Standard Chassis Models

9K
PVH09K3FA, PVH09K3FB, PVH09R3FA, PVH09R3FB

12K
PVH12K3FA, PVH12K3FB, PVH12R3FA, PVH12R3FB
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FRIDRICH AUTHORIZED PARTS DEPOTS 110
Your safety and the safety of others is very important.

We have provided many important safety messages in this manual and on your appliance. Always read and obey all safety messages.

This is a safety Alert symbol.
This symbol alerts you to potential hazards that can kill or hurt you and others.
All safety messages will tell you what the potential hazard is, tell you how to reduce the chance of injury, and tell you what will happen if the instructions are not followed. All safety messages will follow the safety alert symbol with the word “WARNING” or “CAUTION”. These words mean:

⚠️ WARNING
Indicates a hazard which, if not avoided, can result in severe personal injury or death and damage to product or other property.

⚠️ CAUTION
Indicates a hazard which, if not avoided, can result in personal injury and damage to product or other property.

⚠️ NOTICE
Indicates property damage can occur if instructions are not followed.

⚠️ WARNING
Refrigeration system under high pressure
Do not puncture, heat, expose to flame or incinerate.
Only certified refrigeration technicians should service this equipment.
R410A systems operate at higher pressures than R22 equipment. Appropriate safe service and handling practices must be used.
Only use gauge sets designed for use with R410A.
Do not use standard R22 gauge sets.
SAFETY FIRST

<table>
<thead>
<tr>
<th>WARNING</th>
<th>AVERTISSEMENT</th>
<th>ADVERTENCIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not remove, disable or bypass this unit’s safety devices. Doing so may cause fire, injuries, or death.</td>
<td>Ne pas supprimer, désactiver ou contourner cette l’unité des dispositifs de sécurité, faire vous risqueriez de provoquer le feu, les blessures ou la mort.</td>
<td>No eliminar, desactivar o pasar por alto los dispositivos de seguridad de la unidad. Si lo hace podría producirse fuego, lesiones o muerte.</td>
</tr>
</tbody>
</table>

ELECTRICAL HAZARDS:

- Unplug and/or disconnect all electrical power to the unit before performing inspections, maintenance, or service.
- Make sure to follow proper lockout/tag out procedures.
- Always work in the company of a qualified assistant if possible.
- Capacitors, even when disconnected from the electrical power source, retain an electrical charge potential capable of causing electric shock or electrocution.
- Handle, discharge, and test capacitors according to safe, established, standards, and approved procedures.
- Extreme care, proper judgment, and safety procedures must be exercised if it becomes necessary to test or troubleshoot equipment with the power on to the unit.
- Do not spray water on the air conditioning unit while the power is on.
- Electrical component malfunction caused by water could result in electric shock or other electrically unsafe conditions when the power is restored and the unit is turned on, even after the exterior is dry.
- Use air conditioner on a single dedicated circuit within the specified amperage rating.
- Use on a properly grounded outlet only.
- Do not cut or modify the power supply cord or remove the ground prong of the plug.
- Never operate the unit on an extension cord.
- Follow all safety precautions and use proper and adequate protective safety aids such as: gloves, goggles, clothing, properly insulated tools, and testing equipment etc.
- Failure to follow proper safety procedures and/or these warnings can result in serious injury or death.
INTRODUCTION

Personal Injury Or Death Hazards

• REFRIGERATION SYSTEM REPAIR HAZARDS:
  • Use approved standard refrigerant recovering procedures and equipment to relieve high pressure before opening system for repair.
  • Do not allow liquid refrigerant to contact skin. Direct contact with liquid refrigerant can result in minor to moderate injury.
  • Be extremely careful when using an oxy-acetylene torch. Direct contact with the torch’s flame or hot surfaces can cause serious burns.
  • Make certain to protect personal and surrounding property with fire proof materials and have a fire extinguisher at hand while using a torch.
  • Provide adequate ventilation to vent off toxic fumes, and work with a qualified assistant whenever possible.
  • Always use a pressure regulator when using dry nitrogen to test the sealed refrigeration system for leaks, flushing etc.

• MECHANICAL HAZARDS:
  • Extreme care, proper judgment and all safety procedures must be followed when testing, troubleshooting, handling, or working around unit with moving and/or rotating parts.
  • Be careful when handling and working around exposed edges and corners of the sleeve, chassis, and other unit components especially the sharp fins of the indoor and outdoor coils.
  • Use proper and adequate protective aids such as: gloves, clothing, safety glasses etc.
  • Failure to follow proper safety procedures and/or these warnings can result in serious injury or death.

• PROPERTY DAMAGE HAZARDS

• FIRE DAMAGE HAZARDS:
  • Read the Installation/Operation Manual for the air conditioning unit prior to operating.
  • Use air conditioner on a single dedicated circuit within the specified amperage rating.
  • Connect to a properly grounded outlet only.
  • Do not remove ground prong of plug.
  • Do not cut or modify the power supply cord.
  • Do not use extension cords with the unit.
  • Be extremely careful when using acetylene torch and protect surrounding property.
  • Failure to follow these instructions can result in fire and minor to serious property damage.

• WATER DAMAGE HAZARDS:
  • Improper installation, maintenance or servicing of the air conditioner unit can result in water damage to personal items or property.
  • Insure that the unit has a sufficient pitch to the outside to allow water to drain from the unit.
  • Do not drill holes in the bottom of the drain pan or the underside of the unit.
  • Failure to follow these instructions can result in damage to the unit and/or minor to serious property damage.
INTRODUCTION

Operation of Equipment in During Construction

- **OPERATION OF EQUIPMENT MUST BE AVOIDED DURING CONSTRUCTION PHASES WHICH WILL PRODUCE AIRBORNE DUST OR CONTAMINATES NEAR OR AROUND AIR INTAKE OPENINGS:**
  - Wood or metal framing;
  - Drywalling or sheathing,
  - Spackling or applying joint compound.
  - Sanding or grinding.
  - Moulding or trimwork.

**NOTICE**

Operating the equipment during any phase of active construction noted above can void the equipment's warranty, also leading to poor performance and premature failure.

Typical Unit Components and Dimensions

- **PDXWS Wall Sleeve**
  - Dimensions: 16” H x 42” W x 13-¾” D
  - Front Cover Dimensions: 16” H x 42” W x 7-¾” D

**Cut-Out Dimensions:**

- 16-¼” x 42-¼”
INTRODUCTION

This service manual is designed to be used in conjunction with the installation and operation manuals provided with each air conditioning system. This service manual was written to assist the professional service technician to quickly and accurately diagnose and repair malfunctions. Installation procedures are not given in this manual. They are given in the Installation and Operation Manual which can be acquired on the Friedrich website (www.friedrich.com).

Model Number Reference Guide

PTAC/PTHP Model Identification Guide

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>P</th>
<th>V</th>
<th>H</th>
<th>09</th>
<th>K</th>
<th>3</th>
<th>F</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td></td>
<td></td>
<td></td>
<td>PV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PV = Friedrich Digital PTAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System</td>
<td></td>
<td></td>
<td></td>
<td>E</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E = Cooling with electric heat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H = Heat Pump with Auxiliary Heat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal Capacity</td>
<td></td>
<td></td>
<td></td>
<td>07</td>
<td>09</td>
<td>12</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>07 = 7,000 Btuh</td>
<td></td>
<td></td>
<td></td>
<td>12</td>
<td></td>
<td>12,000 Btuh</td>
<td></td>
<td></td>
</tr>
<tr>
<td>09 = 9,000 Btuh</td>
<td></td>
<td></td>
<td></td>
<td>15</td>
<td></td>
<td>15,000 Btuh</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td></td>
<td></td>
<td></td>
<td>K</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K = 230/208V - 1 Ph. - 60 Hz.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R = 245V - 1 Ph. - 60 Hz.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Engineering Digit
Design Series
Chassis
F = FreshAire
Nominal Heater Size (230V or 265V)
3=3kW

IMPORTANT: It will be necessary for you to accurately identify the unit you are servicing, so you can be certain of a proper diagnosis and repair.

Figure 103
INTRODUCTION

Serial Number Reference Guide

YEAR OF MANUFACTURE
17 = 2017   18 = 2018
19 = 2019   20 = 2020
21 = 2021   22 = 2022

MONTH OF MANUFACTURE
01 = JANUARY
02 = FEBRUARY
03 = MARCH
04 = APRIL
05 = MAY
06 = JUNE
07 = JULY
08 = AUGUST
09 = SEPTEMBER
10 = OCTOBER
11 = NOVEMBER
12 = DECEMBER

NUMERIC SEQUENCE
FIRST UNIT OF EACH MONTH = 00001

MANUFACTURING LOCATION

Refer to the Chart below for Serial Numbers beginning with an Alpha Sequence

PTAC Serial Number Identification Guide

<table>
<thead>
<tr>
<th>SERIAL NUMBER</th>
<th>A</th>
<th>K</th>
<th>A</th>
<th>M</th>
<th>00001</th>
</tr>
</thead>
<tbody>
<tr>
<td>YEAR MANUFACTURED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PRODUCTION RUN NUMBER</td>
</tr>
<tr>
<td>LJ = 2009</td>
<td>AE = 2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AK = 2010</td>
<td>AF = 2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA = 2011</td>
<td>AG = 2017</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AB = 2012</td>
<td>AC = 2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AD = 2014</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PRODUCT LINE</td>
</tr>
<tr>
<td></td>
<td>M = PRODUCT CODE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MONTH MANUFACTURED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A = Jan</td>
<td>D = Apr</td>
<td>G = Jul</td>
<td>K = Oct</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B = Feb</td>
<td>E = May</td>
<td>H = Aug</td>
<td>L = Nov</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C = Mar</td>
<td>F = Jun</td>
<td>J = Sep</td>
<td>M = Dec</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 104
### INTRODUCTION

#### Product Features

**Friedrich PTAC Digital Control and Unit Features**

The new Friedrich digital PTAC has state of the art features to improve guest comfort, indoor air quality and conserve energy. Through the use of specifically designed control software for the PTAC industry Friedrich has accomplished what other Manufacturer’s have only attempted – a quiet, dependable, affordable and easy to use PTAC. Below is a list of features and their benefit to the owner.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ONLY TWO MODELS</strong></td>
<td></td>
</tr>
<tr>
<td><strong>BETTER DEHUMIDIFICATION</strong></td>
<td></td>
</tr>
<tr>
<td><strong>SOFT START OPERATION</strong></td>
<td></td>
</tr>
<tr>
<td><strong>MERV 8 OUTDOOR AIR FILTER</strong></td>
<td></td>
</tr>
<tr>
<td><strong>REMOTE THERMOSTAT OPERATION</strong></td>
<td></td>
</tr>
<tr>
<td><strong>INTERNAL DIAGNOSTIC PROGRAM</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ELECTRONIC TEMPERATURE LIMITING</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ROOM FREEZE PROTECTION</strong></td>
<td></td>
</tr>
<tr>
<td><strong>CONDENSATE REMOVAL SYSTEM</strong></td>
<td></td>
</tr>
<tr>
<td><strong>UNIVERSAL ELECTRIC HEATER</strong></td>
<td></td>
</tr>
<tr>
<td><strong>FACTORY RUN-TEST</strong></td>
<td></td>
</tr>
</tbody>
</table>

**ONLY TWO MODELS**

**BETTER DEHUMIDIFICATION**

**SOFT START OPERATION**

**MERV 8 OUTDOOR AIR FILTER**

**REMOTE THERMOSTAT OPERATION** Some applications require the use of a wall-mounted thermostat. All new Friedrich PTACs may be switched from unit control to remote thermostat control easily without the need to order a special model or accessory kit.

**INTERNAL DIAGNOSTIC PROGRAM** The Friedrich digital PTAC features a self-diagnostic program that can alert maintenance to component failures or operating problems. The internal diagnostic program saves properties valuable time when diagnosing running problems.

**ELECTRONIC TEMPERATURE LIMITING** By limiting the operating range, the property can save energy by eliminating “max cool” or “max heat” situations common with older uncontrolled systems. The new electronic control allows owners to set operating ranges for both heating and cooling independently of one another.

**ROOM FREEZE PROTECTION** When the PTAC senses that the indoor room temperature has fallen to 50 °F, the unit will cycle on the fan (high) and the electric strip heat to raise the room temperature to 55 °F, and then cycle off again. This feature works regardless of the mode selected and can be turned off.

**CONDENSATE REMOVAL SYSTEM** Condenser fan utilizes slinger ring technology to pick up condensate from the base pan and disperse it on to the condenser coil where it evaporates. This helps to cool the coil and increase the energy efficiency of the unit.

**UNIVERSAL ELECTRIC HEATER** Unit has a universal power cord with 20 Amp coming standard out of the box.

**FACTORY RUN-TEST** All units are factory run tested to ensure trouble free operation.
# INTRODUCTION

## Product Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIGITAL DEFROST THERMOSTAT</strong></td>
<td>The PV-Series uses a digital thermostat to accurately monitor the outdoor coil conditions to allow the heat pump to run whenever conditions are correct. Running the PTAC in heat pump mode saves energy and reduces operating costs. The digital thermostat allows maximization of heat pump run time.</td>
</tr>
<tr>
<td><strong>INSTANT HEAT HEAT PUMP MODE</strong></td>
<td>Heat pump models will automatically run the electric heater to quickly bring the room up to temperature when initially energized, then return to heat pump mode. This ensures that the room is brought up to temperature quickly without the usual delay associated with heat pump units.</td>
</tr>
<tr>
<td><strong>SEPARATE HEAT/COOL FAN CYCLE CONTROL</strong></td>
<td>The owner may choose between fan cycling or fan continuous mode based on property preference. Fan continuous mode is used to keep constant airflow circulation in the room during all times the unit is ‘ON’. Fan cycle will conserve energy by only operating the fan while the compressor or electric heater is operating. The ability to set the fan cycling condition independently between heating and cooling mode will increase user comfort by allowing the choice of only constantly circulating air in the summer or winter time (unlike other PTAC brands that only allow one selection).</td>
</tr>
<tr>
<td><strong>EMERGENCY HEAT OVERRIDE</strong></td>
<td>In the event of a compressor failure in heat pump mode, the compressor may be locked out to provide heat through the resistance heater. This feature ensures that even in the unlikely event of a compressor failure, the room temperature can be maintained until the compressor can be serviced.</td>
</tr>
<tr>
<td><strong>CENTRAL DESK CONTROL READY (ONLY FOR UNIT CONTROL)</strong></td>
<td>All Friedrich digital PTACs have low voltage terminals ready to connect a central desk control energy management system. Controlling the unit from a remote location like the front desk can reduce energy usage and requires no additional accessories on the PTAC unit.</td>
</tr>
<tr>
<td><strong>INDOOR COIL FROST SENSOR</strong></td>
<td>The frost sensor protects the compressor from damage in the event that airflow is reduced or low outdoor temperatures cause the indoor coil to freeze. When the indoor coil reaches 33°F, the compressor is disabled and the fan continues to operate based on demand. Once the coil temperature returns to 53°F, the compressor returns to operation.</td>
</tr>
<tr>
<td><strong>ULTRAQUIET AIR SYSTEM</strong></td>
<td>The PV-Series units feature an indoor fan system design that reduces sound levels without lowering airflow or preventing proper air circulation.</td>
</tr>
<tr>
<td><strong>HIGH EFFICIENCY</strong></td>
<td>The Friedrich PTAC has been engineered so that all functional systems are optimized so that they work together to deliver the highest possible performance.</td>
</tr>
<tr>
<td><strong>DUAL MOTOR</strong></td>
<td>The dual-motor design means that the indoor motor can run at slower speeds which reduces sound levels indoors.</td>
</tr>
<tr>
<td><strong>ROTARY COMPRESSOR</strong></td>
<td>High efficiency rotary compressors are used on all Friedrich PTACs to maximize durability and efficiency.</td>
</tr>
<tr>
<td><strong>TOP-MOUNTED ANTIMICROBIAL AIR FILTERS</strong></td>
<td>All Friedrich PTAC return air filters feature an antimicrobial element that has proven to prevent mold and bacterial growth in laboratory testing. PXFTB replacement filter kits feature the same antimicrobial agent. All filters are washable, reusable and easily accessed from the top of the unit without the removal of the front cover.</td>
</tr>
<tr>
<td><strong>FILTERED FRESH AIR INTAKE</strong></td>
<td>Friedrich PTAC units are capable of introducing up to 40 CFM of outside air into the conditioned space. The outdoor air passes through a washable mesh screen to prevent debris from entering the airstream.</td>
</tr>
<tr>
<td><strong>ALUMINIUM ENDPLATES</strong></td>
<td>Outdoor coil endplates made from aluminium reduce corrosion on the outdoor coil common with other coil designs.</td>
</tr>
<tr>
<td><strong>R-410A REFRIGERANT</strong></td>
<td>Friedrich PTAC units use environmentally-friendly refrigerant.</td>
</tr>
<tr>
<td><strong>BREAK-PROOF CONTROL DOOR</strong></td>
<td>Break-proof control door design maintains the integrity of the unit.</td>
</tr>
<tr>
<td><strong>GALVANIZED ZINC WALL SLEEVE AND BASE PAN</strong></td>
<td>Galvanized zinc coated steel wall sleeve and steel base pan undergo an 11-step preparation process, are powder coated with a polyester finish and cured in an oven for exceptional durability.</td>
</tr>
</tbody>
</table>
## SPECIFICATIONS

### General Specifications 9-12k Heat Pump Models

<table>
<thead>
<tr>
<th>Model</th>
<th>PVH09K</th>
<th>PVH12K</th>
<th>PVH09R</th>
<th>PVH12R</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PERFORMANCE DATA:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling Capacity  Btu</td>
<td>9600/9400</td>
<td>12000/11800</td>
<td>9600</td>
<td>12000</td>
</tr>
<tr>
<td>Cooling Capacity Min./Max  Btu</td>
<td>6462-12099</td>
<td>7929-17142</td>
<td>6462-12099</td>
<td>7929-17142</td>
</tr>
<tr>
<td>Cooling  Watts</td>
<td>790/775</td>
<td>1040/1025</td>
<td>800</td>
<td>1040</td>
</tr>
<tr>
<td>Energy Efficiency Ratio  EER</td>
<td>12.1/12.1</td>
<td>11.5/11.5</td>
<td>12.0</td>
<td>11.5</td>
</tr>
<tr>
<td>Reverse Heating Capacity  Btu</td>
<td>8200/8500</td>
<td>11600/11800</td>
<td>8500</td>
<td>11800</td>
</tr>
<tr>
<td>Reverse Heating Capacity Min./Max.  Btu</td>
<td>5606-11475</td>
<td>6995-16187</td>
<td>5606-11475</td>
<td>6995-16187</td>
</tr>
<tr>
<td>Heating  Watts</td>
<td>710/685</td>
<td>970/950</td>
<td>710</td>
<td>970</td>
</tr>
<tr>
<td>COP</td>
<td>3.51/3.51</td>
<td>3.57/3.58</td>
<td>3.51</td>
<td>3.57</td>
</tr>
<tr>
<td>Moisture Removal  Pts./Hr.</td>
<td>1.4</td>
<td>1.9</td>
<td>1.23</td>
<td>2.43</td>
</tr>
<tr>
<td>Sensible Heat Ratio</td>
<td>80%</td>
<td>78%</td>
<td>82.7%</td>
<td>73.7%</td>
</tr>
<tr>
<td><strong>ELECTRICAL DATA:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage (1 PHASE, 60 Hz)</td>
<td>230/208</td>
<td>230/208</td>
<td>265</td>
<td>265</td>
</tr>
<tr>
<td>Current  Amps</td>
<td>4.4/4.5</td>
<td>4.5/5.0</td>
<td>3.8</td>
<td>4.7</td>
</tr>
<tr>
<td>Reverse Heat  Amps</td>
<td>4.0/4.1</td>
<td>4.6/4.9</td>
<td>3.6</td>
<td>4.3</td>
</tr>
<tr>
<td>Power Factor</td>
<td>0.80</td>
<td>0.96</td>
<td>0.82</td>
<td>0.90</td>
</tr>
<tr>
<td>Compressor LRA</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Compressor RLA</td>
<td>3.2</td>
<td>4.1</td>
<td>4.2</td>
<td>6.2</td>
</tr>
<tr>
<td>Outdoor Fan Motor  HP</td>
<td>1/14</td>
<td>1/12</td>
<td>1/14</td>
<td>1/12</td>
</tr>
<tr>
<td><strong>AIRFLOW DATA:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indoor CFM, HIGH</td>
<td>400</td>
<td>470</td>
<td>400</td>
<td>470</td>
</tr>
<tr>
<td>Indoor CFM, LOW</td>
<td>250</td>
<td>360</td>
<td>290</td>
<td>360</td>
</tr>
<tr>
<td>Make-up Air CFM@0.05” wc</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td><strong>PHYSICAL DATA:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleeve Dimensions H x W x D</td>
<td>16” x 42” x 13 3/4” [all models]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions with front H x W x D</td>
<td>16” x 42” x 21” [all models]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cut Out Dimensions H x W</td>
<td>16 1/4”x 42 1/4” [all models]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Weight  Lbs.</td>
<td>115</td>
<td>120</td>
<td>115</td>
<td>120</td>
</tr>
<tr>
<td>Shipping Weight  Lbs.</td>
<td>137</td>
<td>142</td>
<td>137</td>
<td>142</td>
</tr>
<tr>
<td>R-410A Charge  Oz.</td>
<td>30.34</td>
<td>32.80</td>
<td>32.1</td>
<td>32.8</td>
</tr>
</tbody>
</table>

Figure 202 (General Specs)
SPECIFICATIONS

Figure 205 (Chassis Specs)

Figure 206 (Typical Unit Components and Dimensions)

PDXWS Wall Sleeve Dimensions:
16" H x 42" W x 13-¼" D

Front Cover Dimensions:
16" H x 42" W x 7-¼" D

Cut-Out Dimensions:
16-½" x 42-¼"
### SPECIFICATIONS

#### Electrical Data

All 230/208 volt units are equipped with LCDI power cords.
All 265 volt units are equipped with non-LCDI power cords.

**NOTE:** Use Copper Conductors ONLY. Wire sizes are per NEC, check local codes for overseas applications.

---

#### Table 1  RECEPTACLES AND FUSE TYPES

<table>
<thead>
<tr>
<th>Voltage</th>
<th>230V</th>
<th>265V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amps</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Heater Size</td>
<td>2.5 kW</td>
<td>3.5 kW</td>
</tr>
<tr>
<td>Receptacles</td>
<td>6-15R</td>
<td>6-20R</td>
</tr>
<tr>
<td>NEMA #</td>
<td>6-15P</td>
<td>6-20P</td>
</tr>
</tbody>
</table>

---

#### WARNING

**Electrical Shock Hazard**

Turn off electrical power before service or installation.
ALL electrical connections and wiring MUST be installed by a qualified electrician and conform to the National Code and all local codes which have jurisdiction.
Failure to do so can result in property damage, personal injury and/or death.

---

#### B. Power Cord Information (230/208V models only)

All Friedrich 230/208V PTAC units are shipped from the factory with a Leakage Current Detection Interrupter (LCDI) equipped power cord. The LCDI device meets the UL and NEC requirements for cord connected air conditioners effective August 2004.

To test your power supply cord:
1. Plug power supply cord into a grounded 3 prong outlet.
2. Press RESET.
3. Press TEST (listen for click; Reset button trips and pops out).
4. Press and release RESET (listen for click; Reset button latches and remains in). The power supply cord is ready for operation.

**NOTE:** The LCDI device is not intended to be used as a switch.

Once plugged in the unit will operate normally without the need to reset the LCDI device.

If the LCDI device fails to trip when tested or if the power supply cord is damaged it must be replaced with a new supply cord obtained from the product manufacturer, and must not be repaired.

---

#### FUSE/CIRCUIT BREAKER

Use ONLY type and size fuse or HACR circuit breaker indicated on unit’s rating plate.
Proper current protection to the unit is the responsibility of the owner. NOTE: A time delay fuse is provided with 265V units.

#### GROUNDING

Unit MUST be grounded from branch circuit through service cord to unit, or through separate ground wire provided on permanently connected units. Be sure that branch circuit or general purpose outlet is grounded. The field supplied outlet must match plug on service cord and be within reach of service cord. Refer to Table 1 for proper receptacle and fuse type. Do NOT alter the service cord or plug. Do NOT use an extension cord.

#### RECEPTACLE

The field supplied outlet must match plug on service cord and be within reach of service cord. Refer to Table 1 for proper receptacle and fuse type. Do NOT alter the service cord or plug. Do NOT use an extension cord.

---

**Figure 14**

**Typical LCDI Devices**

15/20A LCDI Device
30A LCDI Device

FRRP014
SPECIFICATIONS

Electrical Data

<table>
<thead>
<tr>
<th>MODEL</th>
<th>HEATER kW</th>
<th>Power Cord Kit</th>
<th>Voltage</th>
<th>Amperage</th>
<th>Receptacle</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVH09K</td>
<td>2.5 (optional)</td>
<td>STD</td>
<td>230/208</td>
<td>15</td>
<td>NEMA 6-15r</td>
</tr>
<tr>
<td></td>
<td>3.5 (default)</td>
<td>STD</td>
<td>230/208</td>
<td>20</td>
<td>NEMA 6-20r</td>
</tr>
<tr>
<td>PVH12K</td>
<td>1.5 (optional)</td>
<td>STD</td>
<td>230/208</td>
<td>15</td>
<td>NEMA 6-15r</td>
</tr>
<tr>
<td></td>
<td>3.5 (default)</td>
<td>STD</td>
<td>230/208</td>
<td>20</td>
<td>NEMA 6-20r</td>
</tr>
<tr>
<td></td>
<td>5.0 (optional)</td>
<td>STD</td>
<td>230/208</td>
<td>30</td>
<td>NEMA 6-30r</td>
</tr>
<tr>
<td>PVH09R</td>
<td>2.5 (optional)</td>
<td>STD</td>
<td>265/277</td>
<td>15</td>
<td>NEMA 7-15r</td>
</tr>
<tr>
<td></td>
<td>3.5 (default)</td>
<td>STD</td>
<td>265/277</td>
<td>20</td>
<td>NEMA 7-20r</td>
</tr>
<tr>
<td>PVH12R</td>
<td>1.5 (optional)</td>
<td>STD</td>
<td>265/277</td>
<td>15</td>
<td>NEMA 7-15r</td>
</tr>
<tr>
<td></td>
<td>3.5 (default)</td>
<td>STD</td>
<td>265/277</td>
<td>20</td>
<td>NEMA 7-20r</td>
</tr>
<tr>
<td></td>
<td>5.0 (optional)</td>
<td>STD</td>
<td>265/277</td>
<td>30</td>
<td>NEMA 7-30r</td>
</tr>
</tbody>
</table>

203/208 Electric Heater Rating [Configuration Based on Power Cord0

<table>
<thead>
<tr>
<th>POWER CORD</th>
<th>VOLTAGE</th>
<th>BRANCH CKT AMPS</th>
<th>MCA</th>
<th>WATTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXPCFA23015A</td>
<td>230/208</td>
<td>15</td>
<td>13.9</td>
<td>2500</td>
</tr>
<tr>
<td>PXPCFA23020A</td>
<td>230/208</td>
<td>20</td>
<td>19.9</td>
<td>3600</td>
</tr>
<tr>
<td>PXPCFA23030A</td>
<td>230/208</td>
<td>30</td>
<td>27.5</td>
<td>5000</td>
</tr>
<tr>
<td>PXPCFA23050A</td>
<td>230/208</td>
<td>50</td>
<td>53.8</td>
<td>10500</td>
</tr>
<tr>
<td>PXPCFA23075A</td>
<td>230/208</td>
<td>75</td>
<td>80.3</td>
<td>15750</td>
</tr>
<tr>
<td>PXPCFA23100A</td>
<td>230/208</td>
<td>100</td>
<td>107.0</td>
<td>21000</td>
</tr>
<tr>
<td>PXPCFA23150A</td>
<td>230/208</td>
<td>150</td>
<td>160.5</td>
<td>31500</td>
</tr>
<tr>
<td>PXPCFA23200A</td>
<td>230/208</td>
<td>200</td>
<td>214.0</td>
<td>42000</td>
</tr>
<tr>
<td>PXPCFA23250A</td>
<td>230/208</td>
<td>250</td>
<td>267.5</td>
<td>52500</td>
</tr>
</tbody>
</table>

Electrical Wiring for 265 Volt Models

Power Cord Installation
All 265V PTAC/PTHP units come with a factory installed non-LCDI power cord for use in a subbase. If the unit is to be hard-wired refer to the instructions below.

NOTE: It is recommended that the PXSB subbase assembly, the PXCJA conduit kit (or equivalent) be installed on all hardware units. If installing a flush-floor mounted unit, make sure the chassis can be removed from the sleeve for service and maintenance.

WARNING

Electrical Shock Hazard
Turn off electrical power before service or installation.
ALL electrical connections and wiring MUST be installed by a qualified electrician and conform to the National Code and all local codes which have jurisdiction. Failure to do so can result in property damage, personal injury and/or death.

To install the line voltage power leads and conduit to chassis, follow the instructions below and refer to Figures 25-27 on page 19. PXCJA Conduit Kit is required with this setup.

1. Follow the removal process of the chassis’s junction box (Figure 25).
2. Prepare the 265V (or 230V) power cord for connection to the chassis’ power cord connector by cutting the cord to the appropriate length (refer to Figure 26 and follow Figure 15). Power cord harness selection shown on Table 2.
3. Route the cut ends of harness through the conduit connector assembly and flex conduit sleeve. Be sure to use the supplied conduit bushing to prevent damage to the cord by the conduit. The cord should pass through the Locknut, Spacer, Chassis Junction Box, Conduit Connector, Bushing, then the Conduit Sleeve. See Figure 17.

4. Route the cut ends of the power cord through the elbow connector at the other end of the conduit. Tighten screws on elbow connector to secure conduit sleeve.

5. Fasten and secure the elbow connector to the wall junction box cover with locknut. Place and mount the wall junction box with the four wall mounting screws making sure to pass the wall lines through the junction box. Connect and join all wall lines with the stripped ends using wire nuts. Tighten both screws of the wall junction box cover to junction box.

6. Follow steps 4-6 and refer to Figure 27.
OPERATION

Function and Control
Buttons and Display

1) Buttons
There are ON/OFF, UP, DOWN, HEAT, COOL, CONSTANT FAN and fan speed of HIGH, LOW, AUTO buttons.
   1. ON/OFF: Press to turn power on or off to the unit.
   2. COOL, HEAT: choose the mode of operation
   3. HIGH, LOW, AUTO: choose the fan speed.
   4. UP, DOWN: Adjust the setting temperature, default: 60-90°F(16~32°C).

2) Dual 8 Digital Tube Displayer and LED
Two 8 digital tube and 7 LEDs [ON/OFF, HIGH, LOW, AUTO, HEAT, COOL, CONSTANT FAN]
   1. Mode LED display: when the unit is running in a certain mode, the corresponding LED is lit up.
   2. ON/OFF LED: at ON status, the LED is lit up.
   3. CONSTANT FAN LED: when this function is enabled, the LED is lit up.
   4. Fan speed LED: when the unit is running at HIGH, LOW or AUTO fan speed, the corresponding LED is lit up.
   5. Dual 8 digital tube display: normally, it displays the indoor ambient temperature. When the UP/DOWN button is pressed it displays the setting temperature. When some error occurs, it displays the ERROR CODE.

Temperature Definition
Indoor setting temperature [Ts]
Indoor ambient temperature [T1]
Indoor coil temperature [T2]
Outdoor coil temperature [T3]
Outdoor ambient temperature [T4]
Compressor discharge temperature [T5]
Indoor outlet air temperature [T6]

System Basic Function
Once the compressor starts, the compressor won’t stop with the change of the indoor temperature. Once the compressor stops, it can only start after a 3 mins delay. [The compressor can stop immediately at the time of mode switchover, turning off the unit, adjusting setting temperature and turning off from a function error.] Depending on the different ambient temperatures and setting temperatures, the compressor runs at different frequencies to achieve the best energy savings and comfort. This is the advantage over traditional A/C compressors.

1) Cooling Mode
Working conditions and process for cooling:
   When T1≥Ts+2°F(1°C), cooling turns on.
   When T1≤Ts-2°F(1°C), cooling turns OFF.
   When Ts-2°F(1°C)<T1<Ts+2°F(1°C), the unit keeps previous running status.
Indoor fan control in cooling mode:
The indoor fan will run synchronously with cooling demand. During no demand period if the CONSTANT FAN button is turned off, it will run for 30s and then turn off. When CONSTANT FAN is ON, it will always be running.
Outdoor fan control in cooling mode:
The outdoor fan has two speeds, low and high. When T4 is above 80°F, the fan operates in high speed. When T4 drops to 77°F, the fan operates in low speed.

2) Heating Mode
Working conditions and process for heating:
   When T1≤Ts-2°F(1°C), the unit is running in heating mode. The heat pump or electric heating will start depending on the ambient temperature condition
   When T1≥Ts+4°F(2°C), the heating is turned OFF.
   When Ts-2°F(1°C)<T1<Ts+4°F(2°C), the unit keeps at the previous running status.
   Electric heater does not work with heat pump at the same time.
   When T4>44°F 7°C, unit will run heat pump all the time.
Function and Control

When $32^\circ F < T4 < 44^\circ F$, unit will run in electric heating mode to meet the first cycle demand. From the second cycle on, heat pump will operate.

When $T4 \leq 32^\circ F$, the E-heater will operate exclusively.

During heat pump mode, once $T3$ freezes to $5^\circ F$, or any fault occurs, unit will switch over to electric heating mode.

Outdoor fan control in heat pump mode:

- When $T4$ is above $57^\circ F$, outdoor fan runs at low speed to lower the noise;
- When $T4$ drops to $53^\circ F$, outdoor fan runs at high speed, in order to ensure the heating capacity.

Electric heating mode:

The unit is equipped with a universal E-heater, which contains two independent heating elements. The 9K BTU unit incorporates a 2.5kW and a 1.0kW element. The 12K BTU unit incorporates a 3.5kW and 1.5kW element.

Power Cord Selection

Use the appropriate power cord for each heating configuration as shown in the table below.

<table>
<thead>
<tr>
<th>Power Cord</th>
<th>15A</th>
<th>20A</th>
<th>30A</th>
</tr>
</thead>
<tbody>
<tr>
<td>9K BTU Unit</td>
<td>2.5kW</td>
<td>3.5kW</td>
<td>N/A</td>
</tr>
<tr>
<td>12k BTU Unit</td>
<td>1.5kW</td>
<td>3.5kW</td>
<td>5kW</td>
</tr>
</tbody>
</table>

Indoor fan control in heating mode:

The indoor fan will run synchronously with the heating demand. During no demand period, it will run for 30s (heat pump) or 1min (E-heating) after CONSTANT FAN button is turned off, then turns OFF. When CONSTANT FAN is ON, it will always be running.

Defrost

In heat pump mode, if the compressor runs continuously for over 30 minutes and $T3 < 26^\circ F$, or runs continuously for 90 minutes and $T3 < 32^\circ F$, the unit will enter defrost stage. Indoor fan will shut down. After the defrosting cycle is finished, the unit turns to E-heating for the first cycle to heat up quickly.

3) Room Freeze Protection (AUTO HEATING)

This is valid only in standby mode. The dual 8 digital tube displays “L0”.

Entry condition: #5 DIP SWITCH is set to ON to enable the indoor freeze protection and the main board detects the indoor ambient temperature is lower than $50^\circ F (10^\circ C)$ for 3 consecutive minutes.

Quitting condition: When indoor ambient temperature rises to $55^\circ F (13^\circ C)$, the heating will stop.

4) Temperature Sensor Open Circuit or Short Circuit Protection

If the temperature sensor has an open circuit or a short circuit, the ERROR CODE will display on the digital tube. If the malfunction of the temperature sensor is detected for 30 seconds, the unit will turn off.

5) Power cut protection

After power cut recovery, unit will have a time delay of 2 to 4 minutes to restart E-heating. The DC-inverter soft start compressor will restart after 3mins.

6) Compressor and DC-inverter features

The DC-inverter compressor has a high efficiency rating and energy savings can be 30% to 80%. Operation voltage range is $160VAC$-$270VAC$, making the unit operation more stable under a wider voltage range power input. With its soft start feature, power surges can be avoided, and also lower the noise level. Without the frequent start-stop, room temperature will be more stable and more comfortable.

The high performance IPM contains a PFC module and under heavy loading PF can be up to 99%, thus decreases EMI pollution to power supply system, and also decreasing power surges.

The compressor driver chip is high performance, making the compressor more stable and reliable.
Function and Control
7) Smart fresh air system

The control logic as the below table1 and table2, the DIP switch is SW3 on the main board.

<table>
<thead>
<tr>
<th>FreshAire System</th>
<th>DIP switch SW3 function</th>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>“Engagement Method”</td>
<td>Sw3 Dip Switch 1</td>
<td>ON/ OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FA fan runs only when Dip Switch is set to “ON”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>FA fan NEVER RUNS when Dip Switch is set to “OFF”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“ID Fan Speed Selection”</td>
<td>Sw3 Dip Switch 2</td>
<td>Cycle/ Continuous</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FA fan cycles On/ Off with the unit indoor fan when Dip Switch 1 is set to “ON” &amp; Dip Switch 2 is set to “Cycle”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>“FA fan runs continuously when Dip Switch 1 is set to “ON” &amp; Dip Switch 2 is set to “Continuous””</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>FreshAire Mode</td>
<td>“24V wall Therm ostat”</td>
</tr>
<tr>
<td>Enable</td>
<td>In Demand</td>
</tr>
<tr>
<td>YES</td>
<td>No Demand</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>“ID Fan Speed Selection”</td>
<td>“Fresh-Air Fan Operation”</td>
</tr>
<tr>
<td>Enable</td>
<td>ID Fan Operation</td>
</tr>
<tr>
<td>YES</td>
<td>ON</td>
</tr>
<tr>
<td>NO</td>
<td>High</td>
</tr>
<tr>
<td>low</td>
<td>High</td>
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<tr>
<td>low</td>
<td>low</td>
</tr>
<tr>
<td>Auto</td>
<td>Auto</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable</td>
<td>“ID Fan Speed Selection”</td>
</tr>
<tr>
<td>YES</td>
<td>“Fresh-Air Fan Operation”</td>
</tr>
<tr>
<td>NO</td>
<td>ID Fan Operation</td>
</tr>
<tr>
<td>YES</td>
<td>ON</td>
</tr>
<tr>
<td>NO</td>
<td>High</td>
</tr>
<tr>
<td>low</td>
<td>High</td>
</tr>
<tr>
<td>low</td>
<td>low</td>
</tr>
<tr>
<td>Auto</td>
<td>Auto</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable</td>
<td>“ID Fan Speed Selection”</td>
</tr>
<tr>
<td>YES</td>
<td>“Fresh-Air Fan Operation”</td>
</tr>
<tr>
<td>NO</td>
<td>ID Fan Operation</td>
</tr>
<tr>
<td>YES</td>
<td>ON</td>
</tr>
<tr>
<td>NO</td>
<td>High</td>
</tr>
<tr>
<td>low</td>
<td>High</td>
</tr>
<tr>
<td>low</td>
<td>low</td>
</tr>
<tr>
<td>Auto</td>
<td>Auto</td>
</tr>
</tbody>
</table>
## OPERATION

### Function and Control

#### Relationship Between Inputs and Output by 24V Wall Thermostat

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>FreshAire Mode</td>
<td>In Demand</td>
</tr>
<tr>
<td>Enable</td>
<td>No Demand</td>
</tr>
<tr>
<td>Continuous</td>
<td>“ID Fan Speed Selection”</td>
</tr>
<tr>
<td>“24V wall Thermostat”</td>
<td>“Fresh-Air Fan Operation”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>low</td>
<td>low</td>
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</tr>
<tr>
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<td>Auto</td>
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</table>

<table>
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<tr>
<th>YES</th>
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</thead>
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<td>High</td>
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<tr>
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</tbody>
</table>

#### Relationship Between Inputs and Output by 12V Wall Thermostat

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>FreshAire Mode</td>
<td>In Demand</td>
</tr>
<tr>
<td>Enable</td>
<td>No Demand</td>
</tr>
<tr>
<td>Continuous</td>
<td>“ID Fan Speed Selection”</td>
</tr>
<tr>
<td>“12V wall Thermostat”</td>
<td>“Fresh-Air Fan Operation”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
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</tbody>
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<table>
<thead>
<tr>
<th>YES</th>
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<tbody>
<tr>
<td>High</td>
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<tr>
<th>YES</th>
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<th>YES</th>
<th>NO</th>
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</thead>
<tbody>
<tr>
<td>High</td>
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</tr>
<tr>
<td>Auto</td>
<td>Auto</td>
<td>Auto</td>
<td>Auto</td>
</tr>
</tbody>
</table>
OPERATION

Function and Control
Advanced Functions

1) DIP Switch Function [after reprogramming, disconnect the power cord and wait 2 minutes for the electronic components [capacitors/resistors] to cool down or bleed off. Then power up again to make changes effective]

1 Reserved
2 Heat pump
   ON- valid; OFF- invalid
3 E-heater
   ON- valid; OFF- invalid
4 Reserved
5 Room freeze protection
   ON- valid; OFF- invalid
6 Auto-restart
   ON- valid; OFF- invalid
7 Reserved
8 Reserved

SW2 DIP switch must be matched with the unit capacity, otherwise the compressor will fail to operate correctly. Do not change dip switches on SW2!

Advanced Settings

Under OFF mode, hold [COOL] and [HIGH] two keys at the same time continuously for 5 seconds. ‘d0’ will be displayed, indicating that the system has entered the advanced operation status.

[COOL] key is used to switch parameter code and parameter value;

[+] or [-] keys are used to switch parameter code or set parameter value;

[ON/OFF] key is used to save and exit settings.

<table>
<thead>
<tr>
<th>Menu NO.</th>
<th>Function</th>
<th>&quot;Parameter value&quot;</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>do</td>
<td>Unit of temperature</td>
<td>F</td>
<td>Fahrenheit (default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>Celsius</td>
</tr>
<tr>
<td>dl</td>
<td>Control master</td>
<td>p</td>
<td>By control panel or IR remote thermostat [default]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>r</td>
<td>By 24V universal remote thermostat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rE</td>
<td>By 12V smart wired controller</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rF</td>
<td>VRPXEMRT2 and VRPXEMWRT2</td>
</tr>
<tr>
<td>d2</td>
<td>Max temperature setting</td>
<td>d3 to 90°F</td>
<td>The Min value is d2 [default 90°F]</td>
</tr>
<tr>
<td>d3</td>
<td>Min temperature setting</td>
<td>60°F to d2</td>
<td>The Max value is d3 [default 90°F]</td>
</tr>
<tr>
<td>d4</td>
<td>Indoor temperature calibration</td>
<td>-9°C to 9°C</td>
<td>If unit of temperature is changed, calibration should be done again. If using the default value, it can be ignored. [default 0°C/0°F]</td>
</tr>
<tr>
<td>d5</td>
<td>Temperature display selection</td>
<td>0 or 1</td>
<td>0-displays room temperature [default ], 1-displays set point.</td>
</tr>
</tbody>
</table>
**Advanced Settings Example**
Setting target: d0(C), d1(r), d2(30°C), d3(18°C), d4(-1°C), d5(1).

Step 1: hold [HEAT] and [FAN SPEED] two keys at the same time continuously for 5 seconds. Display: 'd0''
Step 3: short press [+ or -] key. Display: 'C' (setting d0 has finished)
Step 4: short press [HEAT] key. Display: 'd0''
Step 5: short press [+ key. Display: 'd1''
Step 7: short press [+ or -] key. Display: 'r' (setting d1 has finished)
Step 11: short press [-] key twice. Display: '30' (setting d2 has finished)
Step 15: short press [+ key twice. Display: '18' (setting d3 has finished)

**Memory Function**
The unit will run the same status from the last moment before power down.

**FD Control (front-desk control) & 24V REMOTE THERMOSTAT**
The unit can be turned ON/OFF by front desk control switch. The control terminal is located on the remote thermostat interface, FD.
OPERATION

Function and Control

Control logic
(a). Turn ON unit: short R and FD then release one time within 5s.
(b). Turn OFF unit: short R and FD then release twice within 5s.
(c). Force unit shut down for one time: short R and FD short over 5s.

NOTE: After forcing unit shut down, you can turn on the unit again by control panel.

For the 24V remote thermostat, it is possible to control the unit with the full functions of DC-Inverter unit, if the main board has loaded a faulty control algorithm program. Compressor runs in different frequencies according to different temperature conditions and capacity demands. You don’t need to change the wiring.

Protection Functions
To ensure the system running safely, electric control has following protections. For problem solving, please refer to TROUBLE SHOOTING sections.

1) Outdoor unit overload protection in COOLING mode
When condenser coil temperature exceeds the presetting point, compressor decreases the operating frequency to 30Hz. If this protection is not enough and condenser coil temperature reaches the shut down point, compressor will be turned off.

2) Evaporator subcooling protection (will not display error code)
When evaporator coil temperature drops to 1°C and lasts for 5 minutes, compressor and outdoor fan will stop, but indoor fan keeps on running.

3) Compressor discharge overheat protection
When compressor discharge temperature reaches presetting point, compressor will decrease operating frequency to 30Hz. If this protection is not enough and discharge temperature reaches the shut down point, compressor will be turned off.

4) Evaporator overheat protection in HEAT PUMP mode
When evaporator coil temperature exceeds the presetting point, compressor decreases the operating frequency to 30Hz. If this protection is not enough and evaporator coil temperature reaches the shut down point, compressor will be turned off. At this time the back-up electric heater will be turned on.

5) Input overcurrent protection
When input current exceeds the presetting point, compressor will decrease the operating frequency to 30Hz. If this protection is not enough and current reaches the shut down point, compressor will be turned off.

6) Compressor overcurrent protection.
When compressor operating current exceeds the shut down point, compressor will be shut down.
Function and Control

7) IPM fault protection
When IPM faults, include overheating, unit will be shut down and all outputs are shut down. Control panel displays the error code.

8) Temperature sensor fault protection
Any temperature sensor faults will shut down unit. The error code will be displayed.

9) Communication fault protection
If communication faults between indoor unit and outdoor unit for continuously 2 minutes, unit will shut down and display error code.

10) Compressor starting fault
If compressor fails to start, it will try to restart after 3 minutes. Error code will not be displayed for the first 3 attempts to restart. If the compressor fails to start on the 4th try, it will not attempt restart any more and an error code will occur.

11) DC-BUS overvoltage/undervoltage protection
If the unit senses the DC-BUS is overvoltage or undervoltage, the unit stops and an error code will occur.

12) EEPROM fault
When the unit is powered up, if system monitors the EEPROM chip fault [broken chip or incorrect data], control panel displays error code and will not operate any more.
System Configuration
Fresh Air Vent Control

To operate the FreshAire module please see Dip switch #3. With dip switch in the "on" position FreshAire module will be on continuously. With dip switch in the "OFF" position FreshAire module will be not be activated.

Adjusting Air
To adjust air direction:

1. Remove front panel. See Figure 21.
2. Remove louver screws that hold louver insert in place (from back side of front panel). See Figure 22.
3. Turn louver insert and rotate 180°. See Figure 23.
4. Replace louver insert.
5. Replace screws and front panel.

Adjusting Louvers

AIR DISCHARGE OUTWARD (Default)  AIR DISCHARGE UPWARD
Digital Control User Input Configuration

The adjustable control dip switches are located at the front portion of the digital Smart Center. The inputs are only visible and accessible with the front cover removed from the PTAC.

Dip Switch Setting

Switch 1-Reserved.
Switch 2-Heat pump enable/disable.
Moving Dip Switch #2 to “OFF” can be set as Emergency Heat Override. In the unlikely event of a compressor failure, a heat pump unit may be switched to operate in only the electric heat mode until repairs can be made.
Switch 3-Electric strip enable/disable.
Switch 4-Reserved.
Switch 5-Room Freeze Protection Units are shipped from the factory

With the room freeze protection enable. Room Freeze Protection can be switched off at the owner’s preference by moving Dip Switch 5 to “OFF”. This feature will monitor the indoor room conditions and in the event that the room falls below 50°F, the unit will automatically run “heating”. This occurs regardless of mode.
Switch 6-Electric memory enable/disable
The factory setting is enabled. The smart center will remember user’s setting. After power cut recovery, the unit will operate the same status as before power cut. Moving Dip Switch 6 to “OFF” will disable this feature, smart center will no more remember settings.
Switch 7, Switch 8-Reserved.

<table>
<thead>
<tr>
<th>Switch</th>
<th>Description</th>
<th>Function</th>
<th>Factory setting</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Reserved</td>
<td>/</td>
<td>OFF</td>
<td>/</td>
</tr>
<tr>
<td>#2</td>
<td>Heat pump</td>
<td>ON-enable heat pump; OFF-disable heat pump, run electric heat only.</td>
<td>HP models-ON Electric heat only-OFF</td>
<td>OFF-Overrides compressor operation(HP models only)</td>
</tr>
<tr>
<td>#3</td>
<td>Electric strip</td>
<td>ON-enable electric heat; OFF-disable electric heat.</td>
<td>ON</td>
<td>Factory set. Do not change.</td>
</tr>
<tr>
<td>#4</td>
<td>Reserved</td>
<td>/</td>
<td>OFF</td>
<td>/</td>
</tr>
<tr>
<td>#5</td>
<td>Room Freeze Protection</td>
<td>ON-Allows the unit to ensure the indoor room temperature does not fall below 50°F even when turned off; OFF-disable freeze protection.</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>#6</td>
<td>Electric memory enable/disable</td>
<td>ON-enable; OFF-disable.</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>#7</td>
<td>Reserved</td>
<td>/</td>
<td>OFF</td>
<td>/</td>
</tr>
<tr>
<td>#8</td>
<td>Reserved</td>
<td>/</td>
<td>OFF</td>
<td>/</td>
</tr>
</tbody>
</table>
## OPERATION

### System Configuration Fresh Air Vent Control

<table>
<thead>
<tr>
<th>FreshAire System SW3 DIP SWITCH</th>
<th>Engagement Method</th>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[1] ON/CON. [2] OFF/CYC.</td>
<td>SW3-1</td>
<td>ON / OFF</td>
<td>Fresh-Air Fan runs only when Dip Switch is set to 'ON'</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fresh-Air Fan NEVER RUNS when Dip Switch is set to 'OFF'</td>
</tr>
<tr>
<td>SW3-2</td>
<td>Cycle / Continuous</td>
<td></td>
<td>Fresh-Air Fan runs continuously when SW3-1 is set to 'ON' &amp; SW3-2 is set to 'ON'</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fresh-Air Fan cycles On/Off with the Unit Indoor Fan when SW3-1 is set to 'ON' &amp; SW3-2 is set to 'OFF'</td>
</tr>
</tbody>
</table>
OPERATION

Digital Control User Input Configuration

Digital Control Panel

Cooling Mode
Pressing the “Cool” button after turn the unit on will put the unit into cooling mode. Press “UP” or “DOWN” button to adjust the set point, the unit will start the compressor and run appropriate frequency to maintain a comfortable room temperature. The compressor will come on anytime that the room temperature is 2°F above the set point. The fan will come on with compressor.

Heating Mode
After turn on the unit, press the “Heat” button will put the unit into heating mode.

Heat Pump Models (PVH)
When the “Heat” button is pressed initially the unit may call for electric strips to bring the room to the set point. When the room temperature falls 2°F below the set point, the unit will turn on the compressor or electric strip. The fan will run with compressor or electric strips. When the outdoor ambient temperature falls below 32°F or outdoor coil temperature drops to 5°F, the unit will operate the electric strip instead of heat pump. During heat pump mode, CPU detects the outdoor coil gets freeze, unit will go to defrost. During the defrost operation (10min at most), there will be no heating provide. After finishing defrost, electric heating will come on to warm the room quickly.

Emergency Heat Operation
In the event of a compressor failure in heat pump mode, the compressor may be locked out to provide heat through the electric strip heater automatically. This feature ensures that even in the unlikely event of a compressor failure, the room temperature can be maintained until the compressor can be serviced. If the unit still can’t run electric heater stably, switch Dip switch 2 to OFF, it controls the emergency heat setting.

Constant Fan
Pressing the “Constant Fan” button will provide constant or cycle fan operation in cooling or heating modes. The fan speed selection is made by pressing either “High” or “Low” fan speed button.
OPERATION

Settings- Detailed Configurations

This section is about how to set the unit operating parameter, include display temperature unit, Fahrenheit or Celsius, control master, temperature limit, temperature calibration, display set point or room temperature.

Under OFF mode, hold [Cool] and [Low] two keys at the same time continuously for 5 seconds. This time displays ‘d0’, indicates that system has entered the senior operation status.

[Cool] key is used to switch parameter code and parameter value; [UP] or [DOWN] keys are used to switch parameter code or set parameter value; [Power] key is used to save and exit settings.

<table>
<thead>
<tr>
<th>Menu NO.</th>
<th>Function</th>
<th>“Parameter value”</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>d0</td>
<td>Unit of temperature</td>
<td>F</td>
<td>Fahrenheit (default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>Celsius</td>
</tr>
<tr>
<td>d1</td>
<td>Control master</td>
<td>p</td>
<td>By control panel or IR remote thermostat (default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>r</td>
<td>By 24V universal remote thermostat</td>
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<td>rE</td>
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<td>rF</td>
<td>VRPXEMRT2 and VRPXEMWRT2</td>
</tr>
<tr>
<td>d2</td>
<td>Max temperature setting</td>
<td>d3 to 90°F</td>
<td>The Min value is d2 (default 90°F)</td>
</tr>
<tr>
<td>d3</td>
<td>Min temperature setting</td>
<td>60°F to d2</td>
<td>The Max value is d3 (default 90°F)</td>
</tr>
<tr>
<td>d4</td>
<td>Indoor temperature calibration</td>
<td>-9°C to 9°C</td>
<td>If unit of temperature is changed, calibration should be done again. If using the default value, it can be ignored. (default 0°C/0°F)</td>
</tr>
<tr>
<td>d5</td>
<td>Temperature display selection</td>
<td>0 or 1</td>
<td>0-displays room temperature (default), 1-displays set point.</td>
</tr>
</tbody>
</table>

One example:
Setting target: d0(C), d1(r), d2(88), d3(58), d4(-1), d5(1).
Step1: hold [Cool] and [Low] two keys at the same time continuously for 5 seconds. Display: ‘d0’
Step2: short press [Cool] key. Display: ‘F’ (setting d0 has finished)
Step6: short press [UP] or [DOWN] key. Display: ‘r’ (setting d1 has finished)
Step10: short press [DOWN] key twice. Display: ‘88’ (setting d2 has finished)
Step17: short press [Cool] key. Display: ‘0’ (setting d4 has finished)
OPERATION

Refrigeration Sequence Of Operation

A good understanding of the basic operation of the refrigeration system is essential for the service technician. Without this understanding, accurate troubleshooting of refrigeration system problems will be more difficult and time consuming, if not [in some cases] entirely impossible. The refrigeration system uses four basic principles in its operation which are as follows:

1. “Heat always flows from a warmer body to a cooler body.”

2. “Heat must be added to or removed from a substance before a change in state can occur.”

3. “Flow is always from a higher pressure area to a lower pressure area.”

4. “The temperature at which a liquid or gas changes state is dependent upon the pressure.”

The refrigeration cycle begins at the compressor when a demand is received from the thermostat. Starting the compressor creates a low pressure in the suction line which draws refrigerant gas (vapor) into the compressor. The compressor then “compresses” this refrigerant vapor, raising its pressure and its [heat intensity] temperature.

The refrigerant leaves the compressor through the discharge line as a hot high pressure gas (vapor). The refrigerant enters the condenser coil where it gives up some of its heat. The condenser fan moving air across the coil’s finned surface facilitates the transfer of heat from the refrigerant to the relatively cooler outdoor air.

When a sufficient quantity of heat has been removed from the refrigerant gas (vapor), the refrigerant will “condense” (i.e. change to a liquid). Once the refrigerant has been condensed (changed) to a liquid it is cooled even further by the air that continues to flow across the condenser coil.

The design determines at exactly what point (in the condenser) the change of state (i.e. gas to a liquid) takes place. In all cases, however, the refrigerant must be totally condensed (changed) to a liquid before leaving the condenser coil.

The refrigerant leaves the condenser coil through the liquid line as a warm high pressure liquid. It next will pass through the refrigerant drier (if equipped). It is the function of the drier to trap any moisture present in the system, contaminants, and large particulate matter.

The liquid refrigerant next enters the metering device. The metering device is called a capillary tube. The purpose of the metering device is to “meter” (i.e. control or measure) the quantity of refrigerant entering the evaporator coil.

In the case of the capillary tube this is accomplished (by design) through size (and length) of device, and the pressure difference present across the device. Since the evaporator coil is under a lower pressure (due to the suction created by the compressor) than the liquid line, the liquid refrigerant leaves the metering device entering the evaporator coil. As it enters the evaporator coil, the larger area and lower pressure allows the refrigerant to expand and lower its temperature (heat intensity). This expansion is often referred to as “boiling” or atomizing. Since the unit’s blower is moving indoor air across the finned surface of the evaporator coil, the expanding refrigerant absorbs some of that heat. This results in a lowering of the indoor air temperature, or cooling.

The expansion and absorbing of heat cause the liquid refrigerant to evaporate (i.e. change to a gas). Once the refrigerant has been evaporated (changed to a gas), it is heated even further by the air that continues to flow across the evaporator coil.

The particular system design determines at exactly what point (in the evaporator) the change of state (i.e. liquid to a gas) takes place. In all cases, however, the refrigerant must be totally evaporated (changed) to a gas before leaving the evaporator coil.

The low pressure [suction] created by the compressor causes the refrigerant to leave the evaporator through the suction line as a cool low pressure vapor. The refrigerant then returns to the compressor, where the cycle is repeated.

Figure 301 (Sequence of Operation)
OPERATION

Refrigerant System Diagram

(1) Cooling + Heat Pump + Auxiliary Electric Heater
PDH07R3SG PDH09R3SG PDH12R3SG PDH15R5SG

(2) Cooling + Electric Heater
PDE07R3SG PDE09R3SG PDE12R3SG PDE15R5SG

Figure 301 (Sequence of Operation)
Routine Maintenance

Coils & Chassis

NOTE: Do not use a caustic cleaning agent on coils or base pan. Use a biodegradable cleaning agent and degreaser. The use of harsh cleaning materials may lead to deterioration of the aluminum fins or the coil end plates.

The indoor coil and outdoor coils and base pan should be inspected periodically (annually or semi-annually) and cleaned of all debris (lint, dirt, leaves, paper, etc.) as necessary. Under extreme conditions, more frequent cleaning may be required. Clean the coils with and base pan with a coil comb or soft brush and compressed air or vacuum. A low pressure washer device may also be used; however, you must be careful not to bend the aluminum fin pack. Use a sweeping up and down motion in the direction of the vertical aluminum fin pack when pressure cleaning coils.

NOTE: It is extremely important to insure that none of the electrical and/or electronic parts of the unit get wet when cleaning. Be sure to cover all electrical components to protect them from water or spray.

NOTE: When installed on or near sea coast environments, it recommended that all coils be cleaned at minimum biannually.

Decorative Front

Use a damp (not wet) cloth when cleaning the control area to prevent water from entering the unit, and possibly damaging the electronic control.

The decorative front and the cabinet can be cleaned with warm water and a mild liquid detergent. Do NOT use solvents or hydrocarbon based cleaners such as acetone, naphtha, gasoline, benzene, etc.

The indoor coil can be vacuumed with a dusting attachment if it appears to be dirty. DO NOT BEND FINS. The outdoor coil can be gently sprayed with a garden hose.

The air filter should be inspected weekly and cleaned if needed by vacuuming with a dust attachment or by cleaning in the sink using warm water and a mild dishwashing detergent. Dry the filter thoroughly before reinstalling. Use caution, the coil surface can be sharp.

Fan Motor & Compressor

The fan motor & compressor are permanently lubricated and require no additional lubrication.

Wall Sleeve

Inspect the inside of the wall sleeve and drain system periodically (annually or semi-annually) and clean as required. Under extreme conditions, more frequent cleaning may be necessary. Clean both of these areas with an antibacterial and antifungal cleaner. Rinse both items thoroughly with water and ensure that the drain outlets are operating correctly. Check the sealant around the sleeve and reseal areas as needed.

Inspect for mold or mildew periodically. If present, ensure the sealing gasket around the unit is in good condition and not allowing outside air (or light) through the gasket.

Blower Wheel / Housing / Condenser Fan / Shroud

Inspect the indoor blower and its housing, evaporator blade, condenser fan blade and condenser shroud periodically (yearly or bi-yearly) and clean of all debris (lint, dirt, mold, fungus, etc.). Clean the blower housing area and blower wheel with an antibacterial / antifungal cleaner. Use a biodegradable cleaning agent and degreaser on condenser fan and condenser shroud. Use warm or cold water when rinsing these items. Allow all items to dry thoroughly before reinstalling them.

Electrical / Electronic

Periodically (at least yearly or bi-yearly) inspect all control components: electronic, electrical and mechanical, as well as the power supply. Use proper testing instruments (voltmeter, ohmmeter, ammeter, wattmeter, etc.) to perform electrical tests. Use an air conditioning or refrigeration thermometer to check room, outdoor and coil operating temperatures.

Air Filter

To ensure proper unit operation, the air filter should be cleaned at least monthly, and more frequently if conditions warrant. The unit must be turned off before the filter is cleaned.
PTAC Installation Recommendations

For proper PTAC unit performance and maximum operating life refer to the minimum installation clearances below:

Figure 1

PTAC units should be installed no closer than 12" apart when two units are side by side. If three or more PTAC units are to operate next to one another allow a minimum of 36" between units. Also, a vertical clearance of 60" should be maintained between units installed. In the interior of the room the unit should be located a minimum of 1/4" from the floor and a minimum of 36" from the ceiling.

For PTACs on the ground floor or anytime obstructions are present, use the following guidelines:

Figure 2

- For minor obstructions such as lamp poles or small shrubbery a clearance of 12" from the outdoor louver should be maintained.
- For major obstructions such as a solid fence, wall or other heat rejecting device like a condensing unit, a minimum distance of 36" should be kept.
NOTE: Insure that the unit is only installed in a wall structurally adequate to support the unit including the sleeve, chassis and accessories. If the sleeve projects more than 8" into the room, a subbase or other means of support MUST be used. Please read these instructions completely before attempting installation.

**WARNING**

**Falling Object Hazard**

Not following Installation Instructions for mounting your air conditioner can result in property damage, injury, or death.

**NOTICE**

DO NOT allow any pitch toward the inside.

Flashing on all 4 sides of the opening is recommended.

Potential property damage can occur if instructions are not followed.

For Deep Wall Installation (Greater than 13 1/4")

See Page 9

The following instructions apply ONLY to walls less than 13 1/4" in depth.

1. The PXDR10 Drain Kit, (optional for new construction) see page 10 if applicable, must be installed before the wall sleeve is installed into the wall.

2. The External Drain (for new construction or unit replacement) see page 11 if applicable, must be installed before the wall sleeve is installed into the wall.

3. From inside the building, position the wall sleeve in the opening and push it into the wall until it protrudes at least 1/4" on the outside (See Figure 9, Page 8).

4. Position the wall sleeve with a slight tilt towards the outside to facilitate condensate drainage. It should be level side-to-side and the front should be 1/4 bubble higher than the back.

**Figure 3**

**Typical Wall Sleeve Installation**

NOTE: All 230/208V units are manufactured with a 60" power cord and all 265V units with a 18" power cord.
Alternate Wall Installations

**Figure 5**
Frame and Brick Veneer

**Figure 7**
Block and Brick Veneer

**NOTE:** Follow all wall system manufacturer installation instructions. For sunrooms and modular buildings, adhere to their installation instructions for supporting and sealing sleeve to their frames. All wall and window/wall installations must provide for proper drainage. In applications where the drain holes on the PTAC wall sleeve are not exposed beyond the wall an internal drain system is recommended. It is the installer’s responsibility to ensure there is adequate drainage for the PTAC unit.
Alternate Wall Installations

**Figure 8**
Wall Sleeve Attachment

**NOTE:** The Wall Sleeve must be horizontally level (side-to-side) and pitched 1/4 bubble to the outside when installed in an opening. The mounting hole location should be approximately 2-4" from the top and bottom of the sleeve.

**Figure 9**
Dimensions

<table>
<thead>
<tr>
<th>Dimension*</th>
<th>A (Allow for wall finishing, Minimum)</th>
<th>B (Allow for floor finishing)</th>
<th>C (Allow for proper drainage, Front-to-Back)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Accessories</td>
<td>⅛&quot;</td>
<td>⅛&quot;</td>
<td>---</td>
</tr>
<tr>
<td>With Subbase</td>
<td>1-⅛&quot;</td>
<td>3-⅛&quot;</td>
<td>5&quot;</td>
</tr>
<tr>
<td>With Lateral Duct</td>
<td>⅛&quot;</td>
<td>⅛&quot;</td>
<td>---</td>
</tr>
<tr>
<td>Wall Sleeve Tilt</td>
<td>---</td>
<td>---</td>
<td>¼&quot;</td>
</tr>
</tbody>
</table>

* If more than one accessory is to be used, use the maximum dimension. If the wall thickness is more than 13-⅛" - (A+ ¼"), a sleeve extension must be used.
Alternate Wall Installations

5. Drill two 3/16" holes through each side of the sleeve approximately 4" from top and 4" from bottom of sleeve. Screw four #10 x 1" screws (included) or appropriate fasteners for your installation, through the holes in the sides of the wall sleeve.

6. Apply sealant around the wall sleeve where it projects through the inside and outside wall surfaces. Apply the sealant to the screw heads or the tops of the fasteners used in Step #5.

7. If the chassis and exterior grille are to be installed later, leave the weatherboard and center support in place, otherwise remove and dispose of them. (See Figure 13, Page 12).

8. Provide a support lintel if the wall sleeve is installed in a concrete or masonry wall (See Figure 10, Page 9).

One-Piece Deep Wall Sleeve Installation (PDXWSEXT)

If the wall is thicker than 13 1/4" a deep wall sleeve or wall sleeve extension MUST be used. The deep wall sleeve may be special ordered through your Sales Representative.
**INSTALLATION**

**PXDR10 Drain Kit Installation**

**PXDR10 Drain Kit Installation**

Instructions (optional for new construction)

**NOTE:** Determine whether drain will be located within the wall, on the indoor side, or will drain to the exterior of the building. Follow appropriate instructions below depending on your particular type of installation.

**Internal Drain**

**NOTE:** If installing an internal drain, you MUST install a drain kit on the wall sleeve before the wall sleeve is installed.

1. Refer to Figure 11 and locate the drain within the “Preferred” area of best drainage. Maintain at least a 1/2” clearance from the embossed area.
2. Using the mounting plate with the 1/2” hole as a template, mark and drill two, 3/16” mounting holes and a 1/2” drain hole in the sleeve bottom.

3. Remove the backing from the gasket and mount it on the flat side of the mounting plate (See Figure 12, Page 11). Insert the drain tube through the hole in the gasket and mounting plate so the tube flange will be against the wall sleeve.
4. Position the assembly beneath the drilled holes and secure it with #10-24 x 1/2” machine screws and lock nuts provided. Seal the tops of the screws with silicone caulking.
5. Use 1/4” I.D. copper tube, PVC pipe, or vinyl hose (obtained locally) to connect the internal drain tube to the drain system in the building.
6. Referring to Figure 12, Detail A, Page 11, locate and assemble the two cover plates and gaskets over the drain holes at the rear of the wall sleeve. Attach them with the #10 sheet metal screws provided. Make certain that the four overflow slots at the rear of the wall sleeve are not blocked (See drawing of the back of the sleeve Figure 12, Page 11).
7. If a deep wall extension (PDXWSEXT) is used, after installing the field supplied flashing, caulk as required. Be sure to caulk around the flashing and the wall sleeve where the hole was drilled for the drain tube.

![Diagram of PXDR10 Drain Kit Location and Installation](image)

<table>
<thead>
<tr>
<th><strong>PXDR10</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>QUANTITY</strong></td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>1</td>
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<tr>
<td>1</td>
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<tr>
<td>3</td>
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<tr>
<td>4</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>
INSTALLATION

External Drain

External Drain (for new construction or unit replacement)

When using an external drain system, the condensate is removed through either of two drain holes on the back of the wall sleeve. Select the drain hole which best meets your drainage situation and install the drain kit. Seal off the other with a cover plate.

Drain Tube Installation (See Figure 12)

1. Peel the backing tape off the gaskets and apply the sticky side to one cover plate and one mounting plate as shown in Details A and B.
2. Place the drain tube through the gasket and the mounting plate with the flange toward the wall sleeve.
3. Attach the drain tube assembly to one of the two drain holes at the rear of the wall sleeve. The large flange on the mounting plate is positioned at the bottom of the sleeve facing toward the sleeve, Detail B. When the drain tube is positioned at the desired angle, tighten the screws.

Cover Plate Installation

4. Mount the foam gasket to the cover plate. Using two #10 x ½" sheet metal screws (provided), attach the cover plate to the remaining drain hole. Make certain the large flange on the plate is positioned at the bottom of the sleeve.
5. Discard the additional cover plate, gasket, machine screws, and locknuts.

NOTICE

If the wall sleeve has not been installed, the drain tube must be rotated to a horizontal position until after the sleeve is installed. Tighten the mounting plate screws when the tube is in the proper position. Make certain that the four overflow slots at the rear of the wall sleeve are not blocked (See Figure 12).

When sealing the sleeve on the outside of the building, be careful NOT to let the sealant block the two condensate drain holes or the four overflow slots at the bottom flange of the sleeve.

Potential property damage can occur if instructions are not followed.

NOTE: The large flange on the mounting plate is positioned at the bottom of the sleeve facing toward the sleeve. The drain tube must be rotated to a horizontal position to allow for the wall sleeve to be installed into the wall. Once the wall sleeve is installed, return the drain tube to a downward angle.
**PXGA Standard Grille**

**Installation Instructions**

1. Remove the center support and weatherboard if still installed in the sleeve.

2. Insert six plastic grommets into the grille openings from the outside of the grille as shown in Figure 13.

3. Insert two #8 x \(\frac{3}{8}\)" sheet metal screws (provided) in the top two outside edge plastic grommets, and tighten them half way into the grommets.

4. Grasp the grille by the attached plastic handles. Position it with the condensate drain knockouts facing down.

From inside the building, maneuver the grille through the wall sleeve and pull toward you until the screw heads are inserted into the keyhole slots at the top of the wall sleeve. Tighten the two screws completely.

5. Insert the remaining screws into the remaining holes and tighten securely.

---

**WARNING**

**Falling Object Hazard**

Not following Installation Instructions for mounting your air conditioner can result in property damage, injury, or death.

---

**Figure 13**

**Standard Grille**

---

<table>
<thead>
<tr>
<th>PXGA Standard Grille</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quantity</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>1</td>
<td>Stamped Aluminum Grille</td>
</tr>
<tr>
<td>6</td>
<td>Plastic Grommets</td>
</tr>
<tr>
<td>6</td>
<td>#8 x (\frac{3}{8})&quot; Sheet Metal Screws</td>
</tr>
</tbody>
</table>
CAUTION

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

3. Carefully remove shipping tape from the front panel and power vent door. See Figure 20.

4. Remove front panel, see Figure 21. Pull out at the bottom to release it from the tabs (1). Then lift up (2).

NOTE: If the unit is mounted flush to the floor, the service cord MUST be rerouted at the bottom of the front cover on the side closest to the receptacle. A notch MUST be made in the front cover side where the cord exits the unit. It is the responsibility of the installer to create an exit notch.
Chassis Install

Chassis Installation

1. Lift unit level and slide unit into wall sleeve until seal rests firmly against front of wall sleeve.

![Figure 22 Securing Unit](image)

- POWER SUPPLY CORD

2. Locate the four supplied chassis mounting screws. Insert the screws through the chassis mounting flange holes that are aligned with the speed nuts in the wall sleeve. Tighten all four screws (two per side).

3. Place tabs over top rail. (1) Push inward at bottom until panel snaps into place (2).

4. Reinstall front panel. See Figure 23.

![Figure 23 Replacing Front Panel](image)

- Copper refrigerant tubes are NOT handles. Do NOT use tubing to lift or move chassis.

5. Plug the cord (if applicable) into the appropriate receptacle. Restore power to the unit.

---

**CAUTION**

**Excessive Weight Hazard**

Use two or more people when installing your air conditioner.

Failure to do so can result in back or other injury.

**NOTICE**

To remove the front cover, pull the bottom end forward and lift it up to clear the L bracket across the top of the chassis.
INSTALLATION

Remote Control Thermostat Installation

Remote Control Thermostat Installation

Install Thermostat

1. Approximately 5 ft from the floor.
2. Close to or in a frequently used room, preferably on an inside wall.
3. On a section of wall without pipes or ductwork.

The Thermostat should NOT be mounted:

1. Close to a window, on an outside wall, or next to a door leading outside.
2. Where it can be exposed to direct sunlight or heat, such as the sun, a lamp, fireplace or any other temperature radiating object which may cause a false reading.
3. Close to or in the direct airflow of supply registers and/or return air grilles.
4. Any areas with poor air circulation, such as a corner, behind a door, or an alcove.

Remote Thermostat and Low Voltage Control Connections

Remote Thermostat

All Friedrich PV model PTAC units are factory configured to be controlled by either the chassis mounted Smart Center or a 24V remote wall mounted thermostat. The thermostat may be auto or manual changeover as long as the control configuration matches that of the PTAC unit.

NOTE: All PV models require a single stage cool, dual stage heat thermostat with a reversing valve control. The Friedrich RTB thermostat can be configured for either model.

Thermostat Connections

- R = 24V Power from Unit
- Y = Call for Cooling
- W = Call for Heating
- B = Reversing Valve Energized in Heating Mode
- GL = Call for Low Fan
- GH = Call for High Fan
- C = Common Ground

*If only one G terminal is present on thermostat connect to GL for low speed fan or to GH for high speed fan operation.

To control the unit with a wall mounted thermostat follow the steps below:

1. Unplug the unit before doing any work.
2. Remove the low voltage terminal block from the unit.
3. Connect the corresponding terminals from the wall thermostat to the terminal block.
4. Plug the terminal block on the unit.
5. Restore power to the unit.
6. Under OFF mode, set menu NO.:d1 to “r”, details refer to the previous section “Settings-Detailed Configurations” on page 25.
7. The unit is now controlled by the wall thermostat only.
8. If the accessory escutcheon kit (PDXRTA) is to be used, install it over the existing control panel.

NOTE: The unit control panel no longer controls the unit. To restore the control panel, set menu NO.:d1 back to “P”, details refer to the previous section “Settings-Detailed Configurations” on page 25.

Figure 30

Control board with optional PDXRTB escutcheon kit installed
Front Desk Control Terminal (ONLY FOR UNIT CONTROL)

The Friedrich PV model PTAC has built-in provisions for connection to an external switch to control power to the unit. The switch can be a central desk control system.
For front desk control operation, connect one side of the normal open switch to the R terminal and the other to the FD terminal.

The control logic as below:
(a). Turn ON unit: short R and FD then release for one time within 5s.
(b). Turn OFF unit: short R and FD then release for twice within 5s.
(c). Force unit shut down for one time: short R and FD short over 5s.

NOTE: After forced shut down, you can turn on the unit again by control panel.

NOTE: The desk control system and switches must be field supplied.

Energy Management

Sometimes known as Front Desk Control, an input is provided so that the unit can be manually disabled from a remote location. If the unit detects 24Vac on this input, it will automatically turn itself off. If no voltage is detected on the input, the unit will run normally.

NOTE: It is the installer's responsibility to ensure that all control wiring connections are made in accordance with the installation instructions. Improper connection of the thermostat control wiring and/or tampering with the unit's internal wiring can void the equipment warranty. Other manufacturer's PTACs and even older Friedrich models may have different control wire connections. Questions concerning proper connections to the unit should be directed to Friedrich.
INSTALLATION

Final Inspection & Start-up Checklist

Final Inspection & Start-up Checklist

- Inspect and ensure that all components and accessories have been installed properly and that they have not been damaged during the installation process.
- Check the condensate water drain(s) to ensure they are adequate for the removal of condensate water, and that they meet the approval of the end user.
- Ensure that all installations concerning clearances around the unit have been adhered to. Check to ensure that the unit air filter, indoor coil, and outdoor coil are free from any obstructions.
- Ensure that the entire installation is in compliance with all applicable national and local codes and ordinances that have jurisdiction.
- Secure components and accessories, such as the chassis, decorative front cover and control door.
- Start the unit and check for proper operation of all components in each mode of operation. Instruct the owner or operator of this unit's operation, and the manufacturer's recommended routine maintenance schedule.

NOTE: A log for recording the dates of maintenance and/or service is recommended.

- Present the owner or operator of the equipment with the Installation & Operation manual, all accessory installation instructions, and the name, address and telephone number of the Authorized Friedrich Warranty Service Company in the area for future reference if necessary.

Routine Maintenance

To ensure proper unit operation and life expectancy the following maintenance procedures should be performed on a regular basis.

**WARNING**

**Electrical Shock Hazard**

Unplug Unit or turn off electrical power to unit prior to performing maintenance procedures

Failure to do so can result in electrical shock or death

Front Panel Air Filter

To ensure proper unit operation, the air filters should be cleaned at least monthly, and more frequently if conditions warrant. The unit must be turned off before the filters are cleaned.

To remove the air filters, grasp the top of the filters and lift out of the front cabinet. Reverse the procedure to reinstall the filters.

Clean the filters with a mild detergent in warm water, and allow them to dry thoroughly before reinstalling.

**Fresh Air Filter**

The fresh air filter should be cleaned or replaced after 3 months of use for maximum effectiveness. The unit must be turned off before the filters are replaced.

To replace the fresh air filters, drag the unit from wall sleeve and pull the tape stuck to fresh air filter.

Coils & Chassis

- Do not use a caustic coil cleaning agent on coils or base pan. Use a biodegradable cleaning agent and degreaser. The use of harsh cleaning materials may lead to deterioration of the aluminum fins or the coil end plates.

The indoor coil and outdoor coils and base pan should be inspected periodically (annually or semi-annually) and cleaned of all debris (lint, dirt, leaves, paper, etc.) as necessary. Under extreme conditions, more frequent cleaning may be required. Clean the coils and base pan with a soft brush and compressed air or vacuum. A pressure washer may also be used, however, you must be careful not to bend the aluminum fin pack. Use a sweeping up and down motion in the direction of the vertical aluminum fin pack when pressure cleaning coils.

**NOTE:** It is extremely important to ensure that none of the electrical and/or electronic parts of the unit get wet. Be sure to cover all electrical components to protect them from water or spray.

Decorative Front

The decorative front and discharge air grille may be cleaned with a mild soap or detergent. Do not use solvents or hydrocarbon based cleaners such as acetone, naphtha, gasoline, benzene, etc., to clean the decorative front or air discharge grilles.

Use a damp (not wet) cloth when cleaning the control area to prevent water from entering the unit, and possibly damaging the electronic control.

Fan Motor & Compressor

The fan motor & compressor are permanently lubricated, and require no additional lubrication.

Wall Sleeve

Inspect the inside of the wall sleeve and drain system periodically (annually or semi-annually) and clean as required.

Under extreme conditions, more frequent cleaning may be necessary. Clean both of these areas with an antibacterial and antifungal cleaner. Rinse both items thoroughly with water and ensure that the drain outlets are operating correctly. Check the sealant around the sleeve and reseal areas as needed.
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT

Remove Chassis

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTRIC SHOCK HAZARD</td>
</tr>
<tr>
<td>Turn off electric power before service or installation. Extreme care must be used, if it becomes necessary to work on equipment with power applied.</td>
</tr>
<tr>
<td>Failure to do so could result in serious injury or death.</td>
</tr>
</tbody>
</table>

The Front Panel needs to be removed prior to any repair or troubleshooting procedures.

1. Front panel is removed by lifting up and rotating back and down.

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit weighs approximately 120 pounds. Use caution when removing to prevent personal injury or damage to the equipment.</td>
</tr>
</tbody>
</table>

2. Remove 4 mounting screws and slide unit out of sleeve.
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT

Remove User Interface

1. Remove 1 screw securing User Interface to the control box. (Figure 502)

2. Remove 7 screws attaching display board to user interface. (Figure 503)

3. Disconnect plug. (Figure 504)

**WARNING**

**ELECTRIC SHOCK HAZARD**

Turn off electric power before service or installation. Extreme care must be used, if it becomes necessary to work on equipment with power applied. Failure to do so could result in serious injury or death.
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT
Open Electrical Control Box

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
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<td>ELECTRIC SHOCK HAZARD</td>
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<tr>
<td>Turn off electric power before service or installation. Extreme care must be used, if it becomes necessary to work on equipment with power applied.</td>
</tr>
<tr>
<td>Failure to do so could result in serious injury or death.</td>
</tr>
</tbody>
</table>

1. **Remove front panel** (Figure 501).
2. **Remove User Interface** (Figures 502 thru 504).
3. Remove 7 screws. (Figure 505)
4. Unhinge electrical box.

---

**Remove Main PCB (logic) Board**

1. **Remove front panel** (Figure 501).
2. **Remove User Interface** (Figures 502 thru 504).
3. **Open electrical Control Box** (Figure 505).
4. Snip wire ties to loosen wire bundles. (Figure 506).

**NOTE:** It is a good practice to take pictures of the wiring connections to facilitate reinstallation.

2. Disconnect wire connectors from Main PCB (logic) board one at a time. Identify plugs for reinstallation.
3. Remove 4 standoffs by pinching tip and applying slight upwards pressure to the board.
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT

Remove Power Cord

WARNING

ELECTRIC SHOCK HAZARD
Turn off electric power before service or installation. Extreme care must be used, if it becomes necessary to work on equipment with power applied.
Failure to do so could result in serious injury or death.

1. Remove front panel (Figure 501).

1. Remove power cord access panel located on right side of control box (2 screws) Figure 507)

2. Pinch retainer clips on top and bottom of power cord plug to disconnect (Figure 508).

3. Remove cord grommet (2 screws).

Figure 507 (Remove Power Cord)

Figure 508 (Remove Power Cord)
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT

Remove Power PCB

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
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<td>ELECTRIC SHOCK HAZARD</td>
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<tr>
<td>Turn off electric power before service or installation. Extreme care must be used, if it becomes necessary to work on equipment with power applied. Failure to do so could result in serious injury or death.</td>
</tr>
</tbody>
</table>

1. Remove front panel (Figure 501).
2. Remove User Interface (Figures 502 thru 504).
3. Open electrical Control Box (Figure 505).
4. Snip wire ties to loosen wire bundles (Figure 509).

NOTE: It is necessary to unmount components to gain access for Power PCB (Power Board removal).

5. Remove 2 capacitors, 2 heater board relays, and 1 transformer but **DO NOT** disconnect connections (Figure 510).
NOTE: It is a good practice to take pictures of the wiring connections to facilitate reinstallation.

6. Disconnect wire connectors from Power PCB (Power Board) one at a time, and identify plugs for reinstallation (Figure 511).

7. Remove Power PCB (Power Board) [4 screws].
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT

Remove IPM PCB (Inverter Board)

1. *Remove front panel* (Figure 501).
2. *Remove User Interface* (Figures 502 thru 504).
3. *Open electrical Control Box* (Figure 505).
4. Disconnect CN 13 from the Power PCB.
5. Remove Chassis from Wall (Figure 501).
6. Remove shroud support (2 screws) (Fig 512).
7. Remove IPM PCB Cover (3 screws) (Fig 512).

**NOTE:** It is a good practice to take pictures of the wiring connections to facilitate reinstallation.

8. Disconnect all wires. (Fig 513)

---

**CAUTION**

IPM PCB is attached to a heavy heat sink with thermal paste or a thermal mat which is required to dissipate heat from the IPM PCB. Use care when removing. PCB needs to drop down through housing. It can fall and be damaged if care is not taken.

8) Remove 4 mounting screws (Figure 513).
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT
Remove Blower Wheel (Inside Fan)

**WARNING**

ELECTRIC SHOCK HAZARD

Turn off electric power before service or installation. Extreme care must be used, if it becomes necessary to work on equipment with power applied.

Failure to do so could result in serious injury or death.

1. Remove front panel (Figure 501).

2. Remove User Interface (Figures 502 thru 504).

3. Open electrical Control Box (Figure 505).

4. Remove indoor fan guard (6 screws) (Figure 514).

5. Remove top air guide (6 screws) (Figure 515).

6. Remove fresh air intake housing (2 screws) (Figure 516).
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT

Remove Blower Wheel (Inside Fan)(Continued)

9. Remove left panel (7 screws) (Figure 517).

10. Loosen set screw (DO NOT REMOVE) from blower motor shaft. (Figure 518).

NOTE: Set screw is a metric type "Allen Head" screw.
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT

Remove Blower Wheel (Inside Fan)(Continued)

11. Remove blower end plate (3 screws)(Figure 519).

12. Slide blower assembly out of left side of unit.

Figure 519 (Blower End Plate)
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT

Remove Blower Wheel Motor (Inside Fan)

1. Remove front panel (Figure 501).

2. Remove User Interface (Figures 502 thru 504).

3. Open electrical Control Box (Figure 505).

4. Snip wire ties to loosen wire bundles. (Figure 521)

NOTE: It is a good practice to take pictures of the wiring connections to facilitate reinstallation.

5. Disconnect indoor blower connector on Power PCB (Power Board). (Figure 520).

6. Disconnect Indoor blower capacitor connector (Figure 521).

WARNING
ELECTRIC SHOCK HAZARD
Turn off electric power before service or installation. Extreme care must be used, if it becomes necessary to work on equipment with power applied.
Failure to do so could result in serious injury or death.
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT

Remove Blower Wheel Motor (Inside Fan) (Continued)

7. Remove mounting screws from electrical box rear and side covers and slide out of way to facilitate blower motor replacement (Figure 522).

6. Remove fan motor bracket (3 screws).

7. Remove motor.

Figure 522 (Remove Indoor Blower Motor Bracket)
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT

Remove Heating Element

WARNING

ELECTRIC SHOCK HAZARD

Turn off electric power before service or installation. Extreme care must be used, if it becomes necessary to work on equipment with power applied.

Failure to do so could result in serious injury or death.

1. **Remove front panel** (Figure 501).

2. **Remove User Interface** (Figures 502 thru 504).

3. **Open electrical Control Box** (Figure 505).

4. **Remove Chassis from Wall** (Figure 501)

4. **Remove indoor fan blower** (Figures 514 thru 519).

5. Remove top support bracket (12 screws) (Figure 523)

6. Disconnect blower housing sensor from blower housing (Figure 524).

7. Disconnect Indoor motor capacitor wiring and power connector at Power PCB.

8. Disconnect power leads from heater relays.

9. Disconnect heater ground wire.

10. Remove indoor blower housing (4 screws).

11. Remove heater element assembly from housing (4 screws).

---

**Figure 523 (Remove Top Support Bracket)**

**Figure 524 (Remove Blower Housing Bracket)**

**Figure 525 (Remove Heater Element)**
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT

Remove Freshaire Components

⚠️ WARNING

ELECTRIC SHOCK HAZARD

Turn off electric power before service or installation. Extreme care must be used, if it becomes necessary to work on equipment with power applied.

Failure to do so could result in serious injury or death.

1. Remove Chassis from wall. (Figure 501).

2. Remove Freshair Cover (Figure 526).

3. Cut wire ties as required.

4. Remove 4 screws from fresh air reactor and un-plug 2 terminal wires (Figure 527).

5. Remove bracket (2 screws).

6. Remove fresaire filter by sliding out.

7. Remove all screws from fresh air housing.
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT

Remove Freshaire Components (Continued)

8) Remove freshaire actuator assembly (1 screw).

9) Remove Blower wheel (Figure 514 thru 519).

10) Remove blower wheel housing.

11) Remove freshaire fan assembly (2 screws).
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT

Remove Outdoor Fan

WARNING

Turn off electric power before service or installation. Extreme care must be used, if it becomes necessary to work on equipment with power applied.

Failure to do so could result in serious injury or death.

1. Remove Chassis from wall (Figure 501).

2. Remove front panel (Figure 501). (Not required for Blade replacement)

3. Remove User Interface (Figures 502 thru 504). Not required for Blade replacement

4. Open electrical Control Box (Figure 505). Not required for Blade replacement

5. Cut wire ties as required. Not required for Blade replacement

6. Disconnect indoor blower connector on power panel. (Figure 529). Not required for Blade replacement

7. Disconnect Indoor blower capacitor connector (Figure 530). Not required for Blade replacement

Figure 529 (Disconnect Outdoor Fan Connector)

Figure 530 (Disconnect Outdoor Fan Capacitor)
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT

Remove Outdoor Fan (Continued)

8. Remove Brackets and Shrouds (12 screws) (Figure 531 and 532).

9. Remove Mounting screws (4 places) (Figure 533).
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT

Remove Outdoor Fan (Continued)

10. Pull up and remove fan housing (Figure 534).

11. Remove shaft nut and fan blade (Figure 535).

12. Remove motor (4 places) (Figure 536).
UNIT DISASSEMBLY AND COMPONENT REPLACEMENT

Remove Reversing valve Solenoid

1. **Remove Chassis** from wall (Figure 501).

2. Remove front panel (Figure 501). (Not required for Blade replacement)


4. **Open electrical Control Box** (Figure 505). Not required for Blade replacement.

5. Cut wire ties as required. Not required for Blade replacement.

6. Disconnect connector from Power PCB (Power Board) cn 16 and 17 and feed wire through control box housing (Figure 537).

7. Remove cover (3 screws) (Figure 538).

8. Remove 1 bolt and separate solenoid from valve (Figure 539).
R-410A SEALED SYSTEM REPAIR

The following is a list of important considerations when working with R-410A equipment:

1. R-410A pressure is approximately 60% higher than R-22 pressure.
2. R-410A cylinders must not be allowed to exceed 125 F, they may leak or rupture.
3. R-410A must never be pressurized with a mixture of air, it may become flammable.
4. Servicing equipment and components must be specifically designed for use with R-410A and dedicated to prevent contamination.
5. Manifold sets must be equipped with gauges capable of reading 750 psig (high side) and 200 psig (low side), with a 500-psig low-side retard.
6. Gauge hoses must have a minimum 750-psig service pressure rating.
7. Recovery cylinders must have a minimum service pressure rating of 400 psig, (DOT 4BA400 and DOT BW400 approved cylinders).

8. POE (Polyol-Ester) lubricants must be used with R-410A equipment.
9. To prevent moisture absorption and lubricant contamination, do not leave the refrigeration system open to the atmosphere longer than 1 hour.
10. Weigh-in the refrigerant charge into the high side of the system.
11. Introduce liquid refrigerant charge into the high side of the system.
12. For low side pressure charging of R-410A, use a charging adaptor.
13. Use industry standard R-410A filter dryers.

IMPORTANT

SEALED SYSTEM REPAIRS TO COOL-ONLY MODELS REQUIRE THE INSTALLATION OF A LIQUID LINE DRIER.

EQUIPMENT REQUIRED:
1. Electrical Multimeter
2. E.P.A. Approved Refrigerant Recovery System
3. Vacuum Pump (capable of 200 microns or less vacuum.)
4. Acetylene Welder
5. Electronic Halogen Leak Detector capable of detecting HFC (Hydrofluorocarbon) refrigerants.
6. R410A Refrigerant Manifold
7. 1/4” Braze-type Access Ports
8. Pinch Tool
9. Refrigerant Scale
10. Vacuum Gauge - (0 - 1000 microns)
11. Facilities for flowing nitrogen through refrigeration tubing during all brazing processes.

EQUIPMENT MUST BE CAPABLE OF:
1. Recovering refrigerant to EPA required levels.
2. Evacuation from both the high side and low side of the system simultaneously.
3. Introducing refrigerant charge into high side of the system.
4. Accurately weighing the refrigerant charge introduced into the system.
**R-410A SEALED SYSTEM REPAIRS**

### WARNING

**RISK OF ELECTRIC SHOCK**
- Unplug and/or disconnect all electrical power to the unit before performing inspections, maintenances or service.
- Failure to do so could result in electric shock, serious injury or death.

### WARNING

**HIGH PRESSURE HAZARD**
- Sealed Refrigeration System contains refrigerant and oil under high pressure.
- Proper safety procedures must be followed, and proper protective clothing must be worn when working with refrigerants.
- Failure to follow these procedures could result in serious injury or death.

### Refrigerant Charging

**NOTE:** Because the refrigerant system is a sealed system, service process tubes will have to be installed. First install a line tap and remove refrigerant from system. Make necessary sealed system repairs and vacuum system. Crimp process tube line and solder end shut. Do not leave a service valve in the sealed system.

Proper refrigerant charge is essential to proper unit operation. Operating a unit with an improper refrigerant charge will result in reduced performance (capacity) and/or efficiency. Accordingly, the use of proper charging methods during servicing will insure that the unit is functioning as designed and that its compressor will not be damaged.

Too much refrigerant (overcharge) in the system is just as bad (if not worse) than not enough refrigerant (undercharge). They both can be the source of certain compressor failures if they remain uncorrected for any period of time. Quite often, other problems (such as low air flow across evaporator, etc.) are misdiagnosed as refrigerant charge problems. The refrigerant circuit diagnosis chart will assist you in properly diagnosing the systems.

An overcharged unit will return liquid refrigerant (slugging) back to the suction side of the compressor eventually causing a mechanical failure within the compressor. This mechanical failure can manifest itself as valve failure, bearing failure, and/or other mechanical failure. The specific type of failure will be influenced by the amount of liquid being returned, and the length of time the slugging continues.

Not enough refrigerant (undercharge) on the other hand, will cause the temperature of the suction gas to increase to the point where it does not provide sufficient cooling for the compressor motor. When this occurs, the motor winding temperature will increase causing the motor to overheat and possibly cycle open the compressor overload protector. Continued overheating of the motor windings and/or cycling of the overload will eventually lead to compressor motor or overload failure.
Undercharged Refrigerant Systems

An undercharged system will result in poor performance (low pressures, etc.) in both the heating and cooling cycle.

Whenever you service a unit with an undercharge of refrigerant, always suspect a leak. The leak must be repaired before charging the unit.

To check for an undercharged system, turn the unit on, allow the compressor to run long enough to establish working pressures in the system (15 to 20 minutes).

During the cooling cycle you can listen carefully at the exit of the metering device into the evaporator; an intermittent hissing and gurgling sound indicates a low refrigerant charge. Intermittent frosting and thawing of the evaporator is another indication of a low charge, however, frosting and thawing can also be caused by insufficient air over the evaporator or partial restriction in the refrigeration system besides the metering device.

Checks for an undercharged system can be made at the compressor. If the compressor seems quieter than normal, it is an indication of a low refrigerant charge.

A check of the amperage drawn by the compressor motor should show a lower reading. (Check the Unit Specification.) After the unit has run 10 to 15 minutes, check the gauge pressures. Gauges connected to system with an undercharge will have low head pressures and substantially low suction pressures.
Overcharged Refrigerant Systems

Whenever an overcharged system is indicated, always make sure that the problem is not caused by air flow problems. Improper air flow over the evaporator coil may indicate some of the same symptoms as an overcharged system.

An overcharge can cause the compressor to fail, since it would be “slugged” with liquid refrigerant. The charge for any system is critical. When the compressor is noisy, suspect an overcharge, when you are sure that the air quantity over the evaporator coil is correct. Icing of the evaporator will not be encountered because the refrigerant will boil later if at all. Gauges connected to system will usually have higher head pressure (depending upon amount of overcharge). Suction pressure should be slightly higher.

Compressor amps will be near normal or higher. Noncondensables can also cause these symptoms. To confirm, reclaim some of the charge, if conditions improve, system may be overcharged. If conditions don’t improve, Noncondensables are indicated.
R-410A SEALED SYSTEM REPAIRS

Restricted Refrigerant System

Troubleshooting a restricted refrigerant system can be difficult. The following procedures are the more common problems and solutions to these problems. There are two types of refrigerant restrictions: Partial restrictions and complete restrictions.

A partial restriction allows some of the refrigerant to circulate through the system.

With a complete restriction there is no circulation of refrigerant in the system. Restricted refrigerant systems display the same symptoms as a “low-charge condition.”

When the unit is shut off, or the compressor disengages, the gauges may equalize very slowly.

A quick check for either condition begins at the evaporator. With a partial restriction, there may be gurgling sounds at the metering device entrance to the evaporator. The evaporator in a partial restriction could be partially frosted or have an ice ball close to the entrance of the metering device. Frost may continue on the suction line back to the compressor.

Often a partial restriction of any type can be found by feel, as there is a temperature difference from one side of the restriction to the other.

With a complete restriction, there will be no sound at the metering device entrance. An amperage check of the compressor with a partial restriction may show normal current when compared to the unit specification. With a complete restriction the current drawn may be considerably less than normal, as the compressor is running in a deep vacuum (no load.) Much of the area of the condenser will be relatively cool since most or all of the liquid refrigerant will be stored there.

The following conditions are based primarily on a system in the cooling mode.

![Diagram of R-410A System](Image)
The refrigerant cycle is critically charged. The only acceptable method for charging the sealed system is the Weighed in Charge Method.

The weighed in method should always be used whenever a charge is removed from a unit such as for a leak repair, compressor replacement, or when there is no refrigerant charge left in the unit. To charge by this method, requires the following steps:

1. Install a piercing valve to remove refrigerant from the sealed system. (Piercing valve must be removed from the system before recharging.)
2. Recover Refrigerant in accordance with EPA regulations.
3. Install a process tube to sealed system.
4. Make necessary repairs to system.
5. Evacuate system to 200 microns or less.
6. Weigh in refrigerant with the property quantity of R-410A refrigerant.
7. Start unit, and verify performance.
8. Crimp the process tube and solder the end shut.
Hermetic Components Check

**WARNING**

**BURN HAZARD**
Proper safety procedures must be followed, and proper protective clothing must be worn when working with a torch.
Failure to follow these procedures could result in moderate or serious injury.

**WARNING**

**CUT/SEVER HAZARD**
Be careful with the sharp edges and corners. Wear protective clothing and gloves, etc.
Failure to do so could result in serious injury.

**Metering Device - Capillary Tube Systems**
All units are equipped with capillary tube metering devices. Checking for restricted capillary tubes.

1. Connect pressure gauges to unit.
2. Start the unit in the cooling mode. If after a few minutes of operation the pressures are normal, the check valve and the cooling capillary are not restricted.
3. Switch the unit to the heating mode and observe the gauge readings after a few minutes running time. If the system pressure is lower than normal, the heating capillary is restricted.
4. If the operating pressures are lower than normal in both the heating and cooling mode, the cooling capillary is restricted.

**Check Valve**
A unique two-way check valve is used on the reverse cycle heat pumps. It is pressure operated and used to direct the flow of refrigerant through a single filter drier and to the proper capillary tube during either the heating or cooling cycle.

**NOTE:** The slide (check) inside the valve is made of teflon. Should it become necessary to replace the check valve, place a wet cloth around the valve to prevent overheating during the brazing operation.

**CHECK VALVE OPERATION**
In the cooling mode of operation, high pressure liquid enters the check valve forcing the slide to close the opposite port (liquid line) to the indoor coil. Refer to refrigerant flow chart. This directs the refrigerant through the filter drier and cooling capillary tube to the indoor coil.
In the heating mode of operation, high pressure refrigerant enters the check valve from the opposite direction, closing the port (liquid line) to the outdoor coil. The flow path of the refrigerant is then through the filter drier and heating capillary to the outdoor coil. Failure of the slide in the check valve to seat properly in either mode of operation will cause flooding of the cooling coil. This is due to the refrigerant bypassing the heating or cooling capillary tube and entering the liquid line.

**COOLING MODE**
In the cooling mode of operation, liquid refrigerant from condenser (liquid line) enters the cooling check valve forcing the heating check valve shut. The liquid refrigerant is directed into the liquid dryer after which the refrigerant is metered through cooling capillary tubes to evaporator. (Note: liquid refrigerant will also be directed through the heating capillary tubes in a continuous loop during the cooling mode).

**HEATING MODE**
In the heating mode of operation, liquid refrigerant from the indoor coil enters the heating check valve forcing the cooling check valve shut. The liquid refrigerant is directed into the liquid dryer after which the refrigerant is metered through the heating capillary tubes to outdoor coils. (Note: liquid refrigerant will also be directed through the cooling capillary tubes in a continuous loop during the heating mode).
Reversing Valve Description And Operation

The Reversing Valve controls the direction of refrigerant flow to the indoor and outdoor coils. It consists of a pressure-operated, main valve and a pilot valve actuated by a solenoid plunger. The solenoid is energized during the heating cycle only. The reversing valves used in the RAC system is a 2-position, 4-way valve.

The single tube on one side of the main valve body is the high-pressure inlet to the valve from the compressor. The center tube on the opposite side is connected to the low pressure (suction) side of the system. The other two are connected to the indoor and outdoor coils. Small capillary tubes connect each end of the main valve cylinder to the "A" and "B" ports of the pilot valve. A third capillary is a common return line from these ports to the suction tube on the main valve body. Four-way reversing valves also have a capillary tube from the compressor discharge tube to the pilot valve.

The piston assembly in the main valve can only be shifted by the pressure differential between the high and low sides of the system. The pilot section of the valve opens and closes ports for the small capillary tubes to the main valve to cause it to shift.

**NOTE:** System operating pressures must be near normal before valve can shift.

![4-Way Reversing Valve Diagram](image)
COMPONENT TESTING

Testing The Reversing Valve Solenoid Coil

**WARNING**

**ELECTRIC SHOCK HAZARD**
Disconnect power to the unit before servicing. Failure to follow this warning could result in serious injury or death.

The solenoid coil is an electromagnetic type coil mounted on the reversing valve and is energized during the operation of the compressor in the heating cycle.

1. Turn off high voltage electrical power to unit.
2. Unplug line voltage lead from reversing valve coil.
3. Check for electrical continuity through the coil. If you do not have continuity replace the coil.
4. Check from each lead of coil to the copper liquid line as it leaves the unit or the ground lug. There should be no continuity between either of the coil leads and ground; if there is, coil is grounded and must be replaced.
5. If coil tests okay, reconnect the electrical leads.
6. Make sure coil has been assembled correctly.

**NOTE:** Do not start unit with solenoid coil removed from valve, or do not remove coil after unit is in operation. This will cause the coil to burn out.

**Touch Test in Heating/Cooling Cycle**

**WARNING**

**BURN HAZARD**
Certain unit components operate at temperatures hot enough to cause burns.

Proper safety procedures must be followed, and proper protective clothing must be worn.

Failure to follow these procedures could result in minor to moderate injury.

The only definite indications that the slide is in the mid-position is if all three tubes on the suction side of the valve are hot after a few minutes of running time.

**NOTE:** If both tubes shown as hot or cool are not the same corresponding temperature, refer to figure 703, then the reversing valve is not shifting properly.
NOTE: You must have normal operating pressures before the reversing valve can shift.

Check the operation of the valve by starting the system and switching the operation from "Cooling" to "Heating" and then back to "Cooling". Rapidly cycle. Do not hammer on valve.

Occasionally, the reversing valve may stick in the heating or cooling position or in the mid-position. When sluggish or stuck in the mid-position, part of the discharge gas from the compressor is directed back to the suction side, resulting in excessively high suction pressure.

Should the valve fail to shift from cooling to heating, block the air flow through the outdoor coil and allow the discharge pressure to build in the system. Then switch the system from heating to cooling.

If the valve is stuck in the heating position, block the air flow through the indoor coil and allow discharge pressure to build in the system. Then switch the system from heating to cooling.

Should the valve fail to shift in either position after increasing the discharge pressure, replace the valve.

Dented or damaged valve body or capillary tubes can prevent the main slide in the valve body from shifting. If you determine this is the problem, replace the reversing valve.

After all of the previous inspections and checks have been made and determined correct, then perform the "Touch Test" on the reversing valve.

**Figure 703 (Checking The Reversing Valve)**
COMPONENT TESTING

Replace The Reversing Valve

**WARNING**

**HIGH PRESSURE HAZARD**
Sealed Refrigeration System contains refrigerant and oil under high pressure.

Proper safety procedures must be followed, and proper protective clothing must be worn when working with refrigerants.

Failure to follow these procedures could result in serious injury or death.

**NOTICE**

**FIRE HAZARD**
The use of a torch requires extreme care and proper judgment. Follow all safety recommended precautions and protect surrounding areas with fire proof materials. Have a fire extinguisher readily available. Failure to follow this notice could result in moderate to serious property damage.

1. Install Process Tubes. Recover refrigerant from sealed system. PROPER HANDLING OF RECOVERED REFRIGERANT ACCORDING TO EPA REGULATIONS IS REQUIRED.
2. Remove solenoid coil from reversing valve. If coil is to be reused, remove solenoid and protect from heat while changing valve.
3. Unbraze all lines from reversing valve.
4. Clean all excess braze from all tubing so that they will slip into fittings on new valve.
5. Remove solenoid coil from new valve.
6. Protect new valve body from heat while brazing with plastic heat sink (Thermo Trap) or wrap valve body with wet rag.
7. Fit all lines into new valve and braze lines into new valve.

**WARNING**

**EXPLOSION HAZARD**
The use of nitrogen requires a pressure regulator. Follow all safety procedures and wear protective safety clothing etc.

Failure to follow proper safety procedures could result in serious injury or death.

9. Once the sealed system is leak free, install solenoid coil on new valve and charge the sealed system by weighing in the proper amount and type of refrigerant as shown on rating plate. Crimp the process tubes and solder the ends shut. Do not leave Schrader or piercing valves in the sealed system.

**NOTE:** When brazing a reversing valve into the system, it is of extreme importance that the temperature of the valve does not exceed 250°F at any time.

Wrap the reversing valve with a large rag saturated with water. “Re-wet” the rag and thoroughly cool the valve after each brazing operation of the four joints involved.

The wet rag around the reversing valve will eliminate conduction of heat to the valve body when brazing the line connection.
## COMPONENT TESTING

### Touch Test Chart: To Service Reversing Valves

#### NORMAL FUNCTION OF VALVE

<table>
<thead>
<tr>
<th>VALVE OPERATING CONDITION</th>
<th>TOP TUBE</th>
<th>COIL</th>
<th>BOTTOM TUBE</th>
<th>COIL</th>
<th>LEFT Pilot</th>
<th>RIGHT Pilot</th>
<th>NOTES:</th>
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</thead>
<tbody>
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</tr>
<tr>
<td>Normal Cooling</td>
<td>Hot</td>
<td>Cool</td>
<td>Hot</td>
<td>Cool</td>
<td>Hot</td>
<td>*TVB</td>
<td>TVB</td>
</tr>
<tr>
<td>Normal Heating</td>
<td>Hot</td>
<td>Cool</td>
<td>Hot</td>
<td>Cool</td>
<td>Cool</td>
<td>*TVB</td>
<td>TVB</td>
</tr>
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</table>

#### POSSIBLE CAUSES

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<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
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<tr>
<td>Normal Cooling</td>
<td>Hot</td>
<td>Cool</td>
<td>Cool as (2)</td>
<td>Hot as (1)</td>
<td>*TVB</td>
</tr>
<tr>
<td>Normal Heating</td>
<td>Hot</td>
<td>Cool</td>
<td>Hot as (1)</td>
<td>Cool as (2)</td>
<td>*TVB</td>
</tr>
</tbody>
</table>

#### CORRECTIONS

**MALFUNCTION OF VALVE**

Valve will not shift from cool to heat.

- **Check Electrical circuit and coil**
  - Hot Cool Cool as (2), Cool as (1) *TVB
  - No voltage to coil. Repair electrical circuit.
  - Defective coil. Replace coil.

- **Check refrigeration charge**
  - Low charge. Repair leak, recharge system.
  - Pressure differential too high. Recheck system.

- **Piston cup leak**
  - Stop unit. After pressures equalize, restart with solenoid energized. If valve shifts, reattempt with compressor running. If still no shift, replace valve.

Valve will not shift from cool to heat.

- **Hot Cool Cool as (2), Cool as (1) *TVB**
  - Clogged pilot tubes.
  - Raise head pressure, operate solenoid to free. If still no shift, replace valve.

- **Hot Cool Cool as (2), Hot as (1) *TVB**
  - Both ports of pilot open.
  - Raise head pressure, operate solenoid to free partially clogged port. If still no shift, replace valve.

- **Warm Cool Cool as (2), Hot as (1) *TVB**
  - Piston cup leak.
  - Stop unit. After pressures equalize, restart with solenoid energized. If valve shifts, reattempt with compressor running. If still no shift, replace valve.

Starts to shift but does not complete reversal.

- **Hot Warm Warm Hot *TVB**
  - Not enough pressure differential at start of stroke or not enough flow to maintain pressure differential.
  - Check unit for correct operating pressures and charge. Raise head pressure. If no shift, use valve with smaller port.

- **Hot Cool Cool as (2), Hot as (1) *TVB**
  - Both ports of pilot open.
  - Raise head pressure, operate solenoid if no shift, use valve with smaller ports.

- **Hot Cool Cool as (2) *WVB**
  - Piston needle on end of slide leaking.
  - Operate valve several times, then recheck. If excessive leak, replace valve.

Apparent leap in heating.

- **Hot Cool Cool as (1) Cool as (2) *TVB**
  - Piston needle on end of slide leaking.
  - Operate valve several times, then recheck. If excessive leak, replace valve.

Will not shift from heat to cool.

- **Hot Cool Cool as (1) Cool as (2) *TVB**
  - Pressure differential too high.
  - Stop unit. Will reverse during equalization period. Recheck system.

- **Hot Cool Cool as (1) Cool as (2) *TVB**
  - Dirt in bleeder hole.
  - Raise head pressure, operate solenoid to free dirt. If still no shift, replace valve.

- **Hot Cool Cool as (1) Cool as (2) Hot *TVB**
  - Piston cup leak.
  - Stop unit. After pressures equalize, restart with solenoid deenergized. If valve shifts, reattempt with compressor running. If still will not reverse while running, replace the valve.

- **Hot Cool Cool as (1) Cool as (2) Hot Defective pilot.**
  - Replace valve.

- **Warm Cool Cool as (1) Cool as (2) Warm *TVB**
  - Defective compressor.
  - Replace compressor.

---

Figure 704 (Touch Test Chart)
COMPONENT TESTING

Compressor Checks

Overloads
The compressor is equipped with either an external or internal overload which senses both motor amperage and winding temperature. High motor temperature or amperage heats the overload causing it to open, breaking the common circuit within the compressor. Heat generated within the compressor shell, usually due to recycling of the motor, is slow to dissipate. It may take anywhere from a few minutes to several hours for the overload to reset.

Checking the Overloads

External Overloads
With power off, remove the leads from compressor terminals. If the compressor is hot, allow the overload to cool before starting check. Using an ohmmeter, test continuity across the terminals of the external overload. If you do not have continuity; this indicates that the overload is open and must be replaced.

Internal Overloads
The overload is embedded in the motor windings to sense the winding temperature and/or current draw. The overload is connected in series with the common motor terminal. Should the internal temperature and/or current draw become excessive, the contacts in the overload will open, turning off the compressor. The overload will automatically reset, but may require several hours before the heat is dissipated.

Checking the Internal Overload
1. With no power to unit, remove the leads from the compressor terminals.
2. Using an ohmmeter, test continuity between terminals C-S and C-R. If no continuity, the compressor overload is open and the compressor must be replaced.
COMPONENT TESTING

Compressor Checks

**WARNING**

ELECTRIC SHOCK HAZARD

Turn off electric power before service or installation. Extreme care must be used, if it becomes necessary to work on equipment with power applied.

Failure to do so could result in serious injury or death.

HIGH PRESSURE HAZARD

Sealed Refrigeration System contains refrigerant and oil under high pressure.

Proper safety procedures must be followed, and proper protective clothing must be worn when working with refrigerants.

Failure to follow these procedures could result in serious injury or death.

Gain access to compressor and IPM PCB (Inverter Board) by removing chassis from wall. Refer to Figure 5xx

1) Disconnect terminals R(U), S(V), and T(W) from the compressor.

Resistance Test.

2) Set Ohm meter to the lowest scale and check continuity between pins R(U), S(V), and T(W).

At room temperature (70°-95°F) the resistance should be approximately 2.2 ohms. The Ohm values will change significantly at different temperatures. This does not indicate that the compressor windings are faulty. A reading of open (infinity), or a significant difference in the resistance between the windings does indicate that the compressor windings are faulty.

3) Check for continuity from between pins R(U) to ground, S(V) to ground, and T(U) to ground

The compressor windings are faulty if there is continuity from the compressor windings to ground.

4) Common signs compressor is faulty:

- Compressor motor lock.
- Discharge pressure value approaches static pressure value.
- Compressor motor winding abnormality.

**Note:**

- Don’t put a compressor on its side or turn over.
- Assemble the compressor quickly after removing the plugs. Prolonged exposure will damage the internal components of the compressor.
- Ensure wiring is correct before operating.
- Reverse operation will permanently damage the compressor.

- **Electric Reactor**

Common Problems:

- Sound abnormality
- Runs in a sporadic rhythm.
Component Testing

Compressor Replacement

1. Be certain to perform all necessary electrical and refrigeration tests to be sure the compressor is actually defective before replacing.

2. Recover all refrigerant from the system through the process tubes. **Proper Handling of Recovered Refrigerant According to EPA Regulations is Required.** Do not use gauge manifold for this purpose if there has been a burnout. You will contaminate your manifold and hoses. Use a Schrader valve adapter and copper tubing for burnout failures.

3. After all refrigerant has been recovered, disconnect suction and discharge lines from the compressor and remove compressor. Be certain to have both suction and discharge process tubes open to atmosphere.

4. Unbolt the compressor at 3 places. Replace grommets under mounting bolts if they are worn out.

5. Carefully pour a small amount of oil from the suction stub of the defective compressor into a clean container.

6. Using an acid test kit (one shot or conventional kit), test the oil for acid content according to the instructions with the kit.

7. If any evidence of a burnout is found, no matter how slight, the system will need to be cleaned up following proper procedures.

8. Install the replacement compressor.

9. Pressurize with a combination of R-410A and nitrogen and leak test all connections with an electronic or Halide leak detector. Recover refrigerant and repair any leaks found.

9a. If leak detector is unavailable remove all refrigerant from system and pressurize with nitrogen to 350 psi. Check that system holds pressure.

Repeat Step 9 to insure no more leaks are present

10. Evacuate the system with a good vacuum pump capable of a final vacuum of 200 microns or less. The system should be evacuated through both liquid line and suction line gauge ports. While the unit is being evacuated, seal all openings on the defective compressor. Compressor manufacturers will void warranties on units received not properly sealed. Do not distort the manufacturers tube connections.

11. Recharge the system with the correct amount of refrigerant. The proper refrigerant charge will be found on the unit rating plate. The use of an accurate measuring device, such as a charging cylinder, electronic scales or similar device is necessary.
COMPONENT TESTING

Compressor Replacement - Special Procedure in Case of Compressor Burnout

1. Recover all refrigerant and oil from the system.
2. Remove compressor, capillary tube and filter drier from the system.
3. Flush evaporator condenser and all connecting tubing with dry nitrogen or equivalent. Use approved flushing agent to remove all contamination from system. Inspect suction and discharge line for carbon deposits. Remove and clean if necessary. Ensure all acid is neutralized.
4. Reassemble the system, including new drier strainer and capillary tube.
5. Pressurize with a combination of R-410A and nitrogen and leak test all connections with an electronic or Halide leak detector. Recover refrigerant and repair any leaks found.
5a. If leak detector is unavailable remove all refrigerant from system and pressurize with nitrogen to 350 psi. Check that system holds pressure.
6. Evacuate the system with a good vacuum pump capable of a final vacuum of 200 microns or less. The system should be evacuated through both liquid line and suction line gauge ports. While the unit is being evacuated, seal all openings on the defective compressor. Compressor manufacturers will void warranties on units received not properly sealed. Do not distort the manufacturers tube connections.
7. Recharge the system with the correct amount of refrigerant. The proper refrigerant charge will be found on the unit rating plate. The use of an accurate measuring device, such as a charging cylinder, electronic scales or similar device is necessary.

ROTARY AND SCROLL COMPRESSOR SPECIAL TROUBLESHOOTING AND SERVICE

Troubleshooting and servicing rotary compressors is basically the same as on the reciprocating compressor with only one main exception:

1. **WARNING**
   - HIGH PRESSURE HAZARD
   - Sealed Refrigeration System contains refrigerant and oil under high pressure.
   - Proper safety procedures must be followed, and proper protective clothing must be worn when working with refrigerants.
   - Failure to follow these procedures could result in serious injury or death.

2. **WARNING**
   - ELECTRIC SHOCK HAZARD
   - Turn off electric power before service or installation. Extreme care must be used, if it becomes necessary to work on equipment with power applied.
   - Failure to do so could result in serious injury or death.

3. **WARNING**
   - EXPLOSION HAZARD
   - The use of nitrogen requires a pressure regulator. Follow all safety procedures and wear protective safety clothing etc.
   - Failure to follow proper safety procedures could result in serious injury or death.

4. **WARNING**
   - NEVER, under any circumstances, liquid charge a rotary-compressor through the LOW side. Doing so would cause permanent damage to the new compressor. Use a charging adapter.
COMPONENT TESTING

Check Indoor Fan Motor
Gain Access to the Power PCB (Power Board).
1. Remove front panel (Figure 501).
2. Remove User Interface (Figures 502 thru 504).
3. Open electrical Control Box (Figure 505).

Indoor fan control in cooling mode:
The indoor fan will run synchronously with cooling demand. During no demand period if the CONSTANT FAN button is turned off, it will run for 30s and then turn off. When CONSTANT FAN is ON, it will always be running.
1) Check voltage between Neutral and High, medium, or low.
   Voltages should be 7-9vdc
   If no voltage is present check cable and resistance values on motor.
2) Check for continuity between pins on fan plug connector.
   N-H = 65.4 ohms +- 10%
   N-L = 126.6 ohms +- 10%

Check Outdoor Fan Motor
Outdoor fan control in cooling mode:
The outdoor fan has two speeds, low and high. When T4 is above 80°F, the fan operates in high speed. When T4 drops to 77°F the fan operates in low speed.
1) Check voltage between Neutral and High, or low.
   Voltages should be 7-9vdc.
   If no voltage is present check cable and resistance values on motor.
2) Check for continuity between pins on fan plug connector.
   N-H = 189.6 ohms +-10%
   N-M = 216.2 ohms+-10%
   N-L = 240.6 ohms +-10%
COMPONENT TESTING

Check Fan Motor Capacitors

Gain Access to the Power PCB (Power Board).

1. Remove front panel (Figure 501).
2. Remove User Interface (Figures 502 thru 504).
3. Open electrical Control Box (Figure 505).

**WARNING**

Unplug and/or disconnect all electrical power to the unit before performing inspections, maintenances or service.

Failure to do so could result in electric shock, serious injury or death.

**NOTE:** Many motor capacitors are internally fused. Shorting the terminals will blow the fuse, ruining the capacitor. A 20,000 ohm 2 watt resistor can be used to discharge capacitors safely. Remove wires from capacitor and place resistor across terminals.

1. Disconnect leads to capacitor that you are checking.
2. Bleed down capacitor with 2 watt resistor.
3. Set multi-meter to diode check setting.
4. Check Resistance across capacitor terminals by placing the red lead on the run terminal and the black lead on the common terminal. (The meter will send a small charge into the capacitor)
5. The meter should show a certain amount of resistance initially and then increase in resistance as the charge in the capacitor dissipates until infinity is reached.
6. If the meter shows continuity, or does not bleed back down to infinity, the capacitor is shorted and should be replaced.
7. If the meter initially shows infinity the capacitor is open and should be replaced.

Check Capacitance values in micro Farads using capacitor analyzer.

1. Indoor fan capacitor should read 1.5 uf.
2. Outdoor fan capacitor should read 3.0 uf.
COMPONENT TESTING

Main PCB (logic) Board Connector Identification

- CN 16: Display
- IR/RF Remote
- CN 1: MB Comm
- CN-21: E Heater_N
- CN 2: E Heater 2C
- CN 4-4: I-Check
- CN 5: Debug
- CN 1: MB Comm
- CN 3: Trans_24V
- Power Relays
- CN 6: Display
- Indoor ambient temperature (T1)
- Indoor coil temperature (T2)
- Outdoor coil temperature (T3)
- Compressor discharge temperature (T5)
- Indoor outlet air temperature (T6)
- Outdoor ambient temperature (T4)

Figure 709 (Main PCB (logic) Board)
COMPONENT TESTING

Power PCB (Power Board) Connector Identification

DC Bus Lines
Positive

Positive

Negative

CN-9
Fresh Air
Connector

CN 4
Trans- IN

CN 6
ACN

L1
Fuse

L1

L2/ N

J3 24V -

J3 24V +

CN 21
FAH

CN 22
FAL

CN 20
FA +

CN 10
Power Relays

CN 5
Outside Fan
Connector

CN 18
Outside Fan
Connector

CN 10
Power Relays

CN 3
MB Com

Mod Com

Figure 710 (Power PCB (Power Board)
## TROUBLESHOOTING

### Basic Troubleshooting

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Possible Reasons</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Start Failure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit does not have power; Power line damaged or power not available.</td>
<td>&quot;Check the indicator LED on the LCID power head, it should be lit up, if not, push the RESET button, if still no voltage, but power grid has output, you need to change the power cord.&quot;</td>
<td></td>
</tr>
<tr>
<td>Power cord protection trip.</td>
<td>Check the power cord for damage, push the RESET button. If not solved, replace the power cord.</td>
<td></td>
</tr>
<tr>
<td>Power cord isn’t plugged in correctly.</td>
<td>Plug in cord correctly.</td>
<td></td>
</tr>
<tr>
<td>PCB fuse is broken.</td>
<td>Check if any load [in fan, out fan, reversing valve, power transformer] has a short circuit. Eliminate the error and replace the fuse with the same type.</td>
<td></td>
</tr>
<tr>
<td>Bad contact between main board and control panel.</td>
<td>Check the contact wires, make sure all contact well.</td>
<td></td>
</tr>
<tr>
<td>Compressor delay start.</td>
<td>It’s normal, compressor will start after 3 minutes</td>
<td></td>
</tr>
<tr>
<td>Power fail protection.</td>
<td>When power on, because of auto-restart, unit will delay starting in 120-240s</td>
<td></td>
</tr>
<tr>
<td>Unit in protection mode.</td>
<td>Please check the ERROR CODE</td>
<td></td>
</tr>
<tr>
<td>Main board or Control panel is bad.</td>
<td>Replace the main board or control panel</td>
<td></td>
</tr>
<tr>
<td><strong>Control panel does not work</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When the unit is switch ed to 24V remote thermostat or 12V smart controller, the control panel will not be functioning.</td>
<td>If you need to use control panel to take control, you need to switch the control master. See the ADVANCED SETTINGS section.</td>
<td></td>
</tr>
<tr>
<td><strong>Indoor fan/outdoor fan does not function or runs slowly</strong></td>
<td></td>
<td>Disconnect the power cord, check whether the fan can run smooth by hand or other tools, whether motor wire is connected well. If fan has slow running speed replace capacitor.</td>
</tr>
</tbody>
</table>
## TROUBLESHOOTING

### Basic Troubleshooting

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Possible Reasons</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not cooling/heating adequately</td>
<td>- Something is blocking the indoor/outdoor air outlet.</td>
<td>Make sure that there are no obstacles at the indoor/outdoor air outlet.</td>
</tr>
<tr>
<td></td>
<td>- Set unsuitable temperature.</td>
<td>Make sure that the grill is suitable for the unit, inappropriate grill will cause the compressor to fault. Make sure that the grill has more than 70%.</td>
</tr>
<tr>
<td></td>
<td>- Indoor air filter is dirty.</td>
<td>Should clean the filter at least every month.</td>
</tr>
<tr>
<td></td>
<td>- Room is hot/cold.</td>
<td>Let unit run a little longer that room temperature will be lower/higher.</td>
</tr>
<tr>
<td></td>
<td>- Heat leakage between indoor and outdoor.</td>
<td>Block the leakage place.</td>
</tr>
<tr>
<td></td>
<td>- Indoor coil not cold/heat.</td>
<td>Charge the refrigerant.</td>
</tr>
<tr>
<td>Unit has noise</td>
<td>- &quot;Some moving parts of the unit are loose causing bad vibration. Something in the air way.&quot;</td>
<td>Make sure that all moving parts are assembled well, and nothing is in the air way.</td>
</tr>
<tr>
<td>Bad smell when heating</td>
<td>- The dust on the E-heater is heating.</td>
<td>The bad smell will disappear a little later.</td>
</tr>
<tr>
<td>Outlet temperature is not always cooling/heating</td>
<td>- Outlet temperature is not high enough when heating by heat pump.</td>
<td>When outdoor ambient temp is low, the heat pump will not be able to offer enough heat. Soon after that, the E-heater will come on to heat.</td>
</tr>
<tr>
<td></td>
<td>- Fan stops when cooling/heating.</td>
<td>It is normal when the CONSTANT FAN is OFF. You can enable the CONSTANT FAN.</td>
</tr>
<tr>
<td>Water dripping outdoors.</td>
<td>- Drain pipe kit not installed.</td>
<td>Install the drain pipe kit.</td>
</tr>
<tr>
<td>Water dripping indoors.</td>
<td>- Wall sleeve is not installed correctly.</td>
<td>Install the wall sleeve according to the installation manual.</td>
</tr>
<tr>
<td>Indoor coil freeze</td>
<td>- Outdoor temperature is too low in cooling mode.</td>
<td>When outdoor temperature is drop to 55°F (12.8°) or below, it will cause that indoor coil to freeze. Open the fresh air door, and running at fan mode.</td>
</tr>
<tr>
<td></td>
<td>- Filter is dirty.</td>
<td>Clean the filter to recover the normal air flow</td>
</tr>
</tbody>
</table>
# TROUBLESHOOTING

## Error code and solutions

<table>
<thead>
<tr>
<th>ERROR CODE</th>
<th>Meaning</th>
<th>Solutions</th>
<th>Click link for reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>Communication Error between Power, IPM, Main, &amp; or Display electronic boards+B2:C14</td>
<td>Check all Communication Cables; MOD_Com, MB_Com, Display_com&amp; Power Relay_com.</td>
<td>See “Unit does not operate” in troubleshooting section</td>
</tr>
<tr>
<td>E2</td>
<td>Indoor Temp Sensor Open/Shorted</td>
<td>Check if properly connected.</td>
<td>Check Thermistors</td>
</tr>
<tr>
<td>E3</td>
<td>Indoor Evaporator Coil Sensor Open/Shorted</td>
<td>Check if properly connected.</td>
<td>Check Thermistors</td>
</tr>
<tr>
<td>E4</td>
<td>Indoor Supply Air Sensor Open/Shorted or Overheating of electric heater</td>
<td>Check if properly connected.</td>
<td>Check Thermistors</td>
</tr>
<tr>
<td>E5</td>
<td>IPM Board in protection mode</td>
<td>Check if compressor wiring is incorrect, IPM PCB comprimised, Power PCB comprimised, or if compressor comprimised. Check for airflow obstructions. Check CN 13 on Power PCB for 15VDC at pins 1 and 2. Check compressor coil resistance. Check IPM PCB for arcing or odors of overheating. Check and monitor power supply stability and ensure proper NEC code grounding at the main breaker and power supply.</td>
<td>Remove IPM PCB Identification Board, Power PCB Identification, Compressor Checks, Remove Power PCB</td>
</tr>
<tr>
<td>E6</td>
<td>Outdoor Temp Sensor Open/Shorted</td>
<td>Check if properly connected, check resistance values, check for loose wires/broken wires in Molex connectors.</td>
<td>Check Thermistors</td>
</tr>
<tr>
<td>E7</td>
<td>Outdoor Condenser Coil Sensor Open/Shorted</td>
<td>Check if properly connected, check resistance values, check for loose wires/broken wires in Molex connectors.</td>
<td>Check Thermistors</td>
</tr>
<tr>
<td>EC</td>
<td>Compressor attempted to start but failed to start</td>
<td>Check Dip Switch SW2 on Main Board is correct for the BTU of the unit model.</td>
<td>See Operation section for details on dip switches Compressor Checks</td>
</tr>
<tr>
<td>EH</td>
<td>EEPROM Error</td>
<td>Replace Main Board, Check for compromised electrical wires to Main Board.</td>
<td>Replace Main Board</td>
</tr>
<tr>
<td>EF</td>
<td>30 amp power cord installed on PVH09 (230 or 265 volt) Not Allowed</td>
<td>Replace the power cord to 15A or 20A supply cord as required.</td>
<td>Replace Power Cord</td>
</tr>
<tr>
<td>P1</td>
<td>Cooling or Heating overload</td>
<td>Check for low air flow or no air flow due to evaporator or condenser coil blocked with debris. Evap/Cond motor fan motor compromised, Fan Capacitors compromised, blower wheel/fan blade compromised. Check Resistance values for indoor and Outdoor coil thermistors.</td>
<td>Check indoor fan motor, Check outdoor fan motor, Check Fan Capacitors Check Thermistors</td>
</tr>
</tbody>
</table>
## TROUBLESHOOTING

### Error code and solutions

<table>
<thead>
<tr>
<th>ERROR CODE</th>
<th>Meaning</th>
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<th>Click link for reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2</td>
<td>IPM Over Heat or Over Current Protection envoked</td>
<td>Check for low air flow or no air flow due to evaporator or condenser coil blocked with debris. Evap/Cond motor fan motor compromised, fan Capacitors compromised, blower wheel/fan blade compromised. Check Dip Switch SW2 on Main Board is correct for the BTU of the unit model. Check Compressor wiring is properly connected, Check compressor for Short/ Ground, Check IPM PCB.</td>
<td>See Operation section for details on dip switches. Check indoor fan motor Check outdoor fan motor Check Fan Capacitors Check Compressor Check IPM PCB</td>
</tr>
<tr>
<td>P4</td>
<td>Compressor Discharge Over Heat Protection envoked</td>
<td>Check for low air flow or no air flow due to evaporator or condenser coil blocked with debris. Evap/Cond motor fan motor compromised, fan Capacitors compromised, blower wheel/fan blade compromised. Check Dip Switch SW2 on Main Board is correct for the BTU of the unit model. Check Compressor wiring is properly connected, Check compressor for Short/ Ground, Check IPM Board.</td>
<td>See Operation section for details on dip switches. Check indoor fan motor Check outdoor fan motor Check Fan Capacitors Check Compressor Check IPM PCB</td>
</tr>
<tr>
<td>P7</td>
<td>DC Over/Under Supply Power Voltage Protection envoked</td>
<td>Check for low air flow or no air flow due to evaporator or condenser coil blocked with debris. Indoor blower/ outdoor fan compromised, fan capacitors compromised. Blower wheel/ fan blade compromised. Check dip switch SW2 on main pcb is correct for the BTU of the model. Check compressor wiring is properly connected. Check compressor for short. Check IPM PCB. Check Power Supply is within the required power supply tolerances of +/- 10% Check and monitor power supply stability and ensure proper NEC code grounding at the main breaker and power supply.</td>
<td>See Unit does not Operate Check indoor fan motor Check outdoor fan motor Check Fan Capacitors Check Compressor Check IPM PCB</td>
</tr>
</tbody>
</table>
TROUBLESHOOTING

Unit Does Not Operate

Remove Front Panel
(Figure 501)
Open Electrical Box
(Figure 505)

Check L1 and L2 for
line voltage (220-
265v) on Power PCB

Check LCDI Unit
power supply cord
for tripped circuit

Check the fuse on
the power PCB for
continuity with multi-
meter

Is Line voltage
Present

Replace fuse

Is the fuse open

Go to Next page and
continue troubleshooting

Reset cord and test
unit for proper
operation

Replace Power PCB
and Retest
Does fuse blow
again?

Replace IPM PCB
and Retest
Does fuse blow
again?

Replace Main PCB

End Process

Does Power cord
trip again?

End Process

Correct power
supply connections
or replace Power
cord

End Process

Trace back source
power to tripped
breaker or open
fuse

End Process

YES

YES

NO

YES

NO

YES

NO
TROUBLESHOOTING

Unit Does Not Operate

- Disconnect Display Connector CN6 on top of Main PCB
- Set multimeter to read low voltage DC and place multimeter leads on pins 3 and 7.
- Is Fluctuating 0-6Vdc Present?
  - NO: Continue troubleshooting on next page
  - YES: Check all wiring and comms cable connectors from Main PCB to the Power PCB
- Are any wires showing open (OL)?
  - NO: Replace Display Board
  - YES: Replace Connector cable
- Is Fluctuating 0-6Vdc Present?
  - NO: Fix any issues Reference wiring diagram (figure 803) Main PCB Diagram (Figure 7xx) Power PCB Diagram (Figure 7xx)
  - YES: Ensure all connectors are undamaged, fully connected and fully engaged.
- Any loose, damaged, or disconnected connectors?
  - NO: Is Fluctuating 0-6Vdc Present?
    - NO: Continue troubleshooting on next page
    - YES: Replace Display Board
- Set multimeter to read continuity. Check all wires on display board connector cable to CN6 plug for pin to pin continuity.

Figure 713
TROUBLESHOOTING

Check Heater Coil
The unit is equipped with a universal E-heater, which contains two independent heating elements. Two limit switches are incorporated into the heater assembly. The primary opens at 155°F and closes at 125°F. The secondary’s open temp is 200°F. They can not be replaced independantly. If they are found to be faulty the entire heater assembly must be replaced as a unit. The 9K BTU unit incorporates a 2.5kW and a 1.0kW element. The 12K BTU unit incorporates a 3.5kW and a 1.5kW element.

Gain Access to Main PCB (logic) board
1. Remove front panel (Figure 501).
2. Remove User Interface (Figures 502 thru 504).
3. Open Electrical Control Box (Figure 505)
4. Disconnect Red and Blue wires from the Heater relays (Figure 714)
5. Disconnect black wire from Power PCB (Figure 715)

Testing The Heating Element
Testing of the elements can be made with an ohmmeter across the terminals after the 3 heater wires have been disconnected. Readings should always been taken when coil is cold.

The 9K BTU unit incorporates a 2.5kW and 1.0kW heater coils.

1) Check 2.5 kW coil
   Blue (HeaterCommon) to Black (Heater 1)
   230v = 18.61 ohms +-3%
   265v = 24.70 ohms +-3%

2) Check 1.0 kW coil
   Blue (HeaterCommon) to Red (Heater 2)
   230v = 46.52 ohms +-3%
   265v = 61.73 ohms +-3%

The 12K BTU unit incorporates a 3.5kW and 1.5kW heater coils.

1) Check 3.5 kW coil
   Blue (HeaterCommon) to Black (Heater 1)
   230v = 13.29ohms +-3%
   265v = 17.64 ohms +-3%

2) Check 1.5 kW coil
   Blue (HeaterCommon) to Red (Heater 2)
   230v = 31.01 ohms +-3%
   265v = 41.76 ohms +-3%

If a reading is open or out of tolerance replace the heater assembly.

Reconnect wires and operate heat to place electric heater in demand-See sequence of operation for details.

Check 230/265v at output terminals on heater relays. If 230/265 volts is present and heater element does not toperate correctly, replace heater assembly. If 230/265 volts in not present, proceed to figure 717 (Check electric heater control)
TROUBLESHOOTING

Check Electric Heater Control

1. Replace Heater Assembly.
   Check Heater Assembly. Refer to Figures 714-716 on previous page. Does Heater Assembly check good?

2. Check line voltage connections at line block. Repair as required.
   Check for 230/265v across relay 1 black and relay 2 blue wire on com terminals. Is 230/265 present?

3. Replace Relays as required.
   Check for 12 vdc at heater relays. Is 12 VDC Present?

4. Replace or repair cables.
   Check CN2 and CN21 on Main PCB for 12 vdc. Is 12 VDC Present?

5. Replace Main PCB.
   Check for consistent 12-14 vdc at power relay connector on main PCB. Monitor voltage for a few minutes to ensure voltage does not drop off. Is 12 VDC Present?

6. Replace Power relays cable.
   Check for continuity end to end on power relays cable. Does Cable check good?

Figure 717
Check Thermistors

Gain Access to Main PCB (logic) board

1. Remove front panel (Figure 501).

2. Remove User Interface (Figures 502 thru 504).

3. Open electrical Control Box (Figure 505).

4. Using a multi meter ohm across applicable pins for the sensor you are checking.

5. Refer to thermistor charts for resistance and temperature deviation.

   - 5k Indoor ambient temperature (T1) Figure 719
   - 5k Indoor coil temperature (T2) Figure 719
   - 5k Outdoor coil temperature (T3) Figure 719
   - 5k Outdoor ambient temperature (T4) Figure 719
   - 50k Compressor discharge temp (T5) Figure 720
   - 5k Indoor outlet air temperature (T6) Figure 19

6. Replace sensor if open or if resistance values deviate by more than 10% of the listed values.
## TROUBLESHOOTING

Check Thermistors - Resistance Table of Thermistors (5K)

<table>
<thead>
<tr>
<th>Temp</th>
<th>Resis</th>
<th>Temp</th>
<th>Resis</th>
<th>Temp</th>
<th>Resis</th>
<th>Temp</th>
<th>Resis</th>
<th>Temp</th>
<th>Resis</th>
</tr>
</thead>
<tbody>
<tr>
<td>-33</td>
<td>130100</td>
<td>7</td>
<td>34252</td>
<td>47</td>
<td>10785</td>
<td>57</td>
<td>8275</td>
<td>97</td>
<td>3119</td>
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<td>-32</td>
<td>125518</td>
<td>8</td>
<td>33209</td>
<td>48</td>
<td>10499</td>
<td>58</td>
<td>8063</td>
<td>98</td>
<td>3048</td>
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<td>10221</td>
<td>59</td>
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<td>2980</td>
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<td>-30</td>
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# TROUBLESHOOTING

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250  189
Figure 802 (Used With Inverter Board PN XXX)
This illustrated part catalog has been written to help assist the technician to quickly locate the parts that he or she needs to make a repair.

The catalog is broken down into different figures which represent different modules of the air conditioning unit. For example; the chassis, refrigeration system, blower system, or electrical controls. Each figure contains an illustration(s) containing item numbers and a corresponding item list.

The item list contains the item number, part number, part description, the model it is used on, and the quantity used per figure. The models will end with a letter indicating the major revision of the model. for example; WCT12A30A. Choose the part that corresponds with the USED ON MODEL annotation that corresponds to your nameplate.

In some cases there will be an additional '-' letter indicating there has been a minor revision to that model which may have caused a part number change. For example; WCT12A30A-B. If there are minor revisions listed for a part, and the minor revision that is listed on your equipment’s nameplate is not listed in the manual please check our online parts viewer for the latest update. If you still require assistance, call Friedrich customer service (1-800-541-6645) for an explanation.

Items with a - in front of the item number (for example -10), are non illustrated items.

Items with an * in front of the number (for example *10) are non-stocked items. If you require these items contact Friedrich customer service at (1-800-541-6645) to check for availability and lead time.
PARTS CATALOG

PVH09K3FA, PVH09K3FB, PVH09R3FA, PVH09R3FB

PVH12K3FA, PVH12K3FB, PVH12R3FA, PVH12R3FB

NON-ILLUSTRATED PARTS
75 NOISE BLANKET
76 NOISE BLANKET CAP
77 DISCHARGE AIR SENSOR
78 ROOM AND COIL SENSOR PACK
79 AMBIENT SENSOR
80 DISCHARGE SENSOR
81 POWER CORD LCDI
82 PANEL CLIP
83 BELLOWS VALVE
### Parts Catalog

#### PVH09K3FA, PVH09K3FB, PVH09R3FA, PVH09R3FB

#### PVH12K3FA, PVH12K3FB, PVH12R3FA, PVH12R3FB

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## PARTS CATALOG

**PVH09K3FA, PVH09K3FB, PVH09R3FA, PVH09R3FB**

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# Parts Catalog

**PVH09K3FA, PVH09K3FB, PVH09R3FA, PVH09R3FB, PVH12K3FA, PVH12K3FB, PVH12R3FA, PVH12R3FB**

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PARTS CATALOG

PVH09K3FA, PVH09K3FB, PVH09R3FA, PVH09R3FB

PVH12K3FA, PVH12K3FB, PVH12R3FA, PVH12R3FB

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<td>TSTAT LOW VOLTAGE TERMINAL BLOCK</td>
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- ITEMS ARE NON- ILLUSTRATED
*ITEMS ARE NON-STOCKED, WILL NORMALLY REQUIRE EXTENDED LEAD TIME

Figure 901

PARTS CATALOG

PVH09K3FA, PVH09K3FB, PVH09R3FA, PVH09R3FB

PVH12K3FA, PVH12K3FB, PVH12R3FA, PVH12R3FB
## ACCESSORIES

### New Construction Accessories

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>PDXWSA</td>
<td>WALL SLEEVE Galvanized zinc coated steel is prepared in an 11-step process, then powder coated with a polyester finish and cured in an oven for exceptional durability. The wall sleeve is insulated for sound absorption and thermal efficiency, 16&quot; High x 42&quot; Wide x 13 3/4&quot; Deep.</td>
</tr>
<tr>
<td>PDXWSEXT</td>
<td>DEEP WALL SLEEVE EXTENSION For use when the wall is thicker than 13 1/4&quot; deep. The wall sleeve may be special ordered through your Sales Representative and will be cut to your specific depth requirements.</td>
</tr>
<tr>
<td>PXGA</td>
<td>GRILLE Standard, stamped aluminium, anodized to resist chalking and oxidation.</td>
</tr>
<tr>
<td>PXAA</td>
<td>ARCHITECTURAL GRILLES Consist of heavy-gauge 6063-T5 aluminum alloy: PXAA – Clear, extruded aluminum</td>
</tr>
<tr>
<td>PXBG</td>
<td>PXBG – Beige acrylic enamel</td>
</tr>
<tr>
<td>PXSC</td>
<td>PXSC – Also available in custom colors.</td>
</tr>
<tr>
<td>PXSE</td>
<td>SLEEVE EXTENSION RETROFIT KIT Galvanized zinc coated steel, 2.4&quot; sleeve extension attached to the room side of the sleeve to allow for the installation of a PD-Series Friedrich PTAC in a T-Series sleeve.</td>
</tr>
<tr>
<td>PXSBA</td>
<td>DECORATIVE SUBBASE Provides unit support for walls less than six inches thick. Includes leveling legs, side filler panels and mounting brackets for electrical accessories. Accepts circuit breaker, power disconnect switch, or conduit kit.</td>
</tr>
<tr>
<td>PXSBA</td>
<td>ELECTRICAL SUBBASE Provides unit support for walls less than six inches thick. Includes leveling legs, side filler panels, mounting brackets, a plug-in receptacle and field-wiring access. The subbase also includes electrical knockouts for a power disconnect switch or circuit breaker.</td>
</tr>
<tr>
<td>PXSBA</td>
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<tr>
<td>PXSBA</td>
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<tr>
<td>PXSBA</td>
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<tr>
<td>PXP C23015A</td>
<td>LCDI 230V 15A Cord - 2.5 kW 6 ft. length</td>
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<td>PXP C23020A</td>
<td>LCDI 230V 20A Cord - 3.5 kW 6 ft. length</td>
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<td>PXP C23030</td>
<td>LCDI 230V 30A Cord - 5.0 kW 6 ft. length</td>
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<tr>
<td>PXPC26515A</td>
<td>Non-LCDI 265V 15A Cord - 2.5 kW 18 inch length</td>
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<tr>
<td>PXPC26520A</td>
<td>Non-LCDI 265V 20A Cord - 3.5 kW 18 inch length</td>
</tr>
<tr>
<td>PXPC26530</td>
<td>Non-LCDI 265V 30A Cord - 5.0 kW 18 inch length</td>
</tr>
<tr>
<td>PXJC</td>
<td>CONDUIT KIT WITH JUNCTION BOX Hard wire conduit kit with junction box for 208/230V and 265V units (subbase not required). Kit includes a means of quick disconnect for easy removal of the chassis. *Required for 265V installations.</td>
</tr>
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## ACCESSORIES

<table>
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<th>Part Code</th>
<th>Description</th>
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<tr>
<td>PDXDAA</td>
<td>LATERAL DUCT ADAPTER Attaches to the Friedrich PTAC/PTHP unit to direct up to 35% of the total airflow to a second room. The unit mounted duct plenum features a front mounted aluminum grille that has two positions to provide the most optimal air direction. The air may be directed to either the left or the right of the unit through the supplied 3.5 H&quot; x 7 W&quot; x 47&quot; L plenum. Plenum may be cut to length by the installer. Kit includes duct plenum, front grille, 47&quot; duct extension, duct discharge grille, duct end cap and all necessary mounting hardware.</td>
</tr>
<tr>
<td>PDXDEA</td>
<td>LATERAL DUCT EXTENSION Additional 3.5 H&quot; x 7&quot; W x 47&quot; L plenum for use with the LATERAL DUCT ADAPTER. A maximum of 3 duct extensions total may be used. Note: Ducted airflow is reduced as duct length is increased.</td>
</tr>
<tr>
<td>PXFTA</td>
<td>REPLACEMENT FILTER PACK These are original equipment return air filters. They are reusable and can be cleaned by vacuuming, washing, or blowing out, and are sold in convenient ten-packs. (Two filters per chassis).</td>
</tr>
<tr>
<td>PXDR10</td>
<td>CONDENSATE DRAIN KIT Attaches to the bottom of the wall sleeve for internal draining of condensate or to the rear wall sleeve flange for external draining. Recommended on all units to remove excess condensate. Packaged in quantities of ten.</td>
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<tr>
<td>RT7</td>
<td>DIGITAL REMOTE WALL THERMOSTAT Single stage cool, single stage heat for PDE models or single stage cool, dual stage heat for PDH model thermostat features high/low fan speed switch. Thermostat is hard wired and can be battery powered or unit powered. Features backlit display and multiple configuration modes. For use on PD-series Friedrich PTACs and Vert-I-Paks.</td>
</tr>
<tr>
<td>RT7P</td>
<td>DIGITAL THERMOSTAT Wireless, single stage, wall-mounted digital thermostat with two fan speeds. Features backlit display and multiple configuration modes.</td>
</tr>
<tr>
<td>WRT2</td>
<td>DIGITAL THERMOSTAT Wireless, single stage, wall-mounted digital thermostat with two fan speeds. Features backlit display and multiple configuration modes.</td>
</tr>
<tr>
<td>PDXRTA</td>
<td>REMOTE THERMOSTAT ESCUTCHEON KIT This kit contains ten escutcheons that can be placed over the factory control buttons when a remote wall mounted thermostat is used. The escutcheon directs the guest to the wall thermostat for operation and retains the LED window to display error codes and diagnostic information.</td>
</tr>
<tr>
<td>EMWRT2</td>
<td>Wireless thermostat with occupancy sensor.</td>
</tr>
<tr>
<td>EMRT2</td>
<td>Wired thermostat with occupancy sensor.</td>
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# APPENDIX

## Reference Sheet of Celsius and Fahrenheit

Conversion formula for Fahrenheit degree and Celsius degree: $T_f = T_c \times 1.8 + 32$

### Set temperature

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<th>Fahrenheit display temperature (°F)</th>
<th>Fahrenheit (°F)</th>
<th>Celsius (°C)</th>
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### Ambient temperature

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<th>Celsius (°C)</th>
<th>Fahrenheit display temperature (°F)</th>
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<th>Celsius (°C)</th>
<th>Fahrenheit display temperature (°F)</th>
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<th>Celsius (°C)</th>
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WARRANTY

FRIEDRICH

Friedrich Air Conditioning Co.
10001 Reunion Place, San Antonio, TX 78216
800.541.6645
www.friedrich.com

PV-SERIES
PACKAGED TERMINAL AIR CONDITIONERS
LIMITED WARRANTY

SAVE THIS CERTIFICATE. It gives you specific rights. You may also have other rights which may vary from state to state and province to province.

In the event that your unit needs servicing, contact your nearest authorized service center. If you do not know the nearest service center, ask the company that installed your unit or contact us - see address and telephone number above. To obtain service and/or warranty parts replacement, you must notify an authorized FRIEDRICH Air Conditioning Co. service center, distributor, dealer, or contractor of any defect within the applicable warranty period.

When requesting service: please have the model and serial number from your unit readily available.

Unless specified otherwise herein, the following applies:

FRIEDRICH PACKAGED TERMINAL AIR CONDITIONERS AND HEAT PUMPS

LIMITED WARRANTY - YEAR TWO (Twenty Four (24) months from the date of installation). Any part found to be defective in the material or workmanship will be repaired or replaced free of charge by our authorized service center during the normal working hours; and

LIMITED WARRANTY - THIRD THROUGH FIFTH YEAR (Sixty (60) months from the date of installation). ON THE SEALED REFRIGERATION SYSTEM. Any part of the sealed refrigeration system that is defective in material or workmanship will be repaired or replaced free of charge (excluding freight charges) by our authorized service center during normal working hours. The sealed refrigeration system consists of the compressor, metering device, evaporator, condenser, reversing valve, check valve, and the interconnecting tubing.

These warranties apply only while the unit remains at the original site and only to units installed inside the continental United States, Alaska, Hawaii, Puerto Rico, Mexico and Canada. The warranty applies only if the unit is installed and operated in accordance with the printed instructions and in compliance with applicable local installation and building codes and good trade practices. For international warranty information, contact the Friedrich Air Conditioning Company - International Division.

Any defective part to be replaced must be made available to FRIEDRICH in exchange for the replacement part. Reasonable proof must be presented to establish the date of install, otherwise the beginning date of this certificate will be considered to be our shipment date plus sixty days. Replacement parts can be new or remanufactured. Replacement parts and labor are only warranted for any unused portion of the unit's warranty.

We will not be responsible for and the user will pay for:

1. Service calls to:
   A) Instruct on unit operation. B) Replace house fuses or correct house wiring. C) Clean or replace air filters. D) Remove the unit from its installed location when not accessible for service required. E) Correct improper installations.

2. Parts or labor provided by anyone other than an authorized service center.

3. Damage caused by:
   A) Accident, abuse, negligence, misuse, riot, fire, flood, or acts of God. B) Operating the unit where is a corrosive atmosphere containing chlorine, fluorine, or any damaging chemicals (other than in a normal residential environment). C) Unauthorized alteration or repair of the unit, which in turn affects its stability or performance. D) Failing to provide proper maintenance and service. E) Using an incorrect power source. F) Faulty installation or application of the unit.

We shall not be liable for any incidental, consequential, or special damages or expenses in connection with any use or failure of this unit. We have not made and do not make any representation or warranty fitness for a particular use or purpose and there is no implied condition of fitness for a particular use or purpose. We make no expressed warranties except as stated in this certificate. No one is authorized to change this certificate or to create for us any other obligation or liability in connection with this unit. Any implied warranties shall last for one year after the original purchase date. Some states and provinces do not allow limitations on how long an implied warranty or condition lasts, so the above limitations or exclusions may not apply to you. The provisions of this warranty are in addition to and not a modification of or subtraction from the statutory warranties and other rights and other rights and remedies provided by law.

Performance of Friedrich's Warranty obligation is limited to one of the following methods:

1. Repair of the unit
2. A refund to the customer for the prorated value of the unit based upon the remaining warranty period of the unit.
3. Providing a replacement unit of equal value

The method of fulfillment of the warranty obligation is at the sole discretion of Friedrich Air Conditioning.

In case of any questions regarding the provisions of this warranty, the English version will govern.
CUSTOMER SATISFACTION and QUALITY ASSURANCE
Friedrich is a conscientious manufacturer, concerned about customer satisfaction, product quality, and controlling warranty costs. As an Authorized Service Provider you play a vital role in these areas. By adhering to the policies and procedures you provide us with vital information on each warranty repair you complete. This information is used to identify product failure trends, initiate corrective action, and improve product quality, thereby further reducing warranty expenses while increasing customer satisfaction levels.

FRIEDRICH AUTHORIZED PARTS DEPOTS

AAA Refrigeration Service  
1322 24th Street, Suite B Kenner, Louisiana 70062 504-464-7444  
877-813-7444

The Gabbert Company  
6868 Ardmore  
Houston, Texas 77054  
713-747-4110  
800-458-4110

Reeve Air Conditioning, Inc.  
2501 South Park Road Hallandale, Florida  
33009 954-962-0252  
800-962-3383

Johnstone Supply of Woodside  
27-01 Brooklyn Queens Expway  
Woodside, New York 11377 718-545-5464  
800-431-1143