

FOR SERVICE PERSONNEL ONLY

HITACHI

HITACHI SPLIT-UNIT AIR CONDITIONER INSTALLATION MANUAL

Indoor Unit

RAS-F10CJ
RAS-F10CJV

Outdoor Unit

RAC-F10CJ
RAC-F10CJV

- Carefully read through the procedures of proper installation before starting installation work.
- The sales agent should inform customers regarding the correct operation of installation.

Tools Needed For Installation Work

- \oplus \ominus Screwdriver • Measuring Tape • Knife
- Saw • Pipe Cutter • Hexagonal Wrench Key (IO 4mm)
- Power Drill (ϕ 65mm ~ ϕ 80mm) • Vacuum Pump
- Pliers or Wrench • Torque Wrench • Vacuum Pump Adaptor • Flare Tool • Gas Leakage Detector
- Manifold Valve • Charge Hose • Reamer • File

SAFETY PRECAUTION

- Read the safety precautions carefully before operating the unit.
 - The contents of this section are vital to ensure safety. Please pay special attention to the following sign.
 - ⚠ **WARNING** Incorrect methods of installation may cause death or serious injury.
 - ⚠ **CAUTION** Improper installation may result in serious consequence.
- Be sure that the unit operates in proper condition after installation. Explain to customer the proper way of operating the unit as described in the user's guide.

⚠ WARNING

- Flare nut must use a torque wrench without fail. Tighten with the specified tightening torque. If the flare nut is tightened too much, after a long period of time, the flare nut breaks, Gas leakage, stagnation, touching fire, rarely cause ignition.
- Sharp bending of the pipe use the polyethylene rod, bend not crushed the pipe. Gas leakage from the crushed part, stagnation, touching fire, rarely cause ignition.
- Please request your sales agent or qualified technician to install your unit. Water leakage, short circuit or fire may occur if you do the installation work yourself.
- Please observe the instructions stated in the installation manual during the process of installation. Improper installation may cause water leakage, electric shock and fire.
- Make sure that the units are mounted at locations which are able to provide full support to the weight of the units. If not, the units may collapse and impose danger.
- Observe the rules and regulations of the electrical installation and the methods described in the installation manual when dealing with the electrical work. Use power cables approved by the authorities of your country.
- Be sure to use the specified wire for connecting the indoor and outdoor units. Please ensure that the connections are tight after the conductors of the wire are inserted into the terminals. Improper insertion and loose contact may cause over-heating and fire.
- Please use the specified components for installation work. Otherwise, the units may collapse or water leakage, electric shock and fire may occur.
- Be sure to use the specified piping set for R32. Otherwise, this may result in broken copper pipes or faults.
- When installing or removing an air conditioner, only specified refrigerant (R32) shall be allowed, do not allow air or moisture to remain in the refrigeration cycle. Otherwise, pressure in the refrigeration cycle may become abnormally high so that a rupture may be caused.
- Be sure to ventilate fully if a refrigerant gas leak while at work. If the refrigerant gas comes into contact with fire, a poisonous gas may occur. Be aware that refrigerants may not contain an odour.
- After completion of installation work, check to make sure that there is no refrigeration gas leakage. If the refrigerant gas leaks into the room, coming into contact with fire in the fan-driven heater, space heater, etc., a poisonous gas may occur.
- Unauthorized modifications to the air conditioner may be dangerous. If a breakdown occurs please call a qualified air conditioner technician or electrician. Improper repairs may result in water leakage, electric shock and fire, etc.

⚠ WARNING

- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer. Any unfit method or using incompatible material may cause product damage, burst and serious injury.
- The appliance/pipe-work shall be stored in a well ventilated room with floor area larger than $A_{\min}(0.35\text{m}^2)$ and without any continuously operating ignition source. Keep away from open flames, any operating gas appliances or any operating electric heater. Else, it may explode and cause injury or death.
- The appliance/pipe-work shall be installed, and/or operated in a room with floor area larger than $A_{\min}(0.35\text{m}^2)$ and keep away from ignition sources, such as heat/spark/open flame or hazardous areas such as gas appliances, gas cooking, reticulated gas supply systems or electric cooking appliances, etc.
- Do not pierce or burn as the appliance/pipe-work is pressurized. Do not expose the appliance/pipe-work to heat, flame, sparks, or other sources of ignition. Else, it may explode and cause injury or death.

THE CHOICE OF MOUNTING SITE (Please note the following matters and obtain permission from customer before installation).

⚠ WARNING

- The unit should be mounted at stable, non-vibratory location which can provide full support to the unit.

⚠ CAUTION

- No nearby heat source and no obstruction near the air outlet is allowed.
- The clearance distances from top, right and left are specified in figure below.
- The location must be convenient for water drainage and pipe connection with the Outdoor unit.
- To avoid interference from noise please place the unit and its remote controller at least 1m from the radio, television and inverter type fluorescent lamp.
- To avoid any error in signal transmission from the remote controller, please put the controller far away from high-frequency machines and high-power wireless systems.
- The installation height of indoor unit must be 2.3m or more in a non public area.

⚠ WARNING

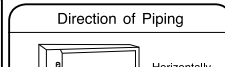
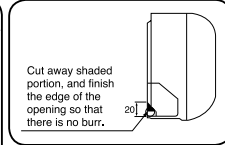
- The outdoor unit must be mounted at a location which can support heavy weight. Otherwise, noise and vibration will increase.

⚠ CAUTION

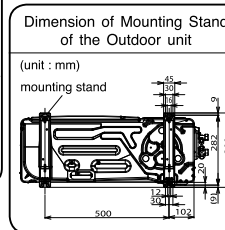
- Do not expose the unit under direct sunshine or rain. Besides, ventilation must be good and clear of obstruction.
- The air blown out of the unit should not point directly to animals or plants.
- The clearances of the unit from top, left, right and front are specified in figure below. At least three of the above sides must be open air.
- Be sure that the hot air blown out of the unit and noise do not disturb the neighbourhood.
- Do not install at a location where there is flammable gas, steam, oil and smoke.
- The location must be convenient for water drainage.
- Place the outdoor unit and its connection wire at least 1m away from the antenna or signal line of television, radio or telephone. This is to avoid noise interference.

Names of Indoor Components

No.	Component's Name	Qty
①	Mounting Plate	1
②	Screw for Mounting Plate (4.1x32)	6
③	Holder for Remote Controller	1
④	AAA Size Battery	2
⑤	Screw for holder of Remote Controller (3.1x16)	2
⑥	Remote Controller	1



There are 4 directions allowed, namely, horizontally perpendicular to the unit, vertically down from right, horizontally out from right and horizontally out to left. Don't form the piping downward at the left of the unit.



⚠ CAUTION

- A brazed, welded or mechanical connection shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts. A vacuum valve shall be provided to evacuate the interconnecting pipe and/or any uncharged refrigerating system parts.
- Mechanical connectors used indoor shall comply with ISO 14903. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flare joints are reused indoors, the flare part shall be re-fabricated.
- Refrigerant tubing shall be protected or enclosed to avoid damage.

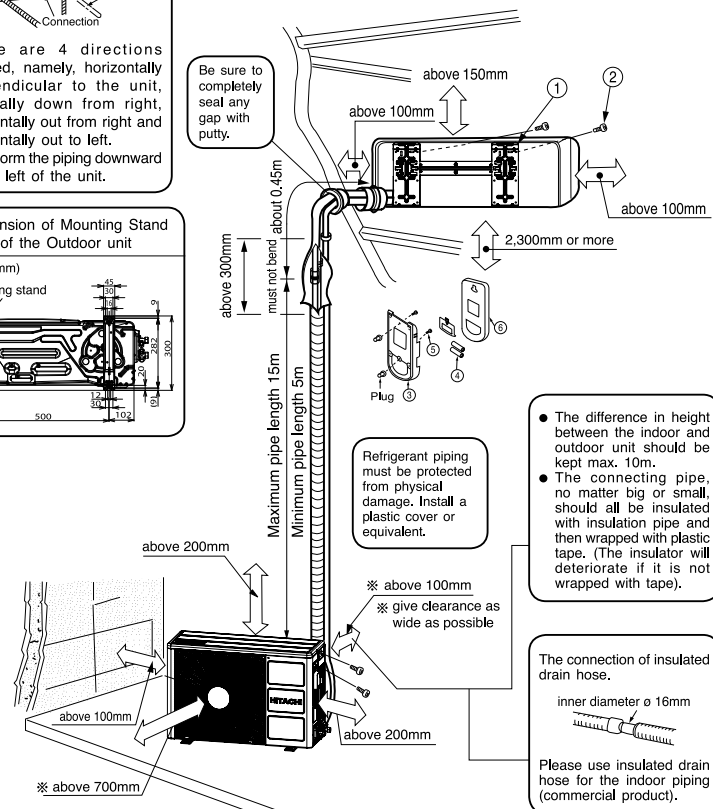
Figure showing the Installation of Indoor and Outdoor Unit

