



Air-Conditioners Indispensable Optional Parts BRANCH BOX

PAC-MKA50BC

ONLY FOR R410A OUTDOOR UNIT

PAC-MKA30BC

ONLY FOR INDOOR USE



INSTALLATION MANUAL

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

FOR INSTALLER

MANUEL D'INSTALLATION

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

POUR L'INSTALLATEUR

MANUAL DE INSTALACIÓN

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

PARA EL INSTALADOR

English

Français

Español

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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.

⚠ 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.

⚠ Warning:

- 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.)

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.

⚠ 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.
- Do not turn off the breaker of M-NET Branch Box when installing the unit below -4°F, otherwise it may result in communication failure.

2. Selecting a location for installation

* The branch box is only 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

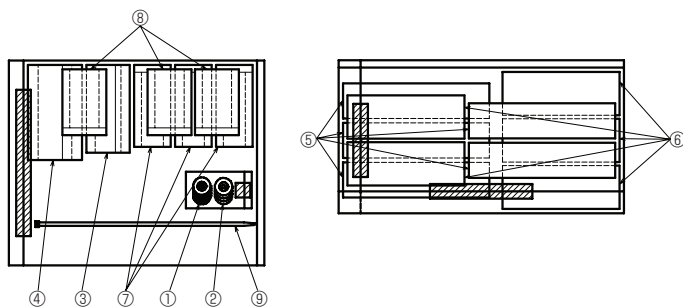


Fig. 3-1

3.1. Check the Branch Box accessories and parts

	Accessory name	Q'ty		
		PAC-MKA30BC	PAC-MKA50BC	
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	
⑩	Conduit plate	1	1	Fastened to the main body and shipped.

4. Dimensions and required servicing space of Branch Box

Optional different-diameter (deformed) joints

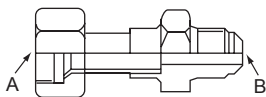


Fig. 4-1

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

- * 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
- Ⓕ Conduit plate
- Ⓖ Terminal block (to indoor unit on control board)
- Ⓗ Terminal block (to outdoor unit)
- Ⓙ Terminal block (for communication cable)

* Ensure that the branch box is installed as shown on the below drawing.

■ PAC-MKA50BC (Fig.4-2)

Suspension bolt: W3/8 (M10)

Refrigerant pipe flared connection

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

■ PAC-MKA50BC (5-branches type)

(inch)

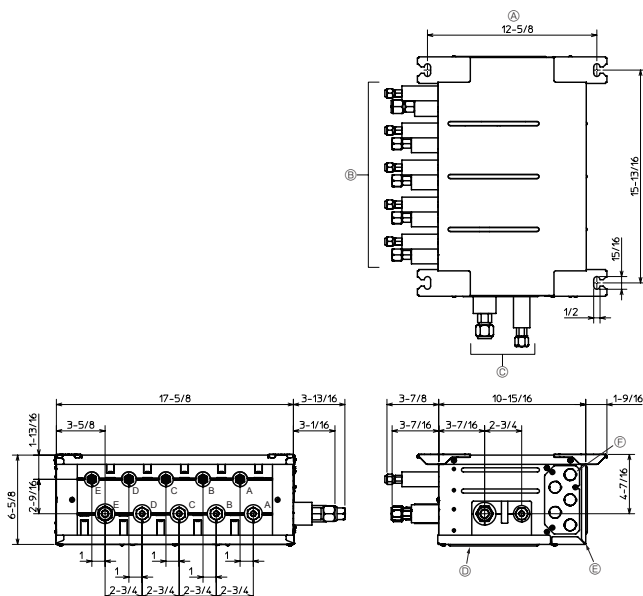


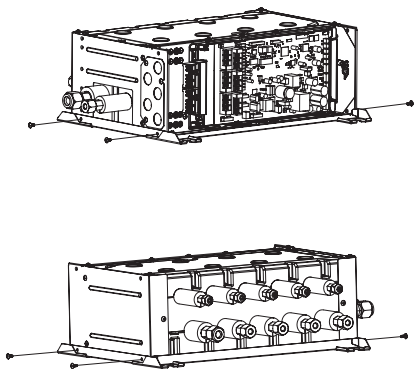
Fig. 4-2

Conversion formula

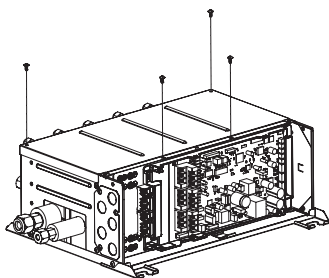
1/4 F	ø6.35
3/8 F	ø9.52
1/2 F	ø12.7
5/8 F	ø15.88
3/4 F	ø19.05

4. Dimensions and required servicing space of Branch Box

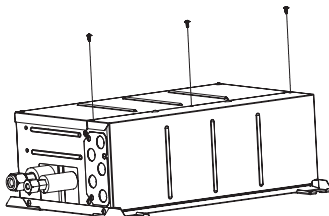
④ Fasten the screws in each part.



⑥ Fasten the screws.

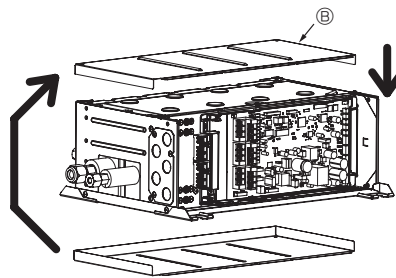


⑧ Fasten the screws.



⑤ Install the service panel on the opposite surface.

Ⓑ Service panel



⑦ Install the electric cover on the opposite surface.

Ⓐ Electric cover

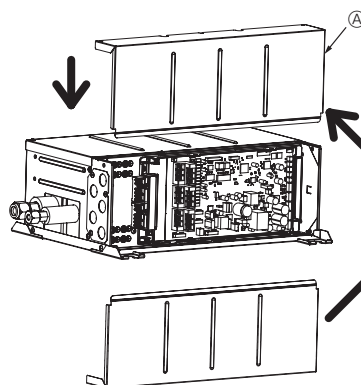


Fig. 4-5

4. Dimensions and required servicing space of Branch Box

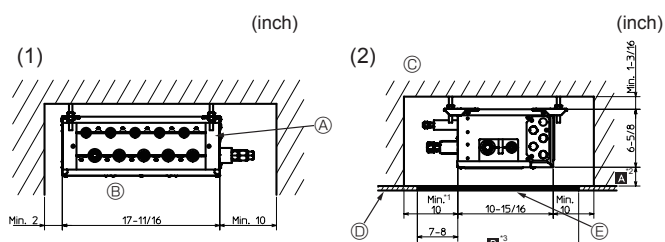


Fig. 4-6

Fig. 4-7

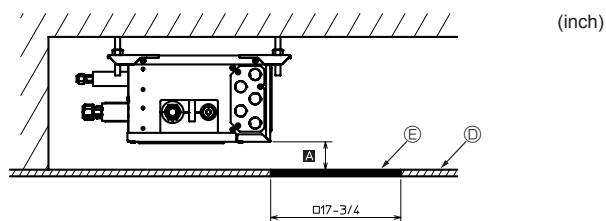


Fig. 4-8

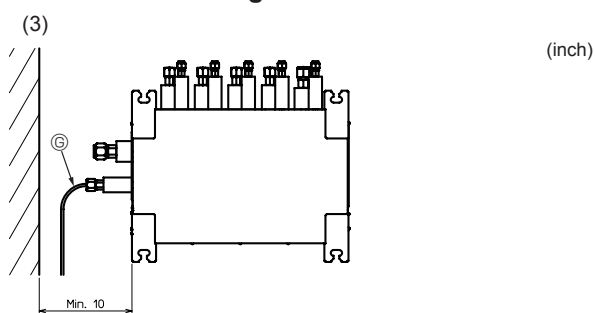


Fig. 4-9

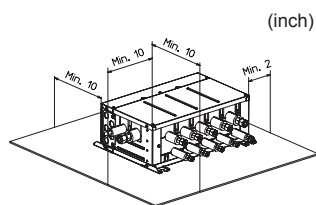


Fig. 4-10

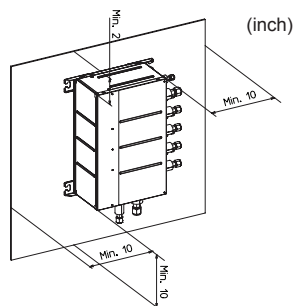


Fig. 4-11

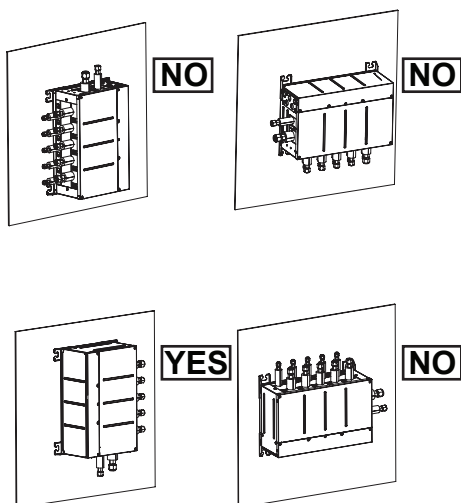


Fig. 4-12

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)

- Ⓒ For indoor installations
- Ⓓ Ceiling board
- Ⓔ Maintenance hole

*1: Minimum 13-3/4 inch (350 mm) is required for 90° bends in refrigerant piping.

*2: Ⓐ is "Min. 7-7/8 inch (200 mm)" <recommendation>.

(Premise: The slope of drain piping is securable 1/100 or more. Required 7-7/8 inch (200 mm) or more, when not securable.)

In the case of less than 7-7/8 inch (200 mm) (for example Ⓐ is 4 inch (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).

*3: Ⓑ is "□ 23 - 5/8 inch (600 mm)" <recommendation>.

In the case of "□ 17-3/4 inch (450 mm)", prepare a maintenance hole at a PCB side (as it is shown in Fig. 4-8), and "Min. 11-13/16 inch (300 mm)" is needed as distance Ⓐ.

In the case of less than 11-13/16 inch (300 mm) (for example Ⓐ is 4 inch (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. 4-9)

- Ⓒ Refrigerant piping

II. The space when installing on the floor. (Fig. 4-10)

III. The space when installing on a wall. (Fig. 4-11)

The installation direction is limited when installing on a wall. (Fig. 4-12)

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

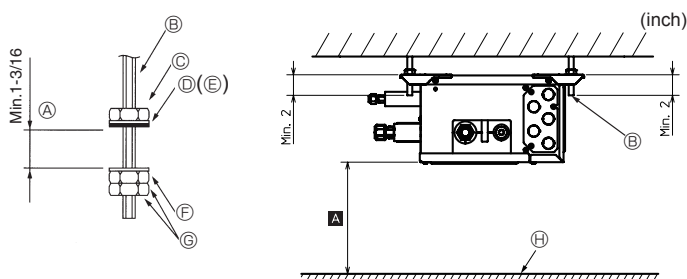


Fig. 6-1

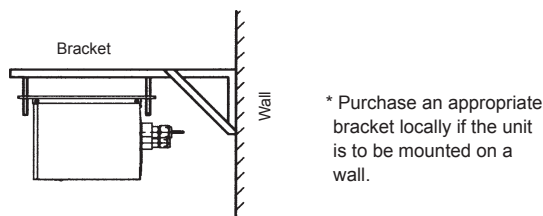


Fig. 6-2

- (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.
- A When unit is hung and nuts tightened
 B Suspension bolt
 C Nut
 D Washer (with cushion) ①
 E Ensure that cushion faces downwards
 F Washer (without cushion) ②
 G Nut (procure locally)
 H Ceiling board

7. Installing refrigerant piping

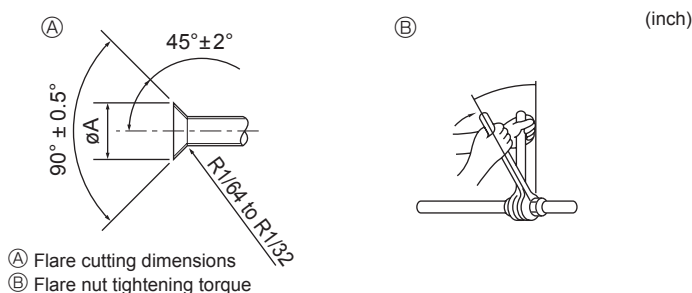


Fig. 7-1

A Flare cutting dimensions

Table 1 (mm (inch))

Copper pipe O.D.	Flare dimensions ØA dimensions
Ø6.35 (1/4)	8.7-9.1 (11/32-23/64)
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)

B Flare nut tightening torque

Table 2

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)

- ▶ 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 [248 °F], Thickness: 15 mm [19/32 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.)

- ▶ 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 1/2 inch (12 mm) thick and able to withstand temperatures in excess of 212 °F, 100 °C).

- ▶ 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 7/16-13/16 inch (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.

7. Installing refrigerant piping

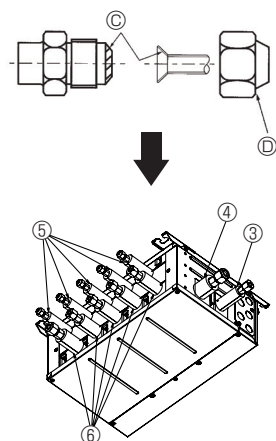


Fig. 7-2

⚠ 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).

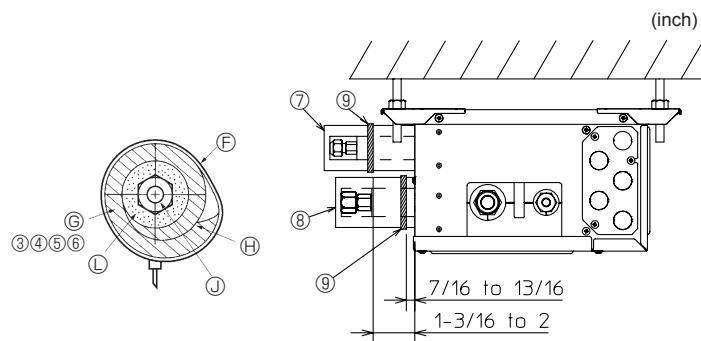


Fig. 7-3

Fig. 7-4

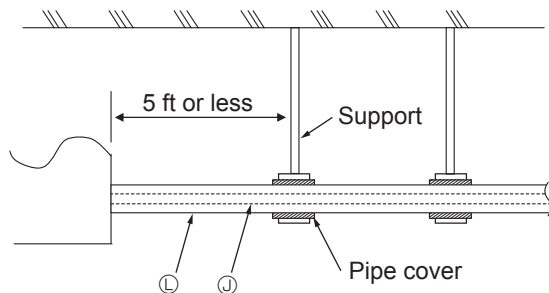


Fig. 7-5

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 (inch, mm)	Tightening torque (ft•lbs, N•m)
1/4, ø6.35	8-11, 13 ± 2
3/8, ø9.52	21-24, 30 ± 2
1/2, ø12.7	35-38, 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 [5 ft] or less from the branch box.

Refer to Fig. 7-5 as an example.

- ⓐ Refrigerant piping
- Ⓛ Thermal insulation for refrigerant piping