SAFETY CONSIDERATIONS

Installing, starting up, and servicing this equipment can be hazardous due to system pressures, electrical components, and equipment location.

Only trained, qualified installers and service mechanics should install, start up, and service this equipment.

Untrained personnel can perform basic maintenance functions, such as cleaning coils. All other operations should be performed by trained service personnel.

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

- Follow all safety codes.
- Wear safety glasses and work gloves.
- Use care in handling, rigging, and setting bulky equipment.

ELECTRIC SHOCK HAZARD.

Open all remote disconnects before servicing this equipment.

IMPORTANT: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with these instructions may cause radio interference. It has been tested and found to comply with the limits of a Class A computing device as defined by FCC (Federal Communications Commission, U.S.A.) regulations, Subpart J of Part 15, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

CONTENTS

SAFETY CONSIDERATIONS ........................................... 1
INTRODUCTION .......................................................... 2
INSTALLATION ........................................................... 2
Step 1 — Rig and Place the Unit ..................................... 2
Step 2 — Join Modules A and B (230-420 Units Only) ............ 27
Step 3 — Check Compressor Mounting .......................... 27
Step 4 — Cooler Fluid and Drain Piping Connections .......... 27
- PREPARATION FOR YEAR-ROUND OPERATION
- PREPARATION FOR WINTER SHUTDOWN
Step 5 — Make Electrical Connections ........................... 28
- FIELD POWER CONNECTIONS
- FIELD CONTROL POWER CONNECTIONS

Step 6 — Install Accessories ........................................ 43
- ELECTRICAL
- LOW-AMBIENT OPERATION
- HOT GAS BYPASS
- MISCELLANEOUS ACCESSORIES

PRE-START-UP .......................................................... 43
System Check ......................................................... 43
Quick Test ............................................................ 44
- A. QUICK TEST STEPS 1-15: UNIT CONFIGURATION
- B. QUICK TEST STEPS 16-30: THERMISTORS AND SET POINT POTENTIOMETERS
- C. QUICK TEST STEPS 31-42: OUTPUT RELAYS

START-UP AND OPERATION ........................................ 50
Digital Display Action ............................................... 50
Actual Start-Up ....................................................... 50
Operating Limitations .............................................. 50
- TEMPERATURES
- VOLTAGE
- MINIMUM FLUID LOOP VOLUME
- FLOW RATE REQUIREMENTS

Operation Sequence ................................................ 51
- UNITS WITH ELECTRONIC EXPANSION VALVE (EXV)
- 30GT080-110 UNITS WITH OPTIONAL THERMOSTATIC EXPANSION VALVE (TXV)
- LOAD SHED
- TEMPERATURE RESET
- HEAD PRESSURE CONTROL
- REMOTE ON-OFF
- REMOTE ALARM

SERVICE ............................................................... 57
Diagnostics and Troubleshooting ................................. 57
Refrigerant Circuit .................................................. 57
- LEAK TESTING
- DEHYDRATION
- REFRIGERANT CHARGE

Electronic Components .......................................... 57
- CONTROL COMPONENTS
- 30GT080-110 AND 230B-315B UNIT CONTROL BOX

Compressors .......................................................... 57
- COMPRESSOR REMOVAL
- OIL CHARGE

Cooler ................................................................. 58
- COOLER REMOVAL
- REPLACING COOLER
- SERVICING COOLER

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.
INTRODUCTION

These instructions cover installation, start-up, and service of 30GT080-420 Flotronic™ liquid chillers with electronic controls and units with factory-installed options (FIOPs).

Chillers are equipped with electronic expansion valves (EXV) as standard. Conventional thermostatic expansion valves (TXV) and liquid line solenoid valves are included as options on 30GT080-110 units only (NOT on associated modular units). Differences in quick test procedures and operation sequences between the standard and optional units should be carefully noted when following these instructions.

NOTE: Unit sizes 230-420 are modular units which are shipped in separate sections as modules A and B. Installation directions specific to these units are noted in these instructions. For modules 230B-315B, follow all general instructions as noted for unit sizes 080-110. For all remaining modules, follow instructions for unit sizes 130-210. See Table 1 for a listing of unit sizes and modular combinations.

Inspect the unit upon arrival for damage. If damage is found, file a claim right away with the shipping company. When considering location for the unit, be sure to consult National Electrical Code (NEC, U.S.A.) and local code requirements. Allow sufficient space for airflow, wiring, piping, and service. See Fig. 1-4. See Fig. 5 for optional non-fused disconnect location on 130-210, 230A-315A, and 330A/B-420A/B units. Be sure surface beneath the unit is level, and is capable of supporting the operating weight of the unit. See Fig. 6-8 and Tables 2A-3B for unit mounting and operating weights.

NOTE: To facilitate refrigerant vent piping, unit sizes 130-210, 230A-315A, and 330A/B-420A/B will have fusible plugs with ¾-in. SAE (Society of Automotive Engineers, U.S.A.) flares if required by local codes.

Table 1 — Unit Sizes and Modular Combinations

<table>
<thead>
<tr>
<th>UNIT MODEL</th>
<th>NOMINAL TONS</th>
<th>SECTION A UNIT 30GT</th>
<th>SECTION B UNIT 30GT</th>
</tr>
</thead>
<tbody>
<tr>
<td>080</td>
<td>80</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>090</td>
<td>90</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>110</td>
<td>110</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>130</td>
<td>125</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>150</td>
<td>145</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>170</td>
<td>160</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>190</td>
<td>180</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>210</td>
<td>200</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>230</td>
<td>220</td>
<td>150</td>
<td>080</td>
</tr>
<tr>
<td>245</td>
<td>230</td>
<td>150</td>
<td>090</td>
</tr>
<tr>
<td>255</td>
<td>240</td>
<td>150</td>
<td>100</td>
</tr>
<tr>
<td>270</td>
<td>260</td>
<td>170</td>
<td>100</td>
</tr>
<tr>
<td>290</td>
<td>280</td>
<td>190</td>
<td>110</td>
</tr>
<tr>
<td>315</td>
<td>300</td>
<td>210</td>
<td>110</td>
</tr>
<tr>
<td>330</td>
<td>325</td>
<td>170</td>
<td>170</td>
</tr>
<tr>
<td>360</td>
<td>350</td>
<td>190</td>
<td>190/170*</td>
</tr>
<tr>
<td>390</td>
<td>380</td>
<td>210</td>
<td>190</td>
</tr>
<tr>
<td>420</td>
<td>400</td>
<td>210</td>
<td>210</td>
</tr>
</tbody>
</table>

*60 Hz units/50 Hz units.

INSTALLATION

Step 1 — Rig and Place the Unit — These units are designed for overhead rigging and it is important that this method be used. Holes are provided in frame base channels, marked for rigging (see rigging label on unit). It is recommended that field-supplied 2-in. Schedule 40 steel pipes be passed through these holes, extending beyond frame enough to attach cables or chains on both sides for 080-110 and 230B-315B units. All other units come with 6 lifting lugs. Use spreader bars to keep cables or chains clear of unit sides. As further protection for the coil faces, plywood sheets may be placed against sides of unit, behind cables or chains. Run cables or chains to a central suspension point so that angle from horizontal is not less than 45 degrees. Raise and set unit down carefully. See Fig. 6-8 for rigging centers of gravity.

CAUTION

1. Do not use forklift trucks on these units.
2. Modular (230-420) units MUST be rigged and placed as separate sections.

For shipping, some domestic units and all export units are mounted on a wooden skid under entire base of unit. Skid can be removed before unit is moved to installation site. Lift the unit from above to remove skid. See Fig. 6-8 rigging for centers of gravity. On export units, the top skid can be used as the spreader bars. If the unit is shipped with coil protection, it must be removed before start-up. The shipping bag for export units must be removed before start-up. On export units with a full crate, the crate sides must be removed to aid in rigging.

If overhead rigging is not available, the unit can be moved on rollers or dragged. When unit is moved on rollers, the unit skid, if equipped, must be removed. To lift the unit, use jacks at the rigging points. Use a minimum of 3 rollers to distribute the load. If the unit is to be dragged, lift the unit as described above, and place unit on a pad. Apply moving force to the pad, and not the unit. When in its final location, raise the unit and remove the pad.

Instructions continued on page 27.
NOTES:
1. Unit must have clearances for airflow (from solid surfaces) as follows:
   Top — Do not restrict in any way
   Ends — 5 ft [1524 mm]
   Sides — 6 ft [1829 mm]
2. Mounting holes may be used to mount unit to concrete pad. They are not recommended for spring isolator location.
3. If spring isolators are used, a perimeter support channel between the unit and the isolators is recommended.
4. Dimensions in [ ] are in millimeters.
5. Thru-the-door handles for non-fused disconnect option on 380/415 v and 460 v units only. When unit has non-fused disconnect option, power-side door opens from right side, NOT left side as shown for standard units.

Fig. 1 — Dimensions; 30GT080,090,230B,245B
NOTES:

1. Unit must have clearances for airflow (from solid surfaces) as follows:
   - Top — Do not restrict in any way
   - Ends — 5 ft \([1524 \text{ mm}]\)
   - Sides — 6 ft \([1829 \text{ mm}]\)

2. Mounting holes may be used to mount unit to concrete pad. They are not recommended for spring isolator location.

3. If spring isolators are used, a perimeter support channel between the unit and the isolators is recommended.

4. Dimensions in \([\text{ ]}\) are in millimeters.

5. Thru-the-door handles for non-fused disconnect option on 380/415 v and 460 v units only. When unit has non-fused disconnect option, power-side door opens from right side, NOT left side as shown for standard units.

Fig. 2 — Dimensions; 30GT100,110,255B-315B
NOTES:

1. Unit must have clearances for airflow (from solid surfaces) as follows:
   Top — Do not restrict in any way
   Ends — 5 ft (1524 mm)
   Sides — 6 ft (1829 mm)

2. Mounting holes may be used to mount unit to concrete pad. They are not recommended for spring isolator location.

3. If spring isolators are used, a perimeter support channel between the unit and the isolators is recommended.

4. Dimensions in [ ] are in millimeters.

---

![Diagram](Fig. 3 — Dimensions; 30GT130-170, 230A-270A, 330A/B, 360B (50 Hz))

---

CENTER OF GRAVITY (ft-in.)

<table>
<thead>
<tr>
<th>UNIT SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>130</td>
<td>9-4½</td>
<td>4-1¾</td>
<td>1-4¾</td>
<td>0-9½</td>
</tr>
<tr>
<td>150, 230A-255A</td>
<td>9-4½</td>
<td>4-2½</td>
<td>1-4¾</td>
<td>0-9½</td>
</tr>
</tbody>
</table>
| 170, 270A, 330A/B, 360B (50 Hz) | 9-4½ | 4-2½ | 1-5½ | 0-8%E
Fig. 4 — Dimensions; 30GT190,210,290A,315A,360A (50 Hz),360A/B (60 Hz), 390A/B, 420A/B

NOTES:
1. Unit must have clearances for airflow (from solid surfaces) as follows:
   - Top — Do not restrict in any way
   - Ends — 5 ft [1524 mm]
   - Sides — 6 ft [1829 mm]
2. Mounting holes may be used to mount unit to concrete pad. They are not recommended for spring isolator location.
3. If spring isolators are used, a perimeter support channel between the unit and the isolators is recommended.
4. Dimensions in [ ] are in millimeters.
Fig. 5 — Location of Optional Non-Fused Disconnect; 130-210 and 230A-315A,330A/B-420A/B Units (130-170,230A-270A,330A/B,360B 50 Hz Shown)
*Points A, B, C, and D are in the corners of the unit. See Fig. 1 and 2 for dimensions.

### 60 Hz

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>CONDENSER COIL</th>
<th>lb</th>
<th>kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>080,230B</td>
<td>C-AL</td>
<td>1624</td>
<td>738</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>1797</td>
<td>817</td>
</tr>
<tr>
<td>090,245B</td>
<td>C-AL</td>
<td>1817</td>
<td>826</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>1997</td>
<td>908</td>
</tr>
<tr>
<td>100,255B,270B</td>
<td>C-AL</td>
<td>2185</td>
<td>993</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>2420</td>
<td>1100</td>
</tr>
<tr>
<td>110,290B,315B</td>
<td>C-AL</td>
<td>2191</td>
<td>996</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>2428</td>
<td>1104</td>
</tr>
</tbody>
</table>

### 50 Hz

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>CONDENSER COIL</th>
<th>lb</th>
<th>kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>080,230B</td>
<td>C-AL</td>
<td>1650</td>
<td>750</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>1830</td>
<td>832</td>
</tr>
<tr>
<td>090,245B</td>
<td>C-AL</td>
<td>1833</td>
<td>833</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>2014</td>
<td>915</td>
</tr>
<tr>
<td>100,255B,270B</td>
<td>C-AL</td>
<td>2222</td>
<td>1010</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>2460</td>
<td>1118</td>
</tr>
<tr>
<td>110,290B,315B</td>
<td>C-AL</td>
<td>2271</td>
<td>1032</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>2508</td>
<td>1140</td>
</tr>
</tbody>
</table>

**LEGEND**

- **C-AL** — Copper Tubing — Aluminum Fins
- **C-C** — Copper Tubing — Copper Fins

**NOTE:** If spring isolators are used, a perimeter support channel between the unit and the isolators is recommended.

### RIGGING CENTER OF GRAVITY

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>080,230B</th>
<th>090,245B</th>
<th>100,110,255B-315B</th>
</tr>
</thead>
<tbody>
<tr>
<td>X Dimension</td>
<td>69.6</td>
<td>87.8</td>
<td>87.8</td>
</tr>
<tr>
<td>Y Dimension</td>
<td>42.0</td>
<td>38.8</td>
<td>40.0</td>
</tr>
</tbody>
</table>

Fig. 6 — Unit Mounting Weights (Approximate); 30GT080-110 and 230B-315B
### Table: Condenser Coil Weights (Approximate)

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>CONDENSER COIL</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>130</td>
<td>C-AL</td>
<td>923</td>
<td>1466</td>
<td>1156</td>
<td>825</td>
<td>1411</td>
<td>1365</td>
<td>1469</td>
<td>1439</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>1051</td>
<td>1593</td>
<td>1283</td>
<td>952</td>
<td>1601</td>
<td>1556</td>
<td>1659</td>
<td>1622</td>
</tr>
<tr>
<td>150,230A-255A</td>
<td>C-AL</td>
<td>926</td>
<td>1563</td>
<td>1160</td>
<td>834</td>
<td>1438</td>
<td>1375</td>
<td>1747</td>
<td>1438</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>1053</td>
<td>1690</td>
<td>1287</td>
<td>961</td>
<td>1628</td>
<td>1566</td>
<td>1938</td>
<td>1629</td>
</tr>
<tr>
<td>170,270A,330A/B</td>
<td>C-AL</td>
<td>962</td>
<td>1732</td>
<td>1333</td>
<td>862</td>
<td>1497</td>
<td>1385</td>
<td>1799</td>
<td>1733</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>1089</td>
<td>1860</td>
<td>1460</td>
<td>990</td>
<td>1688</td>
<td>1819</td>
<td>2007</td>
<td>1653</td>
</tr>
<tr>
<td>190,290A,360A/B</td>
<td>C-AL</td>
<td>1346</td>
<td>1942</td>
<td>1793</td>
<td>1111</td>
<td>1385</td>
<td>1799</td>
<td>1733</td>
<td>1677</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>1536</td>
<td>2132</td>
<td>1983</td>
<td>1301</td>
<td>1575</td>
<td>1989</td>
<td>2037</td>
<td>1595</td>
</tr>
<tr>
<td>210,315A,390A,420A/B</td>
<td>C-AL</td>
<td>1376</td>
<td>2128</td>
<td>1871</td>
<td>1120</td>
<td>1407</td>
<td>1846</td>
<td>2037</td>
<td>1595</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>1566</td>
<td>2318</td>
<td>2061</td>
<td>1310</td>
<td>1597</td>
<td>2036</td>
<td>2227</td>
<td>1784</td>
</tr>
</tbody>
</table>

### Table: Condenser Coil Weights (Approximate)

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>CONDENSER COIL</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>130</td>
<td>C-AL</td>
<td>419</td>
<td>666</td>
<td>525</td>
<td>375</td>
<td>641</td>
<td>620</td>
<td>668</td>
<td>650</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>478</td>
<td>723</td>
<td>583</td>
<td>433</td>
<td>728</td>
<td>707</td>
<td>754</td>
<td>737</td>
</tr>
<tr>
<td>150,230A-255A</td>
<td>C-AL</td>
<td>420</td>
<td>710</td>
<td>527</td>
<td>379</td>
<td>653</td>
<td>625</td>
<td>794</td>
<td>653</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>478</td>
<td>768</td>
<td>585</td>
<td>436</td>
<td>285</td>
<td>711</td>
<td>880</td>
<td>740</td>
</tr>
<tr>
<td>170,270A,330A/B</td>
<td>C-AL</td>
<td>437</td>
<td>787</td>
<td>605</td>
<td>392</td>
<td>680</td>
<td>740</td>
<td>825</td>
<td>664</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>495</td>
<td>845</td>
<td>663</td>
<td>450</td>
<td>767</td>
<td>826</td>
<td>912</td>
<td>751</td>
</tr>
<tr>
<td>190,290A,360A/B</td>
<td>C-AL</td>
<td>611</td>
<td>882</td>
<td>815</td>
<td>505</td>
<td>629</td>
<td>817</td>
<td>787</td>
<td>712</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>698</td>
<td>969</td>
<td>901</td>
<td>591</td>
<td>715</td>
<td>904</td>
<td>874</td>
<td>798</td>
</tr>
<tr>
<td>210,315A,390A,420A/B</td>
<td>C-AL</td>
<td>625</td>
<td>967</td>
<td>850</td>
<td>509</td>
<td>639</td>
<td>384</td>
<td>925</td>
<td>725</td>
</tr>
<tr>
<td></td>
<td>C-C</td>
<td>711</td>
<td>1053</td>
<td>937</td>
<td>595</td>
<td>725</td>
<td>925</td>
<td>1012</td>
<td>810</td>
</tr>
</tbody>
</table>

**LEGEND**

- **C-AL** — Copper Tubing — Aluminum Fins
- **C-C** — Copper Tubing — Copper Fins

*And associated modules.

**NOTE:** Dimensions in () are millimeters.

### RIGGING CENTER OF GRAVITY

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>X Dimension</th>
<th>Y Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>130</td>
<td>112.5</td>
<td>49.9</td>
</tr>
<tr>
<td>150,230A-255A</td>
<td>112.1</td>
<td>50.5</td>
</tr>
<tr>
<td>170,270A,330A/B</td>
<td>112.8</td>
<td>1283</td>
</tr>
<tr>
<td>190,290A,360A/B</td>
<td>136.0</td>
<td>1283</td>
</tr>
<tr>
<td>210,315A,390A,420A/B</td>
<td>135.6</td>
<td>1283</td>
</tr>
</tbody>
</table>

**Fig. 7 — Unit Mounting Weights (Approximate); 30GT130-210, 230A-315A, 330A/B-420A/B (60 Hz)**
**LEGEND**

- C-AL — Copper Tubing — Aluminum Fins
- C-C — Copper Tubing — Copper Fins

*And associated modules.

NOTE: Dimensions in ( ) are millimeters.

---

**Fig. 8 — Unit Mounting Weights (Approximate); 30GT130-210, 230A-315A, 330A/B-420A/B (50 Hz)**
### Table 2A — Physical Data — 60 Hz, English

<table>
<thead>
<tr>
<th>Model Unit Size</th>
<th>080</th>
<th>090</th>
<th>100</th>
<th>110</th>
<th>130</th>
<th>150</th>
<th>170</th>
<th>190</th>
<th>210</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Approx Operating Weight — lb</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-AL</td>
<td>6630</td>
<td>7015</td>
<td>8610</td>
<td>8660</td>
<td>10,046</td>
<td>10,481</td>
<td>11,293</td>
<td>12,676</td>
<td>13,380</td>
</tr>
<tr>
<td>C-C</td>
<td>7355</td>
<td>7740</td>
<td>9560</td>
<td>9610</td>
<td>11,318</td>
<td>11,753</td>
<td>12,565</td>
<td>14,195</td>
<td>14,899</td>
</tr>
<tr>
<td><strong>Refrigerant Charge — lb</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ckt A Total/Over Clear Glass</td>
<td>78/15</td>
<td>78/15</td>
<td>98/20</td>
<td>98/20</td>
<td>133/28</td>
<td>143/35</td>
<td>153/45</td>
<td>178/30</td>
<td>190/40</td>
</tr>
<tr>
<td>Ckt B</td>
<td>78/15</td>
<td>78/15</td>
<td>105/20</td>
<td>105/20</td>
<td>137/28</td>
<td>144/35</td>
<td>162/45</td>
<td>173/30</td>
<td>185/40</td>
</tr>
<tr>
<td><strong>Compressors, Type...rpm</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06E* (Qty) Ckt A</td>
<td>(1) 250, (1) 275</td>
<td>(1) 250, (1) 265</td>
<td>(1) 265, (1) 275</td>
<td>(1) 265, (1) 275</td>
<td>(1) 265, (1) 275</td>
<td>(1) 275, (1) 275</td>
<td>(1) 275, (1) 275</td>
<td>(1) 275, (1) 275</td>
<td>(1) 275, (1) 275</td>
</tr>
<tr>
<td>06E* (Qty) Ckt B</td>
<td>(1) 299</td>
<td>(2) 265</td>
<td>(1) 265, (1) 275</td>
<td>(1) 265, (1) 275</td>
<td>(1) 275, (1) 275</td>
<td>(1) 275, (1) 275</td>
<td>(1) 275, (1) 275</td>
<td>(1) 275, (1) 275</td>
<td>(1) 275, (1) 275</td>
</tr>
<tr>
<td><strong>Oil Charge — Compressor/pt</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ckt A</td>
<td>250/14.0</td>
<td>265/19.0</td>
<td>275/19.0</td>
<td>299/19.0</td>
<td>250/14.0</td>
<td>265/19.0</td>
<td>275/19.0</td>
<td>299/19.0</td>
<td>250/14.0</td>
</tr>
<tr>
<td>Ckt B</td>
<td>250/14.0</td>
<td>265/19.0</td>
<td>275/19.0</td>
<td>299/19.0</td>
<td>250/14.0</td>
<td>265/19.0</td>
<td>275/19.0</td>
<td>299/19.0</td>
<td>250/14.0</td>
</tr>
<tr>
<td><strong>Capacity Control Steps (Standard Unit)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ckt A</td>
<td>66</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Ckt B</td>
<td>44</td>
<td>53</td>
<td>50</td>
<td>46</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Minimum Step Capacity (%)</td>
<td>22</td>
<td>18</td>
<td>15</td>
<td>14</td>
<td>11</td>
<td>11</td>
<td>14</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td><strong>Condenser Fans — Type</strong></td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
</tr>
<tr>
<td><strong>Condenser Coils — Type</strong></td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
</tr>
<tr>
<td><strong>Cooler — No. ...Type</strong></td>
<td>One, Direct Expansion, Shell and Tube</td>
<td>One, Direct Expansion, Shell and Tube</td>
<td>One, Direct Expansion, Shell and Tube</td>
<td>One, Direct Expansion, Shell and Tube</td>
<td>One, Direct Expansion, Shell and Tube</td>
<td>One, Direct Expansion, Shell and Tube</td>
<td>One, Direct Expansion, Shell and Tube</td>
<td>One, Direct Expansion, Shell and Tube</td>
<td>One, Direct Expansion, Shell and Tube</td>
</tr>
<tr>
<td><strong>Fluid Connections — in.</strong></td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Inlet and Outlet</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td><strong>MAX WORKING PRESSURE REFRIGERANT — psig</strong></td>
<td>450</td>
<td>450</td>
<td>450</td>
<td>450</td>
<td>450</td>
<td>450</td>
<td>450</td>
<td>450</td>
<td>450</td>
</tr>
<tr>
<td><strong>Max Working Pressure Refrigerant — psig</strong></td>
<td>375</td>
<td>375</td>
<td>375</td>
<td>375</td>
<td>375</td>
<td>375</td>
<td>375</td>
<td>375</td>
<td>375</td>
</tr>
<tr>
<td><strong>Max Water Volume — Gal. (includes nozzles)</strong></td>
<td>24.5</td>
<td>24.5</td>
<td>30.3</td>
<td>30.3</td>
<td>31.3</td>
<td>31.3</td>
<td>31.3</td>
<td>31.3</td>
<td>31.3</td>
</tr>
<tr>
<td><strong>Net Water Volume — Gal.</strong></td>
<td>24.5</td>
<td>24.5</td>
<td>30.3</td>
<td>30.3</td>
<td>31.3</td>
<td>31.3</td>
<td>31.3</td>
<td>31.3</td>
<td>31.3</td>
</tr>
<tr>
<td><strong>Refrigerant Side/Fluid Side — psig</strong></td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
</tr>
<tr>
<td><strong>Total Airflow — cfm</strong></td>
<td>57,000</td>
<td>57,000</td>
<td>76,000</td>
<td>76,000</td>
<td>100,000</td>
<td>100,000</td>
<td>100,000</td>
<td>100,000</td>
<td>100,000</td>
</tr>
<tr>
<td><strong>Total Airflow — cfm</strong></td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
</tr>
<tr>
<td><strong>Total Airflow — cfm</strong></td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
</tr>
<tr>
<td><strong>Total Airflow — cfm</strong></td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
</tr>
<tr>
<td><strong>Total Airflow — cfm</strong></td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
</tr>
<tr>
<td><strong>Total Airflow — cfm</strong></td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
</tr>
<tr>
<td><strong>Total Airflow — cfm</strong></td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
</tr>
</tbody>
</table>

**Legend:**
- C-AL — Copper Tubing — Aluminum Fins Condenser Coil
- C-C — Copper Tubing — Copper Fins Condenser Coil
- Ckt — Circuit
- ESP — External Static Pressure
- OD — Outside Diameter

*06E250 compressors have 4 cylinders; all others have 6.
†Based on rated ESP of 0.4 in. wg or 1.0 in. wg as appropriate.

**Note:** When facing the compressors, Circuit A is on the right and Circuit B is on the left.
<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>230</th>
<th>245</th>
<th>255</th>
<th>270</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPROX OPERATING WEIGHT — lb</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-AL</td>
<td>10,481</td>
<td>7015</td>
<td>17,496</td>
<td>21,313</td>
</tr>
<tr>
<td>C-C</td>
<td>11,753</td>
<td>7740</td>
<td>19,493</td>
<td>23,565</td>
</tr>
<tr>
<td>REFRIGERANT CHARGE — lb</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ckt A Total/Over</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Ckt A)</td>
<td>143/35</td>
<td>98/20</td>
<td>213/35</td>
<td>278/35</td>
</tr>
<tr>
<td>(Ckt B)</td>
<td>144/35</td>
<td>98/20</td>
<td>213/35</td>
<td>278/35</td>
</tr>
<tr>
<td>BMI MODULES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APPROX OPERATING WEIGHT — lb</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-AL</td>
<td>11,293</td>
<td>8610</td>
<td>19,903</td>
<td>22,125</td>
</tr>
<tr>
<td>C-C</td>
<td>12,565</td>
<td>9560</td>
<td>22,125</td>
<td>24,375</td>
</tr>
</tbody>
</table>

**NOTES:**

- When facing the compressors, Circuit A is on the right and Circuit B is on the left.
- Ckt — Circuit
- ESP — External Static Pressure
- OD — Outside Diameter
- *06E250 compressors have 4 cylinders; all others have 6.
- †Based on rated ESP of 0.4 in. wg or 1.0 in. wg as appropriate.

**LEGEND:**

- C-AL — Copper Tubing — Aluminum Fins Condenser Coil
- C-C — Copper Tubing — Copper Fins Condenser Coil
- Ckt — Circuit
- ESP — External Static Pressure
- OD — Outside Diameter
### Table 2A — Physical Data — 60 Hz, English (cont)

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>290</th>
<th>315</th>
<th>330</th>
<th>360</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPROX OPERATING WEIGHT — lb</td>
<td>12,676</td>
<td>14,195</td>
<td>178</td>
<td>178</td>
</tr>
<tr>
<td>C-AL</td>
<td>8660</td>
<td>9610</td>
<td>98/20</td>
<td>112/30</td>
</tr>
<tr>
<td>C-C</td>
<td>21,336</td>
<td>23,806</td>
<td>128/40</td>
<td>153/45</td>
</tr>
<tr>
<td>UNIT SIZE</td>
<td>13,380</td>
<td>14,899</td>
<td>128/40</td>
<td>153/45</td>
</tr>
<tr>
<td>C-AL</td>
<td>8660</td>
<td>9610</td>
<td>98/20</td>
<td>112/30</td>
</tr>
<tr>
<td>C-C</td>
<td>22,040</td>
<td>24,509</td>
<td>128/40</td>
<td>153/45</td>
</tr>
<tr>
<td>SYSTEM MODULES A</td>
<td>11,293</td>
<td>12,565</td>
<td>128/40</td>
<td>153/45</td>
</tr>
<tr>
<td>B</td>
<td>11,293</td>
<td>12,565</td>
<td>128/40</td>
<td>153/45</td>
</tr>
<tr>
<td>Total</td>
<td>22,586</td>
<td>25,130</td>
<td>128/40</td>
<td>153/45</td>
</tr>
<tr>
<td>APPROX OPERATING WEIGHT — lb</td>
<td>12,676</td>
<td>14,195</td>
<td>178</td>
<td>178</td>
</tr>
<tr>
<td>C-AL</td>
<td>8660</td>
<td>9610</td>
<td>98/20</td>
<td>112/30</td>
</tr>
<tr>
<td>C-C</td>
<td>25,352</td>
<td>28,390</td>
<td>128/40</td>
<td>153/45</td>
</tr>
<tr>
<td>UNIT SIZE</td>
<td>13,380</td>
<td>14,899</td>
<td>128/40</td>
<td>153/45</td>
</tr>
<tr>
<td>C-AL</td>
<td>8660</td>
<td>9610</td>
<td>98/20</td>
<td>112/30</td>
</tr>
<tr>
<td>C-C</td>
<td>22,040</td>
<td>24,509</td>
<td>128/40</td>
<td>153/45</td>
</tr>
<tr>
<td>SYSTEM MODULES A</td>
<td>11,293</td>
<td>12,565</td>
<td>128/40</td>
<td>153/45</td>
</tr>
<tr>
<td>B</td>
<td>11,293</td>
<td>12,565</td>
<td>128/40</td>
<td>153/45</td>
</tr>
<tr>
<td>Total</td>
<td>22,586</td>
<td>25,130</td>
<td>128/40</td>
<td>153/45</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>290</th>
<th>315</th>
<th>330</th>
<th>360</th>
</tr>
</thead>
<tbody>
<tr>
<td>REFRIGERANT CHARGE — lb</td>
<td>178/30</td>
<td>173/30</td>
<td>265/19.0</td>
<td>265/19.0</td>
</tr>
<tr>
<td>R-22</td>
<td>98/20</td>
<td>105/20</td>
<td>19.0</td>
<td>19.0</td>
</tr>
<tr>
<td>Ckt A</td>
<td>190/40</td>
<td>185/40</td>
<td>265/19.0</td>
<td>265/19.0</td>
</tr>
<tr>
<td>Total</td>
<td>275/19.0</td>
<td>275/19.0</td>
<td>265/19.0</td>
<td>265/19.0</td>
</tr>
<tr>
<td>Ckt B</td>
<td>275/19.0</td>
<td>275/19.0</td>
<td>265/19.0</td>
<td>265/19.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>290</th>
<th>315</th>
<th>330</th>
<th>360</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPRESSORS, Type...rpm</td>
<td>1750</td>
<td>1750</td>
<td>1750</td>
<td>1750</td>
</tr>
<tr>
<td>Reciprocating, Semi-Hermetic...</td>
<td>1750</td>
<td>1750</td>
<td>1750</td>
<td>1750</td>
</tr>
<tr>
<td>(Qty) Ckt A</td>
<td>(1) 265, (1) 275, (1) 299 (1) 265, (1) 275 — (3) 265, (1) 275 (1) 265, (1) 275, (1) 299 — (3) 275 (3) 275 — (1) 265, (1) 275, (1) 299 (1) 265, (1) 275, (1) 299 —</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Qty) Ckt B</td>
<td>(1) 265, (1) 275, (1) 299 (1) 265, (1) 275 — (1) 275, (2) 299 (1) 265, (1) 275 — (3) 275 (3) 275 — (1) 265, (1) 275, (1) 299 (1) 265, (1) 275, (1) 299 —</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>290</th>
<th>315</th>
<th>330</th>
<th>360</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Charge — Compressor/pt</td>
<td>265/19.0</td>
<td>265/19.0</td>
<td>265/19.0</td>
<td>265/19.0</td>
</tr>
<tr>
<td>Ckt A</td>
<td>19.0</td>
<td>19.0</td>
<td>19.0</td>
<td>19.0</td>
</tr>
<tr>
<td>Total</td>
<td>12.0</td>
<td>12.0</td>
<td>12.0</td>
<td>12.0</td>
</tr>
<tr>
<td>Ckt B</td>
<td>19.0</td>
<td>19.0</td>
<td>19.0</td>
<td>19.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>290</th>
<th>315</th>
<th>330</th>
<th>360</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity Control Steps</td>
<td>6</td>
<td>8</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>% Cap.</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Ckt A</td>
<td>54</td>
<td>54</td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td>Ckt B</td>
<td>46</td>
<td>46</td>
<td>46</td>
<td>46</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>290</th>
<th>315</th>
<th>330</th>
<th>360</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONDENSER COILS — Type</td>
<td>120,000</td>
<td>120,000</td>
<td>120,000</td>
<td>120,000</td>
</tr>
<tr>
<td>Condenser Coil, OD — in.</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>290</th>
<th>315</th>
<th>330</th>
<th>360</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONDENSER FANS — Type</td>
<td>178/30</td>
<td>173/30</td>
<td>265/19.0</td>
<td>265/19.0</td>
</tr>
<tr>
<td>Propeller, Direct Drive</td>
<td>98/20</td>
<td>105/20</td>
<td>19.0</td>
<td>19.0</td>
</tr>
<tr>
<td>Total</td>
<td>190/40</td>
<td>185/40</td>
<td>265/19.0</td>
<td>265/19.0</td>
</tr>
<tr>
<td>Ckt A</td>
<td>275/19.0</td>
<td>275/19.0</td>
<td>265/19.0</td>
<td>265/19.0</td>
</tr>
<tr>
<td>Total</td>
<td>275/19.0</td>
<td>275/19.0</td>
<td>265/19.0</td>
<td>265/19.0</td>
</tr>
<tr>
<td>Ckt B</td>
<td>275/19.0</td>
<td>275/19.0</td>
<td>265/19.0</td>
<td>265/19.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>290</th>
<th>315</th>
<th>330</th>
<th>360</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX WORKING PRESSURE — Refrigerant Side/Fluid Side</td>
<td>450</td>
<td>450</td>
<td>450</td>
<td>450</td>
</tr>
<tr>
<td>psig</td>
<td>450</td>
<td>450</td>
<td>450</td>
<td>450</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>290</th>
<th>315</th>
<th>330</th>
<th>360</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLUID CONNECTIONS — in.</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
</tr>
<tr>
<td>Inlet and Outlet</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
</tr>
<tr>
<td>Drain (NPT)</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
<td>278/300</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>290</th>
<th>315</th>
<th>330</th>
<th>360</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLUID CONNECTIONS — in.</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Victaulic Type</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

**LEGEND**

- C-AL — Copper Tubing — Aluminum Fins Condenser Coil
- C-C — Copper Tubing — Copper Fins Condenser Coil
- Ckt — Circuit
- ESP — External Static Pressure
- OD — Outside Diameter

*06E250 compressors have 4 cylinders; all others have 6.
†Based on rated ESP of 0.4 in. wg or 1.0 in. wg as appropriate.

