Service Manual

MODEL: GWH18AC-D3DNA1B (CB11500430)
GWH24AC-D3DNA1B (CB11500450)
(Refrigerant R410A)
Summary and features...........................................................................................................1

Part 1 Safety Precautions.......................................................................................................2

Part 2 Specifications..............................................................................................................3

Part 3 Construction Views......................................................................................................5
  3.1 Indoor Unit .......................................................................................................................5
  3.2 Outdoor Unit ....................................................................................................................6

Part 4 Refrigerant System Diagram........................................................................................7

Part 5 Schematic Diagram.....................................................................................................8
  5.1 Electrical Data ................................................................................................................8
  5.2 Electrical Wiring .............................................................................................................8
  5.3 Printed Circuit Board ...................................................................................................10

Part 6 Function and Control..................................................................................................12
  6.1 Unit Display Panels .......................................................................................................12
  6.2 Remote Control Display ...............................................................................................12
  6.3 Remote Control Operations .........................................................................................13
  6.4 Control System .............................................................................................................17

Part 7 Installation Manual.....................................................................................................21
  7.1 Notices for Installation .................................................................................................21
  7.2 Installation Drawing .....................................................................................................23
  7.3 Install Indoor Unit .........................................................................................................24
  7.4 Install Outdoor Unit ......................................................................................................25
  7.5 Start-up ..........................................................................................................................28

Part 8 Exploded Views and Parts List....................................................................................29
  8.1 Indoor Unit ....................................................................................................................29
  8.2 Outdoor Unit ...............................................................................................................33
## Table of Contents

### Part 9 Troubleshooting

9.1 Troubleshooting ......................................................... 37
9.2 Diagnostic Charts .......................................................... 38
9.2.2 Blinking LED of Indoor/Outdoor Unit ......................... 45
9.2.3 Check Malfunction Process ....................................... 49

### Part 10 Removal Procedure

10.1 Removal Procedure of Indoor Unit .............................. 58
10.2 Removal Procedure of Outdoor Unit (18K Unit) ............ 61
10.3 Removal Procedure of Outdoor Unit (24K Unit) .......... 64
Summary and features

Indoor Unit

GWH18AC-D3DNA1B/I
GWH24AC-D3DNA1B/I

Outdoor Unit

GWH18AC-D3DNA1B/O
GWH24AC-D3DNA1B/O

Remote Control

YT1FF
1. Safety Precautions

Installing, starting up, and servicing air-conditioning equipment can be hazardous due to system pressures, electrical components, and equipment location (roofs, elevated structures, etc.). Only trained, qualified installers and service mechanics should install, start-up, and service this equipment. Untrained personnel can perform basic maintenance functions such as cleaning coils. All other operations should be performed by trained service personnel.

When working on the equipment, observe precautions in the literature and on tags, stickers, and labels attached to the equipment.

Follow all safety codes. Wear safety glasses and work gloves. Keep quenching cloth and fire extinguisher nearby when brazing. Use care in handling, rigging, and setting bulky equipment.

Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes and current editions of the National Electrical Code (NEC).

Recognize safety information. This is the safety-alert symbol ! . When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these signal words: DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which will result in severe personal injury or death. WARNING signifies hazards which could result in personal injury or death. CAUTION is used to identify unsafe practices which may result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which will result in enhanced installation, reliability, or operation.

**WARNING**

**ELECTRICAL SHOCK HAZARD**

Failure to follow this warning could result in personal injury or death.

Before installing, modifying, or servicing system, main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switch with a suitable warning label.

- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections or inadequate grounding can cause accidental injury or death.
- Ground the unit according to local electrical codes.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.
- Make sure the ceiling/wall is strong enough to hold the unit’s weight. The outdoor unit should be installed in a location where air and noise emitted by the unit will not disturb the neighbors.
- Properly insulate any refrigerant or condensate lines running inside a room to prevent “sweating” that can cause dripping water and damage to walls and floors.
- The outdoor unit must be installed on stable, level surface, where there is no accumulation of snow, leaves or rubbish.

- The unit should be installed according to the instructions in order to minimize the risk of damage from earthquakes, hurricanes or strong winds.
- Contact of refrigerant and fire generates poisonous gas.
- Use specified refrigerant only.

**CAUTION**

**UNIT DAMAGE HAZARD**

Failure to follow this caution may result in equipment damage or improper operation.

Never use the system compressor as a vacuum pump.

Refrigerant lines and indoor coil should be evacuated using the recommended deep vacuum method of 500 microns. The alternate triple evacuation method may be used if the procedure outlined below is followed. Always break a vacuum with dry nitrogen.

- Keep your fingers and clothing away from any moving parts.
- Clear the site after installation. Make sure no foreign objects are left in the unit.
- Always ensure effective grounding for the unit.

**Caution**

- Never install on the place where a combustible gas might leak, or it may lead to fire or explosion.
- When the unit is installed at telecommunication centers or hospitals, take a proper provision against noise.
- When installing at a watery place, provide an electric leak ground fault breaker.
- Do not wash the unit with water.
- Be very careful about unit transportation. The unit should not be carried by only one person if it is more than 45lb.
- Do not touch the heat exchanger fins with bare hands.
- Do not touch the compressor or refrigerant piping without wearing glove.
- Do not operate the air conditioner without air filter.
- Should any emergency occur, stop the unit and disconnect the power immediately.
### 2. Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>GWH18AC-D3DNA1B</th>
<th>GWH24AC-D3DNA1B</th>
</tr>
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<tbody>
<tr>
<td>Product Code</td>
<td>CB11500430</td>
<td>CB11500450</td>
</tr>
<tr>
<td>Function</td>
<td>COOLING</td>
<td>COOLING</td>
</tr>
<tr>
<td></td>
<td>HEATING</td>
<td>HEATING</td>
</tr>
<tr>
<td>Rated Voltage</td>
<td>208-230V~</td>
<td>208-230V~</td>
</tr>
<tr>
<td>Frequency(Hz)</td>
<td>60Hz</td>
<td>60Hz</td>
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<tr>
<td>Total Capacity (W) Standard (Low~High):</td>
<td>5275 (1820~6450)</td>
<td>7325 (1200~7325)</td>
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<td>Total Capacity (Btu/h) Standard (Low~High):</td>
<td>18000 (6200~22000)</td>
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<td>Power Input (W) Standard (Low~High):</td>
<td>1500 (180~2650)</td>
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<td>Rated Current (A)</td>
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<td>Air Flow Volume (CFM) (SH/H/M/L)</td>
<td>488/441/383/324</td>
<td>606/471/412/353</td>
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<td>Moisture Removal (gal./hr.)</td>
<td>0.5</td>
<td>0.7</td>
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<tr>
<td>EER (BTU/W)</td>
<td>SEER=20 HSPF=10.2</td>
<td>SEER=18 HSPF=10.2</td>
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<td>Energy Class</td>
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#### Indoor unit

<table>
<thead>
<tr>
<th>Model of Indoor Unit</th>
<th>GWH18AC-D3DNA1B/I</th>
<th>GWH24AC-D3DNA1B/I</th>
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<tr>
<td>Fan Motor Speed (rpm)/(H/M/L)</td>
<td>1500/1150/1050/950</td>
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<tr>
<td>Output of Fan Motor (w)</td>
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<td>Input Power of Heater (w)</td>
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<td>/</td>
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<td>Fan Motor Capacitor (μF)</td>
<td>1.5</td>
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<tr>
<td>Fan Motor RLA(A)</td>
<td>0.25</td>
<td>0.45</td>
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<tr>
<td>Fan Type</td>
<td>Cross flow fan</td>
<td>Cross flow fan</td>
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<tr>
<td>Evaporator</td>
<td>Aluminum fin-copper tube</td>
<td>Aluminum fin-copper tube</td>
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<td>Row-Fin Gap (inch)</td>
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<td>Swing Motor Model</td>
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<td>MP35XX</td>
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<td>Fuse (A)</td>
<td>PCB 3.15A</td>
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<td>51/43/40/35</td>
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<tr>
<td>Sound Power Level dB (A) (H/M/L)</td>
<td>56/53/50/45</td>
<td>61/53/50/45</td>
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<td>Dimension (WH/D) (inch)</td>
<td>37.7<em>11.8</em>7.7</td>
<td>42.9<em>12.9</em>8.2</td>
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<td>Dimension of Package (L/W/H) (inch)</td>
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<td>45.6<em>16.1</em>12.2</td>
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<td>35/46</td>
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## Specifications

