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KYSOR/WARREN

5201 Transport Boulevard
Columbus, GA. 31907
706-568-1514

Installation & Operation Manual

QM1LVC1

Self-Service/Single Deck/Self-Contained Display Case

HEATCRAFT Worldwide Refrigeration

IMPORTANT – KEEP IN STORE FOR FUTURE USE

Table of Contents

Introductions – General Information

This manual has been prepared for our customers and the personnel involved in setting up and maintaining our cases.

Icon Key
Caution
Special Note
Warning

The Kysor//Warren single deck self-service case is specially designed to merchandise packaged sandwiches, cheese, deli, prepared foods, produce and meat. These cases should be installed and operated according to the instructions contained in this manual to insure proper performance. They are designed for display of products in an air-conditioned store where temperature and humidity are maintained at a **maximum of 75º dry-bulb temperature and 55% relative humidity.**

CAUTION: Failure to maintain maximum design conditions may result in operational issues such as: increased BTU load, high product temperature, coil icing, product frosting, and external sweating.

Case Description

Model	Description
QM1LVC1	Self-service, self-contained, prepared food display case with curved glass and produced in 4 ft. length.

These cases are connected to a single condensing unit. Installation and Service instructions are provided by the condensing unit manufacturer and are not part of this manual.

Receiving/Shipping Damage/Lost Items

All equipment should be examined for shipping damage before and during unloading. If there is any damage, the carrier should be notified immediately and an inspection requested. The delivery receipt must be noted that the equipment was received damaged. If damage is of a concealed nature, you must contact the carrier within three (3) days following delivery. A claim must be filed with the carrier by the consignee for all damages.

Note: All claims for shortages must be within 10 days after receipt of shipment.

Refrigerant

A variety of refrigerants can be used in the Kysor//Warren cases provided the correct expansion valve is equipped with the case when ordered (i.e., R–404A required for the end user requires specifying the correct expansion valve for R–404A refrigerant when the order is placed). Multiple expansion valves are available, depending on end user refrigerant requirements. Expansion valves are supplied for the refrigerant specified on the original sales order.

In addition, cases can be modified in the field to allow changing the type of refrigerant used. This requires changing the expansion valve and distributor orifice that is currently equipped in the case. Contact your Kysor//Warren Service Representative for additional information.

Condensing Unit

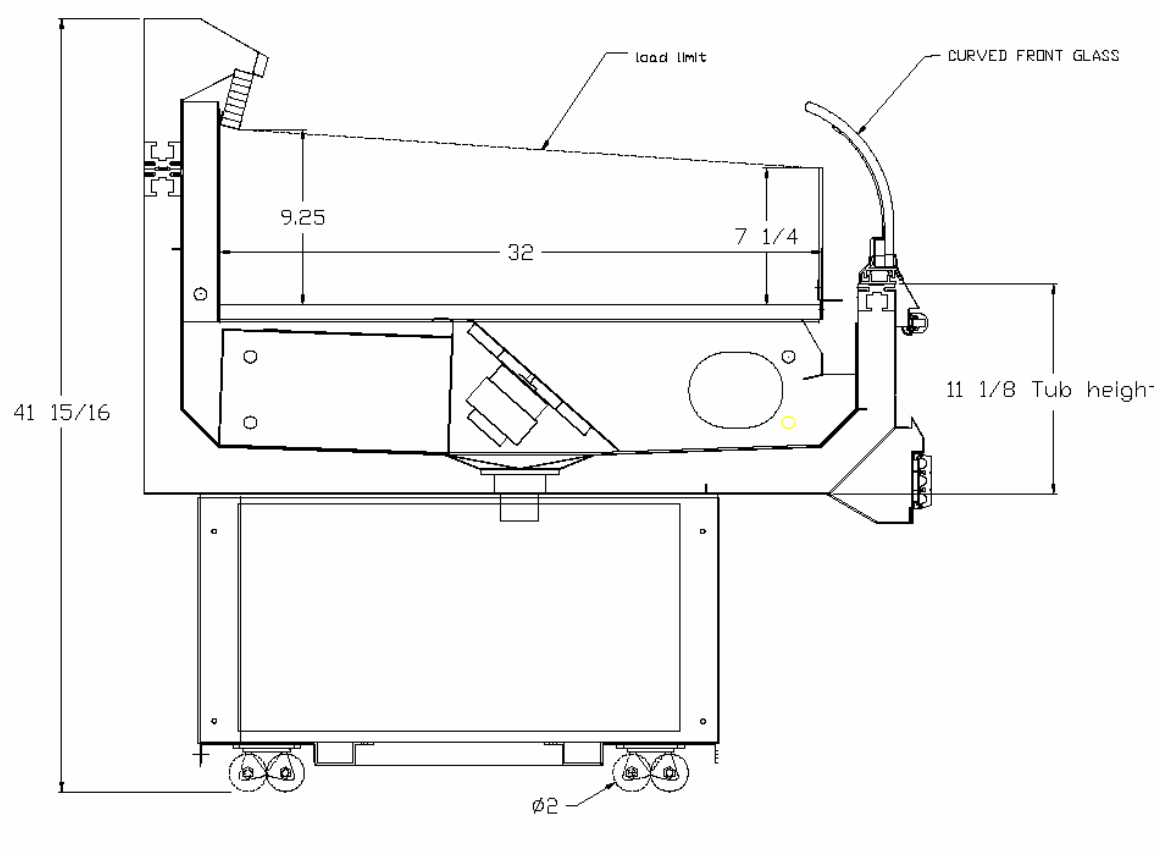
The condensing unit is not intended to be removed from the case except in the event a compressor must be replaced. To remove the condensing unit, disconnect the flare suction/liquid connections on the base valves at the right front of the case.

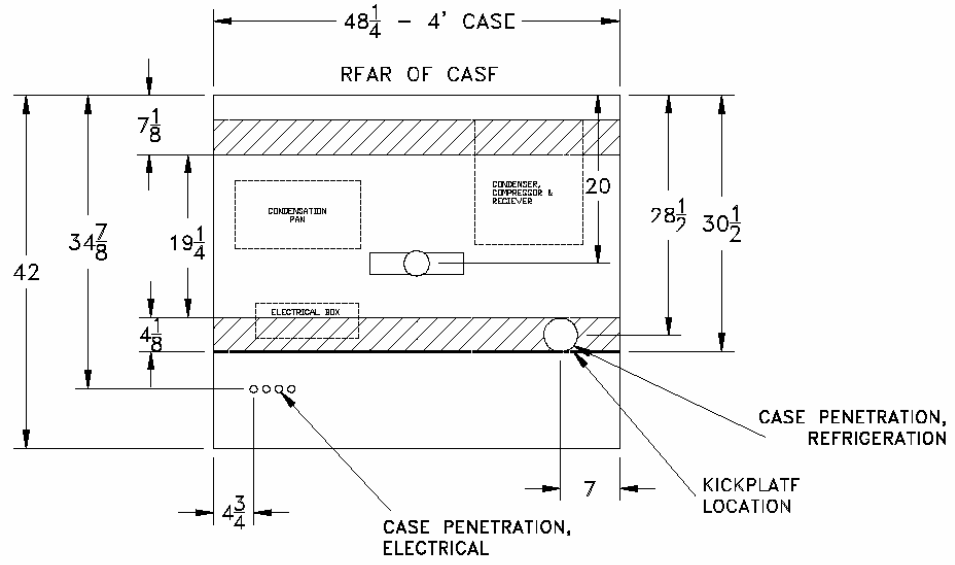
 **CAUTION:** Before attempting to remove the condensing unit, be sure that all electrical power to the case has been turned off. Also, caution should be used when releasing pressure on the refrigerant system.

 **NOTE:** The refrigerant charge for this case is very critical. If the case should need to be recharged, an accurate charging device must be used. No refrigerant should be released into the atmosphere. It must be reclaimed. There are several different refrigerant configurations to these units. Refer to Case Data for detail.

 **CAUTION:** During installation and service of this equipment, precautions should be taken to prevent loss of refrigerant to the atmosphere.

Plan View and Cross Section





Case Data

QM1LVC1

Capacities	**4’**
Cubic Capacity	9.9
Dimensions	**4’**
Overall Length (w/o ends)	48.250”
Thickness – Pair Ends	1.5”/End

CASE DATA	**04**
Power Supply	115V/60/1
Anti-Sweat Amps	0.1
Fan Amps	0.7
Min Circuit Amp	20.9
Max OCP	25
Condensing Unit Amps	9.7
Ref. Cycle Amps	18.5
Defrost Cycle Amps	8.8
Refrigerant	R-404A
Refrigerant Charge	3.3 lbs
Horse Power	½
All electrical data based on 115V.	

DEFROST CONTROLS			
Defrost	**Per Day**	**Fail Safe**	**Termination**
Off Cycle	4*	45 min	45°F

*Set defrost intervals at every 6 hours.

Discharge Air Velocity	**Discharge Air Temp**
225 FPM	21-25°F

Note: Temperature is measured in discharge air. Defrost frequency is at design conditions. Higher temperature or humidity may require more defrost and longer fail-safes. These cases are not designed to operate environments where the ambient temperature is greater than 75ºF and the relative humidity is greater than 55%.

CAUTION: Failure to maintain maximum design conditions may result in operational issues such as: increased BTU load, high product temperature, coil icing, product frosting, and external sweating.

CAUTION: Failure to properly install electrical wiring and control wiring as per wiring diagram(s), defrost settings, and temperature set-points may result in operational issues such as: increased BTU load, high product temperature, coil icing, product frosting, and external sweating.

Refer to www.kysorwarren.com for other electrical data and information.

Case Installation

Preparation

Prepare the installation area as follows:

1. Clean area where case is to be installed.

2. Verify installation area is at least 15 feet from any outside entrances or heating and cooling outlets.

Caution: To prevent condensation on the end panels of cases, a minimum of 6.0 inches between walls or other cases is required for air flow. If 6.0 inches is not possible, then the space between the cases must be completely filled and sealed or an updraft fan kit must be installed to provide air circulation through the space.

3. Ensure floor loading will support the case and the case contents.
4. Ensure proper AC power is available. Refer to case AC input requirements located in the electrical connections section of this manual.
5. Ensure expansion valve in case is the proper valve for the type of refrigerant used at the installation site.

Installation

The following instructions are provided for unpacking, moving, loading, and lifting the case prior to installation.

Note: READ ALL INSTRUCTIONS CAREFULLY BEFORE BEGINNING INSTALLATION

Unpacking

1. Ensure the evaporator cover is installed correctly with the deck pans installed.

2. Move the case into position, install, adjust superheat, and perform the operational checkout procedures following the instructions within this manual.

 Caution: Be careful not to damage the factory-installed end while moving the case. Use the case lift points on the case to move it to the proper location.

Installing Case

1. Ensure all preparation for installation, as outlined in the above paragraphs, have been fully complied with and are complete.
2. Allow a minimum of 6 inches between the rear of the case and the store walls and/or other cases. This space reduces the possibility of condensation problems. It may be necessary to provide forced air ventilation in some installations.

Electrical Connections – General

An electrical box is provided with each refrigerator for wiring your fan, anti-sweat heaters, and light circuits. This is an approved method by the Underwriters' Laboratories; however, field wiring must be in accordance with local and national electrical codes.

All field connections are made in the electrical box. Make sure that proper voltage is supplied to your refrigerator. Check refrigerator nameplate for the required voltage for fans, anti-sweat heaters, lights and defrost heaters. ALL REFRIGERATORS MUST BE GROUNDED.

The Recommended Control Settings in the Case Data shows the electrical ratings for your case. This is the same information that appears on your refrigeration nameplate.

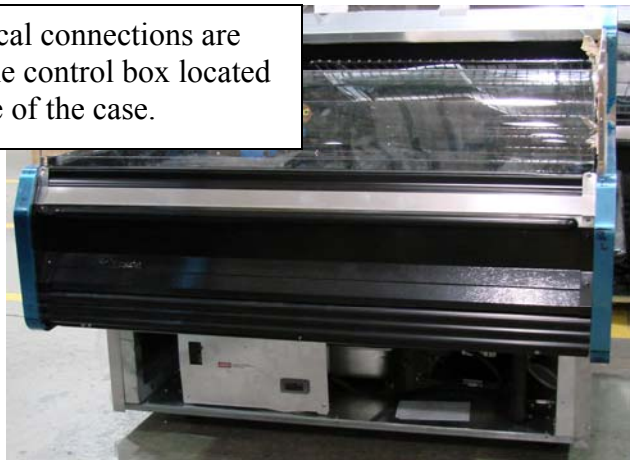
 NOTE: Fan motors must operate continuously and panel must be marked sufficiently to prevent the fan motors from being turned off accidentally. When refrigerators are multiplexed, add the total of these amperage values to determine wire size and circuit protection. Anti-condensate controllers can be used to control the anti-condensate heater.

WARNING! Ensure the Kickplate does not come in contact with the case electrical wiring. Live electrical wiring that comes in contact with the case is a shock hazard that may cause severe injury or death by electrocution.

WARNING! 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 fans, heaters, thermostats and light bulbs. Failure to disconnect the electrical power may result in personal injury or death.

Electrical Termination

All electrical connections are made in the control box located in the base of the case.



The wires are clearly identified for termination purposes as follows:

Component	Wire Number
Anti-Sweat Heater	1 and 2
Refrigerator Fan Motors and Drain Heater	3 and 4
Lighting Circuit	5 and 6
Defrost Heaters	7 and 8
Temperature Control	9 and 10
Dual Temperature?	15 and 16
Defrost Termination Control	17 and 18

Paragon ERC-2 Set-Up Instruction

1. Remove cover from Paragon display so the display LED is visible. The display must be shown on Figure 1:

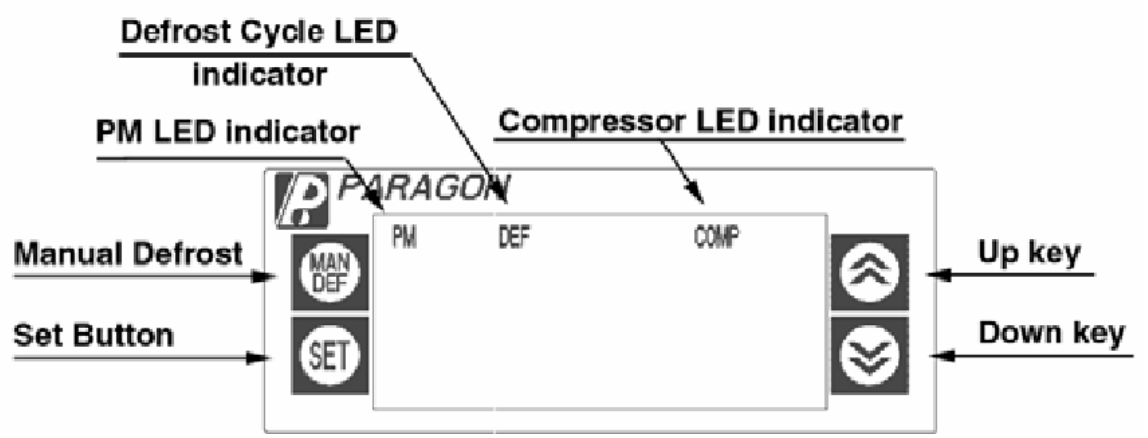


FIGURE 1

To change time-of-day and setpoint temperature (First Level) follow these steps:

Step 1	SET	Press and hold set for 5 seconds. The display will show **CLoC**
Step 2	SET	Press SET again to change the time-of-day
Step 3	^^ or vv	Press UP or DOWN until the correct time-of-day is displayed
Step 4	SET	Press SET to accept the new time
Step 5	vv	Press DOWN to go to the next parameter – Setpoint Temperature - **SEt** (cut out)
Step 6	SET	Press SET to change the setpoint temperature
Step 7	^^ or vv	Press UP or DOWN to go to the desired setpoint. The range is – 40 to 60°F or –40 to 16°C
Step 8	SET	Press SET to accept the change
Step 9	vv	Press DOWN to exit the first level of programming

Note 1: During programming, if no button is pushed during 30 seconds, the control will go back to the normal operating mode. This is valid for both programming levels.

Note 2: When changing the time, press and hold the MAN DEF button for 3 seconds to change the AM/PM mode.

FIGURE 2

2. Set Clock to local time.
3. Set Setpoint Temperature, SEt, TO "**21**"
4. Set Clock Format, CLHr, TO "**12HR**"
5. Set Temperature Format, dSP, TO "**F**"
6. Set Defrost Type, dFtP, TO "**Elec**"
7. Set Fan Status During Defrost, EFAN, to "**Yes**"
8. Set Fan Status During Normal Mode, CFAN, to "**On**"
9. Set Defrost Interval, dFin, to "**Tday**"
10. Set Minimum Compressor Off Time, CoFF, to "**0**"
11. Set Minimum Compressor On Time, Con, to "**0**"
12. Set Alarm Delay, Alrd, to "**0**"
13. Set Compressor Run Time, CPrn, to "**0**"
14. Set Number Defrost, nodF, to "4"
15. Set Start time, dEF1, defrost in 6 hr intervals
16. Set Defrost Duration, dEFd, to "45 **minutes**"
17. Set Fan Delay, Fand, to "**0**"
18. Set Pump Down, Pudn, to "**0**"
19. Set Drip Time, driP, to "0"
20. Set Setpoint Differential, diF, to "**4**"
21. Set Temperature Initiated Defrost, tdEF, to "**n/a**"
22. Set Defrost Termination Temp, dEF, to "**45**"
23. Set Fan Cut-In to, FAn, to "**n/a**"
24. Set Low Temperature Alarm, ALLo, to "16"
25. Set High Temperature Alarm, ALHi, to "**60**"

Parameter	Display Symbol	Description	Range / Options
Display Status	dSPL	Information shown on the display during operation conditions	tdAy – time-of-day rSP° – zone temperature (refrigerated space) CyCL – cycle between time and zone temperature Epr° – evaporator coil temperature
Clock Format	CLHr	Format of the time (12 or 24 hours mode)	12Hr – AM/PM format 24Hr – 24 hour format
Temperature Format	°dSP	Temperature degrees	°F – degrees Fahrenheit °C – degrees Celsius
Defrost Type	dFtP	Type of defrost used in the application	ELEC – electric heater defrost / off cycle HgAS – hot gas
Fan Status During Defrost	EFAN	Enable or not the fan during defrost	no – fan is turned off during defrost yES – fan remains on during defrost
Fan Status During Normal Mode	CFAN	Enable or not the fan during normal compressor on/off mode	on – fan is always on during normal mode CyCP – fan cycles with compressor
Defrost Interval	dFin	Type of defrost interval	TdAy – time-of-day setpoint CPrn – compressor run time tdEF – temperature initiated defrost
Minimum Compressor Off Time	CoFF	Minimum time that the compressor will remain turned off	Range: from 0 to 15 min
Minimum Compressor On Time	Con	Minimum time that the compressor will remain turned on	Range: from 0 to 15 min
Alarm Delay	ALrd	Time delay before the alarm goes off after the temperature fall off the two alarm setpoints	Range: from 0 to 59 min
Compressor Run Time	CPrn	Time the compressor will run between defrosts	
Number of Defrosts	nodF	Number of defrosts per day	from 0 to 8 (0 means 1 defrost every 48 hours)
Defrost Start Time	dEF1-8	Start time of each defrost	
Defrost Duration	dEFd	Defrost duration time (back-up for defrost termination temperature)	Range: from 0 min to 4 hours
Fan Delay	FAnd	Delay time for the fan after defrost (back-up for fan cut-in temperature)	Range: from 0 to 15 min
Pump Down	Pudn	Pump down duration	Range: from 0 to 59 min
Drip Time	driP	Drip time duration	Range: from 0 to 59 min
Setpoint Differential	diF°	Cut-in temperature differential Note: cut-in is cut-out plus differential	Range: from 1 to 25°
Temperature Initiated Defrost	tdEF	Temperature that will initiate a defrost cycle	Range: from – 40 to 40°F or – 40 to 4°C
Defrost Termination Temperature	dEF°	Temperature in the evaporator that will terminate the defrost cycle	Range: from 0 to 75°F or –18 to 24°C
Fan Cut-In Temperature	FAn°	Temperature in the evaporator that will turn the fan on after defrost	Range: from – 40 to 60°F or – 40 to 16°C
Low Temperature Alarm	ALLo	Low temperature setpoint that will make the alarm go off and the error message appear on the display	Range: from – 40 to 83°F or – 40 to 28°C
High Temperature Alarm	ALHi	High temperature setpoint that will make the alarm go off and the error message appear on the display	Range: from – 40 to 83°F or –40 to 28°C

Important Note: To change from degrees **C** to **F** or vice-versa, the user must reprogram all the parameters that are related to the temperature. The unit does not convert the parameters automatically from degrees **F** to **C** or vice-versa.

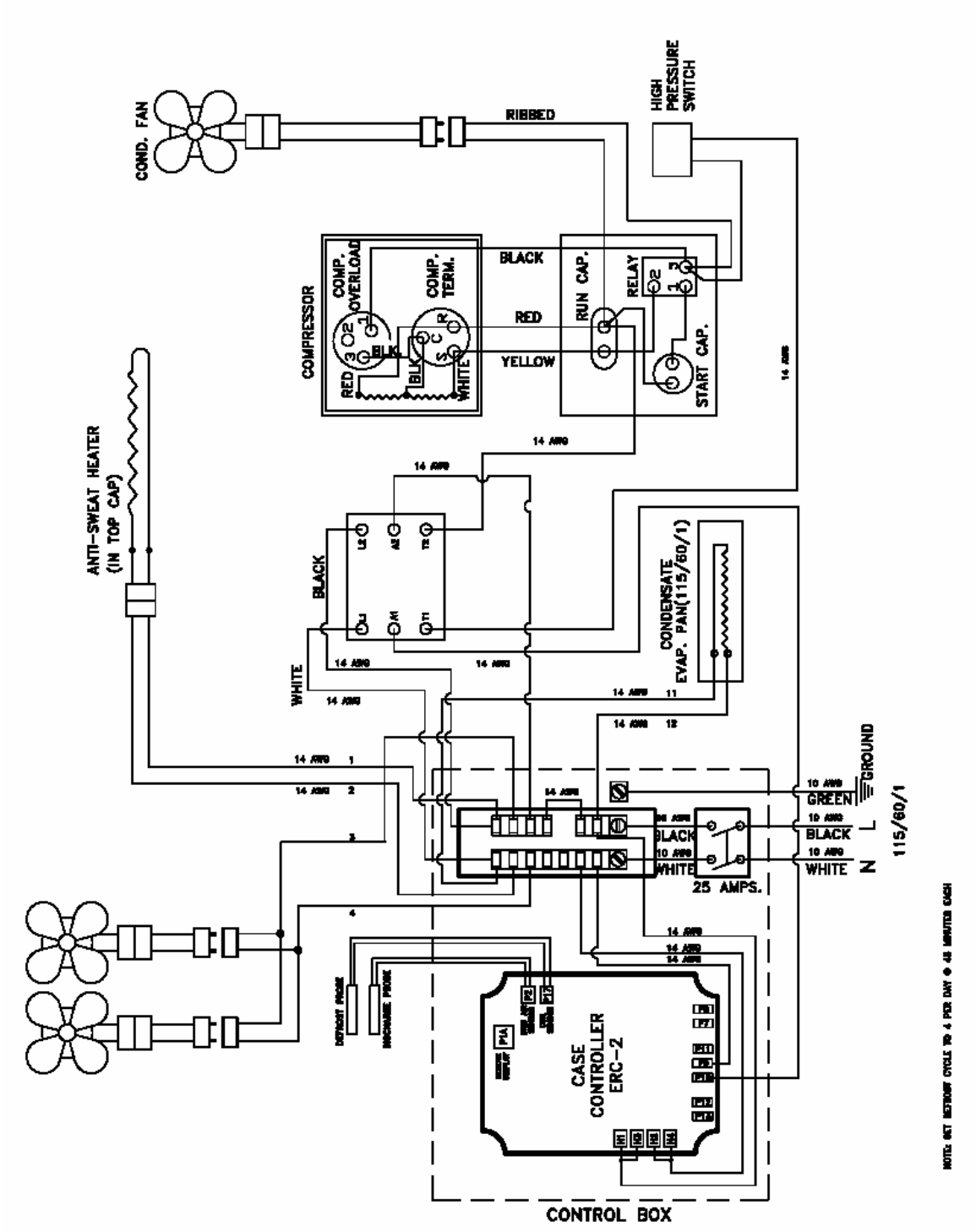
PLEASE SEE BELOW PARAGON DISPLAY AND ERROR CODE

Error Codes

Display	Control Status
Er 1	ERC Fault – software or hardware failure
Er 2	ERC Communication Fault – indicates that there is a problem with the display module cable
Er 3	Zone Sensor Fault – indicates an open or shorted temperature sensor
Er 4	Evaporator Sensor Fault – indicates an open or shorted evaporator sensor
Er 6	Low Temperature Alarm – indicates that the temperature has dropped below the low alarm setpoint
Er 7	High Temperature Alarm – indicates that the temperature has gone above the high alarm setpoint

For Error Codes 1 and 2 cut the power to the unit and correct the problem to reset the display.
For Codes 3 and 4, press the UP or DOWN button on the display to reset the error message. If the display still shows the message, the sensor must be replaced.
The Error Codes 6 and 7 will be automatically reset once the temperature is back within the two setpoints.

Wiring Diagram

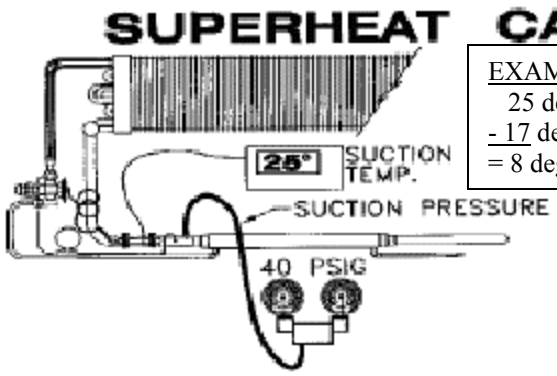


Expansion Valve and Superheat

Caution: During service of this equipment, precautions should be taken to prevent loss of refrigerant to the atmosphere. Always install the expansion valve stem cap after making valve adjustments.

The expansion valve furnished with your case has been sized for maximum coil efficiency. To adjust superheat perform the following:

1. Place a thermocouple near the expansion valve bulb. Read the suction line pressure as near coil as possible. (If at the condensing case, estimate suction line loss at 2 PSIG).
2. Convert coil suction pressure to temperature. The difference between coil temperature and the thermocouple temperature is superheat. (Use average superheat when expansion valve is hunting).
3. Do not set superheat until cases have pulled down to operating temperature and never open or close the valve over ¼ turn between adjustments and allow 10 minutes or more between adjustments.
4. Superheat should be set to 6-8°F.
5. After the initial setting, the superheat should be rechecked when product is stocked and at desired temperature.

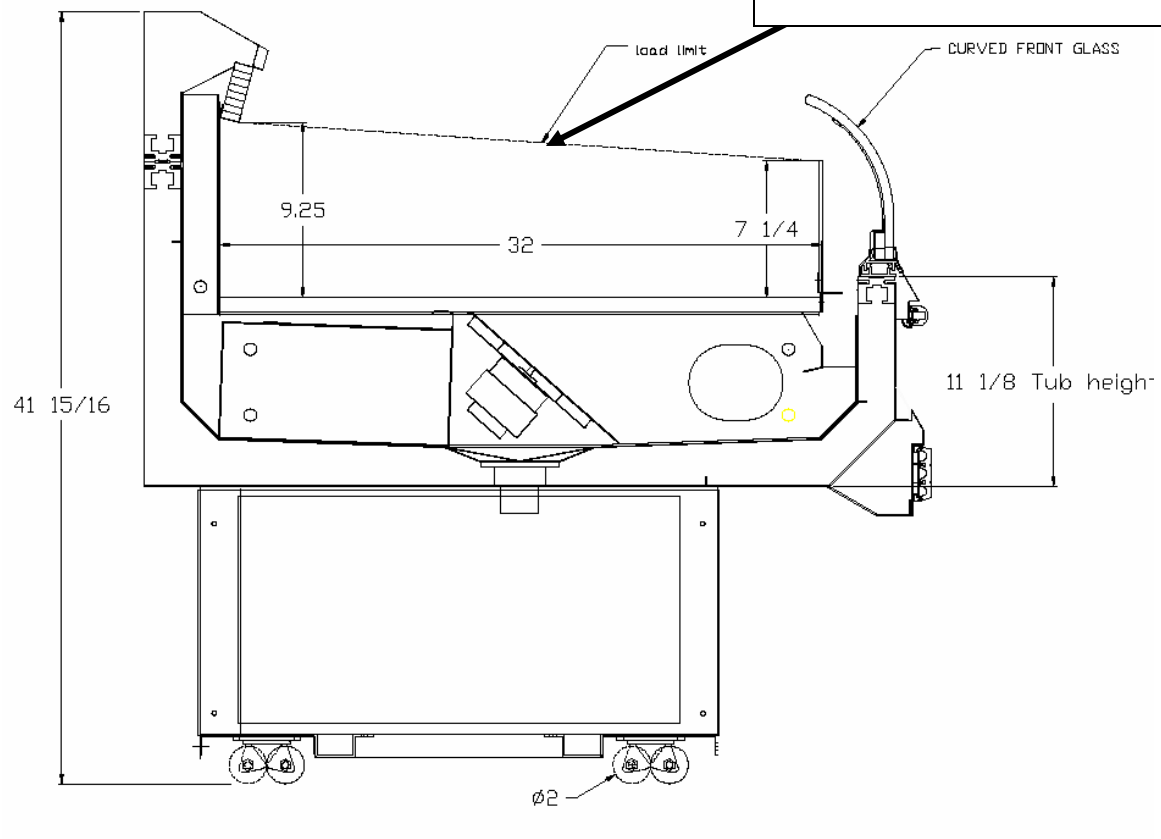


Operation

Loading

Merchandise should not be placed in the fixture until all controls have been adjusted and the case is at the proper temperature. **AT NO TIME SHOULD THE CASE BE STOCKED BEYOND THE LOAD LINE.**

All cases have load limit line markings. Product must be kept within the load limit line for cases to function properly.



Do not place product in cases until it is at proper operating temperature. Air discharge and return flues must remain open and free of debris or obstruction at all times to provide proper refrigeration and air current performance. Do not allow any product, signs, debris, etc. to block these grilles. Do not use any non-approved shelving, display racks or any accessory that could hamper air current performance.

 Warning! **Do not walk on top of the cases!** This could result in damage to the case and serious personal injury could occur. These cases are not designed to support excessive external weight. Do not use top of cases for storage.

Normal Operation

1. Off-Cycle Defrost is standard on these models and the fans run continuously.

Cleaning

As a general rule, always use mild soap and water to wipe the case down. Special precautions must be taken when cleaning some components of the case.

Exterior surfaces should be cleaned with warm water and mild soap to protect and maintain the finish. **Do not use cleaners containing abrasive materials or ammonia, which will scratch or dull the finish.** The waste outlet should be flushed with water following each cleaning.

Interior surfaces may be cleaned with most mild soap formulas, ammonia based cleaners and sanitizing solutions with no harm to the surface.

 **WARNING! Always shut power off during the cleaning process. Cleaning the case with electrical power applied is a shock hazard that may cause serious injury or death.**

 **WARNING! DO NOT USE HOT water on COLD glass surfaces. This could cause the glass to shatter and could result in personal injury. Glass fronts and ends should be warm before applying hot water.**

 Caution: The following could damage the case:

Do not use solvent, oil or acidic-based cleaners on any interior surfaces as the surface may become damaged.

Do not use abrasive cleaners and scouring pads as these will mar the finish.

Never introduce water into the case faster than the waste outlet can release it.

DO NOT USE STEAM OR HIGH PRESSURE SYSTEMS TO CLEAN THE CASE AS SEALS MAY BE BROKEN WHICH WILL CAUSE THE CASE TO LEAK.

Condensing Units

Follow the previous general cleaning of the interior and exterior parts with the exception of DO NOT USE WATER HOSE to clean evaporator or tub of the case.

Caution: Condensing units should have at least 18” clearance from any wall or other obstruction in order to operate properly.

WARNING! Always shut power off at the main breaker during the cleaning process. Cleaning the case or condensing unit with electrical power applied is a shock hazard that may cause serious injury or death.

Caution: **DO NOT FLUSH WITH WATER.** This case is not connected to a drain system and has its own evaporating pan with limited capacity.

Condensing Units: Once a month compressed air should be blown through evaporator to clear any debris or dust – opposite to direct normal air flow.

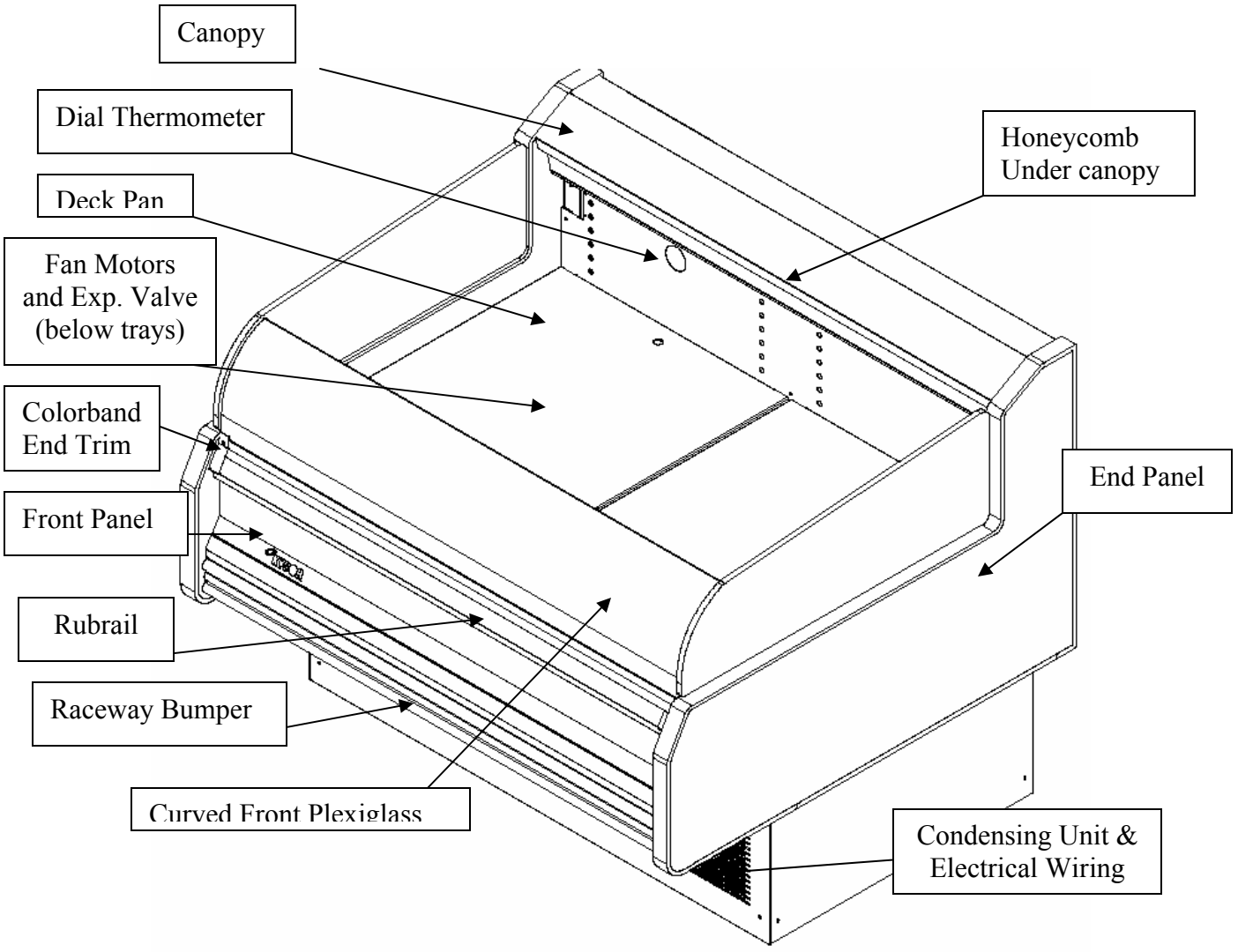
Caution**:** Care should be taken with compressed air. Debris and dust may be blown into eyes.

Note: Do not stack anything that may block airflow in front of louvers or rear of case. Self-contained cases draw air from back to front and blocking this airflow will cause case to overheat and shut down.

Honeycomb Assembly

Honeycomb should be cleaned every 6-8 months, depending on store conditions. The honeycomb may be cleaned with a vacuum cleaner or removed to be washed with soap and water. The honeycomb must be completely dry before returning it to the case.

Parts List and Drawings



Note: Standard parts are provided in the parts lists. Cases may be equipped with specialty parts that were incorporated into the case(s) at the time they were manufactured. It is important to have the case serial number when contacting Kysor//Warren for replacement parts.

Parts List QM1LVC1

Description	4’
Expansion Valve	03A25202
Evap Fan Motor STD	09A10040
Evap Fan Blade	09B10032
Fan Wiring Harness	10M10144
Curved Front Plexiglass	13A10399
Plexiglass Wing End	13A10674
Honeycomb White	13A15012
Honeycomb Black	13A15054
Condensate Drain Pan (1000 Watt)	28H12042

Standard parts are listed. Individual cases may have options different than listed and the serial number for these cases is required when ordering parts.

Warranty

IN THE CONSTANT EFFORT TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO CHANGE AT ANY TIME SPECIFICATIONS, DESIGN, OR PRICES WITHOUT INCURRING OBLIGATION.

One-Year Warranty

KYSOR//WARREN warrants to the original purchaser this new equipment and all parts thereof, to be free from defects in material and workmanship under normal use and service. If any part or parts of the equipment should prove defective during the period of one year from installation date (not to exceed one year and thirty days from the date of original shipment from the factory), KYSOR//WARREN hereby guarantees to replace or repair, without charge (F.O.B. Columbus, Georgia), such part or parts as proven defective, and which KYSOR//WARREN’S examination disclosed to its satisfaction to be thus defective, with a new or functionally operative part. The liability of KYSOR//WARREN under this warranty shall be limited to claims made by the original purchaser to KYSOR//WARREN or its local distributor within the warranty period.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED OR STATUTORY, INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS, AND ALL OTHER OBLIGATIONS OR LIABILITIES OF KYSOR//WARREN.

I. GLAZING:

Glass is not guaranteed against breakage. If this refrigerator is equipped with a glazing assembly carrying the manufacturer's brand name (Thermopane, Twindow, etc.), the manufacturer's glazing warranty in effect at the time of this shipment is extended to that assembly. It is void outside the continental United States.

II. BULBS:

Light bulbs and fluorescent lamp tubes are not covered by any warranty for length of life or for any type of breakage.

III. THIS WARRANTY SHALL NOT APPLY:

1. To the condensing case used with refrigerated equipment unless it was sold and shipped by KYSOR//WARREN.
2. When this equipment or any part thereof is damaged by fire, flood, act of God, or when the original model and serial number plate has been altered, defaced, or removed.
3. When this equipment or any part thereof is subject to accident, alteration, abuse, misuse, tampering, operation on low or improper voltages, or is put to a use other than recommended by KYSOR//WARREN.
4. When this equipment or any part thereof is damaged, or when operation is impaired, due to failure to follow installation manual (improper installation is the responsibility of the installer).
5. Outside the continental United States, Canada and Mexico.
6. To labor cost for replacement of parts, or for freight or shipping expenses.
7. To freight or shipping charges or to customs duties to any country.
8. If the Warranty holder fails to comply with all the provisions, terms and conditions of this Warranty.

Parts replaced under this Warranty are warranted only through the remainder of the original Warranty. KYSOR//WARREN may, at its option and in its discretion, elect to honor this Warranty and to disregard the original purchaser's non-compliance with any of the provisions, terms and conditions of the Warranty.

THIS WARRANTY DOES NOT COVER CONSEQUENTIAL DAMAGES. KYSOR//WARREN shall not be liable under any circumstances for any consequential damages, including loss of profits, additional labor costs, loss of refrigerant or food products, or injury to person or property caused by defective material or parts or for any delay in the performance of this Warranty due to causes beyond its control. The foregoing shall constitute the sole and exclusive remedy of any purchase and the sole and exclusive liability of KYSOR//WARREN in connection with this product.

Parts Warranty Policy

The following procedures are in accordance with Kysor//Warren's standard one-year warranty, which covers any part to be free of defects under normal use and service for one year from the date of installation. **Not to exceed one year and thirty days from the date of original shipment from the factory.**

New Equipment Parts Shortages and Defects

Any parts shortages or damage must be reported to Kysor//Warren no more than 10 working days from the date of delivery. After this time has expired Kysor//Warren will assume the parts were lost during installation and all parts required will be charged cost plus shipping to replace.

Parts Ordering Procedure

All parts must be ordered through the Kysor//Warren parts department with the following information:

- Store Name and Number
- Location
- Case or Case Model and Serial Number
- Firm or Contractor Placing Order
- Shipping Address
- Parts Description
- Reason for Defect

If the order is for a replacement part still in warranty a Purchase Order Number will be required from the contractor placing the order. We will then issue a Return Material Authorization Tag (RMA) that will be sent to the firm or contractor who has ordered the part.

Return Authorization Procedure

Warranty parts must be returned postage prepaid to Kysor//Warren within 30 days from replacement part ship date and must be accompanied by a RMA in order to ensure the proper credit. The RMA should also be written on the outside of the box. Any parts not returned within 30 days will be invoiced to the firm or contractor who has placed the order.

IN THE CONSTANT EFFORT TO IMPROVE OUR PRODUCTS, WE RESERVE THE RIGHT TO CHANGE AT ANYTIME SPECIFICATIONS, DESIGN, OR PRICES WITHOUT INCURRING OBLIGATION.

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Kysor//Warren, whose policy is one of continuous improvement, reserves the right to change at anytime, these specifications, designs or prices without incurring obligation.

KYSOR/WARREN

HEATCRAFT
Worldwide Refrigeration