NOTE: When facing the compressors, Circuit A is on the right and Circuit B is on the left.
### Table 2A — Physical Data — 60 Hz, English (cont)

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>390</th>
<th>420</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>APPROX OPERATING WEIGHT — lb</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-AL</td>
<td>13,380</td>
<td>12,676</td>
</tr>
<tr>
<td>C-C</td>
<td>14,899</td>
<td>14,195</td>
</tr>
<tr>
<td><strong>REFRIGERANT CHARGE — lb</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-22 Ckt A Total/Over</td>
<td>190/40</td>
<td>178/30</td>
</tr>
<tr>
<td>Ckt B Clear Glass</td>
<td>185/40</td>
<td>173/30</td>
</tr>
<tr>
<td><strong>COMPRESSORS, Type, rpm</strong></td>
<td>Reciprocating, Semi-Hermetic</td>
<td>Reciprocating, Semi-Hermetic</td>
</tr>
<tr>
<td>06E*</td>
<td>(Qty) Ckt A</td>
<td>(1) 265, (1) 275</td>
</tr>
<tr>
<td></td>
<td>(Qty) Ckt B</td>
<td>(1) 275, (2) 299</td>
</tr>
<tr>
<td><strong>OIL CHARGE — Compressor/pt</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ckt A</td>
<td>265/19.0, 275/19.0, 299/19.0</td>
<td>265/19.0, 275/19.0, 299/19.0</td>
</tr>
<tr>
<td>Ckt B</td>
<td>265/19.0, 275/19.0, 299/19.0</td>
<td>265/19.0, 275/19.0, 299/19.0</td>
</tr>
<tr>
<td><strong>CONVERTER CAPACITY STEPS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Cap. Ckt A</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Ckt B</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Minimum Step Capacity (%)</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td><strong>CONDENSER COILS — Type</strong></td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tubes (Copper), OD — in.</td>
<td>0.375</td>
</tr>
<tr>
<td></td>
<td>No. Rows — Ckt A or B</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Face Area sq ft — Ckt A and B Total</td>
<td>268.9</td>
</tr>
<tr>
<td><strong>MAXIMUM WORKING PRESSURE REFREGERANT — psig</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Refrigerant Side/Fluid Side</td>
<td>278/300</td>
</tr>
<tr>
<td><strong>COOLER — No. ...Type</strong></td>
<td>One Per Module, Direct Expansion, Shell and Tube</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weight (empty) — lb</td>
<td>1865</td>
</tr>
<tr>
<td></td>
<td>No. Refrigerant Circuits</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Net Fluid Volume — Gal. (includes nozzle)</td>
<td>70.4</td>
</tr>
<tr>
<td></td>
<td>Max Working Pressure</td>
<td>278/300</td>
</tr>
<tr>
<td><strong>FLUID CONNECTIONS — in.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inlet and Outlet</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Drain (NPT)</td>
<td>¾</td>
</tr>
</tbody>
</table>

**LEGEND**

- **C-AL** — Copper Tubing — Aluminum Fins Condenser Coil
- **C-C** — Copper Tubing — Copper Fins Condenser Coil
- **Ckt** — Circuit
- **ESP** — External Static Pressure
- **OD** — Outside Diameter

*06E250 compressors have 4 cylinders; all others have 6.

†Based on rated ESP of 0.4 in. wg or 1.0 in. wg as appropriate.

NOTE: When facing the compressors, Circuit A is on the right and Circuit B is on the left.
### Table 2B — Physical Data — 60 Hz, SI

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>080</th>
<th>090</th>
<th>100</th>
<th>110</th>
<th>130</th>
<th>150</th>
<th>170</th>
<th>190</th>
<th>210</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPROX OPERATING WEIGHT — kg</td>
<td>3013</td>
<td>3189</td>
<td>3914</td>
<td>3935</td>
<td>4566</td>
<td>4754</td>
<td>5133</td>
<td>5761</td>
<td>6081</td>
</tr>
<tr>
<td>C-AL</td>
<td>3343</td>
<td>3518</td>
<td>4346</td>
<td>4368</td>
<td>5144</td>
<td>5342</td>
<td>5711</td>
<td>6452</td>
<td>6772</td>
</tr>
<tr>
<td>C-C</td>
<td>2546</td>
<td>2687</td>
<td>3454</td>
<td>3476</td>
<td>4254</td>
<td>4452</td>
<td>4831</td>
<td>5541</td>
<td>5772</td>
</tr>
<tr>
<td>REFRIGERANT CHARGE — kg</td>
<td>35.4/6.8</td>
<td>35.4/6.8</td>
<td>44.5/9.1</td>
<td>44.5/9.1</td>
<td>60.5/12.7</td>
<td>65.0/15.9</td>
<td>69.5/20.5</td>
<td>80.9/13.6</td>
<td>86.4/18.2</td>
</tr>
<tr>
<td>Compressors, Type...r/s</td>
<td>Reciprocating, Semi-Hermetic...29.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06E*</td>
<td>(Qty) Ckt A</td>
<td>(1) 250, (1) 275 (1) 250, (1) 265 (1) 265, (1) 275 (1) 265, (1) 275, (1) 299 (1) 275, (1) 299 (3) 265 (3) 275 (1) 265, (1) 275, (1) 299 (3) 265, (1) 275 (1) 275, (1) 299 (1) 275, (2) 299</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ckt B</td>
<td>(1) 299 (2) 265 (1) 265, (1) 275 (1) 265, (1) 275 (1) 275, (1) 299 (2) 299 (3) 275 (1) 265, (1) 275, (1) 299 (1) 275, (2) 299</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condenser Coils — Type</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. Blades_Diameter — mm</td>
<td>4...762</td>
<td>4...762</td>
<td>4...762</td>
<td>4...762</td>
<td>4...762</td>
<td>4...762</td>
<td>4...762</td>
<td>4...762</td>
<td>4...762</td>
</tr>
<tr>
<td>No. Fans_Total kW</td>
<td>6...9.4</td>
<td>6...9.4</td>
<td>8...12.7</td>
<td>8...12.7</td>
<td>10...15.9</td>
<td>10...15.9</td>
<td>10...15.9</td>
<td>10...15.9</td>
<td>10...15.9</td>
</tr>
<tr>
<td>Total Airflow — L/s</td>
<td>26 898</td>
<td>26 898</td>
<td>35 864</td>
<td>35 864</td>
<td>47 190</td>
<td>47 190</td>
<td>47 190</td>
<td>56 630</td>
<td>56 630</td>
</tr>
<tr>
<td>High Static Fan Speed — r/s</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>No. Blades_Diameter — mm</td>
<td>12...762</td>
<td>12...762</td>
<td>12...762</td>
<td>12...762</td>
<td>12...762</td>
<td>12...762</td>
<td>12...762</td>
<td>12...762</td>
<td>12...762</td>
</tr>
<tr>
<td>Total Airflow — L/s†</td>
<td>28 315</td>
<td>28 315</td>
<td>37 750</td>
<td>37 750</td>
<td>47 190</td>
<td>47 190</td>
<td>47 190</td>
<td>56 630</td>
<td>56 630</td>
</tr>
<tr>
<td>CONDENSER FANS — Type</td>
<td>Propeller, Direct Drive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacity Control Steps (Standard Unit)</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>% Cap. Ckt A</td>
<td>56</td>
<td>47</td>
<td>50</td>
<td>54</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Minimum Step Capacity (%)</td>
<td>22</td>
<td>18</td>
<td>15</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>FLUID CONNECTIONS — in.</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

**LEGEND**

- **C-AL** — Copper Tubing — Aluminum Fins Condenser Coil
- **C-C** — Copper Tubing — Copper Fins Condenser Coil
- **Ckt** — Circuit
- **ESP** — External Static Pressure
- **OD** — Outside Diameter

*06E250 compressors have 4 cylinders; all others have 6.
†Based on rated ESP of 100 Pa or 250 Pa as appropriate.

**NOTE:** When facing the compressors, Circuit A is on the right and Circuit B is on the left.
## Table 2B — Physical Data — 60 Hz, SI (cont)

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>230</th>
<th>245</th>
<th>255</th>
<th>270</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>APPROX OPERATING WEIGHT</strong> — kg</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-AL</td>
<td>4754</td>
<td>3013</td>
<td>7747</td>
<td>4754</td>
</tr>
<tr>
<td>C-AL</td>
<td>5342</td>
<td>3343</td>
<td>8685</td>
<td>5342</td>
</tr>
<tr>
<td><strong>APPROX OPERATING WEIGHT</strong> — kg</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-C</td>
<td>4754</td>
<td>3013</td>
<td>7747</td>
<td>4754</td>
</tr>
<tr>
<td>C-C</td>
<td>5342</td>
<td>3343</td>
<td>8685</td>
<td>5342</td>
</tr>
</tbody>
</table>

| **REFRIGERANT CHARGE** — kg | | | | |
| R-22 Ckt A Total/Over | 60.5/15.9 | 35.4/6.8 | —/— | 60.5/15.9 |
| R-22 Ckt A Clear Glass | 53.4/15.9 | 35.4/6.8 | —/— | 53.4/15.9 |

| **COMPRESSORS** | | | | |
| Type — r/s | | | | |
| Reciprocating, Semi-Hermetic | 29.2 | | | |
| (Qty) Ckt A | (3) 265 | (1) 250, (1) 275 | —/— | (3) 265 |
| (Qty) Ckt B | (2) 299 | (1) 299 | —/— | (2) 299 |

| **CONDENSERS** | | | | |
| Type | Propeller, Direct Drive | Propeller, Direct Drive | | Propeller, Direct Drive |
| Standard/Low Noise | | | | |
| Fan Speed — r/s | 19 | 19 | — | 19 |
| No. Blades Diameter — mm | 4.762 | 4.762 | — | 4.762 |
| No. Fans/Total kW | 10.159 | 6.94 | 16.253 | 10.159 |
| Total Airflow — L/s | 47.190 | 26.898 | 74.088 | 47.190 |
| High Static | | | | |
| Fan Speed — r/s | 29 | 29 | — | 29 |
| No. Blades Diameter — mm | 12.762 | 12.762 | — | 12.762 |
| No. Fans/Total kW | 10.370 | 6.222 | 16.592 | 10.370 |
| Total Airflow — L/s | 47.190 | 28.315 | 75.505 | 47.190 |

| **COOLER** | | | | |
| Type | One Per Module...Direct Expansion, Shell and Tube |
| No. Refrigerant Circuits | 3 | 3 | 3 | 3 |
| No. Refrigerant Circuits | 3 | 3 | 3 | 3 |
| Net Fluid Volume — L (includes nozzles) | 197.0 | 92.9 | 289.9 | 197.0 |
| Max Working Pressure Refrigerant — kPa | 3103 | 3103 | — | 3103 |
| | 3103 | 3103 | — | 3103 |

| **LEGEND** | | | | |
| C-AL | Copper Tubing — Aluminum Fins Condenser Coil |
| C-C | Copper Tubing — Copper Fins Condenser Coil |
| Ckt | Circuit |
| ESP | External Static Pressure |
| OD | Outside Diameter |

*06E250 compressors have 4 cylinders; all others have 6.
†Based on rated ESP of 100 Pa or 250 Pa as appropriate.

**NOTE:** When facing the compressors, Circuit A is on the right and Circuit B is on the left.
## Table 2B — Physical Data — 60 Hz, SI (cont)

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>290</th>
<th>B</th>
<th>Total</th>
<th>315</th>
<th>B</th>
<th>Total</th>
<th>330</th>
<th>B</th>
<th>Total</th>
<th>360</th>
<th>B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPOX OPERATING WEIGHT — kg C-AL</td>
<td>5761</td>
<td>3935</td>
<td>9696</td>
<td>6081</td>
<td>3905</td>
<td>10016</td>
<td>5133</td>
<td>5133</td>
<td>10266</td>
<td>5761</td>
<td>5761</td>
<td>11522</td>
</tr>
<tr>
<td>C-C</td>
<td>6452</td>
<td>4368</td>
<td>10820</td>
<td>6772</td>
<td>4368</td>
<td>11140</td>
<td>5711</td>
<td>5711</td>
<td>11422</td>
<td>6452</td>
<td>6452</td>
<td>12904</td>
</tr>
<tr>
<td>REFRIGERANT CHARGE — kg R-22</td>
<td>80.9/13.6</td>
<td>44.5/9.1</td>
<td>—/—</td>
<td>86.4/18.2</td>
<td>44.5/9.1</td>
<td>—/—</td>
<td>69.2/20.5</td>
<td>69.2/20.5</td>
<td>—/—</td>
<td>80.9/13.6</td>
<td>80.9/13.6</td>
<td>—/—</td>
</tr>
<tr>
<td>Ckt A Total/Over</td>
<td>80.9/13.6</td>
<td>44.5/9.1</td>
<td>—/—</td>
<td>86.4/18.2</td>
<td>44.5/9.1</td>
<td>—/—</td>
<td>69.2/20.5</td>
<td>69.2/20.5</td>
<td>—/—</td>
<td>80.9/13.6</td>
<td>80.9/13.6</td>
<td>—/—</td>
</tr>
<tr>
<td>Ckt B Clear Glass</td>
<td>78.6/13.6</td>
<td>47.7/9.1</td>
<td>—/—</td>
<td>84.1/18.2</td>
<td>47.7/9.1</td>
<td>—/—</td>
<td>73.6/20.5</td>
<td>73.6/20.5</td>
<td>—/—</td>
<td>78.6/13.6</td>
<td>78.6/13.6</td>
<td>—/—</td>
</tr>
<tr>
<td>COMPRESSORS, Type, r/s Reciprocating, Semi-Hermetic, 29.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Qy) Ckt A</td>
<td>(1) 265, (1) 275, (1) 299</td>
<td>(1) 265, (1) 275, (1) 299</td>
<td>(1) 265, (1) 275, (1) 299</td>
<td>(1) 265, (1) 275, (1) 299</td>
<td>— (3) 265, (1) 275, (1) 299</td>
<td>— (3) 275, (1) 275, (1) 299</td>
<td>— (3) 265, (1) 275, (1) 299</td>
<td>(1) 265, (1) 275, (1) 299</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Qy) Ckt B</td>
<td>(1) 265, (1) 275, (1) 299</td>
<td>(1) 265, (1) 275, (1) 299</td>
<td>(1) 265, (1) 275, (1) 299</td>
<td>(1) 265, (1) 275, (1) 299</td>
<td>— (3) 265, (1) 275, (1) 299</td>
<td>— (3) 275, (1) 275, (1) 299</td>
<td>— (3) 265, (1) 275, (1) 299</td>
<td>(1) 265, (1) 275, (1) 299</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condenser Fans — Type</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td></td>
</tr>
<tr>
<td>Fan Speed — r/s</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>No. Fans...Total kW</td>
<td>12...19.1</td>
<td>8...12.7</td>
<td>20...31.8</td>
<td>12...19.1</td>
<td>8...12.7</td>
<td>20...31.8</td>
<td>12...19.1</td>
<td>8...12.7</td>
<td>20...31.8</td>
<td>12...19.1</td>
<td>8...12.7</td>
<td>20...31.8</td>
</tr>
<tr>
<td>Total Airflow — L/s</td>
<td>56 630</td>
<td>35 864</td>
<td>92 494</td>
<td>56 630</td>
<td>35 864</td>
<td>92 494</td>
<td>47 190</td>
<td>47 190</td>
<td>94 380</td>
<td>47 190</td>
<td>47 190</td>
<td>94 380</td>
</tr>
<tr>
<td>High Static</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fan Speed — r/s</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>No. Blades...Diameter — mm</td>
<td>12...762</td>
<td>12...762</td>
<td>12...762</td>
<td>12...762</td>
<td>12...762</td>
<td>12...762</td>
<td>12...762</td>
<td>12...762</td>
<td>12...762</td>
<td>12...762</td>
<td>12...762</td>
<td></td>
</tr>
<tr>
<td>No. Fans...Total kW</td>
<td>12...44.4</td>
<td>8...29.6</td>
<td>20...74.0</td>
<td>12...44.4</td>
<td>8...29.6</td>
<td>20...74.0</td>
<td>10...37.0</td>
<td>10...37.0</td>
<td>20...74.0</td>
<td>12...44.4</td>
<td>12...44.4</td>
<td>24...88.8</td>
</tr>
<tr>
<td>Total Airflow — L/s†</td>
<td>56 630</td>
<td>37 750</td>
<td>94 380</td>
<td>56 630</td>
<td>37 750</td>
<td>94 380</td>
<td>56 630</td>
<td>56 630</td>
<td>113 260</td>
<td>56 630</td>
<td>56 630</td>
<td>113 260</td>
</tr>
<tr>
<td>Condenser Coils — Type</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
</tr>
<tr>
<td>No. Rows...Ckt A or B</td>
<td>3</td>
<td>3</td>
<td>—</td>
<td>3</td>
<td>3</td>
<td>—</td>
<td>3</td>
<td>3</td>
<td>—</td>
<td>3</td>
<td>3</td>
<td>—</td>
</tr>
<tr>
<td>Face Area sq m — Ckt A and B Total</td>
<td>20.92</td>
<td>15.61</td>
<td>36.53</td>
<td>20.92</td>
<td>15.61</td>
<td>36.53</td>
<td>20.92</td>
<td>15.61</td>
<td>36.53</td>
<td>20.92</td>
<td>15.61</td>
<td>36.53</td>
</tr>
<tr>
<td>Max Working Pressure Refrigerant — kPa</td>
<td>3103</td>
<td>3103</td>
<td>—</td>
<td>3103</td>
<td>3103</td>
<td>—</td>
<td>3103</td>
<td>3103</td>
<td>—</td>
<td>3103</td>
<td>3103</td>
<td>—</td>
</tr>
<tr>
<td>Cooler — No. Type</td>
<td>741</td>
<td>391</td>
<td>1132</td>
<td>741</td>
<td>391</td>
<td>1132</td>
<td>741</td>
<td>391</td>
<td>1132</td>
<td>741</td>
<td>391</td>
<td>1132</td>
</tr>
<tr>
<td>Weight (empty) — kg</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>No. Refrigerant Circuits</td>
<td>129.0</td>
<td>114.6</td>
<td>343.6</td>
<td>267.0</td>
<td>114.6</td>
<td>381.6</td>
<td>229</td>
<td>229</td>
<td>458</td>
<td>229</td>
<td>229</td>
<td>458</td>
</tr>
<tr>
<td>Fluid Connections — in.</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Drain (NPT)</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
</tr>
</tbody>
</table>

**LEGEND**
- C-AL — Copper Tubing — Aluminum Fins Condenser Coil
- C-C — Copper Tubing — Copper Fins Condenser Coil
- Ckt — Circuit
- ESB — External Static Pressure
- OD — Outside Diameter
- *06E250 compressors have 4 cylinders; all others have 6.
- †Based on rated ESP of 100 Pa or 250 Pa as appropriate.

**NOTE:** When facing the compressors, Circuit A is on the right and Circuit B is on the left.
Table 2B — Physical Data — 60 Hz, SI (cont)

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPROX OPERATING WEIGHT — kg</td>
<td>6081</td>
<td>5761</td>
<td>11842</td>
<td>6081</td>
<td>6081</td>
<td>12162</td>
</tr>
<tr>
<td>C-AL</td>
<td>6772</td>
<td>6452</td>
<td>13224</td>
<td>6772</td>
<td>6772</td>
<td>13544</td>
</tr>
<tr>
<td>REFRIGERANT CHARGE — kg</td>
<td>86.4/18.2</td>
<td>80.9/13.6</td>
<td>—/—</td>
<td>86.4/18.2</td>
<td>86.4/18.2</td>
<td>—/—</td>
</tr>
<tr>
<td>Circuit B Clear Glass</td>
<td>84.1/18.2</td>
<td>78.6/13.6</td>
<td>—/—</td>
<td>84.1/18.2</td>
<td>84.1/18.2</td>
<td>—/—</td>
</tr>
<tr>
<td>COMPRESSORS, Type, r/s</td>
<td>Reciprocating, Semi-Hermetic, 29.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06E* *(Qty) Circuit A</td>
<td>(3) 265, (1) 275</td>
<td>(1) 265, (1) 275, (1) 299</td>
<td>—</td>
<td>(3) 265, (1) 275</td>
<td>(3) 265, (1) 275</td>
<td>—</td>
</tr>
<tr>
<td>*(Qty) Circuit B</td>
<td>(1) 275, (2) 299</td>
<td>(1) 265, (1) 275, (1) 299</td>
<td>—</td>
<td>(1) 275, (2) 299</td>
<td>(1) 275, (2) 299</td>
<td>—</td>
</tr>
<tr>
<td>Oil Charge — Compressor/L</td>
<td>285.9/0.275/0.9/0.0, 285.9/0.275/0.9/0.0, —/—</td>
<td>285.9/0.275/0.9/0.0, 285.9/0.275/0.9/0.0, —/—</td>
<td>—/—</td>
<td>285.9/0.275/0.9/0.0, 285.9/0.275/0.9/0.0, —/—</td>
<td>285.9/0.275/0.9/0.0, 285.9/0.275/0.9/0.0, —/—</td>
<td>—/—</td>
</tr>
<tr>
<td>Capacity Control Steps</td>
<td>7</td>
<td>6</td>
<td>—</td>
<td>7</td>
<td>6</td>
<td>—</td>
</tr>
<tr>
<td>% Cap.</td>
<td>50</td>
<td>50</td>
<td>—</td>
<td>50</td>
<td>50</td>
<td>—</td>
</tr>
<tr>
<td>Oil Charge — Compressor/L</td>
<td>50</td>
<td>50</td>
<td>—</td>
<td>50</td>
<td>50</td>
<td>—</td>
</tr>
<tr>
<td>Minimum Step Capacity (%)</td>
<td>12</td>
<td>14</td>
<td>—</td>
<td>12</td>
<td>12</td>
<td>—</td>
</tr>
<tr>
<td>CONDENSER FANS — Type</td>
<td>Propeller, Direct Drive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard/ Low Noise</td>
<td>Propeller, Direct Drive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fan Speed — r/s</td>
<td>19</td>
<td>19</td>
<td>—</td>
<td>19</td>
<td>19</td>
<td>—</td>
</tr>
<tr>
<td>Total Airflow — L/s</td>
<td>56630</td>
<td>56630</td>
<td>113260</td>
<td>56630</td>
<td>56630</td>
<td>113260</td>
</tr>
<tr>
<td>High Static</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fan Speed — r/s</td>
<td>29</td>
<td>29</td>
<td>—</td>
<td>29</td>
<td>29</td>
<td>—</td>
</tr>
<tr>
<td>No. Fans, Total kW</td>
<td>12.444</td>
<td>12.444</td>
<td>—</td>
<td>24.888</td>
<td>24.888</td>
<td>—</td>
</tr>
<tr>
<td>Total Airflow — L/s†</td>
<td>56630</td>
<td>56630</td>
<td>113260</td>
<td>56630</td>
<td>56630</td>
<td>113260</td>
</tr>
<tr>
<td>CONDENSER COILS — Type</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tubes (Copper), OD — mm</td>
<td>9.53</td>
<td>9.53</td>
<td>—</td>
<td>9.53</td>
<td>9.53</td>
<td>—</td>
</tr>
<tr>
<td>No. Rows — Circuits A or B</td>
<td>3</td>
<td>3</td>
<td>—</td>
<td>3</td>
<td>3</td>
<td>—</td>
</tr>
<tr>
<td>Face Area sq m — Ckt A or B Total</td>
<td>20.92</td>
<td>20.92</td>
<td>41.84</td>
<td>20.92</td>
<td>20.92</td>
<td>41.84</td>
</tr>
<tr>
<td>Max Working Pressure Refrigerant — kPa</td>
<td>3103</td>
<td>3103</td>
<td>3103</td>
<td>3103</td>
<td>3103</td>
<td>3103</td>
</tr>
<tr>
<td>COOLER — No. Type</td>
<td>One Per Module, Direct Expansion, Shell and Tube</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (empty) — kg</td>
<td>848</td>
<td>741</td>
<td>1589</td>
<td>848</td>
<td>848</td>
<td>1696</td>
</tr>
<tr>
<td>No. Refrigerant Circuits</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Net Fluid Volume — L (includes nozzles)</td>
<td>267.0</td>
<td>229.0</td>
<td>496</td>
<td>267.0</td>
<td>267.0</td>
<td>534</td>
</tr>
<tr>
<td>Refrigerant Side/Fluid Side — kPa</td>
<td>1916/2068</td>
<td>1916/2068</td>
<td>—/—</td>
<td>1916/2068</td>
<td>1916/2068</td>
<td>—/—</td>
</tr>
<tr>
<td>FLUID CONNECTIONS — in.</td>
<td>Victaulic Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inlet and Outlet</td>
<td>6</td>
<td>6</td>
<td>—</td>
<td>6</td>
<td>6</td>
<td>—</td>
</tr>
<tr>
<td>Drain (NPT)</td>
<td>¾</td>
<td>¾</td>
<td>—</td>
<td>¾</td>
<td>¾</td>
<td>—</td>
</tr>
</tbody>
</table>

LEGEND
- C-AL — Copper Tubing — Aluminum Finned Condenser Coil
- C-C — Copper Tubing — Copper Finned Condenser Coil
- CKT — Circuit
- ESP — External Static Pressure
- OD — Outside Diameter

*(06E compressors have 4 cylinders; all others have 6.
†Based on rated ESP of 100 Pa or 250 Pa as appropriate.

NOTE: When facing the compressors, Circuit A is on the right and Circuit B is on the left.
## Table 3A — Physical Data — 50 Hz, English

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>080</th>
<th>090</th>
<th>100</th>
<th>110</th>
<th>130</th>
<th>150</th>
<th>170</th>
<th>190</th>
<th>210</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>APPROX OPERATING WEIGHT — lb</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-AL</td>
<td>6,720</td>
<td>7,135</td>
<td>8,710</td>
<td>8,840</td>
<td>10,511</td>
<td>10,676</td>
<td>11,443</td>
<td>12,906</td>
<td>13,545</td>
</tr>
<tr>
<td>C-C</td>
<td>7,445</td>
<td>7,860</td>
<td>9,660</td>
<td>9,790</td>
<td>11,783</td>
<td>11,948</td>
<td>12,715</td>
<td>14,425</td>
<td>15,645</td>
</tr>
<tr>
<td><strong>REFRIGERANT CHARGE — lb</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-22 Total/Over Clear Glass</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ckt A</td>
<td>78/15</td>
<td>78/15</td>
<td>98/20</td>
<td>98/20</td>
<td>133/28</td>
<td>143/35</td>
<td>153/45</td>
<td>178/30</td>
<td>190/40</td>
</tr>
<tr>
<td>Ckt B</td>
<td>78/15</td>
<td>78/15</td>
<td>105/20</td>
<td>105/20</td>
<td>137/28</td>
<td>143/35</td>
<td>162/45</td>
<td>173/30</td>
<td>185/40</td>
</tr>
<tr>
<td><strong>COMPRESSORS, Type...rpm</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reciprocating, Semi-Hermetic...</td>
<td>1450</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06E* (Qty) Ckt A</td>
<td>(1) 265, (1) 299 (1) 265, (1) 299 (1) 265, (1) 299 (2) 299 (2) 299 (3) 299 (2) 299 (3) 299</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Qty) Ckt B</td>
<td>(1) 299 (1) 265, (1) 275 (1) 265, (1) 299 (2) 299 (2) 299 (2) 299 (1) 275, (2) 299 (3) 299</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Oil Charge — Compressor/pt</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>265/19,0, 275/19,0, 299/19,0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Capacity Control Steps (Standard Unit)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>% Cap.</td>
<td>Ckt A</td>
<td>62</td>
<td>54</td>
<td>50</td>
<td>50</td>
<td>52</td>
<td>60</td>
<td>48</td>
<td>50</td>
</tr>
<tr>
<td>Ckt B</td>
<td>38</td>
<td>46</td>
<td>50</td>
<td>50</td>
<td>48</td>
<td>40</td>
<td>52</td>
<td>50</td>
<td>48</td>
</tr>
<tr>
<td>Minimum Step Capacity (%)</td>
<td>16</td>
<td>14</td>
<td>13</td>
<td>17</td>
<td>10</td>
<td>13</td>
<td>17</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>CONDENSER FANS — Type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard/Low Noise</td>
<td>Propeller, Direct Drive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fan Speed — rpm</td>
<td>950, 950, 950, 950, 950, 950, 950, 950, 950, 950</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. Blades, Diameter — in.</td>
<td>6.30, 6.30, 6.30, 6.30, 6.30, 6.30, 6.30, 6.30, 6.30, 6.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. Fans, Total kW</td>
<td>6.94, 6.94, 6.17, 6.17, 10.19, 10.19, 10.19, 10.19, 10.19, 10.19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Airflow — cfm</td>
<td>57,000, 57,000, 76,000, 76,000, 100,000, 100,000, 100,000, 120,000, 120,000, 120,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Static Fan Speed — rpm</td>
<td>1445, 1445, 1445, 1445, 1445, 1445, 1445, 1445, 1445, 1445</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. Fans, Total kW</td>
<td>6.22, 6.22, 8.29, 8.29, 10.37, 10.37, 10.37, 12.44, 12.44, 12.44</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Airflow — cfm</td>
<td>60,000, 60,000, 80,000, 80,000, 100,000, 100,000, 100,000, 120,000, 120,000, 120,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CONDENSER COILS — Type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>Tubes (Copper), OD — in.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. Rows — Ckt A or B</td>
<td>3</td>
<td>0.375, 0.375, 0.375, 0.375, 0.375, 0.375, 0.375, 0.375, 0.375, 0.375</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Face Area sq ft — Ckt A and B Total</td>
<td>128.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Working Pressure Refrigerant — psig</td>
<td>450</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (empty) — lb</td>
<td>745</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. Refrigerant Circuits</td>
<td>24.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Water Volume — Gal. (includes nozzles)</td>
<td>278,300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigerant Side/Fluid Side — psig</td>
<td>278,300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLUID CONNECTIONS — in.</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drain (NPT)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COOLER — No. Refrigerant Circuits</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One, Direct Expansion, Shell and Tube</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (empty) — lb</td>
<td>745</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. Refrigerant Circuits</td>
<td>24.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Water Volume — Gal. (includes nozzles)</td>
<td>278,300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigerant Side/Fluid Side — psig</td>
<td>278,300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FLUID CONNECTIONS — in.</strong></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inlet and Outlet</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drain (NPT)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LEGEND**

- **C-AL** — Copper Tubing — Aluminum Fins Condenser Coil
- **C-C** — Copper Tubing — Copper Fins Condenser Coil
- **Ckt** — Circuit
- **ESP** — External Static Pressure
- **OD** — Outside Diameter

*06E250 compressors have 4 cylinders; all others have 6.
†Based on rated ESP of 0.4 in. wg or 1.0 in. wg as appropriate.

**NOTE:** When facing the compressors, Circuit A is on the right and Circuit B is on the left.
### Table 3A — Physical Data — 50 Hz, English (cont)

#### 30GT UNIT SIZE

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPROX OPERATING WEIGHT — lb</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-AL</td>
<td>10,676</td>
<td>6720</td>
<td>17,396</td>
<td>10,676</td>
<td>7135</td>
<td>17,811</td>
<td>10,676</td>
<td>8710</td>
<td>19,386</td>
</tr>
<tr>
<td>C-C</td>
<td>11,948</td>
<td>7445</td>
<td>19,393</td>
<td>11,948</td>
<td>9660</td>
<td>21,608</td>
<td>11,948</td>
<td>12,715</td>
<td>24,663</td>
</tr>
<tr>
<td>SYSTEM MODULES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APPROX OPERATING WEIGHT — lb</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-AL</td>
<td>11,443</td>
<td>8710</td>
<td>20,153</td>
<td>11,443</td>
<td>8710</td>
<td>20,153</td>
<td>11,443</td>
<td>8710</td>
<td>20,153</td>
</tr>
<tr>
<td>C-C</td>
<td>12,715</td>
<td>9660</td>
<td>22,375</td>
<td>12,715</td>
<td>9660</td>
<td>22,375</td>
<td>12,715</td>
<td>9660</td>
<td>22,375</td>
</tr>
</tbody>
</table>

#### REFRIGERANT CHARGE — lb

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-AL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ckt A Total/Over</td>
<td>143/35</td>
<td>78/15</td>
<td>221/50</td>
<td>143/35</td>
<td>78/15</td>
<td>221/50</td>
<td>143/35</td>
<td>98/20</td>
<td>241/55</td>
</tr>
<tr>
<td>Ckt B Clear Glass</td>
<td>143/35</td>
<td>78/15</td>
<td>221/50</td>
<td>143/35</td>
<td>78/15</td>
<td>221/50</td>
<td>143/35</td>
<td>105/20</td>
<td>248/55</td>
</tr>
</tbody>
</table>

#### COMPRESSORS, Type...rpm

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-AL</td>
<td>(3) 299</td>
<td>(1) 265, (1) 299</td>
<td>10,676</td>
<td>(3) 299</td>
<td>(1) 265, (1) 299</td>
<td>17,396</td>
<td>(3) 299</td>
<td>(1) 265, (1) 299</td>
<td>34,072</td>
</tr>
<tr>
<td>C-C</td>
<td>(2) 299</td>
<td>(1) 265</td>
<td>11,948</td>
<td>(2) 299</td>
<td>(1) 265</td>
<td>19,393</td>
<td>(2) 299</td>
<td>(1) 265</td>
<td>39,243</td>
</tr>
</tbody>
</table>

#### OIL CHARGE — Compressor/pt

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-AL</td>
<td>9.0</td>
<td>19.0</td>
<td>28.0</td>
<td>9.0</td>
<td>19.0</td>
<td>28.0</td>
<td>9.0</td>
<td>19.0</td>
<td>28.0</td>
</tr>
<tr>
<td>C-C</td>
<td>19.0</td>
<td>19.0</td>
<td>38.0</td>
<td>19.0</td>
<td>19.0</td>
<td>38.0</td>
<td>19.0</td>
<td>19.0</td>
<td>38.0</td>
</tr>
</tbody>
</table>

#### CONDENSER COILS — Type

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONDENSER COILS — Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tubes (Copper), OD — in.</td>
<td>0.375</td>
<td>0.375</td>
<td>0.750</td>
<td>0.375</td>
<td>0.375</td>
<td>0.750</td>
<td>0.375</td>
<td>0.375</td>
<td>0.750</td>
</tr>
<tr>
<td>No. Rows — Ckt A or B</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Face Area sq ft — Ckt A and B Total</td>
<td>225.1</td>
<td>128.3</td>
<td>353.4</td>
<td>225.1</td>
<td>128.3</td>
<td>353.4</td>
<td>225.1</td>
<td>168.0</td>
<td>393.1</td>
</tr>
</tbody>
</table>

#### FLUID CONNECTIONS — in.

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-AL</td>
<td>1320</td>
<td>745</td>
<td>2065</td>
<td>1320</td>
<td>745</td>
<td>2065</td>
<td>1320</td>
<td>860</td>
<td>2180</td>
</tr>
<tr>
<td>C-C</td>
<td>52.0</td>
<td>24.5</td>
<td>76.5</td>
<td>52.0</td>
<td>24.5</td>
<td>76.5</td>
<td>52.0</td>
<td>30.3</td>
<td>82.3</td>
</tr>
<tr>
<td>Inlet and Outlet</td>
<td>0.75</td>
<td>0.75</td>
<td>1.50</td>
<td>0.75</td>
<td>0.75</td>
<td>1.50</td>
<td>0.75</td>
<td>0.75</td>
<td>1.50</td>
</tr>
<tr>
<td>Drain (NPT)</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
<td>¾</td>
</tr>
</tbody>
</table>

#### NOTE:
- When facing the compressors, Circuit A is on the right and Circuit B is on the left.

---

**LEGEND**

- **C-AL** — Copper Tubing — Aluminum Fins Condenser Coil
- **C-C** — Copper Tubing — Copper Fins Condenser Coil
- **Ckt** — Circuit
- **ESP** — External Static Pressure
- **OD** — Outside Diameter
- ***06E250 compressors have 4 cylinders; all others have 6.**
- **†Based on rated ESP of 0.4 in. wg or 1.0 in. wg as appropriate.**

---

**NOTE:**

- **C-AL** — Copper Tubing — Aluminum Fins Condenser Coil
- **C-C** — Copper Tubing — Copper Fins Condenser Coil
- **Ckt** — Circuit
- **ESP** — External Static Pressure
- **OD** — Outside Diameter
- ***06E250 compressors have 4 cylinders; all others have 6.**
- **†Based on rated ESP of 0.4 in. wg or 1.0 in. wg as appropriate.**

---

**NOTE:**

- **C-AL** — Copper Tubing — Aluminum Fins Condenser Coil
- **C-C** — Copper Tubing — Copper Fins Condenser Coil
- **Ckt** — Circuit
- **ESP** — External Static Pressure
- **OD** — Outside Diameter
- ***06E250 compressors have 4 cylinders; all others have 6.**
- **†Based on rated ESP of 0.4 in. wg or 1.0 in. wg as appropriate.**
### Table 3A — Physical Data — 50 Hz, English (cont)

#### SYSTEM MODULES

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPROX OPERATING WEIGHT — lb</td>
<td>12,906</td>
<td>8840</td>
<td>21,746</td>
<td>15,945</td>
<td>8840</td>
<td>24,825</td>
<td>11,443</td>
<td>11,443</td>
<td>22,886</td>
<td>12,906</td>
<td>11,443</td>
<td>24,349</td>
</tr>
<tr>
<td>C-C</td>
<td>14,425</td>
<td>9790</td>
<td>24,215</td>
<td>15,064</td>
<td>9790</td>
<td>24,854</td>
<td>12,715</td>
<td>12,715</td>
<td>25,430</td>
<td>14,425</td>
<td>12,715</td>
<td>27,140</td>
</tr>
</tbody>
</table>

#### COMPRESSION CHARGE — lb

<table>
<thead>
<tr>
<th>System</th>
<th>Module</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>50/19.0</td>
<td>98/20</td>
<td>275/30</td>
<td>98/20</td>
<td>275/30</td>
<td>98/20</td>
<td>275/30</td>
<td>98/20</td>
<td>275/30</td>
<td>98/20</td>
<td>275/30</td>
<td>98/20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### COMPRESSORS, Type, rpm

<table>
<thead>
<tr>
<th>System</th>
<th>Module</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reciprocating, Semi-Hermetic...</td>
<td>1450</td>
<td>06E*</td>
<td></td>
<td>1450</td>
<td>06E*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### OIL CHARGE — Compressor/pt

<table>
<thead>
<tr>
<th>System</th>
<th>Module</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>299/19.0</td>
<td>19.0</td>
<td>299/19.0</td>
<td>—</td>
<td>299/19.0</td>
<td>—</td>
<td>299/19.0</td>
<td>—</td>
<td>299/19.0</td>
<td>—</td>
<td>299/19.0</td>
<td>—</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### CONDENSER FANS — Type

<table>
<thead>
<tr>
<th>System</th>
<th>Module</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propeller, Direct Drive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### CONDENSER COILS — Type

<table>
<thead>
<tr>
<th>System</th>
<th>Module</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### FLUID CONNECTIONS — in.

<table>
<thead>
<tr>
<th>System</th>
<th>Module</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
<th>A</th>
<th>B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victaulic Type</td>
<td>6</td>
<td>5</td>
<td>—</td>
<td>6</td>
<td>5</td>
<td>—</td>
<td>6</td>
<td>5</td>
<td>—</td>
<td>6</td>
<td>5</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

#### LEGEND

- **C-AL** — Copper Tubing — Aluminum Finned Condenser Coil
- **C-C** — Copper Tubing — Copper Finned Condenser Coil
- **Ckt** — Circuit
- **ESP** — External Static Pressure
- **OD** — Outside Diameter

*Note: When facing the compressors, Circuit A is on the right and Circuit B is on the left.*
<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>390</th>
<th>420</th>
<th>Total</th>
<th>390</th>
<th>420</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPROX OPERATING WEIGHT — lb</td>
<td>13,545</td>
<td>12,906</td>
<td>26,451</td>
<td>13,545</td>
<td>13,545</td>
<td>27,090</td>
</tr>
<tr>
<td>C-AL</td>
<td>15,064</td>
<td>14,425</td>
<td>29,489</td>
<td>15,064</td>
<td>15,064</td>
<td>30,128</td>
</tr>
<tr>
<td>C-C</td>
<td>190/40</td>
<td>178/30</td>
<td>—/—</td>
<td>190/40</td>
<td>190/40</td>
<td>—/—</td>
</tr>
<tr>
<td>Ckt A Total</td>
<td>185/40</td>
<td>173/30</td>
<td>—/—</td>
<td>185/40</td>
<td>185/40</td>
<td>—/—</td>
</tr>
<tr>
<td>Ckt B Clear Glass</td>
<td>Reciprocating, Semi-Hermetic, 1450</td>
<td>265/19.0, 299/19.0</td>
<td>299/19.0</td>
<td>265/19.0, 299/19.0</td>
<td>299/19.0</td>
<td>240,000</td>
</tr>
<tr>
<td>COMPRESSORS, Type...rpm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06E* (Qty) Ckt A</td>
<td>(2) 265, (2) 299</td>
<td>(3) 299</td>
<td>—</td>
<td>(2) 265, (2) 299</td>
<td>(3) 299</td>
<td>—</td>
</tr>
<tr>
<td>(Qty) Ckt B</td>
<td>(3) 299</td>
<td>(3) 299</td>
<td>—</td>
<td>(3) 299</td>
<td>(3) 299</td>
<td>—</td>
</tr>
<tr>
<td>Oil Charge — Compressor</td>
<td>265/19.0, 299/19.0</td>
<td>299/19.0</td>
<td>—</td>
<td>265/19.0, 299/19.0</td>
<td>299/19.0</td>
<td>—</td>
</tr>
<tr>
<td>Oil Charge — Compressor</td>
<td>265/19.0, 299/19.0</td>
<td>299/19.0</td>
<td>—</td>
<td>265/19.0, 299/19.0</td>
<td>299/19.0</td>
<td>—</td>
</tr>
<tr>
<td>Condenser Fans — Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard/Low Noise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fan Speed — rpm</td>
<td>950</td>
<td>950</td>
<td>—</td>
<td>950</td>
<td>950</td>
<td>—</td>
</tr>
<tr>
<td>No. Blades...Diameter — in.</td>
<td>6...30</td>
<td>6...30</td>
<td>—</td>
<td>6...30</td>
<td>6...30</td>
<td>—</td>
</tr>
<tr>
<td>No. Fans...Total kW</td>
<td>12...19.1</td>
<td>12...19.1</td>
<td>24...38.2</td>
<td>12...19.1</td>
<td>12...19.1</td>
<td>24...38.2</td>
</tr>
<tr>
<td>Total Airflow — cfm</td>
<td>120,000</td>
<td>120,000</td>
<td>240,000</td>
<td>120,000</td>
<td>120,000</td>
<td>240,000</td>
</tr>
<tr>
<td>Condenser Coils — Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>0.375</td>
<td>0.375</td>
<td>0.375</td>
<td>0.375</td>
<td>0.375</td>
<td>0.375</td>
</tr>
<tr>
<td>No. Rows</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Face Area sq ft — Ckt A and B Total</td>
<td>268.9</td>
<td>268.9</td>
<td>537.8</td>
<td>268.9</td>
<td>268.9</td>
<td>537.8</td>
</tr>
<tr>
<td>Max Working Pressure Refrigerant — psig</td>
<td>450</td>
<td>450</td>
<td>—</td>
<td>450</td>
<td>450</td>
<td>—</td>
</tr>
<tr>
<td>Condenser Fans — Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard/Low Noise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fan Speed — rpm</td>
<td>950</td>
<td>950</td>
<td>—</td>
<td>950</td>
<td>950</td>
<td>—</td>
</tr>
<tr>
<td>No. Blades...Diameter — in.</td>
<td>6...30</td>
<td>6...30</td>
<td>—</td>
<td>6...30</td>
<td>6...30</td>
<td>—</td>
</tr>
<tr>
<td>No. Fans...Total kW</td>
<td>12...19.1</td>
<td>12...19.1</td>
<td>24...38.2</td>
<td>12...19.1</td>
<td>12...19.1</td>
<td>24...38.2</td>
</tr>
<tr>
<td>Total Airflow — cfm</td>
<td>120,000</td>
<td>120,000</td>
<td>240,000</td>
<td>120,000</td>
<td>120,000</td>
<td>240,000</td>
</tr>
<tr>
<td>Condenser Coils — Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td>0.375</td>
<td>0.375</td>
<td>0.375</td>
<td>0.375</td>
<td>0.375</td>
<td>0.375</td>
</tr>
<tr>
<td>No. Rows</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Face Area sq ft — Ckt A and B Total</td>
<td>268.9</td>
<td>268.9</td>
<td>537.8</td>
<td>268.9</td>
<td>268.9</td>
<td>537.8</td>
</tr>
<tr>
<td>Max Working Pressure Refrigerant — psig</td>
<td>450</td>
<td>450</td>
<td>—</td>
<td>450</td>
<td>450</td>
<td>—</td>
</tr>
<tr>
<td>Condenser Fans — Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard/Low Noise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fan Speed — rpm</td>
<td>950</td>
<td>950</td>
<td>—</td>
<td>950</td>
<td>950</td>
<td>—</td>
</tr>
<tr>
<td>No. Blades...Diameter — in.</td>
<td>6...30</td>
<td>6...30</td>
<td>—</td>
<td>6...30</td>
<td>6...30</td>
<td>—</td>
</tr>
<tr>
<td>No. Fans...Total kW</td>
<td>12...19.1</td>
<td>12...19.1</td>
<td>24...38.2</td>
<td>12...19.1</td>
<td>12...19.1</td>
<td>24...38.2</td>
</tr>
<tr>
<td>Total Airflow — cfm</td>
<td>120,000</td>
<td>120,000</td>
<td>240,000</td>
<td>120,000</td>
<td>120,000</td>
<td>240,000</td>
</tr>
</tbody>
</table>

*06E250 compressors have 4 cylinders; all others have 6.
†Based on rated ESP of 0.4 in. wg or 1.0 in. wg as appropriate.
NOTE: When facing the compressors, Circuit A is on the right and Circuit B is on the left.
### Table 3B — Physical Data — 50 Hz, SI

#### APPROX OPERATING WEIGHT — kg

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>C-AL</th>
<th>C-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>080</td>
<td>3055</td>
<td>3384</td>
</tr>
<tr>
<td>090</td>
<td>3243</td>
<td>3573</td>
</tr>
<tr>
<td>100</td>
<td>3960</td>
<td>4390</td>
</tr>
<tr>
<td>110</td>
<td>4018</td>
<td>4450</td>
</tr>
<tr>
<td>130</td>
<td>4778</td>
<td>5335</td>
</tr>
<tr>
<td>150</td>
<td>4852</td>
<td>5430</td>
</tr>
<tr>
<td>170</td>
<td>5201</td>
<td>5779</td>
</tr>
<tr>
<td>190</td>
<td>5866</td>
<td>6556</td>
</tr>
<tr>
<td>210</td>
<td>6156</td>
<td>6847</td>
</tr>
</tbody>
</table>

#### REFRIGERANT CHARGE — kg

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>R-22</th>
<th>Ckt A</th>
<th>Ckt B</th>
</tr>
</thead>
<tbody>
<tr>
<td>080</td>
<td>35.4</td>
<td>35.4</td>
<td>35.4</td>
</tr>
<tr>
<td>090</td>
<td>44.5</td>
<td>44.5</td>
<td>47.8</td>
</tr>
<tr>
<td>100</td>
<td>50.7</td>
<td>50.7</td>
<td>57.8</td>
</tr>
<tr>
<td>110</td>
<td>59.8</td>
<td>59.8</td>
<td>65.0</td>
</tr>
<tr>
<td>130</td>
<td>69.5</td>
<td>69.5</td>
<td>73.6</td>
</tr>
<tr>
<td>150</td>
<td>80.9</td>
<td>80.9</td>
<td>84.1</td>
</tr>
</tbody>
</table>

#### COMPRESSORS, Type...r/s

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>Ckt A</th>
<th>Ckt B</th>
</tr>
</thead>
<tbody>
<tr>
<td>080</td>
<td>265</td>
<td>299</td>
</tr>
<tr>
<td>090</td>
<td>265</td>
<td>299</td>
</tr>
<tr>
<td>100</td>
<td>265</td>
<td>299</td>
</tr>
<tr>
<td>110</td>
<td>265</td>
<td>299</td>
</tr>
<tr>
<td>130</td>
<td>299</td>
<td>299</td>
</tr>
<tr>
<td>150</td>
<td>299</td>
<td>299</td>
</tr>
<tr>
<td>170</td>
<td>299</td>
<td>299</td>
</tr>
<tr>
<td>190</td>
<td>299</td>
<td>299</td>
</tr>
<tr>
<td>210</td>
<td>299</td>
<td>299</td>
</tr>
</tbody>
</table>

#### Oil Charge — Compressor/L

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>265/9.0</th>
<th>275/9.0</th>
<th>299/9.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>080</td>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
</tr>
<tr>
<td>090</td>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
</tr>
<tr>
<td>100</td>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
</tr>
<tr>
<td>110</td>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
</tr>
<tr>
<td>130</td>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
</tr>
<tr>
<td>150</td>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
</tr>
<tr>
<td>170</td>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
</tr>
<tr>
<td>190</td>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
</tr>
<tr>
<td>210</td>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
</tr>
</tbody>
</table>

#### Condenser Fans — Type

- Standard/Low Noise
- High Static

#### Condenser Coils — Type

- Vertical and Horizontal, Plate Fin, Enhanced Tubing

#### Cooler — No. ...Type

- One...Direct Expansion, Shell and Tube

#### Fluid Connections — in.

- Victaulic Type
- Drain (NPT)

### Legend

- C-AL — Copper Tubing — Aluminum Fins Condenser Coil
- C-C — Copper Tubing — Copper Fins Condenser Coil
- CH — Circuit
- ESP — External Static Pressure
- OD — Outside Diameter

*06E250 compressors have 4 cylinders; all others have 6.
†Based on rated ESP of 100 Pa or 250 Pa as appropriate.

NOTE: When facing the compressors, Circuit A is on the right and Circuit B is on the left.
Table 3B — Physical Data — 50 Hz, SI (cont)

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>230</th>
<th>245</th>
<th>255</th>
<th>270</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPROX OPERATING WEIGHT — kg</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-AL</td>
<td>4852</td>
<td>3055</td>
<td>7907</td>
<td>4852</td>
</tr>
<tr>
<td>C-C</td>
<td>5430</td>
<td>3384</td>
<td>8814</td>
<td>5430</td>
</tr>
<tr>
<td>REFRIGERANT CHARGE — kg</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-22 Ckt A Total/Over</td>
<td>65.0/15.9</td>
<td>35.4/6.8</td>
<td>44.5/9.1</td>
<td>65.0/15.9</td>
</tr>
<tr>
<td>Ckt B Clear Glass</td>
<td>65.0/15.9</td>
<td>35.4/6.8</td>
<td>44.5/9.1</td>
<td>65.0/15.9</td>
</tr>
<tr>
<td>COMPRESSORS, Type, r/s</td>
<td>Reciprocating,</td>
<td>Semi-Hermetic,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06E* (Qt) Ckt A</td>
<td>(3) 299</td>
<td>(1) 265, (1) 299</td>
<td>—</td>
<td>(3) 299</td>
</tr>
<tr>
<td>(Qt) Ckt B</td>
<td>(2) 299</td>
<td>(1) 265, (1) 275</td>
<td>—</td>
<td>(2) 299</td>
</tr>
<tr>
<td>Condenser Fans — Type</td>
<td>Propeller, Direct Drive, Direct Drive</td>
<td>Propeller, Direct Drive, Direct Drive</td>
<td>Propeller, Direct Drive, Direct Drive</td>
<td></td>
</tr>
<tr>
<td>Standard/Low Noise</td>
<td>15.8</td>
<td>15.8</td>
<td>15.8</td>
<td>15.8</td>
</tr>
<tr>
<td>No. Blades, Diameter — mm</td>
<td>6…762</td>
<td>6…762</td>
<td>6…762</td>
<td>6…762</td>
</tr>
<tr>
<td>No. Fans, Total kW</td>
<td>10…15.9</td>
<td>6…9.4</td>
<td>16…25.3</td>
<td>10…15.9</td>
</tr>
<tr>
<td>Total Airflow — L/s</td>
<td>47…190</td>
<td>26…898</td>
<td>74…088</td>
<td>47…190</td>
</tr>
<tr>
<td>High Static</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fan Speed — r/s</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>No. Blades, Diameter — mm</td>
<td>12…762</td>
<td>12…762</td>
<td>12…762</td>
<td>12…762</td>
</tr>
<tr>
<td>No. Fans, Total kW</td>
<td>10…37.0</td>
<td>6…22.2</td>
<td>16…59.2</td>
<td>10…37.0</td>
</tr>
<tr>
<td>Total Airflow — L/s†</td>
<td>47…190</td>
<td>28…315</td>
<td>75…505</td>
<td>47…190</td>
</tr>
<tr>
<td>Condenser Coils — Type</td>
<td>Vertical and Horizontal, Plate Fin, Enhanced Tubing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. Rows — Ckt A or B</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Face Area sq m — Ckt A and B Total</td>
<td>20.92</td>
<td>32.84</td>
<td>20.92</td>
<td>32.84</td>
</tr>
<tr>
<td>Max Working Pressure Refrigerant — kPa</td>
<td>3103</td>
<td>3103</td>
<td>3103</td>
<td>3103</td>
</tr>
<tr>
<td>Cooler — No. Type</td>
<td>One Per Module, Direct Expansion, Shell and Tube</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (empty) — kg</td>
<td>600</td>
<td>338</td>
<td>938</td>
<td>600</td>
</tr>
<tr>
<td>No. Refrigerant Circuits</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Net Fluid Volume — L (includes nozzles)</td>
<td>197</td>
<td>289</td>
<td>486</td>
<td>197</td>
</tr>
<tr>
<td>Fluid Connections — in.</td>
<td>Vicual Type</td>
<td>Vicual Type</td>
<td>Vicual Type</td>
<td>Vicual Type</td>
</tr>
<tr>
<td>Inlet and Outlet</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

**LEGEND**

- C-AL — Copper Tubing — Aluminum Fins Condenser Coil
- C-C — Copper Tubing — Copper Fins Condenser Coil
- Ckt — Circuit
- ESP — External Static Pressure
- OD — Outside Diameter

*06E250 compressors have 4 cylinders; all others have 6.
†Based on rated ESP of 100 Pa or 250 Pa as appropriate.

**NOTE:** When facing the compressors, Circuit A is on the right and Circuit B is on the left.
### Table 3B — Physical Data — 50 Hz, SI (cont)

<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>290</th>
<th>315</th>
<th>330</th>
<th>360</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPROX OPERATING WEIGHT — kg</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-AL</td>
<td>5866</td>
<td>4018</td>
<td>9</td>
<td>884</td>
</tr>
<tr>
<td>C-C</td>
<td>6556</td>
<td>4450</td>
<td>11</td>
<td>006</td>
</tr>
</tbody>
</table>

| REFRIGERANT CHARGE — kg |       |     |     |     |
| Ckt A Total/Over | 86.4 | 18.2 | 44.5 | 9.1 | — | — | — | — | 69.5 | 20.5 | — | — |
| Ckt B Clear Glass | 84.1 | 18.2 | 47.7 | 9.1 | — | — | — | — | 73.6 | 20.5 | — | — |

| COMPRESSORS, Type.../r/s |       |     |     |     |
| (Qty) Ckt A | 3 | 299 | 2 | 299 | — | 2 | 265 | 2 | 299 | 3 | 299 | 2 | 299 | — | 2 | 275 | 2 | 299 | — | 3 | 299 | 2 | 299 | — | 3 | 299 | 2 | 299 | — |
| (Qty) Ckt B | 3 | 299 | 2 | 299 | — | 2 | 299 | 2 | 299 | — | 2 | 299 | 2 | 299 | — | 2 | 299 | 2 | 299 | — | 3 | 299 | 2 | 299 | — |

| Capacity Control Steps |       |     |     |     |
| % Cap. | 50 | 50 | 50 | — | 52 | 50 | 48 | 48 | — | 50 | 50 | 50 | — |
| Ckt A | 50 | 50 | 50 | — | 52 | 50 | 48 | 48 | — | 50 | 50 | 50 | — |

| Minimum Step Capacity (%) |       |     |     |     |
| High Static | 17 | 17 | 17 | — | 10 | 17 | 10 | 10 | — | 17 | 10 | — |

| CONDENSER FANS — Type |       |     |     |     |
| Standard/Low Noise | Propeller, Direct Drive | Propeller, Direct Drive | Propeller, Direct Drive | Propeller, Direct Drive |
| Fan Speed — r/s | 15.8 | 15.8 | — | 15.8 | 15.8 | — | 15.8 | 15.8 | — | 15.8 | 15.8 | — |
| No. Blades.../Diameter — mm | 6...762 | 6...762 | — | 6...762 | 6...762 | — | 6...762 | 6...762 | — | 6...762 | 6...762 | — |
| No. Fans.../Total kW | 12...19.1 | 8...12.7 | 20...74.0 | 12...19.1 | 8...12.7 | 20...74.0 | 10...15.9 | 10...15.9 | 20...31.8 | 12...19.1 | 10...15.9 | 22...31.8 |
| Total Airflow — L/s | 56 | 630 | 37 | 750 | 94 | 380 | 56 | 630 | 20...74 | 12...44.4 | 12...762 | 12...762 | 20...74 |
| High Static | 56 | 630 | 37 | 750 | 94 | 380 | 56 | 630 | 20...74 | 12...44.4 | 12...762 | 12...762 | 20...74 |

| CONDENSER COILS — Type |       |     |     |     |
| Standard/Low Noise | Vertical and Horizontal, Plate Fin, Enhanced Tubing | Vertical and Horizontal, Plate Fin, Enhanced Tubing | Vertical and Horizontal, Plate Fin, Enhanced Tubing | Vertical and Horizontal, Plate Fin, Enhanced Tubing |
| No. Rows.../Ckt A or B | 3 | 3 | 3 | — | 3 | 3 | 3 | 3 | — | 3 | 3 | — |
| Face Area sq m — Ckt A and B Total | 24.98 | 15.61 | 40.59 | 24.98 | 15.61 | 40.59 | 24.98 | 15.61 | 40.59 | 24.98 | 15.61 | 40.59 |
| Max Working Pressure Refrigerant — kPa | 3103 | 3103 | 3103 | 3103 | — | — | — | — | 3103 | 3103 | — | — |

| COOLER — No. Type |       |     |     |     |
| Standard/Low Noise | One Per Module, Direct Expansion, Shell-and-Tube | One Per Module, Direct Expansion, Shell-and-Tube | One Per Module, Direct Expansion, Shell-and-Tube | One Per Module, Direct Expansion, Shell-and-Tube |
| Weight (empty).../kg | 741 | 391 | 1132 | 848 | 391 | 1239 | 741 | 391 | 1239 | 741 | 1482 | 741 | 1482 |
| No. Refrigerant Circuits | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Net Fluid Volume — L includes nozzles | 229 | 114.6 | 343.6 | 267.0 | 114.6 | 381.6 | 229 | 114.6 | 381.6 | 229 | 458 | 229 | 458 |

| FLUID CONNECTIONS — in. |       |     |     |     |
| Standard/Low Noise | Victaulic Type | Victaulic Type | Victaulic Type | Victaulic Type |
| Inlet and Outlet | 6 | 5 | 6 | 5 | 6 | 5 | 6 | 5 | 6 | 5 | 6 | 5 |
| Drain (NPT) | ¾ | — | ¾ | — | ¾ | — | ¾ | — | ¾ | — | ¾ | — |

**LEGEND**

- C-AL — Copper Tubing — Aluminum Fins Condenser Coil
- C-C — Copper Tubing — Copper Fins Condenser Coil
- Ckt — Circuit
- ESP — External Static Pressure
- OD — Outside Diameter

*06E250 compressors have 4 cylinders; all others have 6.
†Based on rated ESP of 100 Pa or 250 Pa as appropriate.

