To ensure proper functionality and optimum performance, it is STRONGLY recommended that Hillphoenix specialty cases be installed/serviced by qualified technicians who have experience working with commercial refrigerated display merchandisers and storage cabinets. For a list of Hillphoenix-authorized installation/service contractors, please visit our website at www.hillphoenix.com.
LIABILITY NOTICE

For Cases with Shelf Lighting Systems

Hillphoenix does NOT design any of its shelf lighting systems or any of its display cases with shelf lighting systems for direct or indirect exposure to water or other liquids. The use of a misting system or water hose on a display case with a shelf lighting system, resulting in the direct or indirect exposure of the lighting system to water, can lead to a number of serious issues (including, without limitation, electrical failures, fire, electric shock, and mold) in turn resulting in personal injury, death, sickness, and/or serious property damage (including, without limitation, to the display itself, to the location where the display is situated [e.g., store] and to any surrounding property). DO NOT use misting systems, water hoses or other devices that spray liquids in Hillphoenix display cases with lighted shelves.

If a misting system or water hose is installed or used on a display case with a shelf lighting system, then Hillphoenix shall not be subject to any obligations or liabilities (whether arising out of breach of contract, warranty, tort [including negligence], strict liability or other theories of law) directly or indirectly resulting from, arising out of or related to such installation or use, including, without limitation, any personal injury, death or property damage resulting from an electrical failure, fire, electric shock, or mold.

R-744 (CO₂) NOTICE

For Systems Utilizing R-744 (CO₂) Refrigerant

For refrigeration units that utilize R-744 (CO₂), pressure relief and pressure-regulating relief valves may need to be installed based on the system capacity. The valves need to be located such that no stop valve is positioned between the relief valves and the parts or section of the system being protected.

When de-energizing refrigeration units containing R-744 (CO₂), venting of the R-744 (CO₂) refrigerant may occur through the pressure regulating relief valves. These valves are located on the refrigeration system and not on the case model. If venting does occur, the valve must not be defeated, capped, or altered by any means.

WARNING: Under no circumstances should any component be replaced or added without consulting Hillphoenix Field Service Engineering. Utilizing improper components may result in serious injury to persons or damage to the system.
Important

At Hillphoenix®, the safety of our customers and employees, as well as the ongoing performance of our products, are top priorities. To that end, we include important warning messages in all Hillphoenix installation and operations handbooks, accompanied by an alert symbol paired with the word "DANGER", "WARNING", or "CAUTION".

All warning messages will inform you of the potential hazard; how to reduce the risk of case damage, personal injury or death; and what may happen if the instructions are not properly followed.

<table>
<thead>
<tr>
<th>DANGER</th>
<th>Indicates an immediate threat of death or serious injury if all instructions are not followed carefully.</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARNING</td>
<td>Indicates a potential threat of death or serious injury if all instructions are not followed carefully.</td>
</tr>
<tr>
<td>CAUTION</td>
<td>Indicates that failure to properly follow instructions may result in case damage.</td>
</tr>
</tbody>
</table>
Revision History

- new manual format_04/16
- DOE, CV4 energy data, endview/diagram updates, LED lighting, fan/coil content, Dixell operating instructions, electrical hookups, piping locations, UL cord/plug "same type" statement and warranty_10/19
## ENERGY DATA

### PTD REMOTE BASE & HOT DOME

#### Electrical Data

<table>
<thead>
<tr>
<th>Model</th>
<th>Fans per Case</th>
<th>High Efficiency Fans</th>
<th>Anti-Condensate Fans</th>
<th>Drain Heaters</th>
<th>Optional Defrost Heaters</th>
<th>RRS²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>120 Volts (Amps)</td>
<td>120 Volts (Amps)</td>
<td>120 Volts</td>
<td>208 Volts (Amps)</td>
<td></td>
</tr>
<tr>
<td>PTDR-H (BASE) 4'</td>
<td>1</td>
<td>0.3</td>
<td></td>
<td>36</td>
<td>- - -</td>
<td></td>
</tr>
<tr>
<td>6'</td>
<td>2</td>
<td>0.6</td>
<td></td>
<td>72</td>
<td>- - -</td>
<td></td>
</tr>
<tr>
<td>8'</td>
<td>3</td>
<td>0.9</td>
<td></td>
<td>108</td>
<td>- - -</td>
<td></td>
</tr>
<tr>
<td>10'</td>
<td>4</td>
<td>1.2</td>
<td></td>
<td>144</td>
<td>- - -</td>
<td></td>
</tr>
<tr>
<td>12'</td>
<td>4</td>
<td>1.2</td>
<td></td>
<td>144</td>
<td>- - -</td>
<td></td>
</tr>
</tbody>
</table>

#### Lighting Data

<table>
<thead>
<tr>
<th>Model</th>
<th>Lights per Row</th>
<th>Light Length (ft)</th>
<th>Clearvoyant 4 LED Lighting (Per Light Row)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Standard Power (Cornice or Shelf) 120 Volts</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Amps</td>
</tr>
<tr>
<td>PTDR-H (BASE) 4'</td>
<td>1</td>
<td>4</td>
<td>0.05</td>
</tr>
<tr>
<td>6'</td>
<td>2</td>
<td>3</td>
<td>0.08</td>
</tr>
<tr>
<td>8'</td>
<td>2</td>
<td>4</td>
<td>0.10</td>
</tr>
<tr>
<td>10'</td>
<td>2</td>
<td>5</td>
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<tr>
<td>12'</td>
<td>3</td>
<td>4</td>
<td>0.15</td>
</tr>
</tbody>
</table>

#### Guidelines & Control Settings (DX)

<table>
<thead>
<tr>
<th>Model</th>
<th>Conventional BTUH/ft</th>
<th>Parallel BTUH/ft</th>
<th>Superheat Set Point @ Bulb (°F)</th>
<th>Evaporator (°F)</th>
<th>Discharge Air (°F)</th>
<th>Discharge Air Velocity (FPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTDR-H (BASE) DX</td>
<td>485</td>
<td>445</td>
<td>6.8</td>
<td>26</td>
<td>29</td>
<td>250</td>
</tr>
<tr>
<td>RRS</td>
<td>109</td>
<td>100</td>
<td>10</td>
<td>26</td>
<td>29</td>
<td>200</td>
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#### Defrost Controls

<table>
<thead>
<tr>
<th>Model</th>
<th>Defrosts per Day</th>
<th>Run-Off Time (min)</th>
<th>Electric Defrost</th>
<th>Timed-Off Defrost</th>
<th>Hot Gas Defrost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fail-Safe (min)</td>
<td>Termination Temp (°F)</td>
<td>Fail-Safe (min)</td>
</tr>
<tr>
<td>PTDR-H (BASE) DX</td>
<td>4</td>
<td>- - -</td>
<td>- - -</td>
<td>65/36</td>
<td>42</td>
</tr>
<tr>
<td>RRS</td>
<td>4</td>
<td>- - -</td>
<td>- - -</td>
<td>65/36</td>
<td>42</td>
</tr>
</tbody>
</table>

1. NOTE: "- - -" indicates data not applicable.
2. RRS - Refrigerated Rear Storage.
3. Listed BTUH indicates unlighted shelves. Add the following for lighted shelves:
   - 4' Shelf LED: 36 BTUH
   - 4' Canopy LED: 72 BTUH
   - 3' Shelf LED: 27 BTUH
   - 3' Hi-Output LED: 54 BTUH
4. Average discharge air velocity at peak of defrost.
5. Time-off duration for defrost with no termination control.