⚠ CAUTION

- This unit is chargeless up to 15m pipe length.
- Installation of pipe length less than minimum pipe length requirement (3 meters) may generate an abnormal sound.
- The minimum floor area of the room: $A_{\min}(0.35\text{m}^2)$.
- The maximum refrigerant charge amount: 0.61kg.

⚠ WARNING

Flare connection only at outside of building



- The difference in height between the indoor and outdoor unit should be kept max. 10m.
- The connecting pipe, no matter big or small, should all be insulated with insulation pipe and then wrapped with plastic tape. (The insulator will deteriorate if it is not wrapped with tape).

The connection of insulated drain hose.
inner diameter ϕ 16mm
Please use insulated drain hose for the indoor piping (commercial product).

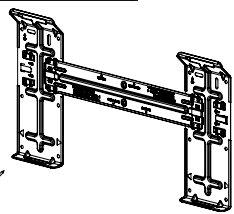
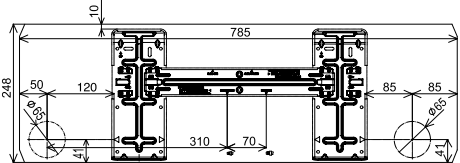
1 Installation of Hanger, Wall Penetration and Installation of Protection Pipe

⚠ CAUTION

- The draining of the water container inside the indoor unit can be done from the left. Therefore the mounting plate must be fixed horizontally or slightly tilted towards the side of drain hose. Otherwise, condensed water may overflow the water container.

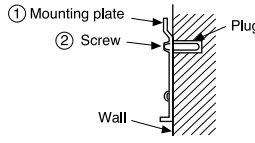
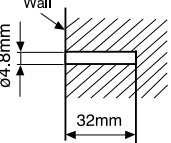
Direct Mounting On The Wall

- Please use hidden beams in the wall to hold the mounting plate.

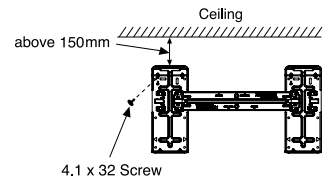


Procedures of Installation and Precautions

- Procedures to fix the mounting plate.
- 1. Drill holes on wall. (As shown below)
- 2. Push plug into the holes. (As shown below)

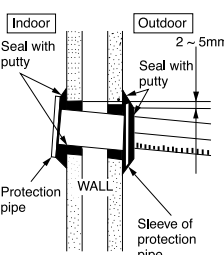


- 3. Fix the mounting plate on wall with 4.1 x 32 screw (As shown in figure below)



Wall Penetration and Installation of Protection Pipe

- Drill a ϕ 65mm hole on wall which is slightly tilted towards the outdoor side. Drill the wall at a small angle.
- Cut the protection pipe according to the wall thickness.
- Empty gap in the sleeve of protection pipe should be completely sealed with putty to avoid dripping of rain water into the room.



⚠ WARNING

Be sure that the wire is not in contact with any metal in the wall. Please use the protection pipe as wire passing through the hollow part of the wall so as to prevent the possibility of damaged by mouse. Unless it seals completely, any air with high humidity flows from outdoor and any dew may drop.

