TOSHIBA
Leading Innovation

OUTDOOR UNIT INSTALLATION MANUAL

AIR CONDITIONER (MULTI-SPLIT TYPE)

For general public use

Outdoor Unit
RAS-4M23SAV-E
RAS-4M23SACV-E
RAS-3M26GAV-E1
RAS-4M27GAV-E1
RAS-4M27GACV-E

ENGLISH EN

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ENGLISH

* Please read this installation manual carefully before installing the air conditioner.

IMPORTANT NOTICE

- For details on how to install the indoor units, refer to the installation manual accompanying the indoor units.

1 PRECAUTIONS FOR SAFETY

Be sure to read this installation manual carefully before installing.
The supplied CD-ROM contains the installation manual translated into many languages.
Recommend to the owner to perform maintenance periodically when using over long periods of time.

Be sure to follow the precautions provided here to avoid safety risks. The symbols and their meanings are shown below.	
⚠ DANGER	It indicates that incorrect use of this unit can result in a high possibility of severe injury(*1) or death.
⚠ WARNING	It indicates that incorrect use of this unit may cause severe injury or death.
⚠ CAUTION	It indicates that incorrect use of this unit may cause personal injury(*2), or property damage(*3).

*1: A severe injury refers to blindness, injury, burns (hot or cold), electrical shock, bone fracture, or poisoning that leaves aftereffects and requires hospitalization or extended out-patient treatment.
*2: Personal injury means a slight accident, burn, or electrical shock which does not require admission or repeated hospital treatment.
*3: Property damage means greater damage which affects assets or resources.

For general public use

• RAS-4M23SAV-E, RAS-4M23SACV-E
Power supply cord of parts of appliance for outdoor use shall be at least polychloroprene sheathed flexible cord (design H07RN-F) or cord designation 60245 IEC66 (1.5 mm^2 or more). (Shall be installed in accordance with national wiring regulations.)
• RAS-3M26GAV-E1, RAS-4M27GAV-E1, RAS-4M27GACV-E
Power supply cord of parts of appliance for outdoor use shall be at least polychloroprene sheathed flexible cord (design H07RN-F) or cord designation 60245 IEC66 (2.5 mm^2 or more). (Shall be installed in accordance with national wiring regulations.)

⚠ CAUTION

New refrigerant air conditioner installation
THIS AIR CONDITIONER USES THE NEW HFC REFRIGERANT (R410A), WHICH DOES NOT DESTROY THE OZONE LAYER.
R410A refrigerant is apt to be affected by impurities such as water, oxidizing membranes, and oils because the pressure of R410A refrigerant is approx. 1.6 times of refrigerant R22. As well as the adoption of this new refrigerant, refrigerating machine oil has also been changed. Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigerating machine oil does not enter the refrigeration cycle of a new-refrigerant air conditioner. To avoid mixing refrigerant and refrigerating machine oil, the sizes of charging port connecting sections on the main unit are different from those for the conventional refrigerant, and different size tools are also required. For connecting pipes, use new and clean piping materials with highpressure withstand capabilities, designed for R410A only, and ensure that water or dust does not enter. Moreover, do not use any existing piping as its pressure withstand may be insufficient and may contain impurities.

⚠ DANGER

- FOR USE BY QUALIFIED PERSONS ONLY.
- MEANS FOR DISCONNECTION FROM THE SUPPLY HAVING A CONTACT SEPARATION OF AT LEAST 3 mm IN ALL POLES MUST BE INCORPORATED IN THE FIXED WIRING.
- TURN OFF MAIN POWER SUPPLY 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 WRONGLY, ELECTRIC PARTS MAY BE DAMAGED.
- CHECK THE EARTH WIRE THAT IT IS NOT BROKEN OR DISCONNECTED BEFORE INSTALLATION.
- DO NOT INSTALL NEAR CONCENTRATIONS OF COMBUSTIBLE GAS OR GAS VAPORS. FAILURE TO FOLLOW THIS INSTRUCTION CAN RESULT IN FIRE OR EXPLOSION.
- TO PREVENT OVERHEATING THE INDOOR UNIT AND CAUSING A FIRE HAZARD, PLACE THE UNIT WELL AWAY (MORE THAN 2 M) FROM HEAT SOURCES SUCH AS RADIATORS, HEATERS, FURNACE, STOVES, ETC.

- WHEN MOVING THE AIR CONDITIONER FOR INSTALLING IT IN ANOTHER PLACE AGAIN, BE VERY CAREFUL NOT TO GET THE SPECIFIED REFRIGERANT (R410A) WITH ANY OTHER GASEOUS BODY INTO THE REFRIGERATION CYCLE. IF AIR OR ANY OTHER GAS IS MIXED IN THE REFRIGERANT, THE GAS PRESSURE IN THE REFRIGERATION CYCLE BECOMES ABNORMALLY HIGH AND IT RESULTINGLY CAUSES BURST OF THE PIPE AND INJURIES ON PERSONS.
- IN THE EVENT THAT THE REFRIGERANT GAS LEAKS OUT OF THE PIPE DURING THE INSTALLATION WORK, IMMEDIATELY LET FRESH AIR INTO THE ROOM. IF THE REFRIGERANT GAS IS HEATED BY FIRE OR SOMETHING ELSE, IT CAUSES GENERATION OF POISONOUS GAS.
- WHEN INSTALLING OR RE-INSTALLING THE AIR CONDITIONER, DO NOT INJECT AIR OR OTHER SUBSTANCES BESIDES THE DESIGNATED REFRIGERANT “R410A” INTO THE REFRIGERATING CYCLE. IF AIR OR OTHER SUBSTANCES ARE MIXED, AN ABNORMAL PRESSURE CAN OCCUR IN THE REFRIGERATING CYCLE, AND THIS CAN CAUSE AN INJURY DUE TO A PIPE RUPTURE.

