For Installer

Air-Conditioners
PUHZ-BP·HA

Installation Manual
For safe and correct use, read this manual and the indoor unit installation manual thoroughly before installing the air-conditioner unit.
1. Safety precautions

≥ Before installing the unit, make sure you read all the “Safety precautions.”
≥ Please report to or take consent by the supply authority before connection to the system.

★ Warning: Describes precautions that must be observed to prevent danger of injury or death to the user.
★ Caution: Describes precautions that must be observed to prevent damage to the unit.
★ Warning: Carefully read the labels affixed to the main unit.

1.1. Before installation

★ Caution:
• Do not use the unit in an unusual environment. If the air conditioner is installed in areas exposed to steam, volatile oil (including machine oil), or sulfuric gas, areas exposed to high salt content such as the seaside, or areas where the unit will be covered by snow, the performance can be significantly reduced and the internal parts can be damaged.
• Do not install the unit where combustible gases may leak, be produced, flow, or accumulate. If combustible gas accumulates around the unit, fire or explosion may result.

1.2. Before installation (relocation)

★ Caution:
• Be extremely careful when transporting the units. Two or more persons are needed to handle the unit, as it weighs 20 kg or more. Do not grasp the packaging bands. Wear protective gloves to remove the unit from the packaging and to move it, as you can injure your hands on the fins or other parts.
• Be sure to safely dispose of the packaging materials. Packaging materials, such as nails and other metal or wooden parts may cause stab or other injuries.
• The outdoor unit produces condensation during the heating operation. Make sure to provide drainage around the outdoor unit if such condensation is likely to cause damage.
• When installing the unit in a hospital or communications office, be prepared for noise and electronic interference. Inverters, home appliances, high-frequency medical equipment, and radio communications equipment can cause the air conditioner to malfunction or breakdown. The air conditioner may also affect medical equipment, disturbing medical care, and communications equipment, harming the screen display quality.

2. Installation location

★ Caution:
• Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. If the pipes are not connected correctly, the unit will not be properly grounded and electric shock may result.
• Use only specified cables for wiring. The connections must be made securely without tension on the terminals. If the cables are connected or installed incorrectly, overheating or fire may result.
• The terminal block cover panel of the outdoor unit must be firmly attached. If the cover panel is mounted incorrectly and dust and moisture enter the unit, electric shock or fire may result.
• When installing or moving the air conditioner, use only the specified refrigerant (R410A) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines. Air enclosed in the lines can cause pressure peaks resulting in a rupture and other hazards.
• Use only accessories authorized by Mitsubishi Electric and ask a dealer or an authorized technician to install them. If accessories are incorrectly installed, water leakage, electric shock, or fire may result.
• Do not alter the unit. Consult a dealer for repairs. If alterations or repairs are not performed correctly, water leakage, electric shock, or fire may result.
• The user should never attempt to repair the unit or transfer it to another location. If the unit is installed incorrectly, water leakage, electric shock, or fire may result. If the air conditioner must be repaired or moved, ask a dealer or an authorized technician.
• After installation has been completed, check for refrigerant leaks. If refrigerant leaks into the room and comes into contact with the flame of a heater or portable cooking range, poisonous gases will be released.

3. Installing the outdoor unit

★ Caution:
• The base and attachments of the outdoor unit must be periodically checked for looseness, cracks or other damage. If such defects are left uncorrected, the unit may fall down and cause damage or injuries.
• Do not clean the air conditioner unit with water. Electric shock may result.
• Tighten all are nuts to specification using a torque wrench. If tightened firmly without tension on the terminals, the cables are connected or installed incorrectly, overheating or fire may result.
• The terminal block cover panel of the outdoor unit must be firmly attached. If the cover panel is mounted incorrectly and dust and moisture enter the unit, electric shock or fire may result.
• Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. If the pipes are not connected correctly, the unit will not be properly grounded and electric shock may result.
• Use only specified cables for wiring. The connections must be made securely without tension on the terminals. If the cables are connected or installed incorrectly, overheating or fire may result.

