# AIR CONDITIONER
# BRANCH BOX

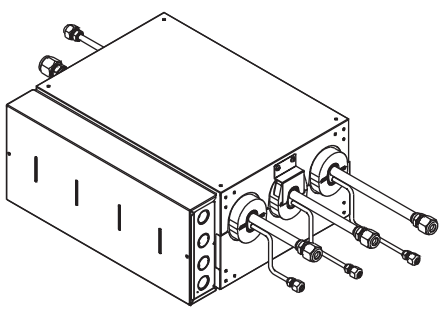
English

Français

Español

# INSTALLATION MANUAL

For authorized personnel only.



## Contents



PART NO. 9380120001-04

## IMPORTANT!
## Please Read Before Starting

This air conditioning system meets strict safety and operating standards.
As the installer or service person, it is an important part of your job to install or service the system so it operates safely and efficiently.

**For safe installation and trouble-free operation, you must:**

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- Observe all local, state, and national electrical codes.
- Pay close attention to all danger, warning, and caution notices given in this manual.

WARNING: This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.

CAUTION: This symbol refers to a hazard or unsafe practice which can result in personal injury and the potential for product or property damage.

- Hazard alerting symbols


Electrical


Safety/alert

### If Necessary, Get Help

These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales/service outlet or your certified dealer for additional instructions.

### In Case of Improper Installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

## SPECIAL PRECAUTIONS

### When Wiring

**ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.**

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause accidental injury or death.
- Ground the unit following local electrical codes.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.

### When Installing...

**...In a Ceiling or Wall**
Make sure the ceiling/wall is strong enough to hold the unit's weight. It may be necessary to construct a strong wood or metal frame to provide added support.

**...In a Room**
Properly insulate any tubing run inside a room to prevent "sweating" that can cause dripping and water damage to walls and floors.

### When Connecting Refrigerant Tubing

- Keep all tubing runs as short as possible.
- Use the flare method for connecting tubing.
- Apply refrigeration compressor oil (or equivalent ) used for the outdoor unit to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak-free connection.
- Check carefully for leaks before opening the refrigerant valves. Refer to outdoor unit installation manual for proper procedure.

**NOTE:**
Depending on the system type, liquid and gas lines may be either narrow or wide. Therefore, to avoid confusion the refrigerant tubing for your particular model is specified as either "small" or "large" rather than as"liquid" or "gas".

### When Servicing

- Turn the power OFF at the main circuit breaker panel before opening the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit being serviced.
- After installation, explain correct operation to the customer, using the operating manual.

**⚠ DANGER**

**Never touch electrical components immediately after the power supply has been turned off. Electrical shock may occur. After turning off the power, always wait 5 minutes or more before touching electrical components.**

| ⚠ WARNING |
| --- |
| Ask a qualified technician to perform the installation.<br>A faulty installation carried out by the customer himself/herself may cause a water leakage, electric shock or fire. |
| Perform the installation properly by following this Installation Manual.<br>Otherwise, a faulty installation may cause water leakage, electric shock or fire. |
| Be sure to always use the parts accessories or the specified parts for installation.<br>Failure to use the specified parts may cause the equipment to fail, water leakage, electric shock or fire. |
| Install the equipment in a location that is out of reach of children. |
| During installation and relocation of air conditioner, do not allow air or any substances other than the specified refrigerant (R410A) to enter the refrigerant cycle.<br>Air or any other substances entered in the refrigerant cycle may cause abnormally high pressure in the refrigerant cycle, which could result in explosion or personal injury. For additional information, refer to the R410A MSDS. |
| Ventilate the area if there is a refrigerant leak while performing the installation.<br>If the refrigerant gas comes into contact with an open flame, it can generate toxic fumes. |
| Be sure to check that there are no refrigerant leaks after installation is completed.<br>If there is refrigerant gas leak indoors and comes into contact with an open flame from such sources as a fan heater, Bunsen burner, or stove, it can generate toxic fumes. |
| When installing this system in high humidity locations, install using Ground fault equipment breakers (often referred to in other countries as an ELCB earth leakage current breaker) to reduce the risk of leaking current which may result in electric shock or potential fire. |

| ⚠ CAUTION |
| --- |
| Do not install in a location where there is risk of leaking flammable gas.<br>In the event that a gas leak should occur, gas build up around the equipment can cause fire. |
| It is not necessary to provide drainage for Branch box. |
| This equipment is for indoor use only. |
| Secure the flare nuts according to the specified method such as using a torque wrench.<br>Over-tightening the flare nuts can result in cracking or breaking after a long period of time, and thus cause a refrigerant leak. |

## 2. ABOUT THE UNIT

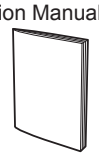
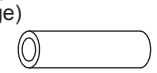
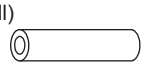
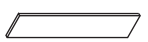
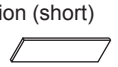
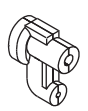
### 2.1. Precautions for using R410A refrigerant

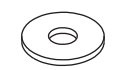
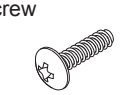
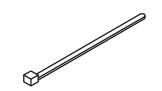
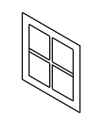
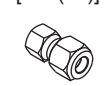
| | |
|---|---|
| The basic installation work procedures are the same as conventional refrigerant models.<br>However, pay careful attention to the following points: | |
| 1 | Since the working pressure is 1.6 times higher than that of conventional refrigerant (R22) models, some of the piping and installation and service tools are special. (See the table below.)<br>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. |
| 2 | Be careful that foreign matter (oil, water, etc.) does not enter the piping than with refrigerant models. Also, when storing the piping, securely seal the openings by pinching, taping, etc. |

### 2.2. Special tools for R410A

| Tool name | Contents of change |
|---|---|
| **Gauge manifold** | Pressure is high and cannot be measured with a conventional (R22) gauge. To prevent erroneous mixing of other refrigerants, the diameter of each port has been changed.<br>It is recommended the gauge with seals –0.1 to 5.3 MPa (30 in.Hg to 768 psi) for high pressure. –0.1 to 3.8 MPa (30 in.Hg to 551 psi) 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. |

### 2.3. Accessories

| Name and shape | Q'ty | Application |
|---|---|---|
| Installation Manual  | 1 | This manual |
| Coupler heat insulation (large)  | 4 | For indoor and outdoor side pipe joint (gas pipe) |
| Coupler heat insulation (small)  | 4 | For indoor and outdoor side pipe joint (liquid pipe) |
| Insulation (long)  | 3 | For use on the section where the insulation fits onto this equipment (indoor unit side) |
| Insulation (short)  | 3 | For use on the section where the insulation fits onto this equipment (outdoor unit side) |
| Insulation  | 3 | To be used with this equipment's (indoor unit side) piping |
| Hanger  | 4 | For suspending the Branch box from ceiling |

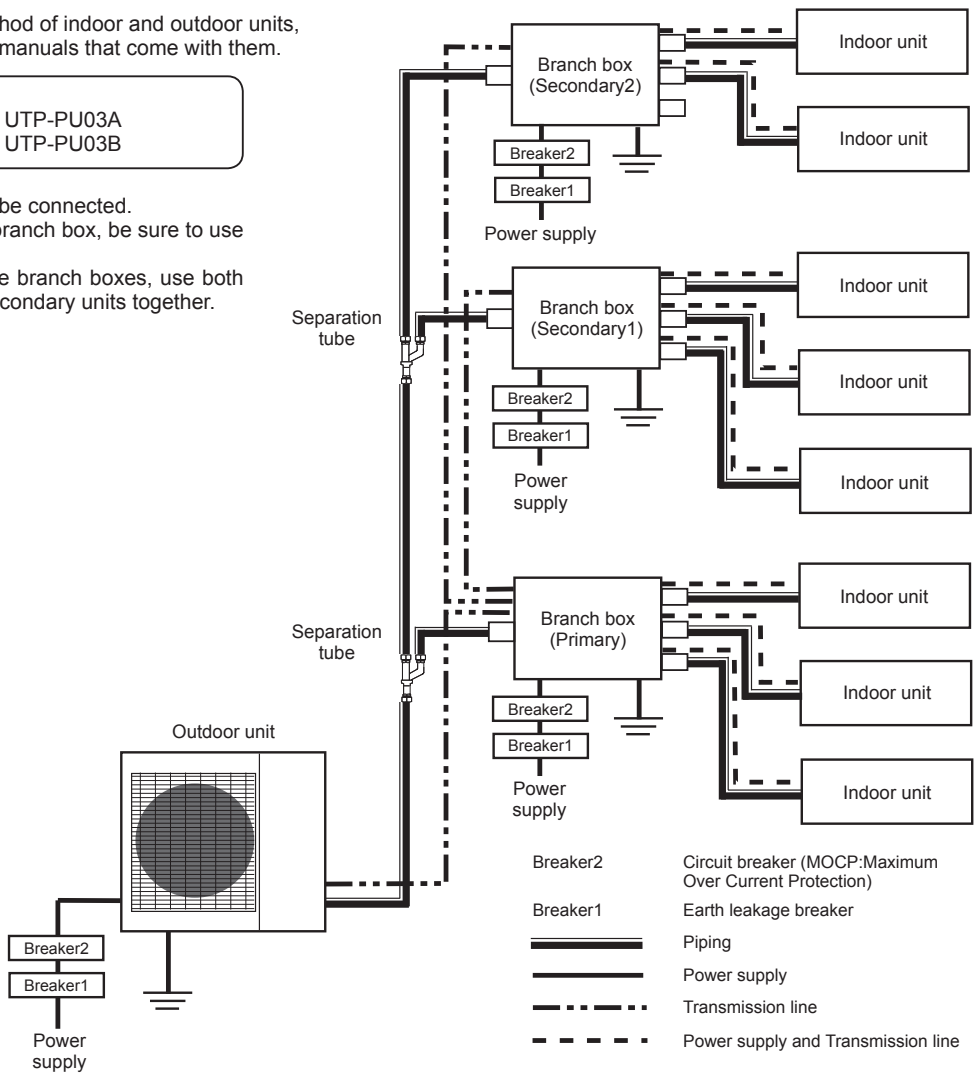
| Name and shape | Q'ty | Application |
|---|---|---|
| Washer  | 8 | For suspending the Branch box from ceiling |
| Tapping screw (Ø 4×10)  | 8 | For installing the Hanger |
| Tapping screw (Ø 4×25)  | 8 | For installing the Branch box on the wall |
| Binder  | 1 | For remote controller cable binding |
| Seal  | 1 | To prevent small animals from entering inside |
| Adapter [mm(in.)]<br>12.7 (1/2) → 9.52 (3/8)  | 3 | For indoor unit connection |
| Adapter [mm(in.)]<br>12.7 (1/2) → 15.88 (5/8)  | 3 | For indoor unit connection |

