INSTALLATION INSTRUCTIONS
– VRF System Air Conditioner –

Panasonic®

This air conditioner uses the refrigerant R410A.

Model No.

Indoor Units				
Type	Indoor Unit Type	Nominal Capacity		
		7	9	12
K2	Wall Mounted	S-07MK2U6	S-09MK2U6	S-12MK2U6

Read through the Installation Instructions before you proceed with the installation.
In particular, you will need to read under the “IMPORTANT!” section at the top of the page.

IMPORTANT!
Please Read Before Starting

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

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

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- This air conditioner shall be installed in accordance with National Wiring Regulations.
- Pay close attention to all warning and caution notices given in this manual.

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

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

If Necessary, Get Help

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

In Case of Improper Installation

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

SPECIAL PRECAUTIONS

WARNING **When Wiring**

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

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause **accidental injury or death**.
- **Ground the unit** following local electrical codes.
- Connect all wiring tightly. Loose wiring may cause over-heating at connection points and a possible fire hazard.
- To prevent possible hazards from insulation failure, the unit must be grounded.

- This equipment is strongly recommended to be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case of equipment breakdown or insulation breakdown.

When Transporting

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

When Installing…

Select an installation location which is rigid and strong enough to support or hold the unit, and select a location for easy maintenance.

…In a Room

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

CAUTION Keep the fire alarm and the air outlet at least 5 feet (1.5 m) away from the unit.

…In Moist or Uneven Locations

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

…In an Area with High Winds

Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

…In a Snowy Area (for Heat Pump-type Systems)

Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.

When Connecting Refrigerant Tubing

- Ventilate the room well, in the event that is refrigerant gas leaks during the installation. Be careful not to allow contact of the refrigerant gas with a flame as this will cause the generation of poisonous gas.
- Keep all tubing runs as short as possible.
- Use the flare method for connecting tubing.
- Apply refrigerant lubricant to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak-free connection.
- Check carefully for leaks before starting the test run.

WARNING

- When performing piping work do not mix air except for specified refrigerant (R410A) in refrigeration cycle. It causes capacity down, and risk of explosion and injury due to high tension inside the refrigerant cycle.
- Check for a leaking refrigerant! Refrigerant gas may produce a toxic gas if it comes in contact with fire.
- Do not add or replace refrigerant other than specified type. It may cause product damage, burst and injury etc.

- Do not leak refrigerant while piping work for an installation or re-installation, and while repairing refrigeration parts.
  Handle liquid refrigerant carefully as it may cause frostbite.

When Servicing

- Turn the power OFF at the main power box (mains) before opening the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit being serviced.

WARNING

- This product must not be modified or disassembled under any circumstances. Modified or disassembled unit may cause fire, electric shock or injury.
- Do not clean inside the indoor and outdoor units by users. Engage authorized dealer or specialist for cleaning.
- In case of malfunction of this appliance, do not repair by yourself. Contact to the sales dealer or service dealer for a repair.

CAUTION

- Do not touch the air inlet or the sharp aluminum fins of the outdoor unit. You may get injured.
- Ventilate any enclosed areas when installing or testing the refrigeration system. Escaped refrigerant gas, on contact with fire or heat, can produce dangerously toxic gas.
- Confirm after installation that no refrigerant gas is leaking. If the gas comes in contact with a burning stove, gas water heater, electric room heater or other heat source, it can cause the generation of poisonous gas.

Others

CAUTION

- Do not sit or step on the unit, you may fall down accidentally.
- Do not touch the air inlet or the sharp aluminum fins of the outdoor unit. You may get injured.
- Do not stick any object into the FAN CASE.
  You may be injured and the unit may be damaged.

Check of Density Limit

The room in which the air conditioner is to be installed requires a design that in the event of refrigerant gas leaking out, its density will not exceed a set limit.

The refrigerant (R410A), which is used in the air conditioner, is safe, without the toxicity or combustibility of ammonia, and is not restricted by laws imposed to protect the ozone layer. However, since it contains more than air, it poses the risk of suffocation if its density should rise excessively. Suffocation from leakage of refrigerant is almost non-existent. With the recent increase in the number of high density buildings, however, the installation of multi air conditioner systems is on the increase because of the need for effective use of floor space, individual control, energy conservation by curtailing heat and carrying power, etc.

Most importantly, the multi air conditioner system is able to replenish a large amount of refrigerant compared to conventional individual air conditioners. If a single unit of the multi air conditioner system is to be installed in a small room, select a suitable model and installation procedure so that if the refrigerant accidentally leaks out, its density does not reach the limit (and in the event of an emergency, measures can be made before injury can occur).

ASHRAE and the International Mechanical Code of the ICC as well as CSA provide guidance and define safeguards related to the use of refrigerants, all of which define a Refrigerant Concentration Level (RCL) of 25 pounds (11.3 kg) per 1,000 cubic feet (28.3 m^3) for R410A refrigerant.

For additional guidance and precautions related to refrigerant safety, please refer to the following documents:

International Mechanical Code 2012 (IMC-2012)
(or more recently revised)
ASHRAE 15
ASHRAE 34

CONTENTS

1. GENERAL

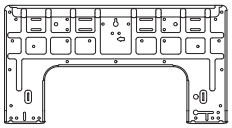
This booklet briefly outlines where and how to install the air conditioning system. Please read over the entire set of instructions for the indoor units and make sure all accessory parts listed are with the indoor units before beginning.

1-1. Tools Required for Installation (not supplied)

1. Flathead screwdriver
2. Phillips head screwdriver
3. Knife or wire stripper
4. Tape measure
5. Carpenter's level
6. Sabre saw or keyhole saw
7. Hacksaw
8. Core bits
9. Hammer
10. Drill
11. Tube cutter
12. Tube flaring tool
13. Torque wrench
14. Adjustable wrench
15. Reamer (for deburring)

1-2. Accessories Supplied with Unit

Wall Mounted (K2 type)

No.	Accessories part	Qty.
1	Installation plate 	1
2	Installation plate fixing screw 	5
3	Drain hose adapter 	1
4	Operating Instructions 	1
5	Installation Instruction 	1
6	Warranty card 	1

1-3. Type of Copper Tube and Insulation Material

If you wish to purchase these materials separately from a local source, you will need:

1. Deoxidized annealed copper tube for refrigerant tubing. Cut each tube to the appropriate lengths +1 ft. (30 cm) to 1.5 ft. (40 cm) to dampen vibration between units.
2. Foamed polyethylene insulation for copper tubes as required to precise length of tubing. Wall thickness of the insulation should be not less than 5/16" (8 mm).
3. Use insulated copper wire for field wiring. Wire size varies with the total length of wiring.
   Refer to 4. ELECTRICAL WIRING for details.

⚠ CAUTION

Check local electrical codes and regulations before obtaining wire. Also, check any specified instructions or limitations.

1-4. Additional Materials Required for Installation

1. Refrigeration (armored) tape
2. Insulated staples or clamps for connecting wire (See your local codes.)
3. Putty
4. Refrigeration tubing lubricant
5. Clamps or saddles to secure refrigerant tubing
6. Scale for weighing

2. SELECTING THE INSTALLATION SITE

2-1. Indoor Unit

AVOID:

- areas where leakage of flammable gas may be expected.
- places where large amounts of oil mist exist.
- direct sunlight.
- locations near heat sources which may affect the performance of the unit.
- locations where external air may enter the room directly.
  This may cause “condensation” on the air discharge ports, causing them to spray or drip water.
- locations where the remote controller will be splashed with water or affected by dampness or humidity.
- installing the remote controller behind curtains or furniture.
- locations where high-frequency emissions are generated.

DO:

- select an appropriate position from which every corner of the room can be uniformly cooled.
- select a location where the ceiling is strong enough to support the weight of the unit.

⚠ WARNING

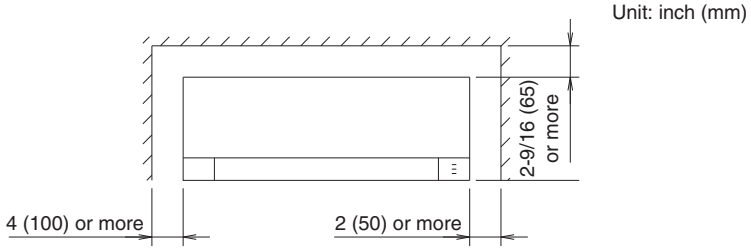
- select a location which can support a load that is four times the indoor unit weight.
- select a location where tubing and drain pipe have the shortest run to the outdoor unit.
- allow room for operation and maintenance as well as unrestricted air flow around the unit.
- install the unit within the maximum elevation difference above or below the outdoor unit and within a total tubing length (L) from the outdoor unit as detailed in the installation instructions packed with the outdoor unit.
- allow room for mounting the remote controller about 3.3 ft. (1 m) off the floor, in an area that is not in direct sunlight nor in the flow of cool air from the indoor unit.

