

# SPLIT TYPE AIR CONDITIONER

## Ceiling Suspension Type

### INSTALLATION MANUAL

(PART NO. 9361156012-02)  
For authorized service personnel only.

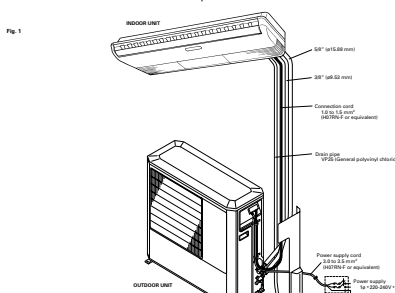
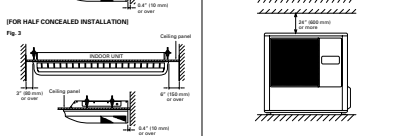
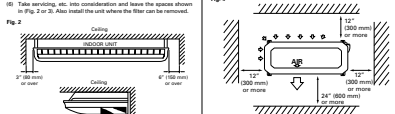
- WARNING**
- For the air conditioner to operate satisfactorily, install it as outlined in this installation manual.
  - Installation work must be performed in accordance with national wiring standards by authorized personnel only.
  - Do not turn on the power until all installation work is complete.

- Be careful not to scratch the air conditioner when handling it.
- After installation, verify 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.

#### SELECTING THE MOUNTING POSITION

- WARNING**
- Install the unit where it will not be tilted by more than 5°.
  - When installing the outdoor unit where it may be exposed to strong wind, fasten it securely.
- CAUTION**
- Do not install where there is the danger of combustible gas leakage.
  - Do not install the unit near a source of heat, steam, or flammable gas.
  - If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.

- Observe the mounting position with the customer as follows:
- INDOOR UNIT**
    - Install the indoor unit level on a strong wall which is not subject to vibration.
    - The inlet and outlet ports should not be obstructed: the air should be able to circulate all over the room.
    - Do not install the unit where it will be exposed to direct sunlight.
    - Install the unit where the drain pipe can be easily installed.
    - Take wiring, etc. into consideration and leave the space shown in Fig. 2 or 3. Also install the unit where the filter can be removed.



#### STANDARD PARTS

The following standard parts are included. Use them as required.

##### INDOOR UNIT ACCESSORIES

Name and Shape	Qty	Application
Remote control unit	1	Use for air conditioner operation
Battery (penlight)	4	For remote control unit
Remote control unit holder	1	For mounting the remote control unit
Refrigerant gauge (set 12)	3	For remote control unit holder installation
Drain hose insulation	1	Adhesive tape 70 x 230
VT wire	1	For fixing the drain hose (1.200 mm)
Coupler heat insulator (large)	2	For indoor side pipe joint large pipe
Coupler heat insulator (small)	1	For indoor side pipe joint small pipe
Nylon fastener	1	For fixing the coupler heat insulator
Special nut A (large flange)	4	For installing indoor unit
Special nut B (small flange)	4	For installing indoor unit
Installation template	1	For positioning the indoor unit
Accessory pipe assembly	1	For connecting the piping

##### OUTDOOR UNIT ACCESSORIES

Wrench (open-end)	1	For opening the refrigerant valve on the outdoor unit
Cable clip	2	For power cord binding
Flange nut (small)	1	For fixing the valve cover
Drain pipe	1	For outdoor unit drain piping work (Flange & Coupler Reverse cycle model only)
Drain size	2	

#### CONNECTION PIPE REQUIREMENT

Table 1						
<table border="1"> <thead> <tr> <th>Dimensions</th> <th>Large</th> <th>Small</th> </tr> </thead> <tbody> <tr> <td>Outer diameter</td> <td>58* (ø1.88 mm)</td> <td>38* (ø1.22 mm)</td> </tr> </tbody> </table>	Dimensions	Large	Small	Outer diameter	58* (ø1.88 mm)	38* (ø1.22 mm)
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Outer diameter	58* (ø1.88 mm)	38* (ø1.22 mm)				

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

#### ELECTRICAL REQUIREMENT

Electric wire size and load-carrying capacity

Table 2	
Power supply cord (mm <sup>2</sup> )	MAX. 3.0
Connection cord (mm <sup>2</sup> )	MIN. 3.0
MAX. 1.6	
Connection cord (mm <sup>2</sup> )	MIN. 1.2
MAX. 1.2	

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

#### INSTALLATION PROCEDURE

Install the air conditioner as follows:

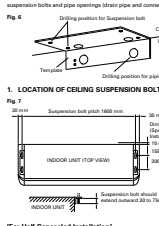
##### 1. PREPARING INDOOR UNIT INSTALLATION

###### REMOVE THE INTAKE GRILLE AND SIDE COVER

- Remove the top Air Filter (Fig. 5).
- Remove the two intake grilles (Fig. 5).
  - For (L) Left side and (R) Right side: Remove Air Filter and intake grille at three places. (Refer to **INDOOR UNIT INSTALLATION**.)
  - For (L) Left side: Remove both the Side cover A (Right and Left side). (Refer to **INDOOR UNIT INSTALLATION**.)
  - For (R) Right side: Remove both the Side cover B (Right and Left side).
- Remove the Side cover A (Right side) and Side cover B (Left side).
  - For (L) Left side: Remove both the Side cover A (Right and Left side). (Refer to **INDOOR UNIT INSTALLATION**.)
  - For (R) Right side: Remove both the Side cover B (Right and Left side). (Refer to **INDOOR UNIT INSTALLATION**.)

