SANYO INSTALLATION INSTRUCTIONS

– Split System Air Conditioner –

COOL/DRY Model

In order to protect the environment, this air conditioner uses the new refrigerant R410A.

Contents

Model Combinations

Combine indoor and outdoor units only as listed below.

Indoor Unit	Outdoor Units
KS2462R	C2462R
	CL2462R

Power supply: 60Hz, single-phase, 208/230V

Units should be installed by a licensed contractor according to local code requirements.

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IMPORTANT!
Please Read Before Starting

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

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

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- Observe all local, state, and national electrical codes.
- Pay close attention to all 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 overheating at connection points and a possible fire hazard.

When Transporting

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

When Installing…

…In a Ceiling, Wall or Floor

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

…In a Room

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

…In Moist or Uneven Locations

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

…In an Area with High Winds

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

…In a Snowy Area (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

- 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.

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.

Others

CAUTION

- 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 upon completing installation that no refrigerant gas is leaking. If escaped gas comes in contact with a stove, gas water heater, electric room heater or other heat source, it can produce dangerously toxic gas.

1. General

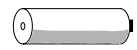
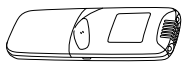
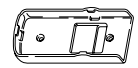
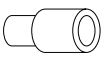
This booklet briefly outlines where and how to install the air conditioning system. Please read over the entire set of instructions for the indoor and outdoor units and make sure all accessory parts listed are with the system before beginning.

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

1. Standard screwdriver
2. Phillips head screwdriver
3. Knife or wire stripper
4. Tape measure
5. Carpenter's level
6. Sabre saw or key hole 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)
16. Pipe bending tool (spring bender)

1-2. Accessories Supplied with Indoor Unit

Table 1

Parts	Figure	Q'ty	Parts	Figure	Q'ty	Parts	Figure	Q'ty
Rawl plug		12	AAA alkaline battery		2	Tapping screw	Truss-head Phillips 5/32 × 5/8" (4 × 16 mm) 	12
Remote control unit		1	Remote control holder		1	Joint drain		1

1-3. Optional Copper Tubing Kit

Copper tubing for connecting the outdoor unit to the indoor unit is available in kits which contain the narrow and wide tubing, fittings and insulation. Consult your nearest sales outlet or A/C workshop.

NOTE For rear-left tubing, optional tube connection (C) **(APR-EN46U1B)** is necessary. See page 20.
Also consult your nearest sales outlet or A/C workshop.

1-4. 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 as detailed in Table 2.

   When cutting tubing, add approximately 12 to 16 in. to each tube length to reduce vibration between the air conditioning units.

Table 2

Model	Outer Diameter	
	Narrow Tube	Wide Tube
KS2462R	3/8"	3/4"

2. Foamed polyethylene insulation for the specified copper tubes as required to precise length of tubing. Wall thickness of the insulation should be not less than 5/16".

1-5. Field Wiring

Use insulated copper wire for field wiring. Wire size varies with the total length of wiring. Refer to 3-6. Wiring Instructions for details.

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

1-6. Additional Materials Required for Installation

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

1-7. Operating Range

	Temperature	Indoor Air Intake	Outdoor Air Intake
Cooling	Maximum	95°F DB, 71°F WB	115°F DB
	Minimum	67°F DB, 57°F WB	67°F DB, (0°F DB)*

*CL□□□□ Models

2. Installation Site Selection

2-1. Indoor Unit

WARNING

To prevent abnormal heat generation and the possibility of fire, do not place obstacles, enclosures and grilles in front of or surrounding the air conditioner in a way that may block air flow.

AVOID:

- direct sunlight.
- nearby heat sources that may affect performance of the unit.
- areas where leakage of flammable gas may be expected.
- places where large amounts of oil mist exist.

DO:

- select an appropriate position from which every corner of the room can be uniformly cooled. (High on a wall is best.)
- select a location that will hold the weight of the unit.
- select a location where tubing and drain hose have the shortest run to the outside. (Fig. 1)
- allow room for operation and maintenance as well as unrestricted air flow around the unit. (Fig. 2)
- install the unit within the maximum elevation difference (H) above or below the outdoor unit and within a total tubing length (L) from the outdoor unit as detailed in Table 3 and Fig. 3a.

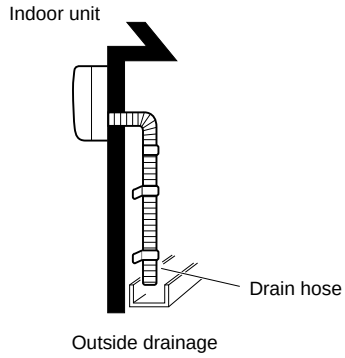
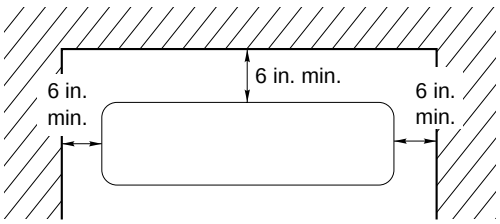


Fig. 1



Front View

Fig. 2

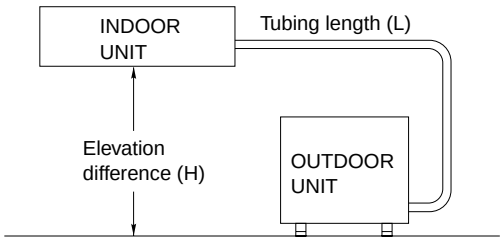


Fig. 3a

CAUTION

For stable operation of the air conditioner, do not install wall-mounted type indoor units less than 5 ft. from floor level.

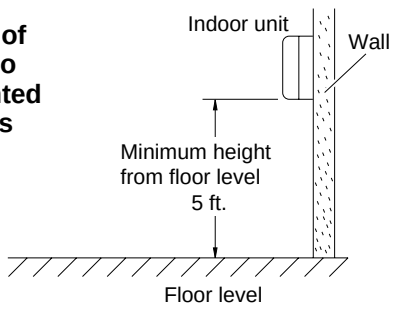


Fig. 3b

Table 3

Model	Max. Allowable Tubing Length at Shipment (ft.)	Limit of Tubing Length (L) (ft.)	Limit of Elevation Difference (H) (ft.)	Required Amount of Additional Refrigerant (oz./ft.)*
C2462R, CL2462R	23	132	50	0.43

* If total tubing length becomes 23 to 132 ft. (max.), additional refrigerant (R410A) charge of 0.43 oz./ft. is required. No additional charge of compressor oil is necessary.

2-2. Outdoor Unit

AVOID:

- heat sources, exhaust fans, etc. (Fig. 4a)
- damp, humid or uneven locations.

DO:

- choose a place as cool as possible.
- choose a place that is well ventilated.
- allow enough room around the unit for air intake/ exhaust and possible maintenance. (Fig. 4b)
- provide a solid base a minimum of 6 inches above ground level to reduce humidity and protect the unit against possible water damage and decreased service life. (Fig. 4c)
- use lug bolts or equal to bolt down unit, to reduce vibration and noise.

2-3. Air Discharge Chamber for Top Discharge

Install the air-discharge chamber in the field when:

- it is difficult to keep a space of minimum 2 ft. between the air-discharge outlet and an obstacle.
- the air-discharge outlet faces a sidewalk and discharged hot air may disturb people passing by. Refer to Fig. 5a.

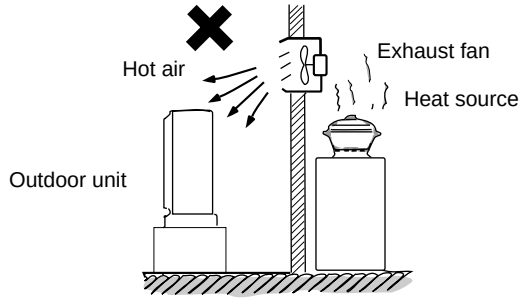


Fig. 4a

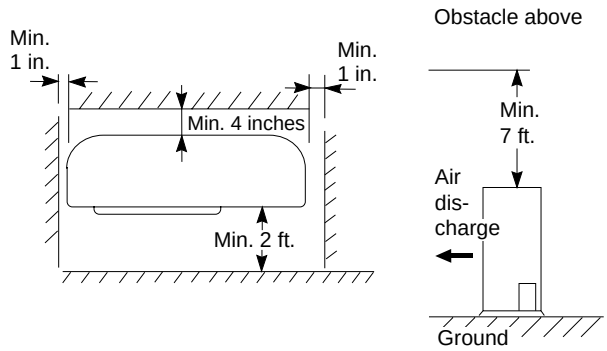


Fig. 4b

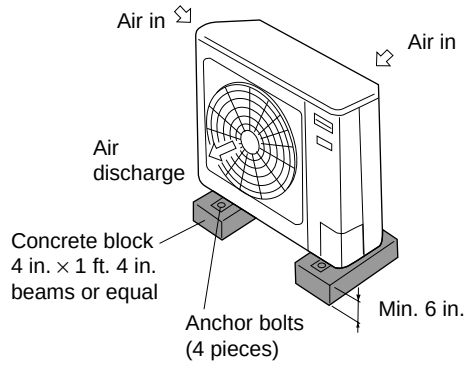


Fig. 4c

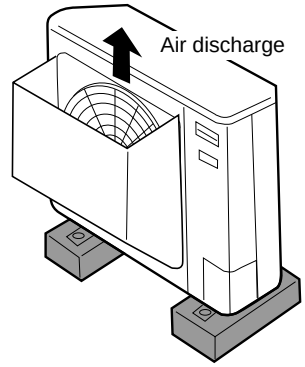


Fig. 5a

2-4. Wind Shield for “CL” Model

IMPORTANT

It is recommended to use wind shields for “CL” model (Fig. 5b). “CL” model is designed to use in low outdoor temperature conditions.

General

When the outdoor unit is installed in a position exposed to strong wind (like seasonal winds with low air temperature in winter), a suitable wind shield must be installed on the outdoor unit.

This unit is designed so that the fan of the outdoor unit runs at low speed when the air conditioner is operated at low outdoor air temperatures. When the outdoor unit is exposed to strong wind, the system pressure drops because of the freeze protector.

For outer dimensions of the wind shield, see Fig. 5c.