NOTE

Air delivery will be degraded if the distance from the floor to the ceiling is greater than 9.8 ft. (3 m).

The air inlet and outlet of the indoor unit must be free of any obstructions to allow air to spread throughout the room.

1. The indoor unit must be within a maintenance space.



Front View

Fig. 2-1

3. HOW TO INSTALL THE INDOOR UNIT

3-1. Starting the Installation

(1) Remove the rear panel.

NOTE

Tubing can be extended in 6 directions as shown in Fig. 3-1. Select the direction you need providing the shortest run to the outside unit.

Piping direction

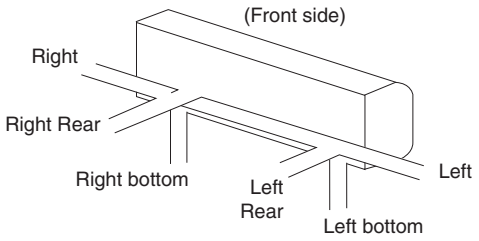


Fig. 3-1

3-2. How to Fix Installation Plate

The mounting wall should be strong and solid enough to withstand the unit's vibration.

Unit: inch (mm)

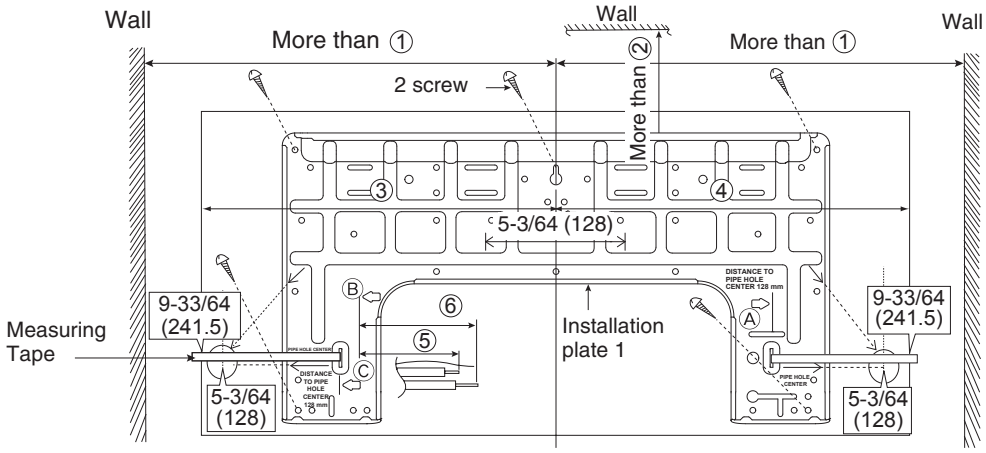


Fig. 3-2

Table 3-1

		S-07MK2U6 S-09MK2U6 S-12MK2U6	
		inch	mm
Dimension	①	21-17/64	540
	②	3-15/64	82
	③	17-9/32	439
	④	17-1/64	432
	⑤	1-11/16	43
	⑥	3-47/64	95

The center of installation plate should be at more than ① at right and left of the wall.
The distance from installation plate edge to ceiling should be more than ②.
From installation plate center to unit's left side is ③.
From installation plate center to unit's right side is ④.
For left side piping, piping connection for liquid should be about ⑤ from this line.
For left side piping, piping connection for gas should be about ⑥ from this line.

(1) Mount the installation plate on the wall with 5 screws or more (at least 5 screws).
(If mounting the unit on the concrete wall, consider using anchor bolts.)

- Always mount the installation plate horizontally by aligning the marking-off line with the thread and using a level gauge.

(2) Drill the piping plate hole with ø2-3/4" (ø70 mm) hole-core drill.

- Putting measuring tape at position as shown in the diagram above.
  The hole center is obtained by measuring the distance namely 5-3/64" (128 mm) for left and right hole respectively.
  Another method is intersection point of arrow mark extension.
  The meeting point of the extension arrow mark is the hole center position.
- Drill the piping hole at either the right or the left and the hole should be slightly slanting to the outdoor side. (Refer to Section 3-3. "To Drill a Hole in the Wall and Install a Piping sleeve".)

(3) Double check with a carpenter's level or tape measure that the panel is level. This is important to install the unit properly. (Fig. 3-3)

CAUTION **Also avoid areas where electrical wiring or conduits are located.**

The previous precautions are also applicable if tubing goes through the wall in any other location.

(4) Using a sabre saw, keyhole saw or hole-cutting drill attachment, cut a hole in the wall. (Fig. 3-4)

NOTE

Hole should be made at a slight downward slant to the outdoor side.

3-3. To Drill a Hole in the Wall and Install a Piping sleeve

(1) Insert the piping sleeve to the hole.

(2) Fix the bushing to the sleeve.

(3) Cut the sleeve until it extrudes about 5/8" (15 mm) from the wall.

CAUTION When the wall is hollow, please be sure to use the piping sleeve assembly to prevent dangers caused by mice biting the connection cable.

(4) Finish by sealing the sleeve with putty or caulking compound at the final stage.

3-4. Install the Rear Panel on the Wall

Be sure to confirm that the wall is strong enough to suspend the unit.

(1) Make sure the panel is flush against the wall.
Any space between the wall and unit will cause noise and vibration.

3-5. How to take out Front Grille

Please follow the steps below to take out front grille if necessary such as when servicing.

(1) Set the vertical airflow direction louvers to the horizontal position.

(2) Remove the 2 caps on the front grille as shown in the figure at right, and then remove the 2 mounting screws.

(3) Pull the lower section of the front grille towards you to remove the front grille.

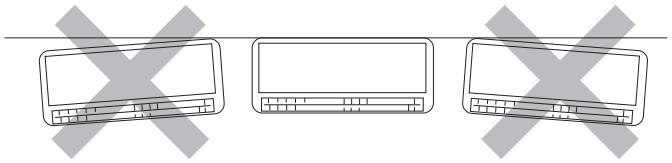


Fig. 3-3

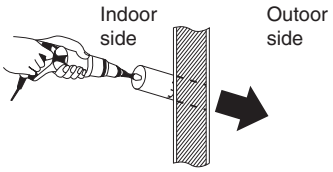


Fig. 3-4

Table 3-2

Hole Diameter
2-3/4 inch (70 mm)

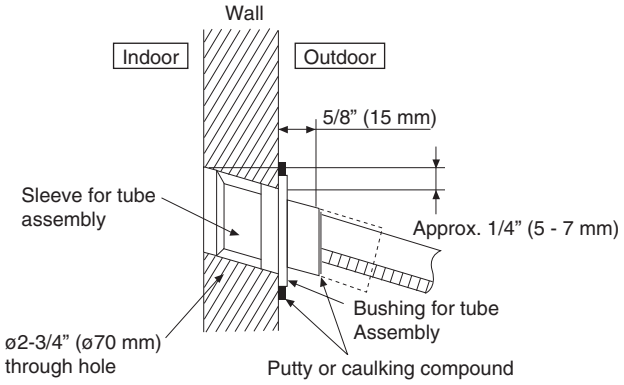


Fig. 3-5

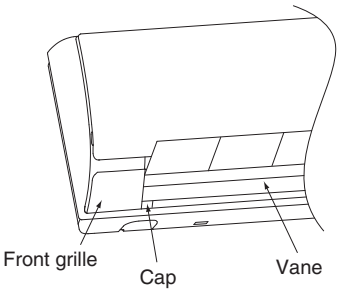


Fig. 3-6

When reinstalling the front grille, first set the vertical airflow direction louver to the horizontal position and then carry out steps (2) - (3) described at left in the reverse order.

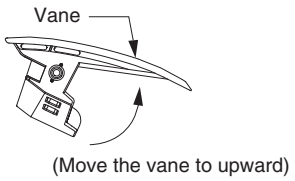


Fig. 3-7

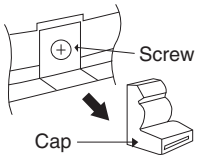


Fig. 3-8

3-6. Indoor Unit Installation

- Do not turn over the unit without its shock absorber during pull out the piping. It may cause intake grille damage.
- Use shock absorber during pull out the piping to protect the intake grille from damage.