## 3. SYSTEM CONFIGURATION

For the installation method of indoor and outdoor units, refer to the installation manuals that come with them.

Branch box
Primary unit : UTP-PU03A
Secondary unit : UTP-PU03B

2 to 8 indoor units can be connected.
When installing just 1 branch box, be sure to use the primary unit.
When installing multiple branch boxes, use both the primary unit and secondary units together.




## 4. INSTALLATION WORK

### 4.1. Selecting an installation location

**⚠ CAUTION**

Do not install the Branch box in the following areas:

- Area with high salt content, such as at the seaside. It will deteriorate metal parts, causing the parts to fail or the unit to leak water.
- Area filled with mineral oil or containing a large amount of splashed oil or steam, such as a kitchen. It will deteriorate plastic parts, causing the parts to fail or the unit to leak water.
- Area that generates substances that adversely affect the equipment, such as sulfuric gas, chlorine gas, acid, or alkali. It will cause the copper pipes and brazed joints to corrode, which can cause refrigerant leakage.
- Area containing equipment that generates electromagnetic interference. It will cause the control system to malfunction, preventing the unit from operating normally.
- Area that can cause combustible gas to leak, contains suspended carbon fibers or flammable dust, or volatile inflammables such as paint thinner or gasoline. If gas leaks and settles around the unit, it can cause a fire.
- Area where small animals may live. It may cause failure, smoke or fire if small animals enter and touch internal electrical parts.
- Area where animals may urinate on the unit or ammonia may be generated.

When installing the unit in a location such as above the ceiling or on the wall, follow the conditions below.

- Install the branch box in a location that has strong support and no vibrations.
- Install in a location that has enough space for branch box installation.
- Install in a well-ventilated area.
- Install in a location that is not exposed to temperatures exceeding the system operating range or humidity above 80% RH.
- **Do not install the unit near a bedroom. Refrigerant noise may be heard from the piping.**
- Refer to “4.2 Installation dimensions” for installation restrictions.

English

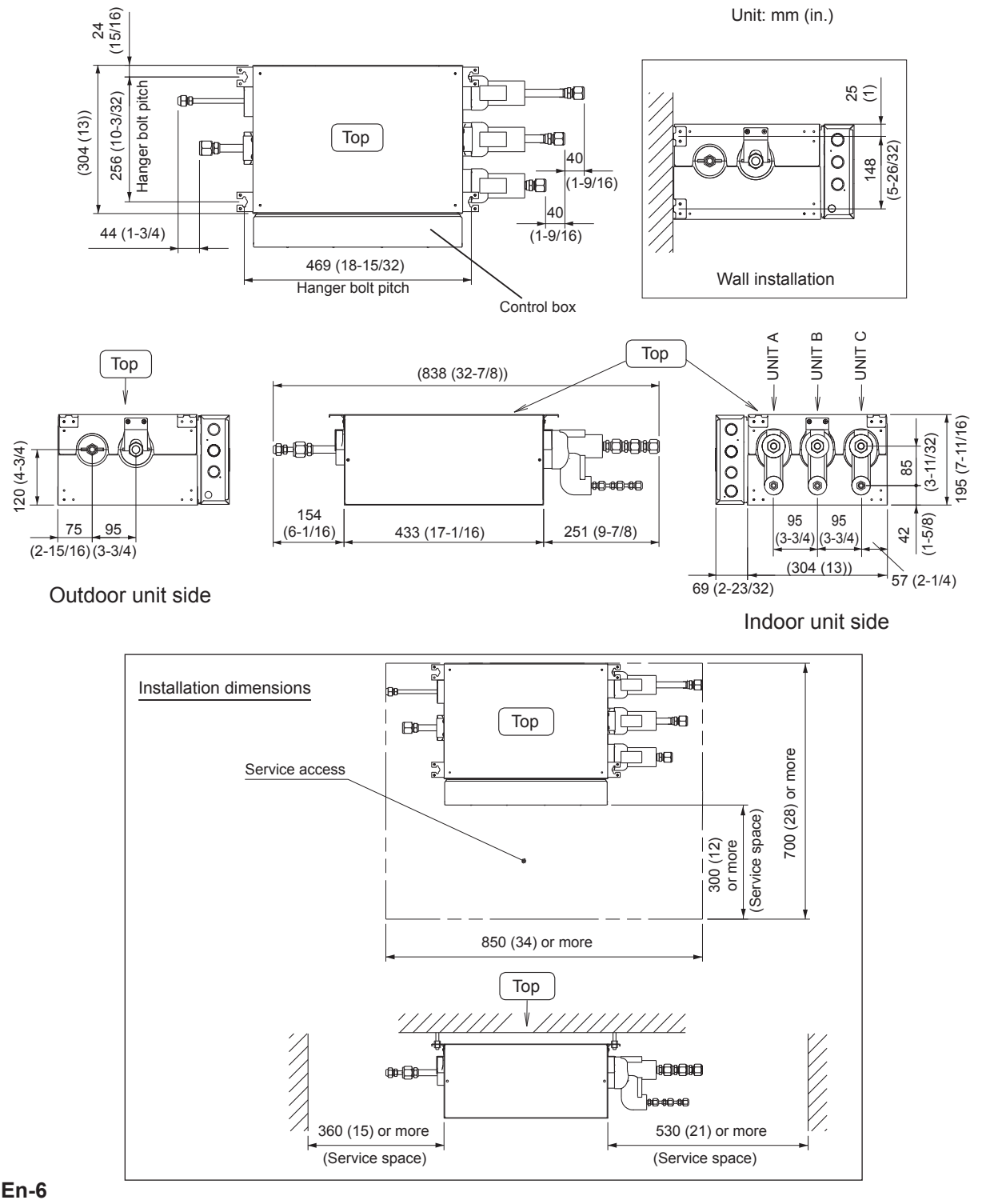
## 4.2. Installation dimensions

- The branch box can be installed onto the wall or hanging from the ceiling.
- The branch box can be installed and set horizontally or vertically.
- Provide a service hole for maintenance and inspection purposes as shown in the figure below.
- It is not necessary to provide drainage for the Branch box.
- The slope of the top side must be within ±5° in all directions of the horizontal plane.
- Use M8 or M10 (5/16″ or 3/8″) for the bolt size when hanging.

### 4.2.1. Horizontal installation

Be sure to install so that the top side faces down.

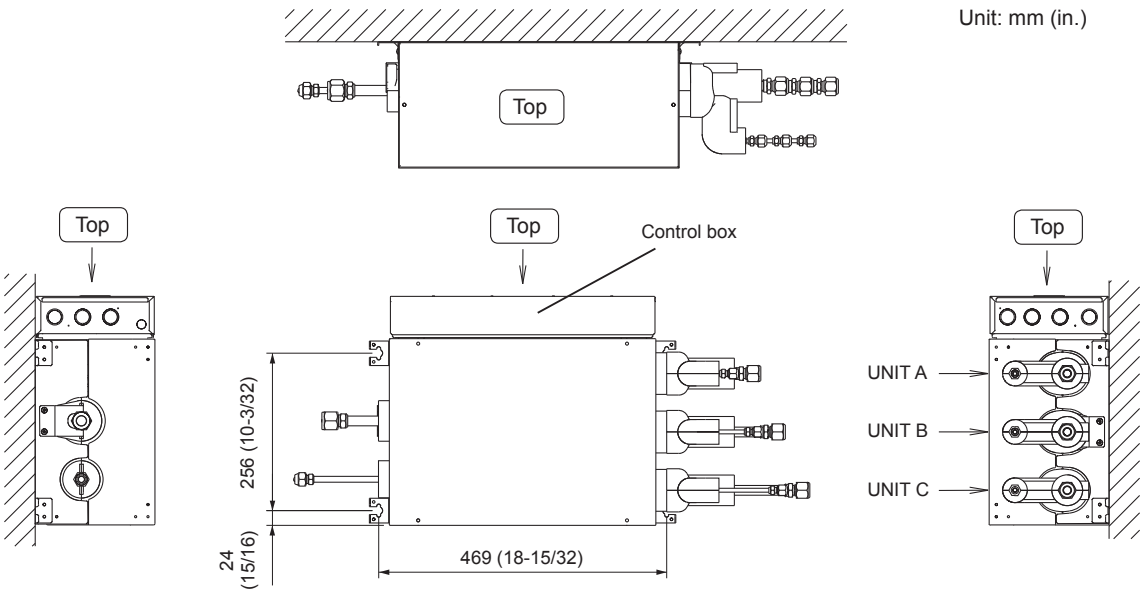
Unit: mm (in.)

