

Refrigerant R407C Duct Type INSTALLATION INSTRUCTION SHEET

(PART NO. 9365748060)

This air conditioner uses new refrigerant HFC (R407C).

Indoor unit is an appliance not accessible to the general public.

For authorized service personnel only.

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.

WARNING	
①	For the air conditioner to operate satisfactorily, install it as outlined in this installation instruction sheet.
②	Connect the indoor unit and outdoor unit with the air conditioner piping and cords available from our standard parts. This installation instruction sheet 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	If refrigerant leaks while work is being carried out, ventilate the area. If the refrigerant comes in contact with a flame, it produces a toxic gas.
⑤	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.

STANDARD PARTS

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

INDOOR UNIT ACCESSORIES

Name and Shape	Qty	Application
Remote controller	1	Use for air conditioner operation
Flange joint	1	For connecting the piping
Gasket	1	Installation between flange joint and indoor unit
Special nut A (large flange)	4	For suspending the indoor unit from ceiling
Special nut B (small flange)	4	
Washer	8	
Coupler heat insulation	1	For indoor side pipe joint (small)
Flange joint insulation	1	For indoor side pipe joint (large)
Binder (Large)	1	For fixing the connection pipe (Large and small)
Binder (Small)	1	For fixing the remote controller cord
Remote controller cord clamp	10	For installing the remote controller cord
Screw	10	For installing the remote controller

OUTDOOR UNIT ACCESSORIES

Name and Shape	Qty	Application
Flange joint assembly	1	For connecting the piping
Coupler heat insulation	1	For outdoor side pipe joint
Gasket	1	Installation between flange joint assembly and valve B
Bolt	2	For fixing the flange joint assembly
Drain pipe	3	For outdoor unit drain piping work (Reverse cycle model only)
One-touch bush	1	For power supply cord installation
Clamp	1	For power supply cord installation

- There is no limit to the height of the side wall.
- The height of the wall (H) on the front side and rear side should be 1,200 mm or less.
- If the wall height exceeds 1,200 mm, add dimension (h) to the respective service space dimensions L1 and L2.

CONNECTION PIPE REQUIREMENT

Table 1

Diameter	Maximum length	Maximum height (between indoor and outdoor)
Small	Large	
12.7 mm	28.58 mm	50 m
		30 m

- Use 0.8 mm to 1.6 mm thick pipe.
- Use pipe with water-resistant heat insulation.
- Use pipe that can withstand a pressure of 3,040 kPa.

ELECTRICAL REQUIREMENT

Table 2

	INDOOR UNIT	OUTDOOR UNIT
Power supply cord (mm ²)	MAX. 2.5*1 MIN. 1.5*1	6.0*2 4.0*2
Fuse capacity (A)	10	30
Connection cord (mm ²)	MAX. 2.5*1 MIN. 1.5*1	

- Use conformed cord with Type 245 IEC57(*) or Type 245 IEC66(*)2.
- Install all electrical works in accordance to the standard.
- Install the disconnect device with a contact gap of at least 3 mm in all poles nearby the units. (Both indoor unit and outdoor unit)

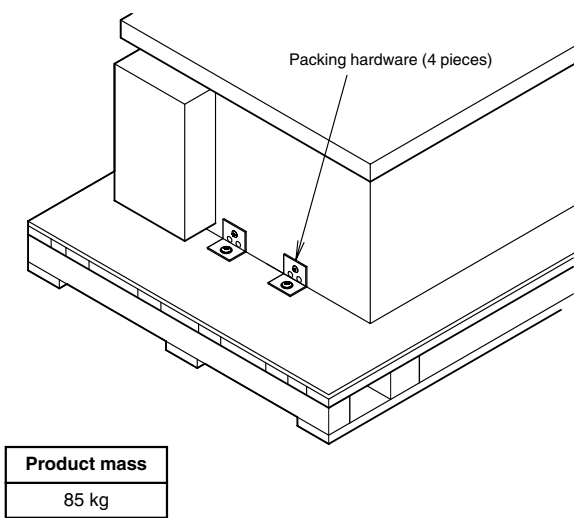
INSTALLATION PROCEDURE

Install the air conditioner as follows.

1 INDOOR UNIT INSTALLATION

1. CONVEYANCE METHOD

Fig. 3



Leave the packing materials on until the unit is at the installation site. Remove the packing hardware and dispose of it.

SELECTING THE MOUNTING POSITION

Decide the mounting position together with the customer as follows:

INDOOR UNIT

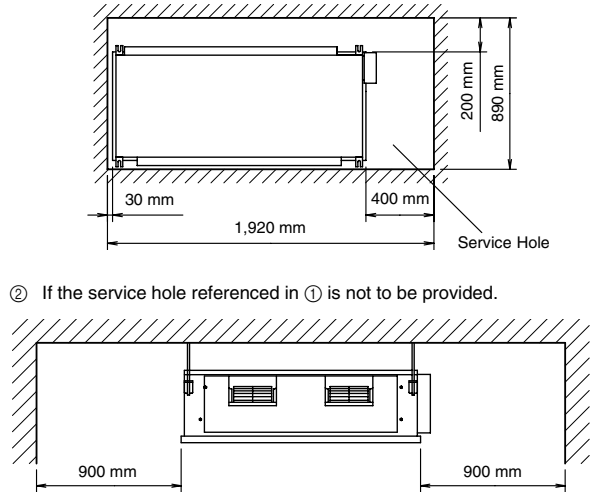
WARNING

Install at a place that can withstand the weight of the indoor and outdoor units and install positively so that the units will not topple or fall.

- 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. 1).

Fig. 1

- If a service hole is to be provided at the bottom of the product.



OUTDOOR UNIT

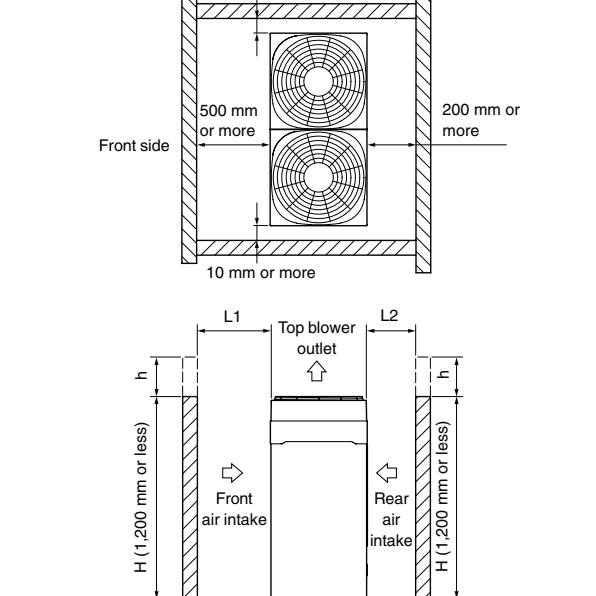
WARNING

- Install the unit where it will not be tilted by more than 5°.
- When installing the outdoor unit it may be exposed to strong wind, fasten it securely.

