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General

These completely assembled 7-1/2 thru 20 ton evaporator blower units include a well insulated cabinet, a DX cooling coil with copper tubes and aluminum fins, expansion valve(s), distributor(s), throwaway filters, centrifugal blower(s), blower motor, completely wired control box and a small holding charge of dry nitrogen. Blower motors and adjustable drives are factory-installed on all units.

Supplemental resistance heaters, supply air plenums, return air grills, hot water coils, non-freeze steam coils, and bases are available as accessories for field installation.

The units are shipped in the vertical position ready for field installation.

Safety Considerations

Installer should pay particular attention to the words: NOTE, CAUTION, and WARNING. Notes are intended to clarify or make the installation easier. Cautions are given to prevent equipment damage. Warnings are given to alert installer that personal injury and/or equipment damage may result if installation procedure is not handled properly.

Additional information on the design, installation, operation and service of this equipment is available in the Technical Guide - 5123379.

Renewal Parts

Contact your local Source 1 parts distribution center for authorized replacement parts.

Agency Approvals

Design certified by CSA as follows:
1. For use as a (cooling coil, heat pump coil/air handler) only with or without supplemental electric heat.
2. For indoor installation only.

Inspection

As soon as a unit is received, it should be inspected for possible damage during transit. If damage is evident, the extent of the damage should be noted on the carrier's freight bill. A separate request for inspection by the carrier's agent should be made in writing.

Reference

This instruction covers the installation and operation of evaporator blower units. For information on the operation of matching condensing units, refer to Installation Manual - 5184277 for cooling units and Installation Manual - 5121844 for heat pumps.
Nomenclature

Configured Split Air Handler Model Number Nomenclature

- **Product Category**
  - N = Split System, Air Handler, AC & HP, R-410A

- **Product Identifier**
  - H = Standard Efficiency, 2-Pipe, R-410A
  - J = Standard Efficiency, 4-Pipe, R-410A

- **Nominal Cooling Capacity - MBH**
  - T07 = 7.5 Ton Available in 2-Pipe Only
  - T10 = 10 Ton
  - T15 = 15 Ton
  - T20 = 20 Ton
  - T25 = 25 Ton

1. NJT25 Not Offered

- **Heat Type & Nominal Heat Capacity**
  - C00 = Cooling Only

- **Product Options**
  - AA = No Options Installed
  - EJ = E-Coat Evaporator Coil

- **Installation Options**
  - A = None

- **Voltage**
  - 2 = 208/230-3-60
  - 4 = 460-3-60
  - 6 = 208/230/460-3-60
  - 5 = 575-3-60

2. NH/NJ-20 Airflow Option “F” Only.

- **Airflow**
  - B = 1.5 HP Motor
  - C = 2.0 HP Motor
  - D = 3 HP Motor
  - E = 5 HP Motor
  - F = 7.5 HP Motor
  - N = None (Motor Drive Kit Req)

3. Motors are not shipped with 25 ton Air Handler Units.
# Unit Application Data

## Table 1: Unit Application Data Indoor

<table>
<thead>
<tr>
<th>Model</th>
<th>Power Supply Voltage</th>
<th>Voltage Variation</th>
<th>Supply Air Range CFM</th>
<th>Entering Air Temperature Degrees °F</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHT07</td>
<td>208/230-3-60</td>
<td>187</td>
<td>253</td>
<td>2,250</td>
</tr>
<tr>
<td></td>
<td>460-3-60</td>
<td>414</td>
<td>506</td>
<td>2,250</td>
</tr>
<tr>
<td></td>
<td>575-3-60</td>
<td>540</td>
<td>630</td>
<td>2,250</td>
</tr>
<tr>
<td>NHT10</td>
<td>208/230-3-60</td>
<td>187</td>
<td>253</td>
<td>3,000</td>
</tr>
<tr>
<td></td>
<td>460-3-60</td>
<td>414</td>
<td>506</td>
<td>3,000</td>
</tr>
<tr>
<td></td>
<td>575-3-60</td>
<td>540</td>
<td>630</td>
<td>3,000</td>
</tr>
<tr>
<td>NJT10</td>
<td>208/230-3-60</td>
<td>187</td>
<td>253</td>
<td>3,000</td>
</tr>
<tr>
<td></td>
<td>460-3-60</td>
<td>414</td>
<td>506</td>
<td>3,000</td>
</tr>
<tr>
<td></td>
<td>575-3-60</td>
<td>540</td>
<td>630</td>
<td>3,000</td>
</tr>
<tr>
<td>NHT15</td>
<td>208/230-3-60</td>
<td>187</td>
<td>253</td>
<td>4,500</td>
</tr>
<tr>
<td></td>
<td>460-3-60</td>
<td>414</td>
<td>506</td>
<td>4,500</td>
</tr>
<tr>
<td></td>
<td>575-3-60</td>
<td>540</td>
<td>630</td>
<td>4,500</td>
</tr>
<tr>
<td>NJT15</td>
<td>208/230-3-60</td>
<td>187</td>
<td>253</td>
<td>4,500</td>
</tr>
<tr>
<td></td>
<td>460-3-60</td>
<td>414</td>
<td>506</td>
<td>4,500</td>
</tr>
<tr>
<td></td>
<td>575-3-60</td>
<td>540</td>
<td>630</td>
<td>4,500</td>
</tr>
<tr>
<td>NHT20</td>
<td>208/230-3-60</td>
<td>187</td>
<td>253</td>
<td>6,000</td>
</tr>
<tr>
<td></td>
<td>460-3-60</td>
<td>414</td>
<td>506</td>
<td>6,000</td>
</tr>
<tr>
<td></td>
<td>575-3-60</td>
<td>540</td>
<td>630</td>
<td>6,000</td>
</tr>
<tr>
<td>NJT20</td>
<td>208/230-3-60</td>
<td>187</td>
<td>253</td>
<td>6,000</td>
</tr>
<tr>
<td></td>
<td>460-3-60</td>
<td>414</td>
<td>506</td>
<td>6,000</td>
</tr>
<tr>
<td></td>
<td>575-3-60</td>
<td>540</td>
<td>630</td>
<td>6,000</td>
</tr>
</tbody>
</table>

1. Heating Min/Max temperatures apply to steam and hot water coils. NOTE: Do not apply steam to hot water coils.
Physical Data Indoor Unit

Table 2: Physical Data Indoor Unit

<table>
<thead>
<tr>
<th>Component</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NHT07</td>
</tr>
<tr>
<td>Nominal Tonnage</td>
<td>7 1/2</td>
</tr>
<tr>
<td>DIMENSIONS (inches)</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>56.0</td>
</tr>
<tr>
<td>Width</td>
<td>30.0</td>
</tr>
<tr>
<td>Height</td>
<td>65.0</td>
</tr>
<tr>
<td>WEIGHTS (lb)</td>
<td></td>
</tr>
<tr>
<td>Unit Shipping</td>
<td>526</td>
</tr>
<tr>
<td>Unit Operating With</td>
<td>498</td>
</tr>
<tr>
<td>Standard Motor and Drive</td>
<td>500</td>
</tr>
<tr>
<td>High Static Motor and Drive</td>
<td></td>
</tr>
<tr>
<td>INDOOR BLOWER (Forward Curve)</td>
<td>Diameter x Width</td>
</tr>
<tr>
<td>Quantity</td>
<td>1</td>
</tr>
<tr>
<td>INDOOR COIL</td>
<td></td>
</tr>
<tr>
<td>Face area (Sq. Ft.)</td>
<td>10.6</td>
</tr>
<tr>
<td>Rows</td>
<td>3</td>
</tr>
<tr>
<td>Fins per inch</td>
<td>15</td>
</tr>
<tr>
<td>Circuitry Type</td>
<td>Interlaced</td>
</tr>
<tr>
<td>Refrigerant Control</td>
<td>TXV</td>
</tr>
<tr>
<td>SYSTEM DATA</td>
<td></td>
</tr>
<tr>
<td>No. Refrigeration Circuits</td>
<td>1</td>
</tr>
<tr>
<td>Suction Line OD (in.)</td>
<td>1 1/8</td>
</tr>
<tr>
<td>Liquid Line OD (in.)</td>
<td>5/8</td>
</tr>
<tr>
<td>FILTERS</td>
<td></td>
</tr>
<tr>
<td>Size and Quantity Per Model (in.)</td>
<td>16 x 25 x 2</td>
</tr>
<tr>
<td></td>
<td>20 x 24 x 2</td>
</tr>
<tr>
<td>Face area (Sq. Ft.)</td>
<td>11.1</td>
</tr>
<tr>
<td>Size and Quantity Per Model (in.)</td>
<td>16 x 25 x 4</td>
</tr>
<tr>
<td></td>
<td>18 x 24 x 4</td>
</tr>
<tr>
<td>Face area (Sq. Ft.)</td>
<td>11.1</td>
</tr>
</tbody>
</table>

Air Discharge Conversion

These units are shipped for Vertical Airflow operation as seen in Figure 1 Position 1, but may be converted to Positions 2 thru 8 as well as for Horizontal Airflow operation illustrated in Figure 2 Positions 1 thru 8.

NOTE: Units that require bottom return conversion for vertical airflow operation Figure 1 positions 5, 6, 7, and 8 and horizontal air flow operation Figure 2 positions 5, 6, 7 and 8 require a field installed bottom return kit.

1BP0401 for 7.5 AND 10 TON
1BP0402 for 15 TON
1BP0403 for 20 TON

Conversion Example:

Convert Vertical Airflow Position 1 to Horizontal Airflow Position 1 as follows:

1. Remove the front panel from the blower section and set aside. Save the screws for Step 8.
2. Remove the four bolts that hold the coil section and blower section together. Save the bolts for Step 6.
3. Set the blower section aside.
4. Remove the evaporator section rear panel and set aside. Save the screws for Step 7.
5. Rotate the blower section and mate it to the hole left by removing the panel in Step 4.
6. Bolt the two sections together using the four 3/8" nut inserts provided with the bolts removed in Step 2.
7. Place the panel removed in Step 4 on top of the evaporator section and screw together.
8. Replace the panel removed in Step 1 on the blower section and screw together.
Figure 1: Vertical Airflow Arrangements

Figure 2: Horizontal Airflow Arrangements
Figure 3: Typical Cabinet Assembly

Unit Installation

Location
This split system evaporator unit is not designed for outdoor installation. It must be located inside a building structure, either inside or outside the conditioned space where it is protected from rain and other moisture.

The unit should be located as close to the condenser unit/heat pump as practical and positioned to minimize bends in the refrigerant piping.

This unit can be installed vertically or horizontally and can be set directly on a floor or platform, or supported by metal or wooden beams.

Rigging
Care must be taken when moving the unit. Do not remove any packaging until the unit is near the place of installation. SPREADER BARS SHOULD BE USED BETWEEN THE SLINGS TO PREVENT CRUSHING THE UNIT FRAME OR PANELS. When preparing to move the unit, always determine the center of gravity of the unit in order to equally distribute the weight. Rig the unit by attaching chain or cable slings around the bottom skid. A lift truck may be used to raise a unit to a suspended location. Refer to Table 4 for unit weights.

Clearances

Table 3: Minimum Clearances

<table>
<thead>
<tr>
<th>Minimum Clearances</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Top with Supply Air Opening¹</td>
<td>24&quot;</td>
</tr>
<tr>
<td>Front with Return Air Opening</td>
<td>24&quot;</td>
</tr>
<tr>
<td>Right Side with Access for Piping, Power &amp; Control Wiring Connections²</td>
<td>24&quot;</td>
</tr>
<tr>
<td>Left Side</td>
<td>24&quot;</td>
</tr>
<tr>
<td>Rear²</td>
<td>N/A</td>
</tr>
<tr>
<td>Bottom²</td>
<td>N/A</td>
</tr>
</tbody>
</table>

¹ This dimension will vary if an electric heater, a supply air plenum or a base is used.
² This dimension is required for normal installation and service.
³ Although no clearance is required for service and operation, some clearance may be required for routing the power and control wiring.
⁴ Allow enough clearance to trap the condensate drain line.

NOTE: If the coil has to be removed, the blower section can be unbolted and set aside and the coil can be lifted out the top of the evaporator section.
Mounting

The split system evaporator unit can be applied in various horizontal positions. Figure 4 shows recommended suspension rigging using properly sized all-thread and metal c-channel. All components to suspend the unit must be field supplied. Please refer to the unit's total weight, center of gravity and corner weights (Horizontal position) shown in the appropriate table for proper support sizing.

Figure 4: Typical Suspension of AHU’s From Ceiling
### Table 4: Corner Weights & Center of Gravity NH/NJ Units

<table>
<thead>
<tr>
<th>Model</th>
<th>Drive Options</th>
<th>Weight (lbs.)</th>
<th>Center of Gravity (in.)</th>
<th>4 Point Load Location (lbs.)</th>
<th>6 Point Load Location (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>Y</td>
<td>A</td>
</tr>
<tr>
<td><strong>Vertical Airflow</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHT07</td>
<td>Std. Mtr. and Drv.</td>
<td>524</td>
<td>16.2</td>
<td>26.7</td>
<td>109</td>
</tr>
<tr>
<td></td>
<td>High Static Mtr. and Drv.</td>
<td>526</td>
<td>16.2</td>
<td>26.7</td>
<td>110</td>
</tr>
<tr>
<td>NHT10</td>
<td>Std. Mtr. and Drv.</td>
<td>562</td>
<td>15.5</td>
<td>26.8</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>High Static Mtr. and Drv.</td>
<td>573</td>
<td>15.5</td>
<td>26.7</td>
<td>127</td>
</tr>
<tr>
<td>NJT10</td>
<td>Std. Mtr. and Drv.</td>
<td>564</td>
<td>15.5</td>
<td>26.9</td>
<td>126</td>
</tr>
<tr>
<td></td>
<td>High Static Mtr. and Drv.</td>
<td>575</td>
<td>15.5</td>
<td>26.9</td>
<td>128</td>
</tr>
<tr>
<td>NHT15</td>
<td>Std. Mtr. and Drv.</td>
<td>796</td>
<td>18.2</td>
<td>35.8</td>
<td>164</td>
</tr>
<tr>
<td></td>
<td>High Static Mtr. and Drv.</td>
<td>824</td>
<td>18.2</td>
<td>35.8</td>
<td>170</td>
</tr>
<tr>
<td>NJT15</td>
<td>Std. Mtr. and Drv.</td>
<td>796</td>
<td>18.2</td>
<td>35.8</td>
<td>164</td>
</tr>
<tr>
<td></td>
<td>High Static Mtr. and Drv.</td>
<td>824</td>
<td>18.2</td>
<td>35.8</td>
<td>170</td>
</tr>
<tr>
<td>NHT20</td>
<td>Std. Mtr. and Drv.</td>
<td>908</td>
<td>15.8</td>
<td>42.6</td>
<td>179</td>
</tr>
<tr>
<td></td>
<td>High Static Mtr. and Drv.</td>
<td>938</td>
<td>15.7</td>
<td>42.4</td>
<td>185</td>
</tr>
<tr>
<td>NJT20</td>
<td>Std. Mtr. and Drv.</td>
<td>908</td>
<td>15.8</td>
<td>42.6</td>
<td>179</td>
</tr>
<tr>
<td></td>
<td>High Static Mtr. and Drv.</td>
<td>938</td>
<td>15.7</td>
<td>42.4</td>
<td>185</td>
</tr>
</tbody>
</table>

| **Horizontal Airflow** |                          |               |   |   |   |   |   |   |   |   |   |   |   |   |
| NHT07     | Std. Mtr. and Drv.       | 524           | 30.1 | 26.7 | 118 | 119 | 131 | 130 | 79 | 79 | 87 | 87 | 87 | 87 |
|           | High Static Mtr. and Drv.| 526           | 30.1 | 26.7 | 119 | 120 | 132 | 130 | 79 | 79 | 88 | 87 | 87 | 87 |
| NHT10     | Std. Mtr. and Drv.       | 562           | 29.9 | 26.8 | 129 | 129 | 140 | 140 | 86 | 86 | 94 | 94 | 94 | 94 |
|           | High Static Mtr. and Drv.| 573           | 29.9 | 26.8 | 130 | 130 | 145 | 142 | 87 | 87 | 96 | 96 | 96 | 96 |
| NJT10     | Std. Mtr. and Drv.       | 564           | 29.9 | 26.9 | 131 | 130 | 140 | 140 | 87 | 87 | 93 | 93 | 93 | 93 |
|           | High Static Mtr. and Drv.| 575           | 30.2 | 26.9 | 132 | 133 | 144 | 142 | 88 | 88 | 96 | 96 | 96 | 96 |
| NHT15     | Std. Mtr. and Drv.       | 796           | 33.7 | 35.8 | 179 | 187 | 203 | 194 | 119 | 122 | 126 | 136 | 132 | 128 |
|           | High Static Mtr. and Drv.| 824           | 34.4 | 35.8 | 182 | 196 | 214 | 197 | 120 | 127 | 134 | 145 | 137 | 130 |
| NJT15     | Std. Mtr. and Drv.       | 796           | 33.7 | 35.8 | 179 | 187 | 203 | 194 | 119 | 122 | 126 | 136 | 132 | 128 |
|           | High Static Mtr. and Drv.| 824           | 34.4 | 35.8 | 182 | 196 | 214 | 197 | 120 | 127 | 134 | 145 | 137 | 130 |
| NHT20     | Std. Mtr. and Drv.       | 908           | 30.1 | 42.6 | 188 | 189 | 249 | 247 | 125 | 126 | 128 | 165 | 164 | 164 |
|           | High Static Mtr. and Drv.| 938           | 30.6 | 42.4 | 191 | 198 | 262 | 252 | 126 | 130 | 133 | 176 | 171 | 167 |
| NJT20     | Std. Mtr. and Drv.       | 908           | 30.1 | 42.6 | 188 | 189 | 249 | 247 | 125 | 126 | 128 | 165 | 164 | 164 |
|           | High Static Mtr. and Drv.| 938           | 30.6 | 42.4 | 191 | 198 | 262 | 252 | 126 | 130 | 133 | 176 | 171 | 167 |

---

**Diagram:**

- **Vertical Position:**
  - FRONT (A, D)
  - REAR (C, D)
  - LEFT (A, C)
  - RIGHT (B, C)
  - WIDTH (X)
  - LENGTH (Y)

- **Horizontal Position:**
  - FRONT (A, B)
  - REAR (C, D)
  - LEFT (A, B)
  - RIGHT (C, D)
  - HORIZONTAL POSITION (X)
  - VERTICAL POSITION (Y)
Duct Connections

Ductwork should always be suspended with hangers or supported by legs. It should never be fastened directly to the building structure.

Allow clearance around ducts for safety in the handling of heated air and for insulation when required.

Insulation

Ductwork insulation should meet the following criteria:

- Be used when ducts pass through an unconditioned space in the cooling season or through an unheated space during the heating season.
- Include a vapor barrier around the outside to prevent the absorption of moisture.
- Be no less than 2 inches thick with a weatherproof coating when applied to ducts exposed to outdoor conditions.

Supply Air Ducts

See Figure 5 for suggested method of connecting supply air ductwork. Non-flammable material collars should be used to minimize the transmission of noise and/or vibration.

NOTE: Consult local plumbing codes for type of glue required for drain connection.

Drain Connections

All drain lines MUST be trapped and located so they will not be exposed to freezing temperatures.

All evaporator blower units have a 3/4" ABS condensate stub at the end of a double sloped drain pan. The drain pan is removable and reversible. It can be unscrewed and slid out from one side of the evaporator section and installed in the other end.

Figure 5: Suggested Method For Connecting Ductwork

Figure 6: Recommended Drain Piping

Refrigerant Mains

This Split-System (Air Condensing / Heat Pump / Air Handling) unit is one component of an entire system. As such it requires specific application considerations with regard to the rest of the system (air handling unit, duct design, condensing unit, refrigerant piping and control scheme).

Failure to properly apply this equipment with the rest of the system may result in premature failure and/or reduced performance / increased costs. Warranty coverage specifically excludes failures due to improper application and Unitary Products specifically disclaims any liability resulting from improper application.

Please refer to the equipment Technical Guide, Installation Manual and the piping applications bulletin 247077 or call the applications department for Unitary Products @ 1-877-UPG-SERV for guidance.

Line Sizing

When sizing refrigerant pipe for a split-system air conditioner, check the following:

1. Suction line pressure drop due to friction.
2. Liquid line pressure drop due to friction.
3. Suction line velocity for oil return.
4. Liquid line pressure drop due to vertical rise. For certain piping arrangements, different sizes of suction line pipe may have to be used. The velocity of the refrigerant vapor must always be great enough to carry the oil back to the compressor.
5. **Evaporator Located Below Condenser** - On a split system where the evaporator blower is located below the condenser, the suction line must be sized for both pressure drop and for oil return.
6. **Condenser Located Below Evaporator** - When the condenser is located below the evaporator blower, the liquid line must be designed for the pressure drop due to both friction loss and vertical rise. If the pressure drop due to vertical rise and friction exceeds 60 psi, some refrigerant will flash before it reaches the thermal expansion valve.

**Flash gas:**
1. Increases the liquid line pressure loss due to friction that in turn causes further flashing.
2. Reduces the capacity of the refrigerant control device which starves the evaporator.
3. Erodes the seat of the refrigerant control device.
4. Causes erratic control of the refrigerant entering the evaporator.

**Take Adequate Precautions**

Many service problems can be avoided by taking adequate precautions to provide an internally clean and dry system and by using procedures and materials that conform to established standards.

Use hard drawn copper tubing where no appreciable amount of bending around pipes or other obstructions is necessary. If soft copper is used, care should be taken to avoid sharp bends that may cause a restriction. Pack fibreglass insulation and a sealing material such as permagum around refrigerant lines where they penetrate a wall to reduce vibrations and to retain some flexibility.

Support all tubing at minimum intervals with suitable hangers, brackets or clamps.

Braze all copper-to-copper joints with Silfos-5 or equivalent brazing material. Do not use soft solder. Insulate all suction lines with a minimum of 1/2” ARMAFLEX or equivalent that meets local code. Liquid lines exposed to direct sunlight and/or high temperatures must also be insulated. Never solder suction and liquid lines together. They can be taped together for convenience and support purposes, but they must be completely insulated from each other.

Before beginning installation of the main lines, be sure that the evaporator section has not developed a leak in transit. Check pressure at the Schrader valve located on the header of each coil. If pressure still exists in the system, it can be assumed to be leak free. If pressure DOES NOT exist the section will need to be repaired before evacuation and charging is performed.

A filter-drier MUST be field-installed in the liquid line of every system to prevent dirt and moisture from damaging the system. Properly sized filter-driers are shipped with each condensing section.

**NOTE:** Installing a filter-drier does not eliminate the need for the proper evacuation of a system before it is charged.

A field-installed moisture indicating sight-glass should be installed in the liquid line(s) between the filter-drier and the evaporator coil. The moisture indicating sight-glass can be used to check for excess moisture in the system.

The evaporator coil has copper sealing disks brazed over the ends of the liquid and suction connections. The temperature required to make or break a brazed joint is high enough to cause oxidation of the copper unless an inert atmosphere is provided.

**NOTE:** Dry Nitrogen should flow through the system at all times when heat is being applied and until the joint has cooled. The flow of Nitrogen will prevent oxidation of the copper lines during installation.

Always punch a small hole in sealing disks before unbrazing to prevent the pressure in the line from blowing them off. Do not use a drill as copper shavings can enter system.

**NOTE:** Solenoid and hot gas bypass valves (if used) should be opened manually or electrically during brazing or evacuating.

**NOTE:** Schrader valves located on unit service valves should have their stem removed during brazing to prevent damage to the valve.

**Start Installation**

Start Installation of main lines at the condenser unit. Verify the service valves are fully seated by screwing the stem of both valves down into the valve body until it stops. Remove the Schrader valve stem and connect a low-pressure nitrogen source to the service port on the suction line valve body. Punch a small hole in the sealing disk; the flow of Nitrogen will prevent any debris from entering the system. Wrap the valve body with a wet rag to prevent overheating during the brazing process. Overheating the valve will damage the valve seals. Unbraze the sealing disk, cool the valve body and prepare the joint for connections of the main lines. Repeat for the liquid line valve body.

---

**WARNING**

Never remove a cap from an access port unless the valve is fully back-seated with its valve stem in the maximum counter-clockwise position because the refrigerant charge will be lost. Always use a refrigeration valve wrench to open and close these service valves.
Connect the main liquid line to the liquid line connection on the condenser unit, while maintaining a flow of Nitrogen. Cool the valve body and replace the Schrader valve stem on the service port of the liquid line service valve.

Install the liquid line from the condenser unit to the evaporator liquid connection, maintaining a flow of nitrogen during all brazing operations.

The filter-drier and sight glass must be located in this line, leaving the O.D. unit.

Connect a low-pressure nitrogen source to the Schrader valve located on the evaporator section coil headers. Punch a small hole in the sealing disks, the flow of Nitrogen will prevent any debris from entering the system. Unbraze both liquid and suction sealing disks and prepare the joints for connections of the main lines.

Connect the main liquid line to the liquid line connection on the evaporator section, while maintaining a flow of Nitrogen.

Make the suction line connection at the evaporator and run the line to the condenser unit. Connect the main suction line to the suction line connection on the condenser unit, while maintaining a flow of nitrogen. Cool the valve body and replace the Schrader valve stem on the service port of the liquid line service valve.

Once the brazing process is complete, leak testing should be done on all interconnecting piping and the evaporator before proper evacuation to 500 microns is performed. Once the line set and evaporator section is properly evacuated the service valves can be opened and the condensing unit is now ready to charge with the appropriate weight of refrigerant.

**Expansion Valve Bulb Installation**

Thermal expansion valve bulbs are not factory-installed in their final locations. They are only temporarily secured for shipment. Thermal expansion valve bulbs are equipped with 60” capillary tubes to allow placement of the bulbs anywhere along the suction line; even outside the unit. Do not attempt to install the TXV bulb(s) until all other piping connections are complete.

**NHT07 thru T20 Models**

After all piping connections are made, the expansion valve bulbs may be mounted outside the unit by pulling them through the slotted bushing located on the patch plate and placed on the common suction line (See Figure 7). First, remove the bushing and slide the capillary tubes through the slot toward the center of the bushing. Reinsert the bushing, then fasten both bulbs in the 4 o'clock and/or 8 o'clock position using the bulb clamps provided. Insulate the bulbs to ensure proper valve operation.

**NJT10 thru T20 Models**

After all piping connections are made, fasten the expansion valve bulb from System 1 to the corresponding suction line in a 4 o'clock or 8 o'clock position using one of the bulb clamps provided. Repeat the procedure for System 2. Expansion valve bulbs may be mounted outside the unit by pulling them through the slotted bushing located on the patch plate and placed on the matching system suction line. Insulate the bulbs to ensure proper valve operation.

**WARNING**

Ensure the TXV bulbs are not crossed between systems. Undesirable performance and possible compressor damage may occur.

![Figure 7: TVX Bulb Location](image)

**Liquid Line Solenoids**

The NHT10 thru T20 units are shipped with factory installed, normally closed, liquid line solenoid valves on the second stage

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<th><strong>CAUTION</strong></th>
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<td>This system uses R-410A Refrigerant which operates at higher pressures than R-22. No other refrigerant may be used in this system. Gage sets, hoses, refrigerant containers and recovery systems must be designed to handle R-410A. If you are unsure, consult the equipment manufacturer. Failure to use R-410A compatible servicing equipment may result in property damage or injury.</td>
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<th><strong>WARNING</strong></th>
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<tr>
<td>Wear safety glasses and gloves when handling refrigerants. Failure to follow this warning can cause serious personal injury.</td>
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</table>
system. When the solenoid coil is energized with a 24-volt signal, the valve will open.

During brazing operations, the valves should be placed in the OPEN position by removing the stem cap with a 9/16" wrench, then rotating the exposed valve stem inward (CLOCKWISE), approximately 10-12 full turns (from the fully CLOSED position), using a 4" adjustable wrench.

The valve stems should be returned to the CLOSED (COUNTER-CLOCKWISE) position prior to the unit's operation.

**Air System Adjustment**

Refer to Tables 7 thru 14 to adjust the air system.

---

**Electrical Connections**

The electric box ships complete with contractor, transformer, relays, circuit breaker and terminal block for making field connections.

Refer to Typical Unit Wiring Diagrams.

Install a power supply to meet the electrical requirements listed in Table 5.

Provide a disconnect switch and fusing as required.

Install interconnecting control wiring between condensing section, evaporator system and room thermostat.

---

**Figure 8: Typical Simplified Field Wiring Diagram – NHT07 Evaporator with PHT07 Heat Pump Condenser**
Figure 9: Typical Simplified Field Wiring Diagram – NHT07 Evaporator
Figure 10: Typical Simplified Field Wiring Diagram – NHT10 thru T20 Evaporator with PHT10 thru T20 Heat Pump Condenser

Note: Do Not Use a heat Pump Thermostat

Figure 11: Typical NHT10 thru T20 Liquid Line Solenoid Wiring
Figure 12: Typical Simplified Field Wiring Diagram – NHT10 thru T20 Evaporator
Figure 13: Typical Simplified Field Wiring Diagram – NJT15 thru T20 Evaporator with PJT15 thru T20 Heat Pump Condenser

Figure 14: Typical Simplified Field Wiring Diagram – NJT15 thru T20 Evaporator
Figure 15: Typical Simplified Field Wiring Diagram – NHT07 Evaporator with YHT07 Condenser

Figure 16: Typical Simplified Field Wiring Diagram – NHT07 Evaporator
Figure 17: Typical Simplified Field Wiring Diagram – NHT10 thru T20 Evaporator with YHT10 thru T20 Condenser

NOTE: On non NH/NJ Evaporator models, isolation relays must be installed to avoid overloading on 75 VA transformers on the condensing unit.

Figure 18: Typical NHT10 thru T20 Liquid Line Solenoid Wiring
Figure 19: Typical Simplified Field Wiring Diagram – NHT10 thru T20 Evaporator
**CONDENSER CONTROL BOX**

![Condenser Control Box Diagram]

**EVAPORATOR CONTROL BOX**

![Evaporator Control Box Diagram]

**NOTE:** On non NH/NJ Evaporator models, isolation relays must be installed to avoid overloading on 75 VA transformers on the condensing unit.

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**Figure 20:** Typical Simplified Field Wiring Diagram – NJT10 thru T20 Evaporator with YJT10 thru T20 Condenser

**Figure 21:** Typical Simplified Field Wiring Diagram – NJT10 thru T20 Evaporator
## Electrical Data

### Table 5: Electrical Data - Evaporator Units

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<th>Supply Blower Motor</th>
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<td>10 KW</td>
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<td>36</td>
<td>2</td>
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<td>575-3-60</td>
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</tr>
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<td></td>
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<td>9.6</td>
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<td>16</td>
<td>2</td>
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<td>36 KW</td>
<td>36</td>
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<td>34.6</td>
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## Table 5: Electrical Data - Evaporator Units (Continued)

<table>
<thead>
<tr>
<th>Motor HP</th>
<th>Power Supply</th>
<th>Supply Blower Motor</th>
<th>Electric Heat Option</th>
<th>MCA(^1) (Amps)</th>
<th>Max Fuse(^2) Breaker(^3) Size (Amps)</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>208-3-60</td>
<td>9.6</td>
<td>None</td>
<td>---</td>
<td>---</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 KW 7.5</td>
<td>1</td>
<td>20.8</td>
<td>38</td>
</tr>
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<td>16 KW 12</td>
<td>2</td>
<td>33.4</td>
<td>53.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>26 KW 19.5</td>
<td>2</td>
<td>54.2</td>
<td>79.7</td>
</tr>
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<td></td>
<td>36 KW 27</td>
<td>2</td>
<td>75.1</td>
<td>105.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 KW* 37.6</td>
<td>2</td>
<td>104.2</td>
<td>142.5</td>
</tr>
</tbody>
</table>

| 230-3-60 | 9.4          | None                | ---                  | ---              | 11.8                                   |
|          |              | 10 KW 10            | 1                    | 24.1             | 41.8                                   |
|          |              | 16 KW 16            | 2                    | 38.5             | 59.9                                   |
|          |              | 26 KW 26            | 2                    | 62.5             | 89.9                                   |
|          |              | 36 KW 36            | 2                    | 86.6             | 120                                   |
|          |              | 50 KW* 50           | 2                    | 120.3            | 132                                   |

| 460-3-60 | 4.7          | None                | ---                  | ---              | 5.9                                    |
|          |              | 10 KW 10            | 1                    | 12               | 20.9                                   |
|          |              | 16 KW 16            | 2                    | 19.2             | 29.9                                   |
|          |              | 26 KW 26            | 2                    | 31.3             | 45                                    |
|          |              | 36 KW 36            | 2                    | 43.3             | 60                                    |
|          |              | 50 KW* 50           | 2                    | 60.1             | 66                                    |

| 575-3-60 | 3.6          | None                | ---                  | ---              | 4.5                                    |
|          |              | 10 KW 10            | 1                    | 9.6              | 16.5                                   |
|          |              | 16 KW 16            | 2                    | 15.4             | 23.7                                   |
|          |              | 26 KW 26            | 2                    | 25               | 35.8                                   |
|          |              | 36 KW 36            | 2                    | 34.6             | 47.8                                   |
|          |              | 50 KW* 50           | 2                    | 48.1             | 52.6                                   |

| 208-3-60 | 14.0         | None                | ---                  | ---              | 17.5                                   |
|          |              | 10 KW 7.5           | 1                    | 20.8             | 43.5                                   |
|          |              | 16 KW 12            | 2                    | 33.3             | 59.1                                   |
|          |              | 26 KW 19.5          | 2                    | 54.1             | 85.2                                   |
|          |              | 36 KW 27            | 2                    | 74.9             | 111.2                                  |
|          |              | 50 KW 37.6          | 2                    | 104.4            | 148.0                                  |

| 230-3-60 | 13.2         | None                | ---                  | ---              | 16.5                                   |
|          |              | 10 KW 10            | 1                    | 24.1             | 46.6                                   |
|          |              | 16 KW 16            | 2                    | 38.5             | 64.6                                   |
|          |              | 26 KW 26            | 2                    | 62.5             | 94.7                                   |
|          |              | 36 KW 36            | 2                    | 86.6             | 124.8                                  |
|          |              | 50 KW 50            | 2                    | 120.3            | 136.8                                  |

| 460-3-60 | 6.6          | None                | ---                  | ---              | 8.3                                    |
|          |              | 10 KW 10            | 1                    | 12.0             | 23.3                                   |
|          |              | 16 KW 16            | 2                    | 19.2             | 32.3                                   |
|          |              | 26 KW 26            | 2                    | 31.3             | 47.3                                   |
|          |              | 36 KW 36            | 2                    | 43.3             | 62.4                                   |
|          |              | 50 KW 50            | 2                    | 60.1             | 68.4                                   |

| 575-3-60 | 5.2          | None                | ---                  | ---              | 6.5                                    |
|          |              | 10 KW 10            | 1                    | 9.6              | 18.5                                   |
|          |              | 16 KW 16            | 2                    | 15.4             | 25.7                                   |
|          |              | 26 KW 26            | 2                    | 25.0             | 37.8                                   |
|          |              | 36 KW 36            | 2                    | 34.6             | 49.8                                   |
|          |              | 50 KW 50            | 2                    | 48.1             | 54.6                                   |
The information below should be used to assist in application of product when being applied at altitudes at or exceeding 1000 feet above sea level.

The air flow rates listed in the standard blower performance tables are based on standard air at sea level. As the altitude or temperature increases, the density of air decreases. In order to use the indoor blower tables for high altitude applications, certain corrections are necessary.

A centrifugal fan is a "constant volume" device. This means that, if the rpm remains constant, the CFM delivered is the same regardless of the density of the air. However, since the air at high altitude is less dense, less static pressure will be generated and less power will be required than a similar application at sea level. Air density correction factors are shown in Table 6 and Figure 22.
The examples below will assist in determining the airflow performance of the product at altitude.

**Example 1:** What are the corrected CFM, static pressure, and BHP at an elevation of 5,000 ft. if the blower performance data is 6,000 CFM, 1.5 IWC and 4.0 BHP?

**Solution:** At an elevation of 5,000 ft. the indoor blower will still deliver 6,000 CFM if the rpm is unchanged. However, the Altitude/Temperature Correction Factors table must be used to determine the static pressure and BHP. Since no temperature data is given, we will assume an air temperature of 70°F. The table shows the correction factor to be 0.832.

\[
\text{Corrected static pressure} = 1.5 \times 0.832 = 1.248 \text{ IWC}
\]

\[
\text{Corrected BHP} = 4.0 \times 0.832 = 3.328
\]

**Example 2:** A system, located at 5,000 feet of elevation, is to deliver 6,000 CFM at a static pressure of 1.5". Use the unit blower tables to select the blower speed and the BHP requirement.

**Solution:** As in the example above, no temperature information is given so 70°F is assumed.

The 1.5" static pressure given is at an elevation of 5,000 ft. The first step is to convert this static pressure to equivalent sea level conditions.

\[
\text{Sea level static pressure} = 1.5 / 0.832 = 1.80"\]

Enter the blower table at 6000 sCFM and static pressure of 1.8". The rpm listed will be the same rpm needed at 5,000 ft.

Suppose that the corresponding BHP listed in the table is 3.2. This value must be corrected for elevation.

\[
\text{BHP at 5,000 ft.} = 3.2 \times 0.832 = 2.66
\]
**Drive Selection**

1. Determine Upflow or Horizontal supply duct Application.
2. Determine desired airflow.
3. Calculate or measure the amount of external static pressure.
4. Using the operating point, determined from steps 1, 2 & 3, locate this point on the appropriate supply air blower performance table. (Linear interpolation may be necessary.)
5. Noting the RPM and BHP from step 4, locate the appropriate motor and/or drive on the RPM selection table.
6. Review the BHP compared to the motor options available. Select the appropriate motor and/or drive.
7. Review the RPM range for the motor options available. Select the appropriate drive if multiple drives are available for the chosen motor.
8. Determine turns open to obtain the desired operation point.

**Example**

1. 3250 CFM
2. 1.4 iwg
3. Using the supply air blower performance table below, the following data point was located: 1100 RPM & 1.8 BHP.
4. Using the RPM selection table below, Model X is found.
5. 1.8 BHP exceeds the maximum continuous BHP rating of the 1.5 HP motor. The 2 HP motor is required.
6. 1100 RPM is within the range of the 2 HP drives.
7. Using the 2 HP motor and drive, 1 turn open will achieve 1128 RPM.

**Airflow Performance**

**Example Supply Air Blower Performance**

<table>
<thead>
<tr>
<th>(CFM)</th>
<th>0.2</th>
<th>0.4</th>
<th>0.6</th>
<th>0.8</th>
<th>1.0</th>
<th>1.2</th>
<th>1.4</th>
<th>1.6</th>
<th>1.8</th>
<th>2.0</th>
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<tbody>
<tr>
<td>RPM</td>
<td>BHP</td>
<td>RPM</td>
<td>BHP</td>
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<td>RPM</td>
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<td>-----</td>
</tr>
<tr>
<td>3000</td>
<td>696</td>
<td>0.9</td>
<td>757</td>
<td>1.1</td>
<td>822</td>
<td>1.2</td>
<td>891</td>
<td>1.3</td>
<td>961</td>
<td>1.3</td>
</tr>
<tr>
<td>3250</td>
<td>729</td>
<td>1.1</td>
<td>790</td>
<td>1.3</td>
<td>855</td>
<td>1.4</td>
<td>924</td>
<td>1.5</td>
<td>984</td>
<td>1.6</td>
</tr>
<tr>
<td>3500</td>
<td>766</td>
<td>1.3</td>
<td>826</td>
<td>1.5</td>
<td>892</td>
<td>1.6</td>
<td>953</td>
<td>1.6</td>
<td>1010</td>
<td>1.8</td>
</tr>
</tbody>
</table>

**RPM Selection**

<table>
<thead>
<tr>
<th>Unit Model</th>
<th>HP</th>
<th>Max BHP</th>
<th>Motor Sheave</th>
<th>Blower Sheave</th>
<th>6 Turns Open</th>
<th>5 Turns Open</th>
<th>4 Turns Open</th>
<th>3 Turns Open</th>
<th>2 Turns Open</th>
<th>1 Turn Open</th>
<th>Fully Closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Std.</td>
<td>1.5</td>
<td>1.73</td>
<td>1VL40</td>
<td>AK69</td>
<td>N/A</td>
<td>690</td>
<td>743</td>
<td>796</td>
<td>849</td>
<td>902</td>
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<tr>
<td>HS</td>
<td>2</td>
<td>2.30</td>
<td>1VL40</td>
<td>AK56</td>
<td>N/A</td>
<td>863</td>
<td>929</td>
<td>995</td>
<td>1062</td>
<td>1128</td>
<td>1194</td>
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</tbody>
</table>

Johnson Controls Unitary Products
Airflow Performance

Table 7: NHT07 Upflow

<table>
<thead>
<tr>
<th>(CFM)</th>
<th>0.2 RPM BHP</th>
<th>0.4 RPM BHP</th>
<th>0.6 RPM BHP</th>
<th>0.8 RPM BHP</th>
<th>1.0 RPM BHP</th>
<th>1.2 RPM BHP</th>
<th>1.4 RPM BHP</th>
<th>1.6 RPM BHP</th>
<th>1.8 RPM BHP</th>
<th>2.0 RPM BHP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Std. 1.5 HP &amp; Field Supplied Drive</td>
<td>754 0.8</td>
<td>828 0.9</td>
<td>902 1.0</td>
<td>988 1.1</td>
<td>1051 1.3</td>
<td>1116 1.4</td>
<td>1183 1.5</td>
<td>High Static 2 HP &amp; Drive</td>
<td>Standard 1.5 HP &amp; Drive</td>
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</tr>
<tr>
<td>2250</td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2500</td>
<td>707 0.8</td>
<td>777 0.9</td>
<td>851 1.0</td>
<td>925 1.1</td>
<td>996 1.3</td>
<td>1059 1.4</td>
<td>1124 1.5</td>
<td>1191 1.7</td>
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<tr>
<td>2750</td>
<td>735 0.9</td>
<td>805 1.1</td>
<td>879 1.2</td>
<td>953 1.3</td>
<td>1012 1.4</td>
<td>1076 1.6</td>
<td>1141 1.7</td>
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<tr>
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<td>705 1.0</td>
<td>767 1.1</td>
<td>837 1.2</td>
<td>911 1.3</td>
<td>973 1.5</td>
<td>1035 1.6</td>
<td>1099 1.7</td>
<td>1164 1.9</td>
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<td>Exceeds BHP Limitations</td>
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<td>741 1.1</td>
<td>802 1.3</td>
<td>872 1.4</td>
<td>947 1.5</td>
<td>1002 1.7</td>
<td>1064 1.8</td>
<td>1127 2.0</td>
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</tr>
<tr>
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<td>780 1.4</td>
<td>842 1.5</td>
<td>912 1.6</td>
<td>974 1.8</td>
<td>1035 1.9</td>
<td>1097 2.1</td>
<td>1161 2.2</td>
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</tr>
<tr>
<td>3750</td>
<td>823 1.6</td>
<td>884 1.7</td>
<td>954 1.9</td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>

1. Airflow performance includes dry evaporator coil. See Static Resistance table for additional applications.
2. See RPM Selection table to determine desired motor sheave setting and to determine the maximum continuous BHP.
3. kW = BHP x 0.746 ÷ nameplate rated motor efficiency.

Table 8: NHT07 Horizontal

<table>
<thead>
<tr>
<th>(CFM)</th>
<th>0.2 RPM BHP</th>
<th>0.4 RPM BHP</th>
<th>0.6 RPM BHP</th>
<th>0.8 RPM BHP</th>
<th>1.0 RPM BHP</th>
<th>1.2 RPM BHP</th>
<th>1.4 RPM BHP</th>
<th>1.6 RPM BHP</th>
<th>1.8 RPM BHP</th>
<th>2.0 RPM BHP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Std. 1.5 HP &amp; Field Supplied Drive</td>
<td>747 0.8</td>
<td>816 0.9</td>
<td>889 1.0</td>
<td>954 1.2</td>
<td>1013 1.3</td>
<td>1071 1.5</td>
<td>1128 1.6</td>
<td>High Static 2 HP &amp; Drive</td>
<td>Standard 1.5 HP &amp; Drive</td>
<td></td>
</tr>
<tr>
<td>2250</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2500</td>
<td>703 0.8</td>
<td>768 0.9</td>
<td>837 1.0</td>
<td>909 1.1</td>
<td>977 1.2</td>
<td>1036 1.4</td>
<td>1094 1.5</td>
<td>1151 1.7</td>
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<td></td>
</tr>
<tr>
<td>2750</td>
<td>728 0.9</td>
<td>793 1.0</td>
<td>862 1.1</td>
<td>934 1.2</td>
<td>998 1.4</td>
<td>1056 1.5</td>
<td>1114 1.7</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3000</td>
<td>696 0.9</td>
<td>757 1.1</td>
<td>822 1.2</td>
<td>891 1.3</td>
<td>961 1.4</td>
<td>1019 1.6</td>
<td>1077 1.7</td>
<td>1135 1.9</td>
<td></td>
<td>Exceeds BHP Limitations</td>
</tr>
<tr>
<td>3250</td>
<td>729 1.1</td>
<td>790 1.3</td>
<td>855 1.4</td>
<td>924 1.5</td>
<td>984 1.6</td>
<td>1042 1.8</td>
<td>1100 1.9</td>
<td>1159 2.1</td>
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</tr>
<tr>
<td>3500</td>
<td>766 1.3</td>
<td>826 1.5</td>
<td>892 1.6</td>
<td>953 1.8</td>
<td>1010 1.9</td>
<td>1069 2.0</td>
<td>1127 2.2</td>
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<td></td>
</tr>
<tr>
<td>3750</td>
<td>806 1.6</td>
<td>867 1.7</td>
<td>932 1.8</td>
<td>984 1.9</td>
<td>1041 2.1</td>
<td>1099 2.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Airflow performance includes dry evaporator coil. See Static Resistance table for additional applications.
2. See RPM Selection table to determine desired motor sheave setting and to determine the maximum continuous BHP.
3. kW = BHP x 0.746 ÷ nameplate rated motor efficiency.
1. Airflow performance includes dry evaporator coil. See Static Resistance table for additional applications.
2. See RPM Selection table to determine desired motor sheave setting and to determine the maximum continuous BHP.
3. \(\text{kW} = \text{BHP} \times 0.746 \div \text{nameplate rated motor efficiency.}\)

### Table 9: NH/NJT10 Upflow

<table>
<thead>
<tr>
<th>(CFM)</th>
<th>Available External Static Pressure - IWG</th>
<th>0.2</th>
<th>0.4</th>
<th>0.6</th>
<th>0.8</th>
<th>1.0</th>
<th>1.2</th>
<th>1.4</th>
<th>1.6</th>
<th>1.8</th>
<th>2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RPM</td>
<td>BHP</td>
<td>RPM</td>
<td>BHP</td>
<td>RPM</td>
<td>BHP</td>
<td>RPM</td>
<td>BHP</td>
<td>RPM</td>
<td>BHP</td>
<td>RPM</td>
</tr>
<tr>
<td>Std. 2 HP &amp; Field Supplied Drive</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2500</td>
<td>671</td>
<td>0.8</td>
<td>728</td>
<td>0.9</td>
<td>788</td>
<td>1.0</td>
<td>853</td>
<td>1.1</td>
<td>926</td>
<td>1.3</td>
<td>975</td>
</tr>
<tr>
<td>2750</td>
<td>684</td>
<td>0.9</td>
<td>741</td>
<td>1.0</td>
<td>801</td>
<td>1.1</td>
<td>866</td>
<td>1.2</td>
<td>933</td>
<td>1.4</td>
<td>982</td>
</tr>
<tr>
<td>3000</td>
<td>701</td>
<td>1.0</td>
<td>757</td>
<td>1.1</td>
<td>817</td>
<td>1.3</td>
<td>882</td>
<td>1.4</td>
<td>941</td>
<td>1.5</td>
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### Table 10: NH/NJT10 Horizontal

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1. Airflow performance includes dry evaporator coil. See Static Resistance table for additional applications.
2. See RPM Selection table to determine desired motor sheave setting and to determine the maximum continuous BHP.
3. \(\text{kW} = \text{BHP} \times 0.746 \div \text{nameplate rated motor efficiency.}\)
Table 11: NH/NJT15 Upflow

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1. Airflow performance includes dry evaporator coil. See Static Resistance table for additional applications.
2. See RPM Selection table to determine desired motor sheave setting and to determine the maximum continuous BHP.
3. $kW = \text{BHP} \times 0.746 \div \text{nameplate rated motor efficiency}$.

Table 12: NH/NJT15 Horizontal

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1. Airflow performance includes dry evaporator coil. See Static Resistance table for additional applications.
2. See RPM Selection table to determine desired motor sheave setting and to determine the maximum continuous BHP.
3. $kW = \text{BHP} \times 0.746 \div \text{nameplate rated motor efficiency}$.
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1. Airflow performance includes dry evaporator coil. See Static Resistance table for additional applications.
2. See RPM Selection table to determine desired motor sheave setting and to determine the maximum continuous BHP.
3. kW = BHP x 0.746 + nameplate rated motor efficiency.
### Table 15: RPM Selection

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<th>Unit Model</th>
<th>HP</th>
<th>Max BHP</th>
<th>Motor Sheave</th>
<th>Blower Sheave</th>
<th>6 Turns Open</th>
<th>5 Turns Open</th>
<th>4 Turns Open</th>
<th>3 Turns Open</th>
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1. Setting not available.
2. Setting not recommended for use with Type B v-belts.
Table 16: Additional Static Resistance

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<th>Bottom Return</th>
<th>Electric Heat kW</th>
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<th>Wet Indoor 1</th>
<th>2&quot; Filters</th>
<th>Bottom Return</th>
<th>Electric Heat kW</th>
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1. Pressure drop added by condensate over a dry coil.
To check the supply air CFM after the initial balancing has been completed:

1. Drill two (2) 5/16-inch holes in the side panel as shown in Figure 23.

2. Insert at least 8 inches of 1/4 inch tubing into each of these holes for sufficient penetration into the airflow on both sides of the evaporator coil.

3. Using an inclined manometer, determine the pressure drop across a dry evaporator coil. Since the moisture on an evaporator coil may vary greatly, measuring the pressure drop across the wet coil under field conditions would be inaccurate. To assure a dry coil, the refrigerant system should be de-activated while the test is being run.

4. Knowing the pressure drop across a dry coil, the actual CFM through the unit can be determined from the curves shown in Figure 24.

If the CFM is above or below the specified value, the supply air motor pulley may have to be readjusted. After one hour of operation, check the belt and pulleys for tightness and alignment.

Failure to properly adjust the total system air quantity can result in extensive blower damage.

After readings have been obtained, remove the tubes and seal up the drilled holes in the side panel. 5/16 inch dot plugs (P/N 029-12880) are available from your local Source 1 parts distribution center.
Figure 24: Pressure Drop Across A Dry Indoor Coil vs. Supply Air CFM
Belt Tension

The tension on the belt should be adjusted as shown in Figure 25.

**Figure 25: Belt Adjustment**

- **DEFL. FORCE**
- **SPAN LENGTH**
- **A**
- **B**
- **C**
- **STATIONARY WEB**

**Procedure for adjusting belt tension:**
1. Loosen four nuts (top and bottom) of the Belt Adjust/Motor Mounting Bracket (A).
2. Loosen Lock Nut (C).
3. Adjust by turn Belt Tensioning Bolt (B).
4. Use belt tension checker to apply a perpendicular force to one belt at the midpoint of the span as shown. Deflection distance of 4mm (5/32”) is obtained.

To determine the deflection distance from normal position, use a straight edge from sheave to sheave as reference line. The recommended deflection force is as follows:
   - Tension new belts at the max. deflection force recommended for the belt section. Check the belt tension at least two times during the first 24 hours of operation. Any retensioning should fall between the min. and max. deflection force values.
5. After adjusting re-tighten nuts (A) and Lock Nut (C).

**Twin Belt Drive Adjustment (T15 - T20 Models Only)**

Check to see if both belts drive at the same speed. Do this by making a mark across both belts. Turn the drive several revolutions by hand. If the mark has not separated, the belts are traveling at the same speed.

Twin groove blower motor pulleys should be installed with the shaft set screw (A) towards the motor (see Figure 26).

**Figure 26: Double Groove Pulley**

If necessary to align pulleys, the housing of the twin groove motor pulley may extend 25% of its length beyond end of motor shaft.

Always align twin groove pulleys using the stationary web.

The blower motor pulleys are adjustable by half turns. Select required RPM from Airflow Performance tables and adjust pulley.
Sequence of Operation

Blower Sequence of Operation

Continuous Blower

Set the room thermostat fan switch to "ON". The 24V signal provided to the "G1" terminal directly from the thermostat or from the condenser / heat pump closes the coil of the fan motor relay (BR1).

- Relay BR1 controls the coil for contactor M1.
- Contactor M1 controls the indoor fan motor FM1.

Intermittent Blower

Set the room thermostat fan switch to "AUTO" and set the system switch to "AUTO" or "HEAT". During a call for cooling or heating, the 24V signal provided to the "G1" terminal directly from the thermostat or from the condenser / heat pump closes the coil of the fan motor relay (BR1).

- Relay BR1 controls the coil for contactor M1.
- Contactor M1 controls the indoor fan motor FM1.

Cooling Sequence of Operation

Single Stage Evaporator Unit (NHT07)

No addition input signal is required to operate the evaporator unit during cooling. The evaporator coil operates with only one system of cooling.

Dual Stage, 2-Pipe Evaporator Unit (NHT10 thru T20)

When the thermostat calls for the first stage of cooling (Y1), a 24V signal is provided to the "S1" terminal directly from the condenser / heat pump. This signal closes the coil of the solenoid control relay (RY1). The evaporator coil operates the lower refrigeration system only.

When the thermostat calls for the second stage of cooling (Y2), a 24V signal is provided to the "S2" terminal directly from the condenser / heat pump. This signal closes the coil of the solenoid control relay (RY2). The relays RY1 and RY2 operating in series then energize the solenoid valve (1LLS) allowing refrigerant to flow through the upper refrigeration system.

NOTE: The unit controls are designed to allow lead-lag compressor operation. When both compressors are operating, the solenoid valve opens. If either compressor stops, its matching solenoid control relay closes thus closing shutting down the upper refrigeration system.

Dual Stage, 4-Pipe Evaporator Unit (NJT10 thru T20)

No addition input signal is required to operate the evaporator unit during cooling. The evaporator coil operates with two independent, fully intertwined systems of cooling.

Maintenance

Filters must be cleaned or replaced as often as necessary to assure good airflow and filtering action.

To remove filters through the side of the unit, remove the solid side panel from either end of the unit.

To remove the filters from the front of the unit, open access panel. The filters can be lifted out through the access panel.

The drain pan should be inspected regularly to assure proper drainage.

Blower bearings and motor bearings are permanently lubricated.
Figure 27: Unit Dimensions NHT07/T10 & NJT10

NOTE: Use System 1 piping dimensions when applying a NHT07/T10 model system.
Figure 24: Unit Dimensions NHT07/T10 & NJT10 (Continued)
Figure 28: Unit Dimensions NH/NJT15

NOTE: Use System 1 piping dimensions when applying a NHT15 model system.
Figure 25: Unit Dimensions NH/NJT15 (Continued)
Figure 29: Unit Dimensions NH/NJT20

NOTE: Use System 1 piping dimensions when applying a NHT20 model system.
Figure 26: Unit Dimensions NH/NJT20 (Continued)
Table 18: Piping, Electrical and Duct Opening Connection Sizes

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<td>Length</td>
<td>52.0</td>
<td>52.0</td>
<td>52.0</td>
<td>71.9</td>
<td>71.9</td>
<td>93.4</td>
<td>93.4</td>
</tr>
</tbody>
</table>
Typical Wiring Diagrams

Air Handling Units

Figure 30: Typical NHT07 Wiring Diagram
Figure 31: Typical NHT10 thru T20, 1.5 Thru 5.0 HP Blower Motor Only Wiring Diagram
Figure 32: Typical NHT20, 7.5 HP Blower Motor 208/230 Volt Only Wiring Diagram
Figure 33: Typical NHT20, 7.5 HP Blower Motor 460/575 Volt Only Wiring Diagram
Figure 34: Typical NJT10 thru T20, 1.5 Thru 5.0 HP Blower Motor Only Wiring Diagram
Figure 36: Typical NJT20, 7.5 HP Blower Motor 460/575 Volt Only Wiring Diagram
START-UP & SERVICE DATA INSTRUCTION

COMMERCIAL SPLIT SYSTEMS

7.5 To 50.0 TON

START-UP CHECKLIST

Date: _______________________________________________________________________________________________________
Job Name: __________________________________________________________________________________________________
Customer Name: _____________________________________________________________________________________________
Address: ____________________________________________________________________________________________________
City: ______________________________   State: ______________________________   Zip: ________________________________
Evaporator Model Number: _______________________________ Serial Number: __________________________________________
Condenser Model Number: _______________________________ Serial Number: __________________________________________
Qualified Start-up Technician: _________________________________ Signature: _________________________________________
HVAC Contractor: _________________________________________________________ Phone: _____________________________
Address: ____________________________________________________________________________________________________
Contractor’s E-mail Address: ____________________________________________________________________________________
Electrical Contractor: _________________________________________________________  Phone:___________________________
Distributor Name: ___________________________________________________________   Phone: ___________________________

WARRANTY STATEMENT

Johnson Controls/UPG is confident that this equipment will operate to the owner's satisfaction if the proper procedures are followed and checks are made at initial start-up. This confidence is supported by the 30 day dealer protection coverage portion of our standard warranty policy which states that Johnson Controls/UPG will cover parts and labor on new equipment start-up failures that are caused by a defect in factory workmanship or material, for a period of 30 days from installation. Refer to current standard warranty policy and warranty manual found on UPGnet for details.

In the event that communication with Johnson Controls/UPG is required regarding technical and/or warranty concerns, all parties to the discussion should have a copy of the equipment start-up sheet for reference. A copy of the original start-up sheet should be filed with the Technical Services Department.

The packaged unit is available in constant or variable air volume versions with a large variety of custom options and accessories available. Therefore, some variation in the startup procedure will exist depending upon the products capacity, control system, options and accessories installed.

This start-up sheet covers all startup check points common to all package equipment. In addition it covers essential startup check points for a number of common installation options. Depending upon the particular unit being started not all sections of this startup sheet will apply. Complete those sections applicable and use the notes section to record any additional information pertinent to your particular installation.

Warranty claims are to be made through the distributor from whom the equipment was purchased.

EQUIPMENT STARTUP

Use the local LCD or Mobile Access Portal (MAP) Gateway to complete the start-up.

A copy of the completed start-up sheet should be kept on file by the distributor providing the equipment and a copy sent to:

Johnson Controls/UPG
Technical Services Department
5005 York Drive
Norman, OK 73069

1034350-UCL-D-0817
SAFETY WARNINGS

The inspections and recording of data outlined in this procedure are required for start-up of Johnson Controls/UPG's packaged products. Industry recognized safety standards and practices must be observed at all times. General industry knowledge and experience are required to assure technician safety. It is the responsibility of the technician to assess all potential dangers and take all steps warranted to perform the work in a safe manner. By addressing those potential dangers, prior to beginning any work, the technician can perform the work in a safe manner with minimal risk of injury.

NOTE: Read and review this entire document before beginning any of the startup procedures.

DESIGN APPLICATION INFORMATION

This information will be available from the specifying engineer who selected the equipment. If the system is a VAV system the CFM will be the airflow when the remote VAV boxes are in the full open position and the frequency drive is operating at 60 HZ. Do not proceed with the equipment start-up without the design CFM information.

Design Supply Air CFM: __________________________ Design Return Air CFM: __________________________
Design Outdoor Air CFM At Minimum Position: _______________________________________________________
Total External Static Pressure: __________________________________________________________________
Supply Static Pressure: ___________________________________________________________________________
Return Static Pressure: ___________________________________________________________________________
Design Building Static Pressure: __________________________________________________________________

ADDITIONAL APPLICATION NOTES FROM SPECIFYING ENGINEER:
### General Inspection

<table>
<thead>
<tr>
<th>Description</th>
<th>Completed</th>
<th>See Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit inspected for shipping, storage, or rigging damage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit installed with proper clearances</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit installed within slope limitations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigeration system checked for gross leaks (presence of oil)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminal screws and wiring connections checked for tightness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filters installed correctly and clean</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condensate drain trapped properly, refer to Installation Manual</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All field wiring (power and control) complete</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Refrigerant Line Inspection

<table>
<thead>
<tr>
<th>Description</th>
<th>System 1</th>
<th>System 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is Condenser below Evaporator?</td>
<td>Yes ☐</td>
<td>No ☐</td>
</tr>
<tr>
<td>Total Line Length end to end.</td>
<td>_____ Ft.</td>
<td>_____ Ft.</td>
</tr>
<tr>
<td>Vertical Lift in Ft.</td>
<td>_____ Ft.</td>
<td>_____ Ft.</td>
</tr>
<tr>
<td>Vertical Fall in Ft.</td>
<td>_____ Ft.</td>
<td>_____ Ft.</td>
</tr>
<tr>
<td>Number of Elbows?</td>
<td>_____ Ea.</td>
<td>_____ Ea.</td>
</tr>
<tr>
<td>Liquid Line Size</td>
<td>_____ Ea.</td>
<td>_____ Ea.</td>
</tr>
<tr>
<td>Suction Line Size</td>
<td>_____ Ea.</td>
<td>_____ Ea.</td>
</tr>
<tr>
<td>Solenoid Valve?</td>
<td>Yes ☐</td>
<td>No ☐</td>
</tr>
<tr>
<td>Check Valves?</td>
<td>Yes ☐</td>
<td>No ☐</td>
</tr>
<tr>
<td>Check Valves / Solenoid arrangements installed as per UPG Piping Guide</td>
<td>Yes ☐</td>
<td>No ☐</td>
</tr>
<tr>
<td>Oil Separator ?</td>
<td>Yes ☐</td>
<td>No ☐</td>
</tr>
<tr>
<td>Accumulator ?</td>
<td>Yes ☐</td>
<td>No ☐</td>
</tr>
<tr>
<td>TXV - Hard shutoff</td>
<td>Yes ☐</td>
<td>No ☐</td>
</tr>
<tr>
<td>Heatpump</td>
<td>Yes ☐</td>
<td>No ☐</td>
</tr>
</tbody>
</table>

### Air Moving Inspection

<table>
<thead>
<tr>
<th>Description</th>
<th>Completed</th>
<th>See Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment of drive components</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belt tension adjusted properly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blower pulleys tight on shaft, bearing set screws tight, wheel tight to shaft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure switch or transducer tubing installed properly</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Operating Measurements - Air Flow

Fan operates with proper rotation (All VFD equipped units with the optional Manual Bypass must be phased for correct blower rotation with the Bypass switch set in the LINE position).

<table>
<thead>
<tr>
<th>Fan Type</th>
<th>ID Fans</th>
<th>Exh. Fans</th>
<th>Cond. Fans</th>
</tr>
</thead>
<tbody>
<tr>
<td>IWC</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pressure drop across dry evaporator coil (At maximum design CFM):

<table>
<thead>
<tr>
<th>Fan Type</th>
<th>Supply CFM Using Dry Coil Chart</th>
<th>Final Adjusted Supply Air CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>IWC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Consult the proper airflow to pressure drop table to obtain the actual airflow at the measured pressure differential.
2. Was a motor pulley adjustment or change required to obtain the correct airflow?
   - Was it necessary to increase or decrease the airflow to meet the design conditions?
   - If the motor pulley size was changed, measure the outside diameters of the motor and blower pulleys and record those diameters here:
     - Blower Motor HP _______________________________ FLA _______ RPM _______
     - Pulley Pitch Diameter ________________ Turns Out _______ Final Turns Out _______
     - Blower Pulley Pitch Diameter ___________ Fixed Sheave ___________________

### ELECTRICAL DATA

<table>
<thead>
<tr>
<th>Device</th>
<th>Nameplate</th>
<th>Measured List All Three Amperages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>AMPS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Device</th>
<th>AMPS</th>
<th>AMPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Fan Motor</td>
<td>AMPS</td>
<td>AMPS</td>
</tr>
<tr>
<td>Condenser Fan #1</td>
<td>AMPS</td>
<td>AMPS</td>
</tr>
<tr>
<td>Condenser Fan #2 (if equipped)</td>
<td>AMPS</td>
<td>AMPS</td>
</tr>
<tr>
<td>Condenser Fan #3 (if equipped)</td>
<td>AMPS</td>
<td>AMPS</td>
</tr>
<tr>
<td>Condenser Fan #4 (if equipped)</td>
<td>AMPS</td>
<td>AMPS</td>
</tr>
<tr>
<td>Compressor #1</td>
<td>AMPS</td>
<td>AMPS</td>
</tr>
<tr>
<td>Compressor #2 (if equipped)</td>
<td>AMPS</td>
<td>AMPS</td>
</tr>
<tr>
<td>Compressor #3 (if equipped)</td>
<td>AMPS</td>
<td>AMPS</td>
</tr>
<tr>
<td>Compressor #4 (if equipped)</td>
<td>AMPS</td>
<td>AMPS</td>
</tr>
</tbody>
</table>

1. VAV units with heat section - simulate heat call to drive VAV boxes and VFD/IGV to maximum design airflow position.
2. VAV units without heat section - VAV boxes must be set to maximum design airflow position.

Notes above apply for 3rd party application only.
### OPERATING MEASUREMENTS - COOLING

<table>
<thead>
<tr>
<th>Stage</th>
<th>Discharge Pressure</th>
<th>Discharge Temp.</th>
<th>Liquid Line Pressure At Service Valve</th>
<th>Liquid Line Temp.</th>
<th>Subcooling²</th>
<th>Suction Pressure</th>
<th>Suction Temp.</th>
<th>Superheat</th>
</tr>
</thead>
<tbody>
<tr>
<td>First³</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
</tr>
<tr>
<td>Second (if equipped)</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
</tr>
<tr>
<td>Third (if equipped)</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
</tr>
<tr>
<td>Fourth (if equipped)</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
</tr>
<tr>
<td>Heat Pump 1st Stage</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
<td>#</td>
</tr>
</tbody>
</table>

1. Liquid line temperature should be taken before filter/drier.
2. Subtract 10 psi from discharge pressure for estimated liquid line pressure
3. If Rawal valve installed, contact Technical Service.

Outside air temperature  ____________ db °F   ____________ wb °F   ____________ RH%
Return Air Temperature  ____________ db °F   ____________ wb °F   ____________ RH%
Mixed Air Temperature   ____________ db °F   ____________ wb °F   ____________ RH%
Supply Air Temperature  ____________ db °F   ____________ wb °F   ____________ RH%

### REFRIGERANT SAFETIES

<table>
<thead>
<tr>
<th>Action</th>
<th>Completed</th>
<th>See Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prove Compressor Rotation (3 phase only) by guage pressure</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Prove High Pressure Safety, All Systems</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Prove Low Pressure Safety, All Systems</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

### OPERATING MEASUREMENTS ELECTRIC HEATING

Heater kW  ____________ kW
Heater Voltage, Nameplate  ____________ Volts

Heater Model Number: ____________________________
Serial Number: ____________________________

<table>
<thead>
<tr>
<th>Stage</th>
<th>Nameplate</th>
<th>Measured List All Three Amperages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>_______AMPS</td>
<td>_______AMPS _______AMPS _______AMPS</td>
</tr>
<tr>
<td>Stage 2</td>
<td>_______AMPS</td>
<td>_______AMPS _______AMPS _______AMPS</td>
</tr>
<tr>
<td>Stage 3</td>
<td>_______AMPS</td>
<td>_______AMPS _______AMPS _______AMPS</td>
</tr>
<tr>
<td>Stage 4</td>
<td>_______AMPS</td>
<td>_______AMPS _______AMPS _______AMPS</td>
</tr>
</tbody>
</table>

Checked Heater Limit  Yes ☐  No ☐
Air Moving Switch Installed?  Yes ☐  No ☐
## OPERATIONAL MEASUREMENTS - STAGING CONTROLS

### Verify Proper Operation of Heating/Cooling Staging Controls

<table>
<thead>
<tr>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create a cooling demand at the Thermostat, BAS System or Smart Equipment™</td>
<td></td>
</tr>
<tr>
<td>Verify that cooling/economizer stages are energized.</td>
<td></td>
</tr>
<tr>
<td>Create a heating demand at the Thermostat, BAS System or Smart Equipment™</td>
<td></td>
</tr>
<tr>
<td>Verify that heating stages are energized.</td>
<td></td>
</tr>
</tbody>
</table>

### Verify Proper Operation of the Variable Frequency Drive (If Required)

<table>
<thead>
<tr>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verify that motor speed modulates with duct pressure change.</td>
<td></td>
</tr>
</tbody>
</table>

## FINAL - INSPECTION

<table>
<thead>
<tr>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verify that all operational control set points have been set to desired value</td>
<td></td>
</tr>
<tr>
<td>Scroll through all setpoints and change as may be necessary to suit the occupant requirements.</td>
<td></td>
</tr>
<tr>
<td>Verify that all option parameters are correct</td>
<td></td>
</tr>
<tr>
<td>Scroll through all option parameters and ensure that all installed options are enabled in the software and all others are disabled in the software. (Factory software settings should match the installed options)</td>
<td></td>
</tr>
<tr>
<td>Verify that all access panels have been closed and secured</td>
<td></td>
</tr>
<tr>
<td>Save a backup file from the unit control board onto a USB flash drive.</td>
<td></td>
</tr>
</tbody>
</table>

## OBSERVED PRODUCT DEFICIENCIES & CONCERNS:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________