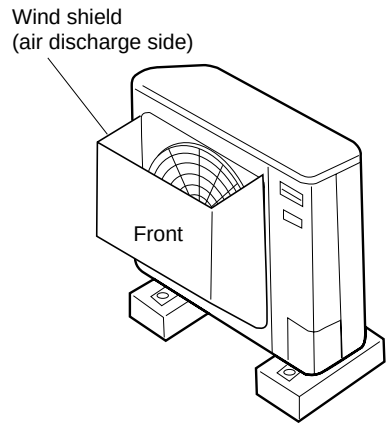
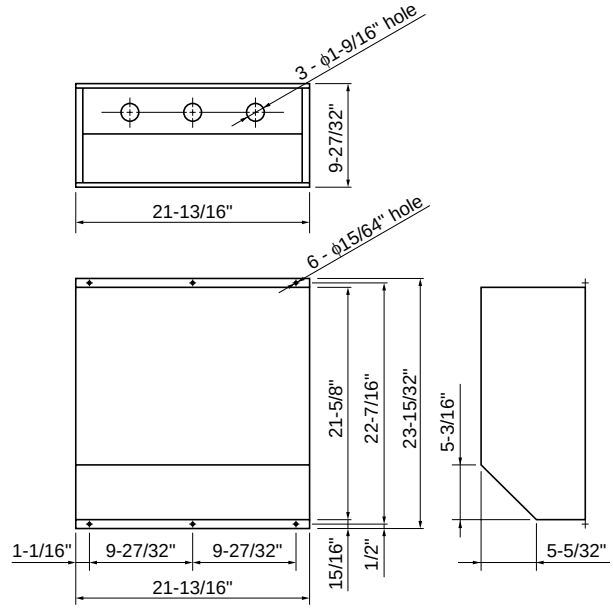


Fig. 5b

Recommended outer dimensions of wind shield (field supply)



CL2462R

Fig. 5c

3. How to Install the Indoor Unit

3-1. Remove the Rear Panel from the Unit

Remove and discard the set screws and take off the rear panel. (Fig. 6)

NOTE

Tubing can be extended in 3 directions as shown in Fig. 7a. Select the direction you need providing the shortest run to the outside unit.

3-2. Make a Hole

(1) Remove the rear panel from the indoor unit and place it on the wall at the location selected. Make sure the unit is horizontal, using a carpenter's level or tape measure to measure down from the ceiling.

(2) Determine which side of the unit you should make the hole. (Fig. 7b)

(3) Before making a hole, check carefully that no studs or pipes are directly run behind the spot to be cut.

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

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

(4) Using a sabre saw, key hole saw or hole-cutting drill attachment, cut a hole in the wall. See Table 4 and Fig. 8.

Table 4

Hole Dia. (inch)
3-3/16"

(5) Measure the thickness of the wall from the inside edge to the outside edge and cut PVC pipe at a slight angle 1/4" shorter than the thickness of the wall. (Fig. 9)

(6) Place the plastic cover over the end of the pipe (for indoor side only) and insert in the wall. (Fig. 10)

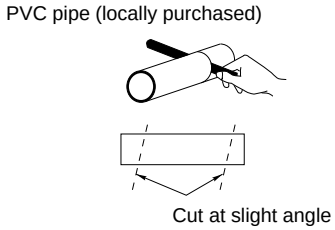


Fig. 9

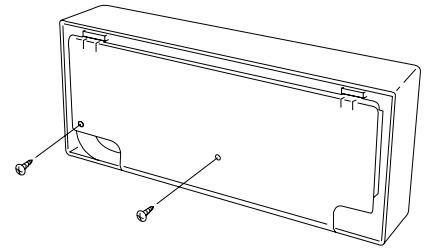


Fig. 6

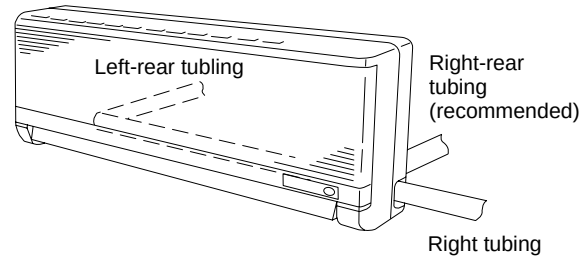


Fig. 7a

In case of left-rear or right-rear tubing

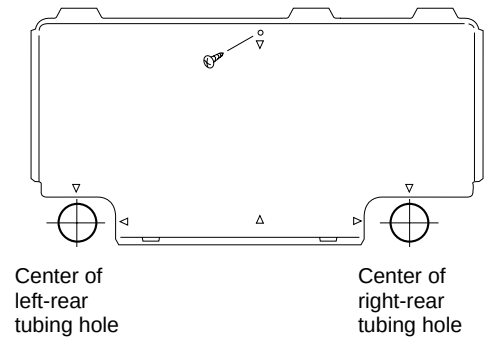


Fig. 7b

NOTE

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

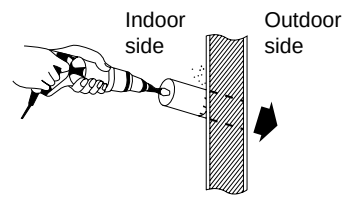


Fig. 8

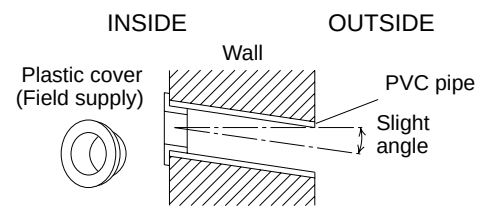


Fig. 10

3-3. Install the Rear Panel on the Wall

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

See either Item a) or b) below depending on the wall type.

a) If Wooden Wall

(1) Attach the rear panel to the wall with the 10 screws provided. (Fig. 11)
If you are not able to line up the holes in the rear panel with the beam locations marked on the wall, use toggle bolts to go through the holes on the panel or drill 3/16" dia. holes in the panel over the stud locations and then mount the rear panel.

(2) Double check with a ruler or carpenter's level that the panel is level. This is important to install the unit properly. (Fig. 12)

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

b) If Block, Brick, Concrete or Similar Type Wall

Make 3/16" dia. holes in the wall. Insert rawl plugs for appropriate mounting screws. (Fig. 13)

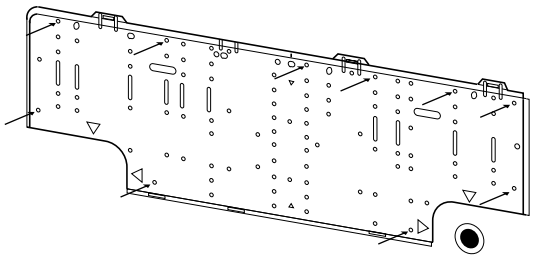


Fig. 11

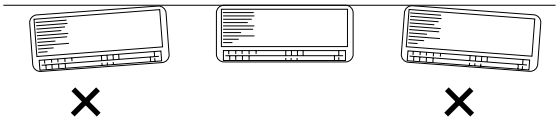


Fig. 12

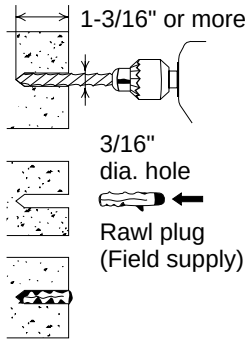


Fig. 13

3-4. Remove the Grille to Install the Indoor Unit

Basically, these models can be installed and wired without removing the grille. **If access to any internal part is needed, follow the steps as given below**:

How to remove the grille

(1) Set the 2 flaps in the horizontal position.

(2) Unscrew the 3 screws. (Fig. 14a)

(3) Remove the grille.

(a) Hold both corners of the air intake grille, then pull out and up to open. (Fig. 14b)

(b) Use a standard screwdriver to push up the 3 tabs to remove the grille. (Fig. 14b)

(c) Pull the lower part of the grille toward you to remove. (Fig. 14a)

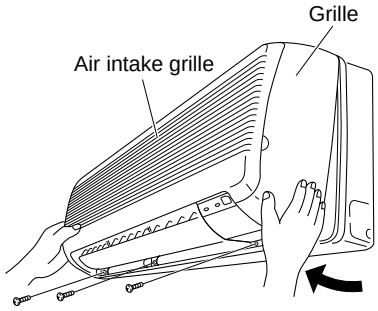


Fig. 14a

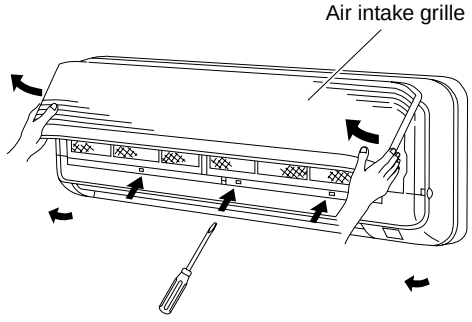


Fig. 14b

How to replace the grille

(1) Close the flaps.

(2) Reinstall the grille into the lower part while aligning its tabs on the upper part. (Fig. 15a) Insert the tabs in the slots and push the lower part of the grille back into position.

(3) Press at each of the 5 tabs to completely close the grille. Make sure that the grille and frame are firmly fitted together. (Fig. 15b)

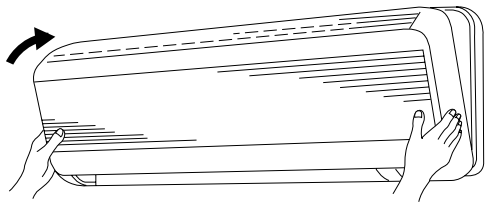


Fig. 15a

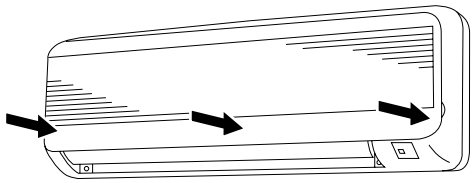


Fig. 15b

3-5. Shape the Indoor Side Tubing

1) Arrangement of tubing by directions

   a) Right tubing

      The corner of the right frame needs to be cut by a hacksaw or the like. (Fig. 16)

   b) Right-rear or left-rear tubing

      In this case, the corner of the frame need not be cut.

2) To mount the indoor unit on the rear panel:

   Hang the 3 mounting slots of the unit on the upper tabs of the rear panel. (Fig. 17)

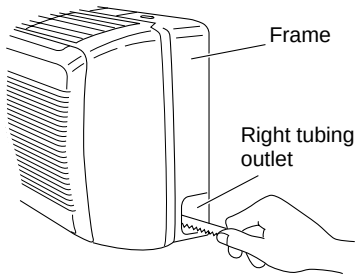


Fig. 16

3-6. Wiring Instructions

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.

