

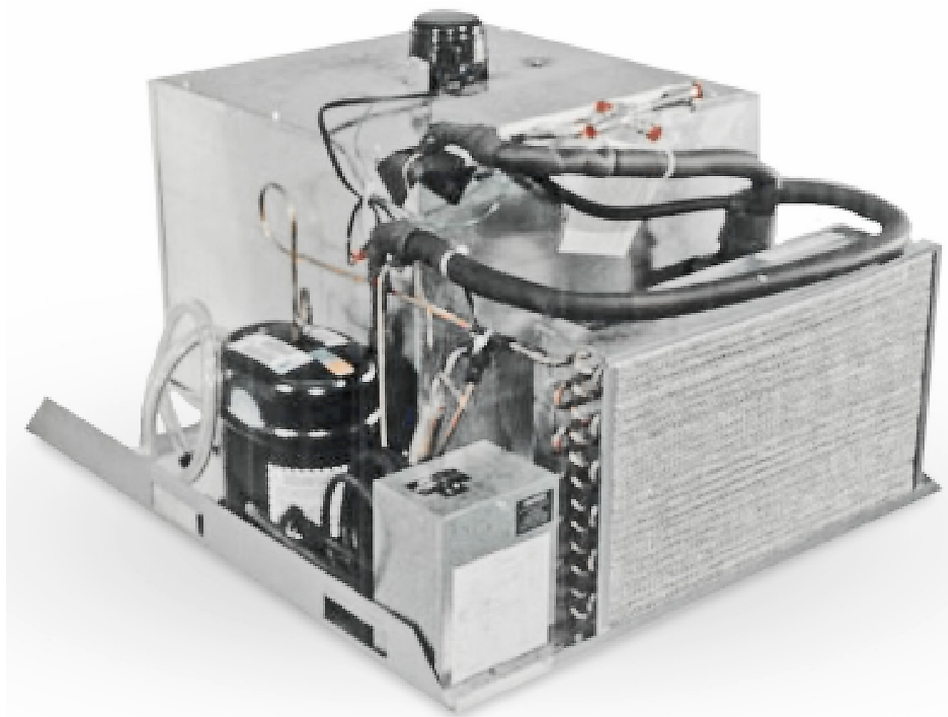


ABS 2.0 PRE-CHILLER

Service Manual

620073775 – ABS Pre-Chiller, 115V, 60Hz, R290

620073774 – ABS Pre-chiller, 230V, 50Hz, R290



Release Date: March 6, 2023

Publication Number: 620073775MNL

Revision Date: March 6, 2023

Revision: A

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Printed in U.S.A.

TABLE OF CONTENTS

Safety Instructions	1
Unit Dimensions	5
Installation Details & Reference Information	6
Installation	6
Component Locations	15
Component Details & Guidelines	18
Pre-Chiller Access and Removal	26
Maintenance	27
Troubleshooting	28
Component Replacement	32
Pressure Switch Replacement	35
Ice Bank Controller Replacement	38
Ice Probe Replacement	39
Agitator Motor Replacement	40
Condenser Fan Replacement	41
Start Capacitor Replacement	42

SAFETY INSTRUCTIONS

READ AND FOLLOW ALL SAFETY INSTRUCTIONS

Safety Overview

- Read and follow **ALL SAFETY INSTRUCTIONS** in this manual and any warning/caution labels on the unit (decals, labels or laminated cards).
- Read and understand ALL applicable OSHA (Occupational Safety and Health Administration) safety regulations before operating this unit.

Recognition



Different Types of Alerts

DANGER:

Indicates an immediate hazardous situation which if not avoided **WILL** result in serious injury, death or equipment damage.

WARNING:

Indicates a potentially hazardous situation which, if not avoided, **COULD** result in serious injury, death, or equipment damage.

CAUTION:

Indicates a potentially hazardous situation which, if not avoided, **MAY** result in minor or moderate injury or equipment damage.

SAFETY TIPS

- Carefully read and follow all safety messages in this manual and safety signs on the unit.
- Keep safety signs in good condition and replace missing or damaged items.
- Do not let anyone operate the unit without proper training. This appliance is not intended for use by very young children or infirm persons without supervision. Young children should be supervised to ensure that they do not play with the appliance.
- Keep your unit in proper working condition and do not allow unauthorized modifications to the unit.

QUALIFIED SERVICE PERSONNEL

WARNING:

Only trained and certified electrical and refrigeration technicians should service this unit.

ALL WIRING AND PLUMBING MUST CONFORM TO NATIONAL AND LOCAL CODES. FAILURE TO COMPLY COULD RESULT IN SERIOUS INJURY, DEATH OR EQUIPMENT DAMAGE.

IF THE SUPPLY CORD IS DAMAGED, IT MUST BE REPLACED BY THE MANUFACTURER, ITS SERVICE AGENT OR SIMILARLY QUALIFIED PERSONS IN ORDER TO AVOID A HAZARD.

SAFETY PRECAUTIONS

This unit has been specifically designed to provide protection against personal injury. To ensure continued protection observe the following:

WARNING:

Disconnect power to the unit before servicing following all lock out/tag out procedures established by the user. Verify all of the power is off to the unit before any work is performed.

FAILURE TO DISCONNECT THE POWER COULD RESULT IN SERIOUS INJURY, DEATH OR EQUIPMENT DAMAGE.

CAUTION:

Always be sure to keep area around the unit clean and free of clutter. Failure to keep this area clean may result in injury or equipment damage.

DO NOT STORE EXPLOSIVE SUBSTANCES SUCH AS AEROSOL CANS WITH A FLAMMABLE PROPELLANT IN THIS APPLIANCE.

CHILDREN SHALL NOT PLAY WITH THE APPLIANCE. CLEANING AND USER MAINTENANCE SHALL NOT BE PERFORMED BY CHILDREN WITHOUT SUPERVISION.

R290 REFRIGERANT PRECAUTIONS



WARNING! R290 Refrigerant used in this dispenser is flammable. Follow the Warnings listed below to avoid hazards.

⚠ DANGER:

Risk Of Fire Or Explosion. Flammable Refrigerant Used. Do Not Use Mechanical Devices To Defrost Refrigerator. Do Not Puncture Refrigerant Tubing.

⚠ DANGER:

Risk Of Fire Or Explosion. Flammable Refrigerant Used. To Be Repaired Only By Trained Service Personnel. Do Not Puncture Refrigerant Tubing.

⚠ CAUTION:

Risk Of Fire Or Explosion. Flammable Refrigerant Used. Consult Repair Manual/Owner's Guide Before Attempting To Install or Service This Product. All Safety Precautions Must be Followed.

⚠ CAUTION:

Risk Of Fire Or Explosion. Flammable Refrigerant Used. Dispose Of Properly In Accordance With Federal Or Local Regulations. Flammable Refrigerant Used.

⚠ CAUTION:

Risk Of Fire Or Explosion Due To Puncture Of Refrigerant Tubing; Follow Handling Instructions Carefully. Flammable Refrigerant Used.

⚠ WARNING:

Do not use electrical appliances inside the food/ice storage compartments unless they are of the type recommended by the manufacturer.

⚠ WARNING:

To reduce flammability hazards the installation of this appliance must only be carried out by a suitably qualified person.

⚠ WARNING:

Any fluid circuits connected to the appliance shall safely release abnormal pressure. It shall not allow the release of flammable refrigerant into areas served by the other circuits if these do not comply with minimum room area limit.

The appliance is to be installed in accordance with the Safety Standard for Refrigeration Systems.

⚠ WARNING:

Appliances and their surroundings shall not attain excessive temperatures in normal use.

⚠ WARNING:

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).

Do not pierce or burn.

Be aware that refrigerants may not contain an odor.

⚠ WARNING:

Keep any required ventilation openings clear of obstruction.

Notice that servicing shall be performed only as recommended by manufacturer.

UNIT DIMENSIONS

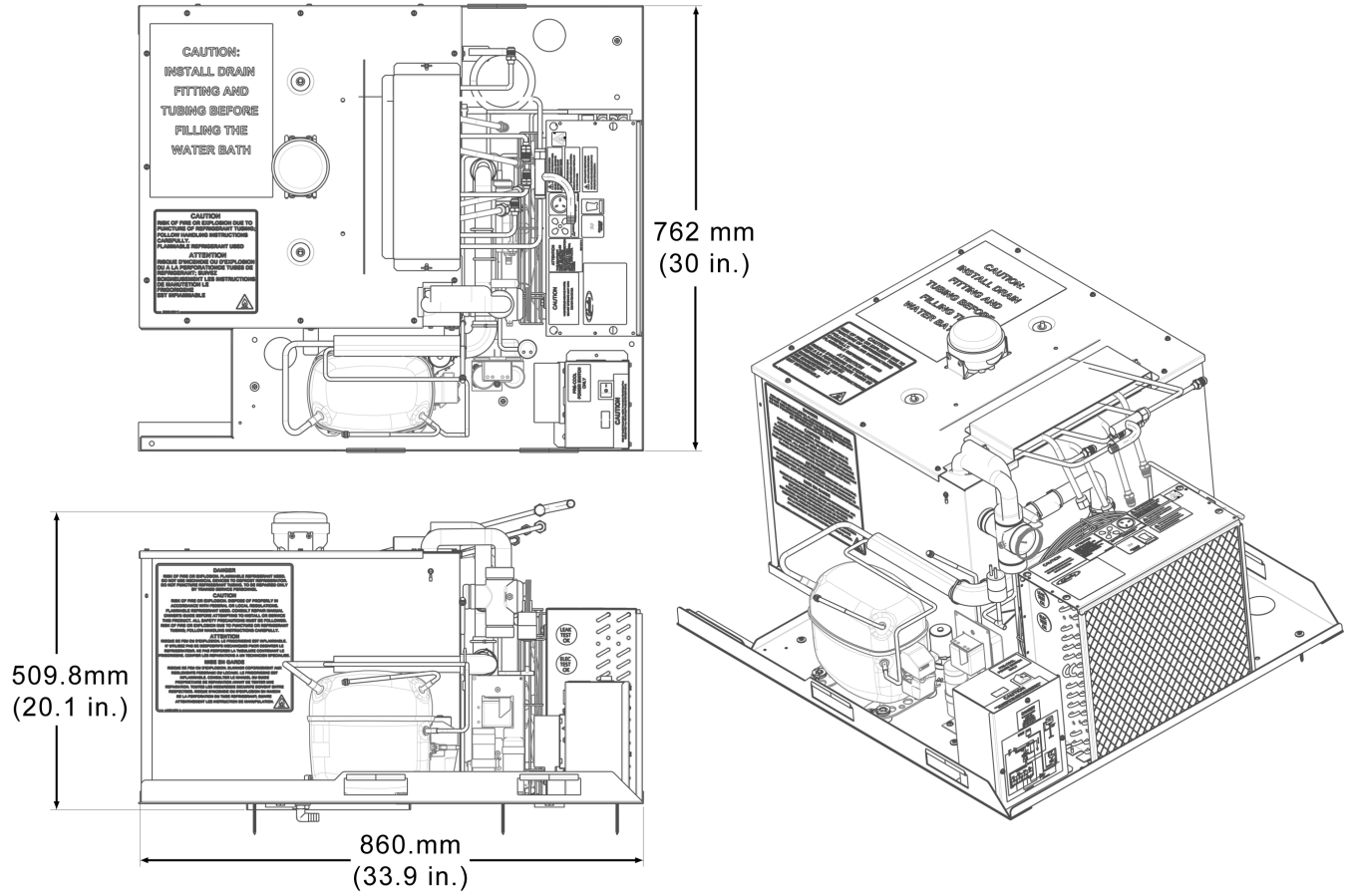


Figure 1

INSTALLATION DETAILS & REFERENCE INFORMATION

Nameplate Data

Pre-Chiller	VAC	Ph	Hz	Refrigerant			Test Pressure PSI (kPa) (Bar)		Pre-Chiller Shipping Weight
				Oz	Grams	Type	High Side	Low Side	
620073775	115V	1	60	4.23	120	R-290	425 (2930.3) (29.3)	170 (1172.1) (11.7)	189 lbs (85.7kg)
620073774	230V	1	50	5.29	150	R-290			

⚠ DANGER:

Only trained and certified electrical/HVAC technicians should service the electrical components and wiring connections in the pre-chiller unit.

FAILURE TO COMPLY COULD RESULT IN SERIOUS INJURY, DEATH OR DAMAGE TO THE EQUIPMENT.

INSTALLATION

Unpack and inspect the Kit. Make sure all parts listed are present and in good condition.



