TOSHIBA
Carrier
AIR CONDITIONER (MULTI TYPE)
Installation manual

Indoor Unit
Model name: 

Ceiling type
MMC-AP0181H2UL
MMC-AP0241H2UL
MMC-AP0361H2UL
MMC-AP0421H2UL
Ceiling type Installation Manual

Please read this manual thoroughly before installation work and install the products correctly.
• This Manual describes the installation method of the indoor unit.
• For installation of the outdoor unit, refer to the Installation Manual of the outdoor unit.

ADOPITION OF NEW REFRIGERANT
This Air Conditioner uses R410A an environmentally friendly refrigerant.

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1 Accessory Parts

<table>
<thead>
<tr>
<th>Part name</th>
<th>Q’ty</th>
<th>Shape</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation Manual</td>
<td>1</td>
<td>This manual</td>
<td>–</td>
</tr>
<tr>
<td>Installation pattern</td>
<td>1</td>
<td>–</td>
<td>Drawing-out port of hanging bolt pipe</td>
</tr>
<tr>
<td>Heat insulation pipe</td>
<td>2</td>
<td>–</td>
<td>For heat insulation of pipe connecting section</td>
</tr>
<tr>
<td>Washer</td>
<td>4</td>
<td>3/8&quot; (M10) × Ø1.0&quot; (25 mm)</td>
<td>For holding down unit</td>
</tr>
<tr>
<td>Hose band</td>
<td>2</td>
<td>–</td>
<td>For connecting drain pipe</td>
</tr>
<tr>
<td>Drain hose</td>
<td>1</td>
<td>–</td>
<td>For connecting drain pipe</td>
</tr>
<tr>
<td>Bushing Ø2.2&quot; (Ø56)</td>
<td>1</td>
<td>–</td>
<td>For protection of edge at hole for remote control wires</td>
</tr>
<tr>
<td>Bushing Ø1.1&quot; (Ø28)</td>
<td>1</td>
<td>–</td>
<td>For sealing the back side conduit hole</td>
</tr>
<tr>
<td>Heat insulator</td>
<td>1</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Heat insulator of top plate</td>
<td>1</td>
<td>–</td>
<td>For upper pipe hole of indoor unit (0.2&quot; - thickness x 5.1&quot; x 6.3&quot; (Ø8 - thickness x 130 x 160 mm))</td>
</tr>
<tr>
<td>Banding band</td>
<td>2</td>
<td>–</td>
<td>For prevention of open of drain hose heat insulator</td>
</tr>
</tbody>
</table>
2 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 heat exchanger. 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. Keep quenching cloth and fire extinguisher nearby during brazing. 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.

WARNING

- Only a qualified installer or service person is allowed to do installation work.
- Only a qualified installer or service person is allowed to do installation work. Inappropriate installation may result in water leakage, electric shock or fire.
- Only a qualified installer or service person is allowed to do installation work. 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.

- 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.

EN

3-EN  4-EN
3 Selection of Installation Place

**WARNING**
- Install the air conditioner securely in a location where the base can sustain the weight adequately.
  - If the strength is not enough, the unit may fall down resulting in injury.
- Install the air conditioner at a height 8' (2.4 m) or more from the floor.
  - If you insert your hands or others directly into the unit while the air conditioner operates, it is dangerous because you may contact with revolving fan or active electricity.

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

Upon approval of the customer, install the air conditioner in a place that satisfies the following conditions.
- Place where the unit can be installed horizontally.
- Place where a sufficient servicing space can be ensured for safety maintenance and check.
- Place where drained water will not cause any problem.

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

**Wireless remote control**

- Decide the position which remote control is operated and the installation place.
  - And then refer to the Installation Manual of the wireless remote controller kit sold separately.
  - (The signal of the wireless type remote control can be received within approx. 23’ (7 m). This distance is a criterion and varies a little according to capacity of the battery, etc.)
- To prevent malfunction, select a place where is not affected by a fluorescent lamp or direct sunlight.
- Two or more (up to 6 units) wireless-type indoor units can be set in a room.

**Before installation**

1. **Removal of suction grille**

   Slide the suction grille fixing knobs (2 positions) toward the arrow direction, and then open the suction grille.

   Under the condition of suction grille opened, push the hook section of hinges (2 positions) at the rear side, and then pull out the suction grille.

**Installation space**

Secure the specified space in the figure for installation and servicing.

**Ceiling height**

Set the installable height of the ceiling within 13’1” (4 m), otherwise the air distribution will become poor.

If height of ceiling exceeds 11’6” (3.5 m), hot air becomes difficult to reach the floor surface, and then the change of setup of high ceiling is necessary. For the change method of high ceiling, refer to the application control, “Installing indoor unit on high ceiling” in this Manual.

**List of installable ceiling height**

<table>
<thead>
<tr>
<th>Setup data</th>
<th>Ceiling height</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>Standard  (Factory default) 11’6” (3.5 m) or less</td>
</tr>
<tr>
<td>0001</td>
<td>High ceiling 1 more than 11’6” (3.5 m) up to 13’1” (4.0 m)</td>
</tr>
</tbody>
</table>

According to the conditions of installation, setup time of turning on of filter sign (notification of filter cleaning) of the remote control can be changed.