<table>
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<th>GWH18AC-D3DNA1B/O</th>
<th>GWH24AC-D3DNA1B/O</th>
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<td>China Resources (Shenyang) Sanyo CO., LTD</td>
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<td>C-6RZ146H1A</td>
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<td>Compressor Type</td>
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<td>41</td>
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<td>L.R.A. (A)</td>
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<td>8.4</td>
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<td>Compressor RLA(A)</td>
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<td>1640</td>
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<td>Compressor Power Input(W)</td>
<td>1NT11L-3979</td>
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<td>Overload Protector</td>
<td>Electronic expand valve</td>
<td>Electronic expand valve</td>
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<td>Throttling Method</td>
<td>Transducer starting</td>
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<td>Starting Method</td>
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<td>Fan Motor Capacitor (μF)</td>
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<td>Fan Motor (uF)</td>
<td>Axial fan</td>
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<td>Air Flow Volume of Outdoor Unit (CFM)</td>
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<td>1/16</td>
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<tr>
<td>Sound Pressure Level dB (A)</td>
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<td>Defrosting Method</td>
<td>2-1/16</td>
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<td>Climate Type</td>
<td>35°*27.5°*13.4</td>
<td>36.2°*31.1°*14.5</td>
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<td>Isolation</td>
<td>551</td>
<td>551</td>
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<td>Moisture Protection</td>
<td>15°*28.9°*18.1</td>
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<td>Permissible Excessive Operating Pressure for the Discharge Side(psi)</td>
<td>54</td>
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<td>Permissible Excessive Operating Pressure for the Suction Side(psi)</td>
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<td>Sound Pressure Level db (A)</td>
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<td>Sound Power Level db (A)</td>
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<td>118/132</td>
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<td>Dimension (W/H/D) (inch)</td>
<td>40.5°*28.9°*18.1</td>
<td>41.9°*33°*19</td>
</tr>
<tr>
<td>Dimension of Package (W/H/D)(inch)</td>
<td>110/121</td>
<td>118/132</td>
</tr>
<tr>
<td>Net Weight/Gross Weight (lb.)</td>
<td>110/121</td>
<td>118/132</td>
</tr>
<tr>
<td>Refrigerant and Charge (oz.)</td>
<td>40.5°*28.9°*18.1</td>
<td>41.9°*33°*19</td>
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<td>Precharge line length (ft.)</td>
<td>R410A/51.1</td>
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<td>Gas additional charge(lb./ft.)</td>
<td>1/4</td>
<td>1/4</td>
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<tr>
<td>Cover Diameter</td>
<td>1/2</td>
<td>1/2</td>
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<tr>
<td>Outer Diameter</td>
<td>50</td>
<td>50</td>
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<tr>
<td>Max Distance</td>
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The above data is subject to change without notice. Please refer to the nameplate of the unit.
3. Construction Views

3.1 Indoor Unit

<table>
<thead>
<tr>
<th>Model</th>
<th>W</th>
<th>H</th>
<th>D</th>
<th>Q</th>
<th>R</th>
<th>S</th>
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<td>GWH18AC-D3DNA1B</td>
<td>37-13/16</td>
<td>11-13/16</td>
<td>7-11/16</td>
<td>4-5/8</td>
<td>27-5/16</td>
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<tr>
<td>GWH24AC-D3DNA1B</td>
<td>42-15/16</td>
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<td>8-3/16</td>
<td>8-7/16</td>
<td>26-15/16</td>
<td>7-1/2</td>
</tr>
</tbody>
</table>

Unit: inch
3.2 Outdoor Unit

GWH18AC-D3DNA1B/O

GWH24AC-D3DNA1B/O

Unit: (inch)
4. Refrigerant System Diagram

Refrigerant pipe diameter
18K Unit
Liquid : 1/4" (6 mm)
Gas : 1/2" (12 mm)
24K Unit
Liquid : 1/4" (6 mm)
Gas : 5/8" (16 mm)
5. Schematic Diagram

5.1 Electrical Data

Meaning of marks

- **Indoor Unit**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Color symbol</th>
<th>Symbol</th>
<th>Color symbol</th>
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<tbody>
<tr>
<td>WH</td>
<td>WHITE</td>
<td>BN</td>
<td>BROWN</td>
</tr>
<tr>
<td>YE</td>
<td>YELLOW</td>
<td>BU</td>
<td>BLUE</td>
</tr>
<tr>
<td>RD</td>
<td>RED</td>
<td>BK</td>
<td>BLACK</td>
</tr>
<tr>
<td>YEGN</td>
<td>YELLOW GREEN</td>
<td></td>
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</tr>
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</table>

- **Outdoor Unit**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parts name</th>
<th>Symbol</th>
<th>Color symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1 L2</td>
<td>REACTOR</td>
<td>WH</td>
<td>WHITE</td>
</tr>
<tr>
<td>YK</td>
<td>Four-way-Valve</td>
<td>YE</td>
<td>YELLOW</td>
</tr>
<tr>
<td>EKV</td>
<td>ELECTRONIC EXPANSION VALVE</td>
<td>RD</td>
<td>RED</td>
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<tr>
<td>SAT</td>
<td>OVERLOAD</td>
<td>BN</td>
<td>SAT OVERLOAD BN BROWN</td>
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<tr>
<td>COMP</td>
<td>COMPRESSOR</td>
<td>BU</td>
<td>BLUE</td>
</tr>
<tr>
<td>✪</td>
<td>GROUNDING</td>
<td>BK</td>
<td>BLACK</td>
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<tr>
<td>L</td>
<td>REACTOR</td>
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5.2 Electrical wiring

- **Indoor Unit**

Models: GWH18AC-D3DNA1B/I, GWH24AC-D3DNA1B/I
● Outdoor Unit
Models GWH18AC-D3DNA1B/O  GWH24AC-D3DNA1B/O

These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.

WARNING
Please don't touch any terminal when the voltage of terminal P(DC+) and N(DC-) at AP1 is higher than 30V to prevent the risk of electrical shock!
5.3 Printed Circuit Board

Indoor Unit

● TOP VIEW

● BOTTOM VIEW

<table>
<thead>
<tr>
<th>No.</th>
<th>Port Name</th>
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<tbody>
<tr>
<td>1</td>
<td>Neutral line</td>
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<tr>
<td>2</td>
<td>Neutral line of health function</td>
</tr>
<tr>
<td>3</td>
<td>Fuse</td>
</tr>
<tr>
<td>4</td>
<td>Live line</td>
</tr>
<tr>
<td>5</td>
<td>Power cable of PG motor</td>
</tr>
<tr>
<td>6</td>
<td>Live line of health function</td>
</tr>
<tr>
<td>7</td>
<td>Jumper cap</td>
</tr>
<tr>
<td>8</td>
<td>Link to up-down swing motor</td>
</tr>
<tr>
<td>9</td>
<td>Feedback line of PG motor</td>
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<tr>
<td>10</td>
<td>Temperature sensor</td>
</tr>
<tr>
<td>11</td>
<td>Display port</td>
</tr>
<tr>
<td>12</td>
<td>Port of communication with outdoor unit</td>
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</table>
Outdoor Unit

- TOP VIEW

<table>
<thead>
<tr>
<th>No.</th>
<th>Port Name</th>
<th>No.</th>
<th>Port Name</th>
<th>No.</th>
<th>Port Name</th>
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<tbody>
<tr>
<td>1</td>
<td>Compressor port</td>
<td>2</td>
<td>Compressor overload protector</td>
<td>3</td>
<td>Temperature sensor</td>
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<td>4</td>
<td>Electronic expansion valve</td>
<td>5</td>
<td>Fan HALL port</td>
<td>6</td>
<td>Outdoor fan</td>
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<tr>
<td>7</td>
<td>4-way valve</td>
<td>8</td>
<td>Port of communication with indoor unit</td>
<td>9</td>
<td>Live line</td>
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<td>13</td>
<td>PFC capacitor port</td>
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<td>Reactor port 2</td>
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- BOTTOM VIEW
6. Function and Control

6.1 Unit Display Panels

NOTE: The display panel on the indoor unit can be turned on or off using the remote control. Press the SWING button twice to turn the display on and off. Some of the functions will appear on the display panel, on the remote control, or both.

On the Unit:

* The temperature readout will be replaced by an error code if there is a malfunction.

6.2 Remote Control Display

- **TRANSMISSION INDICATOR**: Illuminates when remote control transmits signals to the indoor unit.
- **ON/OFF INDICATOR**: This symbol appears when the unit is turned on by the remote control, and disappear when the unit is turned off.
- **FAN SPEED DISPLAY**: Indicates the set fan speed. AUTO is displayed when unit is running in AUTO mode.
- **MODE DISPLAY**: Indicates the current operation mode “AUTO”, “COOL”, “DRY”, “FAN ONLY”, or “HEAT”
- **SLEEP DISPLAY**: Indicates unit is running in SLEEP mode.
- **TEMPERATURE DISPLAY**: Temperature setting from 61°F (16°C) to 86°F (30°C) will be displayed. If FAN mode is selected, there will be no temperature displayed.
- **SWING DISPLAY**: Indicates that louvers are moving continuously for better air distribution.
- **CLOCK DISPLAY**: Indicates the current time (0 to 24 hours).
- **TIMER DISPLAY**: Indicates that time ON, time OFF, or both is set.

NOTE: Symbols shown in this manual are for the purpose of demonstration. During actual operation, only the relevant symbols are displayed.
6.3 Remote Control Operations

**CAUTION**

**EQUIPMENT DAMAGE HAZARD**
Failure to follow this caution may result in equipment damage. Handle the control with care and avoid getting the control wet.

**IMPORTANT**: The remote control can operate the unit from a distance of up to 25 ft. (7.6 m) as long as there are no obstructions. This is one way communication only (from remote control to fan coil).

The remote control can perform the following basic functions:
- Turn the system ON and OFF
- Select operating mode
- Adjust room air temperature set point and fan speed
- Adjust airflow direction

Refer to the Remote Control Function section for detailed description of all the capabilities of the remote control.

**Battery Installation**

Two AAA 1.5 v alkaline batteries (included) are required for operation of the remote control.

To install or replace batteries:
1. Slide the back cover off the control to open the battery compartment.
2. Remove old batteries if you are replacing the batteries.
3. Insert batteries. Follow the polarity markings inside the battery compartment.
4. Replace battery compartment cover.