4. Installing the refrigerant piping

★ Warning:
• The unit must be installed on a structure that can sustain its weight. If the unit is not installed correctly, the pipes may burst and cause damage or injuries. In addition, water leakage, electric shock, or fire may result.
• The unit must be installed according to the instructions in order to minimize the risk of damage from earthquakes, typhoons, or strong winds. An incorrectly installed unit may fall down and cause damage or injuries.
• The unit must be securely installed on a structure that can sustain its weight. If the unit is mounted on an unstable structure, it may fall down and cause damage or injuries.
• If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration in the room from exceeding the safety limit in the event of refrigerant leakage. Consult a dealer regarding the appropriate measures to prevent the allowable concentration from being exceeded. Should the refrigerant leak and cause the concentration limit to be exceeded, hazards due to lack of oxygen in the room may result.
• Ventilate the room if refrigerant leaks during operation. If refrigerant comes into contact with a flame, poisonous gases will be released.
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• Use only accessories authorized by Mitsubishi Electric and ask a dealer or an authorized technician to install them. If accessories are incorrectly installed, water leakage, electric shock, or fire may result.
• Do not alter the unit. Consult a dealer for repairs. If alterations or repairs are not performed correctly, water leakage, electric shock, or fire may result.
• The user should never attempt to repair the unit or transfer it to another location. If the unit is installed incorrectly, water leakage, electric shock, or fire may result. If the air conditioner must be repaired or moved, ask a dealer or an authorized technician.
• After installation has been completed, check for refrigerant leaks. If refrigerant leaks into the room and comes into contact with the flame of a heater or portable cooking range, poisonous gases will be released.
1. Safety precautions

1.3. Before electric work
   - Be sure to install circuit breakers. If not installed, electric shock may result.
   - For the power lines, use standard cables of sufficient capacity. Otherwise, a short circuit, overheating, or fire may result.
   - When installing the power lines, do not apply tension to the cables. If the connections are loosened, the cables can snap or break and overheating or fire may result.
   - Be sure to ground the unit. Do not connect the ground wire to gas or water pipes, lightning rods, or telephone grounding lines. If the unit is not properly grounded, electric shock may result.
   - Use circuit breakers (ground fault interrupter, isolating switch, isolating switch with fuse), and molded case circuit breaker with the specified capacity. If the circuit breaker capacity is larger than the specified capacity, breakdown or fire may result.

1.4. Before starting the test run
   - Turn on the main power switch more than 12 hours before starting operation. Starting operation just after turning on the power switch can severely damage the internal parts. Keep the main power switch turned on during the operation season.
   - Before starting operation, check that all panels, guards and other protective parts are correctly installed. Rotating, hot, or high voltage parts can cause injuries.
   - After stopping operation, be sure to wait at least five minutes before turning off the main power switch. Otherwise, water leakage or breakdown may result.

1.5. Using R410A refrigerant air conditioners
   - Use new refrigerant pipes.
   - Be sure to clean the pipes and make sure that the insides of the pipes are clean.
   - Replace the existing flare nuts and flare the flared sections again.
   - Do not use thin pipes. (Refer to page 5)
   - Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. Make sure the insides of the pipes are clean and do not contain any harmful contaminants such as sulfuric compounds, oxidants, debris, or dust. Use pipes with the specified thickness. (Refer to page 5)
   - Store the pipes to be used during installation indoors and keep both ends of the pipes sealed until just before brazing. (Leave elbow joints, etc. in their packaging.) If dust, debris, or moisture enters the refrigerant lines, refrigerant oil deterioration may result.
   - Use ester oil, ether oil, alkylbenzene oil (small amount) as the refrigeration oil. Be sure to install circuit breakers. If not installed, electric shock may result.
   - Do not use a charging cylinder. If a charging cylinder is used, the compressor capacity will decrease and the airflow and a malfunction may result.
   - Do not use mineral oil or mineral oil deterioration may result.
   - Use the transportation handles of the outdoor unit to transport the unit. If the unit is carried from the bottom, fingers may be pinched.

1.6. Accessories of outdoor unit (Fig. 1-1)
   - The parts shown in the left are the accessories of this unit, which are affixed to the inside of the service panel.
   - Joint pipe: x1

2. Installation location

2.1. Refrigerant pipe (Fig. 2-1)
   - Check that the difference between the heights of the indoor and outdoor units, the length of refrigerant pipe, and the number of bends in the pipe are within the limits shown below.

<table>
<thead>
<tr>
<th>Models</th>
<th>Pipe size(mm)</th>
<th>Pipe length (one way)</th>
<th>Height difference (one way)</th>
<th>Number of bends (one way)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P100</td>
<td>Ø15.88 Ø9.52</td>
<td>Max. 50 m</td>
<td>Max. 30 m</td>
<td>Max. of 15</td>
</tr>
<tr>
<td>P125</td>
<td>Ø15.88 Ø9.52</td>
<td>Max. 50 m</td>
<td>Max. 30 m</td>
<td>Max. of 15</td>
</tr>
<tr>
<td>P140</td>
<td>Ø15.88 Ø9.52</td>
<td>Max. 50 m</td>
<td>Max. 30 m</td>
<td>Max. of 15</td>
</tr>
<tr>
<td>BP170</td>
<td>Ø25.4 Ø12.7</td>
<td>Max. 70 m</td>
<td>Max. 30 m</td>
<td>Max. of 15</td>
</tr>
<tr>
<td>BP200</td>
<td>Ø25.4 Ø12.7</td>
<td>Max. 70 m</td>
<td>Max. 30 m</td>
<td>Max. of 15</td>
</tr>
<tr>
<td>BP250</td>
<td>Ø25.4 Ø12.7</td>
<td>Max. 70 m</td>
<td>Max. 30 m</td>
<td>Max. of 15</td>
</tr>
</tbody>
</table>