When it is difficult to warm up the room due to installation place or structure of the room, the detection temperature of heating can be raised.

For change the setup time, refer to the application control, “Filter sign setting” and “To secure better effect of heating” in this Manual.
2 Removing wire guard
Remove the screws (2 pcs.) which are fixing the wire guard. Remove the clamps fixing screws and remove the wire guard.

3 Removal of side panel
After removing the side panel fixing screws (1 each at right and left), slide the side panel forward and then remove it.

CAUTION
Attach back the wire guard once indoor unit is installed. Remove the 2 screws fixing the wire guard and hang the wire guard with the clamps during a service.

4 Removal of protective vinyl
Peel out the protective vinyl on the level louver.

5 Removal of protector
Remove the protector (1 pcs.) of the fan. (AP024 only)

4 Installation

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

External view
Installation of hanging bolts

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

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

<table>
<thead>
<tr>
<th>Hanging bolt</th>
<th>3/8” (M10)</th>
<th>4 pieces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nut</td>
<td>3/8” (M10)</td>
<td>12 pieces</td>
</tr>
</tbody>
</table>

Using the installation pattern (accessory)

In use, the pattern, positioning of the hanging bolt and pipe hole can be performed.

- As an error to some degree may generate on the pattern size due to temperature and humidity, be sure to confirm the size.

Installation of hanging bolt

Use 3/8” (M10) hanging bolts (4 pcs, to be local procure). Matching to the existing structure, set pitch according to size in the unit external view as shown below.

*New concrete slab*

Install the bolts with insert brackets or anchor bolts.

<table>
<thead>
<tr>
<th>Blade type bracket</th>
<th>Rubber</th>
<th>Screw</th>
<th>Anchor bolt</th>
</tr>
</thead>
</table>

*Steel frame structure*

Use existing angles or install new support angles.

- Hanging bolt
- Support angle

*Existing concrete slab*

Use a hole-in anchors, hole-in plugs, or a hole-in bolts.

Draw-out direction of pipe/wire

- Decide installation place of the unit and draw-out direction of pipe and wire.

Pipe knockout hole

- Piping from rear side
  * Cut off the groove section with a plastic cutter, etc.

- Piping from right side
  * Cut off the groove section with a metal saw or plastic cutter, etc.

- Piping from left side
  * Taking pipe from left side is applied only to the refrigerant pipe. The refrigerant pipe cannot be taken out from the left side.
  * Cut off the groove section with a metal saw or plastic cutter, etc.

- Piping from upper side
  * Taking pipe from upper side is applied only to the refrigerant pipe.
  * When taking out the drain pipe from the upper side, use a drain up kit sold separately.
  * Open the upper pipe draw-out port (Knockout hole shown in the external view).
  * After piping, cut off the attached heat insulator of the top plate to pipe shape, and then seal the knockout hole.

Installation of indoor unit

- Preparation before holding down main unit
  * Confirm the presence of the ceiling material beforehand because the fixing method of hanging metal when the ceiling material is set differs from that when the ceiling material is not set.

  ▼ There is ceiling material

  1. Hold up the unit by the indoor unit with the hanging bolts.
  2. Attach upper nuts as shown in the figure.
  3. Securely fix the ceiling material with the double nuts.

  REQUIREMENT
  * The ceiling surface may not be horizontal. Be sure to confirm that width and depth directions are level.

- Holding down of main unit

  1. Attach washer and nuts to the hanging bolt.

  2. Hang the unit to the hanging bolt as shown the figure below.

  ▼ There is no ceiling material

  1. Hold up the unit by the indoor unit with the hanging bolts.
  2. Attach upper nuts as shown in the figure.
  3. Securely fix the ceiling material with the double nuts.

  REQUIREMENT
  * The ceiling surface may not be horizontal. Be sure to confirm that width and depth directions are level.

Installation of remote control (Sold separately)

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

- Pull out the remote control cord through upper side of the refrigerant pipe and drain pipe.
- Do not leave the remote control at a place exposed to the direct sunlight and near a stove.
5 Refrigerant Piping

- Refrigerant Piping
  - The connecting sections of the refrigerant pipes are provided at the positions in the figure below.

1. Use copper pipe with 0.03" (0.8 mm) or more thickness. (In case pipe size is Ø5/8" (15.9 mm), with 0.04" (1.0 mm) or more.)
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.

- Permissible Piping Length and Height Difference
  - They vary according to the outdoor unit. For details, refer to the Installation Manual attached to the outdoor unit.

- Flaring
  - Cut the pipe with a pipe cutter. Remove burrs completely. Remaining burrs may cause gas leakage.
  - Insert a flare nut into the pipe, and flare the pipe. As the flaring sizes of 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)
    - 1/4" (6.4), 3/8" (9.5) 0 - 0.02"
    - 1/2" (12.7), 5/8" (15.9) 0 - 0.04"

- Flaring dia. meter size: A (Unit: in (mm))
  - Outer dia. of copper pipe
    - 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)

- Pipe size
  - Model name | MMC- | AP016 type | AP024, AP036 type | AP042 type
  - Pipe size | Liquid side | 1/4" (6.4 mm) | 5/8" (9.5 mm)
  - Gas side | 1/2" (12.7 mm) | 5/8" (15.9 mm)

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

- 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.
  - Apply the attached heat insulation to the pipe connecting section of the indoor unit securely without gap.