**NOTE:**
1. When replacing batteries, do not use old batteries or a different type battery. This may cause the remote control to malfunction.
2. If the remote is not going to be used for several weeks, remove the batteries. Otherwise battery leakage may damage the remote control.
3. The average battery life under normal use is about 6 months.

4. Replace the batteries when there is no audible beep from the indoor unit or if the Transmission Indicator fails to light.

**Set the Clock**

Before you start operating the air conditioner, set the clock on the remote control as outlined below. The clock panel on the remote controller will display the time regardless of whether the air conditioner is in use or not.

**Initial Setting of the Clock:**

After batteries are inserted in the remote control, the clock panel will display “12:00” AM.

1. Push the CLOCK button once
   - “AM” will flash
2. Push the “TIME +” or “TIME -” button. Each time you press the button, the time moves forward or backward by one minute depending on which button you press.
   - If you push the temperature button continuously, the time adjusts in increments of 10 minutes.
3. When the right time is achieved, press the CLOCK button once to set the time. The “AM” will stop flashing.
4. To readjust the Clock, Press the CLOCK button on the remote. The “AM” or “PM” will flash. Repeat steps 1 through 3.

**NOTE:** Note: The time of the CLOCK must be set before the AUTO-TIMER function will operate.

**UNIT OPERATION HAZARD**

Failure to follow this caution may result in equipment damage or improper operation.

Static electricity or other factors (voltage fluctuations) can cause the remote control clock to reset. If your remote control is reset (the time of “12:00” flashing), set the clock before starting the unit.
Remote Control Operation - Quick Start

NOTE: When transmitting a command from the remote control to the unit, be sure to point the control toward the LED display on the front panel of the unit. The unit will confirm receipt of a command by sounding an audible beep.

1. Turn the unit on by pushing the ON/OFF button.
2. Select the desired mode by pushing the mode button.
3. Select the temperature set point by pointing the control toward the unit and pressing the “TEMP +” or “TEMP -” temperature set point buttons until the desired temperature appears on screen.
4. Select the desired fan speed by pressing the FAN SPEED button to select desired fan speed.

NOTE: Cool only units have no heat mode.

5. Set the airflow direction. When the unit is turned on, the louver default to the cooling or heating position. The user can adjust the default louver position by pushing the “SWING” button. The louver will start to move. At this point, the user can have the louver moving continuously or stopped when the desired position is achieved by pushing the “SWING” button.

Emergency Operation

If the remote control is lost, damaged, or the batteries are exhausted, the AUTO button on the unit can be used to run the unit.

Open the front cover panel and press the AUTO button once briefly when the system is off.

To stop emergency operation, push the AUTO button once. The emergency operation can also be stopped by pushing the “ON/OFF”, “CLOCK”, “T-OFF”, or “T-ON” twice.

The following occurs when the AUTO button is pushed:

- 77°F (25°C) will be displayed on display panel.
- Unit will run in FAN ONLY mode if return air temperature is between 68°F (20°C) and 77°F (25°C).
- Unit will run in HEATING if return air temperature is less than 68°F.
- Unit will run in COOLING if return air temperature is greater than 77°F (25°C).
- Fan speed will be set to AUTO
- SWING will be on.

REMOTE CONTROL FUNCTIONS

The remote control is the interface between the user and the high-wall systems. Commands are entered by the user to control the system. Any command that has been entered with the remote control will remain in the memory until it is changed by the user or the batteries are replaced.

NOTE: When entering commands, point the remote control in the direction of the LED display on the front panel. The $\Delta$ will appear for a short period of time on the remote control when the command is entered. The unit will only emit an audible beep when the signals are received correctly.

On/Off Button

When the air conditioner is not in operation, the remote control will display the last set point and time.

- Press the On/Off button to start the unit.
  - The unit will start in the last operating mode and set point. The “OPER” indicator will appear. The “RUN” indicator on the display panel turns green.
- Press button On/Off to stop the unit.
  - The “RUN” indicator light on the display panel will turn red and the remote control will display the setpoint and time. “OPER” will disappear.

NOTE: If the On/Off button is pressed too soon after a stop, the compressor will not start for 3 minutes due to the inherent protection against frequent compressor cycling.

Selecting an Operating Mode

Use the Mode button to select one of the available modes.
Setting the Room Temperature Set Point
Pressing the “TEMP +” and “TEMP -” buttons will raise or lower the temperature.

The unit will confirm signal receipt with a beep and the value of the set temperature on the display, on the remote control, and on the front panel, will change accordingly.

The temperature can be set between 61°F (16°C) and 86°F (30°C).

NOTE: In Cooling mode, if the temperature selected is higher than the room temperature, the unit will not start. The same applies for the Heating mode if the selected temperature is lower than the room temperature.

Selecting the Fan Speed
The fan speed can be selected by pressing the “FAN” button.

NOTE: When the unit is on, the fan will run continuously in cooling or heating. When in heating, there might be situations where the fan will slow down or shut off to prevent cold blow.

Selecting the Horizontal Direction Louver Position
When the unit is turned on, the louvers default to the cooling or heating position.

If the louver position is not providing adequate comfort due to room layout or where people are gathered, the user has two options:

1. Have the horizontal louvers move continuously. This is accomplished by pushing the “SWING” button. When this button is pushed, the “SWING” icon will appear on the remote control and the louvers will operate in a preset range as shown in the figure below.

2. If a stationary position other than the default position is preferred, push the “SWING” button once and allow the louver to move to the desired position then push the “SWING” button again.

NOTE: Always use the remote control to adjust the louver position otherwise, abnormal operation may occur. If the louver is manually adjusted out of its range, turn the unit off and then on again.

Sometimes, in the heating mode, when the “SWING” button is pushed, the louvers will not start moving right away. This is due to the fact that the fan will not start running until the coil temperature is warm enough to prevent discomfort to the user by blowing cold air.

Selecting Vertical Direction of the Louver
The vertical louvers can be adjusted manually to direct the airflow to achieve the optimal comfort in the space.

Timer Function
TIMER ON (to start the unit) and TIMER OFF (to stop the unit) can be used separately or together. The clock on the remote control must be set before using this function.

Timer ON only

This function will allow the unit to start automatically at the set time. The TIMER ON can be set while the unit is on or off.

To set the TIMER ON function, perform the following:

1. Push the “T-ON” button once.
2. The timer indicator will appear on the remote control with “ON” flashing.
3. Push the “TIME -” or “TIME +” until the desired on time is reached.

NOTE: Pressing the “TIME -” or “TIME +” will decrease or increase the time in 1 minute increments. Pressing the “TIME -” or “TIME +” continuously will decrease or increase the time in 10 minute increments.

4. Push the “T-ON” again. The “ON” icon will stop blinking and the time at which the unit will start is set.

The “T-ON” time will be stored in memory indefinitely until it is cancelled by the user by pushing the “CANCEL” button or the remote control batteries are replaced.

If the unit is running and the “T-ON” set time is reached, the unit will continue operating normally.

NOTE: When the unit is shut off by the user using the “ON/OFF” button, and if the “T-ON” is set, the following will be displayed on the remote control.
- Set Point
- Time
- “TIME ON” icon

On the display panel, the operation light will turn red. When the “T-ON” is reached, the display on the remote does not change, and the unit is running as indicated by the operation light on the front cover turning green. To get display on the remote, push the “ON/OFF” button once.
**Timer OFF only**

This function will allow the unit to stop automatically at the set time. The timer can be set while the unit is on or while it is off.

To set the “TIMER OFF” function, perform the following:

1. Push the “T- -OFF” button once.
2. The “TIMER” indicator will appear on the remote control with “OFF” flashing.
3. Push the “TIME - -” or “TIME +” button until the desired ON time is reached.

**NOTE:** Pressing the “TIME - -” or “TIME +” will decrease or increase the time in 1 minute increments. Pressing the “TIME - -” or “TIME +” continuously, will decrease or increase the time in 10 minute increments.

4. Push the “T- -OFF” button again, the “OFF” icon will stop blinking and the time at which the unit will turn off is set.

The “T- -OFF” time will be stored in memory indefinitely until is is cancelled by pushing the the “CANCEL” button or the batteries are replaced in the remote control.

If the unit is running and the “T- -OFF” set time is reached, the unit will turn off and the operation indicator light on the front panel will turn red. The display on the remote control will remain the same as when the unit was running. To turn the unit on again, push the “ON/OFF” button twice. The operation indicator light on the front panel will turn green.

**Timer ON and Timer OFF**

Use both functions as described in “TIMER ON” and “TIMER OFF” sections to program the unit to turn on and shut off at specified times. Times will be stored in memory until cancelled by user or the remote control batteries are replaced.

**Sleep Mode**

This mode is used to conserve energy and can be used when the unit is in the COOL, HEAT or AUTO mode only.

**Cool Mode**

- Push the SLEEP button. The SLEEP display will appear on the remote control.

- After 1 hour the set point will be raised by 1.8°F (1°C).
- After another hour, the set point will be raised by another 1.8°F (1°C) and the fan will run in low speed.
- The SLEEP mode will be cancelled when the SLEEP button is pushed again.

**Heat Mode**

- Same as cooling mode but set points will be lowered by 1.8°F (1°C) and the HEAT icon will disappear from the display panel.