2 Installation of the Indoor Unit

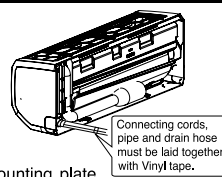
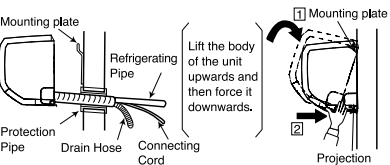
VERTICALLY DOWNWARD PIPING

Preparation

- Connect connecting cord.
- Pull out the pipe, connecting cord and drain hose.

Installation

- The upper part of the Indoor unit is hanged on the mounting plate.
- The projection at the lower part of the Indoor unit is hooked onto the mounting plate.

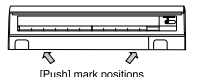


⚠ CAUTION

Please pull the lower part of the Indoor unit outwards to check if the unit is hooked onto the mounting plate. Improper installation may cause vibration and noise.

HOW TO REMOVE INDOOR UNIT

- Push up the (PUSH) sections at the bottom of the indoor unit and pull the bottom plate towards you. Then the claws are released from the stationary plate. (The (PUSH) sections are indicated by 2 arrows in the right figure)

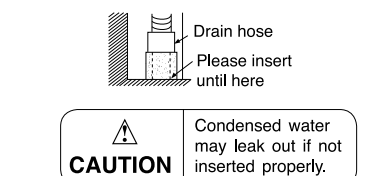
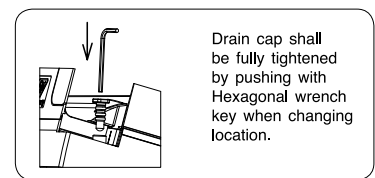
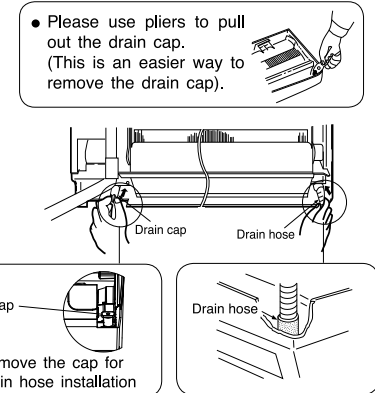


HORIZONTAL PIPING

Preparation

Change of Drain Hose and Installation Procedures.

- Exchange the location of drain hose and drain cap during horizontal piping as shown in figure below. Be sure to plug in the drain hose until the insulating material folds upon itself.



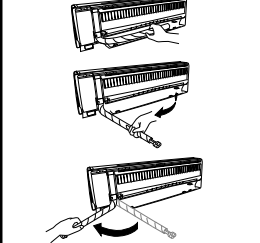
⚠ CAUTION

For horizontally out to right piping

- Press the upper side of clamp
- Unfold the pipe to downward slowly.
- Bend the pipe to the right side of chassis.

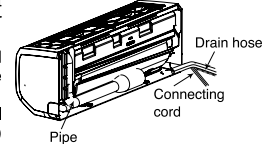
⚠ BAD

Following bending from left to right directly could cause damage to pipe.



INSTALLATION OF REFRIGERATING PIPES AFTER CONNECTION

- The refrigerating pipes should be adjusted to fit into the hole on the wall and then ready for further connection.
- The terminals of 2 connected pipes must be covered with insulator used for terminal connection. Then the pipes are wrapped with insulation pipe.
- Connect the connecting cord after removing electrical cover. (Refer to "CONNECTION OF POWER CORD")
- After adjustment, fit the connecting cord and pipes into the space available under the indoor unit.



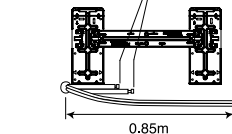
⚠ CAUTION

- The rubber strap used for fixing the insulator should not be tied with great force. Otherwise, this will damage heat insulation and causes water condensation.

THE CONNECTION OF REFRIGERATING PIPE DURING THE INSTALLATION OF INDOOR UNIT

Preparation To Install Refrigerating Pipes

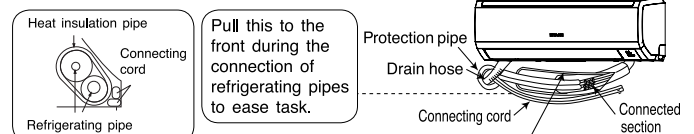
- Refer to below diagram for the connecting refrigerating pipes and cord arrangement.
- The end of the refrigerating pipes are at locations marked with "▽" symbol.



