SANYO INSTALLATION INSTRUCTIONS

— Split System Air Conditioner —

CONTENTS

Model Combinations

Combine indoor and outdoor units only as listed below.

Indoor units	Outdoor units
XS1852 (PNR-XS2432)	C1852, CL1852

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

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

SANYO FISHER COMPANY
A DIVISION OF SANYO NORTH AMERICA CORPORATION
21605 Plummer Street
Chatsworth, CA91311

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

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 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

- Execute enough ventilation in case refrigerant gases leak during operations. Be careful that the contact of the refrigerant gases with the flare will cause the generation of poisonous gases.
- 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.

NOTE
Depending on the system type, liquid and gas lines may be either narrow or wide. Therefore, to avoid confusion the refrigerant tubing for your particular model is specified as either “narrow” or “wide” rather than as “liquid” or “gas”.

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.

1. General

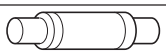
This booklet briefly outlines where and how to install the air conditioning system. Please read over the entire set of instructions for the indoor and outdoor units and make sure all accessory parts listed are with the system before beginning.

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

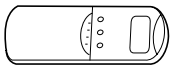
1. Standard screwdriver
2. Phillips head screwdriver
3. Knife or wire stripper
4. Tape measure
5. Level
6. Sabre saw or key hole saw
7. Hacksaw
8. Core bits
9. Hammer
10. Drill
11. Tube cutter
12. Tube flaring tool
13. Torque wrench
14. Adjustable wrench
15. Reamer (for deburring)
16. Service valve wrench
17. Wire cutter

1-2. Accessories Supplied with Unit

Table 1-1

Part Name	Figure	Q'ty	Remarks
Full-scale installation diagram		1	For determining suspension bolt pitch
Flare insulator		1	For wide tubes
Installation gauge		1	For adjusting the unit position
Insulating tape	 (White for insulating)	1	For wide tube flare nuts
Hose band		2	For securing drain hose
Packing		1	For drain joint
Drain insulator		1	For drain joint
Drain hose		1	
Drain hose adapter		1	For drain outlet
Owner's manual		1	
Hexagonal Wrench*		1	To open and shut the Narrow Tube Service Valve

*Packed in the outdoor unit

Part Name	Figure	Q'ty
Wireless remote control unit		1
AAA alkaline battery		2
Tapping screw	Special screw 4 × 16 mm 	1
Tapping screw	 TOTA 4 × 16	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.

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.
   Cut each tube 12 in. to 16 in. longer than the appropriate lengths to dampen vibration between units.
2. Foamed polyethylene insulation for 5/8" (15.88 mm) O.D. copper tubes as required to precise length of tubing. Wall thickness of the insulation should be not less than 0.3 inch (8 mm).

CAUTION

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

1-5. Additional Materials Required for Installation

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

1-6. 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

1-7. Tubing Length

- Refrigerant tubing between the indoor and outdoor units should be kept as short as possible.
- Select and decide the installation location so that the length of the refrigerant tubing will be within the limits given in Table 1-2.

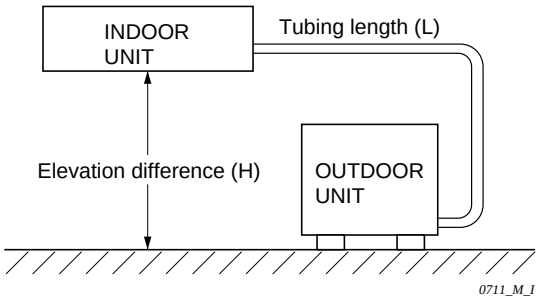


Fig. 1-1

Table 1-2

Tubing Data / Models		C1852 CL1852
Tubing size outer dia.	Narrow tube in. (mm)	1/4 (6.35) : Thickness 0.0314" (0.8 mm)
	Wide tube in. (mm)	5/8 (15.88) : Thickness 0.0394" (1.0 mm)
Limit of tubing length (ft.)		65
Limit of elevation difference between the 2 units	Outdoor unit is higher than indoor unit (ft.)	23
	Outdoor unit is lower than indoor unit (ft.)	23
Max. allowable tubing length at shipment (ft.)		33
Required additional refrigerant *1 (oz./ft.)		0.27

No additional charge of compressor oil is necessary.

*1 If total tubing length becomes 33 to 65 ft., charge additional refrigerant (R22) by 0.27 oz./ft..

2. Selecting the Installation Site

Indoor Unit

AVOID:

- areas where leakage of flammable gas may be expected.
- places where large amount of oil mist exist.
- direct sunlight.
- locations near heat sources which may affect performance of the unit.
- locations where external air may enter the room directly. This may cause “sweating” on the air discharge ports, causing them to spray or drip.
- locations where the remote control unit will be splashed with water or affected by dampness or humidity.
- installing the remote control unit behind curtains or furniture.
- locations where the receiver in the indoor unit is exposed to the inverter lamp light. Faulty operation of the unit occurs.

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.
- 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. (Fig. 2-1)
- install the unit within the maximum elevation difference above or below the outdoor unit and within a total tubing length from the outdoor unit as detailed in Table 1-2.
- allow room for mounting the remote control unit about 3 ft. off the floor, in an area that is not in direct sunlight nor in the flow of cool air from the indoor unit.

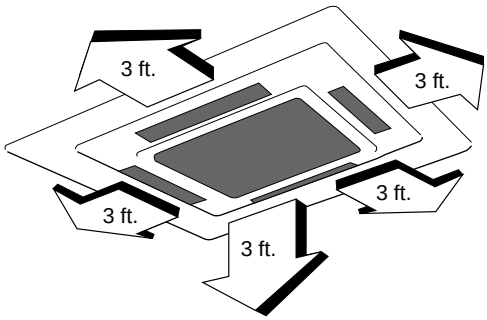


Fig. 2-1

NOTE

Air delivery will be degraded if the distance from the floor to the ceiling is greater than 10 ft..

Outdoor Unit

AVOID:

- heat sources, exhaust fans, etc. (Fig. 2-2)
- 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. 2-3)

CAUTION

- **Install the outdoor unit above snowfall line.**
- **Do not place objects on or sit on the outdoor unit. Also, never block the air intake/outlet or exhaust. Distortion of the outdoor unit or incomplete combustion may result.**
- **Do not introduce foreign matter into the air intake/outlet or exhaust. Do not poke them with such objects as a stick.**

- provide a solid base (level concrete pad, concrete block, 4 in. × 16 in. (10 × 40 cm) beams or equal), a minimum of 4 in. (10 cm) above ground level to reduce humidity and protect the unit against possible water damage and decreased service life (Fig. 2-4).
- use lug bolts or equal to bolt down unit, reducing vibration and noise.

2-1. Baffle Plates for the Outdoor Unit (CL×× models only)

NOTE

It is recommended to use baffle plates for model CL1852. The baffle plates are not normally required for the other models.

When the outdoor unit is installed in a position exposed to strong wind (like seasonal winds with low air temperature in winter), baffle plates must be installed on the outdoor unit. (Fig. 2-5)

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.

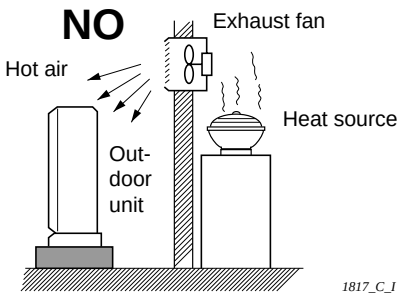


Fig. 2-2

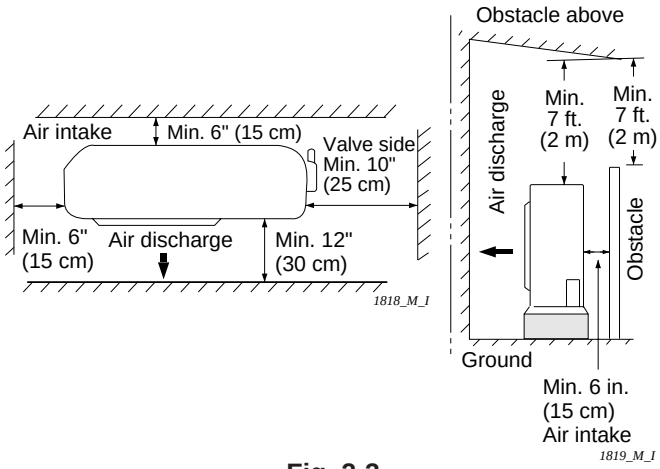


Fig. 2-3

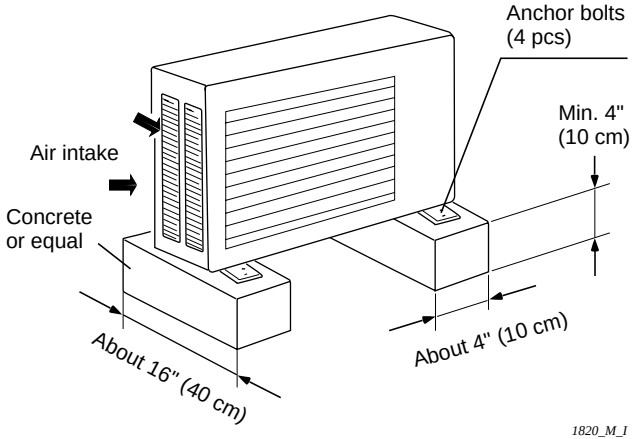


Fig. 2-4

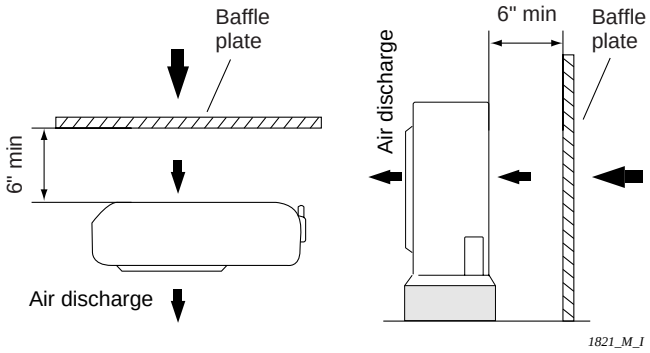


Fig. 2-5

3. How to Install the Indoor Unit

3-1. Suspending the Indoor Unit

This unit uses a drain pump. Use a carpenter's level to check that the unit is level.