Figure 2

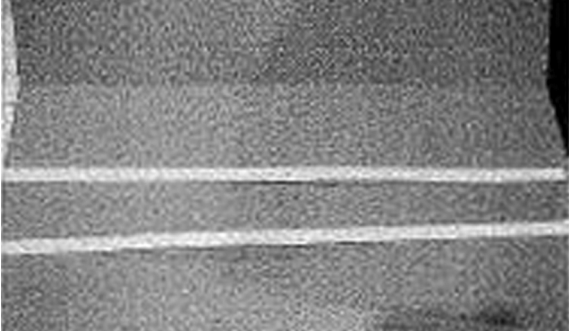

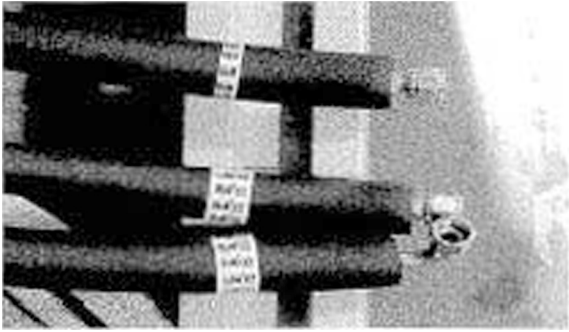
Table 1

Loose-Shipped Parts			
Item No.	Part No.	Name	Qty.
1	560000256	Glide Strips	2
2	077040900	L Nut	1
3	176205000	Barb Fitting	4
4	77030100	Nut	5
5	311304000	Gasket	8
6	111353000	Clamps	5
7	620807207	Kit Bag	1
8	620073774INST	Instruction Sheet	1

INSTALLATION

Assembly Instructions

Table 2

Step	Action	
1	Place the glide strips on the frame of the cabinet (rails must be clean and dry).	 <p>Figure 3</p>
2	Place the “L” nut on one of the carbonated water lines and clamp.	 <p>Figure 4</p>
3	Place the two hose fittings and nuts on the water and carbonated water lines and clamp.	 <p>Figure 5</p>

INSTALLATION

ABS 2.0 PRE-COOLER INSTALLATION

Table 3

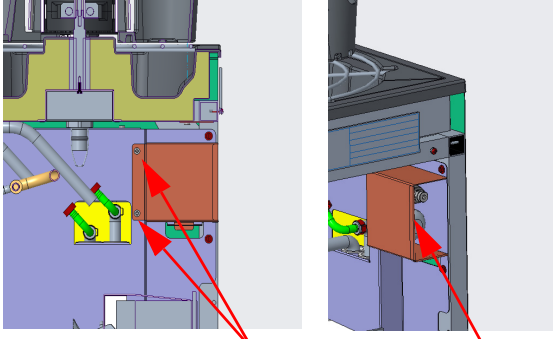
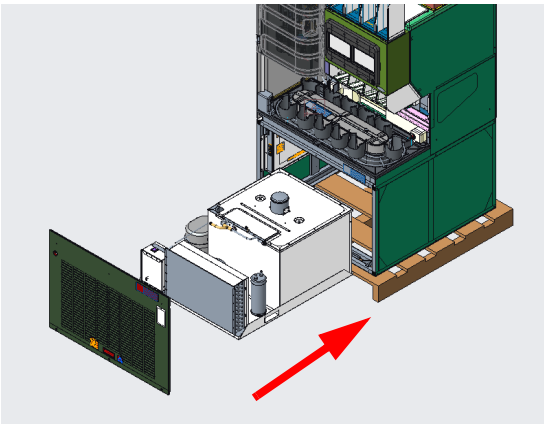
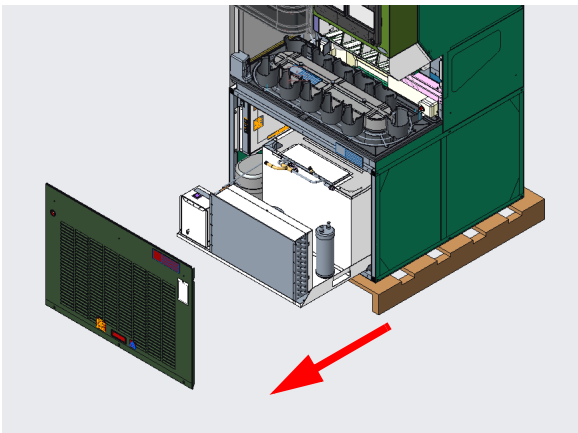
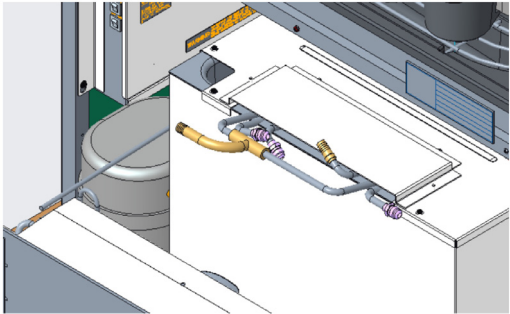
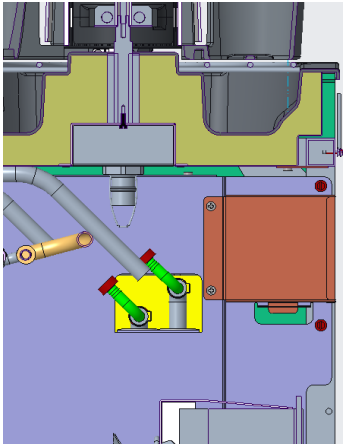
Step	Action	
1	Remove nozzle housing bracket by removing 2 screws.	 <p style="text-align: center;">Screws Nozzle Housing</p> <p style="text-align: center;">Figure 6</p>
2	<p>A. Place the Pre-Cooler unit in the ABS 2.0 lower cabinet. If the electrical outlets are behind the ABS, plug the power cords in before the Pre-cooler is installed. When sliding the Pre-Cooler into the ABS 2.0 dispenser lower cabinet, someone should guide the Pre-Cooler water tank and overflow hoses over front support bar of the cabinet.</p> <p>B. If not supported the drain filter could crack or break</p>	 <p style="text-align: center;">Figure 7</p>
3	Pull (slide) the Pre-Cooler out of the ABS 2.0 dispenser lower cabinet as far as it will go (stops will prevent Pre-Cooler from sliding out too far).	 <p style="text-align: center;">Figure 8</p>

Table 3

Step	Action	
4	Route and connect the three labeled 1/2-inch [12.7 mm] I.D. carbonated and plain water tubing from the ABS 2.0 unit to the Pre-cooler. The tubing is individually insulated and labeled as being WATER and CARBONATED WATER, the connections on the Pre-cooler are also marked as being WATER and CARBONATED WATER	 <p style="text-align: center;">Figure 9</p>
5	Route 1/2-inch [12.7mm] I.D. carbonated and plain water tubing from the bundle tubing to the Pre-Cooler and connect to the labeled 1/2-inch[12.7mm]barbed carbonated and plain water inlet connectors on the Pre-Cooler.	
6	After pre-cooler is installed, replace cleaning kit nozzle bracket with 2 screws.	 <p style="text-align: center;">Figure 10</p>

IMPORTANT: Before connecting the carbonated and the plain water tubing to the Pre-Cooler, the Pre-Cooler must be pulled out of the ABS 2.0 dispenser lower cabinet to the stops. The water tubing is the correct length and does not need to be cut to fit. The carbonated and the plain water tubing should properly coil when the Pre-Cooler is pushed back in place inside the ABS 2.0 dispenser cabinet. When Pre-Cooler is in place inside the ABS 2.0 dispenser lower cabinet, the carbonated and plain water tubing must not be in contact with the refrigeration compressor, the compressor discharge tube, or the agitator motor.

AC Electrical Connections (cont.)

Electrical schematics are shown below (Figs. 11 & 12) detailing the component interconnections.

115V Pre-Chiller

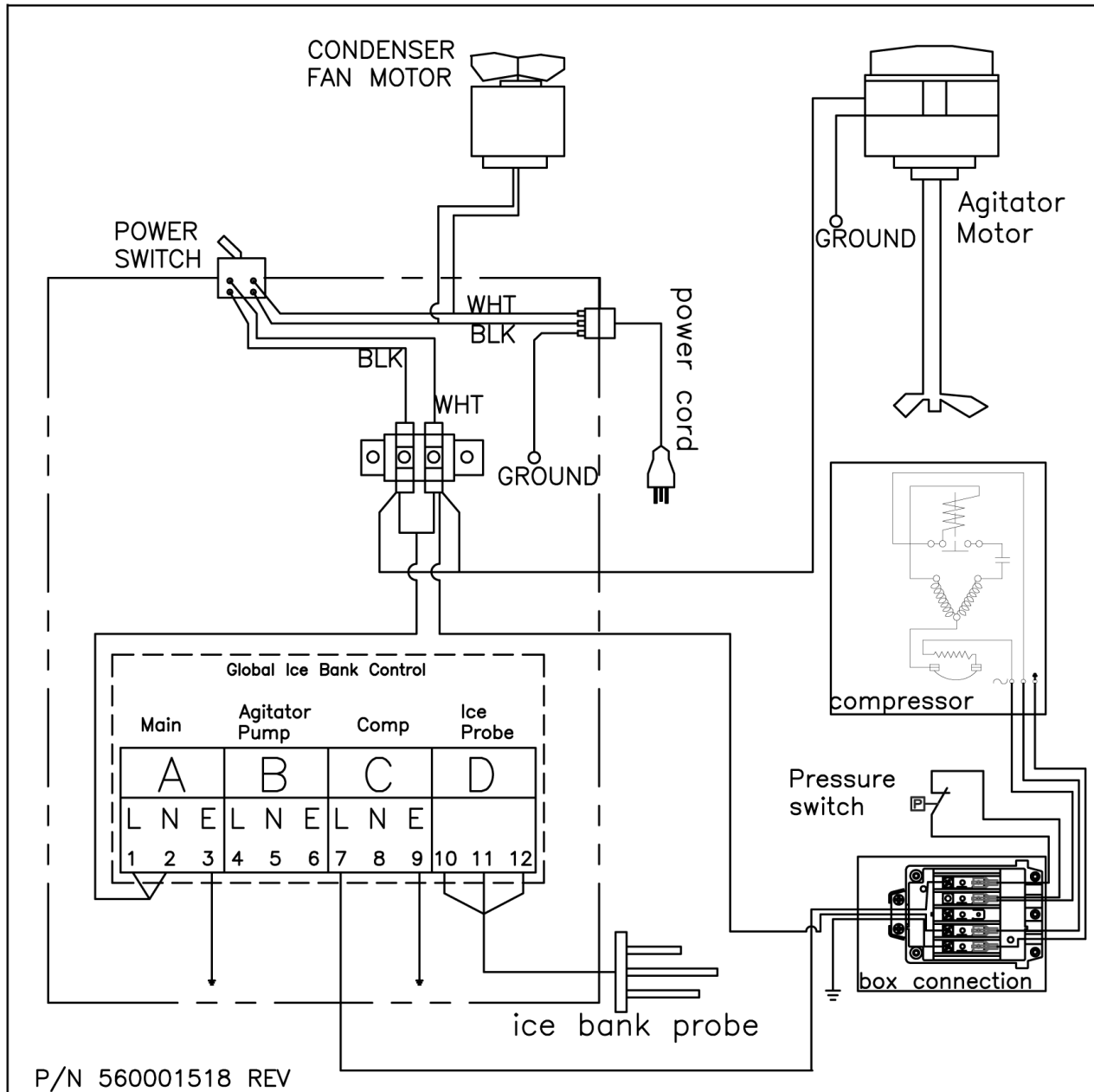


Figure 11

AC Electrical Connections (cont.)