Engineered for stores with ambient conditions not to exceed 75° and 55% relative humidity.
Due to engineering improvements specifications may change without notice.
All measurements are taken per ASHRAE - 72 - 2005 specifications.
Hillphoenix refrigerated display cases for sale in the United States meet or exceed department of energy 2017 efficiency requirements.
Numbers are based on standard case sizes. Consult engineering.
**PTD REMOTE BASE & HOT DOME**

**Service**

<table>
<thead>
<tr>
<th>Model</th>
<th>Top Heaters</th>
<th>Bottom Heaters</th>
<th>Lights</th>
<th>Shelves</th>
<th>Total Amps (120/208-3-60)</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTD (DOME)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4'</td>
<td>3</td>
<td>250</td>
<td>3</td>
<td>400</td>
<td>2</td>
<td>100</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6'</td>
<td>4</td>
<td>250</td>
<td>4</td>
<td>400</td>
<td>3</td>
<td>100</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8'</td>
<td>6</td>
<td>250</td>
<td>5</td>
<td>400</td>
<td>4</td>
<td>100</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10'</td>
<td>7</td>
<td>250</td>
<td>6</td>
<td>400</td>
<td>5</td>
<td>100</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12'</td>
<td>8</td>
<td>250</td>
<td>7</td>
<td>400</td>
<td>6</td>
<td>100</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Electrical Data**

<table>
<thead>
<tr>
<th>Model</th>
<th>Fans per Case</th>
<th>Convection Fans</th>
<th>Total Amps (120/208-3-60)</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTD (DOME)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4'</td>
<td>1</td>
<td>0.06</td>
<td>12.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6'</td>
<td>3</td>
<td>0.18</td>
<td>37.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10'</td>
<td>3</td>
<td>0.18</td>
<td>37.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12'</td>
<td>4</td>
<td>0.24</td>
<td>49.9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Lighting Data**

<table>
<thead>
<tr>
<th>Model</th>
<th>Lights per Row</th>
<th>Light Length (ft)</th>
<th>Fluorescent Lighting (Per Light Row)</th>
<th>amps</th>
<th>Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTD (DOME)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 NOTE: "- - -" indicates data not applicable.
Thank you for choosing Hillphoenix for your food merchandising needs. This handbook contains important technical information and will assist you with the installation and operation of your new Hillphoenix specialty cases. By closely following the instructions, you can expect peak performance; attractive fit and finish; and long case life.

We are always interested in your suggestions for improvements (e.g. case design, technical documents, etc.). Please feel free to contact our Marketing Services group at the number listed below. Thank you for choosing Hillphoenix, and we wish you the very best in outstanding food merchandising.

CASE DESCRIPTION
This manual specifically covers the PTD-R-H (Synerg-E) bakery, beverage, deli, meat and seafood application service/self-service open multi-deck merchandiser.

STORE CONDITIONS
Hillphoenix cases are designed to operate in an air-conditioned store that maintains a 75°F (24°C) store temperature and 55% (max) relative humidity (ASHRAE conditions). Case operation will be adversely affected by exposure to excessively high ambient temperatures and/or humidity.

REFRIGERATION SYSTEM OPERATION
Air-cooled condensing units require adequate ventilation for efficient performance. Machine-room temperatures must be maintained at a minimum of 65°F in winter and a maximum of 95°F in summer. Minimum condensing temperatures should be no less than 70°F.

SHIPPING CASES
Transportation companies assume all liability from the time a shipment is received by them until the time it is delivered to the consumer. Our liability ceases at the time of shipment.

RECEIVING CASES
Examine fixtures carefully and in the event of shipping damage and/or shortages, please contact the Service Parts Department at the number listed below.

CASE DAMAGE
Claims for obvious damage must be 1) noted on either the freight bill or the express receipt and 2) signed by the carrier’s agent; otherwise, the carrier may refuse the claim. If damage becomes apparent after the equipment is unpacked, retain all packing materials and submit a written request to the carrier for inspection within 14 days of receipt of the equipment. Failure to follow this procedure will result in refusal by the carrier to honor any claims with a consequent loss to the consumer.

If a UPS shipment has been damaged, retain the damaged material, the carton and notify us at once. We will file a claim.

LOST/MISSING ITEMS
Equipment has been carefully inspected to insure the highest level of quality. Any claim for lost/missing items must be made to Hillphoenix within 48 hours of receipt of the equipment. When making a claim please use the number listed below.

SERVICE & TECHNICAL SUPPORT
For service or technical questions regarding specialty cases, please contact our Specialty Products Division Service Department at 1-319-293-3777. For questions regarding our refrigeration systems or electrical distribution centers, please contact our Systems Division Customer Service Department at 1-770-388-0706.

CONTACTING THE FACTORY
If you need to contact Hillphoenix regarding a specific fixture, be certain that you have both the case model number and serial number (this information can be found on the data tag, located on the top-left interior of the case). When you have this information, call the number below and ask for a Service Parts Representative.

Hillphoenix Specialty Products
703 Franklin Street, PO Box 478
Keosauqua, IA 52565
Tel: (319) 293-3777/Fax: (319) 293-3776
Website: www.hillphoenix.com
CASE INSTALLATION

LOCATION
This refrigerated display case has been designed for displaying and storing perishable food product. It is engineered for air-conditioned stores with a maximum ambient of 75°F and 55% relative humidity.