- 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.)
- Install the outdoor unit in a place where it will be free from being dirty or getting wet by rain as much as possible.
- Install the unit where connection to the indoor unit is easy.
- During heating operation, drain water flows from the outdoor unit. Therefore, install the outdoor unit in a place where drain water flow will not be obstructed. (Reverse cycle model only)
- Do not place animals and plants in the path of the warm air.
- Take the air conditioner weight into account and select a place where noise and vibration are small.
- Select place so that the warm air and noise from the air conditioner do not disturb neighbors.
- Install inlet and outlet ducts in order to maintain stable operation in cold or snowy regions.
- Provide the space shown in Fig. 2 so that the air flow is not blocked.

- Installing the unit individually

Fig. 2



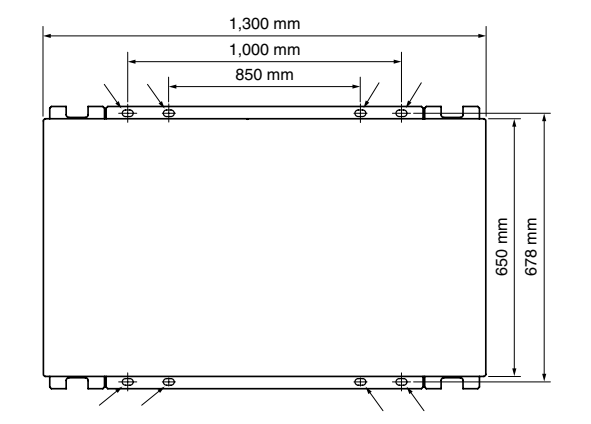
2. OUTDOOR UNIT PROCESSING

Outdoor unit to be fasten it with bolts or wire at the four places indicated by the arrows. (Fig. 13)

- Anchor Bolt Positions

- The distance between the left and right anchor bolts should be at least 850 mm.

Fig. 13



- Set the unit on a strong stand, such as concrete blocks to minimize shock and vibration.
- If a mounting bracket is installed at the knockout hole section in the base, do not connect the piping from the bottom.

2. INSTALLING HANGERS

Fig. 4 Hanging bolt installation diagram

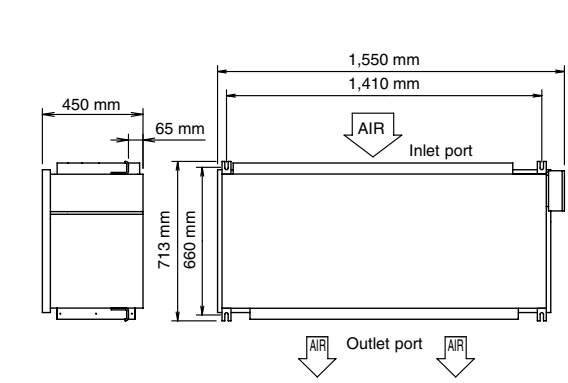
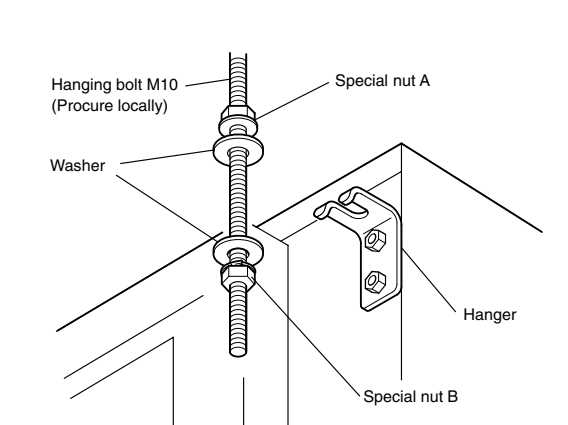


Fig. 5



3. LEVELING

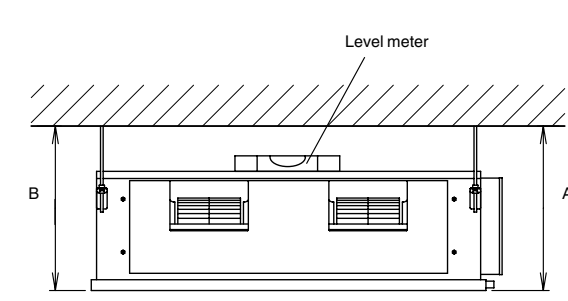
Use the procedure in the following figure to adjust the levelness.

Bolt Strength 9.81 to 14.71 N·m (100 to 150 kgf·cm)

3. LEVELING

Use the procedure in the following figure to adjust the levelness.

Fig. 6

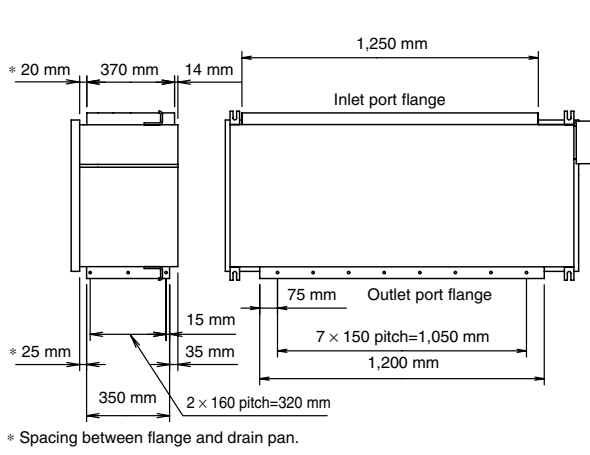


The side of the unit that holds the drain port (A) should be slightly lower than the opposite side of the unit (B). The slant should allow from 0 to 20 mm of difference between (A) and (B).

4. MOUNTING THE DUCT

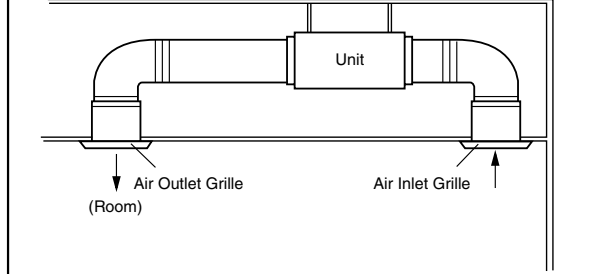
Follow the procedure in the following figure to install the ducts.

Fig. 7 Flange positions for connecting the duct.



CAUTION

- If an intake duct is installed, take care not to damage the temperature sensor (the temperature sensor is attached to the intake port flange).
- Be sure to install the air inlet grille and the air outlet grille for air circulation. The correct temperature cannot be detected. Grills must be installed so that man can't touch unit fan, and can't be removed by only hand operation with tool.



