Hillphoenix

A DOVER COMPANY

MULTI-DECK ISLAND MERCHANDISER

INSTALLATION & OPERATIONS MANUAL

02DMZD

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

NSF COMPONENT c UL us

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VERSION 1 (07/13)

- New manual format

V1.0X (x10/13)

- added Addendums; removed Appendix
- updated Glycol Notice (pg. iii)
- updated Electrical Data (pg. 2)
- updated Case Dimensions drawing (pg. 3)
- Re-link files(11/2015)

PRECAUTIONARY NOTICES

At Hillphoenix®, the safety of our customers and employees, as well as the ongoing performance of our products, are top priorities. To that end, we call out important messages in all Hillphoenix installation and operations handbooks with an accompanying alert symbol. All of these notices are meant to provide information about potential dangers to personal health and safety—as well as risks of case damage—if the instructions are not carefully followed.

ATTENTION!

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

CAUTION!

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

DANGER!

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

SERVICE NOTICE

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

LIABILITY NOTICE

For Cases with Shelf Lighting Systems

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

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

P079211M, REVO

R-744 (CO2) NOTICE

For Systems Utilizing R-744 (CO2) Refrigerant

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

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

GLYCOL NOTICE

For Systems Utilizing Glycol Refrigerant

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

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

CAUTION!

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

02DMZD Multi-Deck Merchandiser

6', 8' & 12' (Frozen Food)

ELECTRICAL DATA

Case Length	Fans Per Case	High Efficiency Fans		Anti-Condensate Heaters		Defrost Heaters			
		120 Volts		120 Volts		208 Volts		240 Volts	
		Amps	Watts	Amps	Watts	Amps	Watts	Amps	Watts
6'	2	0.30	22.0	0.37	44.0	8.70	1800	10.00	2400
8'	2	0.30	22.0	0.50	60.0	11.50	2400	13.30	3195
12'	3	0.45	33.0	0.74	88.0	17.30	3600	20.00	4795

LIGHTING DATA

Case Length	Lights Per Row	Light Length	Clearvoyant LED Lighting (Per Light Row)			
			Standard Power (Cornice or Shelf)		High Power (Cornice)	
			120 Volts		120 Volts	
			Amps	Watts	Amps	Watts
6'	1	5'	0.12	14.3	0.22	26.3
8'	2	3'	0.14	16.6	0.25	29.8
12'	2	5'	0.24	28.6	0.44	52.6

GUIDELINES and CONTROL SETTINGS

BTUH/ft		Superheat Set Point @ Bulb (°F)	Evaporator (°F)	Discharge Air (°F)	Discharge Air Velocity (FPM)
Conventional	Parallel				
205	200	3 - 5	-17	-1	50

DEFROST CONTROLS

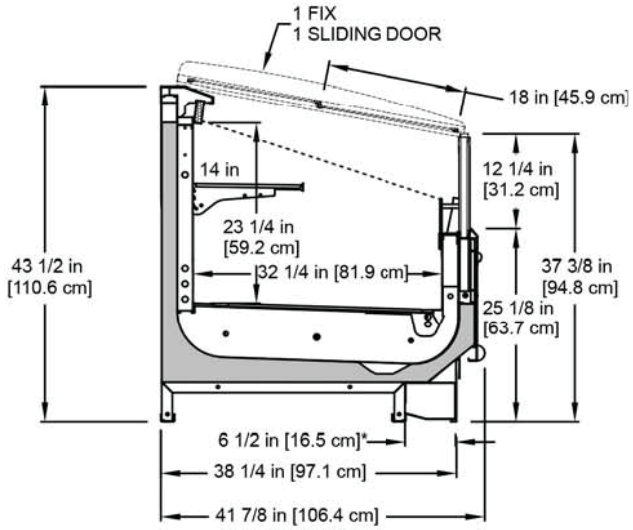
Defrosts Per Day	Run-Off Time (Min)	Electric Defrost		Hot Gas Defrost	
		Fail-Safe (Min)	Termination Temp (°F)	Fail-Safe (Min)	Termination Temp (°F)
1	8 - 10	45	48	30	60

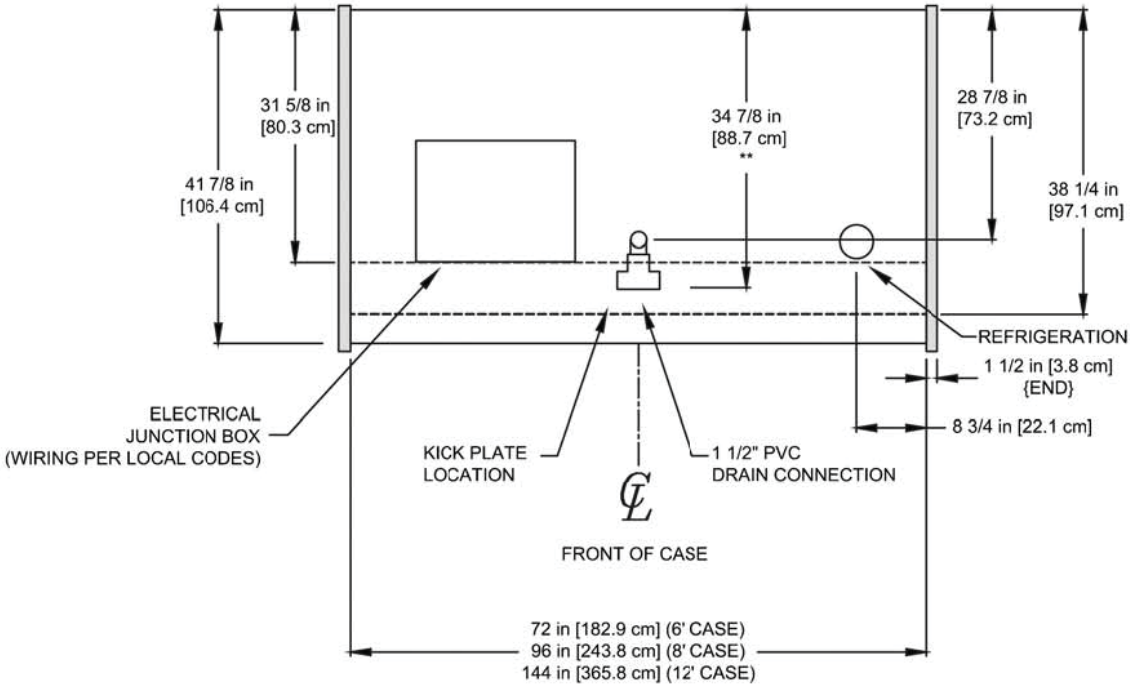
NOTES:

- Listed discharge air velocity represents the average velocity at the peak of defrost. 50 fpm air flow is measured in the top slots of the rear baffle. Air flow at the honeycomb is ~10 fpm.
- 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.

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 2012 energy efficiency requirements.

Defrost Schedule	
Defrosts per Day	Time
1	12 midnight
2	12am - 12pm
3	6am - 2pm - 10pm
4	12am-6am-12pm-6pm
6	12am-4am-8am-12pm-4pm-8pm





NOTES:

* : STUB-UP AREA

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

- FRONT AND REAR SILL HEIGHTS VARY WITH BASEFRAME HEIGHT
- ENDS ADD APPROXIMATELY 1 INCH TO CASE HEIGHT
- SUCTION LINE (4")-1/2", (6' & 8')-5/8" , (12')7/8".
- LIQUID LINE (ALL LENGTHS)- 3/8"
- DASHED LINES SIGNIFY AREA INSIDE THE BASE RAIL BEHIND KICK PLATE

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 display 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 toll-free number listed below. Thank you for choosing Hillphoenix, and we wish you the very best in outstanding food merchandising.

