

HUSSmann®

ESC

DELI/MEAT/FISH SERVICE CASE



P/N IGSV-ESC-0303

INSTALLATION & OPERATION GUIDE

General Instructions

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THIS BOOKLET CONTAINS INFORMATION ON:

ESC: European-style Refrigerated Service Case for Deli, Meat, Fish, and *matching Refrigerated Wedges*.

****NOTE:** Be sure to read the “Important Information” section for proper case operation, before loading the merchandiser.

SHIPPING DAMAGE

All equipment and separately packaged accessories should be carefully removed, and thoroughly examined for shipping damage during unloading. This equipment has been carefully inspected at our factory, and the carrier has assumed responsibility for its safe arrival. If it is indeed damaged, either apparent or concealed - a claim must be filed with carrier. If there is **obvious loss or damage**, it must be noted on the freight bill or express receipt, and signed by the carrier's agent; otherwise, carrier may refuse claim. The carrier will supply the necessary claim forms. When loss or damage is not apparent until after all equipment is uncrated, a claim for **concealed damage** is made. Make request in writing to carrier for inspection within 15 days. Retain all packaging. The carrier will supply inspection report and required claim forms. Check your shipment for any possible **shortages** of material. If a shortage should exist and is found to be the responsibility of Hussmann Chino, *notify Hussmann Chino*. If such a shortage involves the carrier, *notify the carrier* immediately and request an inspection. Hussmann Chino will acknowledge shortages within ten days from receipt of equipment.

HUSSMANN CHINO PRODUCT CONTROL

The serial number and shipping date of all equipment is recorded in Hussmann's files for warranty and replacement part purposes. All correspondence pertaining to warranty or parts ordering must include the serial number of each piece of equipment involved, in order to provide the customer with the correct parts.

The Hussmann warranty is printed in the back of this guide.

Keep this booklet with the case at all times for future reference.

HUSSmann®/Chino

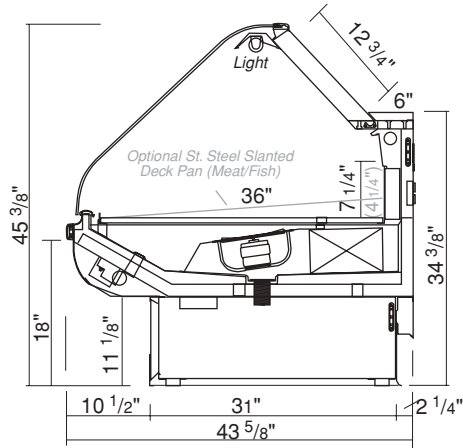
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Important Information

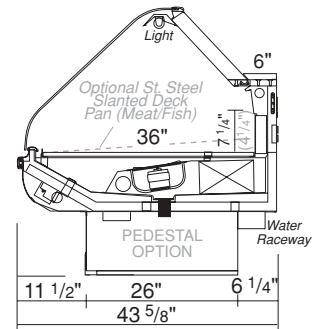
The ESC service cases are easy to work, attractive merchandising display cases capable of maintaining superb product quality, with the installation of the proper controlling devices. These should be set according to the manufacturer's specifications and combined with a properly maintained humidity system. Incorrect settings and failure to maintain the humidity system will result in short product life from dehydration, shrinkage and discoloration. Below are a few guidelines to ensure optimum performance and product life.

- Review the Case Specification in this book to verify thermostat setting. Do not set temperature too cold, **as this causes product dehydration.**
- Temperatures should be achieved by a t-stat and suction solenoid at each case. Do not use EPR valves, liquid line solenoids or electronic control devices of any kind. **These controls allow temperature swings causing product dehydration and excessive energy consumption.**
- Defrost cycles should be set according to the Case Specifications in this book
- Clean humidity system a minimum of every 90 days **for proper system operation.**
- Work and rotate product – not to exceed a four (4) hour period.
- At night turn off case lights and cover product with **moistened cheesecloth or fabric towels.**
- Keep meat holding box at 32°.
- Keep meat prep room refrigerated at 55°.
- Meat bloom box (if applicable) should be at 36°.
- Meat must enter the case at 40° or below. **Product deterioration is very rapid above 40°.**
- Maintain sanitary conditions throughout the meat holding, prep and working areas.
- Do not display product directly within the air discharge.
- **Turn and rotate the meat. The blood which gives the pink color works down in time which causes surface discoloration and dehydration. When turned before this condition occurs the other side is kept in good color (bloom) condition. The meat can even be turned (3) three and (4) four times.**
- **It is not required at night to remove the product from the case. Turn the lights off at night and cover the product. We recommend you use a moistened cheesecloth or towels. This helps slow down the product dehydration process by taking the moisture from the cloth and not from the product. This is an old method that meat shops have used for many years. It works and helps to gain extended product life.**
- **Cold coils remove heat and moisture from the case and deposit it as frost on the coil. Thus a defrost is required to remove this frost. Our humidity system adds moisture to the case and helps slow down the dehydration process. The only other moisture in the case is in the product. A single level of meat in a case will dry out much faster than a fully loaded case with three to four levels of meat.**
- **The colder the case, the faster the product loses its moisture and shelf life. It is very important to maintain a constant even product temperature (see Case Specifications).**

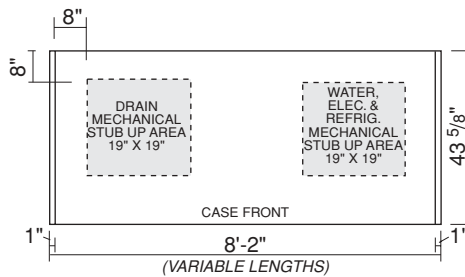
Cut & Plan Views



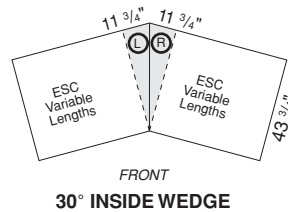
ESC
Service
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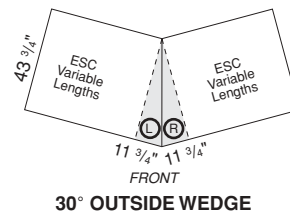
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Pedestal Option
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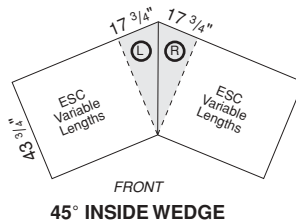
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Plan View
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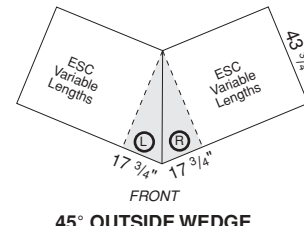
30° INSIDE WEDGE



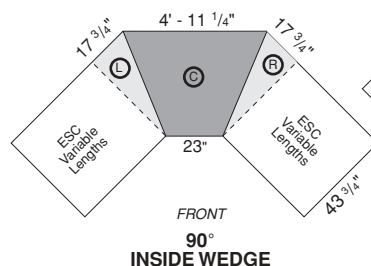
30° OUTSIDE WEDGE



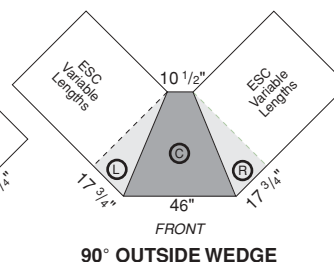
45° INSIDE WEDGE



45° OUTSIDE WEDGE



90° INSIDE WEDGE



90° OUTSIDE WEDGE

Installation

LOCATION

The refrigerated merchandisers have been designed for use only in air conditioned stores where temperature and humidity are maintained at or below 75°F and 55% relative humidity. DO NOT allow air conditioning, electric fans, ovens, open doors or windows (etc.) to create air currents around the merchandiser, as this will impair its correct operation.

Product temperature should always be maintained at a constant and proper temperature. This means that from the time the product is received, through storage, preparation and display, the temperature of the product must be controlled to maximize life of the product.

UNCRATING THE STAND

Place the fixture as close to its permanent position as possible. Remove the top of the crate. Detach the walls from each other and remove from the skid. Unbolt the case from the skid. The fixture can now be lifted off the crate skid. **Lift only at base of stand!**

NSF7 APPROVED CASES

Cases with the NSF7 are rigidly inspected by our Quality Control inspectors during construction. The cases are then temperature and performance tested for 24 hours prior to shipment.

EXTERIOR LOADING

These models have **not** been structurally designed to support excessive external loading. **Do not walk on their tops;** This could cause serious personal injury and damage to the fixture.

SETTING AND JOINING

The sectional construction of these models enable them to be joined in line to give the effect of one continuous display. A joint trim kit is supplied with each joint.

LIFT-UP GLASS RE-ADJUSTMENT

In addition to verifying that the Allen screws on the lift-up glass are tightened when the case is delivered, **recheck the Allen screws on the glass ONCE THE CASE IS IN FULL OPERATION AND BROUGHT TO TEMPERATURE.**

Temperature changes can affect the size and shape of the materials involved, and can cause changes in the secure fit of the glass and the clamp.

LEVELING

IMPORTANT! IT IS IMPERATIVE THAT CASES BE LEVELED FROM FRONT TO

BACK AND SIDE TO SIDE PRIOR TO JOINING. A LEVEL CASE IS NECESSARY TO INSURE PROPER OPERATION, WATER DRAINAGE, GLASS ALIGNMENT, AND OPERATION OF THE HINGES SUPPORTING THE GLASS. LEVELING THE CASE CORRECTLY WILL SOLVE MOST HINGE OPERATION PROBLEMS.

NOTE: A. To avoid removing concrete flooring, begin lineup leveling from the highest point of the store floor.

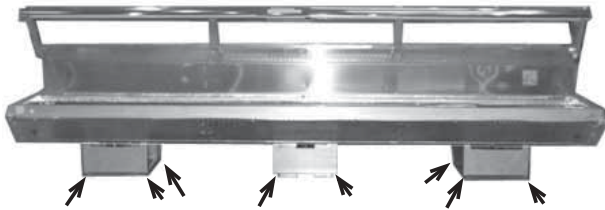
B. When wedges are involved in a lineup, set them first.

All cases were leveled and joined prior to shipment to insure the closest possible fit when cases are joined in the field. When joining, use a carpenter's level and shim legs accordingly. Case must be raised correctly, under legs where support is best, to prevent damage to case.

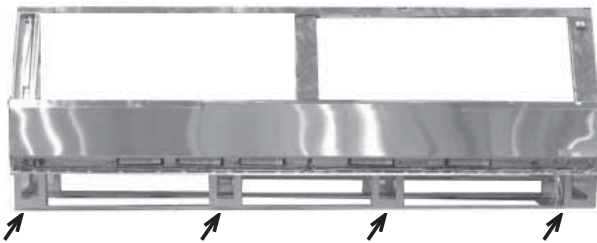
- I. Using case blueprints, measure off and mark on the floor the exact dimensions of where the cases will sit. Snap chalk line for front and back positions of base rail or pedestal. Mark the location of each joint front and back. Find the highest point throughout the lineup. **FLOORS ARE NORMALLY NOT LEVEL!** Determine the highest point of the floor; cases will be set off this point. All cases in the entire lineup must be brought up to the highest level of the case sitting at the highest point in the lineup. This may be done a few different ways. 1) Walk the floor looking for any mounds or dips. 2) Use a string level. 3) Use a transit. Mark the difference and place the appropriate number of shims required to maintain high-point level. If a wedge is used in the middle of a lineup, the wedge must be set off the highest point on the floor **FIRST**, with the rest of the lineup being leveled from it.

NOTE; Pedestals must be shimmed individually under each corner of the pedestal.

Installation cont'd



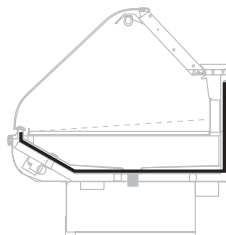
Shim standard cases in the middle, and at all other points under the case along the rail as needed (depending on case length).



Shimming the cases helps avoid case sag and poor glass alignment.

2. Set first case, and adjust legs over the highest part of the floor so that case is level. Prevent damage – case must be raised under leg or by use of 2x6 or 2x4 leg brace. Remove side and back leg braces after case is set.
3. Set second case as close as possible to the first case, and level case to the first using the instructions in step one.
4. Apply masking tape 1/8" in from end of case on inside and outside rear mullion on both cases to be joined.
5. Apply liberal bead of case joint sealant (butyl) to first case. Sealant area is shown using a dotted line in illustration in Step 8. Apply heavy amount to cover entire shaded area.

DO NOT USE PERMAGUM!



It is the contractor's responsibility to install case(s) according to local construction and health codes.

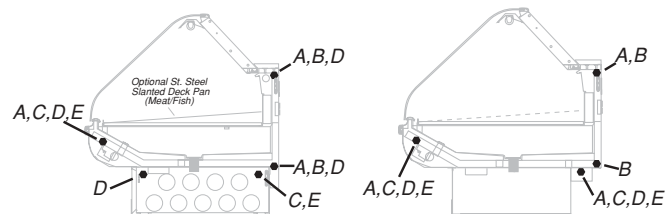
6. Slide second case up to first case snugly. Then level second case to the first case so glass front, bumper and top are flush.



CAUTION

Do not use cam locks to pull cases together.

7. To compress butyl at joint, use two Jurgenson wood clamps. Make sure case is level from front to back and side to side on inside bulkheads at joint.
8. Attach sections together via the camlocks pictured in the illustration below.



LEGEND

- A = Straight Case
 B = Inside Wedges
 C = 45° Wedges
 D = 30° Outside Wedges
 E = 90° Outside Wedges

9. Apply bead of butyl to top of bulkheads and slip on stainless steel bulkhead cap. Also apply butyl to seam between overhead light tubes.
10. **VERY IMPORTANT!** Apply liberal amounts of black butyl to area under interior lower legs and fill all voids down to bulkhead.
11. Use finger to smooth butyl as thin as possible at masking tape on inside and outside of rear mullion

Installation cont'd

(apply additional butyl if necessary). Remove tape applied on line #3.

INSIDE REFRIGERATED WEDGES

Line up taper pins with holes on adjoining case. Turn camlock to lock in. Two camlocks are located at the rear of the case behind the air discharge and behind the lower electrical raceway access panel. Bolt the wedge into the adjoining case in the front. If the adjoining case is refrigerated, the bolt is located under the pans in the front. When the adjoining case is a hot case, the cases are bolted together by means of a bracket located behind the front panel. Remove the front panel by lifting it up and out.

COMMON END BETWEEN UNLIKE CASES AND HOT CASES

Bolt the end onto the case using the bolts provided in predrilled holes behind the front of the panel through the bracket provided and in the rear behind the rear access panel on the bottom. Common ends between refrigerated cases are also bolted together behind the air discharge panel. Remove the discharge panel by lifting up and out. Hot case are only bolted in two places. IN the rear of the case, behind the access panel and in the front of the case behind the front panel.

OUTSIDE REFRIGERATED WEDGE:

Taper pin and camlock locations are the same as a standard case.

INSIDE DRY WEDGES

Bolt the wedge into the sides of the adjoining case. Use the bolts provided

INSIDE PEDESTAL WEDGES

Set the wedge on adjoining case's mounting brackets located at the base of the unit, and bolt down. Drive screws provided through the sides of the wedge (4 screws per side), accessible through the back of the wedge.