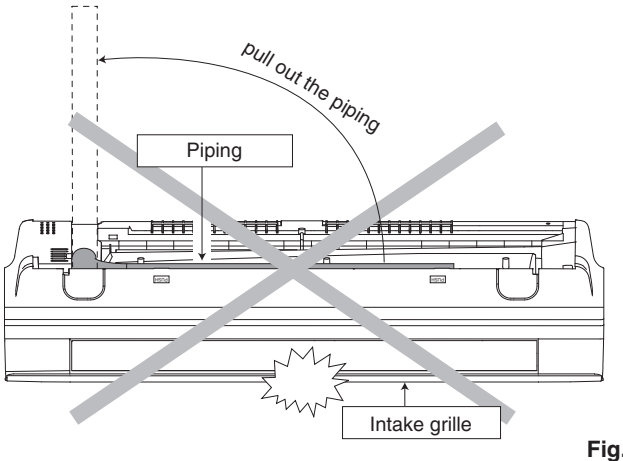


Fig. 3-9

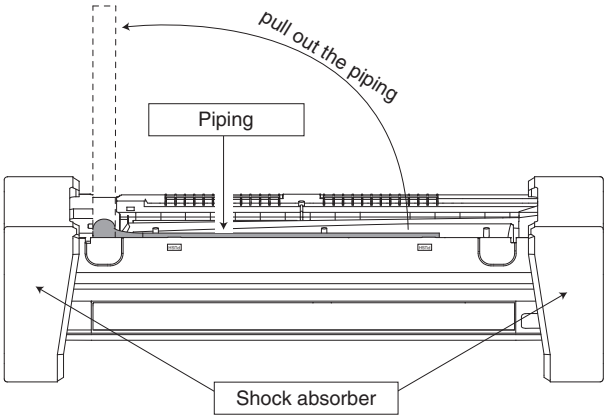


Fig. 3-10

(1) For the Right Rear Piping

Step 1	Pull out the Indoor piping
↓	
Step 2	Install the Indoor Unit
↓	
Step 3	Secure the Indoor Unit
↓	
Step 4	Insert the power supply cord and connection cable

- Insert the cables from bottom of the unit through the control board hole until terminal board area.

How to keep the cover

In case of the cover is cut, keep the cover at the rear of chassis as shown in the figure for future reinstallation.
(Left, right and 2 bottom covers for piping.)

(2) For the Right and Right Bottom Piping

Step 1	Pull out the Indoor piping
↓	
Step 2	Install the Indoor Unit
↓	
Step 3	Insert the power supply cord and connection cable
↓	• Insert the cables from bottom of the unit through the control board hole until terminal board area.
Step 4	Secure the Indoor Unit

Right Rear piping

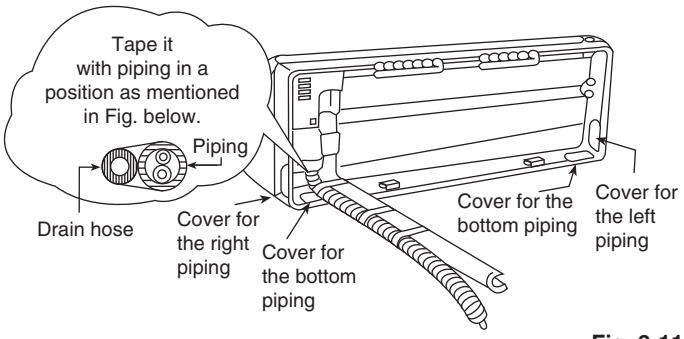


Fig. 3-11

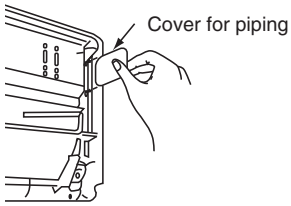


Fig. 3-12

Right and Right Bottom piping

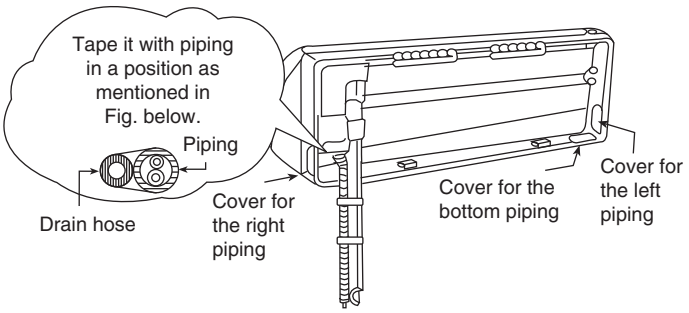


Fig. 3-13

(3) For the Embedded Piping

Step 1	Replace the drain hose
↓	
Step 2	Bend the embedded piping
↓	• Use a spring bender or equivalent to bend the piping so that the piping is not crushed.
Step 3	Pull the connection cable into Indoor Unit
↓	• The power supply cord and indoor unit and outdoor unit connection cable can be connected without removing the front grille.
Step 4	Cut and flare the embedded piping
↓	• When determining the dimensions of the piping, slide the unit all the way to the left on the installation plate.
↓	
Step 5	Install the Indoor Unit
↓	
Step 6	Connect the piping
↓	
Step 7	Insulate and finish the piping
↓	
Step 8	Secure the Indoor Unit

Install the indoor unit

Hook the indoor unit onto the upper portion of installation plate. (Engage the indoor unit with the upper edge of the installation plate). Ensure the hooks are properly seated on the installation plate by moving it in left and right.

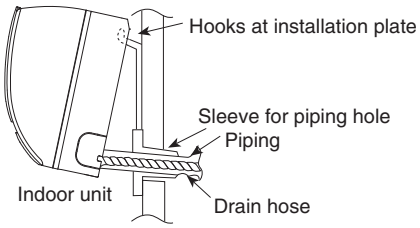


Fig. 3-14

Secure the Indoor Unit

Press the lower left and right side of the unit against the installation plate until hooks engages with their slot (sound click).

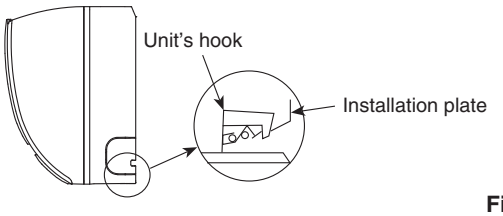
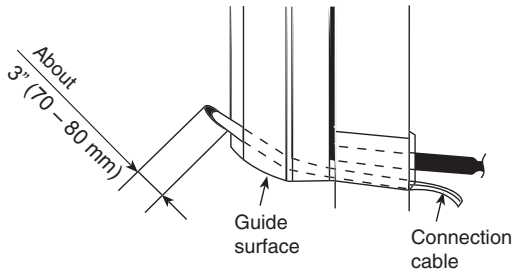


Fig. 3-15

Insert the connection cable



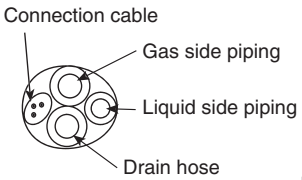


Fig. 3-16

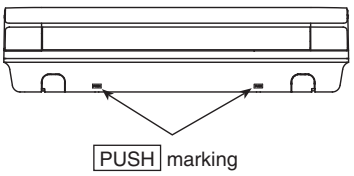


Fig. 3-17

To take out the unit, push the PUSH marking at the bottom unit, and pull it slightly towards you to disengage the hooks from the unit.

(This can be used for left rear piping and bottom piping also.)

3-7. Replace the Drain Hose

(1) Rear view for left piping installation

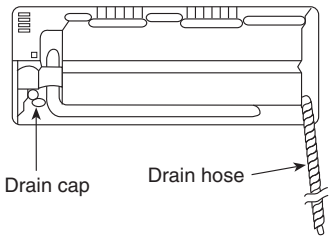


Fig. 3-18

(2) Adjust the piping slightly downwards

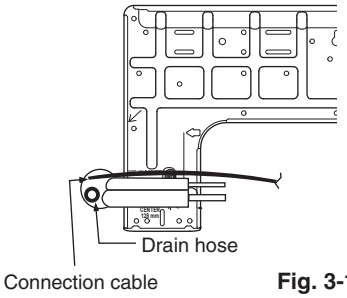


Fig. 3-19

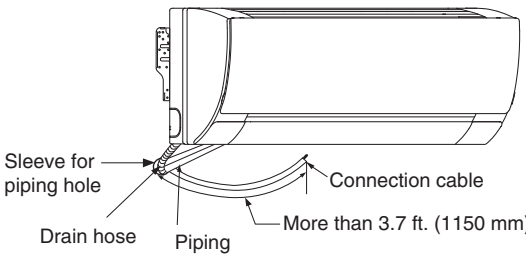


Fig. 3-20

(3) How to pull the piping and drain hose out, in case of the embedded piping.