- Be sure to install the air filter in the air inlet. If the air filter is not installed, the heat exchanger may be clogged and its performance may decrease.

Fig. 8 Static pressure characteristic curve (recommend range)

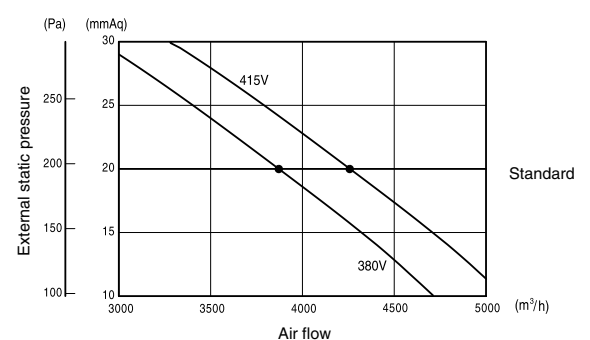
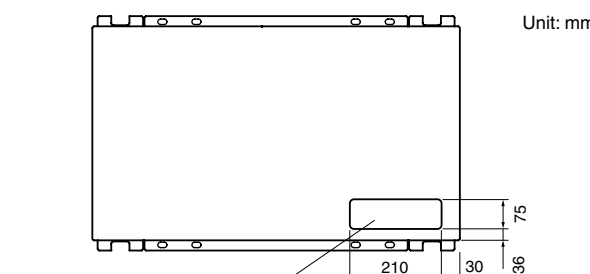


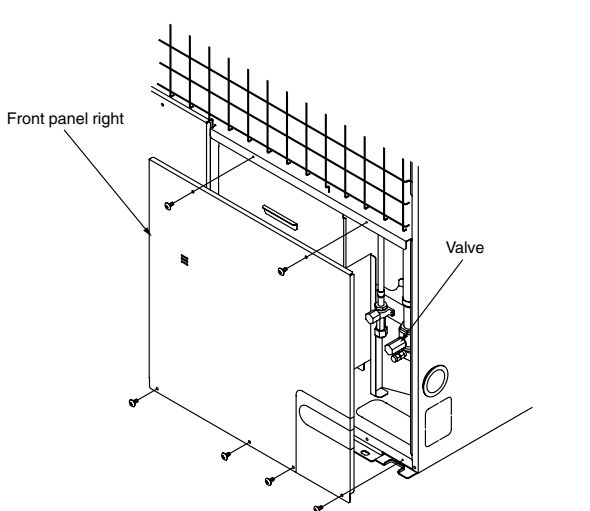
Fig. 16



- If the piping is connected from the left and rear, be sure that there is enough space around the unit to make connections.

- Remove the front panel right.

Fig. 17



- Before connecting flange joint assembly to ball valve. Remove bolts, valve plate and gasket.

Fig. 18

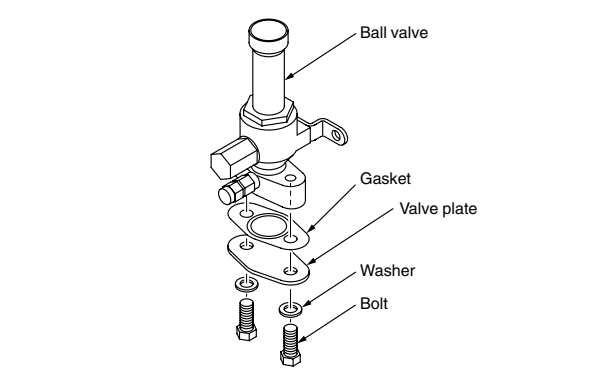


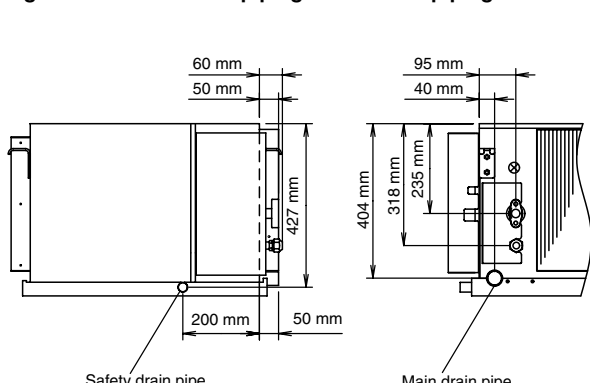
Fig. 15



- Remove the rear panel in order to install the left piping.
- If a mounting bracket is installed at the knockout hole section in the base, do not connect the piping from the bottom.

5. INSTALLING DRAIN PIPE

Fig. 9 Position of drain piping and coolant piping.



CAUTION

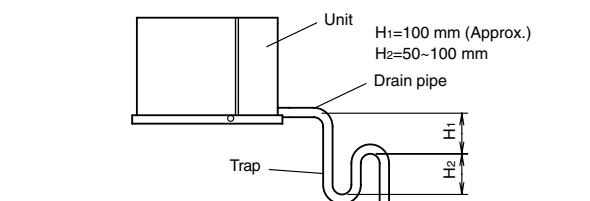
- This product has drain ports in two locations. Follow the procedure in the figure to connect drain pipes to each of them.
- Be sure to properly insulate the drain pipes.

The position of the installed drain pipe should have a downward gradient of 1/50 to 1/100. Make sure that drain pipe is installed without rises. Use general hard polyvinyl chloride pipe (VP25) and connect it with adhesive (polyvinyl chloride) so that there is no leakage. Do not perform air bleeding.

- Main drain

On the main drain, provide one trap near the indoor unit.

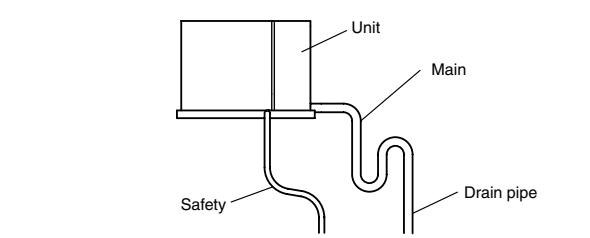
Fig. 10



- Safety drain

There is no need to provide a trap for the safety drain. If the safety drain is connected to the main drain, make the connection below the main trap.

Fig. 11



- Once the installation is complete, check the flow of drain water.

3 CONNECTING THE PIPING

CAUTION

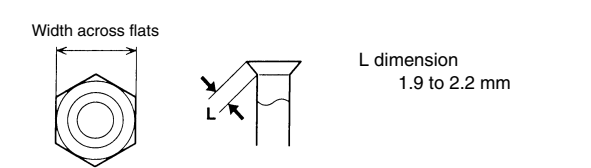
- Do not use mineral oil on flared part. Prevent mineral oil from getting into the system as this would reduce the lifetime of the units.
- Never use piping which has been used for previous installations. Only use parts which are delivered with the unit.
- While welding the pipes, be sure to blow dry nitrogen gas through them.