2) Provide a power outlet to be used exclusively for each unit, with a power supply disconnect and circuit breaker for overcurrent protection provided in the exclusive line.

3) To prevent possible hazard due to insulation failure, the unit must be grounded.

4) Each wiring connection must be done tightly and 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.

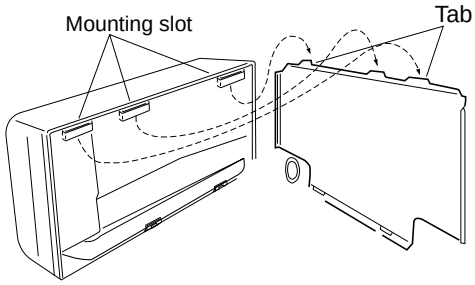


Fig. 17

3-7. Recommended Wire Length and Diameter

Regulations on wiring diameter differ from locality to locality. For field wiring requirements, please refer to your local electrical codes. Carefully observe these regulations when carrying out the installation.
Table 5 lists recommended wire lengths and diameters for power supply systems.
Refer to the wiring system diagram (Fig. 18) for the meaning of “A” and “B” in Table 5.

Table 5

AWG / Model	(A) Power Supply Wiring Length (ft.)	(B) Inter-Unit Power Line	Fuse or Circuit Capacity
	(#12)	(#14)	
C2462R, CL2462R	64 (Max.)	132 (Max.)	35A

··· AWG (American Wire Gauge)

WARNING

- **Be sure to comply with local codes on running the wire from the indoor unit to the outdoor unit (size of wire and wiring method, etc.).**
- **Each wire must be firmly connected.**
- **No wire should be allowed to touch refrigerant tubing, the compressor, or any moving part.**

WARNING

To avoid the risk of electric shock, each air conditioner unit must be grounded.

CAUTION

Be sure to connect the power supply line to the outdoor unit as shown in the wiring diagram. The indoor unit draws its power from the outdoor unit.

WIRING SYSTEM DIAGRAM

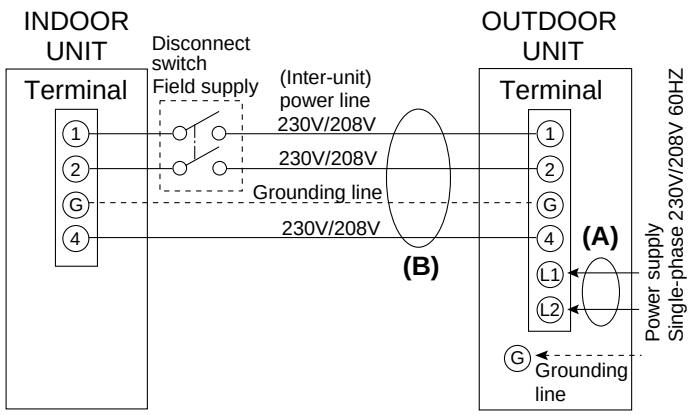


Fig. 18

3-8. Wiring Instructions for Inter-unit Connections

(1) Insert the inter-unit wiring (according to local codes) into the through-the-wall PVC pipe. Run the wiring toward the indoor side allowing approx. 10 inches to extend from the wall face. (Fig. 19)

(2) Route the inter-unit wiring from the back of the indoor unit and pull it toward the front for connection. (Figs. 20a and 20b)

(3) Connect the inter-unit wiring to the corresponding terminals on the terminal plate (Figs. 20a and 20b) while referring to the wiring diagram.

(4) Be sure to secure the wiring with the provided clamp.

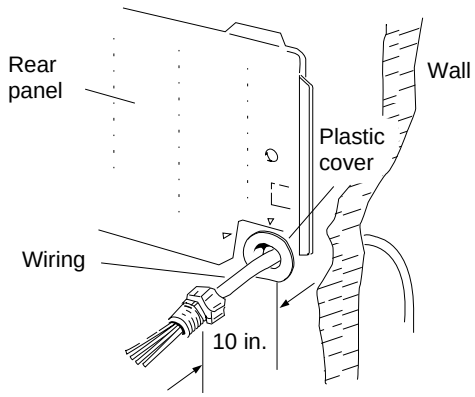


Fig. 19

How to remove the cover plate

To access the terminal plate inside the indoor unit, follow these steps.

(1) Using a Phillips screwdriver, remove the screw on the cover plate. (Figs. 20a and 20b)

(2) Remove the cover plate.

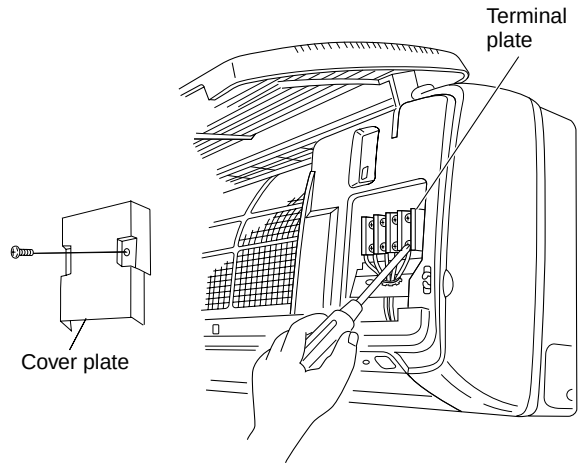


Fig. 20a

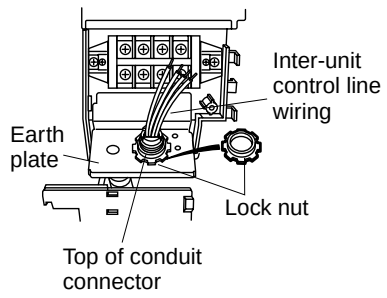


Fig. 20b

WARNING **Loose wiring may cause the terminal to overheat or result in unit malfunction. A fire hazard may also exist. Therefore, be sure all wiring is tightly connected.**

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

How to connect wiring to the terminal

■ **For solid core wiring (or F-cable)**

(1) Cut the wire end with a cutting pliers, then strip the insulation to expose the solid wire about 1 in. (Fig. 21a)

(2) Using a screwdriver, remove the terminal screw(s) on the terminal plate.

(3) Using the pliers, bend the solid wire to form a loop suitable for the terminal screw.

(4) Shape the loop wire properly, place it on the terminal plate and fix it securely with the removed terminal screw using a screwdriver.

■ **For stranded wiring**

(1) Cut the wire end with a cutting pliers, then strip the insulation to expose the stranded wiring about 3/8 in. and tightly twist the wire ends. (Figs. 21b and 21c)

(2) Using a screwdriver, remove the terminal screw(s) on the terminal plate.

(3) Using a ring connector fastener or pliers, securely clamp each stripped wire end with a ring connector. (Fig. 21b)

(4) Place the ring connector wire, and replace and tighten the removed terminal screw using a screwdriver. (Fig. 22)

NOTE

Being careful not to cut the wire, strip off the plastic insulation using a wire cutter or pliers. (Fig. 23)

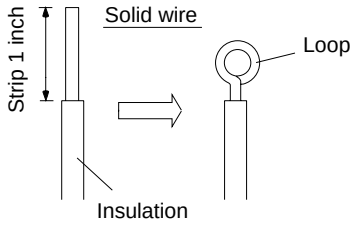


Fig. 21a

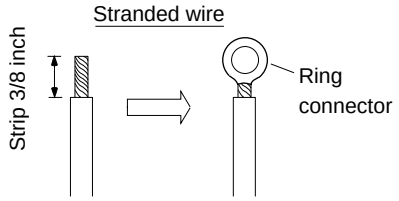


Fig. 21b

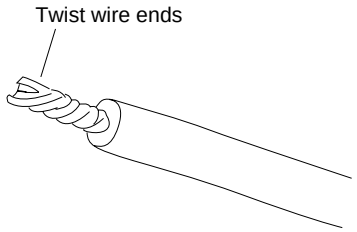


Fig. 21c

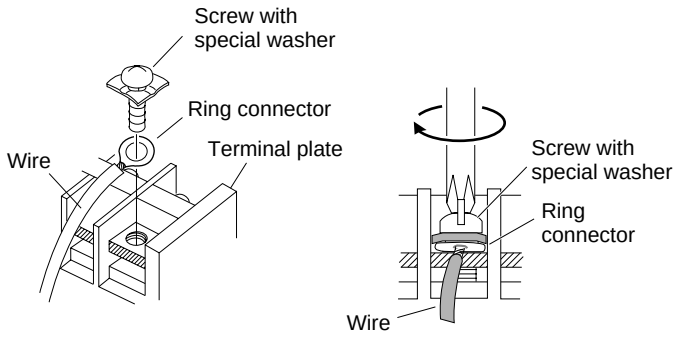


Fig. 22

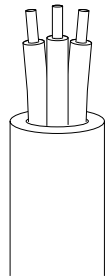


Fig. 23

3-9. Mounting

■ **Right-side tubing**

(1) Shape the refrigerant tubing so that it can easily go into the wall hole. (Fig. 24)

CAUTION

If using a stepladder, be careful to keep your balance and not fall off. To prevent the unit from damage and avoid personal injury, ask for someone's help when feeding the tubing through the hole because the unit is heavy and difficult to hold in place.

(2) Push the wiring, refrigerant tubing, and drain hose through the hole in the wall. Adjust the indoor unit so it is securely seated on the rear panel.

(3) Carefully bend the tubing (if necessary) to run along the wall in the direction of the outdoor unit and then tape as far as the fittings.

CAUTION

The air conditioner's performance will be deteriorated if a tube is crushed. To prevent crushing of tubing, avoid sharp bends. Use a pipe bending tool to bend tubes. (Fig. 25)

(4) Connect the refrigerant tubing to the outdoor unit. (After performing a leak test on the connecting part, insulate it with tubing insulation. (Fig. 26)) Also, refer to Section 4-3. Connecting Tubing between Indoor and Outdoor Units.

(5) Assemble the refrigerant tubing, drain hose, and inter-unit wiring as shown in Fig. 27.

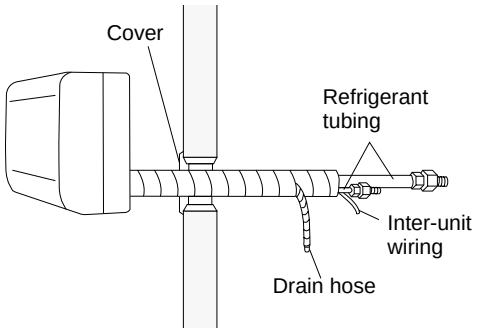


Fig. 24

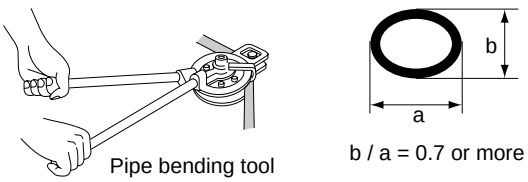


Fig. 25

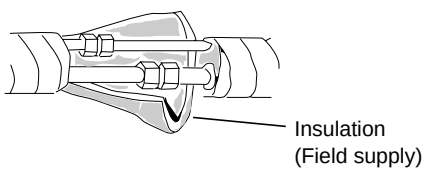


Fig. 26

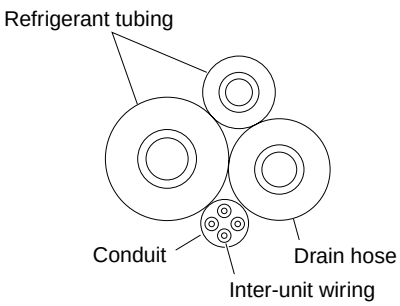


Fig. 27

3-10. Drain Hose

a) The drain hose should be slanted downward to the outdoors. (Fig. 28)

b) Never form a trap in the course of the hose.

c) If the drain hose will run in the room, insulate the hose with insulation* so that chilled condensation will not damage furniture or floors. (Fig. 29)

* Foamed polyethylene or its equivalent is recommended.

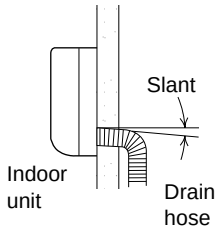


Fig. 28

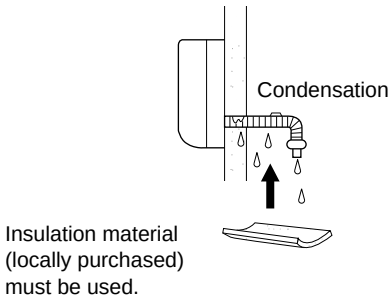


Fig. 29

WARNING **Do not supply power to the unit or operate it until all tubing and wiring to the outside unit are completed.**

Risk of Electric Shock

4. Remote Control Unit Installation Position

The remote control unit can be operated from either a non-fixed position or a wall-mounted position.

To ensure that the air conditioner operates correctly, do not install the remote control unit in the following places:

- In direct sunlight
- Behind a curtain or other place where it is covered
- More than 26 ft. (8 m) away from the air conditioner
- In the path of the air conditioner's airstream
- Where it may become extremely hot or cold
- Where it may be subject to electrical or magnetic interference

4-1. Mounting on a Wall

1) Confirm the indoor unit beeps when the ON/OFF button is pressed at the wall location where the remote control unit is to be attached, then attach the holder to the wall. (Fig. 30)
2) When taking out the remote control unit, grasp and pull it from the holder.

When using the remote control unit

- Point the transmission portion of the remote control unit at the receiver area of the indoor unit to control the air conditioner.
- Do not place objects that may block the transmitted signals between the receiver and the remote control unit.

When mounting the remote control unit to prevent theft or loss

1) Mount the holder to the wall with one of the screws (using only the hole in the top of the holder) (Fig. 31).
2) Remove the cover of the remote control unit and take out the batteries. Next, place the remote control unit in the holder.
3) Fasten both the remote control unit and holder to the wall with the remaining screw (using the hole in the bottom of the holder).
4) Install the batteries in the remote control unit and close the cover.

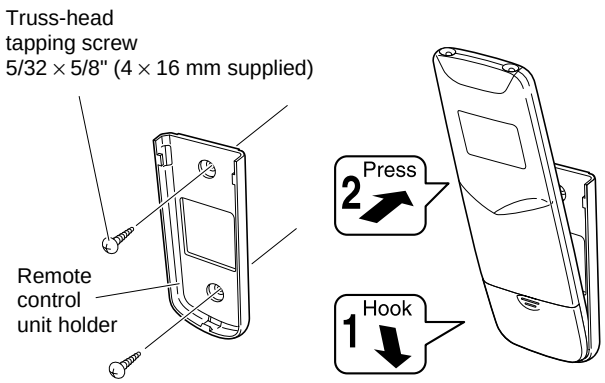


Fig. 30

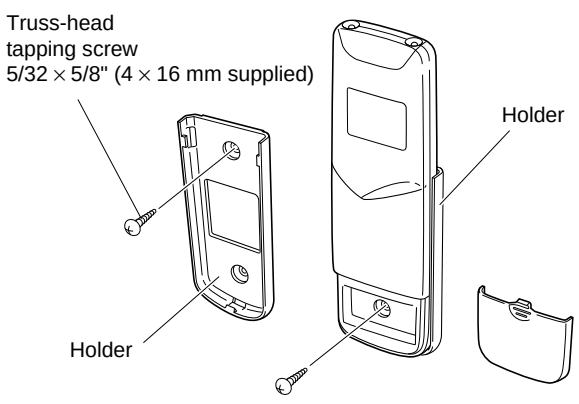
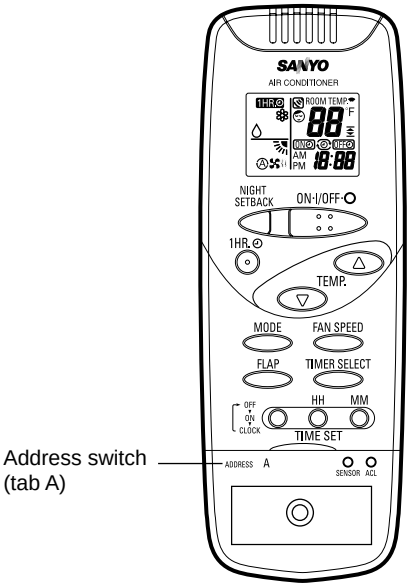


Fig. 31

5. Address Switches

- Change the address switch to prevent mixing of signals from remote control units when 2 Sanyo air conditioners are installed next to each other. Normally, the address switch is set to A. To change the address to B, break tab A of the remote control address switch and cut the jumper cable (JP11) on the indoor unit board. (Figs. 32 and 33)
  If you need more information, contact your air conditioning system dealer.
- Normally, the tabs on the remote control unit should not be broken.



NOTE The illustration above pictures the remote control unit after the cover has been lowered and removed.

Fig. 32

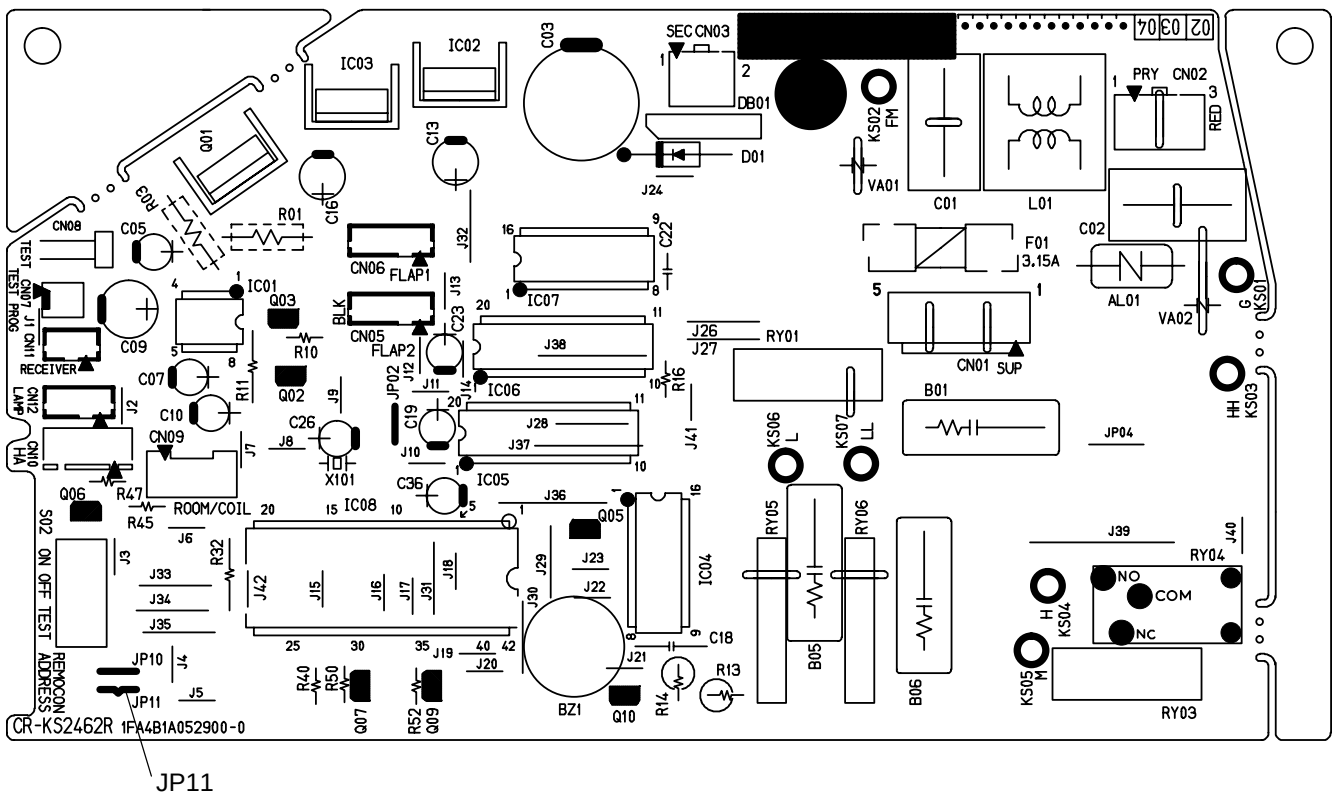


Fig. 33

6. How to Install the Outdoor Unit

6-1. Removing the Packing Skid

Remove the packing skid from the bottom. (Fig. 34)

Place the unit on a level concrete pad, block or equal and anchor.

Refer to Section 2. “Installation Site Selection.”