230V Pre-Chiller

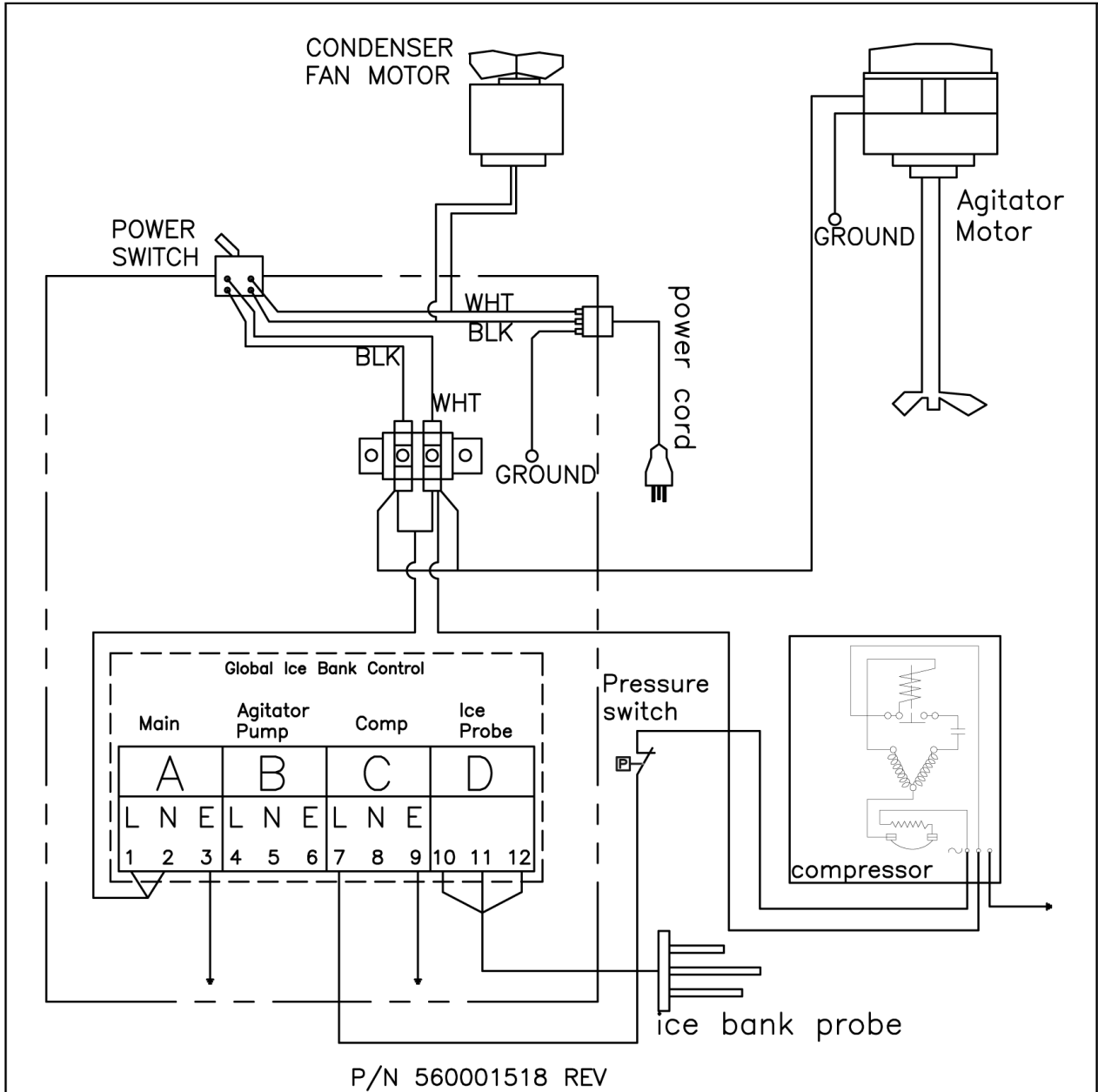


Figure 12

Refrigeration System Diagram

115V and 230V Pre-Chiller

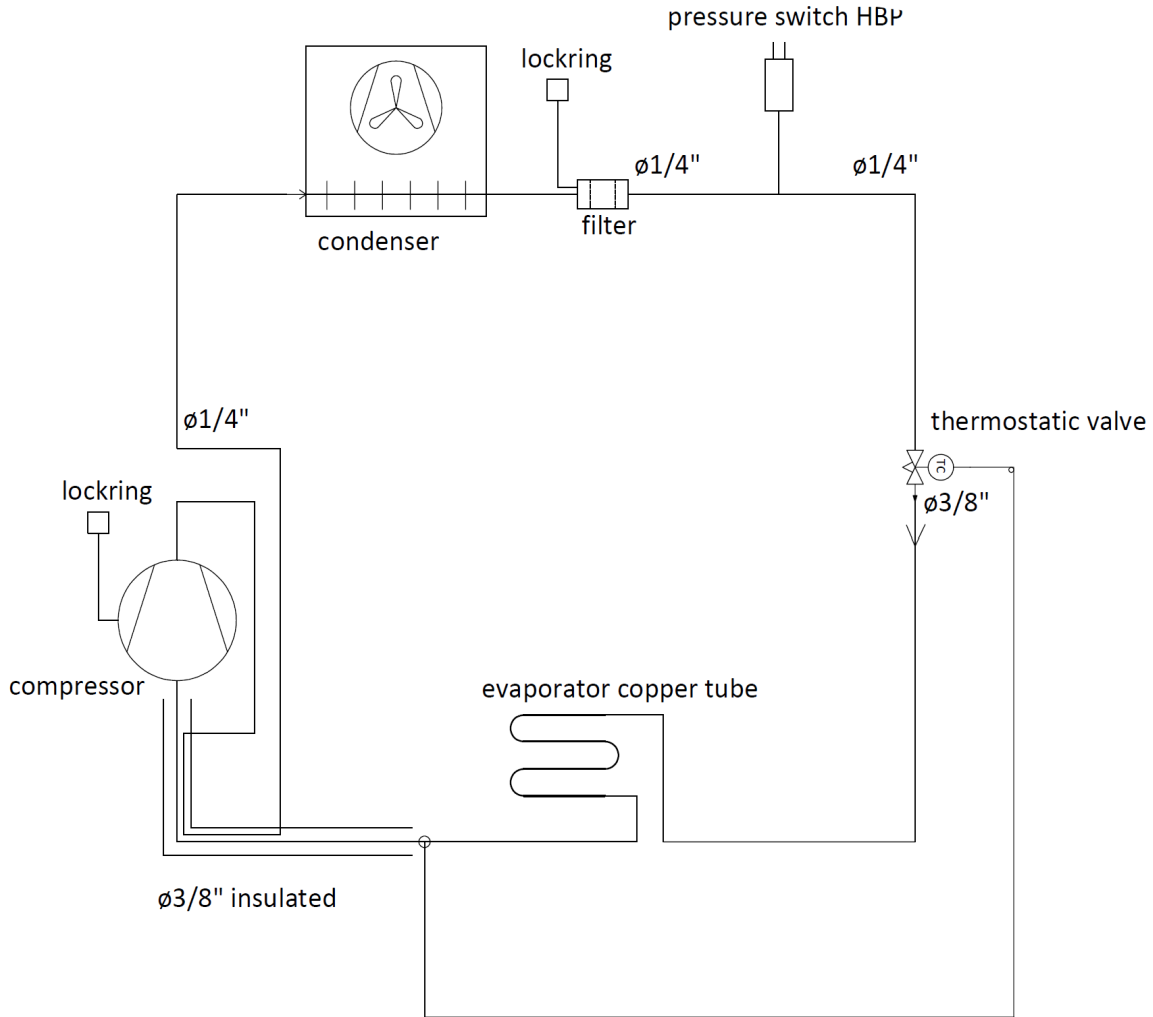


Figure 13

External Water Connections

Four (4) water lines from the ABS 2.0 unit extend to the pre-chiller unit in the left-side location indicated below. These water lines support the cooling capacity of the external devices. Accessories to connect external devices are not included. Connections should be performed by a certified installer.

ABS 2.0
Water lines
route from
here.

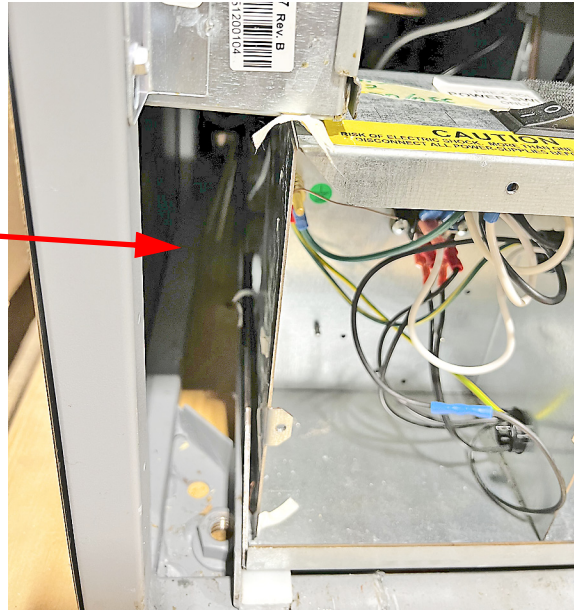
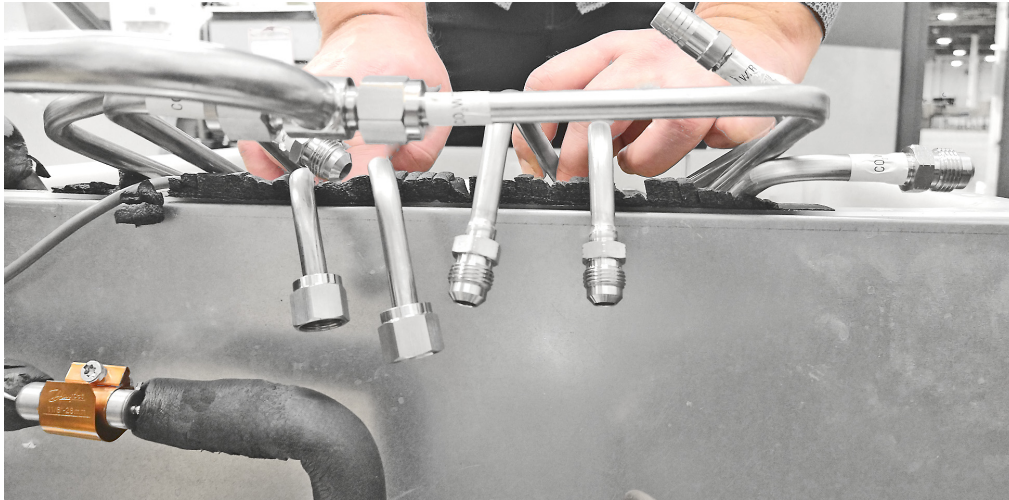


Figure 14

ABS 2.0 Water lines route to coil connections here.

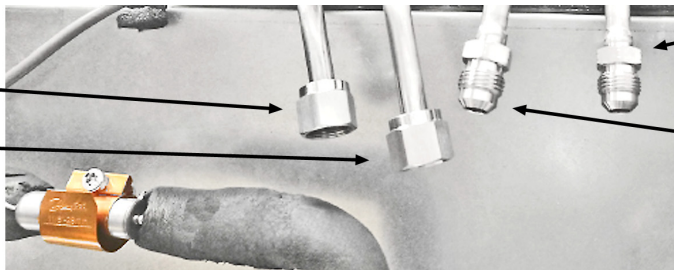


Figure 15



WATER (SUPPLY) INPUT AND (CHILLED) OUTPUT COIL LINES.

Output
5/8-18 SS Fitting
3/8 Tube
3/8 Gasket Flare 45°
Copper



Input
5/8-18 SS Flare Nut for
3/8 Tube
3/8 Gasket Flare 45°
Copper

Figure 16

COMPONENT LOCATIONS

Refer to the following figures for system component locations.

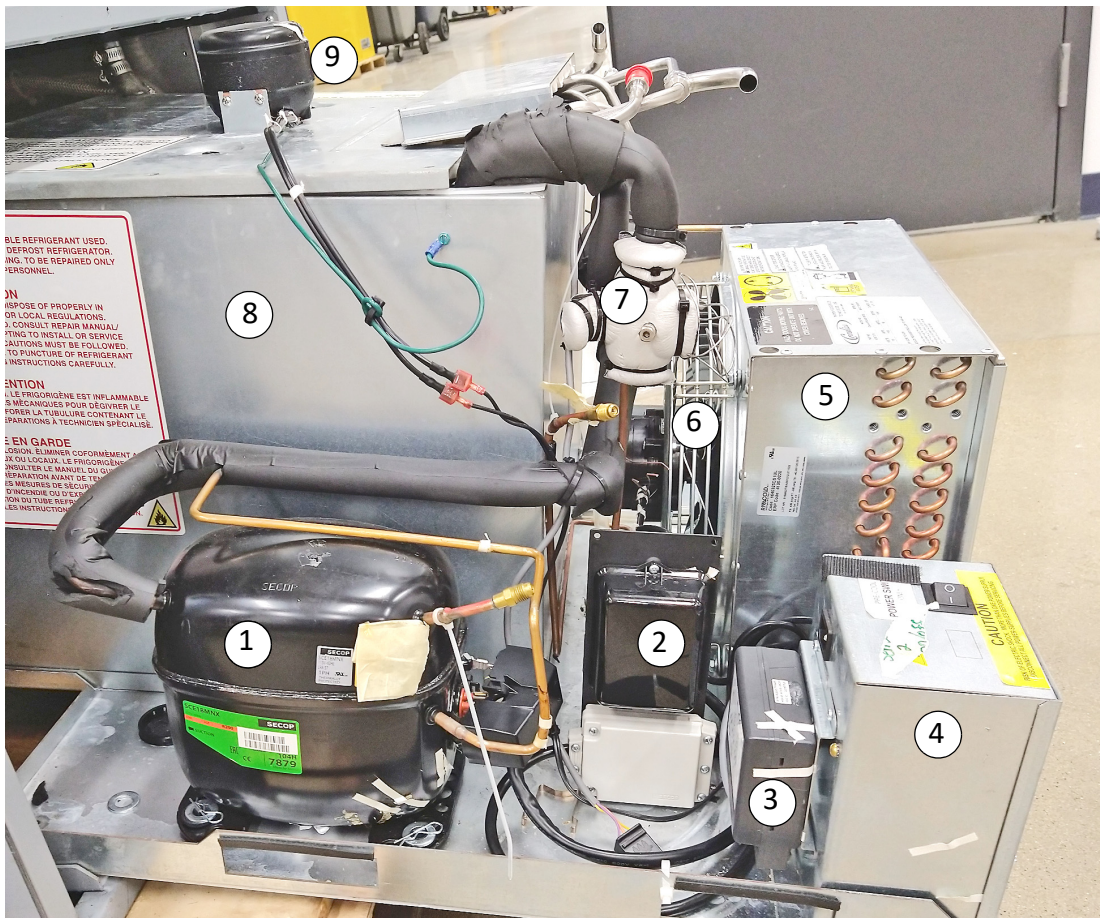


Figure 17

- 1) Refrigeration Compressor
- 2) Start Tower (115V Compressor only)
(Capacitor/Relay on back of bracket)
- 3) Global Ice Bank Controller
- 4) Electrical Box
- 5) Condenser
- 6) Condenser Fan
- 7) TXV (Expansion) Valve
- 8) Ice Bank (Water Reservoir & Coils)
- 9) Agitator Motor

