8. PRECAUTIONS ON INSTALLATION

8.1 INSTALLATION MANUAL

8.1.1 AU18, 25, 25(3)

SPLIT TYPE ROOM AIR CONDITIONER

Cassette Type [Cooling Model]

INSTALLATION MANUAL

(PART NO. 9356964011)

For authorized service personnel only.

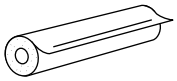
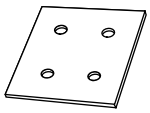
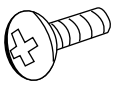
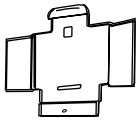
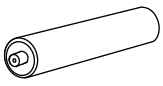
⚠ WARNING
① For the room air conditioner to operate satisfactorily, install it as outlined in this installation manual.
② Connect the indoor unit and outdoor unit with the room air conditioner piping cords available from our standard parts. This installation manual describes the correct connections using the installation set available from our standard parts.
③ Installation work must be performed in accordance with national wiring standards by authorized personnel only.
④ Do not turn on the power until all installation work is complete.

- Be careful not to scratch the air conditioner when handling it.
- After installation, explain correct operation to the customer, using the operating manual.
- Let the customer keep this installation manual because it is used when the air conditioner is serviced or moved.
- The maximum length of the piping is shown in Table 1. If the units are further apart than this, correct operation cannot be guaranteed.

STANDARD PARTS

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

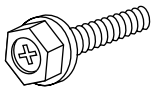
INDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Application
Coupler heat insulation 	2	For indoor side pipe joint
Special nut A (large flange) 	4	For installing indoor unit
Special nut B (small flange) 	4	For installing indoor unit
Template 	1	For ceiling hole cutting
Remote controller 	1	
Machine screw (small) 	1	For installing the remote controller
Remote controller holder 	1	For mounting the remote controller
Screw (medium) 	2	For installing the remote controller holder
Battery (R6P/LR6) 	4	For remote controller

OUTDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Application
Hexagon wrench 	1	For air purge

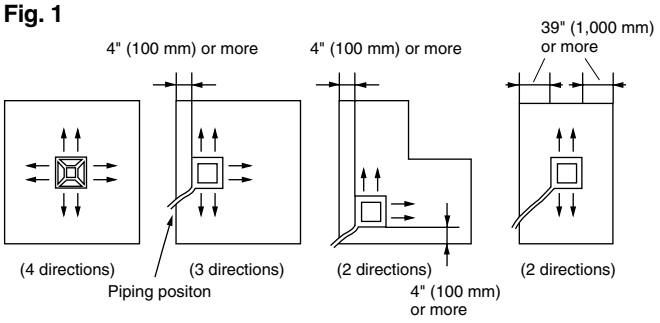
GRILLE ACCESSORIES

Name and Shape	Q'ty	Application
Bolt 	4	For mounting grille
Washer 	4	For mounting grille
Spring washer 	4	For mounting grille
Blower cover insulation 	2	For discharged air

SELECTING THE MOUNTING POSITION

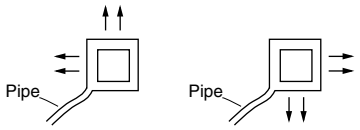
Especially, the installation place is very important for the split type air conditioner because it is very difficult to move from place to place after the first installation. Decide the mounting position together with the customer as follows: The discharge direction can be selected as shown below.

Fig. 1



⚠ CAUTION

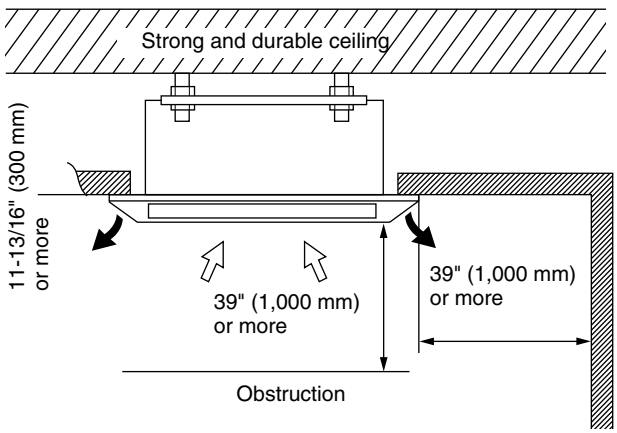
Since 2-way outlet as shown below causes performance problems, do not set it.



Indoor unit

(1) Install the indoor unit on a place having a sufficient strent strength so that it withstands against the weight of the indoor unit.
(2) The inlet and outlet ports should not be obstructed; the air should be able to blow all over the room.
(3) Leave the space required to service the air conditioner. (Fig.2)
(4) The ceiling rear height is 11-13/16 inches (300mm) or more.
(5) A place from where the air can be distributed evenly throughout the room by the unit.
(6) A place from where drainage can be extracted outdoors easily.

Fig. 2



Outdoor unit

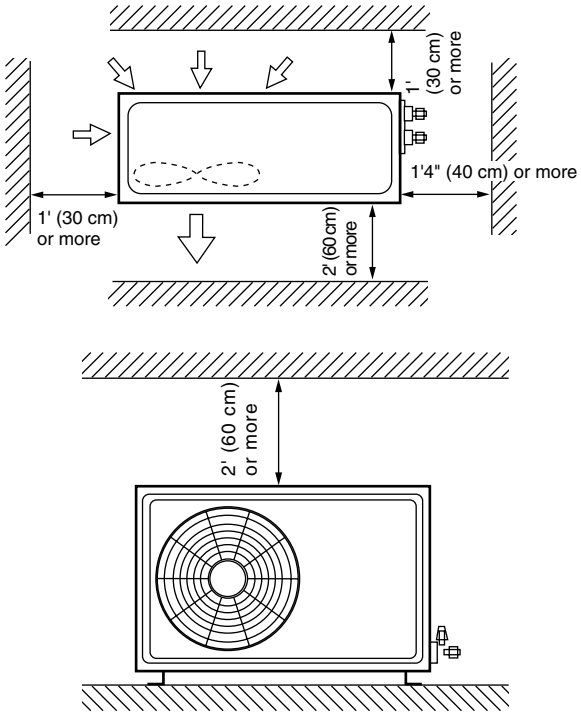
⚠ WARNING

① Install the unit where it will not be tilted by more than 5˚

② When installing the outdoor unit where it may exposed to strong wind, fasten it securely.

(1) If possible, do not install the unit where it will be exposed todirect sunlight.(If necessary, install a blind that does not interfere with the air flow.)
(2) Install the outdoor unit in a place where it will be free from being dirty or getting wet by rain as much as possible.
(3) Install the unit when connection to the indoor unit is easy.
(4) Do not place animals and plants in the path of the warm air.
(5) Take the air conditioner weight into account and select a place where noise and vibration are small.
(6) Select a place so that the warm air and noise from the air conditioner do not disturb neighbors.
(7) Provide the space shown in Fig. 3 so that the air flow is not blocked. Also for efficient operation, leave open three of the four directions front, rear, and both sides.

Fig. 3



CONNECTION PIPE REQUIREMENT

Table 1

	Diameter		Maximum height	Maximum height (between indoor and outdoor)
	Small	Large		
18,000 BTU/h class 25,000 BTU/h (1ø) class	9.53 mm (3/8 in)	15.88 mm (5/8 in)	25 m (82 ft)	15 m (49 ft)
25,000 BTU/h(3ø) class	9.53 mm (3/8 in)	15.88 mm (5/8 in)	35 m (115 ft)	30 m (98 ft)

- Use 0.7 mm to 1.2 mm thick pipe.
- Use pipe with water-resistant heat insulation.
- Use pipe that can withstand a pressure of 3,040 kPa.

ELECTRICAL REQUIREMENT

• Electric wire size and fuse capacity.

Table 2

		18,000 BTU/h class	25,000 BTU/h(1ø) class	25,000 BTU/h (3ø) class
Power cable (mm^2)	MAX	3.0	3.0	2.0
	MIN	2.5	2.5	1.5
Connection cord (mm^2)	MAX	3.0	3.0	1.5
	MIN	2.5	1.0	1.0
Fuse capacity (A)		30	30	10

- Always use H07RN-F or equivalent as the connection cord.
- Install the circuit breaker nearby the units. (Both indoor unit and outdoor unit)

INSTALLATION PROCEDURE

Install the room sir conditioner as follows:

1 INDOOR UNIT INSTALLATION

2. Hanging preparations

Firmly fasten the hanging bolts as shown in Fig. 5 or by another method.

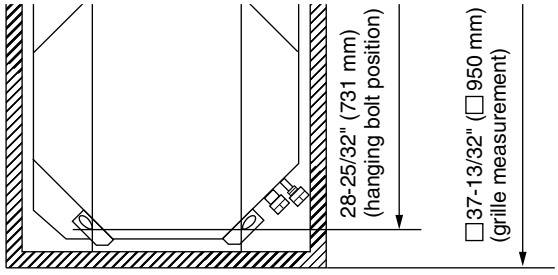
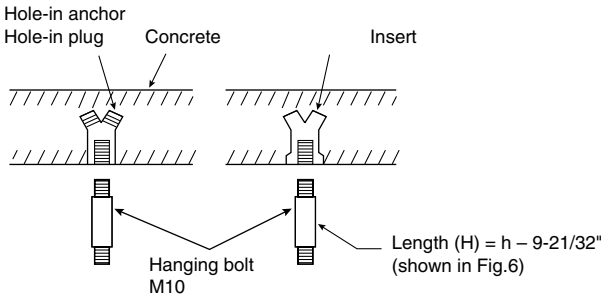


Fig. 5



3. Body installation

(1) Install special nut A (large flange) to the hanging bolts at a position 11-1 /32" to 11-7/32" (280 to 285 mm) from the bottom of the ceiling. (Fig. 7)

(2) Next, install special nut B (small flange) to the hanging bolts. Provide a space of 25/64" to 19/32" (10 to 15 mm) between special nut B and special nut A (large flange).

(3) Align the end of the hanging bolts with the larger of the four long body mounting plate holes and lift the body until it touches special nut A. Then slide the body in the rotation direction so that it is supported by special nut B. (Fig. 8)

(4) Adjust special nut B so that the bottom of the ceiling and the four grille supporters are on the same plane. (Fig. 6)

(5) Leveling
Using a level, or vinyl hose filled with water, fine adjust so that the body is level.

⚠ WARNING

Perform final tightening by tightening the double nut firmly.

Fig.6

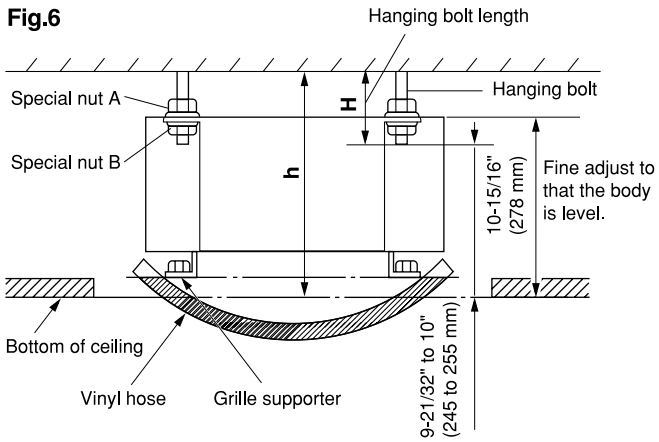


Fig. 7

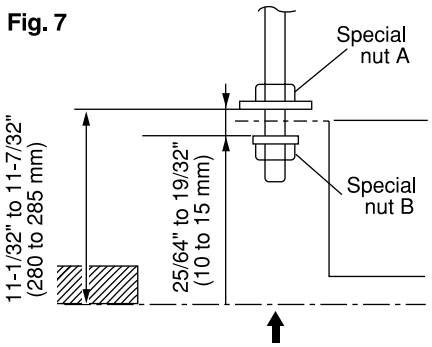
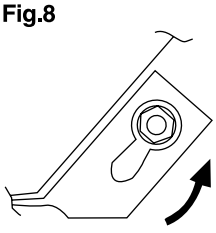


Fig.8

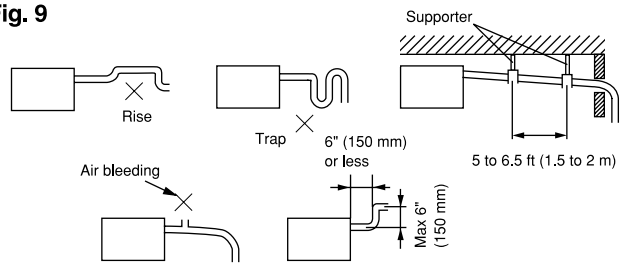


2 INSTALLING DRAIN PIPE

Note: Install the drain pipe.

- Install the drain pipe with downward gradient (1/50 to 1/100) and so there are no rises or traps in the pipe.
- Use general hard polyvinyl chloride pipe (VP25) [outside diameter 1-1/4" (32 mm)] and connect it with adhesive (polyvinyl chloride) so that there is no leakage.
- When the pipe is long, install supporters.
- Do not perform air bleeding.
- Always heat insulate the indoor side of the drain pipe.
- When desiring a high drain pipe height raise it up to 6" (150 mm) within a range of 6" (150 mm) from the body. A rise dimension over this range will cause leakage.

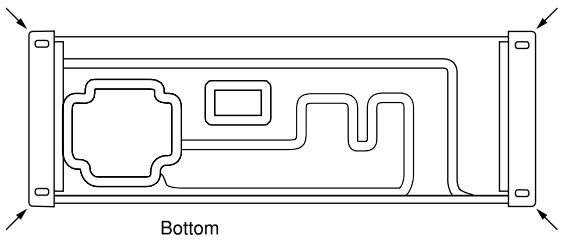
Fig. 9



3 OUTDOOR UNIT INSTALLATION

When the outdoor unit will be exposed to strong wind, fasten it with bolts at the places indicated by the arrows. (Fig. 10)

Fig. 10



4 CONNECTING THE PIPING

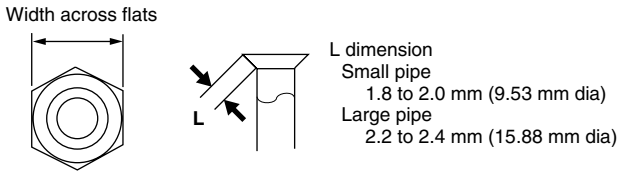
1. Flare processing

(1) Cut the connection pipe with pipe cutters so that the pipe is not deformed.
(2) Holding the pipe downward so that cuttings cannot enter the pipe, remove the burrs.
(3) Remove the flare nut from the indoor unit pipe and outdoor unit and assemble as shown in (Table 3) and insert the flare nut onto the pipe, and flare with a flaring tool.
(4) Check if the flared part " L" (Fig. 11) is spread uniformly and that there are no cracks.

Table 3

Pipe	Flare nut
Small pipe	Small (width across flats 22 mm)
Large pipe	Large (width across flats 24 mm)

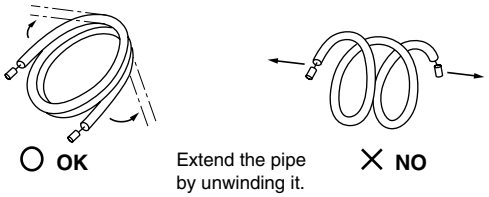
Fig. 11



2. Bending pipes

The pipes are snapped by your hands. Be careful not to collapse them.

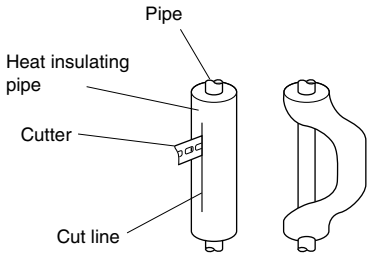
Fig. 12



Do not bend the pipes in an angle less than 90˚. When the pipes are bent and stretched repeatedly, the material will be hardened, causing the pipes no longer be sent or stretched. Be sure to limit number of bending and stretching to three times.

When bending the pipe, do not bend it as is. The pipe will be collapsed. In this case, cut the heat insulating pipe with a sharp cutter as shown in Fig. 13 and bend it after exposing the pipe. After bending the pipe as you want, be sure to put the heat insulating pipe back on the pipe, and secure it with tape.

Fig. 13



⚠ CAUTION

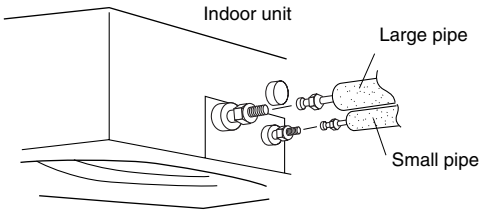
① To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 150 mm or over.

② If the pipe is bent repeatedly at the same place, it will break.

3. Connection pipes

(1) Indoor unit side

Fig. 14



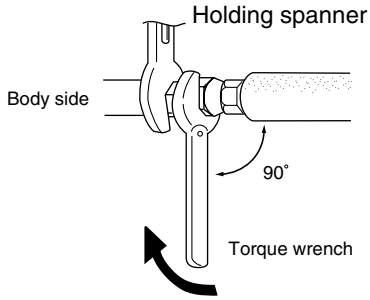
⚠ CAUTION

① Be sure to apply the pipe against the port on the indoor unit correctly. If the centering is improper, the flare nut cannot be tightened smoothly. If the flare nut is forced to turn, the threads will be damaged.

② Do not remove the flare nut from the indoor unit pipe until immediately before connecting the connection pipe.

When the flare nut is tightened properly by your hand, hold the body side coupling with a separate spanner, then tighten with a torque wrench. (Fig. 15)

Fig.15



⚠ CAUTION

① [Hold] the torque wrench at its grip, keeping it in the right angle with the pipe as shown in Fig. 15, in order to tighten the flare nut correctly.

Table 4: Flare nut tightening torque

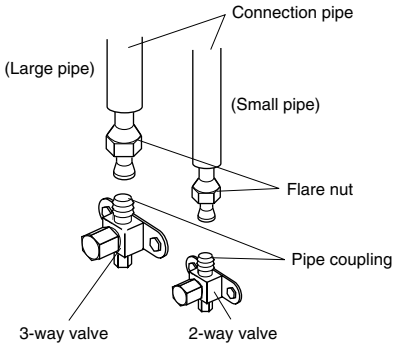
Pipe	Tightening torque
Small pipe	310 to 350 kgf • cm
Large pipe	750 to 800 kgf • cm

⚠ CAUTION

Be sure to connect the large pipe after connecting the small pipe completely.

(2) Outdoor unit side
Tighten the flare nut of the connection pipe at the outdoor unit valve connector. The tightening method is the same as that as at the indoor side.

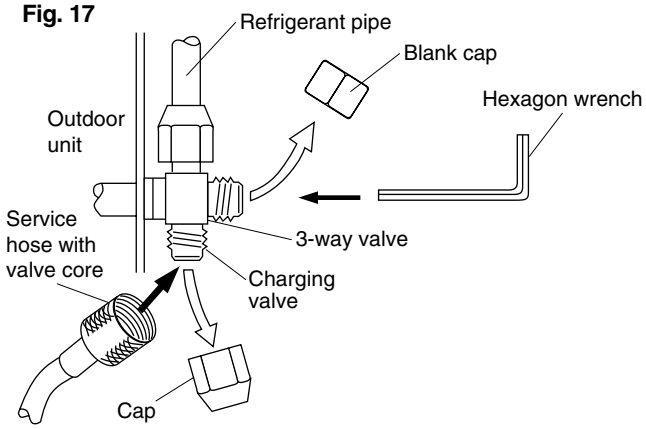
Fig. 16

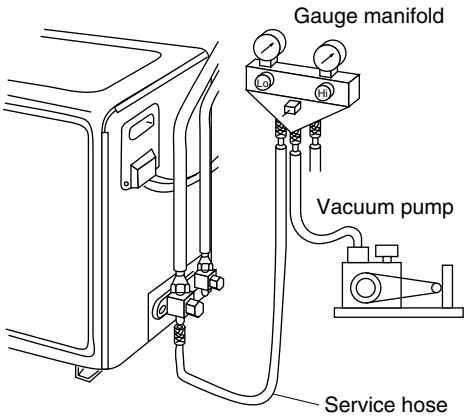


5 AIR PURGE

1. Air purge
(1) Remove the cap, and connect the gauge manifold and the vacuum pump to the charging valve by the service hoses.
(2) Vacuum the indoor unit and the connecting pipes until the pressure in them lowers to below 1.5 mmHg.
(3) Disconnect the service hoses and fit the cap to the charging valve (Tightening torque: 70 to 90 kgf•cm).
(4) Remove the blank caps, and fully open the spindles of the 2-way and 3-way valves with a hexagon wrench (Torque: 2-way valve: 70 to 90 kgf•cm, 3-way valve: 100 to 120 kgf•cm).
(5) Tighten the blank caps of the 2-way valve and 3-way valve to the specified torque (200 to 250 kgf•cm).

Fig. 17





2. Additional charge
Refrigerant suitable for a piping length of 5 m is charged in the outdoor unit at the factory. When the piping is longer than 5 m, additional charging is necessary. For he additional amount, see the table below.

Table 5

Pipe length		16 ft (5 m)	33 ft (10 m)	49 ft (15 m)	66 ft (20 m)	82 ft (25 m)	98ft (30 m)	115 ft (35 m)
Additional refrigerant	18,000 BTU/h class 25,000 BTU/h (1ø) class	None	2.1 oz (60 g)	4.2 oz (120 g)	6.3 oz (180 g)	8.5 oz (240 g)	–	–
	25,000 BTU/h (3ø) class	None	2.1 oz (60 g)	4.2 oz (120 g)	6.3 oz (180 g)	8.5 oz (240 g)	10.6 oz (300 g)	1.8 oz (360 g)

[18,000 BTU/h class • 25,000 BTU/h (1ø) class]

Between 5 m and 25 m, when using a connection pipe other than that in the table, charge additional refrigerant with 0.42 oz (12 g)/3.3 ft(1 m) as the criteria.

[25,000 BTU/h (3ø) class]

Between 5 m and 35 m, when using a connection pipe other than that in the table, charge additional refrigerant with 0.42 oz (12 g)/3.3 ft(1 m) as the criteria.

⚠ CAUTION

① When moving and installing the air conditioner, do not mix gas other than the specified refrigerant (R22) inside the refrigerant cycle.

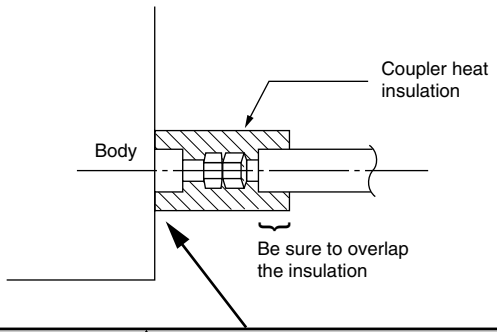
② When adding refrigerant, add the refrigerant from the charging valve at the completion of work.

The maximum length of the piping is 25m[18,000 BTU/h class•25,000 BTU/h(1ø) class], 35m [25,000 BTU/h (3ø) class]. If the units are further apart than this, correct operation can not be guaranteed..

6 INSTALLING THE COUPLER HEAT INSULATION

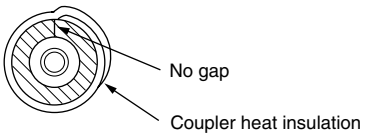
After checking for gas leaks, insulate by wrapping insulation around the two parts (large and small) of the indoor unit coupling, using the coupler heat insulation.

Fig. 18



⚠ CAUTION

Must fit tightly against body without any gap.



7 ELECTRICAL WIRING

HOW TO CONNECT WIRING TO THE TERMINALS

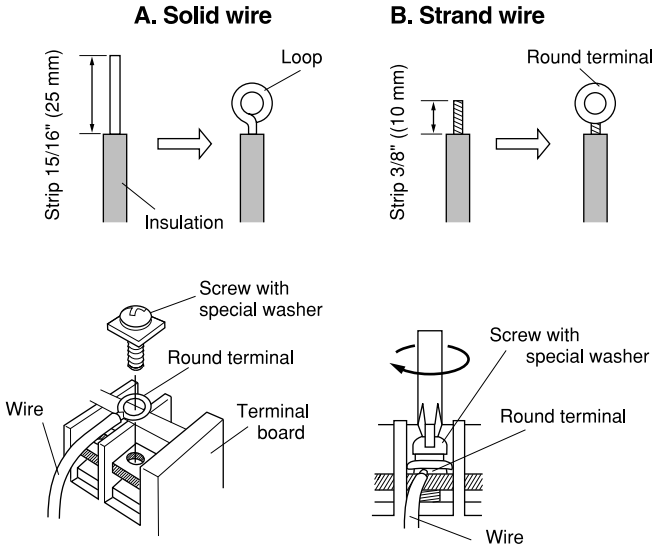
A. For solid core wiring (or F-cable)

(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 15/16" (25 mm) to expose the solid wire.
(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 screw-driver.

B. 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) to expose the strand wiring.
(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.
(4) Position the round terminal wire, and replace and tighten the terminal screw using a screwdriver.

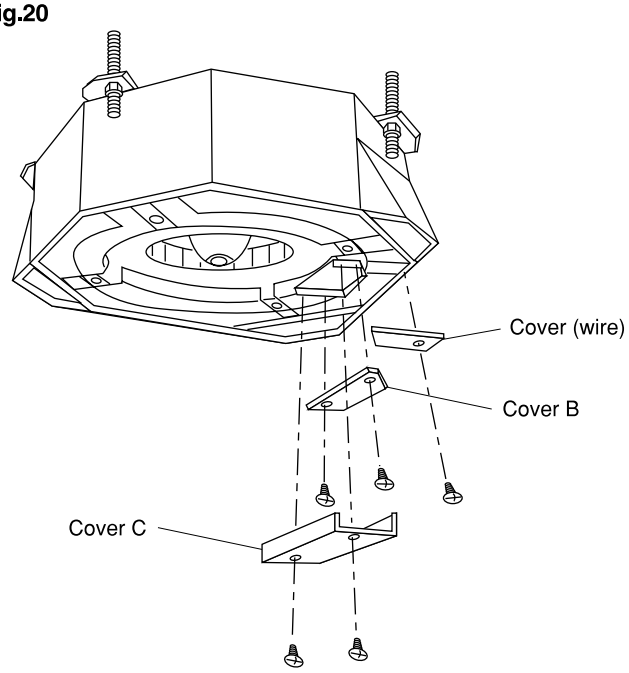
Fig.19



1. Indoor unit side

(1) Remove the cover B,C and cover (wire) and install the power cable [18,000 BTU/h class•25,000 BTU/h (1ø) class] and the connection cord. (Figs. 20, 21 and 22)

Fig.20

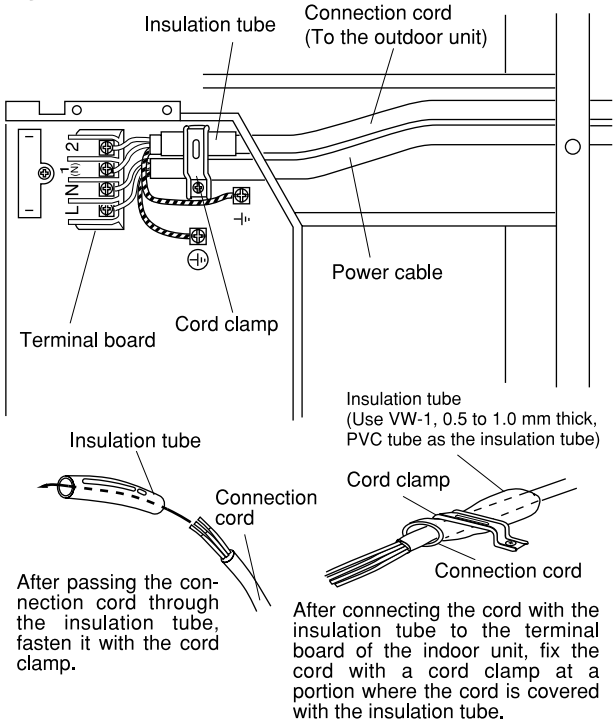


(2) After wiring is complete, clamp the power cable [18,000 BTU/h class•25,000 BTU/h (1ø) class] and connection cord with the cord clamp.

(3) Install the cover B and cover (wire).

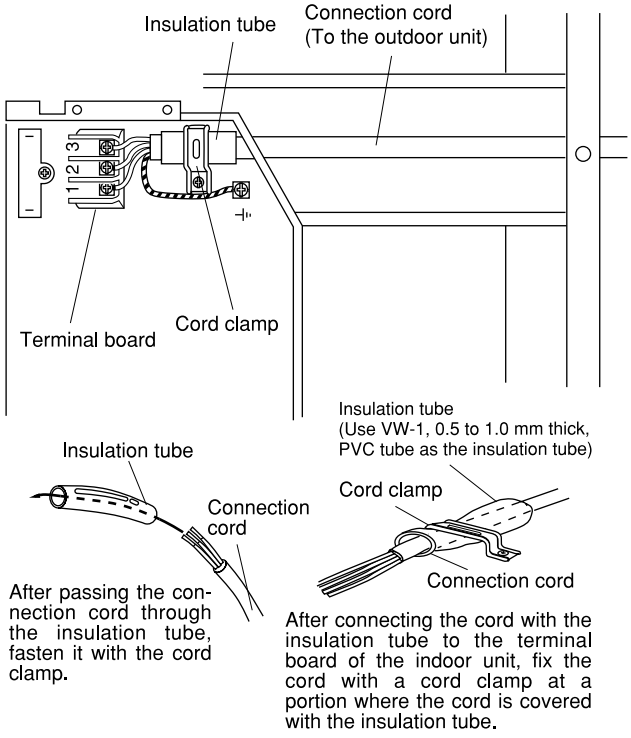
[18,000 BTU/h class•25,000 BTU/h (1ø) class]

Fig.21



[25,000 BTU/h (3ø) class]

Fig.22



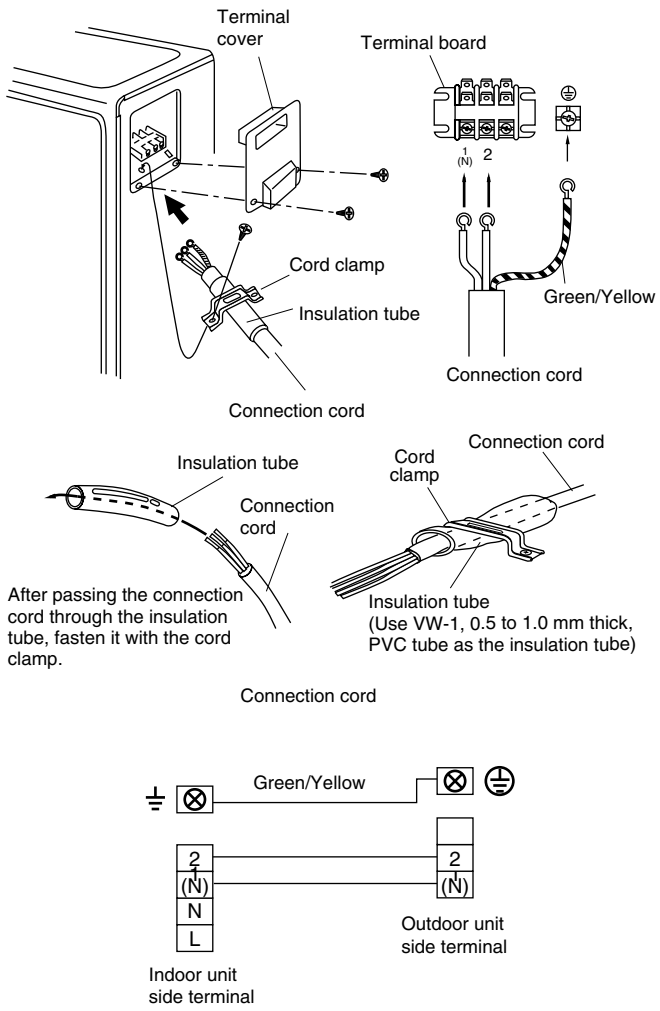
2. Outdoor unit side

(1) Remove the terminal cover of the outdoor unit, and insert the end of the connection cord and the power cable [25,000 BTU/h (3ø) class] into the terminal board.

(2) Fasten the connection cord with the cord clamps, and install the terminal cover.

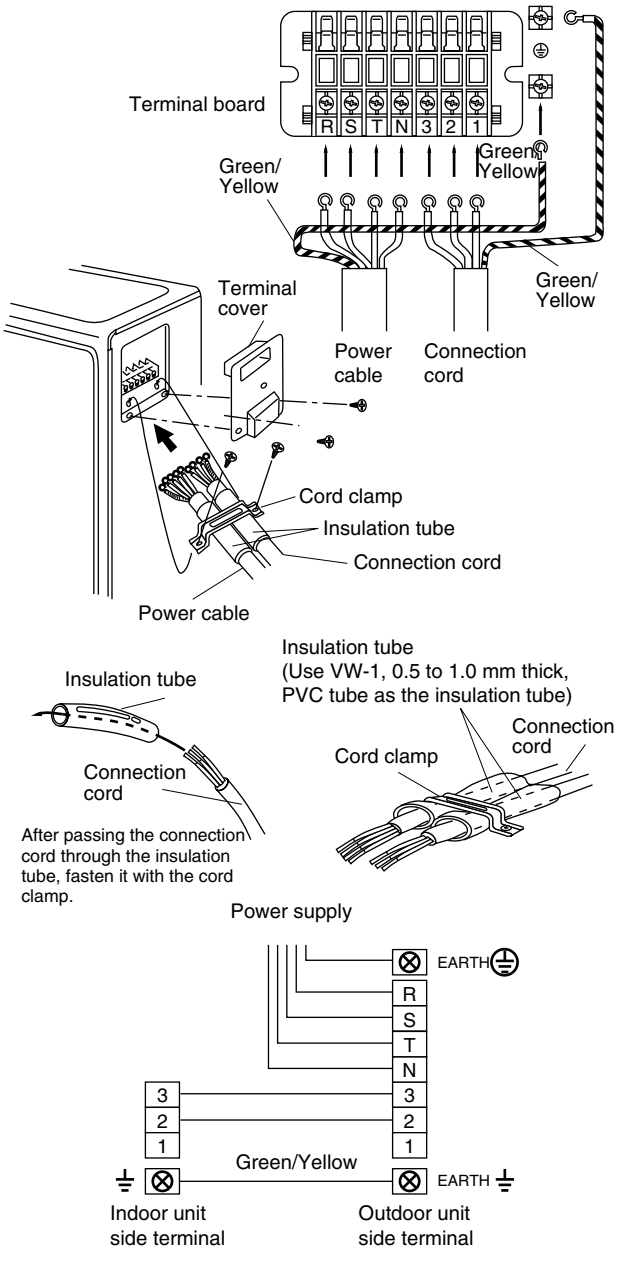
[18,000 BTU/h class • 25,000 BTU/h (1ø) class]

Fig.23



[25,000 BTU/h (3ø) class]

Fig.24



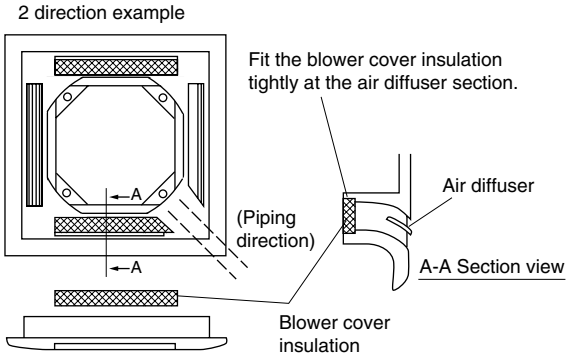
8 GRILLE INSTALLATION

1. Blower cover insulation

Install the blower cover insulation only when the outlet direction is not specified.

