

# TOSHIBA

Leading Innovation >>>

R32 or R410A

## *AIR CONDITIONER (MULTI-SPLIT TYPE)* Installation Manual

### Indoor Unit

Model name:

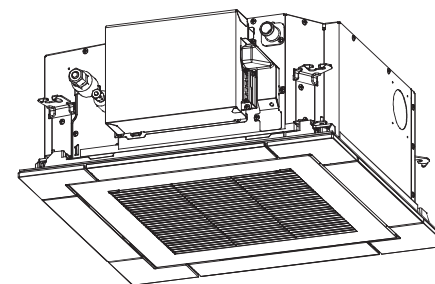
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Compact 4-Way Cassette type

**RAS-M10U2MUVG-E**

**RAS-M13U2MUVG-E**

**RAS-M16U2MUVG-E**



## Original instruction

Please read this Installation Manual carefully before installing the Air Conditioner.

- This Manual describes the installation method of the indoor unit.
- For installation of the outdoor unit, follow the Installation Manual attached to the outdoor unit.

### **ADOPTION OF R32 or R410A REFRIGERANT**

This Air Conditioner has adopted a refrigerant HFC (R32 or R410A) which does not destroy the ozone layer. Be sure to check the refrigerant type for outdoor unit to be combined, and then install it.

**Product information of ecodesign requirements. (Regulation (EU) 2016/2281)**  
<http://ecodesign.toshiba-airconditioning.eu/en>

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Thank you for purchasing this Toshiba air conditioner.

Please read carefully through these instructions that contain important information and ensure that you understand them.

After completing the installation work, hand over this Installation Manual as well as the Owner's Manual provided with the outdoor unit to the user, and ask the user to keep them in a safe place for future reference.

#### Generic denomination: Air conditioner

#### Definition of qualified installer or qualified service person

The air conditioner must be installed, maintained, repaired and removed by a qualified installer or qualified service person. When any of these jobs is to be done, ask a qualified installer or qualified service person to do them for you. A qualified installer or qualified service person is an agent who has the qualifications and knowledge described in the table below.

Agent	Qualifications and knowledge which the agent must have
Qualified installer	<ul style="list-style-type: none"> <li>The qualified installer is a person who installs, maintains, relocates and removes the air conditioners made by Toshiba Carrier Corporation. He or she has been trained to install, maintain, relocate and remove the air conditioners made by Toshiba Carrier Corporation or, alternatively, he or she has been instructed in such operations by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to these operations.</li> <li>The qualified installer who is allowed to do the electrical work involved in installation, relocation and removal has the qualifications pertaining to this electrical work as stipulated by the local laws and regulations, and he or she is a person who has been trained in matters relating to electrical work on the air conditioners made by Toshiba Carrier Corporation or, alternatively, he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work.</li> <li>The qualified installer who is allowed to do the refrigerant handling and piping work involved in installation, relocation and removal has the qualifications pertaining to this refrigerant handling and piping work as stipulated by the local laws and regulations, and he or she is a person who has been trained in matters relating to refrigerant handling and piping work on the air conditioners made by Toshiba Carrier Corporation or, alternatively, he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work.</li> <li>The qualified installer who is allowed to work at heights has been trained in matters relating to working at heights with the air conditioners made by Toshiba Carrier Corporation or, alternatively, he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work.</li> </ul>
Qualified service person	<ul style="list-style-type: none"> <li>The qualified service person is a person who installs, repairs, maintains, relocates and removes the air conditioners made by Toshiba Carrier Corporation. He or she has been trained to install, repair, maintain, relocate and remove the air conditioners made by Toshiba Carrier Corporation or, alternatively, he or she has been instructed in such operations by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to these operations.</li> <li>The qualified service person who is allowed to do the electrical work involved in installation, repair, relocation and removal has the qualifications pertaining to this electrical work as stipulated by the local laws and regulations, and he or she is a person who has been trained in matters relating to electrical work on the air conditioners made by Toshiba Carrier Corporation or, alternatively, he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work.</li> <li>The qualified service person who is allowed to do the refrigerant handling and piping work involved in installation, repair, relocation and removal has the qualifications pertaining to this refrigerant handling and piping work as stipulated by the local laws and regulations, and he or she is a person who has been trained in matters relating to refrigerant handling and piping work on the air conditioners made by Toshiba Carrier Corporation or, alternatively, he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work.</li> <li>The qualified service person who is allowed to work at heights has been trained in matters relating to working at heights with the air conditioners made by Toshiba Carrier Corporation or, alternatively, he or she has been instructed in such matters by an individual or individuals who have been trained and is thus thoroughly acquainted with the knowledge related to this work.</li> </ul>

#### Definition of protective gear



When the air conditioner is to be transported, installed, maintained, repaired or removed, wear protective gloves and 'safety' work clothing.

In addition to such normal protective gear, wear the protective gear described below when undertaking the special work detailed in the table below.

Failure to wear the proper protective gear is dangerous because you will be more susceptible to injury, burns, electric shocks and other injuries.

Work undertaken	Protective gear worn
All types of work	Protective gloves 'Safety' working clothing
Electrical-related work	Gloves to provide protection for electricians Insulating shoes Clothing to provide protection from electric shock
Work done at heights (50 cm or more)	Helmets for use in industry
Transportation of heavy objects	Shoes with additional protective toe cap
Repair of outdoor unit	Gloves to provide protection for electricians

These safety cautions describe important matters concerning safety to prevent injury to users or other people and damages to property. Please read through this manual after understanding the contents below (meanings of indications), and be sure to follow the description.





Indication	Meaning of Indication
 <b>WARNING</b>	Text set off in this manner indicates that failure to adhere to the directions in the warning could result in serious bodily harm (*1) or loss of life if the product is handled improperly.
 <b>CAUTION</b>	Text set off in this manner indicates that failure to adhere to the directions in the caution could result in slight injury (*2) or damage (*3) to property if the product is handled improperly.

\*1: Serious bodily harm indicates loss of eyesight, injury, burns, electric shock, bone fracture, poisoning, and other injuries which leave aftereffect and require hospitalization or long-term treatment as an outpatient.






\*2: Slight injury indicates injury, burns, electric shock, and other injuries which do not require hospitalization or long-term treatment as an outpatient.

\*3: Damage to property indicates damage extending to buildings, household effects, domestic livestock, and pets.

#### MEANINGS OF SYMBOLS DISPLAYED ON THE UNIT

	<b>WARNING</b> (Risk of fire)	This mark is for R32 refrigerant only. Refrigerant type is written on nameplate of outdoor unit. In case that refrigerant type is R32, this unit uses a flammable refrigerant. If refrigerant leaks and comes in contact with fire or heating part, it will create harmful gas and there is risk of fire.
		Read the OWNER'S MANUAL carefully before operation.
		Service personnel are required to carefully read the OWNER'S MANUAL and INSTALLATION MANUAL before operation.
		Further information is available in the OWNER'S MANUAL, INSTALLATION MANUAL, and the like.

## ■ Warning indications on the air conditioner unit

Warning indication		Description
 <p><b>WARNING</b> <b>ELECTRICAL SHOCK HAZARD</b> Disconnect all remote electric power supplies before servicing.</p>	<p><b>WARNING</b> <b>ELECTRICAL SHOCK HAZARD</b> Disconnect all remote electric power supplies before servicing.</p>	
 <p><b>WARNING</b> Moving parts. Do not operate unit with grille removed. Stop the unit before the servicing.</p>	<p><b>WARNING</b> Moving parts. Do not operate unit with grille removed. Stop the unit before the servicing.</p>	
 <p><b>CAUTION</b> High temperature parts. You might get burned when removing this panel.</p>	<p><b>CAUTION</b> High temperature parts. You might get burned when removing this panel.</p>	
 <p><b>CAUTION</b> Do not touch the aluminum fins of the unit. Doing so may result in injury.</p>	<p><b>CAUTION</b> Do not touch the aluminium fins of the unit. Doing so may result in injury.</p>	
 <p><b>CAUTION</b> <b>BURST HAZARD</b> Open the service valves before the operation, otherwise there might be the burst.</p>	<p><b>CAUTION</b> <b>BURST HAZARD</b> Open the service valves before the operation, otherwise there might be the burst.</p>	

# 1 Precautions for safety

The manufacturer shall not assume any liability for the damage caused by not observing the description of this manual.