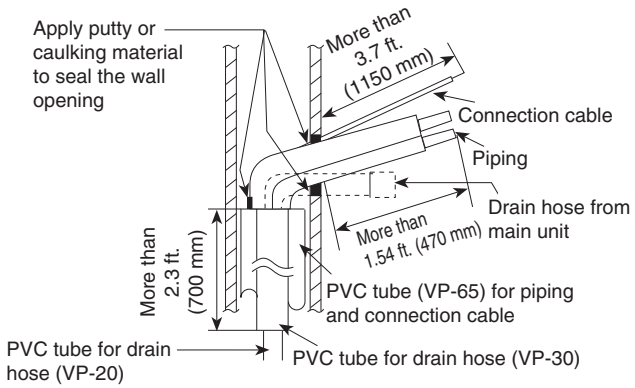


Fig. 3-21

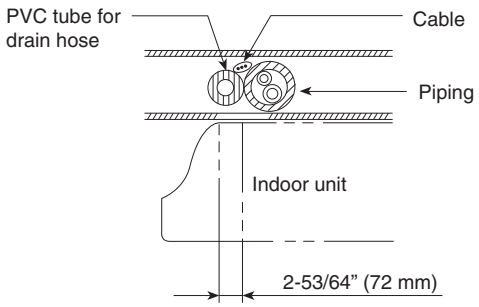


Fig. 3-22

(4) In case of left piping how to insert the connection cable and drain hose.

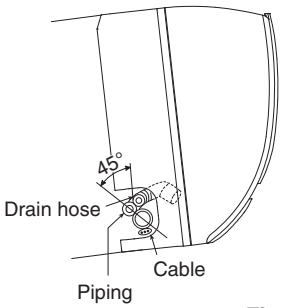


Fig. 3-23

(For the right piping, follow the same procedure)

NOTE

Attention not to bend up drain hose

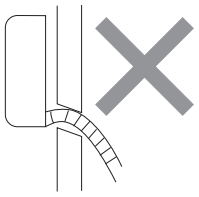


Fig. 3-24

3-8. Drain Hose Adapter (supplied) Usage

- Join indoor drain hose to 3/4" (20 mm) nominal PVC pipe size by using drain hose adapter (supplied) when necessary.

NOTE

Make sure indoor unit drain hose & 3/4" (20 mm) nominal PVC pipe are fully inserted to drain hose adapter (supplied).

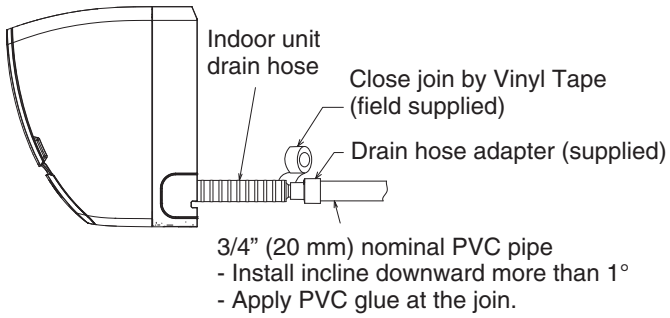


Fig. 3-25

3-9. Check the Drainage

- Open front panel and remove air filters.
  (Drainage checking can be carried out without removing the front grille.)
- Pour a glass of water into the drain tray-styrofoam.
- Ensure that water flows out from drain hose of the indoor unit.

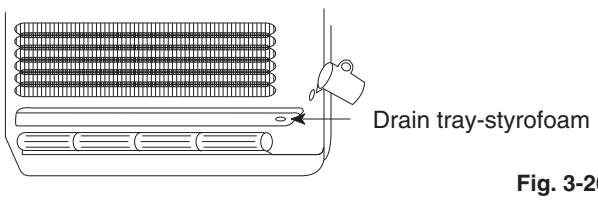


Fig. 3-26

4. ELECTRICAL WIRING

4-1. General Precautions on Wiring

(1) Before wiring, confirm the rated voltage of the unit as shown on its nameplate, then carry out the wiring closely following the wiring diagram.

⚠ WARNING

(2) This equipment is strongly recommended to be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case of equipment breakdown or insulation breakdown.
Earth Leakage Circuit Breaker (ELCB) must be incorporated in the fixed wiring in accordance with the wiring regulations. The Earth Leakage Circuit Breaker (ELCB) must be an approved 15 A, having a contact separation in all poles.

(3) To prevent possible hazards from insulation failure, the unit must be grounded.

(4) Each wiring connection must be done in accordance with the wiring system diagram. Wrong wiring may cause the unit to misoperate or become damaged.

(5) Do not allow wiring to touch the refrigerant tubing, compressor, or any moving parts of the fan.

(6) Unauthorized changes in the internal wiring can be very dangerous. The manufacturer will accept no responsibility for any damage or misoperation that occurs as a result of such unauthorized changes.

(7) Regulations on wire diameters differ from locality to locality. For field wiring rules, please refer to your LOCAL ELECTRICAL CODES before beginning.
You must ensure that installation complies with all relevant rules and regulations.

(8) To prevent malfunction of the air conditioner caused by electrical noise, care must be taken when wiring as follows:

- The remote control wiring and the inter-unit control wiring should be wired apart from the inter-unit power wiring.
- Use shielded wires for inter-unit control wiring between units and ground the shield on single side.

(9) If the power supply cord of this appliance is damaged, it must be replaced by a repair shop designated by the manufacturer, because special-purpose tools are required.