Two blower cover insulations are packed with the grille assembly. Install the blower cover insulation at the diffuser position shown in Fig. 25. At this time, use the piping position as the criteria.

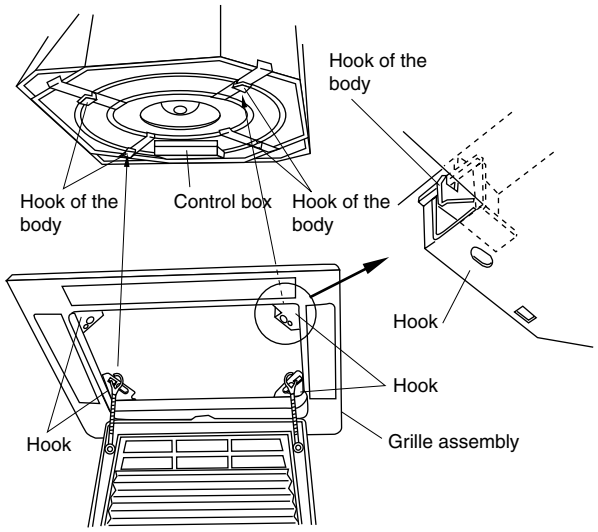
Fig. 25



2. Installing grille assembly to body

Hook the grille assembly to the hook of the body and temporarily fasten it. Do this that bottom of control box of the body becomes the display section of the grille assembly.

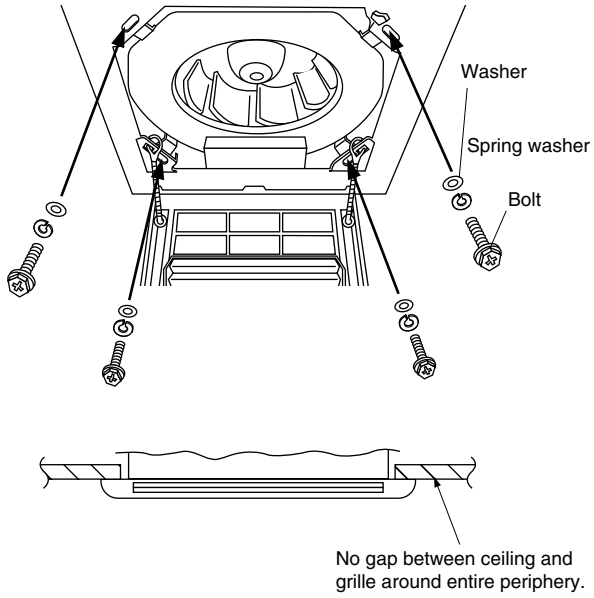
Fig. 26



Bolting the grille assembly to the body

Install the grille assembly to the body with the four bolts, spring washers and washers.

Fig. 27



Wireless unit connection wire wiring

Connect the connector in accordance with part A detail view. Then clamp the lead wire with clamp so that it does not touch the rotating parts .

Fig. 28

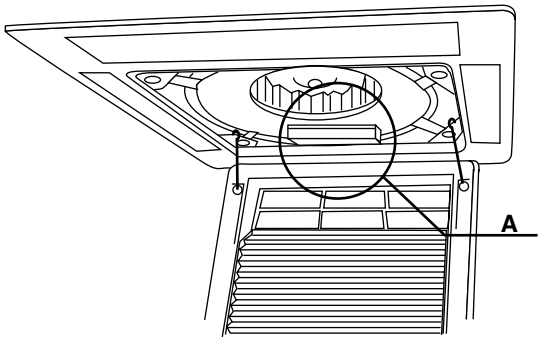
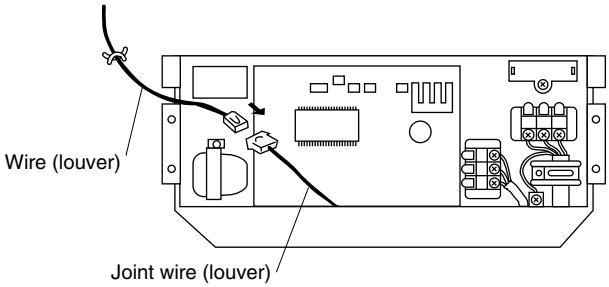


Fig. 29 Part A detail view



Install the cover C. (Fig. 20)

Install the intake grille.

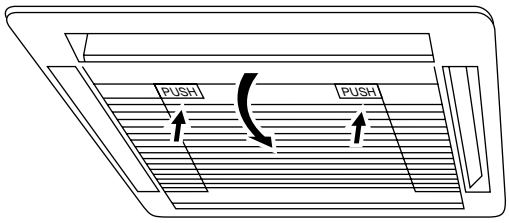
REMOVING/INSTALLING THE INTAKE GRILLE

1. Removing the intake grille

(1) Push the intake grille pushbuttons (two places) until you hear a “click”.

(2) Open the intake grille.

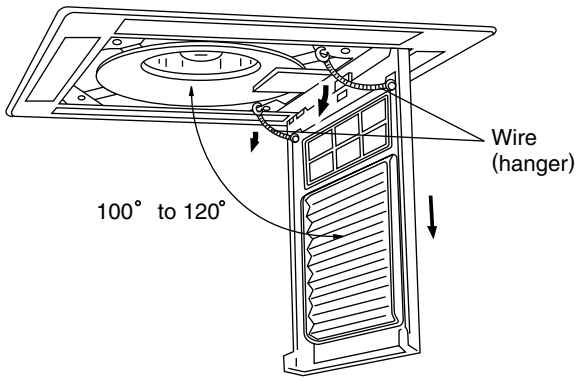
Fig. 30



(3) Remove the wire (hanger). (Fig. 31)

(4) Remove the intake grille by opening it 100˚ to 120˚.

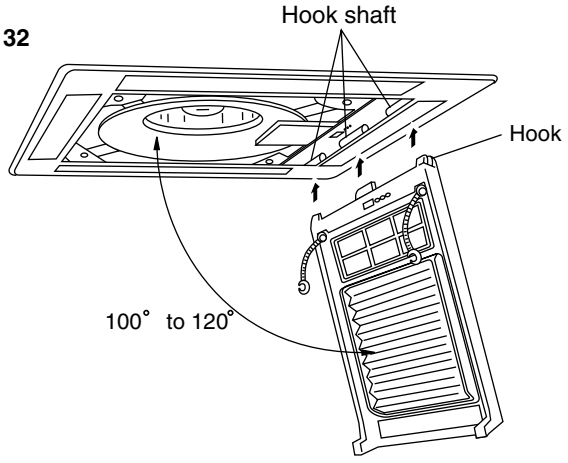
Fig. 31



2. Installing the intake grille

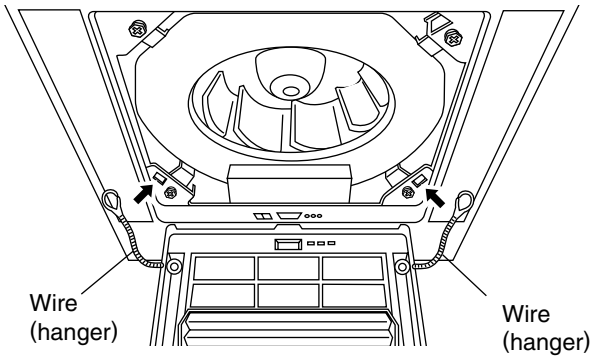
(1) Tilt the intake grille 100˚ to 120˚ and hook the three hooks to the intake grille hook shaft.

Fig. 32



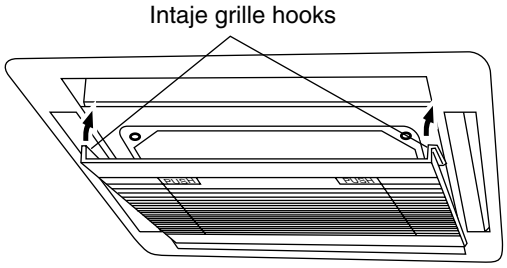
(2) Install the wire (hanger).

Fig. 33



(3) Hook the intake grille hooks to the grille assembly.

Fig. 34



(4) Push the intake grille pushbuttons (two places) until you hear a “click”.

⚠ CAUTION

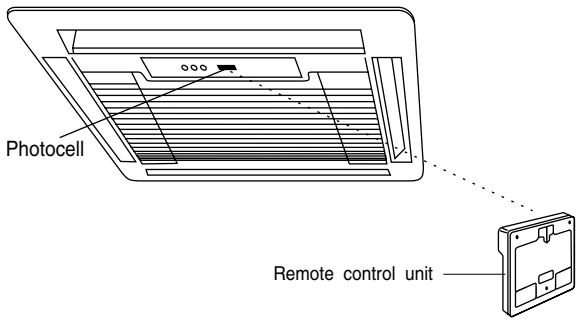
① The louver angle cannot be changed if the power is not on, (If moved by hand, it may be damaged.)

② The grille assembly is directional relative to the air conditioner body.

9 REMOTE CONTROLLER INSTALLATION

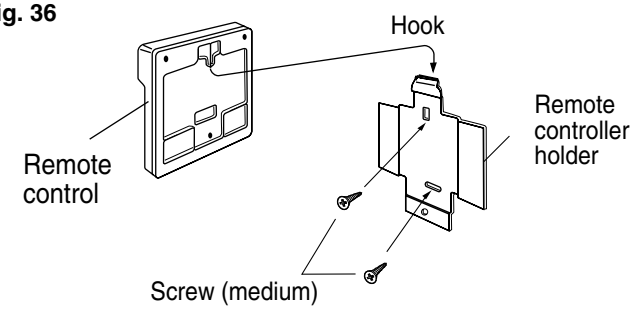
• Install the remote controller so that the front is facing the photocell. (Fig. 35)

Fig. 35



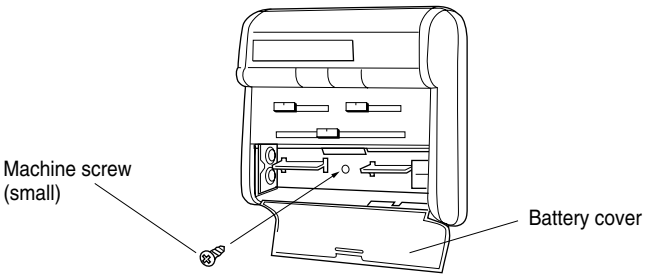
• Install the remote controller with a distance of 7 m between the remote controller and the grille photocell as the criteria. However, when installing the remote controller, check that it operates positively.
• Install the remote controller holder to a wall, pillar, etc. with the two screws (medium).
• Hook the remote controller to the hook of the remote controller holder. (Fig. 36)

Fig. 36



• Fasten the remote controller to the remote controller holder with the machine screw (small). (Fig. 37)

Fig. 37



• Remote controller code switching

Fig. 38

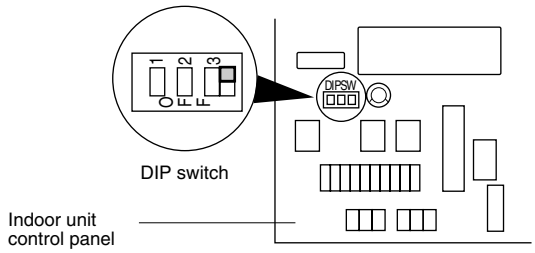
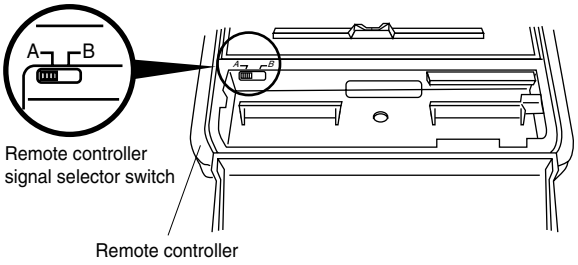


Fig. 39



Controll panel DIP switch [3] and the remote controller signal selector switch can be switched and signals received as follows:

DIP SW [3]	Remote controller signal selector SW
ON	A
OFF	B

✻ When DIP SW [3] was set to ON — remote controller signal selector SW was set to B and DIP SW [3] was set to OFF — remote controller selector SW was set to A, signals cannot be received.

<Example>

When two air conditioners installed in a room

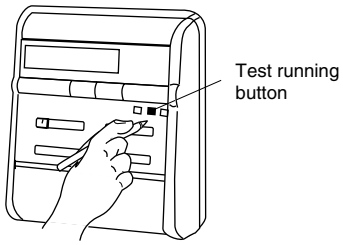
■ **When you want to run the two conditioners the same Set DIP SW [3] of both air conditioners to ON and the remote controller signal selector SW to A.**

■ **When you can run the two air conditioners individually Set DIP SW [3] of one air conditioner to ON and the remote controller signal selector SW to A. Set DIS**

10 TEST RUNNING

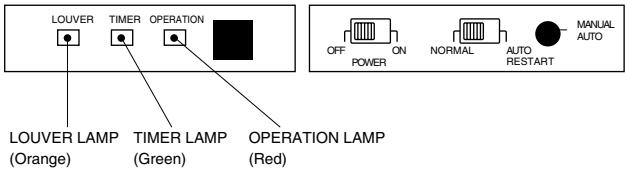
- Press the remote controller test running button while the air conditioner is running.
- At the end of test running, press the remote controller start-stop button. (F ig. 40)

Fig. 40



- Run the air conditioner in accordance with the operating manual.

Fig. 41



Operation can be checked by lighting and flashing of the grille display section (Fig.41) OPERATION andTIMER lamps.
Perform judgement in accordance with the following:

- **Power ON**

When the power is turned on, the grille display section OPERATION and TIMER lamps flash quickly and alternately. When operation starts thereafter, flashing stops.

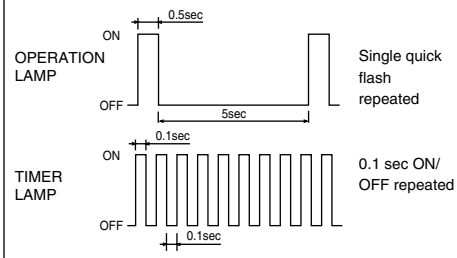
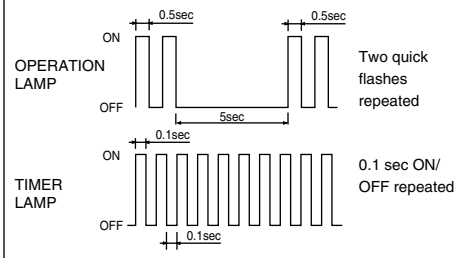
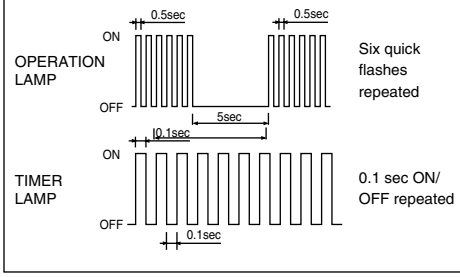
- **Test running**

When the air conditioner is run by pressing the remote controller test running button, the OPERATION and TIMER lamps flash slowly at the same time.

- **Error**

The OPERATION and TIMER lamps operate as follows (Table 6) according to the error contents.

Table 6

Error display	Error contents
	Room temperature thermistor abnormal temperature detected
	Piping thermistor abnormal temperature detected
	Float switch ON for 3 minutes or longer

- To stop test running, press the START/STOP button.
- Do not operate the air conditioner in the test running state for a long time.
- For the operation method, refer to the operating manual and perform operation check
- Check that there are to abnormal sounds or vibration sounds during test running.

8.1.2 AU18R, 25R

SPLIT TYPE AIR CONDITIONER
Cassette Type [Reverse Cycle Model]
INSTALLATION MANUAL

(PART NO. 9356966015)

For authorized service personnel only.

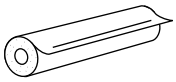
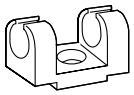
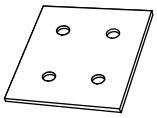
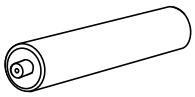
⚠ WARNING
① For the room air conditioner to operate satisfactorily, install it as outlined in this installation manual.
② Connect the indoor unit and outdoor unit with the room air conditioner piping and cords available from our standard parts. This installation manual describes the correct connections using the installation set available from our standard parts.
③ Installation work must be performed in accordance with national wiring standards by authorized personnel only.
④ Do not turn on the power until all installation work is complete.

- Be careful not to scratch the air conditioner when handling it.
- After installation, explain correct operation to the customer, using the operating manual.
- Let the customer keep this installation manual because it is used when the air conditioner is serviced or moved.
- The maximum length of the piping is shown in Table 1. If the units are further apart than this, correct operation cannot be guaranteed.

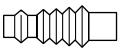
STANDARD PARTS

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

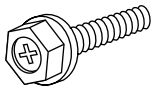
INDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Application
Coupler heat insulation 	2	For indoor side pipe joint
Remote controller cord clamp 	10	For installing the remote controller cord
Screw 	10	For installing the remote controller cord clamp
	2	For installing the remote controller
Special nut A (large flange) 	4	For installing indoor unit
Special nut B (small flange) 	4	For installing indoor unit
Remote controller 	1	Installation to indoor unit
Template 	1	For ceiling hole cutting
Binder 	2 (large)	For remote controller cord binding
	2 (small)	For remote controller cord binding

OUTDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Application
Hexagon wrench 	1	For air purge
Pipe (drain) 	1	For outdoor unit drain piping work
Flexible tube 	1	
Cap (drain) 	2	

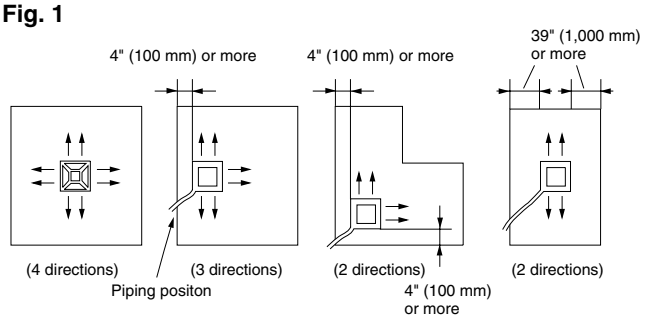
GRILLE ACCESSORIES

Name and Shape	Q'ty	Application
Bolt 	4	For mounting grille
Washer 	4	For mounting grille
Spring washer 	4	For mounting grille
Blower cover insulation 	2	For discharged air

SELECTING THE MOUNTING POSITION

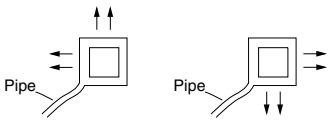
Especially, the installation place is very important for the split type air conditioner because it is very difficult to move from place to place after the first installation.
Decide the mounting position together with the customer as follows:
The discharge direction can be selected as shown below.

Fig. 1



CAUTION

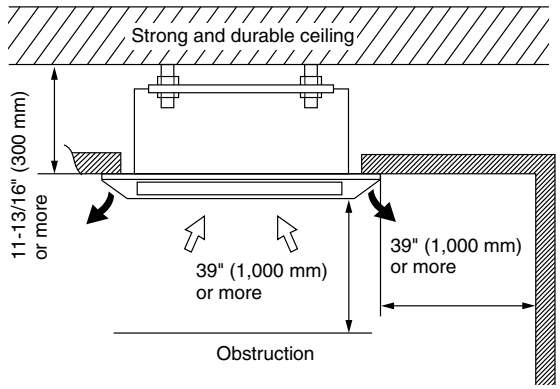
Since 2-way outlet as shown below causes performance problems, do not set it.



Indoor unit

(1) Install the indoor unit on a place having a sufficient strength so that it withstands against the weight of the indoor unit.
(2) The inlet and outlet ports should not be obstructed; the air should be able to blow all over the room.
(3) Leave the space required to service the air conditioner. (Fig. 2)
(4) The ceiling rear height is 11-13/16 inches (300 mm) or more.
(5) A place from where the air can be distributed evenly throughout the room by the unit.
(6) A place from where drainage can be extracted outdoors easily.

Fig. 2



CONNECTION PIPE REQUIREMENT

Table 1

Diameter		Maximum length	Maximum height (between indoor and outdoor)
Small	Large		
9.53 mm (3/8 in)	15.88 mm (5/8 in)	25 m (82 ft)	15 m (49 ft)

- Use 0.7 mm to 1.2 mm thick pipe.
- Use pipe with water-resistant heat insulation.
- Use pipe that can withstand a pressure of 3,040 kPa.

ELECTRICAL REQUIREMENT

- Electric wire size and fuse capacity:

Table 2

		18,000 BTU/h class	25,000 BTU/h class
Power cable (mm^2)	MAX	3.0	3.0
	MIN	2.5	2.5
Connection cord (mm^2)	MAX	3.0	3.0
	MIN	2.5	2.5
Fuse capacity (A)		20	30

- Always use H07RN-F or equivalent as the connection cord.
- Install the circuit breaker nearby the units. (Both indoor unit and outdoor unit)

Outdoor unit

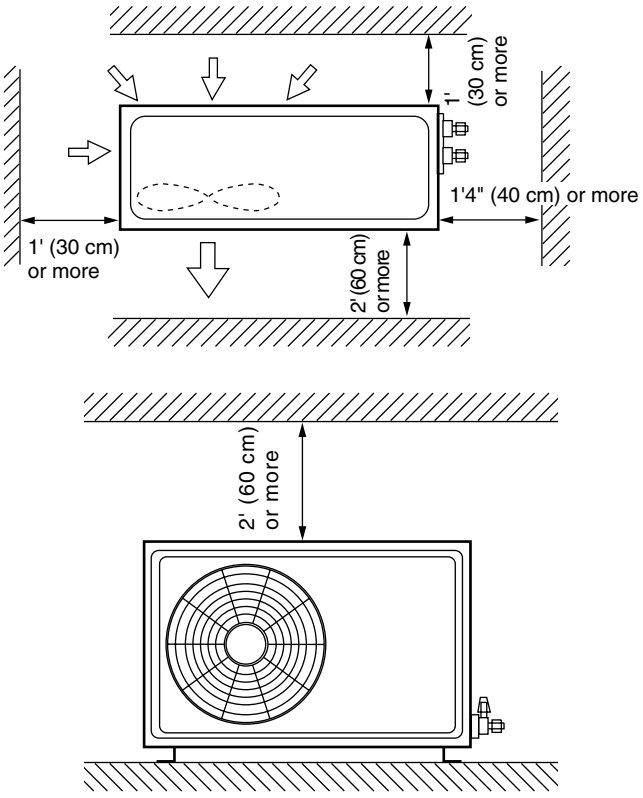
⚠ WARNING

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

When installing the outdoor unit where it may exposed to strong wind, fasten it securely.

(1) If possible, do not install the unit where it will exposed to direct sunlight. (If necessary, install a blind that does not interfere with the air flow.)
(2) Install the outdoor unit in a place where it will be free from being dirty or getting wet by rain as much as possible.
(3) Install the unit when connection to the indoor unit is easy.
(4) During heating operation, drain water flows from the outdoor unit.
Therefore, install the outdoor unit in a place where the drain water flow will not be obstructed.
(5) Do not place animals and plants in the path of the warm air.
(6) Take the air conditioner weight into account and select a place where noise and vibration are small.
(7) Select a place so that the warm air and noise from the air conditioner do not disturb neighbors.
(8) Provide the space shown in Fig. 3 so that the air flow is not blocked. Also for efficient operation, leave open three of the four directions front, rear, and both sides.

Fig. 3



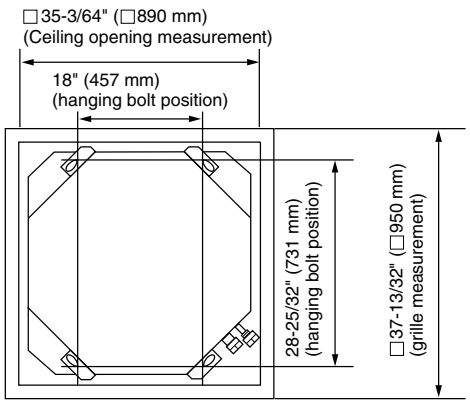
INSTALLATION PROCEDURE

Install the room air conditioner as follows:

1 INDOOR UNIT INSTALLATION

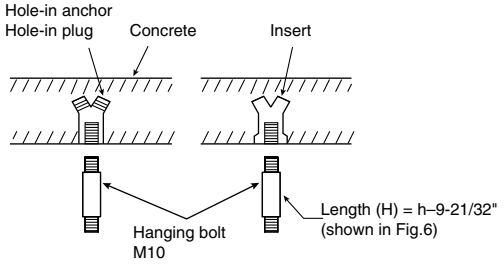
1. Position the ceiling hole and hanging bolts as shown in Fig. 4.

Fig. 4



2. Hanging preparations
Firmly fasten the hanging bolts as shown in Fig. 5 or by another method.

Fig. 5



3. Body installation

(1) Install special nut A (large flange) to the hanging bolts at a position 11-1 /32" to 11-7/32" (280 to 285 mm) from the bottom of the ceiling. (Fig. 7)

(2) Next, install special nut B (small flange) to the hanging bolts. Provide a space of 25/64" to 19/32" (10 to 15 mm) between special nut B and special nut A (large flange).

(3) Align the end of the hanging bolts with the larger of the four long body mounting plate holes and lift the body until it touches special nut A.
Then slide the body in the rotation direction so that it is supported by special nut B. (Fig. 8)

(4) Adjust special nut B so that the bottom of the ceiling and the four grille supporters are on the same plane. (Fig. 6)

(5) Leveling
Using a level, or vinyl hose filled with water, fine adjust so that the body is level.

⚠ WARNING

Perform final tightening by tightening the double nut firmly.

Fig. 6

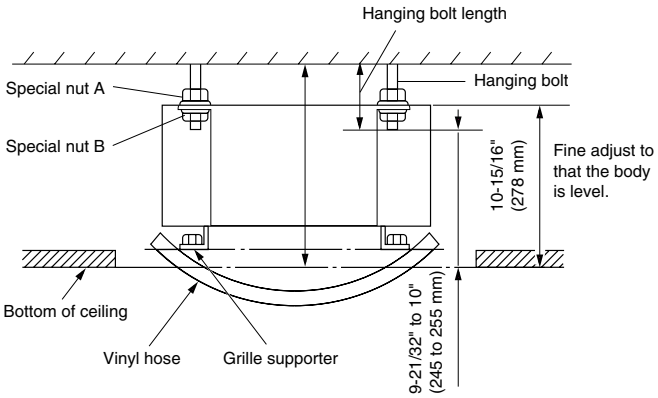


Fig. 7

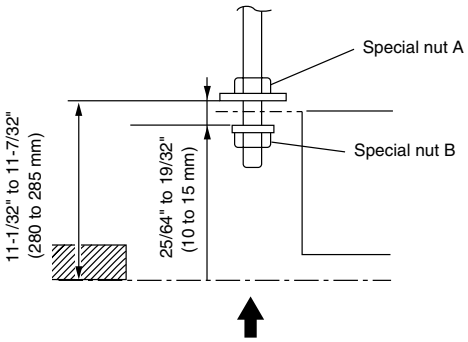
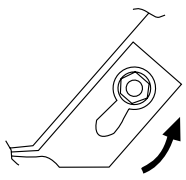


Fig.8

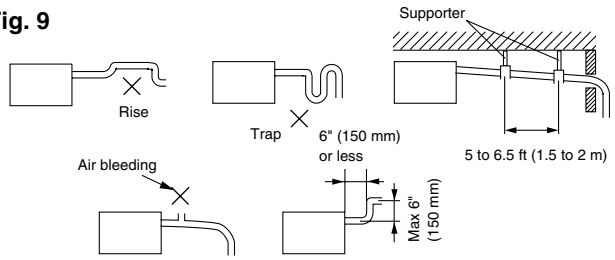


2 INSTALLING DRAIN PIPE

Note: Install the drain pipe.

- Install the drain pipe with downward gradient (1/50 to 1/100) and so there are no rises or traps in the pipe.
- Use general hard polyvinyl chloride pipe (VP25) [outside diameter 1-1/4" (32 mm)] and connect it with adhesive (polyvinyl chloride) so that there is no leakage.
- When the pipe is long, install supporters.
- Do not perform air bleeding.
- Always heat insulate the indoor side of the drain pipe.
- When desiring a high drain pipe height raise it up to 6" (150 mm) within a range of 6" (150 mm) from the body. A rise dimension over this range will cause leakage.

Fig. 9



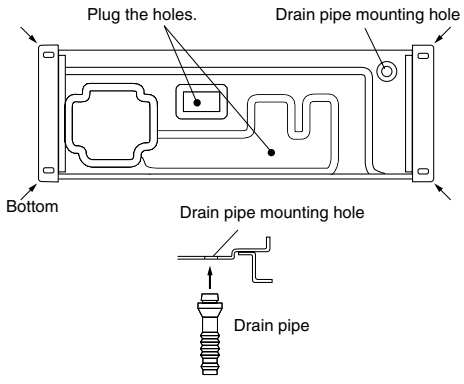
3 OUTDOOR UNIT INSTALLATION

(1) When the outdoor unit will be exposed to strong wind, fasten it with bolts at the places indicated by the arrows. (Fig. 10)

(2) Since the drain water flows out of the outdoor unit during heating operation, install the drain pipe and connect it to an commercial 16 mm hose.

(3) When installing the drain pipe, plug all the holes (• holes at two places) other than the drain pipe mounting hole in the bottom of the outdoor unit with putty so there is no water leakage. (Fig. 10)

Fig. 10



4 CONNECTING THE PIPING

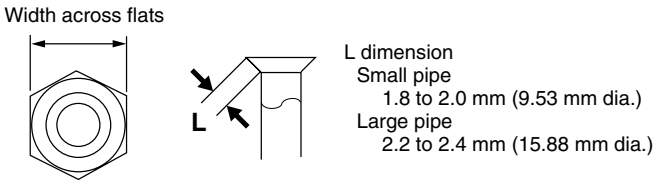
1. Flare processing

(1) Cut the connection pipe with pipe cutters so that the pipe is not deformed.
(2) Holding the pipe downward so that cuttings cannot enter the pipe, remove the burrs.
(3) Remove the flare nut from the indoor unit pipe and outdoor unit and assemble as shown in (Table 3) and insert the flare nut onto the pipe, and flare with a flaring tool.
(4) Check if the flared part " L" (Fig. 11) is spread uniformly and that there are no cracks.

Table 3

Pipe	Flarenut
Small pipe	Small (width across flats 22 mm)
Large pipe	Large (width across flats 24 mm)

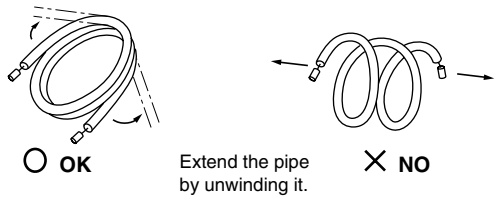
Fig. 11



2. Bending pipes

The pipes are snapped by your hands. Be careful not to collapse them.

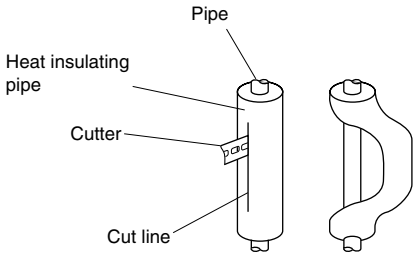
Fig. 12



Do not bend the pipes in an angle less than 90°. When the pipes are bent and stretched repeatedly, the material will be hardened, causing the pipes no longer be sent or stretched. Be sure to limit number of bending and stretching to three times.

When bending the pipe, do not bend it as is. The pipe will be collapsed. In this case, cut the heat insulating pipe with a sharp cutter as shown in Fig. 13 and bend it after exposing the pipe. After bending the pipe as you want, be sure to put the heat insulating pipe back on the pipe, and secure it with tape.

Fig. 13



⚠ CAUTION

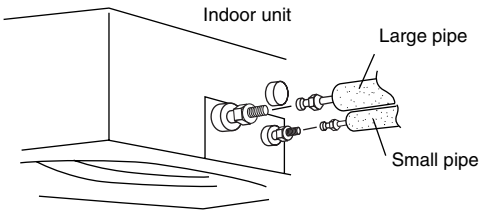
① To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 150 mm or over.

② If the pipe is bent repeatedly at the same place, it will break.

3. Connection pipes

(1) Indoor unit side

Fig. 14



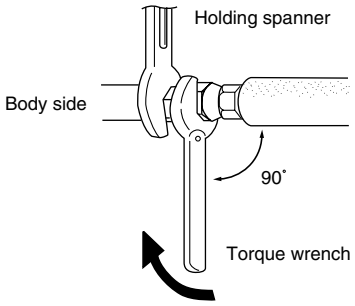
⚠ CAUTION

① Be sure to apply the pipe against the port on the indoor unit correctly. If the centering is improper, the flare nut cannot be tightened smoothly. If the flare nut is forced to turn, the threads will be damaged.

② Do not remove the flare nut from the indoor unit pipe until immediately before connecting the connection pipe.

When the flare nut is tightened properly by your hand, hold the body side coupling with a separate spanner, then tighten with a torque wrench. (Fig. 15)

Fig. 15



⚠ CAUTION

① Hold the torque wrench at its grip, keeping it in the right angle with the pipe as shown in Fig. 15, in order to tighten the flare nut correctly.

Table 4: Flare nut tightening torque

Pipe	Tightening torque
Small pipe	310 to 350 kgf · cm
Large pipe	750 to 800 kgf · cm

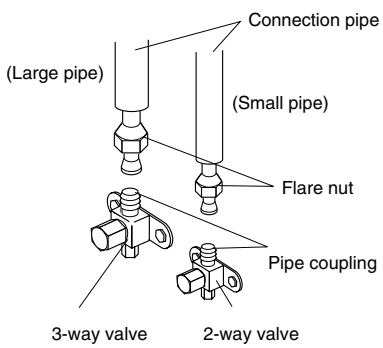
CAUTION

Be sure to connect the large pipe after connecting the small pipe completely.

(2) **Outdoor unit side**

Tighten the flare nut of the connection pipe at the outdoor unit valve connector. The tightening method is the same as that as at the indoor side.

Fig. 16



5 AIR PURGE

1. Air purge

(1) Remove the cap, and connect the gauge manifold and the vacuum pump to the charging valve by the service hoses.