- 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.

- Tightening torque (N•m)
  - Outer dia. of copper pipe
    - 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)

- Leak check test, evacuation and other procedure
  - For leak check test, evacuation, addition of refrigerant, and gas leak check, refer to the Installation Manual attached to the outdoor unit.

- Requirement
  - Do not supply power to the indoor unit until the leak check test and evacuation are completed. (If the indoor unit is powered on, the pulse motor valve is fully closed, which extends the time for vacuuming.)

- Open the valve fully
  - Open the valve of the outdoor unit fully. For details, refer to the Installation Manual attached to the outdoor unit.

- Work using double spanner
  - Wrap the pipe with the attached heat insulator without any gap between the indoor unit.

- The seam must be faced upward (ceiling side).

- The valve must be turned to the right.

- The valve must be turned to the left.
6 Drain Piping Work

**CAUTION**
- Following the Installation Manual, perform the drain piping work so that water is properly drained, and apply a heat insulation so as not to cause a dew drop. Inappropriate piping work may result in water leakage in the room and wet of furniture.

**Piping/Heat insulating material**

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

<table>
<thead>
<tr>
<th>Piping</th>
<th>Heat insulator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard vinyl chloride pipe VP20 (Outer dia.: Ø1.0” (26 mm))</td>
<td>Foam polyethylene: Thickness 0.4” (10 mm) or more</td>
</tr>
</tbody>
</table>

**REQUIREMENT**
- Perform heat insulation of the drain pipes of the indoor unit.
- Perform heat insulation of the connecting part with the indoor unit. An incomplete heat insulation causes dew drop.
- Set the drain pipe with downward slope (1/100 or more), and do not make swelling or trap on the piping. It may cause an abnormal sound.
- For length of the traversing drain pipe, restrict to 65’7” (20 m) or less. In case of a long pipe, provide support brackets with interval of 4’11” - 6’7” (1.5 - 2 m) in order to prevent wavin.
- Do not apply force to the connecting part of the drain pipe.
- The hard vinyl-chloride pipe cannot be directly connected to the drain pipe connecting port of the indoor unit. For connection with the drain pipe connecting port, fix the attached flexible hose with the hose band, otherwise a damage or water leak is caused on the drain pipe connecting port.

**Drain up**
When not securing down slope on the drain pipe, use a Drain pump kit sold separately. Also refer to the “Drain pump kit installation manual”. The drain pipe can be raised 23.6” (600 mm) from the top face of the main unit.
- When using Drain pump kit, both drain pipe and refrigerant pipe can be taken only from upper side.
- VP25 PVC pipe is needed when a drain pump is used.

**Connection of drain hose**
- Insert the attached drain hose into the drain pipe connecting port on the drain pan up to the end.
- Fit the attached hose band to the end of the pipe connecting port, and then tighten it securely.

**REQUIREMENT**
- Fix the drain hose with the attached hose band, and set the tightening position upward.
- As the draining is the natural water draining, arrange the pipe outside of the unit on the down slope.
- If piping is performed as shown in the figure, drain cannot be discharged.

**Perform heat insulating**
- Using the attached drain hose heat insulator, lap the connecting section and the drain hose without clearance, and then tighten with two handing band so that heat insulator does not open.
- Covering the attached drain hose heat insulator, lap the heat insulator (procured locally) to the drain pipe without clearance.

**Connecting drain pipe**
- Connect the hard vinyl chloride pipe (procured locally) to the mounted drain hose which was attached.
- Piping from left side
  - To take pipe from the left side, exchange the plug from left to right. Push in the plug of which end is not sharp up to the end.

**Adhesive inhibited**
Use the attached flexible hose and hose band for connecting the drain hose to the drain hose. If applying the adhesive, socket will be damaged and cause water leakage.

**NO GOOD**

- Confirm that soft hose is pushed in up to the end of the drain pan.

**Lap covering connecting section between drain pan and drain hose.**

Heat insulator (procured locally) is put on the other end at the upper side.
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 2-core with non-polarity wires for the control wiring between indoor unit and outdoor unit and Central control wiring. To prevent noise trouble, use 2-core shielded wire.
- The length of the communication line means the total length of the control wire length between indoor and outdoor units added with the central control wire length.

**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.

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### Power supply wire and control wires specifications

**Power supply wire and control wires specifications**

- Power supply wire and control wires are procured locally.
- For the power supply specifications, follow to the table below. If capacity is little, it is dangerous because overheat or seizure may be caused.

**Indoor unit power supply**

- For the power supply of the indoor unit, prepare the exclusive power supply separated from that of the outdoor unit.