CASE DESCRIPTION

O2DMZD multi-deck merchandiser

STORE CONDITIONS

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

REFRIGERATION SYSTEM OPERATION

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

RECEIVING CASES

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

CASE DAMAGE

Claims for obvious damage must be 1) noted on either the freight bill or the express receipt and 2) signed by the carrier's agent; otherwise, the carrier may refuse the claim. If damage becomes apparent after the equipment is unpacked, retain all packing materials and submit a written request to the carrier for inspection within 14 days of receipt of the equipment.

LOST/MISSING ITEMS

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.

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.

PARTS ORDERING

If you need to contact Hillphoenix regarding specific fixtures/parts, call 1-800-283-1109 and ask for a Service Parts Representative. Provide the following information about the part you are ordering:

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

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

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

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

FLOOR PREP

1. Verify the building dimensions with the general contractor. Ask for the points of reference from which to take dimensions for setting 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.

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 assembly (Fig. 1) and lower the basehorse on to the shim packs. Repeat on the other end of the case.

Fig. 1 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.

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.

2. Once the basehorse is properly placed on the shim packs, check the vertical plumb of the case by placing a bubble level on the rear wall. Add/remove shim packs as needed. For the horizontal level, repeat this process after placing the bubble level on the front sill.

Multi-Case

1. Remove any shelves (discard the shelf clips) and/or loose items (e.g. shipping materials, 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.**
2. 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.
3. Follow the single-case installation instructions for the first case, then position the next case in the line-up approximately 3' away. Remove the casters on the end that is closest to the first case.
4. Apply the foam tape gasket (supplied) and a bead of butyl or silicone sealant to the end of the first case (Fig. 2). From the opposite end, push the second case to a position that is approximately 6" from the first case, then remove the remaining casters and position case on the shim packs.
5. Push the cases tightly together, then lightly bolt them together through the holes that are provided (Fig. 2). Tighten all the joining bolts until all margins are equal. Be careful not to over tighten.
6. Repeat steps 3–5t of this sequence for all remaining cases. Be certain to properly level all cases.

*7. If seismic brackets were ordered, see **Addendum A** for detailed installation instructions.*

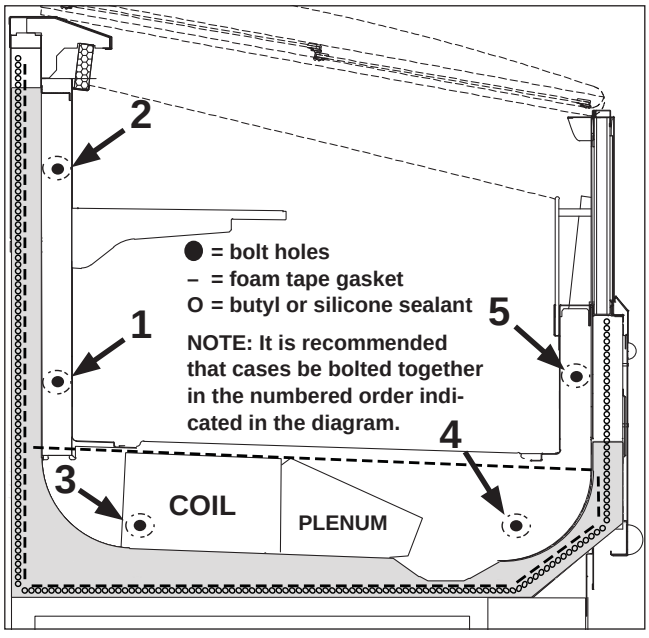
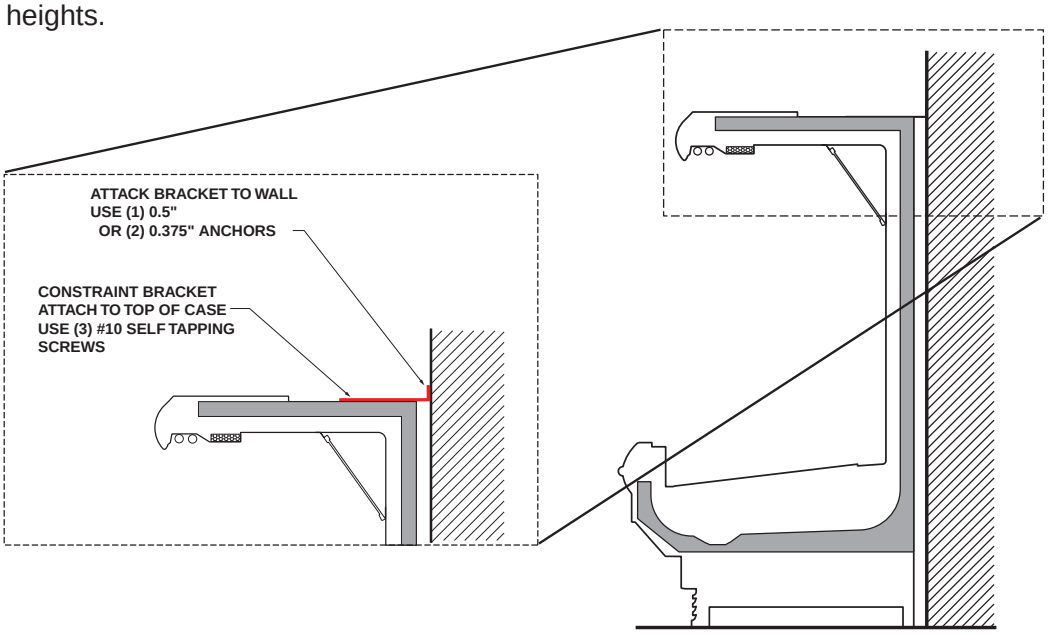


Fig. 2 Bolt holes, foam tape gasket and sealant

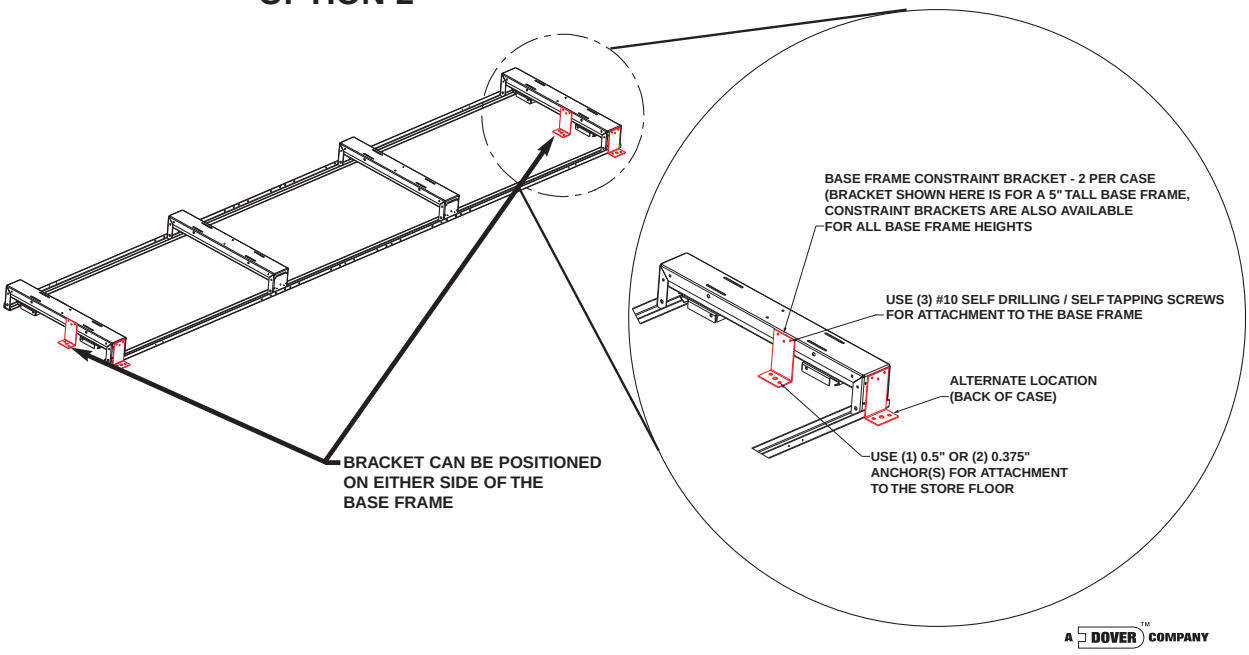
SEISMIC BRACKET INSTALLATION

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



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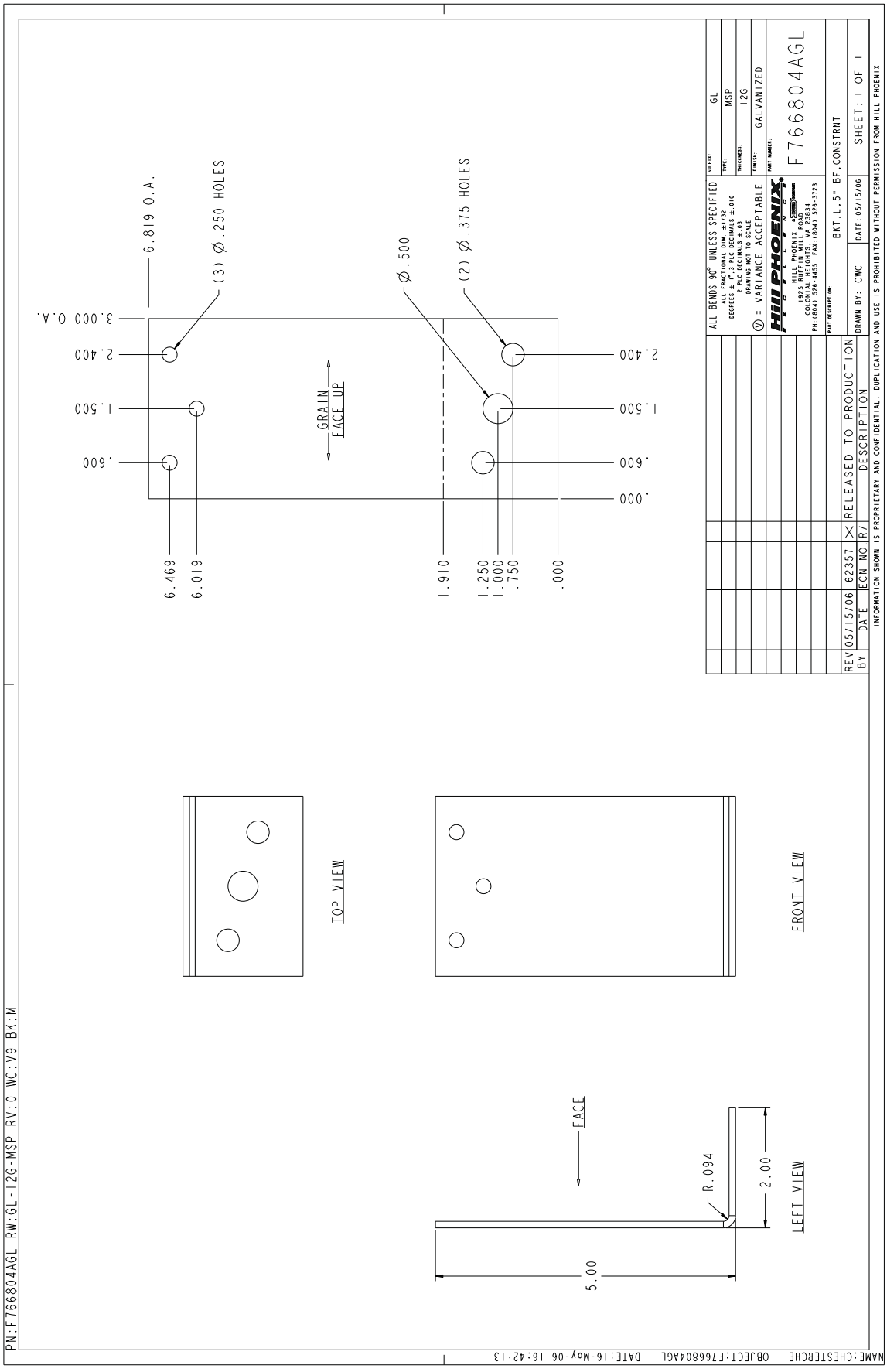
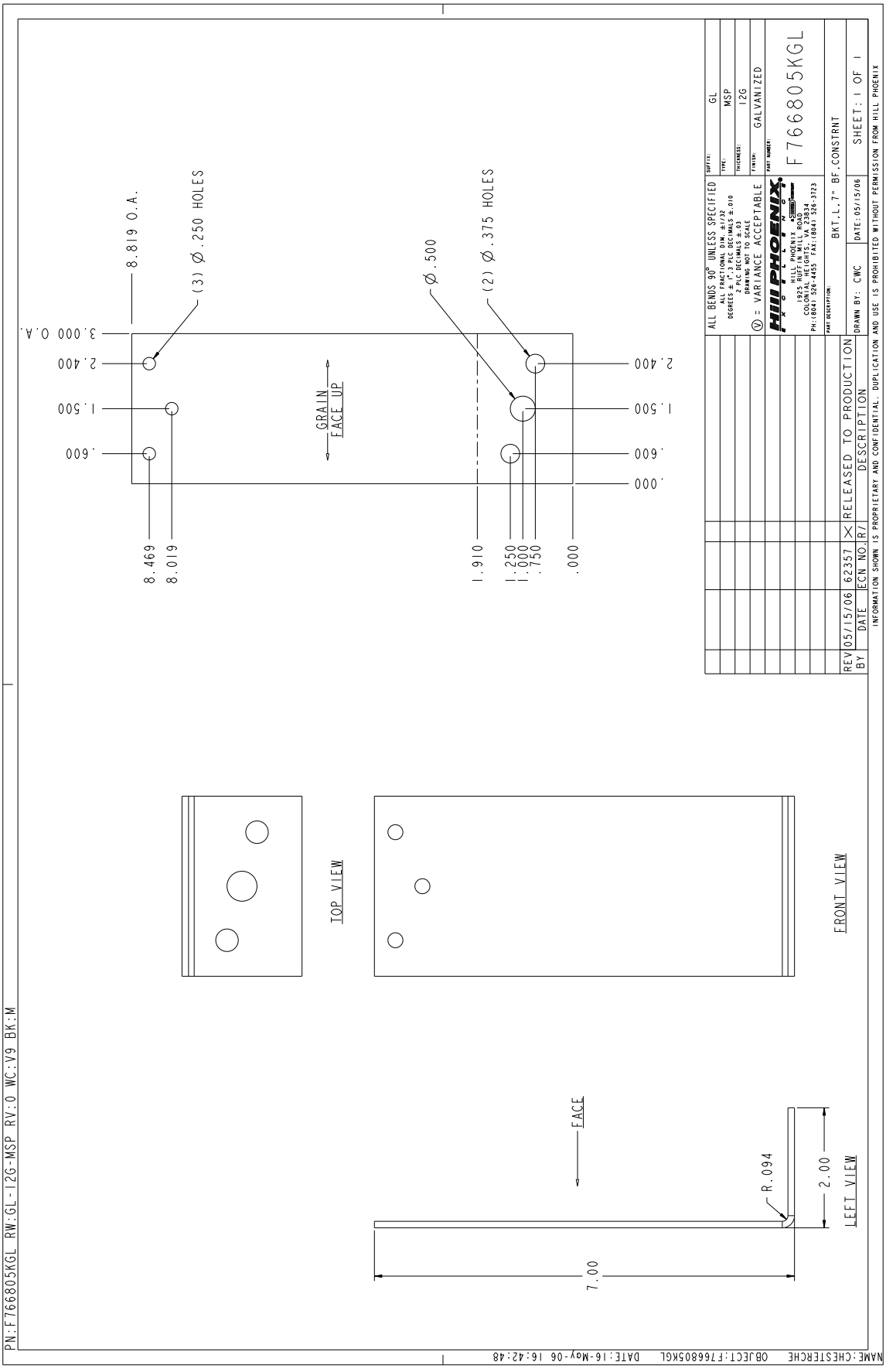
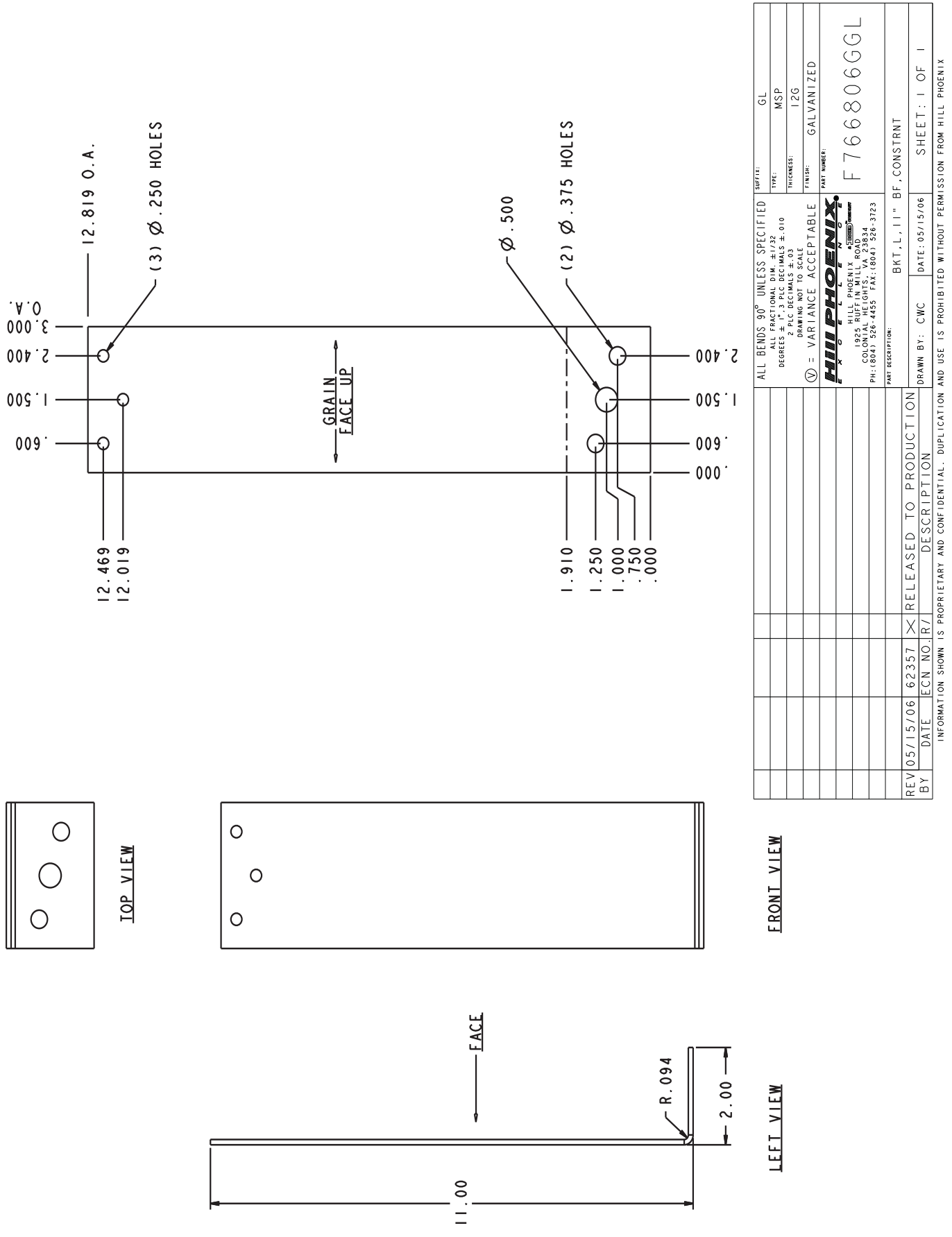
SEISMIC BRACKET (5”)



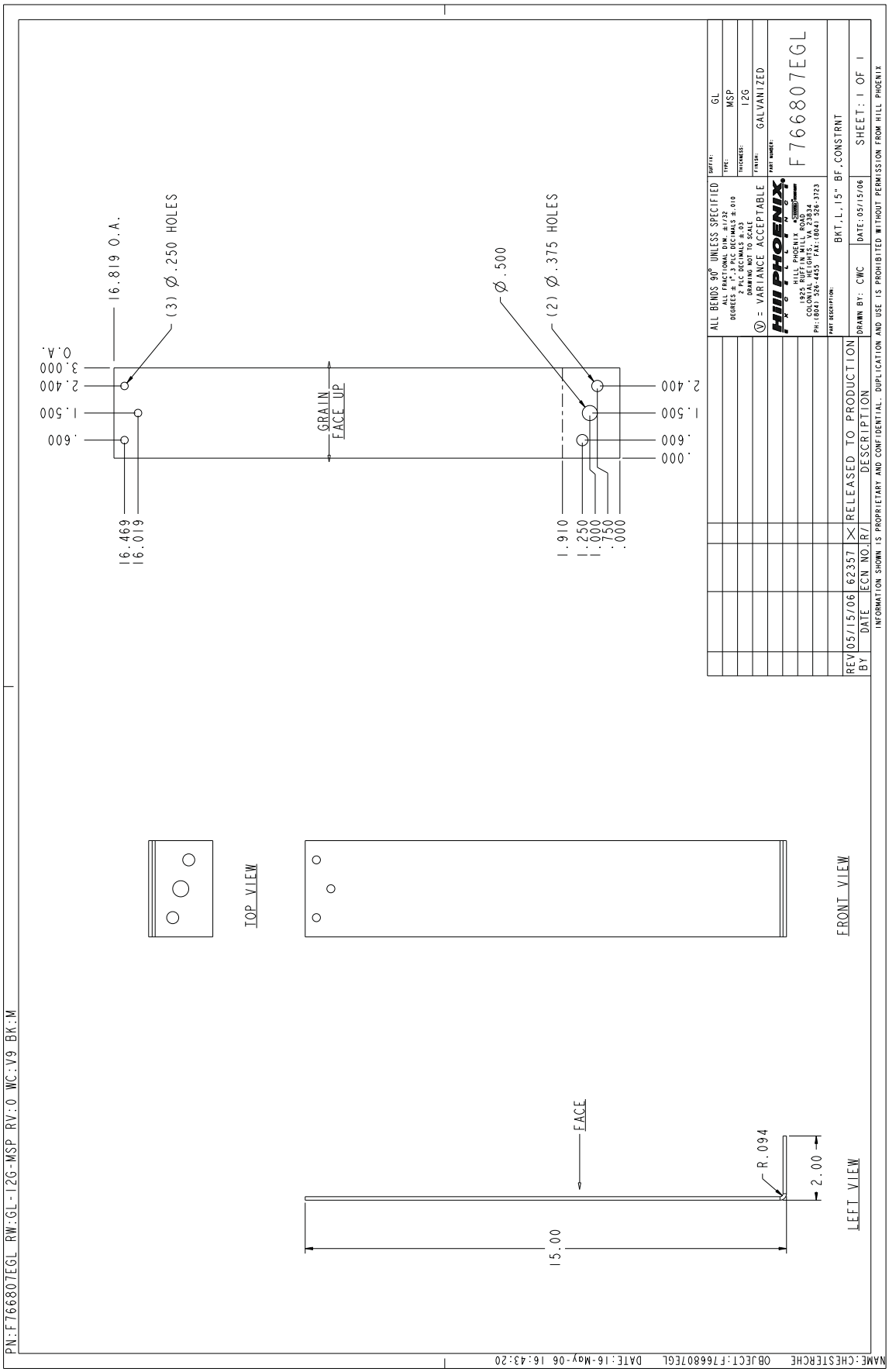
SEISMIC BRACKET (7”)



SEISMIC BRACKET (11”)



SEISMIC BRACKET (15”)



TRIM OUT

1. To align the master bumpers, slide master bumper joint trim in between adjoining master bumpers. (Fig. 3). 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.

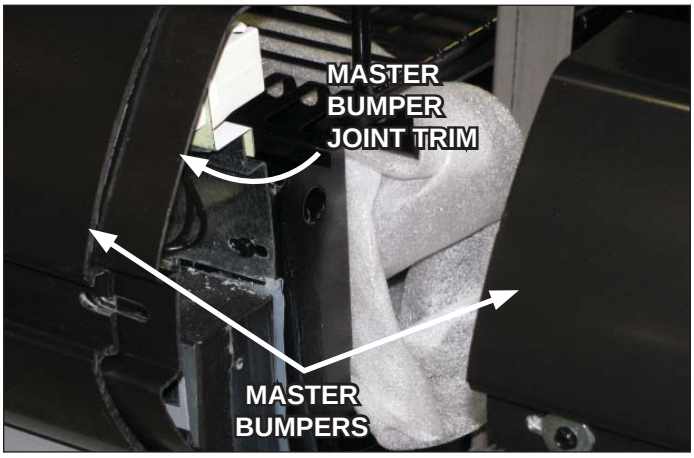


Fig. 3 Master bumpers and joint trim

2. Close the seam where the bumper joins the case end. The bumper joint closes the seam that may develop 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. 4). The tape acts as a watershed preventing water from settling in the case joint.

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

5. Install rear sill joint trim (if applicable).

6. The “J” rail may be pre-installed at the factory or shipped loose with the case. If it is pre-installed, simply loosen the screws holding the “J” rail in place to allow it to slide down and fit flush with the floor. Re-tighten screws. If it is shipped loose, attach the “J” rail to the base horse with the screws provided.

7. Install lower front panel or upper kickplate retainer (if included). Insert top of kickplate into the kickplate retainer. Slide the kickplate up into the retainer, then down onto the “J” rail (Fig. 5). The bottom of the kick-plate fits over the extruding "lip" of the "J" rail.

8. Install end kickplates with screws provided and insert plug buttons.

9. 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.

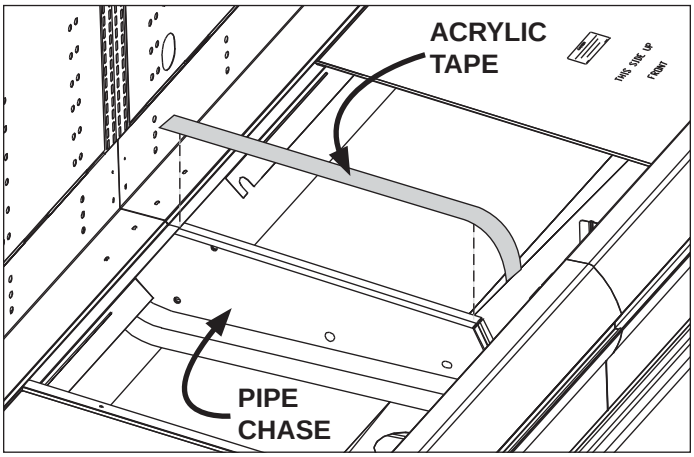


Fig. 4 Sealing the pipe chase

10. 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.

11. Install case shelves. Be aware that differing shelf configurations will affect energy consumption and case performance.

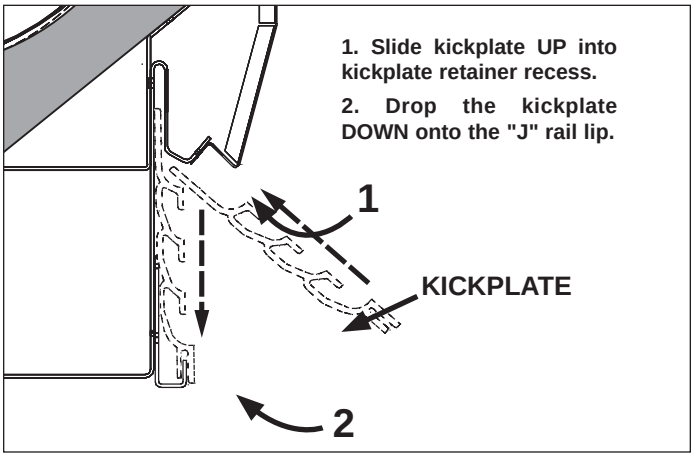


Fig. 5 Kickplate installation

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!

Connections are illustrated in dimensional drawings found on **page 3**.

REFRIGERATION

The refrigeration piping penetration is located at the front-right area of the case, fully visible in front of the fan plenum.

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 - located on the left-hand side of the case - are accessible by lifting the deck pans (lifting the fan plenum is not required).

Before operating the case, be certain to remove the shipping blocks (Fig. 6) 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.

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. 7). Care should be given to ensure that all connections are watertight and sealed with the appropriate PVC or ABS cement.

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 the electrical junction box or raceway running along the bottom-front of the case (Fig. 8).

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 **Addendum B**.*

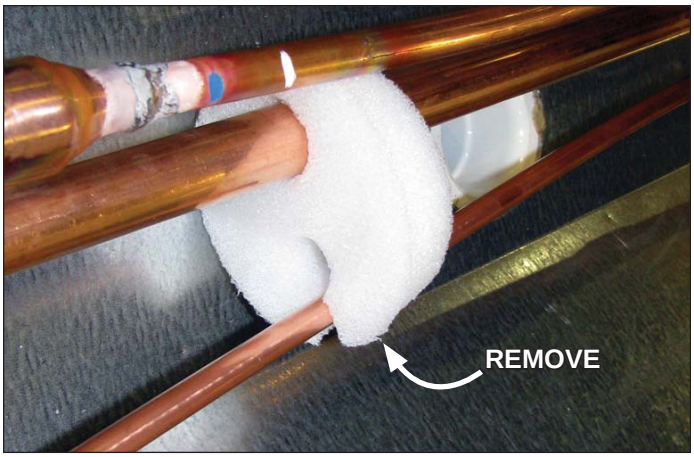


Fig. 6 Remove the shipping blocks

Fig. 7 "P" trap

Fig. 8 Junction box beneath case

ATTENTION!

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

WIRE IDENTIFICATION CHART

WIRE IDENTIFICATION	BLACK	WHITE	BLUE	RED	YELLOW	PURPLE
DEFROST HEATERS (1-PHASE)	1,2					
DEFROST HEATERS (3-PHASE)	L1		L3	L2		
ANTI-CONDENSATE HEATERS	14	13				
	16	15				
	18	17				
AISLE WARMER	10	9				
DRAIN HEATER	36	37				
PRIMARY FANS	4	3	40			
SECONDARY FANS	6	5				
AMBIENT FANS	8	7				
LIGHTS	12	11				
BELL	60,62					
TEMPERATURE CONTROL					19,20	
DEFROST TERMINATION CONTROL	22					21
DEFROST SAFETY CUT-OUT CONTROL	28					27
LIQUID LINE SOLENOID					30	31
SUCTION LINE SOLENOID					38	39
CASE/CONTROLLER POWER	42	41				
TRANSFORMER	24	25				
CAPACITOR	34		35			
RECEPTACLE	32	33				
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				
GFI RECEPTACLE	56	55				
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				
MAIN SECONDARY FLUID SOLENOID	73 220V	73		72		
AIR DEFROST FAN	74	59				
SECONDARY COOLANT PUMP	76	61				
TANK FLUSH SOLENOID	87 220V	87				
MISTING SOLENOID	89 220V	89			88	
DRIP DOWN TIMER					90	
REAR STORAGE BOX FANS	94	95				
GROUND TO EXTERIOR/FRAME						
GROUND TO INTERIOR LINER						
GROUND TO JUNCTION BOX						
GROUND TO LIGHTS						

ATTENTION: ELECTRICIAN

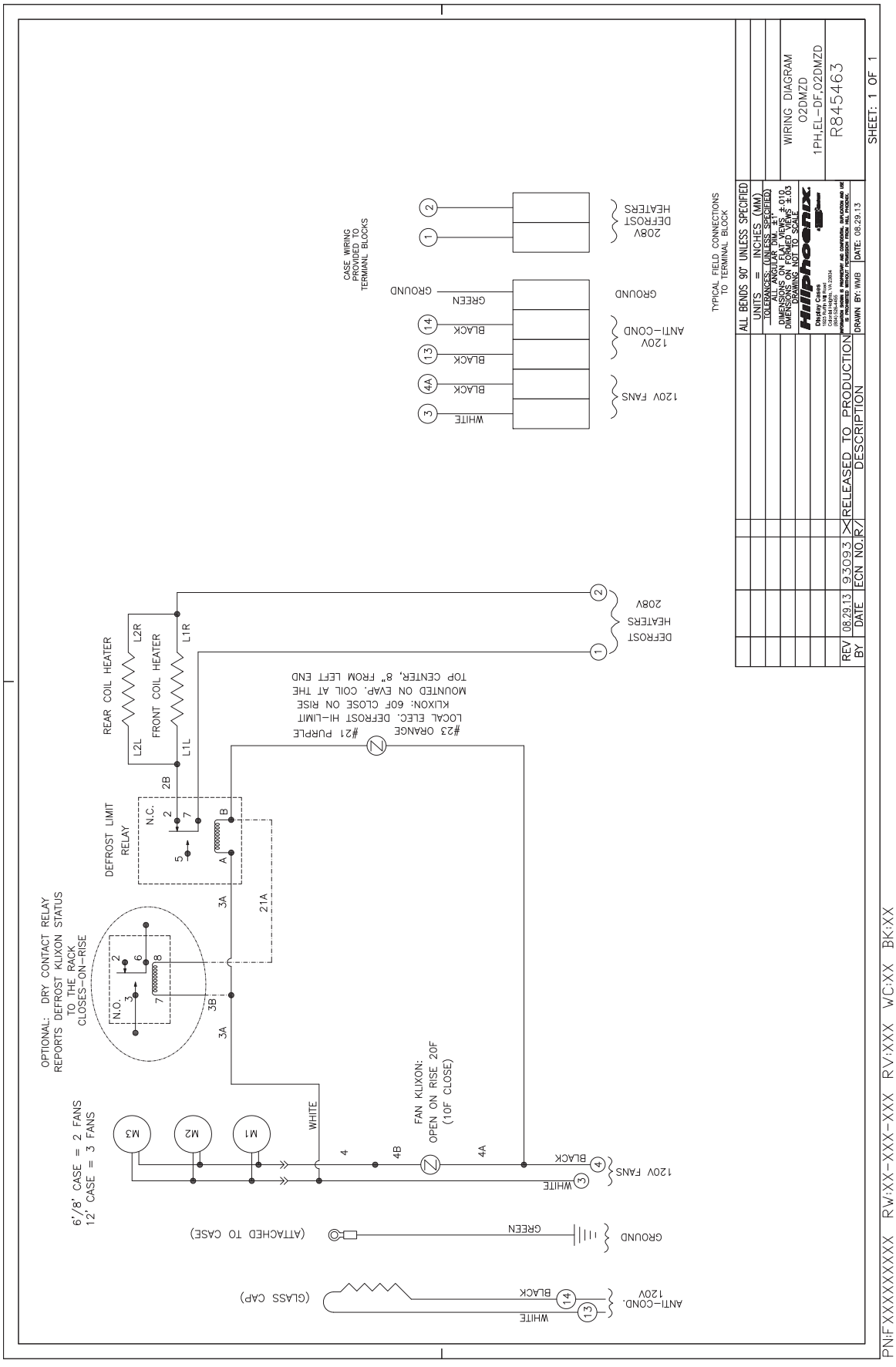
For safety and code compliance, ground fixture at the time of installation.

CAUTION

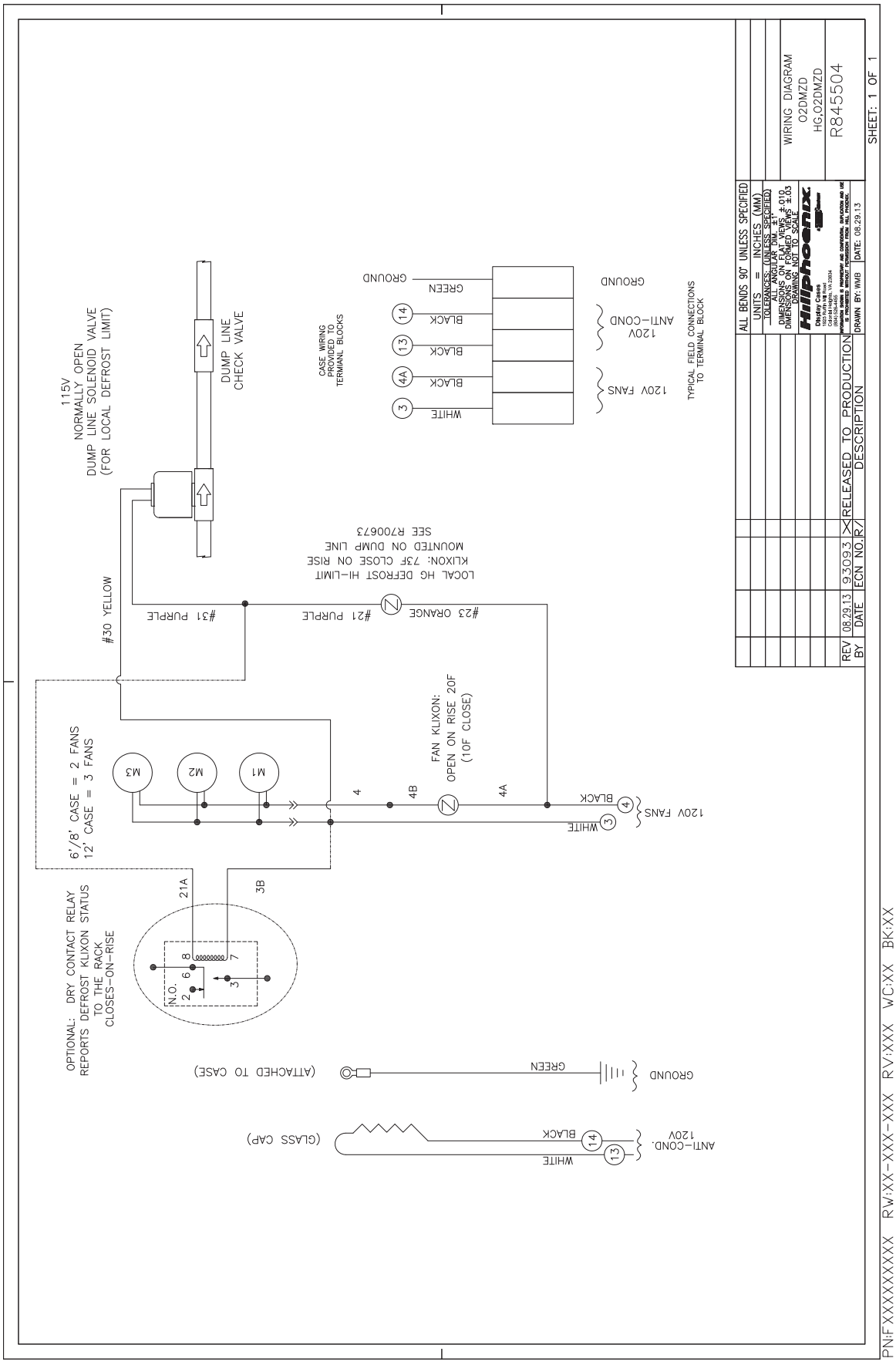
Risk of electric shock. More than one power supply. Disconnect all power supplies before servicing.

P901598E - R4

WIRING DIAGRAM: ELECTRIC DEFROST



WIRING DIAGRAM: HOT GAS DEFROST



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

- ☐ **Have you thoroughly examined the case for shipping damage? (see pg. 2)**
- ☐ **Have you removed and discarded the casters? (see pg. 3)**
- ☐ **Have you checked the vertical plumb of the case? The horizontal level? (see pg. 3)**
- ☐ **Have you applied the foam tape gasket and sealant between adjoining cases? (see pg. 3)**
- ☐ **Have you sealed the case-to-case joints by applying caulk and acrylic tape to the pipe-chase seam? (see pg. 4)**
- ☐ **Have you cleared the case of any loose packaging or case materials? (see pg. 4)**
- ☐ **Have you removed the shipping blocks from the refrigeration lines? (see pg. 5)**
- ☐ **Have you sealed any tank penetrations? (see pg. 5)**

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.

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. Please keep products within the load limit line shown on the diagram below (Fig.9). Overloading will cause malfunction and the loss of proper temperature levels, particularly when discharge and return air sections are covered.

DEFROST & TEMPERATURE CONTROLS

In accordance with customer preference, 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 Klixon® thermostat, 2) a sensor probe, or 3) a dial-type thermostat with sensor bulb (the thermostat will 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.

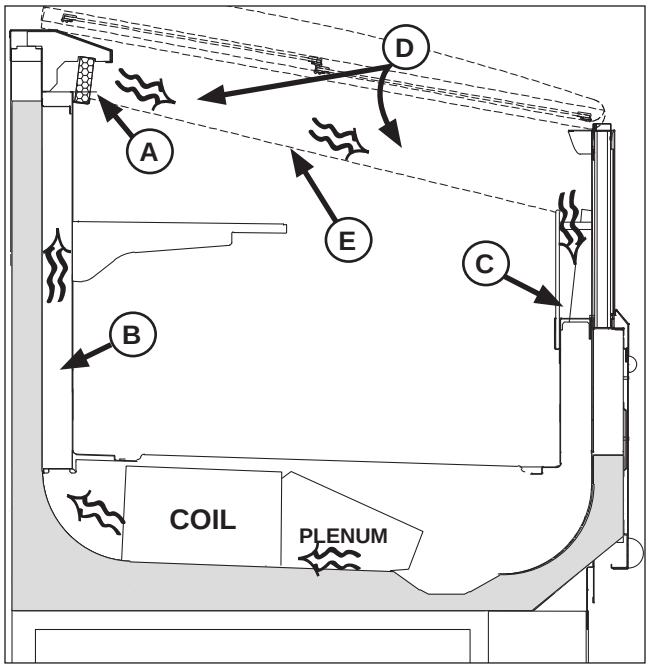


Fig. 9 Airflow; probe, sensor locations

A. DISCHARGE AIR
B. REAR BAFFLE
C. RETURN AIR
D. AIRFLOW
E. LOAD LIMIT

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 the **Electrical Data** section on page 2. Further adjustment may be required depending on store conditions.*

DETERMINING SUPERHEAT

To identify proper superheat settings, complete the following:

1. Obtain suction pressure from access port; obtain suction line temperature from area near TXV bulb at the outlet of evaporator coil (Fig. 10).
2. Using the suction pressure reading, convert pressure to temperature using temperature pressure chart (*see **Addendum C***).
3. Subtract the converted temperature reading from the actual temperature reading for superheat setting.

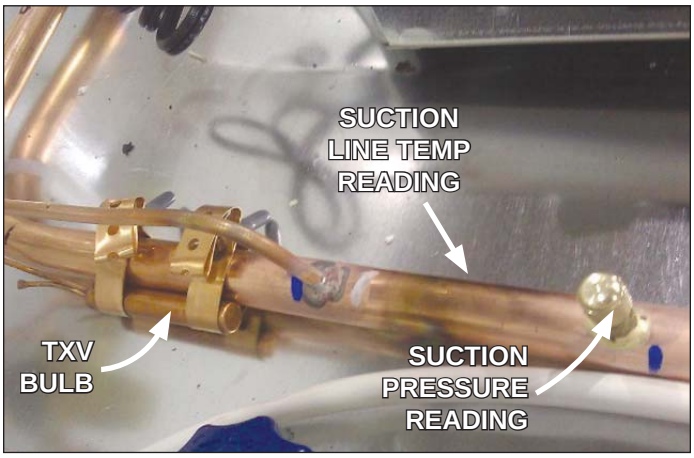


Fig. 10 Obtain pressure and temperature readings

Vacuum-Inches of Mercury
Bold Italic Figures

TEMPERATURE PRESSURE CHART - at sea level

Pressure-Pounds Per
Square Inch Gauge

TEMPERATURE		REFRIGERANT (SPORLAN CODE)					TEMPERATURE		REFRIGERANT (SPORLAN CODE)					TEMPERATURE		REFRIGERANT (SPORLAN CODE)				
(°F)	(°C)	134a (J)	404A (S)	507 (P)	717 (A)	744 - CO_2	(°F)	(°C)	134a (J)	404A (S)	507 (P)	717 (A)	744 - CO_2	(°F)	(°C)	134a (J)	404A (S)	507 (P)	717 (A)	744 - CO_2
-60	-51.1	21.8	7.3	5.8	18.6	79.9	12	-11.1	13.1	45.4	48.1	25.6	357.4	42	5.6	37.0	88.8	92.8	61.6	569.3
-55	-48.3	20.3	3.9	2.2	16.6	91.1	13	-10.6	13.8	46.6	49.3	26.5	363.4	43	6.1	38.0	90.6	94.6	63.1	577.6
-50	-45.6	18.7	0.1	0.9	14.3	103.4	14	-10.0	14.4	47.8	50.5	27.5	369.5	44	6.7	39.0	92.4	96.5	64.7	586.0
-45	-42.8	16.9	2.0	3.0	11.7	116.6	15	-9.4	15.0	49.0	51.8	28.4	375.6	45	7.2	40.1	94.2	98.3	66.3	594.5
-40	-40.0	14.8	4.3	5.4	8.8	131.0	16	-8.9	15.7	50.2	53.0	29.4	381.8	46	7.8	41.1	96.0	100.2	67.9	603.1
-35	-37.2	12.5	6.8	8.1	5.4	146.5	17	-8.3	16.4	51.5	54.3	30.4	388.0	47	8.3	42.2	97.9	102.1	69.5	611.7
-30	-34.4	9.8	9.6	11.0	1.6	163.1	18	-7.8	17.0	52.7	55.6	31.4	394.3	48	8.9	43.2	99.8	104.1	71.1	620.5
-25	-31.7	6.9	12.7	14.1	1.3	181.0	19	-7.2	17.7	54.0	56.9	32.4	400.7	49	9.4	44.3	101.7	106.0	72.8	629.3
-20	-28.9	3.7	16.0	17.6	3.6	200.2	20	-6.7	18.4	55.3	58.3	33.5	407.2	50	10.0	45.4	103.6	108.0	74.5	638.3
-18	-27.8	2.3	17.4	19.1	4.6	208.3	21	-6.1	19.1	56.6	59.6	34.6	413.8	55	12.8	51.2	115.3	118.3	83.4	684.4
-16	-26.7	0.8	18.9	20.6	5.6	216.5	22	-5.6	19.9	58.0	61.0	35.7	420.4	60	15.6	57.4	126.0	129.2	92.9	733.1
-14	-25.6	0.4	20.4	22.2	6.7	225.0	23	-5.0	20.6	59.3	62.4	36.8	427.1	65	18.3	64.0	137.3	140.7	103.2	784.2
-12	-24.4	1.1	22.0	23.8	7.8	233.8	24	-4.4	21.3	60.7	63.8	37.9	433.8	70	21.1	71.1	149.3	153.0	114.2	838.1
-10	-23.3	1.9	23.6	25.5	9.0	242.7	25	-3.9	22.1	62.1	65.3	39.0	440.7	75	23.9	78.7	162.0	165.9	125.9	894.9
-8	-22.2	2.8	25.3	27.3	10.3	251.9	26	-3.3	22.9	63.5	66.7	40.2	447.6	80	26.7	86.7	175.4	179.6	138.4	954.9
-6	-21.1	3.6	27.0	29.1	11.5	261.3	27	-2.8	23.7	64.9	68.2	41.4	454.6	85	29.4	95.2	189.5	194.1	151.8	1018
-4	-20.0	4.6	28.8	30.9	12.9	271.0	28	-2.2	24.5	66.4	69.7	42.6	461.7	90	32.2	104.3	204.5	209.3	166.1	**
-2	-18.9	5.5	30.7	32.8	14.3	280.9	29	-1.7	25.3	67.8	71.2	43.8	468.8	95	35.0	113.9	220.2	225.4	181.2	**
0	-17.8	6.5	32.6	34.8	15.7	291.0	30	-1.1	26.1	69.3	72.7	45.0	476.1	100	37.8	124.2	236.8	242.3	197.3	**
1	-17.2	7.0	33.6	35.8	16.4	296.2	31	-0.6	26.9	70.8	74.3	46.3	483.4	105	40.6	135.0	254.2	260.1	214.4	**
2	-16.7	7.5	34.6	36.9	17.2	301.5	32	0.0	27.8	72.4	75.9	47.6	490.8	110	43.3	146.4	272.5	278.8	232.5	**
3	-16.1	8.0	35.6	37.9	18.0	306.8	33	0.6	28.6	73.9	77.5	48.9	498.3	115	46.1	158.4	291.8	298.5	251.6	**
4	-15.6	8.5	36.6	39.0	18.8	312.1	34	1.1	29.5	75.5	79.1	50.2	505.8	120	48.9	171.2	312.1	319.2	271.9	**
5	-15.0	9.1	37.7	40.1	19.6	317.6	35	1.7	30.4	77.1	80.7	51.6	513.4	125	51.7	184.6	333.3	340.9	293.3	**
6	-14.4	9.6	38.7	41.1	20.4	323.1	36	2.2	31.3	78.7	82.4	52.9	521.2	130	54.4	198.7	355.6	363.8	315.8	**
7	-13.9	10.2	39.8	42.3	21.2	328.6	37	2.8	32.2	80.3	84.1	54.3	529.0	135	57.2	213.6	379.1	387.8	339.6	**
8	-13.3	10.8	40.9	43.4	22.1	334.2	38	3.3	33.1	82.0	85.8	55.7	536.9	140	60.0	229.2	403.7	413.0	364.7	**
9	-12.8	11.3	42.0	44.5	22.9	339.9	39	3.9	34.1	83.7	87.5	57.2	544.8	145	62.8	245.7	429.6	439.5	391.0	**
10	-12.2	11.9	43.1	45.7	23.8	345.7	40	4.4	35.0	85.4	89.2	58.6	552.9	150	65.6	262.9	456.8	467.4	418.7	**
11	-11.7	12.5	44.3	46.9	24.7	351.5	41	5.0	36.0	87.1	91.0	60.1	561.0	155	68.3	281.0	485.5	497.0	447.8	**

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

DANGER!

SHOCK HAZARD

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

FANS

The fan blade pitch is set during manufacturing. It is important that the blade pitch be maintained as specified. **Do not attempt a field modification by altering the blades.**

Fan motors 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 make a change:

1. Unplug the fan motor (Fig. 11), easily accessible outside the plenum. Be certain to push power cord back through plenum opening to avoid damage to power cord.
2. Remove fasteners, then lift out the entire fan basket.

Reverse procedure when re-installing fan basket.

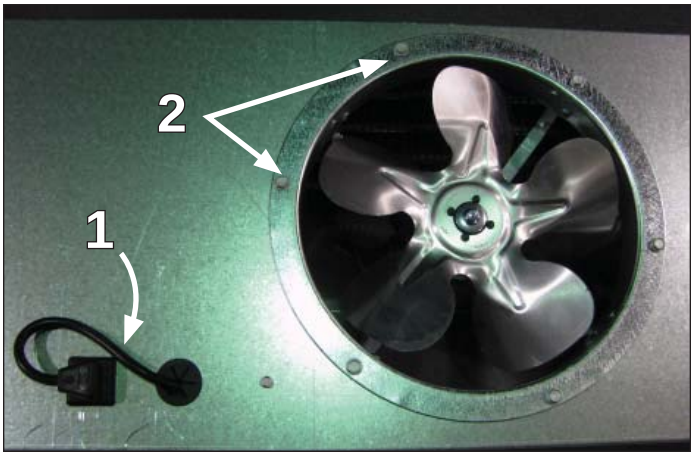


Fig. 11 Fan basket

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.

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.

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 front of the case where the waste outlet is located for easy access. Check waste outlet to insure it is not clogged before starting the cleaning process and avoid introducing water faster than the case drain can carry it away.
- To clean the 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.

Fig. 12 Single-piece fan plenum and coil cover

WARRANTY

HEREINAFTER REFERRED TO AS MANUFACTURER

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

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

The fourteen month warranty shall not apply:

1. To any unit or any part thereof which has been subject to accident, alteration, negligence, misuse or abuse, operation on improper voltage, or which has not been operated in accordance with the manufacturer's recommendation, or if the serial number of the unit has been altered, defaced, or removed.

2. When the unit, or any part thereof, is damaged by fire, flood, or other act of God.

3. Outside the continental United States.

4. To labor cost for replacement of parts, or for freight, shipping expenses, sales tax or upgrading.

5. When the operation is impaired due to improper installation.

6. When installation and startup forms are not properly complete or returned within two weeks after startup.

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

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

MAIL CLAIM TO:

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

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

Warning
Servicing & Case Care

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

Be certain that all electric power is turned off before servicing or cleaning to avoid electrical shock. In some cases, more than one switch may need to be turned off to completely de-energize the case.

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

All lighting components must be dried thoroughly before installation and before re-energizing the lighting circuit.

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

Hillphoenix
A DOVER COMPANY

Phone: 1-800-283-1109

1925 Ruffin Mill Road, Colonial Heights, VA 23834