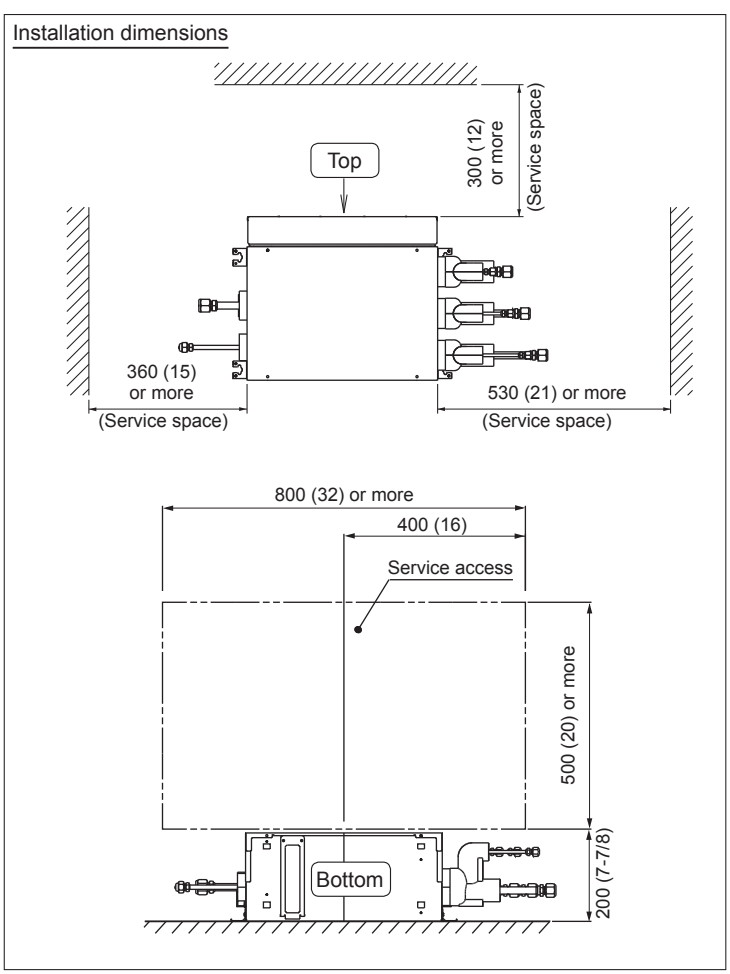


### 4.2.2. Vertical installation

- A vertical installation can only be performed when mounting on the wall.
  (A vertical installation cannot be hung from the ceiling.)
- Be sure to install the control box so that the top side faces up.
- The positioning of the control box cannot be changed when performing a vertical installation.

Unit: mm (in.)



## 4.3. Installation of the unit

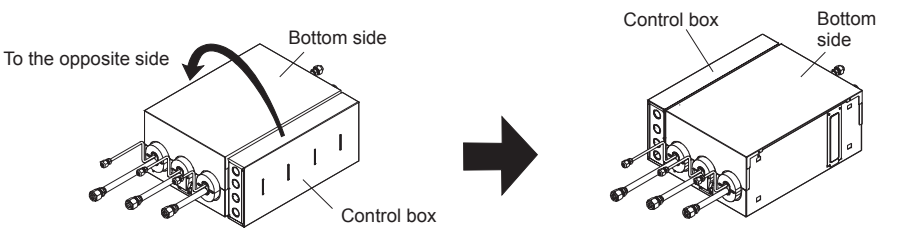
| ⚠ WARNING |
|---|
| Perform installation in a location which can properly withstand the weight of the unit.<br>Failure to install in a robust location or a faulty installment may cause the equipment to fail, water leakage, electric shock or fire. |
| During installation, secure the hanger bolt so it does not come off. |

| ⚠ CAUTION |
|---|
| Be sure to provide adequate maintenance space when installing the unit above the ceiling.<br>(Refer to the installation restrictions contained in “4.2 Installation dimensions”.) |

### 4.3.1. Changing the positioning of the control box

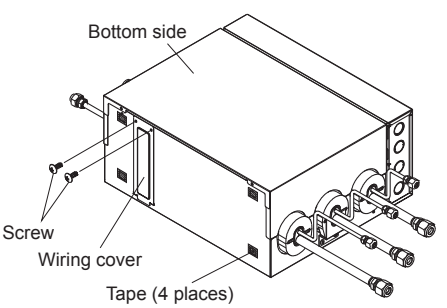
| ⚠ CAUTION |
|---|
| Change the positioning of the control box on-site before performing the installation. |

The positioning of the control box can be changed.
(Only when installed horizontally. When vertically installed, the positioning cannot be changed.)

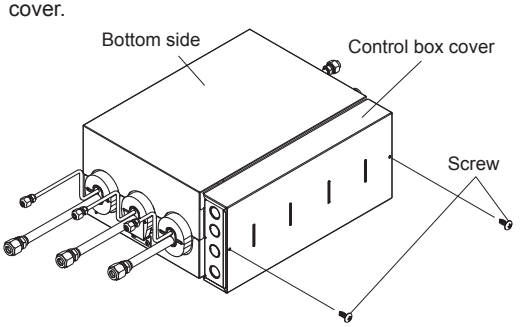



At time of shipment　　Positioning after change

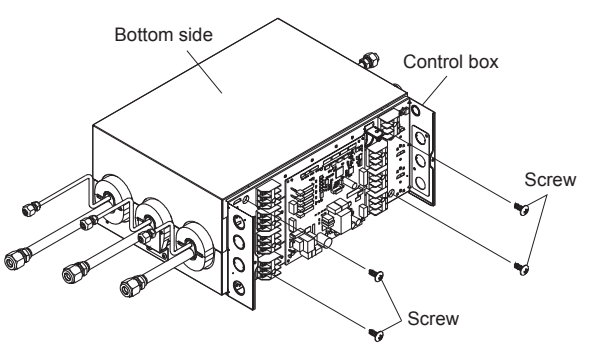
(1) Remove the screws (2 pieces) to remove the wiring cover.
Remove the tapes (4 places) on the main unit.



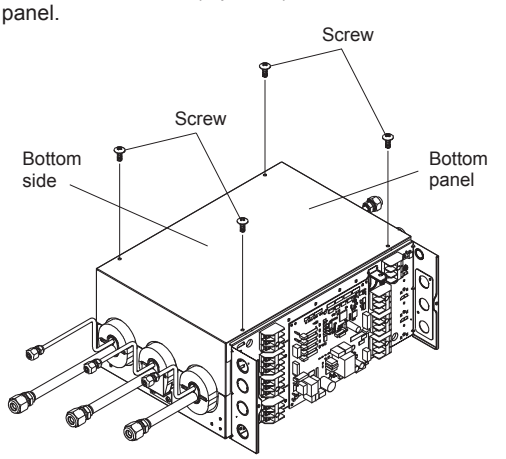

(2) Remove the screws (2 pieces) to remove the control box cover.



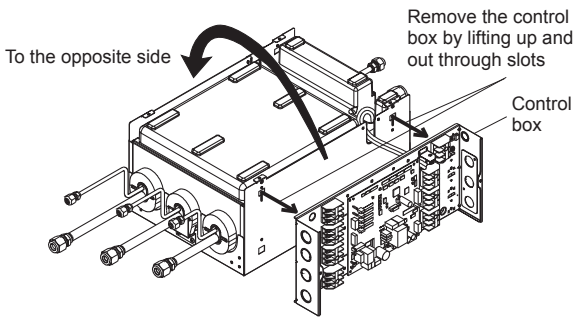

(3) Remove the screws (4 pieces).
(Note: Do not remove the control box.)



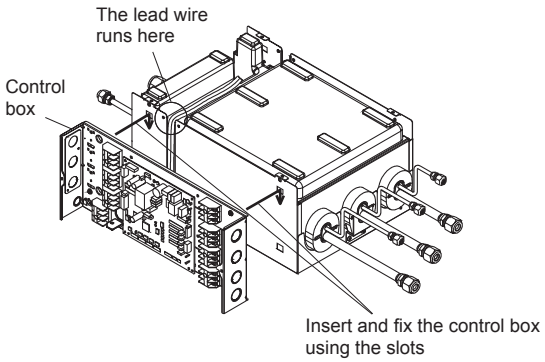

(4) Remove the screws (4 pieces) to remove the bottom panel.