**Power supply**

<table>
<thead>
<tr>
<th>Power supply</th>
<th>208/230V-1-60Hz</th>
</tr>
</thead>
</table>

**Control wiring, Central control wiring**

- 2-core with non-polarity wires are used for the control wiring between indoor unit and outdoor unit and Central control wiring.
- To prevent noise trouble, use 2-core shielded wire.
- The length of the communication line means the total length of the control wire length between indoor and outdoor units added with the central control wire length.

**REQUIREMENT**

- Use copper supply wire.
- Use UL wire rated 800V for the power supply.
- Use UL wire rated 300V for the remote control wires and control wires.

---

### Electric characteristics

<table>
<thead>
<tr>
<th>Model</th>
<th>Power Supply</th>
<th>Voltage Range (V)</th>
<th>MCA (A)</th>
<th>MOCP (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMC-AP0181H2UL</td>
<td>208/230V-1-60Hz</td>
<td>187 - 253</td>
<td>0.5</td>
<td>15</td>
</tr>
<tr>
<td>MMC-AP0241H2UL</td>
<td></td>
<td></td>
<td>0.7</td>
<td>15</td>
</tr>
<tr>
<td>MMC-AP0361H2UL</td>
<td></td>
<td></td>
<td>1.0</td>
<td>15</td>
</tr>
<tr>
<td>MMC-AP0421H2UL</td>
<td></td>
<td></td>
<td>1.2</td>
<td>15</td>
</tr>
</tbody>
</table>

### Control wire

- Control wiring between indoor units, and outdoor unit (2-core shielded wire)

**Remote control wiring**

- 2-core with non-polarity wire is used for wiring of the remote control wiring and group remote controls wiring.
- Remote control wiring, remote control inter-unit wiring

**Remote control wiring**

- Use copper supply wire.
- Use UL wire rated 800V for the power supply.
- Use UL wire rated 300V for the remote control wires and control wires.
## Wiring between indoor and outdoor units

**NOTE**
An outdoor unit connected with control wiring between indoor and outdoor units wire becomes automatically the header unit.

### Wiring example

![Wiring diagram](image)

### Wire connection

**REQUIREMENT**
- Connect the wires matching the terminal numbers. Incorrect connection causes a trouble.
- The low-voltage circuit is provided for the control wire and the remote control wire. (Do not connect the high-voltage circuit)
- Loosen the cover mounting screws (2 positions) of the electrical control box, and then remove the cover.
- Attach the conduit pipe to the conduit hole with a lock nut.
- Silt the film of bushing attached to the hole for control wire and remote control wire, and then pass through wires.
- Connect the power supply wires, control wiring and the remote control wire to the terminal block of the electrical control box. Secure the ground wire with the ground screw.
- Tighten screws of the terminal block securely, and fix the wires with code 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 so that it does not pinch the wires.
Fix the power supply wires and the control wires/remote control wires separately with the cord clamp as shown below.

Connected at backside

Connected at upside

**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.

**Address setup**

Set up the addresses as per the Installation Manual supplied with the outdoor unit.

---

**Power supply wires and ground wire**

1. Strip the wire ends.
   - Power supply wire: 0.4” (10 mm)
   - Ground wire: 0.8” (20 mm)
2. Match the wire colors with the terminal numbers on the indoor units and circuit breakers’ 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.

**Control wires**

Because a “hole for control wires and remote control wires” has little space, a cover of control wires (2-core shielded wire) should be removed up to 10” (260mm).

---

**Unit: in (mm)**

| Wire | Unit
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply wires</td>
<td>0.8” (20)</td>
</tr>
<tr>
<td>Ground wire</td>
<td>0.4” (10)</td>
</tr>
<tr>
<td>Power supply wire and control wire</td>
<td>1.2” (30)</td>
</tr>
</tbody>
</table>
8 Applicable Controls

Changing applicable control setting

Basic procedure for changing settings
Change the settings while the air conditioner is not working.
(Stop the air conditioner before making settings.)

Procedure 1
Push \( \text{button and temp. setup } \) button simultaneously for 4 seconds or more.
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 erase 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.)

Procedure 2
Each time \( \) 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.

Installing indoor unit on high ceiling

When the height of the ceiling to be installed exceeds 3.5 m (11'6"), adjustment of fan speed is necessary. Set up the high ceiling.

Procedure 3
Specify CODE No. \( \) with temp. setup \( \) / \( \) buttons.

Procedure 4
Select SET DATA \( \) with timer time \( \) / \( \) buttons.

Procedure 5
Push \( \) 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.

Procedure 6
When settings have been completed, push \( \) button. When the display changes from flashing to lit, the setup is completed.
* To change settings of another indoor unit, repeat from Procedure 2.

Remote control-less setting

To set the unit to high ceiling setting, there is a method that requires the changing of the short plugs on the indoor P.C. board. This method is only to be used where a wired remote control (Group control) is not used.

* However, once the setting is changed, it is necessary to reset the setting back to 0000 that placing the short plugs back to the factory default position and rewriting the setting data back to 0000 with wired remote control.

Select by exchange of short plugs on indoor P.C. board.