1. FLARE PROCESSING

- Cut the connection pipe with pipe cutters so that the pipe is not deformed.
- Holding the pipe downward so that cuttings cannot enter the pipe and remove the burrs.
- 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.
- Check if the flared part "L" (Fig. 20) is spread uniformly and that there are no cracks.

Pipe	Flare nut
Small pipe (12.7 mm dia.)	width across flats 24 mm

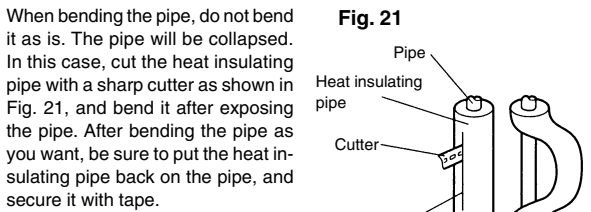
Fig. 20



2. BENDING PIPES

CAUTION

- To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 150 mm or over.
- If the pipe is bent repeatedly at the same place, it will break.



- Once the installation is complete, check the flow of drain water.

Fig. 21

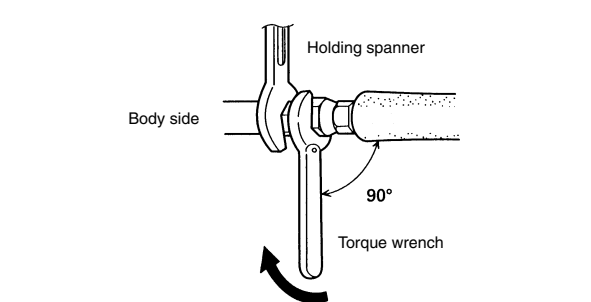


Table 4 Tightening torque

Pipe	Tightening torque
Flare nut (Small pipe)	49 to 61 N·m (490 to 610 kgf·cm)
Bolt (Flange joint)	35 to 40 N·m (350 to 400 kgf·cm)

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. 24).

Fig. 24



CAUTION

Hold the torque wrench at its grip, keeping it in the right angle with the pipe as shown in Fig. 24, in order to tighten the flare nut correctly.

- Connecting the flange joint

Fig. 25 Indoor unit side

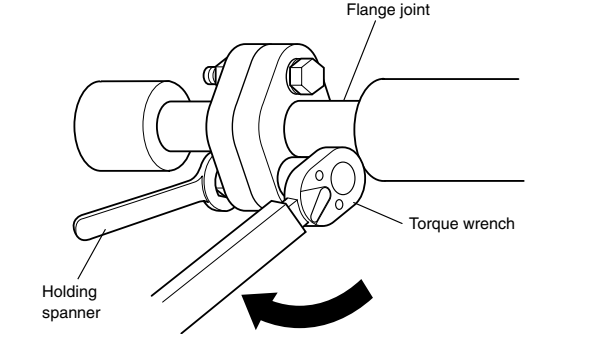
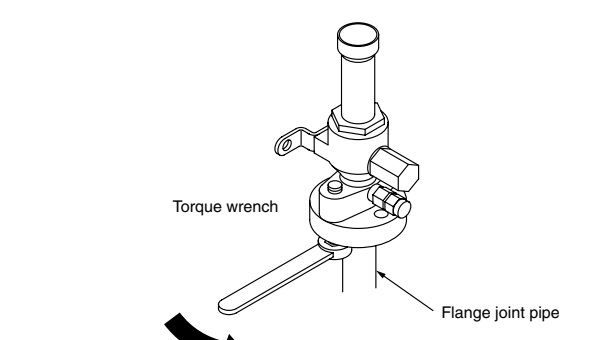


Fig. 26



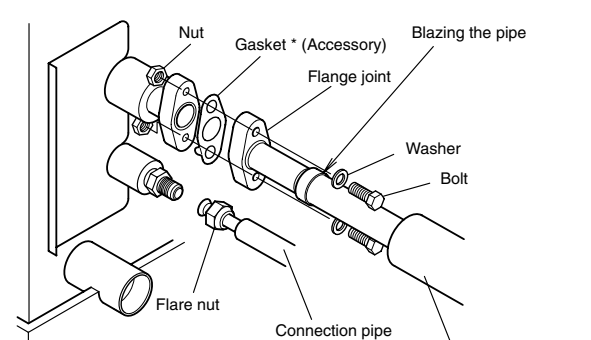
CAUTION

Tighten the bolts evenly.

3. CONNECTION PIPES

- As shown in the figure, connect the piping for the indoor and outdoor units.
- On the large pipe side, braze the provided flange joint and connection pipe.
- After the pipes, an air tightness test must be formed. To perform the test, close the valve and increase the pressure of the nitrogen gas to 30 kg/cm²G (2.94 MPa).

Fig. 22 Indoor unit side



CAUTION

Make sure that the folded portion of the gasket (marked *) is facing the indoor unit.

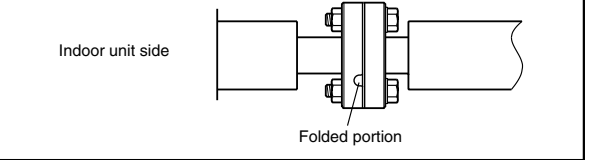
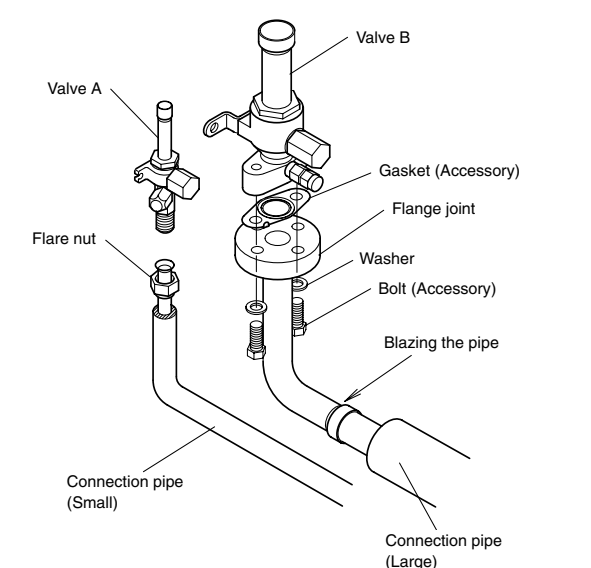


Fig. 23 Outdoor unit side



CAUTION

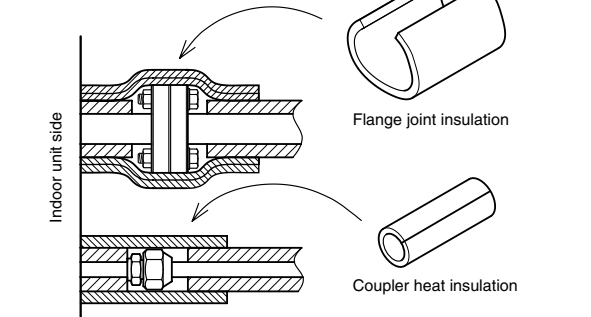
- Be sure to apply the pipe against the port on the indoor unit correctly. If the centering is improper, the flare nut cannot be tightened smoothly. If the flare nut is forced to turn, the threads will be damaged.
- Use the new gaskets provided with each of the parts.

