

Installation Manual
Branch Pipes
Model RBC-TWP 30•50

Toshiba Carrier Corporation

For “Cautions on Safety”, please read “Cautions on Safety” contained in the installation manual of the air conditioner and follow the precautions.

Important

Read the following cautions carefully before installing your air conditioner.

The two indoor units of TOSHIBA simultaneous twin packaged air conditioning system are the same units. Set and install the main and sub units taking the installation site into consideration. (Be certain to use the new refrigerant R410A in the indoor units.) The indoor unit connected to the remote control switch will be the main unit.

1. Installation

- These branch pipes are for new HFC refrigerant R410A that does not destroy the ozone layer.
- 1) Compared with the previous refrigerants, pressure of Refrigerant R410A is about 1.6 times higher and is easily affected by impurities such as moisture, oxidized films and oil. The new refrigerant also requires new refrigerating machine oil. Make certain to prevent mixing of moisture, rubbish, old refrigerant and refrigerating machine oil into the refrigeration cycle of the air conditioner with the new refrigerant when installing the air conditioner.
- 2) The sizes of the air conditioner charge port and connection part of the installation tool are different from those of the previous refrigerant to prevent mixing of the refrigerant and refrigerating machine oil. A special tool dedicated to the new refrigerant R410A is need. (For the complete information, read the installation manual for air conditioner outdoor units.)
- 3) Use clean, new pipe fittings when connecting the connection pipe. Install the pipe carefully avoiding mixing of moisture and rubbish.

2. Wiring



- 1) The remote control switch cannot be connected to both of the two indoor units (main and sub units). Connect it only to the indoor unit that will become the main indoor unit (Unit A). Connecting the remote control switch to the sub indoor unit will cause malfunction.

3. Refrigerant Piping (Branch piping system is used for refrigerant piping)

- 1) Compared with R22, pressure of R410A is about 1.6 times. Unless the piping is installed correctly, gas leak may be caused during operation such as pressure boosting. Conduct a leak test of the pipe connecting parts correctly.
- 2) In case the actual length of the piping exceeds the standard piping length, accurately add the refrigerant referring to **(Additional Refrigerant Amount)**.
- 3) Thermal insulation materials for the branch pipes are not supplied as accessories. Provide thermal insulation correctly using fitting covers or other materials sold on the market. For further information, read **Refrigerant Piping** and **Piping Thermal Insulation**.
Improper thermal insulation work will result in a failure and a claim.

Components

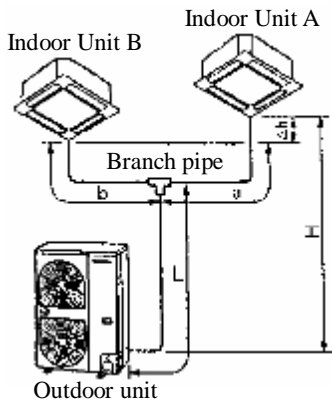
The following parts are supplied as accessories of the branch pipes. Check them when opening the carton box.

| Part | | Quantity | Shape | Use |
|---------------------------|-------------|----------|---|---|
| Installation Instructions | | 1 | This booklet | For installation works |
| Branch pipe | Gas side | 1 |  | For refrigerant pipe branching and collection |
| | Liquid side | 1 |  | |

Refrigerant Piping

Tolerance of Pipe Length

Tolerance of Pipe Head



| Model (RAV-) | Pipe Length (One Direction) | | | Height Difference | | | Remarks |
|--------------------------|------------------------------|------------------------------|---|--|--|------------------------------------|--------------------|
| | Full length L+a or L+b | Branch piping a, b | Difference of branch piping length b-a, or a-b | Outdoor Unit - Indoor Unit H | | Between Indoor Units Δh | |
| | | | | Outdoor Unit Installed Above Indoor Unit | Outdoor Unit Installed Below Indoor Unit | | |
| SM1100AT-E SM1400AT-E | Below 50m (actual length) | Below 15m (actual length) | Below 10m | Below 30m | Below 15m | Below 0.5m | Less than 10 bends |

Refrigerant Piping

Cautions

When planning a layout for Units A and B, comply with the following:

1. The lengths after branching ("a" and "b") should be equal if feasible. Install Units A and B so that the difference of the branching lengths becomes less than 10m if the lengths cannot be equal due to the branch pipe position.
2. Install Units A and B on the same level. If Units A and B cannot be installed on the same level, the difference in level should be limited to 0.5m or less.
3. Be certain to install Units A and B in the same room. Units A and B cannot be operated independently each other.

Piping Materials and Sizes

- Use copper tube of Type 1220 in JIS H 3300 (Copper and copper alloy seamless pipes and tubes) with 40mg/10m or less in the amount of oil stuck on inner walls of pipe and 0.8mm in pipe wall thickness for diameters 6.4, 9.5 and 12.7mm and 1.0mm, for diameter 15.9mm. Never use pipes of thin wall thickness such as 0.7mm.

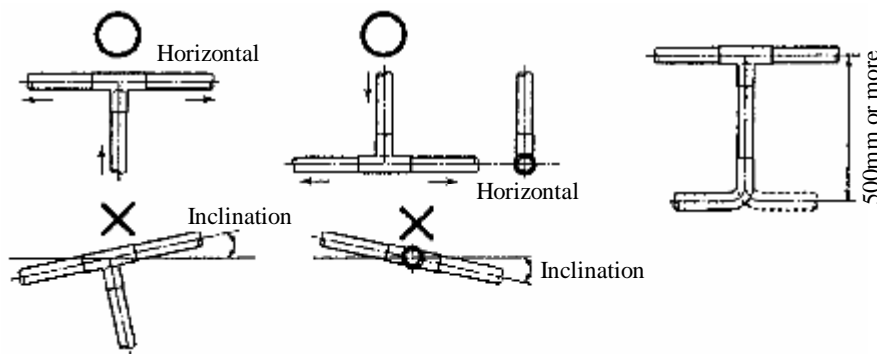
In parentheses () are wall thickness [unit: mm]

| Model (RAV-) | | SH1100AT-E | SH1400AT-E |
|--------------|-------------|---------------|------------------------------|
| Pipe side | Gas side | Main piping | Ø15.9 (1.0) |
| | | Branch piping | Ø 12.7 (0.8) Ø 15.9 (1.0) |
| | Liquid side | Main piping | Ø 9.5 (0.8) |
| | | Branch piping | Ø 6.4 (0.8) Ø 9.5 (0.8) |

Branch Pipe

Now the refrigerant pipe is installed using branch pipes supplied as accessories.

- Bend and adjust the refrigerant piping so that the branch pipes and pipe after branching become horizontal.
- Fix the branch pipes onto a wall in a ceiling or onto a column.
- Provide a straight pipe longer than 500mm in length as the main piping of the branches.



Air Purging

For the complete information, read the installation instructions for outdoor units of air conditioner.

- Purge air using a vacuum pump.

Additional Refrigerant Amount

Cautions

- Be certain to write the additional refrigerant amount, pipe length (actual length), head and other specification on the nameplate put on the outdoor unit for recording.
- Seal the correct amount of additional refrigerant in the system.

<Formula for Calculating Additional Refrigerant Amount>

Do not remove the refrigerant even if the additional refrigerant amount becomes minus as a result of calculations by the following formula and operate the air conditioner as it is.

$$\begin{aligned} \text{Additional refrigerant amount (kg)} &= \text{Main piping additional refrigerant amount (kg)} + \\ &\quad \text{Branch piping additional refrigerant amount (kg)} \\ &= A \times (L - 18) + B \times (a + b - 4) \end{aligned}$$

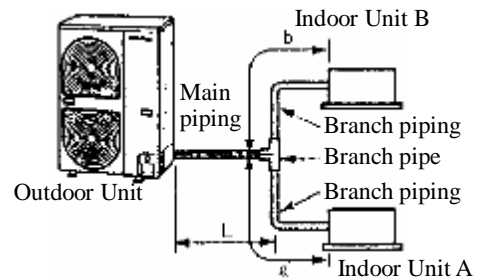
A: Additional refrigerant amount per meter of actual main piping length (kg)

B: Additional refrigerant amount per meter of actual branch piping length (kg)

L: Actual length of main piping (m)

a, b: Actual length of branch piping (m)

| Model (RAV) | Standard piping length | | Additional refrigerant amount per Meter (kg/m) | |
|-------------|------------------------|---------------|--|-------|
| | Main piping | Branch piping | A | B |
| SM1100AT-E | 18m | 2m | 0.040 | 0.020 |
| SM1400AT-E | | | 0.040 | 0.040 |



Gas Leak Test

Use a leak detector manufactured specially for the HFC refrigerant (R410A, R134a, etc.) when testing R410A.

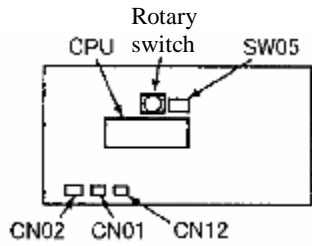
*The sensitivity of leak detectors for previous HCFC refrigerants (such as R22) lowers to about 1/40 when used with HFC refrigerants and these detectors cannot be used.

<<High wall>>

Electrical Wiring

- Be certain to install wires by connecting them to terminals of the same numbers according to the following wiring diagram. Incorrect wiring will result in a failure.
- Exercise reasonable caution with the following when installing wires.

| No. | Item | Description |
|-----|-------------------------|---|
| 1 | Remote control wiring | (1) Connect the remote controller only to the main unit. (2) Install wires to B and C only between the main unit (Unit A) and sub unit (Unit B). (3) Disconnect Connector CN12 of the sub unit (Unit B). |
| 2 | Main circuit wiring | Connect wires of the main circuit from the outdoor unit, main unit (Unit A) and sub unit (Unit B) correctly. (Wires of (1), (2) and (3)) |
| 3 | Indoor unit No. setting | Set the rotary switches on the control printed circuit board of the indoor unit to 1 and 2 for the main unit (Unit A) and sub unit (Unit B). |
| 4 | Selector Switch Setting | Set the selector switch (SW05-1) on the printed circuit boards of the indoor units to ON. Set both the main unit (Unit A) and sub unit (Unit B) to ON. |

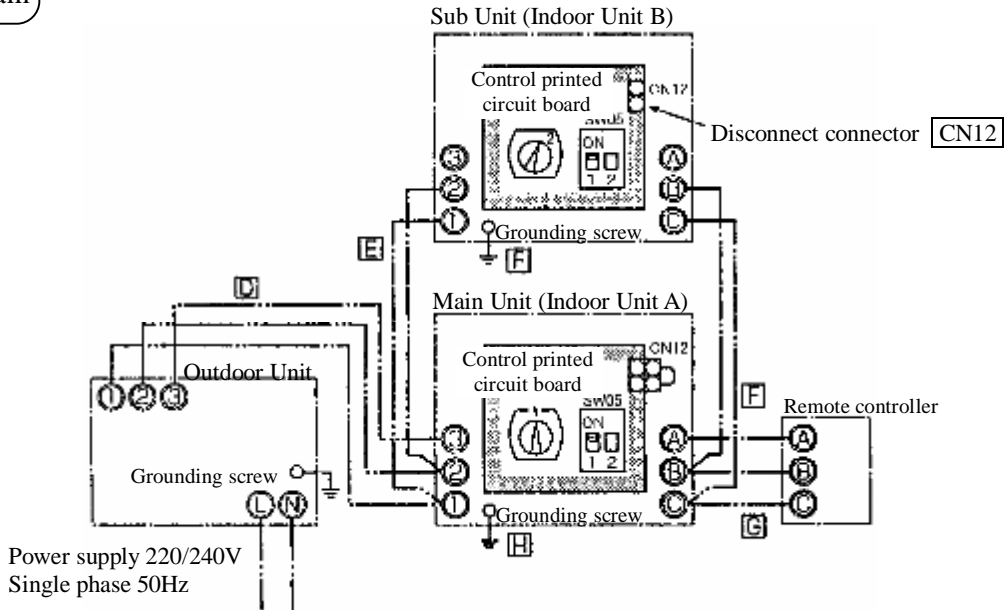


Disconnect connector **CN12** of Unit B.



<Locations of switches on control panel circuit board>

Wiring Diagram



- See the table on the upper right for a jumper wire specification. (D E F G H)
- All two-dot chain lines show wiring jobs to be performed at the site.
- The remote controller circuits are low voltage circuits. These circuits must not be made to directly contact indoor-outdoor connection or be contained with the connection in the same conduit tubes. (Otherwise malfunction will be caused by noise)

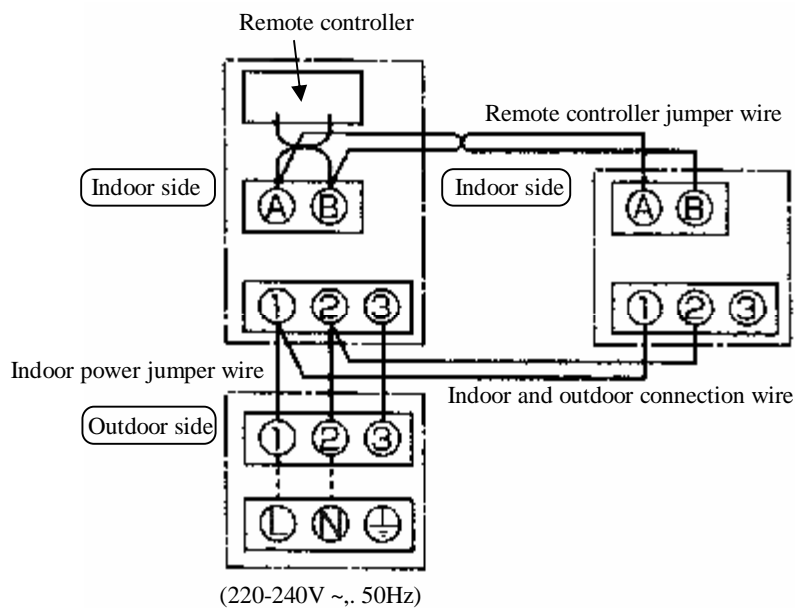
<<4-Way Ceiling Cassette and Built-In Duct>>

Electrical Wiring

- Be certain to install wires by connecting them to terminals of the same numbers according to the following wiring diagram.
- Exercise reasonable caution with the following when installing wires.

| No. | Item | Description |
|-----|---|--|
| 1 | Remote control wiring | (1) Connect the remote controller only to the main unit. (2) Install jumper wires between the main unit and sub unit. The jumper wires of the remote controller have no polarities. |
| 2 | Wiring internal and external connection wires | (1) Install wires from the outdoor unit to the main unit as in usual wiring. (Wires of (1), (2) and (3)) (2) Install Wires (1) and (2) only when installing connection wires from the master unit to the sub unit. |

- All two-dot chain lines show wiring jobs to be performed at the site.
- The remote controller circuits are low voltage circuits. These circuits must not be made to directly contact internal and external wires or contained in the same conduit tubes that house internal and external wires. (Otherwise malfunction will be caused by noise)



Wiring Specification

Specification of Wires Between Units and Numbers of Wires

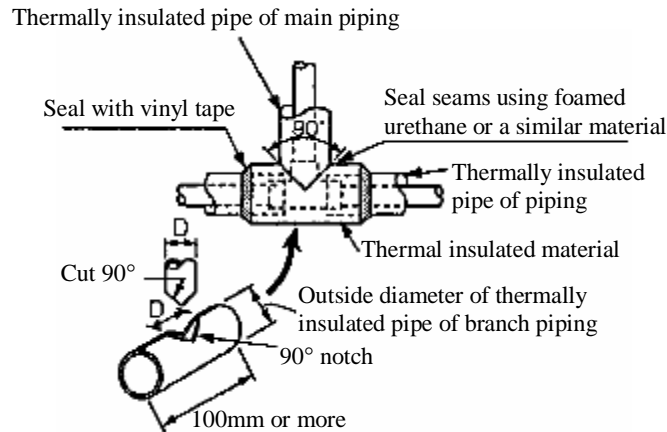
| Item | | Model (RAV-) | | SM1100AT-E | SM1400AT-E |
|--|-----|---------------|--|--|------------|
| | | | | | |
| Jump wire Outdoor unit - indoor unit (main unit) | [D] | No. of wires | | 3 | |
| | | Wire diameter | | 1.0mm ² or more | |
| Jump wire Indoor unit - indoor unit (main unit) (sub unit) | [E] | No. of wires | | 2 | |
| | | Wire diameter | | 1.0mm ² or more | |
| Jump wire Indoor unit - indoor unit (main unit) (sub unit) | [F] | No. of wires | | 2 | |
| | | Wire diameter | | 1.0mm ² or more | |
| Remote control wiring | [G] | No. of wires | | 2 | |
| | | Wire diameter | | Between 0.5mm ² and 2mm ² (up to 200m) | |
| Grounding conductor | | [H] | | Solid wire, Ø2mm | |

- Procure necessary parts and perform all connection work locally.
- Read the installation instructions for the outdoor and indoor units for wiring specification of power wires and cables.

Piping Thermal Insulation (Local Procurement)

Be certain to thermally insulate the piping both on the liquid and gas sides.

- Use thermal insulating materials for piping higher than 120°C in heat resistance.
Example: EPT - Ethylene propylene terpolymer
- Thermally insulate the branch pipe sections using fitting covers (for tees) more than 10mm in thickness or processing thermal insulation materials as follows.
(Thermal insulation materials for the branch pipes are not supplied as accessories)
- Seal the branch pipe sections tightly without producing gaps.



Cautions

Thermal insulating materials sometimes condense depending on the atmosphere inside the ceiling.

Provide adequate thermal insulation by adding glass wool (16 to 20kg/m³, thickness 10mm or more) to the foregoing thermal insulating materials in case the inside of ceilings is expected to be high in temperature and humidity.

Test Run

Be certain to conduct a test run in accordance with the procedures contained in the operating and installation instructions supplied with the indoor units.

Delivery to Customer

- Make certain to hand over the instruction manual supplied with the indoor units to the customer.
- Deliver the system after thoroughly explaining the contents of the instruction manual.
It is important to explain to the customer in details about simultaneously starting and stopping the two indoor units by operating one remote control switch.