When selecting the location for placement of this case, avoid the following conditions:

**Excessive Air Movement**
1. Doors
2. Air-conditioned vents
3. Other air sources

**Excessive Heat**
1. Windows
2. Sun
3. Flood lamps 8 feet or less from the product
4. Other heat sources

**FLOOR PREP**
1. Ask the general contractor if your current copy of the building dimensions are the most recently issued. Also, ask for the points of reference from which you should take dimensions to locate the cases.
2. Using chalk lines or a laser transit, mark the floor where the cases are to be located for the entire lineup. The lines should coincide with the outside edges of the case feet.
3. Move case as close as possible to its permanent location. Remove all crating and shipping braces above the shipping pallet. Loosen the plastic dust cover from the pallet, but leave cover over the case to protect it while removing the case from the pallet. Carefully, lift case up and off the pallet. Remove dust cover. Installation hardware ships in a marked packet located inside the case.
4. Leveling is necessary to ensure proper operation of the refrigeration system and drainage of the condensate. Locate the highest point on the positioning lines as a reference for determining the proper height of the shim-pack levelers. A laser transit is recommended for precision and requires just one person. Level adjustable feet by twisting, if applicable, or shim as necessary under horizontal supports as this will help ensure that the case is not settling over time.
5. Locate horizontal support positions along the chalk line (Fig. 1). Spot properly leveled shim packs at each support location.

**Fig. 1 Horizontal supports**

**CAUTION**
Locate the horizontal supports under unit before removing from pallet. Failure to do so will damage the finished metal if correct lift points are not identified prior to removal.

**CAUTION**
These cases are not designed for excessive external weight. Do not walk on top or inside of cases. Doing so may result in case damage and/or personal injury.

**LINE-UP & INSTALLATION**

**Single Case**
1. Move the case into position. Using a “J” bar, raise the end of the case (under cross support), and lower the horizontal support on to the shim packs. Repeat on the other end of the case.

**WARNING**
Be certain that your hands and feet are out of the way before lowering the case. Failure to do so may result in serious injury.

2. Once the case is properly placed on the shim packs, check the vertical plumb of the case by placing a bubble level on the rear wall. Add/remove shim packs as needed. For the horizontal level, repeat this process after placing the bubble level on the front sill.
3. Install the bumper, if applicable, into pre-attached bumper track and snap into place.
4. After sufficient time has passed to allow for bumper shrinkage, cut away the excess bumper for final fit and finish. Be certain to use an appropriate cutting tool (tubing- or PVC-cutter) to ensure a smooth cut.
5. Install case shelves and reconnect lights. Be aware that
differing shelf configurations will affect energy consumption and case performance.

6. Install toekick back onto the base of case.

**Multi-Case**

1. Remove any shelves (discard the shelf clips) and/or loose items from the cases that may interfere with case joining. Keep all loose items as they will be used later in the installation process.

2. Follow the single-case installation instructions for the first case, excluding #6, then position the next case in the line-up approximately 3' away.

3. Move the second case to a position that is approximately 6" from the first case, then position case on the shim packs.

4. Push the cases tightly together, then lightly bolt them together through the holes provided (Fig. 2). Tighten all the joining bolts until all margins are equal. Be careful not to over tighten.

5. The stub-up location can be found under the tank on the customer left. See diagram on page 9 for access locations.

6. Apply case-to-case watershed (supplied) over the end frame seam (Fig. 3). The watershed prevents water from settling in the case joint.

7. Repeat steps 3-6 of this sequence for all remaining cases. Be certain to properly level all cases.

8. Properly align the front panels as needed, then install, if applicable, front panel trim (supplied).

9. Install the bumper into pre-attached bumper track and snap into place.

10. After sufficient time has passed to allow for bumper shrinkage, cut away the excess bumper for final fit and fin-

**CAUTION**

Installation of 3rd-party materials may result in diminished case performance.
CASE CONNECTIONS

REFRIGERATION

Refrigeration connections will be made through the refrigeration stub up location on the customer left side of the case. Refrigeration lines may be headed together for all cases in a line-up, if necessary, by lines through the access holes with a high grade silicon to prevent recirculation. All lines must be correctly sized. See diagram on page 9 for access locations.

If it becomes necessary to penetrate the case bottom for any reason, make certain it is sealed afterward with canned-foam sealant and white RTV.

CAUTION

Be certain that all piping connections are compliant with local codes.

CAUTION

Be sure to remove all styrofoam shipping blocks from piping and refrigerant lines. Failure to do so may result in case damage.

PLUMBING

The drain outlet or “P” trap (Fig. 4) is shipped loose with the case and made from a 1 1/2” PVC pipe. Care should be given to ensure that all connections are water-tight and sealed with the appropriate PVC or ABS cement.

CAUTION

If any brazing is necessary, place wet rags around the area to avoid tank damage.

CAUTION

Be certain that all plumbing connections are compliant with local codes.

Drain lines can be run left or right of the tee with the proper pitch to satisfy local drainage requirements. When connecting the PVC to the existing floor drains be sure to provide as much downhill slope as possible and avoid long runs of drain lines.

Do not install condensate drains in contact with non-insulated suction lines in order to prevent condensate from freezing. Install the 1 1/2” PVC trap, which is provided with the case. All drains must be trapped.

ELECTRICAL

Electrical hookups are made through the electrical raceway that can be accessed by removing the rear raceway panel.

For case-to-case wiring, run conduit between the power supply boxes or run wiring through the raceway. When connecting to the power supply on the case, field wiring should exit box from the side furthest away from case wiring to allow more room inside for wiring connections. Always check the data tag located on left end exterior panel or top interior of the case. The case must be grounded. For more detailed electrical wiring information (see Appendix A1).

CAUTION

Be certain that all electrical connections are compliant with local codes.

DANGER

CAUTION, RISK OF ELECTRIC SHOCK. If the cord or plug becomes damaged, replace only with a cord and plug of the same type.
MECHANICAL ACCESS LOCATIONS

POWER SUPPLY

12 in [30.5 cm]

6 in [15.2 cm]

6 in

18 in [45.7 cm]

51 in [129.6 cm]

FRONT OF CASE

1 in [2.5 cm]

15” x 11” MECHANICAL ACCESS FOR ELECT., REFRIG., AND DRAIN CONNECTIONS

TOEKICK

51 in [129.6 cm]

18 in [45.7 cm]

2 1/16 in [5.2 cm]

97 in [246.4 cm] (8’ case)

97 in [246.4 cm] (8’ case)

42 in [106.6 cm]

1 in [2.5 cm]

48 1/2 in [122.2 cm] (4’ case)

72 1/2 in [184.2 cm] (6’ case)

97 in [246.4 cm] (8’ case)

121 in [307.3 cm] (10’ case)

145 in [368.3 cm] (12’ case)

121 in

2 1/16 in

100 in

92 in

123.2 cm

45.7 cm

5.2 cm

2.5 cm

106.6 cm
LIGHTING, HEAT & POWER SUPPLIES

GENERAL LIGHTING INFORMATION

The hot dome section of this case is equipped with T-8 lights and the refrigerated base section is equipped with LED luminaries. They feature specially designed light reflectors in the cornice to improve the illumination of products. The T-8 electronic ballasts and the LED power supplies operate both the cornice and shelf lights and are located above the cornice reflectors.

The lighting system has an ON/OFF switch located in the raceway, power box or at the inside back of the case. Once a case has been properly positioned in the store and an electrician has connected the lighting circuit, the lights may be turned on to verify that they are connected and functioning properly.

To ensure peak performance, it is advisable to run the lighting systems only when the store climate control is on and the case heat is started. Note: It is highly recommended that the ambient store temperature not exceed 80°F.

**DANGER**

**SHOCK HAZARD**
Always disconnect power to case when cleaning, servicing or configuring components of the lighting system. Failure to do so may result in serious injury or death.

**WARNING**

Using improper DC power supplies may damage the luminaires, resulting in sub-standard operation and increased chances of safety issues/injury.

**WARNING**

Never replace a 24V DC power supply with a T8 or T5 ballast of any kind! Ballasts use alternating current (AC) instead of direct current (DC) and operate at a much higher voltage than is used by this LED system. Doing so will damage the LED system and increases the chance of safety issues/injury.

T-8 SHELF LUMINAIRES

1. Unplug the white T-8 lamp power cords located at the inside-back of the case below the lamp being replaced (Fig. 5).
2. Carefully separate the cap from the lamp holder on both ends of the T-8 lamp (Fig. 6). Simultaneously pull down at both ends of the old T-8 lamp to remove.
3. Push and snap the new T-8 lamp into place on the lamp holder. When the T-8 is properly seated, the lamp button - which secures the T-8 to the lamp holder - will be clearly visible through the lamp button hole. The cap should be pushed all the way down (Fig. 7) for positive engagement indicator.

HEATED SHELVES

Unlike the shelf luminaries that are designated with a white receptacle and cord; the heat receptacle and cord designation is
black (Fig. 8). The two, light and heat cords, are located at opposite ends of the same shelf and the color designated white/black receptacles to match at their corresponding end of the inside back of the case.

In order to supply heat to the shelves this black heat cord must be plugged in to it’s designated receptacle during use at all times.

Removing shelf luminaires:
1. Unplug the luminaire.
2. Pinching the latching clips inward at the ends of the luminaire, rotate luminaire up at each end until hooks are free, then remove.

Re-installing shelf luminaires:
1. Place hook into shelf roll form at shelf front and rotate rear of luminaire toward the shelf.
2. Depress the rear clip so that luminaire can finish rotation and until clip engages the shelf bracket.

**T-8 NON-SHELF LUMINAIRES**

Removing non-shelf luminaires:
1. Simultaneously squeeze the plastic clips at each end.
2. When the hooks are disengaged, pull the luminaire free.

Re-installing non-shelf luminaires:
1. Align the 4-pole jack with the 4-pole connector on the clip-in luminaire.
2. Push into place - side clips will engage on the sheet metal of the case.
3. Fasten anti-tamper bracket into sheet metal of case with #8 screw at end opposite of the 4-pole in-line connector.

**LED DRIVER/POWER SUPPLY ACCESS**

To gain access to the LED driver or power supplies remove the raceway cover (Fig. 10). The power supply can be located at the customer left side of the case.

**REPLACING LED LIGHTS**

Once store power is connected and the light circuit is energized, the Clearvoyant LED system should operate without the need for any significant maintenance for several years. Should a power supply need to be removed and/or replaced, turn off the power to the case before proceeding. Be certain to replace the power supply with genuine Hillphoenix parts or a comparable UL-listed Class-2 rated regulated 24V DC power supply with 100W output capacity.
LED LUMINAIRES

Removing LED luminaires:
1. Unplug the luminaire (Fig. 11).
2. Remove the screws from the light clamps (Fig. 12) while keeping ahold of the light. Once the screws are removed the light rod will come away from the case with the clamps still holding to the light.
3. Remove the closed clamps and inner rings (Fig. 13) by unclipping the clamp ends located above the screw opening. This will release the grip around the inner ring (Fig. 14) and allow for the two pieces to be separated from one another.
4. Carefully remove the inner rings from around the light rod.

Re-installing LED luminaires:
1. Place a ring (Fig. 15) around each end of the light rod and rotate until both edges of the rod line-up and snap ahold to the ridges in the ring.
2. Slide a clamp (Fig. 15) over each ring and close them tight around the rings by clipping together the clamp ends located above the screw opening.
3. Line-up the closed clamps (Fig. 13) and light rod with the existing screw holes on the case and re-attach.
4. Rotate the light rod into desired position after the clamps are firmly re-attached.

CAUTION
Too much tension on the inner clamp rings while removing them from an LED light rod may cause breakage. Use only enough tension for removal.
Before powering-up the case, be certain that all of the steps listed below have been completed to ensure proper case functionality, safety and compliance with warranty terms.

- Have you thoroughly examined the case for shipping damage? (see pg. 5)
- Have you checked the vertical plumb of the case? The horizontal level? (see pg. 6)
- Have you applied the sealant to the end breakers of adjoining cases? (see pg. 7)
- Have you sealed the case-to-case joints by applying caulk and acrylic tape to the end frame seam? (see pg. 7)
- Have you installed the toekick? (see pg. 7)
- Have you removed the shipping blocks from the refrigeration and plumbing lines? (see pg. 8)

After powering-up the case, be certain that all of the steps listed below have been completed to ensure proper case functionality, safety and compliance with warranty terms.

1. Check all lights and heating elements to ensure they are all functioning properly.

2. Check case temperature and adjust controller as needed.
HEAT CONTROLS & SETTINGS

HEAT CONTROLS

Hillphoenix case hot wells are equipped with digital controls (Fig. 16). To adjust press the appropriate arrow firmly. There is one control per well for individual functions.

The controls are normally grouped in clusters. Each case will have Control #1 and one or more Control #2.

PREHEATING

Turn on power switch and set controls to level 9 for preheating. Place empty pans or tiles in all wells. Let unit operate with empty pans or tiles for 60 minutes before loading with product. Adjust controls to desired levels before loading case with product. Putting hot food in a case this has not reached full temperature will cause product temperature to drop quickly. All product must be preheated to 175°F. It is essential that product be fully cooked and heated prior to stocking the case. Check product temperature of larger pieces when cooking different size items. It takes longer for larger pieces to reach desired temperature.

Control #1

This is the largest control. Once settings are determined, use this control to turn power ON and OFF for the case. Reset when ambient conditions change or product changes.

---

A Heat Active - The heating element turns ON and OFF, once every second. The heat active dot blinks ON/OFF each time the element is switched ON/OFF. If the dot is not blinking check to ensure that the heating element is running properly.

B Lights - The top light is for illumination only. It is not for control of the upper heat.

C Case Power - Turn power ON/OFF at the switch. Press buttons firmly to ensure proper ON/OFF.

D Main Power - When controls are OFF the main power light should remain lit.

E Heating Levels - Adjust levels UP or DOWN.

