

Hillphoenix®

A **DOVER**™ COMPANY



REACH-IN DOOR MERCHANDISER INSTALLATION & OPERATIONS MANUAL

ONRM

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To ensure proper functionality and optimum performance, it is strongly recommended that Hillphoenix display 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 Web site at www.hillphoenix.com.



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V1.00
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REV.	DATE	CHANGE DESCRIPTION	AUTHOR
V1.00	06/18/18	Initial manual release (new format)	T.A.G.

PRECAUTIONARY NOTICES

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 call out important messages in all Hillphoenix installation and operations handbooks with an accompanying alert symbol. All of these notices are meant to provide information about potential dangers to personal health and safety—as well as risks of case damage—if the instructions are not carefully followed.



ATTENTION!

Indicates an important point of information that is key to ensuring proper case functionality.



CAUTION!

Indicates the potential threat of injury if all instructions are not followed carefully.



DANGER!

Indicates an immediate threat of serious injury or death if all instructions are not followed carefully.

SERVICE NOTICE

To ensure proper functionality and optimum performance, it is strongly recommended that Hillphoenix display 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 Web site: 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.

P079211M, REVO

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.

GLYCOL NOTICE

For Systems Utilizing Glycol Refrigerant

Use of glycol as a secondary refrigerant must be carried out in accordance with the procedures that have been set forth in the Hillphoenix Second Nature Medium Temperature Secondary Refrigeration Installation Manual, available for download here: <http://goo.gl/JIWd77>

Additionally, Hillphoenix uses and recommends Dow glycol-based coolants, which contain specially formulated industrial inhibitors that help to prevent corrosion in our display merchandisers. Over time, the effectiveness of these inhibitors deteriorates, increasing the chance for corrosion. We recommend testing of glycol solutions annually through the Dow lab. The service is free for systems containing over 250 gallons of glycol coolants, while the cost is approximately \$100 for smaller systems. For more information, see Dow's DOWFROST and DOWFROST HD Guide here: <http://goo.gl/v6i1iQ>



CAUTION!

Under no circumstance 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 refrigeration system.

Thank you for choosing Hillphoenix display cases for your food merchandising needs. This handbook contains important technical information and will assist you with the installation and operation of your new display cases. By closely following the instructions, you can expect attractive fit and finish, peak performance, and long case life.

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

CASE DESCRIPTION

ONRM Reach-in door Fresh Meat merchandisers.

ELECTRICAL DATA & DIMENSIONAL DRAWINGS

Electrical data and dimensional drawings for the cases listed in this manual can be found in **Appendices A–D**.

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 (CRMA 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.

RECEIVING CASES

Examine fixtures carefully and in the event of shipping damage and/or shortages, please contact the Service Parts Department at 1-800-283-1109.

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.

LOST/MISSING ITEMS

Hillphoenix equipment is carefully inspected before shipping 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.

SERVICE/TECHNICAL SUPPORT

For service or technical questions, please contact our Case Division Customer Service Department at 1-800-283-1109. For questions regarding our refrigeration systems or electrical distribution centers, please contact our Systems Division Customer Service Department at 1-770-388-0706.

PARTS ORDERING

If you need to contact Hillphoenix regarding specific fixtures or parts, please call 1-800-283-1109 and ask for a Service Parts Representative. 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

**Serial plate is located inside the case on the top-left side.*

If the parts are to be returned for credit, ask the Parts Department to furnish you with a Return Material Authorization Number.



See **Appendix H** for a detailed parts list and illustration.

Hillphoenix
1925 Ruffin Mill Rd.
Colonial Heights, VA 23834
Mon.-Fri. (8 a.m to 5 p.m EST)
Tel: 1-800-283-1109
Fax: 804-526-7450
Web site: www.hillphoenix.com

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. Leveling is necessary to ensure proper case alignment and to avoid potential case damage. 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.
4. Locate basehorse positions along the chalk line. Spot properly leveled shim packs at each basehorse location. For narrow cases - ONRM, ONRB & ONRBH place shim packs under both the basehorses and kickplate supports (Fig. 1).

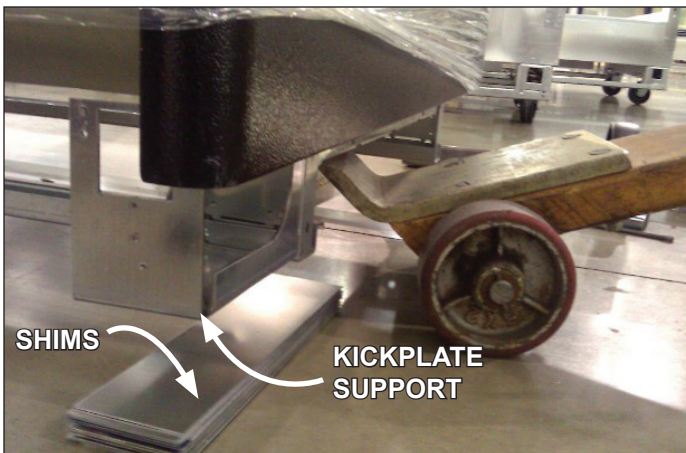


Fig. 1 Kickplate support

LINE-UP & INSTALLATION

Single Case

1. Roll the case into position, leaving a minimum of 2" between the wall and back of case. Using a "J" bar, raise the end of the case (under cross support), remove the caster assemblies (Fig. 2) and lower the basehorse on to the shim packs. Repeat at other end.



CAUTION!

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

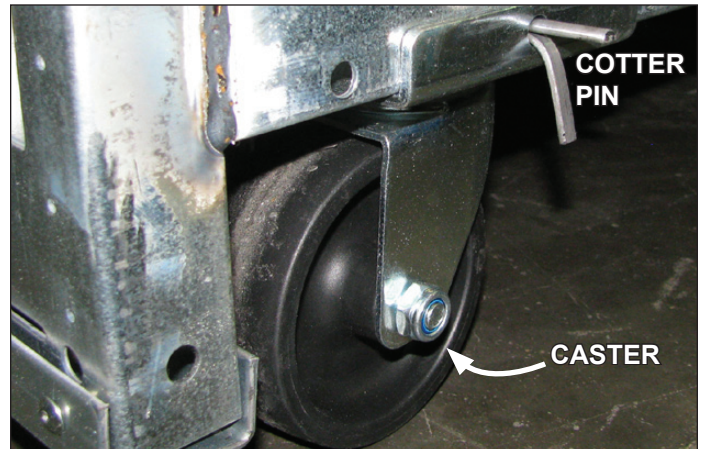


Fig. 2 Removing the casters is an easy process. Simply flatten and remove the cotter pins that are holding the casters in place. Then lift the case with a "J" bar and slide the caster assemblies out. The dismantled casters can now be discarded.

2. Once the basehorse is properly placed on the shim packs, check the horizontal level by placing a bubble level on the front sill. For the vertical plumb, repeat this process by placing the bubble level on the case frame. Add/remove shim packs as needed. **NOTE: DO NOT use doors as plumb reference; doors have a designed setback. Use case frame for measurement.**

Multi-Case

1. Remove shelves and discard the shelf clips.
2. Remove any loose items (shipping braces, mirror assemblies, etc.) from the cases that may interfere with case joining. **Keep all loose items as they will be used later in the installation process.**
3. Remove the return air grill at the case joint. The grill lifts out without fasteners and may be easily removed to gain clear access to the case-to-case joining bolts.
4. Follow the single-case installation instructions for the first case, then position the next case in the line-up approximately 3' away. Apply the foam tape gasket (supplied) and beads of butyl or silicone sealant to one of the adjoining case ends (Fig. 3). Remove the caster assemblies.
5. When the last casters are removed, pipe-rollers may be used to help move the case. While the case is still in a raised position, position the pipe-roller(s) near an interior vertical support of the baseframe assembly, then lower the case onto the pipe-roller(s). Be certain that both the front and back baserails are resting on the pipe-roller(s), since failure to do so may result in case damage.
6. Push the case to within 3-4 inches of the adjoining case. Once the case is properly positioned, lift it at the opposite end with the "J" bar in order to remove the piperoller(s).

7. Push the cases tightly together, then lightly bolt them together through the holes that are provided (Fig. 3). Tighten all the joining bolts until all margins are equal. Be careful not to over tighten.
8. Repeat steps 2-6 of this sequence for all remaining cases. Be certain to properly level all cases.
9. If seismic brackets were ordered, see **Appendix J** for detailed installation instructions.

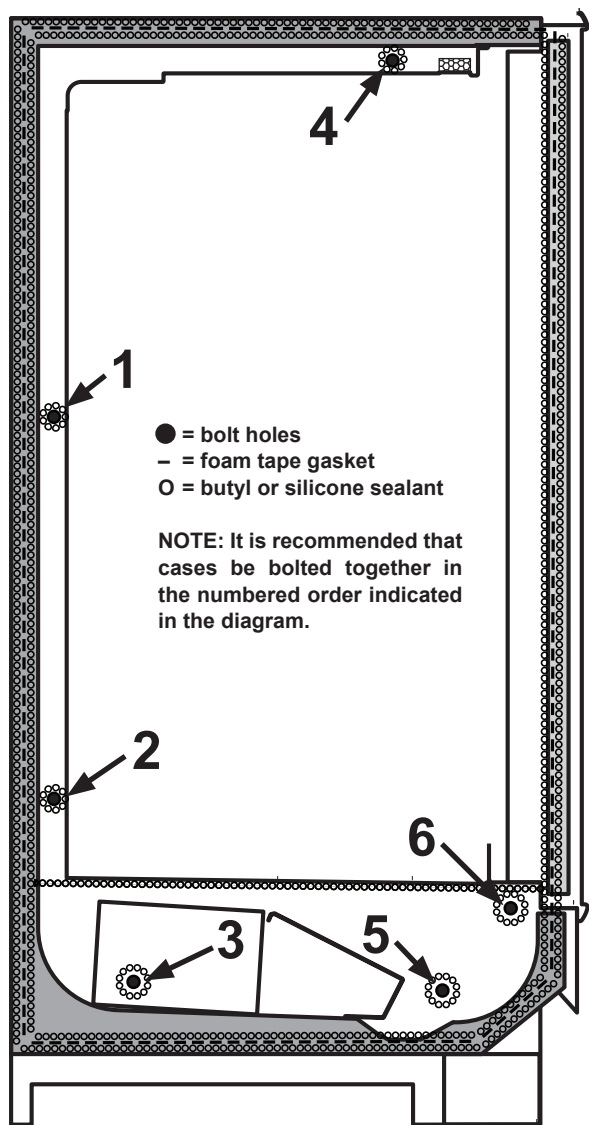


Fig. 3 Bolt holes, foam tape gasket and sealant

TRIM OUT

1. To align the master bumpers, install the master bumper joint trim in between adjoining master bumpers. (Fig. 4). Slide the master bumpers left or right to close the seams as required, working outwards from the center of the line-up to the ends.
2. Close the seam where the bumper joins the case end. The bumper joint closes the seam that may develop

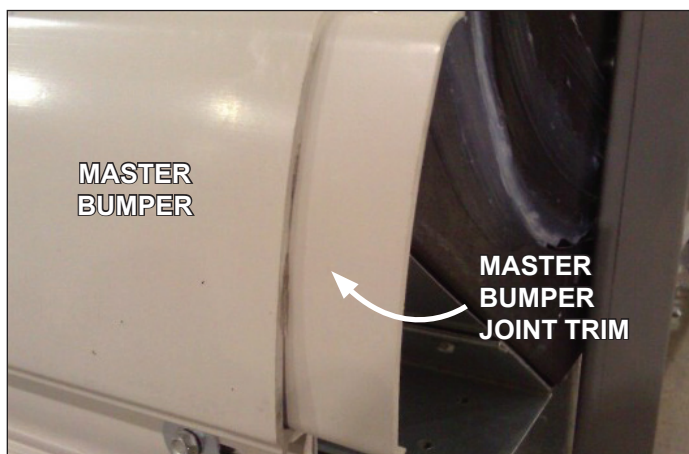


Fig. 4 Master bumper and joint trim

if the master bumper is moved away from the end to close the case-to-case joint seam.