##### 2. INDOOR UNIT INSTALLATION

You can use the necessary template to help you install the indoor unit. The template helps you determine the appropriate locations for suspension bolts and pipe openings (drain pipe and connection cords).

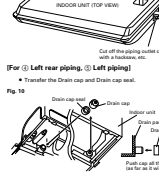


##### 3. DRILLING THE HOLES AND ATTACHING THE SUSPENSION BOLTS

- Drill ø25mm holes at the suspension-bolt locations.
- Install the bolts, then temporarily attach Special nut A and B and a normal M10 nut to each bolt. (The two special nuts are provided with the unit. The M10 nut must be obtained locally.) (Refer to Fig. 11.)

##### 4. INSTALLING THE INDOOR UNIT

When the indoor unit is level, tighten the suspension bolts.



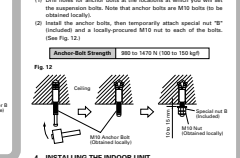
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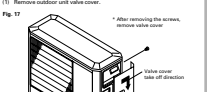
##### 4. INSTALLING THE INDOOR UNIT

When the indoor unit is level, tighten the suspension bolts.

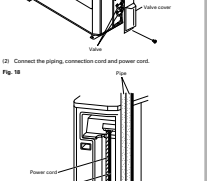


##### 2. OUTDOOR UNIT CONNECTION CORD AND PIPE CONNECTION PREPARATIONS

###### 1. REMOVE OUTDOOR UNIT VALVE COVER

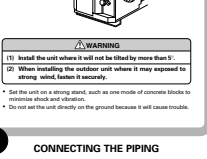


###### 2. CONNECT THE PIPING, CONNECTION CORD AND POWER CORD



###### 3. CONNECTING THE PIPING

When the indoor unit is level, tighten the suspension bolts.



###### 4. LIMITATION OF REFRIGERANT PIPING LENGTH

Table 2		
Max length (L)	Cutting model	59.9 (200 m)
	Heat & Cool model (Reverse cycle)	62.9 (205 m)
	Max. height (difference H)	19.9 (19 m)

###### 5. FLARE PROCESSING

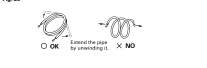
- Cut the connection pipe with pipe cutters so that the pipe is not deformed.
- Hold the pipe clamped at the outdoor unit pipe and indoor unit pipe, and assemble it as shown in (Table 4) and insert the flare nut onto the pipe and turn with a flange nut.
- Check if the flare part "L" (Fig. 19) is inserted uniformly and that there are no cracks.

###### 6. TIGHTENING TORQUE

Table 3: Flare nut tightening torque	
Small pipe (ø1.22 mm d.i.)	210 to 250 kgf-cm (20 to 24.3 N-m)
Large pipe (ø1.58 mm d.i.)	370 to 400 kgf-cm (37 to 39.2 N-m)

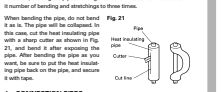
###### 7. BENDING PIPES

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

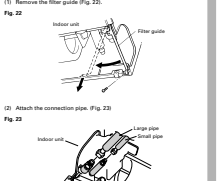


##### 4. CONNECTION PIPES

###### INDOOR UNIT SIDE

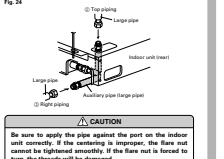


###### OUTDOOR UNIT SIDE



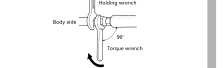
###### CONNECTING THE PIPING

When the indoor unit is level, tighten the suspension bolts.



###### 7. BENDING PIPES

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

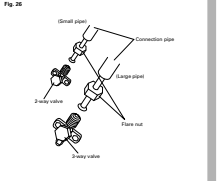


###### 8. TIGHTENING TORQUE

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Small pipe (ø1.22 mm d.i.)	210 to 250 kgf-cm (20 to 24.3 N-m)
Large pipe (ø1.58 mm d.i.)	370 to 400 kgf-cm (37 to 39.2 N-m)

###### 9. 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 at the indoor unit.



**AIR PURGE**

- 1. AIR PURGE**
  - Remove the cap, and connect the gauge manifold and the vacuum pump to the charging valve by the service hoses.
  - Vacuum the indoor unit and the connecting pipes until the pressure in them lowers to below 1.5 mmHg.
  - Disconnect the service hoses and fit the cap to the charging valve (Tightening torque : 70 to 90 kgf • cm).
  - 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).
  - Tighten the blank caps of the 2-way valve and 3-way valve to the specified torque (200 to 250 kgf • cm).

Fig. 27

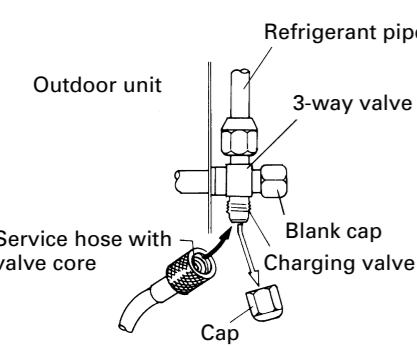
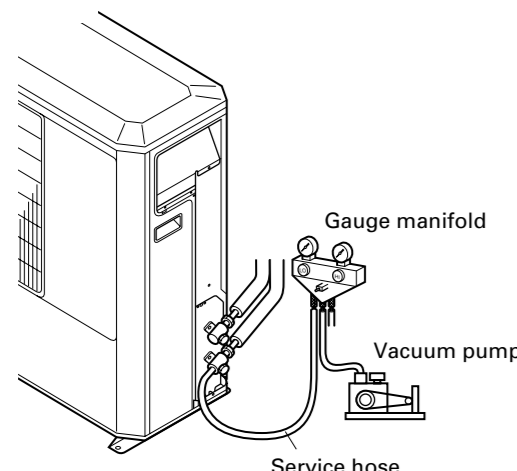


Fig. 28



**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 6

Pipe length (5 m)	Additional refrigerant				
	Heat & Cool (Reverse cycle)	Cooling model	Heat & Cool (Reverse cycle)	Cooling model	Heat & Cool (Reverse cycle)
16 ft (5 m)	None	None	7.1 oz (200 g)	3.0 oz (85 g)	—
33 ft (10 m)	None	None	14.1 oz (400 g)	6.0 oz (170 g)	—
49 ft (15 m)	21.2 oz (600 g)	9.0 oz (255 g)	21.2 oz (600 g)	12.0 oz (340 g)	—
66 ft (20 m)	28.2 oz (800 g)	15.0 oz (425 g)	28.2 oz (800 g)	15.0 oz (425 g)	—

Between 5 m and 30 m, when using a connection pipe other than that in the table, charge additional refrigerant with 1.8 oz (40 g) / 3.3 ft (1 m) (Reverse cycle model), 0.6 oz (17 g) / 3.3 ft (1 m) (Cooling model) as the criteria.

**CAUTION**

- When moving and installing the air conditioner, do not mix gas other than the specified refrigerant (R22) inside the refrigerant cycle.
- When adding refrigerant, add the refrigerant from the charging valve at the completion of work.
- If the units are further apart than the maximum pipe length, correct operation can not be guaranteed.

**GAS LEAKAGE INSPECTION**

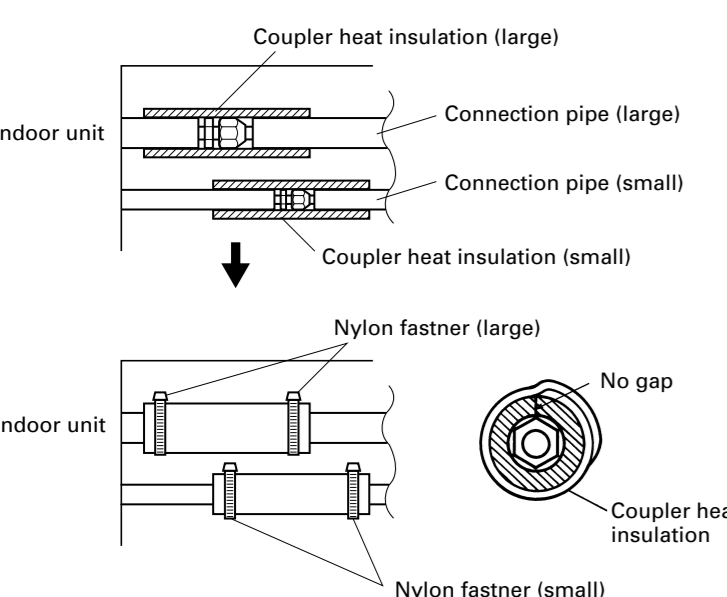
**CAUTION**

After connecting the piping, check the joints for gas leakage with gas leak detector.

**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. Secure both ends of the heat insulation material using nylon fasteners.

Fig. 29



- When using an auxiliary pipe, make sure that the fastener used is insulated in the same way.

**DRAIN PIPING**

- 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 38 mm].
- During installation of the drain pipe, be careful to avoid applying pressure to the drain port of the indoor unit.
- When the pipe is long, install supporters (Fig. 30).
- Do not perform air bleeding.
- Always heat insulate (8mm or over thick) the indoor side of the drain pipe.