3-2. Preparation for Suspending

(1) Fix the suspension bolts securely in the ceiling using the method shown in the diagrams (Figs. 3-1 and 3-2), by attaching them to the ceiling support structure, or by any other method that ensures that the unit will be securely and safely suspended.

(2) Follow Fig. 3-2 and Table 3-1 to make the holes in the ceiling.

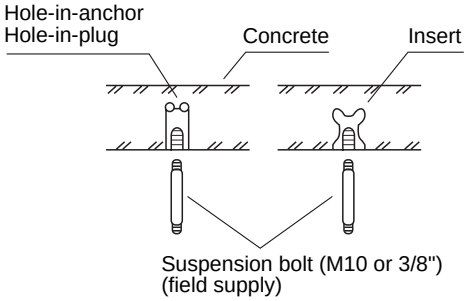


Fig. 3-1

Table 3-1 Unit : inch (mm)

Type \ Length	A	B
XS1852 (PNR-XS2432)	32-9/32 (820)	28-3/4 (730)

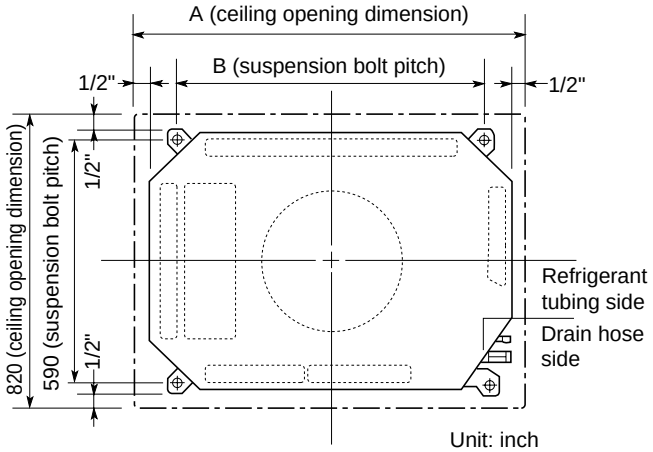


Fig. 3-2

(3) Determine the pitch of the suspension bolts using the supplied full-scale installation diagram. The diagram and table (Fig. 3-3 and Table 3-2) show the relationship between the positions of the suspension fitting, the unit, and the panel.

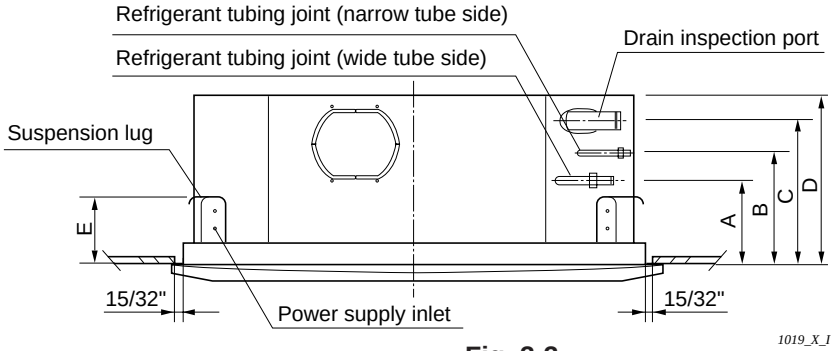


Fig. 3-3

Table 3-2 Unit : inch

Type \ Length	A	B	C	D	E
XS1852 (PNR-XS2432)	5-29/32	7-7/8	10-1/32	11-23/32	4-29/32

3-3. Placing the Unit Inside the Ceiling

(1) When placing the unit inside the ceiling, determine the pitch of the suspension bolts using the supplied full-scale installation diagram. (Fig. 3-4)
The size of the opening for the indoor unit can be confirmed by attaching the full-scale installation diagram beneath the unit. (Fig. 3-4)
Tubing and wiring must be laid inside the ceiling when suspending the unit. If the ceiling is already constructed, lay the tubing and wiring into position for connection to the unit before placing the unit inside the ceiling.

(2) The length of suspension bolt must be appropriate for a distance between the bottom of the bolt and the bottom of the ceiling of more than 2-3/8 in. as shown in Fig. 3-4.

(3) Thread the 2 hexagonal nuts and washers (field supply) onto the 4 suspension bolts as shown in Fig. 3-5.

Use 2 sets of nuts and washers (upper and lower), so that the unit will not fall off the suspension lugs.

(4) Remove the protective cardboard used to protect the fan parts during transport.

(5) Adjust the distance between the unit and surface of the ceiling (1-7/8 in.) using the supplied installation gauge. (Fig. 3-4)

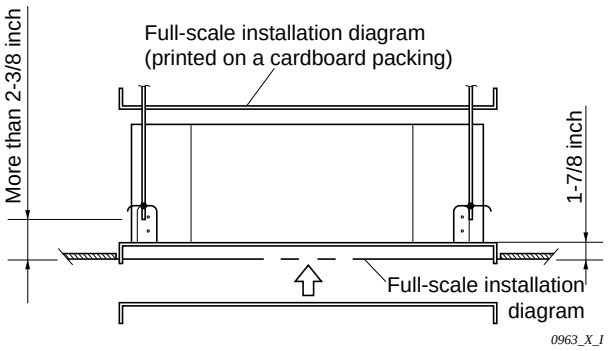


Fig. 3-4

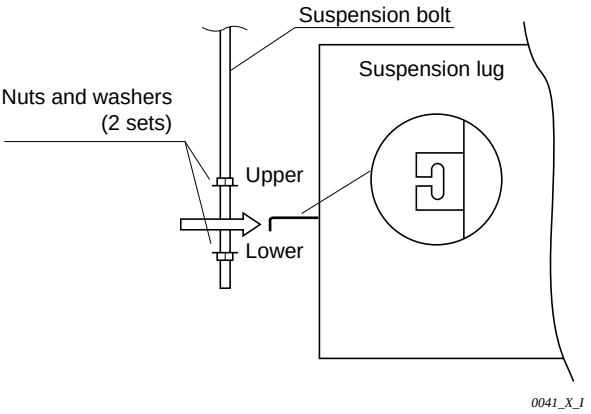


Fig. 3-5

3-4. Installing the Drain Piping

(1) Prepare standard hard PVC pipe (O.D. 1-3/64 in.) for the drain and use the supplied drain hose and hose band to prevent water leaks.
The PVC pipe must be purchased separately.

The transparent part allows you to check drainage. (Fig. 3-6)

CAUTION

Tighten the hose clamps so their locking nuts face upward. (Fig. 3-6)

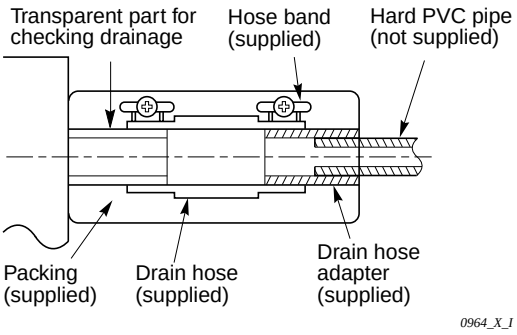


Fig. 3-6

(2) After checking the drainage, wrap the supplied packing and drain pipe insulator around the pipe. (Fig. 3-7)

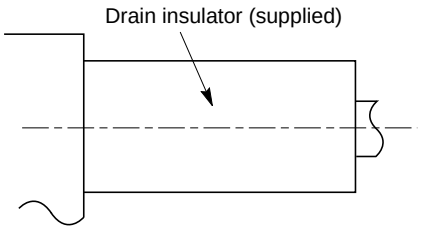


Fig. 3-7

NOTE

Ensure the drain pipe has a downward gradient (1/100 or more) and that there are no water traps.