4-2. Recommended Wire Length and Wire Diameter for Power Supply System

Indoor unit

Type	Time delay fuse or circuit capacity
K2	15 A

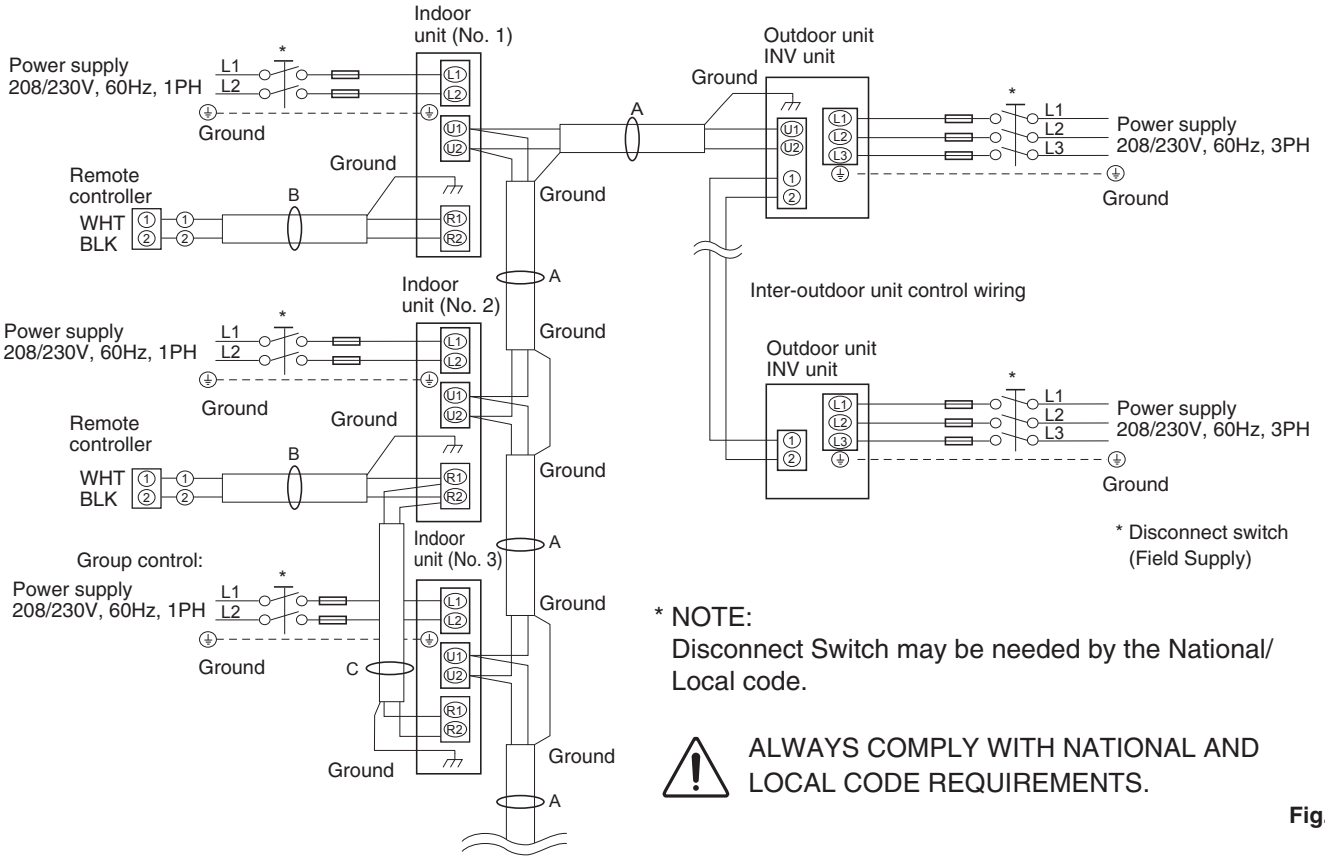
Control wiring

(A) Inter-unit control wiring (between outdoor and indoor units)	(B) Remote control wiring	(C) Control wiring for group control
AWG #18 ($0.75\ mm^2$) **Use shielded wiring***	AWG #18 ($0.75\ mm^2$) **Use shielded wiring***	AWG #18 ($0.75\ mm^2$) **Use shielded wiring***
Max. 3,280 ft. (Max. 1,000 m)	Max. 1,640 ft. (Max. 500 m)	Max. 650 ft. (Total) (Max. 200 m (Total))

NOTE

* With ring-type wire terminal.

4-3. Wiring System Diagram



* NOTE:
Disconnect Switch may be needed by the National/ Local code.

ALWAYS COMPLY WITH NATIONAL AND LOCAL CODE REQUIREMENTS.

Fig. 4-1

NOTE

(1) Refer to Section “4-2. Recommended Wire Length and Wire Diameter for Power Supply System” for the explanation of “A”, “B” and “C” in the above diagram.

(2) The basic connection diagram of the indoor unit shows the terminal boards, so the terminal boards in your equipment may differ from the diagram.

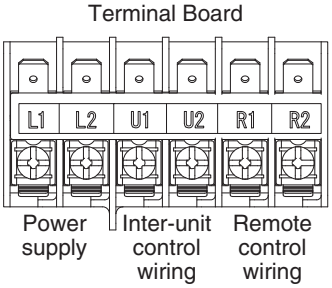
(3) Refrigerant Circuit (R.C.) address should be set before turning the power on.

(4) Regarding R.C. address setting, refer to the installation instructions supplied with the outdoor unit. Auto address setting can be executed by remote controller automatically.

(5) Ensure that the ground shield cable for inter-unit control wiring between outdoor and indoor units should be connected to the outdoor unit.

(6) For the inter-unit control wiring between the indoor units, be sure to connect between the shield.
Then connect it to the shield of inter-unit control wiring between outdoor and indoor units.

(7) Ensure that the ground shield cable for a remote controller should be connected only to the indoor unit.



K2 Type

Fig. 4-2

CAUTION

(1) When linking the outdoor units in a network, disconnect the terminal extended from the short plug (on the outdoor main control PCB) from all outdoor units except any one of the outdoor units. (When shipping: In shorted condition.)
For a system without link (no connection wiring between outdoor units), do not remove the short plug.

(2) Do not install the inter-unit control wiring in a way that forms a loop. (Fig. 4-3)

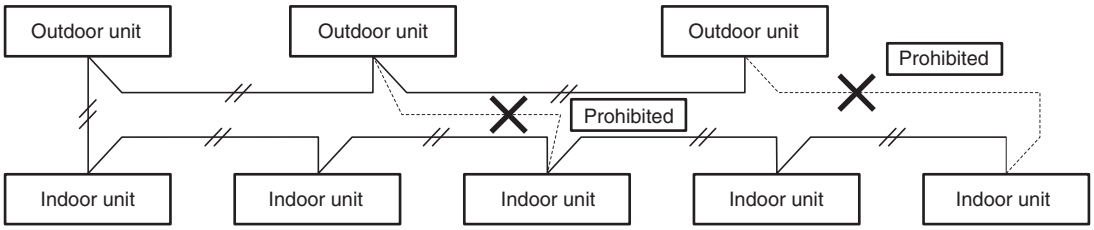


Fig. 4-3

(3) Do not install inter-unit control wiring such as star branch wiring. Star branch wiring causes misaddress setting. (Fig. 4-4)

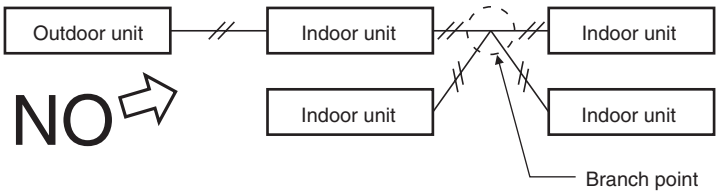


Fig. 4-4

(4) If branching the inter-unit control wiring, the number of branch points should be 16 or fewer.

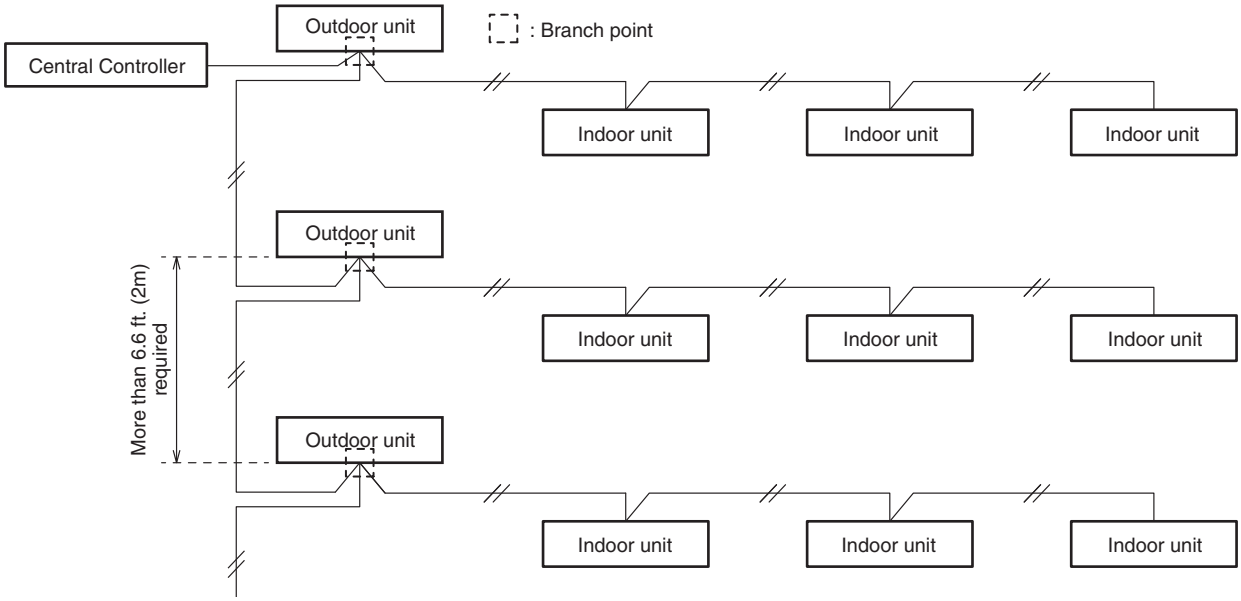


Fig. 4-5

CAUTION **Loose wiring may cause the terminal to overheat or result in unit malfunction. A fire hazard may also occur. Therefore, ensure that all wiring is tightly connected.**

When connecting each power wire to the terminal, follow the instructions on “How to connect wiring to the terminal” and fasten the wire securely with the fixing screw of the terminal board.

How to connect wiring to the terminal

■ **For stranded wiring**

(1) Cut the wire end with cutting pliers, then strip the insulation to expose the stranded wiring approx. 3/8 inch (10 mm) and tightly twist the wire ends. (Fig. 4-6)

(2) Using a Phillips head screwdriver, remove the terminal screw(s) on the terminal board.

(3) Using a ring connector fastener or pliers, securely clamp each stripped wire end with a ring pressure terminal.