## **WARNING**

### General

- Before starting to install the air conditioner, read through the Installation Manual carefully, and follow its instructions to install the air conditioner.
- Only a qualified installer or service person is allowed to do installation work. Inappropriate installation may result in water leakage, electric shock or fire.
- Do not use any refrigerant different from the one specified for complement or replacement. Otherwise, abnormally high pressure may be generated in the refrigeration cycle, which may result in a failure or explosion of the product or an injury to your body.
- Before opening the intake grille of the indoor unit or service panel of the outdoor unit, set the circuit breaker to the OFF position. Failure to set the circuit breaker to the OFF position may result in electric shocks through contact with the interior parts. Only a qualified installer (\*1) or qualified service person (\*1) is allowed to remove the intake grille of the indoor unit or service panel of the outdoor unit and do the work required.
- Before carrying out the installation, maintenance, repair or removal work, set the circuit breaker to the OFF position. Otherwise, electric shocks may result.
- Place a “Work in progress” sign near the circuit breaker while the installation, maintenance, repair or removal work is being carried out. There is a danger of electric shocks if the circuit breaker is set to ON by mistake.
- Only a qualified installer (\*1) or qualified service person (\*1) is allowed to undertake work at heights using a stand of 50 cm or more or to remove the intake grille of the indoor unit to undertake work.
- Wear protective gloves and safety work clothing during installation, servicing and removal.
- Do not touch the aluminium fin of the unit. You may injure yourself if you do so. If the fin must be touched for some reason, first put on protective gloves and safety work clothing, and then proceed.
- Do not climb onto or place objects on top of the outdoor unit. You may fall or the objects may fall off of the outdoor unit and result in injury.

- When work is performed at heights, use a ladder which complies with the ISO 14122 standard, and follow the procedure in the ladder's instructions. Also wear a helmet for use in industry as protective gear to undertake the work.
- Before cleaning the filter or other parts of the outdoor unit, set the circuit breaker to OFF without fail, and place a "Work in progress" sign near the circuit breaker before proceeding with the work.
- Before working at heights, put a sign in place so that no-one will approach the work location, before proceeding with the work. Parts and other objects may fall from above, possibly injuring a person below. While carrying out the work, wear a helmet for protection from falling objects.
- Do not use the refrigerant other than R32 or R410A. For the refrigerant type, check the outdoor unit to be combined.
- The air conditioner must be transported in stable condition. If any part of the product is broken, contact the dealer.
- When the air conditioner must be transported by hand, carry it by two or more people.
- Do not move or repair any unit by yourself. There is high voltage inside the unit. You may get electric shock when removing the cover and main unit.

#### **Selection of installation location**

- When the air conditioner is installed in a small room, provide appropriate measures to ensure that the concentration of refrigerant leakage occur in the room does not exceed the critical level.
- Do not install in a location where flammable gas leaks are possible. If the gas leak and accumulate around the unit, it may ignite and cause a fire.
- To transport the air conditioner, wear shoes with additional protective toe caps.
- To transport the air conditioner, do not take hold of the bands around the packing carton. You may injure yourself if the bands should break.
- Install the indoor unit at least 2.5 m above the floor level since otherwise the users may injure themselves or receive electric shocks if they poke their fingers or other objects into the indoor unit while the air conditioner is running.
- Do not place any combustion appliance in a place where it is directly exposed to the wind of air conditioner, otherwise it may cause imperfect combustion.

- Appliance and pipe-work shall be installed, operated and stored in a room with a floor area larger than  $A_{\min} \text{ m}^2$ .  
How to get  $A_{\min} \text{ m}^2$ :  $A_{\min} = (M / (2.5 \times 0.22759 \times h_0))^2$   
M is the refrigerant charge amount in appliance in **kg**;  
 $h_0$  is the installation height of the appliance in **m**:  
0.6 m for floor standing / 1.8 m for wall mounted / 1.0 m for window mounted / 2.2 m for ceiling mounted.  
(R32 refrigerant models only. For detail, refer to Installation Manual of the outdoor unit.)

#### **Installation**

- When the indoor unit is to be suspended, the designated hanging bolts (M10 or W3/8) and nuts (M10 or W3/8) must be used.
- Install the air conditioner securely in a location where the base can sustain the weight adequately. If the strength is not enough, the unit may fall down resulting in injury.
- Follow the instructions in the Installation Manual to install the air conditioner. Failure to follow these instructions may cause the product to fall down or topple over or give rise to noise, vibration, water leakage or other trouble.
- Carry out the specified installation work to guard against the possibility of high winds and earthquake. If the air conditioner is not installed appropriately, a unit may topple over or fall down, causing an accident.
- If refrigerant gas has leaked during the installation work, ventilate the room immediately. If the leaked refrigerant gas comes in contact with fire, noxious gas may generate.
- Use forklift to carry in the air conditioner units and use winch or hoist at installation of them.

#### **Refrigerant piping**

- Install the refrigerant pipe securely during the installation work before operating the air conditioner. If the compressor is operated with the valve open and without refrigerant pipe, the compressor sucks air and the refrigeration cycles is over pressurized, which may cause an injury.
- Tighten the flare nut with a torque wrench in the specified manner. Excessive tighten of the flare nut may cause a crack in the flare nut after a long period, which may result in refrigerant leakage.
- After the installation work, confirm that refrigerant gas does not leak. If refrigerant gas leaks into the room and flows near a fire source, such as a cooking range, noxious gas may be generated.

- When the air conditioner has been installed or relocated, follow the instructions in the Installation Manual and purge the air completely so that no gases other than the refrigerant will be mixed in the refrigerating cycle. Failure to purge the air completely may cause the air conditioner to malfunction.
- Nitrogen gas must be used for the airtight test.
- The charge hose must be connected in such a way that it is not slack.

### **Electrical wiring**

- Only a qualified installer (\*1) or qualified service person (\*1) is allowed to carry out the electrical work of the air conditioner. Under no circumstances must this work be done by an unqualified individual since failure to carry out the work properly may result in electric shocks and/or electrical leaks.
- To connect the electrical wires, repair the electrical parts or undertake other electrical jobs, wear gloves to provide protection for electricians insulating shoes and clothing to provide protection from electric shocks. Failure to wear this protective gear may result in electric shocks.
- Use wiring that meets the specifications in the Installation Manual and the stipulations in the local regulations and laws. Use of wiring which does not meet the specifications may give rise to electric shocks, electrical leakage, smoking and/or a fire.
- Connect earth wire. (Grounding work)  
Incomplete earthing causes an electric shock.
- Do not connect earth wires to gas pipes, water pipes, and lightning conductor or telephone earth wires.
- After completing the repair or relocation work, check that the earth wires are connected properly.
- Install a circuit breaker that meets the specifications in the installation manual and the stipulations in the local regulations and laws.
- Install the circuit breaker where it can be easily accessed by the agent.
- When installing the circuit breaker outdoors, install one which is designed to be used outdoors.
- Under no circumstances, the power supply wire or the indoor and outdoor connecting wire must not be connected in the middle (Connection using a solderless terminal etc.)  
Connection trouble in the places where the wire is connected in the middle may give rise to smoking and/or a fire.

- Electrical wiring work shall be conducted according to law and regulation in the community and installation manual.  
Failure to do so may result in electrocution or short circuit.
- The means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.

### **Test run**

- Before operating the air conditioner after having completed the work, check that the electrical control box cover of the indoor unit and service panel of the outdoor unit are closed, and set the circuit breaker to the ON position. You may receive an electric shock if the power is turned on without first conducting these checks.
- If there is any kind of trouble (such as check code display has appeared, smell of burning, abnormal sounds, the air conditioner fails to cool or heat or water is leaking) has occurred in the air conditioner, do not touch the air conditioner yourself but set the circuit breaker to the OFF position, and contact a qualified service person. Take steps to ensure that the power will not be turned on (by marking “out of service” near the circuit breaker, for instance) until qualified service person arrives. Continuing to use the air conditioner in the trouble status may cause mechanical problems to escalate or result in electric shocks or other trouble.
- After the work has finished, use an insulation tester set (500 V Megger) to check the resistance is 1 MΩ or more between the charge section and the non-charge metal section (Earth section). If the resistance value is low, a disaster such as a leak or electric shock is caused at user's side.
- Upon completion of the installation work, check for refrigerant leaks and check the insulation resistance and water drainage. Then conduct a test run to check that the air conditioner is operating properly.