Fig. 30

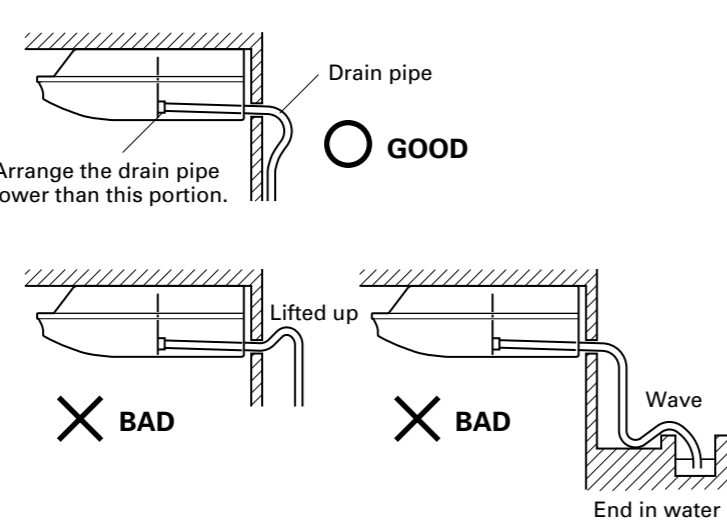
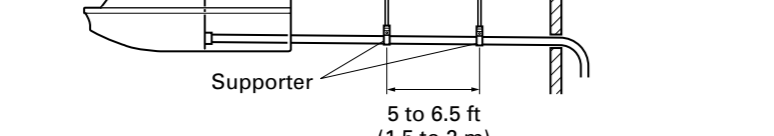


Fig. 31



- Install insulation for the drain pipe. (See Figs. 31 and 32.) Cut the included insulation material to an appropriate size and adhere it to the pipe.

Fig. 32

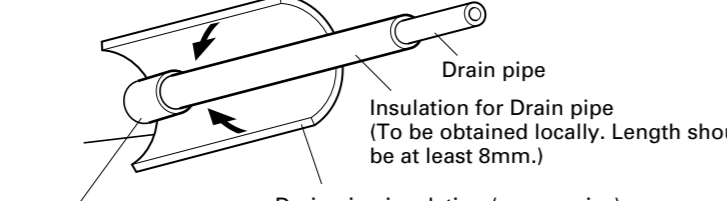
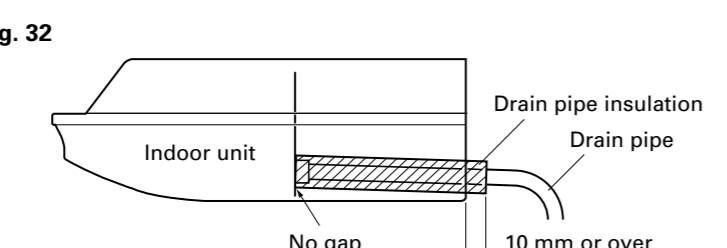


Fig. 33



- If "Ⓞ Right rear piping": fasten the drain pipe with VT wire so that the pipe slopes correctly within the indoor unit. (Fig. 33)

**ELECTRICAL WIRING**

**HOW TO CONNECT WIRING TO THE TERMINALS**

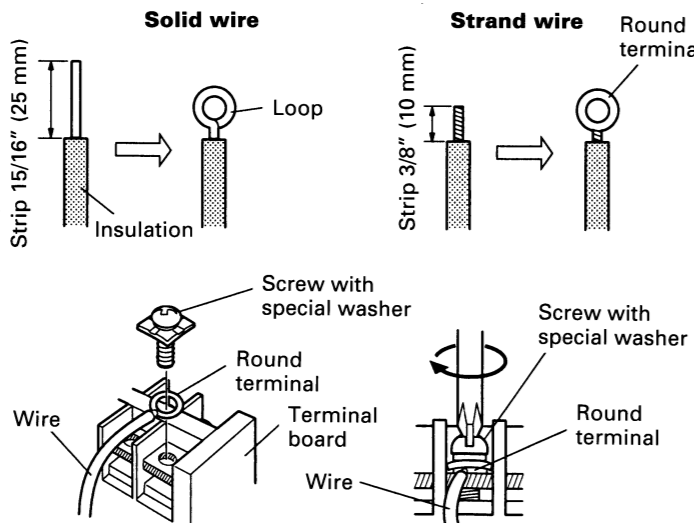
**A. For solid core wiring (or F-cable)**

- Cut the wire and with a wire cutter or wire-cutting pliers, then strip the insulation to about 15/16" (25 mm) 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 and with a wire cutter or wire-cutting pliers, then strip the insulation to about 3/8" (10 mm) 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.

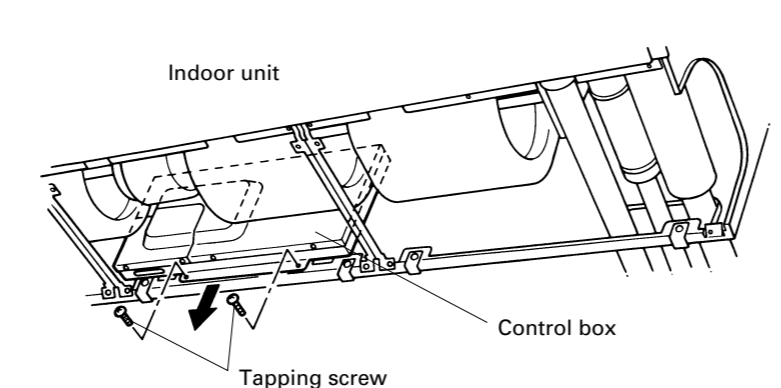
Fig. 34



**1. INDOOR UNIT SIDE**

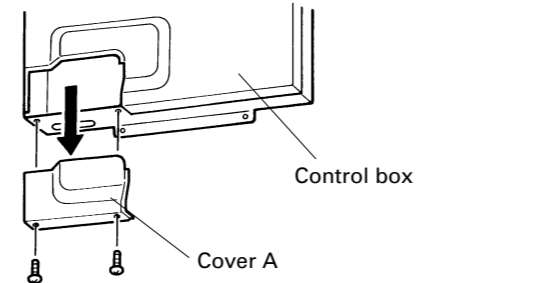
- Remove the two tapping screws and pull the control box downward. (Fig. 35)