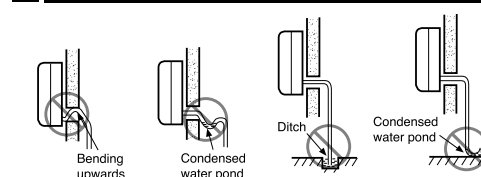
Installation

Hang the Indoor unit onto the mounting plate. Use the temporary stand at the back of the Indoor unit to push its lower part 15cm forwards.

- Place the drain hose through the hole on the wall.
- Wrap the refrigerating pipes with insulation pipe after connecting refrigerating pipe.
- Connect the connecting cord after removing electrical cover. (Refer to "Connection of Power Cord")
- After adjustment, the connecting cord and refrigerating pipes are placed into the space available under the Indoor unit.
- The projection of Indoor unit must hook to the mounting plate.



3 Installation of Drain Hose

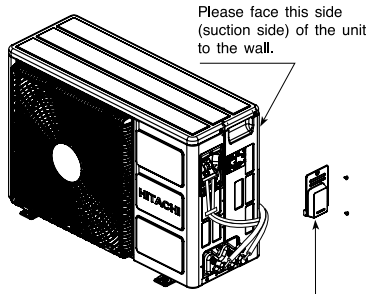


⚠ CAUTION

- Be sure that the drain hose is not loosely connected or bend.

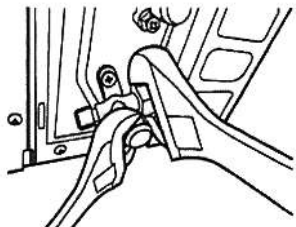
You are free to choose the side (left or right) for the installation of drain hose. Please ensure the smooth flow of condensed water of the Indoor unit during installation. (Carelessness may result in water leakage.)

- Please mount the outdoor unit on stable ground to prevent vibration and increase of noise level.
- Decide the location for piping after sorting out the different types of pipe available.
- Open the side plate by unscrewing the screws as shown below.



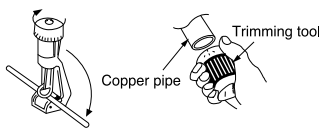
Please remove side cover when connecting the connecting cord.

- Use the two spanners of the service valve flare nut and tighten, loosen so that the service valve will not deform. Gas leak from the crushed part, stagnation, touching fire, rarely cause ignition.



1 Preparation of Pipe

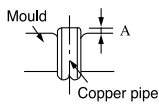
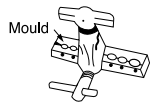
- Use a pipe cutter to cut the copper pipe.



CAUTION

- Jagged edge will cause leakage.
- Point the side to be trimmed downwards during trimming to prevent copper chips from entering the pipe.

- Before flaring, please put on the hexagon screw cap.



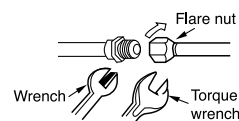
- Recommend to use R32 flaring tool.

Outer Diameter (mm)	Thickness (mm)	A (mm)		
		Flare tool for R32	Conventional flare tool	
		Clutch type	Clutch type	Wing nut type
6.35 (1/4)	0.8	0.0 ~ 0.5	1.0 ~ 1.5	1.5 ~ 2.0
9.52 (3/8)	0.8	0.0 ~ 0.5	1.0 ~ 1.5	1.5 ~ 2.0

2 Pipe Connection



In case of removing flare nut of an Indoor unit, first remove a nut of small diameter side, or a seal cap of big diameter side will fly out. Prevent water from entering into the piping when working.



