

SPLIT TYPE ROOM AIR CONDITIONER

MODELS: ASU 9 / AOU 9

ASU12 / AOU12

ASU12R / AOU12R

INSTALLATION MANUAL

(PART NO. 9357067018)

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 danger, 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 and the potential for product or property damage.

• Hazard alerting symbols



Electrical



Safety / alert

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 Ceiling or Wall

Make sure the ceiling/wall 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

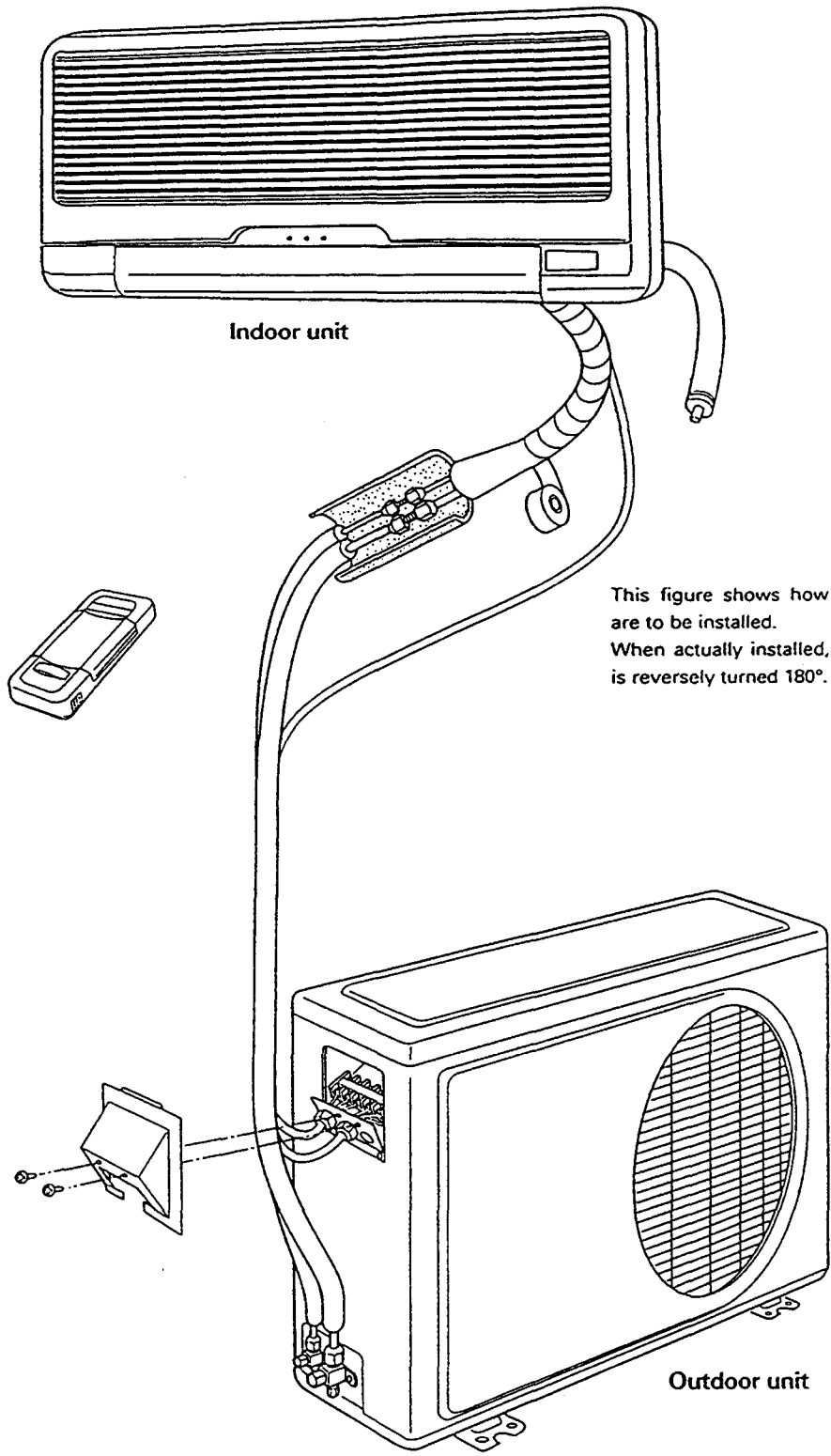
- Keep all tubing runs as short as possible.
- Use the flare method for connecting tubing.
- Apply refrigerant lubricant to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak-free connection.
- Check carefully for leaks before 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 "small" or "large" rather than as "liquid" or "gas".

When Servicing

- Turn the power OFF at the main circuit breaker panel 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.
- After installation, explain correct operation to the customer, using the operating manual.



Indoor unit

This figure shows how the attachments are to be installed. When actually installed, the outdoor unit is reversely turned 180°.

Outdoor unit

GENERAL

This INSTALLATION MANUAL 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. TYPE OF COPPER PIPE AND INSULATION MATERIAL

Copper tubing for connecting the outdoor unit to the indoor unit and insulation material is available for purchase locally. When you purchase them, please specify the following.

A. Deoxidized annealed copper pipe for refrigerant piping as:

Table 1

Piping	Small pipe		Large pipe	
	Outer diameter	Thickness	Outer diameter	Thickness
ASU9	1/4" (6.35 mm)	1/32" (0.8 mm)	3/8" (9.52 mm)	1/32" (0.8 mm)
ASU12	1/4" (6.35 mm)	1/32" (0.8 mm)	1/2" (12.7 mm)	1/32" (0.8 mm)
ASU12R	1/4" (6.35 mm)	1/32" (0.8 mm)	1/2" (12.7 mm)	1/32" (0.8 mm)

Cut each pipe to the appropriate length + 12" (30 cm) to 16" (40 cm) to dampen vibration between units.

B. Foamed polyethylene insulation for copper pipes as required to precise length of piping. Wall thickness of the insulation should not be less than 5/16" (8 mm).