   - Height difference limitations are binding regardless of which unit, indoor or outdoor, is positioned higher.
   - Indoor units
   - Outdoor units

2.2. Choosing the outdoor unit installation location
   - Avoid locations exposed to direct sunlight or other sources of heat.
   - Select a location from which noise emitted by the unit will not inconvenience neighbors.
   - Select a location permitting easy wiring and pipe access to the power source and indoor unit.
   - Avoid locations where combustible gases may leak, be produced, flow, or accumulate.
   - Note that water may drain from the unit during operation.
   - Select a level location that can carry the weight and vibration of the unit.
   - Avoid locations where the snow fall is anticipated, special precautions such as raising the installation location or installing a hood on the air intake and air outlet must be taken to prevent the snow from blocking the air intake or blowing directly against it. This can reduce the airflow and a malfunction may result.
   - Avoid locations exposed to oil, steam, or sulfuric gas.
   - Use the transportation handles of the outdoor unit to transport the unit. If the unit is carried from the bottom, hands or fingers may be pinched.

2.3. Outline dimensions (Outdoor unit) (Fig. 2-2)
2. Installation location

2.4. Ventilation and service space

2.4.1. Windy location installation

When installing the outdoor unit on a rooftop or other location unprotected from the wind, situate the air outlet of the unit so that it is not directly exposed to strong winds. Strong wind entering the air outlet may impede the normal airflow and a malfunction may result.

The following shows 3 examples of precautions against strong winds.

1. Face the air outlet towards the nearest available wall about 50 cm away from the wall. (Fig. 2-3) [for BP170-BP250 models : 100cm]

2. Install an optional air guide if the unit is installed in a location where strong winds from a typhoon, etc. may directly enter the air outlet. (Fig. 2-4)

3. Position the unit so that the air outlet blows perpendicularly to the seasonal wind direction, if possible. (Fig. 2-5)

2.4.2. When installing a single outdoor unit (Refer to the last page)

Minimum dimensions are as follows, except for Max., meaning Maximum dimensions, indicated.

The figures in parentheses are for BP125-BP250 models.

1. Obstacles at rear only (Fig. 2-6)

2. Obstacles at rear and above only (Fig. 2-7)

3. Obstacles at rear and sides only (Fig. 2-8)

4. Obstacles at front and rear only (Fig. 2-10)
   - When using an optional air outlet guide, the clearance for BP125-BP250 models is 500 mm or more.

5. Obstacles at rear, sides, and above only (Fig. 2-11)
   - Do not install the optional air outlet guides for upward airflow.

2.4.3. When installing multiple outdoor units (Refer to the last page)

Leave 10 mm space or more between the units.

1. Obstacles at rear only (Fig. 2-12)

2. Obstacles at rear and above only (Fig. 2-13)
   - No more than 3 units must be installed side by side. In addition, leave space as shown.
   - Do not install the optional air outlet guides for upward airflow.

3. Obstacles at front only (Fig. 2-14)
   - When using an optional air outlet guide, the clearance for BP125-BP250 models is 1000 mm or more.

4. Obstacles at front and rear only (Fig. 2-15)
   - When using an optional air outlet guide installed for upward airflow, the clearance is 500 (1000) mm or more.

5. Multiple parallel unit arrangement (Fig. 2-17)
   - When using an optional air outlet guide installed for upward airflow, the clearance is 1000 (1500) mm or more.

6. Stacked unit arrangement (Fig. 2-18)
   - The units can be stacked up to 2 units high.
   - No more than 2 stacked units must be installed side by side. In addition, leave space as shown.

3. Installing the outdoor unit

Be sure to install the unit on a sturdy, level surface to prevent rattling noises during operation. (Fig. 3-1)

**<Foundation specifications>**

- Foundation bolt: M10 (3/8")
- Thickness of concrete: 120 mm
- Length of bolt: 70 mm
- Weight-bearing capacity: 320 kg

- Make sure that the length of the foundation bolt is within 30 mm of the bottom surface of the base.
- Secure the base of the unit firmly with 4-M10 foundation bolts in sturdy locations.