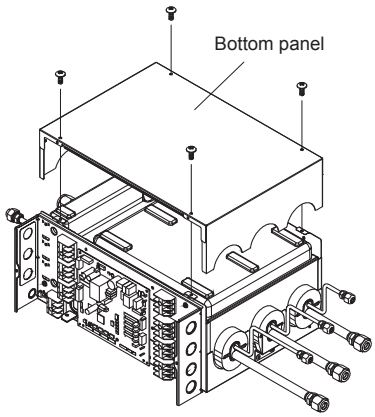
(5) Remove the control box as shown in the figure, and then change the positioning to the opposite side.



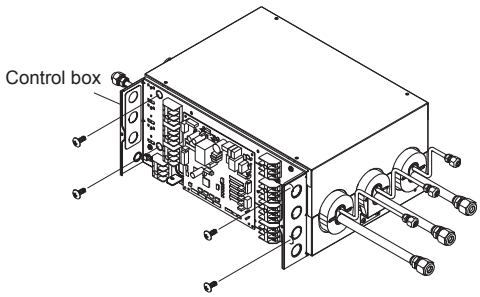

(6) Attach the control box to the main unit as shown in the figure.



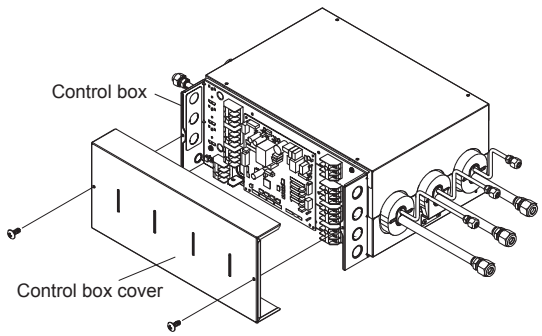

(7) Attach the bottom panel and secure it with the screws (4 pieces).



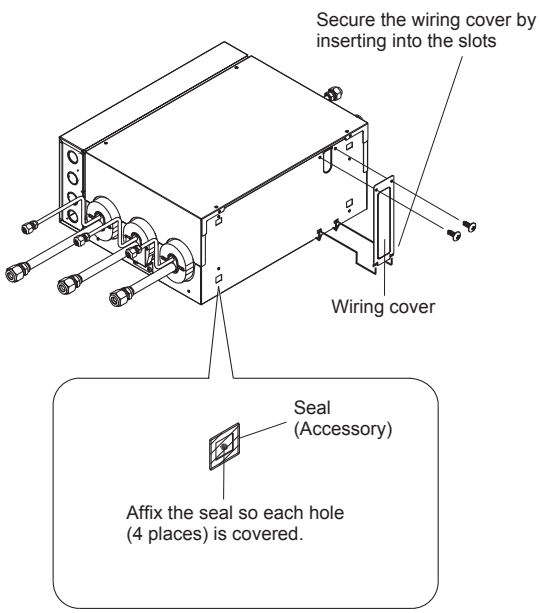

(8) Secure the control box with the screws (4 pieces).




(9) Attach the control box cover and secure it with the screws (2 places).




(10) Attach the wiring cover and secure it with the screws (2 places).
Affix the seals on the main unit (4 places).

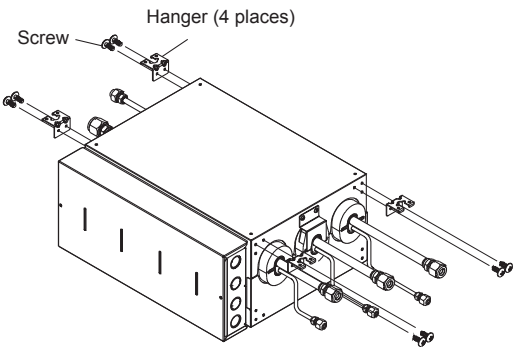



English

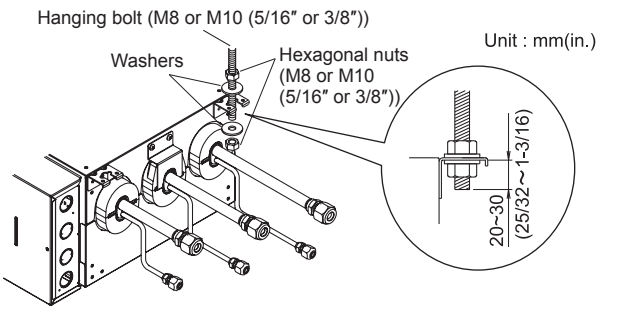
### 4.3.2-A. Fix the unit (When hanging from the ceiling)

| ⚠ CAUTION |
| --- |
| Do not hang from the ceiling when performing a vertical installation. |

(1) Secure the hangers (accessories) with the screws (2 pieces, Ø 4 x 10, accessories). (4 places)



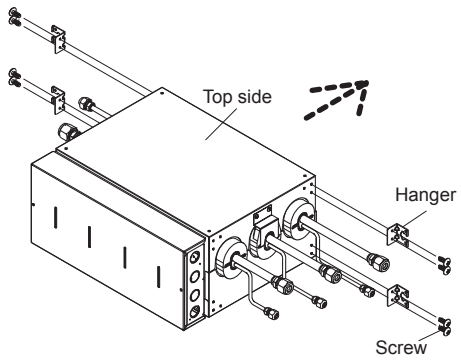

(2) Secure the attachment section with the hanging bolt. (Use M8 or M10 (5/16″ or 3/8″) for the hanging bolt)
(3) Secure the hangers with hexagonal nuts (field supply) and the washers (accessories) as shown in the figure below.
(4) Once you have checked the unit is flat, fasten the hexagonal nuts.
(The unit's slope must be within ±5° in all directions.)



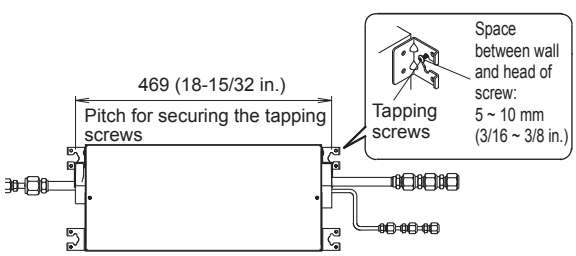
### 4.3.2-B. Fix the unit (For wall installation)

<Horizontal installation>

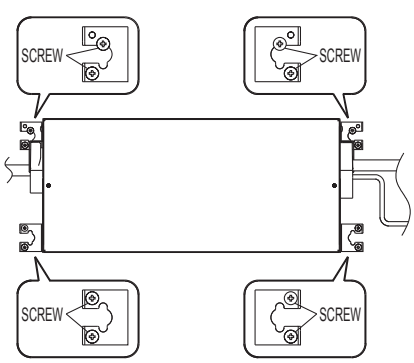
(1) Secure the hangers (accessories) with the screws (2 pieces, Ø 4 x 10, accessories). (4 places)
• Install the unit with its top side facing upwards.




(2) For temporary mounting of the unit, install 2 of the Ø 4×25 screws in the wall, allowing the space of 5~10mm (3/16~3/8 inch) between the wall and the screw heads. Then hook the unit over these 2 screws.

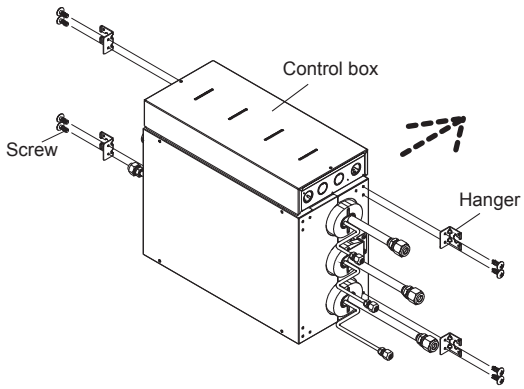



(3) After checking that the unit is flat, secure and mount the branch box with the 8 screws (Ø 4 x 25, accessories) provided including the tapping screws. (The unit's slope must be within ±5° in all directions.)

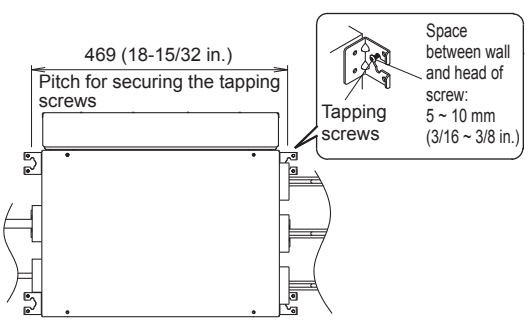



<Vertical installation>

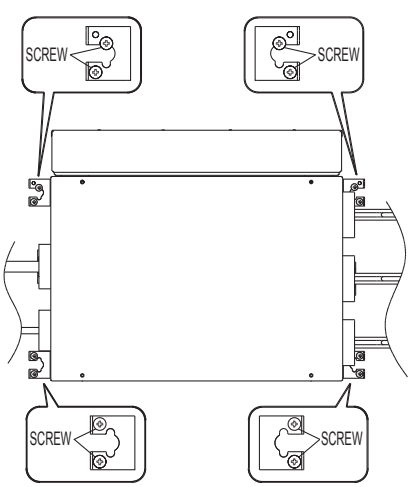
(1) Secure the hangers (accessories) with the screws (2 pieces, Ø 4 x 10, accessories). (4 places)
• Install the unit with the control box facing upwards.