CAUTION

- **Do not install an air bleeder tubes, as this may cause water to spray from the drain tube outlet. (Fig. 3-8)**

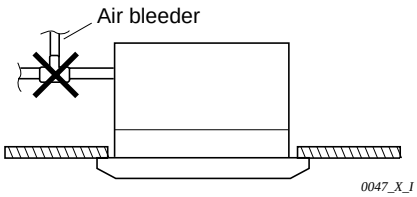


Fig. 3-8

- **If it is necessary to increase the height of the drain pipe, the section directly after the connection port can be raised a maximum of 10 in. Do not raise it any higher than 10 in., as this could result in water leaks. (Fig. 3-9)**

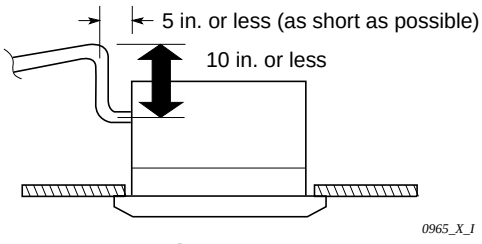


Fig. 3-9

- **Do not install the pipe with an upward gradient from the connection port. It will cause the drain water to flow backwards and leak when the unit is stopped. (Fig. 3-10)**

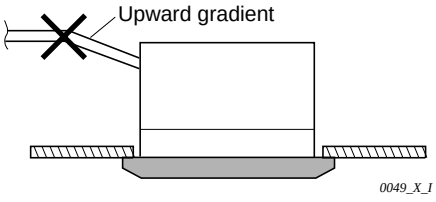


Fig. 3-10

- **Do not apply force to the piping on the unit side when connecting the drain pipe. The pipe should not be allowed to hang unsupported from its connection to the unit. Fasten the pipe to a wall, frame, or other support as close to the unit as possible. (Fig. 3-11)**

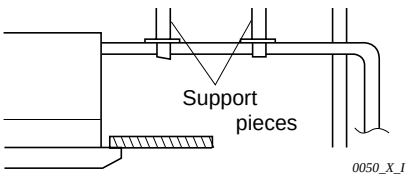


Fig. 3-11

- **Provide insulation for any drain pipes that are installed indoors.**

3-5. Checking the Drainage

After wiring and piping are completed, use the following procedure to check that the water will drain smoothly. For this, prepare a bucket and wiping cloth ready to catch and wipe up spilled water.

WARNING **Do not supply power to the unit until the tubing and wiring to the outdoor unit are completed.**

(1) Take off the tube cover and through the opening, slowly pour about 43 oz. of water into the drain pan to check drainage.

(2) Do Test Run to check the drainage after completing installation. When performing Test Run, be sure to observe the Test Run procedure.
Refer to page 37.

CAUTION **Be careful since the fan will start turning when checking the drainage.**

(3) After drain checking is finished, return the Operation Selector switch to the RUN position (ON position) and remount the tube cover.

CAUTION **To mount the tube cover, use 5/16" (4 × 8 mm) tapping screws. Do not use long screws as they may puncture the drain pan and cause water leakage.**

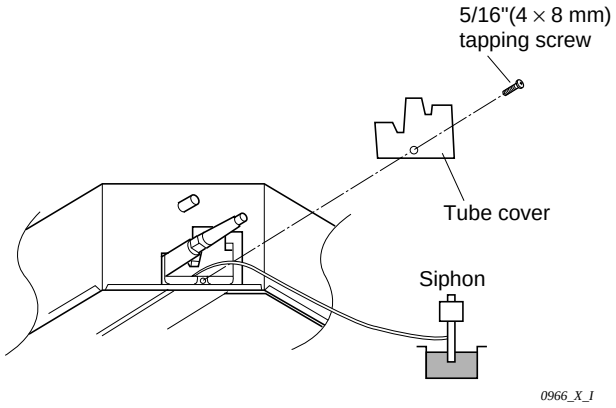


Fig. 3-12

■ Ceiling Panel

CAUTION

Never touch or attempt to move the air direction louver by hand or you may damage the unit. Instead, use the remote control unit if you want to change the direction or air flow.

3-6. Before Installing the Ceiling Panel

(1) Remove the air-intake grille and air filter from the ceiling panel. (Figs. 3-13 and 3-14)

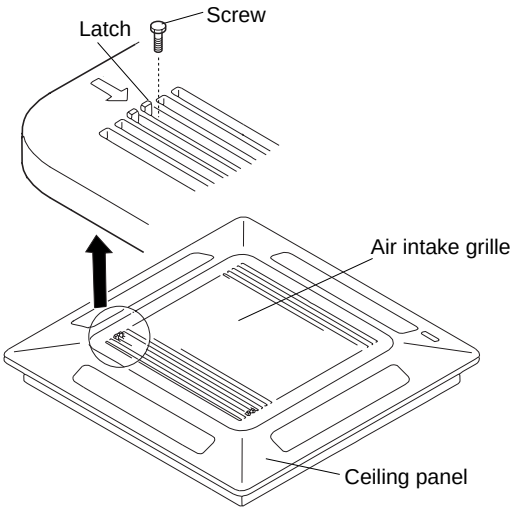
(a) Remove the 2 screws on the latch of the air-intake grille. (Fig. 3-13)

(b) Press on the 2 latches of the air-intake grille with your thumb in the direction of the arrow to open the grille. (Fig. 3-13)

(c) With the air-intake grille open about 45˚, remove the safety string (hook on the grille side). (Fig. 3-14)

(d) Pull the air-intake grille towards you to remove it from the ceiling panel.

(2) Pull down the two panel catches on the body of the indoor unit body. (Fig. 3-15)



0149_X_I

Fig. 3-13

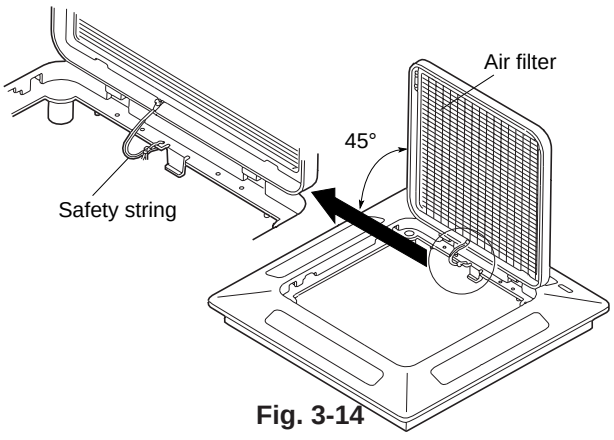


Fig. 3-14

0150_X_I

3-7. Installing the Ceiling Panel

(1) Lift the ceiling panel and position it to align the panel hook with the panel catch of the indoor unit.

NOTE

The ceiling panel must be mounted in the correct direction. Note that the 2 catches of the panel differ in size.
Confirm that the catches are correctly matched between the ceiling panel and the indoor unit body.

(2) Next, check to see that the ceiling panel is properly aligned with the seamline of the ceiling. If it is not, remove the ceiling panel and slightly readjust the indoor unit body to the proper suspension point.

(3) When the ceiling panel has been properly aligned, use the supplied 4 mounting screws (M5) with washers to permanently fasten the ceiling panel.

(4) Install the wiring connector from the ceiling panel to the connector in the electrical component box of the indoor unit. After installing the connector, use the clamp on the body of the indoor unit to secure the wiring.

(5) Install the air filter and air-intake grille by performing the steps in section 3-6 in reverse.

NOTE

Rehook the safety string before closing the air-intake grille.

3-8. When Removing the Ceiling Panel for Servicing

When removing the ceiling panel for servicing, remove the air-intake grille and air filter, disconnect the wiring connector inside the electrical component box, and then remove the 4 mounting screws.

