

Refrigerant R410A

MULTI SPLIT TYPE ROOM AIR CONDITIONER INSTALLATION INSTRUCTION SHEET

(PART NO. 9373557012)

WARNING	This mark indicates procedures which, if improperly performed, might lead to the death or serious injury of the user.
CAUTION	This mark indicates procedures which, if improperly performed, might possibly result in personal harm to the user, or damage to property.

This air conditioner uses new refrigerant HFC (R410A).

The basic installation work procedures are the same as conventional refrigerant (R22) models. However, pay careful attention to the following points:

- Since the working pressure is 1.6 times higher than that of conventional refrigerant (R22) models, some of the piping and installation and service tools are special. (See the table below.) Especially, when replacing a conventional refrigerant (R22) model with a new refrigerant R410A model, always replace the conventional piping and flare nuts with the R410A piping and flare nuts.
- Models that use refrigerant R410A have a different charging port thread diameter to prevent erroneous charging with conventional refrigerant (R22) and for safety. Therefore, check beforehand. (The charging port thread diameter for R410A is 1/2 UNF 20 threads per inch.)
- Be more careful that foreign matter (oil, water, etc.) does not enter the piping than with refrigerant (R22) models. Also, when storing the piping, securely seal the openings by pinching, taping, etc.
- When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.

Special tools for R410A

Tool name	Contents of change
Gauge manifold	Pressure is high and cannot be measured with a conventional gauge. To prevent erroneous mixing of other refrigerants, the diameter of each port has been changed. It is recommended the gauge with seals -0.1 to 5.3 MPa (-76 cmHg to 53 kgf/cm ²) for high pressure. -0.1 to 3.8 MPa (-76 cmHg to 38 kgf/cm ²) for low pressure.
Charge hose	To increase pressure resistance, the hose material and base size were changed.
Vacuum pump	A conventional vacuum pump can be used by installing a vacuum pump adapter.
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

Copper pipes

It is necessary to use seamless copper pipes and it is desirable that the amount of residual oil is less than 40 mg/10 m. Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface). Otherwise, the expansion valve or capillary tube may become blocked with contaminants. As an air conditioner using R410A incurs pressure higher than when using R22, it is necessary to choose adequate materials. Thicknesses of copper pipes used with R410A are as shown in Table 1. Never use copper pipes thinner than 0.8 mm (Nominal diameter is 1/4 in., 3/8 in., even when it is available on the market.

Table 1 Thicknesses of Annealed Copper Pipes

Nominal diameter (inch)	Outer diameter (mm)	Thickness (mm)	
		R410A	[ref.] R22
1/4	6.35	0.80	0.80
3/8	9.52	0.80	0.80

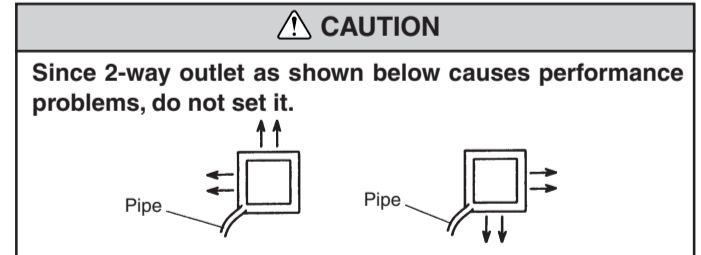
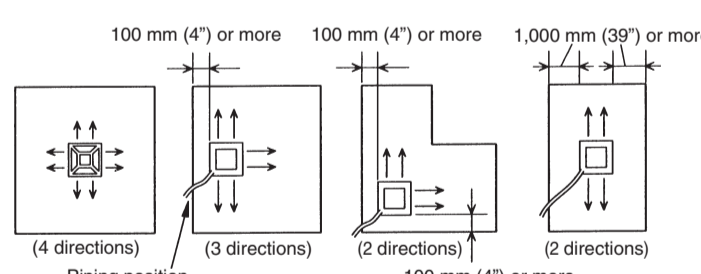
For authorized service personnel only.

- WARNING**
- For the room air conditioner to operate satisfactorily, install it as outlined in this installation instruction sheet.
 - Connect the indoor unit and outdoor unit with the room air conditioner piping and cords available from our standards parts. This installation instruction sheet describes the correct connections using the installation set available from our standard parts.
 - Installation work must be performed in accordance with national wiring standards by authorized personnel only.
 - 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 instruction sheet because it is used when the air conditioner is serviced or moved.

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 after the first installation. The discharge direction can be selected as shown below.

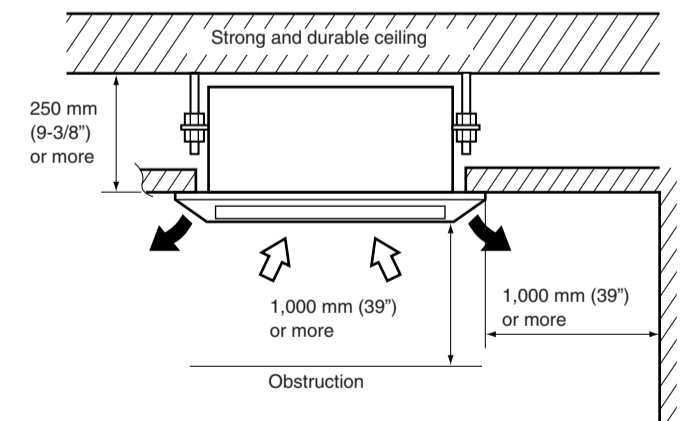
Fig. 1



INDOOR UNIT

- Install the indoor unit on a place having a sufficient strength so that it withstands against the weight of the indoor unit.
- The inlet and outlet ports should not be obstructed; the air should be able to blow all over the room.
- Leave the space required to service the air conditioner. (Fig. 2)
- The ceiling rear height is 250 mm (9-3/8") or more.
- A place from where the air can be distributed evenly throughout the room by the unit.
- A place from where drainage can be extracted outdoors easily.

Fig. 2



OUTDOOR UNIT

To select the mounting position of the outdoor unit, refer to the installation instruction sheet included with the outdoor unit.

STANDARD PARTS

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

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 control unit	1	Use for air conditioner operation
Battery (penlight)	2	For remote control unit
Remote control unit holder	1	For mounting the remote control unit
Tapping screw (ø3 × 12)	2	For remote control unit holder installation

GRILLE ACCESSORIES

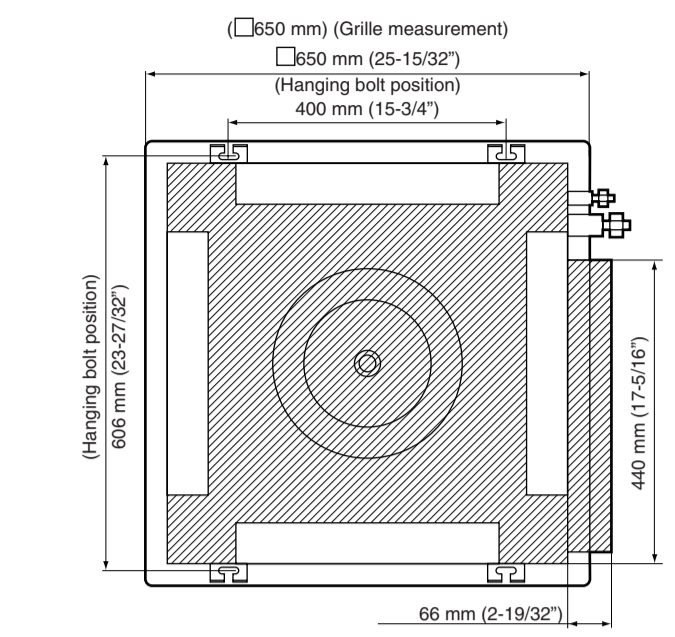
Name and Shape	Q'ty	Application
Bolt	4	For mounting grille
Washer	4	For mounting grille
Blower cover insulation	2	For discharged air

INSTALLATION PROCEDURE

Install the room air conditioner as follows:

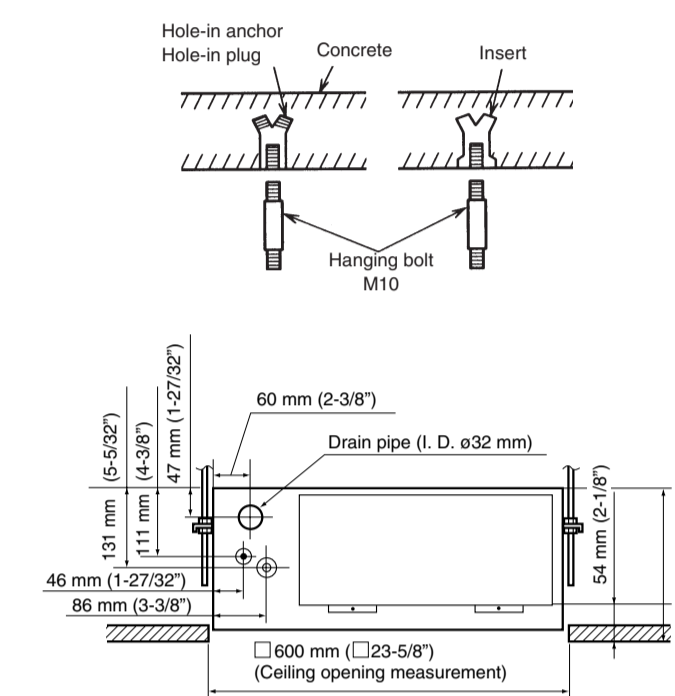
1 INDOOR UNIT INSTALLATION

1. Position the ceiling hole and hanging bolts.



2. Hanging preparations

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



3. Body installation

- Install special nut A, then special nut B onto the hanging bolt.
 - Raise the body and mount its hooks onto the hanging bolt between the special nuts.
 - Turn special nut B to adjust the height of the body.
 - Leveling
- Using a level, or vinyl hose filled with water, fine adjust so that the body is level. (Fig. 1-1)

WARNING

Perform final tightening by tightening the double nut firmly.

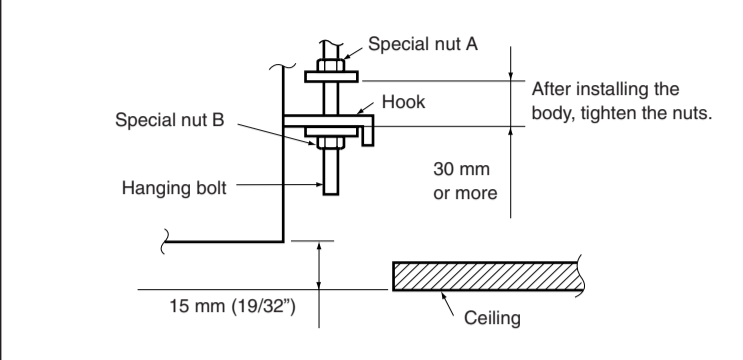
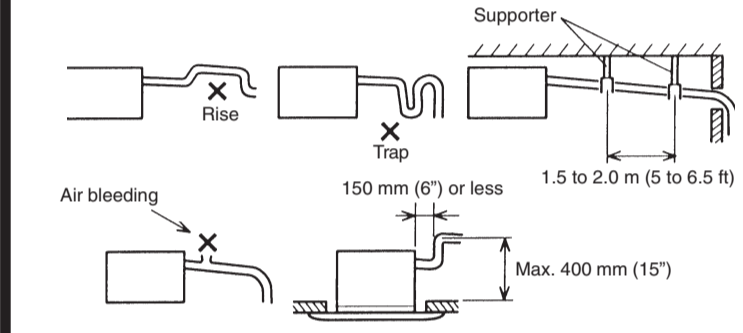


Fig. 1-1

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 32 mm (1-1/4")) 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 400 mm (15") or less from the ceiling within a range of 150 mm (6") from the body. A rise dimension over this range will cause leakage.



3 CONNECTING THE PIPING

WARNING

Do not use the existing (for R22) piping and flare nuts.

- If the existing materials are used, the pressure inside the refrigerant cycle will rise and cause breakage, injury, etc. (Use the special R410A materials.)

CAUTION

- Do not use mineral oil on flared part. Prevent mineral oil from getting into the system as this would reduce the lifetime of the units.
- While welding the pipes, be sure to blow dry nitrogen gas through them.
- The maximum lengths of this product are shown in table 2. If the units are further apart than this, correct operation can not be guaranteed.

1. FLARING

- Cut the connection pipe to the necessary length with a pipe cutter.
 - Hold the pipe downward so that cuttings will not enter the pipe and remove the burrs.
 - Insert the flare nut (always use the flare nut attached to the indoor and outdoor units respectively) onto the pipe and perform the flare processing with a flare tool.
- Use the special R410A flare tool, or the conventional (for R22) flare tool.

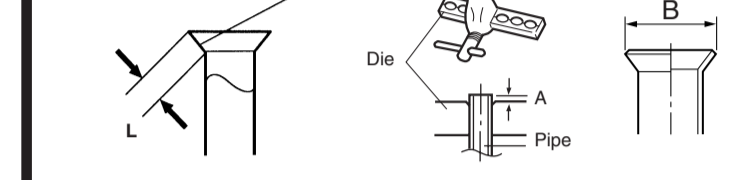


Table 3-1 Flaring dimension: B

Pipe outside diameter	B (mm)	
	For R410A	For R22
6.35 mm (1/4 in.)	9.1	9.0
9.52 mm (3/8 in.)	13.2	13.0

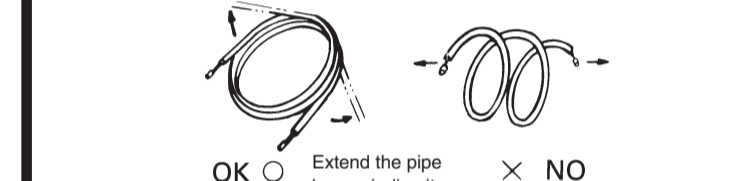
When using conventional flare tools (for R22 pipes) to flare R410A pipes, the dimension A should be approximately 0.5 mm more than indicated in Table 3-2 (for flaring with R410A flare tools) to achieve the specified flaring. Use a thickness gauge to measure the dimension A.