1. Secure the joint backer located behind the cart bumper support at the joints. To adjust the front panel. Loosen the screws holding the bumper on the case on either side the joint, and slide the extrusion to the center of the joint.
2. Starting from a center case in a lineup or a wedge, align front panels. Front panels can be loosened and adjusted laterally by loosening the screws holding

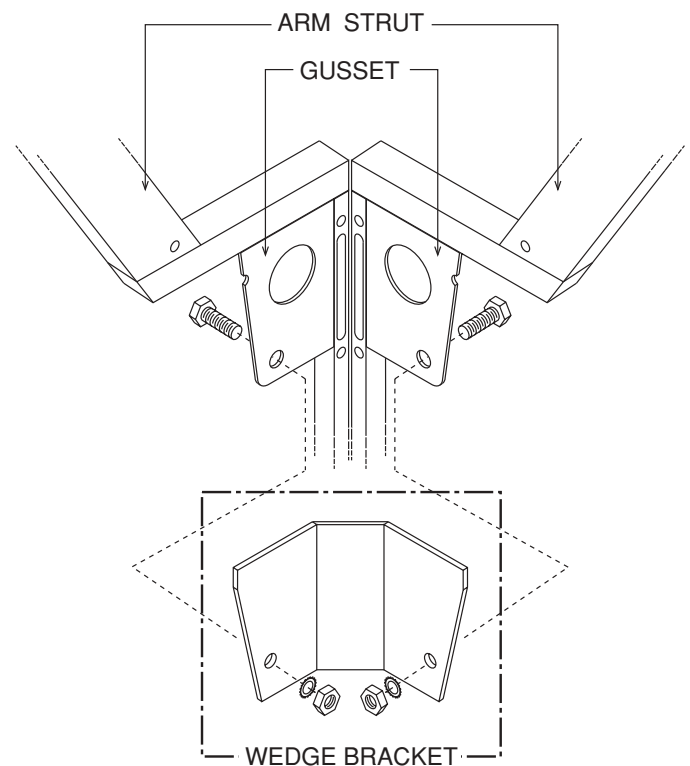
the case bumper channel

****NOTE:** Be sure to read the "Important Information" Section for proper case operation, before loading the merchandiser.

LIFT-UP GLASS RE-ADJUSTMENT

In addition to verifying that the Allen screws on the lift-up glass are tightened when the case is delivered, **recheck the Allen screws on the glass ONCE THE CASE IS IN FULL OPERATION AND BROUGHT TO TEMPERATURE.**

Temperature changes can affect the size and shape of the materials involved, and can cause changes in the secure fit of the glass and the clamp.



Corner wedges are attached via front and rear camlocks. Use a 7mm allen wrench to turn the locks. Do not over-tighten! Join the top by using a joint bracket (included in joint kit) with 3/8" bolts.

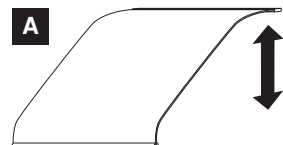
Glass Adjustment

ESC Glass Adjustment

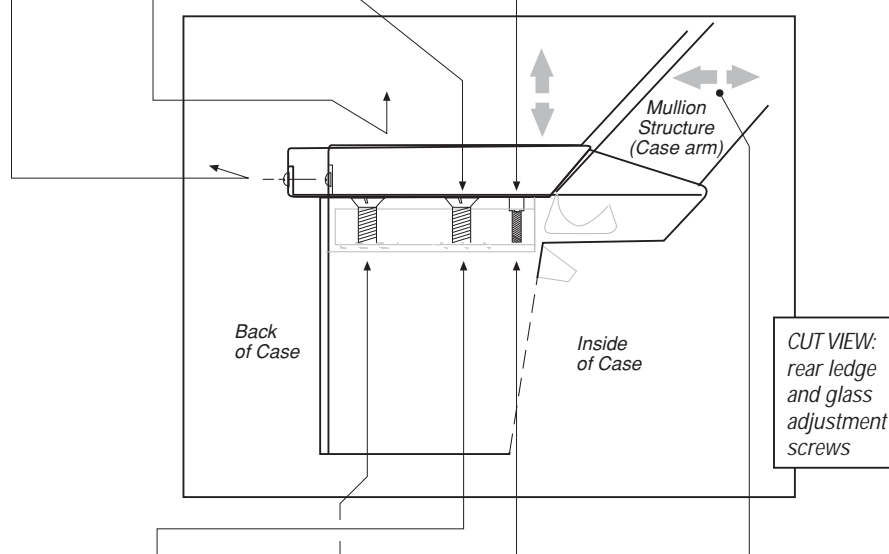
NOTE: Before making any of the recommended adjustments, Verify that the case(s) have been leveled properly.

Tech/glassadj/970602 tn

Adjust glass Up and Down (vertically)



1. Remove rear prep ledge.
2. Remove galvanized sub top.
3. Loosen front locking screw **ONLY!** (5/16"x1.25" Flat head).
4. Turn height adjustment screw to raise and lower mullion. (1/8" set screw) Max travel = 1/4" CW – mullion up, CCW – mullion down.
5. Check alignment and retighten front locking screw and re-install removed components.



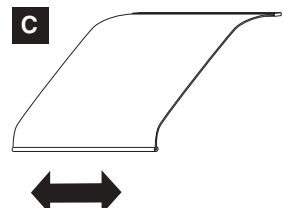
Adjust glass Front to Back



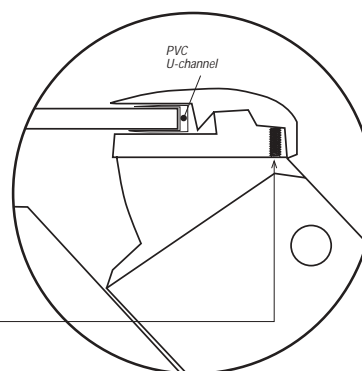
1. Remove rear prep ledge and remove galvanized sub top (see above).
2. Loosen front locking screw **FIRST!** (5/16" flat head).
3. Loosen back locking screw **SECOND!** (5/16" flat head).
4. Back out height adjustment screw, until arm bottoms out on the gusset bracket **COUNT # of turns!** (1/8" set screw).
5. Slide the mullion arm forward or backward by moving the mullion structure itself. Max travel = 5/8"
6. Restore the height adjustment screw to original position (from step 4) and verify glass alignment. Retighten rear then front locking screws from step 1.

IMPORTANT

Adjust glass Side to Side (horizontally)



1. Open glass panel. Relieve the tension on the hinge.
2. Back out all the set screws along the top edge of the glass panel to open clamp. (3mm set screw)
3. Slide glass in desired direction.



LIFT-UP GLASS RE-ADJUSTMENT

In addition to verifying that the Allen screws on the lift-up glass are tightened when the case is delivered, **recheck the Allen screws on the glass ONCE THE CASE IS IN FULL OPERATION AND BROUGHT TO TEMPERATURE.**

Temperature changes can affect the size and shape of the materials involved, and can cause changes in the secure fit of the glass and the clamp.

Plumbing

WASTE OUTLET AND P-TRAP

The waste outlet is located off the center of the case on one side allowing drip piping to be run lengthwise under the fixture.

A 1-1/2" P-trap and threaded adapter are supplied with each fixture. The P-trap must be installed to prevent air leakage and insect entrance into the fixture.

NOTE: PVC-DWV solvent cement is recommended.

Follow the manufacturer's instructions.

INSTALLING CONDENSATE DRAIN

Poorly or improperly installed condensate drains can seriously interfere with the operation of this refrigerator, and result in costly maintenance and product losses. Please follow the recommendations listed below when installing condensate drains to insure a proper installation:

1. Never use pipe for condensate drains smaller than the nominal diameter of the pipe or P-trap supplied with the case.
2. When connecting condensate drains, the P-trap must be used as part of the condensate drain to prevent air leakage or insect entrance. Store plumbing system floor drains should be at least 14" off the center of the case to allow use of the P-trap pipe

section. Never use two water seals in series in any one line. Double P-traps in series will cause a lock and prevent draining.

3. Always provide as much down hill slope ("fall") as possible; 1/8" per foot is the preferred minimum. PVC pipe, when used, must be supported to maintain the 1/8" pitch and to prevent warping.
4. Avoid long runs of condensate drains. Long runs make it impossible to provide the "fall" necessary for good drainage.
5. Provide a suitable air break between the flood rim of the floor drain and outlet of condensate drain. 1" is ideal.
6. Prevent condensate drains from freezing:
 - a. Do not install condensate drains in contact with non-insulated suction lines. Suction lines should be insulated with a nonabsorbent insulation material such as Armstrong's Armaflex.
 - b. Where condensate drains are located in dead air spaces (between refrigerators or between a refrigerator and a wall), provide means to prevent freezing. The water seal should be insulated to prevent condensation.

Manifold Flush System

GENERAL DESCRIPTION

Twice a day for two (2) minutes, a high pressure water stream will flush most residue build-up from the bottom of the manifold chamber. This is the area that residue builds and expands from. Frequency of this periodic maintenance will vary depending on water mineral content and sanitary conditions.

AUTOMATIC FLUSH SYSTEM

Electrical components are located within the electrical raceway. Electrical components in this area are 115V AC. Water flow for flush system is rated at 0.25 GPM at 60PSI water pressure. Flush nozzles are located in the front of the case.

BASIC SYSTEM OPERATION:

1. Filtered water is supplied to the 115V solenoid valve.

2. At a time of day determined by you, the 115V time clock will energize the solenoid for 2 minutes.

START UP:

1. Manually move time clock to initiate a flush cycle.
2. Observe that flush nozzle is spraying down center of manifold chamber.
3. Set clock to correct time of day.
4. Set trip pins to the "time of day system is to flush" (NOTE: 2 flush/day!)

MANUAL FLUSH SYSTEM

Water valve is located on the outside of the case, in the rear, on the left hand side as viewed from the rear.

BASIC SYSTEM OPERATION:

1. Open the water valve to allow the flush system start. It is recommended that the case is flushed two (2) times daily for two (2) minutes.

MAINTENANCE:

Perform maintenance when servicing humidity system.

Humidity System

GENERAL DESCRIPTION

One contributor to the spoilage of fresh meats is dehydration, which causes loss in weight and volume (shrinkage) and product discoloration. As the refrigeration system removes heat from the case, it also removes critical moisture from the air, and any unwrapped products in the case. The Humidity System replaces the moisture in the air, in order to compensate for the moisture taken by the refrigeration system, and disposed of down the drain line. The system is built into the discharge plenum, and mixes moisture laden air with refrigerated air before the air is passed through - and around the product. The system is constructed almost entirely of PVC pipe, and uses air that is subcooled to approximately the same temperature as the case. The sub-cooling of air inhibits the formation of growth found to be a problem in other humidification systems. Maintenance is almost unnecessary if you follow a few simple rules:

1. Keep the case clean.
2. Keep the water filter clean, and change it every 6-12 months or sooner, depending on the kind of water found in your area.
3. Flush the header every 6 months, by loosening the connecting "L", then removing it from the case, and flushing with a hose.

IMPORTANT INFORMATION

The ESC is capable of maintaining superb product quality with the installation of the proper controlling devices. These devices should be set according to the manufacturer's specifications. The humidity system should be properly maintained. Incorrect settings and failure to maintain the humidity system will result in short product life. Below are a few guidelines for optimum performance and product life:

- Set thermostat to cut in at the discharge temperature designated in the case specifications section of the appropriate installation guide or spec. sheet. Maintain the recommended product temperature for Deli, Meat, and Fish. DO NOT set temperature too cold, as this causes product dehydration.
- Temperatures should be achieved by means of a T-Stat and Suction Solenoid at each case. DO NOT use EPR valves, Liquid Line Solenoids, or electronic control devices of any kind. These controls allow temperature swings that cause dehydration and excessive energy consumption.
- Set defrost cycles as listed in the Case Specifications Data for your particular case. The number of defrosts per day should never change. The duration of the defrost cycle may be adjusted to meet conditions present at your location.
- Clean humidity system a minimum of every 90 days for proper system operation.
- Work and rotate product - not to exceed a 4-hour period.
- At night, turn off case lights, and cover unwrapped product with moistened cheesecloth or fabric towels.
- Keep meat holding box at 32°F
- Keep meat prep room refrigerated at 55°F
- Meat Bloom Box (if applicable) should be at 36°F
- Meat must enter the case at 40°F or below. Product deteriorates rapidly above 40°F.
- Clean sanitary conditions throughout the meat holding, prep, and work areas.
- Do not display product directly within the air discharge
- Turn and rotate meat. The blood works down through the meat over time, which causes the top surface to discolor and dehydrate. Turn meat 3-4 times.
- It is not required to remove product from case overnight. Turn off case lights, and cover product with moistened cheesecloth or fabric towel. This helps slow down product dehydration, by taking moisture from the cloth and not the product. This is an old method used by meat shops for many years, as it extends product life.
- Cold coils remove heat & moisture from the case and deposit this as frost onto the coil. Thus a defrost is required to remove this frost. Our humidity system induces moisture into the case, and helps slow down the dehydration process. The only other moisture in the case is that which is in the product. A single level of meat will dry out faster than a fully loaded case with 3-4 levels of meat.
- The colder the case, the faster the product loses its moisture and shelf life. It is very important to maintain a constant, even, correct, product temperature.

Humidity System, cont'd

HUMIDIFICATION SYSTEM HOOKUPS

Remove the raceway panel on the lower back of the case. The pre-piped water shut-off valve and the water filter are located on the left hand side of the case. The water line (which is a 1/4" OD copper fitting) can be connected to the ball shut-off valve, by means of a compression fitting (supplied). The line should be one size larger than the supply line. The line can then be run from one case to another from within the raceway(s) using Tee connectors. Before connecting the water to the humidity system, it is best to purge the line to flush any debris that may clog the water filter. If the water line requires purging after the cases are hooked together, it is not necessary to check each one. Simply shut ball valves to each humidity system, remove the water line from the last case in the flow, and purge. By doing this as a precautionary measure, you may avoid problems and repeat servicing.

START-UP

Turn on the fan circuit. Check to see if the fan for the humidity system is running. Remove the right hand bottom pan (when facing the front of the case), then the TXV cover. The fan is located up against the right hand side of for proper system operation.

the case, as viewed from the front, under the fan plenum (see diagram). View the blade, and make sure the fan rotation agrees with the air flow arrows. Turn on the water, by turning the ball valve in the direction of the flow (OFF is at 90° to the direction of flow).