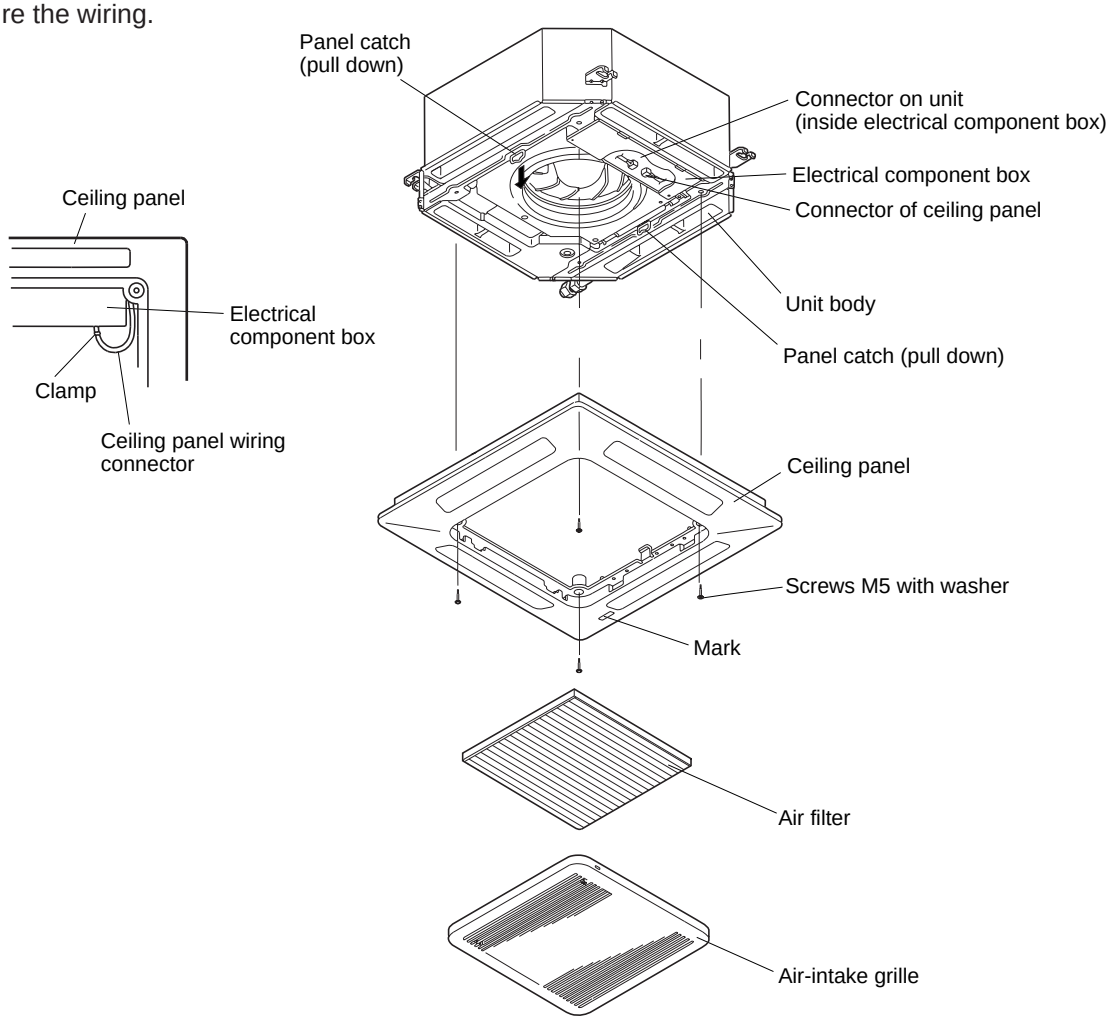


Fig. 3-15

0967_X_I

3-9. Duct for Fresh Air

- Air-intake chamber (including Duct connection box and flange) are attached to the indoor unit when used to take fresh outdoor air.
  High-performance filter or Super long-life filter can be also installed in the air-intake chamber.

(1) SETUP PRIOR TO INSTALLATION

- When installing the high performance filter or super long-life filter, the parts and parts numbers of filters to be assembled with the air-intake chamber are listed below. Please check that the correct part numbers are present.

Air-intake chamber	High performance filter	Super long-life filter
CMB-GSJ80T (XS1852)	AFT-MSJ80T AFT-HSJ80T	AFT-LSJ80T

(2) ACCESSORIES

- Check that the following parts are in the box when unpacking.

NAME	QT'Y	REMARKS
Cord with socket (9P) 	1	Connecting line. Connect only when high-performance filter is used
Screw (M5 × L125) 	4	Air-intake filter (for fastening)
Screw (M4 × L12) 	4+4	Duct connection flange/ box (for fastening)
Duct connection box	1	(for fresh air)
Duct connection flange	1	(for connecting fresh air duct)

(3) INSTALLATION

(a) Setup for the indoor unit

- When assembling the high-performance filter, open the lid of the electrical component box, remove the socket (9P) of the fan motor cable inside the electrical component box and connect the accessory cord with socket (9P).

CAUTION

Do not connect the "accessory cord with socket" to the electrical component box when the unit is used to take fresh air.
Do not connect the "accessory cord with socket" when assembling the super long-life filter.
Always store the "accessory cord with socket" inside the electrical component box.

Installation steps (a) to (b) are the same for both the CMB-GSJ80T and the GSJ140T. The drawing illustrates installation of air-intake chamber to the CMB-GSJ80T.

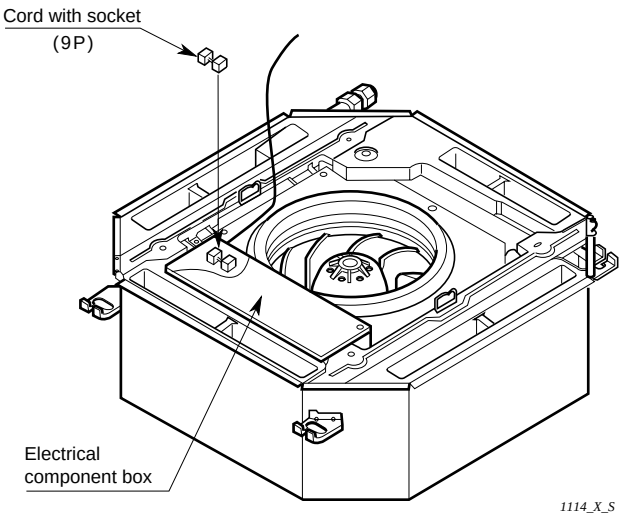


Fig. 3-16

(b) INSTALLING THE AIR-INTAKE CHAMBER

- Set the air-intake chamber to the indoor unit taking care not to set to the incorrect direction. (Fig. 3-17)
- Fasten the air-intake camber with the accessory screws. (M5 × L125, 4pcs) (Fig. 3-17)

(c) INSTALLING THE DUCT CONNECTION BOX

- Fasten the duct connection flange to the duct connection box with the accessory screws (M4 × L12, 4 pcs.). (Fig. 3-18)
- Put the duct connction box into the rectangular hole of the air-intake chamber and fasten it to the both sides of the indoor unit and chamber with the accessory screws (M4 × L12, 4 pcs.). (Fig. 3-18)

(d) INSTALLING THE INDOOR UNIT

- Install the indoor unit to the ceiling.
  (Install the indoor unit according to items 3-1 to 3-6.)

(e) INSTALLING THE CEILING PANEL

- Attach the ceiling panel to the chamber.
- Remove the socket cover of the air-intake chamber and pass the 3P and 6P sockets through it. (Fig. 3-17)
- Connect the 3P socket to the 3P plug of the indoor unit electrical component box.
- Connect the 6P socket to the 6P plug from the operation selector.
- Reattach the socket cover.

(f) INSTALLING THE HIGH-PERFORMANCE FILTER OR SUPER LONG-LIFE FILTER (Fig. 3-18)

- Turn the filter hooks of the air-intake chamber.
- Install high-performance or super long-life filter into the chamber. (Install in the correct direction. Set the filter so that the arrow on the side as shown in the drawing on the right can be installed into the air-intake chamber.
- Turn the filter hook (positioned so the filter frame is aligned) and secure the air filter in place.

CAUTION

Take adequate precautions when installing onto the ceiling. The air-intake chamber is especially prone to rupture if struck on it's side.

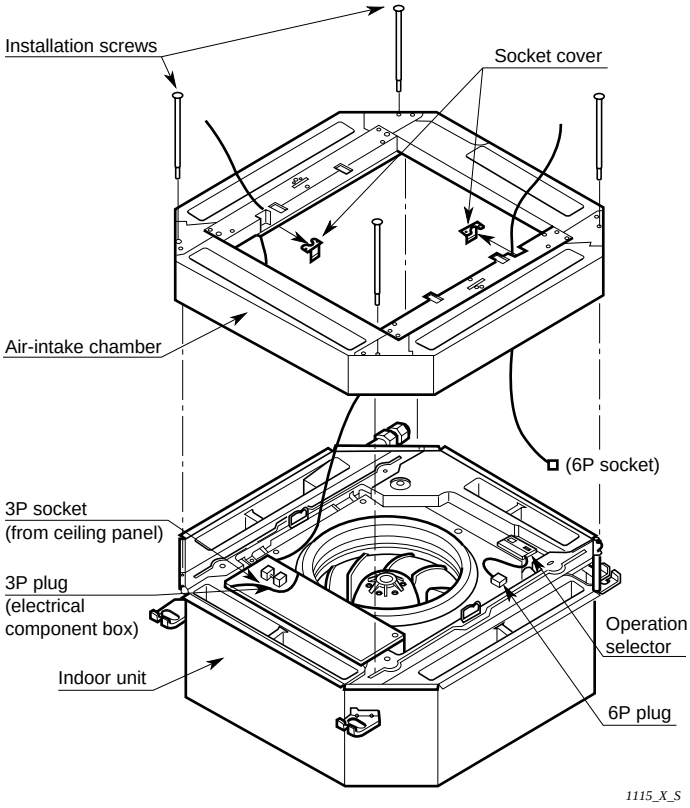


Fig. 3-17

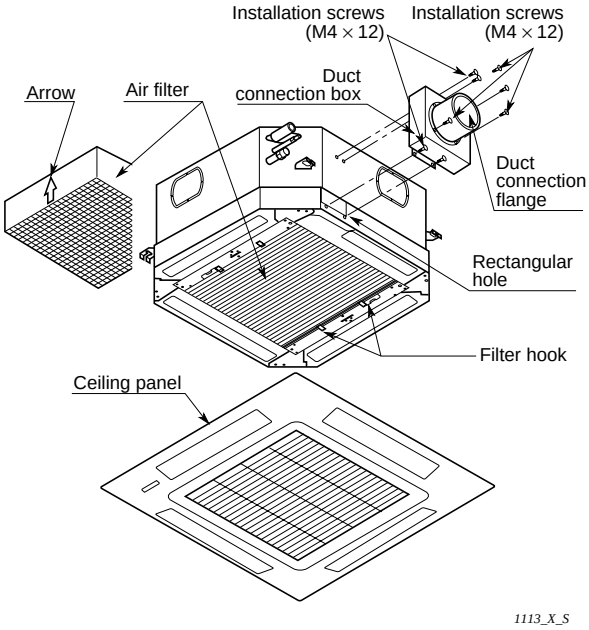


Fig. 3-18

4. How to Install the Remote Control Unit

■ Wireless Remote Control Unit

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. 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) Removable mounting

(a) Momentarily hold the remote control unit in the desired mounting position.

(b) Confirm that the air conditioner responds correctly when you press keys on the remote control from that position.

(c) After confirming correct operation, use a screwdriver to screw the supplied special mounting screw into the wall. (Fig. 4-1)

(d) Hang the remote control unit from the mounting screw.

(2) Non-removable mounting

(a) Momentarily hold the remote control unit in the desired mounting position.

(b) Confirm that the air conditioner responds correctly when you press keys on the remote control from that position.

(c) After confirming correct operation, use a screwdriver to screw the mounting screw into the wall. (Fig. 4-1)

(d) Remove the remote control cover by sliding it downward.

(e) Remove the batteries of the remote control unit.

(f) Hang the remote control unit from the mounting screw, and use a screwdriver to screw the remote control unit securing screw into the wall through the hole in the battery compartment. (Fig. 4-2)

(g) Replace the batteries.

(h) Again confirm that the remote control unit operates correctly.

Removable mounting

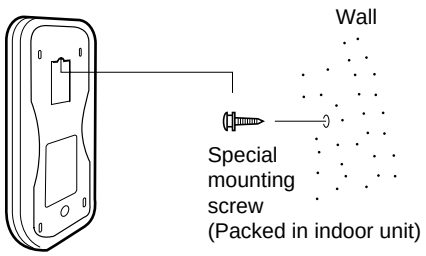


Fig. 4-1

Non-removable mounting

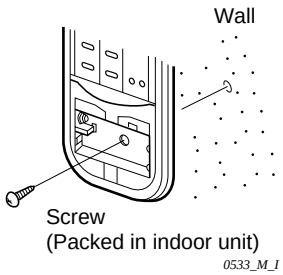


Fig. 4-2

■ Wired Remote Control Unit (Option)

(1) To access the printed circuit board, remove the cover plate of the electrical component box.

(2) Attach the remote control connectors securely to the mating connector pins on the printed circuit board.

(3) Turn the R.C.U. switch from “WIRELESS” to “WIRED”.

(4) Replace the cover plate.

WARNING **Do not supply power to the unit until the tubing and wiring to the outdoor unit is completed.**

The mounting position for the remote control unit should be located in an accessible place for control and permit the average room temperature to be detected. Never cover the unit or recess it into the wall.

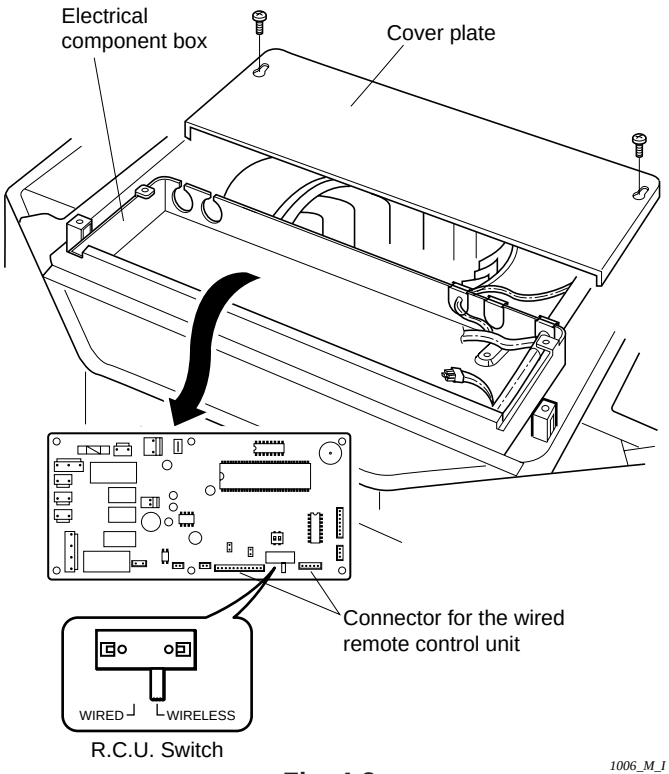


Fig. 4-3

4-2. Installing the Wired Remote Control Unit

(1) Use a ballpoint pen or similar pointed object to remove the plastic bushing which is inserted in the rear of the remote control unit. The bushing can be discarded. (Fig. 4-4)

(2) Align the cord with the groove of the remote control unit.

(3) Attach the mounting plate to the wall with the 2 supplied screws. Then align the rail on the rear of the control unit with the slot of the mounting plate and slide the unit down as far as it will go. (Fig. 4-4) Fix the control unit cord to the wall.

(4) If local codes allow, the remote control unit cord can be wired in the wall. (Fig. 4-5)

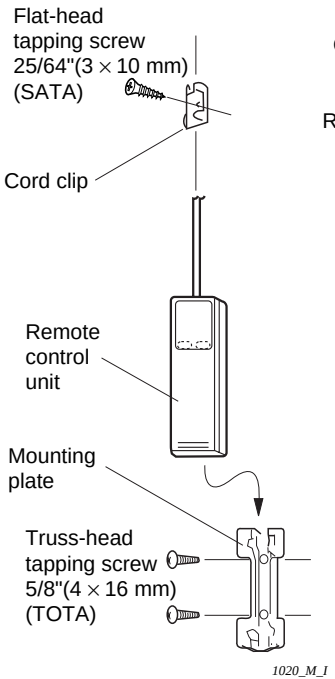


Fig. 4-4

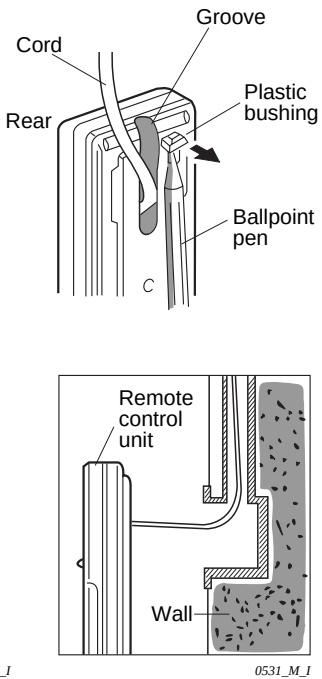


Fig. 4-5

5. Address Switches

If you are installing one indoor unit or one group of indoor units in the same room, it is necessary for you to assign each unit its own address so that each can be operated by its own remote control unit. You assign the addresses by matching the switch position of each indoor unit with the switch position of its remote control unit. The switch of the remote control unit is shown in Fig. 5-1.

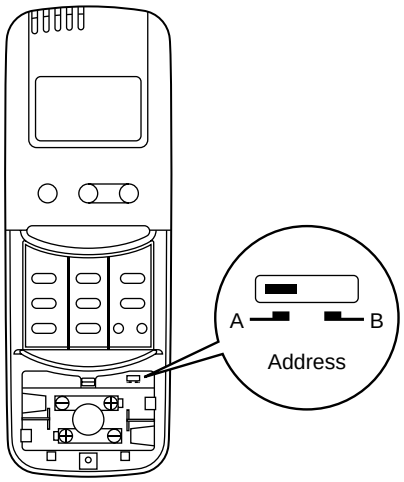
5-1. Finding the Address Switches

Remote Control Unit

Remove the lid by sliding it off. You can see the switches inside the battery compartment. (Fig. 5-1)

Indoor Unit

(1) Turn off the Power Switch.
(2) Remove the Grille.
(3) Remove the cover of the Electrical Component Box.



Address switch is in “A” position at time of shipment.

1008_M_I

Fig. 5-1

5-2. Switch Positions for 2 Units or 2 Groups of Units

Table 5-1 shows the positions you can use for up to 2 units or 2 groups of indoor units installed in the same room. Two remote control units are necessary to allow the respective units or group to be controlled independently.

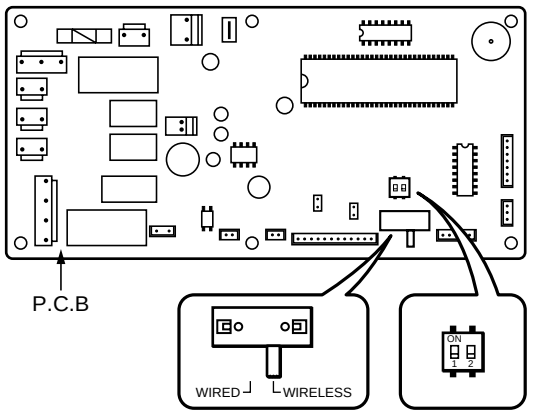
Table 5-1

Unit No.	Remote Control Address switch	Indoor Unit Address switch	
		1	2
1	A	OFF	OFF
2	B	ON	ON

The indoor unit address switch is set at 1-OFF & 2-OFF position at shipment.

NOTE

An indoor unit cannot be controlled if its remote control unit is too far away (more than 26 ft.). If the remote control unit does not work correctly, bring it closer to the unit being operated and try again. There should be no obstacles between the remote control unit and the indoor unit. For this reason, if the remote control unit is to be used from a fixed position, check the operation before mounting.



1321_M_I

Fig. 5-2

6. Electrical Wiring

6-1. 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 (ex. National Electric Code: ANSI/NFPA70) 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.

6-2. Recommended Wire Length and Wire Diameter for Power Supply System

Models	(A)*1 Power Supply AWG #12	(B)*1 Inter-unit Wiring AWG #12	Time Delay Fuse or Circuit Capacity	Power Supply Terminal Base (Outdoor Unit)	
				Capacity	Max. Wire Diameter
C1852, CL1852	75 ft.	65 ft.	15 A	20 A	AWG #12

*1 Refer to the Wiring System Diagrams (See Fig. 6-3) for the meaning of “A”, “B”.
AWG = American Wire Gauge

6-3. Wiring Instructions for the Outdoor Unit

(1) To take off the access panel, remove the 4 screws. (See Fig. 6-1)

(2) Dismount plugs on the conduit plate.

(3) Temporarily mount the conduits on the conduit plate.

(4) Properly connect both the power supply and inter-unit lines to the corresponding terminals on the terminal block.
Refer to the wiring diagram in Fig. 6-2 (which also appears on the access panel).

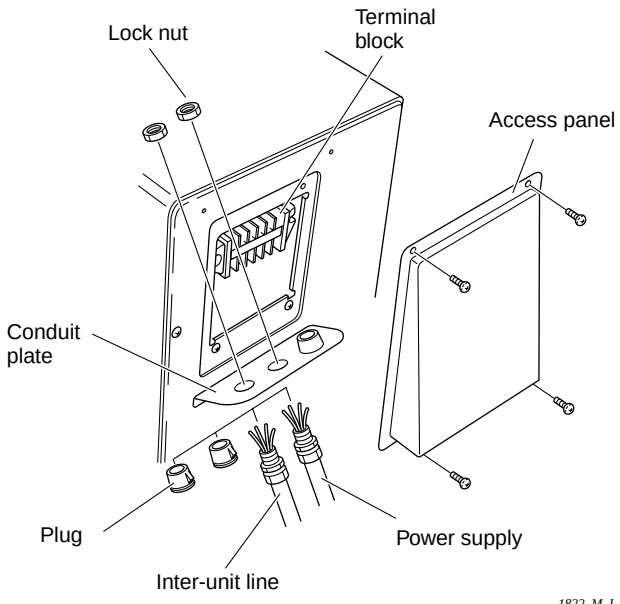


Fig. 6-1

NOTE

- Conduit's trade size for this unit is 1/2". The conduit can be purchased at a hardware store.
- The fuse located in the outdoor unit provides power supply protection and may blow when power is applied if the system has been incorrectly wired.

(5) Ground the unit in accordance with local codes.

(6) Be sure to size each wire allowing several inches longer than the required length for wiring.

(7) Use lock nuts to secure the conduit tubes.

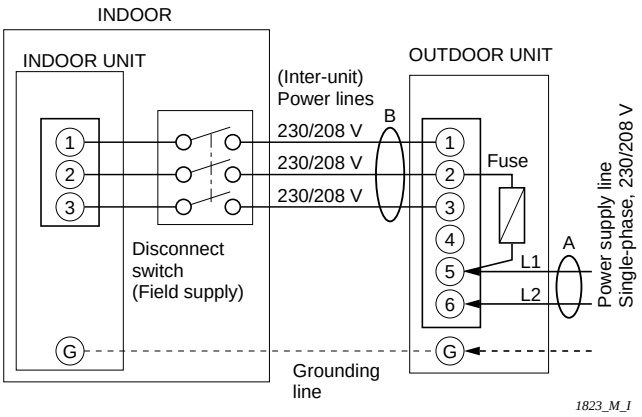


Fig. 6-2

WARNING

- **Be sure to comply with local codes while running the wire from the indoor unit to the outdoor unit (size of wire and wiring method, etc.).**
- **Every wire must be connected firmly.**
- **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

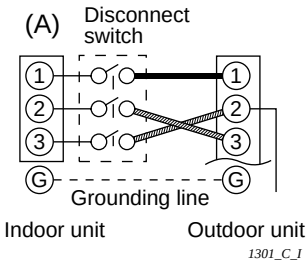
- **Be sure to connect the power supply line to the outdoor unit as shown in the wiring diagram. The indoor unit draws its power from the outdoor unit.**

6-4. 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.

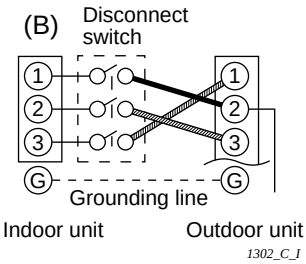
Problem 1

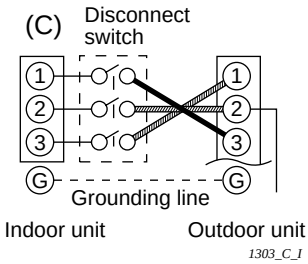
- Short circuit will occur after approx. 3 minutes and the power circuit fuse blows.



Problem 2

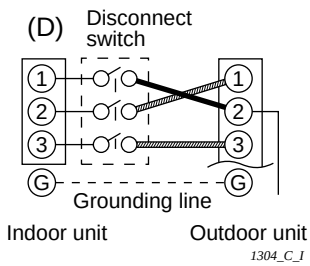
- Air conditioner will not operate.

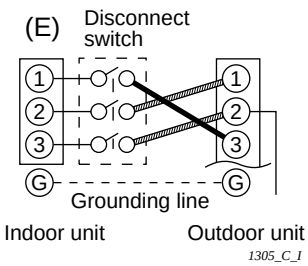




Problem 3

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





WARNING

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

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

6-5. How to Connect Wiring to the Terminal

■ For solid core wiring (or F-cable)

(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to expose the solid wire about 1 in.. (Fig. 6-3)

(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 wire loop properly, position it on the terminal plate and fix it securely with the terminal screw using a screwdriver.

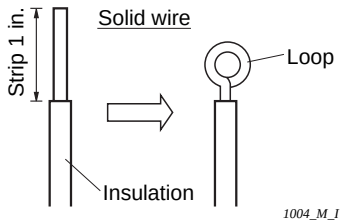


Fig. 6-3

■ For stranded wiring

(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to expose the stranded wiring about 3/8 in.. (Fig. 6-4)

(2) Using a Pillips head 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 pressure terminal. (Fig. 6-4)

(4) Place the ring pressure terminal, and replace and tighten the removed terminal screw using a screwdriver. (Fig. 6-5)

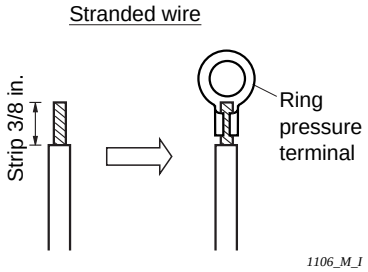


Fig. 6-4

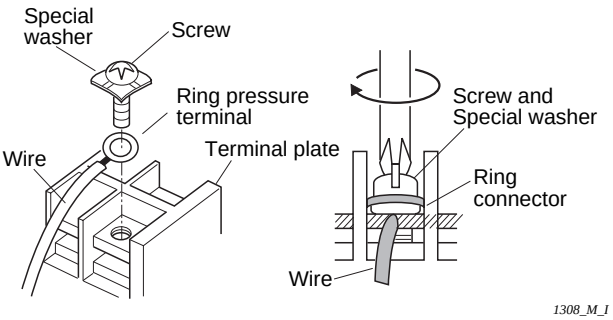


Fig. 6-5

7. How to Process Tubing

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

7-1. Use of the Flaring Method

Many of the 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.

7-2. Flaring Procedure with a Flare Tool

(1) Cut the copper tube to the required length with a tube cutter. It is recommended to cut about 12 – 20 in. longer than the estimated tubing length.

(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. 7-1)

NOTE

When reaming, hold the tube end downward and be sure that no copper scraps fall into the tube. (Fig. 7-2)

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

(4) Make a flare at the end of copper tube with a flare tool.* (Fig. 7-3)
*Use "RIGID®" or equivalent.

NOTE

A good flare should have the following characteristics:

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

7-3. Precaution 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. 7-4)

(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. 7-5)

- 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.