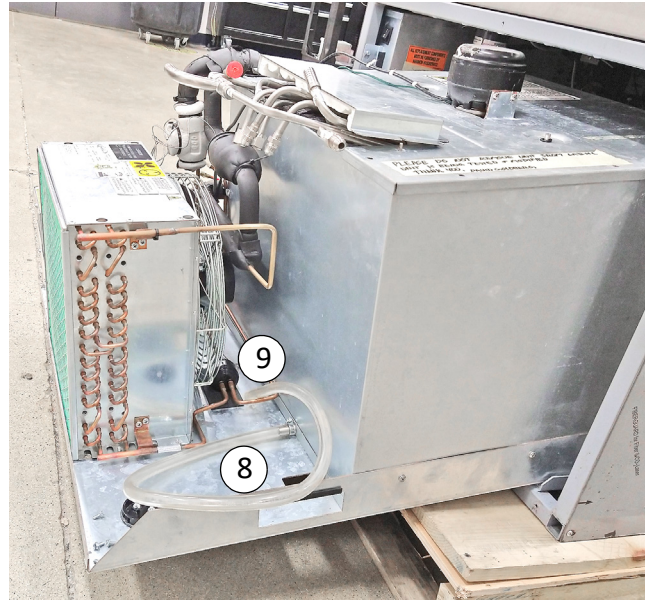
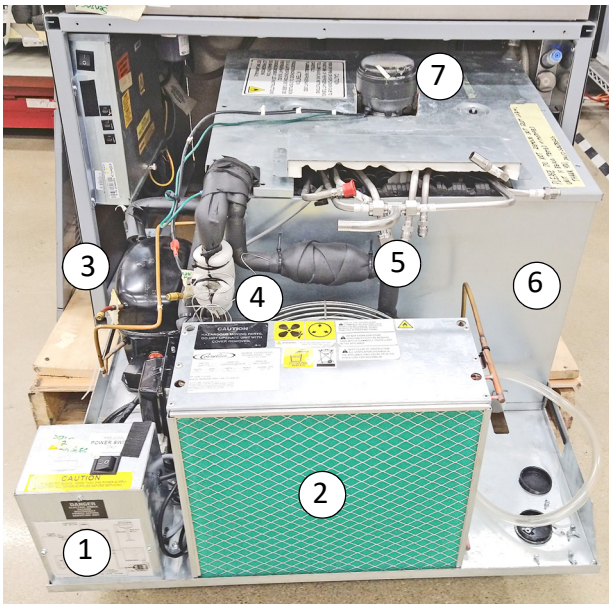
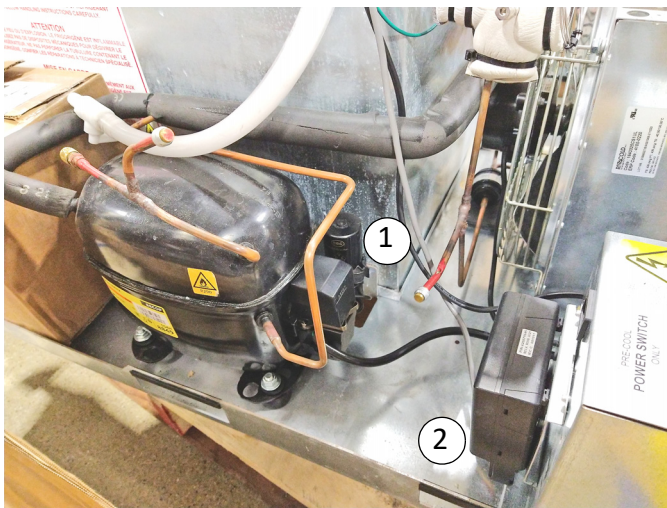


Figure 18

- | | |
|--------------------------------|---------------------------------------|
| 1) Electrical Box | 6) Ice Bank (Water Reservoir & Coils) |
| 2) Condenser & Debris Filter | 7) Agitator Motor |
| 3) Refrigeration Compressor | 8) Ice Bank Overflow Hose |
| 4) TXV (Expansion) Valve | 9) Drier Canister |
| 5) Expansion Valve Sensor Bulb | |



(230V Units)

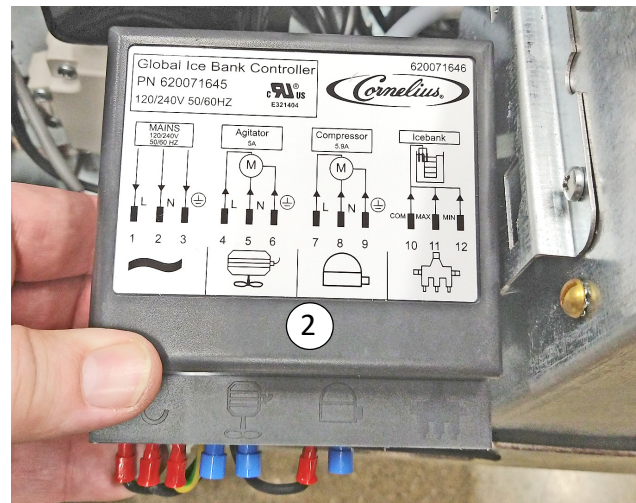


Figure 19

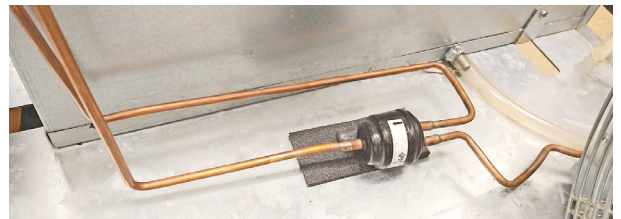
- 1) Start Capacitor (230V compressor only)
- 2) Ice Bank Controller & Label (Showing 4 Wiring Connector Sockets)



Condenser Fan



Agitator Motor



Drier Canister



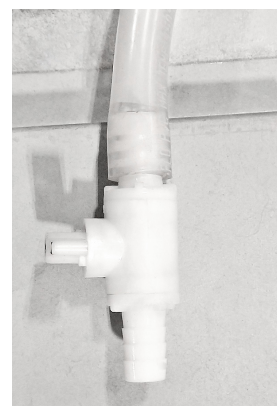
Pressure-Limit Switch



Tank Manual Drain (Underside)



**Ice-Bank Overflow-Drain Hose
(from Standpipe)**

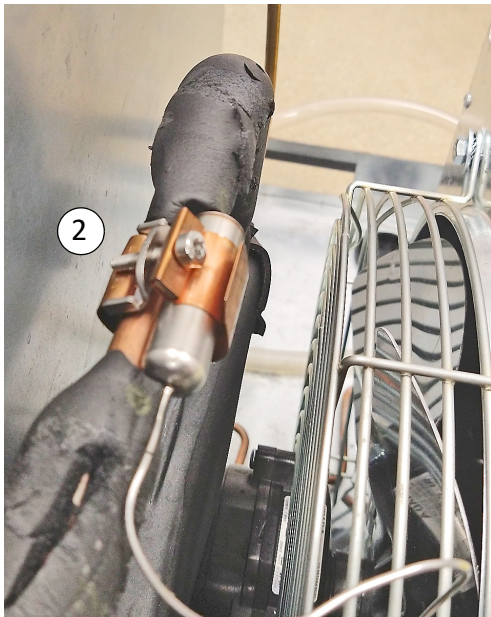
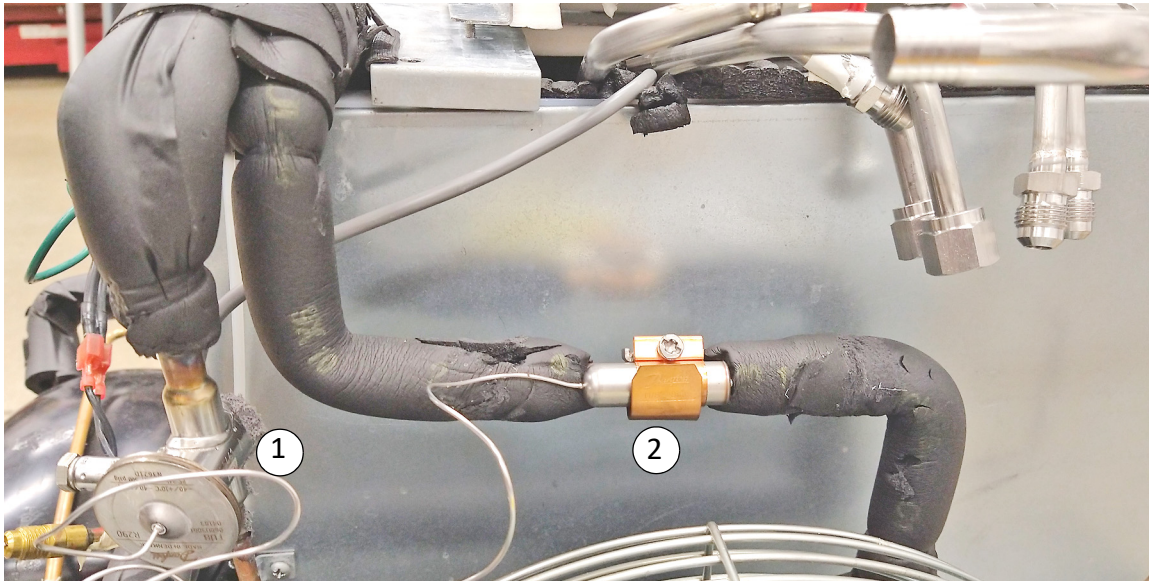


Drain Hose Fitting

Figure 20

Component Details & Guidelines

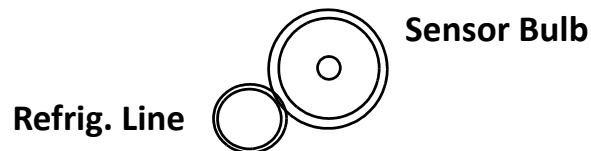
Note details of component locations and orientation.

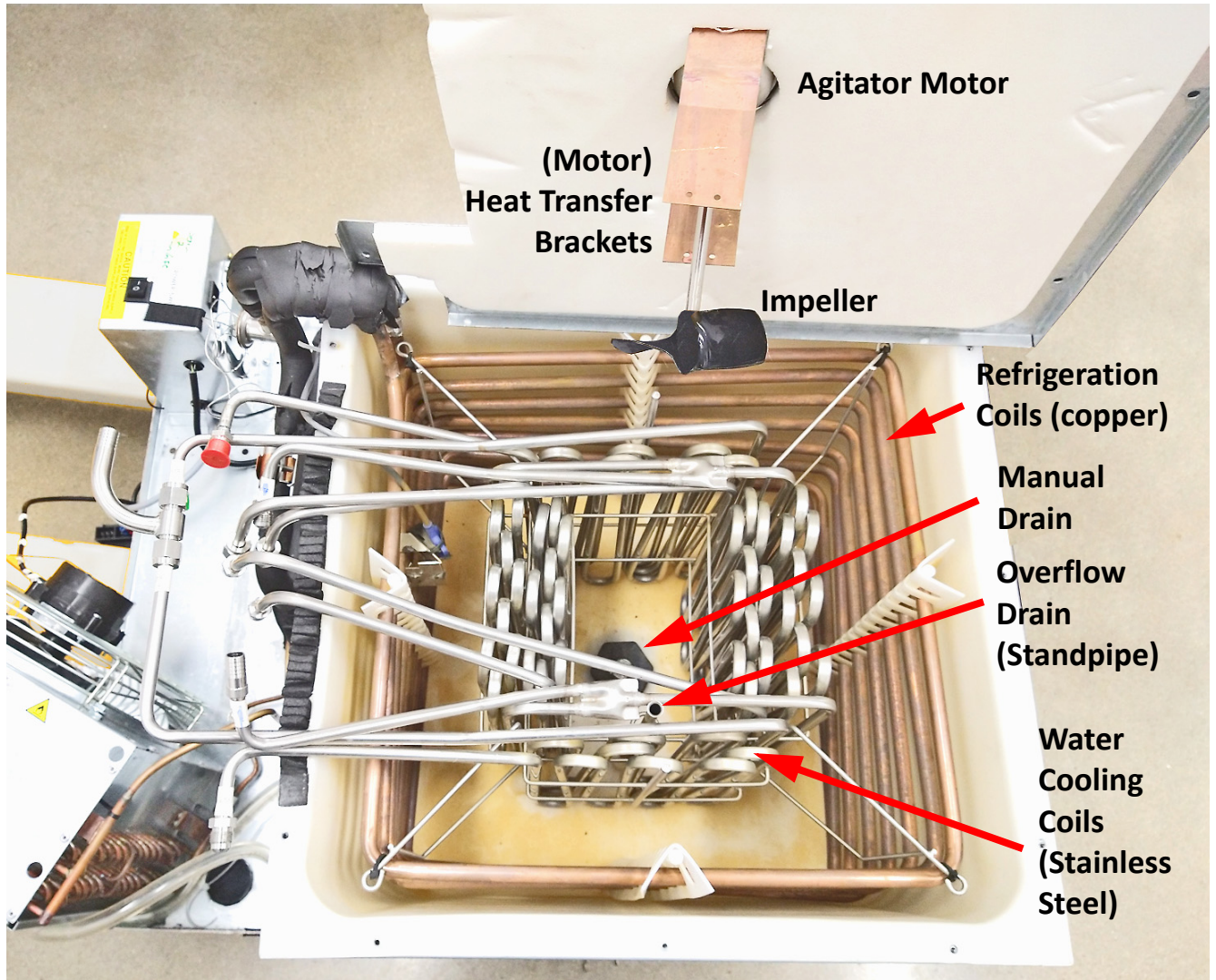


NOTICE: Sensor Bulb must be installed at approx. 2 O'clock (or 45°) on the line.