### **Explanations given to user**

- Upon completion of the installation work, tell the user where the circuit breaker is located. If the user does not know where the circuit breaker is, he or she will not be able to turn it off in the event that trouble has occurred in the air conditioner.
- After the installation work, follow the Owner's Manual to explain to the customer how to use and maintain the unit.

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## Relocation

- Only a qualified installer (\*1) or qualified service person (\*1) is allowed to relocate the air conditioner. It is dangerous for the air conditioner to be relocated by an unqualified individual since a fire, electric shocks, injury, water leakage, noise and/or vibration may result.
  - When carrying out the pump-down work shut down the compressor before disconnecting the refrigerant pipe. Disconnecting the refrigerant pipe with the service valve left open and the compressor still operating will cause air or other gas to be sucked in, raising the pressure inside the refrigeration cycle to an abnormally high level, and possibly resulting in rupture, injury or other trouble.
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## CAUTION









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### **This Air Conditioner has adopted a refrigerant HFC (R32 or R410A) which does not destroy the ozone layer.**

- As the R32 or R410A refrigerant is easily affected by impurities such as moisture, oxidized film, oil, etc., due to the high pressure, be careful not to allow the moisture, dirt, existing refrigerant, refrigerating machine oil, etc., to get mixed up in the refrigeration cycle during the installation work.
  - A special tool for the R32 or R410A refrigerant is required for installation.
  - Use a new and clean piping materials for the connecting pipe so that moisture and dirt are not mixed together during the installation work.
  - When using existing pipes, follow the installation manual enclosed with the outdoor unit.
- 

(\*1) Refer to the "Definition of qualified installer or qualified service person".

## 2 Accessory parts

Part name	Qty	Shape	Usage
Owner's Manual	1		(Hand over to customers) (For other languages that do not appear in this Installation Manual, please refer to the enclosed CD-R.)
Installation Manual	1	This manual	(Hand over to customers) (For other languages that do not appear in this Installation Manual, please refer to the enclosed CD-R.)
CD-ROM	1	—	Owner's Manual and Installation Manual
Heat insulating pipe	2		For heat insulation of the pipe connecting section
Installation pattern	1	—	For checking of ceiling opening and the main unit position
Installation gauge	2		For positioning of the ceiling position (To be used with the installation pattern)
Heat insulator	1		For heat insulation of drain connecting section
Eccentric washer	4		For unit hanging
Washer	4		For unit hanging
Hose band	2		For connecting drain pipe
Flexible hose	1		For adjusting core-out of drain pipe

### ■ Separate sold parts

The ceiling panel and remote controller are sold separately. For the installation of these products, follow the Installation Manuals supplied with them.

## 3 Selection of installation place

### WARNING

- **Install the air conditioner securely in a location where the base can sustain the weight adequately.**  
If the strength is not enough, the unit may fall down resulting in injury.
- **Install the air conditioner at a height 2.5 m or more from the floor.**  
If you insert your hands or others directly into the unit while the air conditioner operates, it is dangerous because you may contact with revolving fan or active electricity.

### CAUTION

- **Do not install in a location where flammable gas may leaks are possible.**  
If the gas leak and accumulate around the unit, it may ignite and cause a fire.

**Upon approval of the customer, install the air conditioner in a place that satisfies the following conditions.**

- Place where the unit can be installed horizontally.
- Place where a sufficient servicing space can be ensured for safety maintenance and check.
- Place where drained water will not cause any problem.

**Avoid installing in the following places.**

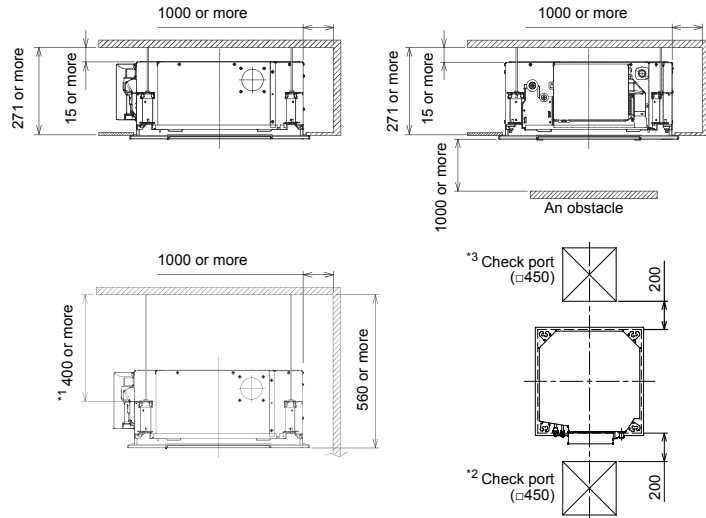
- Place exposed to air with high salt content (seaside area), or place exposed to large quantities of sulfide gas (hot spring).  
(The unit should be used in these places, special protective measures are needed.)
- A restaurant kitchen where a lot of oil is used or place near machines in a factory (Oil adhering to the heat exchanger and resin part (turbo fan) in the indoor unit may reduce the performance, generate mist or dew drop, or deform or damage resin parts.)
- Places where iron or other metal dust is present. If iron or other metal dust adheres to or collects on the interior of the air conditioner, it may spontaneously combust and start a fire.
- Place where organic solvent is used nearby.
- Place close to a machine generating high frequency.
- Place where the discharged air blows directly into the window of the neighbour house. (Outdoor unit)
- Place where noise of the outdoor unit is easily transmitted.  
(When the outdoor unit is installed on the boundary with the neighbour, pay due attention to the level of noise.)
- Place with poor ventilation. (Before air duct work, check whether value of fan speed, static pressure and duct resistance are correct.)
- Do not use the air conditioner for special purposes such as preserving food, precision instruments, or art objects, or where breeding animals or growing plants are kept. (This may degrade the quality of preserved materials.)
- Place where any of high-frequency appliances (including inverter devices, private power generators, medical equipment, and communication equipment) and inverter-type fluorescent light is installed.  
(A malfunction of the air conditioner, abnormal control, or problems due to noise to such appliances / equipment may occur.)
- When the wireless remote controller is used in a room equipped with an inverter-type fluorescent light or at a place exposed to direct sunlight, signals from the remote controller may not be received correctly.
- Place where organic solvent is used.
- Place near a door or window exposed to humid outside air (Dew drop may form.).
- Place where special spray is used frequently.



## ■ Installation space

Ensure there is sufficient space to install the unit and to perform maintenance work as and when required. Keep 15 mm or more for clearance between top plate of the indoor unit and the ceiling surface.

Unit: mm



### REQUIREMENT

- \*1 If there is no ceiling board, the length of the hanging bolt shall be more than 400 mm.
- \*2 Set a service check opening panel at electrical control box side of the unit (size: 450 × 450 mm or more) for piping, maintenance, and servicing.
- \*3 For the adjustment of the installation height of the indoor unit.

## ■ Selection of installation place

Continual operation of the indoor unit under high-humidity conditions as described below, dew may condense and water may drop.

Especially, high-humidity atmosphere (dew point temperature: 23 °C or more) may generate dew inside the ceiling.

1. Unit is installed inside the ceiling with slated roof.
2. Unit is installed at a location using inside of the ceiling as fresh air intake path.
3. Kitchen

### REQUIREMENT

When the humidity inside the ceiling seems to be higher than 80%, attach a heat insulator to the side (top) surface of the indoor unit. (Use a heat insulator with a thickness of 10 mm or more.)

## ■ Ceiling height

Unit : m

Model RAS-	Installable ceiling height
M10, M13 type	Up to 2.7
M16 type	Up to 3.5

When the height of the ceiling exceeds the distance of the item Standard / 4-way in below table, the warm air is difficult to reach the floor.

It is necessary to change the setup value of the high ceiling setting or discharge direction. (RAS-M16 type only)  
When changing the setting of the ceiling height in the models, RAS-M10, M13 type, if it is set over 2.7 m, the hot air is difficult to reach the floor.

### ▼ Height list of ceiling possible to be installed

Unit : m

Indoor unit Capacity type	M10, M13 type	M16 type	Setup of high ceiling
Discharge direction	4-way	4-way	Setup data
Standard (Factory default)	2.7	2.9	0000
High ceiling (1)	—	3.2	0001
High ceiling (3)	—	3.5	0003

### REQUIREMENT

When high ceiling (1) or (3) is used with 4-way blowing, a draft is easily recognized due to drop of discharge temperature.

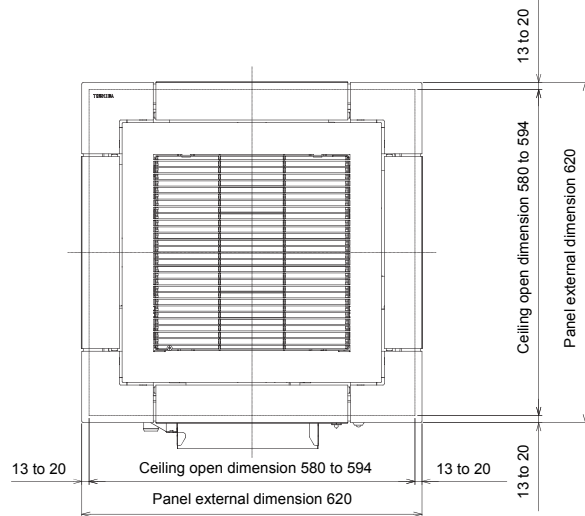
Refer to “10. Others” in this manual for the setting procedure.

# 4 Installation

## REQUIREMENT

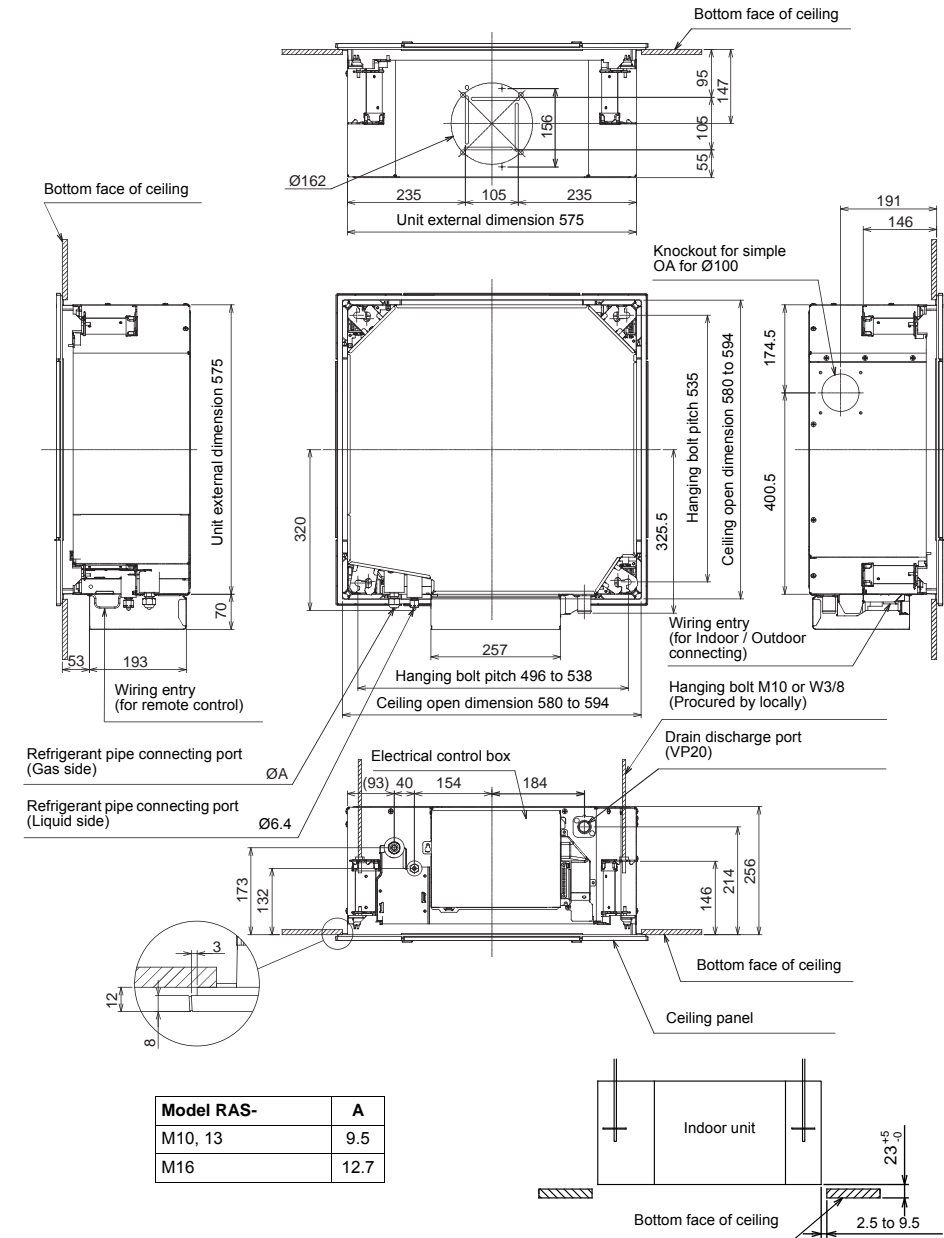
- Strictly comply with the following rules to prevent damage of the indoor units and human injury.
- Do not put a heavy article on the indoor unit. (Even units are packaged)
  - Carry in the indoor unit as it is packaged if possible. If carrying in the indoor unit unpacked by necessity, use buffering cloth or other soft cloth to not damage the unit.
  - To move the indoor unit, hold the hooking metals (4 positions) only.
  - Do not apply force to the other parts (refrigerant pipe, drain pan, foamed parts, or resin parts).
  - Carry the package by two or more persons, and do not bundle it with plastic band at positions other than specified.

## External view



## External view

Unit: mm



Model RAS-	A
M10, 13	9.5
M16	12.7

## ■ Opening a ceiling and installation of hanging bolts

- Consider the piping / wiring after the unit is hung to determine the location of the indoor unit installation and orientation.
- After the location of the indoor unit installation has been determined, open the ceiling and install hanging bolts.
- The dimensions of the ceiling opening and hanging bolt pitches are given in the outline drawing and the attached installation pattern.
- When a ceiling already exists, lay the drain pipe, refrigerant pipe, control wires, and remote controller wires to their connection locations before hanging the indoor unit.

Procure hanging bolts and nuts for installing the indoor unit (these are not supplied).

Hanging bolt	M10 or W3/8	4 pieces
Nut	M10 or W3/8	12 pieces

### Using the installation pattern (accessory)

The installation pattern is provided inside the packaging cap.

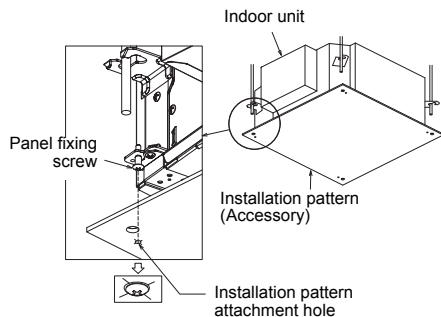
#### <For existing ceiling>

Use the installation pattern positioning a ceiling opening and hanging bolts.

#### <For new ceiling>

Use the installation pattern to position the ceiling opening when a ceiling is hanged.

- After the hanging bolts have been installed, install the indoor unit.
- After loosening the panel fixing screws of the indoor unit, hook them on the four holes in the installation pattern.
- When hanging a ceiling, open the ceiling along the outside dimensions of the installation pattern.



## Treatment of ceiling









The ceiling differs according to structure of building. For details, consult your constructor or interior finish contractor.

In the process after the ceiling board has been removed, it is important to reinforce ceiling foundation (frame) and to keep horizontal level of installed ceiling correctly in order to prevent vibration of ceiling board.

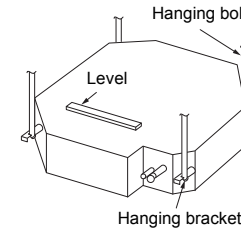
- Cut and remove the ceiling foundation.
- Reinforce the cut surface of ceiling foundation, and add ceiling foundation for fixing the end of ceiling board.