3. Seal the interior case-to-case joints with caulk (supplied), then apply acrylic tape (supplied) over the pipe-chase seam (Fig. 5). The tape acts as a watershed preventing water from settling in the case joint.
4. If the case has a Streamlyne bumper (Fig. 6), the bumper will be shipped loose in the case. Before install-

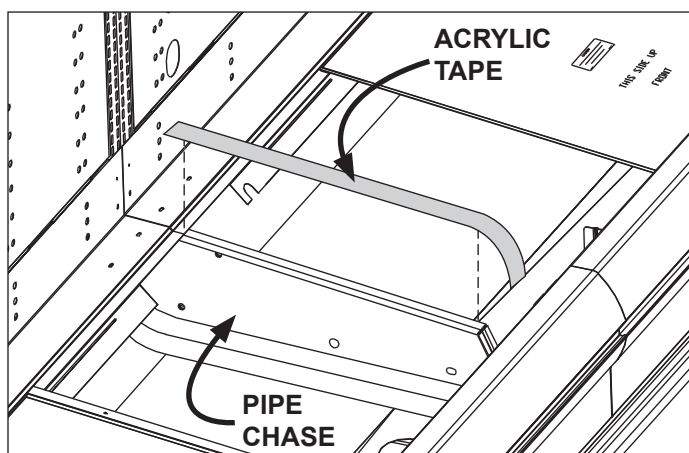


Fig. 5 Sealing the pipe chase

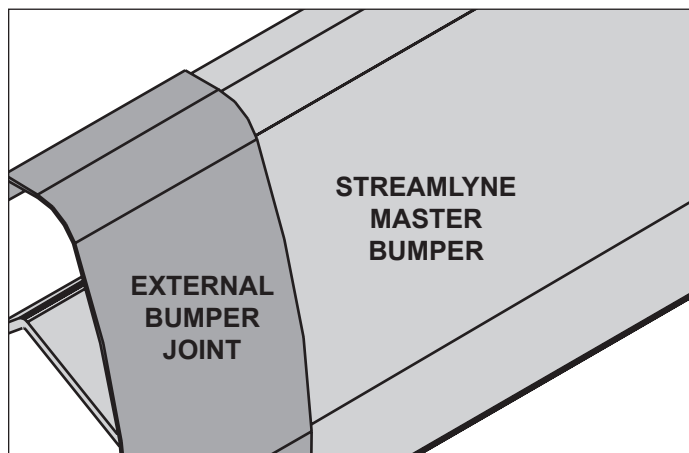


Fig. 6 Streamlyne master bumpers and joint trim

ing on the case, install the external bumper joint on the Streamlyne bumper. Simply slide the joint over the bumper for either case-to-case or case-to-end joints.

5. Place the hook of the Streamlyne bumper on the lip of the master bumper bracket and rotate the bumper down while pushing it in (Fig. 7). When the top edge of the bumper has slipped under the color band, be certain that it is pushed in as far as it will go.

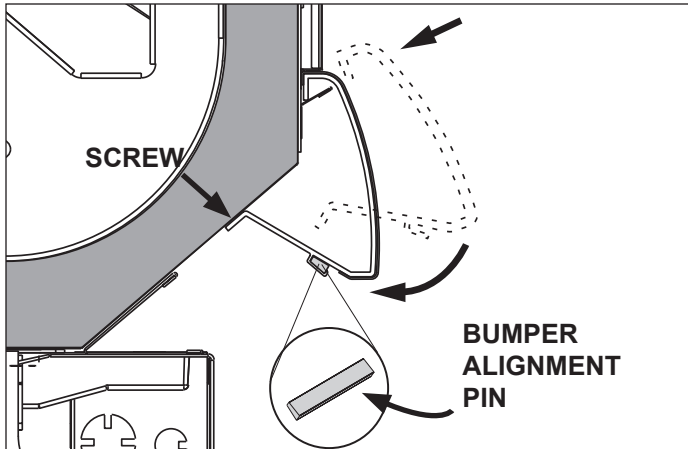


Fig. 7 Streamlyne bumper alignment pin

6. Attach the bumper to the tank with the screws provided. Insert the bumper alignment pin into the underside of the bumper to align it to the bumper on the next case.
7. If non-insulated acrylic partitions are included, see **Appendix L** for installation instructions.
8. Re-install shelves (or peg hook assemblies if applicable). Be aware that differing shelf configurations will affect energy consumption and case performance. If peg hook assemblies are included, see **Appendix K** for installation instructions.



Fig. 8 Front panel joint trim

9. Properly align the front panels as needed, then install the front panel trim (Fig. 8).
10. Fasten the door-frame joints to the adjoining door frames using the supplied T-bolts.

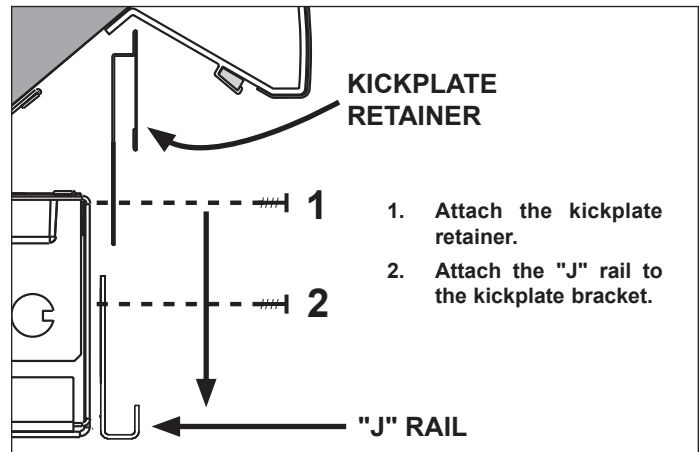


Fig. 9 "J" rail installation

11. Using the screws provided, install the upper kickplate retainer and the "J" rail, both of which are shipped loose in the case (Fig. 9). The kickplate brackets are pre-installed at the factory.
12. Insert top of kickplate into the kickplate retainer. Slide the kickplate up into the retainer, then down onto the "J" rail (Fig. 10). Be certain that the bottom of the kickplate is fitted over extruding "lip" of the "J" rail.

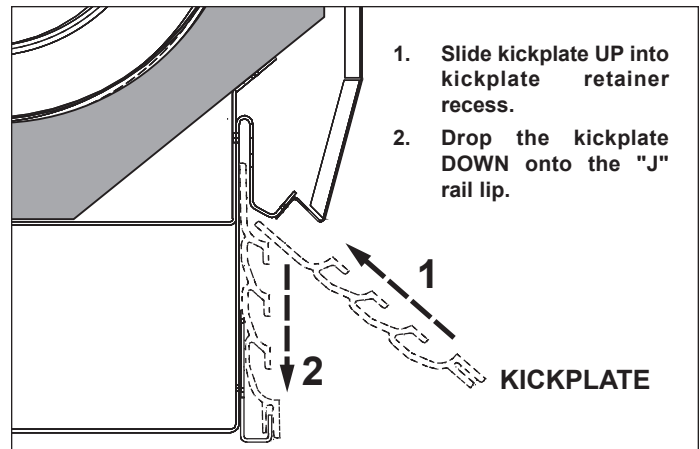


Fig. 10 Kickplate installation

13. Install end kickplates with screws provided and insert plug buttons.
14. Insert nose bumper into master bumper channel. Roll nose bumper into channel along entire lineup, up to 96'. We recommend leaving an additional 6" of nose bumper at the ends to allow for shrinkage during the first 24-48 hours following case start-up.
15. 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.
16. If case top fascia is included, see **Appendix G** for installation instructions. If electronic display modules are included, see **Appendix M** for installation instructions.

REFRIGERATION

There are three available refrigeration piping options: standard, rear, and top-piping.

Standard piping penetration is located at the front-right area of the case, fully visible in front of the fan plenum. Rear piping penetration is located at the rear-right area, consisting of a pre-cut access punch-out, exposing the foam material that must be penetrated prior to pipe joining (Fig. 11). If top piping is utilized, piping stub-outs are located at the top-back-right of the case.

The expansion valve and other controls are located on the left-hand side of the case and are accessible by lifting the left-hand deck pans—lifting the fan plenum is not required.

Before operating the case, be certain to remove the shipping blocks (Fig. 12) that protect the refrigeration lines during shipping. If it becomes necessary to penetrate the case tank in any area, be certain to seal any open gaps afterwards with canned-foam sealant and white RTV.

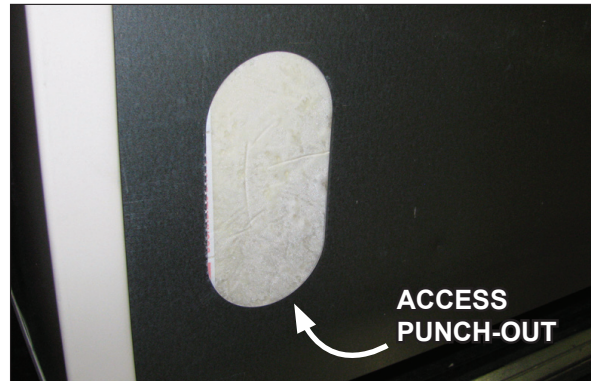


Fig. 11 Penetrate foam as needed to access piping

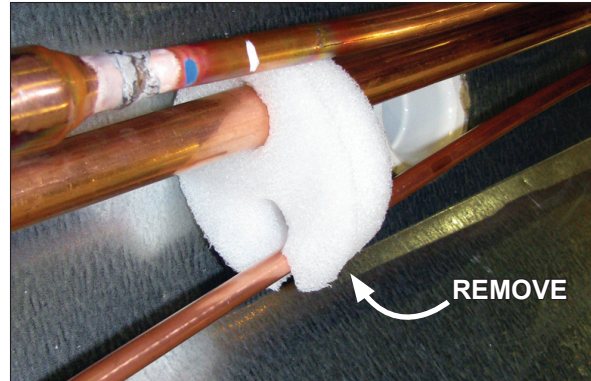


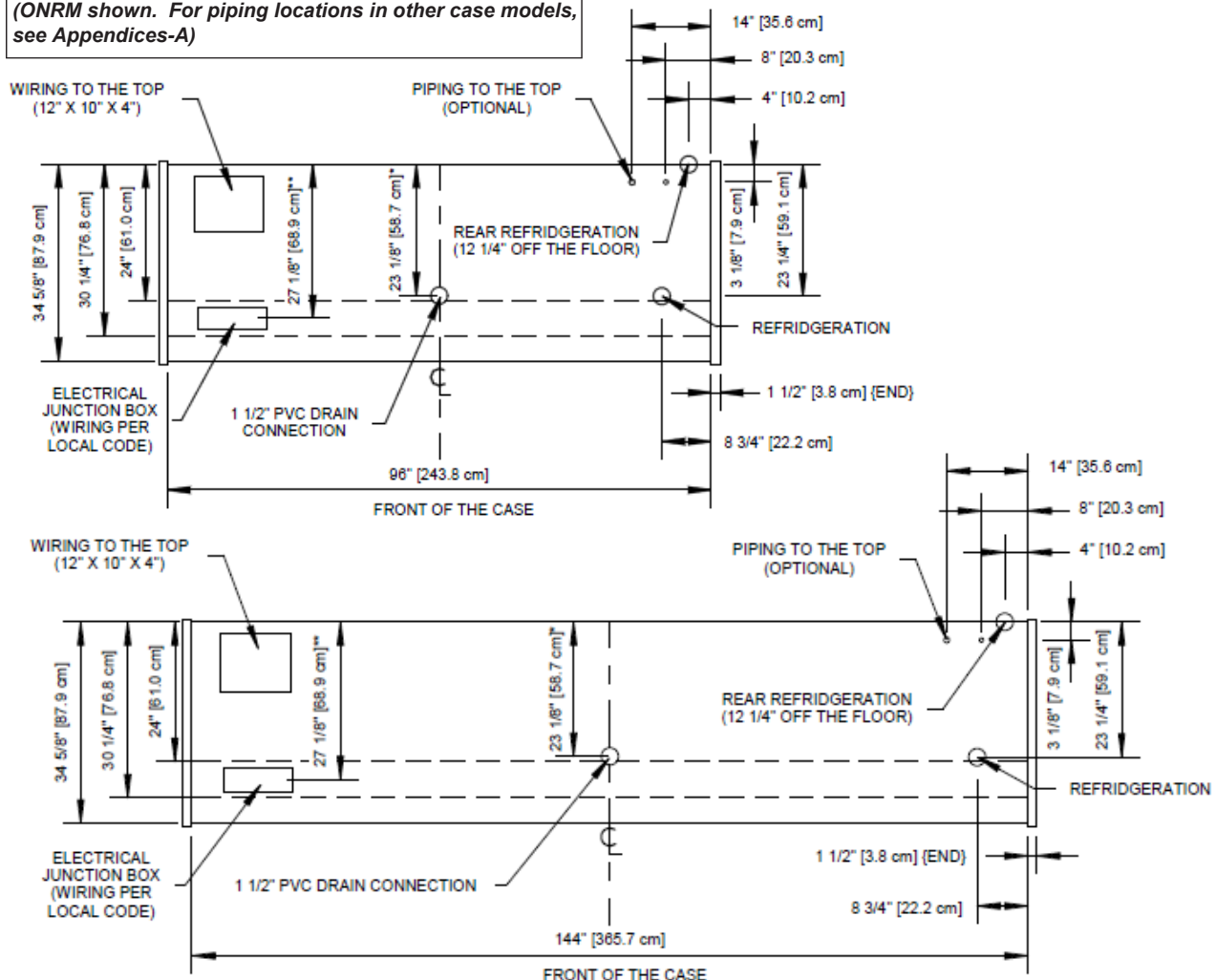
Fig. 12 Remove the shipping blocks

**ATTENTION!**

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

ONRM

(ONRM shown. For piping locations in other case models, see Appendices-A)



PLUMBING

The drain outlet is specially molded out of PVC material and is located in the front-center of the case for convenient access. The "P" trap, furnished with the case, is constructed of schedule 40 PVC pipe (Fig. 13). Care should be given to ensure that all connections are water-tight and sealed with the appropriate PVC or ABS cement.

