January 2006

HUSSMANN®

INSTALLATION & SERVICE INSTRUCTIONS FOR

USL LOW TEMPERATURE Solid Door Reach-In for Ice Cream and Frozen Foods

HUSSMANN®

First Call for help (US and Canada):

1-800-922-1919

Soporte Tècnico y Asistencia (Mèxico):

01-800-522-1900

For a Service Network Locator and other Information visit us at

www.hussmann.com

select Worldwide Locations

P/N OII – USL
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HUSSMANN - GLOVERSVILLE

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INTRODUCTION -

Hussmann USL models are self-contained, low temperature, vertical solid door reach-ins for the storage of ice cream and frozen foods. Design features include automatic defrost, efficient foamed in place non-CFC insulation, and balanced refrigeration systems for energy saving performance.

INSPECTION –

Upon receipt of the cabinet, carefully examine the crating for damage. If the crate is damaged, make a note on the delivery ticket before signing. Carefully remove shipping crate and examine cabinet for "concealed damage. If damage is found, contact the delivery carrier immediately and have his agent prepare an inspection report for the purpose of filing a claim. THIS IS YOUR RESPONSIBILITY.

LOCATION –

The USL low temperature, storage, self contained reach-ins are designed for back room storage applications of ice cream and frozen food products. Location where drafts from air conditioning grille, fans and open doors that would blow into the case should be avoided.

CLEARANCE –

Because the condensing unit is located at the top of the cabinet, at least 12 inches of clearance should be allowed at the rear of the cabinet and at the top of the case. This clearance is necessary to provide free air movement to and from the condenser for maximum operating efficiency.

INSTALLATION and START-UP –

SKID –

The skid should be left on the cabinet until it is near the final location. The skid provides protection for both the case and floor. The skid is removed by raising one end of the case approximately six inches. BLOCK SECURELY and remove the two skid bolts on the raised end. This procedure is repeated on the opposite end. When the skid bolts are removed, the case may be slid off the skid.

LEG INSTALLATION –

After the case is near its final location and the skid has been removed, the NSF approved legs should be installed. The legs are packaged inside the cabinet. To install the legs, replace the tape and door blocks. Raise one end of the cabinet approximately 8 inches, BLOCK SECURELY, and install two legs. The leg mounting plates are factory installed and contain a 1/2 x 13 tapped hole to match with the leg assembly. The procedure is repeated on the opposite end. With the cabinet legs installed, the cabinet should be positioned in its final location and leveled.

The cabinet is leveled by turning the bottom section of each leg. The self closing doors require the cabinet to be properly leveled. End to end leveling will make the doors close with uniform speed and tightness. A slight pitch from front to rear is desirable. THE CABINET BACK SHOULD NEVER BE HIGHER THAN THE FRONT.

TOP DECORATIVE PANEL REMOVAL –

The top decorative panel is removed by sliding the panel up into the upper aluminum

trim and pulling it forward until it clears the bottom aluminum trim.

CABINET DRAIN –

A vinyl drain tube is provided for connection to the condensate pan which is mounted to the bottom of the cabinet. The drain must be trapped to guard against the drain line freezing, to prevent warm air from going up into the back of the case, and for good sanitation practice. A copper tube trap is supplied for this purpose.

The condensate pan is electrically heated. A separate 115 volt supply with a ground rated at 10 amps should be provided for this heater. The heater is supplied with a 115 volt supply cord with a grounding prong. DO NOT REMOVE the grounding prong under any circumstances.

The cabinet power switch does not shut off the power to this pan. If the heater in the pan should need replacing, be sure to disconnect the power source to the pan.

SHELVES –

Each cabinet is provided with 3 cantilever shelves per door that are adjustable on 1 inch increments & tiltable. Each cabinet also has one bottom shelf per door. These shelves have one inch legs to allow proper air flow in the cabinet. Behind the shelves are wire flue spacers which also allow for proper air flow. All shelves and flue spacers are white, epoxy coated for durability and ease of cleaning.

Care should be taken when loading the shelves with product. Product on the highest level of shelves, should not touch the evaporator drain pan. This pan gets warm during the defrost cycle, and some melting of the product may occur if it is touching the pan/

AIR DISTRIBUTION and REAR FLUE SPACER -

Air is drawn through the evaporator from front to rear and is discharged down the back wall, returning up the face of the door to the return air grill. NOTE: Rear wire grid must be in place as this forms a discharge air flue at the back of the cabinet

ELECTRICAL CONNECTIONS –

The USL-2 is supplied with a power supply cord with a grounding prong. Do not remove the grounding prong under any circumstances.

It is very important for safety to you and your customers to have the cabinet properly grounded. The electrical installation should be done by a qualified electrician in accordance with the National Electrical Code and/or local codes.

Note: Connecting this unit to any electrical supply other than specified on the serial plate will void the warranty and may result in serious damage to the case. The cabinet should be supplied with its own service.

SERIAL PLATE INFORMATION –

The serial plate is located in the upper left hand corner of the case interior. It has all the pertinent information needed for proper electrical installation. The serial plate should not be removed for any reason.

START UP PROCEDURE –

1. **After the wiring has been completed, set the defrost timer for the correct time of day, making sure the defrost pins are secure in the face of the clock. USL cabinets are factory set for 1 defrost period in 24 hours. (12 a.m.)**

2. **Cut the band holding the compressor in place during shipping.**

3. **Check the cabinet thoroughly for loose nuts and bolts and electrical connections. Inspect the refrigeration lines for any visible damage or chafing.**

4. **Replace the electrical box cover.**

5. **Start the cabinet and allow to pull down to operating temperature before loading.**

SPECIFICATIONS –

DIMENSIONS –

	Cu. Ft.			Exterior	
Model	Cap	Drs	L	W+	H
USL-2	43.7	2	52”	34 1/4”	84 1/4”
				Interior	
			47 13/16”	25 11/16”	62 3/4”

+ Exclusive of Door Handles

ELECTRICAL –

	Unit H.P.	Hz/Ph	Volts
USL-2	3/4	60/1	115

	Run Amps	Fuse Size	Ship Wt.
USL-2	15.0	20 amp	875

BTU CAPACITIES –

		Rating	Temps °F	
	BTU/HR	Evap	Cond.	Amb
USL-2	2280	-20	110	90

During June ‘95, R404A refrigerant was phased into use on the USL-2. The refrigerant charge is 46 oz. of R404A.

GENERAL UPKEEP

CARE and CLEANING –

To insure good sanitation, appearance, and minimum maintenance, the cabinet should be cleaned and washed regularly as use demands. Clean with mild detergent and warm water. DO NOT USE AN ABRASIVE CLEANER OR STEEL WOOL AS THEY WILL MAR THE FINISH.

ROUTINE MAINTENANCE –

Under normal conditions, after the cabinet is installed and running, very little maintenance should be required. However, the following list of housekeeping practices will assure trouble-free operation.

1. **Check operation of condenser fan motors. Fan blades must turn freely.**

2. **Check drain pan and heater to prevent accidental overflow.**

3. **Make sure doors are closing properly and that the gaskets seal.**

4. **Make sure all evaporator fan motors are running. These can be seen through grill inside cabinet.**

5. **Clean the cabinet with a mild detergent. This will insure good sanitation, and minimize maintenance. Never use an abrasive as this could mar the finish.**

OPERATION and MAINTENANCE

POWER SWITCHES –

The power switch is located at the electrical box which is behind the top decorative panel. The switch will shut off all power.

TEMPERATURE CONTROL –

The temperature control is located in the electrical box on the top of the case. The temperature control does not have an 'OFF' position. Adjustments may be made by the use of a screwdriver in the slot provided in the face of the control. Turning it clockwise will give warmer temperatures while counter-clockwise will give colder temperatures. There is also an adjustable temperature differential (the difference between the cut-in temperature and the cut-out temperature) located next to the dial face.

The control has a range of –30ºF to +50ºF with a differential of 5º to 20º. It is factory set for approximately –15ºF with an 8º differential. The temperature should be checked with a thermometer other than the case thermometer after it is running to insure that the case is running at the proper temperature for the product.

THERMOMETER –

The thermometer is located in the center of the top header. The thermometer will probably need resetting to reflect the proper case temperature. Using a separate thermometer located on a shelf in the case, compare this temperature to that on the case thermometer. If the case thermometer needs to be adjusted, remove the clear protective cover by popping it off with a small screwdriver and turning the small adjustment screw on the face of the thermometer.

The thermometer is used to indicate proper operating temperatures. For the USL the proper operating temperature is –10ºF to –15ºF.

The thermometer will also warm up rather rapidly when the case door is held open for a time such as when the case is being restocked or a shopper is making a decision on a product. After the door is closed it will take some time for the thermometer to pull back down to the case temperature.