Table 3-2 Pipe outside diameter

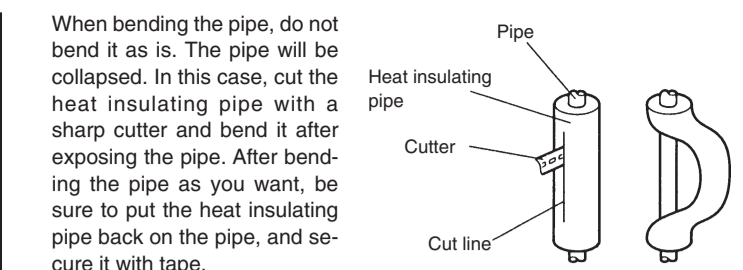
Pipe outside diameter	A (mm)			
	Flare tool for R410A, clutch type	Conventional (R22) flare tool Clutch type	Wing nut type	Wing nut type
6.35 mm (1/4 in.)	0 to 0.5	1.0 to 1.5	1.5 to 2.0	1.5 to 2.0
9.52 mm (3/8 in.)	0 to 0.5	1.0 to 1.5	1.5 to 2.0	1.5 to 2.0

2. Bending pipes

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



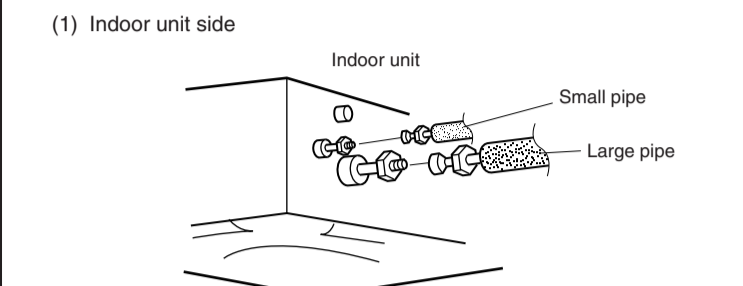
Do not bend the pipes in an angle more than 90°. When pipes are repeatedly bent or stretched, the material will harden, making it difficult to bend or stretch them any more. Do not bend or stretch the pipes more than three times.



CAUTION

- To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 70 mm or over.
- If the pipe is bent repeatedly at the same place, it will break.

3. Connection pipes



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

After matching the center of the flare surface and tightening the nut hand tight, tighten the nut to the specified tightening torque with a torque wrench.

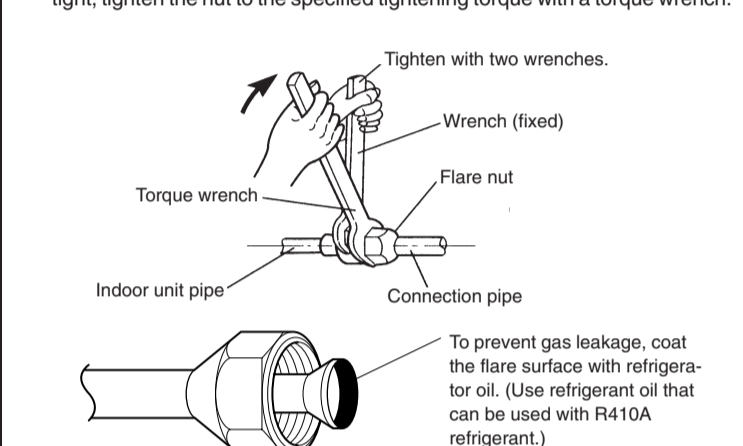


Table 3-3 Flare nut tightening torque

Flare nut	Tightening torque	Tightening torque standard (using a 20 cm wrench)
6.35 mm dia.	16 to 18 N·m (160 to 180 kgf·cm)	Wrist strength
9.52 mm dia.	30 to 42 N·m (300 to 420 kgf·cm)	Arm strength

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

CONNECTION PIPE REQUIREMENT

Table 2

Diameter	Maximum length	Maximum Height (between indoor and outdoor)	
			Small
6.35 mm (1/4 in.)	9.52 mm (3/8 in.)	15 m (49 ft) × 2	8 m (26 ft)

• Use pipe with water-resistant heat insulation.

CAUTION

Install heat insulation around both the gas and liquid pipes. Failure to do so may cause water leaks. Use heat insulation with heat resistance above 120 °C. (Reverse cycle model only)

In addition, if the humidity level at the installation location of the refrigerant piping is expected to exceed 70%, install heat insulation around the refrigerant piping. If the expected humidity level is 70-80%, use heat insulation that is 15 mm or thicker and if the expected humidity exceeds 80%, use heat insulation that is 20 mm or thicker. If heat insulation is used that is not as thick as specified, condensation may form on the surface of the insulation. In addition, use heat insulation with heat conductivity of 0.045 W/(m·K) or less (at 20 °C).

ELECTRICAL REQUIREMENT

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

INDOOR UNITS-OUTDOOR UNIT CONNECTIONS

CAUTION

When connecting indoor units with different outputs (7000 and 12000 BTU) to the outdoor unit, connect the 12000 BTU indoor unit to the unit A connection port and the 7000 BTU indoor unit to the unit B connection port.

4 VACUUM PROCESS

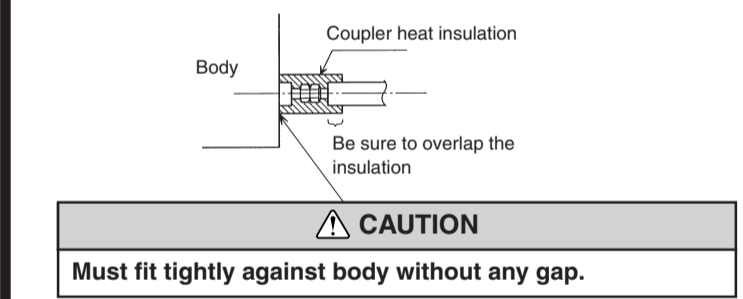
CAUTION

- Do not purge the air with refrigerants but use a vacuum pump to vacuum the installation! There is no extra refrigerant in the outdoor unit for air purging!
- Use a vacuum pump for R410A exclusively. Using the same vacuum pump for different refrigerants may damage the vacuum pump or the unit.

For details, refer to the installation instruction sheet included with the outdoor unit.

5 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.



CAUTION

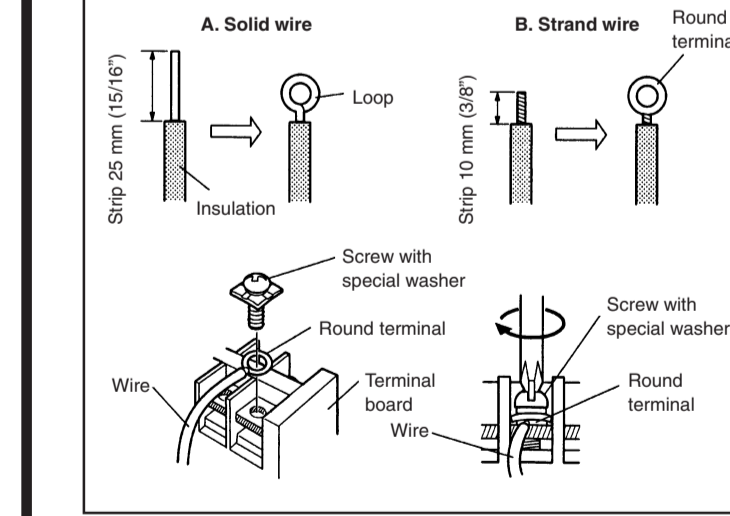
Must fit tightly against body without any gap.



6 ELECTRICAL WIRING

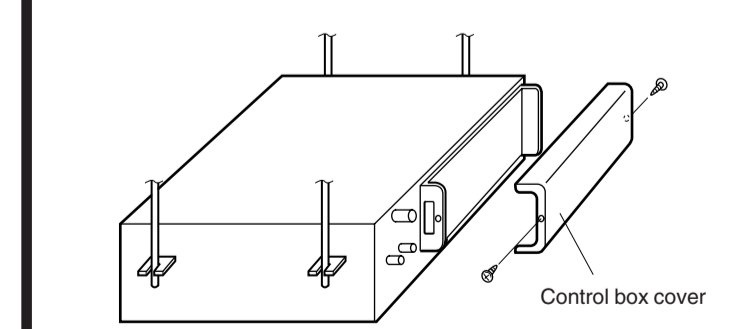
HOW TO CONNECT WIRING TO THE TERMINALS

- A. For solid core wiring (or F-cable)**
- Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 25 mm (15/16") of expose the solid wire.
 - Using a screwdriver, remove the terminal screw(s) on the terminal board.
 - Using pliers, bend the solid wire to form a loop suitable for the terminal screw.
 - 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**
- Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 10 mm (3/8") of expose the strand wiring.
 - Using a screwdriver, remove the terminal screw(s) on the terminal board.
 - Using a round terminal fastener or pliers, securely clamp a round terminal to each stripped wire end.
 - Position the round terminal wire, and replace and tighten the terminal screw using a screwdriver.

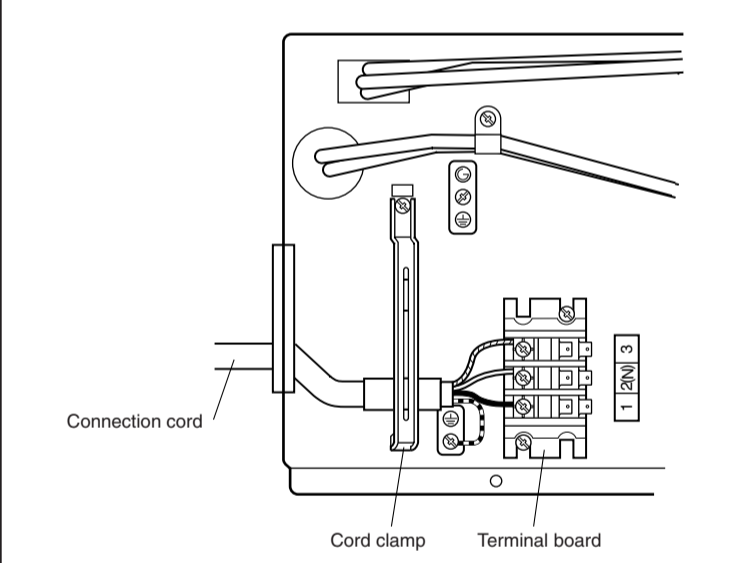


1. Indoor unit side

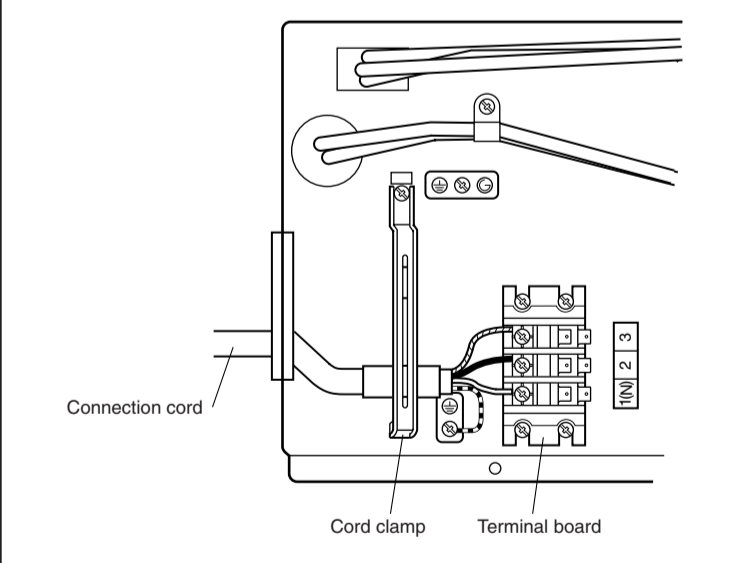
- Remove the control box cover and install the connection cord.



[Heat & Cool model (Reverse cycle)]



[Cooling model]



2. Outdoor unit side

As for the connection with the outdoor unit, refer to the installation instruction sheet of a belonging to the outdoor unit.

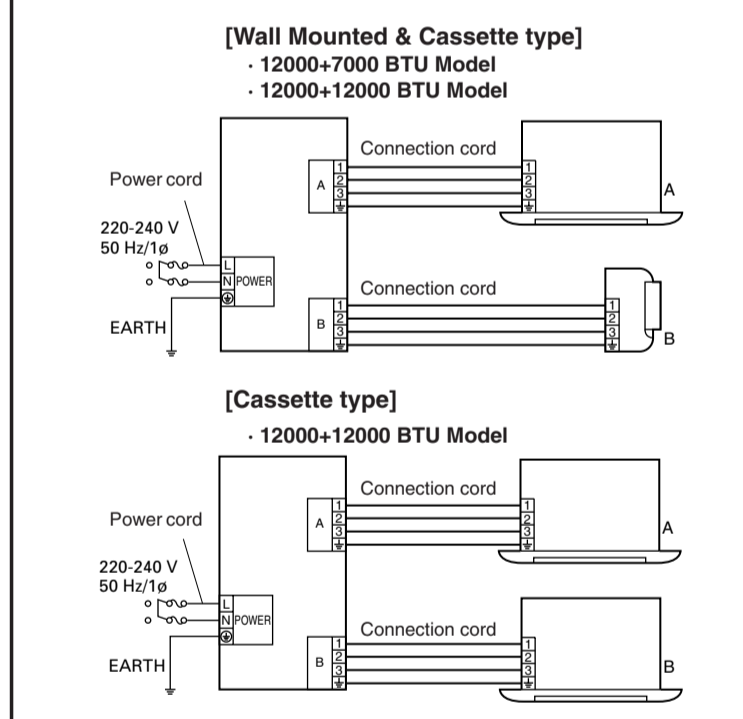
CAUTION

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

- 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.

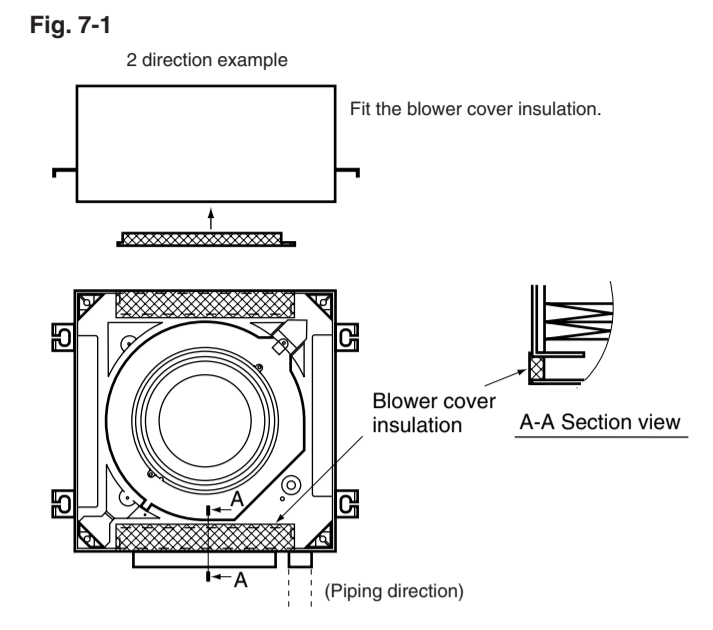
For details, refer to the installation instruction sheet included with the outdoor unit.

Indoor and outdoor wire connection

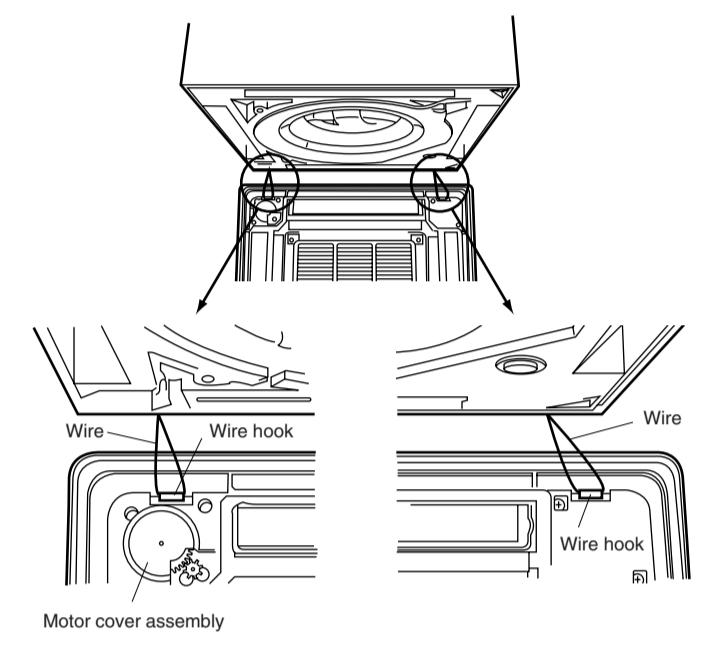


7 GRILLE INSTALLATION

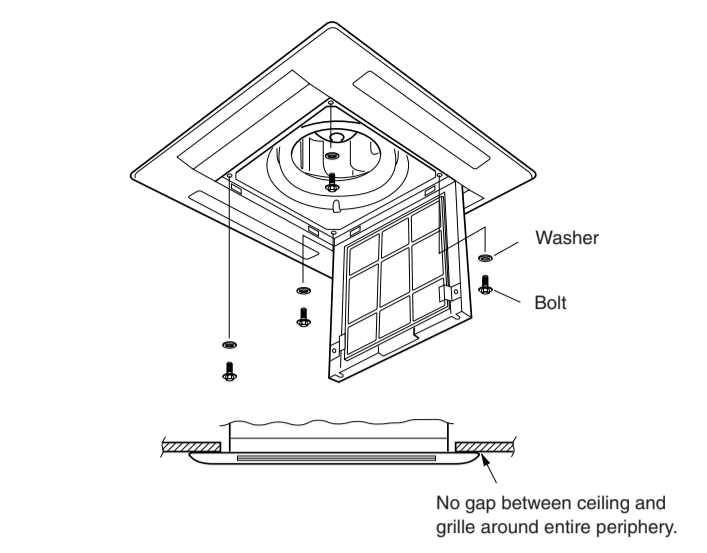
1. Blower cover insulation
Install the blower cover insulation only when the outlet direction is not specified.
Two blower cover insulations are packed with the grille assembly. Install the blower cover insulation at the diffuser position shown in Fig. 7-1. At the time, use the piping position as the criteria.



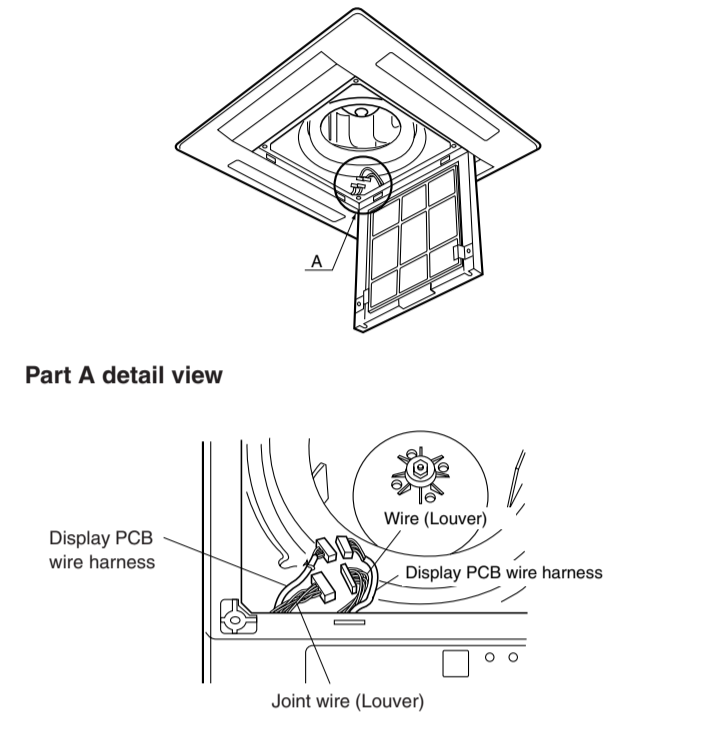
2. Installing grille assembly to body
Hang the grille assembly on the wires attached to the indoor unit.



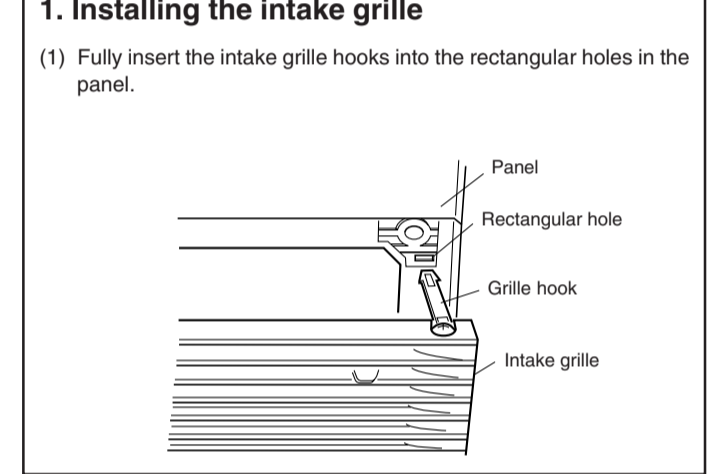
Bolting the grille assembly to the body
Install the grille assembly to the body with the four bolts, spring washers, and washers.



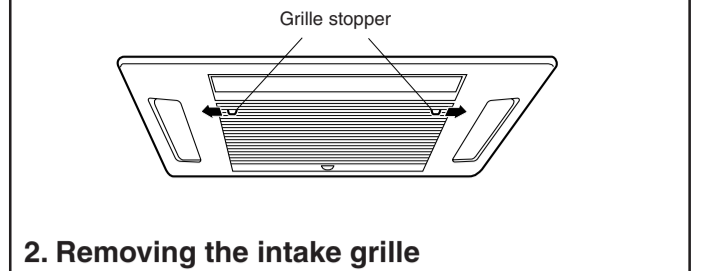
Wireless unit connection wire wiring
Connect the connector in accordance with Part A detail view. Then clamp the lead wire with clamp so that it does not touch the rotating parts.



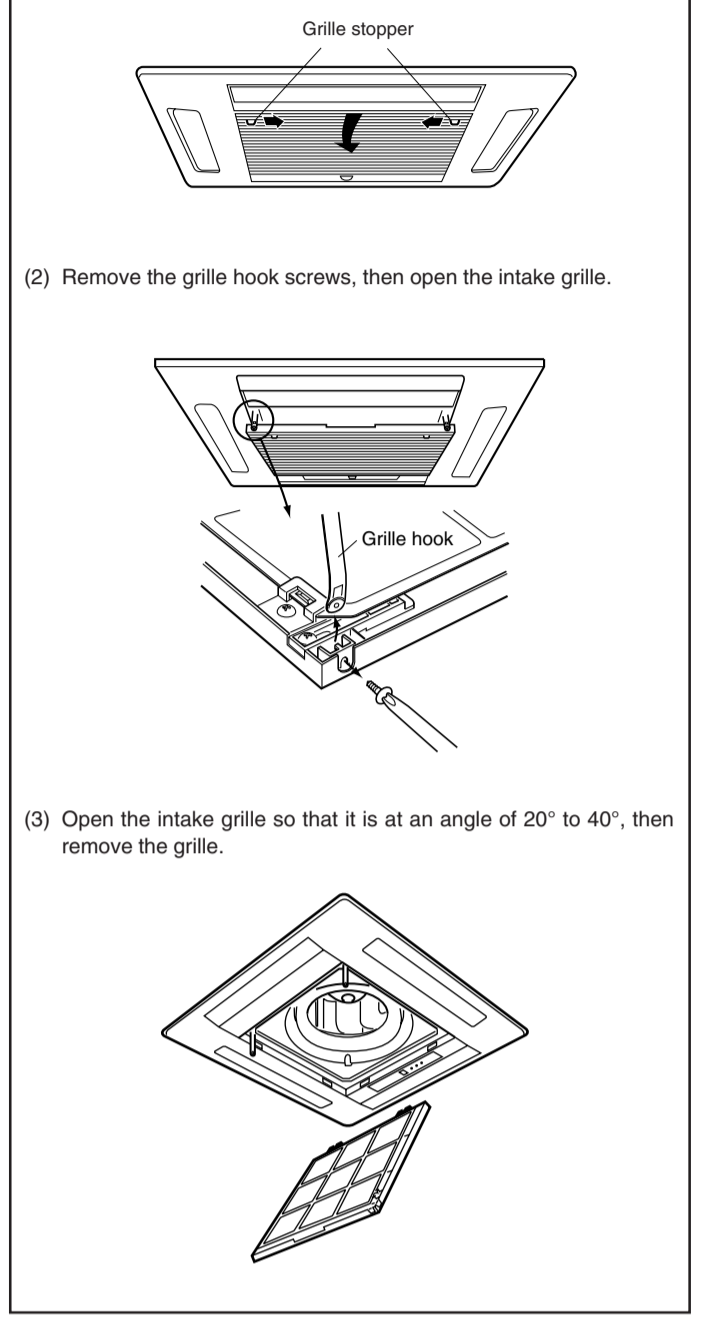
INSTALLING/REMOVING THE INTAKE GRILLE



8 POWER



2. Removing the intake grille



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.

(3) Install so that there is no gap between the grille assembly and the air conditioner body.

9 REMOTE CONTROL UNIT INSTALLATION

WARNING

(1) The rated voltage of this product is 230 V A.C. 50 Hz.

(2) Before turning on the verify that the voltage is within the 198 V to 264 V range.

(3) Always use a special branch circuit and install a special breaker to supply power to the room air conditioner.

(4) Use a circuit breaker matched to the capacity of the air conditioner. (Install in accordance with standard)

(5) The circuit breaker is installed in the permanent wiring. Always use a circuit that can trip all the poles of the wiring and has an isolation distance of at least 3 mm between the contacts of each pole.

(6) Perform wiring work in accordance with standards so that the room air conditioner can be operated safely and positively.

(7) Install a leakage circuit breaker in accordance with the related laws and regulations and electric company standards.

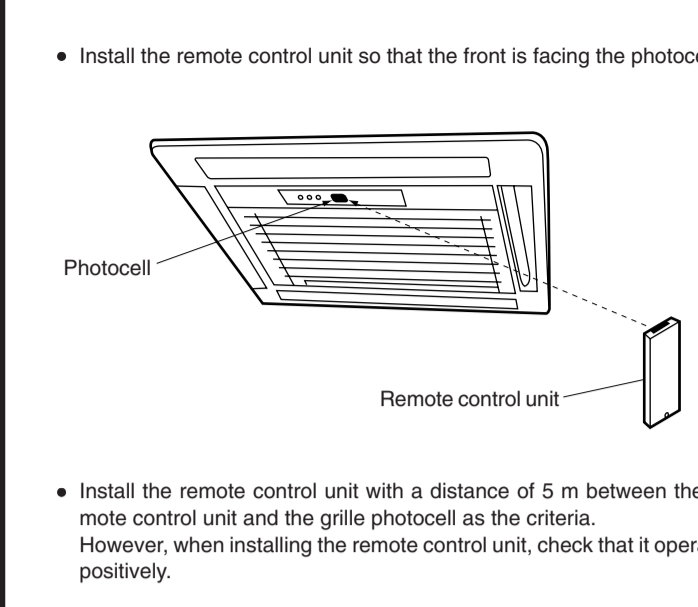
CAUTION

(1) The power source capacity must be the sum of the air conditioner current and the current of other electrical appliances. When the current contracted capacity is insufficient, change the contracted capacity.

(2) When the voltage is low and the air conditioner is difficult to start, contact the power company the voltage raised.



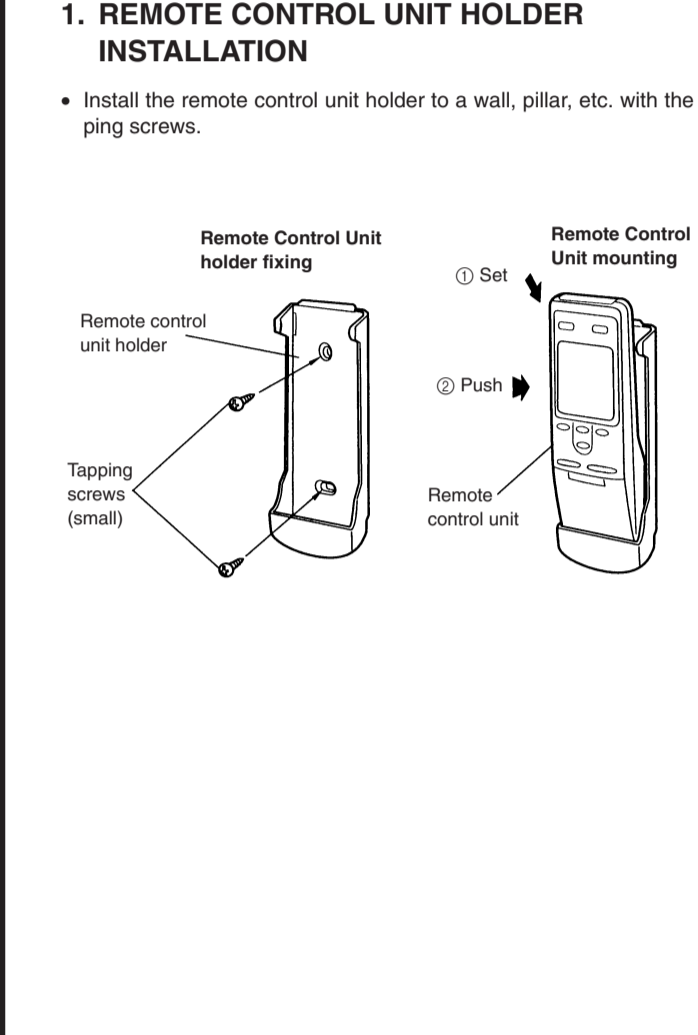
2. SWITCHING REMOTE CONTROL UNIT SIGNAL CODES



CAUTION

(1) Check that the indoor unit correctly receives the signal from the remote control unit, then install the remote control unit holder.

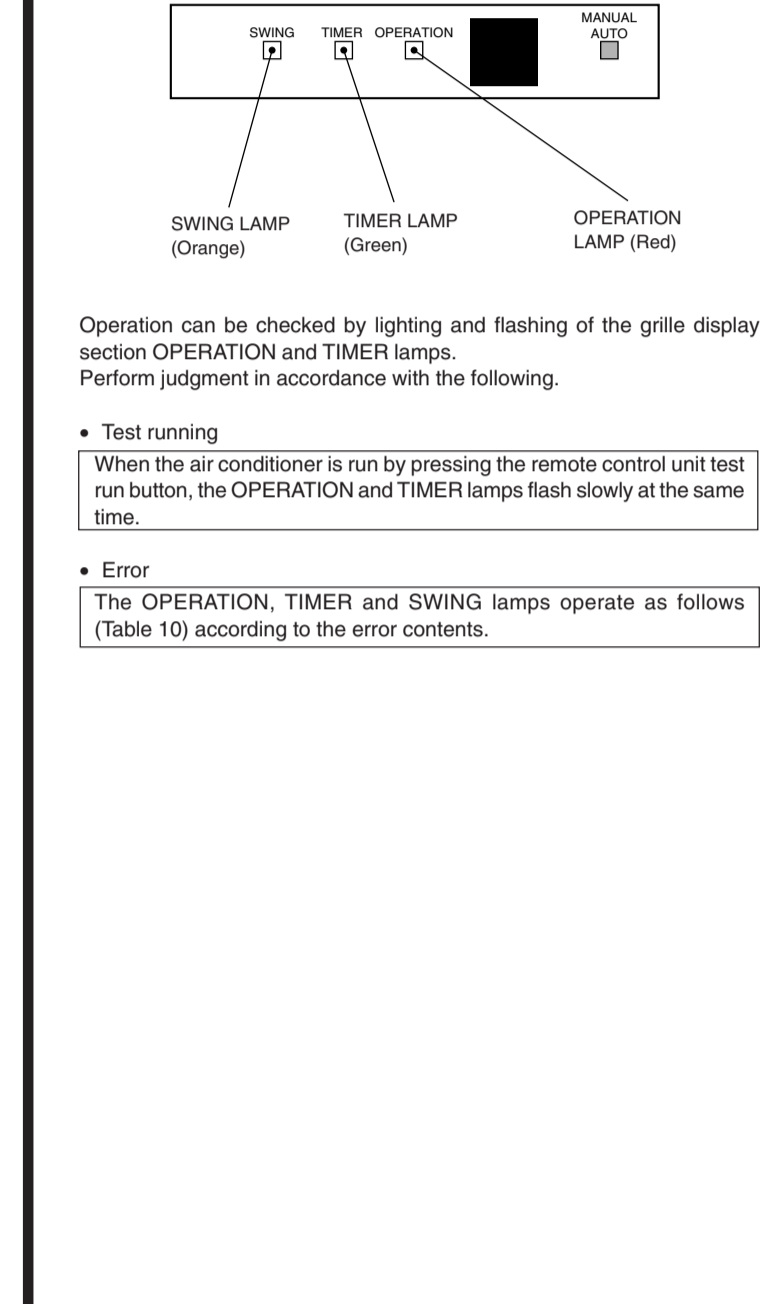
(2) Select the remote control unit holder selection site by paying careful attention to the following:
Avoid places in direct sunlight.
Select a place that will not be affected by the heat from a stove, etc.



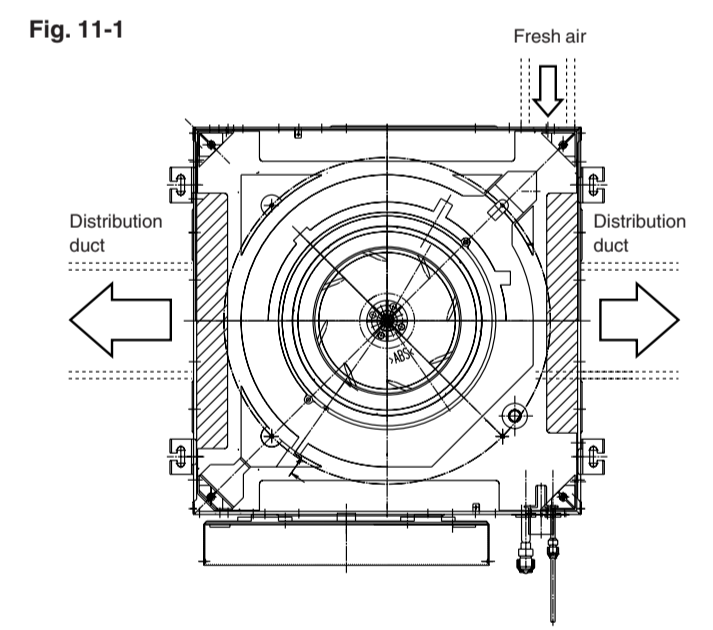
10 TEST RUNNING

• Perform test operation and check items 1 and 2 below.
• For the operation method, refer to the operating manual.
• The outdoor unit may not run, depending on the room temperature.
• In this case, the 'TEST RUN' signal is received during air conditioner operation (use a metallic object to short the two metal contacts under the battery compartment lid and send the 'TEST RUN' signal from the remote control unit).

• To end test operation, press the remote control unit START/STOP button. (When the air conditioner is run by pressing the remote control unit TEST RUN button, the OPERATION and TIMER lamps will simultaneously flash slowly.)

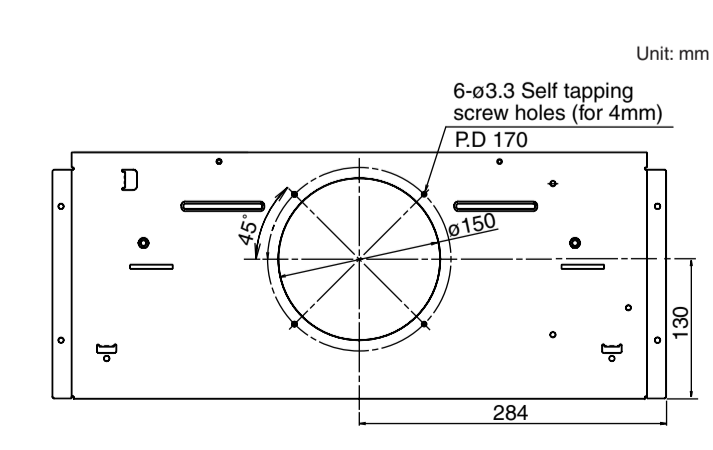
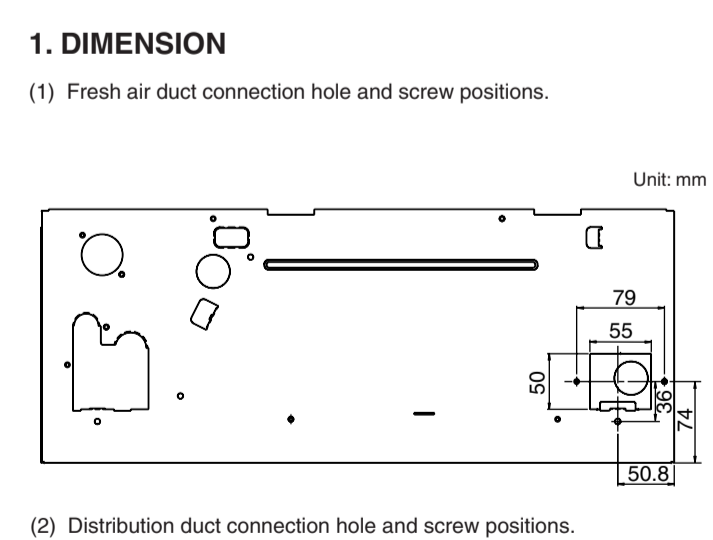


11 OPENING THE DUCT CONNECTION HOLE



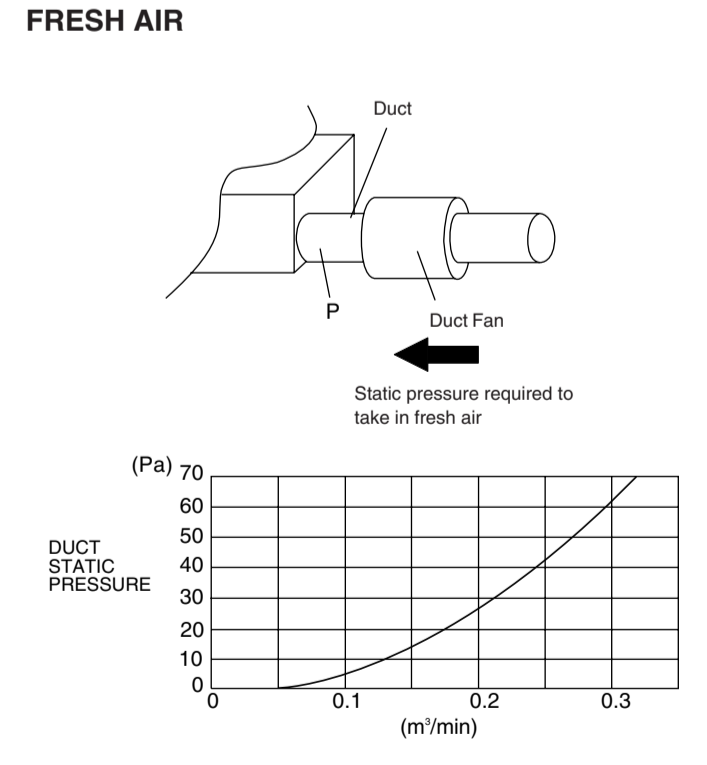
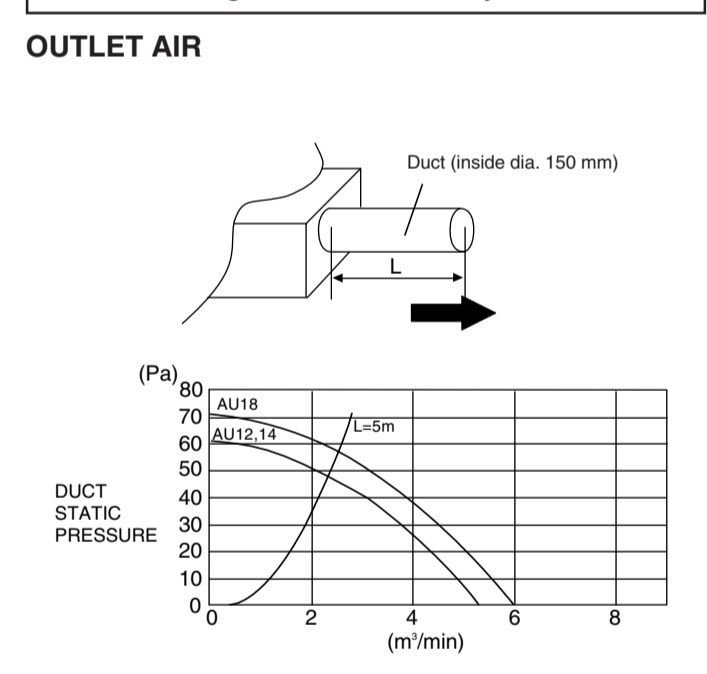
1. DIMENSION

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

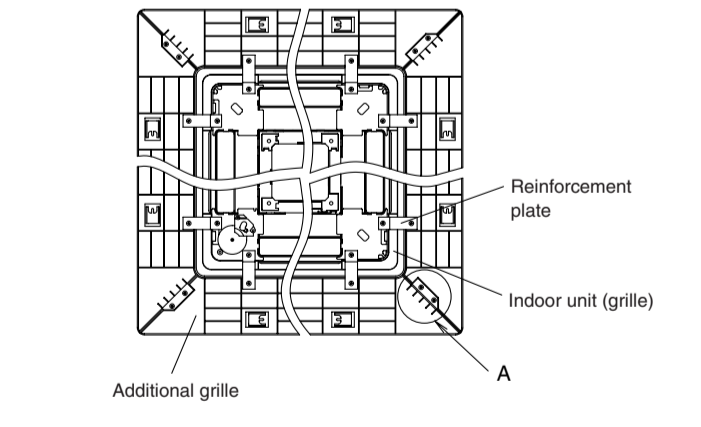
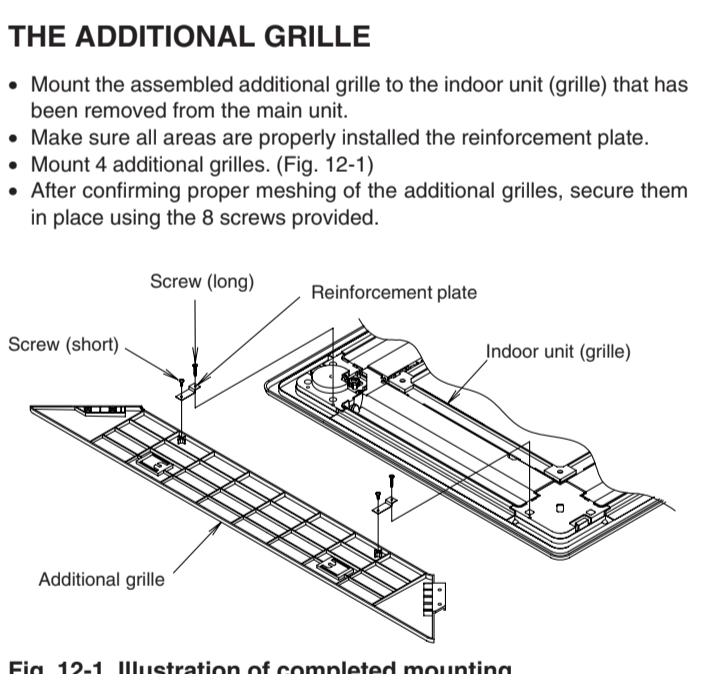


CAUTION

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



12 INSTALLING THE OPTION PARTS (ADDITIONAL GRILLE)



CAUTION

When installing the additional grille, please refer to the installation instruction sheet supplied with the additional grille.