4. INSULATION ON THE PIPE JOINT

Indoor unit side

In order to prevent condensation, apply the insulation without leaving any gaps.

Fig. 27



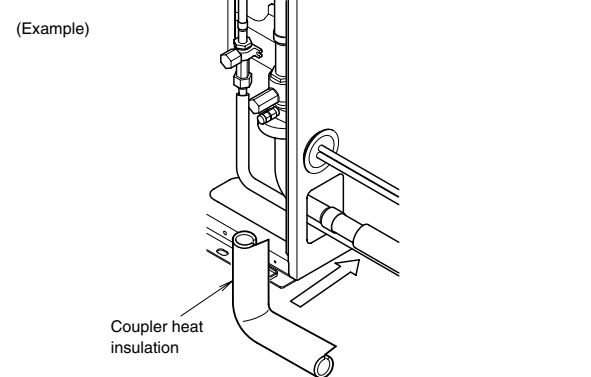
CAUTION

There should be no gaps between the insulation and the product.

Outdoor unit side

Seal with the accessory insulation so that water does not enter at the top of the pipe insulation installed to the connection pipe.

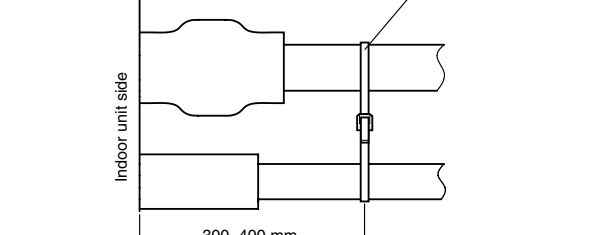
Fig. 28



5. SECURING THE PIPING (Indoor unit only)

- Secure the two pipes so that they are parallel, using a binder or other means.

Fig. 29



CAUTION

If the pipes are not secured, there is a risk of damage to the unit's internal piping.

- Continued on back -

VACUUM PROCESS

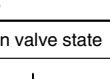
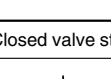
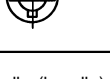
CAUTION

- 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 R407C exclusively. Using the same vacuum pump for different refrigerant may damage the vacuum pump or the unit.

1. VACUUM

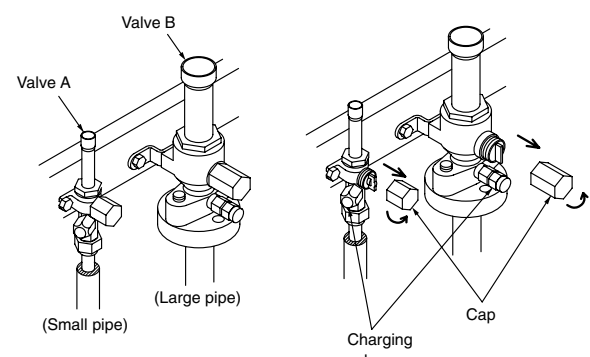
- Remove the cap, and connect the gauge manifold and the vacuum pump to the charging valve by the service hoses.
- Vacuum the indoor unit and the connecting pipes until the pressure gauge indicates -0.1 MPa (-76 cmHg).
- When -0.1 MPa (-76 cmHg) is reached, operate the vacuum pump for at least 1 hour.
- After vacuuming inside the indoor unit and the piping, remove the cap of the two valves.
- Open the spindle (handle) of the two valves from the closed state. (Table 6)
- Tighten the cap and charging valve of the two valves to the specified torque (Table 5).

Table 5		
	Tightening torque	
	Large valve	Small valve
Handle	1.47 N · m (15 kgf · cm) or less	
Cap	14.7 to 19.6 N · m (150 to 200 kgf · cm)	

Table 6		
Valve A	Open valve state	
		
Valve B	Open valve state	
		

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

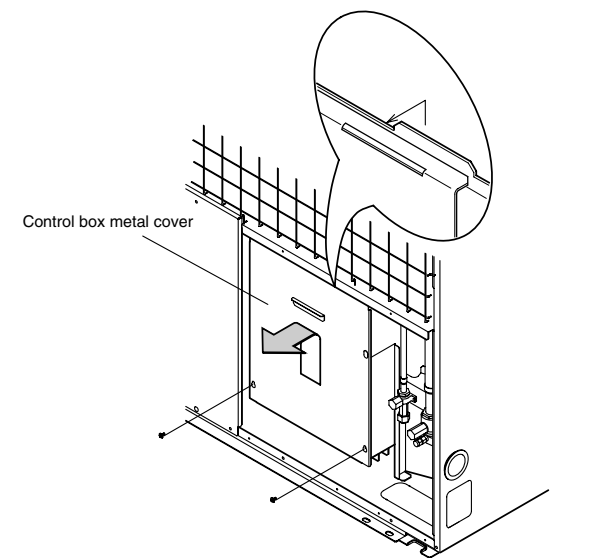
Fig. 30



3. OUTDOOR UNIT SIDE

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

Fig. 41



- After wiring is complete, clamp connection cord and power supply cord with cord clamp.
- Attach the control box cover.

Fig. 42

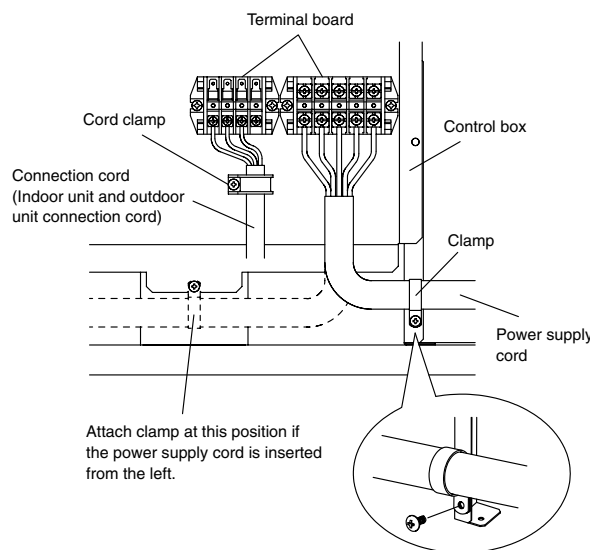


Fig. 43

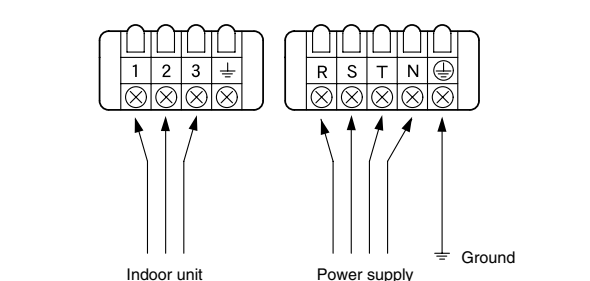
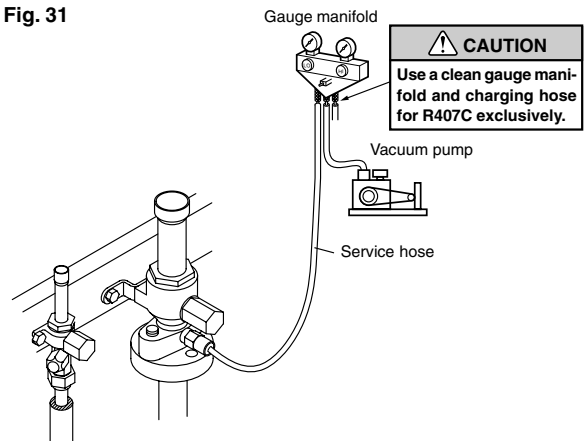


Fig. 31



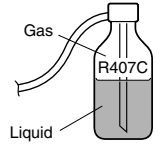
2. ADDITIONAL CHARGE

- Up to a pipe length of 30 m, charging with additional refrigerant is not necessary.
- If the pipe length exceeds 30 m, charging with refrigerant is necessary.
- Charge with additional refrigerant in the amounts shown in the table below.

Table 7				
Actual pipe length	30 m (99 ft)	40 m (132 ft)	50 m (164 ft)	g/m (oz/ft)
Additional refrigerant (R407C)	Cooling model	Reverse cycle model	Cooling model	Reverse cycle model
	None	None	500 g (18 oz)	1,000 g (35 oz)
			1,000 g (35 oz)	2,000 g (70 oz)
			2,000 g (70 oz)	3,000 g (105 oz)

CAUTION

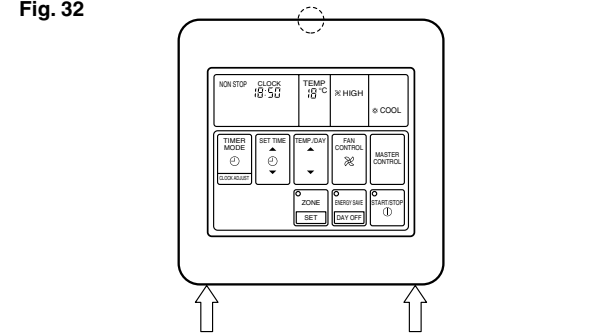
- When moving and installing the air conditioner, do not mix gas other than the specified refrigerant R407C inside the refrigerant circuit.
- When charging the refrigerant R407C, always use an electronic balance for refrigerant charging (to measure the refrigerant by weight).
- When charging the refrigerant, 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.
- Add refrigerant from the charging valve after the completion of the work.
- The maximum length of the piping is 50 m. If the units are further apart than this, correct operation can not be guaranteed.



REMOTE CONTROLLER INSTALLATION

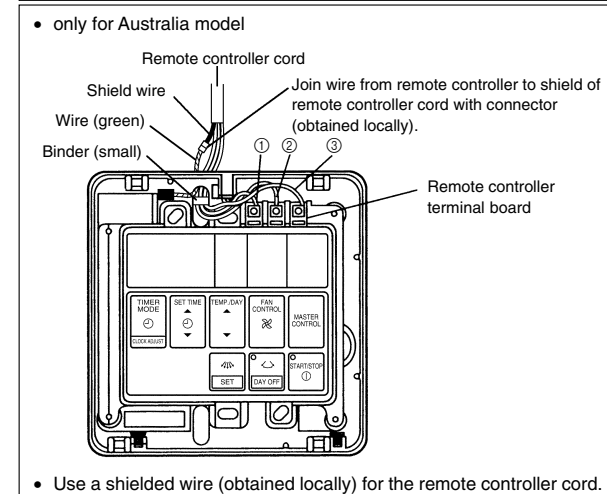
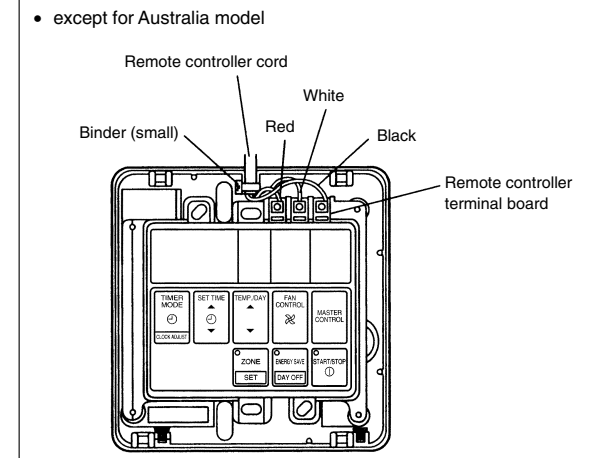
- Insert the end of a flat blade screwdriver at the arrow parts of the groove at the side of the remote controller case and remove the remote controller case top by turning the screwdriver.
- Disconnect the remote controller cord from the remote controller terminal board.

Fig. 32



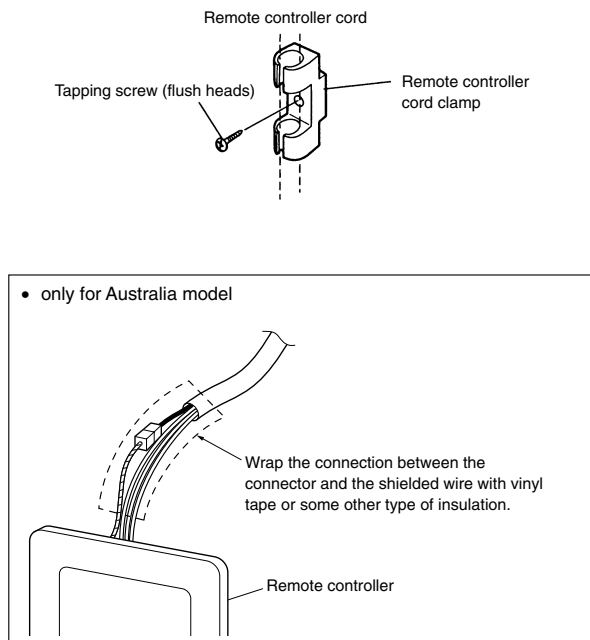
- Make a notch in the thin part (□) of Fig. 32) at the remote controller case top and bottom with nippers, file, etc.
- Pass the remote controller cord to the remote controller terminal board specified in (Fig. 33).
- Clamp the remote controller cord sheath with the binder (small) as shown in Fig. 33.
- Cut off the excess binder.
- Clamp the remote controller cord to a wall, etc. with the remote controller cord clamp furnished (Fig. 34).

Fig. 33



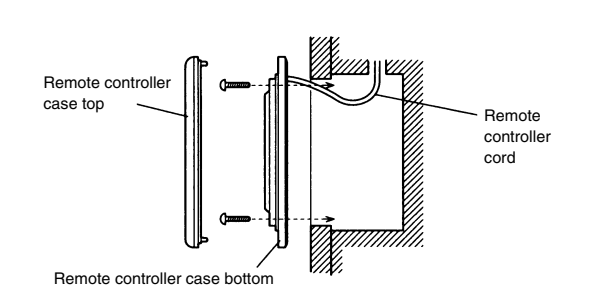
- Use a shielded wire (obtained locally) for the remote controller cord.

Fig. 34

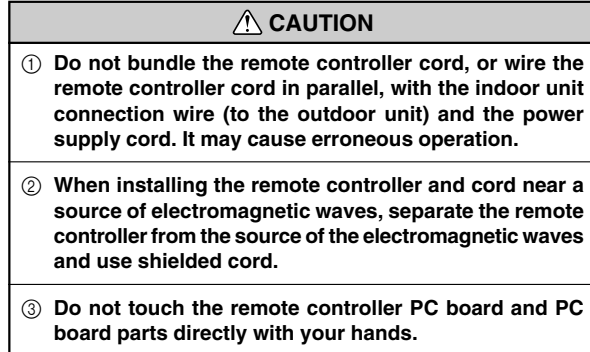


- When remote controller cord embedded
 - Embed the remote controller cord and box.
 - Pass the remote controller cord through the hole at the remote controller case bottom and install the cord to the box (Fig. 35).
 - Connect the remote controller cord to the remote controller terminal board specified in (Fig. 33).

Fig. 35 [Example]



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



POWER

WARNING

- The rated voltage of this product is 380-415 V 3ø 50 Hz.
- Before turning on verify that the voltage is within the 342 to 457 V range.
- Always use a special branch circuit and install a special receptacle to supply power to the air conditioner.
- Use a special branch circuit breaker and receptacle matched to the capacity of the air conditioner. (Install in accordance with standard.)
- Perform wiring work in accordance with standards so that the air conditioner can be operated safely and positively.
- Install a leakage special branch circuit breaker in accordance with the related laws and regulations and electric company standards.

CAUTION

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

ELECTRICAL WIRING

WARNING

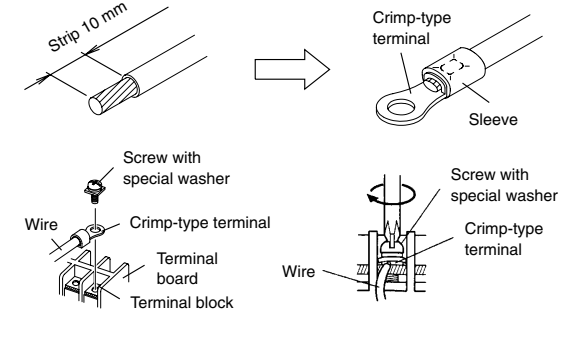
- Before starting work, check that power is not being supplied to the indoor unit and outdoor unit.
- Match the terminal board numbers and connection cord colors with those of the outdoor unit. Erroneous wiring may cause burning of the electric parts.
- Connect the connection cord firmly to the terminal 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.
- Install the remote controller wires so as not to be directly touched with your hand.

HOW TO CONNECT WIRING TO THE TERMINALS

For strand wiring

- Use crimp-type terminals with insulating sleeves as shown in the figure below to connect to the terminal block.
- Securely crimp the crimp-type terminals to the wires using an appropriate tool so that the wires do not come loose.
- Use the specified wires, connect them securely, and fasten them so that there is no stress placed on the terminals.
- Use an appropriate screwdriver to tighten the terminal screws. Do not use a screwdriver that is too small, otherwise, the screw heads may be damaged and prevent the screws from being properly tightened.
- Do not tighten the terminal screws too much, otherwise, the screws may break.
- See the table below for the terminal screw tightening torques.

Fig. 36



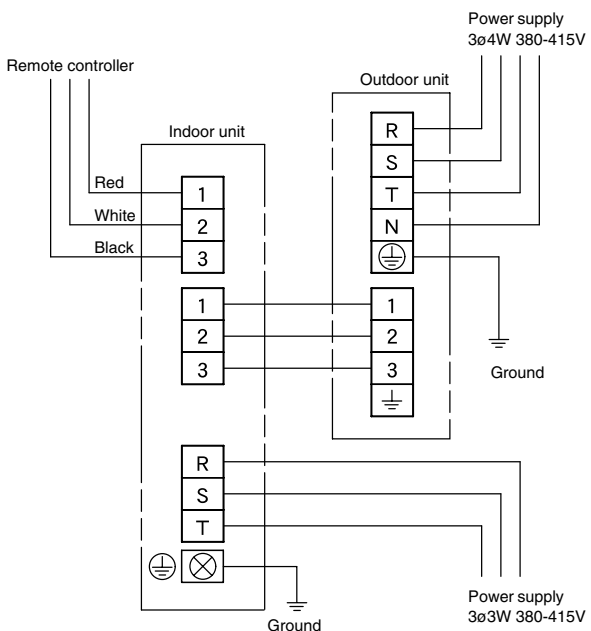
Tightening torque	
M4 screw	1.2 to 1.8 N·m (12 to 18 kgf·cm)
M5 screw	2.0 to 3.0 N·m (20 to 30 kgf·cm)

WARNING

Use crimp-type terminals and tighten the terminal screws to the specified torques, otherwise, abnormal overheating may be produced and possibly cause heavy damage inside the unit.

1. CONNECTIONS DIAGRAM

Fig. 37



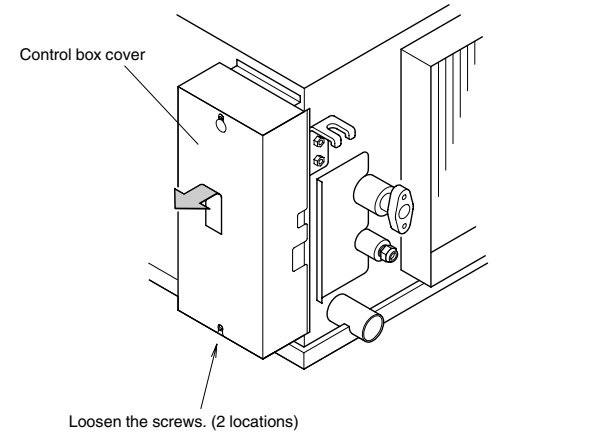
- A separated power supply must be provided for the indoor unit and outdoor unit.
 - Outdoor unit : 3ø 4W 380-415V
 - Indoor unit : 3ø 3W 380-415V
- The max. current is as follows table.