The thermometer can be replaced by removing the three screws securing it to the cabinet. Open the doors and remove the evaporator drain pan be removing the screws along the edges. Remove the evaporator fan grill. The thermometer sensing element is secured to the evaporator fan plenum.

Loosen the screw securing the element. Remove the element and thermometer. Insert new element and retighten screw. Finish assembly in reverse order. Be sure to run the sensing element of the new thermometer through the hole I the cabinet face prior to securing it to the evaporator fan plenum.

ELECTRICAL ENCLOSURE –

The electrical enclosure contains the defrost time clock and terminal

boards. For servicing convenience, access is gained by removing the top decorative panel and electrical box cover. THE CABINET SUPPLY BREAKERS SHOULD BE DISCONNECTED BEFORE REMOVING THE ENCLOSURE COVER.

The cabinet electrical supply breakers should be disconnected before removing the enclosure cover, and before service work ore maintenance of any kind is performed.

DEFROST TIME CLOCK –

The timer is factory pre-set for one defrost cycle per day at 12:00 a.m., with a 40 minute failsafe. The timer must be adjusted to the proper time of day when the cabinet is started. The timer is adjusted by turning the knurled adjustment knob in the center of the dial face counter-clockwise until the time indicator corresponds with the correct time of day.

The defrost pins should be checked for tightness. The timer will require re-adjusting after a power failure of the cabinet supply or if it is turned off for extended periods of time. If an additional defrost is required due to ambient or cabinet usage conditions, do not put a defrost during the middle of the day.

Put any additional defrost during the night or at a time when the cabinet has the lowest usage.

Defrost is time initiated and temperature terminated. If the thermostat should fail, the timer is equipped with a failsafe set at 40 minutes that will allow defrost to terminate on time.

DEFROST HEATER THERMOSTAT –

The defrost heater thermostat is clamped to the evaporator outlet tube. It is a bi-metal thermostat that is tied in series with the evaporator fans for a delay and with defrost time clock solenoid to end defrost when the temperature has been satisfied. The evaporator fans will not come on until the thermostat senses 32ºF and defrost will terminate when the stat senses 58ºF.

DEFROST HEATER REPLACEMENT –

The defrost heaters are firmly embedded in the evaporator and held in place with spring clips. To remove the heater, first remove all the spring clips and pull the defective heater out of the slots in the evaporator, starting at the wire supply lead.

The replacement heater should be firmly seated in the slots by using a small block of wood and a mallet. After the new heater is in place, replace all of the spring retaining clips to assure heater retention. One lead of the defective heater may be used to pull the new leads through the cabinet to the respective terminals as marked on each lead.

NOTE: Care must be taken to make sure the drain stub is correctly inserted in the cabinet drain tube for proper drainage.

LIGHTING –

Interior lighting is provided by incandescent lamps. The lamps have protective shields which can be removed for bulb replacement. The lights are equipped with switches mounted in the upper left hand corner of the door opening, that allow the lights to come on when the door is opened. The switches are connected in series.

FRAME HEATERS –

The cabinet is equipped with frame heaters around each door. These are thermostatically controlled and will not come on until the cabinet is at operating temperature.

FRAME HEATER REPLACEMENT –

To replace the cabinet frame heater wires, first remove the vinyl breaker strips by pulling the outer edge away from the cabinet. Replace wires exactly as removed, pulling the leads through the plastic conduit. After connections have been made, check the heaters for operation. Replace the plastic breakers by reversing the removal procedure.

EXPANSION VALVE ADJUSTMENT –

Expansion valve must be adjusted to fully feed the evaporator. Before attempting to adjust the valve make sure the evaporator is either clean or only lightly covered with frost, and that the cabinet is within 10º of its expected operation temperature. Adjust the expansion valve as follows:

1. **Attach two sensing probes to the evaporator, one under the clamp holding the expansion valve sensing bulb and the other securely taped to one of the return bends two thirds of the way through the evaporator circuit. Some "hunting" of the expansion valve is normal**

2. **The valve should be adjusted so that during the hunting the greatest difference between the two probes is 3º to 5º F.**

3. **Remove valve stem cover and turn valve stem counter-clockwise to decrease temperature difference between the probes.**

4. **To increase temperature difference of probes, turn the valve stem clockwise. With this adjustment, during a portion of the hunting the temperature differences between the two probes may be less than 3º F, or at times as low as 0º F.**