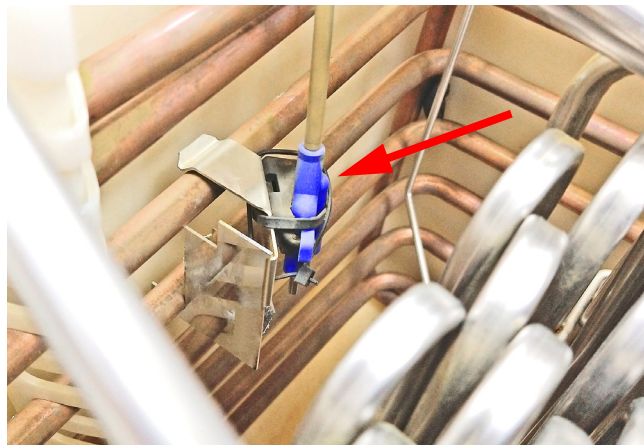
Figure 21

- 1) TXV (Expansion) Valve
- 2) Expansion Valve Sensor Bulb





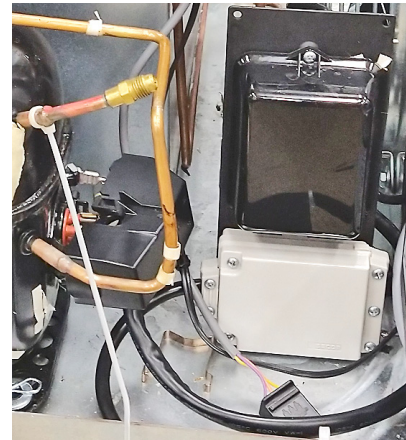
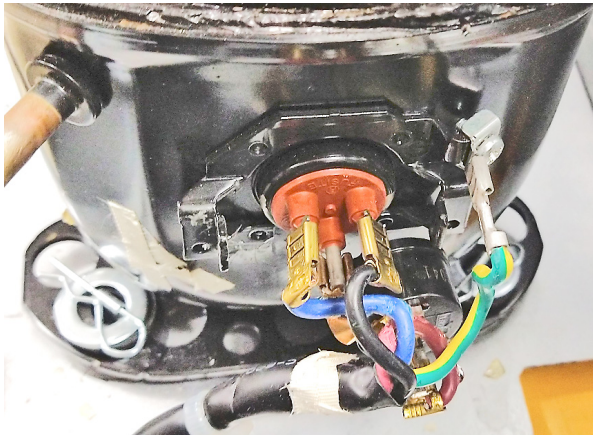
Ice Bank Interior



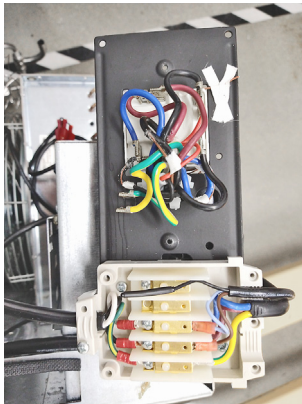
Ice Bank Sensor Probe (blue)

Figure 22

Compressor Details and Start-Device Wiring - 115V Units



115V Compressor & Start Tower



**Tower
Junction
Covers
Removed**



**Tower Rear
Relay &
Capacitor**

Start Tower Wiring Schematic

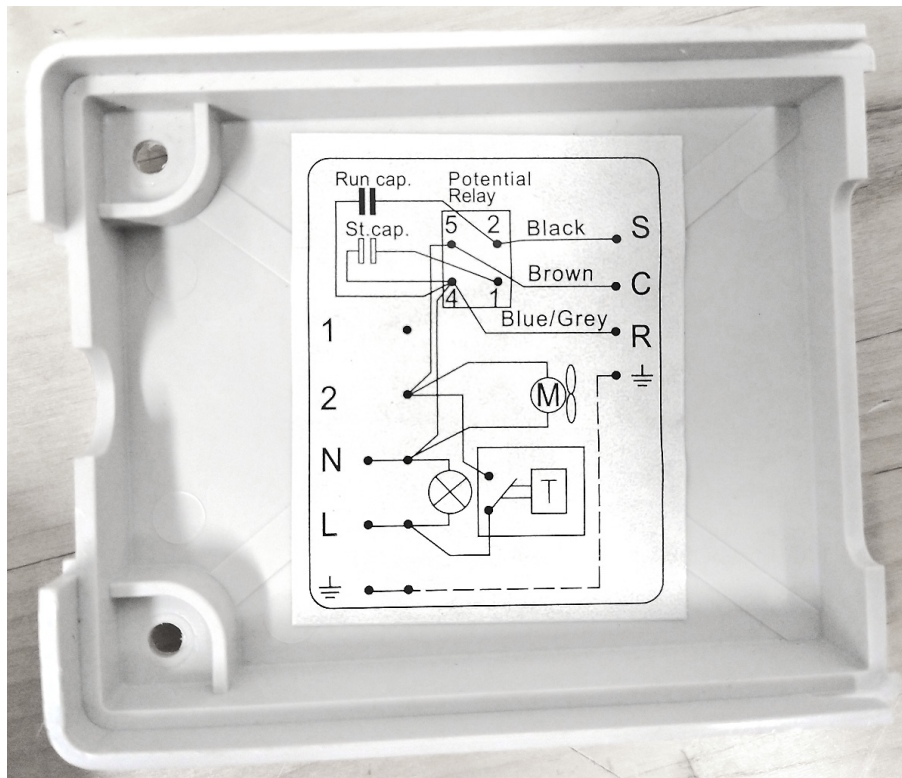


Figure 23

Compressor Details and Start-Device Wiring - 115V Units

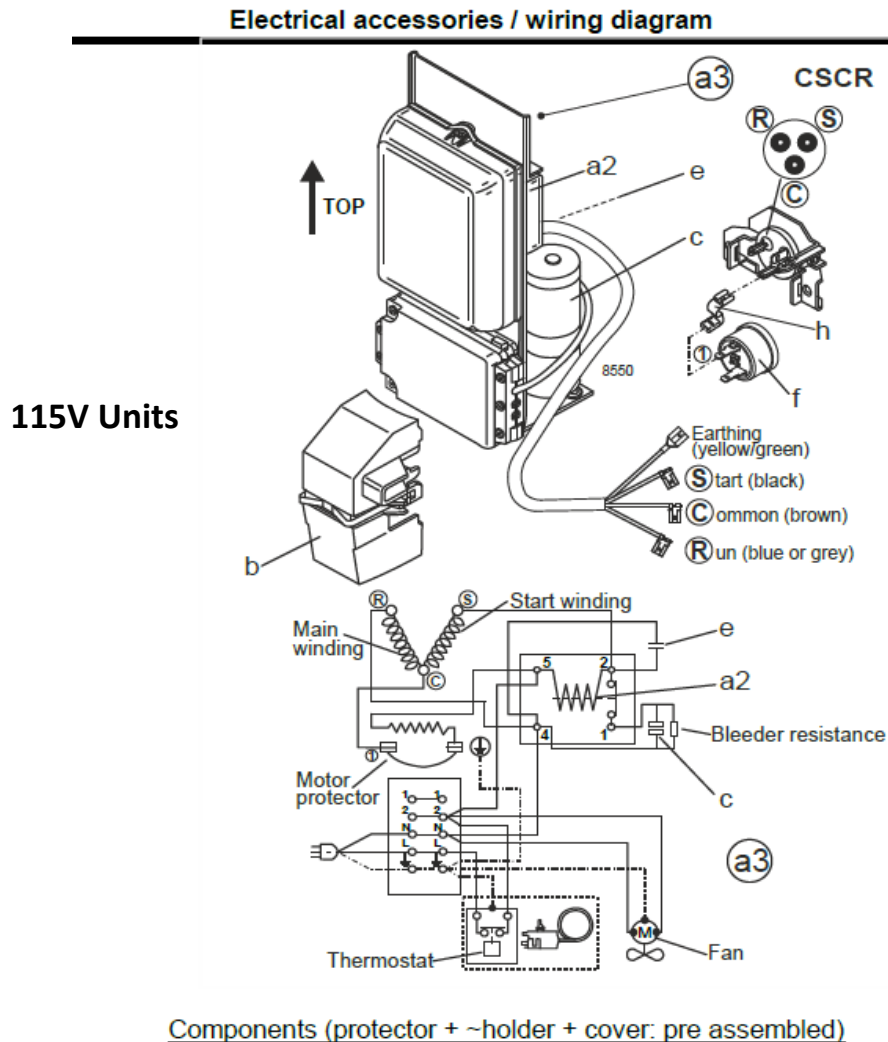
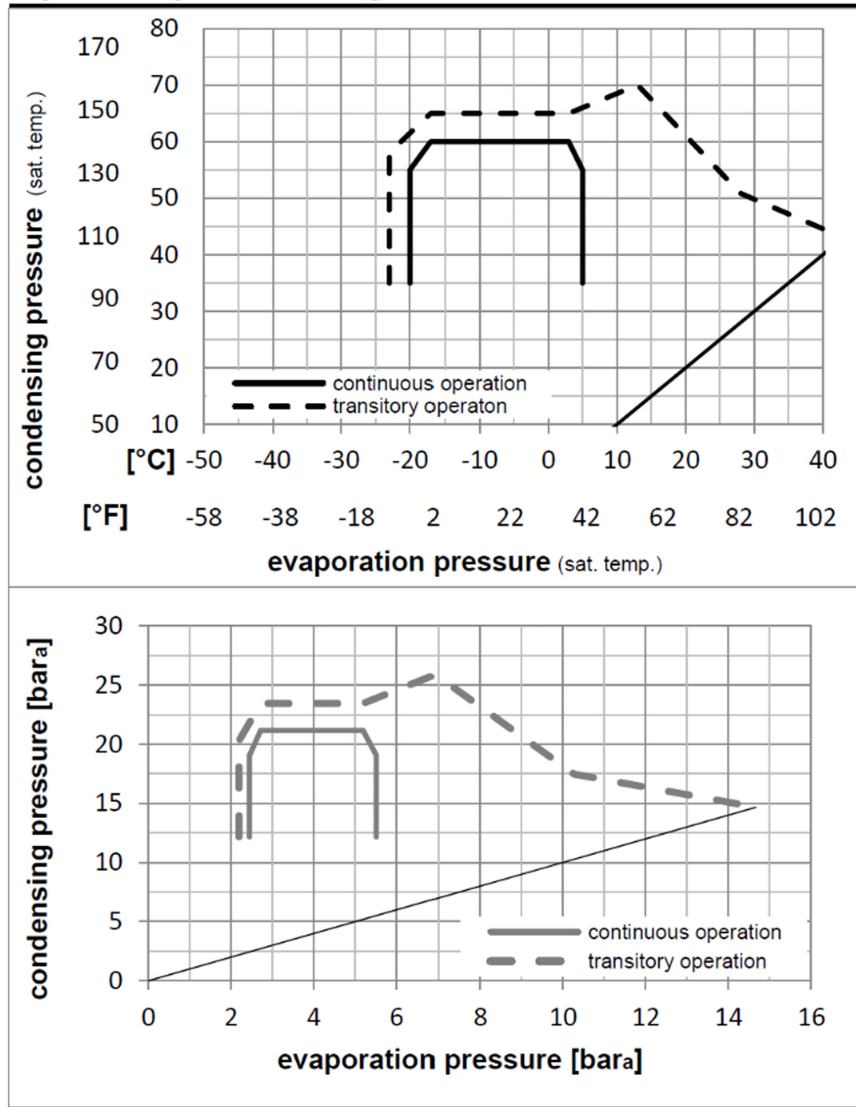


