



REACH-IN MERCHANDISER

INSTALLATION & OPERATIONS MANUAL

ORB ORBH ONRB ONRBH

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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.

Hillphoenix®



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V1.00
09/19



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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.

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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.



Revision History

- new manual format_9/19

GENERAL INFORMATION

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 ONRB, ONRBH, ORB, and ORBH.

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 display cases, please contact our Case Division Customer Service Department at the toll free number listed below. 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 toll-free number below and ask for a Service Parts Representative.

Hillphoenix
1925 Ruffin Mill Rd
Colonial Heights, VA 23834
Mon.-Fri. (8 a.m. to 5 p.m.)
Tel: 1-800-283-1109/Fax: 804-526-7450
Website: 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—ONRB and ONRBH— place shim packs under both the basehorses and kickplate supports (Fig. 1).

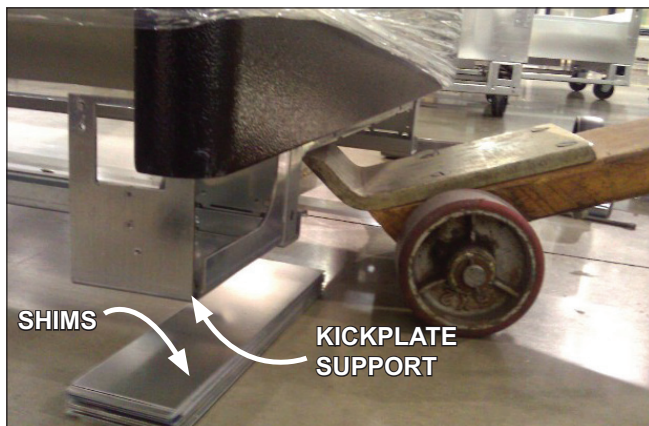


Fig. 1 Kickplate support

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.

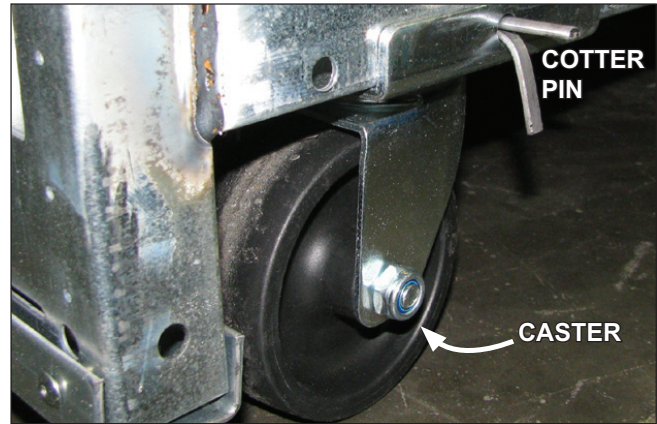


Fig. 2 Removing the casters is an easy process. Simply flatten and remove the cotter pins that are holding the casters in place. Then lift the case with a "J" bar and slide the caster assemblies out. The dismantled casters can now be discarded.

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).

CASE INSTALLATION

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 F** for detailed installation instructions.

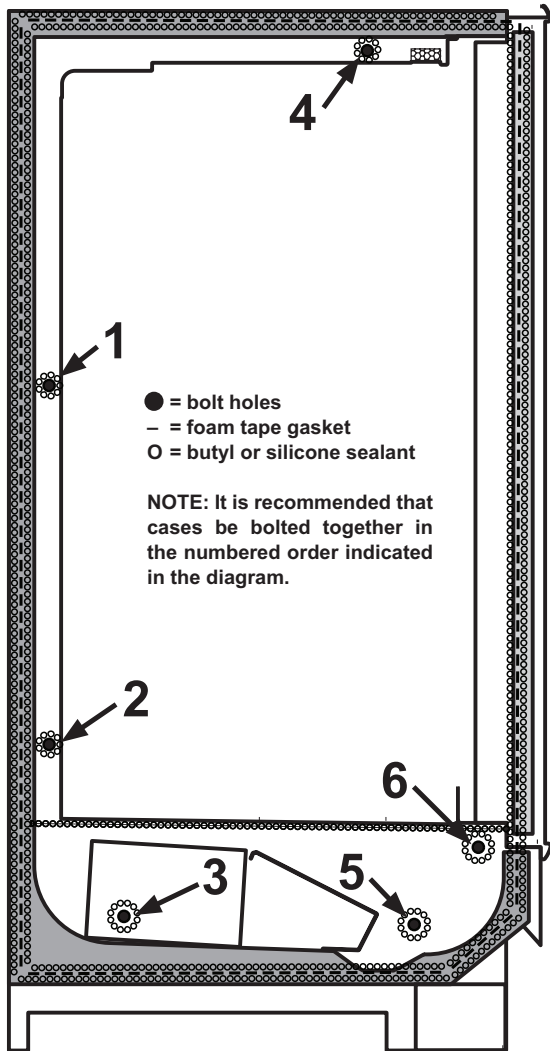


Fig. 3 Bolt holes, foam tape gasket and sealant

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

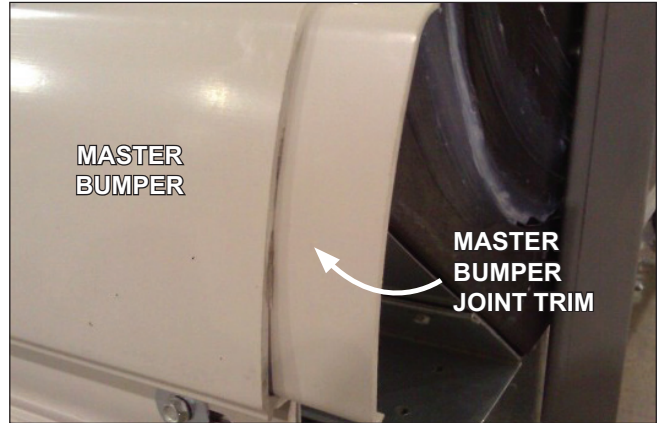


Fig. 4 Master bumper and joint trim

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-

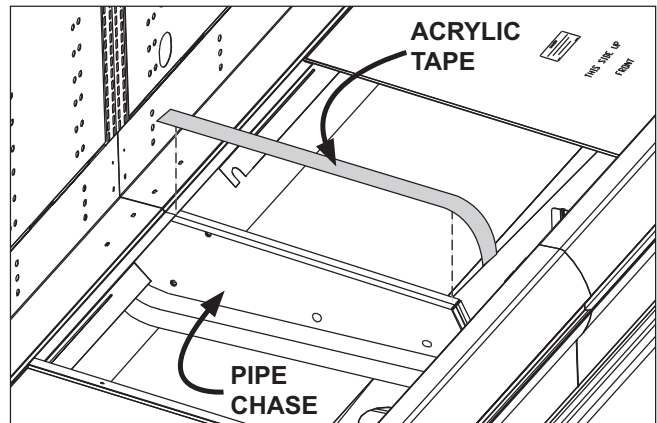


Fig. 5 Sealing the pipe chase

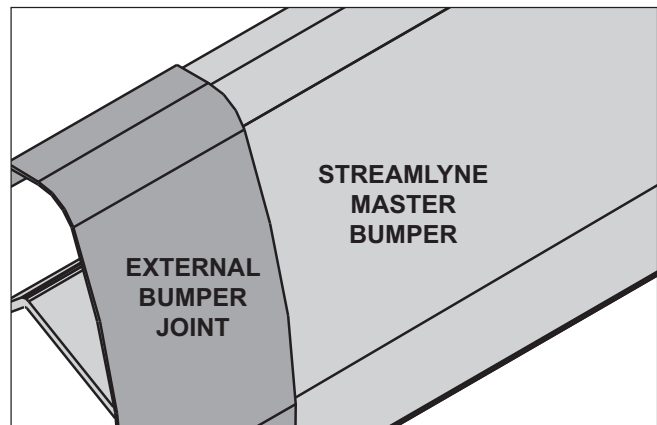


Fig. 6 Streamlyne master bumpers and joint trim

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.

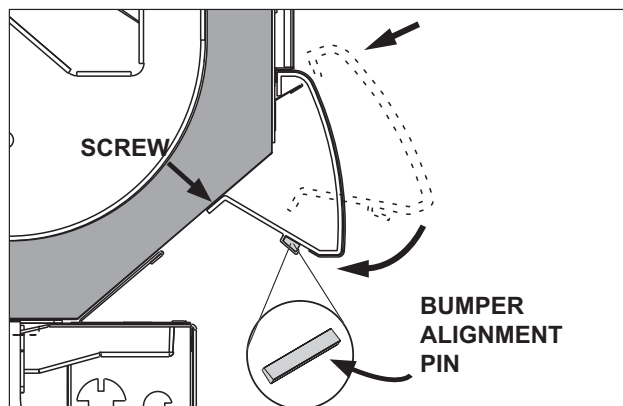


Fig. 7 Streamlyne bumper alignment pin

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 H** 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 J** 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.

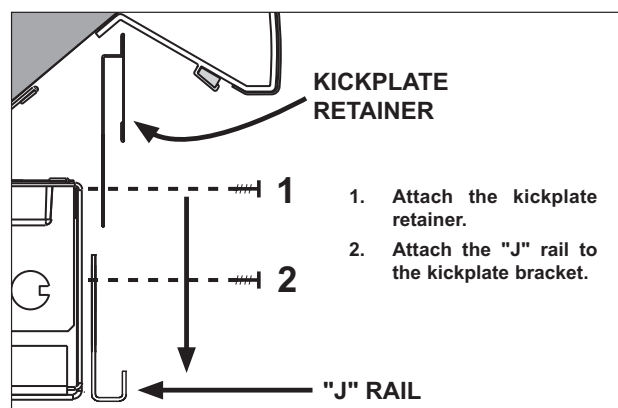


Fig. 9 "J" rail installation

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.

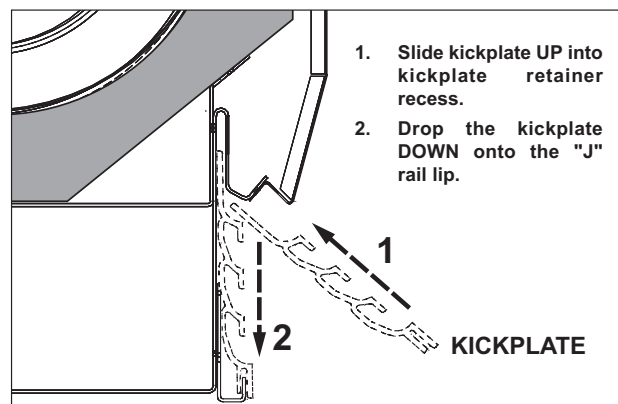


Fig. 10 Kickplate installation

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 D** for installation instructions. If electronic display modules are included, see **Appendix I** for installation instructions.

CASE CONNECTIONS

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.

If hot gas defrost is utilized, suction lines to each case in the circuit should be of equal distance from the main suction line. The expansion valve and other controls are located on the left-hand side of the case and are accessible by lifting the two 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.



ATTENTION!

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



Fig. 11 Penetrate foam as needed to access piping

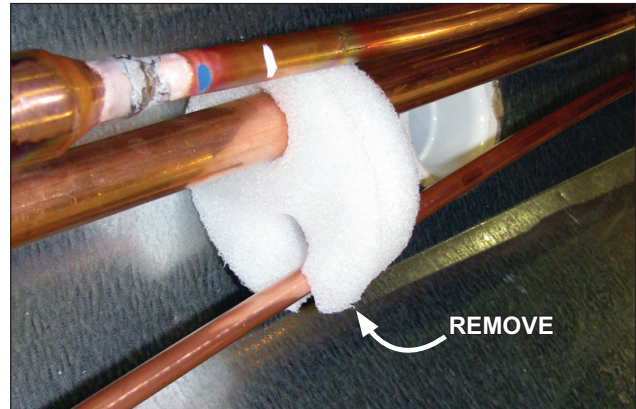
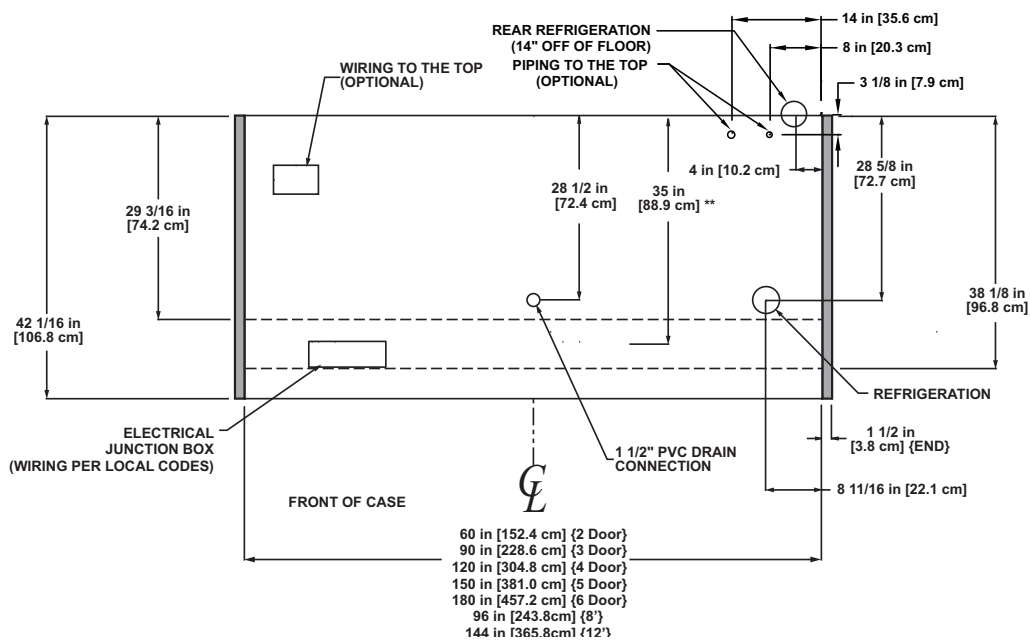


Fig. 12 Remove the shipping blocks

ORB

(ORB shown. For piping locations in other case models, see Appendices A–D.)



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.

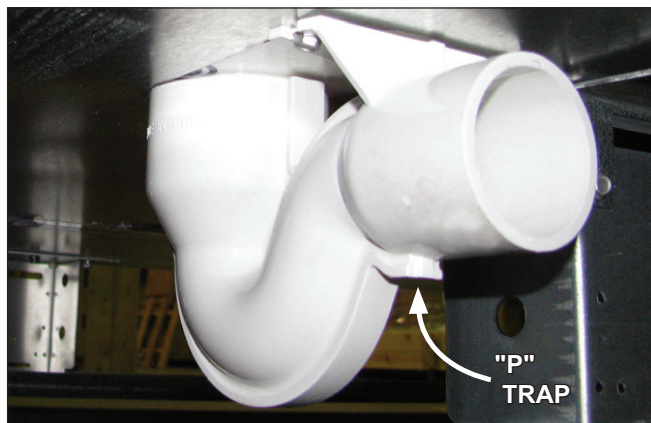


Fig. 13 "P" trap

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 B**.

LIGHTING

Lighting for reach-in door cases is pre-installed during the manufacturing process. The light switch is located on the outside of the case, underneath the front panel at the far left-hand end. For any questions or service needs, please contact our Case Division Customer Service Department toll-free at 1-800-283-1109.



Fig. 14 Junction box beneath case

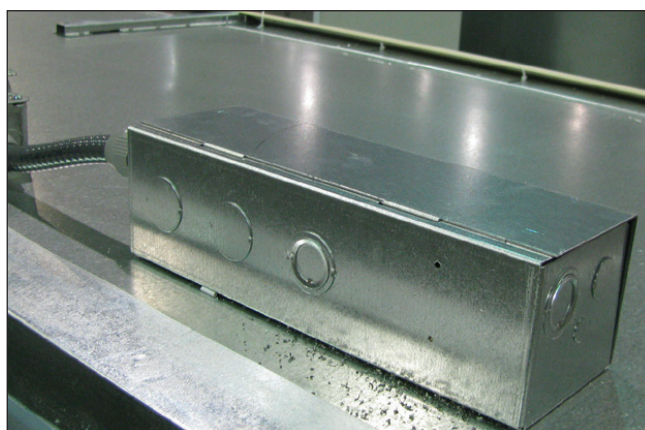


Fig. 15 Junction box beneath case



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.

PRE-POWER CHECKLIST

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 removed and discarded casters? (see pg. 5)**
- ☐ **Have you checked the vertical plumb of the case? The horizontal level? (see pg. 5)**
- ☐ **Have you applied the foam tape gasket and sealant to the end breakers of adjoining case? (see pg. 5)**
- ☐ **Have you sealed the case-to-case joints by applying caulk and acrylic tape to the pipe-chase seam? (see pg. 6)**
- ☐ **Have you removed the shipping blocks from the refrigeration lines? (see pg. 8)**

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

Hillphoenix cases utilize electric, hot gas, or 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 Klaxon® 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.).

If electric defrost is used, the defrost termination sensor will be located either behind the rear baffle or mounted to the coil. If hot gas defrost is used, the defrost termination sensor will be mounted to the dump line—the sensor should always be mounted on the coil-side of the check

valve or solenoid valve. Finally, if timed-off defrost is used, 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 **Appendix A**. 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.

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 C**), 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.

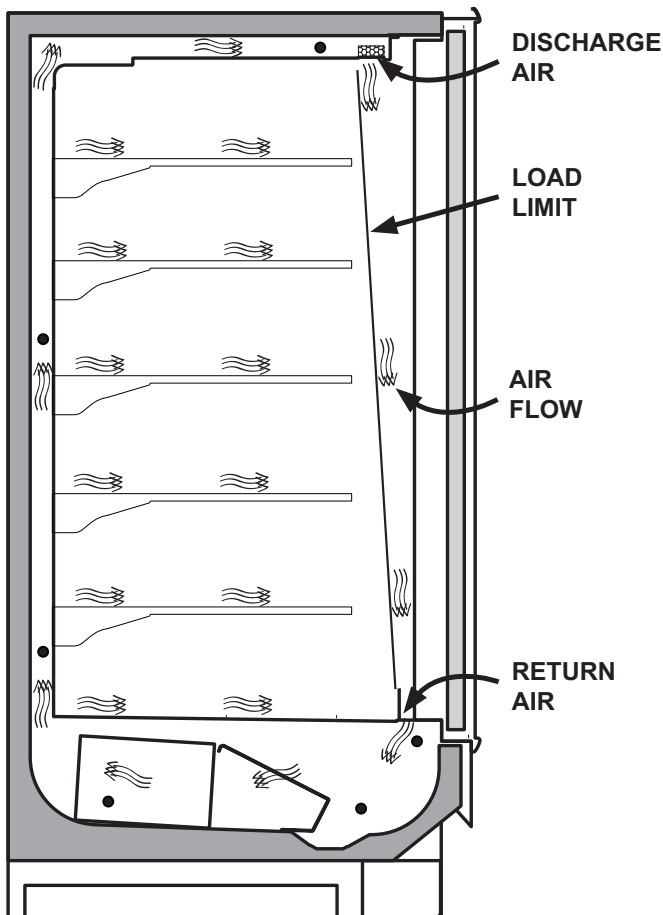


Fig. 16 Airflow

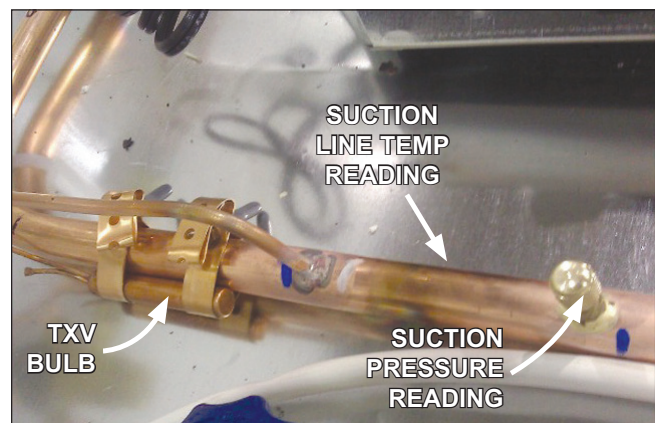


Fig. 17 Obtain pressure and temperature readings

FAN MAINTENANCE & CASE CLEANING



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.

EBM Papst fans have 8" fan blades with a factory-set blade pitch. The fans are pre-set to run at 1800 RPMs; if an airflow adjustment is required, replacement fans with a different RPM set-point may be ordered.

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.)

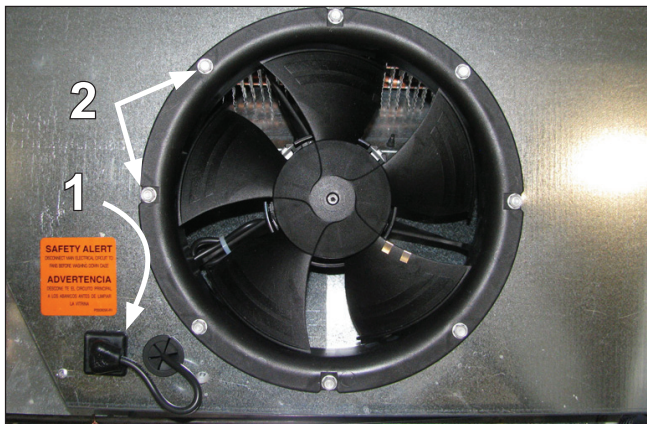


Fig. 18 Fan basket



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).

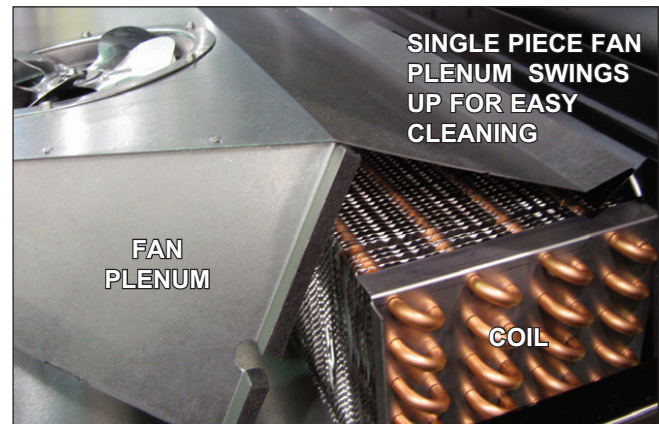


Fig. 19 Single-piece fan plenum and coil cover



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.



Contact the Service Parts Department at:

1-800-283-1109

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, contact the Parts Department. Do not send parts without authorization.

A	Technical Reference Sheet
B	Electrical Wiring Diagrams
C	Sporlan Pressure-Temperature Chart
D	Case Top Fascia
E	Parts List
F	Seismic Brackets
G	Defrost Sensor Access Panel
H	Non-Insulated Acrylic Partitions
I	Electronic Display Module
J	Peg Hooks

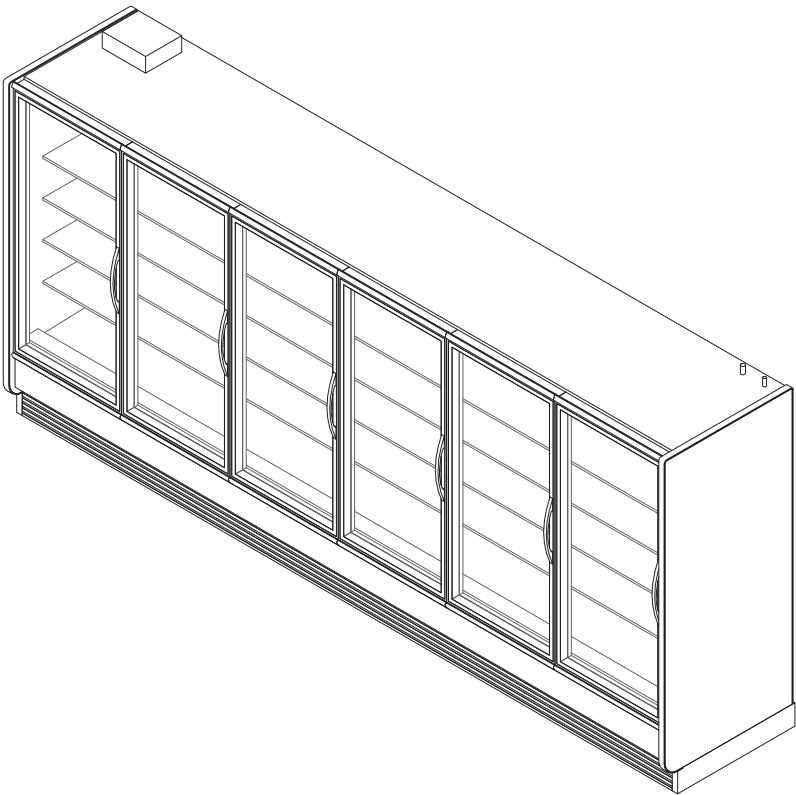
A1: TECHNICAL REFERENCE SHEET

ONRB

Narrow Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

GENERAL NOTES:

- 4-foot cases Bi-Swing consist of 2 (24") doors.
- 6-foot cases Bi-Swing swing consist of 3 (24") doors.
- 8-foot cases single swing consist of 3 (32") doors.
- 8-foot case Bi-swing consist of 4 (24") doors.
- 12-foot cases single swing consist of 4 (36") doors.
- 12-foot cases Bi-swing consist of 6 (24") doors.
- Lighting controls - occupancy sensors are required.
- Option 1: OEM Provided: Lighting controls (on/off) are standard unless otherwise specified.
- Option 2: End User Provided: Light controls should be based on occupancy sensors.



SHIPPING WEIGHT	
Case	Weight
ONRB	---



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.

ONRB

Rev. Date	Rev. #	Rev. Title
9-26-19	6	DATA UPDATE
9-24-19	5	ENDVIEW UPDATE



A2: TECHNICAL REFERENCE SHEET

ONRB

Narrow Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

ELECTRICAL DATA			
Case Length	Fans Per Case	High Efficiency Fans	
		120 Volt	
		Amps	Watts
1 Door	1	0.22	26
2 Door	2	0.44	53
3 Door	3	0.66	79
4 Door	4	0.88	106
5 Door	5	1.1	132
6 Door	6	1.32	158
4'	1	0.22	26
6'	2	0.44	53
8'	2	0.44	53
12'	3	0.66	79

LIGHTING DATA					
Case Length	Door Size	OP45		OP55 (French Swing Only)	
		120 Volts		120 Volts	
		Amps	Watts	Amps	Watts
1 Door	31"	0.18	21.0	---	---
2 Door	30"	0.36	43.1	---	---
3 Door	30"	0.54	65.2	---	---
4 Door	30"	0.73	87.3	---	---
5 Door	30"	0.91	109.4	---	---
6 Door	30"	1.10	131.5	---	---
4'	24"	---	---	0.26	31.0
6'	24"	---	---	0.52	61.9
8'	24"	---	---	0.52	61.9
8'	32"	0.54	65.2	---	---
12'	24"	---	---	0.77	92.8
12'	36"	0.73	87.3	---	---

NOTES:

- "----" indicates that this feature is not an option on this case model and/or the data is not yet available yet.
- Anti-condensate heat values represent a door with no heat.
- 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 light wattage by 42% at 75°F/55%RH conditions, reduce the light wattages above by 42%.
- Data listed is for Optimax Radiant and low power Optimax Pro (high power available). For other lighting options please contact your sales representative.



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.

ONRB

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9-26-19	6	DATA UPDATE
9-24-19	5	ENDVIEW UPDATE

Hillphoenix
A DOVER COMPANY

A3: TECHNICAL REFERENCE SHEET

ONRB

Narrow Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

ANTI CONDENSATE DATA

Case Length	Door Size	Number of Doors	101 Frames		Vista Frames	
			Un Heated Doors		Un Heated Doors	
			ELMD, ELMH, I90		Vista C, I60	
			120 Volts		120 Volts	
			Amps	Watts	Amps	Watts
1 Door	31"	1	0.16	19	0.16	19
2 Door	30"	2	0.32	38	0.32	38
3 Door	30"	3	0.50	60	0.50	60
4 Door	30"	4	0.69	83	0.69	83
5 Door	30"	5	0.86	103	0.86	103
6 Door	30"	6	1.06	127	1.06	127
4'	24"	2	0.18	22	0.18	22
6'	24"	3	0.35	42	0.35	42
8'	24"	4	0.39	47	0.39	47
8'	32"	3	0.51	61	0.51	61
12'	24"	6	0.63	76	0.63	76
12'	36"	4	0.74	89	0.74	89

GUIDLINES AND CONTROL DATA

Application	Case Length	Door Size	BTUH/Door		Superheat Set Point @ Bulb (°F)	Evaporator (°F)	Discharge Air (°F)	Discharge Air Velocity (FPM)
			Conventional	Parallel				
Beverage	1-6 Door	30"	510	465	4 - 6	34	40	250
Beverage	4'	24"	405	370	4 - 6	34	40	250
Beverage	6'	24"	405	370	4 - 6	34	40	250
Beverage	8'	24"	405	370	4 - 6	34	40	250
Beverage	8'	32"	540	495	4 - 6	34	40	250
Beverage	12'	24"	405	370	4 - 6	34	40	250
Beverage	12'	36"	610	555	4 - 6	34	40	250
Deli / Dairy	1-6 Door	30"	520	475	4 - 6	30	36	250
Deli / Dairy	4'	24"	415	380	4 - 6	30	36	250
Deli / Dairy	6'	24"	415	380	4 - 6	30	36	250
Deli / Dairy	8'	24"	415	380	4 - 6	30	36	250
Deli / Dairy	8'	32"	555	510	4 - 6	30	36	250
Deli / Dairy	12'	24"	415	380	4 - 6	30	36	250
Deli / Dairy	12'	36"	625	570	4 - 6	30	36	250
Meat	1-6 Door	30"	600	550	4 - 6	28	34	250
Meat	4'	24"	480	440	4 - 6	28	34	250
Meat	6'	24"	480	440	4 - 6	28	34	250
Meat	8'	24"	480	440	4 - 6	28	34	250
Meat	8'	32"	640	590	4 - 6	28	34	250
Meat	12'	24"	480	440	4 - 6	28	34	250
Meat	12'	36"	720	660	4 - 6	28	34	250

DEFROST CONTROLS

Defrosts Per Day	Timed-Off Defrost	
	Fail-Safe (Min)	Termination Temp (°F)
4	30	47



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.

ONRB

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A4: TECHNICAL REFERENCE SHEET

ONRB

Narrow Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

SECOND NATURE DATA

Case Model	No. of Coils	Application	Front Sill height	BTUH/FT		GPM/ft (DR)	Supply Fluid Temp (°F)	Discharge Air Temp (°F)
				Conventional	Parallel			
ONRB (30" DOOR)	1	Beverage	Std. Reach In	510	465	0.06	20	38
ONRB (30" DOOR)	1	Deli/Dairy	Std. Reach In	520	475	0.08	20	36
ONRB (30" DOOR)	1	Meat	Std. Reach In	600	550	0.11	20	34
ONRB (30" DOOR)	1	Beverage	Std. Reach In	510	465	0.08	25	38
ONRB (30" DOOR)	1	Deli/Dairy	Std. Reach In	520	475	0.12	25	36
ONRB (30" DOOR)	1	Meat	Std. Reach In	600	550	0.16	25	34
ONRB (PER FOOT)	1	Beverage	Std. Reach In	203	185	0.02	20	34
ONRB (PER FOOT)	1	Deli/Dairy	Std. Reach In	208	190	0.03	20	34
ONRB (PER FOOT)	1	Meat	Std. Reach In	240	220	0.04	20	34
ONRB (PER FOOT)	1	Beverage	Std. Reach In	203	185	0.03	25	34
ONRB (PER FOOT)	1	Deli/Dairy	Std. Reach In	208	190	0.05	25	34
ONRB (PER FOOT)	1	Meat	Std. Reach In	240	220	0.06	25	34

SECOND NATURE DATA

Case Model	No. of Coils	Application	Front Sill height	Supply Fluid Temp (°F)	No. of Defrost	Timed-Off Defrost		Warm Fluid Defrost	
						Fail-Safe (Min)	Termination Temp (°F)	Fail-Safe (Min)	Termination Temp (°F)
ONRB (30" DOOR)	1	Beverage	Std. Reach In	20	4	60	47	26	49
ONRB (30" DOOR)	1	Deli/Dairy	Std. Reach In	20	4	60	47	26	49
ONRB (30" DOOR)	1	Meat	Std. Reach In	20	4	60	47	26	49
ONRB (30" DOOR)	1	Beverage	Std. Reach In	25	4	45	47	26	49
ONRB (30" DOOR)	1	Deli/Dairy	Std. Reach In	25	4	45	47	26	49
ONRB (30" DOOR)	1	Meat	Std. Reach In	25	4	45	47	26	49
ONRB (PER FOOT)	1	Beverage	Std. Reach In	20	4	60	47	26	49
ONRB (PER FOOT)	1	Deli/Dairy	Std. Reach In	20	4	60	47	26	49
ONRB (PER FOOT)	1	Meat	Std. Reach In	20	4	60	47	26	49
ONRB (PER FOOT)	1	Beverage	Std. Reach In	25	4	45	47	26	49
ONRB (PER FOOT)	1	Deli/Dairy	Std. Reach In	25	4	45	47	26	49
ONRB (PER FOOT)	1	Meat	Std. Reach In	25	4	45	47	26	49

NOTES:

- All medium temperature data listed is for 35% by wt. PROPYLENE GLYCOL.
- Inhibited Propylene Glycol solution with water, such as Dowfrost or equivalent. (Dowfrost is a trademark of the Dow Chemical Company).
- Flowrates are determined by ASHRAE test conditions and may need to be adjusted based on store conditions.
- ** Flowrates are per case



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ONRB

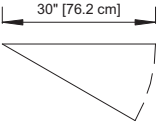
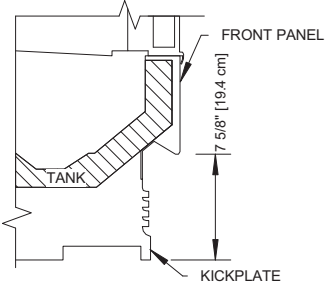
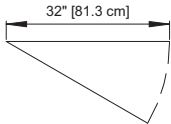
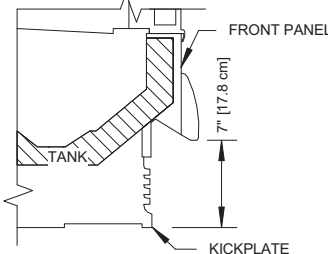
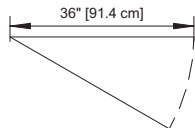
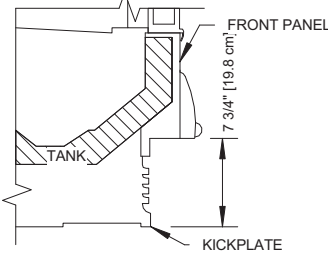
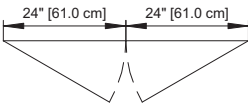
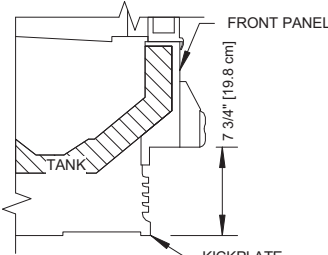
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A5: TECHNICAL REFERENCE SHEET

ONRB

Narrow Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

DOOR OPTIONS	FRONT OPTIONS
STANDARD SWING DOOR 1, 2, 3, 4, 5, & 6 - DOOR CASES 	<u>FLAT FRONT (O SERIES)</u> 
STANDARD SWING DOOR 8' CASE 	<u>STREAMLINE BUMPER</u> 
STANDARD SWING DOOR 12' CASE 	<u>HALF BUMPER</u> 
BI- SWING DOOR 4', 6', 8' & 12' CASES 	<u>CLASSIC 2 BUMPER</u> 