F Heating Levels (Range) 0 = OFF
   1 = Lowest
   9 = Highest
**Functions:**

- Case Power ON/OFF
- Lights ON/OFF
- Top Fan ON/OFF
- Overhead Heat

**Range:**

- (0-9)
- 0 = OFF
- 1 = Lowest Setting
- 9 = Highest Setting

**Control #2**

At least one and possibly several of these controls will be on each case depending on the number of wells. There will always be one control per well.

**Functions:**

- Well Control

**Range:**

- (0-9)
- 0 = OFF
- 1 = Lowest Setting
- 9 = Highest Setting

**Control #3**

This control is only present in a combination service/self-service case for the overhead heat.

**Functions:**

- Overhead Heat Control

**Range:**

- (0-9)
- 0 = OFF
- 1 = Lowest Setting
- 9 = Highest Setting

**PRODUCT DISPLAY & SETTNGS**

This merchandiser is designed to operate without water in the well. Adding water will cause the case to expend many BTU’s in order to heat the water and not the product. This may cause condensation to collect on the front glass (if applicable) of service cases.

For best results product should be arranged by product type with groupings of like product together.

**Load Limits**

1. Product must be 6" below the top heater in self-service cases and contained in the tile or well area.
2. The well must be completely covered with tiles or pans whether filled with product or empty.

**WARNING**

All product must be fully cooked prior to being stocked in the case. Failure to do so may result in serious illness or death.

**WARNING**

Always keep product within the designated heated areas. Failure to do so may result in case malfunction and product losing proper temperature, resulting in sub-standard operation and increased chances of food contamination.

**Common Settings**

Product that is immersed in liquid is easier to keep hot. Products like fried foods are the hardest to maintain temperature.
HEAT CONTROLS & SETTINGS

To adjust temperatures, change the heat setting one number at a time by holding the UP or DOWN button 2-3 seconds to ensure change made. Allow 1-2 hours for the case temperature to even out before continuing. The settings will need to be adjusted to your specific product and store conditions. Use these settings as a starting point.

Once the correct setting is found, the controls may be left at that setting, and turned ON and OFF using the power switch on the main control. The case must be turned on 1 hour before placing the product. Be sure that all wells are covered with pans or tiles all times whether filled with product or empty.

Recommended:  
5-6 = Overhead Controls  
5-6 = Fried Foods  
2-5 = Immersed Foods

CASE AIR TEMPERATURE

The case air temperature may not be as high as the desired product temperature. This case is designed to produce long wave radiant heat. This type of heat penetrates the food and keeps it warm from the inside out. Therefore, the air temperature may not be the same as the product temperature. Measure product interior temperature to determine the correct settings, not the air temperature for the best results.

UNIT SHUTDOWN

Turn case power to OFF on Control #1. It is not necessary to adjust well or overhead heat controls. Remove product, turn off case lights and allow the case to cool completely before cleaning.
AIRFLOW & PRODUCT LOAD

Hillphoenix cases provide maximum product capacity within the refrigerated air envelope. Please keep products within the appropriate load limit.

It is important that you do not overload the food product display so that it impinges on the airflow pattern (Fig. 17). Overloading will cause malfunction and the loss of proper temperature levels.

![Fig. 17 Airflow pattern](image)

WARNING

Always keep product within the designated air curtain. Failure to do so may result in case malfunction and product losing proper temperature, resulting in sub-standard operation and increased chances of food contamination.

DEFROST & TEMPERATURE CONTROLS

Cases are equipped with either Hot Gas or Timed-Off defrost at the owner's option.

The hot gas defrost termination sensor bulb and probe are attached to the dump line which is in the front, left-hand side of the case.

DETERMINING SUPERHEAT

To identify proper superheat settings, complete the following:

1. Obtain suction pressure from access port; obtain suction line temperature from area near TXV bulb at the outlet of evaporator coil.
2. Using the suction pressure reading, convert pressure to temperature using temperature pressure chart (see Appendix C1).
3. Finally, subtract the converted temperature reading from the actual temperature reading for superheat setting.
CASE CLEANING

A periodic cleaning schedule should be established to maintain proper sanitation, insure maximum operating efficiency, and avoid the corrosive action of food fluids on metal parts that are left on for long periods of time. We recommend cleaning once a week. Further suggestions for case cleaning include the following:

- To avoid shock hazard, be sure all electrical power is turned off before cleaning. In some installations, more than one disconnect switch may have to be turned off to completely de-energize the case.
- All surfaces pitch downward to a deep-drawn drain trough, funneling liquids to the center of the case where the waste outlet is located for easy access. Check the waste outlet to insure it is not clogged before starting the cleaning process and avoid introducing water faster than the case drain can carry it away.
- To clean the LED luminaires, shut off the lights in the case, then wipe the luminaires down with a soft, damp cloth. Avoid using harsh or abrasive cleaners as they may damage the lights. Be certain that the luminaires are completely dry before re-energizing.
- Clean from top to bottom when cleaning the display case to avoid cross contamination.
- If any potentially harmful cleaners are used, be certain to provide a temporary separator (e.g., cardboard, plastic wrap, etc.) between those cases that are being cleaned and those that may still contain product.
- Avoid spraying any cleaning liquids directly on the electrical connections.
- Allow cases to be turned off long enough to clean any frost or ice from coil and pans.
- Remove toekick and clean underneath the case with a broom and a long-handled mop. Use warm water and a disinfecting cleaning solution when cleaning underneath the cases.

Fans and Pressure Plate

1. Disconnect power to the case and wait for fans to come to a complete stand-still.
2. To access the underside of the fans first remove the screws on the top ends and front sill of the pressure plate cover (Fig. 18). Lift the pressure plate by use of the provided lift handles (Fig. 19). There are hinges shared between the pressure plate and coil covers. Note: It is recommended that more than one person lift the pressure plate. The topside of pressure plate will rest against the topside of the coil cover, exposing the underside of the pressure plate and fans (Fig. 20).

Only lift the pressure plate and/or coil cover for a qualified inspector or a trained service provider. Failure to do so may result in damage to the refrigerant system.
CASE CLEANING

Coil Inspection

1. Disconnect power to the case and wait for fans to come to a complete stand-still.

2. Remove the top two screws at both ends of the coil cover (Fig. 21), as well as the screws from the top ends and front sill of the pressure plate cover (Fig. 18). Be sure to save the removed screws for reassembly.

3. Carefully, without bending the sheet metal cover, with the use of the handles provided, gently slide the coil cover with the pressure plate assembly forward to expose the evaporator coil.

4. Clean as necessary. Use a spray bottle filled with an approved mild detergent and warm water. This location should be accessed by qualified personnel only.

5. Be sure to screw the coil cover back to its original position after cleaning and/or inspection is complete.

![Hinge and Screws](image)

**CAUTION**

Always be sure to move the pressure plate and screw the coil cover back to their original position after the cleaning and/or inspection is complete. Failure to do so may result in damage to the refrigerant system.

Rear Load Doors

1. Remove the rear sliding doors on the back of the case and clean. To remove: push up and pull out (Fig. 22). Note: The same applies for optional rear lower storage doors (RRS/DRS).

2. Use a spray bottle filled with an approved mild detergent and warm water.

3. Use a clean, disposable cloth (approved item) to thoroughly clean all areas of the case.

4. Wipe down doors with a clean, disposable cloth (approved item).

5. Place the cleaned doors on a clean sanitized surface until they are dry.

![Rear Load Door Removal](image)
<table>
<thead>
<tr>
<th>ISSUE</th>
<th>CAUSE</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dome temperature too warm.</td>
<td>Temperature settings too high on main controller.</td>
<td>Adjust controls down - case temps should come down accordingly.</td>
</tr>
<tr>
<td>Product in dome not 140°</td>
<td>Internal temperature when placed in the case should be 175°. Check case surface temp for proper control setting. Should be 190° - 200° to hold proper product temperature.</td>
<td>Adjust settings to 8 on top and 7 on bottom.</td>
</tr>
<tr>
<td>Self-service bunker of case not holding temperature.</td>
<td>Ambient conditions may be affecting the case operation.</td>
<td>Check case position in store. Is the case located near an open door or air conditioning vent? RH should not be over 50% and temperature above 75°.</td>
</tr>
<tr>
<td></td>
<td>Condensing coil clogged or dirty.</td>
<td>Clean condensing unit - check settings and cycle defrost.</td>
</tr>
<tr>
<td>Water has pooled under the case. *Self-Contained Model Only</td>
<td>Ambient conditions may be affecting the dissipater pan.</td>
<td>Could potentially up the size to a larger condensate pan which can evaporate more water.</td>
</tr>
<tr>
<td>Case lights and controls are pulsating or controls #’s and LED’s are fading across the panel.</td>
<td>Wrong power hookup or voltage drop to the case.</td>
<td>Have electrician confirm that case has correct power and voltage.</td>
</tr>
<tr>
<td>Not holding product temperature. (150°F is recommended)</td>
<td>Cause Unknown. (Refer to action.)</td>
<td>-What temperatures are they trying to maintain?</td>
</tr>
<tr>
<td>Its is important to ask the right questions to determine the correct solution.</td>
<td></td>
<td>-What is the heat level set at?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Did they preheat case for 1-1/2 hours?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Confirm product temp going into the case. (Minimum FDA requirement is 165°F - 175°F) (Hillphoenix recommendation: 175°F)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-What kind of packaging are they using?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Is it resting flat on heated surface?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Are they using the wrong bowls or platters?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Is product stacked too high?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Are they melting packaging?</td>
</tr>
<tr>
<td>Criteria met, but still not holding product temperature.</td>
<td>Cause Unknown. (Refer to Action.)</td>
<td>-Call service</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Check surface temperature. Should be 200°F or higher.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Change heat range on control board. (Dip switches)</td>
</tr>
</tbody>
</table>
Contact the Service Parts Department at:

319-293-3777

Provide the following information about the part you are ordering:

- Model number and serial number* of the case for which the part is intended.
- Length of the part (if applicable).
- Color of part (if painted) or color of polymer part.
- Whether part is for left or right-hand application.
- Quantity

*Data tag is located on the left end exterior panel or top interior of the case.

If the parts are to be returned for credit, contact the Parts Department. Do not send parts without authorization.
A1 .................................................................................................................. Wiring Information
B1-B3 ........................................................................................................ Dixell Operating Instructions
C1 .............................................................................................................. Sporlan Pressure-Temperature Chart
D1 .................................................................................................................. Parts List
TBD
B1: DIXELL OPERATING INSTRUCTIONS

**DIGITAL CONTROLLER**

**XR03CX – XR04CX**

### 1. CONTENTS

1. Contents
2. General warnings
3. General description
4. Regulation
5. Defrost
6. Front panel commands
7. Parameters
8. Digital inputs
9. Installation and mounting
10. Electrical connections
11. How to use the hot key
12. Alarm signaling
13. Technical data
14. Instructions
15. Default settings

### 2. GENERAL WARNINGS

**PLEASE READ BEFORE USING THIS MANUAL**

1. This manual is part of the product and should be kept near the instrument for easy and quick reference.
2. The instrument shall not be used for purposes different from those described hereunder. It cannot be used as a safety device.
3. Check the application limits before proceeding.

**SAFETY PRECAUTIONS**

- Check the supply voltage is correct before connecting the instrument.
- Do not expose to water or moisture; use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent formation of condensation.
- Warning: disconnect all electrical connections before any kind of maintenance.
- Fit the probe where it is not accessible by the End User. The instrument must not be opened.
- In case of failure or faulty operation send the instrument back to the distributor or to “Dixell S.p.A.” (see address) with a detailed description of the fault.
- In case of applications in industrial environments, the use of mains filters (our mod. FT1) is recommended.
- Ensure that the wires for probes, loads and the power supply are separated and far enough from each other, without crossing or intertwining.
- In case of applications in industrial environments, the use of mains filters (our mod. FT1) is recommended.

### 3. GENERAL DESCRIPTION

The XR03CX in 32x74x50mm short format, is a microprocessor based controller suitable for applications on normal temperature refrigerating units. It provides two relay output: one for compressor and the other one for alarm signaling or as auxiliary output. It provides an NTC probe input and a digital input for alarm signaling, for switching the auxiliary output or for start defrost. The instrument is fully configurable through special parameters that can be easily programmed through the keyboard or the by HOTKEY.

The XR04CX, in 32x74x50mm short format, is a microprocessor based controller suitable for applications on normal or low temperature refrigerating units. It provides two relay output: one for compressor and the other one for defrost. It provides two NTC probe inputs, one for room temperature and other one to control defrost. The instrument is fully configurable through special parameters that can be easily programmed through the keyboard or the by HOTKEY.

### 4. REGULATION

The regulation is performed according to the temperature measured by the thermostat probe with a positive differential from the set point. The temperature increases and reaches set point plus differential the compressor is started and then turned off when the temperature reaches the set point value again.

In case of fault in the thermostat probe the start and stop of the compressor are timed through parameters “Cf” and “Cn”.

### 5. DEFROST

**XR03CX**

Defrost is performed through a simple stop of the compressor. Parameter “d” controls the interval between defrost cycles, while its length is controlled by parameter “Md”.

**XR04CX**

Two defrost modes are available through the “Md” parameter:
- **tdEL**: defrost through electrical heater (compressor OFF)
- **tdin**: hot gas defrost (compressor ON)

Other parameters are used to control the interval between defrost cycles (“Id”), its maximum length (“Md”) and two defrost modes: timed or controlled by the evaporator’s probe. At the end of defrost, dripping time is started. If its length is set in the “dt” parameter. With “d” the dripping time is disabled.