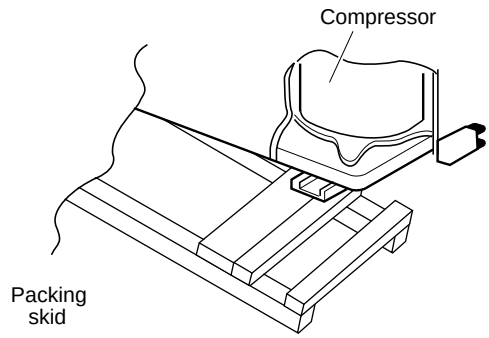


Fig. 34

6-2. Installing the Outdoor Unit

(1) Install blocks or a solid platform under the outdoor unit which provides a minimum height of 6 in. from ground level. (Fig. 35)

(2) The outdoor unit must be bolted down tightly to the blocks or platform with 4 anchor bolts.

6-3. Tubing Direction

- Tubing can be extended in 4 different directions as shown in Fig. 36.
- Service valves are housed inside the unit. To access them, remove the access panel by removing the 3 attaching screws, then slide the panel downward and pull it toward you.
  If either rear, right or front tubing is needed, punch out the knockout holes with a hammer and punch or similar tool.
- After punching out the knockout holes, mount plastic protectors on the tubing outlets. There accessories are packed inside the unit and can be accessed through the access panel.
- Use tube benders to extend refrigerant tubing to the outside.

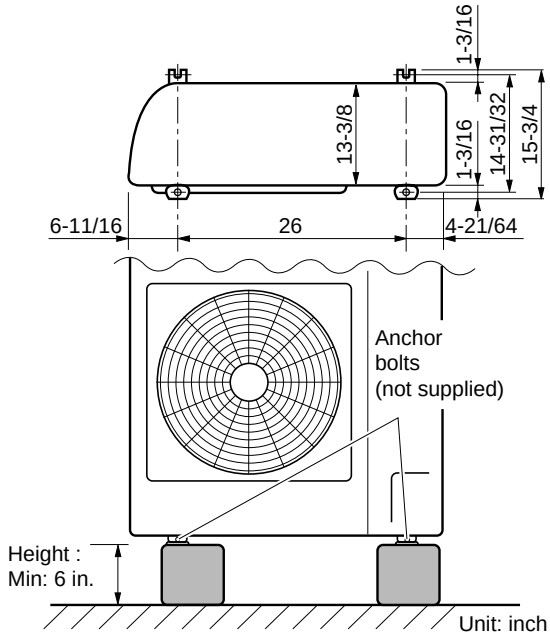
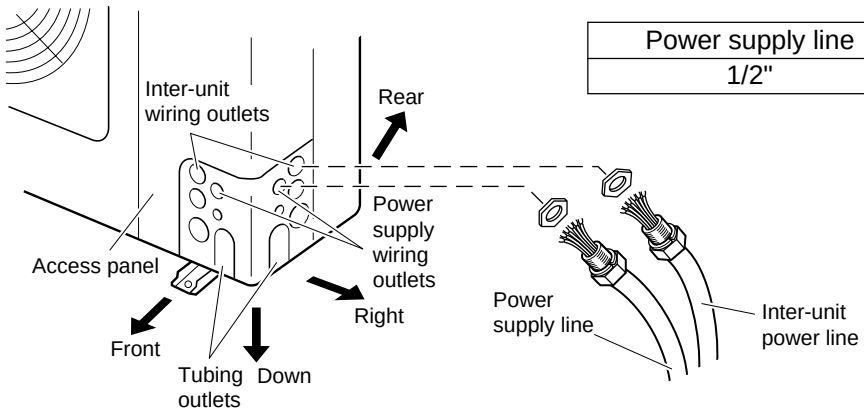


Fig. 35



Power supply line	Inter unit power line
1/2"	1/2"

Fig. 36

7. Electrical Wiring

7-1. 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.

(2) Provide a power outlet to be used exclusively for each unit, and a power supply disconnect and circuit breaker for overcurrent protection should be provided in the exclusive line.

(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 inter-unit control wiring and the remote control wiring (option) should be wired apart from the inter-unit power wiring.
- It is recommended that shielded wires or twisted-pair wires be used for the remote control and the inter-unit control wiring if the air conditioner is installed where it is exposed to the influence of electrical and/or electro-magnetic noise.

7-2. Recommended Wire Length and Wire Diameter for Power Supply System

Models	(A)*1 Power Supply	(B)*1 Inter-unit Wiring AGW #14	Time Delay Fuse or Circuit Capacity
C2462R, CL2462R	64 ft. (AWG #12)	132 ft.	35 A

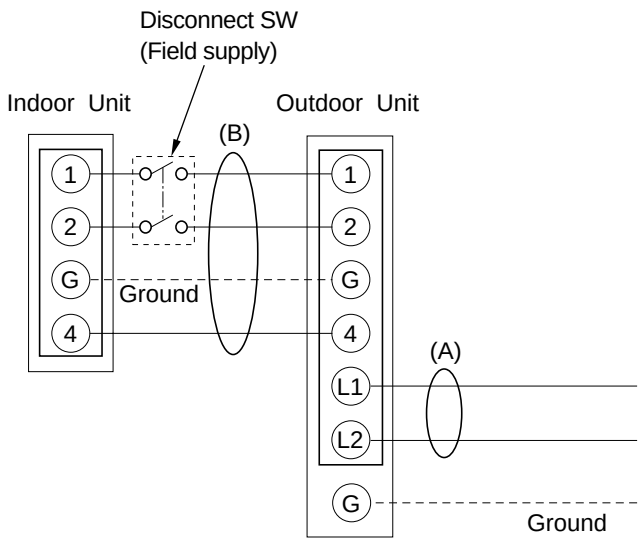
*1 Refer to the Wiring System Diagrams (See below diagram) for the meaning of “A” and “B.”
AWG = American Wire Gauge

NOTE

To access the electrical component box, open the air intake grille and remove the electrical component box cover.

7-3. Wiring System Diagram

Outdoor Unit: “C”, “CL” models
Single-phase
60 Hz, 208/230 V



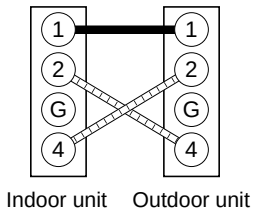
CAUTION

7-4. Examples of Incorrect Wiring

The following are examples of improper wiring that result in system misoperation. You should confirm that you have wired the units correctly before beginning the Test Run described on page 25.

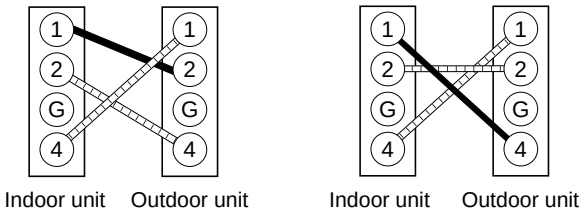
Problem 1

- Short circuit will occur after approx. 3 minutes.



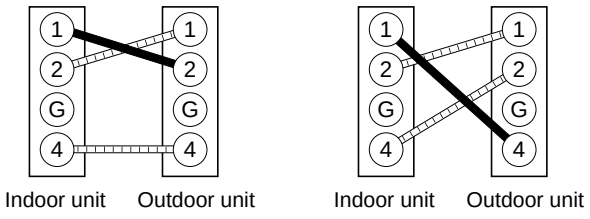
Problem 2

- Air conditioner will not operate.



Problem 3

- Compressor will not start; only indoor unit will operate.



8. How to Process Tubing (See 11. REFRIGERANT R410A: SPECIAL PRECAUTIONS)

The narrow tubing side is connected by a flare nut, and the wide tubing side is connected by brazing.

8-1. Use of the Flaring Method

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

8-2. 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. 12 to 16 in. longer than the tubing length you estimate.

(2) Remove burrs at the end of the copper tube with a tube reamer or file. This process is important and should be done carefully to make a good flare. (Fig. 37)

NOTE

When reaming, hold the tube end downward and be sure that no copper scraps fall into the tube. (Fig. 38a)

(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 copper tube with a flare tool.* (Fig. 38b)

(*Use "RIGID®" or equivalent.)

(5) Use the special flare tool for R410A for making a flare. If the conventional flare tool (for R22) is used, the flared portion of the tubing should protrude 1.0 to 1.5 mm. (Fig. 38c)

NOTE

A good flare should have the following characteristics:

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

8-3. 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) Apply refrigerant lubricant to the matching surfaces of the flare and union before connecting them together. This helps to reduce gas leaks. (Fig. 39a)

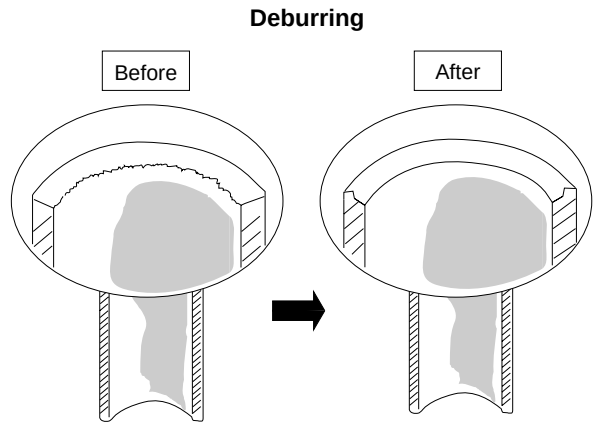


Fig. 37

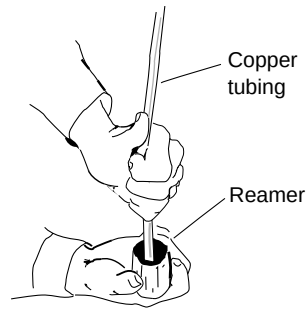


Fig. 38a

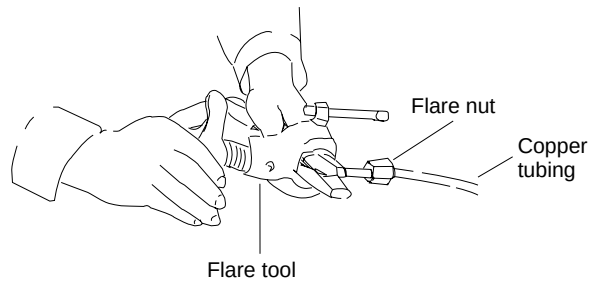


Fig. 38b

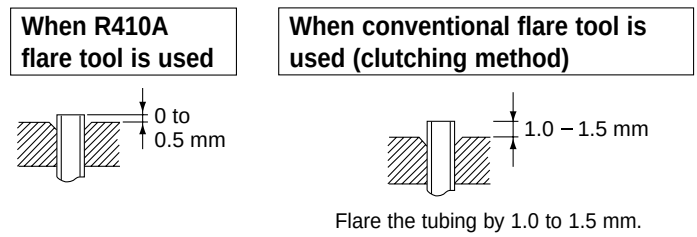


Fig. 38c

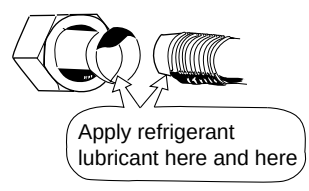


Fig. 39a

(3) For proper connection, align the union tube and flare tube with each other, then screw in the flare nut lightly at first to obtain a smooth match. (Fig. 39b)

- Adjust the shape of the narrow and wide tubes using a tube bender at the installation site and connect them to the each tubing side valve using a flare nut.

