HUSSMANN®/CHINO

Q3-M/FC

MEAT/FISH SERVICE CASE

Installation & Operation Manual

REV. 0923

HUSSMANN®



Q3-M/FC
Q3-M-FS-EP
Q3-M-FC-EP

MEAT/FISH SERVICE CASE

INSTALLATION & OPERATION GUIDE

General Instructions

Table of Contents

General Instructions..... 2
Cut and Plan Views 3
Installation..... 4
Location 4
Uncrating the Stand 4
Tighten Glass Screws..... 4
Exterior Loading..... 4
Setting and Joining 4
Leveling 4
Q Glass Adjustment 5
Bumper Installation Instructions..... 11
Plumbing 14
Waste Outlet and P-TRAP..... 14
Installing Condensate Drain..... 14
Refrigeration 14
Refrigerant Type 14
Piping..... 14
Refrigeration Lines..... 14
Control Settings 14
Access to TEV Valves and Drain Lines 14
Electronic Expansion Valve (Optional)..... 14
Measuring the Operating Superheat..... 15
Thermostat Location 15
Refrigeration Data..... 15
Defrost Data..... 15
Physical Data..... 15
Q3-MC Standard Piping Diagram 16
Q3 - Meat Coil Close-off Configuration 20
Electrical..... 21
Wiring Color Code 21
Electrical Circuit Identification..... 21
Electrical Service Receptacles (When Applicable) 21
Field Wiring and Serial Plate Amperage 21
Ballast Location 21
Ashrae Color Code 21
Finishing Touches 22
Bumper Installation Tips 22
Installing Splashguard 22
User Information.....23
Stocking 23
Important Steps 23
Case Cleaning 23
Cleaning Glass and Mirrors 24
Non-Glare Glass 24
Plexiglass and Acrylic Care 24
Cleaning..... 24
Antistatic Coatings 24
Maintenance..... 25
Electrical Wiring Diagrams 32
Wiring Diagrams 33
Specification Sheets 53
Appendices 55
Appendix A. - Temperature Guidelines - Refrigerated 55
Appendix B. - Application Recommendations - Refrigerated... 55
Appendix C. - Field Recommendations - Refrigerated 55
Appendix D. - Recommendations to User - Refrigerated 56

This Booklet Contains Information on:
Q3-M/FC refrigerated, service meat/fish merchandiser.

Shipping Damage
All equipment should be thoroughly examined for shipping damage before and during unloading.

This equipment has been carefully inspected at our factory and the carrier has assumed responsibility for safe arrival. If damaged, either apparent or concealed, claim must be made to the carrier.

Apparent Loss or Damage
If there is an *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 necessary claim forms.

Concealed Loss or Damage
When loss or damage *is not apparent until after equipment is uncrated*, a claim for concealed damage is made. Make request in writing to carrier for inspection within 15 days, and retain all packaging. The carrier will supply inspection report and required claim forms.

Shortages
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 has been 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.

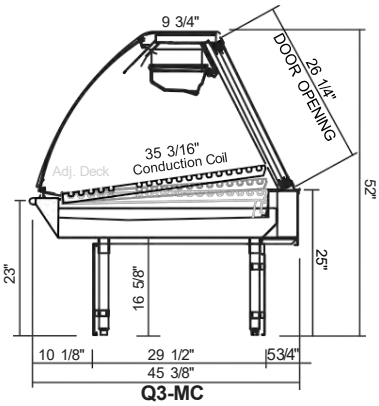
Keep this booklet with the case at all times for future reference.

HUSSMANN®/CHINO
A publication of HUSSMANN® Chino
13770 Ramona Avenue • Chino, California 91710
(909) 628-8942 FAX
(909) 590-4910
(800) 395-9229



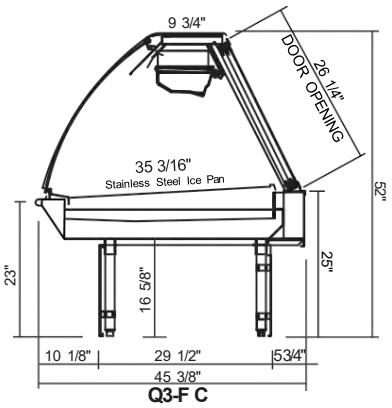
This equipment is to be installed to comply with the applicable NEC, Federal, State, and Local Plumbing and Construction Code having jurisdiction.

Cut and Plan Views



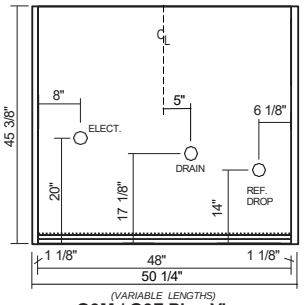
Q3-MC
Service Meat - Curved Glass
with Adjustable Slanted Deck

Scale = 1/2"



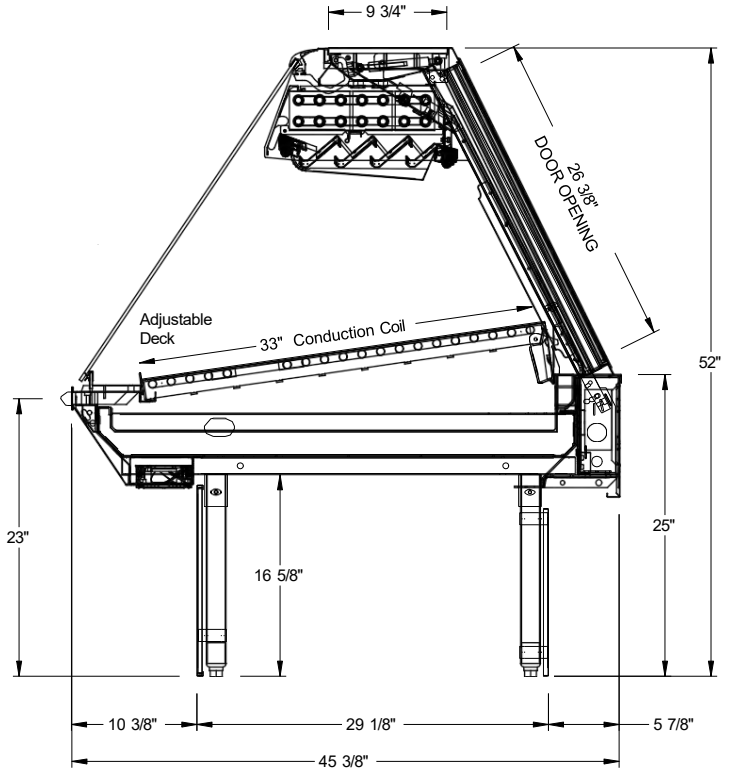
Q3-F C
Service Fish- Curved Glass

Scale = 1/2"



(VARIABLE LENGTHS)

Q3M / Q3F Plan View
Straight Section



Q3-MS
Service Meat-Straight Glass
with Adjustable Slanted Glass

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. Keep in place, attached case until ready to set/bolt to adjoining case.

Tighten Glass Screws

Tighten screws along clamshell located on the underside of glass before placing unit into operation.

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.

An Alignment pin kit is supplied with every case and must be used in alignment.

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 ALL HINGE OPERATION AND GLASS ALIGNMENT 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 carpenters level and adjust legs accordingly. The legs on the Q3-M/FC are adjustable and do not require shims. Simply screw the leg up or down to adjust height.

1. 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.
   a) Walk the floor looking for any mounds or dips.
   b) Use a string level.
   c) Use a transit.
   If a wedge is used in the middle of a lineup, the wedge must be set on the highest point on the floor FIRST, with the rest if the lineup being leveled from it. The Q3-M/FC case has adjustable legs to allow for leveling.
2. Set first case over the highest part of the floor and adjust legs so that case is level. Remove side and back leg braces after case is set and joined.
3. Set second case within one foot (1') of the first case, and remove leg skids. Keep the supports along the length of the case and far end of case. 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 and body work 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

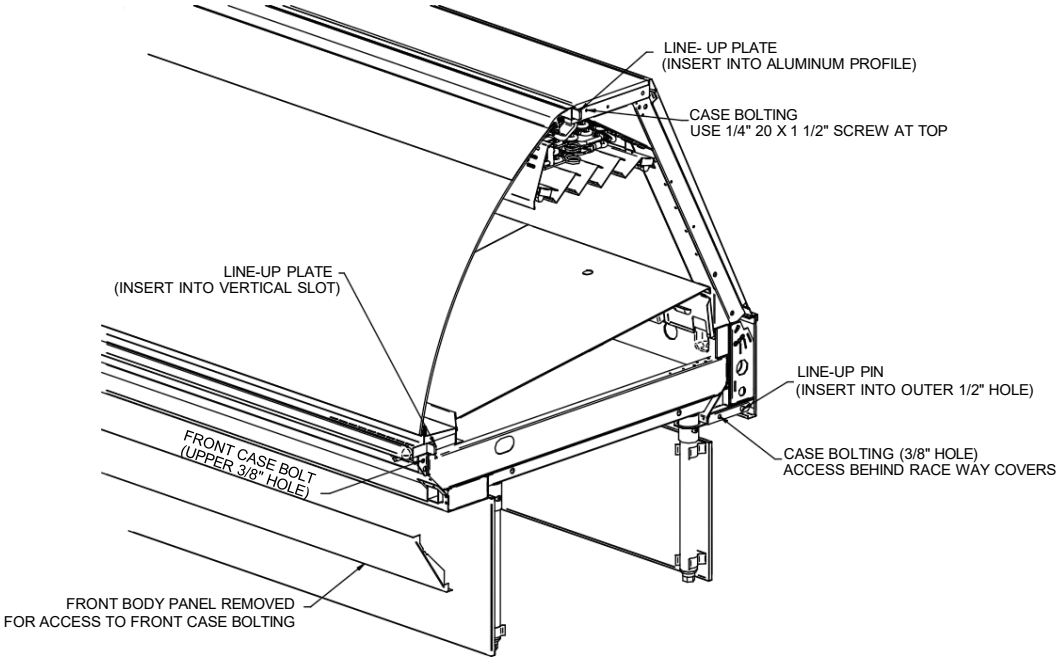
6. Slide second case up to first case snugly. Then level second case to the first case so glass front, bumper and top are flush.



Do not use bolts to pull cases together.

Installation (Cont'd)

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 bolts pictured in the illustration below.
9. Apply bead of butyl to top of bulk heads and slip on stainless steel bulkhead cap. Also apply silicone to seam between joints.
10. Use finger to smooth silicone as thin as possible at masking tape on inside and outside of rear mullion (apply additional silicone if necessary). Remove tape applied on line #4.
11. Remove front, back and end shipping braces.



Line Up Tab



Line Up Plate



Q Glass Adjustment

Proper adjustment of the side-to-side position on the glass clamp on Vieler Streamline hardware such as used on Hussmann Q series service cases is critical to proper operation of the glass hardware. Failure to properly adjust the glass clamp can result in failure of the hardware and possible injury to personnel.

When setting or repairing cases, the glass clamp is frequently adjusted from side to side once the cases are set in order to control glass gaps or compensate for poorly installed case line ups. Due to the unique design of this type of hardware, using practices common to other types of hardware can result in the above failures.

Step 1: Level Case

The canopy hardware and glass gaps are set at the factory for proper fit with the Cases Square and level. Before attempting to do any adjustment of the canopy hardware, ensure that the cases are set square and level. Additionally, the adjoining cases must be pulled together tightly.

To adjust the front glass please follow these steps

Before you start any adjustments make sure the cases are level, Front to Back and side to side



Installation (Cont'd)



Step # 2

To level the cases remove the front and rear close-offs, You can adjust the Height by turning the base leg adjusters



When you turn the leg adjuster clock-wise the case will go up.

When you turn the leg adjuster counter clock-wise the case will go down.

IMPORTANT: Attempting to compensate for poor installation practices by manipulating the canopy hardware will result in unsatisfactory workmanship and possibly cause hardware failure and/or injury.

Step 3: Adjusting Glass Height

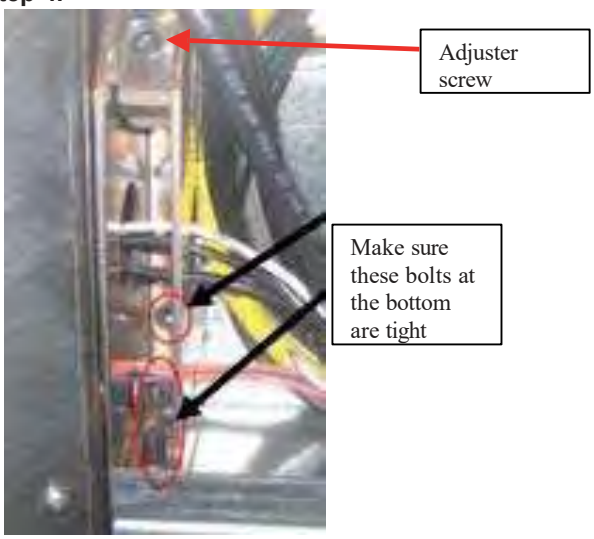
After the cases are set and level, rear covers must be removed to access the glass height adjusters



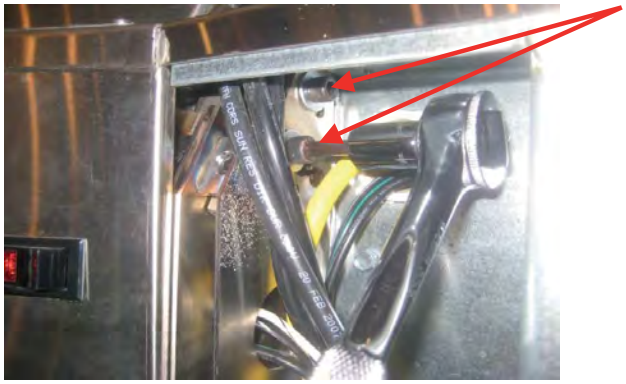
Some cases have wrapping boards installed, the wrapping boards need to be removed to be able to remove the small rear covers. Unhook at K-99 bracket.

Remove the small rear covers under each rear canopy arm to access the arm adjusters.

Step 4:



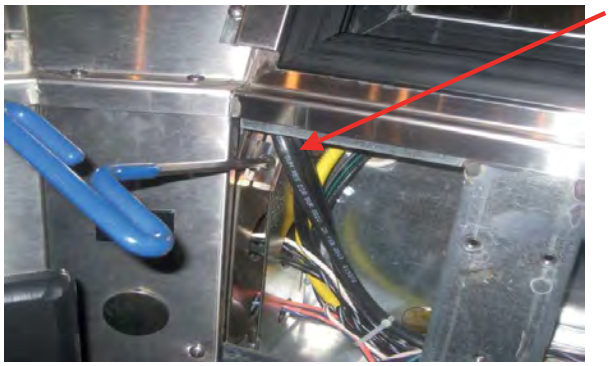
Loosen the two lock screws on the side (do not remove)



To properly adjust the height of the glass requires that both hinge arms of each section of glass be loosened before attempting to change the glass position.

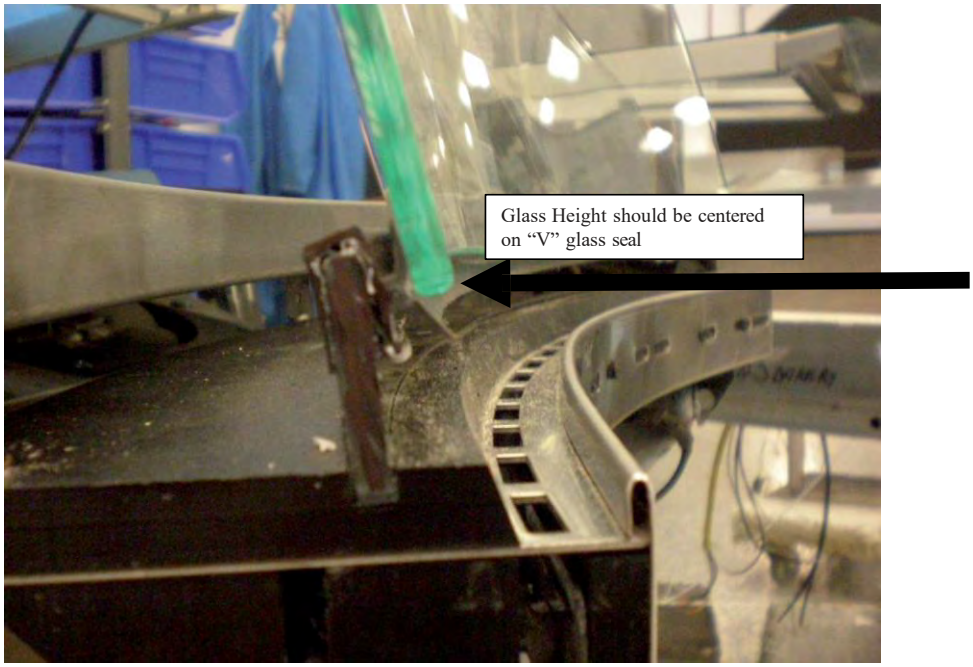
Turning the bolt clock-wise, the front glass will go down.

Turning the bolt counter clock-wise, the front glass will go up.



Installation (Cont'd)

After all the glass height has been adjusted, go back and tighten all the lock screws.

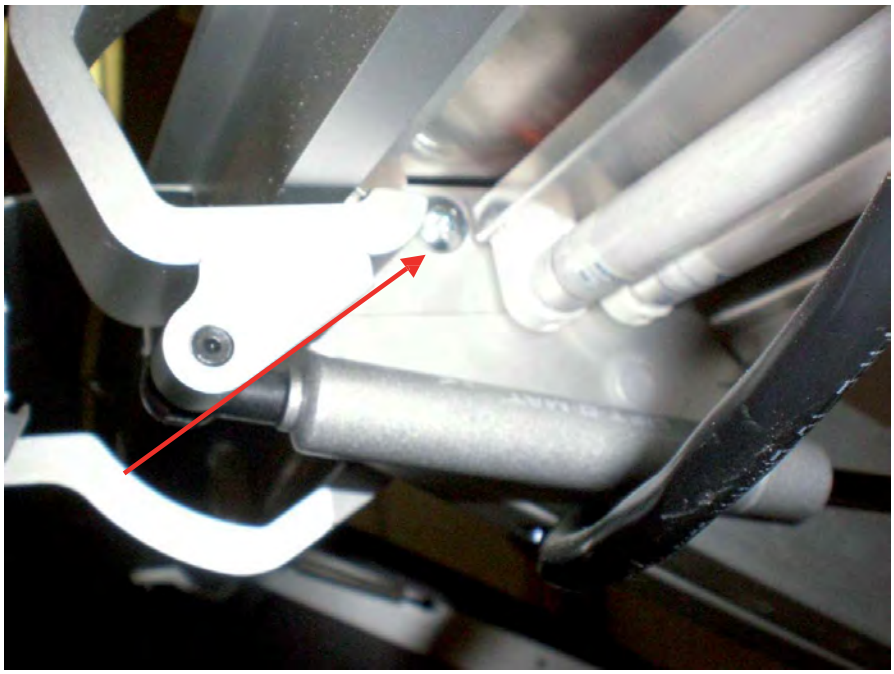


Glass must be parallel to ledge when viewed from front.

IMPORTANT: Attempting to compensate for poor installation practices by manipulating the canopy hardware will result in unsatisfactory workmanship and possibly cause hardware failure and/or injury.

Step 5: Glass Side to Side Adjustment

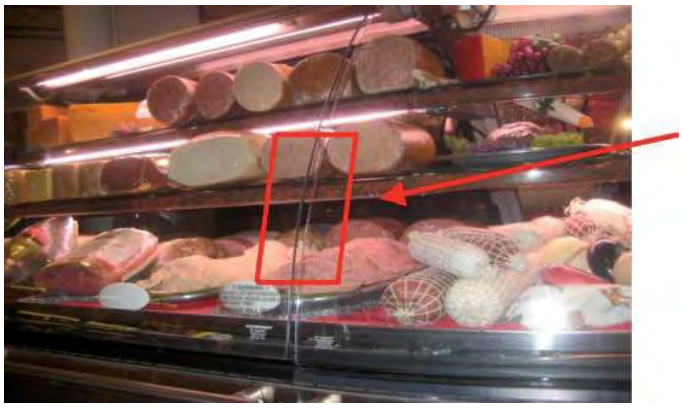
The glass gaps can be slightly optimized by moving the glass and glass clamp assembly side to side. This should be done as the final adjustment only after the glass/canopy height of the cases are set and leveled to each other. The canopy hardware on adjoining Q Series cases should be screwed together with the ¼"-20 THD screws included with the cases. There are threaded holes provided in the stationary portion of the top hardware for this purpose.



Installation (Cont'd)

To adjust glass to glass gaps see the following.





To properly adjust the glass gaps requires that both hinge arms of each section of glass be loosened before attempting to change the glass position.