**Time Delay**

If the On/Off button is pressed too soon after a stop, the compressor will not start for 3 minutes due to the inherent protection against frequent compressor cycling. The unit will only emit an audible beep when the signals are received correctly.

**Heating Features**

If the unit is in the heating mode, there will be a delay when the fan starts. The fan will start only after the coil is warmed up to prevent cold blow.

**Defrost Operation**

In heating mode, if the outdoor coil is frosted, the indoor fan and outdoor fan will turn off while system removes the frost on the outdoor coil. “H1” will be displayed on the display panel on the front cover of the unit.

The system will automatically revert to normal operation when frost is removed from the outdoor unit, and “H1” will disappear.

**Auto Start**

If the power fails while the unit is operating, the unit stores the operating condition, and it will start operation automatically under those conditions when the power is restored.
CONTROL SYSTEM

The 53GXC(Q) units are equipped with microprocessors in the indoor and outdoor units. They perform the following two functions:

1. Provide safety for the system
2. Control the system and provide optimum levels of comfort and efficiency.

3 Minute Time Delay

In order to protect the compressor, there is a 3 minute delay on break even if the control is calling for heating or cooling.

Indoor Coil Freeze Protection

When the unit is running in the COOL or DRY MODE, the indoor coil can freeze due to any of the following:

- Low system charge
- Reduced indoor airflow
- Restricted refrigerant flow
- Low ambient temperature (outdoor)
- Low load (indoor)

The indoor coil thermistor monitors the coil temperature continuously. Any time the coil temperature drops below 30.2°F (-1°C), the compressor and the outdoor fan (30 seconds later) will be switched off until the coil temperature rises above 42.8°F (6°C) and the compressor was off for a minimum of 3 minutes.

High Compressor Discharge Temperature

The compressor discharge temperature can be high due to any of the following:

- Low refrigerant charge
- Blocked capillary

The compressor discharge line thermistor continuously monitors the temperature and communicates with the microprocessor. Depending on the temperature measured, the compressor will be allowed to increase the frequency to meet the load or is forced to run at the current or reduced frequency. If the temperature gets excessively high, the compressor will be de-energized as shown below:

Low Voltage Protection

If the incoming voltage is below the minimum allowed, E5 will be displayed on the front panel of the indoor unit.

Condenser High Temperature Protection

Condenser high temperature can occur due to any of the following conditions:

- High outdoor ambient
- Outdoor fan blocked
- Outdoor coil blocked

The outdoor coil thermistor continuously monitors the temperature and communicates with the microprocessor. Depending on the temperature measured, the compressor will be allowed to increase the frequency if needed to meet the load or is forced to run at the current or reduced frequency. If the temperature gets excessively high the compressor will be de-energized as shown below:

NOTE: In heating the indoor fan is de-energized 60 seconds after the compressor is de-energized.
Compressor Over Current Protection

Over current protection can result due to any of the following:

- The ambient temperature is too high
- Locked rotor on the compressor
- Blockage in the refrigeration circuit (capillary tubes for example)
- Outdoor air is blocked or restricted

The compressor current is monitored continuously. Based on the amp draw measured, the microprocessor will allow the compressor to increase frequency, maintain frequency, drop frequency, and eventually de-energized the compressor if excessive amps are experienced.

MODES OF OPERATION

The units have five main operating modes:
1. Fan only
2. Cooling
3. Heating (heat pump only)
4. Auto
5. Dry (Dehumidification)

The units also have the manual mode that allows the unit to be operated without the remote control.

Fan Only Mode

In this mode, the system circulates the room air without changing the room air temperature.

Cooling Mode

In this mode, the system cools and dries the room air with the fan running continuously, either at a selected fan speed or Auto fan speed. The fan runs even when the compressor cycles off. This feature enhances room comfort and efficiency of the system.

IPM Module Protection

This can be caused by any of the following:

- Loss of cooling to the heat sink
- High ambient temperatures
- Low voltage
- Loose screws fastening the board to the heat sink

When this occurs, H5 is displayed on the LED display on the front panel of the indoor unit.

SEQUENCE OF OPERATION

Interface

A wireless remote control, supplied with the unit, is the interface between the fan coil and the user. The wireless remote control has the following characteristics:

- Dedicated controllers for °C or °F. Each indoor units comes with two remotes that are clearly labeled for the appropriate temperature scale.
- The remote control range is from 61°F (16.1°C) to 86°F (30°C).
- The same remote is used for both cooling only and heat pump units
- The wireless remote control range is 25 ft (7.6 m).
- The same remote can be used to control more than one unit.
- If the remote control is lost, damaged, or the batteries are exhausted, the system can be operated using the manual button located under the front panel.

Outdoor Fan Operation - Cooling

When in cooling mode, the fan runs continuously either at the chosen set speed, or in Auto mode, where the speed is determined by the microprocessor based on the difference between the room temperature and the temperature set point as shown below:
Heating Mode

In this mode, the system heats the room air with the indoor fan running at either the selected speed or on Auto. As the cooling mode, the indoor fan will run continuously unless interrupted by the cold blow algorithm. This algorithm will not allow the fan to run if the indoor coil temperature drops below a preset value.

Compressor and Fan Operation

As shown below, the compressor and outdoor fan cycle on and off based on the actual room temperature versus the set point. The outdoor fan is de-energized 30 seconds after the compressor is de-energized. The reversing valve is energized in heating and will stay energized for 2 minutes after the compressor is de-energized. The reversing valve is energized 2 seconds before the compressor is energized.

Cold Blow Prevention

This function prevents the cold air from blowing into a space when in heat mode. When there is a demand for heating one of the following conditions occurs:

- If the indoor coil temperature is < 106°F (41.1°C) and the room temperature is < 75°F (23.4°C), there will be a 3 minute time delay before the indoor fan runs at low speed for 5 minutes.
- If the indoor coil temperature is ≥ 106°F (41.1°C) and the room temperature is ≥ 75°F (23.4°C), the indoor fan will run at low speed for 1 minute.

After one of the above steps occur, the indoor fan speed will be determined as shown below:

Defrost

Defrost is controlled by the microprocessor and will occur if the unit operated in the heating mode for at least 45 minutes and any of the conditions below lasted for more than 3 minutes.

The defrost cycle will terminate 12 minutes after the initiation of the defrost cycle or when the coil temperature is ≥ 50°F (10°C). The defrost algorithm is shown below:
**AUTO MODE**

When the Auto setting is selected, at startup the unit will run in cooling, fan only, or heating based on the room temperature at shown below.

![Diagram showing AUTO Mode](image)

**SLEEP MODE**

Additional energy savings can be realized by selecting the Sleep mode. When the sleep setting is selected, the temperature set point is adjusted automatically as shown below:

![Diagram showing SLEEP Mode](image)

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**Fig. 25 – AUTO Mode**

After startup and if the unit is running in cooling, the compressor will be de-energized when the room temperature is 73.4°F (23°C). If the unit was running in heating, the compressor will be de-energized when the room temperature is 73.4°F (23°C). There is a 6 minute time delay before modes are switched.

**Fig. 26 – SLEEP Mode**

7.1 Notices for Installation

Caution

Please contact your Gree authorized service center when the unit is to be relocated.

Installation Site Instructions

- Proper installation site is vital for correct and efficient operation of the unit. Avoid the following sites where:
  - strong heat sources, vapours, flammable gas or volatile liquids are emitted.
  - high-frequency electro-magnetic waves are generated by radio equipment,
  - welders and medical equipments are placed.
  - salt-laden air prevails (such as close to coastal areas).
  - the air is contaminated by industrial vapours and oils.
  - the air contains sulfur gas such as in hot spring zones.
  - the air has deteriorated or there is high possibility of corrosion.

Installation Site of Indoor Unit

Install the indoor unit:

1. Where airflow is not blocked and cool air spreads over the entire room.
2. Where the condensing water can be easily drained out, and where it is easily connected to outdoor unit.
3. Where it is out of reach of children.
4. Select the place where the wall is strong enough to withstand the full weight and vibration of the unit.
5. Be sure to leave enough space to allow access for routine maintenance. The installation site should be 98 inch or more above the floor.
6. Where it is 39 inch or more away from TV set or any other electric appliances.
7. Select a place where the filter can be easily taken out.
8. Make sure that the indoor unit is installed in accordance with installation dimension instructions.
9. Do not use the unit in the laundry or around the swimming pool etc.
Install the outdoor unit:
1. Where noise and outflow air emitted by unit will not annoy neighbors.
2. Where there is sufficient ventilation.
3. Where there is no obstruction blocking the air inlet or outlet.
4. Where it is able to withstand the full weight and vibration.
5. Where it is dry and the unit is not exposed to direct sunshine or strong wind.
6. Make sure that the outdoor unit is installed in accordance with the installation instructions, and is convenient for maintenance and repair.
7. Where the height difference between indoor and outdoor units is within 16ft, and the length of the connecting tubing does not exceed 32ft.
8. Where it is out of reach of children.
9. Where the unit does not have negative impact on pedestrian or city amenity.

Safety Precautions for Electrical Wiring
1. A dedicated power supply circuit should be used in accordance with local electrical safety regulations.
2. Don't drag the power cord.
3. The unit should be reliably earthed and connected to an exclusive earth device by the professionals.
4. The air switch must have the functions of magnetic tripping and heat tripping to prevent short circuit and overloading.
5. The minimum distance between the unit and combustive surface is 5ft.
6. The appliance shall be installed in accordance with national wiring regulations.
7. An all-pole disconnection switch having a contact separation of at least 1/8inch in all poles should be connected in fixed wiring.