Figure 24

Compressor Details and Start-Device Wiring - 115V Units

Operation pressure range

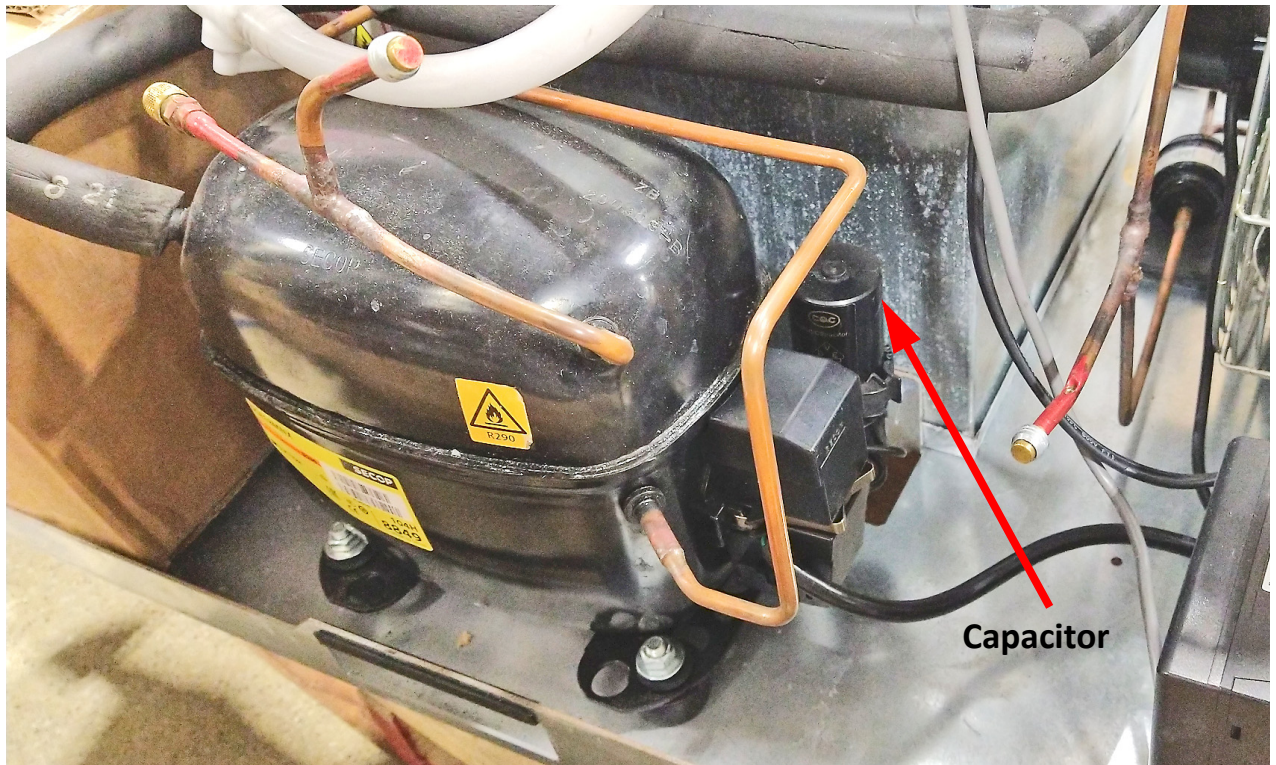


Electrical data - Configurations with SCE18MNX

	Conf. 1	Conf. 2
Starting device type	relay	relay
Run capacitor	23,5µF	-/-
Start capacitor	410µF	410µF
LRA (locked rotor amps / 4s)	56,6A	55,9A
RLA (rated load amps / 1s)	8,98A	9,87A
Cut in current	56,6A	55,9A

Figure 25

Compressor Details and Start Device Wiring - 230V Units



230V Compressor

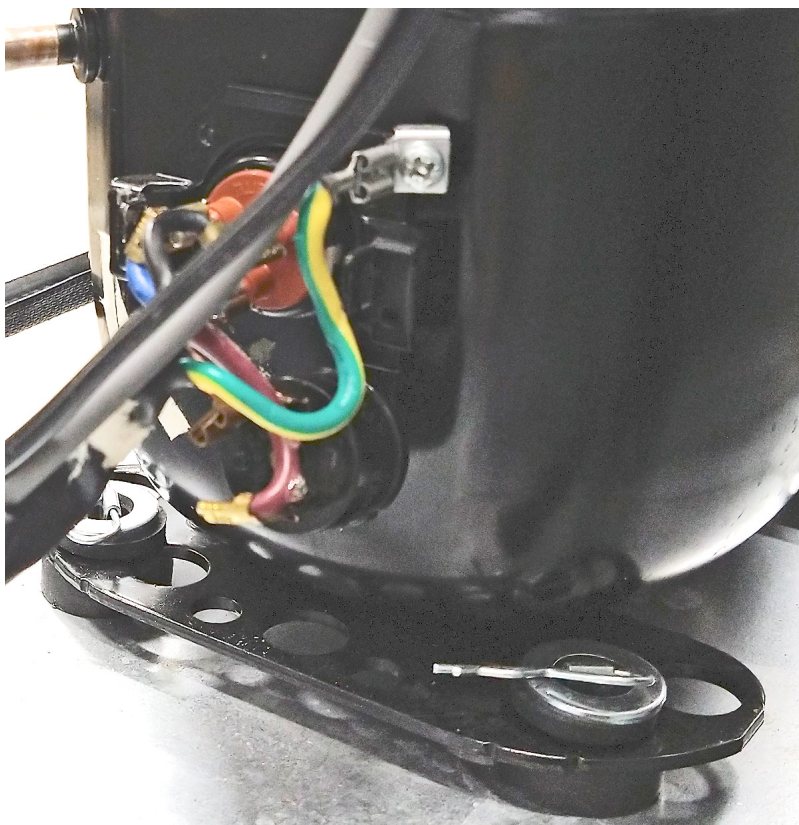
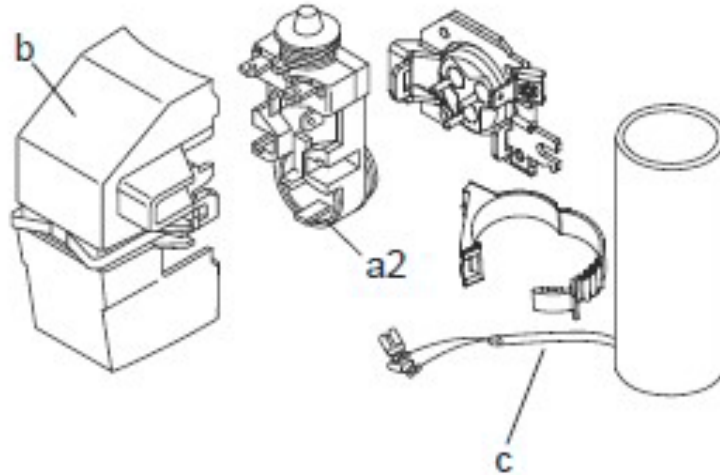


Figure 26

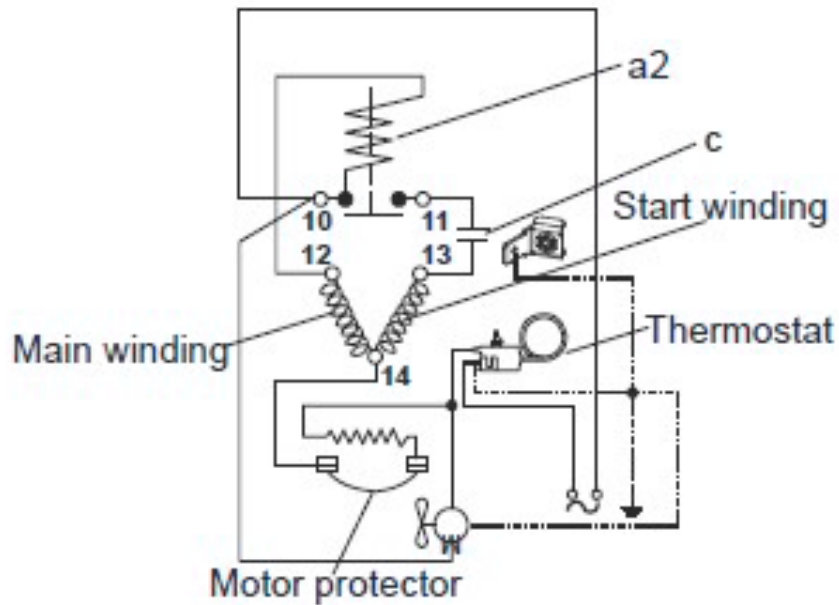
Compressor Details and Start Device Wiring - 230V Units

CSIR



8893

230V Units



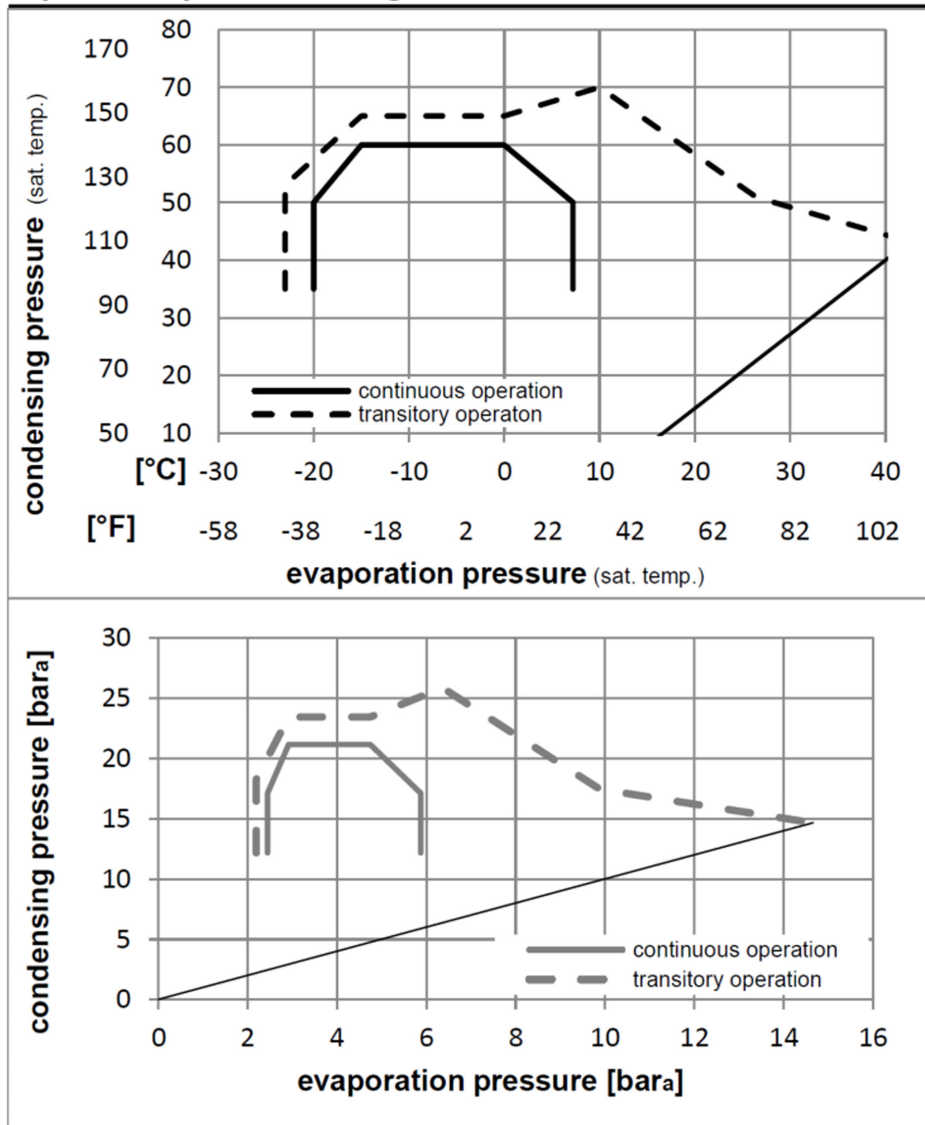
Components (relay + cover: pre-assembled)

- a2 assy. relay + ext. protector (T0214)
- c start capacitor (80µF)
- d cord relief
- b plastic cover + clamp

Figure 27

Compressor Details and Start Device Wiring - 230V Units

Operation pressure range



Electrical data - Configurations with SCE18MNX

	Conf. 1	Conf. 2
Starting device type	relay	relay
Run capacitor	-/-	-/-
Start capacitor	80 μ F	80 μ F
LRA (locked rotor amps / 4s)	21,07A	21,07A
RLA (rated load amps / 1s)	3,75A	3,75A
Cut in current	21,07A	21,07A
IP class	21	21

Figure 28

PRE-CHILLER ACCESS AND REMOVAL

The Pre-chiller is located in the lower-right compartment of the ABS 2.0 Dispenser unit. Its components are mounted on a steel pan (refrigeration base) that slides out of the unit to allow access. For major maintenance or repairs, the entire chiller system may be lifted and removed using an hydraulic hand-truck.

Pre-Chiller Extended on Rails for Servicing



Remove front securing plate from ABS 2.0 compartment rail to allow Pre-Chiller slide-out.



On re-install, make sure that the plastic rail slides are in place, both sides.

Figure 29

Pre-Chiller Slide-out / Removal

- 1) Shut off electrical power and water supplies to the ABS 2.0 unit and the Pre-Chiller unit.
- 2) Remove the front, cover panel from the lower-right compartment of the ABS 2.0 Dispenser.
- 3) Remove the securing plate at the lower front of the compartment to allow pre-chiller slide out.
- 4) Depressurize the ABS 2.0 system.
- 5) Disconnect all of the water lines from the pre-chiller coil tubes.
- 6) Disconnect (unplug) the electrical cables routed from the ABS 2.0 to the pre-chiller.
- 7) Drain the ice bank reservoir using the manual drain port (Fig. 22A). Or open the drain valve in that drain line (Figure 22B).
- 8) **Two technicians recommended:** Pull on and lift the refrigeration base front edge to slide the pre-chiller outward from the unit.
- 9) **For full pre-chiller removal. Two technicians recommended:**
 - A) Disconnect the manual drain line from its drain.
 - B) Use an hydraulic hand-truck to lift the pre-chiller off and above its rails so that the manual drain fitting (Fig. 22A), will clear the compartment base rail. Be careful to avoid stressing or breaking the drain fitting.
 - C) Roll the hand-truck to extract the pre-chiller from the compartment.
- 10) **Re-install:** Ensure that the plastic slides are installed on the compartment rails, shown in Fig. 29 above.
- 11) Carefully truck the pre-chiller into place, lowering it slowly to engaged the guide rails.
- 12) Reconnect water, electrical & drain lines. Refill ice bank reservoir (add water after removing access cover (Figs. 30 & 31).