C. Use insulated copper wire for field wiring.



CAUTION:

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

2. ADDITIONAL MATERIALS REQUIRED FOR INSTALLATION

- A. Refrigeration (armored) tape
- B. Insulated staples or clamps for connecting wire
(See your local electrical codes.)
- C. Putty
- D. Refrigeration lubricant
- E. Clamps or saddles to secure refrigerant piping

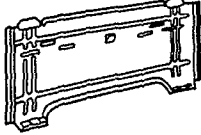

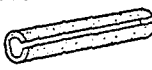

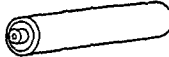




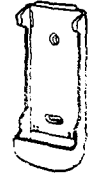
3. OPERATING RANGE

Table 2

	Temperature	Indoor air intake	Outdoor air intake
Cooling	Maximum	90°F DB, 73°F WB	115°F DB, - WB
	Minimum	65°F DB, 57°F WB	70°F DB, - WB
Heating	Maximum	80°F DB, - WB	75°F DB, 65°F WB
	Minimum	- DB, - WB	32°F DB, - WB

STANDARD ACCESSORIES

The following installation parts are furnished.
Use them as required.

Name and Shape	Q'ty	Use
Wall hook bracket 	1	For indoor unit installation
Wall cap 	1	For through hole connection pipe protection
Pipe insulation 	1	Connecting piping joint insulation (Supplied with end of indoor unit piping)
Remote controller 	1	
Battery (AAA size) 	2	For remote controller
Tapping screw (Big) ($\phi 4 \times 20$) 	12	For wall hook bracket installation
Tapping screw (Medium) ($\phi 4 \times 10$) 	9	For wall hook bracket installation
Tapping screw (Small) ($\phi 3 \times 12$) 	2	For installing the remote controller holder
Hexagon wrench 	1	For air purge (Supplied with outdoor unit)
Remote controller holder 		For remote controller installation

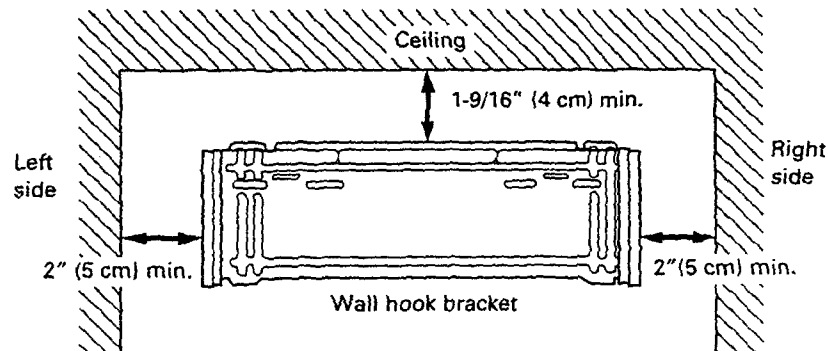
SELECTING THE MOUNTING POSITION

Decide the mounting position together with the customer as follows:

1. INDOOR UNIT

- A. Install the indoor unit level on a strong wall which is not subject to vibration.
- B. The inlet and outlet ports should not be obstructed: the air should be able to blow all over the room.
- C. Install the unit away from heat, steam and flammable gas sources.
- D. Install the unit near an electric outlet or private circuit.
- E. Install the unit away from direct sunlight exposure.
- F. Install the unit where connection to the outdoor unit is easy.
- G. Install the unit where the drain pipe can be easily installed.
- H. Take servicing, etc. into consideration and leave the spaces shown in (Fig. 1). Also install the unit where the filter can be removed.

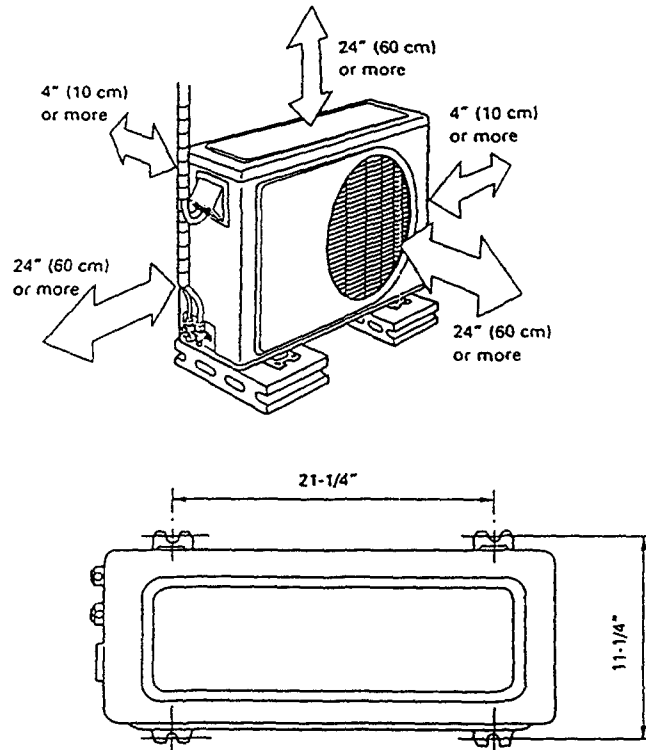
Fig. 1



2. OUTDOOR UNIT

A. Leave the spaces shown in (Fig. 2) for good air flow.

Fig. 2



- B. If possible do not install the unit where it will be exposed to direct sunlight. (If necessary, install a blind that does not interfere with the air flow.)
- C. Install the unit away from heat, steam and flammable gas sources.
- D. Upon choosing installation site, shield unit from high wind areas.
- E. Install the unit out of the way of common passages.
- F. Take you neighbors into consideration so that they are not disturbed by air blowing into their windows or by noise.

NOTE

When there are friezes on both sides, the above measurements should be considered.



CAUTION:

- Limit the height difference between the indoor and outdoor units to within 16 ft (5 m).
- The maximum length of the piping is 33 ft (10 m). If the units are further apart than this, correct operation can not be guaranteed.

ELECTRICAL REQUIREMENT

Always make the air conditioner power supply a special branch circuit and provide a special switch and receptacle. Do not extend the power cord.



