TOSHIBA

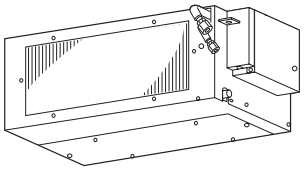
INSTALLATION MANUAL
MANUEL D'INSTALLATION
INSTALLATIONS-HANDBUCH
MANUALE DI INSTALLAZIONE
MANUAL DE INSTALACIÓN
MANUAL DE INSTALAÇÃO
ΕΓΧΕΙΡΙΔΙΟ ΕΓΚΑΤΑΣΤΑΣΗΣ

ENGLISH
FRANÇAIS
DEUTSCH
ITALIANO
ESPAÑOL
PORTUGUÊS
ΕΛΛΗΝΙΚΑ

AIR CONDITIONER (MULTI-SPLIT TYPE)

CLIMATISEUR (TYPE MULTI-SPLIT)
KLIMAGERÄT (MULTI-SPLIT SYSTEM)
CONDIZIONATORE D'ARIA (TIPO MULTIAMBIENTI)
AIRE ACONDICIONADO (TIPO MULTI-SPLIT)
CONDICIONADOR DE AR (TIPO COM MÚLTIPLA DIVISÃO)
ΚΛΙΜΑΤΙΣΤΙΚΟ (ΤΥΠΟΣ MULTI-SPLIT)

Concealed Duct Type
Type à conduits dissimulés
Luftkanal verborgen montiert
Tipo a condotto nascosto
Modelo con conductos ocultos
Tipo com Conduto Embutido
Τύπος συγκεκαλυμμένου αγωγού



HFC
R410A

	Indoor Unit Unité intérieure Raumeinheit Unità interna Unidad interior Unidade interna Εσωτερική μονάδα	Outdoor Unit Unité extérieure Außeneinheit Unità esterna Unidad exterior Unidade externa Εξωτερική μονάδα
Cooling Only Model Modèle à froid seul Geräte nur zur Kühlung Modello solo per raffreddamento Modelo de refrigeración únicamente Modelo Apenas para Refrigeração Μοντέλο Ψύξης αποκλειστικά	RAS-M10GDCV-E RAS-M13GDCV-E RAS-M16GDCV-E	RAS-M14GACV-E RAS-M18GACV-E RAS-3M23GACV-E RAS-4M27GACV-E
Heat Pump Model Modèle à thermopompe Geräte mit Heizung Modello con pompa di riscaldamento Modelo con bomba de calor Modelo da Bomba de Calor Μοντέλο με Αντλία Θερμότητας	RAS-M10GDV-E RAS-M13GDV-E RAS-M16GDV-E	RAS-M14GAV-E RAS-M18GAV-E RAS-3M26GAV-E RAS-4M27GAV-E

CONTENTS/SOMMAIRE/INHALT/INDICE/CONTENIDO

ENGLISH

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.
- The supply and return air panels are to be procured locally.

FRANÇAIS

Veuillez lire attentivement ce Manuel d'installation avant d'installer le climatiseur.

- Ce manuel décrit la procédure d'installation de l'unité intérieure.
- Pour installer l'unité extérieure, reportez-vous au Manuel d'installation fourni avec l'unité extérieure.
- Les panneaux d'alimentation en air et de retour de l'air doivent être fournis sur place.

DEUTSCH

Bitte lesen Sie dieses Handbuch sorgfältig, bevor Sie mit der Installation des Klimagerätes beginnen.

- In diesem Handbuch wird die Installation der Raumeinheit beschrieben.
- Um die Außeneinheit zu installieren, folgen Sie den Anweisungen in dem Handbuch, das der Außeneinheit beiliegt.
- Die Zu- und Abluftgitter müssen bauseits bereit gestellt werden.

ITALIANO

Prima di installare il condizionatore d'aria, leggere attentamente questo Manuale di installazione.

- Questo manuale illustra il metodo di installazione per l'unità interna.
- Per l'installazione dell'unità esterna, seguire le istruzioni del Manuale di installazione in dotazione con l'unità esterna.
- I pannelli di alimentazione e per l'aria di ritorno devono essere procurati dal cliente.

ESPAÑOL

Lea atentamente este Manual de instalación antes de proceder a la instalación del aparato de aire acondicionado.

- Este manual describe el método de instalación de la unidad interior.
- Para la instalación de la unidad exterior, consulte el Manual de instalación que acompaña a la unidad exterior.
- Los paneles de aire de suministro y de retorno deberán adquirirse localmente.

ÍNDICE/ΠΕΡΙΕΧΟΜΕΝΑ

PORTUGUÊS

Por favor, leia este Manual de Instalação atentamente, antes da instalação do Condicionador de Ar.

- Este manual descreve o método de instalação da unidade interna.
- Para a instalação da unidade externa, siga o Manual de Instalação, entregue juntamente com a unidade externa.
- Os painéis do ar de alimentação e de retorno poderão ser obtidos no local.

ΕΛΛΗΝΙΚΑ

Παρακαλώ διαβάστε προσεχτικά το Εγχειρίδιο Εγκατάστασης πριν από την εγκατάσταση του Κλιματιστικού.

- Το παρόν Εγχειρίδιο περιγράφει τη μέθοδο εγκατάστασης της εσωτερικής μονάδας.
- Για την εγκατάσταση της εξωτερικής μονάδας, ακολουθήστε το Εγχειρίδιο Εγκατάστασης που προμηθεύεται με την εξωτερική μονάδα.
- Τα καπάκια παροχής και επαναφοράς του αέρα προμηθεύονται από την τοπική αγορά.

1 SAFETY PRECAUTIONS

Power supply cord of outdoor unit shall be 2.5 mm^2 (H07RN-F or 60245IEC66) polychloroprene sheathed flexible cord.

- Read this “SAFETY PRECAUTIONS” carefully before Installation.
- The precautions described below include the important items regarding safety. Observe them without fail.
- After the installation work, perform a trial operation to check for any problem. Follow the Owner’s Manual to explain to the customer how to use and maintain the unit.
- Turn off the main power supply switch (or breaker) before the unit maintenance.
- Ask the customer to keep the Installation Manual together with the Owner’s Manual.

CAUTION

New Refrigerant Air Conditioner Installation

• THIS AIR CONDITIONER ADOPTS THE NEW HFC REFRIGERANT (R410A) WHICH DOES NOT DESTROY OZONE LAYER.

R410A refrigerant is apt to be affected by impurities such as water, oxidizing membrane, and oils because the working pressure of R410A refrigerant is approx. 1.6 times as that of refrigerant R22. Accompanied with the adoption of the new refrigerant, the refrigeration machine oil has also been changed. Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigeration machine oil does not enter the new type refrigerant R410A air conditioner circuit.
To prevent mixing of refrigerant or refrigerating machine oil, the sizes of connecting sections of charging port on main unit and installation tools are different from those of the conventional refrigerant units. Accordingly, special tools are required for the new refrigerant (R410A) units as shown on page 18. For connecting pipes, use new and clean piping materials with high pressure fittings made for R410A only, so that water and/or dust does not enter. Moreover, do not use the existing piping because there are some problems with pressure fittings and possible impurities in existing piping.

CAUTION

TO DISCONNECT THE APPLIANCE FROM THE MAIN POWER SUPPLY

Disconnection from the supply mains:
The means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.

WARNING

- Ask an authorized dealer or qualified installation professional to install/maintain the air conditioner.
  Inappropriate installation may result in water leakage, electric shock or fire.
- Turn off the main power supply switch or breaker before attempting any electrical work.
  Make sure all power switches are off. Failure to do so may cause electric shock.
- Connect the connecting cable correctly.
  If the connecting cable is connected by wrong way, electric parts may be damaged.
- When moving the air-conditioner for installation to another place, be very careful not to allow the specified refrigerant (R410A) to become mixed with any other gaseous body into the refrigeration circuit. If air or any other gas mixes with the refrigerant, the gas pressure in the refrigeration circuit will become abnormally high and it may result in the pipe bursting or personnel injuries.
- The electrical work should be performed by a qualified electrician in accordance with the technical standards for electrical equipment, internal wiring regulations, and installation manual for the electrical equipment. A dedicated circuit should be used, and the voltage should match the rated voltage of the product. If the power supply circuit does not have enough capacity or the work is performed improperly, an electric shock or fire can result.
- Be sure to connect the indoor and outdoor unit wires at their tips. Do not connect the wires below the tips. If the connections and fixtures are not made properly, overheating or a fire can result.
- Connect the wiring between the indoor and outdoor units so that the cord clamp does not stick out, and attach the covers properly. If the clamp is not attached properly, the terminal sections can overheat, and a fire or electric shock can result.
- Always use the supplied parts or specified parts for the installation work parts. Usage of different parts can cause the unit to fall, a water leak, fire, or electric shock.
- Never modify this unit by removing any of the safety guards or by by-passing any of the safety interlock switches.
- Exposure of unit to water or other moisture before installation may cause a short circuit.
  Do not store it in a wet basement or expose to rain or water.
- After unpacking the unit, examine it carefully for possible damage.
- Do not install in a place that can increase the vibration of the unit.
- To avoid personal injury, be careful when handling parts with sharp edges.
- Perform installation work properly according to the Installation Manual.
  Inappropriate installation may result in water leakage, electric shock or fire.

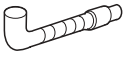
- When installing the air conditioner in a small room, provide appropriate measures to ensure that the concentration of refrigerant in the room does not exceed the critical level should leakage occur.
  It is not dangerous refrigerant; it has not toxicity or combustibility. However, a concentration above 0.3 kg/m³ as criterion still causes suffocation. The volume of refrigerant charged to the Multi System air conditioner is more than the volume charged to a conventional individual system.
- Install the air conditioner securely in a location where the weight of the unit can be sustained adequately.
- Perform the specified installation work to guard against an earthquake.
  If the air conditioner is not installed appropriately, accidents may occur due to the falling unit.
- 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.
- 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 generate.
- When wiring, use the specified cables and connect the terminals securely to prevent external forces applied to the cable from affecting the terminals.
- Be sure to provide grounding.
  Do not connect ground wires to gas pipes, water pipes, lightning rods or ground wires for telephone cables.
- Do not install the air conditioner in a location subject to a risk of exposure to combustible gas.
  Otherwise, the combustible gas leaks, stays around the unit and a fire may occur.
- Do not install in locations where the unit will get splashed by water or with high humidity such as bathrooms. This can cause deterioration of the insulation, resulting in an electric shock or fire.
- Check the following points before starting operation in the installation work.
  - The pipes are securely connected and do not leak.
  - The service valve is opened.
  Operating the compressor while the service valve is closed will result in an abnormally high pressure, and can possibly damage the compressor and other parts. Also, any leaks in the connections can cause air to be sucked in, resulting in an even higher abnormally pressure, and can cause a pipe rupture or injury.
- 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 with the compressor still operating will cause air, etc. to be sucked in, raising the pressure inside the refrigeration cycle to an abnormally high level, and possibly resulting in rupturing, injury, etc.

CAUTION

- Wear work gloves when carrying out the installation work or repairs. Contact with parts, etc. may cause injury if the work or repairs are conducted without wearing gloves.
- Earth leakage breakers are required in certain installation locations. Failure to install the earth leakage breakers can result in an electric shock.
- The pipes for the drain work should be installed properly in accordance with the installation manual to ensure proper draining. Failure to install the pipes properly can cause a leak indoors and wet the furniture and other objects in the home.
- Tighten the flare nut with a torque wrench using the specified method. If the flare nut is over-tightened, it can crack over a long period of time, resulting in a refrigerant leak.
- Do not touch the inlets or aluminum fins of the indoor and outdoor unit. An injury could result.
- Do not install the outdoor unit where small animals typically live. If small animals get inside the unit and touch the electrical parts, a failure or fire can result. Also, please keep the area around the outdoor unit clear of fallen leaves and other objects.
- After the installation work is completed, perform test operation to check that there is nothing abnormal, and explain to the customer the operating and cleaning procedures based on the owner's manual. Also, ask the customer to store this installation manual together with the owner's manual.

2 ACCESSORY PARTS AND PARTS TO BE PROCURED LOCALLY

Accessory parts

Part No.	Part name (Q'ty)	Part No.	Part name (Q'ty)
①	 Wireless remote controller x 1	⑤	 Elbow thermal-insulating cover x 1
②	 Remote controller holder x 1	⑥	 Batteries (Manganese) x 2
③	 Mounting screws for remote controller holder 3.5 mm (diam.) x 16 mm x 2	⑦	 Black screws for switch panel 4 mm (diam.) x 10 mm x 2
④	 Drain hose x 1	⑧	 Tapping screws for flange (2nd type) 4 mm (diam.) x 8 mm x 16

Others

Name
Installation manual
Owner's manual

Parts to be procured locally

- Connecting pipe (Liquid side)
  (6.35 mm (diam.), Nominal (diam.) 1/4" thick 0.8 mm)
- Connecting pipe (Gas side)
  (12.7 mm (diam.), Nominal (diam.) 1/2" thick 0.8 mm)
  RAS-M16GDCV-E, RAS-M16GDV-E
  (9.52 mm (diam.), Nominal (diam.) 3/8" thick 0.8 mm)
  RAS-M10GDCV-E, RAS-M10GDV-E, RAS-M13GDCV-E, RAS-M13GDV-E
- Power supply cord
  2.5 mm^2 (H07RN-F or 60245IEC66)
- Connecting cable
  1.0 mm^2 (H07RN-F or 60245IEC66)
- Thermal insulation for refrigerant pipe (10 mm or more, thermal insulating foam polyethylene)
- Thermal insulation for drain pipe (10 mm or more, foam polyethylene)
- Drain pipe (Outer 26 mm (diam.))
- Tapes
- Grounding cable (1.6 mm (diam.) or more)

3 SELECTION OF INSTALLATION PLACE

WARNING

- Install the air conditioner where there is sufficient strength to withstand the weight of the unit.
  If the strength is not sufficient, the unit may fall down resulting in injury.
- Install the air conditioner at a position keeping the height by 2.5 m or more from the floor.
  If you insert your hands or others directly into the unit during running of the air conditioner, it is dangerous because you may contact with revolving fan or active electricity.

CAUTION

- Do not install the air conditioner in a location subject to a risk of exposure to combustible gas.
  Otherwise, the combustible gas leaks, stays around the unit and a fire may occur.

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

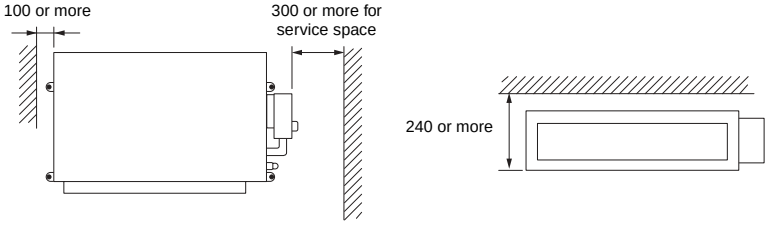
- Place where the unit can be installed horizontally.
- Place where a sufficient servicing space can be ensured for safe maintenance and check.
- Place where drained water will not cause any problem.
- Make sure that the user cannot access the unit main body after the installation.

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). (Should the unit be used in these places, special protective measures are needed.)
- Place exposed to oil, vapor, oil smoke or corrosive gas.
- 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 neighboring house. (For outdoor unit)
- Place where noise of the outdoor unit is easy to transmit. (When installing the air conditioner on the boundary with the neighbor, pay due attention to the level of noise.)
- Place with poor ventilation. (Before air ducting work, check whether value of air volume, static pressure and duct resistance are correct.)

Installation space

Secure the space required to installation and servicing.



Selection of installation place

In case of continues the 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 inside of the ceiling.

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

If installing a unit at such place, adhere insulating material (glass wool, etc.) additionally over all the positions of the indoor unit which come to contact with high-humidity atmosphere.

ADVICE

- Set a check port at right side of the unit (size: 450 x 450 mm) for piping, maintenance, and servicing.

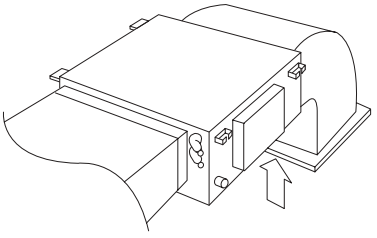
4 INSTALLATION OF INDOOR UNIT

WARNING

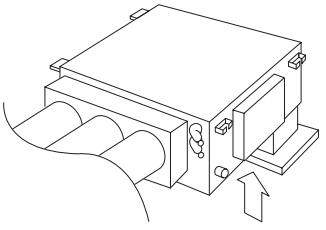
Install the air conditioner certainly at a place to sufficiently withstand the weight. If the strength is insufficient, the unit may fall down resulting in human injury.
Perform a specified installation work to guard against an earthquake.
An incomplete installation can cause accidents by the units falling and dropping.

Return air method is choiced from rear or under direction as shown in figure.

Return air from rear side



Return air from bottom side



- If a system to suck in air directly from the bottom of the unit is adopted, the noise level increases. It is recommended to mount the return duct so that air is not directly sucked in.

Installation procedure

1. Lay drain pipes, refrigerant pipes, and connecting cables under wall or ceiling concurrently with supply/drain water work and piping work.
2. Install the mounting frames of supply/return air panels
3. Position the refrigerant and drain pipes
4. Install the indoor unit
   - Preparation for installation
   - Setting/fixing of indoor unit
5. Connect cables and pipes
6. Mount the switch panel and set switches
7. Install supply/return air panels
8. Mount thermal insulation
9. Mount check port

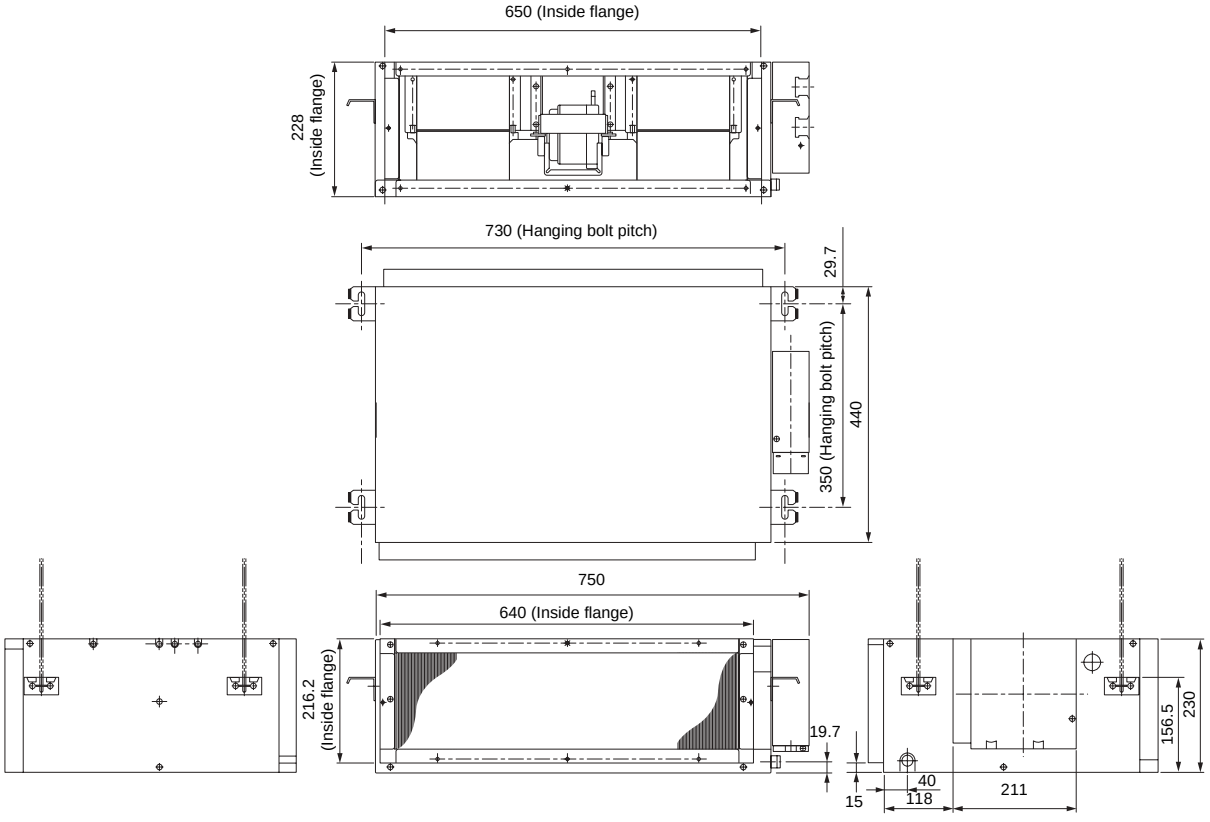
NOTE

For installation of the outdoor unit, refer to the Installation manual (Packed in the outdoor unit).

External view

REQUIREMENT

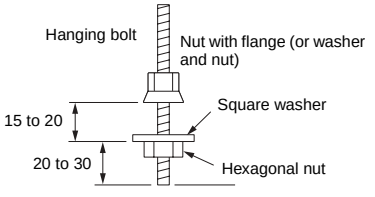
The hanging bolt pitch on longitudinal direction is not divided at center with the ceiling opening size. Therefore, check the relational position in the following figure.



Hanging down of indoor unit

Refer to installation figures of hanging material and hanging bolt.

- Adjustment of hanging bolt length and nut position
  Adjust hanging bolt length and nut position as shown in the figure before hanging down the indoor unit.



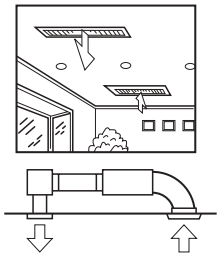
NOTE

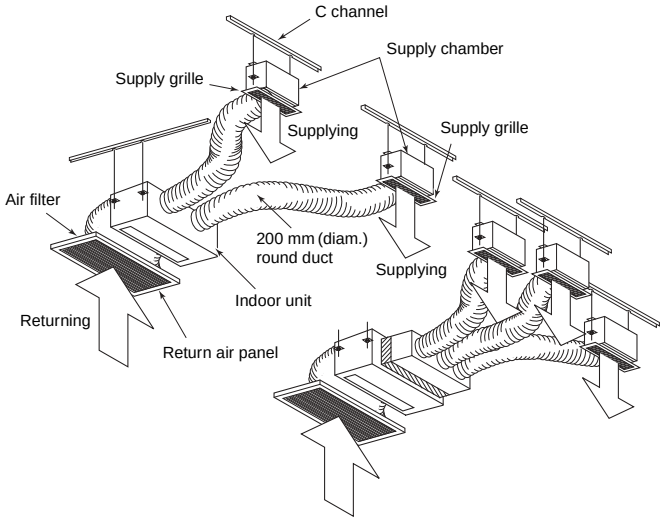
Be sure to set the indoor unit horizontally so as not to cause malfunction of the float switch or leakage of water.

Considering pipe/wire connecting work inside the ceiling after the indoor unit has been hanged, select an installation place and determine piping direction.

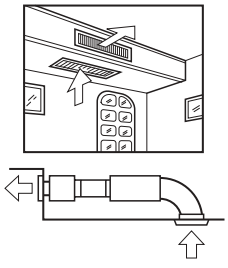
- If the ceiling has been already set, lead refrigerant pipe, drain pipe, connecting wire, switch panel cord, etc. up to the place where pipe and wire are connected before hanging the main unit.

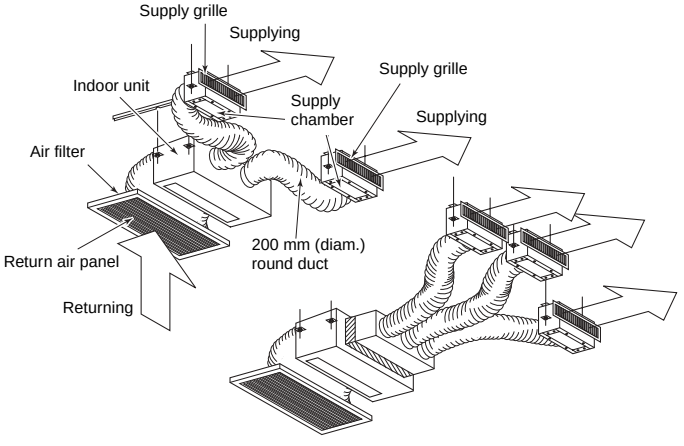
Concealed duct type





Ledge ceiling concealed duct type





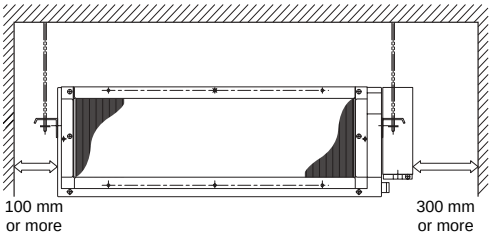
NOTE

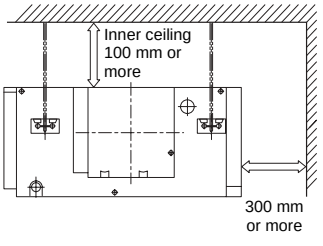
- Opening area of the return grille should be larger than one of the return port of the indoor unit.

Restriction to installation

Installation space

- As shown in the figure, keep space around the indoor unit.





5 AIR DUCTING WORK

Static pressure characteristics of each model

Fig. 1 RAS-M10GDCV-E, RAS-M10GDV-E

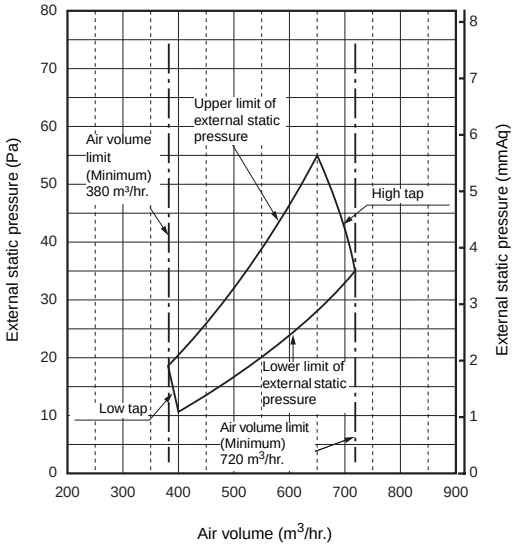


Fig. 2 RAS-M13GDCV-E, RAS-M13GDV-E

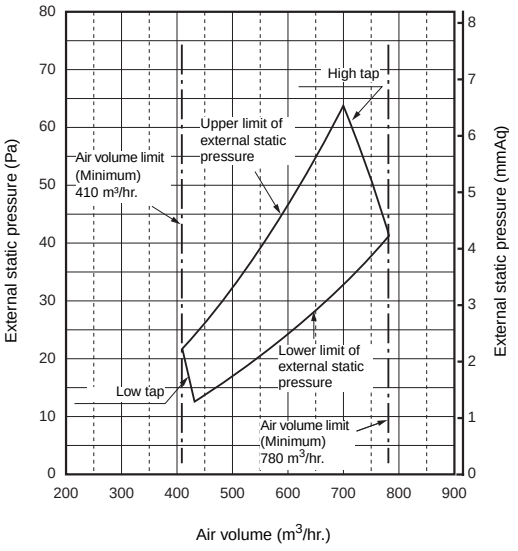
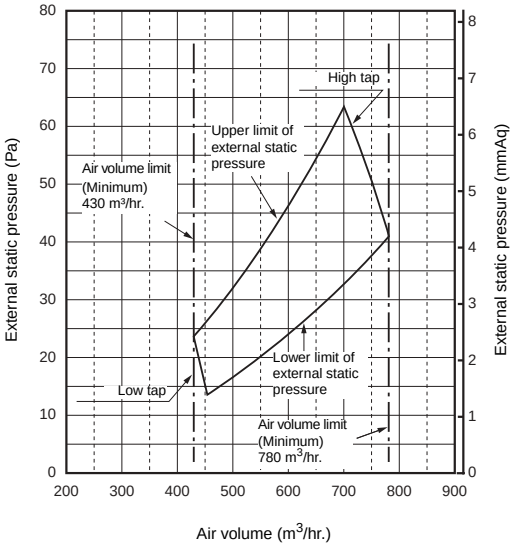


Fig. 3 RAS-M16GDCV-E, RAS-M16GDV-E



Model RAS-		M10GDCV-E M10GDV-E	M13GDCV-E M13GDV-E	M16GDCV-E M16GDV-E
Max. capacity point	Air volume	650	700	700
	Static pressure	54.9 (5.6)	63.7 (6.5)	63.7 (6.5)
Max. air volume	Air volume	720	780	780
	Static pressure	35.3 (3.6)	41.2 (4.2)	41.2 (4.2)
Min. capacity point	Air volume	400	430	450
	Static pressure	10.8 (1.1)	12.7 (1.3)	13.7 (1.4)
Min. air volume	Air volume	380	410	430
	Static pressure	18.6 (1.9)	21.6 (2.2)	23.5 (2.4)

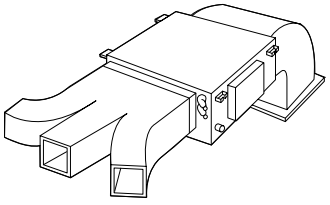
Unit for static pressure: Pa (mmAq)
Unit for air volume: m³/hr.

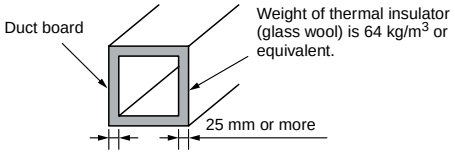
Installation reference

The air supply ducting work is classified into two ways, one is branched by the square ducts, and the other is branched by the round ducts. (Be sure to divide the air supply duct into three or more branches.)

Square duct

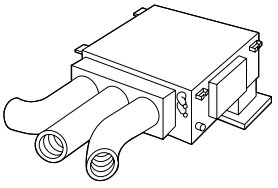
In case of using the square duct, apply the thermal insulator of thickness by 25 mm or more to the duct board. For the thermal insulator, use high-density glass wool of weight by 64kg/m^3.

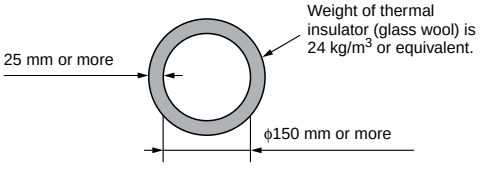




Round duct

In case of using the round duct, use the thermal insulator of thickness by 25 mm or more and inner diameter by 150 mm or more to the duct board. (If the inner diameter is not enough, resistance generates, as the result, air does not flow smoothly and loss of the static pressure increases.) For the thermal insulator, use high-density glass wool of weight by 24 kg/m^3 or equivalent.





Connecting method of the duct

1. Supply air side

1. Using 6 screws, mount the flange to the supply air port of the indoor unit. (Fig. 1)
2. Make the square duct according to inner dimension of the flange. (A x B)
   Use a glass wool board with inside/outside finishing by 25 mm-thickness and 64 kg/m^3-density.
3. Connect the flange and each type of duct. (Fig. 2)

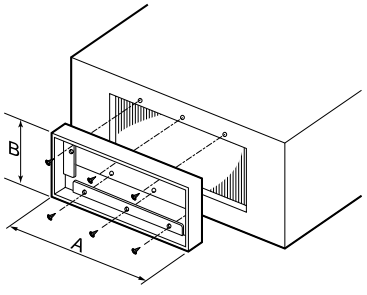


Fig. 1

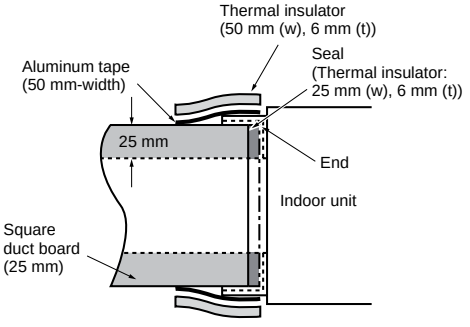


Fig. 2

CAUTION

Incomplete thermal insulation of the supply air flange and sealing may occur dewing resulted in falling of water drop.

Square duct

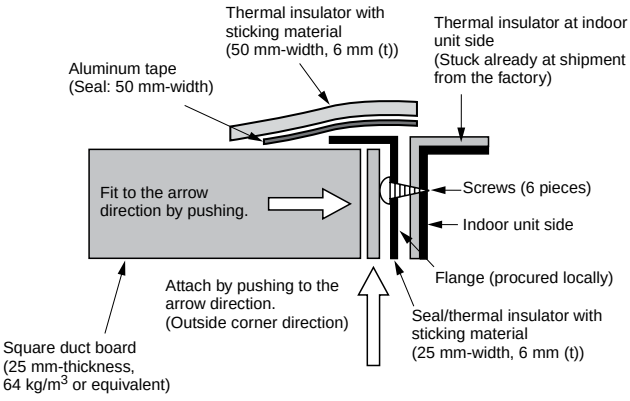


Fig. 2 (a)

Round duct

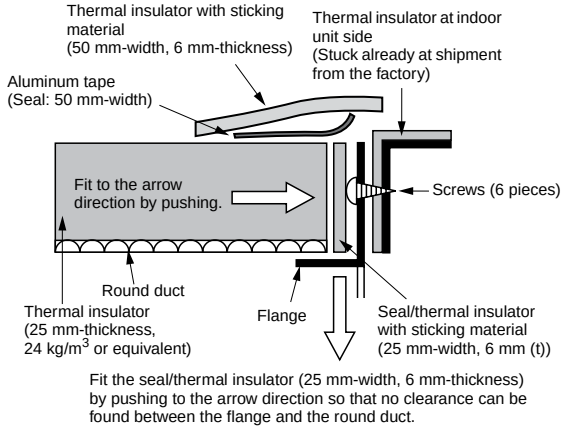


Fig. 2 (b)

2. Return air side

Caution for Safety

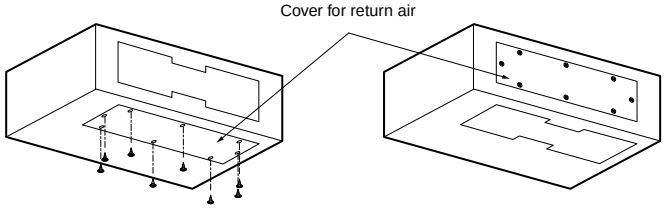
When you do not connect the duct to the return air side (using steel and others), apply a protective measures so that your hands or fingers do not directly touch with the motor or other electric parts.

2-1. Return air from rear side

1. Follow the procedure same as that for the supply air side.
   Flange mounting → Square duct making → Connecting work

2-2. Return air from lower side

1. Remove the cover for return air at the lower side of the indoor unit, and attach the cover to the opening port at the rear side of the indoor unit.



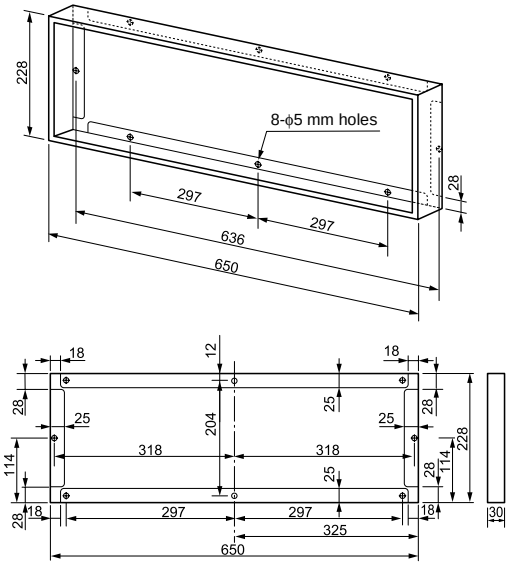
2. Mount the flange to the place from where the cover for return air was removed.
3. Mount the square duct.
4. Arrange the flange and the square duct.

Points at installation work

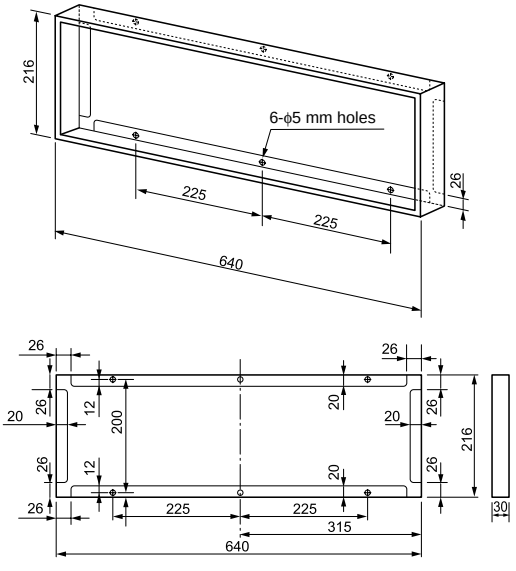
General cautions

1. Considering installation places of indoor unit and supply chamber, and structure of the building, determine the duct path.
2. In order to utilize the static pressure characteristics of the air supply in the indoor unit, design the duct branching by setting size up to the air supply chamber or by setting length to the first branch as long as possible (Min. 200 mm or longer) so that an even air volume can be obtained.
   Especially, when setting the branching point just after air supplying of the indoor unit, air concentrates at the center part and air is difficult to flow to the ducts at both sides.
3. Connect each connecting section surely, and apply sufficient thermal insulation.
   In this model which the duct is branched in the ceiling, compared with the general houses, the high temperature generates on the periphery in the cooling time (especially, at attic and etc.), temperature difference increases between the supply air and outside of the duct, and dewing may occur.
   Dewing on the surface of the thermal insulator covering exposure of the metal connecting section or leaking portion of the cooling air may cause a trouble such as falling of water drop.
4. Thermal insulation of screwing sections is necessary.
   Avoid dewing by applying thermal insulation to 6 screws which fix the duct flange of the air supply chamber.
   - For duct parts, the flexible branch duct (thermal insulation, 25 mm or more thickness) is recommended.
   - Adjust the duct length to 6 m or less even for straight pipe, and avoid sudden bending (part resistance is large.) if bending.

Return air flange



Supply air flange



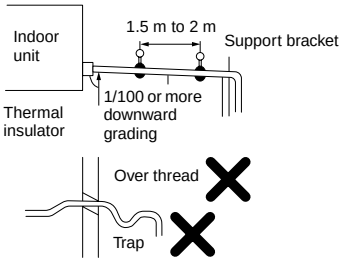
6 DRAIN PIPING WORK

Piping material

- For laying pipes under ground, use hard vinyl chloride pipe. (Inner diam. 20 or 25 mm)

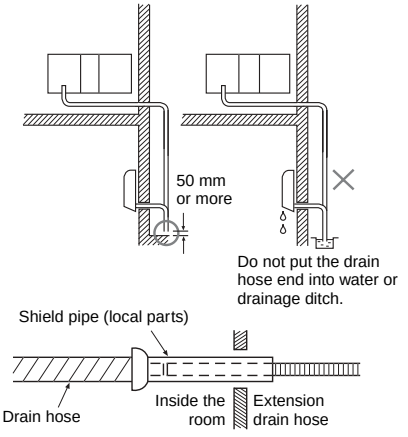
Piping and cautions

- Set drain side of pipe at downward slope. (1/100 or more)
- Be sure to apply thermal insulation (foaming polyethylene, 10 mm-thickness or more) for pipes passing through the room.
- Adhere the connecting sections with vinyl chloride agent surely so that no water leakage is caused.
- Support the piping with hanging bracket so that force is not applied to connection sections of pipe and pipe is not waved with connected pipes.
- As shown in the figure, set the collective piping such as the ceiling duct so that waste water does not back up from the main pipe.



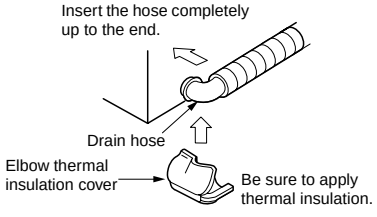
NOTE

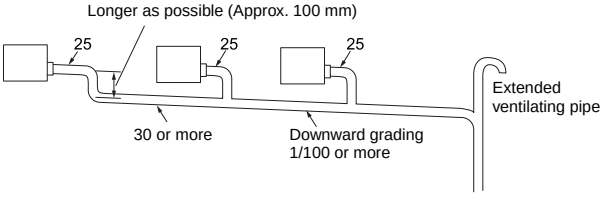
- Do not make slack or trap at halfway of pipes.
- Set pipes so that the end of drain pipe is not dipped in water, and also keep space with 50 mm or more to the ground.
- After piping work, check water drains smoothly.
- Hole should be made at a slight downward slant to the outdoor side.
- When connecting extension drain hose, insulate the connecting part of extension drain hose with shield pipe.



Connection of the drain hose

- Insert the drain hose completely into the connecting port of the drain pan.
- Apply thermal insulation surely to the drain hose with elbow thermal insulation cover.





Drain-up kit (Option)

For drain-up kit installation.
Refer to the installation manual supplied with the drain-up kit.

7 REFRIGERANT PIPING

Refrigerant Piping

1. If the outdoor units are to be mounted on a wall, make sure that the platform supporting is sufficiently strong. The platform should be designed and manufactured to maintain its strength over a long period of time, and sufficient consideration should be given to ensuring that the outdoor unit will not fall.
2. **Use copper pipe with 0.8 mm or more thickness.**
3. Flare nut and flare works are also different from those of the conventional refrigerant. Take out the flare nut attached to the main unit of the air conditioner, and use it.

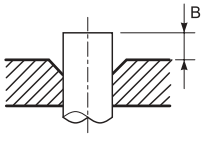
CAUTION

IMPORTANT 4 POINTS FOR PIPING WORK
1. Take away dust and moisture from the inside of the connecting pipes.
2. Tight connection (between pipes and unit)
3. Evacuate the air in the connecting pipes using VACUUM PUMP.
4. Check the gas leakage (connected points).

Flaring

Insert a flare nut into the pipe, and flare the pipe. As the flaring sizes of R410A differ from those of refrigerant R22, the flare tools newly manufactured for 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)**



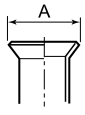
Rigid (Clutch type)

Outer diameter of copper pipe	R410A tool used		Conventional tool used	
	R410A	R22	R410A	R22
6.35	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0
9.52	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0
12.7	0 to 0.5	(Same as left)	1.0 to 1.5	0.5 to 1.0

Imperial (Wing nut type)

Outer diameter of copper pipe	R410A	R22
6.35	1.5 to 2.0	1.0 to 1.5
9.52	1.5 to 2.0	1.0 to 1.5
12.7	2.0 to 2.5	1.5 to 2.0

- **Flaring size: A (Unit: mm)**



Outer diameter of copper pipe	$A^{+0}_{-0.4}$	
	R410A	R22
6.35	9.1	9.0
9.52	13.2	13.0
12.7	16.6	16.2

* In the case of flaring for R410A with the conventional flare tool, pull out it approx. 0.5 mm more than that for R22 to adjust to the specified flare size. The copper pipe gauge is useful for adjusting projection margin size.

Tightening connection

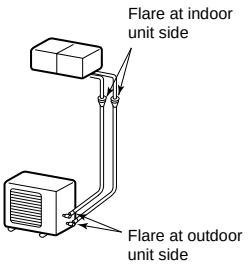
Align the centers of the connecting pipes and tighten the flare nut as far as possible with your fingers. Then tighten the nut with a spanner and torque wrench as shown in the figure.

CAUTION

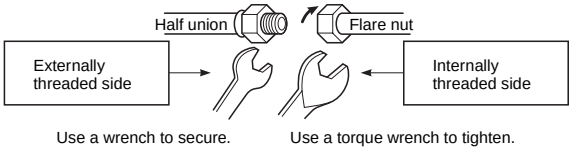
- Do not apply excess torque. Otherwise, the nut may crack depending on the conditions.

(Unit: N·m)

Outer diameter of copper pipe	Tightening torque
6.35 mm (diam.)	14 to 18 (1.4 to 1.8 kgf·m)
9.52 mm (diam.)	33 to 42 (3.3 to 4.2 kgf·m)
12.7 mm (diam.)	50 to 62 (5.0 to 6.2 kgf·m)



- **Tightening torque for connection of flare pipe**
  Pressure of R410A becomes higher than that of R22. (Approx. 1.6 times) Therefore, using a torque wrench, tighten firmly the flare pipe connecting sections which connect the indoor and outdoor units up to the specified tightening torque. Incorrect connections may cause not only a gas leakage, but also a trouble of the refrigeration cycle.



8 EVACUATING

EVACUATION
Evacuate the air in the connecting pipes and in the indoor unit using vacuum pump.
Do not use the refrigerant in the outdoor unit. For details, see the manual of vacuum pump.

Use a vacuum pump

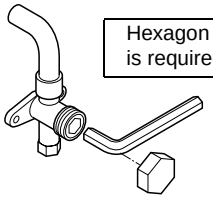
Be sure to use a vacuum pump with counter-flow prevention function so that inside oil of the pump does not flow backward into pipes of the air conditioner when the pump stops.

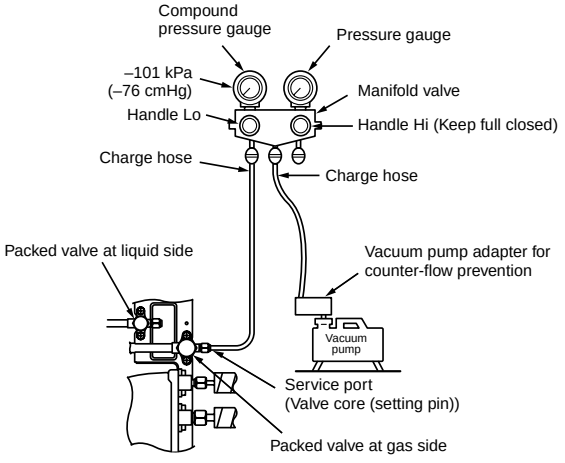
1. Connect the charge hose from the manifold valve to the service port of the gas side packed valve.
2. Connect the charge hose to the port of vacuum pump.
3. Open fully the low pressure side handle of the gauge manifold valve.
4. Operate the vacuum pump to start for evacuating.
   Perform evacuating for about 35 minutes if the piping length is total 70 meters.
   (25 minutes for total 50 meters)
   (assuming a pump capacity of 27 liters per minute.)
   Then confirm that the compound pressure gauge reading is –101 kPa (–76 cmHg).
5. Close the low pressure side valve handle of gauge manifold.
6. Open fully the valve stem of the packed valves (both sides of Gas and Liquid).
7. Remove the charging hose from the service port.
8. Securely tighten the caps on the packed valves.

Packed valve handling precautions

- Open the valve stem all the way out; do not try to open it beyond the stopper.
- Securely tighten the valve stem cap in torque as follows:

Gas side (12.7 mm (diam.))	50 to 62 N·m (5.0 to 6.2 kgf·m)
Gas side (9.52 mm (diam.))	33 to 42 N·m (3.3 to 4.2 kgf·m)
Liquid side (6.35 mm (diam.))	14 to 18 N·m (1.4 to 1.8 kgf·m)
Service port	14 to 18 N·m (1.4 to 1.8 kgf·m)





9 ELECTRICAL WORK

For the air conditioner that has no power cord.

NOTE

For selection and connection method of the power supply cords, refer to the details in the Installation Manual of the outdoor unit.

CAUTION

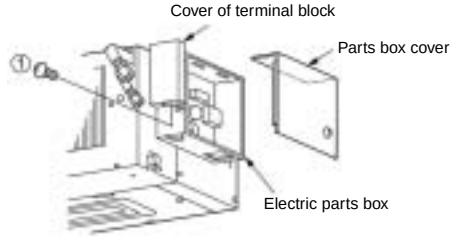
- If incorrect/incomplete wiring is carried out, it will cause an electrical fire or smoke.
- Prepare the power supply for exclusive use with the air conditioner.
- Be sure to use the cord clamps specified positions with attached to the product.
- Do not damage or scratch the conductive core and inner insulator of power and inter-connecting cables when peeling them.
- Be sure to comply with local cords on running the wire from outdoor unit to indoor unit (size of wire and wiring method etc.)
- Use the power cord and Inter-connecting cable with specified thickness, specified type, and protective devices specified.

How to wire

1. Connect the connecting cable to the terminal as identified with their respective matched numbers on the terminal block of indoor and outdoor unit.
   1.0 mm^2 (H07 RN-F or 60245 IEC 66)
2. When connecting the connecting cable to the outdoor unit terminal, prevent water coming in the outdoor unit.
3. Insulate the unused cords (conductors) stripped the sheath of connecting cable with PVC tape.
   Process them so that they do not touch any electrical or metal parts.
4. For inter-unit wiring, do not use a cut wire jointed to another on the way.

Cabling

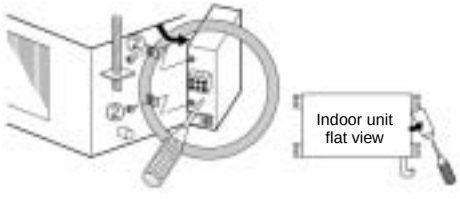
1. As shown in the figure, remove a screw ① and then remove cover of the terminal block.



2. Remove two screws ②, and pull the parts box while lifting up it. If an incomplete connection is done, a contact failure may be caused and resulted in a danger of an electric shock and so on.

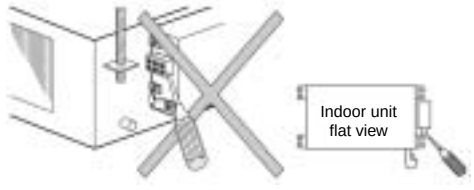
Work under condition that the parts box is loosened:

Correct way

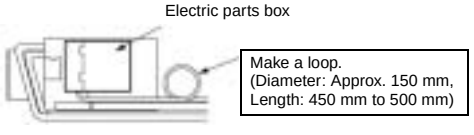


Work under condition that the parts box is fixed:

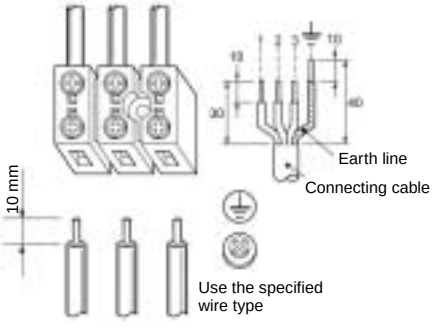
Incorrect way



3. Strip wire ends (10 mm).
4. Match wire colors with terminal numbers on indoor and outdoor units' terminal blocks and firmly screw wires to the corresponding terminals.
5. Connect the ground wires to the corresponding terminals.
6. Fix the cable with cord clamp.
7. Fix cover of the parts box and the terminal block surely with the fixing screws.



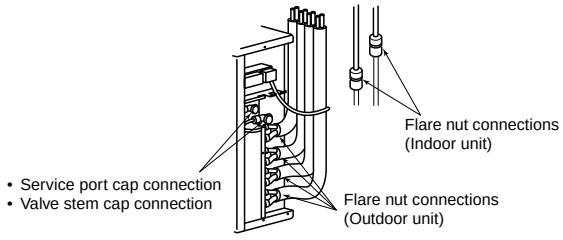
Make a loop on the cable for margin of the length so that the electric parts box can be taken out during servicing.



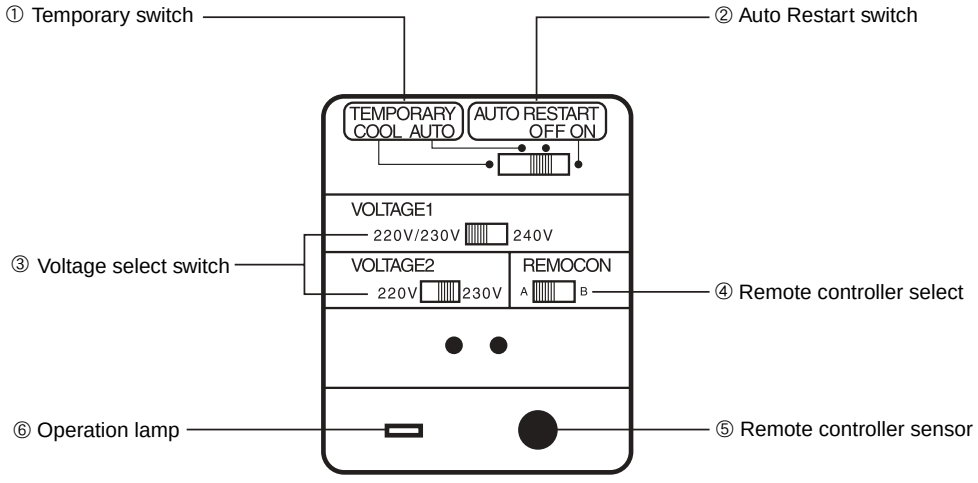
Check and Test Operation

Be sure to test the piping connections for gas leaking.

- Check the flare nut connections, valve stem cap connections and service port cap connections for gas leak with a leak detector or soap water.



Setup of selector switch on switch panel



① Temporary switch
For an temporary operation when the remote controller is not found or in a trial operation, set the TEMPORARY switch to COOL or AUTO side.
If setting the switch to COOL side, the cooling operation can be confirmed even while the thermostat is OFF when temperature of the return air is low.

② Auto Restart switch
The Auto Restart switch is useful for restarting the system when the outside power supply is unstable by an instantaneous power failure, etc. Do not use this switch when the unit itself is in trouble.
For usual operation by the remote controller, set this switch to OFF. (Otherwise, an operation by the remote controller is unavailable.)

③ Using VOLTAGE1 and VOLTAGE2 switches, select an appropriate voltage according to supplied voltage. Voltage, 220V, 230V, or 240V can be selected.

④ REMOCON priority select switch
When the indoor units are nearly set, set both indoor unit and remote controller to A or B for selecting the priority.

⑤ Remote controller sensor
The remote controller sensor can receive a signal at position approx. 7 m off.

⑥ Operation lamp
This lamp goes on during operation, and goes off during stop time, respectively.

10 INSTALLATION/SERVICING TOOLS

Tools

Tools	Applicable to R22 model	
Gauge manifold	✕	
Charge hose	✕	
Electronic balance for refrigerant charging	☐	
Torque wrench (nominal diam. 1/2, 5/8)	✕	
Flare tool (clutch type)	☐	
Gauge for projection adjustment	—	—
Vacuum pump adapter	☐	
Gas leakage detector	✕	

✕ : Newly prepared (They are special requirements for R410A, separated from those for R22.)
☐ : Existing tools are available.

For the details of the tools, refer to the Installation manual of the outdoor unit.

TOSHIBA CARRIER CORPORATION

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