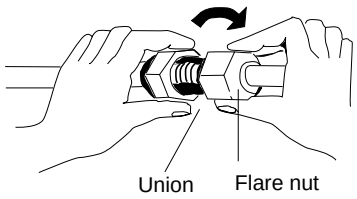


Fig. 39b

8-4. Precautions During Brazing

- Replace air inside the tube with nitrogen gas to prevent copper oxide film from forming during the brazing process.
- Do not allow the tubing to get too hot during the brazing process. The nitrogen gas inside the tubing may overheat, causing refrigerant system valves to become damaged. Therefore allow the tubing to cool between brazings.

8-5. Indoor Unit Tubing

■ **Rear-left tubing**

NOTE

For rear-left tubing, optional tube connection (C) **(APR-EN46U1B)** is necessary. Please consult your nearest sales outlet or A/C workshop.

1. Make a 3-3/16" hole in the wall, centered on the crossing point between the triangle marks (A and B) on the rear panel. (Fig. 40a)
2. Set the rear panel at its original position where it was installed with screws.
3. Cut the wide tube at a point 4-1/8" from the triangle mark.
4. Remove the 1/2" flare nut from the optional tube connection (C), place it on the cut wide tube, and then flare the wide tube. (Fig. 40b)
5. Connect the optional tube connection (C) to the wide tube.
6. Connect the 3/4" tube to the connected optional tube connection.
7. Connect the 3/8" tube to the narrow tube.
8. Cover the narrow and wide tubes with insulation material.

■ **Rear-right tubing**

9. Make a 3-3/16" hole in the wall, centered on the crossing point between the triangle marks (A' and B') on the rear panel. (Fig. 40a)
10. Connect the 3/4" tube to the wide tube.
11. Connect the 3/8" tube to the narrow tube.
12. Cover the narrow and wide tubes with insulation material.

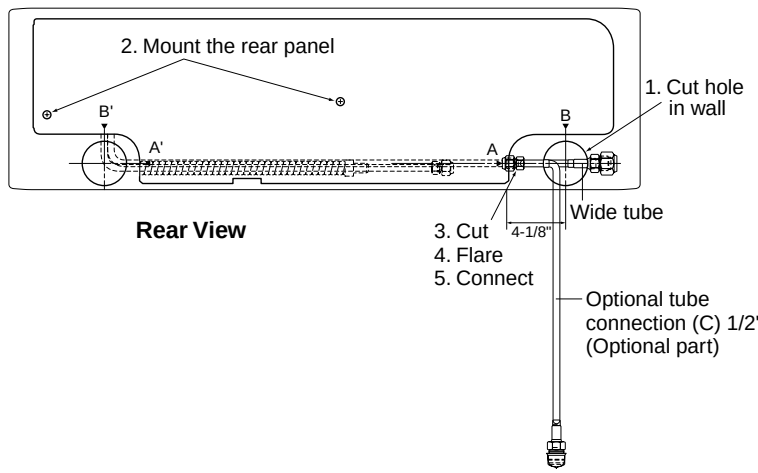


Fig. 40a

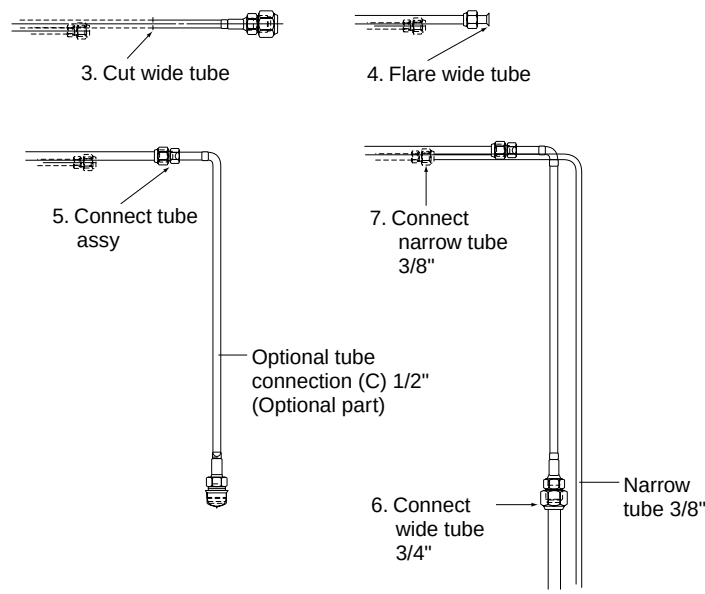


Fig. 40b

8-6. Connecting Tubing between Indoor and Outdoor Units

a) Tightly connect the indoor side refrigerant tubing extended from the wall with the outdoor side tubing. (Fig. 41)

b) To fasten the flare nuts, apply specified torque as:

Table 6

Tube Dia.	Tightening Torque
3/8"	Approx. 300 – 340 lbs.·in (35 – 40 N·m)
3/4"	Approx. 870 – 1,040 lbs.·in (100 – 120 N·m)

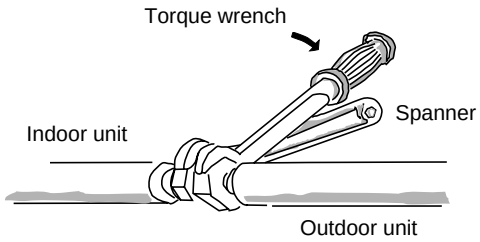


Fig. 41

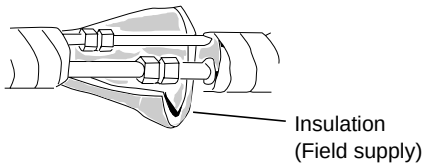


Fig. 42

8-7. Insulation of Refrigerant Tubing (For C2462R and CL2462R)

IMPORTANT

To prevent heat loss and wet floors due to dripping of condensation, **both tubes must be well insulated with a proper insulation material.** The thickness of the insulation should be a minimum 5/16" (Fig. 43)

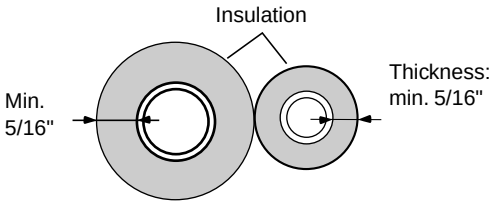


Fig. 43

8-8. Taping the Tubes

CAUTION

After a tube has been insulated, never try to bend it into a narrow curve, as this may cause the tube to break or crack.

(1) At this time, the 2 refrigerant tubes (and electrical wire if local codes permit) should be taped together with armoring tape. The drain hose may also be included and taped together as 1 bundle with the 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. (Fig. 44)

(3) Clamp the tubing bundle to the wall, using 1 clamp approx. every 4 ft.

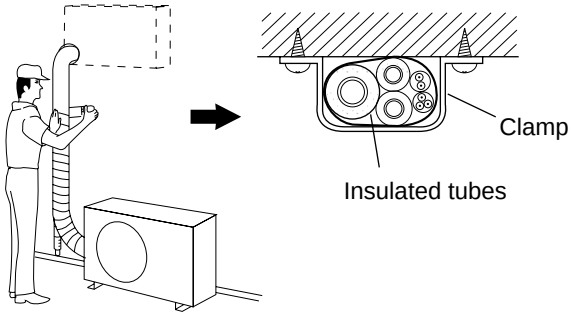


Fig. 44

NOTE

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

8-9. 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. 45 shows refrigerant tubing taped separately from the drain hose.

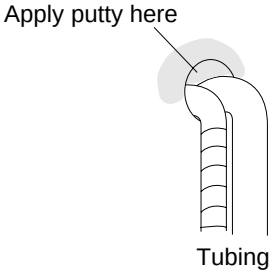


Fig. 45

9. Air Purging

Air and moisture remaining in the refrigerant system have undesirable effects as indicated below. Therefore, they must be purged completely.

- pressure in the system rises
- operating current rises
- cooling (or heating) efficiency drops
- moisture in the air may freeze and block capillary tubing
- water may lead to corrosion of parts in the refrigerant system

■ Air Purging with a Vacuum Pump (for Test Run)

Check that each tube (both narrow and wide tubes) between the indoor and outdoor units have been properly connected and all wiring for the test run has been completed. Remove the valve caps from both the wide and narrow service valves on the outdoor unit. Note that both narrow and wide tube service valves on the outdoor unit are kept closed at this stage.

Leak test

(1) With the service valves on the outdoor unit closed, remove the 1/4". flare nut and its bonnet on the wide tube service valve. (Save them for reuse.)

(2) Attach a manifold valve (with pressure gauges) and dry nitrogen gas cylinder to this service port with charge hoses.

CAUTION

Use a manifold valve for air purging. If it is not available, use a stop valve for this purpose. The “Hi” knob of the manifold valve must always be kept closed.

(3) Pressurize the system to no more than 150 P.S.I.G. with dry nitrogen gas and close the cylinder valve when the gauge reading reaches 150 P.S.I.G. Then, test for leaks with liquid soap.

