HUSSMANN®



TYA4-R

Medium Temperature Island Merchandisers



Installation & Operation Manual

IMPORTANT Keep in store for future reference!

P/N 3122483_C April 2021

Spanish 3123210

MANUAL- I/O TYA4-R

Table of Contents

Regulations	4
Unloading	5
Cut and Plan Views	8
Installation	9
Plumbing	11
Refrigeration Piping	12
Sump Pump Configuration	13
Maintenance	15
Specifications	18
Wiring Diagrams	19
User Information	21
Troubleshooting	22
Appendix	24



IMPORTANT KEEP IN STORE FOR FUTURE REFERENCE Quality that sets industry standards!

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INSTALLATION

UL LISTING

These merchandisers are manufactured to meet ANSI/ UL 471 standard requirements for safe-ty. Proper installation is required to maintain the listing.

FEDERAL / STATE REGULATION

These merchandisers at the time they are manufactured, meet all federal and state/ provincial regulations. Proper installation is required to ensure these standards are maintained. Near the serial plate, each merchandiser carries a label identifying the environment for which the merchandiser was designed for use.

ANSI/NSF-7 Type I – Display Refrigerator / Freezer Intended for 75°F (24°C) / 55%RH Ambient Application

ANSI/NSF-7 Type II – Display Refrigerator / Freezer Intended for 80°F / 55%RH Ambient Application

ANSI/NSF-7 – Display Refrigerator Intended for Bulk Produce

HUSSMANN PRODUCT CONTROL

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

> Recommended operating ambient temperature is between 65°F (18°C) to 75°F (23.9°C). Maximum relative humidity is 55%.

SHIPPING DAMAGE

All equipment should be thoroughly examined for shipping damage before and during unloading. This equipment has been carefully inspected at our factory. Any claim for loss or damage must be made to the carrier. The carrier will provide any necessary inspection reports and/or claim forms.

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.

Concealed Loss or Damage

When loss or damage is not apparent until after equipment is uncrated, retain all packing materials and submit a written response to the carrier for inspection within 15 days.

LOCATION

These merchandisers are designed for displaying products in air conditioned stores where temperature is maintained at or below the ANSI / NSF-7 specified level and relative humidity is maintained at or below 55%.

Placing refrigerated merchandisers in direct sunlight, near hot tables or near other heat sources could impair their efficiency. Like other merchandisers, these merchandisers are sensitive to air disturbances. Air currents passing around merchandisers will seriously impair their operation. Do NOT allow air conditioning, electric fans, open doors or windows, etc. to create air currents around the merchandiser.

UNLOADING

Unloading from Trailer:

Lever Bar (also known as a Mule, Johnson Bar, J-bar, Lever Dolly, or Pry Lever)

Move the merchandiser as close as possible to its permanent location and remove all packaging. Check for damage before discarding packaging. Remove all separately packed accessories such as kits and shelves.

Improper handling may cause damage to the merchandiser when unloading. To avoid damage:

- 1. Do not drag the merchandiser out of the trailer. Use a Johnson bar (mule).
- 2. Use a forklift or dolly to remove the merchandiser from the trailer.

Do not walk or put heavy objects on case. Do not place objects atop the unit.

A WARNING

Do NOT stand or walk on top of merchandiser. Do not store items or flammable materials atop the unit.



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

EXTERIOR LOADING

Do NOT walk on top of merchandisers or damage to the merchandisers and serious personal injury could occur.

MERCHANDISERS ARE NOT STRUCTURALLY DESIGNED TO SUPPORT EXTERNAL LOADING such as the weight of a person. Do not place heavy objects on the merchandiser.

SHIPPING SKID

Each merchandiser is shipped on a skid to protect the merchandiser's base, and to make positioning the case easier.

Remove the top of the crate and detach walls from each other. Lift crate from the skid. Unscrew the case from the skid. The fixture can now be lifted off the crate skid. *Lift only at base of skid!* Remove any braces and/or skids attached (blanket wrapped merchandiser may have skids).