(2) For temporary mounting of the unit, install 2 of the Ø 4×25 screws in the wall, allowing the space of 5~10mm (3/16~3/8 inch) between the wall and the screw heads. Then hook the unit over these 2 screws.




(3) After checking that the unit is flat, secure and mount the branch box with the 8 screws (Ø 4 x 25, accessories) provided including the tapping screws. (The unit's slope must be within ±5° in all directions.)



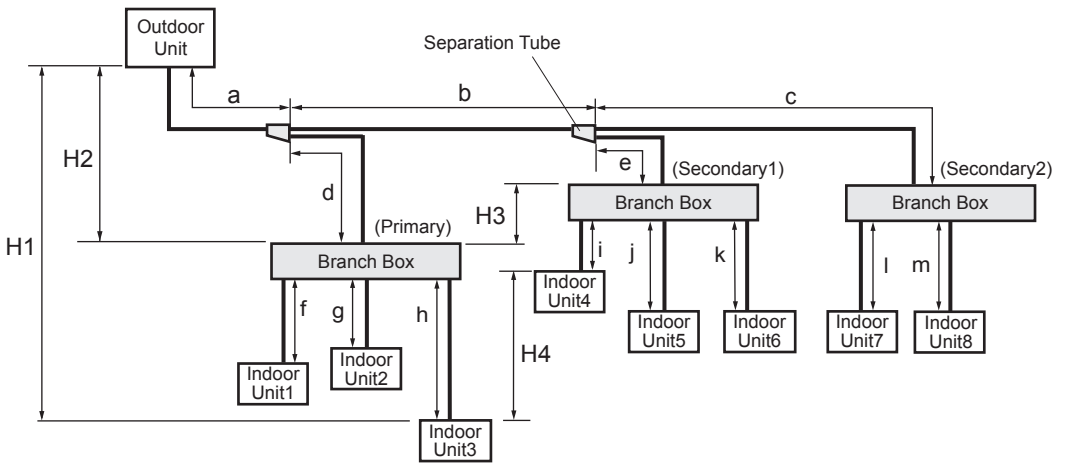

English

## 5. PIPE INSTALLATION

### 5.1. Refrigerant pipe size and allowable piping length

Insulate the liquid side and gas side of the piping well. Failure to insulate can lead to water leaks. Use insulation material for the gas side of the piping with a heat resistance of more than 120°C (248°F). In addition, reinforce the insulation material for the refrigerant piping if the connecting piping periphery exceeds 30°C (86°F) with a relative humidity of 80%. (More than 20 mm (25/32″) thickness) Failure to reinforce the insulation material can lead to condensation on the insulation material's surface. Before installation, check that the refrigerant being used is R410A. If a different type of refrigerant is used, it will not operate properly. (The outdoor unit is filled with refrigerant.)

| ⚠ CAUTION |
|---|
| Do no mix with other air/gases except the specified refrigerant for the refrigerant cycle. Ventilate the area if there is a refrigerant leak while performing the installation. |
| Over-tightening when connecting the flare fittings can result in cracking or breaking of the flare nuts, and thus cause a refrigerant leak. |
| For on-site piping insulation, be sure that the insulation covers the entire unit's pipe connection. Pipe exposure can lead to water leaks from condensation and consequently cause burn injury from contact. |
| During flare connection, apply the refrigeration compressor oil (or equivalent) used for the outdoor unit to the flare section. |
| Secure the piping by taping it or performing pipe pinching so that impurities, water or dust do not penetrate inside the piping. |




| | | | Limitation m (ft) | | Diagram |
|---|---|---|---|---|---|
| Allowable pipe length (actual pipe length) | Maximum total equivalent pipe length | | 115 or less | (377) | Total |
| | Between outdoor unit and the farthest indoor unit | | 70 or less | (230) | a + b + c + m |
| | Between outdoor unit and branch boxes | | 55 or less | (180) | a + b + c + d + e |
| | Between branch box and indoor unit | Total | 60 or less | (197) | f + g + h + i + j + k + l + m |
| | | Each unit | Between 3-15 | (10-49) | f, g, h, i, j, k, l, m |
| | Between outdoor unit and the first separation tube | | 5 or more | (16) | a |
| | Between outdoor unit and branch box (when there is no separation tube) | | 5 or more | (16) | a+d |
| Allowable height difference | Between outdoor unit and indoor unit | | 30 or less | (98) | H1 |
| | Between outdoor unit and branch box | | 30 or less | (98) | H2 |
| | Between branch box and branch box | | 15 or less | (49) | H3 |
| | Between indoor unit and indoor unit | | 15 or less | (49) | H4 |

Note) Install the separation tube close to the branch box. Keep the pipe length for sections c, d, and e as short as possible.

Pipe size selection

| | Code | Condition (model code of indoor unit) | Gas pipe [mm (in.)] | Liquid pipe [mm (in.)] |
|---|---|---|---|---|
| From the outdoor unit to the first separation tube | a | — | Ø 15.88 (5/8) | Ø 9.52 (3/8) |
| From the separation tube to the next separation tube | b | — | Ø 15.88 (5/8) | Ø 9.52 (3/8) |
| From the separation tube to the branch box | c, d, e | — | Ø 15.88 (5/8) | Ø 9.52 (3/8) |
| From the branch box to the indoor unit | f, g, h, i, j, k, l, m | 7, 9, 12 | Ø 9.52 (3/8) | Ø 6.35 (1/4) |
| | | 18 | Ø 12.70 (1/2) | |
| | | 24 | Ø 15.88 (5/8) | |

## 5.2. Selecting the pipe material

**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 (0.004 oz/100 ft). 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 conventional refrigerant (R22), it is necessary to choose adequate materials.
Thicknesses of copper pipes used with R410A are as shown in the table. Never use copper pipes thinner than that in the table even when it is available on the market.

**Thicknesses of Annealed Copper Pipes (R410A)**

| Pipe outside diameter [mm(in.)] | Thickness [mm(in.)] |
|---|---|
| 6.35 (1/4) | 0.80 (0.032) |
| 9.52 (3/8) | 0.80 (0.032) |
| 12.70 (1/2) | 0.80 (0.032) |
| 15.88 (5/8) | 1.00 (0.039) |
| 19.05 (3/4) | 1.20 (0.047) |

English

## 5.3. Flare connection (Pipe connection)

**⚠ WARNING**

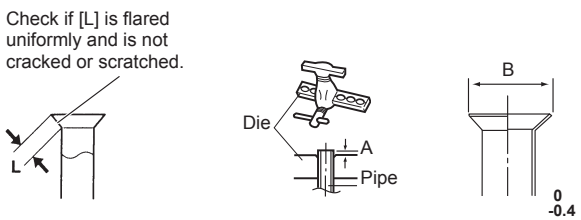
Be sure to perform flare connection. It causes a malfunction and a fire of this unit when connecting the pipes other than flare connection (brazing etc.).

**⚠ 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.

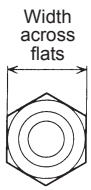
### 5.3.1. Flaring

(1) Cut the connection pipe to the necessary length with a pipe cutter.
(2) Hold the pipe downward so that cuttings will not enter the pipe and remove any burrs.
(3) 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 flare tool.
(4) Protect the pipes by pinching them or with tape to prevent dust, dirt, or water from entering the pipes.




| Pipe outside diameter [mm(in.)] | Dimension A [mm(in.)] Flare tool for R410A, clutch type | Dimension B [mm(in.)] |
|---|---|---|
| 6.35 (1/4) | 0 to 0.5 (0 to 0.02) | 9.1 (11/32) |
| 9.52 (3/8) | | 13.2 (17/32) |
| 12.70 (1/2) | | 16.6 (21/32) |
| 15.88 (5/8) | | 19.7 (25/32) |

When using conventional flare tools to flare R410A pipes, the dimension A should be approximately 0.5 mm (0.02") more than indicated in the table (for flaring with R410A flare tools) to achieve the specified flaring. Use a thickness gauge to measure the dimension A.




| Pipe outside diameter [mm(in.)] | Width across flats of Flare nut [mm(in.)] |
|---|---|
| 6.35 (1/4) | 17 (21/32) |
| 9.52 (3/8) | 22 (7/8) |
| 12.70 (1/2) | 26 (1-1/32) |
| 15.88 (5/8) | 29 (1-5/32) |

### 5.3.2. Bending pipes

The pipes are shaped 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 3 times.