(4) Place the ring pressure terminal, and replace and tighten the removed terminal screw using a screwdriver. (Fig. 4-7)

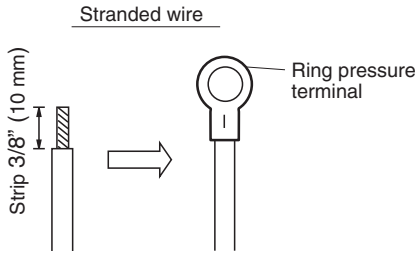


Fig. 4-6

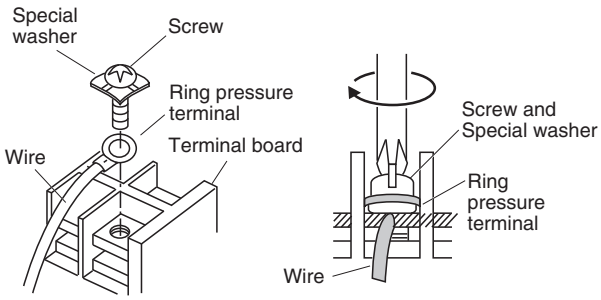
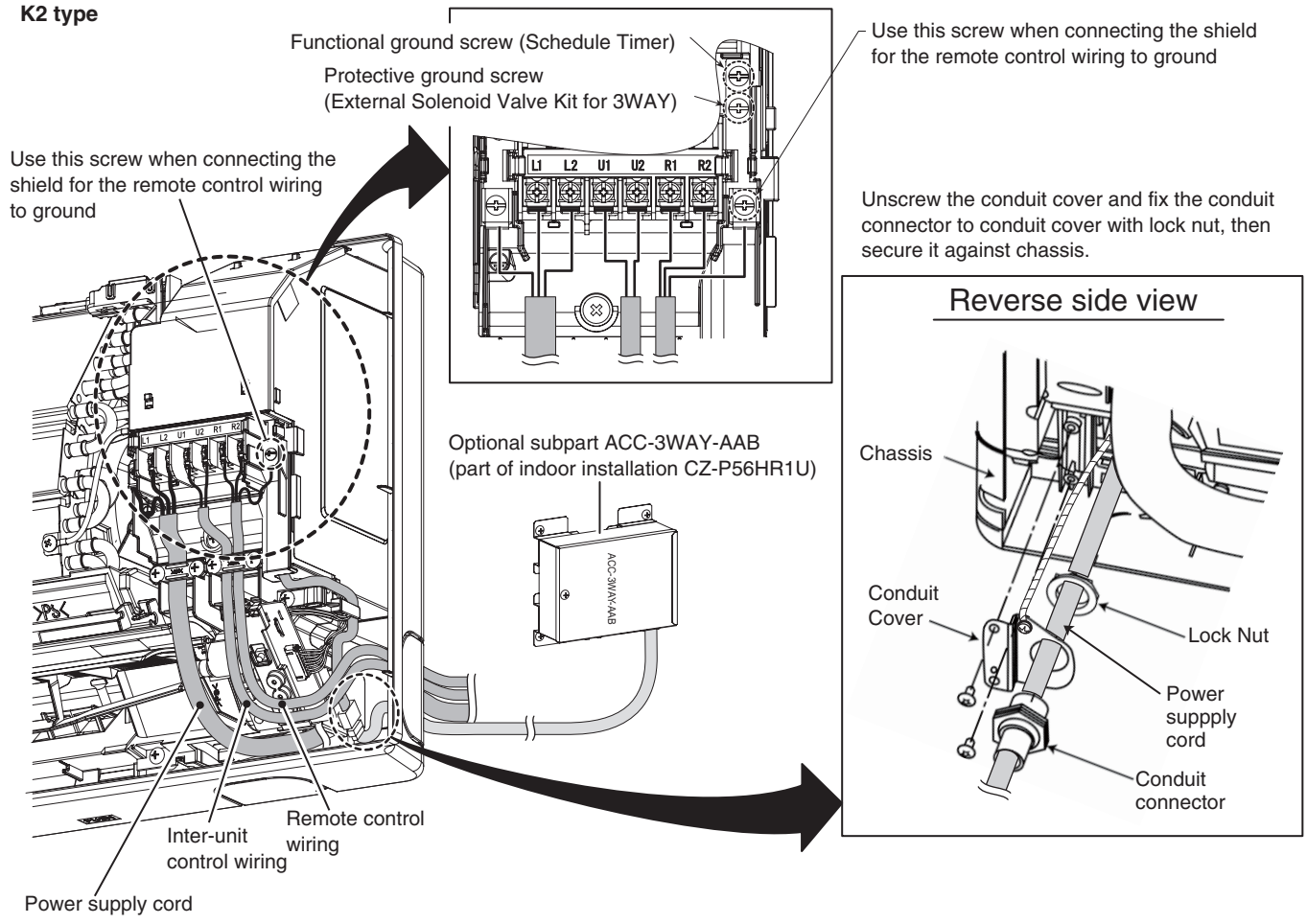


Fig. 4-7

■ **Wiring sample**

K2 type



5. HOW TO PROCESS TUBING

The liquid tubing side is connected by a flare nut, and the gas tubing side is connected by brazing.

5-1. Connecting the Refrigerant Tubing

Use of the Flaring Method

Many of conventional split system air conditioners employ the flaring method to connect refrigerant tubes that run between indoor and outdoor units. In this method, the copper tubes are flared at each end and connected with flare nuts.

Flaring Procedure with a Flare Tool

(1) Cut the copper tube to the required length with a tube cutter. It is recommended to cut approx. 1-2 ft. (30 – 50 cm) longer than the tubing length you estimate.

(2) Remove burrs at each end of the copper tubing with a tube reamer or file. This process is important and should be done carefully to make a good flare. Be sure to keep any contaminants (moisture, dirt, metal filings, etc.) from entering the tubing. (Figs. 5-1 and 5-2)

NOTE

When reaming, hold the tube end downward and be sure that no copper scraps fall into the tube. (Fig. 5-2)

(3) Remove the flare nut from the unit and be sure to mount it on the copper tube.

(4) Make a flare at the end of the copper tube with a flare tool. (Fig. 5-3)

NOTE

A good flare should have the following characteristics:

- inside surface is glossy and smooth
- edge is smooth
- tapered sides are of uniform length

Caution Before Connecting Tubes Tightly

(1) Apply a sealing cap or water-proof tape to prevent dust or water from entering the tubes before they are used.

(2) Be sure to apply refrigerant lubricant (ether oil) to the inside of the flare nut before making piping connections. This is effective for reducing gas leaks. (Fig. 5-4)

(3) For proper connection, align the union tube and flare tube straight with each other, then screw on the flare nut lightly at first to obtain a smooth match. (Fig. 5-5)

- Adjust the shape of the liquid tube using a tube bender at the installation site and connect it to the liquid tubing side valve using a flare.

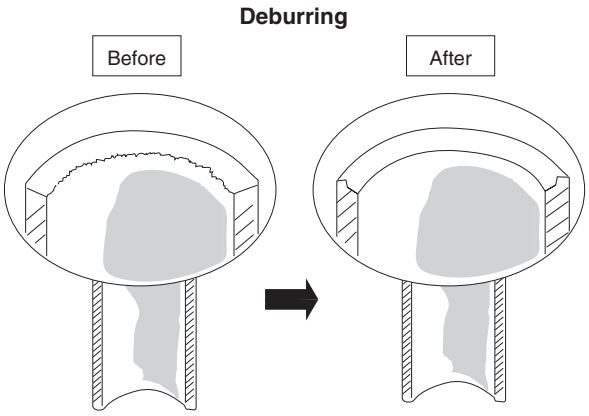


Fig. 5-1

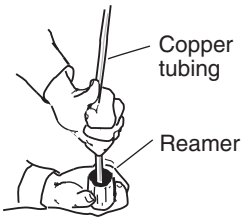


Fig. 5-2

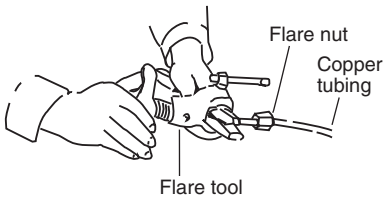


Fig. 5-3

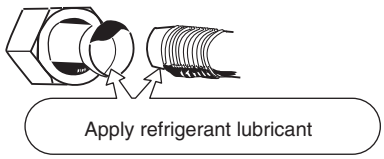


Fig. 5-4

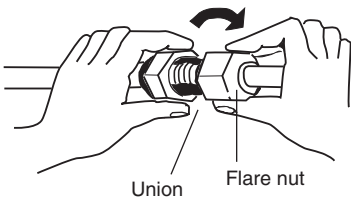


Fig. 5-5

Cautions During Brazing

- **Replace air inside the tube with nitrogen gas to prevent copper oxide film from forming during the brazing process. (Oxygen, carbon dioxide and Freon are not acceptable.)**
- **Do not allow the tubing to get too hot during brazing. The nitrogen gas inside the tubing may overheat, causing refrigerant system valves to become damaged. Therefore allow the tubing to cool when brazing.**
- **Use a reducing valve for the nitrogen cylinder.**
- **Do not use agents intended to prevent the formation of oxide film. These agents adversely affect the refrigerant and refrigerant oil, and may cause damage or malfunctions.**

5-2. Connecting Tubing Between Indoor and Outdoor Units

(1) Tightly connect the indoor-side refrigerant tubing extended from the wall with the outdoor-side tubing.