Fig. 35



- Remove the Cover A and install the Connection cord (Fig. 36 and 37)
- After wiring is complete, clamp the Connection cord with the Cord clamp (Fig. 37)
- Reattach Cover A. Then fasten the control box back into its original position using the two tapping screws.
- Attach the connection cord and cable clips. Make sure that they are positioned so that they will not interfere with opening and closing of the intake grille or with removal and installation of the air filters. (Fig. 37)

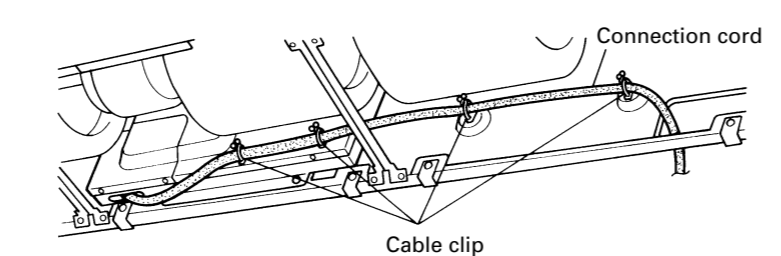
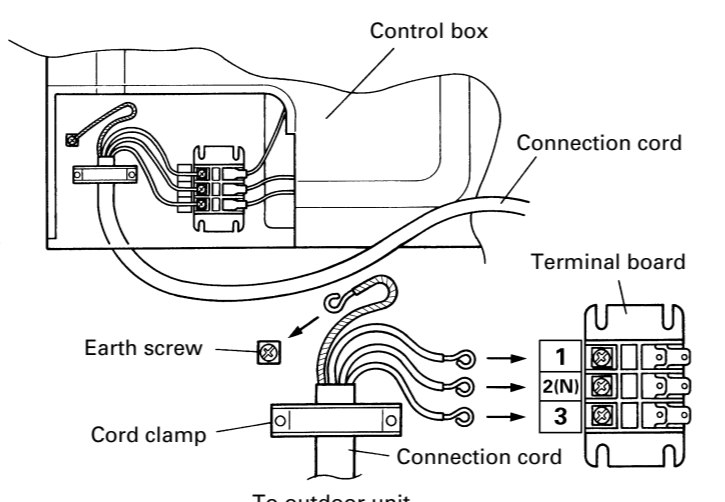
Fig. 36



**WARNING**

- Before starting work, check that power is not being supplied to the outdoor unit.
- Match the terminal board numbers and connection cord colors with those of the outdoor unit. Erroneous wiring may cause burning of the electric parts.
- Connect the connection cord firmly to the terminal board. Imperfect installation may cause a fire.
- Always fasten the outside covering of the connection cord with the cord clamp. (If the insulator is chafed, electric leakage may occur.)
- Always connect the ground wire.

Fig. 37



**2. OUTDOOR UNIT SIDE**

**WARNING**

- Before starting work, check that power is not being supplied to the outdoor unit.
- Match the terminal board numbers and connection cord colors with those of the outdoor unit. Erroneous wiring may cause burning of the electric parts.
- Connect the connection cord firmly to the terminal board. Imperfect installation may cause a fire.
- Always fasten the outside covering of the connection cord with the cord clamp. (If the insulator is chafed, electric leakage may occur.)
- Always connect the ground wire.

**CAUTION**

- Use 1.0 mm<sup>2</sup> to 1.5 mm<sup>2</sup> H07RN-F or equivalent as the connection cord.
- Select power cable matched to the fuse capacity. (Install in accordance with standard.)
- Use VW-1, 12 mm diameter, 0.5 to 1.0 mm thick, PVC tube as the insulation tube.

- Remove outdoor unit valve cover and connect the power cord and the outdoor unit connection cord wired at the indoor unit.
- Fasten the sheath with a cord clamp.
- Fasten the power cord and connection cord with cable clip and binders as shown in (Fig. 40)

Fig. 38

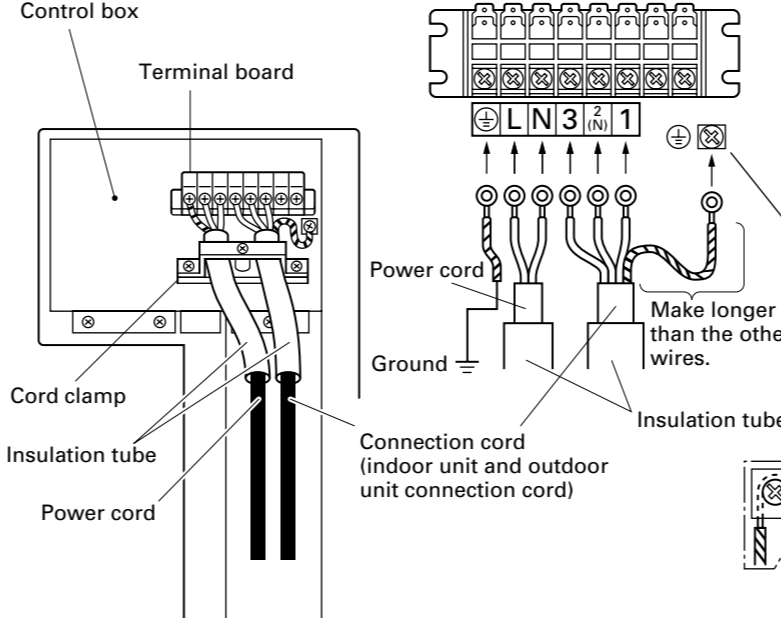


Fig. 39

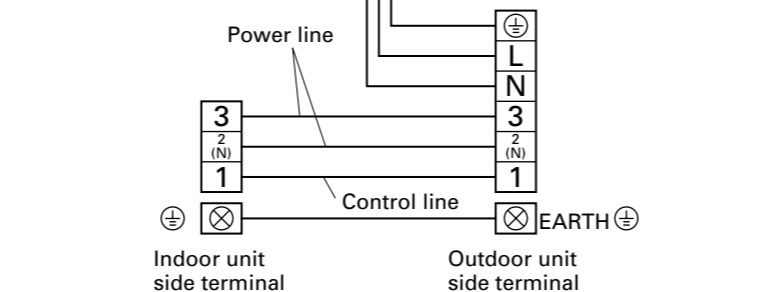
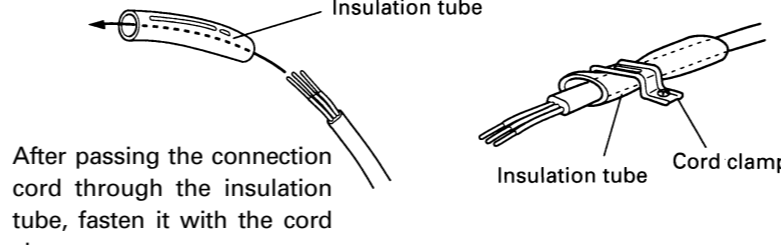


Fig. 40



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

Fig. 41

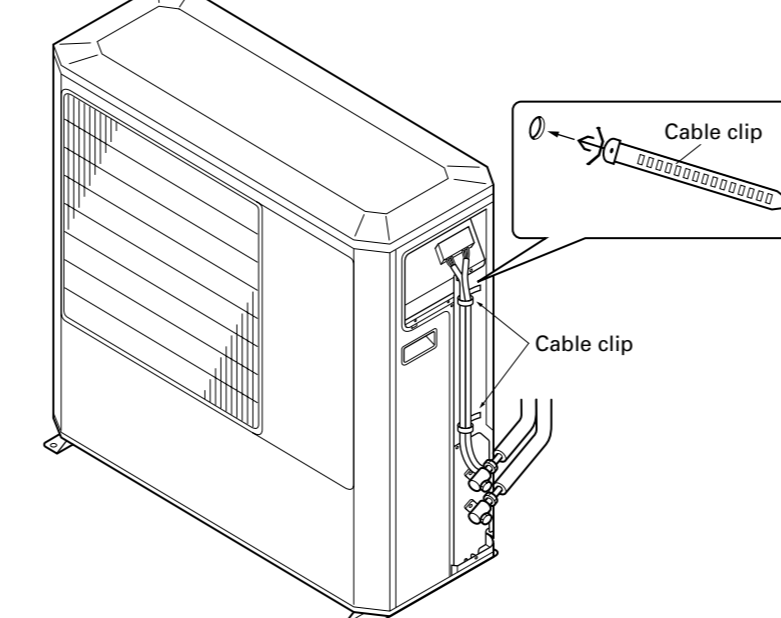


Fig. 42

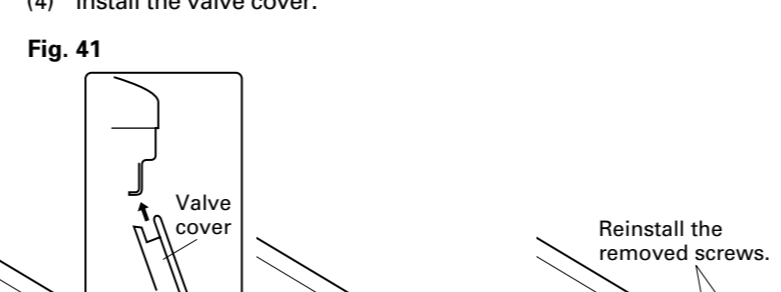


Fig. 43

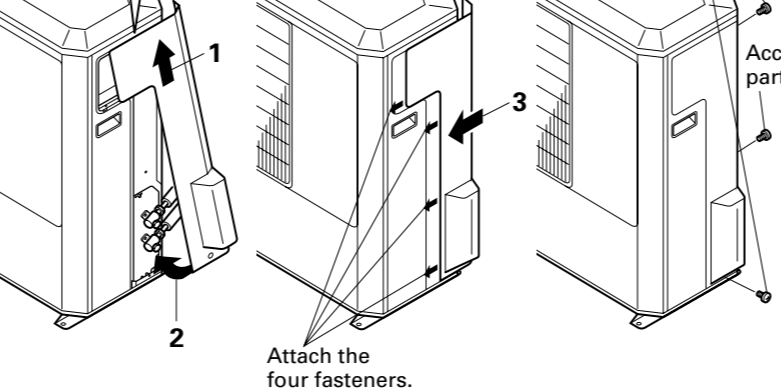


Fig. 44

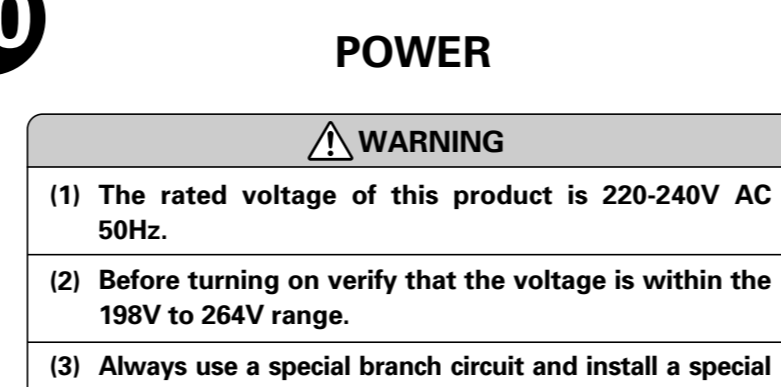
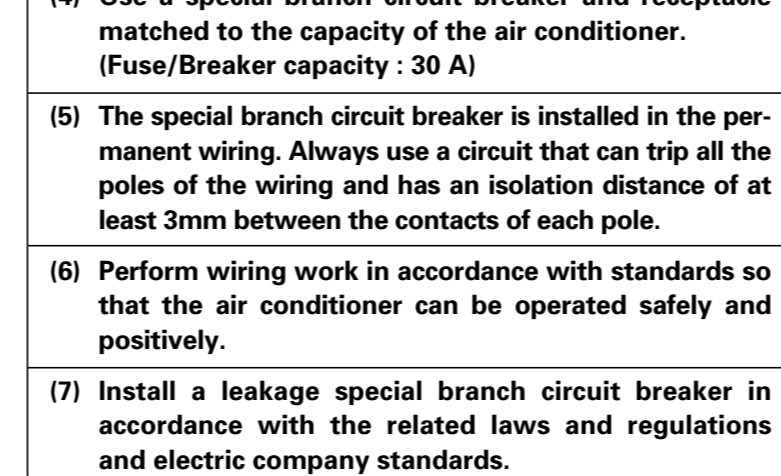


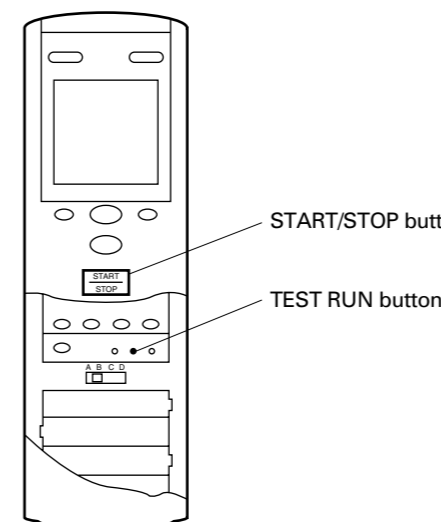
Fig. 45



**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, press the TEST RUN button while the air conditioner is running. (With the transmit section of the remote control unit facing the body, press the TEST RUN button with the tip of a ball point pen.)

Fig. 42



- 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.)

**1. INDOOR UNIT**

- Is operation of each button on the remote control unit normal?
- Does each lamp light normally?
- Do not air flow direction flap and louvers operate normally?
- Is the drain normal?

**2. OUTDOOR UNIT**

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

**FINISHING**

- Install the filter guide.
- Install the intake grille.
- Install side covers A and B (if the unit is installed in a half-concealed installation, only install side cover A).
- Install the air filters.

**CUSTOMER GUIDANCE**

Explain the following to the customer in accordance with the operating manual:

- Starting and stopping method, operation switching, temperature adjustment, timer, air flow adjustment, and other remote control unit operations.
- Air filter removal and cleaning.
- Give the operating and installation manuals to the customer.

**REMOTE CONTROL UNIT INSTALLATION**

**CAUTION**

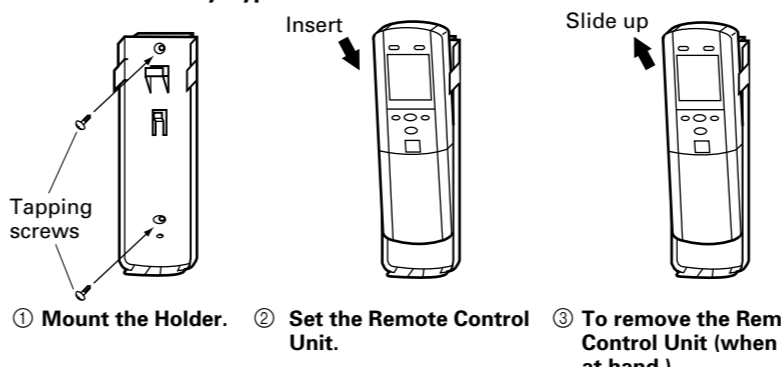
- Check that the indoor unit correctly receives the signal from the remote control unit, then install the remote control unit holder.
- Select the remote control unit holder selection site by paying careful attention to the following: Avoid places in direct sunlight. Select a place that will not be affected by the heat from a stove, etc.

**1. REMOTE CONTROL UNIT HOLDER INSTALLATION**

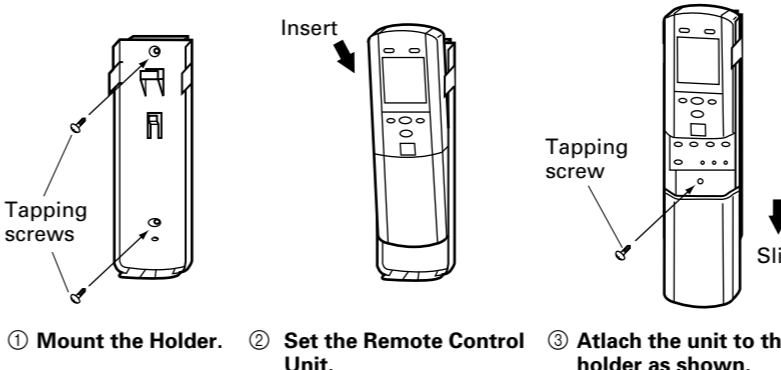
- Install the remote control unit holder to a wall or pillar with the tapping screws.

Fig. 43

**For use as Handy Type**



**For use as Wall Fixing Type**

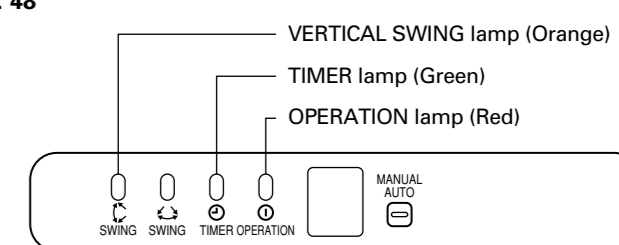


**A ERROR DISPLAY**

**1. INDOOR UNIT**

Operation can be checked by lighting and flashing of the display section OPERATION, TIMER and VERTICAL SWING lamps. Perform judgment in accordance with the following.

Fig. 48



- Test running
- When the air conditioner is run by pressing the remote control unit test run button, the OPERATION, TIMER and VERTICAL SWING lamps flash slowly at the same time.

- Error
- The OPERATION, TIMER and VERTICAL SWING lamps operate as follows (Table 8) according to the error contents.

Table 8

Error display	OPERATION lamp	TIMER lamp	VERTICAL SWING lamp	Error contents
Blinks	Blinks	Goes off		Model information abnormal (permanent type)
Pulses 4 times	Blinks	Goes off		Drain abnormal (permanent type)
Pulses 6 times	Blinks	Goes off		Indoor fan abnormal
Pulses 2 times	Blinks	Goes off		Room air temperature thermistor open circuit
Pulses 3 times	Blinks	Goes off		Room air temperature thermistor short circuit
Pulses 5 times	Blinks	Goes off		Piping thermistor open circuit
Pulses 7 times	Blinks	Goes off		Piping thermistor short circuit
Blinks	Pulses 2 times	Goes off		Serial communications abnormal
Blinks	Pulses 3 times	Goes off		Reverse phase wire connection abnormal
Blinks	Pulses 6 times	Goes off		Outdoor heat exchanger thermistor open circuit
Blinks	Pulses 5 times	Goes off		Outdoor heat exchanger thermistor short circuit
Blinks	Pulses 7 times	Goes off		High pressure abnormal
Blinks	Pulses 4 times	Goes off		Outdoor discharge thermistor open circuit
Blinks	Pulses 8 times	Goes off		Outdoor discharge thermistor short circuit
Blinks	Pulses 9 times	Goes off		Discharge temperature abnormal
Blinks	Pulses 10 times	Goes off		Outdoor air temperature thermistor open circuit
Blinks	Pulses 11 times	Goes off		Outdoor air temperature thermistor short circuit

**2. OUTDOOR UNIT**

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

Table 9

Error display	Error contents
ON OFF Lighting continue	Discharge pipe temperature abnormal
ON (0.5 sec) OFF (5 sec) Puls 1 time repeated	Outdoor heat exchanger temperature sensor abnormal
ON (0.5 sec) OFF (5 sec) Pulses 2 times repeated	Outdoor temperature sensor abnormal
ON (0.5 sec) OFF (5 sec) Pulses 3 times repeated	Discharge pipe temperature sensor abnormal
ON OFF Lighting continue	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.