2017 DOE COMPLIANT COMPONENT
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ONRB

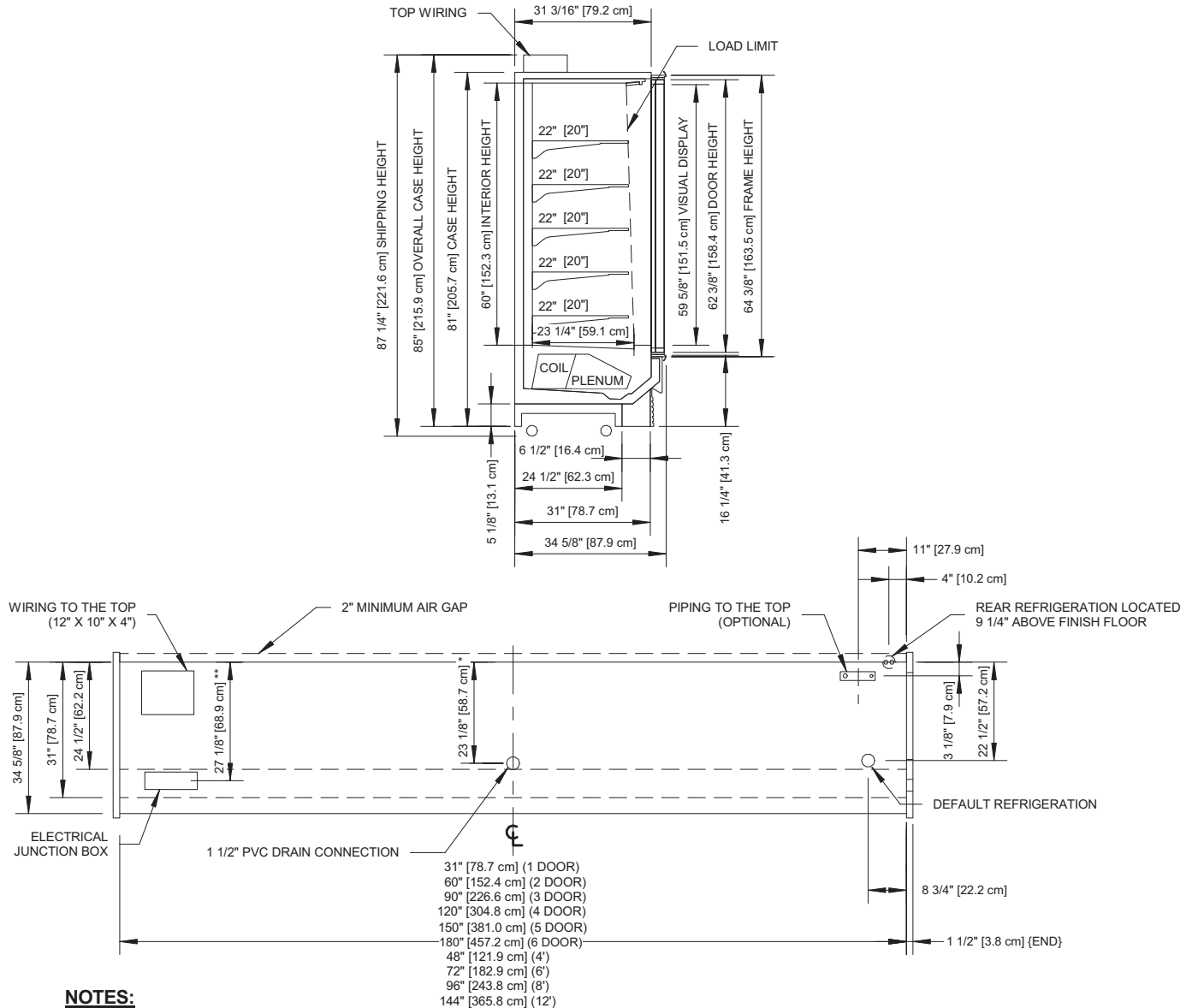
Rev. Date	Rev. #	Rev. Title
9-26-19	6	DATA UPDATE
9-24-19	5	ENDVIEW UPDATE

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A6: TECHNICAL REFERENCE SHEET

ONRB

Narrow Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)



NOTES:

* : STUB-UP AREA

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

- Ends add approximately 1" to case height, 1/2" to the back & 1" to the front.
- Back panels add approximately 1" to the rear of the case.
- Vented kickplate adds 3/4".

2017
DOE
COMPLIANT



COMPONENT

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ONRB

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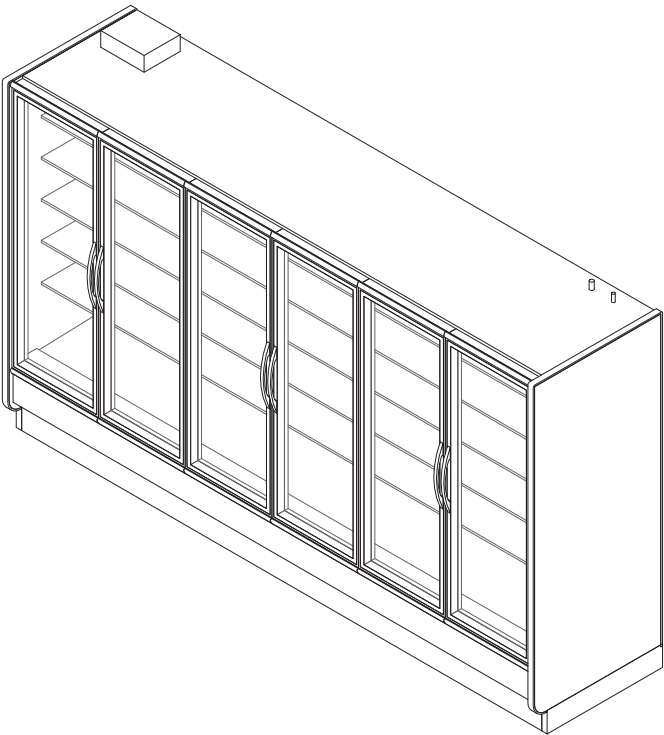
A7: TECHNICAL REFERENCE SHEET

ONRBH

High, Narrow Reach In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

GENERAL NOTES

- 4-foot case Bi-Swing consist of 2 (24") doors.
- 6-foot case Bi-Swing consist of 3 (24") doors.
- 8-foot cases single swing consist of 3 (32") doors.
- 8-foot case Bi-swing consist of 4 (24") doors.
- 12-foot cases single swing consist of 4 (36") doors.
- 12-foot cases Bi-swing consist of 6 (24") doors.
- Lighting controls - occupancy sensors are required.
 - Option 1: OEM Provided: Lighting controls (on/off) are standard unless otherwise specified.
 - Option 2: End User Provided: Light controls should be based on occupancy sensors.



SHIPPING WEIGHT	
Case	Weight
ONRBH	---



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.

ONRBH

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9-26-19	7	DATA UPDATE
9-25-19	6	ENDVIEW UPDATE



A8: TECHNICAL REFERENCE SHEET

ONRBH

High, Narrow Reach In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

ELECTRICAL DATA			
Case Length	Fans Per Case	High Efficiency Fans	
		120 Volt	
		Amps	Watts
1 Door	1	0.22	26
2 Door	2	0.44	53
3 Door	3	0.66	79
4 Door	4	0.88	106
5 Door	5	1.10	132
6 Door	6	1.32	158
4'	1	0.22	26
6'	2	0.44	53
8'	2	0.44	53
12'	3	0.66	79

LIGHTING DATA					
Case Length	Door Size	OP45		OP55 (French Swing Only)	
		120 Volts		120 Volts	
		Amps	Watts	Amps	Watts
1 Door	31"	0.18	21.0	---	---
2 Door	30"	0.36	43.1	---	---
3 Door	30"	0.54	65.2	---	---
4 Door	30"	0.73	87.3	---	---
5 Door	30"	0.91	109.4	---	---
6 Door	30"	1.10	131.5	---	---
4'	24"	---	---	0.26	31.0
6'	24"	---	---	0.52	61.9
8'	24"	---	---	0.52	61.9
8'	32"	0.54	65.2	---	---
12'	24"	---	---	0.77	92.8
12'	36"	0.73	87.3	---	---

ANTI CONDENSATE DATA					
Case Length	Door Size	101 Frames		Vista Frames	
		Un Heated Doors		Un Heated Doors	
		ELMD, ELMH, I90		Vista C, I60	
		120 Volts		120 Volts	
		Amps	Watts	Amps	Watts
1 Door	30"	0.18	22	0.18	22
2 Door	30"	0.36	43	0.36	43
3 Door	30"	0.55	66	0.55	66
4 Door	30"	0.75	90	0.75	90
5 Door	30"	0.94	113	0.94	113
6 Door	30"	1.15	138	1.15	138
4'	24"	0.20	24	0.20	24
6'	24"	0.39	47	0.39	47
8'	24"	0.43	52	0.43	52
8'	32"	0.56	67	0.52	62
12'	24"	0.68	82	0.68	82
12'	36"	0.80	96	0.80	96

2017
DOE
COMPLIANT



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.

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A9: TECHNICAL REFERENCE SHEET

ONRBH

High, Narrow Reach In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

GUIDLINES AND CONTROL DATA								
Application	Case Length	Door Size	BTUH/Door		Superheat Set Point @ Bulb (°F)	Evaporator (°F)	Discharge Air (°F)	Discharge Air Velocity (FPM)
			Conventional	Parallel				
Beverage	1 - 6 Door	30"	635	585	4 - 6	34	40	250
Beverage	4'	24"	505	465	4 - 6	34	40	250
Beverage	6'	24"	505	465	4 - 6	34	40	250
Beverage	8'	24"	505	465	4 - 6	34	40	250
Beverage	8'	32"	675	620	4 - 6	34	40	250
Beverage	12'	24"	505	465	4 - 6	34	40	250
Beverage	12'	36"	760	700	4 - 6	34	36	250
Deli / Dairy	1 - 6 Door	30"	650	595	4 - 6	30	36	250
Deli / Dairy	4'	24"	520	475	4 - 6	30	36	250
Deli / Dairy	6'	24"	520	475	4 - 6	30	36	250
Deli / Dairy	8'	24"	520	475	4 - 6	30	36	250
Deli / Dairy	8'	32"	695	635	4 - 6	30	36	250
Deli / Dairy	12'	24"	520	475	4 - 6	30	36	250
Deli / Dairy	12'	36"	780	715	4 - 6	30	36	250
Meat	1 - 6 Door	30"	725	670	4 - 6	28	34	250
Meat	4'	24"	580	535	4 - 6	28	34	250
Meat	6'	24"	580	535	4 - 6	28	34	250
Meat	8'	24"	580	535	4 - 6	28	34	250
Meat	8'	32"	775	715	4 - 6	28	34	250
Meat	12'	24"	580	535	4 - 6	28	34	250
Meat	12'	36"	870	805	4 - 6	28	34	250

DEFROST CONTROLS		
Defrosts Per Day	Timed-Off Defrost	
	Fail-Safe (Min)	Termination Temp (°F)
4	30	47

NOTES

- "----" indicates that this feature is not an option for this case model.
- Data listed is for Optimax Radiant. For other lighting options, please contact your sales representative.
- Anti-condensate heat values represent a door with no heat.
- 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 determine actual daily energy usage at 75°F/55%RH conditions, reduce the light wattage by 42%.



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ONRBH

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A10: TECHNICAL REFERENCE SHEET

ONRBH

High, Narrow Reach In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

SECOND NATURE DATA

Case Model	No. of Coils	Application	Front Sill height	BTUH/FT		GPM/ft (DR)	Supply Fluid Temp (°F)	Discharge Air Temp (°F)
				Conventional	Parallel			
ONRBH (30" Door)	1	Beverage	Std. Reach In	635	585	0.07	20	36
ONRBH (30" Door)	1	Deli/Dairy	Std. Reach In	650	595	0.10	20	38
ONRBH (30" Door)	1	Meat	Std. Reach In	725	670	0.13	20	34
ONRBH (30" Door)	1	Beverage	Std. Reach In	635	585	0.10	25	36
ONRBH (30" Door)	1	Deli/Dairy	Std. Reach In	650	595	0.15	25	38
ONRBH (30" Door)	1	Meat	Std. Reach In	725	670	0.19	25	34
ONRBH (Per Foot)	1	Beverage	Std. Reach In	253	233	0.03	20	34
ONRBH (Per Foot)	1	Deli/Dairy	Std. Reach In	260	238	0.04	20	34
ONRBH (Per Foot)	1	Meat	Std. Reach In	290	268	0.05	20	34
ONRBH (Per Foot)	1	Beverage	Std. Reach In	253	233	0.04	25	34
ONRBH (Per Foot)	1	Deli/Dairy	Std. Reach In	260	238	0.06	25	34
ONRBH (Per Foot)	1	Meat	Std. Reach In	290	268	0.08	25	34

SECOND NATURE DATA

Case Model	No. of Coils	Application	Front Sill height	Supply Fluid Temp (°F)	No. of Defrost	Timed-Off Defrost		Warm Fluid Defrost	
						Fail-Safe (Min)	Termination Temp (°F)	Fail-Safe (Min)	Termination Temp (°F)
ONRBH (30" Door)	1	Beverage	Std. Reach In	20	4	60	47	26	49
ONRBH (30" Door)	1	Deli/Dairy	Std. Reach In	20	4	60	47	26	49
ONRBH (30" Door)	1	Meat	Std. Reach In	20	4	60	47	26	49
ONRBH (30" Door)	1	Beverage	Std. Reach In	25	4	45	47	26	49
ONRBH (30" Door)	1	Deli/Dairy	Std. Reach In	25	4	45	47	26	49
ONRBH (30" Door)	1	Meat	Std. Reach In	25	4	45	47	26	49
ONRBH (Per Foot)	1	Beverage	Std. Reach In	20	4	60	47	26	49
ONRBH (Per Foot)	1	Deli/Dairy	Std. Reach In	20	4	60	47	26	49
ONRBH (Per Foot)	1	Meat	Std. Reach In	20	4	60	47	26	49
ONRBH (Per Foot)	1	Beverage	Std. Reach In	25	4	45	47	26	49
ONRBH (Per Foot)	1	Deli/Dairy	Std. Reach In	25	4	45	47	26	49
ONRBH (Per Foot)	1	Meat	Std. Reach In	25	4	45	47	26	49

NOTES

- All medium temperature data listed is for 35% by wt. PROPYLENE GLYCOL.
- Inhibited Propylene Glycol solution with water, such as Dowfrost or equivalent. (Dowfrost is a trademark of the Dow Chemical Company).
- Flowrates are determined by ASHRAE test conditions and may need to be adjusted based on store conditions.
- ** Flowrates are per case



ONRBH

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.

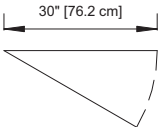
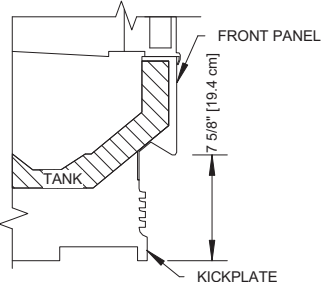
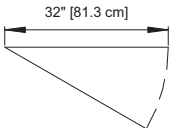
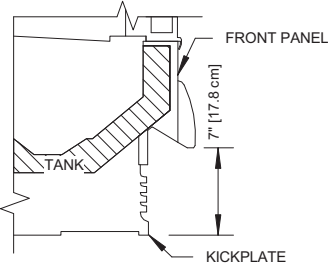
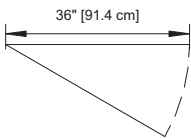
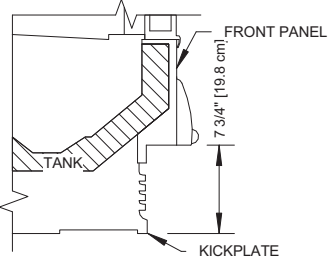
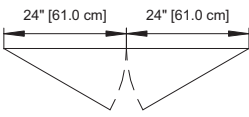
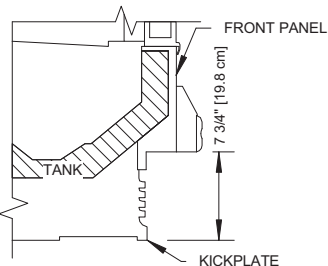
Rev. Date	Rev. #	Rev. Title
9-26-19	7	DATA UPDATE
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A11: TECHNICAL REFERENCE SHEET

ONRBH

High, Narrow Reach In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

DOOR OPTIONS	FRONT OPTIONS
STANDARD SWING DOOR 1, 2, 3, 4, 5, & 6 - DOOR CASES 	<u>FLAT FRONT (O SERIES)</u> 
STANDARD SWING DOOR 8' CASE 	<u>STREAMLINE BUMPER</u> 
STANDARD SWING DOOR 12' CASE 	<u>HALF BUMPER</u> 
BI- SWING DOOR 4', 6', 8' & 12' CASES 	<u>CLASSIC 2 BUMPER</u> 

2017
DOE
COMPLIANT

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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.

ONRBH

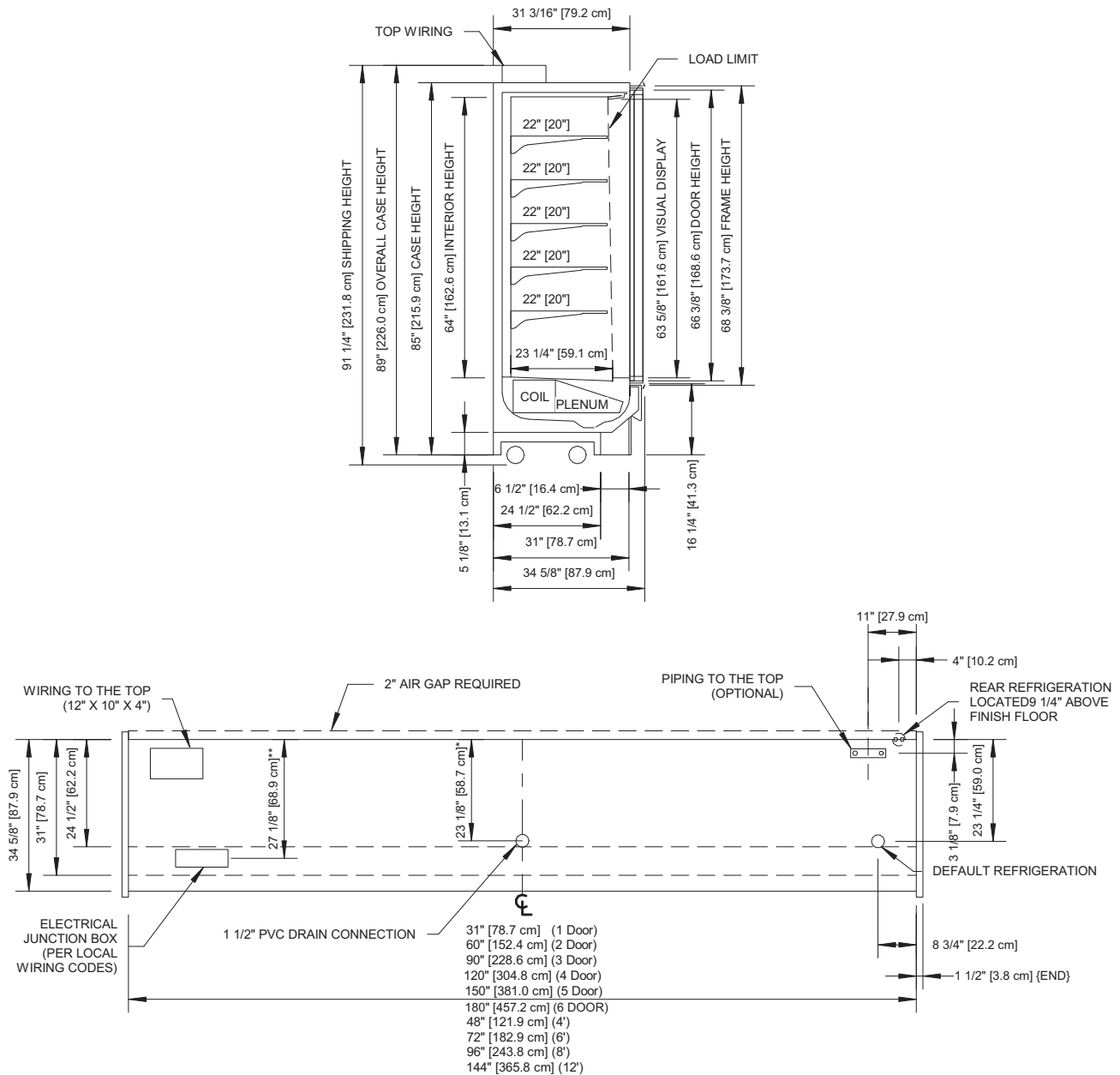
Rev. Date	Rev. #	Rev. Title
9-26-19	7	DATA UPDATE
9-25-19	6	ENDVIEW UPDATE

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A12: TECHNICAL REFERENCE SHEET

ONRBH

High, Narrow Reach In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)



NOTES

* : STUB-UP AREA.