Max current [A]	Reverse cycle model		Cooling model
	Cooling	Heating	Cooling
Outdoor unit	24.0	24.0	26.6
Indoor unit	2.0	2.0	2.0
Total	26.0	26.0	28.6

2. INDOOR UNIT SIDE

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

Fig. 38



- After wiring is complete, clamp the remote controller cord, connection cord and power supply cord with cord clamp.
- Attach the control box cover.

Fig. 39

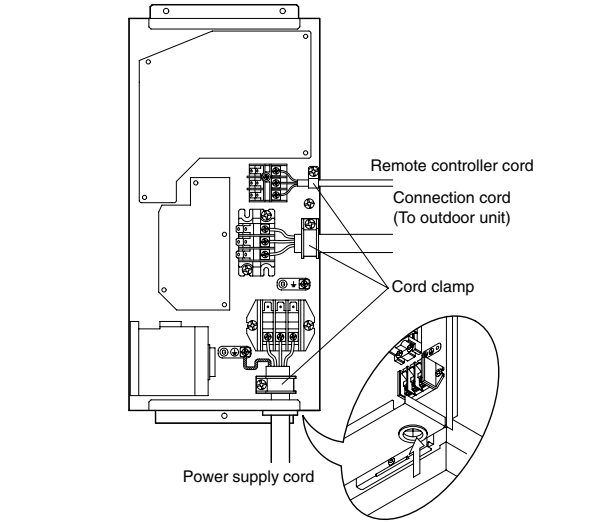
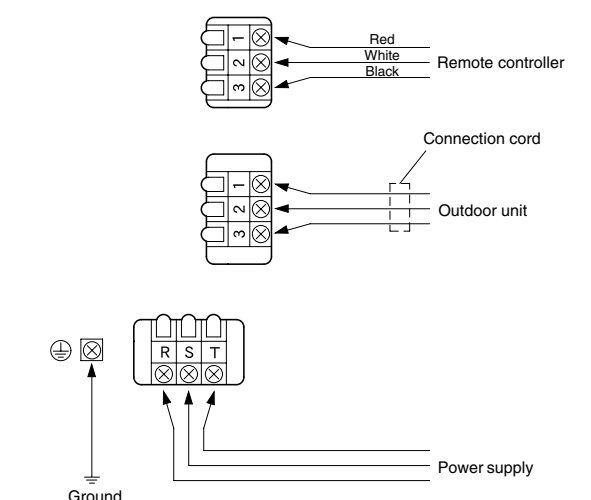


Fig. 40



CAUTION

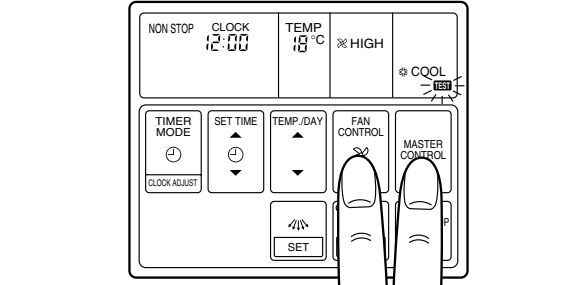
- Use care not to mistake the power supply and connection wires when installing.
- Install so that the wire for the remote controller will not come in contact with other connection wires.

TEST RUNNING

1. REMOTE CONTROLLER

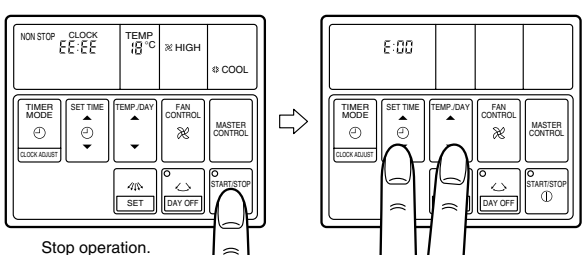
- Supply power to the crankcase heater 12 hours before the start of operation in the winter.
- For test running, when the remote controller FAN CONTROL button and MASTER CONTROL button are pressed simultaneously for more than three seconds when the air conditioner is not running, the air conditioner starts and TEST is displayed on the remote controller display. However, the TEMP/DAY setting button does not function, but all other buttons, displays, and protection functions operate (Fig. 44).

Fig. 44



- When EE : EE blinks at the current time display, there is an error inside the air conditioner. If the SET TIME button (←) and TEMP/DAY 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. 45). When the operation lamp lights, press the START/STOP button and after operation lamp goes off, perform the same operation (Fig. 45). Process the error contents by referring to (Table 8).

Fig. 45



Error cord	Error contents
E-00	Communication error (indoor unit → remote controller)
E-01	Communication error (indoor unit → outdoor unit)
E-02	Room temperature sensor open
E-03	Room temperature sensor shortcircuited
E-04	Indoor heat exchanger temperature sensor open
E-05	Indoor heat exchanger temperature sensor shortcircuited
E-06	Outdoor heat exchanger temperature sensor open
E-07	Outdoor heat exchanger temperature sensor shortcircuited
E-08	Power source connection error
E-09	Float switch operated
E-0A	Outdoor temperature sensor open

Error cord	Error contents
E-0b	Outdoor temperature sensor shortcircuited
E-0c	Discharge pipe temperature sensor open
E-0d	Discharge pipe temperature sensor shortcircuited
E-0e	Outdoor low pressure abnormal
E-0f	Discharge pipe temperature abnormal
E-11	Model abnormal
E-12	Indoor fan abnormal
E-13	Outdoor signal abnormal
E-14	Outdoor EEPROM abnormal

- To stop test running, press the START/STOP button.
- For the operation method, refer to the operating manual and perform operation check.
- Check that there are no abnormal sounds or vibration sounds during test running.

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.

Error contents	LED1	LED2	LED3	LED4	LED5	LED6
Signal abnormal	—	—	×	×	×	×
Indoor unit abnormal	—	—	×	×	×	×
Discharge pipe temperature abnormal	—	—	×	×	×	×
Outdoor heat exchanger temperature abnormal	—	—	×	×	×	×
Outdoor temperature abnormal	—	—	×	×	×	×
Power source connection error	—	—	×	×	×	×
EEPROM abnormal	—	—	×	×	×	×
Outdoor high pressure abnormal	—	—	×	×	×	×
Discharge pipe temperature abnormal	—	—	×	×	×	×

○: 0.5s ON0.5s OFF (flash) ×: OFF
 ⊙: 0.1s ON0.1s OFF (flash) —: Indefinite

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.

Fig. 46 ERROR LED DISPLAY LAYOUT