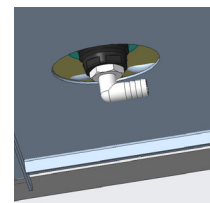


Figure 29A



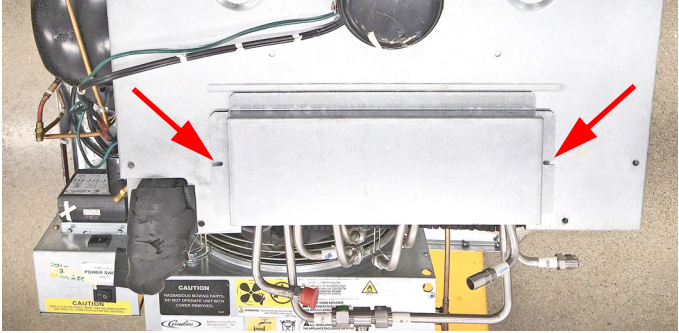
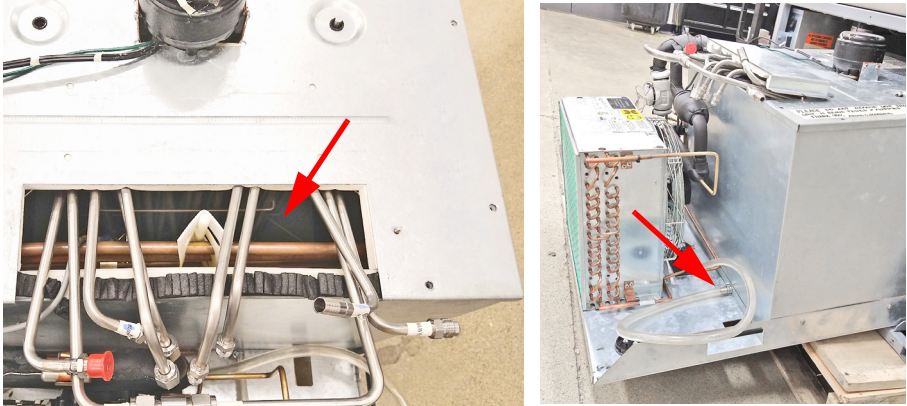

Figure 29B

MAINTENANCE

Perform these procedures to ensure that the ice bank has the proper water level and that the condenser debris filter is not impeding air flow.

Frequency: Every Three Months

Table 4

Step	Action	
1	Disconnect electrical power from the pre-chiller.	
2	Remove the two screws securing the access cover atop the ice bank. Remove the cover.	 <p>Figure 30</p>
3	Pour water into the access port until water appears in the overflow (standpipe) drain tubing, shown at right. Then re-install the access cover.	 <p>Figure 31</p>
4	Slide the debris filter up and out of its mounting rails. Use compressed air to carefully blow out any dust and debris. Reinstall the filter as shown in Figure 32 with the "AIR FLOW" arrow pointing toward the condenser unit.	 <p>Figure 32</p>
5	Re-connect electrical power to the pre-chiller.	



TROUBLESHOOTING

The guide below provides Causes and Corrective Actions with respect to malfunctions related to a reduction or loss of water-cooling capacity.

NOTE: Since troubleshooting and repair/replacement procedures to be performed on the pre-chiller must be conducted by a qualified/certified, HVAC repair technician (or in some cases an MFT Field Service Engineer), already trained in applicable diagnostic and corrective procedures, this manual provides only general procedural and safety guidelines relevant to them.

Table 5

Symptom	Probable Cause	Corrective Action
No Cooling	<p>Line voltage not within name plate specification causing compressor overload to trip.</p> <p>No water in water ice bath or water level extremely low, exposing ice bank sensing probe.</p> <p>Defective Ice Bank Control or sensing probe.</p> <p>Cabinet fan inoperative resulting in warm concentrate (water continues to cool).</p> <p>Compressor short cycles on overload.</p> <p>Compressor starts but hums & trips overload.</p> <p>Defective compressor overload or start capacitor.</p> <p>Compressor starts but does not switch off of start winding.</p> <p>Refrigerant leak.</p>	<p>Contact an electrician.</p> <p>Fill ice bath to proper water level (until water begins flowing in the overflow stand-pipe drain line (clear).</p> <p>Replace.</p> <p>Replace.</p> <p>Excessively high discharge pressure due to restricted condenser or inoperative condenser fan motor.</p> <p>Seized or shorted compressor, replace.</p> <p>Test & replace.</p> <p>Relay or compressor is defective. Test & replace faulty item.</p> <p>Repair leak, evacuate & recharge system.</p>
Warm drinks	<p>Ambient air around dispenser is too warm.</p> <p>Excessive demand on dispenser.</p> <p>Dirty condenser coil.</p> <p>Inoperative condenser fan.</p> <p>Defective Ice-Bank controller.</p> <p>Loss of refrigerant charge due to leak in system.</p>	<p>Relocate dispenser.</p> <p>Add water pre-cooler or second dispenser.</p> <p>Clean condenser coil.</p> <p>Replace condenser fan motor.</p> <p>Test & replace if necessary.</p> <p>Repair leak and recharge system.</p>
Concentrate warm, water cold.	<p>Cabinet fan inoperable.</p> <p>Agitator motor/pump inoperable or restricted.</p> <p>Loss of refrigerant charge due to leak in system.</p>	<p>Check/replace fan.</p> <p>Check/replace agitator motor.</p> <p>Repair leak & recharge system.</p>

Initial Notes

Compressor Start Capacitor - The failure of this device can be the cause of an early, pre-chiller failure. Please note the following:

230V Compressor Capacitor - The capacitor alone is available for replacement, refer to Illustrated Parts List 620073775IPL.

115V Compressor Capacitor - The capacitor is available only as a part of a Starting Tower assembly that also includes a relay and wiring junction boxes (Fig. 34). Refer to the illustrated parts list for the part number.

TROUBLESHOOTING

Perform the following checks to evaluate refrigeration system operation.

WARNING:

Only trained and certified electrical, plumbing and refrigeration technicians should diagnose and service this unit. ALL WIRING AND PLUMBING MUST CONFORM TO NATIONAL AND LOCAL CODES. FAILURE TO COMPLY COULD RESULT IN SERIOUS INJURY, DEATH OR EQUIPMENT DAMAGE.

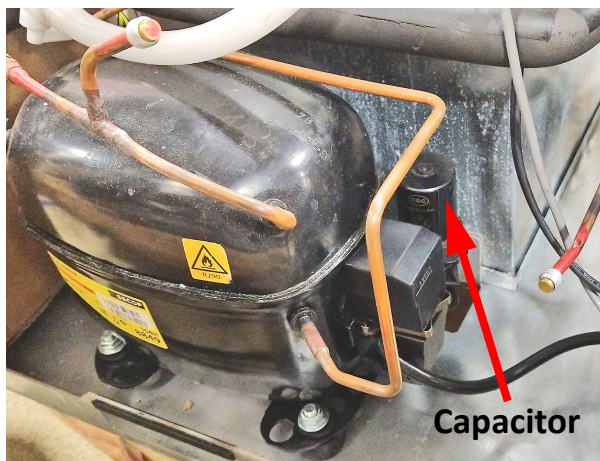
Capacitor Check

DANGER:

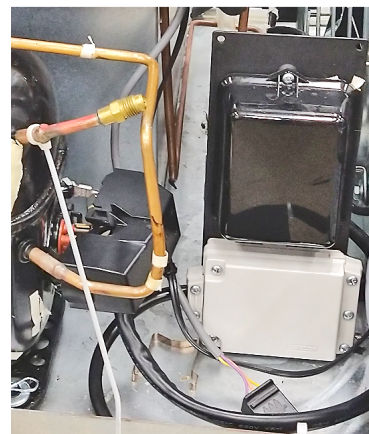
Disconnect power to the unit before servicing. Follow all lock out/tag out procedures established by the user. Verify all power is off to the unit before performing any work. Failure to comply could result in serious injury, death or damage to the equipment.

Discharge capacitors in a way that won't cause any spark, using a Supco CapDis tool.

1. Check or replace start capacitor - disconnect bleed resistor before checking for shorted capacitor.
2. Check or replace run capacitor - check for shorted capacitor or either terminal grounded to case.



230V Units



115V Units

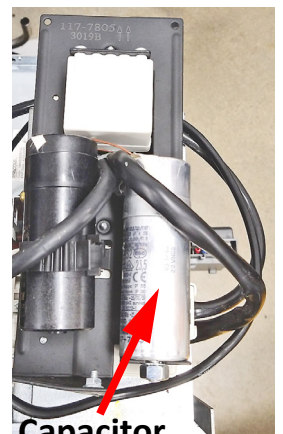


Figure 33

?

TROUBLESHOOTING

Refrigeration Compressor Check

⚠ DANGER:

Disconnect power to the unit before servicing. Follow all lock out/tag out procedures established by the user. Verify all power is off to the unit before performing any work. Failure to comply could result in serious injury, death or damage to the equipment.

115V Units Only

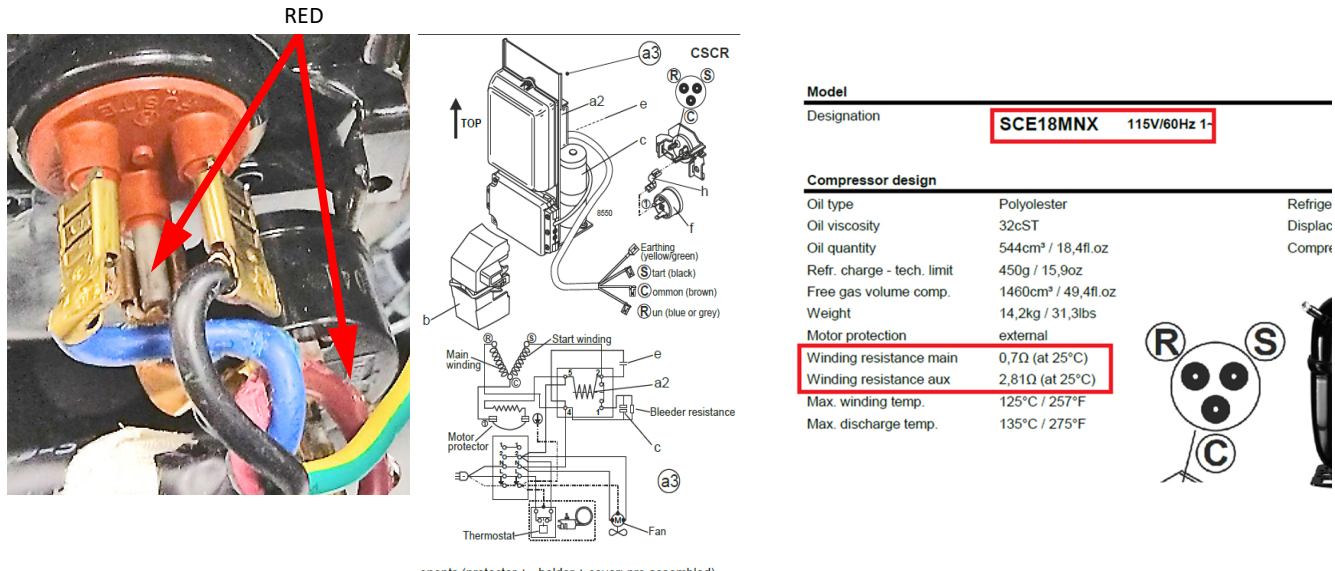


Figure 34

The resistance readings of the windings should be as shown in the table. A meter capable of these low readings must be used.

1. Check between "C" and "R." Replace the compressor if there is no continuity as the run windings are open.
2. Check between "C" and "S." Replace the compressor if there is no continuity as the start windings are open.
3. Check between "C" and "R" or "S" and the shell of the compressor. If there is continuity, replace the compressor as the motor is grounded.
4. Check between screw terminal on the overload and "C" on the compressor. Check and repair the lead or connections if there is no continuity.

230V Units Only

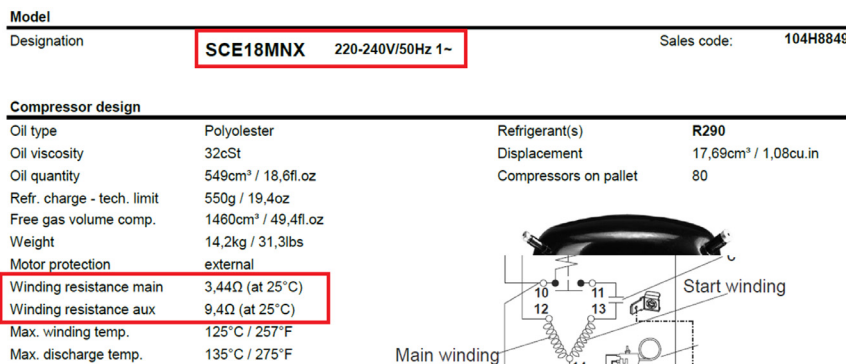


Figure 35

TROUBLESHOOTING

Expansion Valve Check

A thermostatic expansion valve is used to control the amount of refrigerant flowing through the evaporator (ice bank refrigeration coils). Improperly installed or defective expansion valves may cause deficient cooling.

