MITSUBISHI ELECTRIC

Air-Conditioners OUTDOOR UNIT
MXZ-SM36/48/60NAM
MXZ-SM36/42/48NAMHZ

C ETL LISTED US
Intertek
33223

HFC utilized
R410A

INSTALLATION MANUAL

FOR INSTALLER

For safe and correct use, please read this installation manual thoroughly before installing the air-conditioner unit.

English

MANUEL D'INSTALLATION

POUR L'INSTALLATEUR

Veuillez lire le manuel d'installation en entier avant d'installer ce climatiseur pour éviter tout accident et vous assurer d'une utilisation correcte.

Français

MANUAL DE INSTALACIÓN

PARA EL INSTALADOR

Para un uso seguro y correcto, lea detalladamente este manual de instalación antes de montar la unidad de aire acondicionado.

Español

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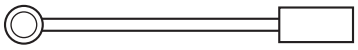
Confirmation of parts attached

In addition to this manual, the following part is supplied with the outdoor unit.
It is used for grounding the S terminal of transmission terminal block TB7.
For detail refers to “6. Electrical work”.



Grounding lead wire

1. Safety precautions

► Before installing the unit, make sure you read all the “Safety precautions”.
► Please report to or take consent by the supply authority before connection to the system.

⚠ Warning:
Describes precautions that must be observed to prevent danger of injury or death to the user.

⚠ Caution:
Describes precautions that must be observed to prevent damage to the unit.

After installation work has been completed, explain the “Safety Precautions” use, and maintenance of the unit to the customer according to the information in the Operation Manual and perform the test run to ensure normal operation. Both the Installation Manual and Operation Manual must be given to the user for keeping. These manuals must be passed on to subsequent users.

⏚ : Indicates a part which must be grounded.

⚠ Warning:
Carefully read the labels affixed to the main unit.

⚠ Warning:

- **The unit must not be installed by the user. Ask a dealer or an authorized technician to install the unit. If the unit is installed incorrectly, water leakage, electric shock, or fire may result.**
- **For installation work, follow the instructions in the Installation Manual and use tools and pipe components specifically made for use with R410A refrigerant.**
- **The R410A refrigerant in the HFC system is pressurized 1.6 times the pressure of usual refrigerants. If pipe components not designed for R410A refrigerant are used and the unit is not installed correctly, the pipes may burst and cause damage or injuries. In addition, water leakage, electric shock, or fire may result.**
- **When installing the unit, use appropriate protective equipment and tools for safety. Failure to do so could cause injuries.**
- **The unit must be installed according to the instructions in order to minimize the risk of damage from earthquakes, typhoons, or strong winds. An incorrectly installed unit may fall down and cause damage or injuries.**
- **The unit must be securely installed on a structure that can sustain its weight. If the unit is mounted on an unstable structure, it may fall down and cause damage or injuries.**
- **If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration in the room from exceeding the safety limit in the event of refrigerant leakage. Consult a dealer regarding the appropriate measures to prevent the allowable concentration from being exceeded. Should the refrigerant leak and cause the concentration limit to be exceeded, hazards due to lack of oxygen in the room may result.**
- **Ventilate the room if refrigerant leaks during operation. If refrigerant comes into contact with a flame, poisonous gases will be released.**
- **All electric work must be performed by a qualified technician according to local regulations and the instructions given in this manual. The units must be powered by dedicated power lines and the correct voltage and circuit breakers must be used. Power lines with insufficient capacity or incorrect electrical work may result in electric shock or fire.**
- **Be sure to connect the power supply cords and the connecting wires for the indoor units, outdoor units, and branch boxes directly to the units (no intermediate connections). Intermediate connections can lead to communication errors if water enters the cords or wires and causes insufficient insulation to ground or a poor electrical contact at the intermediate connection point.**
- **Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. If the pipes are not connected correctly, the unit will not be properly grounded and electric shock may result.**
- **Use only specified cables for wiring. The wiring connections must be made securely with no tension applied on the terminal connections. Also, never splice the cables for wiring (unless otherwise indicated in this document). Failure to observe these instructions may result in overheating or a fire.**
- **The terminal block cover panel of the outdoor unit must be firmly attached. If the cover panel is mounted incorrectly and dust and moisture enter the unit, electric shock or fire may result.**
- **When installing or relocating, or servicing the outdoor unit, use only the specified refrigerant (R410A) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines. If air is mixed with the refrigerant, then it can be the cause of abnormal high pressure in the refrigerant line, and may result in an explosion and other hazards. The use of any refrigerant other than that specified for the system will cause mechanical failure or system malfunction or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety.**
- **Do not perform pump down work when there is a gas leak. The intake of air or other gases causes abnormally high pressure in the refrigeration cycle, which may cause explosion or injury.**
- **Use only authorized accessories and ask a dealer or an authorized technician to install them. If accessories are incorrectly installed, water leakage, electric shock, or fire may result.**
- **Do not alter the unit. Consult a dealer for repairs. If alterations or repairs are not performed correctly, water leakage, electric shock, or fire may result.**
- **The user should never attempt to repair the unit or transfer it to another location. If the unit is installed incorrectly, water leakage, electric shock, or fire may result. If the air conditioner must be repaired or moved, ask a dealer or an authorized technician.**
- **After installation has been completed, check for refrigerant leaks. If refrigerant leaks into the room and comes into contact with the flame of a heater or portable cooking range, poisonous gases will be released.**
- **When opening or closing the valve below freezing temperatures, refrigerant may spurt out from the gap between the valve stem and the valve body, resulting in injuries.**

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1. Safety precautions

1.1. Before installation

⚠ **Caution:**

- **Do not use the unit in an unusual environment. If the air conditioner is installed in areas exposed to steam, volatile oil (including machine oil), or sulfuric gas, areas exposed to high salt content such as the seaside, or areas where the unit will be covered by snow, the performance can be significantly reduced and the internal parts can be damaged.**
- **Do not install the unit where combustible gases may leak, be produced, flow, or accumulate. If combustible gas accumulates around the unit, fire or explosion may result.**
- **The outdoor unit produces condensation during the heating operation. Make sure to provide drainage around the outdoor unit if such condensation is likely to cause damage.**
- **When installing the unit in a hospital or communications office, be prepared for noise and electronic interference. Inverters, home appliances, high-frequency medical equipment, and radio communications equipment can cause the air conditioner to malfunction or breakdown. The air conditioner may also affect medical equipment, disturbing medical care, and communications equipment, harming the screen display quality.**
- **Follow the instructions below to prevent abrasive components contained in sandpaper and cutting tools from entering the refrigerant circuit because those components can cause failures of the compressor and valves.**
  - To deburr pipes, use a reamer or other deburring tools, not sandpaper.
  - To cut pipes, use a pipe cutter, not a grinder or other tools that use abrasive materials.
  - When cutting or deburring pipes, do not allow cutting chips or other foreign matters to enter the pipes.
  - If cutting chips or other foreign matters enter pipes, wipe them off the inside of the pipes.

1.2. Before installation (relocation)

⚠ **Caution:**

- **Be extremely careful when transporting the units. 2 or more persons are needed to handle the unit, as it weighs 20 kg, 44 lbs or more. Do not grasp the packaging bands. Wear protective gloves to remove the unit from the packaging and to move it, as you can injure your hands on the fins or the edge of other parts.**
- **Be sure to safely dispose of the packaging materials. Packaging materials, such as nails and other metal or wooden parts may cause stabs or other injuries.**
- **The base and attachments of the outdoor unit must be periodically checked for looseness, cracks or other damage. If such defects are left uncorrected, the unit may fall down and cause damage or injuries.**
- **Do not clean the air conditioner unit with water. Electric shock may result.**
- **Tighten all flare nuts to specification using a torque wrench. If tightened too much, the flare nut can break after an extended period and refrigerant can leak out.**

1.3. Before electric work

⚠ **Caution:**

- **Be sure to install circuit breakers. If not installed, electric shock may result.**
- **Please follow applicable federal, state, or local codes to prevent potential leakage/electric shock. Or install a ground fault interrupt for the prevention of leakage and electric shock.**
- **For the power lines, use standard cables of sufficient capacity. Otherwise, a short circuit, overheating, or fire may result.**
- **When installing the power lines, do not apply tension to the cables. If the connections are loosened, the cables can snap or break and overheating or fire may result.**
- **Be sure to ground the unit. Do not connect the ground wire to gas or water pipes, lightning rods, or telephone grounding lines. If the unit is not properly grounded, electric shock may result.**
- **Use circuit breakers (ground fault interrupter, isolating switch (+B fuse), and molded case circuit breaker) with the specified capacity. If the circuit breaker capacity is larger than the specified capacity, breakdown or fire may result.**

1.4. Before starting the test run

⚠ **Caution:**

- **Turn on the main power switch more than 12 hours before starting operation. Starting operation just after turning on the power switch can severely damage the internal parts. Keep the main power switch turned on during the operation season.**
- **Before starting operation, check that all panels, guards and other protective parts are correctly installed. Rotating, hot, or high voltage parts can cause injuries.**
- **Do not touch any switch with wet hands. Electric shock may result.**
- **Do not touch the refrigerant pipes with bare hands during operation. The refrigerant pipes are hot or cold depending on the condition of the flowing refrigerant. If you touch the pipes, burns or frostbite may result.**
- **After stopping operation, be sure to wait at least 5 minutes before turning off the main power switch. Otherwise, water leakage or breakdown may result.**

1.5. Using R410A refrigerant air conditioners

⚠ **Caution:**

- **Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. Make sure the insides of the pipes are clean and do not contain any harmful contaminants such as sulfuric compounds, oxidants, debris, or dust. Use pipes with the specified thickness. (Refer to page 6) Note the following if reusing existing pipes that carried R22 refrigerant.**
  - Replace the existing flare nuts and flare the flared sections again.
  - Do not use thin pipes. (Refer to page 6)
- **Store the pipes to be used during installation indoors and keep both ends of the pipes sealed until just before brazing. (Leave elbow joints, etc. in their packaging.) If dust, debris, or moisture enters the refrigerant lines, oil deterioration or compressor breakdown may result.**
- **Use ester oil, ether oil, alkylbenzene oil (small amount) as the refrigeration oil applied to the flared sections. If mineral oil is mixed in the refrigeration oil, oil deterioration may result.**
- **Do not use refrigerant other than R410A refrigerant. If another refrigerant is used, the chlorine will cause the oil to deteriorate.**
- **Use the following tools specifically designed for use with R410A refrigerant. The following tools are necessary to use R410A refrigerant. Contact your nearest dealer for any questions.**

Tools (for R410A)	
Gauge manifold	Flare tool
Charge hose	Size adjustment gauge
Gas leak detector	Vacuum pump adapter
Torque wrench	Electronic refrigerant charging scale

- **Be sure to use the correct tools. If dust, debris, or moisture enters the refrigerant lines, refrigeration oil deterioration may result.**
- **Do not use a charging cylinder. If a charging cylinder is used, the composition of the refrigerant will change and the efficiency will be lowered.**

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2. Installation location

2.1. Refrigerant pipe

Refer to Fig. 4-1.

2.2. Choosing the outdoor unit installation location

- Avoid locations exposed to direct sunlight or other sources of heat.
- Select a location from which noise emitted by the unit will not inconvenience neighbors.
- Select a location permitting easy wiring and pipe access to the power source and indoor unit.
- Avoid locations where combustible gases may leak, be produced, flow, or accumulate.
- Note that water may drain from the unit during operation.
- Select a level location that can bear the weight and vibration of the unit.
- Avoid locations where the unit can be covered by snow. In areas where heavy snow fall is anticipated, special precautions such as raising the installation location or installing a hood on the air intake must be taken to prevent the snow from blocking the air intake or blowing directly against it. This can reduce the airflow and a malfunction may result.
- Avoid locations exposed to oil, steam, or sulfuric gas.
- Use the transportation handles of the outdoor unit to transport the unit. If the unit is carried from the bottom, hands or fingers may be pinched.

2.3. Outline dimensions (Outdoor unit) (Fig. 2-1)

(inch)

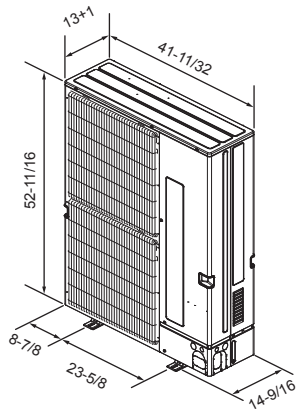

Fig. 2-1

2.4. Constraints on indoor unit installation

You should note that indoor units that can be connected to this outdoor unit are the following constraints.

- Indoor units with model numbers 04-72 can be connected.
- When using Branch box, Indoor units with model numbers 06-36 can be connected.
- Refer to the table 1 below for possible room, indoor unit combinations.

Verification

The rated capacity should be determined by observing the table below. The unit's quantities are limited as shown in the following table 2. For the next step, make sure that the total rated capacity selected will stay in a range of 50% – 130% of the outdoor unit capacity.

- MXZ-SM36 18 – 46 kBtu/h
- MXZ-SM42 21 – 54 kBtu/h
- MXZ-SM48 24 – 62 kBtu/h
- MXZ-SM60 30 – 78 kBtu/h

Table 1-1: City Multi indoor units (P·FY series)

Indoor unit type	P04	P05	P06	P08	P12	P15	P18	P24	P30	P36	P48	P54	P72
Rated capacity (Cooling) (kBtu/h)	4	5	6	8	12	15	18	24	30	36	48	54	72

Table 1-2: M series, P series, S series

Model No.	06	09	12	15	18	24	30	36
Rated capacity (Cooling) (kBtu/h)	6	9	12	15	18	24	30	36

Combinations in which the total capacity of indoor units exceeds the capacity of the outdoor unit will reduce the cooling capacity of each indoor unit below their rated cooling capacity. Thus, combine indoor units with an outdoor unit within the outdoor unit's capacity, if possible.

Table 2: Connectable indoor units quantities

- City Multi indoor units

SM36	1-11
SM42	1-12
SM48	1-12
SM60	1-12

- Branch Box system (M, S, P series indoor units via Branch box)

SM36	2*1 – 4 (3) units *2 *3 *4
SM42	2*1 – 5 (4) units *2 *3 *4
SM48	2*1 – 8 (6) units *2 *3 *4
SM60	2*1 – 8 (6) units *2 *3 *5

*1 Only one unit connection is possible with SVZ-series unit.

*2 The number enclosed in parentheses is the maximum number of units that can be connected when 1 or more PLA-A·EA7 units is connected.

*3 When connecting a SVZ-series unit(s), set additional constraints as follows. For connections other than those specified below, consult your dealer.

Number of connecting SVZ-series unit	Constraints (For each connected branch box)
2	Any indoor units other than SVZ-series units are not connectable.
1	• The total rated capacity (cooling) should be 100% or below including the SVZ-series unit (only SM60). • Only 1 SEZ or 1 PEAD can be included in the connection.

*4 A branch box can connect to maximum 3 of the SEZ/PEAD-series units.

*5 A branch box can connect to maximum 2 of the SEZ/PEAD-series units. When connecting with 1 and over 1 of the SEZ/PEAD-series units, the total rated capacity (cooling) including of the SEZ/PEAD is 100% and below 100%

For connections other than those specified in 1 and 2, including connections with SVZ-series units, consult a dealer.

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2. Installation location

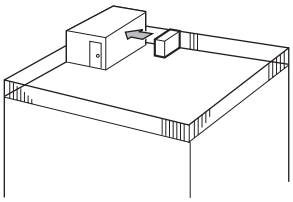

Fig. 2-2

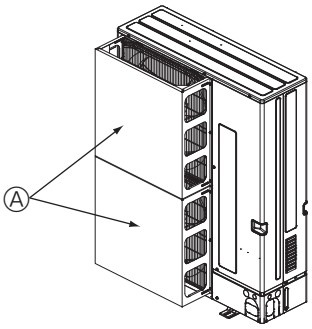

Fig. 2-3

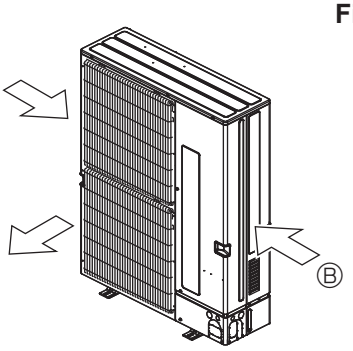

Fig. 2-4

2.5. Ventilation and service space

Note:

The dimensions given along the arrows above are required to guarantee the air conditioner's performance. Install the unit in as wide a place as possible for later service or repairs.

2.5.1. Windy location installation

When installing the outdoor unit on a rooftop or other location unprotected from the wind, situate the air outlet of the unit so that it is not directly exposed to strong winds. Strong wind entering the air outlet may impede the normal airflow and a malfunction may result.

The following shows three examples of precautions against strong winds.

① Face the air outlet towards the nearest available wall about 50 cm (19-11/16") away from the wall. (Fig. 2-2)

② Install an optional wind baffle if the unit is installed in a location where strong winds from a typhoon, etc. may directly enter the air outlet. (Fig. 2-3)
Ⓐ Wind baffle

③ Position the unit so that the air outlet blows perpendicularly to the seasonal wind direction, if possible. (Fig. 2-4)
Ⓑ Wind direction

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2. Installation location

(inch)

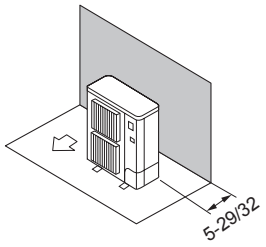

Fig. 2-5

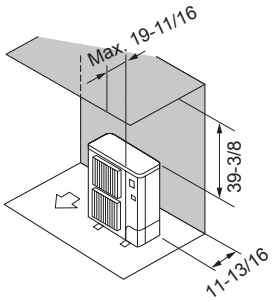

Fig. 2-6

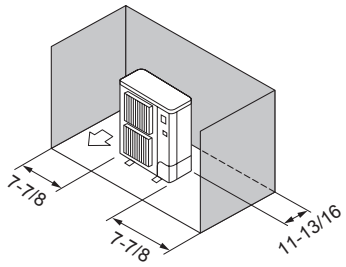

Fig. 2-7

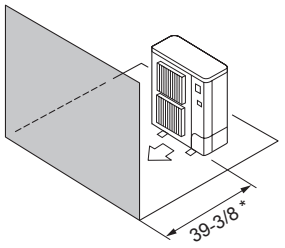

Fig. 2-8

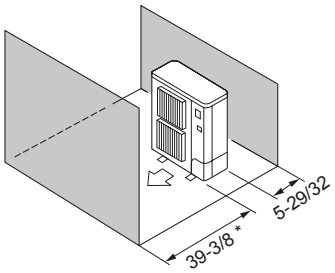

Fig. 2-9

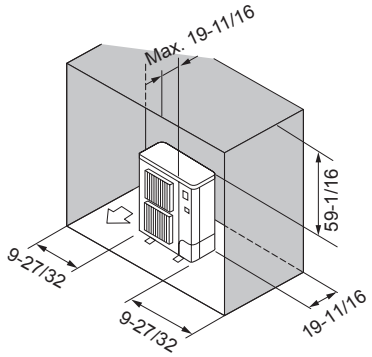

Fig. 2-10

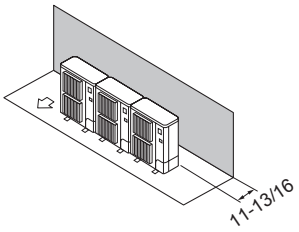

Fig. 2-11

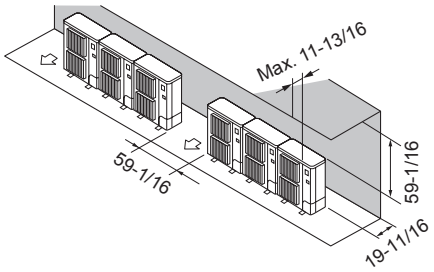

Fig. 2-12

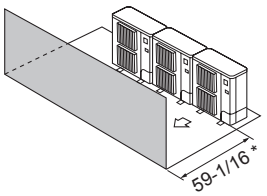

Fig. 2-13

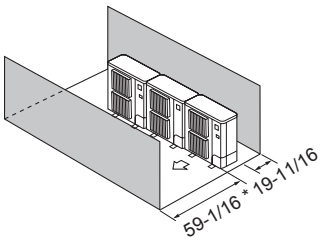

Fig. 2-14

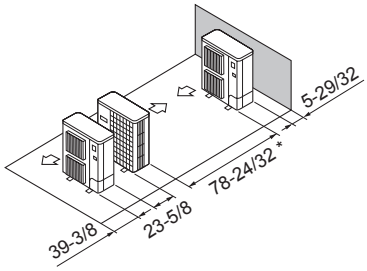

Fig. 2-15

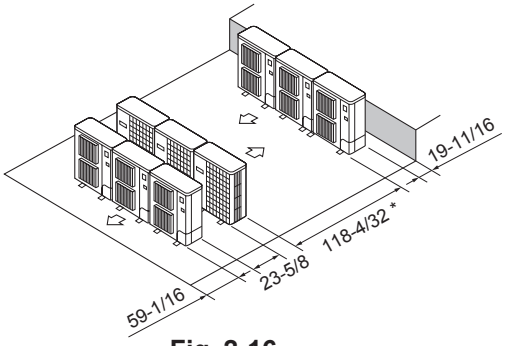

Fig. 2-16

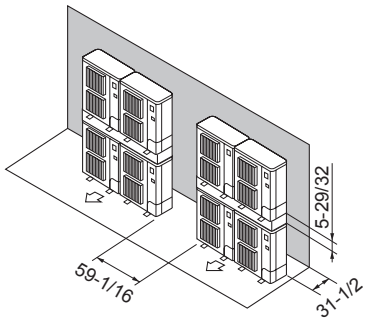

Fig. 2-17

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2.5.2. When installing a single outdoor unit

Minimum dimensions are as follows, except for Max., meaning Maximum dimensions, indicated.

Refer to the figures for each case.

① Obstacles at rear (Fig. 2-5)

② Obstacles at rear and above (Fig. 2-6)

③ Obstacles at rear and sides (Fig. 2-7)

④ Obstacles at front (Fig. 2-8)

* When using the optional air outlet guides, the clearance is 19-11/16" (500 mm) or more.

⑤ Obstacles at front and rear (Fig. 2-9)

* When using the optional air outlet guides, the clearance is 19-11/16" (500 mm) or more.

⑥ Obstacles at rear, sides, and above (Fig. 2-10)

• Do not install the optional air outlet guides for upward airflow.

2.5.3. When installing multiple outdoor units

Leave 1" (25 mm) space or more between the units.

① Obstacles at rear (Fig. 2-11)

② Obstacles at rear and above (Fig. 2-12)

• No more than 3 units must be installed side by side. In addition, leave space as shown.

• Do not install the optional air outlet guides for upward airflow.

③ Obstacles at front (Fig. 2-13)

* When using the optional air outlet guides, the clearance is 39-3/8" (1000 mm) or more.

④ Obstacles at front and rear (Fig. 2-14)

* When using the optional air outlet guides, the clearance is 39-3/8" (1000 mm) or more.

⑤ Single parallel unit arrangement (Fig. 2-15)

* When using the optional air outlet guides installed for upward airflow, the clearance is 39-3/8" (1000 mm) or more.

⑥ Multiple parallel unit arrangement (Fig. 2-16)

* When using the optional air outlet guides installed for upward airflow, the clearance is 59-1/16" (1500 mm) or more.

⑦ Stacked unit arrangement (Fig. 2-17)

• The units can be stacked up to 2 units high.

• No more than 2 stacked units must be installed side by side. In addition, leave space as shown.

3. Installing the outdoor unit

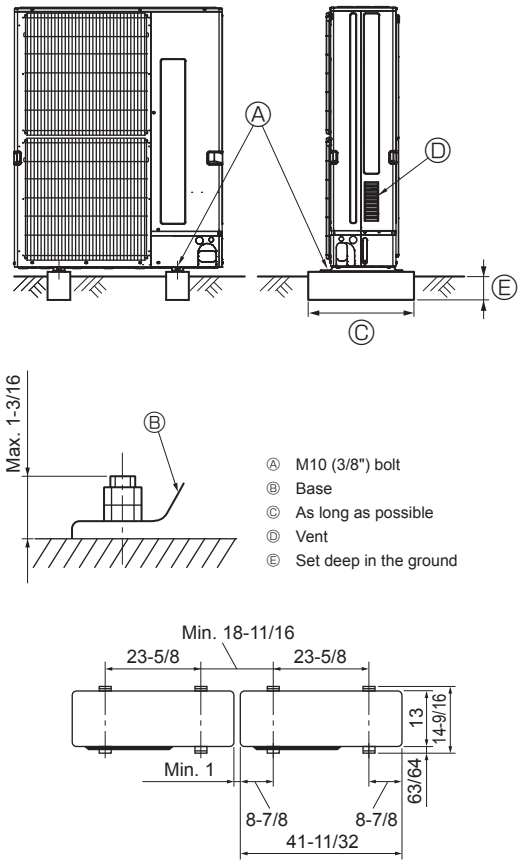


Fig. 3-1

- Be sure to install the unit in a sturdy, level surface to prevent rattling noises during operation. (Fig. 3-1)

<Foundation specifications>

Foundation bolt	M10 (3/8")
Thickness of concrete	120 mm (4-23/32")
Length of bolt	70 mm (2-3/4")
Weight-bearing capacity	320 kg (705 lbs)

- Make sure that the length of the foundation bolt is within 30 mm (1-3/16") of the bottom surface of the base.
- Secure the base of the unit firmly with four-M10 foundation bolts in sturdy locations.

Installing the outdoor unit

- Do not block the vent. If the vent is blocked, operation will be hindered and breakdown may result.
- In addition to the unit base, use the installation holes on the back of the unit to attach wires, etc., if necessary to install the unit. Use self-tapping screws (ø5 × 15 mm, ø13/16" × 19/32" or less) and install on site.

⚠ Warning:

- **The unit must be securely installed on a structure that can sustain its weight. If the unit is mounted on an unstable structure, it may fall down and cause damage or injuries.**
- **The unit must be installed according to the instructions in order to minimize the risk of damage from earthquakes, typhoons, or strong winds. An incorrectly installed unit may fall down and cause damage or injuries.**

⚠ Caution:

- **Install the unit on a rigid structure to prevent excessive operation sound or vibration.**

4. Installing the refrigerant piping

4.1. Precautions for devices that use R410A refrigerant

- Refer to page 2 for precautions not included below on using air conditioners with R410A refrigerant.
- Use ester oil, ether oil, alkylbenzene oil (small amount) as the refrigeration oil applied to the flared sections.
- Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. Use refrigerant pipes with the thicknesses specified in the table to the below. Make sure the insides of the pipes are clean and do not contain any harmful contaminants such as sulfuric compounds, oxidants, debris, or dust.

⚠ Warning:

When installing or relocating, or servicing the outdoor unit, use only the specified refrigerant (R410A) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines.
If air is mixed with the refrigerant, then it can be the cause of abnormal high pressure in the refrigerant line, and may result in an explosion and other hazards.
The use of any refrigerant other than that specified for the system will cause mechanical failure or system malfunction or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety.

ø6.35 mm (1/4 inch), ø9.52 mm (3/8 inch), ø12.7 mm (1/2 inch)	Thickness 0.8 mm (1/32 inch)
ø15.88 mm (5/8 inch), ø19.05 mm (3/4 inch)	Thickness 1.0 mm (5/128 inch)

- Do not use pipes thinner than those specified above.
- **The thicknesses listed in the table above are based on Japanese standards. Use pipes with a maximum working pressure of 4.15 MPa [601 PSIG] or higher according to local standards.**

⚠ Caution:

Follow the instructions below to prevent abrasive components contained in sandpaper and cutting tools from entering the refrigerant circuit because those components can cause failures of the compressor and valves.

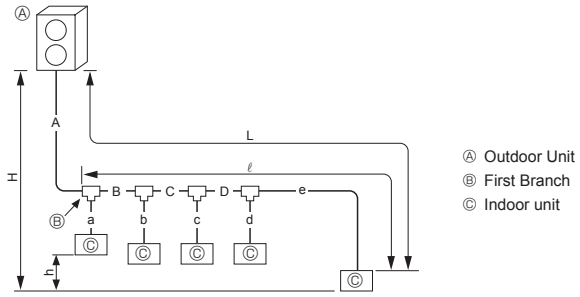
- **To deburr pipes, use a reamer or other deburring tools, not sandpaper.**
- **To cut pipes, use a pipe cutter, not a grinder or other tools that use abrasive materials.**
- **When cutting or deburring pipes, do not allow cutting chips or other foreign matters to enter the pipes.**
- **If cutting chips or other foreign matters enter pipes, wipe them off the inside of the pipes.**

en

4. Installing the refrigerant piping

4.2. Pipe length and height difference

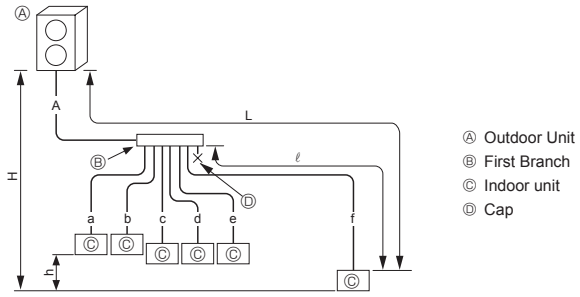
4.2.1. Connection without Branch Box (Fig. 4-1)



Ⓐ Outdoor Unit
Ⓑ First Branch
Ⓒ Indoor unit

		SM36/42/48	SM60
A+B+C+D+a+b+c+d+e		≦ 300 m [984 ft]	≦ 150 m [492 ft]
L = A+B+C+D+e		≦ 150 m [492 ft]	≦ 80 m [262 ft]
ℓ = B+C+D+e		≦ 30 m [98 ft]	
H	Outdoor higher	≦ 50 m [164 ft]	
	Outdoor lower	≦ 40 m [131 ft]*	≦ 40 m [131 ft]
h		≦ 15 m [49 ft]	

* When PKFY-P06NBMU, PKFY-P08NHMU, PKFY-P04/06/08/12NLMU, PFFY-P06/08/12NEMU, or PFFY-P06/08/12NRMU is included, use within 30 m [98 ft].



Ⓐ Outdoor Unit
Ⓑ First Branch
Ⓒ Indoor unit
Ⓓ Cap

		SM36/42/48	SM60
A+a+b+c+d+e+f		≦ 300 m [984 ft]	≦ 150 m [492 ft]
L = A+f		≦ 150 m [492 ft]	≦ 80 m [262 ft]
ℓ = f		≦ 30 m [98 ft]	
H	Outdoor higher	≦ 50 m [164 ft]	
	Outdoor lower	≦ 40 m [131 ft]*	≦ 40 m [131 ft]
h		≦ 15 m [49 ft]	

* When PKFY-P06NBMU, PKFY-P08NHMU, PKFY-P04/06/08/12NLMU, PFFY-P06/08/12NEMU, or PFFY-P06/08/12NRMU is included, use within 30 m [98 ft].

Fig. 4-1

Conversion formula

1/4 F	ø6.35 (1/4)
3/8 F	ø9.52 (3/8)
1/2 F	ø12.7 (1/2)
5/8 F	ø15.88 (5/8)
3/4 F	ø19.05 (3/4)

A, B, C, D (mm [inch])

	Liquid pipe	Gas pipe
SM36/42/48	ø9.52 [3/8]	ø15.88 [5/8]
SM60		ø19.05 [3/4]

a, b, c, d, e, f (mm [inch])

Model number	Liquid pipe	Gas pipe
04, 05, 06, 08, 12, 15, 18	ø6.35 [1/4]	ø12.7 [1/2]
24, 27, 30, 36, 48, 54	ø9.52 [3/8]	ø15.88 [5/8]
72	ø9.52 [3/8]	ø19.05 [3/4]

Branch kit model
CMY-Y62-G-E

4-Branching header	8-Branching header
CMY-Y64-G-E	CMY-Y68-G-E

Piping preparation

① Table below shows the specifications of pipes commercially available.

Outside diameter mm (inch)	Insulation thickness mm (inch)	Insulation material
6.35 (1/4)	8 (5/16)	Heat resisting foam plastic 0.045 specific gravity
9.52 (3/8)	8 (5/16)	
12.7 (1/2)	8 (5/16)	
15.88 (5/8)	8 (5/16)	
19.05 (3/4)	8 (5/16)	

② Ensure that the 2 refrigerant pipes are insulated to prevent condensation.
③ Refrigerant pipe bending radius must be 4" (100 mm) or more.

⚠ Caution:
Be sure to use the insulation of specified thickness. Excessive thickness may cause incorrect installation of the indoor unit and lack of thickness may cause dew drippage.

⚠ Warning:
When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes. The compressor may burst and cause injury if any foreign substance, such as air, enters the system.

en

4. Installing the refrigerant piping

4.2.2. Connection with Branch Box (Fig. 4-2)

- This unit has flared connections on each indoor unit and branch box and outdoor unit sides.
- Remove the valve cover of the outdoor unit, then connect the pipe.
- Refrigerant pipes are used to connect the branch box and outdoor unit.

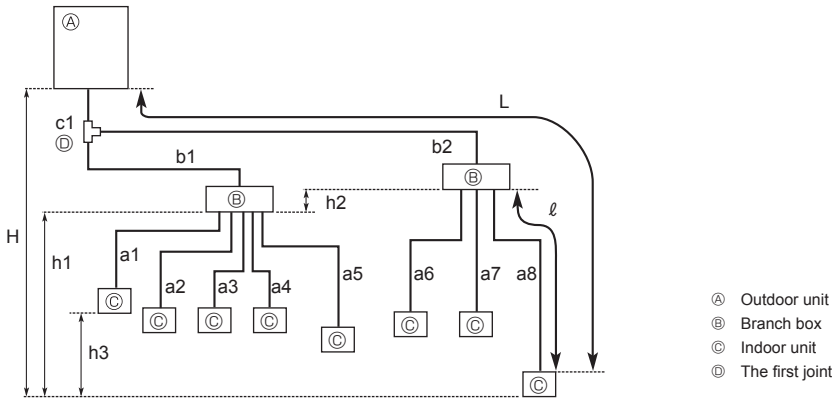


Fig. 4-2

Permissible length (one-way)	Total piping length	c1 + b1 + b2 + a1 + a2 + a3 + a4 + a5 + a6 + a7 + a8 ≤ 150 m (492 ft.)
	Farthest piping length (L) *1	c1 + b2 + a8 ≤ 80 m (262 ft.)
	Piping length between outdoor unit and branch boxes	c1 + b1 + b2 ≤ 55 m (180 ft.)
	Farthest branch box from the first joint (b2)	b2 ≤ 30 m (98 ft.)
	Farthest piping length after branch box (ℓ)	a8 ≤ 25 m (82 ft.)
	Total piping length between branch boxes and indoor units	a1 + a2 + a3 + a4 + a5 + a6 + a7 + a8 ≤ 95 m (311 ft.)
Permissible height difference (one-way)	In indoor/outdoor section (H) *2	H ≤ 50 m (164 ft.) (In case of outdoor unit is set higher than indoor unit)
		H ≤ 40 m (131 ft.) (In case of outdoor unit is set lower than indoor unit)
	In branch box/indoor unit section (h1)	h1 + h2 ≤ 15 m (49 ft.)
	In each branch unit (h2)	h2 ≤ 15 m (49 ft.)
	In each indoor unit (h3)	h3 ≤ 12 m (39 ft.)
Number of bends		| c1 + b1 + a1 |, | c1 + b1 + a2 |, | c1 + b1 + a3 |, | c1 + b1 + a4 |, | c1 + b1 + a5 |, | c1 + b2 + a6 |, | c1 + b2 + a7 |, | c1 + b2 + a8 | ≤ 15

*1 The piping specification table does not provide a minimum line set length. However, indoor units with connected piping length less than 16 ft. (5 m) could produce intermittent noise during normal system operation in very quiet environments. Please be aware of this important information when installing and locating the indoor unit within the conditioned space.

*2 Branch box should be placed within the level between the outdoor unit and indoor units.

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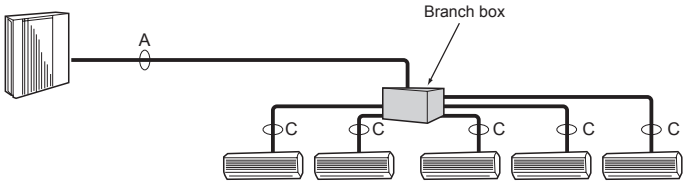
4. Installing the refrigerant piping

■ **In case of using 1-branch box**

Flare connection employed. (No. brazing)



■ **In case of using 2-branch boxes**

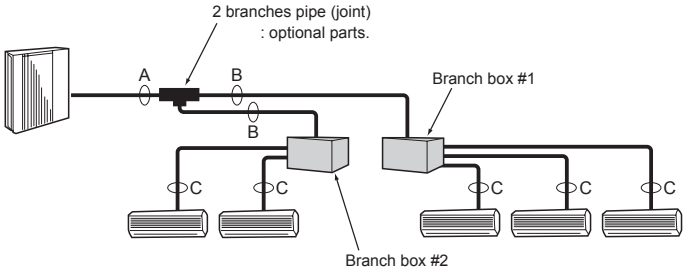


Fig. 4-3

Refrigerant pipe flared connection of branch box mm (inch)

	To indoor unit					To outdoor unit
	A	B	C	D	E	
Liquid pipe	ø6.35 (1/4)	ø6.35 (1/4)	ø6.35 (1/4)	ø6.35 (1/4)	ø6.35 (1/4)	ø9.52 (3/8)
Gas pipe	ø9.52 (3/8)	ø9.52 (3/8)	ø9.52 (3/8)	ø9.52 (3/8)	ø12.7 (1/2)	ø15.88 (5/8)

* 3-branch type : only A, B, C

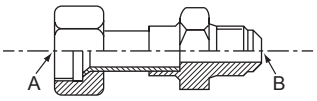


Fig. 4-4

Conversion formula

1/4 F	ø6.35 (1/4)
3/8 F	ø9.52 (3/8)
1/2 F	ø12.7 (1/2)
5/8 F	ø15.88 (5/8)
3/4 F	ø19.05 (3/4)

Pipe size

A

	Liquid pipe	Gas pipe
SM36	ø9.52 (3/8)	ø15.88 (5/8)
SM42		
SM48		
SM60		ø19.05 (3/4)

B

• SM36/42/48

Liquid pipe	Gas pipe
ø9.52 (3/8)	ø15.88 (5/8)

• SM60

Total capacity of indoor units	Liquid pipe	Gas pipe
– 54 kBtu/h	ø9.52 (3/8)	ø15.88 (5/8)
54 kBtu/h –	ø9.52 (3/8)	ø19.05 (3/4)

C

The piping connection size differs according to the type and capacity of indoor units. Match the piping connection size of branch box with indoor unit.

If the piping connection size of branch box does not match the piping connection size of indoor unit, use optional different-diameter (deformed) joints to the branch box side. (Connect deformed joint directly to the branch box side.)

■ **Pipe size (Branch box-Indoor unit) *Case of M series or S series Indoor unit**

Indoor unit type	(Btu/h)	06	09	12	15	18	24	30	36
Pipe size (mm (inch))	Liquid	ø6.35 (1/4)	ø6.35 (1/4)	ø6.35 (1/4)	ø6.35 (1/4)	ø6.35 (1/4)	ø9.52 (3/8)	ø9.52 (3/8)	ø9.52 (3/8)
	Gas	ø9.52 (3/8)	ø9.52 (3/8)	ø9.52 (3/8)	ø12.7 (1/2)	ø12.7 (1/2)	ø15.88 (5/8)	ø15.88 (5/8)	ø15.88 (5/8)

■ **Pipe size (Branch box-Indoor unit) *Case of P series indoor unit**

Indoor unit type	(Btu/h)	09	12	15	18	24	30	36
Pipe size (mm (inch))	Liquid	ø6.35 (1/4)	ø6.35 (1/4)	ø6.35 (1/4)	ø6.35 (1/4)	ø9.52 (3/8)	ø9.52 (3/8)	ø9.52 (3/8)
	Gas	ø9.52 (3/8)	ø12.7 (1/2)	ø12.7 (1/2)	ø12.7 (1/2)	ø15.88 (5/8)	ø15.88 (5/8)	ø15.88 (5/8)

The lineup of a connectable indoor unit depends on a district/areas/country.

Different-diameter joint (optional parts) (Fig. 4-4)

Model name	Connected pipes diameter	Diameter A	Diameter B
	mm (inch)	mm (inch)	mm (inch)
MAC-A454JP-E	ø9.52 (3/8) → ø12.7 (1/2)	ø9.52 (3/8)	ø12.7 (1/2)
MAC-A455JP-E	ø12.7 (1/2) → ø9.52 (3/8)	ø12.7 (1/2)	ø9.52 (3/8)
MAC-A456JP-E	ø12.7 (1/2) → ø15.88 (5/8)	ø12.7 (1/2)	ø15.88 (5/8)
PAC-493PI	ø6.35 (1/4) → ø9.52 (3/8)	ø6.35 (1/4)	ø9.52 (3/8)
PAC-SG76RJ-E	ø9.52 (3/8) → ø15.88 (5/8)	ø9.52 (3/8)	ø15.88 (5/8)
PAC-SG75RJ-E	ø15.88 (5/8) → ø19.05 (3/4)	ø15.88 (5/8)	ø19.05 (3/4)

Piping preparation

① Table below shows the specifications of pipes commercially available.

Outside diameter	Insulation thickness	Insulation material
mm (inch)	mm (inch)	
6.35 (1/4)	8 (5/16)	Heat resisting foam plastic 0.045 specific gravity
9.52 (3/8)	8 (5/16)	
12.7 (1/2)	8 (5/16)	
15.88 (5/8)	8 (5/16)	
19.05 (3/4)	8 (5/16)	

② Ensure that the 2 refrigerant pipes are insulated to prevent condensation.

③ Refrigerant pipe bending radius must be 4” (100 mm) or more.

⚠ **Caution:**

Be sure to use the insulation of specified thickness. Excessive thickness may cause incorrect installation of the indoor unit and branch box, and lack of thickness may cause dew drippage.

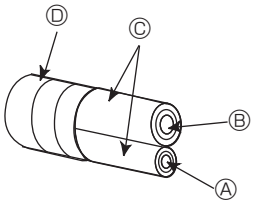
2-branch pipe (Joint): Optional parts (According to the connection method, you can choose the favorite one.)

Model name	Connection method
MSDD-50AR-E	flare
MSDD-50BR-E	brazing

■ **Installation procedure (2 branches pipe (Joint))**

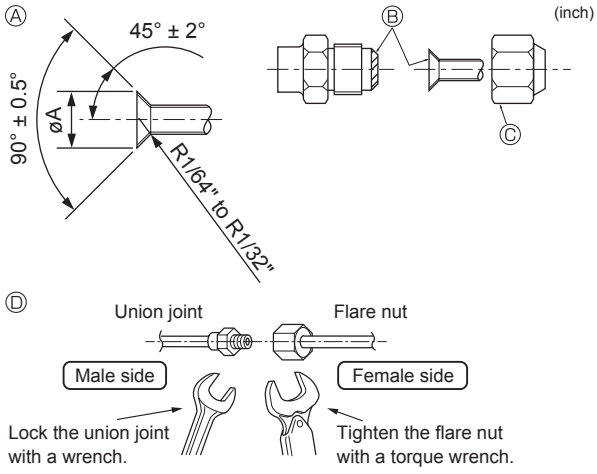
Refer to the installation manuals of MSDD-50AR-E and MSDD-50BR-E.

en



Ⓐ Liquid pipe
Ⓑ Gas pipe
Ⓒ Insulation
Ⓓ Taping

Fig. 4-5



Ⓐ Flare cutting dimensions
Ⓓ Flare nut tightening torque

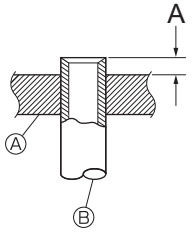
Fig. 4-6

Ⓐ (Fig. 4-6)

Copper pipe O.D. (mm) (inch)	Flare dimensions øA dimensions (mm) (inch)
ø6.35 (1/4)	8.7 - 9.1 (5/16 - 3/8)
ø9.52 (3/8)	12.8 - 13.2 (1/2 - 33/64)
ø12.7 (1/2)	16.2 - 16.6 (41/64 - 21/32)
ø15.88 (5/8)	19.3 - 19.7 (49/64 - 25/32)
ø19.05 (3/4)	23.6 - 24.0 (15/16 - 61/64)

Copper pipe O.D. (mm) (inch)	Flare nut O.D. (mm) (inch)	Tightening torque (N·m)* (ft·lbs)
ø6.35 (1/4)	17 (43/64)	14 - 18 (10 - 13)
ø6.35 (1/4)	22 (7/8)	34 - 42 (25 - 30)
ø9.52 (3/8)	22 (7/8)	34 - 42 (25 - 30)
ø9.52 (3/8)	26 (1-3/64)	49 - 61 (35 - 44)
ø12.7 (1/2)	26 (1-3/64)	49 - 61 (35 - 44)
ø12.7 (1/2)	29 (1-9/64)	68 - 82 (49 - 59)
ø15.88 (5/8)	29 (1-9/64)	68 - 82 (49 - 59)
ø15.88 (5/8)	36 (1-27/64)	100 - 120 (71 - 87)
ø19.05 (3/4)	36 (1-27/64)	100 - 120 (71 - 87)

* 1 N·m≒10 kgf·cm



Ⓐ Die
Ⓑ Copper pipe

Fig. 4-7

4.3. Connecting pipes (Fig. 4-5) (Fig. 4-6)

- Conduct sufficient anti-condensation and insulation work to prevent water dripping from the refrigerant piping. (liquid pipe/gas pipe)
- Increase insulation depending on the environment where the refrigerant piping is installed, or condensation may occur on the surface of the insulation material. (Insulation material Heat-resistant temperature: 120 °C, 248 °F, Thickness: 15 mm, 5/8 inch or more)
  * When the refrigerant piping is used in locations subject to high temperature and humidity such as in the attic, further addition of insulation may be required.
- To insulate the refrigerant piping, apply heat-resistant polyethylene foam between the indoor unit and insulation material as well as to the net between the insulation material filling all gaps.
  (Condensation forming on the piping may result in condensation in the room or burns when contacting the piping.)
- The indoor parts of the drain pipe should be wrapped with polyethylene foam insulation materials (specific gravity of 0.03, thickness of 9 mm (3/8 inch) or more).

[Fig. 4-6]

- Apply thin layer of refrigerant oil to pipe and joint seating surface before tightening flare nut. Ⓐ
- Apply refrigerating machine oil over the entire flare seat surface. Ⓑ
- Use the flare nuts as follows. Ⓒ
- For connection, first align the center, then tighten the first 3 to 4 turns of flare nut by hand.
- Use 2 wrenches to tighten piping connections. Ⓓ
- Use leak detector or soapy water to check for gas leaks after connections are completed.
- When bending the pipes, be careful not to break them. Bend radius of 100 mm (4 inch) to 150 mm (6 inch) are sufficient.
- Make sure the pipes do not contact the compressor. Abnormal noise or vibration may result.

① Pipes must be connected starting from the indoor unit.
Flare nuts must be tightened with a torque wrench.
② Flare the liquid pipes and gas pipes and apply a thin layer of refrigeration oil (Applied on site).

- When usual pipe sealing is used, refer to Table 2 for flaring of R410A refrigerant pipes.
  The size adjustment gauge can be used to confirm A measurements.

⚠ **Warning:**
When installing the unit, securely connect the refrigerant pipes before starting the compressor.

⚠ **Caution:**
- **Be sure to wrap insulation around the piping. Direct contact with the bare piping may result in burns or frostbite.**

Table 2 (Fig. 4-7) mm (inch)

Copper pipe O.D.	A	
	Flare tool for R410A	Flare tool for R22·R407C
	Clutch type	
ø6.35 (1/4)	0 - 0.5 (0 - 1/64)	1.0 - 1.5 (3/64 - 1/16)
ø9.52 (3/8)	0 - 0.5 (0 - 1/64)	1.0 - 1.5 (3/64 - 1/16)
ø12.7 (1/2)	0 - 0.5 (0 - 1/64)	1.0 - 1.5 (3/64 - 1/16)
ø15.88 (5/8)	0 - 0.5 (0 - 1/64)	1.0 - 1.5 (3/64 - 1/16)
ø19.05 (3/4)	0 - 0.5 (0 - 1/64)	1.0 - 1.5 (3/64 - 1/16)

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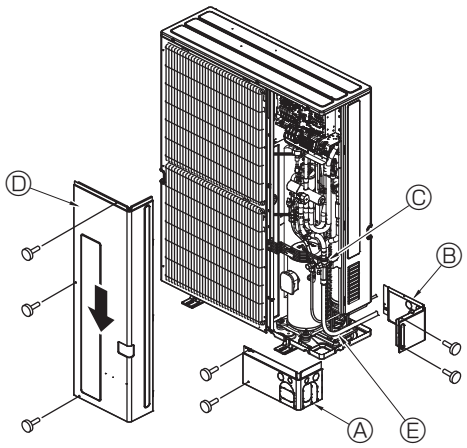
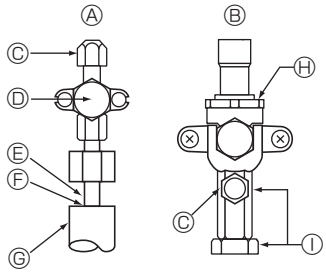


Ⓐ Front piping cover
Ⓑ Piping cover
Ⓒ Stop valve
Ⓓ Service panel
Ⓔ Bend radius : 100 mm - 150 mm (3-15/16″ – 5-7/8″)

Fig. 4-8



Ⓐ Stop valve <Liquid side>
Ⓑ Stop valve <Gas side>
Ⓒ Service port
Ⓓ Open/Close section
Ⓔ Local pipe
Ⓕ Sealed, same way for gas side
Ⓖ Pipe cover
Ⓗ Do not use a wrench here. Refrigerant leakage may result.
Ⓘ Use two wrenches here.

Fig. 4-9

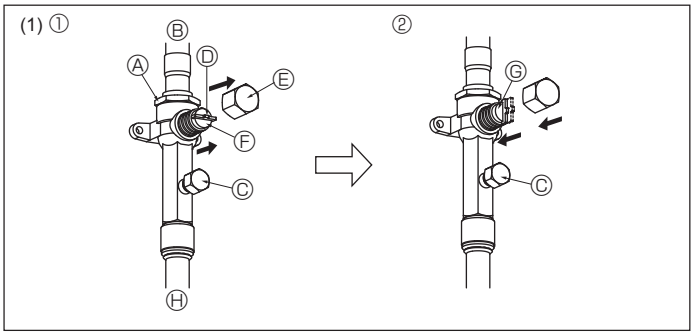


Fig. 4-10

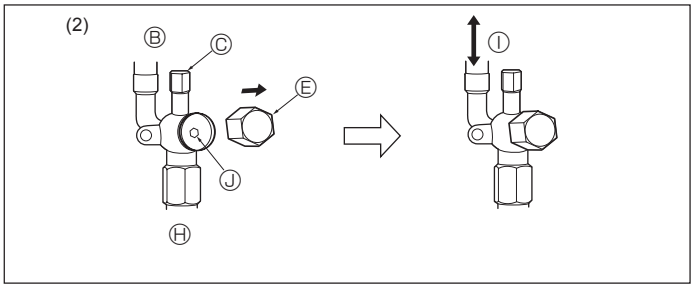


Fig. 4-11

Ⓐ Valve body
Ⓑ Unit side
Ⓒ Service port
Ⓓ Handle
Ⓔ Cap
Ⓕ Completely closed
Ⓖ Completely open
Ⓗ Refrigerant piping side (On-site installation)
Ⓘ Direction the refrigerant flows in
Ⓙ Valve stem

4.4. Refrigerant piping (Fig. 4-8)

Remove the service panel Ⓓ (three screws) and the front piping cover Ⓐ (two screws) and rear piping cover Ⓑ (two screws).

① Perform refrigerant piping connections for the indoor/outdoor unit when the outdoor unit's stop valve is completely closed.

② Vacuum-purge air from the indoor unit and the connection piping.

Evacuation

Evacuate with the valve of the outdoor unit closed and evacuate both the connection piping and the indoor unit from the service port provided on the valve of the outdoor unit using a vacuum pump. (Always evacuate from the service port of both liquid pipe and gas pipe.) After the vacuum reaches 650 Pa [abs] [0.0943 psi/5 Torr], continue evacuation for at least one hour or more. Then, stop the vacuum pump and leave it for 1 hour. Ensure the degree of vacuum has not increased. **(If the degree of vacuum increase is larger than 130 Pa [0.01886 psi/1.0 Torr], water might have entered. Apply pressure to dry nitrogen gas up to 0.05 MPa [7.25 psi] and vacuum again.)** Finally, seal in with the liquid refrigerant through the liquid pipe, and adjust the gas piping to obtain an appropriate amount of the refrigerant during operation.

* Never perform air purging using refrigerant.

③ After connecting the refrigerant pipes, check the connected pipes and the indoor unit for gas leaks. (Refer to 4.5. Refrigerant pipe airtight testing method)

④ Vacuumize the refrigerant lines through the service port of the liquid and gas stop valves. And then open the stop valves completely (for both the liquid and gas stop valves). This will completely connect the refrigerant lines of the indoor and outdoor units.

- If the stop valves are left closed and the unit is operated, the compressor and control valves will be damaged.
- Use a leak detector or soapy water to check for gas leaks at the pipe connection sections of the outdoor unit.
- Do not use the refrigerant from the unit to purge air from the refrigerant lines.
- After the valve work is completed, tighten the valve caps to the correct torque: 20 to 25 N·m [14 to 18 ft·lbs] (200 to 250 kgf·cm).
  Failure to replace and tighten the caps may result in refrigerant leakage. In addition, do not damage the insides of the valve caps as they act as a seal to prevent refrigerant leakage.

⑤ Use sealant to seal the ends of the thermal insulation around the pipe connection sections to prevent water from entering the thermal insulation.

Refrigerant pipes are protectively wrapped

•The pipes can be protectively wrapped up to a diameter of ø90 mm (3-9/16") before or after connecting the pipes. Cut out the knockout in the pipe cover following the groove and wrap the pipes.

Pipe inlet gap

• Use putty or sealant to seal the pipe inlet around the pipes so that no gaps remain. (If the gaps are not closed, noise may be emitted or water and dust will enter the unit and breakdown may result.)

Note:

<Triple Evacuation>

- Evacuate the system to 4,000 microns from both service valves. System manifold gauges must not be used to measure vacuum. A micron gauge must be used at all times.
  - Break the vacuum with Nitrogen (N2) into the discharge service valve to 0 PSIG.
- Evacuate the system to 1,500 microns from the suction service valve.
  - Break the vacuum with Nitrogen (N2) into the discharge service valve to 0 PSIG.
- Evacuate the system to 500 microns. System must hold the vacuum at 500 microns for a minimum of 1 hour.
- Conduct a rise test for a minimum of 30 minutes.

4.5. Refrigerant pipe airtight testing method

(1) Connect the testing tools.
- Make sure the stop valves Ⓐ Ⓑ are closed and do not open them.
- Add pressure to the refrigerant lines through the service port Ⓒ of the liquid stop valve Ⓐ and the gas stop valve Ⓑ.

(2) Do not add pressure to the specified pressure all at once; add pressure little by little.
① Pressurize to 0.5 MPa [73 PSIG], wait five minutes, and make sure the pressure does not decrease.
② Pressurize to 1.5 MPa [218 PSIG], wait five minutes, and make sure the pressure does not decrease.
③ Pressurize to 4.15 MPa [601 PSIG] and measure the surrounding temperature and refrigerant pressure.

(3) If the specified pressure holds for about one day and does not decrease, the pipes have passed the test and there are no leaks.
- If the surrounding temperature changes by 1°C [1.8°F], the pressure will change by about 0.01 MPa [1.5 PSIG]. Make the necessary corrections.

(4) If the pressure decreases in steps (2) or (3), there is a gas leak. Look for the source of the gas leak.

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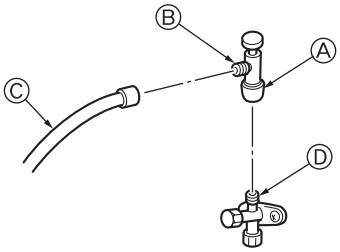
4. Installing the refrigerant piping



* The figure to the left is an example only.
The stop valve shape, service port position, etc., may vary according to the model.
* Turn section Ⓐ only.
(Do not further tighten sections Ⓐ and Ⓑ together.)

Ⓒ Charge hose
Ⓓ Service port

Fig. 4-12

4.6. Stop valve opening method

The stop valve opening method varies according to the outdoor unit model. Use the appropriate method to open the stop valves.
(1) Gas side (Fig. 4-10)
① Remove the cap, pull the handle toward you and rotate 1/4 turn in a counterclockwise direction to open.
② Make sure that the stop valve is open completely, push in the handle and rotate the cap back to its original position.
(2) Liquid side (Fig. 4-11)
① Remove the cap and turn the valve rod counterclockwise as far as it will go with the use of a 4 mm [3/16"] hexagonal wrench. Stop turning when it hits the stopper.
② Make sure that the stop valve is open completely and rotate the cap back to its original position.

Precautions when using the charge valve (Fig. 4-12)
Do not tighten the service port too much when installing it, otherwise, the valve core could be deformed and become loose, causing a gas leak.
After positioning section Ⓑ in the desired direction, turn section Ⓐ only and tighten it. Do not further tighten sections Ⓐ and Ⓑ together after tightening section Ⓐ.

⚠ Warning:
- **When opening or closing the valve below freezing temperatures, refrigerant may spurt out from the gap between the valve stem and the valve body, resulting in injuries.**
- **When installing the unit, securely connect the refrigerant pipes before starting the compressor.**

4.7. Additional refrigerant charge

Additional refrigerant charge
Refrigerant for the extended piping is not included in the outdoor unit when the unit is shipped from the factory. Therefore, charge each refrigerant piping system with additional refrigerant at the installation site. In addition, in order to carry out service, enter the size and length of each liquid pipe and additional refrigerant charge amounts in the spaces provided on the "Refrigerant amount" plate on the outdoor unit.
* When the unit is stopped, charge the unit with the additional refrigerant through the liquid stop valve after the pipe extensions and indoor units have been vacuumized.
When the unit is operating, add refrigerant to the gas check valve using a safety charger. Do not add liquid refrigerant directly to the check valve.

Calculation of additional refrigerant charge
- Calculate the additional charge using the liquid pipe size and length of the extended piping and total capacity of connected indoor units.
- Calculate the additional refrigerant charge using the procedure shown to the right, and charge with the additional refrigerant.
- For amounts less than 0.1 kg, round up the calculated additional refrigerant charge.
(For example, if the calculated charge is 6.01 kg, round up the charge to 6.1 kg.)

<Additional Charge>
Calculation of refrigerant charge

Pipe size Liquid pipe ø6.35		+	**Pipe size Liquid pipe ø9.52**		+	Total capacity of connected indoor units	Amount for the indoor units
SM36/42/48	**(m) × 19.0 (g/m) ((ft) × 0.21 (oz/ft))**		**SM36/42/48**	**(m) × 50.0 (g/m) ((ft) × 0.55 (oz/ft))**		– 27	1.5 kg (53 oz)
						28 – 54	2.5 kg (88 oz)
SM60	**(m) × 27.0 (g/m) ((ft) × 0.29 (oz/ft))**		**SM60**	**(m) × 70.0 (g/m) ((ft) × 0.75 (oz/ft))**		55 –	3.0 kg (106 oz)

Included refrigerant amount when shipped from the factory

Included refrigerant amount	
SM36/42/48	4.8 kg (169 oz)
SM60	5.1 kg (180 oz)

<Example>
Outdoor model : MXZ-SM48NAM
Indoor 1 : model 24
2 : model 15
3 : model 08
4 : model 08
A : ø9.52 30 m (98 ft)
a : ø9.52 15 m (49 ft)
b : ø6.35 10 m (33 ft)
c : ø6.35 10 m (33 ft)
d : ø6.35 20 m (66 ft)
} At the conditions below:

The total length of each liquid line is as follows:
ø9.52 : A + a = 30 + 15 = 45 m (148 ft)
ø6.35 : b + c + d = 10 + 10 + 20 = 40 m (131 ft)
The total capacity of connected indoor unit is as follows:
24 + 15 + 08 + 08 = 55
<Calculation example>
Additional refrigerant charge

$$40 \times \frac{19.0}{1000} + 45 \times \frac{50.0}{1000} + 3.0 = 6.1 \text{ kg (rounded up)}$$

(131 × 0.21 + 148 × 0.55 + 106 = 215 oz)

5. Drainage piping work

Outdoor unit drainage pipe connection
When drain piping is necessary, use the drain socket or the drain pan (option).
However, it can not be used for MXZ-SM36/42/48NAMHZ (Hyper Heating model)

Drain socket	PAC-SG61DS-E
Drain pan	PAC-SH97DP-E

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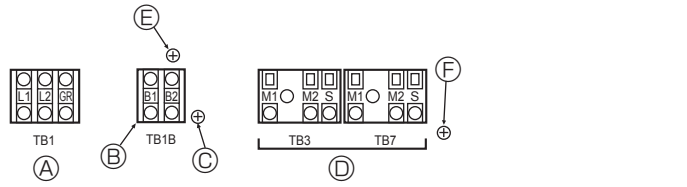
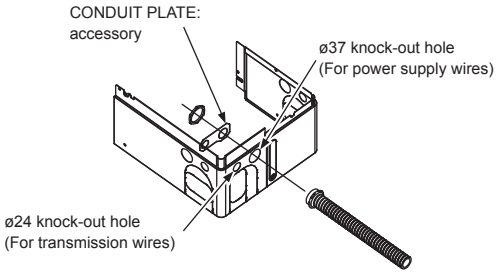
6. Electrical work

6.1. Caution

① Follow ordinance of your governmental organization for technical standard related to electrical equipment, wiring regulations and guidance of each electric power company.
② Use self-extinguishing distribution cables for power supply wiring.
③ Wiring for control (hereinafter referred to as transmission line) shall be (5 cm [2 inch] or more) apart from power source wiring so that it is not influenced by electric noise from power source wiring. (Do not insert transmission line and power source wire in the same conduit.)
④ Be sure to provide designated grounding work to outdoor unit.
⑤ Give some allowance to wiring for electrical part box of indoor and outdoor units, because the box is sometimes removed at the time of service work.
⑥ Never connect the main power source to terminal block of transmission line. If connected, electrical parts will be burnt out.
⑦ Use 2-core shield cable for transmission line. If transmission lines of different systems are wired with the same multiplecore cable, the resultant poor transmitting and receiving will cause erroneous operations.
⑧ Only the transmission line specified should be connected to the terminal block for outdoor unit transmission.
(Transmission line to be connected with indoor unit : Terminal block TB3 for transmission line, Other : Terminal block TB7 for centralized control)
Erroneous connection does not allow the system to operate.
⑨ In case to connect with the upper class controller or to conduct group operation in different refrigerant systems, the control line for transmission is required between the outdoor units each other.
Connect this control line between the terminal blocks for centralized control. (2-wire line with no polarity)
When conducting group operation in different refrigerant systems without connecting to the upper class controller, replace the insertion of the short circuit connector from CN41 of one outdoor unit to CN40.
⑩ Before turning outdoor unit on, be sure to turn the indoor units and the branch boxes on.





Ⓐ : Power source
Ⓑ : Power supply for branch box
Ⓒ : Screw on the electrical component box
Ⓓ : Transmission line
Ⓔ : Screw on the electrical component box for ground connection (TB3)
Ⓕ : Screw on the electrical component box for ground connection (TB7)

Fig. 6-1

6.2. Control box and connecting position of wiring (Fig. 6-1)

1. Connect the wiring between the outdoor unit and the indoor unit or branch box to the transmission terminal block (TB3) of the outdoor unit.
Connect the wiring between the outdoor unit and the centralized control system to the transmission terminal block (TB7) of the outdoor unit.
When using shielded wiring, connect the ground of the shielded wiring to the shield terminal (S) of the terminal block (TB3) or (TB7).
If the connection of the outdoor unit's transmission power supply connector has been changed from CN41 to CN42, connect the shield terminal (S) of the terminal block (TB7) to the screw Ⓕ using the included lead wire.
* The shield (S) terminal of the transmission terminal block (TB3) is connected to the ground Ⓔ when the unit is shipped from the factory.
2. Conduit mounting plates are being provided. Remove the knock-out pieces from the piping cover, pass the power supply and transmission wires through the appropriate knock-out holes, and connect the wires to the terminal block.
3. The terminal block (TB1B) is for supplying power to the branch box (208 / 230 V, max. 6A).
4. Fix power source wiring to the terminal block by using buffer bushing for tensile force (PG connection or the like).

⚠ **Caution:**
Never connect the transmission line for the branch box or the central control system transmission line to this terminal block (TB1B). If the transmission lines are connected, the indoor unit, branch box or system controller could be damaged.

6.3. Wiring transmission cables

① **Types of control cables**

1. Wiring transmission cables

Types of transmission cable	Shielding wire (2-core) CVVS, CPEVS or MVVS
Cable diameter	More than 1.25 mm² [AWG 16]
Maximum wiring length	Within 200 m [656 ft]

2. M-NET Remote control cables

Types of remote control cable	Shielding wire (2-core) CVVS, CPEVS or MVVS
Cable diameter	0.5 to 1.25 mm² [AWG 20 to AWG 16]
Remarks	When the wiring length exceeds 10 m [32 ft], use cable with the same specifications as transmission line wiring.

3. MA Remote control cables

Type of remote control cable	Sheathed 2-core cable (unshielded) CVV
Cable diameter	0.3 to 1.25 mm² [AWG 22 to AWG 16] (0.75 to 1.25 mm² [AWG 18 to AWG 16])*
Remarks	Within 200 m [656 ft]

* Connected with simple remote controller.

② **Wiring examples**

• Controller name, symbol and allowable number of controllers.

Name		Symbol	Allowable number of controllers	
Outdoor unit controller		OC	–	
Indoor unit controller	CITY MULTI series	M-IC	MXZ-SM36	1 to 11 units per 1 OC
			MXZ-SM42	1 to 12 units per 1 OC
			MXZ-SM48	
			MXZ-SM60	
	M, S, P series	A-IC	MXZ-SM36	2 to 4 units per 1 OC *1
			MXZ-SM42	2 to 5 units per 1 OC *1
			MXZ-SM48	2 to 8 units per 1 OC *1
			MXZ-SM60	
Branch box		BC	0 to 2 units per 1 OC *1	
Remote controller	M-NET	M-NET RC *2	Maximum of 12 controllers for 1 OC (Can not be connected if Branch box is used.) *1	
	MA	MA-RC	Maximum of 2 per group	
	Wireless	WL-RC	–	

Note:
***1. The number of connectable units may be limited by some conditions such as an indoor unit's capacity or each unit's equivalent power consumption.**
***2. Don't use the Lossnay controller (PZ-61DR-E, PZ-43SMF-E, PZ-52SF-E, PZ-60DR-E).**

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6. Electrical work

Example of a group operation system with multiple outdoor units (Shielding wires and address setting are necessary.)

<Examples of Transmission Cable Wiring: When Not Using a Branch Box>

■ **M-NET Remote Controller (Fig. 6-2)**

■ **MA Remote Controller (Fig. 6-3)**

<Wiring Method and Address Settings: without Branch box system>

a. Always use shielded wire when making connections between the outdoor unit (OC) and the indoor unit (M-IC).

b. Use feed wiring to connect terminals M1 and M2 and the ground terminal on the transmission cable terminal block (TB3) of each outdoor unit (OC) to terminals M1, M2 and terminal S on the transmission cable terminal block of the indoor unit (M-IC).

c. Connect terminals 1 (M1) and 2 (M2) on the transmission cable terminal block of the indoor unit (M-IC) that has the most recent address within the same group to the terminal block on the remote controller (M-NET RC).

d. Connect together terminals M1, M2 and terminal S on the terminal block for centralized control (TB7) for the outdoor unit (OC).

e. The jumper connector CN41 on the control panel does not change.

f. Connect shield ground of the indoor units transmission line to the shield (S) terminal of (TB3).
Connect shield ground of the line between outdoor units and the centralized control system transmission line to the shield (S) terminal of (TB7).

g. Set the address setting switch as follows.