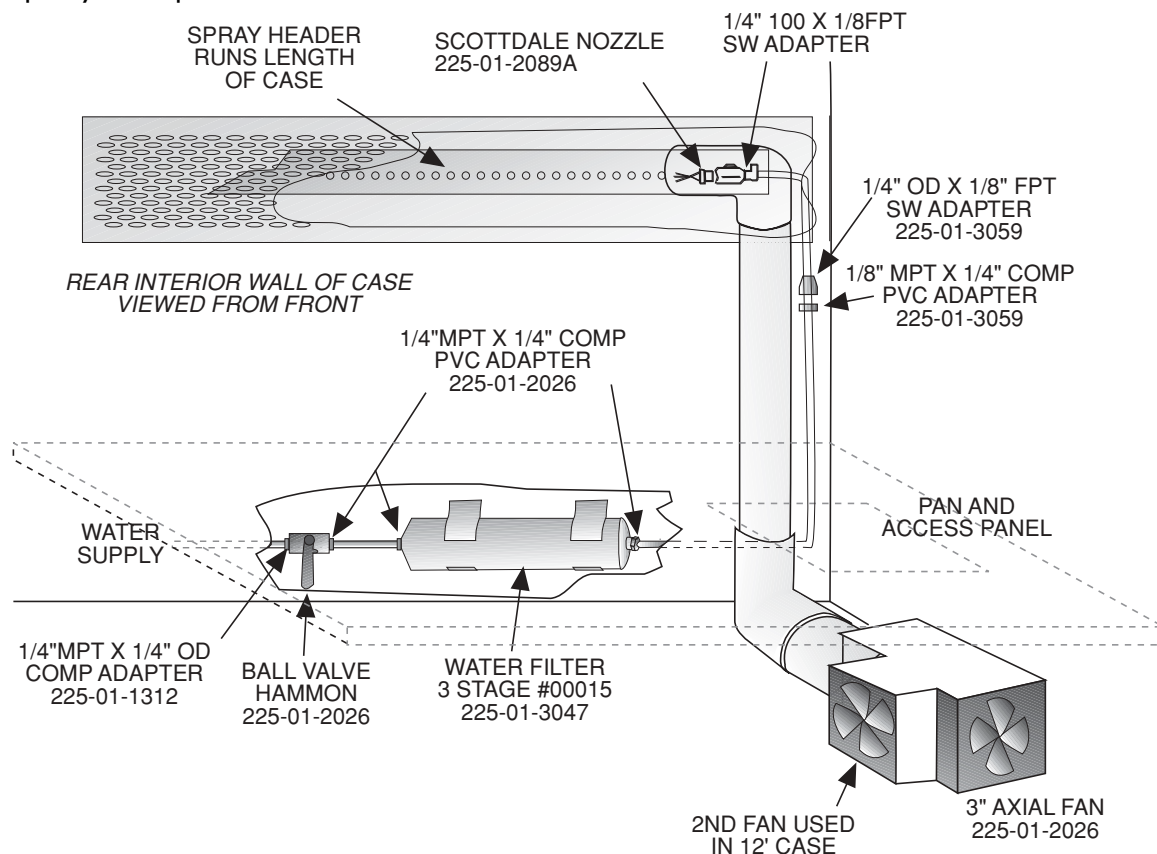
After a few minutes, Check the spray header by removing the discharge air grill located on the right hand side of the case (when viewed from the rear), by lifting the 4'-0" section of grill by both ends, until the bottom clears. Pull up and set aside. The spray header will be exposed. Grasp the header and pull it loose from the 90° "L" until you see the misting nozzle, which should be spraying. If not, check the following:

1. Make sure the water is feeding the nozzle
2. Remove the nozzle, and purge the water
3. Check strainer at entrance to nozzle

Reinsert the header into the 90° "L", making sure that the nozzle is in the center of the pipe when totally inserted, and the holes in the header are facing the front of the case at a level angle.

MAINTENANCE

- Clean humidity system a minimum of every 90 days



HUMIDITY SYSTEM as viewed from the front.

Note: The axial fans included in the humidity system must be replaced as a unit.

Refrigeration

REFRIGERANT TYPE

The standard refrigerant will be R-22 unless otherwise specified on the customer order. Check the serial plate on the case for information.

PIPING

The refrigerant line outlets are located under the case. Locate first the electrical box, the outlets are then on the same side of the case but at the opposite end. Insulate suction lines to prevent condensation drippage.

REFRIGERATION LINES

LIQUID	SUCTION
3/8" O.D.	5/8" O.D.

NOTE: The standard coil is piped at 5/8" (suction); however, the store tie-in may vary depending on the number of coils and the draw the case has. Depending on the case setup, the connecting point in the store may be 5/8", 7/8", or 1 1/8". Refer to the particular case you are hooking up.

Refrigerant lines should be sized as shown on the refrigeration legend furnished by the store.

Install *P-traps* (oil traps) at the base of all suction line vertical risers.

Pressure drop can rob the system of capacity. To keep the pressure drop to a minimum, keep refrigerant line run as short as possible, using the minimum number of elbows. Where elbows are required, use long radius elbows only.

CONTROL SETTINGS

See the "Case Specs" section of this guidebook for the appropriate settings for your merchandiser. Maintain these parameters to achieve near constant product temperatures. Product temperature should be measured first thing in the morning, after having been refrigerated overnight. For all multiplexing, defrost should be time terminated. Loadmaster valves are not recommended. Defrost times should as directed in the Case Specifications section of this guide. The number of defrosts per day should never change. The duration of the defrost cycle may be adjusted to meet conditions present at your location.

ACCESS TO TX VALVES & DRAIN LINES

MECHANICAL - Remove product from end of case. Remove product racks. Remove refrigeration and drain access panels (labeled). TX valve (mechanical only) and drain are located under each access panel at end of the case.

ELECTRONIC - The Electronic Expansion valve master and slave cylinder(s) are located within the electrical access panel(s).

ELECTRONIC EXPANSION VALVE (OPTIONAL)

A wide variety of electronic expansion valves and case controllers can be utilized. Please refer to EEV and controller manufacturers information sheet. Sensors for elec-

tronic expansion valves will be installed on the coil inlet, coil outlet, and in the discharge air. (Some supermarkets require a 4th sensor in the return air). Case controllers will be located in the electrical raceway or under the case

THERMOSTATIC EXPANSION VALVE LOCATION

This device is located on the same side as the refrigeration stub. A Sporlan balanced port expansion valve model is furnished as standard equipment, unless otherwise specified by customer.

EXPANSION VALVE ADJUSTMENT

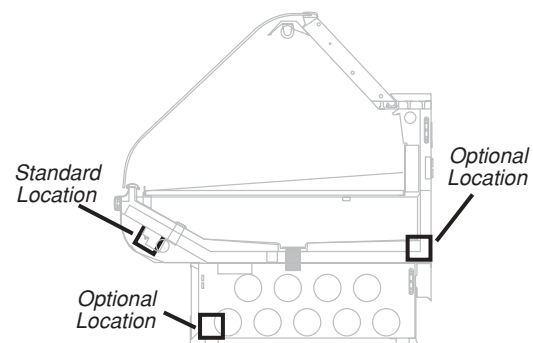
Expansion valves must be adjusted to fully feed the evaporator. Before attempting any adjustments, make sure the evaporator is either clear or very lightly covered with frost, and that the fixture is within 10°F of its expected operating temperature.

MEASURING THE OPERATING SUPERHEAT

1. Determine the suction pressure with an accurate pressure gauge at the evaporator outlet.
2. From a refrigerant pressure temperature chart, determine the saturation temperature at the observed suction pressure.
3. Measure the temperature of the suction gas at the thermostatic remote bulb location.
4. Subtract the saturation temperature obtained in step No.2 from the temperature measured in step No.3.
3. The difference is superheat.
5. Set the superheat for 5°F - 7°F.

T-STAT LOCATION

T-Stats are located within the electrical raceway. Refer to diagram below.



Electrical

WIRING COLOR CODE

STANDARD CASE WIRE COLOR CODE		
TYPE INSTALLED ↑	■ ● GREEN	GROUND
	■ ● PURPLE	ANTI-SWEAT
	■ ● ORANGE	LIGHTS
	■ ● YELLOW	RECEPTACLE
	■ RED	T-STAT 230V
	■ BROWN	FAN MOTORS
	■ BLACK/WHITE	T-STAT 115V
	● BROWN	FAN MOTORS/T-STAT 115V
	● GRAY	SOL-VALVE
	○	FACT. INSTALLED T-STAT & SOLENOID
TYPE INSTALLED ↓		

CASE MUST BE GROUNDED

NOTE: Refer to label affixed to case to determine the actual configuration as checked in the "TYPE INSTALLED" boxes.

ELECTRICAL CIRCUIT IDENTIFICATION

Standard lighting for all models will be full length fluorescent lamps located within the case at the top.

The switch controlling the lights, the plug provided for digital scale, and the thermometer are located at the rear of the case mullion.

The receptacle that is provided on the exterior back of these models is intended for computerized scales with a five amp maximum load, not for large motors or other high wattage appliances. It should be wired to a dedicated circuit.

ELECTRICAL SERVICE RECEPTACLES (WHEN APPLICABLE)

The receptacles located on the exterior of the merchandiser are intended for scales and lighted displays. They are not intended nor suitable for large motors or other external appliances.

**DANGER**

**BEFORE SERVICING
ALWAYS DISCONNECT ELECTRICAL
POWER AT THE MAIN DISCONNECT
WHEN SERVICING OR REPLACING ANY
ELECTRICAL COMPONENT.**

This includes (but not limited to) Fans, Heaters, Thermostats, and Lights.

FIELD WIRING & SERIAL PLATE AMPERAGE

Field Wiring must be sized for component amperes printed on the serial plate. Actual ampere draw may be less than specified. Field wiring from the refrigeration control panel to the merchandisers is required for refrigeration thermostats. Most component amperes are listed in the "Case Specs" section, but always check the serial plate.

BALLAST LOCATION

Ballasts are located within the access panel that runs the length of the rear of the case. Refer to T-stat location in previous section. They are located in the same area.

ASHRAE COLOR CODE

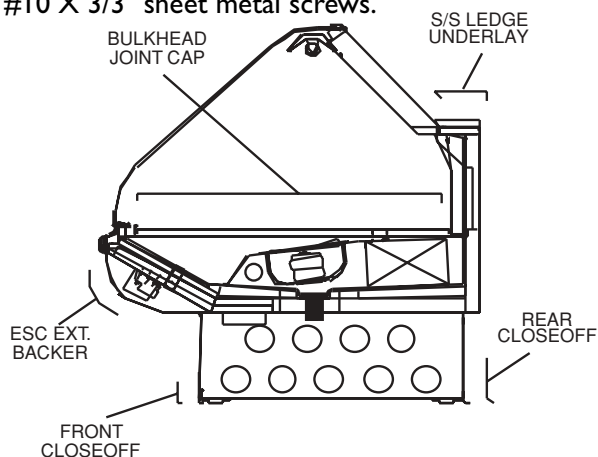
NOTE: All other manufacturers; no known sensor codes

Case Control Systems		SENSOR COLORS	
Manufacturer ® >		EIL	CPC
Location			
Coil Inlet	Color	Blue	Blue
	Part#	225-01-1755	225-01-3255
Coil Outlet	Color	Red	Red
	Part#	225-01-1757	225-01-3123
Discharge Air	Color	Green	Green
	Part#	225-01-1756	225-01-3260
Return Air	Color	Purple	Green
	Part#	225-01-1758	225-01-3260
Defrost Term.	Color	White	Orange
	Part#	225-01-0650	225-01-3254
Liquid Line	Color	White	Blue
	Part#	225-01-0650	225-01-3255

Finishing Touches

JOINT TRIM

After cases have been leveled and joined, and refrigeration, electrical, and wasted piping work completed, install the splashguards. Fasten along the top edge, or center, with #10 X 3/3" sheet metal screws.



Do Not Seal Joint Trim To Floor!

BUMPER INSTALLATION TIPS

1. Start to attach the bumper at one end of the lineup, preferably on a straight case.
2. Push the end of the bumper into the bumper channel firmly. This may be difficult if bumper is cold.
3. Bending the bumper backwards to open up the bumper, guide it forward onto the bumper channel.
4. An inside bumper miter must be cut on wedges.
5. Loose ends on miters must be anchored with screws on the bottom edge.
6. The top and bottom edges of the bumper must be firmly seated into the retainer by applying with a rubber mallet (not by hand).
7. The bumper should be struck by the mallet at a slight angle that forces the bumper back into itself to prevent stretching. The installation can be made easier by applying a paraffin block to the retainer grooves.

INSTALLING SPLASHGUARD

After merchandisers have been leveled and joined, and all drip piping, electrical and refrigeration work has been completed, install the splashguards. Splashguards may be sealed to the floor using a vinyl cove base trim. The size of trim needed will depend on how much the floor is out of level. **NOTE:** The splashguard must be removable to allow access to components behind it.

1. Remove all dirt, wax, debris, etc. from the area of the splashguard to ensure a secure adhesion.
2. Apply a good contact cement to the trim, allowing a proper dry time.
3. Install trim to the splashguard so that it is flush with the floor.

User Information

STOCKING

Improper temperature and lighting will cause serious product loss. Discoloration, dehydration and spoilage can be controlled with proper use of the equipment and handling of product. Product temperature should always be maintained at a constant and proper temperature. This means that from the time the product is received, through storage, preparation and display, the temperature of the product must be controlled to maximize life of the product. Hussmann cases were not designed to “heat up” or “cool down” product—but rather to maintain an item’s proper temperature for maximum shelf life. To achieve the protection required always:

1. Minimize processing time to avoid damaging temperature rise to the product. Product should be at proper temperature.
2. Keep the air in and around the case area free of foreign gasses and fumes or food will rapidly deteriorate.
3. Maintain the display merchandisers temperature controls as outlined in the refrigerator section of this manual.
4. Do not place any product into these refrigerators until all controls have been adjusted and they are operating at the proper temperature. Allow merchandiser to operate a minimum of 6 hours before stocking with any product.
5. When stocking, never allow the product to extend beyond the recommended load limit. **Air discharge and return air flue must be unobstructed at all times to provide proper refrigeration.**
6. There are vents located at the base of the front of the glass, just above the front rail. These vents supply a continuous, gentle flow of air across the front glass which inhibits condensation. **Do not place any signs or other restrictive objects on the front of the refrigerator that will block these vents.**
7. Keep the service doors closed (when applicable). Refrigeration performance will be seriously affected if left open for a prolonged period of time.
8. Avoid the use of supplemental flood or spot lighting. Display light intensity has been designed for maximum visibility and product life at the factory. The use of higher output fluorescent lamps (H.O. and V.H.O.), will shorten the shelf life of the product.
9. In the Deli, Meat and Fish cases, completely cover the product each night with a clean damp cloth or butcher paper (never use plastic, as it does not allow for proper circulation). Make sure the cloth or paper

is in direct contact with the product.

10. Turn and rotate the meat fairly often. The blood which gives the pink color works its way downward with time.
11. Cold coils remove heat and moisture from the case and deposit this as frost onto the coil. Thus, a defrost is required. Our humidity system induces moisture into the case and helps slow down the dehydration process. The only other moisture within the case is that in the product itself. A single level of meat will dry out faster than a fully loaded case of 3–4 levels of meat.

IMPORTANT STEPS

1. Do not set temperature too cold, as this causes product dehydration. **Product Temperature: 33°–35°!**
Set thermostat to cut in at 28° discharge air. Meat holding box: 32°. Meat prep room: 55°. Meat bloom box: 36°.
Process the meat to enter case at 40° or below. Product deterioration is very rapid above 40°.
2. Temperature control should be by means of a T-Stat and Suction Stop Solenoid at each case. Do not use EPR valves, Liquid Line Solenoids or electronic control devices of any kind, as these allow temperature swings causing dehydration and excessive energy consumption.
3. Product should be worked and rotated on a regular basis, not to exceed a 4-hour period.
4. At night, turn off case lights and cover the product with a damp (not wet) cloth similar to cheese cloth (etc.). This should be washed out in the morning and kept in a walk-in box during the day—so that it is cool and moist when covering the product.
5. Discharge air temperature should be approximately 26°F, with between 150–200 FPM air velocity. Do not display product directly within the air discharge.
6. Clean Humidity system a minimum of every 90 days for proper system operation.

CASE CLEANING

Long life and satisfactory performance of any equipment are dependent upon the care given to it. To insure long life, proper sanitation and minimum maintenance costs, the refrigerator should be thoroughly cleaned frequently. **SHUT OFF FAN DURING CLEANING PROCESS.** It can be unplugged within the case, or shut off case at the source. The interior bottom may be cleaned with any domestic soap or detergent based cleaners. Sanitizing solutions will not harm the interior bottom, however, these solutions should

User Information, cont'd

always be used according to the manufacturer's directions. It is essential to establish and regulate cleaning procedures. This will minimize bacteria causing discoloration which leads to degraded product appearance and significantly shortening product shelf life.

Soap and hot water are not enough to kill this bacteria. A sanitizing solution must be included with each cleaning process to eliminate this bacteria.

1. Scrub thoroughly, cleaning all surfaces, with soap and hot water.
2. Rinse with hot water, but do not flood.
3. Apply the sanitizing solution according to the manufacturer's directions.
4. Rinse thoroughly.
5. Dry completely before resuming operation.

CLEANING GLASS & MIRRORS

Only use a soft cloth and water for cleaning

any glass or mirrored components. Be sure to rinse and/or dry completely.

Never use hot water on cold glass surfaces! It may shatter and cause serious injury! Allow glass surfaces to warm first



PRECAUTION

CLEANING PRECAUTIONS

WHEN CLEANING:

- DO NOT USE HIGH PRESSURE WATER HOSES
- DO NOT INTRODUCE WATER FASTER THAN WASTE OUTLET CAN DRAIN
- NEVER ON A SELF CONTAINED UNIT WITH AN EVAPORATOR FAN
- NEVER USE A CLEANING OR SANITIZING SOLUTION THAT HAS AN OIL BASE (these will dissolve the butyl sealants) or an AMMONIA BASE (this will corrode the copper components of the case)

TO PRESERVE THE ATTRACTIVE FINISH:

- DO USE WATER AND A MILD DETERGENT FOR THE EXTERIOR ONLY
- DO NOT USE ABRASIVES OR STEEL WOOL SCOURING PADS (these will mar the finish)

Installer Instructions

I M P O R T A N T !
READ BEFORE RAISING FRONT GLASS ON ESHS:

IMPORTANT!**READ BEFORE RAISING FRONT GLASS :**

HEX SCREWS ALONG CLAMSHELL MAY HAVE LOOSENED DURING SHIPPING!! RETIGHTEN ALL CLAMSHELL SCREWS BEFORE OPENING GLASS!

The top cylinders, which allow the raising and lowering of the glass, have been carefully tested for proper tension. However, during shipment, the lubricant inside may have settled. This settling may cause excessive or uneven tension on the glass - to the point of breakage.

After installing new cylinders, it is advisable to perform these three easy steps before completely raising the front glass.

1. Slowly raise and lower each glass section 6 times, to a height of 6".
2. Increase the height to 12", and raise and lower the glass 6 more times.
3. Finally, raise the glass to it's full extension. This should release any settled lubricant in the cylinders, and prevent any stress on the front glass. (1)(3)

Important Glass Notifications**CAUTION**

Cylinders are a wear item. They are designed:

- **To support the glass when fully open**
- **to allow the glass to close slowly**

Have your Service Contractor replace the cylinders when required.

**WARNING**

Glass is heavy and can cause bodily damage. Check support cylinders for periodic maintenance

**WARNING**

Once cylinders are removed, front glass will have NO support to maintain a raised position. Support the front glass at all times until cylinder is replaced or the glass is lowered.

Level Minitop Hardware

IF GLASS DOES NOT CLOSE/STAY OPEN PROPERLY- LEVEL MINI TOP HARDWARE

During shipping, it is possible that the mini top hardware housing the pistons and armature has been jostled out of position. This affects the opening angle of the glass.

1. Be sure mini top hardware is level front to back by placing a level along the top of the mini top housing at each hinge location. **If it is not, you will need a shim kit before you can correct. Order from Hussmann Chino.**
2. Remove top glass and panel at top of hardware housing.
3. Mark position of hardware (glass) in relation to case before loosening hex screw using masking tape applied on mini top hardware and case, and pen. Hex screw allows realignment of glass angle and position front to back.
4. Raise glass and loosen hex screw. (See item/diagram #6 on page 13.)
5. Shim to adjust until level using shims available from Hussmann Chino (16 or 20 gauge stainless steel).
6. Check angle by using level placed on top of mini top hardware. Note: a 6" level will fit perfectly within access area.
7. Remove $1\frac{1}{4}$ " chrome cap at front of case arm support. The removal of this cap allows finger access to hold nut plate while tightening hex screw.
8. Hold nut plate and tighten hex screw.
9. If there is still a problem with glass staying open over-level by adding an addition shim under front of case.

NOTE: BEFORE MAKING ANY OF THE RECOMMENDED ADJUSTMENTS, VERIFY THAT THE CASE(S) HAVE BEEN LEVELED PROPERLY. TIPS & TROUBLESHOOTING

Adjustments

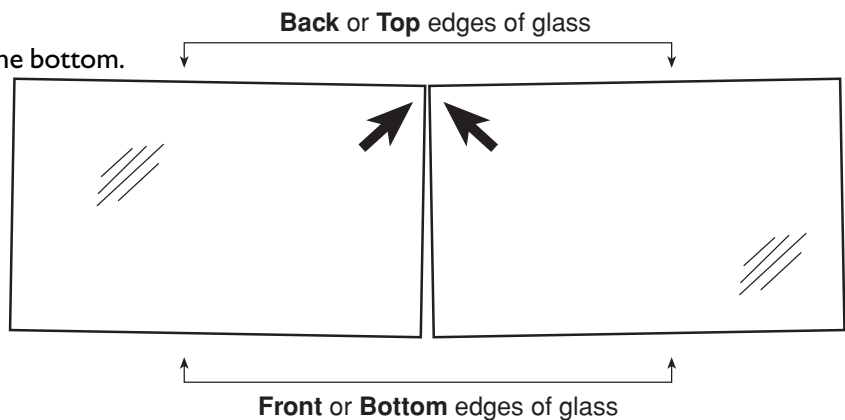
Before calling for service if something seems wrong, check the following:

I. INSPECT THE GAP BETWEEN THE GLASS PANELS

A. If pinched at the top:

Gap is more narrow at the top than at the bottom.

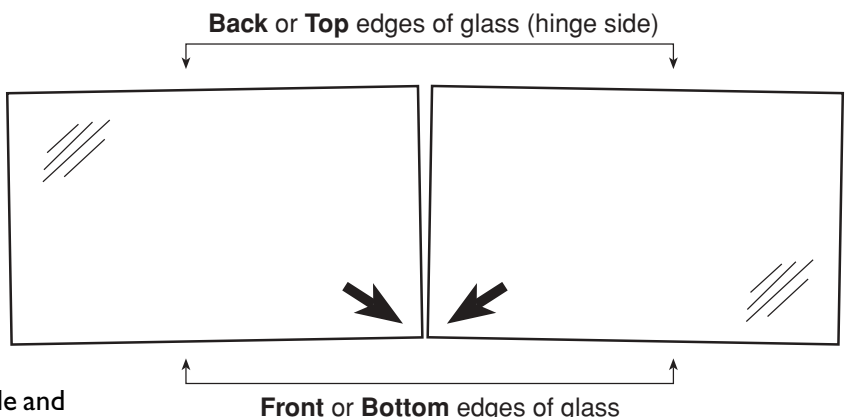
Then see Item 4 / Uneven Gap.



B. If pinched at the bottom:

Gap is more narrow at the bottom than at the top.

Then see Item 4 / Uneven Gap



C. If gap is even, but too narrow or too wide and conditions are satisfactory then go to

Item 6 / Front and Back Adjustment. Typical gap = $\frac{3}{16}$ " to $\frac{1}{4}$ "

2. CHECK CLOSING ACTION OF THE GLASS PANEL

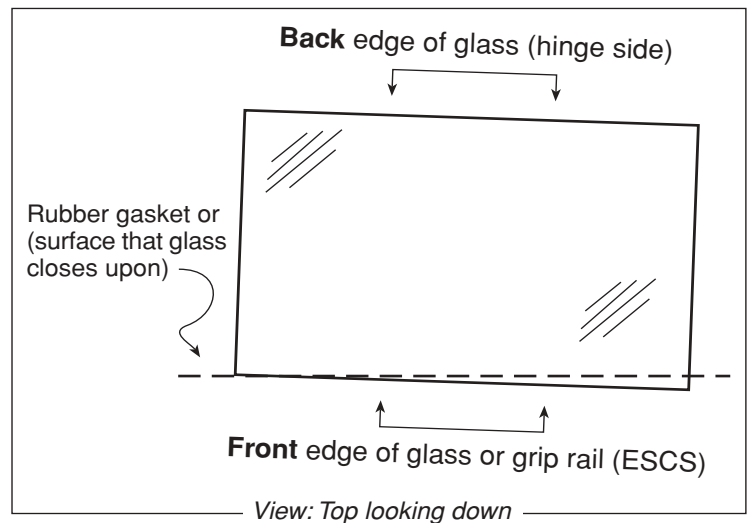
Test each panel by gently pushing it to close. Does the glass panel bounce or wobble as it closes?

A glass panel that does not close smoothly and neatly, most likely is misaligned with the front edge of the glass and the surface or edge which it closes upon.

Refer to diagram at the right.

To correct problem

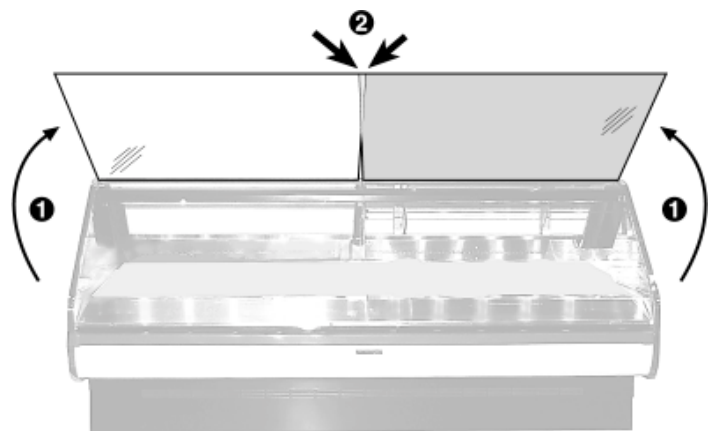
Go to Item 5.



3. CHECK OPENING ACTION OF GLASS PANELS

A. Lift up adjacent glass panels at the same time and note the following:

B. Do the corners of the glass maintain an even gap throughout the travel of the panels? And do the corners touch or overlap at any point?



To correct problem

Go to items 4 & 5.

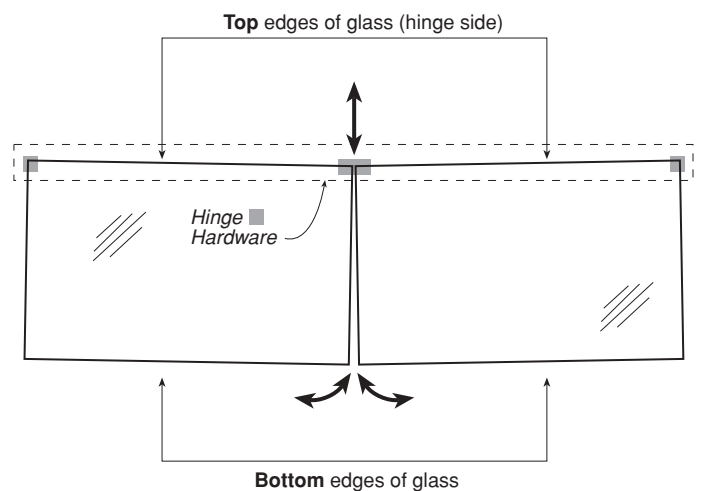
4. STRATEGIES FOR CORRECTING UNEVEN GAP AND OPENING OVERLAP PROBLEMS

VERTICALLY adjust the hinge(s) to even the gap

A. Adjust center hinge (Outer hinges stationary)

As this diagram indicates, raising the middle hinge draws the bottom edges closer together. Whereas lowering the hinge widens the gap.

B. Adjust outside hinges (Center hinge stationary) This diagram indicates that raising the outside hinges widens the gap at the bottom; whereas, lowering the outside hinges will draw the bottom edges closer together.



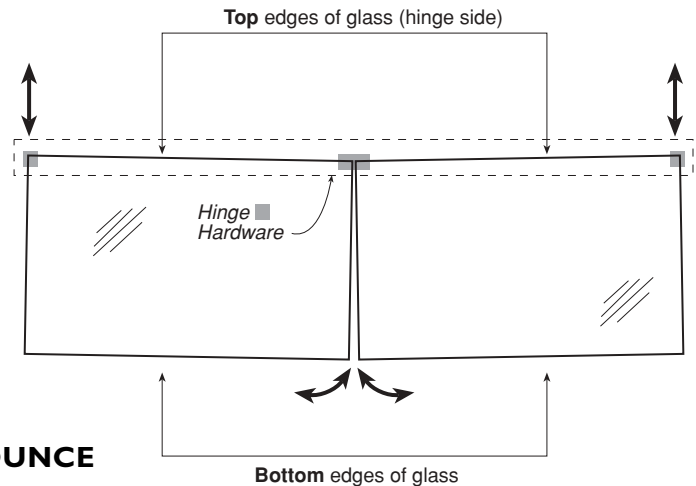
Which hinge(s) should I adjust first?

In most cases the center hinge is the first candidate, but if it cannot be adjusted because, either the adjustment screw is maxed out or no additional shims can be added or removed, then obviously the outer hinges must be adjusted

Go to Item 5 / Correcting Glass Bounce.

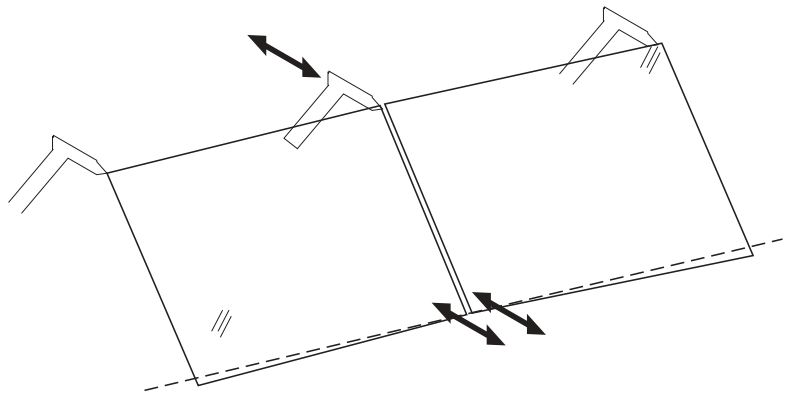
5. STRATEGIES FOR CORRECTING GLASS BOUNCE AND OPENING OVERLAP PROBLEMS

Adjust hinges **FRONT – BACK**.