CAUTION:

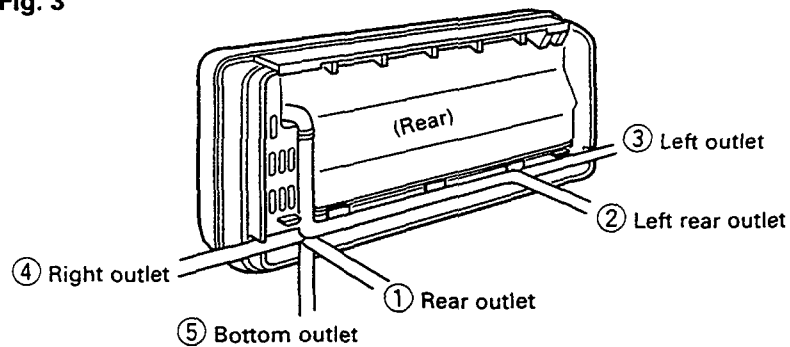
<i>MINIMUM CIRCUIT AMPACITY</i>	<i>15 A</i>
<i>MAXIMUM OVERCURRENT PROTECTION</i>	<i>20 A</i>
<i>(TIME DELAY FUSE OR HACR TYPE CIRCUIT BREAKER)</i>	

INSTALLATION PROCEDURE

INDOOR UNIT INSTALLATION

The piping can be connected in the five directions indicated by ①, ②, ③, ④ and ⑤ in (Fig. 3). When the piping is connected in direction ③ or ④, cut along the piping groove in the side of the front cover with a hacksaw. When connecting the piping in direction ⑤, cut a notch in the thin wall at the front bottom of the front cover.

Fig. 3



1. INSTALLING THE WALL HOOK BRACKET

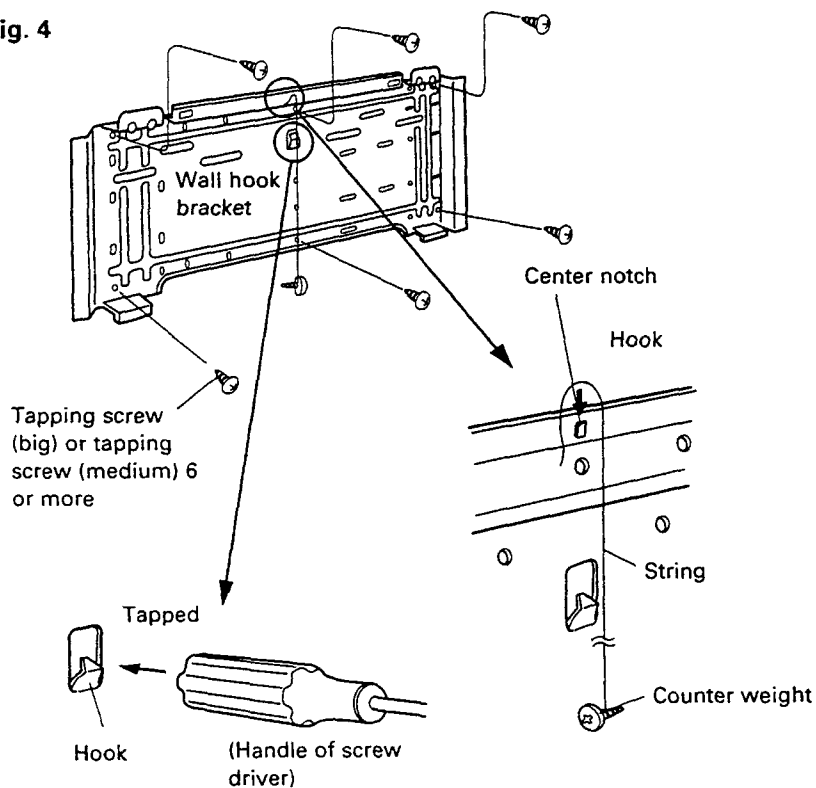
- Install the wall hook bracket so that it is correctly positioned horizontally and vertically. If the wall hook bracket is tilted, water will drip to the floor.
- Install the wall hook bracket so that it is strong enough to withstand the weight of an adult.

[Installation directly to a wall]

Before fastening the wall hook bracket to the wall with the screws, level it by tapping the hook at the center of bracket to the wall with the handle of a screwdriver.

- A. Fasten the wall hook bracket to the wall with 6 or more screws through the holes near the outer edge of the bracket.
- B. Check that there is no rattle at the wall hook bracket.

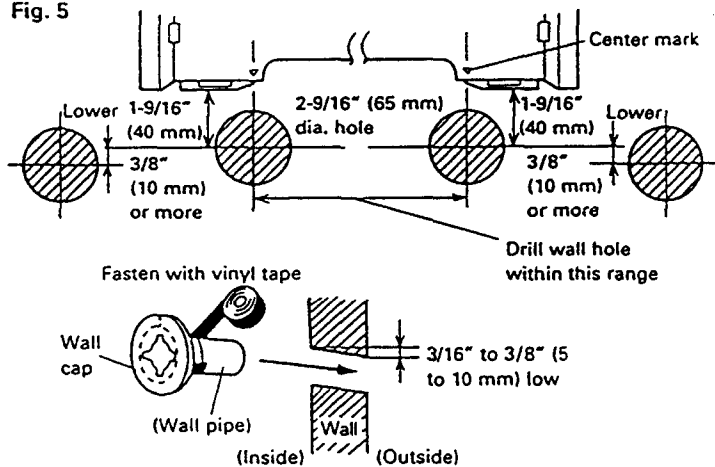
Fig. 4



2. CUTTING THE HOLE IN THE WALL FOR THE CONNECTING PIPING

- Cut a 2-9/16" (65 mm) diameter hole in the wall at the position shown in (Fig. 5).
- When cutting the wall hole at the inside of the installation frame, cut the hole within the range of the left and right center marks 1-9/16" (40 mm) below the installation frame.
When cutting the wall hole at the outside of the installation frame, cut the hole at least 3/8" (10 mm) below less.
- Cut the hole so that the outside end is lower (3/16" to 3/8" (5 to 10 mm)) than the inside end.
- Cut the wall hole pipe to match the wall thickness, stick it into the accessory wall cap, fasten the cap with vinyl tape, and stick the pipe through the hole. (The connection pipe is supplied in the installation set.) (Fig. 5)

Fig. 5



- For ③ left piping and ④ right piping, cut the hole a little lower so that drain water will flow freely. (Fig. 5)

NOTE

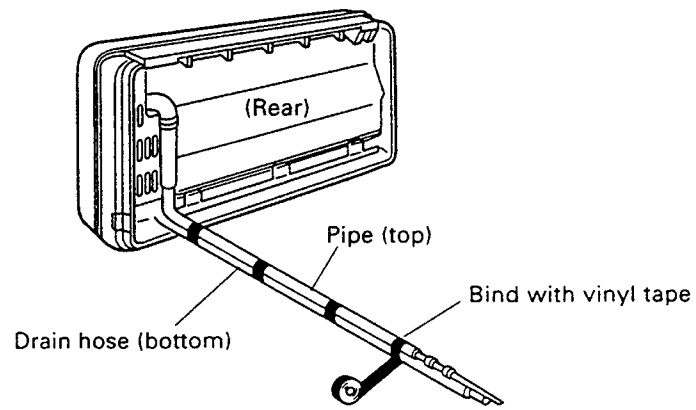
- Always align the center of the wall hole. If misaligned, water leakage will occur.
- If the wall hole pipe is not used, the cord interconnecting the indoor and outdoor units may touch metal and cause electric leakage.

3. FORMING THE DRAIN HOSE AND PIPE

A. [① Rear piping]

- (1) Install the indoor unit piping in the direction of the wall hole and bind the drain hose and pipe together with vinyl tape. (Fig. 6)
- (2) Install the piping so that the drain hose is at the bottom.

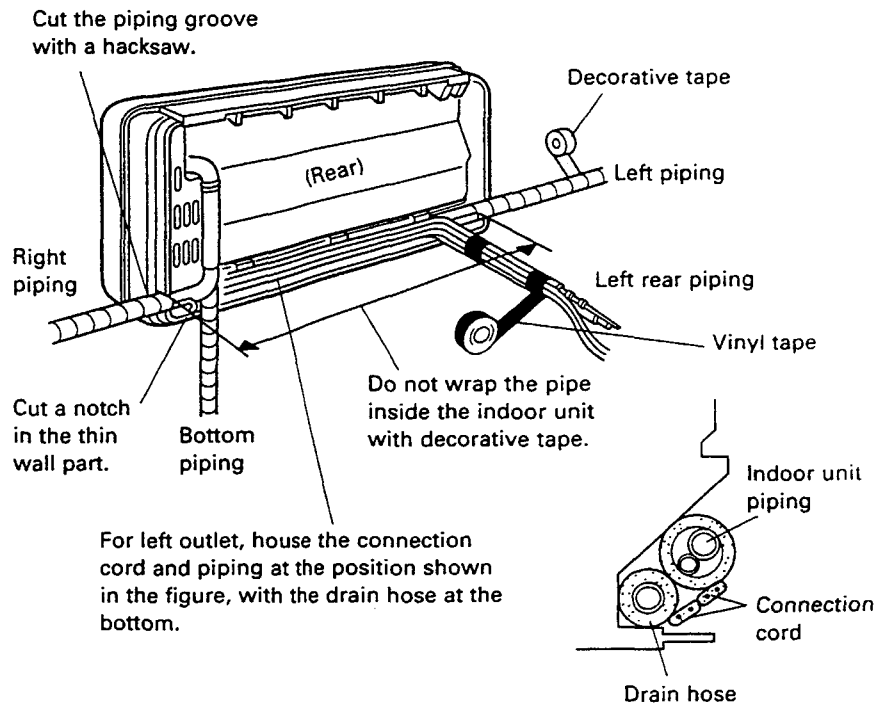
Fig. 6



**B. [For ② Left rear piping, ③ Left piping, ④ Right piping,
⑤ Bottom piping (Fig. 3 ② ③ ④ ⑤ respectively)]**

- Perform “⑥ ELECTRICAL WIRING” before performing this piping
- Wrap the pipes of the indoor unit that are visible from the outside with decorative tape.

Fig. 7

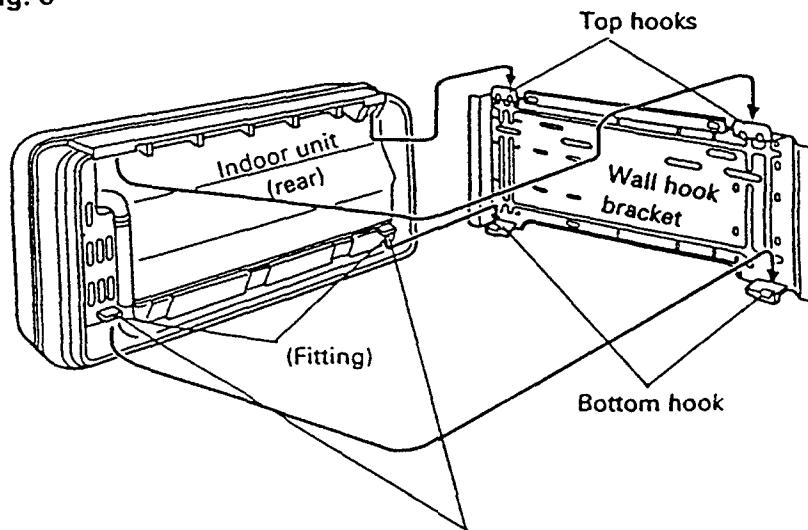


NOTE

- **To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 4" (100 mm) or more.**
- **If the pipe is bend repeatedly at the same place, it will break.**
- **Do not remove the flare nut from the indoor unit pipe until immediately before connecting the connection pipe**

- After passing the indoor piping and drain hose through the wall hole, hang the indoor unit on the hooks at the top and bottom of the wall hook bracket.

Fig. 8

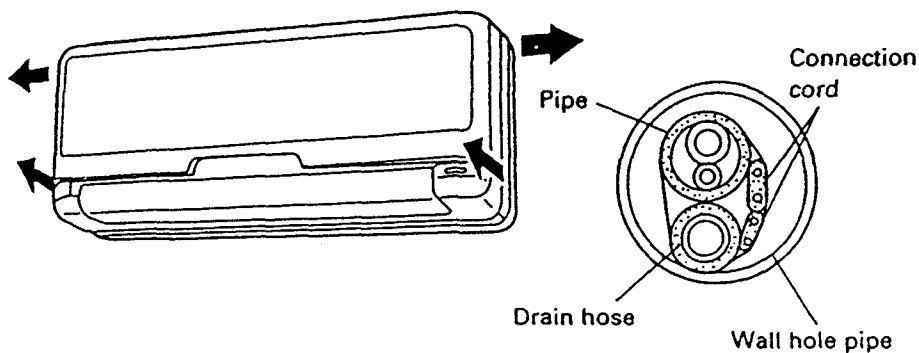


After hooking the indoor unit to the top hook, hook the fittings of the indoor unit to the two bottom hooks while lowering the unit and pushing it against the wall.

Check that:

- The top and bottom hooks are hooked firmly and the indoor unit does not move to the front and rear or left and right.
- The indoor unit is accurately positioned horizontally and vertically.
- The drain hose is at the bottom of the wall hole pipe.

Fig. 9



OUTDOOR UNIT INSTALLATION

- Set the unit on a strong stand, such as one made of concrete blocks to minimize shock and vibration.
- Do not set the unit directly on the ground because it will cause trouble.

NOTE

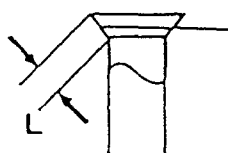
Install the unit where it will not be tilted by more than 5°.

CONNECTING THE PIPING

1. FLARING

- Cut the connection pipe to the necessary length with a pipe cutter.
- Hold the pipe downward so that cuttings will not enter the pipe and remove the burrs.
- Insert the flare nut onto the pipe and flare the pipe with a flaring tool.

Fig. 10



Check if [L] is flared uniformly and is not cracked or scratched.

L dimension

Thin pipe 1/4" (6.35 mm)dia.1/16" (1.4 to 1.7 mm)

Thick pipe 3/8" (9.53 mm)dia.5/64" (1.8 to 2.0 mm)

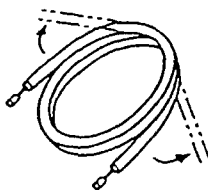
1/2" (12.7 mm)dia.5/64" (1.9 to 2.2 mm)

2. BENDING

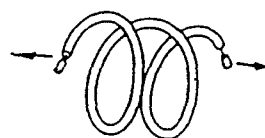
- When bending the pipe, be careful not to crush it .
- To prevent crushing of the pipe, do not bend the pipe at a radius curvature of 4" (100 mm) or more.
- If the copper pipe is bent or pulled to often, it will become stiff. Do not bend the pipe more than three times at one place.

Fig. 11

Be careful not to collapse them.



○ OK



× NO

Extend the pipe by unwinding it.

3. CONNECTION

- A. Install the outdoor unit wall cap (should be locally available) to the wall hole pipe.
- B. Connect the outdoor unit and indoor unit piping.
- C. After matching the center of the flare surface and tightening the nut hand tight, tighten the nut to the specified tightening torque with a torque wrench. (Tighten the flare nut of the outdoor unit 3-way valve after air purging.)

Fig. 12 Tighten with two wrenches.

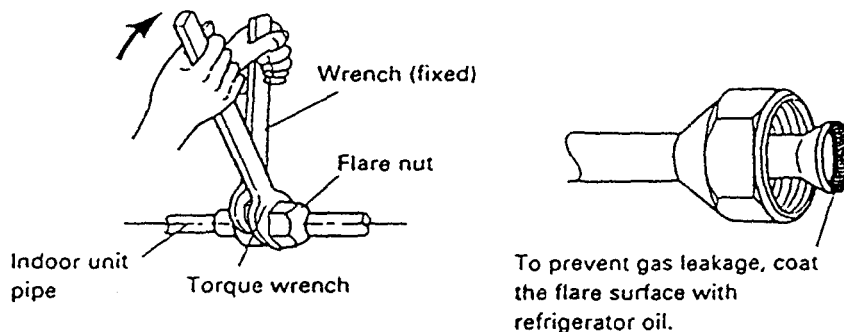


Table 3 Flare nut tightening torque

Flare nut	Tightening torque ft•lbs (kgf•cm)	Tightening torque standard (using a 8" (20 cm) wrench)
1/4" (6.35 mm) dia.	10.85 (150) to 14.47 (200)	Wrist strength
3/8" (9.53 mm) dia.	22.42 (310) to 25.32 (350)	Arm strength
1/2" (12.7 mm) dia.	36.17 (500) to 39.78 (550)	Arm strength

Do not remove the cap from the connection pipe before connecting the pipe.

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. 5/16" (8 mm).



CAUTION:

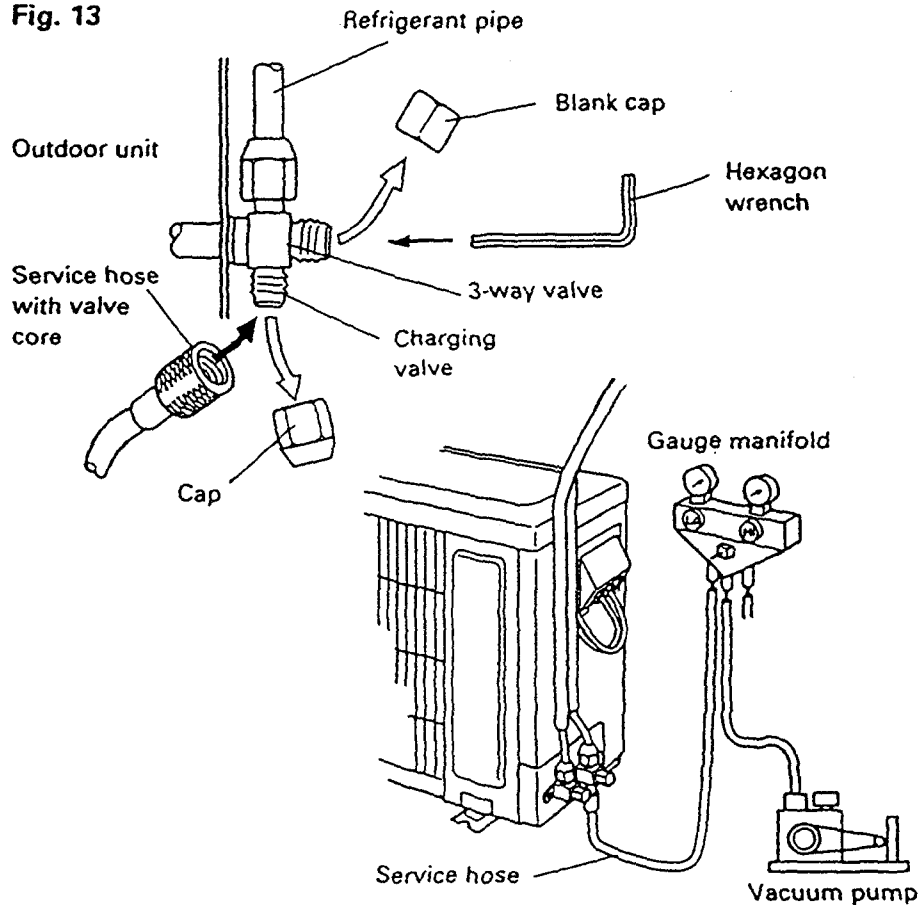
After a tube has been insulated, never try to bend it into a narrow curve, as this may cause the tube to break or crack.

AIR PURGE

1. AIR PURGE

- A. Remove the cap, and connect the gauge manifold and the vacuum pump to the charging valve by the service hoses.
- B. Vacuum the indoor unit and the connecting pipes until the pressure in them lowers to below 200 Pa (1.5 mmHg).
- C. Disconnect the service hoses and fit the cap to the charging valve (Tightening torque: 5.06 to 6.51 ft. lbs (70 to 90 kgf·cm)).
- D. Remove the blank caps, and fully open the spindles of the 2-way and 3-way valves with a hexagon wrench (Torque: 5.06 to 6.51 ft. lbs (70 to 90 kgf·cm)).
- E. Tighten the blank caps of the 2-way valve and 3-way valve to the specified torque (14.47 to 18.08 ft. lbs (200 to 250 kgf·cm)).

Fig. 13



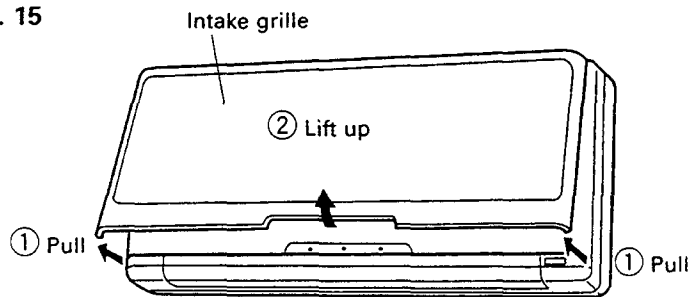
ELECTRICAL WIRING

1. INDOOR UNIT SIDE

HOW TO REMOVE THE CASING

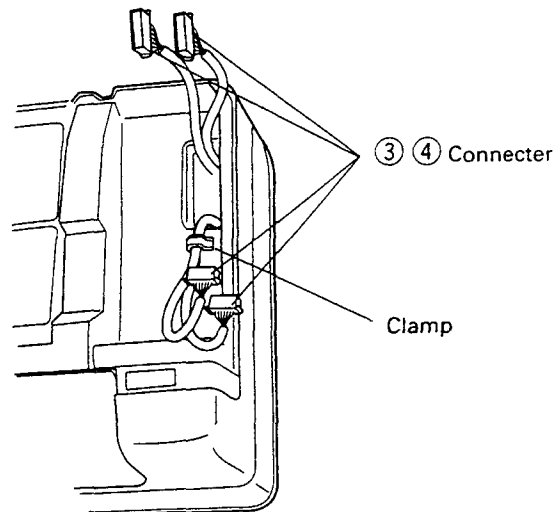
- ① Hook a finger at both sides of the intake grille and open the grille by pulling it forward.
- ② Open the intake grille further and lift the grille.

Fig. 15



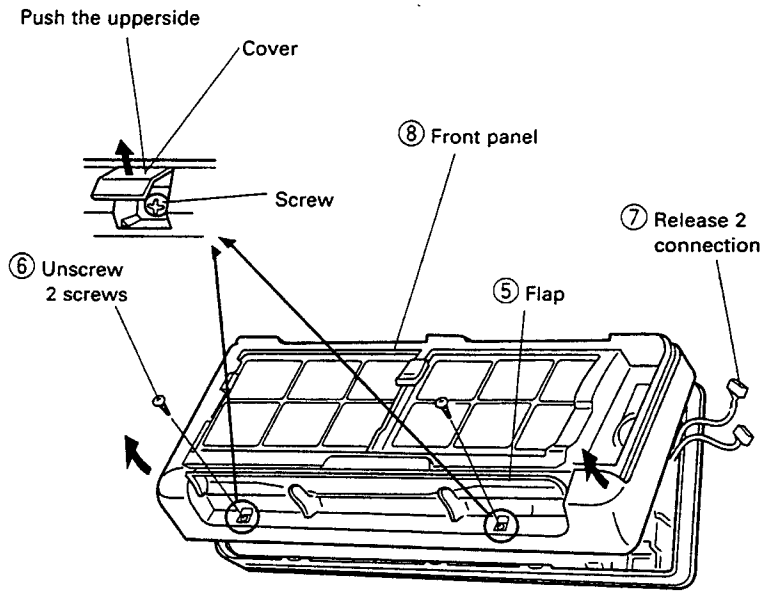
- ③ Disconnect the 2 wiring connectors.
- ④ Release lead wires from clamp.