**NOTE:** When facing the compressors, Circuit A is on the right and Circuit B is on the left.
<table>
<thead>
<tr>
<th>SYSTEM MODULES</th>
<th>390</th>
<th>420</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPROX OPERATING WEIGHT — kg</td>
<td>6156</td>
<td>5866</td>
<td>12 022</td>
</tr>
<tr>
<td>C-AL</td>
<td>6156</td>
<td>5866</td>
<td>12 022</td>
</tr>
<tr>
<td>C-C</td>
<td>6847</td>
<td>6556</td>
<td>13 403</td>
</tr>
<tr>
<td>REFRIGERANT CHARGE — kg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-22</td>
<td>12 022</td>
<td>12 022</td>
<td>24 044</td>
</tr>
<tr>
<td>Ckt A Total/Over</td>
<td>84.1/18.2</td>
<td>80.9/13.6</td>
<td>—/—</td>
</tr>
<tr>
<td>Ckt B Clear Glass</td>
<td>84.1/18.2</td>
<td>78.6/13.6</td>
<td>—/—</td>
</tr>
<tr>
<td>COMPRESSORS, Type...r/s</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06E* (Qty) Ckt A</td>
<td>(2) 265, (2) 299</td>
<td>(3) 299</td>
<td>—</td>
</tr>
<tr>
<td>(Qty) Ckt B</td>
<td>(3) 299</td>
<td>(3) 299</td>
<td>—</td>
</tr>
<tr>
<td>Capacity Control Steps</td>
<td>7</td>
<td>6</td>
<td>—</td>
</tr>
<tr>
<td>% Cap. Ckt A</td>
<td>52</td>
<td>50</td>
<td>—</td>
</tr>
<tr>
<td>Ckt B</td>
<td>48</td>
<td>50</td>
<td>—</td>
</tr>
<tr>
<td>Minimum Step Capacity (%)</td>
<td>10</td>
<td>17</td>
<td>—</td>
</tr>
<tr>
<td>CONDENSER FANS — Type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard/Low Noise</td>
<td>Propeller, Direct Drive</td>
<td>Propeller, Direct Drive</td>
<td></td>
</tr>
<tr>
<td>Fan Speed — r/s</td>
<td>15.8</td>
<td>15.8</td>
<td>—</td>
</tr>
<tr>
<td>No. Blades, Diameter — mm</td>
<td>6...762</td>
<td>6...762</td>
<td>—</td>
</tr>
<tr>
<td>No. Fans, Total KW</td>
<td>12...19.1</td>
<td>12...19.1</td>
<td>24...38.2</td>
</tr>
<tr>
<td>Total Airflow — L/s</td>
<td>56 630</td>
<td>56 630</td>
<td>113 260</td>
</tr>
<tr>
<td>Condenser Fans (Indoor)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condenser Fans (Outdoor)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condenser Fans (Total)</td>
<td>265 9.0</td>
<td>299 9.0</td>
<td>265/9.0, 299/9.0</td>
</tr>
<tr>
<td>Total Airflow — L/s†</td>
<td>56 630</td>
<td>56 630</td>
<td>113 260</td>
</tr>
<tr>
<td>CONDENSER COILS — Type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tubes (Copper), OD — mm</td>
<td>9.53</td>
<td>9.53</td>
<td>—</td>
</tr>
<tr>
<td>No. Rows — Ckt A or B Total</td>
<td>24.98</td>
<td>24.98</td>
<td>49.96</td>
</tr>
<tr>
<td>Face Area sq m — Ckt A and B Total</td>
<td>3103</td>
<td>3103</td>
<td>—</td>
</tr>
<tr>
<td>Max Working Pressure Refrigerant — kPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COOLER — No. ...Type</td>
<td>One Per Module...Direct Expansion, Shell and Tube</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (empty) — kg</td>
<td>848</td>
<td>741</td>
<td>1599</td>
</tr>
<tr>
<td>No. Refrigerant Circuits</td>
<td>4</td>
<td>4</td>
<td>—</td>
</tr>
<tr>
<td>Net Fluid Volume — L (includes nozzles)</td>
<td>276</td>
<td>276</td>
<td>—</td>
</tr>
<tr>
<td>Refrigerant Side/Fluid Side — kPa</td>
<td>1916/2068</td>
<td>1916/2068</td>
<td>—/—</td>
</tr>
<tr>
<td>FLUID CONNECTIONS — in.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inlet and Outlet</td>
<td>Victaulic Type</td>
<td>Victaulic Type</td>
<td>—</td>
</tr>
<tr>
<td>Drain (NPT)</td>
<td>¾</td>
<td>¾</td>
<td>—</td>
</tr>
</tbody>
</table>

**LEGEND**

- **C-AL** — Copper Tubing — Aluminum Fins Condenser Coil
- **C-C** — Copper Tubing — Copper Fins Condenser Coil
- **Ckt** — Circuit
- **ESP** — External Static Pressure
- **OD** — Outside Diameter

*06E250 compressors have 4 cylinders; all others have 6.*
†Based on ESP of 100 Pa or 250 Pa as appropriate.

**NOTE:** When facing the compressors, Circuit A is on the right and Circuit B is on the left.
Locate the unit so that the condenser airflow is unrestricted both above and on the sides of the unit. See Fig. 1-5 for required clearances. The unit may be mounted on a level pad directly on the base rails or on a raised perimeter rail around the unit. If unit is mounted on a raised perimeter rail, fasten the unit to the rail using the mounting holes provided.

NOTE: Once the unit is in place, check to be sure unit is level so that oil will equalize properly.

Step 2 — Join Modules A and B (230-420 Units Only) — If accessory trim kit has been purchased to join the modules together, install it now. Refer to accessory installation instructions for installation details.

Step 3 — Check Compressor Mounting — Compressors are mounted on rails. Each rail is mounted on springs (one at each end, and one between each compressor) when applicable. For shipping, the rails are secured to the frame base at each support. Before start-up, loosen the holddown bolts so that the compressor rails float freely. See Fig. 9 and 10 for views of compressor mounting.

Step 4 — Cooler Fluid and Drain Piping Connections — When facing cooler side of unit, inlet (return) fluid connection is on the right. It is recommended that a screen strainer with a minimum size of 20 mesh be installed ahead of the cooler inlet to prevent debris from damaging internal tubes of cooler. Outlet (supply) fluid connection is on the left. The cooler has fluid-side Victaulic-type connections (follow connection directions as provided by the coupling manufacturer). If compressor and cooler grilles have been added, holes must be cut in grilles for field piping and insulation.

NOTE: For 130-210 and associated modular units (see Table 1), be sure that cooler piping does not interfere with the electrical connections.

Although cooler has an air vent, it is recommended that field-supplied air vents be installed in system to facilitate servicing. Field-supplied shut-off valves should also be installed to facilitate servicing and flow balancing. Locate valves in return and supply cooler fluid lines as close to the chiller as possible. Locate air vents at highest point of the cooler fluid system.

Upon completion of the field piping installation, in areas where the piping is exposed to 32 °F (0 °C) or lower ambient temperatures, freeze-up protection is recommended using inhibited ethylene glycol or other suitable corrosion-inhibited anti-freeze solution and electric heater tapes. Heater tapes should have a rating for area ambient temperatures and should be covered with a suitable thickness of closed-cell insulation. Route power for the heater tapes from a separate fused disconnect. Mount the disconnect within sight from the unit per NEC or local codes. Label disconnect as heater tape power source with warning that power must not be turned off except when servicing the unit.

A drain connection is located at leaving fluid (supply) end of cooler. See Fig. 1-4 for connection location.

PREPARATION FOR YEAR-ROUND OPERATION — If unit is to operate all year, add sufficient inhibited ethylene glycol or other suitable corrosion-inhibited anti-freeze solution to the cooler fluid to prevent freezing under cold operating conditions. Consult local water authority on characteristics of area water and a recommended inhibitor for the cooler fluid loop.

PREPARATION FOR WINTER SHUTDOWN — Do not shut off control power disconnect during off-season shutdown.

At end of cooling season:
1. If unit has optional heater tapes on cooler, remove fuse no. 1.

   **CAUTION**

   Failure to remove fuse no. 1 before draining heater-equipped coolers can result in heater tape and insulation damage.

2. Drain the fluid from the system.

3. Replace the drain plug and add 2 gallons (8 liters) (080-110 and associated modular units), 3 gallons (11.4 liters) (130-190 and associated modular units), or 4 gallons (15.1 liters) (210 and associated modular units) of inhibited ethylene glycol or other suitable corrosion-inhibited anti-freeze solution to the cooler to prevent freezing of any remaining water in system. Anti-freeze can be added through the vent on top of cooler.
4. Open one of the thermistor connections to allow air to escape the vessel and the anti-freeze to enter.

5. At the beginning of the next cooling season, refill cooler, add recommended inhibitor, and replace FU1 (if removed).

**Step 5 — Make Electrical Connections** — The electrical characteristics of the available power supply must agree with the unit nameplate rating. Supply voltage must be within the limits shown. The control box is divided into field power side on the right, and control power supply on the left (when facing control box) on 080-110 and associated modular units. (See Table 1.) On 130-210 and associated modular units (see Table 1), the power box is located on the cooler side of the unit, and the control box is located on the compressor side.

**FIELD POWER CONNECTIONS** (See Fig. 11-15) — All power wiring must comply with applicable local and national codes. Install field-supplied, branch circuit fused disconnect(s) of a type that can be locked off or open. Disconnect(s) must be located within sight from and readily accessible from unit in compliance with NEC Article 440-14. See Tables 4A-7 for unit electrical data.

**IMPORTANT:** The 30GT080-420 units have a factory-installed option for a non-fused disconnect for power and control entry. If the unit is equipped with this option, all field wiring should be to the non-fused disconnect rather than the terminal blocks.

**LEGEND AND NOTES FOR WIRING DIAGRAMS** (FIG. 11-15)

**LEGEND**

- EQUIP — Equipment
- GND — Ground
- TB — Terminal Block
- KCMIL — Thousand Circular Mils
- NEC — National Electrical Code (U.S.A.)
- ---- Field Power Wiring
- ---- Factory Installed Wiring

**NOTES:**

1. Factory wiring is in accordance with NEC. Field modifications or additions must be in compliance with all applicable codes.
2. Wiring for main field power supply must be rated 75°C minimum. Use copper, copper-clad aluminum, or aluminum conductors for all units, except use copper conductors only for the following units: 30GT110, 290B, and 315B 346-v; 30GT110, 290B, and 315B 380/415-v part-wind start; 30GT210, 315A, 390A, 420A/B 208/230-volts.
3. Dimensions in [ ] are millimeters.
30GT130-210, 230A-315A, and 330-420 Units — The field power wiring enters the unit through the left side of the cooler side power box. The control power enters the control box on the compressor side of the unit.

NOTE: If optional non-fused disconnect is installed, power wiring must enter through center panel of unit (disconnect location).

IMPORTANT: Do not obstruct the field cooler connections when installing field power into the power box. Use 90-degree liquid-tight conduit fittings to connect field power to the unit and avoid the cooler piping area.

All units have a single location for power connection (one per module on 230-420 units) to simplify field power wiring. The maximum acceptable wire size for the terminal block is 500 kcmil. Copper, copper-clad aluminum, or aluminum conductors are acceptable for all units except 30GT210, 315A, 390A, and 420A/B 208/230-3-60 units. These units require copper conductors. For 208/230-3-60 and 230-3-50 units, 9 parallel conductors are required. All other voltages require 6 parallel conductors.
FIELD CONTROL POWER CONNECTIONS (See Fig. 16 and 17) — For 208/230-, 460- and 575-3-60 units:
If the accessory transformer is not used, provide a 115-1-60 power source for the control circuit, through a field-supplied fused disconnect (per NEC). This conductor must be copper only. Control power enters the control box through a ½-in. (22.2-mm) conduit connection located on the right side of the control section.

For 30GT080-110 and 230B-315B units with 380-3-60 or 380/415-3-50 power: Control circuit voltage is taken from the line voltage, therefore, no additional power supply is required. If a separate power source is required, follow these instructions and disconnect the wires between the control and power terminal blocks.

For 30GT080-110 and 230B-315B Units with 230-3-50 or 346-3-50 power: A separate 230-1-50 control power source is required. Provide a 230-1-50 power source for the control circuit through a field-supplied fused disconnect (per NEC or local code). This conductor must be copper only. Control power enters the control box through a ½-in. (22 mm) conduit connection located on the right side of the control section.

NOTE: The 230-v unit is only available in 330 and larger sizes.

Fig. 14 — Field Power Wiring; Unit Sizes 230A-315A, 330A/B-420A/B
For 30GT130-210, 230A-315A, and 330A/B-420A/B units with 380-3-60 and 380/415-3-50 power: Control voltage is tapped from line to neutral. No additional power supply is required. If a separate power source is required, follow these instructions and disconnect the wires between the control and power terminal blocks.

Units with a power supply of 380-3-60 have 230-1-60 control circuit power, which is taken from the unit's power supply voltage. Units with a power supply of 380/415-3-50 have 230-1-50 control circuit power, which is also taken from the unit's power supply voltage. For control circuit current draw, see Table 5.

For 30GT130-210, 230A-315A, and 330A/B-420A/B Units with 230-3-50 or 346-3-50 power: A separate 230-1-50 control power source is required. Provide a 230-1-50 power source for the control circuit through a field-supplied fused disconnect (per NEC or local code). This conductor must be copper only. Control power enters the control box through a 7/8-in. (22 mm) conduit connection located on the right side of the control section.

All Units: Control circuit power draw includes the compressor crankcase heaters at 180 w each, the 8 cooler heaters (if equipped) at 210 w each, and the electronic board heater at 120 w.

\[ \text{CAUTION} \]

Crankcase heaters, cooler heaters, and board heater are all wired into the control circuit ahead of the control circuit switch. Therefore, they are always active even if the control circuit switch is off.

An interlock circuit for external safeties, such as the chilled fluid flow switch (CWFS), remote on-off, and chilled fluid pump interlock (CWPI) is provided between terminals TB6-3 and TB6-4 for field use. To use this circuit, remove the factory jumper and install the switches.

LEGEND AND NOTES FOR WIRING DIAGRAMS (Fig. 16 and 17)

<table>
<thead>
<tr>
<th>A</th>
<th>Alarm</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWFS</td>
<td>Chilled Water (Fluid) Flow Switch</td>
</tr>
<tr>
<td>CWPI</td>
<td>Chilled Water (Fluid) Pump Interlock</td>
</tr>
<tr>
<td>EQUIP</td>
<td>Equipment</td>
</tr>
<tr>
<td>NEC</td>
<td>National Electrical Code</td>
</tr>
<tr>
<td>O.A.</td>
<td>Outdoor Air</td>
</tr>
<tr>
<td>TB</td>
<td>Terminal Block</td>
</tr>
</tbody>
</table>

- Field Power Wiring
- Field Control Wiring
- Factory Installed Wiring

NOTES:
1. Factory wiring is in accordance with NEC (U.S.A.). Field modifications or additions must be in compliance with all applicable codes.
2. Wiring for main field power supply must be rated 75° C minimum. Use copper, copper-clad aluminum, or aluminum conductors for all units, except use copper conductors only for the following units: 30GT110, 290B, 315B 346-v; 30GT110, 290B, 315B 380/415-v part-wind start; 30GT210, 315A, 390A, 420A/B 208/230-volts.
3. Power for control circuit should be supplied from a separate source through a field-supplied fused disconnect. See Table 5 for required amp value for disconnect. Connect control circuit power to terminals 1 and 2 of TB4. Connect neutral side of supply to terminal 2 of TB4. Control circuit conductors for all units must be copper only.
4. Terminals 3 and 4 of TB6 are for field connection for remote ON-OFF control, CWPI, and CWFS. The contacts must be rated for dry circuit application capable of reliably switching a 5 vdc, 0.5 mA load. Remove jumper between 3 and 4 of TB6 if remote ON-OFF is installed.
5. The maximum load allowed for the remote alarm circuit is 75 va sealed, 360 va inrush at 115- or 230-v, depending on model. Remove resistor across terminals TB5-1 and TB5-2 (080-110 and 230B-315B units) when using remote alarm.
6. Dimensions in [ ] are millimeters.

Fig. 16 — Field Control Power Wiring; Unit Sizes 080-110, 230B-315B
Table 4A — Unit Electrical Data, 30GT080-110

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>VOLTAGE</th>
<th>STANDARD CONDENSER FAN</th>
<th>HIGH-STATIC CONDENSER FAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nameplate V-Hz (3 Phase)</td>
<td>Supplied*</td>
<td>MCA</td>
</tr>
<tr>
<td>080</td>
<td>208/230-60</td>
<td>187 253</td>
<td>396.5</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>414 506</td>
<td>185.8†</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>518 633</td>
<td>160.9</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>342 418</td>
<td>209.9</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>325 380</td>
<td>250.1</td>
</tr>
<tr>
<td></td>
<td>380/415-50</td>
<td>342 440</td>
<td>218.5†</td>
</tr>
<tr>
<td>090</td>
<td>208/230-60</td>
<td>187 253</td>
<td>397.4</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>414 506</td>
<td>198.0†</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>518 633</td>
<td>168.0</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>342 418</td>
<td>205.9</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>325 380</td>
<td>269.3</td>
</tr>
<tr>
<td></td>
<td>380/415-50</td>
<td>342 440</td>
<td>244.1†</td>
</tr>
<tr>
<td>100</td>
<td>208/230-60</td>
<td>187 253</td>
<td>470.1</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>414 506</td>
<td>224.8†</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>518 633</td>
<td>191.1</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>342 418</td>
<td>242.1</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>325 380</td>
<td>303.8</td>
</tr>
<tr>
<td></td>
<td>380/415-50</td>
<td>342 440</td>
<td>270.2†</td>
</tr>
<tr>
<td>110</td>
<td>208/230-60</td>
<td>187 253</td>
<td>521.4</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>414 506</td>
<td>248.9†</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>518 633</td>
<td>212.0</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>342 418</td>
<td>274.1</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>325 380</td>
<td>373.0</td>
</tr>
<tr>
<td></td>
<td>380/415-50</td>
<td>342 440</td>
<td>316.4†</td>
</tr>
</tbody>
</table>

NOTE: See legend and notes on page 33.
### Table 4B — Unit Electrical Data, 30GT130-210

<table>
<thead>
<tr>
<th>UNIT SIZE</th>
<th>Nameplate V-Hz (3 Phase)</th>
<th>Supplied* MCA</th>
<th>MCA</th>
<th>STANDARD CONDENSER FAN</th>
<th>ICF</th>
<th>HIGH STATIC CONDENSER FAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>208-300</td>
<td>187</td>
<td>253</td>
<td>610.2</td>
<td>XL</td>
<td>700</td>
<td>700</td>
</tr>
<tr>
<td>460-60</td>
<td>414</td>
<td>506</td>
<td>271.8</td>
<td>XL</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>575-60</td>
<td>518</td>
<td>633</td>
<td>245.9</td>
<td>XL</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>380-60</td>
<td>342</td>
<td>418</td>
<td>331.1</td>
<td>XL</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>230-50</td>
<td>207</td>
<td>253</td>
<td>536.0</td>
<td>XL</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>346-50</td>
<td>325</td>
<td>380</td>
<td>382.9</td>
<td>XL</td>
<td>450</td>
<td>450</td>
</tr>
<tr>
<td>380/415-50</td>
<td>342</td>
<td>440</td>
<td>338.6</td>
<td>XL</td>
<td>350</td>
<td>350</td>
</tr>
</tbody>
</table>

- **FLA**: Full Load Amps (Fan Motors)
- **ICF**: Maximum Instantaneous Current Flow during starting (the point in the starting sequence where the sum of the LRA for the starting compressor, plus the total FLA for all running fan motors is maximum)
- **kW** Total condenser fan motor input power
- **LRA**: Locked Rotor Amps
- **MCA**: Minimum Circuit Amps (for wire sizing) — complies with NEC Section 450-24
- **MOCP**: Maximum Overcurrent Protective Device Amps
- **NEC**: National Electrical Code, U.S.A.
- **Rec Fuse**: Recommended dual-element fuse amps; 150% of largest compressor RLAP 100% of sum of remaining compressor RLAs. Size up to the next larger standard fuse size.
- **PW**: Part Wind
- **RLA**: Rated Load Amps (Compressors)
- **XL**: Across-the-Line

**LEGEND**

- **VOLTAGE**: Supplied* MCA
- **TERMINAL BLOCKS**: MCA
- **PARALLEL CONDUCTORS**: MCA

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>VOLTAGE</th>
<th>TERMINAL BLOCKS</th>
<th>PARALLEL CONDUCTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>208-300</td>
<td>208</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>460-60</td>
<td>460</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>575-60</td>
<td>575</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>380-60</td>
<td>380</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>230-50</td>
<td>230</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>346-50</td>
<td>346</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>380/415-50</td>
<td>380/415</td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

4. Units have the following power wiring terminal blocks and parallel conductors:

5. Maximum incoming wire size for each terminal block is 500 kcmil.

6. Power draw of control circuits includes both crankcase heaters and cooler heaters (where used). Each compressor has a crankcase heater which draws 180 w of power.

**NOTES:**

1. All modules have single point primary power connection. (Each module requires its own power supply.) Main power must be supplied from a field-supplied disconnect.

2. The unit control circuit power (115 v, single-phase for 208/230-, 460-, and 575-v units; 230 v, single-phase for all other voltages) must be supplied from a separate source through a field-supplied disconnect. The control circuit transformer accessory may be applied to power from primary unit supply.

3. Crankcase and cooler heaters are wired into the control circuit so they are always operable as long as the control circuit power supply disconnect is on, even if any safety device is open, and the unit ON/OFF switch is in the OFF position.

---

**Additional Notes:**

- All modules have single point primary power connection. (Each module requires its own power supply.) Main power must be supplied from a field-supplied disconnect.

- The unit control circuit power (115 v, single-phase for 208/230-, 460-, and 575-v units; 230 v, single-phase for all other voltages) must be supplied from a separate source through a field-supplied disconnect. The control circuit transformer accessory may be applied to power from primary unit supply.

- Crankcase and cooler heaters are wired into the control circuit so they are always operable as long as the control circuit power supply disconnect is on, even if any safety device is open, and the unit ON/OFF switch is in the OFF position.
<table>
<thead>
<tr>
<th>VOLTAGE</th>
<th>MODULE A</th>
<th>Standard Condenser Fan</th>
<th>High-Static Condenser Fan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module</td>
<td>Role</td>
<td>Fuse Size</td>
<td>ICF</td>
</tr>
<tr>
<td>208/230-60</td>
<td>250</td>
<td>253</td>
<td>664.2</td>
</tr>
<tr>
<td>460-60</td>
<td>414</td>
<td>506</td>
<td>312.9</td>
</tr>
<tr>
<td>575-60</td>
<td>518</td>
<td>633</td>
<td>272.3</td>
</tr>
<tr>
<td>300/415-50</td>
<td>342</td>
<td>418</td>
<td>359.9</td>
</tr>
<tr>
<td>346-50</td>
<td>325</td>
<td>380</td>
<td>461.5</td>
</tr>
<tr>
<td>380/415-50</td>
<td>342</td>
<td>440</td>
<td>377.9</td>
</tr>
</tbody>
</table>

NOTE: See legend and notes on page 33.
## Table 4C — Unit Electrical Data, 30GT230-420 (cont)

<table>
<thead>
<tr>
<th>Nameplate Voltage (3 Phase)</th>
<th>Supplied*</th>
<th>MCA</th>
<th>MOCP</th>
<th>Rec</th>
<th>ICF</th>
<th>MCA</th>
<th>MOCP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
<td>Max</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>208/230-60</td>
<td>187</td>
<td>253</td>
<td>398.5</td>
<td>500</td>
<td>450</td>
<td>450</td>
<td>896.9</td>
</tr>
<tr>
<td>460-60</td>
<td>414</td>
<td>506</td>
<td>250</td>
<td>200</td>
<td>225</td>
<td>424.2</td>
<td>305.4</td>
</tr>
<tr>
<td>575-60</td>
<td>518</td>
<td>633</td>
<td>216.0</td>
<td>200</td>
<td>175</td>
<td>365.6</td>
<td>464.9</td>
</tr>
<tr>
<td>380-60</td>
<td>342</td>
<td>418</td>
<td>209.9</td>
<td>250</td>
<td>250</td>
<td>492.6</td>
<td>339.5</td>
</tr>
<tr>
<td>346-50</td>
<td>325</td>
<td>380</td>
<td>250.1</td>
<td>300</td>
<td>275</td>
<td>532.8</td>
<td>379.8</td>
</tr>
<tr>
<td>380/415-50</td>
<td>342</td>
<td>440</td>
<td>218.5</td>
<td>250</td>
<td>250</td>
<td>472.0</td>
<td>327.6</td>
</tr>
<tr>
<td></td>
<td>208/230-60</td>
<td>187</td>
<td>253</td>
<td>397.4</td>
<td>450</td>
<td>450</td>
<td>722.3</td>
</tr>
<tr>
<td>460-60</td>
<td>414</td>
<td>506</td>
<td>198.0</td>
<td>225</td>
<td>225</td>
<td>361.2</td>
<td>237.5</td>
</tr>
<tr>
<td>575-60</td>
<td>518</td>
<td>633</td>
<td>168.0</td>
<td>200</td>
<td>175</td>
<td>286.2</td>
<td>213.2</td>
</tr>
<tr>
<td>380-60</td>
<td>342</td>
<td>418</td>
<td>205.5</td>
<td>250</td>
<td>225</td>
<td>294.9</td>
<td>225.0</td>
</tr>
<tr>
<td>346-50</td>
<td>325</td>
<td>380</td>
<td>269.3</td>
<td>300</td>
<td>275</td>
<td>552.0</td>
<td>399.0</td>
</tr>
<tr>
<td>380/415-50</td>
<td>342</td>
<td>440</td>
<td>244.1</td>
<td>300</td>
<td>250</td>
<td>497.0</td>
<td>363.5</td>
</tr>
<tr>
<td></td>
<td>208/230-60</td>
<td>187</td>
<td>253</td>
<td>470.1</td>
<td>500</td>
<td>500</td>
<td>826.2</td>
</tr>
<tr>
<td>460-60</td>
<td>414</td>
<td>506</td>
<td>224.8</td>
<td>250</td>
<td>250</td>
<td>408.8</td>
<td>312.3</td>
</tr>
<tr>
<td>575-60</td>
<td>518</td>
<td>633</td>
<td>212.0</td>
<td>250</td>
<td>225</td>
<td>289.4</td>
<td>233.1</td>
</tr>
<tr>
<td>380-60</td>
<td>342</td>
<td>418</td>
<td>242.2</td>
<td>250</td>
<td>225</td>
<td>492.6</td>
<td>339.5</td>
</tr>
<tr>
<td>346-50</td>
<td>325</td>
<td>380</td>
<td>303.8</td>
<td>350</td>
<td>350</td>
<td>586.5</td>
<td>433.5</td>
</tr>
<tr>
<td>380/415-50</td>
<td>342</td>
<td>440</td>
<td>270.2</td>
<td>300</td>
<td>300</td>
<td>521.6</td>
<td>388.7</td>
</tr>
<tr>
<td></td>
<td>208/230-60</td>
<td>187</td>
<td>253</td>
<td>521.4</td>
<td>600</td>
<td>600</td>
<td>1019.2</td>
</tr>
<tr>
<td>460-60</td>
<td>414</td>
<td>506</td>
<td>248.9</td>
<td>300</td>
<td>250</td>
<td>500.8</td>
<td>367.3</td>
</tr>
<tr>
<td>575-60</td>
<td>518</td>
<td>633</td>
<td>212.5</td>
<td>250</td>
<td>225</td>
<td>416.6</td>
<td>292.1</td>
</tr>
<tr>
<td>380-60</td>
<td>342</td>
<td>418</td>
<td>274.1</td>
<td>350</td>
<td>350</td>
<td>556.8</td>
<td>403.8</td>
</tr>
<tr>
<td>346-50</td>
<td>325</td>
<td>380</td>
<td>373.0</td>
<td>450</td>
<td>450</td>
<td>655.7</td>
<td>502.7</td>
</tr>
<tr>
<td>380/415-50</td>
<td>342</td>
<td>440</td>
<td>316.4</td>
<td>350</td>
<td>350</td>
<td>562.5</td>
<td>434.7</td>
</tr>
<tr>
<td></td>
<td>208/230-60</td>
<td>187</td>
<td>253</td>
<td>521.4</td>
<td>600</td>
<td>600</td>
<td>1019.2</td>
</tr>
<tr>
<td>460-60</td>
<td>414</td>
<td>506</td>
<td>248.9</td>
<td>300</td>
<td>250</td>
<td>500.8</td>
<td>367.3</td>
</tr>
<tr>
<td>575-60</td>
<td>518</td>
<td>633</td>
<td>212.5</td>
<td>250</td>
<td>225</td>
<td>416.6</td>
<td>292.1</td>
</tr>
<tr>
<td>380-60</td>
<td>342</td>
<td>418</td>
<td>274.1</td>
<td>350</td>
<td>350</td>
<td>556.8</td>
<td>403.8</td>
</tr>
<tr>
<td>346-50</td>
<td>325</td>
<td>380</td>
<td>373.0</td>
<td>450</td>
<td>450</td>
<td>655.7</td>
<td>502.7</td>
</tr>
<tr>
<td>380/415-50</td>
<td>342</td>
<td>440</td>
<td>316.4</td>
<td>350</td>
<td>350</td>
<td>562.5</td>
<td>434.7</td>
</tr>
<tr>
<td></td>
<td>208/230-60</td>
<td>187</td>
<td>253</td>
<td>521.4</td>
<td>600</td>
<td>600</td>
<td>1019.2</td>
</tr>
<tr>
<td>460-60</td>
<td>414</td>
<td>506</td>
<td>248.9</td>
<td>300</td>
<td>250</td>
<td>500.8</td>
<td>367.3</td>
</tr>
<tr>
<td>575-60</td>
<td>518</td>
<td>633</td>
<td>212.5</td>
<td>250</td>
<td>225</td>
<td>416.6</td>
<td>292.1</td>
</tr>
<tr>
<td>380-60</td>
<td>342</td>
<td>418</td>
<td>274.1</td>
<td>350</td>
<td>350</td>
<td>556.8</td>
<td>403.8</td>
</tr>
<tr>
<td>346-50</td>
<td>325</td>
<td>380</td>
<td>373.0</td>
<td>450</td>
<td>450</td>
<td>655.7</td>
<td>502.7</td>
</tr>
<tr>
<td>380/415-50</td>
<td>342</td>
<td>440</td>
<td>316.4</td>
<td>350</td>
<td>350</td>
<td>562.5</td>
<td>434.7</td>
</tr>
<tr>
<td></td>
<td>208/230-60</td>
<td>187</td>
<td>253</td>
<td>521.4</td>
<td>600</td>
<td>600</td>
<td>1019.2</td>
</tr>
<tr>
<td>460-60</td>
<td>414</td>
<td>506</td>
<td>248.9</td>
<td>300</td>
<td>250</td>
<td>500.8</td>
<td>367.3</td>
</tr>
<tr>
<td>575-60</td>
<td>518</td>
<td>633</td>
<td>212.5</td>
<td>250</td>
<td>225</td>
<td>416.6</td>
<td>292.1</td>
</tr>
<tr>
<td>380-60</td>
<td>342</td>
<td>418</td>
<td>274.1</td>
<td>350</td>
<td>350</td>
<td>556.8</td>
<td>403.8</td>
</tr>
<tr>
<td>346-50</td>
<td>325</td>
<td>380</td>
<td>373.0</td>
<td>450</td>
<td>450</td>
<td>655.7</td>
<td>502.7</td>
</tr>
<tr>
<td>380/415-50</td>
<td>342</td>
<td>440</td>
<td>316.4</td>
<td>350</td>
<td>350</td>
<td>562.5</td>
<td>434.7</td>
</tr>
<tr>
<td></td>
<td>208/230-60</td>
<td>187</td>
<td>253</td>
<td>521.4</td>
<td>600</td>
<td>600</td>
<td>1019.2</td>
</tr>
<tr>
<td>460-60</td>
<td>414</td>
<td>506</td>
<td>248.9</td>
<td>300</td>
<td>250</td>
<td>500.8</td>
<td>367.3</td>
</tr>
<tr>
<td>575-60</td>
<td>518</td>
<td>633</td>
<td>212.5</td>
<td>250</td>
<td>225</td>
<td>416.6</td>
<td>292.1</td>
</tr>
<tr>
<td>380-60</td>
<td>342</td>
<td>418</td>
<td>274.1</td>
<td>350</td>
<td>350</td>
<td>556.8</td>
<td>403.8</td>
</tr>
<tr>
<td>346-50</td>
<td>325</td>
<td>380</td>
<td>373.0</td>
<td>450</td>
<td>450</td>
<td>655.7</td>
<td>502.7</td>
</tr>
<tr>
<td>380/415-50</td>
<td>342</td>
<td>440</td>
<td>316.4</td>
<td>350</td>
<td>350</td>
<td>562.5</td>
<td>434.7</td>
</tr>
</tbody>
</table>

**NOTE:** See legend and notes on page 33.
**Table 5 — Control Circuit**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>With Cooler Heater</td>
<td>Without Cooler Heater</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>203/230-3-60</td>
<td>115-1-60</td>
<td>104</td>
<td>127</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>460-3-60</td>
<td>115-1-60</td>
<td>104</td>
<td>127</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>575-3-60</td>
<td>115-1-60</td>
<td>104</td>
<td>127</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>380-3-60</td>
<td>230-1-60</td>
<td>207</td>
<td>254</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>346-5-50</td>
<td>230-1-60</td>
<td>198</td>
<td>254</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>230-3-50</td>
<td>230-1-60</td>
<td>198</td>
<td>254</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>380/415-5-50</td>
<td>230-1-60</td>
<td>198</td>
<td>254</td>
<td>15</td>
<td>5</td>
</tr>
</tbody>
</table>

See legend and notes on page 33.

**Table 6A — Compressor Electrical Data, 30GT080-110**

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>NAMEPLATE V-Hz (3 Phase)</th>
<th>COMPRRESSOR NUMBERS</th>
<th>A1</th>
<th>A2</th>
<th>B1</th>
<th>B2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>RLA</td>
<td>LRA</td>
<td>RLA</td>
<td>LRA</td>
<td>RLA</td>
</tr>
<tr>
<td>080-XL</td>
<td>208/230-60</td>
<td>106.4</td>
<td>506</td>
<td>67.9</td>
<td>345</td>
<td>147.7</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>46.8</td>
<td>253</td>
<td>34.6</td>
<td>173</td>
<td>65.4</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>40.4</td>
<td>176</td>
<td>28.8</td>
<td>120</td>
<td>57.1</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>52.6</td>
<td>280</td>
<td>34.6</td>
<td>191</td>
<td>78.8</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>44.9</td>
<td>247</td>
<td>79.5</td>
<td>382</td>
<td>79.5</td>
</tr>
<tr>
<td></td>
<td>380/415-50</td>
<td>43.6</td>
<td>223</td>
<td>65.4</td>
<td>345</td>
<td>65.4</td>
</tr>
<tr>
<td>080-PW</td>
<td>208/230-60</td>
<td>106.4</td>
<td>304</td>
<td>67.9</td>
<td>207</td>
<td>147.4</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>48.7</td>
<td>152</td>
<td>33.3</td>
<td>104</td>
<td>67.9</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>33.3</td>
<td>106</td>
<td>28.2</td>
<td>72</td>
<td>53.8</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>53.8</td>
<td>168</td>
<td>79.5</td>
<td>229</td>
<td>79.5</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>44.9</td>
<td>148</td>
<td>79.5</td>
<td>229</td>
<td>79.5</td>
</tr>
<tr>
<td></td>
<td>380/415-50</td>
<td>43.6</td>
<td>134</td>
<td>67.9</td>
<td>207</td>
<td>67.9</td>
</tr>
<tr>
<td>090-XL</td>
<td>208/230-60</td>
<td>89.7</td>
<td>446</td>
<td>67.9</td>
<td>207</td>
<td>89.7</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>44.9</td>
<td>134</td>
<td>33.3</td>
<td>104</td>
<td>44.9</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>33.3</td>
<td>98</td>
<td>28.2</td>
<td>72</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>45.5</td>
<td>247</td>
<td>79.5</td>
<td>382</td>
<td>44.9</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>44.9</td>
<td>148</td>
<td>79.5</td>
<td>229</td>
<td>44.9</td>
</tr>
<tr>
<td></td>
<td>380/415-50</td>
<td>43.6</td>
<td>134</td>
<td>67.9</td>
<td>207</td>
<td>43.6</td>
</tr>
<tr>
<td>090-PW</td>
<td>208/230-60</td>
<td>89.7</td>
<td>268</td>
<td>67.9</td>
<td>207</td>
<td>89.7</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>44.9</td>
<td>134</td>
<td>33.3</td>
<td>104</td>
<td>44.9</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>33.3</td>
<td>98</td>
<td>28.2</td>
<td>72</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>44.9</td>
<td>148</td>
<td>79.5</td>
<td>229</td>
<td>44.9</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>44.9</td>
<td>148</td>
<td>79.5</td>
<td>229</td>
<td>44.9</td>
</tr>
<tr>
<td></td>
<td>380/415-50</td>
<td>43.6</td>
<td>134</td>
<td>67.9</td>
<td>207</td>
<td>43.6</td>
</tr>
<tr>
<td>100-XL</td>
<td>208/230-60</td>
<td>89.7</td>
<td>446</td>
<td>67.9</td>
<td>207</td>
<td>89.7</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>43.6</td>
<td>223</td>
<td>46.8</td>
<td>253</td>
<td>43.6</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>36.5</td>
<td>164</td>
<td>40.4</td>
<td>176</td>
<td>36.5</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>44.9</td>
<td>148</td>
<td>53.8</td>
<td>168</td>
<td>44.9</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>44.9</td>
<td>148</td>
<td>79.5</td>
<td>229</td>
<td>44.9</td>
</tr>
<tr>
<td></td>
<td>380/415-50</td>
<td>43.6</td>
<td>134</td>
<td>67.9</td>
<td>207</td>
<td>43.6</td>
</tr>
<tr>
<td>100-PW</td>
<td>208/230-60</td>
<td>89.7</td>
<td>268</td>
<td>67.9</td>
<td>207</td>
<td>89.7</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>44.9</td>
<td>134</td>
<td>48.7</td>
<td>152</td>
<td>44.9</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>33.3</td>
<td>98</td>
<td>33.3</td>
<td>106</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>44.9</td>
<td>148</td>
<td>79.5</td>
<td>229</td>
<td>44.9</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>44.9</td>
<td>148</td>
<td>79.5</td>
<td>229</td>
<td>44.9</td>
</tr>
<tr>
<td></td>
<td>380/415-50</td>
<td>43.6</td>
<td>134</td>
<td>67.9</td>
<td>207</td>
<td>43.6</td>
</tr>
<tr>
<td>110-XL</td>
<td>208/230-60</td>
<td>89.7</td>
<td>446</td>
<td>67.9</td>
<td>207</td>
<td>89.7</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>43.6</td>
<td>223</td>
<td>65.4</td>
<td>345</td>
<td>43.6</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>36.5</td>
<td>164</td>
<td>57.1</td>
<td>276</td>
<td>36.5</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>45.5</td>
<td>247</td>
<td>79.5</td>
<td>229</td>
<td>45.5</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>79.5</td>
<td>382</td>
<td>79.5</td>
<td>382</td>
<td>79.5</td>
</tr>
<tr>
<td></td>
<td>380/415-50</td>
<td>65.4</td>
<td>345</td>
<td>65.4</td>
<td>345</td>
<td>65.4</td>
</tr>
<tr>
<td>110-PW</td>
<td>208/230-60</td>
<td>89.7</td>
<td>446</td>
<td>147.4</td>
<td>414</td>
<td>89.7</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>44.9</td>
<td>134</td>
<td>67.9</td>
<td>207</td>
<td>44.9</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>33.3</td>
<td>98</td>
<td>53.8</td>
<td>165</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>44.9</td>
<td>148</td>
<td>79.5</td>
<td>229</td>
<td>44.9</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>79.5</td>
<td>382</td>
<td>79.5</td>
<td>382</td>
<td>79.5</td>
</tr>
<tr>
<td></td>
<td>380/415-50</td>
<td>67.9</td>
<td>207</td>
<td>67.9</td>
<td>207</td>
<td>67.9</td>
</tr>
</tbody>
</table>

NOTE: See legend and notes on page 33.
### Table 6B — Compressor Electrical Data, 30GT130-210

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>NAMEPLATE V-Hz (3 Phase)</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
</tr>
</thead>
<tbody>
<tr>
<td>130-XL</td>
<td>208/230-60</td>
<td>107.7 506</td>
<td>151.3 690</td>
<td>—</td>
<td>—</td>
<td>107.7 506</td>
<td>151.3 690</td>
<td></td>
</tr>
<tr>
<td></td>
<td>460/60</td>
<td>46.8 253</td>
<td>64.5 345</td>
<td>—</td>
<td>—</td>
<td>46.8 253</td>
<td>64.5 345</td>
<td></td>
</tr>
<tr>
<td></td>
<td>575/60</td>
<td>41.7 176</td>
<td>57.1 176</td>
<td>—</td>
<td>—</td>
<td>41.7 176</td>
<td>57.1 176</td>
<td></td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>55.8 280</td>
<td>80.2 382</td>
<td>—</td>
<td>—</td>
<td>55.8 280</td>
<td>80.2 382</td>
<td></td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>46.8 259</td>
<td>55.8 294</td>
<td>55.8 294</td>
<td>80.2 400</td>
<td>80.2 400</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>230-50</td>
<td>77.0 342</td>
<td>87.9 366</td>
<td>87.9 366</td>
<td>107.7 545</td>
<td>107.7 545</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>380/415-50</td>
<td>44.9 134</td>
<td>44.9 134</td>
<td>65.5 207</td>
<td>65.5 207</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>130-PW</td>
<td>208/230-60</td>
<td>107.7 304</td>
<td>151.3 414</td>
<td>—</td>
<td>—</td>
<td>107.7 304</td>
<td>151.3 414</td>
<td></td>
</tr>
<tr>
<td></td>
<td>460/60</td>
<td>46.8 152</td>
<td>65.4 207</td>
<td>—</td>
<td>—</td>
<td>46.8 152</td>
<td>65.4 207</td>
<td></td>
</tr>
<tr>
<td></td>
<td>575/60</td>
<td>41.7 106</td>
<td>57.1 144</td>
<td>—</td>
<td>—</td>
<td>41.7 106</td>
<td>57.1 144</td>
<td></td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>55.8 168</td>
<td>80.2 230</td>
<td>—</td>
<td>—</td>
<td>55.8 168</td>
<td>80.2 230</td>
<td></td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>46.8 155</td>
<td>55.8 155</td>
<td>55.8 155</td>
<td>80.2 240</td>
<td>80.2 240</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>230-50</td>
<td>77.0 206</td>
<td>87.9 220</td>
<td>87.9 220</td>
<td>107.7 327</td>
<td>107.7 327</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>380/415-50</td>
<td>44.9 134</td>
<td>44.9 134</td>
<td>65.5 207</td>
<td>65.5 207</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150-XL</td>
<td>208/230-60</td>
<td>107.7 506</td>
<td>151.3 690</td>
<td>—</td>
<td>—</td>
<td>107.7 506</td>
<td>151.3 690</td>
<td></td>
</tr>
<tr>
<td></td>
<td>460/60</td>
<td>46.8 253</td>
<td>64.5 345</td>
<td>—</td>
<td>—</td>
<td>46.8 253</td>
<td>64.5 345</td>
<td></td>
</tr>
<tr>
<td></td>
<td>575/60</td>
<td>41.7 176</td>
<td>57.1 176</td>
<td>—</td>
<td>—</td>
<td>41.7 176</td>
<td>57.1 176</td>
<td></td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>55.8 280</td>
<td>80.2 382</td>
<td>—</td>
<td>—</td>
<td>55.8 280</td>
<td>80.2 382</td>
<td></td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>46.8 259</td>
<td>55.8 294</td>
<td>55.8 294</td>
<td>80.2 400</td>
<td>80.2 400</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>230-50</td>
<td>77.0 342</td>
<td>87.9 366</td>
<td>87.9 366</td>
<td>107.7 545</td>
<td>107.7 545</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>380/415-50</td>
<td>44.9 134</td>
<td>44.9 134</td>
<td>65.5 207</td>
<td>65.5 207</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150-PW</td>
<td>208/230-60</td>
<td>107.7 506</td>
<td>151.3 690</td>
<td>—</td>
<td>—</td>
<td>107.7 506</td>
<td>151.3 690</td>
<td></td>
</tr>
<tr>
<td></td>
<td>460/60</td>
<td>46.8 253</td>
<td>64.5 345</td>
<td>—</td>
<td>—</td>
<td>46.8 253</td>
<td>64.5 345</td>
<td></td>
</tr>
<tr>
<td></td>
<td>575/60</td>
<td>41.7 176</td>
<td>57.1 176</td>
<td>—</td>
<td>—</td>
<td>41.7 176</td>
<td>57.1 176</td>
<td></td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>55.8 280</td>
<td>80.2 382</td>
<td>—</td>
<td>—</td>
<td>55.8 280</td>
<td>80.2 382</td>
<td></td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>46.8 259</td>
<td>55.8 294</td>
<td>55.8 294</td>
<td>80.2 400</td>
<td>80.2 400</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>230-50</td>
<td>77.0 342</td>
<td>87.9 366</td>
<td>87.9 366</td>
<td>107.7 545</td>
<td>107.7 545</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>380/415-50</td>
<td>44.9 134</td>
<td>44.9 134</td>
<td>65.5 207</td>
<td>65.5 207</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** See legend and notes on page 33.
| 30GT UNIT SIZE | NAMEPLATE V-Hz (3 Phase) | MODULE A
Compressor Numbers |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>230-XL</td>
<td>208/230-60</td>
<td>208/230-60</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>460-60</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>575-60</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>380-60</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>346-50</td>
</tr>
<tr>
<td></td>
<td>380-415-50</td>
<td>380-415-50</td>
</tr>
<tr>
<td>230-PW</td>
<td>208/230-60</td>
<td>208/230-60</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>460-60</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>575-60</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>380-60</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>346-50</td>
</tr>
<tr>
<td></td>
<td>380-415-50</td>
<td>380-415-50</td>
</tr>
<tr>
<td>245-XL</td>
<td>208/230-60</td>
<td>208/230-60</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>460-60</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>575-60</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>380-60</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>346-50</td>
</tr>
<tr>
<td></td>
<td>380-415-50</td>
<td>380-415-50</td>
</tr>
<tr>
<td>245-PW</td>
<td>208/230-60</td>
<td>208/230-60</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>460-60</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>575-60</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>380-60</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>346-50</td>
</tr>
<tr>
<td></td>
<td>380-415-50</td>
<td>380-415-50</td>
</tr>
<tr>
<td>255-XL</td>
<td>208/230-60</td>
<td>208/230-60</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>460-60</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>575-60</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>380-60</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>346-50</td>
</tr>
<tr>
<td></td>
<td>380-415-50</td>
<td>380-415-50</td>
</tr>
<tr>
<td>255-PW</td>
<td>208/230-60</td>
<td>208/230-60</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>460-60</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>575-60</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>380-60</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>346-50</td>
</tr>
<tr>
<td></td>
<td>380-415-50</td>
<td>380-415-50</td>
</tr>
<tr>
<td>270-XL</td>
<td>208/230-60</td>
<td>208/230-60</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>460-60</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>575-60</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>380-60</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>346-50</td>
</tr>
<tr>
<td></td>
<td>380-415-50</td>
<td>380-415-50</td>
</tr>
<tr>
<td>270-PW</td>
<td>208/230-60</td>
<td>208/230-60</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>460-60</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>575-60</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>380-60</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>346-50</td>
</tr>
<tr>
<td></td>
<td>380-415-50</td>
<td>380-415-50</td>
</tr>
<tr>
<td>290-XL</td>
<td>208/230-60</td>
<td>208/230-60</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>460-60</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>575-60</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>380-60</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>346-50</td>
</tr>
<tr>
<td></td>
<td>380-415-50</td>
<td>380-415-50</td>
</tr>
<tr>
<td>290-PW</td>
<td>208/230-60</td>
<td>208/230-60</td>
</tr>
<tr>
<td></td>
<td>460-60</td>
<td>460-60</td>
</tr>
<tr>
<td></td>
<td>575-60</td>
<td>575-60</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>380-60</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>346-50</td>
</tr>
<tr>
<td></td>
<td>380-415-50</td>
<td>380-415-50</td>
</tr>
</tbody>
</table>

NOTE: See legend and notes on page 33.
<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>NAMEPLATE V-Hz (3 Phase)</th>
<th>MODULE B Compressor Numbers</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
</tr>
</thead>
<tbody>
<tr>
<td>230-XL</td>
<td></td>
<td></td>
<td>106.4</td>
<td>506</td>
<td>67.9</td>
<td>345</td>
<td>147.7</td>
<td>690</td>
<td></td>
</tr>
<tr>
<td>230-PW</td>
<td></td>
<td></td>
<td>106.4</td>
<td>304</td>
<td>67.9</td>
<td>207</td>
<td>147.4</td>
<td>690</td>
<td></td>
</tr>
<tr>
<td>245-XL</td>
<td></td>
<td></td>
<td>89.7</td>
<td>446</td>
<td>67.9</td>
<td>345</td>
<td>89.7</td>
<td>446</td>
<td>89.7</td>
</tr>
<tr>
<td>245-PW</td>
<td></td>
<td></td>
<td>89.7</td>
<td>690</td>
<td>67.9</td>
<td>345</td>
<td>89.7</td>
<td>446</td>
<td>89.7</td>
</tr>
<tr>
<td>255-XL</td>
<td></td>
<td></td>
<td>89.7</td>
<td>446</td>
<td>106.4</td>
<td>506</td>
<td>89.7</td>
<td>446</td>
<td>106.4</td>
</tr>
<tr>
<td>255-PW</td>
<td></td>
<td></td>
<td>89.7</td>
<td>690</td>
<td>106.4</td>
<td>506</td>
<td>89.7</td>
<td>446</td>
<td>106.4</td>
</tr>
<tr>
<td>270-XL</td>
<td></td>
<td></td>
<td>89.7</td>
<td>446</td>
<td>106.4</td>
<td>506</td>
<td>89.7</td>
<td>446</td>
<td>106.4</td>
</tr>
<tr>
<td>270-PW</td>
<td></td>
<td></td>
<td>89.7</td>
<td>690</td>
<td>106.4</td>
<td>506</td>
<td>89.7</td>
<td>446</td>
<td>106.4</td>
</tr>
<tr>
<td>290-XL</td>
<td></td>
<td></td>
<td>89.7</td>
<td>446</td>
<td>147.4</td>
<td>690</td>
<td>89.7</td>
<td>446</td>
<td>106.4</td>
</tr>
<tr>
<td>290-PW</td>
<td></td>
<td></td>
<td>89.7</td>
<td>690</td>
<td>147.4</td>
<td>690</td>
<td>89.7</td>
<td>446</td>
<td>106.4</td>
</tr>
</tbody>
</table>

NOTE: See legend and notes on page 33.
## Table 6C — Compressor Electrical Data, 30GT230-420 (cont)

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>NAMEPLATE V-Hz (3 Phase)</th>
<th>MODULE A Compressor Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RLA</td>
</tr>
<tr>
<td>315-XL</td>
<td>208/230-60</td>
<td>89.8</td>
</tr>
<tr>
<td>460-60</td>
<td>44.9</td>
<td>223</td>
</tr>
<tr>
<td>575-60</td>
<td>36.6</td>
<td>184</td>
</tr>
<tr>
<td>380-60</td>
<td>46.8</td>
<td>247</td>
</tr>
<tr>
<td>346-50</td>
<td>46.8</td>
<td>259</td>
</tr>
<tr>
<td>380/415-50</td>
<td>44.9</td>
<td>223</td>
</tr>
<tr>
<td>330-PW</td>
<td>208/230-60</td>
<td>89.8</td>
</tr>
<tr>
<td>460-60</td>
<td>44.9</td>
<td>134</td>
</tr>
<tr>
<td>575-60</td>
<td>36.6</td>
<td>99</td>
</tr>
<tr>
<td>380-60</td>
<td>46.8</td>
<td>149</td>
</tr>
<tr>
<td>346-50</td>
<td>46.8</td>
<td>155</td>
</tr>
<tr>
<td>380/415-50</td>
<td>44.9</td>
<td>134</td>
</tr>
<tr>
<td>330-XL</td>
<td>208/230-60</td>
<td>107.7</td>
</tr>
<tr>
<td>460-60</td>
<td>46.8</td>
<td>253</td>
</tr>
<tr>
<td>575-60</td>
<td>41.7</td>
<td>176</td>
</tr>
<tr>
<td>380-60</td>
<td>55.8</td>
<td>280</td>
</tr>
<tr>
<td>346-50</td>
<td>55.8</td>
<td>294</td>
</tr>
<tr>
<td>230-50</td>
<td>87.9</td>
<td>366</td>
</tr>
<tr>
<td>380/415-50</td>
<td>46.8</td>
<td>253</td>
</tr>
<tr>
<td>330-PW</td>
<td>208/230-60</td>
<td>107.7</td>
</tr>
<tr>
<td>460-60</td>
<td>46.8</td>
<td>152</td>
</tr>
<tr>
<td>575-60</td>
<td>41.7</td>
<td>106</td>
</tr>
<tr>
<td>380-60</td>
<td>55.8</td>
<td>177</td>
</tr>
<tr>
<td>346-50</td>
<td>55.8</td>
<td>240</td>
</tr>
<tr>
<td>230-50</td>
<td>87.9</td>
<td>220</td>
</tr>
<tr>
<td>380/415-50</td>
<td>46.8</td>
<td>152</td>
</tr>
<tr>
<td>360-XL</td>
<td>208/230-60</td>
<td>89.8</td>
</tr>
<tr>
<td>460-60</td>
<td>44.9</td>
<td>223</td>
</tr>
<tr>
<td>575-60</td>
<td>36.6</td>
<td>164</td>
</tr>
<tr>
<td>380-60</td>
<td>46.8</td>
<td>247</td>
</tr>
<tr>
<td>346-50</td>
<td>80.2</td>
<td>240</td>
</tr>
<tr>
<td>230-50</td>
<td>107.7</td>
<td>345</td>
</tr>
<tr>
<td>380/415-50</td>
<td>65.5</td>
<td>345</td>
</tr>
<tr>
<td>360-PW</td>
<td>208/230-60</td>
<td>107.7</td>
</tr>
<tr>
<td>460-60</td>
<td>44.9</td>
<td>134</td>
</tr>
<tr>
<td>575-60</td>
<td>36.6</td>
<td>99</td>
</tr>
<tr>
<td>380-60</td>
<td>46.8</td>
<td>149</td>
</tr>
<tr>
<td>346-50</td>
<td>80.2</td>
<td>240</td>
</tr>
<tr>
<td>230-50</td>
<td>107.7</td>
<td>327</td>
</tr>
<tr>
<td>380/415-50</td>
<td>65.5</td>
<td>207</td>
</tr>
</tbody>
</table>

**NOTE:** See legend and notes on page 33.
<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>NAMEPLATE V-Hz (3 Phase)</th>
<th>MODULE B Compressor Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>315-XL</td>
<td></td>
<td>A1</td>
</tr>
<tr>
<td>208/230-60</td>
<td>89.7</td>
<td>446</td>
</tr>
<tr>
<td>460-60</td>
<td>43.6</td>
<td>223</td>
</tr>
<tr>
<td>575-60</td>
<td>36.5</td>
<td>164</td>
</tr>
<tr>
<td>380-60</td>
<td>45.5</td>
<td>247</td>
</tr>
<tr>
<td>346-50</td>
<td>79.5</td>
<td>382</td>
</tr>
<tr>
<td>380/415-50</td>
<td>65.4</td>
<td>345</td>
</tr>
<tr>
<td>315-PW</td>
<td></td>
<td>A1</td>
</tr>
<tr>
<td>208/230-60</td>
<td>89.7</td>
<td>268</td>
</tr>
<tr>
<td>460-60</td>
<td>44.9</td>
<td>134</td>
</tr>
<tr>
<td>575-60</td>
<td>33.3</td>
<td>98</td>
</tr>
<tr>
<td>380-60</td>
<td>44.9</td>
<td>148</td>
</tr>
<tr>
<td>346-50</td>
<td>79.5</td>
<td>229</td>
</tr>
<tr>
<td>380/415-50</td>
<td>67.9</td>
<td>207</td>
</tr>
<tr>
<td>330-XL</td>
<td></td>
<td>A1</td>
</tr>
<tr>
<td>208/230-60</td>
<td>107.7</td>
<td>506</td>
</tr>
<tr>
<td>460-60</td>
<td>46.8</td>
<td>253</td>
</tr>
<tr>
<td>575-60</td>
<td>41.7</td>
<td>176</td>
</tr>
<tr>
<td>380-60</td>
<td>55.8</td>
<td>280</td>
</tr>
<tr>
<td>346-50</td>
<td>79.5</td>
<td>366</td>
</tr>
<tr>
<td>380/415-50</td>
<td>46.8</td>
<td>152</td>
</tr>
<tr>
<td>330-PW</td>
<td></td>
<td>A1</td>
</tr>
<tr>
<td>208/230-60</td>
<td>107.7</td>
<td>304</td>
</tr>
<tr>
<td>460-60</td>
<td>46.8</td>
<td>152</td>
</tr>
<tr>
<td>575-60</td>
<td>41.7</td>
<td>176</td>
</tr>
<tr>
<td>380-60</td>
<td>55.8</td>
<td>177</td>
</tr>
<tr>
<td>346-50</td>
<td>79.5</td>
<td>220</td>
</tr>
<tr>
<td>380/415-50</td>
<td>46.8</td>
<td>152</td>
</tr>
<tr>
<td>360-XL</td>
<td></td>
<td>A1</td>
</tr>
<tr>
<td>208/230-60</td>
<td>89.8</td>
<td>446</td>
</tr>
<tr>
<td>460-60</td>
<td>44.9</td>
<td>223</td>
</tr>
<tr>
<td>575-60</td>
<td>36.6</td>
<td>164</td>
</tr>
<tr>
<td>380-60</td>
<td>46.8</td>
<td>247</td>
</tr>
<tr>
<td>346-50</td>
<td>55.8</td>
<td>294</td>
</tr>
<tr>
<td>380/415-50</td>
<td>46.8</td>
<td>253</td>
</tr>
<tr>
<td>360-PW</td>
<td></td>
<td>A1</td>
</tr>
<tr>
<td>208/230-60</td>
<td>89.8</td>
<td>268</td>
</tr>
<tr>
<td>460-60</td>
<td>44.9</td>
<td>134</td>
</tr>
<tr>
<td>575-60</td>
<td>36.6</td>
<td>99</td>
</tr>
<tr>
<td>380-60</td>
<td>46.8</td>
<td>149</td>
</tr>
<tr>
<td>346-50</td>
<td>55.8</td>
<td>177</td>
</tr>
<tr>
<td>380/415-50</td>
<td>46.8</td>
<td>152</td>
</tr>
</tbody>
</table>

NOTE: See legend and notes on page 33.
<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>NAMEPLATE V-Hz (3 Phase)</th>
<th>MODULE A</th>
<th>Compressor Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>30GT-230-60</td>
<td>208/230-60</td>
<td>89.8 446</td>
<td>89.8 446 89.8 446 89.8 446 107.7 506 107.7 506 151.3 690 151.3 690</td>
</tr>
<tr>
<td>30GT-420-60</td>
<td>460-60</td>
<td>44.9 223</td>
<td>44.9 223 44.9 223 44.9 223 46.8 253 46.8 253 65.4 345 65.4 345</td>
</tr>
<tr>
<td>30GT-230-420</td>
<td>575-60</td>
<td>36.6 164</td>
<td>36.6 164 36.6 164 36.6 164 41.7 176 41.7 176 57.1 240 57.1 240</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>46.8 247</td>
<td>46.8 247 46.8 247 46.8 247 55.8 280 55.8 280 80.2 382 80.2 382</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>46.8 259</td>
<td>46.8 259 80.2 400 80.2 400 80.2 400 80.2 400</td>
</tr>
<tr>
<td></td>
<td>230-50</td>
<td>77.0 342</td>
<td>77.0 342 107.7 327 107.7 327 107.7 327</td>
</tr>
<tr>
<td></td>
<td>380-415-50</td>
<td>44.9 134</td>
<td>44.9 134 65.5 207 65.5 207 65.5 207</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>NAMEPLATE V-Hz (3 Phase)</th>
<th>MODULE B</th>
<th>Compressor Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>30GT-230-60</td>
<td>208/230-60</td>
<td>89.8 446</td>
<td>107.7 506 151.3 690</td>
</tr>
<tr>
<td>30GT-420-60</td>
<td>460-60</td>
<td>44.9 223</td>
<td>46.8 253 46.8 253</td>
</tr>
<tr>
<td>30GT-230-420</td>
<td>575-60</td>
<td>36.6 164</td>
<td>41.7 176 57.1 240</td>
</tr>
<tr>
<td></td>
<td>380-60</td>
<td>46.8 247</td>
<td>55.8 280 80.2 382</td>
</tr>
<tr>
<td></td>
<td>346-50</td>
<td>80.2 400</td>
<td>80.2 400 80.2 400</td>
</tr>
<tr>
<td></td>
<td>230-50</td>
<td>107.7 327</td>
<td>107.7 327 107.7 327</td>
</tr>
<tr>
<td></td>
<td>380-415-50</td>
<td>65.5 345</td>
<td>65.5 345 65.5 345</td>
</tr>
</tbody>
</table>

**NOTE:** See legend and notes on page 33.
### Table 7 — Condenser Fan Electrical Data

<table>
<thead>
<tr>
<th>UNIT SIZE</th>
<th>NAMEPLATE VOLTAGE (V-Ph-Hz)</th>
<th>STANDARD/LOW NOISE CONDENSER FANS</th>
<th>HIGH STATIC CONDENSER FANS</th>
</tr>
</thead>
<tbody>
<tr>
<td>30GT</td>
<td></td>
<td><strong>Total</strong> Quantity Hp kW (Quantity) FLA (ea) (Quantity) LRA (ea) <strong>Total</strong> Quantity Hp kW (Quantity) FLA (ea) (Quantity) LRA (ea)</td>
<td></td>
</tr>
<tr>
<td>080,090, 230B,245B</td>
<td>208/230-3-60 460-3-60 575-3-60 380-3-60 346-3-50 380/415-3-50</td>
<td>6 1 0.746 (6) 6.6, (2) 5.5 (6) 3.3, (2) 2.8 (6) 3.4 (4) 31.6, (2) 30.0 (4) 31.6, (2) 30.0</td>
<td>6 5 3.73 (6) 14.6 (6) 6.3 (6) 41.6 (6) 5.2 (6) 42.0</td>
</tr>
<tr>
<td>100,110, 255B,270B, 290B,315B</td>
<td>208/230-3-60 460-3-60 575-3-60 380-3-60 346-3-50 380/415-3-50</td>
<td>8 1 0.746 (6) 6.6, (2) 5.5 (6) 3.3, (2) 2.8 (6) 3.4 (8) 31.6, (2) 30.0 (8) 31.6, (2) 30.0</td>
<td>8 5 3.73 (8) 14.6 (8) 6.3 (8) 41.6 (8) 5.2 (8) 42.0</td>
</tr>
<tr>
<td>130-170 230A-270A, 330A/B,360B (50 Hz)</td>
<td>208/230-3-60 460-3-60 575-3-60 380-3-60 346-3-50 230-3-50** 380/415-3-50</td>
<td>10 1 0.746 (6) 6.6, (4) 5.5 (6) 3.3, (4) 2.8 (10) 3.9 (10) 3.4 (10) 3.4 (6) 31.6, (4) 30.0 (6) 31.6, (4) 30.0 (10) 30.0 (10) 30.0</td>
<td>10 5 3.73 (10) 14.6 (10) 6.3 (10) 41.6 (10) 5.2 (10) 42.0</td>
</tr>
<tr>
<td>190,210, 290A,315A, 360A/B (60 Hz), 390A/B,420A/B</td>
<td>208/230-3-60 460-3-60 575-3-60 380-3-60 346-3-50 230-3-50 380/415-3-50</td>
<td>12 1 0.746 (8) 6.6, (4) 5.5 (8) 3.3, (4) 2.8 (12) 3.4 (12) 3.4 (12) 3.4 (8) 31.6, (4) 30.0 (8) 31.6, (4) 30.0 (12) 30.0 (12) 30.0</td>
<td>12 5 3.73 (12) 14.6 (12) 6.3 (12) 41.6 (12) 5.2 (12) 42.0</td>
</tr>
</tbody>
</table>

### Step 6 — Install Accessories

**ELECTRICAL** — A number of electrical accessories are available to provide the following optional features (for details, refer to the Controls and Troubleshooting book):
- Accessory temperature reset board and accessory thermistor (used for any of the following types of temperature reset):
  - Return fluid temperature reset
  - Space temperature reset (requires accessory thermistor)
  - Outdoor air temperature reset (requires accessory thermistor)
- Chilled fluid flow switch

**LOW-AMBIENT OPERATION** — If operating temperatures below 0°F (−18°C) are expected, refer to separate installation instructions for low-ambient operation, Motormaster® III control.

**HOT GAS BYPASS** — Hot gas bypass usually is not recommended because it results in application of equipment out of its normal design application range. However, if its use is required, the appropriate hot gas bypass package may be used. For installation details, refer to separate instructions supplied with the accessory package.

**MISCELLANEOUS ACCESSORIES** — For applications requiring special accessories, the following packages are available: condenser hail guard, gage panel, sound reduction kit, convenience outlet, and security grille package.

### PRE-START-UP

**IMPORTANT:** Before beginning Pre-Start-Up or Start-Up, complete Start-Up Checklist for Flotronic™ Chiller Systems at center of this publication (page CL-1). The Checklist assures proper start-up of a unit, and provides a record of unit condition, application requirements, system information, and operation at initial start-up.

Do not attempt to start the chiller until following checks have been completed.