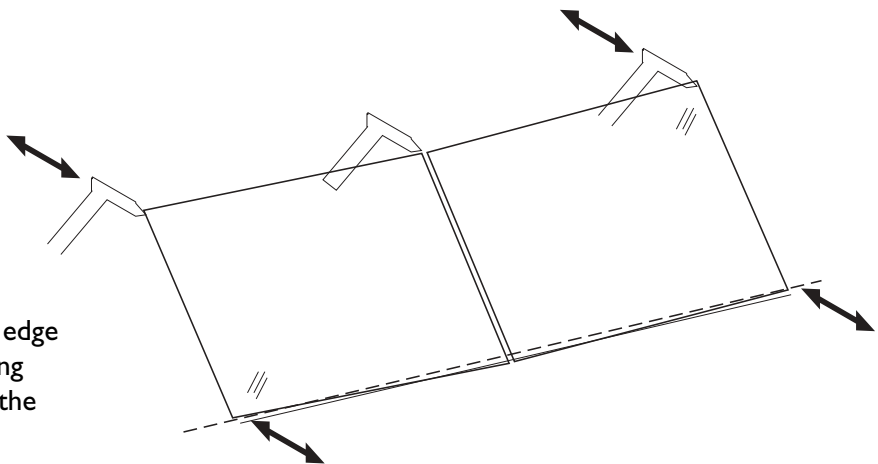
A. Adjust center Hinge (Outer hinges stationary)

As this diagram indicates, pulling the middle hinge further back, pulls the inside edges closer to the surface or edge which the glass rests upon. And pushing the middle hinge to the front, pushes the inside edges further away from the surface or edge which the glass rests upon.



B. Adjust outside hinges (Center hinge stationary)

As this diagram indicates, pulling the outside hinge further back, pulls the outside edge closer to the surface or edge which the glass rests upon. And pushing the middle hinge to the front, pushes the inside edges further away from the surface or edge which the glass rests upon.



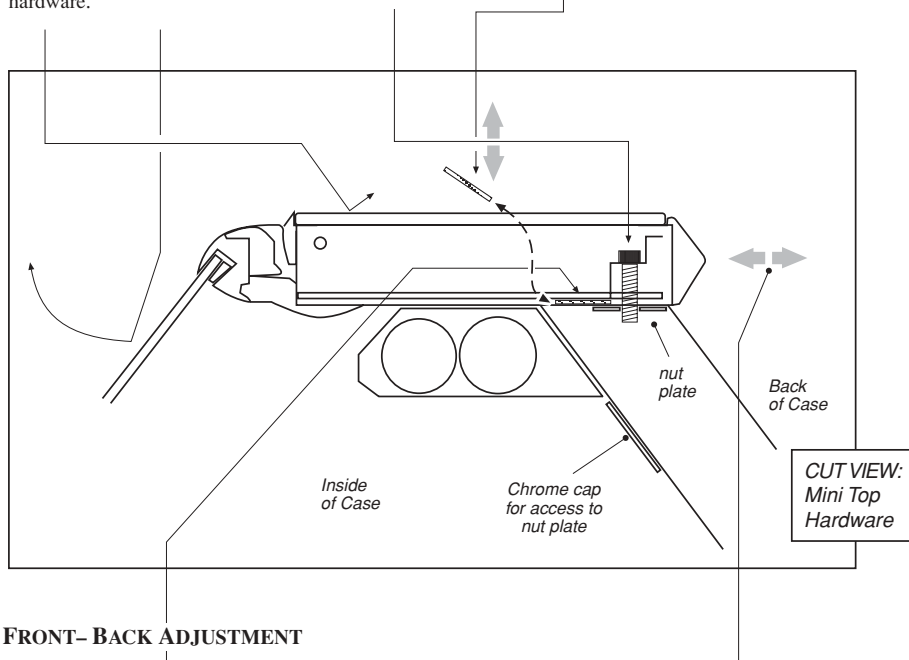
Which hinge(s) should I adjust first?

In most cases the center hinge is the first candidate, but if the arm/mini-cam is at its maximum or minimum position, then obviously the outer hinges must be used.

6. VERTICAL AND FRONT TO BACK ADJUSTMENT AND OPENING OVERLAP PROBLEMS

• VERTICAL ADJUSTMENT

1. Remove top glass and panel enclosing mini-top hardware.
2. Lift open glass panel(s) and relieve tension on hinge.
3. Loosen hex screw (1/4" allen). Remove chrome access plate in order to hold nut plate.
4. Add or remove shims as needed. (see note on shims below)
5. Close glass panel(s) and check alignment. Retighten hex screw and reinstall removed components.



• FRONT-BACK ADJUSTMENT

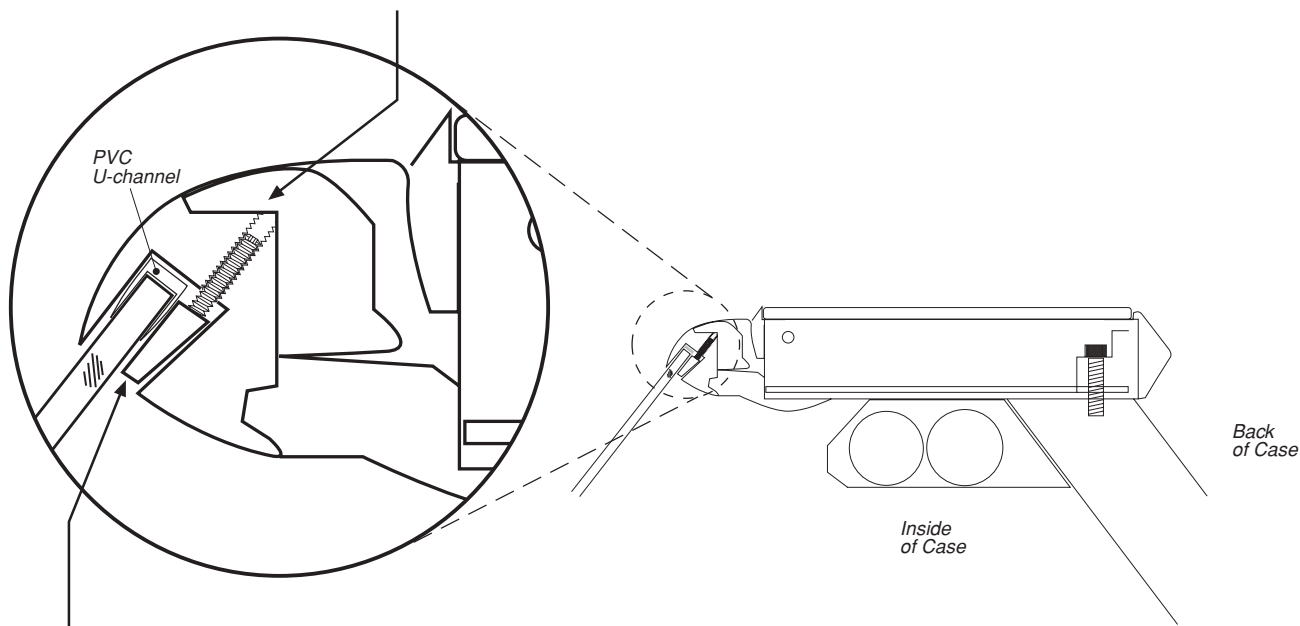
1. Remove top glass and panel enclosing mini-top hardware.
2. Estimate amount of adjustment and make pencil mark on the
3. Lift open glass panel(s) and relieve tension on hinge.
4. Loosen hex screw (1/4" allen) slightly. Remove chrome access plate in order to hold nut plate.
5. Slide the mini-top forward or backward to the mark in step 2. Check alignment of glass. Retighten components.

NOTE: Standard shim thickness is 1/16"

7. Glass Replacement & Right – Left Adjustment

1. Open glass panel.
Relieve the tension on the hinge.

2. Back out all the set screws along the top edge of the glass panel (3mm set screw)



3. Use tip of screwdriver to gently tap loose wedge the entire length of the panel

4. Slide glass panel in desired direction or remove panel



**IMPORTANT
INFORMATION**

FOR PROMPT SERVICE

WHEN CONTACTING THE FACTORY REGARDING PROBLEMS, BE SURE TO HAVE THE CASE **MODEL** AND **SERIAL NUMBER** HANDY.

THIS INFORMATION IS ON A PLATE LOCATED ON THE CASE ITSELF.

Maintenance



BEFORE SERVICING – Always disconnect electrical power at the main disconnect when servicing or replacing any electrical component

This includes (but not limited to) Fans, Heaters, Thermostats, and Lights.

REPLACING FLUORESCENT LAMPS

Fluorescent lamps are furnished with a shatterproof protective coating. The same type of lamp with protective coating must be used if replaced.

This lamp has been treated to resist breakage and must be replaced with a similarly treated lamp in order to maintain compliance with NSF Standards. NSF CODE 4.28.1

Contact HUSSMANN Chino for replacement
1-800-395-9229 x 2131

General Electric has many national distribution locations. Call for your closest location.

Ushio America Inc. is located at: 10550 Camden Drive.
Cypress, CA. 90630

T-5 BULBS

Please note: T-5 lights must be turned off and on *after* bulb replacement.

EVAPORATOR FANS

The evaporator fans are located at the center front of these merchandisers directly beneath the display pans. *Should fans or blades need servicing, always replace fan blades with the raised embossed side of the blade TOWARD THE MOTOR.*


COPPER COILS

The copper coils used in Hussmann merchandisers may be repaired in the field. Materials are available from local refrigeration wholesalers.

Hussmann recommends using #15 Sil-Fos for repairs.

TIPS & TROUBLESHOOTING

Before calling for service, check the following:

1. Check electrical power supply to the equipment for connection.
2. Check fixture loading. Overstocking case will affect its proper operation.
3. If frost is collecting on fixture and/or product, check that Humidity Control is working properly, and that no outside doors () are open—allowing moisture to enter

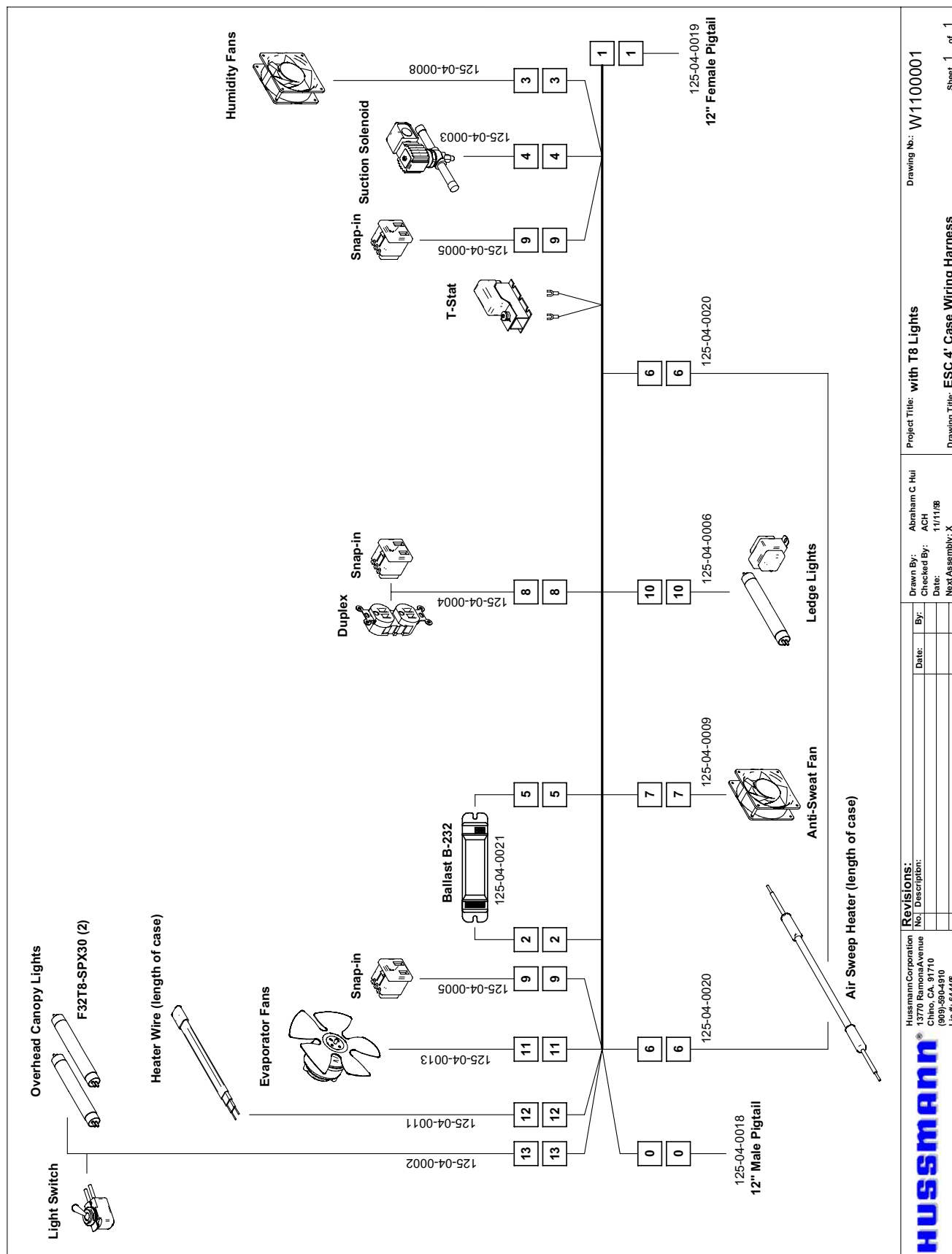
IMPORTANT INFORMATION

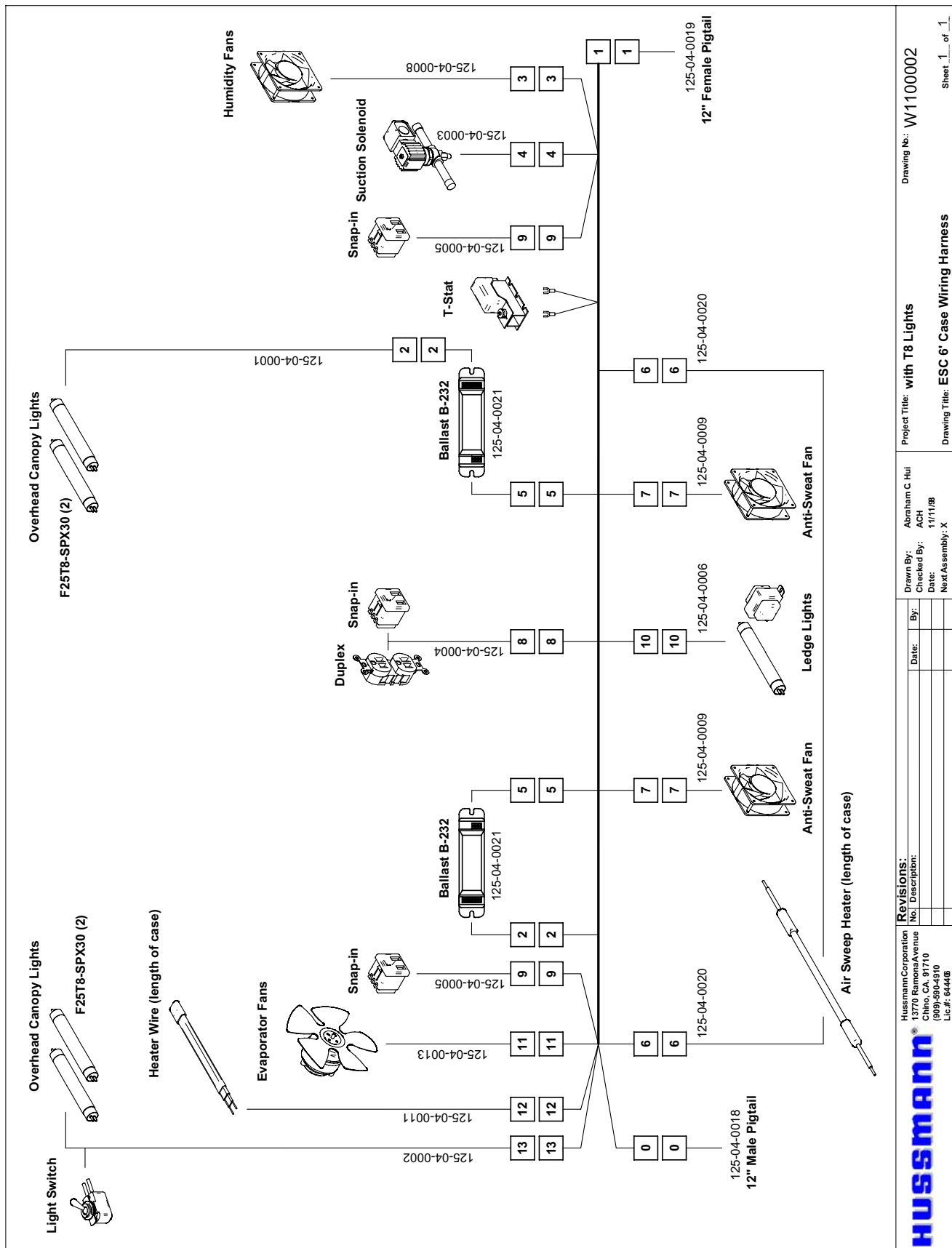
FOR PROMPT SERVICE

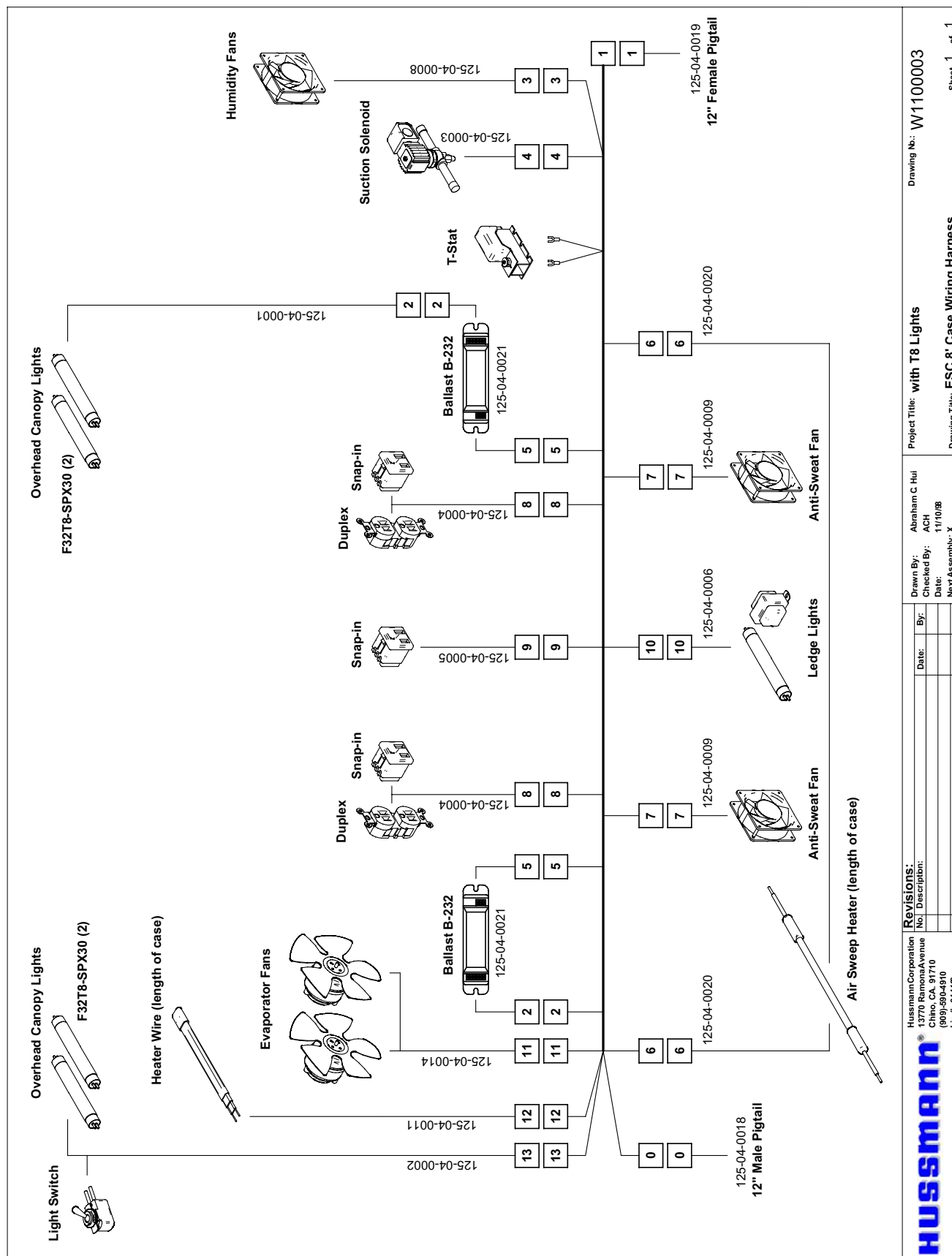
When contacting the factory, be sure to have the Case Model and Serial Number handy. This information is on a plate located on the case itself.

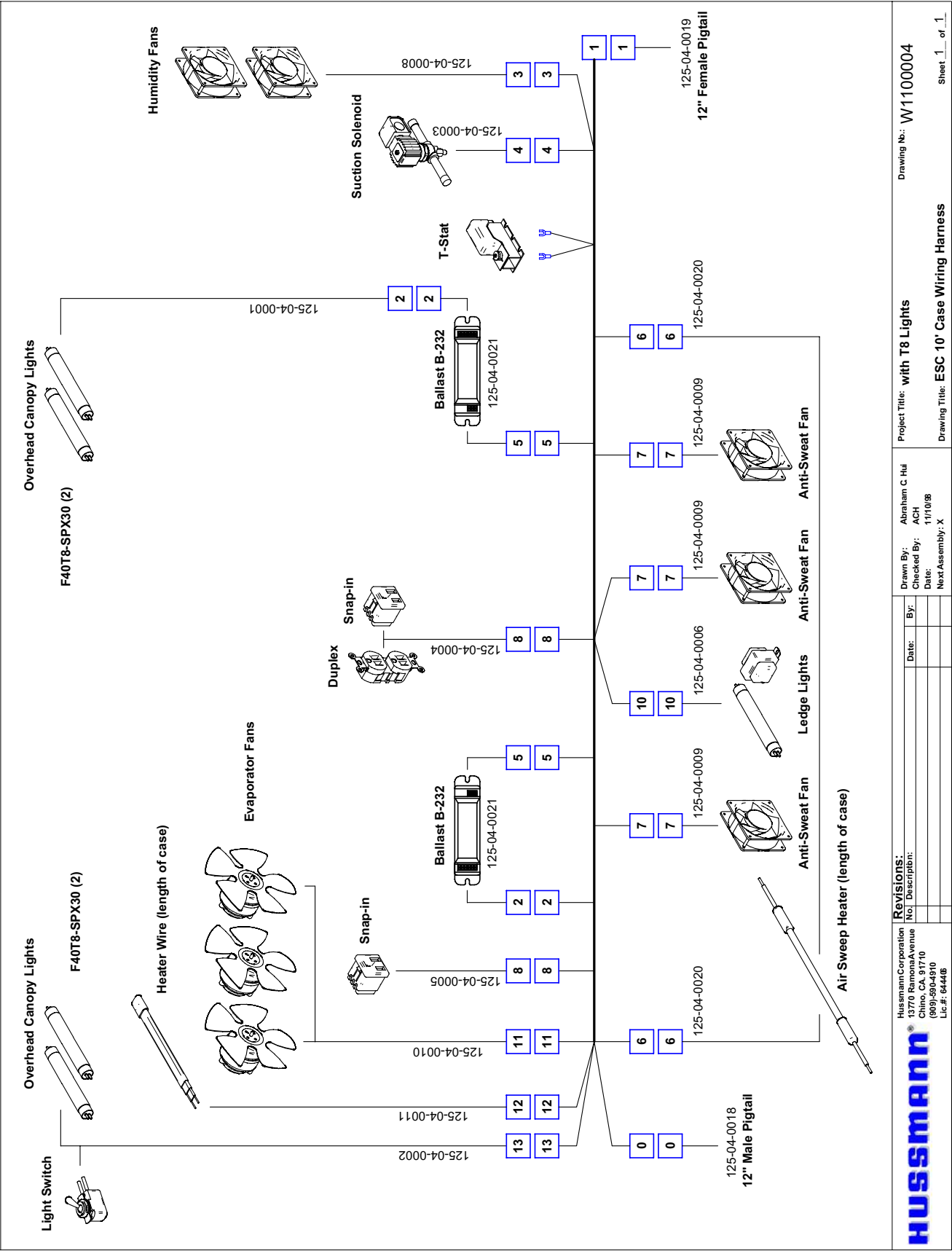
Case Specifications

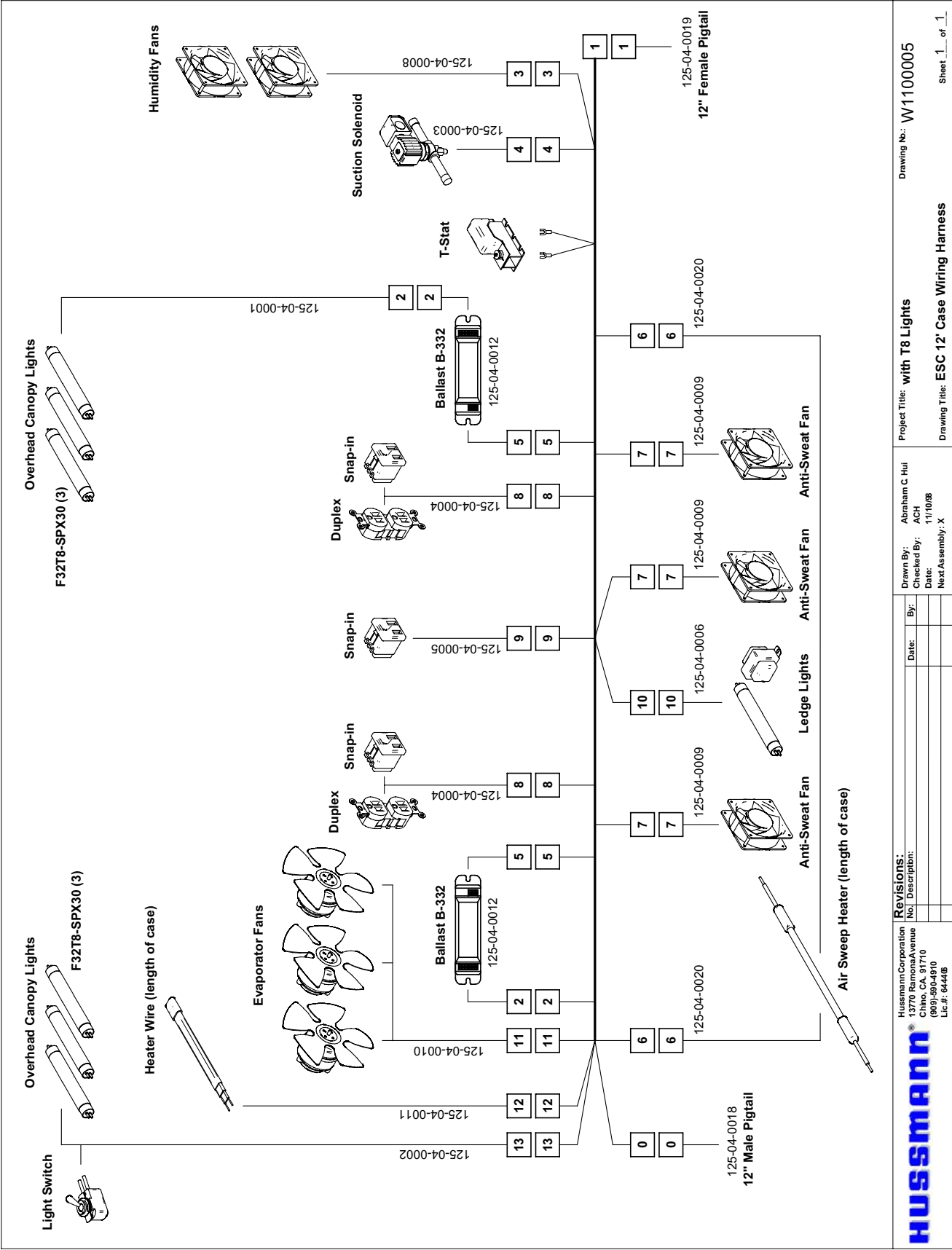
Length/ Application	Refrigeration Btu / Hr.	Average Temperatures (°F)	Disch. Air Speed (CFM)	T-Stat Settings (°F)	Coil Type	Fan Blade Size (in) & Pitch (°)	Motors (Qty.) Evap. A/S	Fans	Defrosts Hum. per day	Electrical Load (Amps) @ ~115 VAC Evap.Fans	Case	Std.	Air Sweep	Hum.	Set (PSI)	Condensing Unit Data Size Voltage	Diagram													
ESC / ESCS																														
4'	Deli	650	2,600	20°	36°	28°	300	28°	26°	Forced Air	8"x 20° "	1	1	1	40	3	0.33	0.6	0.35	0.59	15	0.18	1.04	0.16	30	50	1/3	115	10.9	W1100001
Meat / Fish																														
6'	Deli	650	3,900	20°	33°	28°	300	28°	26°	Forced Air	8"x 20° "	1	1	1	40	3	0.33	0.6	0.52	1.18	15	0.18	1.57	0.16	30	50	1/2	115	19.9	W1100002
Meat / Fish																														
8'	Deli	650	5,200	20°	36°	28°	300	28°	26°	Forced Air	8"x 20° "	2	2	1	40	3	0.66	1.2	0.7	1.18	15	0.36	2.09	0.16	30	50	3/4	208 / 230	8.7	W1100003
Meat / Fish																														
12'	Deli	650	7,800	20°	36°	28°	300	28°	26°	Forced Air	8"x 20° "	3	3	2	40	3	0.99	1.8	1.04	1.3	15	0.54	3.13	0.32	30	50	1	208 / 230	13	W1100005
Meat / Fish																														
ESC Bakery																														
6'	8"x 20° "																													
8'	8"x 20° "																													
12'	8"x 20° "																													
ESC / ESCS Wedges																														
45°	Inside - Outside -	Load on parent case Load on parent case																												
90°	Inside - Deli Meat	2,670 20° 34°	28° 26°	150 ~ 200	28° 26°	Forced Air	8"x 10° "	1	1	40	3	0.33	0.6	0.26	15	0.18	0.46													
Outside -																														
	Deli Meat	2,670 34°	28° 26°	150 ~ 200	28° 26°	Forced Air	8"x 10° "	1	1	40	3	0.33	0.6	0.09	15	0.18	1.04													
Meat																														











Drawing No.: W1100005

Project Title: with T8 Lights

Drawn By: Abraham C. Hui
Checked By: ACH
Date: 1/10/08
Next Assembly: X

Revisions:

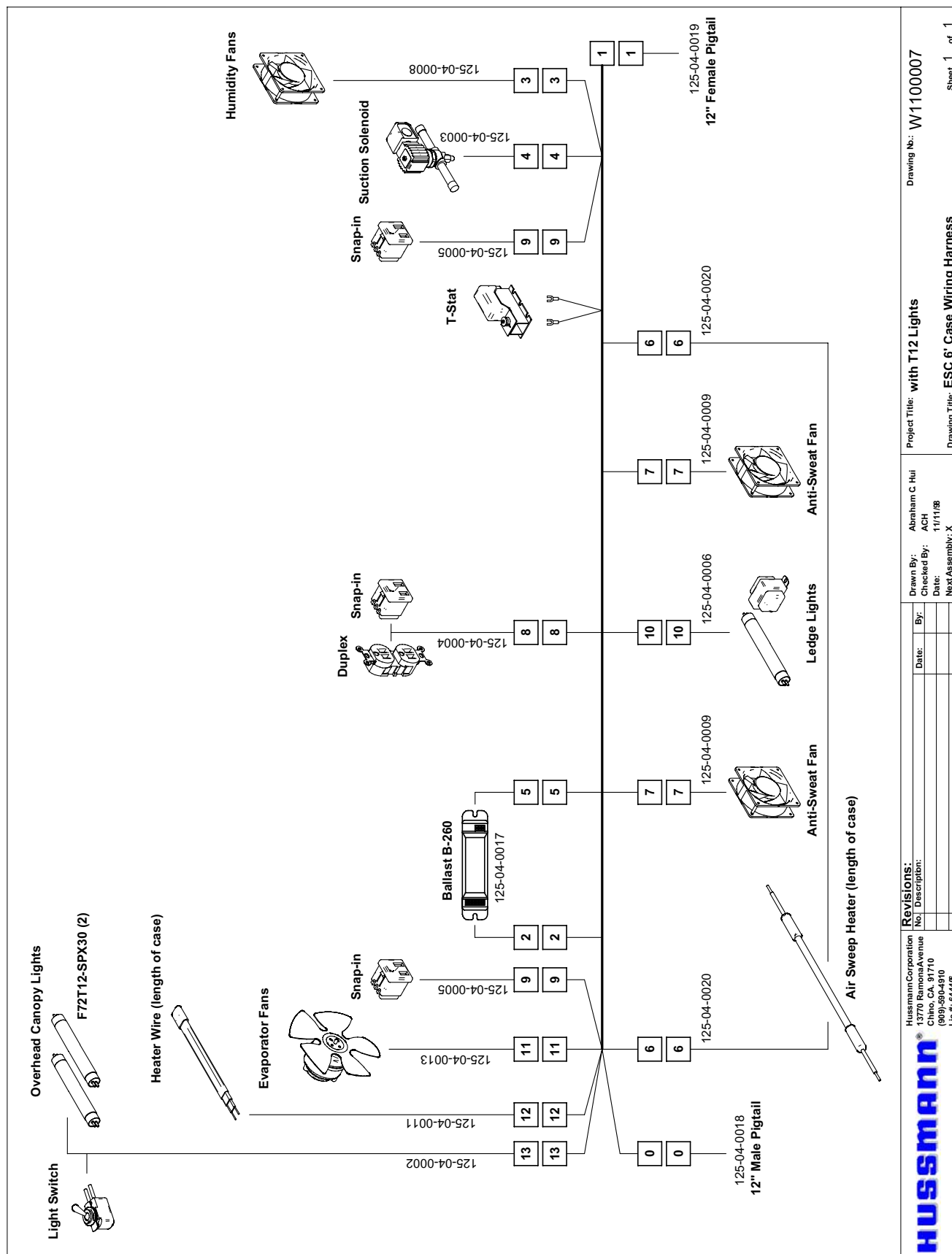
No.	Description

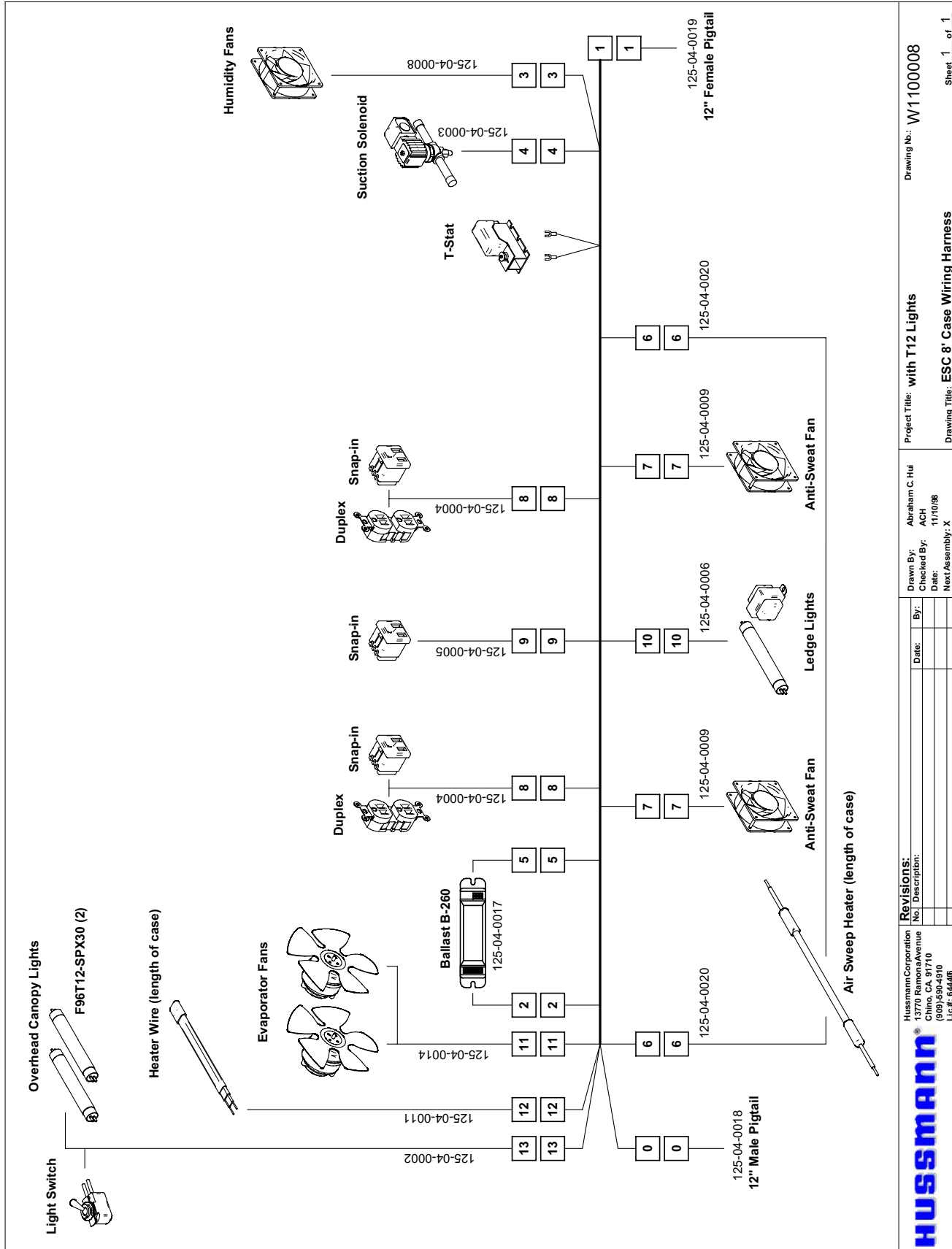
Hussmann Corporation
13770 Ramona Avenue
Chino, CA 91710
(909) 590-4910
Lic.#: 64446

Sheet 1 of 1

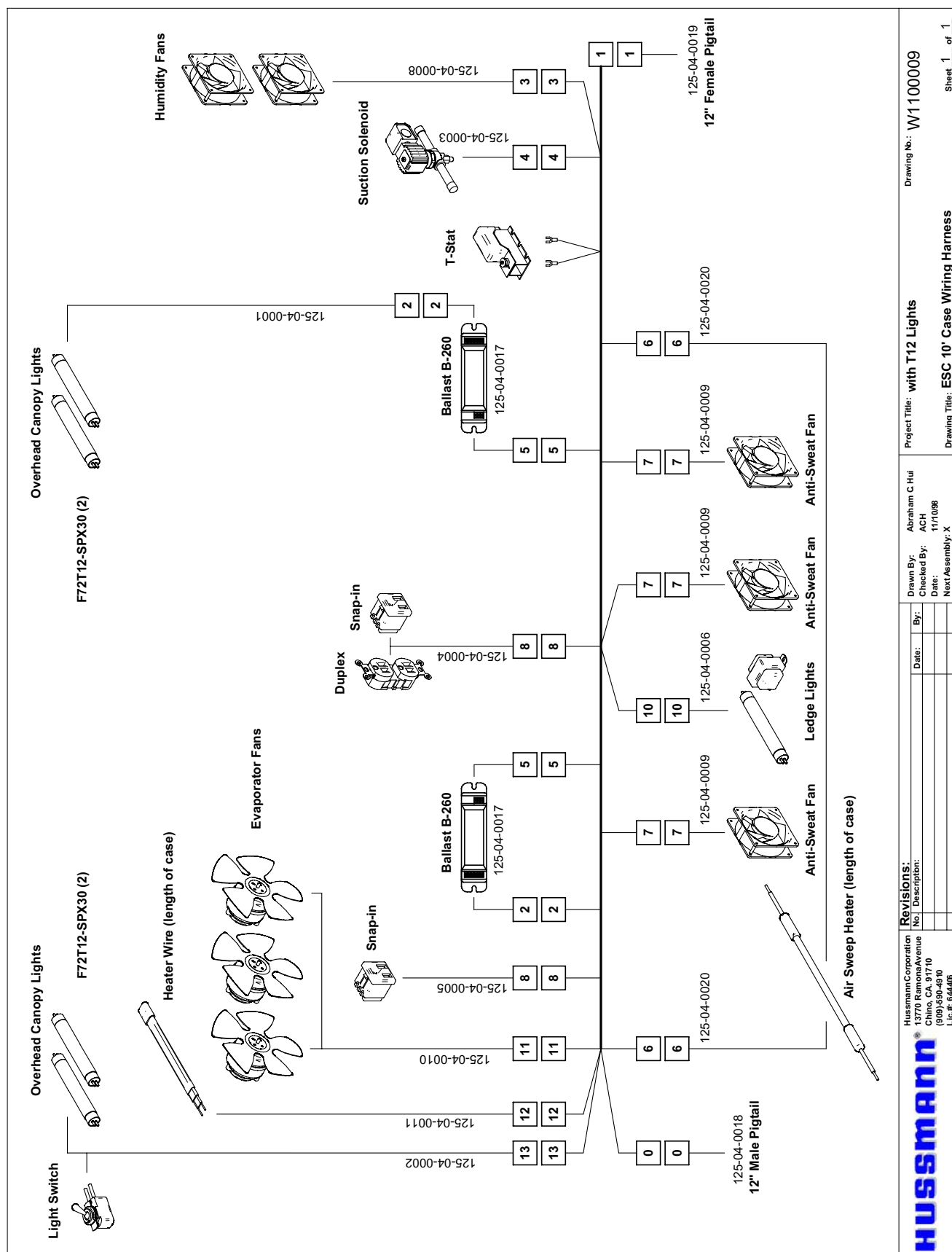
Drawing Title: ESC 12' Case Wiring Harness

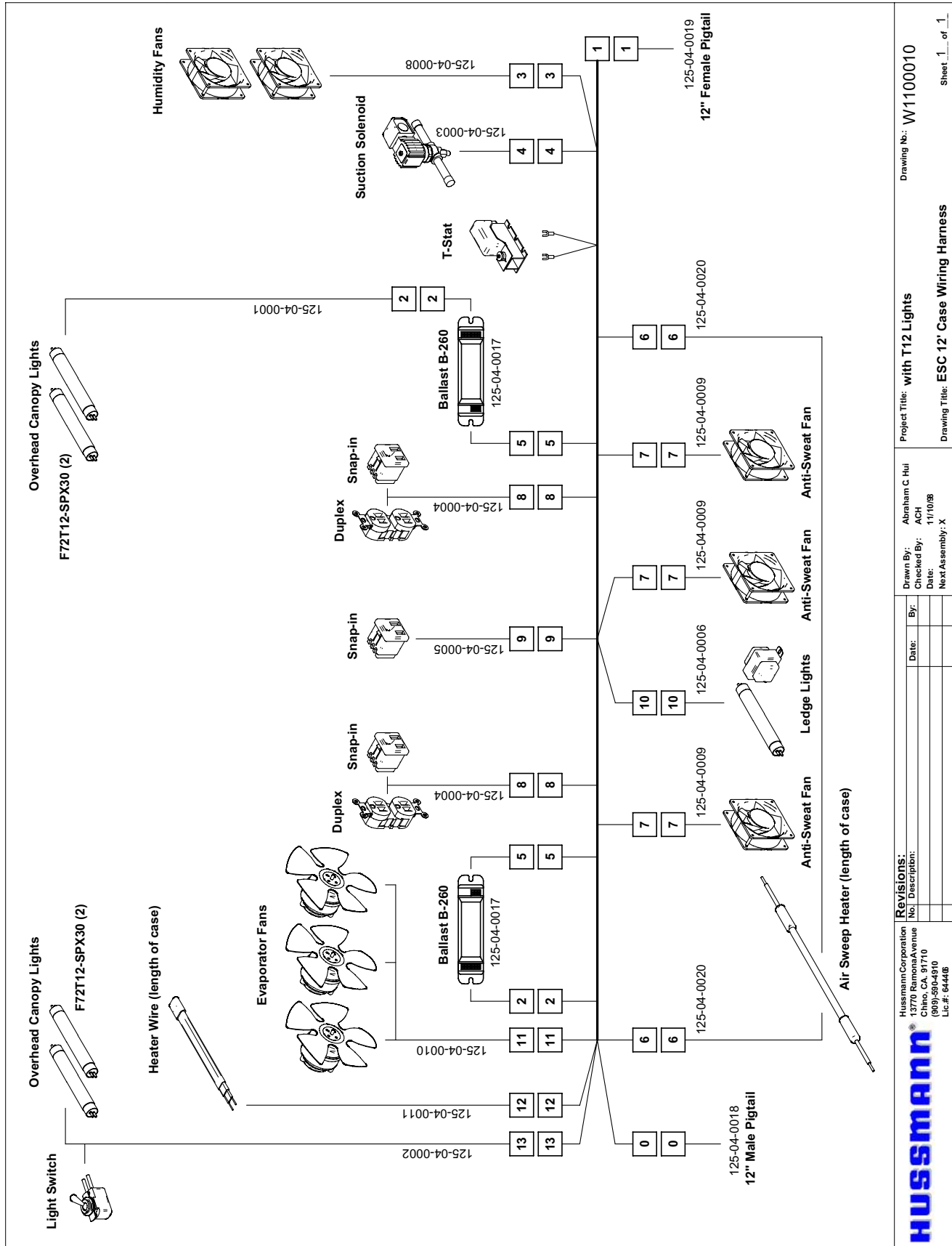






HUSSEMAN		Revisions:		Project Title: with T12 Lights		Drawing No.: W1100008	
Husmann Corporation	No. Description:	Drawn By:	Abraham C. Hui	Checked By:	ACH	Sheet	1 of 1
13770 Ramona Avenue		Date:		Date:	11/10/08		
Chino, CA 91710				Next Assembly:	X		
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Drawing No.: W1100010