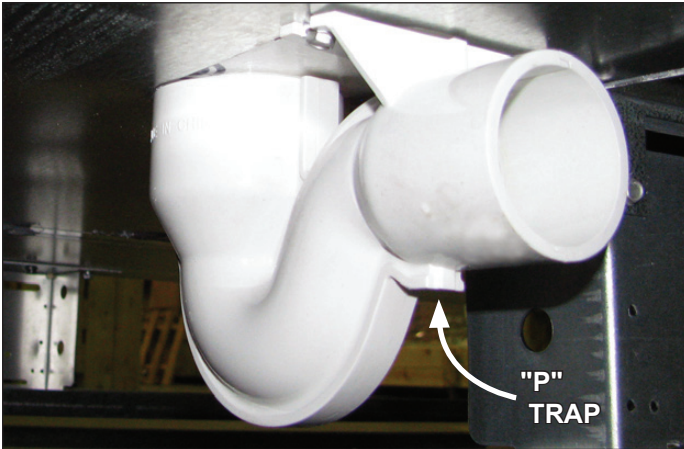


Fig. 13 "P" trap

The drain lines can be run left or right of the tee with the proper pitch to satisfy local drainage requirements. Since the kickplate is shipped loose with the case, you should have open access to the drain line area during installation.

If the kickplate has been installed, you will find it very easy to remove. Simply lift the kickplate up from the "J" rail and pull it out, away from the case (see **Trim Out** section).

ELECTRICAL

Electrical hookups are made to a junction box located either at the bottom-front-left of the case (Fig. 14), at the top-rear-left of the case (Fig. 15) or to the raceway running along the bottom-front of the case.

For case-to-case wiring, run conduit between the junction boxes or run wiring through the raceway. When connecting to the junction box on the bottom-left side of the case, field wiring should exit box from the right side (furthest away from case wiring) to allow more room inside for wiring connections. For more detailed electrical wiring information, see **Appendix E**.

LIGHTING

ONRM case does not feature vertical lights on the frames. Shelf lights (4 rows) on 18" shelves and a horizontal canopy light is a standard offering. For any questions or service needs, please contact Case Division Customer Service Department toll-free at 1-800-283-1109.



Fig. 14 Junction box beneath case

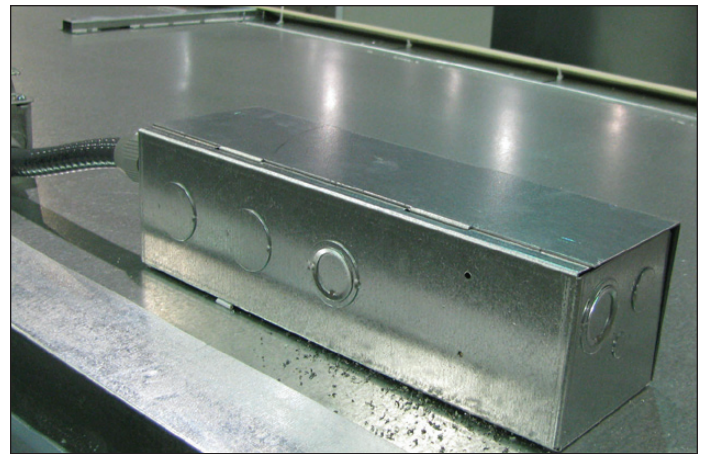


Fig. 15 Junction box beneath case



ATTENTION!

Be certain to clear the case of any loose packaging or case materials before energizing the case. Failure to do so may result in case damage or malfunction.



ATTENTION!

Be certain that all piping and electrical connections comply with local codes.

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. 2)**
- ☐ **Have you removed and discarded the casters? (see pg. 3)**
- ☐ **Have you checked the vertical plumb of the case? The horizontal level? (see pg. 3)**
- ☐ **Have you applied the foam tape gasket and sealant between adjoining cases? (see pg. 3)**
- ☐ **Have you sealed the case-to-case joints by applying caulk and acrylic tape to the pipe-chase seam? (see pg. 4)**
- ☐ **Have you removed the shipping blocks from the refrigeration lines? (see pg. 6)**
- ☐ **Have you sealed any tank penetrations? (see pg. 6)**
- ☐ **Have you cleared the case of any loose packaging or case materials? (see pg. 7)**

AIR FLOW & PRODUCT LOAD

It is important that you do not overload the food product display so that it impinges on the air flow pattern—overloading will cause malfunction and the loss of proper temperature levels, particularly when discharge and return air sections are covered. Please keep products within the load limit line shown on the diagram below (Fig.16).

DEFROST & TEMPERATURE CONTROLS

ONRM case utilizes timed-off defrost. The primary components used for the defrost cycle are the various defrost termination sensors, which work to terminate the defrost cycle in the case. These controls may include 1) a Klixon® thermostat, 2) a sensor probe, or 3) a dial-type thermostat with sensor bulb (the thermostat will always be mounted with the electrical controls of the case - i.e. in the electrical junction box, in the electrical raceway, etc.).

In a timed-off defrost, the refrigeration cycle is simply turned off by the case controls for a specified amount of time; therefore, there are generally no active defrost components utilized.

The discharge air probe monitors the temperature of the discharge air and may be used as the defrost termination sensor. The probe can generally be found behind the rear baffle, in the upper baffle, or in front of the honeycomb. NOTE: if the discharge air probe is used for defrost termination, none of the termination sensors listed earlier will be installed in the case.

For more detailed information on suggested defrost times and settings, see **Appendices A–D**. Further adjustments may be required depending on store conditions.



ATTENTION!

To insure optimal operation of the door and frame system, a constant 120V supply be used to power the electrical circuits. Cycling the input voltage will adversely impact case performance.

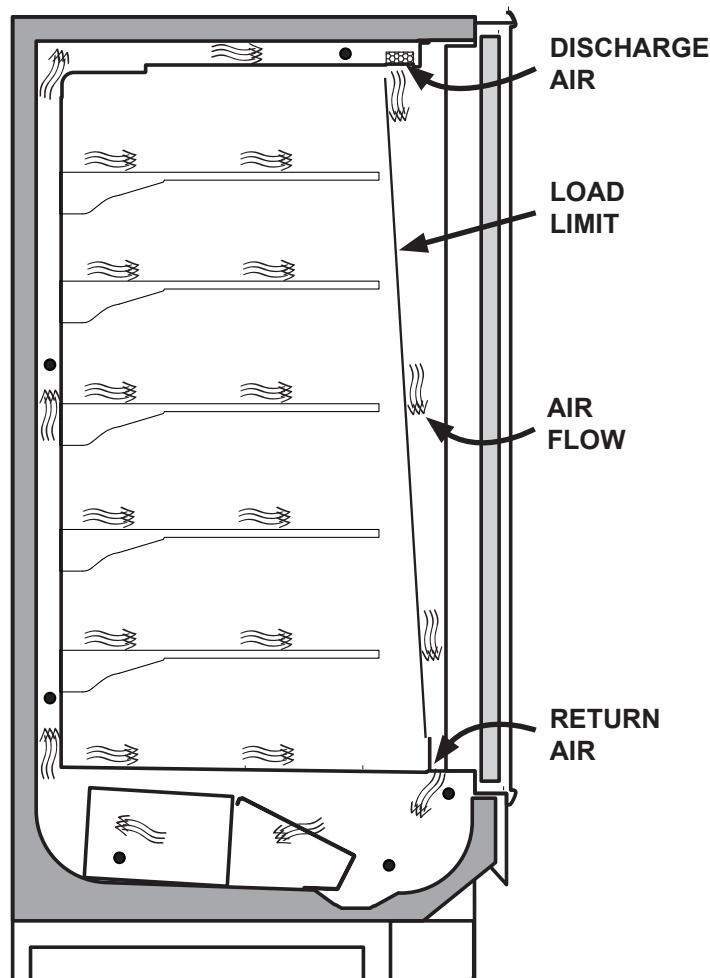


Fig. 16 Airflow

DETERMINING SUPERHEAT

To identify the correct superheat settings, complete the following steps:

1. Obtain suction pressure from the access port. Obtain suction line temperature from the area near the TXV bulb at the outlet of the evaporator coil (Fig. 17).
2. Using the suction pressure reading and the Sporlan® temperature-pressure chart (**Appendix F**), convert pressure-to-temperature.
3. Finally, subtract the converted temperature reading from the actual temperature reading. The resulting number is the superheat setting—once this has been determined, adjust the TXV as needed to obtain the proper setting.

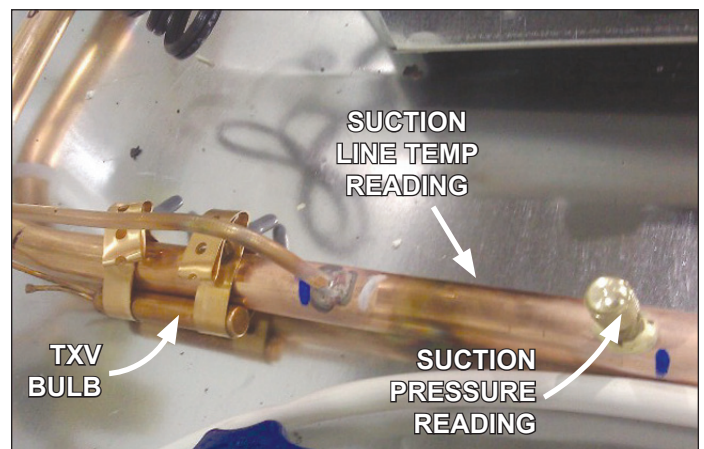


Fig. 17 Obtain pressure and temperature readings



DANGER!

SHOCK HAZARD

Always disconnect power to case when servicing or cleaning. Failure to do so may result in serious injury or death.

FANS

Reach-in door cases feature electronically commutated (ECM) fan motor assemblies, whereby the fan blade, fan motor, and basket are integrated into a single unit.

MODULES

Fan assemblies may be changed with an easy two-step process without lifting up the plenum, thereby avoiding the necessity to unload the entire product display to change the fan assembly:

1. Unplug the fan motor (Fig. 18) from the receptacle on the exterior of the fan plenum. Push the power cord back through the plenum opening.
2. Remove fasteners, then lift out the entire fan basket.

(Reverse procedure when re-installing fan assembly.)

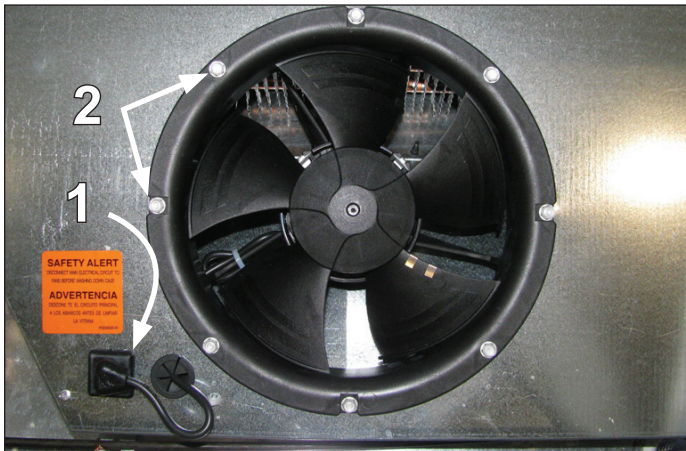


Fig. 18 Fan basket



ATTENTION!

Power cord must be pushed back through the plenum opening before removing the fan basket. Failure to do so may result in damage to the power cord.

CLEANING PROCEDURES

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.

- 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 and other debris to the waste outlet. Check waste outlet before starting the cleaning process to insure it is unclogged. Avoid introducing water faster than the case drain can carry it away.
- Lift the fan plenum to gain access to the coil for cleaning and maintenance (Fig. 19).