### 6. FRONT PANEL COMMANDS

**SET**

- To display target set point, in programming mode it selects a parameter or confirm an operation
- To start a manual defrost
- In programming mode it browses the parameter codes or increases the displayed value
- In programming mode it browses the parameter codes or decreases the displayed value

**AUX**

**KEYS COMBINATION**

- To lock or unlock the keyboard
- To enter in programming mode
- To return to room temperature display

### 7. PARAMETERS

#### 7.1 Digital inputs

#### 7.2 Parameters

#### 7.3 Front panel commands

#### 7.4 Regulation

---

1592020130 XR03_04CX GB 16.01.07.doc XR03CX – XR04CX
B2: DIXELL OPERATING INSTRUCTIONS

OPERATING MANUAL

1592020130

1. PROBES
   - The probes should be mounted with the bulb upwards to prevent damages due to casual liquid infiltration. It is recommended to place the thermostat probe away from air streams to correctly measure the average room temperature. Place the defrost termination probe among the evaporator fins in the coldest place, where most ice is formed, far from heaters or from the warmest place during defrost, to prevent premature defrost termination.

2. HOW TO PROGRAM THE HOT KEY (DOWNLOAD)
   - Insert a programmed "Hot Key" into the 5-pin receptacle and then turn the Controller ON.
   - Automatically the parameter list of the "Hot Key" is downloaded into the Controller memory, the "de" message is blinking followed by a flashing "Ed".
   - After 10 seconds the instrument will restart working with the new parameters.
   - Remove the "Hot Key".

3. ALARM SIGNALLING
   - The "Er" message is displayed for failed programming. In this case push again ok key if you want to restart the upload again or remove the "Hot key" to abort the operation.

4. TECHNICAL DATA
   - The free voltage digital input is programmable in different configurations by the "dP" parameter.

5. TECHNICAL DATA
   - The digital input is disabled again. With the door open, the high and low temperature alarms are disabled.

6. INSTALLATION AND MOUNTING
   - The instrument is provided with screw terminal block to connect cables with a cross section up to 2.5 mm². Before connecting cables make sure the power supply complies with the instrument’s requirements. Separate the probe cables from the power supply cables, from the outputs and the power connections. Do not exceed the maximum current allowed on each relay, in case of heavier loads use a suitable external relay.

7. ELECTRICAL CONNECTIONS
   - In case the door is open, the high and low temperature alarms are disabled.

8. DIGITAL INPUTS
   - The door switch is "Fmdo" and the door is open if "dP" is not active. The "dP" parameter is enabled, the display shows the message "dP" and the regulation restarts if "dP" is not active.

9. INSTALLATION AND MOUNTING
   - The door switch is "Fmdo" and the door is open if "dP" is not active. The "dP" parameter is enabled, the display shows the message "dP" and the regulation restarts if "dP" is not active.
**B3: DIXELL OPERATING INSTRUCTIONS**

**Operating Manual**

**14. CONNECTIONS**

**XR03CX - 20A o 8A Compressor**

NOTE: The compressor relay is 20(8)A or 16(6)A depending on the model.

NOTE: 120Vac or 24Vac/dc or 12Vac/dc connect to 6 and 7

**XR04CX - 20A o 8A Compressor**

NOTE: The compressor relay is 20(8)A or 16(6)A depending on the model.

**15. DEFAULT SETTING VALUES**

<table>
<thead>
<tr>
<th>ID</th>
<th>DESCRIPTION</th>
<th>RANGE</th>
<th>DEFAULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hy</td>
<td>Differential</td>
<td>0.1 ÷ 25°C/1 ÷ 45°F</td>
<td>2.0°C / 4°F</td>
</tr>
<tr>
<td>L5</td>
<td>Minimum Set Point</td>
<td>-55°C+SET/+67°F+SET</td>
<td>-55 °C / -55°F</td>
</tr>
<tr>
<td>US</td>
<td>Maximum Set Point</td>
<td>SET/+99°C/ SET+210°F</td>
<td>99 °C / 99°F</td>
</tr>
<tr>
<td>ot</td>
<td>First probe calibration</td>
<td>-9.9÷9.9°C/-18÷18°F</td>
<td>0.0</td>
</tr>
<tr>
<td>P2</td>
<td>Second probe presence (Only XR04CX)</td>
<td>n - Y</td>
<td>y</td>
</tr>
<tr>
<td>dE</td>
<td>Second probe calibration (Only XR04CX)</td>
<td>-9.9÷9.9°C/-18÷18°F</td>
<td>0.0</td>
</tr>
<tr>
<td>od</td>
<td>Outputs activation delay at start up</td>
<td>0 ÷ 99 min</td>
<td>0</td>
</tr>
<tr>
<td>AC</td>
<td>Anti-short cycle delay</td>
<td>0 ÷ 50 min</td>
<td>1</td>
</tr>
<tr>
<td>Cy</td>
<td>Compressor ON time faulty probe</td>
<td>0 ÷ 99 min</td>
<td>15</td>
</tr>
<tr>
<td>Cn</td>
<td>Compressor OFF time faulty probe</td>
<td>0 ÷ 99 min</td>
<td>30</td>
</tr>
<tr>
<td>CH</td>
<td>Kind of Action (Only XR04CX)</td>
<td>cL ÷ Ht</td>
<td>cL</td>
</tr>
<tr>
<td>CF</td>
<td>Measurement units</td>
<td>°C - °F</td>
<td>°C / °F</td>
</tr>
<tr>
<td>rE</td>
<td>Resolution (only for °C)</td>
<td>deE – in</td>
<td>deE</td>
</tr>
<tr>
<td>Ld</td>
<td>Default Display (Only XR04CX)</td>
<td>P1-P2 - SP</td>
<td>P1</td>
</tr>
<tr>
<td>dy</td>
<td>Display delay</td>
<td>0 ÷ 15 min</td>
<td>0</td>
</tr>
<tr>
<td>td</td>
<td>Defrost type</td>
<td>EL - in</td>
<td>EL</td>
</tr>
<tr>
<td>dE</td>
<td>Defrost termination temperature</td>
<td>-50÷50°C/-88÷122°F</td>
<td>8.0 °C / 46°F</td>
</tr>
<tr>
<td>id</td>
<td>Interval between defrost cycles</td>
<td>0 ÷ 99 hours</td>
<td>6</td>
</tr>
<tr>
<td>Md</td>
<td>Maximum length for defrost</td>
<td>0 ÷ 99 min.</td>
<td>30</td>
</tr>
</tbody>
</table>
### TEMPERATURE PRESSURE CHART - at sea level

To determine subcooling for R-404A use **BUBBLE POINT** values (Temperatures above 50°F — Gray Background); to determine superheat for R-404A, use **DEW POINT** values (Temperatures 50°F and below).