CAUTION
EQUIPMENT DAMAGE HAZARD
Failure to follow this caution may result in equipment damage or improper operation.
- Be sure to comply with local codes while running wire from indoor unit to outdoor unit.
- Every wire must be connected firmly. Loose wiring may cause terminal to overheat or result in unit malfunction. A fire hazard may also exist. Therefore, be sure all wiring is tightly connected.
- No wire should be allowed to touch refrigerant tubing, compressor or any moving parts.
- Disconnecting means must be provided and shall be located within sight and readily accessible from the air conditioner.
- Connecting cable with conduit shall be routed through hole in the conduit panel.

NOTE: Polarity of power wires must match original connection on outdoor unit.

Earthing requirements
1. Air conditioner is type I electric appliance. Please ensure the unit is reliably earthed.
2. The yellow-green wire in air conditioner is the earthing wire which can not be used for other purposes. Improper earthing may cause electric shock.
3. The earth resistance should accord to the national criterion.
4. The user's power must have reliable earthing terminal. Please don't connect the earthing wire with the following:
   4. Other place that professional personnel consider is unreliable
5. The model and rated values of fuses should accord with the silk print on fuse cover or related PCB.
7.2 Installation Drawing

- The dimensions of the space necessary for correct installation of the appliance include the minimum permissible distances to adjacent structures.
INSTALLATION GUIDE

7.3 INDOOR UNIT INSTALLATION

INSTALL MOUNTING PLATE

1. Carefully remove the mounting plate, which is attached to the back of the indoor unit.
2. The mounting plate should be located horizontally and level on the wall. All minimum spacings shown in Fig. 6 and Fig. 7 should be maintained.
3. If the wall is block, brick, concrete or similar material, drill .2” (5 mm) diameter holes and insert anchors for the appropriate mounting screws.
4. Attach the mounting plate to the wall.

DRILL HOLE IN WALL FOR INTERCONNECTING PIPING, DRAIN AND WIRING

Refrigerant Line Routing

The refrigerant lines may be routed in any of the four directions shown in Fig. 8 (a) and (b).

For maximum serviceability, it is recommended to have refrigerant line flare connections and the drain connection on the outside of the wall that the fan coil is mounted on.

If piping is going through the back:

1. Determine pipe hole position using the mounting plate as a template. Drill pipe hole diameter per chart below. The outside pipe hole is 1/2-in. (13 mm) min. lower than inside pipe hole, so it slants slightly downward (see Fig. 9).

If piping is going to exit from the left rear, it is recommended to field-fabricate piping extensions to get the flare connections to the outside of the wall.

<table>
<thead>
<tr>
<th>Model Size</th>
<th>Hole Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>9k, 12k and 18k</td>
<td>2.56 (65)</td>
</tr>
<tr>
<td>24k</td>
<td>3.72 (95)</td>
</tr>
</tbody>
</table>

Fig. 6 – 18k Mounting Plate Spacing

Fig. 7 – 24k Mounting Plate Spacing

Fig. 8 – Refrigerant Line Routing

Fig. 9 – Drill Holes
If piping is going through the right or left side:
1. Use a small saw blade to carefully remove the corresponding plastic covering on side panel and drill the appropriate size hole where the pipe is going through the wall. See Fig. 8(c).
2. Remove knockout 1 if you are running only the wiring. Remove knockout 1 and 2 or knockout 1, 2 and 3 if you are running both piping and wiring through the side of the unit.

7.4 OUTDOOR UNIT INSTALLATION
1. Use a rigid base to support unit in a level position.
2. Locate outdoor unit and connect piping and wiring.

---

**CAUTION**

**EQUIPMENT DAMAGE HAZARD**
Failure to follow this caution may result in equipment damage or improper operation.
Excessive torque can break flare nut depending on installation conditions.

---

Piping Connections to Outdoor Unit
**IMPORTANT:** Use refrigeration grade tubing ONLY. No other type of tubing may be used. Use of other types of tubing will void manufacturer’s warranty.
Make sure there is enough piping to cover the required length between the outdoor and indoor unit.

**Piping Guide:**
- Do not open service valves or remove protective caps from tubing ends until all the connections are made.
- Bend tubing with bending tools to avoid kinks and flat spots.
- Keep the tubing free of dirt, sand, moisture, and other contaminants to avoid damaging the refrigerant system.
- Avoid sags in the suction line to prevent the formation of oil traps. Insulate each tube with minimum 3/8-in. (10 mm) wall thermal pipe insulation. Inserting the tubing into the insulation before making the connections will save time and improve installation quality.
1. Remove service valve cover if provided with unit.
2. Cut tubing with tubing cutter.
3. Install correct size flare nut onto tubing and make flare connection.
4. Apply a small amount of refrigerant oil to the flare connection on the tubing.
5. Properly align tubing in with service valve.
6. Tighten flare nut and finish installation using two wrenches as shown in Fig. 10.

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**INSTALL ALL POWER AND INTERCONNECTING WIRING TO OUTDOOR UNIT**

Outdoor Unit Wiring Connections
1. Mount outdoor power disconnect.
2. Run power wiring from main box to disconnect per NEC and local codes. Set outdoor unit in place.
3. Remove field wiring cover from unit by removing screws.
4. Connect conduit to the conduit panel. (See Fig. 12)
5. Properly connect both power supply and control lines to terminal block per the connection diagram.
6. Ground unit in accordance with NEC and local electrical codes.
7. Use lock nuts to secure conduit.
8. Reinstall field wiring cover.

---

**CAUTION**

**EQUIPMENT DAMAGE HAZARD**
Failure to follow this caution may result in equipment damage or improper operation.
- Be sure to comply with local codes while running wire from indoor unit to outdoor unit.
- Every wire must be connected firmly. Loose wiring may cause terminal to overheat or result in unit malfunction. A fire hazard may also exist. Therefore, be sure all wiring is tightly connected.
- No wire should be allowed to touch refrigerant tubing, compressor or any moving parts.
- Disconnecting means must be provided and shall be located within sight and readily accessible from the air conditioner.
- Connecting cable with conduit shall be routed through hole in the conduit panel.
INSTALL ALL POWER, INTERCONNECTING WIRING, AND PIPING TO INDOOR UNIT.

1. Run interconnecting piping and wiring from outdoor unit to indoor unit.
2. Pass interconnecting cable through hole in wall (outside to inside).
3. Lift indoor unit into position and route piping and drain through hole in wall (inside to outside). Fit interconnecting wiring into back side of indoor unit.
4. Hang indoor unit on upper hooks of wall mounting plate (as shown in Fig. 13).
5. Open front cover of indoor unit and remove field wiring terminal block cover (see Fig. 14).
6. Pull interconnecting wire up from back of indoor unit and position in close to the terminal block on indoor unit.
7. Push bottom of indoor unit onto mounting plate to complete wall mount.
8. Connect wiring from outdoor unit per connection diagram (see Fig. 12).

**NOTE:** Polarity of power wires must match original connection on outdoor unit.

9. Replace field wiring cover and close front cover of indoor unit.
10. Connect refrigerant piping and drain line outside of indoor unit. Refer to Fig. 10 for proper installation of flare connections. Complete pipe insulation at flare connection then fasten piping and wiring to the wall as required. Completely seal the hole in the wall.
CAUTION

UNIT DAMAGE HAZARD
Failure to follow this caution may result in equipment
damage or improper operation.

Never use the system compressor as a vacuum pump.

Refrigerant tubes and indoor coil should be evacuated using the
recommended deep vacuum method of 500 microns. The alternate
triple evacuation method may be used if the procedure outlined
below is followed. Always break a vacuum with dry nitrogen.

SYSTEM VACUUM AND CHARGE
Using Vacuum Pump
1. Completely tighten flare nuts A, B, C, D, connect manifold
gage charge hose to a charge port of the low side service
valve. (See Fig. 15.)
2. Connect charge hose to vacuum pump.
3. Fully open the low side of manifold gage. (See Fig. 16)
4. Start vacuum pump
5. Evacuate using either deep vacuum or triple evacuation
method.
6. After evacuation is complete, fully close the low side of
manifold gage and stop operation of vacuum pump.
7. The factory charge contained in the outdoor unit is good for
up to 25 ft. (8 m) of line length. For refrigerant lines longer
than 25 ft (8 m), add 0.1 oz. per foot of extra piping up to
the maximum allowable length.
8. Disconnect charge hose from charge connection of the low
side service valve.
9. Fully open service valves B and A.
10. Securely tighten caps of service valves.

Deep Vacuum Method
The deep vacuum method requires a vacuum pump capable of
pulling a vacuum of 500 microns and a vacuum gage capable of
accurately measuring this vacuum depth. The deep vacuum method
is the most positive way of assuring a system is free of air and
liquid water. (See Fig. 17)

Triple Evacuation Method
The triple evacuation method should only be used when vacuum
pump is only capable of pumping down to 28 in. of mercury
vacuum and system does not contain any liquid water.
Refer to Fig. 18 and proceed as follows:
1. Pump system down to 28 in. of mercury and allow pump to
continue operating for an additional 15 minutes.
2. Close service valves and shut off vacuum pump.
3. Connect a nitrogen cylinder and regulator to system and
open until system pressure is 2 psig.
4. Close service valve and allow system to stand for 1 hr. Dur-
ing this time, dry nitrogen will be able to diffuse throughout
the system absorbing moisture.
5. Repeat this procedure as indicated in Fig. 18. System will
then be free of any contaminants and water vapor.

Fig. 15 — Service Valve

Fig. 16 — Manifold

Final Tubing Check
IMPORTANT: Check to be certain factory tubing on both indoor
and outdoor unit has not shifted during shipment. Ensure tubes are
not rubbing against each other or any sheet metal. Pay close
attention to feeder tubes, making sure wire ties on feeder tubes are
secure and tight.
START-UP

Test Operation
Perform test operation after completing gas leak and electrical safety check.
1. Push the “ON/OFF” button on Remote Control to begin testing.

NOTE: A protection feature prevents the air conditioner from being activated for approximately 3 minutes.
2. Push MODE button, select COOLING, HEATING, FAN mode to check if all functions work correctly.

SYSTEM CHECKS
1. Conceal the refrigerant and condensate lines where possible.
2. Make sure that the drain line slopes downward along its entire length.
3. Ensure all refrigerant and condensate lines and connections are properly insulated.
4. Fasten refrigerant and condensate lines to the outside wall, when possible.
5. Seal the hole through which the cables and refrigerant and condensate lines pass.

INDOOR UNIT
1. Do all Remote Control buttons function properly?
2. Do the display panel lights work properly?
3. Does the air deflection louver function properly?
4. Does the drain work?

OUTDOOR UNIT
1. Are there unusual noises or vibrations during operation?

Explain Following Items To Customer With The Aid Of The Owner’s Manual:
1. How to turn air conditioner on and off; selecting COOLING, HEATING and other operating modes; setting a desired temperature; setting the timer to automatically start and stop air conditioner operation; and all other features of the Remote Control and display panel.
2. How to remove and clean the air filter.
3. How to set air deflection louver.
4. Explain care and maintenance.
5. Present the Owner’s Manual and installation instructions to customer.
8. Exploded Views and Parts List

8.1 Indoor Unit
## Exploded Views and Parts List

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8.2 Outdoor Unit
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<td>1</td>
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<tr>
<td>14</td>
<td>Front Side Plate Sub-Assy</td>
<td>01303249P</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>Compressor And Fittings C-6RZ146H1A</td>
<td>00103501</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>Baffle (valve support)</td>
<td>01365435P</td>
<td>1</td>
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<tr>
<td>17</td>
<td>Cut off Valve</td>
<td>07133616</td>
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<tr>
<td>18</td>
<td>Valve Support Sub-Assy</td>
<td>0171501201P</td>
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<td>19</td>
<td>Handle assy</td>
<td>02113109</td>
<td>1</td>
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<tr>
<td>20</td>
<td>Right Side Plate</td>
<td>0130504402P</td>
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<td>21</td>
<td>Capacitor</td>
<td>33000039</td>
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<td>22</td>
<td>Reactor</td>
<td>43130021</td>
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<tr>
<td>23</td>
<td>Clapboard Sub-Assy</td>
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<td>24</td>
<td>Terminal Board</td>
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<td>1</td>
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<td>25</td>
<td>Main board</td>
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<td>26</td>
<td>Relay</td>
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<td>27</td>
<td>Relay</td>
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<td>0</td>
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<td>Electric Box Assy</td>
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<td>Temperature Sensor</td>
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<td>Electronic Expansion Valve</td>
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<td>Electric expand valve fitting</td>
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<td>Rear Grill (Front)</td>
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<td></td>
<td>Cut-off Valve</td>
<td>07130239</td>
<td>1</td>
</tr>
</tbody>
</table>

The above data are subject to be changed without notice.
### 9. Troubleshooting

#### 9.1 Troubleshooting

This section provides the required flow charts to troubleshoot problems that may arise.

**NOTE**: Information required in the diagnoses can be found either on the wiring diagrams or in the appendix.

**Required Tools:**
The following tools are needed when diagnosing the units:
- Digital multimeter
- Screw drivers (Phillips and straight head)
- Needle-nose pliers

**Recommended Steps**

1. Refer to the diagnostic hierarchy chart below and determine the problem at hand.
2. Go to the chart listed in the diagnostic hierarchy and follow the steps in the chart for the selected problem.

Error codes, if they occur, are displayed on the LED panel on the front cover of the unit. In addition, some of the same errors are displayed by flashing LEDs on the outdoor board. If possible, always check the diagnostic codes displayed on the indoor unit first.

For problems requiring measurements at the control boards:

1. Always disconnect the main power.
2. When possible check the outdoor board first.
3. Start by removing the outdoor unit top cover.
4. Reconnect the main power.
5. Probe the outdoor board inputs and outputs with a digital multi-meter referring to the wiring diagrams and input/output charts found in the appendix.
6. Connect the red probe to hot signal and the black probe to the ground or negative.
7. Note that some of the DC voltage signals are pulse will give continuously variable readings.
8. If it is necessary to check the indoor unit board you must start by disconnecting the main power.
9. Next remove the front cover of the unit and then control box cover.
10. Carefully remove the indoor board from the control box, place it face up on a plastic surface (not metal).
11. Reconnect the main power and repeat steps 5, 6, and 7.
12. Disconnect main power before reinstalling board to avoid shock hazard and board damage.

For problems requiring pressure measurements:

1. Connect the low pressure gauge to the gauge connection port on the suction service valve.
2. Set compressor speed using the system remote control as follows:
   - COOLING – Select a set point of 66°F and push the sleep button 4 times
   - HEATING – Select a set point of 84°F and push the sleep button 4 times
3. With the system operating at steady state conditions, make the following measurements:
   a. Outdoor ambient temperature
   b. Compressor discharge temperature as close to the compressor as possible
   c. Suction pressure
4. Refer to the Appendix and select a suction pressure and discharge temperature range based on the outdoor ambient temperature for either cooling or heating. Compare the measured pressure and temperature to the values in the chart to determine if the operating pressures and temperatures of the systems are normal or not.

---

**Fig. 27 – Diagnostic Hierarchy**
9.2 DIAGNOSTIC CHARTS

Fig. 28 – Indoor Freeze Protection

Fig. 29 – High Compressor Discharge Temperature
DIAGNOSTIC CHARTS (CONT.)

Reset circuit breaker. Is problem fixed? Yes Problem fixed

No

Check the wires (type) and connections between indoor and outdoor units *

No

Yes Fix connection or replace wiring

No further action is required

Reset main power and restart system using remote. Problem persists?

Yes

No

Measure Volts DC on outdoor TB between S & N. Ok? **

Yes

No

Replace outdoor board.

Measure Volts DC on indoor TB between S & N. Ok? **

Yes

No

Replace indoor board.

Notes:

Before measuring the Volts DC on outdoor TB, disconnect the field wire on terminal S.

Before measuring the Volts DC on indoor TB, disconnect the field wire on terminal S.

Have the red probe of the meter on terminal S and the black probe on terminal N. Reconnect wiring when measurements are complete.

* Thermostat wires cannot be used. Wires should be connected per connection diagrams. Failure to do that will result in a communication error. Polarity needs to be maintained between indoor and outdoor units

** There is 3 minutes to make the measurement before the diagnostic light comes back on.

Fig. 30 – Communication Error

Reset main power and restart system using remote. Problem persists? Yes No further action is required

No

Check sensor connector at ID or OD board Connection good?

No

Fix connection

Yes

Check input and output on indoor or outdoor board.

No

Replace board

Yes

Check sensor resistance. Appendix A4

No

Replace sensor

Yes

Double check connection, for corrosion or high resistance.

Fig. 31 – Temperature Sensor

A09362

A09363

39
DIAGNOSTIC CHARTS (CONT.)

Fig. 32 – High Condensing Temperature

Is unit running in outdoor ambient higher than 110 °F?

Yes → Beyond operating range

No → Outdoor coil clean?

Yes → Check outdoor coil temperature thermistor. Chart 4, ok?

Yes → Check motor for open or short. Ok?

Yes → Replace outdoor motor

No → Replace outdoor board

No → Clean coil. Problem persists?

Yes → Replace thermistor. Problem persists

No → Problem solved

Check outdoor coil temperature thermistor. Chart 4, ok?

Yes → Check motor for open or short. Ok?

Yes → Replace outdoor motor

No → Replace outdoor board

No → Problem solved

Check output on outdoor board. Ok?

Yes → Connect low side gauge at suction service valve. Measure discharge temp.*

No → High head, high suction?

Yes → High head, low suction?

Yes → Unit is overcharged. Reclaim charge and weigh in correct charge.

No → Restriction in refrigeration circuit.

*Measure discharge temperature at the sensor on the discharge tube. See Appendix A5

Fig. 33 – Compressor Overcurrent Protection

40
DIAGNOSTIC CHARTS (CONT.)

Check heat sink for obstruction and dirt

Yes → Clean. Problem fixed?

No → Check if connection is loose

Yes → See note below * Is problem fixed?

No → Check voltage and current. Ok? See note below **

No → Measure voltage between X15 and X9. Ok?

Yes → Replace compressor

No → Replace outdoor board

* Remove screws, remove heat sink, remove thermal grease. Apply new thermal grease and reassemble.
** Check if voltage between power module P and N is too low and if current is too high. In normal conditions, voltage between P and N should be about 370V.

Fig. 34 – IPM Module Protection

Try to start unit using auto Function. Unit runs?

Yes → Use auto function to shut off unit.