DO NOT LAY MERCHANDISER OVER ON THE FLOOR TO REMOVE SKID.

Once the skid is removed, the merchandiser must be lifted —NOT PUSHED— to reposition. To remove the skid, remove screws attaching skid to the merchandiser.

Check floor where cases are to be set to see if it is a level area. Determine the highest part of the floor.

A WARNING

Do NOT remove shipping crate until the merchandiser is positioned for installation.



- 1. Do Not Push, Pull, Adjust, or Manipulate the TY case by any glass component.
 - Doing so will result in severe damage to such components
 - Glass breakage may result in serious injury
- 2. Never stand on the TY Top, Deck, or any Shelves for any reason.
 - Misusing these surfaces as steps will result in damage to the case
 - Misusing these surfaces as steps may result in serious injury to the user
 - These surfaces are intended for the storage and merchandising of food products only
 - Use a ladder or designed structure to work above the case (Do not lean on case)
- 3. DO NOT remove shelves. WARNING! This will adversely impact case performance when merchandising.



Warning

Minimum Clearances for TY cases are to be followed as instructed for proper placement inside store locations.

- A minimum clearance of 15' from door opening must be maintained in order for case to remain in optimal performance.
- Side clearances are to be a minimum of 8' when placed next to a solid wall.
- Height clearance measured from floor follows as a minimum of 10' vertically.
- Minimum of 36" clearance if near an open aisle is required for optimal Air Curtain cycling. (Assumed 8' clearance from solid wall)



The following figure demonstrates proper clearances for Entyce cases assuming the surrounding walls are solid to ensure optimal performance of the cases Air Curtain.



Cut and Plan Views

Description: Entyce A multi deck air curtain Self-Service case designed to display pre-packaged Deli, Bakery, Meat, Seafood, and/or Beverage products.





Installation

TY Lifting and Transport Instructions

1. The Entyce can be lifted by a forklift at typical lifting points.





- 2. Ensure lower body panels are removed before lifting with a forklift. Serious damage will occur if the body panels are not removed.
- 3. Make sure that fork spacing and width will not damage drain or come in contact with piping, or electrical lines.
- Be sure that the forks are long enough to support beyond the center of the case but not damage near components. Check for proper balance before moving. A minimum fork length of 36" is recommended for 68" wide cases.

- 5. The TY merchandiser can be raised at one end underneath the deck with a forklift to allow the placement of rollers or dollies.
- Evenly support the entire base structure on rollers or dollies before attempting to move. Each Base Leg must have its own dollie to properly support the case.

Lifting Points are typical and dependent upon size of case and refrigeration application, drainage configurations will call for altercations in Lifting Zones.

Below are the following drainage configurations and lifting should be altered to the expected model.

Full Side Drain

Improper placement of forks may damage drainage piping. Use a spotter when placing forks. Make sure that piping will not be damaged. Use J-Bars or Jacks if forks cannot be used safely.



Installation

Location

The refrigerated merchandisers have been designed for use only in air conditioned stores where temperature and humidity are maintained at or 75°F and 55% relative humidity or below 80°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.



Uncrating the Stand

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

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.



Leveling

A LEVEL CASE IS NECESSARY TO INSURE PROPER OPERATION AND WATER DRAINAGE. Note: A. To avoid removing concrete flooring, begin lineup leveling from the highest point of the store floor.

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.



Plumbing

Waste Outlet and P-TRAP

The waste outlet is located in front and center of the case on both sides which allows for suitable access to each drain allowing drip piping to be run lengthwise under the fixture. A 1-1/2" P-TRAP and threaded adapter are supplied with each fixture. The P-TRAP must be installed to prevent air leakage and insect entrance into the fixture.

NOTE: PVC-DWV solvent cement is recommended. Follow Hussmann's instructions.

Installing Condensate Drain

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

- 1. Never use pipe for condensate drains smaller than the nominal diameter of the pipe or P-TRAP supplied with the case.
- 2. When connecting condensate drains, the P-TRAP must be used as part of the condensate drain to prevent air leakage or insect entrance. Store plumbing system floor drains should be at least 14" off the center of the case to allow use of the P-TRAP pipe section. Never use two water seals in series in any one line. Double P-TRAPS in series will cause a lock and prevent draining.

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



Drain Locations

Refrigeration Piping

The standard refrigerant will be R-448 unless otherwise specified on the customer order. Check the serial plate on the case for information. Refrigeration outlet access and the refrigeration components for the Entyce are situated on the left hand side near the centerline of the case to deliver optimal access which provides for easy installation and maintenance purposes without the probability of damaging any components. Refrigerant lines should be sized as shown on the refrigeration legend furnished by the store. Install P-TRAPS (oil traps) at the base of all suction line vertical risers. Pressure drop can rob the system of capacity. To keep the pressure drop to a minimum, keep refrigerant line run as short as possible, using the minimum number of elbows. Where elbows are required, use long radius elbows only. All refrigeration components are located underneath the left hand side case deck pans.

Refrigeration Lines

Liquid	<u>Suction</u>		
1⁄2" O.D.	⁷ /8" O.D.		

Sump Pump Configuration

Connecting Sump Lines

For Entyce cases with a Sump Pump Configuration connect liquid line, suction line, electrical, and drain line to top case stub-ups (outlets).

Note: Isolate Drain line from Suction line either by separating the lines or insulating the suction line.



Sealing Sump Lines

For Entyce cases with a Sump Pump Configuration connect liquid line, suction line, electrical, and drain line to top case stub-ups (outlets).

Note: Example below demonstrates the proper method of sealing refrigeration and electrical access points. Ensure tight seal to eliminate any air penetration.

Sealed refrigeration lines inside of pipe. This is an EXAMPLE of how to properly seal electrical lines (using silicone) once electrical lines are pulled using provided wire-chase. Installers: After running electrical you MUST seal top (shown here) and bottom of this pipe to eliminate any air penetration!

Failure to do so will cause condensation inside of pipe and water will drip on floor! Silicone is an acceptable material to seal pipe.

CARE AND CLEANING

Long life and satisfactory performance of any equipment is dependent upon the care it receives. To ensure long life, proper sanitation and minimum maintenance costs, these merchandisers should be thoroughly cleaned, all debris removed and the interiors washed down, weekly.

Exterior Surfaces

The exterior surfaces must be cleaned with a mild detergent and warm water to protect and maintain their attractive finish. **Never use ABRASIVE CLEANSERS OR SCOURING PADS.**

Interior Surfaces

The interior surfaces may be cleaned with most domestic detergents, ammonia based cleaners and sanitizing solutions with no harm to the surface. Self contained models empty into a limited capacity evaporation pan, which will overflow if excess water is used in cleaning.

Do NOT Use:

- Abrasive cleansers and scouring pads, as these will mar the finish.
- Coarse paper towels on coated glass.
- Ammonia-based cleaners on acrylic parts.
- Solvent, oil or acidic based cleaners on any interior surfaces.
- Do not use high pressure water hoses.

A WARNING

Product will be degraded and may spoil if allowed to sit in a non-refrigerated area.

Do:

- Remove the product and all loose debris to avoid clogging the waste outlet.
- Store product in a refrigerated area such as a cooler. Remove only as much product as can be taken to the cooler in a timely manner.
- Disconnect electrical power before cleaning.
- Thoroughly clean all surfaces with soap and hot water. **Do NOT USE STEAM OR HIGH WATER PRESSURE HOSES TO WASH THE INTERIOR.** THESE WILL DESTROY THE MERCHANDISERS' SEALING CAUSING LEAKS AND POOR PERFORMANCE.
- Take care to minimize direct contact between fan motors and cleaning or rinse water.
- Do NOT flood merchandiser with water. Never introduce water faster than the waste outlet can remove it.

SELF CONTAINED MODELS EMPTY INTO AN EVAPORATION PAN THAT WILL OVERFLOW IF TOO MUCH WATER IS INTRODUCED DURING CLEANING.

- Allow merchandisers to dry before resuming operation.
- After cleaning is completed, turn on power to the merchandiser.

A WARNING

Do NOT allow cleaning agent or cloth to contact food product.

A WARNING

Do NOT use HOT water on Cold glass Surfaces. This can cause the glass to shatter and could result in personal injury. Allow glass fronts, to warm before applying hot water.

REMOVING SCRATCHES FROM BUMPER

Most scratches and dings can be removed using the following procedure.

- 1. Use steel wool to smooth out the surface area of the bumper.
- 2. Clean area.
- 3. Apply vinyl or car wax and polish surface for a smooth glossy finish.

CLEANING UNDER FAN PLENUM

After cleaning be sure the plenum is properly lowered into position OR PRODUCT LOSS WILL RESULT due to improper refrigeration.

A WARNING

SHUT FANS OFF DURING CLEANING PROCESS.

CLEANING DISCHARGE AIR LOUVERS

Discharge air louvers should be cleaned every six months. Dirty louvers will cause merchandisers to perform poorly. The louvers may be cleaned with a vacuum cleaner.

Soap and water may be used if all water is removed from the louvers cells before replacing. Be careful not to damage the louvers.

A WARNING

— LOCK OUT / TAG OUT —

To avoid serious injury or death from electrical shock, always disconnect the electrical power at the main disconnect when servicing or replacing any electrical component. This includes, but is not limited to, such items as doors, lights, fans, heaters, and thermostats. 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.

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 adjustments as necessary. To maintain product integrity, move all product to a cooler until the unit has returned to normal operating temperatures.

Evaporation Pan is Hot!

and poses risk of bodily injury – Always Wear gloves and protective eye wear when servicing. Turn off evaporation pan heater, and allow pan to cool.

CLEANING EVAPORATION PAN (SELF CONTAINED ONLY)

The condensate water outlet for self contained models empties into a limited capacity evaporation pan.

Debris or dirt accumulation inside the condensate evaporation pan or on the heater coil will reduce the pan's evaporation capacity and cause premature heater failure. The evaporation pan waste water will overflow and spill onto the floor if the heater is not properly operating.

Remove accumulated debris from the evaporation pan. Wipe down heater coil with a cloth and warm water. Be sure to remove any dirt, debris or liquids from the heater coil.

Water introduced during cleaning will cause the evaporation pan to overflow.

SELF-SERVICE DELI - TYPE I

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

REFRIGERATION DATA:

		CAPAC (BTU/I	NTY *** HR/FT)		VELOCITY		
CASE LENGTHS	CASE USAGE	RATING C	ONDITION	EVAPO	RATOR	DISCHARGE AIR ** (°F)	(FT/MIN)
		NSF 7	AHRI 1200	NSF 7	AHRI 1200	NSF 7	NSF 7
61,81,101,121	DELI	1910	1910	26	26	30~32	100~150
4E,6E,8E,10E	DELI	1850	1850	26	26	30~32	100~150

CASE LENGTHS	EST. REFG. CHRG.	20°F G 6° F	LYCOL
	(LBS)	GPM	PSI
61	2.5	4.1	5.6
81	2.5	5.4	7.8
101	3.0	6.7	5.4
121	3.4	7.9	7.2
4E	2.0	2.5	2.8
6E	2.5	2.5	3.3
8E	3.0	3.7	2.9
10E	3.4	4.7	4.4

**FRONT DISCHARGE AIR MEASURED INSIDE AIR CURTAIN HONEYCOMB

***REFRIGERATION NOTES:

TES: 1) BTU'S SHOWN ARE WITHOUT LIGHTS 2) ADD 10 BTU'S PER FOOT OF LED LIGHTS PER LIGHT MATRIX BELOW 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 NOT ADJUSTING SUPERHEAT.

5) RATING CONDITION IS NSF TYPE I, 75°F/55% RH

REFRIGERATION DATA CONTINUED:

		ENCOR	1			TEDM				EN	ID PANEL W	IDTH KEY
SETT	INGS	ENSON	DEFROST TI	ТІМЕ	DEFROST		DRIP	DEFROST WATER	# OF E		END PNL WIDTH	TOTAL ADDED
1104.05	CUT IN	CUT	TYPE	(MIN)	(#/DAY)	COIL	TIME	DAY/FT)		PNLS	(IN.)	LENGTH (IN.)
USAGE	(°F)	001				ONLY		. ,		1	1.125	1.125
	(.,	(°F)				0				2	1.125	2.25
DELI	32	29	OFF TIME	16	12	54	N/A	12				

ELECTRICAL DATA:

STANDARD FANS, HEATERS, LED LIGHTS (115 VOLT)

	EVAPORATOR FANS					CANOPY LIGHTS LED		OPTIONAL LED SHELF LIGHTS		MAX. LED LOAD (W/ ALL OPTIONS)		ANTI-SWEAT HEATERS		CONVENIENCE OUTLETS (OPTIONAL)			LIGHT MATRIX
CASE LENGTH	# OF EVAP FANS	BLADE DIA. (IN.)	BLADE PITCH (°)	AMPS	WATTS	AMPS	AMPS WATTS		WATTS	AMPS	WATTS	AMPS	WATTS	# OUTLETS	VOLTS	AMPS	FT OF LED
61	6	8	15	1.8	48	0.1	14	0.4	52	0.6	66	0.4	50	1	115	15	26
81	6	8	20	1.8	48	0.2	25	0.7	84	0.9	109	0.6	70	1	115	15	42
101	8	8	15	2.4	64	0.3	35	1.0	113	1.3	148	0.8	90	1	115	15	58
121	10	8	15	3.0	80	0.4	46	1.3	146	1.7	191	1.0	110	1	115	15	74
4E	4	8	20	1.2	32	0.1	12	0.4	41	0.5	53	0.3	40	1	115	15	22
6E	6	8	15, 20	1.8	48	0.2	23	0.6	73	0.8	96	0.5	60	1	115	15	38
8E	8	8	20	2.4	48	0.3	33	0.9	102	1.2	135	0.7	80	1	115	15	54
10E	10	8	15, 20	3.0	64	0.4	43	1.2	135	1.5	178	0.9	100	1	115	15	70

OPTIONAL HIGH OUTPUT LED LIGHTS (115 VOLT)

CASE LENGTHS	CANOPY LIGHTS H.O. LED		OPTIONA	AL SHELF	MAX. H.O. LED LOAD			
	AMPS	WATTS	AMPS	WATTS	AMPS	WATTS		
61	N/A	N/A	N/A	N/A	N/A	N/A		
81	N/A	N/A	N/A	N/A	N/A	N/A		
101	N/A	N/A	N/A	N/A	N/A	N/A		
121	N/A	N/A	N/A	N/A	N/A	N/A		
4E	N/A	N/A	N/A	N/A	N/A	N/A		
6E	N/A	N/A	N/A	N/A	N/A	N/A		
8E	N/A	N/A	N/A	N/A	N/A	N/A		
10E	N/A	N/A	N/A	N/A	N/A	N/A		

Wiring Diagrams

Wiring Diagrams

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 one (1) hour before stocking with any product.
- 5. When stocking, never allow the product to extend beyond the recommended load limit. Air discharge and return air flue must be unobstructed at all times to provide proper refrigeration.
- 6. 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.

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 entire 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 Hussmann'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.

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 generated 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 marked 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.

Troubleshooting

Troubleshooting Guide

Problem	Possible Cause	Possible Solution
Case temperature is too warm.	Ambient conditions may be affecting the case operation.	Check case position in store. Is the case located near an open door, window, electric fan or air conditioning vent that may cause air currents? Case must be located minimum 15 Ft away from doors or windows. Cases are designed to operate at 55% Relative humidity and a temperature of 75°F.
	Discharge air temp is out of spec.	Check evaporator fan operation. Check electrical connections and input voltage.
		Fans are installed backwards. Check airflow direction.
		Fan blades are installed incorrectly. Make sure fan blades have correct pitch and are per specification.
		Check to see that fan plenum is installed correctly. It should not have any gaps.
		Check suction pressure and insure that it meets factory specifications.
	Case is in defrost.	Check defrost settings. See Technical Specifications section.
	Product load may be over its limits blocking airflow.	Redistribute product so it does not exceed load level. There is a sticker on the inside of the case indicating what the maximum load line is.
	Coil is freezing over.	Return air is blocked, make sure debris is not blocking the intake section.
		Coil close-offs are not installed. Inspect coil to make sure these parts are on the case.
	Condensing coil or evaporator coil is clogged or dirty.	Clean coil.
Case temperature is too cold.	The t-stat temp is set too low.	Check settings. See Technical Specifications section.
	Ambient conditions may be affecting the case operation.	Check case position in store. Is the case located near an open door, window, electric fan or air conditioning vent that may cause air currents? Case must be located minimum 15 Ft away from doors or windows. Cases are designed to operate at 55% Relative humidity and a temperature of 75°F.
Condensation on glass.	Ambient conditions may be affecting the case operation.	Check case position in store. Is the case located near an open door, window, electric fan or air conditioning vent that may cause air currents? Case must be located minimum 15 Ft away from doors or windows. Cases are designed to operate at 55% Relative humidity and a temperature of 75°F.
	Inadequate air circulation.	Check if air sweep fans are functioning, check electrical connections.
	There is not enough heat provided in the airflow.	Check if air sweep heater is functioning, check electrical connections.
	There are glass gaps on the side of the case.	See glass adjustment section.
	Glass is not completely shut.	Close glass correctly.

Troubleshooting

Problem	Possible Cause	Possible Solution
Water has pooled	Case drain is clogged.	Clear drain.
under case.	PVC drains under case may have a leak.	Repair as needed.
	Case tub has unsealed opening.	Seal as needed.
	If the case is in a lineup, case to case joint is missing or unsealed.	Install case to case joint and seal as needed.
	Evaporator pan is overflowing (if applicable).	Check electrical connection to evaporator pan. Check float assembly, it should move freely up and down the support stem. Clear any debris.
Case is not draining	Case is not level.	Level the case.
properly.	Drain screen is plugged.	Clean drain screen and remove any debris.
	Drain or P-trap is clogged.	Clear any debris.
Frost or ice on evaporator coil.	Evaporator fans are not functioning.	Check electrical connections.
	Defrost clock is not functioning.	Case should be serviced by a qualified service technician.
	Coil is freezing over.	Return air is blocked, make sure debris is not blocking the intake section.
		Coil close-offs are not installed. Inspect coil to make sure these parts are on the case.
Lights do not come on.	LED Driver/light socket wiring.	Check electrical connections. See Electrical Section and check wiring diagram.
	LED Driver needs to be replaced.	Case should be serviced by a qualified service technician. See Electrical Section.
	Lamp socket needs to be replaced.	Case should be serviced by a qualified service technician.
	Lamp needs to be replaced.	See Maintenance Section.
	Light Switch needs to replaced.	Case should be serviced by a qualified service technician.

Appendix A. - Temperature Guidelines

The refrigerators should be operated according to the manufacturer's published engineering specifications for entering air temperatures for specific equipment applications. Table 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	U°F
	-5 F
A Non frozen:	
1) Meat	34°F
2) Dairy/Deli	34°F
3) Produce	
a. Processed	36°F
b. Unprocessed	45°F
B. Frozen	0°F
C. Ice Cream	-5°F

Appendix B. - Application Recommendations

- 1.0 Temperature performance is critical for controlling bacteria growth. Therefore, the following recommendations are included in the standard. They are based on confirmed field experience over many years.
- 1.1 The installer is responsible for following the installation instructions and recommendations provided by Hussmann for the installation of each individual type refrigerator.
- 1.2 Refrigeration piping should be sized according to the equipment manufacturer's recommendations and installed in accordance with normal refrigeration practices. Refrigeration piping should be insulated according to Hussmann's recommendations.

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

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 hazardous food.
- 1.1 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

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

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

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To obtain warranty information or other support, contact your Hussmann representative. Please include the model and serial number of the product.

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