Unit	Range	Setting Method
M-IC (Main)	01 to 50	Use the most recent address within the same group of indoor units
M-IC (Sub)	01 to 50	Use an address, other than that of the M-IC (Main) from among the units within the same group of indoor units. This must be in sequence with the M-IC (Main)
OC	51 to 100	Use the most recent address of all the indoor units plus 50 * The address automatically becomes “100” if it is set as “01 - 50”.
M-NET RC (Main)	101 to 150	Set at an M-IC (Main) address within the same group plus 100
M-NET RC (Sub)	151 to 200	Set at an M-IC (Main) address within the same group plus 150
MA-RC	–	Unnecessary address setting (Necessary main/sub setting)

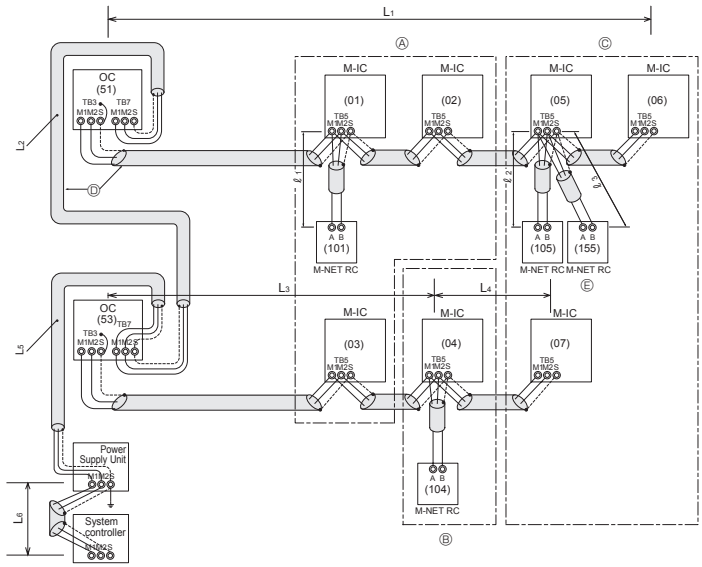
h. The group setting operations among the multiple indoor units is done by the remote controller (M-NET RC) after the electrical power has been turned on.

<Wiring Method and Address Setting: include Branch box system>

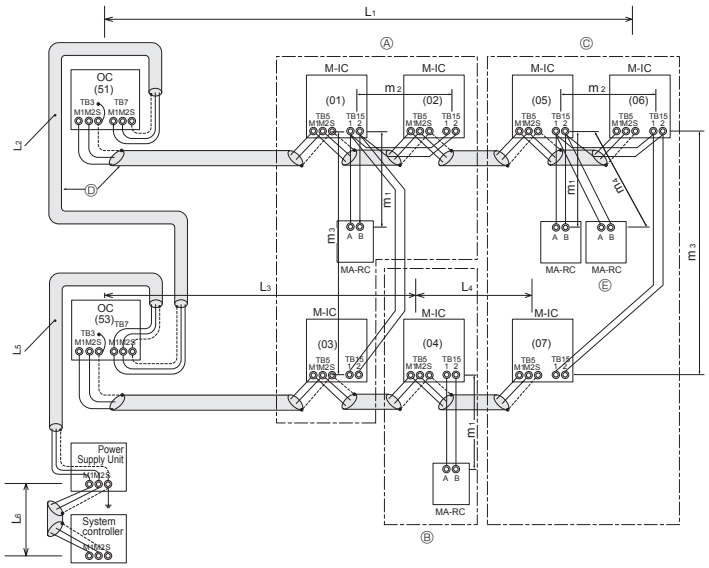
Please refer to the Branch box Installation Manual.

<Example of Transmission Cable Wiring: Not using Branch box>

■ **M-NET Remote Controller**



■ **MA Remote Controller**



Ⓐ : Group 1
Ⓑ : Group 2
Ⓒ : Group 3
Ⓓ : Shielded Wire
Ⓔ : Sub Remote Controller
( ): Address

<Permissible Lengths>

- **Maximum line length via outdoor units: $L_1+L_2+L_3+L_4$, $L_3+L_4+L_5+L_6$ and $L_1+L_2+L_5+L_6 \leqq 500$ m [1640 ft] (1.25 mm² [AWG16] or more)**
- **Indoor/outdoor transmission line Maximum length: L_1, L_3+L_4, L_2+L_5 and $L_6 \leqq 200$ m [656 ft] (1.25 mm² [AWG16] or more)**
- **Remote controller cable length:**
  ℓ_1, $\ell_2+\ell_3 \leqq 10$ m [33 ft] (0.5 to 1.25 mm² [AWG20 to AWG16])
  If the length exceeds 10 m [33 ft], use a 1.25 mm² [AWG16] shielded wire. The section of the cable that exceeds 10 m [33 ft] must be included in the max length via outdoor units and max transmission cable length.

Fig. 6-2

<Permissible Lengths>

- **Maximum line length via outdoor units (M-NET cable): $L_1+L_2+L_3+L_4$, $L_3+L_4+L_5+L_6$ and $L_1+L_2+L_5+L_6 \leqq$ 500 m [1640 ft] (1.25 mm² [AWG16] or more)**
- **Indoor/outdoor transmission line Maximum length (M-NET cable): L_1, L_3+L_4, L_2+L_5 and $L_6 \leqq 200$ m [656 ft] (1.25 mm² [AWG16] or more)**
- **Remote controller cable length: m_1, $m_1+m_2+m_3$ and $m_1+m_2+m_3+m_4 \leqq 200$ m [656 ft] (0.3 to 1.25 mm² [AWG22 to AWG16])**

Fig. 6-3

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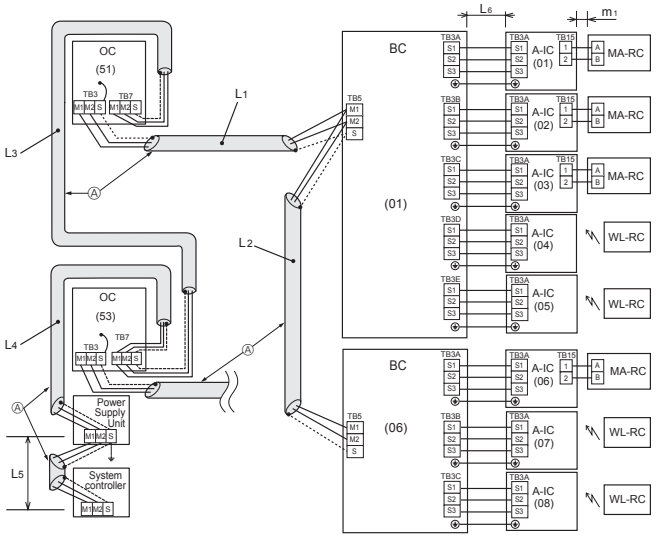
6. Electrical work

<Example of Transmission Cable Wiring: Connecting with Branch box>



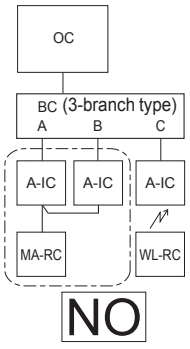
Ⓐ : Shielded wire
( ) : Address example
A-IC : M, S, P series Indoor unit

<Permissible Lengths>
- **Maximum line length via outdoor units (M-NET cable):**
  $L_1 + L_2 + L_3 + L_4 + L_5 \leqq 500$ m [1640 ft] (1.25 mm² [AWG16] or more)
- **Branch box/outdoor transmission line Maximum length (M-NET cable):**
  $L_1 + L_2$, $L_3 + L_4$, $L_5 \leqq 200$ m [656 ft] (1.25 mm² [AWG16] or more)
- **Indoor/Branch box transmission line Maximum length (A-control cable):**
  $L_6 \leqq 25$ m [82 ft] (1.5 mm² [AWG14])
- **Remote controller cable length:**
  $m_1 \leqq 200$ m [656 ft] (0.3 to 1.25 mm² [AWG22 to AWG16])

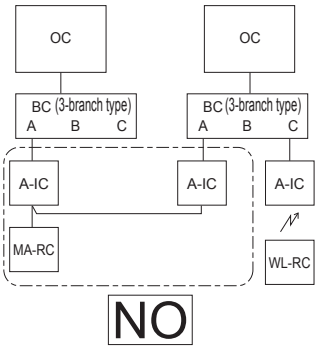
Fig. 6-4

<Incorrect Systems>

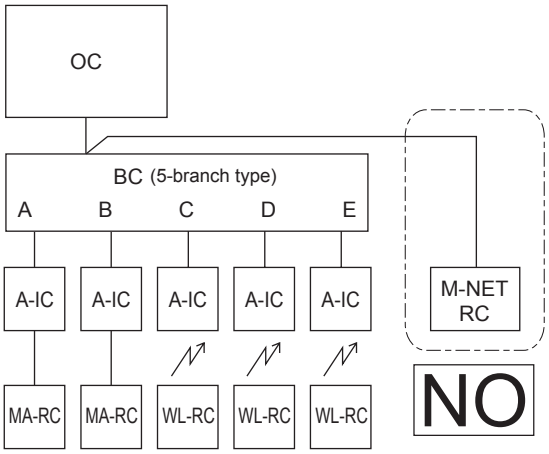
1. Group operation by single remote controller



2. Group operation between different refrigerant systems



3. Connection of M-NET Remote controller



1. Plural indoor units cannot be operated by a single remote controller.
2. Different refrigerant systems cannot be connected together.
3. M-NET remote controller cannot be connected.

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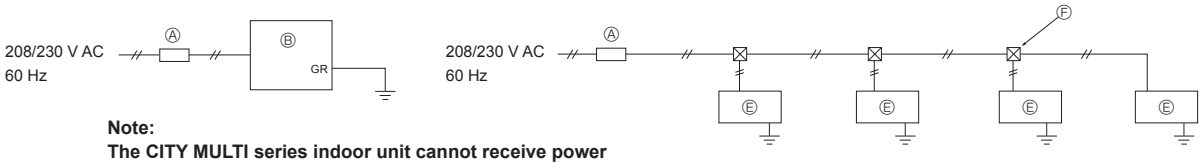
6.4. Wiring of main power supply and equipment capacity

Schematic Drawing of Wiring: When Not Using a Branch Box (Example) (Fig. 6-5)



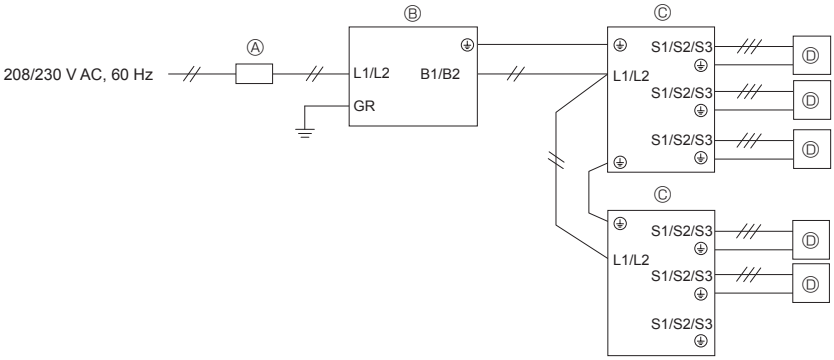
Note:
The CITY MULTI series indoor unit cannot receive power supplied from an outdoor unit, so provide it with power separately.

Fig. 6-5

Ⓐ Switch (Breakers for Wiring and Current Leakage (if you use))
Ⓑ Outdoor Unit
Ⓒ Branch Box
Ⓓ A-Control indoor unit (M, S, P series indoor unit)
Ⓔ CITY MULTI series indoor unit
Ⓕ Pull Box

Schematic Drawing of Wiring: When Using a Branch Box (Example) (Fig. 6-6)

<When Power Is Supplied from the Outdoor Unit>



<When Power Is Supplied Separately>

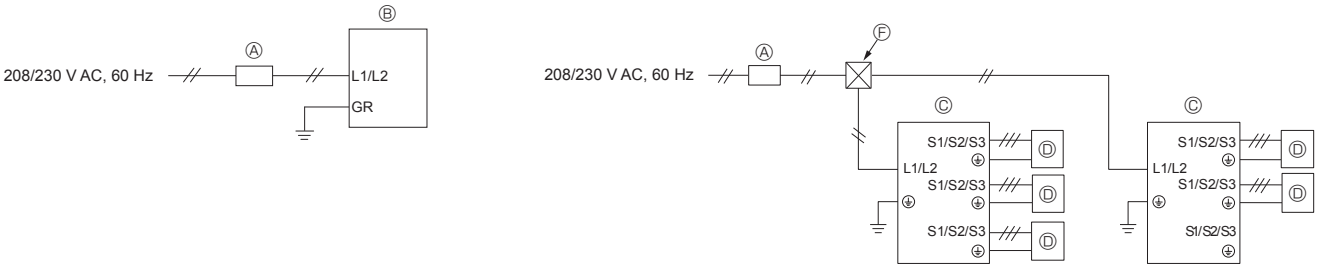


Fig. 6-6

Thickness of Wire for Main Power Supply and On/Off Capacities

<When power is supplied separately>

Model		Power Supply	Minimum Wire Thickness (mm^2 [AWG])		Breaker for Wiring*1	Breaker for Current Leakage (if you use)	Minimum circuit ampacity	Maximum rating of over current protector device
			Main Cable*2	Ground				
Outdoor Unit	36/48NAM	208/230 V AC, 60 Hz	5.3 [AWG10]	5.3 [AWG10]	30 A	30 A 30 mA 0.1 sec. or less	29 A	40 A
	36/42/48NAMHZ		8.4 [AWG8]	8.4 [AWG8]	40 A	40 A 30 mA 0.1 sec. or less	36 A	40 A
	60NAM		8.4 [AWG8]	8.4 [AWG8]	40 A	40 A 30 mA 0.1 sec. or less	36 A	45 A
Branch Box			Refer to installation manual of Branch Box.					

<When power is supplied from the outdoor unit>

Model		Power Supply	Minimum Wire Thickness (mm^2 [AWG])		Breaker for Wiring*1	Breaker for Current Leakage (if you use)	Minimum circuit ampacity	Maximum rating of over current protector device
			Main Cable*2	Ground				
Outdoor Unit	36/48NAM	208/230 V AC, 60 Hz	8.4 [AWG8]	8.4 [AWG8]	40 A	40 A 30 mA 0.1 sec. or less	35 A	50 A
	36/42/48NAMHZ		13.3 [AWG6]	13.3 [AWG6]	45 A	45 A 30 mA 0.1 sec. or less	42 A	50 A
	60NAM		13.3 [AWG6]	13.3 [AWG6]	50 A	50 A 30 mA 0.1 sec. or less	46 A	50 A
Branch Box			Refer to installation manual of Branch Box.					

*1. Please follow applicable federal, state, or local codes to prevent potential leakage/electric shock. Or install a ground fault interrupt for the prevention of leakage and electric shock.

IMPORTANT
If a current leakage breaker is used, it should be compatible with higher harmonics as this unit is equipped with an inverter. The use of an inadequate breaker can cause the incorrect operation of inverter.

***2. Use copper supply wires. Use the electric wires over the rating voltage 300 V.**

*3. Although the conduit size is larger than the size specified for the wire thickness according to UL standards, use a conduit size of 3/4 inch.

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6. Electrical work

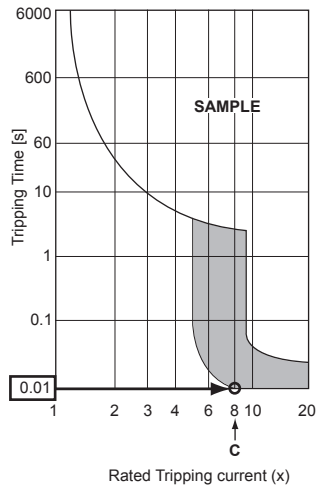
Total operating current of the indoor unit	Minimum wire thickness (mm²/AWG)			Ground-fault interruper *1 (if you use)	Local switch (A)		Breaker for wiring (NFB)
	Main Cable	Branch	Ground		Capacity	Fuse	
F0 = 15 A or less *2	2.1/14	2.1/14	2.1/14	15 A current sensitivity *3	15	15	15
F0 = 20 A or less *2	3.3/12	3.3/12	3.3/12	20 A current sensitivity *3	20	20	20
F0 = 30 A or less *2	5.3/10	5.3/10	5.3/10	30 A current sensitivity *3	30	30	30

Apply to IEC61000-3-3 about max. permissive system impedance.
*1 The Ground-fault interrupter should support inverter circuit.
The Ground-fault interrupter should combine using of local switch or wiring breaker.
*2 Please take the larger of F1 or F2 as the value for F0.
F1 = Total operating maximum current of the indoor units × 1.2
F2 = {V1 × (Quantity of Type1)/C} + {V1 × (Quantity of Type2)/C} + {V1 × (Quantity of Type3)/C} + {V1 × (Quantity of Type4)/C} + … + {V1 × (Quantity of Type13)/C}

Indoor unit		V1	V2
Type 1	PEAD-A·AA, SVZ-A·AA	26.9	2.4
Type 2	PLA-A·EA7, SEZ-KD·NA	19.8	
Type 3	SLZ-KF·NA	17.1	
Type 4	MLZ-KP·NA (2)	9.9	
Type 5	MFZ-KJ·NA, MSZ-GL·NA, MSZ-FS·NA	7.4	
Type 6	MSZ-FH·NA, MSZ-FH·NA2, MSZ-EF·NAW(B)(S)-U1	6.8	
Type 7	Branch box	5.1	3.0
Type 8	PEFY-P·NMAU-E3, PVFY-P·NAMU	38.0	1.6
Type 9	PKFY-P·NHMU, PKFY-P·NKMU, PEFY-P·NMSU, PCFY-P·NKMU, PLFY-EP·NEMU, PLFY-P·NFMU, PMFY-P·NBMU, PKFY-P·NLMU	19.8	2.4
Type 10	PKFY-P·NBMU, PLFY-P·NCMU	3.5	2.4
Type 11	PEFY-P·NMHU, PFFY-P·NEMU, PFFY-P·NRMU	0.0	0.0
Type 12	PEFY-P·NMHSU (connected to MXZ-SM60 only)	13.8	4.8
Type 13	PEFY-P·NMAU-E4	18.6	3.0

C : Multiple of tripping current at tripping time 0.01s
Please pick up “C” from the tripping characteristic of the breaker.

Sample chart



<Example of “F2” calculation>
* Condition PEFY-NMSU × 4 + PEFY-NMAU × 1, C = 8 (refer to right sample chart)
F2 = 19.8 × 4/8 + 38 × 1/8
= 14.65
→ 16 A breaker (Tripping current = 8 × 16 A at 0.01 s)
*3 Current sensitivity is calculated using the following formula.
G1= V2 × (Quantity of Type1) + V2 × (Quantity of Type2) + V2 × (Quantity of Type3) + … + V2 × (Quantity of Type13)
+ V3 × (Wire length [km])

G1	Current sensitivity
30 or less	30 mA 0.1 sec or less
100 or less	100 mA 0.1 sec or less

Wire thickness (mm²/AWG)	V3
2.1/14	48
3.3/12	56
5.3/10	66

1. **Use a separate power supply for the outdoor unit and indoor unit.**
2. **Bear in mind ambient conditions (ambient temperature,direct sunlight, rain water,etc.) when proceeding with the wiring and connections.**
3. **The wire size is the minimum value for metal conduit wiring. The power cord size should be 1 rank thicker consideration of voltage drops. Make sure the power-supply voltage does not drop more than 10%.**
4. **Specific wiring requirements should adhere to the wiring regulations of the region.**
5. **Power supply cords of parts of appliances for outdoor use shall not be lighter than polychloroprene sheathed flexible cord (design 60245 IEC57). For example, use wiring such as YZW.**
6. **Install an earth longer than other cables.**

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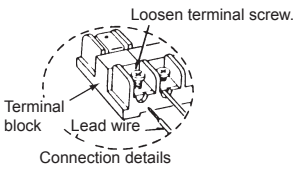
⚠ **Warning:**
- **Be sure to use specified wires to connect so that no external force is imparted to terminal connections. If connections are not fixed firmly, it may cause heating or fire.**
- **Be sure to use the appropriate type of overcurrent protection switch. Note that generated overcurrent may include some amount of direct current.**
- **Be sure to attach the terminal block covers/panel of the outdoor unit securely. If it is not attached correctly, if could result in a fire or an electric shock due to dust, water. etc.**

⚠ **Caution:**
- **Be careful not to make mis-wiring.**
- **Firmly tighten the terminal screws to prevent them from loosening.**
- **After tightening, pull the wires lightly to confirm that they not move.**
- **If the connecting wire is incorrectly connected to the terminal block, the unit does not operate normally.**
- **Some installation site may require attachment of an earth leakage breaker. If no earth leakage breaker is installed, it may cause an electric shock.**
- **Do not use anything other than breaker and fuse with correct capacity. Using fuse and wire or copper wire with too large capacity may cause a malfunction of unit or fire.**
- **Properly route wiring so as not to contact the sheet metal edge or a screw tip.**

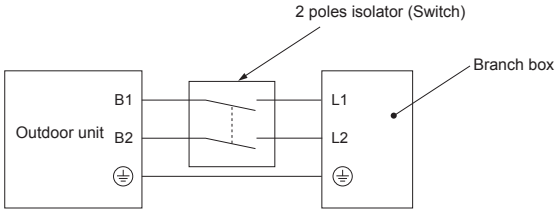


6. Electrical work

IMPORTANT
Make sure that the current leakage breaker is one compatible with higher harmonics.
Always use a current leakage breaker that is compatible with higher harmonics as this unit is equipped with an inverter.
The use of an inadequate breaker can cause the incorrect operation of inverter.

Never splice the power cable or the indoor-outdoor-branch box connection cable, otherwise it may result in a smoke, a fire or communication failure.

⚠ **Warning:**
- **Please turn off the main power supply when servicing. And do not touch the B1, B2 terminals when the power is energized. If isolator should be used between outdoor unit and branch box/indoor unit and branch box, please use 3-pole type or 2-pole type. (Please refer to figure below.)**
- **Turn on the main power when the ambient temperature is -20°C (-4°F) or higher.**
- **Under conditions of -20°C (-4°F), it needs at least 4hr stand by before the units operate in order to warm the electrical parts.**



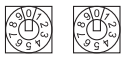
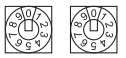
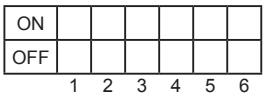
⚠ **Caution:**
After using the isolator, be sure to turn off and on the main power supply to reset the system. Otherwise, the outdoor unit may not be able to detect the branch box(es) or indoor units.

Be sure to connect the outdoor-branch box/indoor-branch box connecting cables directly to the units (no intermediate connections).
Intermediate connections can lead to communication errors if water enters the cables and causes insufficient insulation to ground or a poor electrical contact at the intermediate connection point.
(If an intermediate connection is necessary, be sure to take measures to prevent water from entering the cables.)

6. Electrical work

6.5. Address setting

Switch address setting

<table>
<tr><th></th><th>Outdoor</th><th colspan="2">Branch Box</th><th>M, S, P series Indoor</th><th>CITY MULTI series</th></tr>
<tr><th></th><th></th><th>Address</th><th>Connection Setting</th><th></th><th></th></tr>
<tr><td>Switch</td><td> 
tens digit ones digit
SWU2 SWU1</td><td> 
tens digit ones digit
SW12 SW11</td><td> 
SW1</td><td>None</td><td>
tens digit ones digit
SW12 SW11</td></tr>
<tr><td>Range</td><td>51 - 100</td><td>1 - 50</td><td>–</td><td>–</td><td>1 - 50</td></tr>
<tr><td>Setting</td><td>CITY MULTI series Indoor or Branch Box address +50</td><td>• According to the set address (for example, 01), the addresses for the connected indoor units are set sequentially (for example, 02, 03, 04, and 05).
<table><tr><td>SW1</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td></td></tr><tr><td></td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td></td></tr><tr><td>Port</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td></td></tr><tr><td>Address</td><td>01</td><td></td><td></td><td></td><td></td><td>(SW11, 12)</td></tr><tr><td></td><td></td><td>02</td><td>03</td><td>04</td><td>05</td><td>(sequential numbers)</td></tr></table></td><td>• Specify whether indoor units are connected to each port (A, B, C, D, and E).
<table><tr><th>SW1</th><th>Port</th><th>OFF</th><th>ON</th></tr><tr><td>1</td><td>A</td><td>disconnected</td><td>connected</td></tr><tr><td>2</td><td>B</td><td>disconnected</td><td>connected</td></tr><tr><td>3</td><td>C</td><td>disconnected</td><td>connected</td></tr><tr><td>4</td><td>D</td><td>disconnected</td><td>connected</td></tr><tr><td>5</td><td>E</td><td>disconnected</td><td>connected</td></tr><tr><td>6</td><td>not use</td><td></td><td></td></tr></table></td><td>There are no address settings for the indoor units.</td><td>–</td></tr>
</table>

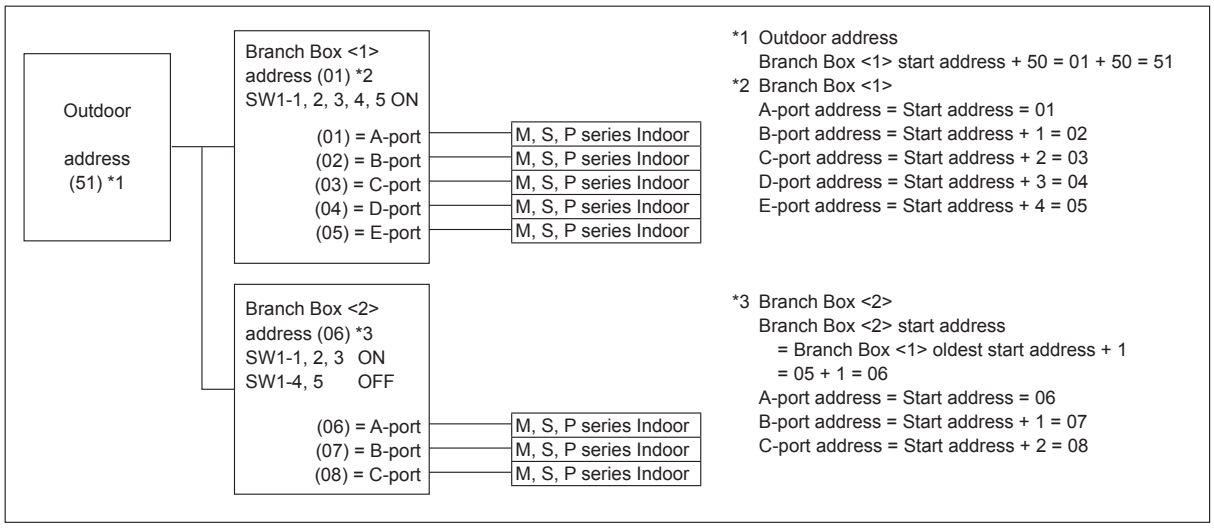
Note: 1. Branch box address

When setting the address, use a number within the range 1–50.

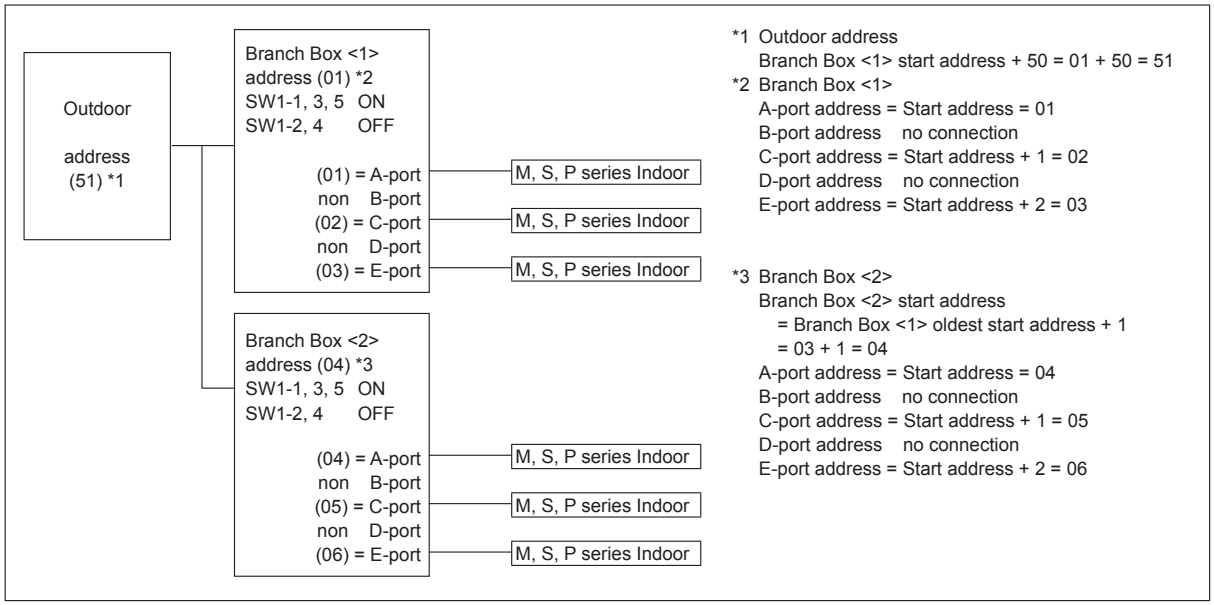
Ex. The set address is (47) and there are 5 indoor units (A, B, C, D, and E).

If A: (47), B: (48), C: (49), D: (50), and E: (51), E is incorrect because it exceeds 50.

Ex1. Outdoor + Branch <1> (M, S, P series Indoor A, B, C, D, E) + Branch <2> (M, S, P series Indoor A, B, C)



Ex2. Outdoor + Branch <1> (M, S, P series Indoor A, C, E) + Branch <2> (M, S, P series Indoor A, C, E)



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7. Test run

7.1. Before test run

► After completing installation and the wiring and piping of the indoor and outdoor units, check for refrigerant leakage, looseness in the power supply or control wiring, wrong polarity and no disconnection of one phase in the supply.

► Use a 500-volt megohmmeter to check that the resistance between the power supply terminals and ground is at least 1 MΩ.

► Do not carry out this test on the control wiring (low voltage circuit) terminals.

⚠ Warning:

Do not use the air conditioner if the insulation resistance is less than 1 MΩ.

Insulation resistance

After installation or after the power source to the unit has been cut for an extended period, the insulation resistance will drop below 1 MΩ due to refrigerant accumulating in the compressor. This is not a malfunction. Perform the following procedures.

1. Remove the wires from the compressor and measure the insulation resistance of the compressor.
2. If the insulation resistance is below 1 MΩ, the compressor is faulty or the resistance dropped due the accumulation of refrigerant in the compressor.
3. After connecting the wires to the compressor, the compressor will start to warm up after power is supplied. After supplying power for the times indicated below, measure the insulation resistance again.
   - The insulation resistance drops due to accumulation of refrigerant in the compressor. The resistance will rise above 1 MΩ after the compressor is warmed up for 12 hours.
     (The time necessary to warm up the compressor varies according to atmospheric conditions and refrigerant accumulation.)
   - To operate the compressor with refrigerant accumulated in the compressor, the compressor must be warmed up at least 12 hours to prevent breakdown.
4. If the insulation resistance rises above 1 MΩ, the compressor is not faulty.

⚠ Caution:

- **The compressor will not operate unless the power supply phase connection is correct.**
- **Turn on the power at least 12 hours before starting operation.**

- Starting operation immediately after turning on the main power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.

► The followings must be checked as well.

- The outdoor unit is not faulty. LED on the control board of the outdoor unit flash when the outdoor unit is faulty.
- Both the gas and liquid stop valves are completely open.

7.2. Test run

7.2.1. Using remote controller

Refer to the indoor unit installation manual.

- Be sure to perform the test run for each indoor unit. Make sure each indoor unit operates properly following the installation manual attached to the unit.
- If you perform the test run for all indoor units at once, you cannot detect any erroneous connection, if any, of the refrigerant pipes and the connecting wires.

* The compressor operation is not available for 3 minutes at least after the power is supplied.

- The compressor can emit noise just after turn on the power supply or in case of low outside air temperature.
- Depending on the operating conditions, the outdoor unit fan may stop while the compressor is operating, but this is not a malfunction.

About the restart protective mechanism

Once the compressor stops, the restart preventive device operates so the compressor will not operate for 3 minutes to protect the air conditioner.

7.2.2. Using SW3 in outdoor unit

Note:

In case of the test run from outdoor unit, all indoor units operate. Therefore, you can not detect any erroneous connection of refrigerant pipes and the connecting wires. If it aims at detection of any erroneous connection, be sure to carry out the test run from remote controller with reference to "7.2.1. Using remote controller".

SW3-1	**ON**	**Cooling operation**
SW3-2	**OFF**	
SW3-1	**ON**	**Heating operation**
SW3-2	**ON**	

* After performing the test run, set SW3-1 to OFF.

- A few seconds after the compressor starts, a clanging noise may be heard from the inside of the outdoor unit. The noise is coming from the check valve due to the small difference in pressure in the pipes. The unit is not faulty.

The test run operation mode cannot be changed by DIP switch SW3-2 during the test run. (To change the test run operation mode during the test run, stop the test run by DIP switch SW3-1. After changing the test run operation mode, resume the test run by switch SW3-1.)

7.3. Refrigerant collecting (Pump down)

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

① Turn off the circuit breaker.
② Connect the low pressure side of the gauge manifold to the service port of the gas side stop valve.
③ Close the liquid stop valve.
④ Supply power (circuit breaker).
* Start-up of the indoor-outdoor communication takes about 3 minutes after the power (circuit breaker) is turned on. Start the pump-down operation 3 to 4 minutes after the power (circuit breaker) is turned ON.
⑤ Perform the test run for cooling operation (SW3-1: ON and SW3-2: OFF). The compressor (outdoor unit) and ventilators (indoor and outdoor units) start operating and test run for cooling operation begins. Immediately after performing the test run for cooling operation, set the outdoor service switch SW2-4 (pump down switch) from OFF to ON.
* Do not continue to operate for a long time with the switch SW2-4 set to ON. Make sure to switch it to OFF after pump down is completed.
* Only set the SW3-1 and SW3-2 to ON if the unit is stopped. However, even if the unit is stopped and the SW3-1 and SW3-2 are set to ON less than 3 minutes after the compressor stops, the refrigerant collecting operation cannot be performed. Wait until compressor has been stopped for 3 minutes and then set the SW3-1 and SW3-2 to ON again.
⑥ Fully close the gas stop valve when the pressure reading on the gauge drops 7.1 - 0.0 PSIG (approximately 0.5 - 0.0 kgf/cm^2)
⑦ Stop the air conditioner operation (SW3-1: OFF and SW3-2: OFF). Set the outdoor service switch SW2-4 from ON to OFF.
⑧ Turn off the power supply (circuit breaker).
* If too much refrigerant has been added to the air conditioner system, the pressure may not drop to 7.1 PSIG (0.5 kgf/cm^2). If this occurs, use a refrigerant collecting device to collect all of the refrigerant in the system, and then recharge the system with the correct amount of refrigerant after the indoor and outdoor units have been relocated.

⚠ Warning:

- **When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes. The compressor may burst and cause injury if any foreign substance, such as air, enters the system.**
- **Do not perform pump down work when there is a gas leak. The intake of air or other gases causes abnormally high pressure in the refrigeration cycle, which may cause explosion or injury.**

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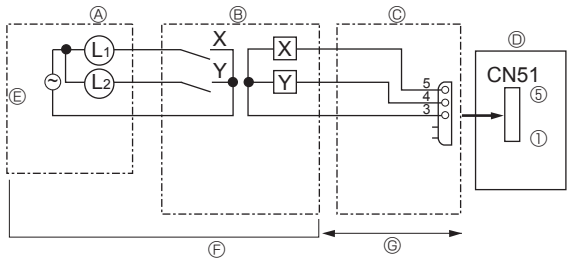
8. Special Functions

8.1. OUTDOOR UNIT INPUT/OUTPUT CONNECTOR

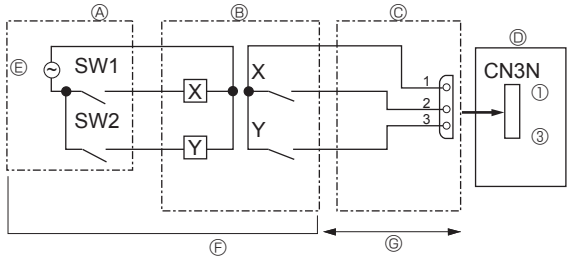
• State (CN51)



Ⓐ Distant control board
Ⓑ Relay circuit
Ⓒ External output adapter (PAC-SA88HA-E)
Ⓓ Outdoor unit control board
Ⓔ Lamp power supply
Ⓕ Procure locally
Ⓖ Max. 10 m [33 ft]

L1: Error display lamp
L2: Compressor operation lamp
X, Y: Relay (coil rating: ≦ 0.9 W, 12 V DC)

• Auto change over (CN3N)

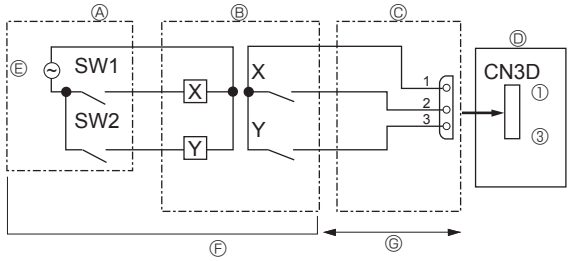


Ⓐ Remote control panel
Ⓑ Relay circuit
Ⓒ External input adapter (PAC-SC36NA-E)
Ⓓ Outdoor unit control board
Ⓔ Relay power supply
Ⓕ Procure locally
Ⓖ Max. 10 m [33 ft]

SW1: Switch
SW2: Switch
X, Y: Relay (contact rating : ≧ 0.1 A, 15 V DC; min. applicable load: ≦ 1 mA)

	ON	OFF
SW1	Heating	Cooling
SW2	Validity of SW1	Invalidity of SW1

• Silent Mode / Demand Control (CN3D)



Ⓐ Remote control panel
Ⓑ Relay circuit
Ⓒ External input adapter (PAC-SC36NA-E)
Ⓓ Outdoor unit control board
Ⓔ Relay power supply
Ⓕ Procure locally
Ⓖ Max. 10 m [33 ft]

SW1: Switch
SW2: Switch
X, Y: Relay (contact rating : ≧ 0.1 A, 15 V DC; min. applicable load: ≦ 1 mA)

The silent mode and the demand control are selected by switching the DIP switch 9-2 on outdoor controller board.
It is possible to set it to the following power consumption (compared with ratings) by setting SW1, 2.

	Outdoor controller board DIP SW9-2	SW1	SW2	Function
Silent mode	OFF	ON	–	Silent mode operation
Demand control	ON	OFF	OFF	100% (Normal)
		ON	OFF	75%
		ON	ON	50%
		OFF	ON	0% (Stop)

en

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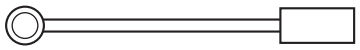
2. Emplacement d'installation 3
3. Installation de l'appareil extérieur 6
4. Installation de la tuyauterie du réfrigérant 6
5. Mise en place du tuyau d'écoulement 12
6. Installations électriques 13
7. Marche d'essai 20
8. Fonctions spéciales 21

Vérification des pièces livrées

En plus du présent manuel, l'élément suivant est livré avec l'appareil extérieur.
Il sert à mettre à la terre la borne S du bloc de sortie de transmission TB7. Pour plus de détails à ce sujet, voir "6. Installations électriques".



Fil de terre

1. Consignes de sécurité

► Avant d'installer le climatiseur, lire attentivement toutes les "Consignes de sécurité".
► Veuillez consulter ou obtenir la permission votre compagnie d'électricité avant de connecter votre système.

⚠ Avertissement:
Précautions à suivre pour éviter tout danger de blessure ou de décès de l'utilisateur.

⚠ Précaution:
Décrit les précautions qui doivent être prises pour éviter d'endommager l'appareil.

Une fois l'installation terminée, expliquer les "Consignes de sécurité", l'utilisation et l'entretien de l'appareil au client conformément aux informations du mode d'emploi et effectuer l'essai de fonctionnement en continu pour garantir un fonctionnement normal. Le manuel d'installation et le mode d'emploi doivent être fournis à l'utilisateur qui doit les conserver. Ces manuels doivent également être transmis aux nouveaux utilisateurs.

⏚ : Indique un élément qui doit être mis à la terre.

⚠ Avertissement:
Prendre soin de lire les étiquettes se trouvant sur l'appareil principal.

⚠ Avertissement:

- **L'appareil ne doit pas être installé par l'utilisateur. Contacter un revendeur ou un technicien agréé pour installer l'appareil. Si l'appareil n'est pas correctement installé, des fuites d'eau, des chocs électriques ou des incendies peuvent se produire.**
- **Pour l'installation, respecter les instructions du manuel d'installation et utiliser des outils et des composants de tuyau spécialement conçus pour une utilisation avec le réfrigérant R410A.**
- **La pression du réfrigérant R410A du système HFC est 1,6 fois supérieure à celle des réfrigérants traditionnels. Si des composants de tuyau non adaptés au réfrigérant R410A sont utilisés et si l'appareil n'est pas correctement installé, les tuyaux peuvent éclater et provoquer des dommages ou des blessures. Des fuites d'eau, des chocs électriques et des incendies peuvent également se produire.**
- **Lors de l'installation de l'appareil, utiliser un équipement de protection et des outils appropriés pour assurer la sécurité. Le non-respect de cette consigne peut entraîner des blessures.**
- **L'appareil doit être installé conformément aux instructions pour réduire les risques de dommages liés à des tremblements de terre, des typhons ou des vents violents. Une installation incorrecte peut entraîner la chute de l'appareil et provoquer des dommages ou des blessures.**
- **L'appareil doit être solidement installé sur une structure pouvant supporter son poids. Si l'appareil est fixé sur une structure instable, il risque de tomber et de provoquer des dommages ou des blessures.**
- **Si le climatiseur est installé dans une petite pièce, certaines mesures doivent être prises pour éviter que la concentration de réfrigérant ne dépasse le seuil de sécurité en cas de fuite. Consulter un revendeur pour obtenir les mesures adéquates et ainsi éviter de dépasser la concentration autorisée. En cas de fuite de réfrigérant et de dépassement du seuil de concentration, des risques liés au manque d'oxygène dans la pièce peuvent survenir.**
- **Aérer la pièce en cas de fuite de réfrigérant lors de l'utilisation. Le contact du réfrigérant avec une flamme peut provoquer des émanations de gaz toxiques.**
- **Toutes les installations électriques doivent être effectuées par un technicien qualifié conformément aux réglementations locales et aux instructions fournies dans ce manuel. Les appareils doivent être alimentés par des lignes électriques adaptées. Utiliser la tension correcte et des coupe-circuits. Des lignes électriques de capacité insuffisante ou des installations électriques incorrectes peuvent provoquer un choc électrique ou un incendie.**
- **Veiller à relier les cordons d'alimentation et les fils de raccordement des appareils intérieurs et des appareils extérieurs directement aux appareils (sans raccordement intermédiaire).**
  Les raccordements intermédiaires peuvent engendrer des erreurs de communication si de l'eau s'infiltre dans les cordons et les fils et provoquent une isolation insuffisante de la mise à la terre ou un mauvais contact électrique au niveau du point de raccordement intermédiaire.
- **Utiliser le cuivre phosphoreux C1220, pour des tuyaux sans soudure en cuivre et en alliage de cuivre, pour raccorder les tuyaux de réfrigérant. Si les tuyaux ne sont pas correctement raccordés, la mise à la terre de l'appareil ne sera pas conforme et des chocs électriques peuvent se produire.**
- **N'utiliser que les câbles spécifiés pour les raccordements. Les raccordements doivent être réalisés correctement sans tension sur les bornes. Ne jamais effectuer de jonction sur les câbles (sauf en cas d'indications contraires). Le non respect de cette consigne peut entraîner une surchauffe ou un incendie.**
- **Le couvercle du bloc de sortie de l'appareil extérieur doit être solidement fixé. S'il n'est pas correctement installé et si des poussières et de l'humidité s'infiltrent dans l'appareil, un choc électrique ou un incendie peut se produire.**
- **Lors de l'installation, du déplacement ou de l'entretien de l'appareil extérieur, n'utilisez que le réfrigérant spécifié (R410A) pour remplir les tuyaux de réfrigérant. Ne pas le mélanger avec un autre réfrigérant et faire le vide d'air dans les tuyaux. Si du réfrigérant est mélangé avec de l'air, cela peut provoquer des pointes de pression dans les tuyaux de réfrigérant et entraîner une explosion et d'autres risques.**
  L'utilisation d'un réfrigérant différent de celui spécifié pour le climatiseur peut entraîner des défaillances mécaniques, des dysfonctionnements du système ou une panne de l'appareil. Dans le pire des cas, cela peut entraîner un obstacle à la mise en sécurité du produit.
- **Ne pas purger s'il y a une fuite de gaz. L'arrivée d'air ou d'autres gaz provoque une pression anormalement élevée dans le cycle de réfrigération, ce qui peut provoquer une explosion ou des blessures.**
- **Utilisez uniquement des accessoires autorisés et demandez à un revendeur ou à un technicien agréé de les installer. Si les accessoires ne sont pas correctement installés, une fuite d'eau, un choc électrique ou un incendie peut se produire.**
- **Ne pas changer l'appareil. Consulter un revendeur en cas de réparations. Si les modifications ou réparations ne sont pas correctement effectuées, une fuite d'eau, un choc électrique ou un incendie peut se produire.**
- **L'utilisateur ne doit jamais essayer de réparer ou de déplacer l'appareil. Si l'appareil n'est pas correctement installé, des fuites d'eau, des chocs électriques ou des incendies peuvent se produire. Si le climatiseur doit être réparé ou déplacé, contacter un revendeur ou un technicien agréé.**
- **Une fois l'installation terminée, vérifier les éventuelles fuites de réfrigérant. Si le réfrigérant fuit dans la pièce et entre en contact avec la flamme d'un chauffage ou d'une cuisinière, des gaz toxiques peuvent se dégager.**
- **Lors de l'ouverture ou de la fermeture de la vanne sous des températures de congélation, le réfrigérant peut jaillir de l'espace entre la tige de vanne et le corps de vanne et provoquer des blessures.**

fr

1. Consignes de sécurité

1.1. Avant l'installation

⚠ **Précaution:**

- **Ne pas utiliser l'appareil dans un environnement inhabituel. Si le climatiseur est installé dans des endroits exposés à la vapeur, à l'huile volatile (notamment l'huile de machine), au gaz sulfurique, à une forte teneur en sel, par exemple, à la mer, ou dans des endroits où l'appareil sera recouvert de neige, les performances peuvent considérablement diminuer et les pièces internes de l'appareil être endommagées.**
- **Ne pas installer l'appareil dans des endroits où des gaz de combustion peuvent s'échapper, se dégager ou s'accumuler. L'accumulation de gaz de combustion autour de l'appareil peut provoquer un incendie ou une explosion.**
- **L'appareil extérieur produit de la condensation lors du fonctionnement du chauffage. Prévoir un système de drainage autour de l'appareil extérieur au cas où la condensation provoquerait des dommages.**
- **Lors de l'installation de l'appareil dans un hôpital ou un centre de communications, se préparer au bruit et aux interférences électroniques. Les inverseurs, les appareils électroménagers, les équipements médicaux haute fréquence et de communications radio peuvent provoquer un dysfonctionnement ou une défaillance du climatiseur. Le climatiseur peut également endommager les équipements médicaux et de communications, perturbant ainsi les soins et réduisant la qualité d'affichage des écrans.**
- **Suivre les instructions ci-dessous pour éviter que les composants abrasifs contenus dans le papier de verre et les outils de coupe ne pénètrent dans le circuit de réfrigérant, car ces composants peuvent provoquer des défaillances du compresseur et des vannes.**
  - Pour ébavurer les tuyaux, utilisez un alésoir ou d'autres outils d'ébavurage, et non du papier de verre.
  - Pour couper les tuyaux, utilisez un coupe-tuyaux et non une meuleuse ou d'autres outils qui utilisent des matériaux abrasifs.
  - Lors de la coupe ou de l'ébavurage des tuyaux, ne pas laisser des copeaux de métal ou d'autres matières étrangères pénétrer dans les tuyaux.
  - Si des copeaux de métal ou d'autres matières étrangères pénètrent dans les tuyaux, les éliminer de l'intérieur des tuyaux.

1.2. Avant l'installation (déplacement)

⚠ **Précaution:**

- **Transporter les appareils avec précaution. L'appareil doit être transporté par deux personnes ou plus, car il pèse 20 kg, 44 lbs minimum. Ne pas tirer les rubans d'emballage. Portez des gants de protection pour sortir l'appareil de son emballage et pour le déplacer, car vous risquez de vous blesser les mains sur les ergots ou les arêtes des autres pièces.**
- **Veiller à éliminer le matériel d'emballage en toute sécurité. Le matériel d'emballage (clous et autres pièces en métal ou en bois) peut provoquer des blessures.**
- **La base et les fixations de l'appareil extérieur doivent être vérifiées régulièrement pour éviter qu'elles ne se desserrent, se fissurent ou subissent d'autres dommages. Si ces défauts ne sont pas corrigés, l'appareil peut tomber et provoquer des dommages ou des blessures.**
- **Ne pas nettoyer le climatiseur à l'eau au risque de provoquer un choc électrique.**
- **Serrer les écrous évasés, conformément aux spécifications, à l'aide d'une clé dynamométrique. Si les écrous sont trop serrés, ils peuvent se casser après un certain temps et provoquer une fuite de réfrigérant.**

1.3. Avant l'installation électrique

⚠ **Précaution:**

- **Veiller à installer des coupe-circuits. Dans le cas contraire, un choc électrique peut se produire.**
- **Veuillez respecter les réglementations nationales, de l'état ou locales applicables pour prévenir les fuites/chocs électriques potentiels. Ou installez un disjoncteur de fuite à la terre pour la prévention des fuites et des chocs électriques.**
- **Pour les lignes électriques, utiliser des câbles standard de capacité suffisante. Dans le cas contraire, un court-circuit, une surchauffe ou un incendie peut se produire.**
- **Lors de l'installation des lignes électriques, ne pas mettre les câbles sous tension. Si les connexions sont desserrées, les câbles peuvent se rompre et provoquer une surchauffe ou un incendie.**
- **Veiller à mettre l'appareil à la terre. Ne pas relier le fil de terre aux conduites de gaz ou d'eau, aux paratonnerres ou aux lignes de terre téléphoniques. Une mise à la terre incorrecte de l'appareil peut provoquer un choc électrique.**
- **Utiliser des coupe-circuits (disjoncteur de fuite à la terre, interrupteur d'isolement (fusible +B) et disjoncteur à boîtier moulé) à la capacité spécifiée. Si la capacité du coupe-circuit est supérieure à celle spécifiée, une défaillance ou un incendie peut se produire.**

1.4. Avant la marche d'essai

⚠ **Précaution:**

- **Activer l'interrupteur principal au moins 12 heures avant la mise en fonctionnement de l'appareil. L'utilisation de l'appareil juste après sa mise sous tension peut endommager sérieusement les pièces internes. Laisser l'interrupteur activé pendant la période d'utilisation.**
- **Avant d'utiliser l'appareil, vérifier que tous les panneaux, toutes les protections et les autres pièces de sécurité sont correctement installés. Les pièces tournantes, chaudes ou à haute tension peuvent provoquer des blessures.**
- **Ne pas toucher les interrupteurs les mains humides au risque de provoquer un choc électrique.**
- **Ne pas toucher les tuyaux de réfrigérant les mains nues lors de l'utilisation. Les tuyaux de réfrigérant sont chauds ou froids en fonction de l'état du réfrigérant qu'ils contiennent. Toucher les tuyaux peut provoquer des brûlures ou des gelures.**
- **A la fin de l'utilisation de l'appareil, attendre au moins cinq minutes avant de désactiver l'interrupteur principal. Dans le cas contraire, une fuite d'eau ou une défaillance peut se produire.**

1.5. Utilisation de climatiseurs utilisant le réfrigérant R410A

⚠ **Précaution:**

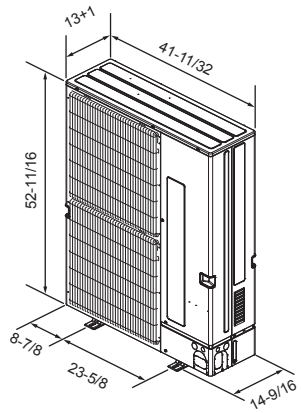
- **Utiliser le cuivre phosphoreux C1220, pour des tuyaux sans soudure en cuivre et en alliage de cuivre, pour raccorder les tuyaux de réfrigérant. Vérifier que l'intérieur des tuyaux est propre et dépourvu de tout agent nocif tel que des composés sulfuriques, des oxydants, des débris ou des saletés. Utiliser des tuyaux d'épaisseur spécifiée. (Se reporter à la page 6). Respecter les instructions suivantes en cas de réutilisation de tuyaux de réfrigérant R22 existants.**

- Remplacer les écrous évasés existants et évaser de nouveau les sections évasées.
- Ne pas utiliser de tuyaux fins. (Se reporter à la page 6)

- **Stocker à l'intérieur les tuyaux à utiliser pendant l'installation et couvrir les deux extrémités jusqu'au processus de brasage. (Laisser les joints de coude, etc. dans leur emballage.) L'infiltration de poussières, de débris ou d'humidité dans les tuyaux de réfrigérant peut affecter la qualité de l'huile ou endommager le compresseur.**
- **Appliquer une petite quantité d'huile ester, éther ou alkylbenzène comme huile réfrigérante sur les sections évasées. Le mélange d'huile minérale et d'huile réfrigérante peut affecter la qualité de l'huile.**
- **Ne pas utiliser un réfrigérant autre que le réfrigérant R410A. Si c'est le cas, le chlore peut affecter la qualité de l'huile.**
- **Utiliser les outils suivants spécialement conçus pour une utilisation avec le réfrigérant R410A. Les outils suivants sont nécessaires pour utiliser le réfrigérant R410A. En cas de questions, contacter le revendeur le plus proche.**

Outils (pour R410A)	
Collecteur jauge	Outil d'évasement
Tuyau de charge	Jauge de réglage de la taille
Détecteur de fuite de gaz	Adaptateur pour pompe à vide
Clé dynamométrique	Echelle électronique de charge de réfrigérant

- **Veiller à utiliser les outils adaptés. L'infiltration de poussières, de débris ou d'humidité dans les tuyaux de réfrigérant peut affecter la qualité de l'huile réfrigérante.**
- **Ne pas utiliser un cylindre de charge. L'utilisation d'un cylindre de charge peut modifier la composition du réfrigérant et réduire son efficacité.**



(pouce)

Fig. 2-1

2.1. Tuyaux de réfrigérant

Se reporter à la section Fig. 4-1.

2.2. Sélection de l'emplacement d'installation de l'appareil extérieur

- Eviter les endroits exposés au rayonnement solaire direct ou à d'autres sources de chaleur.
- Sélectionner un endroit où le bruit de l'appareil n'incommodera pas le voisinage.
- Sélectionner un endroit permettant un accès facile des câbles et tuyaux à la source d'alimentation et à l'appareil intérieur.
- Eviter les endroits exposés à des risques de fuite, d'échappement ou d'accumulation de gaz.
- Ne pas oublier que des gouttes d'eau peuvent couler de l'appareil lors de son utilisation.
- Sélectionner un endroit de niveau pouvant supporter le poids et les vibrations de l'appareil.
- Eviter les endroits où l'appareil peut être recouvert de neige. Dans les zones où les chutes de neige importantes sont prévisibles, certaines précautions (par ex., relever l'emplacement d'installation ou installer une hotte sur l'arrivée d'air) doivent être prises pour éviter que la neige ne bloque l'arrivée d'air ou ne tombe directement dessus. La circulation de l'air risque de diminuer et d'entraîner un dysfonctionnement.
- Eviter les endroits exposés à l'huile, à la vapeur ou au gaz sulfurique.
- Utiliser les poignées de transport (quatre emplacements à gauche, à droite, à l'avant et à l'arrière) de l'appareil extérieur pour le déplacer. Transporter l'appareil par le bas peut provoquer des pincements aux mains ou aux doigts.

2.3. Dimensions extérieures (Appareil extérieur) (Fig. 2-1)

2.4. Contraintes concernant l'installation d'un appareil intérieur

Les contraintes suivantes s'appliquent aux appareils intérieurs qui peuvent être raccordés à cet appareil extérieur.

- Les appareils intérieurs ayant pour numéro de modèle 04-72 peuvent être raccordés.
- En cas d'utilisation de boîtier de dérivation, les appareils intérieurs des modèles 06-36 peuvent être raccordés.
- Reportez-vous au tableau 1 ci-dessous pour connaître les combinaisons possibles d'unités internes.

Vérification

La puissance nominale doit être déterminée à l'aide du tableau ci-dessous. Le nombre d'unités est limité, comme indiqué au tableau 2 ci-dessous. Au cours de la prochaine étape, veillez à ce que la puissance nominale totale sélectionnée varie entre 50% - 130% de la puissance de l'appareil extérieur.

- MXZ-SM36 18 – 46 kBtu/h
- MXZ-SM42 21 – 54 kBtu/h
- MXZ-SM48 24 – 62 kBtu/h
- MXZ-SM60 30 – 78 kBtu/h

Tableau 1-1 : Appareils intérieurs City Multi (série P·FY)

Type d'appareil intérieur	P04	P05	P06	P08	P12	P15	P18	P24	P30	P36	P48	P54	P72
Capacité nominale (refroidissement) (kBtu/h)	4	5	6	8	12	15	18	24	30	36	48	54	72

Tableau 1-2 : Série M, série P, série S

Nº de modèle	06	09	12	15	18	24	30	36
Capacité nominale (refroidissement) (kBtu/h)	6	9	12	15	18	24	30	36

Dans les combinaisons dans lesquelles la capacité totale des appareils intérieurs est supérieure à la capacité de l'appareil extérieur, la capacité de refroidissement de chaque appareil intérieur sera réduite en dessous de sa capacité de refroidissement nominale. Par conséquent, combiner des appareils intérieurs à un appareil extérieur sans dépasser la capacité de ce dernier, si possible.

Tableau 2 : Nombre d'appareils intérieurs pouvant être raccordés

- Appareils intérieurs City Multi

SM36	1-11
SM42	1-12
SM48	1-12
SM60	1-12

- Système de boîtier de dérivation (appareils intérieurs Série M, S, P via boîtier de dérivation)

SM36	2*1 – 4 (3) appareils *2 *3 *4
SM42	2*1 – 5 (4) appareils *2 *3 *4
SM48	2*1 – 8 (6) appareils *2 *3 *4
SM60	2*1 – 8 (6) appareils *2 *3 *5

*1 Un seul appareil peut être raccordé à l'appareil série SVZ.

*2 Le nombre entre parenthèses est le nombre maximum d'appareils qui peuvent être raccordés lorsque 1 ou plusieurs appareils PLA-A·EA7 sont raccordés.

*3 En cas de raccordement d'un ou de plusieurs appareils de la série SVZ, définissez des contraintes supplémentaires de la manière suivante.
Pour des raccordements différents de ceux spécifiés ci-dessous, consultez votre revendeur.

Nombre d'appareils raccordés de la série SVZ	Contraintes (pour chaque boîtier de dérivation raccordé)
2	Il n'est pas possible de raccorder d'autres appareils intérieurs que les appareils de la série SVZ.
1	• La capacité nominale totale (refroidissement) doit être de 100 % ou inférieure, appareil de la série SVZ inclus (SM60 uniquement). • Seul 1 appareil SEZ ou 1 appareil PEAD peut être inclus dans le raccordement.

*4 Un boîtier de dérivation peut raccorder jusqu'à 3 appareils de la série SEZ/PEAD.

*5 Un boîtier de dérivation peut raccorder jusqu'à 2 appareils de la série SEZ/PEAD.
En cas de raccordement avec 1 ou plus de 1 appareil de la série SEZ/PEAD, la capacité nominale totale (refroidissement), appareils SEZ/PEAD inclus, est de 100 % et inférieure à 100 %.

Pour des raccordements autres que ceux spécifiés dans 1 et 2, y compris les raccordements avec des appareils de la série SVZ, consultez un revendeur.

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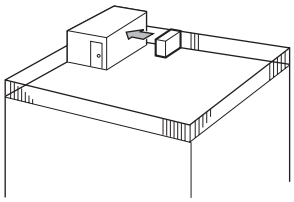


Fig. 2-2

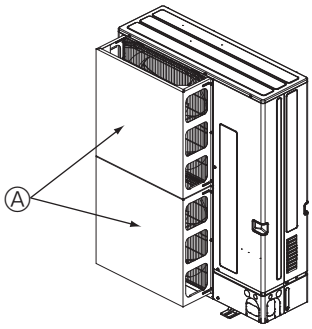


Fig. 2-3

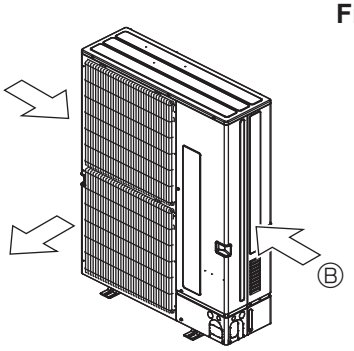


Fig. 2-4

2.5. Ventilation et espace de service

Remarque :

Les dimensions figurant à côté des flèches ci-dessus sont nécessaires pour garantir les performances du climatiseur. Installez l'appareil dans un espace le plus large possible pour faciliter les entretiens ou les réparations ultérieurs.

2.5.1. Installation à un endroit exposé au vent

Lors de l'installation de l'appareil extérieur sur un toit ou à d'autres endroits non protégés du vent, diriger la sortie d'air de l'appareil vers le côté qui n'est pas directement exposé aux vents forts. Le vent soufflant dans la sortie d'air peut empêcher l'air de circuler normalement et provoquer un dysfonctionnement.

Voici trois exemples de précautions à prendre.

① Positionner la sortie d'air vers le mur le plus proche et à environ 50 cm (19-11/16") de celui-ci. (Fig. 2-2)

② Installez un dispositif de protection contre le vent si l'appareil est installé à un endroit où des vents violents, en cas de typhon par exemple, risquent de souffler directement dans la sortie d'air. (Fig. 2-3)
Ⓐ Dispositif de protection contre le vent

③ Placer l'appareil de sorte que la sortie d'air souffle dans la direction perpendiculaire à celle des vents saisonniers, si celle-ci est connue. (Fig. 2-4)
Ⓑ Sens du vent

2. Emplacement d'installation

(pouce)

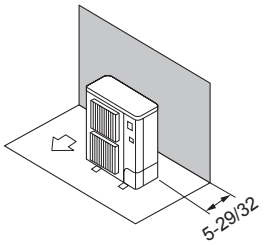


Fig. 2-5

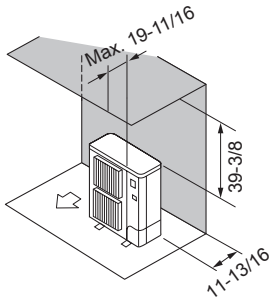


Fig. 2-6

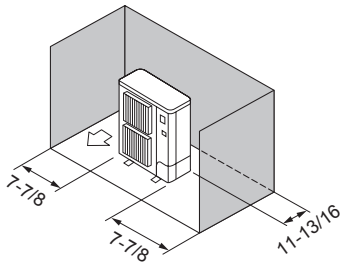


Fig. 2-7

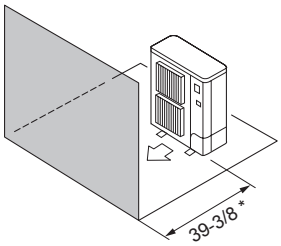


Fig. 2-8

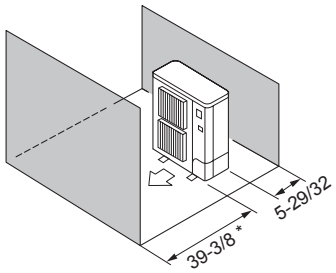


Fig. 2-9

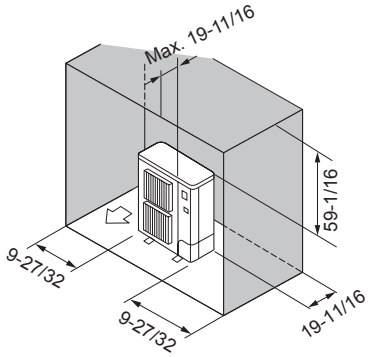


Fig. 2-10

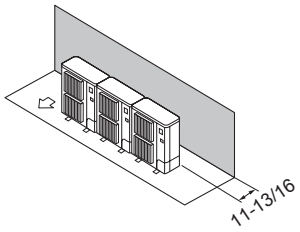


Fig. 2-11

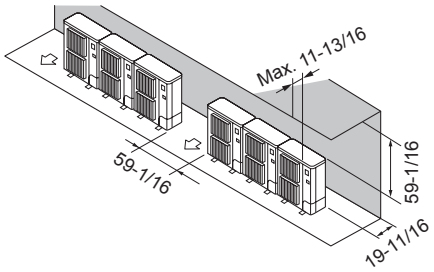


Fig. 2-12

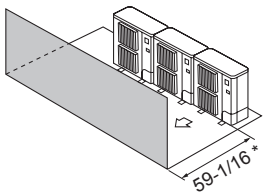


Fig. 2-13

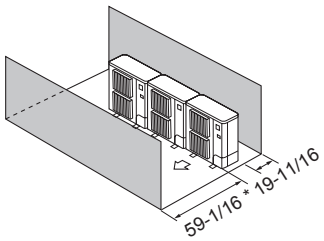


Fig. 2-14

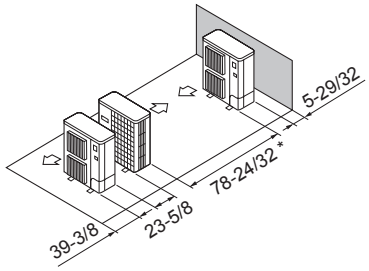


Fig. 2-15

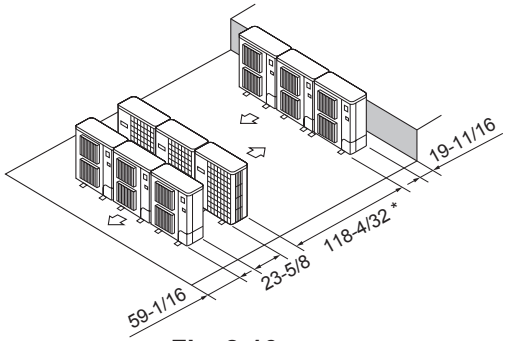


Fig. 2-16

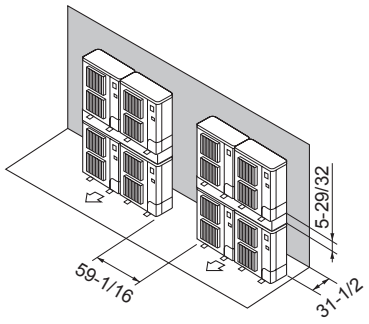


Fig. 2-17

2.5.2. Lors de l'installation d'un seul appareil extérieur

Le dimensions minimales sont les suivantes, à l'exception des valeurs Max., indiquant les dimensions maximales.

Utiliser les chiffres pour chaque cas.

① Obstacles à l'arrière (Fig. 2-5)

② Obstacles à l'arrière et au-dessus (Fig. 2-6)

③ Obstacles à l'arrière et sur les côtés (Fig. 2-7)

④ Obstacles à l'avant (Fig. 2-8)

* Lors de l'utilisation les guidages de sortie d'air en option, le jeu est de 19-11/16" (500 mm) minimum.

⑤ Obstacles à l'avant et à l'arrière (Fig. 2-9)

* Lors de l'utilisation les guidages de sortie d'air en option, le jeu est de 19-11/16" (500 mm) minimum.

⑥ Obstacles à l'arrière, sur les côtés et au-dessus (Fig. 2-10)

• Ne pas utiliser les guidages de sortie d'air en option pour un débit d'air vers le haut.

2.5.3. Lors de l'installation de plusieurs appareils extérieurs

Espacer les appareils de 1" (25 mm) minimum.

① Obstacles à l'arrière (Fig. 2-11)

② Obstacles à l'arrière et au-dessus (Fig. 2-12)

• Ne pas installer côte à côte plus de trois appareils. Espacer également les appareils, comme illustré.

• Ne pas utiliser les guidages de sortie d'air en option pour un débit d'air vers le haut.

③ Obstacles à l'avant (Fig. 2-13)

* Lors de l'utilisation les guidages de sortie d'air en option, le jeu est de 39-3/8" (1000 mm) minimum.

④ Obstacles à l'avant et à l'arrière (Fig. 2-14)

* Lors de l'utilisation les guidages de sortie d'air en option, le jeu est de 39-3/8" (1000 mm) minimum.

⑤ Disposition pour un seul appareil parallèle (Fig. 2-15)

* Lors de l'utilisation les guidages de sortie d'air en option installé pour un débit d'air vers le haut, le jeu est de 39-3/8" (1000 mm) minimum.

⑥ Disposition pour plusieurs appareils parallèles (Fig. 2-16)

* Lors de l'utilisation les guidages de sortie d'air en option installé pour un débit d'air vers le haut, le jeu est de 59-1/16" (1500 mm) minimum.

⑦ Disposition pour appareils empilés (Fig. 2-17)

• Il est possible d'empiler jusqu'à deux appareils.

• Ne pas installer côte à côte plus de deux appareils empilés. Espacer également les appareils, comme illustré.

fr

3. Installation de l’appareil extérieur

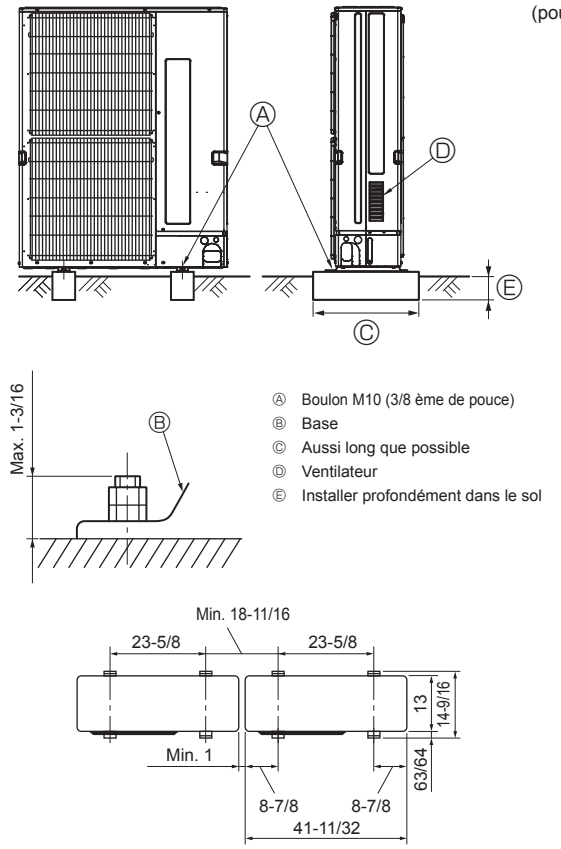


Fig. 3-1

- Bien installer l’appareil sur une surface solide et de niveau, de façon à éviter tout bruit de crécelle pendant le fonctionnement. (Fig. 3-1)

<Spécifications de la fondation>

Boulon de fondation	M10 (3/8 ème de pouce)
Epaisseur de béton	120 mm (4-23/32 ème de pouce)
Longueur des boulons	70 mm (2-3/4 ème de pouce)
Résistance au poids	320 kg (705 lbs)

- S’assurer que la longueur des boulons de fondation ne dépasse pas 30 mm (1-3/16") par rapport à la surface inférieure de la base.
- Fixer fermement la base de l’appareil avec quatre boulons de fondation M10 placés à des endroits suffisamment robustes.

Installation de l’appareil extérieur

- Ne pas bloquer le ventilateur. Si le ventilateur est bloqué, l’appareil sera ralenti et risque d’être endommagé.
- Pour installer l’appareil, utiliser, si nécessaire et en plus de la base de l’appareil, les orifices d’installation situés à l’arrière pour fixer les câbles, etc. Utiliser des vis autotaraudeuses (ø5 × 15 mm, ø13/16" × 19/32" maximum) et installer l’appareil sur site.

⚠ Avertissement:

- **L’appareil doit être solidement installé sur une structure pouvant supporter son poids. Si l’appareil est fixé sur une structure instable, il risque de tomber et de provoquer des dommages ou des blessures.**
- **L’appareil doit être installé conformément aux instructions pour réduire les risques de dommages liés à des tremblements de terre, des typhons ou des vents violents. Une installation incorrecte peut entraîner la chute de l’appareil et provoquer des dommages ou des blessures.**

⚠ Précaution:

- **Installez l’appareil sur une surface solide pour éviter des bruits ou des vibrations d’opération excessives.**

4. Installation de la tuyauterie du réfrigérant

4.1. Consignes pour appareils utilisant le réfrigérant R410A

- Se reporter à la page 2 pour les consignes non reprises ci-dessous concernant l’utilisation de climatiseurs avec un réfrigérant R410A.
- Appliquer une petite quantité d’huile ester, éther ou alkylbenzène comme huile réfrigérante sur les sections évasées.
- Utiliser le cuivre phosphoreux C1220, pour des tuyaux sans soudure en cuivre et en alliage de cuivre, pour raccorder les tuyaux de réfrigérant. Utiliser les tuyaux de réfrigérant dont l’épaisseur est spécifiée dans le tableau ci-dessous. Vérifier que l’intérieur des tuyaux est propre et dépourvu de tout agent nocif tel que des composés sulfuriques, des oxydants, des débris ou des saletés.

⚠ Avertissement:

Lors de l’installation, du déplacement ou de l’entretien de l’appareil extérieur, n’utilisez que le réfrigérant spécifié (R410A) pour remplir les tuyaux de réfrigérant. Ne pas le mélanger avec un autre réfrigérant et faire le vide d’air dans les tuyaux.

Si du réfrigérant est mélangé avec de l’air, cela peut provoquer des pointes de pression dans les tuyaux de réfrigérant et entraîner une explosion et d’autres risques.

L’utilisation d’un réfrigérant différent de celui spécifié pour le climatiseur peut entraîner des défaillances mécaniques, des dysfonctionnements du système ou une panne de l’appareil. Dans le pire des cas, cela peut entraîner un obstacle à la mise en sécurité du produit.

ø6,35 mm (1/4 pouce), ø9,52 mm (3/8 pouce), ø12,7 mm (1/2 pouce)	Épaisseur 0,8 mm (1/32 pouce)
ø15,88 mm (5/8 pouce), ø19,05 mm (3/4 pouce)	Épaisseur 1,0 mm (5/128 pouce)

- Ne pas utiliser de tuyaux plus fins que ceux spécifiés ci-dessus.
- **Les épaisseurs du tableau ci-dessus sont basées sur les normes japonaises. Utilisez des tuyaux présentant une pression de fonctionnement maximale de 4,15 MPa [601 PSIG] ou plus selon les normes locales.**

⚠ Précaution:

Suivre les instructions ci-dessous pour éviter que les composants abrasifs contenus dans le papier de verre et les outils de coupe ne pénètrent dans le circuit de réfrigérant, car ces composants peuvent provoquer des défaillances du compresseur et des vannes.

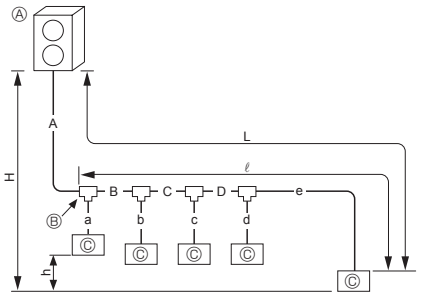
- **Pour ébavurer les tuyaux, utilisez un alésoir ou d'autres outils d'ébavurage, et non du papier de verre.**
- **Pour couper les tuyaux, utilisez un coupe-tuyaux et non une meuleuse ou d'autres outils qui utilisent des matériaux abrasifs.**
- **Lors de la coupe ou de l’ébavurage des tuyaux, ne pas laisser des copeaux de métal ou d’autres matières étrangères pénétrer dans les tuyaux.**
- **Si des copeaux de métal ou d'autres matières étrangères pénètrent dans les tuyaux, les éliminer de l'intérieur des tuyaux.**

fr

4. Installation de la tuyauterie du réfrigérant

4.2. Longueur de tuyau et différence de hauteur

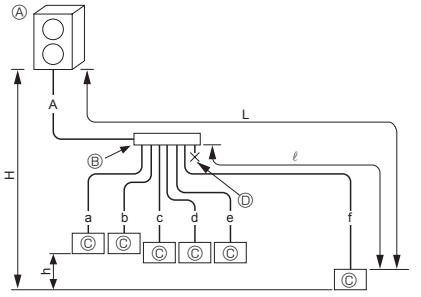
4.2.1. Raccordement sans boîtier de dérivation (Fig. 4-1)



Ⓐ Appareil extérieur
Ⓑ Première dérivation
Ⓒ Appareil intérieur

		SM36/42/48	SM60
A+B+C+D+a+b+c+d+e		≦ 300 m [984 pieds]	≦ 150 m [492 pieds]
L = A+B+C+D+e		≦ 150 m [492 pieds]	≦ 80 m [262 pieds]
ℓ = B+C+D+e		≦ 30 m [98 pieds]	
H	Extérieur plus haut	≦ 50 m [164 pieds]	
	Extérieur plus bas	≦ 40 m [131 pieds]*	≦ 40 m [131 pieds]
h		≦ 15 m [49 pieds]	

* Lorsque PKFY-P06NBMU, PKFY-P08NHMU, PKFY-P04/06/08/12NLMU, PFFY-P06/08/12NEMU ou PFFY-P06/08/12NRMU sont compris, ne dépassez pas 30 m [98 pieds].



Ⓐ Appareil extérieur
Ⓑ Première dérivation
Ⓒ Appareil intérieur
Ⓓ Capuchon

		SM36/42/48	SM60
A+a+b+c+d+e+f		≦ 300 m [984 pieds]	≦ 150 m [492 pieds]
L = A+f		≦ 150 m [492 pieds]	≦ 80 m [262 pieds]
ℓ = f		≦ 30 m [98 pieds]	
H	Extérieur plus haut	≦ 50 m [164 pieds]	
	Extérieur plus bas	≦ 40 m [131 pieds]*	≦ 40 m [131 pieds]
h		≦ 15 m [49 pieds]	

* Lorsque PKFY-P06NBMU, PKFY-P08NHMU, PKFY-P04/06/08/12NLMU, PFFY-P06/08/12NEMU ou PFFY-P06/08/12NRMU sont compris, ne dépassez pas 30 m [98 pieds].

Fig. 4-1

Formule de conversion

1/4 F	ø6,35 (1/4)
3/8 F	ø9,52 (3/8)
1/2 F	ø12,7 (1/2)
5/8 F	ø15,88 (5/8)
3/4 F	ø19,05 (3/4)

A, B, C, D (mm [pouce])

	Conduit de liquide	Conduit de gaz
SM36/42/48	ø9,52 [3/8]	ø15,88 [5/8]
SM60		ø19,05 [3/4]

a, b, c, d, e, f (mm [pouce])

Numéro de modèle	Conduit de liquide	Conduit de gaz
04, 05, 06, 08, 12, 15, 18	ø6,35 [1/4]	ø12,7 [1/2]
24, 27, 30, 36, 48, 54	ø9,52 [3/8]	ø15,88 [5/8]
72	ø9,52 [3/8]	ø19,05 [3/4]

Modèle du kit de dérivation
CMY-Y62-G-E

4-Socle de dérivation	8-Socle de dérivation
CMY-Y64-G-E	CMY-Y68-G-E

Préparation du tuyau

① Le tableau ci-dessous présente les spécifications des tuyaux disponibles dans le commerce.

Diamètre extérieur	Epaisseur de l'isolation	Matériau d'isolation
mm (pouce)	mm (pouce)	
6,35 (1/4)	8 (5/16)	Plastique expansé résistant à la chaleur ayant une gravité spécifique de 0,045.
9,52 (3/8)	8 (5/16)	
12,7 (1/2)	8 (5/16)	
15,88 (5/8)	8 (5/16)	
19,05 (3/4)	8 (5/16)	

② Vérifier que les 2 tuyaux de réfrigérant sont isolés pour empêcher la formation de condensation.

③ Le rayon de pliage du tuyau de réfrigérant doit être de 4 pouce (100 mm) minimum.

⚠ **Précaution:**
Veiller à utiliser l'isolation de l'épaisseur indiquée. Une isolation trop épaisse pourrait être à l'origine d'une installation incorrecte de l'appareil intérieur alors qu'une isolation trop fine pourrait provoquer des fuites.

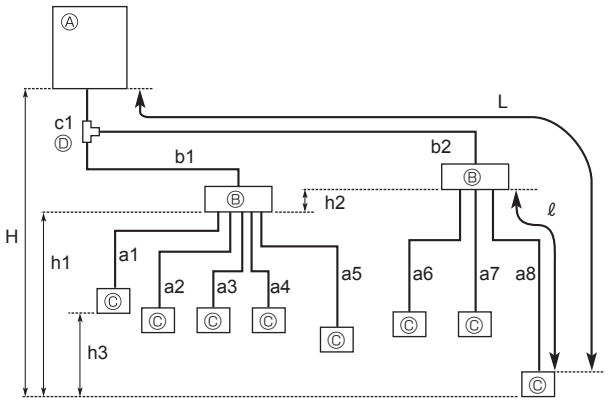
⚠ **Avertissement:**
Pendant l'opération d'aspiration du réfrigérant, arrêtez le compresseur avant de débrancher les tuyaux de réfrigérant. Le compresseur risque d'éclater et de provoquer des blessures si une substance étrangère, comme de l'air, pénètre dans le système.

fr

4. Installation de la tuyauterie du réfrigérant

4.2.2. Raccordement avec boîtier de dérivation (Fig. 4-2)

- Cet appareil intègre des raccordements évasés de chaque côté des appareils intérieurs, du boîtier de dérivation et de l'appareil extérieur.
- Retirer le couvercle de soupape de l'appareil extérieur, puis raccorder le tuyau.
- Les tuyaux de réfrigérant servent à raccorder le boîtier de dérivation et l'appareil extérieur.



Ⓐ Appareil extérieur
Ⓑ Boîtier de dérivation
Ⓒ Appareil intérieur
Ⓓ Le premier joint

Fig. 4-2

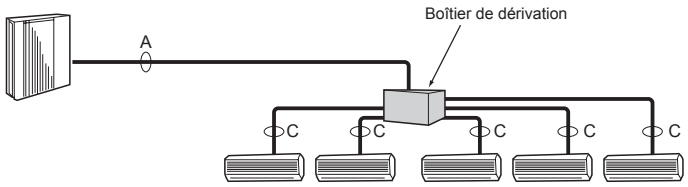
Longueur admise (un sens)	Longueur de tuyau totale	c1 + b1 + b2 + a1 + a2 + a3 + a4 + a5 + a6 + a7 + a8 ≤ 150 m (492 pieds)
	Longueur de tuyau maximum (L) *1	c1 + b2 + a8 ≤ 80 m (262 pieds)
	Longueur de tuyau entre l'appareil extérieur et les boîtiers de dérivation	c1 + b1 + b2 ≤ 55 m (180 pieds)
	Boîtier de dérivation le plus éloigné du premier joint (b2)	b2 ≤ 30 m (98 pieds)
	Longueur de tuyau maximum après le boîtier de dérivation (ℓ)	a8 ≤ 25 m (82 pieds)
	Longueur de tuyau totale entre les boîtiers de dérivation et les appareils intérieurs	a1 + a2 + a3 + a4 + a5 + a6 + a7 + a8 ≤ 95 m (311 pieds)
Différence de hauteur admise (un sens)	Dans la section intérieure/extérieure (H) *2	H ≤ 50 m (164 pieds) (Si l'appareil extérieur est placé plus haut que l'appareil intérieur)
		H ≤ 40 m (131 pieds) (Si l'appareil extérieur est placé plus bas que l'appareil intérieur)
	Dans la section boîtier de dérivation/appareil intérieur (h1)	h1 + h2 ≤ 15 m (49 pieds)
	Dans chaque appareil de dérivation (h2)	h2 ≤ 15 m (49 pieds)
	Dans chaque appareil intérieur (h3)	h3 ≤ 12 m (39 pieds)
Nombre de coudes		| c1 + b1 + a1 |, | c1 + b1 + a2 |, | c1 + b1 + a3 |, | c1 + b1 + a4 |, | c1 + b1 + a5 |, | c1 + b2 + a6 |, | c1 + b2 + a7 |, | c1 + b2 + a8 | ≤ 15

*1 Le tableau des spécifications de tuyauterie n'indique pas de longueur de ligne minimum. Cependant, les appareils intérieurs dont la longueur de tuyauterie connectée est inférieure à 16 pieds (5 m) pourraient produire un bruit intermittent pendant le fonctionnement normal du système dans des environnements très calmes. Tenez compte de cette information importante lors de l'installation et du positionnement de l'appareil intérieur dans l'espace climatisé.

*2 Placer le boîtier de dérivation à une hauteur comprise entre celle de l'appareil extérieur et des appareils intérieurs.

4. Installation de la tuyauterie du réfrigérant

■ **En cas d'utilisation d'1 boîtier de dérivation**
Raccordement évasé utilisé. (Pas de brasage)



■ **En cas d'utilisation de 2 boîtiers de dérivation**

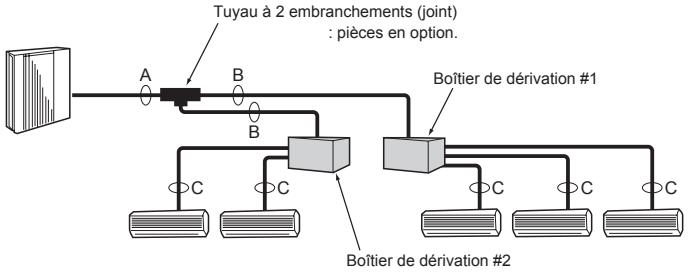


Fig. 4-3

Raccordement évasé du tuyau de réfrigérant de boîtier de dérivation mm (pouce)

	Vers l'appareil intérieur					Vers l'appareil extérieur
	A	B	C	D	E	
Conduit de liquide	ø6,35 (1/4)	ø6,35 (1/4)	ø6,35 (1/4)	ø6,35 (1/4)	ø6,35 (1/4)	ø9,52 (3/8)
Conduit de gaz	ø9,52 (3/8)	ø9,52 (3/8)	ø9,52 (3/8)	ø9,52 (3/8)	ø12,7 (1/2)	ø15,88 (5/8)

* Type à 3 embranchements : uniquement A, B, C

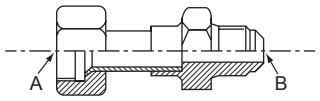


Fig. 4-4

Formule de conversion

1/4 F	ø6,35 (1/4)
3/8 F	ø9,52 (3/8)
1/2 F	ø12,7 (1/2)
5/8 F	ø15,88 (5/8)
3/4 F	ø19,05 (3/4)

Taille du tuyau

A

	Conduit de liquide	Conduit de gaz
SM36	ø9,52 (3/8)	ø15,88 (5/8)
SM42		
SM48		
SM60		ø19,05 (3/4)

B

• SM36/42/48

Conduit de liquide	Conduit de gaz
ø9,52 (3/8)	ø15,88 (5/8)

• SM60

Capacité totale des appareils intérieurs	Conduit de liquide	Conduit de gaz
– 54 kBtu/h	ø9,52 (3/8)	ø15,88 (5/8)
54 kBtu/h –	ø9,52 (3/8)	ø19,05 (3/4)

C

La taille des raccordements de tuyau diffère selon le type et la capacité des appareils intérieurs. Adapter la taille du raccordement du tuyau du boîtier de dérivation à l'appareil intérieur.
Si la taille du raccordement du tuyau du boîtier de dérivation diffère de celle du raccordement du tuyau de l'appareil intérieur, utiliser des joints de diamètre différent (déformés), disponibles en option, au niveau du boîtier de dérivation. (Raccorder le joint déformé directement au niveau du boîtier de dérivation.)

■ **Taille du tuyau (Boîtier de dérivation/Appareil intérieur) *Cas des appareils intérieurs de la série M ou S**

Type d'appareil intérieur	(Btu/h)	06	09	12	15	18	24	30	36
Taille du tuyau (mm (pouce))	Liquide	ø6,35 (1/4)	ø6,35 (1/4)	ø6,35 (1/4)	ø6,35 (1/4)	ø6,35 (1/4)	ø9,52 (3/8)	ø9,52 (3/8)	ø9,52 (3/8)
	Gaz	ø9,52 (3/8)	ø9,52 (3/8)	ø9,52 (3/8)	ø12,7 (1/2)	ø12,7 (1/2)	ø15,88 (5/8)	ø15,88 (5/8)	ø15,88 (5/8)

■ **Taille du tuyau (Boîtier de dérivation/Appareil intérieur) *Cas de l'appareil intérieur de la série P**

Type d'appareil intérieur	(Btu/h)	09	12	15	18	24	30	36
Taille du tuyau (mm (pouce))	Liquide	ø6,35 (1/4)	ø6,35 (1/4)	ø6,35 (1/4)	ø6,35 (1/4)	ø9,52 (3/8)	ø9,52 (3/8)	ø9,52 (3/8)
	Gaz	ø9,52 (3/8)	ø12,7 (1/2)	ø12,7 (1/2)	ø12,7 (1/2)	ø15,88 (5/8)	ø15,88 (5/8)	ø15,88 (5/8)

La connexion réglage d'un appareil intérieur raccordable dépend de la région/du pays.

Joint de diamètre différent (pièces disponibles en option) (Fig. 4-4)

Nom de modèle	Diamètre des tuyaux raccordés mm (pouce)	Diamètre A mm (pouce)	Diamètre B mm (pouce)
MAC-A454JP-E	ø9,52 (3/8) → ø12,7 (1/2)	ø9,52 (3/8)	ø12,7 (1/2)
MAC-A455JP-E	ø12,7 (1/2) → ø9,52 (3/8)	ø12,7 (1/2)	ø9,52 (3/8)
MAC-A456JP-E	ø12,7 (1/2) → ø15,88 (5/8)	ø12,7 (1/2)	ø15,88 (5/8)
PAC-493PI	ø6,35 (1/4) → ø9,52 (3/8)	ø6,35 (1/4)	ø9,52 (3/8)
PAC-SG76RJ-E	ø9,52 (3/8) → ø15,88 (5/8)	ø9,52 (3/8)	ø15,88 (5/8)
PAC-SG75RJ-E	ø15,88 (5/8) → ø19,05 (3/4)	ø15,88 (5/8)	ø19,05 (3/4)

Préparation du tuyau

① Le tableau ci-dessous présente les spécifications des tuyaux disponibles dans le commerce.

Diamètre extérieur mm (pouce)	Epaisseur de l'isolation mm (pouce)	Matériau d'isolation
6,35 (1/4)	8 (5/16)	Plastique expansé résistant à la chaleur ayant une gravité spécifique de 0,045.
9,52 (3/8)	8 (5/16)	
12,7 (1/2)	8 (5/16)	
15,88 (5/8)	8 (5/16)	
19,05 (3/4)	8 (5/16)	

② Vérifier que les 2 tuyaux de réfrigérant sont isolés pour empêcher la formation de condensation.

③ Le rayon de pliage du tuyau de réfrigérant doit être de 4 pouce (100 mm) minimum.

⚠ **Précaution:**

Veiller à utiliser l'isolation de l'épaisseur indiquée. Une épaisseur trop importante peut engendrer une installation incorrecte de l'appareil intérieur et du boîtier de dérivation ; une épaisseur trop faible peut provoquer un égouttement de la condensation.

Tuyau à 2 embranchements (Joint) : Pièces disponibles en option (en fonction de la méthode de raccordement choisie, il est possible de choisir votre préférée).

Nom de modèle	Méthode de raccordement
MSDD-50AR-E	évasement
MSDD-50BR-E	brasage

■ **Procédure d'installation (tuyau à 2 embranchements (Joint))**

Veuillez consulter les manuels d'installation des MSDD-50AR-E et MSDD-50BR-E.

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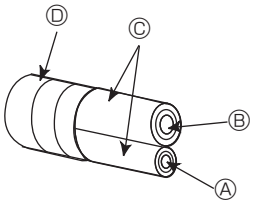
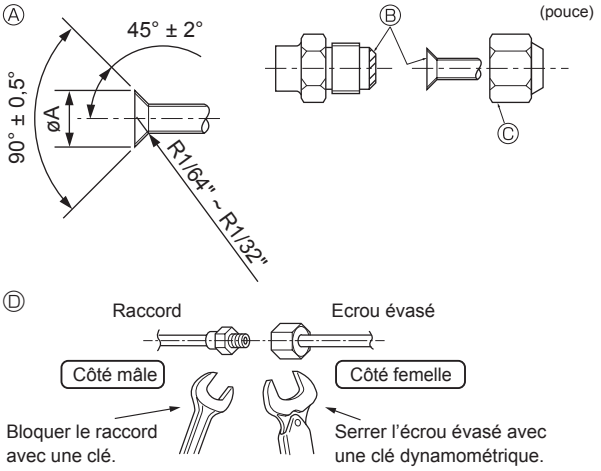


Ⓐ Conduit de liquide
Ⓑ Conduit de gaz
Ⓒ Isolation thermique
Ⓓ Rubanage

Fig. 4-5



Ⓐ Dimension de l'évasement
Ⓓ Couple de serrage du raccord conique

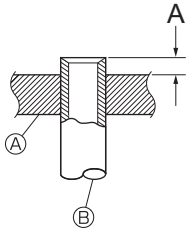
Fig. 4-6

Ⓐ (Fig. 4-6)

Diam. ext. Tuyau en cuivre (mm) (pouce)	Dimensions évasement Dimensions øA (mm) (pouce)
ø6,35 (1/4)	8,7 - 9,1 (5/16 - 3/8)
ø9,52 (3/8)	12,8 - 13,2 (1/2 - 33/64)
ø12,7 (1/2)	16,2 - 16,6 (41/64 - 21/32)
ø15,88 (5/8)	19,3 - 19,7 (49/64 - 25/32)
ø19,05 (3/4)	23,6 - 24,0 (15/16 - 61/64)

Diam. ext. Tuyau en cuivre (mm) (pouce)	Diam.ext. raccord conique (mm) (pouce)	Couple de serrage (N·m)* (ft·lbs)
ø6,35 (1/4)	17 (43/64)	14 - 18 (10 - 13)
ø6,35 (1/4)	22 (7/8)	34 - 42 (25 - 30)
ø9,52 (3/8)	22 (7/8)	34 - 42 (25 - 30)
ø9,52 (3/8)	26 (1-3/64)	49 - 61 (35 - 44)
ø12,7 (1/2)	26 (1-3/64)	49 - 61 (35 - 44)
ø12,7 (1/2)	29 (1-9/64)	68 - 82 (49 - 59)
ø15,88 (5/8)	29 (1-9/64)	68 - 82 (49 - 59)
ø15,88 (5/8)	36 (1-27/64)	100 - 120 (71 - 87)
ø19,05 (3/4)	36 (1-27/64)	100 - 120 (71 - 87)

* 1 N·m ≒ 10 kgf·cm



Ⓐ Matrice
Ⓑ Tuyau en cuivre

Fig. 4-7

4.3. Connexion des tuyaux (Fig. 4-5) (Fig. 4-6)

- Assurez-vous de bien isoler les tuyaux de réfrigérant pour éviter la formation de condensation sur les tuyaux. (de liquide et de gaz)
- Selon l'environnement d'installation des tuyaux de réfrigérant, il peut être nécessaire d'appliquer une couche d'isolation supplémentaire pour éviter la formation de condensation sur la surface du matériel d'isolation.
  (Température de résistance à la chaleur du matériel d'isolation : 120 °C, 248 °F ; épaisseur : 15 mm, 5/8 po. ou plus)
  * Si les tuyaux de réfrigérant sont placés dans des endroits sujets à des températures/humidité élevées, tels que dans un grenier, une couche d'isolation supplémentaire peut être nécessaire.
- Pour isoler les tuyaux de réfrigérant, appliquez une mousse de polyéthylène résistante à la chaleur entre l'appareil intérieur et le matériel d'isolation, ainsi que dans tous les espaces entre le matériel d'isolation.
  (De la condensation sur les tuyaux peut causer de la condensation dans la pièce ou des brûlures lors de contacts avec les tuyaux.)
- Les parties intérieures du tuyau d'écoulement doivent également être entourées de matière isolante en mousse de polyéthylène (avec une poids spécifique de 0,03 et de 9 mm (3/8 pouce) d'épaisseur ou plus).

[Fig. 4-6]

- Appliquer un film mince d'huile réfrigérante sur la surface du tuyau et du support du joint avant de serrer l'écrou évasé. Ⓐ
- Appliquer de l'huile réfrigérante sur toute la surface évasée du fond. Ⓑ
- Utiliser les raccords coniques comme suit. Ⓒ
- Le raccordement est réalisé en alignant d'abord le centre puis en serrant à la main les 3 ou 4 premiers tours de l'écrou de fixation à évasement.
- Utiliser deux clés pour serrer les connexions des tuyaux. Ⓓ
- Lorsque le raccord des tuyaux est terminé, utiliser un détecteur de fuite de gaz ou une solution savonneuse à base d'eau pour s'assurer qu'il n'y ait pas de fuite de gaz.
- Veiller à ne pas rompre les tuyaux lors de leur courbure. Un rayon de courbure de 100 mm (4 pouces) à 150 mm (6 pouce) est suffisant.
- Vérifier que les tuyaux ne touchent pas le compresseur. Des vibrations ou des bruits anormaux pourraient se produire.

① Raccorder les tuyaux en commençant par l'appareil intérieur.
Serrer les écrous évasés à l'aide d'une clé dynamométrique.
② Evaser les conduits de liquide et de gaz, puis appliquer un film mince d'huile réfrigérante (application sur site).

- Si un procédé d'étanchéité traditionnel est utilisé pour les tuyaux, se reporter au tableau 2 pour l'évasement des tuyaux de réfrigérant R410A.
  La jauge de réglage de la taille peut être utilisée pour confirmer les mesures A.

⚠ Avertissement:
Pendant l'installation de l'appareil, branchez correctement les tuyaux de réfrigérant avant de lancer le compresseur.

⚠ Précaution:
- **Assurez-vous d'isoler les tuyaux. Un contact direct avec des tuyaux non isolés peut causer des brûlures ou des gelures.**

Tableau 2 (Fig. 4-7) mm (pouce)

Diam. ext. Tuyau en cuivre	A	
	Outil d'évasement pour le R410A	Outil d'évasement pour le R22·R407C
	Type embrayage	
ø6,35 (1/4)	0 - 0,5 (0 - 1/64)	1,0 - 1,5 (3/64 - 1/16)
ø9,52 (3/8)	0 - 0,5 (0 - 1/64)	1,0 - 1,5 (3/64 - 1/16)
ø12,7 (1/2)	0 - 0,5 (0 - 1/64)	1,0 - 1,5 (3/64 - 1/16)
ø15,88 (5/8)	0 - 0,5 (0 - 1/64)	1,0 - 1,5 (3/64 - 1/16)
ø19,05 (3/4)	0 - 0,5 (0 - 1/64)	1,0 - 1,5 (3/64 - 1/16)

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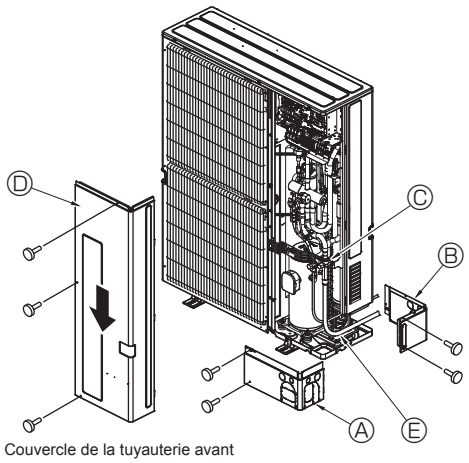
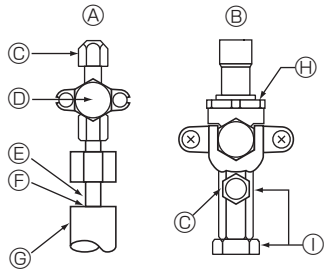
4. Installation de la tuyauterie du réfrigérant



Ⓐ Couvercle de la tuyauterie avant
Ⓑ Couvercle de la tuyauterie
Ⓒ Vanne d'arrêt
Ⓓ Panneau de service
Ⓔ Rayon de cintrage : 100 mm - 150 mm (3-15/16" - 5-7/8")

Fig. 4-8



Ⓐ Vanne d'arrêt <côté liquide>
Ⓑ Vanne d'arrêt <côté gaz>
Ⓒ Orifice pour l'entretien
Ⓓ Section d'ouverture/fermeture
Ⓔ Tuyau local
Ⓕ Hermétique, idem pour le côté gaz
Ⓖ Fourrure du tuyau
Ⓗ Ne pas utiliser de clé ici.
Il pourrait y avoir des fuites de réfrigérant.
Ⓘ Utiliser deux clés ici.

Fig. 4-9

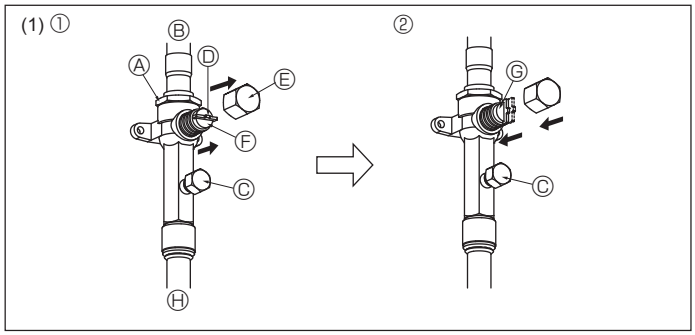


Fig. 4-10

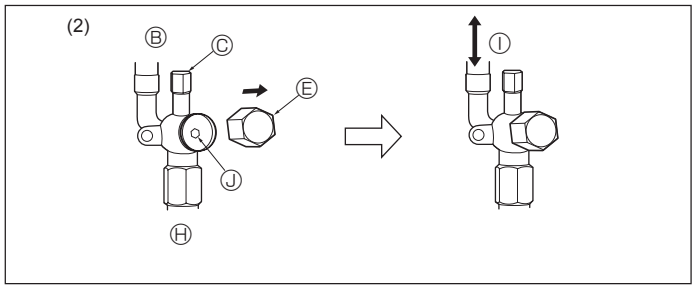


Fig. 4-11

Ⓐ Corps de vanne
Ⓑ Côté appareil
Ⓒ Orifice de service
Ⓓ Levier
Ⓔ Capuchon
Ⓕ Complètement fermé
Ⓖ Complètement ouvert
Ⓗ Côté tuyau réfrigérant (Installation sur le côté)
Ⓘ Sens d'écoulement du réfrigérant
Ⓙ Tige de vanne

4.4. Mise en place des tuyaux de réfrigérant (Fig. 4-8)

Retirer le panneau de service Ⓓ (trois vis), le cache-tuyaux avant Ⓐ (deux vis) et le cache-tuyaux arrière Ⓑ (deux vis).

① Effectuer les raccordements des tuyaux de réfrigérant de l'appareil intérieur/extérieur lorsque la vanne d'arrêt de l'appareil extérieur est complètement fermée.
② Faire le vide d'air de l'appareil intérieur et des tuyaux de raccordement.

Évacuation

Évacuez avec la valve de l'unité extérieure fermée et évacuez en même temps la tuyauterie de connexion et l'unité intérieure depuis le port de service fourni sur la valve de l'unité extérieure à l'aide d'une pompe à vide. (Évacuez toujours depuis le port de service du tube de liquide et du tube de gaz.) Après que le vide ait atteint 650 Pa [abs] [0,0943 psi/5 Torr], continuez l'évacuation pendant au moins une heure. Arrêtez ensuite la pompe à vide et laissez-la pendant une heure. Vérifiez que le degré de vide n'a pas augmenté. **(Si le degré d'augmentation du vide est supérieur à 130 Pa [0,01886 psi/1,0 Torr], de l'eau pourrait avoir pénétré. Appliquez une pression d'azote sec jusqu'à 0,05 MPa [7,25 psi] et appliquez de nouveau le vide.)** Pour finir, scellez avec le frigorigène liquide à travers le tube de fluide et ajustez la tuyauterie de gaz pour obtenir une quantité appropriée de frigorigène pendant le fonctionnement.

* N'exécutez jamais de purge d'air à l'aide du frigorigène.

③ Une fois les tuyaux de réfrigérant raccordés, vérifier les éventuelles fuites de gaz dans les tuyaux raccordés et l'appareil intérieur. (Voir 4.5. Test d'étanchéité des tuyaux de réfrigérant.)
④ Vider les tuyaux de réfrigérant par l'orifice de service des vannes d'arrêt de liquide et de gaz. Puis, ouvrir complètement les vannes d'arrêt (de liquide et de gaz). Cette opération permet le raccordement complet des tuyaux de réfrigérant des appareils intérieur et extérieur.
- Faire fonctionner l'appareil sans avoir ouvert les vannes d'arrêt risque d'endommager le compresseur et la vanne de commande.
- Utiliser un détecteur de fuites ou de l'eau savonneuse pour vérifier les éventuelles fuites de gaz aux sections de raccordement des tuyaux de l'appareil extérieur.
- Ne pas utiliser le réfrigérant de l'appareil pour faire le vide d'air des tuyaux de réfrigérant.
- Après avoir utilisé les vannes, resserrer leurs capuchons au couple correct : 20 à 25 N·m [14 à 18 ft·lbs] (200 à 250 kgf·cm).
  Si les capuchons sont mal replacés ou resserrés, une fuite de réfrigérant peut se produire. Veiller également à ne pas endommager l'intérieur des capuchons des vannes car leur étanchéité empêche les fuites de réfrigérant.

⑤ Appliquer un agent d'étanchéité sur les extrémités de l'isolation thermique autour des sections de raccordement des tuyaux afin d'empêcher l'eau de pénétrer dans l'isolation thermique.

Les tuyaux de réfrigérant sont entourés d'une couche de protection.
- Les tuyaux peuvent être entourés, après ou avant avoir été raccordés, d'une couche de protection allant jusqu'à ø90 mm (3-9/16"). Découper la rondelle défonçable du cache-tuyaux en suivant la rainure et envelopper les tuyaux.

Orifice d'entrée du tuyau
- Appliquer du mastic ou un agent d'étanchéité sur l'entrée des tuyaux pour éviter tout espace. (Si les espaces ne sont pas supprimés, l'appareil risque de fonctionner bruyamment ou d'être endommagé à cause d'une infiltration d'eau et de poussières).

Remarque:
<Triple évacuation>
- Évacuez le système de 4 000 microns par les deux valves de service. Les ensembles de jauge du système ne doivent pas être utilisés pour mesurer le vide. Une jauge micron doit être utilisée en permanence.
  - Cassez le vide avec de l'azote (N2) dans la valve de service de décharge jusqu'à 0 PSIG.
- Évacuez le système de 1 500 microns par la valve d'aspiration.
  - Cassez le vide avec de l'azote (N2) dans la valve de service de décharge jusqu'à 0 PSIG.
- Évacuez le système de 500 microns. Le système doit maintenir le vide à 500 microns pendant au moins 1 heure.
- Exécutez un test d'échauffement pendant au moins 30 minutes.

4.5. Test d'étanchéité des tuyaux de réfrigérant

(1) Connecter les outils de test.
- Vérifier que les vannes d'arrêt Ⓐ et Ⓑ sont fermées et ne pas les ouvrir.
- Ajouter de la pression dans les tuyaux de réfrigérant par l'orifice de service Ⓒ de la vanne d'arrêt de liquide Ⓐ et de la vanne d'arrêt de gaz Ⓑ.

(2) Ne pas ajouter en une seule fois de pression à la pression spécifiée mais progressivement.
① Pressuriser jusqu'à 0,5 MPa [73 PSIG] attendre cinq minutes et vérifier que la pression ne diminue pas.
② Pressuriser jusqu'à 1,5 MPa [218 PSIG], attendre cinq minutes et vérifier que la pression ne diminue pas.
③ Pressuriser jusqu'à 4,15 MPa [601 PSIG], puis mesurer la température ambiante et la pression du réfrigérant.

(3) Si la pression spécifiée se maintient pendant environ une journée sans diminuer, les tuyaux ne présentent pas de fuite.
- Si la température ambiante varie de 1°C [1,8°F], la pression varie d'environ 0,01 MPa [1,5 PSIG]. Apporter les corrections nécessaires.

(4) Si la pression diminue à l'étape (2) ou (3), il y a une fuite de gaz. Rechercher l'origine de la fuite de gaz.

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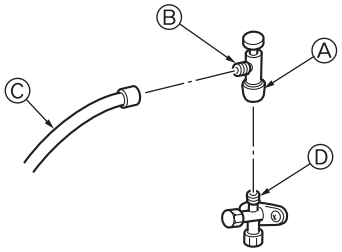
4. Installation de la tuyauterie du réfrigérant



* La figure à gauche n'est représentée qu'à titre d'exemple. La forme de la vanne d'arrêt, la position de l'ouverture de service, etc., peuvent différer selon le modèle.
* Tournez la section Ⓐ uniquement. (Ne serrez pas davantage les sections Ⓐ et Ⓑ l'une contre l'autre.)

Ⓒ Flexible de charge
Ⓓ Ouverture de service

Fig. 4-12

4.6. Comment ouvrir la vanne d'arrêt

La méthode d'ouverture de la vanne d'arrêt varie selon le modèle de l'appareil extérieur. Ouvrir les vannes d'arrêt conformément à la méthode appropriée.

(1) Côté gaz (Fig. 4-10)

① Enlever le capuchon, ramener la poignée vers soi et la tourner d'un quart de tour en sens inverse des aiguilles d'une montre pour ouvrir la vanne.

② Vérifier que la vanne d'arrêt est complètement ouverte, appuyer sur la poignée et tourner le capuchon pour le ramener sur sa position d'origine.

(2) Côté liquide (Fig. 4-11)

① Retirez le bouchon, et tournez la tige de soupape à fond dans le sens antihoraire avec une clé hexagonale de 4 mm [3/16"]. Arrêtez de tourner quand elle frappe la retenue.

② Vérifier que la vanne d'arrêt est complètement ouverte et tourner le capuchon pour le ramener sur sa position d'origine.

Précautions à prendre lors de l'utilisation de la soupape de charge (Fig. 4-12)

Ne serrez pas trop l'ouverture de service au moment de l'installer, car vous pourriez déformer le corps de la soupape et des fuites pourraient se produire.

Après avoir posé la section Ⓑ dans la direction désirée, tournez la section Ⓐ uniquement et serrez-la.

Ne serrez pas davantage les sections Ⓐ et Ⓑ l'une contre l'autre après avoir serré la section Ⓐ.

⚠ **Avertissement:**

- **Lors de l'ouverture ou de la fermeture de la vanne sous des températures de congélation, le réfrigérant peut jaillir de l'espace entre la tige de vanne et le corps de vanne et provoquer des blessures.**
- **Pendant l'installation de l'appareil, brancher correctement les tuyaux de réfrigérant avant de lancer le compresseur.**

4.7. Charge supplémentaire de réfrigérant

Charge supplémentaire de réfrigérant

Le réfrigérant pour les extensions de tuyauterie n'est pas inclus dans l'appareil extérieur lors de sa sortie d'usine. Par conséquent, chargez le réfrigérant supplémentaire dans chaque système de conduites de réfrigérant sur le lieu d'installation. En outre, pour l'entretien, indiquez la section et la longueur de chaque conduite de liquide ainsi que les quantités de charge supplémentaires dans les espaces prévus à cet effet sur la plaquette "Quantité de réfrigérant" située sur l'appareil extérieur.

* Une fois l'appareil arrêté, le charger de réfrigérant supplémentaire par la vanne d'arrêt de liquide après avoir vidé les extensions de tuyaux et les appareils intérieurs.
Lors de l'utilisation de l'appareil, ajouter du réfrigérant par le clapet de non-retour du gaz à l'aide d'un chargeur de sécurité. Ne pas ajouter de réfrigérant liquide directement par le clapet de non-retour.

Calcul de la charge supplémentaire de réfrigérant

- Calculez la charge supplémentaire à l'aide de la section de la conduite de liquide et de la longueur de l'extension de tuyauterie.
- Calculez la charge de réfrigérant supplémentaire selon la procédure indiquée à droite, et chargez le système à l'aide du réfrigérant supplémentaire.
- Pour les quantités inférieures à 0,1 kg, arrondissez la charge de réfrigérant supplémentaire calculée.
  (Par exemple, si la charge calculée est de 6,01 kg, arrondissez-la à 6,1 kg.)

<Charge supplémentaire>

Calcul de la charge de réfrigérant

Dimension des tuyaux Conduit de liquide ø6,35			**Dimension des tuyaux Conduit de liquide ø9,52**	
SM36/42/48	**(m) × 19,0 (g/m) ((pieds) × 0,21 (oz/pieds))**	+	**SM36/42/48**	**(m) × 50,0 (g/m) ((pieds) × 0,55 (oz/pieds))**
SM60	**(m) × 27,0 (g/m) ((pieds) × 0,29 (oz/pieds))**		**SM60**	**(m) × 70,0 (g/m) ((pieds) × 0,75 (oz/pieds))**

	Capacité totale des appareils intérieurs connectés	Quantité pour les appareils intérieurs
+	– 27	1,5 kg (53 oz)
	28 – 54	2,5 kg (88 oz)
	55 –	3,0 kg (106 oz)

Y compris quantité de réfrigérant à la sortie d'usine

	Y compris quantité de réfrigérant
SM36/42/48	4,8 kg (169 oz)
SM60	5,1 kg (180 oz)

<Exemple>

Modèle extérieur : MXZ-SM48NAM — A : ø9,52 30 m (98 pieds)

Intérieur 1 : modèle 24 — a : ø9,52 15 m (49 pieds)
2 : modèle 15 — b : ø6,35 10 m (33 pieds)
3 : modèle 08 — c : ø6,35 10 m (33 pieds)
4 : modèle 08 — d : ø6,35 20 m (66 pieds)

} Dans les conditions indiquées ci-dessous:

La longueur totale de chaque tuyau de liquide est la suivante:
ø9,52 : A + a = 30 + 15 = 45 m (148 pieds)
ø6,35 : b + c + d = 10 + 10 + 20 = 40 m (131 pieds)
La capacité totale de chaque appareil intérieur connecté est la suivante :
24 + 15 + 08 + 08 = 55
<Exemple de calcul>
Charge de réfrigérant supplémentaire

$$40 \times \frac{19,0}{1000} + 45 \times \frac{50,0}{1000} + 3,0 = 6,1 \text{ kg (arrondi au chiffre supérieur)}$$

(131 × 0,21 + 148 × 0,55 + 106 = 215 oz)

5. Mise en place du tuyau d'écoulement

Raccordement du tuyau d'écoulement de l'appareil extérieur

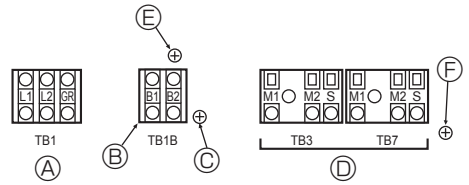
Lorsqu'un tuyau d'écoulement s'avère nécessaire, utiliser la douille de drainage ou la cuvette de drainage (en option).
Il ne peut toutefois pas être utilisé pour MXZ-SM36/42/48NAMHZ (modèle Hyper Heating)

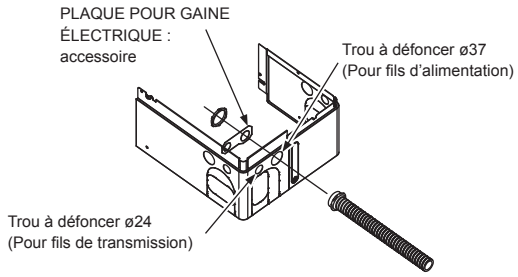
Douille de drainage	PAC-SG61DS-E
Cuvette de drainage	PAC-SH97DP-E

6. Installations électriques

6.1. Précaution

① Respecter les réglementations gouvernementales pour les normes techniques concernant les installations électriques et le câblage et suivre les conseils de la compagnie d'électricité concernée.
② Utiliser des câbles de distribution auto-extinguibles pour le câblage de l'alimentation.
③ Les câbles de commandes (ci-après dénommé la ligne de transmission) seront éloignés (de 5 cm [2 pouce] ou plus) des câbles de la source d'alimentation de sorte à ne pas être influencé par les interférences de l'alimentation. (Ne jamais introduire la ligne de transmission et les câbles d'alimentation dans la même gaine.)
④ Toujours effectuer les travaux adéquats de mise à la terre à l'appareil extérieur.
⑤ Laisser une longueur de câble suffisante dans le boîtier des éléments électriques des appareils intérieurs et des appareils extérieurs car le boîtier doit parfois être retiré pour les interventions techniques.
⑥ Ne jamais raccorder la source d'alimentation principale au bloc terminal de la ligne de transmission car cela brûlerait les composants électriques.
⑦ Utiliser un câble blindé à deux fils comme ligne de transmission. Si les lignes de transmission des différents systèmes devaient être reliées par le même câble à fils multiples, la transmission et la réception seraient mauvaises ce qui conduirait à un fonctionnement erroné des appareils.
⑧ Seule la ligne de transmission indiquée doit être reliée au bloc terminal pour la transmission de l'appareil extérieur.
(Ligne de transmission à raccorder à l'appareil intérieur: Bloc terminal TB3 pour la ligne de transmission, Autres: Bloc terminal TB7 pour une commande centralisée)
Une mauvaise connexion empêchera le fonctionnement du système.
⑨ En cas de raccordement avec le contrôleur de classe supérieure ou pour obtenir un fonctionnement groupé de plusieurs systèmes de réfrigérant, il est nécessaire de placer une ligne de contrôle de transmission entre chaque appareil extérieur. Connecter cette ligne de contrôle entre les blocs terminaux pour une commande centralisée. (Ligne à deux câbles non polarisés.)
En cas de raccordement dans différents systèmes de réfrigérant sans passer par le contrôleur de classe supérieure, sur un des appareils extérieurs, déplacer le cavalier du connecteur de court-circuit de CN41 à CN40.
⑩ Avant de mettre l'appareil extérieur sous tension, veiller à mettre sous tension les appareils intérieurs et les boîtiers de dérivation.





Ⓐ : Alimentation
Ⓑ : Alimentation pour boîtier de dérivation
Ⓒ : Vis du boîtier des composants électriques
Ⓓ : Ligne de transmission
Ⓔ : Vis sur la boîte de composants électriques pour le raccordement à la terre (TB3)
Ⓕ : Vis sur la boîte de composants électriques pour le raccordement à la terre (TB7)

Fig. 6-1

6.2. Boîtier de commande et emplacement pour le raccordement des câbles (Fig. 6-1)

1. Connectez les fils entre l'appareil extérieur et l'appareil intérieur ou raccordez le boîtier au bloc de sortie de transmission (TB3) de l'appareil extérieur.
Raccorder le câblage entre l'appareil extérieur et le système de commande centralisé au bloc terminal de transmission (TB7) de l'appareil extérieur.
En cas d'utilisation d'un câblage blindé, raccorder la mise à la terre du câblage blindé à la borne de blindage (S) du bloc terminal (TB3) ou (TB7).
Si le raccordement du connecteur d'alimentation de la transmission de l'appareil extérieur est passé de CN41 à CN42, raccorder la borne de blindage (S) du bloc terminal (TB7) à la vis Ⓕ au moyen du fil de sortie fourni.
* La borne de blindage (S) du bloc terminal de transmission (TB3) est reliée à la terre Ⓔ à la sortie d'usine de l'appareil.
2. Des plaques de montage pour conduits sont fournies. Retirer les pièces démontables du cache de tuyauterie, faire passer les fils d'alimentation et de transmission par les trous de démontage appropriés et raccorder les fils au bloc terminal.
3. Le bornier (TB1B) fournir l'alimentation à la boîte de dérivation (208 / 230 V, max. 6A).
4. Fixez le câblage de la source d'alimentation au bornier en utilisant la bague anti-traction (connexion PG ou similaire).

⚠ **Précaution:**
Ne raccordez jamais la ligne de transmission du boîtier de dérivation ou la ligne de transmission du système de commande centralisée à ce bornier (TB1B). Si les lignes de transmission y sont connectées, l'appareil intérieur, le boîtier de dérivation ou le système de commande pourrait être endommagé.

6.3. Mise en place des câbles de transmission

① **Types de câbles de commande**

1. Mise en place des câbles de transmission

Types de câbles de transmission	Fil blindé (à deux âmes) CVVS, CPEVS ou MVVS
Diamètre des câbles	Supérieur à 1,25 mm² [AWG16]
Longueur maximum des câbles	Moins de 200 m [656 pieds]

2. Câbles de la télécommande M-NET

Types de câbles de télécommande	Fil blindé (à deux âmes) CVVS, CPEVS ou MVVS
Diamètre du câble	0,5 à 1,25 mm² [AWG20 à AWG16]
Remarques	Pour une longueur de câblage supérieure à 10 m [32 pieds], utilisez un câble ayant les mêmes caractéristiques que le câblage de la ligne de transmission.

3. Câbles de la télécommande MA

Type de câble de télécommande	Câble gainé à 2 âmes (non blindé) CVV
Diamètre du câble	0,3 à 1,25 mm² [AWG22 à AWG16] (0,75 à 1,25 mm² [AWG18 à AWG16])*
Remarques	Moins de 200 m [656 pieds]

* Raccordé avec télécommande simple.

② **Exemples de câblage**

• Nom du contrôleur, symbole et nombre de contrôleurs permis.

Nom		Symbole	Nombre de contrôleurs permis	
Contrôleur de l'appareil extérieur		OC	–	
Contrôleur de l'appareil intérieur	Série CITY MULTI	M-IC	MXZ-SM36	1 à 11 unités par OC
			MXZ-SM42	1 à 12 unités par OC
			MXZ-SM48	
			MXZ-SM60	
	Série M, S, P	A-IC	MXZ-SM36	2 à 4 unités par OC *1
			MXZ-SM42	2 à 5 unités par OC *1
			MXZ-SM48	2 à 8 unités par OC *1
			MXZ-SM60	
Boîtier de dérivation		BC	0 à 2 unités par OC *1	
Commande à distance	M-NET	M-NET RC *2	12 contrôleurs maximum par OC (Ne peut pas être connecté si un boîtier de dérivation est utilisé.) *1	
	MA	MA-RC	Maximum 2 par groupe	
	Sans fil	WL-RC	–	

Remarque:
***1. Le nombre d'appareils qu'il est possible de raccorder peut être limité par certaines conditions telles que la capacité de l'appareil intérieur ou la consommation électrique équivalente de chaque appareil.**
***2. Ne pas utiliser le contrôleur à distance Lossnay (PZ-61DR-E, PZ-43SMF-E, PZ-52SF-E, PZ-60DR-E).**

fr

6. Installations électriques

Exemple de système de fonctionnement relié à la terre avec plusieurs appareils extérieurs (Il est nécessaire d'utiliser des câbles blindés et de définir les adresses.)

<Exemple de mise en place des câbles de transmission : sans boîtier de dérivation>

■ Commande à distance M-NET (Fig. 6-2)

■ Commande à distance MA (Fig. 6-3)

<Méthode de câblage et définition des adresses : sans système de boîtier de dérivation>

a. Toujours utiliser un fil blindé pour les connexions entre l'appareil extérieur (OC) et l'appareil intérieur (M-IC).
b. Utilisez des câbles d'alimentation pour raccorder les terminaux M1 et M2 et la borne de terre du bornier du câble de transmission (TB3) de chaque appareil extérieur (OC) aux bornes M1, M2 et S du bornier des câbles de transmission de l'appareil intérieur (M-IC).
c. Raccorder les bornes 1 (M1) et 2 (M2) du bloc terminal des câbles de transmission de l'appareil intérieur (M-IC) qui possède l'adresse la plus récente au sein d'un même groupe au bloc terminal de la commande à distance (M-NET RC).
d. Connectez ensemble les bornes M1, M2 et S du bornier de la commande centralisée (TB7) de l'appareil extérieur (OC).
e. Le cavalier CN41 du panneau de commande ne change pas.
f. Connectez la masse blindée de la ligne de transmission des appareils intérieurs à la borne blindée (S) de (TB3).
Connectez le câble blindé de la ligne entre les appareils extérieurs et la ligne de transmission du système de commande centralisée à la borne blindée (S) de (TB7).
g. Régler les commutateurs d'adresses comme indiqué ci-dessous.

Appareil	Plage	Méthode de réglage
M-IC (maître)	01 à 50	Utiliser l'adresse la plus récente au sein du même groupe d'appareils intérieurs
M-IC (esclave)	01 à 50	Utiliser une adresse, autre que celle du M-IC (maître) parmi les unités d'un même groupe d'appareils intérieurs. Celle-ci doit se trouver en séquence avec celle du M-IC (maître)
OC	51 à 100	Utiliser l'adresse la plus récente des appareils intérieurs dans le même système réfrigérant plus 50 * L'adresse devient automatiquement "100" si elle est réglée sur "01-50".
M-NET RC (maître)	101 à 150	Régler l'adresse M-IC (maître) plus 100
M-NET RC (esclave)	151 à 200	Régler l'adresse adresse M-IC (maître) plus 150
MA-RC	–	Réglage d'adresse inutile (Réglage principal/secondaire nécessaire)

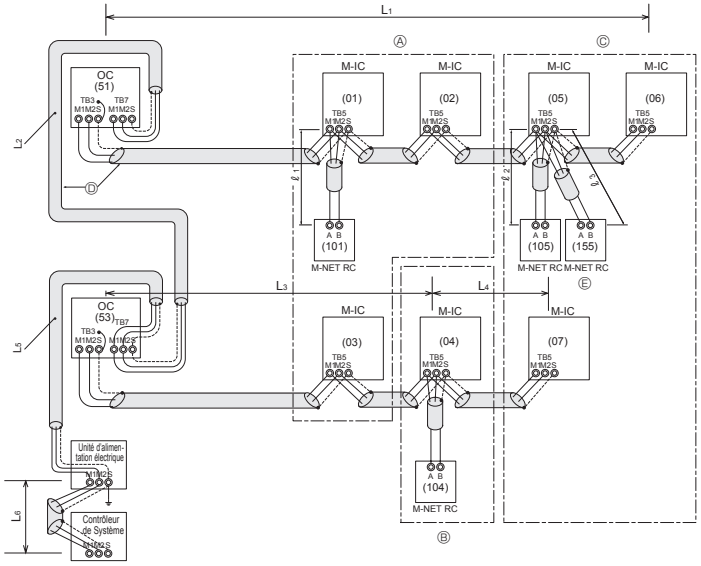
h. Les opérations de réglage groupé pour des appareils intérieurs multiples s'effectuent par le biais de la commande à distance (M-NET RC) après la mise sous tension.

<Méthode de câblage et définition des adresses : avec système de boîtier de dérivation>

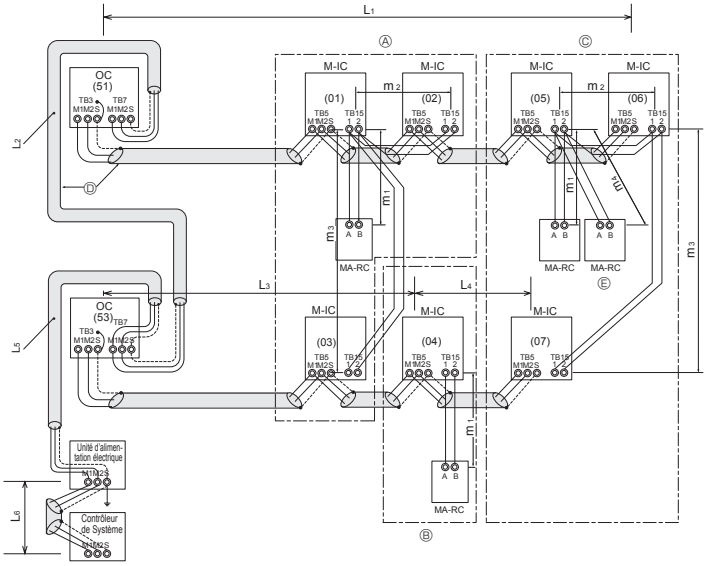
Reportez-vous au Manuel d'installation du boîtier de dérivation.

<Exemple de câblage de transmission : Sans boîtier de dérivation>

■ Commande à distance M-NET



■ Commande à distance MA



Ⓐ : Groupe 1
Ⓑ : Groupe 2
Ⓒ : Groupe 3
Ⓓ : Fil blindé
Ⓔ : Commande à distance secondaire
( ): Adresse

<Longueurs possibles>

- **Longueur maximale de ligne par l'intermédiaire des appareils extérieurs : $L_1+L_2+L_3+L_4$, $L_3+L_4+L_5+L_6$ et $L_1+L_2+L_5+L_6 \leqq 500$ m [1640 pieds] (1,25 mm² [AWG16] ou plus)**
- **Longueur maximale de la ligne de transmission intérieur/extérieur : L_1, L_3+L_4, L_2+L_5 et $L_6 \leqq 200$ m [656 pieds] (1,25 mm² [AWG16] ou plus)**
- **Longueur du câble de télécommande : ℓ_1, $\ell_2+\ell_3 \leqq 10$ m [33 pieds] (0,5 à 1,25 mm² [AWG20 à AWG16]) Si la longueur excède 10 m [33 pieds], utilisez un fil blindé de 1,25 mm² [AWG16]. La section du câble dépassant 10 m [33 pieds] doit être incluse dans la longueur maximale via les appareils extérieurs et la longueur maximale du câble de transmission.**

Fig. 6-2

<Longueurs possibles>

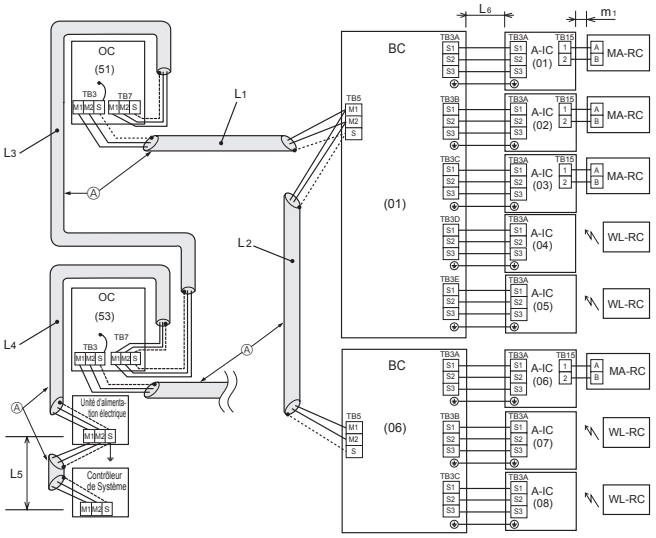
- **Longueur maximale de ligne par l'intermédiaire des appareils extérieurs (câble M-NET) : $L_1+L_2+L_3+L_4$, $L_3+L_4+L_5+L_6$ et $L_1+L_2+L_5+L_6 \leqq 500$ m [1640 pieds] (1,25 mm² [AWG16] ou plus)**
- **Longueur maximale de la ligne de transmission intérieur/extérieur (câble M-NET) : L_1, L_3+L_4, L_2+L_5 et $L_6 \leqq 200$ m [656 pieds] (1,25 mm² [AWG16] ou plus)**
- **Longueur du câble de la télécommande : m_1, $m_1+m_2+m_3$ et $m_1+m_2+m_3+m_4 \leqq 200$ m [656 pieds] (0,3 à 1,25 mm² [AWG22 à AWG16])**

Fig. 6-3

fr

6. Installations électriques

<Exemple de câblage de transmission : Raccordement avec boîtier de dérivation>



Ⓐ : Fil blindé
( ) : Exemple d'adresse
A-IC : Appareil intérieur série M, S, P

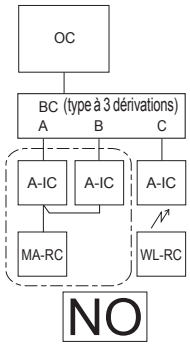
<Longueurs possibles>

- **Longueur maximale de ligne par l'intermédiaire des appareils extérieurs (câble M-NET) : $L_1 + L_2 + L_3 + L_4 + L_5 \leqq 500$ m [1640 pieds] (1,25 mm² [AWG16] ou plus)**
- **Longueur maximale de la ligne de transmission boîtier de dérivation/ extérieur (câble M-NET) : $L_1 + L_2$, $L_3 + L_4$, $L_5 \leqq 200$ m [656 pieds] (1,25 mm² [AWG16] ou plus)**
- **Longueur maximale de la ligne de transmission intérieur/boîtier de dérivation (Câble de commande A) : $L_6 \leqq 25$ m [82 pieds] (1,5 mm² [AWG14])**
- **Longueur du câble de la télécommande : $m_1 \leqq 200$ m [656 pieds] (0,3 à 1,25 mm² [AWG22 à AWG16])**

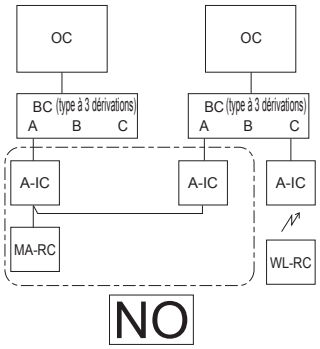
Fig. 6-4

<Systèmes incorrects>

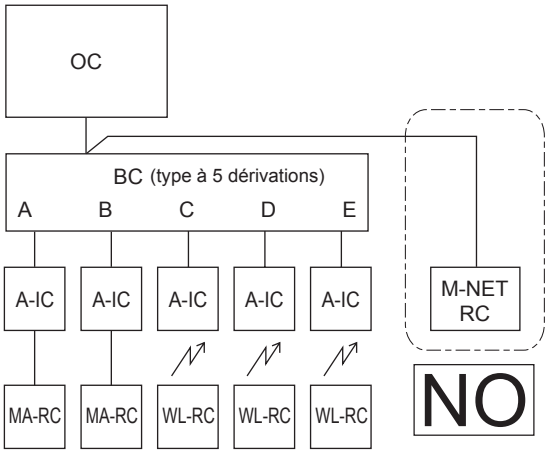
1. Exploitation de groupe par télécommande unique



2. Exploitation de groupe entre systèmes de réfrigérant différents



3. Raccordement de la télécommande M-NET



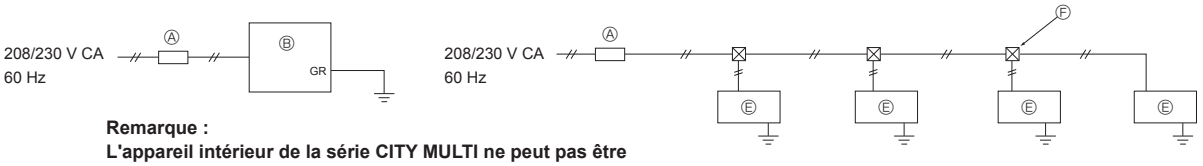
1. Plusieurs appareils intérieurs ne peuvent pas être commandés par une seule télécommande.
2. Des systèmes de réfrigérant différents ne peuvent pas être connectés ensemble.
3. Une télécommande M-NET ne peut pas être connectée.

fr

6. Installations électriques

6.4. Câblage de l'alimentation principale et capacité des équipements

Schéma du câblage : sans boîtier de dérivation (exemple) (Fig. 6-5)



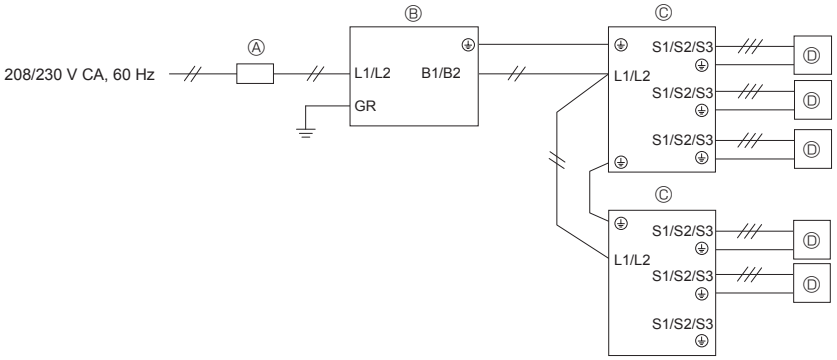
Remarque :
L'appareil intérieur de la série CITY MULTI ne peut pas être alimenté par un appareil extérieur, il faut donc lui fournir une alimentation séparée.

Fig. 6-5

Ⓐ Coupe-circuit (pour fuites à la terre (le cas échéant))
Ⓑ Appareil extérieur
Ⓒ Boîtier de dérivation
Ⓓ Appareil intérieur de "commande A" (appareil intérieur série M, S, P)
Ⓔ Appareil intérieur de la série CITY MULTI
Ⓕ Boîtier de traction

Schéma du câblage : avec un boîtier de dérivation (exemple) (Fig. 6-6)

<Lorsque l'alimentation provient de l'appareil extérieur>



<Lorsque l'alimentation provient d'une source séparée>

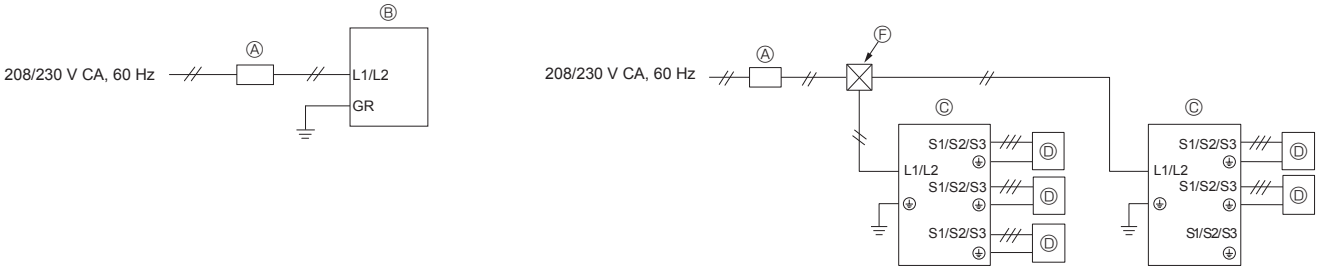


Fig. 6-6

Section des câbles pour l'alimentation principale et capacités On/Off
<Lorsque l'alimentation provient d'une source séparée>

Modèle		Alimentation	Section minimum des câbles (mm² [AWG])		Coupe-circuit pour le câblage*1	Coupe-circuit pour les fuites de courant (le cas échéant)	Courant admissible minimum du circuit	Régime nominal maximum du dispositif de protection de surintensité
			Câble principal*2	Terre				
Appareil extérieur	36/48NAM	208/230 V CA, 60 Hz	5,3 [AWG10]	5,3 [AWG10]	30 A	30 A 30 mA 0,1 sec ou moins	29 A	40 A
	36/42/48NAMHZ		8,4 [AWG8]	8,4 [AWG8]	40 A	40 A 30 mA 0,1 sec ou moins	36 A	40 A
	60NAM		8,4 [AWG8]	8,4 [AWG8]	40 A	40 A 30 mA 0,1 sec ou moins	36 A	45 A
Boîtier de dérivation			Reportez-vous au manuel d'installation du boîtier de dérivation.					

<Lorsque l'alimentation provient de l'appareil extérieur>

Modèle		Alimentation	Section minimum des câbles (mm² [AWG])		Coupe-circuit pour le câblage*1	Coupe-circuit pour les fuites de courant (le cas échéant)	Courant admissible minimum du circuit	Régime nominal maximum du dispositif de protection de surintensité
			Câble principal*2	Terre				
Appareil extérieur	36/48NAM	208/230 V CA, 60 Hz	8,4 [AWG8]	8,4 [AWG8]	40 A	40 A 30 mA 0,1 sec ou moins	35 A	50 A
	36/42/48NAMHZ		13,3 [AWG6]	13,3 [AWG6]	45 A	45 A 30 mA 0,1 sec ou moins	42 A	50 A
	60NAM		13,3 [AWG6]	13,3 [AWG6]	50 A	50 A 30 mA 0,1 sec ou moins	46 A	50 A
Boîtier de dérivation			Reportez-vous au manuel d'installation du boîtier de dérivation.					

*1. Veuillez respecter les réglementations nationales, de l'état ou locales applicables pour prévenir les fuites/chocs électriques potentiels. Ou installez un disjoncteur de fuite à la terre pour la prévention des fuites et des chocs électriques.

IMPORTANT
Si un disjoncteur de fuite de courant est utilisé, il doit être compatible avec les harmoniques les plus élevés, car cet appareil est équipé d'un inverseur. L'utilisation d'un disjoncteur inadapté peut provoquer un dysfonctionnement de l'inverseur.

***2. Utiliser des câbles électriques en cuivre. Utiliser des câbles électriques correspondant à une tension de 300 V.**

*3. Bien que le diamètre de la gaine soit supérieur au diamètre spécifié pour l'épaisseur de câble conformément aux normes UL, utilisez un diamètre de gaine de 3/4 de pouce.

6. Installations électriques

Courant total d'exploitation de l'appareil intérieur	Section minimum des câbles (mm²/AWG)			Disjoncteur de fuite de terre *1 (le cas échéant)	Commutateur local (A)		Disjoncteur pour câblage (NFB)
	Câble principal	Dérivation	Terre		Capacité	Fusible	
F0 = 15 A ou moins *2	2,1/14	2,1/14	2,1/14	Sensibilité au courant 15 A *3	15	15	15
F0 = 20 A ou moins *2	3,3/12	3,3/12	3,3/12	Sensibilité au courant 20 A *3	20	20	20
F0 = 30 A ou moins *2	5,3/10	5,3/10	5,3/10	Sensibilité au courant 30 A *3	30	30	30

Pour l'impédance maximale permise du système, voir la norme CEI 61000-3-3.

*1 Le disjoncteur de fuite de terre doit prendre en charge le circuit d'inverseur.
Le disjoncteur de fuite de terre doit combiner l'utilisation d'un interrupteur local ou d'un coupe-circuit.

*2 Prendre la valeur la plus haute de F1 ou F2 comme valeur pour F0.

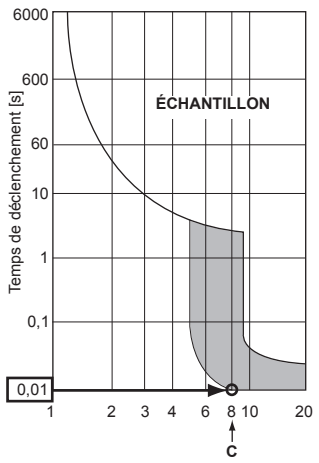
F1 = Courant maximum d'exploitation total des appareils intérieurs × 1,2

F2 = {V1 × (Quantité de type1)/C} + {V1 × (Quantité de type2)/C} + {V1 × (Quantité de type3)/C} + {V1 × (Quantité de type4)/C} + … + {V1 × (Quantité de type13)/C}

Appareil intérieur		V1	V2
Type 1	PEAD-A·AA, SVZ-A·AA	26,9	2,4
Type 2	PLA-A·EA7, SEZ-KD·NA	19,8	
Type 3	SLZ-KF·NA	17,1	
Type 4	MLZ-KP·NA (2)	9,9	
Type 5	MFZ-KJ·NA, MSZ-GL·NA, MSZ-FS·NA	7,4	
Type 6	MSZ-FH·NA, MSZ-FH·NA2, MSZ-EF·NAW(B)(S)-U1	6,8	
Type 7	Boîtier de dérivation	5,1	3,0
Type 8	PEFY-P·NMAU-E3, PVFY-P·NAMU	38,0	1,6
Type 9	PKFY-P·NHMU, PKFY-P·NKMU, PEFY-P·NMSU, PCFY-P·NKMU, PLFY-EP·NEMU, PLFY-P·NFMU, PMFY-P·NBMU, PKFY-P·NLMU	19,8	2,4
Type 10	PKFY-P·NBMU, PLFY-P·NCMU	3,5	2,4
Type 11	PEFY-P·NMHU, PFFY-P·NEMU, PFFY-P·NRMU	0,0	0,0
Type 12	PEFY-P·NMHSU (raccordé à MXZ-SM60 uniquement)	13,8	4,8
Type 13	PEFY-P·NMAU-E4	18,6	3,0

C : Multiple de courant de déclenchement au temps de déclenchement 0,01 s
Prenez "C" dans les caractéristiques de déclenchement du disjoncteur.

Diagramme d'échantillon



<Exemple de calcul "F2">
* Condition PEFY-NMSU × 4 + PEFY-NMAU × 1, C = 8 (reportez-vous au diagramme de droite)
F2 = 19,8 × 4/8 + 38 × 1/8
= 14,65
→ disjoncteur 16 A (courant de déclenchement = 8 × 16 A à 0,01 s)

*3 La sensibilité de courant est calculée selon la formule suivante.
G1 = V2 × (Quantité de Type1) + V2 × (Quantité de Type2) + V2 × (Quantité de Type3) + … + V2 × (Quantité de Type13)
+ V3 × (Longueur câble [km])

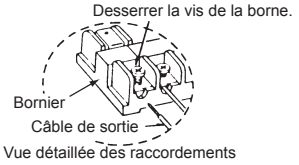
G1	Sensibilité de courant
30 ou moins	30 mA 0,1 sec ou moins
100 ou moins	100 mA 0,1 sec ou moins

Épaisseur câble (mm²/AWG)	V3
2,1/14	48
3,3/12	56
5,3/10	66

1. **Utiliser une alimentation séparée pour l'appareil extérieur et pour l'appareil intérieur.**
2. **Tenir compte des conditions climatiques (température ambiante, rayons solaires directs, eau pluviale, etc.) lors du câblage et du raccordement des appareils.**
3. **Les dimensions des câbles représentent les dimensions minimales pour le câblage de conduits métalliques. Le cordon d'alimentation doit être une unité plus épais à cause des chutes de tension.**
   Vérifier que la tension de l'alimentation ne diminue pas de plus de 10%.
4. **En cas de câblages spécifiques, ceux-ci doivent respecter les lois en vigueur dans la région concernée.**
5. **Les cordons d'alimentation électrique des éléments des appareils utilisés à l'extérieur seront au moins aussi lourds que les cordons souples blindés de polychloroprène (conception 60245 IEC57). Vous pouvez notamment utiliser dans ce cas des câbles de type YZW.**
6. **Installer un câble de terre plus long que les autres câbles.**

⚠ **Avertissement:**
- **Toujours utiliser les câbles indiqués pour les connexions de sorte qu'aucune force externe ne s'applique aux bornes. Si les connexions ne sont pas effectuées correctement, il peut se produire une surchauffe, voir un incendie.**
- **Assurez-vous d'utiliser le correct interrupteur de protection contre la surintensité de courant. Veuillez noter que la surintensité de courant générée peut comprendre une certaine quantité de courant direct.**
- **Veiller à fixer correctement les caches/le panneau du bornier de l'appareil extérieur.**
  S'il est mal fixé, un incendie ou un choc électrique risquent de se produire en raison de la présence de poussière, d'eau, etc.

⚠ **Précaution:**
- **Veiller à ne pas effectuer d'erreur de branchement.**
- **Serrer fermement les vis de fixation des bornes afin d'éviter tout faux contact.**
- **Après le serrage, tirer légèrement sur les câbles pour vérifier qu'ils sont bien fixés.**
- **Si le câble de connexion n'est pas raccordé correctement au bornier, l'appareil ne fonctionnera pas normalement.**
- **Certains sites d'installation peuvent demander l'application d'un coupe-circuit de fuite à la terre. Si ce coupe-circuit n'est pas installé, il peut y avoir danger d'électrocution.**
- **Ne jamais utiliser de coupe-circuits ou de fusibles autres que ceux possédant la valeur adéquate. L'utilisation de fusibles et de fils/fils en cuivre surdimensionnés risque de provoquer un mauvais fonctionnement de l'appareil, voir un incendie.**
- **Acheminez correctement le câblage de manière à ce qu'il ne touche pas le bord de la tôle ou une pointe de vis.**



Vue détaillée des raccordements

fr

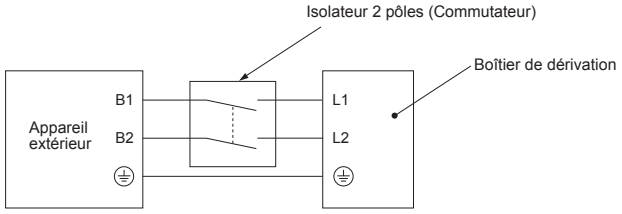
6. Installations électriques

IMPORTANT
S'assurer que le disjoncteur de fuite de courant est compatible avec les harmoniques les plus élevées.
Veiller à toujours utiliser un disjoncteur de fuite de courant compatible avec les harmoniques les plus élevées car cet appareil est équipé d'un inverseur.
L'utilisation d'un disjoncteur inapproprié peut provoquer un dysfonctionnement de l'onduleur.

Ne jamais épicer le câble d'alimentation ou le câble de raccordement boîtier de dérivation intérieur-extérieur car cela pourrait provoquer de la fumée, un incendie ou une erreur de communication.

⚠ **Avertissement:**

- **Veuillez couper l'alimentation principale au cours des entretiens. Et ne touchez pas aux bornes B1, B2 lorsque le circuit est alimenté. Si un isolateur doit être utilisé entre l'appareil extérieur et le boîtier de dérivation/ l'appareil intérieur et le boîtier de dérivation, veuillez utiliser un isolateur à 3 pôles ou à 2 pôles. (Voir le schéma ci-dessous.)**
- **Brancher l'alimentation principale lorsque la température ambiante est inférieure à -20 °C (-4 °F).**
- **À -20 °C (-4 °F) ou en-deçà, l'appareil a besoin d'au moins 4 heures de veille avant de pouvoir fonctionner afin de chauffer les pièces électriques.**



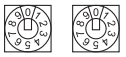
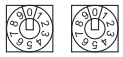
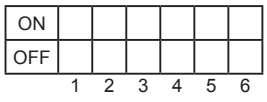
⚠ **Précaution:**
Après avoir utilisé l'isolateur, veillez à couper puis à remettre l'alimentation principale afin de réinitialiser le système. Sinon, l'unité externe pourra ne pas détecter le(s) boîtier(s) de dérivation ou les unités internes.

Assurez-vous de raccorder les câbles des boîtiers de dérivation extérieurs/intérieurs directement aux appareils (sans raccordements intermédiaires).
Des erreurs de communication peuvent se produire en cas de raccordements intermédiaires si de l'eau s'infiltre entre les câbles et cause une mauvaise isolation à la terre ou un contact électrique insuffisant au point de raccordement intermédiaire.
(Si un branchement intermédiaire est impératif, veiller à ce que l'eau ne puisse pas pénétrer dans les câbles.)

6. Installations électriques

6.5. Réglage des adresses

Réglage de l'adresse du commutateur

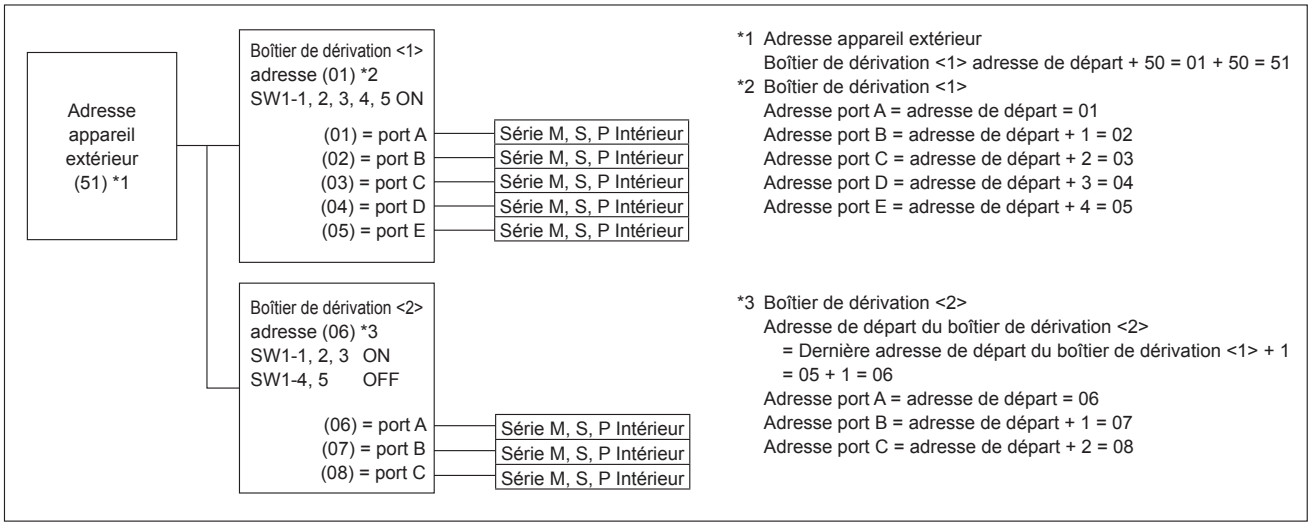
	Extérieur	Boîtier de dérivation		Série M, S, P Intérieur	Série CITY MULTI
		Adresse	Configuration du raccordement		
Commutateur				Aucun	
Plage	51 - 100	1 - 50	–	–	1 - 50
Réglage	Série CITY MULTI Intérieur ou adresse de boîtier de dérivation +50	• En fonction de l'adresse définie (par exemple 01), les adresses des appareils intérieurs raccordés sont définies séquentiellement (par exemple 02, 03, 04 et 05).	• Indiquer si des appareils intérieurs sont connectés à chaque port (A, B, C, D et E).	Il n'y a pas de définitions d'adresses pour les appareils intérieurs.	–

SW1	1	2	3	4	5	
	ON	ON	ON	ON	ON	
Port	A	B	C	D	E	
Adresse	01					(SW11, 12)
		02	03	04	05	(numéros séquentiels)

SW1	Port	OFF	ON
1	A	déconnecté	connecté
2	B	déconnecté	connecté
3	C	déconnecté	connecté
4	D	déconnecté	connecté
5	E	déconnecté	connecté
6	non utilisé		

Remarque : 1. Adresse du boîtier de dérivation
Lors de la définition de l'adresse, utiliser un nombre dans la plage 1–50.
Ex. L'adresse définie est (47) et il y a 5 appareils intérieurs (A, B, C, D et E).
Si A : (47), B : (48), C : (49), D : (50) et E : (51), E est incorrect parce qu'il dépasse 50.

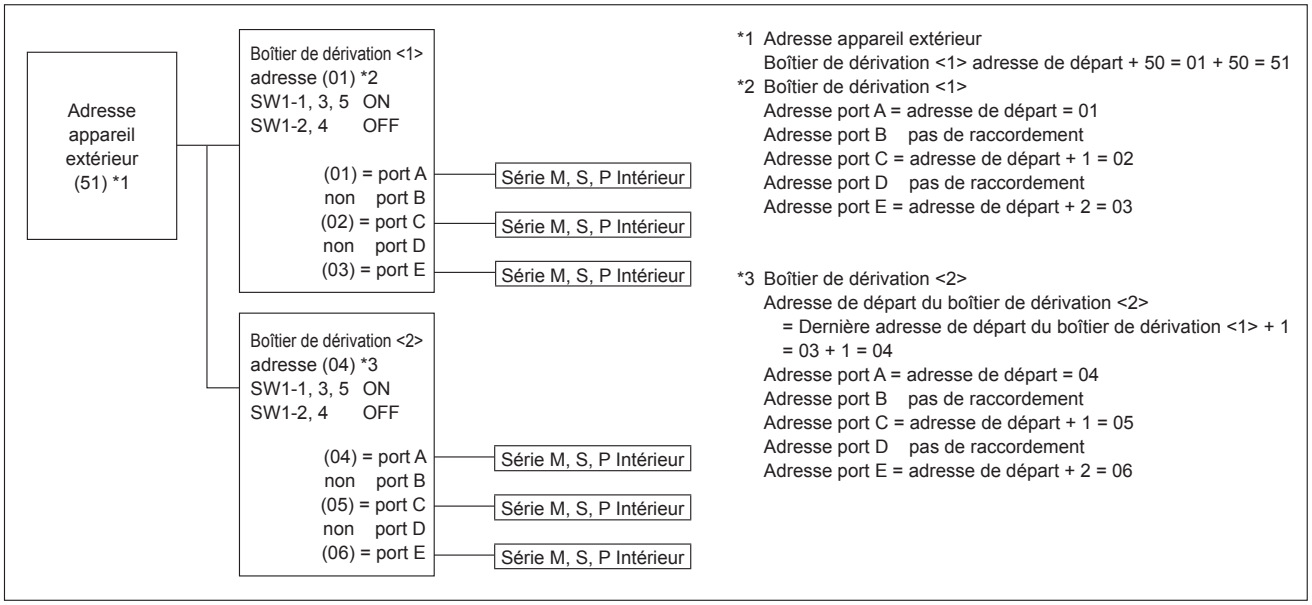
Ex1. Extérieur + Embranchement <1> (Série M, S, P Intérieur A, B, C, D, E) + Embranchement <2> (Série M, S, P Intérieur A, B, C)



*1 Adresse appareil extérieur
Boîtier de dérivation <1> adresse de départ + 50 = 01 + 50 = 51
*2 Boîtier de dérivation <1>
Adresse port A = adresse de départ = 01
Adresse port B = adresse de départ + 1 = 02
Adresse port C = adresse de départ + 2 = 03
Adresse port D = adresse de départ + 3 = 04
Adresse port E = adresse de départ + 4 = 05

*3 Boîtier de dérivation <2>
Adresse de départ du boîtier de dérivation <2>
= Dernière adresse de départ du boîtier de dérivation <1> + 1
= 05 + 1 = 06
Adresse port A = adresse de départ = 06
Adresse port B = adresse de départ + 1 = 07
Adresse port C = adresse de départ + 2 = 08

Ex2. Extérieur + Embranchement <1> (Série M, S, P Intérieur A, C, E) + Embranchement <2> (Série M, S, P Intérieur A, C, E)



*1 Adresse appareil extérieur
Boîtier de dérivation <1> adresse de départ + 50 = 01 + 50 = 51
*2 Boîtier de dérivation <1>
Adresse port A = adresse de départ = 01
Adresse port B pas de raccordement
Adresse port C = adresse de départ + 1 = 02
Adresse port D pas de raccordement
Adresse port E = adresse de départ + 2 = 03

*3 Boîtier de dérivation <2>
Adresse de départ du boîtier de dérivation <2>
= Dernière adresse de départ du boîtier de dérivation <1> + 1
= 03 + 1 = 04
Adresse port A = adresse de départ = 04
Adresse port B pas de raccordement
Adresse port C = adresse de départ + 1 = 05
Adresse port D pas de raccordement
Adresse port E = adresse de départ + 2 = 06

fr

7. Marche d'essai

7.1. Avant la marche d'essai

► Lorsque l'installation, le tuyautage et le câblage des appareils intérieur et extérieur sont terminés, vérifier l'absence de fuites de réfrigérant, la fixation des câbles d'alimentation et de commande, l'absence d'erreur de polarité et contrôler qu'aucune phase de l'alimentation n'est déconnectée.

► Utilisez un mégohmmètre de 500 V pour vérifier que la résistance entre les bornes d'alimentation électrique et la terre est d'au moins 1 MΩ.

► Ne pas effectuer ce test sur les terminaux des câbles de contrôle (circuit à basse tension).

⚠ Avertissement:
Ne pas utiliser le climatiseur si la résistance de l'isolation est inférieure à 1 MΩ.

Résistance de l'isolation
Après l'installation ou après la coupure prolongée de la source d'alimentation, la résistance de l'isolation chutera en deçà d'1 MΩ en raison de l'accumulation de réfrigérant dans le compresseur. Il ne s'agit pas d'un dysfonctionnement. Respectez les procédures suivantes.

1. Retirer les câbles du compresseur et mesurer la résistance de l'isolation du compresseur.
2. Si la résistance de l'isolation est inférieure à 1 MΩ, le compresseur est défaillant ou du réfrigérant s'est accumulé dans le compresseur.
3. Après avoir connecté les câbles au compresseur, celui-ci commence à chauffer dès qu'il est sous tension. Après avoir mis sous tension le compresseur pendant les durées indiquées ci-dessous, mesurer de nouveau la résistance de l'isolation.
   - La résistance de l'isolation chute en raison de l'accumulation de réfrigérant dans le compresseur. La résistance dépassera 1 MΩ après que le compresseur a chauffé pendant 12 heures.
     (Le temps mis par le compresseur pour chauffer varie selon les conditions atmosphériques et l'accumulation de réfrigérant).
   - Pour faire fonctionner le compresseur dans lequel s'est accumulé du réfrigérant, il est nécessaire de le faire chauffer pendant au moins 12 heures afin d'éviter toute défaillance.
4. Si la résistance de l'isolation dépasse 1 MΩ, le compresseur n'est pas défectueux.

⚠ Précaution:
- **Le compresseur fonctionnera uniquement si les connexions des phases de l'alimentation électrique sont correctes.**
- **Mettez l'appareil sous tension au moins 12 heures avant de le faire fonctionner.**

- La mise en marche de l'appareil immédiatement après sa mise sous tension pourrait provoquer de sérieux dégâts aux éléments internes. Ne mettez pas l'appareil hors tension pendant la saison de fonctionnement.

► Les points suivants doivent être contrôlés également.
- L'appareil extérieur n'est pas défectueux. Le témoin sur la carte de commandes de l'appareil extérieur clignote lorsque celui-ci est défectueux.
- Les vannes d'arrêt de liquide et de gaz sont complètement ouvertes.

7.2. Marche d'essai

7.2.1. Utilisation de la télécommande

Se reporter au manuel d'installation de l'appareil intérieur.

- Veiller à effectuer un essai pour chaque appareil intérieur. Vérifier que chaque appareil intérieur fonctionne correctement et conformément aux instructions du manuel d'installation fourni avec l'appareil.
- Si l'essai est réalisé simultanément pour tous les appareils intérieurs, il est impossible de détecter les mauvais raccordements, le cas échéant, des tuyaux de réfrigérant et des fils de raccordement.

* Il faut attendre au moins 3 minutes après la mise sous tension du compresseur pour que ce dernier soit opérationnel.

- Le compresseur peut émettre un son juste après sa mise sous tension ou si la température de l'air extérieur est basse.
- En fonction des conditions de fonctionnement, le ventilateur de l'appareil extérieur peut s'arrêter alors que le compresseur fonctionne. Il ne s'agit pas d'un dysfonctionnement.

A propos du mécanisme de protection de redémarrage
A l'arrêt du compresseur, le dispositif préventif de redémarrage s'active de sorte que le compresseur ne sera pas opérationnel pendant 3 minutes, afin de protéger le climatiseur.

7.2.2. Utilisation de SW3 dans l'appareil intérieur

Remarque:
Si l'essai est réalisé à partir de l'appareil extérieur, tous les appareils intérieurs fonctionnent. Il est donc impossible de détecter les mauvais raccordements des tuyaux de réfrigérant et des fils de raccordement. Si l'objectif de cet essai est de détecter les mauvais raccordements, veiller à exécuter l'essai au moyen de la télécommande. Pour ce faire, se reporter à la section "7.2.1. Utilisation de la télécommande".

SW3-1	**ON**	**Fonctionnement du rafraîchissement**
SW3-2	**OFF**	
SW3-1	**ON**	**Fonctionnement du chauffage**
SW3-2	**ON**	

* Après avoir effectué l'essai de fonctionnement, placer SW3-1 sur OFF.

- Quelques secondes après le démarrage du compresseur, un bruit métallique provenant de l'intérieur de l'appareil extérieur peut retentir. Le bruit provient de la valve de contrôle et s'explique par une différence de pression minime dans les tuyaux. L'appareil n'est pas défectueux.

Le mode d'essai ne peut pas être modifié via le commutateur DIP SW3-2 lors de la marche d'essai. (Pour ce faire, arrêter l'essai via le commutateur DIP SW3-1. Une fois le mode modifié, reprendre l'essai via le commutateur SW3-1.)

7.3. Récupération du réfrigérant (Aspiration)

Effectuer les procédures suivantes pour récupérer le réfrigérant en cas de déplacement de l'appareil intérieur ou de l'appareil extérieur.

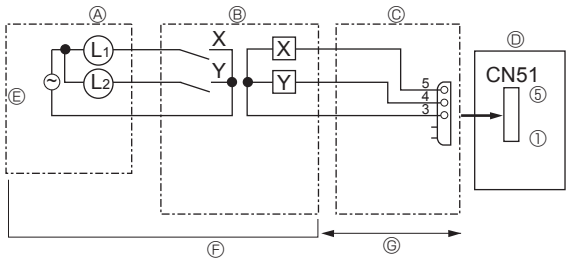
① Couper le disjoncteur.
② Raccorder le côté basse pression du collecteur à jauge à l'ouverture de service du robinet d'arrêt du gaz.
③ Fermer le robinet d'arrêt du liquide.
④ Rétablir le courant (disjoncteur).
* Le démarrage de la communication interne-externe prend environ 3 minutes après la mise sous tension (coupe-circuit). Démarrer la purge 3 à 4 minutes après la mise sous tension (coupe-circuit).
⑤ Effectuer l'essai de fonctionnement en mode de refroidissement (SW3-1 : ON et SW3-2 : OFF). Le compresseur (appareil extérieur) et les ventilateurs (appareils intérieurs et extérieurs) démarrent et l'essai de refroidissement commence. Immédiatement après avoir exécuté le test de fonctionnement en mode de refroidissement, basculer le commutateur SW2-4 (commutateur de purge) de l'appareil extérieur de OFF à ON.
* Ne pas faire fonctionner l'appareil longtemps lorsque le commutateur SW2-4 est activé (ON). Veiller à désactiver le commutateur (OFF) une fois la purge terminée.
* Ne mettre les commutateurs SW3-1 et SW3-2 sur ON que si l'appareil est à l'arrêt. Cependant, même si l'appareil est arrêté et que les commutateurs SW3-1 et SW3-2 sont activés moins de 3 minutes après l'arrêt du compresseur, la récupération du réfrigérant ne peut pas s'effectuer. Attendre 3 minutes après l'arrêt du compresseur avant de réactiver les commutateurs SW3-1 et SW3-2.
⑥ Fermer complètement le robinet d'arrêt du gaz lorsque le manomètre indique 7,1 - 0,0 PSIG (environ 0,5 - 0,0 kgf/cm^2)
⑦ Arrêter le climatiseur (SW3-1 : OFF et SW3-2 : OFF). Basculer le commutateur SW2-4 de ON à OFF.
⑧ Couper le courant (disjoncteur).
* Si une trop grande quantité de réfrigérant a été ajoutée au système de climatisation, il est possible que la pression ne puisse pas baisser jusqu'à 7,1 PSIG (0,5 kgf/cm^2). Dans ce cas, utiliser un dispositif de collecte du réfrigérant pour recueillir la totalité du réfrigérant du système, puis recharger la quantité de réfrigérant correcte dans le système après avoir déplacé les appareils intérieurs et extérieurs.

⚠ Avertissement:
- **Pendant la purge du réfrigérant, arrêter le compresseur avant de débrancher les tuyaux de réfrigérant. Le compresseur risque d'éclater et de provoquer des blessures si une substance étrangère, comme de l'air, pénètre dans le système.**
- **Ne pas purger s'il y a une fuite de gaz. L'arrivée d'air ou d'autres gaz provoque une pression anormalement élevée dans le cycle de réfrigération, ce qui peut provoquer une explosion ou des blessures.**

8. Fonctions spéciales

8.1. CONNECTEUR D'ENTRÉE/SORTIE DE L'APPAREIL EXTÉRIEUR

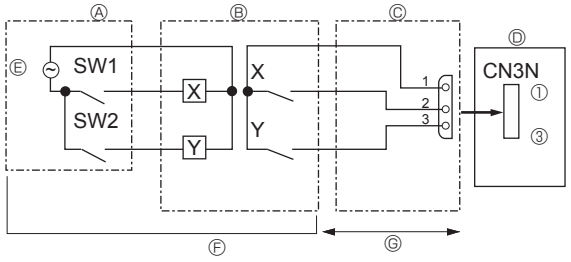
• État (CN51)



Ⓐ Panneau de commande déporté
Ⓑ Circuit du relais
Ⓒ Adaptateur de sortie externe (PAC-SA88HA-E)
Ⓓ Carte de commande de l'appareil extérieur
Ⓔ Alimentation électrique du témoin
Ⓕ Se procurer localement
Ⓖ Max. 10 m [33 pieds]

L1 : Témoin d'affichage d'erreur
L2 : Témoin de fonctionnement du compresseur
X, Y : Relais (valeurs nominales de la bobine : ≦ 0,9 W, 12 VCC)

• Changement automatique (CN3N)

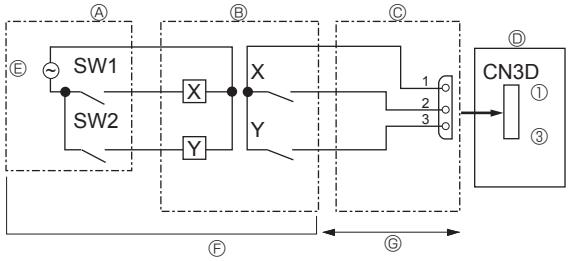


Ⓐ Panneau de télécommande
Ⓑ Circuit du relais
Ⓒ Adaptateur d'entrée externe (PAC-SC36NA-E)
Ⓓ Carte de commande de l'appareil extérieur
Ⓔ Alimentation électrique du relais
Ⓕ Se procurer localement
Ⓖ Max. 10 m [33 pieds]

SW1 : Commutateur
SW2 : Commutateur
X, Y : Relais (puissance de coupure du contact : ≧ 0,1 A, 15 VCC ; charge applicable min. : ≦ 1 mA)

	ON	OFF
SW1	Chauffage	Refroidissement
SW2	Validité de SW1	Non-validité de SW1

• Mode silencieux / Contrôle de la demande (CN3D)



Ⓐ Panneau de télécommande
Ⓑ Circuit du relais
Ⓒ Adaptateur d'entrée externe (PAC-SC36NA-E)
Ⓓ Carte de commande de l'appareil extérieur
Ⓔ Alimentation électrique du relais
Ⓕ Se procurer localement
Ⓖ Max. 10 m [33 pieds]

SW1 : Commutateur
SW2 : Commutateur
X, Y : Relais (puissance de coupure du contact : ≧ 0,1 A, 15 VCC ; charge applicable min. : ≦ 1 mA)

La sélection du mode silencieux et du contrôle de la demande se fait par commutation du commutateur DIP 9-2 du panneau de commande extérieur.
Les consommations électriques suivantes (par rapport aux valeurs nominales) peuvent être définies à l'aide de SW1, 2.

	DIP SW9-2 du panneau de commande extérieur	SW1	SW2	Fonctionnement
Mode silencieux	OFF	ON	–	Fonctionnement en mode silencieux
Contrôle de la demande	ON	OFF	OFF	100 % (Normal)
		ON	OFF	75 %
		ON	ON	50 %
		OFF	ON	0 % (Arrêt)

Contenido

1. Medidas de Seguridad. 1
2. Lugar de instalación 3
3. Instalación de la unidad exterior 6
4. Instalación de los tubos del refrigerante 6
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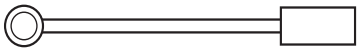
Confirmación de las piezas incluidas

Además del presente manual, se suministra la siguiente pieza con la unidad exterior. Esta pieza se utiliza para cablear a tierra el terminal S del bloque del terminal de transmisión TB7. Para obtener más información, consulte el apartado “6. Trabajo eléctrico”.



Cableado a tierra

1. Medidas de Seguridad

► Antes de instalar la unidad, asegúrese de haber leído el capítulo de “Medidas de seguridad”.
► Antes de conectar el sistema, informe al servicio de suministro o pídale permiso para efectuar la conexión.

⚠ Atención:
Describe las precauciones que deben tenerse en cuenta para evitar el riesgo de lesiones o muerte del usuario.

⚠ Cuidado:
Describe las precauciones que deben tenerse en cuenta para evitar daños en la unidad.

Después de terminar la instalación, explique las “Medidas de Seguridad”, funcionamiento y mantenimiento de la unidad al cliente según el Manual de instrucciones y realice una prueba para asegurarse de que funciona correctamente. Entregue una copia del Manual de instalación y del Manual de instrucciones al usuario. Estos manuales deben pasar a usuarios posteriores del equipo.

⏚ : Indica una pieza que debe estar conectada a tierra.

⚠ Atención:
Lea atentamente las etiquetas adheridas a la unidad principal.

⚠ Atención:

- **El usuario no debe instalar la unidad. La instalación del aire acondicionado debe correr a cargo del distribuidor o técnico autorizado. La instalación incorrecta de la unidad puede provocar escapes de agua, descargas eléctricas o incendios.**
- **Para la instalación, siga las instrucciones del Manual de instalación y utilice las herramientas y piezas de fontanería específicamente diseñados para utilizar con el refrigerante R410A.**
- **El refrigerante R410A en el sistema de HFC puede asimilar una presión 1,6 veces superior a la de los refrigerantes convencionales. Si los accesorios de fontanería que se instalan no están fabricados para el refrigerante R410A, los tubos se pueden quemar y causar daños o lesiones. Además, pueden producirse escapes de agua, descargas eléctricas o incendios.**
- **Al instalar la unidad, utilice las herramientas y el equipo de protección apropiados por seguridad. El hecho de no hacerlo puede provocar lesiones.**
- **La unidad debe instalarse según las instrucciones para reducir posibles daños en caso de terremoto, huracán o vientos fuertes. Si no se instala correctamente, la unidad podría caerse y provocar daños o lesiones.**
- **La unidad debe instalarse firmemente sobre una estructura capaz de soportar su peso. Si la unidad se instala sobre una estructura inestable, podría caerse y provocar daños o lesiones.**
- **Si el equipo de aire acondicionado se instala en una sala pequeña deberán tomarse medidas para prevenir que la concentración de refrigerante exceda los límites de seguridad en caso de fugas. Pregunte a un distribuidor por las medidas adecuadas para evitar que la concentración exceda los límites. Si se produce una fuga de refrigerante que sobrepase los límites de concentración, la estancia en la sala puede ser peligrosa por falta de oxígeno.**
- **Si se produce una fuga de refrigerante durante el funcionamiento, ventile la sala. Si el refrigerante entra en contacto con una llama, se desprenderán gases nocivos.**
- **Todas las conexiones eléctricas deberán ser realizadas por un técnico cualificado según la normativa local y las instrucciones de este manual. Cada unidad debe tener su línea eléctrica y se deben usar disyuntores y un voltaje correcto. El uso de líneas eléctricas con una capacidad insuficiente o una conexión eléctrica incorrecta puede provocar descargas eléctricas o incendios.**
- **Asegúrese de conectar los cables de alimentación y los cables de conexión para las unidades interiores, unidades exteriores y cajas de derivación directamente a las unidades (sin conexiones intermedias).**
  Las conexiones intermedias pueden producir errores de comunicación en caso de que el agua moje los cordones o los cables de conexión y, por consiguiente, la toma a tierra sea insuficiente, así como el contacto eléctrico en el punto de conexión intermedio.
- **Utilice tubos de cobre fosforoso del tipo C1220 y tubos de aleación de cobre sin costuras para conectar los tubos del refrigerante. Si los tubos no se conectan correctamente, la unidad no estará bien puesta a tierra y puede provocar descargas eléctricas.**
- **Utilice solo cables especificados para el cableado. Las conexiones del cableado se deben realizar con seguridad sin que se ejerza tensión en las conexiones de los terminales. Asimismo, no empalme nunca los cables al realizar el cableado (a menos que se indique lo contrario en este documento). El hecho de no seguir estas instrucciones puede provocar un sobrecalentamiento o un incendio.**
- **La cubierta del bloque de terminales de la unidad exterior tiene que estar bien sujeta. Si la cubierta no se instala correctamente y el polvo y la humedad entran en la unidad, se pueden producir una descarga eléctrica o un incendio.**
- **Cuando instale, mueva o revise el equipo de la unidad exterior, utilice solo el refrigerante indicado (R410A) para cargar los tubos del refrigerante. No lo mezcle con otro tipo de refrigerante y vacíe completamente de aire los tubos.**
  Si el aire se mezcla con el refrigerante, podría producir una tensión anormalmente alta en el tubo del refrigerante y ocasionar una explosión u otros peligros. Usar un refrigerante distinto al indicado para el sistema provocará un fallo mecánico, un funcionamiento defectuoso del sistema o la avería de la unidad. En el peor de los casos, podría suponer un grave impedimento para garantizar la seguridad del producto.
- **No realice el trabajo de vaciado cuando haya una fuga de gas. La entrada de aire u otros gases causa una presión anormalmente alta en el ciclo de refrigeración, lo que puede causar una explosión o lesiones.**
- **Utilice únicamente accesorios autorizados y solicite su instalación a un distribuidor o técnico autorizado. Si los accesorios no se instalan correctamente, pueden producirse escapes de agua, descargas eléctricas o incendios.**
- **No modifique la unidad. Para las reparaciones, acuda a su distribuidor. Si las modificaciones o las reparaciones no se realizan correctamente, pueden producirse escapes de agua, descargas eléctricas o incendios.**
- **El usuario nunca debe intentar reparar la unidad o moverla de sitio. Si la unidad no se instala correctamente, pueden producirse escapes de agua, descargas eléctricas o incendios. Si debe reparar o mover el equipo de aire acondicionado, acuda a su distribuidor o técnico autorizado.**
- **Tras haber realizado la instalación, compruebe si hay fugas de refrigerante. Si en caso de fuga el refrigerante entra en contacto con las llamas de un calentador o de un equipo de cocina portátil, se desprenderán gases nocivos.**
- **Al abrir o cerrar la válvula por debajo de las temperaturas de congelación, el refrigerante puede salir a chorros desde el espacio entre el vástago de la válvula y el cuerpo de la válvula y resultar en lesiones.**

es

1. Medidas de Seguridad

1.1. Cuestiones previas a la instalación

⚠ **Cuidado:**

- **No utilice la unidad en un ambiente enrarecido. Este aire acondicionado no se puede instalar en áreas expuestas a vapor, aceite esencial (incluyendo el aceite para máquinas) o al humo sulfúrico, ni en áreas con alto contenido en sal, como playas, o en zonas donde la nieve pueda cubrir la unidad, ya que pueden reducir significativamente su rendimiento y dañar las piezas internas.**
- **No instale la unidad donde se puedan verter, producir, circular o acumular gases inflamables. Si se acumula gas inflamable en zonas próximas a la unidad, se podría producir un incendio o una explosión.**
- **La unidad exterior produce condensación cuando funciona como calefacción. Asegúrese de habilitar drenaje alrededor de la unidad exterior si la condensación puede provocar daños.**
- **Si instala la unidad en un hospital o en un centro de comunicaciones, recuerde que la unidad produce ruidos e interferencias electrónicas. Los conmutadores, aparatos domésticos, equipos médicos de alta frecuencia y las comunicaciones de radio pueden provocar un mal funcionamiento o la avería del equipo de aire acondicionado. El equipo de aire acondicionado también puede afectar los equipos médicos e interrumpir los cuidados médicos, así como los equipos de comunicación y dañar la calidad de la pantalla.**
- **Siga estas instrucciones para evitar que los componentes abrasivos contenidos en el papel de lija y las herramientas de corte penetren en el circuito de refrigerante, ya que dichos componentes pueden provocar fallos en el compresor y las válvulas.**
  - Para desbarbar las tuberías, utilice un escariador u otras herramientas de desbarbado, no papel de lija.
  - Para cortar las tuberías, utilice un cortador de tuberías, no una amoladora ni otras herramientas que utilizan materiales abrasivos.
  - Al cortar o desbarbar las tuberías, procure que las virutas de corte u otras partículas extrañas no penetren en las tuberías.
  - Si las virutas de corte u otras partículas extrañas penetran en las tuberías, limpie el interior de las mismas.

1.2. Cuestiones previas a la instalación (reubicación)

⚠ **Cuidado:**

- **Tenga mucho cuidado cuando mueva las unidades. Se necesitan dos o más personas para llevar la unidad porque pesa 20 kg, 44 lbs o más. No la sujete por las bandas de embalaje. Utilice guantes protectores para sacar la unidad de la caja y para moverla, ya que se podría lastimar las manos con las aletas o con los bordes de alguna de las piezas.**
- **Guarde los embalajes en un lugar seguro. Los materiales de embalaje, como tal o de madera pueden producir pinchazos y otras lesiones.**
- **La base y los aditamentos de fijación de la unidad exterior deben comprobarse periódicamente para detectar posibles roturas, tuercas flojas o cualquier otro daño que hayan podido sufrir. Si no se solucionan esos problemas, la unidad podría caerse y causar daños o lesiones.**
- **No limpie con agua el equipo de aire acondicionado. Puede sufrir una descarga eléctrica.**
- **Apriete las tuercas de abocardado a los niveles recomendados mediante una llave dinamométrica. Si las aprieta demasiado, se pueden romper al cabo de un tiempo y producirse fugas de refrigerante.**

1.3. Antes de la instalación eléctrica

⚠ **Cuidado:**

- **Asegúrese de instalar disyuntores. Si no se instalan, se podrían producir descargas eléctricas.**
- **Observe las correspondientes normas federales, estatales o locales para evitar posibles fugas/descargas eléctricas. También puede instalar un interruptor de fallo de conexión a tierra para evitar fugas y descargas eléctricas.**
- **Use cables estándar de suficiente capacidad para las líneas eléctricas. Si no lo hace así, se podría producir un cortocircuito, un sobrecalentamiento o un incendio.**
- **Cuando instale las líneas eléctricas, los cables no deben tener corriente. Si las conexiones se aflojan, los cables se podrían cruzar o romper y se podría producir un incendio o un sobrecalentamiento.**
- **Asegúrese de instalar una toma de tierra. No conecte el cable de tierra a las tomas de tierra de las tuberías de gas o de agua, de postes de iluminación o de teléfono. Si la unidad no está bien conectada a la línea de tierra, se puede producir una descarga eléctrica.**
- **Utilice disyuntores (interruptor de falta de tierra, interruptor aislante (+fusible B) e interruptores en caja moldeada) con la potencia especificada. Si la potencia del interruptor es mayor que la especificada, puede ocurrir un incendio o una avería.**

1.4. Antes de realizar las pruebas de funcionamiento

⚠ **Cuidado:**

- **Conecte la corriente al menos 12 horas antes de que empiece a funcionar el equipo. Si se acciona inmediatamente después de haberlo conectado a la corriente, pueden producirse daños graves en las piezas internas. Mantenga la unidad conectada a la corriente durante la temporada de funcionamiento.**
- **Antes de que comience a funcionar el equipo, compruebe que todos los paneles y protectores están instalados correctamente. Las piezas giratorias, calientes o de alto voltaje pueden provocar lesiones.**
- **No toque ningún interruptor con las manos mojadas. Puede sufrir una descarga eléctrica.**
- **No toque la tubería del refrigerante sin guantes mientras durante el funcionamiento. La tubería del refrigerante está caliente o frío según las condiciones de la corriente de refrigerante. Si toca la tubería puede sufrir quemaduras por el calor o por el frío.**
- **Una vez deje de funcionar el aparato, espere 5 minutos antes de apagar el interruptor principal. De lo contrario, se puede producir un goteo de agua o una avería.**

1.5. Utilización del refrigerante R410A para equipos de aire acondicionado

⚠ **Cuidado:**

- **Utilice tubos de cobre fosforoso del tipo C1220 y tubos de aleación de cobre sin costuras para conectar los tubos del refrigerante. Asegúrese de que el interior de las tuberías está limpio y que no contienen ningún contaminante dañino como compuestos sulfúricos, oxidantes, impurezas o polvo. Utilice tuberías con el grosor especificado. (Consulte la página 6) Tenga en cuenta lo siguiente si reutiliza tuberías que contenían refrigerante R22.**
  - Sustituya las tuercas de abocardado existentes y vuelva a abocardar las secciones abocardadas.
  - No use tuberías de poco grosor. (Consulte la página 6)
- **Almacene las tuberías que se deban instalar en el interior y mantenga los orificios tapados hasta el momento de instalarlas. (Deje las juntas articuladas y otras piezas en sus embalajes.) Si el polvo, los restos o la humedad entran en las tuberías de refrigeración, se puede producir el deterioro del aceite o una avería en el aparato.**
- **Utilice aceite de éster, de éter o alquilobenceno (en pequeñas cantidades) para recubrir las secciones abocardadas. Si se mezcla aceite mineral con aceite de refrigeración se puede deteriorar el aceite.**
- **No utilice otro refrigerante que no sea R410A. Si utiliza otro refrigerante, el cloro provocará el deterioro del aceite.**
- **Utilice las siguientes herramientas especialmente diseñadas para usar con el refrigerante R410A. Se necesitan las siguientes herramientas para utilizar el refrigerante R410A. Si tiene alguna duda, consulte con su distribuidor más cercano.**

Herramientas (para R410A)	
Manómetro	Abocardador
Manguera de carga	Ajustador del tamaño
Detector de fugas de gas	Adaptador de la bomba de vacío
Llave dinamométrica	Báscula electrónica de carga del refrigerante

- **Asegúrese de utilizar las herramientas adecuadas. Si el polvo, los restos o la humedad entran en las tuberías de refrigeración, se puede producir el deterioro del aceite de refrigeración.**
- **No utilice un cilindro de carga. Si utiliza un cilindro de carga, variará la composición del refrigerante y no será tan eficaz.**

es

2. Lugar de instalación

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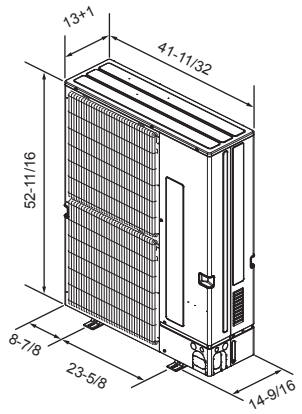


Fig. 2-1

2.1. Tubería de refrigerante

Consulte la sección Fig. 4-1.

2.2. Elección del lugar de instalación de la unidad exterior

- No instale la unidad en lugares expuestos directamente al sol o a otras fuentes de calor.
- Escoja un lugar donde el ruido de la unidad no moleste a los vecinos.
- Escoja un lugar donde sea fácil instalar el cableado y las tuberías y acceder a la fuente de alimentación y a la unidad exterior.
- No instale la unidad donde se puedan verter, producir, circular o acumular gases inflamables.
- Durante el funcionamiento, la unidad puede perder agua.
- Escoja un lugar nivelado que pueda soportar el peso y la vibración de la unidad.
- No instale la unidad en lugares donde la pueda cubrir la nieve. En zonas propensas a las nevadas intensas, se deben tomar medidas de precaución, como por ejemplo, situar la unidad elevada o instalar una protección en la entrada de aire para evitar que la nieve la obstruya o fluya directamente contra ésta. Esto reduce la corriente de aire e impide que la unidad funcione correctamente.
- No instale la unidad en lugares expuestos a aceite, vapor o humo sulfúrico.
- Utilice las asas de transporte de la unidad exterior parar transportarla. Si transporta la unidad tomándola por la parte inferior se podría lesionar las manos o los dedos.

2.3. Dimensiones exteriores (Unidad exterior) (Fig. 2-1)

2.4. Limitaciones en la instalación de las unidades interiores

Debe tener en cuenta que las unidades interiores que pueden conectarse a esta unidad exterior tienen las siguientes limitaciones.

- Las unidades interiores, con los números de modelo 04-72, se podrán conectar.
- Si se utiliza una caja de derivación, pueden conectarse unidades interiores con referencias 06-36.
- Para conocer las posibles combinaciones de unidades interiores en habitaciones, consulte la Tabla 1 a continuación.

Verificación

La capacidad nominal se debe determinar de acuerdo con la siguiente tabla. La cantidad de unidades está limitada según se muestra en la Tabla 2 a continuación. En el siguiente paso, asegúrese de que la capacidad nominal seleccionada esté dentro del rango del 50% al 130% de la capacidad de la unidad exterior.

- MXZ-SM36 18 – 46 kBtu/h
- MXZ-SM42 21 – 54 kBtu/h
- MXZ-SM48 24 – 62 kBtu/h
- MXZ-SM60 30 – 78 kBtu/h

Tabla 1-1: Unidades interiores City Multi (serie P·FY)

Tipo de unidad interior	P04	P05	P06	P08	P12	P15	P18	P24	P30	P36	P48	P54	P72
Capacidad nominal (Refrigeración) (kBtu/h)	4	5	6	8	12	15	18	24	30	36	48	54	72

Tabla 1-2: Serie M, serie P, serie S

N.º de modelo	06	09	12	15	18	24	30	36
Capacidad nominal (Refrigeración) (kBtu/h)	6	9	12	15	18	24	30	36

Las combinaciones en las que la capacidad total de las unidades interiores sobrepase la capacidad de la unidad exterior reducirán la capacidad de refrigeración de cada unidad interior por debajo de la capacidad nominal de refrigeración correspondiente. Por ello, si es posible, combine las unidades interiores según la capacidad que admita la unidad exterior.

Tabla 2: Cantidades de unidades interiores que se pueden conectar

- Unidades interiores City Multi

SM36	1-11
SM42	1-12
SM48	1-12
SM60	1-12

- Sistema de caja de derivación (unidades interiores de la serie M, S, P a través de caja de derivación)

SM36	2*1 – 4 (3) unidades *2 *3 *4
SM42	2*1 – 5 (4) unidades *2 *3 *4
SM48	2*1 – 8 (6) unidades *2 *3 *4
SM60	2*1 – 8 (6) unidades *2 *3 *5

*1 Solo es posible una conexión de unidad con la unidad serie SVZ.

*2 El número entre paréntesis es el número máximo de unidades que pueden conectarse cuando se han conectado 1 o más unidades PLA-A·EA7.

*3 Al conectar una(s) unidad(es) de la serie SVZ, establezca las siguientes restricciones adicionales. Si las conexiones son distintas a las especificadas a continuación, consulte con su distribuidor.

Número de unidades conectadas de la serie SVZ	Restricciones (Para cada caja de derivación conectada)
2	No se pueden conectar unidades interiores que no sean de la serie SVZ.
1	• La capacidad nominal total (refrigeración) debe ser como máximo del 100 %, incluida la unidad de la serie SVZ (solo SM60). • Solo pueden incluirse en la conexión 1 unidad SEZ o 1 unidad PEAD.

*4 Una caja de derivación puede conectarse a un máximo de 3 de las unidades de la serie SEZ/PEAD.

*5 Una caja de derivación puede conectarse a un máximo de 2 de las unidades de la serie SEZ/PEAD.
Al conectarse con 1 y más de 1 de las unidades de la serie SEZ/PEAD, la capacidad nominal total (refrigeración) de la SEZ/PEAD es del 100 % e inferior al 100 %

Para conexiones distintas a las especificadas en los puntos 1 y 2, incluyendo las conexiones con las unidades de la serie SVZ, consulte a un distribuidor.

es

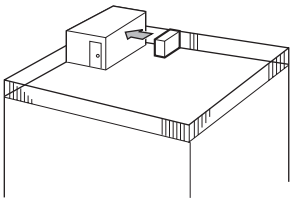


Fig. 2-2

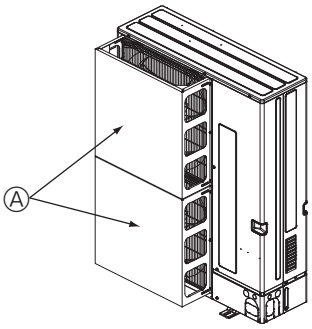


Fig. 2-3

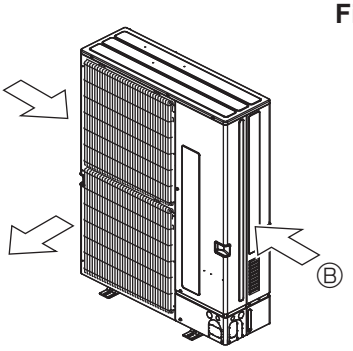


Fig. 2-4

2.5. Ventilación y espacio de servicio

Nota:

Las dimensiones indicadas junto a las flechas son necesarias para garantizar el buen funcionamiento del aire acondicionado. Instale la unidad en un lugar lo más ancho posible para facilitar su servicio o reparación posteriores.

2.5.1. Instalación en lugares expuestos al viento

Cuando instale una unidad en el tejado o en otros lugares desprotegidos del viento, la salida de aire de la unidad no debe quedar expuesta directamente al viento fuerte. Si el viento fuerte entra en la salida de aire puede impedir la circulación normal del aire y causar un mal funcionamiento.

A continuación se muestran 3 ejemplos de precauciones a tomar contra el viento fuerte.

① Coloque la salida de aire de frente a la pared más próxima a una distancia de unos 50 cm (19-11/16") de ella. (Fig. 2-2)

② Si la unidad está situada en un lugar expuesto a vientos fuertes como huracanes que puedan entrar en la salida de aire, coloque un deflector de viento opcional. (Fig. 2-3)
Ⓐ Deflector de viento

③ Coloque la unidad de manera que la salida de aire sople en dirección perpendicular a la dirección estacional del viento, si la conoce. (Fig. 2-4)
Ⓑ Dirección del viento

es

(pulg.)

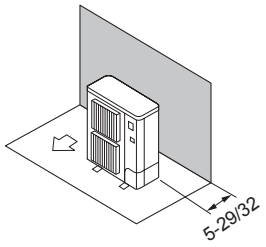


Fig. 2-5

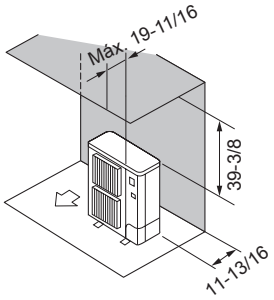


Fig. 2-6

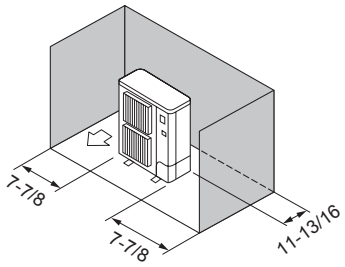


Fig. 2-7

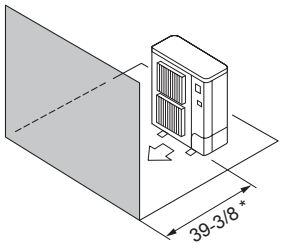


Fig. 2-8

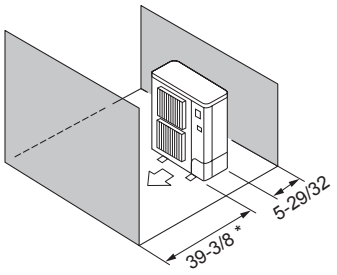


Fig. 2-9

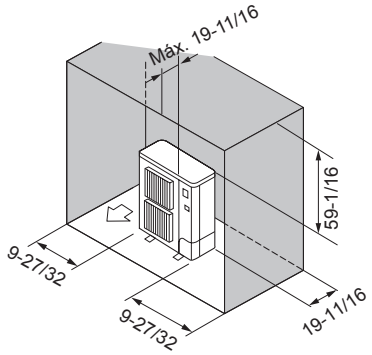


Fig. 2-10

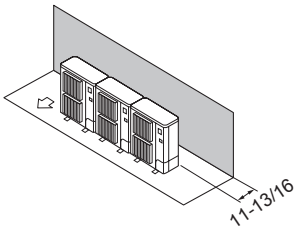


Fig. 2-11

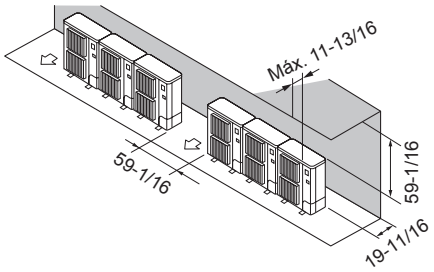


Fig. 2-12

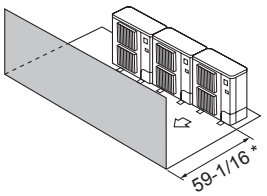


Fig. 2-13

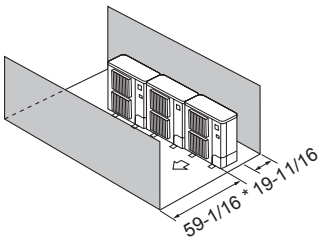


Fig. 2-14

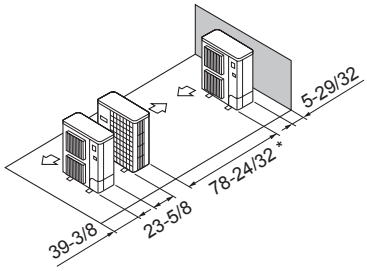


Fig. 2-15

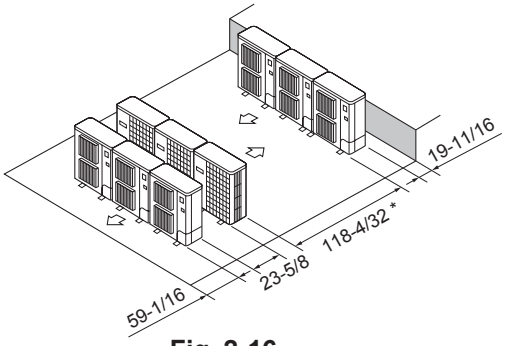


Fig. 2-16

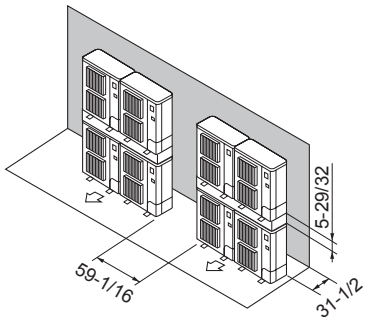


Fig. 2-17

2.5.2. Cuando se instala una unidad exterior simple

Las dimensiones mínimas son las siguientes, excepto para máx. (dimensiones máximas), las cuales también están indicadas.

Consulte los números correspondientes para cada caso.

① Obstáculos en la parte trasera (Fig. 2-5)

② Obstáculos en la parte trasera y superior (Fig. 2-6)

③ Obstáculos en la parte trasera y los laterales (Fig. 2-7)

④ Obstáculos en la parte delantera (Fig. 2-8)

* Si utiliza las guías para salida de aire opcional, el espacio libre deberá ser de 19-11/16" (500 mm) o más.

⑤ Obstáculos en la parte delantera y trasera (Fig. 2-9)

* Si utiliza las guías para salida de aire opcional, el espacio libre deberá ser de 19-11/16" (500 mm) o más.

⑥ Obstáculos en la parte trasera, los laterales y superior (Fig. 2-10)

• No utilice las guías para salida de aire opcionales para corriente de aire hacia arriba.

2.5.3. Cuando instale varias unidades exteriores

Deje un espacio de 1" (25 mm) o más entre las unidades.

① Obstáculos en la parte trasera (Fig. 2-11)

② Obstáculos en la parte trasera y superior (Fig. 2-12)

• No se deben instalar más de tres unidades correlativas. Además, se debe dejar el espacio indicado.

• No utilice las guías para salida de aire opcionales para corriente de aire hacia arriba.

③ Obstáculos en la parte delantera (Fig. 2-13)

* Si utiliza las guías para salida de aire opcional, el espacio libre deberá ser de 39-3/8" (1000 mm) o más.

④ Obstáculos en la parte delantera y trasera (Fig. 2-14)

* Si utiliza las guías para salida de aire opcional, el espacio libre deberá ser de 39-3/8" (1000 mm) o más.

⑤ Disposición en paralelo de unidades simples (Fig. 2-15)

* Si utiliza las guías para salida de aire opcional instalada para que el aire salga hacia arriba, el espacio libre debe ser de 39-3/8" (1000 mm) o más.

⑥ Disposición en paralelo de varias unidades (Fig. 2-16)

* Si utiliza las guías para salida de aire opcional instalada para que el aire salga hacia arriba, el espacio libre debe ser de 59-1/16" (1500 mm) o más.

⑦ Disposición de unidad apilada (Fig. 2-17)

• Se pueden apilar hasta dos unidades de altura.

• No se deben instalar más de dos unidades correlativas. Además, se debe dejar el espacio indicado.

es

3. Instalación de la unidad exterior

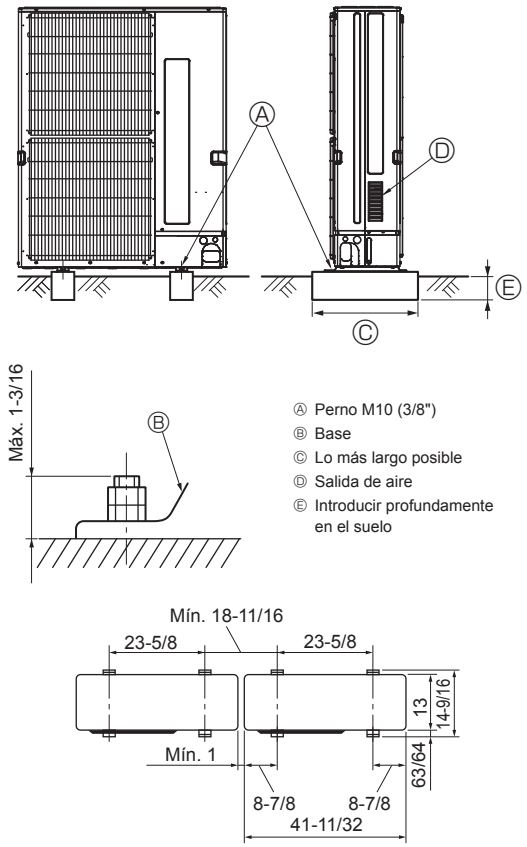


Fig. 3-1

- Cerciórese de instalar la unidad en una superficie robusta y nivelada para evitar los ruidos de traqueteo durante la operación. (Fig. 3-1)

<Especificaciones de la cimentación>

Perno de cimentación	M10 (3/8")
Grosor del hormigón	120 mm (4-23/32")
Longitud del perno	70 mm (2-3/4")
Capacidad de soporte de peso	320 kg (705 lbs)

- Cerciórese de que la longitud del perno de cimentación esté dentro de 30 mm (1-3/16") de la superficie inferior de la base.
- Asegure firmemente la base de la unidad con cuatro pernos de cimentación M10 en lugares robustos.

Instalación de la unidad exterior

- No obstruya la salida de aire. Si se obstruye la salida de aire, se puede dificultar el funcionamiento del aparato y puede causar una avería.
- Además de la base de la unidad, utilice los orificios de instalación situados en la parte trasera de la unidad para añadirle cables u otros elementos necesarios para instalar la unidad. Utilice tirafondos (ø5 × 15 mm, ø13/16" × 19/32" o menos) para instalar el equipo.

⚠ Atención:

- **La unidad debe instalarse firmemente sobre una estructura capaz de soportar su peso. Si la unidad se instala sobre una estructura inestable, podría caerse y provocar daños o lesiones.**
- **La unidad debe instalarse según las instrucciones para reducir posibles daños en caso de terremoto, huracán o vientos fuertes. Si no se instala correctamente, la unidad podría caerse y provocar daños o lesiones.**

⚠ Cuidado:

- **Instale la unidad en una estructura rígida para prevenir posibles vibraciones o el exceso de ruido durante el funcionamiento.**

4. Instalación de los tubos del refrigerante

4.1. Precauciones a tomar en equipos que utilicen el refrigerante R410A

- Consulte la página 2 para las precauciones a tomar en equipos que utilicen el refrigerante R410A y que no se encuentren a continuación.
- Utilice aceite de éster, de éter o alquilobenceno (en pequeñas cantidades) para recubrir las secciones abocardadas.
- Utilice tubos de cobre fosforoso del tipo C1220 y tubos de aleación de cobre sin costuras para conectar los tubos del refrigerante. Utilice tuberías para refrigerante del grosor especificado en la tabla siguiente. Asegúrese de que el interior de las tuberías está limpio y que no contienen ningún contaminante nocivo como compuestos sulfúricos, oxidantes, restos o polvo.

⚠ Atención:

Cuando instale, mueva o revise el equipo de la unidad exterior, utilice solo el refrigerante indicado (R410A) para cargar los tubos del refrigerante. No lo mezcle con otro tipo de refrigerante y vacíe completamente de aire los tubos.

Si el aire se mezcla con el refrigerante, podría producir una tensión anormalmente alta en el tubo del refrigerante y ocasionar una explosión u otros peligros.

Usar un refrigerante distinto al indicado para el sistema provocará un fallo mecánico, un funcionamiento defectuoso del sistema o la avería de la unidad. En el peor de los casos, podría suponer un grave impedimento para garantizar la seguridad del producto.

ø6,35 mm (1/4 pulg.), ø9,52 mm (3/8 pulg.), ø12,7 mm (1/2 pulg.)	Grosor 0,8 mm (1/32 pulg.)
ø15,88 mm (5/8 pulg.), ø19,05 mm (3/4 pulg.)	Grosor 1,0 mm (5/128 pulg.)

- No utilice tubos con un grosor menor del especificado a continuación.
- **Los grosores que se enumeran en la tabla anterior están basados en estándares japoneses. Utilice tuberías que funcionen a una presión de 4,15 MPa [601 PSIG] como mínimo de acuerdo a los estándares locales.**

⚠ Cuidado:

Siga estas instrucciones para evitar que los componentes abrasivos contenidos en el papel de lija y las herramientas de corte penetren en el circuito de refrigerante, ya que dichos componentes pueden provocar fallos en el compresor y las válvulas.

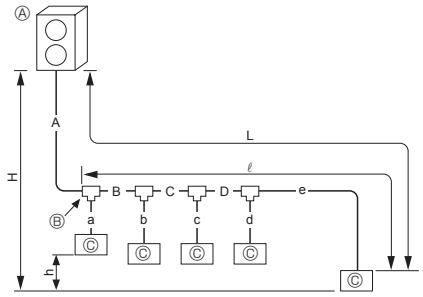
- **Para desbarbar las tuberías, utilice un escariador u otras herramientas de desbarbado, no papel de lija.**
- **Para cortar las tuberías, utilice un cortador de tuberías, no una amoladora ni otras herramientas que utilizan materiales abrasivos.**
- **Al cortar o desbarbar las tuberías, procure que las virutas de corte u otras partículas extrañas no penetren en las tuberías.**
- **Si las virutas de corte u otras partículas extrañas penetran en las tuberías, limpie el interior de las mismas.**

es

4. Instalación de los tubos del refrigerante

4.2. Longitud de los tubos y diferencia de altura

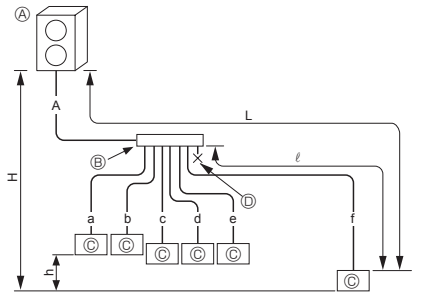
4.2.1. Conexión sin caja de derivación (Fig. 4-1)



Ⓐ Unidad exterior
Ⓑ Primera bifurcación
Ⓒ Unidad interior

		SM36/42/48	SM60
A+B+C+D+a+b+c+d+e		≦ 300 m [984 pies]	≦ 150 m [492 pies]
L = A+B+C+D+e		≦ 150 m [492 pies]	≦ 80 m [262 pies]
ℓ = B+C+D+e		≦ 30 m [98 pies]	
H	Exterior superior	≦ 50 m [164 pies]	
	Exterior inferior	≦ 40 m [131 pies]*	≦ 40 m [131 pies]
h		≦ 15 m [49 pies]	

* Si se incluyen los modelos PKFY-P06NBMU, PKFY-P08NHMU, PKFY-P04/06/08/12NLMU, PFFY-P06/08/12NEMU o PFFY-P06/08/12NRMU, utilíce-los a una distancia máxima de 30 m [98 pies].



Ⓐ Unidad exterior
Ⓑ Primera bifurcación
Ⓒ Unidad interior
Ⓓ Tapa

		SM36/42/48	SM60
A+a+b+c+d+e+f		≦ 300 m [984 pies]	≦ 150 m [492 pies]
L = A+f		≦ 150 m [492 pies]	≦ 80 m [262 pies]
ℓ = f		≦ 30 m [98 pies]	
H	Exterior superior	≦ 50 m [164 pies]	
	Exterior inferior	≦ 40 m [131 pies]*	≦ 40 m [131 pies]
h		≦ 15 m [49 pies]	

* Si se incluyen los modelos PKFY-P06NBMU, PKFY-P08NHMU, PKFY-P04/06/08/12NLMU, PFFY-P06/08/12NEMU o PFFY-P06/08/12NRMU, utilíce-los a una distancia máxima de 30 m [98 pies].

Fig. 4-1

Fórmula de conversión

1/4 F	ø6,35 (1/4)
3/8 F	ø9,52 (3/8)
1/2 F	ø12,7 (1/2)
5/8 F	ø15,88 (5/8)
3/4 F	ø19,05 (3/4)

A, B, C, D (mm [pulg.])

	Tubo de líquido	Tubo de gas
SM36/42/48	ø9,52 [3/8]	ø15,88 [5/8]
SM60		ø19,05 [3/4]

a, b, c, d, e, f (mm [pulg.])

Número de modelo	Tubo de líquido	Tubo de gas
04, 05, 06, 08, 12, 15, 18	ø6,35 [1/4]	ø12,7 [1/2]
24, 27, 30, 36, 48, 54	ø9,52 [3/8]	ø15,88 [5/8]
72	ø9,52 [3/8]	ø19,05 [3/4]

Modelo de juego de bifurcación
CMY-Y62-G-E

4-Cabezal de bifurcación	8-Cabezal de bifurcación
CMY-Y64-G-E	CMY-Y68-G-E

Preparación de los tubos

① En la tabla siguiente se muestran las especificaciones de los tubos comercialmente disponibles.

Diámetro exterior	Grosor del aislamiento	Material de aislamiento
mm (pulg.)	mm (pulg.)	
6,35 (1/4)	8 (5/16)	Plástico celular resistente al calor y gravedad específica de 0,045
9,52 (3/8)	8 (5/16)	
12,7 (1/2)	8 (5/16)	
15,88 (5/8)	8 (5/16)	
19,05 (3/4)	8 (5/16)	

② Asegúrese de que los 2 tubos de refrigerante están aislados para evitar la condensación.

③ El radio mínimo de curvatura debe ser de 4" (100 mm) o más.

⚠ Cuidado:

Asegúrese de utilizar el aislamiento del grosor especificado. Un grosor excesivo puede alterar la correcta instalación de la unidad interior y un grosor insuficiente puede generar goteo de rocío.

⚠ Atención:

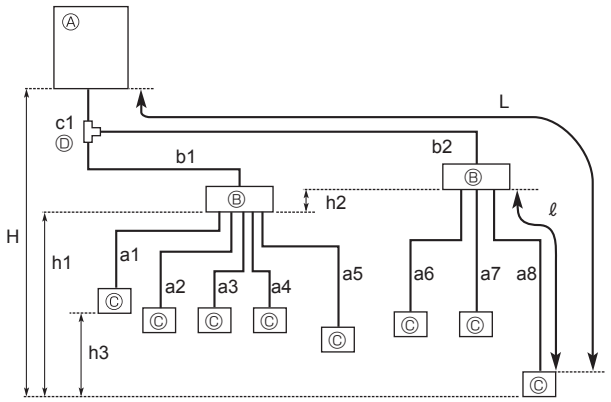
Al bombear el refrigerante, detenga el compresor antes de desconectar las tuberías de refrigerante. El compresor podría explotar y causar lesiones en caso de penetrar alguna sustancia extraña, como por ejemplo aire, en el sistema.

es

4. Instalación de los tubos del refrigerante

4.2.2. Conexión con caja de derivación (Fig. 4-2)

- Esta unidad tiene conexiones abocardadas en cada unidad interior, en la caja de derivación y en los laterales de la unidad exterior.
- Retire la cubierta de la válvula de la unidad exterior y, a continuación, conecte el tubo.
- Los tubos de refrigerante se utilizan para conectar la caja de derivación y la unidad interior.



Ⓐ Unidad exterior
Ⓑ Caja de derivación
Ⓒ Unidad interior
Ⓓ La primera junta

Fig. 4-2

Longitud permitida (un sentido)	Longitud total de los tubos	c1 + b1 + b2 + a1 + a2 + a3 + a4 + a5 + a6 + a7 + a8 ≤ 150 m (492 pies)
	Longitud máxima de los tubos (L) *1	c1 + b2 + a8 ≤ 80 m (262 pies)
	Longitud de los tubos entre la unidad exterior y las cajas de derivación	c1 + b1 + b2 ≤ 55 m (180 pies)
	Caja de derivación más alejada de la primera junta (b2)	b2 ≤ 30 m (98 pies)
	Longitud máxima del tubo desde la caja de derivación (ℓ)	a8 ≤ 25 m (82 pies)
	Longitud total de los tubos entre las cajas de derivación y las unidades interiores	a1 + a2 + a3 + a4 + a5 + a6 + a7 + a8 ≤ 95 m (311 pies)
Diferencia en la altura permitida (un sentido)	En la sección interior/exterior (H) *2	H ≤ 50 m (164 pies) (En caso de que la unidad exterior se instale más arriba que la unidad interior)
		H ≤ 40 m (131 pies) (En caso de que la unidad exterior se instale más abajo que la unidad interior)
	En la sección caja de derivación/unidad interior (h1)	h1 + h2 ≤ 15 m (49 pies)
	En cada unidad de derivación (h2)	h2 ≤ 15 m (49 pies)
	En cada unidad interior (h3)	h3 ≤ 12 m (39 pies)
Número de codos		| c1 + b1 + a1 |, | c1 + b1 + a2 |, | c1 + b1 + a3 |, | c1 + b1 + a4 |, | c1 + b1 + a5 |, | c1 + b2 + a6 |, | c1 + b2 + a7 |, | c1 + b2 + a8 | ≤ 15

*1 La tabla de especificaciones de las tuberías no indica una longitud mínima del conjunto de conducciones. No obstante, las unidades interiores cuyas tuberías conectadas tengan una longitud inferior a 16 pies (5 m) pueden producir ruidos intermitentes durante el funcionamiento normal del sistema en entornos muy silenciosos. Tenga en cuenta esta importante información cuando instale y coloque la unidad interior dentro del espacio correspondiente.

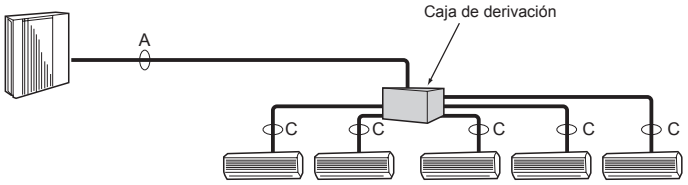
*2 La caja de derivación se deberá situar en el nivel entre la unidad exterior y las unidades interiores.

es

4. Instalación de los tubos del refrigerante

■ **En caso de utilizar una caja de 1 derivación**

Conexión abocardada utilizada. (Sin soldadura)



■ **En caso de utilizar cajas de 2 derivaciones**

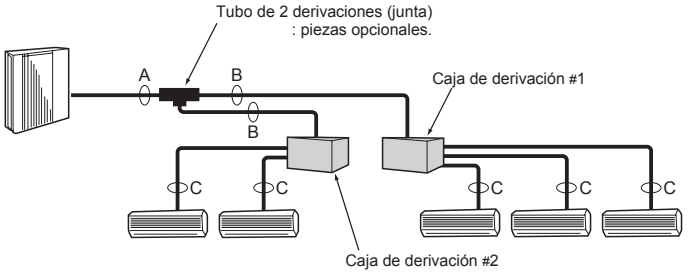


Fig. 4-3

Conexión abocardada del tubo de refrigerante de la caja de derivación mm (pulg.)

	Para la unidad interior					Para la unidad exterior
	A	B	C	D	E	
Tubo de liquido	ø6,35 (1/4)	ø6,35 (1/4)	ø6,35 (1/4)	ø6,35 (1/4)	ø6,35 (1/4)	ø9,52 (3/8)
Tubo de gas	ø9,52 (3/8)	ø9,52 (3/8)	ø9,52 (3/8)	ø9,52 (3/8)	ø12,7 (1/2)	ø15,88 (5/8)

* De tipo 3 derivaciones : solo A, B, C

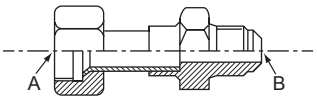


Fig. 4-4

Fórmula de conversión

1/4 F	ø6,35 (1/4)
3/8 F	ø9,52 (3/8)
1/2 F	ø12,7 (1/2)
5/8 F	ø15,88 (5/8)
3/4 F	ø19,05 (3/4)

Tamaño del tubo

A

	Tubo de liquido	Tubo de gas
SM36	ø9,52 (3/8)	ø15,88 (5/8)
SM42		
SM48		
SM60		ø19,05 (3/4)

B

• SM36/42/48

Tubo de liquido	Tubo de gas
ø9,52 (3/8)	ø15,88 (5/8)

• SM60

Capacidad total de las unidades interiores	Tubo de liquido	Tubo de gas
– 54 kBtu/h	ø9,52 (3/8)	ø15,88 (5/8)
54 kBtu/h –	ø9,52 (3/8)	ø19,05 (3/4)

C

El tamaño de la conexión de los tubos varía en función del tipo y la capacidad de las unidades interiores. Haga que coincida el tamaño de la conexión del tubo de la caja de derivación con la unidad interior.

Si el tamaño de la conexión del tubo de la caja de derivación no coincide con el tamaño de la conexión del tubo de la unidad interior, utilice juntas opcionales de diámetro diferente (deformadas) en el lateral de la caja de derivación. (Conecte la junta deformada directamente al lateral de la caja de derivación).

■ **Tamaño del tubo (Caja de derivación-Unidad interior) *Caso de la serie M o unidad interior de la serie S**

Tipo de unidad interior	(Btu/h)	06	09	12	15	18	24	30	36
Tamaño del tubo (mm (pulg.))	Líquido	ø6,35 (1/4)	ø6,35 (1/4)	ø6,35 (1/4)	ø6,35 (1/4)	ø6,35 (1/4)	ø9,52 (3/8)	ø9,52 (3/8)	ø9,52 (3/8)
	Gas	ø9,52 (3/8)	ø9,52 (3/8)	ø9,52 (3/8)	ø12,7 (1/2)	ø12,7 (1/2)	ø15,88 (5/8)	ø15,88 (5/8)	ø15,88 (5/8)

■ **Tamaño del tubo (Caja de derivación-Unidad interior) *Caso de la unidad interior de la serie P**

Tipo de unidad interior	(Btu/h)	09	12	15	18	24	30	36
Tamaño del tubo (mm (pulg.))	Líquido	ø6,35 (1/4)	ø6,35 (1/4)	ø6,35 (1/4)	ø6,35 (1/4)	ø9,52 (3/8)	ø9,52 (3/8)	ø9,52 (3/8)
	Gas	ø9,52 (3/8)	ø12,7 (1/2)	ø12,7 (1/2)	ø12,7 (1/2)	ø15,88 (5/8)	ø15,88 (5/8)	ø15,88 (5/8)

La alineación de una unidad interior conectable depende del distrito/zona/país.

Junta de diámetro diferente (piezas opcionales) (Fig. 4-4)

Nombre del modelo	Diámetro de los tubos conectados	Diámetro A	Diámetro B
	mm (pulg.)	mm (pulg.)	mm (pulg.)
MAC-A454JP-E	ø9,52 (3/8) → ø12,7 (1/2)	ø9,52 (3/8)	ø12,7 (1/2)
MAC-A455JP-E	ø12,7 (1/2) → ø9,52 (3/8)	ø12,7 (1/2)	ø9,52 (3/8)
MAC-A456JP-E	ø12,7 (1/2) → ø15,88 (5/8)	ø12,7 (1/2)	ø15,88 (5/8)
PAC-493PI	ø6,35 (1/4) → ø9,52 (3/8)	ø6,35 (1/4)	ø9,52 (3/8)
PAC-SG76RJ-E	ø9,52 (3/8) → ø15,88 (5/8)	ø9,52 (3/8)	ø15,88 (5/8)
PAC-SG75RJ-E	ø15,88 (5/8) → ø19,05 (3/4)	ø15,88 (5/8)	ø19,05 (3/4)

Preparación de los tubos

① En la tabla siguiente se muestran las especificaciones de los tubos comercialmente disponibles.

Diámetro exterior	Grosor del aislamiento	Material de aislamiento
mm (pulg.)	mm (pulg.)	
6,35 (1/4)	8 (5/16)	Plástico celular resistente al calor y gravedad específica de 0,045
9,52 (3/8)	8 (5/16)	
12,7 (1/2)	8 (5/16)	
15,88 (5/8)	8 (5/16)	
19,05 (3/4)	8 (5/16)	

② Asegúrese de que los 2 tubos de refrigerante están aislados para evitar la condensación.

③ El radio mínimo de curvatura debe ser de 4” (100 mm) o más.

⚠ **Cuidado:**

Asegúrese de utilizar el aislamiento del grosor especificado. Si el grosor es excesivo puede que no se instalen correctamente la unidad interior y la caja de derivación; y si es insuficiente, puede provocar el goteo de rocío.

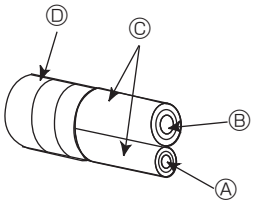
Tubo de 2 derivaciones (Junta) : Piezas opcionales (Elija la más conveniente según el método de conexión).

Nombre del modelo	Método de conexión
MSDD-50AR-E	abocardado
MSDD-50BR-E	soldadura

■ **Procedimiento de instalación (Tubo de 2 derivaciones (Junta))**

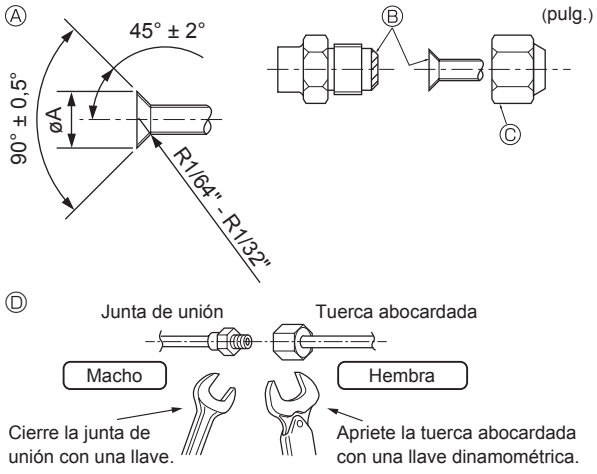
Consulte los manuales de instalación de MSDD-50AR-E y MSDD-50BR-E.

es



Ⓐ Tubo de liquido
Ⓑ Tubo de gas
Ⓒ Aislamiento térmico
Ⓓ Forrado con cinta

Fig. 4-5



Ⓐ Dimensiones del corte abocinado
Ⓓ Torsión de apriete de la tuerca abocardada

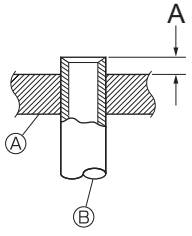
Fig. 4-6

Ⓐ (Fig. 4-6)

Tubo de cobre O.D. (mm) (pulg.)	Dimensiones de abocinado dimensiones øA (mm) (pulg.)
ø6,35 (1/4)	8,7 - 9,1 (5/16 - 3/8)
ø9,52 (3/8)	12,8 - 13,2 (1/2 - 33/64)
ø12,7 (1/2)	16,2 - 16,6 (41/64 - 21/32)
ø15,88 (5/8)	19,3 - 19,7 (49/64 - 25/32)
ø19,05 (3/4)	23,6 - 24,0 (15/16 - 61/64)

Tubo de cobre O.D. (mm) (pulg.)	Tuerca de abocardado O.D. (mm) (pulg.)	Torsión de apriete (N·m)* (ft·lbs)
ø6,35 (1/4)	17 (43/64)	14 - 18 (10 - 13)
ø6,35 (1/4)	22 (7/8)	34 - 42 (25 - 30)
ø9,52 (3/8)	22 (7/8)	34 - 42 (25 - 30)
ø9,52 (3/8)	26 (1-3/64)	49 - 61 (35 - 44)
ø12,7 (1/2)	26 (1-3/64)	49 - 61 (35 - 44)
ø12,7 (1/2)	29 (1-9/64)	68 - 82 (49 - 59)
ø15,88 (5/8)	29 (1-9/64)	68 - 82 (49 - 59)
ø15,88 (5/8)	36 (1-27/64)	100 - 120 (71 - 87)
ø19,05 (3/4)	36 (1-27/64)	100 - 120 (71 - 87)

* 1 N·m ≒ 10 kgf·cm



Ⓐ Troquel
Ⓑ Tubo de cobre

Fig. 4-7

4.3. Tubos de conexión (Fig. 4-5) (Fig. 4-6)

- Lleve a cabo los trabajos de aislamiento y anticondensación pertinentes para evitar que gotee el agua desde el tubo de refrigerante. (tubo de líquido/gas)
- Aumente el grado de aislamiento en función del entorno donde esté instalado el tubo de refrigerante. De lo contrario, podría generarse condensación en la superficie del material de aislamiento. (Temperatura del material de aislamiento resistente al calor: 120 °C (248 °F), grosor: 15 mm (5/8 pulgadas) o más)
  * Cuando el tubo de refrigerante se usa en emplazamientos expuestos a una alta temperatura y humedad, como en áticos, es posible que se necesite reforzar el aislamiento.
- Para aislar el tubo de refrigerante, aplique espuma de polietileno resistente al calor entre la unidad interior y el material de aislamiento, así como a la red que se encuentra entre el material de aislamiento para cubrir todos los huecos. (La condensación que se forme en el tubo puede generar condensación en la sala o incluso quemaduras al tocar el tubo.)
- Las piezas interiores del tubo de drenaje tienen que estar envueltas en materiales aislantes de espuma de polietileno (gravedad específica de 0,03 y espesor de 9 mm (3/8 pulg.) o más).

[Fig. 4-6]

- Aplique una capa delgada de aceite refrigerante a la superficie tubo y de la junta de asiento antes de apretar la tuerca de abocardado. Ⓐ
- Aplique aceite refrigerante para máquinas en toda la superficie abocinada. Ⓑ
- Utilice las tuercas abocardadas tal y como se indica a continuación. Ⓒ
- Para hacer la conexión, alinee primero el centro y apriete las primeras 3 o 4 vueltas de la tuerca abocardada con la mano.
- Utilice 2 llaves de apriete para apretar las conexiones de los tubos. Ⓓ
- Utilice un detector de fugas o agua jabonosa para comprobar posibles fugas de gas una vez realizadas las conexiones.
- Cuando doble los tubos, tenga cuidado de no romperlos. Un radio de curvatura de 100 mm (4 pulg.) a 150 mm (6 pulg.) resultará suficiente.
- Asegúrese de que las tuberías no tocan el compresor. Podría producir ruidos o vibraciones extrañas.

① Las tuberías se deben conectar empezando por la unidad interior.
Las tuercas abocardadas se deben apretar con una llave dinamométrica.
② Caliente el tubo de líquido y el tubo de gas y aplique una fina capa de aceite de refrigeración (aplicado directamente).

- Cuando utilice un sellador de tubos normal, consulte la Tabla 2 para abocardar tuberías para refrigerante R410A.
  Para confirmar las medidas de A se puede utilizar el ajustador del tamaño.

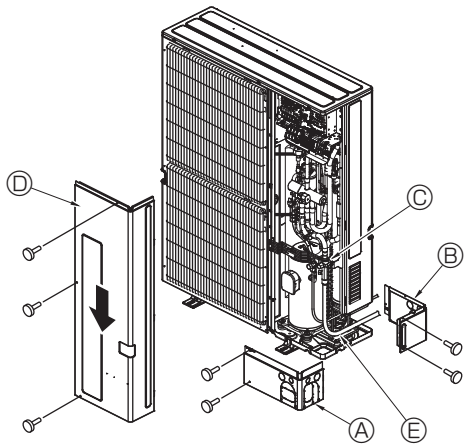
⚠ Atención:
Al instalar la unidad, conecte las tuberías de refrigerante de forma fija antes de poner en marcha el compresor.

⚠ Cuidado:
- **Asegúrese de revestir los tubos con materiales aislantes. El contacto directo con dichos tubos al descubierto puede provocar quemaduras o congelaciones.**

Tabla 2 (Fig. 4-7) mm (pulg.)

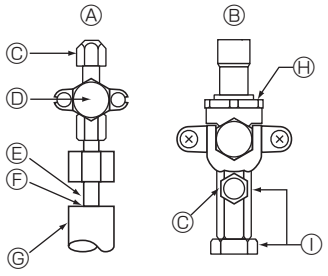
Tubo de cobre O.D.	A	
	Herramienta abocinada para R410A	Herramienta abocinada para R22·R407C
	Tipo gancho	
ø6,35 (1/4)	0 - 0,5 (0 - 1/64)	1,0 - 1,5 (3/64 - 1/16)
ø9,52 (3/8)	0 - 0,5 (0 - 1/64)	1,0 - 1,5 (3/64 - 1/16)
ø12,7 (1/2)	0 - 0,5 (0 - 1/64)	1,0 - 1,5 (3/64 - 1/16)
ø15,88 (5/8)	0 - 0,5 (0 - 1/64)	1,0 - 1,5 (3/64 - 1/16)
ø19,05 (3/4)	0 - 0,5 (0 - 1/64)	1,0 - 1,5 (3/64 - 1/16)

es



Ⓐ Cubierta de la tubería frontal
Ⓑ Cubierta de la tubería
Ⓒ Válvula de parada
Ⓓ Panel de servicio
Ⓔ Radio del codo: 100 mm - 150 mm (3-15/16" - 5-7/8")

Fig. 4-8



Ⓐ Válvula de retención <Lado de líquido>
Ⓑ Válvula de retención <Lado de gas>
Ⓒ Puerto de servicio
Ⓓ Sección Abierto/Cerrado
Ⓔ Tubo local
Ⓕ Sellado, igual para lado de gas
Ⓖ Cubierta del tubo
Ⓗ No utilice una llave aquí. Podría producirse una pérdida de refrigerante.
Ⓘ Utilice dos llaves aquí.

Fig. 4-9

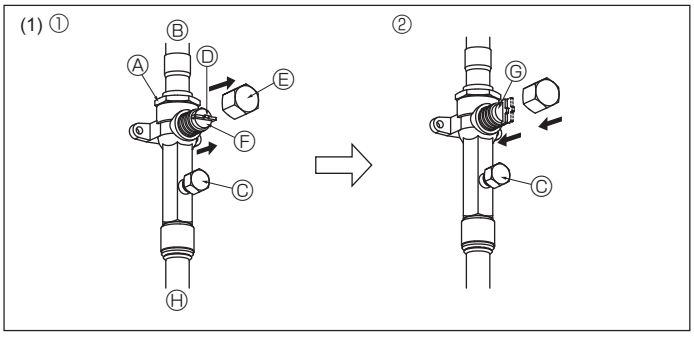


Fig. 4-10

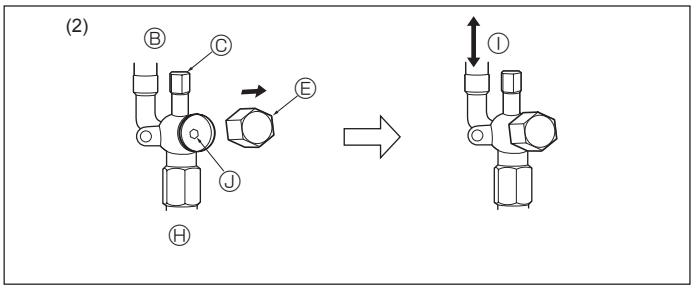


Fig. 4-11

Ⓐ Cuerpo de la válvula
Ⓑ Lado de unidad
Ⓒ Puerto de servicio
Ⓓ Manivela
Ⓔ Tapa
Ⓕ Completamente cerrada
Ⓖ Completamente abierta
Ⓗ Lado de tubo de refrigerante (Instalación correcta)
Ⓘ Dirija la circulación del refrigerante a
Ⓙ Vástago de la válvula

4.4. Tubos de refrigerante (Fig. 4-8)

Quite el panel de servicio Ⓓ (tres tornillos) y la cubierta de la tubería frontal Ⓐ (dos tornillos) y la cubierta de la tubería posterior Ⓑ (dos tornillos).

① Realice las conexiones de los tubos de refrigerante de la unidad interior/exterior con la válvula de parada de la unidad exterior completamente cerrada.

② Purgue el aire del sistema por succión en la unidad interior y tubos de conexión.

Vaciado

Realice el vaciado con la válvula de la unidad exterior cerrada, y vacíe la tubería de conexión y la unidad interior desde el puerto de servicio que se proporciona en la válvula de la unidad exterior utilizando una bomba de vacío. (Realice el vaciado siempre desde el puerto de servicio de los tubos de líquido y gas.) Una vez que la bomba haya alcanzado 650 Pa [abs] [0,0943 psi/5 Torr], continúe con el vaciado durante al menos una hora o más. Después, detenga la bomba de vacío y espere 1 hora. Asegúrese de que el grado de vacío no haya incrementado. **(Si el incremento del grado de vacío es superior a 130 Pa [0,01886 psi/1,0 Torr], es posible que haya entrado agua. Aplique presión al gas de nitrógeno seco hasta que alcance 0,05 MPa [7,25 psi] y vuelva a realizar el vacío.)** Por último, selle con el líquido refrigerante en el tubo de líquido y ajuste el tubo de gas para obtener una cantidad adecuada de refrigerante durante el funcionamiento.

* Nunca lleve a cabo la purga del aire utilizando refrigerante.

③ Tras conectar las tuberías de refrigerante con la unidad interior, compruebe que no haya fugas de gas. (Consulte apartado 4.5. Prueba de fuga de gas del tubo de refrigerante.)

④ Aspire las líneas de refrigerante a través del puerto de reparaciones de las válvulas de parada de líquido y de gas. A continuación, abra completamente las válvulas de parada (tanto las válvulas de parada de líquido como las de gas). Esta operación le permitirá conectar completamente las líneas refrigerantes de las unidades interiores y exteriores.

- Si deja cerradas las válvulas de parada y pone en marcha la unidad, el compresor y la válvula de control sufrirán daños.
- Utilice un detector de fugas o jabón y agua para detectar las fugas de gas en las juntas de las conexiones de los tubos de la unidad exterior.
- No utilice el refrigerante desde la unidad para purgar el aire de las líneas de refrigerante.
- Tras haber realizado los trabajos en las válvulas, ajuste las tuercas de las válvulas a la presión adecuada: 20 a 25 N·m [14 a 18 ft·lbs] (200 a 250 kgf·cm). Si no sustituye o aprieta bien las tuercas puede provocar una fuga de refrigerante. Además, evite dañar el interior de las válvulas ya que funcionan como selladoras para evitar fugas de refrigerante.

⑤ Utilice un sellador para proteger las conexiones de los tubos y los extremos del material aislante no se impregnen de agua.

Las tuberías de refrigerante están envueltas con una protección

- Los tubos se pueden envolver para su protección hasta un diámetro de ø90 mm (3-9/16") antes de conectar los tubos. Corte la tapa del tubo siguiendo la guía y envuelva los tubos.

Hueco de entrada de la tubería

- Utilice masilla de minio o un sellador para sellar el extremo del tuvo alrededor del tubo para que no queden espacios vacíos.
  (Si no se tapan los vacíos, se puede producir ruido o puede entrar agua o polvo y la unidad se podría averiar.)

Nota:

<Vaciado triple>

- Vacíe el sistema a 4.000 micras desde ambas válvulas de servicio. No utilice los medidores múltiples del sistema para medir el vacío. Utilice siempre un micrómetro.
  - Rompa el vacío con el nitrógeno (N2) en la válvula de servicio de descarga a 0 PSIG.
- Vacíe el sistema a 1.500 micras desde la válvula de servicio de aspiración.
  - Rompa el vacío con el nitrógeno (N2) en la válvula de servicio de descarga a 0 PSIG.
- Vacíe el sistema a 500 micras. El sistema deberá mantener el vacío a 500 micras durante mínimo 1 hora.
- Realice una prueba de aumento durante al mínimo 30 minutos.

4.5. Prueba de fuga de gas del tubo de refrigerante

(1) Conecte las herramientas para pruebas.

- Asegúrese de que las válvulas de parada Ⓐ Ⓑ están cerradas y no las abra.
- Añada presión a las líneas de refrigerante a través del puerto de reparaciones Ⓒ de la válvula de parada de líquido Ⓐ y de la válvula de parada del gas Ⓑ.

(2) No añada presión al nivel especificado de golpe; hágalo poco a poco.

① Presurice a 0,5 MPa [73 PSIG], espere cinco minutos y compruebe que la presión no se ha reducido.

② Presurice a 1,5 MPa [218 PSIG], espere cinco minutos y compruebe que la presión no se ha reducido.

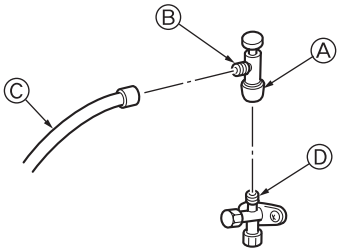
③ Presurice a 4,15 MPa [601 PSIG] y tome la temperatura ambiental y la presión del refrigerante.

(3) Si la presión especificada se mantiene estable durante un día y no se reduce, las tuberías han pasado la prueba y no existe riesgo de fugas.

- Si la temperatura ambiental cambia 1°C [1,8°F], la presión variará unos 0,01 MPa [1,5 PSIG]. Haga las correcciones necesarias.

(4) Si la presión se reduce en los pasos (2) o (3), hay una fuga de gas. Busque el punto de fuga del gas.

4. Instalación de los tubos del refrigerante



* La figura de la izquierda no es más que un ejemplo.
La forma de la válvula de parada, la posición del puerto de servicio, etc. pueden variar en función del modelo.
* Gire únicamente la sección Ⓐ.
(No siga apretando las secciones Ⓐ y Ⓑ juntas).

Ⓒ Manguera de carga
Ⓓ Puerto de servicio

Fig. 4-12

4.6. Método de abertura de la válvula de retención

El método de abertura de la válvula de retención varía según el modelo de unidad exterior. Utilice el método adecuado para abrir las válvulas de retención.

(1) Lado de gas (Fig. 4-10)

① Quite la tapa, tire de la manivela hacia usted y gire 1/4 de vuelta hacia la izquierda para abrir.

② Cerciórese de que la válvula de parada esté completamente abierta, empuje la manivela y enrosque la tapa en su posición original.

(2) Lado de líquido (Fig. 4-11)

① Abra la tapa y gire la varilla de válvula hacia la izquierda hasta su tope, utilizando una llave hexagonal de 4 mm [3/16"]. Deje de girar cuando llega al tope.

② Cerciórese de que la válvula de parada esté completamente abierta y enrosque la tapa en su posición original.

Precauciones al utilizar la válvula de carga (Fig. 4-12)

No apriete demasiado el puerto de servicio cuando lo instale, de lo contrario, el núcleo de la válvula podría deformarse y quedar suelto, provocando fugas de gas.

Tras situar la sección Ⓑ en la dirección deseada, gire únicamente la sección Ⓐ y apriétela. No siga apretando las secciones Ⓐ y Ⓑ juntas tras apretar la sección Ⓐ.

⚠ Atención:

- **Al abrir o cerrar la válvula por debajo de las temperaturas de congelación, el refrigerante puede salir a chorros desde el espacio entre el vástago de la válvula y el cuerpo de la válvula y resultar en lesiones.**
- **Al instalar la unidad, conecte firmemente las tuberías de refrigerante antes de poner en marcha el compresor.**

4.7. Carga adicional de refrigerante

Carga adicional de refrigerante

El refrigerante para la tubería extendida no viene incluido en la unidad exterior cuando esta se envía de fábrica. Por lo tanto, cargue cada sistema de tuberías de refrigerante con refrigerante adicional en el lugar de la instalación. Además, para efectuar labores de mantenimiento, introduzca el tamaño y la longitud de cada tubería de líquido y cantidades de carga de refrigerante adicional en los espacios proporcionados en la placa de "Cantidad de refrigerante" de la unidad exterior.

* Con la unidad detenida, cárguela con el refrigerante adicional por la válvula de parada de líquido después de haber aspirado las extensiones de los tubos y las unidades interiores.
Si la unidad está en marcha, añada refrigerante a la válvula de retención de gas con un cargador seguro. No añada refrigerante líquido directamente a la válvula de retención.

Cálculo de la recarga adicional de refrigerante

- Calcule la carga adicional utilizando el tamaño de la tubería de líquido y la longitud de la tubería extendida.
- Calcule la carga adicional de refrigerante siguiendo el procedimiento que se muestra a la derecha, y cargue el refrigerante adicional.
- Para cantidades inferiores a 0,1 kg, redondee hacia arriba la cantidad de refrigerante adicional calculada.
(Por ejemplo, si la carga calculada es 6,01 kg, redondee la carga a 6,1 kg).

<Carga adicional>

Cálculo de la carga de refrigerante

Medida del tubo Tubería de líquido ø6,35			**Medida del tubo Tubería de líquido ø9,52**	
SM36/42/48	**(m) × 19,0 (g/m) ((pies) × 0,21 (oz/pies))**	+	**SM36/42/48**	**(m) × 50,0 (g/m) ((pies) × 0,55 (oz/pies))**
SM60	**(m) × 27,0 (g/m) ((pies) × 0,29 (oz/pies))**		**SM60**	**(m) × 70,0 (g/m) ((pies) × 0,75 (oz/pies))**

	Capacidad total de las unidades interiores conectadas	Cantidad de unidades interiores
+	– 27	1,5 kg (53 oz)
	28 – 54	2,5 kg (88 oz)
	55 –	3,0 kg (106 oz)

Cantidad de refrigerante incluido cuando se envía de fábrica

Cantidad de refrigerante incluido	
SM36/42/48	4,8 kg (169 oz)
SM60	5,1 kg (180 oz)

<Ejemplo>

Modelo exterior : MXZ-SM48NAM A : ø9,52 30 m (98 pies)
Interior 1 : modelo 24 a : ø9,52 15 m (49 pies)
2 : modelo 15 b : ø6,35 10 m (33 pies)
3 : modelo 08 c : ø6,35 10 m (33 pies)
4 : modelo 08 d : ø6,35 20 m (66 pies)
} Con las condiciones que figuran más abajo.

La longitud total de cada conducto de líquido es la siguiente:
ø9,52 : A + a = 30 + 15 = 45 m (148 pies)
ø6,35 : b + c + d = 10 + 10 + 20 = 40 m (131 pies)
La capacidad total de la unidad interior conectada es la siguiente:
24 + 15 + 08 + 08 = 55

<Ejemplo de cálculo>

Carga adicional de refrigerante

$$40 \times \frac{19,0}{1000} + 45 \times \frac{50,0}{1000} + 3,0 = 6,1 \text{ kg (redondeado)}$$

(131 × 0,21 + 148 × 0,55 + 106 = 215 oz)

5. Tubería de drenaje

Conexión de la tubería de drenaje con la unidad exterior

Cuando sea necesario drenar la tubería, use la toma de drenaje o la batería de drenaje (opcional).
No obstante, no puede utilizarse con el modelo MXZ-SM36/42/48NAMHZ (modelo Hyper Heating)

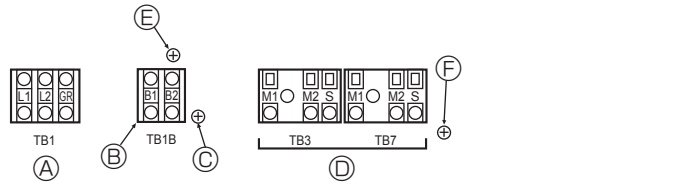
Toma de drenaje	PAC-SG61DS-E
Batería de drenaje	PAC-SH97DP-E

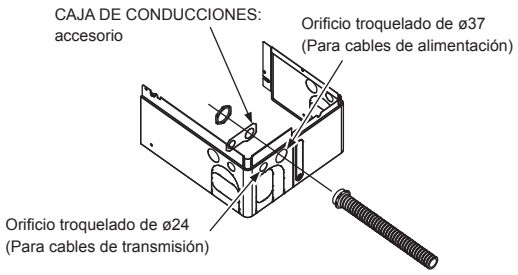
es

6. Trabajo eléctrico

6.1. Cuidado

① Siga las ordenanzas gubernamentales en cuanto a normas técnicas relacionadas con el equipo eléctrico, las regulaciones sobre cableado y las indicaciones de cada compañia eléctrica.
② Utilice cables de distribución autoextinguibles para el cableado eléctrico.
③ El cableado para control (a partir de ahora denominado línea de transmisión) debe estar (5 cm [2 pulg.] o más) aparte del cableado de la fuente de energía de manera que no le afecte el ruido eléctrico del cableado de la fuente de energía. (no intercale la línea de transmisión y el cable de la fuente de energía en el mismo conducto.)
④ Asegúrese de dar el trabajo de tierra previsto para la unidad exterior.
⑤ Dé un cierto margen al cableado para la caja eléctrica de las unidades interior y exterior, ya que la caja es retirada a veces cuando se realiza el trabajo de mantenimiento.
⑥ No conecte nunca la fuente principal de energía al bloque de terminal de la línea de transmisión. Si está conectado, las piezas eléctricas se quemarán.
⑦ Use cable blindado de dos almas para la línea de transmisión. Si las líneas de transmisión de sistemas diferentes están conectados con los mismos cables de varias almas, la pobre transmisión y recepción resultante dará lugar a funciones erróneas.
⑧ Únicamente la línea de transmisión especificada debería ser conectada al bloque de terminal para la transmisión de la unidad exterior.
(La línea de transmisión que debe conectarse con la unidad interior: El bloque de terminal TB3 para la línea de transmisión, Otro: El bloque de terminal TB7 para un control centralizado)
Una conexión errónea no permite que el sistema funcione.
⑨ Si se conecta con el controlador de gama alta o se efectúa una manejo en grupo en diferentes sistemas de refrigeración es necesaria la línea de control para la transmisión entre cada una de las unidades exteriores.
Conecte esta línea de control entre los bloques de terminal para un control centralizado (línea de dos cables sin polaridad).
Cuando se lleva a cabo un manejo en grupo en diferentes sistemas de refrigeración sin conectar al controlador de gama alta, cambie el inserto del conector de cortocircuito de CN41 de una unidad exterior a CN40.
⑩ Antes de activar la unidad exterior, compruebe que haya activado las unidades interiores y las cajas de derivación.





Ⓐ : Fuente de alimentación
Ⓑ : Fuente de alimentación para caja de derivación
Ⓒ : Tornillo en la caja de componentes eléctricos
Ⓓ : Línea de transmisión
Ⓔ : Atornillar en la caja de componentes eléctricos para la conexión a tierra (TB3)
Ⓕ : Atornillar en la caja de componentes eléctricos para la conexión a tierra (TB7)

Fig. 6-1

6.2. Caja de control y posición de conexión de los cables (Fig. 6-1)

1. Conecte el cableado entre la unidad exterior y la unidad interior o la caja de derivación al bloque de terminales de transmisión (TB3) de la unidad exterior.
Conecte el cableado entre la unidad exterior y el sistema de control centralizado al bloque terminales de transmisión (TB7) de la unidad exterior.
Al utilizar cableado blindado, conecte la tierra del cableado blindado al terminal de blindaje (S) del bloque de terminales (TB3) o (TB7).
Si se ha cambiado la conexión del conector de la fuente de alimentación de transmisión de la unidad exterior de CN41 a CN42, conecte el terminal de blindaje (S) del bloque de terminales (TB7) al tornillo Ⓕ utilizando el cable conductor incluido.
* El terminal de blindaje (S) del bloque de terminales de transmisión (TB3) se conecta a la tierra Ⓔ cuando la unidad sale de fábrica.
2. Se suministran las cajas de montaje de conducciones. Retire las piezas de desmontaje de la cubierta de las tuberías, pase los cables de transmisión y de la fuente de alimentación a través de los orificios apropiados de desmontaje y conecte los cables al bloque de terminales.
3. La caja de terminales (TB1B) suministra alimentación a la caja de derivación (208 / 230 V, máx. 6 A).
4. Fije el cableado de la fuente de alimentación al bloque de terminales utilizando un manguito aislador separador para la fuerza de tracción (conexión PG o similar).

⚠ **Cuidado:**
Nunca conecte la línea de transmisión para la caja de derivación ni la línea de transmisión del sistema de control central a este bloque de terminales (TB1B). Si las líneas de transmisión están conectadas, la unidad interior, la caja de derivación o el controlador de sistema podrían resultar dañados.

6.3. Tendido de cables de transmisión

① **Tipos de cables de control**

1. Cables de transmisión del cableado

Tipos de cables de transmisión	Cable blindado (dos almas) CVVS, CPEVS o MVVS
Diámetro del cable	Más de 1,25 mm² [AWG16]
Longitud máxima del cable	Entre unos 200 m [656 pies]

2. Cables del controlador remoto M-NET

Tipos de cables del mando a distancia	Cable blindado (dos almas) CVVS, CPEVS o MVVS
Diámetro del cable	0,5 a 1,25 mm² [AWG20 a AWG16]
Observaciones	Cuando la longitud del cableado pase de 10 m [32 pies], utilice un cable con las mismas características que el cableado de la línea de transmisión.

3. Cables del controlador remoto MA

Tipo de cable del mando a distancia	Cable revestido de 2 núcleos (no blindado) CVV
Diámetro del cable	0,3 a 1,25 mm² [AWG22 a AWG16] (0,75 a 1,25 mm² [AWG18 a AWG16])*
Observaciones	Entre unos 200 m [656 pies]

* Conectado con controlador remoto sencillo.

② **Ejemplos de cables**

• Nombre de los controladores, símbolo y número de controladores conectables.

Nombre		Símbolo	Número de controladores permitido	
Controlador de la unidad exterior		OC	–	
Controlador de la unidad interior	Serie CITY MULTI	M-IC	MXZ-SM36	De 1 a 11 unidades por 1 OC
			MXZ-SM42	De 1 a 12 unidades por 1 OC
			MXZ-SM48	
			MXZ-SM60	
	Serie M, S, P	A-IC	MXZ-SM36	De 2 a 4 unidades por 1 OC *1
			MXZ-SM42	De 2 a 5 unidades por 1 OC *1
			MXZ-SM48	De 2 a 8 unidades por 1 OC *1
			MXZ-SM60	
Caja de derivación		BC	De 0 a 2 unidades por 1 OC *1	
Controlador remoto	M-NET	M-NET RC *2	Un máximo de 12 controladores para un OC (No puede conectarse si se utiliza una caja de derivación). *1	
	MA	MA-RC	Un máximo de 2 por grupo	
	Inalámbrico	WL-RC	–	

Nota:
***1. El número de unidades conectables puede quedar limitado por ciertas condiciones, tales como la capacidad de una unidad interior o el consumo equivalente de cada unidad.**
***2. No utilice el controlador Lossnay (PZ-61DR-E, PZ-43SMF-E, PZ-52SF-E, PZ-60DR-E).**

es

6. Trabajo eléctrico

Ejemplo de un sistema de funcionamiento en tierra con varias unidades exteriores (Se requiere cable blindado y ajustes de dirección.)

<Ejemplo de tendido de cables de transmisión: cuando no se utiliza una caja de derivación>

■ **Controlador remoto M-NET (Fig. 6-2)**

■ **Controlador remoto MA (Fig. 6-3)**

<Ajustes de dirección y del método de cableado: sin sistema de caja de derivación>

a. Utilice siempre un cable blindado al realizar las conexiones entre la unidad exterior (OC) y la unidad interior (M-IC).
b. Pase los cables para conectar los terminales M1 y M2 y el terminal de tierra del bloque de terminales del cable de transmisión (TB3) de cada unidad exterior (OC) a los terminales M1, M2 y S del bloque de terminales del cable de transmisión de la unidad interior (M-IC).
c. Conecte los terminales 1 (M1) y 2 (M2) del bloque de terminal del cable de transmisión de la unidad interior (M-IC) cuya dirección es la más reciente del mismo grupo, al bloque de terminal del controlador remoto (M-NET RC).
d. Conecte entre sí los terminales M1, M2 y S del bloque de terminales para un control centralizado (TB7) de la unidad exterior (OC).
e. El conector del puente CN41 del panel de control no cambia.
f. Conecte la toma de tierra blindada de la línea de transmisión de las unidades interiores al terminal (S) blindado de (TB3).
Conecte la toma de tierra blindada de la línea entre las unidades exteriores y la línea de transmisión del sistema de control centralizado al terminal (S) blindado de (TB7).
g. Active el interruptor de ajuste de la dirección tal como se muestra más abajo.

Unidad	Campo	Cómo realizar los ajustes
M-IC (máster)	de 01 a 50	Ajuste la dirección más reciente del mismo grupo de unidades interiores (IC)
M-IC (subordinada)	de 01 a 50	Ajuste la dirección en el mismo grupo de unidades interiores que no sea el de M-IC (máster). M-IC (máster) debe ser secuencial
OC	de 51 a 100	Ajuste la dirección más reciente de las unidades interiores en el mismo sistema de refrigeración + 50 * La dirección se establece automáticamente en “100” si se configura como “01-50”.
M-NET RC (máster)	de 101 a 150	Ajuste la dirección M-IC (máster) + 100
M-NET RC (subordinada)	de 151 a 200	Ajuste la dirección M-IC (máster) + 150
MA-RC	–	Configuración de dirección innecesaria (Imprescindible el ajuste en principal/subordinado)

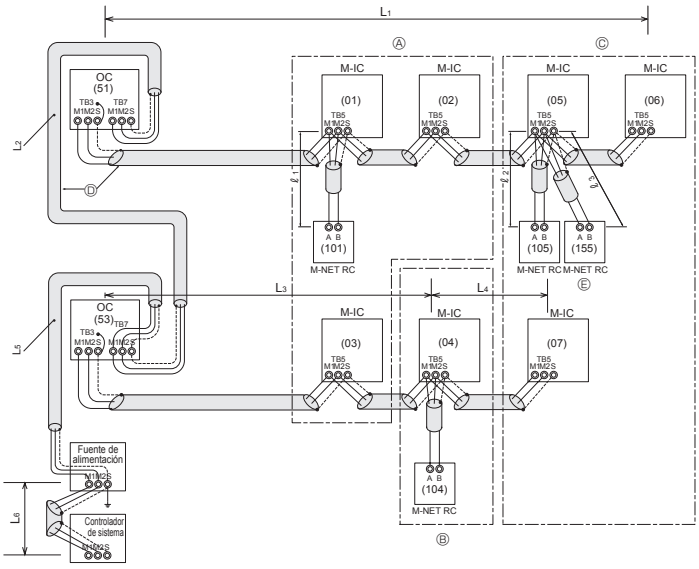
h. Ajuste diferentes unidades exteriores como un grupo del controlador remoto (M-NET RC) después de dar la corriente.

<Ajuste de dirección y del método de cableado: con sistema de caja de derivación>

Consulte el Manual de instalación de la caja de derivación

<Ejemplo de tendido de cables de transmisión: Sin utilizar caja de derivación>

■ **Controlador remoto M-NET**



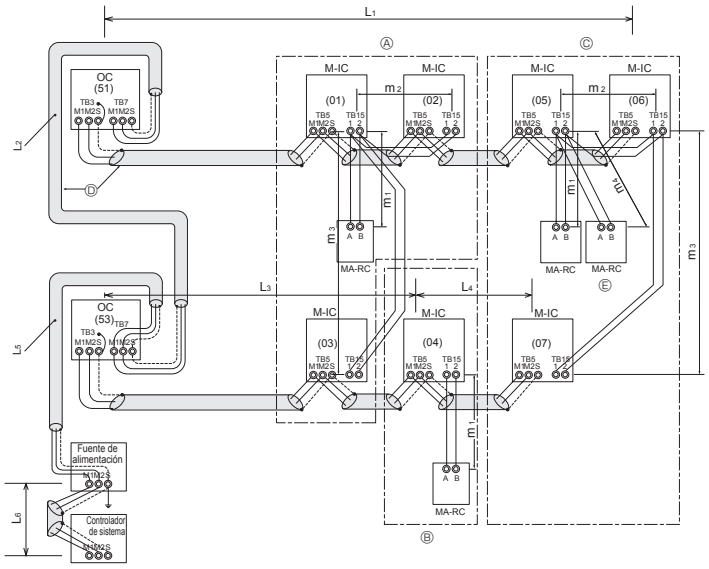
Ⓐ : Grupo 1
Ⓑ : Grupo 2
Ⓒ : Grupo 3
Ⓓ : Cable blindado
Ⓔ : Controlador remoto secundario
( ): Dirección

<Longitudes permitidas>

- **Longitud máxima de la línea a través de las unidades exteriores: $L_1+L_2+L_3+L_4$, $L_3+L_4+L_5+L_6$ y $L_1+L_2+L_5+L_6 \leqq$ 500 m [1640 pies] (1,25 mm² [AWG16] o superior)**
- **Longitud máxima de la línea de transmisión interior/exterior: L_1, L_3+L_4, L_2+L_5 y $L_6 \leqq$ 200 m [656 pies] (1,25 mm² [AWG16] o superior)**
- **Longitud del cable del mando a distancia: ℓ_1, $\ell_2+\ell_3 \leqq$ 10 m [33 pies] (0,5 a 1,25 mm² [AWG20 a AWG16])**
  Si la longitud es superior a 10 m [33 pies], utilice un cable blindado de 1,25 mm² [AWG16]. La sección del cable que sobrepase los 10 m [33 pies] debe incluirse en la longitud máxima a través de unidades exteriores y la longitud máxima del cable de transmisión.

Fig. 6-2

■ **Controlador remoto MA**



<Longitudes permitidas>

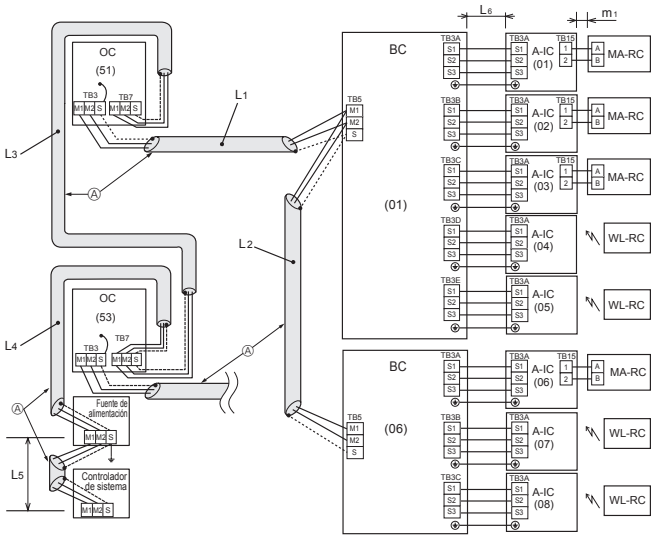
- **Longitud máxima de la línea a través de las unidades exteriores (cable M-NET): $L_1+L_2+L_3+L_4$, $L_3+L_4+L_5+L_6$ y $L_1+L_2+L_5+L_6 \leqq$ 500 m [1640 pies] (1,25 mm² [AWG16] o superior)**
- **Longitud máxima de la línea de transmisión interior/exterior (cable M-NET): L_1, L_3+L_4, L_2+L_5 y $L_6 \leqq$ 200 m [656 pies] (1,25 mm² [AWG16] o superior)**
- **Longitud del cable del mando a distancia: m_1, $m_1+m_2+m_3$ y $m_1+m_2+m_3+m_4 \leqq$ 200 m [656 pies] (0,3 a 1,25 mm² [AWG22 a AWG16])**

Fig. 6-3

es

6. Trabajo eléctrico

<Ejemplo de tendido de cables de transmisión: Conectar con caja de derivación>



Ⓐ : Cable blindado
( ) : Ejemplo de dirección
A-IC : Unidad interior de la serie M, S, P

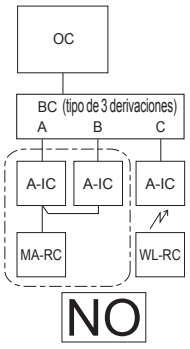
<Longitudes permitidas>

- **Longitud máxima de la línea a través de las unidades exteriores (cable M-NET): $L_1 + L_2 + L_3 + L_4 + L_5 \leqq 500$ m [1640 pies] (1,25 mm² [AWG16] o superior)**
- **Longitud máxima de la línea de transmisión exterior/caja de derivación (cable M-NET): $L_1 + L_2$, $L_3 + L_4$, $L_5 \leqq 200$ m [656 pies] (1,25 mm² [AWG16] o superior)**
- **Longitud máxima de la línea de transmisión interior/caja de derivación (Cable de control A): $L_6 \leqq 25$ m [82 pies] (1,5 mm² [AWG14])**
- **Longitud del cable del controlador remoto: $m_1 \leqq 200$ m [656 pies] (0,3 a 1,25 mm² [AWG22 a AWG16])**

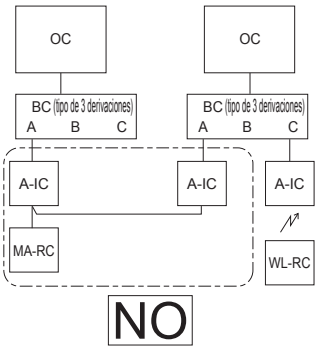
Fig. 6-4

<Sistemas incorrectos>

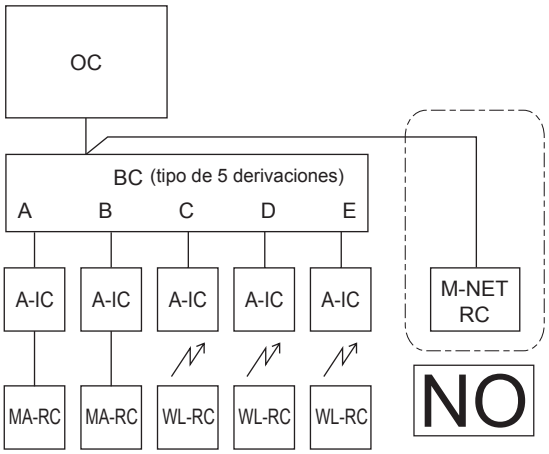
1. Funcionamiento en grupo mediante un solo mando a distancia



2. Funcionamiento en grupo entre distintos sistemas refrigerantes



3. Conexión del controlador remoto M-NET



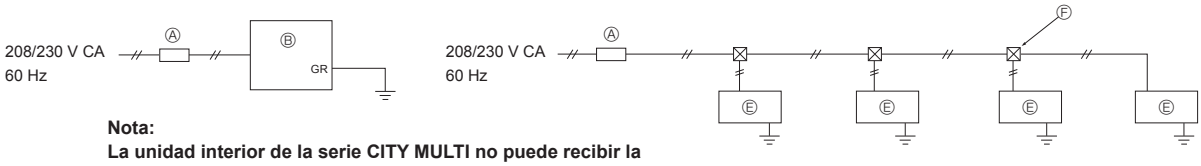
1. No pueden controlarse varias unidades interiores con un solo mando a distancia.
2. No pueden conectarse distintos sistemas refrigerantes entre sí.
3. No puede conectarse un mando a distancia M-NET.

es

6. Trabajo eléctrico

6.4. Cableado del suministro principal de energía y capacidad del equipo

Dibujo esquemático del cableado: cuando no se utiliza una caja de derivación (ejemplo) (Fig. 6-5)



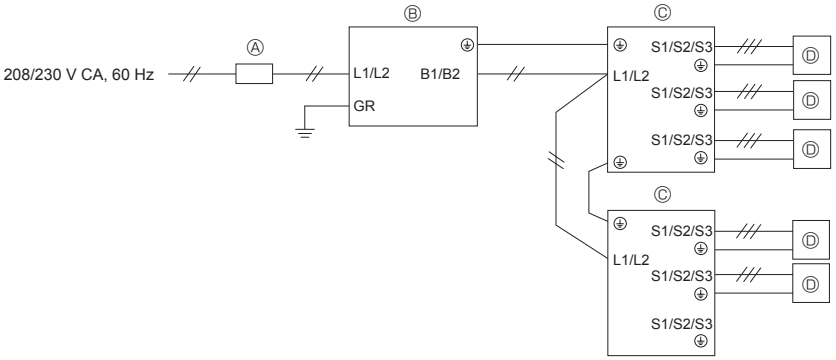
Nota:
La unidad interior de la serie CITY MULTI no puede recibir la alimentación suministrada desde una unidad exterior, por lo que deberá utilizar una fuente de alimentación independiente.

Fig. 6-5

Ⓐ Disyuntor de cable (disyuntor de fuga de tierra (si los utiliza))
Ⓑ Unidad exterior
Ⓒ Caja de derivación
Ⓓ Unidad intema de “Control A” (unidad interior de las series M, S, P)
Ⓔ Unidad interior de la serie CITY MULTI
Ⓕ Caja de derivación

Dibujo esquemático del cableado: cuando se utiliza una caja de derivación (ejemplo) (Fig. 6-6)

<Si la corriente eléctrica se recibe desde la unidad exterior>



<Si la corriente eléctrica se recibe por separado>

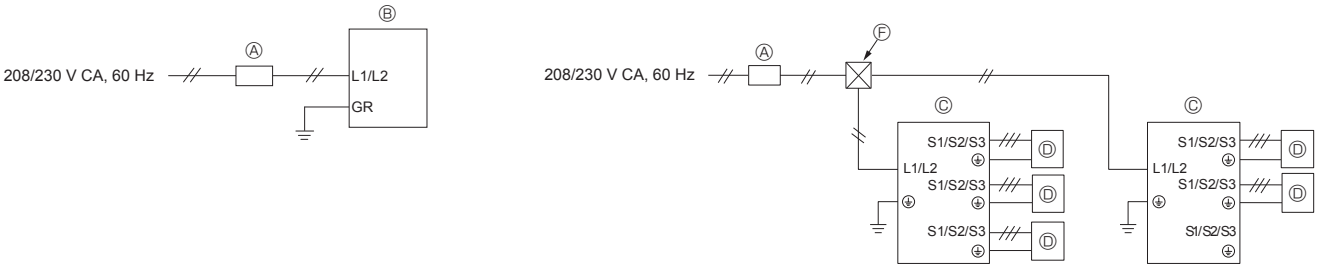


Fig. 6-6

Grosor del cable para el suministro principal de energía y capacidades on/off

<Si la corriente eléctrica se recibe por separado>

Modelo		Fuente de alimentación	Grosor mínimo del cable (mm² [AWG])		Disyuntor para cableado*1	Disyuntor para fuga de corriente (si los utiliza)	Ampacidad mínima del circuito	Límite superior del dispositivo protector de sobrecarga
			Cable princi-pal*2	Toma de tierra				
Unidad exterior	36/48NAM	208/230 V CA, 60 Hz	5,3 [AWG10]	5,3 [AWG10]	30 A	30 A 30 mA 0,1 segundos o menos	29 A	40 A
	36/42/48NAMHZ		8,4 [AWG8]	8,4 [AWG8]	40 A	40 A 30 mA 0,1 segundos o menos	36 A	40 A
	60NAM		8,4 [AWG8]	8,4 [AWG8]	40 A	40 A 30 mA 0,1 segundos o menos	36 A	45 A
Caja de derivación			Consulte el manual de instalación de la Caja de derivación.					

<Si la corriente eléctrica se recibe desde la unidad exterior>

Modelo		Fuente de alimentación	Grosor mínimo del cable (mm² [AWG])		Disyuntor para cableado*1	Disyuntor para fuga de corriente (si los utiliza)	Ampacidad mínima del circuito	Límite superior del dispositivo protector de sobrecarga
			Cable princi-pal*2	Toma de tierra				
Unidad exterior	36/48NAM	208/230 V CA, 60 Hz	8,4 [AWG8]	8,4 [AWG8]	40 A	40 A 30 mA 0,1 segundos o menos	35 A	50 A
	36/42/48NAMHZ		13,3 [AWG6]	13,3 [AWG6]	45 A	45 A 30 mA 0,1 segundos o menos	42 A	50 A
	60NAM		13,3 [AWG6]	13,3 [AWG6]	50 A	50 A 30 mA 0,1 segundos o menos	46 A	50 A
Caja de derivación			Consulte el manual de instalación de la Caja de derivación.					

*1. Observe las correspondientes normas federales, estatales o locales para evitar posibles fugas/descargas eléctricas. También puede instalar un interruptor de fallo de conexión a tierra para evitar fugas y descargas eléctricas.

IMPORTANTE
Si utiliza un disyuntor de fuga de corriente, debería ser compatible con armónicos superiores porque esta unidad está equipada con un inversor. El uso de un disyuntor inadecuado puede causar el funcionamiento incorrecto del inversor.

***2. Utilice cables de alimentación de cobre. Utilice cables eléctricos con una tensión nominal de 300 V.**

*3. Aunque el tamaño del conducto es mayor que el tamaño especificado para el grosor del cable de acuerdo con los estándares UL, utilice un tamaño de conducto de 3/4 de pulgada.

es

6. Trabajo eléctrico

Intensidad de funcionamiento total de la unidad interior	Grosor mínimo del cable (mm²/AWG)			Interruptor de falta a tierra *1 (si los utiliza)	Interruptor local (A)		Disyuntor para el cableado (NFB)
	Cable principal	Derivación	Tierra		Capacidad	Fusible	
F0 = 15 A o menos *2	2,1/14	2,1/14	2,1/14	15 A sensibilidad a la corriente *3	15	15	15
F0 = 20 A o menos *2	3,3/12	3,3/12	3,3/12	20 A sensibilidad a la corriente *3	20	20	20
F0 = 30 A o menos *2	5,3/10	5,3/10	5,3/10	30 A sensibilidad a la corriente *3	30	30	30

Aplicar a IEC61000-3-3 aproximadamente máx. impedancia permitida en el sistema.

*1 El interruptor de falta a tierra debería servir de respaldo al circuito del convertidor.
El interruptor de falta a tierra debería combinar el uso de un disyuntor local o un disyuntor de cable.

*2 Tome el valor que sea superior (F1 o F2) como valor para F0.

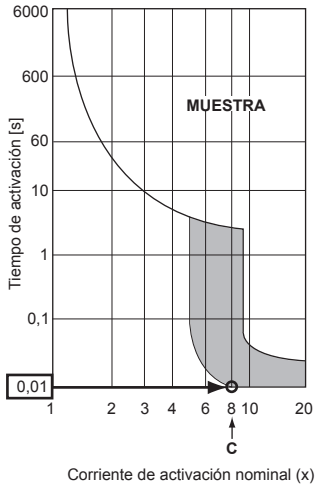
F1 = Intensidad de funcionamiento total de las unidades interiores × 1,2

F2 = {V1 × (Cantidad de tipo 1)/C} + {V1 × (Cantidad de tipo 2)/C} + {V1 × (Cantidad de tipo 3)/C} + {V1 × (Cantidad de tipo 4)/C} + … + {V1 × (Cantidad de tipo 13)/C}

Unidad interior		V1	V2
Tipo 1	PEAD-A·AA, SVZ-A·AA	26,9	2,4
Tipo 2	PLA-A·EA7, SEZ-KD·NA	19,8	
Tipo 3	SLZ-KF·NA	17,1	
Tipo 4	MLZ-KP·NA (2)	9,9	
Tipo 5	MFZ-KJ·NA, MSZ-GL·NA, MSZ-FS·NA	7,4	
Tipo 6	MSZ-FH·NA, MSZ-FH·NA2, MSZ-EF·NAW(B)(S)-U1	6,8	
Tipo 7	Caja de derivación	5,1	3,0
Tipo 8	PEFY-P·NMAU-E3, PVFY-P·NAMU	38,0	1,6
Tipo 9	PKFY-P·NHMU, PKFY-P·NKMU, PEFY-P·NMSU, PCFY-P·NKMU, PLFY-EP·NEMU, PLFY-P·NFMU, PMFY-P·NBMU, PKFY-P·NLMU	19,8	2,4
Tipo 10	PKFY-P·NBMU, PLFY-P·NCMU	3,5	2,4
Tipo 11	PEFY-P·NMHU, PFFY-P·NEMU, PFFY-P·NRMU	0,0	0,0
Tipo 12	PEFY-P·NMHSU (conectada solo a MXZ-SM60)	13,8	4,8
Tipo 13	PEFY-P·NMAU-E4	18,6	3,0

C : Múltiplo de la corriente de activación en un tiempo de activación de 0,01 s
Por favor, calcule la variable “C” en función del grado de activación del interruptor.

Gráfico de muestra



<Ejemplo de cálculo para “F2”>
* Condición PEFY-NMSU × 4 + PEFY-NMAU × 1, C = 8 (consulte el gráfico de la derecha)
F2 = 19,8 × 4/8 + 38 × 1/8
= 14,65
→ Interruptor de 16 A (Corriente de activación = 8 × 16 A a 0,01 s)

*3 La sensibilidad de corriente se calcula mediante la siguiente fórmula.

G1 = V2 × (cantidad del tipo 1) + V2 × (cantidad del tipo 2) + V2 × (cantidad del tipo 3) + … + V2 × (cantidad del tipo 13) + V3 × (longitud de cable [km])

G1	Sensibilidad de corriente
30 o menos	30 mA 0,1 s o menos
100 o menos	100 mA 0,1 s o menos

Grosor de cable (mm²/AWG)	V3
2,1/14	48
3,3/12	56
5,3/10	66

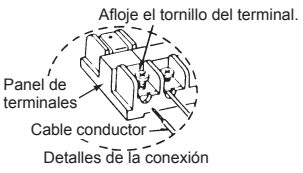
1. **Utilice una fuente de alimentación principal diferente para la unidad exterior y unidad interior.**
2. **Tenga en cuenta las condiciones ambientales (temperatura ambiente, luz solar directa, lluvia, etc.) cuando realice el tendido de cables y las conexiones.**
3. **El tamaño del cable corresponde al valor mínimo para cables de conductos de metal. El cable de alimentación principal debe tener un tamaño más grande teniendo en cuenta las caídas de tensión.**
   Asegúrese que la tensión de la alimentación principal no baje más del 10%.
4. **Los requisitos específicos sobre el cableado deben adaptarse a las reglamentaciones locales.**
5. **Los cables de alimentación principal de los componentes de aparatos destinados al uso en la intemperie no deben ser más livianos que el cable flexible con revestimiento de policioropreno (diseño 60245 IEC57). Por ejemplo, utilice cables del tipo YZW.**
6. **Instale un cable de toma de tierra más largo que el resto de los cables.**

⚠ **Atención:**

- **Asegúrese de usar los cables especificados para realizar las conexiones de manera que actúa ninguna fuerza externa sobre las conexiones del terminal. Si las conexiones no están bien fijadas, se corre el riesgo de que se produzca calentamiento o un incendio.**
- **Asegúrese de escoger un interruptor de protección de sobrecarga adecuado. No olvide que la sobrecorriente generada puede contener pequeñas cantidades de corriente directa.**
- **Coloque siempre firmemente las cubiertas del bloque de terminales/el panel de la unidad exterior.**
  Si no se fija correctamente, podría ocasionar incendios o descargas eléctricas a causa del polvo, el agua, etc.

⚠ **Cuidado:**

- **Procure no equivocarse al hacer las conexiones.**
- **Apriete bien los tornillos de los terminales para que no se aflojen.**
- **Una vez apretados, tire ligeramente de los cables para confirmar que no se mueven.**
- **Si el cable de conexión está conectado de forma incorrecta al panel de terminales, la unidad no funcionará de manera normal.**
- **Algunas instalaciones están hechas en sitios que requieren un disyuntor de fuga de tierra. Si no se instala un disyuntor de fuga de tierra, puede producirse un electroshock.**
- **Use los fusibles y el disyuntor con la capacidad correcta. Si emplea un fusible o cable con demasiada capacidad puede haber una disfunción de la unidad o incluso puede producirse un incendio.**
- **Oriente el cableado correctamente para que no entre en contacto con el borde de la chapa ni con la punta de un tornillo.**



Detalles de la conexión

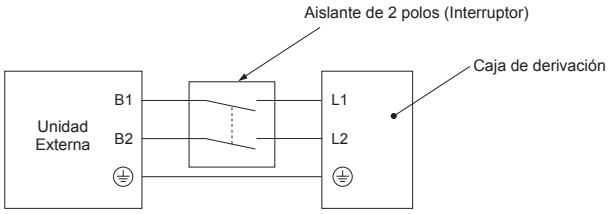
es

6. Trabajo eléctrico

IMPORTANTE
Asegúrese de que el disyuntor de corriente es compatible con corrientes armónicas más altas.
Utilice siempre un disyuntor de corriente compatible con corrientes armónicas más altas ya que esta unidad está equipada con un conmutador.
El uso de un disyuntor inadecuado puede hacer que el conmutador no funcione correctamente.

Nunca empalme el cable de alimentación o el cable de conexión de la unidad interior-exterior-caja de derivación, ya que si lo hiciera podría provocar humo, un incendio o un error de comunicación.

⚠ **Atención:**
- **Desactive la fuente de alimentación principal cuando realice el mantenimiento. Porlo tanto, desconecte la fuente de alimentación principal antes de realizar el mantenimiento. Y nunca toque los terminales B1 ni B2 mientras esté conectada la alimentación. Si es necesario utilizar un aislador entre la unidad exterior y la caja de derivación/la unidad interior y la caja de derivación, utilice el tipo de 2 o 3 polos. (Consulte la siguiente figura).**
- **Conectar la corriente cuando la temperatura ambiente sea -20 °C (-4 °F) o inferior.**
- **En condiciones de -20 °C (-4 °F) o temperaturas inferiores, son necesarias al menos 4 horas de reposo antes de que las unidades entren en funcionamiento para que se calienten los componentes eléctricos.**

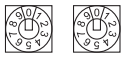
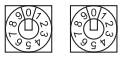
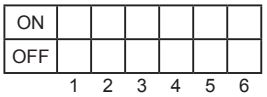


⚠ **Cuidado:**
Cuando termine de utilizar el aislante, asegúrese de apagar y volver a encender la alimentación principal para reiniciar el sistema. De lo contrario, es posible que la unidad exterior no pueda detectar la caja o cajas de derivación ni las unidades interiores.

Asegúrese de conectar los cables de conexión entre las unidades exterior e interior y la caja de derivación directamente a las unidades (sin conexiones intermedias).
Las conexiones intermedias pueden producir errores de comunicación si el agua penetra en los cables y provoca un aislamiento insuficiente con respecto al suelo o un contacto eléctrico deficiente en el punto de conexión intermedia.
(Si se necesita realizar una conexión intermedia, asegúrese de tomar medidas para evitar que el agua entre en los cables.)

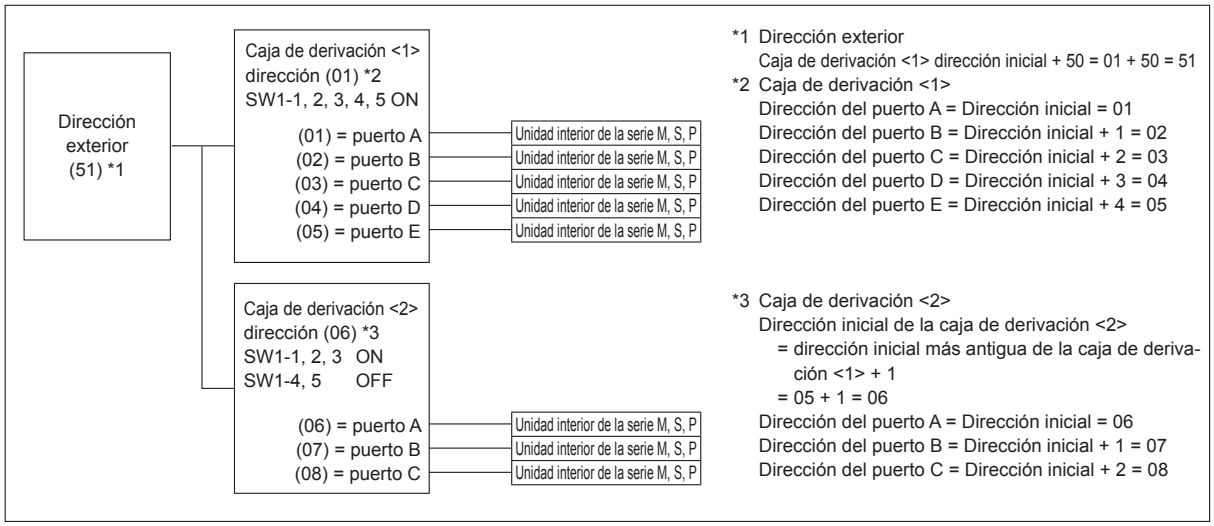
6.5. Ajuste de dirección

Ajuste de dirección del interruptor

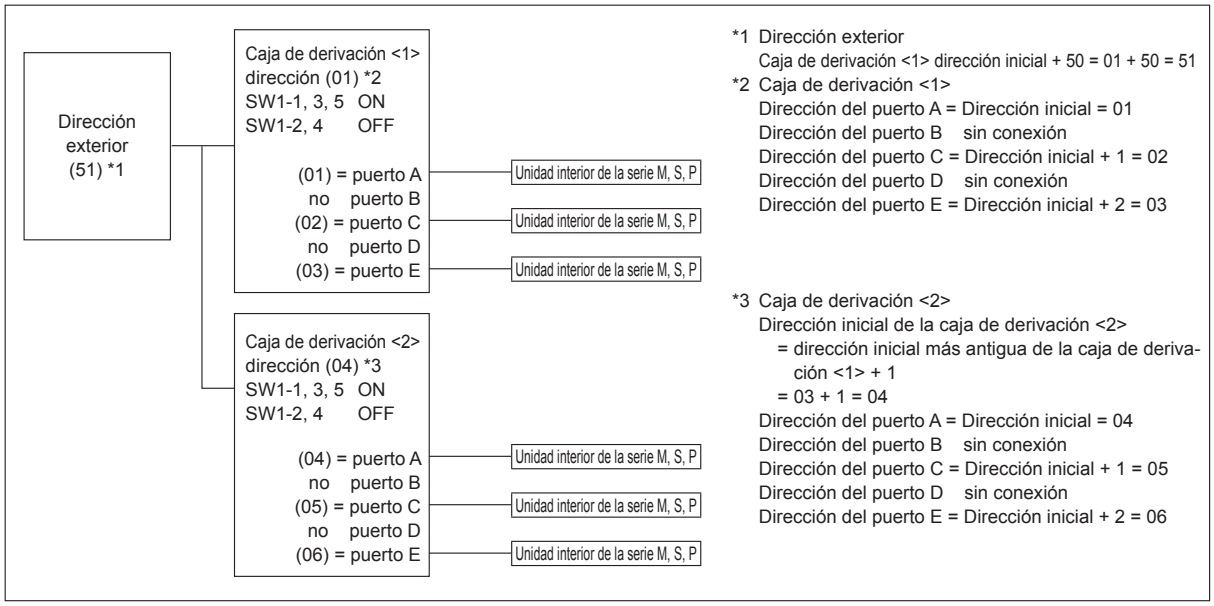
	Exterior	Caja de derivación		Unidad interior de la serie M, S, P	Serie CITY MULTI
		Dirección	Ajuste de conexión		
Interruptor				Ninguno	
Intervalo	51 - 100	1 - 50	–	–	1 - 50
Configuración	Unidad interior de la serie CITY MULTI o dirección de la caja de derivación +50	• De acuerdo con la dirección ajustada (por ejemplo, 01), las direcciones para las unidades interiores conectadas se ajustan secuencialmente (por ejemplo, 02, 03, 04 y 05). SW1: 1 ON, 2 ON, 3 ON, 4 ON, 5 ON Puerto: A, B, C, D, E Dirección: 01 (SW11, 12); 02, 03, 04, 05 (números secuenciales)	• Especifique si las unidades interiores están conectadas a cada puerto (A, B, C, D y E). SW1 = 1: Puerto A, desconectada, conectada SW1 = 2: Puerto B, desconectada, conectada SW1 = 3: Puerto C, desconectada, conectada SW1 = 4: Puerto D, desconectada, conectada SW1 = 5: Puerto E, desconectada, conectada SW1 = 6: no se utiliza	No hay ajustes de dirección para las unidades interiores.	–

Nota: 1. Dirección de la caja de derivación
Cuando ajuste la dirección, utilice un número dentro del intervalo 1-50.
Ej. La dirección ajustada es (47) y hay 5 unidades interiores (A, B, C, D y E).
Si A: (47), B: (48), C: (49), D: (50) y E: (51), E es incorrecta porque supera 50.

Ej1. Exterior + Derivación <1> (Unidad interior de la serie M, S, P A, B, C, D, E) + Derivación <2> (Unidad interior de la serie M, S, P A, B, C)



Ej2. Exterior + Derivación <1> (Unidad interior de la serie M, S, P A, C, E) + Derivación <2> (Unidad interior de la serie M, S, P A, C, E)



es

7. Prueba de funcionamiento

7.1. Antes de realizar las pruebas

► **Después de la instalación de tubos y cables en las unidades interior y exterior, compruebe que no haya escapes de refrigerante, que no se haya aflojado ni la fuente de alimentación ni el cableado de control, que la polaridad no sea errónea y que no se haya desconectado ninguna fase de la alimentación.**

► **Utilice un megóhmetro de 500 V para comprobar que la resistencia entre los bornes de alimentación y la tierra es como mínimo de 1 MΩ.**

► **No efectúe esta prueba en los bornes de los cables de control (circuito de bajo voltaje).**

⚠ **Atención:**

No utilice el aire acondicionado si la resistencia de aislamiento es inferior a 1 MΩ.

Resistencia del aislamiento

Después de la instalación, o después de un prolongado período de desconexión del aparato, la resistencia del aislamiento será inferior a 1 MΩ debido a la acumulación de refrigerante en el compresor. Esto no es una avería. Siga los siguientes pasos:

1. Retire los cables del compresor y mida la resistencia del aislamiento del compresor.
2. Si la resistencia del aislamiento es menor de 1 MΩ, el compresor está dañado o la resistencia ha descendido por la acumulación de refrigerante en el compresor.
3. Después de conectar los cables al compresor, éste empezará a calentarse después de volver a restablecerse el suministro de corriente. Después de restablecer la corriente según los intervalos que se detallan a continuación, vuelva a medir la resistencia del aislamiento.
   - La resistencia del aislamiento se reduce debido a la acumulación de refrigerante en el compresor. La resistencia volverá a subir por encima de 1 MΩ después de que el compresor haya funcionado durante 12 horas. (El tiempo requerido para calentar el compresor varía según las condiciones atmosféricas y la acumulación de refrigerante.)
   - Para hacer funcionar un compresor con refrigerante acumulado, se debe calentar durante al menos 12 horas para evitar que se averíe.
4. Si la resistencia del aislamiento es superior a 1 MΩ, el compresor no está averiado.

⚠ **Cuidado:**

- **El compresor no funcionará a menos que la conexión de fase de la fuente de alimentación sea correcta.**
- **Conecte la corriente al menos 12 horas antes de que empiece a funcionar el equipo.**

- Si se acciona inmediatamente después de haberlo conectado a la corriente, pueden producirse daños graves en las piezas internas. Mantenga la unidad conectada a la corriente durante la temporada de funcionamiento.

► **También debe comprobar lo siguiente.**

- La unidad exterior no está averiada. El indicador LED en el cuadro de control de la unidad exterior parpadea cuando esta está averiada.
- Tanto las válvulas de gas como las de líquido están completamente abiertas.

7.2. Prueba de funcionamiento

7.2.1. Uso del control remoto

Consulte el manual de instalación de la unidad interior.

- Asegúrese de realizar la prueba de funcionamiento en cada unidad interior. Asegúrese de que cada unidad interior funciona correctamente siguiendo el manual de instalación que se entrega con la unidad.
- Si realiza la prueba de funcionamiento en todas las unidades interiores a la vez, no podrá detectar si existe alguna conexión errónea en los tubos del refrigerante y en los cables de conexión.

* El compresor no funciona durante tres minutos como mínimo después del encendido del interruptor.

- Puede que el compresor emita un ruido cuando se enciende el interruptor o en caso de que la temperatura externa del aire sea baja.
- Dependiendo de las condiciones de funcionamiento, es posible que el ventilador de la unidad exterior se detenga mientras el compresor está funcionando, pero no se trata de una avería.

Acerca del mecanismo de protección de la puesta en marcha

Cuando se para el compresor, se desencadena el dispositivo preventivo de puesta en marcha para que el compresor permanezca inactivo durante 3 minutos como medida de protección del aparato.

7.2.2. Al usar SW3 en la unidad exterior

Nota:

En caso de realizar la prueba de funcionamiento desde la unidad exterior, todas las unidades interiores se ponen en funcionamiento. Por consiguiente, no podrá detectar si existe alguna conexión errónea en los tubos del refrigerante y en los cables de conexión. Si lo que desea es comprobar que no exista una conexión errónea, asegúrese de efectuar la prueba de funcionamiento desde el control remoto; para ello, consulte la sección "7.2.1. Uso del control remoto".

SW3-1	**ON**	**Funcionamiento del enfriamiento**
SW3-2	**OFF**	
SW3-1	**ON**	**Funcionamiento del de la calefacción**
SW3-2	**ON**	

* Después de la realización de las pruebas, ponga SW3-1 en OFF.

- A los pocos segundos de funcionar el compresor, se puede oír un pequeño sonido metálico del interior de la unidad exterior. El sonido lo produce la válvula de retención por la pequeña diferencia de presión de las tuberías. La unidad no está averiada.

El modo de prueba de funcionamiento no se puede cambiar por el conmutador DIP SW3-2 durante la prueba. (Para cambiar el modo de prueba de funcionamiento durante la prueba, pare la prueba con el conmutador DIP SW3-1. Después de cambiar el modo de prueba de funcionamiento, reanude la prueba con el conmutador SW3-1.)

7.3. Recuperación de refrigerante (vaciado)

Lleve a cabo los siguientes procedimientos para recuperar el refrigerante cuando traslade la unidad interior o exterior.

① Desactive el disyuntor.

② Conecte la parte de baja presión del manómetro a la abertura de la válvula de retención de gas.

③ Cierre la válvula de parada de líquido.

④ Conecte la fuente de alimentación (disyuntor).

* La comunicación entre la unidad interior y la exterior se inicia aproximadamente 3 minutos después de conectar la alimentación (disyuntor). Inicie la operación de vaciado entre 3 y 4 minutos después de que se haya conectado la alimentación (disyuntor).

⑤ Realice la prueba de funcionamiento para la operación de refrigeración (SW3-1: ON y SW3-2: OFF). El compresor (unidad exterior) y los ventiladores (unidades interior y exterior) se ponen en marcha y se inicia el funcionamiento de prueba del modo de refrigeración. Inmediatamente después de realizar la prueba de funcionamiento de enfriamiento, ponga la posición del conmutador de servicio exterior SW2-4 (conmutador de vaciado) de OFF a ON.

* No permita que siga funcionando durante mucho tiempo con el interruptor SW2-4 en la posición ON. Asegúrese de colocarlo en la posición OFF después de haber finalizado el vaciado.

* Ponga los conmutadores SW3-1 y SW3-2 en la posición ON únicamente si la unidad está parada. Aun así, incluso si la unidad está parada y los interruptores SW3-1 y SW3-2 se ponen en posición ON menos de 3 minutos después de que el compresor se haya parado, la operación de recuperación del refrigerante no se puede realizar. Espere al menos a que el compresor haya estado parado durante 3 minutos y vuelva a poner los interruptores SW3-1 y SW3-2 en posición ON.

⑥ Cierre por completo la válvula de parada de la tubería de gas cuando el indicador de presión descienda 7,1 - 0,0 PSIG (aproximadamente 0,5 - 0,0 kgf/cm^2).

⑦ Detenga el funcionamiento del acondicionador de aire (SW3-1: OFF y SW3-2: OFF). Cambie el conmutador de servicio exterior SW2-4 de ON a OFF.

⑧ Desconecte la fuente de alimentación (disyuntor).

* Si se ha añadido demasiado refrigerante al sistema acondicionador de aire, es posible que la presión no descienda a 7,1 PSIG (0,5 kgf/cm^2). Si esto ocurre, utilice el recogedor de refrigerante para recoger todo el refrigerante del sistema y, a continuación, una vez que las unidades interior y exterior se hayan reubicado, vuelva a recargar el sistema con la cantidad adecuada de refrigerante.

⚠ **Atención:**

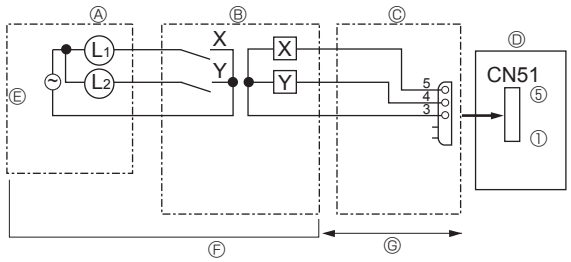
- **Al realizar el vaciado del refrigerante, detenga el compresor antes de desconectar las tuberías de refrigerante. El compresor podría explotar y causar lesiones si penetrara alguna sustancia extraña, como por ejemplo aire, en el sistema.**
- **No realice el trabajo de vaciado cuando haya una fuga de gas. La entrada de aire u otros gases causa una presión anormalmente alta en el ciclo de refrigeración, lo que puede causar una explosión o lesiones.**

es

8. Funciones especiales

8.1. CONECTOR DE ENTRADA/SALIDA DE LA UNIDAD EXTERIOR

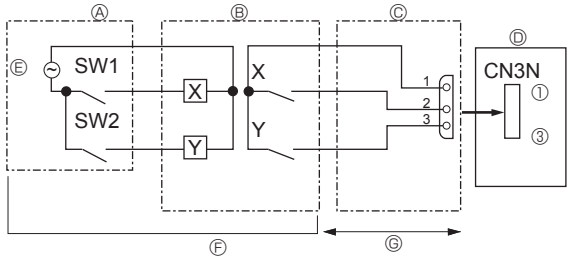
• Estado (CN51)



Ⓐ Cuadro de control a distancia
Ⓑ Circuito de relés
Ⓒ Adaptador de salida externa (PAC-SA88HA-E)
Ⓓ Cuadro de control de la unidad exterior
Ⓔ Fuente de alimentación de la luz
Ⓕ No incluidos
Ⓖ Máx. 10 m [33 pies]

L1: Luz de visualización de errores
L2: Luz de funcionamiento del compresor
X, Y: Relé (tensión nominal de la bobina: ≦ 0,9 W, 12 V CC)

• Cambio automático (CN3N)

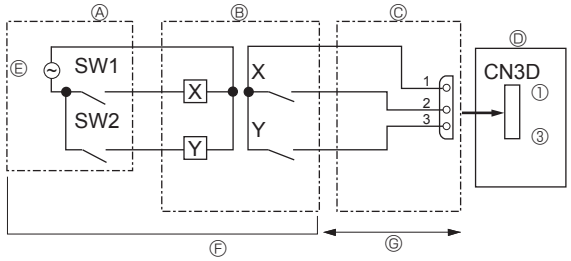


Ⓐ Panel de control remoto
Ⓑ Circuito de relés
Ⓒ Adaptador de entrada externa (PAC-SC36NA-E)
Ⓓ Cuadro de control de la unidad exterior
Ⓔ Fuente de alimentación del relé
Ⓕ No incluidos
Ⓖ Máx. 10 m [33 pies]

SW1: Interruptor
SW2: Interruptor
X, Y: Relé (nivel de contacto : ≧ 0,1 A, 15 V CC / carga mínima aplicable: ≦ 1 mA)

	ON	OFF
SW1	Calefacción	Refrigeración
SW2	Validez de SW1	Invalidez de SW1

• Modo silencioso / Control de demanda (CN3D)



Ⓐ Panel de control remoto
Ⓑ Circuito de relés
Ⓒ Adaptador de entrada externa (PAC-SC36NA-E)
Ⓓ Cuadro de control de la unidad exterior
Ⓔ Fuente de alimentación del relé
Ⓕ No incluidos
Ⓖ Máx. 10 m [33 pies]

SW1: Interruptor
SW2: Interruptor
X, Y: Relé (nivel de contacto : ≧ 0,1 A, 15 V CC / carga mínima aplicable: ≦ 1 mA)

El modo silencioso y el control de demanda se seleccionan cambiando el interruptor DIP 9-2 en la placa del controlador exterior.
Puede ajustarlo al siguiente consumo de energía (comparado con los índices) ajustando SW1, 2.

	Placa del controlador exterior DIP SW9-2	SW1	SW2	Función
Modo silencioso	OFF	ON	–	Funcionamiento en modo silencioso
Control de demanda	ON	OFF	OFF	100% (Normal)
		ON	OFF	75%
		ON	ON	50%
		OFF	ON	0% (Detenido)

es

This product is designed and intended for use in the residential, commercial and light-industrial environment.

Please be sure to put the contact address/telephone number on this manual before handing it to the customer.

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

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Printed in Japan

MITSUBISHI ELECTRIC

Air-Conditioners Indispensable Optional Parts
BRANCH BOX
PAC-MK51BC
PAC-MK31BC

HFC utilized
R410A

ONLY FOR R410A OUTDOOR UNIT

ONLY FOR INDOOR USE

INSTALLATION MANUAL
FOR INSTALLER
For safe and correct use, please read this installation manual thoroughly before installing the air-conditioner unit.

INSTALLATIONSHANDBUCH
FÜR INSTALLATEURE
Zum sicheren und ordnungsgemäßen Gebrauch der Klimaanlage das Installationshandbuch gründlich durchlesen.

MANUEL D'INSTALLATION
POUR L'INSTALLATEUR
Veuillez lire le manuel d'installation en entier avant d'installer ce climatiseur pour éviter tout accident et vous assurer d'une utilisation correcte.

INSTALLATIEHANDLEIDING
VOOR DE INSTALLATEUR
Voor een veilig en juist gebruik moet u deze installatiehandleiding grondig doorlezen voordat u de airconditioner installeert.

MANUAL DE INSTALACIÓN
PARA EL INSTALADOR
Para un uso seguro y correcto, lea detalladamente este manual de instalación antes de montar la unidad de aire acondicionado.

MANUALE DI INSTALLAZIONE
PER L'INSTALLATORE
Per un uso sicuro e corretto, leggere attentamente questo manuale di installazione prima di installare il condizionatore d'aria.

ΕΓΧΕΙΡΙΔΙΟ ΟΔΗΓΙΩΝ ΕΓΚΑΤΑΣΤΑΣΗΣ
ΓΙΑ ΑΥΤΟΝ ΠΟΥ ΚΑΝΕΙ ΤΗΝ ΕΓΚΑΤΑΣΤΑΣΗ
Για ασφάλεια και σωστή χρήση, παρακαλείστε διαβάσετε προσεχτικά αυτό το εγχειρίδιο εγκατάστασης πριν αρχίσετε την εγκατάσταση της μονάδας κλιματισμού.

MANUAL DE INSTALAÇÃO
PARA O INSTALADOR
Para segurança e utilização correctas, leia atentamente este manual de instalação antes de instalar a unidade de ar condicionado.

INSTALLATIONSMANUAL
TIL INSTALLATØREN
Læs venligst denne installationsmanual grundigt, før De installerer airconditionanlægget, af hensyn til sikker og korrekt anvendelse.

INSTALLATIONSMANUAL
FÖR INSTALLATÖREN
Läs denna installationsmanual noga för säkert och korrekt bruk innan luftkonditioneringen installeras.

MONTAJ ELKİTABI
MONTÖR İÇİN
Emniyetli ve doğru biçimde nasıl kullanılacağını öğrenmek için lütfen klima cihazını monte etmeden önce bu elkitabını dikkatle okuyunuz.

РУКОВОДСТВО ПО УСТАНОВКЕ
ДЛЯ УСТАНОВИТЕЛЯ
Для осторожного и правильного использования прибора необходимо тщательно ознакомиться с данным руководством по установке до выполнения установки кондиционера.

English
Deutsch
Français
Nederlands
Español
Italiano
Ελληνικά
Português
Dansk
Svenska
Türkçe
Русский

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This installation manual is only for the branch box installation. In installing the indoor units and outdoor units, refer to the installation manual attached to each unit.

1. Safety precautions

- **► Before installing the unit, make sure you read all the "Safety precautions".**
- **► Please report to or take consent by the supply authority before connection to the system.**
- **► PAC-MK•BC series are designed as professional equipment. When installing the unit in a regular house, install the optional Reactor Box (PAC-RB01BC) for harmonic suppression.**
- **► When receiving electricity from the outdoor unit, applicable standards for the outdoor unit may not be satisfied depending on the indoor unit used.**

⚠ Warning:
Describes precautions that must be observed to prevent danger of injury or death to the user.

⚠ Caution:
Describes precautions that must be observed to prevent damage to the unit.

After installation work has been completed, explain the "Safety Precautions," use, and maintenance of the unit to the customer according to the information in the Operation Manual and perform the test run to ensure normal operation. Both the Installation Manual and Operation Manual must be given to the user for keeping. These manuals must be passed on to subsequent users.

⏚ : Indicates a part which must be grounded.

⚠ Warning:
Carefully read the labels affixed to the main unit.

⚠ Warning:

- **The unit must not be installed by the user.**
- **Ask a dealer or an authorized technician to install the unit.**
- **For installation work, follow the instructions in the Installation Manual and use tools and pipe components specifically made for use with refrigerant specified in the outdoor unit installation manual.**
- **The unit must be installed according to the instructions in order to minimize the risk of damage from earthquakes, typhoons, or strong winds. An incorrectly installed unit may fall down and cause damage or injuries.**
- **The unit must be securely installed on a structure that can sustain its weight.**
- **If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration in the room from exceeding the safety limit in the event of refrigerant leakage. Should the refrigerant leak and cause the concentration limit to be exceeded, hazards due to lack of oxygen in the room may result.**
- **Ventilate the room if refrigerant leaks during operation. If refrigerant comes into contact with a flame, poisonous gases will be released.**
- **All electric work must be performed by a qualified technician according to local regulations and the instructions given in this manual.**
- **Use only specified cables for wiring.**
- **The terminal block cover panel of the unit must be firmly attached.**
- **Use only accessories authorized by Mitsubishi Electric and ask a dealer or an authorized technician to install them.**
- **The user should never attempt to repair the unit or transfer it to another location.**
- **After installation has been completed, check for refrigerant leaks. If refrigerant leaks into the room and comes into contact with the flame of a heater or portable cooking range, poisonous gases will be released.**
- **Be sure to connect the power supply cords and the connecting wires for the indoor units, outdoor units, and branch boxes directly to the units (no intermediate connections).**
  Intermediate connections can lead to communication errors if water enters the cords or wires and causes insufficient insulation to ground or a poor electrical contact at the intermediate connection point.
  (If an intermediate connection is necessary, be sure to take measures to prevent water from entering the cords and wires.)

⚠ Caution:

- **Make sure that the refrigerant pipes are well insulated to prevent condensation.**
  Incomplete insulation may cause condensation on the surface of pipes, wetting of the ceiling, floor and other important properties.
- **Do not use the unit in an unusual environment. If the air conditioner is installed in areas exposed to steam, volatile oil (including machine oil), or sulfuric gas, areas exposed to high salt content such as the seaside, the performance can be significantly reduced and the internal parts can be damaged.**
- **Do not install the unit where combustible gases may leak, be produced, flow, or accumulate. If combustible gas accumulates around the unit, fire or explosion may result.**
- **When installing the unit in a hospital or communications office, be prepared for noise and electronic interference. Inverters, home appliances, high-frequency medical equipment, and radio communications equipment can cause the air conditioner to malfunction or breakdown. The air conditioner may also affect medical equipment, disturbing medical care, and communications equipment, harming the screen display quality.**
- **Thermal insulation of the refrigerant pipe is necessary to prevent condensation. If the refrigerant pipe is not properly insulated, condensation will be formed.**
- **Place thermal insulation on the pipes to prevent condensation. If the drain-pipe is installed incorrectly, water leakage and damage to the ceiling, floor, furniture, or other possessions may result.**
- **Do not clean the air conditioner unit with water. Electric shock may result.**
- **Tighten all flare nuts to specification using a torque wrench. If tightened too much, the flare nut can break after an extended period.**
- **Be sure to install circuit breakers, if not installed, electric shock may result.**
- **For the power lines, use standard cables of sufficient capacity. Otherwise, a short circuit, overheating, or fire may result.**
- **When installing the power lines, do not apply tension to the cables. If the connections are loosened, the cables can snap or break and overheating or fire may result.**
- **Do not connect the ground wire to gas or water pipes, lighting rods, or telephone grounding lines. If the unit is not properly grounded, electric shock may result.**

2. Selecting a location for installation

*** The branch box is only for indoor use.**
Please attach the special optional cover (PAC-AK350CVR-E) to install the branch box in the outdoors.

- Ensure that the branch box is installed in a location which facilitates servicing and maintenance. (ensure that the required maintenance hole or service space is available).

- **Do not install near bedrooms. The sound of refrigerant flowing through the piping may sometimes be audible.**
- **Ensure that it is located where noise in operation will not be a problem.**

After power is supplied or after an operation stop for a while, a small clicking noise may be heard from the inside of the branch box. The electronic expansion valve is opening and closing. The unit is not faulty.

- Determine the route of refrigerant piping, and electrical wiring beforehand.
- Ensure that the location of the installation is such that the length of refrigerant piping is within the specified limits.

- **Do not install in location that is hot or humid for long periods of time.**

- Ensure that the branch box is installed above the ceiling of corridor, bath room, etc., where persons are not regularly there (Avoid installing at around center of the room.) for maintenance.

*** Ensure that the unit is installed in a location able to support its weight.**

⚠ Warning:
Ensure that the unit is installed firmly in a location able to support its weight. If the installation is of insufficient strength the unit may fall, resulting in injury.

3. Confirming supplied accessories

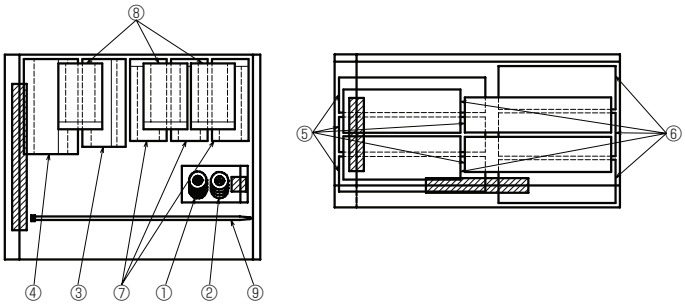


Fig. 3-1

3.1. Check the Branch Box accessories and parts

	Accessory name	Q'ty		
		PAC-MK31BC	PAC-MK51BC	
①	Washer (with insulation)	4	4	
②	Washer	4	4	
③	Pipe cover (Liquid)	1	1	TO OUTDOOR UNIT
④	Pipe cover (Gas)	1	1	TO OUTDOOR UNIT
⑤	Pipe cover (Liquid)	3	5	TO INDOOR UNITS
⑥	Pipe cover (Gas)	3	5	TO INDOOR UNITS
⑦	Joint cover (Liquid)	1	3	
⑧	Joint cover (Gas)	1	3	
⑨	Band	16	24	

4. Dimensions and required servicing space of Branch Box

Optional different-diameter (deformed) joints

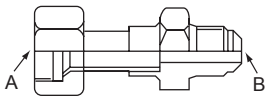


Fig. 4-1

Model name	Connected pipes diameter	Diameter A	Diameter B
	mm	mm	mm
MAC-A454JP	ø9.52 → ø12.7	ø9.52	ø12.7
MAC-A455JP	ø12.7 → ø9.52	ø12.7	ø9.52
MAC-A456JP	ø12.7 → ø15.88	ø12.7	ø15.88
PAC-493PI	ø6.35 → ø9.52	ø6.35	ø9.52
PAC-SG76RJ-E	ø9.52 → ø15.88	ø9.52	ø15.88

■ **PAC-MK51BC (5-branches type)**

(mm)

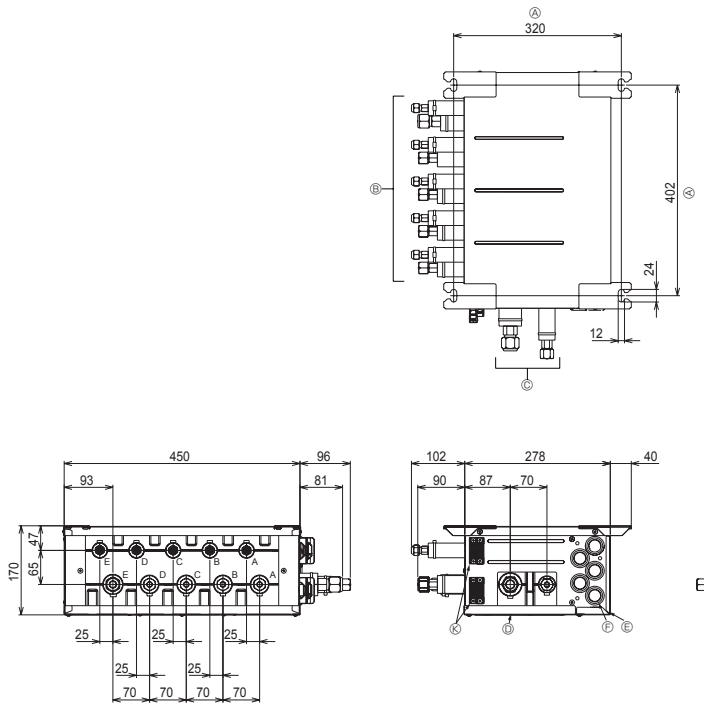


Fig. 4-2

* Please connect 2 indoor units or more with 1 system.
* Up to 2 branch boxes may be connected to 1 outdoor unit.
* Suspension bolt : W3/8 (M10)
* Refrigerant pipe flared connection

*** The piping connection size differs according to the type and capacity of indoor units. Match the piping connection size for indoor unit and branch box. If the piping connection size of branch box does not match the piping connection size of indoor unit, use optional different-diameter (deformed) joints to the branch box side. (Connect deformed joint directly to the branch box side.)**

Ⓐ Suspension bolt pitch
Ⓑ To indoor unit
Ⓒ To outdoor unit
Ⓓ Service panel (for LEV, THERMISTOR)
Ⓔ Electric cover
Ⓕ Rubber bush
Ⓖ Terminal block (to indoor unit on control board)
Ⓗ Terminal block (to outdoor unit)
Ⓙ Terminal block (for communication cable)
Ⓚ Cable clamp

* Ensure that the branch box is installed as shown on the below drawing.

■ **PAC-MK51BC (Fig.4-2)**

Suspension bolt: W3/8 (M10)
Refrigerant pipe flared connection

mm

	A	B	C	D	E	To outdoor unit
Liquid pipe	ø6.35	ø6.35	ø6.35	ø6.35	ø6.35	ø9.52
Gas pipe	ø9.52	ø9.52	ø9.52	ø9.52	ø12.7	ø15.88

Conversion formula

1/4 F	ø6.35
3/8 F	ø9.52
1/2 F	ø12.7
5/8 F	ø15.88
3/4 F	ø19.05

4. Dimensions and required servicing space of Branch Box

■ **PAC-MK31BC (3-branches type)**

(mm)

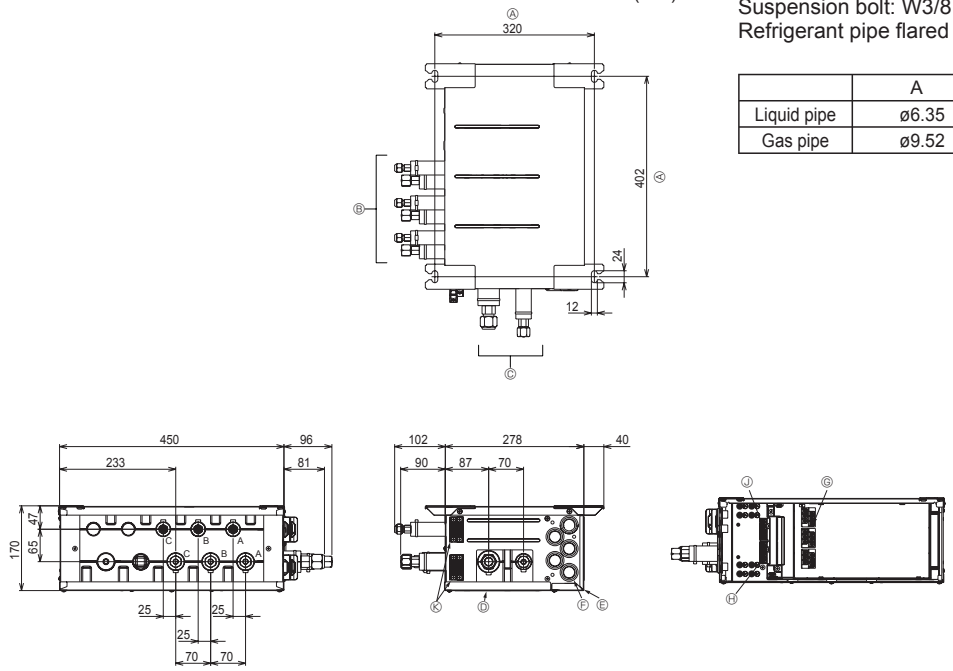


Fig. 4-3

■ **PAC-MK31BC (Fig.4-3)**

Suspension bolt: W3/8 (M10)

Refrigerant pipe flared connection

mm

	A	B	C	To outdoor unit
Liquid pipe	ø6.35	ø6.35	ø6.35	ø9.52
Gas pipe	ø9.52	ø9.52	ø9.52	ø15.88

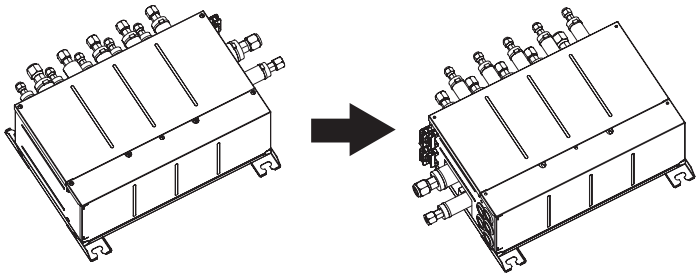
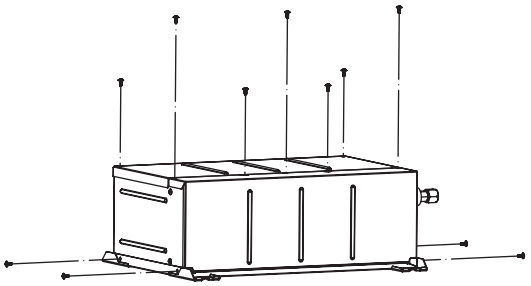


Fig. 4-4

4.1. The direction of the piping can be changed. (Fig. 4-4). [Work Procedures] (Fig. 4-5)

① Remove the screws in each part.

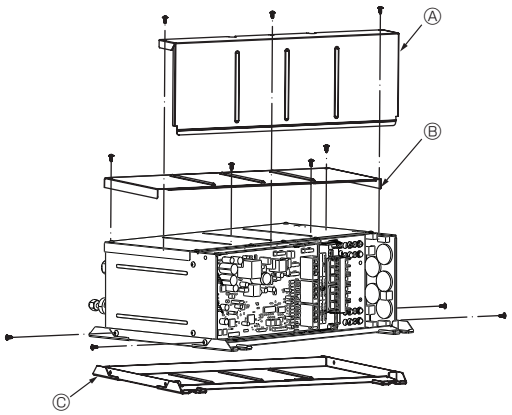


② Remove the electric cover, service panel, and top panel.

Ⓐ Electric cover

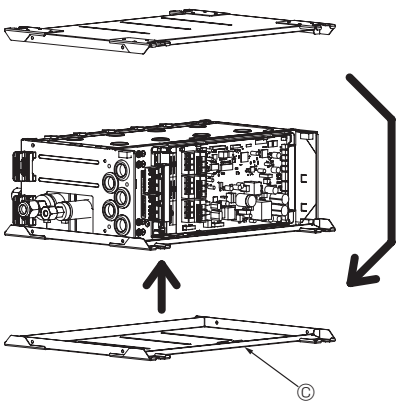
Ⓑ Service panel

Ⓒ Top panel

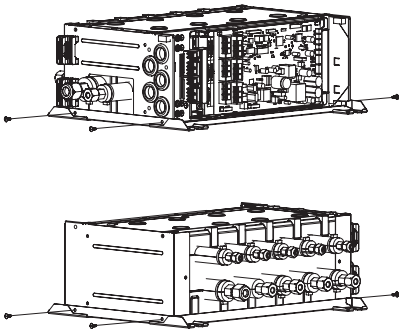


③ Install the top panel on the opposite surface.

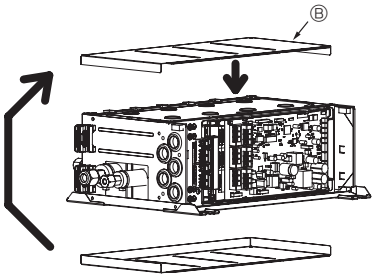
Ⓒ Top panel



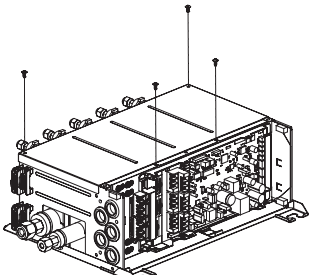
④ Fasten the screws in each part.



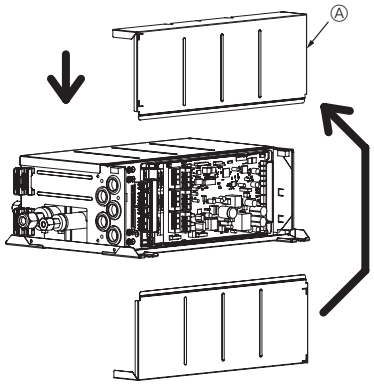
⑤ Install the service panel on the opposite surface.
Ⓑ Service panel



⑥ Fasten the screws.



⑦ Install the electric cover on the opposite surface.
Ⓐ Electric cover



⑧ Fasten the screws.

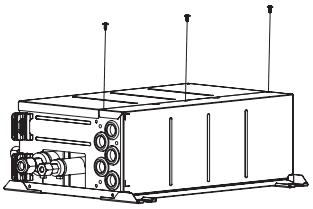


Fig. 4-5

4. Dimensions and required servicing space of Branch Box

(mm)

(1)

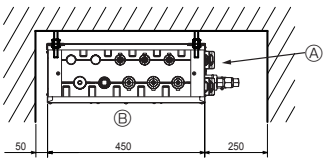


Fig. 4-6

(mm)

(2)

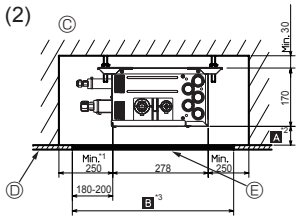


Fig. 4-7

(mm)

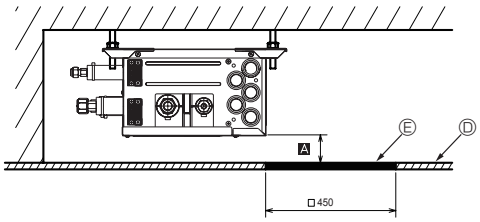


Fig. 4-8

(mm)

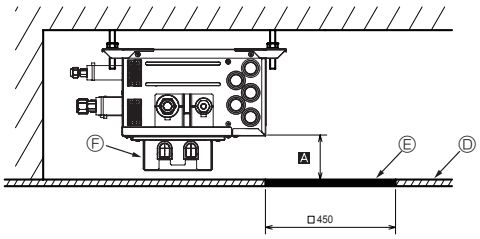


Fig. 4-9

(3)

(mm)

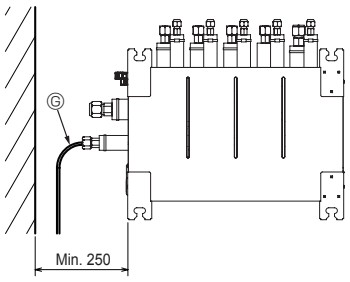


Fig. 4-10

(mm)

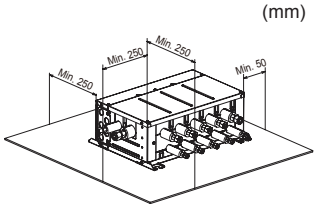


Fig. 4-11

(mm)

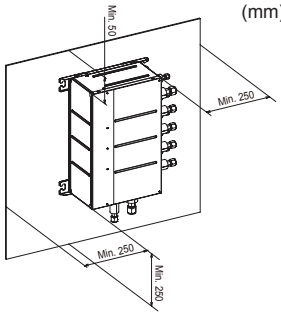
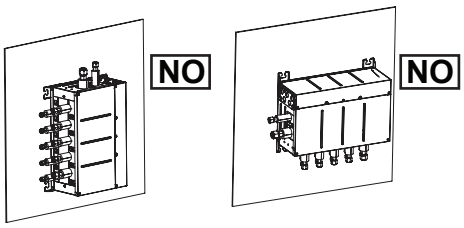


Fig. 4-12



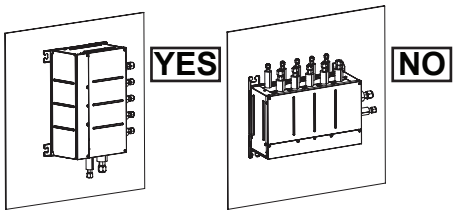


Fig. 4-13

4.2. Space required for installation and servicing

Ⅰ. The space when installing with the suspension bolts.

(1) Front View (Fig. 4-6)
- Ⓐ Branch box
- Ⓑ On the side of piping

(2) Side View (Fig. 4-7, Fig. 4-8, Fig. 4-9)
- Ⓒ For indoor installations
- Ⓓ Ceiling board
- Ⓔ Maintenance hole
- Ⓕ Reactor Box (Optional parts)

*1: Minimum 350 mm is required for 90° bends in refrigerant piping.

***2: A is "Min. 200 mm" <recommendation>.**

In the case of less than 200 mm (for example A is 100 mm), the exchange work of Branch box from a maintenance hole becomes difficult (Only exchange work of a PCB, linear expansion valve coils and sensors are possible).
To install the optional Reactor Box, set A to Min. 270 mm <recommendation> (Fig. 4-9).

***3: B is "□ 600 mm" <recommendation>.**

In the case of "□ 450 mm", prepare a maintenance hole at a PCB side (as it is shown in Fig. 4-8, Fig. 4-9), and "Min. 300 mm" is needed as distance A.
In the case of less than 300 mm (for example A is 100 mm), the exchange work of Branch box, linear expansion valve coils and sensors from a maintenance hole becomes difficult (Only exchange work of a PCB is possible).

(3) Top View (Fig. 4-10)
- Ⓖ Refrigerant piping

Ⅱ. The space when installing on the floor. (Fig. 4-11)

Ⅲ. The space when installing on a wall. (Fig. 4-12)

The installation direction is limited when installing on a wall. (Fig. 4-13)

When installing the unit on the wall, install the piping connected to the outdoor unit facing down. Other ways are not acceptable.

5. Refrigerant piping

* Always follow the specifications written in the installation manual of the outdoor unit. Exceeding these requirements may cause reduced performance of the equipment, and malfunctions.

6. Mounting the Branch Box

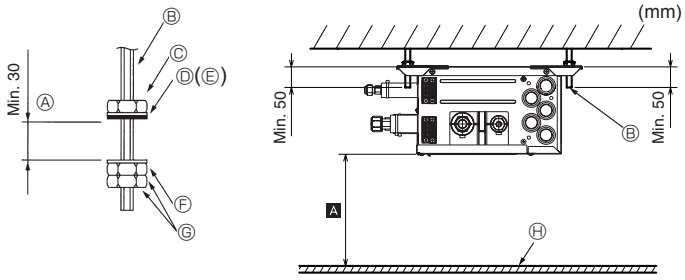
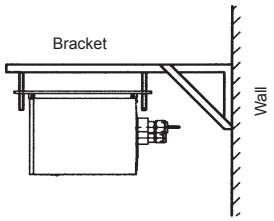


Fig. 6-1

(1) Install the suspension bolts (procure locally) at the specified pitch (Fig. 4-2, 4-3).
(2) Fit the washers and nuts (①, ②, procure locally) to the suspension bolts. (Fig. 6-1)
(3) Hang the unit on the suspension bolts.
(4) Fully tighten the nuts (check ceiling height).
(5) Use a level to adjust the branch box to the horizontal.

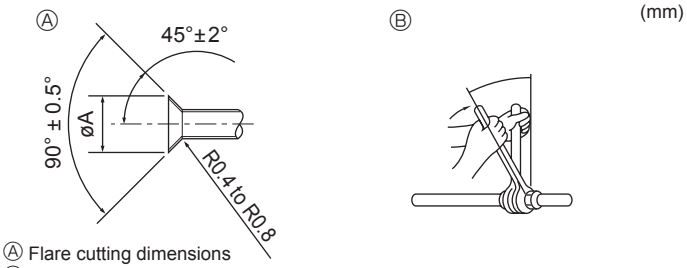
Ⓐ When unit is hung and nuts tightened
Ⓑ Suspension bolt
Ⓒ Nut
Ⓓ Washer (with cushion) ①
Ⓔ Ensure that cushion faces downwards
Ⓕ Washer (without cushion) ②
Ⓖ Nut (procure locally)
Ⓗ Ceiling board



* Purchase an appropriate bracket locally if the unit is to be mounted on a wall.

Fig. 6-2

7. Installing refrigerant piping



Ⓐ Flare cutting dimensions
Ⓑ Flare nut tightening torque

Fig. 7-1

► Connect the liquid and gas pipes of each indoor unit to the same end connection numbers as indicated on the indoor unit flare connection section of each Branch Box. If connected to wrong end connection numbers, it doesn't work normally.
► When connecting indoor units, make sure to connect refrigerant pipes and connection wires to the appropriate connection ports marked with matching alphabets. (Ex. A, B, C, D, E)

Note:
Be sure to mark all the local refrigerant piping (liquid pipes, gas pipes, etc.) for each indoor unit designating clearly which room it belongs in. (Ex. A, B, C, D, E)

► List indoor unit model names in the name plate on the control box of Branch Box (for identification purposes).

- Conduct sufficient anti-condensation and insulation work to prevent water dripping from the refrigerant piping. (liquid pipe/gas pipe)
- Increase insulation depending on the environment where the refrigerant piping is installed, or condensation may occur on the surface of the insulation material. (Insulation material Heat-resistant temperature: 120 °C, Thickness: 15 mm or more)
  * When the refrigerant piping is used in locations subject to high temperature and humidity such as in the attic, further addition of insulation may be required.
- To insulate the refrigerant piping, apply heat-resistant polyethylene foam between the indoor unit and insulation material as well as to the net between the insulation material filling all gaps. (Condensation forming on the piping may result in condensation in the room or burns when contacting the piping.)

► When using commercially available refrigerant piping, ensure that both liquid and gas piping are wrapped with commercially available thermal insulation materials (insulation materials at least 12 mm thick and able to withstand temperatures in excess of 100 ºC).
► Refer to the installation manual of the outdoor unit when creating a vacuum and opening or closing valves.

(1) Remove the flared nuts and caps from the branch box.
(2) Flare the ends of the liquid and gas piping, and apply refrigeration oil (procure locally) to the flared seat.
Do not apply oil to the threaded portion.
(3) Connect the refrigerant piping immediately. Always tighten the flared nuts to the torque specified in the table 2 using a torque wrench and double spanner.
(4) Press the pipe covers ③ and ⑤ on the liquid piping against the unit and wrap to hold in place. (Fig. 7-3)
(5) Press the pipe covers ④ and ⑥ on the gas piping against the unit and wrap to hold in place. (Fig. 7-3)
(6) Apply the supplied bands ⑨ at a position 10 - 20 mm from each end of the pipe covers (③④⑤⑥).
(7) If the indoor unit is not connected, fit the supplied pipe covers (with caps, ⑦ and ⑧) to the branch box refrigerant piping connections against the unit to prevent condensation dripping from the pipes. (Fig. 7-4)
(8) Clamp the pipe covers (⑦⑧) in place with the supplied bands ⑨.

Ⓐ Flare cutting dimensions

Table 1

Copper pipe O.D. (mm)	Flare dimensions øA dimensions (mm)
ø6.35	8.7-9.1
ø9.52	12.8-13.2
ø12.7	16.2-16.6
ø15.88	19.3-19.7

Ⓑ Flare nut tightening torque

Table 2

Copper pipe O.D. (mm)	Flare nut O.D. (mm)	Tightening torque (N•m)
ø6.35	17	14-18
ø6.35	22	34-42
ø9.52	22	34-42
ø9.52	26	49-61
ø12.7	26	49-61
ø12.7	29	68-82
ø15.88	29	68-82
ø15.88	36	100-120

*1 N•m ≈ 10 kgf•cm

7. Installing refrigerant piping

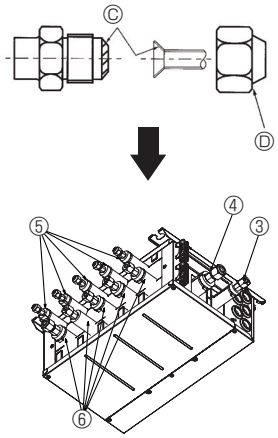


Fig. 7-2

⚠ Caution:
Tighten the flare nut with a torque wrench in the specified method.
Overtightening will cause the flare nut to crack and it will cause refrigerant leakage over a period of time.

Ⓒ Apply refrigeration oil to the entire (Fig. 7-2) surface of the flared seat.
Ⓓ Basically use flared nuts fitted to the body (commercially available flared nuts may crack).

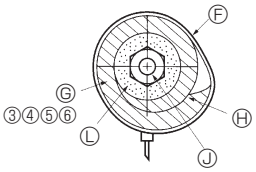


Fig. 7-3

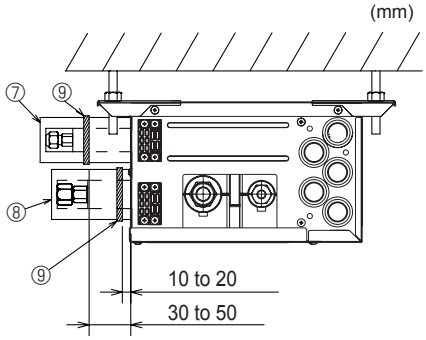


Fig. 7-4

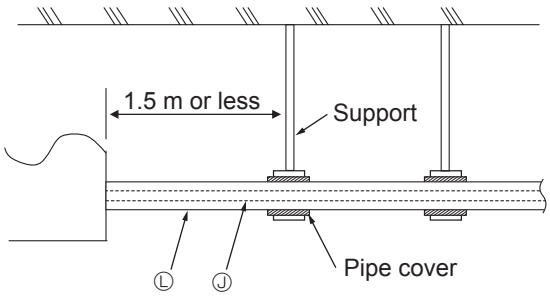


Fig. 7-5

Note:
A special flare nut (optional or attached to the indoor unit) is needed to some indoor units.
Please refer to the installation manual of outdoor unit and indoor unit for details.

Ⓕ Band ⑨
Ⓖ Pipe covers ③④⑤⑥
Ⓗ Tighten
Ⓙ Refrigerant piping
Ⓛ Thermal insulation for refrigerant piping

► Use the following procedures for indoor connection part which indoor unit is not connected. (Fig. 7-4)

(1) In order to prevent refrigerant leaks, make sure that the flare nuts are tightened according to the specified torques* in Table 3.
* Refrigerant may also leak if the flare nuts are tightened more than the specified torques.
(2) In order to prevent condensation, install the pipe covers ⑦ ⑧ against the unit and fasten them with the supplied bands ⑨ .

Table 3

Diameters of branch box openings for connecting indoor units (mm)	Tightening torque (N•m)
ø6.35	13 ± 2
ø9.52	30 ± 2
ø12.7	50 ± 2

► Refrigerant charge:
Refer to the installation manual of the outdoor unit.
Use only R410A refrigerant (use of other refrigerants may cause troubles).

⚠ Caution:
To avoid excessive strain on the branch box, support the piping with one or more support(s) 1.5 m or less from the branch box.
Refer to Fig. 7-5 as an example.

Ⓙ Refrigerant piping
Ⓛ Thermal insulation for refrigerant piping

8. Electrical work

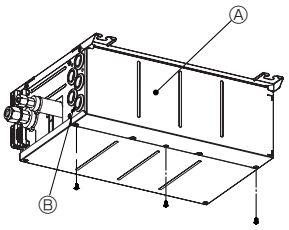


Fig. 8-1

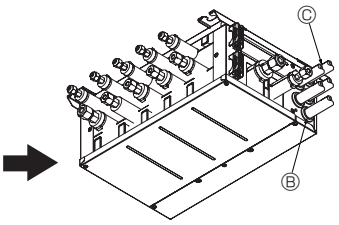


Fig. 8-2

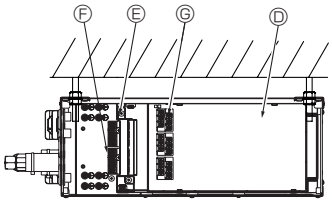


Fig. 8-3

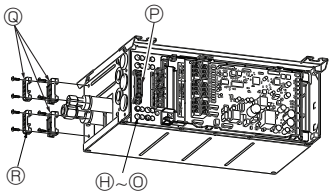


Fig. 8-4

Ⓐ Electric cover
Ⓑ Rubber bush
Ⓒ Wiring
Ⓓ Controller board
Ⓔ Terminal block: TB5
Ⓕ Terminal block: TB2B <To outdoor unit>
Ⓖ Terminal block: TB3A-TB3E <To indoor unit>
Ⓗ Earth Terminal <To outdoor unit>
Ⓙ Earth Terminal <For TB3A>
Ⓚ Earth Terminal <For TB3B>
Ⓛ Earth Terminal <For TB3D>
Ⓜ Earth Terminal <For TB3C>
Ⓝ Earth Terminal <For TB3E>
Ⓞ Earth Terminal <To other branch box>
Ⓟ Cable clamp <For TB2B>
Ⓠ Cable clamp <For TB3A-TB3E>
Ⓡ Cable clamp <For TB5>

► **Cautions for electrical work.**

⚠ **Warning:**

- **Always use dedicated circuits with breakers, and at the rated voltage. Power supply circuits with insufficient capacity, and bad workmanship during installation, may result in electric shock or fire.**

⚠ **Caution:**

- **Be sure to establish an earth. Do not earth the unit to a utility pipe, arrester, or telephone earth. Incomplete earth may cause electrical shock. A high surge current from lightning or other sources may cause damage to the air conditioner.**
- **Use the specified electrical wiring and ensure that it is connected properly, and that it is not under tension. Failure to follow these requirements may result in broken wiring, heating, or fire.**

► **Before turning Branch Box on, be sure to set the switches.**

► **To turn the power on, turn on the Branch Box then the outdoor unit, in that order. (In case power supplies for Branch Box and outdoor unit are separated)**

► **Wiring connecting branch box and outdoor unit, and branch box and indoor units, functions as both power supply and signal cable. Connect this wiring in accordance with the terminal block numbers to ensure correct polarity.**

► **Ensure that the appropriate refrigerant piping and electrical wiring are connected to each indoor unit. Incorrect wiring will interfere with the correct operation of the unit.**

► **Connect refrigerant pipes and connection wires to the appropriate ports marked with matching alphabets (Ex. A, B, C, D, E) on this unit.**

► **Always fix each ground wire separately with a ground screw.**

► **To prevent that wiring installed in the ceiling is chewed by rats etc., it should be installed in wiring conduit.**

1. Remove the electric cover. (Fig. 8-1)
2. Pass the wiring into the branch box each wire in place with a wiring clamp.
3. Firmly connect each wire to the appropriate terminal block. (Fig. 8-8)
4. Set dip sw. (Refer to 8.3)
5. Replace the electric cover.

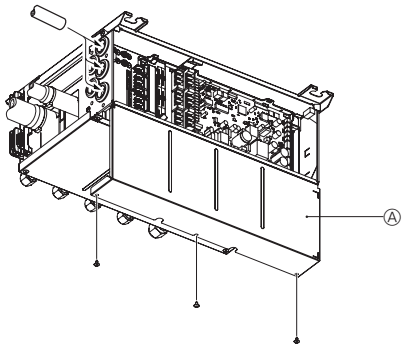


Fig. 8-5

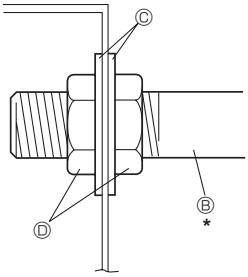


Fig. 8-6

8.1. When using wiring conduit (Fig. 8-5,6,7)

Replace the horizontal cover when the wiring conduit has been fixed in place.

Ⓐ Cover
Ⓑ Wiring conduit
Ⓒ Washer
Ⓓ Nut

Wiring conduit of up to 1" OD may be used.

(1) When using 1" OD wiring conduit, remove the bush and fix to the branch box. Remove the horizontal cover while fixing to the branch box.

(2) When using wiring conduit of 3/4" OD or smaller, notch the bush and insert the wiring conduit approximately 100 mm into the branch box.

* Replace the horizontal cover when the wiring conduit has been fixed in place.

⚠ **Caution:**

To avoid excessive strain on the branch box, support the wiring conduit Ⓑ with one or more support(s) 1.5 m or less from the branch box.

Refer to Fig. 8-7 as an example.

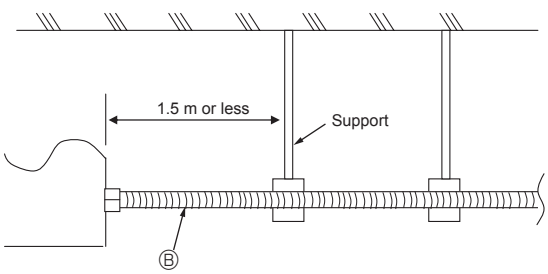
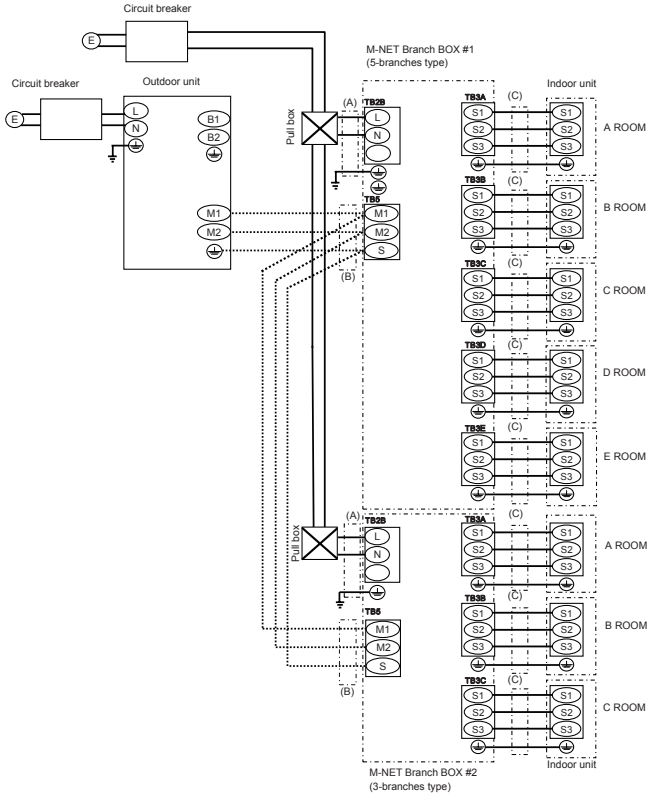


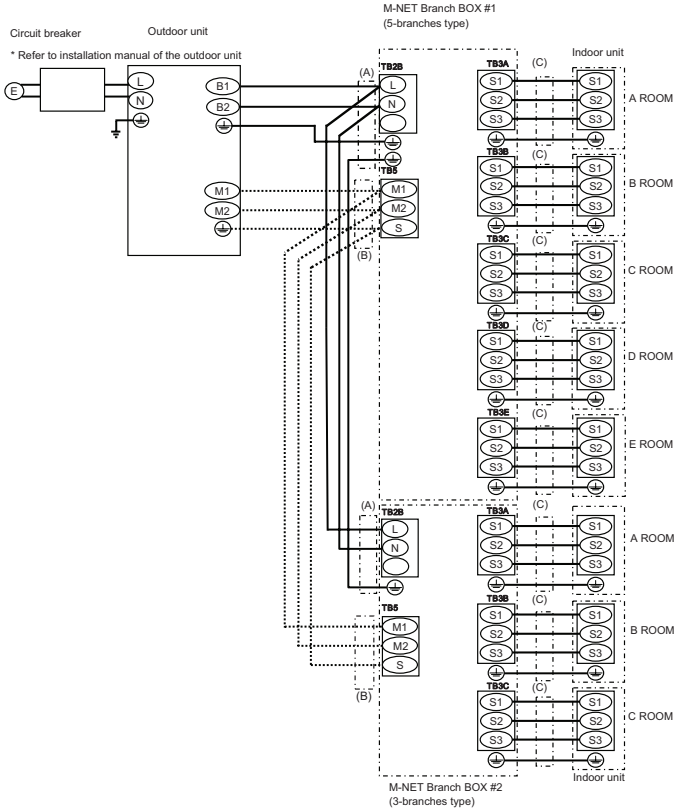
Fig. 8-7

8.2. External wiring procedure (Fig. 8-8, Fig 8-9)

■ **Supply power separately to branch box and outdoor unit**



■ **Power supply from Outdoor unit**



■ **Supply power separately to branch box and outdoor unit**

When installing the unit in a regular house. (Refer to Note ③)

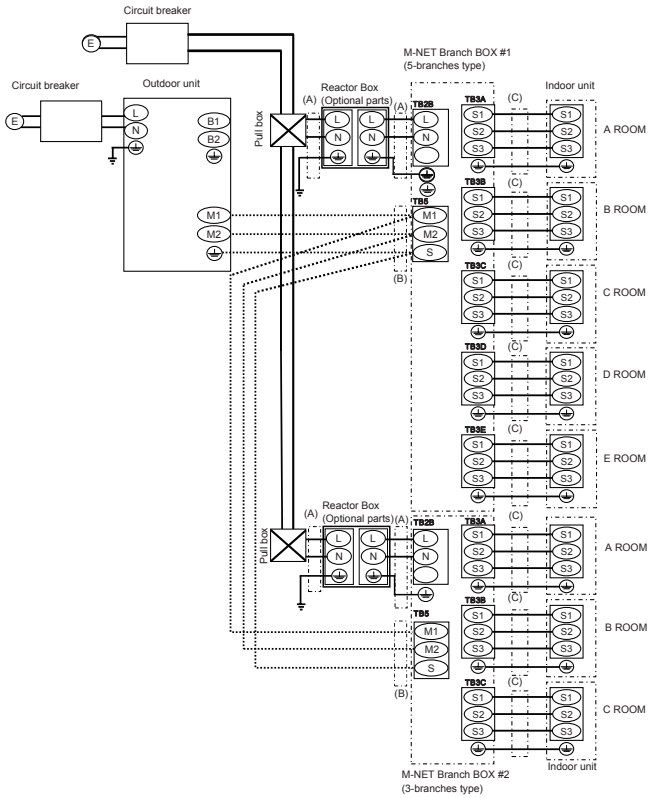
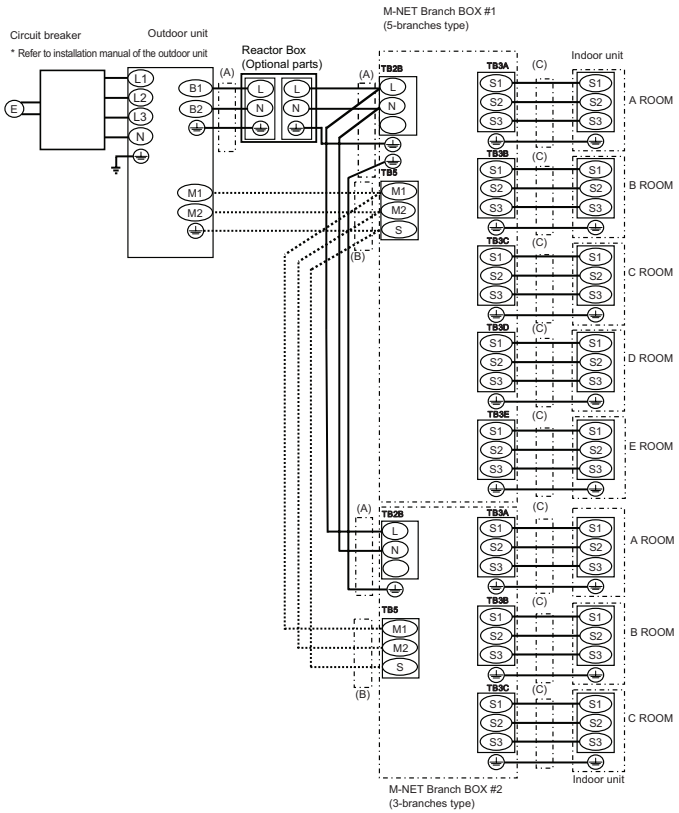


Fig. 8-8

■ **Power supply from Outdoor unit**

When installing the unit in a regular house. (Refer to Note ③)



Ⓔ Power supply: Single phase 220/230/240 V 50 Hz, 220 V 60 Hz

M-NET Branch BOX
(5-branches type)

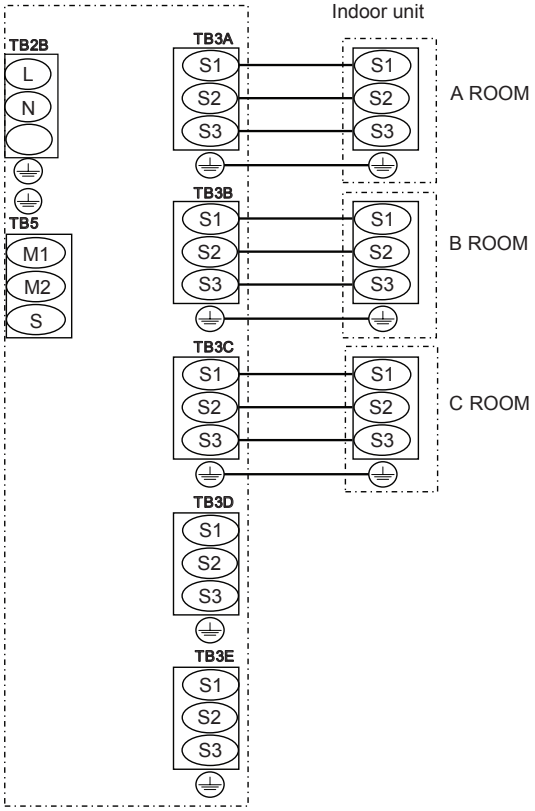


Fig. 8-9

Note:

① **Connect the lines (B), (C) in accordance with the terminal block names to ensure correct polarity.**

② **As for lines (C), S1 and S2 are for connecting the power source. And S2 and S3 are for signals. S2 is common cable for the power source and signal.**

Wire diameter		
(A) Main power line/ Earth line	(B) M-NETcable Shielding wire CVVS, CPEVS or MVVS	(C) Signal line/ Earth line
3-core 2.5 mm²	2-core 1.25 mm² Less Than 200 m	4-core 1.5 mm² Less Than 25 m

When using twisted wire for the wiring, the use of round terminal is required.

Notes: 1. Wiring size must comply with the applicable local and national code.

2. Power supply cords and indoor unit/branch box/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)

3. Install an earth line longer than power cables.

4. Do not bundle the M-NET cable with the connection cable and power supply cable. It may cause erroneous operation.

③ **Reactor BOX (Optional parts)**

When the product is used for a purpose other than as professional equipment, the Reactor BOX may be necessary.

	Branch box power supply method	
Outdoor unit	Power supply from outdoor unit	Separate power supply
1-phase power supply	Unnecessary	Necessary
3-phase power supply	Necessary	Necessary

⚠ **Warning:**

Never splice the cable, otherwise it may result in a smoke, a fire or communication failure.

• Recommended Connection Method

When connecting one indoor unit to the branch box, connect it to TB3A. When connecting 2 indoor units, connect them to TB3A and TB3B. When connecting 3 indoor units, connect them to TB3A, TB3B, and TB3C. Connect indoor units in the order of A→B→C→D→E.

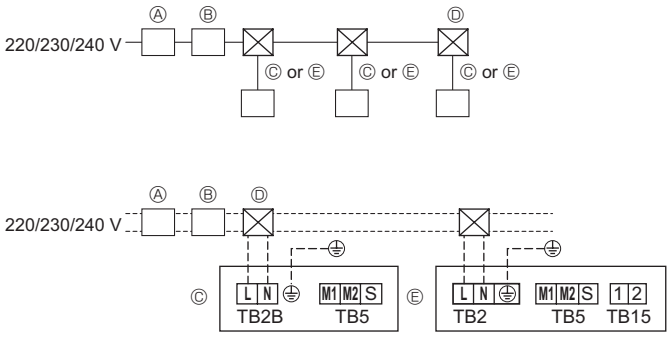


Fig. 8-10

■ Power supply wiring (Supply power separately to branch box and outdoor unit)

- Install an earth line longer than other cables.
- Power supply cords of appliance shall not be lighter than design 245IEC57 or 227IEC57, 245 IEC 53 or 227 IEC 53.
- A switch with at least 3 mm, 1/8 inch contact separation in each pole shall be provided by the air conditioner installation.

[Fig. 8-10]

Ⓐ Ground-fault interrupter
Ⓑ Local switch/Wiring breaker
Ⓒ Branch Box
Ⓓ Pull box
Ⓔ M-NET CONTROL INDOOR UNIT

8. Electrical work

Total operating current of the indoor unit	Minimum wire thickness (mm²)			Capacity (A)	Fuse (A)	Breaker for wiring (NFB)	Ground-fault interrupter *1
	Main cable	Branch	Ground				
F0 = 16A or less *2	1.5	1.5	1.5	16	16	20	20A current sensitivity *3
F0 = 25A or less *2	2.5	2.5	2.5	25	25	30	30A current sensitivity *3
F0 = 32A or less *2	4.0	4.0	4.0	32	32	40	40A current sensitivity *3

Apply to IEC61000-3-3 about max. permissive system impedance.
*1 The Ground-fault interrupter should support inverter circuit.
The Ground-fault interrupter should combine using of local switch or wiring breaker.
*2 Please take the larger of F1 or F2 as the value for F0.
F1 = Total operating maximum current of the indoor units × 1.2
F2 = (V1/C)

Connect to Branch box (PAC-MK•BC)

Indoor unit		V1	V2
Type 1	SEZ-KD•VA, PCA-RP•KAQ, PLA-ZRP•BA(.UK), SLZ-KF•VA	19.8	2.4
Type 2	PEAD-RP•JAQ(L).UK	26.9	
Type 3	MLZ-KA•VA, SLZ-KA•VAQ(L)3	9.9	
Type 4	MSZ-FH•VE, MSZ-SF•VE, MSZ-EF•VE, MSZ-SF•VA, MSZ-GF•VE	6.8	
Type 5	MFZ-KJ•VE, MSXY-FJ	7.4	
Type 6	Branch box (PAC-MK•BC)	5.1	3.0
Type 7	ecodan C generation*5	5.1	5.0*

Connect to Connection kit (PAC-LV11M)

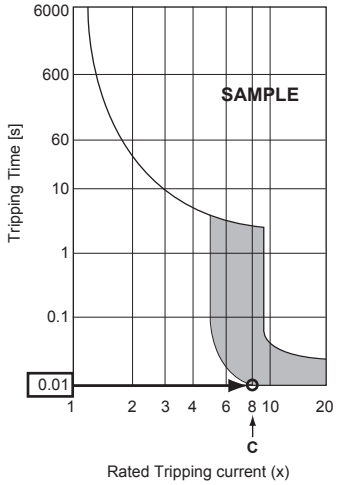
Indoor unit		V1	V2
Type 1	MSY-EF•VE, MSY-GE•VA, MSY-GH, MSZ-GE•VA, MSZ-SF•VA, MSZ-SF•VE, MSZ-EF•VE, MSZ-FH•VE	6.8	2.4
Type 2	MFZ-KJ•VE	7.4	
Type 3	Connection kit (PAC-LV11M)	3.5	

Indoor unit		V1	V2
Type 1	PMFY-VBM, PLFY-VBM, PEFY-VMS1, PCFY-VKM PKFY-VHM, PKFY-VKM, PFFY-VLRMM, PFFY-VKM, PLFY-VFM	19.8	2.4
Type 2	PLFY-VCM	9.9	
Type 3	PKFY-VBM	3.5	
Type 4	PEFY-VMA	38.0	1.6
Type 5	PLFY-VLMD, PEFY-VMH,PEFY-VMR, PDFY-VM PFFY-VLEM, PFFY-VLRM, PWFY-VM	0	0

*This value may increase due to a locally connected actuator.
C : Multiple of tripping current at tripping time 0.01s
Please pick up "C" from the tripping characteristic of the breaker.

Condition: Branch Box × 2 + SEZ-KD•VA × 5, C=8 (refer to right sample chart)
F2 = 5.1 × 2/8 + 19.8 × 5/8
= 13.65

Sample chart



*3 Current sensitivity is calculated using the following formula.
G1 = V2 + V3 × (Wire length[km])

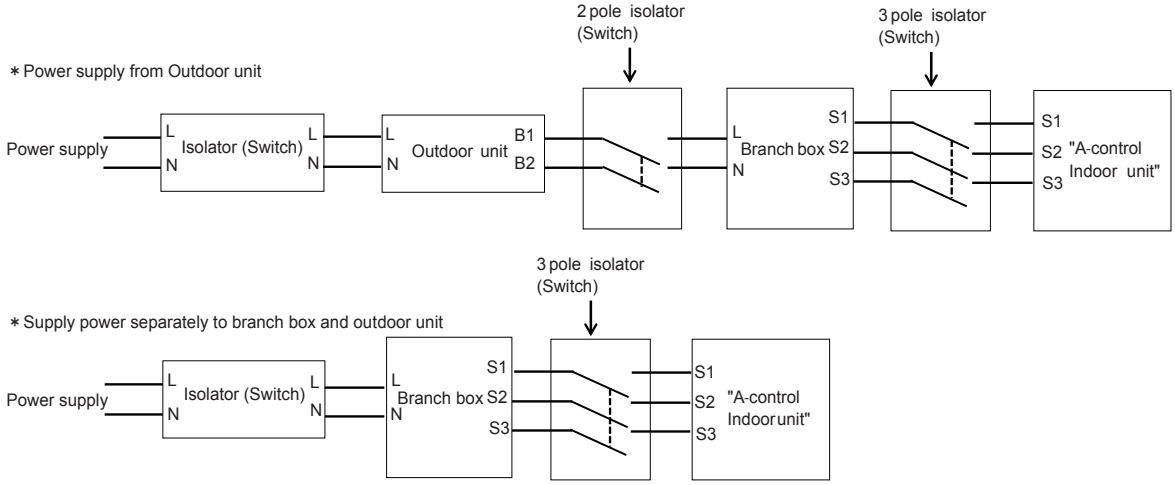
G1	Current sensitivity
30 or less	30 mA 0.1sec or less
100 or less	100 mA 0.1sec or less

Wire thickness (mm²)	V3
1.5	48
2.5	56
4.0	66

When connecting 3 units of the PLA-ZRP series respectively to the Branch Box 1.5mm² using 20m of wiring and connecting the Branch Box and PEFY-VMA to a single breaker using wiring totaling 100m in length;
G1 = 2.4 × 3 + 3 + 1.6 + 48 × 0.02 × 3 + 56 × 0.1
= 20.28
→ 30 mA Current sensitivity

*5 When the ecodan is connected, the master controller (G-50A etc.) cannot be connected.

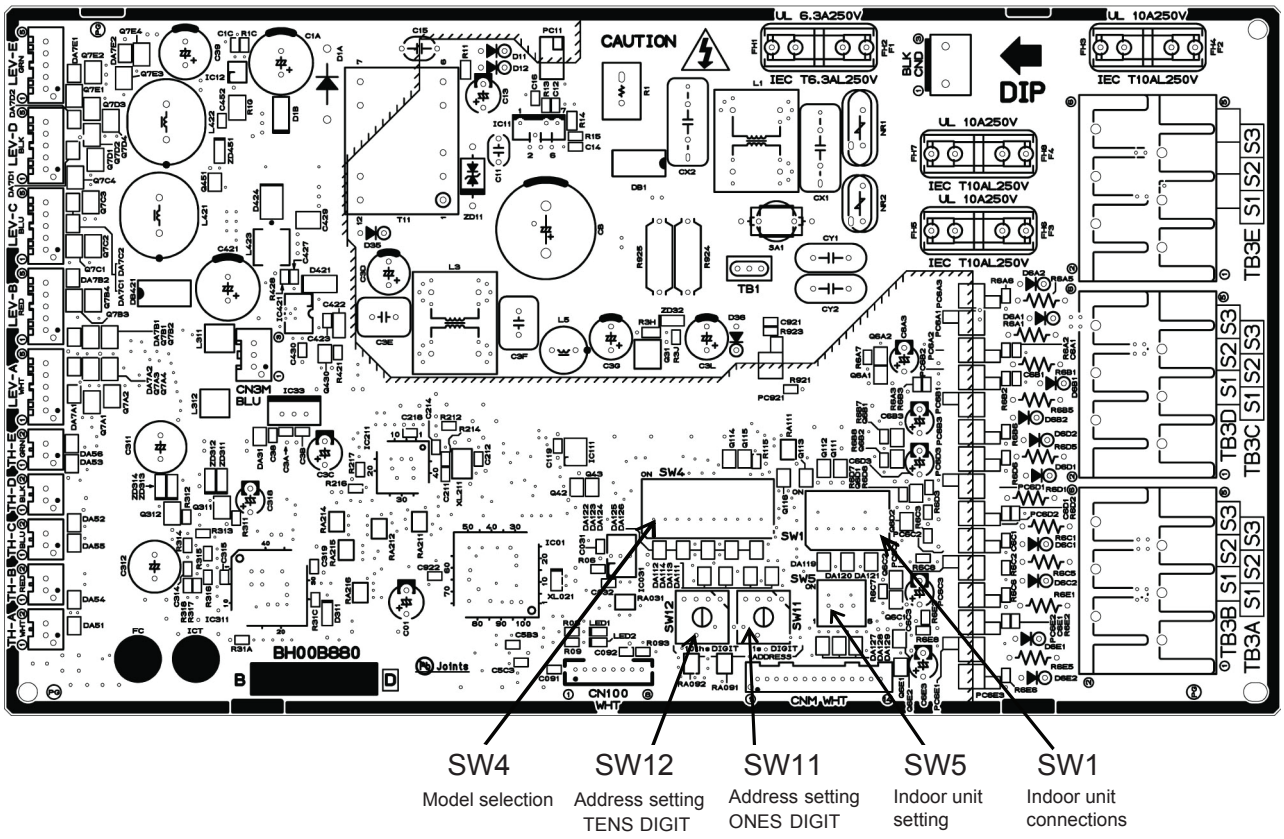
⚠ **Warning:**
In case of A-control wiring, there is high voltage potential on the S3 terminal caused by electrical circuit design that has no electrical insulation between power line and communication signal line. Therefore, please turn off the main power supply when servicing. And do not touch the S1, S2, S3 terminals when the power is energized. If isolator should be used between outdoor unit and branch box/indoor unit and branch box, please use 2-pole or 3-pole type, as shown in the following figures.



⚠ **Caution:**
After using the isolator, be sure to turn off and on the main power supply to reset the system. Otherwise, the outdoor unit may not be able to detect the branch box(es) or indoor units.

8. Electrical work

8.3. Switch setting



Dip switch setting (Effective only before turning on the power)

SW1

ON
OFF
1 2 3 4 5 6

(Example)
- When the indoor units are connected to Indoor unit A and C, turn SW1-1 and SW1-3 to on.

	Switch	OFF	ON
Indoor Unit A	SW1-1	Not connected	Connected
Indoor Unit B	SW1-2	Not connected	Connected
Indoor Unit C	SW1-3	Not connected	Connected
Indoor Unit D	SW1-4	Not connected	Connected
Indoor Unit E	SW1-5	Not connected	Connected
Not used	SW1-6		

SW4

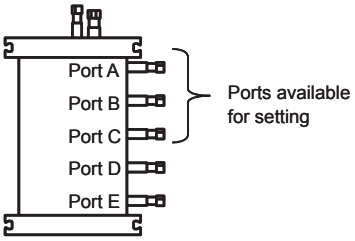
ON
OFF
1 2 3 4 5 6 7 8 9 10

(Example)
- When the indoor unit is cooling only system, turn SW4-5 to on.

Switch	OFF	ON
SW4-5	Cooling & Heating system	Cooling only system

When connecting the Cylinder or the Hydro box unit to the unit in the house, connect the air to air system indoor unit connected in the bedrooms to A to C ports and make the following switch settings below.
Also, after referring to the outdoor unit installation manual, add refrigerant.
Port A to C are available for setting for up to a maximum of 3 rooms.

SW5			Port setting
4	5	6	
Off	Off	Off	Not specified
On	Off	Off	Port A
Off	On	Off	Port B
On	On	Off	Port A+B
Off	Off	On	Port C
On	Off	On	Port A+C
Off	On	On	Port B+C
On	On	On	Port A+B+C



Address switch (Effective only before turning on the power)
Actual indoor unit address setting varies in different systems. Refer to the installation manual for the outdoor unit for details on how to make the address setting.
Each address is set with a combination of the settings for the tens digit and ones digit.

(Example)
- When setting the address to “3”, set the ones digit to 3, and the tens digit to 0.
- When setting the address to “25”, set the ones digit to 5, and the tens digit to 2.

(Example)
- When setting the address of the branch BOX to “3”, an address is assigned to each indoor unit starting with Unit A as shown below no matter if each indoor unit is connected. (SW1-1~5 ON)
  Indoor Unit A Address 3
  Indoor Unit B Address 4
  Indoor Unit C Address 5
  Indoor Unit D Address 6
  Indoor Unit E Address 7
- When the address is set to “25” and also 3 indoor units (Unit A, Unit C, and Unit E) are connected. (SW1-1, 1-3, 1-5 ON)
  Indoor Unit A Address 25
  Indoor Unit C Address 26
  Indoor Unit E Address 27

9. Test run

- Refer to the “Test run” section of the installation manual of the indoor units and outdoor unit.
- When the branch box and outdoor power source are separate, turn on the power of the branch box first, and then turn on the outdoor unit power.

• After power is supplied or after an operation stop for a while, a small clicking noise may be heard from the inside of the branch box. The electronic expansion valve is opening and closing. The unit is not faulty.

- Be sure to perform the test run in cooling mode for each indoor unit. Make sure each indoor unit operates properly following the installation manual attached to the unit.
- If you perform the test run for all indoor units at once, you cannot detect any erroneous connection, if any, of the refrigerant pipes and the indoor/outdoor unit connecting wires.
- To check for improper wiring, perform the test run for each indoor unit individually.

⚠ **Caution:**

- **Use the remote controller to operate the indoor unit.**
- **The following symptoms are not malfunctions.**

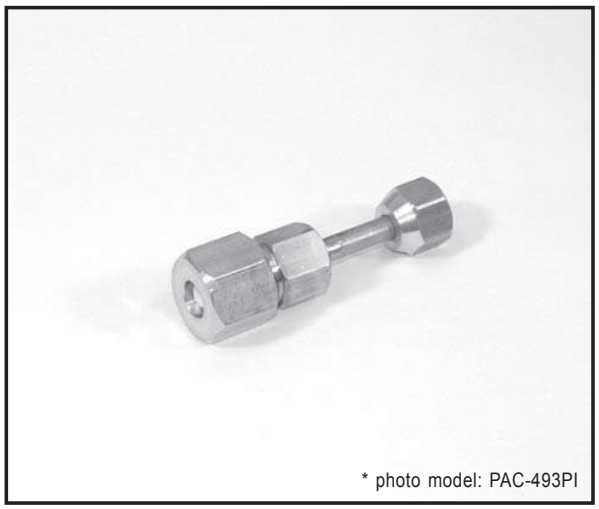
Symptom	Cause	Indoor unit LED display *
Indoor unit does not operate even if set to cooling (heating) operation	The cooling (heating) operation cannot be operated when the heating (cooling) operation of another indoor unit is operating.	Stand by (For Multi System)
Indoor unit fan stops during heating operation	The fan stops during defrosting operation.	-
	Fan stops when the refrigerant collecting mode ** is activated.	Stand by (For Multi System)

* See the operation manual of indoor units for details.

** This mode is activated for approximately 1 minute to help avoid an insufficient supply of refrigerant during heating operation when refrigerant is stored in an indoor unit that has been turned off or thermo-off.

Joint Pipe Unit ϕ9.52 → Pipe ϕ12.7 MAC-A454JP-E

Photo



* photo model: PAC-493PI

Descriptions

A part to connect refrigerant pipes of the different diameter. (Unit ϕ9.52 → ϕ12.7)

Applicable Models

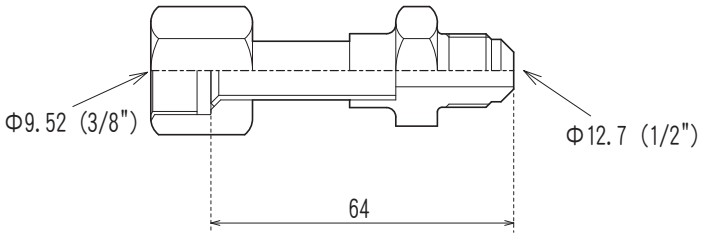
- MXZ-3A54VA
- MXZ-4A71VA
- MXZ-4A80VA
- MXZ-5A100VA
- MXZ-8A140VA
- PAC-AK30BC
- PAC-AK50BC

Specifications

Pipe diameter	Φ 9.52
Pipe material	C 1220T - OL

Dimensions

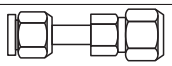
Unit : mm (inch)



How to Use / How to Install

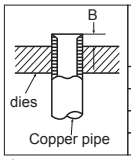
Make sure that you have all the following parts, in addition to this manual in this box:

Joint Pipe
- PAC-SG76RJ-E (unit side: Φ9.52 diameter, onsite pipe side: Φ15.88 diameter)
- PAC-493PI (unit side: Φ6.32 diameter, onsite pipe side: Φ9.52 diameter)
- MAC-A454JP-E (unit side: Φ9.52 diameter, onsite pipe side: Φ12.7 diameter)
- MAC-A455JP-E (unit side: Φ12.7 diameter, onsite pipe side: Φ9.52 diameter)
- MAC-A456JP-E (unit side: Φ12.7 diameter, onsite pipe side: Φ15.88 diameter)

Unit side  Onsite piping side

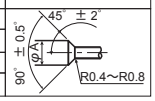
Installation procedure
(carefully read the following before installing.)
This optional part is used to connect indoor/outdoor unit to onsite pipes of different diameters.
※When installing this optional part, be sure to read "Refrigerant pipe connection" in the installation manual attached to outdoor unit.

1) Apply flare processing to onsite pipes to adapt to R410A, according to the table on the right.Use optional accessory flare nut at this time.
※Check the installation manual attached to the outdoor unit for advisability on whether or not onsite (existing) pipes can be used.

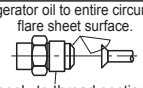


Pipe diameter (mm)	B size (mm)	
	R410A flare tool	R22/R407C flare tool
	Clutch type	
ϕ 6.35 (1/4")	0~0.5	1.0~1.5
ϕ 9.52 (3/8")	0~0.5	1.0~1.5
ϕ12.70 (1/2")	0~0.5	1.0~1.5
ϕ15.88 (5/8")	0~0.5	1.0~1.5

※When flare processing for refrigerant R410A is applied using current tool, refer to the table above. B size can be secured using copper pipe gauge for margin adjustment.

Outer diameter of copper pipe (mm)	Processing size of flare section (mm)	Flare shape
ϕ6.35	8.7~9.1	
ϕ9.52	12.8~13.2	
ϕ12.70	16.2~16.6	
ϕ15.88	19.3~19.7	

2) Remove caps (both ends) for protection against mixing of foreign materials from optional part, and thinly apply refrigerat or oil (locally procured) on flare surface.

Refrigerator oil application point
Apply refrigerator oil to entire circumference of flare sheet surface. 
※ Do not apply to thread section. (If applied to threads, flare nut can easily be loosened.)

3) Securely tighten flare nut using torque wrench according to the table on the right.

〈Proper tightening torque using torque wrench〉

Outer diameter of copper pipe (mm)	Tightening torque N•m (kgf•cm)
ϕ6.35	14~18(140~180)
ϕ9.52	34~42(340~420)
ϕ12.70	49~61(490~610)
ϕ15.88	68~82(680~820)

4) After refrigerant pipe is connected, be sure to perform gas leakage inspection for onsite connection pipes (including this optional part) and indoor/outdoor unit.

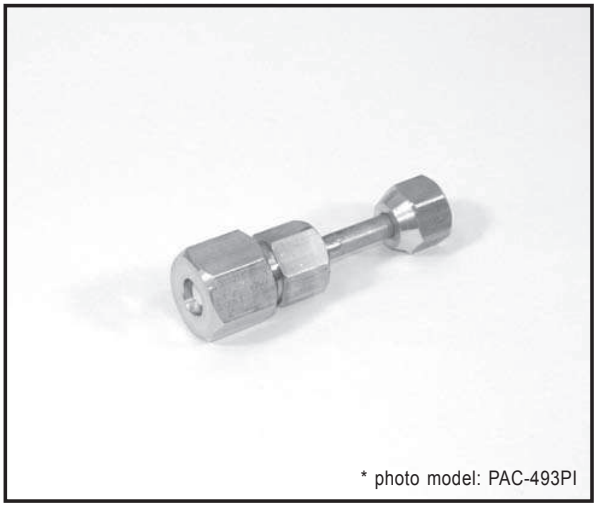
5) Heat insulation is necessary for this optional part: Wrap heat insulator (locally procured) around the onsite pipes and also the optional part (for dewdrop dripping prevention).

6) Perform test run according to the installation manual of the unit, making sure to also perform operation check.

OPTIONAL PARTS

Joint Pipe Unit ϕ12.7 → Pipe ϕ15.88 MAC-A456JP-E

Photo



* photo model: PAC-493PI

Descriptions

A part to connect refrigerant pipes of the different diameter.
(Unit ϕ12.7 → ϕ15.88)

Applicable Models

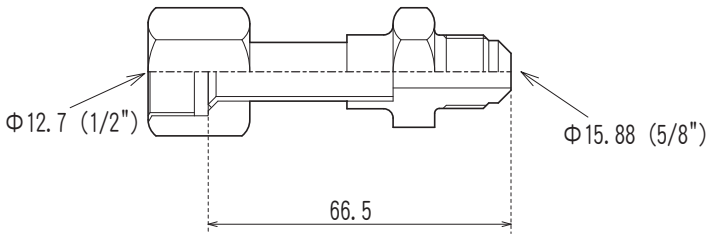
- MXZ-4A71VA
- MXZ-4A80VA
- MXZ-5A100VA
- MXZ-8A140VA
- PAC-AK30BC
- PAC-AK50BC

Specifications

Pipe diameter	Φ 12.7
Pipe material	C 1220T - OL

Dimensions

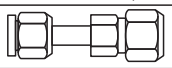
Unit : mm (inch)



How to Use / How to Install

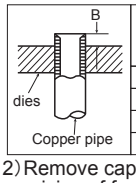
Make sure that you have all the following parts, in addition to this manual in this box:

Joint Pipe
PAC-SG76RJ-E (unit side: Φ9.52 diameter, onsite pipe side: Φ15.88 diameter)
PAC-493PI (unit side: Φ6.32 diameter, onsite pipe side: Φ9.52 diameter)
MAC-A454JP-E (unit side: Φ9.52 diameter, onsite pipe side: Φ12.7 diameter)
MAC-A455JP-E (unit side: Φ12.7 diameter, onsite pipe side: Φ9.52 diameter)
MAC-A456JP-E (unit side: Φ12.7 diameter, onsite pipe side: Φ15.88 diameter)

Unit side  Onsite piping side

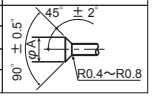
Installation procedure
(carefully read the following before installing.)
This optional part is used to connect indoor/outdoor unit to onsite pipes of different diameters.
※When installing this optional part, be sure to read "Refrigerant pipe connection" in the installation manual attached to outdoor unit.

1) Apply flare processing to onsite pipes to adapt to R410A, according to the table on the right.Use optional accessory flare nut at this time.
※Check the installation manual attached to the outdoor unit for advisability on whether or not onsite (existing) pipes can be used.

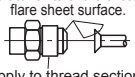


Pipe diameter (mm)	B size (mm)	
	R410A flare tool	R22/R407C flare tool
	Clutch type	
φ 6.35 (1/4")	0~0.5	1.0~1.5
φ 9.52 (3/8")	0~0.5	1.0~1.5
φ12.70 (1/2")	0~0.5	1.0~1.5
φ15.88 (5/8")	0~0.5	1.0~1.5

※When flare processing for refrigerant R410A is applied using current tool, refer to the table above. B size can be secured using copper pipe gauge for margin adjustment.

Outer diameter of copper pipe (mm)	Processing size of flare section (mm)	Flare shape
φ6.35	8.7~9.1	
φ9.52	12.8~13.2	
φ12.70	16.2~16.6	
φ15.88	19.3~19.7	

2) Remove caps (both ends) for protection against mixing of foreign materials from optional part, and thinly apply refrigerat or oil (locally procured) on flare surface.

Refrigerator oil application point
Apply refrigerator oil to entire circumference of flare sheet surface.

※ Do not apply to thread section. (If applied to threads, flare nut can easily be loosened.)

3) Securely tighten flare nut using torque wrench according to the table on the right.

〈Proper tightening torque using torque wrench〉

Outer diameter of copper pipe (mm)	Tightening torque N•m (kgf•cm)
φ6.35	14~18 (140~180)
φ9.52	34~42 (340~420)
φ12.70	49~61 (490~610)
φ15.88	68~82 (680~820)

4) After refrigerant pipe is connected, be sure to perform gas leakage inspection for onsite connection pipes (including this optional part) and indoor/outdoor unit.

5) Heat insulation is necessary for this optional part: Wrap heat insulator (locally procured) around the onsite pipes and also the optional part (for dewdrop dripping prevention).

6) Perform test run according to the installation manual of the unit, making sure to also perform operation check.

OPTIONAL PARTS

ENGLISH

MITSUBISHI ELECTRIC

SPLIT-TYPE AIR CONDITIONERS
INSTALLATION MANUAL

DG79A04VH01

MSZ-GS06/09/12/15NA
MSY-GS09/12/15NA

When installing multi units, refer to the installation manual of the multi unit for outdoor unit installation.

Required Tools for Installation

Phillips screwdriver	5/32 in. (4 mm) hexagonal wrench
Level	Flare tool for R410A
Scale	Gauge manifold for R410A
Utility knife or scissors	Vacuum pump for R410A
3 in. (75 mm) hole saw	Charge hose for R410A
Torque wrench	Pipe cutter with reamer
Wrench (or spanner)	

1. BEFORE INSTALLATION

1-1. THE FOLLOWING SHOULD ALWAYS BE OBSERVED FOR SAFETY

- Be sure to read these safety precautions and instructions.
- Be sure to observe the warnings and cautions specified here.
- After reading this manual, be sure to store it with the OPERATING INSTRUCTIONS for future reference.
- Please report to your supply authority or obtain their consent before connecting this equipment to the power supply system.

⚠ WARNING (Could lead to death or serious injury.)

- **Do not install the unit by yourself (user).**
  Improper or incomplete installation could cause fire, electric shock, injury due to the unit falling, or water leakage. Consult a qualified installer or the dealer from whom you purchased the unit.
- **Follow the instructions detailed in the installation manual.**
  Incomplete installation could cause fire or electric shock, injury due to the unit falling, or leakage of water.
- **When installing the unit, use appropriate protective equipment and tools for safety.**
  Failure to do so could cause injury.
- **Install the unit securely in a place that can bear the weight of the unit.**
  If the installation location cannot bear the weight of the unit, the unit could fall causing injury.
- **Do not alter the unit.**
  It may cause fire, electric shock, injury or water leakage.
- **Perform electrical work according to the installation manual and be sure to use an exclusive circuit. Do not connect other electrical appliances to the circuit.**
  If the capacity of the power circuit is insufficient or there is incomplete electrical work, it could result in a fire or an electric shock.
- **Ground the unit correctly.**
  Do not connect the ground wire to a gas pipe, water pipe, lightning rod or telephone ground. Defective grounding could cause electric shock.
- **Do not damage the wires.**
  Damaged wires could cause fire.
- **Be sure to shut off the main power when setting up the indoor P.C. board or wiring.**
  Failure to do so could cause electric shock.
- **Use the specified wires to securely connect the indoor and outdoor units. Attach the wires firmly to avoid applying stress to the terminal block.**
  Improper connection could cause fire.
- **Do not install the unit in a place where flammable gas may leak.**
  If gas leaks and accumulates around the unit, it could cause an explosion.
- **Do not use intermediate connection of the power cord or the extension cord. Do not connect many devices to one AC outlet.**
  It could cause a fire or an electric shock.
- **Use the parts provided or specified parts for the installation work.**
  The use of defective parts could cause an injury or leakage of water due to a fire, an electric shock, the unit falling, etc.
- **When plugging the power supply plug into the outlet, make sure that there is no dust, blockage, or loose parts both in the outlet and on the plug. Verify that the power supply plug is completely in the outlet.**
  If there is dust, blockage, or loose parts on the power supply plug or the outlet, it could cause electric shock or fire. If loose parts are found on the power supply plug, replace it.
- **Securely attach the electrical cover to the indoor unit and the service panel to the outdoor unit.**
  If the electrical cover of the indoor unit and/or the service panel of the outdoor unit are not attached securely, dust, water, etc. could collect in the unit and could cause a fire or an electric shock.
- **When installing, relocating, or servicing the unit, make sure that no substance other than the specified refrigerant (R410A) enters the refrigerant circuit.**
  Any presence of foreign substance such as air can cause abnormal pressure rise and may result in explosion or injury. The use of any refrigerant other than that specified for the system will cause mechanical failure, system malfunction, or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety.
- **Do not discharge the refrigerant into the atmosphere. Check that the refrigerant gas does not leak after installation has been completed. If refrigerant leaks during installation, ventilate the room.**
  If refrigerant comes in contact with a fire, harmful gas could be generated.
  If refrigerant gas leaks indoors, and comes into contact with the flame of a fan heater, space heater, stove, etc., harmful gases will be generated.
- **Use appropriate tools and piping materials for installation.**
  The pressure of R410A is 1.6 times higher than R22. Not using the appropriate tools and materials, or improper installation could cause the pipes to burst causing an injury.
- **When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes.**
  If the refrigerant pipes are disconnected while the compressor is running and the stop valve is open, air could be drawn in and the pressure in the refrigeration cycle could become abnormally high, causing the pipes to burst.
- **When installing the unit, securely connect the refrigerant pipes before starting the compressor.**
  If the compressor is started before the refrigerant pipes are connected and the stop valve is open, air could be drawn in and the pressure in the refrigeration cycle could become abnormally high, causing the pipes to burst.
- **Fasten a flare nut with a torque wrench as specified in this manual.**
  If fastened too tight, a flare nut could break and cause refrigerant leakage.
- **Install the unit according to national wiring regulations.**
- **When opening or closing the valve below freezing temperatures, refrigerant may spurt out from the gap between the valve stem and the valve body, resulting in injuries.**

⚠ CAUTION (Could lead to serious injury when operated incorrectly.)

- **Depending on the installation area, install a Ground Fault Interrupt (GFI) circuit breaker.**
  If the Ground Fault Interrupt (GFI) circuit breaker is not installed, an electric shock could occur.
- **Perform the drainage/piping work securely according to the installation manual.**
  If there is defect in the drainage/piping work, water could drip from the unit, and damage household items.
- **Do not touch the air inlet or the aluminum fins of the outdoor unit.**
  This could cause injury.
- **Do not install the outdoor unit where small animals may live.**
  If small animals enter the unit and damage its electrical parts, it could cause a malfunction, smoke emission, or fire. Keep the area around the unit clean.

1-2. SELECTING THE INSTALLATION LOCATION

INDOOR UNIT

- Where airflow is not blocked.
- Where cool (or warm) air spreads over the entire room.
- On a rigid wall to reduce the possibility of vibration.
- Where it is not exposed to direct sunlight. Do not expose to direct sunlight also during the period following unpacking to before use.
- Where it can be easily drained.
- At a distance 3 ft. (1 m) or more away from a TV and radio. Operation of the air conditioner may interfere with radio or TV reception. An amplifier may be required for the affected device.
- In a place as far away as possible from fluorescent and incandescent lights (so the infrared remote control can operate the air conditioner normally).
- Where the air filter can be removed and replaced easily.
- Where it is away from the other heat or steam source.

Note:
Install the indoor unit high on the wall where air can distribute over the entire room.

REMOTE CONTROLLER

- Where it is convenient to operate and easily visible.
- Where children cannot easily touch it.
- Select a position about 4 ft. (1.2 m) above the floor. Check that signals from the remote controller from that position are received by the indoor unit ('beep' or 'beep beep' receiving tone sounds). Then, attach remote controller holder to a pillar or wall and install wireless remote controller.

Note:
In rooms where inverter type fluorescent lamps are used, the signal from the wireless remote controller may not be received.

OUTDOOR UNIT

- Where it is not overly exposed to strong winds. If the outdoor unit is exposed to a wind during defrosting, the defrosting time will be longer.
- Where airflow is good and dustless.
- Where neighbours are not annoyed by operation sound or hot (or cool) air.
- Where rigid wall or support is available to prevent the increase of operation sound or vibration.
- Where there is no risk of combustible gas leakage.
- If installing the unit in a location high above the ground, be sure to secure the unit legs.
- Where it is at least 10 ft. (3 m) away from the antenna of TV set or radio. Operation of the air conditioner may interfere with radio or TV reception in areas where reception is weak. An amplifier may be required for the affected device.
- Install the unit horizontally.
- Please install it in an area not affected by snowfall or blowing snow. In areas with heavy snow, please install a canopy, a pedestal and/or baffle boards.

Note:

- It is advisable to make a piping loop near outdoor unit so as to reduce vibration.
- For increased efficiency, install the outdoor unit in a location where continuous direct sunlight or excessive water can be avoided as much as possible.

Note:
When operating the air conditioner in low outside temperature, be sure to follow the instructions described below.

- Never install the outdoor unit in a place where its air inlet/outlet side may be exposed directly to wind.
- To prevent exposure to wind, install the outdoor unit with its air inlet side facing the wall and a baffle board on the air outlet side.

Avoid the following places for installation where air conditioner trouble is liable to occur.

- Where flammable gas could leak.
- Where there is an excessive amount of machine oil in the air.
- Where oil is splashed or where the area is filled with oily smoke (such as cooking areas and factories, in which the properties of plastic could be changed and damaged).
- Salty places such as the seaside.
- Where sulfide gas is generated such as hot spring, sewage, waste water.
- Where there is high-frequency or wireless equipment.
- Where there is emission of high levels of VOCs, including phthalate compounds, formaldehyde, etc., which may cause chemical cracking.

1-3. SPECIFICATIONS

1-3-1. POWER SUPPLY AND INDOOR/OUTDOOR WIRE CONNECTION

- Power should be taken from an exclusive branched circuit.
- Wiring work should be based on applicable technical standards.
- Wiring connections should be made following the diagram.
- Securely tighten screws.

Connecting wires and the ground wire

- Use solid conductor Min. AWG14 or stranded conductor Min. AWG14.
- Use double insulated copper wire with 600 V insulation.
- Use copper supply wire.

* Follow local electrical codes.

Power supply cable and ground wire

- Use solid or stranded conductor Min. AWG14.
- Use copper supply wire.

* Follow local electrical codes.

Note:
When the indoor unit is powered from the outdoor unit, depending on local code, a disconnect switch needs to be installed to a power supply circuit.

Electrical specifications

MODEL			MSZ-GS06NA	MSZ-GS09NA MSY-GS09NA		MSZ-GS12NA MSY-GS12NA		MSZ-GS15NA MSY-GS15NA	
	INDOOR								
	OUTDOOR		-	MUZ-GS09NA(H) MUY-GS09NA	MUZ-GS09NAHZ	MUZ-G12NA(H) MUY-GS12NA	MUZ-GS12NAHZ	MUZ-G15NA(H) MUY-GS15NA	MUZ-GS15NAHZ
INDOOR UNIT									
Power supply (V, PHASE, Hz)			208/230, 1, 60						
Min. Circuit Ampacity (A)			1.0						
Fan motor (F.L.A.) (A)			0.75						
OUTDOOR UNIT									
Power supply (V, PHASE, Hz)			208/230, 1, 60						
Max. Fuse size (time delay) (A)			*	15	15	15	15	15	15
Min. Circuit Ampacity (A)			*	10	10	10	10	10	10
Fan motor (F.L.A.) (A)			*	0.50	0.50	0.50	0.50	0.50	0.50
Compressor	(R.L.A) (A)	MSZ	*	6.7	6.7	6.7	7.4	7.4	7.4
		MSY	*	6.7	-	6.7	-	7.4	-
	(L.R.A) (A)	MSZ	*	8.4	8.4	8.4	9.2	9.2	9.2
		MSY	*	8.4	-	8.4	-	9.2	-
Control voltage			Indoor unit - Remote controller: (Wireless) Indoor unit - Outdoor unit: DC12-24 V (Polar)						

* MSZ-GS06NA is a dedicated indoor unit for multi system. Refer to the installation manual of the multi unit for details.

1-3-2. REFRIGERANT PIPES

- To prevent condensation, insulate the two refrigerant pipes.

⚠ CAUTION
Be sure to use the insulation of specified thickness (table on the right). Excessive insulation may cause incorrect installation of the indoor unit, and too little insulation may cause condensate to form.

- Refrigerant pipe bending radius must be 4 in. (100 mm) or more.
- The unit has flared connections on both indoor and outdoor sides.
- Remove the valve cover from the outdoor unit, then connect the pipe.
- Refrigerant pipes are used to connect the indoor and outdoor units.
- Be careful not to crush or over bend the pipe in pipe bending.
- Refrigerant adjustment... If pipe length exceeds 25 ft. (7.5 m), additional refrigerant (R410A) charge is required. (The outdoor unit is charged with refrigerant for pipe length up to 25 ft. [7.5 m])
- Please carefully consider the indoor unit location when piping lengths are less than 16 ft. (5 m) as there could be intermittent noises during normal operation that would be noticeable in very quiet environments.

Pipe	Outside diameter	Minimum wall thickness	Insulation thickness	Insulation material
	inch (mm)			
For liquid	1/4 (6.35)	0.0315 (0.8)	5/16 (8)	Heat resistant foam plastic 0.045 Specific gravity
For gas	3/8 (9.52)	0.0315 (0.8)	5/16 (8)	
	1/2 (12.7)	0.0315 (0.8)	5/16 (8)	

Limits		
Pipe length	MSZ/MSY-GS09/12/15NA	65 ft. (20 m) max.
Height difference	MSZ/MSY-GS09/12/15NA	40 ft. (12 m) max.
No. of bends		10 max.

Pipe length	Up to 25 ft. (7.5 m)	No additional charge is required.
	Exceeding 25 ft. (7.5 m)	Additional charge is required. (Refer to the table below.)
Refrigerant to be added	MSZ/MSY-GS09/12/15NA	1.08 oz each 5 ft. (20 g/m)

1-4. INSTALLATION DIAGRAM

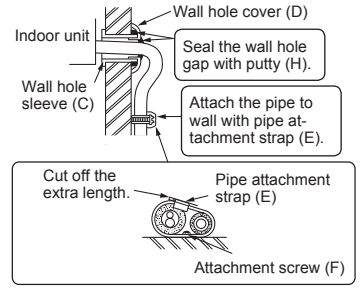
ACCESSORIES
Check the following parts before installation.
<Indoor unit>

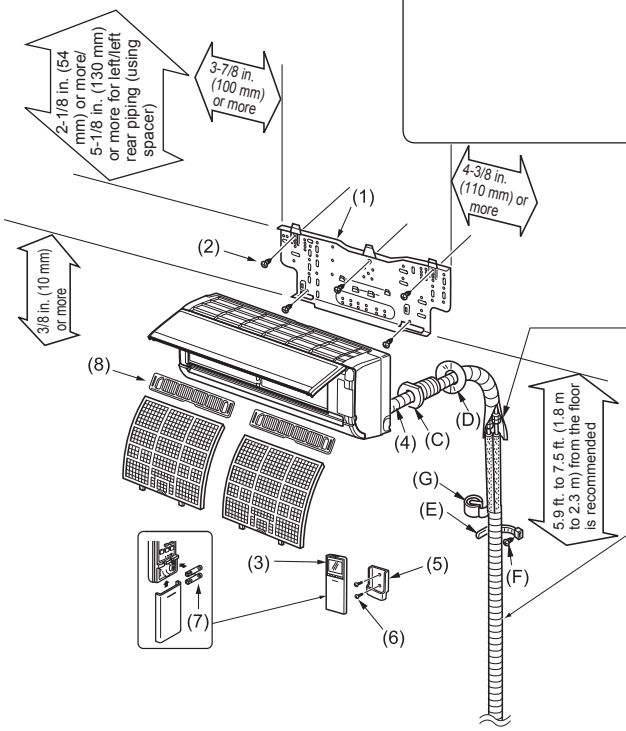
(1)	Installation plate	1
(2)	Attachment screws for the installation plate 4 × 25 mm	5
(3)	Wireless remote controller	1
(4)	Felt tape (For left or left-rear piping)	1
(5)	Remote controller holder	1
(6)	Screws for the remote controller holder 3.5 × 16 mm (Black)	2
(7)	Battery (AAA) for (3)	2
(8)	Air cleaning filter	2

FIELD-SUPPLIED PARTS

(A)	Indoor/outdoor unit connecting wire*1	1
(B)	Extension pipe	1
(C)	Wall hole sleeve	1
(D)	Wall hole cover	1
(E)	Pipe attachment strap	2 to 5
(F)	Screw for (E) 4 × 20 mm	2 to 5
(G)	Piping tape	1
(H)	Putty	1
(I)	Drain hose (or soft PVC hose, 19/32 in. [15 mm] inner diameter or hard PVC pipe VP16)	2 to 5
(J)	Refrigerant oil	1
(K)	Power supply cord *1	1

Use the wall hole sleeve (C) to prevent indoor/outdoor connecting wire (A) from contacting metal parts in the wall and to protect the wiring from rodents.



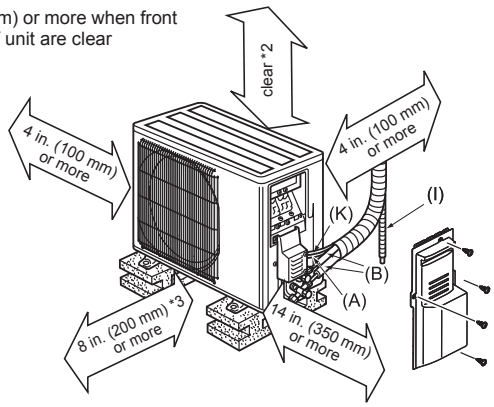


After the leak test, apply insulating material tightly so that there is no gap.

When the piping is to be attached to a wall comprised of tin plate or metal netting, use chemically treated wooden piece 25/32 in. (20 mm) or thicker between the wall and the piping, or wrap insulation vinyl tape 7 to 8 turns around the piping.
To use existing piping, perform COOL operation for 30 minutes and pump down before removing the old air conditioner. Remake flare according to the dimension for new refrigerant.

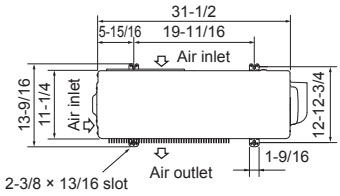
Note:
*1 Place indoor/outdoor unit connecting wire (A) and power supply cord (K) at least 3 ft. (1 m) away from the TV antenna wire.

*2 4 in. (100 mm) or more when front and sides of unit are clear

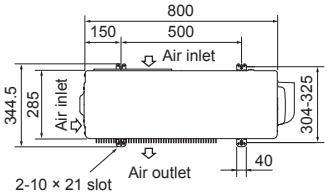


*3 When any 2 sides of left, right and rear of unit are clear

Unit: inch

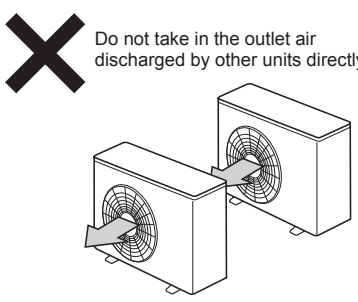


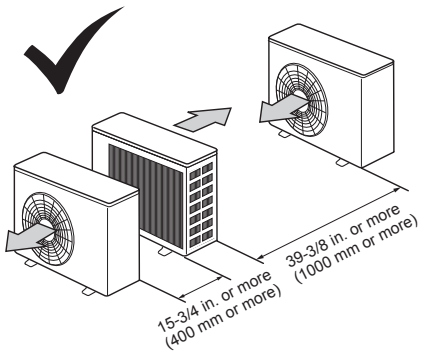
Unit: mm



Units should be installed by licensed contractor according to local code requirements.

Note:
- The dimensions indicated in the arrows (⟺) above show the required space to guarantee performance of the air conditioner. Install the outdoor unit where the maximum possible space can be provided, considering later relocation, services, or repairs.
- The cooling/heating performance and the efficiency of power usage may fall about 10% at the place where short cycle is likely occur due to poor ventilation. Installing the air outlet guide (optional) can improve performances.
- If air from the outlet blows against the wall, it may cause stains on the wall.



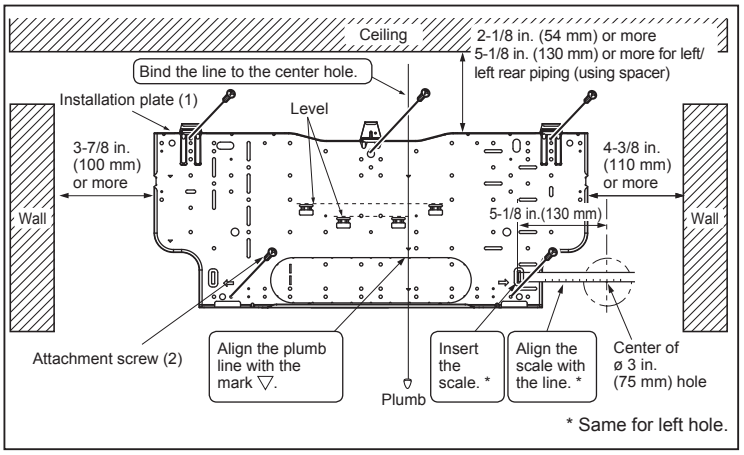


Drain piping for outdoor unit
Install the unit horizontally.
Do not use drain socket in cold regions. Drain may freeze and make the fan stop.
The outdoor unit produces condensate during the heating operation. Select the installation place to ensure to prevent the outdoor unit and/or the grounds from being wet by drain water or damaged by frozen drain water.

2. INDOOR UNIT INSTALLATION

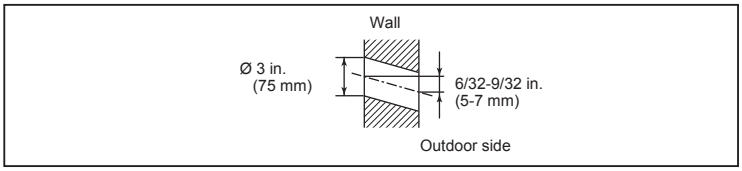
2-1. ATTACHING THE INSTALLATION PLATE

- Find a stud in the wall to attach installation plate (1) horizontally by tightening the fixing screws (2) firmly.
- To prevent installation plate (1) from vibrating, be sure to install the attachment screws in the holes indicated in the illustration. For added support, additional screws may also be installed in other holes.
- When the indoor unit is to be attached to a concrete wall using recessed bolts, secure installation plate (1) using 7/16 in. x 13/16 in. · 7/16 in. x 1 in. (11 mm × 20 mm · 11 mm × 26 mm) oval hole (17-3/4 in. [450 mm] pitch).
- If the recessed bolt is too long, change it for a shorter one (field-supplied).



2-2. DRILLING

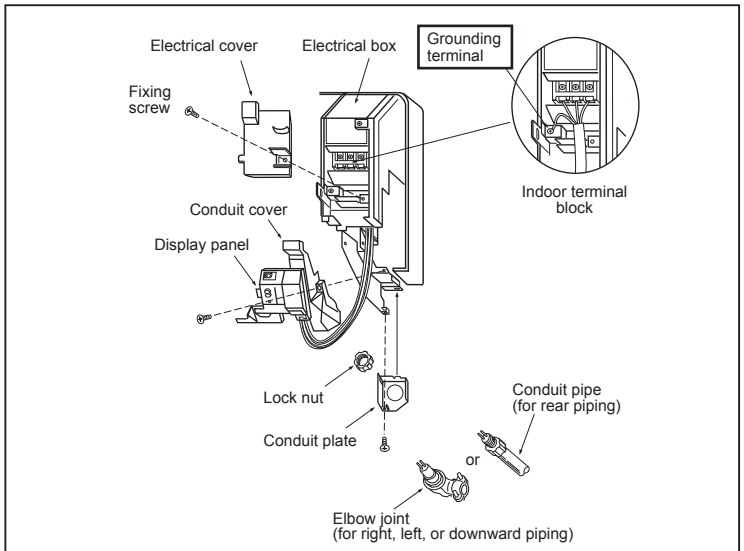
1) Determine where the holes will be located on the wall.
2) Drill a ø 3 in. (75 mm) hole. The outdoor side should be 6/32 to 9/32 in. (5 to 7 mm) lower than the indoor side.
3) Insert wall hole sleeve (C).



2-3. CONNECTING WIRES FOR INDOOR UNIT

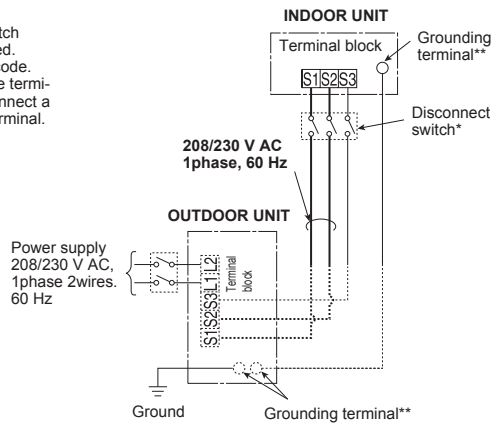
Note:
When the indoor unit is powered from the outdoor unit, depending on local code, a disconnect switch needs to be installed to a power supply circuit.

1) Remove the panel assembly. (Refer to 5-1.)
2) Place the upper part of the indoor unit on the installation plate.
3) Remove corner box and electrical cover.
4) Remove display panel, conduit cover and conduit plate.
5) Attach conduit pipe (for rear piping) / elbow joint (for right, left, or downward piping) to conduit plate with lock nut. The thread of the installed conduit pipe / elbow joint appearing inside should be less than 3/8 in. (10 mm). (Fig. 1) Elbow joint should appear less than 1-3/16 in. (30 mm) outside. (Fig. 2)
6) Process the end of ground wire (Fig. 3). Connect it to the ground terminal of electrical parts box.
7) Process the end of indoor/outdoor unit connecting wire (A) (Fig. 3). Attach it to the terminal block. Be careful not to make mis-wiring. Attach the wire to the terminal block securely so that its core cannot be seen, and no external force affects the connecting section of the terminal block.
8) Firmly tighten the terminal screws. After tightening, verify that the wires are tightly fastened.
9) Reinstall conduit plate, conduit cover and display panel.
10) According to the piping direction, remove the shaded part of the left side of box (Fig. 4) or corner box (Fig. 5). Reinstall electrical cover, corner box and front panel.



- Connect wires to the appropriate terminals
- For future servicing, leave some slack in the connecting wires.

Remark:
* A disconnect switch should be required. Check the local code.
** Use a ring tongue terminal in order to connect a ground wire to terminal.



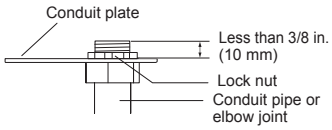


Fig. 1

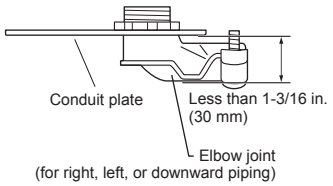
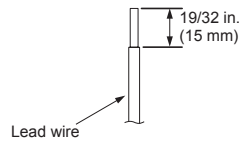


Fig. 2



- Make ground wire a little longer than others. (More than 1-9/16 in. [40 mm])

Fig. 3

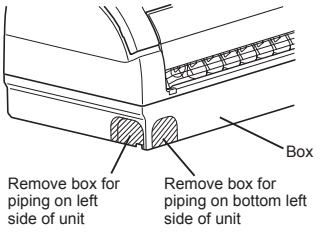


Fig. 4

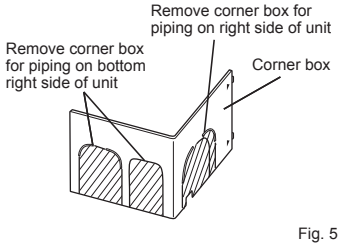


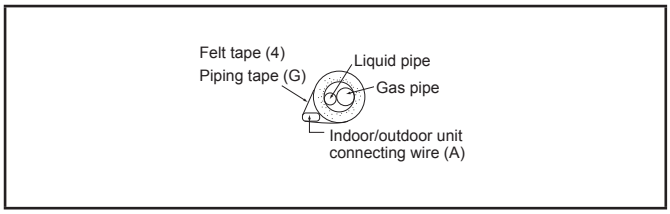
Fig. 5

2-4. PIPE FORMING AND DRAIN PIPING

2-4-1. PIPE FORMING

- Place the drain hose below the refrigerant piping.
- Make sure that the drain hose is not crowded or bent.
- Do not pull the hose when applying the tape.
- When the drain hose passes the room, be sure to wrap it with insulation material (field-supplied).

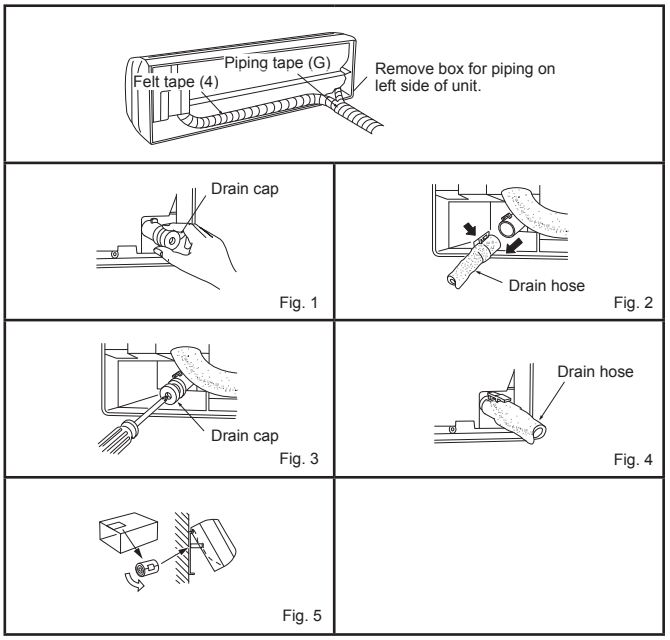
Note:
Make sure not to damage the cover of refrigerant pipe when attaching it back on with screws.



Left or left-rear piping

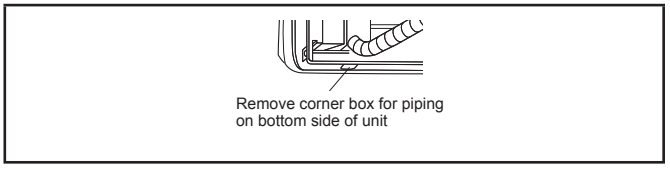
Note:
Be sure to reattach the drain hose and the drain cap if the piping is being installed on left or left-rear of unit, otherwise, water could drip down from the drain hose.

1) Place the refrigerant piping and the drain hose together, then firmly apply felt tape (4) from the end.
   Felt tape (4) overlap width should be 1/3 the tape width. Use a bandage stopper at the end of felt tape (4).
2) Pull out the drain cap at the back right of the indoor unit. (Fig. 1)
   • Hold the convex section at the end and pull the drain cap.
3) Pull out the drain hose at the back left of the indoor unit. (Fig. 2)
   • Hold the claw marked by the arrows and pull out the drain hose forward.
4) Put the drain cap into the section to which the drain hose is to be attached at the rear of the indoor unit. (Fig. 3)
   • Insert a screwdriver into the hole on the cap and insert the cap fully into the drain pan.
5) Insert the drain hose fully into the drain pan at the back right of the indoor unit. (Fig. 4)
   • Check if the hose is hooked securely to the projection of its inserting part at the drain pan.
6) Insert the drain hose into wall hole sleeve (C), and attach the upper part of indoor unit onto the installation plate (1). Then, shift the indoor unit completely to the left to make placing the piping in the back of the unit easier.
7) Cut out a piece of cardboard from the shipping box, roll it up, hook it onto the back rib, and use it as a spacer to lift the indoor unit. (Fig. 5)
8) Connect the refrigerant piping with the extension pipe (B).
9) Attach the lower part of the indoor unit into the installation plate (1).



Rear or bottom piping

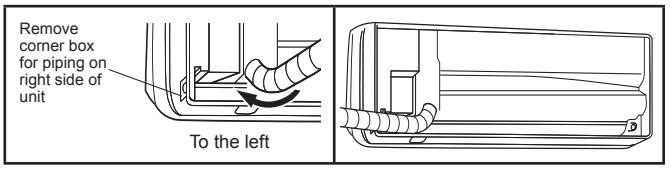
1) Place the refrigerant piping and the drain hose together, then firmly apply piping tape (G) from the end.
2) Insert the piping and the drain hose into the wall hole sleeve (C), and attach the upper part of the indoor unit on the installation plate (1).
3) Check if the indoor unit is attached securely on the installation plate (1) by moving the unit to left and right.
4) Attach the lower part of the indoor unit into the installation plate (1).



Right piping

Note:
Before performing the following, make sure that wiring is completed, and the conduit cover is installed. (Refer to 2-3.)

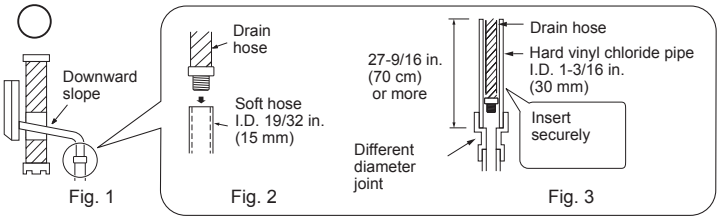
1) Place the refrigerant piping and the drain hose together, shift them to left side of the unit, and then firmly apply piping tape (G) from the end.
2) Insert the piping and the drain hose into the wall hole sleeve (C), and attach the upper part of the indoor unit on the installation plate (1).
3) Check if the indoor unit is attached securely on the installation plate (1) by moving the unit to left and right.
4) Attach the lower part of the indoor unit into the installation plate (1).



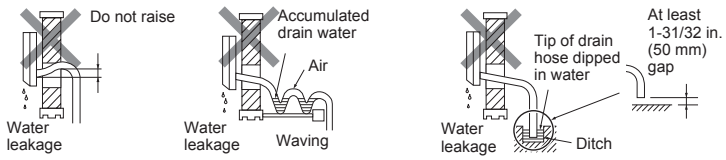
2-4-2. DRAIN PIPING

- If the extension drain hose has to pass through a room, be sure to wrap it with insulation (field-supplied).
- The drain hose should point downward for easy drain. (Fig. 1)
- If the drain hose provided with the indoor unit is too short, connect it with a field-supplied drain hose (I). (Fig. 2)
- When connecting the drain hose to a hard vinyl chloride pipe, be sure to insert it securely into the pipe. (Fig. 3)

Do not put the drain pipe directly in a drainage ditch where Ammonia or Sulphuric gas may be generated. The evaporated corrosive gas may return to the indoor side through drain pipe and this may cause an unpleasant odor and corrosion on Heat exchanger may occur.



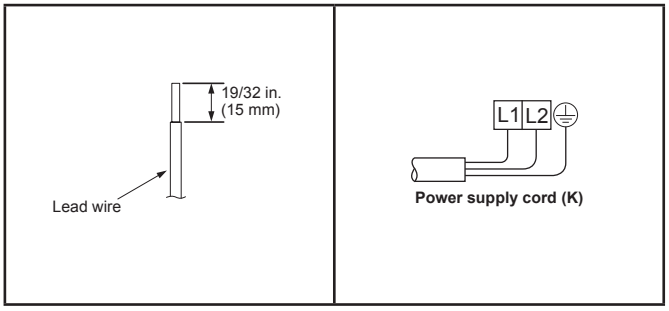
Do not make drain piping as shown below.

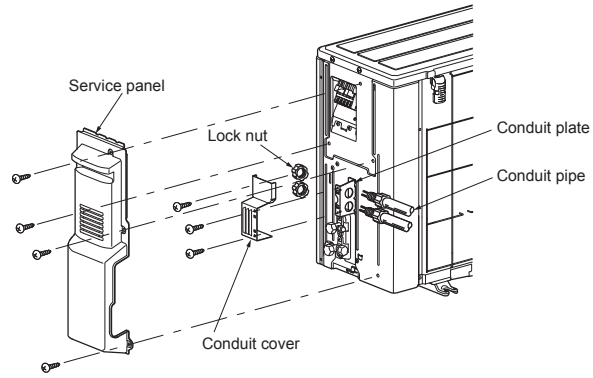


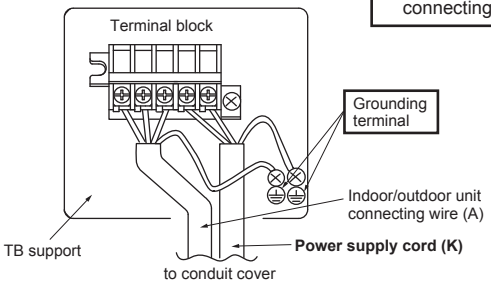
3. OUTDOOR UNIT INSTALLATION

3-1. CONNECTING WIRES FOR OUTDOOR UNIT

1) Remove the service panel.
2) Remove the conduit cover.
3) Attach the conduit connectors to the conduit plate with lock nuts then secure it against unit with screws.
4) Connect the ground wires of indoor/outdoor unit connecting wire (A) and power supply cord (K) to the TB support.
5) Loosen the terminal screws, then attach indoor/outdoor unit connecting wire (A) and power supply cord (K) from the indoor unit correctly to the terminal block. Attach the wires to the terminal block securely so that the cores cannot be seen, and no external force affects the connecting section of the terminal block.
6) Firmly tighten the terminal screws. After tightening, verify that the wires are tightly fastened.
7) Install the conduit cover.
8) Install the service panel securely.





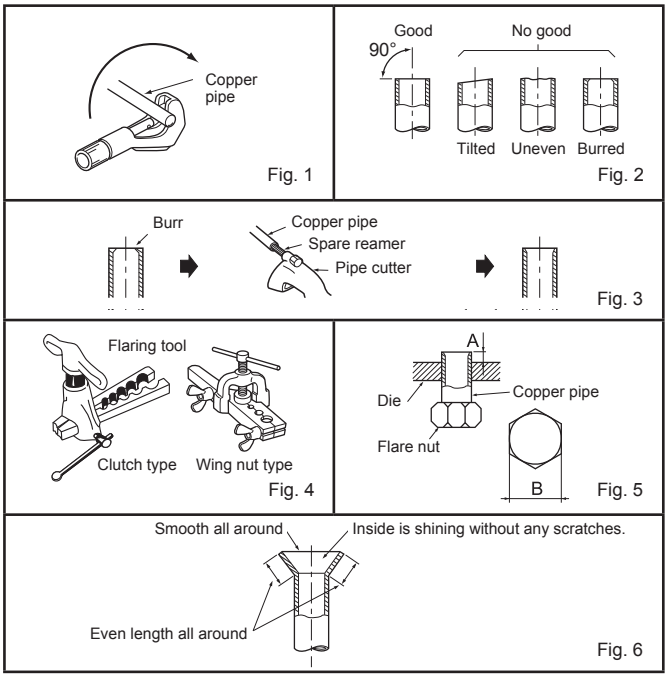


- Make earth wire a little longer than others. (More than 3-7/8 in. [100 mm])
- For future servicing, leave some slack in the connecting wires.

3-2. FLARE CONNECTION

1) Cut the copper pipe as straight as possible with a pipe cutter. (Fig. 1, 2)
2) Remove all burrs from the cut section of the pipe, ensuring that precautions are taken to avoid getting metal shavings into the piping. (Fig. 3)
3) Remove flare nuts attached to indoor and outdoor units, then put them on pipe.
4) Flaring work (Fig. 4, 5). Firmly hold copper pipe in the dimension shown in the table. Select A inch (mm) from the table according to the tool you use.
5) Check
   - Compare the flared work with Fig. 6.
   - If flare is defective, cut off the section and repeat procedure.

Pipe diameter inch (mm)	B inch (mm)	A inch (mm)			Tightening torque	
		Clutch type tool for R410A	Clutch type tool for R22	Wing nut type tool for R22	ft-lb (kgf•cm)	N•m
ø 1/4 (6.35)	21/32 (17)	0 to 0.02 (0 to 0.5)	0.04 to 0.06 (1.0 to 1.5)	0.06 to 0.08 (1.5 to 2.0)	10 to 13 (140 to 180)	13.7 to 17.7
ø 3/8 (9.52)	7/8 (22)				25 to 30 (350 to 420)	34.3 to 41.2
ø 1/2 (12.7)	1-1/32 (26)			0.08 to 0.10 (2.0 to 2.5)	36 to 42 (500 to 575)	49.0 to 56.4
ø 5/8 (15.88)	1-5/32 (29)				54 to 58 (750 to 800)	73.5 to 78.4



3-3. PIPE CONNECTION

- Fasten flare nut with a torque wrench as specified in the table (refer to 3-2.).
- When fastened too tight, flare nut may eventually break and cause refrigerant leakage.
- Be sure to wrap insulation around the piping. Direct contact with the bare piping may result in burns or frostbite.

Indoor unit connection

Connect both liquid and gas pipings to indoor unit.

- Apply a thin coat of refrigeration oil (J) on the flared ends of the pipes. Do not apply refrigeration oil on screw threads. Excessive tightening torque will result in damage on the screw.
- To connect, first align the center, then tighten the first 3 to 4 turns of flare nut by hand.
- Use tightening torque table above as a guideline for indoor unit side joints, and tighten using two wrenches. Excessive tightening damages the flare section.

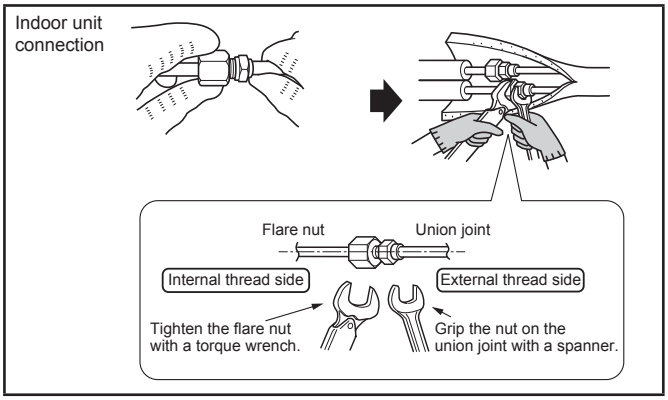
Outdoor unit connection

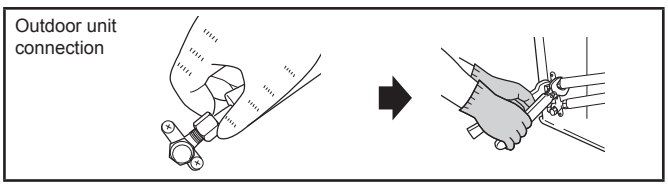
Connect pipes to stop valve pipe joint of the outdoor unit following the same procedure detailed in Indoor unit connection.

- For tightening, use a torque wrench or spanner.

⚠ WARNING

When installing the unit, securely connect the refrigerant pipes before starting the compressor.





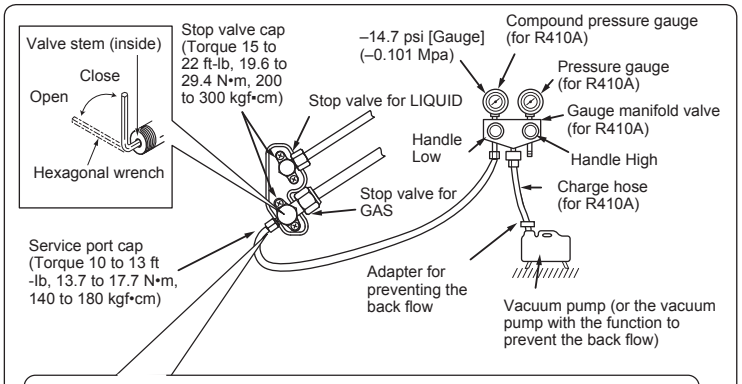
3-4. INSULATION AND TAPING

1) Cover piping joints with pipe cover.
2) For outdoor unit side, insulate the piping, including valves.
3) Apply piping tape (G) starting from the connection on the outdoor unit.
   - When piping has to be installed through a ceiling, closet or where the temperature and humidity are high, use additional field-supplied insulation to prevent condensation.

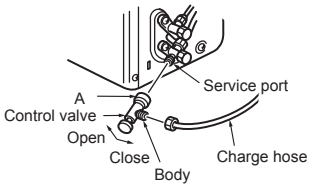
4. PURGING PROCEDURES, LEAK TEST, AND TEST RUN

4-1. PURGING PROCEDURES AND LEAK TEST

1) Remove service port caps from stop valves on both sides of refrigerant lines. (The stop valves are fully closed when shipped.) Leave closed.
2) Connect gauge manifold to ports of stop valves.



Precautions when using the control valve



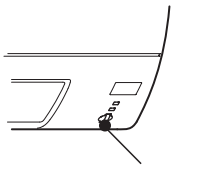
When attaching the control valve to the service port, valve core may deform or loosen if excess pressure is applied. This may cause gas leak.

When attaching the control valve to the service port, make sure that the valve core is in closed position, and then tighten part A. Do not tighten part A or turn the body when valve core is in open position.

3) Evacuate the system to 4000 microns from both service valves. System manifold gauges must not be used to measure vacuum. A micron gauge must be used at all times. Break the vacuum with Nitrogen(N2) into the discharge service valve to 0 PSIG.
4) Evacuate the system to 1500 microns. Break the vacuum with Nitrogen(N2) into the discharge service valve to 0 PSIG.
5) Evacuate the system to 500 microns.
6) Close gauge manifold valves, stop the pump, and conduct a 30 minute rise test.
7) System should hold 500 microns for a minimum of 1 hour.
8) Fully open the valve stem of all stop valves on both sides of gas pipe and liquid pipe by the hexagonal wrench. If the valve stem hits the stopper, do not turn it any further. Operating without fully opening lowers the performance and this causes trouble.
9) Refer to 1-3 and charge the prescribed amount of additional refrigerant if needed. Be sure to charge slowly with liquid refrigerant. Otherwise composition of the refrigerant in the system may be changed and affect performance of the air conditioner.
10) Remove gauge manifolds and replace service port caps and tighten.
11) Leak test

4-2. TEST RUN

1) Insert power supply plug into the power outlet and/or turn on the breaker.
2) Press the E.O. SW once for COOL, and twice for HEAT (only MSZ series) operation. Test run will be performed for 30 minutes. If the upper lamp blinks every 0.5 seconds, inspect the indoor/outdoor unit connecting wire (A). After the test run, emergency COOL mode (75ºF [24ºC] COOL) will start.
3) To stop operation, press the E.O. SW several times until all LED lamps turn off. Refer to operating instructions for details.



Checking the remote (infrared) signal reception

Press the OFF/ON button on the remote controller (3) and listen for an audible indicator from the indoor unit. Press the OFF/ON button again to turn the air conditioner off.

- Once the compressor stops, the restart preventive device operates so the compressor will not operate for 3 minutes to protect the air conditioner.

4-3. AUTO RESTART FUNCTION

This product is equipped with an auto restart function. When the power supply is cut off during operation, such as during blackouts, the function automatically starts operation in the previous setting once the power supply is resumed. (Refer to the operating instructions for details.)

Caution:

- After test run or remote signal reception check, turn off the unit with the E.O. SW or the remote controller before turning off the power supply. If this procedure is not performed, the unit will automatically begin operation when power supply is resumed.

To the user

- After installing the unit, explain to the user about auto restart function.
- If auto restart function is unnecessary, it can be deactivated. Consult the service representative to deactivate the function. Refer to the service manual for details.

4-4. EXPLANATION TO THE USER

- Using the OPERATING INSTRUCTIONS, explain to the user how to use the air conditioner (the remote controller, removing the air filters, placing or removing the remote controller from the remote controller holder, cleaning methods, precautions for operation, etc.)
- Recommend that the user read the OPERATING INSTRUCTIONS carefully.

5. RELOCATION AND MAINTENANCE

5-1. REMOVING AND INSTALLING THE PANEL ASSEMBLY

Removal procedure (Fig. 1)

1) Remove the two screws that attach the panel assembly.
2) Remove the panel assembly. Be sure to remove its bottom end first.

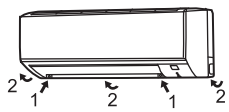


Fig. 1

Installation procedure (Fig. 2)

1) Install the panel assembly following the removal procedure in reverse.
2) Be sure to press the positions as indicated by the arrows in order to attach the assembly completely to the unit.

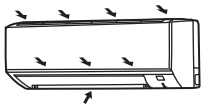
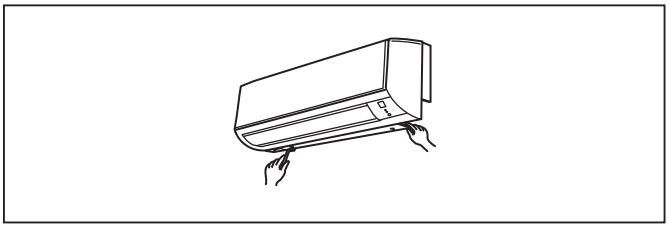


Fig. 2

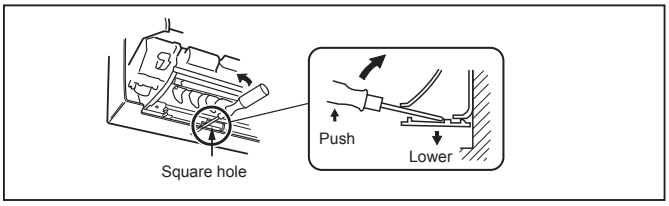
5-2. REMOVING THE INDOOR UNIT

Remove the bottom of the indoor unit from the installation plate.
When releasing the corner part, release both left and right bottom corner part of indoor unit and pull it downward and forward as shown in the figure on the right.



If the above method cannot be used

Remove the front panel. Then, insert hexagonal wrenches into the square holes on the left and right sides of the unit and push them up as shown in the following figure. The bottom of the indoor unit lowers and releases the hooks.



5-3. PUMPING DOWN

When relocating or disposing of the air conditioner, pump down the system following the procedure below so that refrigerant is not released into the atmosphere.

1) Connect the gauge manifold valve to the service port of the stop valve on the gas pipe side of the outdoor unit.
2) Fully close the stop valve on the liquid pipe side of the outdoor unit.
3) Close the stop valve on the gas pipe side of the outdoor unit almost completely so that it can be easily closed fully when the pressure gauge shows 0 psi [Gauge] (0 Mpa).
4) Start the emergency COOL operation.
   To start the emergency operation in COOL mode, disconnect the power supply plug and/or turn off the breaker. After 15 seconds, connect the power supply plug and/or turn on the breaker, and then press the E.O. SW once. (The emergency COOL operation can be performed continuously for up to 30 minutes.)
5) Fully close the stop valve on the gas pipe side of the outdoor unit when the pressure gauge shows (0.1 to 0 psi [Gauge] (0.05 to 0 Mpa)).
6) Stop the emergency COOL operation.
   To stop operation, press the E.O. SW several times until all LED lamps turn off. Refer to operating instructions for details.

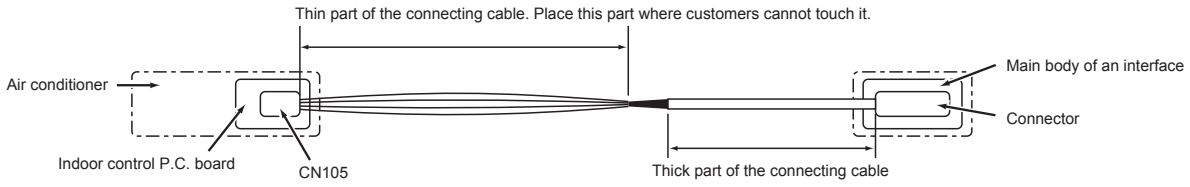
⚠ WARNING

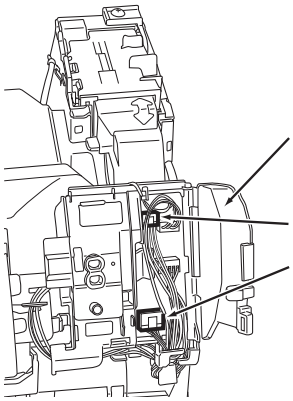
When the refrigeration circuit has a leak, do not execute pump down with the compressor.
When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes. The compressor may burst if air etc. get into it.

6. CONNECTING THE INTERFACE/CONNECTOR CABLE TO THE AIR CONDITIONER

- Connect the INTERFACE/CONNECTOR CABLE to the Indoor electronic control P.C. board of the air conditioner with the connecting cable.
- Cutting or extending the connecting cable of the INTERFACE/CONNECTOR CABLE results in defects in connecting.
  Do not bundle the connecting cable together with power supply cord, indoor/outdoor connecting wire, and/or earth wire. Keep as much distance as possible between the connecting cable and those wires.
- The thin part of the connecting cable should be stored and placed where customers cannot touch it.

Connecting



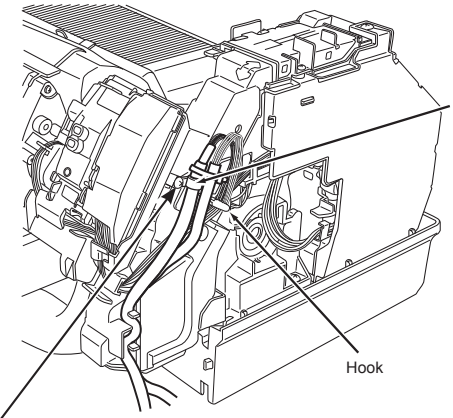


(1) Remove the panel and the lower right corner box.

(2) Open the cover of the indoor control P.C. board.

CN24

(3) Join the connecting cable to CN105 connector.

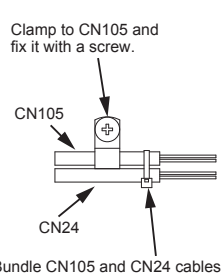


(4) Hook the connecting cable as shown in the figure.

(5) Attach the cable clamp provided with an interface to the thick part of the connecting cable with a screw 4×16 as shown in the figure.

(6) Close the cover of the indoor control P.C. board. Be careful not to catch the thin part of the connecting cable in the cover. Reinstall the panel and the lower right corner box.

In case of simultaneous connection of CN24 and CN105



⚠ WARNING

Fix the connecting cable at the prescribed position securely. Incorrect installation may cause electric shock, fire, and/or malfunction.

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BUILDING, 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

ENGLISH

MITSUBISHI ELECTRIC

SPLIT-TYPE AIR CONDITIONERS
INSTALLATION MANUAL

MSZ-GS24NA
MSY-GS24NA

JG79N508H01

When installing multi units, refer to the installation manual of the multi unit for outdoor unit installation.

Required Tools for Installation

Phillips screwdriver	5/32 in. (4 mm) hexagonal wrench
Level	Flare tool for R410A
Scale	Gauge manifold for R410A
Utility knife or scissors	Vacuum pump for R410A
3 in. (75 mm) hole saw	Charge hose for R410A
Torque wrench	Pipe cutter with reamer
Wrench (or spanner)	

1. BEFORE INSTALLATION

1-1. THE FOLLOWING SHOULD ALWAYS BE OBSERVED FOR SAFETY

- Be sure to read these safety precautions and instructions.
- Be sure to observe the warnings and cautions specified here.
- After reading this manual, be sure to store it with the OPERATING INSTRUCTIONS for future reference.
- Please report to your supply authority or obtain their consent before connecting this equipment to the power supply system.

⚠ WARNING (Could lead to death or serious injury.)

- **Do not install the unit by yourself (user).**
  Improper or incomplete installation could cause fire, electric shock, injury due to the unit falling, or water leakage. Consult a qualified installer or the dealer from whom you purchased the unit.
- **Follow the instructions detailed in the installation manual.**
  Incomplete installation could cause fire or electric shock, injury due to the unit falling, or leakage of water.
- **When installing the unit, use appropriate protective equipment and tools for safety.**
  Failure to do so could cause injury.
- **Install the unit securely in a place that can bear the weight of the unit.**
  If the installation location cannot bear the weight of the unit, the unit could fall causing injury.
- **Do not alter the unit.**
  It may cause fire, electric shock, injury or water leakage.
- **Perform electrical work according to the installation manual and be sure to use an exclusive circuit. Do not connect other electrical appliances to the circuit.**
  If the capacity of the power circuit is insufficient or there is incomplete electrical work, it could result in a fire or an electric shock.
- **Ground the unit correctly.**
  Do not connect the ground wire to a gas pipe, water pipe, lightning rod or telephone ground. Defective grounding could cause electric shock.
- **Do not damage the wires.**
  Damaged wires could cause fire.
- **Be sure to shut off the main power when setting up the indoor P.C. board or wiring.**
  Failure to do so could cause electric shock.
- **Use the specified wires to securely connect the indoor and outdoor units. Attach the wires firmly to avoid applying stress to the terminal block.**
  Improper connection could cause fire.
- **Do not install the unit in a place where flammable gas may leak.**
  If gas leaks and accumulates around the unit, it could cause an explosion.
- **Do not use intermediate connection of the power cord or the extension cord. Do not connect many devices to one AC outlet.**
  It could cause a fire or an electric shock.
- **Use the parts provided or specified parts for the installation work.**
  The use of defective parts could cause an injury or leakage of water due to a fire, an electric shock, the unit falling, etc.
- **When plugging the power supply plug into the outlet, make sure that there is no dust, blockage, or loose parts both in the outlet and on the plug. Verify that the power supply plug is completely in the outlet.**
  If there is dust, blockage, or loose parts on the power supply plug or the outlet, it could cause electric shock or fire. If loose parts are found on the power supply plug, replace it.
- **Securely attach the electrical cover to the indoor unit and the service panel to the outdoor unit.**
  If the electrical cover of the indoor unit and/or the service panel of the outdoor unit are not attached securely, dust, water, etc. could collect in the unit and could cause a fire or an electric shock.
- **When installing, relocating, or servicing the unit, make sure that no substance other than the specified refrigerant (R410A) enters the refrigerant circuit.**
  Any presence of foreign substance such as air can cause abnormal pressure rise and may result in explosion or injury. The use of any refrigerant other than that specified for the system will cause mechanical failure, system malfunction, or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety.
- **Do not discharge the refrigerant into the atmosphere. Check that the refrigerant gas does not leak after installation has been completed. If refrigerant leaks during installation, ventilate the room.**
  If refrigerant comes in contact with a fire, harmful gas could be generated.
  If refrigerant gas leaks indoors, and comes into contact with the flame of a fan heater, space heater, stove, etc., harmful gases will be generated.
- **Use appropriate tools and piping materials for installation.**
  The pressure of R410A is 1.6 times higher than R22. Not using the appropriate tools and materials, or improper installation could cause the pipes to burst causing an injury.
- **When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes.**
  If the refrigerant pipes are disconnected while the compressor is running and the stop valve is open, air could be drawn in and the pressure in the refrigeration cycle could become abnormally high, causing the pipes to burst.
- **When installing the unit, securely connect the refrigerant pipes before starting the compressor.**
  If the compressor is started before the refrigerant pipes are connected and the stop valve is open, air could be drawn in and the pressure in the refrigeration cycle could become abnormally high, causing the pipes to burst.
- **Fasten a flare nut with a torque wrench as specified in this manual.**
  If fastened too tight, a flare nut could break and cause refrigerant leakage.
- **Install the unit according to national wiring regulations.**
- **When opening or closing the valve below freezing temperatures, refrigerant may spurt out from the gap between the valve stem and the valve body, resulting in injuries.**

⚠ CAUTION (Could lead to serious injury when operated incorrectly.)

- **Depending on the installation area, install a Ground Fault Interrupt (GFI) circuit breaker.**
  If the Ground Fault Interrupt (GFI) circuit breaker is not installed, an electric shock could occur.
- **Perform the drainage/piping work securely according to the installation manual.**
  If there is defect in the drainage/piping work, water could drip from the unit, and damage household items.
- **Do not touch the air inlet or the aluminum fins of the outdoor unit.**
  This could cause injury.
- **Do not install the outdoor unit where small animals may live.**
  If small animals enter the unit and damage its electrical parts, it could cause a malfunction, smoke emission, or fire. Keep the area around the unit clean.

1-2. SELECTING THE INSTALLATION LOCATION

INDOOR UNIT

- Where airflow is not blocked.
- Where cool (or warm) air spreads over the entire room.
- On a rigid wall to reduce the possibility of vibration.
- Where it is not exposed to direct sunlight. Do not expose to direct sunlight also during the period following unpacking to before use.
- Where it can be easily drained.
- At a distance 3 ft. (1 m) or more away from a TV and radio. Operation of the air conditioner may interfere with radio or TV reception. An amplifier may be required for the affected device.
- In a place as far away as possible from fluorescent and incandescent lights (so the infrared remote control can operate the air conditioner normally).
- Where the air filter can be removed and replaced easily.
- Where it is away from the other heat or steam source.

Note:
Install the indoor unit high on the wall where air can distribute over the entire room.

REMOTE CONTROLLER

- Where it is convenient to operate and easily visible.
- Where children cannot easily touch it.
- Select a position about 4 ft. (1.2 m) above the floor. Check that signals from the remote controller from that position are received by the indoor unit ('beep' or 'beep beep' receiving tone sounds). Then, attach remote controller holder to a pillar or wall and install wireless remote controller.

Note:
In rooms where inverter type fluorescent lamps are used, the signal from the wireless remote controller may not be received.

OUTDOOR UNIT

- Where it is not overly exposed to strong winds. If the outdoor unit with defrosting function is exposed to a wind, the defrosting time will be longer.
- Where airflow is good and dustless.
- Where neighbours are not annoyed by operation sound or hot (or cool) air.
- Where rigid wall or support is available to prevent the increase of operation sound or vibration.
- Where there is no risk of combustible gas leakage.
- If installing the unit in a location high above the ground, be sure to secure the unit legs.
- Where it is at least 10 ft. (3 m) away from the antenna of TV set or radio. Operation of the air conditioner may interfere with radio or TV reception in areas where reception is weak. An amplifier may be required for the affected device.
- Install the unit horizontally.
- Please install it in an area not affected by snowfall or blowing snow. In areas with heavy snow, please install a canopy, a pedestal and/or baffle boards.

Note:

- It is advisable to make a piping loop near outdoor unit so as to reduce vibration.
- For increased efficiency, install the outdoor unit in a location where continuous direct sunlight or excessive water can be avoided as much as possible.

Note:
When operating the air conditioner in low outside temperature, be sure to follow the instructions described below.

- Never install the outdoor unit in a place where its air inlet/outlet side may be exposed directly to wind.
- To prevent exposure to wind, install the outdoor unit with its air inlet side facing the wall and a baffle board on the air outlet side.

Avoid the following places for installation where air conditioner trouble is liable to occur.

- Where flammable gas could leak.
- Where there is an excessive amount of machine oil in the air.
- Where oil is splashed or where the area is filled with oily smoke (such as cooking areas and factories, in which the properties of plastic could be changed and damaged).
- Salty places such as the seaside.
- Where sulfide gas is generated such as a hot spring, sewage, waste water.
- Where there is high-frequency or wireless equipment.
- Where there is emission of high levels of VOCs, including phthalate compounds, formaldehyde, etc., which may cause chemical cracking.

1-3. SPECIFICATIONS

1-3-1. POWER SUPPLY AND INDOOR/OUTDOOR WIRE CONNECTION

- Power should be taken from an exclusive branched circuit.
- Wiring work should be based on applicable technical standards.
- Wiring connections should be made following the diagram.
- Securely tighten screws.

Connecting wires and the ground wire

- Use solid conductor Min. AWG14 or stranded conductor Min. AWG14.
- Use double insulated copper wire with 600 V insulation.
- Use copper conductors only.

* Follow local electrical codes.

Power supply cable and ground wire

- Use solid or stranded conductor Min. AWG12.
- Use copper conductors only.

* Follow local electrical codes.

Note:
When the indoor unit is powered from the outdoor unit, depending on local code, a disconnect switch needs to be installed to a power supply circuit.

Electrical specifications

MODEL			INDOOR	MSZ-GS24NA MSY-GS24NA	
			OUTDOOR	MUZ-GS24NA(H) MUY-GS24NA	MUZ-GS24NAHZ
INDOOR UNIT					
Power supply (V, PHASE, Hz)				208/230, 1, 60	
Min. Circuit Ampacity		(A)		1.0	
Fan motor (F.L.A.)		(A)		0.73	
OUTDOOR UNIT					
Power supply (V, PHASE, Hz)				208/230, 1, 60	
Max. Fuse size (time delay)		(A)		20	20
Min. Circuit Ampacity		(A)		18	18
Fan motor (F.L.A.)		(A)		0.93	0.93
Compressor	(R.L.A) (A)		MSZ	13.6	13.6
			MSY	13.6	-
	(L.R.A) (A)		MSZ	17.0	17.0
			MSY	17.0	-
Control voltage				Indoor unit - Remote controller: (Wireless) Indoor unit - Outdoor unit: DC12-24 V (Polar)	

1-3-2. REFRIGERANT PIPES

- To prevent condensation, insulate the two refrigerant pipes.

⚠ CAUTION
Be sure to use the insulation of specified thickness (table on the right). Excessive insulation may cause incorrect installation of the indoor unit, and too little insulation may cause condensate to form.

- Refrigerant pipe bending radius must be 4 in. (100 mm) or more.
- The unit has flared connections on both indoor and outdoor sides.
- Remove the valve cover from the outdoor unit, then connect the pipe.
- Refrigerant pipes are used to connect the indoor and outdoor units.
- Be careful not to crush or over bend the pipe in pipe bending.
- Refrigerant adjustment... If pipe length exceeds 25 ft. (7.5 m), additional refrigerant (R410A) charge is required.
  (The outdoor unit is charged with refrigerant for pipe length up to 25 ft. [7.5 m])
- Please carefully consider the indoor unit location when piping lengths are less than 16 ft. (5 m) as there could be intermittent noises during normal operation that would be noticeable in very quiet environments.

Pipe	Outside diameter	Minimum wall thickness	Insulation thickness	Insulation material
	inch (mm)			
For liquid	1/4 (6.35)	0.0315 (0.8)	5/16 (8)	Heat resistant foam plastic 0.045 Specific gravity
For gas	5/8 (15.88)	0.0394 (1.0)	5/16 (8)	

Limits	
Pipe length	100 ft. (30 m) max.
Height difference	50 ft. (15 m) max.
No. of bends	10 max.

Pipe length	Up to 25 ft. (7.5 m)	No additional charge is required.
	Exceeding 25 ft. (7.5 m)	Additional charge is required. (Refer to the table below.)
Refrigerant to be added	MSZ-GS24NA MSY-GS24NA	1.08 oz. (20 g/m)

1-4. INSTALLATION DIAGRAM

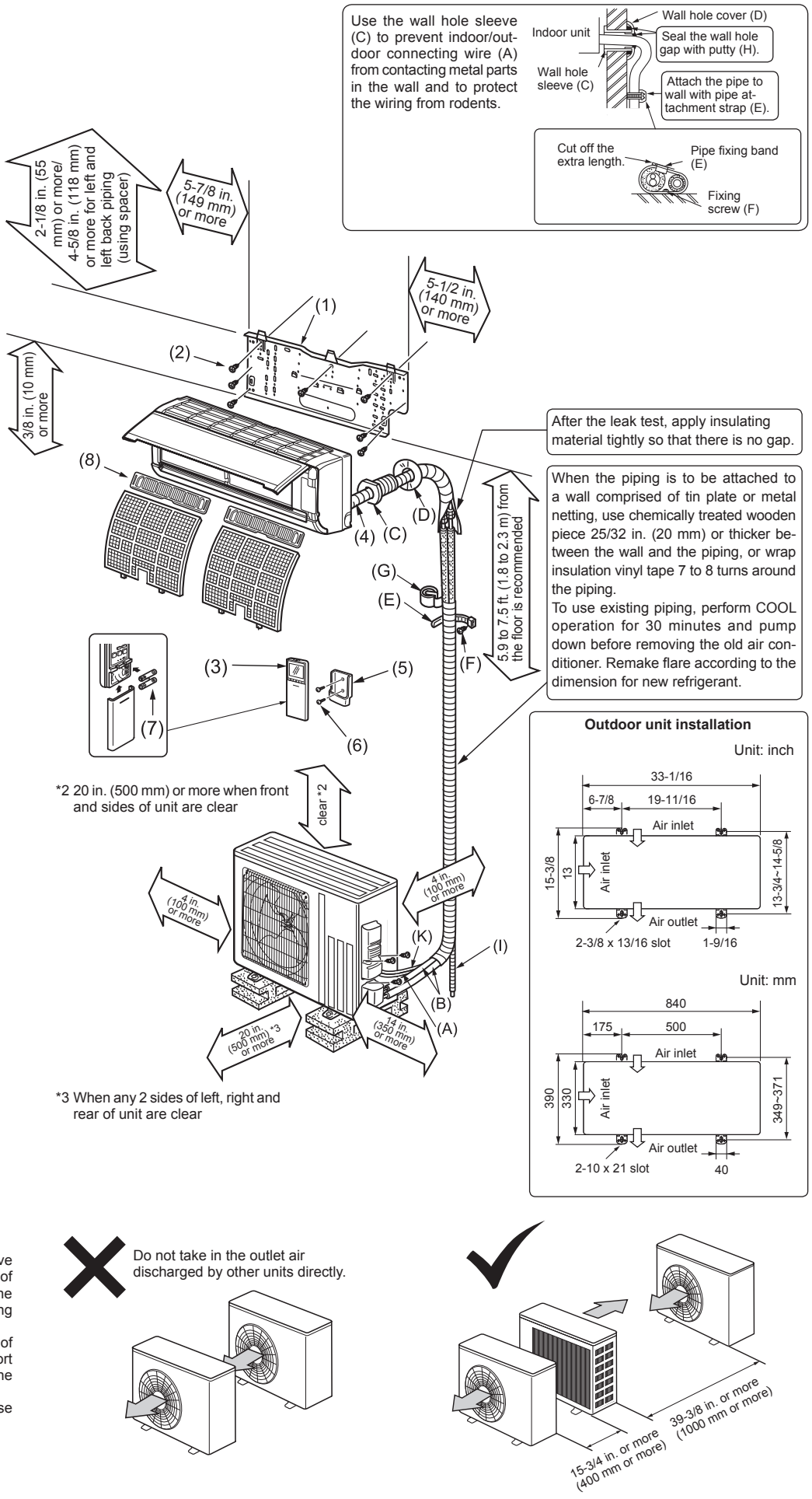
ACCESSORIES
Check the following parts before installation.
<Indoor unit>

(1)	Installation plate	1
(2)	Attachment screws for the installation plate 4 × 25 mm	7
(3)	Wireless remote controller	1
(4)	Felt tape (For left or left-rear piping)	1
(5)	Remote controller holder	1
(6)	Screws for the remote controller holder 3.5 × 16 mm (Black)	2
(7)	Battery (AAA) for (3)	2
(8)	Air cleaning filter	2

FIELD-SUPPLIED PARTS

(A)	Indoor/outdoor unit connecting wire *1	1
(B)	Extension pipe	1
(C)	Wall hole sleeve	1
(D)	Wall hole cover	1
(E)	Pipe attachment strap	2 to 5
(F)	Screw for (E) 4 × 20 mm	2 to 5
(G)	Piping tape	1
(H)	Putty	1
(I)	Drain hose (or soft PVC hose, 19/32 in. [15 mm] inner diameter or hard PVC pipe VP16)	1 or 2
(J)	Refrigerant oil	1
(K)	Power supply cord *1	1

Note:
*1 Place indoor/outdoor unit connecting wire (A) and power supply cord (K) at least 3 ft. (1 m) away from the TV antenna wire.



Units should be installed by licensed contractor according to local code requirements.

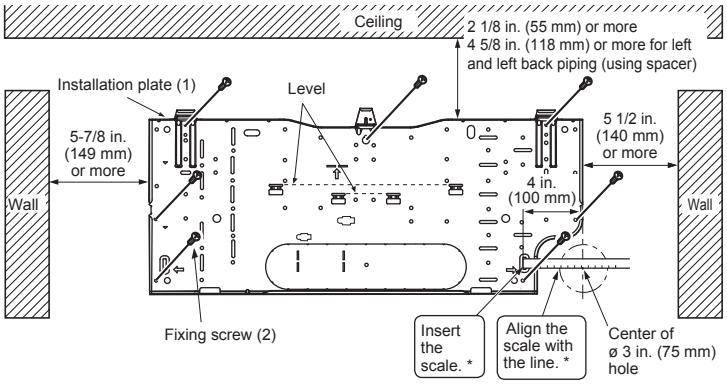
Note:
- The dimensions indicated in the arrows (⟺) above show the required space to guarantee performance of the air conditioner. Install the outdoor unit where the maximum possible space can be provided, considering later relocation, services, or repairs.
- The cooling/heating performance and the efficiency of power usage may fall about 10% at the place where short cycle is likely occur due to poor ventilation. Installing the air outlet guide (optional) can improve performances.
- If air from the outlet blows against the wall, it may cause stains on the wall.

Drain piping for outdoor unit
Install the unit horizontally.
Do not use drain socket in cold regions. Drain may freeze and make the fan stop.
The outdoor unit produces condensate during the heating operation. Select the installation place to ensure to prevent the outdoor unit and/or the grounds from being wet by drain water or damaged by frozen drain water.

2. INDOOR UNIT INSTALLATION

2-1. ATTACHING THE INSTALLATION PLATE

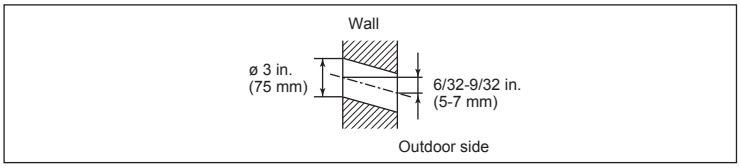
- Find a stud in the wall to attach installation plate (1) horizontally by tightening the fixing screws (2) firmly.
- To prevent installation plate (1) from vibrating, be sure to install the attachment screws in the holes indicated in the illustration. For added support, additional screws may also be installed in other holes.
- When the knockout is removed, apply vinyl tape to the knockout edges to prevent damaging the wires.
- When the indoor unit is to be attached to a concrete wall using recessed bolts, secure installation plate (1) using 7/16 in. x 13/16 in. · 7/16 in. x 1 in. (11 mm × 20 mm · 11 mm × 26 mm) oval hole (17-3/4 in. [450 mm] pitch).
- If the recessed bolt is too long, change it for a shorter one (field-supplied).



* Same for left hole.

2-2. DRILLING

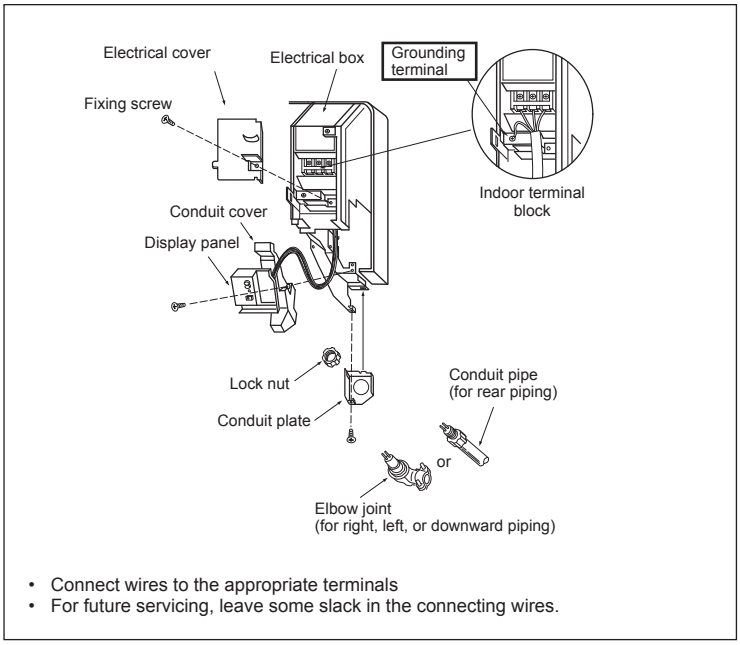
1) Determine where the holes will be located on the wall.
2) Drill a ø 3 in. (75 mm) hole. The outdoor side should be 6/32 to 9/32 in. (5 to 7 mm) lower than the indoor side.
3) Insert wall hole sleeve (C).



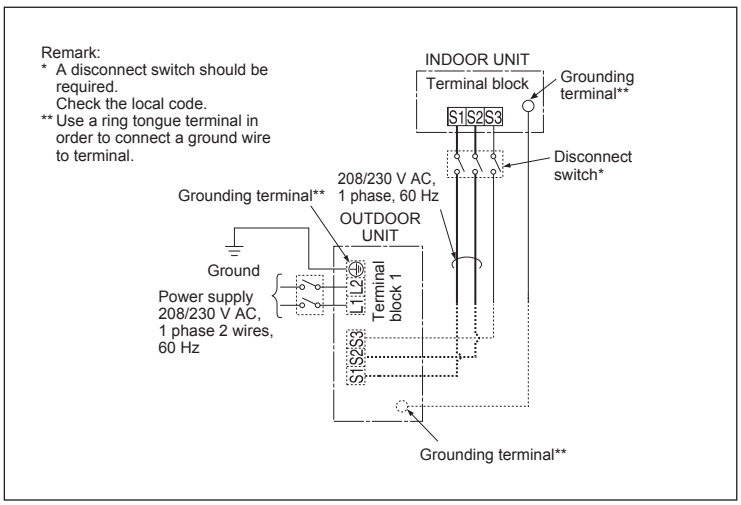
2-3. CONNECTING WIRES FOR INDOOR UNIT

Note:
When the indoor unit is powered from the outdoor unit, depending on local code, a disconnect switch needs to be installed to a power supply circuit.

1) Remove the panel assembly. (Refer to 5-1.)
2) Place the upper part of the indoor unit on the installation plate.
3) Remove corner box R and electrical cover.
4) Remove display panel, conduit cover and conduit plate.
5) Attach conduit pipe (for rear piping) / elbow joint (for right, left, or downward piping) to conduit plate with lock nut. The thread of the installed conduit pipe / elbow joint appearing inside should be less than 3/8 in. (10 mm). (Fig. 1) Elbow joint should appear less than 1-3/16 in. (30 mm) outside. (Fig. 2)
6) Process the end of ground wire (Fig. 3). Connect it to the ground terminal of electrical parts box.
7) Process the end of indoor/outdoor unit connecting wire (A) (Fig. 3). Attach it to the terminal block. Be careful not to make mis-wiring. Attach the wire to the terminal block securely so that its core cannot be seen, and no external force affects the connecting section of the terminal block.
8) Firmly tighten the terminal screws. After tightening, verify that the wires are tightly fastened.
9) Reinstall conduit plate, conduit cover and display panel.
10) According to the piping direction, remove the shaded part of the corner box L (Fig. 4) or corner box R (Fig. 5). Reinstall electrical cover, corner box R and panel assembly.



- Connect wires to the appropriate terminals
- For future servicing, leave some slack in the connecting wires.



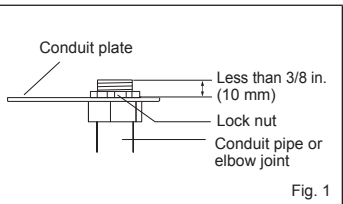


Fig. 1

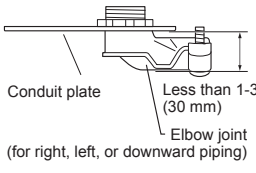
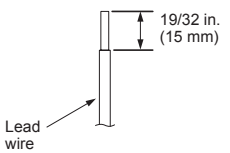


Fig. 2



- Make ground wire a little longer than others. (More than 2-3/8 in. [60 mm])

Fig. 3

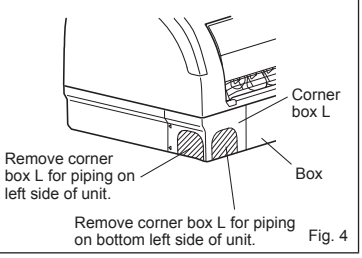


Fig. 4

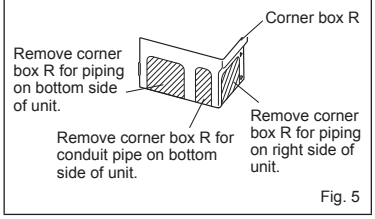


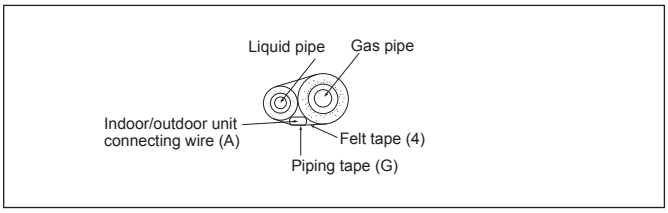
Fig. 5

2-4. PIPE FORMING AND DRAIN PIPING

2-4-1. PIPE FORMING

- Place the drain hose below the refrigerant piping.
- Make sure that the drain hose is not crowded or bent.
- Do not pull the hose when applying the tape.
- When the drain hose passes the room, be sure to wrap it with insulation material (field-supplied).

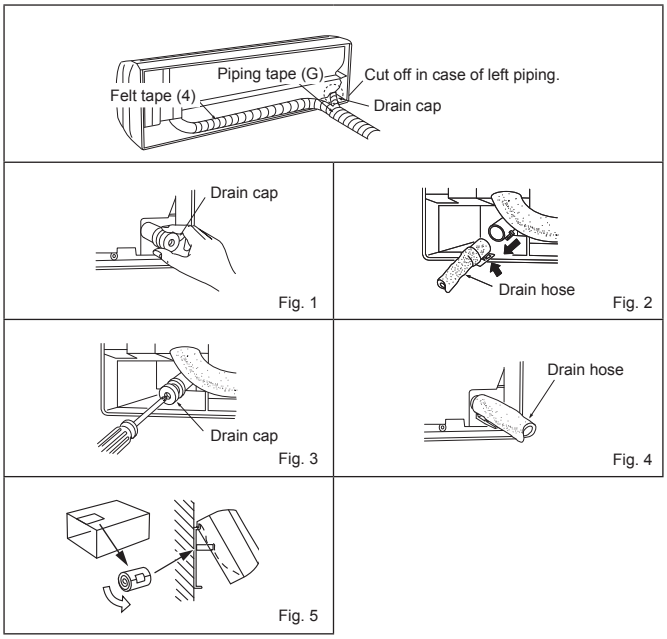
Note:
Make sure not to damage the cover of refrigerant pipe when attaching it back on with screws.



Left or left-rear piping

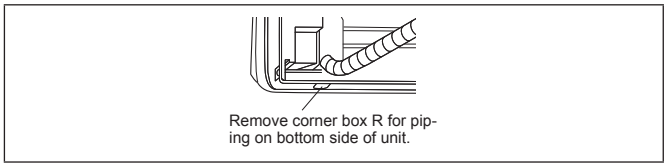
Note:
Be sure to reattach the drain hose and the drain cap if the piping is being installed on left or bottom left of unit, otherwise, water could drip down from the drain hose.

1) Place the refrigerant piping and the drain hose together, then firmly apply felt tape (4) from the end.
   Felt tape (4) overlap width should be 1/3 the tape width. Use a bandage stopper at the end of felt tape (4).
2) Pull out the drain cap at the back right of the indoor unit. (Fig. 1)
   • Hold the convex section at the end and pull the drain cap.
3) Pull out the drain hose at the back left of the indoor unit. (Fig. 2)
   • Hold the claw marked by the arrows and pull out the drain hose forward.
4) Put the drain cap into the section to which the drain hose is to be attached at the rear of the indoor unit. (Fig. 3)
   • Insert a screwdriver into the hole on the cap and insert the cap fully into the drain pan.
5) Insert the drain hose fully into the drain pan at the back right of the indoor unit. (Fig. 4)
   • Check if the hose is hooked securely to the projection of its inserting part at the drain pan.
6) Insert the drain hose into wall hole sleeve (C), and attach the upper part of indoor unit onto the installation plate (1). Then, shift the indoor unit completely to the left to make placing the piping in the back of the unit easier.
7) Cut out two pieces of cardboard from the shipping box (use any two pieces of the four pieces), roll each piece, hook them onto the back rib, and use them as spacer to lift the indoor unit. (Fig. 5)
8) Connect the refrigerant piping with the extension pipe (B).
9) Attach the lower part of the indoor unit into the installation plate (1).



Rear or bottom piping

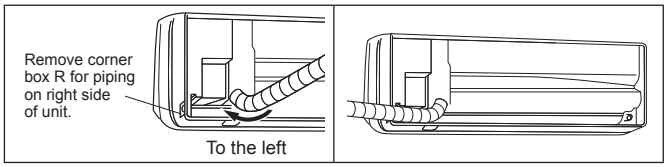
1) Place the refrigerant piping and the drain hose together, then firmly apply piping tape (G) from the end.
2) Insert the piping and the drain hose into the wall hole sleeve (C), and attach the upper part of the indoor unit on the installation plate (1).
3) Check if the indoor unit is attached securely on the installation plate (1) by moving the unit to left and right.
4) Attach the lower part of the indoor unit into the installation plate (1).



Right piping

Note:
Before performing the following, make sure that wiring is completed, and the conduit cover is installed. (Refer to 2-3.)

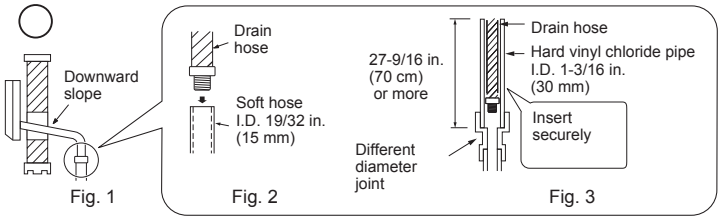
1) Place the refrigerant piping and the drain hose together, shift them to left side of the unit, and then firmly apply piping tape (G) from the end.
2) Insert the piping and the drain hose into the wall hole sleeve (C), and attach the upper part of the indoor unit on the installation plate (1).
3) Check if the indoor unit is attached securely on the installation plate (1) by moving the unit to left and right.
4) Attach the lower part of the indoor unit into the installation plate (1).



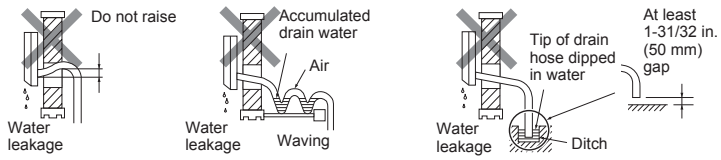
2-4-2. DRAIN PIPING

- If the extension drain hose has to pass through a room, be sure to wrap it with insulation (field-supplied).
- The drain hose should point downward for easy drain. (Fig. 1)
- If the drain hose provided with the indoor unit is too short, connect it with a field-supplied drain hose (l). (Fig. 2)
- When connecting the drain hose to a hard vinyl chloride pipe, be sure to insert it securely into the pipe. (Fig. 3)

Do not put the drain pipe directly in a drainage ditch where Ammonia or Sulphuric gas may be generated. The evaporated corrosive gas may return to the indoor side through drain pipe and this may cause an unpleasant odor and corrosion on Heat exchanger may occur.



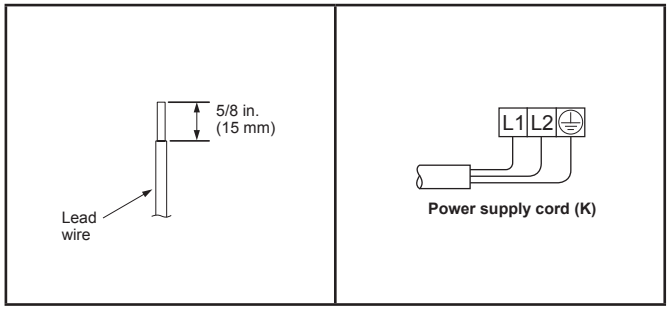
Do not make drain piping as shown below.

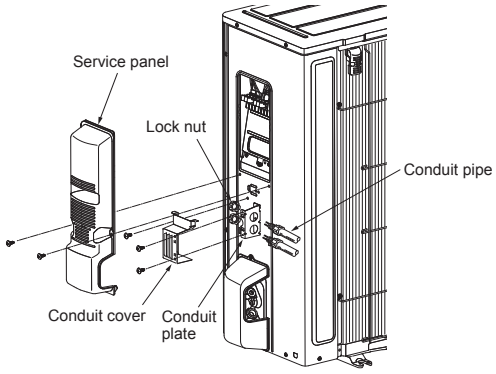


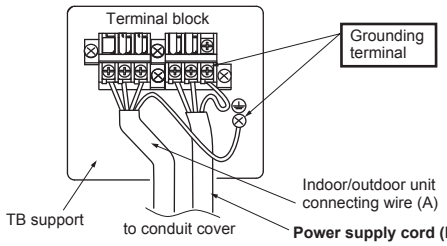
3. OUTDOOR UNIT INSTALLATION

3-1. CONNECTING WIRES FOR OUTDOOR UNIT

1) Remove the service panel.
2) Remove the conduit cover.
3) Attach the conduit connectors to the conduit plate with lock nuts then secure it against unit with screws.
4) Connect the ground wires of indoor/outdoor unit connecting wire (A) and power supply cord (K) to the TB support.
5) Loosen the terminal screws, then attach indoor/outdoor unit connecting wire (A) and power supply cord (K) from the indoor unit correctly to the terminal block. Attach the wires to the terminal block securely so that the cores cannot be seen, and no external force affects the connecting section of the terminal block.
6) Firmly tighten the terminal screws. After tightening, verify that the wires are tightly fastened.
7) Install the conduit cover.
8) Install the service panel securely.







- Make ground wire a little longer than others. (More than 3-7/8 in. [100 mm])
- For future servicing, leave some slack in the connecting wires.

3-2. FLARE CONNECTION

1) Cut the copper pipe as straight as possible with a pipe cutter. (Fig. 1, 2)
2) Remove all burrs from the cut section of the pipe, ensuring that precautions are taken to avoid getting metal shavings into the piping. (Fig. 3)
3) Remove flare nuts attached to indoor and outdoor units, then put them on pipe.
4) Flaring work (Fig. 4, 5). Firmly hold copper pipe in the dimension shown in the table. Select A inch (mm) from the table according to the tool you use.
5) Check
   - Compare the flared work with Fig. 6.
   - If flare is defective, cut off the section and repeat procedure.

Pipe diameter inch (mm)	B inch (mm)	A inch (mm)			Tightening torque	
		Clutch type tool for R410A	Clutch type tool for R22	Wing nut type tool for R22	ft-lb (kgf•cm)	N•m
ø 1/4 (6.35)	21/32 (17)	0 to 0.02 (0 to 0.5)	0.04 to 0.06 (1.0 to 1.5)	0.06 to 0.08 (1.5 to 2.0)	10 to 13 (140 to 180)	13.7 to 17.7
ø 3/8 (9.52)	7/8 (22)				25 to 30 (350 to 420)	34.3 to 41.2
ø 1/2 (12.7)	1-1/32 (26)			0.08 to 0.10 (2.0 to 2.5)	36 to 42 (500 to 575)	49.0 to 56.4
ø 5/8 (15.88)	1-5/32 (29)				54 to 58 (750 to 800)	73.5 to 78.4

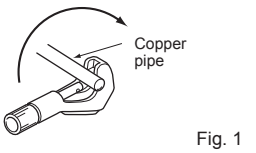


Fig. 1

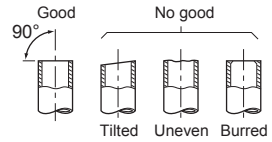


Fig. 2

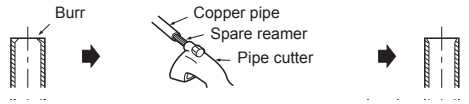


Fig. 3

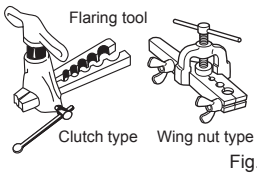


Fig. 4

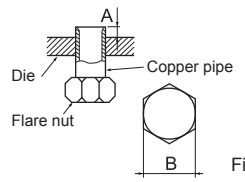


Fig. 5

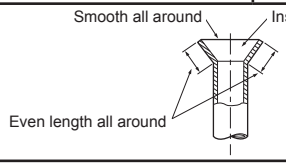


Fig. 6

3-3. PIPE CONNECTION

- Fasten flare nut with a torque wrench as specified in the table above.
- When fastened too tight, flare nut may eventually break and cause refrigerant leakage.
- Be sure to wrap insulation around the piping. Direct contact with the bare piping may result in burns or frostbite.

Indoor unit connection

Connect both liquid and gas piping to indoor unit.

- Apply a thin coat of refrigeration oil (J) on the flared ends of the pipes. Do not apply refrigeration oil on screw threads. Excessive tightening torque will result in damage on the screw.
- To connect, first align the center, then tighten the first 3 to 4 turns of flare nut by hand.
- Use tightening torque table in (3-2.) as a guideline for indoor unit side joints, and tighten using two wrenches. Excessive tightening damages the flare section.

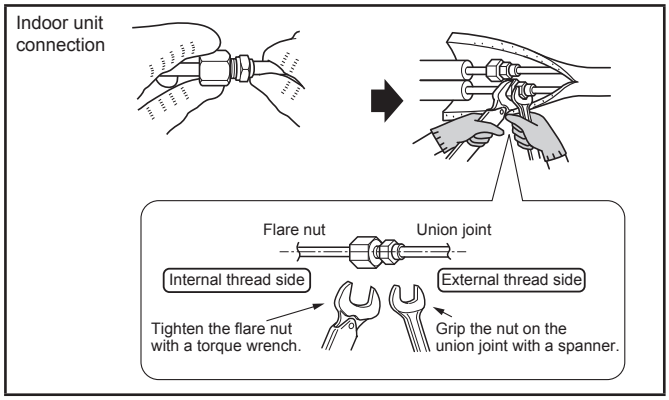
Outdoor unit connection

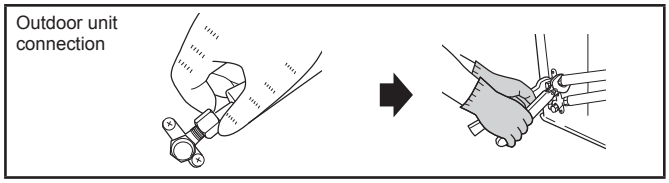
Connect pipes to stop valve pipe joint of the outdoor unit following the same procedure detailed in Indoor unit connection.

- For tightening, use a torque wrench or spanner.

⚠ WARNING

When installing the unit, securely connect the refrigerant pipes before starting the compressor.





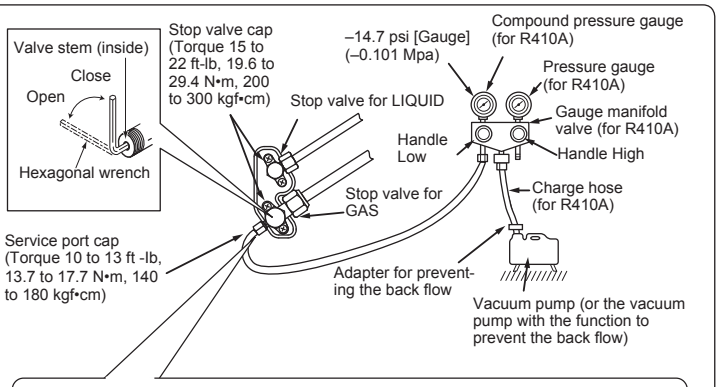
3-4. INSULATION AND TAPING

1) Cover piping joints with pipe cover.
2) For outdoor unit side, insulate the piping, including valves.
3) Apply piping tape (G) starting from the connection on the outdoor unit.
   - When piping has to be installed through a ceiling, closet or where the temperature and humidity are high, use additional field-supplied insulation to prevent condensation.

4. PURGING PROCEDURES, LEAK TEST, AND TEST RUN

4-1. PURGING PROCEDURES AND LEAK TEST

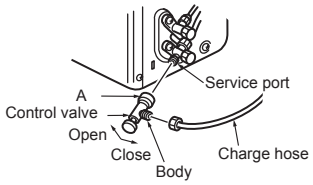
1) Remove service port caps from stop valves on both sides of refrigerant lines. (The stop valves are fully closed when shipped.) Leave closed.
2) Connect gauge manifold to ports of stop valves.



Precautions when using the control valve

When attaching the control valve to the service port, valve core may deform or loosen if excess pressure is applied. This may cause gas leak.

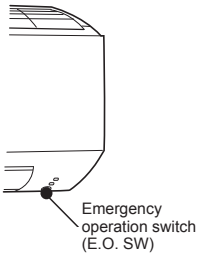
When attaching the control valve to the service port, make sure that the valve core is in closed position, and then tighten part A. Do not tighten part A or turn the body when valve core is in open position.



3) Evacuate the system to 4000 microns from both service valves. System manifold gauges must not be used to measure vacuum. A micron gauge must be used at all times. Break the vacuum with Nitrogen(N2) into the discharge service valve to 0 PSIG.
4) Evacuate the system to 1500 microns. Break the vacuum with Nitrogen(N2) into the discharge service valve to 0 PSIG.
5) Evacuate the system to 500 microns.
6) Close gauge manifold valves, stop the pump, and conduct a 30 minute rise test.
7) System should hold 500 microns for a minimum of 1 hour.
8) Fully open the valve stem of all stop valves on both sides of gas pipe and liquid pipe by the hexagonal wrench. If the valve stem hits the stopper, do not turn it any further. Operating without fully opening lowers the performance and this causes trouble.
9) Refer to 1-3 and charge the prescribed amount of additional refrigerant if needed. Be sure to charge slowly with liquid refrigerant. Otherwise composition of the refrigerant in the system may be changed and affect performance of the air conditioner.
10) Remove gauge manifolds and replace service port caps and tighten.
11) Leak test

4-2. TEST RUN

1) Insert power supply plug into the power outlet and/or turn on the breaker.
2) Press the E.O. SW once for COOL, and twice for HEAT (only MSZ series) operation. Test run will be performed for 30 minutes. If the upper operation indicator light blinks every 0.5 seconds, inspect the indoor/outdoor unit connecting wire (A). After the test run, emergency COOL mode (75°F [24°C] COOL) will start.
3) To stop operation, press the E.O. SW several times until all LED lamps turn off. Refer to operating instructions for details.



Checking the remote (infrared) signal reception
Press the OFF/ON button on the remote controller and listen for an audible indicator from the indoor unit. Press the OFF/ON button again to turn the air conditioner off.

- Once the compressor stops, the restart preventive device operates so the compressor will not operate for 3 minutes to protect the air conditioner.

4-3. AUTO RESTART FUNCTION

This product is equipped with an auto restart function. When the power supply is cut off during operation, such as during blackouts, the function automatically starts operation in the previous setting once the power supply is resumed. (Refer to the operating instructions for details.)

Caution:

- After test run or remote signal reception check, turn off the unit with the E.O. SW or the remote controller before turning off the power supply. If this procedure is not performed, the unit will automatically begin operation when power supply is resumed.

To the user

- After installing the unit, explain to the user about auto restart function.
- If auto restart function is unnecessary, it can be deactivated. Consult the service representative to deactivate the function. Refer to the service manual for details.

4-4. EXPLANATION TO THE USER

- Using the OPERATING INSTRUCTIONS, explain to the user how to use the air conditioner (the remote controller, removing the air filters, placing or removing the remote controller from the remote controller holder, cleaning methods, precautions for operation, etc.)
- Recommend that the user read the OPERATING INSTRUCTIONS carefully.

5. RELOCATION AND MAINTENANCE

5-1. REMOVING AND INSTALLING THE PANEL ASSEMBLY

Removal procedure (Fig. 1)

1) Remove the three screws that attach the panel assembly.
2) Remove the panel assembly. Be sure to remove its bottom end first.

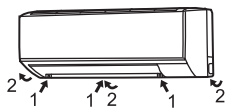


Fig. 1

Installation procedure (Fig. 2)

1) Install the panel assembly following the removal procedure in reverse.
2) Be sure to press the positions as indicated by the arrows in order to attach the assembly completely to the unit.

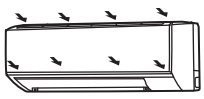
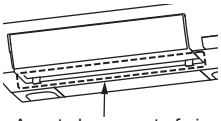


Fig. 2

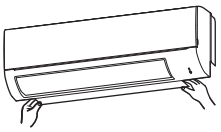
* Do not hold the A part when installing/removing or carrying the panel, or the panel might be damaged.



A part : lower part of air outlet of the panel

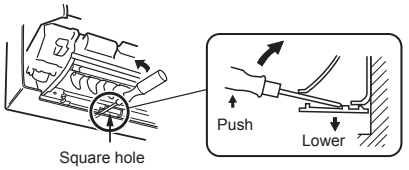
5-2. REMOVING THE INDOOR UNIT

Remove the bottom of the indoor unit from the installation plate.
When releasing the corner part, release both left and right bottom corner part of indoor unit and pull it downward and forward as shown in the figure on the right.



If the above method cannot be used

Remove the panel. Then, insert hexagonal wrenches into the square holes on the left and right sides of the unit and push them up as shown in the following figure. The bottom of the indoor unit lowers and releases the hooks.



5-3. PUMPING DOWN

When relocating or disposing of the air conditioner, pump down the system following the procedure below so that refrigerant is not released into the atmosphere.

1) Connect the gauge manifold valve to the service port of the stop valve on the gas pipe side of the outdoor unit.
2) Fully close the stop valve on the liquid pipe side of the outdoor unit.
3) Close the stop valve on the gas pipe side of the outdoor unit almost completely so that it can be easily closed fully when the pressure gauge shows 0 psi [Gauge] (0 Mpa).
4) Start the emergency COOL operation.
   To start the emergency operation in COOL mode, disconnect the power supply plug and/or turn off the breaker. After 15 seconds, connect the power supply plug and/or turn on the breaker, and then press the E.O. SW once. (The emergency COOL operation can be performed continuously for up to 30 minutes.)
5) Fully close the stop valve on the gas pipe side of the outdoor unit when the pressure gauge shows (0.1 to 0 psi [Gauge] (0.05 to 0 Mpa)).
6) Stop the emergency COOL operation.
   To stop operation, press the E.O. SW several times until all LED lamps turn off. Refer to operating instructions for details.

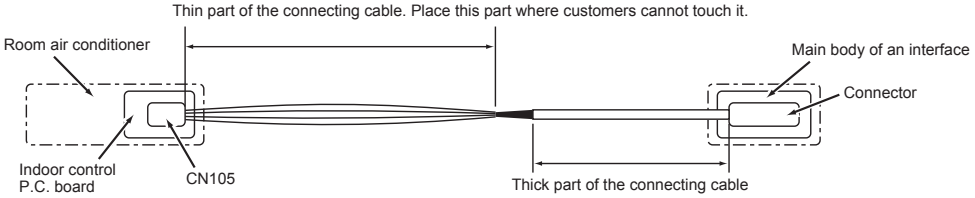
⚠ WARNING

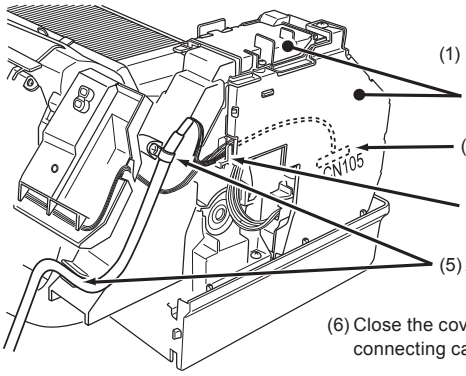
When the refrigeration circuit has a leak, do not execute pump down with the compressor.
When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes. The compressor may burst if air etc. get into it.

6. CONNECTING THE INTERFACE/CONNECTOR CABLE TO THE AIR CONDITIONER

- Connect the INTERFACE/CONNECTOR CABLE to the Indoor electronic control P.C. board of the air conditioner with the connecting cable.
- Cutting or extending the connecting cable of the INTERFACE/CONNECTOR CABLE results in defects in connecting.
  Do not bundle the connecting cable together with power supply cord, indoor/outdoor connecting wire, and/or earth wire. Keep as much distance as possible between the connecting cable and those wires.
- The thin part of the connecting cable should be stored and placed where customers cannot touch it.

Connecting





(1) Remove the panel and the lower right corner part.

(2) Open the cover of the indoor control P.C. board.

(3) Join the connecting cable to CN105 on the indoor control P.C. board.

(4) Hook the connecting cable as shown in the figure.

(5) Attach the cable clamp provided with Interface to the thick part of the connecting cable with a screw 4×16, then fit the cable into the ribs as shown in the figure.

(6) Close the cover of the indoor control P.C. board. Be careful not to catch the thin part of the connecting cable in the cover. Reinstall the panel and the lower right corner part.

⚠ WARNING

Fix the connecting cable at the prescribed position securely. Incorrect installation may cause electric shock, fire, and/or malfunction.

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