No → Start unit using remote control. Audible noise heard? Unit started?

Yes → Check batteries. OK? Replace battery

No → Go to chart 13

Problem solved

Reset circuit breaker. Is unit running?

No → Is there power to outdoor unit?

Yes → Check input and output on outdoor board. Ok?

Yes → Replace outdoor board

No → Replace indoor board

Problem solved

Check components. Ok? Flow charts 10 thru 12

Yes → Check fuse on indoor board. Ok?

Yes → Replace fuse

No → Replace defective component

Determine defective component and replace

No → Check wiring and circuit breaker and fix

Fig. 35 – Unit Not Running, No Diagnostic Code
DIAGNOSTIC CHARTS (CONT.)

Outdoor coil clean? Yes → No
Clean coil. Problem persists? No → Problem solved

Indoor filter clean? Yes → No
Clean filter. Problem persists? No → Problem solved

Check indoor fan motor

Yes
Connect low side gauge at suction service valve. Measure discharge temp.*

No
Normal suction, high head? Yes → No
High head, high suction? No → High head, low suction?

Yes
Non condensables in sys. Pump down and recharge unit

No
See note below *

* Restriction in system. Check capillary tube and check for damage to liquid line between indoor and outdoor units.

Fig. 36 – Unit Not Running Optimally

Visually check outdoor Unit for ice blockage. **

Yes → No
Check reversing valve. Go to flow chart 12

Yes
Check defrost sensor. Ok?
Go to flow chart 2

Yes
Check application limits. Ok?

No
Beyond operating range

Yes
Check ambient conditions. Prime icing?

Yes
Explain to customer

* To supplement flow chart 9
** Check for blockage on outdoor coil and drain pan. Are the holes in drain pans blocked?

Fig. 37 – Unit Not Running Optimally (HP in Heating*)
DIAGNOSTIC CHARTS (CONT.)

Fig. 38 – Motors

Check RV connection on outdoor board. Ok?
No

Clean or repair the connection

Yes

Check RV output on outdoor board. Ok?
No

Replace outdoor board

Yes

Check RV solenoid. Ok?
No

Replace solenoid

Yes

Replace reversing valve.

Fig. 39 – Reversing Valve
### 9.2.2 Blinking LED of Indoor/Outdoor Unit

<table>
<thead>
<tr>
<th>Name of Malfunction</th>
<th>Display of Double Eight Code</th>
<th>Running Lamp</th>
<th>Cooling Lamp</th>
<th>Heating Lamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerant System High Pressure Protection</td>
<td>E1</td>
<td>Blink 1 Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anti-Freezing Protection</td>
<td>E2</td>
<td>Blink 2 Times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anti-High Temperature Protection</td>
<td>E8</td>
<td>Blink 8 Times</td>
<td></td>
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</tr>
<tr>
<td>Indoor Ambient Sensor Open or Short-circuit</td>
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<td>Blink 1 Time</td>
<td></td>
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<tr>
<td>Outdoor Ambient Sensor Open or Short-circuit</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Indoor Refrigerant Sensor Open or Short-circuit</td>
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</tr>
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<td>Indoor Tube Sensor Open or Short-circuit</td>
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<tr>
<td>Outdoor Tube Sensor Open or Short-circuit</td>
<td>F9</td>
<td>Blink 9 Times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indoor Ambient Sensor Open or Short-circuit</td>
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<td>Blink 1 Time</td>
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<td></td>
</tr>
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</tr>
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</tr>
<tr>
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<tr>
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<td></td>
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<td>Blink 1 Time</td>
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<td>Outdoor Tube Sensor Open or Short-circuit</td>
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<td></td>
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<td>Blink 3 Times</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>Blink 5 Times</td>
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<tr>
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<td>Blink 7 Times</td>
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<tr>
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<tr>
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<tr>
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<td>Blink 7 Times</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outdoor Tube Sensor Open or Short-circuit</td>
<td>U9</td>
<td>Blink 9 Times</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9.2.3 Check Malfunction Process

Refer to indicator on indoor/outdoor unit and malfunction table (paste on the electric of cover or the top cover of unit) to confirm the malfunction type.

The indicator of outdoor controller panel will display the related malfunction;

Some malfunctions are to be displayed on the indoor display, while others will be seen on remote controller (press light button 4 times continuously in 3S).

In below malfunction diagnoses process, “Y” is for “Yes”; “N” is for “No”;

In below malfunction diagnoses process, controller panel AP1 is for outdoor controller panel;

**Discharge electrolytic capacity and confirm voltage decreases to 20V below according to before method, if not, electrical shock or control panel damaged may occur!!**

9.2.3.1 Capacity charging malfunction (outdoor unit malfunction)
Indoor unit display: PU (dual-8 display), heating indicator is off for 3S and blinks 17 times.

Main detection point:
- Detect if the voltage of L and N terminal of wiring board is between 210AC-240AC by alternating voltage meter;
- Is reactor (L) well connected? Is connection wire loosened or pull-out? Is reactor (L) damaged?

Malfunction diagnosis process:
9.2.3.2 IPM protection, desynchronizing malfunction, phase current of compressor is overcurrent (outdoor unit malfunction)

Indoor display:
H5 (dual-8 display), heating indicator is off for 3S and blinks 5 times.
P5 (dual-8 display), heating indicator is off for 3S and blinks 15 times.
H7 (dual-8 display), heating indicator is off for 3S and blinks 7 times.

Main detection points:
- Are control board AP1 and compressor COMP well connected? Are they loosened? Is the connection sequence correct?
- Is voltage input in the normal range (Test the voltage between L. N of wiring board XT by DC voltage meter)?
- Is coil resistance of compressor normal? Is there reliable insulation between compressor coil and copper tube?
- Is the work load of unit heavy? Is radiating of unit OK?
- Is the refrigerant charging appropriate?

Malfunction diagnosis process:
9.2.3.3 Diagnosis of high temperature overload protection (Check outdoor unit when cooling and indoor unit when heating)

Indoor unit display: H4 (dual-8 display), heating indicator is off for 3S and blinks 4 times.
Main detection points:
- Is the indoor and outdoor ambient temperature in normal range?
- Is the indoor and outdoor fan running normally?
- Is the radiating environment of indoor and outdoor unit OK?
- Is the indoor and outdoor pipe temperature sensor normal?

Malfunction diagnosis process:

```
Anti-High temperature, overload protection

If the outdoor ambient temperature is higher than 48°F, Y

N

If the radiating of outdoor and indoor unit is well?

Y

N

If the indoor and outdoor fan work well?

Y

N

If the temperature sensor is normal with pipe temperature resistance value meter (Check outdoor pipe temperature under cooling and indoor pipe temperature under heating)

Y

N

Wait for 20min after the unit is powered-off

Replace the related control panel (Check outdoor control panel under cooling and indoor control panel under heating)

Replace fan capacity C1

Replace fan motor

Finish
```

9.2.3.4 Diagnosis of failure startup (outdoor unit malfunction)

Indoor display: LC (dual-8 display), heating indicator is off for 3S and blinks 11 times.

Main detection point:
- Is the compressor wiring correct?
- Is the off time of compressor enough?
- Is the compressor damaged?
- Is the refrigerant charging too much?

Malfunction diagnosis process:

Energize the unit and start it

If the stop time of compressor is more than 3min?

Y

If the compressor wire COMP(UVW) is well connected and connection sequence is correct

Y

If the refrigerant charging is too much?

Y

Charge the refrigerant with service manual

Does the unit start up normally?

N

Replace control board AP1

If malfunction is removed?

N

Replace the compressor

Finish
9.2.3.5 Diagnosis of compressor synchronism (outdoor unit malfunction)
Indoor display: H7 (dual-8 display), heating indicator is off for 3S and blinks 7 times.

Main detection point:
- Is the system pressure over-high?
- Is the work voltage over-low?

Malfunction diagnosis process:

```
Synchronism after energize the unit and start it

If the stop time of compressor is more than 3min
  Y
    If the compressor wire COMP(UVW) is well connected, the connection sequence forwards to clockwise direction?
      Y
        Connect wire well
      N
        Replace compressor

  N
    Synchronism occurred during operation
    If the outdoor fan works normally?
      Y
        Check if the fan terminal OFAN is connected well
        If the input voltage of unit is normal?
          Y
            Improve the radiating of unit (clean heat exchanger and increase ventilation)
          N
            Charge the refrigerant with service manual
        N
          Start to run until the power resume normal voltage
        N
          Replace outdoor fan
      N
        Remove malfunction?
          Y
            Replace control board AP1
          N
            Replace compressor
    N
      Replace control board AP1
      Remove malfunction?
        Y
          Replace compressor
        N
          finish

N
  If the refrigerant is too much?
    Y
      Charge the refrigerant with service manual
    N
      Replace outdoor fan
  Y
    Replace compressor
```
9.2.3.6 Diagnosis of overload and discharge malfunction (outdoor unit malfunction)

Indoor display: H3 (dual-8 display), heating indicator is off for 3S and blinks 3 times.
E4 (dual-8 display), operation is off for 3S and blinks 4 times.

Main detection point:
- Is the electron expansion valve connected well? Is the expansion valve damaged?
- Is there refrigerant leakage?
- Is the overload protector damaged?
- Is the discharge temperature sensor damaged?

Malfunction diagnosis process:

After the unit de-energized for 20min

If the overload protector SAT is well connected?

