Residential VRV System Air Conditioner

MODEL
RXSQ60TAVJUA

Installation manual
Residential VRV System air conditioner

Manuel d’installation
Climatiseur à système VRV résidentiel

Manual de instalación
Acondicionador residencial de aire sistema VRV
Maximum allowable height difference of the receiver tank

Pipe Equivalent length

Height difference (OD below ID)

Maximum allowable height difference of the receiver tank

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figure 18

figure 19

figure 20

figure 21

figure 22

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NOTE Indicates situations that may result in equipment or property-damage accidents only.

DANGER
   • Refrigerant gas is heavier than air and replaces oxygen. A massive leak will result in oxygen depletion, especially in basements, and an asphyxiation hazard will result in serious injury or death.
   • Do not ground units to water pipes, gas pipes, telephone wires, or lightning rods as incomplete grounding will result in a severe shock hazard resulting in severe injury or death.
   • Additionally, grounding to gas pipes will result in a gas leak and potential explosion resulting in severe injury or death.
   • If refrigerant gas leaks during installation, ventilate the area immediately. Refrigerant gas will result in producing toxic gas if it comes into contact with fire. Exposure to this gas will result in severe injury or death.
   • After completing the installation work, check that the refrigerant gas does not leak throughout the system.
   • Do not install unit in an area where flammable materials are present due to risk of explosions that will result in serious injury or death.
   • Safely dispose all packing and transportation materials in accordance with federal/state/local laws or ordinances. Packing materials such as nails and other metal or wood parts, including plastic packing materials used for transportation will result in injuries or death by suffocation.

WARNING
   • Only qualified personnel must carry out the installation work. Installation must be done in accordance with this installation manual. Improper installation could result in water leakage, electric shock, or fire.
   • When installing the unit in a small room, take measures to keep the refrigerant concentration from exceeding allowable safety limits. Excessive refrigerant leaks, in the event of an accident in a closed ambient space, could result in oxygen deficiency.
   • Use only specified accessories and parts for installation work. Failure to use specified parts could result in water leakage, electric shocks, fire, or the unit failing.
   • Install the air conditioner or heat pump on a foundation strong enough that it can withstand the weight of the unit.
   • A foundation of insufficient strength could result in the unit falling and causing injuries.
   • Take into account strong winds, typhoons, or earthquakes when installing. Improper installation could result in the unit falling and causing accidents.
   • Make sure that a separate power supply circuit is provided for this unit and that all electrical work is carried out by qualified personnel according to local, state and national regulations. An insufficient power supply capacity or improper electrical construction could result in electric shocks or fire.
   • Make sure that all wiring is secured, that specified wires are used, and that no external forces act on the terminal connections or wires. Improper connections or installation could result in fire.
   • When wiring, position the wires so that the control box cover can be securely fastened. Improper positioning of the control box cover could result in electric shocks, fire, or the terminals overheating.
   • Before touching electrical parts, turn off the unit.
   • This equipment can be installed with a Ground-Fault Circuit Interrupter (GFCI). Although this is a recognized measure for
additional protection, with the grounding system in North America, a dedicated GFCI is not necessary.

- Securely fasten the unit terminal cover (panel). If the terminal cover/panel is not installed properly, dust or water may enter the outdoor unit and could result in fire or electric shock.
- When installing or relocating the system, keep the refrigerant circuit free from substances other than the specified refrigerant (R410A) such as air. Any presence of air or other foreign substance in the refrigerant circuit could result in abnormal pressure rise or rupture, resulting in injury.
- Do not change the setting of the protection devices. If the pressure switch, thermal switch, or other protection device is shorted and operated forcibly, or parts other than those specified by Daikin are used, fire or explosion could result.

**CAUTION**

- Do not touch the switch with wet fingers. Touching a switch with wet fingers may result in electric shock.
- Do not allow children to play on or around the unit or it may result in injury.
- The heat exchanger fins are sharp enough to cut, and may result in injury if improperly used. To avoid injury wear glove or cover the fins when working around them.
- Do not touch the refrigerant pipes during and immediately after operation as the refrigerant pipes may be hot or cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor, and other refrigerant cycle parts. It may result in your hands getting burns or frostbite if you touch the refrigerant pipes.
- To avoid injury, give the pipes time to return to normal temperature or, if you must touch them, be sure to wear proper gloves.
- Install drain piping to proper drainage. Improper drain piping may result in water leakage and property damage.
- Insulate piping to prevent condensation.
- Be careful when transporting the product.
- Do not turn off the power immediately after stopping operation. Always wait for at least 5 minutes before turning off the power. Otherwise, water leakage may result.
- Do not use a charging cylinder. Using a charging cylinder may cause the refrigerant to deteriorate.
- Refrigerant R410A in the system must be kept clean, dry, and tight.
  (a) Clean and Dry - Foreign materials (including mineral oils such as SUNISO oil or moisture) should be prevented from getting into the system.
  (b) Tight - R410A does not contain any chlorine, does not destroy the ozone layer, and does not reduce the earth's protection against harmful ultraviolet radiation. R410A can contribute to the greenhouse effect if it is released. Therefore take proper measures to check for the tightness of the refrigerant piping installation. Read the chapter Refrigerant Piping and follow the procedures.
- Since R410A is a blend, the required additional refrigerant must be charged in its liquid state. If the refrigerant is charged in a state of gas, its composition can change and the system will not work properly.
- The indoor unit is for R410A. See the catalog for indoor models that can be connected. Normal operation is not possible when connected to other units.
- Remote controller (wireless kit) transmitting distance can be shorter than expected in rooms with electronic fluorescent lamps (inverter or rapid start types). Install the indoor unit far away from fluorescent lamps as much as possible.
- Indoor units are for indoor installation only. Outdoor units can be installed either outdoors or indoors. This unit is for outdoor use.
- Do not install the air conditioner or heat pump in the following locations:
  (a) Where a mineral oil mist or oil spray or vapor is produced, for example, in a kitchen.
- Plastic parts may deteriorate and fall off and thus may result in water leakage.
  (b) Where corrosive gas, such as sulfuric acid gas, is produced.
  Corroding copper pipes or soldered parts may result in refrigerant leakage.
- (c) Near machinery emitting electromagnetic waves. Electromagnetic waves may disturb the operation of the control system and cause the unit to malfunction.
- (d) Where flammable gas may leak, where there is carbon fiber, or ignitable dust suspension in the air, or where volatile flammables such as thinner or gasoline are handled. Operating the unit in such conditions may result in a fire.
- Take adequate measures to prevent the outdoor unit from being used as a shelter by small animals. Small animals making contact with electrical parts may result in malfunctions, smoke, or fire. Instruct the customer to keep the area around the unit clean.

**NOTE**

- Install the power supply and transmission wires for the indoor and outdoor units to at least 3.5 ft. (1 m) away from televisions or radios to prevent image interference or noise. Depending on the radio waves, a distance of 3.5 ft. (1 m) may not be sufficient to eliminate the noise.
- Dismantling the unit, treatment of the refrigerant, oil and additional parts must be done in accordance with the relevant local, state, and national regulations.
- Do not use the following tools that are used with conventional refrigerants: gauge manifold, charge hose, gas leak detector, reverse flow check valve, refrigerant charge base, vacuum gauge, or refrigerant recovery equipment.
- If the conventional refrigerant and refrigerator oil are mixed in R410A, the refrigerant result in deterioration.
- This air conditioner or heat pump is an appliance that should not be accessible to the general public.
  - As design pressure is 478 psi (3.3 MPa), the wall thickness of field-installed pipes should be selected in accordance with the relevant local, state, and national regulations.

**Codes and Regulations**

This product is designed and manufactured to comply with national codes. Installation in accordance with such codes and/or prevailing local codes/regulations is the responsibility of the installer. The manufacturer assumes no responsibility for equipment installed in violation of any codes or regulations. Rated performance is achieved after 72 hours of operation.

### 2. INTRODUCTION

1. This series uses R410A refrigerant. Be absolutely sure to comply with "7. PRECAUTIONS ON REFRIGERANT PIPING", because even greater caution is needed to prevent impurities from entering R410A (mineral oils and water).
2. The design pressure is 478psi (3.3MPa), which means that piping may be thicker than conventionally, so please refer to "7. PRECAUTIONS ON REFRIGERANT PIPING".
3. This is a mixed refrigerant, so charge as a liquid when adding refrigerant. (If charged as a gas, the composition of the refrigerant may change, preventing normal operation.)
4. The indoor unit must use R410A. See the catalog for indoor unit models which can be connected. (Normal operation is not possible when connected to other units.)
5. The power supply of this series is single-phase, 208/230V, 60Hz.
2-1 Combination
The indoor units can be installed in the following range.
• Be sure to connect a dedicated indoor unit. See the catalog for indoor unit models which can be connected.
• Total capacity/quantity of indoor units
  (Outdoor unit)  (Total capacity of indoor units)  (Total quantity of indoor units)
  RXSQ60 type ....... 8.35~21.7kW  9 units

2-2 Standard operation limit
Normal operation
The figures below assume following operating conditions for indoor and outdoor units:
Equivalent pipe length .................................................... 25ft. (7.6m)
Level difference.................................................................... 0ft. (0m)

2-3 Standard supplied accessories
Make sure that the accessories shown below are all present.
(The accessories can be found behind the front panel.)

2-4 Option accessory
• Refrigerant branching kit
  * See “7. PRECAUTIONS ON REFRIGERANT PIPING” for details on how to connect refrigerant branch kits and how many are needed.

3. BEFORE INSTALLATION
<Transporting the Unit>
As shown in figure 2, move the unit slowly. (Take care not to let hands or things come in contact with rear fins.)

4. SELECTING INSTALLATION SITE
(1) Select an installation site where the following conditions are satisfied and that meets with your customer’s approval.
• Places which are well-ventilated.
• Places where the unit does not bother next-door neighbors.
• A location where small animals will not make nests in the unit.
• Safe places which can withstand the unit’s weight and vibration and where the unit can be installed level.
• A locations where there is enough space to install the unit.
• Places where the indoor and outdoor unit's piping and wiring lengths come within the allowable ranges.
• A location where there is no risk of flammable gas leaking.

(2) If the unit is installed in a location where it might be exposed to strong wind, install as per figure 3.
• 11 mph (5 m/s) or higher winds blown against the outdoor unit's exhaust cause a deterioration in the system performance. High winds force re-circulation of the exhaust air into the inlet, which is known to cause the following effects:
  • Reduction in performance.
  • Increased frost formation in heating mode.
  • System shut down due to increased pressures.
• If very strong wind blows continuously on the air outlet side of the outdoor unit, the fan may turn in reverse at high speed and break, so install as per figure 3.

(Refer to figure 3)
1. Turn the air outlet side toward the building's wall, fence or windbreak screen.
2. Air inlet grille
3. Ensure there is enough space for installing the unit.
4. Set the outlet side at a right angle to the direction of the wind.
5. Strong wind
6. Blown air

(3) When installing the unit in a place frequently exposed to snow, pay special attention to the following:
• Install the outdoor unit on a stand (field supply), so that the bottom frame is more than 20 in. (500 mm) higher than the expected snow fall to prevent it from being covered by snow.
• Attach a snow hood (field supply) and a snow vizer (field supply).
• Avoid installation at the place where a snowdrift is generated.
• Further, perform the following countermeasures, since there is risk that the drain water produced at the defrost operation freezes.
• Install the outdoor unit so that its bottom place level has a sufficient height from foundation level, so that ice does not grow at the lower surface of the bottom place of the outdoor unit. (Recommended clearance: 20 in. (500 mm) or more)
• In areas where the outside air temperature drops below 32°F (0°C) for more than 12 hours continuously, install a drain-pan heater (optional accessory) on the bottom frame to prevent the drain from freezing.
  • An optional drain pan heater is available when the unit is installed in a climate where the drain may freeze.
  • The installer should use their local knowledge to determine if this accessory is necessary to prevent the drain from freezing.
  • Do not use a concentrated drain plug (field supply).
    (If a drain plug and/or drain pipe are/is used, there is a risk of freezing.)
  • If there is a problem with drain dripping from the bottom frame drain, set up a roof (field supply) below the outdoor unit, or enact other countermeasures.
  • Remove the rear inlet grille to prevent snow from accumulating on the rear fins.
• When there is possibility of short-circuit depending on the ambient situation, use the wind direction adjusting plate (optional accessory).

(Refer to figure 4)
1. Indoor unit
2. Fuse/Breaker
3. Remote controller
4. Personal computer or radio

(7) Space needed for installation
Refer to figure 5-10 for necessary clearance and service space between the refrigerant tank and the unit. Install the tank outside of this space.

<Precautions when installing units in series>
• The direction for interunit piping is either forward or down when installing units in series, as shown in the figure(5-10).
• If the piping is brought out from the back, the outdoor unit will require at least 10in. from its right side.
  (All figures represent millimeters.)

(7)-1 IN CASE OBSTACLES EXIST ONLY IN FRONT OF THE AIR INLET
When nothing is obstructing the top
1. Installation of single unit
  • In case obstacles exist only in front of the air inlet (Refer to figure 5-[1])
  • In case obstacles exist in front of the air inlet and on both sides of the unit (Refer to figure 5-[2])
2. In case of installing multiple units (2 units or more) in lateral connection per row
  • In case obstacles exist in front of the air inlet and on both sides of the unit (Refer to figure 5-[3])

When something is obstructing the top
1. Installation of single unit
  • In case obstacles exist only in front of the air inlet (Refer to figure 6-[1])
  • In case obstacles exist in front of the air inlet and on both sides of the unit (Refer to figure 6-[2])
2. In case of installing multiple units (2 units or more) in lateral connection per row
  • In case obstacles exist in front of the air inlet and on both sides of the unit (Refer to figure 6-[3])

(7)-2 IN CASE OBSTACLES EXIST IN FRONT OF THE OUTLET SIDE
When nothing is obstructing the top
1. Installation of single unit (Refer to figure 7-[1])
2. In case of installing multiple units (2 units or more) in lateral connection per row (Refer to figure 7-[2])

When something is obstructing the top
1. Installation of single unit (Refer to figure 7-[3])
2. In case of installing multiple units (2 units or more) in lateral connection per row (Refer to figure 7-[4])

(7)-3 IN CASE OBSTACLES EXIST IN FRONT OF BOTH THE AIR INLET AND OUTLET SIDES
Pattern 1: Where obstacle in front of the air outlet is higher than the unit.
  (There is no height limit for obstructions on the intake side.)

When nothing is obstructing the top
1. Installation of single unit (Refer to figure 8-[1])
2. In case of installing multiple units (2 units or more) in lateral connection per row (Refer to figure 8-[2])

When something is obstructing the top
1. Installation of single unit (Refer to figure 8-[3])
2. In case of installing multiple units (2 units or more) in lateral connection per row (Refer to figure 8-[4])
**When something is obstructing the top**

1. Installation of single unit (Refer to figure 8-[3])

Relation of dimensions of H, A, and L are shown in the table below. inch(mm)

<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>0 &lt; L ≤ 1/2H</td>
<td>30(750)</td>
</tr>
<tr>
<td></td>
<td>1/2H &lt; L ≤ H</td>
<td>40(1000)</td>
</tr>
</tbody>
</table>

Note:

Get the lower part of the frame sealed so that air from the outlet does not bypass.

2. Series installation (up to two units) (Refer to figure 8-[4])

Relation of dimensions of H, A, and L are shown in the table below. inch(mm)

<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>0 &lt; L ≤ 1/2H</td>
<td>40(1000)</td>
</tr>
<tr>
<td></td>
<td>1/2H &lt; L ≤ H</td>
<td>50(1250)</td>
</tr>
</tbody>
</table>

Note:

1. Get the lower part of the frame sealed so that air from the outlet does not bypass.
2. Only two units at most can be installed in series.

**Pattern 2:** Where obstacles in front of the air outlet is lower than the unit.

(There is no height limit for obstructions on the intake side.)

**When nothing is obstructing the top**

1. Installation of single unit (Refer to figure 8-[5])

2. In case of installing multiple units (2 units or more) in lateral connection per row (Refer to figure 8-[6])

Relation of dimensions of H, A, and L are shown in the table below. inch(mm)

<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>0 &lt; L ≤ 1/2H</td>
<td>10(250)</td>
</tr>
<tr>
<td></td>
<td>1/2H &lt; L ≤ H</td>
<td>12(300)</td>
</tr>
</tbody>
</table>

When something is obstructing the top

1. Installation of single unit (Refer to figure 8-[7])

Relation of dimensions of H, A, and L are shown in the table below. inch(mm)

<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>0 &lt; L ≤ 1/2H</td>
<td>4(100)</td>
</tr>
<tr>
<td></td>
<td>1/2H &lt; L ≤ H</td>
<td>9(225)</td>
</tr>
</tbody>
</table>

Note:

Get the lower part of the frame sealed so that air from the outlet does not bypass.

2. Series installation (up to two units) (Refer to figure 8-[8])

Relation of dimensions of H, A, and L are shown in the table below. inch(mm)

<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>0 &lt; L ≤ 1/2H</td>
<td>10(250)</td>
</tr>
<tr>
<td></td>
<td>1/2H &lt; L ≤ H</td>
<td>12(300)</td>
</tr>
</tbody>
</table>

Note:

1. Get the lower part of the frame sealed so that air from the outlet does not bypass.
2. Only two units at most can be installed in series.

(7)-4 IN CASE OF STACKED INSTALLATION

1. In case obstacles exist in front of the outlet side (Refer to figure 8-[1])

Note:

1. No more than two units should be stacked.
2. About 4in. (100mm) is required as the dimension for laying the upper outdoor unit’s drain pipe.
3. Shut off the Z part (the area between the upper outdoor unit and the lower outdoor unit) so that outlet air does not bypass.

2. In case obstacles exist in front of the air inlet (Refer to figure 9-[2])

Note:

1. No more than two units should be stacked.
2. About 4in. (100mm) is required as the dimension for laying the upper outdoor unit’s drain pipe.
3. Shut off the Z part (the area between the upper outdoor unit and the lower outdoor unit) so that outlet air does not bypass.

(7)-5 IN CASE OF MULTIPLE-ROW INSTALLATION (FOR ROOF TOP USE, ETC.)

1. In case of installing one unit per row (Refer to figure 10-[1])
2. In case of installing multiple units (2 units or more) in lateral connection per row (Refer to figure 10-[2])

Relation of dimensions of H, A, and L are shown in the table below. inch(mm)

<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>0 &lt; L ≤ 1/2H</td>
<td>10(250)</td>
</tr>
<tr>
<td></td>
<td>1/2H &lt; L ≤ H</td>
<td>12(300)</td>
</tr>
</tbody>
</table>

5. PRECAUTIONS ON INSTALLATION

- Before installation, make sure the unit is level and the foundation is sturdy enough to prevent vibration and noise.
- Fasten the unit in place using 4 foundation bolts M12 or equivalent.
- Make sure the drainage works properly.
- In such locations, for example, where the drain water might drip onto passersby, lay the drain pipe using the separately sold drain plug and seal up the drain holes in the bottom frame. For details, please contact your dealer.
- In case of installing the outdoor unit in cold climates, do not take this centralized drainage way. Otherwise, drain pipe freeze-up and ice build-up on the bottom frame way occur.
- When laying the drain pipe, at least 4in. (100mm) from the bottom of the outdoor unit is needed.
- Make sure the drainage works properly.
  (Watch out for water leaks if piping is brought out the bottom.)

(Refer to figure 11)

1. Diagram of lower surface

**Drain pipe installation**

- Locations where drain water from the outdoor unit might be a problem.
- Fasten the unit in place using 4 foundation bolts M12 or equivalent.
- Make sure the drainage works properly.
  (Watch out for water leaks if piping is brought out the bottom.)

(Refer to figure 12)

1. Drain plug
2. 4 tabs
3. Drain receiver
4. Insert the drain receiver into the drain plug and hook the tabs.
5. Bottom frame drain hole
6. (1) Insert the drain plug through the drain hole in the bottom frame shown in figure 13.
   (2) Turn the drain plug along the guide until it stops (approx. 40°).
7. Guide

(Refer to figure 13)

1. Air outlet side
2. Diagram of lower surface
3. Drain hole (For plug)
4. Drain hole

**How to remove the transport clasp**

- A yellow transport clasp and washer are attached to the legs of the compressor to protect the unit during transportation, so remove them as shown in figure 14.
(Refer to figure 14)
1. Compressor
2. Securing nut
3. Transport clasp (Yellow)
4. Turn in the direction of the arrow and remove.
(1) Open the sound-proof cover as shown in figure 14. Do not pull the sound-proof cover or remove it from the compressor.
(2) Remove the securing nut.
(3) Remove the washer.
(4) Remove the transport clasp as shown in figure 14.
(5) Retighten the securing nut.
(6) Return the sound-proof cover as it was.

6. FIELD WIRING

To the electrician
• Do not operate until refrigerant piping work is completed. (Failure to adhere to this caution may lead to irreparable compressor damage.)

6-1 Wiring connection example for whole system
• Electrical wiring work should be done by a certified professional.
• Follow the 'Electrical wiring diagram face plate' when carrying out any electrical wiring.
• Only proceed with wiring work after blocking off all power.
• Make sure the ground resistance is no greater than 4Ω.
• Ground the indoor and outdoor units.
• Do not connect the ground wire to gas pipes, sewage pipes, lightning rods, or telephone ground wires.
• Gas pipes: can explode or catch fire if there is a gas leak.
• Sewage pipes: no grounding effect is possible if hard plastic piping is used.
• Telephone ground wires and lightning rods: dangerous when struck by lightning due to abnormal rise in electrical potential in the grounding.
• Use copper wire.
• When doing the electrical wiring, always shut off the power source before working, and do not turn on the switch until all work is complete.
• This unit has an inverter, so it must be grounded in order to reduce noise and prevent it affecting other appliances, and also to release any electrical build-up in the unit case due to leaked current.
• Do not install a power-factor improving phase-advancing capacitor under any circumstances. (Not only will this not improve the power factor, but it might cause a fire.)
• Connect the wire securely using designated wire and fix it with attached clamp without applying external pressure on the terminal parts (terminal for power wiring, terminal for transmission wiring and earth terminal). See "6-3 How to connect the power supply wiring".
• Left-over wiring should not be wrapped and stuffed into the unit.
• To prevent the power wiring from being damaged by the knock hole edges, put it in a wiring pipe or plastic tube to protect it.
• Secure the wiring with the included clamp so that it does not come in contact with the piping or stop valve.
(See "6-3 How to connect the power supply wiring")

CAUTION
• Use a power wire pipe for the power supply wiring.
• Outside the unit, make sure the weak electric wiring (i.e. for the remote controller cord, between units, etc.) and the strong electric wiring do not pass near each other, keeping them at least 2in. (50mm) apart. Proximity may cause electrical interference, malfunctions, and breakage.

• Be sure to connect the power wiring to the power wiring terminal block and secure it as described in '6-3 How to connect the power supply wiring'.
• Transmission wiring should be secured as described in '6-4 Transmission wiring connection procedure'.
• Secure wiring with clamp (accessory) to avoid contact with piping.
• Make sure the wiring and the front panel do not stick up above the structure, and close the cover firmly.

(Refer to figure 15)
1. Fuse/Breaker
2. Power supply
3. Outdoor unit
4. 16V
5. 208/230V
6. Indoor unit
7. Remote controller
8. Ground wire
9. Indoor unit (CXTQ**) (Refer to figure 14)
10. Gas Furnace

6-2 How to lay the power supply wiring and transmission wiring
Let the power supply wiring and transmission wiring with a conduit pass through one of the knockout holes on the front or side cover, and let the transmission wiring with a conduit pass through another knockout hole.
• For protection from uninsulated live parts, thread the power supply wiring and the transmission wiring through the included insulation tube and secure it with the included clamp.

<Power supply wiring>

<Transmission wiring>

Precautions knock out holes
• Open the knock holes with a hammer or the like.
• After knocking out the holes, we recommend you remove burrs in the knock holes and paint the edges and areas around the edges using the repair paint to prevent rusting.
• When passing wiring through knock holes, make sure there are no burrs, and protect the wiring with protective tape.

(Refer to figure 16)
1. Stop valve attachment plate
2. Power supply wiring (including ground wire) or transmission wiring
3. Back of unit

If small animals might enter the unit, block the knock holes with an appropriate material (field supply).
4. Knockout hole
5. Side of unit
6. Front of unit
7. Terminal block
8. Control Box

<Precautions when laying power wiring>
- Wiring of different thicknesses cannot be connected to the power terminal block.
  (Slack in the power wiring may cause abnormal heat.)
- Use sleeve-insulated round pressure terminals for connections to the power terminal block. When none are available, connect wire of the same diameter to both sides, as shown in the figure.

Follow the instructions below if the wiring gets very hot due to slack in the power wiring.
- For wiring, use the designated power wire and connect firmly, then secure using the included clamping material to prevent outside pressure being exerted on the terminal board.
- Use an appropriate screwdriver for tightening the terminal screws. A screwdriver with a small head will strip the head and make proper tightening impossible.
- Over-tightening the terminal screw may break it.

See the table below the tightening torque of the terminal screws.

<table>
<thead>
<tr>
<th>Model name</th>
<th>Voltage</th>
<th>Maximum overcurrent protective device</th>
</tr>
</thead>
<tbody>
<tr>
<td>RXSQ60 type</td>
<td>208/230V</td>
<td>35A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>29.1A</td>
</tr>
</tbody>
</table>

6-3 How to connect the power supply wiring

- Attach a circuit breaker/GFCI.

<table>
<thead>
<tr>
<th>Model name</th>
<th>Phase and frequency</th>
<th>Voltage</th>
<th>Maximum overcurrent protective device</th>
</tr>
</thead>
<tbody>
<tr>
<td>RXSQ60 type</td>
<td>1-60Hz</td>
<td>208/230V</td>
<td>35A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>29.1A</td>
</tr>
</tbody>
</table>

6-4 Transmission wiring connection procedure
- Between indoor units in the same system, pass the wiring between the units as shown in figure 18. (There is no polarity.)

<table>
<thead>
<tr>
<th>Precautions regarding the length of wiring between units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. wiring length: 984ft (300m)</td>
</tr>
<tr>
<td>Total wiring length: 1968ft (600m)</td>
</tr>
<tr>
<td>Max. no. of branches: 8</td>
</tr>
</tbody>
</table>

Precautions regarding wiring between units
- Do not connect 208/230V power wiring to terminals for the transmission wiring. Doing so would destroy the entire system.
- Wiring to the indoor unit should be wired to F1 and F2 (TO IN/D unit) on the outdoor unit’s terminal block (X2M).

NOTE
- The above wiring should be wired using AWG18-16 stranded, non-shielded wiring. (See figure 18 for how to ground the shield.)
- All transmission wiring is to be procured on site.

7. PRECAUTIONS ON REFRIGERANT PIPING

- Do not allow anything other than the designated refrigerant to get mixed into the refrigerant cycle, such as air, nitrogen, etc. If any refrigerant gas leaks while working on the unit, ventilate the room thoroughly right away.
- Use R410A only when adding refrigerant.
- Installation tools:
  Make sure to use installation tools (gauge manifold, charge hose, etc.) that are exclusively used for R410A installations to withstand the pressure and to prevent foreign materials (e.g., mineral oils and moisture) from mixing into the system.
- Vacuum pump:
  - Use a 2-stage vacuum pump with a non-return valve.
  - Make sure the pump oil does not flow opposite into the system while the pump is not working.
  - Use a vacuum pump which can evacuate to 500 microns.
7-1 Selecting piping material

**CAUTION**
Piping and other pressure containing parts shall comply with the applicable legislation and shall be suitable for refrigerant. Use phosphoric acid deoxidized seamless copper for refrigerant.

**CAUTION**
- All field piping must be installed by a licensed refrigeration technician and must comply with relevant local and national regulations.
- After piping work is complete, do not under any circumstances open the stop valve until 6. FIELD WIRING on page 6 and POST-WORK CHECKS on page 13 are complete.
- Do not use flux when brazing the refrigerant piping. Use the phosphor copper brazing filler metal (B-Cu93P-710/795:ISO 3677) which does not require flux. Flux has extremely negative effect on refrigerant piping systems. For instance, if the chlorine based flux is used, it will cause pipe corrosion or, in particular, if the flux contains fluorine, it will damage the refrigerant oil.
- Use only pipes which are clean inside and outside and which do not accumulate harmful sulfur, oxidents, dirt, cutting oils, moisture, or other contamination. (Foreign materials inside pipes including oils for fabrication must be 0.14 gr/10 ft. (30 mg/10 m) or less.)
- Use the following items for the refrigerant piping.
  - **Material**: Jointless phosphor-deoxidized copper pipe.
  - **Size**: See 7-6 Example of connection.
  - **Thickness**: Select a thickness for the refrigerant piping which complies with national and local laws.
- Install the refrigerant branch kit while observing the following conditions and referring to the installation manual offered as an accessory of the kit.

(Refer to figure 20)
1. Install the REFNET joint so it splits horizontally or vertically.
2. Horizontal surface
3. A-arrow view
4. ±30° or less
5. Level
6. Vertical is also OK
7. Install the REFNET header so that it splits horizontally.
8. B-arrow view

7-2 Protection against contamination when installing pipes

- Wrap the piping to prevent moisture, dirt, dust, etc. from entering the piping.
- Exercise caution when passing copper piping through the through-holes and when passing them out to the outside.
- CAUTION
- Insulation on liquid pipe is required if there is possibility to operate at reversed ambient temperatures between outdoor and indoor (cooling: outdoor<indoor, heating: outdoor>indoor)
- Liquid pipes which located under outdoor ambient condition should to be insulated as much as possible.
- Condensation at non-insulation liquid pipe may cause a problem, field pipe setting (Mode2-4) have to set “1” or “3”.
- If there is a place where insulation can not be installed, add the amount of refrigerant according to “7-7 Additional refrigerant charge amount”.
- Insulation on liquid pipe is required if there is possibility to operate at reversed ambient temperatures between outdoor and indoor (cooling: outdoor<indoor, heating: outdoor>indoor)

Limitations when using existing pipes.
When installing residential VRV you should use the specified pipe diameter sizes and insulate both gas and liquid pipes. An exception to this would be in a system replacement application where existing piping can be used if the limitations listed below are followed.

1. Limitations when using existing liquid pipes.
   - Observe the piping size of 7-6.
   - Using existing liquid pipes is allowed for the main pipe only. Ther-mal insulation is required to branch pipes.
   - Insulation is required to accessible liquid pipe exposed outdoors and indoors.
   - Liquid pipes which located under outdoor ambient condition should to be insulated as much as possible.
   - Condensation at non-insulation liquid pipe may cause a problem, field pipe setting (Mode2-4) have to set “1” or “3”.
   - If there is a place where insulation can not be installed, add the amount of refrigerant according to “7-7 Additional refrigerant charge amount”.

2. Limitations when using existing gas pipes.
   - Observe the piping size of 7-6.
   - Using existing liquid pipes is allowed for the main pipe only.
• Insulation is required to all gas pipe.
• When the gas pipe diameter is larger than the specified pipe diameter, add the amount of refrigerant according to "7-7 Additional refrigerant charge amount" term.
• In order to maximize the performance, it is recommended to use standard size piping and install insulation. On both liquid and gas pipes.
• Main pipe: Main pipe means the field line set from the stop valve to the first branch.
• Branch pipe: Branch pipe means the field line set from the first branch to indoor units.

Table 1

<table>
<thead>
<tr>
<th>Pipe size (in.)</th>
<th>Tightening torque (lb·in)</th>
<th>A dimension when processing flares (in.)</th>
<th>Flare shape (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot; (9.5mm)</td>
<td>24.1-29.4</td>
<td>0.504-0.520</td>
<td>R1.06-0.031</td>
</tr>
<tr>
<td>5/8&quot; (15.9mm)</td>
<td>45.6-55.6</td>
<td>0.760-0.776</td>
<td>(19.3-19.7mm)</td>
</tr>
<tr>
<td>3/4&quot; (19.1mm)</td>
<td>71.7-87.5</td>
<td>0.929-0.945</td>
<td>(23.6-24.9mm)</td>
</tr>
</tbody>
</table>

- NOTE: Cutting out the two slits makes it possible to install as shown in figure 24. (Use a metal saw to cut out the slits.)

- Precautions when connecting pipes:
  • Please refer to the Table 1 for the dimensions for processing flares.
  • When connecting the flare nut, coat the flare both inside and outside with refrigerating machine oil and initially tighten by hand 3 or 4 turns before tightening firmly.
  • Please refer to the Table 1 for the tightening torque. (Too much tightening will end up in splitting of the flare.)

- In installations where existing refrigerant pipes are being used; and the pipes are not accessible to the installer, ensure that all visible piping is insulated. The refrigerant pipes between the outdoor unit and wall must be insulated if any portion of the un-accessible liquid pipe cannot be insulated. In addition to this, a field setting change will be required to enable to system to operate smoothly in such installations. Failure to follow the instruction may lead to damage due to sweating and cause compressor damage and void warranty.

- In case of "no-insulation" on liquid line, when ambient temperature is "low", the system may cycle the fan off for thermo-off unit and fan operation continues.

- Insulation is required to all gas pipe.
- Insulation is required to enable to system to operate smoothly in such installations.
- Selection of insulation dimension is recommended as following:
  a) Insulation of pipes should be done after performing air tight test and vacuum drying on page 12.
  b) Heat transfer rate: 0.041 to 0.052W/MK (0.024 to 0.030 BTU/hr/ft²°F (0.035 to 0.045 kcal/m²°C))
  c) Be sure to use insulation that is designed for use with HVAC Systems.
  d) The highest temperature that the gas-side piping can reach is around 248°F (120°C), so be sure to use insulating material which is very resistant.

- Branch pipe: Branch pipe means the field line set from the first branch to indoor units.

- Highly recommended to use the interunit piping (liquid and gas-side) and the refrigerant branch kit. (Not insulating them may cause leaking.)

- If a torque wrench is not available, there is a place where the tightening torque will suddenly increase if a normal wrench is used to tighten the flare nut.

- After all the piping has been connected, use nitrogen to perform a gas leak check.

Precautions for connecting pipes:
• Be careful not to let the interunit piping come into contact with the compressor terminal cover.
• Adjust the height of the insulation material on liquid pipe when it has the possibility of getting in contact with the terminal. Also make sure that the interunit piping does not touch the mounting bolt of the compressor.

CAUTION
For local insulation, be sure to insulate all the way to the pipe connections inside the machine.
Exposed piping may cause leaking or burns on contact.
### Example of connection
(Connection of 8 indoor units
Heat pump system)

![Diagram of connection](attachment:connection_diagram.png)

**Branch with refnet joint**
- Outdoor unit
- REFNET joint (A-G)
- Indoor units (1-8)

**Branch with refnet joint and refnet header**
- Outdoor unit
- REFNET joint (A-G)
- Refnet header
- Indoor units (1-8)

**Branch with refnet header**
- Outdoor unit
- Refnet header
- Indoor units (1-8)

### Maximum allowable length
- Between outdoor and indoor units
  - Actual pipe length: 100ft (30.5m)
  - Equivalent pipe length: 125ft (38m)

### Allowable length after the branch
- Pipe length from first refrigerant branch kit (either refnet joint or refnet header) to indoor unit ≤ 100ft (30.5m)
- Pipe length to indoor unit ≤ 100ft (30.5m)

### Refrigerant branch kit selection

<table>
<thead>
<tr>
<th>Outdoor unit capacity type</th>
<th>Refrigerant branch kit name</th>
</tr>
</thead>
<tbody>
<tr>
<td>RXSQ60 type</td>
<td>KHRP264/2279</td>
</tr>
</tbody>
</table>

### Pipe size selection

**Gas pipe**

<table>
<thead>
<tr>
<th>Outdoor unit capacity type</th>
<th>Piping size (outer diameter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 type</td>
<td>3/4&quot; (19.1mm)</td>
</tr>
<tr>
<td>36 type</td>
<td>7/8&quot; (22.2mm)</td>
</tr>
<tr>
<td>48 type</td>
<td>1-1/8&quot; (28.6mm)</td>
</tr>
<tr>
<td>60 type</td>
<td>1-1/8&quot; (28.6mm)</td>
</tr>
</tbody>
</table>

**Liquid pipe**

<table>
<thead>
<tr>
<th>Outdoor unit capacity type</th>
<th>Piping size (outer diameter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 type</td>
<td>1/2&quot; (12.7mm)</td>
</tr>
<tr>
<td>36 type</td>
<td>3/8&quot; (9.5mm)</td>
</tr>
<tr>
<td>48 type</td>
<td>5/8&quot; (15.9mm)</td>
</tr>
<tr>
<td>60 type</td>
<td>5/8&quot; (15.9mm)</td>
</tr>
</tbody>
</table>

**Use for multi connection**

- Match the size of the connection piping on the outdoor unit.
- Use for multi connection.

**Use for par connection**

- Match the size of the connection piping on the outdoor unit.
- Use for par connection.

### Caution on selecting connection pipes

- Usable existing gas pipe: CXTQ**
- 24 type: 3/4" (19.1mm)
- 36 type: 7/8" (22.2mm)
- 48 type: 1-1/8" (28.6mm)
- 60 type: 1-1/8" (28.6mm)

- Standard size: ○
- Available: ●
- Not available: △

### How to select the refnet header

- Choose from the following table below the REFNET header according to the number of units on the system.

<table>
<thead>
<tr>
<th>Outdoor or unit capacity type</th>
<th>Refrigerant branch kit name</th>
</tr>
</thead>
<tbody>
<tr>
<td>RXSQ60 type</td>
<td>KHRP264/2279</td>
</tr>
<tr>
<td>KHRP265M33/99 (Max. 8 branch)</td>
<td></td>
</tr>
</tbody>
</table>

### Piping between outdoor unit and refrigerant branch kit
- Match the size of the connection piping on the outdoor unit.

### Piping between refrigerant branch kit and indoor unit
- Match the size of the connection piping on the indoor unit.

### Between refrigerant branch kit and indoor unit oil
- Pipe size for direct connection to indoor unit must be the same as the connection size of indoor unit.

### Between outdoor and indoor units

- Pipe length between outdoor and indoor units ≤ 100ft (30.5m)

### Between indoor and indoor units

- Example unit 8: a + b + c + d + e + f + g + p ≤ 100ft (30.5m)
- Difference in height between adjacent indoor units (H2) ≤ 49ft (15m)

### Difference in height between outdoor and indoor units (H1)

- Example unit 8: a + b + c + d + e + f + g + p ≤ 100ft (30.5m)

### Total piping length from outdoor unit to all indoor units

- Total piping length ≤ 492ft (150m)
### Additional refrigerant charge amount

#### Thermal insulation on liquid line

<table>
<thead>
<tr>
<th>1) Total</th>
<th>2) Total</th>
<th>3) Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lbs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### No - thermal insulation on liquid line

<table>
<thead>
<tr>
<th>1) Total</th>
<th>2) Total</th>
<th>3) Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lbs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Liquid refrigerant amount for field piping

<table>
<thead>
<tr>
<th>Pipe size</th>
<th>Refrigerant amount (lbs/ft)</th>
<th>Liquid Pipe Length (ft)</th>
<th>Sub total (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4&quot;</td>
<td>0.096</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>1/4&quot;</td>
<td>0.015</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

#### Main Gas refrigerant amount for field piping

<table>
<thead>
<tr>
<th>Main Gas Pipe size</th>
<th>Refrigerant amount (lbs/ft)</th>
<th>Main Gas Pipe Length (ft)</th>
<th>Sub total (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>N/A</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>7/8&quot;</td>
<td>0.008</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>0.008</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>1&quot;</td>
<td>N/A</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

#### ODU Capacity

<table>
<thead>
<tr>
<th>Model name</th>
<th>Refrigerant amount (lbs)</th>
<th>Unit number</th>
<th>Sub total (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RXSQ**T</td>
<td>24.36</td>
<td>48</td>
<td>2.40</td>
</tr>
<tr>
<td>RXSQ**T</td>
<td>24.36</td>
<td>48</td>
<td>2.40</td>
</tr>
<tr>
<td>RXSQ**T</td>
<td>24.36</td>
<td>48</td>
<td>2.40</td>
</tr>
<tr>
<td>RXSQ**T</td>
<td>24.36</td>
<td>48</td>
<td>2.40</td>
</tr>
</tbody>
</table>

#### Indoor unit type

<table>
<thead>
<tr>
<th>Model name RXSQ**T</th>
<th>Unit number</th>
<th>Refrigerant amount (lbs)</th>
<th>Sub total (lbs)</th>
<th>Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>RXSQ**T</td>
<td>24.36</td>
<td>48</td>
<td>2.40</td>
<td>(A)</td>
</tr>
<tr>
<td>RXSQ**T</td>
<td>24.36</td>
<td>48</td>
<td>2.40</td>
<td>(B)</td>
</tr>
<tr>
<td>RXSQ**T</td>
<td>24.36</td>
<td>48</td>
<td>2.40</td>
<td></td>
</tr>
<tr>
<td>RXSQ**T</td>
<td>24.36</td>
<td>48</td>
<td>2.40</td>
<td></td>
</tr>
</tbody>
</table>

*Put connected indoor unit Qty based on Table below.*

- Ducted
  - FXMQ**
  - FXDG**
  - FXIQ**
  - FXIQ**
  - FXQO**
  - CXQD**
  - CXQD**
  - CXQD**
  - CXQD**

- Non-ducted
  - FXNQ**
  - FXNQ**
  - FXNQ**
  - FXNQ**

- Available
  - G1
  - G2
  - G3
  - G4
  - G5
  - G6
  - G7
  - G8
  - G9
  - G10

- Model name RXSQ**T
  - [A] 24.36
  - [B] 24.36
  - [C] 24.36

- [A] - [B]: 0, Put "0"
7-8 Air tight test and vacuum drying

After doing the piping, perform the following inspections.

Be sure to use nitrogen gas. (See the figure ("Stop valve operation procedure") for the location of the service port.)

[Procedure]
Pressurize from the liquid pipes and gas pipes to 550psi (3.8MPa) (and not above 550psi (3.8MPa)). If there is not pressure drop over the next 24 hours, the equipment has passed the test.

If the pressure drops, check for leakage positions. (Confirm that there is no leakage, then release nitrogen.) If a FXTQ indoor unit and a CXTQ unit are used, only pressurize to 450psi (3.1MPa).

Use a vacuum pump that can create a vacuum down to at least 500 microns.

[Procedure]
Operate the vacuum pump for at least 2 hours from both the liquid and gas pipes and decrease the pressure to at least 500 microns.

Leave at below 500 microns for at least 1 hour and make sure that the vacuum gauge does not rise. (If it does rise, there is either still moisture in the system or a leak.)

Cases where moisture might enter the piping (i.e., if doing work during the rainy season, if the actual work takes long enough that condensation may form on the inside of the pipes, if rain might enter the pipes during work, etc.)

After performing the vacuum drying for 2 hours, pressurize to 7.2psi (0.05MPa) (i.e., vacuum breakdown) with nitrogen gas, then depressurize down to at least 500 microns for an hour using the vacuum pump (vacuum drying). (If the pressure does not reach at least 500 microns even after depressurizing for at least 2 hours, repeat the vacuum breakdown - vacuum drying process.) Leave as a vacuum for 1 hour after that, and make sure the vacuum gauge does not rise.

(Refer to figure 27)
1. Decompression valve
2. Nitrogen
3. Vacuum pump
4. Valve (Open)
5. Charge hose
6. Stop valve service port
7. Indoor unit
8. Gas line stop valve (Close)
9. Liquid line stop valve (Close)
10. Indicates local procurement
11. Outdoor unit

NOTE
The stop valve must always be turned to "closed". Otherwise the refrigerant in the outdoor unit will pour out.

Stop valve operation procedure

[Precautions when handling the stop valve]

The names of parts needed to operate the stop valve are shown in the figure below. The unit is shipped from the factory with the stop valve turned to the "closed" position.

Servicing port

Valve stem
Valve cap
Flare nut
Field piping connection

• Since the side boards may be deformed if only a torque wrench is used when loosening or tightening flare nuts, always lock the stop valve with a wrench and then use a torque wrench.
• In cases where the unit is run in heating mode when the outside temperature is low or in other situations where the operating pressure might drop, seal the gas-side flare nut on the stop valve with silicon sealant or the like to prevent it from freezing.

Stop valve operation procedure

Have a hex wrench ready (size: 0.2in.(4mm) and 0.3in.(6mm)).

Opening the valve
1. Place the hex wrench on the valve stem and turn counter-clockwise.
2. Stop when the valve stem no longer turns. It is now open.

Close the valve
1. Place the hex wrench on the valve stem and turn clockwise.
2. Stop when the valve stem no longer turns. It is now closed.

Liquid-side tightening torque Gas-side tightening torque
10.0 ~ 12.2 ft·lbf 16.6 ~ 20.3 ft·lbf
13.5 ~ 16.5 N·m 22.5 ~ 27.5 N·m

Precautions for handling valve cap

• A seal is attached to the point indicated by the arrow. Take care not to damage it.

Precautions for handling servicing port

• Use a push-rod-provided charging hose for operation.
• Be sure to tighten the valve cap securely after operation.

Tightening torque 8.5 ~ 10.3 ft·lbf (10.8 ~ 14.7 N·m)
8. ADDITIONAL REFRIERGANT CHARGE

**WARNING**
- When leaving the unit with the power on, be sure to switch with another person doing the installation or close the front panel.

8-1 Before adding refrigerant
- Make sure the following work and inspection is complete, in accordance with the installation manual.
  - Piping
  - Wiring
  - Airtightness test, Vacuum drying

8-2 Checking the refrigerant tank
- Check whether the tank has a siphon pipe before charging and place the tank so that the refrigerant is charged in liquid form. (See the figure below.)
  - Tank with siphon pipe
  - Other tanks

8-3 Adding refrigerant

Filling after calculating the amount of refrigerant to add
1. Calculate the amount of refrigerant to add as described in “Calculating the amount of refrigerant to add” in “7. PRECAUTIONS ON REFRIGERANT PIPING”.
2. After the vacuum drying is finished, open valve A and charge the calculated amount of refrigerant through the service port for the liquid-side stop valve.
3. Close valve A after charging is complete.

Note: If all the refrigerant to be added cannot be charged using the above procedure, right-hand the procedure below and re-charge the refrigerant.

If all the refrigerant could not be added
Add refrigerant using the following procedure. See the “Service Precautions” plate attached to the outdoor unit for details on the settings for adding refrigerant.

9. POST-WORK CHECKS

Perform the following checks after work is complete.
1. Drain pipe connection, removal of transport clasp → See “5. PRECAUTIONS ON INSTALLATION”.
2. Incorrect power supply wiring, loose screws → See “6-4 Transmission wiring connection procedure”.
3. Incorrect refrigerant piping connections → See “7. PRECAUTIONS ON REFRIGERANT PIPING”.
4. Piping sizes, use of insulation → See “7-1 Selecting piping material”.
5. Stop valve check → See “7-1 Selecting piping material”.
6. Record of Amount of Refrigerant Added → Record it on “Record of Amount of Refrigerant Added” on the “Service Precautions” plate.

10. TEST RUN

This unit is equipped with a crank case heater to ensure smooth startup. Be sure to turn the power on at least 6 hours before operation in order to have power running to the crank case heater.

**WARNING**
When leaving the unit with the power on, be sure to switch with another person doing the installation or close the front panel.

Precautions before turning the power on
- Using insulating sheets, tape electric parts as described in the “Service Precautions” plate on the back of the front panel.
- All indoor units connected to the outdoor unit operate automatically. Complete work on the indoor units in order to ensure maximum safety.

10-1 Power On–Check Operation
- Make sure to perform the check operation after installation.
  (If the air conditioner is operated using the indoor remote controller without performing the check operation, the malfunction code “U3” is displayed in the indoor remote controller, and normal operation is disabled.)
  - When making settings on the outdoor unit PC board (A1P) after turning the power on, do not touch anything other than the push-button switches and dip switches.
    (See the “Service Precautions” plate for the locations of the push-button switches (BS1-5) and dip switches (DS1-1, 2) on the PC board (A1P).)
During the operation, monitor the indoor unit operation status and check for any incorrect wiring.

1. Close the outdoor unit's front panel. **Caution** Be sure to turn the power on at least 6 hours before operation in order to have power running to the crankcase heater.

2. Open the outdoor unit's front panel. **Note** The check run cannot be performed in recovery or other modes. Each indoor unit cannot be checked individually for problems. In order to ensure uniform refrigerant distribution, it may take up to around 10 minutes for the compressor to start up after the unit begins running. This is not a malfunction.

3. When the customer requests quiet operation or demand operation, make these settings using the push-button switches (BS1-5) on the outdoor unit's PC board (A1P). **Caution** Operate the push-button switches through the opening after protecting it with an insulation cover. (See the “Service Precautions” plate for details.) Use caution to avoid electric shock while working, since the outdoor unit is on. Only set the push-button switches (BS1-5) after making sure the microcomputer OK monitor is lit up. See the “Service Precautions” plate on the front panel of the outdoor unit for details on how to make the settings. Do not forget to write the settings down on the “Service Precautions” plate. The dip switch (BS1-1) does not need to be set, so do not touch it. Doing so may cause malfunction.

4. Check that the liquid and gas-side stop valves are open and if they are closed, open them. **Caution** Do not leave any stop valve closed otherwise the compressor will fail.

5. Press the test run button (BS4) for at least five seconds and perform check operation. For details, see the operation manual which comes with the unit.

6. Close the front panel of the outdoor unit after check operation is complete.

**Precautions During Check Operation**

- If operation is performed within 12 minutes of the indoor and outdoor units being turned on, H2P will light up, and the compressor will not run. Only perform operation after checking that the LED display is as shown in “10-1 Power On–Check Operation” table. In order to ensure uniform refrigerant distribution, it may take up to around 10 minutes for the compressor to start up after the unit begins running. This is not a malfunction.

- Each indoor unit cannot be checked individually for problems. After this operation is complete, run the unit normally using the remote controller.

- The check run cannot be performed in recovery or other modes. If the outdoor pipe thermistor (R2T), the intake pipe thermistor (R3T), and the pressure sensors (S1NPH and S1NPL) are removed before operation, the compressor might burn out, so avoid this under all circumstances.

**10-2 Temperature control operation checklist**

[Set the master unit (the indoor unit with rights of selection cooling or heating)]

**With a wired remote controller**

- After check operation is complete, displays of all the connected remote controllers will flash “Switching mode”. Ask the customer which indoor unit to set as the master unit. (Setting the most frequently used indoor unit as the master unit is recommended.) Press the mode-switch button on the remote controller for the master unit.

**With wireless remote controller**

- After check operation is complete, press the mode-switch button on the remote controller for the master unit.

- Ask the customer which indoor unit to set as the master unit. (Setting the most frequently used indoor unit as the parent unit is recommended.) Press the mode-switch button on the remote controller for the master unit.

- A beeping sound will be emitted and the timer lamps on all the indoor units will go off. That indoor unit will be the indoor unit which has the right to switch between cooling and heating. For details, see the operation manual which comes with the unit.

- After check operation is complete, check the temperature control using normal operation. (Heating is not possible if the outdoor temperature is 75°F(24°C) or higher. See the included operation manual.)

(1) Make sure the indoor and outdoor units are operating normally. (If liquid compression by the compressor or other abnormal noises can be heard, stop the unit immediately, heat the crank case for a sufficient amount of time, and try again.)

(2) Run each indoor unit one at a time and make sure the corresponding outdoor unit is also running.

(3) Check to see if cold (or hot) air is coming out of the indoor unit.

(4) Press the fan direction and fan strength buttons on the indoor unit to see if they operate properly.

**Precautions during temperature control checks**

- For around 5 minutes after the compressor stops, the compressor will not run even if the “operate/stop” button on the remote controller is pressed.

- When the system operation is stopped by the remote controller, the outdoor units may continue operating for further 1 minutes at maximum.

- Malfunction code “US” is displayed if check operation is not performed using the test run button the first time after installation. Perform the check operation in accordance with “10-1 Power On–Check Operation”.

**<Precautions during temperature control checks>**

- Be sure to turn the power on at least 6 hours before operation in order to have power running to the crankcase heater.

- Each indoor unit cannot be checked individually for problems. In order to ensure uniform refrigerant distribution, it may take up to around 10 minutes for the compressor to start up after the unit begins running. This is not a malfunction.

- Each indoor unit cannot be checked individually for problems. In order to ensure uniform refrigerant distribution, it may take up to around 10 minutes for the compressor to start up after the unit begins running. This is not a malfunction.

- Each indoor unit cannot be checked individually for problems. In order to ensure uniform refrigerant distribution, it may take up to around 10 minutes for the compressor to start up after the unit begins running. This is not a malfunction.
[Remote controller displays malfunction code]

(1) Check on a remote controller connected to the indoor unit.

<table>
<thead>
<tr>
<th>Malfunction code</th>
<th>Installation error</th>
<th>Remedial action</th>
</tr>
</thead>
<tbody>
<tr>
<td>E3</td>
<td>The stop valve of an outdoor unit is left closed.</td>
<td>Open the gas-side stop valve and the liquid-side stop valve.</td>
</tr>
<tr>
<td>Refrigerant overcharge.</td>
<td>Recalculate the required amount of refrigerant from the piping length and correct the refrigerant charge level by recovering any excessive refrigerant with a refrigerant recovery machine.</td>
<td></td>
</tr>
<tr>
<td>F6</td>
<td>The stop valve of an outdoor unit is left closed.</td>
<td>Open the gas-side stop valve and the liquid-side stop valve.</td>
</tr>
<tr>
<td>Refrigerant overcharge.</td>
<td>Recalculate the required amount of refrigerant from the piping length and correct the refrigerant charge level by recovering any excessive refrigerant with a refrigerant recovery machine.</td>
<td></td>
</tr>
<tr>
<td>U2</td>
<td>Insufficient refrigerant.</td>
<td>Check if the additional refrigerant charge has been finished correctly.</td>
</tr>
<tr>
<td>Refrigerant overcharge.</td>
<td>Recalculate the required amount of refrigerant from the piping length and add an adequate amount of refrigerant.</td>
<td></td>
</tr>
<tr>
<td>U3</td>
<td>Insufficient supply voltage</td>
<td>Check to see if the supply voltage is supplied properly.</td>
</tr>
<tr>
<td>U4</td>
<td>No power is supplied to an outdoor unit.</td>
<td>Turn the power on for the outdoor unit.</td>
</tr>
<tr>
<td>U6</td>
<td>The stop valve of an outdoor unit is left closed.</td>
<td>Open the gas-side stop valve and the liquid-side stop valve.</td>
</tr>
<tr>
<td>Refrigerant overcharge.</td>
<td>Recalculate the required amount of refrigerant from the piping length and correct the refrigerant charge level by recovering any excessive refrigerant with a refrigerant recovery machine.</td>
<td></td>
</tr>
<tr>
<td>U8</td>
<td>Insufficient refrigerant.</td>
<td>Check if the additional refrigerant charge has been finished correctly.</td>
</tr>
<tr>
<td>Refrigerant overcharge.</td>
<td>Recalculate the required amount of refrigerant from the piping length and add an adequate amount of refrigerant.</td>
<td></td>
</tr>
<tr>
<td>U9</td>
<td>Insufficient refrigerant.</td>
<td>Check if the additional refrigerant charge has been finished correctly.</td>
</tr>
<tr>
<td>Refrigerant overcharge.</td>
<td>Recalculate the required amount of refrigerant from the piping length and add an adequate amount of refrigerant.</td>
<td></td>
</tr>
<tr>
<td>U10</td>
<td>Insufficient refrigerant.</td>
<td>Check if the additional refrigerant charge has been finished correctly.</td>
</tr>
<tr>
<td>Refrigerant overcharge.</td>
<td>Recalculate the required amount of refrigerant from the piping length and add an adequate amount of refrigerant.</td>
<td></td>
</tr>
</tbody>
</table>

- When using a central controller, see the installation manual or service manual which came with the central controller.
- If nothing is displayed on the remote controller
  - There might be a problem with the connections or communication between the indoor unit and the remote controller. Make sure all the wiring is properly connected.

**CAUTION**

To the pipe-layer, To the electrician

After the test run, when handing the unit over to the customer, make sure the front panel on the unit and all screws are attached.

10-3 Final charge adjustment

It is not necessary to do this final adjustment normally, but perform the following operation only when the most adequate refrigerant charge for the best performance is required and the piping length between the outdoor and indoor units is less than 50ft.(15m).

The outdoor temperature must be between 65°F and 105°F.

The number of revolutions of the compressor must be greater than or equal to the change mode. (It can be confirmed by LED display on printed circuit board).

The number of revolutions of the compressor LED display.

In the case of multiple connection with an indoor unit other than RXQ/CXQ, the receiver vessel (Optional item) is not attached to the liquid piping.

Run the system for 60 minutes in cooling by the forced operation using the setting mode 2, No.2 LED on, mode 2, No.1 LED on, (Refer to Service Manual) to allow pressures to stabilize.

Check subcooling of outdoor unit at LSV. Systems should have the target subcooling in the table below.

1. If the subcooling is low, add charge to raise subcooling to the target value. (The maximum additional charge is 2.2 lbs.(1kg))
2. If the subcooling is high, remove charge to lower the subcooling to the target value.

<table>
<thead>
<tr>
<th>Model</th>
<th>Target subcooling</th>
</tr>
</thead>
<tbody>
<tr>
<td>RXSQ60~</td>
<td>14±1°F (7.78±0.56°C)</td>
</tr>
</tbody>
</table>

11. ENERGY SAVING AND OPTIMUM OPERATION

RXSQ~ units are equipped with advanced energy saving functionality. Depending on the priority, emphasis can be put on energy saving or comfort level. Several parameters can be selected, resulting in the best balance between energy consumption and comfort for the particular application.

Several patterns are available and explained below. Modify the parameters to the needs of your building and to realize the best balance between energy consumption and comfort.

Refer to Service Manual for changing the field settings.

Setting definition:[A-B]=C;A=mode,B=setting NO.,C=setting value.

11-1 Three main operation methods are available:

- **Basic**
  - The refrigerant temperature is fixed independent from the situation. It corresponds to the standard operation which is known and can be expected from/under previous VRV systems:
    - To activate this operation method under cooling operation: change field setting [2-6]=2.
    - To activate this operation method under heating operation: change field setting [2-9]=2.
  - **Automatic (default)**
    - The refrigerant temperature is set depending on the outdoor ambient conditions. As such adjusting the refrigerant temperature to match the required load (which is also related to the outdoor ambient conditions).
      - E.g., when your system is operating in cooling, you do not need as much cooling under low outdoor ambient temperatures (e.g., 77°F(25°C)) as under high outdoor ambient temperatures (e.g., 96°F(35°C)).
    - Using this idea, the system automatically starts increasing its refrigerant temperature, automatically reducing the delivered capacity and increasing the system's efficiency.
      - To activate this operation method under cooling operation: change field setting [2-6]=2
default);
      - E.g., when your system is operating in heating, you do not need as much heating under high outdoor ambient temperatures (e.g., 59°F(15°C)) as under low outdoor ambient temperatures (e.g., 23°F(-5°C)).
Using this idea, the system automatically starts decreasing its refrigerant temperature, automatically reducing the delivered capacity and increasing the system’s efficiency.

- To activate this operation method under heating operation: change field setting [2-9]=1 (default).

- Hi-sensible (cooling)
  The refrigerant temperature is set higher (cooling) compared to basic operation. The focus under high sensible mode is improved comfort for the customer. The selection method of indoor units is important and has to be considered as the available capacity is not the same as under basic operation. For details concerning to Hi-sensible applications, please contact your dealer.
  - To activate this setting under cooling operation: change field setting [2-6] to the appropriate value, matching the requirements of the pre-designed system containing a high sensible solution.

### 11-2 Several comfort settings are available

For each of above modes a comfort level can be selected. The comfort level is related to the timing and the effort (energy consumption) which is put in achieving a certain room temperature by temporarily changing the refrigerant temperature to different values in order to achieve requested conditions more quickly.

- **Powerful**
  Overshoot (during heating operation) or undershoot (during cooling operation) is allowed compared to the requested refrigerant temperature, in order to achieve the required room temperature very fast.
  - The overshoot is allowed from the start up moment.
  - The system will eventually go to the steady state condition which is defined by the operation mode above.
  - When the request from the indoor units becomes more moderate, the system will eventually go to the steady state condition which is defined by the operation mode above.
  - Overshoot (during heating operation) or undershoot (during cooling operation) is allowed compared to the requested refrigerant temperature, in order to achieve the required room temperature very fast.
  - The overshoot is allowed from the start up moment.
  - When the request from the indoor units becomes more moderate, the system will eventually go to the steady state condition which is defined by the operation mode above.
  - The original refrigerant temperature target, which is defined by the operation method (see above) is kept without any correction, unless for protection control.
  - To activate the mild comfort setting under cooling operation, change field setting [2-41]=0.
  - To activate the powerful comfort setting under heating operation, change field setting [2-42]=1.
  - This setting is used in conjunction with setting [2-8].
  - This setting is used in conjunction with setting [2-9].

- **Quick**
  Overshoot (during heating operation) or undershoot (during cooling operation) is allowed compared to the requested refrigerant temperature, in order to achieve the required room temperature very fast.
  - The overshoot is allowed from the start up moment.
  - The system will eventually go to the steady state condition which is defined by the operation mode above.
  - When the request from the indoor units becomes more moderate, the system will eventually go to the steady state condition which is defined by the operation mode above.
  - The original refrigerant temperature target, which is defined by the operation method (see above) is kept without any correction, unless for protection control.
  - To activate the quick comfort setting under cooling operation, change field setting [2-41]=2.
  - This setting is used in conjunction with setting [2-8].
  - This setting is used in conjunction with setting [2-9].

- **Mild**
  Overshoot (during heating operation) or undershoot (during cooling operation) is allowed compared to the requested refrigerant temperature, in order to achieve the required room temperature very fast.
  - The overshoot is not allowed from the start up moment. The start up occurs under the condition which is defined by the operation mode above.
  - In case of cooling operation the evaporating temperature is allowed to go down to 42°F (6°C) on temporary base depending on the situation.
  - In case of heating operation the condense temperature is allowed to go up to 115°F (46°C) on temporary base depending on the situation.
  - When the request from the indoor units becomes more moderate, the system will eventually go to the steady state condition which is defined by the operation method above.
  - The original refrigerant temperature target, which is defined by the operation method (see above) is kept without any correction, unless for protection control.
  - To activate the mild comfort setting under cooling operation, change field setting [2-41]=0.
  - To activate the powerful comfort setting under heating operation, change field setting [2-42]=1.
  - This setting is used in conjunction with setting [2-8].
  - This setting is used in conjunction with setting [2-9].

### 11-3 Switch over ambient setting

When the gas furnace is connected, it can be set so that gas furnace operation can be switched at the outside air temperature.

The switching temperature can be set in service mode 2-14. Also, in order to prevent frequent switching, a differential of the outside air temperature is provided (2-15 # 1ΔT = 10°F (5.6°C)).

The factory setting is 2-14 # 6 = 15°F (9.4°C).

<table>
<thead>
<tr>
<th>Temp. ΔT (°C)</th>
<th>Setting # 2-15</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>-5</td>
<td>2.8</td>
<td>5.6</td>
<td>8.3</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>5.6</td>
<td>8.3</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ΔT (°F)</th>
<th>Setting # 2-15</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>5.6</td>
</tr>
<tr>
<td>5</td>
<td>8.3</td>
</tr>
<tr>
<td>0</td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ΔT=10°F (5.6°C)</th>
<th>Setting # 2-15</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.6</td>
<td>8.3</td>
</tr>
<tr>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>

The on-heat pump gas furnace temperature is provides (2-15 # 1ΔT = 10°F (5.6°C)).
### 11-4 Setting of Heat Pump Lockout and Emergency Heat Mode

Heat pump is locked out when the setting below and/or external input to ABC terminal has been made.

<table>
<thead>
<tr>
<th>No.</th>
<th>Setting item display</th>
<th>Setting condition display</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Setting of heat pump lockout 1</td>
<td>OFF: O ● ● ● ● ● ○ +</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ON: O ● ● ● ● ● ○ ●</td>
</tr>
<tr>
<td>37</td>
<td>Setting of heat pump lockout 2</td>
<td>OFF: O ● ● ● ● ● ● +</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mode 1: O ● ● ● ● ● ○</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mode 2: O ● ● ● ● ● ●</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mode 3: O ● ● ● ● ● ○</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mode 4: O ● ● ● ● ● ○</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mode 5: O ● ● ● ● ● ○</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mode 6: O ● ● ● ● ● ○</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Heat-pump heating is always locked out</td>
<td>Field setting: 2-16: ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shorted between: Heating Thermo-on: ON (H/L), Heating Thermo-off: OFF</td>
</tr>
<tr>
<td>I</td>
<td>Heat-pump heating is always locked out</td>
<td>Field setting: 2-37: Mode 1, ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A-C: ON (H/L), B-C: LL, OFF</td>
</tr>
<tr>
<td>I</td>
<td>Heat-pump heating is always locked out</td>
<td>Field setting: 2-37: Mode 2, ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A-C: ON (H/L), B-C: LL, OFF</td>
</tr>
<tr>
<td>I</td>
<td>Heat-pump heating is always locked out</td>
<td>Field setting: 2-37: Mode 3, ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A-C: ON (H/L), B-C: OFF</td>
</tr>
<tr>
<td>I</td>
<td>Heat-pump heating is always locked out</td>
<td>Field setting: 2-37: Mode 4, ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A-C: ON (H/L), B-C: OFF</td>
</tr>
<tr>
<td>I</td>
<td>Heat-pump heating is always locked out</td>
<td>Field setting: 2-37: Mode 5, ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A-C: ON (H/L), B-C: OFF</td>
</tr>
<tr>
<td>I</td>
<td>Heat-pump heating is always locked out</td>
<td>Field setting: 2-37: Mode 6, ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A-C: ON (H/L), B-C: OFF</td>
</tr>
</tbody>
</table>

*Factory setting*
Heat pump lockout temperature

Heat pump would be locked out when the outdoor ambient temperature is smaller than the heat pump lockout temperature. This setting is only effective when heat pump lockout mode has been set.

When connecting with multiple G/Fs, should make the following settings. And should make the field setting of indoor. About indoor setting, see indoor installation manual.

<table>
<thead>
<tr>
<th>No.</th>
<th>Setting item display</th>
<th>Setting condition display</th>
</tr>
</thead>
<tbody>
<tr>
<td>57</td>
<td>Heat pump lockout temperature</td>
<td></td>
</tr>
</tbody>
</table>

Heat pump lockout release differential

Heat pump would be resumed when the outdoor ambient temperature is recovered by differential above the heat pump lockout temperature.

<table>
<thead>
<tr>
<th>No.</th>
<th>Setting item display</th>
<th>Setting condition display</th>
</tr>
</thead>
<tbody>
<tr>
<td>47</td>
<td>Heat pump lockout release differential</td>
<td></td>
</tr>
</tbody>
</table>

Automatic lockout

When heat pump lockout mode has been set, the auto backup function will automatically be set. This will allow the auxiliary or secondary heat source to be automatically energized in the event of a system failure related to outdoor units.
11-5 Setting of larger pipe connection and no insulation on liquid line

When using existing piping, make the following settings.

- Selection of thermistor
  → "Only remote controller thermistor".

If the above setting is not set, thermo-off indoor unit might exert heating capacity.

**Caution:** Failure to follow the instruction may lead to damage due to sweating and cause compressor damage and void warranty.

<table>
<thead>
<tr>
<th>No.</th>
<th>Setting item display</th>
<th>Setting condition display</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MODE H1P</td>
<td>TEST H2P</td>
</tr>
<tr>
<td>4</td>
<td>Existing pipe connection</td>
<td>○</td>
</tr>
</tbody>
</table>

- Standard pipe connection
  - Gas side: Standard diameter

- Existing pipe connection
  - Gas side: Larger pipe
    - Liquid side: No insulated

- Existing pipe connection
  - Gas side: Larger pipe
    - Liquid side: Insulated

- Existing pipe connection
  - Gas side: Standard diameter

In case of "Not insulated" (Setting# 1 or 3), the field settings for indoor units below are also required.

- Selection of thermistor → "Only remote controller thermistor".

<table>
<thead>
<tr>
<th></th>
<th>Factory setting</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Setting condition display</th>
<th>MODE H1P</th>
<th>TEST H2P</th>
<th>C/H selection</th>
<th>Low noise H6P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard pipe connection</td>
<td>○ ● ● ● ● ● ● ●</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing pipe connection</td>
<td>○ ● ● ● ○ ● ● ○</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing pipe connection</td>
<td>○ ● ● ● ○ ● ● +</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing pipe connection</td>
<td>○ ● ● ● ○ ○ ○ ○</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Existing pipe connection
- Gas side: Standard diameter
- Liquid side: Insulated

- Gas side: No insulated
- Liquid side: Insulated

- Gas side: Insulated
- Liquid side: Insulated

- Gas side: No insulated
- Liquid side: No insulated

- Gas side: Standard diameter
- Liquid side: Standard diameter

- Gas side: Larger pipe
- Liquid side: No insulated

- Gas side: Larger pipe
- Liquid side: Insulated

- Gas side: Standard diameter
- Liquid side: No insulated

- Gas side: Standard diameter
- Liquid side: Insulated
Example: Automatic mode during cooling

A Actual load curve
B Virtual load curve (initial capacity automatic mode)
C Virtual target value (initial evaporation temperature value automatic mode)
D Required evaporation temperature value
E Load factor
F Outside air temperature
Te Evaporating temperature
Quick
Powerful
Mild

Room temperature evolution:

A Indoor unit set temperature
B Operation start
C Operating time
D Mild
E Quick
F Powerful

Example: Automatic mode during heating

A Virtual load curve (default automatic mode peak capacity)
B Load curve
C Virtual target value (initial condensation temperature value automatic mode)
D Design temperature
E Load factor
F Outside air temperature
Tc Condensing temperature
Quick
Powerful
Mild

Room temperature evolution:

A Indoor unit set temperature
B Operation start
C Operating time
D Mild
E Quick
F Powerful
No matter which control is selected, variations on the behavior of the system are still possible due to protection controls to keep the unit operating under reliable conditions. The intentional target, however, is fixed and will be used to obtain the best balance between energy consumption and comfort, depending on the application type.

12. CAUTION FOR REFRIGERANT LEAKS

(Ponts to note in connection with refrigerant leaks)

Introduction

The installer and system specialist shall secure safety against leakage according to local regulations or standards. The following standards may be applicable if local regulations are not available. The VRV System, like other air conditioning systems, uses R410A as refrigerant. R410A itself is an entirely safe non-toxic, non-combustible refrigerant. Nevertheless care must be taken to ensure that air conditioning facilities are installed in a room which is sufficiently large. This assures that the maximum concentration level of refrigerant gas is not exceeded, in the unlikely event of major leak in the system and this in accordance to the local applicable regulations and standards.

Maximum concentration level

The maximum charge of refrigerant and the calculation of the maximum concentration of refrigerant is directly related to the humanly occupied space in to which it could leak.

The unit of measurement of the concentration is lb./ft$^3$ (the weight in lb. of the refrigerant gas in 1 ft$^3$ volume of the occupied space). Compliance to the local applicable regulations and standards for the maximum allowable concentration level is required.

Pay a special attention to the place, such as a basement, etc. where refrigerant can stay, since refrigerant is heavier than air.

Procedure for checking maximum concentration

Check the maximum concentration level in accordance with steps 1 to 4 below and take whatever action is necessary to comply.

1. Calculate the amount of refrigerant (lb.) charged to each system separately.

   amount of refrigerant in a single unit system (amount of refrigerant with which the system is charged before leaving the factory) + additional charging amount (amount of refrigerant added locally in accordance with the length or diameter of the refrigerant piping) = total amount of refrigerant (lb.) in the system

   NOTE

   • Where a single refrigerant facility is divided into 2 entirely independent refrigerant systems then use the amount of refrigerant with which each separate system is charged.

2. Calculate the smallest room volume (ft$^3$). Incase like the following, calculate the volume of (A), (B) as a single room or as the smallest room.

   A. Where there are no smaller room divisions

   B. Where there is a room division but there is an opening between the rooms sufficiently large to permit a free flow of air back and forth.