	Outer dia. of pipe	Torque N·m (kgf·cm)
Small dia. side	6.35 (1/4")	13.7 ~ 18.6 (140 ~ 190)
Large dia. side	9.52 (3/8")	34.3 ~ 44.1 (350 ~ 450)
Valve head cap	Small dia. side 6.35 (1/4")	19.6 ~ 24.5 (200 ~ 250)
	Large dia. side 9.52 (3/8")	19.6 ~ 24.5 (200 ~ 250)
Valve core cap		12.3 ~ 15.7 (125 ~ 160)

3 Removal Of Air From The Pipe And Gas Leakage Inspection

Procedures of using Vacuum Pump for Air Removal

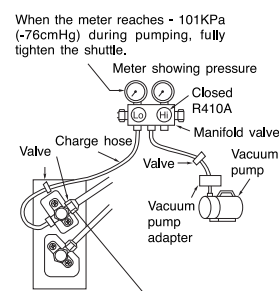
As shown in right figure, remove the cap of valve core. Then, connect the charge hose. Remove the cap of valve head. Connect the vacuum pump adapter to the vacuum pump and connect the charge hose to the adapter.

Fully tighten the "Hi" knob of the manifold valve and completely unscrew the "Lo" knob. Run the vacuum pump for about 10~15 minutes, then completely tighten the "Lo" knob and switch off the vacuum pump. After vacuuming, confirm that the needle of the manifold gauge is stable for 3~5 minutes.

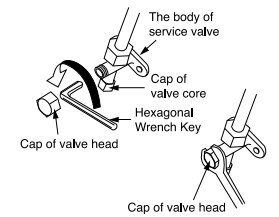
Remove the charge hose and tighten the cap of valve core. Check the cap's periphery if there is any gas leakage.

Completely unscrew the spindle of the service valve (at 2 places) in anti-clockwise direction to allow the flow of refrigerant (using Hexagonal Wrench key).

Re-cap the service valve and tighten using wrench. Check the cap's periphery if there is any gas leakage. The task is then completed.



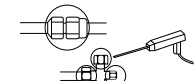
When pumping starts, slightly loosen the flare nut to check of air sucked in. Then tighten the flare nut.



Gas Leakage Inspection

Please use gas leakage detector to check if leakage occurs at the connection of Flare nut as shown on the right.

If gas leakage occurs, further tighten the connection to stop leakage. (Use the detector provided for R32)

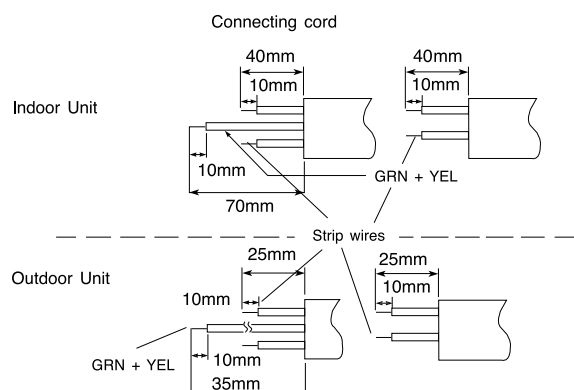
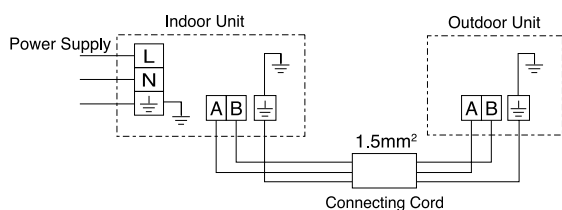


CAUTION

- Prevent moisture from entering pipe connection.
 - Refrigerating machine oil not be applied to the outside of the flare.
- When refrigerating machine oil is applied to the outside of the flare, excessive tightening of the flare nut, cracking of the flare nut, destruction of the flare and gas leakage may occur.
- When using the control valve, do not use deteriorated packing. And, do not overtighten the steering wheel. Gas leakage from the service valve part, stagnation, touching fire, rarely cause ignition.