N

Under ambient temperature, test the resistance of overload of overload protector with ohmic meter, resistance value is less than 1000Ω

Y

Y

Connect wire well with wiring diagram

N

Under ambient temperature, test the resistance of overload of overload protector with ohmic meter, resistance value is less than 1000Ω

Y

If the wiring terminal FA of electron expansion is well connected?

N

Replace overload protector SAT

Y

Check if electronic expansion valve coil is installed on the valve body normally.

Y

Check there is block for electronic expansion valve

Remove malfunction?

N

Check refrigerant, if there is leakage, please refer to specification

Y

N

Remove malfunction?

Y

Check if the discharge temperature sensor is normal with temperature sensor resistance value meter

N

Replace discharge temperature sensor

Y

Replace outdoor control board

Finish
9.2.3.7 PFC (correction for power factor) malfunction (outdoor unit malfunction)
Indoor display: HC (dual-8 display), heating indicator is off for 3S and blinks 6 times.
Main detection point:
- Check if reactor (L) of outdoor unit and PFC capacity are damaged

Malfunction diagnosis process:
9.2.3.8 Communication malfunction (outdoor unit malfunction)
Indoor display: E6 (dual-8 display), heating indicator is off for 3S and blinks 6 times.
Main detection point:
- Check if the connection wire and the built-in wiring of indoor and outdoor units are connected well and not damaged;
- Is the communication circuit of indoor mainboard damaged? Is the communication circuit of outdoor mainboard (AP1) damaged?
Malfunction diagnosis process:
Diagnosis process for outdoor communication circuit: (refer to key test point of outdoor unit):

- **Start**
- Test voltage value with Test 10 position in diagram with voltage meter
  - Number jumping
    - Test voltage value with Test 15 position in diagram with voltage meter
      - Number jumping
        - Test voltage value with Test 11 position in diagram with voltage meter
          - Number jumping
            - Test voltage value with Test 12 position in diagram with voltage meter
              - Number jumping
                - The circuit of outdoor unit communication is normal
                  - The circuit of outdoor unit communication is normal
                    - Outdoor unit malfunction
                      - Finish
                        - Finish
                          - Finish
                            - Finish
                              - Finish
                                - Finish
                                  - Finish
                                    - Finish
                                      - Finish
                                        - Finish
                                          - Finish
                                            - Finish
                                              - Finish
                                                - Finish
                                                  - Finish
                                                    - Finish
                                                      - Finish
                                                        - Finish
                                                          - Finish
                                                            - Finish
## 10. Removal Procedure

### 10.1 Removal Procedure of Indoor Unit

<table>
<thead>
<tr>
<th>Step</th>
<th>Procedure</th>
</tr>
</thead>
</table>
| 1.   | Remove **panel**  
Push the convex parts on the left and right sides of the front panel, and then lift the front panel.  
Unscrew the screws fixing the display cover and pull out the plug. Forcibly lift the front panel upwards from the clasps to take it out. |
| 2.   | Remove **filter and wire-pressed clamp**  
Top the middle section of air filter from the clasps at both sides. Pull the air filter forward to remove it.  
Unscrew the 1 screw on press plate to open the press wire board. |
| 3.   | Remove **swing louver**  
Push out the axle bush in the middle of air deflector. Then slightly bend the air deflector to remove it. |
| 4.   | Remove **panel case**  
Unscrew the 7 tapping screws fixing the front case, and turn the front case backwards to remove it. |

**Warning**: Be sure to wait for a minimum of 10 minutes after turning off all power supplies before disassembling work.
## Removal Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>Remove <strong>water tray</strong>&lt;br&gt;Unscrew the ground screw on the electric box cover and loose the clasps to remove electric box cover. Pull out the wiring terminal. Unscrew the 2 screws fixing the water tray to remove the water tray.</td>
</tr>
<tr>
<td>6.</td>
<td>Remove <strong>electric box</strong>&lt;br&gt;Unscrew the 2 screws fixing the electric box. Unplug the motor terminal. Unscrew the three ground screws. Lift the electric box upwards to remove it.</td>
</tr>
<tr>
<td>7.</td>
<td>Remove <strong>evaporator assy</strong>&lt;br&gt;Unscrew the screws fixing the clamp plate of rear pipe at the back of evaporator to remove the plate. &lt;br&gt;Unscrew the screw on the right of evaporator.</td>
</tr>
</tbody>
</table>
### Step 8. Remove motor and cross-flow louver

Unscrew the 2 screws on the left of evaporator
Turn the evaporator at certain angle to remove it.

Unscrew the screws fixing the press plate of motor and connecting motor and cross flow fan to remove the motor and cross flow louver.
## 10.2 Removal Procedure of Outdoor Unit (18K Unit)

### Warning
Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

<table>
<thead>
<tr>
<th>Step</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Remove <strong>top cover</strong>&lt;br&gt;Twist off the fastening screw used for fixing the handle, pull it downward and then remove the handle. Twist off the screws around the top cover, pull it upward and then remove the top cover.</td>
</tr>
<tr>
<td>2.</td>
<td>Remove <strong>grille and right side plate</strong>&lt;br&gt;Twist off the screw around the grille and then remove the grille. Twist off the screws between right side plate and end plate of condenser, valve support, pull it upward and then remove the right side plate.</td>
</tr>
<tr>
<td>3.</td>
<td>Remove <strong>electric box</strong>&lt;br&gt;Disassemble the screws on electric box cover, pull out the temperature sensor and then remove the electric box. Ensure don not contact control panel when removing electric box cover, if not, electrolytic capacity will discharge and lead electric shock or burn out control panel.</td>
</tr>
<tr>
<td>Step</td>
<td>Procedure</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
</tr>
<tr>
<td>4.</td>
<td><strong>Remove axial flow blade</strong></td>
</tr>
<tr>
<td></td>
<td>Loosen the tight nut with spanner and remove the nuts, spring washer, plain washer, then remove the axial flow blade forcibly.</td>
</tr>
<tr>
<td>5.</td>
<td><strong>Remove motor and motor support</strong></td>
</tr>
<tr>
<td></td>
<td>Twist off the clamping screws, take out the motor, twist off the screws used for fixing the motor support, pull it upward and then remove the motor support.</td>
</tr>
<tr>
<td>6.</td>
<td><strong>Remove electronic expansion valve and four-way valve</strong></td>
</tr>
<tr>
<td></td>
<td>Unsolder the spot weld between electronic expansion valve and other connection, and then remove the electronic expansion valve. Unsolder the spot weld between the four-way valve and other connection, and then remove the four-way valve.</td>
</tr>
</tbody>
</table>
## Removal Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td>Remove the gas valve and liquid valve</td>
</tr>
</tbody>
</table>

Twist off the screws used for fixing the gas valve and liquid valve, unsolder the spot weld between gas valve and return-air pipe and then remove the gas valve and liquid valve.

| 8.   | Remove compressor |

Loosen the nuts of compressor, unsolder weld spot shown on suction pipe and discharge pipe of compressor, move the pipeline and then take out the compressor.
## 10.3 Removal Procedure of Outdoor Unit (24K Unit)

<table>
<thead>
<tr>
<th>Step</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Remove <strong>top cover, front side panel</strong></td>
</tr>
</tbody>
</table>
|      | Twist off the clamping screws used for fixing the handle with screwdriver, pull it downward forcibly and then remove the handle.  
|      | Twist off the screws around the top cover, pull it upward and then remove the top cover.  
|      | Twist off the screws around the front side panel and then remove the front side plate. |

| 2.   | Remove **grille and right side plate** |
|      | Twist off the screws around the grille and then remove the grille.  
|      | Twist off the screws between right side plate and end plate of condenser, valve support, pull it upward and then remove the right side plate. |

| 3.   | Remove **electric box** |
|      | Twist off the screws on electric box cover, pull out the temperature sensor and then remove the electric box.  
|      | Ensure do not contact control panel when removing electric box cover, if not, electrolytic capacity will discharge and lead electric shock or burn out control panel. |
## Removal Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>Remove <strong>axial flow blade</strong></td>
</tr>
<tr>
<td></td>
<td>Loosen the clamp nut with spanner, take out nuts, spring washer, plain washer and then remove the axial flow blade forcibly.</td>
</tr>
<tr>
<td>5.</td>
<td>Remove <strong>motor and motor support</strong></td>
</tr>
<tr>
<td></td>
<td>Twist off the fixing screws and then take out the motor. Twist oft the screws used for fixing the motor support, pull it upward and then remove the motor support.</td>
</tr>
<tr>
<td>6.</td>
<td>Remove <strong>four-way valve</strong></td>
</tr>
<tr>
<td></td>
<td>Unsolder the spot weld between four-way valve and other pipes and then remove the four-way valve sub-assy.</td>
</tr>
</tbody>
</table>
## Removal Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Procedure</th>
</tr>
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<tbody>
<tr>
<td>7.</td>
<td><strong>Remove the gas valve and liquid valve</strong></td>
</tr>
<tr>
<td></td>
<td>Twist off the screws used for the gas valve and liquid valve, unsolder the spot weld between gas valve and return-air pipe and then remove the gas valve and liquid valve.</td>
</tr>
<tr>
<td>8.</td>
<td><strong>Remove compressor</strong></td>
</tr>
<tr>
<td></td>
<td>Loosen the nuts of compressor; unsolder the weld spot shown on suction pipe and discharge pipe of compressor. Remove the pipeline and then remove the compressor.</td>
</tr>
</tbody>
</table>