**System Check**

1. Check all auxiliary components, such as the chilled fluid circulating pump, air-handling equipment, or other equipment to which the chiller supplies liquid. Consult manufacturer’s instructions. If the unit has field-installed accessories, be sure all are properly installed and wired correctly. Refer to unit wiring diagrams.
2. Backseat (open) compressor suction and discharge shut-off valves. Close valves one turn to allow refrigerant pressure to reach the test gages.
3. Open liquid line service valves.
4. Fill the chiller fluid circuit with clean water (with recommended inhibitor added) or other noncorrosive fluid to be cooled. Bleed all air out of high points of system. An air vent is included with the cooler. If
outdoor temperatures are expected to be below 32 F (0° C), sufficient inhibited ethylene glycol or other suitable corrosion-inhibited antifreeze should be added to the chiller water circuit to prevent possible freeze-up.

5. Check tightness of all electrical connections.

6. Oil should be visible in the compressor sight glass. See Fig. 18. An acceptable oil level in the compressor is from 1/8 to 3/8 of sight glass. Adjust the oil level as required. No oil should be removed unless the crankcase heater has been energized for at least 24 hours. See Oil Charge section on page 57 for Carrier-approved oils.

7. Electrical power source must agree with unit nameplate.

8. Crankcase heaters must be firmly locked into compressors, and must be on for 24 hours prior to start-up.

9. Fan motors are 3 phase. Check rotation of fans during the quick test (see Quick Test section below). Fan rotation is clockwise as viewed from top of unit. If fan is not turning clockwise, reverse 2 of the power wires.

10. Check compressor suspension. Mounting rails must be floating freely on the springs.

11. Perform quick test to verify proper settings. See Controls and Troubleshooting literature for more details.

Quick Test (See Fig. 19 and Table 8) — Both main power and control circuit power must be on.

The quick test program utilizes a 2-digit LED (light-emitting diode) display (Fig. 19) on set point board to show status of all input and output signals to microprocessor control. Display action and quick test procedure are described as follows:

The quick test is a 42-step program that provides a means of checking all input and output signals of microprocessor control prior to unit start-up. This check ensures that all control options, thermistors, and status switches are in proper working order.

To initiate the quick test program, first turn unit control switch to the ON position. When \[ \begin{array}{c} 
\text{ON} \\
\end{array} \] appears in display, immediately press display button once. An \[ \begin{array}{c} 
1 \\
\end{array} \] will appear in display; this indicates that microprocessor in control system is ready to run quick test program.

IMPORTANT: Do not allow unit control circuit to remain energized with \[ \begin{array}{c} 
1 \\
\end{array} \] showing in display for more than 2 minutes. If display button is not pressed within this time, control will attempt to start unit.

For each step of the 42-step program, display button must be pressed twice. On first press, step number is displayed; second press initiates required action, and code as shown in Table 8 is displayed.

NOTE: Step number is a numeral followed by a decimal point (a 2-digit number has a decimal point after each numeral). Action code number is one or 2 digits with no decimal point(s).

IMPORTANT: Once quick test is initiated, display button must be pressed at least once every 10 minutes for control to remain in quick test mode. If button is not pressed within this time, control will attempt to start unit.

To recheck any step in quick test, control must be recycled by turning unit control circuit switch off for a few seconds, then on again. Restart quick test program as described above and proceed through quick test steps. Press display button twice for each step until step to be rechecked is reached.

The quick test program is divided into 3 sections as described below and shown in Table 8. For more detailed information, refer to Controls and Troubleshooting literature.
**NOTES:**

1. Refer to Controls and Troubleshooting literature for details.
2. Processor board is rotated 90 degrees counterclockwise from position shown when installed in unit.
3. Do not remove label covering EPROM. Removal causes program to be erased.

*EPROM HT207101-1-XX.

---

**LEGEND**

- **DIP** — Dual In-Line Package
- **EPROM** — Erasable, Programmable, Read-Only Memory
- **EXV** — Electronic Expansion Valve
- **LED** — Light-Emitting Diode
- **LWT** — Leaving Water (Fluid) Temperature
- **TP** — Test Pin

---

**Fig. 19 — Center of Flotronic™ Control System (080-110 and 230B-315B Shown)**
A. QUICK TEST STEPS 1 - 15: UNIT CONFIGURATION
— Microprocessor in unit control system is programmed by 2 switch assemblies located on processor board (Fig. 19). Configuration header is factory set and cannot be changed in the field. The DIP switch assembly contains 8 microswitches that must be set in accordance with various options and accessories selected. As shipped from factory, all DIP switches except those controlling pull-down option (switch no. 3) and compressor unloaders (switch no. 7 on 30GT080-330, and 360B 50 Hz units) are in OFF position. Switch no. 8 is in OFF position for water units, and ON position for brine units. All DIP switches should be checked and set to proper position for options selected during quick test.

The DIP switch assembly, functions, and display codes are shown in Fig. 19 and in Tables 8 and 9. Refer to Controls and Troubleshooting literature for details.

B. QUICK TEST STEPS 16 - 30: THERMISTORS AND SET POINT POTENTIOMETERS — In these steps, microprocessor checks resistance values of all sensors and set point potentiometers to ensure they are functional and set within proper range for unit configuration.

Nominal resistance values for all sensors range from 363,000 to 216 ohms. Normal display code for good sensors and potentiometers is . Display code indicates a faulty potentiometer, thermistor, or wiring. A display can also indicate a particular option is not being used, i.e., demand limit not installed.

Tables 8 and 10 show set point potentiometer functions, locations, and quick test display codes.

C. QUICK TEST STEPS 31 - 42: OUTPUT RELAYS — These quick test steps allow microprocessor to check output signals from relay boards in unit control system. In addition, operation of all condenser fans and compressors is checked at each step.

Normal display code for steps 3, 4 through 3, 4 is . In steps 3, 5 through 3, 4, when appropriate, each compressor is started and allowed to run for approximately 10 seconds. At start-up appears, followed by in a few seconds. At end of 10-second test, code test, code returns to display indicating that test step has been successfully completed. Code indicated that compressor protection circuit (CPCS) or control relay (CR) was tested.

Fan and compressor operating sequence for quick test steps 3, 4 through 4, 6 are shown in Table 8 and Fig. 20.

If quick test steps do not operate as described, a defect exists in one or more of the following: relay being tested, electronic control, and/or unit wiring. Refer to Controls and Troubleshooting literature for additional information.

<table>
<thead>
<tr>
<th>FAN ARRANGEMENT</th>
<th>FAN NO.</th>
<th>QUICK TEST DISPLAY NUMBER*</th>
<th>CONTROLLED BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>30GT080,090,230B,245B</td>
<td>1</td>
<td>3.5.</td>
<td>Compressor No. A1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3.9.</td>
<td>Compressor No. B1</td>
</tr>
<tr>
<td></td>
<td>3,4</td>
<td>3.1.</td>
<td>First Stage of Condenser Fans</td>
</tr>
<tr>
<td></td>
<td>5,6</td>
<td>3.2.</td>
<td>Second Stage of Condenser Fans</td>
</tr>
<tr>
<td>30GT100,110,255B-315B</td>
<td>1</td>
<td>3.5.</td>
<td>Compressor No. A1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3.9.</td>
<td>Compressor No. B1</td>
</tr>
<tr>
<td></td>
<td>3,4</td>
<td>3.1.</td>
<td>First Stage of Condenser Fans</td>
</tr>
<tr>
<td></td>
<td>5,6,7,8</td>
<td>3.2.</td>
<td>Second Stage of Condenser Fans</td>
</tr>
<tr>
<td>30GT130-210 230A-315, 330A/B-420A/B†</td>
<td>5,7</td>
<td>3.5.</td>
<td>Compressor No. A1</td>
</tr>
<tr>
<td></td>
<td>6,8</td>
<td>3.9.</td>
<td>Compressor No. B1</td>
</tr>
<tr>
<td></td>
<td>3,4,9,10</td>
<td>3.1.</td>
<td>First Stage of Condenser Fans</td>
</tr>
<tr>
<td></td>
<td>1,2,11,12</td>
<td>3.2.</td>
<td>Second Stage of Condenser Fans</td>
</tr>
</tbody>
</table>

*During quick test only.
†Fan numbers 11 and 12 apply only to 190 and 210 and associated modular units (see Table 1).
**Control box.
<table>
<thead>
<tr>
<th>QUICK TEST STEP NO.</th>
<th>NORMAL DISPLAY</th>
<th>STEP DESCRIPTION</th>
<th>HEADER POSITION OR CONTROL SWITCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Type Unit — Air-Cooled Chiller</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3 through 7</td>
<td>No. of Compressors</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switch 6 Off, Switch 7 Off</td>
<td>Configuration Header: 1 and 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switch 6 On, Switch 7 Off</td>
<td>Configuration Header: 3, 4, and 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switch 6 Off, Switch 7 On</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0 or 2</td>
<td>No. of Unloaders</td>
<td>DIP Switches 6 and 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switch 6 Off, Switch 7 Off</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switch 6 On, Switch 7 Off</td>
<td></td>
</tr>
<tr>
<td>NOTE:</td>
<td></td>
<td>There are no unloaders on 190, 210 and associated modular units.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0 or 1</td>
<td>0 = Water</td>
<td>DIP Switch 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = Brine</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0 or 8</td>
<td>0 = EXV</td>
<td>Configuration Header: 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = TXV</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>50 or 60</td>
<td>50 = 50 Hz</td>
<td>Configuration Header: 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60 = 60 Hz</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>0 or 1</td>
<td>0 = External Reset</td>
<td>DIP Switch 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = Return Fluid Reset</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>0 or 1</td>
<td>0 = Reset Disabled</td>
<td>DIP Switch 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = Reset Enabled</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>0 or 1</td>
<td>0 = Pulldown Disabled</td>
<td>DIP Switch 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = Pulldown Enabled</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>0 or 1</td>
<td>0 = Demand Limit Disabled</td>
<td>DIP Switch 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = Demand Limit Enabled</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>0 or 1</td>
<td>0 = Remote On/Off — Switch/Jumper Open</td>
<td>TB6-3 and TB6-4</td>
</tr>
<tr>
<td>12</td>
<td>0 or 1</td>
<td>0 = Loss-of-Charge Switch A Open</td>
<td>Circuit A Loss-of-Charge Switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = Loss-of-Charge Switch A Closed</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>0 or 1</td>
<td>0 = Loss-of-Charge Switch B Open</td>
<td>Circuit B Loss-of-Charge Switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = Loss-of-Charge Switch B Closed</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>0 or 1</td>
<td>0 = Low Oil Pressure Switch A Open</td>
<td>Circuit A Low Oil Pressure Switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = Low Oil Pressure Switch A Closed</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>0 or 1</td>
<td>0 = Low Oil Pressure Switch B Open</td>
<td>Circuit B Low Oil Pressure Switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = Low Oil Pressure Switch B Closed</td>
<td></td>
</tr>
</tbody>
</table>

See legend and notes on page 49.
<table>
<thead>
<tr>
<th>QUICK TEST STEP NO.</th>
<th>NORMAL DISPLAY</th>
<th>STEP DESCRIPTION</th>
<th>THERMISTOR OR POTENTIOMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.b.</td>
<td>1</td>
<td>1 — Thermistor OK</td>
<td>T1 — Cooler Leaving Fluid Thermistor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 — Thermistor Faulty</td>
<td></td>
</tr>
<tr>
<td>1.7.</td>
<td>1</td>
<td>1 — Thermistor OK</td>
<td>T2 — Cooler Entering Fluid Thermistor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 — Thermistor Faulty</td>
<td></td>
</tr>
<tr>
<td>1.8.</td>
<td>1</td>
<td>1 — Thermistor OK</td>
<td>T3 — Saturated Condensing Thermistor, Circuit A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 — Thermistor Faulty</td>
<td></td>
</tr>
<tr>
<td>1.9.</td>
<td>1</td>
<td>1 — Thermistor OK</td>
<td>T4 — Saturated Condensing Thermistor, Circuit B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 — Thermistor Faulty</td>
<td></td>
</tr>
<tr>
<td>2.0.</td>
<td>1 or 0</td>
<td>1 — Thermistor OK</td>
<td>T5 — Cooler Thermistor, Circuit A (EXV Units)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 — Thermistor Faulty or Not Used</td>
<td></td>
</tr>
<tr>
<td>2.1.</td>
<td>1 or 0</td>
<td>1 — Thermistor OK</td>
<td>T6 — Cooler Thermistor, Circuit B (EXV Units)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 — Thermistor Faulty or Not Used</td>
<td></td>
</tr>
<tr>
<td>2.2.</td>
<td>1 or 0</td>
<td>1 — Thermistor OK</td>
<td>T7 — Compressor Thermistor, Circuit A (EXV Units)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 — Thermistor Faulty or Not Used</td>
<td></td>
</tr>
<tr>
<td>2.3.</td>
<td>1 or 0</td>
<td>1 — Thermistor OK</td>
<td>T8 — Compressor Thermistor, Circuit B (EXV Units)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 — Thermistor Faulty or Not Used</td>
<td></td>
</tr>
<tr>
<td>2.4.</td>
<td>1 or 0</td>
<td>1 — Thermistor OK</td>
<td>T10 — Accessory Remote Thermistor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 — Thermistor Faulty or Not Used</td>
<td></td>
</tr>
<tr>
<td>2.5.</td>
<td>1</td>
<td>1 — Potentiometer OK</td>
<td>P1 — Leaving Fluid Set Point Potentiometer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 — Potentiometer Faulty</td>
<td></td>
</tr>
<tr>
<td>2.6.</td>
<td>0</td>
<td>No Significance</td>
<td></td>
</tr>
<tr>
<td>2.7.</td>
<td>1 or 0</td>
<td>1 — Potentiometer OK</td>
<td>P3 — Accessory Reset Limit Potentiometer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 — Potentiometer Faulty or Option Not Used</td>
<td></td>
</tr>
<tr>
<td>2.8.</td>
<td>1 or 0</td>
<td>1 — Potentiometer(s) OK</td>
<td>P4 — Accessory Demand Limit Potentiometer(s)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 — Potentiometer(s) Faulty or Option Not Used</td>
<td></td>
</tr>
<tr>
<td>2.9.</td>
<td>1 or 0</td>
<td>1 — Potentiometer OK</td>
<td>P5 — Accessory Reset Ratio Potentiometer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 — Potentiometer Faulty or Option Not Used</td>
<td></td>
</tr>
<tr>
<td>3.0.</td>
<td>1 or 0</td>
<td>1 — Potentiometer OK</td>
<td>P6 — Accessory Reset Set Point Potentiometer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 — Potentiometer Faulty or Option Not Used</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: See legend and notes on page 49.
### Table 8 — Quick Test (cont)

**SECTION C. — Output Relay Check**

<table>
<thead>
<tr>
<th>QUICK TEST STEP NO.</th>
<th>NORMAL DISPLAY</th>
<th>STEP DESCRIPTION</th>
<th>RELAY NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>![Image]</td>
<td>Energize First Stage of Condenser Fans 080-110** — OFM3, OFM4 130-210** — OFM3, OFM4, OFM9, OFM10</td>
<td>K11</td>
</tr>
<tr>
<td>3.2</td>
<td>![Image]</td>
<td>Energize Second Stage of Condenser Fans 080, 090** — OFM5, OFM6 100, 110** — OFM5, OFM6, OFM7, OFM8 130-170** — OFM1, OFM2 190, 210** — OFM1, OFM2, OFM11, OFM12</td>
<td>K12</td>
</tr>
<tr>
<td>3.3</td>
<td>![Image]</td>
<td>Energize Liquid Line Solenoid Valve (080-110, TXV only), Circuit A</td>
<td>K9</td>
</tr>
<tr>
<td>3.4</td>
<td>![Image]</td>
<td>Energize Liquid Line Solenoid Valve (080-110, TXV only), Circuit B</td>
<td>K10</td>
</tr>
<tr>
<td>3.5</td>
<td>![Image]</td>
<td>Energize Compressor A1 and OFM1 (008-110**) Energize Compressor A1, OFM5, and OFM7 (all other unit sizes)</td>
<td>K1</td>
</tr>
<tr>
<td>3.6</td>
<td>![Image]</td>
<td>Energize Compressor A2</td>
<td>K2</td>
</tr>
<tr>
<td>3.7</td>
<td>![Image]</td>
<td>No Action (080-110, 130 [60 Hz])**</td>
<td>K3</td>
</tr>
<tr>
<td>3.8</td>
<td>![Image]</td>
<td>Energize Compressor A3 (130 [50 Hz], 150-210***)</td>
<td>K4</td>
</tr>
<tr>
<td>3.9</td>
<td>![Image]</td>
<td>Energize Unloader A1 (080-170***)</td>
<td>K5</td>
</tr>
<tr>
<td>4.0</td>
<td>![Image]</td>
<td>Energize Compressor B1, OFM2 (080-110***) Energize Compressor B1, OFM6, and OFM8 (all other unit sizes)</td>
<td>K6</td>
</tr>
<tr>
<td>4.1</td>
<td>![Image]</td>
<td>No Action (080***) Energize Compressor B2 (all other unit sizes)</td>
<td>K7</td>
</tr>
<tr>
<td>4.2</td>
<td>![Image]</td>
<td>Energize Unloader B1 (080-170) No Action (190-210***)</td>
<td>K8</td>
</tr>
</tbody>
</table>

**LEGEND**

- **CPCS** — Compressor Protection Control System
- **CR** — Control Relay
- **DIP** — Dual, In-Line Package
- **EXV** — Electronic Expansion Valve
- **FIO** — Factory-Installed Option
- **OFM** — Outdoor (Condenser) Fan Motor
- **TB** — Terminal Block
- **TXV** — Thermostatic Expansion Valve

*Do not change select switch to brine on units that do not have modifications for brine. Special modifications are required. Contact Carrier for details.

†Display is ![Image] for Flotronic™ EXV units only.

Display is ![Image] for 080-110 Flotronic FIO units (with TXV).

**And associated modular units.

††Compressors will be energized for 10 seconds. ![Image] indicates open CPCS or CR module contacts (compressor energized). ![Image] indicates closed CPCS or CR contacts (compressor deenergized).
Table 9 — DIP Switch Functions

<table>
<thead>
<tr>
<th>DIP SWITCH NO.</th>
<th>SELECTED FUNCTION*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type of Reset</td>
</tr>
<tr>
<td>2</td>
<td>Reset</td>
</tr>
<tr>
<td>3</td>
<td>Pull Down Limit</td>
</tr>
<tr>
<td>4</td>
<td>Not Used</td>
</tr>
<tr>
<td>5</td>
<td>Demand Limit</td>
</tr>
<tr>
<td>6</td>
<td>1 Unloader</td>
</tr>
<tr>
<td>7</td>
<td>2 Unloaders</td>
</tr>
<tr>
<td>8</td>
<td>Brine</td>
</tr>
</tbody>
</table>

LEGEND

DIP — Dual In-Line Package

*Refer to Table 8, Quick Test steps 3. through 1.0.

Table 10 — Potentiometer Locations

<table>
<thead>
<tr>
<th>POTENTIOMETER</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 — Leaving Fluid Set Point</td>
<td>Set Point Board (Standard)</td>
</tr>
<tr>
<td>P3 — Demand Limit Set Point</td>
<td>Accessory Board (Option)</td>
</tr>
<tr>
<td>P4 — Demand Limit Set Point</td>
<td>Accessory Board (Option)</td>
</tr>
<tr>
<td>P5 — Reset Ratio Set Point</td>
<td>Accessory Board (Option)</td>
</tr>
<tr>
<td>P6 — Reset Temp Set Point</td>
<td>Accessory Board (Option)</td>
</tr>
</tbody>
</table>

START-UP AND OPERATION

NOTE: Complete Start-Up Checklist at center of publication (page CL-1) prior to starting unit.

Digital Display Action — The electronic control system uses a 2-digit LED display located on display set point board (see Fig. 19) to show operational information and diagnostic codes.

When control ON-OFF switch is turned to ON position, display shows **2 0** for 2 minutes to indicate control is in initialization mode. The EXV will be closed as part of initialization sequence. This does not occur on FIOP units, where a conventional TXV is used.

After a 2-minute period, display turns off and unit is allowed to start. If button is pressed after the **2 0** has been removed from display, operational status codes or diagnostic information will be shown as long as button is held in. Code numbers on display have following significance:

<table>
<thead>
<tr>
<th>CODE NUMBER</th>
<th>OPERATIONAL STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-12</td>
<td>Capacity stage</td>
</tr>
<tr>
<td>20-26</td>
<td>Operational information</td>
</tr>
<tr>
<td>51-87</td>
<td>Overload information</td>
</tr>
</tbody>
</table>

Under normal operation, only stage number is displayed. If an operational status code or an overload code is displayed, the display rotates every 2 seconds and displays up to 3 numbers. Overload information will take priority over all other codes. The codes are stored by the microprocessor as long as board is energized.

IMPORTANT: The alarm memory is cleared when control power is removed.

Actual Start-Up — Actual start-up should be done only under supervision of a qualified refrigeration mechanic.

1. Be sure all service valves are open. The unit is shipped from the factory with the suction, discharge, and liquid line service valves closed.
2. Set leaving fluid temperature. No cooling range adjustment is necessary.
3. If accessory reset boards are used, set potentiometers properly. Refer to Controls and Troubleshooting literature for details.
4. Start chilled fluid pump.
5. Turn ON-OFF switch to ON position. The display will read **2 0**. During this time the machine checks all potentiometers and thermistors for valid readings. In approximately 2 minutes, the **2 0** reading is no longer displayed, and the machine is operational.

Allow the unit to operate and confirm that everything is functioning properly. Check the leaving fluid temperature and be sure that it agrees with the set point potentiometer P1. If the temperature setting does not agree, the set point can be compensated by shifting the control point slightly. If temperature reset is in effect, the leaving fluid temperature may not agree with the set point.

Operating Limitations

TEMPERATURES (See Table 11) — If unit is to be used in an area with high solar radiation, mounted position should be such that control box is not exposed to direct solar radiation. Exposure to direct solar radiation could affect the temperature switch controlling cooler heaters.

Table 11 — Temperature Limits

<table>
<thead>
<tr>
<th>TEMPERATURES</th>
<th>F</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Ambient Temp</td>
<td>125</td>
<td>52</td>
</tr>
<tr>
<td>Minimum Ambient Temp</td>
<td>0</td>
<td>−18</td>
</tr>
<tr>
<td>Maximum Cooler EWT*</td>
<td>95</td>
<td>35</td>
</tr>
<tr>
<td>Maximum Cooler LWT</td>
<td>70</td>
<td>21</td>
</tr>
<tr>
<td>Minimum Cooler LWT†</td>
<td>40</td>
<td>4.5</td>
</tr>
</tbody>
</table>

LEGEND

EWT — Entering Fluid (Water) Temperature
LWT — Leaving Fluid (Water) Temperature

*For sustained operation, it is recommended that EWT NOT exceed 85 F (29.4 C).
†Unit and/or DIP (dual-in-line package) switch requires modification below this temperature.

Low-Ambient Operation — If operating temperatures below 0° F (−18 C) are expected, refer to separate installation instructions for low-ambient operation/Motormaster® III control. Contact your Carrier representative for details.

High Cooler LCWT (Leaving Chilled Water [Fluid] Temperature) — During start-up with leaving fluid temperatures above approximately 60 F (16 C), expansion valves (EXV and FIOP TXV for 080-110 sizes) limit suction pressure to approximately 90 psig (620 kPa) to avoid overloading compressor.

Low Cooler LCWT — Application of chillers within 39.9 F to 34 F (4.4 C to 1.1 C) temperature range is possible in some situations with proper field change of control configuration. This requires that DIP switch no. 8 (brine switch) of J11 on the processor board be set to ON position. See Tables 8 and 9.

⚠️ WARNING

Do not operate with leaving water temperature below 34 F (1.1 C). Application in the range 34 F to 15 F (1° C to −9.4 C) requires chiller with factory modification for brine duty (only applicable to certain units). Contact your Carrier representative for details.
VOLTAGE

**Main Power Supply** — Minimum and maximum acceptable supply voltages are listed in Tables 4A-4C.

**Unbalanced 3-Phase Supply Voltage:**

Never operate a motor where a phase imbalance between phases is greater than 2%. To determine percentage of voltage imbalance:

\[
\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation}}{\text{average voltage}}
\]

The maximum voltage deviation is the largest difference between a voltage measurement across 2 legs and the average across all 3 legs.

**EXAMPLE:** Supply voltage is 240-3-60.

\[
\begin{align*}
\text{AB} &= 243 \text{ v} \\
\text{BC} &= 236 \text{ v} \\
\text{AC} &= 238 \text{ v}
\end{align*}
\]

Average voltage = \( \frac{243 + 236 + 238}{3} = \frac{717}{3} = 239 \text{ v} \)

Determine maximum deviation from average voltage:

AB = 243 - 239 = 4 v

BC = 239 - 236 = 3 v

AC = 239 - 238 = 1 v

Maximum deviation is 4 v.

Determine percentage of voltage imbalance:

\[
\% \text{ Voltage Imbalance} = 100 \times \frac{4}{239} = 1.7\%
\]

This voltage imbalance is satisfactory as it is below the maximum allowable 2%.

**IMPORTANT:** If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately. Do not operate unit until imbalance condition is corrected.

**Control Circuit Power** — Electronic control includes logic to detect low control circuit voltage. Acceptable voltage range is shown in Table 5.

**MINIMUM FLUID LOOP VOLUME** — To obtain proper temperature control, loop fluid volume must be at least 3 gal per ton (3.25 L per kW) of chiller nominal capacity for air conditioning and at least 6 gal per ton (6.5 L per kW) for process applications or systems that must operate in low ambient (below 32 F [0° C]). Refer to application information in Product Data literature for details.

**FLOW RATE REQUIREMENTS** — Standard chillers should be applied with nominal flow rates approximating those listed in Table 12. Higher or lower flow rates are permissible to obtain lower or higher temperature rises. Minimum flow rates must be maintained or exceeded to assure turbulent flow and proper heat transfer in the cooler.

**WARNING**

Operation below minimum flow could subject tubes to frost pinching in tube sheet, resulting in failure of cooler.

Consult application data and job design requirements to determine flow rate requirements for particular installation.

**Table 12 — Nominal and Minimum Cooler Fluid Flow Rates**

<table>
<thead>
<tr>
<th>UNIT SIZE</th>
<th>NOMINAL FLOW RATE*</th>
<th>MINIMUM FLOW RATE (See Notes)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gpm</td>
<td>L/s</td>
</tr>
<tr>
<td>30GT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>080,230B</td>
<td>192</td>
<td>12.11</td>
</tr>
<tr>
<td>090,245B</td>
<td>216</td>
<td>13.62</td>
</tr>
<tr>
<td>100,255B,270B</td>
<td>240</td>
<td>15.14</td>
</tr>
<tr>
<td>110,290B,315B</td>
<td>264</td>
<td>16.65</td>
</tr>
<tr>
<td>130</td>
<td>300</td>
<td>18.9</td>
</tr>
<tr>
<td>150,230A,245A,255A</td>
<td>348</td>
<td>21.9</td>
</tr>
<tr>
<td>170,270A,330,360B (50 Hz)</td>
<td>384</td>
<td>24.2</td>
</tr>
<tr>
<td>190,290A,360A/B (60 Hz),360A (50 Hz),390B</td>
<td>432</td>
<td>27.2</td>
</tr>
<tr>
<td>210,315A,390A,420A/B</td>
<td>480</td>
<td>30.2</td>
</tr>
</tbody>
</table>

**LEGEND**

ARI — Air Conditioning and Refrigeration Institute (U.S.A.)
Gpm — Gallons per minute (U.S.A.)
L/s — Liters per second
N — Liters per kW
V — Gallons per ton

*Nominal flow rates required at ARI conditions 44 F (7 C) leaving fluid temperature, 54 F (12 C) entering fluid temperature, 95 F (35 C) ambient. Fouling factor .00025 ft² • hr • F/Btu (.000044 m² • K/W).

**NOTES:**

1. Minimum flow based on 1.0 fps (0.30 m/s) velocity in cooler without special cooler baffling.
2. Minimum Loop Volumes:
   Gallons = V x ARI Cap. (tons)
   Liters = N x ARI Cap. (kW)

<table>
<thead>
<tr>
<th>APPLICATION</th>
<th>V</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Air Conditioning</td>
<td>3</td>
<td>3.25</td>
</tr>
<tr>
<td>Process Type Cooling</td>
<td>6 to 10</td>
<td>6.5 to 10.8</td>
</tr>
<tr>
<td>Low Ambient Unit Operation</td>
<td>6 to 10</td>
<td>6.5 to 10.8</td>
</tr>
</tbody>
</table>

**Operation Sequence** — During unit off cycle, crankcase heaters are energized. If ambient temperature is below 36 F (2 C), cooler heaters and a microprocessor board heater are also energized.

When control ON-OFF switch is turned to ON position, control first goes through a 2-minute initialization, period, during which the display continuously shows . Ninety (90) seconds after leaves display, control begins to bring on compressors. Rate at which compressors are started depends on leaving chilled fluid temperature and rate of change of leaving fluid temperature.

An automatic lead-lag feature in control system on all units determines by random selection whether circuit A or B starts first.

At first call for cooling, microprocessor starts first compressor, deenergizes crankcase heater, and starts one condenser fan.

Downloaded from www.Manualslib.com manuals search engine
UNITS WITH ELECTRONIC EXPANSION VALVE (EXV)
— The EXV remains closed for 10 seconds to purge cooler and suction line of any liquid refrigerant that may have migrated to these areas during off period. After 10 seconds, EXV starts to open. As more cooling is required, control brings on additional stages of capacity. Loading sequence for compressors is shown in Table 13. Automatic lead-lag control is provided on all units.

Lag compressor will shut down, and lead compressor will continue to run. After lag compressor has shut down, the EXV is signaled to close. Lead compressor remains on until EXV is less than 300 steps open, and the saturated suction temperature is less than 25°F (−4°C) as sensed by cooler thermistor T5 or T6, or until one minute has elapsed.

30GT080-110 UNITS WITH OPTIONAL THERMOSTATIC EXPANSION VALVE (TXV)
NOTE: The TXV option is available for 080-110 units only and does not apply to associated modular units.

Liquid line solenoid valve is not energized for first 10 seconds of compressor operation. This is called pre-pumpout cycle.

Microprocessor determines how rapidly capacity stages are added or subtracted based on deviation from leaving chilled fluid temperature set point and rate of change of leaving fluid temperature. If fluid temperature is very warm and pulldown option is being used, microprocessor limits rate of temperature drop of leaving fluid to 1°F (0.56°C) per minute to avoid high peak kW charges. If the capacity is being limited by pulldown, the control display shows when the display button is pressed. Once capacity has been satisfied, the unit starts to shut down.

Lag compressor will be shut down and lead compressor continues to run for 10 seconds to purge cooler of any refrigerant.

LOAD SHED — If load shed option is being used, control limits maximum capacity to load shed input value. Refer to Controls and Troubleshooting literature for details. If capacity is limited by a load shed signal, display shows when display button is pressed.

TEMPERATURE RESET — If temperature reset is being used, microprocessor adjusts leaving fluid temperature to obtain greater part-load efficiency. Refer to Controls and Troubleshooting literature for details. If leaving fluid temperature is being reset, display shows when the display button is pressed.

HEAD PRESSURE CONTROL
Units with EXV — Microprocessor controls EXV to maintain a superheat of 30°F (16.7°C) entering compressor cylinders.

Microprocessor control also cycles condenser fans on and off to maintain an adequate pressure differential across EXVs. Fans are controlled by position of EXV and saturated condensing temperature thermistors. When EXV is fully open and superheat is greater than 40°F (22°C), fan stages are removed; when the valve is approximately half open, fan stages are added. This allows unit to run at very low condensing temperatures at part load. Thus chiller has very high part-load EERs (energy efficiency ratios). Fan sequence is shown in Fig. 20. Refer to Controls and Troubleshooting literature for more head pressure control information.

Units with TXV (30GT080-110 Only) — There is one TXV for each refrigerant circuit, and each TXV is factory set to maintain 8 to 10°F (5 to 6°C) superheat of vapor leaving cooler to control flow of liquid refrigerant into cooler. Superheat can be reset but should be reset only if necessary.

Logic to cycle microprocessor-controlled fans is based on saturated condensing temperature only. This temperature is sensed by thermistors T3 and T4 (Fig. 21 and 22). The microprocessor turns on an additional stage of fans when either coil thermistor (T3 or T4) is greater than 113°F (45°C) and turns off a fan stage when T3 and T4 are both below 73°F (23°C). Between each change in fan stage, control waits one minute to allow head pressure to stabilize unless either T3 or T4 is greater than 125°F (52°C), in which case all microprocessor-controlled fans come on immediately.

Condenser fan sequence is shown in Fig. 20.

REMOTE ON-OFF — In applications where controlling the starting and stopping of the chiller from a remote location is desired, such as a remote timeclock, the remote on-off feature is used. See Fig. 16 and 17 for wiring information. If the chiller is being held off by the remote on-off switch, appears in the display when the display button is pressed.

NOTE: DO NOT USE FLUID PUMP to cycle chiller on and off except as a safety feature. Cycling of chiller must be accomplished through the remote on-off switch, since the fluid pump must continue to run for 1 minute after initialization of pumpdown.

REMOTE ALARM — See Fig. 16 and 17 for remote alarm field wiring.
## Table 13 — Capacity Control Steps

<table>
<thead>
<tr>
<th>UNIT SIZE</th>
<th>CONTROL STEPS</th>
<th>% Displ.</th>
<th>Compressors</th>
<th>% Displ.</th>
<th>Compressors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LOADING SEQUENCE A</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>080,230B (60 Hz) A1†, B1†</td>
<td>1</td>
<td>22</td>
<td>A1*</td>
<td>29</td>
<td>B1*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>52</td>
<td>A1*,B1*</td>
<td>52</td>
<td>A1*,B1*</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>67</td>
<td>A1*, B1</td>
<td>63</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>78</td>
<td>A1,B1</td>
<td>78</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>89</td>
<td>A1*,A2,B1</td>
<td>89</td>
<td>A1*,A2,B1</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>100</td>
<td>A1,A2,B1</td>
<td>100</td>
<td>A1,A2,B1</td>
</tr>
<tr>
<td>080,230B (50 Hz) A1†, B1†</td>
<td>1</td>
<td>16</td>
<td>A1*</td>
<td>25</td>
<td>B1*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>42</td>
<td>A1*,B1*</td>
<td>42</td>
<td>A1*,B1*</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>54</td>
<td>A1*, B1</td>
<td>50</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>62</td>
<td>A1,B1</td>
<td>62</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>92</td>
<td>A1*,A2,B1</td>
<td>92</td>
<td>A1*,A2,B1</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>100</td>
<td>A1,A2,B1</td>
<td>100</td>
<td>A1,A2,B1</td>
</tr>
<tr>
<td>090,245B (60 Hz) A1†, B1†</td>
<td>1</td>
<td>18</td>
<td>A1*</td>
<td>18</td>
<td>B1*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>35</td>
<td>A1*,B1*</td>
<td>35</td>
<td>A1*,B1*</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>44</td>
<td>A1*, B1</td>
<td>44</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>53</td>
<td>A1,B1</td>
<td>53</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>65</td>
<td>A1*,A2,B1</td>
<td>71</td>
<td>A1,B1*,B2</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>73</td>
<td>A1,A2,B1</td>
<td>80</td>
<td>A1,B1,B2</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>91</td>
<td>A1*,A2,B1,B2</td>
<td>91</td>
<td>A1,A2,B1*,B2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>100</td>
<td>A1,A2,B1,B2</td>
<td>100</td>
<td>A1,A2,B1,B2</td>
</tr>
<tr>
<td>090,245B (50 Hz) A1†, B1†</td>
<td>1</td>
<td>14</td>
<td>A1*</td>
<td>14</td>
<td>B1*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>29</td>
<td>A1*,B1*</td>
<td>29</td>
<td>A1*,B1*</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>36</td>
<td>A1*, B1</td>
<td>36</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>43</td>
<td>A1,B1</td>
<td>43</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>68</td>
<td>A1*,A2,B1</td>
<td>60</td>
<td>A1*,B1*,B2</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>73</td>
<td>A1,A2,B1</td>
<td>67</td>
<td>A1,B1,B2</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>93</td>
<td>A1*,A2,B1,B2</td>
<td>93</td>
<td>A1,A2,B1*,B2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>100</td>
<td>A1,A2,B1,B2</td>
<td>100</td>
<td>A1,A2,B1,B2</td>
</tr>
<tr>
<td>100,255B,270B (60 Hz) A1†, B1†</td>
<td>1</td>
<td>15</td>
<td>A1*</td>
<td>15</td>
<td>B1*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>31</td>
<td>A1*,B1*</td>
<td>31</td>
<td>A1*,B1*</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>39</td>
<td>A1*, B1</td>
<td>39</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>46</td>
<td>A1,B1</td>
<td>46</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>65</td>
<td>A1*,A2,B1</td>
<td>65</td>
<td>A1,B1*,B2</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>73</td>
<td>A1,A2,B1</td>
<td>73</td>
<td>A1,B1,B2</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>92</td>
<td>A1*,A2,B1,B2</td>
<td>92</td>
<td>A1,A2,B1*,B2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>100</td>
<td>A1,A2,B1,B2</td>
<td>100</td>
<td>A1,A2,B1,B2</td>
</tr>
<tr>
<td>100,255B,270B (50 Hz) A1†, B1†</td>
<td>1</td>
<td>13</td>
<td>A1*</td>
<td>13</td>
<td>B1*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>26</td>
<td>A1*,B1*</td>
<td>26</td>
<td>A1*,B1*</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>33</td>
<td>A1*, B1</td>
<td>33</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>40</td>
<td>A1,B1</td>
<td>40</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>63</td>
<td>A1*,A2,B1</td>
<td>63</td>
<td>A1,B1*,B2</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>70</td>
<td>A1,A2,B1</td>
<td>70</td>
<td>A1,B1,B2</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>93</td>
<td>A1*,A2,B1,B2</td>
<td>93</td>
<td>A1,A2,B1*,B2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>100</td>
<td>A1,A2,B1,B2</td>
<td>100</td>
<td>A1,A2,B1,B2</td>
</tr>
<tr>
<td>110,290B,315B (60 Hz) A1†, B1†</td>
<td>1</td>
<td>14</td>
<td>A1*</td>
<td>14</td>
<td>B1*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>29</td>
<td>A1*,B1*</td>
<td>29</td>
<td>A1*,B1*</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>36</td>
<td>A1*, B1</td>
<td>36</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>43</td>
<td>A1,B1</td>
<td>43</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>68</td>
<td>A1*,A2,B1</td>
<td>60</td>
<td>A1*,B1*,B2</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>75</td>
<td>A1,A2,B1</td>
<td>67</td>
<td>A1,B1,B2</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>93</td>
<td>A1*,A2,B1,B2</td>
<td>93</td>
<td>A1,A2,B1*,B2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>100</td>
<td>A1,A2,B1,B2</td>
<td>100</td>
<td>A1,A2,B1,B2</td>
</tr>
<tr>
<td>110,290B,315B (50 Hz) A1†, B1†</td>
<td>1</td>
<td>17</td>
<td>A1*</td>
<td>17</td>
<td>B1*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>33</td>
<td>A1*,B1*</td>
<td>33</td>
<td>A1*,B1*</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>42</td>
<td>A1*, B1</td>
<td>42</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>50</td>
<td>A1,B1</td>
<td>50</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>67</td>
<td>A1*,A2,B1</td>
<td>67</td>
<td>A1,B1*,B2</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>75</td>
<td>A1,A2,B1</td>
<td>75</td>
<td>A1,B1,B2</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>92</td>
<td>A1*,A2,B1,B2</td>
<td>92</td>
<td>A1,A2,B1*,B2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>100</td>
<td>A1,A2,B1,B2</td>
<td>100</td>
<td>A1,A2,B1,B2</td>
</tr>
</tbody>
</table>

**LEGEND**

Displ. — Displacement (Approximate)

*Compressor unloaded.
†Compressor unloader; standard.
**Compressor unloader, accessory.

**NOTES:**

1. The microprocessor selects loading sequence A or B, which in turn determines the compressor circuit that is energized first. This evens out operating hours on each circuit over an extended period of time.

2. The staging of modular units (30GT230-420) will be random due to variables within the system. The loading sequence of each individual module will be as listed.

3. If unit operation is anticipated with system load below minimum unloaded capacity of chiller:
   a. Consider using 2 smaller units in place of the larger unit.
   b. Increase fluid loop volume to ensure adequate run time (see Application Data section in Product Data literature).
   c. Consider adding accessory hot gas bypass package.
<table>
<thead>
<tr>
<th>UNIT SIZE</th>
<th>CONTROL STEPS</th>
<th>LOADING SEQUENCE A</th>
<th>LOADING SEQUENCE B</th>
</tr>
</thead>
<tbody>
<tr>
<td>130 (60 Hz)</td>
<td>1</td>
<td>14</td>
<td>A1*</td>
</tr>
<tr>
<td>A1†, B1†</td>
<td>2</td>
<td>29</td>
<td>A1*,B1*</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>36</td>
<td>A1*,B1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>43</td>
<td>A1, B1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>64</td>
<td>A1*,A2,B1</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>72</td>
<td>A1, A2,B1</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>93</td>
<td>A1*,A2,B1,B2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>100</td>
<td>A1, A2,B1,B2</td>
</tr>
<tr>
<td>130 (50 Hz)</td>
<td>1</td>
<td>10</td>
<td>A1*</td>
</tr>
<tr>
<td>A1†, B1†</td>
<td>2</td>
<td>21</td>
<td>A1*,B1*</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>29</td>
<td>A1*,B1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>34</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>47</td>
<td>A1*,A2,B1</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>58</td>
<td>A1, A2,B1</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>77</td>
<td>A1*,A2,B1,B2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>82</td>
<td>A1, A2,B1,B2</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>95</td>
<td>A1*,A2,A3,B1,B2</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>100</td>
<td>A1,A2,A3,B1,B2</td>
</tr>
<tr>
<td>150,230A,245A,255A (60 Hz)</td>
<td>1</td>
<td>11</td>
<td>A1*</td>
</tr>
<tr>
<td>A1†, B1†</td>
<td>2</td>
<td>19</td>
<td>A1*,B1*</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>28</td>
<td>A1*,B1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>33</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>44</td>
<td>A1*,A2,B1</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>58</td>
<td>A1,A2,B1</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>78</td>
<td>A1*,A2,B1,B2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>83</td>
<td>A1, A2,B1,B2</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>94</td>
<td>A1*,A2,A3,B1,B2</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>100</td>
<td>A1,A2,A3,B1,B2</td>
</tr>
<tr>
<td>150,230A,245A,255A (50 Hz)</td>
<td>1</td>
<td>13</td>
<td>A1*</td>
</tr>
<tr>
<td>A1†, B1†</td>
<td>2</td>
<td>27</td>
<td>A1*,B1*</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>33</td>
<td>A1*,B1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>40</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>53</td>
<td>A1*,A2,B1</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>60</td>
<td>A1,A2,B1</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>73</td>
<td>A1*,A2,B1,B2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>80</td>
<td>A1, A2,B1,B2</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>93</td>
<td>A1*,A2,A3,B1,B2</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>100</td>
<td>A1,A2,A3,B1,B2</td>
</tr>
<tr>
<td>170,270A,330A/B (60 Hz)</td>
<td>1</td>
<td>11</td>
<td>A1*</td>
</tr>
<tr>
<td>A1†, B1†</td>
<td>2</td>
<td>22</td>
<td>A1*,B1*</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>28</td>
<td>A1*,B1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>33</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>44</td>
<td>A1*,A2,B1</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>50</td>
<td>A1,A2,B1</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>61</td>
<td>A1*,A2,B1,B2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>67</td>
<td>A1,A2,B1,B2</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>78</td>
<td>A1*,A2,A3,B1,B2</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>83</td>
<td>A1,A2,A3,B1,B2</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>94</td>
<td>A1*,A2,A3,B1,B2,B3</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>100</td>
<td>A1,A2,A3,B1,B2,B3</td>
</tr>
<tr>
<td>170,270A,330A/B,360B (50 Hz)</td>
<td>1</td>
<td>10</td>
<td>A1*</td>
</tr>
<tr>
<td>A1†, B1†</td>
<td>2</td>
<td>24</td>
<td>A1*,B1*</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>28</td>
<td>A1*,B1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>29</td>
<td>A1,B1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>43</td>
<td>A1*,A2,B1</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>43</td>
<td>A1,A2,B1</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>57</td>
<td>A1*,A2,B1,B2</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>62</td>
<td>A1, A2,B1,B2</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>76</td>
<td>A1*,A2,A3,B1,B2</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>81</td>
<td>A1,A2,A3,B1,B2</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>95</td>
<td>A1*,A2,A3,B1,B2,B3</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>100</td>
<td>A1,A2,A3,B1,B2,B3</td>
</tr>
</tbody>
</table>

**Legend**

- **Displ.** — Displacement (Approximate)
- *Compressor unloaded.
- †Compressor unloader, standard.
- **Compressor unloader, accessory.

**Notes:**

1. The microprocessor selects loading sequence A or B, which in turn determines the compressor circuit that is energized first. This evens out operating hours on each circuit over an extended period of time.
2. The staging of modular units (30GT230-420) will be random due to variables within the system. The loading sequence of each individual module will be as listed.
3. If unit operation is anticipated with system load below minimum unloaded capacity of chiller:
   a. Consider using 2 smaller units in place of the larger unit.
   b. Increase fluid loop volume to ensure adequate run time (see Application Data section in Product Data literature).
   c. Consider adding accessory hot gas bypass package.
<table>
<thead>
<tr>
<th>30GT UNIT SIZE</th>
<th>CONTROL STEPS</th>
<th>LOADING SEQUENCE A</th>
<th>Compressors</th>
<th>LOADING SEQUENCE B</th>
<th>Compressors</th>
</tr>
</thead>
<tbody>
<tr>
<td>190,290A, 360A/B,390B (60 Hz)</td>
<td>1 14 190,290A, 360A/B,390B (60 Hz)</td>
<td>1 A1 14 A1</td>
<td>1 190,290A, 360A/B,390B (60 Hz)</td>
<td>1 A1 14 A1</td>
<td></td>
</tr>
<tr>
<td>1 27 190,290A, 360A/B,390B (60 Hz)</td>
<td>2 A1 27 A1</td>
<td>2 190,290A, 360A/B,390B (60 Hz)</td>
<td>2 A1 27 A1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 43 190,290A, 360A/B,390B (60 Hz)</td>
<td>3 A1 43 A1</td>
<td>3 190,290A, 360A/B,390B (60 Hz)</td>
<td>3 A1 43 A1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 59 190,290A, 360A/B,390B (60 Hz)</td>
<td>4 A1 59 A1</td>
<td>4 190,290A, 360A/B,390B (60 Hz)</td>
<td>4 A1 59 A1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 79 190,290A, 360A/B,390B (60 Hz)</td>
<td>5 A1 79 A1</td>
<td>5 190,290A, 360A/B,390B (60 Hz)</td>
<td>5 A1 79 A1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 100 190,290A, 360A/B,390B (60 Hz)</td>
<td>6 A1 100 A1</td>
<td>6 190,290A, 360A/B,390B (60 Hz)</td>
<td>6 A1 100 A1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>210,315A, 390A,420A/B (50 Hz)</td>
<td>1 10 210,315A, 390A,420A/B (50 Hz)</td>
<td>1 A1 16 A1</td>
<td>1 210,315A, 390A,420A/B (50 Hz)</td>
<td>1 A1 16 A1</td>
<td></td>
</tr>
<tr>
<td>7 100 210,315A, 390A,420A/B (50 Hz)</td>
<td>7 A1 100 A1</td>
<td>7 210,315A, 390A,420A/B (50 Hz)</td>
<td>7 A1 100 A1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See legend on page 54.
LEGEND

EXV — Electronic Expansion Valve
T — Thermistor
TXV — Thermostatic Expansion Valve

Fig. 21 — Typical Thermistor Locations

Fig. 22 — Thermistor T3 and T4 Locations

*And associated modular units (see Table 1).
SERVICE

ELECTRIC SHOCK HAZARD.
Turn off all power to unit before servicing. The ON-OFF switch on control panel does not shut off control power; use field disconnect.

Diagnositics and Troubleshooting — Refer to Controls and Troubleshooting literature.

For field service use, a Ground Fault Interrupter (GFI) convenience outlet is available as a field-installed accessory for all units. The GFI is rated for 15 amps. However, in units with active cooler heaters, only 8 amps are available.

Refrigerant Circuit

LEAK TESTING — Units are shipped with complete operating charge of refrigerant R-22 (see Tables 2A-3B) and should be under sufficient pressure to conduct a leak test. If there is no pressure in the system, use standard refrigeration practices to search for the leak. Repair the leak using good refrigeration practices. After leaks are repaired, system must be evacuated and dehydrated.

DEHYDRATION — Refer to Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants, Sections 6 and 7 for details. Do not use compressor to evacuate system.

REFRIGERANT CHARGE (Refer to Tables 2A-3B) — Immediately ahead of filter drier in each circuit is a factory-installed liquid line service valve. Each valve has a 1/4-in. Schrader connection for charging liquid refrigerant.

Charging with Unit Off and Evacuated — Close liquid line service valve before charging. Weigh in charge shown on unit nameplate (also in Tables 2A-3B). Open liquid line service valve; start unit and allow it to run several minutes fully loaded. Check for a clear sight glass. Be sure clear condition is liquid and not vapor.

Charging with Unit Running — If charge is to be added while unit is operating, all condenser fans and compressors must be operating. It may be necessary to block condenser coils at low ambient temperatures to raise condensing pressure to approximately 280 psig (1931 kPa) to turn all condenser fans on. Do not totally block a coil to do this. Partially block all coils in uniform pattern. Charge each circuit until sight glass shows clear liquid, then weigh in amount over a clear sight glass as listed in Tables 2A-3B.

IMPORTANT: When adjusting refrigerant charge, circulate fluid through cooler continuously to prevent freezing and possible damage to the cooler. Do not overcharge, and never charge liquid into low-pressure side of system.

Electronic Components

CONTROL COMPONENTS — Unit uses an advanced electronic control system that normally does not require service. For details on controls refer to Controls and Troubleshooting literature.

30GT080-110 AND 230B-315B UNIT CONTROL BOX — Viewed facing compressors, main control box is at left end of unit. All incoming power enters through main box. Control box contains power components and electronic controls.

Outer panels are hinged and latched for easy opening. Remove screws to remove inner panels. Outer panels can be held open for service and inspection by using door retainer on each panel. Remove bottom pin from door retainer assembly, swing retainer out horizontally, engage pin in one of the retainer ears and the hinge assembly.

30GT130-210, 230A-315A, AND 330A/B-420A/B UNIT CONTROL AND MAIN POWER BOXES — The main power box is on the cooler side of the unit, and the control box is on the compressor side. Outer panels are hinged and latched for easy opening. Remove screws to remove inner panels.

Compressors — If lead compressor on either refrigerant circuit becomes inoperative for any reason, circuit is locked off and cannot be operated due to features built in the electronic control system. Do not attempt to bypass controls to force compressors to run.

COMPRESSOR REMOVAL — Access to the pump end of the compressor is from the compressor side of the unit. Access to the motor end of the compressor is from the inside of the unit. All compressors can be removed from the compressor side of the unit.

IMPORTANT: All compressor mounting hardware and support brackets removed during servicing must be reinstalled prior to start-up.

Following the installation of the new compressor:

Tighten discharge service valve bolts to —

<table>
<thead>
<tr>
<th>Suffix</th>
<th>OIL CHARGE</th>
<th>L</th>
<th>Pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>06E250</td>
<td>80 to 90 ft-lb (109 to 122 N-m)</td>
<td>66</td>
<td>14</td>
</tr>
<tr>
<td>06E265</td>
<td>60 to 90 ft-lb (80 to 105 N-m)</td>
<td>80</td>
<td>19</td>
</tr>
<tr>
<td>06E275</td>
<td>60 to 90 ft-lb (80 to 105 N-m)</td>
<td>90</td>
<td>19</td>
</tr>
<tr>
<td>06E299</td>
<td>60 to 90 ft-lb (80 to 105 N-m)</td>
<td>90</td>
<td>19</td>
</tr>
</tbody>
</table>

OIL CHARGE (Refer to Tables 2A-3B) — All units are factory charged with oil. Acceptable oil level for each compressor is from 1/4 to 3/4 of sight glass (see Fig. 18).

When additional oil or a complete charge is required, use only Carrier-approved compressor oil.

Approved oils are as follows:

Petroleum Specialties, Inc. — Cryol 150 (factory oil charge)
Texaco, Inc. — Capella WF-32
Witco Chemical Co. — Suniso 3GS

Compressor(s) Oil Required

Do not use any oil that has been exposed to atmosphere.
Cooler — The cooler is easily accessible from the cooler side of the unit. The refrigerant feed components are accessible from the control box end of the unit.

COOLER REMOVAL — Cooler can be removed from the cooler side of the unit as follows:

**CAUTION**
Open and tag all electrical disconnects before any work begins. Note that cooler is heavy and both fluid-side and refrigerant-side may be under pressure.

1. To ensure the refrigerant is in the condenser, follow this procedure:
   a. Open the circuit breakers and close the discharge valves for the lag compressors (A2, A3, A4, B2, and B3), and close the discharge valves for these compressors.
   b. After the lag compressors have shut down, close the liquid line service valve for one circuit. Allow the lead compressor to pump down that circuit until it reaches approximately 10 to 15 psig (68.8 to 103.2 kPa).
   c. As soon as the system reaches that pressure, shut down the lead compressor by opening the compressor circuit breaker, then quickly close the discharge service valve for that compressor.
   d. Repeat the procedure for the other circuit.

**WARNING**
Do not close the discharge valve of an operating compressor. Severe damage to the compressor can result.

2. Close the shutoff valves, if installed, in the cooler fluid lines, and remove the cooler fluid piping. Remove the cooler fluid-side strainer (130-210, 230A-315A, and 330A/B-420A/B only).
3. Open the air vent at the top of the cooler, and open the drain on the bottom of the cooler (near the leaving fluid outlet) to drain the cooler. Both the drain and the air vent are located on the leaving-fluid end of cooler. See Fig. 23.
4. Disconnect the conduit and cooler heater wires, if equipped. Remove all thermistors from the cooler, being sure to label all thermistors as they are removed. Thermistor T2 is immersed directly in the fluid. Thermistors T1, T5, and T6 are friction-fit well-type thermistors. See Fig. 23.
5. Remove the insulation on the refrigerant connection end of the cooler.
6. Unbolt the suction flanges from the cooler head. Save the bolts.
7. Remove the liquid lines by breaking the silver-soldered joints at the cooler liquid line nozzles.
8. On 30GT080-110 and 230B-315B units, remove the two vertical supports under the condenser coil, in front of the cooler. Provide temporary support as needed. Save all screws for reinstallation later.
9. Remove the screws in the cooler feet. Slide the cooler slightly to the left to clear the refrigerant tubing. Slide the cooler to the end of the unit opposite the tubing and carefully remove, or pivot the cooler and remove it from the cooler side of the unit.

Removing the cooler can be accomplished in one of 2 ways, depending on the jobsite. Either continue sliding the cooler toward the end of the unit opposite the tubing and carefully remove, or pivot the cooler and remove it from the cooler side of the unit.

---

**Fig. 23 — Cooler Thermistor Locations**

---

**Legend**

EXV — Electronic Expansion Valve
T — Thermistor

*And associated modular units (see Table 1).
REPLACING COOLER — To replace the cooler:
1. Insert new cooler carefully into place. Reattach the screws into the cooler feet (using saved screws). On 30GT080-110 and 230B-315B units, reattach the 2 vertical supports under the condenser coil in front of the cooler using screws saved.
2. Replace the liquid lines and solder at the cooler liquid line nozzles.
3. Rebolt the suction flanges onto the cooler head using bolts saved during removal. Use new gaskets for the suction line flanges. Use compressor oil to aid in gasket sealing and tighten the suction flange bolts to 70 to 90 ft-lb (94 to 122 N-m).
   NOTE: The suction flange has a 4-bolt pattern. See Carrier specified parts for replacement part number, if necessary.
4. Using adhesive, reinstall the cooler insulation on the refrigerant connection end of the cooler.
5. Reinstall the thermistors. Refer to Thermistors section on page 65, and install as follows:
   a. Apply pipe sealant to the ¼-in. NPT threads on the replacement coupling for the fluid side, and install it in place of the original.
   b. Reinstall thermistor T1 well, and insert thermistor T1 into well.
   c. Install thermistor T2 (entering fluid temperature) so that it is not touching an internal refrigerant tube, but so that it is close enough to sense a freeze condition. The recommended distance is ¼ in. (3.2 mm) from the cooler tube. Tighten the packing nut finger tight, and then tighten 1¼ turns more using a back-up wrench.
6. Install the cooler heater and conduit (if equipped), connecting the wires as shown in the unit wiring schematic located on the unit.
7. Close the air vent at the top of the cooler, and close the drain on the bottom of the cooler near the leaving fluid outlet. Both the drain and the air vent are located on the leaving fluid end of the cooler. See Fig. 23.
8. Reconnect the cooler fluid piping, and open the shutoff valves (if installed). Purge the fluid of all air before starting unit.
9. Open the discharge service valves, close the circuit breakers, and open the liquid line service valves for the compressors.

SERVICING COOLER — When cooler heads and partition plates are removed, tube sheets are exposed showing ends of tubes.

**CAUTION**
Do not use the packing nut to tighten the coupling. Damage to the ferrules will result.

b. Reinstall thermistor T1 well, and insert thermistor T1 into well.
c. Install thermistor T2 (entering fluid temperature) so that it is not touching an internal refrigerant tube, but so that it is close enough to sense a freeze condition. The recommended distance is ¼ in. (3.2 mm) from the cooler tube. Tighten the packing nut finger tight, and then tighten 1¼ turns more using a back-up wrench.
6. Install the cooler heater and conduit (if equipped), connecting the wires as shown in the unit wiring schematic located on the unit.
7. Close the air vent at the top of the cooler, and close the drain on the bottom of the cooler near the leaving fluid outlet. Both the drain and the air vent are located on the leaving fluid end of the cooler. See Fig. 23.
8. Reconnect the cooler fluid piping, and open the shutoff valves (if installed). Purge the fluid of all air before starting unit.
9. Open the discharge service valves, close the circuit breakers, and open the liquid line service valves for the compressors.

SERVICING COOLER — When cooler heads and partition plates are removed, tube sheets are exposed showing ends of tubes.

**CAUTION**
Certain tubes in the 10HB coolers cannot be removed. Eight tubes in the bundle are secured inside the cooler to the baffles and cannot be removed. These tubes are marked by a dimple on the tube sheet. See Fig. 24. *If any of these tubes have developed a leak, plug the tube(s) as described under Tube Plugging section below.*

**Tube Plugging** — A leaky tube can be plugged until retubing can be done. The number of tubes plugged determines how soon cooler must be retubed. Tubes plugged in the following locations will affect the performance of the unit: Any tube in the area of thermistor T2, particularly the tube that thermistor T2 is adjacent to, will affect unit reliability and performance. Thermistor T2 is used in the freeze protection algorithm for the controller. If several tubes require plugging, check with your local Carrier representative to find out how number and location can affect unit capacity.

Figure 25 shows an Elliott tube plug and a cross-sectional view of a plug in place.

**CAUTION**
Use extreme care when installing plugs to prevent damage to the tube sheet section between the holes.
Retubing (See Table 14) — When retubing is to be done, obtain service of qualified personnel experienced in boiler maintenance and repair. Most standard procedures can be followed when retubing the 10HB coolers. An 8% crush is recommended when rolling replacement tubes into the tube sheet. An 8% crush can be achieved by setting the torque on the gun at 48 to 50 in.-lb (5.4 to 5.6 N-m).

The following Elliott Co. tube rolling tools are required:
- B3400 Expander Assembly
- B3401 Cage
- B3405 Mandrel
- B3408 Rolls

Place one drop of Loctite No. 675 or equivalent on top of tube prior to rolling. This material is intended to “wick” into the area of the tube that is not rolled into the tube sheet, and prevent fluid from accumulating between the tube and the tube sheet.

Tube information follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Diameter</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube sheet hole diameter</td>
<td>0.631</td>
<td>16.03</td>
</tr>
<tr>
<td>Tube OD</td>
<td>0.625</td>
<td>15.87</td>
</tr>
<tr>
<td>Tube ID after rolling</td>
<td>0.581</td>
<td>14.76</td>
</tr>
<tr>
<td>(includes expansion due to clearance)</td>
<td>0.588</td>
<td>14.94</td>
</tr>
</tbody>
</table>

NOTE: Tubes next to gasket webs must be flush with tube sheet (both ends).

**Table 14 — Plugs**

<table>
<thead>
<tr>
<th>COMPONENTS FOR PLUGGING</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Tubes</td>
<td></td>
</tr>
<tr>
<td>Brass Pin</td>
<td>853103-500*</td>
</tr>
<tr>
<td>Brass Ring</td>
<td>853002-570*</td>
</tr>
<tr>
<td>For Holes without Tubes</td>
<td></td>
</tr>
<tr>
<td>Brass Pin</td>
<td>853103-1*</td>
</tr>
<tr>
<td>Brass Ring</td>
<td>853002-631*</td>
</tr>
<tr>
<td>Locquite</td>
<td>No. 675†</td>
</tr>
</tbody>
</table>

*Order directly from: Elliott Tube Company, Dayton, Ohio
†Can be obtained locally.

**Tightening Cooler Head Bolts**

Gasket Preparation — When reassembling cooler heads, always use new gaskets. Gaskets are neoprene-based and are brushed with a light film of compressor oil. Do not soak gasket or gasket deterioration will result. Use new gaskets within 30 minutes to prevent deterioration. Reassemble cooler nozzle end or plain end cover of the cooler with the gaskets. Torque all cooler bolts to the following specification and sequence:

- ⅛-in. Diameter Perimeter Bolts ........... 150 to 170 ft-lb (201 to 228 N-m)
- ½-in. Diameter Flange Bolts ............. 70 to 90 ft-lb (94 to 121 N-m)

1. Install all bolts finger tight.
2. Bolt tightening sequence is outlined in Fig. 26. Follow the numbering sequence so that pressure is evenly applied to gasket.
3. Apply torque in one-third steps until required torque is reached. Load all bolts to each one-third step before proceeding to next one-third step.
4. No less than one hour later, retighten all bolts to required torque values.
5. After refrigerant is restored to system, check for refrigerant leaks with soap solution or Halide device.
6. Replace cooler insulation.

**Condenser Coils**

COIL CLEANING — Clean coils with a vacuum cleaner, fresh water, compressed air, or a bristle brush (not wire). Units installed in corrosive environments should have coil cleaning as part of a planned maintenance schedule. In this type of application, all accumulations of dirt should be cleaned off the coil.

CAUTION

Do not use high-pressure water or air — fin damage may result.

**Condenser Fans** — Each fan is supported by a formed wire mount bolted to fan deck and covered with a wire guard. The exposed end of fan motor shaft is protected from weather by grease. If fan motor must be removed for service or replacement, be sure to regrease fan shaft, and reinstall fan guard. For proper performance, fan should be positioned as in Fig. 27 (standard and low-noise applications). Tighten setscrews to 15 ± 1 ft-lb (20 ± 1.3 N-m).

If the unit is equipped with the high static fan option, the fan must be set from the top of the fan deck to the plastic ring or center of the fan to a distance of 2.13 in. ± 0.13 in. (54 ± 3 mm). This is different from standard fans, since there is no area available to measure from the top of the orifice ring to the fan hub itself. See Fig. 28.

**Refrigerant Feed Components** — Each circuit has all necessary refrigerant controls.

**Electronic Expansion Valve (EXV)** — A cutaway view of valve is shown in Fig. 29.

High-pressure liquid refrigerant enters valve through bottom. A series of calibrated slots have been machined in side of orifice assembly. As refrigerant passes through orifice, pressure drops and refrigerant changes to a 2-phase condition (liquid and vapor). To control refrigerant flow for different operating conditions, sleeve moves up and down over orifice and modulates orifice size. Sleeve is moved by a linear stepper motor. Stepper motor moves in increments and is controlled directly by processor board. As stepper motor rotates, motion is transferred into linear movement by lead screw. Through stepper motor and lead screw, 1500 discrete steps of motion are obtained. The large number of steps and long stroke results in very accurate control of refrigerant flow. The valve orifice begins to be exposed at 320 steps. Since there is not a tight seal with the orifice and the sleeve, the minimum position for operation is 120 steps.
The microprocessor controls the valve. Two thermistor temperature sensors are used to determine superheat. One thermistor is located in cooler and other is located in passage between compressor motor and cylinders. The difference between the 2 temperatures controls superheat. On a normal TXV or EXV system, superheat leaving evaporator is normally 10° F (5.6° C) and motor then adds approximately 15° to 20° F (8° to 11° C) resulting in approximately 30° F (16.7° C) superheat entering cylinders.

Because EXVs are controlled by the processor board, it is possible to track valve position. By this means, head pressure is controlled and unit is protected against loss of charge and a faulty valve. During initial start-up, EXV is fully closed. After initialization period, valve position is tracked by processor by constantly observing amount of valve movement.

The EXV is also used to limit cooler saturated suction temperature to 55 F (13 C). This makes it possible for the chiller to start at higher cooler fluid temperatures without overloading the compressor. This is commonly referred to as MOP (maximum operating pressure).

Because EXVs are controlled by the processor board, it is possible to track valve position. By this means, head pressure is controlled and unit is protected against loss of charge and a faulty valve. During initial start-up, EXV is fully closed. After initialization period, valve position is tracked by processor by constantly observing amount of valve movement.

The EXV is also used to limit cooler saturated suction temperature to 55 F (13 C). This makes it possible for the chiller to start at higher cooler fluid temperatures without overloading the compressor. This is commonly referred to as MOP (maximum operating pressure).

If it appears that EXV is not properly controlling operating suction pressure or superheat, there are a number of checks that can be made using quick test and initialization features built into the microprocessor control. See Controls and Troubleshooting literature.

Follow steps below to diagnose and correct EXV problems.

Step 1 — Check Processor EXV Outputs — Check EXV output signals at appropriate terminals on J4 terminal strip, as follows:
1. Turn power off.
2. Connect positive test lead of meter to terminal 8 on connector J7 (see Fig. 30).

<table>
<thead>
<tr>
<th>DIMENSION</th>
<th>FAN TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard</td>
</tr>
<tr>
<td>A</td>
<td>0.50&quot; (13 mm)</td>
</tr>
<tr>
<td>B</td>
<td>0.88&quot; (22 mm)</td>
</tr>
</tbody>
</table>

NOTE: Fan rotation is clockwise as viewed from top of unit.

The microprocessor controls the valve. Two thermistor temperature sensors are used to determine superheat. One thermistor is located in cooler and other is located in passage between compressor motor and cylinders. The difference between the 2 temperatures controls superheat. On a normal TXV or EXV system, superheat leaving evaporator is normally 10° F (5.6° C) and motor then adds approximately 15° to 20° F (8° to 11° C) resulting in approximately 30° F (16.7° C) superheat entering cylinders.
3. Set meter for approximately 20 vdc.
4. Turn power on, but do not enter quick test mode. For the first 100 seconds, valve motor windings will be alternately energized to close valve in circuit 1.
5. During this time, connect negative test lead to terminals 9, 10, 11, and 12 in succession. Voltage should rise and fall at each pin. If it remains constant at a voltage or at 0 v, remove connector and recheck. If problem is still there, replace processor board. If there is no longer a problem there, check EXV.
6. Turn power off and connect positive lead to terminal 1 on connector J7.
7. Turn power on. After 100 seconds, motor windings in circuit 2 valve will begin to be energized.
8. During this time, connect negative test lead to terminals 2, 3, 4, and 5. Voltage should rise and fall at each pin. If it remains constant at a voltage or at 0 v, remove connector and recheck. If problem is still there, replace processor board. If there is no longer a problem there, check EXV.

**Step 2 — Check EXV Wiring** — Check wiring to EXVs from J7 terminal strip on processor board (see Fig. 30).

![Fig. 29 — Electronic Expansion Valve (EXV)](image)

![Fig. 30 — Processor Board Connections](image)

1. Check color coding and wire connections. Make sure wires are connected to correct terminals at J7 and EXV plug connections.
2. Check for continuity and tight connection at all pin terminals.
3. Check plug connections at J7 and at EXVs. Be sure EXV connections are not crossed.

**Step 3 — Check Resistance of EXV Motor Windings** — Remove plug at J7 terminal strip and check resistance between common lead (red wire, terminal D) and remaining leads A, B, C, and E. Resistance should be 25 ohms ± 2 ohms.

**Step 4 — Check Thermistors that Control EXV** — Check thermistors that control processor output voltage pulses to EXVs. Circuit A thermistors are T5 and T7, and circuit B thermistors are T6 and T8. Refer to Fig. 21 for location.

1. Use quick test steps 2.0. through 2.3. to determine if thermistors are shorted or open.
2. Check thermistor calibration at a known temperature by measuring actual resistance and comparing value measured with values listed in Tables 15 and 16.
3. Make sure that thermistor leads are connected to proper pin terminals at J1 terminal strip on processor board and that thermistor probes are located in proper position in refrigerant circuit (Fig. 21 and 23).

When above checks have been completed, actual operation of EXV can be checked by using procedures outlined in **Step 5 — Check Operation of the EXV section** below. During quick test steps 3.5. and 3.9., each EXV is opened approximately 500 steps by processor. This quick test feature, along with initialization mode, can be used to verify proper valve operation.

**Step 5 — Check Operation of the EXV** — Use following procedure to check actual operation of EXVs.

1. Close liquid line service valve for circuit to be checked and run through appropriate quick test step 3.5. or 3.9. to pump down low side of system. Repeat quick test step 3 times to ensure all refrigerant has been pumped from low side and that EXV has been driven fully open (1500 steps open).

**NOTE:** Do not use control ON-OFF switch to recycle control during this step, and be sure to allow compressors to run full 10 seconds at each step.

2. Turn control circuit switch and compressor circuit breaker(s) to OFF position. Close compressor service valves and remove any remaining refrigerant from low side of system.
3. Remove screws holding top cover of EXV. Carefully remove top cover, using caution to avoid damage to the O-ring seal and motor leads. If EXV plug was disconnected during this process, reconnect it after the cover is removed.
4. Note position of lead screw (see Fig. 29). If valve has responded properly to processor signals in Step 5.1 above, valve should be fully open and lead screw should protrude approximately ¼ in. (6 mm) to ¾ in. (19 mm) above top of motor.
5. Recycle control by turning control circuit switch to ON position. This puts control in initialization mode. During first 100 seconds of initialization mode, each valve is driven to fully closed position (zero steps open) by processor. With cover lifted off EXV valve body, observe operation of valve motor and lead screw. The motor should turn in the counterclockwise (CCW) direction and lead screw should move down into motor hub until valve is fully closed. Lead screw movement should be smooth and uniform from fully open to fully closed position.
### Table 15 — Sensor Temperature (°F) vs Resistance/Voltage Drop; Flotronic™ Chiller

<table>
<thead>
<tr>
<th>TEMPERATURE VOLTAGE RESISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(°F) DROP (V) (OHMS)</td>
</tr>
<tr>
<td>--------------------------------</td>
</tr>
<tr>
<td>131 0.227 339</td>
</tr>
<tr>
<td>132 0.224 336</td>
</tr>
<tr>
<td>133 0.221 332</td>
</tr>
<tr>
<td>134 0.218 329</td>
</tr>
<tr>
<td>135 0.215 326</td>
</tr>
<tr>
<td>136 0.212 323</td>
</tr>
<tr>
<td>137 0.209 320</td>
</tr>
<tr>
<td>138 0.206 317</td>
</tr>
<tr>
<td>139 0.203 314</td>
</tr>
<tr>
<td>140 0.200 311</td>
</tr>
<tr>
<td>141 0.197 308</td>
</tr>
<tr>
<td>142 0.194 305</td>
</tr>
<tr>
<td>143 0.191 302</td>
</tr>
<tr>
<td>144 0.188 299</td>
</tr>
<tr>
<td>145 0.185 296</td>
</tr>
<tr>
<td>146 0.182 293</td>
</tr>
<tr>
<td>147 0.179 290</td>
</tr>
<tr>
<td>148 0.176 287</td>
</tr>
<tr>
<td>149 0.173 284</td>
</tr>
<tr>
<td>150 0.170 281</td>
</tr>
<tr>
<td>151 0.167 278</td>
</tr>
<tr>
<td>152 0.164 275</td>
</tr>
<tr>
<td>153 0.161 272</td>
</tr>
<tr>
<td>154 0.158 269</td>
</tr>
<tr>
<td>155 0.155 266</td>
</tr>
<tr>
<td>156 0.152 263</td>
</tr>
<tr>
<td>157 0.149 260</td>
</tr>
<tr>
<td>158 0.146 257</td>
</tr>
<tr>
<td>159 0.143 254</td>
</tr>
<tr>
<td>160 0.140 251</td>
</tr>
<tr>
<td>161 0.137 248</td>
</tr>
<tr>
<td>162 0.134 245</td>
</tr>
<tr>
<td>163 0.131 242</td>
</tr>
<tr>
<td>164 0.128 239</td>
</tr>
<tr>
<td>165 0.125 236</td>
</tr>
<tr>
<td>166 0.122 233</td>
</tr>
<tr>
<td>167 0.119 230</td>
</tr>
<tr>
<td>168 0.116 227</td>
</tr>
<tr>
<td>169 0.113 224</td>
</tr>
<tr>
<td>170 0.110 221</td>
</tr>
<tr>
<td>171 0.107 218</td>
</tr>
<tr>
<td>172 0.104 215</td>
</tr>
<tr>
<td>173 0.101 212</td>
</tr>
<tr>
<td>174 0.098 209</td>
</tr>
<tr>
<td>175 0.095 206</td>
</tr>
<tr>
<td>176 0.092 203</td>
</tr>
<tr>
<td>177 0.089 200</td>
</tr>
<tr>
<td>178 0.086 197</td>
</tr>
<tr>
<td>179 0.083 194</td>
</tr>
<tr>
<td>180 0.080 191</td>
</tr>
<tr>
<td>181 0.077 188</td>
</tr>
<tr>
<td>182 0.074 185</td>
</tr>
<tr>
<td>183 0.071 182</td>
</tr>
<tr>
<td>184 0.068 179</td>
</tr>
<tr>
<td>185 0.065 176</td>
</tr>
<tr>
<td>186 0.062 173</td>
</tr>
<tr>
<td>187 0.059 170</td>
</tr>
<tr>
<td>188 0.056 167</td>
</tr>
<tr>
<td>189 0.053 164</td>
</tr>
<tr>
<td>190 0.050 161</td>
</tr>
<tr>
<td>191 0.047 158</td>
</tr>
<tr>
<td>192 0.044 155</td>
</tr>
<tr>
<td>193 0.041 152</td>
</tr>
<tr>
<td>194 0.038 149</td>
</tr>
<tr>
<td>195 0.035 146</td>
</tr>
<tr>
<td>196 0.032 143</td>
</tr>
<tr>
<td>197 0.029 140</td>
</tr>
<tr>
<td>198 0.026 137</td>
</tr>
<tr>
<td>199 0.023 134</td>
</tr>
<tr>
<td>200 0.020 131</td>
</tr>
<tr>
<td>201 0.017 128</td>
</tr>
<tr>
<td>202 0.014 125</td>
</tr>
<tr>
<td>203 0.011 122</td>
</tr>
<tr>
<td>204 0.008 119</td>
</tr>
<tr>
<td>205 0.005 116</td>
</tr>
<tr>
<td>206 0.002 113</td>
</tr>
<tr>
<td>207 0.000 110</td>
</tr>
<tr>
<td>208 0.000 107</td>
</tr>
<tr>
<td>209 0.000 104</td>
</tr>
<tr>
<td>210 0.000 101</td>
</tr>
<tr>
<td>211 0.000 98</td>
</tr>
<tr>
<td>212 0.000 95</td>
</tr>
<tr>
<td>213 0.000 92</td>
</tr>
<tr>
<td>214 0.000 89</td>
</tr>
<tr>
<td>215 0.000 86</td>
</tr>
<tr>
<td>216 0.000 83</td>
</tr>
<tr>
<td>217 0.000 80</td>
</tr>
<tr>
<td>218 0.000 77</td>
</tr>
<tr>
<td>219 0.000 74</td>
</tr>
<tr>
<td>220 0.000 71</td>
</tr>
<tr>
<td>221 0.000 68</td>
</tr>
<tr>
<td>222 0.000 65</td>
</tr>
<tr>
<td>223 0.000 62</td>
</tr>
<tr>
<td>224 0.000 59</td>
</tr>
<tr>
<td>225 0.000 56</td>
</tr>
<tr>
<td>226 0.000 53</td>
</tr>
<tr>
<td>227 0.000 50</td>
</tr>
<tr>
<td>228 0.000 47</td>
</tr>
<tr>
<td>229 0.000 44</td>
</tr>
<tr>
<td>230 0.000 41</td>
</tr>
<tr>
<td>231 0.000 38</td>
</tr>
<tr>
<td>232 0.000 35</td>
</tr>
<tr>
<td>233 0.000 32</td>
</tr>
<tr>
<td>234 0.000 29</td>
</tr>
<tr>
<td>235 0.000 26</td>
</tr>
<tr>
<td>236 0.000 23</td>
</tr>
<tr>
<td>237 0.000 20</td>
</tr>
<tr>
<td>238 0.000 17</td>
</tr>
<tr>
<td>239 0.000 14</td>
</tr>
<tr>
<td>240 0.000 11</td>
</tr>
<tr>
<td>241 0.000 08</td>
</tr>
<tr>
<td>242 0.000 05</td>
</tr>
<tr>
<td>243 0.000 02</td>
</tr>
<tr>
<td>244 0.000 00</td>
</tr>
<tr>
<td>TEMPERATURE (°C)</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>-32.0</td>
</tr>
<tr>
<td>-31.5</td>
</tr>
<tr>
<td>-31.0</td>
</tr>
<tr>
<td>-30.5</td>
</tr>
<tr>
<td>-30.0</td>
</tr>
<tr>
<td>-29.5</td>
</tr>
<tr>
<td>-29.0</td>
</tr>
<tr>
<td>-28.5</td>
</tr>
<tr>
<td>-28.0</td>
</tr>
<tr>
<td>-27.5</td>
</tr>
<tr>
<td>-27.0</td>
</tr>
<tr>
<td>-26.5</td>
</tr>
<tr>
<td>-26.0</td>
</tr>
<tr>
<td>-25.5</td>
</tr>
<tr>
<td>-25.0</td>
</tr>
<tr>
<td>-24.5</td>
</tr>
<tr>
<td>-24.0</td>
</tr>
<tr>
<td>-23.5</td>
</tr>
<tr>
<td>-23.0</td>
</tr>
<tr>
<td>-22.5</td>
</tr>
<tr>
<td>-22.0</td>
</tr>
<tr>
<td>-21.5</td>
</tr>
<tr>
<td>-21.0</td>
</tr>
<tr>
<td>-20.5</td>
</tr>
<tr>
<td>-20.0</td>
</tr>
<tr>
<td>-19.5</td>
</tr>
<tr>
<td>-19.0</td>
</tr>
<tr>
<td>-18.5</td>
</tr>
<tr>
<td>-18.0</td>
</tr>
<tr>
<td>-17.5</td>
</tr>
<tr>
<td>-17.0</td>
</tr>
<tr>
<td>-16.5</td>
</tr>
<tr>
<td>-16.0</td>
</tr>
<tr>
<td>-15.5</td>
</tr>
<tr>
<td>-15.0</td>
</tr>
<tr>
<td>-14.5</td>
</tr>
<tr>
<td>-14.0</td>
</tr>
<tr>
<td>-13.5</td>
</tr>
<tr>
<td>-13.0</td>
</tr>
<tr>
<td>-12.5</td>
</tr>
<tr>
<td>-12.0</td>
</tr>
<tr>
<td>-11.5</td>
</tr>
<tr>
<td>-11.0</td>
</tr>
<tr>
<td>-10.5</td>
</tr>
<tr>
<td>-10.0</td>
</tr>
<tr>
<td>-9.5</td>
</tr>
<tr>
<td>-9.0</td>
</tr>
<tr>
<td>-8.5</td>
</tr>
<tr>
<td>-8.0</td>
</tr>
<tr>
<td>-7.5</td>
</tr>
<tr>
<td>-7.0</td>
</tr>
<tr>
<td>-6.5</td>
</tr>
<tr>
<td>-6.0</td>
</tr>
<tr>
<td>-5.5</td>
</tr>
<tr>
<td>-5.0</td>
</tr>
<tr>
<td>-4.5</td>
</tr>
<tr>
<td>-4.0</td>
</tr>
<tr>
<td>-3.5</td>
</tr>
<tr>
<td>-3.0</td>
</tr>
<tr>
<td>-2.5</td>
</tr>
<tr>
<td>-2.0</td>
</tr>
<tr>
<td>-1.5</td>
</tr>
<tr>
<td>-1.0</td>
</tr>
<tr>
<td>0.0</td>
</tr>
<tr>
<td>0.5</td>
</tr>
<tr>
<td>1.0</td>
</tr>
<tr>
<td>1.5</td>
</tr>
<tr>
<td>2.0</td>
</tr>
<tr>
<td>2.5</td>
</tr>
<tr>
<td>3.0</td>
</tr>
<tr>
<td>3.5</td>
</tr>
<tr>
<td>4.0</td>
</tr>
<tr>
<td>4.5</td>
</tr>
<tr>
<td>5.0</td>
</tr>
<tr>
<td>5.5</td>
</tr>
<tr>
<td>6.0</td>
</tr>
<tr>
<td>6.5</td>
</tr>
<tr>
<td>7.0</td>
</tr>
<tr>
<td>7.5</td>
</tr>
<tr>
<td>8.0</td>
</tr>
<tr>
<td>8.5</td>
</tr>
<tr>
<td>9.0</td>
</tr>
<tr>
<td>9.5</td>
</tr>
<tr>
<td>10.0</td>
</tr>
<tr>
<td>10.5</td>
</tr>
<tr>
<td>11.0</td>
</tr>
<tr>
<td>11.5</td>
</tr>
<tr>
<td>12.0</td>
</tr>
<tr>
<td>12.5</td>
</tr>
<tr>
<td>13.0</td>
</tr>
<tr>
<td>13.5</td>
</tr>
<tr>
<td>14.0</td>
</tr>
<tr>
<td>14.5</td>
</tr>
<tr>
<td>15.0</td>
</tr>
<tr>
<td>15.5</td>
</tr>
</tbody>
</table>
6. When test has been completed, carefully reassemble EXV. Be careful not to damage motor or O-ring when reassembling valve. Open compressor service valves and close compressor circuit breakers. Open liquid line service valve. Turn control circuit switch to ON position, and allow unit to operate. Verify proper operation of unit.

This process of opening and closing EXV can be repeated by repeating quick test steps 3.5. or 3.9. and recycling control as described in preceding steps. If valve does not operate as described (when properly connected to processor and receiving correct signals), replace valve.

If operating problems persist after reassembly, they may be due to out-of-calibration thermistor(s), or intermittent connections between processor board terminals and EXV plug. Recheck all wiring connections and voltage signals.

Another possible cause of improper refrigerant flow control could be restrictions in liquid line. Check for plugged filter drier(s), stuck liquid line solenoid valve(s), or restricted metering slots in the EXV. Formation of ice or frost on lower body of EXV is one symptom of restricted metering slots. Clean or replace valve if necessary.

NOTE: Frosting of valve is normal during quick test steps 3.5. and 3.9., and at initial start-up. Frost should dissipate after 5- to 10-minute operation of a system that is operating properly. If valve is to be replaced, wrap valve with a wet cloth to prevent excessive heat from damaging internal components. Superheat control built into valve is not adjustable.

NOTE: The EXV orifice is a screw-in type that can be removed for inspection and cleaning. Once the top cover has been removed, the EXV motor may be taken out by removing the 2 cap screws securing motor to valve body. Pull motor, lead screw, and the slide assembly up off the orifice assembly. A slot has been cut in top of orifice assembly to facilitate removal using a large screwdriver. Turn orifice assembly counterclockwise to remove.

When cleaning or reinstalling orifice assembly, be careful not to damage orifice assembly seals. The bottom seal acts as a liquid shut-off, replacing a liquid line solenoid valve.

Reassembly of valve is made easier by screwing the slide and lead screw assembly out of the motor. Align hole in top of slide with the guide pin in orifice assembly and gently push slide and lead screw onto orifice assembly about half way. Screw motor onto lead screw and secure EXV motor with cap screws. Be careful not to twist or pull on wires from EXV motor to valve cover pin connections. Check EXV operation in quick step steps outlined on page 44.

THERMOSTATIC EXPANSION VALVE (TXV) (080-110 ONLY) — The chiller with optional TXV is equipped with 2 conventional TXVs (one per circuit). This control system necessitates use of a liquid line solenoid valve. TXVs are factory set to maintain 8°F to 10°F (4.4°C to 5.6°C) superheat of vapor leaving cooler by controlling flow of refrigerant into cooler. Superheat can be reset but should be reset only if absolutely necessary.

When optional TXVs are used, thermistors T5, T6, T7, and T8 are eliminated (see Fig. 21).

The TXVs also incorporate an MOP (maximum operating pressure) feature to limit cooler suction to 55 F (13°C), making it possible for compressor to start at higher cooler fluid temperatures without overloading.

NOTE: The TXV option is not available on 080-110 units used as a modular system.

MOISTURE-LIQUID INDICATOR — Clear flow of liquid refrigerant indicates sufficient charge in system. Bubbles in the sight glass indicate undercharged system or presence of noncondensables. Moisture in system, measured in parts per million (ppm), changes color of indicator:

Green — moisture is below 45 ppm;
Yellow-green (chartreuse) — 45 to 130 ppm (caution);
Yellow (wet) — above 130 ppm.

Change filter drier at first sign of moisture in system.

FILTER DRIER — Whenever moisture-liquid indicator shows presence of moisture, replace filter drier(s). There is one filter drier on each circuit. Refer to Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants, for details on servicing filter driers.

LIQUID LINE SOLENOID VALVE — All units have a liquid line solenoid valve to prevent liquid refrigerant migration to low side of system during the off cycle.

LIQUID LINE SERVICE VALVE — This valve is located immediately ahead of filter drier, and has a ¼-in. Schrader connection for field charging. In combination with compressor discharge service valve, each circuit can be pumped down into the high side for servicing.

Thermistors — Electronic control uses 4 to 9 thermistors to sense temperatures used to control the operation of chiller. See Table 17.

Table 17 — Thermistor Designations

<table>
<thead>
<tr>
<th>SENSOR</th>
<th>TEMPERATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>Cooler Leaving Fluid</td>
</tr>
<tr>
<td>T2</td>
<td>Cooler Entering Fluid</td>
</tr>
<tr>
<td>T3</td>
<td>Saturated Condensing Temperature — Circuit A</td>
</tr>
<tr>
<td>T4</td>
<td>Saturated Condensing Temperature — Circuit B</td>
</tr>
<tr>
<td>T5*</td>
<td>Evaporator Refrigerant Temperature — Circuit A</td>
</tr>
<tr>
<td>T6*</td>
<td>Evaporator Refrigerant Temperature — Circuit B</td>
</tr>
<tr>
<td>T7*</td>
<td>Compressor Return Gas Temperature — Circuit A</td>
</tr>
<tr>
<td>T8*</td>
<td>Compressor Return Gas Temperature — Circuit B</td>
</tr>
<tr>
<td>T10</td>
<td>Remote Temperature Sensor (Accessory)</td>
</tr>
</tbody>
</table>

*Not used on units with optional TXV (080-110 only).

All thermistors are identical in their temperature vs resistance and voltage drop performance. Resistances at various temperatures are listed in Table 15 or 16.

LOCATION — General locations of thermistor sensors are shown in Fig. 21.

Cooler Leaving Fluid Thermistor, T1 — Thermistor T1 is located in the leaving fluid nozzle. The probe is in a well immersed in the fluid. Actual location is shown in Fig. 21 and 23.

Cooler Entering Fluid Thermistor, T2 — Thermistor T2 is located in the cooler shell in first baffle space, in close proximity to tube bundle. The connection is made through a ¼-in. coupling (Fig. 31). Actual location is shown in Fig. 21 and 23.
Saturated Condensing Temperature Thermistors, T3 and T4 — Thermistors T3 and T4 are each clamped to the outside of a return bend on condenser coil. Exact locations for all units are shown in Fig. 21 and 22.

Evaporator Refrigerant Thermistors, T5 and T6 — Thermistors T5 and T6 are located next to refrigerant inlet in cooler head. Thermistors are well-type thermistors. Typical location is shown in Fig. 21 and 23. (Not used on units with TXV.)

Compressor Return Gas Thermistors, T7 and T8 — Thermistors T7 and T8 are located in lead compressor in each circuit in a suction passage between motor and cylinders above oil pump. They are well-type thermistors. Location is shown in Fig. 21. (Not used on units with TXV.)

Remote Thermistor, T10 — Thermistor T10 is an accessory and is mounted remotely from unit. It is used for outdoor air or space temperature reset.

To troubleshoot a Thermistor, refer to separate Controls and Troubleshooting literature.

TO REPLACE THERMISTOR T2 (Cooler):

1. Remove and discard original thermistor and coupling. Do not disassemble new coupling. Install assembly as received.
2. Apply pipe sealant to 1/4-in. NPT threads on replacement coupling, and install in place of original. Do not use the packing nut to tighten coupling. Damage to ferrules will result.
3. Thermistor T2 (entering fluid temperature) should not be touching an internal refrigerant tube, but should be close enough to sense a freeze condition. Recommended distance is 1/8 in. (3.2 mm) from cooler tube. Tighten packing nut finger-tight to position ferrules, then tighten 1 1/4 turns more using a back-up wrench. Ferrules are now attached to the thermistor, which can be withdrawn from coupling for service.

TO REPLACE THERMISTORS T1, T5, T6, T7, AND T8 — Add a small amount of thermal conductive grease to thermistor well. Thermistors are friction-fit thermistors, which must be slipped into receivers located in the cooler leaving fluid nozzle for T1, in the cooler head for T5 or T6, and in the compressor pump end for T7 or T8.

NOTE: Thermistor T1 is on all units; thermistors T5, T6, T7, and T8 are on EXV units only.

THERMISTORS T3 AND T4 — These thermistors are located on header end of condenser coil. They are clamped on a return bend.

THERMISTOR/TEMPERATURE SENSOR CHECK — A high quality digital volt-ohmmeter is required to perform this check.

1. Connect the digital voltmeter across the appropriate thermistor terminals at the J1 terminal strip on the processor board (see Fig. 32 and Fig. 19). Using the voltage reading obtained, read the sensor temperature from Table 15 or 16. To check thermistor accuracy, measure temperature at probe location with an accurate thermocouple-type temperature measuring instrument. Insulate thermocouple to avoid ambient temperatures from influencing reading. Temperature measured by thermocouple and temperature determined from thermistor voltage reading should be close, ± 5° F (3° C) if care was taken in applying thermocouple and taking readings.
2. If a more accurate check is required, unit must be shut down. Remove thermistor and check at a known temperature (freezing point or boiling point of water) using either voltage drop measured across thermistor at the J1 terminals with unit in quick test mode or by determining the resistance with chiller shut down and thermistor disconnected from J1.
Safety Devices — Chiller contain many safety devices and protection logic built into electronic control. Following is a brief summary of major safeties. For complete details, refer to Controls and Troubleshooting literature.

COMPRESSOR PROTECTION

Circuit Breaker — One manual reset calibrated-trip magnetic circuit breaker for each compressor protects against overcurrent. Do not bypass or increase size of a breaker to correct problems. Determine cause for trouble and correct before resetting breaker. Circuit breaker must-trip amps (MTA) are listed on individual circuit breakers, and on unit label diagrams.

30GT080-110 AND 230B-315B Compressor Protection Board (CPCS) — The CPCS is used to control and protect compressors and crankcase heaters. Board provides following features:

- Compressor contactor control
- Crankcase heater control
- Ground current protection
- Status communication to processor board
- High-pressure protection

One large relay is located on CPCS board that controls crankcase heater and compressor contactor. In addition, relay provides a set of contacts that microprocessor monitors to determine operating status of compressor. If processor board determines that compressor is not operating properly through signal contacts, control locks compressor off.

The CPCS contains logic that can detect if current-to-ground of any winding exceeds 2.5 amps; if so, compressor shuts down.

A high-pressure switch with a trip pressure of 426 ± 7 psig (2,936 ± 48 kPa) is mounted on each compressor; switch setting is shown in Table 18. Switch is wired in series with the CPCS. If switch opens, CPCS relay opens, processor detects it through signal contacts and compressor locks off.

If any of these switches open during operation, the compressor stops and the failure is detected by processor when signal contacts open. If lead compressor in either circuit is shut down by high pressure switch, ground current protector, loss of charge switch, or oil pressure switch, all compressors in the circuit are locked off.

Table 18 — Pressure Switch Settings, psig (kPa)

<table>
<thead>
<tr>
<th>SWITCH</th>
<th>CUTOUT</th>
<th>CUT-IN</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Pressure</td>
<td>426 ± 7</td>
<td>320 ± 20</td>
</tr>
<tr>
<td></td>
<td>(2,936 ± 48)</td>
<td>(2,205 ± 138)</td>
</tr>
<tr>
<td>Loss-of-Charge</td>
<td>7 (48.2)</td>
<td>22 (151.6)</td>
</tr>
</tbody>
</table>

CRANKCASE HEATERS — Each compressor has a 180-w crankcase heater to prevent absorption of liquid refrigerant by oil in crankcase when compressor is not running. Heater power source is auxiliary control power, independent of main unit power. This assures compressor protection even when main unit power disconnect switch is off.

IMPORTANT: Never open any switch or disconnect that deenergizes crankcase heaters unless unit is being serviced or is to be shut down for a prolonged period. After a prolonged shutdown or a service job, energize crankcase heaters for 24 hours before starting unit.

COOLER PROTECTION

Freeze Protection — Cooler can be wrapped with heater cables as shown in Fig. 33, which are wired through an ambient temperature switch set at 36 F (2 C). Entire cooler is covered with closed-cell insulation, applied over heater cables. Heaters plus insulation protect cooler against low ambient temperature freeze-up to 0° F (−18 C).

IMPORTANT: If unit is installed in an area where ambient temperatures fall below 32 F (0° C), it is recommended that inhibited ethylene glycol or other suitable corrosion-inhibitive antifreeze solution be used in chilled-liquid circuit.

Low Fluid Temperature — Microprocessor is programmed to shut chiller down if leaving fluid temperature drops below 35 F (1.7 C). When fluid temperature rises to 6° F (3.3° C) above leaving fluid set point, safety resets and chiller restarts.

Loss of Fluid Flow Protection — Microprocessor contains internal logic that protects cooler against loss of cooler flow. Entering and leaving fluid temperature sensors in cooler detect a no-flow condition. Leaving sensor is located in leaving fluid nozzle and entering sensor is located in first cooler baffle space in close proximity to cooler tubes, as shown in Fig. 23. When there is no cooler flow and the compressors start, leaving fluid temperature does not change. However, entering fluid temperature drops rapidly as refrigerant enters cooler through EXV. Entering sensor detects this temperature drop and when entering temperature is 5° F (2.8° C) below leaving temperature, unit stops and is locked off.

30GT130-210, 230A-315A, AND 330A/B-420A/B — A control relay in conjunction with a ground fault module replaces the function of the CPCS. To reset, press the push-button switch on the module.

LOW OIL PRESSURE PROTECTION — Lead compressor in each circuit is equipped with a switch to detect low oil pressure. Switch is connected directly to processor board. Switch is set to open at approximately 5 psig (35 kPa) and to close at 9 psig (62 kPa) maximum. If switch opens when compressor is running, processor board stops all compressors in circuit. During start-up, switch is bypassed for 2 minutes.

AirVent T1 LOCATION

Fig. 33 — Cooler Heater Cables

T — Thermistor
Loss-of-Charge — A pressure switch connected to high side of each refrigerant circuit protects against total loss-of-charge. Switch settings are listed in Table 18. If switch is open, unit cannot start; if switch opens during operation, unit locks out and cannot restart until switch is closed. Low charge is also monitored by the processor when an EXV is used.

A low charge is detected by monitoring EXV position and superheat entering the compressor. If EXV is wide open, superheat is greater than 50 F (28 C) and saturated cooler suction is less than 55 F (13 C), circuit is stopped and locked off.

Relief Devices — Fusible plugs are located in each circuit to protect against damage from excessive pressures.

HIGH-SIDE PROTECTION — One device is located between condenser and filter drier; a second is on filter drier. These are both designed to relieve pressure on a temperature rise to approximately 210 F (99 C).

LOW-SIDE PROTECTION — A device is located on suction line, designed to relieve pressure on a temperature rise to approximately 170 F (77 C).

PRESSURE RELIEF VALVES — Where relief valves are installed, there is one in each circuit. The valves are designed to relieve at 450 psig (3103 kPa). These valves should not be capped. If a valve relieves, it should be replaced. If valve is not replaced, it may relieve at a lower pressure, or leak due to trapped dirt from the system which may prevent resealing.

The pressure relief valves are equipped with a ¾-in. SAE flare for field connection. Some local building codes require that relieved gases be removed. This connection will allow conformance to this requirement.

Other Safeties — There are several other safeties that are provided by microprocessor control. For details refer to Controls and Troubleshooting literature.