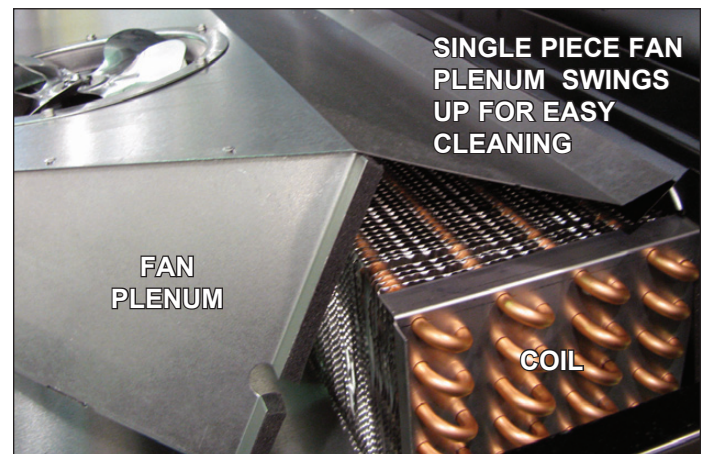


Fig. 19 Single-piece fan plenum and coil cover



CAUTION!

Exercise extreme caution when working in a case with the coil cover removed. The coil contains many sharp edges that can cause severe cuts to the hands and arms.

- To clean the lights, shut off the lights in the case, then wipe them down with a soft, damp cloth. Avoid using harsh or abrasive cleaners as they may damage the lights. Be certain that the lights are completely dry before re-energizing.
- 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 cleaning solutions directly on electrical connections.
- Allow cases to be turned off long enough to clean any frost or ice from coil and pans.
- Remove kickplate 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.

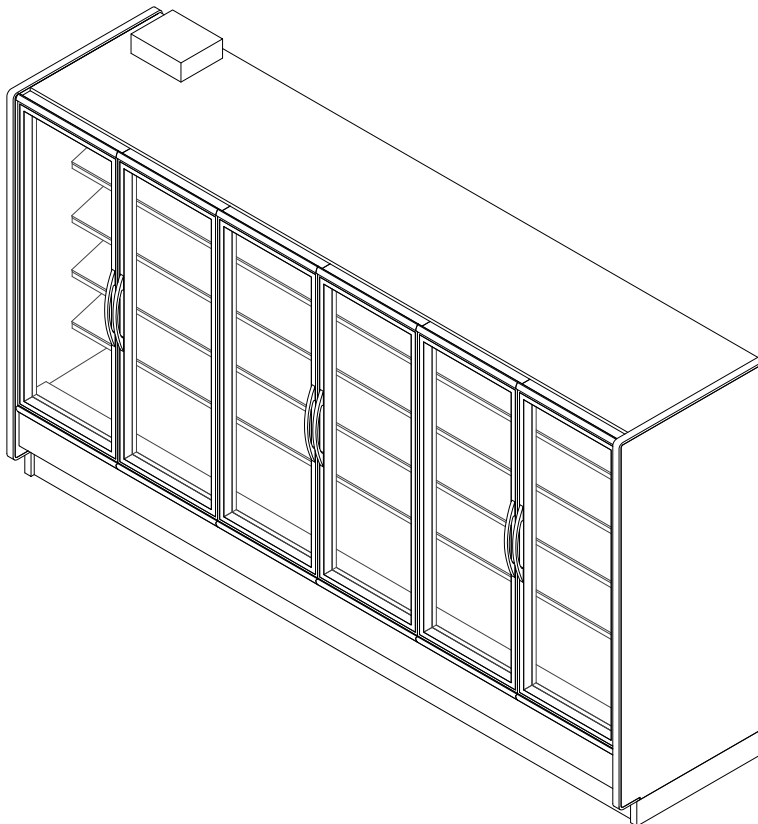
A	ONRM OPERATING DATA & CASE DIMENSIONS
B	ELECTRICAL WIRING
C	SPORLAN PRESSURE-TEMPERATURE CHART
D	CASE TOP FASCIA
E	PARTS LIST
F	SEISMIC BRACKETS
G	NON-INSULATED ACRYLIC PARTITIONS

ONRM

Narrow Reach-In Merchandiser
4', 6', 8' & 12' (Meat)

GENERAL NOTES

- 4ft cases consist of 2 (24") doors.
- 8ft cases Bi-swing consist of 4 (24") doors.
- 12ft cases Bi-swing consist of 6 (24") doors.
- Door frames are heated. Doors are not heated.
- Lighting controls - occupancy sensors are required.
OPTION 1: OEM Provided: Lighting controls (on/off) are standard unless otherwise specified.
OPTION 2: END User Provided: Lighting controls should be based on occupancy sensors.



SHIPPING WEIGHT	
Case	Weight
ONRM	1000 to 2000 LBs



COMPONENT

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 REQUIREMENTS.

ONRM

Rev Date:	Rev #	Revision Description:
4-16-18	2	NEW STANDARDS
12-1-17	1	DOE 2017

Hillphoenix
A DOVER COMPANY

ELECTRICAL DATA			
Case Length	Fans Per Case	High Efficiency Fans	
		120 Volts	
		Amps	Watts
4'	2	0.43	52
6'	2	0.43	52
8'	3	0.66	79
12'	4	0.88	106

LIGHTING DATA						
Case Length	Lights Per Row	Light Length	Clearvoyant v4 Lighting (Per Light Row)			
			Standard Power (Cornice or Shelf)		High Power (Cornice Only)	
			120 Volts		120 Volts	
			Amps	Watts	Amps	Watts
4'	1	4'	0.05	5.9	0.12	14.9
6'	2	3'	0.08	9.4	0.20	23.8
8'	2	4'	0.10	11.8	0.25	29.9
12'	3	4'	0.15	17.6	0.37	44.8

GUIDELINES & CONTROL DATA								
Case Length	Application	Size Door	BTUH/Door		Evaporator (°F)	Superheat Set Point @ Bulb (°F)	Discharge Air (°F)	Discharge Air Velocity (FPM)
			Conventional	Parallel				
4',6',8',12'	Meat	24"	510	480	28	6 - 8	32	380

ANTI-CONDENSATE DATA					
Case Length	Size Door	Anthony			
		I90		Vista-C/I60	
		120 Volts		120 Volts	
		Amps	Watts	Amps	Watts
4'	24"	0.24	28.2	0.44	52.2
6'	24"	0.41	49.2	0.58	69.6
8'	24"	0.47	56.4	0.68	81.6
12'	24"	0.71	84.6	0.93	111.6

DEFROST CONTROLS		
Defrosts Per Day	Timed-Off Defrost	
	Fail-Safe (Min)	Termination Temp (°F)
	2	30
		42

NOTES

- "—" indicates that the feature is not an option with this case model.
- Listed discharge air velocity represents the average velocity at the peak of defrost.
- Temperature and defrost settings listed above are recommended start-up settings. Final operational settings may need to be adjusted for the store conditions in which the case operates.
- The recommended evaporator temperatures may need to be adjusted based on system setup, store conditions, etc. The minimum recommended evaporator temperature is 4°F below the listed evaporator temperature.
- Light wattages above reflect 100% run time. To acquire DOE representation, reduce the light wattage by 42% at 75°F/55%RH.



COMPONENT

ONRM

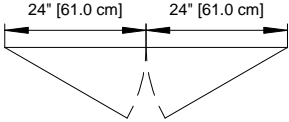
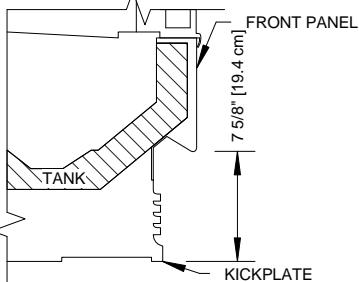
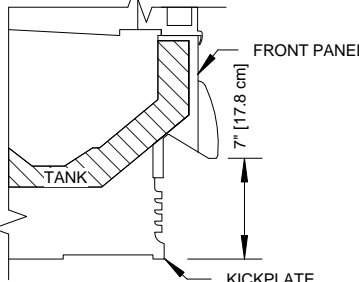
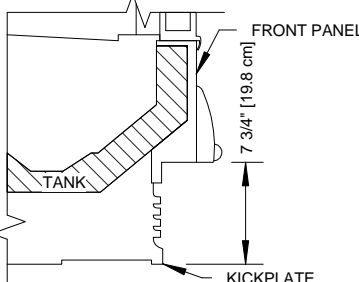
ALL MEASUREMENTS ARE TAKEN PER ASHRAE-72-2005 SPECIFICATIONS. HILLPHOENIX REFRIGERATED DISPLAY CASES FOR SALE IN THE UNITED STATES MEET OR EXCEED DEPARTMENT OF ENERGY 2017 REQUIREMENTS.

Rev Date:	Rev #	Revision Description:
4-16-18	2	NEW STANDARDS
12-1-17	1	DOE 2017



ONRM

Narrow Reach-In Merchandiser
4', 6', 8' & 12' (Meat)

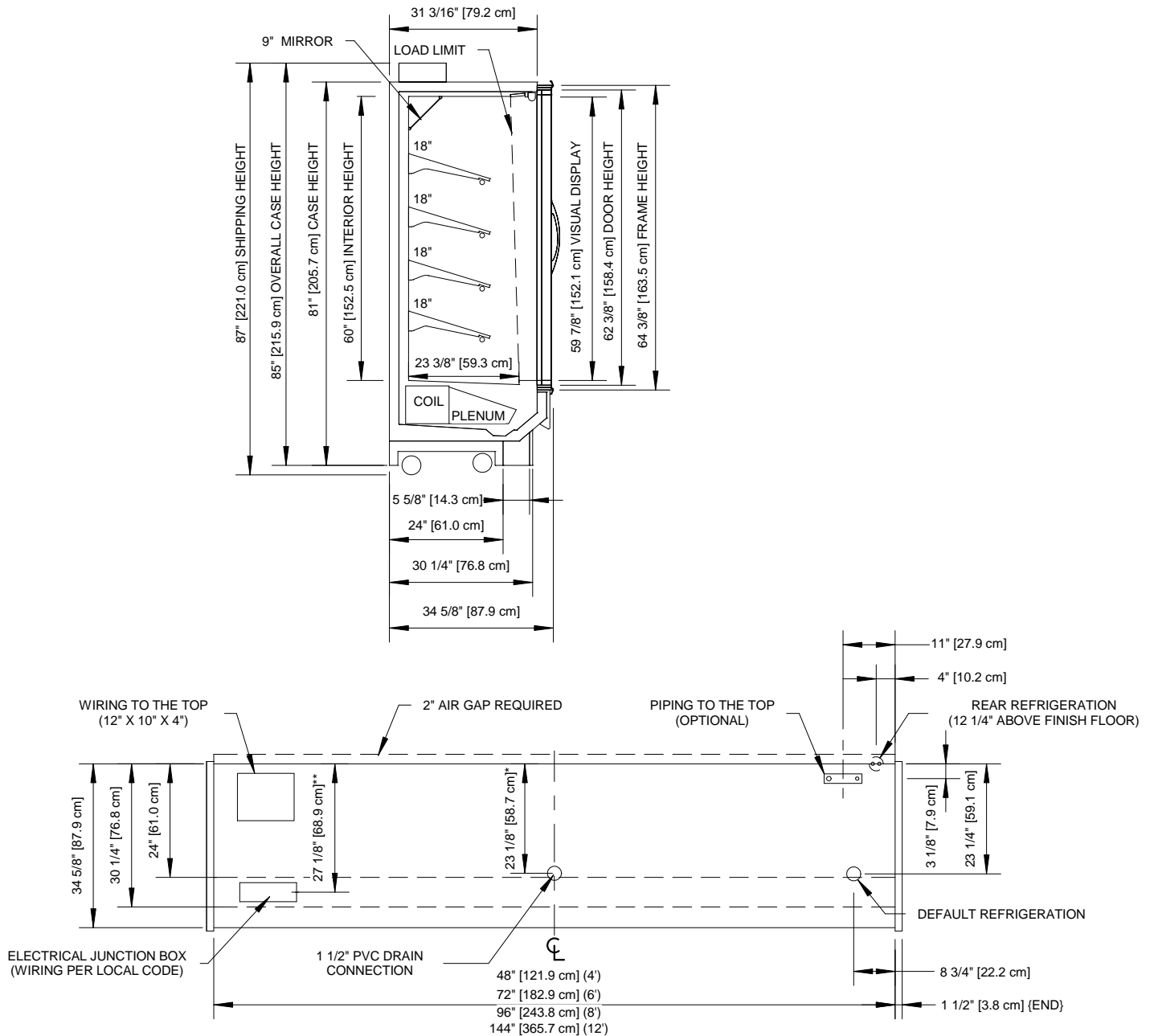
DOOR OPTIONS	FRONT OPTIONS
<p>BI-SWING DOOR 4, 8' & 12' CASES</p> 	<p><u>FLAT FRONT (O SERIES)</u></p> 
	<p><u>STREAMLINE BUMPER</u></p> 
	<p><u>HALF BUMPER</u></p> 

NOTES

- Option available: High power lights

ONRM

Rev Date:	Rev #	Revision Description:
4-16-18	2	NEW STANDARDS
12-1-17	1	DOE 2017

**NOTES**

* : STUB-UP AREA.

** : RECOMMENDED STUB-UP CENTERLINE FOR ELECTRICAL AND HUB DRAINS.

- Ends add approximately 1" to the case height, 1/2" to the back & 1" to the front.
- Back panels add approximately 1" to the rear of the case.
- Top canopy LED lights.



COMPONENT

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 REQUIREMENTS.

ONRM

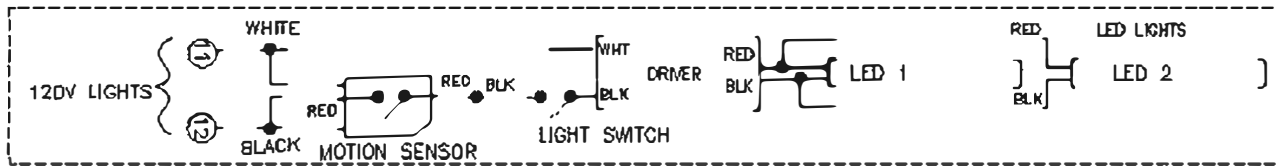
Rev Date:	Rev #	Revision Description:
4-16-18	2	NEW STANDARDS
12-1-17	1	DOE 2017

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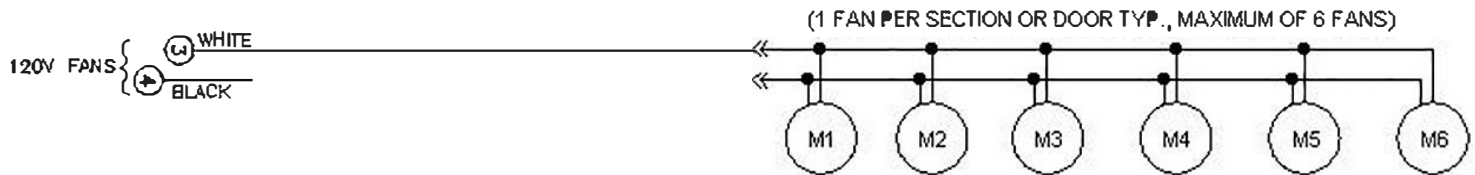
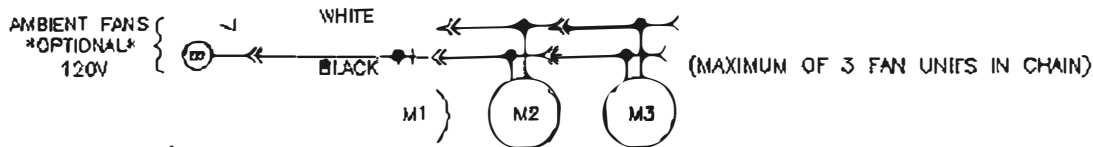
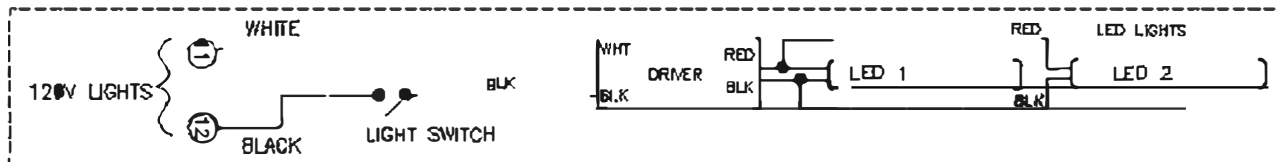
WIRING IDENTIFICATION

<div>ATTENTION ELECTRICIAN</div> <div>:FOR SAFETY AND CODE COMPLIANCE GROUND FIXTURE AT TIME OF INSTALLATION</div> <div>:CAUTION</div> <div>RISK OF ELECTRIC SHOCK. MORE THAN ONE POWER-SUPPLY. DISCONNECT ALL POWER-SUPPLIES BEFORE SERVICING.</div> <div>P901598E - R4</div>	WIRE IDENTIFICATION	BLACK	WHITE	BLUE	RED	YELLOW	PURPLE	ORANGE	GREEN
	DEFROST HEATERS (1-PHASE)	1,2							
	DEFROST HEATERS (3-PHASE)	L1		L3	L2				
		14	13						
	ANTI-CONDENSATE HEATERS	16	15						
		18	17						
	AISLE WARMER	10	9						
	DRAIN HEATER	36	37						
	PRIMARY FANS	4	3	40					
	SECONDARY FANS	6	5						
	AMBIENT FANS	8	7						
	LIGHTS	12	11						
	BELL	60,62							
	TEMPERATURE CONTROL					19,20			
	DEFROST TERMINATION CONTROL	22					21	23	
	DEFROST SAFETY CUT-OUT CONTROL	28					27	29	
	LIQUID LINE SOLENOID					30	31		
	SUCTION LINE SOLENOID					38	39		
	CASE/CONTROLLER POWER	42	41						
	TRANSFORMER	24	25						
	CAPACITOR	34		35					
	RECEPTACLE	32	33						75
	SYSTEM NEUTRAL (3-PHASE)		N						
	POWER CORD (SELF-CONTAINED)	58	57						
	SERVICE LIGHT (HI-PRESSURE)	53,54							
	HIGH PRESSURE SWITCH			49,50					
	DUAL PRESSURE SWITCH	51,52							
	CONDENSING UNIT POWER	48	47		44 220V				
	CONDENSING UNIT FAN		45	46					
	IG RECEPTACLE	26	43						77
	GFIRECEPTACLE	56	55						79
	HUMIDIFIER	70	71						
	REFRIGERATED PAN SOLENOID	65 220V	65				64		
	REFRIGERATED PAN BYPASS SOLENOID	67 220V	67	66					
	AIR HEATER DEFROST SOLENOID	69 220V	69					68	
	MAIN SECONDARY FLUID SOLENOID	73 220V	73		72				
	AIR DEFROST FAN	74	59						
	SECONDARY COOLANT PUMP	76	61						
	TANK FLUSH SOLENOID	87 220V	87			88			86
	MISTING SOLENOID	89 220V	89			90			
	Drip DOWN TIMER								
	REAR STORAGE BOX FANS	94	95						
	GROUND TO EXTERIOR/FRAME								81
	GROUND TO INTERIOR LINER								83
	GROUND TO JUNCTION BOX								85
	GROUND TO LIGHTS								97

OPTIONAL MOTION SENSOR LIGHTING CONTROL



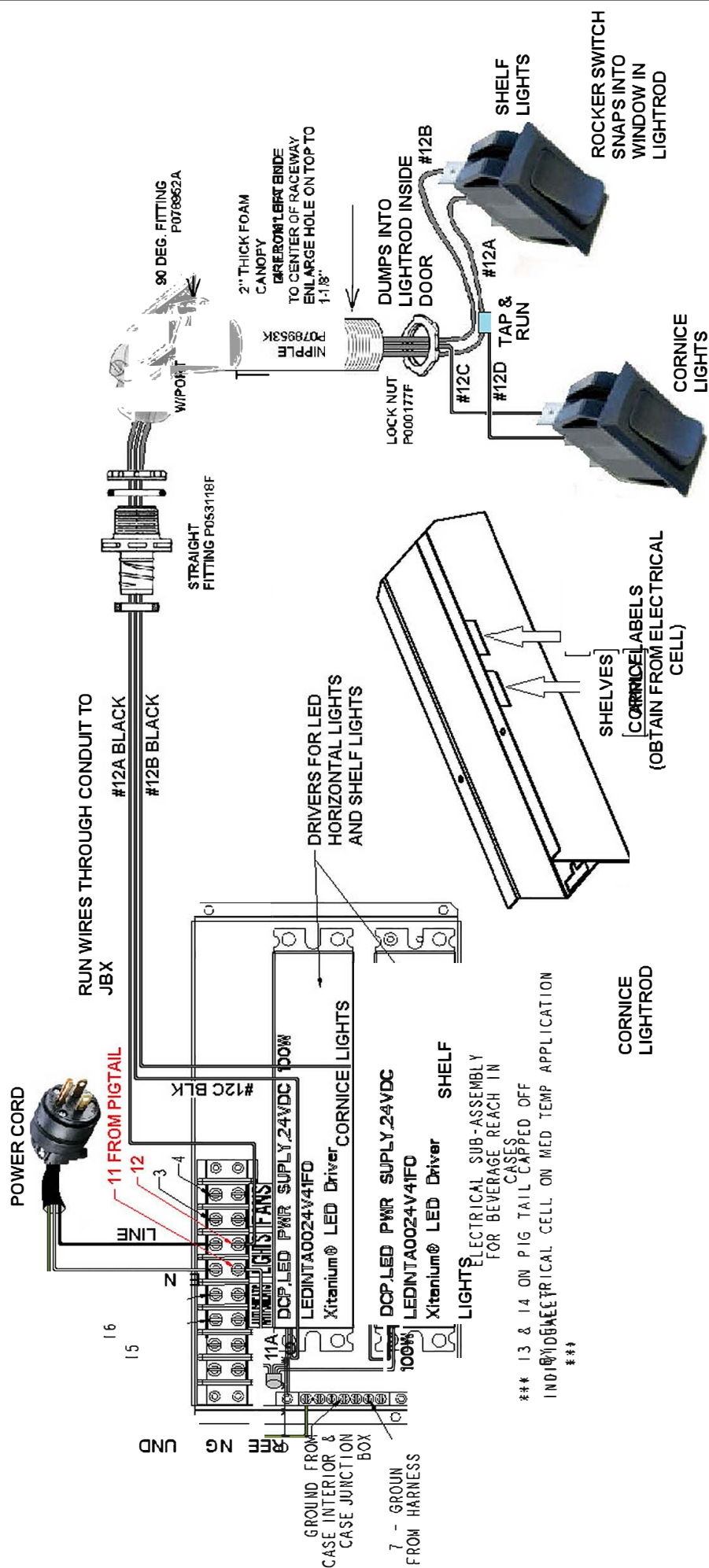
LIGHTS



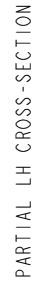
(Reference Drawing - R859742)

B.3 ELECTRICAL WIRING

NOTES:
THE VERTICAL DOORFRAME LIGHTS HAVE A SWITCH MOUNTED
IN THE DOORFRAME.
THE SHELF AND CORNICE LIGHT SWITCHES ARE LOCATED IN THE
CORNICE LIGHTROD LOCATED JUST INSIDE THE DOORS.




(Reference Drawing - R870622)



1. DRILL $\varnothing 7/8"$ HOLE IN CANOPY 4" LEFT END TO CENTER OF RACEWAY; ~~ENLARGE~~ HOLE ON TOP TO $\varnothing 1-1/8"$
2. RUN WIRES THROUGH THE LIQUID TITE CONDUIT TO THE BACK OF THE CASE.
3. DRILL $\varnothing 7/8"$ HOLE IN CANOPY 4" FROM LEFT END AND 6.25" FROM THE OUTSIDE BACK WALL OF THE CASE ENLARGE HOLE ON TOP TO $\varnothing 1-1/8"$
4. BUNDLE WIRES AND RUN ALONG THE INSIDE BACK WALL OF THE CASE AND THROUGH THE EGRESS INTO THE JUNCTION BOX AT THE BOTTOM OF THE CASE
5. LOCATE THE LED POWER SUPPLY IN THE JUNCTION BOX AT THE BOTTOM OF THE CASE
6. SEE REFERENCE DRAWING R827741 FOR MORE DETAILS

[illegible]

C.1 SPORLAN PRESSURE-TEMPERATURE CHART

Vacuum-Inches of Mercury Bold Italic Figures				TEMPERATURE PRESSURE CHART - at sea level										Pressure-Pounds Per Square Inch Gauge				
TEMPERATURE		REFRIGERANT (SPORLAN CODE)		TEMPERATURE		REFRIGERANT (SPORLAN CODE)		TEMPERATURE		REFRIGERANT (SPORLAN CODE)		TEMPERATURE		REFRIGERANT (SPORLAN CODE)				
(°F)	(°C)	134a (J)	404A (S)	507 (P)	717 (A)	744 - CO ₂	134a (J)	404A (S)	507 (P)	717 (A)	744 - CO ₂	(°F)	(°C)	134a (J)	404A (S)	507 (P)	717 (A)	744 - CO ₂
-60	-51.1	21.8	7.3	5.8	18.6	79.9	13.1	45.4	48.1	25.6	357.4	42	5.6	37.0	88.8	92.8	61.6	569.3
-55	-48.3	20.3	3.9	2.2	16.6	91.1	13.8	46.6	49.3	26.5	363.4	43	6.1	38.0	90.6	94.6	63.1	577.6
-50	-45.6	18.7	0.1	0.9	14.3	103.4	14.4	47.8	50.5	27.5	369.5	44	6.7	39.0	92.4	96.5	64.7	586.0
-45	-42.8	16.9	2.0	3.0	11.7	116.6	15.0	49.0	51.8	28.4	375.6	45	7.2	40.1	94.2	98.3	66.3	594.5
-40	-40.0	14.8	4.3	5.4	8.8	131.0	15.7	50.2	53.0	29.4	381.8	46	7.8	41.1	96.0	100.2	67.9	603.1
-35	-37.2	12.5	6.8	8.1	5.4	146.5	16.4	51.5	54.3	30.4	388.0	47	8.3	42.2	97.9	102.1	69.5	611.7
-30	-34.4	9.8	9.6	11.0	1.6	163.1	17.0	52.7	55.6	31.4	394.3	48	8.9	43.2	99.8	104.1	71.1	620.5
-25	-31.7	6.9	12.7	14.1	1.3	181.0	17.7	54.0	56.9	32.4	400.7	49	9.4	44.3	101.7	106.0	72.8	629.3
-20	-28.9	3.7	16.0	17.6	3.6	200.2	18.4	55.3	58.3	33.5	407.2	50	10.0	45.4	103.6	108.0	74.5	638.3
-18	-27.8	2.3	17.4	19.1	4.6	208.3	19.1	56.6	59.6	34.6	413.8	55	12.8	51.2	115.3	118.3	83.4	684.4
-16	-26.7	0.8	18.9	20.6	5.6	216.5	19.9	58.0	61.0	35.7	420.4	60	15.6	57.4	126.0	129.2	92.9	733.1
-14	-25.6	0.4	20.4	22.2	6.7	225.0	20.6	59.3	62.4	36.8	427.1	65	18.3	64.0	137.3	140.7	103.2	784.2
-12	-24.4	1.1	22.0	23.8	7.8	233.8	21.3	60.7	63.8	37.9	433.8	70	21.1	71.1	149.3	153.0	114.2	838.1
-10	-23.3	1.9	23.6	25.5	9.0	242.7	22.1	62.1	65.3	39.0	440.7	75	23.9	78.7	162.0	165.9	125.9	894.9
-8	-22.2	2.8	25.3	27.3	10.3	251.9	22.9	63.5	66.7	40.2	447.6	80	26.7	86.7	175.4	179.6	138.4	954.9
-6	-21.1	3.6	27.0	29.1	11.5	261.3	23.7	64.9	68.2	41.4	454.6	85	29.4	95.2	189.5	194.1	151.8	1018
-4	-20.0	4.6	28.8	30.9	12.9	271.0	24.5	66.4	69.7	42.6	461.7	90	32.2	104.3	204.5	209.3	166.1	**
-2	-18.9	5.5	30.7	32.8	14.3	280.9	25.3	67.8	71.2	43.8	468.8	95	35.0	113.9	220.2	225.4	181.2	**
0	-17.8	6.5	32.6	34.8	15.7	291.0	26.1	69.3	72.7	45.0	476.1	100	37.8	124.2	236.8	242.3	197.3	**
1	-17.2	7.0	33.6	35.8	16.4	296.2	26.9	70.8	74.3	46.3	483.4	105	40.6	135.0	254.2	260.1	214.4	**
2	-16.7	7.5	34.6	36.9	17.2	301.5	27.8	72.4	75.9	47.6	490.8	110	43.3	146.4	272.5	278.8	232.5	**
3	-16.1	8.0	35.6	37.9	18.0	306.8	28.6	73.9	77.5	48.9	498.3	115	46.1	158.4	291.8	298.5	251.6	**
4	-15.6	8.5	36.6	39.0	18.8	312.1	29.5	75.5	79.1	50.2	505.8	120	48.9	171.2	312.1	319.2	271.9	**
5	-15.0	9.1	37.7	40.1	19.6	317.6	30.4	77.1	80.7	51.6	513.4	125	51.7	184.6	333.3	340.9	293.3	**
6	-14.4	9.6	38.7	41.1	20.4	323.1	31.3	78.7	82.4	52.9	521.2	130	54.4	198.7	355.6	363.8	315.8	**
7	-13.9	10.2	39.8	42.3	21.2	328.6	32.2	80.3	84.1	54.3	529.0	135	57.2	213.6	379.1	387.8	339.6	**
8	-13.3	10.8	40.9	43.4	22.1	334.2	33.1	82.0	85.8	55.7	536.9	140	60.0	229.2	403.7	413.0	364.7	**
9	-12.8	11.3	42.0	44.5	22.9	339.9	34.1	83.7	87.5	57.2	544.8	145	62.8	245.7	429.6	439.5	391.0	**
10	-12.2	11.9	43.1	45.7	23.8	345.7	35.0	85.4	89.2	58.6	552.9	150	65.6	262.9	456.8	467.4	418.7	**
11	-11.7	12.5	44.3	46.9	24.7	351.5	36.0	87.1	91.0	60.1	561.0	155	68.3	281.0	485.5	497.0	447.8	**

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

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If case top fascia is included for installation, secure the front and rear fascia panels at the ends with the provided Tek screws. The front fascia panels have a hole in the center near the bottom. If required, route the motion sensor cable through this hole (Fig. 1).

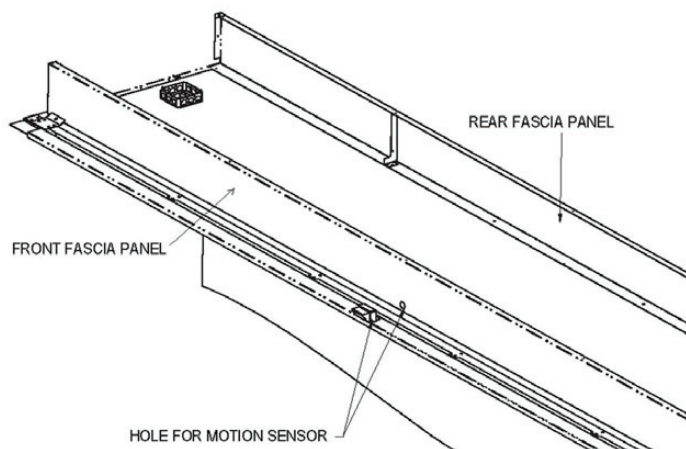


Fig. 1 Front and rear fascia

Attach the vertical gussets (Fig. 2) to the panels to provide additional stiffness. Slide the gusset into the inside of the fascia panel and align the holes at the top. Fasten with screws at the top and through the bottom.

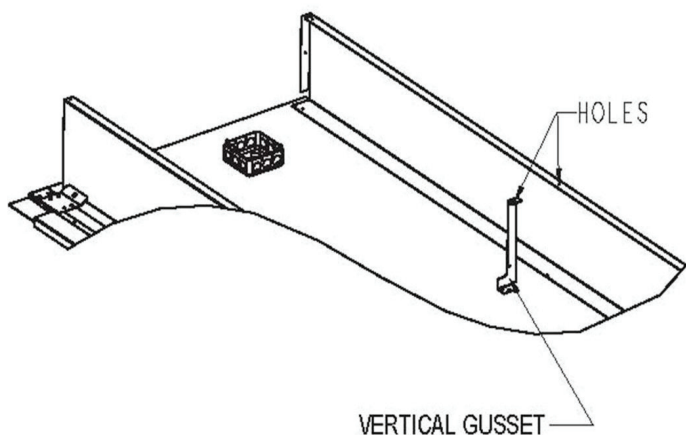


Fig. 2 Attach vertical gussets

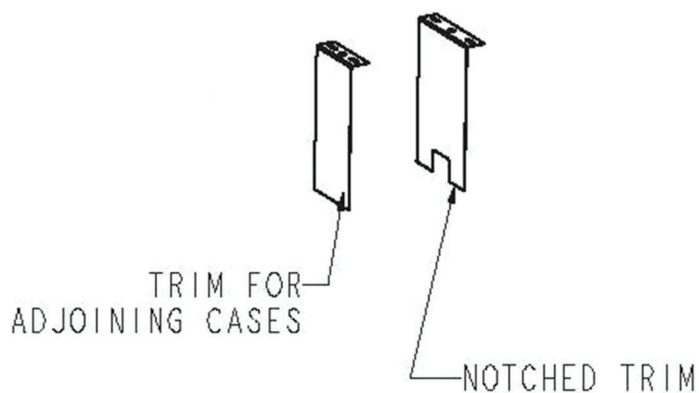


Fig. 3 Notched trim

Install the provided case-to-case fascia joint trim with the provided screws. Use the notched trim (Fig. 3) for bridging over a foamed partition.

Install the adjustable end fascia panels (Fig. 4). Nest one panel inside the other and slide to the desired distance. Fasten with screws once the desired front to rear distance is obtained.

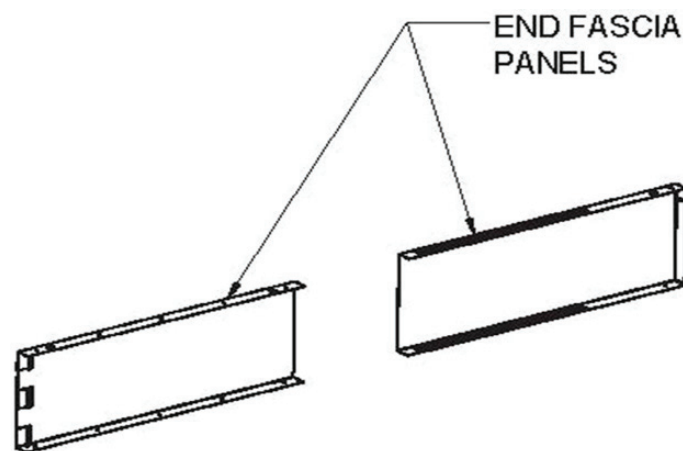


Fig. 4 Install end fascia panels

Note: If ballast supports are present, utilize the support structure shown in Fig. 5 below.

The fascia is fastened directly to the ballast supports at (a) using the provided Tek screws. Brackets are fastened to the fascia at (b) and to the supports at (c). Brackets are fastened to the end fascia at (d) and the tank at (e). "L" brackets are screwed into the supports or tank at (f).