**Installing the outdoor unit**

- Do not block the vent. If the vent is blocked, operation will be hindered and breakdown may result.
- In addition to the unit base, use the installation holes it fixes top panel on the back of the unit to attach wires, etc. If necessary to install the unit. Use self-tapping screws (ø5 × 15 mm or less) and install on site.

**Warning:**

- The unit must be securely installed on a structure that can sustain its weight. If the unit is mounted on an unstable structure, it may fall down and cause damage or injuries.
- The unit must be installed according to the instructions in order to minimize the risk of damage from earthquakes, typhoons, or strong winds. An incorrectly installed unit may fall down and cause damage or injuries.
4. Installing the refrigerant piping

4.1. Precautions for devices that use R410A refrigerant
• Refer to page 3 for precautions not included below on using air conditioners with R410A refrigerant.
• Use ester oil, ether oil, alkylbenzene oil (small amount) as the refrigeration oil applied to the flared sections.
• Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. Use refrigerant pipes with the thicknesses specified in the table below. Make sure the insides of the pipes are clean and do not contain any harmful contaminants such as sulfuric compounds, oxidants, debris, or dust.
• Always apply no-oxidation brazing when brazing the pipes, otherwise the compressor will be damaged.

<table>
<thead>
<tr>
<th>Pipe size (mm)</th>
<th>ø6.35</th>
<th>ø9.52</th>
<th>ø12.7</th>
<th>ø15.88</th>
<th>ø19.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness (mm)</td>
<td>0.8</td>
<td>0.8</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Warning:
When installing or moving the air conditioner, use only the specified refrigerant (R410A) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines. Air enclosed in the lines can cause pressure peaks resulting in a rupture and other hazards.

<table>
<thead>
<tr>
<th>Pipe size (mm)</th>
<th>ø6.35</th>
<th>ø9.52</th>
<th>ø12.7</th>
<th>ø15.88</th>
<th>ø19.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness (mm)</td>
<td>0.8</td>
<td>0.8</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

• Do not use pipes thinner than those specified above.

4.2. Connecting pipes
• When commercially available copper pipes are used, wrap liquid and gas pipes with commercially available insulation materials (heat-resistant to 100 °C or more, thickness of 12 mm or more).
• The indoor parts of the drain pipe should be wrapped with polyethylene foam insulation materials (specific gravity of 0.03, thickness of 9 mm or more).
• Apply thin layer of refrigerant oil to pipe and joint seating surface before tightening flare nut. (Fig. 4-1)
• Use 2 wrenches to tighten piping connections. (Fig. 4-1)
• Use leak detector or soapy water to check for gas leaks after connections are completed.
• Apply refrigerating machine oil over the entire flare seat surface. (Fig. 4-1)
• Use the flare nuts for the following pipe size. (Fig. 4-1)

<table>
<thead>
<tr>
<th>Copper pipe O.D. (mm)</th>
<th>Flare cutting dimensions</th>
<th>Flare nut tightening torque (N·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø6.35</td>
<td>8.7 ~ 9.1</td>
<td>14 - 18</td>
</tr>
<tr>
<td>ø9.52</td>
<td>12.5 ~ 13.2</td>
<td>34 - 42</td>
</tr>
<tr>
<td>ø12.7</td>
<td>16.2 ~ 16.6</td>
<td>68 - 82</td>
</tr>
<tr>
<td>ø15.88</td>
<td>19.3 ~ 19.7</td>
<td>100 - 120</td>
</tr>
<tr>
<td>ø19.05</td>
<td>23.6 ~ 24.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 (Fig. 4-2)

<table>
<thead>
<tr>
<th>Copper pipe O.D. (mm)</th>
<th>Flare nut O.D. (mm)</th>
<th>Tightening torque (N·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø6.35</td>
<td>17</td>
<td>14 - 18</td>
</tr>
<tr>
<td>ø9.52</td>
<td>22</td>
<td>34 - 42</td>
</tr>
<tr>
<td>ø12.7</td>
<td>26</td>
<td>69 - 81</td>
</tr>
<tr>
<td>ø15.88</td>
<td>29</td>
<td>88 - 100</td>
</tr>
<tr>
<td>ø19.05</td>
<td>36</td>
<td>100 - 120</td>
</tr>
</tbody>
</table>

- For PEA-RP170-250WGA
  The method of pipe connection is brazing connection.
4. Installing the refrigerant piping

4.3. Refrigerant piping (Fig. 4-4)
Remove the service panel (3 screws) and the front piping cover (2 screws) and rear piping cover (2 screws).

1. Perform refrigerant piping connections for the indoor/outdoor unit when the outdoor unit’s stop valve is completely closed.
2. Vacuum-purge air from the indoor unit and the connection piping.
3. After connecting the refrigerant pipes, check the connected pipes and the indoor unit for gas leaks. (Refer to 4.4 Refrigerant pipe airtight testing method)
4. A high-performance vacuum pump is used at the stop valve service port to maintain a vacuum for an adequate time (at least 1 hour after reaching –101 kPa (5 Torr)) in order to vacuum dry the inside of the pipes. Always check the degree of vacuum at the gauge manifold. If there is any moisture left in the pipe, the degree of vacuum is sometimes not reached with short-time vacuum application.
5. After vacuum drying, completely open the stop valves (both liquid and gas) for the outdoor unit. This completely links the indoor and outdoor refrigerant circuits.

- If the vacuum drying is inadequate, air and water vapor remain in the refrigerant circuits and can cause abnormal rise of high pressure, abnormal drop of low pressure, deterioration of the refrigerating machine oil due to moisture, etc.
- If the stop valves are left closed and the unit is operated, the compressor and control valves will be damaged.
- Use a leak detector or soapy water to check for gas leaks at the pipe connection sections of the outdoor unit.
- Do not use the refrigerant from the unit to purge air from the refrigerant lines.
- After the valve work is completed, tighten the valve caps to the correct torque: 20 to 25 N·m (200 to 250 kgf·cm).
- Failure to replace and tighten the caps may result in refrigerant leakage. In addition, do not damage the inside of the valve caps as they act as a seal to prevent refrigerant leakage.

6. Use sealant to seal the ends of the pipe cover around the pipe connection sections to prevent water from entering the thermal insulation.

4.4. Refrigerant pipe airtight testing method (Fig. 4-5)
(1) Connect the testing tools.
- Make sure the stop valves are closed and do not open them.
- Add pressure to the refrigerant lines through the service port of the liquid stop valve.
(2) Do not add pressure to the specified pressure all at once; add pressure little by little.
- Pressurize to 0.5 MPa (5 kgf/cm²G), wait 5 minutes, and make sure the pressure does not decrease.
- Pressurize to 1.5 MPa (15 kgf/cm²G), wait 5 minutes, and make sure the pressure does not decrease.
- Pressurize to 4.15 MPa (41.5 kgf/cm²G) and measure the surrounding temperature and refrigerant pressure.
(3) If the specified pressure holds for about one day and does not decrease, the pipes have passed the test and there are no leaks.
- If the surrounding temperature changes by 1 °C, the pressure will change by about 0.01 MPa (0.1 kgf/cm²G). Make the necessary corrections.
(4) If the pressure decreases in steps (2) or (3), there is a gas leak. Look for the source of the gas leak.

4.5. Stop valve opening method
The stop valve opening method varies according to the outdoor unit model. Use the appropriate method to open the stop valves.

(1) Gas side (Fig. 4-6)
1. Remove the cap, pull the handle toward you and rotate 1/4 turn in a counterclockwise direction to open.
2. Make sure that the stop valve is open completely and push the handle and rotate the cap back to its original position.

(2) Liquid side (Fig. 4-7)
1. Remove the cap and turn the valve rod counterclockwise as far as it will go with the use of a 4 mm hexagonal wrench. Stop turning when it hits the stopper.
2. Remove the cap, pull the handle toward you and rotate 1/4 turn in a counterclockwise direction to open.
3. Make sure that the stop valve is open completely and rotate the cap back to its original position.

Refrigerant pipes are protectively wrapped.
- The pipes can be protectively wrapped up to a diameter of ø90 before or after connecting the pipes. Cut out the knockout in the pipe cover following the groove and wrap the pipes.

Pipe inlet gap
- Use putty or sealant to seal the pipe inlet around the pipes so that no gaps remain. (If the gaps are not closed, noise may be emitted or water and dust will enter the unit and breakdown may result.)

4.6. Addition of refrigerant
- Additional charging is not necessary if the pipe length does not exceed 20 m for BP100-BP140 and 30 m for BP170-BP250.
- If the pipe length is exceeded, charge the unit with additional R410A refrigerant according to the permitted pipe lengths in the following table:
  - When the unit is stopped, charge the unit with the additional refrigerant through the liquid stop valve after the pipe extensions and indoor unit have been evacuated.
  - When the unit is operating, add refrigerant to the gas check valve using a safety charger. Do not add liquid refrigerant directly to the check valve.
  - After changing the unit with refrigerant, note the added refrigerant amount on the service label (attached to the unit). Refer to the “1.5. Using R410A refrigerant air conditioners” for more information.
- Be careful when installing multiple units. Connecting to an incorrect indoor unit can lead to abnormally high pressure and have a serious effect on operation performance.