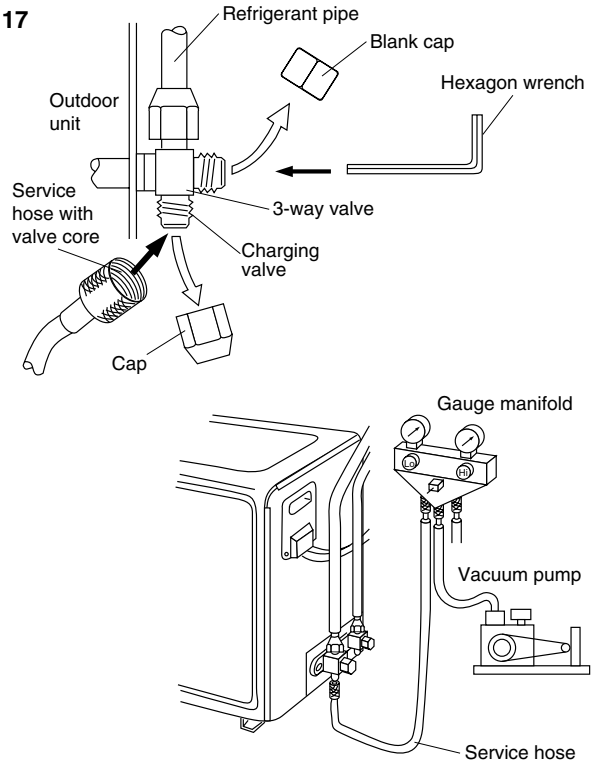
(2) Vacuum the indoor unit and the connecting pipes until the pressure in them lowers to below 1.5 mmHg.

(3) Disconnect the service hoses and fit the cap to the charging valve (Tightening torque: 70 to 90 kgf•cm).

(4) Remove the blank caps, and fully open the spindles of the 2-way and 3-way valves with a hexagon wrench (Torque: 2-way valve: 70 to 90 kgf•cm, 3-way valve: 100 to 120 kgf•cm).

(5) Tighten the blank caps of the 2-way valve and 3-way valve to the specified torque (200 to 250 kgf•cm).

Fig. 17



2. Additional charge

Refrigerant suitable for a piping length of 5 m is charged in the outdoor unit at the factory. When the piping is longer than 5 m, additional charging is necessary. For the additional amount, see the table below.

Table 5

Pipe length		16 ft (5 m)	33 ft (10 m)	49 ft (15 m)	66 ft (20 m)	82 ft (25 m)
Additional refrigerant	18,000 BTU/h class	None	8.5 oz (240 g)	16.9 oz (480 g)	25.4 oz (720 g)	33.9 oz (960 g)
	25,000 BTU/h class	None	6.0 oz (170 g)	12.0 oz (340 g)	18.0 oz (510 g)	24.0 oz (680 g)

[18,000 BTU/h class]

Between 5 m and 25 m, when using a connection pipe other than that in the table, charge additional refrigerant with 1.69 oz (48 g)/3.3 ft(1 m) as the criteria.

[25,000 BTU/h class]

Between 5 m and 25 m, when using a connection pipe other than that in the table, charge additional refrigerant with 1.20 oz (34 g)/3.3 ft(1 m) as the criteria.

⚠ CAUTION

① When moving and installing the air conditioner, do not mix gas other than the specified refrigerant (R22) inside the refrigerant cycle.

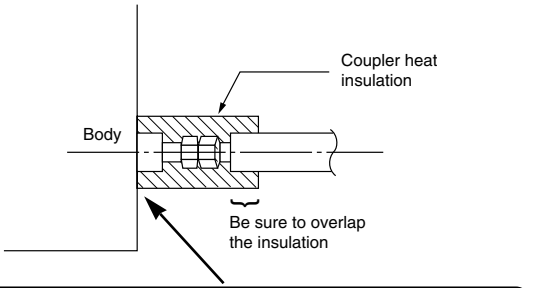
② When adding refrigerant, add the refrigerant from the charging valve at the completion of work.

③ The maximum length of the piping is 25m. If the units are further apart than this, correct operation can not be guaranteed.

6 INSTALLING THE COUPLER HEAT INSULATION

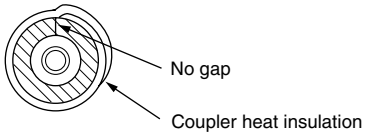
After checking for gas leaks, insulate by wrapping insulation around the two parts (large and small) of the indoor unit coupling, using the coupler heat insulation.

Fig. 18



⚠ CAUTION

Must fit tightly against body without any gap.



7 ELECTRICAL WIRING

HOW TO CONNECT WIRING TO THE TERMINALS

A. 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) to expose the solid wire.

(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 screw-driver.

B. For strand wiring

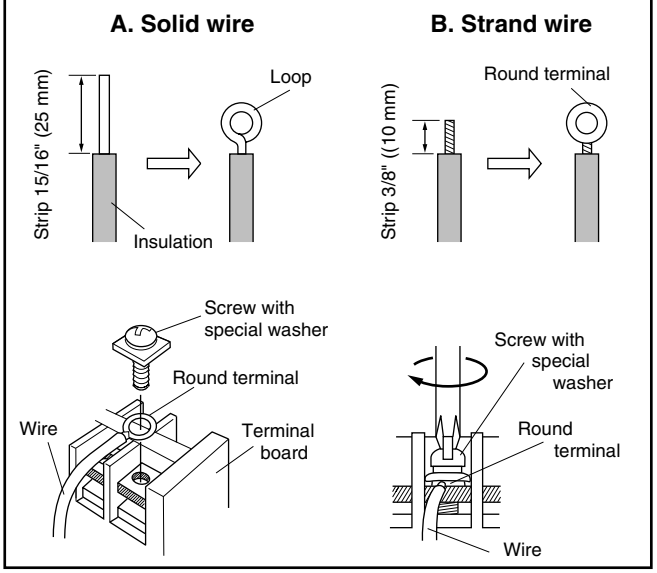
(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 3/8" (10 mm) to expose the strand wiring.

(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.

(4) Position the round terminal wire, and replace and tighten the terminal screw using a screwdriver.

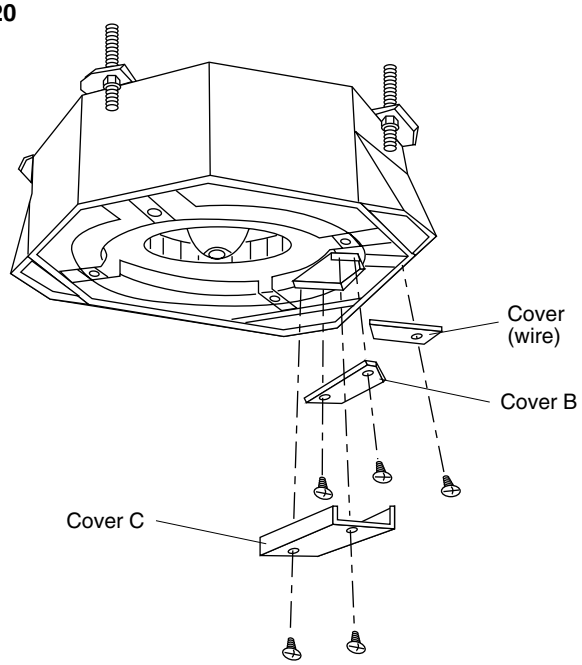
Fig. 19



1. Indoor unit side

(1) Remove the cover B,C and cover (wire) and install the connection cord. (Figs. 20, 21 and 22)

Fig. 20



(2) After wiring is complete, clamp the remote controller cord and connection cord with the cord clamp and binder (large).

(3) Install the cover B and cover (wire).

Fig. 21

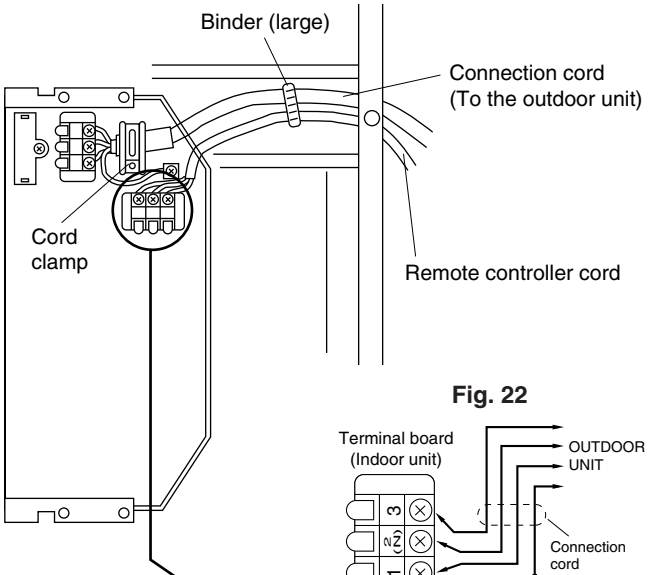
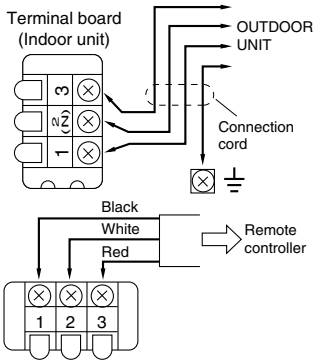


Fig. 22



⚠ CAUTION

① Tighten the indoor unit connection cord (to the outdoor unit) and power supply indoor and outdoor unit terminal board connections firmly with the terminal board screws. Faulty connection may cause a fire.

② If the indoor unit connection cord (to the outdoor unit) and power supply are wired incorrectly, the air conditioner may be damaged.

③ Wire the indoor unit connection cord (to the outdoor unit) by matching the numbers of the outdoor and indoor units terminal board numbers as shown in (Fig. 22)

④ Ground both the indoor and outdoor units by attaching a ground wire.

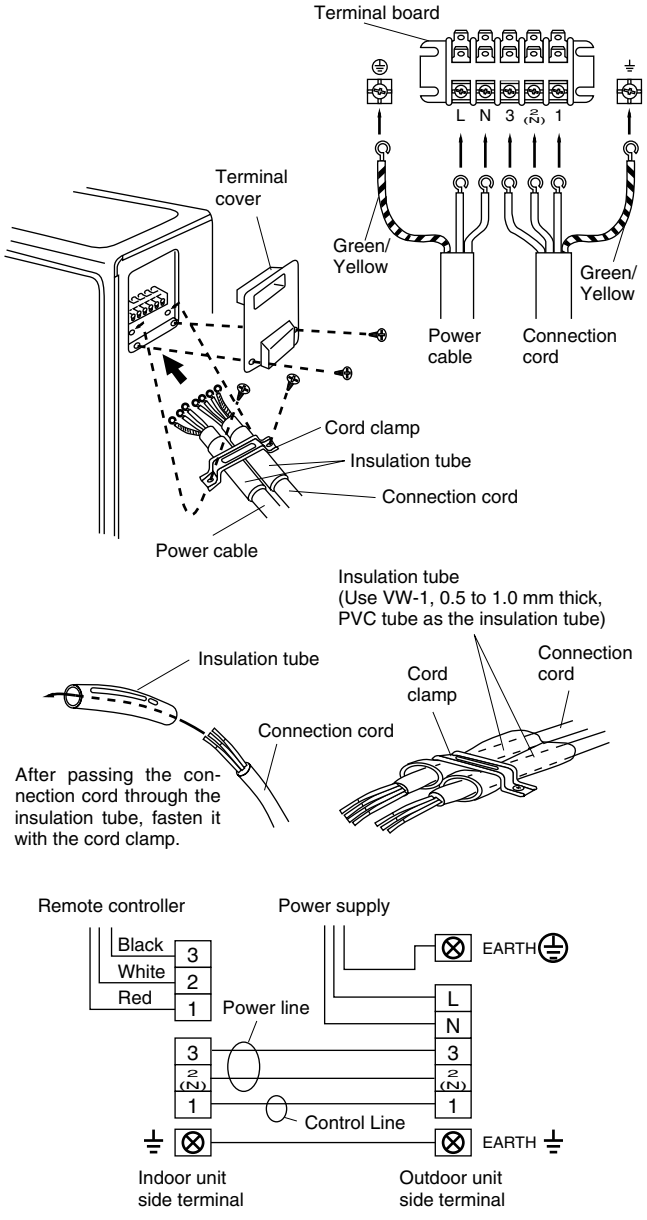
⑤ Unit shall be grounded in compliance with the applicable local and national codes.

2. Outdoor unit side

(1) Remove the terminal cover of the outdoor unit, and insert the end of the connection cord and the power cable into the terminal board.

(2) Fasten the connection cord with the cord clamps, and install the terminal cover.

Fig. 23



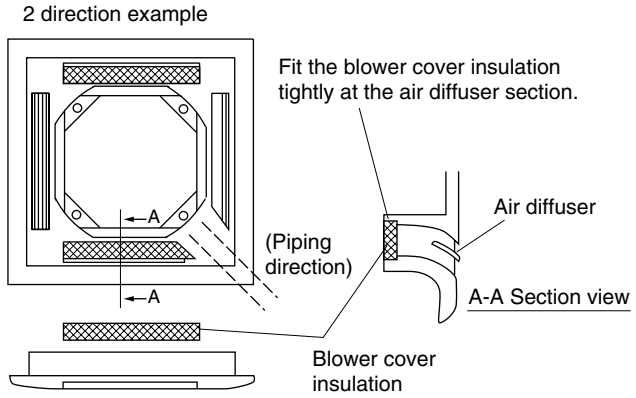
8 GRILLE INSTALLATION

1. Blower cover insulation

Install the blower cover insulation only when the outlet direction is not specified.

Two blower cover insulations are packed with the grille assembly. Install the blower cover insulation at the diffuser position shown in Fig. 24. At this time, use the piping position as the criteria.

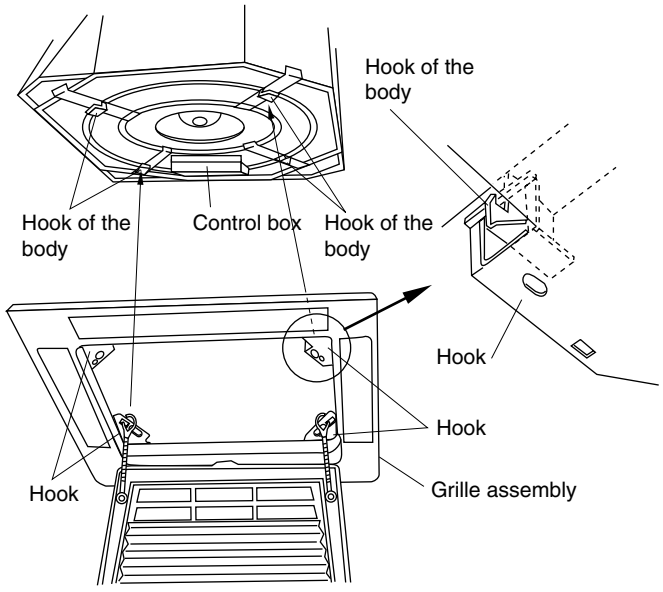
Fig. 24



2 Installing grille assembly to body

Hook the grille assembly to the hook of the body and temporarily fasten it.

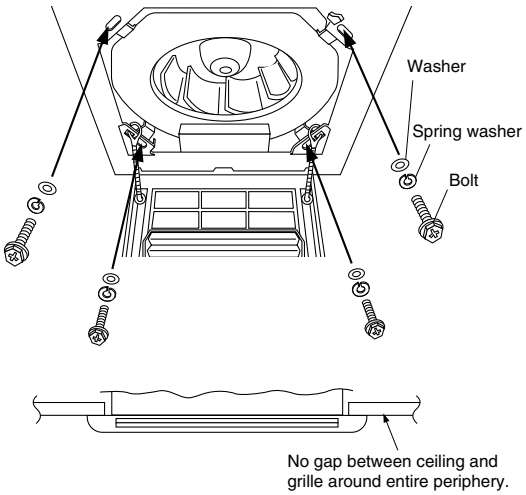
Fig. 25



Bolting the grille assembly to the body

Install the grille assembly to the body with the four bolts, spring washers, and washers.

Fig. 26



Wireless unit connection wire wiring

Connect the connector in accordance with part A detail view. Then clamp the lead wire with clamp so that it does not touch the rotating parts .

Fig. 27

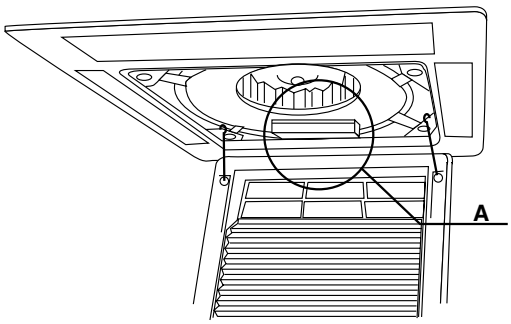
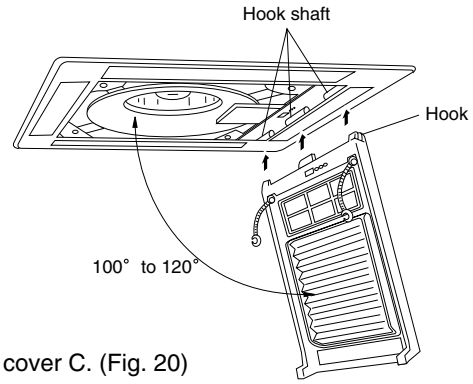


Fig. 28 Part A detail view



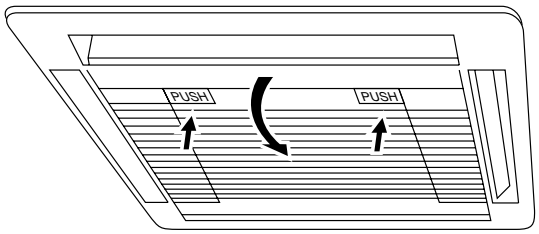
Install the cover C. (Fig. 20)
Install the intake grille.

REMOVING / INSTALLING THE INTAKE GRILLE

1. Removing the intake grille

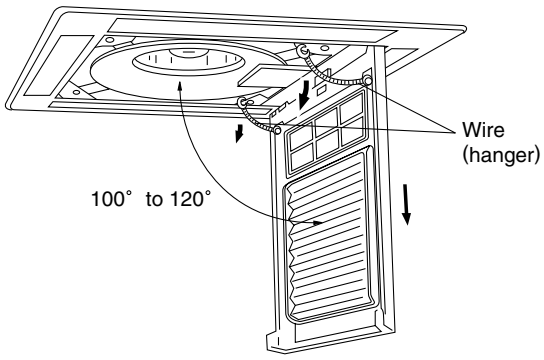
(1) Push the intake grille pushbuttons (two places) until you hear a “click”.
(2) Open the intake grille.

Fig. 29



(3) Remove the wire (hanger). (Fig. 30)
(4) Remove the intake grille by opening it 100˚ to 120˚.

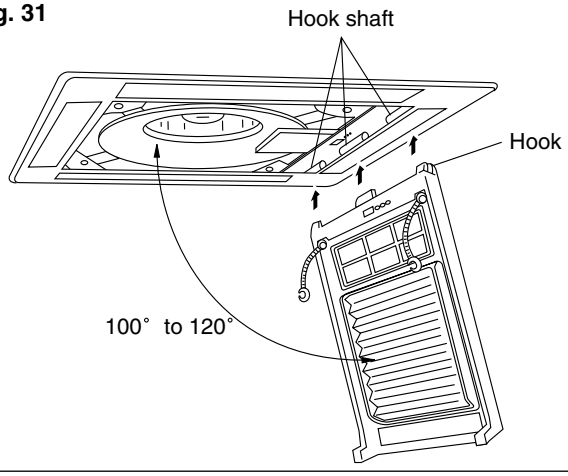
Fig. 30



2. Installing the intake grille

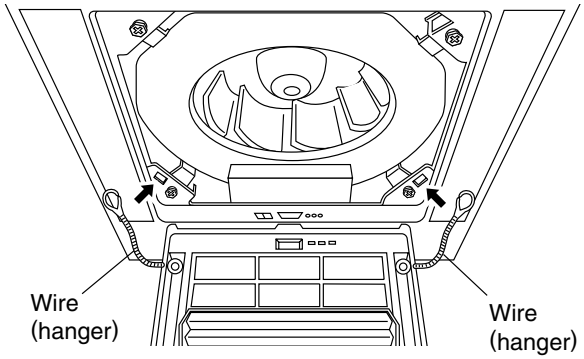
(1) Tilt the intake grille 100˚ to 120˚ and hook the three hooks to the intake grille hook shaft.

Fig. 31



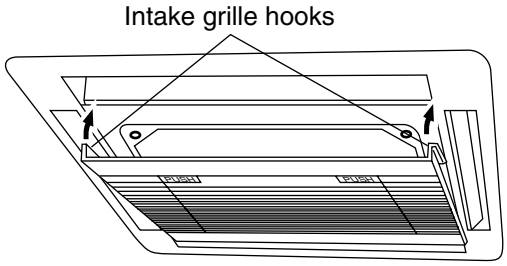
(2) Install the wire (hanger).

Fig. 32



(3) Hook the intake grille hooks to the grille assembly.

Fig. 33



(4) Push the intake grille pushbuttons (two places) until you hear a “click”.

⚠ CAUTION

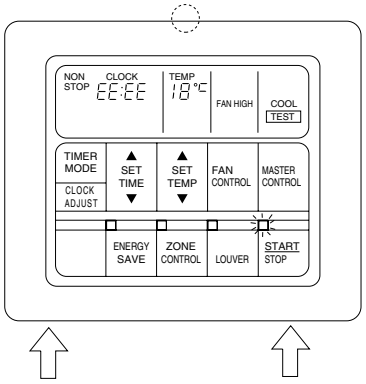
① **The louver angle cannot be changed if the power is not on, (If moved by hand, it may be damaged.)**

② **The grille assembly is directional relative to the air conditioner body.**

9 REMOTE CONTROLLER INSTALLATION

- Insert the end of a flat blade screwdriver at the arrow parts of the groove at the side of the remote controller case and remove the remote controller case top by turning the screwdriver.
- Disconnect the remote controller cord from the remote controller terminal board.

Fig. 34



(1) When remote controller exposed

1) Make a notch in the thin part (◌ part of Fig. 34) at the remote controller case top and bottom with nippers, file, etc.
2) Connect the remote controller cord to the remote controller terminal board specified in (Fig. 35).
3) Clamp the remote controller cord sheath with the binder (small) as shown in Fig. 35.
4) Cut off the excess binder.
5) Clamp the remote controller cord to a wall, etc. with the remote controller cord clamp furnished. (Fig. 36)

Fig. 35

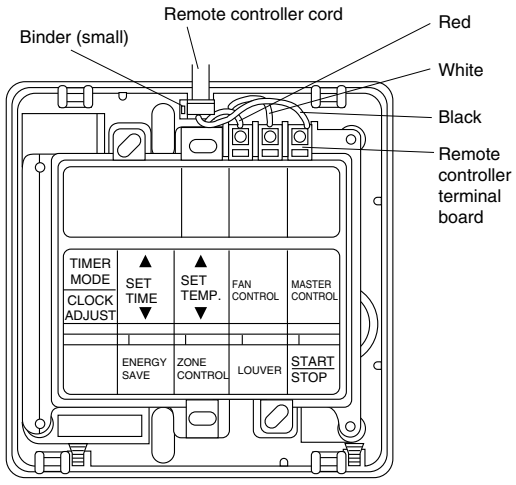
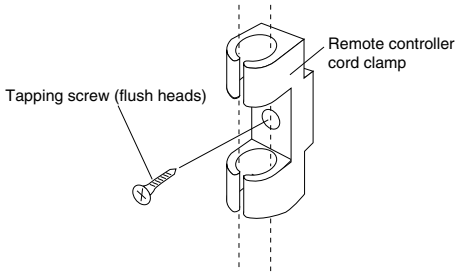
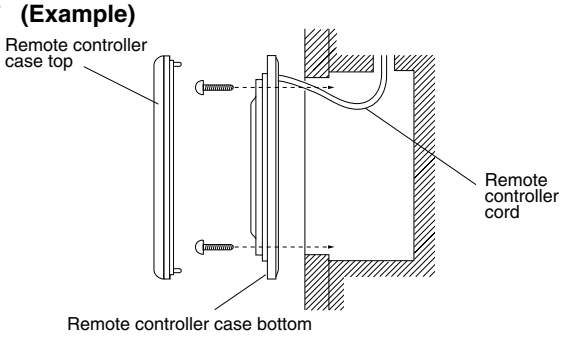


Fig. 36



(2) When remote controller cord embedded
1) Embed the remote controller cord and box.
2) Pass the remote controller cord through the hole at the remote controller case bottom and install the cord to the box. (Fig. 37)
3) Connect the remote controller cord to the remote controller terminal board specified in (Fig. 35).

Fig. 37 (Example)



- After wiring work is complete, return the remote controller case top to its original state.

⚠ CAUTION

① **Do not bundle the remote controller cord, or wire the remote controller cord in parallel, with the indoor unit connection wire (to the outdoor unit) and the power supply cord. It may cause erroneous operation.**

② **When installing the remote controller and cord near a source of electromagnetic waves, separate the remote controller from the source of the electromagnetic waves and use shielded cord.**

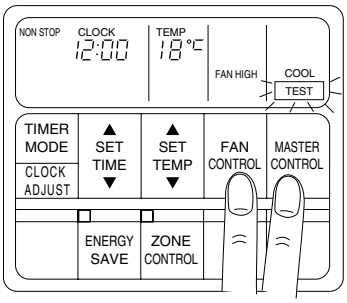
③ **Do not touch the remote controller PC board and PC board parts directly with your hands.**

10 TEST RUNNING

1. Remote controller

- Supply power to the crankcase heater 12 hours before the start of operation in winter.
- For test running, when the remote controller FAN CONTROL button and MASTER CONTROL button are pressed simultaneously for more than three seconds when the air conditioner is not running, the air conditioner starts and TEST is displayed on the remote controller display.
  However, the SET TEMP. setting button does not function, but all other buttons, displays, and protection functions operate. (Fig. 38)

Fig. 38



- When EE:EE blinks at the current time display, there is an error inside the air conditioner. If the ZONE CONTROL button and ENERGY SAVE button are pressed simultaneously for more than three seconds, the self diagnosis check will start and the error contents will be displayed at the current time display. (Fig. 39) When the operation lamp lights, press the START/STOP button and after operation lamp goes off, perform the same operation. (Fig. 39) Process the error contents by referring to (Table 6).

Fig. 39

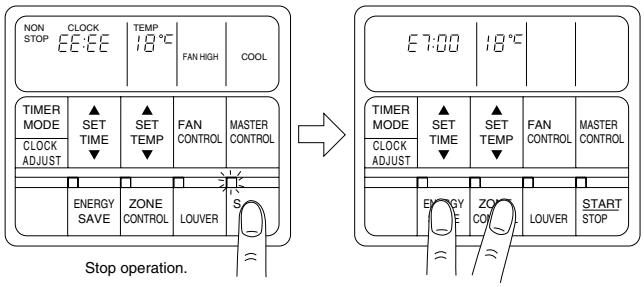


Table 6

Error cord	Error
E0:00	Communication error (indoor unit ⟷ remote controller)
E1:00	Communication error (indoor unit ⟷ outdoor unit)
E2:00	Room temperature sensor open
E3:00	Room temperature sensor shorted
E4:00	Indoor heat exchanger temperature sensor open
E5:00	Indoor heat exchanger temperature sensor shorted
E6:00	Outdoor heat exchanger temperature sensor open
E7:00	Outdoor heat exchanger temperature sensor shorted
E9:00	Float switch operated
EA:00	Outdoor temperature sensor open
EB:00	Outdoor temperature sensor shorted
EC:00	Discharge pipe temperature sensor open
ED:00	Discharge pipe temperature sensor shorted
EE:00	High pressure abnormal
EF:00	Discharge pipe temperature abnormal

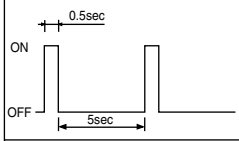
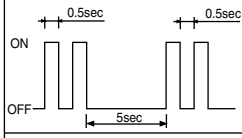
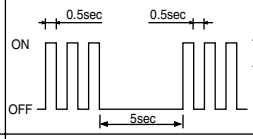
2. Outdoor unit

When the outdoor temperature drops, the outdoor unit's fans may switch to low speed.

ERROR

The LED lamps operate as follows (Table 7) according to the error contents.

Table 7

	Error display	Error contents
LED No. 1 Lamp		Discharge pipe temperature abnormal
		Outdoor heat exchanger temperature sensor abnormal
		Outdoor temperature sensor abnormal
		Discharge pipe temperature sensor abnormal
LED No. 2 Lamp		High pressure abnormal

when the fault is cleared, the LED lamp goes off.

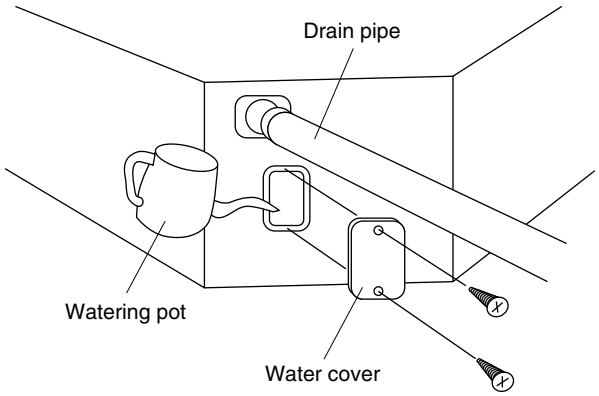
However, for discharge pipe temperature abnormal and high pressure abnormal, the LED lamp lights continuously for 24 hours, as long as the power is not turned off.

3. Checking drainage

To check the drain, remove the water cover and fill with 2 to 3ℓ of water as shown in Fig. 40.

The drain pump operates when operating in the cooling mode.

Fig. 40



8.1.3 AU30, 36, 45 (50Hz)

SPLIT TYPE AIR CONDITIONER
Cassette Type [Cooling Model]
INSTALLATION MANUAL

(PART NO. 9356927023)

For authorized service personnel only.

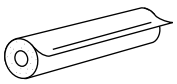
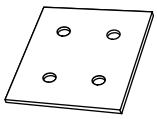
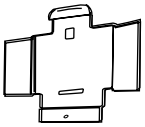
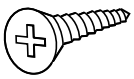
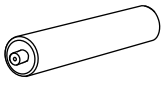
⚠ WARNING
① For the room air conditioner to operate satisfactorily, install it as outlined in this installation manual.
② Installation work must be performed in accordance with national wiring standards by authorized personnel only.
③ Do not turn on the power until all installation work is complete.

Be careful not to scratch the air conditioner when handling it.
After installation, explain correct operation to the customer, using the operating manual.
Let the customer keep this installation manual because it is used when the air conditioner is serviced or moved.
The maximum length of the piping is shown in Table 1. If the units are further apart than this, correct operation cannot be guaranteed.

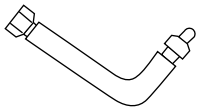
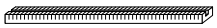
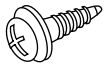
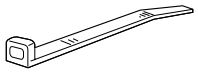
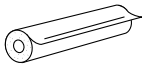
STANDARD PARTS

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

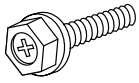
INDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Application
Coupler heat insulation 	2	For indoor side pipe joint
Special nut A (large flange) 	4	For installing indoor unit
Special nut B (small flange) 	4	For installing indoor unit
Template 	1	For ceiling hole cutting
Remote controller 	1	
Machine screw (small) 	1	For installing the remote controller
Remote controller holder 	1	For mounting the remote controller
Screw (medium) 	2	For installing the remote controller holder
Battery (R6P/LR6) 	4	For remote controller

OUTDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Application
Power cap 	1	For power cable installation
Auxiliary pipe assembly 	1	For wiring conduit (gas side) connection (May not be supplied, depending on the model)
Edge cover 	1	For wiring conduit installation hole edge protection
Tapping screw 	2	• For cabinet A and cabinet D mounting (1) • Spare (1)
Binder 	1	For power cable binding
Putty 	1	For sealing
Coupler heat insulation 	1	For outdoor side pipe joint

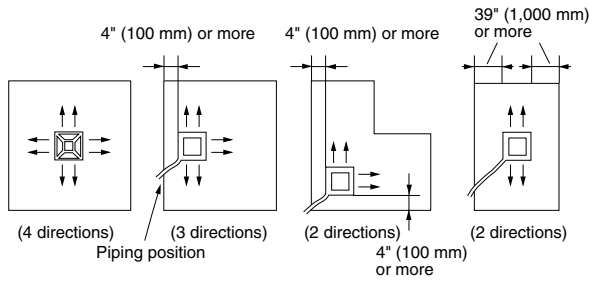
GRILLE ACCESSORIES

Name and Shape	Q'ty	Application
Bolt 	4	For mounting grille
Washer 	4	For mounting grille
Spring washer 	4	For mounting grille
Blower cover insulation 	2	For discharged air

SELECTING THE MOUNTING POSITION

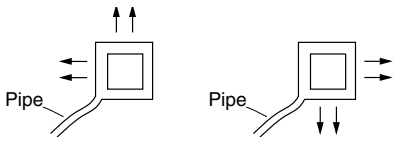
Especially, the installation place is very important for the split type air conditioner because it is very difficult to move from place to place after the first installation. Decide the mounting position together with the customer as follows: The discharge direction can be selected as shown below.

Fig. 1



⚠ CAUTION

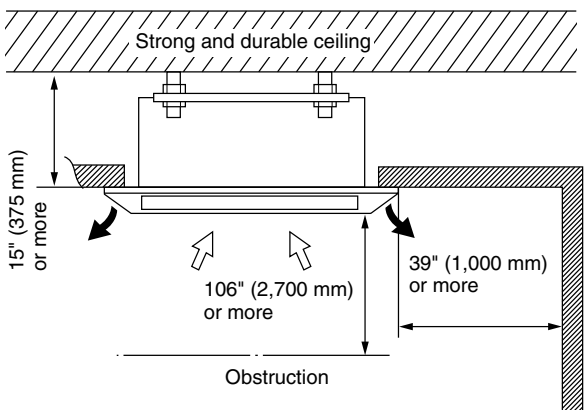
Since 2-way outlet as shown below causes performance problems, do not set it.



Indoor unit

(1) Install the indoor unit on a place having a sufficient strength so that it withstands against the weight of the indoor unit.
(2) The inlet and outlet ports should not be obstructed; the air should be able to blow all over the room.
(3) Leave the space required to service the air conditioner. (Fig.2)
(4) The ceiling rear height is 15 inches (375 mm) or more.
(5) A place from where the air can be distributed evenly throughout the room by the unit.
(6) A place from where drainage can be extracted outdoors easily.

Fig. 2



Outdoor unit

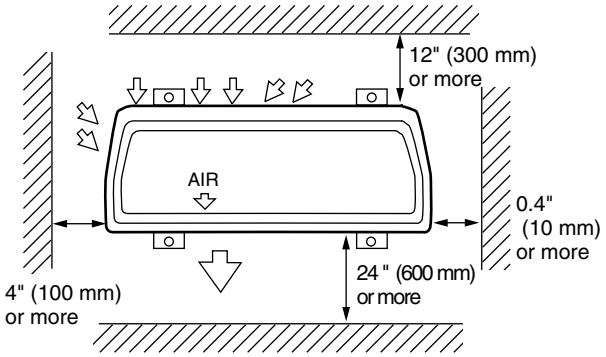
⚠ WARNING

① Install the unit where it will not be tilted by more than 5˚

② When installing the outdoor unit where it may be exposed to strong wind, fasten it securely.

(1) Leave the space indicated for good air flow. (Fig. 3)

Fig. 3



(2) 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.)
(3) Do not install the unit near a source of heat, steam, or flammable gas.
(4) Do not install the unit where a strong wind blows or where it is very dusty.
(5) Do not install the unit where people pass.
(6) Install the outdoor unit in a place where it will be free from being dirty or getting wet by rain as much as possible.
(7) Install the unit when connection to the indoor unit is easy.

CONNECTION PIPE REQUIREMENT

Table 1

	Diameter		Maximum height	Maximum height (between indoor and outdoor)
	Small	Large		
30,000 BTU/h class	9.53 mm	15.88 mm	30 m	15 m
36,000 BTU/h(3 ø) class	9.53 mm	19.05 mm	50 m	30 m
45,000 BTU/h(3 ø) class	9.53 mm	19.05 mm	50 m	30 m

Use 0.7 mm to 1.2 mm thick pipe.
Use pipe with water-resistant heat insulation.

ELECTRICAL REQUIREMENT

- Electric wire size and fuse capacity.

Table 2

		30,000 BTU/h class	36,000 BTU/h class	45,000 BTU/h class
Power cable (mm^2)	MAX	3.0	2.0	2.0
	MIN	2.5	15	1.5
Connection cord (mm^2)	MAX	1.5	1.5	1.5
	MIN	1.0	1.0	1.0
Fuse capacity (A)		30	20	20

- Always use H 07RN-F or equivalent as the connection cord.
  Install the disconnect device with a contact gap of at least 3 mm nearby the units. (Both indoor unit and outdoor unit.)

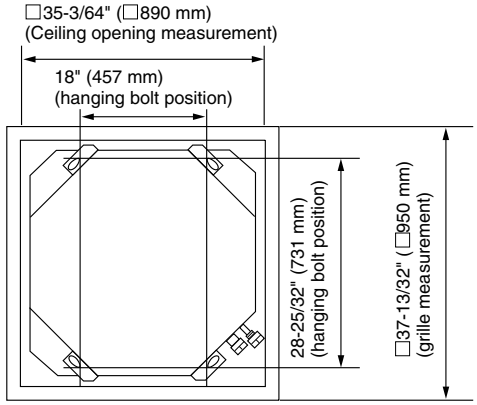
INSTALLATION PROCEDURE

Install the room air conditioner as follows:

1 INDOOR UNIT INSTALLATION

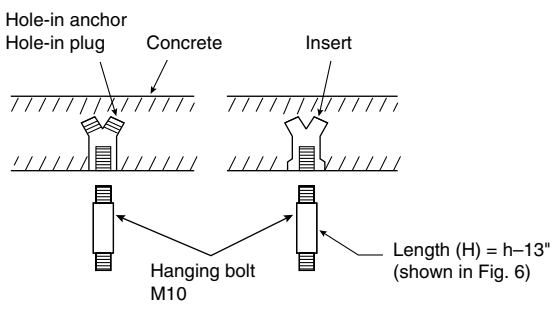
1. Position the ceiling hole and hanging bolts as shown in Fig. 4.

Fig. 4



2. **Hanging preparations**
   Firmly fasten the hanging bolts as shown in Fig. 5 or by another method.

Fig. 5



3. Body installation

(1) Install special nut A (large flange) to the hanging bolts at a position 14-13/32" to 14-19/32" (366 to 371 mm) from the bottom of the ceiling. (Fig. 7)

(2) Next, install special nut B (small flange) to the hanging bolts. Provide a space of 25/64" to 19/32" (10 to 15 mm) between special nut B and special nut A (large flange).

(3) Align the end of the hanging bolts with the larger of the four long body mounting plate holes and lift the body until it touches special nut A.
Then slide the body in the rotation direction so that it is supported by special nut B. (Fig. 8)

(4) Adjust special nut B so that the bottom of the ceiling and the four grille supporters are on the same plane. (Fig. 6)

(5) Leveling
Using a level, or vinyl hose filled with water, fine adjust so that the body is level.

⚠ WARNING

Perform final tightening by tightening the double nut firmly.

Fig. 6

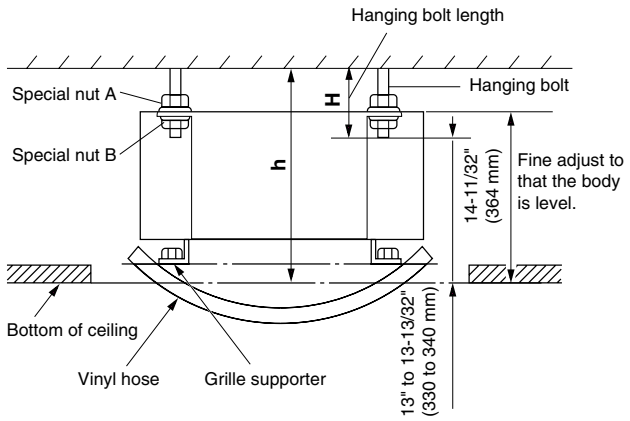


Fig. 7

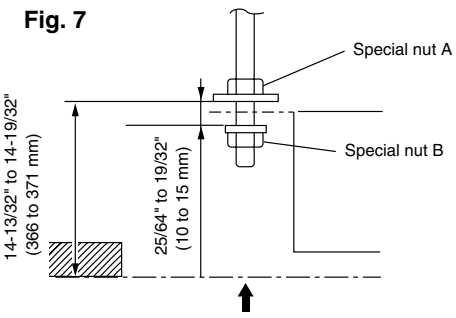
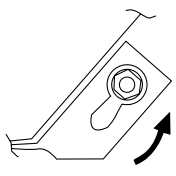


Fig. 8

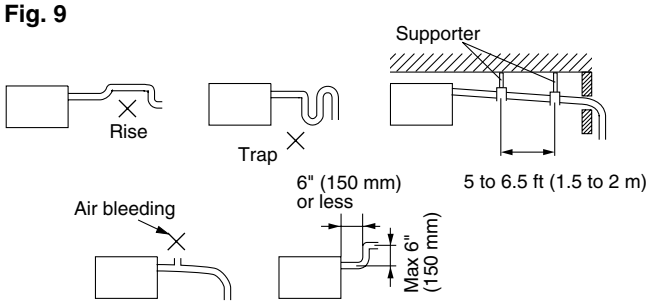


2 INSTALLING DRAIN PIPE

Note: Install the drain pipe.

- Install the drain pipe with downward gradient (1/50 to 1/100) and so there are no rises or traps in the pipe.
- Use general hard polyvinyl chloride pipe (VP25) [outside diameter 1-1/4" (32 mm)] and connect it with adhesive (polyvinyl chloride) so that there is no leakage.
- When the pipe is long, install supporters.
- Do not perform air bleeding.
- Always heat insulate the indoor side of the drain pipe.
- When desiring a high drain pipe height raise it up to 6" (150 mm) within a range of 6" (150 mm) from the body. A rise dimension over this range will cause leakage.

Fig. 9

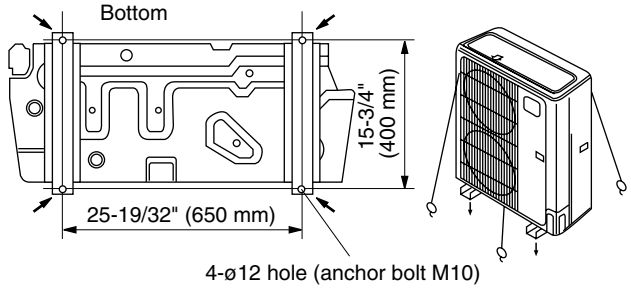


3 OUTDOOR UNIT INSTALLATION

1. Outdoor unit processing

When the outdoor unit will be exposed to strong wind, fasten it with bolts or wire at the four places indicated by the arrows. (Fig. 10)

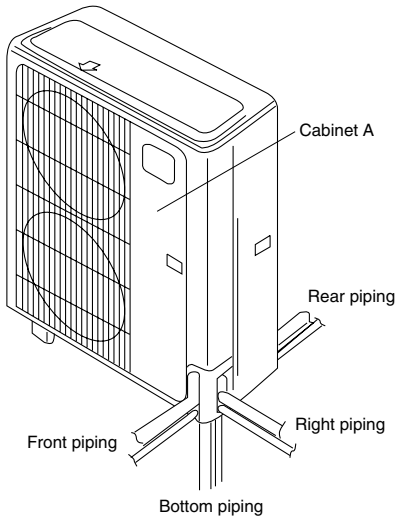
Fig. 10



2. Outdoor unit connection cord and pipe connection preparations

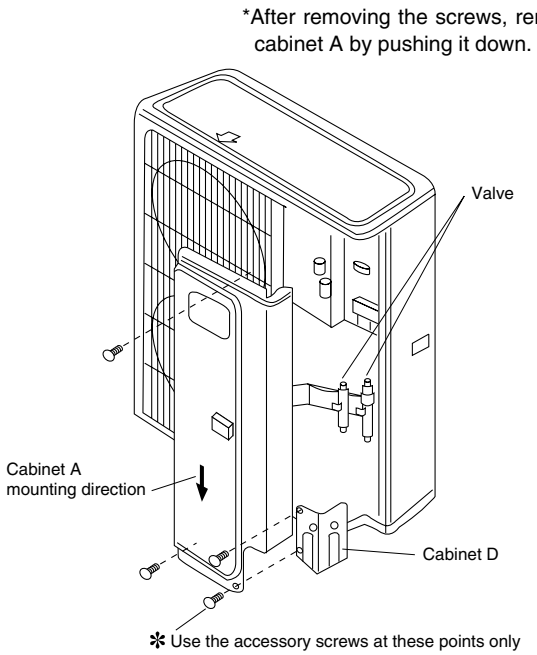
(1) Piping and connection cord mounting direction (4-way mounting possible).

Fig. 11



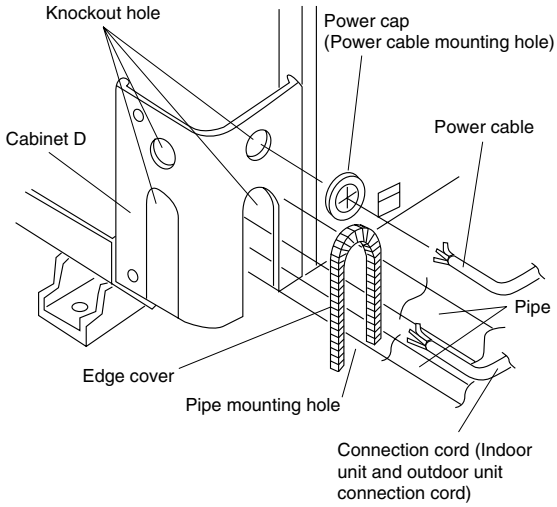
(2) Remove outdoor unit cabinet A and cabinet D.

Fig. 12



(3) Open the piping and connection cord knockout holes of the desired direction with nippers, etc.
After opening the knockout holes, install the accessory edge cover and power cap to protect the opened places.

Fig. 13

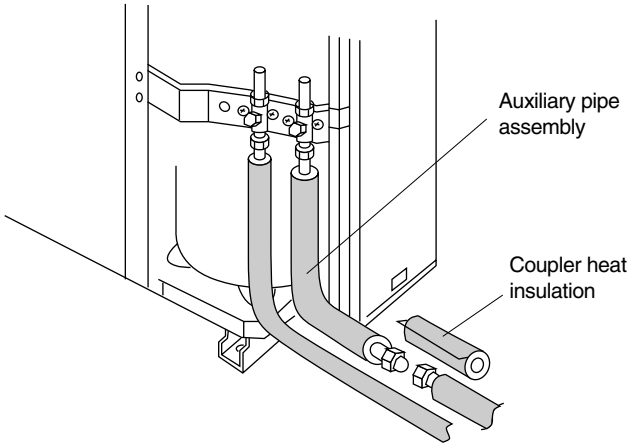


(4) Connect the piping and power cable from the mounting holes.

Fig. 14

(Example)

✻ When pipe bending work is difficult inside the outdoor unit, use the accessory auxiliary pipe assembly.



4 CONNECTING THE PIPING

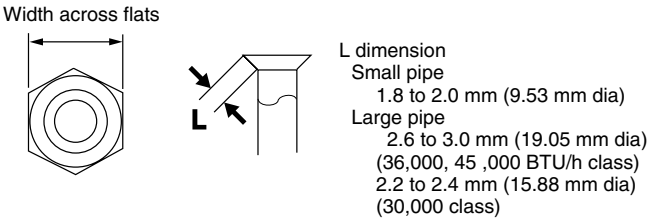
1. Flare processing

(1) Cut the connection pipe with pipe cutters so that the pipe is not deformed.
(2) Holding the pipe downward so that cuttings cannot enter the pipe, remove the burrs.
(3) Remove the flare nut from the indoor unit pipe and outdoor unit and assemble as shown in (Table 3) and insert the flare nut onto the pipe, and flare with a flaring tool.
(4) Check if the flared part " L" (Fig. 15) is spread uniformly and that there are no cracks.

Table 3

Pipe	Flare nut
Small pipe	Small (width across flats 22 mm)
Large pipe	Large (width across flats 36 mm) $^{36,000}_{45,000}$ BTU/h class
	Large (width across flats 24mm) 30,000 BTU/h class

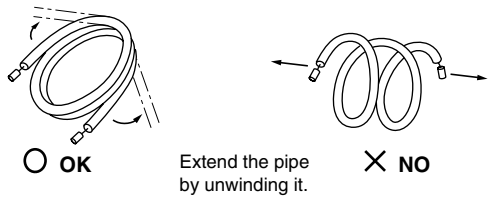
Fig. 15



2. Bending pipes

The pipes are snapped by your hands. Be careful not to collapse them.

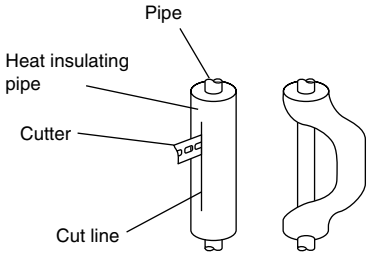
Fig. 16



Do not bend the pipes in an angle less than 90°. When the pipes are bent and stretched repeatedly, the material will be hardened, causing the pipes no longer be sent or stretched. Be sure to limit number of bending and stretching to three times.

When bending the pipe, do not bend it as is. The pipe will be collapsed. In this case, cut the heat insulating pipe with a sharp cutter as shown in Fig. 17 and bend it after exposing the pipe. After bending the pipe as you want, be sure to put the heat insulating pipe back on the pipe, and secure it with tape.

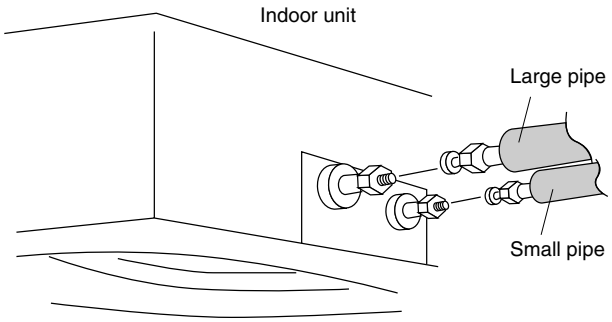
Fig. 17



3. Connection pipes

(1) Indoor unit side

Fig. 18

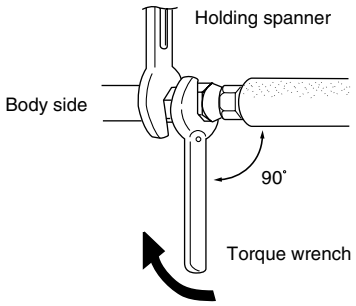


⚠ CAUTION

Be sure to apply the pipe against the port on the indoor unit correctly. If the centering is improper, the flare nut cannot be tightened smoothly. If the flare nut is forced to turn, the threads will be damaged.

When the flare nut is tightened properly by your hand, hold the body side coupling with a separate spanner, then tighten with a torque wrench. (Fig. 19)

Fig. 19



⚠ CAUTION

Hold the torque wrench at its grip, keeping it in the right angle with the pipe as shown in Fig. 19, in order to tighten the flare nut correctly.

Table 4: Flare Nut Tightening Torque

Pipe	Tightening torque
Small pipe	310 to 350 kgf · cm (30.4 to 34.3 N · m)
Large pipe	800 to 1,000 kgf · cm (78.4 to 98 N · m) 19.05 mm dia. 750 to 800 kgf · cm (73.5 to 78.4 N · m) 15.88 mm dia.

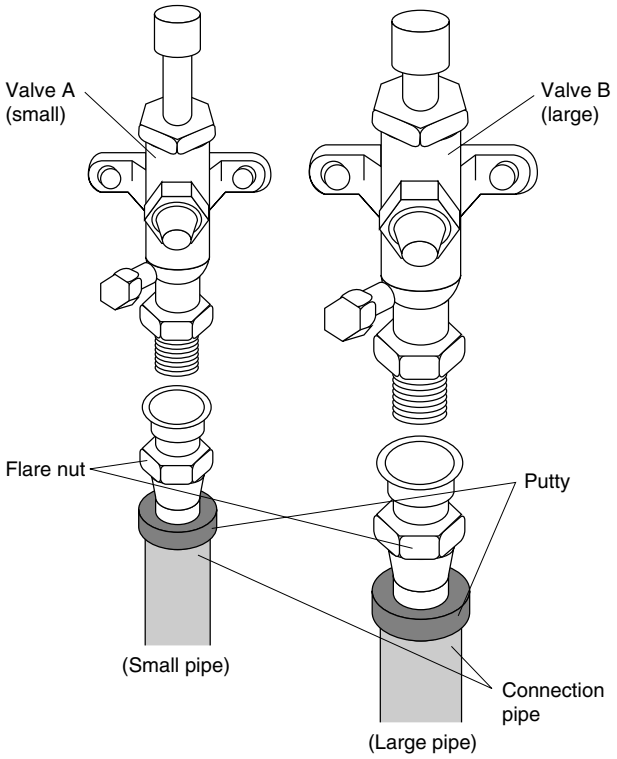
⚠ CAUTION

Be sure to connect the large pipe after connecting the small pipe completely.

(2) Outdoor unit side

1) Tighten the flare nut of the connection pipe at the outdoor unit valve connector . The tightening method is the same as that as at the indoor side.
2) Seal with the accessory putty so that water does not enter at the top of the pipe insulation installed to the connection pipe (large pipe and small pipe).

Fig. 20



5 AIR PURGE

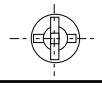
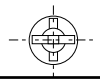
1. Air purge

(1) Purge the air inside the indoor unit and the piping to a pressure of 1.5 mmHg abs or less from the charging valve with a vacuum pump.
(2) After purging the air inside the indoor unit and the piping, remove the cap of the two valves.
(3) Open the spindle (handle) of the two valves from the closed state (Table 6).
(4) Tighten the cap of the two valves to the specified torque.

Table 5

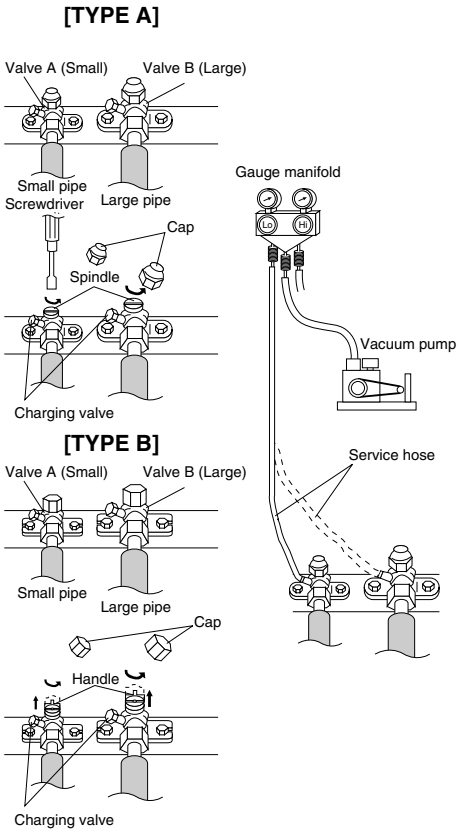
	Tightening torque	
	Large valve	Small valve
Spindle (TYPE A)	25 kgf•cm (2.45 N · m) or less	
Handle (TYPE B)	15 kgf•cm (1.47 N · m) or less	
Cap	150 to 200 kgf•cm (14.7 to 19.6 N · m)	

Table 6

Valve	Open valve state	Closed valve state
TYPE A		
TYPE B		

✻If the spindle (handle) is not fully open, performance will drop and an abnormal sound will be generated.

Fig. 21



2. Additional charge

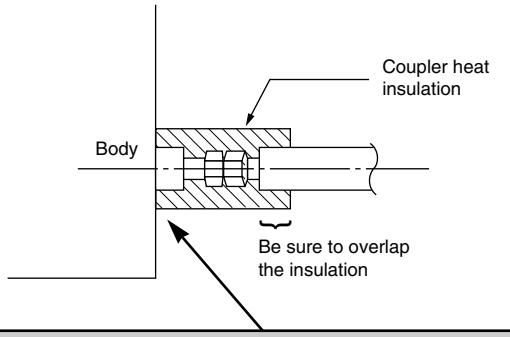
Table 7

Pipe length		33 ft (10 m)	66 ft (20 m)	99 ft (30 m)	132 ft (40 m)	164 ft (50 m)	oz/ft (g/m)
Additional refrigerant	30,000 BTU/h class	3.0 oz (85 g)	9.0 oz (255 g)	15.0 oz (425 g)	—	—	0.6 oz/3.3 ft (17 g/m)
	36,000 BTU/h class	4.8 oz (135 g)	14.3 oz (405 g)	23.8 oz (675 g)	33.3 oz (945 g)	42.9 oz (1,215 g)	0.95 oz/3.3 ft (27 g/m)
	45,000 BTU/h class	None		14.1 oz (400 g)	28.2 oz (800 g)	42.3 oz (1,200 g)	1.41 oz/3.3 ft (40 g/m)

6 INSTALLING THE COUPLER HEAT INSULATION

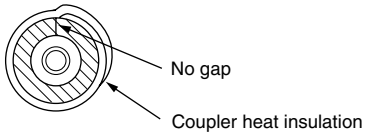
After checking for gas leaks, insulate by wrapping insulation around the two parts (large and small) of the indoor unit coupling, using the coupler heat insulation.
After installing the coupler heat insulation, wrap both ends with vinyl tape so that there is no gap.

Fig. 22



⚠ CAUTION

Must fit tightly against body without any gap.



⚠ CAUTION

① When charging the refrigerant, always use a measuring cylinder.

② Add refrigerant from the charging valve after the completion of the work.

7 ELECTRICAL WIRING

HOW TO CONNECT WIRING TO THE TERMINALS

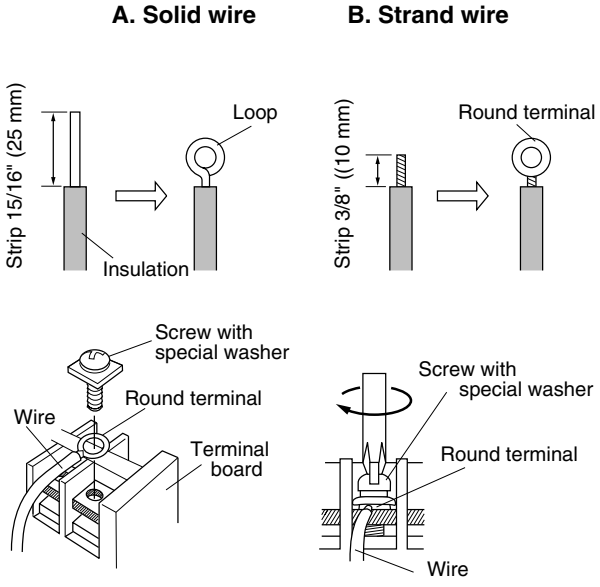
A. For solid core wiring (or F-cable)

(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 15/16" (25 mm) to expose the solid wire.
(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.

B. 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) to expose the strand wiring.
(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.
(4) Position the round terminal wire, and replace and tighten the terminal screw using a screwdriver.

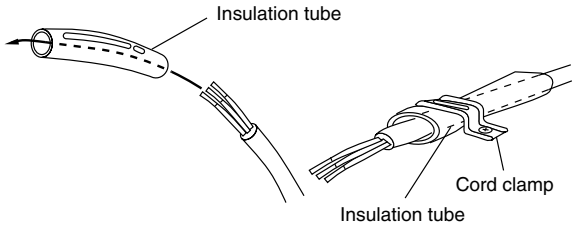
Fig. 23



HOW TO FIX CONNECTION CORD AND POWER CABLE AT THE CORD CLAMP

After passing the connection cord and power cable through the insulation tube, fasten it with the cord clamp.

Fig. 24

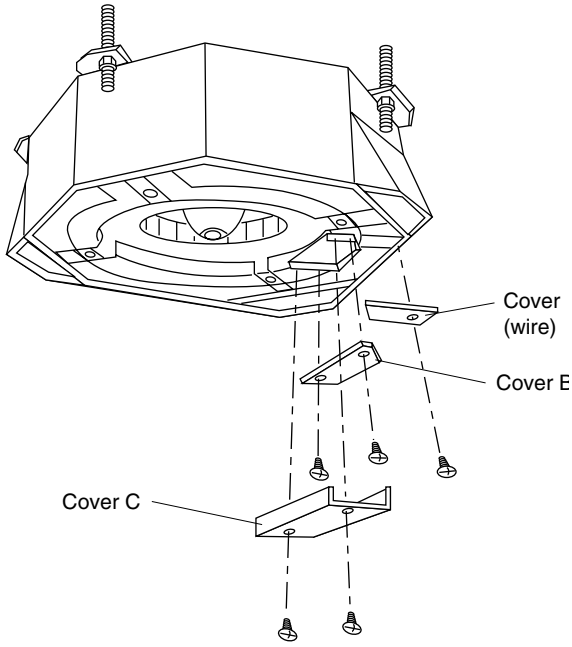


Use VW-1, 0.5 to 1.0 mm thick, PVC tube as the insulation tube.

1. Indoor unit side

(1) Remove the cover B,C and cover (wire) and install the connection cord. (Figs. 25 and 26)

Fig. 25



(2) After wiring is complete, clamp the connection cord with the cord clamp. (Fig. 26)

(3) Install the cover B and cover (wire).

Fig. 26

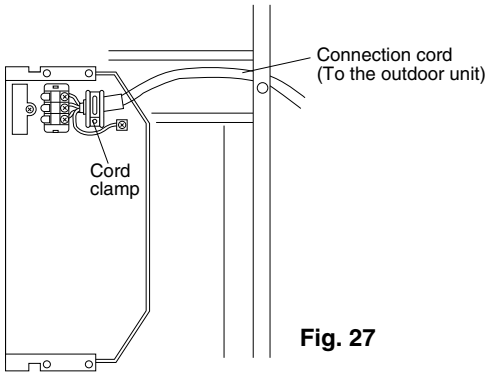
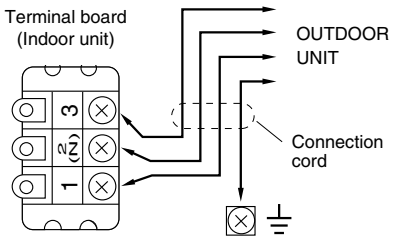


Fig. 27



⚠ CAUTION

① Tighten the indoor unit connection cord (to the outdoor unit) and power supply indoor and outdoor unit terminal board connections firmly with the terminal board screws. Faulty connection may cause a fire.

② If the indoor unit connection cord (to the outdoor unit) and power supply are wired incorrectly, the air conditioner may be damaged.

③ Wire the indoor unit connection cord (to the outdoor unit) by matching the numbers of the outdoor and indoor units terminal board numbers as shown in (Fig. 27).

④ Ground both the indoor and outdoor units by attaching a ground wire.

⑤ Unit shall be grounded in compliance with the applicable local and national codes.

2. Outdoor unit side

(1) Remove outdoor unit cabinet A and connect the power cable and the outdoor unit connection cord wired at the indoor unit.

(2) Fasten the power cable and connection cord with cable clip and binders as shown in (Fig. 30).

Fig. 28 36,000 BTU/h class

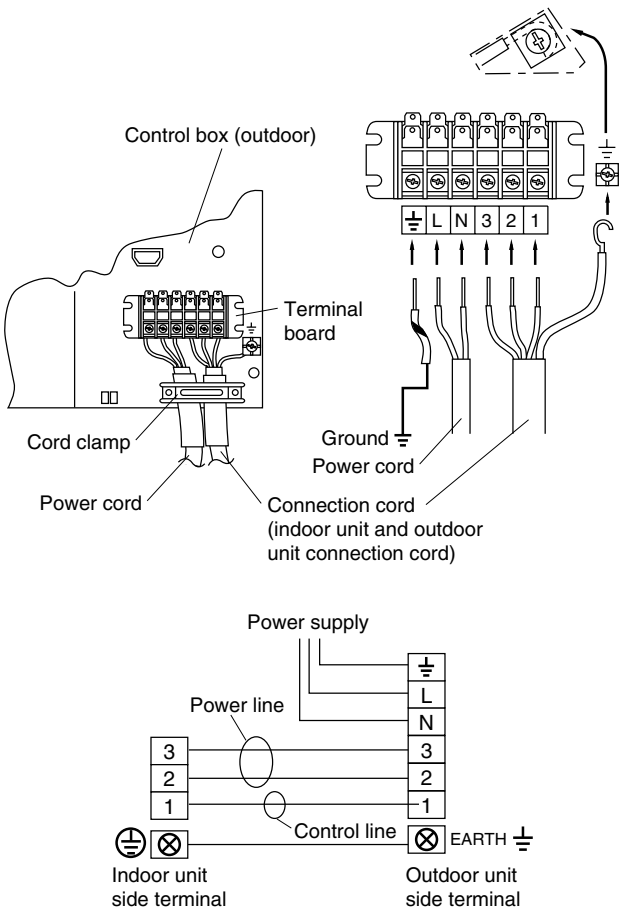


Fig. 29 45,000 BTU/h class

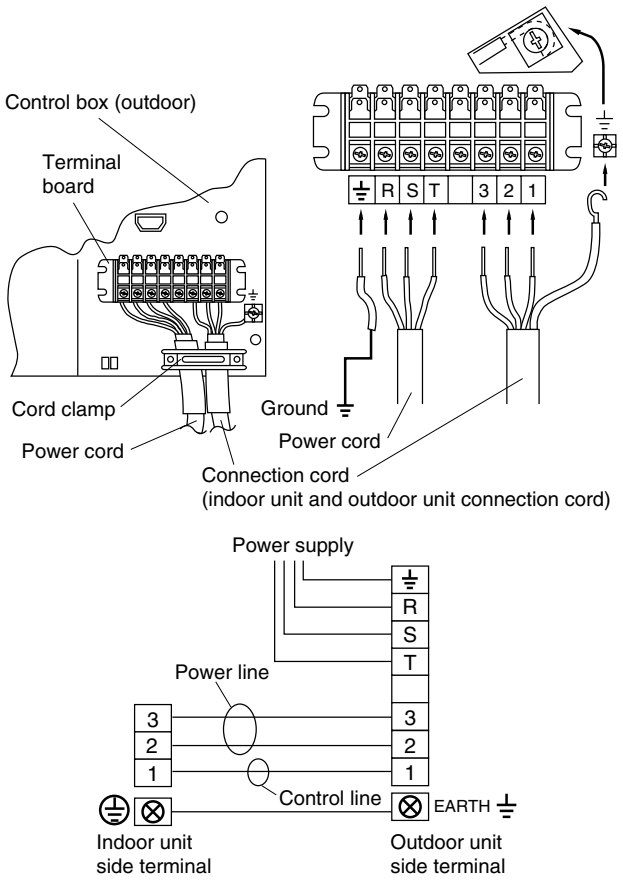
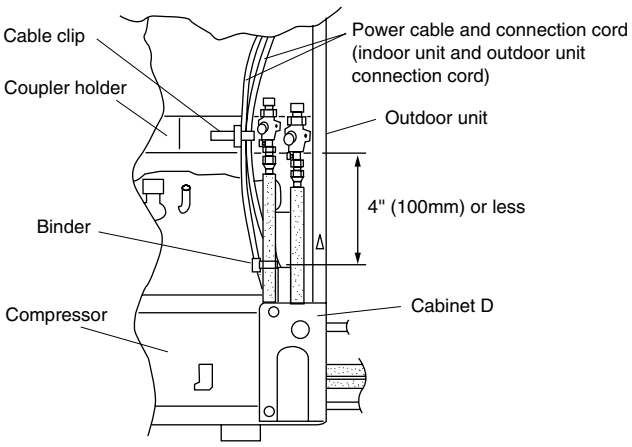


Fig. 30

Power cable and connection cord



8 GRILLE INSTALLATION

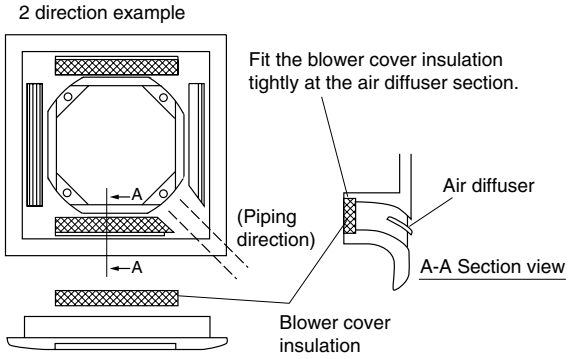
1. Blower cover insulation

Install the blower cover insulation only when the outlet direction is not specified.

Two blower cover insulations are packed with the grille assembly.

Install the blower cover insulation at the diffuser position shown in Fig. 31. At this time, use the piping position as the criteria.

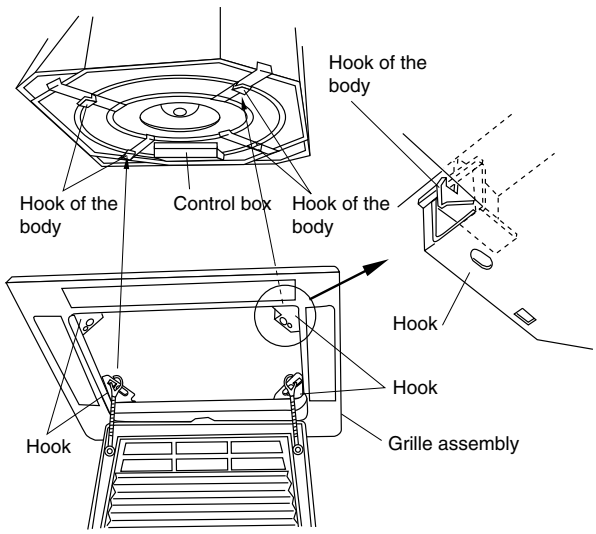
Fig. 31



2 Installing grille assembly to body

Hook the grille assembly to the hook of the body and temporarily fasten it.