## Installation of hanging bolt

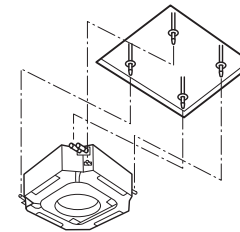
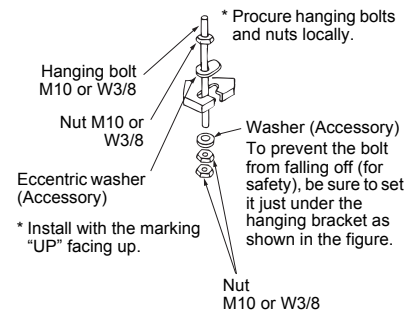
Use M10 hanging bolts (4 pcs, locally procured). Matching to the existing structure, set pitch according to size in the unit external view as shown below.

New concrete slab	
Install the bolts with insert brackets or anchor bolts.	
	
(Blade type bracket)	(Slide type bracket)
	
Anchor bolt	Pipe hanging anchor bolt
* Rubber	
Steel flame structure	
Use existing angles or install new support angles.	
	
Hanging bolt	Support angle
Existing concrete slab	
Use a hole-in anchors, hole-in plugs, or a hole-in bolts.	
	

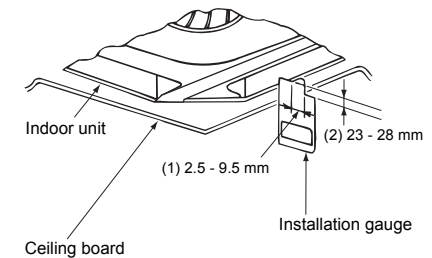
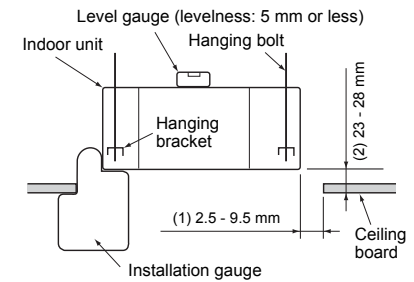
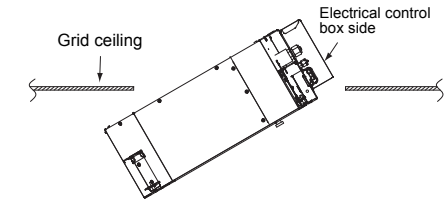
## Installation of ceiling opening and hanging bolt



- Attach a nut (locally procured) and the washer (supplied) to each hanging bolt.
- Insert a washer on both sides of the T groove of the hanging bracket of the indoor unit, and hang the indoor unit.
- Check that the four sides of the indoor unit are level using a level gauge (levelness: 5 mm or less).
- Detach the installation gauge (accessory) from the installation pattern.
- Using the installation gauge, check and adjust the positional relation between the indoor unit and the ceiling opening (1) (2.5 - 9.5 mm: 4 sides) and the hanging-up height (2) (23 - 28 mm: 4 corners). (How to use the installation gauge is printed on the gauge.)



For the grid ceiling, incline the unit and then mount the unit from the electrical control box side as shown in the figure below.



### CAUTION

Before installation of the indoor unit, remove the tape that holds the fan and bell mouth. Running the unit without removing the tape may damage the fan motor.

## ■ Installation of ceiling panel (Sold separately)

Install the ceiling panel according to Installation Manual attached with it after piping / wiring work has completed.

Check that installation of indoor unit and ceiling opening part is correct, and then install it.

### REQUIREMENT

- Joint the connecting sections of ceiling panel, ceiling surface, ceiling panel and indoor unit closely. Any gap between them will cause air leakage and the generate condensation or water leakage.
- Remove the adjust corner caps at the four corners of the ceiling panel, and then install the ceiling panel onto the indoor unit. Also, check that the claws are securely fit when returning the adjust corner caps to its original position.

## ■ Installation of remote controller (Sold separately)

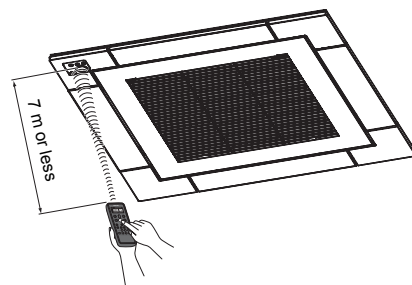
For installation of the wired remote controller, follow the Installation Manual attached with the remote controller.

- Pull out the remote controller cord together with the refrigerant pipe or drain pipe. Pass the remote controller cord through upper side of the refrigerant pipe and drain pipe.
- Do not leave the remote controller at a place exposed to the direct sunlight or near a stove.

## ■ Wireless remote controller (Sold separately)

The sensor of indoor unit with wireless remote controller can receive a signal by distance within approx. 7 m. Based upon it, determine a place where the remote controller is operated and the installation place.

- Operate the remote controller, confirm that the indoor unit receives a signal surely, and then install it.
- Keep 1 m or more from the devices such as television, stereo. (Disturbance of image or noise may generate.)
- To prevent a malfunction, select a place where is not influenced by a fluorescent light or direct sunlight.
- Two or more (Up to 6 units) indoor units with wireless type remote controller can be installed in the same room.



# 5 Drain piping

### ⚠ CAUTION

Following the Installation Manual, perform the drain piping work so that water is properly drained, and apply a heat insulation so as not to cause a dew drop.

**Inappropriate piping work may result in water leakage in the room and wet of furniture.**

## ■ Piping / Heat insulating material

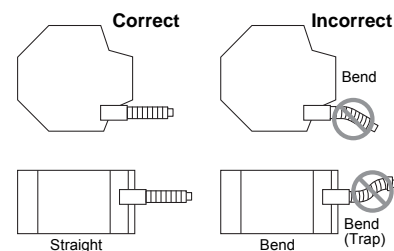
Require the following materials for piping and heat insulating at site.

Piping	Hard vinyl chloride pipe VP20 (Outer dia.: Ø26 mm)
Heat insulator	Foam polyethylene: Thickness 10 mm or more

## ■ Flexible hose

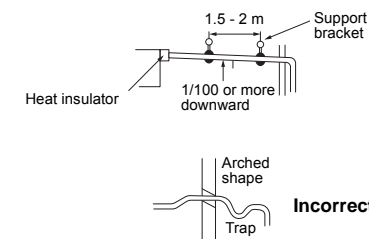
Use the attached flexible hose to adjust centre discrepancy of the hard vinyl chloride pipe.

- Do not use the flexible hose as stretched, or do not deform.
- Fix the soft end of the flexible hose with the attached hose band.
- Use the flexible hose on a horizontal level.

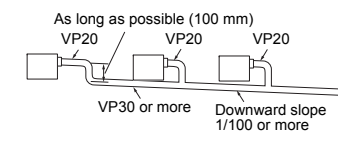


### REQUIREMENT

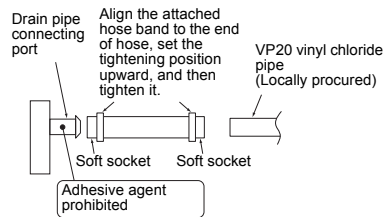
- Perform heat insulation of the drain pipes of the indoor unit.
- Perform heat insulation of the connecting part with the indoor unit. An incomplete heat insulation causes dew drop.
- Set the drain pipe with downward slope (1/100 or more), and do not make swelling or trap on the piping. It may cause an abnormal sound.
- For length of the traversing drain pipe, restrict to 20 m or less. In case of a long pipe, provide support brackets with interval of 1.5 - 2 m in order to prevent waving.



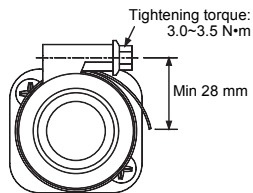
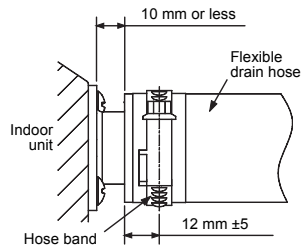
- Set the collective piping as shown in the below figure.



- Do not apply force to the connecting part of the drain pipe.
- The hard vinyl-chloride pipe cannot be directly connected to the drain pipe connecting port of the indoor unit. For connection with the drain pipe connecting port, fix the attached flexible hose with the hose band, otherwise a damage or water leak is caused on the drain pipe connecting port.



- Adhesive agent cannot be used for the pipe connecting port (Soft socket) of the indoor unit. Be sure to use the attached hose band for fixing, otherwise damage or water leakage of the drain pipe connecting port is caused.



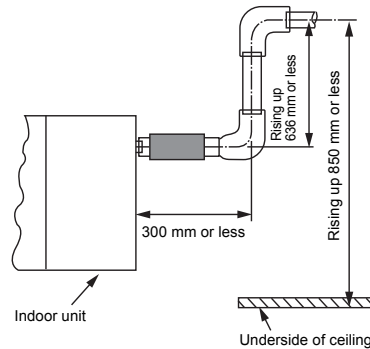
## ■ Connecting drain pipe

- Connect VP20 hard vinyl chloride pipe (Locally procured) to flexible drain hose using attached hose band.

## ■ Drain up

When a down-gradient cannot be secured for the drainpipe, drain-up piping is possible.

- The height of the drain pipe must be 850 mm or less from the bottom of the ceiling.
- Take the drain pipe out of the drain pipe joint with the indoor unit in 300 mm or less, and bend up the pipe vertically.
- Immediately after the pipe is bent up vertically, lay the pipe making a down-gradient.
- Set downward grading immediately after raising up vertically.



## ■ Check the draining

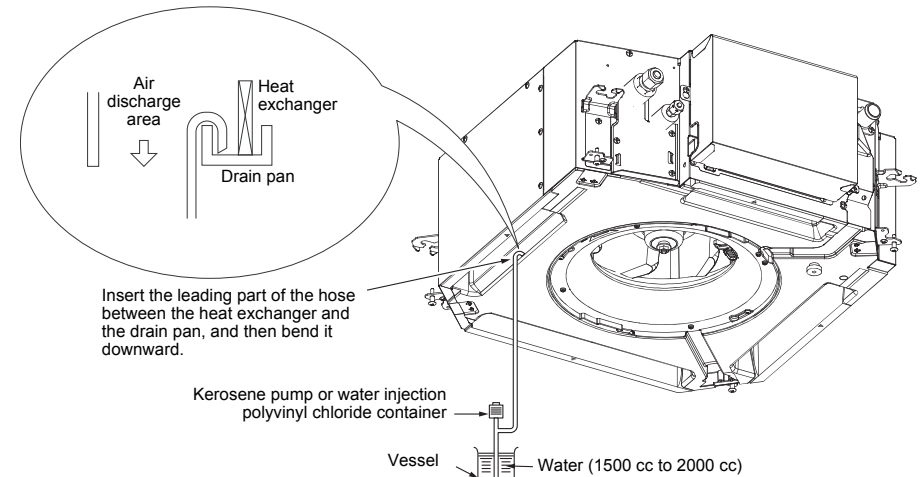
In the test run, check that water drain is properly performed and water does not leak from the connecting part of the pipes.

Check draining also when installed in heating period. By using a pitcher or hose, pour water (1500 - 2000 cc) into the discharge port before installation of the ceiling panel.

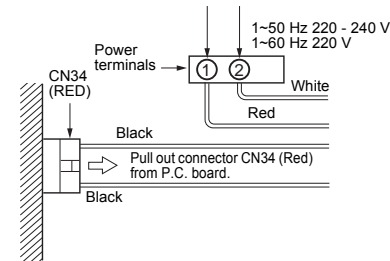
Pour water gradually so that water does not spread on the motor of the drain pump.

### ⚠ CAUTION

Pour water gently so that it does not spread around inside the indoor unit, which may cause a malfunction.

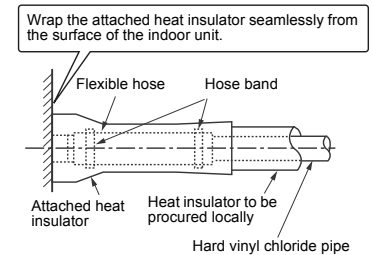


- After the electric work has finished, pour water during COOL mode operation.
- If the electric work has not yet finished, pull out the float switch connector (CN34: Red) from the electrical control box, and check draining by plugging the single phase 220 - 240 V power to the terminal blocks ① and ②. If doing so, the drain pump motor operates. (Never apply 220-240 V to ① or ②, otherwise a trouble of P.C. board occurs.)
- Test water drain while checking the operation sound of the drain pump motor. (If the operation sound changes from continuous sound to intermittent sound, water is normally drained.) After the check, the drain pump motor runs, connecting the float switch connector. (In case of check by pulling out the float switch connector, be sure to return the connector to the original position.)



## ■ Perform heat insulating

- As shown in the figure, cover the flexible hose and hose band with the attached heat insulator up to the bottom of the indoor unit without gap.
- Cover the drain pipe seamlessly with a heat insulator to be procured locally so that it overlaps with the attached heat insulator of the drain connecting section.



- \* Direct the slits and seams of the heat insulator upward to avoid water leakage.

# 6 Refrigerant piping

## ⚠ CAUTION

Use flare nuts that are included with the unit. Using different flare nuts may cause refrigerant gas leakage.

## ■ Refrigerant piping

Use the following item for the refrigerant piping.

**Material : Seamless phosphorous deoxidized copper pipe.**  
**Ø6.35, Ø9.52, Ø12.7 Wall thickness 0.8 mm or more**

### REQUIREMENT

When the refrigerant pipe is long, provide support brackets at intervals of 2.5 - 3 m to clamp the refrigerant pipe. Otherwise, abnormal sound may be generated.

## ⚠ CAUTION

### IMPORTANT 4 POINTS FOR PIPING WORK

1. Reusable mechanical connectors and flared joints are not allowed indoors. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be refabricated.
2. Tight connection (between pipes and unit)
3. Evacuate the air in the connecting pipes by using VACUUM PUMP.
4. Check the gas leakage. (Connected points)

## ■ Pipe size

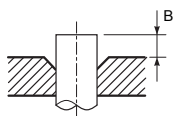
Model name	RAS-	M10, 13 type	M16 type
Pipe size	Gas side	9.5 mm	12.7 mm
	Liquid side	6.4 mm	6.4 mm

## ■ Permissible piping length and height difference

They vary according to the outdoor unit.  
 For details, refer to the Installation Manual attached to the outdoor unit.

### Flaring

- Cut the pipe with a pipe cutter. Remove burrs completely. Remaining burrs may cause gas leakage.
- Insert a flare nut into the pipe, and flare the pipe. As the flaring sizes of R32 or R410A differ from those of refrigerant R22, the flare tools newly manufactured for R32 or R410A are recommended. However, the conventional tools can be used by adjusting projection margin of the copper pipe.



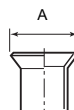
### ▼ Projection margin in flaring: B (Unit: mm)

Rigid (Clutch type)

Outer dia. of copper pipe	R32 or R410A tool used	Conventional tool used
6.4, 9.5	0 - 0.5	1.0 - 1.5
12.7		

### ▼ Flaring dia. meter size: A (Unit: mm)

Outer dia. of copper pipe	A <sup>+0</sup> <sub>-0.4</sub>
6.4	9.1
9.5	13.2
12.7	16.6



## ⚠ CAUTION

- Do not scratch the inner surface of the flared part when removing burrs.
- Flare processing under the condition of scratches on the inner surface of flare processing part will cause refrigerant gas leak.
- Check that the flared part is not scratched, deformed, stepped, or flattened, and that there are no chips adhered or other problems, after flare processing.
- Do not apply refrigerating machine oil to the flare surface.

## Tightening connection

## ⚠ CAUTION

Do not apply excessive torque. Otherwise, the nut may crack depending on the conditions.

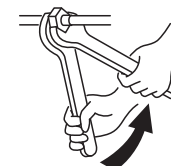
Unit: N·m

Outer dia. of copper pipe	Tightening torque
6.4 mm	14 - 18
9.5 mm	34 - 42
12.7 mm	49 - 61

### ▼ Tightening torque of flare pipe connections

Incorrect connections may cause not only a gas leak, but also a trouble of the refrigeration cycle.

Align the centres of the connecting pipes and tighten the flare nut as far as possible with your fingers. Then tighten the nut with a spanner and torque wrench as shown in the figure.



Work using two spanner

### REQUIREMENT

Tightening with an excessive torque may crack the nut depending on installation conditions.  
 Tighten the nut within the specified tightening torque.

## ■ Evacuation

Perform vacuuming from the charge port of valve of the outdoor unit by using a vacuum pump.

For details, follow to the Installation Manual attached to the outdoor unit.

- Do not use the refrigerant sealed in the outdoor unit for evacuation.

### REQUIREMENT

For the tools such as charge hose, use those manufactured exclusively for R32 or R410A.

### Refrigerant amount to be added

For addition of the refrigerant, add refrigerant "R32 or R410A" referring to the attached Installation Manual of outdoor unit.

Use a scale to charge the refrigerant of specified amount.

### REQUIREMENT

- Charging an excessive or too little amount of refrigerant causes a trouble of the compressor. Charge the refrigerant of specified amount.
- A personnel who charged the refrigerant should write down the pipe length and the added refrigerant amount in the F-GAS label of the outdoor unit. It is necessary to fix the compressor and refrigeration cycle malfunction.

### Open the valve fully

Open the valve of the outdoor unit fully. A 4 mm-hexagonal wrench is required for opening the valve.  
 For details, refer to the Installation Manual attached to the outdoor unit.

### Gas leak check

Check with a leak detector or soap water whether gas leaks or not, from the pipe connecting section or cap of the valve.

### REQUIREMENT

Use a leak detector manufactured exclusively for HFC refrigerant (R32, R410A).

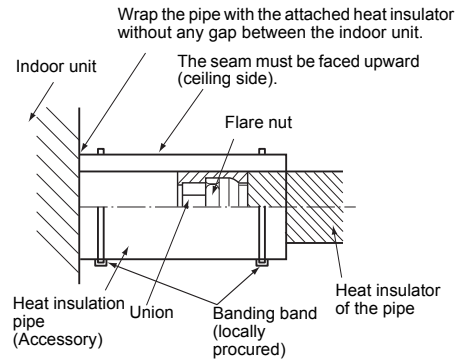
### Heat insulation process

Apply heat insulation for the pipes separately at liquid side and gas side.

- For the heat insulation to the pipes at gas side, use the material with heat-resisting temperature 120 °C or higher.
- Apply the attached heat insulation to the pipe connecting section of the indoor unit securely without gap.

### REQUIREMENT

- Apply the heat insulation to the pipe connecting section of the indoor unit securely up to the root without exposure of the pipe. (The pipe exposed to the outside causes water leak.)
- Wrap heat insulator with its slits facing up (ceiling side).



## 7 Electrical connection

### ⚠ WARNING

- **Use the specified wires for wiring connect the terminals. Securely fix them to prevent external forces applied to the terminals from affecting the terminals.**  
Incomplete connection or fixation may cause a fire or other trouble.
- **Connect earth wire. (grounding work)**  
Incomplete earthing cause an electric shock.  
Do not connect earth wires to gas pipes, water pipes, lightning conductor or telephone earth wires.
- **Appliance shall be installed in accordance with national wiring regulations.**  
Capacity shortage of power circuit or incomplete installation may cause an electric shock or a fire.
- **Under no circumstances, the power supply wire or the indoor and outdoor connecting wire must not be connected in the middle (Connection using a solderless terminal etc.)**  
Connection trouble in the places where the wire is connected in the middle may give rise to smoking and/or a fire.

### ⚠ CAUTION

- For power supply specifications, follow the Installation Manual of outdoor unit.
  - Do not connect 220 – 240 V power to the terminal blocks (Ⓐ, Ⓑ) for control wiring.  
Otherwise, the system will fail.
  - Do not damage or scratch the conductive core and inner insulator of power and system interconnection wires during peeling them.
  - Perform the electric wiring so that it does not come to contact with the high-temperature part of the pipe.  
The coating may melt resulting in an accident.
- Do not turn on the power of the indoor unit until vacuuming of the refrigerant pipes completes.

## ■ Wiring connection

### Indoor / Outdoor connecting wires specifications

#### Indoor unit power supplied from outdoor unit

- The outdoor unit power supply patterns vary on models.

Indoor unit power supply	1~50 Hz 220 - 240 V
	1~60 Hz 220 V

Indoor / Outdoor connecting wires*	4 × 1.5 mm <sup>2</sup> or more (H07 RN-F or 60245 IEC 66)*	Up to 70 m
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\*Number of wire × wire size  
\*Including earth line

### Remote controller wiring

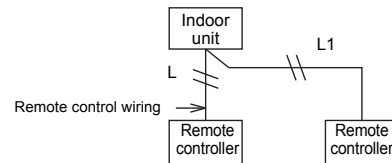
Remote controller wiring, remote controller inter-unit wiring	Wire size: 2 × 0.5 to 2.0 mm <sup>2</sup>	
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Total length of remote control wiring and inter-wiring between remote controllers (L+L1)	1 remote controller	2 remote controllers
	Up to 500 m	Up to 300 m

\* 1 For detail of the wired remote controller (RB-RWS21-E), follow the Installation Manual attached with the remote controller.

### CAUTION

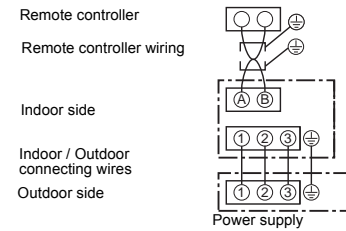
The remote controller wire and Indoor / Outdoor connecting wires cannot be parallel to contact each other and cannot be stored in the same conduits. If doing so, a trouble may be caused on the control system due to noise or other factor.



## ■ Wiring between indoor unit and outdoor unit

- Figure below shows the wiring connections between the indoor and outdoor units and between the indoor units and remote controller. The wires indicated by the broken lines or dot-and-dash lines are provided at the locally.
- Refer to the both indoor and outdoor unit wiring diagrams.
- The power of the indoor unit is supplied from the outdoor unit.

### Wiring diagram



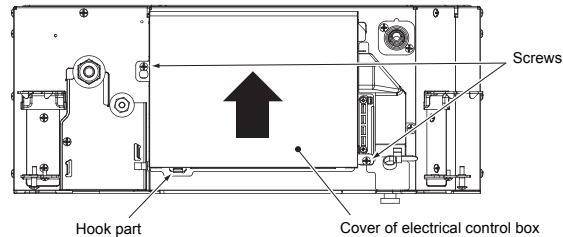


## ■ Wire connection

### REQUIREMENT

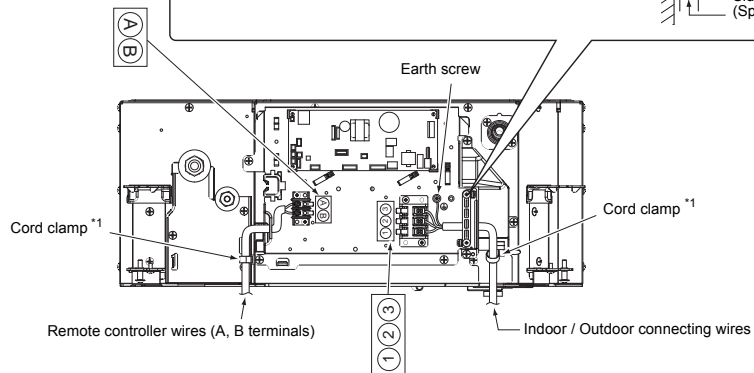
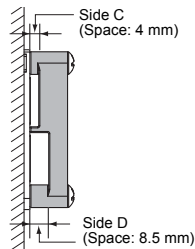
- Connect the wires matching the terminal numbers. Incorrect connection causes a trouble.
- Route the wire through the wire connection port of the indoor unit.
- The low-voltage circuit is provided for the control wire and remote controller wire. (Do not connect the high-voltage circuit.)

1. Loosen the two screws, and remove the cover of electrical control box by sliding in the direction of the arrow.
2. Connect the Indoor / Outdoor connecting wires and remote controller wire to the terminal block of the electrical control box.
3. Tighten the screws of the terminal block, and fix the wires with cord clamp attached to the electrical control box. (Do not apply tension to the connecting section of the terminal block.)
4. Mount the cover of the electrical control box without pinching wires. (Mount the cover after wiring on the ceiling panel.)



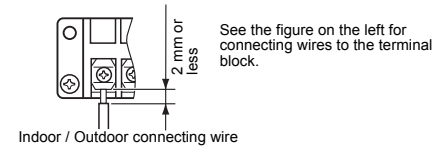
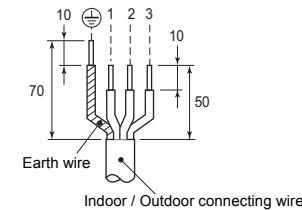
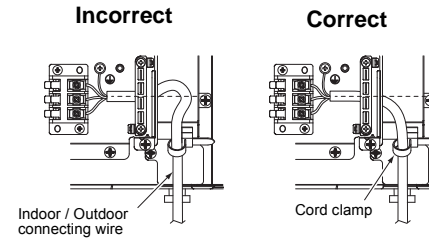
Select side C or D for the cord clamp position referring to the following table according to the cable type and diameter.  
\* Cord clamp can be attached on either right or left side.  
When twin system are connected, clamp two cables with one cord clamp.

Wire type	Specification	Cord clamping position
Cabtyre cable	3-core stranded wire 2.5 mm <sup>2</sup>	Side D
Cabtyre cable	4-core stranded wire 1.5 mm <sup>2</sup>	Side C



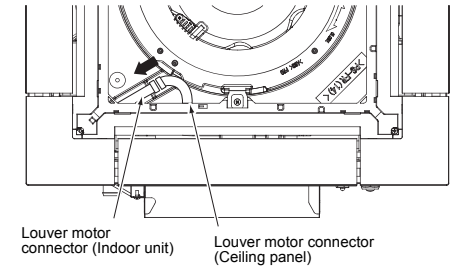
## ⚠ CAUTION

\*1 Make sure to fix the Indoor / Outdoor connecting wire with the cord clamp so that no water enters into the electrical control box through the Indoor / Outdoor connecting wire.



## ■ Wiring on the ceiling panel

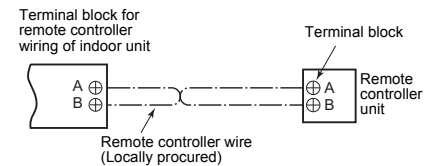
According to the Installation Manual of the ceiling panel, connect the louver motor connector on the ceiling panel side and the louver motor connector on the indoor unit side.



## ■ Remote controller wiring

Strip off approx. 9 mm the wire to be connected.




### Wiring diagram



## 8 Test run

### Wireless remote controller

**1** Turn on the power of the air conditioner. When power is turned on for the first time after installation, it takes approx. 5 minutes until the remote controller becomes available. In the case of subsequent power-on, it takes approx. 1 minute until the remote controller becomes available. Execute a test run after the predetermined time has passed.

**2** Push "ON/OFF" button on the remote controller, select [  Cool] or [  Heat] with "MODE" button, and then select [  HIGH] with "FAN" button.

**3**

Cooling test run	Heating test run
Set the temperature to 17°C with the temp. setup buttons.	Set the temperature to 30°C with the temp. setup buttons.

**4**

Cooling test run	Heating test run
After confirming a signal receiving sound "beep" immediately set the temperature to 18°C with the temp. setup buttons.	After confirming a signal receiving sound "beep" immediately set the temperature to 29°C with the temp. setup buttons.

**5**

Cooling test run	Heating test run
After confirming a signal receiving sound "beep" immediately set the temperature to 17°C with the temp. setup buttons.	After confirming a signal receiving sound "beep" immediately set the temperature to 30°C with the temp. setup buttons.

**6** Repeat procedures 4 → 5 → 4 → 5. Indicators "Operation" (green), "Timer" (green), and "Ready" (orange) in the wireless receiver section flash in approx. 10 seconds, and the air conditioner starts operation. If any of these indicators does not flash, repeat procedures 2 to 5.

**7** Upon completion of the test run, push "ON/OFF" button to stop operation.

<Overview of test run operations using the wireless remote controller>

#### ▼ Cooling test run:

ON/OFF → 17°C → 18°C → 17°C → 18°C → 17°C → 18°C → 17°C → (test run) → ON/OFF

#### ▼ Heating test run:

ON/OFF → 30°C → 29°C → 30°C → 29°C → 30°C → 29°C → 30°C → (test run) → ON/OFF

## 9 Maintenance

Prior to maintenance, ensure the power supply is turned off.

### ⚠ WARNING

Cleaning of the air filter and other parts of the air filter involves dangerous work in high places, so be sure to have a qualified service person do it. Do not attempt it yourself.

### ⚠ CAUTION

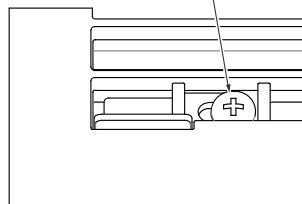
Do not handle the buttons with wet hands as this will cause the risk of electric shock.

### Cleaning of air filter

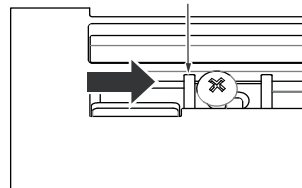
Clean the air filters every 3 months. The performance of the air conditioner will degrade if the air filters are covered with dust. Clean the air filters as often as possible.

#### 1 Open the air intake grille.

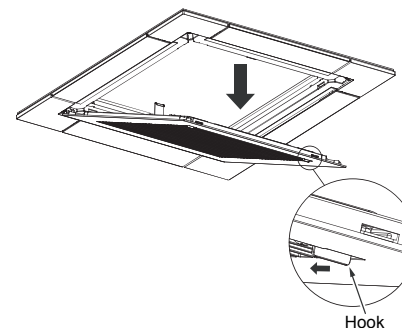
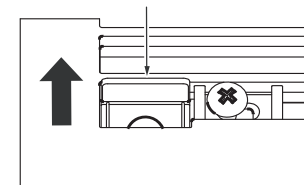
- Loosen the fixing screw.



- Slide the fixing bracket toward the inside.

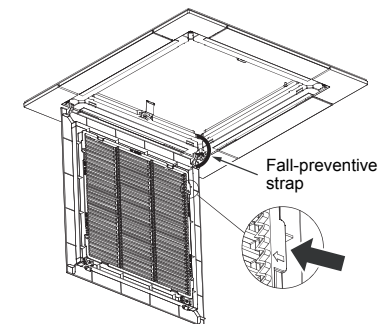


- Holding the air intake grille, slide the hook in the direction of the arrow and slowly open the grille.



#### 2 Take out the air filter.

- Push the extrusion of the air filter away from the grille and remove.



### 3 Cleaning with water or vacuum cleaner.

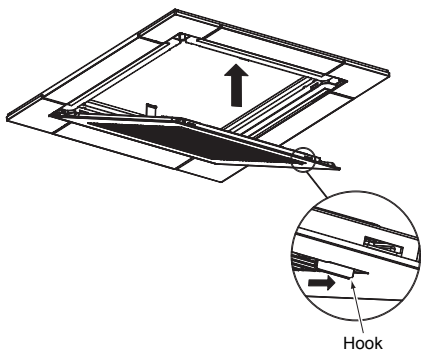
- If dirt is heavy, clean the air filter using tepid water with a neutral detergent or just water.
- After cleaning with water, dry the air filter sufficiently in a shaded place.



### 4 Mount the air filter.

### 5 Close the air intake grille.

- Check that the fall-preventive strap of the air intake grille is attached to the panel.
- In inverse process of 1, firmly attach the hook, fixing bracket and fixing screw.



#### **CAUTION**

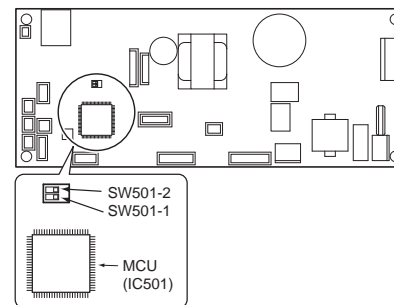
- Do not start the air conditioner while leaving air filter removed.

## 10 Others

### ■ Installing indoor unit on high ceiling

When an indoor unit is installed on a ceiling higher than the standard height, make the high-ceiling setting for fan speed adjustment.

Change the high-ceiling setting with the DIP switch on the receiver section P.C. board.



SET DATA	SW501-1	SW501-2
0000 (Factory default)	OFF	OFF
0001	ON	OFF
0003	OFF	ON

#### ◆ To restore the factory defaults

To return the DIP switch settings to the factory defaults, set SW501-1 and SW501-2 to OFF.

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