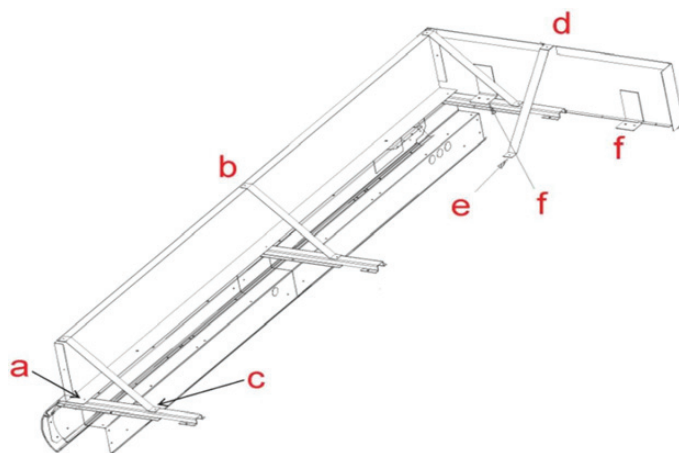
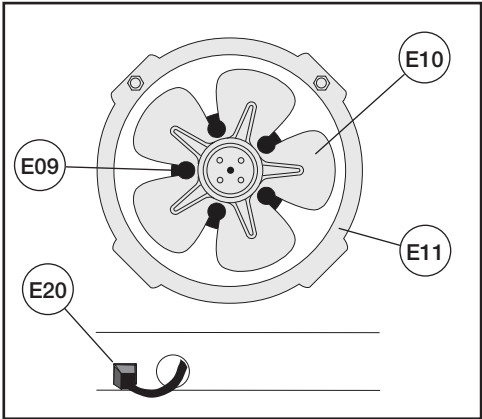


Fig. 5 Attaching fascia to ballast supports

E.1 PARTS LIST

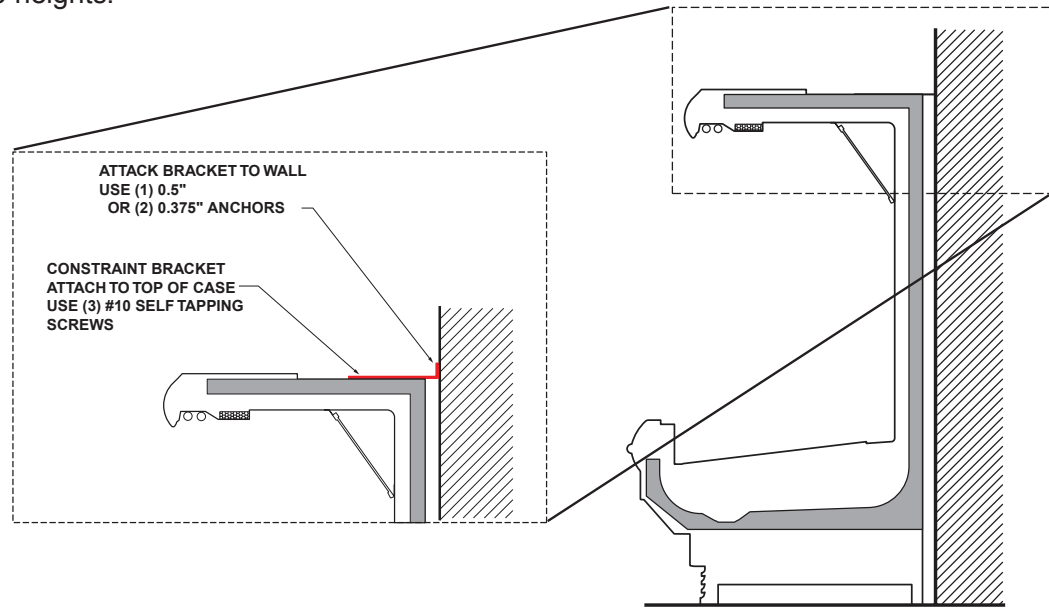


Location Number	Part Descriptions
1	Kickplate , Storm Grey
2	Master Bumper , 3/4, 1/2, Featherstone, Smoke, White, French Vanilla, Black
3	Lower Front Panel , Painted Custom Color (Not Shown)
4	Color Band , Painted Custom Color or Stainless
9	Deck Pan , Painted, Unpainted
10	Wire Shelving , White, With or Without Covers
11	Front Baffle , Aluminum
12	Honeycomb , 1"x 4"x 48"
13	Honeycomb Retainer , Painted
15	Upper Rear Baffle , Center or End
17	Nose Bumper , Polymer Custom Color
20	Lower Rear Baffle , Painted
23	Electrical Junction Box , (mounted on bottom left front or on top left rear)
24	"J" Rail , for Kickplate
25	Top Flue Panel , Painted
36	Plug Button , (Not Shown)
55	Door , Specify Mask Color, Ardco or Anthony, Door Handle Type, Low or Medium Temperature Application, Left or Right Hand Swing,
56	Door Frame Manufacturer, Low or Medium Temperature Application
69	Coil
78	Bumper Retainer
81	Bottom Wire Racks
82	Tag Moulding , PVC or Aluminum
83	Thermometer , Includes Bracket
87	End Assembly , Solid, Custom Color, Identify Left or Right hand, Color of Panel, and Color of End Trim Color
88	End Kickplate , Painted, Stainless Steel
E01	Defrost Heaters
E02	Anti-Condensate Heaters , Discharge
E08	Ballast , Electronic, (Identify by brand name and model number)
E09	Fan Motor - STATE HIGH EFFICIENCY OR STANDARD
E10	Fan Blade
E11	Fan Basket , 8"
E20	Fan Cord-Set , High Efficiency or Standard

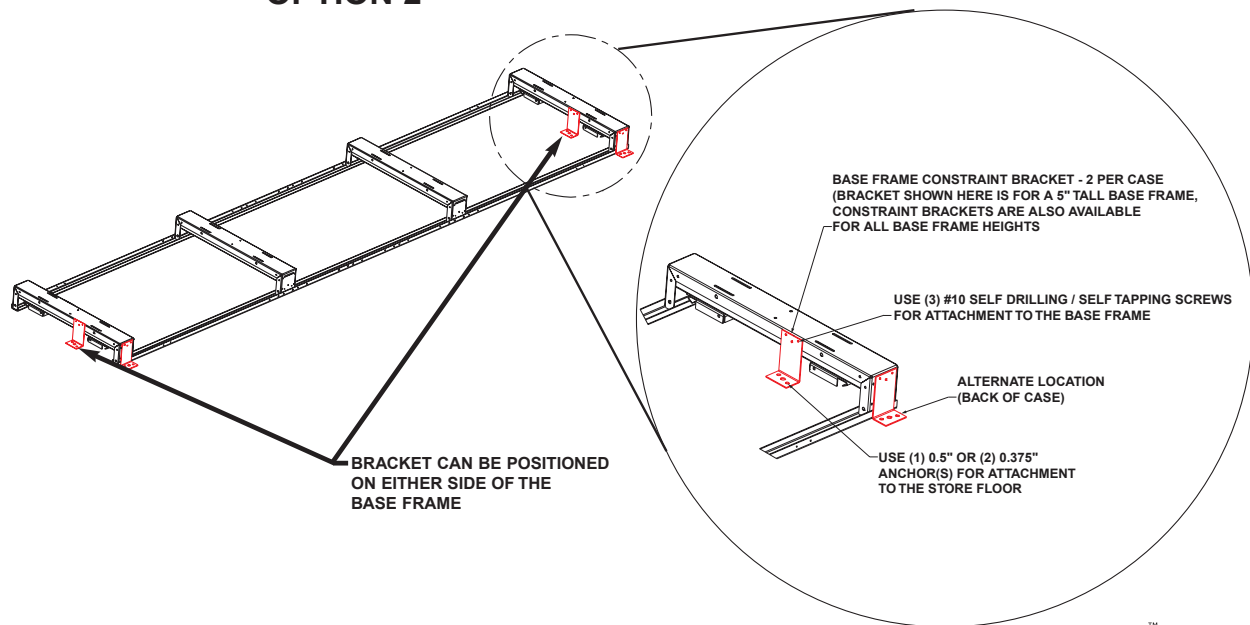
F.1 SEISMIC BRACKETS

The case constraint brackets can be installed in 2 ways. Option 1 can be used on multi-deck cases and uses an “L” bracket to attach the case to a vertical wall, as shown below. Option 2 can be used on multi-deck cases or on cases that do not have a canopy. Attach the “L” brackets to the base frames in either of the locations shown below. Brackets are available for all base frame heights.

OPTION 1

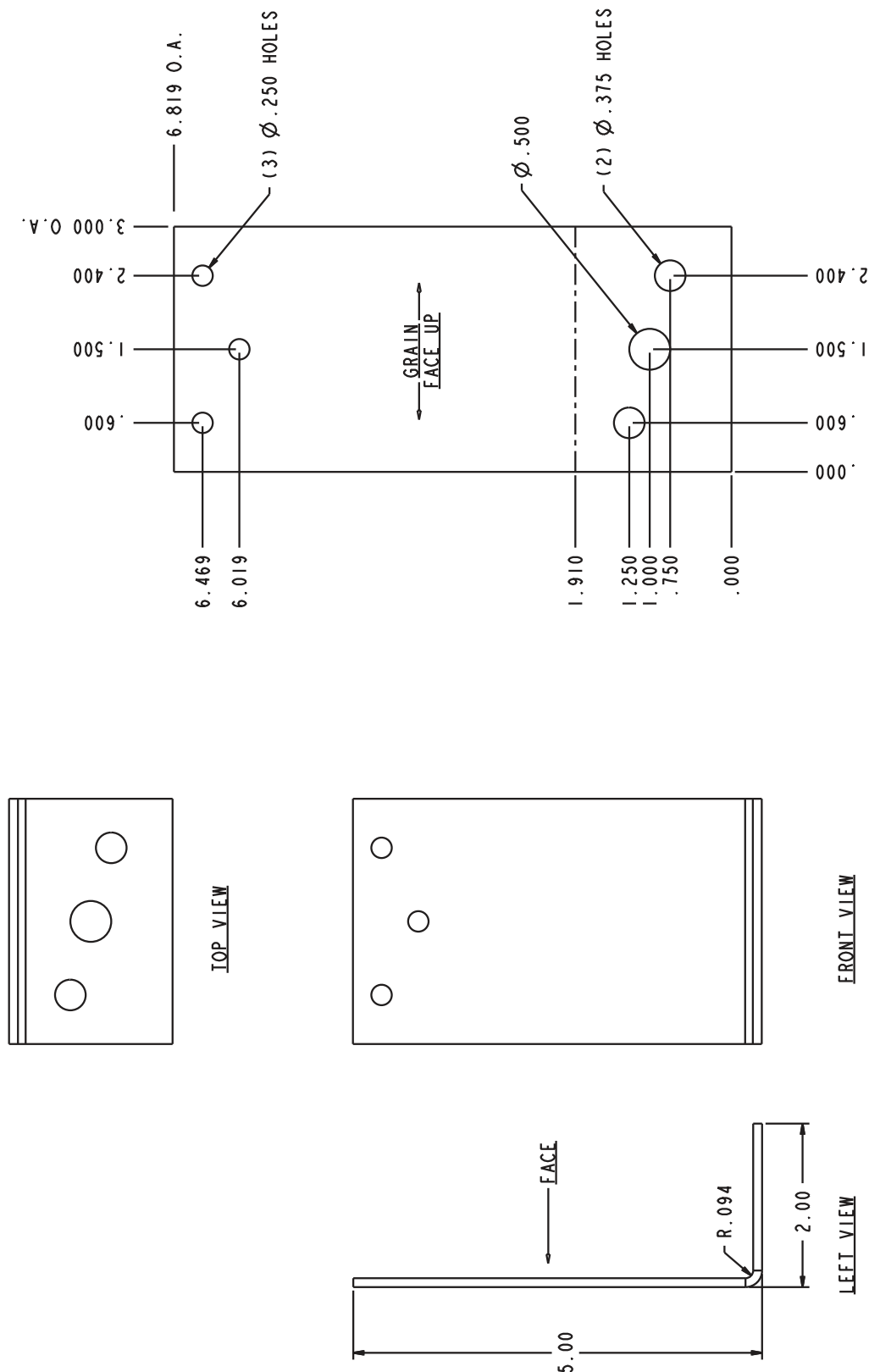


OPTION 2



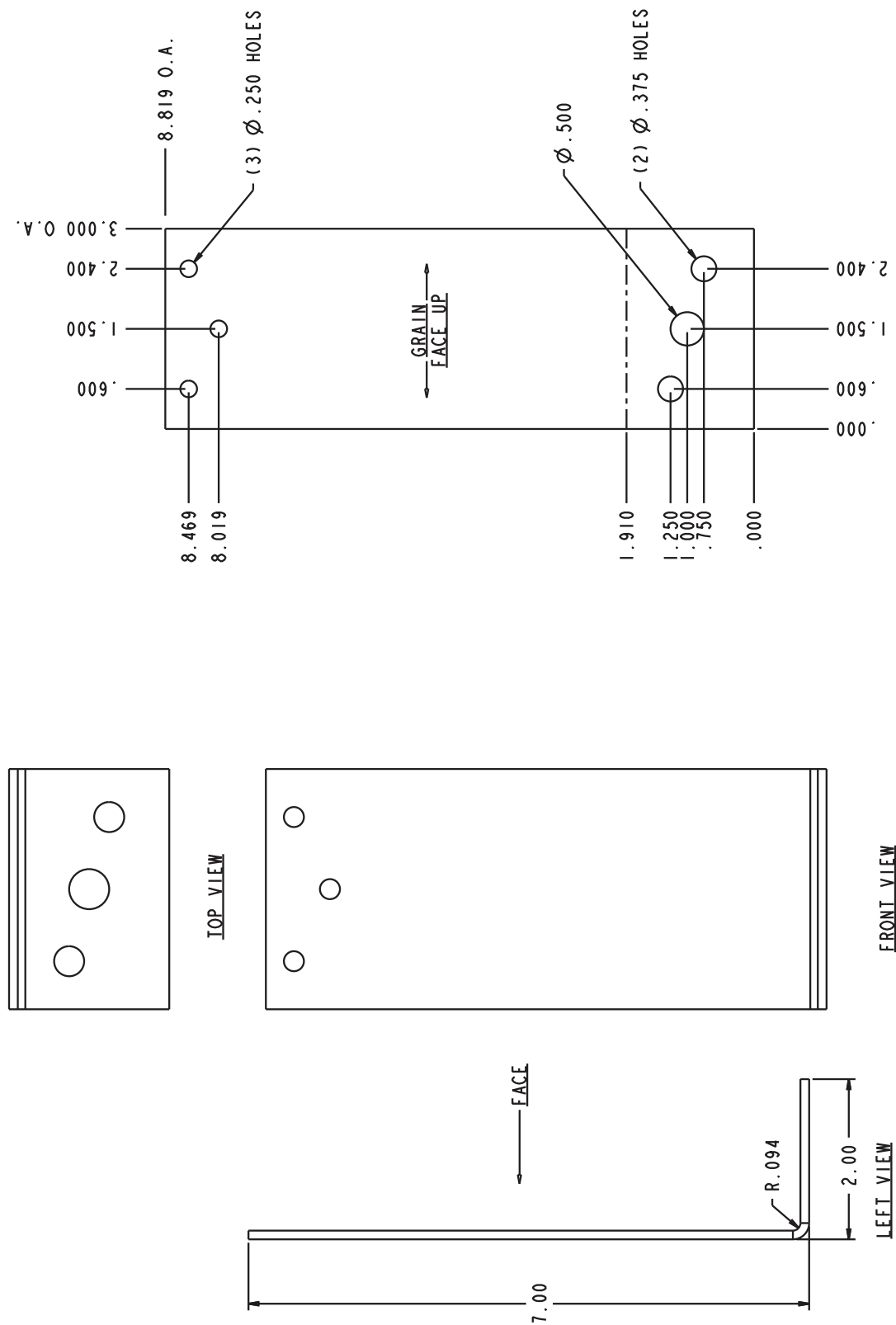
A **DOVER** COMPANY

5" BRACKETS



REV BY	05/15/06	62357	×	RELEASED TO PRODUCTION
DATE	ECN NO./I	DESCRIPTION		
<p>INFORMATION SHOWN IS PROPRIETARY AND CONFIDENTIAL. DUPLICATION AND USE IS PROHIBITED WITHOUT PERMISSION FROM HILL PHOENIX</p>				

7" BRACKETS



REV BY	05/15/06	62357	×	RELEASED TO PRODUCTION
	DATE	ECN NO./R/		DESCRIPTION
<p>ALL BENDS 90° UNLESS SPECIFIED</p> <p>ALL FRACTIONAL DIM. ±1/32</p> <p>DEGREES ± 1°. 3 PLC DECIMALS ± 0.10</p> <p>2 PLC DECIMALS ± .03</p> <p>DRAWING NOT TO SCALE</p> <p>Ⓢ = VARIANCE ACCEPTABLE</p>				
<p>HILL PHOENIX</p> <p>HILL PHOENIX ^{ESTD 1925} STEEL ^{STEEL} COMPANY</p> <p>1925 RUFF IN MILL ROAD</p> <p>COLOMBUS, OHIO 43004-3734</p> <p>PH: (604) 526-4455 FAX: (604) 526-3723</p>				
<p>PART NUMBER: F766805KGL</p>				
<p>PART DESCRIPTION: BKT, L, 7" BF, CONSTRNT</p>				
<p>DRAWN BY: CWC DATE: 05/15/06 SHEET: 1 OF 1</p>				
<p>INFORMATION SHOWN IS PROPRIETARY AND CONFIDENTIAL. DUPLICATION AND USE IS PROHIBITED WITHOUT PERMISSION FROM HILL PHOENIX</p>				

15" BRACKETS

TOP VIEW

FRONT VIEW

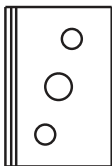
15" BRACKETS

ALL BENDS 90° UNLESS SPECIFIED
ALL FRACTIONAL DIM. ±1/32
DEGREES ±.3 P.L. DECIMALS ±.010
HILL PHOENIX
1925 RUFFIN MILL ROAD
COLUMBIA, SC 29924
PH: (804) 528-4455 FAX: (804) 528-3723

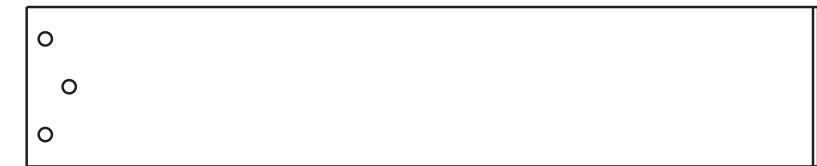
① = VARIANCE ACCEPTABLE
DRAWING NOT TO SCALE

SUPPLY: GL
TYPE: MSP
THICKNESS: 12G
FINISH: GALVANIZED
PART NUMBER: F766807EGL

16.469
16.019
16.819 O.A.
(3) Ø .250 HOLES
GRAIN
FACE UP
Ø .500
(2) Ø .375 HOLES
2.400
1.500
.600
.000
1.910
1.250
1.000
.750
.000



TOP VIEW



FRONT VIEW



LEFT VIEW

[illegible]

G.1 NON-INSULATED ACRYLIC PARTITIONS

Use the following instructions to install Hillphoenix non insulated partitions. It is recommended that all shelves and deck pans from both sides of the partition be removed to avoid any potential damage or injury.

Step 1: Mount the two vertical retainer brackets to the shelf standard (figures 1 & 2) using the supplied tek screws (8-18x3/4). The rectangular cutouts in the retainers must align with the rectangular slots in the shelf standard. Vertical Retainer Bracket #1 should be located below the 3rd slot from the top and Vertical Bracket #2 should be located above the 6th slot from the bottom. The grooves in the vertical retainer brackets must be centered on the case to case joint. The tek screws are to be drilled through the pre-drilled holes in the retainer brackets as shown in figure 3. Note that the vertical and horizontal retainer brackets are identical.

Step 2: Slide the Plexiglas partition into the vertical retainer brackets. Use the supplied retainer bolts and nuts (8-32x1/2) to secure the Plexiglas partition to the vertical retainer brackets as shown in figure 3. Drill additional holes in the Plexiglas if the pre-drilled holes in the Plexiglas do not line up with the holes in the retainer brackets.

Step 3: Slide Horizontal Retainer Bracket #2 onto the bottom of the Plexiglas partition as shown in figure 2. Align the partition parallel to the pipe chase and secure the bracket by drilling directly into the pipe chase using the supplied tek screws. Slide Horizontal Retainer Bracket #1 onto the top of the Plexiglas partition and secure it to the top flue of the case using the supplied tek screws. Secure the partition using the retainer bolts and nuts in the horizontal retainer brackets as done in step 2.

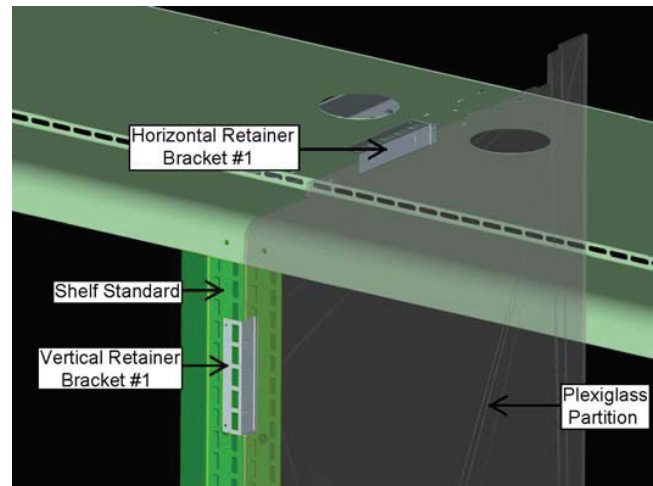


Figure 1: Top of Plexiglas Partition

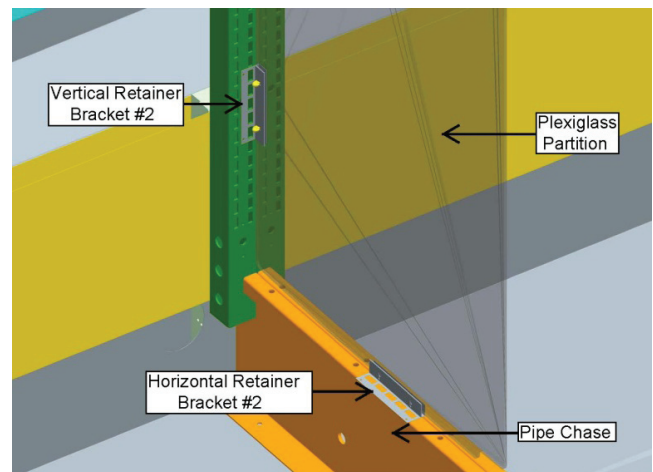


Figure 2: Bottom of Plexiglas

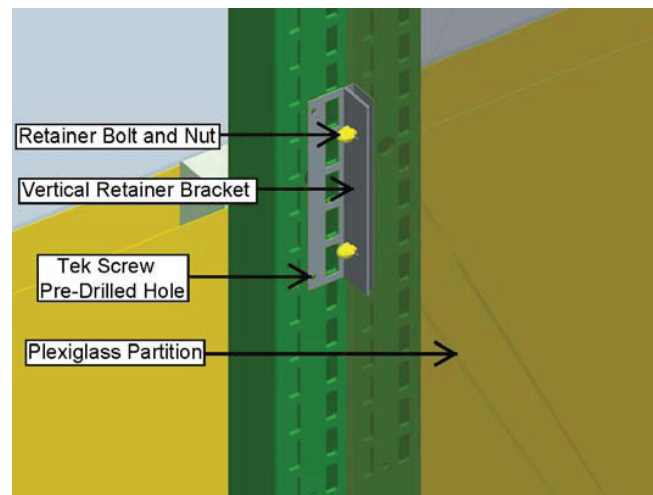


Figure 3: Vertical Retainer Bracket Installation

NOTES



A  COMPANY

WARRANTY

HEREINAFTER REFERRED TO AS MANUFACTURER

FOURTEEN MONTH WARRANTY. MANUFACTURER'S PRODUCT IS WARRANTED TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP UNDER NORMAL USE AND MAINTENANCE FOR A PERIOD OF FOURTEEN MONTHS FROM THE DATE OF ORIGINAL SHIPMENT. A NEW OR REBUILT PART TO REPLACE ANY DEFECTIVE PART WILL BE PROVIDED WITHOUT CHARGE, PROVIDED THE DEFECTIVE PART IS RETURNED TO MANUFACTURER. THE REPLACEMENT PART ASSUMES THE UNUSED PORTION OF THE WARRANTY.

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

The fourteen month warranty shall not apply:

1. To any unit or any part thereof which has been subject to accident, alteration, negligence, misuse or abuse, operation on improper voltage, or which has not been operated in accordance with the manufacturer's recommendation, 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. Outside the continental United States.
4. To labor cost for replacement of parts, or for freight, shipping expenses, sales tax or upgrading.
5. When the operation is impaired due to improper installation.
6. When installation and startup forms are not properly complete or returned within two weeks after startup.

THIS PLAN DOES NOT COVER CONSEQUENTIAL DAMAGES. Manufacturer shall not be liable under any circumstances for any consequential damages, including loss of profit, additional labor cost, loss of refrigerant or food products, or injury to personnel or property caused by defective material or parts or for any delay in its performance hereunder due to causes beyond its control. The foregoing shall constitute the sole and exclusive remedy of any purchases and the sole and exclusive liability of Manufacturer in connection with this product.

The Warranties are Expressly in Lieu of All Other Warranties, Express or Implied and All Other Obligations or Liabilities on Our Part. The Obligation to Repair or Replace Parts or Components Judged to be Defective in Material or Workmanship States Our Entire Liability Whether Based on Tort, Contract or Warranty. We Neither Assume Nor Authorize Any Other Person to Assume for Us Any Other Liability in Connection with Our Product.

MAIL CLAIM TO:

Hillphoenix
Display Merchandisers
1925 Ruffin Mill Road
Colonial Heights, VA 23834
1-800-283-1109

Hillphoenix
Refrigeration Systems &
Electrical Distribution Products
709 Sigman Road
Conyers, GA 30013
770-285-3200

Warning **Servicing & Case Care**

When servicing or cleaning cases, observe the following procedures to avoid case damage or injury:

Be certain that all electricity to the case is turned off before servicing or cleaning to avoid electrical shock. In some cases, more than one switch may need 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 components must be dried thoroughly before installation and before re-energizing the lighting circuit.

Please refer to the Case Cleaning section of this installation manual.

Hillphoenix
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Fax: 804-526-7450
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Responsible solutions.™**



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