<table>
<thead>
<tr>
<th>Short plug position</th>
<th>SET DATA</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short Open</td>
<td>0000</td>
<td>Standard (Factory default)</td>
</tr>
<tr>
<td>Short Open</td>
<td>0001</td>
<td>High ceiling 1</td>
</tr>
</tbody>
</table>

Remote control-less setting
With the changing of the short plugs on the indoor P.C. board, the details are shown in the below table.

Remote control-less setting

To set the unit to high ceiling setting, there is a method that requires the changing of the short plugs on the indoor P.C. board. This method is only to be used where a wired remote control (Group control) is not used.

* However, once the setting is changed, it is necessary to reset the setting back to 0000 that placing the short plugs back to the factory default position and rewriting the setting data back to 0000 with wired remote control.

Select by exchange of short plugs on indoor P.C. board.

<table>
<thead>
<tr>
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<th>SET DATA</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short Open</td>
<td>0000</td>
<td>Standard (Factory default)</td>
</tr>
<tr>
<td>Short Open</td>
<td>0001</td>
<td>High ceiling 1</td>
</tr>
</tbody>
</table>

Remote control-less setting

To set the unit to high ceiling setting, there is a method that requires the changing of the short plugs on the indoor P.C. board. This method is only to be used where a wired remote control (Group control) is not used.

* However, once the setting is changed, it is necessary to reset the setting back to 0000 that placing the short plugs back to the factory default position and rewriting the setting data back to 0000 with wired remote control.

Select by exchange of short plugs on indoor P.C. board.

<table>
<thead>
<tr>
<th>Short plug position</th>
<th>SET DATA</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short Open</td>
<td>0000</td>
<td>Standard (Factory default)</td>
</tr>
<tr>
<td>Short Open</td>
<td>0001</td>
<td>High ceiling 1</td>
</tr>
</tbody>
</table>
Filter sign setting

According to the installation condition, the lighting time of the filter sign (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 lighting time from the following table.

<table>
<thead>
<tr>
<th>SET DATA</th>
<th>Filter sign lighting time</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 (Factory default)</td>
</tr>
<tr>
<td>0003</td>
<td>5000 H</td>
</tr>
<tr>
<td>0004</td>
<td>10000 H</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 device 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 table below.

<table>
<thead>
<tr>
<th>SET DATA</th>
<th>Detection temp 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) (Factory default)</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>

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 SET DATA for the SET DATA in Procedure 4.

<table>
<thead>
<tr>
<th>SET DATA</th>
<th>Filter sign lighting time</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>Not used (factory setting)</td>
</tr>
<tr>
<td>0001</td>
<td>Used</td>
</tr>
</tbody>
</table>

When ⏰ flashes, the remote control sensor is defective.
Select the SET DATA [0000] (not used) or replace the remote control.

Group control

In a group control, a remote control can control up to maximum 8 units.
• The wired remote control only can control a group control. The wireless remote control is unavailable for this control.
• For wiring procedure and wires of the individual line (identical refrigerant line) system, refer to “Electric work” in this Manual.
• Wiring between indoor units in a group is performed in the following procedure.
• Connect the indoor units by connecting the remote control wires from the remote control terminal blocks (A, B) of the indoor unit connected with a remote control to the remote control terminal blocks (A, B) of the other indoor unit. (Non-polarity)
• For address setup, refer to the Installation Manual attached to the outdoor unit.

Group control

Execute a test run

Operate the unit with the 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 thermo.-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.
• Do not run the air conditioner in a mode other than [COOL] or [HEAT].
• The detection of error is performed as usual.

Test Run

Before test run

• Before turning on the circuit breaker, carry out the following procedure.

1) By using 500V-megger, check that resistance of L1 to L2 and the ground (grounding). If resistance of less than 1MΩ is detected, do not run the unit.
2) Check the valve of the outdoor unit being opened fully.
3) Specify [32] for the CODE No. in Procedure 3.
4) Specify [01] for the CODE No. in Procedure 4.
5) Select the following data for the SET DATA in Procedure 4.

<table>
<thead>
<tr>
<th>SET DATA</th>
<th>Filter sign lighting time</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>Not used (factory setting)</td>
</tr>
<tr>
<td>0001</td>
<td>Used</td>
</tr>
</tbody>
</table>

When ⏰ flashes, the remote control sensor is defective.
Select the SET DATA [0000] (not used) or replace the remote control.

• For wiring procedure and wires of the individual line (identical refrigerant line) system, refer to “Electric work” in this Manual.

To execute a test run

Procedure 2

Push button.

Procedure 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 error is performed as usual.

Execute a test run

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.

CAUTION
• Do not use the forced test run for cases other than the test run because it applies an excessive load to the devices.
• Do not run the air conditioner in a mode other than [COOL] or [HEAT].
• The detection of error is performed as usual.

Test Run

Execute a test run

Wired remote control

Procedure 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.
Wireless remote control

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

Procedure 2
Push “ON/OFF” button on the remote control, select [COOL] or [HEAT] with “MODE” button, and then select [HIGH] with “FAN” button.

Procedure 3

<table>
<thead>
<tr>
<th>Cooling test run</th>
<th>Heating test run</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set the temperature to 64 °F (18°C) with the temp. setup buttons.</td>
<td>Set the temperature to 86 °F (30°C) with the temp. setup buttons.</td>
</tr>
</tbody>
</table>

Procedure 4

<table>
<thead>
<tr>
<th>Cooling test run</th>
<th>Heating test run</th>
</tr>
</thead>
<tbody>
<tr>
<td>After confirming a signal receiving sound “beep” immediately set the temperature to 64 °F (18°C) with the temp. setup buttons.</td>
<td>After confirming a signal receiving sound “beep” immediately set the temperature to 86 °F (30°C) with the temp. setup buttons.</td>
</tr>
</tbody>
</table>

Procedure 5

<table>
<thead>
<tr>
<th>Cooling test run</th>
<th>Heating test run</th>
</tr>
</thead>
<tbody>
<tr>
<td>After confirming a signal receiving sound “beep” immediately set the temperature to 64 °F (18°C) with the temp. setup buttons.</td>
<td>After confirming a signal receiving sound “beep” immediately set the temperature to 86 °F (30°C) with the temp. setup buttons.</td>
</tr>
</tbody>
</table>

Procedure 6
Repeat procedures 4 → 5 → 4 → 5.

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

Procedure 7
Upon completion of the test run, push “ON/OFF” button to stop operation.

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

- Cooling test run:
  ON/OFF → 64 °F (18 °C) → 66 °F (19 °C) → 64 °F (18 °C) → 66 °F (19 °C) → 64 °F (18 °C) → (test run) → ON/OFF

- Heating test run:
  ON/OFF → 86 °F (30 °C) → 84 °F (29 °C) → 86 °F (30 °C) → 84 °F (29 °C) → 86 °F (30 °C) → (test run) → ON/OFF

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

Procedure 7
Upon completion of the test run, push “ON/OFF” button to stop operation.

10 Troubleshooting

Confirmation and check

When an error 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 error log” for confirmation.

Confirmation of error log

When an error occurred on the air conditioner, the error log can be confirmed with the following procedure. (The error log is stored in memory up to 4 errors.) The log can be confirmed from both operating status and stop status.

Procedure 1
Push and buttons simultaneously for 4 seconds or more, the following display appears.

If [Service check] is displayed, the mode enters in the error log mode.

- [01]: Order of error log is displayed in CODE No. window.
- [Check code] is displayed in CHECK window.
- [Indoor unit address in which an error occurred] is displayed in Unit No.

Procedure 2
Push button. The error log stored in memory is displayed in order.

REQUIREMENT

Do not push button because all the error log of the indoor unit will be deleted.

Procedure 3
Push button to return to the usual display after confirmation.

1. Check the errors 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

### Check method

The operation status can be monitored through the communication between the indoor unit and the remote control. If there is a communication error, the LED on the remote control will flash alternately. The following section lists the check code names and LED patterns, which can be used to identify the error type.

### Check code list

#### Indoor remotes

- **Grounding (GND)**: Grounding error between the indoor unit and the remote control
- **LED**: Flashing LED
- **GND**: Grounding error
- **Communication error**: Communication error between the indoor unit and the remote control
- **Remote control**: Remote control error
- **Remote control display**: Remote control display error

#### Outdoor remotes

- **Remote control display**: Remote control display error
- **Remote control**: Remote control error
- **LED**: Flashing LED
- **Communication error**: Communication error between the indoor unit and the remote control
- **Remote control display**: Remote control display error

#### Connection to the outdoor unit (I/F)

- **Remote control**: Remote control error
- **Communication error**: Communication error between the indoor unit and the remote control
- **Remote control display**: Remote control display error

### Check method

1. **To check from indoor remote control:** See “Wireless remote control display” in the list.
2. **To check from outdoor unit:** See “Outdoor 7-segment display” in the list.
3. **To check from indoor unit with a wireless remote control:** See “Sensor block display of receiving unit” in the list.

### Check code list

#### Outdoor 7-segment display

<table>
<thead>
<tr>
<th>Check code</th>
<th>LED Pattern</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>✔️</td>
<td>Remote control error</td>
</tr>
<tr>
<td>1</td>
<td>✔️</td>
<td>Communication error between the indoor device and the remote control</td>
</tr>
<tr>
<td>2</td>
<td>✔️</td>
<td>Remote control display error</td>
</tr>
<tr>
<td>3</td>
<td>✔️</td>
<td>Communication error between the indoor unit and the remote control (Detected at indoor side)</td>
</tr>
<tr>
<td>4</td>
<td>✔️</td>
<td>Communication error between the indoor unit and the remote control (Detected at outdoor side)</td>
</tr>
<tr>
<td>5</td>
<td>✔️</td>
<td>Increase of No. of indoor units</td>
</tr>
<tr>
<td>6</td>
<td>✔️</td>
<td>Decrease of No. of indoor units</td>
</tr>
<tr>
<td>7</td>
<td>✔️</td>
<td>Increased header unit display number</td>
</tr>
<tr>
<td>8</td>
<td>✔️</td>
<td>Decreased header unit display number</td>
</tr>
<tr>
<td>9</td>
<td>✔️</td>
<td>Communication error between the indoor unit and the remote control (Detected at outdoor side)</td>
</tr>
<tr>
<td>10</td>
<td>✔️</td>
<td>Increased header unit display number</td>
</tr>
<tr>
<td>11</td>
<td>✔️</td>
<td>Decreased header unit display number</td>
</tr>
</tbody>
</table>

#### Wired remote control display

<table>
<thead>
<tr>
<th>Check code</th>
<th>LED Pattern</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>✔️</td>
<td>Remote control error</td>
</tr>
<tr>
<td>13</td>
<td>✔️</td>
<td>Communication error between the indoor device and the remote control</td>
</tr>
<tr>
<td>14</td>
<td>✔️</td>
<td>Remote control display error</td>
</tr>
<tr>
<td>15</td>
<td>✔️</td>
<td>Communication error between the indoor unit and the remote control (Detected at indoor side)</td>
</tr>
<tr>
<td>16</td>
<td>✔️</td>
<td>Communication error between the indoor unit and the remote control (Detected at outdoor side)</td>
</tr>
<tr>
<td>17</td>
<td>✔️</td>
<td>Increase of No. of indoor units</td>
</tr>
<tr>
<td>18</td>
<td>✔️</td>
<td>Decrease of No. of indoor units</td>
</tr>
<tr>
<td>19</td>
<td>✔️</td>
<td>Increased header unit display number</td>
</tr>
<tr>
<td>20</td>
<td>✔️</td>
<td>Decreased header unit display number</td>
</tr>
<tr>
<td>21</td>
<td>✔️</td>
<td>Communication error between the indoor unit and the remote control (Detected at outdoor side)</td>
</tr>
<tr>
<td>22</td>
<td>✔️</td>
<td>Increased header unit display number</td>
</tr>
<tr>
<td>23</td>
<td>✔️</td>
<td>Decreased header unit display number</td>
</tr>
</tbody>
</table>

### Additional information

- **E01:** Indoor timer error
- **E02:** Outdoor timer error
- **E03:** Communication error between the indoor device and the remote control
- **E04:** Increased header unit display number
- **E05:** Decreased header unit display number
- **E06:** Increased header unit display number
- **E07:** Decreased header unit display number
- **E08:** Communication error between the indoor device and the remote control (Detected at outdoor side)
- **E09:** Increased header unit display number
- **E10:** Decreased header unit display number
- **E11:** Communication error between the indoor device and the remote control (Detected at outdoor side)
- **E12:** Increased header unit display number
- **E13:** Decreased header unit display number
- **E14:** Communication error between the indoor device and the remote control (Detected at outdoor side)
- **E15:** Increased header unit display number
- **E16:** Decreased header unit display number
- **E17:** Communication error between the indoor device and the remote control (Detected at outdoor side)
- **E18:** Increased header unit display number
- **E19:** Decreased header unit display number
- **E20:** Communication error between the indoor device and the remote control (Detected at outdoor side)
- **E21:** Increased header unit display number
- **E22:** Decreased header unit display number
- **E23:** Communication error between the indoor device and the remote control (Detected at outdoor side)
- **E24:** Increased header unit display number
- **E25:** Decreased header unit display number
- **E26:** Communication error between the indoor device and the remote control (Detected at outdoor side)
- **E27:** Increased header unit display number
- **E28:** Decreased header unit display number

### Notes

- **E01:** Indoor timer error (Detected at remote control side)
- **E02:** Outdoor timer error (Detected at remote control side)
- **E03:** Communication error (Detected at remote control side)
- **E04:** Increased header unit display number (Detected at remote control side)
- **E05:** Decreased header unit display number (Detected at remote control side)
- **E06:** Communication error (Detected at remote control side)
## Ceiling type Installation Manual

### Oil level detective circuit error I/F

- **01: TK1 oil circuit system error**  
  Status: 1
  Device: Oil level detective circuit
  Error: 1

- **02: TK2 oil circuit system error**  
  Status: 1
  Device: Oil level detective circuit
  Error: 1

- **03: TK3 oil circuit system error**  
  Status: 1
  Device: Oil level detective circuit
  Error: 1

- **04: TK4 oil circuit system error**  
  Status: 1
  Device: Oil level detective circuit
  Error: 1

### TD3 miswiring I/F

- **L03**  
  Status: 1
  Device: SIM Indoor center unit
  Error: 1

- **L04**  
  Status: 1
  Device: SIM Outdoor line address
  Error: 1

### SIM Duplicated indoor units with priority I/F

- **L05**  
  Status: 1
  Device: SIM Duplicated indoor units with priority
  Error: 1

### SIM Group line in individual indoor unit Indoor I/F

- **L07**  
  Status: 1
  Device: SIM Group line
  Error: 1

### SIM No. of IPDU error I/F

- **L29**  
  Status: 1
  Device: SIM No. of IPDU
  Error: 1

### SIM Outdoor fan IPDU error IPDU

- **P26**  
  Status: 1
  Device: SIM Outdoor fan
  Error: 1

### Error detected by TCC-LINK central control device

### Check code

<table>
<thead>
<tr>
<th>Check code</th>
<th>Wireless remote control</th>
<th>Sensor block display of receiving unit</th>
<th>Check code name</th>
<th>Judging device</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3-IPDU</td>
<td>Miniature display</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L20</td>
<td>SIM No. of IPDU error</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Error detected by TCC-LINK central control device (17)

### Check code

<table>
<thead>
<tr>
<th>Check code</th>
<th>Wireless remote control</th>
<th>Sensor block display of receiving unit</th>
<th>Check code name</th>
<th>Judging device</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TCC-LINK : TOSHIBA Carrier Communication Link.
**WARNINGS ON REFRIGERANT LEAKAGE**

**Check of Concentration Limit**

The room in which the air conditioner is to be installed requires a design that in the event of refrigerant gas leaking out, its concentration will not exceed a set limit.

The refrigerant R410A, which is used in the air conditioner, is safe without the toxicity or combustibility of ammonia, and is not restricted by laws to be imposed which protect the ozone layer. However, since it contains more than air, it poses the risk of suffocation if its concentration should rise excessively.

Suffocation from leakage of R410A is almost non-existent. With the recent increase in the number of high concentration buildings, however, the installation of multi air conditioner systems is on the increase because of the need for effective use of floor space, individual control, energy conservation by curtailing heat and carrying power etc.

Most importantly, the multi air conditioner system is able to replenish a large amount of refrigerant compared with conventional individual air conditioners. If a single unit of the multi conditioner system is to be installed in a small room, select a suitable model and installation procedure so that if the refrigerant accidentally leaks out, its concentration does not reach the limit (and in the event of an emergency, measures can be made before injury can occur).

In a room where the concentration may exceed the limit, create an opening with adjacent rooms, or install mechanical ventilation combined with a gas leak detection device.

The concentration is as given below.

\[
\text{Total amount of refrigerant (lbs (kg))} = \min \text{volume of the indoor unit installed room} (\text{ft}^3 (\text{m}^3)) \times \text{Concentration limit (lbs/ft}^3 (\text{kg/m}^3))
\]

**NOTE 1:**

If there are 2 or more refrigerating systems in a single refrigerating device, the amounts of refrigerant should be as charged in each independent device.

**NOTE 2:**

The standards for minimum room volume are as follows:

1. No partition (shaded portion)
2. When there is an effective opening with the adjacent room for ventilation of leaking refrigerant gas (opening without a door, or an opening 0.15% or larger than the respective floor spaces at the top or bottom of the door).
3. If an indoor unit is installed in each partitioned room and the refrigerant piping is interconnected, the smallest room of course becomes the object. But when a mechanical ventilation is installed interlocked with a gas leakage detector in the smallest room where the density limit is exceeded, the volume of the next smallest room becomes the object.

**NOTE 3:**

The minimum indoor floor area compared with the amount of refrigerant is roughly as follows:

<table>
<thead>
<tr>
<th>Total amount of refrigerant (lbs (kg))</th>
<th>Min. indoor floor area (ft² (m²))</th>
</tr>
</thead>
<tbody>
<tr>
<td>22lbs (10kg)</td>
<td>≤ 31 (9.5m²)</td>
</tr>
<tr>
<td>33lbs (15kg)</td>
<td>31 - 66 (9.5 - 20m²)</td>
</tr>
</tbody>
</table>

The possible amount of leaked refrigerant gas in rooms A, B and C is 22lbs (10kg). The possible amount of leaked refrigerant gas in rooms D, E and F is 33lbs (15kg).
**Confirmation of Indoor Unit Setup**

Prior to delivery to the customer, check the address and setup of the indoor unit, which has been installed in this time and fill the check sheet (Table below).

Data of four units can be entered in this check sheet. Copy this sheet according to the No. of the indoor units. If the installed system is a group control system, use this sheet by entering each line system into each installation manual attached to the other indoor units.

This check sheet is required for maintenance after installation. Fill this sheet and then pass this Installation Manual to the customers.

### Indoor unit setup check sheet

<table>
<thead>
<tr>
<th>Room name</th>
<th>Room name</th>
<th>Room name</th>
<th>Room name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor unit</td>
<td>Indoor unit</td>
<td>Indoor unit</td>
<td>Indoor unit</td>
</tr>
<tr>
<td>Model</td>
<td>Model</td>
<td>Model</td>
<td>Model</td>
</tr>
<tr>
<td>Check indoor unit address. (For check method, refer to Applicable controls in this manual.)</td>
<td>In case of a single system, it is unnecessary to enter the indoor address. (CODE No.: Line [12], Indoor [13], Group [14], Central control [03])</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Central control address</th>
<th>Central control address</th>
<th>Central control address</th>
<th>Central control address</th>
</tr>
</thead>
</table>

### Various setup

- High ceiling setup
  - NO CHANGE
  - HIGH CEILING 1

- Filter sign lighting time
  - NO CHANGE
  - NONE

- Detected temp. shift value
  - NO CHANGE
  - +2°C 3.6°F

- Incorporation of parts sold separately
  - Others

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**TOSHIBA CARRIER CORPORATION**

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