PROCEDURES OF WIRING

Procedures of Wiring

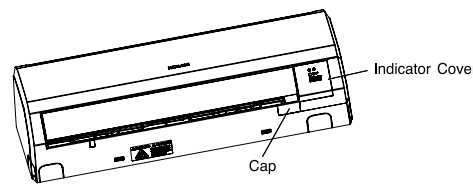


WARNING

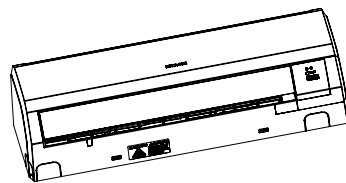
- The naked part of the wire core should be 10 mm and fix it to the terminal tightly. Then try to pull the individual wire to check if the contact is tight. Improper insertion may burn the terminal.
- Be sure to use only power cables approved from the authorities in your country.
- Please refer to the installation manual for wire connection to the terminals of the units. The cabling must meet the standards of electrical installation.
- There is a AC voltage of 220-230V between the L and N terminals. Therefore, before servicing, be sure to remove the plug from the AC outlet or switch off the main switch.
- Do not make any connection in the middle of the connecting cable. It may cause the wire over heated, emit smoke and fire.

Wiring Of The Indoor Unit

- 1 • For wire connection of the Indoor unit, you need to remove the Cap and Indicator Cover.



- 4 • Assemble back the Terminal Cover. Make sure it fixed securely. Attach the Indicator Cover and fixed with screw. Attach back the Cap into it's place.



Wiring of The Outdoor Unit

- Please remove the side cover for wire connection.



- If you cannot attach the side cover due to the connecting cord, press the connecting cord in direction to the front panel to fix it.
- Be sure that the hooks of the side cover is fixed in certainly. Otherwise water leakage may occur and this causes short circuit or faults.

IMPORTANT

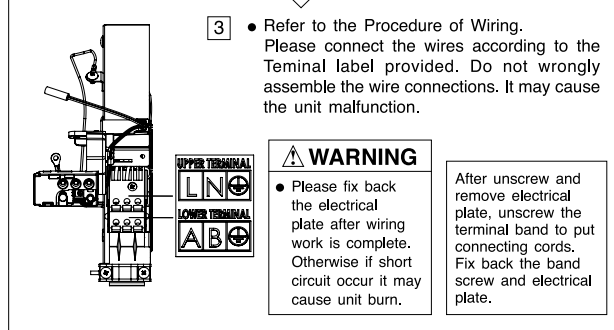
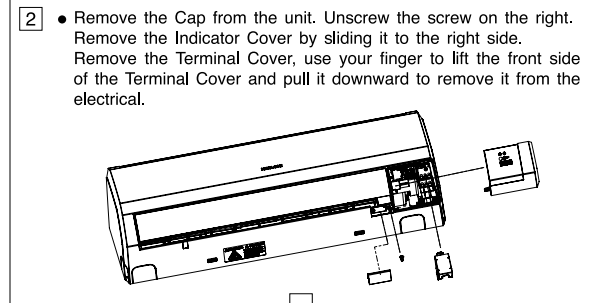
Cable length	Wire cross-section
up to 25m	1.5mm²

IMPORTANT

Circuit Breaker
10A

CAUTION

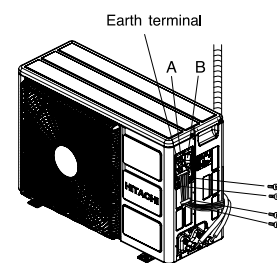
Outdoor supply cords shall not be lighter than polychloroprene sheathed flexible cord with code designation 60245 IEC 57.



WARNING

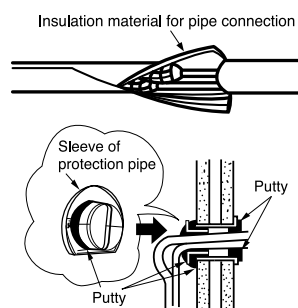
- Please fix back the electrical plate after wiring work is complete. Otherwise if short circuit occur it may cause unit burn.

After unscrew and remove electrical plate, unscrew the terminal band to put connecting cords. Fix back the band screw and electrical plate.



1 Insulation And Maintenance Of Pipe Connection

- The connected terminals should be completely sealed with heat insulator and then tied up with rubber strap.
- Please tie the pipe and power line together with vinyl tape as shown in the figure showing the installation of Indoor and Outdoor units. Then fix their position with holders.
- To enhance the heat insulation and to prevent water condensation, please cover the outdoor part of the drain hose and pipe with insulation pipe.
- Completely seal any gap with putty.



3 Power Source And Operation Test

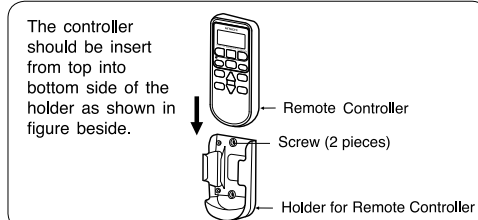
Power Source

CAUTION

- Please use a new socket. Accident may occur due to the use of old socket because of poor contact.
- Please plug in and then remove the plug for 2 ~ 3 times. This is to ensure that the plug is completely plugged into the socket.
- Keep additional length for the power cord and do not render the plug under external force as this may cause poor contact.
- Do not fix the power cord with U-shape nail.

2 Installation Of Remote Controller

- The remote controller can be placed in its holder which is fixed on wall or beam.
- To operate the remote controller at its holder, please ensure that the unit can receive signal transmitted from the controller at the place where the holder is to be fixed. The unit will beep when signal is received from the remote controller. The signal transmission is weakened by the fluorescent light. Therefore, during the installation of the remote control holder, please switch on the light, even during day time, to determine the mounting location of the holder.



Operation Test

- Please ensure that the air conditioner is in normal operating condition during the operation test.
- Explain to your customer the proper operation procedures as described in the user's manual.

WARNING

This symbol shows that this equipment uses a flammable refrigerant.

If the refrigerant is leaked, together with an external ignition source, there is a possibility of ignition.

CAUTION

This symbol shows that the Operation Instructions should be read carefully.

CAUTION

This symbol shows that a service personnel should be handling this equipment with reference to the Installation Manual.

CAUTION

This symbol shows that there is information included in the Operation Manual and/or Installation Manual

Pump Down Method When Reuse Existing Piping (R410 Model) for R32 Model

- Compressor oil of R410 model is insoluble in compressor oil of R32 model. The mixing of compressor oil may cause damage of compressor.

Possibility of Mixing

- Reuse of piping of R410 model is dangerous because of its compressor oil.

- When reuse piping of R410 model, pump down must be carried out properly to ensure compressor oil which is remained inside piping is collected away.

CAUTION

Reuse of piping R410 model only apply if previous model is Hitachi and proper pump down method is used.

To Reuse Old Piping

- Piping of R410 model can be reused only when air-conditioner is properly pumped down.

- The purpose of pump down is to collect back the compressor oil (which is mixed with refrigerant and circulating inside refrigeration cycle) properly into the outdoor unit of air conditioner.

Proper Pump Down Method

- Operate air conditioner at cooling mode for 10~15 minutes
Most Important Process
Purpose: To make the oil & refrigerant mix together. They are in separated condition when air conditioner is stopped.
- After 10~15 minutes of operation, close 2s valve. After 3 minutes, close 3s valve. Mixed refrigerant & oil will be collected into outdoor unit.
- Take out air conditioner unit. It is advisable to flush the piping with R32 to avoid any contamination remain before new installation.
- Install New Refrigerant air conditioner

CAUTION

- A circuit breaker must be installed. Without a circuit breaker or fuse the danger of electric shock exists. A main switch with a contact gap of more than 3mm has to be installed in the power supply line to the outdoor unit.
- Do not install the unit near a location where there is flammable gas. The outdoor unit may catch fire if flammable gas leaks around it.
- Do not install the indoor unit in a machine shop or kitchen where vapor from oil or its mist flows to the indoor unit. The oil will deposit on the heat exchanger, thereby reducing the indoor unit performance and may deform and in the worst case, break the plastic parts of the indoor unit.
- Please ensure smooth flow of water when installing the drain hose.
- Piping shall be suitable supported with a maximum spacing of 1m between the supports.

WARNING

BURST HAZARD
Do not allow air, etc. to get into refrigerant cycle (piping)
RISK OF EXPLOSION
Compressor must be stopped before removing refrigerant pipes. All service valve must be fully closed after pumping down operation.