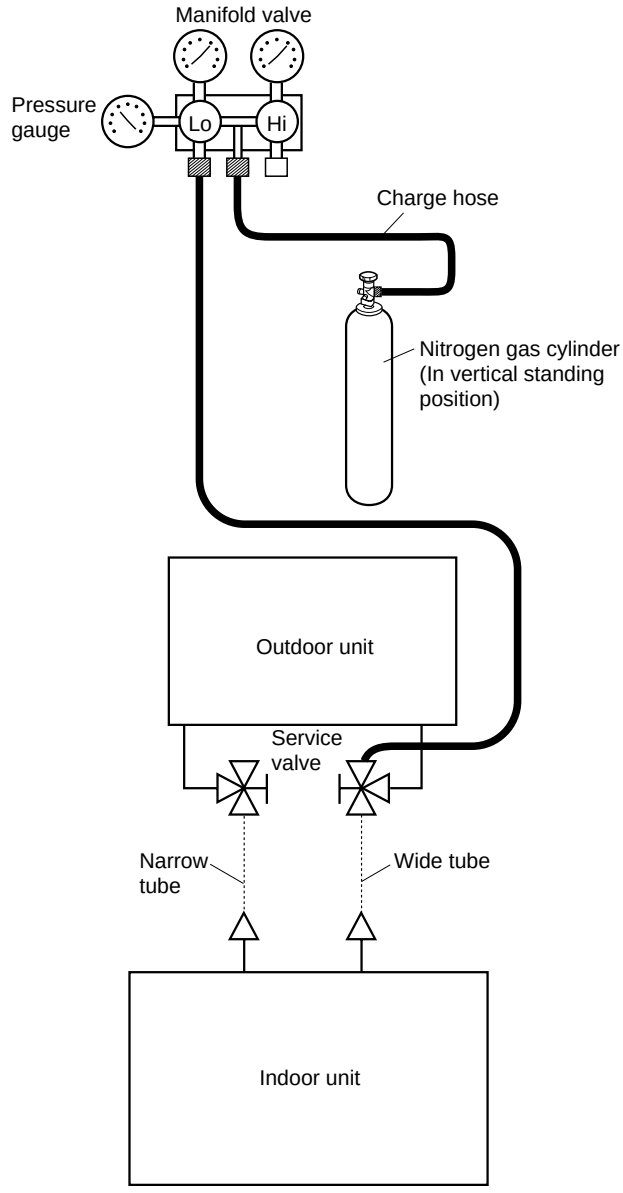


Fig. 46

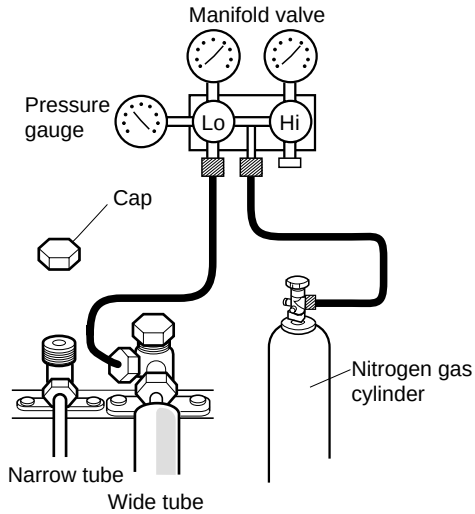


Fig. 47

CAUTION

To prevent nitrogen from ente the refrigerant system in the liquid state, the top of the cylinder must be higher than the bottom when you pressurize the system. Usually, the cylinder is used in a vertical standing position. (Refer to the previous page.)

(4) Do a leak test of all joints of the tubing (both indoor and outdoor) and both wide and narrow service valves. Bubbles indicate a leak. Wipe off the soap with a clean cloth after the leak test.

(5) After the system is found to be free of leaks, relieve the nitrogen pressure by loosening the charge hose connector at the nitrogen cylinder. When the system pressure is reduced to normal, disconnect the hose from the cylinder.

Evacuation

(1) Attach the charge hose end described in the preceding steps to the vacuum pump to evacuate the tubing and indoor unit.
Confirm that the “Lo” knob of the manifold valve is open. Then, run the vacuum pump. The operation time for evacuation varies with the tubing length and capacity of the pump. The following table shows the amount of time for evacuation:

Required time for evacuation when 30 gal/h vacuum pump is used	
If tubing length is less than 50 ft.	If tubing length is longer than 50 ft.
45 minutes or more	**90 minutes or more**

NOTE

The required time in the above table is calculated based on the assumption that the ideal (or target) vacuum condition is around 10 mmHg abs.

(2) When the desired vacuum is reached, close the “Lo” knob of the manifold valve and turn off the vacuum pump.

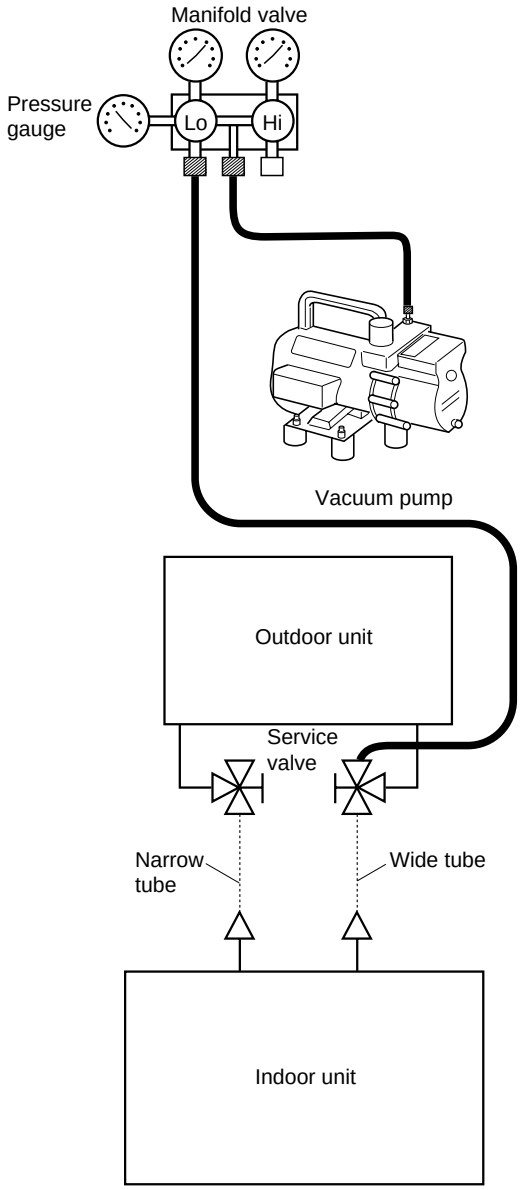


Fig. 48

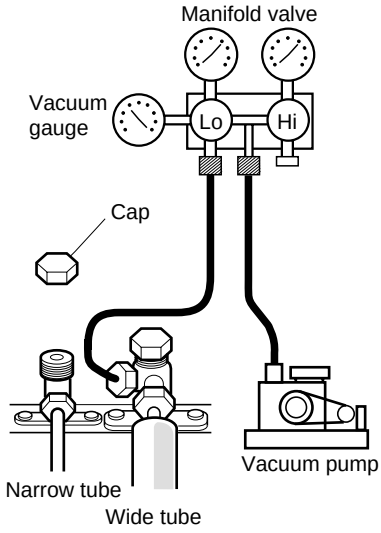


Fig. 49

Charging additional refrigerant

CAUTION **Use a charging cylinder designed for use with R410A.**

- Calculate the required amount of additional refrigerant according to narrow tube length (see P. 3, Table 3). (Fig. 50)
- Use a balance (scale) to measure the refrigerant accurately.

CAUTION **When charging R410A, due to the high pressure be sure to carefully open the charging cylinder valve a little at a time.**

- After the required vacuum level is reached, charge liquid refrigerant from the charge opening of the liquid-side valve. Valves must be closed at this time.

Note: If the additional refrigerant charge amount cannot all be charged at once, charge the remaining refrigerant in gas form by using the wide tube service valve with the system in Cooling mode at the time of test run.

- When the charging is completed, all valves must be fully opened.

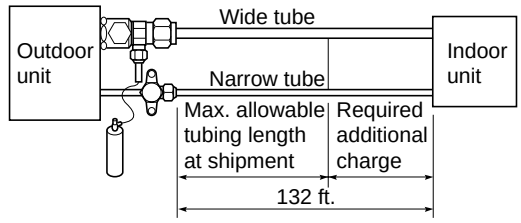


Fig. 50

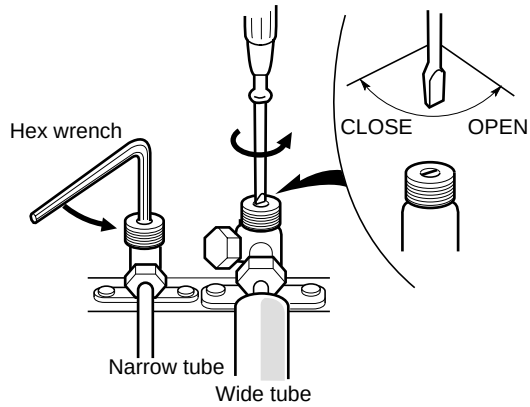


Fig. 51

Finishing the job

(1) With a hex wrench, turn the narrow tube service valve stem counter-clockwise to fully open the valve. (Fig. 51)

(2) With a screwdriver, turn the wide tube service valve stem counter-clockwise to fully open the valve. (Fig. 51)

CAUTION **To avoid gas from leaking when removing the charge hose, make sure the stem of the wide tube is turned all the way out ("BACK SEAT" position).**

(3) Loosen the charge hose connected to the wide tube service port (1/4".) slightly to release the pressure, then remove the hose.

(4) Replace the 1/4". flare nut and its bonnet on the wide tube service port and fasten the flare nut securely with an adjustable wrench or box wrench. This process is very important to prevent gas from leaking from the system.

(5) Replace the valve caps at both wide and narrow service valves and fasten them securely.

This completes air purging with a vacuum pump. The air conditioner is now ready for a test run.

10. Test Run

10-1. Preparing for Test Run

Before starting the air conditioner, check the following:

(1) Remove all loose matter from the cabinet especially metal filings, bits of wire, and clips.

(2) Connect the control wiring correctly and tighten all electrical connections.

(3) For “CL” models only:
Connect the power to the unit **for at least 5 hours** before starting the compressor. The bottom of the compressor should be warm to the touch and the crankcase heater around the feet of the compressor should be hot to the touch.

(4) Open both the wide and narrow tube service valves after an air purge.

(5) Remove the transportation cardboard protection for the indoor fan.

10-2. Performing Test Run

CAUTION **Be careful since the fan will start when performing Test Run.**

(1) Locate the Operation Selector (on right side) by opening the air discharge grille on the indoor unit. (Fig. 52)

(2) Set the Operation Selector to the “Test” position. The air conditioner will start running.

