TOSHIBA Carrier
AIR CONDITIONER (SPLIT TYPE)
Installation Manual

Indoor Unit
Model name:
Concealed Duct Type
RAV-SP181BT-UL
RAV-SP241BT-UL
RAV-SP301BT-UL
RAV-SP361BT-UL
RAV-SP421BT-UL
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.

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 aluminum 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.

Accessory parts

<table>
<thead>
<tr>
<th>Part name</th>
<th>Q’ty</th>
<th>Shape</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner’s Manual</td>
<td>1</td>
<td>This manual</td>
<td>(Be sure to hand it to the customers.)</td>
</tr>
<tr>
<td>Installation Manual</td>
<td>1</td>
<td>This manual for installer</td>
<td></td>
</tr>
<tr>
<td>Heat insulating pipe</td>
<td>2</td>
<td>[Diagram]</td>
<td>For heat insulation of pipe connecting section</td>
</tr>
<tr>
<td>Washer</td>
<td>8</td>
<td>[Diagram]</td>
<td>For hanging-up unit (0.4” × Ø1.3” (M10 × Ø34))</td>
</tr>
<tr>
<td>Drain socket</td>
<td>1</td>
<td>[Diagram]</td>
<td>For connect drain pipe</td>
</tr>
<tr>
<td>Banding band</td>
<td>2</td>
<td>[Diagram]</td>
<td>For fixing of pipe connecting heat insulator</td>
</tr>
<tr>
<td>Screw</td>
<td>8</td>
<td>[Diagram]</td>
<td>For attaching a fan guard (sold separately) for air intake from underneath</td>
</tr>
</tbody>
</table>
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, 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.

Preparation before installation

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

Reserve sufficient space required for installation or service work.

<table>
<thead>
<tr>
<th>Unit width</th>
<th>Air filter width</th>
<th>Ceiling opening size C</th>
<th>Space required for attaching or detaching the filter D</th>
</tr>
</thead>
<tbody>
<tr>
<td>27.6&quot; (700)</td>
<td>25.0&quot; (635)</td>
<td>29.5&quot; (750)</td>
<td>28.7&quot; (730)</td>
</tr>
<tr>
<td>39.4&quot; (1000)</td>
<td>38.0&quot; (965)</td>
<td>41.3&quot; (1050)</td>
<td>23.6&quot; (600)</td>
</tr>
<tr>
<td>53.2&quot; (1350)</td>
<td>52&quot; (1321)</td>
<td>55.1&quot; (1400)</td>
<td>40.5&quot; (1030)</td>
</tr>
</tbody>
</table>

**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.
- For air intake from under air intake, reserve a space of 17.7" (450 mm) or more.
- When pulling the refrigerant pipe, drain pipe, etc., avoid the filter port. Otherwise, the filter cannot be replaced.
- Set a ceiling opening port for maintaining the fan, fan motor, etc. Otherwise, they cannot be maintained.

### Arranging the under intake type

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

#### <Back air intake>

1. Remove the cover plate A.
2. Attach the FAN-GUARD. (Sold separately)
3. Use the supplied screws.
4. Fix the cover plate A.
5. Remove the filter flange and then fix it to the bottom surface.

#### <Under air intake>

1. Remove the cover plate A.
2. Attach the FAN-GUARD. (Sold separately)
3. Use the supplied screws.
4. Fix the cover plate A.

### 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.

### Electrical control box

- Air filter (locally procured)
- Space required for attaching or detaching the filter

### CAUTION

For air intake from under air intake, reserve a space of 17.7" (450 mm) or more.

### FAN-GUARD

<table>
<thead>
<tr>
<th>Model</th>
<th>RAV:</th>
<th>SP18 type</th>
<th>SP24 type</th>
<th>SP30 to SP42 type</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAN-GUARD</td>
<td>TCB-503718UL-1</td>
<td>TCB-501518UL</td>
<td>TCB-102718UL</td>
<td></td>
</tr>
</tbody>
</table>

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).
- To install vibration isolation material to hanging bolts, confirm that it does not increase the unit vibration.

### External dimensions

**Unit:** in (mm)

- **Hanging bolt pitch**
  - **A:** 1.8" (41)

- **Unit external dimension**
  - **A:** 27.6" (700)
  - **B:** 30.2" (766)
  - **C:** 31.6" (801.6)

- **Air discharge flange outside**
  - **A:** 2.2" (57)
  - **B:** 2.4" (59)

- **Air filter slot**
  - **A:** 25.1" (638)

- **Refrigerant pipe connecting port**
  - **Gas side (F):** Ø1" (26)
  - **Liquid side (G):** Ø7/8" (22.2)

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

- **Air intake**
  - **Model RAV-**
    - **SP18:** 34.6" (880)
    - **SP24:** 37.8" (959)
    - **SP30, SP36, SP42:** 43.4" (1104)

### Diagrams

- **<Back air intake>**
  - Drain pipe connecting port
  - VP25 (Polyvinyl chloride tube: External Dia, 1-1/4" Internal Dia, 1")
  - Refrigerant pipe connecting port (Liquid side)
  - Hole for power supply cable

- **<Under air intake>**
  - Hole for control wire and remote control wiring
  - Hole for power supply cable

### Dimensions Chart

<table>
<thead>
<tr>
<th>Model RAV-</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP18</td>
<td>27.6&quot; (700)</td>
<td>30.2&quot; (766)</td>
<td>19.7&quot; (501.6)</td>
<td>24.6&quot; (621.6)</td>
<td>1/2&quot; (12.7)</td>
<td>1/4&quot; (6.4)</td>
<td></td>
</tr>
<tr>
<td>SP24</td>
<td>30.4&quot; (770)</td>
<td>42&quot; (1066)</td>
<td>31.6&quot; (801.6)</td>
<td>36.3&quot; (921.6)</td>
<td>3/4&quot; (15.9)</td>
<td>3/8&quot; (9.5)</td>
<td></td>
</tr>
<tr>
<td>SP30, SP36, SP42</td>
<td>53.2&quot; (1350)</td>
<td>55.7&quot; (1416)</td>
<td>45.4&quot; (1151.6)</td>
<td>50.7&quot; (1271.6)</td>
<td>5/8&quot; (15.9)</td>
<td>3/8&quot; (9.5)</td>
<td></td>
</tr>
</tbody>
</table>
**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.

<table>
<thead>
<tr>
<th>Requirement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Check that four sides are horizontal with a level gauge. (Horizontal degree: Within 0.2&quot; (5 mm))</td>
<td></td>
</tr>
</tbody>
</table>

_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._

**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.

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.

**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.
Fan characteristics

<Back air intake>

181 type

Standard Air Flow: 459 (cfm)

241 type

Standard Air Flow: 735 (cfm)

301 type

Standard Air Flow: 953 (cfm)

361, 421 type

Standard Air Flow: 1165 (cfm)
<Under air intake>

### 181 type

- **Standard Air Flow:** 410 (cfm)

### 241 type

- **Standard Air Flow:** 700 (cfm)

### 301 type

- **Standard Air Flow:** 903 (cfm)

### 361, 421 type

- **Standard Air Flow:** 1165 (cfm)
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.

<table>
<thead>
<tr>
<th>MODEL: RAV-SP</th>
<th>SP20 to SP42 type</th>
<th>SP24 type</th>
<th>SP18 type</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>52&quot; (1320)</td>
<td>39.2&quot; (990)</td>
<td>26.4&quot; (670)</td>
</tr>
<tr>
<td>H</td>
<td>12.6&quot; (320)</td>
<td>12.6&quot; (320)</td>
<td>12.6&quot; (320)</td>
</tr>
<tr>
<td>D</td>
<td>1&quot; (25)</td>
<td>1&quot; (25)</td>
<td>1&quot; (25)</td>
</tr>
</tbody>
</table>

Filter size (H × W × D) and quantity

- 12" × 20" × 1", (2) piece
- 12" × 16" × 1", (1) piece
- 12" × 18" × 1", (1) piece
- 12" × 25" × 1", (1) piece

Two positions for filter rack

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.

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.

**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.

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![Diagram showing condensate drain setup and insulation details.](image-url)
6 Refrigerant piping and evacuation

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

■ Pipe size

<table>
<thead>
<tr>
<th>Model name</th>
<th>RAV-SP18 type</th>
<th>SP24, SP30, SP36, SP42 type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas side</td>
<td>1/2&quot; (12.7 mm)</td>
<td>3/8&quot; (15.9 mm)</td>
</tr>
<tr>
<td>Liquid side</td>
<td>1/4&quot; (6.4 mm)</td>
<td>3/32&quot; (9.5 mm)</td>
</tr>
</tbody>
</table>

■ 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.

■ Projection margin in flaring : B (Unit : in (mm))
<table>
<thead>
<tr>
<th>Rigid (Clutch type)</th>
<th>Conventional tool used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer dia. of copper pipe</td>
<td>R410A</td>
</tr>
<tr>
<td>1/4&quot; (6.4), 3/8&quot; (9.5)</td>
<td>0 - 0.02&quot;</td>
</tr>
<tr>
<td>1/2&quot; (12.7), 5/8&quot; (15.9)</td>
<td>0 - 0.05&quot;</td>
</tr>
</tbody>
</table>

■ Flaring dia. meter size : A (Unit : in (mm))
<table>
<thead>
<tr>
<th>Outer dia. of copper pipe</th>
<th>A (Unit : in (mm))</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4&quot; (6.4)</td>
<td>0.36&quot; (9.1)</td>
</tr>
<tr>
<td>3/8&quot; (9.5)</td>
<td>0.52&quot; (13.2)</td>
</tr>
<tr>
<td>1/2&quot; (12.7)</td>
<td>0.65&quot; (16.6)</td>
</tr>
<tr>
<td>5/8&quot; (15.9)</td>
<td>0.78&quot; (19.7)</td>
</tr>
</tbody>
</table>

■ 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.

■ 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.

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.

■ 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.

■ 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.
**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:

![Diagram of heat insulation process]

- **Indoor unit**
- **Flare nut**
- **Union**
- **Heat insulator of the pipe**
- **Banding band (Accessory)**

**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 electric 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 control 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.

## 7 Electrical connection

### WARNING

1. 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.
2. 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.
3. 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 control 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.
**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.

**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.

* Only at the time of Central control use.

**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.
### 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.**

1. Push and hold **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 **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 **button is pushed.)

2. When settings have been completed, push **button to determine the settings.** When **button is pushed, **flashes and then the display content disappears and the air conditioner enters the normal stop mode. (While **is flashing, no operation of the remote control is accepted.)


4. Select SET DATA [xxxx] with “TIME” **buttons.

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

6. Push **button to change settings. When **button is pushed, **flashes and then the display content disappears and the air conditioner enters the normal stop mode.

**NOTE**

- 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.

- When settings have been completed, push **button to determine the settings. When **button is pushed, **flashes and then the display content disappears and the air conditioner enters the normal stop mode. (While **is flashing, no operation of the remote control is accepted.)

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

**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.

<table>
<thead>
<tr>
<th>SET DATA</th>
<th>External static pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>Standard (Factory default)</td>
</tr>
<tr>
<td>0001</td>
<td>High static pressure 1</td>
</tr>
<tr>
<td>0003</td>
<td>High static pressure 2</td>
</tr>
<tr>
<td>0006</td>
<td>Low static pressure</td>
</tr>
</tbody>
</table>

**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.

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

<table>
<thead>
<tr>
<th>DIP switch position</th>
<th>SW01</th>
<th>SW02</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SET DATA</th>
<th>Filter sign term</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>None</td>
</tr>
<tr>
<td>0001</td>
<td>150 H</td>
</tr>
<tr>
<td>0002</td>
<td>2500 H</td>
</tr>
<tr>
<td>0003</td>
<td>5000 H</td>
</tr>
<tr>
<td>0004</td>
<td>10000 H</td>
</tr>
</tbody>
</table>