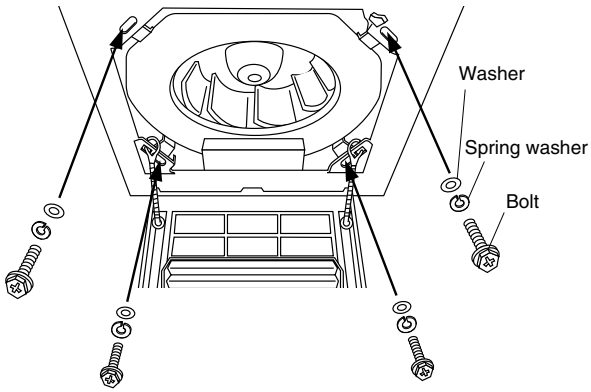
Fig. 32



Bolting the grille assembly to the body

Install the grille assembly to the body with the four bolts, spring washers, and washers.

Fig. 33



Grille unit connection wire wiring

Connect the connector in accordance with part A detail view. Then clamp the lead wire with clamp so that it does not touch the rotating parts.

Fig. 34

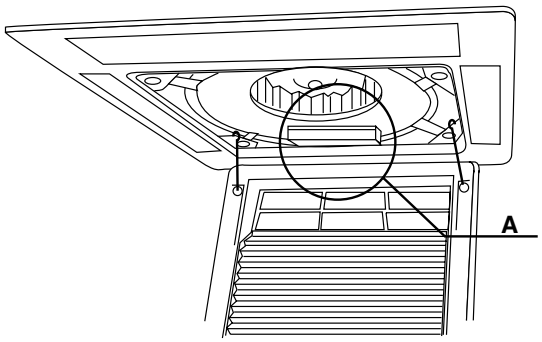
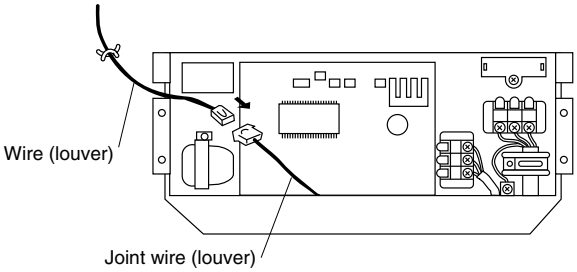


Fig. 35 Part A detail view



Install the cover C. (Fig. 25)

Install the intake grille.

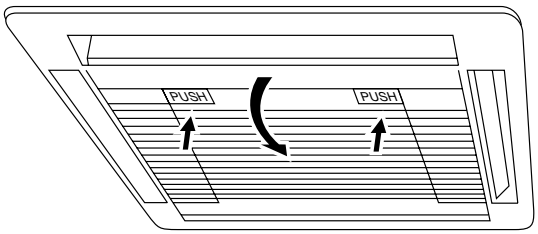
REMOVING / INSTALLING THE INTAKE GRILLE

1. Removing the intake grille

(1) Push the intake grille pushbuttons (two places) until you hear a "click".

(2) Open the intake grille.

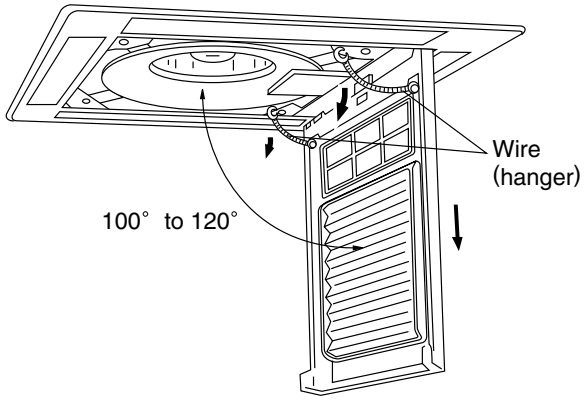
Fig. 36



(3) Remove the wire (hanger). (Fig. 37)

(4) Remove the intake grille by opening it 100° to 120°.

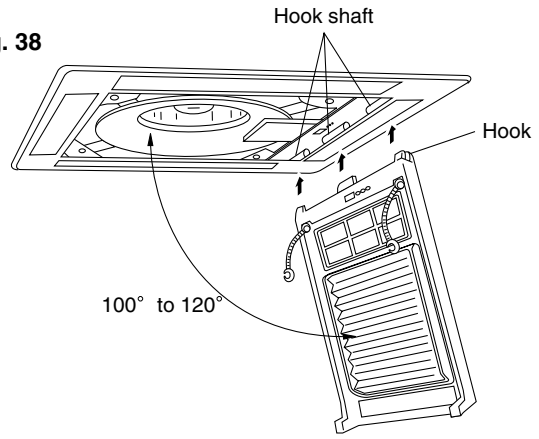
Fig. 37



2. Installing the intake grille

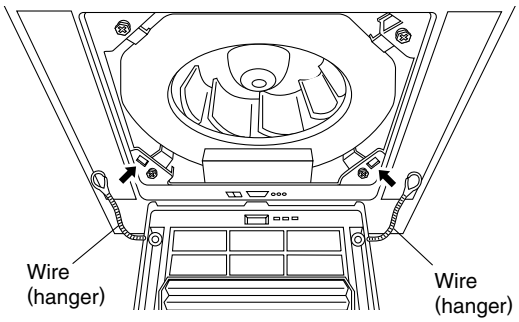
(1) Tilt the intake grille 100° to 120° and hook the three hooks to the intake grille hook shaft.

Fig. 38



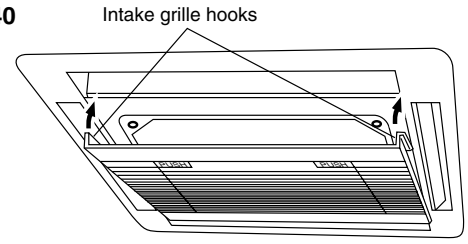
(2) Install the wire (hanger).

Fig. 39



(3) Hook the intake grille hooks to the grille assembly.

Fig. 40



⚠ CAUTION

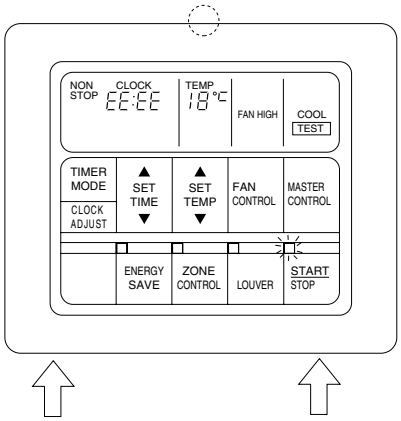
① **The louver angle cannot be changed if the power is not on, (If moved by hand, it may be damaged.)**

② **The grille assembly is directional relative to the air conditioner body.**

9 REMOTE CONTROLLER INSTALLATION

- Insert the end of a flat blade screwdriver at the arrow parts of the groove at the side of the remote controller case and remove the remote controller case top by turning the screwdriver.
- Disconnect the remote controller cord from the remote controller terminal board.

Fig. 41



(1) When remote controller exposed

1) Make a notch in the thin part (◌ part of Fig. 41) at the remote controller case top and bottom with nippers, file, etc.
2) Connect the remote controller cord to the remote controller terminal board specified in (Fig. 42).
3) Clamp the remote controller cord sheath with the binder (small) as shown in Fig. 42.
4) Cut off the excess binder.
5) Clamp the remote controller cord to a wall, etc. with the remote controller cord clamp furnished. (Fig. 43)

Fig. 42

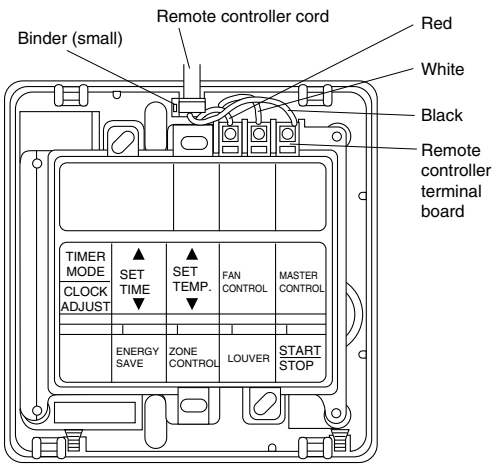
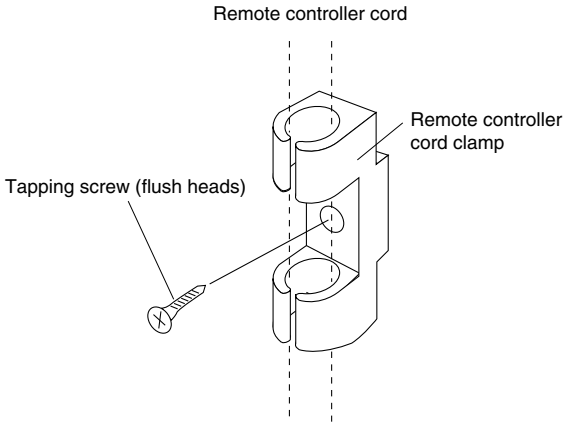


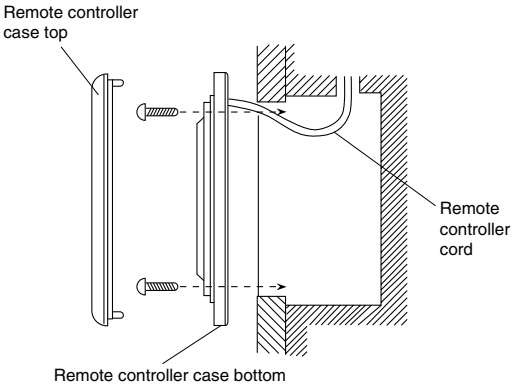
Fig. 43



(2) When remote controller cord embedded

1) Embed the remote controller cord and box.
2) Pass the remote controller cord through the hole at the remote controller case bottom and install the cord to the box. (Fig. 44)
3) Connect the remote controller cord to the remote controller terminal board specified in (Fig. 42).

Fig. 44 (Example)



- After wiring work is complete, return the remote controller case top to its original state.

⚠ CAUTION

① **Do not bundle the remote controller cord, or wire the remote controller cord in parallel, with the indoor unit connection wire (to the outdoor unit) and the power supply cord. It may cause erroneous operation.**

② **When installing the remote controller and cord near a source of electromagnetic waves, separate the remote controller from the source of the electromagnetic waves and use shielded cord.**

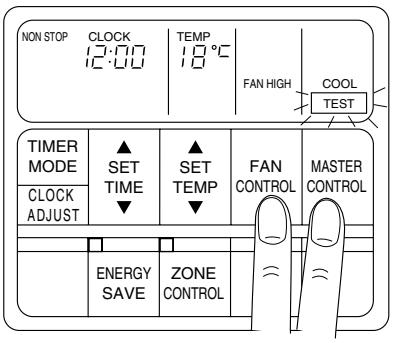
③ **Do not touch the remote controller PC board and PC board parts directly with your hands.**

10 TEST RUNNING

1. Remote controller

- Supply power to the crankcase heater 12 hours before the start of operation in winter.
- For test running, when the remote controller FAN CONTROL button and MASTER CONTROL button are pressed simultaneously for more than three seconds when the air conditioner is not running, the air conditioner starts and TEST is displayed on the remote controller display.
  However, the SET TEMP. setting button does not function, but all other buttons, displays, and protection functions operate. (Fig. 45)

Fig. 45



- When EE:EE blinks at the current time display, there is an error inside the air conditioner. If the ZONE CONTROL button and ENERGY SAVE button are pressed simultaneously for more than three seconds, the self diagnosis check will start and the error contents will be displayed at the current time display. (Fig. 46)
  When the operation lamp lights, press the START/STOP button and after operation lamp goes off, perform the same operation. (Fig. 46)
  Process the error contents by referring to (Table 8).

Fig. 46

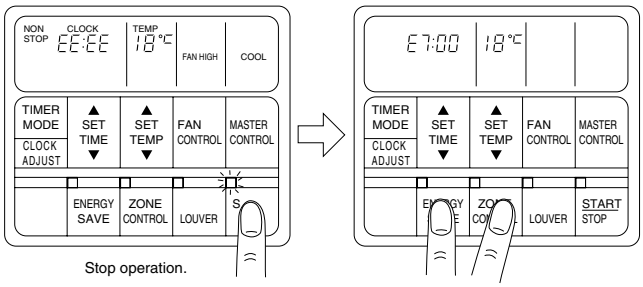


Table 8

Error cord	Error
E0:00	Communication error (indoor unit ↔ remote controller)
E1:00	Communication error (indoor unit ↔ outdoor unit)
E2:00	Room temperature sensor open
E3:00	Room temperature sensor shorted
E4:00	Indoor heat exchanger temperature sensor open
E5:00	Indoor heat exchanger temperature sensor shorted
E6:00	Outdoor heat exchanger temperature sensor open
E7:00	Outdoor heat exchanger temperature sensor shorted
E9:00	Float switch operated
EA:00	Outdoor temperature sensor open
EB:00	Outdoor temperature sensor shorted
EC:00	Discharge pipe temperature sensor open
ED:00	Discharge pipe temperature sensor shorted
EE:00	High pressure abnormal
EF:00	Discharge pipe temperature abnormal

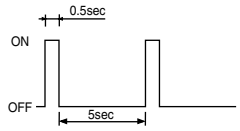
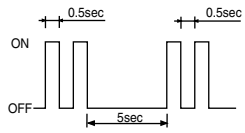
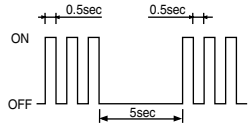
2. Outdoor unit

When the outdoor temperature drops, the outdoor unit's fans may switch to low speed, or one of the fans may stop intermittently.

ERROR

The LED lamps operate as follows (Table 9) according to the error contents.

Table 9

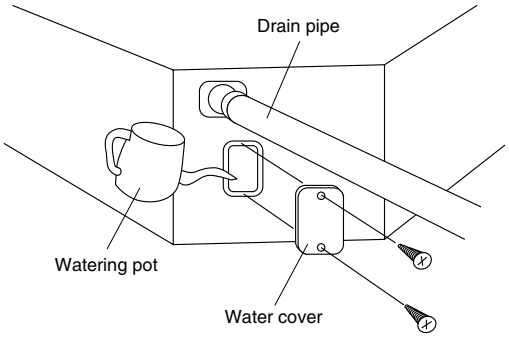
	Error display	Error contents
LED No. 1 Lamp		Discharge pipe temperature abnormal
		Outdoor heat exchanger temperature sensor abnormal
		Outdoor temperature sensor abnormal
		Discharge pipe temperature sensor abnormal
LED No. 2 Lamp		High pressure abnormal

When the fault is cleared, the LED lamp goes off.
However, for discharge pipe temperature abnormal and high pressure abnormal, the LED lamp lights continuously for 24 hours, as long as the power is not turned off.

3. Checking drainage

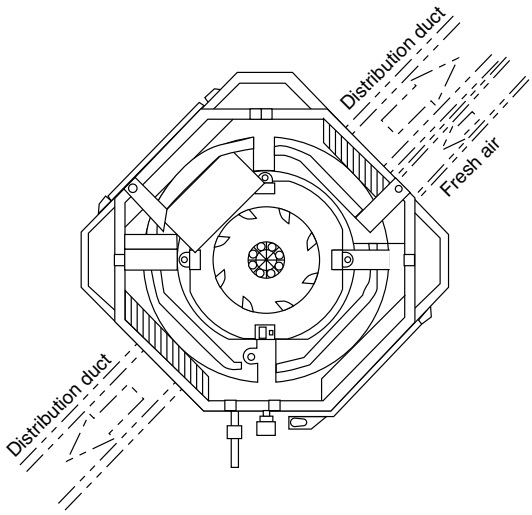
To check the drain, remove the water cover and fill with 2 to 3ℓ of water as shown in Fig. 47.
The drain pump operates when operating in the cooling mode.

Fig. 47



11 OPENING THE DUCT CONNECTION HOLE

Fig. 48



⚠ CAUTION

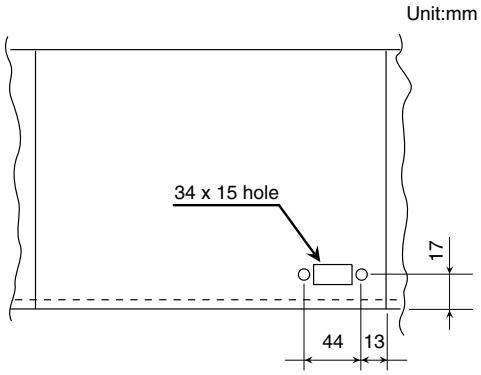
① When performing hole opening work, be careful not to damage the drain pan.

② When connecting the distribution duct, to make the air flow easily, block the outlet port with the blower cover insulation as shown by the hatched lines in Fig. 48. For the blocking direction, refer to Fig. 31.

1. Dimensions

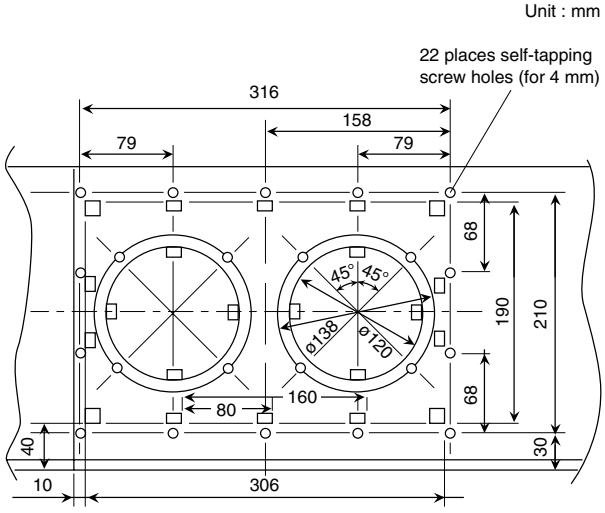
(1) Fresh air duct connection hole and screw positions.

Fig. 49



(2) Distribution duct connection hole and screw positions.

Fig. 50

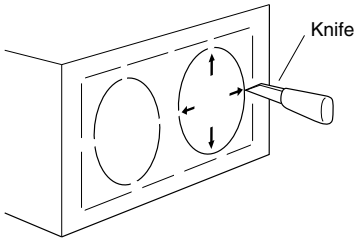


2. Distribution duct hole processing

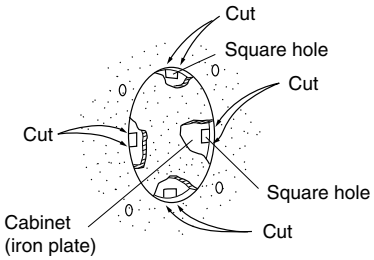
Use the distrubution duct hole by removing the insulation material as shown below.

Fig. 51

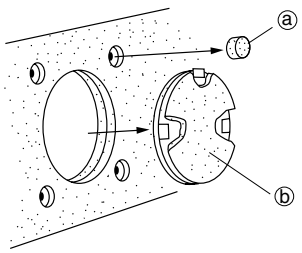
- Open the hole by cutting the insulation at the hole opening position with a knife at the points indicated by the arrows.



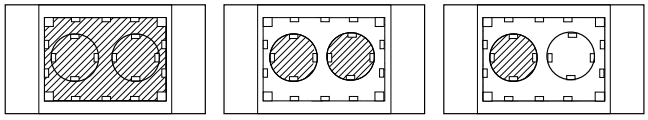
- Remove the insulation at the square holes.
- Cut off the part (Cabinet) indicated by the arrow in the figure at the left with nippers, needle nose pliers, etc.
  - ∗ Be careful not to damage the internal parts. Remove as shown by ⓑ at the bottom left.
  - ∗ The fabrication and use of an iron plate removal tools for use instead of the tools previously mentioned are introduced in Fig. 53.



- Open the holes and pull out insulation ⓐ as shown in the figure.
- Connect the distribution duct.
  - ∗ When mounting the duct, block the gap so that there is no cold air leakage.
  - ∗ Insulate the duct and cut connection.



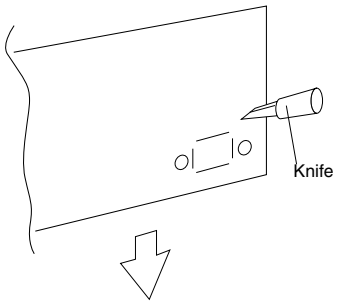
Duct connection pattern



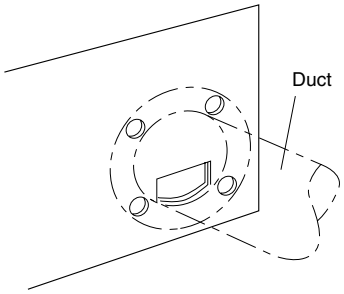
3. Fresh air duct connection hole processing

Fig. 52

• Cut the insulation to a ▭ shape with a knife.



• Connect the duct as shown in the figure.

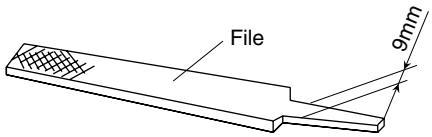


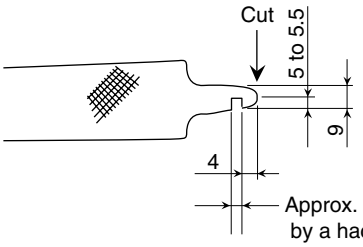
⚠ CAUTION

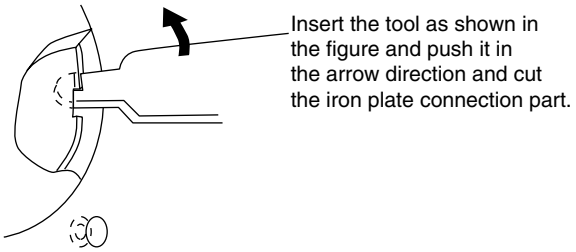
The air conditioner cannot take in fresh air by itself. When connecting a fresh air duct, always use a duct fan.

Fig. 53

Unit: mm







8.1.4 AU30R, 36R, 45R (50Hz)

SPLIT TYPE AIR CONDITIONER
Cassette Type [Reverse Cycle Model]
INSTALLATION MANUAL

(PART NO. 9356967029)

For authorized service personnel only.

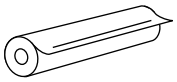
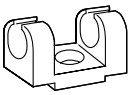
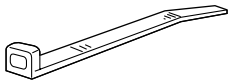
⚠ WARNING
① For the room air conditioner to operate satisfactorily, install it as outlined in this installation manual.
② Installation work must be performed in accordance with national wiring standards by authorized personnel only.
③ Do not turn on the power until all installation work is complete.

- Be careful not to scratch the air conditioner when handling it.
- After installation, explain correct operation to the customer, using the operating manual.
- Let the customer keep this installation manual because it is used when the air conditioner is serviced or moved.
- The maximum length of the piping is shown in Table 1. If the units are further apart than this, correct operation cannot be guaranteed.

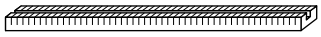
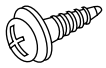
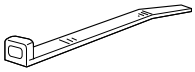
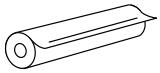
STANDARD PARTS

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

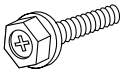
INDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Application
Coupler heat insulation 	2	For indoor side pipe joint
Remote controller cord clamp 	10	For installing the remote controller cord
Screw 	10	For installing the remote controller cord clamp
	2	For installing the remote controller
Special nut A (large flange) 	4	For installing indoor unit
Special nut B (small flange) 	4	For installing indoor unit
Remote controller 	1	Installation to indoor unit
Template 	1	For ceiling hole cutting
Binder 	2 (large)	For remote controller cord binding
	1 (small)	For remote controller and remote controller cord binding

OUTDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Application
Power cap 	1	For power cable installation
Auxiliary pipe assembly 	1	For wiring conduit (gas side) connection (May not be supplied, depending on the model)
Edge cover 	1	For wiring conduit installation hole edge protection
Tapping screw 	2	• For cabinet A and cabinet D mounting (1) • Spare (1)
Binder 	1	For power cable binding
Putty 	1	For sealing
Coupler heat insulation 	1	For outdoor side pipe joint
Pipe (drain) 	2	For outdoor unit drain piping work (May not be supplied, depending on the model.)
Flexible tube 	2	
Cap (drain) 	2	

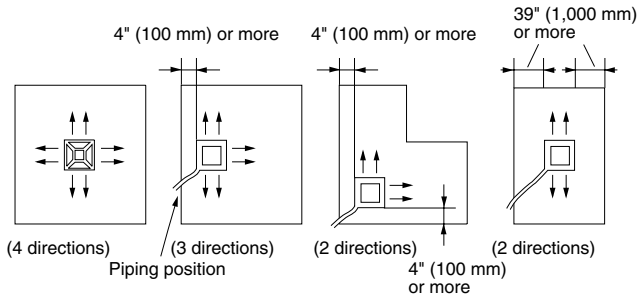
GRILLE ACCESSORIES

Name and Shape	Q'ty	Application
Bolt 	4	For mounting grille
Washer 	4	For mounting grille
Spring washer 	4	For mounting grille
Blower cover insulation 	2	For discharged air

SELECTING THE MOUNTING POSITION

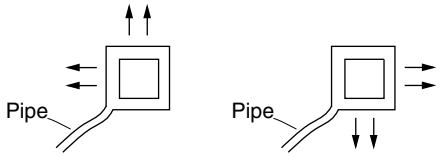
Especially, the installation place is very important for the split type air conditioner because it is very difficult to move from place to place after the first installation.
Decide the mounting position together with the customer as follows:
The discharge direction can be selected as shown below.

Fig. 1



⚠ CAUTION

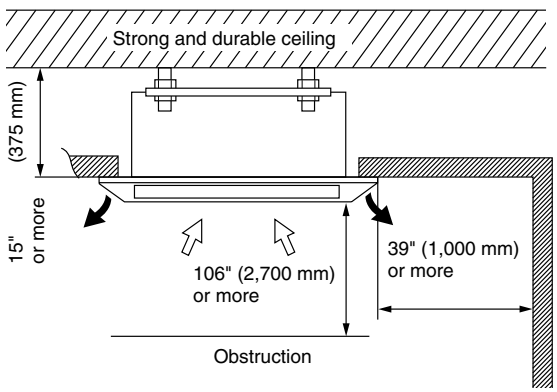
Since 2-way outlet as shown below causes performance problems, do not set it.



Indoor unit

(1) Install the indoor unit on a place having a sufficient strength so that it withstands against the weight of the indoor unit.
(2) The inlet and outlet ports should not be obstructed; the air should be able to blow all over the room.
(3) Leave the space required to service the air conditioner. (Fig.2)
(4) The ceiling rear height is 15 inches (375 mm) or more.
(5) A place from where the air can be distributed evenly throughout the room by the unit.
(6) A place from where drainage can be extracted outdoors easily.

Fig. 2



Outdoor unit

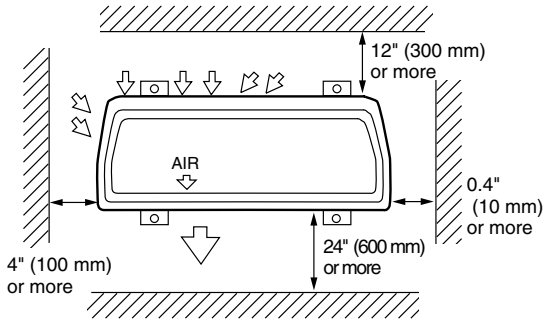
⚠ WARNING

① Install the unit where it will not be tilted by more than 5˚

② When installing the outdoor unit where it may be exposed to strong wind, fasten it securely.

(1) Leave the spaces indicated for good air flow. (Fig. 3)

Fig. 3



(2) 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.)
(3) Do not install the unit near a source of heat, steam, or flammable gas.
(4) During heating operation, drain water flows from the outdoor unit. Therefore, install the outdoor unit in a place where the drain water flow will not be obstructed.
(5) Do not install the unit where a strong wind blows or where it is very dusty.
(6) Do not install the unit where people pass.
(7) Install the outdoor unit in a place where it will be free from being dirty or getting wet by rain as much as possible.
(8) Install the unit when connection to the indoor unit is easy.

CONNECTION PIPE REQUIREMENT

Table 1

	Diameter		Maximum height	Maximum height (between indoor and outdoor)
	Small	Large		
30,000 BTU/h class	9.53 mm	15.88 mm	30 m	15 m
36,000 BTU/h(3 ø) class	9.53 mm	19.05 mm	50 m	30 m
45,000 BTU/h(3 ø) class	9.53 mm	19.05 mm	50 m	30 m

Use 0.7 mm to 1.2 mm thick pipe.
Use pipe with water-resistant heat insulation.

ELECTRICAL REQUIREMENT

• Electric wire size and fuse capacity

Table 2

		30,000 BTU/h class	36,000 BTU/h class	45,000 BTU/h class
Power cable (mm²)	MAX	3.0	2.0	2.0
	MIN	2.5	1.5	1.5
Connection cord (mm ²)	MAX	1.5	1.5	1.5
	MIN	1.0	1.0	1.0
Fuse capacity (A)		30	20	20

• Always use H07RN-F or equivalent as the connection cord.
• Install the disconnect device with a contact gap of at least 3 mm nearby the units. (Both indoor unit and outdoor unit)

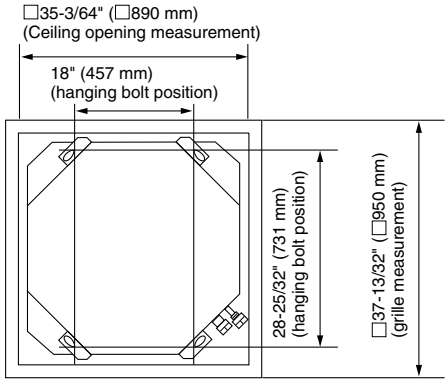
INSTALLATION PROCEDURE

Install the air conditioner as follows:

1 INDOOR UNIT INSTALLATION

1. Position the ceiling hole and hanging bolts as shown in Fig. 4.

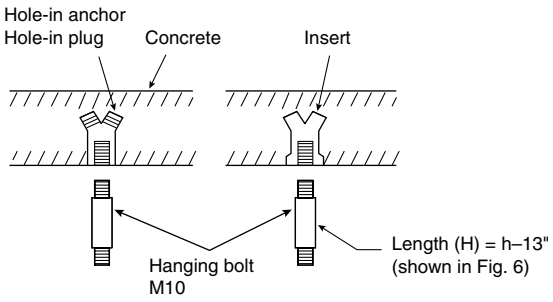
Fig. 4



2. Hanging preparations

Firmly fasten the hanging bolts as shown in Fig. 5 or by another method.

Fig. 5



3. Body installation

(1) Install special nut A (large flange) to the hanging bolts at a position 14-13/32" to 14-19/32" (366 to 371 mm) from the bottom of the ceiling. (Fig. 7)

(2) Next, install special nut B (small flange) to the hanging bolts. Provide a space of 25/64" to 19/32" (10 to 15 mm) between special nut B and special nut A (large flange).

(3) Align the end of the hanging bolts with the larger of the four long body mounting plate holes and lift the body until it touches special nut A.
Then slide the body in the rotation direction so that it is supported by special nut B. (Fig. 8)

(4) Adjust special nut B so that the bottom of the ceiling and the four grille supporters are on the same plane. (Fig. 6)

(5) Leveling
Using a level, or vinyl hose filled with water, fine adjust so that the body is level.

⚠ WARNING

Perform final tightening by tightening the double nut firmly.

Fig. 6

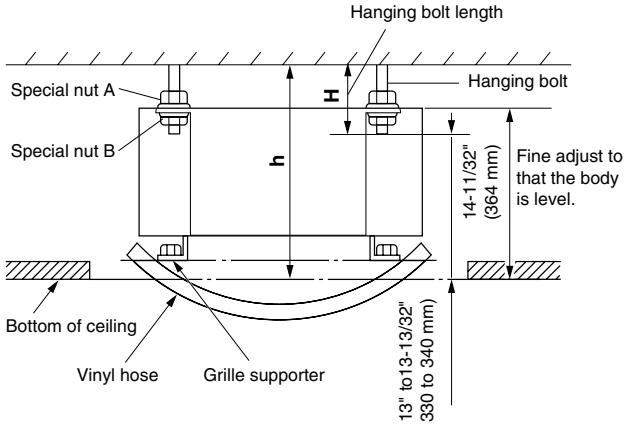


Fig. 7

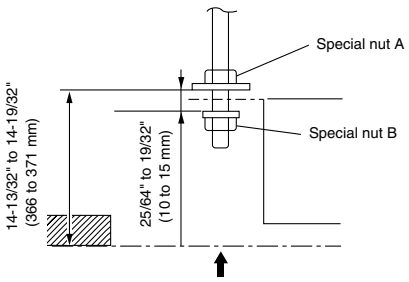
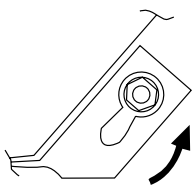


Fig. 8

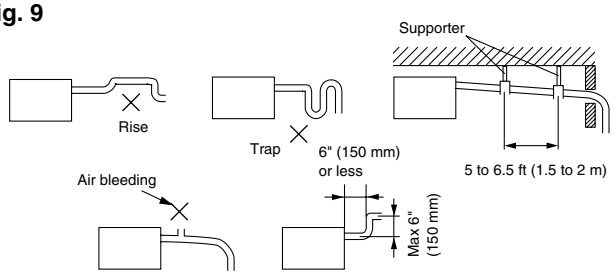


2 INSTALLING DRAIN PIPE

Note: Install the drain pipe.

- Install the drain pipe with downward gradient (1/50 to 1/100) and so there are no rises or traps in the pipe.
- Use general hard polyvinyl chloride pipe (VP25) [outside diameter 1-1/4" (32 mm)] and connect it with adhesive (polyvinyl chloride) so that there is no leakage.
- When the pipe is long, install supporters.
- Do not perform air bleeding.
- Always heat insulate the indoor side of the drain pipe.
- When desiring a high drain pipe height raise it up to 6" (150 mm) within a range of 6" (150 mm) from the body. A rise dimension over this range will cause leakage.

Fig. 9



3 OUTDOOR UNIT INSTALLATION

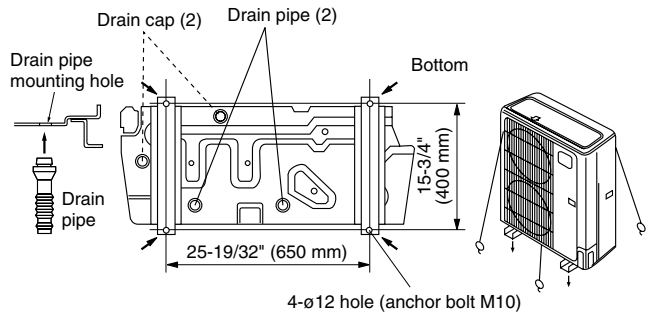
1. Outdoor unit processing

(1) When the outdoor unit will be exposed to strong wind, fasten it with bolts or wire at the four places indicated by the arrows. (Fig. 10)

(2) Since the drain water flows out of the outdoor unit during heating operation, install the drain pipe and connect it to an commercial 16 mm hose. (When heating when the outdoor temperature is 0°C or less, construct so that the drain water drained from the outdoor unit will not freeze in the drain.

(3) When installing the drain pipe, plug all the holes other than the drain pipe mounting hole in the bottom of the outdoor unit with putty so there is no water leakage. (Fig. 10)

Fig. 10

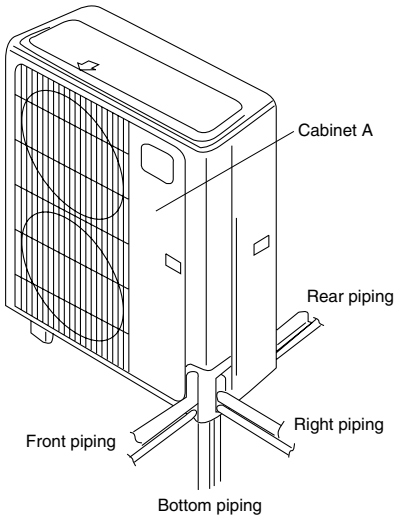


(4) Always use a drain pipe at two places.

2 Outdoor unit connection cord and pipe connection preparations

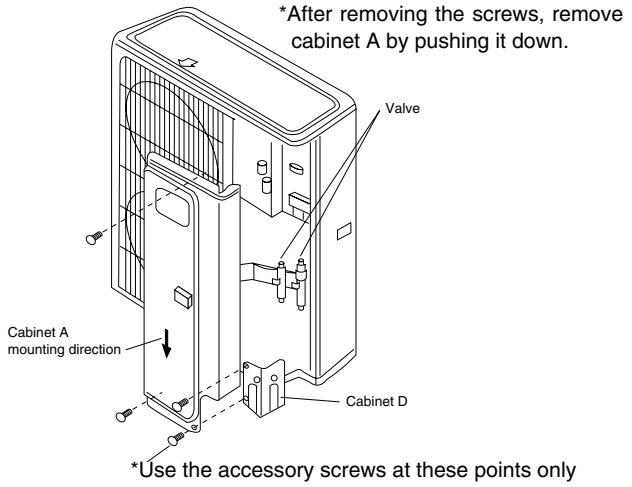
(1) Piping and connection cord mounting direction (4-way mounting possible).

Fig. 11



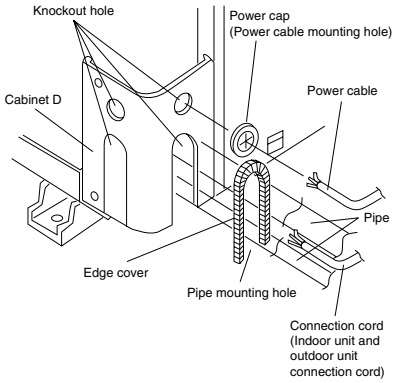
(2) Remove outdoor unit cabinet A and cabinet D.

Fig. 12



(3) Open the piping and connection cord knockout holes of the desired direction with nippers, etc.
After opening the knockout holes, install the accessory edge cover and power cap to protect the opened places.

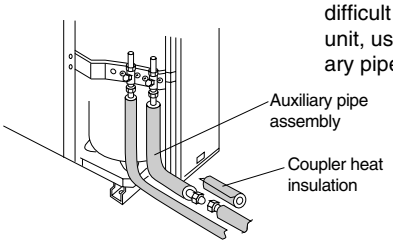
Fig. 13



(4) Connect the piping and power cable from the mounting holes.

Fig. 14

(Example)



* When pipe bending work is difficult inside the outdoor unit, use the accessory auxiliary pipe assembly.

4 CONNECTING THE PIPING

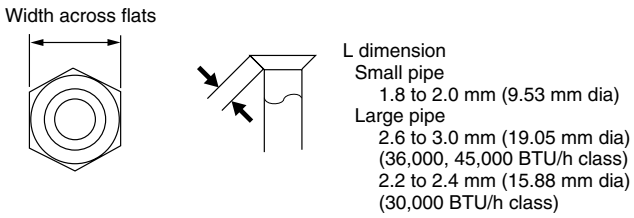
1. Flare processing

(1) Cut the connection pipe with pipe cutters so that the pipe is not deformed.
(2) Holding the pipe downward so that cuttings cannot enter the pipe, remove the burrs.
(3) Remove the flare nut from the indoor unit pipe and outdoor unit and assemble as shown in (Table 3) and insert the flare nut onto the pipe, and flare with a flaring tool.
(4) Check if the flared part "L" (Fig. 15) is spread uniformly and that there are no cracks.

Table 3

Pipe	Flare nut
Small pipe	Small (width across flats 22 mm)
Large pipe	Large (width across flats 36 mm) 36,000 / 45,000 BTU/h class
	Large (width across flats 24mm) 30,000 BTU/h class

Fig. 15



2. Bending pipes

The pipes are snapped by your hands. Be careful not to collapse them.

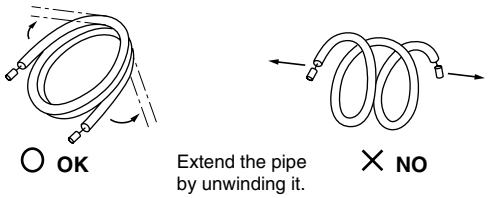
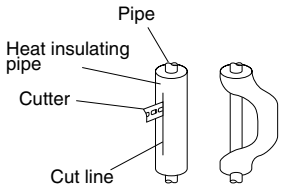


Fig. 16

Do not bend the pipes in an angle less than 90°.
When the pipes are bent and stretched repeatedly, the material will be hardened, causing the pipes no longer be sent or stretched. Be sure to limit number of bending and stretching to three times.

When bending the pipe, do not bend it as is. The pipe will be collapsed. In this case, cut the heat insulating pipe with a sharp cutter as shown in Fig. 17 and bend it after exposing the pipe. After bending the pipe as you want, be sure to put the heat insulating pipe back on the pipe, and secure it with tape.

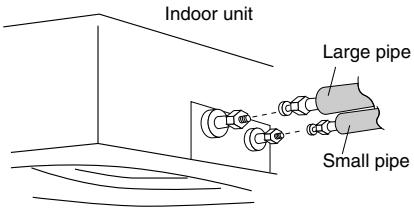
Fig. 17



3. Connection pipes

(1) Indoor unit side

Fig. 18

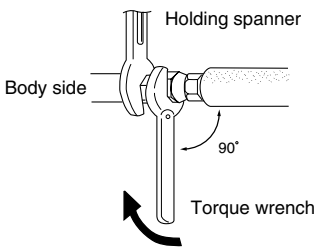


⚠ CAUTION

Be sure to apply the pipe against the port on the indoor unit correctly. If the centering is improper, the flare nut cannot be tightened smoothly. If the flare nut is forced to turn, the threads will be damaged.

When the flare nut is tightened properly by your hand, hold the body side coupling with a separate spanner, then tighten with a torque wrench. (Fig. 19)

Fig. 19



⚠ CAUTION

Hold the torque wrench at its grip, keeping it in the right angle with the pipe as shown in Fig. 19, in order to tighten the flare nut correctly.

Table 4: Flare nut Tightening Torque

Pipe	Tightening torque
Small pipe	310 to 350 kgf · cm (30.4 to 34.3 N · m)
Large pipe	800 to 1,000 kgf · cm (78.4 to 98 N · m) 19.05 mm dia. 750 to 800 kg · cm (73.5 to 78.4 N · m) 15.88 mm dia.

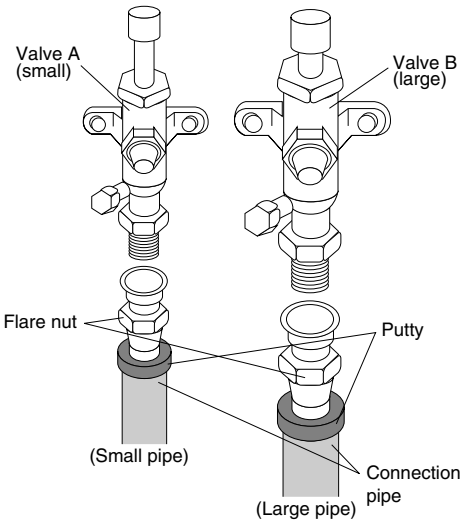
⚠ CAUTION

Be sure to connect the large pipe after connecting the small pipe completely.

(2) Outdoor unit side

1) Tighten the flare nut of the connection pipe at the outdoor unit valve connector. The tightening method is the same as that as at the indoor side.
2) Seal with the accessory putty so that water does not enter at the top of the pipe insulation installed to the connection pipe (large pipe and small pipe).

Fig. 20



5 AIR PURGE

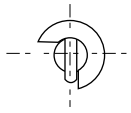
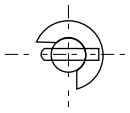
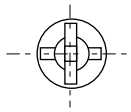
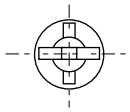
1. Air purge

(1) Purge the air inside the indoor unit and the piping to a pressure of 1.5 mmHg abs or less from the charging valve with a vacuum pump.
(2) After purging the air inside the indoor unit and the piping, remove the cap of the two valves.
(3) Open the spindle (handle) of the two valves from the closed state (Table 6).
(4) Tighten the cap of the two valves to the specified torque.

Table 5

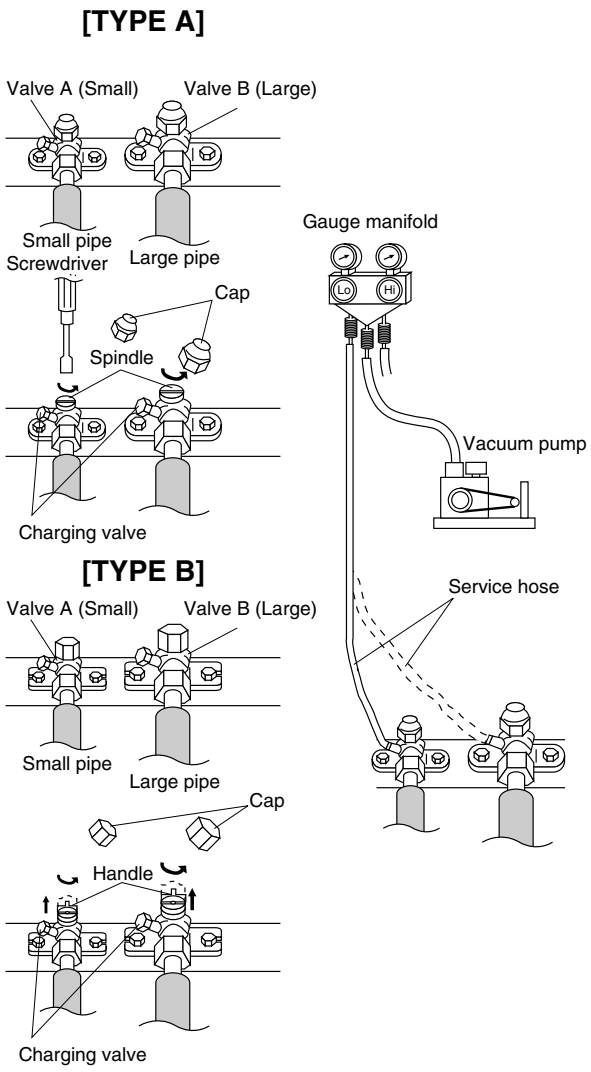
	Tightening torque	
	Large valve	Small valve
Spindle (TYPE A)	25 kgf · cm (2.45 N · m) or less	
Handle (TYPE B)	15 kgf · cm (1.47 N · m) or less	
Cap	150 to 200 kgf · cm (14.7 to 19.6 N · m)	

Table 6

Valve	Open valve state	Closed valve state
TYPE A		
TYPE B		

✻ If the spindle (handle) is not fully open, performance will drop and an abnormal sound will be generated.

Fig. 21



2. Additional charge

Refigerant suitable for a piping length of 5m (30,000 BTU class) and 20m (36,000 , 45,000 BTU class) is charged in the outdoor unit at the factory.

when the piping is longer than 5m (30,000 BTU class) and 20m (36,000 , 45,000 BTU class) , additional charging is necessary.

For the additional amount , see the table below.

Table 7

Pipe length / Additional refrigerant	33 ft (10 m)	66 ft (20 m)	82 ft (25 m)	99 ft (30 m)	132 ft (40 m)	164 ft (50 m)	oz/ft (g/m)
30,000 BTU/h class	8.8 oz (250 g)	26.5 oz (750 g)	35.3 oz (1,000 g)	—			1.8 oz/3.3 ft (50 g/m)
36,000 BTU/h class	None		7.05 oz (200 g)	14.1 oz (400 g)	28.2 oz (800 g)	42.3 oz (1,200 g)	1.41 oz/3.3 ft (40 g/m)
45,000 BTU/h class	None		7.05 oz (200 g)	14.1 oz (400 g)	28.2 oz (800 g)	42.3 oz (1,200 g)	1.41 oz/3.3 ft (40 g/m)

⚠ CAUTION

① When charging the refrigerant, always use a measuring cylinder.

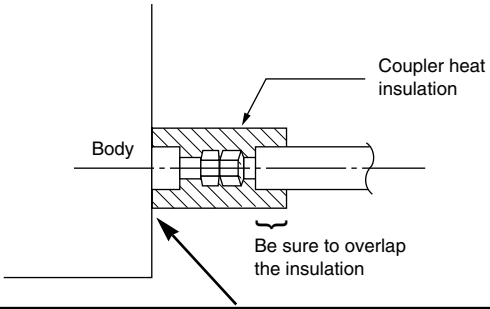
② Add refrigerant from the charging valve after the completion of the work.

6 INSTALLING THE COUPLER HEAT INSULATION

After checking for gas leaks, insulate by wrapping insulation around the two parts (large and small) of the indoor unit coupling, using the coupler heat insulation.

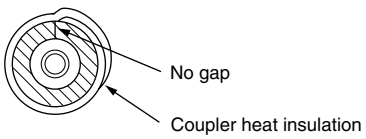
After installing the coupler heat insulation, wrap both ends with vinyl tape so that there is no gap.

Fig. 22



⚠ CAUTION

Must fit tightly against body without any gap.



7 ELECTRICAL WIRING

HOW TO CONNECT WIRING TO THE TERMINALS

A. 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) to expose the solid wire.

(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 screw-driver.

B. For strand wiring

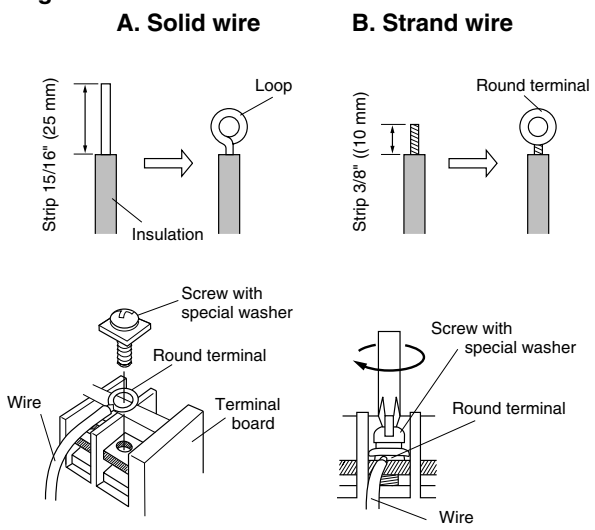
(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 3/8" (10 mm) to expose the strand wiring.

(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.

(4) Position the round terminal wire, and replace and tighten the terminal screw using a screwdriver.

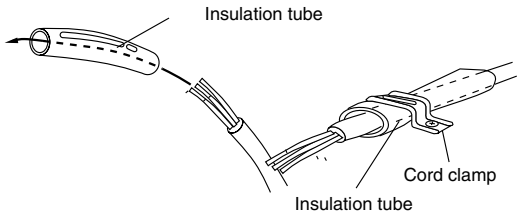
Fig. 23



HOW TO FIX CONNECTION CORD AND POWER CABLE AT THE CORD CLAMP

After passing the connection cord and power cable through the insulation tube, fasten it with the cord clamp.

Fig. 24

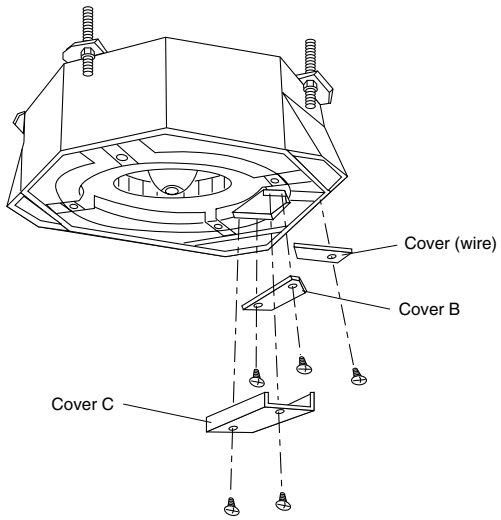


Use VW-1, 0.5 to 1.0 mm thick, PVC tube as the insulation tube.

1. Indoor unit side

(1) Remove the cover B, C and cover (wire) and install the connection cord. (Figs. 25 and 26)

Fig. 25



(2) After wiring is complete, clamp the remote controller cord and connection cord with the cord clamp and binder (large). (Fig. 26)

(3) Install the cover B and cover (wire).

Fig. 26

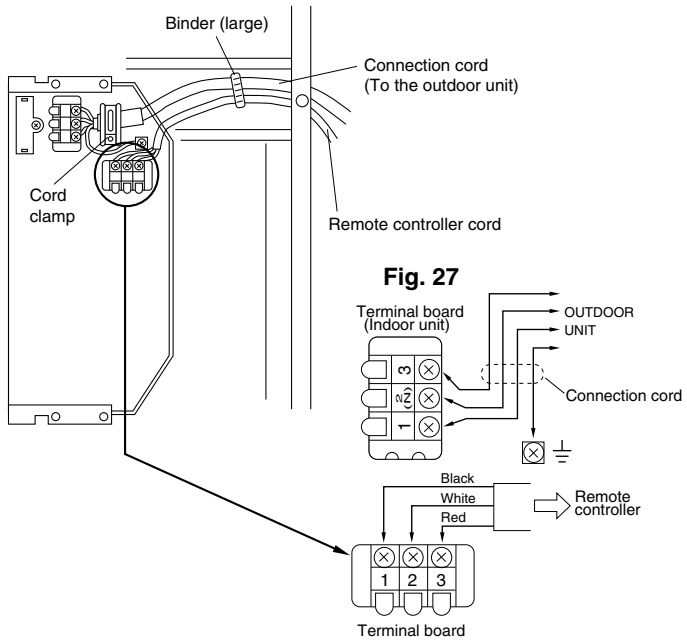


Fig. 27

⚠ CAUTION

① **Tighten the indoor unit connection cord (to the outdoor unit) and power supply indoor and outdoor unit terminal board connections firmly with the terminal board screws. Faulty connection may cause a fire.**

② **If the indoor unit connection cord (to the outdoor unit) and power supply are wired incorrectly, the air conditioner may be damaged.**

③ **Wire the indoor unit connection cord (to the outdoor unit) by matching the numbers of the outdoor and indoor units terminal board numbers as shown in (Fig. 27).**

④ **Ground both the indoor and outdoor units by attaching a ground wire.**

⑤ **Unit shall be grounded in compliance with the applicable local and national codes.**

2. Outdoor unit side

(1) Remove outdoor unit cabinet A and connect the power cable and the outdoor unit connection cord wired at the indoor unit.

(2) Fasten the power cable and connection cord with cable clip and binders as shown in (Fig.30).

Fig. 28 36,000 BTU/h class

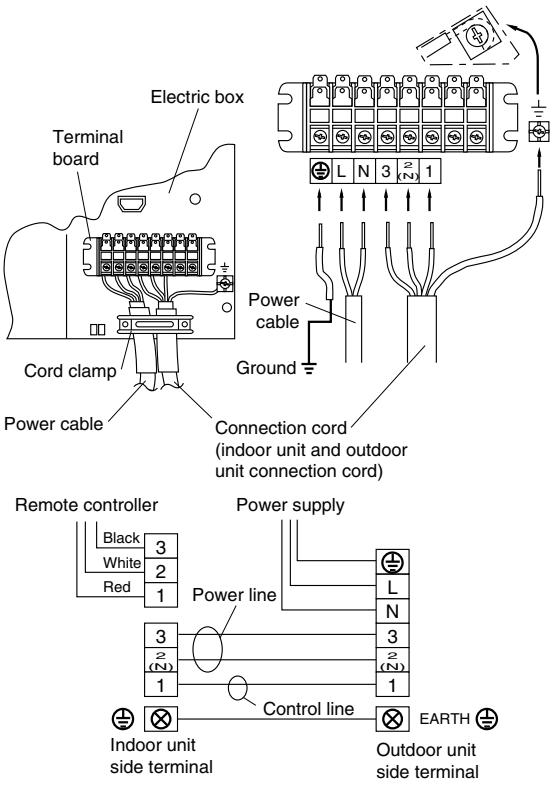
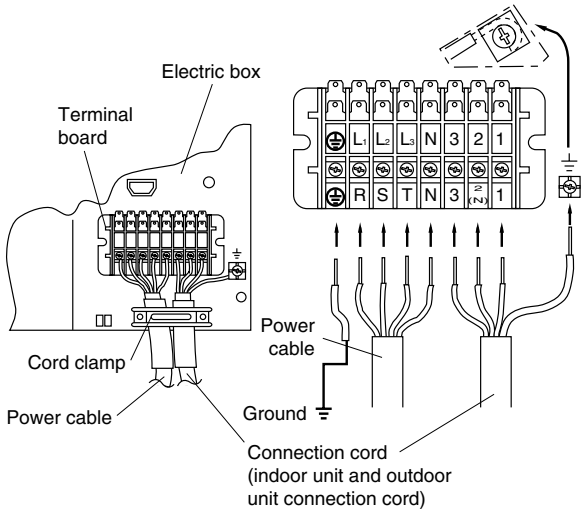


Fig. 29 36,000 45,000 BTU/h class



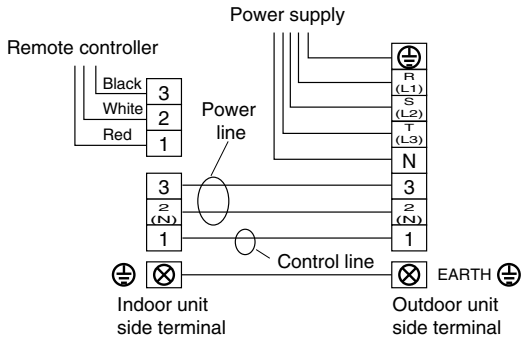
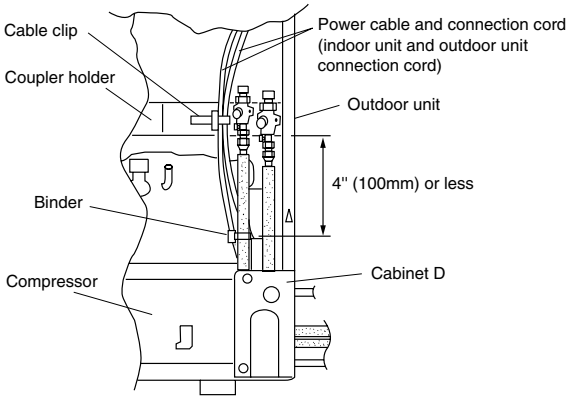


Fig. 30



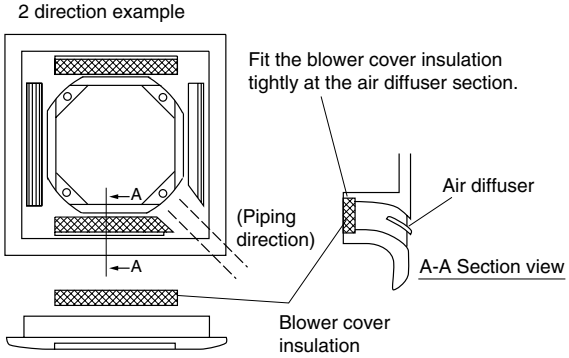
8 GRILLE INSTALLATION

1. Blower cover insulation

Install the blower cover insulation only when the outlet direction is not specified.

Two blower cover insulations are packed with the grille assembly. Install the blower cover insulation at the diffuser position shown in Fig.31. At this time, use the piping position as the criteria.

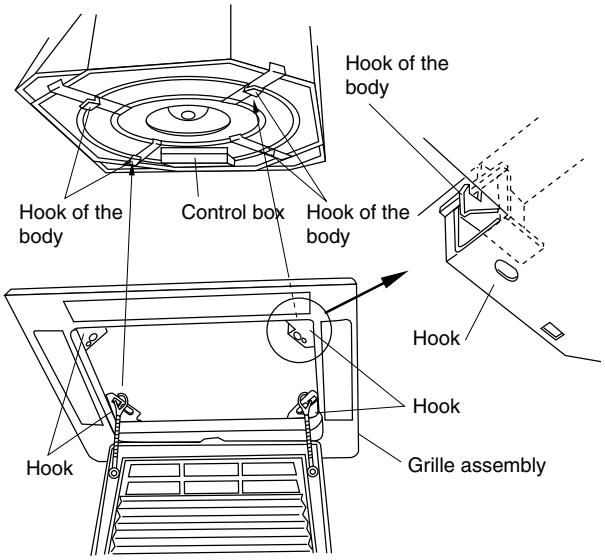
Fig. 31



2. Installing grille assembly to body

Hook the grille assembly to the hook of the body and temporarily fasten it.

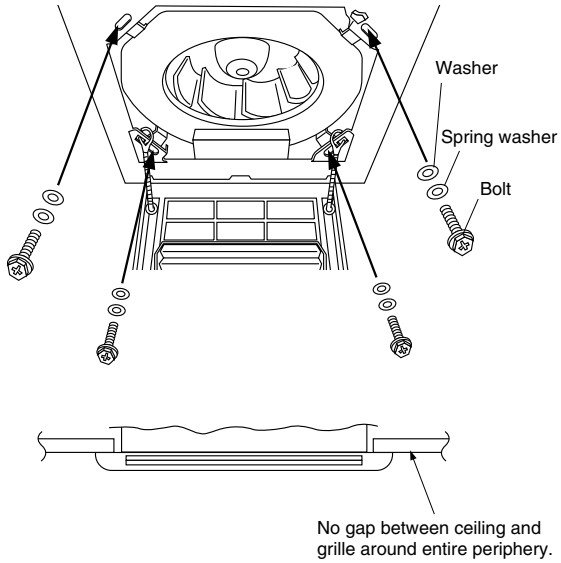
Fig. 32



Bolting the grille assembly to the body

Install the grille assembly to the body with the four bolts, spring washers, and washers.

Fig. 33



Grille unit connection wire wiring

Connect the connector in accordance with part A detail view. Then clamp the lead wire with clamp so that it does not touch the rotating parts.

.

Fig. 34

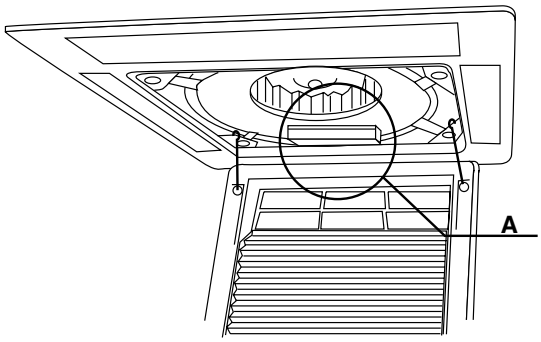
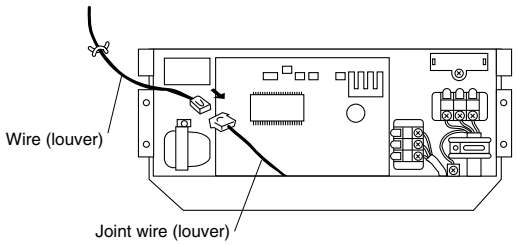


Fig. 35 Part A detail view



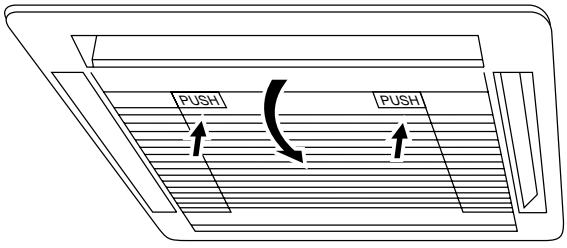
Install the cover C. (Fig. 25)
Install the intake grille.

REMOVING/INSTALLING THE INTAKE GRILLE

1. Removing the intake grille

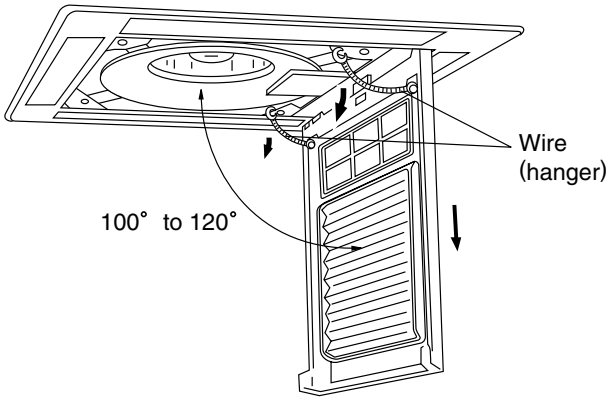
(1) Push the intake grille pushbuttons (two places) until you hear a “click”.
(2) Open the intake grille.

Fig. 36



(3) Remove the wire (hanger). (Fig. 37)
(4) Remove the intake grille by opening it 100° to 120°

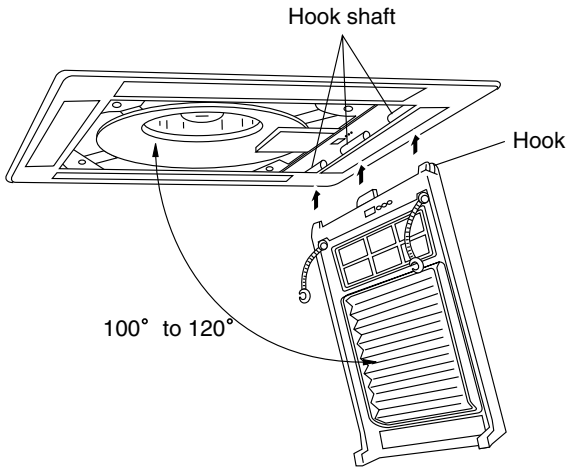
Fig. 37



2. Installing the intake grille

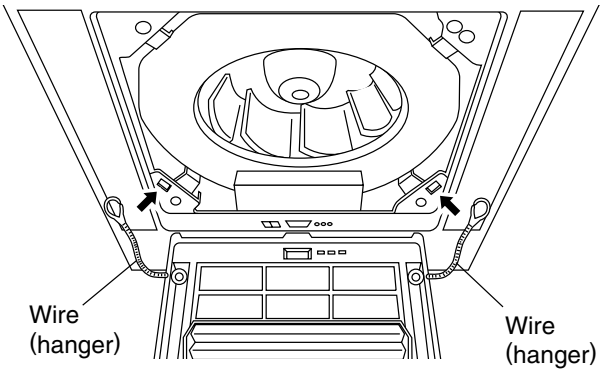
(1) Tilt the intake grille 100° to 120° and hook the three hooks to the intake grille hook shaft.

Fig. 38



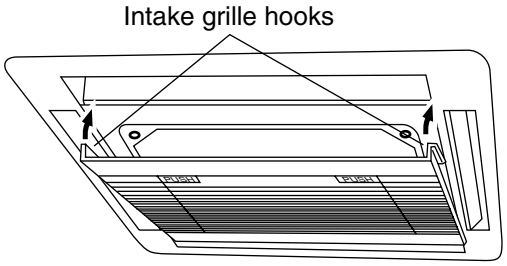
(2) Install the wire (hanger).
.

Fig. 39



(3) Hook the intake grille hooks to the grille assembly.

Fig. 40



(4) Push the intake grille pushbuttons (two places) until you hear a “click”.

⚠ CAUTION

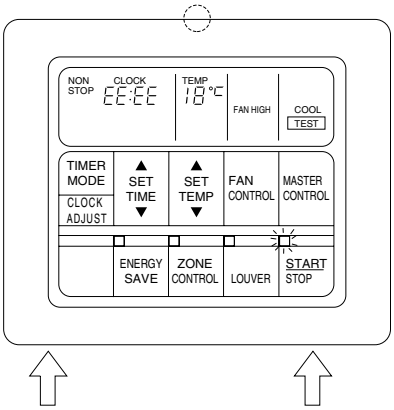
① The louver angle cannot be changed if the power is not on, (If moved by hand, it may be damaged.)

② The grille assembly is directional relative to the air conditioner body.

9 REMOTE CONTROLLER INSTALLATION

- Insert the end of a flat blade screwdriver at the arrow parts of the groove at the side of the remote controller case and remove the remote controller case top by turning the screwdriver.
- Disconnect the remote controller cord from the remote controller terminal board

Fig. 41



(1) When remote controller exposed

1) Make a notch in the thin part (◌ part of Fig. 41) at the remote controller case top and bottom with nippers, file, etc.
2) Connect the remote controller cord to the remote controller terminal board specified in (Fig. 42).
3) Clamp the remote controller cord sheath with the binder (small) as shown in Fig. 42.
4) Cut off the excess binder.
5) Clamp the remote controller cord to a wall, etc. with the remote controller cord clamp furnished. (Fig. 43)

Fig. 42

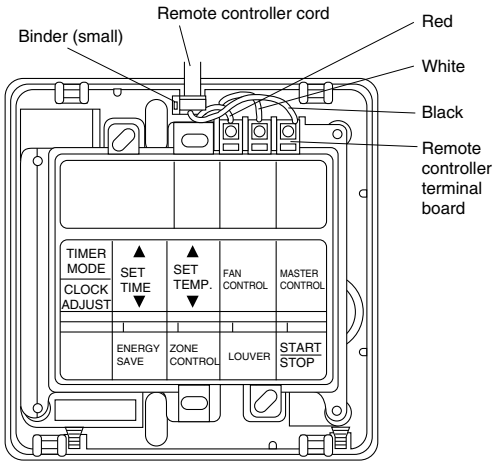
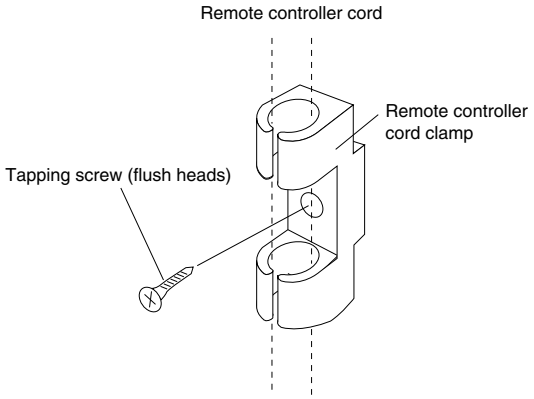


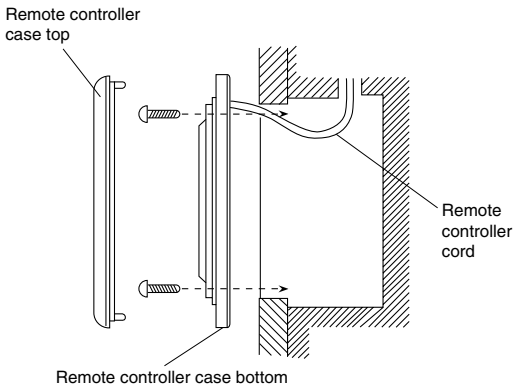
Fig. 43



(2) When remote controller cord embedded

1) Embed the remote controller cord and box.
2) Pass the remote controller cord through the hole at the remote controller case bottom and install the cord to the box. (Fig. 44)
3) Connect the remote controller cord to the remote controller terminal board specified in (Fig. 42).

Fig. 44 (Example)



- After wiring work is complete, return the remote controller case top to its original state.

⚠ CAUTION

① **Do not bundle the remote controller cord, or wire the remote controller cord in parallel, with the indoor unit connection wire (to the outdoor unit) and the power supply cord. It may cause erroneous operation.**

② **When installing the remote controller and cord near a source of electromagnetic waves, separate the remote controller from the source of the electromagnetic waves and use shielded cord.**

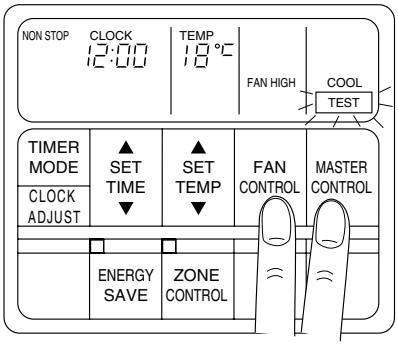
③ **Do not touch the remote controller PC board and PC board parts directly with your hands.**

10 TEST RUNNING

1. Remote controller

- Supply power to the crankcase heater 12 hours before the start of operation in the winter.
- For test running, when the remote controller FAN CONTROL button and MASTER CONTROL button are pressed simultaneously for more than three seconds when the air conditioner is not running, the air conditioner starts and TEST is displayed on the remote controller display. However, the SET TEMP. setting button does not function, but all other buttons, displays, and protection functions operate. (Fig. 45)

Fig. 45



- When EE:EE blinks at the current time display, there is an error inside the air conditioner. If the ZONE CONTROL button and ENERGY SAVE button are pressed simultaneously for more than three seconds, the self diagnosis check will start and the error contents will be displayed at the current time display. (Fig. 46) When the operation lamp lights, press the START/STOP button and after operation lamp goes off, perform the same operation. (Fig. 46) Process the error contents by referring to (Table 8).

Fig. 46

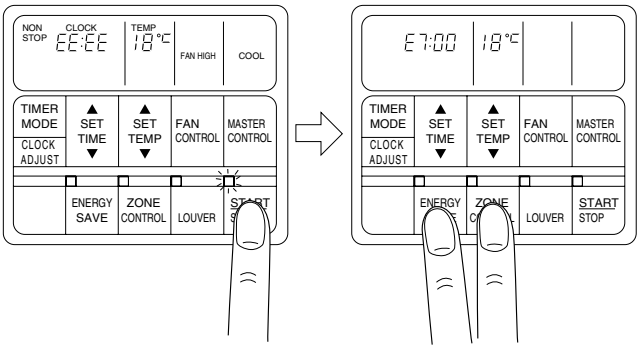


Table 8

Error cord	Error
E0:00	Communication error (indoor unit remote controller)
E1:00	Communication error (indoor unit outdoor unit)
E2:00	Room temperature sensor open
E3:00	Room temperature sensor shorted
E4:00	Indoor heat exchanger temperature sensor open
E5:00	Indoor heat exchanger temperature sensor shorted
E6:00	Outdoor heat exchanger temperature sensor open
E7:00	Outdoor heat exchanger temperature sensor shorted
E9:00	Float switch operated
EA:00	Outdoor temperature sensor open
EB:00	Outdoor temperature sensor shorted
EC:00	Discharge pipe temperature sensor open
ED:00	Discharge pipe temperature sensor shorted
EE:00	High pressure abnormal
EF:00	Discharge pipe temperature abnormal

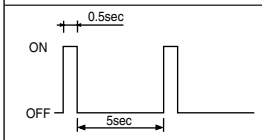
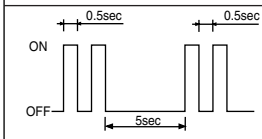
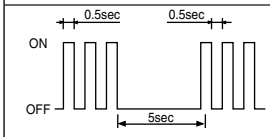
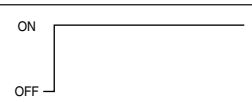
2. Outdoor unit

When the outdoor temperature drops, the outdoor unit's fans may switch to low speed, or one of the fans may stop intermittently.

ERROR

The LED lamps operate as follows (Table 9) according to the error contents.

Table 9

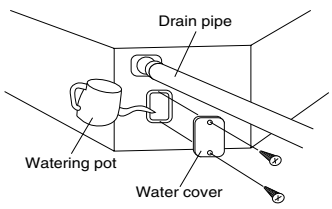
	Error display	Error contents
LED No.1 Lamp		Discharge pipe temperature abnormal
		Outdoor heat exchanger temperature sensor abnormal
		Outdoor temperature sensor abnormal
		Discharge pipe temperature sensor abnormal
LED No. 2 Lamp		High pressure abnormal

When the fault is cleared, the LED lamp goes off.
However, for discharge pipe temperature abnormal and high pressure abnormal, the LED lamp lights continuously for 24 hours, as long as the power is not turned off.

3. Checking drainage

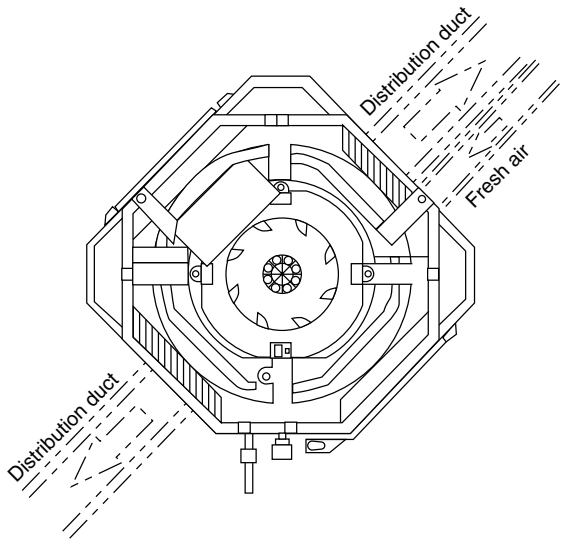
To check the drain, remove the water cover and fill with 2 to 3ℓ of water as shown in Fig. 47.
The drain pump operates when operating in the cooling mode.

Fig. 47



11 OPENING THE DUCT CONNECTION HOLE

Fig. 48



⚠ CAUTION

① When performing hole opening work, be careful not to damage the drain pan.

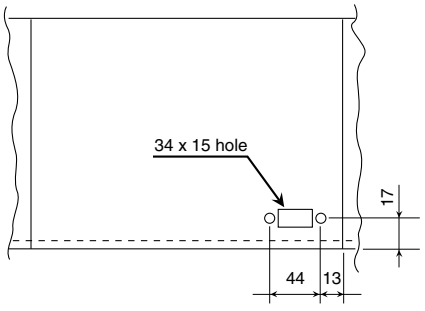
② When connecting the distribution duct, to make the air flow easily, block the outlet port with the blower cover insulation as shown by the hatched lines in Fig. 48. For the blocking direction, refer to Fig. 31

1. Dimension

(1) Fresh air duct connection hole and screw positions.

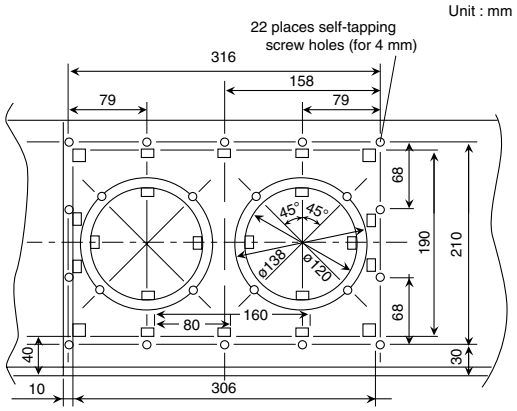
Fig. 49

Unit : mm



(2) Distribution duct connection hole and screw positions.

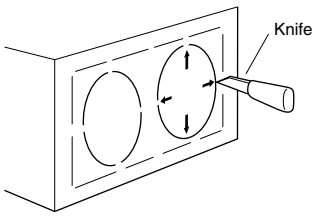
Fig. 50

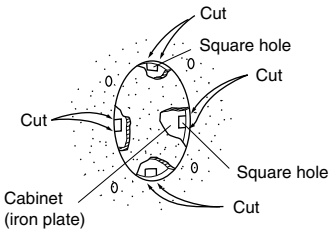


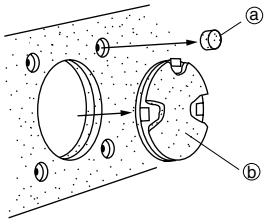
2. Distribution duct hole processing

Use the distribution duct hole by removing the insulation material as shown below.

Fig. 51







- Open the hole by cutting the insulation at the hole opening position with a knife at the points indicated by the arrows.
- Remove the insulation at the square holes.
- Cut off the part (Cabinet) indicated by the arrow in the figure at the left with nippers, needle nose pliers, etc.

✻ Be careful not to damage the internal parts. Remove as shown by ⓑ at the bottom left.

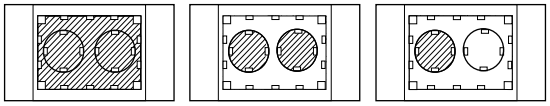
✻ The fabrication and use of an iron plate removal tools for use instead of the tools previously mentioned are introduced in Fig. 53.

- Open the holes and pull out insulation ⓐ as shown in the figure.
- Connect the distribution duct.

✻ When mounting the duct, block the gap so that there is no cold air leakage.

✻ Insulate the duct and cut connection.

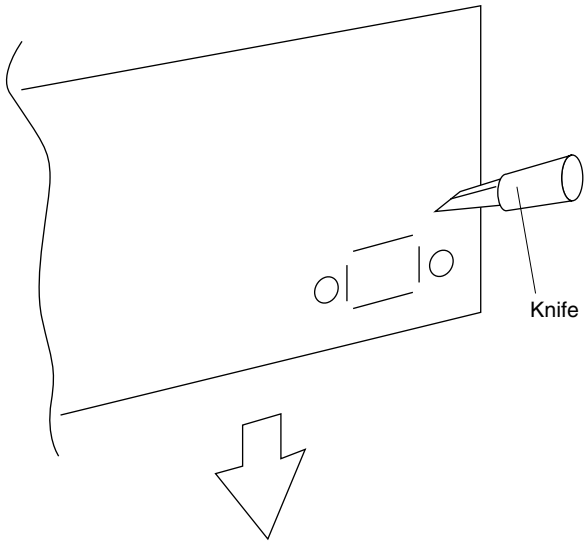
Duct connection pattern



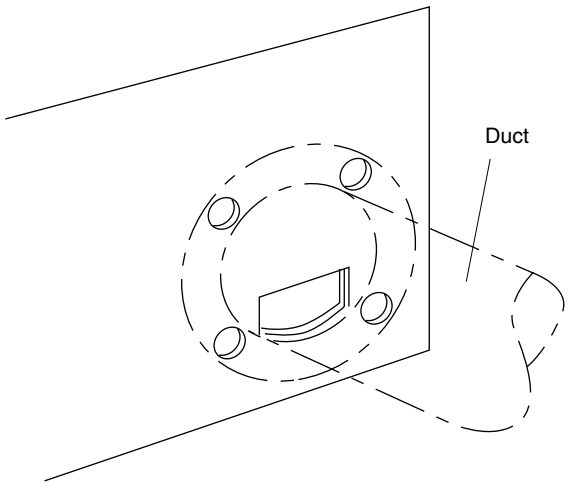
3. Fresh air duct connection hole processing

Fig. 52

· Cut the insulation to a □ shape with a knife.



· Connect the duct as shown in the figure.

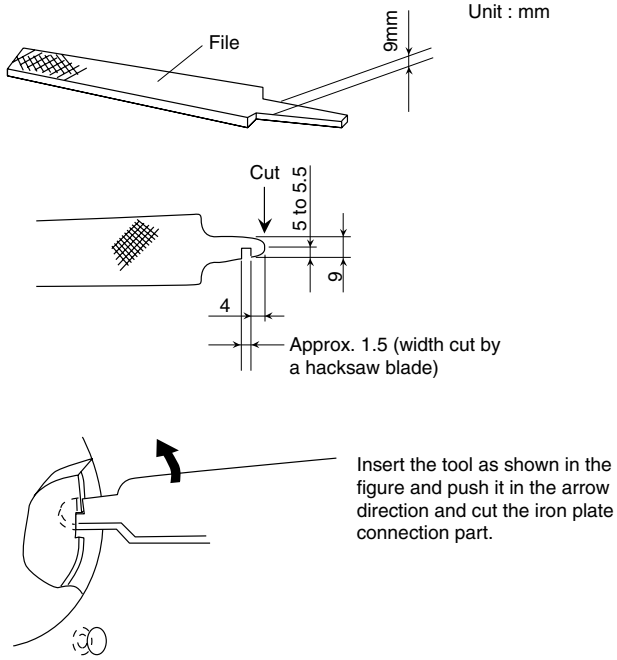


⚠ CAUTION

The air conditioner cannot take in fresh air by itself. When connecting a fresh air duct, always use a duct fan.

Fig. 53

Unit : mm



Insert the tool as shown in the figure and push it in the arrow direction and cut the iron plate connection part.

8.2 REMOTE CONTROLLER INSTALLATION MANUAL

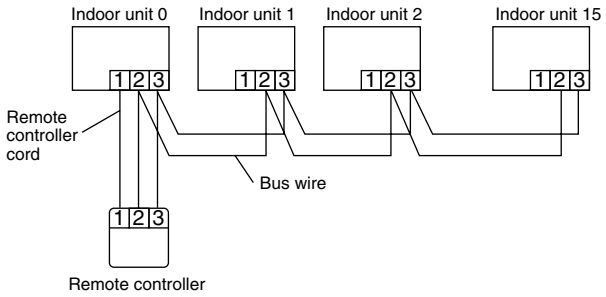
(PART NO.9356976021)

1 CENTRALIZED CONTROL

- One remote controller can control up to 16 air conditioners.
- All the air conditioners can be operated with the same setting.

WIRING METHOD

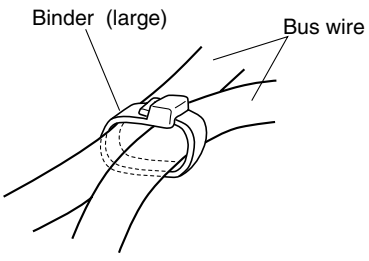
(1) Wire each air conditioner (power cord･indoor and outdoor units connection) individually.
For details, refer to the ELECTRICAL WIRING section of the installation manual.
(2) Connect the bus wire between the indoor units to [REMOTE CONTROLLER 2,3] of the indoor unit terminal board.
3) Install the remote controller to only one air conditioner and remove the remote controller of the other air conditioners.



BUS WIRE

- Use wire having a cross sectional area of 0.75mm^2.
- Make the total length of the bus wire (including the remote controller cord) 500m or less.

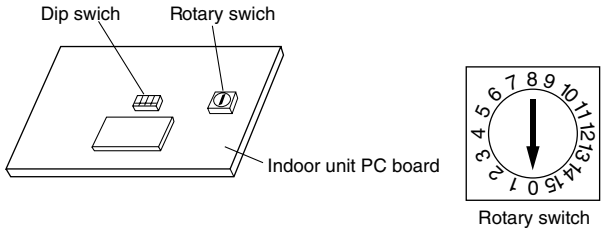
(4) Fasten the bus wire with a binder(large) as shown at the right.



UNIT NO. SETTING METHOD

(Performed at indoor unit)

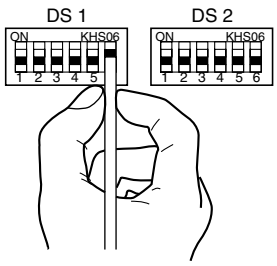
(1) Remove the electric parts box.
(2) Turn off the main power.
(3) Set the unit number with the rotary switch on the indoor unit PC board so it is not duplicated.(Unit No. 0-15)
(4) After setting the unit number,restore the electric parts box.



NUMBER OF CONNECTED UNITS SETTING METHOD

(Performed at remote controller)

(1) Remove the remote controller cover.
(2) Set remote controller Dip switch 1(DS 1)[6] to [ON]. (Figure at the right)
(3) Set the number of additional air conditioners with remote controller Dip switch 1 [1-4]. For the number of additional connected units,see the table below.
(4) Restore the remote controller cover.



1	1 2 3 4	6	1 2 3 4	11	1 2 3 4
2	1 2 3 4	7	1 2 3 4	12	1 2 3 4
3	1 2 3 4	8	1 2 3 4	13	1 2 3 4
4	1 2 3 4	9	1 2 3 4	14	1 2 3 4
5	1 2 3 4	10	1 2 3 4	15	1 2 3 4

Cautions:

1. Connect the bus wire between indoor units by wiring it so that the numbers are correct.
2. When setting the Rotary switch and Dip switch, do not touch any other parts on the PC board directly with your bare hands.

SELF DIAGNOSIS

- If [EE : EE] flashes at the remote controller current time display, perform [Self Diagnosis].
- For the [Self Diagnosis] method, refer to the test operation section of the installation manual. The faulty air conditioner is also displayed.

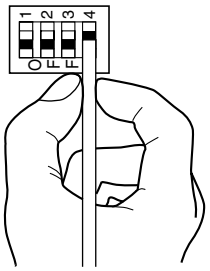
Example [E2:03] :Unit 03 room temperature sensor open

Error cord Faulty unit No.

2 ZONE CONTROL

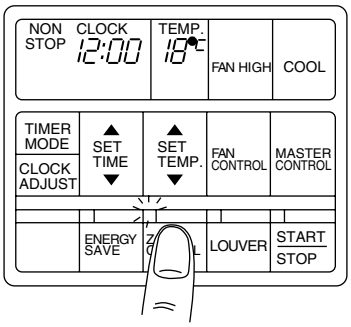
- When the ZONE CONTROL button is pressed while multiple air conditioners are being centralized controlled, only the preset air conditioners stop.

(1) Turn off the main power.
(2) Set Dip switch [4] of the indoor unit you want to stop by ZONE CONTROL button to [ON].(Figure at the right)



OPERATION CONFIRMATION

- Press the ZONE CONTROL button of the remote controller during centralized control operation.Check if only the set air conditioners stop.
- When the ZONE CONTROL button is pressed again, all the air conditioners operates.

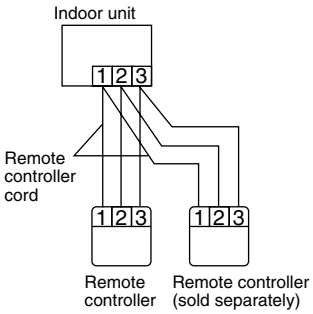


3 SPARE REMOTE CONTROLLER

- Two remote controllers can be connected to one air conditioner. The air conditioner operation contents are the remote controller setting contents set later.
(Both remote controllers show the same display.)

WIRING METHOD

- Besides the normal wiring (1 remote controller, 1 air conditioner), wire the separately sold remote controller cord to the indoor unit terminal board [remote controller] section by matching the numbers. (Figure at the right)
- Set two remote controllers Dip switch 1(DS 1) [5] to [ON].
- Set Dip switch 2 (DS 2) [3] of either of the remote controllers to [ON].

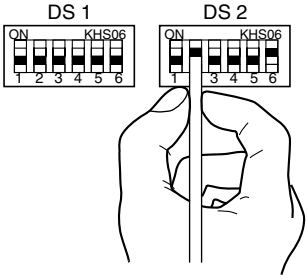


4 AUTO RESTART

- When the air conditioner power was temporarily turned off by a power failure etc., it restarts automatically after the power recovers.
(Operated by setting before the power failure)

SETTING METHOD
(Performed by remote controller)

(1) Turn off the main power.
(2) Set remote controller Dip switch 2 (DS 2) [2], [6] to [ON].

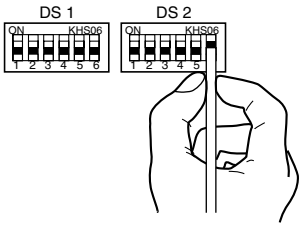


5 MEMORY BACKUP FUNCTION

MEMORY BACKUP FUNCTION

This function starts operation in accordance with the contents before operation was stopped by pressing of the START/STOP button when the power supply to the air conditioner was stopped and restarted by a power failure, switch,etc.

- MEMORY BACKUP FUNCTION use In the state in which the remote controller case top is removed, set Dip switch 2(DS 2) [6] of the remote controller to the ON position.



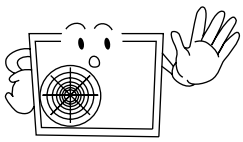
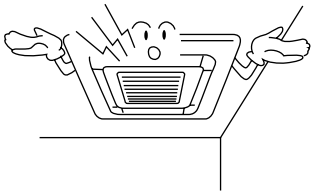
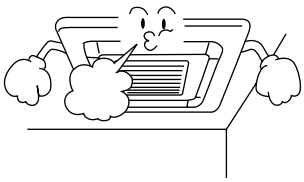
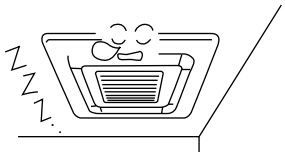
• TO INSTALLER

- Do not wire the bus wire together with or parallel to the indoor and outdoor units connecting wire and power cord. It may cause erroneous operation.
- When installing the bus wire near a source of electromagnetic waves, use shielded wire.
- Operating methods are the same as normal (1 air conditioner, 1 remote controller). For details, refer to operating manual and installation manual.

9. TROUBLESHOOTING

⚠ WARNING!	In the event of a malfunction (burning smell, etc.), immediately stop operation, turn off the electrical breaker, and consult authorized service personnel. Merely turning off the unit's power switch will not completely disconnect the unit from the power source. Always be sure to turn off the electrical breaker to ensure that power is completely off.

Before requesting service, perform the following checks:

	Symptom	Problem
NORMAL FUNCTIONS	Doesn't operate immediately: 	• If the unit is stopped and then immediately started again, the compressor will not operate for about 3 minutes, in order to prevent fuse blowouts. • Whenever the power switch is turned off then on again, the protection circuit will operate for about 3 minutes, preventing unit operation during that period
	Makes noise: 	• During operation and immediately after stopping the unit, you may hear the sound of water flowing in the air conditioner's piping. Also, noise may be particularly noticeable for about 2 to 3 minutes after starting operation (This is the sound of coolant flowing). • During operation, you may hear a slight squeaking sound. This is caused by minute expansion and contraction of the front cover resulting from change in temperature. • After the air conditioner has been shutdown, you may hear the sound of water or a motor running. This is the sound of the pump draining water that condensed inside the unit.
	Smells:	• Some smell may be emitted from the indoor unit. This smell is the result of room odors (furniture, tobacco, etc.) which have been taken into the air conditioner.
	Mist or steam is emitted: 	• During the cooling or drying operation, a thin mist may be seen emitted from the indoor unit. This is a result of sudden cooling of room air by the air emitted from the air conditioner, resulting in condensation and misting. • During heating operation, the outdoor unit's fan may stop, and steam may be seen rising from the unit. This is due to operation of the defrosting mode.
CHECK ONCE MORE	Doesn't operate at all: 	• Has there been a power failure? • Has a fuse blown out, or a circuit breaker been tripped? • Is the main power switch set to the OFF position?
	Poor cooling or heating performance: 	• Is the air filter dirty? • Are the air conditioner's intake or outlet vents blocked? • Did you adjust the room temperature settings (thermostat) correctly? Is there a window or door open? • During the cooling operation, is a window allowing bright sunlight to enter? (Close the curtains.) • During the cooling operation, is there a heat source operating inside the room, or are there too many people in the room?

9.1 WIRELESS REMOTE CONTROLLER FOR COOLING MOEL

1. SYMPTOMS AND CHECK ITEMS

[WIRELESS REMOTE CONTROLLER for COOLING MODEL]

Symptom	Possible causes	Check item	Check points
No operation	Power supply section	Check 1 Check 4 Check 5	Microcomputer input signals DC output voltage Power transformer Remote control signal input faulty Remote controller
Erroneous operation	Reset section	Check 2	Reset circuit
Display faulty	LED display board LED display control section	Check 4	Display LED Microcomputer output signal Driver output signal
Temperature control faulty	Room temperature thermistor A/D converter input section Indoor pipe temperature thermistor	Check 6	Room temperature thermistor Microcomputer input signal Indoor pipe temperature thermistor
Remote control input faulty	Remote control Signal receiving section (Display board)	Check 5 Check 7	Remote controller Microcomputer input/output section
Fan motor control faulty	Fan motor control output section	Check 6 Check 8	Indoor pipe temperature thermistor Fan motor control circuit
Indoor unit to outdoor unit control faulty	Output to outdoor unit	Check 9	Output circuit to outdoor unit
Drain pump control faulty	Drain pump control section	Check 3	Drain pump control circuit
Indication panel abnormal	Thermistor shortcircuited or opened	Check 10	Thermistor

CHECK 1

Symptom ---------- No operation.
Remote control is not received.

Preliminary checks
* Is the power cord plugged in?
* Is power present at the plug socket?
* Is power turned off?

(1) Power connection check
* Is power received at main PC board CN1?
* Is the fuse (3.15A) blown?

(2) Power transformer check
* Are CN6 and CN7 inserted firmly?
* Is 15 to 25V AC output at CN6?

(3) Power supply circuit check
① 12V line
0V-----D1, Q1 faulty
D2, C5, C7, R1,R2 shorted, R3 open
② 5V line
0V----D3 open, IC2 faulty. C8, C9 shorted, other parts may be shorted also.

(4) Power interrupt signal faulty (INT P1 input)
R4, R17, R18 open, C26,C11 shorted.
Q2 faulty

(5) Reset circuit faulty
IC7 faulty

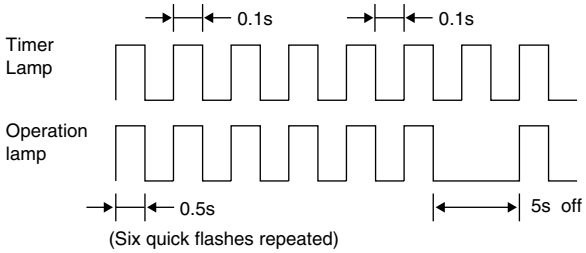
(6) Microcomputer oscillator faulty
Is the oscillator waveform (8.38MHz) output at microcomputer pins 49 and 50? If the oscillation waveform is not output, X1 or the microcomputer is faulty.
(7) Microcomputer faulty

CHECK 2

Symptom-----Erroneous operation. (runaway)
Preliminary checks
* Turn the power off and wait at least 30 seconds. Then, set the power to ON again. If remote control is received normally, there is no trouble.
(1) Reset circuit faulty
IC7 faulty

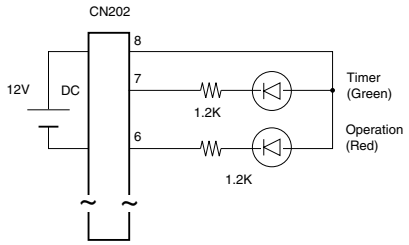
CHECK 3

Symptom-----Drain pump control faulty
* Is the drain pump connectors CN3 inserted firmly?
(1) Drain pump is not turned off, or
drain pump is not turned on.
IC6 faulty, K5 faulty, Microcomputer faulty [P50 (26 pin) remains H or L]
(2) Float switch faulty
RC1 faulty
When the frost switch is turned on 3 minutes or more,the following display appears.

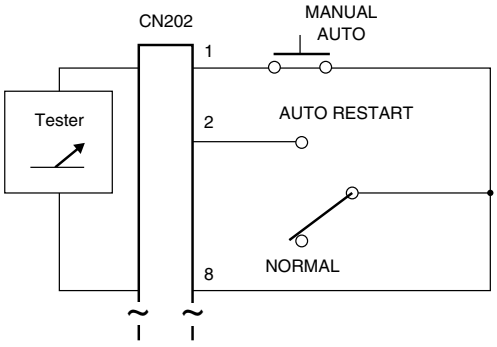


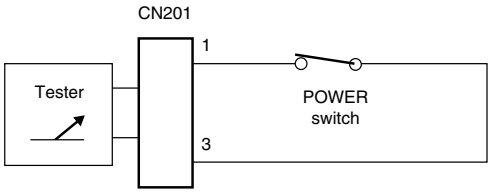
CHECK 4

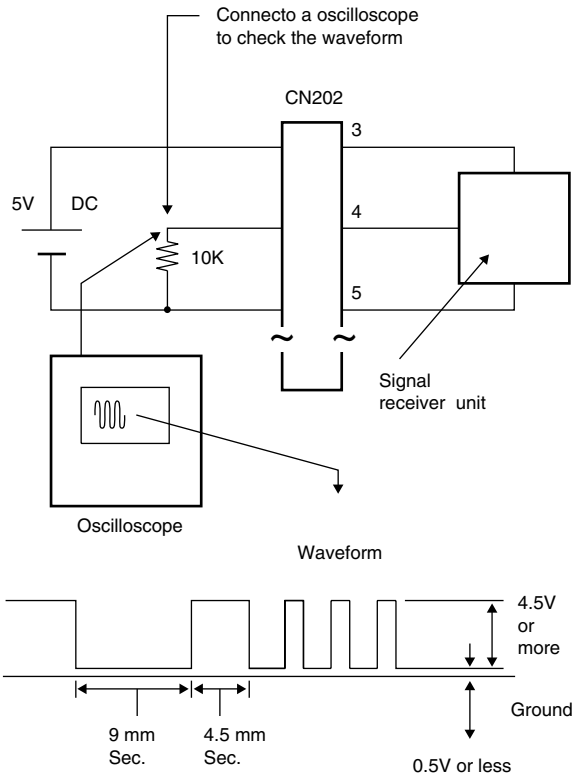
Symptom-----Display faulty.
Preliminary checks
* Is display PC board connectors CN17 inserted firmly?
* Is the display unit cable open?
(1) Display does not light correctly.
* Check lighting of LEDs by using a 12V DC power source as shown below.



* LED display control section check.
Microcomputer output port connected to LED to be displayed "H (3.5V or more)" level. If not "H" level, the microcomputer is faulty.
When 3.5V or more is output across pins 5 and 8 of IC5, if the voltage between pins 9 and 12 is not less than 1.5V, IC5 is faulty.
Furthermore, when 1.5V or less is output across pins 5 and 8 of IC5, if the voltage between pins 9 and 12 is not 12V, IC5 is faulty.
(2) Switch check
* Check the switch conduction with a circuit tester as shown below.
(3) Signal receiver unit check
* Check the output of signal receiver unit with a 5V DC power source and a 10k resistor as shown below.







4.5V or more ---------- When no infrared signal inputted.
0.5V or less ---------- When infrared signal inputted

CHECK 5

Preliminary checks

* If the air conditioner operates when the remote controller's battery is changed, there are no problems. (The battery life is six months to one year)
* When the signal receiving part of the indoor unit is exposed to direct sunlight, the remote control signal may not be received.
* When the infrared signal between the remote control unit and receiver is blocked, the remote control is not worked.

(1) Remote control check
If the signal tone is heard when a transistor radio is turned to an unused frequency in the medium wave band and the remote control button is pressed within 5cm of the radio, the remote control unit is normal.

(2) When the remote control unit is normal, is CN17 disconnected?
The receiver at the air conditioner display PC board is faulty or the main PC board is faulty.

CHECK 6

Symptom-----Room temperature cannot be controlled.
Preliminary checks

* Is the MODE switch in the TEST position?
* Are room temperature thermistor and pipe temperature thermistor connectors (CN3 and CN10) inserted firmly?
* Is the set temperature correct?

(1) Thermistor faulty
The room temperature thermistor resistance and pipe temperature thermistor resistance values are shown on page 9. When there is a large error, the thermistor is faulty.

(2) A/D input circuit faulty
R42 open or shorted, R9 open, C12, C16, C20 shorted. (Room temp.)
R6 open or shorted, R10 open, C13, C17, C21 shorted. (Pipe temp.)
If all of the above are normal, advance to Check 9.

CHECK 7

Symptom-----Remote control signal input faulty.
Preliminary checks

* Does the remote controller operate normally? (Is signal emitted?)
* Does the signal receiver unit (Display board) operate normally? (Refer to CHECK 4.)

(1) Remote control signal input circuit faulty
R22, R21 open, C29 shorted.

CHECK 8

Symptom-----Room fan does not run.
Preliminary checks

* At dry operating, the room fan stops while the compressor stops.
* Turn the fan once or twice by hand. If the fan does not turn easily, the fan motor is faulty.

(1) Fan motor faulty
Fan motor winding open (check between all windings)

(2) Fan motor capacitor faulty.

(3) Relay drive circuit faulty
IC6 faulty, SSR1, K1, K2 faulty.

Microcomputer check
Check at the fan speed stated below.
Hi: P55(Pin31) ----- Hi(5V)
Med: P55(Pin31), P53(Pin29) ----- Hi(5V)

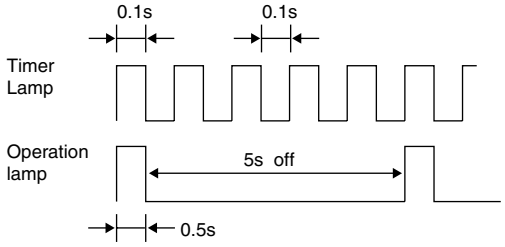
Low: P55(Pin31), P53(Pin29), P54(Pin30) ----- Hi(5V)

CHECK 9

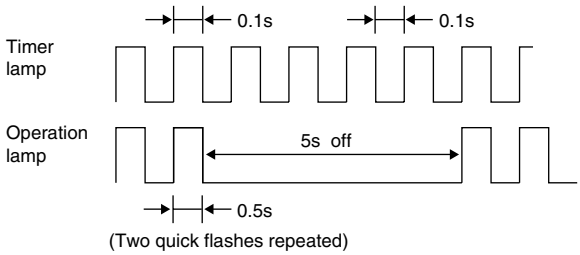
Symptom——-Control to outdoor unit faulty
Preliminary checks
* Check if the signal wire is normal.
(1) Compressor and outdoor fan motor do not operate or stop.
Is the 12VDC applied to the power relay coil?
If not, microcomputer faulty [P43 (Pin21) output faulty]
IC5 faulty, D4, F5 shorted

CHECK 10

Thermistor Abnormal Indication
(1) In spite of operation or non-operation, when the room temperature thermistor or heat exchanger thermistor is opened or shorted, operation is immediately stopped and failure indication [see item (3) stated below] is displayed.
(2) In the case where this function stops the operation, any operation instruction can not resume the operation.
(3) Failure indications stated in (1) are:
* Room temperature thermistor abnormal



* Heat exchanger thermistor abnormal



(Two quick flashes repeated)

2. Thermistor resistance values

1) Room temperature thermistor

Room temperature (℃)	Resistance value (k)
3	28.7
5	25.9
8	22.3
10	20.1
15	15.8
20	12.5
25	10.0
29	8.4
31	7.7
33	7.0
36	6.2
40	5.3
44	4.5

2) Indoor unit pipe temperature thermistor

Pipe temperature (℃)	Resistance value (k)	Pipe temperature (℃)	Resistance value (k)
0	**176.0**	30	39.6
2	157.8	34	33.2
6	127.3	38	27.9
10	103.3	44	21.7
14	84.4	50	17.0
18	69.3	56	13.5
22	57.2	60	11.6
26	47.5		

9.2 LIQUID CRYSTAL WIRED REMOTE CONTROL MODEL

[LIQUID CRYSTAL REMOTE CONTROLLER for REVERSE CYCLE MODEL]

INDOOR UNIT SIDE

Symptom	Possible causes	Check points
An error message is displayed on the remote controller indicator.	Communication error Thermistor faulty	(1) Remote controller self diagnosis check
The system does not work at all.	Power supply circuit failure Reset circuit failure Power interrupt circuit failure Ceramic resonator failure Remote controller input/output circuit failure	(2) Primary circuit of the power supply (3) Secondary circuit of the power supply (4) Reset circuit (5) Power interrupt circuit (6) Ceramic resonator (7) Remote controller input/output circuit
The indoor fan motor does not work.	Fan motor capacitor failure Output circuit for fan motor faulty	(8) Fan motor capacitor and harness
The air flow of the indoor fan motor does not vary.		(9) Output circuit for the indoor fan motor
The drain pump does not work.	Float switch failure Drain pump output circuit failure	(10) Drain pump output circuit

INDOOR UNIT SIDE

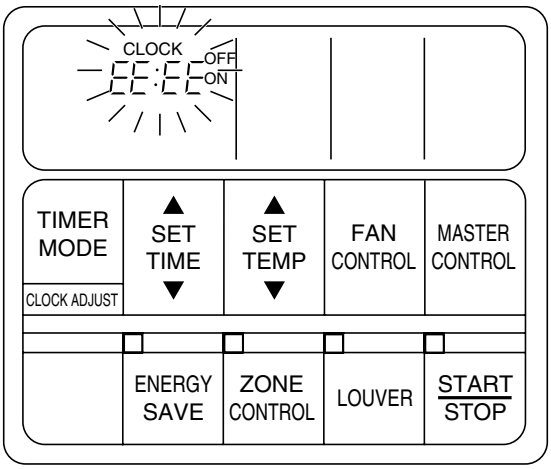
Symptom	Possible causes	Check points
An error message is displayed on the remote controller indicator.	Communication error Thermistor faulty	(11) Self diagnosis check
The system does not work at all.	Power supply circuit failure Reset circuit failure Power interrupt circuit failure Ceramic resonator failure	(12) Primary circuit of the power supply (13) Secondary circuit of the power supply (14) Reset circuit (15) Power interrupt circuit (16) Ceramic resonator
The compressor does not work.	Power relay output circuit failure	(17) Power relay output circuit
The outdoor fan motor does not work.	Fan motor output circuit failure	(18) Fan motor output circuit
The heating does not work.	Four-way valve circuit failure	(19) Four-way valve circuit
The defrost does not work.	Outdoor unit heat exchanger thermistor circuit failure	(20) Outdoor unit heat exchanger thermistor circuit
An error message is displayed on the outside PCB.	Communication error Thermistor faulty	(21) Self diagnosis check
The defrost does not work.	Outdoor unit heat exchanger thermistor circuit failure	(22) Outdoor unit heat exchanger thermistor circuit

(1) Remote control self diagnosis

If EE:EE blinks on the time indicating LED of the remote controller, perform the self diagnosis. The LED indicates which air conditioner is faulty.

If the operation indication lamp is lit, first press the START/STOP button to turn it to OFF. Then, excute the following procedure to display the error description.

Self diagnosis starts when the ZONE CONTROL and ENERGY SAVE switches are pressed at the same time for three seconds or more while EE:EE is blinking on the remote controller. Then, a description of the error is displayed.



Example : **E2 : 03**

Faulty unit number
Error code

The room temperature sensor of Unit 3 is faulty (in a situation where 2 to 16 units are under simultaneous control).
("E2:00" is displayed in a 1-to-1 situation.)

For details about errors, see the table below.

① E0:XX	Transmission and reception errors (indoor unit ↔ remote controller)
② E1:XX	Transmission and reception errors (indoor unit ↔ outdoor unit)
③ E2:XX	Room temperature sensor opened or disconnected
④ E3:XX	Room temperature sensor shortcircuited
⑤ E4:XX	Disconnection of the indoor heat exchanger temperature sensor
⑥ E5:XX	Short-circuit of the indoor heat exchanger temperature sensor
⑦ E6:XX	Disconnection of the outdoor heat exchanger temperature sensor
⑧ E7:XX	Short-circuit of the outdoor heat exchanger temperature sensor
⑨ EA:XX	Disconnection of the outdoor temperature sensor (open mode)
⑩ EB:XX	Short-circuit of the outdoor temperature sensor
⑪ EC:XX	Disconnection of the outdoor discharge pipe temperature sensor
⑫ ED:XX	Short-circuit of the outdoor discharge pipe temperature sensor
⑬ EE:XX	* 60Hz MODEL only High pressure abnormal of the outdoor unit
⑭ EF:XX	Discharge pipe temperature abnormal of the outdoor unit

XX : Faulty unit number

(INDOOR UNIT SIDE)

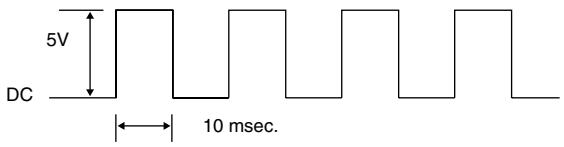
① Error code E0

Transmission and reception errors between the indoor unit and remote controller

Use the oscilloscope to check the output waveform of pin 44 of the microcomputer.

If the waveform does not match that shown in the following figure, it may be due to failure of the following parts :

R7, R8, R9, R10, R11, R12, Q4, Q5, IC7, D6, D7 or L4.



Use the oscilloscope to check the output waveform of pin 20 of the CN8.

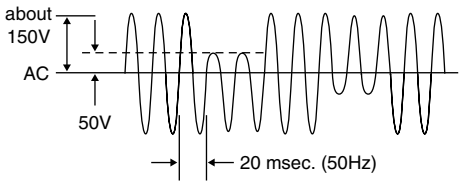
If the waveform does not match that shown in the above figure, it may be due to failure of the following parts :
IC6, R12, R13, D6, D7 or L4

②Error code E1
Transmission and receiving errors between indoor unit and outdoor unit

* Forward transmission error

Use the oscilloscope to check the output waveform between terminals 1 and 3 of the terminal board.

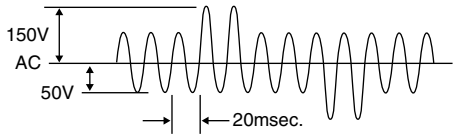
If a serial signal is not output as shown in the following figure, IC4, Q2 or the indoor unit microcomputer may be faulty.



* Reserve transmission error

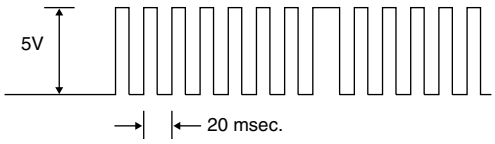
Use the oscilloscope to check the output waveform between terminals 1 and 3 of the terminal board.

If a serial signal is not output as shown in the following figure, the outdoor unit may be faulty.



Use the oscilloscope to check the output waveform of pin 47 of IC4.

If the waveform matches as shown in the following figure, IC4, Q3 is faulty or C15 may be short-circuited.



③Error code E2
Room temperature sensor disconnection

(a) Check whether the room temperature sensor is disconnected.
→ Attach the connector CN9 securely.
(b) Check whether the room temperature sensor lead wire is disconnected.
→ Replace the room temp. thermistor.
(c) Check whether there is 5V between pin 1 of CN9 and ground.
→ Check the power supply circuit.
(d) Check whether R15 is disconnected or the microcomputer is faulty.

④ Error code E3
Room temperature sensor short-circuited
(a) Check whether the room temperature sensor is short-circuited by measuring the resistance value.
→ Replace the room temp. thermistor.

⑤ Error code E4
Disconnection of the indoor heat exchanger temperature sensor

(a) Check whether the indoor heat exchanger temperature sensor is removeded.
→ Attach the connector CN10 securely.
(b) Check whether the indoor heat exchanger temperature sensor is disconnected.
→ Replace the indoor pipe temp. thermistor, if necessary.
(c) Check whether there is 5V between pin 1 of CN10 and ground.
→ Check the power supply circuit.
(d) Check whether R17 is disconnected or the microcomputer is faulty.

⑥ Error code E5
Short-circuit of the indoor heat exchanger temperature sensor

(a) Check whether the indoor heat exchanger temperature sensor is short-circuited.
→ Replace the indoor pipe temp. thermistor, if necessary.

(OUTDOOR UNIT SIDE)

⑦ Error code E6
Disconnection of the outdoor heat exchanger temperature sensor

(a) Check the outdoor pipe temp. thermistor.

⑧ Error code E7
Short-circuit of the outdoor heat exchanger temperature sensor

(a) Check the outdoor pipe temp. thermistor.

⑨ Error code EA
Disconnection of the outdoor temperature sensor

(a) Check the outdoor pipe temperature thermistor.

⑩ Error code EB
Short-circuit of the outdoor temperature sensor

(a) Check the outdoor temperature thermistor.

⑪ Error code EC
Disconnection of the outdoor discharge pipe temperature sensor

(a) Check the outdoor discharge pipe temperature thermistor.

⑫ Error code ED
Short-circuit of the outdoor discharge pipe temperature sensor

(a) Check the outdoor discharge pipe temperature thermistor.

⑬ Error code EE ✻60Hz MODEL only High pressure abnormal

(a) Check the high pressure thermostat switch.

⑭ Error code EF
Outdoor discharge pipe temperature abnormal

(a) Check the discharge pipe temperature.

(2) Primary circuit of the power supply
Is there 220/240V between terminals 2 and 3 on the terminal board ?
↓ └No → The power is not supplied to the unit.
Yes
↓
Is there 220/240V between terminals 2 and 3 of CN1 ?
↓ └No → The CN1 harness is faulty.
Yes
↓
Is 220/240V applied to both ends of the varistor (VA1) ?
↓ └No → The fuse has blown.
Yes

*Remove the connector from the power transformer to measure the resistance across the primary side of the transformer.

Is the resistance value infinite( ) ?
↓ └No → The power primary circuit is working
Yes normally.
↓
The voltage selector socket has been removed or the thermal fuse has blown.

(3) Secondary circuit of the power supply

(a) Logical power supply circuit

(Relay driver power circuit)

Is there about 20V between terminals 1 and 2 of CN7 ?
↓ └No → The power transformer is faulty.
Yes

Is there about 20V across C5 ?
↓ └No → D1 is faulty or C5 is shortcircuited.
Yes

Is the output voltage of Q1 13V ?
↓ └No → Q1 may be faulty or D7, C6 or C7
Yes may be shortcircuited.

Is the output voltage of IC2 (7805) 5V ?
↓ └Yes → The logical power supply circuit is
NO working normally.

Is the input voltage of IC2 (7805) 11V ?
↓ └Yes → IC2 may be faulty or C9 may be
short-circuited.
No

D3 is disconnected.

(b) Remote controller power circuit

Is there about 20V between terminal 3 and 4 of CN7 ?
↓ No → The power transformer is faulty.
Yes

Is there about 20V across C10 ?
↓ No → D4 is faulty or C10 is shortcircuited.
Yes
↓
Is the output voltage of IC3 12V ?
↓ No → IC3 may be faulty or D5 , C11 may be shortcircuited.
Yes
↓
The logical power supply circuited is working normally.

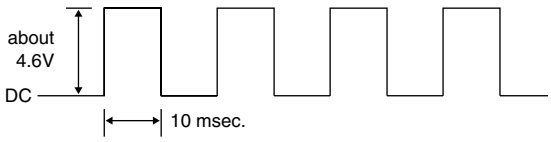
(4) Reset circuit

Check the output voltage of pin 43 (Reset) of the microcomputer. If it is 5V, the reset circuit is working normally. If it is not 5V, it may be due to one of the following failures:

C18 or C17 short-circuited, R14 disconnected, IC8 failure,or microcomputer faulty.

(5) Power interrupt circuit

Use an oscilloscope to check the output waveform of pin 45 (INT1) of the microcomputer. If the waveform has the shape shown in the following figure, the power interrupt circuit is working normally



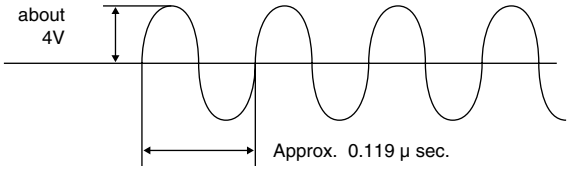
If not, check the output waveform of pin 4 of IC4. If the waveform does not match that shown in the above figure,IC4 is faulty. If the waveform matches the above figure, the power interrupt circuit problem is due to one of the following :

C14 or C15 short-circuited,
R4, R5 disconnection, or Q3 failure.

(6) Ceramic resonator

Use an oscilloscope to check the output waveform between pins 49 and 50 of the microcomputer.

If the waveform matches that shown in the following figure, the ceramic resonator (X2) is working normally.



(7) Remote controller input ⁄ output circuit

The remote controller signal circuit is working normally if there is about 12V between pins 1 and 3 of CN8 and about 11V between pins 2 and 3 of CN8.

(8) Fan motor capacitor and harness

(a) Fan motor capacitor
Check whether CN4 is disconnected.
Check whether the fan motor capacitor lead wire is disconnected.

(b) Fan output circuit

Is the output voltage of pin 31 of the microcomputer 5V when the fan output is ON?
↓ No → Microcomputer failure
Yes
↓
Is there about 14V between pins 10 and 8 of the IC5 ?
↓ No → IC5 failure
Yes
↓
Is SSR1 alternating current ON ?
↓ No → SSR1 failure
Yes
↓
K1, K2 failure, or fan motor failure

(9) Output circuit for indoor fan motor

The failure may be due to one of the following : K1, K2 or IC9, microcomputer faulty.

(10) Drain pump output circuit

The failure may be due to one of the following: The drain pump does not work, K2 or IC9 failure, R21 disconnection, or C20 short-circuited

OUTDOOR UNIT INSIDE

(11) An error message is displayed on the remote controller indicator. (Self diagnosis)

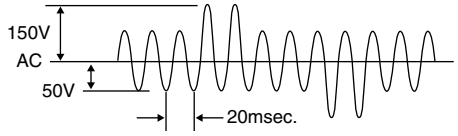
There are three error codes about the outdoor unit to be displayed on the remote controller indicator as follows.

②-1 Error code E1

Transmission and receiving error between indoor unit and outdoor unit

* Reverse transmission error

(a) Use an oscilloscope to check the output waveform between terminals 1 and 3 on the terminal board.
If the waveform matches that shown in the following figure, the system is working normally.

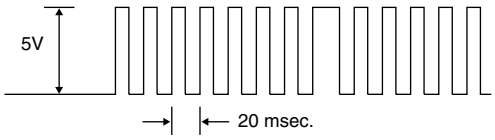


If it does not match, check the waveform as follows

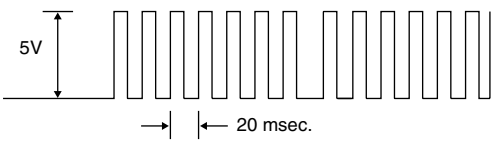
(b) Use the oscilloscope to check the output waveform between pins 14 and 18 of IC2.
If the waveform does not match that shown in the above figure, IC2 is faulty.

(c) Use an oscilloscope to check the output waveform of pin 3 of the microcomputer.

If the waveform does not match that shown in the following figure, the microcomputer may be faulty or Q3 may be faulty.



(d) Use an oscilloscope to check the output waveform of pin 4 of IC2 (HU2001).
If the waveform does not match that shown in the following figure, Q3 is faulty.

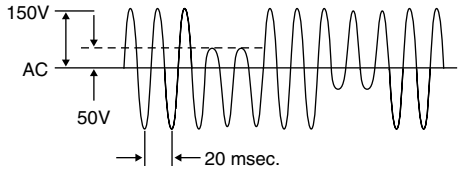


②-2 Error code E1

✻ Forward transmission error

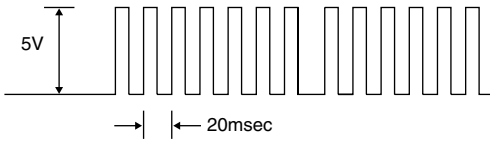
Use an oscilloscope to check the output waveform between pins 2 and 3 of the terminal board.

If the waveform matches that shown in the following figure, the indoor unit is working normally.



Use an oscilloscope to check the output waveform between pins 1 and 3 of the IC2.

If the waveform does not match that shown in the following figure, IC2 is faulty or R5 is disconnected.



If the output waveform of pin 4 of the microcomputer does not match that shown in the above figure, it may be due to R6 disconnection, C11, C35 short-circuited or microcomputer failure.

⑦ Error code E6

The outdoor heat exchanger sensor is disconnected.

(a) Check whether the outdoor unit pipe temperature thermistor is removed.
→ Attach the connector CN11 securely.

(b) Check whether the lead wire for the outdoor unit pipe temperature thermistor is disconnected.
→ If it is disconnected, replace the thermistor.

(c) Microcomputer IC1 may be faulty.

⑧ Error code E7

The outdoor heat exchanger sensor is short-circuited.

(a) Check whether the outdoor unit pipe temperature thermistor is short-circuited.
→ Replace the thermistor if necessary.

(b) Microcomputer IC1 may be faulty.

⑨ Error code EA

Disconnection of the outdoor temperature sensor

(a) Check whether the outdoor temperature thermistor is removed.
→ Attach the connector CN12 securely.

(b) Check whether the lead wire for the outdoor tempera-

ture thermistor is disconnected.
If it is disconnected, replace the thermistor.
(c) Microcomputer IC1 may be faulty.

Error code EB

Short-circuit of the outdoor temperature sensor

(a) Check whether the outdoor temperature thermistor is short-circuited.
Replace the thermistor if necessary.
(b) Microcomputer IC1 may be faulty.

⑪ Error code EC
Disconnection of the outdoor discharge pipe temperature sensor
(a) Check whether the outdoor discharge pipe temperature thermistor is removed.
Attach the connector CN13 securely.
(b) Check whether the lead wire for the outdoor discharge pipe temperature thermistor is disconnected.
If it is disconnected, replace the thermistor.

⑫ Error code ED
Short-circuit of the outdoor discharge pipe temperature sensor

(a) Check whether the outdoor discharge pipe temperature thermistor is short-circuited.
Replace the thermistor if necessary.
(b) Microcomputer IC1 may be faulty.

⑬ Error code EE * 60Hz MODEL only high pressure abnormal

(a) Check whether the LED2 lamp operates as follows.
See check points (20).

(4) Error code EF
Outdoor discharge pipe temperature abnormal

(a) Check whether the LED1 lamp operates as follows.
See check points (20).

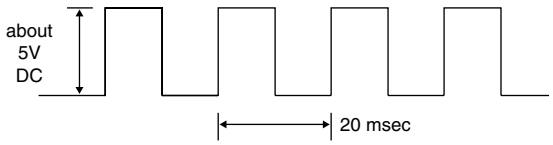
(12) Primary circuit of the power supply
Is there 220/240V between terminals 2 and 3 on the terminal board ?
↓ └No → The power is not supplied to
Yes the unit or wiring is wrong.
↓
Is 220/240V applied to both ends of the varistor (VA1) ?
↓ └No → The fuse has blown.
Yes
↓

*Remove the connector from the power transformer to measure the resistance across the primary side of the transformer.
↓
Is the resistance value infinite( ) ?
↓ └No → The power primary circuit is working normally.
Yes
↓
The voltage selector socket has been removed or the thermal fuse has blown.

(13) Secondary circuit of the power supply
Is there about 20V between the pins 1 and 2 of CN3 ?
└No → The power transformer is faulty.
Yes
↓
Is there 12 to 14V at the both ends of C5 ?
└No → D1 (D2SB20) faulty.
Yes
↓
Is there about 12V at the both ends of C7 ?
└No → D2 is disconnected.
Yes
↓
Is the 5V output from IC4 ?
└No → IC4 may be faulty.
Yes
↓
The voltage at the secondary circuit of the power supply is normal.

(14) Reset circuit
Measure the output voltage of pin 16 of the microcomputer.
If it is 5V, the reset circuit is working normally.
If it is not 5V, reinsert the power plug to measure the output voltage again.
If the voltmeter does not read 5V, C36 or C19 may be short-circuited, or R13 may be disconnected.

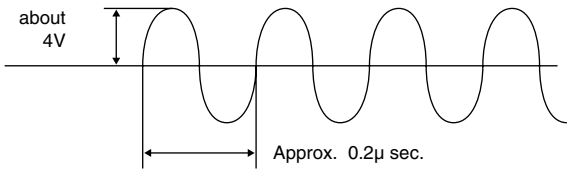
(15) Power interrupt circuit failure
Use an oscilloscope to check the output waveform of pin 2 of IC2
If the waveform does not match that shown in the following figure, IC2 may be faulty, R26 disconnected, or C9 short-circuited.



If the output waveform of pin 13 of the microcomputer does not match that shown in the above figure, Q2 may be faulty, R4 may be disconnected, or C10 may be short-circuited.

(16) Ceramic resonator

Use an oscilloscope to check the output waveform between pins 26 and 27 of the microcomputer.
If the waveform does not match that shown in the following figure, the ceramic resonator (X1) id faulty.



(17) Power relay output circuit.
(The compressor does not operate.)
Is 5V output from pin 37 of the microcomputer when the compressor is turned on ?
↓ No → The microcomputer IC1 is faulty.
Yes
↓
Is there about 12V between pins 10 and 8 of IC6?
↓ No → IC6 is faulty.
Yes
↓
Check the power relay, electromagnetic switch and the compressor OCR.

(18) Fan motor output circuit
(The outdoor unit fan does not rotate.)

Is 5V output from pin 39 of the microcomputer when the fan motor is turned on ?
| No → The microcomputer is faulty.
Yes
↓
Is there about 12V between pins12 and 8 of IC6 ?
↓ No → IC6 is faulty.
Yes
Check K2, outdoor temperature thermistor, fan motor capacitor, and relay.

(19) Four-way valve circuit
(The heating does not work.)

Is 5V output from pin 38 of the microcomputer when the four-way valve on condition ?
↓ └ No → The microcomputer is faulty.
Yes
↓
Is there about 12V between pins 11 and 8 of IC6 ?
↓ └ No → IC6 is faulty.
Yes
↓
Check K1, and solenoid coil for the four-way valve.

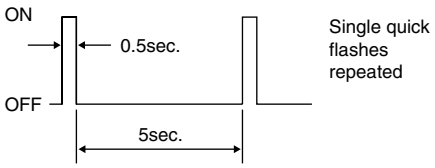
(20) The defrost does not work.

If the outdoor heat exchanger temperature thermistor is working normally, microcomputer may be faulty, or C21 may be short-circuited.

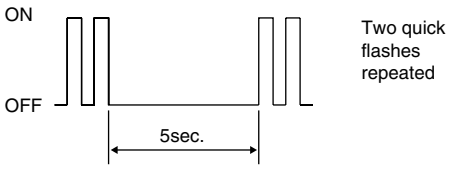
(21) Outdoor unit self diagnosis

The LED lamps operate as follows according to the error contents.
The LED lamps are on the outdoor unit board.
(a) LED1 lamp error display
Discharge pipe temperature abnormal

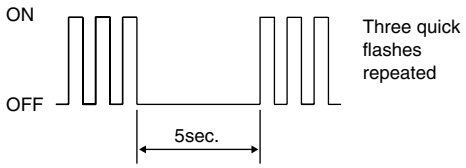
Outdoor heat exchanger temperature sensor abnormal



Outdoor temperature sensor abnormal



Discharge pipe temperature sensor abnormal



(b) LED2 lamp error display

High pressure abnormal

When the fault is cleared, the LED lamp goes off. However, for discharge pipe temperature abnormal and high pressure abnormal, the LED lamp lights continously for 24 hours, as long as the power is not turned off.

(22) Outdoor unit heat exchanger thermistor circuit

If the outdoor heat exchanger temperature thermistor is working normally, IC5 or microcomputer may be faulty, or C16 may be short-circuited.

Note: Thermistor resistance values

<Indoor unit side>

1) Room temperature thermistor

Room temperature (℃)	**Resistance value (k)**
3	28.7
5	25.9
8	22.3
10	20.1
15	15.8
20	12.5
25	10.0
29	8.4
31	7.7
33	7.0
36	6.2
40	5.3
44	4.5

2) Pipe temperature thermistor (Indoor unit side)

Pipe temperature (℃)	**Resistance value (k)**	**Pipe temperature (℃)**	**Resistance value (k)**
0	176.0	34	33.2
2	157.8	38	27.9
6	127.3	44	21.7
10	103.3	50	17.0
14	84.4	55	14.05
18	69.3	60	11.6
22	57.2		
25	50.0		
30	39.6		

<Outdoor unit side>

3) Outdoor heat exchanger temperature thermistor

Room temperature (℃)	Resistance value (k)
-8	24.4
-4	19.7
0	16.0
5	12.5
8	10.8
10	9.8
15	7.8
20	6.2
25	5.0
29	4.2
33	3.6
36	3.2
40	2.7

4) Discharge pipe temperature thermistor

Pipe temperature (℃)	Resistance value (k)	Pipe temperature (℃)	Resistance value (k)
10	646	50	**109**
15	**503**	60	**74.4**
20	**395**	70	**52.1**
25	**313**	80	**37.2**
30	**250**	90	**27.1**
35	**201**	100	**20.0**
40	**163**		

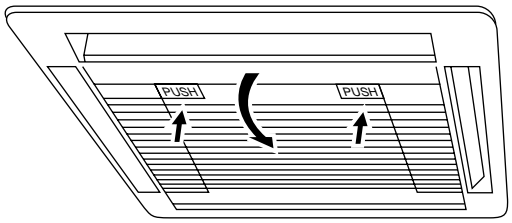
5) Outdoor temperature thermistor
This thermistor is the same as the room temperature thermistor mentioned above.

9.3 CARE AND MAINTENANCE

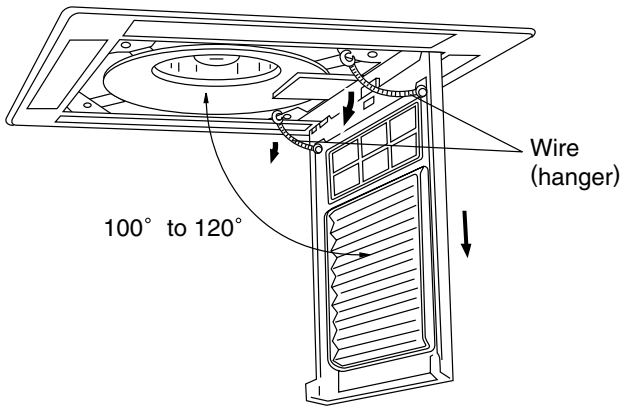
REMOVING / INSTALLING THE INTAKE GRILLE

Removing the intake grille

1. **Push the intake grille pushbuttons(two places) until you hear a “click”.**
   Open the intake grille.

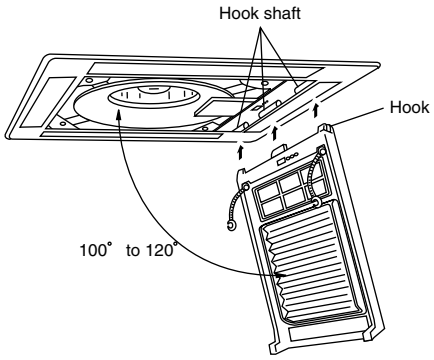


2. **Remove the wire(hanger).**
   Removing the intake grille by opening it 100° to 120°.

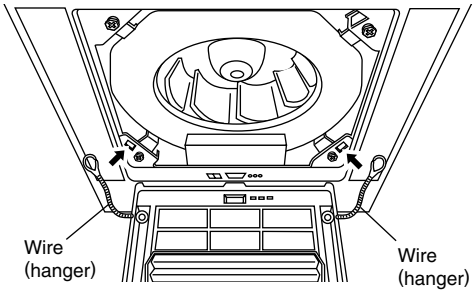


Installing the intake grille

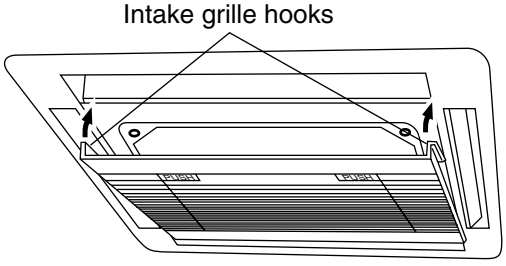
.1. Tilt the intake grille 100° to 120° and hook the three hooks to the intake grille hook shaft.



2. Install the wire(hanger).



3. Push the intake grille push buttons(two places) until you hear a “click”.

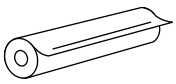
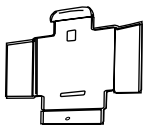
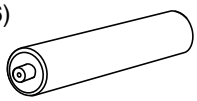
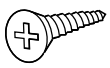
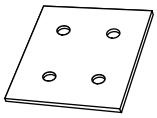
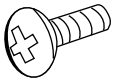


3. Hook the intake grille hooks to the grile assembly.

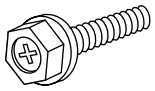
10. OPTIONAL PARTS

10.1 WIRELESS REMORE CONTROL MODEL

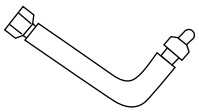
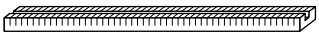
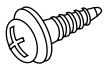
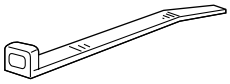
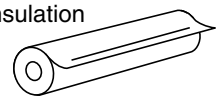
INDOOR UNIT ACCESSORIES

Name and Shape	Part No.
Insulation(pipe) 	9350716029 } 1 each 9352766015 }
Remote controller holder 	9304190004
Battery(R6P/LR6) 	0600188016
Screw: For installing the remote controller holder 	301141164144
Special nut A (large flange) 	313005446653
Special nut B (small flange) 	313005446759
Remote controller 	9355432061
Template 	9357168005
Machine screw (small) 	0700139024

GRILLE ACCESSORIES

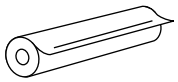
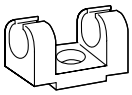
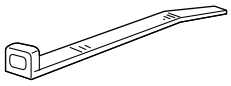
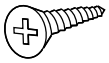
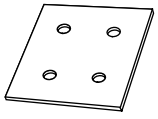
Name and Shape	Part No.
Bolt 	935006189001
Washer 	301801155020
Spring washer 	301821150218
Blower cover insulation 	9357227009

OUTDOOR UNIT ACCESSORIES

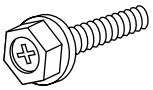
Name and Shape	Part No.					
	AO18 AO30	AO25	AO25(3)	AO30	AO36(3)	AO45(3)
Power cap 	———	———	———	9352173011	9352173011	9352173011
Auxiliary pipe assembly 	———	———	———	———	9355292016	9355292016
Edge cover 	———	———	———	9352436000	9352436000	9352436000
Tapping screws 	———	———	———	301463040100	301463040100	301463040100
Binder 	———	———	———	313035356905	313035356905	313035356905
Putty 	———	———	———	303020200114	303020200114	303020200114
Coupler heat insulation 	———	———	———	———	313005074759	313005074759
Hexagon wrench 	301980005800	301980005800	301980005800	———	———	———

10.2 LIQUID CRYSTAL WIRED REMOTE CONTROL MODEL

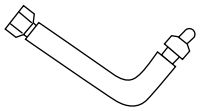
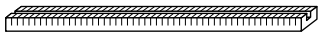
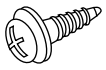
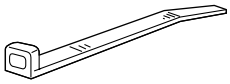
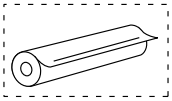
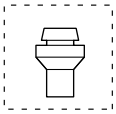
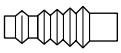
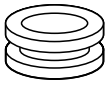
INDOOR UNIT ACCESSORIES

Name and Shape	Part No.
Insulation(pipe) 	9350716029 } 1 each 9352766015 }
Remote controller cord clamp 	313714181904
Binder 	313035356905 (Large)
	313361275805 (Small)
Screw : 	(A) 301141134166 For installing the mounting bracket
	(B) 301141153027 For installing the cord clamp
Special nut A (large flange) 	313005446653
Special nut B (small flange) 	313005446759
Remote controller 	9701673018
Template 	9357168005

GRILLE ACCESSORIES

Name and Shape	Part No.
Bolt 	9356189001
Washer 	301801155020
Spring washer 	301821150218
Blower cover insulation 	9357227009

OUTDOOR UNIT ACCESSORIES

Name and Shape	Part No.			
	AO18R	AO25R	AO36R(3)	AO45R(3)
Power cap 	———	———	9352173011	9352173011
Auxiliary pipe assembly 	———	———	9355292016	9355292016
Edge cover 	———	———	9352436000	9352436000
Tapping screws 	———	———	301463040100	301463040100
Binder 	———	———	313035356905	313035356905
Putty 	———	———	303020200114	303020200114
Coupler heat insulation 	———	———	313005074759	313005074759
Pipe (Drain) 	313728031005	313728031005	———	———
Flexible tube 	313013042915	313013042915	———	———
Cap (Drain) 	313166024302	313166024302	———	———
Hexagon wrench 	301980005800	301980005800	———	———