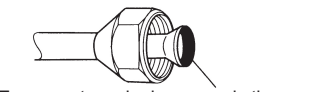
| ⚠ CAUTION |
|---|
| To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 100 mm (4") or over. |
| If the pipe is bent repeatedly at the same place, it will break. |

### 5.3.3. Pipe connection

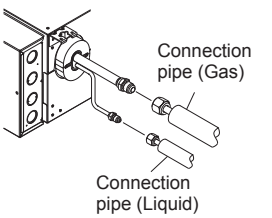
(1) Detach the caps and plugs from the pipes.

| ⚠ CAUTION |
|---|
| Be sure to apply the pipe against the port on the 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 pipe until immediately before connecting the connection pipe. |
| Hold the torque wrench at its grip, keeping it in the right angle with the pipe, in order to tighten the flare nut correctly. |

(2) Centering the pipe against port on the unit, turn the flare nut with hand.

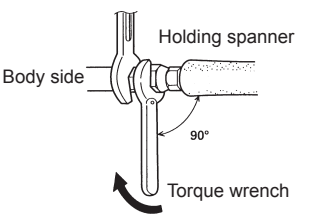


To prevent gas leakage, apply the refrigeration compressor oil (or equivalent) used for the outdoor unit to the flare surface.
Do not use mineral oil.




(3) When the flare nut is tightened properly by hand, use a torque wrench to finally tighten it.

| Flare nut [mm(in.)] | Tightening torque [N·m (lb·ft)] |
|---|---|
| 6.35 (1/4) dia. | 16 to 18 (11.8 to 13.2) |
| 9.52 (3/8) dia. | 32 to 42 (23.5 to 30.9) |
| 12.70 (1/2) dia. | 49 to 61 (36.0 to 44.8) |
| 15.88 (5/8) dia. | 63 to 75 (46.3 to 55.1) |

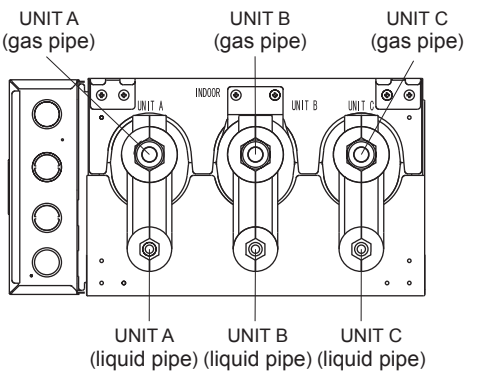



Do not remove the cap from the connection pipe before connecting the pipe.

| ⚠ CAUTION |
|---|
| Be sure to connect the large pipe after connecting the small pipe completely. |

(4) Branch box is marked with engraved letters indicating each corresponding indoor unit (UNIT A, UNIT B and UNIT C).
UNIT A : Refrigerant pipe connection port for UNIT A
UNIT B : Refrigerant pipe connection port for UNIT B
UNIT C : Refrigerant pipe connection port for UNIT C

| ⚠ CAUTION |
|---|
| Label all the refrigerant piping (liquid pipe, gas pipe) specifying to which indoor units they will be connected. |




### 5.3.4. Adapter installation

- Attach the adapters (accessories) to the ports on the gas pipe of the Branch box (Indoor unit side) according to the size of the pipe to be connected.
- Apply the refrigeration compressor oil (or equivalent) used for the outdoor unit to the attaching portion of the adapters.
- Tighten the adapter using a torque wrench according to the tightening torque values in the table below.

| Adapter [mm (in.)] | Tightening torque [N·m (lb·ft)] |
|---|---|
| Ø 12.7 (1/2) → Ø 9.52 (3/8) | 49 to 61 (36.0 to 44.8) |
| Ø 12.7 (1/2) → Ø 15.88 (5/8) | |

## 5.4. Installing insulation

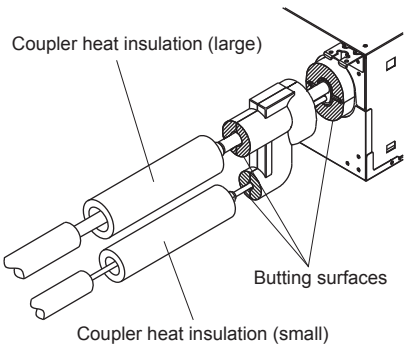
### 5.4.1. Piping insulation

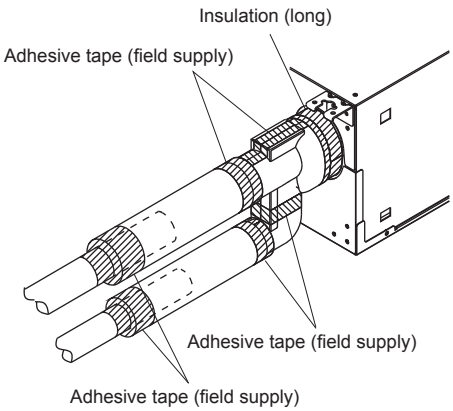
(1) Install the coupler heat insulation (large and small) and insulation (long and short) on each pipe as shown in the figures below.

(2) Attach the butting surface with no gap to eliminate any gap between the insulations.

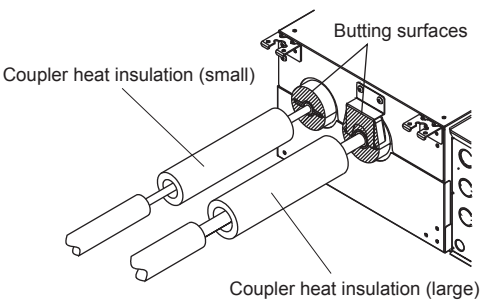
(3) During the pipe insulation work, prevent air from getting inside the insulation with an adhesive tape (field supply).

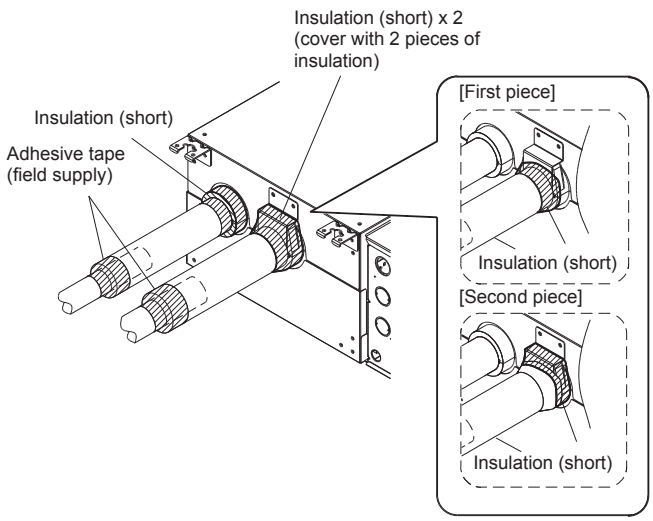
**(A) Indoor unit side**




**(B) Outdoor unit side**

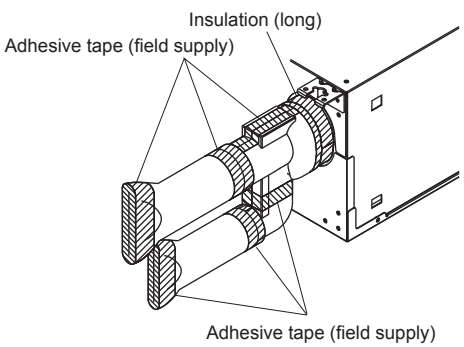



### 5.4.2. Non-connecting pipes

(1) Install the coupler heat insulation (large and small) and insulation (long) as shown in the figure on the right.

(2) Apply an adhesive tape (field supply) to prevent air from getting inside the insulation.



# 6. ELECTRICAL WIRING

## 6.1. Safety precautions for electrical wiring

### Power

| ⚠ WARNING |
|---|
| The rated voltage of this product is 208/230 V A.C. 60 Hz. |
| Before turning on verify that the voltage is within the 187V to 264V range. |
| Use a dedicated power circuit and breaker matched to the capacity of the total of Branch boxes and Indoor units ratings. (Install in accordance with standard.) |
| Perform wiring work in accordance with standards so that the air conditioner can be operated safely and correctly. |
| When installing this system in high humidity locations, install using Ground fault equipment breakers (often referred to in other countries as an ELCB earth leakage current breaker) to reduce the risk of leaking current which may result in electric shock or potential fire. |

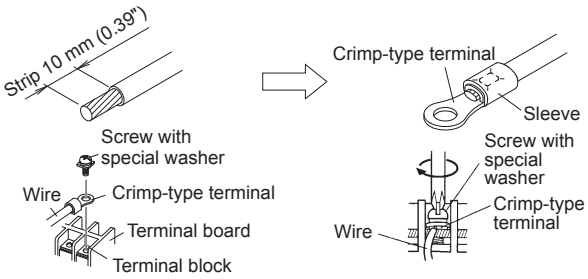
| ⚠ CAUTION |
|---|
| We suggest installing GFEB breakers (30 mA or greater) or follow local electrical code. |
| The power source capacity must be the sum of the air conditioner current and the current of other electrical appliances. When the current contracted capacity is insufficient, change the contracted capacity. |