**SET DATA 0000 0001**

**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.

**Remote control sensor**

<table>
<thead>
<tr>
<th>SET DATA</th>
<th>Detection temperature shift value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>No shift</td>
</tr>
<tr>
<td>0001</td>
<td>1.8 °F (+1 °C)</td>
</tr>
<tr>
<td>0002</td>
<td>3.6 °F (+2 °C)</td>
</tr>
<tr>
<td>0003</td>
<td>5.4 °F (+3 °C)</td>
</tr>
<tr>
<td>0004</td>
<td>7.2 °F (+4 °C)</td>
</tr>
<tr>
<td>0005</td>
<td>9.0 °F (+5 °C)</td>
</tr>
<tr>
<td>0006</td>
<td>10.8 °F (+6 °C)</td>
</tr>
</tbody>
</table>

**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).

- Specify [06] for the CODE No. in Procedure 3.
- 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.

**To secure better effect of heating**

<table>
<thead>
<tr>
<th>SET DATA</th>
<th>Filter sign term</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>None</td>
</tr>
<tr>
<td>0001</td>
<td>150 H</td>
</tr>
<tr>
<td>0002</td>
<td>2500 H</td>
</tr>
<tr>
<td>0003</td>
<td>5000 H</td>
</tr>
<tr>
<td>0004</td>
<td>10000 H</td>
</tr>
</tbody>
</table>

**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.

**Filter sign setting**

<table>
<thead>
<tr>
<th>SET DATA</th>
<th>Filter sign term</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>None</td>
</tr>
<tr>
<td>0001</td>
<td>150 H</td>
</tr>
<tr>
<td>0002</td>
<td>2500 H</td>
</tr>
<tr>
<td>0003</td>
<td>5000 H</td>
</tr>
<tr>
<td>0004</td>
<td>10000 H</td>
</tr>
</tbody>
</table>
### Power saving setting

1. Push \( \square \) button for at least four seconds when the air conditioner is not working. \( \square \) flashes. Indicates CODE No. “C2.”
2. Select an indoor unit to be set by pushing \( \square \) buttons (left side of the button). Each time you push the button, unit numbers change as follows:
   - UNIT No. 1-1
   - UNIT No. 1-2
   - UNIT No. 1-3
   - UNIT No. 1-4
3. Adjust the power save setting by pushing \( \square \) buttons. Each push of the button changes the power level by 1% within the range from 100% to 50%.
   - Factory default is 75%.
4. Determine the setting by pushing \( \square \) button.
5. Push \( \square \) 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 \( \square \) and \( \square \) 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. \( \square \) is also displayed.
2. Pushing \( \square \) buttons, select the number of sensor, etc. (CODE No.) to be monitored. (See the following table.)
3. Pushing \( \square \) (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 \( \square \) button to return to the normal display.

### 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.

---

### Indoor unit data

<table>
<thead>
<tr>
<th>CODE No.</th>
<th>Data name</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Room temperature (remote control)</td>
</tr>
<tr>
<td>02</td>
<td>Indoor unit intake air temperature (TA)</td>
</tr>
<tr>
<td>03</td>
<td>Indoor unit heat exchanger (coil) temperature (TCJ)</td>
</tr>
<tr>
<td>04</td>
<td>Indoor unit heat exchanger (coil) temperature (TC)</td>
</tr>
<tr>
<td>05</td>
<td>Indoor unit fan cumulative operating hours (x1h)</td>
</tr>
<tr>
<td>06</td>
<td>Indoor unit discharge air temperature</td>
</tr>
</tbody>
</table>

### Outdoor unit data

<table>
<thead>
<tr>
<th>CODE No.</th>
<th>Data name</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>Outdoor unit heat exchanger (coil) temperature (TE)</td>
</tr>
<tr>
<td>61</td>
<td>Outside air temperature (TO)</td>
</tr>
<tr>
<td>62</td>
<td>Compressor discharge air temperature (TD)</td>
</tr>
<tr>
<td>63</td>
<td>Compressor intake air temperature (TS)</td>
</tr>
<tr>
<td>64</td>
<td>Heat sink temperature (THS)</td>
</tr>
<tr>
<td>65</td>
<td>Operating current (x1/10)</td>
</tr>
<tr>
<td>F1</td>
<td>Compressor cumulative operating hours (x100h)</td>
</tr>
</tbody>
</table>
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 + + 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 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.)
For a group control, No. of the firstly displayed indoor unit becomes the header unit.

Procedure 2
Every pushing button, the indoor UNIT No. in the group control is displayed in order. Select the indoor unit of which setup is changed can be confirmed because fan of the selected indoor unit operate.

Procedure 3
1. Using temp. setup buttons, specify CODE No. [12].
   (CODE No. [12]: Line address)
2. Using timer time buttons, change the line address from [3] to [2].
3. Push 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
1. Using temp. setup buttons, specify CODE No. [13].
   (CODE No. [13]: Indoor address)
3. Push 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
1. Using temp. setup buttons, specify CODE No. [14].
   (CODE No. [14]: Group address)
2. Using timer time buttons, change the SET DATA from [0001] to [0002].
   (SET DATA [Header unit: 0001] [Follower unit: 0002])
3. Push 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 button 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 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 button. (Setup is determined.) When pushing button, the display disappears and the status becomes the usual stop status.
When pushing button, 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 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 [ ] 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.
(When pushing button, operation of the remote control is not accepted for approx. 1 minute.)

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.
\textbf{Centrally control the system by connecting to the TCC-LINK central control system.}

	extbf{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. **Completion of ELECTRIC WORK construction**
2. **System power ON**
3. **Automatic address setup**
   - The system performs the address setup automatically after power-on.
4. **Line address manual setting/change**
   - Change line addresses.
   - If automatic address setup has not been performed successfully, set addresses manually.
   * Refer to "Manual address setup procedure".
5. **Are indoor units under group control?**
   - **No**
   - **Yes**
     - Are all indoor units under central control set to header units (group address = 1)?
       - **No**
         - Set indoor units under central control to header units again, and set those that are out of central control to follower units again.
         * Refer to "Manual address setup procedure".
       - **Yes**
9. **Set central control addresses**
   * Refer to the manual of the central control system.

\textbf{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 the 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.)

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.

\textbf{Example of addresses after automatic address setup}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{example_addresses.png}
\end{figure}

\textbf{Example of addresses after manual system change}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{example_addresses_change.png}
\end{figure}
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  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  button.

3 Select the operation mode with  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  button to stop a test run.

   (Display part is same as procedure 1.)

5 Push  button to cancel (release from) the test run mode.

   ([TEST] disappears on the display and the status returns to a normal.)
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.

- 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.
- [Unit No. : 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.

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.

Wireless remote control
(TCB-AX32-UL)
1
When TEMPORARY button is pushed for 10 seconds or more, “Pit!” sound is heard and the operation changes to a forced cooling operation. After approx. 3 minutes, a cooling operation starts forcibly.
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.

- 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.

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

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

- Procedure
  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.
## Check codes and parts to be checked

<table>
<thead>
<tr>
<th>Wheel remote control type</th>
<th>Wireless remote control</th>
<th>Sensor block display of receiving unit</th>
<th>Main defective parts</th>
<th>Judging device</th>
<th>Parts to be checked / trouble description</th>
<th>Air-conditioner status</th>
</tr>
</thead>
<tbody>
<tr>
<td>E01</td>
<td>No-header remote control</td>
<td>Remote control</td>
<td>Indoor defective part setting — The header remote control has not been set (including two remote controls)</td>
<td>-</td>
<td></td>
<td>Entire stop</td>
</tr>
<tr>
<td>E02</td>
<td>No-header remote control</td>
<td>Remote control</td>
<td>System interconnection sensor, indoor P.C. board, remote temperature controller — No signal can be sent to the indoor unit</td>
<td>-</td>
<td></td>
<td>Entire stop</td>
</tr>
<tr>
<td>E03</td>
<td>Indoor unit-remote control communication trouble</td>
<td>Indoor control</td>
<td>System interconnection sensor, indoor P.C. board, outdoor P.C. board — Serial communication trouble between indoor unit and outdoor unit</td>
<td>Auto-reset</td>
<td></td>
<td>Entire stop</td>
</tr>
<tr>
<td>E04</td>
<td>Indoor unit-outdoor unit serial communication trouble</td>
<td>Indoor control</td>
<td>Indoor address setting trouble — The same address as the self-address was detected.</td>
<td>Auto-reset</td>
<td></td>
<td>Entire stop</td>
</tr>
<tr>
<td>E06</td>
<td>Duplicated header remote control</td>
<td>Remote control</td>
<td>Remote address setting trouble — Two remote controls are set as header in the double-header control.</td>
<td>-</td>
<td></td>
<td>Entire stop</td>
</tr>
<tr>
<td>E10</td>
<td>CPU-CPU communication trouble</td>
<td>Indoor P.C. board — Communication trouble between main MCU and motor microcomputer MCU</td>
<td>-</td>
<td>Communication trouble between IPDU MCU and CBS MCU</td>
<td>Entire stop</td>
<td></td>
</tr>
<tr>
<td>E18</td>
<td>Header indoor unit— indoor follower unit—regular communication trouble</td>
<td>Indoor control</td>
<td>Indoor P.C. board — Regular communication is not trouble between header and follower indoor units or between main header (main) and follower (sub) units.</td>
<td>Auto-reset</td>
<td></td>
<td>Entire stop</td>
</tr>
<tr>
<td>E31</td>
<td>IPDU communication trouble</td>
<td>Outdoor control</td>
<td>Outdoor communication trouble between IPDU and CBS</td>
<td>Entire stop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F01</td>
<td>Indoor unit heat exchange sensor (TCJ) trouble</td>
<td>Indoor control</td>
<td>Heat exchanger sensor (TCJ), indoor P.C. board — Open-circuit or short-circuit of the heat exchanger sensor (TCJ) was detected.</td>
<td>Auto-reset</td>
<td></td>
<td>Entire stop</td>
</tr>
<tr>
<td>F02</td>
<td>Indoor unit heat exchange sensor (TCJ) trouble</td>
<td>Indoor control</td>
<td>Heat exchanger sensor (TCJ), indoor P.C. board — Open-circuit or short-circuit of the heat exchanger sensor (TCJ) was detected.</td>
<td>Auto-reset</td>
<td></td>
<td>Entire stop</td>
</tr>
<tr>
<td>F04</td>
<td>Outdoor unit discharge temp. sensor (TD) trouble</td>
<td>Outdoor control</td>
<td>Outdoor temperature sensor (TD), outdoor P.C. board — Open-circuit or short-circuit of the discharge temp. sensor was detected.</td>
<td>Entire stop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F08</td>
<td>Outdoor unit temp. sensor (TC/TS) trouble</td>
<td>Outdoor control</td>
<td>Outdoor temp. sensors (TC,TS), outdoor P.C. board — Open-circuit or short-circuit of the outdoor temp. sensor was detected.</td>
<td>Entire stop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F07</td>
<td>TL sensor trouble</td>
<td>Outdoor control</td>
<td>TL sensor may be damaged, disconnected or short-circuited.</td>
<td>Entire stop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F10</td>
<td>Outdoor unit high pressure sensor (TA) trouble</td>
<td>Outdoor control</td>
<td>Outdoor pressure sensor (TA), outdoor P.C. board — Open-circuit or short-circuit of the high-pressure sensor (TA) was detected.</td>
<td>Entire stop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F12</td>
<td>Outdoor unit low pressure sensor (TA) trouble</td>
<td>Outdoor control</td>
<td>Outdoor pressure sensor (TA), outdoor P.C. board — Open-circuit or short-circuit of the low-pressure sensor (TA) was detected.</td>
<td>Entire stop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F13</td>
<td>Outdoor unit high pressure sensor (TC) trouble</td>
<td>Outdoor control</td>
<td>Outdoor temperature sensor (TC), outdoor P.C. board — Open-circuit or short-circuit of the high-pressure sensor (TC) was detected.</td>
<td>Auto-reset</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F14</td>
<td>Outdoor unit low pressure sensor (TC) trouble</td>
<td>Outdoor control</td>
<td>Outdoor temperature sensor (TC), outdoor P.C. board — Open-circuit or short-circuit of the low-pressure sensor (TC) was detected.</td>
<td>Auto-reset</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F28</td>
<td>Indoor unit, other P.C. board trouble</td>
<td>Indoor control</td>
<td>Indoor P.C. board — EEPROM trouble</td>
<td>Auto-reset</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Device Type</th>
<th>Description</th>
<th>Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>H01</td>
<td>Outdoor unit compressor breakdown</td>
<td>Outdoor</td>
<td>Outdoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>H02</td>
<td>Outdoor unit compressor lock</td>
<td>Outdoor</td>
<td>Outdoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>H03</td>
<td>Outdoor unit current detect circuit trouble</td>
<td>Outdoor</td>
<td>Outdoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>H04</td>
<td>Case thermostat operation</td>
<td>Outdoor</td>
<td>Outdoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>H05</td>
<td>Outdoor unit low pressure system trouble</td>
<td>Outdoor</td>
<td>Outdoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>L03</td>
<td>Outdoor indoor unit wiring trouble</td>
<td>Indoor</td>
<td>Indoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>L04</td>
<td>Outdoor indoor unit wiring trouble</td>
<td>Indoor</td>
<td>Indoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>L05</td>
<td>Outdoor indoor unit wiring trouble</td>
<td>Indoor</td>
<td>Indoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>L20</td>
<td>Outdoor indoor unit wiring trouble</td>
<td>Indoor</td>
<td>Indoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>L29</td>
<td>Outdoor indoor unit wiring trouble</td>
<td>Indoor</td>
<td>Indoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>L30</td>
<td>Outdoor indoor unit wiring trouble</td>
<td>Indoor</td>
<td>Indoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>L31</td>
<td>Output unit P.C. board</td>
<td>Outdoor</td>
<td>Outdoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>P01</td>
<td>Indoor unit fan trouble</td>
<td>Indoor</td>
<td>Indoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>P03</td>
<td>Outdoor unit discharge temp. trouble</td>
<td>Outdoor</td>
<td>Outdoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>P04</td>
<td>Outdoor unit high pressure system trouble</td>
<td>Outdoor</td>
<td>Outdoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>P05</td>
<td>Outdoor unit P.C. board</td>
<td>Outdoor</td>
<td>Outdoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>P07</td>
<td>Heat sink overheated</td>
<td>Outdoor</td>
<td>Outdoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>P10</td>
<td>Indoor unit water detection</td>
<td>Indoor</td>
<td>Indoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>P15</td>
<td>Gas leakage detected</td>
<td>Outdoor</td>
<td>Outdoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>P19</td>
<td>4-way valve trouble</td>
<td>Indoor</td>
<td>Indoor</td>
<td>Auto-reset</td>
</tr>
<tr>
<td>P22</td>
<td>High pressure protective operation</td>
<td>Outdoor</td>
<td>Outdoor</td>
<td>Entire stop</td>
</tr>
<tr>
<td>P22</td>
<td>ALT</td>
<td>Outdoor unit fan trouble</td>
<td>Outdoor</td>
<td>Outdoor unit fan motor, outdoor unit P.C. board — A trouble (overcurrent, locking, etc.) was detected in the outdoor unit fan drive circuit.</td>
</tr>
<tr>
<td>P26</td>
<td>ALT</td>
<td>Outdoor unit inverter is activated</td>
<td>Outdoor</td>
<td>IGBT, outdoor unit P.C. board, inverter wiring, compressor — Short-circuit protection for compressor drive circuit devices (G-Tr/IGBT) was activated.</td>
</tr>
<tr>
<td>P29</td>
<td>ALT</td>
<td>Outdoor unit position trouble</td>
<td>Outdoor</td>
<td>Outdoor unit P.C. board, high-pressure switch — Compressor motor position trouble was detected.</td>
</tr>
<tr>
<td>P31</td>
<td>ALT</td>
<td>Other indoor unit trouble</td>
<td>Indoor</td>
<td>Another indoor unit in the group is raising an alarm.</td>
</tr>
</tbody>
</table>

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