To shift the glass side to side or front to back at the glass clamp open the glass and loosen the TORX T-15 screw.

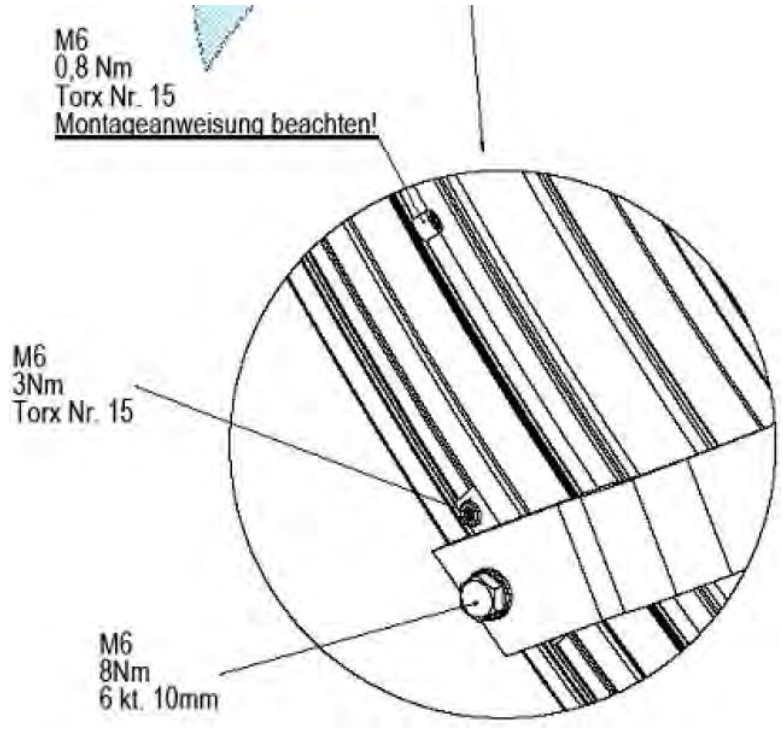
To shift the glass side to side or front to back at the glass clamp
#1 Open the glass and loosen the Torx T-15 screw

2 Loosen the #10 MM bolt on both sides of the glass as needed



Installation (Cont'd)

Torque Specs:



IMPORTANT: Attempting to change the glass position by loosening only one side or by forcing the clamp sideways will result in damaging the hardware and its eventual failure. Loosening the hinge arms requires loosening the attachment screws and setscrews on both hinge arms on the section of glass.

IMPORTANT: It is critical to use the proper size Torx or Hex wrench for the fasteners to avoid stripping the fasteners.

Installation (Cont'd)

Loosen the fasteners only as needed to allow the glass clamp to slip to the desired position.

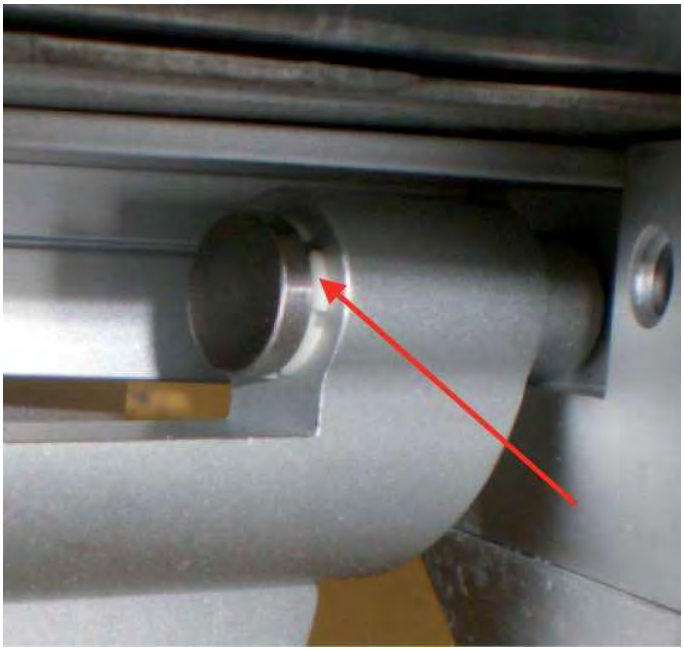
Reposition the glass and glass clamp assembly as needed and verify its position by carefully closing the glass to check clearances.

Once the glass is in the desired position, retighten the fasteners at the hinge arms with the proper wrench.

Recheck the glass position and double check that the fasteners are properly torqued.

IMPORTANT: It is critical that the hinge arm washers or bushings that fasten the hinge arms to the stationary portion of the upper glass hardware do not have any side pressure on them. Even the slightest side pressure will result in the failure of the hardware. If the retaining clips or hinge arm washers or bushings at each hinge arm have any side pressure it is necessary to repeat the adjustment procedure.

When properly adjusted, the hinge arm washers or bushings will have a slight side-to-side free play.



Installation (Cont'd)

Bumper Installation Instructions



Step 1: Make sure the aluminum channel and end caps are installed.



Step 2: Use silicone lubricant to help the bumper slide into the channel.



Step 3: Starting on one end: while inserting the bumper, push it up against the end cap to prevent the bumper from shrinking after installation (when it gets cold).



Step 4: As you insert the bumper into the channel with one hand, pull the bumper toward you with the other to open the inside lips. Slowly apply pressure by rolling the bumper into the track.

Installation (Cont'd)

Boston Series 2000

NOTE: Flexible top: Over cut vinyl 1/8" for every 4' section for the flexible top to ensure a proper fit.

NOTE: Rigid Top: Do not over cut.

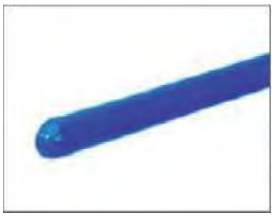


1. Attach the base and end/corner cap to the desired surface by inserting #8 pan head screws through the pre-slotted holes in both the end cap and the base. Insert screws through the two holes of end cap and tighten.



2a. **Flexible Top:** Butt end of the vinyl top against end/corner cap. While applying pressure, bend back vinyl top so that vinyl legs are positioned within the base grooves. Roll vinyl top over full length of base, then tap with rubber mallet to ensure vinyl is securely locked into the base.

2b. **Rigid Top:** Snap the Rigid Top over the Rigid Base.



3. If necessary wipe clean with any household cleaning product.

Helpful Hints:

- For best results, before cutting, install a scrap piece of base into vinyl top to achieve a clean cut.
- Set the uncoiled flexible vinyl at room temperature 24 hours prior to installation.
- Lubricate the inside of the vinyl with soapy water or silicone before installing.
- Over cut the flexible vinyl and compression fit. Adding the additional materials will compensate for stretching which occurs during installation.

Boston 2000 Eco Series



1. Attach the base and end/corner cap to the desired surface by inserting #8 pan head screws through the pre-slotted holes in both the end cap and the base. Insert screws through the two holes of end cap and tighten.



2a. **Flexible Top:** Butt end of the vinyl top against end/corner cap. While applying pressure, bend back vinyl top so that vinyl legs are positioned within the base grooves. Roll vinyl top over full length of base, then tap with rubber mallet to ensure vinyl is securely locked into the base.

2b. **Rigid Top:** Snap the Rigid Top over the Rigid Base.



3. If necessary wipe clean with any household cleaning product.

Helpful Hints:

- For best results, before cutting, install a scrap piece of base into vinyl top to achieve a clean cut.
- Set the uncoiled flexible vinyl at room temperature 24 hours prior to installation.
- Lubricate the inside of the vinyl with soapy water or silicone before installing.
- Over cut the flexible vinyl and compression fit. Adding the additional materials will compensate for stretching which occurs during installation.

Installation (Cont'd)

Boston 1000 Series

NOTE: Flexible top: Over cut vinyl 1/8" for every 4' section for the flexible top to ensure a proper fit.

NOTE: Rigid Top: Do not over cut.

Installation



1. Attach the base and end/corner cap to the desired surface by inserting #8 pan head screws through the pre-slotted holes in both the end cap and the base. Insert screws through the two holes of end cap and tighten.



2a. **Flexible Top:** Butt end of the vinyl top against end/corner cap. While applying pressure, bend back vinyl top so that vinyl legs are positioned within the base grooves. Roll vinyl top over full length of base, then tap with rubber mallet to ensure vinyl is securely locked into the base.

2b. **Rigid Top:** Snap the Rigid Top over the Rigid Base.



3. If necessary wipe clean with any household cleaning product.

Helpful Hints:

- For best results, before cutting, install a scrap piece of base into vinyl top to achieve a clean cut.
- Set the uncoiled flexible vinyl at room temperature 24 hours prior to installation.
- Lubricate the inside of the vinyl with soapy water or silicone before installing.
- Over cut the flexible vinyl and compression fit. Adding the additional materials will compensate for stretching which occurs during installation.

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.

P-traps must be installed at the base of all refrigerated cases. The 1 ½" P-TRAP and threaded adapter must be installed to prevent air leakage and insect entrance into the fixture.

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 non-absorbent 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.

Refrigeration

Refrigerant Type

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.

Oil traps must be installed at the base of all suction line vertical risers on refrigerated cases.

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 Q3-M/FC technical data sheet 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. Defrost times should be as directed in the Q3-M/FC technical data sheet. 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 TEV Valves and Drain Lines

Mechanical - Remove product from case. Remove pans. TX valve (mechanical only) and drain are located under the pans within the case.

Electronic - The Electronic Expansion valve master and slave cylinder(s) are located within the electrical access panel(s) in the rear of case. Unscrew the rear panels with Phillips screwdriver.

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 electronic 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.

Refrigeration

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.
5. The difference is superheat.
6. Set the superheat for 5°F - 7°F.

Thermostat Location

Thermostats are located in the electrical section; behind the rear panel, on the right-hand side of the case (facing the back of the case).

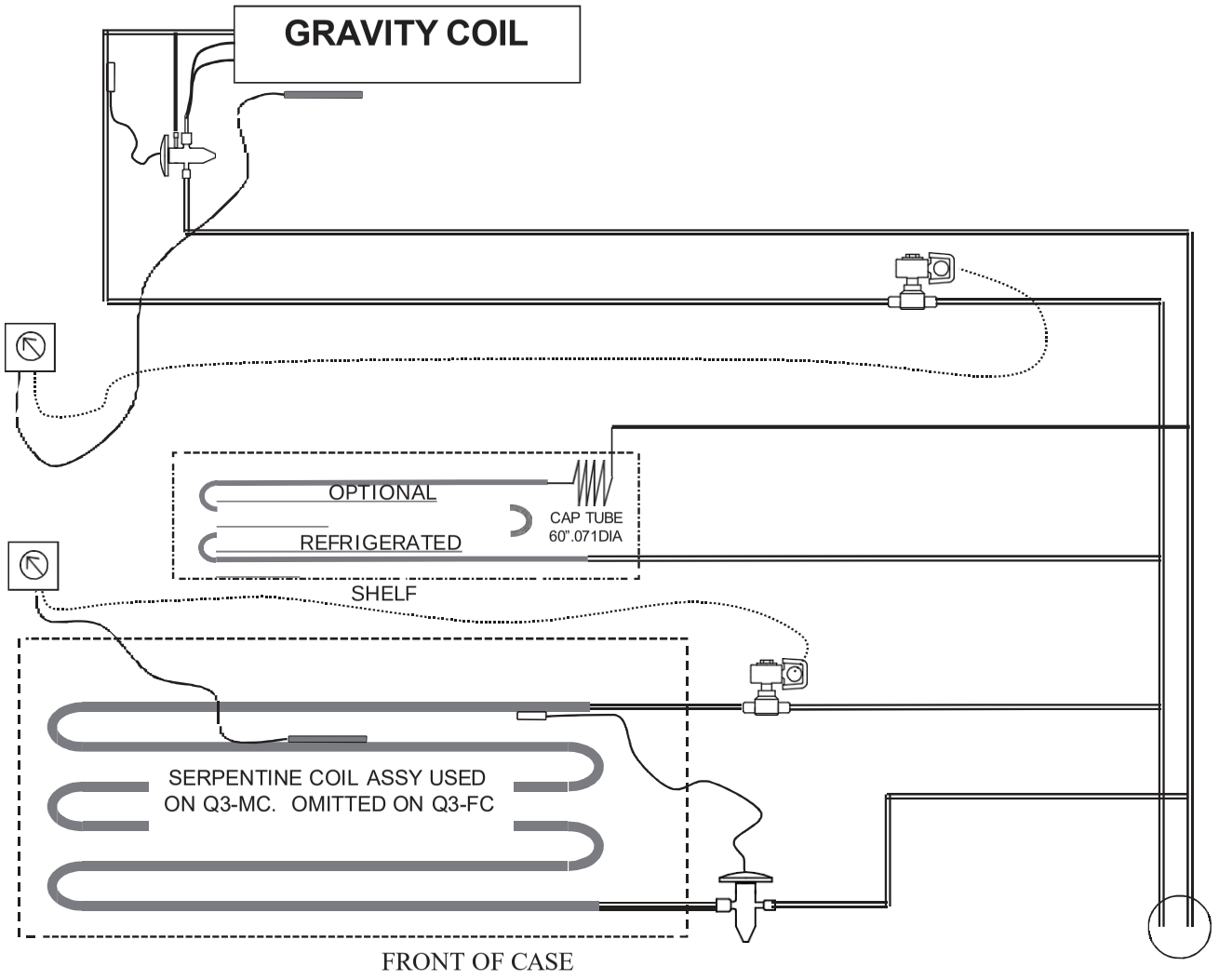




REV: F
10/26/12

Q3-MC/FC PIPING DIAGRAM
4’ 5’ LENGTHS

1/4 CU
3/8 CU
1/2 CU
5/8 CU
7/8 CU



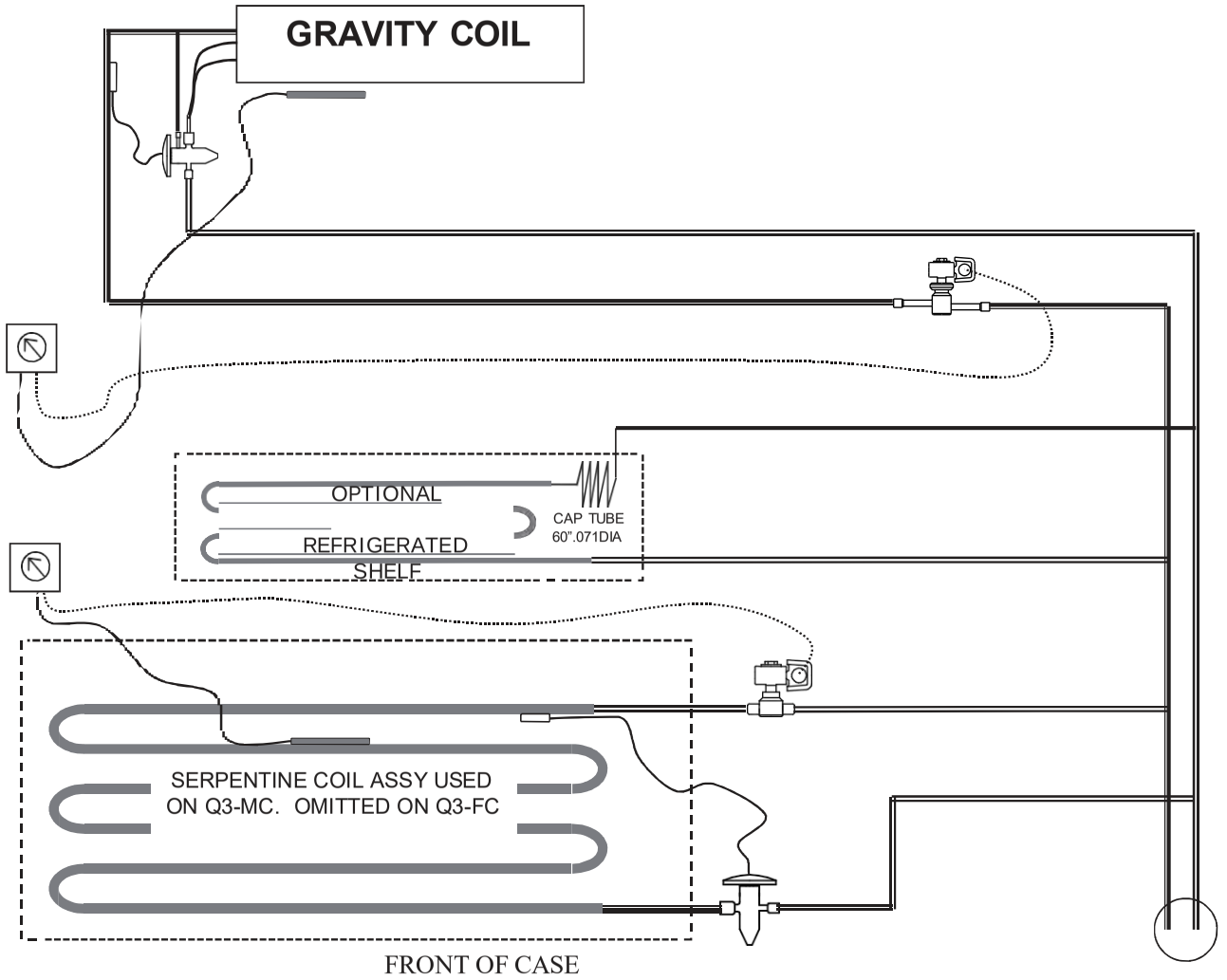
SPECIAL NOTES:

The **digital temperature probe** is to be located in the center of case, approximately half way between the display deck and gravity coil. **It must NOT be in gravity coil air stream**. If the probe is in the gravity coil air stream, the probe will read a low temperature and the user will operate the thermostat control incorrectly.

REV: F
10/26/12

Q3-MC/FC PIPING DIAGRAM
6’ 8’ 10’ 12’ LENGTHS

1/4 CU
3/8 CU
1/2 CU
5/8 CU
7/8 CU

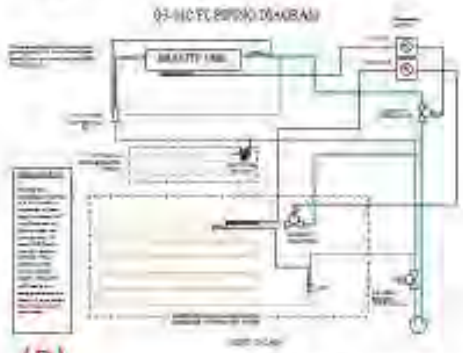


SPECIAL NOTES:

The **digital temperature probe** is to be located in the center of case, approximately half way between the display deck and gravity coil. **It must NOT be in gravity coil air stream**. If the probe is in the gravity coil air stream, the probe will read a low temperature and the user will operate the thermostat control incorrectly.

Q3 M FIELD SETUP AND ADJUSTMENT FOR TEMPERATURE







BASIC OPERATION – The Q3-M series case cools meat/poultry in 2 ways. 1) The gravity coil cools the product via convection (airflow). 2) The serpentine coil under the deck of the case cools the meat/poultry product by means of contact conduction. Slow moving air circulation from the gravity coil and cold contact with serpentine coil on the deck combine to cool the product and keep air flow velocity to a minimum, reducing dehydration. This balance is critical to achieve the expected display life and product temperature.

If the product is lifted off of the deck surface by an aftermarket display shelf or other means, the benefit of conduction cooling from the serpentine coil is lost. The product temperature should be monitored when merchandising product in this manner.

OPERATION SPECIFICATIONS – The following are base line settings designed for 75F and 55%RH° ambient store conditions.

- Suction pressure: 20° F specific refrigerant equivalent
- Superheat: 5-7°F
- Discharge air from gravity coil: 25-27°F
- Discharge air Velocity: 50-75 FPM
- Defrost: 2/day, 50 minutes each

Store conditions, if different from design conditions, may require adjustments to settings as listed below in troubleshooting.

TROUBLESHOOTING - PRODUCT TOO COLD / PRODUCT FREEZING:

- Gravity Coil set too cold. Increase thermostatic set point of gravity coil. Your setting will depend on store conditions and desired product temperature. The thermostatic set point is properly set when the product is 33-38°.
- Ensure Defrost schedule is per case specifications.
- Superheat set too low. Check superheat and adjust as necessary.
- Serpentine is too cold. Probe the deck with the product in place. If the deck is less than 30° increase the serpentine thermostatic SP. Allow 30 minutes for system to react then recheck temperatures.
- The deck plates have been incorrectly installed. Ensure that deck plates containing openings are towards the center of the case and that the solid deck plates are oriented towards the outside (C). The open plates lower the conduction effect in the center of the case, where the cooling effect is the strongest.
- Ensure that all t-stat and TXV bulbs are firmly secured to the pipes in the locations shown in figure (B). The bulbs should be at the 4 or 8 o'clock position on the pipe.
- Ensure that the case is piped per the piping diagram (B).

TROUBLESHOOTING - PRODUCT DEHYDRATING PREMATURELY:

- Gravity Coil set too cold. Increase thermostatic set point of gravity coil. Your setting will depend on store conditions and desired product temperature. The thermostatic set point is properly set when the discharge air from gravity coil is 25-27°
- Product should be turned and rotated about every 4 hrs.
- Product should be covered at night with a clean, damp cloth such as cheese cloth

TROUBLESHOOTING - PRODUCT TOO WARM:

- Verify case is properly piped per the Piping Diagram to the left (B).
- Verify that the system suction pressure is set to a 20° temperature equivalent.
- Verify superheat. Adjust TX valves accordingly. Serpentine coil may be set as low as 2° SH. Gravity coil may be set as low as 3° SH. (NOTE, when adjusting TXV superheat, first adjust the corresponding t-stat to full cold. This will ensure that the t-stat does not close during the adjustment period. Be sure to return t-stat SP).
- If serpentine coil inlet temperature is above 20° reduce the EPR set point. CW increases the valve SP, CCW reduces the SP. 1 full turn will adjust SP approx. 13 PS. The factory SP is 50 PSI which is approx 23-24° in R404a.
- Ensure that the thermostat bulb for the gravity coil (A) is not contacting any coil parts and is located in the discharge air stream.
- Ensure that the TX valve bulbs are located as per the piping diagram (B).
- Ensure that the deck plates are seated and making good contact with the serpentine coil.
- Ensure that open deck plates are towards the center of the case and that the solid deck plates are oriented towards the outside.
- Ensure that gravity coil is fully cleared during defrost. If the defrost fails to clear all ice buildup, the coil will eventually pack with ice and refrigeration performance will be severely degraded. Increase the defrost time in 5 minute increments if this condition is observed.
- Improperly sized refrigerant lines. Ensure that refrigerant lines are properly sized per the installation manual. Inspect liquid line for kinks, pinched or excessive u-bends.
- Ensure that a solid column of liquid refrigerant is reaching the TXV. Inspect liquid line for kinks, pinched or excessive u-bends.
- Ensure that the liquid refrigerant entering temperature is not excessive. Liquid greater than 110° F ahead of the TXV may be an indication of equipment problems.
- Product introduction temperature too high. Correct product introduction temperature is less than 38°F.
- Product is stacked too high. Reduce display height of product. Less than 6" is recommended.
- Product is displayed in containers that impede the conduction cooling from the serpentine coil. Use containers with full length, flat bottoms.
- Incorrect replacement lighting is adding too much heat. Use only Hussmann genuine replacement parts or equivalent.

11/15/11 REV C

Q3 M MERCHANDIZING RECOMMENDATIONS



Ideal Display – flat trays, product 2 layers or less

MERCHANDIZING DOs (*CONSISTANCY IS THE KEY*):

1. Use a consistent display strategy in each case. For instance all bowls of roughly the same shape or all flat trays. The tray material type is not overly important.
2. When displaying product on flat trays directly on the deck surface (ideal display method), layer product single or double high. This promotes even cooling from both the serpentine coil below and gravity coil above, and allows for less refrigeration power, less dehydration and increased product life.
3. Rotate product every couple of hours. Bottom layer should be rotated to the top *and* flipped. This ensures even cooling, dehydration and color maintenance.
4. Adjust controls so that product is between 33°-38°. Keep in mind that product in the center of the case and towards the middle will be colder than product at the edges.
5. Display product in bowls or on risers if desired. If so, all product in the case should be displayed in the same manner. Bare in mind, that this display scheme reduces the benefit of contact cooling from the serpentine coil, which may require a reduction in the gravity coil set point (colder). Increasing the cooling effect of the gravity coil will increase the dehydration rate. If product turnover is good, this is a less important factor. Make gradual changes and do not over-refrigerate the case.
6. When using fluorescent lighting, be sure to use Promolux fluorescents, as they reduce the browning metmyoglobin growth.



Too Many Layers – product stacked very deep. Lower product at risk of freezing.

MERCHANDIZING DON'T's:

1. DO NOT exceed 2 layers when product is displayed directly on the deck surface. This has the effect of insulating the lower product which may become very cold and possibly freeze.
2. DO NOT use different types of displays in a single case. Product refrigeration will not be consistent, that is, some product will be well cooled and others may be either too cold or not cold enough. For instance, if some product is displayed on risers and is towards the edges, they will have a tendency to be warm. If also, in the same case, some product is layered 3 deep or more on flat trays, they will have a tendency to be too cold. If adjustments were made in this example to drop the set point, based on the outside product on risers, it is likely that the product in the center would freeze.
3. DO NOT allow product to sit unattended in excess of 4 hours. Rotate product every couple of hours. Bottom layer should be rotated to top *and* flipped. This ensures even cooling, dehydration and color.
4. DO NOT makes adjustments without considering all product position and display method.



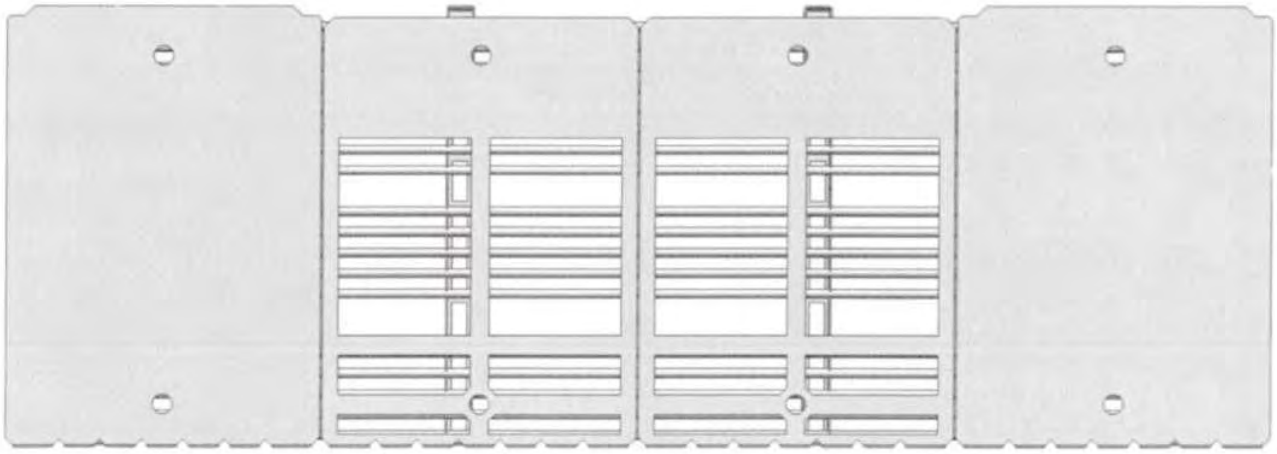
Mixed Display Strategy – bowls on risers, bowls on deck and flat trays.



Acceptable Display – All product is displayed in similarly shaped bowls.

1/5/12 REV C

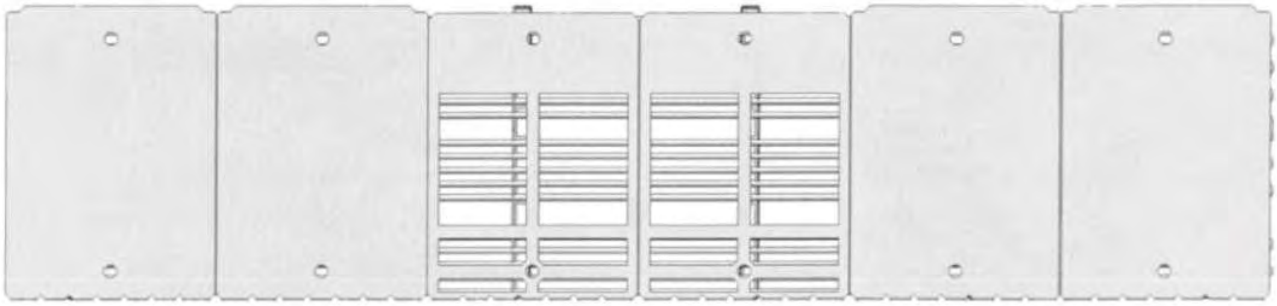
Q3 - Meat Coil Close-off Configuration



Q3-8-Meat



Q3-10-Meat



Q3-12-Meat

Wiring Color Code



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.

NOTE: The total case electrical draw must not exceed 30 Amps ampacity at 115V in one connected lineup.

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.

Field Wiring and 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. Case amperes are listed on the wiring diagram, but always check the serial plate.

LED Driver Location

Drivers are located within the access panel that runs the length of the rear of the case. Refer to diagram on page 4.

Ashrae Color Code

NOTE: All other manufacturers have no standard sensor codes.

Case Control Systems SENSOR COLOR			
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

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. Bend the bumper backwards to open and 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 flow 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.

Important Steps

1. Do not set temperature too cold, as this causes product dehydration.
   Product Temperature: 33°–35°F! Set thermostat to cut in at 28°F discharge air. Meat holding box: 32°F. Meat prep room: 55°F. Meat bloom box: 36°F. Process the meat to enter case at 40°F or below.
2. Product deterioration is very rapid above 40°F. Temperature control should be by means of a T-Stat and Suction Solenoid or equivalent for each case.
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.

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 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 Hussmann’s directions.
4. Rinse thoroughly.
5. Dry completely before resuming operation.

User Information (Cont'd)

Cleaning Glass and 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.

Non-Glare Glass
The high optical clarity of this glass is possible due to special coatings on the glass surface itself. To preserve this coating and the optical clarity, keep the glass clean.

Water is the only solution recommended for use in cleaning non-glare glass. The damage to the glass from improper, caustic solutions is irreparable. In addition to cleaning the glass with the recommended product, there are precautions that should be taken when working and cleaning the inside of the case.

- When cleaning the inside of the cases, we recommend that the glass be fully opened and covered to prevent solutions from splashing onto the glass and ruining the coating on the inside.

Plexiglass and Acrylic Care
Improper cleaning not only accelerates the cleaning cycle but also degrades the quality of this surface. Normal daily buffing motions can generate static cling attracting dust to the surface. Incorrect cleaning agents or cleaning cloths can cause micro scratching of the surface, causing the plastic to haze over time.

Cleaning
Hussmann recommends using a clean damp chamois, or a paper towel marketed as dust and abrasive free with **210® Plastic Cleaner and Polish** available by calling Sumner Labs at **1-800-542-8656**. Hard, rough cloths or paper towels will scratch the acrylic and should not be used.

Antistatic Coatings
The **210®** has proven to be very effective in not only cleaning and polishing the Plexiglass surface, but also providing anti-static and anti-fog capabilities. This product also seals pores and provides a protective coating.



IMPORTANT INFORMATION

Have case Model and Serial Number ready! This information is located on the nameplate of the unit.



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.

.

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 and 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 or windows are open - allowing moisture to enter store.

CAUTION

CLEANING PRECAUTIONS

When cleaning:

- **Do not use high pressure water hoses**
- **Do not introduce water faster then waste outlet can drain**
- **NEVER INTRODUCE WATER ON SELF CONTAINED UNIT WITH AN EVPORATOR PAN**
- **NEVER USE A CLEANING OR SANITIZING SOLUTION THAT HAS AN OIL BASE (these will dissolve the butyl sealants) or an AMMONA 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 A CHLORANITED CLAENER ON ANY SURFACE**
- **DO NOT USE ABRASIVES OR STEEL WOOL SCOURING PADS (these will mar the finish)**

Glass Replacement and Adjustment Instructions

In order to replace or adjust the glass, the glass must be placed in the raised position. The underside of the clamp is exposed, revealing the tightening screws. By turning these screws counterclockwise 1/4 turn each, the glass will be loosened for either removal or adjustment.

Note: Do not overtighten the screws since damage may occur.

Stainless Steel Cleaning and Care

There are three basic things, which can break down your stainless steel's passivity layer and allow corrosion.

1. **Mechanical Abrasion**
   Mechanical Abrasion means those things that will scratch the steels surface. Steel Pads, wire Brushes, and Scrapers are prime examples.
2. **Water**
   Water comes out of our tap in varying degrees of hardness. Depending on what part of the country you live in, you may have hard or soft water. Hard water may leave spots. Also, when heated, hard water leaves deposits behind that if left to sit, will break down the passive layer and rust your stainless steel. Other deposits from food preparation and service must be properly removed.
3. **Chlorides**
   Chlorides are found nearly everywhere. They are in water, food and table salt. One of the worst perpetrators of chlorides can come from household and industrial cleaners.

Don't Despair! Here are a few steps that can help prevent stainless steel rust.

1. **Use the Proper Tools**
   When cleaning your stainless steel products, take care to use non-abrasive tools. Soft Clothes and

Maintenance (Cont'd)

plastic scouring pads will NOT harm the steel's passive layer. Stainless steel pads can also be used but the scrubbing motion must be in the same direction of the manufacturer's polishing marks.

2. **Clean With the Polish Lines**
   Some stainless steels come with visible polishing lines or "grain". When visible lines are present, you should ALWAYS scrub in a motion that is parallel to them. When the grain cannot be seen, play it safe and use a soft cloth or plastic scouring pad.
3. **Use Alkaline, Alkaline Chlorinated or Non-chloride Containing Cleaners**
   While many traditional cleaners are loaded with chlorides, the industry is providing an ever increasing choice of non-chloride cleaners. If you are not sure of your cleaner's chloride content contact your cleaner supplier. If they tell you that your present cleaner contains chlorides, ask for an alternative. Also, avoid cleaners containing quaternary salts as they also can attack stainless steel & cause pitting and rusting.
4. **Treat your Water**
   Though this is not always practical, softening hard water can do much to reduce deposits. There are certain filters that can be installed to remove distasteful and corrosive elements. Salts in a properly maintained water softener are your friends. If you are not sure of the proper water treatment, call a treatment specialist.
5. **Keep your Food Equipment Clean**
   Use alkaline, alkaline chlorinated or non-chlorinated cleaners at recommended strength. Clean frequently to avoid build-up of hard, stubborn stains. If you boil water in your stainless steel equipment, remember the single most likely cause of damage is chlorides in the water. Heating cleaners that contain chlorides has a similar effect.
6. **RINSE, RINSE, RINSE**
   If chlorinated cleaners are used you must rinse, rinse, rinse and wipe dry immediately. The sooner you wipe off standing water, especially when sit contains cleaning agents, the better. After wiping the equipment down, allow it to air dry for the oxygen helps maintain the stainless steel's passivity film.
7. **Never Use Hydrochloric Acid (Muriatic Acid) on Stainless Steel.**
8. **Regularly Restore/Passivate Stainless Steel.**

Maintenance

Case Cleaning Instructions

Long life and satisfactory performance of any equipment are dependent upon the care it receives. Use this guide for proper sanitation and to minimize maintenance costs.

The cleaning processes described below should not require removing of fastners or other parts of the case - contact maintenance if the need arises.

Sections

A. Warnings and Precautions

B. Do's and Don'ts

C. Recommended supplies and methods

D. Daily / Weekly Procedures

A. Warnings & Precautions

WARNING

Product may degrade if allowed and may spoil if allowed to sit in a non-refrigerated area.

Store product in a refrigerated area such as a cooler during the cleaning process. Remove only as much product as can be taken to the cooler in a timely manner.

ICE in or on the coil indicates the refrigeration and defrost cycle is not operating properly. Contact an authorized Service Technician to determine the cause of icing and to make proper adjustments as necessary. To maintain product integrity, if not done so already, move all product to a cooler until the merchandiser has returned to normal operating temperatures.

For cleaning coils: NEVER USE SHARP OBJECTS AROUND COILS. Use a soft brush or vacuum brush to clean debris from coils.

- Do not puncture Coils!
- Do not bend fins.
- **Contact an authorized service technician** if a coil is punctured, cracked, or otherwise damaged.

B. Do's and Dont's

DO:

- Remove the product and all loose debris to avoid clogging the waste outlet.
- Store product in a refrigerated area such as a cooler during the cleaning process. Remove only as much product as can be taken to the cooler in a timely manner.
- Clean from top to bottom when cleaning the display case to avoid cross contamination.
- Thoroughly clean all surfaces with soap and hot water. Do not use steam or high pressure water hoses to wash the interior. These will destroy the merchandisers' sealing causing leaks and poor performance.
- Avoid direct contact between fan motors and cleaning or rinse water.
- Rinse with hot water, but DO NOT flood. Never introduce water faster than the waste outlet can drain.
- Allow merchandiser to completely dry before resuming operation.
- LED lights are magnetized to each shelf and can be removed easily for any shelf cleaning.
- After cleaning has been completed, remember to restore power back to merchandiser.

DON'T:

- Don't use solvent, oil or acidic based cleaners on any interior surfaces.
- Don't use abrasive cleansers and scouring pads, as these will mar the finish.
- Don't use scouring powders or steel wool as they will scratch stainless steel.
- Never use hydrochloric acid (muriatic acid) on stainless steel.
- Don't use a hose (with flowing water) to clean tub area.
- Don't use steam or high pressure water hoses to wash the interior – these will destroy the sealing causing leaks and poor performance.
- Don't introduce water faster than the waste outlet

Maintenance Cont'd

can drain it.

- Don't use a hose on lighted shelves or submerge the shelves in water.

C. Recommended supplies and methods

- Mild cleaning solution
- Sanitizer
- Glass cleaner (see below recommendations)
- Clean towels or paper towels (see below recommendations)
- Soap and hot water
- Non-abrasive cleaning pads

Cleaning Cloths:

- Scotch-Brite® High Performance Cloth – manufactured by 3M® and available in most grocery stores under the name Scotch-Brite® Microfiber Cleaning Cloth in a 12" x 14" size. This cloth is washable and may be reused as long as it remains clean.
- Spontex® Microfibre Cleaning Cloth – distributed by Spontex® and available in most grocery stores under the same name in a 15.75" x 12" size. This cloth is washable and may be reused as long as it remains clean.

Cleaning Fluids – for more difficult cleaning jobs, these products are recommended:

- Windex® - standard product only (extra-strength or specialty products may not be suitable)
- Glass-Plus® - standard product only (extra-strength or specialty products may not be suitable)
- Exceed® Multi-Surface & Glass Cleaner – from Kay Chemical Company, Greensboro, NC

C-1: GLASS surfaces:

For standard glass, use a mild glass cleaner and a clean paper towel or cloth to wipe the glass. For non-glare glass, refer to the previous "Recommended supplies..." section

C-2: STAINLESS STEEL

- Use non abrasive cleaning materials, and always polish with the grain of the steel. Use warm water or add a mild detergent to the water and apply with a cloth. Always wipe dry after wetting.
- **Use non-chlorine containing cleaners such as window cleaners and mild detergents. Do not use cleaners containing salts as this may cause pitting and rusting of the stainless steel finish. Do not use bleach.**
- Clean frequently to avoid build-up of hard, stubborn stains. A stainless steel cleaning solution may be used periodically to minimize scratching and remove stains.
- Rinse and wipe dry immediately after cleaning. Never use hydrochloric acid (muriatic acid) on stainless steel.

C-3: MIRRORED surfaces

Use a mild glass cleaner and a clean paper towel or cloth to wipe the surface. NEVER USE ABRASIVE CLEANSERS OR SCOURING PADS.

C-4: PAINTED surfaces

Cleaned with a mild detergent without chloride and warm water to protect and maintain their attractive finish. NEVER USE ABRASIVE CLEANSERS OR SCOURING PADS.

Schedule and procedures

Follow the recommended schedule below for optimal sanitation and case efficiency and to avoid the corrosive action of food fluids on metal parts that are left on for long periods of time. Exterior and interior cleaning can vary on upkeep of the merchandiser through daily use.

Maintenance Cont'd

Daily *Procedures*

Clean from top to bottom to avoid cross contamination.

❑ 1. Unload the case completely.



Pull product from the rear or front of case. Wrap product, use speed racks to minimize dehydration.

❑ 2. Clean deck with sanitizer. Dry with paper towel or clean cloth.



❑ 3. Wipe and sanitize all areas that food product may have contacted or any surfaces that may have been touched. This will minimize cross contamination.

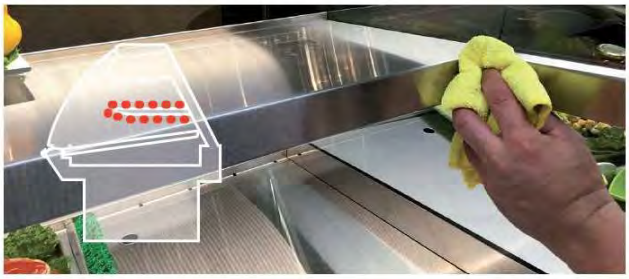




❑ 4. Clean and sanitize underside of drip trays.



❑ 5. Clean and sanitize shelf surfaces.



❑ 6. Clean and sanitize underside of shelves



❑ 7. Clean glass surfaces (Refer to section C-1). Do not spray cleaning solution directly on glass surface. Instead spray cleaning cloth first to avoid over spray.



Maintenance Cont'd



Weekly *Procedures*

❑ 1. In addition to all daily procedures described in the daily procedures...

❑ 2. Remove deck pans. It is recommended to do so through the front of the case.

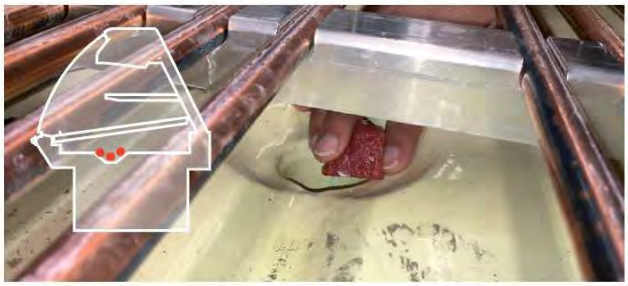


❑ 3. Clean top and bottom. Remove all leaked meat juices



❑ 4. Inspect and remove food and debris that may have fallen below the deck pans.





Do not push debris through drain openings. Particles may become stuck in P-trap and cause odors.

❑ 5. Sanitize tub surfaces and allow to dry.

❑ 6. Clean rear door tracks.



Remove doors by lifting and tilting lower edge outward. Clear debris from guide tracks. Wipe and clean as needed.

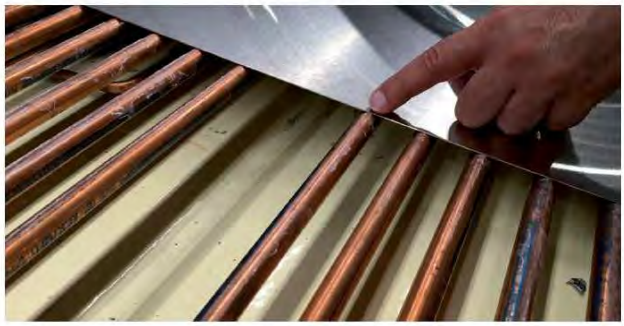
❑ 6. Inspect and clear debris from front air sweep.



Maintenance (Cont'd)

NOTES:

For Hussmann OptiCool™ equipped cases: When reinstalling deck pans, ensure that pans are seated properly and are in contact with the coil system. Optimal performance is compromised if they are not properly reinstalled.



• If ice is present in the coil system, contact maintenance.

• When cleaning scale stands, avoid moving the scale unit itself, recalibrating of the unit may be necessary.

• If floor is power washed, avoid over spraying and contamination under hanging wrapping paper rolls.

Q3-M/FSFC-EP-4R HO LEDS	4'	3051275
Q3-M/FSFC-EP-6R HO LEDS	6'	3051276
Q3-M/FSFC-EP-8R HO LEDS	8'	3051277
Q3-M/FSFC-EP-10R HO LEDS	10'	3051278
Q3-M/FSFC-EP-12R HO LEDS	12'	3051279
Q3-M/FSFC-EP-4R	4'	2H10774
Q3-M/FSFC-EP-6R	6'	2H10113
Q3-M/FSFC-EP-8R	8'	2H10543
Q3-M/FSFC-EP-10R	10'	2H16995
Q3-M/FSFC-EP-12R	12'	2H10114
Q3-MC/FC-4-R W/WATER FLUSH	4'	3106595
Q3-MC/FC-6-R	6'	3083524
Q3-MC/FC-8-R	8'	3074877
Q3-MC/FC-12-R	12'	3087991
Q3-MS-22O-R		3070193
Q3-MS-22O-R		3070194
Q3-MC-45°O REM		W1760004
Q3-MC/MS-22.5°O REM		1H63052
Q3-MC/MS-22.5°I REM		1H63051

CIRCUIT #1
LOADING

	120V	
LT	0.5A	

OPTIONAL:
SHELF

CANOPY

4' LED LIGHT

4' LED LIGHT

4' LED LIGHT

LIGHT CIRCUIT HO
4.1A 44.1W @ 120V

RED +

BLUE -

LED DRIVER

LIGHT SWITCH
TIPPETTE
125-01-0311

BLK #14

WHT #14

BUNDLE
ORANGE

L1 N

~120 VAC - 60 Hz.
MCA= 0.5.1A
MOP= 15A

CIRCUIT #2

RJ-45 NETWORK JACK
125-01-0202

GFCI DUPLEX
125-01-3178

WHT # 14

GRN # 14

BLK # 14

BUNDLE
YELLOW

INCOMING POWER
~120 VAC -60 Hz

ALL SINGLE
RECEPTACLES TO BE
TIED TO DUPLEX GFCI
RECEPTACLE

AIR SWEEP FAN
0522287
4.5W .15A @120VAC

M

AIR SWEEP FAN
SWITCH
TIPPETTE
125-01-0311

BLACK #14

WHITE #14

BUNDLE
BROWN

L1 N

~120 VAC - 60 Hz

MCA= 0.18A
MOP= 15A

GRAVITY COIL

SOLENOID VALVE
.14A @ 120VAC

DIGITAL T-STAT

SENSOR

N 120 C NO

WHITE #14

BLK/WHT STRIPE #14

WHITE #14

BLACK #14

BUNDLE
WHITE/BLACK

N L1

~120 VAC - 60 Hz

DECK COIL

SOLENOID VALVE
.14A @ 120VAC

DIGITAL T-STAT

SENSOR

N 120 C NO

WHITE #14

BLK/WHT STRIPE #14

WHITE #14

BLACK #14

BUNDLE
WHITE/BLACK

N L1

~120 VAC - 60 Hz

REVISION HISTORY						
REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	ECN-CAP-0010806	2017/12/07	RELEASED TO PRODUCTION	CB	CB	CB
B	ECN-COD-0011843	2020/10/02	RE-LABELED DIGITAL T-STAT	CB	CB	CB

NOTES:
CASE MUST BE GROUNDED
WHEN PASSING WIRES THROUGH METAL HOLES A GROMMET MUST BE USED

MATERIAL - N/A
DATE DRAWN - 12-7-17 DRAWN
BY -CRAIG BOOREY REVIEWED
BY -CRAIG BOOREY
APPROVED BY - CRAIG BOOREY
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
TOLERANCES ARE:
DECIMALS .XX ±0.03, .XXX ±0.010
ANGLES ± 2°
THIRD ANGLE PROJECTION

ECN-CAP-0010806
REF -
SHEET 1 OF 1

HUSSMANN

DIAGRAM-Q3-M/FSFC
-EP-4-R W/HO LEDS

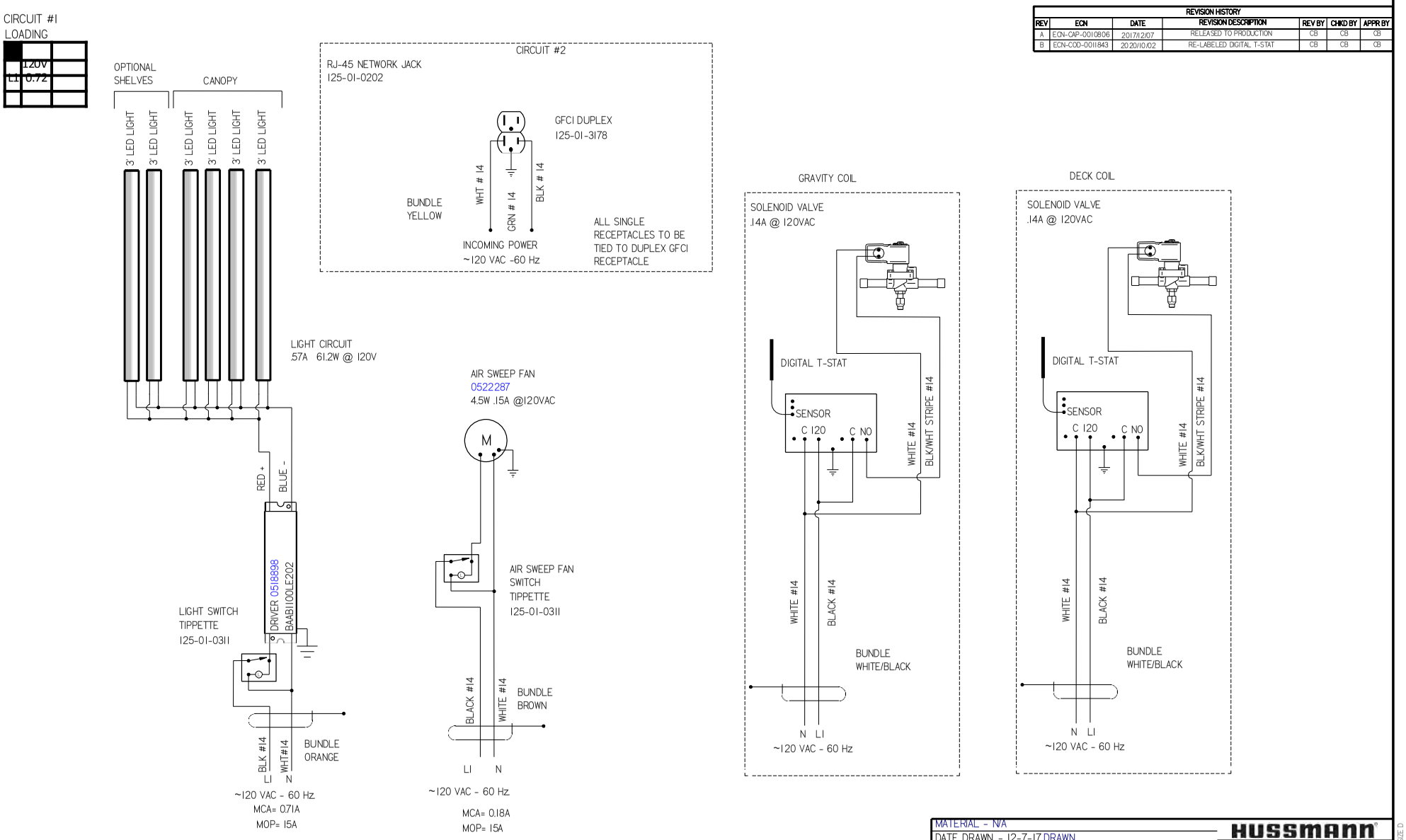
3051275 B

HUSSMANN_QDF_11 SHEET SIZE: D

CIRCUIT #1
LOADING

	120V	
L1	0.72	

REVISION HISTORY						
REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	ECN-CAP-0010806	2017/12/07	RELEASED TO PRODUCTION	CB	CB	CB
B	ECN-COO-0011843	2020/10/02	RE-LABELED DIGITAL T-STAT	CB	CB	CB



NOTES:
CASE MUST BE GROUNDED
WHEN PASSING WIRES THROUGH METAL HOLES A GROMMET MUST BE USED

MATERIAL - N/A	
DATE DRAWN - 12-7-17 DRAWN BY -CRAIG BOOREY REVIEWED	ECN-CAP-0010806
BY -CRAIG BOOREY	REF -
APPROVED BY - CRAIG BOOREY	SHEET 1 OF 1
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.	
TOLERANCES ARE: DECIMALS .XX ±0.03, .XXX ±0.010 ANGLES ± 2°	THIRD ANGLE PROJECTION

HUSSMANN

DIAGRAM-Q3-M/FSFC -EP-6-R W/HO LEDS

3051276 | B

HUSSMANN_CDF_11 SHEET SIZE: D

CIRCUIT #1
LOADING

L1	120V 0.72	

LIGHT CIRCUIT HO
.82A 88.2W @ 120V

CANOPY

4' L.E.D. LIGHT
4' L.E.D. LIGHT
4' L.E.D. LIGHT
4' L.E.D. LIGHT

OPTIONAL SHELVES

4' L.E.D. LIGHT
4' L.E.D. LIGHT

RED +
BLUE -
RED +
BLUE -

LED DRIVER
LED DRIVER

LIGHT SWITCH
TIPPETTE
125-01-0311

BLK #14
WHT #14
BUNDLE
ORANGE

L1 N

~120 VAC - 60 Hz.
MCA= 1.02A
MOP= 15A

CIRCUIT #2

RJ-45 NETWORK JACK
125-01-0202

GFCI DUPLEX
125-01-3178

WHT # 14
GRN # 14
BLK # 14

BUNDLE
YELLOW

INCOMING POWER
~120 VAC -60 Hz

ALL SINGLE
RECEPTACLES TO BE
TIED TO DUPLEX GFCI
RECEPTACLE

AIR SWEEP FAN
0522287
4.5W .15A @120VAC

M

AIR SWEEP FAN SWITCH
TIPPETTE 125-01-0311

BLACK #14
WHITE #14
BUNDLE
BROWN

L1 N

~120 VAC - 60 Hz.
MCA= 0.18A
MOP= 15A

GRAVITY COIL

SOLENOID VALVE
.14A @ 120VAC

DIGITAL T-STAT

SENSOR
C 120
C NO

WHITE #14
BLK/WHT STRIPE #14

WHITE #14
BLACK #14

BUNDLE
WHITE/BLACK

N L1
~120 VAC - 60 Hz

DECK COIL

SOLENOID VALVE
.14A @ 120VAC

DIGITAL T-STAT

SENSOR
C 120
C NO

WHITE #14
BLK/WHT STRIPE #14

WHITE #14
BLACK #14

BUNDLE
WHITE/BLACK

N L1
~120 VAC - 60 Hz

REVISION HISTORY						
REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	ECN-CAP-0010806	2017/12/07	RELEASED TO PRODUCTION	CB	CB	CB
B	ECN-COD-0011843	2020/10/02	RE-LABELED DIGITAL T-STAT	CB	CB	CB

NOTES:
CASE MUST BE GROUNDED
WHEN PASSING WIRES THROUGH METAL HOLES A GROMMET MUST BE USED

MATERIAL - N/A
DATE DRAWN - 12-7-17 DRAWN
BY -CRAIG BOOREY REVIEWED
BY -CRAIG BOOREY
APPROVED BY - CRAIG BOOREY
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
TOLERANCES ARE:
DECIMALS .XX ±.03, .XXX ±.010
ANGLES ± 2°
THIRD ANGLE PROJECTION

ECN-CAP-0010806
REF -
SHEET 1 OF 1

HUSSMANN®

DIAGRAM-Q3-M/FSFC
-EP-8-R W/HO LEDS

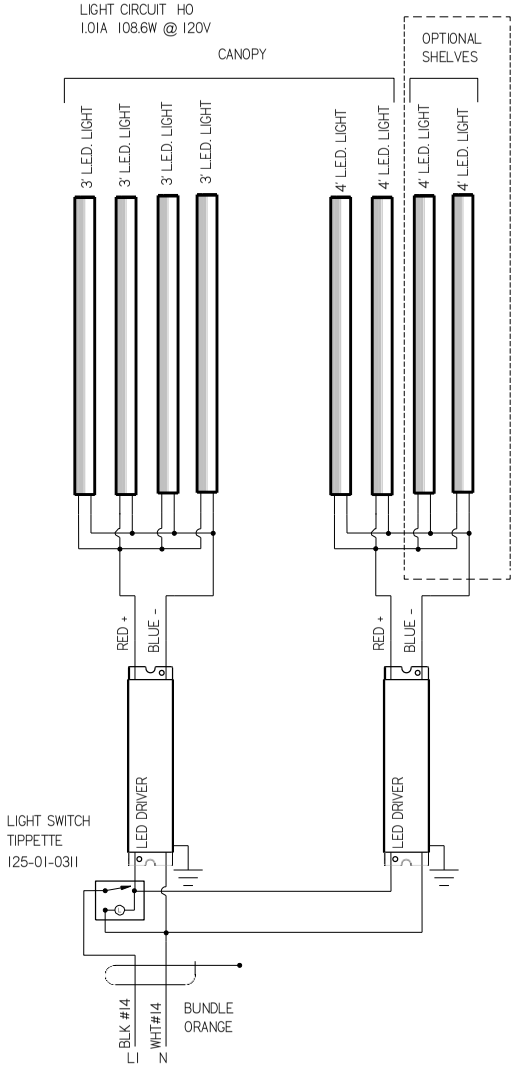
3051277 | B

HUSSMANN_COF_11 SHEET SIZE: D

CIRCUIT #1
LOADING

L1	120V L2	

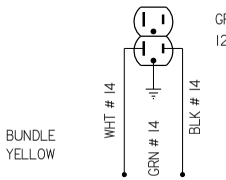
LIGHT CIRCUIT HO
1.01A 108.6W @ 120V



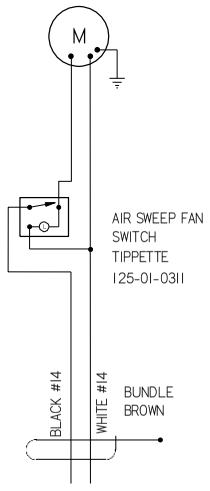
~120 VAC - 60 Hz.
MCA= 1.26A
MOP= 15A

CIRCUIT #2

RJ-45 NETWORK JACK
125-01-0202

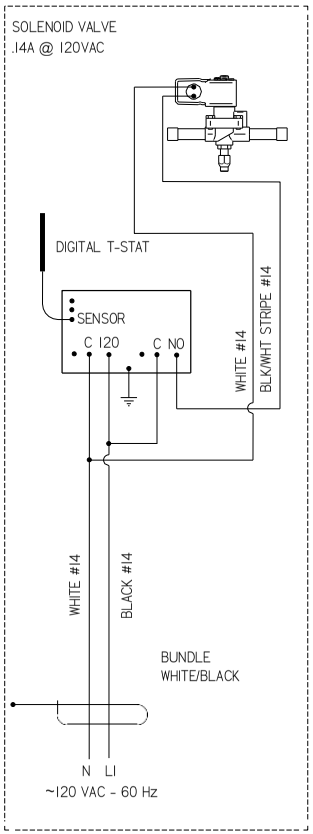


AIR SWEEP FAN
0522287
4.5W .15A @120VAC

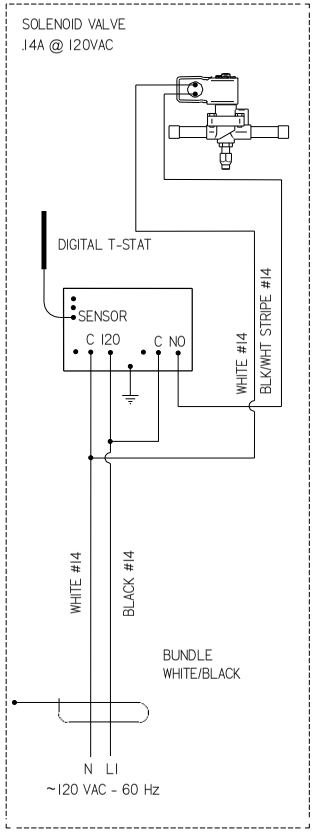


~120 VAC - 60 Hz.
MCA= 0.18A
MOP= 15A

GRAVITY COIL



DECK COIL



NOTES:
CASE MUST BE GROUNDED
WHEN PASSING WIRES THROUGH METAL HOLES A GROMMET MUST BE USED

REVISION HISTORY

REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	ECN-CAP-0010806	2017/12/07	RELEASED TO PRODUCTION	CB	CB	CB
B	ECN-COD-0011843	2020/10/02	RE-LABELED DIGITAL T-STAT	CB	CB	CB

MATERIAL - N/A	HUSSMANN®
DATE DRAWN - 12-7-17 DRAWN	
BY -CRAIG BOOREY REVIEWED	ECN-CAP-0010806
BY -CRAIG BOOREY	REF -
APPROVED BY - CRAIG BOOREY	SHEET 1 OF 1
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.	DIAGRAM-Q3-M/FSFC -EP-10-R W/HO LEDS
TOLERANCES ARE: DECIMALS .XX ±.03, .XXX ±.010 ANGLES ± 2°	THIRD ANGLE PROJECTION
	3051278 B

HUSSMANN_CDF_11 SHEET SIZE: D

REVISION HISTORY						
REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	ECN-CAP-0010806	2017/12/07	RELEASED TO PRODUCTION	CB	CB	CB
B	ECN-COD-0011843	2020/10/02	RE-LABELED DIGITAL T-STAT	CB	CB	CB

CIRCUIT #1
LOADING

	120V	
LT	14	

LIGHT CIRCUIT HO
1.23A 132.3W @ 120V

CANOPY

4' L.E.D. LIGHT
4' L.E.D. LIGHT
4' L.E.D. LIGHT
4' L.E.D. LIGHT
4' L.E.D. LIGHT
4' L.E.D. LIGHT

OPTIONAL SHELVES

4' L.E.D. LIGHT
4' L.E.D. LIGHT
4' L.E.D. LIGHT

RED +
BLUE -
RED +
BLUE -
RED +
BLUE -

LED DRIVER
LED DRIVER
LED DRIVER

LIGHT SWITCH
TIPPETTE
125-01-0311

BLK #14
WHT#14
BUNDLE ORANGE

LI N
~120 VAC - 60 Hz.
MCA= 1.53A
MOP= 15A

CIRCUIT #2

RJ-45 NETWORK JACK
125-01-0202

GFCI DUPLEX
125-01-3178

WHT # 14
GRN # 14
BLK # 14

BUNDLE
YELLOW

INCOMING POWER
~120 VAC -60 Hz

ALL SINGLE RECEPTACLES TO BE TIED TO DUPLEX GFCI RECEPTACLE

AIR SWEEP FAN
0522287
4.5W .15A @120VAC

M

AIR SWEEP FAN
SWITCH
TIPPETTE
125-01-0311

BLACK #14
WHITE #14
BUNDLE BROWN

LI N
~120 VAC - 60 Hz.
MCA= 0.18A
MOP= 15A

GRAVITY COIL

SOLENOID VALVE
.14A @ 120VAC

DIGITAL T-STAT
SENSOR
C 120
C NO
WHITE #14
BLK/WHT STRIPE #14
WHITE #14
BLACK #14
BUNDLE WHITE/BLACK
N LI
~120 VAC - 60 Hz

DECK COIL

SOLENOID VALVE
.14A @ 120VAC

DIGITAL T-STAT
SENSOR
C 120
C NO
WHITE #14
BLK/WHT STRIPE #14
WHITE #14
BLACK #14
BUNDLE WHITE/BLACK
N LI
~120 VAC - 60 Hz

NOTES:
CASE MUST BE GROUNDED
WHEN PASSING WIRES THROUGH METAL HOLES A GROMMET MUST BE USED

MATERIAL - N/A
DATE DRAWN - 12-7-17 DRAWN
BY -CRAIG BOOREY REVIEWED
BY -CRAIG BOOREY
APPROVED BY - CRAIG BOOREY
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
TOLERANCES ARE:
DECIMALS .XX ±.03, .XXX ±.010
ANGLES ± 2v
THIRD ANGLE PROJECTION

HUSSMANN

ECN-CAP-0010806
REF -
SHEET 1 OF 1

DIAGRAM-Q3-M/FSFC
-EP-12-R W/HO LEDS

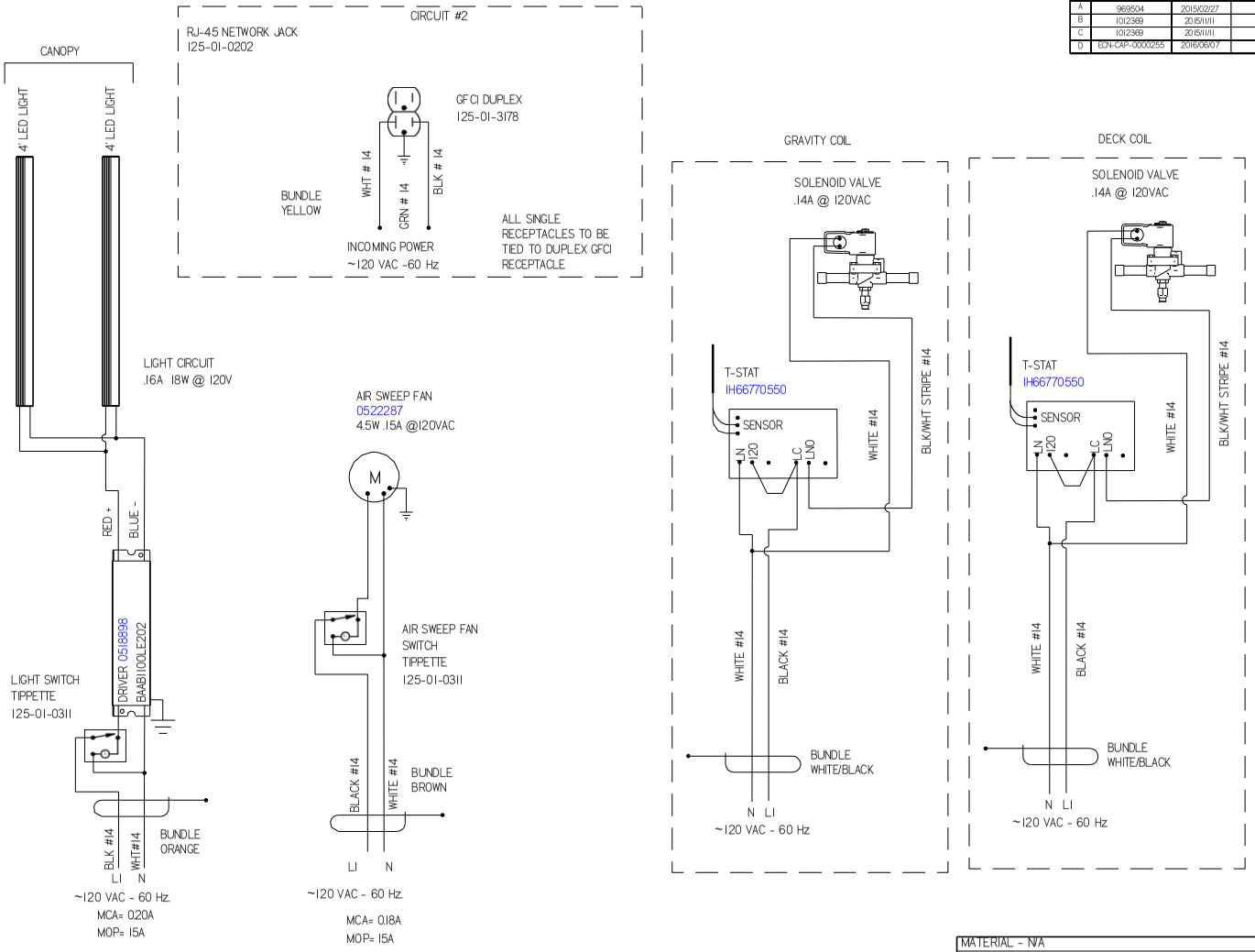
3051279 B

HUSSMANN_COF_11 SHEET SIZE D

CIRCUIT #1
LOADING

	120V	
L1	0.49	

REVISION HISTORY						
REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	969504	2015/02/27	RELEASED TO PRODUCTION	CB	CB	CB
B	1012369	2015/11/11	MATCHED PLM REVISION	CB	CB	CB
C	1012369	2015/11/11	LABELED SOLENOID WIRE	CB	CB	CB
D	ECN-CAP-0000255	2016/06/07	CHANGED T-STAT	CB	CB	CB



NOTES
CASE MUST BE GROUNDED

MATERIAL - N/A	
DATE DRAWN - 2/27/15	
DRAWN BY -CRAIG BOOREY	ECN# - 969504
REVIEWED BY -CRAIG BOOREY	REF -
APPROVED BY - CRAIG BOOREY	SHEET 1 OF 1
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.	
TOLERANCES ARE: DECIMALS XX ±0.03, XXX ±0.010 ANGLES ± 2°	THIRD ANGLE PROJECTION

HUSSMANN

DIAGRAM-Q3-M/FSFC -EP-4-R

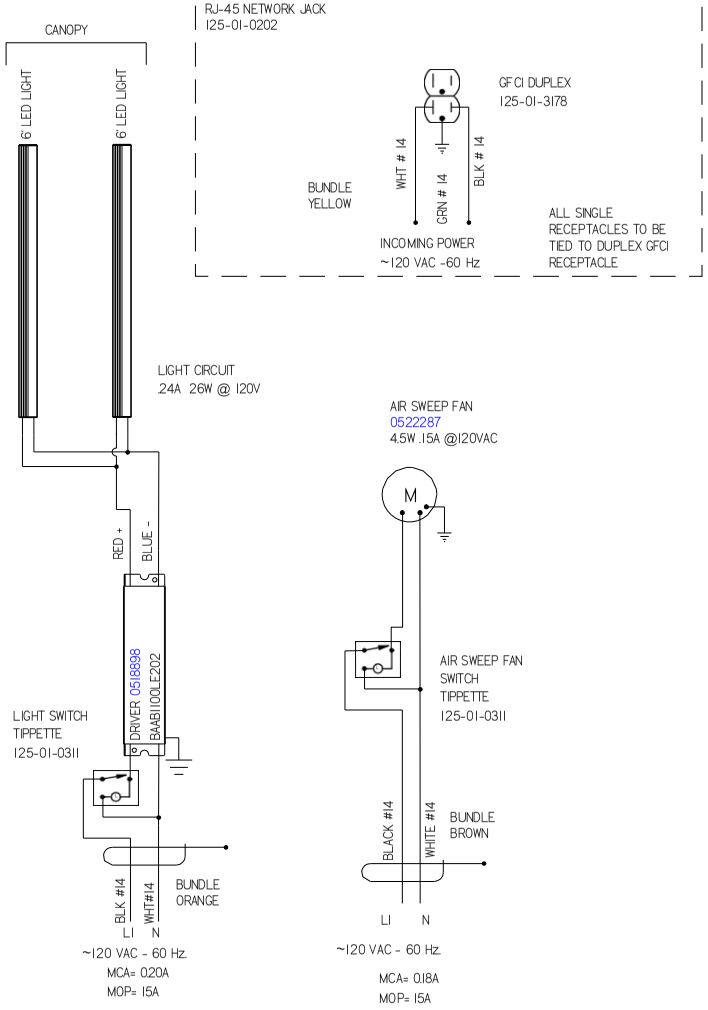
2H10774 D

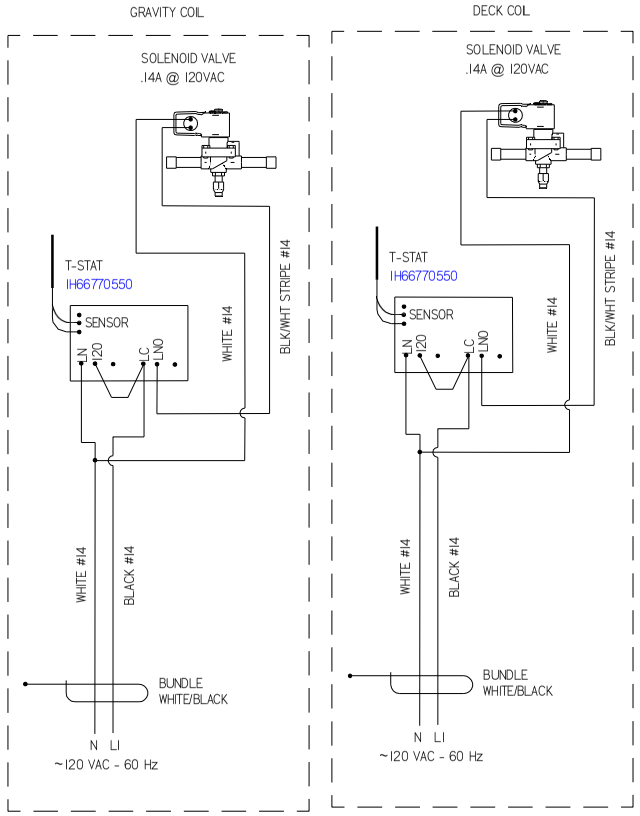
HUSSMANN.DGF.11 SHEET SIZE D

CIRCUIT #1
LOADING

	120V	
L1	0.67	

REVISION HISTORY						
REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	969504	2015/01/30	RELEASED TO PRODUCTION	CB	CB	CB
B	1012369	2015/11/11	MATCHED PLM REVISION	CB	CB	CB
C	1012369	2015/11/11	LABELED SOLENOID WIRE	CB	CB	CB
D	ECN-CAP-0000255	2016/06/07	CHANGED T-STAT	CB	CB	CB





NOTES
CASE MUST BE GROUNDED

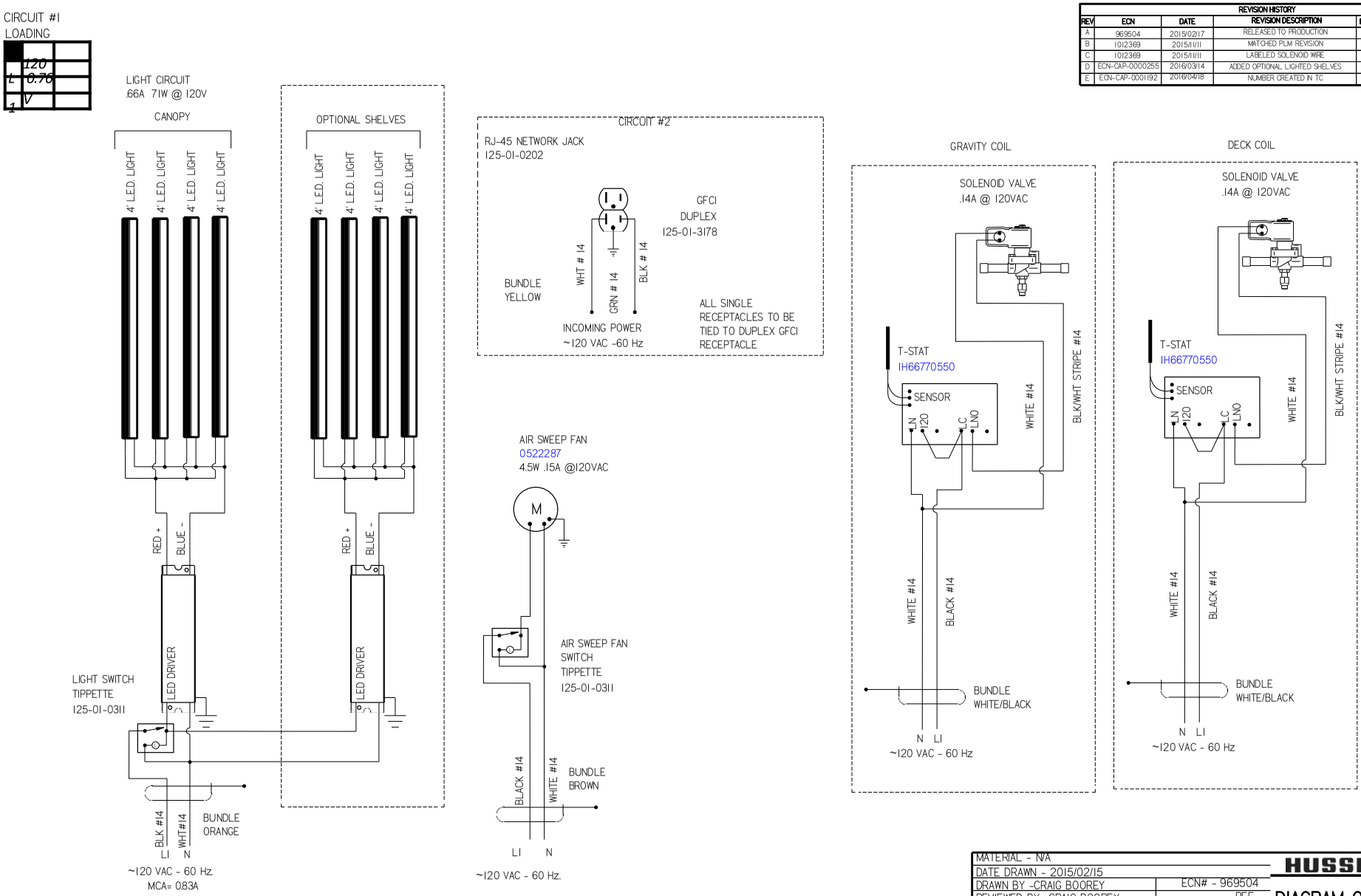
MATERIAL - N/A		HUSSMANN
DATE DRAWN - 1/30/15		
DRAWN BY -CRAIG BOOREY	ECN# - 969504	DIAGRAM-Q3-M/FSFC -EP-6-R
REVIEWED BY -CRAIG BOOREY	REF -	
APPROVED BY - CRAIG BOOREY	SHEET 1 OF 1	2H10113 D
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.		
TOLERANCES ARE: DECIMALS XX u.03, XXX u.010 ANGLES u 2v	THIRD ANGLE PROJECTION	

HUSSMANN.DGF.11 SHEET SIZE D

CIRCUIT #1
LOADING

L	120	
	0.76	
1	V	

REVISION HISTORY						
REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	969504	2015/02/17	RELEASED TO PRODUCTION	CB	CB	CB
B	1012369	2015/11/11	MATCHED PLM REVISION	CB	CB	CB
C	1012369	2015/11/11	LABELED SOLENOID WIRE	CB	CB	CB
D	ECN-CAP-0000255	2016/03/14	ADDED OPTIONAL LIGHTED SHELVES	CB	CB	CB
E	ECN-CAP-0001192	2016/04/18	NUMBER CREATED IN TC	BALA	CB	CB



NOTES:
CASE MUST BE GROUNDED

MATERIAL - N/A	
DATE DRAWN - 2015/02/15	
DRAWN BY -CRAIG BOOREY	ECN# - 969504
REVIEWED BY -CRAIG BOOREY	REF: -
APPROVED BY - CRAIG BOOREY	SHEET 1 OF 1
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.	
TOLERANCES ARE: DECIMALS .XX ±.03, .XXX ±.010 ANGLES ± 2v	THIRD ANGLE PROJECTION

HUSSMANN

DIAGRAM-Q3-M/FSFC -EP-8-R

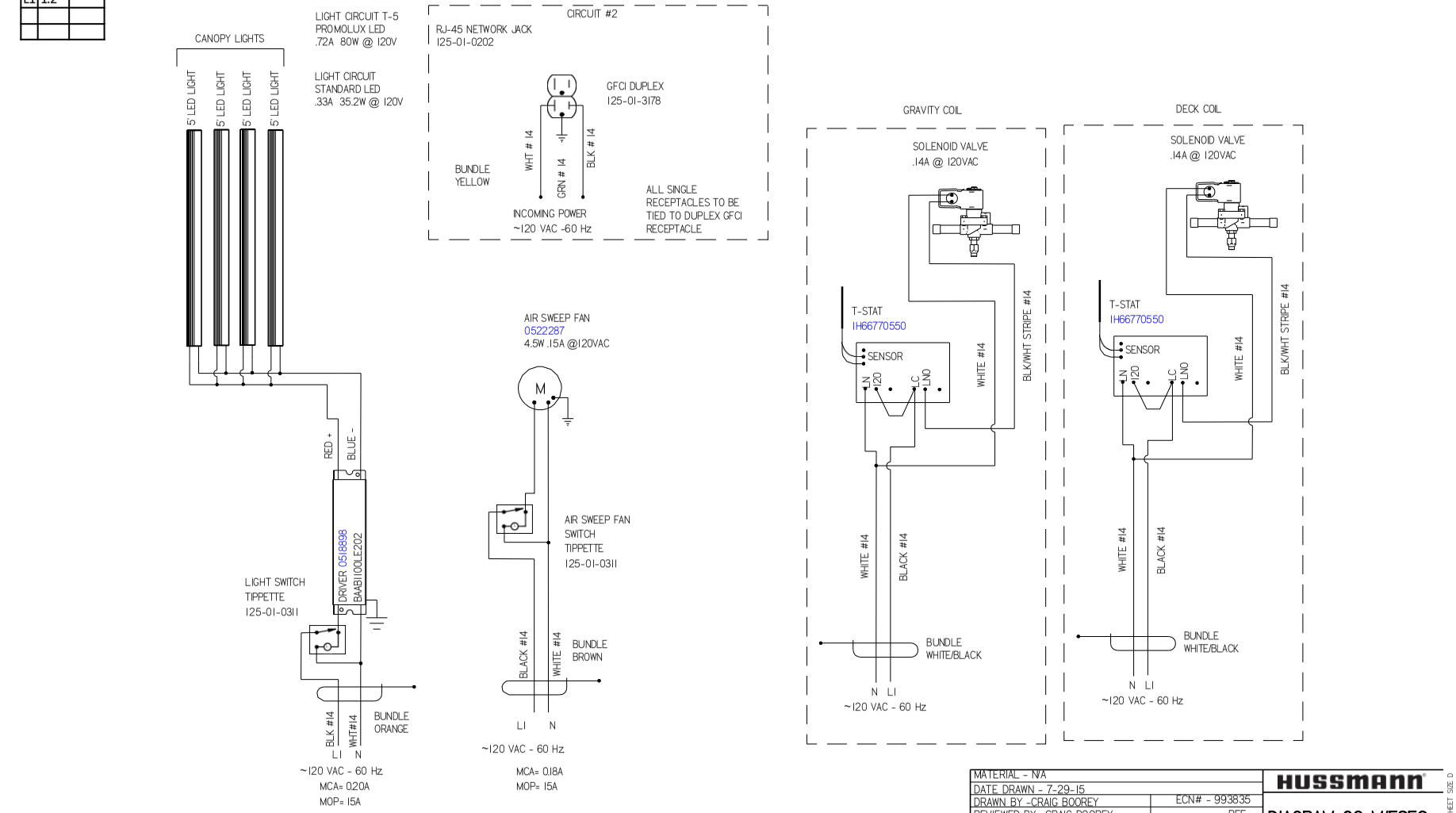
2H10543 | E

HUSSMANN_CDF_11 SHEET SIZE D

CIRCUIT #1
LOADING

	120V	
L1	1.2	

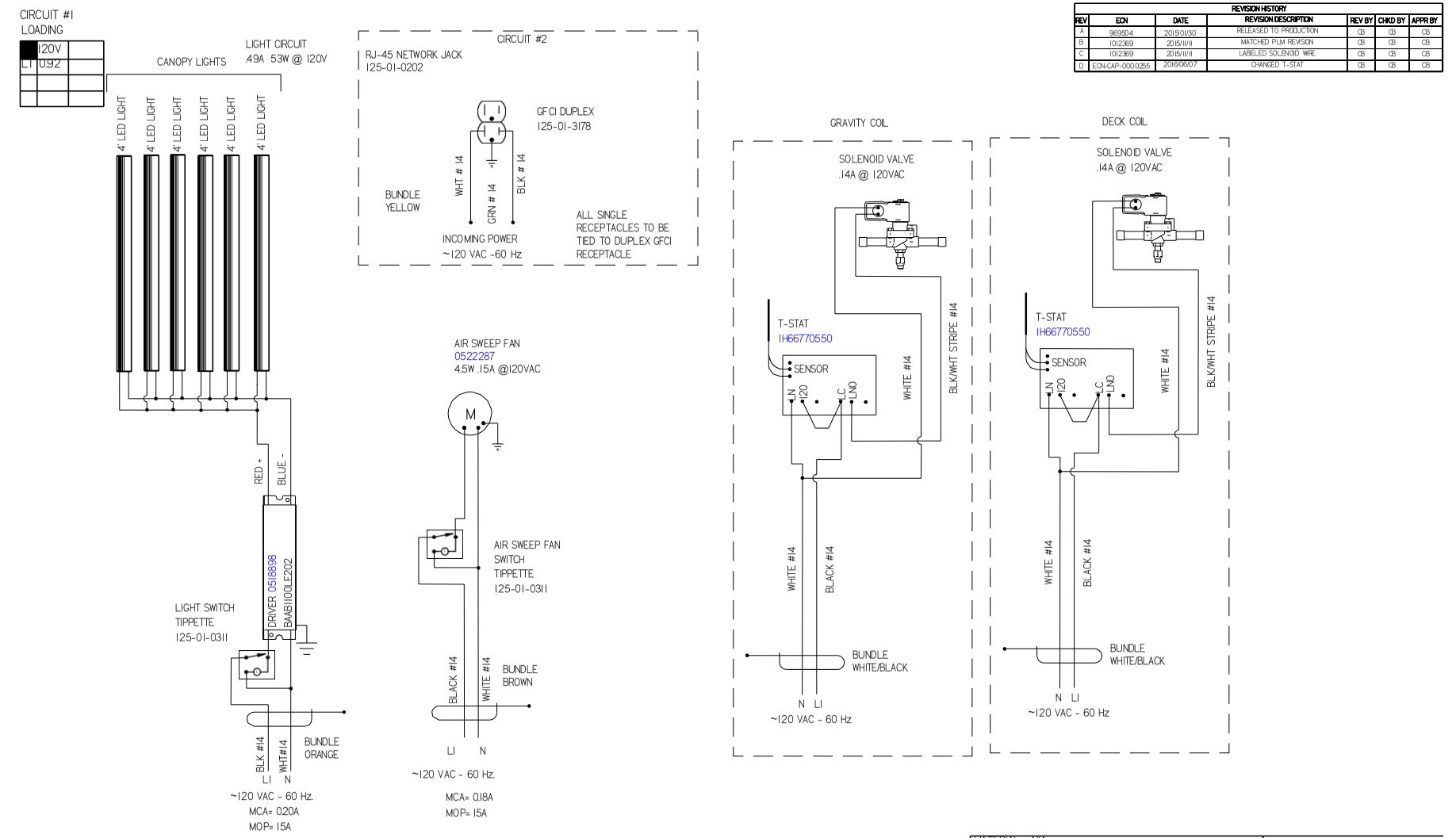
REVISION HISTORY						
REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	993835	2015/07/29	RELEASED TO PRODUCTION	CB	CB	CB
B	1012369	2015/11/11	LABELED SOLENOID WIRE	CB	CB	CB
C	ECN-CAP-0000255	2016/09/07	CHANGED T-STAT	CB	CB	CB



NOTES:
CASE MUST BE GROUNDED

MATERIAL - N/A		HUSSMANN
DATE DRAWN - 7-29-15		
DRAWN BY -CRAIG BOOREY	ECN# - 993835	DIAGRAM-Q3-M/FSFC -EP-10R
REVIEWED BY -CRAIG BOOREY	REF -	
APPROVED BY - CRAIG BOOREY	SHEET 1 OF 1	2H16995 C
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.		
TOLERANCES ARE: DECIMALS XX ±.03, XXX ±.010 ANGLES ± 2°	THIRD ANGLE PROJECTION	

HUSSMANN.DGF-1.1 SHEET SIZE D



REVISION HISTORY						
REV.	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	969504	2015/01/30	RELEASED TO PRODUCTION	CB	CB	CB
B	1012369	2015/11/11	MATCHED PLM REVISION	CB	CB	CB
C	1012369	2015/11/11	LABELED SOLENOID WIRE	CB	CB	CB
D	ECN-CAP-0000255	2016/06/07	CHANGED T-STAT	CB	CB	CB

NOTES:
CASE MUST BE GROUNDED

MATERIAL - N/A	
DATE DRAWN - 1/30/15	
DRAWN BY -CRAIG BOOREY	ECN# - 969504
REVIEWED BY -CRAIG BOOREY	REF -
APPROVED BY - CRAIG BOOREY	SHEET 1 OF 1
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.	
TOLERANCES ARE: DECIMALS XX ±0.03, XXX ±0.010 ANGLES ±2°	THIRD ANGLE PROJECTION

HUSSMANN

DIAGRAM-Q3-M/FSFC -EP-12-R

2H10114 D

HUSSMANN.DGF.11 SHEET SIZE D

CIRCUIT #1
LOADING

	120	
L1	0.6	
	V	

OPTIONAL LEDGE LIGHT

LIGHT CIRCUIT 0.08A 8.7 W

4' L.E.D. LIGHT

RED +

BLUE -

LED DRIVER

LIGHT SWITCH
125-01-0307

BLK #14

WHITE #14

BUNDLE
ORANGE

LI N

~120 VAC - 60 Hz.

MCA= 0.10A

MOP= 15A

LIGHT CIRCUIT 0.16A 17.4 W

CANOPY LIGHT

4' L.E.D. LIGHT

4' L.E.D. LIGHT

RED +

BLUE -

LED DRIVER

LIGHT SWITCH
TIPPETTE
125-01-0311

BLK #14

WHITE #14

BUNDLE
ORANGE

LI N

~120 VAC - 60 Hz

MCA= 0.20A

MOP= 15A

CIRCUIT # 2 (optional)

	LOADING	
L1	120 15.0 V	

NOTE FOR GFCI PROTECTION IF MORE THAN ONE SINGLE RECEPTACLE IS USED IN CONJUNCTION WITH A GFCI DUPLEX RECEPTACLE "DOWNSTREAM" ON THE LOAD SIDE, THE SUM OF ALL RECEPTACLES SHOULD NOT BE MORE THAN 15A

LOAD SIDE POWER
RECEPTACLE
125-01-0443 (OPTIONAL)
~120 VAC - 60 Hz

GFCI DUPLEX
125-01-3178

BUNDLE
YELLOW

WHT # 14

GRN # 14

BLK # 14

INCOMING POWER
~120 VAC - 60 Hz

ALL SINGLE
RECEPTACLES TO BE
TIED TO DUPLEX GFCI
RECEPTACLE

AIR SWEEP FANS
0404551
0.20A 15W @ 120VAC

M

BLACK #14

WHITE #14

BUNDLE
BROWN

LI N

~120 VAC - 60 Hz

MCA= .50A

MOP= 15A

OPTIONAL

SOLENOID VALVE
.14A @ 120VAC

T-STAT
(1) 225-01-0707

WHITE #14

BLACK #14

BUNDLE
WHITE/BLACK

N LI

~120 VAC - 60 Hz

OPTIONAL

ISOLATED
GROUND
RECPT
125-01-1099

WHT # 14

GRN # 14

BLK # 14

BUNDLE
YELLOW

INCOMING POWER
~120 VAC - 60 Hz

CIRCUIT # 2 (optional)

	LOADING	
L1	120 15.0 V	

REVISION HISTORY

REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	ECN-CAP-0019097	9-10-19	RELEASED TO PRODUCTION	CB	CB	CB

SEE PAGE-2 FOR OPTIONAL FLUSH SYSTEM WIRE HARNESS

NOTES:
1. PRINTED DOCUMENT REQUIRED SETTING: ALL COLORS BLACK & WHITE
2. CASE & ANY REMOVABLE PANEL WITH ELECTRICAL PARTS MUST BE GROUNDED.
3. WHEN PASSING WIRES THROUGH METAL HOLES A GROMMET MUST BE USED

UL COLOR CODES / ABBREVIATIONS

- RED = RD
- BLACK = BK
- BLUE = BL
- YELLOW = YL
- GRAY = GY
- WHITE = WT
- GREEN = GN
- BROWN = BN
- ORANGE = OR
- VIOLET = VT

FACTORY 14GA WIRE

FACTORY 10GA WIRE

FIELD WIRE

DO NOT SCALE DRAWING

SHEET 1 OF 2

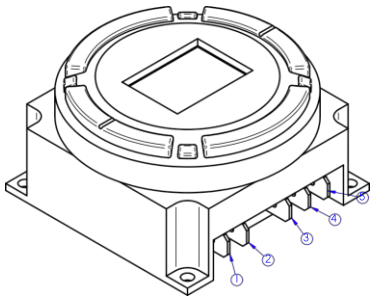
HUSSMANN®

DIAGRAM-Q3-FC-4-R
W/FLUSH SYSTEM

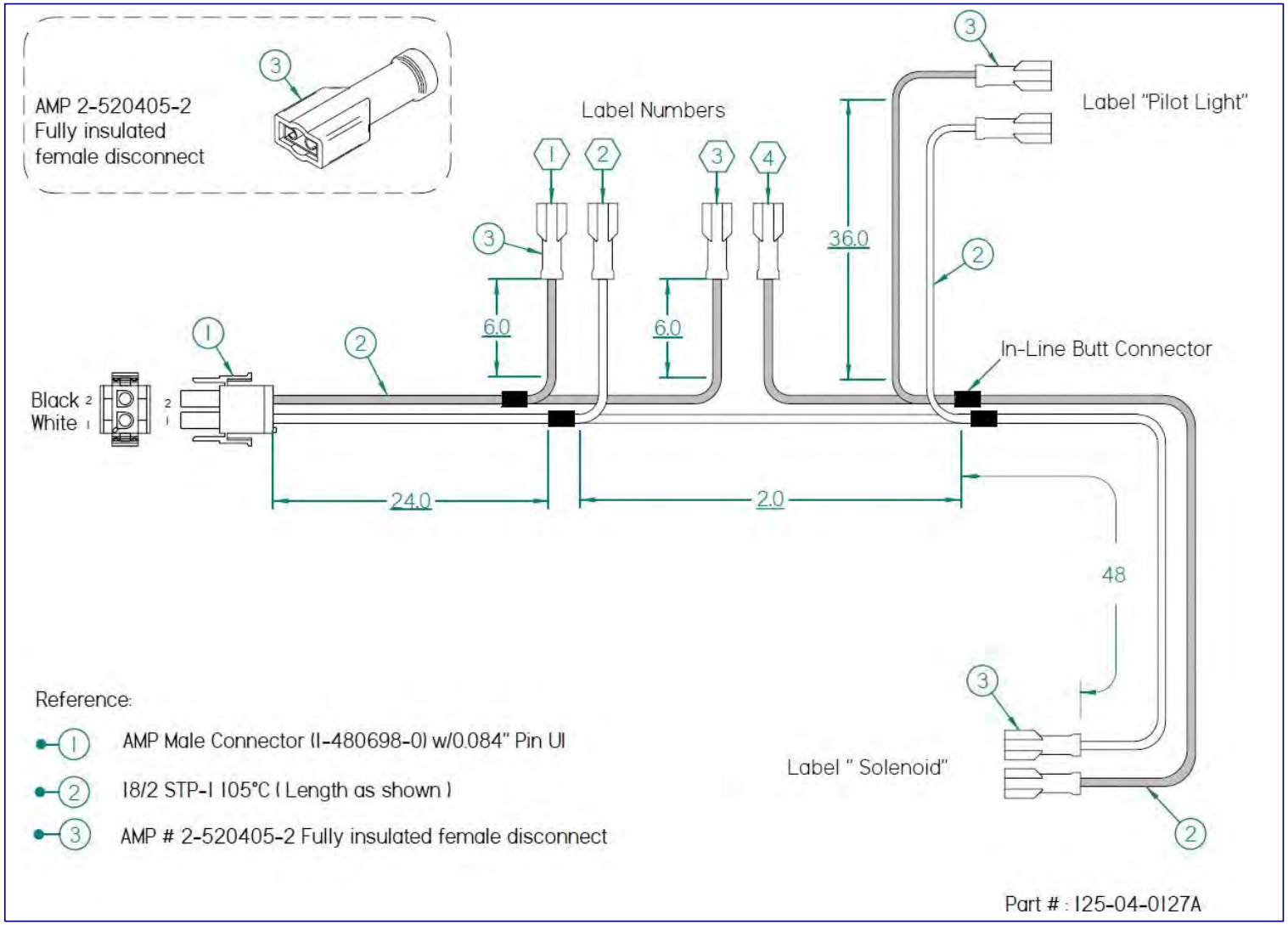
P/N 3106595

REV A

CN0_10 WIRE DIAGRAM SIZE C



GRASSLIN FW/I DIGI 20 - 120
PART # 125-01-0713



NOTES:
1. PRINTED DOCUMENT REQUIRED SETTING: ALL COLORS BLACK & WHITE
2. CASE & ANY REMOVABLE PANEL WITH ELECTRICAL PARTS MUST BE GROUNDED.
3. WHEN PASSING WIRES THROUGH METAL HOLES A GROMMET MUST BE USED

UL COLOR CODES / ABBREVIATIONS		FACTORY 14GA WIRE	HUSSMANN®
RED = RD	WHITE = WT	FACTORY 10GA WIRE	DIAGRAM-Q3-FC-4-R W/FLUSH SYSTEM
BLACK = BK	GREEN = GN	FIELD WIRE	
BLUE = BL	BROWN = BN	DO NOT SCALE DRAWING	P/N 3106595 REV A
YELLOW = YL	ORANGE = OR	SHEET 2 OF 2	
GRAY = GY	VIOLET = VT		

CNO...10 WIRE DIAGRAM SIZE C

REVISION HISTORY						
REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	ECN-CAP-0015589	2018/12/19	RELEASED TO PRODUCTION	CB	CB	CB

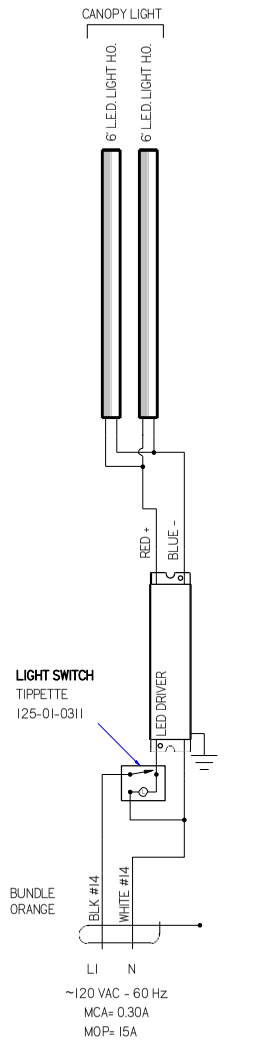
CIRCUIT # 1

	LOADING	
	120 V	
L1	0.92	

NOTE: CASE MUST BE GROUNDED

LIGHT CIRCUIT 0.24A 26.8 W

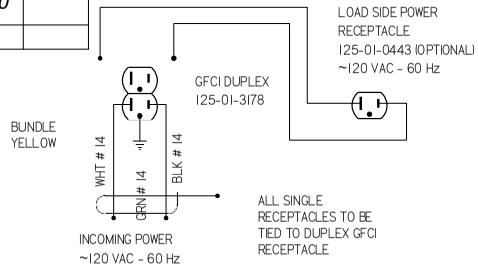
CANOPY LIGHT

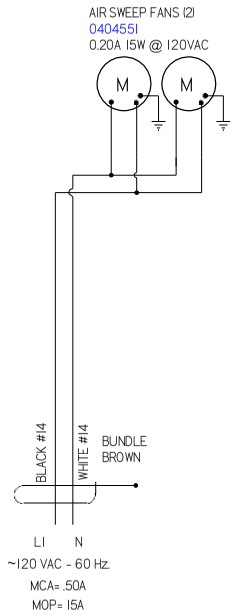


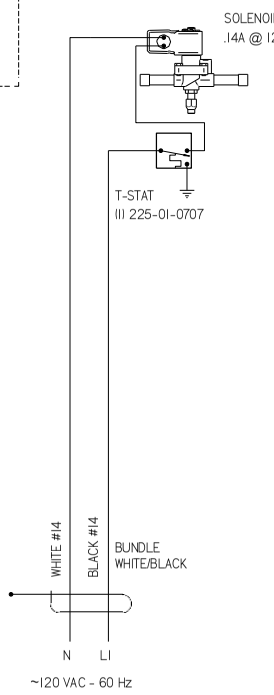
CIRCUIT # 2 (optional)

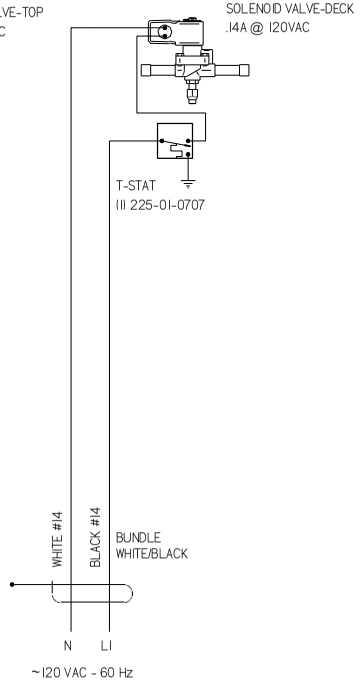
	LOADING	
	120	
L1	15.0	
	V	

NOTE FOR GFCI PROTECTION IF MORE THAN ONE SINGLE RECEPTACLE IS USED IN CONJUNCTION WITH A GFCI DUPLEX RECEPTACLE "DOWNSTREAM" ON THE LOAD SIDE, THE SUM OF ALL RECEPTACLES SHOULD NOT BE MORE THAN 15A









NOTES:
CASE MUST BE GROUNDED
WHEN PASSING WIRES THROUGH METAL HOLES A GROMMET MUST BE USED

MATERIAL - N/A	HUSSMANN
DATE DRAWN -12-19-18	
DRAWN BY -CRAIG BOOREY	ECN-CAP-0015589
REVIEWED BY -CRAIG BOOREY	REF -
APPROVED BY - CRAIG BOOREY	SHEET 1 OF 1
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.	DIAGRAM-Q3-MCFC-6-R
TOLERANCES ARE: DECIMALS .XX ±.03, .XXX ±.010 ANGLES ± 2° — THIRD ANGLE PROJECTION	3083524 A

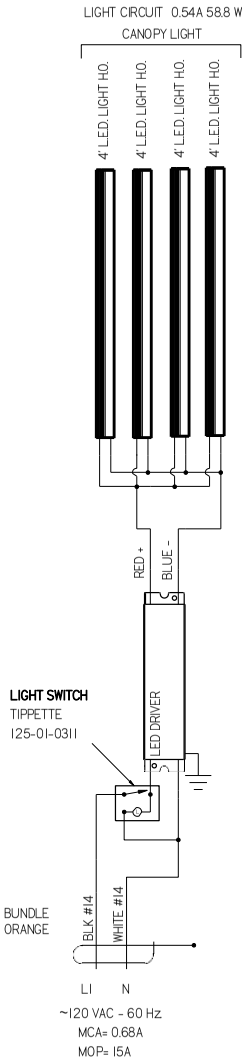
HUSSMANN_CDF_11 SHEET SIZE D

REVISION HISTORY						
REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	ECN-CAP-0014510	2018/09/17	RELEASED TO PRODUCTION	CB	CB	CB

CIRCUIT # 1

	LOADING	
	120 V	
L1	1.1	

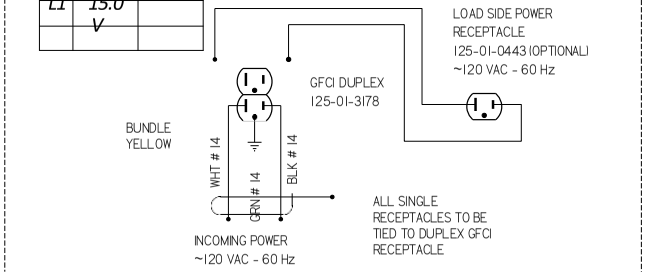
NOTE: CASE MUST BE GROUNDED

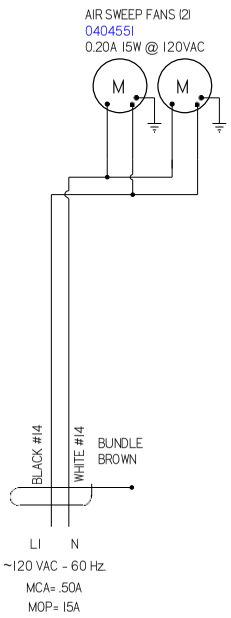


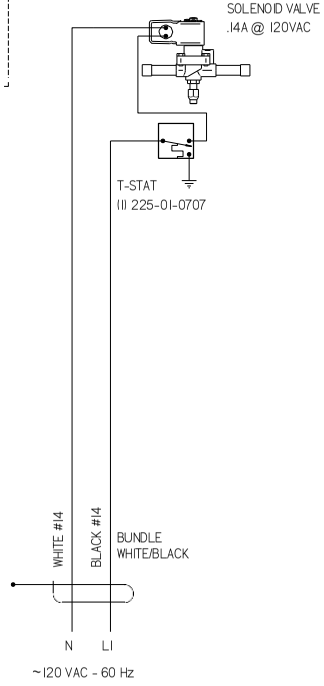
CIRCUIT # 2 (optional)

	LOADING	
	120	
L1	15.0	
	V	

NOTE: FOR GFCI PROTECTION: IF MORE THAN ONE SINGLE RECEPTACLE IS USED IN CONJUNCTION WITH A GFCI DUPLEX RECEPTACLE "DOWNSTREAM" ON THE LOAD SIDE, THE SUM OF ALL RECEPTACLES SHOULD NOT BE MORE THAN 15A







NOTES:
CASE MUST BE GROUNDED
WHEN PASSING WIRES THROUGH METAL HOLES A GROMMET MUST BE USED

MATERIAL - N/A	HUSSMANN
DATE DRAWN -9-17-18	
DRAWN BY -CRAIG BOOREY	ECN-CAP-0014510
REVIEWED BY -CRAIG BOOREY	REF -
APPROVED BY - CRAIG BOOREY	SHEET 1 OF 1
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.	
TOLERANCES ARE: DECIMALS .XX ±.03, .XXX ±.010 ANGLES ± 2°	THIRD ANGLE PROJECTION

DIAGRAM-Q3-FC-8-R

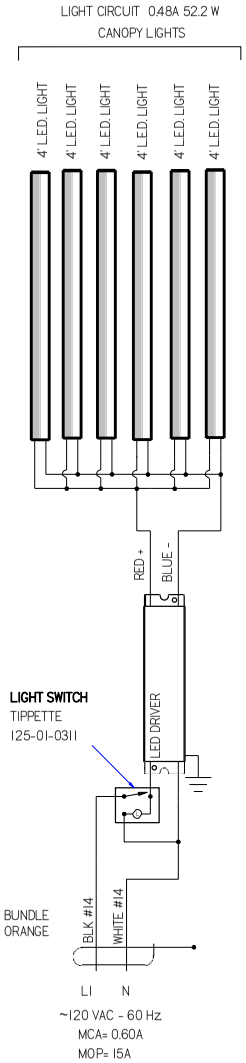
3074877 | A

HUSSMANN_CDF_11 SHEET SIZE: D

REVISION HISTORY						
REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	ECN-CAP-0015599	2019/02/13	RELEASED TO PRODUCTION	CB	CB	CB

CIRCUIT # 1

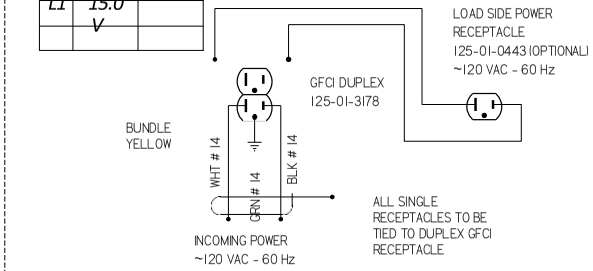
	LOADING	
	120 V	
L1	1.2	

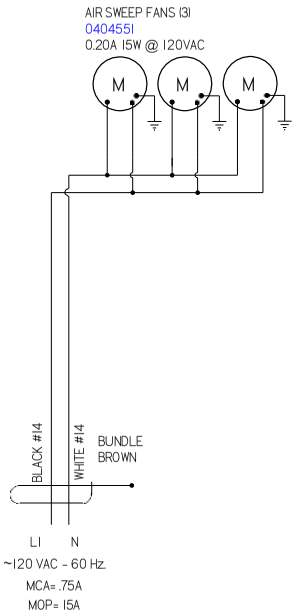


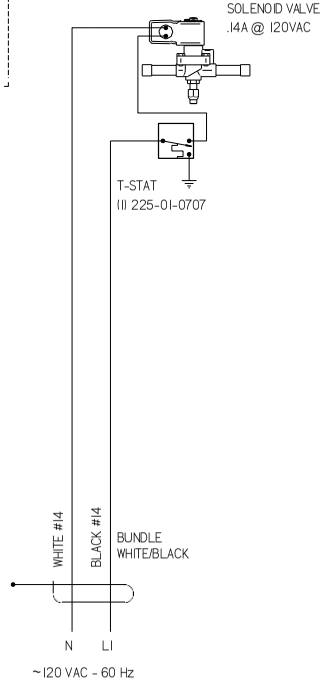
CIRCUIT # 2 (optional)

	LOADING	
	120	
L1	15.0	
	V	

NOTE FOR GFCI PROTECTION: IF MORE THAN ONE SINGLE RECEPTACLE IS USED IN CONJUNCTION WITH A GFCI DUPLEX RECEPTACLE "DOWNSTREAM" ON THE LOAD SIDE, THE SUM OF ALL RECEPTACLES SHOULD NOT BE MORE THAN 15A







NOTES:
CASE MUST BE GROUNDED
WHEN PASSING WIRES THROUGH METAL HOLES A GROMMET MUST BE USED

MATERIAL - N/A	HUSSMANN
DATE DRAWN -2-13-19	
DRAWN BY -CRAIG BOOREY	ECN-CAP-0015599
REVIEWED BY -CRAIG BOOREY	REF -
APPROVED BY - CRAIG BOOREY	SHEET 1 OF 1
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.	
TOLERANCES ARE: DECIMALS .XX ±.03, .XXX ±.010 ANGLES ± 2°	THIRD ANGLE PROJECTION

DIAGRAM-Q3-MC/FC-12R

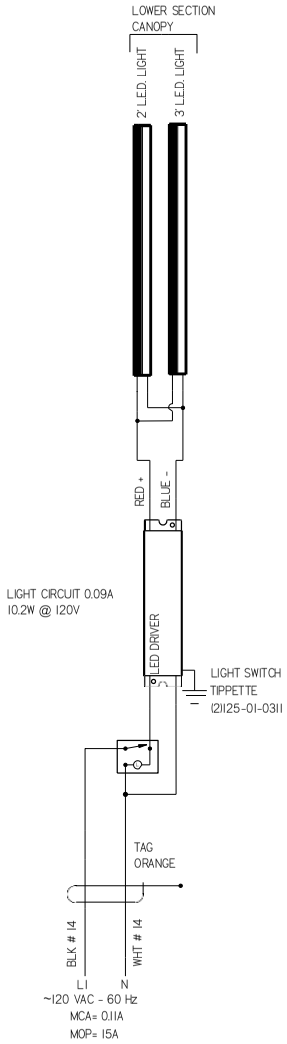
3087991 | A

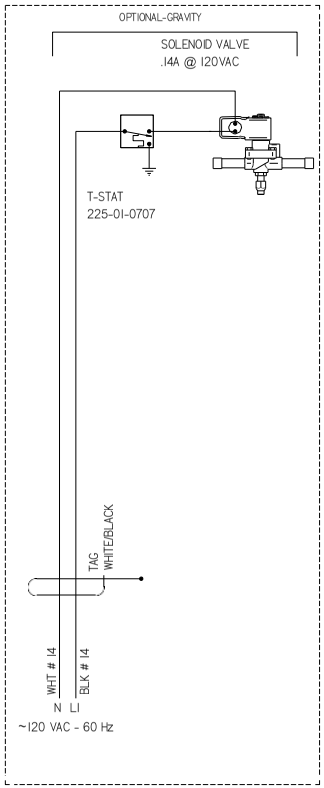
HUSSMANN_CDF_11 SHEET SIZE: D

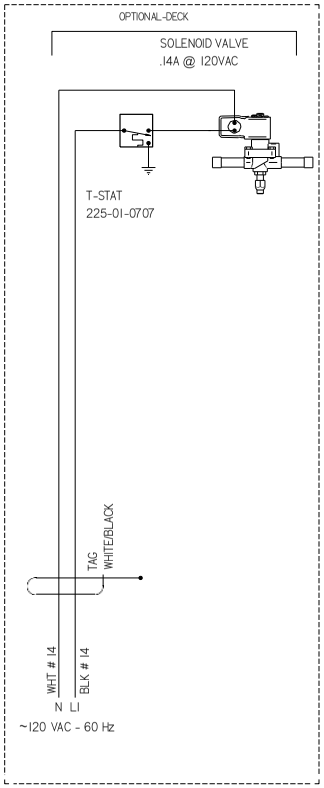
CIRCUIT #1
LOADING

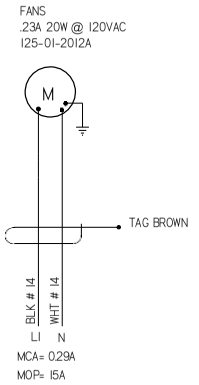
	120	
L	0.6	
	V	
1		

REVISION HISTORY						
REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	ECN-CAP-0013874	2018/07/30	RELEASED TO PRODUCTION	CB	CB	CB









NOTES:
CASE MUST BE GROUNDED
WHEN PASSING WIRES THROUGH METAL HOLES A GROMMET MUST BE USED

MATERIAL - N/A	
DATE DRAWN -7-30-18 DRAWN	
BY -CRAIG BOOREY REVIEWED	ECN-CAP-0013874
BY -CRAIG BOOREY	REF -
APPROVED BY - CRAIG BOOREY	SHEET 1 OF 1
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.	
TOLERANCES ARE: DECIMALS .XX u.03, .XXX u.010 ANGLES u 2v	THIRD ANGLE PROJECTION

HUSSMANN®

DIAGRAM-Q3-MS-22.50-R

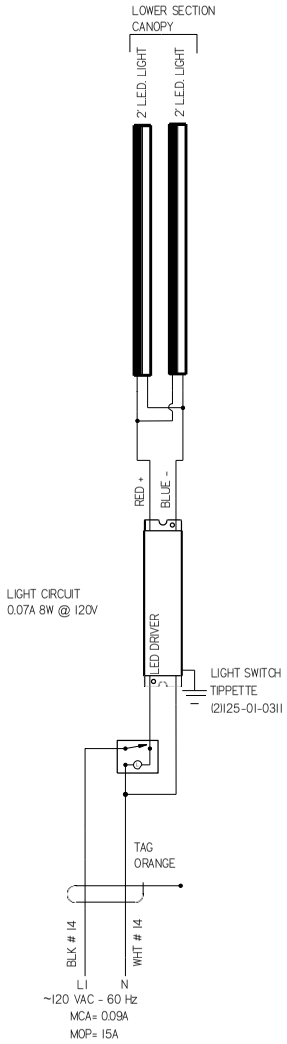
3070193 | A

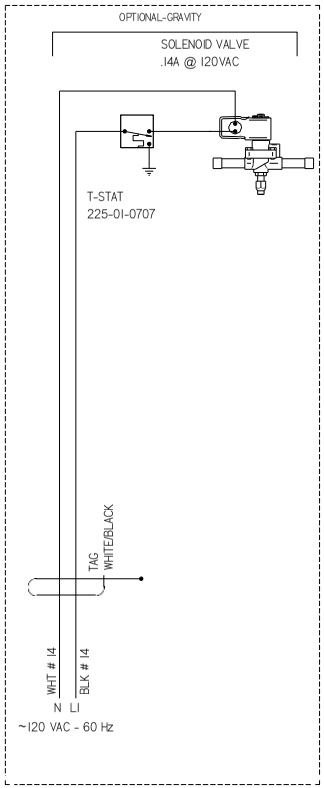
HUSSMANN_CDF_11 SHEET SIZE: D

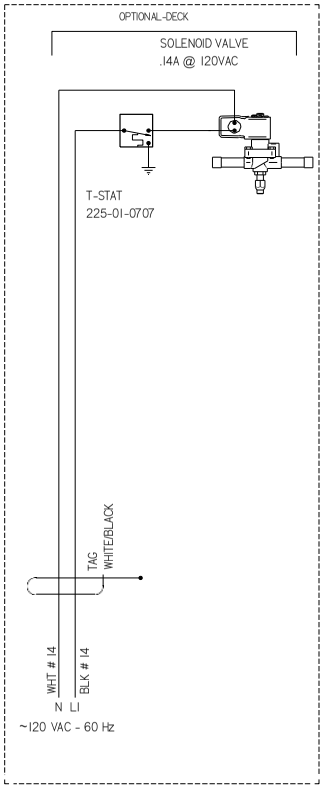
CIRCUIT #1
LOADING

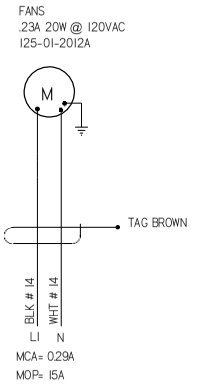
	120	
L	0.57	
	V	
1		

REVISION HISTORY						
REV	ECN	DATE	REVISION DESCRIPTION	REV BY	CHKD BY	APPR BY
A	ECN-CAP-0013874	2018/07/30	RELEASED TO PRODUCTION	CB	CB	CB









NOTES:
CASE MUST BE GROUNDED
WHEN PASSING WIRES THROUGH METAL HOLES A GROMMET MUST BE USED

MATERIAL - N/A		HUSSMANN®
DATE DRAWN -7-30-18 DRAWN		
BY -CRAIG BOOREY REVIEWED	ECN-CAP-0013874	DIAGRAM-Q3-MS-22.5I-R
BY -CRAIG BOOREY	REF -	
APPROVED BY - CRAIG BOOREY	SHEET 1 OF 1	3070194 | A
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.		
TOLERANCES ARE: DECIMALS .XX u.03, .XXX u.010 ANGLES u 2v	THIRD ANGLE PROJECTION	

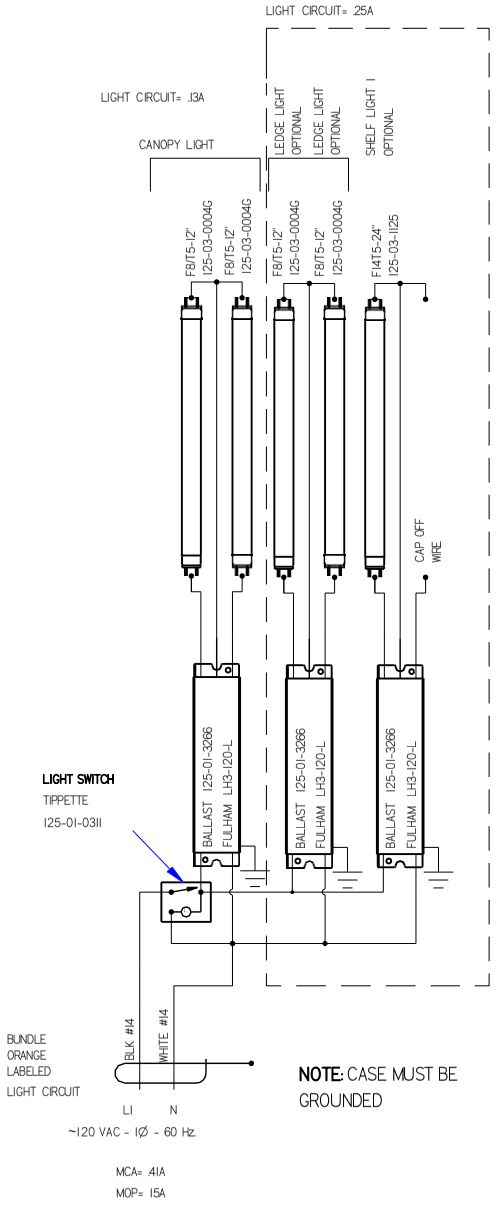
HUSSMANN_CDF_11 SHEET SIZE: D

NO OPTIONS

	LOADING	
	120 V	
L1	.31	
L2		
L3		

WITH OPTIONS

	LOADING	
	120 V	
L1	.56	
L2		
L3		

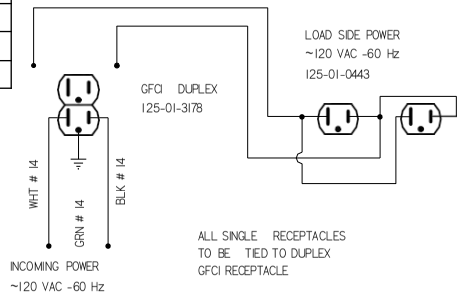


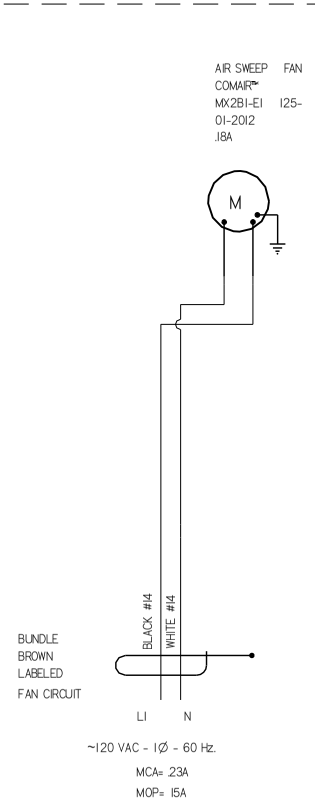
NOTE: CASE MUST BE GROUNDED

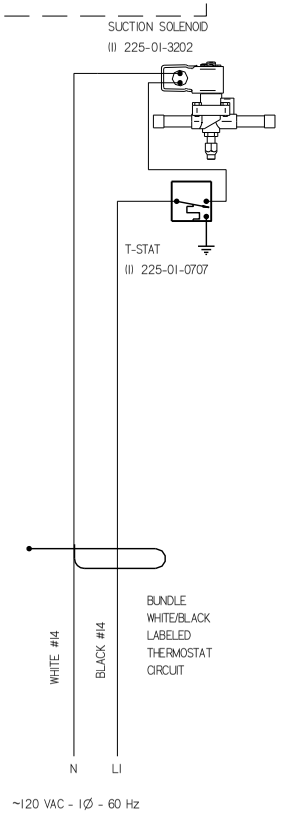
CIRCUIT # 2 (optional)

	LOADING	
	120 V	
L1	15.0	
L2		
L3		

NOTE FOR GFCI PROTECTION IF MORE THAN ONE SINGLE RECEPTACLE IS USED IN CONJUNCTION WITH A GFCI DUPLEX RECEPTACLE "DOWNSTREAM" ON THE LOAD SIDE, THE SUM OF ALL RECEPTACLES SHOULD NOT BE MORE THAN 15A







HUSSMANN
Hussmann Corporation, Intl.
13770 Ramona Avenue
Chino, CA 91710
(909)-590-4910 Lic.#: 644406

REVISIONS:			
#:	DESCRIPTION:	DATE:	BY:
A	Added GFCI circuit # 2	6/26/07	JR

DRAWN BY: JESSE RIOS
CHECKED BY: DATE: 4/27/07
PRODUCTION ORDER #: FILE
LOCATION:

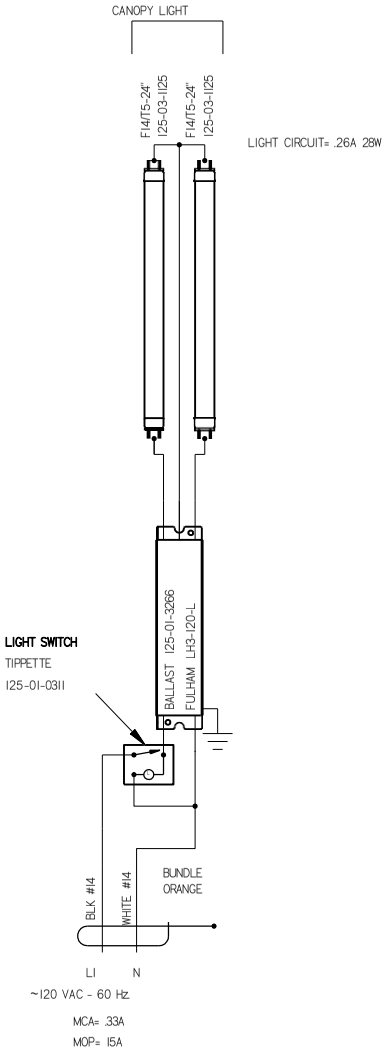
PROJECT TITLE: Q3 45°0 REMOTE

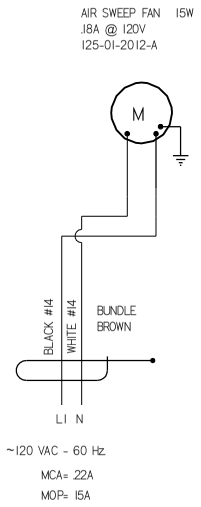
DRAWING #: WI760004

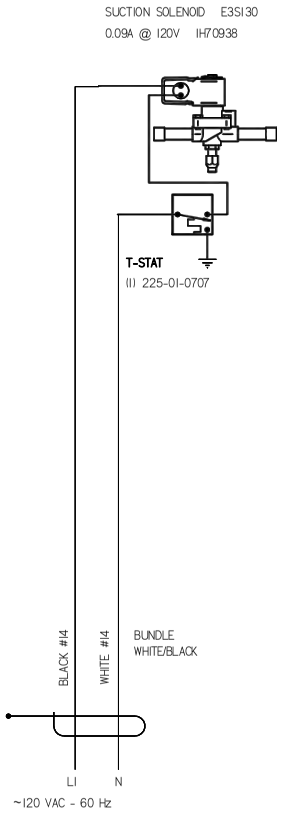
DRAWING TITLE: Q3-MC/Q3-MS-45°0-R

CIRCUIT # 1

	LOADING	
	120 V	
L1	0.5	







HUSSMANN

Hussmann Corporation, Int'l
13770 Ramona Avenue
Chino, CA 91710
(909)-590-4910 Lic.#: 644406

REVISIONS:			
#	DESCRIPTION:	DATE:	BY:
C	Added Heater wire for Fish Application	9/7/11	CB
D	Removed Heater Wire	12/2/11	CB
E	CN#649548 Changed Solenoid Valve	10/17/12	CB

DRAWN BY: CRAIG BOOREY
CHECKED BY: DATE: 8/11/11
PRODUCTION ORDER #: FILE
LOCATION:

PROJECT TITLE: Q3-MEAT/FISH

DRAWING #: IH63052

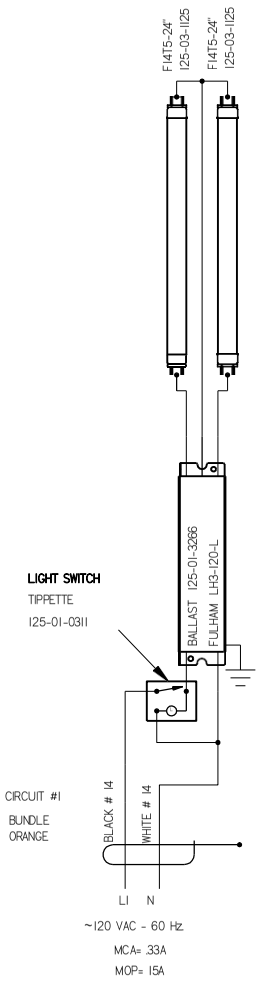
DRAWING TITLE: Q3-MC/FC-22.5°0, Q3-MS/FS-22.5°0

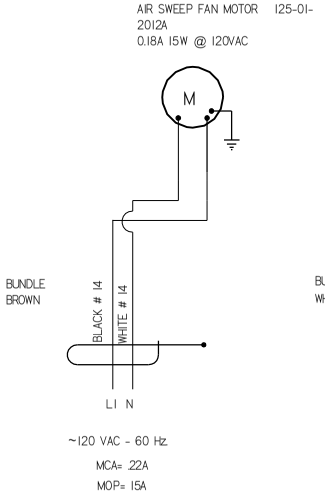
CIRCUIT #1

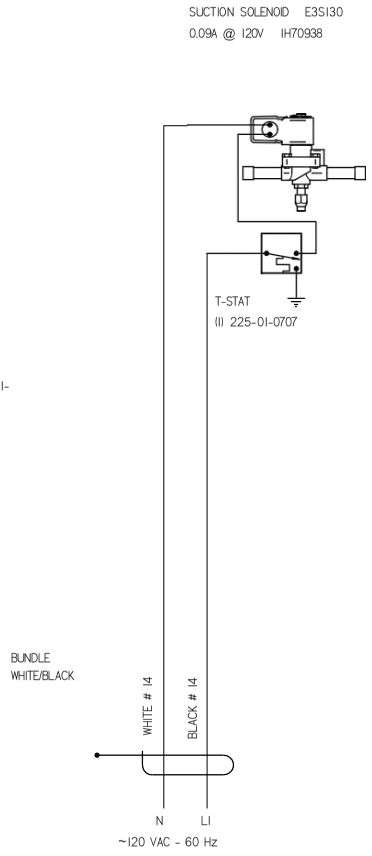
	LOADING	
	120 V	
L1	0.5	

NOTE: CASE MUST BE GROUNDED

LIGHT CIRCUIT= .26A 28W







HUSSMANN

Hussmann Corporation, Int'l
13770 Ramona Avenue
Chino, CA 91710
(909)-590-4910 Lic.#: 644406

REVISIONS:			
#:	DESCRIPTION:	DATE:	BY:
D	Removed Heater Wire	12/2/11	CB
E	CANCELLED REVISION	12/3/11	CB
F	CN#649548 Changed Solenoid Valve	10/17/12	CB

DRAWN BY: CRAIG BOOREY
CHECKED BY: DATE: 8/11/11
PRODUCTION ORDER #: FILE
LOCATION:

PROJECT TITLE: Q3-MEAT/FISH

DRAWING #: IH63051

DRAWING TITLE: Q3-MC/FC-22.5° I REM, Q3-MS/FS-22.5° I REM

Specification Sheet

Intertek Intertek

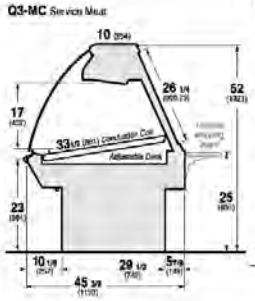
MEAT SERVICE CASE REVISION DATE: 4/27/2021

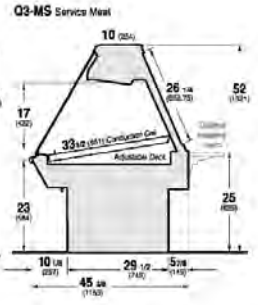
HUSSMANN - Q3-M (CHINO)

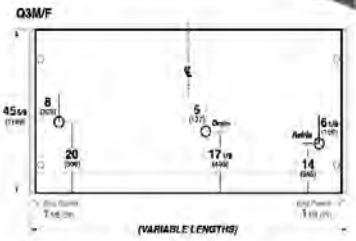
DOE 2017 Energy Efficiency Compliant

Hussmann refrigerated merchandisers configured for sale for use in the United States meet or surpass the requirements of the DOE 2017 energy efficiency standards.









Notes:
Contact your sales representative for information on possible availability of additional case lengths.



22.5° Inside Wedge



22.5° Outside Wedge

REFRIGERATION DATA:

CASE LENGTHS/ WEDGES	CASE USAGE	CAPACITY *** (BTU/HR/FT) (TOTAL FOR WEDGES)		TEMPERATURE (°F)			VELOCITY (FT/MIN)
		RATING CONDITION		EVAPORATOR		DISCHARGE AIR ** (°F)	
		NSF 7	AHRI 1200	NSF 7	AHRI 1200	NSF 7	NSF 7
4',5',6',8',10',12'	MEAT	360	360	20	20	25~29	50~75
22.5° IS	MEAT	860	860	20	20	25~29	50~75
22.5° OS	MEAT	860	860	20	20	25~29	50~75

CASE LENGTHS	EST. REFG. CHRG. 404A (LBS)	GLYCOL (20°F INLET, 6° RISE)	
		GPM	PSI
4'	0.5	0.5	1.0
5'	0.7	0.6	1.8
6'	0.8	0.7	2.8
8'	1.1	1.0	5.2
10'	1.4	1.2	8.2
12'	1.7	1.4	11.8
22.5° IS	0.3	0.3	0.8
22.5° OS	0.3	0.3	1.2

****FRONT DISCHARGE AIR MEASURED INSIDE AIR CURTAIN HONEYCOMB**
*****REFRIGERATION NOTES:**

1) BTU'S INCLUDE 1 ROW CANOPY LED LIGHTS.
2) ADD 10 BTU'S PER FOOT/PER SHELF ROW FOR OPTIONAL LED SHELF LIGHTS
3) AHRI 1200 RATING POINT FOR ENERGY CONSUMPTION COMPARISON ONLY
4) USE DEW POINT FOR HIGH GLIDE REFRIGERANTS. CARE SHOULD BE TAKEN TO USE THE DEW POINT IN P/T TABLES FOR MEASURING AND ADJUSTING SUPERHEAT. ADJUST EVAPORATOR PRESSURE AS NEEDED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SHOWN.
5) RATING CONDITION IS NSF TYPE I, 75°F/55% RH.

END PANEL WIDTH KEY		
# OF END PNLS	END PNL WIDTH (IN.)	TOTAL ADDED LENGTH (IN.)
1	1.125	1.125
2	1.125	2.25

REFRIGERATION DATA CONTINUED:

ELEC. THERMOSTAT / AIR SENSOR SETTINGS			DEFROST TYPE	TIME (MIN)	DEFROST FREQUENCY (#/DAY)	TERM. TEMP (°F) COIL ONLY	DRIP TIME	DEFROST WATER (LBS/DAY/FT)
USAGE	CUT IN (°F)	CUT OUT (°F)						
MEAT	29	25	OFF TIME	60	2	43	N/A	N/A

ELECTRICAL DATA:

STANDARD FANS, HEATERS, LED LIGHTS (115 VOLT)

CASE LENGTH	AIRSWEEP FANS			CANOPY LIGHTS LED		OPTIONAL LED SHELF LIGHTS		MAX. LED LOAD (W/ ALL OPTIONS)		ANTI-SWEAT HEATERS (ON FAN CIRCUIT)		CONVENIENCE OUTLETS (OPTIONAL)		
	# OF FANS	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS	# OUTLETS	VOLTS	AMPS
4'	1	0.1	8.6	0.2	21	N/A	N/A	0.2	21	N/A	N/A	1	115	15
5'	1	0.1	8.6	0.2	26	N/A	N/A	0.2	26	N/A	N/A	1	115	15
6'	2	0.2	17.6	0.3	30	N/A	N/A	0.3	30	N/A	N/A	1	115	15
8'	2	0.2	17.6	0.4	41	N/A	N/A	0.4	41	N/A	N/A	1	115	15
10'	2	0.2	17.6	0.5	52	N/A	N/A	0.5	52	N/A	N/A	1	115	15
12'	3	0.2	26.4	0.5	62	N/A	N/A	0.5	62	N/A	N/A	2	115	30
22.5° IS	1	0.1	8.8	0.1	10	N/A	N/A	0.1	10	N/A	N/A	1	115	15
22.5° OS	1	0.1	8.8	0.1	10	N/A	N/A	0.1	10	N/A	N/A	1	115	15

OPTIONAL HIGH OUTPUT LED LIGHTS (115 VOLT)

CASE LENGTH	CANOPY LIGHTS H.O. LED		OPTIONAL SHELF		MAX. H.O. LED LOAD	
	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS
4'	0.3	30	N/A	N/A	0.3	30
5'	N/A	N/A	N/A	N/A	N/A	N/A
6'	N/A	N/A	N/A	N/A	N/A	N/A
8'	0.5	61	N/A	N/A	0.5	61
10'	N/A	N/A	N/A	N/A	N/A	N/A
12'	0.8	91	N/A	N/A	0.8	91
22.5° IS	N/A	N/A	N/A	N/A	N/A	N/A
22.5° OS	N/A	N/A	N/A	N/A	N/A	N/A

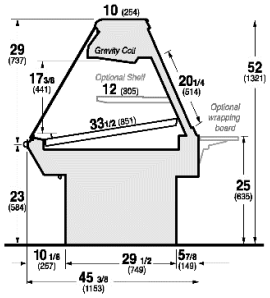
Specification Sheet (Cont'd)

MEAT / FISH SERVICE CASE REVISION DATE 02/22/17

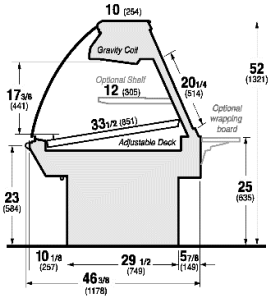
HUSSMANN - Q3-MC/FC-EP, Q3-MS/FS-EP (CHINO)

DOE 2017 Energy Efficiency Compliant — Hussmann refrigerated merchandisers configured for sale for use in the United States meet or surpass the requirements of the DOE 2017 energy efficiency standards.

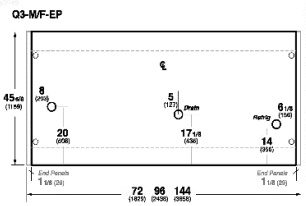
Q3-M/FS-EP Service Meat or Fish

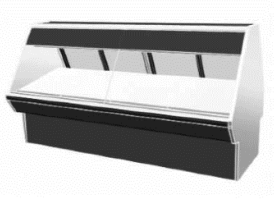


Q3-M/FC-EP Service Meat or Fish Case

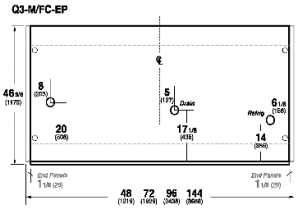


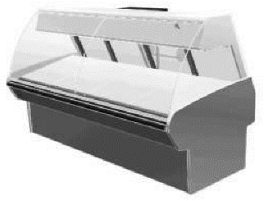
Q3-M/F-EP





Q3-M/FC-EP





REFRIGERATION DATA:

CASE LENGTHS	CASE USAGE	CAPACITY *** (BTU/HR/FT)		TEMPERATURE (°F)			VELOCITY (FT/MIN)
		RATING CONDITION		EVAPORATOR		DISCHARGE AIR ** (°F)	
		NSF 7	AHRI 1200	NSF 7	AHRI 1200	NSF 7	NSF 7
4',6',8',12'	MEAT / FISH (NO SHELF)	250	250	28	28	33	50~75
4',6',8',12'	MEAT / FISH (WITH SHELF)	340	340	20	20	28	50~75

CASE LENGTHS	EST. REFG. CHRG. (LBS)	20°F GLYCOL 6° RISE			
		GRAVITY		DECK	
		GPM	PSI	GPM	PSI
4'	0.7	0.3	0.3	0.1	0.0
6'	1.0	0.4	0.9	0.1	0.2
8'	1.3	0.5	1.9	0.2	0.4
12'	1.9	0.7	4.3	0.2	1.2

****FRONT DISCHARGE AIR MEASURED INSIDE AIR CURTAIN HONEYCOMB**

*****REFRIGERATION NOTES:**

1) BTU'S INCLUDE LIGHTS
2) AHRI 1200 RATING POINT FOR ENERGY CONSUMPTION COMPARISON ONLY
3) USE DEW POINT FOR HIGH GLIDE REFRIGERANTS. CARE SHOULD BE TAKEN TO USE THE DEW POINT IN P/T TABLES FOR MEASURING AND ADJUSTING SUPERHEAT. ADJUST EVAPORATOR PRESSURE AS NEEDED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SHOWN.
4) RATING CONDITION IS NSF TYPE I, 75°F/55% RH
5) ADJUSTMENTS TO CONTROL SETTING SHOULD BE MADE IN 1°F INCREMENTS DEPENDING UPON MEAT DEPT AMBIENT CONDITIONS
6) FOR SHELF APPLICATIONS IT MAY BE NECESSARY TO INCREASE DEFROST TIME APPROXIMATELY 1 MIN PER 1°F BELOW 75°F AMBIENT

REFRIGERATION DATA CONTINUED:

CASE USAGE	ELEC. THERMOSTAT / AIR SENSOR SETTINGS			DEFROST TYPE	TIME (MIN)	DEFROST FREQUENCY (#/DAY)	TERM. TEMP (°F) COIL ONLY	DRIP TIME	DEFROST WATER (LBS/DAY/FT)
	LOCATION	CUT IN (°F)	CUT OUT (°F)						
MEAT / FISH (NO SHELF)	GRAVITY	34	33	OFF TIME	50	1	50	N/A	0.8
	DECK	32	31						
MEAT / FISH (WITH SHELF)	GRAVITY	22	20		65	3	42	N/A	1.2
	DECK	32	31						

END PANEL WIDTH KEY		
# OF END PNLS	END PNL WIDTH (IN.)	TOTAL ADDED LENGTH (IN.)
1	1.125	1.125
2	1.125	2.25

ELECTRICAL DATA:

STANDARD FANS, HEATERS, LED LIGHTS (115 VOLT)

CASE LENGTH	AIRSWEEP FANS			CANOPY LIGHTS LED		OPTIONAL LED SHELF LIGHTS		MAX. LED LOAD (W/ ALL OPTIONS)		ANTI-SWEAT HEATERS (ON FAN CIRCUIT)		CONVENIENCE OUTLETS (OPTIONAL)		
	# OF AIRSWEEP FANS	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS	# OUTLETS	VOLTS	AMPS
4'	1	0.04	4.7	0.18	21	0.09	10	0.27	31	N/A	N/A	1	115	15
6'	1	0.04	4.7	0.26	30	0.13	15	0.40	46	N/A	N/A	1	115	15
8'	1	0.04	4.7	0.36	41	0.18	21	0.54	62	N/A	N/A	1	115	15
12'	1	0.04	4.7	0.54	62	0.27	31	0.81	93	N/A	N/A	1	115	15

OPTIONAL HIGH OUTPUT LED LIGHTS (115 VOLT)

CASE LENGTH	CANOPY LIGHTS H.O. LED		OPTIONAL SHELF H.O. LED		MAX. H.O. LED LOAD	
	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS
4'	0.26	30	0.13	15	0.40	46
6'	N/A	N/A	N/A	N/A	N/A	N/A
8'	0.53	61	0.26	30	0.79	91
12'	0.79	91	0.40	46	1.19	137

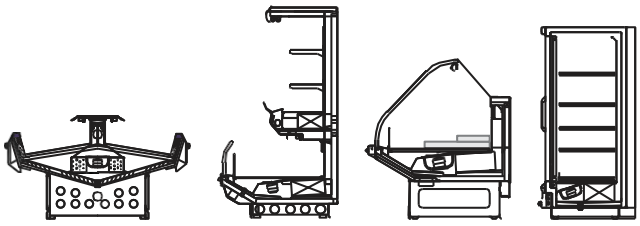
Appendices

Appendix A. - Temperature Guidelines - Refrigerated

The refrigerators should be operated according to the manufacturer's published engineering specifications for entering air temperatures for specific equipment applications. Table 1 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 1

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



I. Open Display Styles *II. Closed Display Styles*

Appendix B. - Application Recommendations - Refrigerated

1. 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.
2. The installer is responsible for following the installation instructions and recommendations provided by Hussmann for the installation of each individual type refrigerator.
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 Hussmann's recommendations.
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.
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 Hussmann.
   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 - Refrigerated

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 (see 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 hazardo**

Appendices (Cont'd)

1. The following recommendations are made for the purpose of 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?
      9. Are display signs blocking or diverting airflow?
      10. 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 Hussmann?
      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 - Refrigerated

1.0 Hussmann Corporation provides 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.

Appendices (Cont'd)

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.

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

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 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.



This warning does not mean that Hussmann products will cause cancer or reproductive harm, or is in violation of any product-safety standards or requirements. As clarified by the California State government, Proposition 65 can be considered more of a ‘right to know’ law than a pure product safety law. When used as designed, Hussmann believes that our products are not harmful. We provide the Proposition 65 warning to stay in compliance with California State law. It is your responsibility to provide accurate Proposition 65 warning labels to your customers when necessary. For more information on Proposition 65, please visit the California State government website.

Service Record

Last service date:	By:

HUSSMANN®/Chino
Additional copies of this publication may be obtained by contacting:
Hussmann® Chino
13770 Ramona Avenue • Chino, California 91710
(909) 628-8942 FAX
(909) 590-4910
(800) 395-9229

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: