

# TOSHIBA

## Carrier

AIR CONDITIONER (SPLIT TYPE)

# Installation Manual



EB99810201

## Indoor Unit

Model name: \_\_\_\_\_

Concealed Duct Type

**RAV-SP181BT-UL**

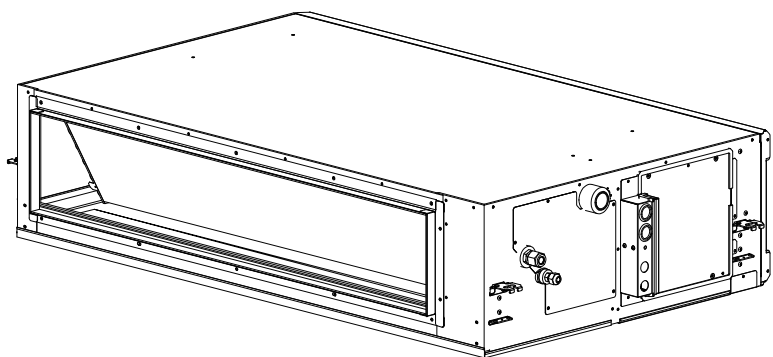
**RAV-SP241BT-UL**

**RAV-SP301BT-UL**

**RAV-SP361BT-UL**

**RAV-SP421BT-UL**

For commercial use  
Pour usage commercial



Installation Manual 1 English

Manuel d'installation 25 Français

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 NEW REFRIGERANT**

This Air Conditioner uses R410A an environmentally friendly refrigerant.

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**1 Precautions for safety**

Installing, starting up, and servicing air-conditioning equipment can be hazardous due to system pressures, electrical components, and equipment location (roofs, elevated structures, etc.).

Only trained, qualified installers and service mechanics should install, start-up, and service this equipment. Untrained personnel can perform basic maintenance functions such as cleaning indoor unit air filter. All other operations should be performed by trained service personnel.

Before working on the equipment, observe precautions in the literature and on tags, stickers, and labels attached to the equipment.

Follow all safety codes. Wear safety glasses and work gloves. Use care in handling, rigging, and setting bulky equipment.

Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes and National Electrical Code (NEC) for special requirements. Recognize safety information. This is the safety-alert symbol . When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these signal words: DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol.

DANGER identifies the most serious hazards which will result in severe personal injury or death. WARNING signifies hazards which could result in personal injury or death. CAUTION is used to identify unsafe practices which may result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which will result in enhanced installation, reliability, or operation.

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

 **WARNING**

- **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.**
- **Connect ground wire. (grounding work)**  
Incomplete grounding may cause an electric shock.  
Do not connect ground wires to gas pipes, water pipes, lightning rods or ground wires for telephone wires.
- **Turn off all the circuit breaker before attempting any electrical work.**  
Failure to do so may cause electric shock.
- **Install the refrigerant pipe securely during the installation work before operating the air conditioner.**  
If the air conditioner is operated with the valve open and without the refrigerant pipe, the compressor sucks air and the refrigeration cycle is overpressurized, which may cause a burst or injury.
- **When moving the air conditioner for the installation into another place, do not enter any gaseous matter other than the specified refrigerant 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 pipe burst and injuries on persons.
- **Perform installation work properly according to the Installation Manual.**  
Inappropriate installation may result in water leakage, electric shock or fire.
- **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.**
- **Install the air conditioner securely in a location where the base can sustain the weight 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 might generate.
- **Electrical work must be performed by a qualified electrician in accordance with the Installation Manual. Use an exclusive power supply for the air conditioner at the rated voltage.**  
An insufficient power supply capacity or inappropriate installation may cause fire.
- **Use the specified wires for wiring connect the terminals. Securely fix them to prevent external forces applied to the terminals from affecting the terminals.**
- **Conform to the regulations of the local electric company when wiring the power supply.**

- **For the refrigerant recovery work (collection of refrigerant from the pipe to the compressor), stop the compressor before disconnecting the refrigerant pipe.**  
If the refrigerant pipe is disconnected while the compressor is working with the valve open, the compressor sucks air and the refrigeration cycle is overpressurized, which may cause a burst or injury.
- **Before carrying out the installation, maintenance, repair or removal work, set the circuit breaker to the OFF position.**  
**Otherwise, electric shocks may result.**
- **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.**
- **The unit can be accessed from the service panel.**
- **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.**
- **Under no circumstances the power wire must not be extended. Connection trouble in the places where the wire is extended may give rise to smoking and/or a fire.**
- **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.**






### CAUTION

- **This air conditioner adopts the new HFC refrigerant (R410A) which does not destroy ozone layer.**
- The characteristics of R410A refrigerant are; easy to absorb water, oxidizing membrane or oil, and its pressure is approx. 1.6 times higher than that of refrigerant R22. Accompanied with the new refrigerant, refrigerating oil has also been changed. Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigerating oil does not enter the refrigerating cycle.
- To prevent charging an incorrect refrigerant and refrigerating oil, the sizes of connecting sections of charging port of the main unit and installation tools are changed from those for the conventional refrigerant.
- Accordingly the exclusive tools are required for the new refrigerant (R410A).
- For connecting pipes, use new and clean piping designed for R410A, and please care so that water or dust does not enter.
- **Tighten the flare nut with a torque wrench in the specified manner.**  
Excessive tightening of the flare nut may cause a crack in the flare nut after a long period, which may result in refrigerant leakage.
- **Wear heavy gloves during the installation work to avoid injury.**

## ■ Important notices

The indoor unit of this air-conditioner uses a DC motor. Current limiting is provided to allow the motor current to be regulated due to the characteristics of a DC motor. Additionally, a thermistor protects the unit against an overload condition. Be sure to stop the fan when replacing the air filter or opening the service panel; otherwise, a protection circuit is tripped, causing both the indoor and outdoor units to stop. At this time, the check code "P12" appears, but this is not a malfunction. When maintenance work is completed, reset the power supply and push the ON/OFF button on the remote control to return the air conditioner to normal operation.

## 2 Accessory parts

Part name	Q'ty	Shape	Usage
Owner's Manual	1	–	(Be sure to hand it to the customers.)
Installation Manual	1	This manual	This manual for installer.
Heat insulating pipe	2		For heat insulation of pipe connecting section
Washer	8		For hanging-up unit (0.4" × Ø1.3" (M10 × Ø34))
Drain socket	1		For connect drain pipe
Banding band	2		For fixing of pipe connecting heat insulator
Screw	8		For attaching a fan guard (sold separately) for air intake from underneath

## 3 Selection of installation place

### Avoid installing in the following places

Select a location for the indoor unit where the cool or warm air will circulate evenly.

Avoid installation in the following kinds of locations.

- Saline area (coastal area).
- Locations with acidic or alkaline atmospheres (such as areas with hot springs, factories where chemicals or pharmaceuticals are made and places where the exhaust air from combustion appliances will be sucked into the unit).  
Doing so may cause the heat exchanger (its aluminum fins and copper pipes) and other parts to become corroded.
- Locations with atmospheres with mist of cutting oil or other types of machine oil.  
Doing so may cause the heat exchanger to become corroded, mists caused by the blockage of the heat exchanger to be generated, the plastic parts to be damaged, the heat insulators to peel off, and other such problems to result.
- Locations where vapors from food oils are formed (such as kitchens where food oils are used).  
Blocked filters may cause the air conditioner's performance to deteriorate, condensation to form, the plastic parts to be damaged, and other such problems to result.
- 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.
- Locations near obstructions such as ventilation openings or lighting fixtures where the flow of the blown air will be disrupted (a disruption of the air flow may cause the air conditioner's performance to deteriorate or the unit to shut down).
- Locations where an in-house power generator is used for the power supply.  
The power line frequency and voltage may fluctuate, and the air conditioner may not work properly as a result.
- On truck cranes, ships or other moving conveyances.
- The air conditioner must not be used for special applications (such as for storing food, plants, precision instruments or art works).  
(The quality of the items stored may be degraded.)
- Locations where high frequencies are generated (by inverter equipment, in-house power generators, medical equipment or communication equipment).  
(Malfunctioning or control trouble in the air conditioner or noise may adversely affect the equipment's operation.)
- Locations where there is anything under the unit installed that would be compromised by wetness.  
(If the drain has become blocked or when the humidity is over 80%, condensation from the indoor unit will drip, possibly causing damage to anything underneath.)
- In the case of the wireless type of system, rooms with the inverter type of fluorescent lighting or locations exposed to direct sunlight.  
(The signals from the wireless remote control may not be sensed.)
- Locations where organic solvents are being used.
- The air conditioner cannot be used for liquefied carbonic acid cooling or in chemical plants.
- Location near doors or windows where the air conditioner may come into contact with high-temperature, high-humidity outdoor air.  
(Condensation may occur as a result.)
- Locations where special sprays are used frequently.

### ■ Installation under high-humidity atmosphere

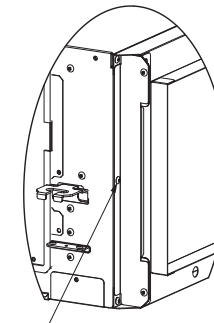
In some cases including the rainy season, especially inside of the ceiling may become high-humidity atmosphere (dew-point temperature: 73 °F (22.8 °C) or higher).

1. Installation to inside of the ceiling with tiles on the roof
  2. Installation to inside of the ceiling with slated roof
  3. Installation to a place where inside of the ceiling is used for pathway to intake the fresh air
  4. Installation to a kitchen
- In the above cases, additionally attach the heat insulator to all positions of the air conditioner, which come to contact with the high-humidity atmosphere. In this case, arrange the side plate (Check port) so that it is easily removed.
  - Apply also a sufficient heat insulation to the duct and connecting part of the duct.

<b>[Reference]</b>	Condensation test conditions
Indoor side:	80 °F (26.7 °C) dry bulb temperature 75 °F (23.9 °C) wet bulb temperature
Air volume:	Low air volume, operation time 4 hours

### ■ Preparation before installation

Remove a fixing screw for shipping from the cover plate of the filter rack, and block the screw hole with tape.

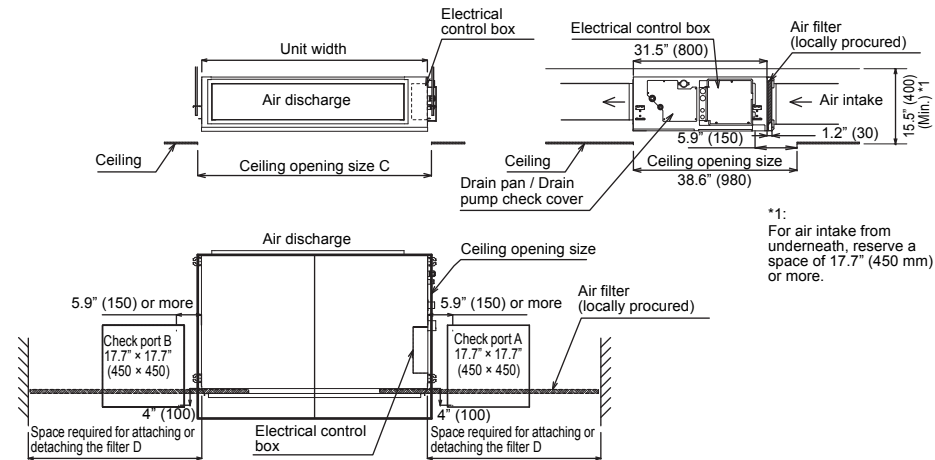


Fixing screw for shipping

## ■ Installation space

Unit: in (mm)

Reserve sufficient space required for installation or service work.



### NOTE

- Set check port A for maintaining the electrical control box, filter, drain pump, drain pipe, and refrigerant pipe.
- Replace the filter through check port A or B.  
(If you pull out the filter in the opposite direction of the electrical control box, check port B is required.)
- Reserve space D required for attaching or detaching the filter.  
Otherwise, the filter cannot be replaced.
- When pulling the refrigerant pipe, drain pipe, etc., avoid the filter port. Otherwise, the filter cannot be replaced.
- The indoor unit is not equipped with an air filter. Procure and install one locally.
- Set a ceiling opening port for maintaining the fan, fan motor, etc. Otherwise, they cannot be maintained.

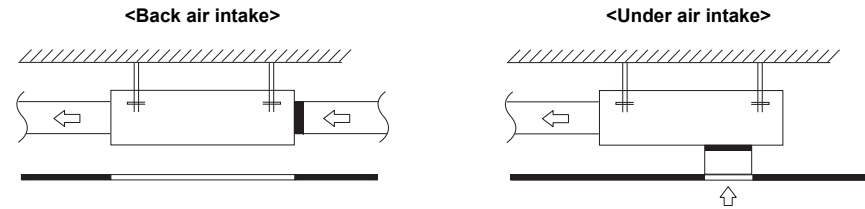
MODEL RAV-	SP18 type	SP24 type	SP30 to SP42 type
Unit width	27.6" (700)	39.4" (1000)	53.2" (1350)
Air filter width	25.0" (635)	38" (18"+20") (965 (457+508))	52" (20"+20"+12") (1321 (508+508+305))
Ceiling opening size C	29.5" (750)	41.3" (1050)	55.1" (1400)
Space required for attaching or detaching the filter D	28.7" (730)	23.6" (600)	40.5" (1030)

## ■ Filter cleaning sign term setting

The lighting term setup of the filter sign (Notification of filter cleaning) of the remote control can be changed according to the condition of installation.

For setup method, refer to "Filter sign setting" in the Applicable controls of this Manual.

## ■ Arranging the under intake type

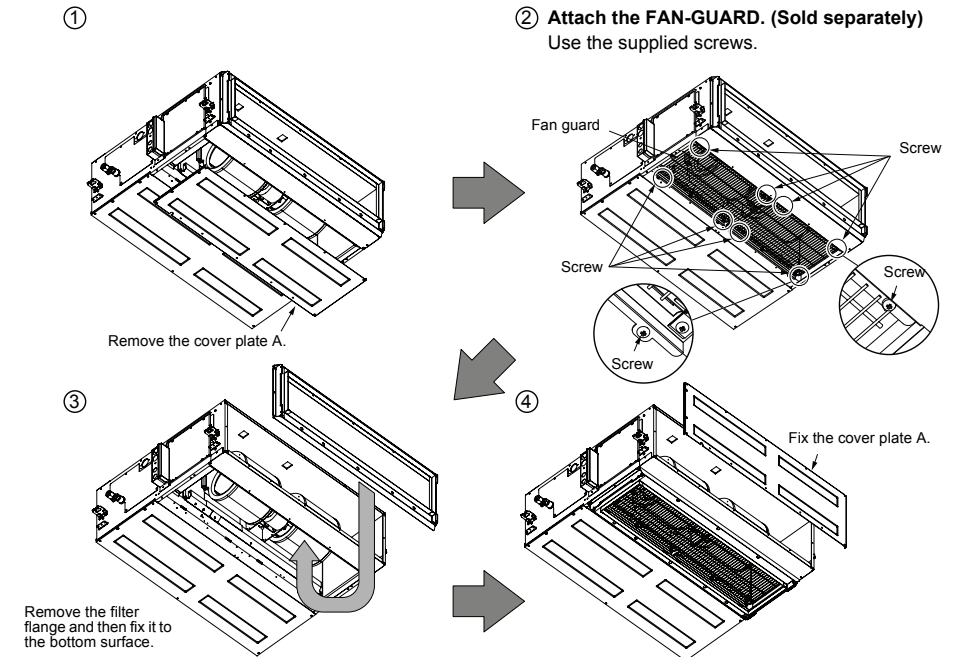


### ⚠ CAUTION

For air intake from under air intake, be sure to attach the FAN-GUARD. (Sold separately)

Model	RAV-	SP18 type	SP24 type	SP30 to SP42 type
FAN-GUARD	model name	TCB-IG071BUL-1	TCB-IG151BUL	TCB-IG211BUL

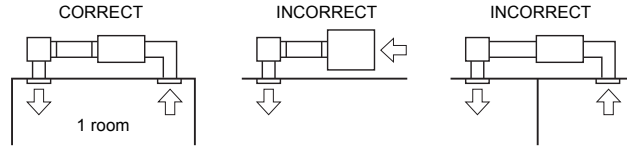
For air intake from under air intake, replace the cover (A) and filter flange as shown below before installing the unit.



# 4 Installation

## 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.
- Do not install the indoor unit in the way that it takes in the air in the ceiling and provides it into the room. The indoor unit must be installed in the way that it takes in the air from the room and returns it back to the room.



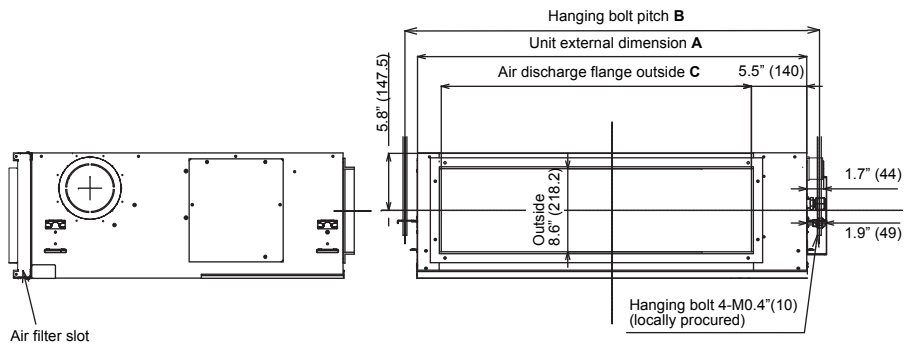
- This unit and its ducting (supply and return air) are intended for use in one room only.

## CAUTION

- 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 or let a person get on it. (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 material to not damage the unit.
  - To move the indoor unit, hold the hooking brackets (4 positions) only.  
Do not apply force to the other parts (refrigerant pipe, drain pan, foamed parts, resin parts or other parts).
  - Carry the package by two or more persons, and do not bundle it with plastic band at positions other than specified.
  - To install vibration isolation material to hanging bolts, confirm that it does not increase the unit vibration.

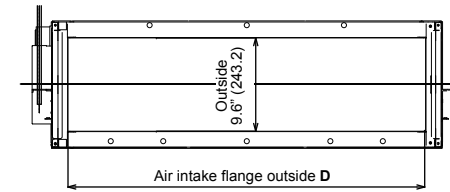
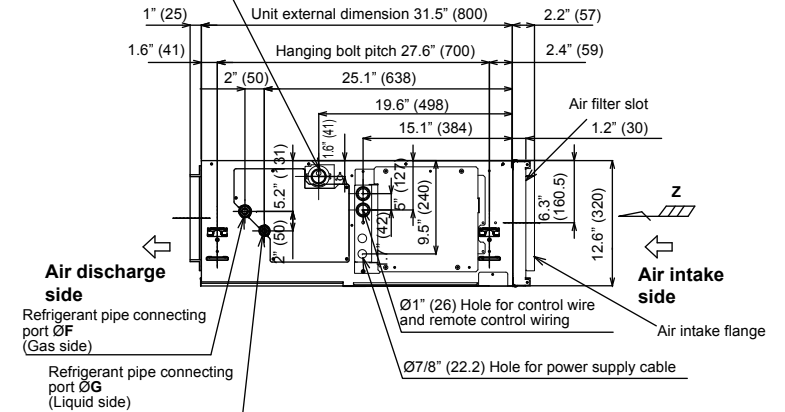
## External dimensions

Unit: in (mm)



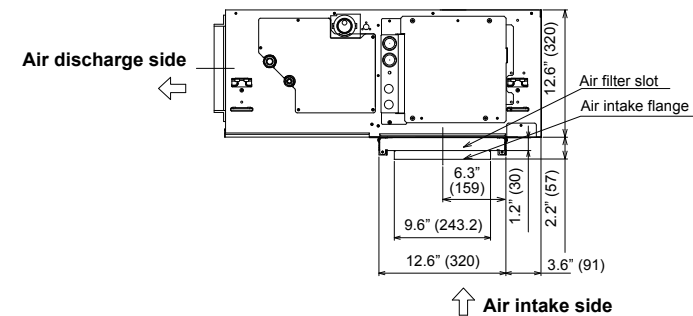
### <Back air intake>

Drain pipe connecting port  
VP25(Polyvinyl chloride tube:  
External Dia.1-1/4" Internal Dia.1"



Z view

### <Under air intake>



Air intake side

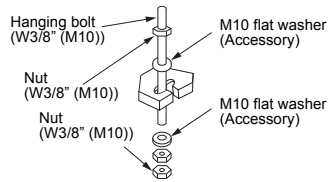
Model RAV-	A	B	C	D	F	G
SP18	27.6" (700)	30.2" (766)	19.7" (501.6)	24.5" (621.6)	1/2" (12.7)	1/4" (6.4)
SP24	39.4" (1000)	42" (1066)	31.6" (801.6)	36.3" (921.6)	5/8" (15.9)	3/8" (9.5)
SP30, SP36, SP42	53.2" (1350)	55.7" (1416)	45.4" (1151.6)	50.1" (1271.6)	5/8" (15.9)	3/8" (9.5)

## ■ Installation of the indoor unit

All issues related to locating the unit above the ceiling, hanging the unit from the building structure, routing/suspending the unit refrigerant piping, routing/suspending the unit wiring and penetrating the ceiling for supply and return air connections to the indoor unit must comply with all applicable codes and regulations.

The indoor unit should be hung above the ceiling utilizing minimum 3/8" x 16 bolts, or threaded rod (4 pieces required) along with 3/8" x 16 nuts, 3/8" flat washers and 3/8" lock washers. All material to be procured locally.

Hanging bolt	W3/8" (M10)	4 pieces
Nut	W3/8" (M10)	12 pieces

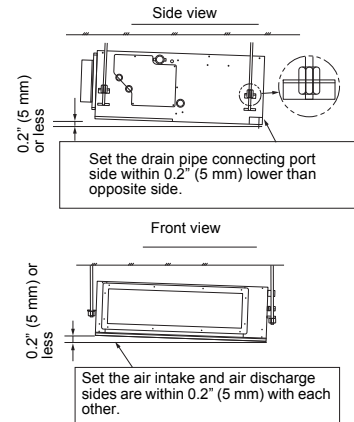


The unit should be positioned level and plumb without pitch in any direction. The bolts, or threaded rod should be attached to the building structure in compliance with all applicable codes and regulations. The spacing for the support bolts, or rods should match the dimensions provided on the unit External dimensions in this manual.

- Check that four sides are horizontal with a level gauge. (Horizontal degree: Within 0.2" (5 mm))

### REQUIREMENT

- Hang the unit in a horizontal position. When unit is hanged to slant, it may cause overflow of drainage.
- Install the unit within the dimension according to the figure below.
- Use level gauge to confirm whether the unit is hang horizontally.



## ■ Installation of wired remote control (sold separately)

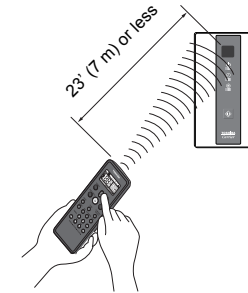
For installation of the wired remote control refer to the instructions that are supplied with the control. The connection point for the control wiring and the entrance point for the control wiring are clearly marked in the instructions.

## ■ Installation of wireless remote control (sold separately)

For installation of the wireless remote control refer to the instructions that are supplied with the control. The connection point for the control wiring and the entrance point for the control wiring are clearly marked in the instructions.

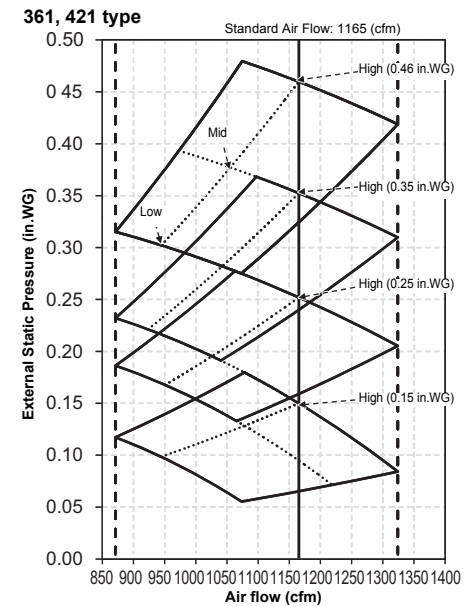
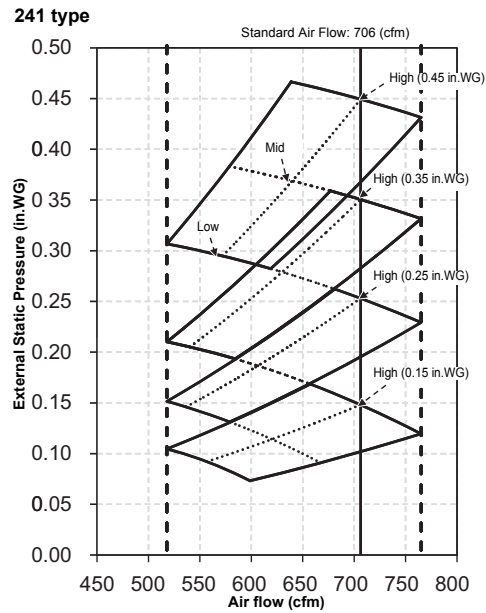
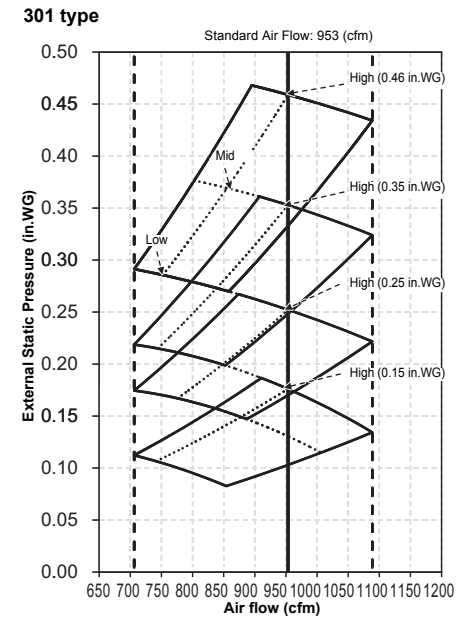
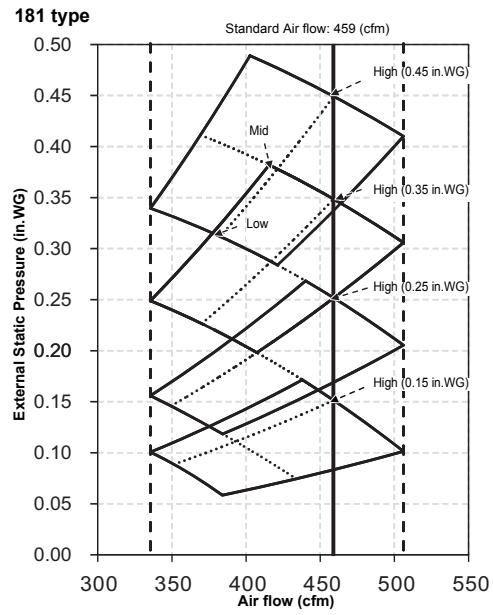
The sensor of indoor unit with wireless remote control can receive a signal by distance within approx. 23' (7 m). Based upon it, determine a place where the remote control is operated and the installation place.

- Keep 39.4" (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 control can be installed in the same room.



## Fan characteristics

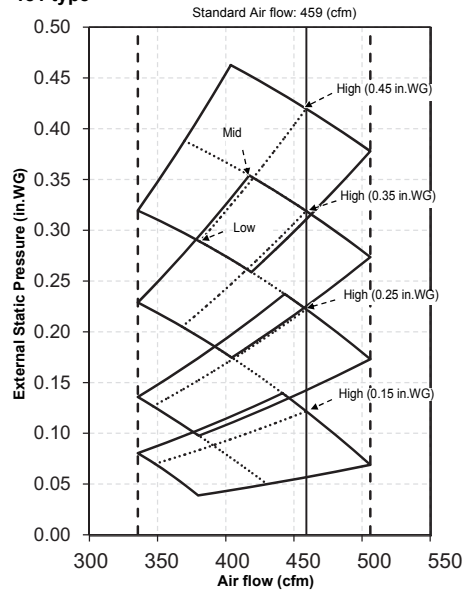
<Back air intake>



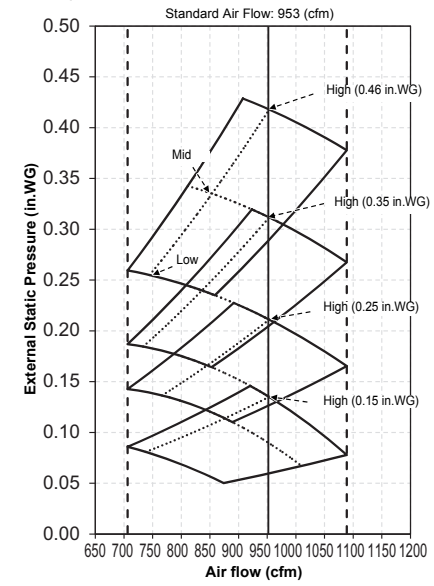


<Under air intake>

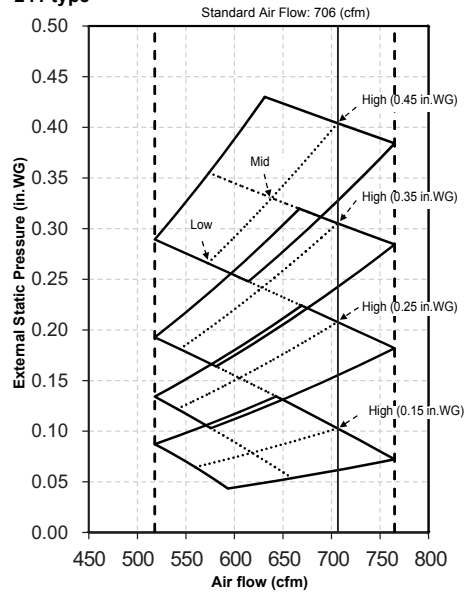
181 type



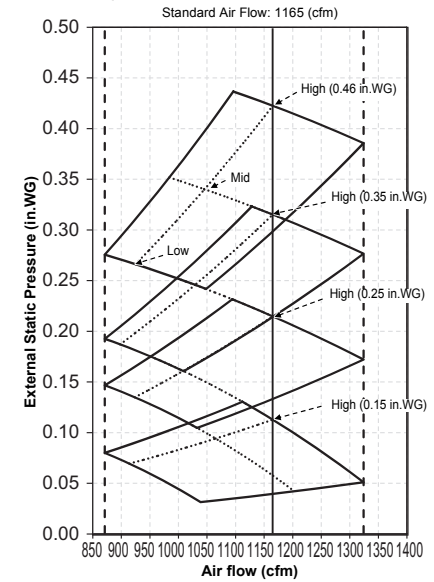
301 type



241 type



361, 421 type



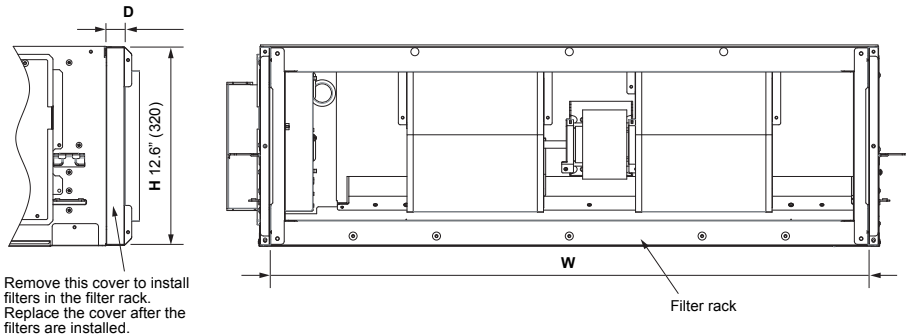
## ■ Installation of air filter

Unit: in (mm)

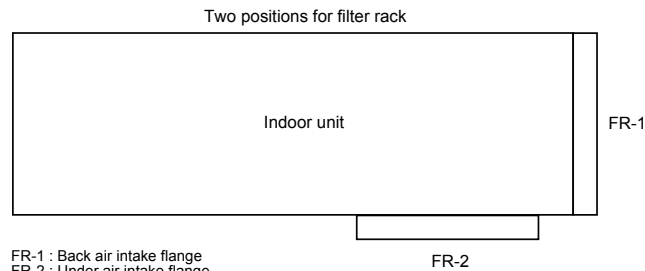
The type of air filters required will be specified by applicable codes and requirements for the fan coil installation. The filters for these fan coil units are all 1" thick x 12" high. The lengths vary with the model of fan coil being installed. All the lengths required are specified in the chart below. All filters are to be procured locally.

**Filter spec: MERV; 7**

### Filter chamber structure and filter size.



MODEL RAV-	SP30 to SP42 type	SP24 type	SP18 type
W	52" (1320)	38.2" (970)	26.4" (670)
H	12.6" (320) *1		
D	1.1" (28)		
Filter size (H × W × D) and quantity	12" × 20" × 1", (2) piece 12" × 12" × 1", (1) piece	12" × 20" × 1", (1) piece 12" × 18" × 1", (1) piece	12" × 25" × 1", (1) piece

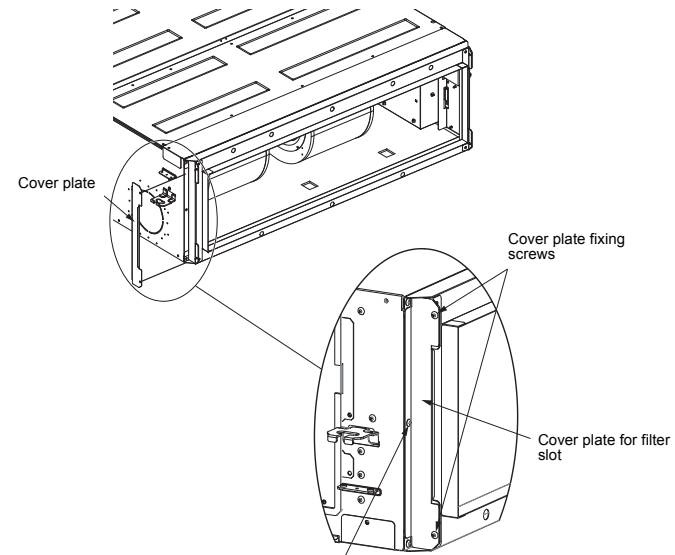


FR-1 : Back air intake flange  
FR-2 : Under air intake flange

All unit models have the FR - 1 & FR - 2 filter position option available. Both positions use the same filters per model shown in the chart above.

## ◆ Installation of air filter

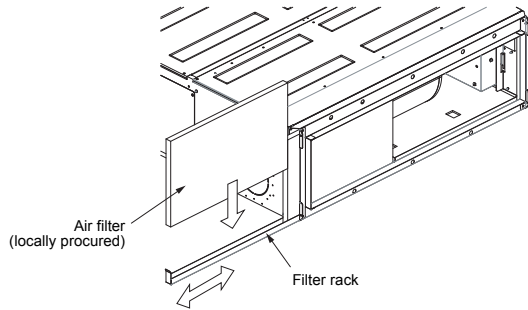
### 1 Remove the cover plate (Screw x 3).



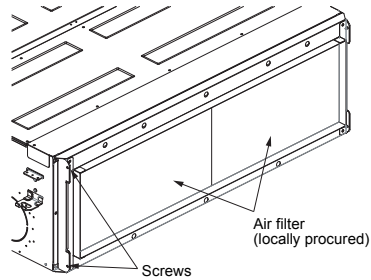
### ⚠ CAUTION

The cover plate is attached temporarily with the screws indicated by the arrows for protection when shipped. After reattaching it, seal the screw holes with tape instead of using the screws.

**2** Pull out the filter rack, and set the air filter (locally procured) in it.



**3** Push the filter rack in fully and reattach the cover plate. (Screws x 2)



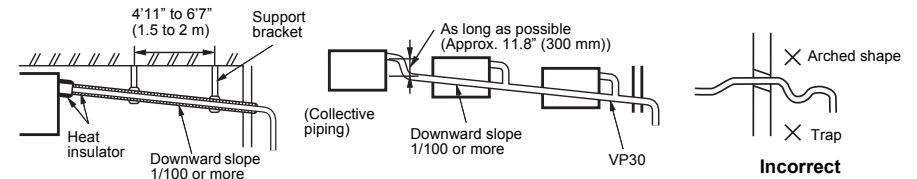
## 5 Drain piping

### ⚠ CAUTION

Condensate drain piping installation and material must comply with applicable codes and regulations for the specific indoor installation.

The condensate drain piping must be insulated to prevent sweating. All material used in the plenum space above the ceiling must comply with applicable codes and regulations. If the condensate drain exits the unit downward (gravity flow) the slope and suspension methods used for the condensate drain piping must comply with applicable codes and regulations.

- The drain pipe must be sloping downward (at an angle of 1/100 or more), and do not run the pipe up and down (arched shape) or allow it to form traps. Doing so may cause abnormal sounds.
- Restrict the length of the traversing drain pipe to 65.6' (20 m) or less. For a long pipe, provide support brackets at intervals of 4'11" to 6'7" (1.5 to 2 m) to prevent flapping.
- Install the collective piping as shown in the following figure.
- Do not provide any air vents. Otherwise, the drain water will spout, causing water to leak.
- Do not allow any force to be applied to the connection area with the drain pipe.

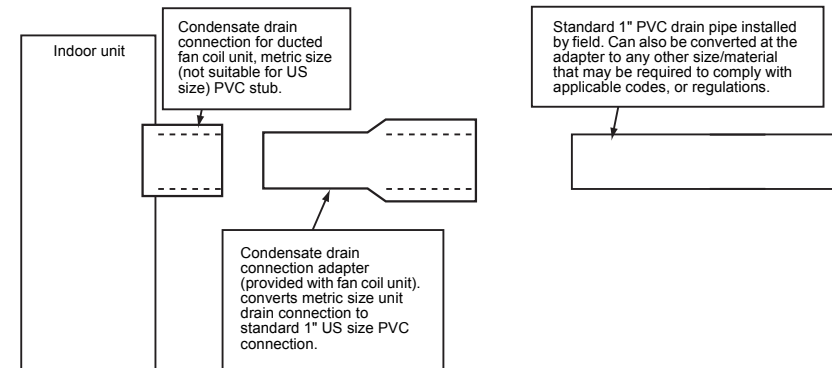


### ■ Connecting drain pipe

Insert the drain socket into the connector until the socket can go no farther.

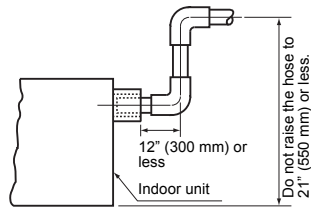
#### REQUIREMENT

- Connect the hard vinyl chloride pipes certainly so that water does not leak by using adhesive agent for vinyl chloride.
- It takes some time to dry and indurate the adhesive agent. (Refer to the manual of adhesive agent.) Do not apply any extra force on the connecting section until the adhesive agent dried.



## ■ Drain up (condensate pumped up from unit)

When gravity drainage cannot be provided directly from the indoor unit condensate exit the piping can be arranged for upward condensate discharge. The vertical leg of the drain line must be a maximum of 12" or less from the indoor condensate exit and the total vertical height of the leg must be a maximum of 21" or less before the drain enters a gravity flow line. These dimensions are specified by the indoor unit condensate pump limitations. As specified for the gravity flow installation all materials and suspension methods must comply with applicable codes and regulations.



## ■ Check the condensate drain system

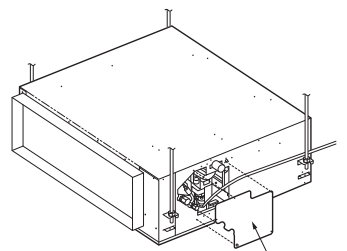
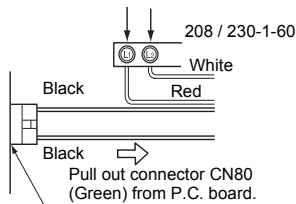
When all piping and wiring is completed the condensate drain system (including the pump) should be checked for correct operation and leaks. If there are any abnormal sounds, leaks, or if the condensate water does not flow normally, the problem should be diagnosed and corrected before the system is certified for operation. In the test run, check that water drain is properly performed and water does not leak from the connecting part of the pipes. When doing this, also check that no abnormal sounds are heard from the drain pump motor. Check draining also when installed in heating period.

### When the electrical and wiring work has been completed

- Pour some water by following the method shown in the following figure. Then, while performing a cooling operation, check that the water drains from the drain pipe connecting port (transparent) and that no water is leaking from the drain pipe.

### When the electrical and wiring work has not been completed

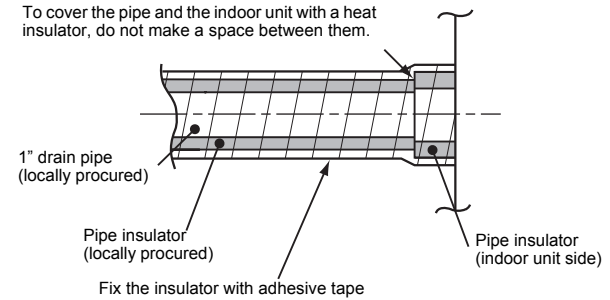
- Disconnect the float switch connector (3P: Green) from the connector (CN80: Green) on the printed circuit board inside the electrical control box. (Before doing this, the power must be turned off.)
- Connect a 208 / 230 V supply voltage to (L1) and (L2) on the power supply terminal block. (Do not apply a 208 / 230 V voltage to (A), (B) of the terminal block. Otherwise, the printed circuit board may be damaged.)
- Pour the water by following the method shown in the following figure. (Amount of water poured: 0.4 to 0.5 gal (1500 to 2000 cc))
- When the power is turned on, the drain pump automatically starts running. Check whether the water is draining from the drain pipe connecting port, and check that no water is leaking from the drain pipe.
- After checking that the water drains and there are no water leaks, turn off the power, connect the float switch connector to its original location (CN80) on the printed circuit board, and return the electrical control box to its original position.



Insert the end of hose up to the near of suction port of drain pump.

## ■ Condensate drain pipe insulation

The condensate drain system piping must be insulated to prevent sweating after the leak check is performed. All material used in the condensate drain system must comply with applicable codes and regulations covering materials installed in the ceiling plenum area.



# 6 Refrigerant piping and evacuation

## Refrigerant piping

- Use the following items for the refrigerant piping.  
**Material:** Seamless phosphorous deoxidized copper pipe.  
**Wall thickness:** 0.03" (0.8 mm) or more 1/2" (12.7 mm) (C1220T-0)  
 0.04" (1.0 mm) or more for 1-1/8" (28.6 mm) (C1220T-1/2H).  
**Do not use any copper pipes with a wall thickness less than these thicknesses.**
- 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.

### REQUIREMENT

When the refrigerant pipe is long, provide support brackets at intervals of 8'2" - 9'10" (2.5 - 3 m) to clamp the refrigerant pipe. Otherwise, abnormal sound may be generated.

### CAUTION

- IMPORTANT 4 POINTS FOR PIPING WORK**
- Remove dust and moisture from the inside of the connecting pipes.
  - Tight connection (between pipes and unit)
  - Evacuate the air in the connecting pipes using VACUUM PUMP.
  - Check the gas leakage. (Connected points)

## Permissible piping length and height difference

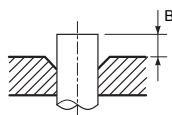
They vary according to the outdoor unit.  
 For details, refer to the Installation Manual attached to the outdoor unit.

## Pipe size

Model name	RAV-	SP18 type	SP24, SP30, SP36, SP42 type
Pipe size	Gas side	1/2" (12.7 mm)	5/8" (15.9 mm)
	Liquid side	1/4" (6.4 mm)	3/8" (9.5 mm)

### 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 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.



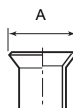
▼ Projection margin in flaring : B (Unit : in (mm))  
 Rigid (Clutch type)

Outer dia. of copper pipe	R410A tool used	Conventional tool used
	R410A	R410A
1/4" (6.4), 3/8" (9.5)	0 - 0.02" (0 - 0.5)	0.04" - 0.06" (1.0 to 1.5)
1/2" (12.7), 5/8" (15.9)		

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

Outer dia. of copper pipe	A <sup>+0</sup> / <sub>-0.02" (-0.4)</sub>
	R410A
1/4" (6.4)	0.36" (9.1)
3/8" (9.5)	0.52" (13.2)
1/2" (12.7)	0.65" (16.6)
5/8" (15.9)	0.78" (19.7)

\* In case of flaring for R410A with the conventional flare tool, pull it out approx. 0.02" (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

### CAUTION

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

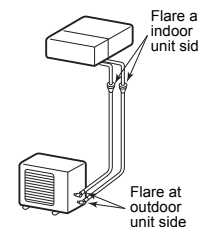
Unit : ft·lbs (N·m)

Outer dia. of copper pipe	Tightening torque
1/4" (6.4 mm)	10 - 13 (14 - 18)
3/8" (9.5 mm)	24 - 31 (33 - 42)
1/2" (12.7 mm)	37 - 46 (50 - 62)
5/8" (15.9 mm)	46 - 57 (63 - 77)

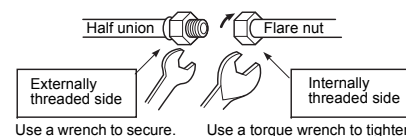
### ▼ Tightening torque of flare pipe connections

Pressure of R410A is higher than that of R22.

(Approx. 1.6 times)  
 Therefore, using a torque wrench, tighten the flare pipe connecting sections which connect the indoor and outdoor units of the specified tightening torque. Incorrect connections may cause not only a gas leak, but also a trouble of the refrigeration cycle.



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.



### REQUIREMENT

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

### Piping with outdoor unit

- Shape of valve differs according to the outdoor unit. For details of installation, refer to the Installation Manual of the outdoor unit.

## Evacuation

Using a vacuum pump, perform vacuuming from the charge port of valve of the outdoor unit.

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

- Never use the refrigerant sealed in the outdoor unit for air purge.

### REQUIREMENT

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

### Refrigerant amount to be added

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

Be sure to 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. Be sure to 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 nameplate attached to the service panel of the outdoor unit. It is necessary to troubleshoot 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 (R410A, R134a, etc.).

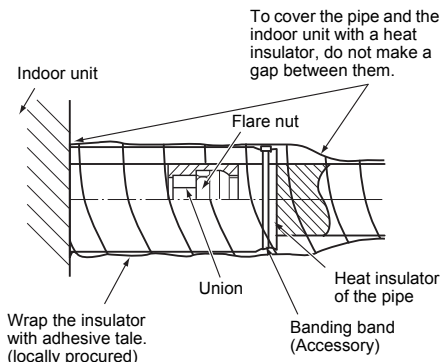
## Heat insulation process

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 248 °F (120 °C) or higher.
- To use the attached heat insulation pipe, apply the 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).
- Apply heat insulating materials to both the gas side and liquid side as shown:



# 7 Electrical connection

### WARNING

- Use predefined wire and connect them certainly. Keep the connecting terminal free from external force.**  
Improper wire connection or clamping may result in exothermic, fire or malfunction.
- Connect ground wire. (grounding work)**  
Incomplete grounding cause an electric shock. Do not connect ground wires to gas pipes, water pipes, lightning rods or ground wires for telephone wires.
- Install appliance in accordance with national wiring regulations.**  
Capacity shortage of circuit breaker or incomplete installation may cause an electric shock or a fire.

### CAUTION

- Consult local building codes, NEC (National Electrical Code) or CEC (Canadian Electrical Code) for special requirements.
- If incorrect / incomplete wiring is carried out, it will cause an electrical fire or smoke.
- Install circuit breaker is not tripped by shock waves. If circuit breaker is not installed, an electric shock may be caused.
- Use the cord clamps attached to the product.
- Do not damage or scratch the conductive core and inner insulator of power and control wires when peeling them.
- Use the power cord and control wire of specified thickness, type, and protective devices required.
- Do not connect 208 / 230 V power to the terminal blocks (U3, U4, A, B etc.) for control wiring. (Otherwise, the system will fail.)
- 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 circuit breaker of the indoor unit until vacuuming of the refrigerant pipes completes.

### REQUIREMENT

- For power supply wiring, strictly conform to the Local Regulation in each country.
- Run the refrigerant piping line and control wiring line in the same line.
- For wiring of power supply of the outdoor units, follow the Installation Manual of each outdoor unit.

## Indoor / Outdoor connecting (system interconnection wires) and control wires specification

- Connect the connecting wire to the terminal as identified with their respective numbers on the terminal block of indoor and outdoor unit. (4 x AWG12)
- Insulate the unsheathed redundant cords (conductors) with electrical insulation tape. Process them so that they do not touch any electrical or metal parts.
- For inter-unit wiring, do not use a wire jointed to another on the way.

	Wire Quantity x size
Indoor unit - Outdoor unit *1	3 x AWG12 (polar)
Ground	1 x AWG12 or thicker
Remote control	2 x AWG20 (non-polar)
Central control - indoor unit *2	2 x AWG 16 (shielded wire, Up to 3280'10" (1000 m)) 2 x AWG 14 (shielded wire, Up to 6561'8" (2000 m))

\*1 :Length of the system interconnection wires.

RAV-	SP180AT2	SP240AT2	SP300AT2 - SP420AT2
Wire length	164'1" (50 m) or less	229'8" (70 m) or less	246'1" (75 m) or less

\*2 :Case of central control with "1:1" Model Connection Interface

### CAUTION

Use the same size wire for the field power supply wire and system interconnection wires when the outdoor unit is RAV-SP180AT2.

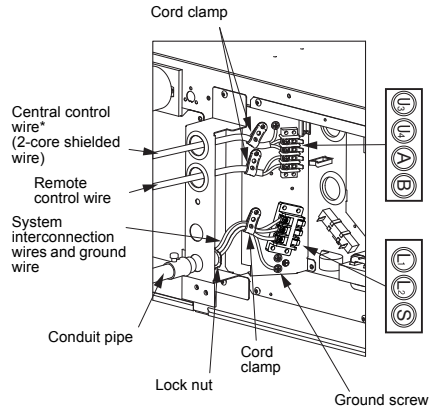
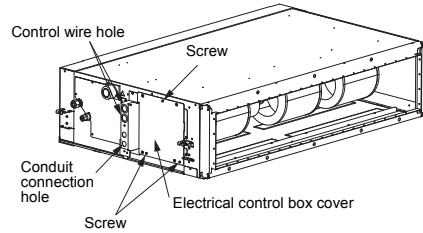
### NOTE

- Use copper supply wires.
- Use UL wires rated 600 V for the system interconnection wires.
- Use UL wires rated 300 V for the remote control wires.
- This indoor unit which has TCC-LINK adapter does not need "1:1" Model Connection Interface (TCB-PCNT31TLUL) (sold separately). (Use terminals (U3, U4) for central control.)

## ■ Wire connection

### REQUIREMENT

- Connect the wires matching the terminal numbers. Incorrect connection causes a trouble.
  - Pass the wires through the bushing of wire connection holes of the indoor unit.
  - The low-voltage circuit is provided for the remote control. (Do not connect the high-voltage circuit)
- Remove the cover of the electrical control box by taking off the mounting screws (3 positions).
  - Attach the conduit pipe with a lock nut.
  - 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.)
  - Mount the cover of the electrical control box without pinching wires.

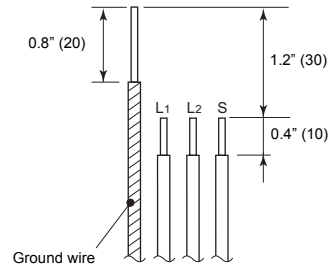


\* Only at the time of Central control use.

## ■ System interconnection wires and ground wire

1. Strip the wire ends.  
System interconnection wire : 0.4" (10 mm)  
Ground wire : 0.8" (20 mm)
2. Match the wire colors with the terminal numbers on the indoor and outdoor units' terminal blocks and firmly screw the wires to the corresponding terminals.
3. Secure the ground wire with the ground screw.
4. Fix the wires with a cord clamp.

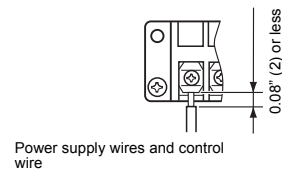
Unit: in (mm)



### ⚠ CAUTION

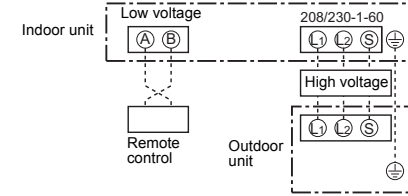
Firmly tighten the screws of the terminal block.

Keep the wire length as shown in figure below when it is connected to the terminal block.



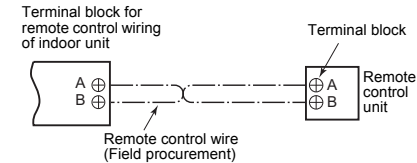
## ■ Wiring diagram

### ▼ Single system



## ■ Remote control wiring

- Strip off the wire approx. 0.4" (9 mm) to connect.
- For a single system, use non polarity, 2 core wire for the remote control wiring. (2 x AWG 20)

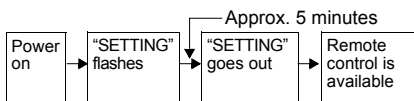


- For the details of wiring/installation of the remote control, refer to the Installation Manual enclosed with the remote control.

# 8 Applicable controls

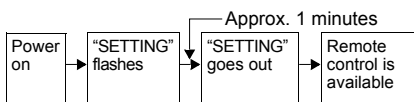
## REQUIREMENT

- When you use this air conditioner for the first time, it takes approx. 5 minutes until the remote control becomes available after power-on. This is normal. **<When power is turned on for the first time after installation>** It takes **approx. 5 minutes** until the remote control becomes available.



**<When power is turned on for the second (or later) time>**

It takes **approx. 1 minute** until the remote control becomes available.



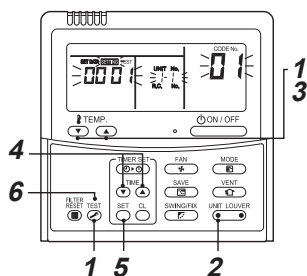
- Normal settings were made as factory default. Change the indoor unit settings as required.
- Use the wired remote control to change the settings.
- \* The settings cannot be changed using the wireless remote control, sub remote control, or remote-controlless system (for central remote control only). Therefore, install the wired remote control to change the settings.

## Basic procedure for changing settings

Change the settings while the air conditioner is not working. **(Stop the air conditioner before making settings.)**

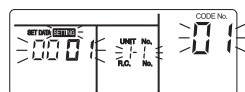
### CAUTION

Set only the CODE No. shown in the following table: Do NOT set any other CODE No. If a CODE No. not listed is set, it may not be possible to operate the air conditioner or other trouble with the product may result.



**1 Push and hold TEST button and "TEMP." button simultaneously for at least 4 seconds. After a while, the display flashes as shown in the figure. Confirm that the CODE No. is [01].**

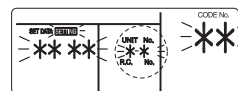
If the CODE No. is not [01], push TEST button to clear the display content, and repeat the procedure from the beginning. (No operation of the remote control is accepted for a while after TEST button is pushed.) (While air conditioners are operated under the group control, "ALL" is displayed first. When UNIT LOUVER is pushed, the indoor unit number displayed following "ALL" is the header unit.)



(\* Display content varies with the indoor unit model.)

**2 Each time UNIT LOUVER button is pushed, indoor unit numbers in the control group change cyclically. Select the indoor unit to change settings for.**

The fan of the selected unit runs and the louvers start swinging. The indoor unit for change settings can be confirmed.



**3 Specify CODE No. [\*\*] with "TEMP." / buttons.**

**4 Select SET DATA [\*\*\*\*] with "TIME" / buttons.**

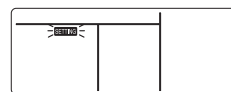
**5 Push SET button. When the display changes from flashing to lit, the setup is completed.**

- To change settings of another indoor unit, repeat from Procedure 2.
- To change other settings of the selected indoor unit, repeat from Procedure 3.

Use SET button to clear the settings. To make settings after SET button was pushed, repeat from Procedure 2.

**6 When settings have been completed, push TEST button to determine the settings.**

When TEST button is pushed, SETTING flashes and then the display content disappears and the air conditioner enters the normal stop mode. (While SETTING is flashing, no operation of the remote control is accepted.)



## External static pressure settings

Set up a tap change based upon the external static pressure of the duct to be connected.

To set up a tap change, follow to the basic operation procedure (1 → 2 → 3 → 4 → 5 → 6).

- Specify [5d] to the CODE No. in procedure 3.
- For the SET DATA of procedure 4, select a SET DATA of the external static pressure to be set up from the following table.

**<Change on wired remote control>**

SET DATA	External static pressure
0000	Standard (Factory default)
0001	High static pressure 1
0003	High static pressure 2
0006	Low static pressure

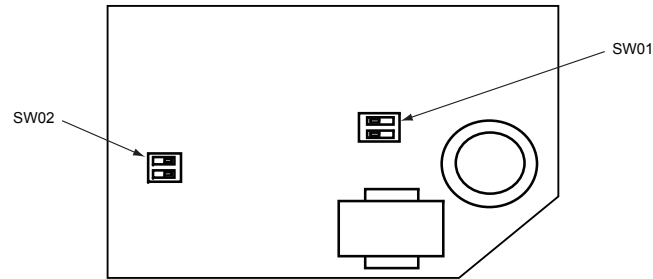


### ▼ With a remote control-less system (group control)

Besides the switching method using the wired remote control as a way to establish the external static pressure, switching is also possible by changing over the DIP switch settings on the indoor P.C. board as shown in the following table.

- \* However, once the settings are changed, it is necessary to reset the SET DATA to 0000 that placing the DIP switch back to the factory default position and rewriting the SET DATA back to 0000 with wired remote control (sold separately).
- Change over the DIP switch on the indoor P.C. board, and select the desired setting.

DIP switch positions (SW01, SW02)



DIP switch position	SW01	SW02	SW01	SW02	SW01	SW02	SW01	SW02
	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	ON	OFF	ON	OFF	ON	OFF	ON	OFF
<b>SET DATA</b>	0000		0001		0003		0006	
<b>External static pressure</b>	Standard (Factory default)		High static Pressure 1		High static Pressure 2		Low static Pressure	

### ■ Filter sign setting

According to the installation condition, the filter sign term (Notification of filter cleaning) can be changed. Follow to the basic operation procedure (1 → 2 → 3 → 4 → 5 → 6).

- For the CODE No. in Procedure 3, specify [01].
- For the [SET DATA] in Procedure 4, select the SET DATA of filter sign term from the following table.

SET DATA	Filter sign term
0000	None
0001	150 H
0002	2500 H (Factory default)
0003	5000 H
0004	10000 H

### ■ To secure better effect of heating

When it is difficult to obtain satisfactory heating due to installation place of the indoor unit or structure of the room, the detection temperature of heating can be raised. Also use a circulator or other machinery to circulate heat air near the ceiling.

Follow to the basic operation procedure (1 → 2 → 3 → 4 → 5 → 6).

- For the CODE No. in Procedure 3, specify [06].
- For the set data in Procedure 4, select the SET DATA of shift value of detection temperature to be set up from the following table.

SET DATA	Detection temperature shift value
0000	No shift
0001	1.8 °F (+1 °C)
0002	3.6 °F (+2 °C) (Factory default)
0003	5.4 °F (+3 °C)
0004	7.2 °F (+4 °C)
0005	9.0 °F (+5 °C)
0006	10.8 °F (+6 °C)


### ■ Remote control sensor

The temperature sensor of the indoor unit senses room temperature usually. Set the remote control sensor to sense the temperature around the remote control.

Select items following the basic operation procedure (1 → 2 → 3 → 4 → 5 → 6).

- Specify [32] for the CODE No. in Procedure 3.
- Select the following data for the SET DATA in Procedure 4.

SET DATA	0000	0001
remote control sensor	Not used (Factory default)	Used

When  flashes, the remote control sensor is defective.

Select the SET DATA [0000] (not used) or replace the remote control.

## ■ Power saving setting

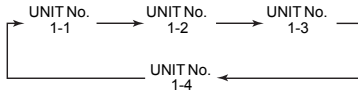
1. Push **SAVE** button for at least four seconds when the air conditioner is not working.

**SETTING** flashes.

Indicates CODE No. "C2."

2. Select an indoor unit to be set by pushing **UNIT LOUVER** (left side of the button).

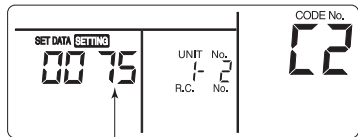
Each time you push the button, unit numbers change as follows:



3. Adjust the power save setting by pushing **TIME** buttons.

Each push of the button changes the power level by 1% within the range from 100% to 50%.

\* Factory default is 75%.



Setting of power level in power saving mode

4. Determine the setting by pushing **SET** button.

5. Push **TEST** button to complete the setting.

## ■ Remote control switch monitoring function

This function is available to call the service monitor mode from the remote control during a test run to acquire temperatures of sensors of the remote control, indoor unit, and outdoor unit.

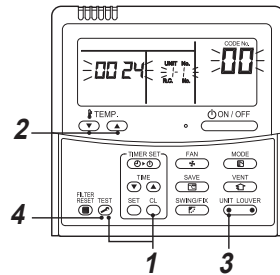
1. Push **CL** and **TEST** buttons simultaneously for at least 4 seconds to call the service monitor mode.

The service monitor indicator lights up and the header indoor unit number is displayed first. CODE No. **00** is also displayed.

2. Pushing **TEMP.** buttons, select the number of sensor, etc. (CODE No.) to be monitored. (See the following table.)

3. Pushing **UNIT LOUVER** (left side of the button), select an indoor unit to be monitored. The sensor temperatures of indoor units and their outdoor unit in the control group are displayed.

4. Push **TEST** button to return to the normal display.



Indoor unit data	
CODE No.	Data name
01	Room temperature (remote control)
02	Indoor unit intake air temperature (TA)
03	Indoor unit heat exchanger (coil) temperature (TCJ)
04	Indoor unit heat exchanger (coil) temperature (TC)
F3	Indoor unit fan cumulative operating hours (x1 h)
F8	Indoor unit discharge air temperature

Outdoor unit data	
CODE No.	Data name
60	Outdoor unit heat exchanger (coil) temperature (TE)
61	Outside air temperature (TO)
62	Compressor discharge air temperature (TD)
63	Compressor intake air temperature (TS)
64	—
65	Heat sink temperature (THS)
6A	Operating current (x1/10)
F1	Compressor cumulative operating hours (x100h)

## ■ Group control

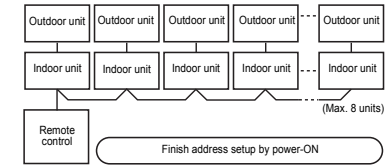
Group control is not available with the supplied wireless remote control.

Use the optional wired remote control.

### In case of group control for system of multiple units

One remote control can control maximum 8 indoor units as a group.

### ▼ In case of group control in single system



- For wiring procedure and wiring method of the individual line (identical refrigerant line) system, follow to "7. Electrical connection".
- Wiring between lines is performed in the following procedure. Connect the terminal block (A/B) of the indoor unit connected with a remote control to the terminal blocks (A/B) of the indoor units of other indoor units by wiring the inter-unit wire of the remote control.
- When the circuit breaker is turned on, the automatic address setup starts and which indicates that address is being set up flashes on the display part. During setup of automatic address, the remote control operation is not accepted.

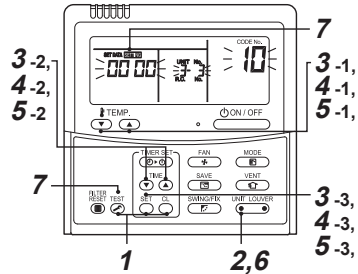
**Required time up to the finish of automatic addressing is approx. 5 minutes.**

### NOTE

In some cases, it is necessary to change the address manually after setup of the automatic address according to the system configuration of the group control.

## Manual address setup procedure (Procedure example 1)

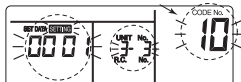
While the operation stops, change the setup.  
(Be sure to stop the operation of the unit.)



### Procedure 1

Push simultaneously **SET** + **CL** + **TEST** buttons for 4 seconds or more. After a while, the display part flashes as shown below. Check the displayed CODE No. is [10].

- When the CODE No. is other than [10], push **TEST** button to erase the display and repeat procedure from the first step. (After pushing **TEST** button, operation of the remote control is not accepted for approx. 1 minute.) (For a group control, No. of the firstly displayed indoor unit becomes the header unit.)



(\* Display changes according to the model No. of indoor unit.)

### Procedure 2

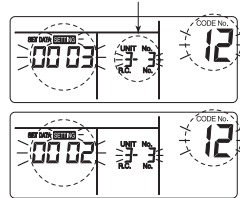
Every pushing **UNIT LOUVER** button, the indoor UNIT No. in the group control is displayed in order. Select the indoor unit of which setup is changed.

In this time, the position of the indoor unit of which setup is changed can be confirmed because fan of the selected indoor unit operate.

### Procedure 3

- Using temp. setup **▼** / **▲** buttons, specify CODE No. [12].  
(CODE No. [12]: Line address)
- Using timer time **▼** / **▲** buttons, change the line address from [3] to [2].
- Push **SET** button.  
In this time, the setup finishes when the display changes from flashing to lighting.

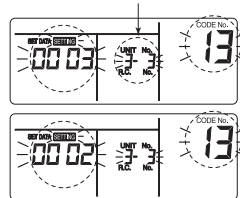
Indoor UNIT No. before setup change is displayed.



### Procedure 4

- Using temp. setup **▼** / **▲** buttons, specify CODE No. [13].  
(CODE No. [13]: Indoor address)
- Using timer time **▼** / **▲** buttons, change the indoor address from [3] to [2].
- Push **SET** button.  
In this time, the setup finishes when the display changes from flashing to lighting.

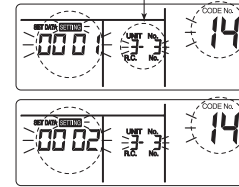
Indoor UNIT No. before setup change is displayed.



### Procedure 5

- Using temp. setup **▼** / **▲** buttons, specify CODE No. [14].  
(CODE No. [14]: Group address)
- Using timer time **▼** / **▲** buttons, change the SET DATA from [0001] to [0002].  
(SET DATA [Header unit: 0001] [Follower unit: 0002])
- Push **SET** button.  
In this time, the setup finishes when the display changes from flashing to lighting.

Indoor UNIT No. before setup change is displayed.



### Procedure 6

If there is other indoor unit to be changed, repeat procedure 2 to 5 to change the setup.

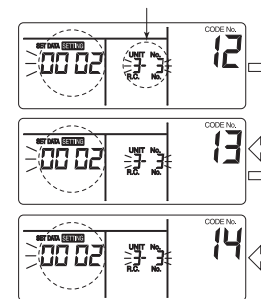
When the above setup has finished, push **UNIT LOUVER** to select the indoor UNIT No. before change of setup, specify CODE No. [12], [13], [14] in order with temp. setup **▼** / **▲** buttons, and then check the changed contents.

Address change check Before change:  
[3-3-1] → After change: [2-2-2]

Pushing **CL** button clears the contents of which setup was changed.

(In this case, procedure from 2 is repeated.)

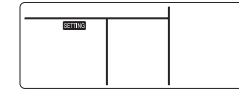
Indoor UNIT No. before setup change is displayed.



### Procedure 7

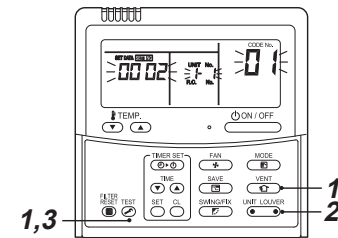
After check of the changed contents, push **TEST** button. (Setup is determined.) When pushing **TEST** button, the display disappears and the status becomes the usual stop status. (When pushing **TEST** button the operation from the remote control is not accepted for approx. 1 minute.)

\* If the operation from the remote control is not accepted even 1 minute or more passed after pushing **TEST** button, it is considered that the address setup is incorrect. In this case, the automatic address must be again set up. Therefore repeat procedure of the setup change from the Procedure 1.



### To recognize the position of the corresponding indoor unit though the indoor UNIT No. is known

Check the position during operation stop.  
(Be sure to stop operation of the set.)



### Procedure 1

Push simultaneously + buttons for 4 seconds or more.

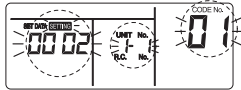
After a while, the display part flashes and the display appears as shown below.

In this time, the position can be checked because fan and louver of the indoor unit operate.

- For the group control, the indoor UNIT No. is displayed as [ALL] and fans of all the indoor units in the group control operate.

Check the displayed CODE No. is [01].

- When the CODE No. is other than [01], push button to erase the display and repeat procedure from the first step. (After pushing button, operation of the remote control is not accepted for approx. 1 minute.)



(\* Display changes according to the model No. of indoor unit.)

### Procedure 2

In the group control, every pushing button, the indoor UNIT No. in the group control is displayed in order.

In this time, the position of the indoor unit can be confirmed because only fan of the selected indoor unit operate.

(For a group control, No. of the firstly displayed indoor unit becomes the header unit.)

### Procedure 3

After confirmation, push button to return the mode to the usual mode.

When pushing button, the display disappears and the status becomes the usual stop status.

(When pushing button the operation from the remote control is not accepted for approx. 1 minute.)



## Central control system

Air conditioners at multiple locations can be controlled individually for each refrigeration system from a control room. Central control is not available with the supplied wireless remote control. Use the optional wired remote control.

### Wiring for central control

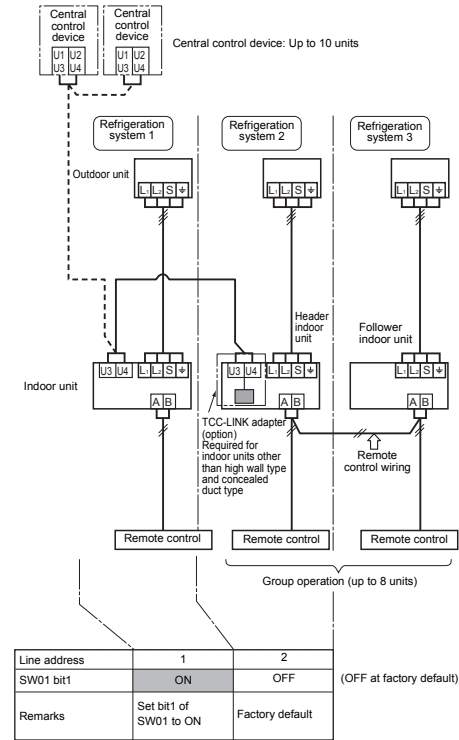
The terminal block for central control wiring ( and ) is the same as that for optional wired remote control. Connect the central control wire to the terminals ( and ) on the terminal block in the same way as the optional wired remote control.

For details, refer to the Installation Manual of the applicable central control system.

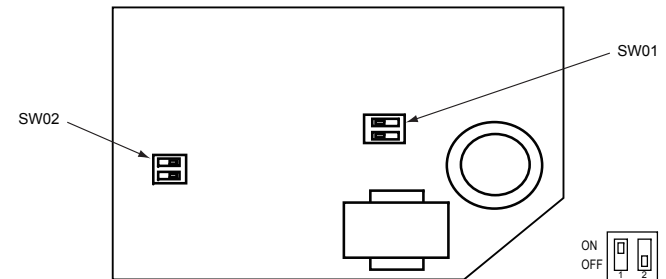
### Centrally control the system by the SDI series on their own

**Setting for the terminating resistor is required.**

- Use switch SW01 for the setting.
- Make the terminating resistor setting only for the indoor unit with the smallest line address number.



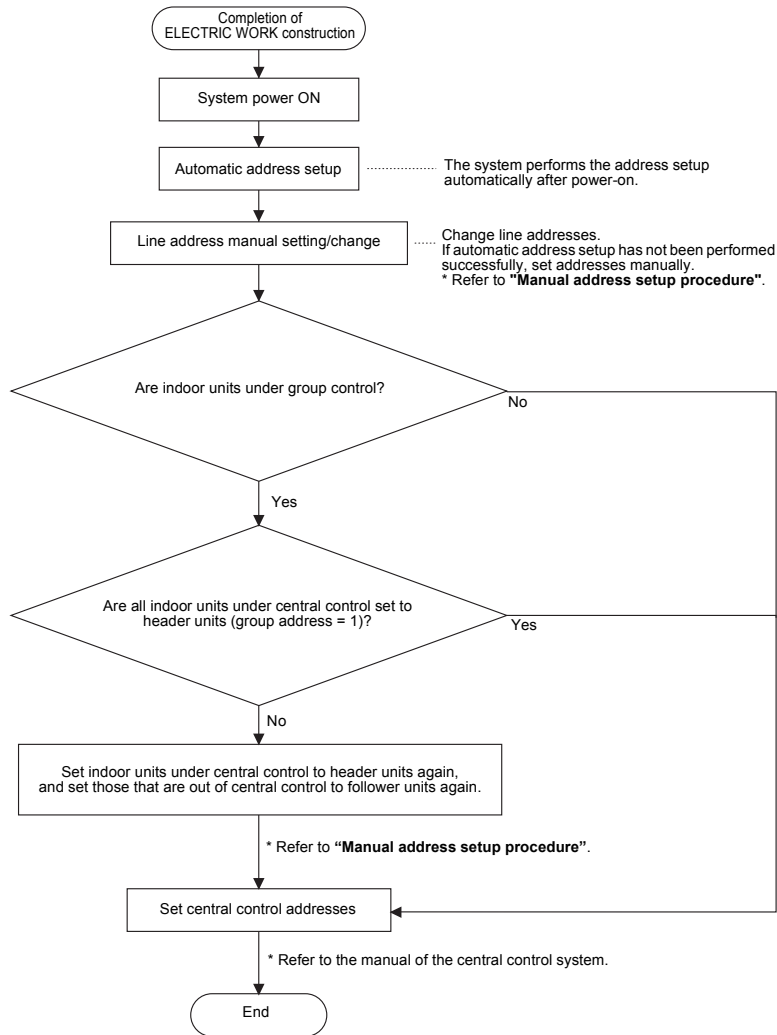
DIP switch positions (SW01, SW02)



▼ Centrally control the system by connecting to the TCC-LINK central control system.

**Setting central control addresses**

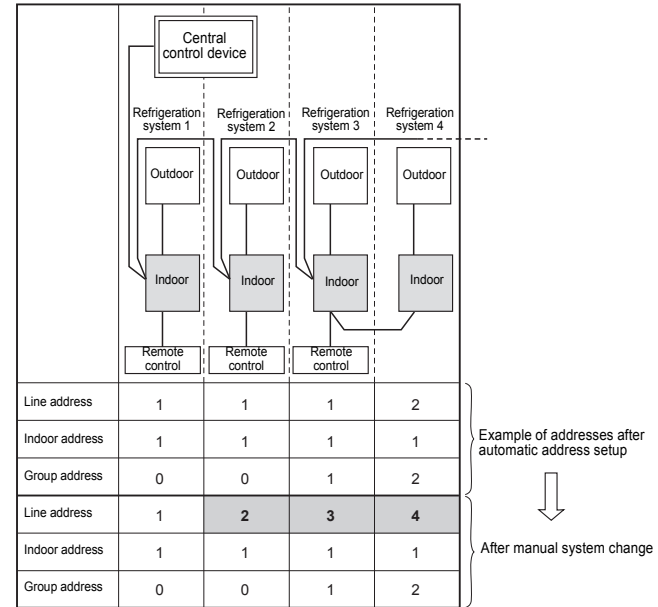
When connecting air conditioners of the SDI series to the TCC-LINK central control system for central control using this product, set the addresses of indoor units using the following procedure.



**1. Indoor unit line address manual setting/change**

[For 29 or less refrigeration systems (when used together with the SMMS series, the number of refrigeration systems of the SMMS series is included.)]

Since all line addresses are set to "1" except for group control by the automatic address setup function after system power-on, change the line addresses for each refrigeration system using the wired remote control.



**NOTE**

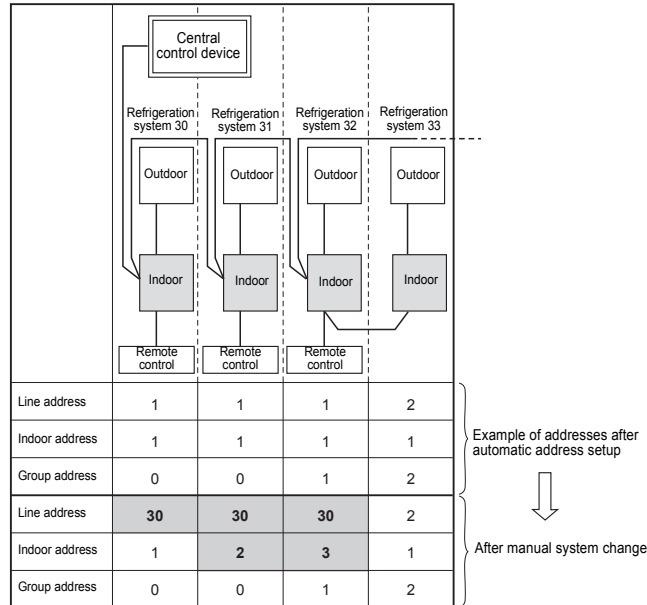
- For changing/setting line addresses using the wired remote control, refer to "Manual address setup procedure".
- Line addresses must be unique for each refrigeration system. Set a line address that is different from any of line addresses of other refrigeration systems.  
(If indoor units of the SDI series are operated under central control together with those of the SMMS series, set line addresses different from those of the SMMS series.)

## 2. Indoor unit line address manual setting/change

[For 30 or more refrigeration systems (when used together with the SMMS series, the number of refrigeration systems of the SMMS series is included.)]

The line address change/setting procedure for up to the 29th refrigeration system is the same as that described in step 1 on the previous page.

- Since all line addresses are set to “1” except for group control by the automatic address setup function after system power-on, change the line addresses for each refrigeration system using the wired remote control.
- Also change the indoor addresses so that they are not duplicated.



### NOTE

- For changing/setting line addresses using the wired remote control, refer to “Manual address setup procedure”.
- Line addresses must be unique for each refrigeration system. Set a line address that is different from any of line addresses of other refrigeration systems.  
(If indoor units of the SDI series are operated under central control together with those of the SMMS series, set line addresses different from those of the SMMS series.)

# 9 Test run

## ■ Before test run

- Before turning on the power supply, carry out the following procedure.
  - 1) By using 500 V-megger, check that resistance of 1 MΩ or more exists between the terminal block L1 to L2 and the grounding. If resistance of less than 1 MΩ is detected, do not run the unit.
  - 2) Check the valve of the outdoor unit being opened fully.
- To protect the compressor at activation time, leave power-ON for 12 hours or more before operating.

## ■ Execute a test run

Operate the unit with the wired remote control as usual. For the procedure of the operation, refer to the attached Owner's Manual.

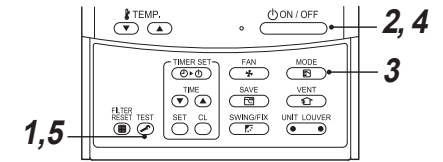
A forced test run can be executed in the following procedure even if the operation stops by thermostat-OFF.

In order to prevent a serial operation, the forced test run is released after 60 minutes have passed and returns to the usual operation.

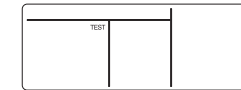
### ⚠ CAUTION

Do not use the forced test run for cases other than the test run because it applies an excessive load to the devices.

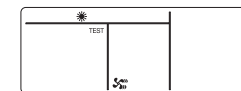
## Wired remote control



- 1 Push **TEST** button for 4 seconds or more. [TEST] is displayed on the display part and the selection of mode in the test mode is permitted.



- 2 Push **ON/OFF** button.
- 3 Select the operation mode with **MODE** button, [**Cool**] or [**Heat**].
  - Do not run the air conditioner in a mode other than [**Cool**] or [**Heat**].
  - The temperature controlling function does not work during test run.
  - The detection of trouble is performed as usual.



- 4 After the test run, push **ON/OFF** button to stop a test run.  
(Display part is same as procedure 1.)
- 5 Push **TEST** button to cancel (release from) the test run mode.  
([TEST] disappears on the display and the status returns to a normal.)



## Wireless remote control

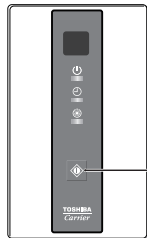
(TCB-AX32-UL)

- 1 When TEMPORARY button is pushed for 10 seconds or more, "P!" sound is heard and the operation changes to a forced cooling operation. After approx. 3 minutes, a cooling operation starts forcedly.

Check cool air starts blowing. If the operation does not start, check wiring again.

- 2 To stop a test operation, push TEMPORARY button once again (Approx. 1 second).

- Check wiring / piping of the indoor and outdoor units in forced cooling operation.



TEMPORARY button

## ■ If a test run cannot be properly performed

If a test run is performed before the outside duct is installed, the protective control works to stop the unit, and the check code "P12" appears. This is not a malfunction.

(The current control works and heating protection control due to the characteristics of the DC motor employed as the indoor fan motor of this model.)

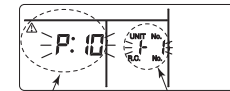
If performing a test run before installing the outside duct, set the air volume to LOW, or block the air vent.

# 10 Troubleshooting

## ■ Confirmation and check

When a trouble occurred in the air conditioner, the check code and the indoor UNIT No. appear on the display part of the remote control.

The check code is only displayed during the operation. If the display disappears, operate the air conditioner according to the following "Confirmation of trouble history" for confirmation.



Check code

Indoor UNIT No. in which a trouble occurred

### Procedure 2

Every pushing of button used to set temperature, the trouble history stored in memory is displayed in order.

The numbers in CODE No. indicate CODE No. [01] (latest) → [04] (oldest).

### REQUIREMENT

Do not push button because all the trouble history of the indoor unit will be deleted.

### Procedure 3

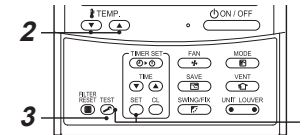
After confirmation, push button to return to the usual display.

1. Check the troubles according to the above procedure.
2. Ask an authorized dealer or qualified service (maintenance) professional to repair or maintain the air conditioner.

## ■ Confirmation of trouble history

When a trouble occurred on the air conditioner, the trouble history can be confirmed with the following procedure. (The trouble history is stored in memory up to 4 troubles.)

The history can be confirmed from both operating status and stop status.

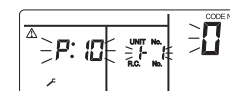


### Procedure 1

When pushing and buttons at the same time for 4 seconds or more, the following display appears.

If [Service check] is displayed, the mode enters in the trouble history mode.

- [01 : Order of trouble history] is displayed in CODE No. window.
- [Check code] is displayed in CHECK window.
- [Indoor unit address in which a trouble occurred] is displayed in Unit No.



### ■ Check codes and parts to be checked

Wired remote control display	Wireless remote control Sensor block display of receiving unit				Main defective parts	Judging device	Parts to be checked / trouble description	Air conditioner status
	Indication	Operation GR	Timer GR	Ready OR				
E01	◎	●	●	●		Remote control	Incorrect remote control setting --- The header remote control has not been set (including two remote controls). No signal can be received from the indoor unit.	*
E02	◎	●	●	●		Remote control	Remote control transmission trouble System interconnection wires, indoor P.C. board, remote control --- No signal can be sent to the indoor unit.	*
E03	◎	●	●	●		Indoor	Indoor unit-remote control regular communication trouble Remote control, network adapter, indoor P.C. board --- No data is received from the remote control or network adapter.	Auto-reset
E04	●	●	◎	◎		Indoor	Indoor unit-outdoor unit serial communication trouble IPDU-CDB communication trouble System interconnection wires, indoor P.C. board, outdoor P.C. board --- Serial communication trouble between indoor unit and outdoor unit	Auto-reset
E08	◎	●	●	●		Indoor	Duplicated indoor addresses ★ Indoor address setting trouble --- The same address as the self-address was detected.	Auto-reset
E09	◎	●	●	●		Remote control	Duplicated header remote controls Remote control address setting trouble --- Two remote controls are set as header in the double-remote control control. (* The header indoor unit stops raising alarm and follower indoor units continue to operate.)	*
E10	◎	●	●	●		Indoor	CPU-CPU communication trouble Indoor P.C. board --- Communication trouble between main MCU and motor microcomputer MCU	Auto-reset
E18	◎	●	●	●		Indoor	Header indoor unit-indoor follower unit regular communication trouble Indoor P.C. board --- Regular communication is not possible between header and follower indoor units or between twin header (main) and follower (sub) units.	Auto-reset
E31	●	●	◎	◎		Outdoor	IPDU communication trouble Communication trouble between IPDU and CDB	Entire stop
F01	◎	◎	●	●	ALT	Indoor	Indoor unit heat exchanger sensor (TCJ) trouble Heat exchanger sensor (TCJ), indoor P.C. board --- Open-circuit or short-circuit of the heat exchanger sensor (TCJ) was detected.	Auto-reset
F02	◎	◎	●	●	ALT	Indoor	Indoor unit heat exchanger sensor (TC) trouble Heat exchanger sensor (TC), indoor P.C. board --- Open-circuit or short-circuit of the heat exchanger sensor (TC) was detected.	Auto-reset
F04	◎	◎	○	○	ALT	Outdoor	Outdoor unit discharge temp. sensor (TD) trouble Outdoor temp. sensor (TD), outdoor P.C. board --- Open-circuit or short-circuit of the discharge temp. sensor was detected.	Entire stop
F06	◎	◎	○	○	ALT	Outdoor	Outdoor unit temp. sensor (TE/TS) trouble Outdoor temp. sensors (TE/TS), outdoor P.C. board --- Open-circuit or short-circuit of the heat exchanger temp. sensor was detected.	Entire stop
F07 (F06)	◎	◎	○	○	ALT	Outdoor	TL sensor trouble TL sensor may be displaced, disconnected or short-circuited.	Entire stop
F08	◎	◎	○	○	ALT	Outdoor	Outdoor unit outside air temp. sensor trouble Outdoor temp. sensor (TO), outdoor P.C. board --- Open-circuit or short-circuit of the outdoor air temp. sensor was detected.	Operation continued
F10	◎	◎	●	●	ALT	Indoor	Indoor unit room temp. sensor (TA) trouble Room temp. sensor (TA), indoor P.C. board --- Open-circuit or short-circuit of the room temp. sensor (TA) was detected.	Auto-reset
F12 (F06)	◎	◎	○	○	ALT	Outdoor	TS sensor trouble TS sensor may be displaced, disconnected or short-circuited.	Entire stop
F13 (L29)	◎	◎	○	○	ALT	Outdoor	Heat sink sensor trouble Abnormal temperature was detected by the temp. sensor of the IGBT heat sink.	Entire stop
F15 (F06)	◎	◎	○	○	ALT	Outdoor	Temp. sensor connection trouble Temp. sensor (TE/TS) may be connected incorrectly.	Entire stop
F29	◎	◎	●	●	SIM	Indoor	Indoor unit, other P.C. board trouble Indoor P.C. board --- EEPROM trouble	Auto-reset

F31 (L29)	◎ ◎ ○		SIM	Outdoor unit P.C. board	Outdoor	Outdoor P.C. board --- In the case of EEPROM trouble.	Entire stop
H01	● ◎ ●			Outdoor unit compressor breakdown	Outdoor	Current detect circuit, power voltage --- Minimum frequency was reached in the current releasing control or short-circuit current (Idc) after direct excitation was detected Wiring trouble of compressor (open phase)	Entire stop
H02	● ◎ ●			Outdoor unit compressor lock	Outdoor	Compressor circuit --- Compressor lock was detected. Wiring trouble of compressor (open phase)	Entire stop
H03	● ◎ ●			Outdoor unit current detect circuit trouble	Outdoor	Current detect circuit, outdoor unit P.C. board --- Abnormal current was detected in AC-CT or a phase loss was detected.	Entire stop
H04 (P04)	● ◎ ●			Case thermostat operation	Outdoor	Malfunction of the case thermostat	Entire stop
H06	● ◎ ●			Outdoor unit low-pressure system trouble	Outdoor	Current, high-pressure switch circuit, outdoor P.C. board --- Ps pressure sensor trouble was detected or low-pressure protective operation was activated.	Entire stop
L03	◎ ● ◎		SIM	Duplicated header indoor units ★	Indoor	Indoor address setting trouble --- There are two or more header units in the group.	Entire stop
L07	◎ ● ◎		SIM	Group line in individual indoor unit ★	Indoor	Indoor address setting trouble --- There is at least one group-connected indoor unit among individual indoor units.	Entire stop
L08	◎ ● ◎		SIM	Indoor group address not set ★	Indoor	Indoor address setting trouble --- Indoor address group has not been set.	Entire stop
L09	◎ ● ◎		SIM	Indoor power level not set	Indoor	Indoor power level has not been set.	Entire stop
L10 (L29)	◎ ○ ◎		SIM	Outdoor unit P.C. board	Outdoor	In the case of outdoor P.C. board jumper wire (for service) setting trouble	Entire stop
L20	◎ ○ ◎		SIM	LAN communication trouble	Network adapter central control	Address setting, central control remote control, network adapter --- Duplication of address in central control communication	Auto-reset
L29	◎ ○ ◎		SIM	Other outdoor unit trouble	Outdoor	Other outdoor unit trouble 1) Communication trouble between IPDU MCU and CDB MCU 2) Abnormal temperature was detected by the heat sink temp. sensor in IGBT.	Entire stop
L30	◎ ○ ◎		SIM	Abnormal external input into indoor unit (interlock)	Indoor	External devices, outdoor unit P.C. board --- Abnormal stop due to incorrect external input into CN80	Entire stop
L31	◎ ○ ◎		SIM	Phase sequence trouble, etc.	Outdoor	Power supply phase sequence, outdoor unit P.C. board --- Abnormal phase sequence of the 3-phase power supply	Operation continued (thermostat OFF)
P01	● ◎ ◎		ALT	Indoor unit fan trouble	Indoor	Indoor fan motor, indoor P.C. board --- Indoor AC fan trouble (fan motor thermal relay activated) was detected.	Entire stop
P03	◎ ● ◎		ALT	Outdoor unit discharge temp. trouble	Outdoor	A trouble was detected in the discharge temp. releasing control.	Entire stop
P04	◎ ● ◎		ALT	Outdoor unit high-pressure system trouble	Outdoor	High-pressure switch --- The IOL was activated or a trouble was detected in the high-pressure releasing control using the TE.	Entire stop
P05 (P04)	◎ ● ◎		ALT	Open phase detected	Outdoor	The power cable may be connected incorrectly. Check open phase and voltages of the power supply.	Entire stop
P07	◎ ● ◎		ALT	Heat sink overheat	Outdoor	Abnormal temperature was detected by the temp. sensor of the IGBT heat sink.	Entire stop
P10	● ◎ ◎		ALT	Indoor unit water overflow detected	Indoor	Drain pipe, clogging of drainage, float switch circuit, indoor P.C. board --- Drainage is out of order or the float switch was activated.	Entire stop
P15 (L29)	◎ ● ◎		ALT	Gas leakage detected	Outdoor	There may be gas leakage from the pipe or connecting part. Check for gas leakage.	Entire stop
P19 (L29)	◎ ● ◎		ALT	4-way valve trouble	Outdoor (Indoor)	4-way valve, indoor temp. sensors (TC/TCJ) --- A trouble was detected due to temperature drop of the indoor unit heat exchanger sensor when heating.	Auto-reset (Auto-reset)
P20 (P04)	◎ ● ◎		ALT	High-pressure protective operation	Outdoor	High-pressure protection	Entire stop



P22	⊙ ● ⊙	ALT	Outdoor unit fan trouble	Outdoor	Outdoor unit fan motor, outdoor unit P.C. board --- A trouble (overcurrent, locking, etc.) was detected in the outdoor unit fan drive circuit.	Entire stop
P26	⊙ ● ⊙	ALT	Outdoor unit inverter Idc activated	Outdoor	IGBT, outdoor unit P.C. board, inverter wiring, compressor --- Short-circuit protection for compressor drive circuit devices (G-Tr/I/GBT) was activated.	Entire stop
P29	⊙ ● ⊙	ALT	Outdoor unit position trouble	Outdoor	Outdoor unit P.C. board, high-pressure switch --- Compressor motor position trouble was detected.	Entire stop
P31	⊙ ● ⊙	ALT	Other indoor unit trouble	Indoor	Another indoor unit in the group is raising an alarm.	Entire stop
					E03/L07/L03/L08 alarm check locations and trouble description	Auto-reset

Check codes in parentheses ( ) are displayed when connected to an outdoor unit other than the new SDI series.  
 ○ : Lighting ⊙ : Flashing ● : OFF ★ : The air conditioner automatically enters the auto-address setting mode.  
 ALT: When two LEDs are flashing, they flash alternately. SIM: When two LEDs are flashing, they flash in synchronization.  
 Receiving unit display OR: Orange GR: Green

**TOSHIBA CARRIER CORPORATION**

**EB99810201**