(3) Let the unit run for about 30 minutes and check that the unit operates normally.

(4) After the Test Run, be sure to reset the Operation Selector to the “ON” position for normal operation. The air conditioner continues to run.

(5) Referring to the Operatiing Instructions, select the Cooling mode and press the ON / OFF operation button on the remote control unit, to confirm remote control unit operation.

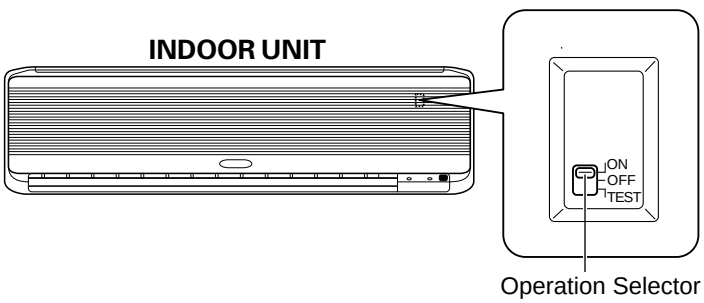
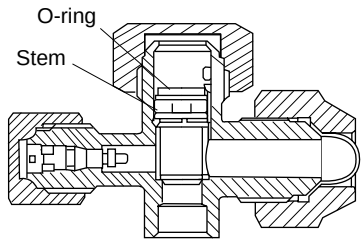
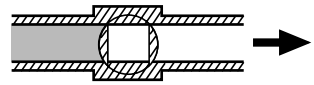
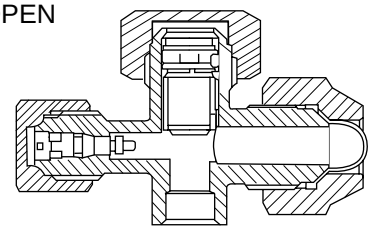
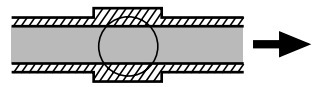


Fig. 52

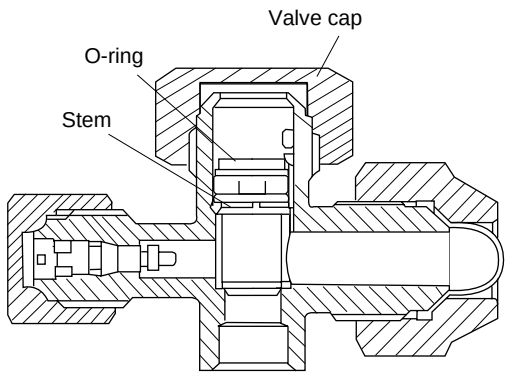
IMPORTANT

Set the Operation Selector to the “ON” position.
Otherwise the unit will stop or will not run correctly.

■ Basic Functions of the Service Valves

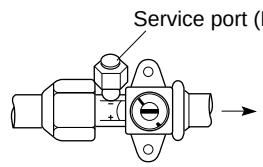
Action	Narrow Tube Service Valve (3-Way)	Wide Tube Service Valve (Ball Valve)
Shipping and air purging	CLOSED 	CLOSED 
Operating and test running the air conditioner	Fully OPEN 	Fully OPEN 

Narrow tube service valve



3-Way Valve
C2462R
CL2462R

Wide tube service valve



■ Pump Down

“Pump down” means collecting all refrigerant gas in the system back into the outdoor unit without losing any of the gas. Pump down is used when the unit is to be moved or before servicing the refrigerant circuit.

Pump down procedure

CAUTION **Be sure to carry out pump down with the unit in Cooling mode.**

(1) Connect the low pressure side (wide tube valve service port) charging hose of the manifold valve to the service port (B) on the wide tube service valve.

(2) Using a hex wrench, turn the narrow tube service valve clockwise all the way to close the service valve.

(3) Press the operation button and start cooling operation.

(4) When the low pressure gauge reading falls to 1 to 0.5 kg/cm^2 (14.2 to 7.1 psi), fully close the wide tube valve stem with a standard screwdriver. Then quickly stop the unit.
When the pressure becomes 0.5 kg/cm^2 or less, the compressor stops by operation of the low-pressure switch. Recover the remaining refrigerant using refrigerant recovery equipment to protect the compressor.

(5) Disconnect all gauges and hoses, and replace the bonnets and the valve caps as they were previously.

(6) When the unit is transferred, after recovering the refrigerant in the unit, charge the specified amount of refrigerant.

11. REFRIGERANT R410A: SPECIAL PRECAUTIONS WHEN INSTALLING UNIT

11-1. Characteristics of New Refrigerant R410A

11-1-1. What is New Refrigerant R410A?

R410A is a new refrigerant that contains two types of pseudo-non-azeotropic refrigerant mixture which do not adversely affect the earth's ozone layer. Its refrigeration capacity and energy efficiency are about the same level as the conventional refrigerant, R22.

11-1-2. Components (mixing proportions)

HFC32 (50%) / HFC125 (50%)

11-1-3. Characteristics

- Less toxic, more chemically stable refrigerant
- The composition of refrigerant R410A changes whether it is in a gaseous phase or liquid phase. Thus, when there is a refrigerant leak the basic performance of the air conditioner may be degraded because of a change in composition of the remaining refrigerant. ***Therefore, do not add new refrigerant.*** Instead, recover the remaining refrigerant with the refrigerant recovery unit. Then, after evacuation, totally recharge the specified amount of refrigerant with the new refrigerant at its normal mixed composition state (in liquid phase).
- When refrigerant R410A is used, the composition will differ depending on whether it is in gaseous or liquid phase, and the basic performance of the air conditioner will be degraded if it is charged while the refrigerant is in gaseous state. ***Thus, always charge the refrigerant while it is in liquid phase.***

CAUTION

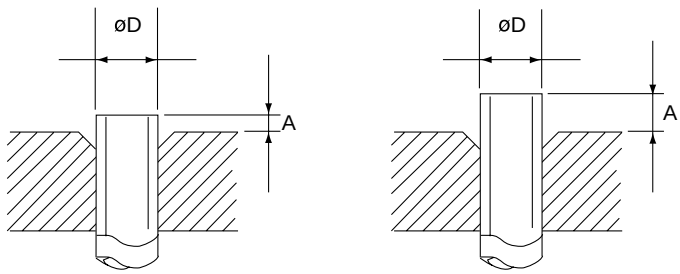
Ether-type oil is used for compressor oil for R410A-type units, which is different from the mineral oil used for R22. Thus more attention to moisture prevention and faster replacement work compared with conventional models are required.

11-2. Checklist Before Installation

Use a clutch-type flare tool for R410A or the conventional flare tool. Note that sizes of the resultant flares differ between these two tools. Where a conventional flare tool is used, make sure to observe A Specification (amount of protrusion).

Diameter of tube (ø) D	A Specification	
	Flare tool for R410A	Conventional flare tool (for R22)
ø6.35 (1/4")	0 – 0.5 mm	1.0 – 1.5 mm
ø19.05 (3/4")	0 – 0.5 mm	1.0 – 1.5 mm

- **Size of flare**



Flare tool for R410A Conventional flare tool (R22)

- **Flare nut:** Because the new refrigerant R410A operates at 1.6 times higher pressure than the conventional refrigerant R22, the flare nuts that came with the unit must be used.

- **Tubing precautions**

  Refrigerant R410A is more easily affected by dust or moisture compared to R22, thus be sure to temporarily cover the ends of the tubing with caps or tape prior to installation.

  Never use 0.7mm-thick copper tubing or tubing which is less than 0.8mm in thickness, since air conditioners with R410A are subject to higher pressure than those using R22 and R407C.

	Outer diameter: mm (inch)	Tubing wall thickness: mm (inch)
Narrow tube	ø6.35 (1/4")	0.8 (0.032)
Wide tube	ø19.05 (3/4")	1.0 (0.042)

- **No addition of compressor oil for R410A**

  No additional charge of compressor oil is required.

- **No use of refrigerant other than R410A**

  Never use a refrigerant other than R410A.

- **If refrigerant R410A is exposed to fire**

  Through welding, etc., toxic gas may be released when R410A refrigerant is exposed to fire. Therefore, be sure to provide ample ventilation during installation work.

- **Caution in case of R410A leak**

  Check for possible leak points with the special leak detector for R410A. If a leak occurs inside the room, immediately provide thorough ventilation.

11-3. Tools Specifically for R410A

- **For servicing, use the following tools for R410A**

Tool Distinction	Tool Name
Tools specifically for R410A	● Gauge manifold ● Charging hose ● Gas leak detector ● Refrigerant cylinder ● Charging cylinder ● Refrigerant recovery unit ● Vacuum pump with anti-reverse flow (***1**) (Solenoid valve-installed type, which prevents oil from flowing back into the unit when the power is off, is recommended.) ● Vacuum pump (***2**) … can be used if the following adapter is attached. ● Vacuum pump adapter (reverse-flow prevention adapter) (***3**). (Solenoid valve-installed adapter attached to a conventional vacuum pump.) ● Electronic scale for charging refrigerant ● Flare tool
Tools which can be commonly used for R22, R407C, and R410A	● Bender ● Torque wrench ● Cutter, reamer ● Welding machine, nitrogen gas cylinder

CAUTION

- **The above tools specifically for R410A must not be used for R22 and R407C. Doing so will cause malfunction of the unit.**
- **For the above vacuum pump (*1, *2) and vacuum pump adapter (*3), those for R22-type units can be used for R407C-type. However, they must be used exclusively for R410A and never alternately with R22 and R407C.**

- To prevent other refrigerants (R22, R407C) from being mistakenly charged to this unit, sizes of the service ports and flare nuts of the narrow tube service valve and wide tube service valve have been altered.

11-4. Charging Additional Refrigerant

11-4-1. When Tubes are Extended

- Observe the proper amount of refrigerant as stated in the installation manual that came with the indoor unit. ***Charge additional refrigerant in liquid state only.***

CAUTION **Never charge additional refrigerant if refrigerant is leaking from the unit.**

11-5. Retro-Fitting Existing Systems

11-5-1. Use of Existing Units

- ***Never use new refrigerant R410A for existing units which use R22.*** This will cause the air conditioner to operate improperly and may result in a hazardous condition.

11-5-2. Use of Existing Tubing

- If replacing an older unit that used refrigerant R22 with a R410A unit, ***do not use its existing tubing.*** Instead, completely new tubing must be used.