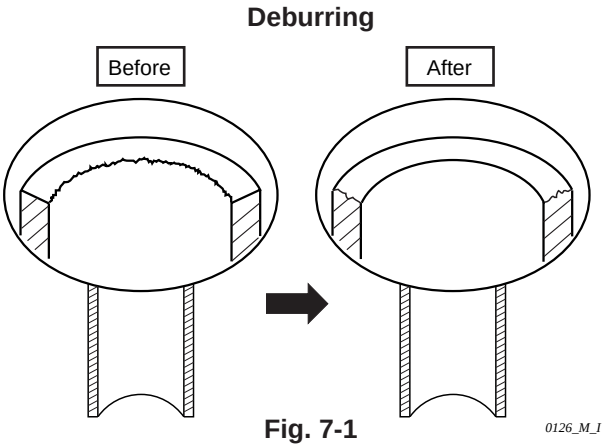


Fig. 7-1

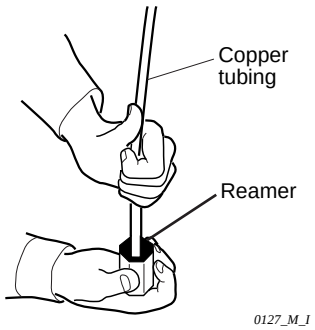


Fig. 7-2

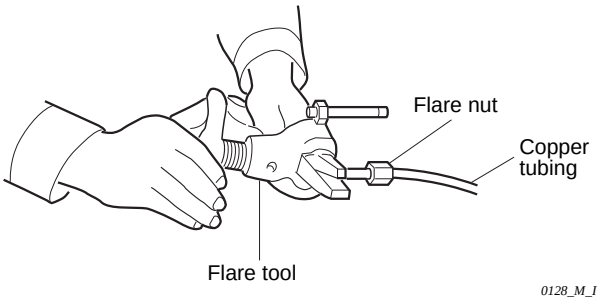


Fig. 7-3

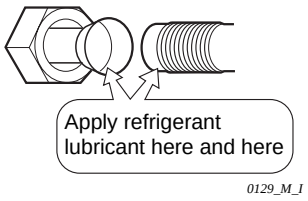


Fig. 7-4

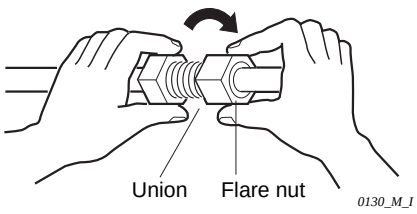


Fig. 7-5

7-4. 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.

7-5. Connecting Tubing between Indoor and Outdoor Units

(1) Tightly connect the indoor side refrigerant tubing with the outdoor side tubing. (Fig. 7-6)

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

Table 7-1

Tube Dia.	Tightening Torque
1/4" (6.35 mm)	Approx. 140 — 180 kg-cm (120 — 160 lbs-in.)
5/8" (15.88 mm)	Approx. 680 — 820 kg-cm (590 — 710 lbs-in.)

7-6. Insulating the Refrigerant Tubing

CAUTION

Always insulate tubes after completing leak tests on all connection points.

Important

To avoid condensation and water leaks, the wide and narrow tubes must be insulated with the supplied insulation materials.

Taping the flare nuts

Wind white insulation tape around the flare nuts at the wide and narrow tube connections. Place the seal (supplied) on the unit. Then cover up the tubing connections with the flare nut insulator, and cover the gap at the union with the supplied black insulation tape. Finally, fix the insulator at both ends with vinyl clamps. (Fig. 7-7)

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.

CAUTION

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

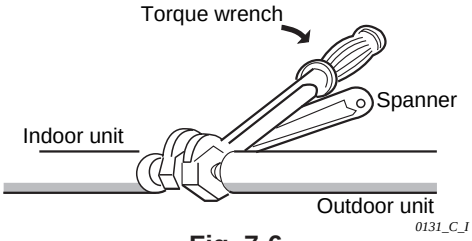


Fig. 7-6

Refrigerant tubing

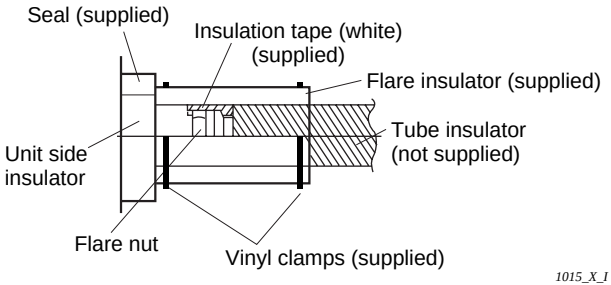
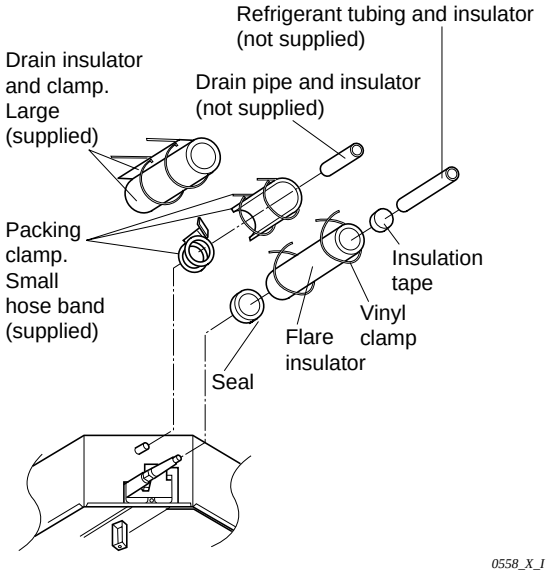


Fig. 7-7

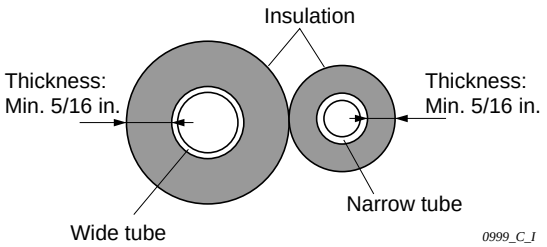


Never grasp the drain or refrigerant connecting outlets when moving the unit.

Fig. 7-8

Important

Because capillary tubing is installed in the outdoor unit, both the wide and narrow tubes of this air conditioner become cold. Therefore, to prevent heat loss and wet floors due to dripping of condensation water, both tubes must be well insulated with proper insulation material. The thickness of the insulation material should be a min. 8 mm (5/16").



7-7. Taping the Tubes

(1) At this time, the refrigerant tubes (and electrical wiring if local codes permit) should be taped with armoring tape in 1 bundle. To prevent the 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. (Fig. 7-9)

(3) Clamp the tubing bundle to the wall, using 1 clamp about every 3 feet.

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.

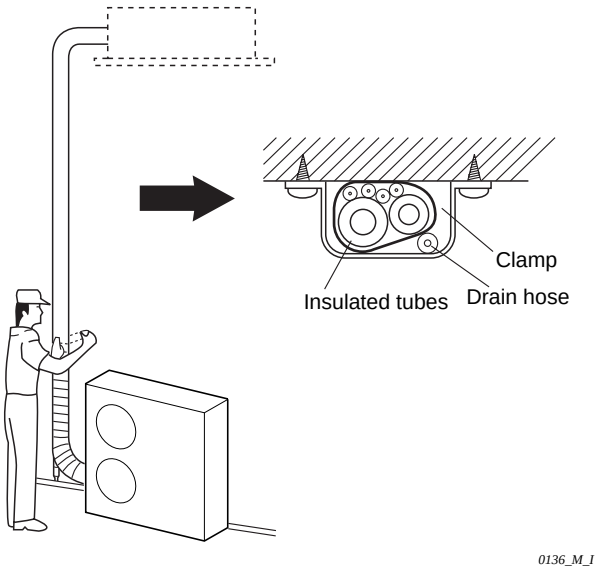


Fig. 7-9

7-8. 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. 7-10)

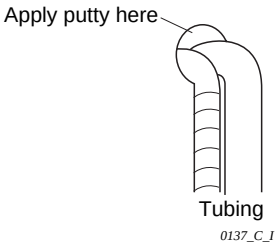


Fig. 7-10

8. 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)

(1) 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.Note that both narrow and wide tube service valves on the outdoor unit are kept closed at this stage.

(2) Using an adjustable wrench or box wrench, remove the valve caps from the service valve on both narrow and wide tubes.

(3) Connect a vacuum pump and a manifold valve (with pressure gauges) to the service port on the wide tube service valve. (Fig. 8-1)

CAUTION

Be sure to 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.

(4) With the “Lo” knob of the manifold valve open, run the vacuum pump. The operation time for the vacuum pump varies with tubing length and the capacity of the pump. The following table shows the amount of time for evacuation:

Required time for evacuation when capacity of 100 liter/h vacuum pump is used	
If tubing length is less than 33 ft. (10 m)	If tubing length is more than 33 ft. (10 m)
10 min. or more	**15 min. 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.

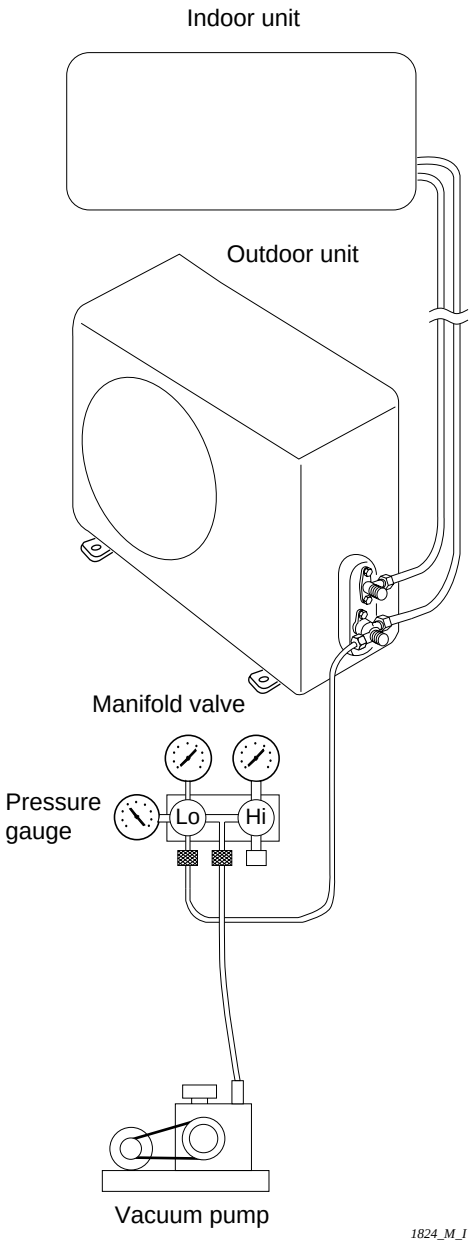


Fig. 8-1

(5) With the vacuum pump still running, close the “Lo” knob of the manifold valve. Then stop the vacuum pump.

(6) With the accessory hex wrench, turn the valve stem on the narrow tube service valve counter-clockwise by 90 degress (1/4 turn) for 10 seconds, and then turn the stem clockwise to close it again. (Fig. 8-2)

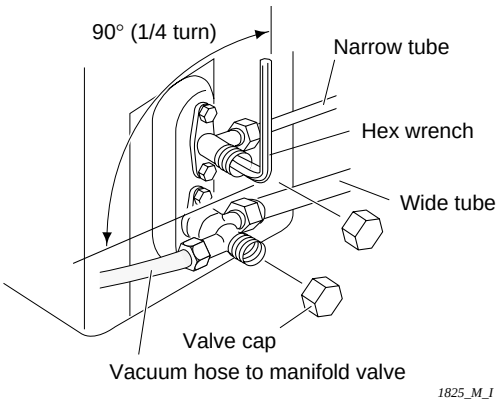


Fig. 8-2

CAUTION

Be sure to completely insert the hex wrench before attempting to turn the valve.

(7) Leak test all joints at the tubing (both indoor and outdoors) with liquid soap. Bubbles indicate a leak. Be sure to wipe off the soap with a clean cloth.

(8) With the hex wrench, turn the wide tube service valve stem counter-clockwise to fully open the valve.

(9) Turn the narrow tube service valve stem counter-clockwise to fully open the valve.

(10) Loosen the vacuum hose connected to the wide tube service port slightly to release the pressure. Then, remove the hose.

(11) Replace the bonnet and flare nut on the wide tube service port and fasten the flare nut securely with an adjustable wrench or box wrench or box wrench. Next, mount the valve cap and tighten it with a torque wrench (the cap needs to be tightened with the torque of 170 ibs.·in. (200 kg·cm)). This process is very important to prevent gas from leaking from the system.

(12) Test run the air conditioner. (See next page.)

(13) While the air conditioner is running, apply liquid soap to check for any gas leaks around the service valves or caps.

(14) If there is no leakage, stop the air conditioner.

(15) Wipe off the soap on the tubing.

This completes air purging with a vacuum pump and the air conditioner is ready for actual operation.

9. Test Run

9-1. Performing Test Run

CAUTION

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

(1) The Operation Selector is located on the electrical component box inside the indoor unit. To access the Operation Selector, press the two latches of the air intake grille in the direction of the arrow to open the grille. Open the air intake grille downward. (Fig. 9-1)

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

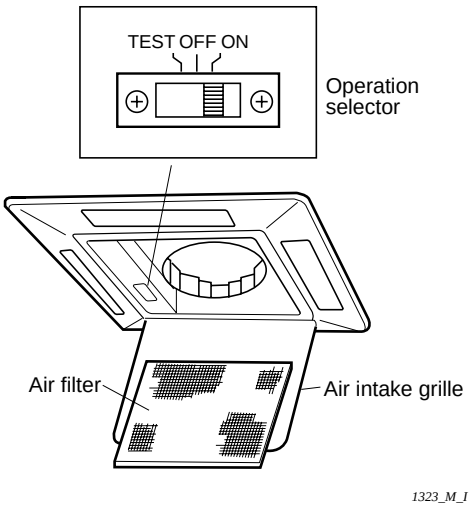


Fig. 9-1

Important

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

9-2. Performing Test Run with Optional Wired Remote Control Unit

(1) Service TEST RUN switch is located on the rear side of the remote control unit. Set the switch to the TEST RUN position. (Fig. 9-2)

(2) Referring to the Operating Instructions, select the cooling mode and press the ON / OFF operation button on the remote control unit.

(3) The air conditioner will start running 3 minutes after the ON / OFF operation button is pressed.

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

(5) Press the ON / OFF operation button again to stop the unit.

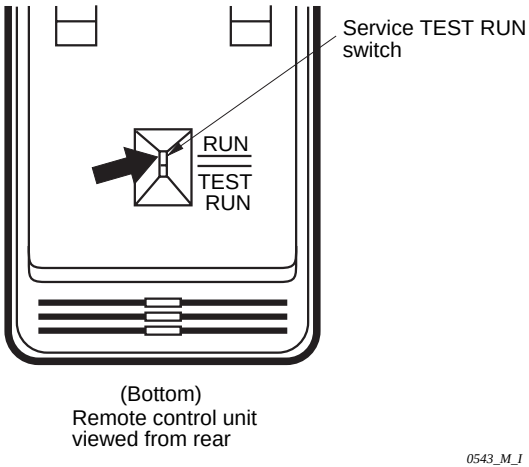


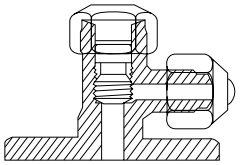
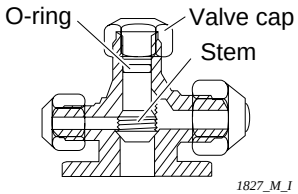
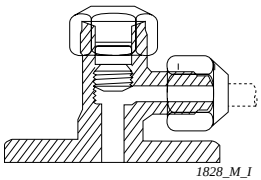
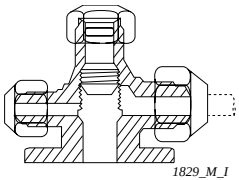
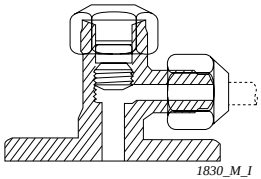
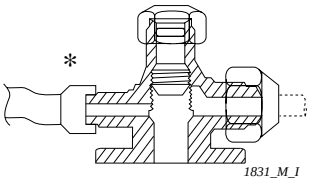
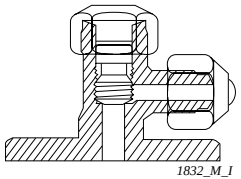
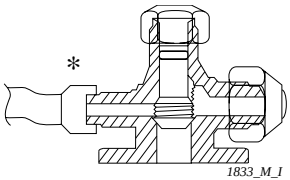
Fig. 9-2

Important

Set the Service Test RUN switch at “RUN” position, otherwise the unit will not run correctly.

9-3. Basic Function of the Service Valves

The basic function of the service valves are given in Table 7 below.

Action	Narrow Tube Service Valve (2-Way)	Wide Tube Service Valve (3-Way)
Shipping	 1826_M_I	 1827_M_I
Operating and test running the air conditioner	 1828_M_I	 1829_M_I
Measuring pressure and gas charging	 1830_M_I	 1831_M_I
Air purging with a vacuum pump	 1832_M_I	 1833_M_I

* The service port on the wide tube service valve uses a Schrader core valve to access the refrigerant system. Therefore, be sure to use a hose connector which has a push-pin inside. (Fig. 9-3)

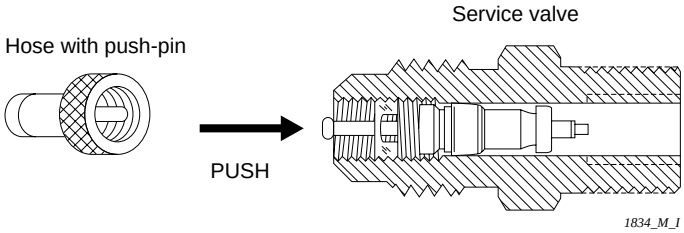


Fig. 9-3

9-4. 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

Be sure to carry out pump down with the unit in cooling mode.

(1) Connect the Lo side charging hose of the manifold valve to the service port 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. (Be sure to confirm that the wide tube service valve is fully open.)

(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.

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