### Electrical wiring

| ⚠ WARNING |
|---|
| Before starting work, check that power is not being supplied to all units. |
| Match the terminal board numbers and connection cable colors with those of the outdoor unit and indoor unit. Erroneous wiring may cause burning of electric parts. |
| Connect the connection cables firmly to the terminal board. Imperfect installation may cause a fire. |
| Always fasten the outside covering of the connection cable with the cable clamp. (If the insulator is chafed, electric leakage may occur.) |
| Always connect the ground wire. |
| Install the remote controller cables so that a hand cannot touch it directly. |
| Be sure to always turn the power off first before performing the installation. Otherwise, handling electrical parts without turning off the power first may cause electric shock. |
| Be sure to set up an earth (ground) during installation. An earth (ground) wire should not be connected to the gas pipe, water pipe, lightning rod, or telephone earth wiring (ground). A faulty earth can cause electric shock or fire. |
| Make sure all wiring connections are secure, do not bundle power cables together, and do not use extension cables or circular power strips. Otherwise, a faulty installation may cause excessive heat and electric shock or fire. |
| Use the specified electrical wires for the wiring between the indoor unit and the branch box and for the power supply. Ensure proper connection of these wires and be sure to secure them in such manner that no external force of the electrical wires is applied to the terminals. |
| Arrange the electrical wires between the indoor unit and the branch box and for the power supply in such manner that the structures such as the service cover do not rise, and then install the cover securely. |

## HOW TO CONNECT WIRING TO THE TERMINALS FOR STAND WIRING.

(1) Use crimp-type terminals with insulating sleeves as shown in the figure below to connect to the terminal block.
(2) Securely crimp the crimp-type terminals to the wires using an appropriate tool so that the wires do not come loose.
(3) Use the specified wires, connect them securely, and fasten them so that there is no stress placed on the terminals.
(4) 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.
(5) Do not tighten the terminal screws too much, otherwise, the screws may break.
(6) See the table below for the terminal screw tightening torques.




| Tightening torque | |
|---|---|
| M4 screw | 1.2 to 1.8 N·m (0.9 to 1.4 lb·ft) |

**⚠ 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.

## 6.2. Selecting the cable and breaker

**⚠ WARNING**

Be sure to install a breaker with the specified capacity.

Regulation of cables and breaker differs from each locality, refer in accordance with local rules.

Select the correct capacity of the power supply according to the load (total current value of the connected units).

| Voltage rating | 1Ø 208/230V (60Hz) |
|---|---|
| Operating range | 187-264V |

| Cable | Cable size *1) | Remarks |
|---|---|---|
| Power supply cable | 14AWG | 2 cable + Ground, 1 Ø 208/230V |
| Connection cable | 14AWG | 3 cable + Ground, 1 Ø 208/230V |

1) Selected sample: Select the correct cable type and size according to the country or region's regulations.
Max. wire length: Set a length so that the voltage drop is less than 2%. Increase the wire diameter when the wire length is long.

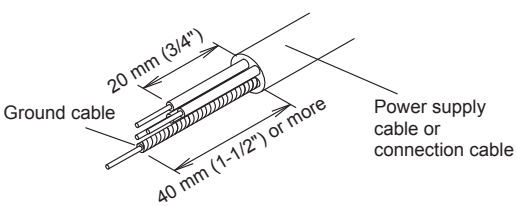
| Breaker | Specification *2) |
|---|---|
| Circuit breaker (MOCP) *4) | Current : 15 (A) |
| Earth leakage breaker | Leakage current : 30mA 0.1sec or less *3) |

2) Select the appropriate breaker of the described specification according to the national or regional standards.
3) Select the breaker that enough load current can pass through it.
4) MOCP: Maximum Over Current Protection

## 6.3. Wiring

### 6.3.1. Cable preparation

Keep the ground cable longer than the other cables.



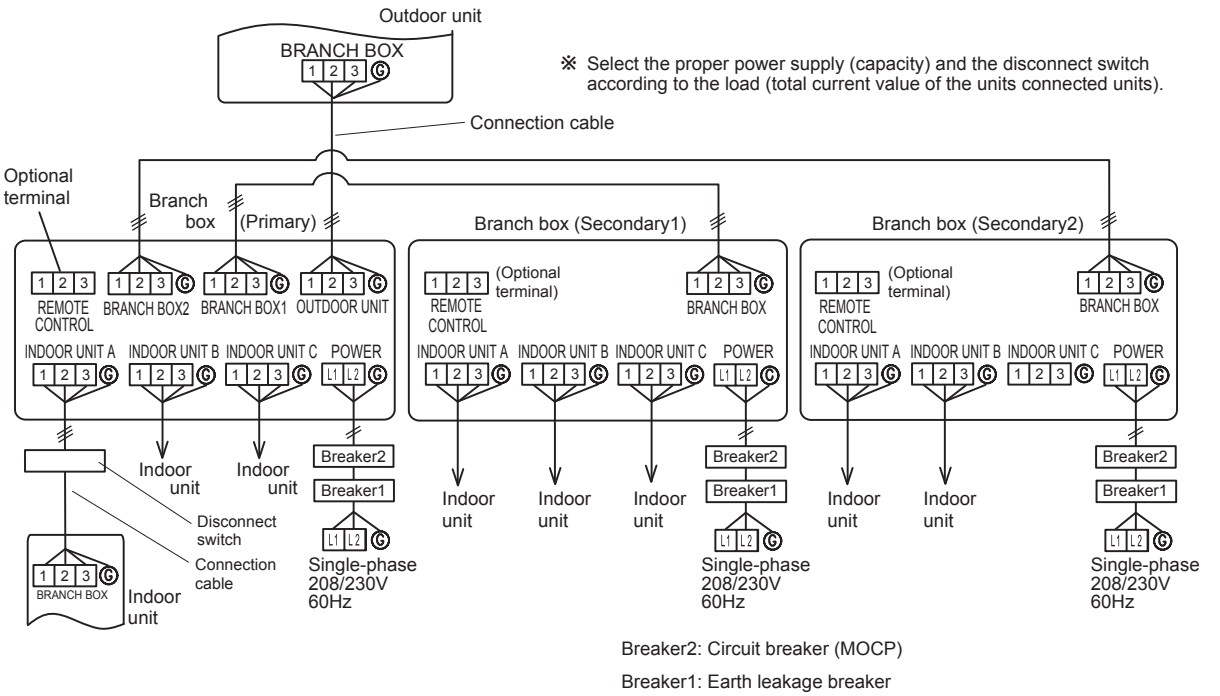

- Power supply cable : 3-core wire cable.
- Connection cable : 4-core wire cable.

English

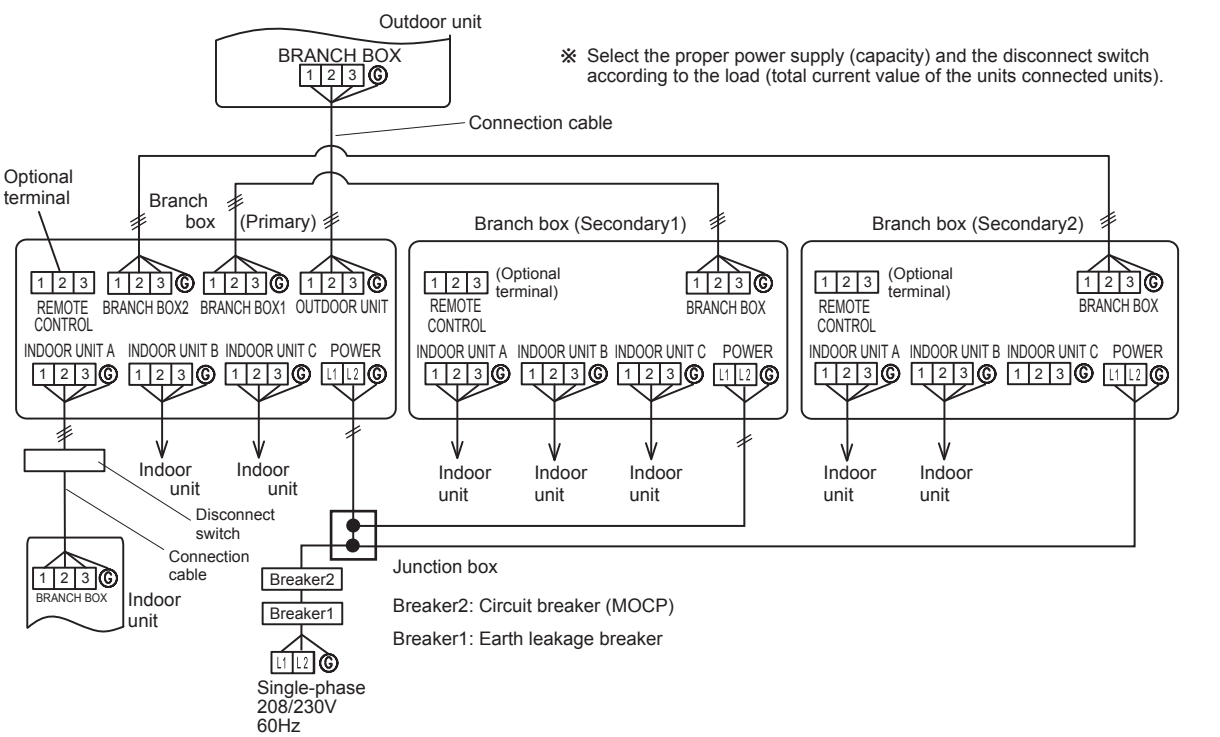
### 6.3.2 Wiring method

Example) Wiring diagram when 3 branch boxes and 8 indoor units are connected

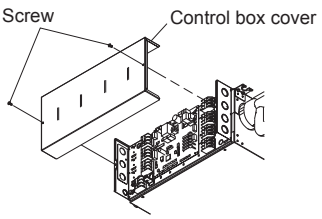
Example 1)




Example 2)



### 6.3.3. Work procedure




(1) Remove the control box cover and install all the wiring.
(Same for primary and secondary units)

(2) When connecting to indoor units B or C,
remove the matching knockout holes in Fig. A.
When connecting to more than 1 branch box,
remove the appropriate knockout holes in Fig. B. (Primary unit only)

Fig. A

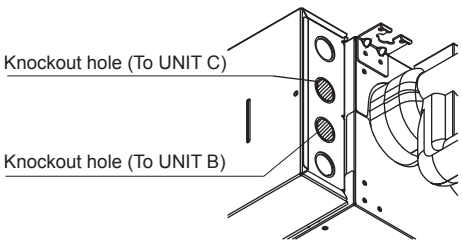
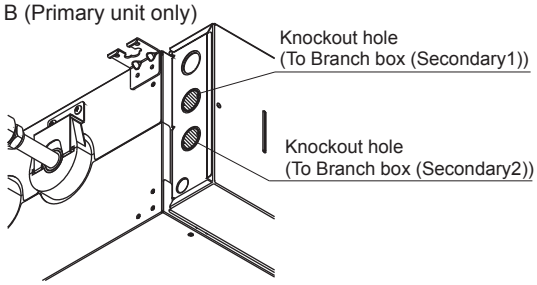
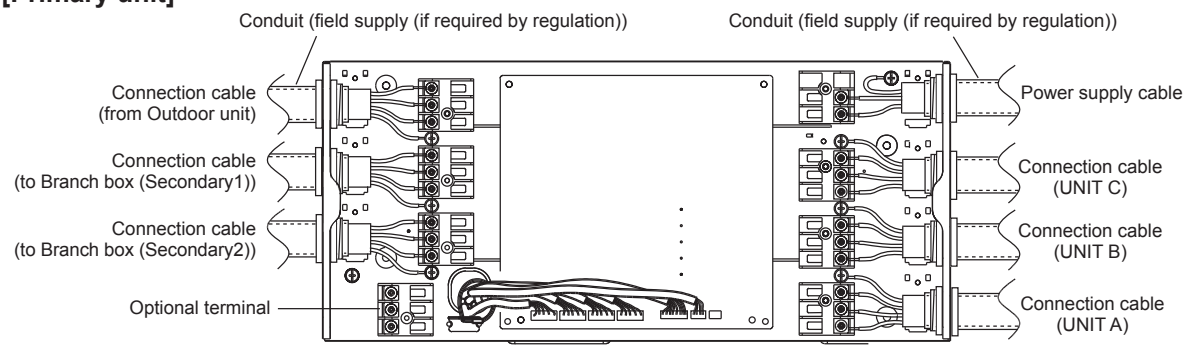



Fig. B (Primary unit only)

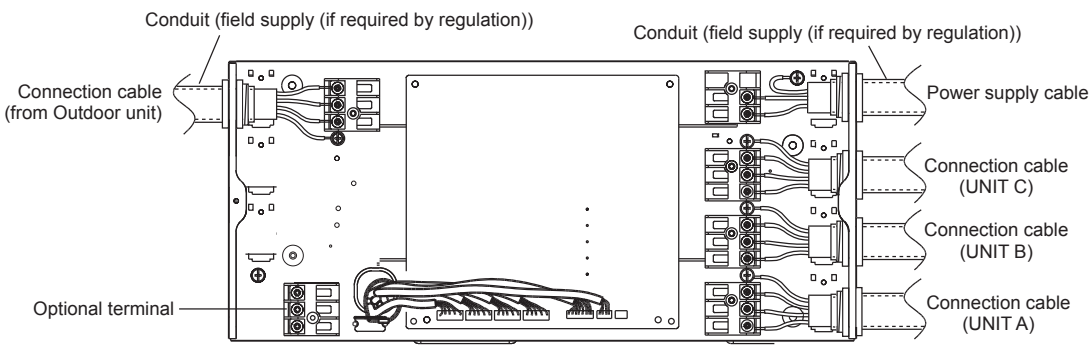


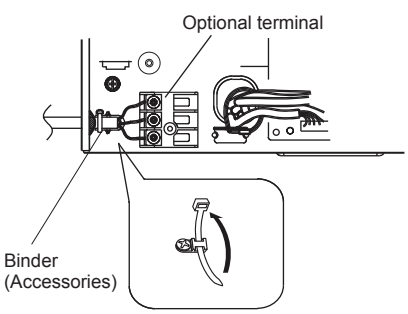

(3) Refer to the drawing for cable connection.

## [Primary unit]

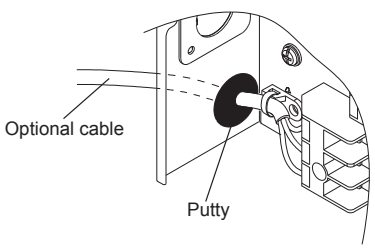



## [Secondary unit]




- When connecting a cable to the optional terminal, secure the cable with the binder (Accessories). Seal the hole that passes the cable with putty so that there is no space.




(4) Install the Control box cover.

**⚠ CAUTION**

Do not bundle the remote controller cable, or wire the remote controller cable in parallel, with the connection cable and the power supply cable. It may cause erroneous operation.

English

## 7. TEST RUN AND CHECK LIST

Conduct the check run and test run according to the Installation Manual of the outdoor unit.
Check the following items before conducting the check run and test run.

| Check Item | Check Column | Troubles in the event of failure |
|---|---|---|
| Has the branch box been installed firmly? | | Drop, vibration or noise |
| Was there any refrigerant leak found through a refrigerant leak inspection? | | Function stop, no cooling or no heating |
| Has the insulation been perfectly installed on the pipes and pipe joints without any gap? | | Water leak |
| Has the piping been installed properly? | | Unable to operate |
| Has the wiring been installed properly? | | Unable to operate |
| Was power cable that meets the specifications used? | | Fire or unable to operate |
| Were breakers that meets the specifications used? | | Fire or unable to operate |
| Has proper grounding been performed? | | Electric shock or fire |

## 8. MALFUNCTION DIAGNOSTICS

When an error occurs, an error description displays in the LED (No. 401 ~ 405).

| | |
|---|---|
| ● | Lit |
| ◎ (n) | Flashing (number of flashing) |
| ○ | Unlit |

### Normal status

| Green | Red | | | | Comment |
|---|---|---|---|---|---|
| LED401 | LED402 | LED403 | LED404 | LED405 | |
| ● | ○ | ○ | ○ | ○ | The branch box is functioning properly. |

### Error status

| Green | Red | | | | Error description |
|---|---|---|---|---|---|
| LED401 | LED402 | LED403 | LED404 | LED405 | |
| ● | ● | ● | ● | ● | Connected combination error |
| ● | ● | ● | ● | ○ | Power frequency error |
| ● | ● | ● | ○ | ● | |
| Branch box identifying display | ◎(1) | ○ | ○ | ○ | EEPROM access error |
| | ◎(2) | ○ | ○ | ○ | Model information error |
| | ◎(3) | ○ | ○ | ○ | • Serial communication error between outdoor unit and branch box<br>• Serial communication error between branch boxes |
| | ◎(4) | ○ | ○ | ○ | Serial communication error between branch boxes |
| Primary unit : ◎(1) | ◎(5) | ● | ○ | ○ | Serial communication error between Indoor Unit A and branch box |
| | | ○ | ● | ○ | Serial communication error between Indoor Unit B and branch box |
| | | ○ | ○ | ● | Serial communication error between Indoor Unit C and branch box |
| Secondary unit1 : ◎(2) | ◎(6) | ● | ○ | ○ | Indoor Unit A, liquid pipe thermistor error (CN309) |
| | | ○ | ● | ○ | Indoor Unit B, liquid pipe thermistor error (CN309) |
| | | ○ | ○ | ● | Indoor Unit C, liquid pipe thermistor error (CN310) |
| Secondary unit2 : ◎(3) | ◎(7) | ● | ○ | ○ | Indoor Unit A, gas pipe thermistor error (CN309) |
| | | ○ | ● | ○ | Indoor Unit B, gas pipe thermistor error (CN309) |
| | | ○ | ○ | ● | Indoor Unit C, gas pipe thermistor error (CN310) |
| | ◎(8) | ● | ○ | ○ | Indoor Unit A, EEV control error (CN305) |
| | | ○ | ● | ○ | Indoor Unit B, EEV control error (CN306) |
| | | ○ | ○ | ● | Indoor Unit C, EEV control error (CN307) |
| | ◎(9) | ○ | ○ | ○ | Remote controller communication error |