<table>
<thead>
<tr>
<th>Model</th>
<th>Permitted pipe length</th>
<th>Additional refrigerant charging amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>21-30m</td>
<td>31-40m</td>
</tr>
<tr>
<td>BP100</td>
<td>–50m</td>
<td>–30m</td>
</tr>
<tr>
<td>BP125</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP140</td>
<td>–70m</td>
<td>–30m</td>
</tr>
<tr>
<td>BP200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP250</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. Installing the refrigerant piping

<Limits of refrigerant piping installation>

4.7. For twin/triple/quadruple combination (Fig. 4-8)

- When this unit is used as a FREE COMPO MULTI unit, install the refrigerant piping with the restrictions indicated in the drawing on the left. In addition, if the restrictions are going to be exceeded, or if there are going to be combinations of indoor and outdoor units, refer to installation instructions for the indoor unit for details about the installation.

<table>
<thead>
<tr>
<th>Outdoor unit</th>
<th>Permissible total piping length A+B+C+D+E</th>
<th>Charge-less piping length A+B+C+D+E</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP100</td>
<td>50m and less</td>
<td>20m and less</td>
</tr>
<tr>
<td>BP125</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP140</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP170</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP250</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Outdoor unit | No. of bends |
------------|--------------|
BP100, 125, 140, 170, 200, 250 | 8 m and less | Within 15 |

E: C-E | D-E | BP170- 250 only

5. Drainage piping work

Outdoor unit drainage pipe connection
When drain piping is necessary, use the drain socket or the drain pan (option).

<table>
<thead>
<tr>
<th>Drain socket</th>
<th>PAC-SG61DS-E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain pan</td>
<td>PAC-SG64DP-E</td>
</tr>
</tbody>
</table>

6. Electrical work

6.1. Outdoor unit (Fig. 6-1)
(1) Remove the service panel.
(2) Wire the cables referring to the Fig. 6-1.

- BP100-BP140
- BP170-BP250

Note: If the protective sheet for the electrical box is removed during servicing, be sure to reinstall it.
6. Electrical work

6.2. Field electrical wiring

- If the wiring connecting the indoor and outdoor units is longer than 80 m, use separate indoor/outdoor unit power supplies. (Refer to the installation manuals of the indoor units for more information.)

### BP100-BP140

<table>
<thead>
<tr>
<th>Outdoor unit model</th>
<th>BP100V</th>
<th>BP125V</th>
<th>BP140V</th>
</tr>
</thead>
<tbody>
<tr>
<td>outdoor unit power supply</td>
<td>~N (single), 50 Hz, 230 V</td>
<td>~N (single), 50 Hz, 230 V</td>
<td>~N (single), 50 Hz, 230 V</td>
</tr>
<tr>
<td>outdoor unit input capacity Main switch/breaker</td>
<td>*1</td>
<td>25 A</td>
<td>32 A</td>
</tr>
</tbody>
</table>

- **Wiring**
  - Wire No. × size (mm²)
    - **Outdoor unit power supply**
      - 3 × Min. 2.5
      - 3 × Min. 4
      - 3 × Min. 6
    - **Indoor unit-Outdoor unit**
      - 3 × 1.5 (Polar)
      - 3 × 1.5 (Polar)
      - 3 × 1.5 (Polar)
    - **Indoor unit-outdoor unit earth**
      - 1 × Min. 1.5
      - 1 × Min. 1.5
      - 1 × Min. 1.5
    - **Remote controller-indoor unit**
      - *3 2 × 0.3 (Non-polar)
      - 2 × 0.3 (Non-polar)
      - 2 × 0.3 (Non-polar)

- **Circuit rating**
  - **Outdoor unit L-N (Single)**
    - *4 AC230V
    - AC230V
    - AC230V
  - **Indoor unit-Outdoor unit S1-S2**
    - *4 AC230V
    - AC230V
    - AC230V
  - **Indoor unit-Outdoor unit S2-S3**
    - *4 DC24V
    - DC24V
    - DC24V
  - **Remote controller-indoor unit**
    - *4 DC12V
    - DC12V
    - DC12V

*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV).

*2. Max. 45 m

If 2.5 mm² used, Max. 50 m

If 2.5 mm² used and S3 separated, Max. 80 m

*3. The 10 m wire is attached in the remote controller accessory.

*4. The figures are NOT always against the ground.

S3 terminal has DC 24 V against S2 terminal. However between S3 and S1, these terminals are NOT electrically insulated by the transformer or other device.

### BP170-BP250

<table>
<thead>
<tr>
<th>Outdoor unit model</th>
<th>BP170, 200, 250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output unit Power supply Phase Power supply</td>
<td>Frequency &amp; Voltage</td>
</tr>
<tr>
<td>3N (3ph 4-wires), 50 Hz, 380 - 400 - 415 V</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outdoor unit input capacity Main switch (Breaker)</th>
<th>*1 32 A</th>
</tr>
</thead>
</table>

- **Wiring**
  - Wire No. × size (mm²)
    - **Outdoor unit power supply**
      - 5 × Min. 4
    - **Indoor unit-Outdoor unit**
      - 3 × 1.5 (Polar)
      - Cable length 50 m : 3 × 4 (Polar)
      - Cable length 80 m : 3 × 6 (Polar)
    - **Indoor unit-outdoor unit earth**
      - 1 × Min. 2.5
    - **Remote controller-indoor unit**
      - *3 2 × 0.3 (Non-polar)

- **Circuit rating**
  - **Outdoor unit L-N, L2-N, L3-N**
    - AC 220 - 230 - 240 V
  - **Indoor unit-Outdoor unit S1-S2**
    - *4 AC 220 - 230 - 240 V
  - **Indoor unit-Outdoor unit S2-S3**
    - *4 DC 24 V
  - **Remote controller-indoor unit**
    - *4 DC 12 V

*1. A breaker with at least 3 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV).

*2. Max. 45 m

If 2.5 mm² used, Max. 50 m

If 2.5 mm² used and S3 separated, Max. 80 m

*3. The 10 m wire is attached in the remote controller accessory.

*4. The figures are NOT always against the ground.

S3 terminal has DC 24 V against S2 terminal. However between S3 and S1, these terminals are NOT electrically insulated by the transformer or other device.

Notes:
1. Wiring size must comply with the applicable local and national code.
2. Power supply cords and Indoor unit/Outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord.
   (Design 60245 IEC 57)
3. Use an earth wire which is longer than the other cords so that it will not become disconnected when tension is applied.

A Warning:
In case of A-control wiring, there is high voltage potential on the S3 terminal caused by electrical circuit design that has no electrical insulation between power line and communication signal line. Therefore, please turn off the main power supply when servicing. And do not touch the S1, S2, S3 terminals when the power is energized. If isolator should be used between indoor unit and outdoor unit, please use 3-pole type.

---

<table>
<thead>
<tr>
<th>Outdoor Unit</th>
<th>3poles isolator (Switch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>&quot;A-Control&quot;</td>
</tr>
<tr>
<td>S2</td>
<td>&quot;A-Control&quot;</td>
</tr>
<tr>
<td>S3</td>
<td>Indoor Unit</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Isolator (Switch)</th>
<th>3poles isolator (Switch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>&quot;A-Control&quot;</td>
</tr>
<tr>
<td>S2</td>
<td>&quot;A-Control&quot;</td>
</tr>
<tr>
<td>S3</td>
<td>Indoor Unit</td>
</tr>
</tbody>
</table>

---

![Diagram of A-Control Wiring System](image-url)
6. Electrical work

7.2.1. Using SW4 in outdoor unit

- SW4-1: OFF — Cooling operation
- SW4-2: ON — Heating operation
- SW4-1: ON — Cooling operation
- SW4-2: OFF — Heating operation

- If the insulation resistance is below 1 MΩ, the compressor is faulty or the resistance dropped due to accumulation of refrigerant in the compressor.

- The following procedures must be checked.
  - The outdoor unit is not faulty. LED1 and LED2 on the control board of the outdoor unit flash when the outdoor unit is faulty.
  - Both the gas and liquid stop valves are completely open.
  - A protective sheet covers the surface of the DIP switch panel on the control board of the outdoor unit. Remove the protective sheet to operate the DIP switches easily.

- The insulation resistance drops due to accumulation of refrigerant in the compressor. The resistance will rise above 1 MΩ after the compressor is warmed up for 4 hours.

- The test run operation mode cannot be changed by DIP switch SW4-2 during the test run. (To change the test run operation mode during the test run, stop the test run by DIP switch SW4-1.) After changing the test run operation mode, resume the test run by switch SW4-1.)

- A few seconds after the compressor starts, a clanging noise may be heard from the inside of the outdoor unit. The noise is coming from the check valve due to the small difference in pressure in the pipes. The unit is not faulty.

- Turn on the power at least 12 hours before starting operation.

- Starting operation immediately after turning on the power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.

- The followings must be checked as well.
  - The outdoor unit is not faulty. LED1 and LED2 on the control board of the outdoor unit flash when the outdoor unit is faulty.
  - Both the gas and liquid stop valves are completely open.
  - A protective sheet covers the surface of the DIP switch panel on the control board of the outdoor unit. Remove the protective sheet to operate the DIP switches easily.

7.2.2. Using remote controller

Refer to the indoor unit installation manual.
8. Special Functions

8.1. Low noise mode (on-site modification) (Fig. 8-1)
By performing the following modification, operation noise of the outdoor unit can be reduced by about 3-4 dB.

The low noise mode will be activated when a commercially available timer or the contact input of an ON/OFF switch is added to the CNDM connector (option) on the control board of the outdoor unit.

- The ability varies according to the outdoor temperature and conditions, etc.
  - The refrigerant collecting operation has been completed normally (LED1 and LED2 are lit), be sure to quickly close the gas stop valve.
  - After the gas stop valve is closed, set the SWP switch on the control board of the outdoor unit to ON. The compressor (outdoor unit) and ventilators (indoor and outdoor units) start operating and refrigerant collecting operation begins. LED1 and LED2 on the control board of the outdoor unit are lit.
  - If the refrigerant collecting operation has been completed normally (LED1 and LED2 are lit), the unit will remain stopped until the power supply is turned off.
  - Note that when the length of the extension piping is long, it may no be possible to perform a pump-down operation. When performing the pump-down operation, make sure that the low pressure is lowered to near 0 MPa (gauge).

8.2. Demand function (on-site modification) (Fig. 8-2)
By performing the following modification, energy consumption can be reduced to 0 –100% of the normal consumption.

The demand function will be activated when a commercially available timer or the contact input of an ON/OFF switch is added to the CNDM connector (option) on the control board of the outdoor unit.

- Complete the circuit as shown when using the external input adapter (PAC-SC36NA) (Option)
- By setting SW7-1 and SW7-2 on the control board of the outdoor unit, the energy consumption (compared to the normal consumption) can be limited as shown below.

<table>
<thead>
<tr>
<th>SW7-1</th>
<th>SW7-2</th>
<th>Energy consumption (SW2 ON)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>0% (Stop)</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>50%</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>75%</td>
</tr>
</tbody>
</table>

8.3. Refrigerant collecting (pump down)
Perform the following procedures to collect the refrigerant when moving the indoor or outdoor unit.

1. Supply power (circuit breaker).
   * When power is supplied, make sure that “CENTRALLY CONTROLLED” is not displayed on the remote controller. If “CENTRALLY CONTROLLED” is displayed, the refrigerant collecting (pump-down) cannot be completed normally.
2. After the gas stop valve is closed, set the SWP switch on the control board of the outdoor unit to ON. The compressor (outdoor unit) and ventilators (indoor and outdoor units) start operating and refrigerant collecting operation begins. LED1 and LED2 on the control board of the outdoor unit are lit.
   * Only set the SWP switch (push-button type) to ON if the unit is stopped. However, even if the unit is stopped and the SWP switch is set to ON less than three minutes after the compressor stops, the refrigerant collecting operation cannot be performed. Wait until compressor has been stopped for 3 minutes and then set the SWP switch to ON again.

9. System control (Fig. 9-1)

- Set the refrigerant address using the DIP switch of the outdoor unit.
- Wiring from the Remote Control
  - This wire is connected to TB5 (terminal board for remote controller) of the indoor unit (non-polar).
  - When a Different Refrigerant System Grouping is Used.
  - Up to 16 refrigerant systems can be controlled as one group using the slim MA remote controller.

Note:
In single refrigerant system (twin/triple), there is no need of wiring 1.

SW1 Function table

<table>
<thead>
<tr>
<th>SW1 Function setting</th>
<th>Operation according to switch setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Compulsory defrosting</td>
</tr>
<tr>
<td>2</td>
<td>Error history clear</td>
</tr>
<tr>
<td>3</td>
<td>Refrigerant system address</td>
</tr>
<tr>
<td>4</td>
<td>Settings for outdoor unit addresses</td>
</tr>
</tbody>
</table>

Note:
In single refrigerant system (twin/triple), there is no need of wiring 1.
This product is designed and intended for use in the residential, commercial and light-industrial environment.

Please be sure to put the contact address/telephone number on this manual before handing it to the customer.