Fig. 16



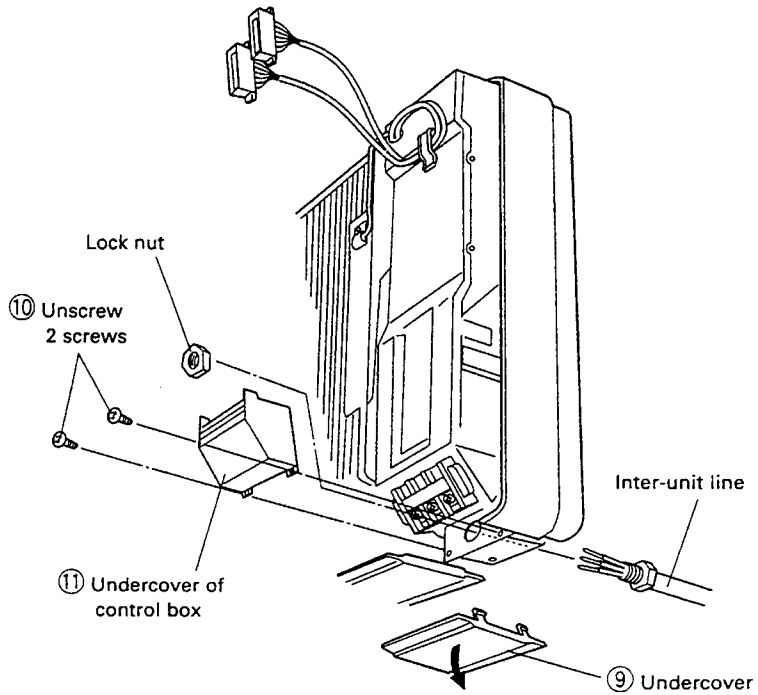
- ⑤ Set the flap in the horizontal position.
- ⑥ Push the upperside of cover to open.
Unscrew 2 screw.
- ⑦ Release 2 connectors from front panel.
- ⑧ Lift up and remove the front panel.

Fig. 17



- ⑨ Remove the undercover.
- ⑩ Unscrew 2 screws.
- ⑪ Remove the undercover of control box.

Fig. 18



HOW TO CONNECT WIRING TO THE TERMINALS

■ 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 about 15/16" (25 mm) of expose the solid wire. (Fig. 19)
- (2) Using a screwdriver, remove the terminal screw(s) on the terminal board.
- (3) Using 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 board and tighten securely with the terminal screw using a screwdriver.

■ For strand wiring

- (1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 3/8" (10 mm) of expose the strand wiring. (Fig. 20)
- (2) Using a screwdriver, remove the terminal screw(s) on the terminal board.
- (3) Using a round terminal fastener or pliers, securely clamp a round terminal to each stripped wire end. (Fig. 20)
- (4) Position the round terminal wire, and replace and tighten the terminal screw using a screwdriver. (Fig. 21)

Fig. 19

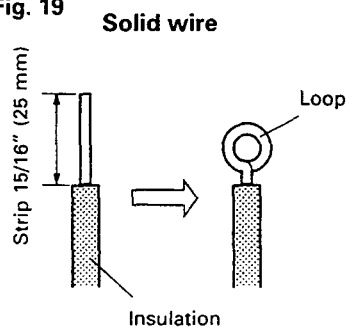


Fig. 20

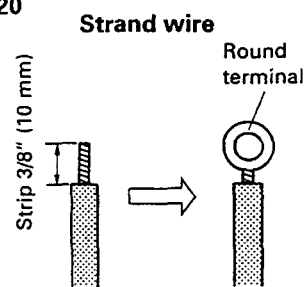
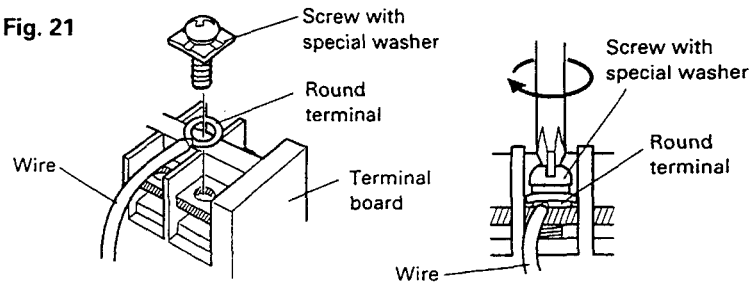


Fig. 21





CAUTION:

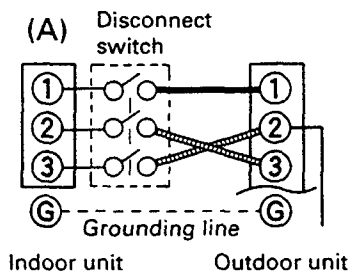
■ **EXAMPLE OF INCORRECT WIRING**

The following are examples of improper wiring that results in system misoperation. You should confirm that you have wired the units correctly before beginning the test run.

Fig. 25

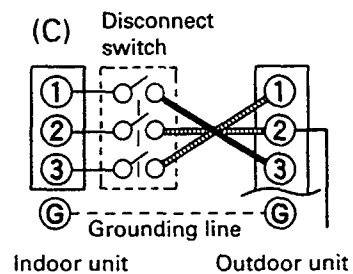
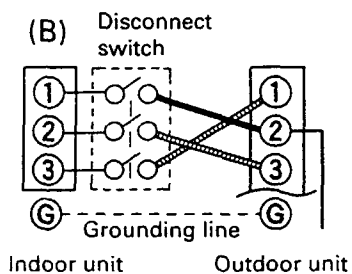
Problem 1

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



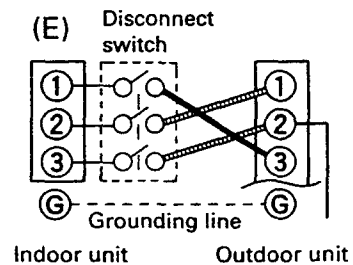
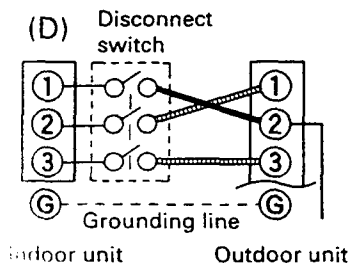
Problem 2

- Air conditioner will not operate.



Problem 3

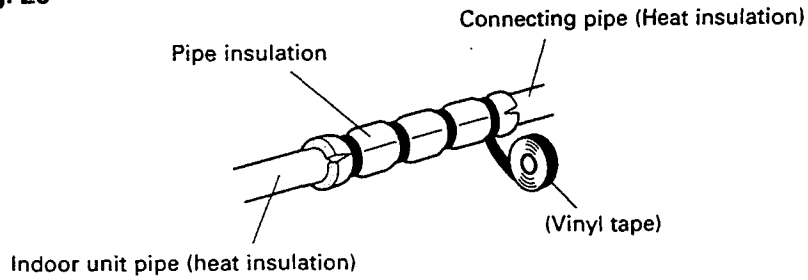
- Compressor will not start; only indoor unit will operate.