Project Title: with T12 Lights

Drawn By: Abraham C. Hui

Checked By: ACH

Date: 11/10/98

Next Assembly: X

Revisions:

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Sheet 1 of 1

Drawing Title: ESC 12' Case Wiring Harness

Appendices

APPENDIX A. – Temperature Guidelines

The refrigerators should be operated according to the manufacturer's published engineering specifications for entering air temperatures for specific equipment applications. Table I shows the typical temperature of the air entering the food zone one hour before the start of defrost and one hour after defrost for various categories of refrigerators. Refer to Appendix C for Field Evaluation Guidelines.

TABLE I

TYPE OF REFRIGERATOR	TYPICAL ENTERING AIR TEMPERATURE
-----------------------------	---

I. OPEN DISPLAY

A. Non frozen:

- | | |
|----------------|------|
| 1) Meat | 28°F |
| 2) Dairy/Deli | 32°F |
| 3) Produce | |
| a. Processed | 36°F |
| b. Unprocessed | 45°F |

B. Frozen

0°F

C. Ice Cream

-5°F

II. CLOSED DISPLAY

A. Non frozen:

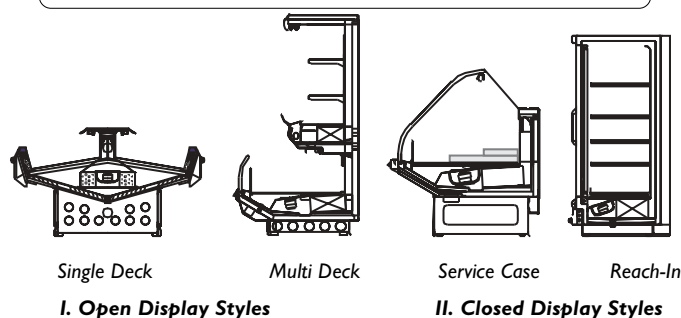
- | | |
|----------------|------|
| 1) Meat | 34°F |
| 2) Dairy/Deli | 34°F |
| 3) Produce | |
| a. Processed | 36°F |
| b. Unprocessed | 45°F |

B. Frozen

0°F

C. Ice Cream

-5°F



APPENDIX B. – Application Recommendations

1.0 Temperature performance is critical for controlling bacteria growth. Therefore, the following recommendations are included in the standard. They are based on confirmed field experience over many years.

1.1 The installer is responsible for following the installation instructions and recommendations provided by the manufacturer for the installation of each individual type refrigerator.

1.2 Refrigeration piping should be sized according to the equipment manufacturer's recommendations and installed in accordance with normal refrigeration practices. Refrigeration piping should be insulated according to the manufacturer's recommendations.

1.3 A clogged waste outlet blocks refrigeration. The installer is responsible for the proper installation of the system which dispenses condensate waste through an air gap into the building indirect waste system.

1.4 The installer should perform a complete start-up evaluation prior to the loading of food into the refrigerator, which includes such items as:

- a) Initial temperature performance, Coils should be properly fed with a refrigerant according to manufacturer's recommendations.
- b) Observation of outside influences such as drafts, radiant heating from the ceiling and from lamps. Such influence should be properly corrected or compensated for.
- c) At the same time, checks should be made of the store dry-bulb and wet-bulb temperatures to ascertain that they are within the limits prescribed by the manufacturer.
- d) Complete start-up procedures should include checking through a defrost to make certain of its adequate frequency and length without substantially exceeding the actual needs. This should include checking the electrical or refrigerant circuits to make sure that defrosts are correctly programmed for all the refrigerators connected to each refrigeration system.
- e) Recording instruments should be used to check performance.

APPENDIX C. – Field Recommendations -

Recommendations for field evaluating the performance of retail food refrigerators and hot cases

1.0 The most consistent indicator of display refrigerator performance is temperature of the air entering the product zone (Refrigerated see Diagram I, Appendix A). In practical use, the precise determination of return air temperature is extremely difficult. Readings of return air temperatures will be variable and results will be inconsistent. The product temperature alone is not an indicator of refrigerator performance.

NOTE: Public Health will use the temperature of the product in determining if the refrigerator will be allowed to display potentially hazardous food. For the purpose of this evaluation, product temperature above the FDA Food Code 1993 temperature for potentially hazardous food will be the first indication that an evaluation should be performed. It is expected that all refrigerators will keep food at the FDA Food Code 1993 temperature for potentially hazardous food.

1.1 The following recommendations are made for the purpose of

Appendices, cont'd

arriving at easily taken and understood data which, coupled with other observations, may be used to determine whether a display refrigerator is working as intended:

- a) **INSTRUMENT** — A stainless steel stem-type thermometer is recommended and it should have a dial a minimum of 1 inch internal diameter. A test thermometer scaled only in Celsius or dually scaled in Celsius and Fahrenheit shall be accurate to 1°C (1.8°F). Temperature measuring devices that are scaled only in Fahrenheit shall be accurate to 2°F. The thermometer should be checked for proper calibration. (It should read 32°F when the stem is immersed in an ice water bath).
- b) **LOCATION** — The probe or sensing element of the thermometer should be located in the airstream where the air first enters the display or storage area, and not more than 1 inch away from the surface and in the center of the discharge opening.
- c) **READING** — It should first be determined that the refrigerator is refrigerating and has operated at least one hour since the end of the last defrost period. The thermometer reading should be made only after it has been allowed to stabilize, i.e., maintain a constant reading.
- d) **OTHER OBSERVATIONS** — Other observations should be made which may indicate operating problems, such as unsatisfactory product, feel/appearance.
- e) **CONCLUSIONS** — In the absence of any apparent undesirable conditions, the refrigerator should be judged to be operating properly. If it is determined that such condition is undesirable, i.e., the product is above proper temperature, checks should be made for the following:
 1. Has the refrigerator been loaded with warm product?
 2. Is the product loaded beyond the "Safe Load Line" markers?
 3. Are the return air ducts blocked?
 4. Are the entering air ducts blocked?
 5. Is a dumped display causing turbulent air flow and mixing with room air?
 6. Are spotlights or other high intensity lighting directed onto the product?
 7. Are there unusual draft conditions (from heating /air-conditioning ducts, open doors, etc.)?
 8. Is there exposure to direct sunlight?
 8. Are display signs blocking or diverting airflow?
 9. Are the coils of the refrigerator iced up?
 11. Is the store ambient over 75°F, 55% RH as set forth in ASHRAE Standard 72 and ASHRAE Standard 117?
 12. Are the shelf positions, number, and size other than recommended by the manufacturer?
 13. Is there an improper application or control system?
 14. Is the evaporator fan motor/blade inoperative?
 15. Is the defrost time excessive?
 16. Is the defrost termination, thermostat (if used) set too high?
 17. Are the refrigerant controls incorrectly adjusted?

18. Is the air entering the condenser above design conditions? Are the condenser fins clear of dirt, dust, etc.?

19. Is there a shortage of refrigerant?

20. Has the equipment been modified to use replacements for CFC-12, CFC-502 or other refrigerant? If so, have the modifications been made in accordance with the recommendations of the equipment manufacturer? Is the refrigerator charged with the proper refrigerant and lubricant? Does the system use the recommended compressor?

APPENDIX D. – Recommendations to user -

1.0 The manufacturer should provide instructions and recommendations for proper periodic cleaning. The user will be responsible for such cleaning, including the cleaning of low temperature equipment within the compartment and the cooling coil area(s). Cleaning practices, particularly with respect to proper refrigerator unloading and warm-up, must be in accordance with applicable recommendations.

1.1 Cleaning of non frozen food equipment should include a weekly cleaning of the food compartment as a minimum to prevent bacteria growth from accumulating. Actual use and products may dictate more frequent cleaning. Circumstances of use and equipment design must also dictate the frequency of cleaning the display areas. Weekly washing down of the storage compartment is also recommended, especially for equipment subject to drippage of milk or other liquids, or the collection of vegetable, meat, crumbs, etc. or other debris or litter. Daily cleaning of the external areas surrounding the storage or display compartments with detergent and water will keep the equipment presentable and prevent grime buildup.

1.2 Load levels as defined by the manufacturer must be observed.

1.3 The best preservation is achieved by following these rules:

- a) Buy quality products.
- b) Receive perishables from transit equipment at the ideal temperature for the particular product.
- c) Expedite perishables to the store's storage equipment to avoid unnecessary warm-up and prolonged temperature recovery. Food store refrigerators are not food chillers nor can they reclaim quality lost through previous mishandling.
- d) Care must be taken when cross merchandising products to ensure that potentially hazardous vegetable products are not placed in non refrigerated areas.
- e) Display and storage equipment doors should be kept closed during periods of inactivity.
- f) Minimize the transfer time of perishables from storage to display.
- g) Keep meat under refrigeration in meat cutting and processing area except for the few moments it is being handled in

Appendices, cont'd

processing. When a cut or tray of meat is not to be worked on immediately, the procedure should call for returning it to refrigeration.

- h) Keep tools clean and sanitized. Since mechanical equipment is used for fresh meat processing, all such equipment should be cleaned at least daily and each time a different kind of meat product comes in contact with the tool or equipment.
- i) Make sure that all refrigeration equipment is installed and adjusted in strict accordance with the manufacturer's recommendations.
- j) See that all storage and refrigeration equipment is kept in proper working order by routine maintenance.

HUSSMANN®

Limited Warranty

This warranty is made to the original user at the original installation site and is not transferable.

Hussmann merchandisers are warranted to be free from defect in material and workmanship under normal use and service for a period of one (1) year from the date of original installation (not to exceed fifteen (15) months from the date of shipment for the factory). **Hussmann Impact Modular Coils are warranted for a total of five (5) years based upon the above criteria.** Hussmann's obligation under this warranty shall be limited to repairing or exchanging any part or parts, without charge F.O.B. factory or nearest authorized parts depot within said period and which is proven to the satisfaction of the original manufacturing plant warranty group to be thus defective.

Hussmann covers the entire case or refrigeration product and all its components (except for lamps, driers, fuses, and other maintenance type replacement parts) for the one (1) year warranty period.

Additionally, Hussmann warrants for a total period of three (3) years all sealed, multi-glass assemblies except those used in sliding doors on closed meat display cases. If within three (3) years from the date of installation (not to exceed thirty-nine (39) months from the date of shipment from factory), it shall be proven to the satisfaction of the originating factory warranty group that there is impaired visibility through the multi-glass assemblies thereof caused by moisture between the glasses, the multi-glass assembly will be replaced free of charge, F.O.B. factory. This additional warranty excludes accident, misuse, or glass breakage.

On Hussmann manufactured self-contained display cases, Hussmann agrees to repair or exchange, at its option, the original motor/compressor unit only with a motor/compressor of like or of similar design and capacity if it is shown to the satisfaction of Hussmann that the motor/compressor is inoperative due to defects in factory workmanship or material under normal use and service as outlined in Hussmann's "Installation Instructions" which are shipped inside new Hussmann equipment. Hussmann's sole obligation under this warranty shall be limited to a period not to exceed five years from date of factory shipment.

On Hussmann refrigeration systems, an additional (4) year extended warranty for the motor/compressor assembly is available, but must be purchased prior to shipment to be in effect. Hussmann reserves the right to inspect the job site, installation and reason for failure.

The motor/compressor warranties listed above do not include replacement or repair of controls, relays, capacitors, overload protectors, valve plates, oil pumps, gaskets or any external part on the motor/compressor replaceable in the field, or any other part of the refrigeration system or self-contained display case.

THE WARRANTIES TO REPAIR OR REPLACE ABOVE RECITED ARE THE ONLY WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, MADE BY HUSSMANN WITH RESPECT TO THE ABOVE MENTIONED EQUIPMENT, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS, AND HUSSMANN NEITHER ASSUMES NOR AUTHORIZES ANY PERSON TO ASSUME FOR IT, ANY OTHER OBLIGATION OR LIABILITY IN CONNECTION WITH THE SALE OF SAID EQUIPMENT OR ANY PART THEREOF.

THIS WARRANTY SHALL NOT APPLY TO LOSS OF FOOD OR CONTENTS OF THE EQUIPMENT DUE TO FAILURE FOR ANY REASON. HUSSMANN SHALL NOT BE LIABLE:

- For payment of labor for any removal or installation of warranted parts;
- For any repair or replacements made without the written consent of Hussmann, or when the equipment is installed or operated in a manner contrary to the printed instructions covering installation and service which accompanied such equipment;
- For any damages, delays, or losses, direct or consequential which may arise in connection with such equipment or part thereof;
- For damages caused by fire, flood, strikes, acts of God or circumstances beyond its control;
- When the equipment is subject to negligence, abuse, misuse or when the serial number of the equipment has been removed, defaced, or altered;
- When the equipment is operated on low or improper voltages
- When the equipment is put to a use other than normally recommended by Hussmann (i.e. deli case used for fresh meat);
- When operation of this equipment is impaired due to improper drain installation;
- For payment of refrigerant loss for any reason;
- For costs related to shipping or handling of replacement parts.

Hussmann Corporation, Corporate Headquarters: Bridgeton, Missouri, U.S.A. 63044 August 1, 1998

Service Record

Last service date: By:

_____	_____
_____	_____
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The *MODEL NAME* and *SERIAL NUMBER* is required in order to provide you with the correct parts and information for your particular unit.

They can be found on a small metal plate on the unit.

Please note them below for future reference.

MODEL:

SERIAL NUMBER: