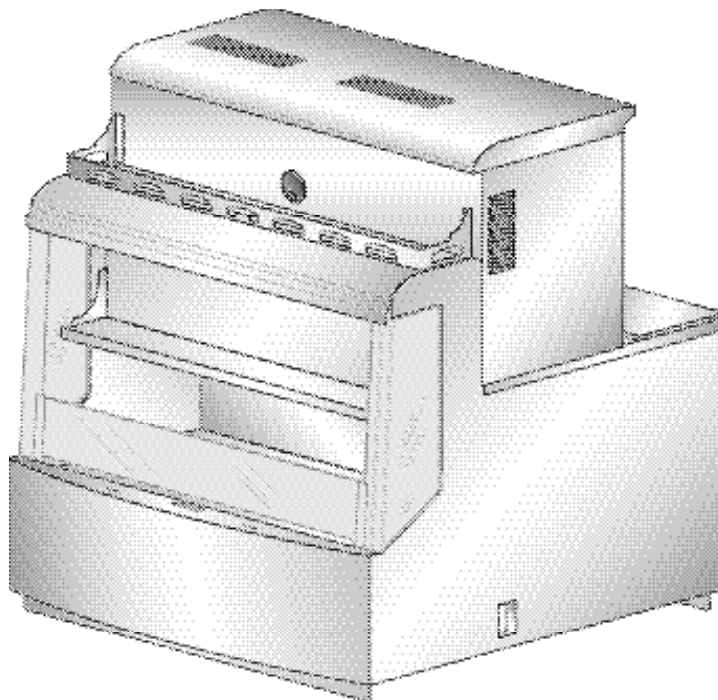




Your Solutions Partner

SUBWAY RFM-51



**Please read this manual completely before attempting
to install, operate or service this equipment**

This document is prepared for trained Duke service technicians. It is not to be used by anyone not properly qualified to perform these procedures.

This Service Manual is not all encompassing. If you have not been trained on servicing this product, be sure to read the manual completely before attempting servicing. Be sure all necessary tools, test equipment, and skills are available. Those procedures for which you do not have the proper skills and test equipment must be performed only by a qualified Duke trained service technician.

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IMPORTANT WARNING AND SAFETY INFORMATION

THIS MANUAL HAS BEEN PREPARED FOR PERSONNEL QUALIFIED TO INSTALL ELECTRICAL EQUIPMENT, WHO SHOULD PERFORM THE INITIAL FIELD STARTUP AND ADJUSTMENTS OF THE EQUIPMENT COVERED BY THIS MANUAL.

READ THIS MANUAL THOROUGHLY BEFORE OPERATING, INSTALLING OR PERFORMING MAINTENANCE ON THE EQUIPMENT.

FAILURE TO FOLLOW INSTRUCTIONS IN THIS MANUAL CAN CAUSE PROPERTY DAMAGE, INJURY OR DEATH.

⚠ WARNING DO NOT USE OR STORE GASOLINE OR OTHER FLAMMABLE VAPORS OR LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.

⚠ WARNING DO NOT OPERATE THIS EQUIPMENT WITHOUT PROPERLY PLACING AND SECURING ALL COVER AND ACCESS PANELS.

⚠ WARNING Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing this equipment.

FOR YOUR SAFETY

Electricity and water do not mix. Unplug the unit before cleaning. If repairs are required, use a qualified service agent. While repairs are being made, be sure the unit is not plugged in. Do not store highly combustible substances on or near the unit. Be sure the compressor compartment has adequate ventilation.

CAUTION

Observe the following:

- Provide and maintain adequate minimum clearances from all walls and combustible materials.
- Provide and maintain adequate clearance for air openings.
- Keep the equipment area free and clear of combustible material.
- Operate equipment only on the type of electricity indicated on the specification plate.
- Retain this manual for future reference.

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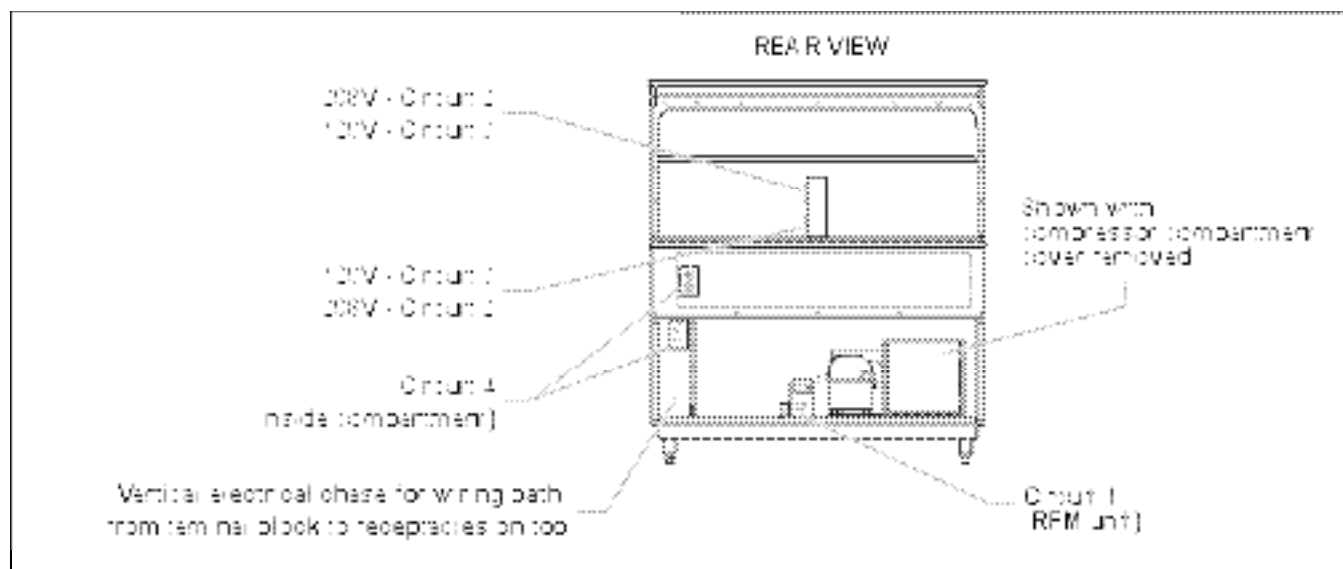
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GENERAL

ELECTRICAL DATA

This unit was shipped from the factory assembled and requires only the necessary electrical connections. There are four separate circuits. The terminal block for the electrical connections is located inside behind the front décor panel assembly. The unit is designed to be operated on one (1) 20 amp dedicated circuit named 'Circuit 1'. The unit must be grounded. The

receptacle, wired circuit, and protection must meet the required local codes for proper operation. There are 2 receptacles mounted on top. These are named 'Circuit 2' and 'Circuit 3'. There is also a receptacle mounted in the rear compressor compartment. This is named 'Circuit 4'. Refer to the illustration below for locations.



Market	Model	Volts	Circuit size AMPS	Power Supply	Equipment
USA and Canada	Circuit 1	120V, 60Hz, 1 ph	20.0	3-wire: L1, N, G min. 90° C	Refrigeration System
	Circuit 2	208V, 60 Hz, 1 ph	30.0	3-wire: L1, L2, G min. 90° C	Speed Oven
	Circuit 3	120V, 60 Hz, 1 ph	20.0	3-wire: L1, N, G min. 90° C	Counter-Top PHU
	Circuit 4	120V, 60 Hz, 1 ph	20.0	3-wire: L1, N, G min. 90° C	Under-Counter PHU/ Optional Condensate Evaporator Pan
Mainland Europe	Circuit 1	230V, 50Hz, 1 ph	16	3-wire: L1, N, G min. 90° C	Refrigeration System
	Circuit 2	400V, 50 Hz, 3 ph	32	5-wire: L1, L2, L3 N, G min. 90° C	Speed Oven
	Circuit 3	230V, 50 Hz, 1 ph	16	3-wire: L1, N, G min. 90° C	Counter-Top PHU
	Circuit 4	230V, 50 Hz, 1 ph	16	3-wire: L1, N, G min. 90° C	Under-Counter PHU/ Optional Condensate Evaporator Pan

INSTALLATION

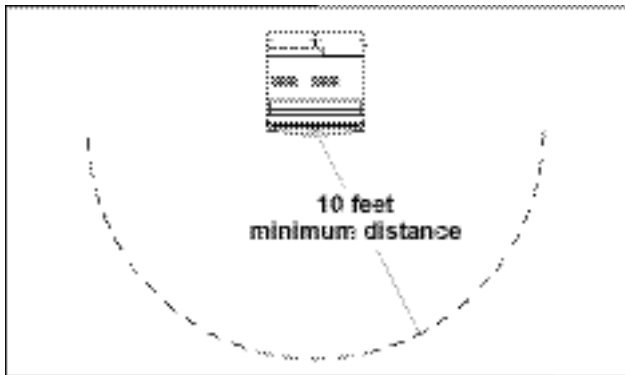
LOCATION

The unit represented in this manual is intended for indoor use only. Be sure the chosen location has a floor strong enough to support the total weight of the unit. Reinforce the floor if necessary to provide for maximum loading.

The outline drawing for the unit is shown below.

Provide adequate space along the front and back taking care to not block airflow to the fan. Be sure that the unit has access to ample air; avoid hot corners and locations near stoves and ovens.

The 915K RFM (refrigerated open air merchandiser) should be located where it is not subject to direct rays of the sun, HVAC ducts, ceiling fans or exterior doors. Excessive air movement across the RFM may cause the unit to work harder to maintain the set point temperature. For optimal performance and lowest energy usage Duke Manufacturing recommends the RFM be located a minimum horizontal distance of 10 feet from the front center of the RFM to any HVAC ducts, ceiling fans, or entry doors.



The unit requires a minimum of 12.0" clearance at the rear of the unit for air discharge. Do not locate the unit with back tight against the wall.

Note the following:

- Excessive airflow into merchandiser may cause elevated temperatures.
- Minimum clearance at the rear of the unit for air discharge is 12.0".

LEVELING

Be sure that the unit is placed on a firm, flat surface/floor. Check for cracks in flooring or tile and avoid these areas if possible. If necessary place support pads, properly rated for the weight of the unit, to "bridge" uneven or cracked flooring. Level unit accordingly. The unit is provided with adjustable feet.

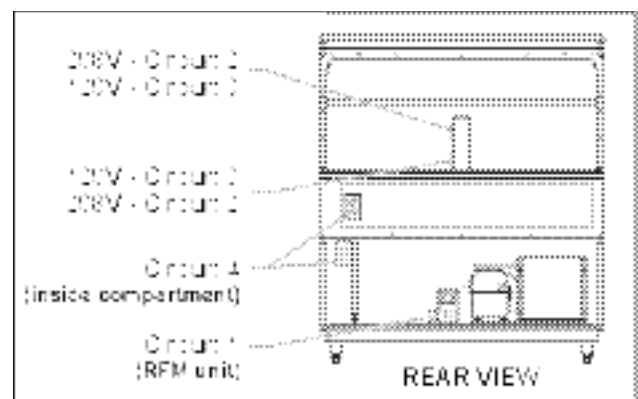
Stabilizing

Use the leg adjustments to insure that the unit is solid to the floor surface at all four contact points. Insure that the unit does not "rock" when pressure is applied to the top corners.

ELECTRICAL CONNECTION

There are 4 separate circuits. The unit must be grounded. The receptacle, wired circuit and protection must meet all required local codes for proper operation. All electrical connections should be performed by a certified electrician and should comply with local electrical codes for your municipality.

This unit was shipped from the factory assembled and requires only the necessary electrical connections. The terminal block for the electrical connections is located inside behind the front décor panel assembly. The unit is designed to be operated on one (1) 20 amp dedicated circuit named 'Circuit 1'. The unit must be grounded. The receptacle, wired circuit, and protection must meet the required local codes for proper operation. There are 2 receptacles mounted on top. These are named 'Circuit 2' and 'Circuit 3'. There is also a receptacle mounted in the rear compressor compartment. This is named 'Circuit 4'. Refer to the illustration below for locations.



IMPORTANT: For US and Canada - L1 to Neutral must be 120 volts AC. For 230V international applications: This is a Class A appliance and is not intended for use on public electrical mains.

All the electrical connections are made at the terminal block located behind electrical cover access panel. The electrical chase is provided in the unit and will line up with adjacent unit corresponding electrical chase. The electrical chase is a pass through chase to feed power to downstream equipment.

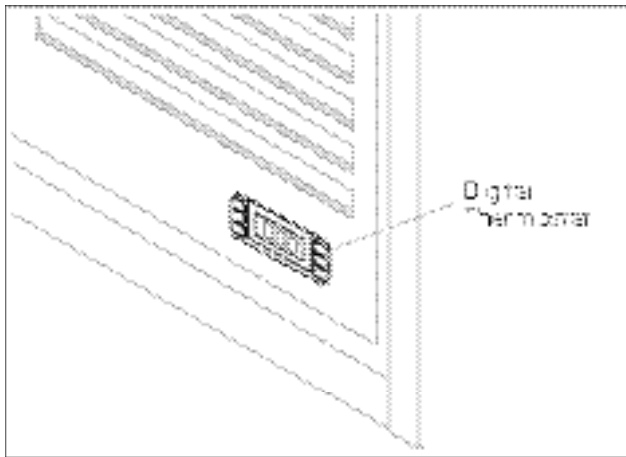
⚠ WARNING REFER TO THE AMPERAGE DATA LIST IN THE SPECIFICATIONS OR THE SERIAL TAG DATA AND YOUR LOCAL CODE OR THE NATIONAL ELECTRICAL CODE TO BE SURE UNIT IS CONNECTED TO THE PROPER POWER SOURCE. A PROTECTED CIRCUIT OF THE CORRECT VOLTAGE AND AMPERAGE MUST BE RUN FOR CONNECTION OF THE SUPPLY CORD OR PERMANENT CONNECTION TO THE UNIT. THE POWER MUST BE TURNED OFF AND DISCONNECTED WHENEVER PERFORMING MAINTENANCE OR REPAIR FUNCTIONS.

PARTS REPLACEMENT

DIGITAL THERMOSTAT

⚠ WARNING THE POWER MUST BE TURNED OFF AND DISCONNECTED AT ALL TIMES DURING MAINTENANCE OR REPAIR FUNCTIONS.

1. Disconnect the unit from its power source.
2. Remove the Compressor Compartment Panel.
3. Tag and disconnect the Digital Thermostat wiring.
4. Remove the Digital Thermostat Probes from the Evaporator Coil, which is located above the Refrigeration Assembly.
5. Remove the Digital Thermostat from the Control Panel by pushing in the tabs on the mounting brackets.



6. Install the replacement Digital Thermostat.

NOTE: Do not kink Digital Thermostat probes.

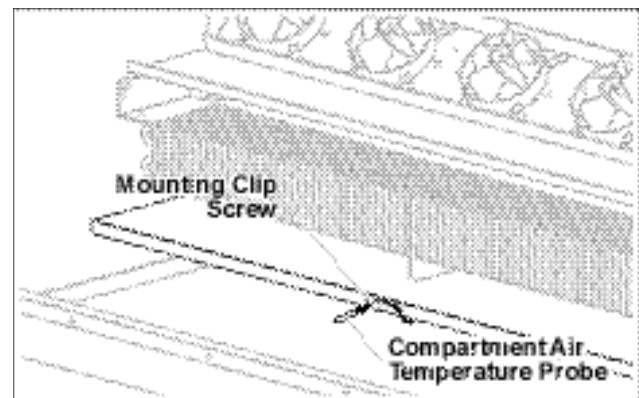
7. Install the Digital Thermostat probes onto the Evaporator Coil.
8. Refer to the tags to reconnect the Digital Thermostat wiring.
9. Install the Control Panel and Louvered Panel.
10. Connect the unit to its power source and check for proper operation.

Additional adjustment to the Digital Thermostat may be required.

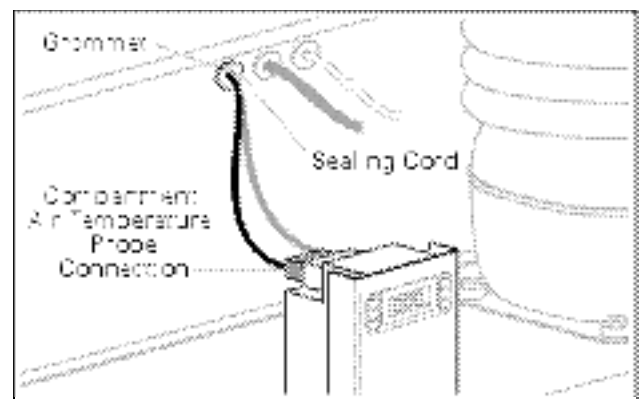
COMPARTMENT AIR TEMPERATURE PROBE

⚠ WARNING THE POWER MUST BE TURNED OFF AND DISCONNECTED AT ALL TIMES DURING MAINTENANCE OR REPAIR FUNCTIONS.

1. Disconnect the unit from its power source.
2. Remove the Compressor Compartment Panel.
3. Remove the Back Inner Panel.
4. Remove The Top Inner Panel.
5. Remove the screw from the mounting clip and remove sensor from clip.



6. From the rear of the unit, pull the sensor wire through to the back.
7. Locate and disconnect sensor wires from plug on back of temperature controller.

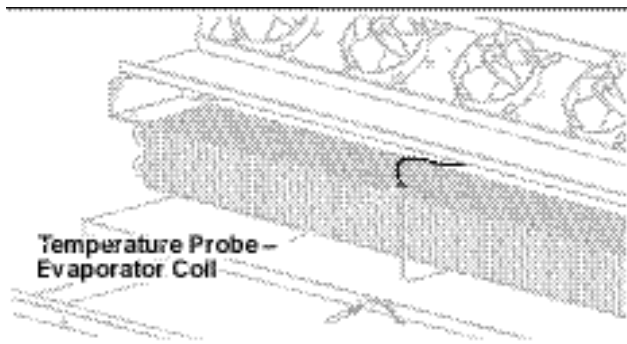


8. Remove Sealing Cord from grommet.
9. Reverse these procedures to install a replacement Sensor.
10. Seal opening with Sealing Cord.

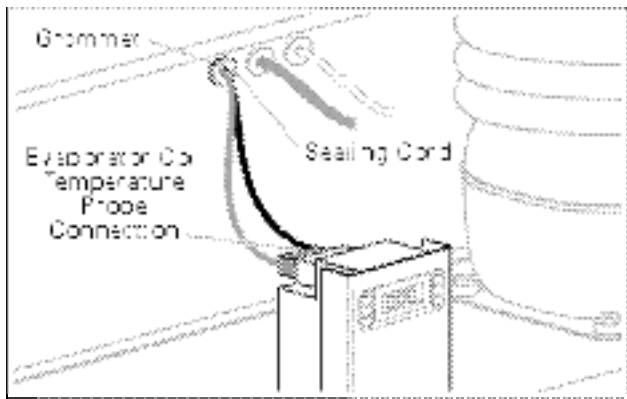
TEMPERATURE PROBE – EVAPORATOR COIL

⚠ WARNING THE POWER MUST BE TURNED OFF AND DISCONNECTED AT ALL TIMES DURING MAINTENANCE OR REPAIR FUNCTIONS.

1. Disconnect the unit from its power source.
2. Remove the Compressor Compartment Panel.
3. Remove the Back Inner Panel.
4. Remove The Top Inner Panel.
5. Remove the screw from the mounting clip.



6. From the rear of the unit, pull the sensor wire through to the back.
7. Locate and disconnect sensor wires from plug on back of temperature controller.

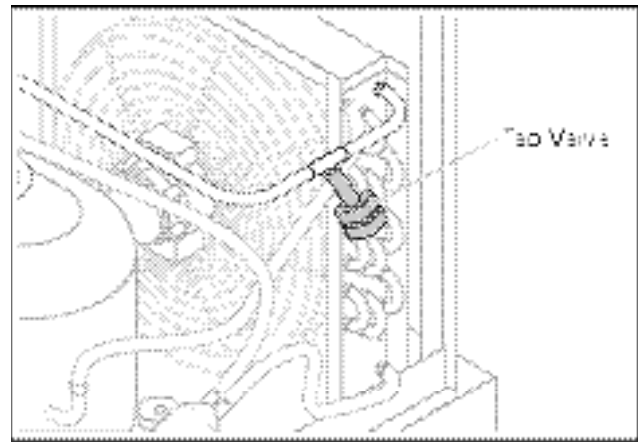


8. Clean sealant from opening.
9. Reverse these procedures to install a replacement Sensor.
10. Seal opening with appropriate sealant.

EXPANSION VALVE

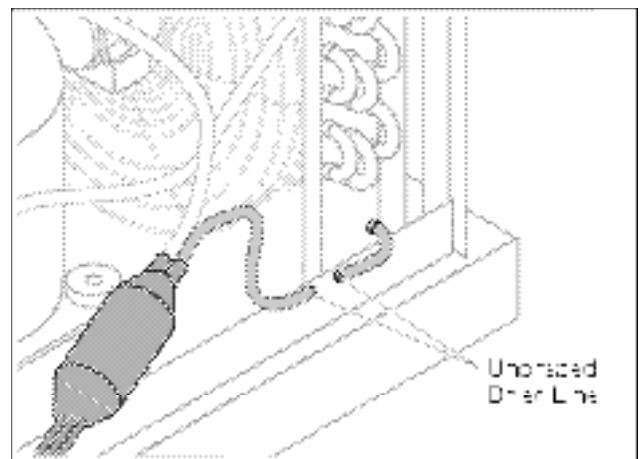
⚠ WARNING THE POWER MUST BE TURNED OFF AND DISCONNECTED AT ALL TIMES DURING MAINTENANCE OR REPAIR FUNCTIONS.

1. Disconnect the unit from its power source.
2. Remove the Compressor Compartment Panel.
3. To properly recover refrigerant, install a Line Tap Valve only on High Process side tube, see the illustration below.

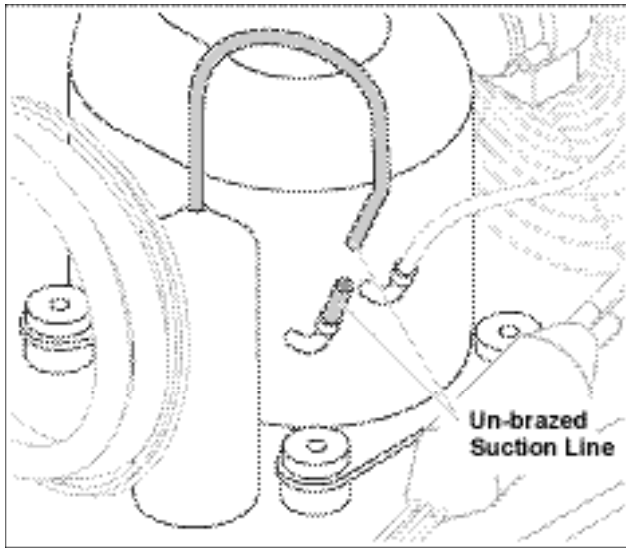


NOTE: Using a Refrigeration-Charging Unit, evacuate refrigerant from the system according to Duke Manufacturing Service Bulletin Number 26. Refrigerant must be recovered in accordance with Federal, State and Local regulations.

4. Remove the insulation from the Suction Line at the Compressor. Be careful, as the Accumulator Insulation will be reused.
5. Un-braze the Drier from the Condenser Outlet; See the illustration below.



6. Un-braze the Suction Line from the Compressor, see the illustration below.



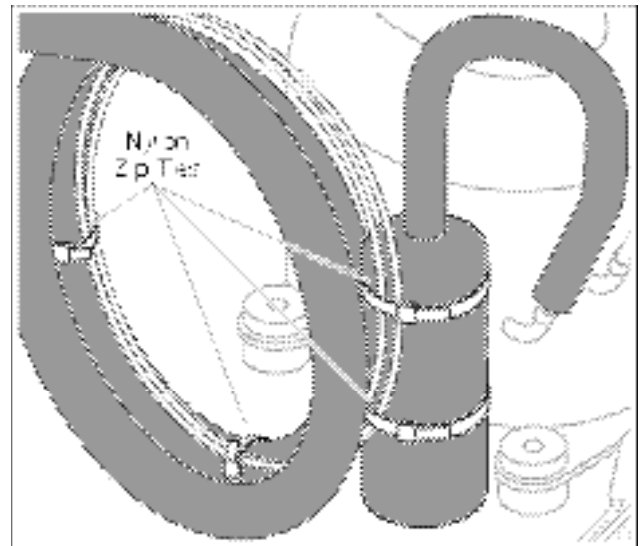
NOTE: Care should be given to support the Condensing unit once out of the cage.

7. Slide the Condensing unit out of the cage as far as possible.
8. Remove the insulation from each of the Evaporator Inlets and the Suction Line at the Manifold.
9. Cut each Evaporator Inlet Tube 1" from the end of the Expansion Valve. Cut the Suction Line 4" from the Manifold. Remove the Expansion Valve.
10. Install the new Expansion Valve and braze in place.
11. Reinstall the Condensing unit; braze the Suction Line to the Compressor and the Drier connection to the Condenser Outlet.
12. Leak check the system.
13. Re-insulate the Evaporator Inlets, Suction Line and Accumulator.
14. Evacuate the system to 500 microns or below.
15. Charge system according to Duke Manufacturing Service Bulletin Number 26.

NOTE: Service Bulletin Number 26 can be found in the SERVICE INFORMATION section of this manual.

Refrigerant information (134a)

- a. Refrigeration charge – Evap. pan or pump (Units not having condensate loop charge is 20 oz.)
 - b. Refrigeration charge – Hot Gas evaporator (Units with condensate loop charge is 26 oz.)
 - c. Superheat at:
 - 65°F ambient: 50° to 55°F evaporator out superheat;
 - 75°F ambient: 35° – 60°F
 - 80°F ambient: 45° – 80°F
 - d. Suction line Pressures In test situations at various ambient at:
 - 65°F ambient: 10 to 15 psi suction line pressure;
 - 75°F ambient: 10 – 20 psi
 - 80°F ambient: 5 – 25 psi
 - e. Suction line temps at various ambient at:
 - 65°F ambient: 55° to 70°F suction line temperature;
 - 75°F ambient: 55° – 80°F
 - 80°F ambient: 55° – 80°F
16. Pinch off and braze the Process Tubes shut.
 17. Using the nylon zip ties provided with the new Capillary Tube Assembly kit, secure the Capillary Tube to avoid abrading.



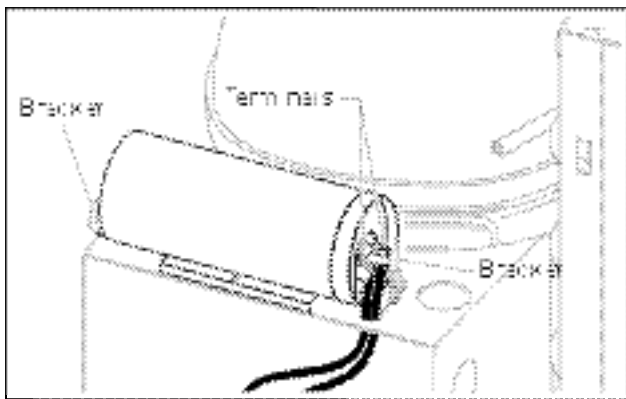
18. Secure the Capillary tubing to the Vapor tubing closest to the Accumulator. This is necessary to allow the Courtesy Loop to extend out for future service.

CAPACITOR

⚠ WARNING THE POWER MUST BE TURNED OFF AND DISCONNECTED AT ALL TIMES DURING MAINTENANCE OR REPAIR FUNCTIONS.

Some units may not have a Capacitor installed.

1. Disconnect the unit from its power source.
2. Remove the Compressor Compartment Panel to gain access
3. Locate the Capacitor in the Compressor Assembly.



⚠ WARNING THE CAPACITOR STORES ELECTRICAL ENERGY AND CAN DELIVER AN ELECTRICAL SHOCK. FULLY DISCHARGE THE CAPACITOR BEFORE REMOVING IT FROM THE UNIT. USE EXTREME CAUTION WHEN DISCHARGING THE CAPACITOR.

4. Discharge the Capacitor. Take a section of heavy gauge insulated wire with the ends stripped and bridge between the two terminals. Then bridge the wire from each terminal, one at a time, to a known ground. Repeat this process 3 times to assure the Capacitor is fully discharged.
5. Disconnect the wires from the faulty Capacitor.
6. Remove the faulty Capacitor from the bracket.
7. Reverse these procedures to install a replacement Capacitor.

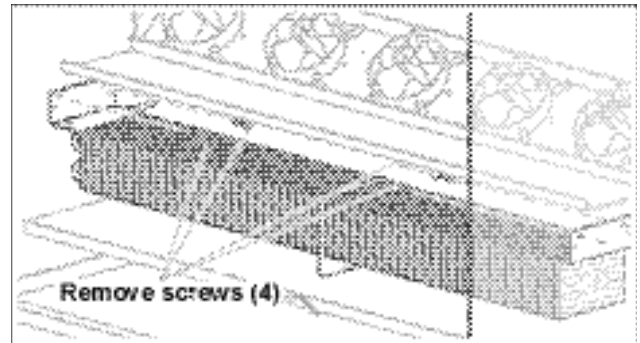
EVAPORATOR

⚠ WARNING THE POWER MUST BE TURNED OFF AND DISCONNECTED AT ALL TIMES DURING MAINTENANCE OR REPAIR FUNCTIONS.

1. Disconnect the unit from its power source.
2. Remove the Back Inner Panel.
3. Remove The Top Inner Panel.
4. Remove the Compressor Compartment Panel.
5. To properly recover refrigerant, install a Line Tap Valve only on High Process side tube.

NOTE: Using a Refrigeration-Charging Unit, evacuate refrigerant from the system according to Duke Manufacturing Service Bulletin Number 26. Refrigerant must be recovered in accordance with Federal, State and Local regulations.

6. Un-braze feeder lines at evaporator.
7. Loosen and remove screws that secure evaporator.



8. Remove evaporator from unit.
9. Install replacement evaporator and secure in place.
10. Charge system according to Duke Manufacturing Service Bulletin Number 26. See refrigerant charges page 9.

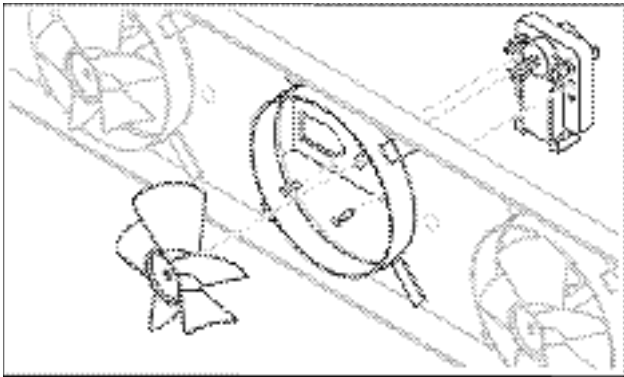
NOTE: Service Bulletin Number 26 can be found in the SERVICE INFORMATION section of this manual.

11. Test unit to ensure proper function.
12. Replace all panels.

EVAPORATOR FAN MOTOR

⚠ WARNING THE POWER MUST BE TURNED OFF AND DISCONNECTED AT ALL TIMES DURING MAINTENANCE OR REPAIR FUNCTIONS.

1. Disconnect the unit from its power source.
2. Remove the Back Inner Panel.
3. Remove The Top Inner Panel.
4. Disconnect wires to the fan motor.
5. Remove the fan blade.

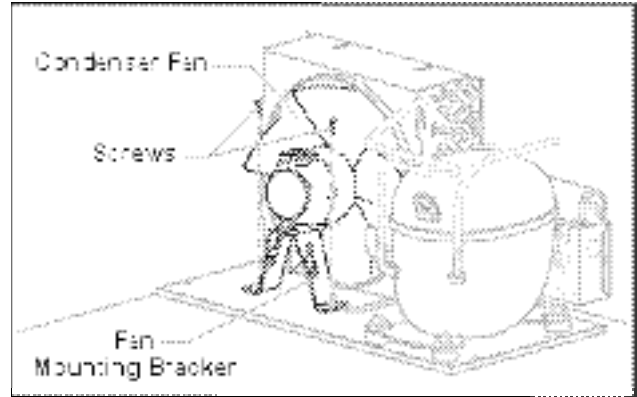


6. Remove the two fan motor mounting screws.
7. Remove the faulty fan motor.
8. Reverse these procedures to install a replacement Evaporator Fan Motor

CONDENSER FAN MOTOR

⚠ WARNING THE POWER MUST BE TURNED OFF AND DISCONNECTED AT ALL TIMES DURING MAINTENANCE OR REPAIR FUNCTIONS.

1. Disconnect the unit from its power source.
2. Remove the Compressor Compartment Panel.
3. Tag and disconnect the Fan wiring.
4. Remove the Fan Mounting Bracket screws.



5. Carefully lift the Fan, Mounting Bracket and Shroud out of unit.
6. Remove old Fan assembly from Mounting Bracket.
7. Reverse this procedure to install a new Fan.

COMPRESSOR / CONDENSING UNIT

⚠ WARNING THE POWER MUST BE TURNED OFF AND DISCONNECTED AT ALL TIMES DURING MAINTENANCE OR REPAIR FUNCTIONS.

The Refrigeration Assembly is accessed from the rear of the unit. Always replace the Compressor/ Condensing unit with the same type of unit that is currently installed.

1. Disconnect the unit from its power source.
2. Remove the Compressor Compartment Panel.
3. Using a Refrigeration-Charging Unit, evacuate refrigerant from the system according to Duke Manufacturing Service Bulletin Number 26.

NOTE: Service Bulletin Number 26 can be found in the SERVICE INFORMATION section of this manual.

4. Remove expansion valve and evaporator tubing from refrigeration assembly.
5. Remove Refrigeration Assembly mounting hardware.
6. Tag and disconnect wiring at Junction Box.
7. Remove Refrigeration Assembly out of unit.
8. Thoroughly clean the Refrigeration Assembly Compartment.

9. Install replacement Refrigeration Assembly into position.
10. Install Refrigeration Assembly Mounting Hardware.
11. Install the Expansion Valve and Evaporator Tubing from Refrigeration Assembly.
12. Using tags, connect the wiring at the Junction Box.
13. Connect unit to power source and test unit.
14. Charge system according to Duke Manufacturing Service Bulletin Number 26.

NOTE: Service Bulletin Number 26 can be found in the SERVICE INFORMATION section of this manual.

15. Reinstall the Compressor Compartment Panel.

EVAPORATOR ANTI-SWEAT HEATER (UPPER)

⚠ WARNING THE POWER MUST BE TURNED OFF AND DISCONNECTED AT ALL TIMES DURING MAINTENANCE OR REPAIR FUNCTIONS.

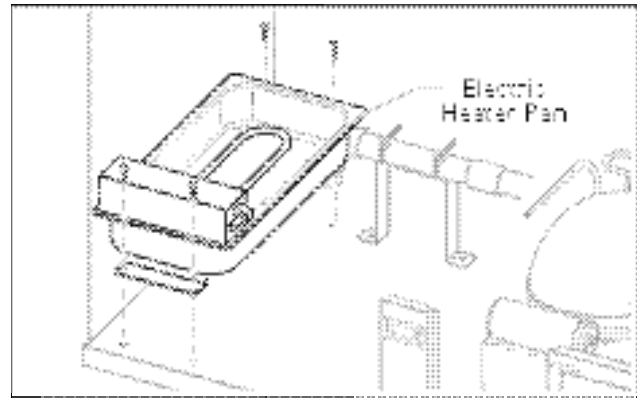
1. Disconnect the unit from its power source.
2. Remove the Back Inner Panel.
3. Remove The Top Inner Panel.
4. Cut element wires close to element.
5. Loosen and remove mounting screws.
6. Remove element from unit.
7. Reverse these procedures to install a replacement element.
8. Reattach wires with wire nuts.

EVAPORATOR HEATER/PAN (ELECTRIC)

⚠ WARNING THE POWER MUST BE TURNED OFF AND DISCONNECTED AT ALL TIMES DURING MAINTENANCE OR REPAIR FUNCTIONS.

1. Disconnect the unit from its power source.
2. Remove the Compressor Compartment Panel.
3. Unplug the power cord from circuit 4.

4. Loosen and remove the mounting screws.



5. Remove element/pan from unit.
6. Reverse these procedures to install a replacement element/pan.

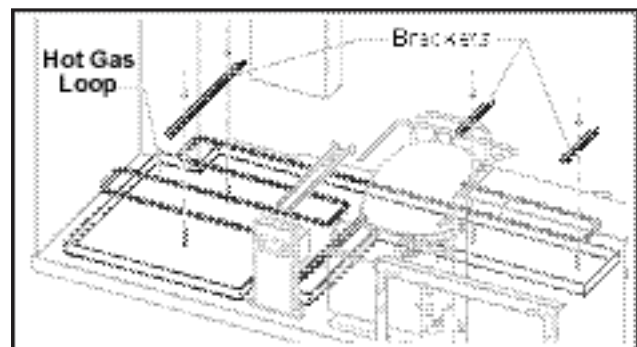
EVAPORATOR HEATER/PAN (HOT GAS)

⚠ WARNING THE POWER MUST BE TURNED OFF AND DISCONNECTED AT ALL TIMES DURING MAINTENANCE OR REPAIR FUNCTIONS.

1. Disconnect the unit from its power source.
2. Remove the Compressor Compartment Panel.
3. Using a Refrigeration-Charging Unit, evacuate refrigerant from the system according to Duke Manufacturing Service Bulletin Number 26.

NOTE: Service Bulletin Number 26 can be found in the SERVICE INFORMATION section of this manual.

4. Cut refrigerant lines close to the Hot Gas Loop/Pan and remove from the unit.
5. Loosen and remove 4 hex nuts on 2 retaining brackets.



6. Remove brackets and Hot Gas Loop.
7. Install replacement Hot Gas Loop and braze connections.
8. Connect unit to power source and test unit.
9. Charge system according to Duke Manufacturing Service Bulletin Number 26.

NOTE: Service Bulletin Number 26 can be found in the SERVICE INFORMATION section of this manual.

10. Reinstall the Compressor Compartment Panel.

LED LIGHTS

 WARNING THE POWER MUST BE TURNED OFF AND DISCONNECTED AT ALL TIMES DURING MAINTENANCE OR REPAIR FUNCTIONS.

1. Disconnect the unit from its power source.
2. Remove Front panel assembly to gain access.
3. Disconnect wire/plug to LED Light stick
4. Remove LED Light Stick from retaining clips.
5. Reverse these procedures to install a replacement LED Light Stick.

LED POWER SUPPLY

 WARNING THE POWER MUST BE TURNED OFF AND DISCONNECTED AT ALL TIMES DURING MAINTENANCE OR REPAIR FUNCTIONS.

1. Disconnect the unit from its power source.
2. Remove Front Panel to Gain Access.
3. Disconnect wires/plug from LED Light Stick.
4. Disconnect electric supply wires.
5. Remove mounting screws from Power supply
6. Remove LED Power Supply from unit
7. Reverse these procedures to install a replacement LED Light Stick.

SERVICE INFORMATION

RECHARGING REFRIGERATION SYSTEM

General

To analyze the performance of a refrigeration system, temperature readings are recorded and converted to pressure readings using a standard pressure/temperature chart.

When it is necessary to service a factory sealed refrigeration system and return it to its properly sealed condition, strictly adhere to the following approved procedure.

Tools

Standard hand and refrigeration tools

Refrigerant Type: See refrigerant charges page 9.

Charging Procedure

NOTE: Prior to refrigeration system service, special care must be taken during the evacuation process to remove air, moisture and other non-condensables from the system. Duke Manufacturing recommends the following triple evacuation method. Failure to follow this procedure may result in poor refrigeration system performance.

1. Evacuate system to 1500 microns
2. Break vacuum to 2 psig with dry nitrogen. If dry nitrogen is unavailable, use same type of refrigerant as used in system.
3. Evacuate system to 1500 microns.
4. Break vacuum to 2 psig with dry nitrogen. If dry nitrogen is unavailable, use same type of refrigerant as used in system.
5. Evacuate system to 500 microns.

The system is now ready to receive refrigerant charge according to information on data plate.

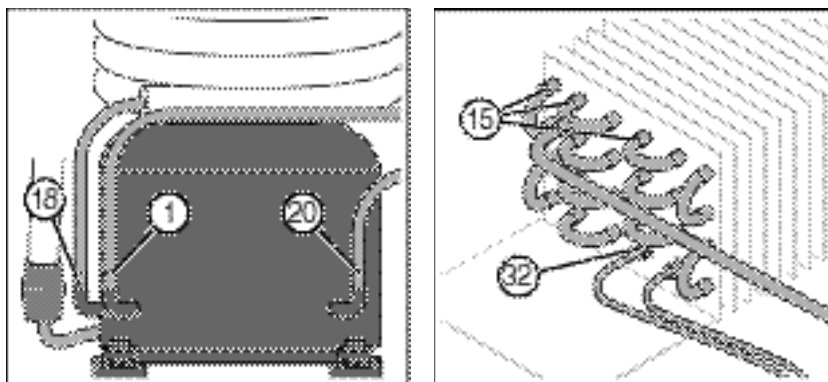
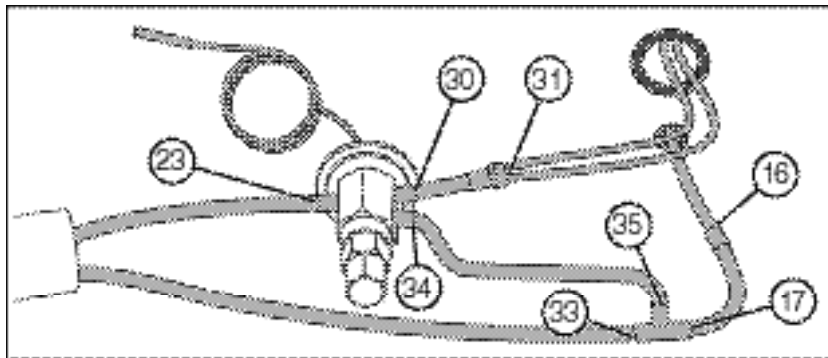
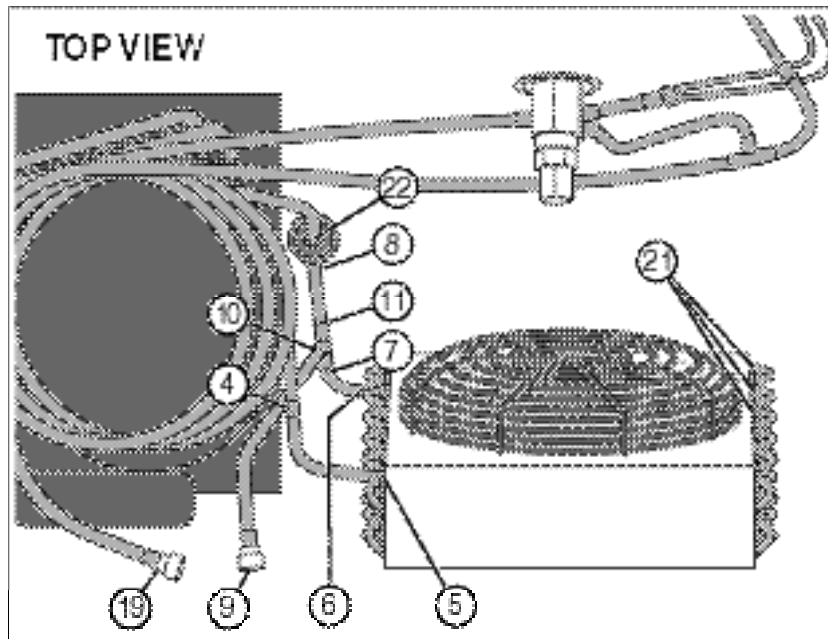
⚠ WARNING: Never use oxygen or acetylene in place of dry nitrogen or refrigerant for leak testing. A violent explosion may result causing property damage, personal injury or death. When using nitrogen to pressure test, always use a pressure regulator. Failure to do so will result in extremely high pressure of the compressor or other system components and result in property damage, personal injury or death.

NOTE: Prior to repair; ensure there is enough process hose (approximately 12") present to complete the repair using the above procedure. If not, install a new process hose before repair sequence.

1. Install a temporary access valve on the high and low side of process hoses as close to factory crimps as possible.
2. Use temporary valves to perform repair. Duke Manufacturing will not reimburse the cost of permanently installed valves.
3. After completing repair, evacuate system using the triple evacuation method described in Duke Manufacturing Service Bulletin Number 26.
4. After completing proper evacuation method, recharge system, using proper refrigerant according to information on data plate.
5. Continue crimping process hose just below temporary valve and again 2" below crimp.
6. With crimp tool in place, remove temporary valve.
7. Braze shut end of process hose.
8. Allow to cool for about 5 minutes.
9. Remove crimp tool.
10. Check brazed end for leaks.

RFM REFRIGERATION SYSTEM JOINT MAPPING DIAGRAM

In the event a leak is found in production, use the following list to document the joint repaired.



- 1 – Outlet from compressor toward condenser.
- 4 – Inlet to condenser – A
- 5 – Inlet to condenser – B
- 6 – Outlet from condenser – A
- 7 – Outlet from condenser – B
- 8 – Inlet to filter/drier from condenser
- 9 – High pressure process tube termination
- 10 – High pressure process tube inlet to filter/drier -A
- 11 – High pressure process tube inlet to filter/drier – B
- 15 – Evaporator coil elbows (multiple)
- 16 – Outlet from evaporator to compressor – A
- 17 – Outlet from evaporator to compressor – B
- 18 – Inlet to compressor from evaporator
- 19 – Low pressure process tube termination
- 20 – Inlet to compressor from low pressure process tube
- 21 – Condenser coil elbows (multiple)
- 22 – Outlet from filter/drier to service loop
- 23 – Inlet to TXV from service loop
- 30 – Outlet from TXV to distributor
- 31 – Distributor to evaporator feeder tubes
- 32 – Feeder tubes to evaporator
- 33 – Outlet from evaporator to compressor – C.
- 34 – Outlet from TXV to equalizer tube.
- 35 – Outlet from equalizer tube to evaporator.

SERVICE BULLETIN NUMBER 26 - NOVEMBER 12, 2003

Refrigeration System Evacuation Process

⚠ WARNING: NEVER USE OXYGEN OR ACETYLENE IN PLACE OF REFRIGERANT AND DRY NITROGEN FOR LEAK TESTING. A VIOLENT EXPLOSION MAY RESULT, CAUSING PERSONAL INJURY OR DEATH.

⚠ WARNING: ALWAYS USE A PRESSURE REGULATOR WHEN USING NITROGEN TO PRESSURE TEST. FAILURE TO DO SO WILL RESULT IN EXTREMELY HIGH PRESSURE, WHICH COULD EXCEED THE BURST PRESSURE OF THE COMPRESSOR OR OTHER SYSTEM COMPONENTS AND RESULT IN PERSONAL INJURY OR DEATH.

When service of the refrigeration system is necessary, care must be given during the evacuation process to ensure removal of air, moisture and other non-condensables from the system. To evacuate a system properly, Duke Manufacturing recommends a triple evacuation procedure outlined below. Failure to follow this process could cause poor performance of the refrigeration system.

1. Evacuate system to 1500 microns
2. Break the vacuum to 2 psig with dry nitrogen, if dry nitrogen is unavailable use the same type of refrigerant as used in the system
3. Evacuate system to 1500 microns
4. Break the vacuum to 2 psig with dry nitrogen, if dry nitrogen is unavailable use the same type of refrigerant as used in the system
5. Evacuate system to 500 microns

The system is now ready to receive the refrigerant charge per the data plate information.

MAINTENANCE

STAINLESS STEEL CARE

Cleaning

Stainless steel contains 70-80% iron, which will rust if not properly maintained. It also contains 12-30% chromium, which forms an invisible passive, protective film that shields against corrosion. If the film remains intact, the stainless steel will remain intact. However, if the film is damaged, the stainless steel can break down and rust. To prevent stainless steel breakdown, follow these steps:

CAUTION: Never use any metal tools. Scrapers, files, wire brushes or scouring pads (except for stainless steel scouring pads) will mar the surface.

CAUTION: Never use steel wool, which will leave behind particles that rust.

CAUTION: Never use acid-based or chloride-containing cleaning solutions, which will break down the protective film.

CAUTION: Never rub in a circular motion.

CAUTION: Never leave any food products or salt on the surface. Many foods are acidic. Salt contains chloride.

For routine cleaning, use warm water, mild soap or detergent and a sponge or soft cloth.

For heavy-duty cleaning, use warm water, a degreaser and a plastic, stainless steel or Scotch-Brite pad.

Always rinse thoroughly. Always rub gently in the direction of the steel grain.

Preserving & Restoring

Special stainless steel polishing cleaners can preserve and restore the protective film.

Preserve the life of stainless steel with a regular application of a high quality stainless steel polishing cleaner as a final step to daily cleaning.

If signs of breakdown appear, restore the stainless steel surface. First, thoroughly clean, rinse and dry the surface. Then, on a daily basis, apply a high-quality stainless steel polish according to manufacturer's instructions.

CLEANING THE CONDENSER COIL

⚠ WARNING THE POWER MUST BE TURNED OFF AND DISCONNECTED AT ALL TIMES DURING MAINTENANCE OR REPAIR FUNCTIONS.

Failure to maintain a clean condenser coil can cause high temperatures and excessive run times. Continuous operation with dirty or clogged condenser coils can result in compressor failure. Neglecting the condenser coil cleaning procedures will void the compressor warranty.

CAUTION: Never use high-pressure water to clean the condenser. High-pressure water can damage electrical components located at or near the condenser coil.

The condenser coil is located at and accessed to the rear of the unit. A vent cover protects the condenser from damage. The condenser coil requires regular cleaning and should be done every 60 days. However, if large amounts of dust and grease accumulate more often, clean the condenser coil every 30 days. For light dust, use a soft, non-wire brush. For heavier dust, use a vacuum cleaner or blow with compressed air.

For heavy grease, use a degreasing agent made specifically for condenser coils on refrigeration units. Spray the degreasing agent on the coil and then blow with compressed air. Never wash the condenser with high-pressure water. High pressure water can damage or bend the cooling fins on the condenser, reducing its efficiency.

Water can also damage the electrical components located near the condenser coil.

TROUBLESHOOTING

TROUBLESHOOTING CHART

Symptom	Cause	Remedy
Display cabinet area too warm	Unit not connected to electrical supply	Reconnect power supply
	Thermostat set wrong	Set thermostat to correct temperature
	Thermostat faulty	Replace Thermostat
	Condenser fan motor not running	Inspect and repair or replace fan
	Dirty Condenser coil	Clean coil
	Refrigerant leak	Find leak, repair and recharge system
Display cabinet area too cold	Thermostat set incorrectly	Set thermostat to correct temperature
	Thermostat is faulty	Replace Thermostat

If, after completing the above checks and adjustments, the system is still not performing to specification, access fittings should be installed on the system to determine operating pressures.

If system pressures fall within normal operating parameters (See refrigerant pressures, page 9) and the above symptoms still exist, the Expansion Valve and/or Drier assembly should be replaced.

LEAK TESTING

This procedure tests for leaks on the suction side of the unit. Perform this procedure to test for small leaks in the suction side of the unit.

1. Charge the unit using the instructions in the RECHARGING THE REFRIGERATION SYSTEM section of this manual, and DUKE SERVICE BULLETIN 26 (see page 16).
2. Turn the unit on and run it through a full cycle.

3. While the unit is operating, remove the insulation from the Manifold and all Suction Line joints.
4. Turn the unit off and wait for at least two minutes to allow it to stabilize.

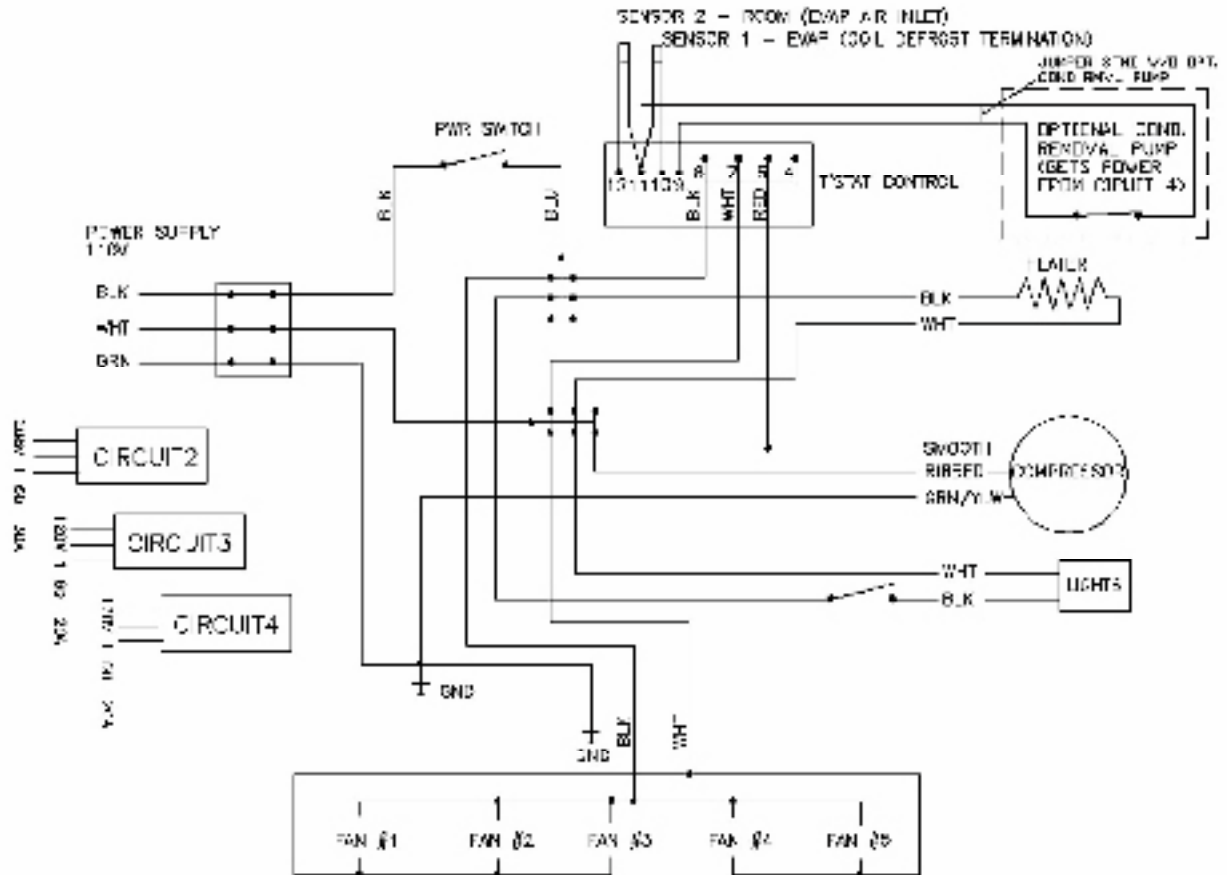
NOTE: Waiting two minutes allows pressure to build up on the low side (suction side) of the unit.

5. Using an Electronic Leak Detector, slowly check the Manifold and Suction Joints for leaks.

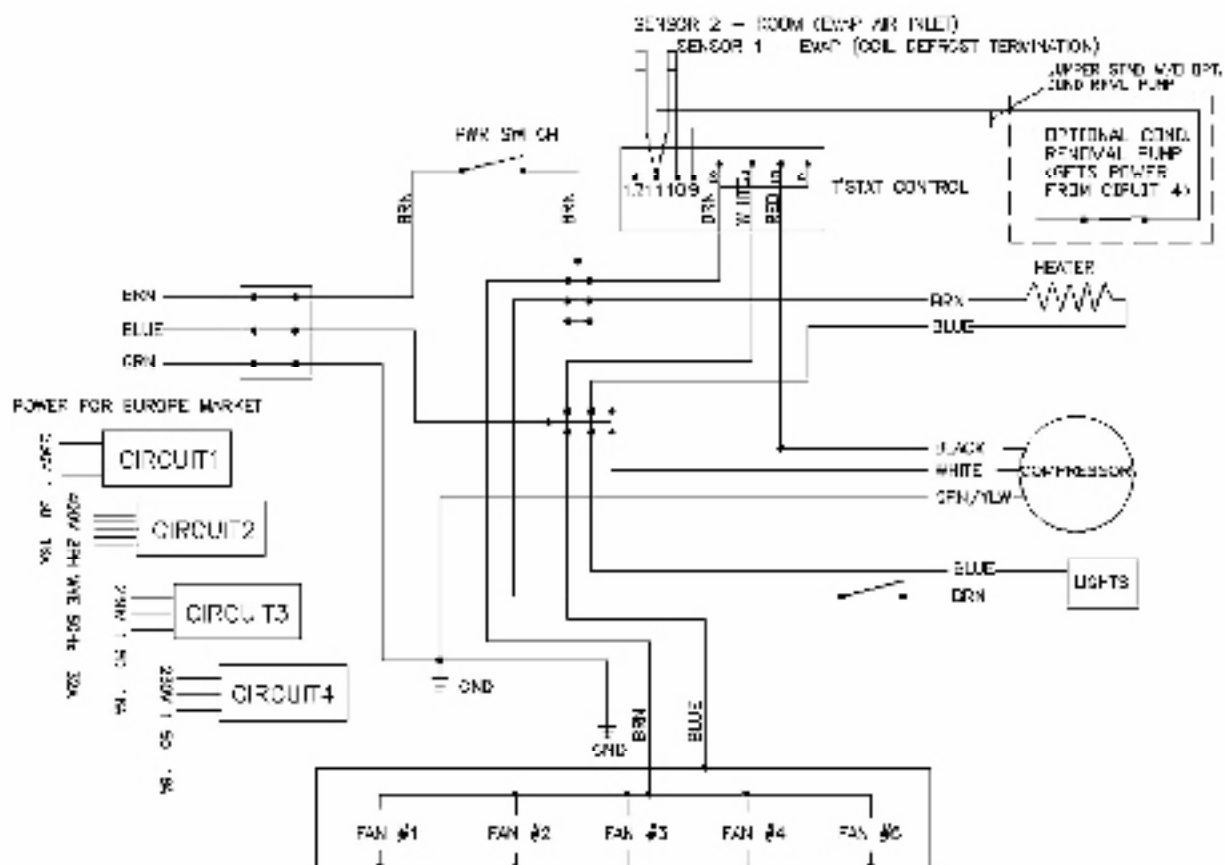
WIRING DIAGRAMS

WIRING SCHEMATIC 120V MODELS

229797



WIRING SCHEMATIC 230V MODELS 229799



NOTES



NOTES

CUSTOMER ASSISTANCE

To aid in reporting this unit in case of loss or theft, please record below the model number and serial number located on the unit. We also suggest you record all the information listed and retain for future reference.

MODEL NUMBER _____	SERIAL NUMBER _____
DATE OF PURCHASE _____	
DEALER _____	TELEPHONE _____
SERVICER _____	TELEPHONE _____

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TO ACCESS INTERNET: www.dukemfg.com

Please provide the following information when you write or call: model number, serial number, date of purchase, your complete mailing address (including zip code), and description of the problem.



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