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

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



ONRBH

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.

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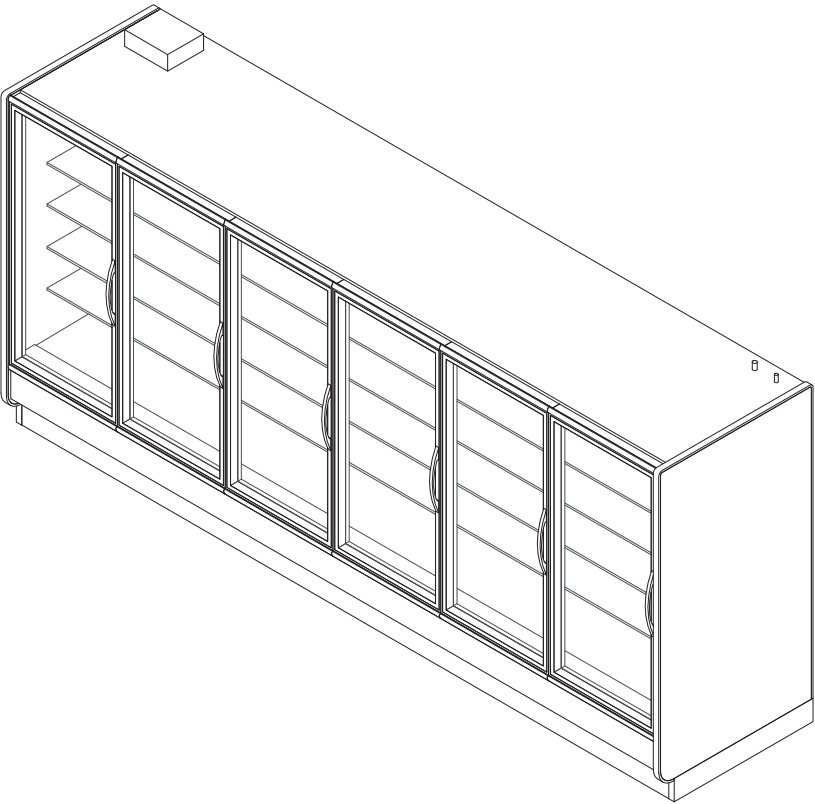
A13: TECHNICAL REFERENCE SHEET

ORB

Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

GENERAL NOTES

- 4-foot Bi-Swing cases consist of 2 (24") doors
- 6-foot Bi-Swing cases consist of 3 (24") doors
- 8-foot cases single swing consist of 3 (32") doors
- 8-foot case Bi-swing consist of 4 (24") doors
- 12-foot cases single swing consist of 4 (36") doors
- 12-foot cases Bi-swing consist of 6 (24") doors
- 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. Store level A/S control should be set to 30% minimum off time at 75°F/55%RH.



SHIPPING WEIGHT	
Case	Weight
ORB	---



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.

ORB

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A14: TECHNICAL REFERENCE SHEET

ORB

Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

ELECTRICAL DATA			
Case Length	Fans Per Case	High Efficiency Fans	
		120 Volt	
		Amps	Watts
1 Door	1	0.22	26
2 Door	2	0.44	53
3 Door	3	0.66	79
4 Door	4	0.88	106
5 Door	5	1.10	132
6 Door	6	1.32	158
4'	1	0.22	26
6'	2	0.44	53
8'	2	0.44	53
12'	3	0.66	79

LIGHTING DATA					
Case Length	Door Size	OP45		OP55 (French Swing Only)	
		120 Volts		120 Volts	
		Amps	Watts	Amps	Watts
1 Door	31"	0.18	21.0	---	---
2 Door	30"	0.36	43.1	---	---
3 Door	30"	0.54	65.2	---	---
4 Door	30"	0.73	87.3	---	---
5 Door	30"	0.91	109.4	---	---
6 Door	30"	1.10	131.5	---	---
4'	24"	---	---	0.26	31.0
6'	24"	---	---	0.52	61.9
8'	24"	---	---	0.52	61.9
8'	32"	0.54	65.2	---	---
12'	24"	---	---	0.77	92.8
12'	36"	0.73	87.3	---	---

ANTI CONDENSATE DATA						
Case Length	Door Size	Number of Doors	101 Frames		Vista Frames	
			Un Heated Doors		Un Heated Doors	
			ELMD, ELMH, I90		Vista C, I60	
			120 Volts		120 Volts	
			Amps	Watts	Amps	Watts
1 Door	31"	1	0.16	19	0.16	19
2 Door	30"	2	0.32	38	0.32	38
3 Door	30"	3	0.50	60	0.50	60
4 Door	30"	4	0.69	83	0.69	83
5 Door	30"	5	0.86	103	0.86	103
6 Door	30"	6	1.06	127	1.06	127
4'	24"	2	0.18	22	0.18	22
6'	24"	3	0.35	42	0.35	42
8'	24"	4	0.39	47	0.39	47
8'	32"	3	0.51	61	0.51	61
12'	24"	6	0.63	76	0.63	76
12'	36"	4	0.74	89	0.74	89

2017
DOE
COMPLIANT



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.

ORB

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A15: TECHNICAL REFERENCE SHEET

ORB

Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

GUIDELINES AND CONTROL DATA								
Application	Doors	Door Size	BTUH/Door		Superheat Set Point @ Bulb (°F)	Evaporator (°F)	Discharge Air (°F)	Discharge Air Velocity (FPM)
			Conventional	Parallel				
Beverage	1 - 6 Door	30"	500	460	4 - 6	34	40	215
Beverage	4'	24"	400	365	4 - 6	34	40	215
Beverage	6'	24"	400	365	4 - 6	34	40	215
Beverage	8'	24"	400	365	4 - 6	34	40	215
Beverage	8'	32"	535	490	4 - 6	34	40	215
Beverage	12'	24"	400	365	4 - 6	34	40	215
Beverage	12'	36"	600	550	4 - 6	34	40	215
Deli / Dairy	1 - 6 Door	30"	560	510	4 - 6	30	36	215
Deli / Dairy	4'	24"	445	405	4 - 6	30	36	215
Deli / Dairy	6'	24"	445	405	4 - 6	30	36	215
Deli / Dairy	8'	24"	445	405	4 - 6	30	36	215
Deli / Dairy	8'	32"	595	540	4 - 6	30	36	215
Deli / Dairy	12'	24"	445	405	4 - 6	30	36	215
Deli / Dairy	12'	36"	670	610	4 - 6	30	36	215
Meat	1 - 6 Door	30"	595	545	4 - 6	28	34	215
Meat	4'	24"	475	435	4 - 6	28	34	215
Meat	6'	24"	475	435	4 - 6	28	34	215
Meat	8'	24"	475	435	4 - 6	28	34	215
Meat	8'	32"	635	580	4 - 6	28	34	215
Meat	12'	24"	475	435	4 - 6	28	34	215
Meat	12'	36"	715	655	4 - 6	28	34	215

DEFROST CONTROLS		
Defrosts Per Day	Timed-Off Defrost	
	Fail-Safe (Min)	Termination Temp (°F)
4	30	47

NOTES

- "---" indicates that this feature is not an option on this case model.
- Data listed is for Optimax Radiant. For other lighting options please contact your sales representative.
- Anti-condensate heat values for Eliminator represent a door with no heat on the glass.
- 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 determine actual daily energy usage at 75°F/55%RH conditions, reduce the light wattages below by 42%.



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.

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A16: TECHNICAL REFERENCE SHEET

ORB

Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

SECOND NATURE DATA

Case Model	No. of Coils	Application	Front Sill height	BTUH/FT		GPM/ft (DR)	Supply Fluid Temp (°F)	Discharge Air Temp (°F)
				Conventional	Parallel			
ORB (30" DOOR)	1	Beverage	Std. Reach In	500	460	0.05	20	38
ORB (30" DOOR)	1	Deli/Dairy	Std. Reach In	560	510	0.08	20	36
ORB (30" DOOR)	1	Meat	Std. Reach In	595	545	0.11	20	34
ORB (30" DOOR)	1	Beverage	Std. Reach In	500	460	0.08	25	38
ORB (30" DOOR)	1	Deli/Dairy	Std. Reach In	560	510	0.13	25	36
ORB (30" DOOR)	1	Meat	Std. Reach In	595	545	0.16	25	34
ORB (PER FOOT)	1	Beverage	Std. Reach In	200	183	0.02	20	38
ORB (PER FOOT)	1	Deli/Dairy	Std. Reach In	223	203	0.03	20	36
ORB (PER FOOT)	1	Meat	Std. Reach In	238	218	0.04	20	34
ORB (PER FOOT)	1	Beverage	Std. Reach In	200	183	0.03	25	38
ORB (PER FOOT)	1	Deli/Dairy	Std. Reach In	223	203	0.05	25	36
ORB (PER FOOT)	1	Meat	Std. Reach In	238	218	0.06	25	34

SECOND NATURE DATA

Case Model	No. of Coils	Application	Front Sill height	Supply Fluid Temp (°F)	No. of Defrost	Timed-Off Defrost		Warm Fluid Defrost	
						Fail-Safe (Min)	Termination Temp (°F)	Fail-Safe (Min)	Termination Temp (°F)
ORB (30" DOOR)	1	Beverage	Std. Reach In	20	4	60	47	26	49
ORB (30" DOOR)	1	Deli/Dairy	Std. Reach In	20	4	60	47	26	49
ORB (30" DOOR)	1	Meat	Std. Reach In	20	4	60	47	26	49
ORB (30" DOOR)	1	Beverage	Std. Reach In	25	4	45	47	26	49
ORB (30" DOOR)	1	Deli/Dairy	Std. Reach In	25	4	45	47	26	49
ORB (30" DOOR)	1	Meat	Std. Reach In	25	4	45	47	26	49
ORB (PER FOOT)	1	Beverage	Std. Reach In	20	4	60	47	26	49
ORB (PER FOOT)	1	Deli/Dairy	Std. Reach In	20	4	60	47	26	49
ORB (PER FOOT)	1	Meat	Std. Reach In	20	4	60	47	26	49
ORB (PER FOOT)	1	Beverage	Std. Reach In	25	4	45	47	26	49
ORB (PER FOOT)	1	Deli/Dairy	Std. Reach In	25	4	45	47	26	49
ORB (PER FOOT)	1	Meat	Std. Reach In	25	4	45	47	26	49

NOTES

- All medium temperature data listed is for 35% by wt. PROPYLENE GLYCOL.
- Inhibited Propylene Glycol solution with water, such as Dowfrost or equivalent. (Dowfrost is a trademark of the Dow Chemical Company).
- Flowrates are determined by ASHRAE test conditions and may need to be adjusted based on store conditions.
- ** Flowrates are per case



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.

ORB

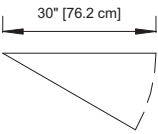
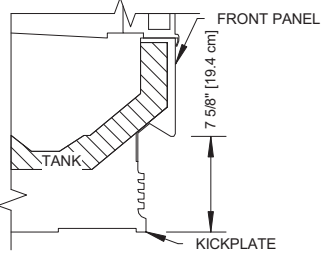
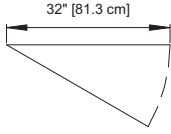
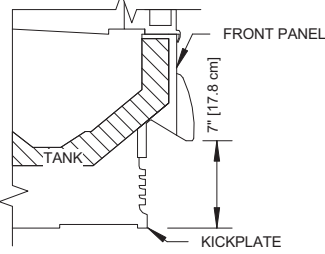
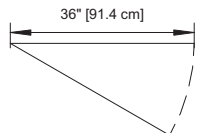
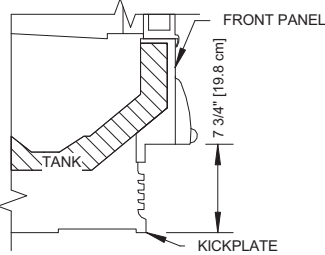
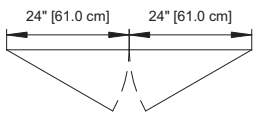
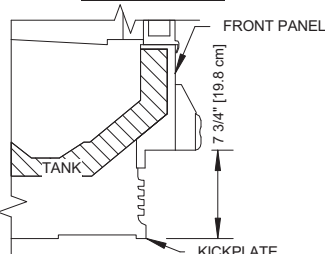
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A17: TECHNICAL REFERENCE SHEET

ORB

Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

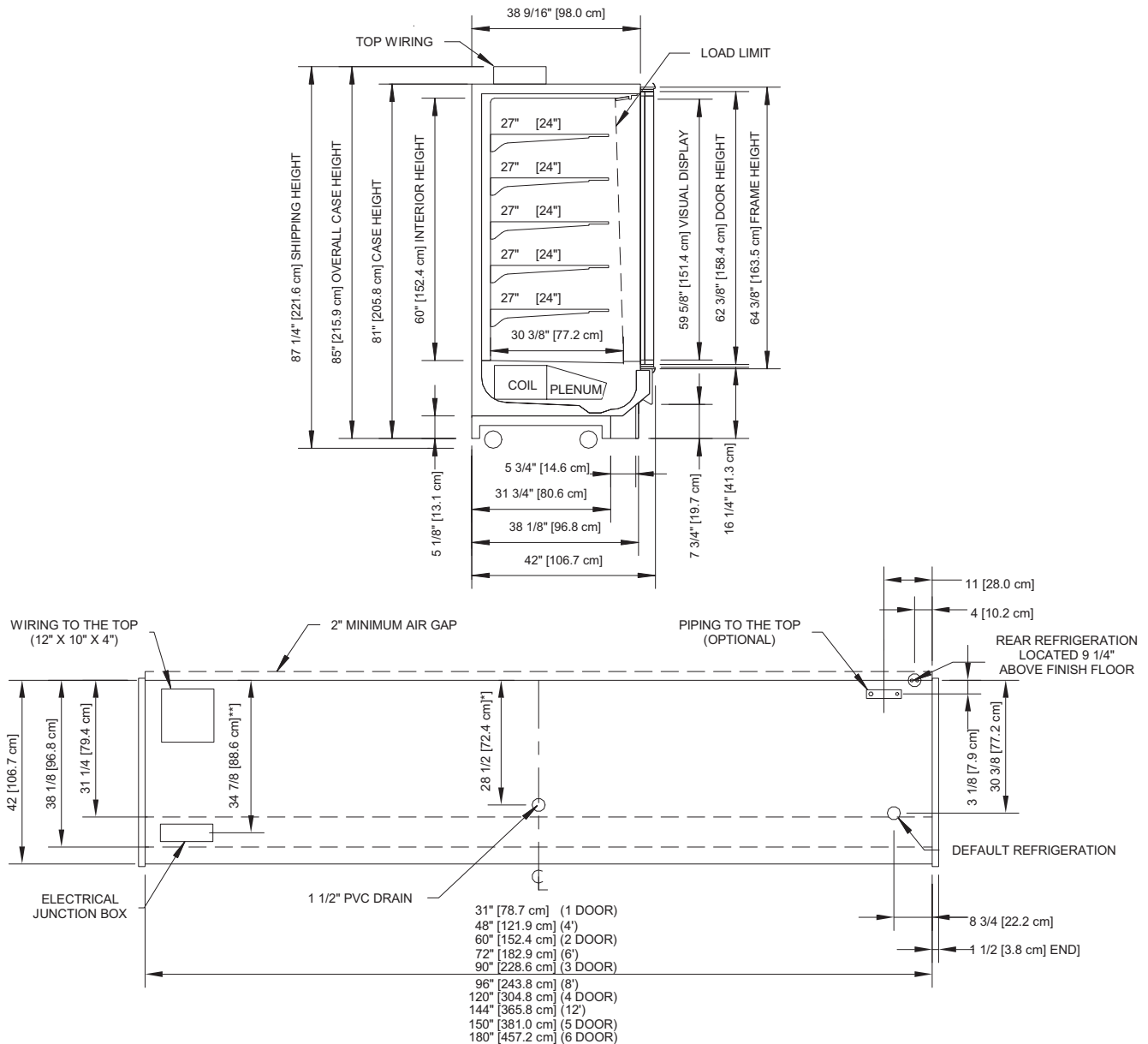
DOOR OPTIONS	FRONT OPTIONS
STANDARD SWING DOOR 1, 2, 3, 4, 5, & 6 - DOOR CASES 	<u>FLAT FRONT (O SERIES)</u> 
STANDARD SWING DOOR 8' CASE 	<u>STREAMLINE BUMPER</u> 
STANDARD SWING DOOR 12' CASE 	<u>HALF BUMPER</u> 
BI-SWING DOOR 4', 6', 8' & 12' CASES 	<u>CLASSIC 2 BUMPER</u> 

ORB		
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A18: TECHNICAL REFERENCE SHEET

ORB

Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)



NOTES

* : STUB-UP AREA

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

- Ends add approximately 1" to case height, 1/2" to the back & 1" to the front

2017
DOE
COMPLIANT



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.

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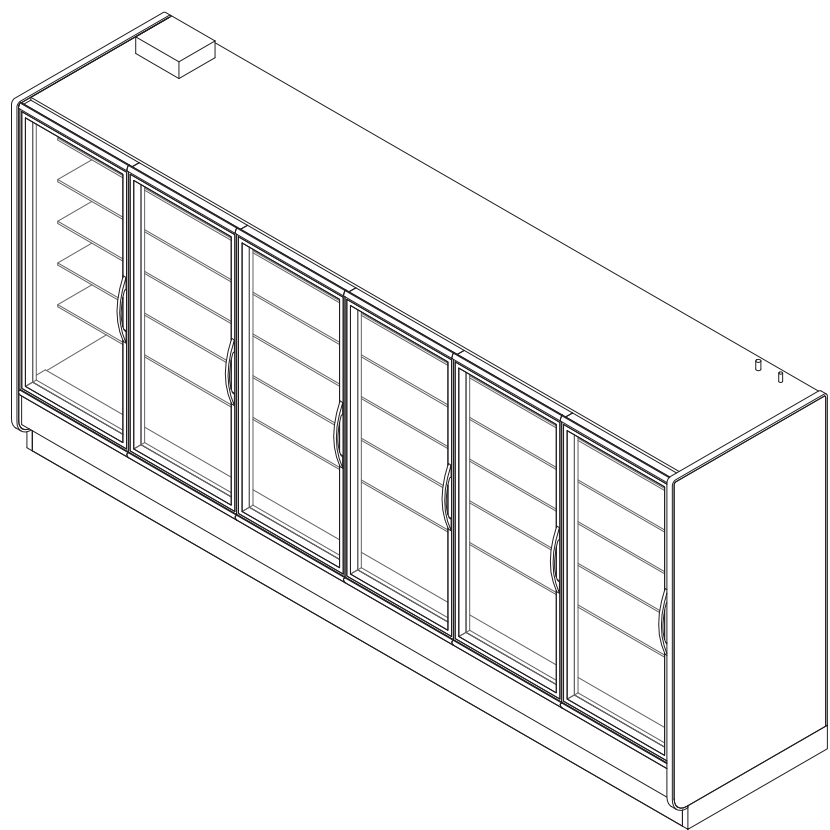
A19: TECHNICAL REFERENCE SHEET

ORBH

High Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

GENERAL NOTES

- 4-foot Bi-Swing cases consist of 2 (24") doors
- 6-foot Bi-Swing cases consist of 3 (24") doors
- 8-foot cases single swing consist of 3 (32") doors
- 8-foot case Bi-swing consist of 4 (24") doors
- 12-foot cases single swing consist of 4 (36") doors
- 12-foot cases Bi-swing consist of 6 (24") doors
- 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. Store level A/S control should be set to 30% minimum off time at 75°F/55%RH.



SHIPPING WEIGHT	
Case	Weight
ORBH	---



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.

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A20: TECHNICAL REFERENCE SHEET

ORBH

High Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

ELECTRICAL DATA			
Case Length	Fans Per Case	High Efficiency Fans	
		120 Volt	
		Amps	Watts
1 Door	1	0.22	26
2 Door	2	0.44	53
3 Door	3	0.66	79
4 Door	4	0.88	106
5 Door	5	1.10	132
6 Door	6	1.32	158
4'	1	0.22	26
6'	2	0.44	53
8'	2	0.44	53
12'	3	0.66	79

LIGHTING DATA					
Case Length	Door Size	OP45		OP55 (French Swing Only)	
		120 Volts		120 Volts	
		Amps	Watts	Amps	Watts
1 Door	31"	0.18	21.0	---	---
2 Door	30"	0.36	43.1	---	---
3 Door	30"	0.54	65.2	---	---
4 Door	30"	0.73	87.3	---	---
5 Door	30"	0.91	109.4	---	---
6 Door	30"	1.10	131.5	---	---
4'	24"	---	---	0.26	31.0
6'	24"	---	---	0.52	61.9
8'	24"	---	---	0.52	61.9
8'	32"	0.54	65.2	---	---
12'	24"	---	---	0.77	92.8
12'	36"	0.73	87.3	---	---

ANTI CONDENSATE DATA					
Case Length	Door Size	101 Frames		Vista Frames	
		Un Heated Doors		Un Heated Doors	
		ELMD, ELMH, I90		Vista C, I60	
		120 Volts		120 Volts	
		Amps	Watts	Amps	Watts
1 Door	31"	0.18	22	0.18	22
2 Door	30"	0.36	43	0.36	43
3 Door	30"	0.55	66	0.55	66
4 Door	30"	0.75	90	0.75	90
5 Door	30"	0.94	113	0.94	113
6 Door	30"	1.15	138	1.15	138
4'	24"	0.20	24	0.20	24
6'	24"	0.39	47	0.39	47
8'	24"	0.43	52	0.43	52
8'	32"	0.56	67	0.52	62
12'	24"	0.68	82	0.68	82
12'	36"	0.80	96	0.80	96

2017
DOE
COMPLIANT



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.

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A21: TECHNICAL REFERENCE SHEET

ORBH

High Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

GUIDELINES AND CONTROL SETTINGS

Application	Case Length	Door Size	BTUH/ft		Superheat Set Point @ Bulb (°F)	Evaporator (°F)	Discharge Air (°F)	Discharge Air Velocity (FPM)
			Conventional	Parallel				
Beverage	1 - 6 Door	30"	620	570	4 - 6	34	40	215
Beverage	4'	24"	495	455	4 - 6	34	40	215
Beverage	6'	24"	495	455	4 - 6	34	40	215
Beverage	8'	24"	495	455	4 - 6	34	40	215
Beverage	8'	32'	660	610	4 - 6	34	40	215
Beverage	12'	24"	495	455	4 - 6	34	40	215
Beverage	12'	36"	745	685	4 - 6	34	40	215
Deli	1 - 6 Door	30"	675	620	4 - 6	30	36	215
Deli	4'	24"	540	495	4 - 6	30	36	215
Deli	6'	24"	540	495	4 - 6	30	36	215
Deli	8'	24"	540	495	4 - 6	30	36	215
Deli	8'	32"	720	660	4 - 6	30	36	215
Deli	12'	24"	540	495	4 - 6	30	36	215
Deli	12'	36"	810	745	4 - 6	30	36	215
Meat	1 - 6 Door	30"	715	660	4 - 6	28	34	215
Meat	4'	24"	570	525	4 - 6	28	34	215
Meat	6'	24"	570	525	4 - 6	28	34	215
Meat	8'	24"	570	525	4 - 6	28	34	215
Meat	8'	32"	760	700	4 - 6	28	34	215
Meat	12'	24"	570	525	4 - 6	28	34	215
Meat	12'	36"	855	790	4 - 6	28	34	215

DEFROST CONTROLS

Defrosts Per Day	Timed-Off Defrost	
	Fail-Safe (Min)	Termination Temp (F)
4	30	47

NOTES

- "----" indicates that this feature is not an option on this case model.
- Data listed is for Optimax Radiant. For other lighting options please contact your sales representative.
- Anti-condensate heat values for Eliminator represent a door with no heat on the glass.
- 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 determine actual daily energy usage at 75°F/55%RH conditions, reduce the light wattages below by 42%.



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.

ORBH

Rev. Date	Rev. #	Rev. Title
9-26-19	6	DATA UPDATE
9-24-19	5	ENDVIEW UPDATE

Hillphoenix
A DOVER COMPANY

A22: TECHNICAL REFERENCE SHEET

ORBH

High Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

SECOND NATURE DATA								
Case Model	No. of Coils	Application	Front Sill height	BTUH/FT		GPM/ft (DR)	Supply Fluid Temp (°F)	Discharge Air Temp (°F)
				Conventional	Parallel			
ORBH (30" Door)	1	Beverage	Std. Reach In	620	570	0.07	20	38
ORBH (30" Door)	1	Deli/Dairy	Std. Reach In	675	620	0.10	20	36
ORBH (30" Door)	1	Meat	Std. Reach In	715	660	0.13	20	34
ORBH (30" Door)	1	Beverage	Std. Reach In	620	570	0.10	25	38
ORBH (30" Door)	1	Deli/Dairy	Std. Reach In	675	620	0.15	25	36
ORBH (30" Door)	1	Meat	Std. Reach In	715	660	0.19	25	34
ORBH (Per Foot)	1	Beverage	Std. Reach In	248	228	0.03	20	38
ORBH (Per Foot)	1	Deli/Dairy	Std. Reach In	270	248	0.04	20	36
ORBH (Per Foot)	1	Meat	Std. Reach In	285	263	0.05	20	34
ORBH (Per Foot)	1	Beverage	Std. Reach In	248	228	0.04	25	38
ORBH (Per Foot)	1	Deli/Dairy	Std. Reach In	270	248	0.06	25	36
ORBH (Per Foot)	1	Meat	Std. Reach In	285	263	0.07	25	34

SECOND NATURE DATA									
Case Model	No. of Coils	Application	Front Sill height	Supply Fluid Temp (°F)	No. of Defrost	Timed-Off Defrost		Warm Fluid Defrost	
						Fail-Safe (Min)	Termination Temp (°F)	Fail-Safe (Min)	Termination Temp (°F)
ORBH (30" Door)	1	Beverage	Std. Reach In	20	4	60	47	26	49
ORBH (30" Door)	1	Deli/Dairy	Std. Reach In	20	4	60	47	26	49
ORBH (30" Door)	1	Meat	Std. Reach In	20	4	60	47	26	49
ORBH (30" Door)	1	Beverage	Std. Reach In	25	4	45	47	26	49
ORBH (30" Door)	1	Deli/Dairy	Std. Reach In	25	4	45	47	26	49
ORBH (30" Door)	1	Meat	Std. Reach In	25	4	45	47	26	49
ORBH (Per Foot)	1	Beverage	Std. Reach In	20	4	60	47	26	49
ORBH (Per Foot)	1	Deli/Dairy	Std. Reach In	20	4	60	47	26	49
ORBH (Per Foot)	1	Meat	Std. Reach In	20	4	60	47	26	49
ORBH (Per Foot)	1	Beverage	Std. Reach In	25	4	45	47	26	49
ORBH (Per Foot)	1	Deli/Dairy	Std. Reach In	25	4	45	47	26	49
ORBH (Per Foot)	1	Meat	Std. Reach In	25	4	45	47	26	49

NOTES

- All medium temperature data listed is for 35% by wt. PROPYLENE GLYCOL.
- Inhibited Propylene Glycol solution with water, such as Dowfrost or equivalent. (Dowfrost is a trademark of the Dow Chemical Company).
- Flowrates are determined by ASHRAE test conditions and may need to be adjusted based on store conditions.
- ** Flowrates are per case

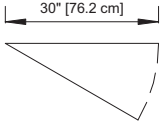
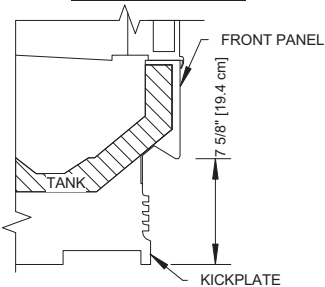
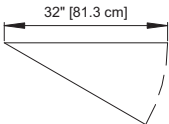
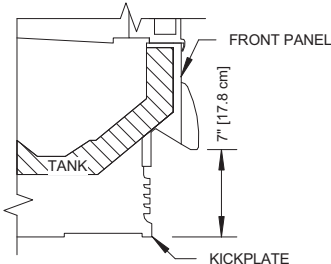
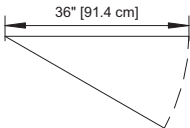
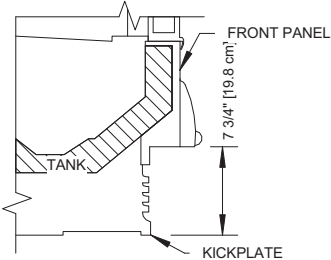
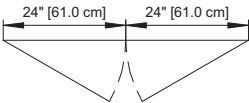
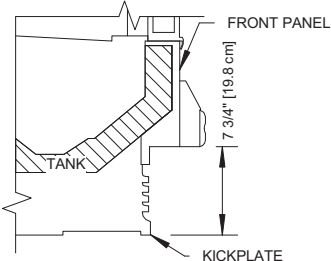
ORBH

Rev. Date	Rev. #	Rev. Title
9-26-19	6	DATA UPDATE
9-24-19	5	ENDVIEW UPDATE

A23: TECHNICAL REFERENCE SHEET

ORBH

High Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)

DOOR OPTIONS	FRONT OPTIONS
STANDARD SWING DOOR 1, 2, 3, 4, 5, 6 - DOOR CASES 	<u>FLAT FRONT (O SERIES)</u> 
STANDARD SWING DOOR 8' CASE 	<u>STREAMLINE BUMPER</u> 
STANDARD SWING DOOR 12' CASE 	<u>HALF BUMPER</u> 
BI- SWING DOOR 4', 6', 8' & 12' CASES 	<u>CLASSIC 2 BUMPER</u> 

2017 DOE COMPLIANT 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.

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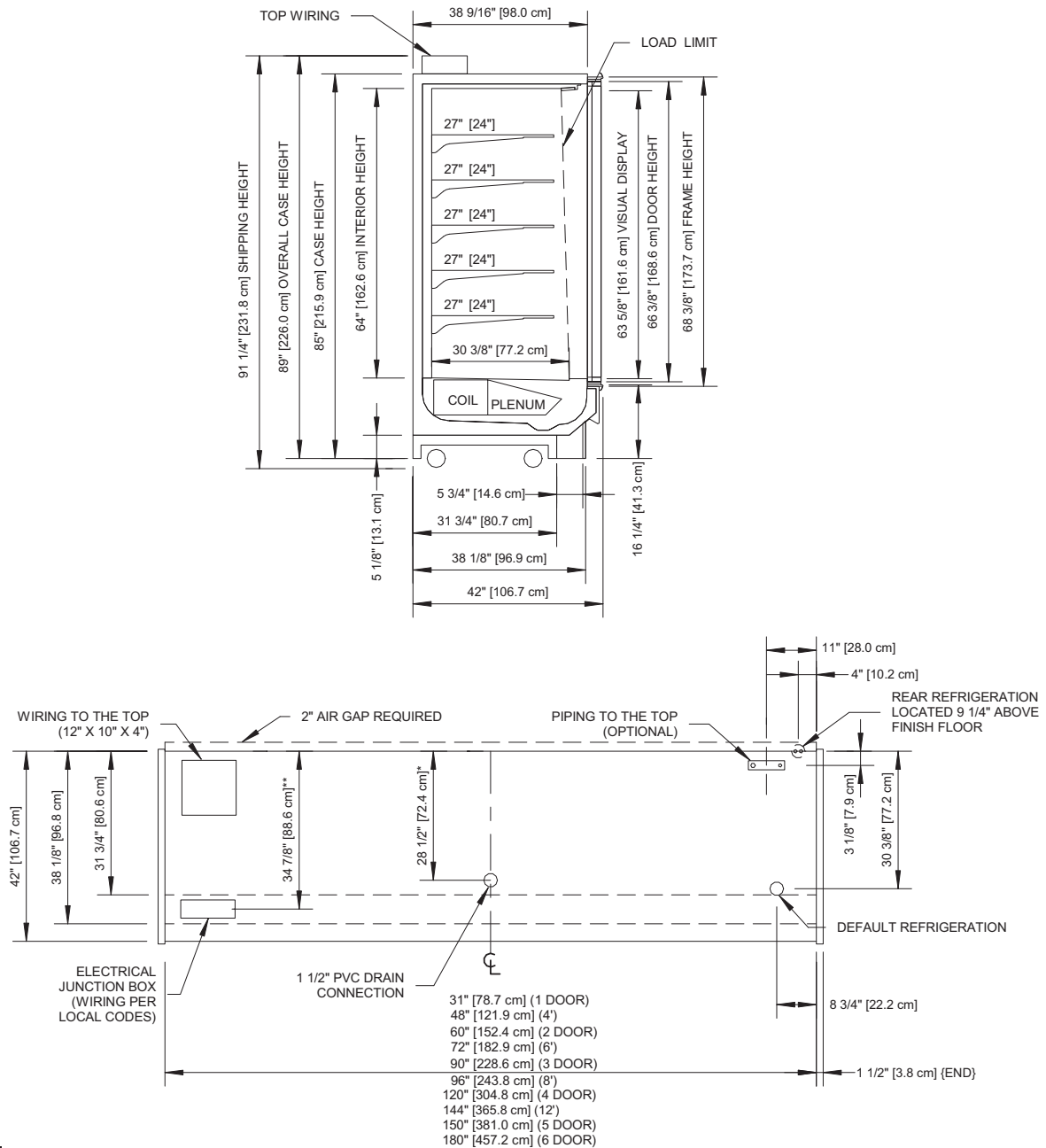
ORBH		
Rev. Date	Rev. #	Rev. Title
9-26-19	6	DATA UPDATE
9-24-19	5	ENDVIEW UPDATE

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A24: TECHNICAL REFERENCE SHEET

ORBH

High Reach-In Merchandiser
1, 2, 3, 4, 5 & 6 Door / 4', 6', 8' & 12' (Beverage / Dairy / Deli / Meat)



NOTES

* : STUB-UP AREA.

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

- Ends add approximately 1" to case height, 1/2" to the back & 1" to the front.



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.

ORBH

Rev. Date	Rev. #	Rev. Title
9-26-19	6	DATA UPDATE
9-24-19	5	ENDVIEW UPDATE

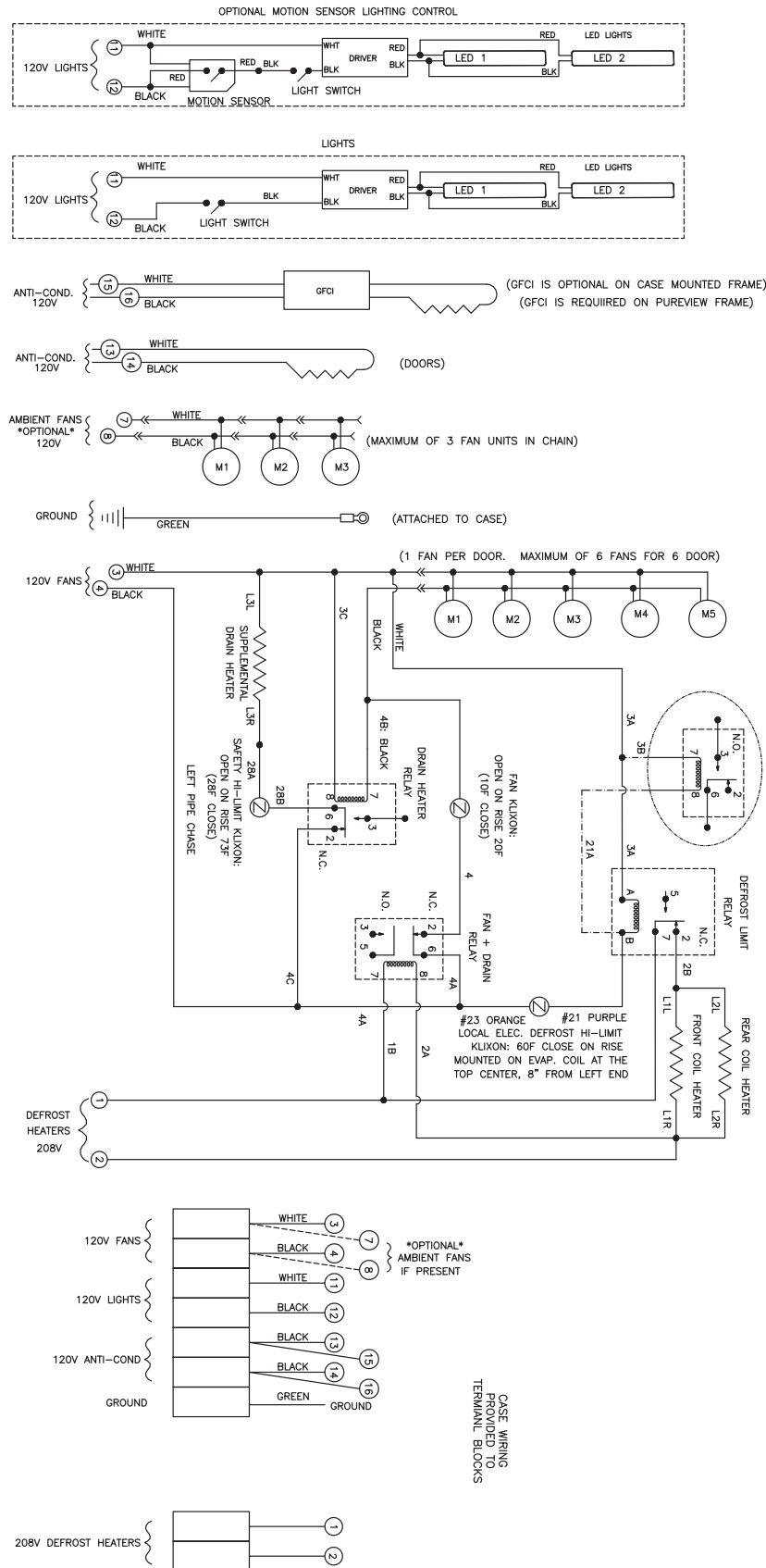
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A DOVER COMPANY

B1: ELECTRICAL WIRING DIAGRAM

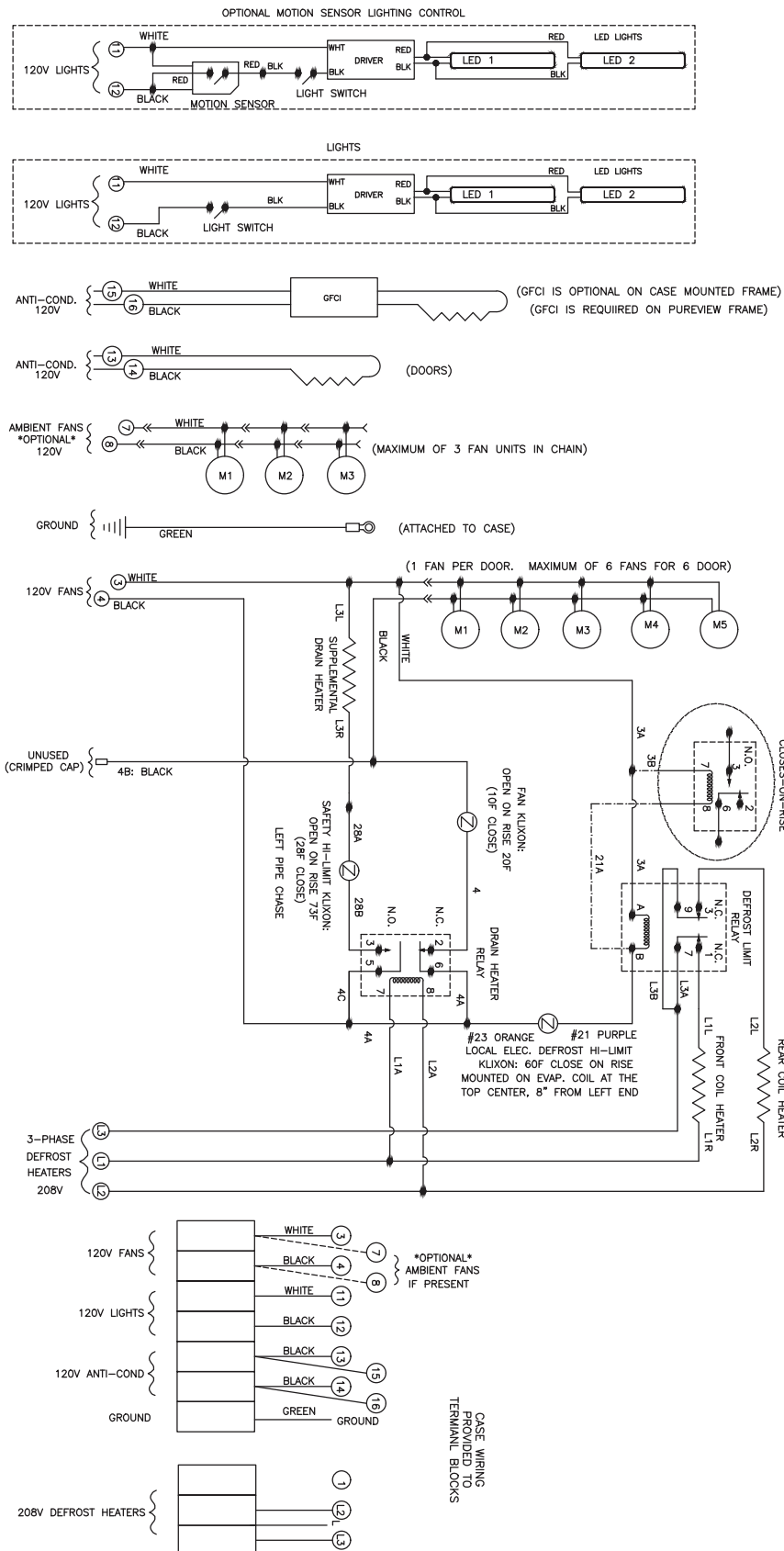
WIRING IDENTIFICATION

ATTENTION ELECTRICIAN :FOR SAFETY AND CODE COMPLIANCE GROUND FIXTURE AT TIME OF INSTALLATION :CAUTION RISK OF ELECTRIC SHOCK. MORE THAN ONE POWER-SUPPLY. DISCONNECT ALL POWER-SUPPLIES BEFORE SERVICING. P901598E - R4	WIRE IDENTIFICATION	BLACK	WHITE	BLUE	RED	YELLOW	PURPLE	ORANGE	GREEN
	DEFROST HEATERS (1-PHASE)	1,2							
	DEFROST HEATERS (3-PHASE)	L1		L3	L2				
	ANTI-CONDENSATE HEATERS	14	13						
		16	15						
		18	17						
		10	9						
	aisle warmer								
	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
	GFI Receptacle	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		61						
	Tank Flush Solenoid	87,220V	87						86
	Misting Solenoid	89,220V	89			88			
	Drip Down Timer					90			
	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

B2: ELECTRICAL WIRING DIAGRAM

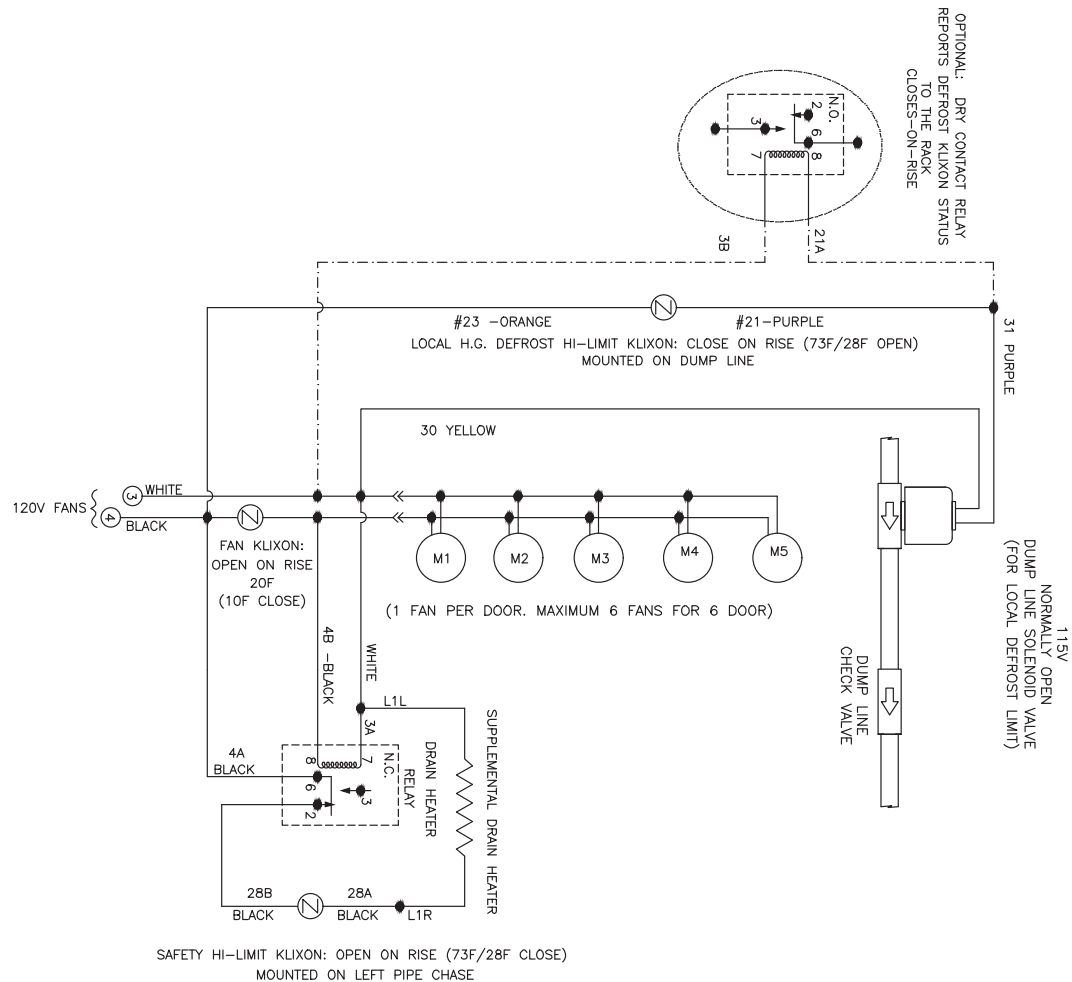
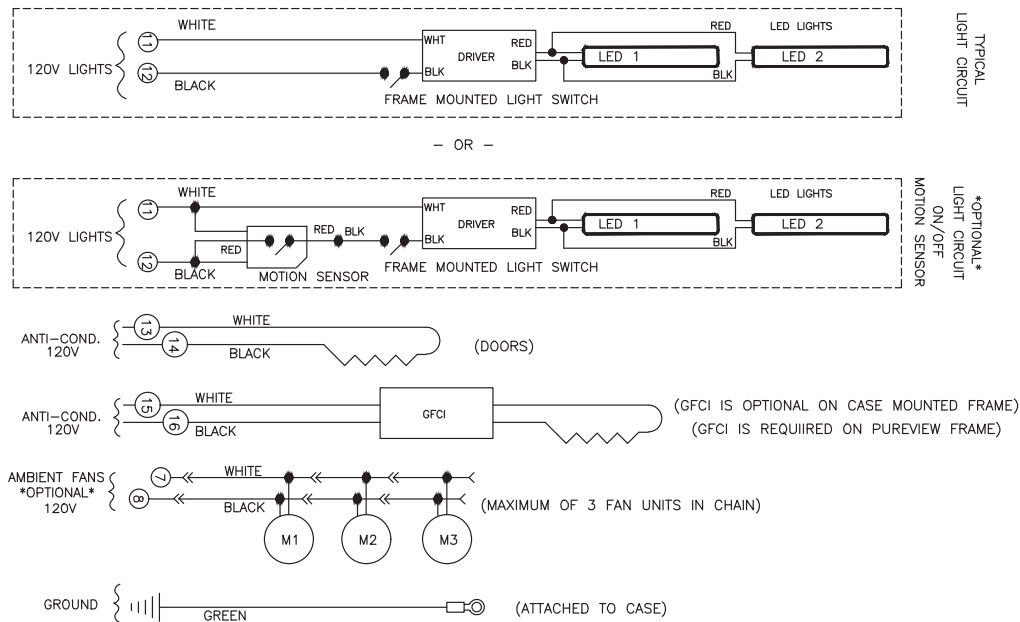
ELECTRIC DEFROST: 1-PHASE

ELECTRIC DEFROST: 3-PHASE



B4: ELECTRICAL WIRING DIAGRAM

ELECTRIC DEFROST: HOT GAS



C1: SPORTAN PRESSURE-TEMPERATURE CHART

Vacuum-Inches of Mercury Bold Italic Figures		TEMPERATURE PRESSURE CHART - at sea level										Pressure-Pounds Per Square Inch Gauge	
		REFRIGERANT (SPORLAN CODE)		REFRIGERANT (SPORLAN CODE)		REFRIGERANT (SPORLAN CODE)		REFRIGERANT (SPORLAN CODE)		REFRIGERANT (SPORLAN CODE)			
TEMPERATURE		TEMPERATURE		TEMPERATURE		TEMPERATURE		TEMPERATURE		TEMPERATURE			
(°F)	(°C)	134a (U)	404A (S)	507 (P)	717 (A)	744 - CO ₂	134a (U)	404A (S)	507 (P)	717 (A)	744 - CO ₂	(°F)	(°C)
-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
-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
-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
-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	-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
-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
-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
-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
-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
-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
-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
-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
-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
-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
-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
-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
-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
-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
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
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
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
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
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
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
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
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
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
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
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
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

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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D1: CASE TOP FASCIA

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).

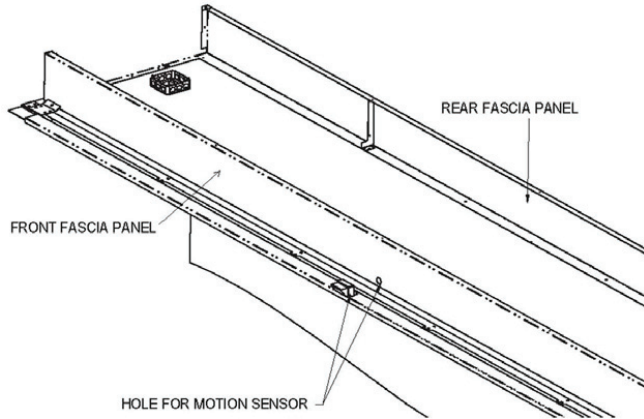


Fig. 1 Front and rear fascia

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.

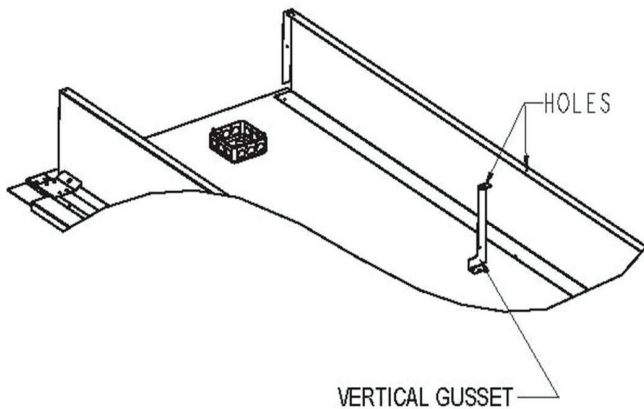


Fig. 2 Attach vertical gussets

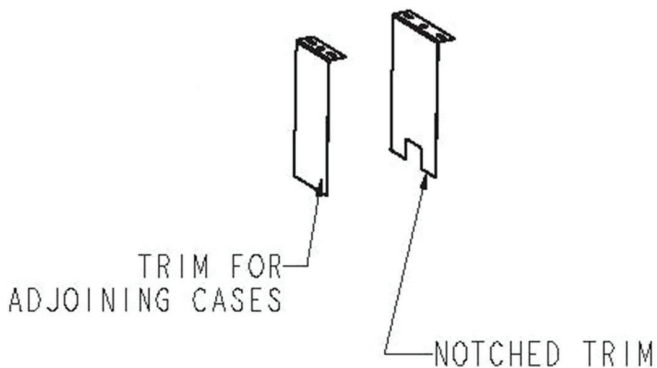


Fig. 3 Notched trim

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.

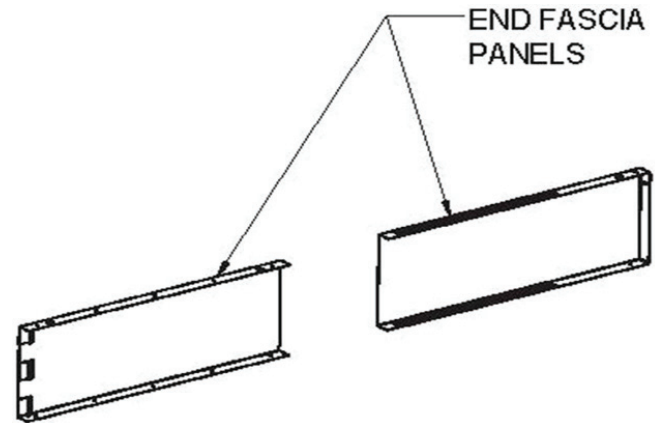


Fig. 4 Install end fascia panels

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).

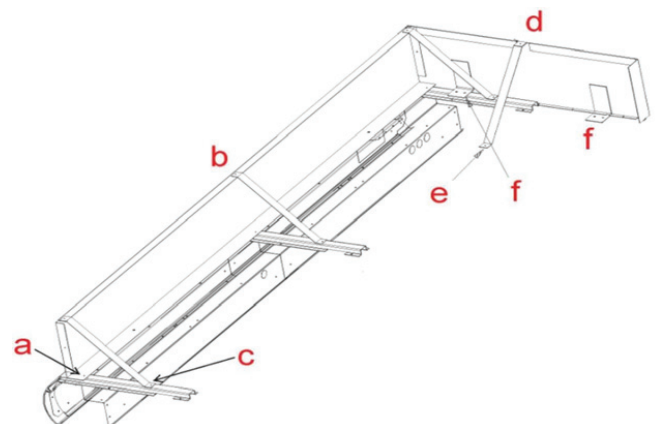
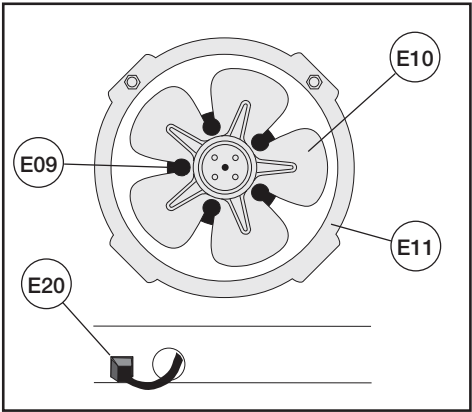


Fig. 5 Attaching fascia to ballast supports

E1: PARTS LIST



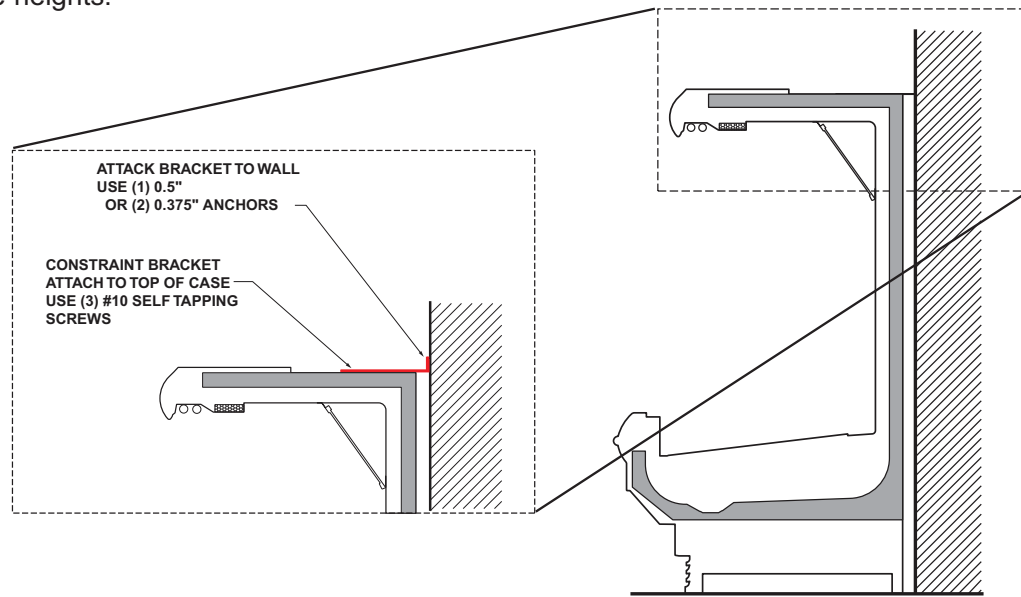
E2: PARTS LIST

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

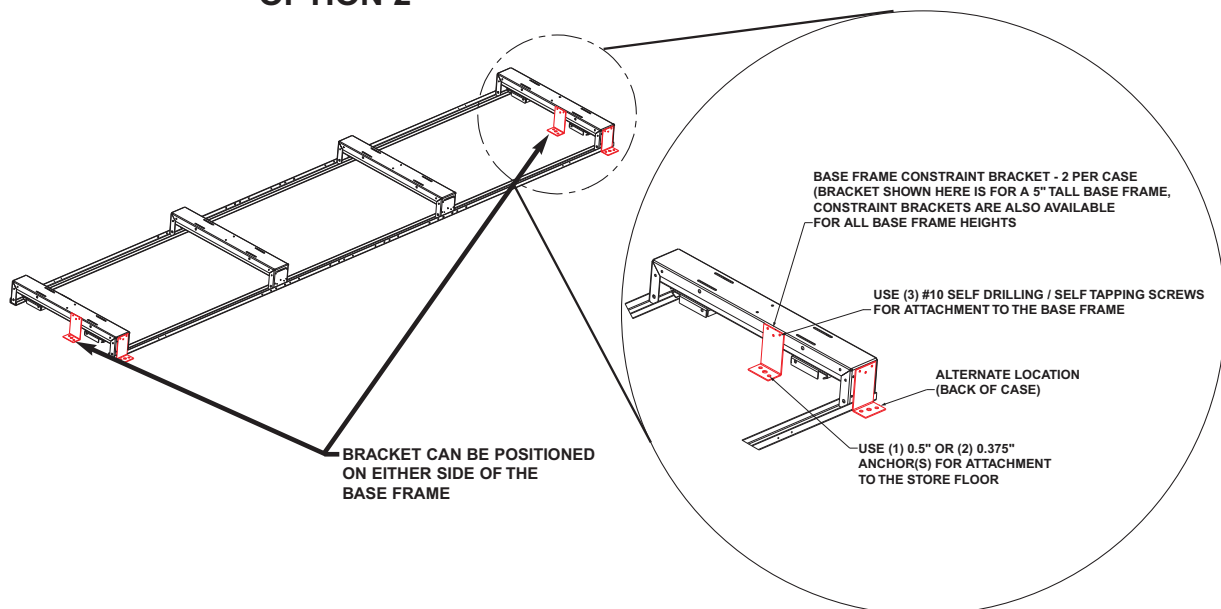
F1: SEISMIC BRACKETS

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



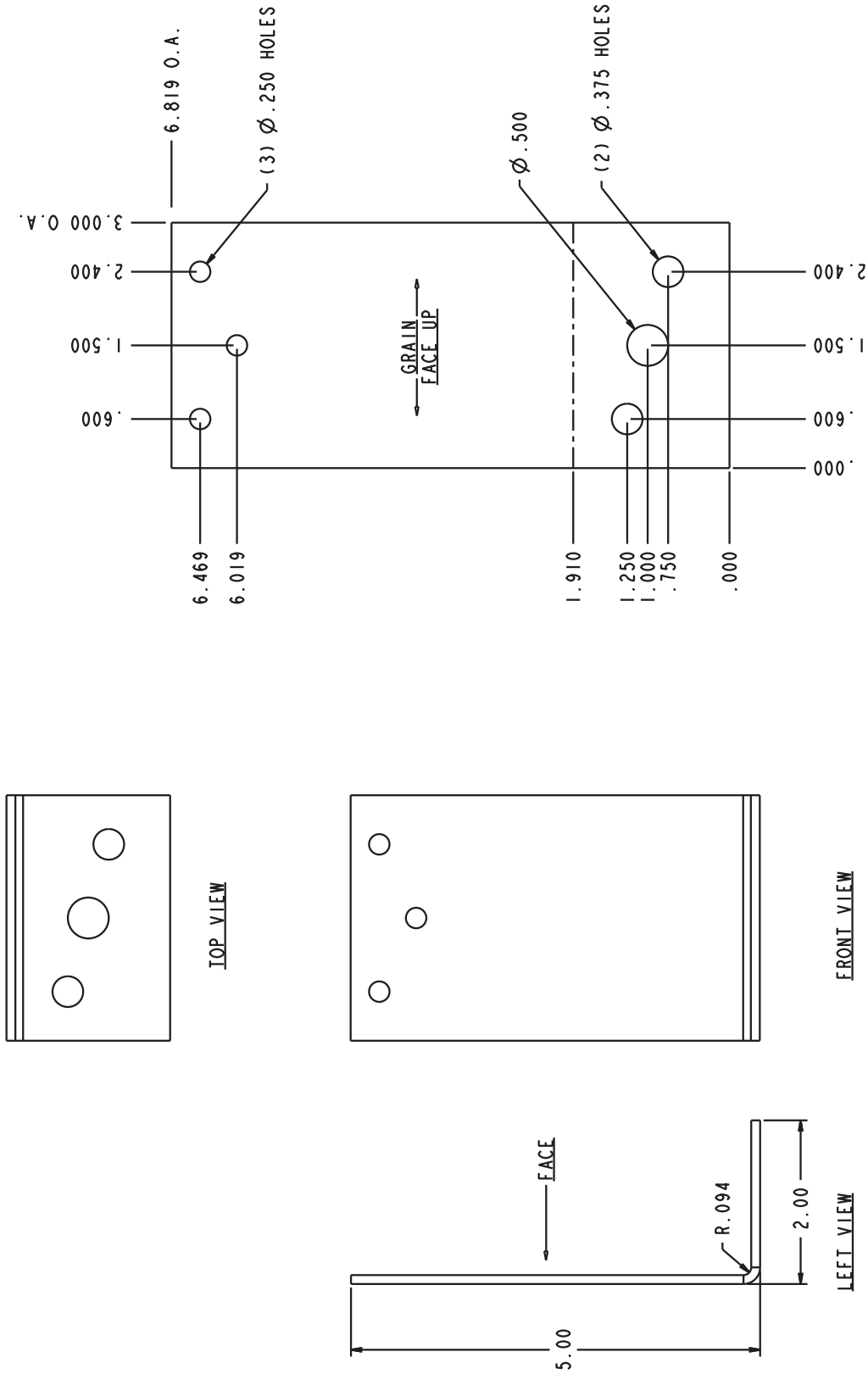
OPTION 2



A DOVERTM COMPANY

F2: SEISMIC BRACKETS

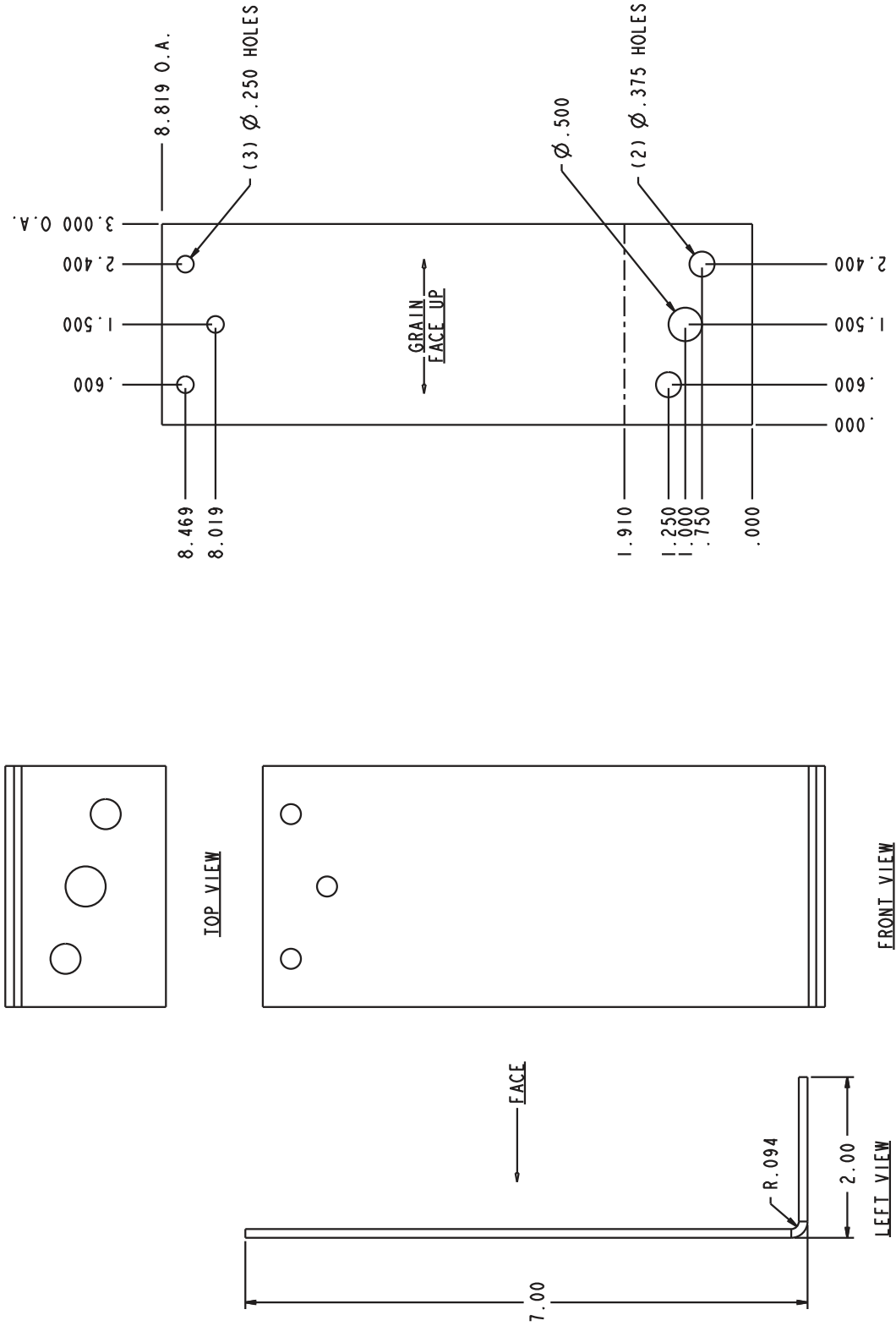
5" BRACKETS



REV 05/15/06	62357	×	RELEASED TO PRODUCTION
BY	DATE	ECN NO. R/	DESCRIPTION
INFORMATION SHOWN IS PROPRIETARY AND CONFIDENTIAL. REPRODUCTION OR DISSEMINATION WITHOUT PERMISSION FROM HILL PHOENIX IS PROHIBITED.			

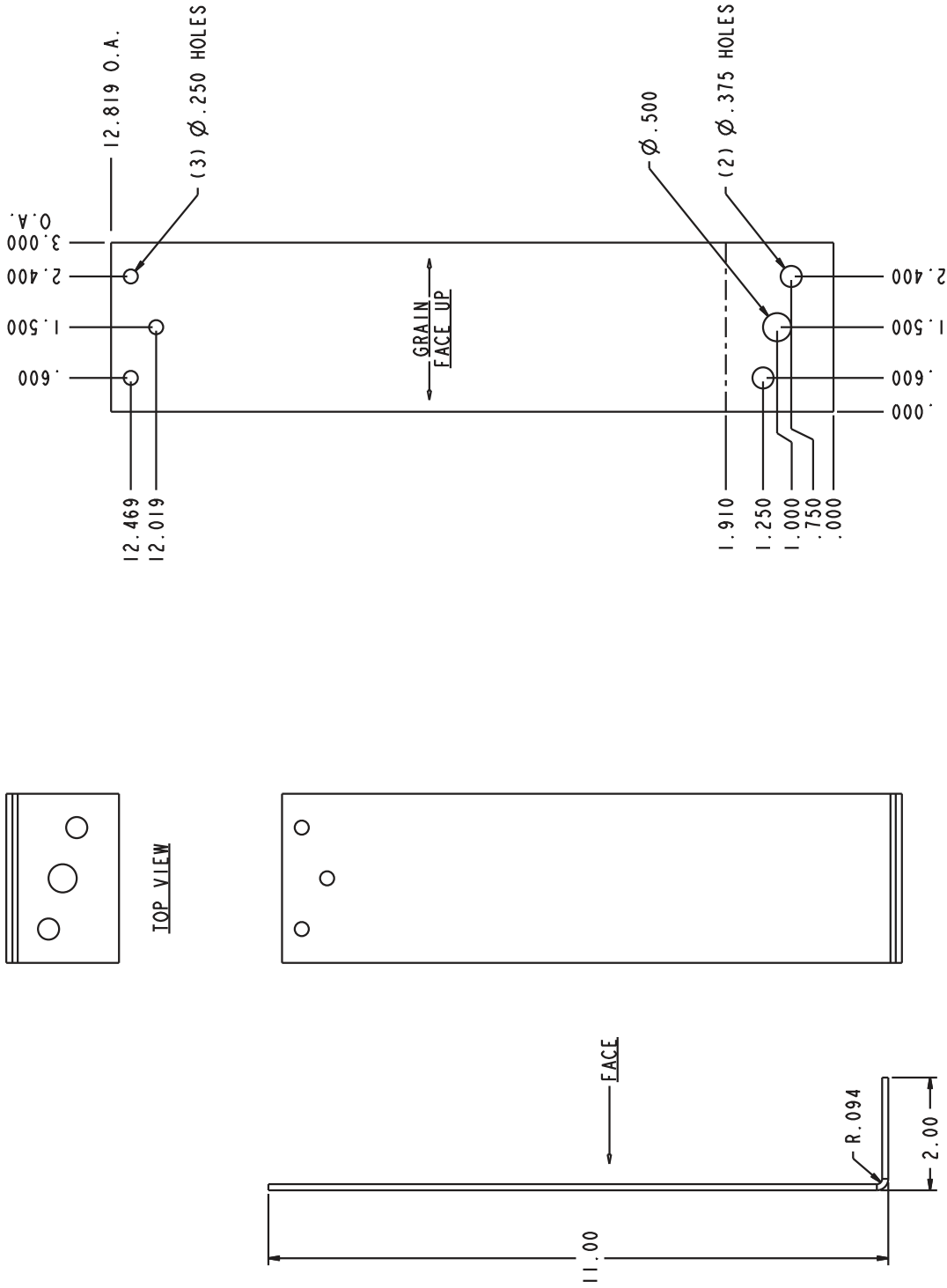
F3: SEISMIC BRACKETS

7" BRACKETS

[illegible]

F4: SEISMIC BRACKETS

11" BRACKETS



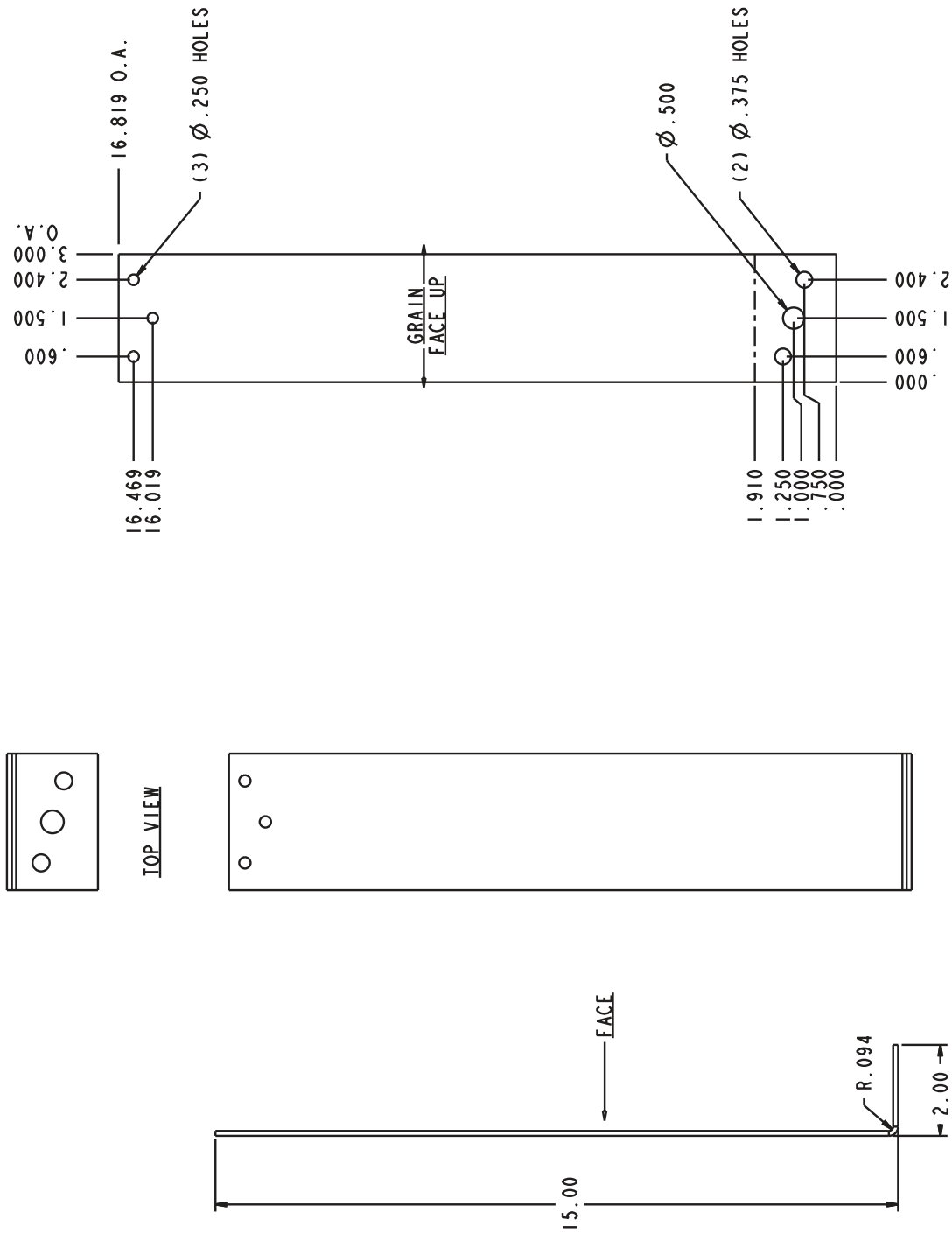
FRONT VIEW

LEFT VIEW

[illegible]

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15" BRACKETS

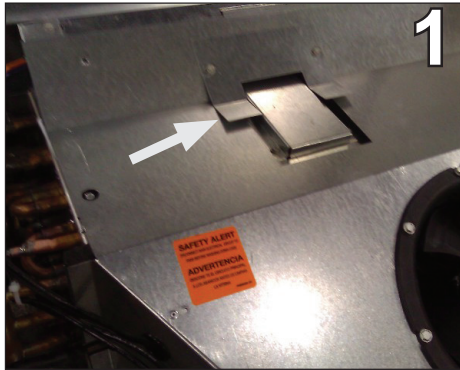


FRONT VIEW

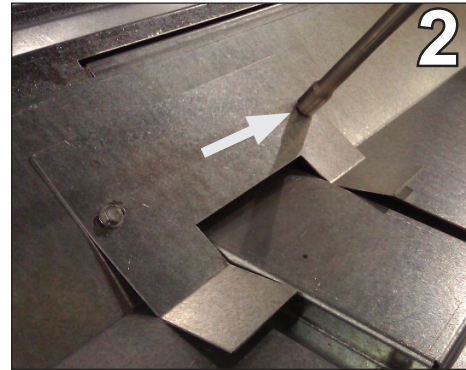
LEFT VIEW

[illegible]

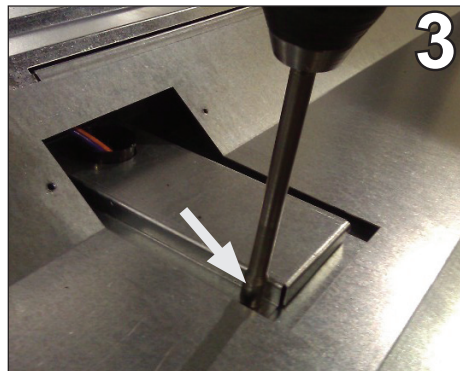
G1: DEFROST SENSOR ACCESS PANEL



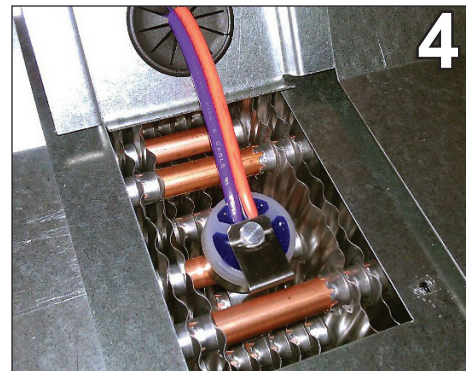
Access panel is located on the left-hand side of the fan plenum .



Unscrew top access panel and remove.



Unscrew sub-panel and lift up, being careful to avoid damage to wiring.



Access to the coil-mounted Klixon and/or defrost termination sensor is now available.

H1: 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.

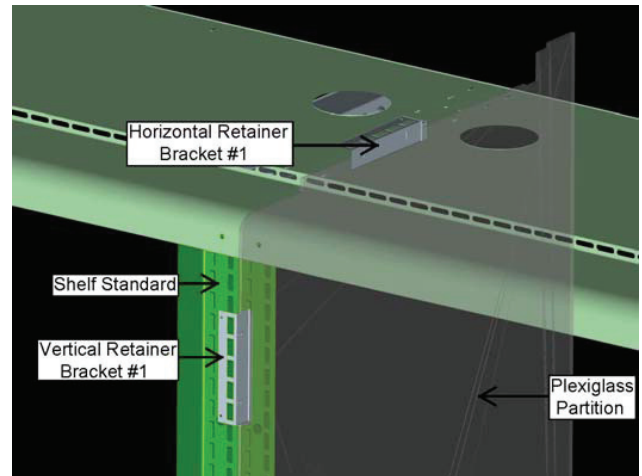


Figure 1: Top of Plexiglas Partition

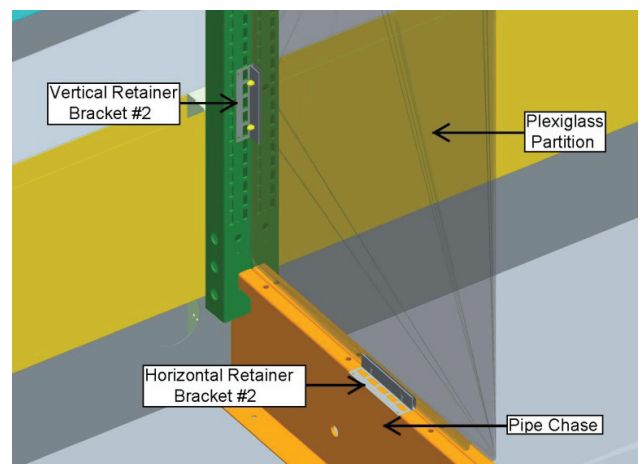


Figure 2: Bottom of Plexiglas

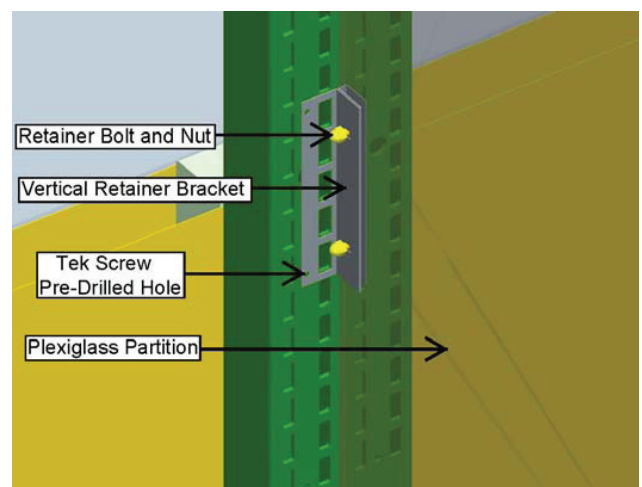


Figure 3: Vertical Retainer Bracket Installation

I1: ELECTRONIC DISPLAY MODULE

The electronic display module (EDM) is installed within a protective enclosure (Fig. 1) and is initially secured to the top-rear area of the case. Unscrew the display module from this location.

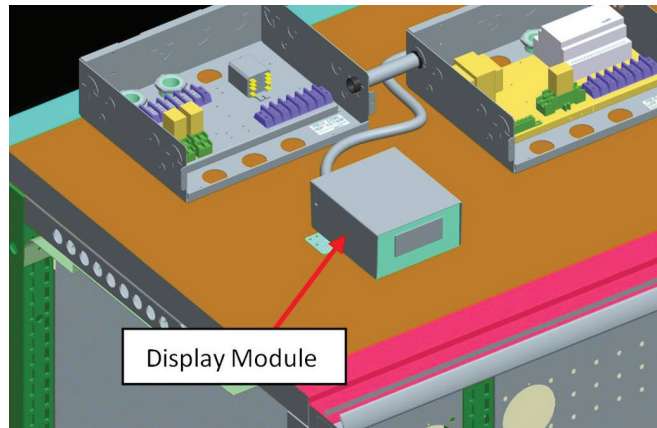


Fig. 1 Electronic display module inside protective enclosure

Pull the display module forward to the front, left-hand side of the case. If top fascia is utilized, slide the display module through the pre-cut rectangular hole in the fascia (Fig. 2) until it sits flush against the cornice.

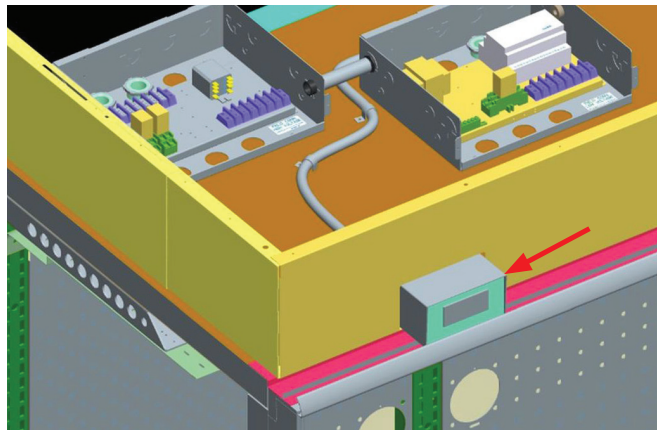


Fig. 2 Slide EDM through pre-cut hole in fascia

Align the pre-drilled holes in the display module and the fascia (Fig. 3), then secure the module using the provided screws.

NOTE: these instructions do not apply to Airewave fascia.

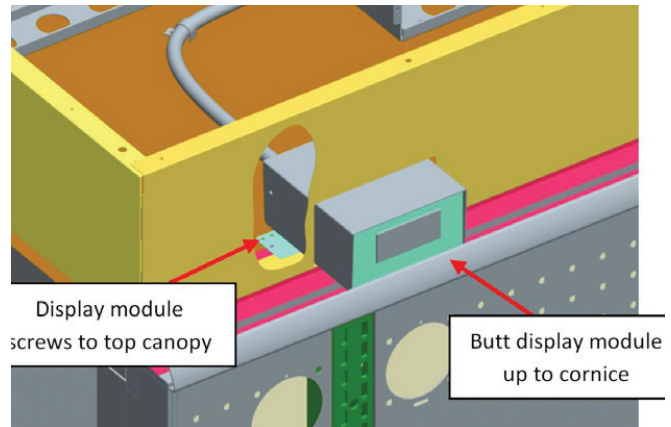


Fig. 3 Align with pre-cut holes and secure with screws

If top fascia is not included, align the front of the display module flush to the front of the cornice (Fig. 4), locating the left edge of the display module 9.25" from the left end of the case. Secure the display module by drilling two screws into the top canopy.

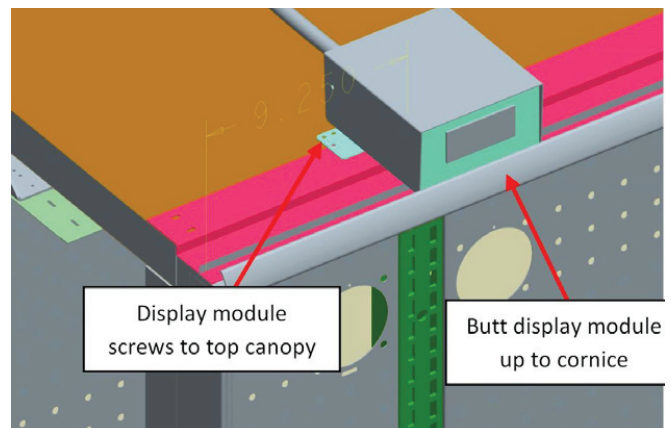
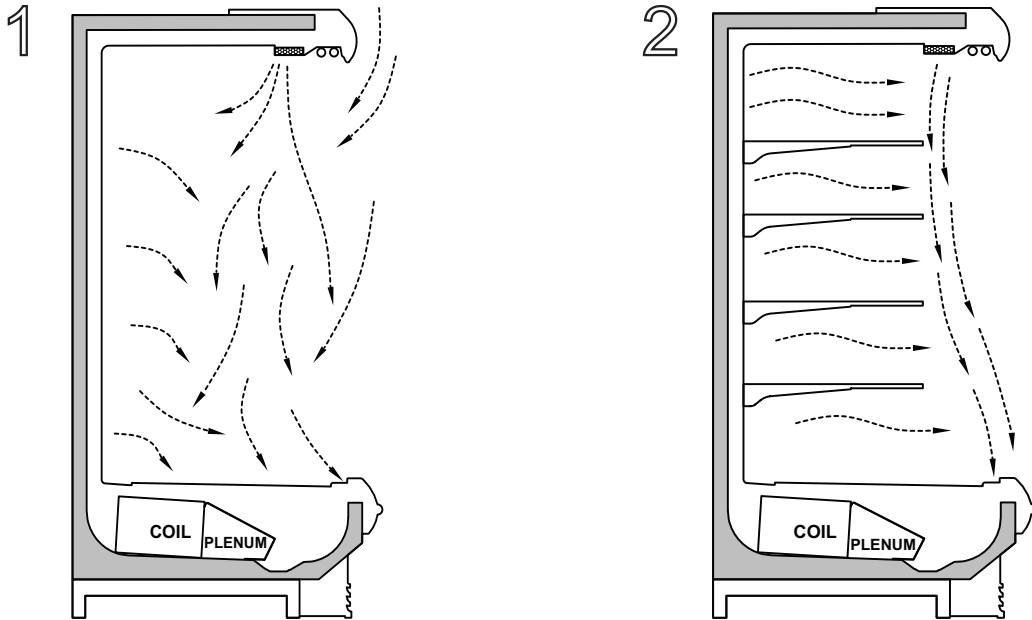


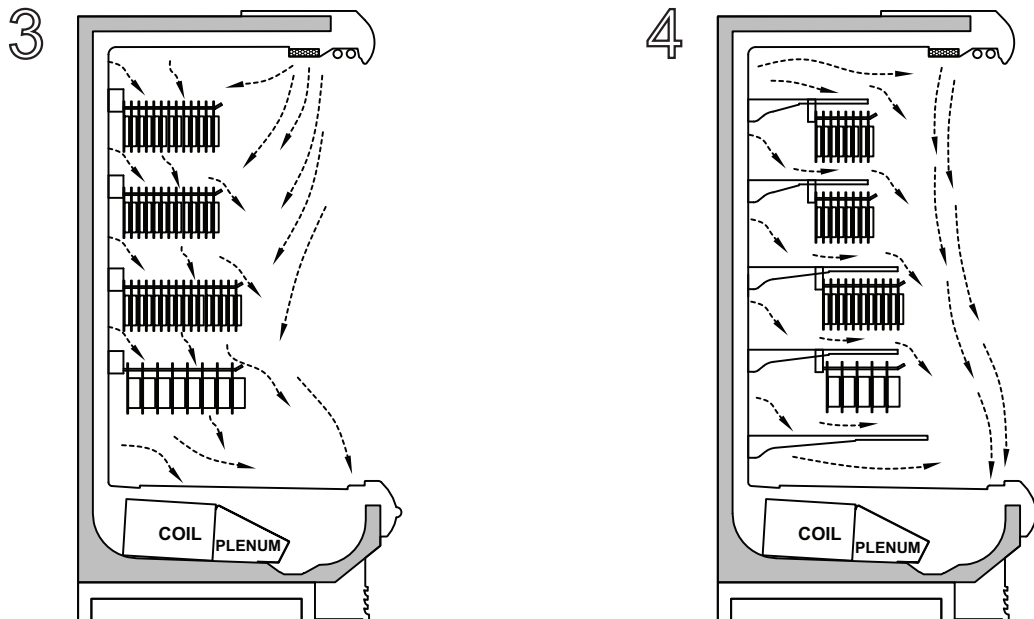
Fig. 4 Align with cornice front and secure with screws

J1: PEG HOOKS

When a case merchandiser's shelves are removed, air drifts back to the rear duct and swirls around, thus breaking the protective air envelope and allowing case air to mix with ambient store air (Fig. 1). When the shelves are present, air flows from the top and back, forming a protective barrier against the ambient store air (Fig. 2).



When peg bars are present, air falls through openings between packages and fails to maintain a protective barrier (Fig. 3). When the bars are fully stocked, the effect is minimized; however, product temperatures will not be optimal. Sweating may be noticed on the top duct panel above the bars and frost will build up on the coil faster, requiring more frequent defrost cycles. For proper set-up of a merchandiser with peg bars, install a solid baffle above each row of peg bars - except for the bottom shelf - to maintain proper air flow and temperatures inside the case. Non-load-bearing solid air baffles should run the same width as the peg bars.





Hill PHOENIX, Inc.
Hereinafter Referred To As Manufacturer

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

Att'n: Tom Bradshaw

Phone: 770-285-3267

tom.bradshaw@hillphoenix.com

Hillphoenix Display Case Division

1925 Ruffin Mill Road

Colonial Heights, VA 23834

Att'n: Harry Moy

Phone: 804-614-1457

harrymoy@hillphoenix.com

Hillphoenix Specialty Products Division

703 Franklin Street

Keosauqua, IA 52565

Attn: Jake Bair

Phone: 319-293-8551

jake.bair@hillphoenix.com

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.

Hillphoenix®

A  **DOVER**™ COMPANY

Tel: 1-800-283-1109

1925 Ruffin Mill Rd, Colonial Heights, VA 23834

Due to our commitment to continuous improvement, all specifications are subject to change without notice.

Hillphoenix is a Sustaining Member of the American Society of Quality.

Visit our website at www.hillphoenix.com