5. **Make adjustments of no more than one half turn of the valve stem at a time and wait for at least fifteen minutes before rechecking probe temperature and making further adjustments. Replace and tighten cover of the valve stem.**

REFRIGERATION –

As stated previously, this case is a self-contained system featuring semi-hermetic compressor and thermostatic expansion valve. The condenser is of a bare tube construction and SHOULD BE PERIODICALLY CLEANED TO MAINTAIN EFFICIENT OPERATION

If it should become necessary to leak test the system, please adhere to the following notice:

Because of the CFC atmospheric considerations being taken today, we ask that leak testing be done with refrigerant 22 mixed with nitrogen. If the condensing unit nameplate designates a refrigerant other than R-22, remove all R-22 from the immediate area to avoid confusion after leak testing and evacuating the unit. Recharge the unit with proper refrigerant.

LEAK TESTING –

The test gas cylinder must be equipped with a pressure gauge and regulator so that system test pressures do not exceed maximum allowable limits. Do not ever use anything other than a R-22/Nitrogen mixture for leak testing.

Attach a refrigerant test gas cylinder to your service manifold and connect the manifold to the charging port on the liquid line valve. Charge an R-22/Nitrogen mixture into the system, raising the pressure to the unit's nameplate for the low side and high side pressures. Using an electronic detector, carefully check the entire system for leaks. Take special care to inspect all brazed and flare connections.

EVACUATION –

After the system is proven leak tight, thoroughly evacuated the system according to the following procedure:

1. **Discharge the refrigerant-nitrogen mixture, allowing it to blow from the system as rapidly as possible, into an empty cylinder. Be sure that all service valves and solenoid valves are open to allow all of the mixture to be discharged.**
2. **Connect a deep-drain vacuum pump to both the high and low side of the system. Pull a vacuum on the system to at least 1500 microns.**
3. **Break the vacuum by adding refrigerant into the system until the pressure is above 0 PSIG. Always charge the refrigerant line into the system through a new drier in the charging manifold line. A 16 cubic inch drier is sufficient for this purpose.**
4. **Repeat steps 2 and 3 two more times, the third time evacuating the system to 500 microns.**

OPERATING DATA –

The following is typical data for USL models based on lab tests, and may vary under field operating conditions.

Ambient Temperature	**75°F**
Head Pressure	**225 psi**
Suction Pressure	**3-5 psi**
Discharge Air	**-25°F**
Return Air	**-10°F**

COMPRESSOR –

The compressor is mounted on springs and banded for shipping purposes and this band needs to be cut upon installation. DO NOT LOOSEN THE COMPRESSOR MOUNTING BOLTS AS THESE ARE FACTORY PRE-SET FOR PROPER RIDING ON THE SPRINGS.

RECEIVER –

The receiver should not be confused for a filter-drier or muffler. The receiver is

in the liquid line after the condenser and just ahead of the filter-drier. It has sweat connections, and is in a horizontal position. The manufacturer may label the receiver as a muffler or a drier but it is, in fact, an empty shell.

<u>CRANKCASE PRESSURE REGULATOR</u> -

The USL-2 with R404a refrigerant employs a crankcase pressure regulator in the suction line. The CPR is set for 12 psi. The purpose of the valve is to maintain a low suction pressure on start-up so that the compressor will start properly. On start-up, the valve will hold the suction pressure at the desired setting until the suction pressure has dropped below the setting, then the valve will open.

If it becomes necessary to check or reset the setting, the case must be warm such as after a defrost cycle or from an initial warm case condition. Put a suction compound gauge on the compressor suction valve, start the compressor. If the pressure needs to be reduced turn the adjustment screw clockwise or, counterclockwise to raise the pressure. DO NOT SET THE VALVE BASED ON THE NAMEPLATE AMPERAGE RATING AS THE PRESSURE SETTING WILL BE TOO HIGH AND THE COMPRESSOR WILL NOT START PROPERLY.

TROUBLE SHOOTING CHARTS FOR THE CASE AND LIGHTING

TROUBLE	PROBABLE CAUSE	SOLUTION
Compressor runs continuously product too warm	**1. Short of refrigerant**	**1. Leak check, change drier, evacuate, and recharge**
	2. Inefficient compressor	**2. Replace**
	3. Dirty condenser	**3. Clean**
High head pressure	**1. Cabinet location too warm**	**1. Relocate cabinet**
	2. Restricted condenser air flow	**2. Clean condenser to remove air flow restriction**
	3. Defective condenser fan motor	**3. Replace**
	4. Air or non-condensable gasses in system	**4. Leak check, change drier, evacuate, and recharge.**
Warm storage temperatures	**1. Temperature control not set properly**	**1. Reset control**
	2. Short of refrigerant	**2. Leak check, change drier, evacuate and recharge**
	3. Cabinet location too warm	**3. Relocate**
	4. Too much refrigerant	**4. Change drier evacuate, and recharge**
	5. Low voltage. Compressor cycling on overload	**5. Check power**
	6. Condenser dirty	**6. Clean**

Compressor runs continuously, product too cold	**1. Defective control**	**1. Replace**
	2. Control feeler tube not in positive contact	**2. Assure proper contact**
	3. Short on refrigerant	**3. Leak check, change drier, evacuate and recharge**
Compressor will not start no noise	**1. Blown fuse or breaker**	**1. Replace fuse or reset breaker**
	2. Defective or broken wiring	**2. Repair or replace**
	3. Defective overload	**3. Replace**
	4. Defective temperature control	**4. Replace**
	5. Power disconnected	**5. Check service cord or wiring connections.**
Compressor will not start cuts out on overload	**1. Low voltage**	**1. Contact electrician**
	2. Defective compressor	**2. Replace**
	3. Defective relay	**3. Replace**
	4. Restriction or moisture	**4. Leak check, replace drier, evacuate and recharge**
	5. Inadequate air over condenser	**5. Clean condenser**
	6. Defective condenser fan motor	**6. Replace**
	7. CRO not set properly	**7. Reset to 12 psi on USL-2**
Icing condition in drain pan	**1. Low voltage**	**1. Check voltage at compressor**
	2. Cabinet not level	**2. Check front to rear leveling, adjust legs accordingly**

3. Defective drain tube heater	3. Replace
4. Defective drain pan heater	4. Replace

TROUBLE SHOOTING
LIGHTING

TROUBLE	SOLUTION
Lights won't light	1. Check light switch
	2. Check to see if bulbs are inserted fully into sockets
	3. Check voltage – Check the bulb to see if it is good

ELECTRICAL COMPONENTS

Compressor	Copeland R502	KAM2-0075-IAA
Compressor	Copeland R404	KAAB-007E-CAA
Condenser Fan Motor		EMS ESPL25EM1
Evaporator Fan Motor		Morrill SPB5EM1
Light Ballast		8G3738W
Incandescent Lamp		GE 40A15

WARRANTY AND PARTS INFORMATION

Please read carefully to assure prompt and accurate service. Thank You

ORDERING REPLACEMENT PARTS –

- **Contact your nearest Hussmann Distributor**
- **Always specify model and serial number of cabinet**
- **If correct part number is not known, give a clear description of part itself and its function in the cabinet or remote unit.**

WARRANTY PARTS PROCEDURE –

- **Same as items 1, 2, and 3 above**

- **Give original installation date of cabinet and, if possible, forward a copy of the original invoice or delivery receipt.**

- **All shipments of in-warranty replacement parts will be invoiced from the factory until such time as the defective part is returned and proven to be defective by our Quality Control Department.**

- **Contact your Hussmann Distributor for instructions on returning in-warranty parts.**

- **Warranty parts must be returned to the factory within 30 days of date of failure to assure proper disposition.**

- **Lack of any of the above information may result in the shipment of the wrong part, or a delay in shipment.**

- **Replacement compressors will not be shipped from the Hussmann factory. They may be obtained from your nearest Copeland Wholesaler.**

- **Your wholesaler will replace, free of charge, any compressor found to be defective within twelve months of installation, not to exceed twenty months from the date of manufacture, as determined by the compressor serial number on the compressor serial plate.**

- **For any defective compressor beyond the twelve or twenty month time period, a salvage value credit will be given too partially offset the invoice for the replacement.**

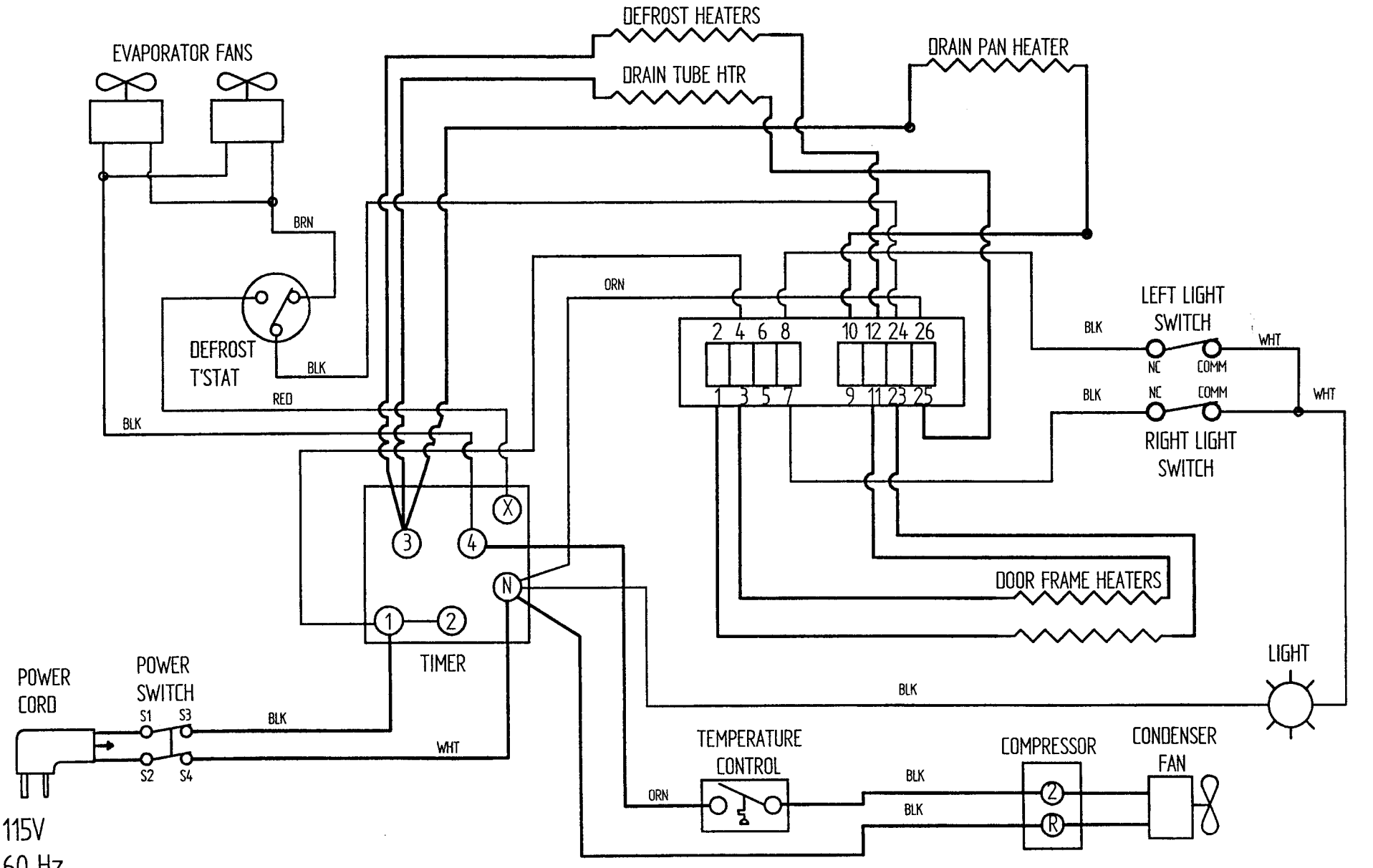
To obtain reimbursement forward to: Hussmann Corporation
140 East State Street
Gloversville, NY
12078

the following information:

- **The cabinet model and serial number**

- **A copy of the wholesaler's invoice, along with a copy of the salvage value credit.**

WIRING DIAGRAMS ARE ATTACHED AT THE BACK OF THIS BOOKLET



REV ED #	REV DATE	REV BY	TOLERANCES UNLESS OTHERWISE SPECIFIED: FRACTIONAL ±1/32" DECIMAL .003" ANGULAR 1° HOLE LOCATION & SPACING ±1/64"
-	-	-	

APPROVED BY :-

ED NUMBER -

DATE DRAWN -5-98
DRAWN BY -J. HOLLAND
APPROVED BY -

UNIT: INCHES
SHEET #: 1 OF 1

HUSSMANN®
GLOVERSVILLE, NY 12078

WIRING DIAGRAM USL-2

M100-2142