FINISHING

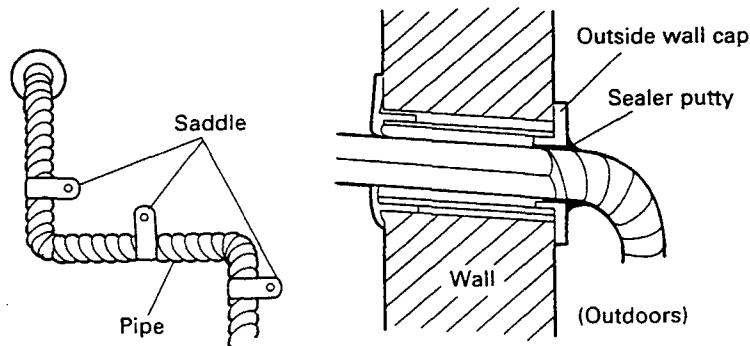
- A. Insulate the piping connections with the pipe insulation supplied and fasten the insulation with vinyl tape so that there are no gaps.

Fig. 26



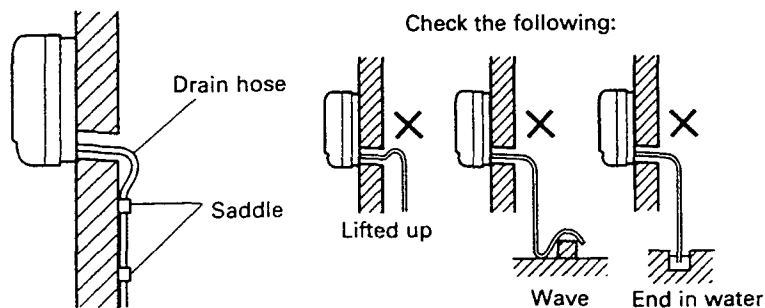
- B. Temporarily fasten the connection cord along the connection pipe with vinyl tape. (Wrap to about 1/3 the width of the tape from the bottom of the pipe so that water does not enter.)
- C. Fasten the connection pipe to the outside wall with a saddle, etc.
- D. Fill the gap between the outside wall pipe hole and the pipe with sealer so that rain water and wind cannot blow in.

Fig. 27



- E. Fasten the drain hose to the outside wall, etc.

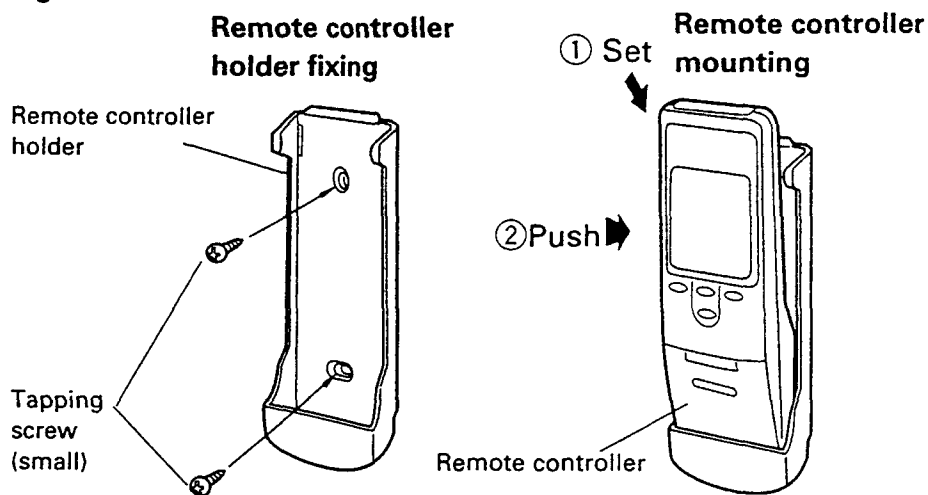
Fig. 28



INSTALLING THE REMOTE CONTROLLER HOLDER

Install the remote controller holder to a wall or pillar with the tapping screws (small).

Fig. 29



CAUTION:

When selecting the remote controller installation site, pay careful attention to the following:

- *Avoid places in direct sunlight.*
- *Select a place where the affect of heat from a stove, etc. is small.*
- *Select a place where the remote controller is not exposed directly to the air discharged from the air conditioner.*

TEST RUNNING

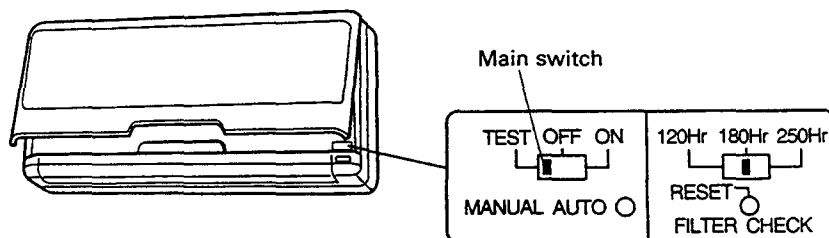
- Perform test operation and check items 1 and 2 below.
- For the test operation method, refer to the operating manual.

The outdoor unit may not operate, depending on the room temperature. In this case, after setting the power switch to the TEST position, operate the air conditioner by remote controller. The outdoor unit operates without regard to the room temperature.

Do not operate the air conditioner in the TEST position for a long time.

At the end of test operation, return the power switch to the ON position.

Fig. 30



(When the power cord is plugged into an AC outlet, the indoor unit OPERATION and TIMER lamps flash alternately and rapidly. When air conditioner begins to operate, the flashing stops.) (When the air conditioner is operated with the power switch in the TEST position, the OPERATION and TIMER lamps flash simultaneously and slowly.)

1. INDOOR UNIT

- A. Is operation of each button on the remote controller normal?
- B. Does each lamp light normally?
- C. Do the wind deflection louvers operate normally?
- D. Is the drain normal?

2. OUTDOOR UNIT

- A. Is there any abnormal noise and vibration during operation?
- B. Will noise, wind, or drain water from the unit disturb the neighbors?
- C. Is there any gas leakage?



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