⚠ WARNING

- Installation work must be requested from the supplying retail dealership or professional vendors. Self-installation may cause water leakage, electrical shock, or fire as a result of improper installation.
- Specified tools and pipe parts for model R410A are required, and installation work must be done in accordance with the manual. HFC type refrigerant R410A has 1.6 times more pressure than that of conventional refrigerant (R22). Use the specified pipe parts, and ensure correct installation, otherwise damage and/or injury may be caused. At the same time, water leakage, electrical shock, and fire may occur.
- Be sure to install the unit in a place which can sufficiently bear its weight. If the load bearing of the unit is not enough, or installation of the unit is improper, the unit may fall and result in injury.
- Electrical work must be performed by a qualified electrical engineer in accordance with the code governing such installation work, internal wiring regulations, and the manual. A dedicated circuit and the rated voltage must be used. Insufficient power supply or improper installation may cause electrical shock or fire.
- Use a cabtyre cable to connect wires in the indoor/outdoor units. Midway connection, stranded wire, and single-wire connections are not allowed. Improper connection or fixing may cause a fire.
- Wiring between the indoor unit and outdoor units must be well shaped so that the cover can be firmly placed. Improper cover installation may cause increased heat, fire, or electrical shock at the terminal area.
- Be sure to use only approved accessories or the specified parts. Failure to do so may cause the unit to fall, water leakage, fire or electrical shock.
- After the installation work, ensure that there is no leakage of refrigerant gas. If the refrigerant gas leaks out of the pipe into the room and is heated by fire or something else from a fanheater, stove or gas range, it causes generation of poisonous gas.
- Make sure the equipment is properly earthed. Do not connect the earth wire to a gas pipe, water pipe, lightning conductor, or telephone earth wire. Improper earth work may be the cause of electrical shock.
- Do not install the unit where flammable gas may leak. If there is any gas leakage or accumulation around the unit, it can cause a fire.
- Do not select a location for installation where there may be excessive water or humidity, such as a bathroom. Deterioration of insulation may cause electrical shock or fire.
- Installation work must be performed following the instructions in this installation manual. Improper installation may cause water leakage, electrical shock or fire. Check the following items before operating the unit.
  - Be sure that the pipe connection is well placed and there are no leaks.
  - Check that the service valve is open. If the service valve is closed, it may cause overpressure and result in compressor damage. At the same time, if there is a leak in the connection part, it may cause air suction and overpressure, resulting in damage to the unit or injury.
- In a pump-down operation, be sure to stop the compressor unit before removing the refrigerant pipe. If removing the refrigerant pipe while the compressor is operating with the service valve opened, it may cause air suction and overpressure, resulting in damage to the unit or injury.
- Do not modify the power cable, connect the cable midway, or use a multiple outlet extension cable. Doing so may cause contact failure, insulation failure, or excess current, resulting in fire or electrical shock.
- If you detect any damage, do not install the unit. Contact your supplying dealer immediately.
- Never modify this unit by removing any of the safety guards or bypassing any of the safety interlock switches.

⚠ CAUTION

- Please read this installation manual carefully before installing the unit. It contains further important instructions for proper installation.
- Exposure of unit to water or other moisture before installation could result in electric shock. 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. Do not install in a place that can amplify the noise level of the unit or where noise and discharged air might disturb neighbors.
- This appliance must be connected to the main power supply by means of a circuit breaker depending on the place where the unit is installed. Failure to do so may cause electrical shock.
- Follow the instructions in this installation manual to arrange the drain pipe for proper drainage from the unit. Ensure that drained water is discharged. Improper drainage can result in water leakage, causing water damage to furniture.
- Tighten the flare nut with a torque wrench using the prescribed method. Do not apply excess torque. Otherwise, the nut may crack after a long period of usage and it may cause the leakage of refrigerant.
- Wear gloves (heavy gloves such as cotton gloves) for installation work. Failure to do so may cause personal injury when handling parts with sharp edges.
- Do not touch the air intake section or the aluminum fins of the outdoor unit. It may cause injury.
- Do not install the outdoor unit in a place which can be a nest for small animals. Small animals could enter and contact internal electrical parts, causing a failure or fire.
- Request the user to keep the place around the unit tidy and clean.
- Make sure to conduct a trial operation after the installation work, and explain how to use and maintain the unit to the customer in accordance with the manual. Ask the customer to keep the operation manual along with the installation manual.

REQUIREMENT OF REPORT TO THE LOCAL POWER SUPPLIER

Please make absolutely sure that the installation of this appliance is reported to the local power supplier before installation. If you experience any problems or if the installation is not accepted by the supplier, the service agency will take adequate countermeasures.

2 OPTIONAL PARTS, ACCESORIES AND TOOLS

Optional Installation Parts

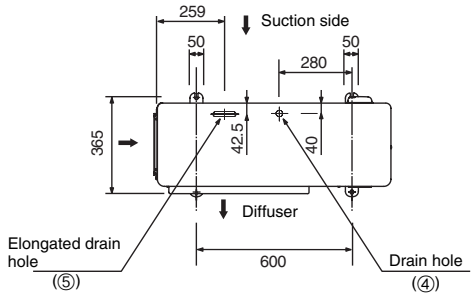
Part name	Specifications			Q'ty
Refrigerant piping*1	Indoor unit name (Abbreviation)	Liquid side (Outer diameter)	Gas side (Outer diameter)	1 ea.
	07, 10, 13	6.35 mm	9.52 mm	
	16, 18	6.35 mm	12.7 mm	
Putty, PVC tapes				1 ea.

*1 Refrigerant piping covered with insulating material (polyethylene form, 6 mm thick).

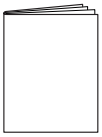
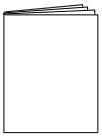
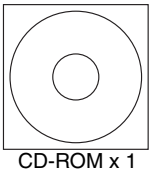
* In case the piping is installed above the ceiling, it shall be covered with thicker insulating material (polyethylene form, 10 mm thick).

Attachment bolt arrangement of outdoor unit

- Secure the outdoor unit with the attachment bolts and nuts if the unit is likely to be exposed to a strong wind.
- Use 8 mm or 10 mm anchor bolts and nuts.
- If it is necessary to drain the defrost water, attach drain nipple to the base plate of the outdoor unit before installing it.



Accessory and Installation Parts

Part No.	Part name (Q'ty)	Part No.	Part name (Q'ty)
①	 Outdoor unit installation manual x 1	④	 Drain nipple x 1 (Heat pump models only)
②	 Specifications x 1	⑤	 Water-proof rubber cap x 1 (Heat pump models only)
③	 CD-ROM x 1 (Outdoor unit installation manual, Specifications)		

Others

Name
Important information and warning
B/W strips (Energy efficiency labels)

Installation/Service Tools

Changes in the product and components

In air conditioners using R410A, in order to prevent any other refrigerant from being accidentally charged, the service port diameter size of the outdoor unit control valve (3 way valve) has been changed. (1/2 UNF 20 threads per inch)

- In order to increase the pressure resisting strength of the refrigerant piping, flare processing diameter and opposing flare nuts sizes have been changed. (for copper pipes with nominal dimensions 1/2 and 5/8)

New tools for R410A

New tools for R410A	Applicable to R22 model		Changes
Gauge manifold	×		As the working pressure is high, it is impossible to measure the working pressure using conventional gauges. In order to prevent any other refrigerant from being charged, the port diameters have been changed.
Charge hose	×		In order to increase pressure resisting strength, hose materials and port sizes have been changed (to 1/2 UNF 20 threads per inch). When purchasing a charge hose, be sure to confirm the port size.
Electronic balance for refrigerant charging	○		As working pressure is high and gasification speed is fast, it is difficult to read the indicated value by means of charging cylinder, as air bubbles occur.
Torque wrench (nominal dia. 1/2, 5/8)	×		The size of opposing flare nuts have been increased. Incidentally, a common wrench is used for nominal diameters 1/4 and 3/8.
Flare tool (clutch type)	○		By increasing the clamp bar's receiving hole size, strength of spring in the tool has been improved.
Gauge for projection adjustment	—		Used when flare is made by using conventional flare tool.
Vacuum pump adapter	○		Connected to conventional vacuum pump. It is necessary to use an adapter to prevent vacuum pump oil from flowing back into the charge hose. The charge hose connecting part has two ports — one is for conventional refrigerant (7/16 UNF 20 threads per inch) and the other is for R410A. If the vacuum pump oil (mineral) mixes with R410A a sludge may occur and damage the equipment.
Gas leakage detector	×		Exclusive for HFC refrigerant.

- Incidentally, the "refrigerant cylinder" comes with the refrigerant designation (R410A) and protector coating in the U.S's ARI specified rose color (ARI color code: PMS 507).
- Also, the "charge port and packing for refrigerant cylinder" requires 1/2 UNF 20 threads per inch corresponding to the charge hose's port size.

3 WHICH MODELS CAN BE COMBINED

Table of models that can be connected

○: Can be connected.
×: Cannot be connected.

			High Wall Type														Slim Duct Type			4-way Air Discharge Cassette Type		
			With air purifying unit											Without air purifying unit								
			DAISEIKAI 3			DAISEIKAI 5								DFS 1								
Heat pump	Indoor unit specification	Class	10	13	16	10	13	16	18	10	13	16	18	07	10	13	16	10	13	16	10	13	16
		Model name	RAS-B10SKVP-E	RAS-B13SKVP-E	RAS-B16SKVP-E	RAS-M10PKVP-E	RAS-M13PKVP-E	RAS-M16PKVP-E	RAS-M18PKVP-E	RAS-M10PKVP-ND	RAS-M13PKVP-ND	RAS-M16PKVP-ND	RAS-M18PKVP-ND	RAS-M07SKV-E	RAS-M10SKV-E	RAS-M13SKV-E	RAS-M16SKV-E	RAS-M10GDV-E	RAS-M13GDV-E	RAS-M16GDV-E	RAS-M10SMUV-E	RAS-M13SMUV-E	RAS-M16SMUV-E
	Outdoor unit for combination	RAS-4M23SAV-E	○	○	○	○	○	○	×	○	○	○	×	×	○	○	○	○	○	○	○	○	○
		RAS-3M26GAV-E1	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
		RAS-4M27GAV-E1	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

			High Wall Type														Slim Duct Type			4-way Air Discharge Cassette Type		
			With air purifying unit											Without air purifying unit								
			DAISEIKAI 3			DAISEIKAI 5								DFS 1								
Cooling-only	Indoor unit specification	Class	10	13	16	10	13	16	18	10	13	16	18	07	10	13	16	10	13	16	10	13	16
		Model name	RAS-M10SKCVP-E	RAS-M13SKCVP-E	RAS-M16SKCVP-E										RAS-M10SKCV-E	RAS-M13SKCV-E	RAS-M16SKCV-E	RAS-M10GDCV-E	RAS-M13GDCV-E	RAS-M16GDCV-E	RAS-M10SMUCV-E	RAS-M13SMUCV-E	RAS-M16SMUCV-E
	Outdoor unit for combination	RAS-4M23SACV-E	○	○	○										○	○	○	○	○	○	○	○	○
		RAS-4M27GACV-E	○	○	○										○	○	○	○	○	○	○	○	○

NOTES

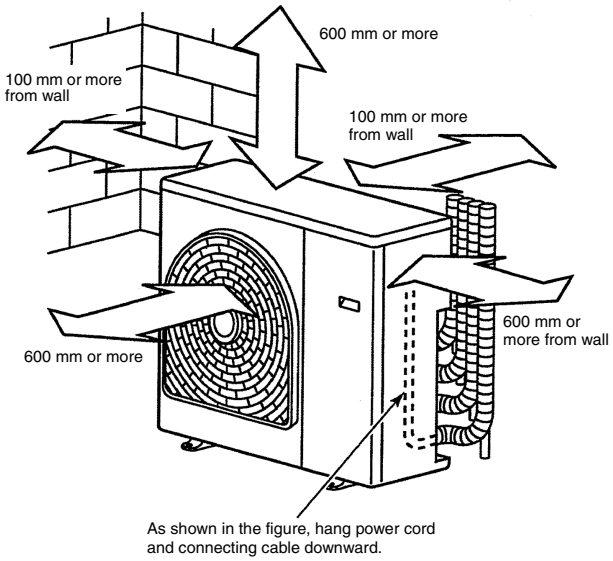
A 1-room connection is not an option for the indoor units (you cannot connect only one indoor unit). A 2-room or more connection must always be used for the indoor units (you must connect at least two indoor units).

4 INSTALLATION OF OUTDOOR UNIT

Installation Location

- A place which provides enough space around the outdoor unit as shown in the diagram.
- A place which can bear the weight of the outdoor unit and does not allow an increase in noise level and vibration.
- A place where the operation noise and discharged air do not disturb neighbors.
- A place which is not exposed to a strong wind.
- A place free of combustible gases.
- A place which does not block a passageway.
- When the outdoor unit is to be installed in an elevated position, be sure to secure its feet.
- Piping connections to the outdoor unit should be arranged in the sequence A, then B, C, D, starting from the bottom. (For each piping connection, the gas pipe is on the bottom and the liquid pipe on top.) Please refer to the descriptions on page 10.
- When multiple indoor units are to be connected to the outdoor unit, make sure the ends of the pipes and wires from each indoor unit are connected to the outdoor unit correctly. (Problems caused by indoor units being connected to the outdoor unit incorrectly are very common in multiple-unit installations.)
- The length and height differences of the connecting pipes between the indoor and outdoor units must be within the ranges indicated below.

NOTE: For installation, at least 3 sides should be kept away from obstacles (walls).



Allowable piping length and height difference

Item / Outdoor unit	Piping length				Height difference
	Minimum for 1 unit	Maximum for 1 unit	Maximum for total of 3 units	Maximum for total of 4 units	
RAS-4M23SAV-E	2 m	25 m	—	60 m*1	15 m
RAS-4M23SACV-E					
RAS-3M26GAV-E1			50 m	—	
RAS-4M27GAV-E1			—	70 m*2	
RAS-4M27GACV-E					

* The outdoor unit should not be installed with one indoor unit only. Be sure the (outdoor) unit is installed with at least two indoor units.

*1 If the total piping length for the 4M23 is 41 m or more, add an extra 20 g/m of refrigerant.

*2 If a 4-way air discharge cassette type is connected to the 4M27, the maximum piping length is 50 m.

- If the outdoor unit is to be mounted on a wall, make sure the platform supporting it is sturdy enough.
  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.
- When the outdoor unit is to be mounted high on a wall, take particular care to ensure that parts do not fall, and that the installer is protected.
- When doing installation work at ground level, it is usual to make wiring and pipe connections to the indoor units, first, and then to make connections to the outdoor unit.
  However, if outdoor work is difficult it is possible, instead, to make changes to the procedure.
  For example, by making adjustments to the wiring and piping lengths on the inside (rather than the outside).
- A place where the drain water does not cause any problems.

Precautions for Adding Refrigerant

- Use a scale having a precision with at least 10 g per index line when adding the refrigerant. Do not use a bathroom scale or similar instrument.
- Use liquid refrigerant when refilling the refrigerant. Since the refrigerant is in liquid form, it can fill quickly. Therefore, perform the filling operation carefully and insert the refrigerant gradually.

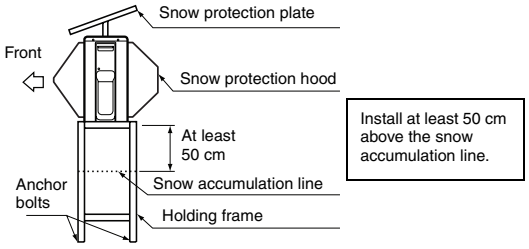
⚠ CAUTION

Install in rooms that are 8 m^3 or larger. If a leak of refrigerant gas occurs inside the room, an oxygen deficiency can occur.

Precautions about Installation in Regions with Snowfall and Cold Temperatures

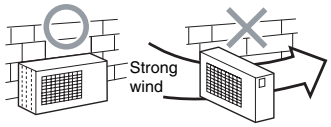
- Do not use the supplied drain nipple for draining water. Drain the water from all the drain holes directly.
- To protect the outdoor unit from snow accumulation, install a holding frame, and attach a snow protection hood and plate.

* Do not use a double-stacked design.



CAUTION

1. Install the outdoor unit in a location where there are no obstructions near its air intake or air outlet.
2. When the outdoor unit is installed in a place that is always exposed to strong winds like on the coast or on a high story of a building, secure the normal fan operation using a duct or a wind shield.
3. Especially in windy areas, install the unit to prevent the admission of wind.
4. Installation in the following places may result in trouble. Do not install the unit in such places.
   - A place full of machine oil.
   - A saline-place such as the coast.
   - A place full of sulfide gas.
   - A place where high-frequency waves are likely to be generated, such as from audio equipment, welders, and medical equipment.

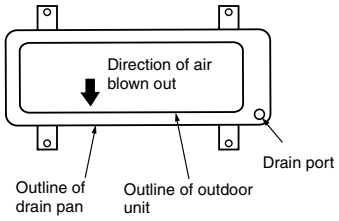


Draining the water (heat pump models only)

A hole is provided on the base plate of the outdoor unit to ensure that the defrost water produced during heating operations is drained off efficiently.

When the outdoor unit is to be installed in an area with a moderate climate

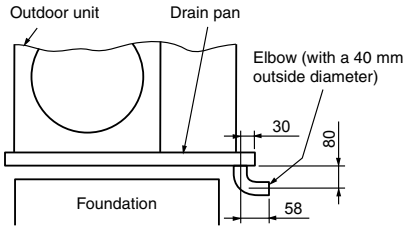
- Allow the water in the outdoor unit to drip onto the ground.
- If a centralized drain is required, which is the case when the unit is installed on a balcony or against a wall, follow the steps below.



- **When a drain pipe is to be used to drain the water**
  - Use a drain pan to catch the defrost water, and drain the pan.
  - Use a pipe made of hard PVC with a nominal diameter of 25 mm inside diameter for the drain pipe.

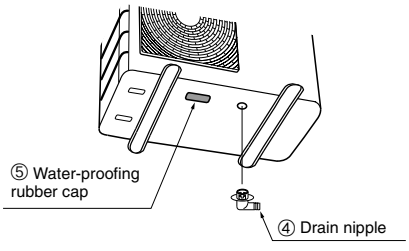
Tips when using a drain pan and elbow

- When using a drain pan, check its dimensions before deciding where the outdoor unit is to be installed.
- When the elbow supplied is to be used, be advised that its dimensions are as shown in the figure. Ensure that the foundation does not protrude beyond where the elbow and the part of the hose connected to it are to be installed.



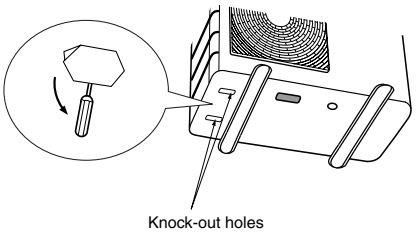
- **When draining off the water using a drain nipple**

  When a drain hose is to be used to drain the water, install the drain nipple and water-proofing rubber cap shown in the figure, and use a commercially available drain hose (16 mm inside diameter). Tightly seal the knock-out holes and screw/thread areas using a silicon adhesive, etc. to ensure that there is no water drippage. Under some conditions, condensation may form on the base plate and drip down. When all the defrost water is to be drained off using a centralized drain, use the drain pan.



When the outdoor unit is to be installed in an area with a snowy or cold climate

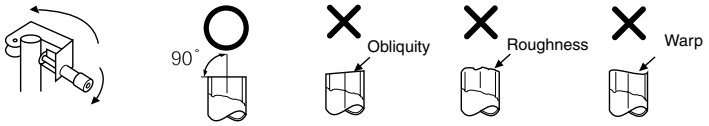
- Allow the water in the outdoor unit to drip onto the ground. (Do not use a hose to drain off the water.)
- The drain water may freeze inside the base plate at below freezing outside air temperatures so use a screwdriver or other tool to open the knock-out holes in the base plate.
  The water will drain more efficiently when the knock-out holes are opened. (Use a screwdriver or other tool to pull out the knock-out pieces.)



Refrigerant Piping Connection

Flaring

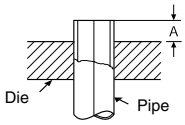
1. Cut the pipe with a pipe cutter.



2. Insert a flare nut into the pipe, and flare the pipe.
   - Projection margin in flaring: A (Unit: mm)

Rigid (Clutch type)

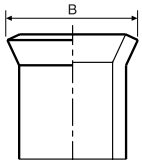
Outer diameter of copper pipe	R410A tool used	Conventional tool used
6.35	0 to 0.5	1.0 to 1.5
9.52	0 to 0.5	1.0 to 1.5
12.7	0 to 0.5	1.0 to 1.5



Imperial (Wing nut type)

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

3. Flaring size: B (Unit: mm)

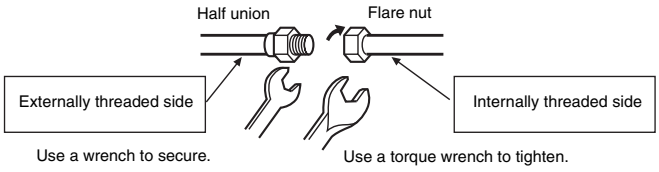


Outer diameter of copper pipe	$B^{+0}_{-0.4}$	
	R410A	R22
6.35	9.1	9.0
9.52	13.2	13.0
12.7	16.6	16.2

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

Tighten the connection

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

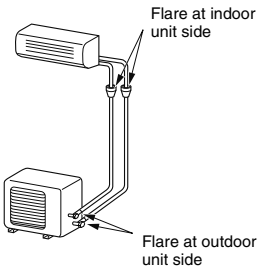


CAUTION

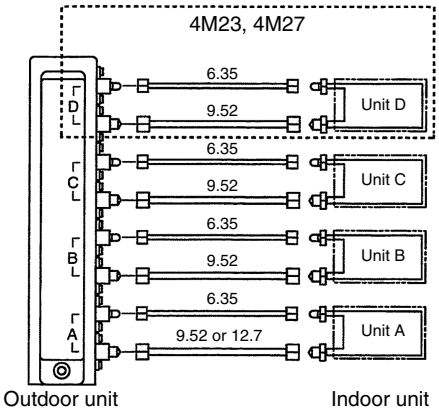
- Do not apply excessive force. Otherwise, the nut may break.

(Unit: N·m)

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



- Tightening torque for connection of flare pipe
  The pressure of R410A is higher than R22. (Approx. 1.6 times.) Therefore securely tighten the flare pipes which connect the outdoor unit and the indoor unit with the specified tightening torque using a torque wrench.
  If any flare pipe is incorrectly connected, it may cause not only a gas leakage but also trouble in the refrigeration cycle.



	RAS-4M23SAV-E, RAS-4M23SACV-E	RAS-3M26GAV-E1	RAS-4M27GAV-E1	RAS-4M27GACV-E
A	1 unit: 16 or 13 or 10	1 unit: 18 or 16 or 13 or 10 or 07	1 unit: 18 or 16 or 13 or 10 or 07	1 unit: 16 or 13 or 10
B	1 unit: 13 or 10	1 unit: 18 or 16 or 13 or 10 or 07	1 unit: 18 or 16 or 13 or 10 or 07	1 unit: 16 or 13 or 10
C	1 unit: 13 or 10	1 unit: 13 or 10 or 07	1 unit: 16 or 13 or 10 or 07	1 unit: 16 or 13 or 10
D	10		1 unit: 13 or 10 or 07	1 unit: 13 or 10
Total	46	45	52	52

* The unit A connection port diameter is 6.35 / 9.52 for the 4M23 and 6.35 / 12.7 for the 3M26 and 4M27.
* Use a different-diameter joint if the diameters of the connection port and connection piping are different.
* Mount the different-diameter joint on the connection port of the outdoor unit.
* Only one 16-class indoor unit can be connected to the 4M23.
* When three or more indoor units are to be connected, only one 18-class indoor unit can be connected.

A 1-room connection is not an option for the indoor units (you cannot connect only one indoor unit).
A 2-room or more connection must always be used for the indoor units (you must connect at least two indoor units).
All combinations that do not exceed the “Total” number can be installed. Note that expanders and reducers may be required depending on the combination method.

Evacuating

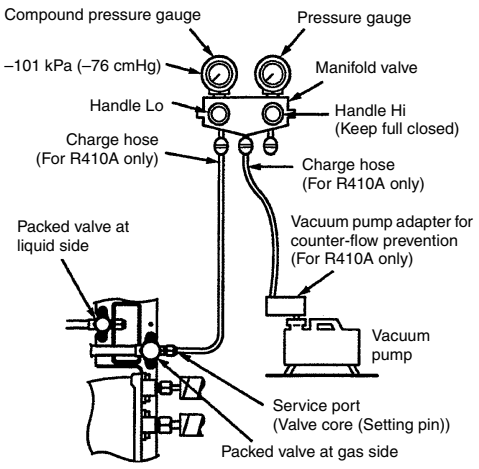
After the piping has been connected to the indoor unit, perform the air purge.

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

Use a vacuum pump

Be sure to use a vacuum pump with counter-flow prevention function so that oil inside the pump does not flow back into the air conditioner pipes when the pump stops. (If oil inside the vacuum pump enters the air conditioner circuit which uses R410A, trouble with the refrigeration system may develop.)

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 the vacuum pump.
3. Open fully the low pressure side handle of the gauge manifold valve.
4. Operate the vacuum pump to begin evacuating. Perform evacuating for about 35 minutes if the piping length is 70 meters (25 minutes for 50 total meters) (assuming a pump capacity of 27 liters per minute). Confirm that the compound pressure gauge reading is –101 kPa (–76 cmHg).
5. Close the low pressure 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.



CAUTION

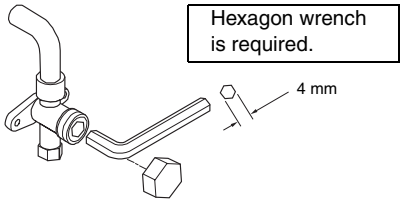
- **IMPORTANT POINTS FOR PIPING WORK**

(1) Prevent dust and moisture from entering the pipes.
(2) Tighten connections carefully (between pipes and unit).
(3) Evacuate the air in the connecting pipes using a VACUUM PUMP.
(4) Check for gas leaks at all connections.

Packed valve handling precautions

- Open the valve stem until it touches the stopper. Once it is in contact with the stopper, refrain from applying any more force than is necessary.
- Securely tighten the valve stem cap with torque in the following table:

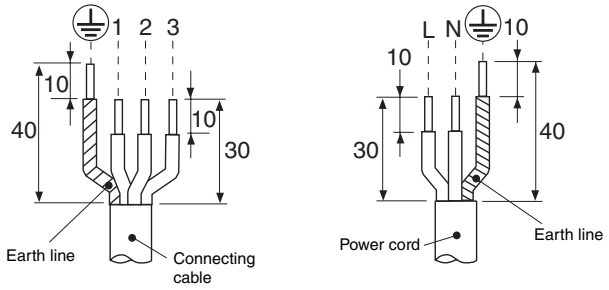
Liquid side, gas side (9.52 mm, 12.7 mm)	33 to 42 N·m (3.3 to 4.2 kgf·m)
Service port	14 to 18 N·m (1.4 to 1.8 kgf·m)



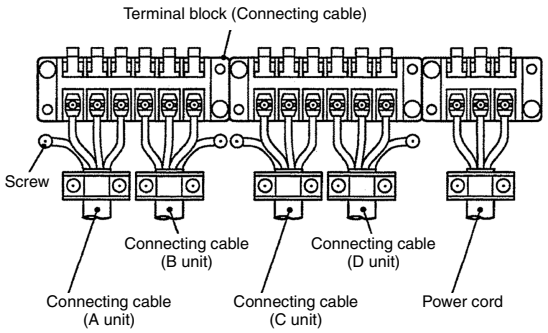
Wiring Connection

1. Remove the side panel and cord clamp from the outdoor unit.
2. Connect the connecting cable to the terminal as identified by the matching numbers on the terminal block of indoor and outdoor unit.
3. Insert the power cord and the connecting cable fully into the terminal block and secure it tightly with screws.
4. Use vinyl tape, etc. to insulate the cords which are not going to be used. Locate them so that they do not touch any electrical or metal parts.
5. Secure the power cord and the connecting cable with the cord clamp.
6. Attach the side panel on the outdoor unit.

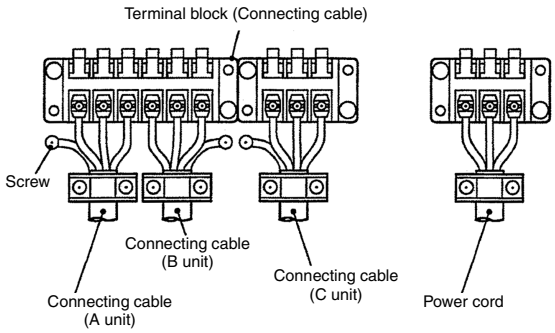
Stripping length of connecting cable



4 unit (A + B + C + D) Multi



3 unit (A + B + C) Multi



Model	4 unit Multi		3 unit Multi	4 unit Multi	
	RAS-4M23SAV-E	**RAS-4M23SACV-E**	**RAS-3M26GAV-E1**	**RAS-4M27GAV-E1**	**RAS-4M27GACV-E**
Power source	220–240V ~50Hz 220V ~60Hz				
Maximum running current	13.8 A	13.8 A	16.4 A	17.0 A	16.6 A
Installation fuse rating	16 A breaker or fuse (all types can be used)		20 A breaker or fuse (all types can be used)		
Power cord	H07RN–F or 60245IEC66 (1.5 mm^2)		H07RN–F or 60245IEC66 (2.5 mm^2)		
Connecting cable	H07RN–F or 60245IEC66 (1.0 mm^2)		H07RN–F or 60245IEC66 (1.0 mm^2)		

CAUTION

- Incorrect wiring connection may cause electrical parts to burn out.
- Be sure to comply with local regulations/codes when running the wire from outdoor unit to indoor unit. (Size of wire and wiring method etc.)
- Every wire must be securely connected.
- If incorrect or incomplete wiring is carried out, fire or smoke may result.
- Prepare the power supply for the exclusive use of the air conditioner.

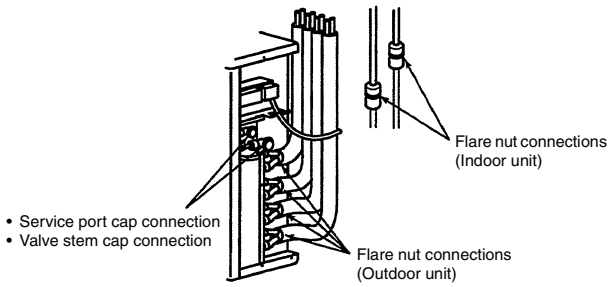
5 GROUNDING

This air conditioner must be grounded without fail.
Grounding is necessary not only to safeguard against the possibility of receiving an electric shock but also to absorb both the static, which is generated by high frequencies and held in the surface of the outdoor unit, and noise since the air conditioner incorporates a frequency conversion device (called an inverter) in the outdoor unit. If the air conditioner is not grounded, users may receive an electric shock if they touch the surface of the outdoor unit and that unit is charged with static.

6 CHECK AND TEST OPERATION

For R410A, use the leak detector exclusively manufactured for HFC refrigerant (R410A, R134a, etc.)

- Check the flare nut connections, valve stem cap connections and service port cap connections for gas leaks with a leak detector or soap water. The check points are mentioned in the right figures.
- * The conventional leak detector for HCFC refrigerant (R22, etc.) cannot be used because its sensitivity for HFC refrigerant lowers to approx. 1/40 of that manufactured exclusively for HFC refrigerant.
- Pressure of R410A becomes approx. 1.6 times that of R22. If installation work has not completely finished, gas leaks may occur in cases such as when pressure rises during operation.



CAUTION
- Use a circuit breaker of a type that is not tripped by shock waves.
- Incorrect/incomplete wiring will cause electrical fires or smoke.
- Prepare the power source for exclusive use with the air conditioner.

Miswiring (Mis-piping) Check

Make sure that the wiring and piping for each room have the same alphabetical code (A, B, C, D).

Connect and secure the power cord.

Use the power cord/cables with thickness, type, and protective devices specified in this manual.

Insulate the unused cords (conductors) with PVC tape.

1. Open the side panel of the outdoor unit.
2. Turn on the power breaker.
3. Set the indoor unit to COOL mode.
   - It is unnecessary to set the temperature.
   - Miswiring checks cannot be executed when the outdoor air temperature is 5°C or less.
4. Start the check.
   - Disconnect the miswiring check connector (color: Red) from the inverter P.C. board.

5. During checks (Check time 3 to 20 minutes).
   - When an error described in the table below occurrs, check that operation stops and an error code is displayed on LED.
6. After checks, the check results are displayed on LED.
   - The compressor stops when a miswiring (mis-pipng) error occurrs.
   - Confirm the contents of the table below.
   - Turn off the power breaker.
   - Correct miswiring/mis-piping.
   - Connect the miswiring check connector.
   - Execute the check operation again.
   - Automatically return to normal operation when conditions are normal.
7. Return to normal operation.
   - To return to normal operation during check operation or after a miswiring (mis-piping) error has been determined, connect the miswiring check connector.

Miswiring (mis-piping) check by LED Indication

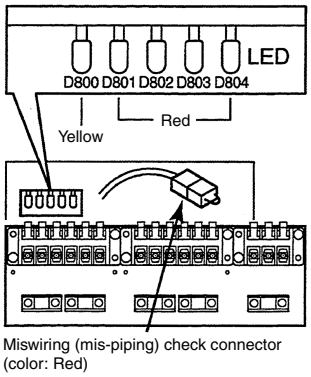
- For this outdoor unit, self-miswiring (mis-piping) checks are possible using the five LEDs (1 Yellow + 4 Red).

* LEDs (D800 to D804) are provided on the inverter P.C. board.

LED	D800	D801	D802	D803	D804	Description
	●	●	●	●	●	Normal operation (no error)
During check	◎	◎	●	●	●	Checking A unit
	◎	●	◎	●	●	Checking B unit
	◎	●	●	◎	●	Checking C unit
*1	◎	●	●	●	◎	Checking D unit
Check results	◎	○	●	●	●	Crush/Clog of Pipe A
	◎	●	○	●	●	Crush/Clog of Pipe B
	◎	●	●	○	●	Crush/Clog of Pipe C
*1	◎	●	●	●	○	Crush/Clog of Pipe D
	◎	○	○	●	●	Miswiring/Mis-piping or Crush/Clog of Pipe A, B
	◎	○	●	○	●	Miswiring/Mis-piping or Crush/Clog of Pipe A, C
*1	◎	○	●	●	○	Miswiring/Mis-piping or Crush/Clog of Pipe A, D
	◎	●	○	○	●	Miswiring/Mis-piping or Crush/Clog of Pipe B, C
*1	◎	●	○	●	○	Miswiring/Mis-piping or Crush/Clog of Pipe B, D
*1	◎	●	●	○	○	Miswiring/Mis-piping or Crush/Clog of Pipe C, D
	◎	○	○	○	●	A, B, C Miswiring/Mis-piping
	◎	○	○	●	○	A, B, D Miswiring/Mis-piping
	◎	○	●	○	○	A, C, D Miswiring/Mis-piping
	◎	●	○	○	○	B, C, D Miswiring/Mis-piping
	◎	○	○	○	○	A, B, C, D Miswiring/Mis-piping Packed valve stays closed

LED : Light Emitting Diode, ○ : LED ON, ● : LED OFF, ◎ : LED Flash

*1 4 unit Multi model only



Miswiring (mis-piping) check connector
(color: Red)

Check mode	Short → Open
Normal operation	Short

7 USEFUL FUNCTIONS

Self-Diagnosis by LED Indication

- For this outdoor unit, by referring to the 5 LED (1 Yellow + 4 Red) indicator lights, self-diagnosis is possible.
- LEDs (D800 to D804) are located on the sub-control board underneath the inverter.

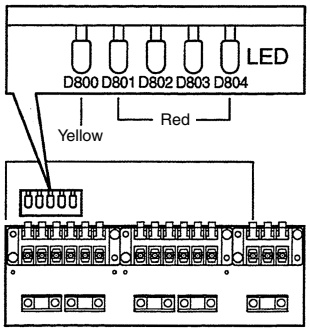
Contents	Indoor alarm code	LED indication				
		D800	D801	D802	D803	D804
Normal running	None	●	●	●	●	●
IGBT short circuit, Compressor motor rear short	14	●	○	●	●	●
Trouble on position detecting circuit	16	○	○	●	●	●
Trouble on current detecting circuit	17	●	●	○	●	●
OUTDOOR CONDENSOR PIPE TEMPERATURE SENSOR (TE) fault *2	18	○	●	○	○	●
SUCTION PIPE TEMPERATURE SENSOR (TS) fault *2	18	●	●	○	○	●
DISCHARGE PIPE TEMPERATURE SENSOR (TD) fault	19	●	○	○	●	●
Trouble on outdoor fan	1A	○	○	○	●	●
OUTDOOR TEMPERATURE SENSOR (TO) fault	1B	●	●	●	○	●
Trouble on compressor system	1C	○	●	○	●	●
GAS SIDE PIPE TEMPERATURE SENSOR a (TGa) fault	1C	○	○	○	○	●
GAS SIDE PIPE TEMPERATURE SENSOR b (TGb) fault	1C	○	●	●	●	○
GAS SIDE PIPE TEMPERATURE SENSOR c (TGc) fault	1C	○	○	●	●	○
GAS SIDE PIPE TEMPERATURE SENSOR d (TGd) fault *1	1C	●	●	●	●	○
Gas leakage, TS sensor out of place, PMV fault, Sensor fault	1C	●	○	○	●	○
TE sensor out of place, INDOOR EVAPORATOR PIPE SENSOR (TC) out of place, PMV fault, Sensor fault	1C	○	○	○	●	○
Indoor or outdoor miswiring, Gas leakage, TS/TC sensor out of place, PMV fault, Sensor fault	1C	●	●	●	○	○
Communication trouble between MCU	1C	○	○	●	○	○
Compressor lock	1D	○	●	●	○	●
Trouble on discharge temperature, Gas leakage	1E	●	○	●	○	●
Compressor break down	1F	○	○	●	○	●

○ : LED ON, ● : LED OFF

*1 4 unit Multi model only
*2 Heat pump model only

- These LEDs do not normally light.

1. If trouble occurs, LED goes on according to the contents of trouble as shown in the table above.
2. When two or more troubles occur, LEDs go on cyclically (alternately).
3. When the trouble is eliminated, LEDs go off.



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