Indoor Unit Tubing Connection (ℓ_1, ℓ_2...ℓ_{n-1})

Indoor unit type		7	9	12
Gas tubing	inch	ø1/2		
	mm	ø12.7		
Liquid tubing	inch	ø1/4		
	mm	ø6.35		

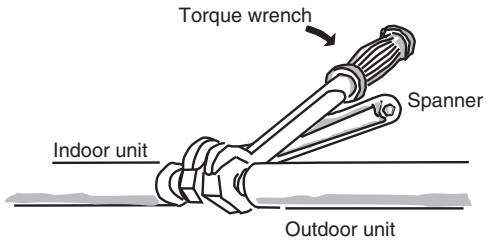


Fig. 5-6

(2) To fasten the flare nuts, apply specified torque.

- When removing the flare nuts from the tubing connections, or when tightening them after connecting the tubing, be sure to use 2 adjustable wrenches or spanners. (Fig. 5-6)
  If the flare nuts are over-tightened, the flare may be damaged, which could result in refrigerant leakage and cause injury or asphyxiation to room occupants.

- For the flare nuts at tubing connections, be sure to use the flare nuts that were supplied with the unit, or else flare nuts for R410A (type 2). The refrigerant tubing that is used must be of the correct wall thickness as shown in the table at right.

Tube diameter		Tightening torque, approximate	Tube thickness
ø1/4" (ø6.35 mm)	lbf·inch	120 – 160 lbf·inch	1/32"
	N·m	14 – 18 N·m	0.8 mm
	{kgf·cm}	{140 – 180 kgf·cm}	
ø3/8" (ø9.52 mm)	lbf·inch	300 – 360 lbf·inch	1/32"
	N·m	34 – 42 N·m	0.8 mm
	{kgf·cm}	{340 – 420 kgf·cm}	
ø1/2" (ø12.7 mm)	lbf·inch	430 – 540 lbf·inch	1/32"
	N·m	49 – 61 N·m	0.8 mm
	{kgf·cm}	{490 – 610 kgf·cm}	
ø5/8" (ø15.88 mm)	lbf·inch	590 – 710 lbf·inch	5/128"
	N·m	68 – 82 N·m	1.0 mm
	{kgf·cm}	{680 – 820 kgf·cm}	
ø3/4" (ø19.05 mm)	lbf·inch	885 – 1060 lbf·inch	5/128"
	N·m	100 – 120 N·m	1.0 mm
	{kgf·cm}	{1000 – 1200 kgf·cm}	

Because the pressure is approximately 1.6 times higher than conventional refrigerant pressure, the use of ordinary flare nuts (type 1) or thin-walled tubes may result in tube rupture, injury, or asphyxiation caused by refrigerant leakage.

- In order to prevent damage to the flare caused by over-tightening of the flare nuts, use the table above as a guide when tightening.

- When tightening the flare nut on the liquid tube, use an adjustable wrench with a nominal handle length of 7 – 7/8 in. (200 mm).

5-3. Insulating the Refrigerant Tubing

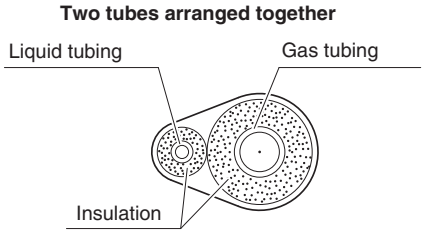


Fig. 5-7

Tubing Insulation

- Thermal insulation must be applied to all unit tubing, including distribution joint (field supply).
  * For gas tubing, the insulation material must be heat resistant to 248°F (120°C) or above. For other tubing, it must be heat resistant to 176°F (80°C) or above.

  Insulation material thickness must be 13/32" (10 mm) or greater.

  If the conditions inside the ceiling exceed DB 86°F (30°C) and RH 70%, increase the thickness of the gas tubing insulation material by 1 step.

CAUTION **If the exterior of the outdoor unit valves has been finished with a square duct covering, make sure you allow sufficient space to access the valves and to allow the panels to be attached and removed.**

NOTE

Gas Leakage Detector

Note that the gas leakage detector should be capable of detecting the refrigerant R410A.

Air Purging

Refer to "AIR PURGING" in the separate Installation Instructions for the outdoor unit in regard to air purging with a vacuum pump (for test run) preparation.

Taping the flare nuts

Cover up the tubing connections with the supplied flare insulator. Then fasten the insulator at both ends with the vinyl clamps (field supply).

Insulation material

The material used for insulation must have good insulation characteristics, be easy to use, be age resistant, and must not easily absorb moisture.

Never grasp the drain or refrigerant connecting outlets when moving the unit.

CAUTION **After a tube has been insulated, never try to bend it into a narrow curve because it can cause the tube to break or crack.**

5-4. Taping the Tubes

(1) At this time, the refrigerant tubes (and electrical wiring if local codes permit) should be taped together with armoring tape in 1 bundle. To prevent condensation from overflowing the drain pan, keep the drain hose separate from the refrigerant tubing.

(2) Wrap the armoring tape from the bottom of the outdoor unit to the top of the tubing where it enters the wall.
As you wrap the tubing, overlap half of each previous tape turn.

(3) Clamp the tubing bundle to the wall, using 1 clamp approx. each meter. (Fig. 5-8)

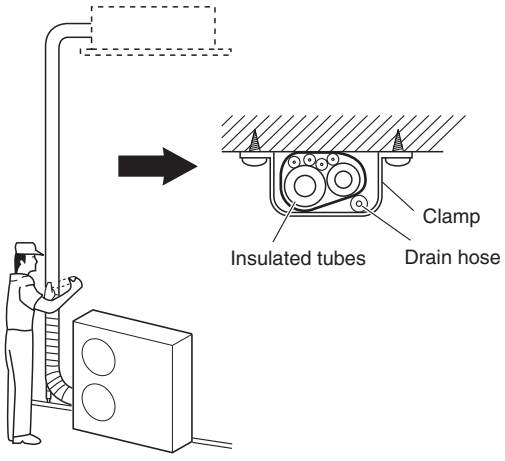


Fig. 5-8

NOTE

Do not wind the armoring tape too tightly since this will decrease the heat insulation effect. Also ensure that the condensation drain hose splits away from the bundle and drips clear of the unit and the tubing.