- **= exceeds critical temperature**

#### Vacuum-Inches of Mercury

**Bold Italic Figures**

<table>
<thead>
<tr>
<th>TEMPERATURE (°F)</th>
<th>REFRIGERANT (SPORLAN CODE)</th>
<th>TEMPERATURE (°F)</th>
<th>REFRIGERANT (SPORLAN CODE)</th>
<th>TEMPERATURE (°F)</th>
<th>REFRIGERANT (SPORLAN CODE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>60.0</td>
<td>134a (J)</td>
<td>20.4</td>
<td>220</td>
<td>134a (J)</td>
</tr>
<tr>
<td>115</td>
<td>58.8</td>
<td>404A (S)</td>
<td>18.2</td>
<td>215</td>
<td>404A (S)</td>
</tr>
<tr>
<td>110</td>
<td>57.6</td>
<td>507 (P)</td>
<td>16.0</td>
<td>210</td>
<td>507 (P)</td>
</tr>
<tr>
<td>105</td>
<td>56.5</td>
<td>717 (A)</td>
<td>13.8</td>
<td>205</td>
<td>717 (A)</td>
</tr>
<tr>
<td>100</td>
<td>55.3</td>
<td>744 - CO</td>
<td>11.6</td>
<td>200</td>
<td>744 - CO</td>
</tr>
</tbody>
</table>

#### Pressure-Pounds Per Square Inch Gauge

<table>
<thead>
<tr>
<th>TEMPERATURE (°F)</th>
<th>REFRIGERANT (SPORLAN CODE)</th>
<th>TEMPERATURE (°F)</th>
<th>REFRIGERANT (SPORLAN CODE)</th>
<th>TEMPERATURE (°F)</th>
<th>REFRIGERANT (SPORLAN CODE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-60</td>
<td>-51.1</td>
<td>134a (J)</td>
<td>21.8</td>
<td>217</td>
<td>134a (J)</td>
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To determine subcooling for R-404A use **BUBBLE POINT** values (Temperatures above 50°F — Gray Background); to determine superheat for R-404A, use **DEW POINT** values (Temperatures 50°F and below).

**= exceeds critical temperature**
D1: PARTS LIST

A  Lift Glass Hardware
B  Case Top
C  Front Fixed Glass
D  Interior End Panel
E  Die Board Plex
F  Die Board
G  Front Toekick
H  Air Return
I  Product Stop
J  Insulated Drain Pan
K  Remote Bottom Deck
L  End Panel Trim
M  End Panel
N  End Toekick
O  Electrical Raceway
P  Outside Back
Q  Lower Rear Storage w/ Doors
R  Adjustable Shelf Bracket
S  Shelf Standard
T  Air Discharge
U  Insulated Lower Deck (Dome)
V  Heated Base Deck (Dome)
W  Strut
X  Sliding Rear Load Doors
Y  Top Heat (Dome)
LIMITED WARRANTY

GENERAL WARRANTY

Manufacturer’s products are warranted to be free from defects in materials and workmanship under normal use and maintenance for fourteen months from date of shipment from manufacturer (the “Base Warranty Period”). In the event of a qualifying warranty claim, a new or rebuilt part to replace any defective part will be provided without charge. The replacement part is covered under this warranty for the remainder of the applicable Base Warranty Period. In order to be eligible for warranty coverage, customer must: (i) notify Manufacturer promptly upon discovery of a warrant defect, and (ii) comply with the warranty claim procedures provided by Manufacturer from time to time.

This equipment warranty does not include labor or other costs incurred for diagnosing, repairing, removing, installing, shipping, servicing, or handling of either defective parts or replacement parts.

The warranty shall not apply:

1. To any unit or any part thereof which has been subject to accident, alteration, negligence, misuse or abuse, or which has not been operated in accordance with the manufacturer’s recommendations, or in conditions outside of Manufacturer’s specifications, or if the serial number of the unit has been altered, defaced, or removed.
2. When the unit, or any part thereof, is damaged by fire, flood, or other act of God.
3. To products that are impaired or damaged due to improper installation.
4. When installation and startup forms are not properly completed or returned within two weeks after startup.
5. If the defective part is not returned to the Manufacturer.
6. To service, maintenance or wear and tear parts (such as lights, starters and ballasts).

MODIFICATIONS TO GENERAL WARRANTY

The following sets forth certain modifications to the General Warranty for specific products of Manufacturer:

DISPLAY CASE AND SPECIALTY PRODUCTS CLEARVOYANT® LED LIGHTING

The warranty period for Clearvoyant LED lighting components within the Clearvoyant lighting system is five years from date of shipment.

REMEDY LIMITATION/DAMAGES EXCLUSION

THE REMEDY OF REPAIR OR PROVISION OF A REPLACEMENT PART WITHOUT CHARGE SHALL BE THE EXCLUSIVE REMEDY FOR ANY WARRANTY CLAIM HEREUNDER. WITHOUT LIMITING THE FOREGOING, MANUFACTURER SHALL NOT BE LIABLE UNDER ANY CIRCUMSTANCES FOR INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES, INCLUDING LOSS OF PROFIT, LABOR COST, LOSS OF REFRIGERANT OR FOOD PRODUCTS.

EXCLUSIVE WARRANTY

THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY WITH RESPECT TO THE PRODUCTS. ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED AND EXCLUDED. NO IMPLIED WARRANTY SHALL BE DEEMED CREATED BY COURSE OF DEALING OR USAGE OF TRADE. NO OTHER PERSON IS AUTHORIZED TO EXPAND OR CREATE ANY OBLIGATION GREATER THAN OR MORE EXPANSIVE THAN THE WARRANTY PROVIDED HEREIN.

Submit warranty claims to:

Hillphoenix Refrigeration & Power
Systems Division
2016 Gees Mill Road
Conyers, GA 30013
Warranty / Service
Phone: 1-833-280-5714

Hillphoenix Display Case Division
1925 Ruffin Mill Road
Colonial Heights, VA 23834
Warranty / Service
Phone: 1-833-280-5714

Hillphoenix Specialty Products Division
703 Franklin Street
Keosauqua, IA 52565
Warranty / Service
Phone: 1-833-280-5714
Warning
Maintenance & Case Care

When cleaning cases the following must be performed PRIOR to cleaning:

To avoid electrical shock, be sure all electric power is turned off before cleaning. In some installations, more than one switch may have to be turned off to completely de-energize the case.

Do not spray cleaning solution or water directly on fan motors or any electrical connections.

All lighting receptacles must be dried off prior to insertion and re-energizing the lighting circuit.

Please refer to the Use and Maintenance section of this installation manual.