5-5. Finishing the Installation

After finishing insulating and taping over the tubing, use sealing putty to seal off the hole in the wall to prevent rain and draft from entering. (Fig. 5-9)

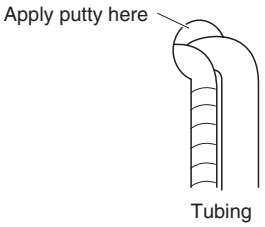
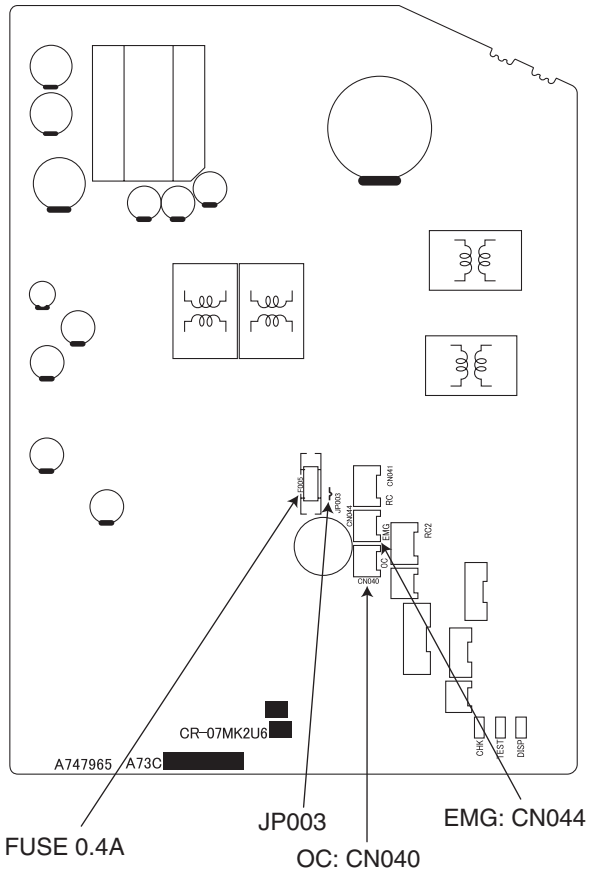


Fig. 5-9

6. PRECAUTIONS ON TEST RUN

- Request that the customer be present at the time the test run is performed.
  Explain the Operating Instructions to the customer and then have the customer actually operate the system.
- Be sure to pass the manual and warranty certificate to the customer.
- Verify that the AC 208 / 230 V wiring is not connected to the terminal plate which is used to connect the inter-unit control wiring.

  * If AC 208 / 230 V is accidentally applied to this terminal plate, the fuse (0.4A for both indoor and outdoor units) on the inter-unit control PCB will be tripped in order to protect the PCB. Correct the wiring connections, then disconnect the 2P connectors (blue, OC, CN040) which are connected to the PCB and connect the other 2P connectors (brown, EMG, CN044). (See the figure.) If operation is still not possible with the brown connectors connected, cut the JP003.
  (Be sure to turn OFF the power before performing this work.)



7. HOW TO INSTALL TIMER REMOTE CONTROLLER (CZ-RTC2) OR HIGH-SPEC WIRED REMOTE CONTROLLER (CZ-RTC3) (OPTIONAL PART)

NOTE

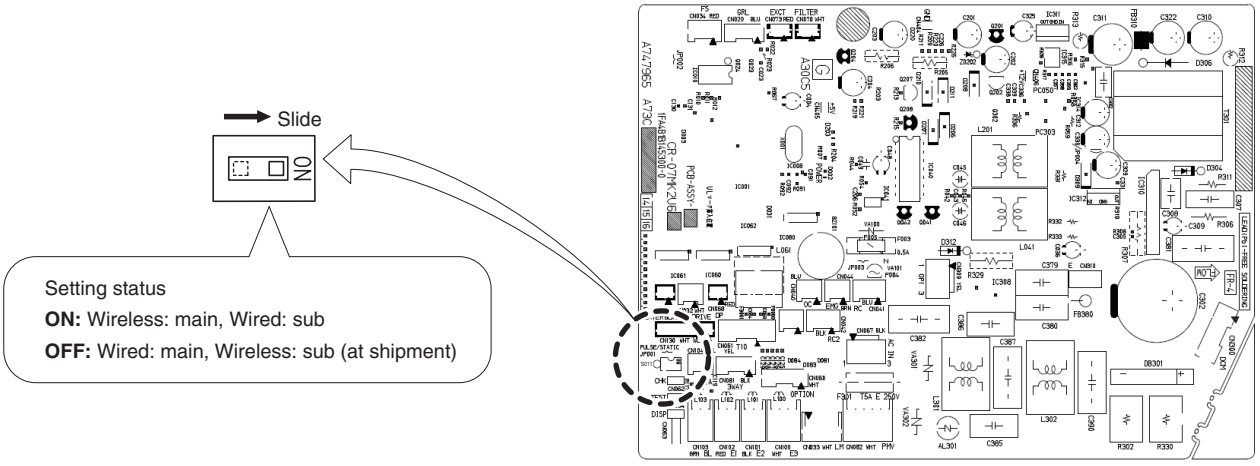
Refer to the Operating Instructions attached to the optional Timer Remote Controller or optional High-spec Wired Remote Controller.

8. APPENDIX

■ When Using Wireless Remote Controller Instead of Wired Remote Controller

When the wireless remote controller is to be used, slide the switch (S011) on the indoor unit control PCB to the ON position.

- If this setting is not made, an alarm will occur. (The operation lamp on the display blinks.)



■ Troubleshooting

If your air conditioner does not work properly, first check the following points before requesting service.
If it still does not work properly, contact your dealer or a service center.

- **Indoor unit**

Symptom		Cause
Noise	Sound like streaming water during operation or after operation	● Sound of refrigerant liquid flowing inside unit ● Sound of drainage water through drain pipe
	Cracking noise during operation or when operation stops.	Cracking sound due to temperature changes of parts
Odor	Discharged air is smelled during operation.	Indoor odor components, cigarette odor and cosmetic odor accumurated in the air conditioner and its air is discharged. Unit inside is dusty. Consult your dealer.
Dewdrop	Dewdrop gets accumurated near air discharge during operation	Indoor moisture is cooled by cool wind and accumulated by dewdrop.
Fog	Fog occurs during operation in cooling mode. (Places where large amounts of oil mist exist at restaurants.)	● Cleaning is necessary because unit inside (heat exchanger) is dirty. Consult your dealer as technical engineering is required. ● During defrost operation
Fan is rotating for a while even though operation stops.		● Fan rotating makes operation smoothly. ● Fan may sometimes rotates because of drying heat exchanger due to settings.
Wind-direction changes while operating. Wind-direction setting cannot be made. Wind-direction cannot be changed.		● When air discharge temperature is low or during defrost operation, horizontal wind flow is made automatically. ● Flap position is occasionally set up individually. ● When long-hour operation is made with fixed wind-direction, wind-direction is controlled automatically and flap position is occasionally changed.
When wind-direction is changed, flap operates several times and stops at designated position.		When wind-direction is changed, flap operates after searching for standard position.
Dust		Dust accumulation inside indoor unit is discharged.

- **Outdoor unit**

Symptom		Cause
No operation	When power is turned ON instantly.	Operation is not acticated for the first approx. 3 minutes because compressor protection circuit is activated.
	When operation is stopped and resumed immediately.	
Noise	Noise often occurs in heating mode.	During defrost operation
Steam	Steam often occurs in heating mode.	
When stopped by remote controller, outdoor unit fan is sometimes operating for a while even though outdoor compressor is stopped.		Fan rotating makes operation smoothly.

● **Check Before Requiring Services**

Symptom	Cause	Remedy
Air conditioner does not run at all although power is turned on.	Power failure or after power failure	Press ON/OFF operation button on remote controller again.
	Operation button is turned off.	● Switch on power if breaker is turned off. ● If breaker has been tripped, consult your dealer without turning it on.
	Fuse blow out.	If blown out, consult your dealer.
Poor cooling or heating performance	Air intake or air discharge port of indoor and outdoor units is clogged with dust or obstacles.	Remove dust or obstruction.
	Wind speed switch is set to “Low”.	Change to “High” or “Strong”.
	Improper temperature settings	Refer to “ ■ Tips for Energy Saving”.
	Room is exposed to direct sunlight in cooling mode.	
	Doors and /or windows are open.	
	Air filter is clogged.	Keep the air filter clean.
	Too much heat sources in room in cooling mode.	Use minimum heat sources and in a short time.
	Too many people in room in cooling mode.	Reduce temperature settings or change to “High” or “Strong”.

If your air conditioner still does not work properly although you checked the points as described above, first stop the operation and turn off the power switch. Then contact your dealer and report the serial number and symptom.
Never repair your air conditioner by yourself since it is very dangerous for you to do so.
You also report if the inspection mark ⚠ and the letters E, F, H, L, P in combination with the numbers appear on the LCD of the remote controller.

■ Tips for Energy Saving

Avoid

- **Do not block the air intake and outlet of the unit.**
  If either is obstructed, the unit will not work well, and may be damaged.
- Do not let direct sunlight into the room.
  Use sunshades, blinds or curtains.
  If the walls and ceiling of the room are warmed by the sun, it will take longer to cool the room.

Do

- Always try to keep the air filter clean. A clogged filter will impair the performance of the unit.
- To prevent conditioned air from escaping, keep windows, doors and any other openings closed.

NOTE

Should the power fail while the unit is running

If the power supply for this unit is temporarily cut off, the unit will automatically resume operation once power is restored using the same settings before the power was interrupted.

– NOTE –

– NOTE –

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