By using general refrigeration system troubleshooting along with the pressure charts you can easily determine whether or not the expansion valve is working properly.

DANGER:

Disconnect power to the unit before servicing. Follow all lock out/tag out procedures established by the user. Verify all power is off to the unit before performing any work. Failure to comply could result in serious injury, death or damage to the equipment.

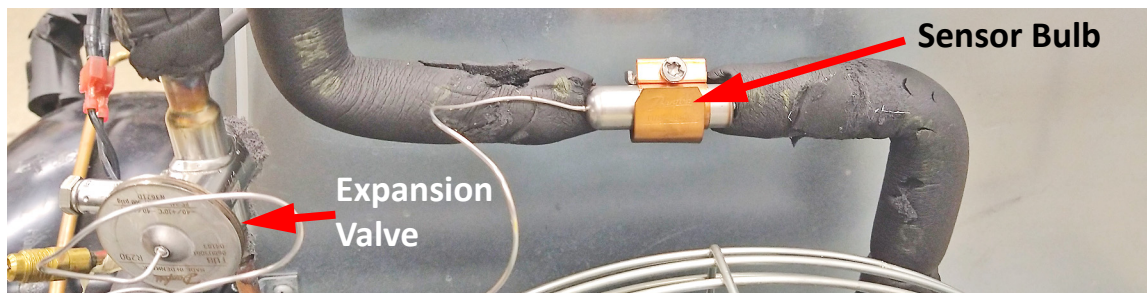


Figure 36

Assessing Expansion Valve Operation

First be sure you have adequate water in the ice bank and good airflow through a clean condenser, and that the unit is properly ventilated, and that the system is properly charged and free from any restrictions. Also be sure the compressor is operating properly. Ensure the insulation around the TXV valve and bulb are not damaged and sealed. Inspect for moisture/ice on the bulb. Seal the insulation well.

Second, take reservoir water temperature and air temperature from the condenser inlet and determine at what pressure the unit should be running. The system is equipped with thermostatic valves, there is NO adjustment. If correct pressure cannot be obtained, first be sure the system has time to stabilize 10–15 minutes. Second, make sure that the sensing bulb is located at the 2:00 position on the outlet side of the refrigeration line to which it is mounted. Ensure it is insulated well and clamped tightly to the tubing.

If system pressures are still not adequate, take second water and air temperature readings and go over other parts of the system for possible problems. If proper charge is questionable, evacuate and recharge to nameplate values and leak check. If the expansion valve still malfunctions, replace it.

When replacing the valve be sure to bleed refrigerant gas from the low side port so as not to lose refrigerant oil. Use general refrigerant system practices when replacing and recharging unit. After a new valve is in place, go through the previous troubleshooting to be sure valve is functioning properly.

CAUTION:

Very High discharge pressure is present in system. Quick disconnects on your gauges will minimize danger and loss of refrigerant.

COMPONENT REPLACEMENT

Follow these instructions to replace selected components. For refrigeration-system components, only essential guidelines are provided.

WARNING:

Only trained and certified electrical, plumbing and refrigeration technicians should diagnose and service this unit. ALL WIRING AND PLUMBING MUST CONFORM TO NATIONAL AND LOCAL CODES. FAILURE TO COMPLY COULD RESULT IN SERIOUS INJURY, DEATH OR EQUIPMENT DAMAGE.

PRE-CHILLER REFRIGERATION SYSTEM REPAIR & SAFETY GUIDELINES

The following guidance and R290 refrigerant-safety information is intended to ensure that repair procedures are conducted under optimal safety conditions.



WARNING! R290 Refrigerant used in this pre-chiller is flammable. Follow the Warnings listed below to avoid hazards.

Initial Considerations

- 1) Isolate the system electrically by disconnecting all AC power sources.
- 3) Before beginning the procedure, ensure that:
 - Mechanical handling equipment is available, if required, for handling the slide-out, pre-chiller system;
 - All personal protective equipment is available and being used correctly;
 - The R290-refrigerant recovery process is supervised at all times by a competent person;
 - Recovery equipment and cylinders conform to the appropriate standards.
- 4) Pump down the refrigerant from the system.

CAUTION:

Do not overfill cylinders (no more than 80% volume liquid charge).
Do not exceed the maximum working pressure of the cylinder, even temporarily.

CAUTION:

When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

CAUTION:

Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

CAUTION:

DO NOT switch recovery system on/off near the source of flammable refrigerant that may be leaking out or may leak out during recovery-system line connection/disconnection.

Recovery Requirements and Guidelines

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

COMPONENT REPLACEMENT

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, FLAMMABLE REFRIGERANTS. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

NOTE: For appliances containing flammable refrigerants, refrigerant purging shall be achieved by breaking vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved; then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that FLAMMABLE REFRIGERANT does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Competence of service personnel Information of procedures additional to usual information for refrigerating appliance installation, repair, maintenance and decommission procedures is required when an appliance with FLAMMABLE REFRIGERANTS is affected. The training of these procedures is carried out by national training organizations or manufacturers that are accredited to teach the relevant national competency standards that may be set in legislation. The achieved competence should be documented by a certificate.

R290 Refrigerant Safety Precautions

Ensure sufficient ventilation at the equipment location.

Be aware that malfunction of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.

Discharge capacitors in a way that won't cause any spark, using a Supco CapDis tool.

Remove the refrigerant. If recovery is not required by national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. In doubt, one person should guard the outlet. Take special care that drained refrigerant will not float back into the building.

Information On Correct Working Procedures

Commissioning

Ensure that floor area is sufficient for REFRIGERANT CHARGE or that the ventilation duct is assembled in a correct manner.

Connect pipes and carry out a leak test before charging with refrigerant.

Check safety equipment before putting into service.

Maintenance

Portable equipment shall be repaired outside or in a workshop specially equipped for servicing units with FLAMMABLE REFRIGERANTS.

Ensure sufficient ventilation at repair place.

Be aware that malfunction of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.



COMPONENT REPLACEMENT

Discharge capacitors in a way that won't cause any spark, using a Supco CapDis tool. (The standard procedure to short circuit the capacitor terminals usually creates sparks. Be advised to avoid that.)

Reassemble sealed enclosures accurately. If seals are worn, replace them.

Check safety equipment before putting into service.

Repair

Portable equipment shall be repaired outside or in a workshop specially equipped for servicing units with FLAMMABLE REFRIGERANTS.

Ensure sufficient ventilation at the repair place.

Be aware that malfunction of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.

Discharge capacitors in a way that won't cause any spark, using a Supco CapDis tool.

Pre-Chiller	VAC	Ph	Hz	Refrigerant			Test Pressure PSI (kPa) (Bar)		Pre-Chiller Shipping Weight
				Oz	Grams	Type	High Side	Low Side	
620073775	115V	1	60	4.23	120	R-290	425 (2930.3) (29.3)	170 (1172.1) (11.7)	189 lbs (85.7kg)
620073774	230V	1	50	5.29	150	R-290			

When BRAZING is required, the following procedures shall be carried out in the order indicated:

- A) Remove the refrigerant. If the recovery is not required by national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. In doubt, one person should guard the outlet. Take special care that drained refrigerant will not float back into the building.
- B) Evacuate the refrigerant circuit.
- C) Purge the refrigerant circuit with oxygen-free nitrogen for 5 min. (not required for A2L refrigerants)
- D) Evacuate again (not required for A2L REFRIGERANTS).
- E) Remove parts to be replaced by cutting, not by flame.
- F) Purge the braze point with nitrogen during the brazing procedure at the pressure indicated below.
- G) Carry out a leak test before charging with refrigerant.

NOTES:

Reassemble sealed enclosures accurately. If seals are worn, replace them.

COMPONENT REPLACEMENT

Disposal

Ensure sufficient ventilation in the work area.

Remove the refrigerant.

Where controlled, refrigerant-recovery is required, follow all local regulatory guidelines and requirements.


Where refrigerant recovery is not required by local/national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. A designated person should oversee this process to ensure safety. Take special care that drained refrigerant will not drift back into the building during the draining process.

When FLAMMABLE REFRIGERANTS are used:

- A) Evacuate the refrigerant circuit.
- B) Purge the refrigerant circuit with oxygen-free nitrogen for 5 min.
- C) Evacuate again.
- D) Cut out the compressor and drain the oil.

Pressure Switch Replacement

Table 6

Step	Action	
1	Disconnect electrical power from the pre-chiller.	
2	<p>Disconnect the Power cord from its electrical connection.</p> <p>Disconnect the switch wiring from:</p> <p>115V Unit: the Start Tower junction box (Fig. 38).</p> <p>230V Unit: the Ice Bank connector and the compressor terminal (Fig. 39).</p>	 <p>Figure 37</p>
3	<p>Remove the high pressure switch by unscrewing it from the Schrader valve fitting.</p> <p>IMPORTANT: Ensure that the new switch is fully seated so the Schrader-valve actuator is depressed properly.</p>	
4	Reconnect the switch wiring.	
5	Reconnect power to the unit.	

COMPONENT REPLACEMENT

115V Pre-Chiller

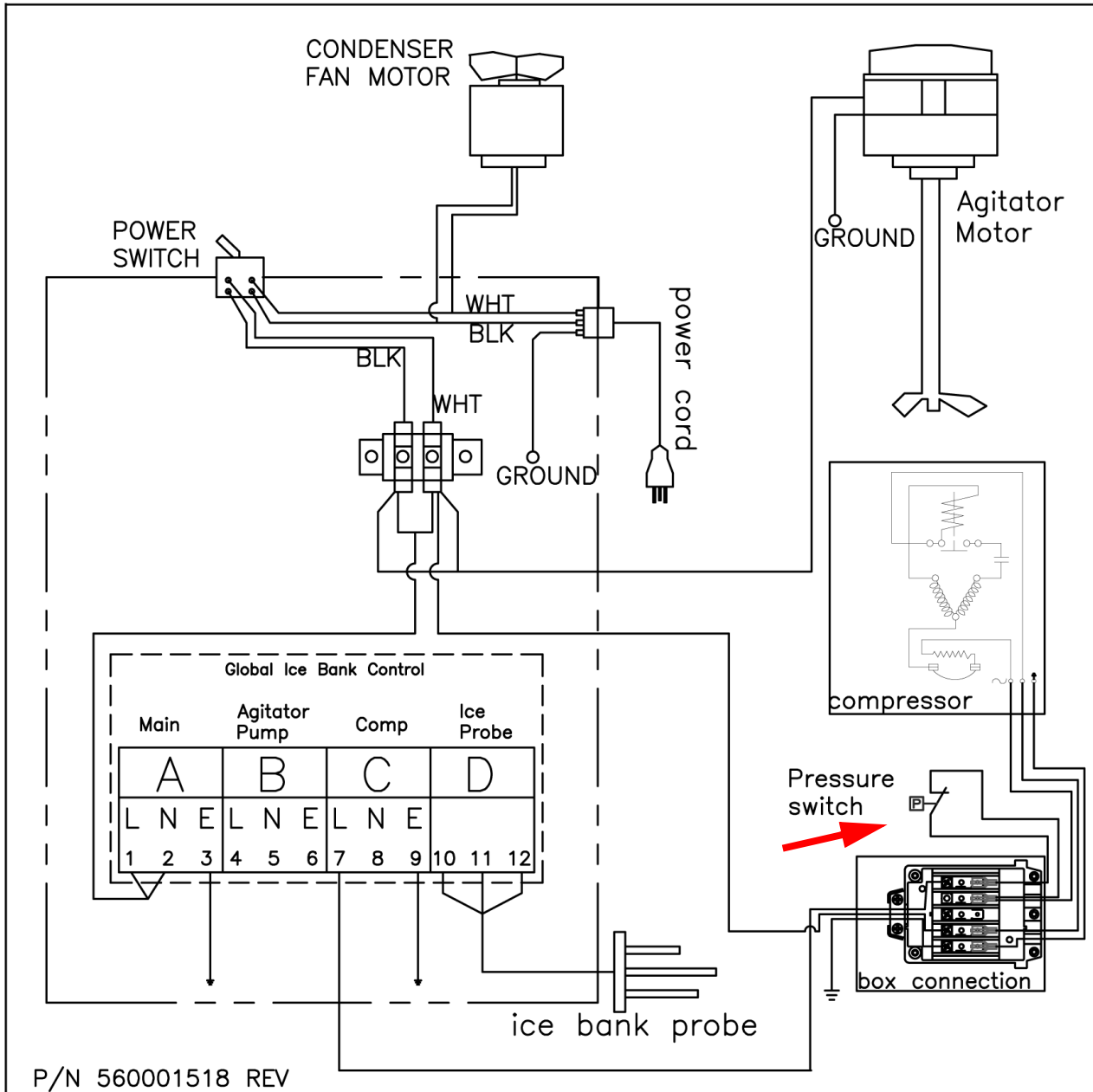


Figure 38

COMPONENT REPLACEMENT

230V Pre-Chiller

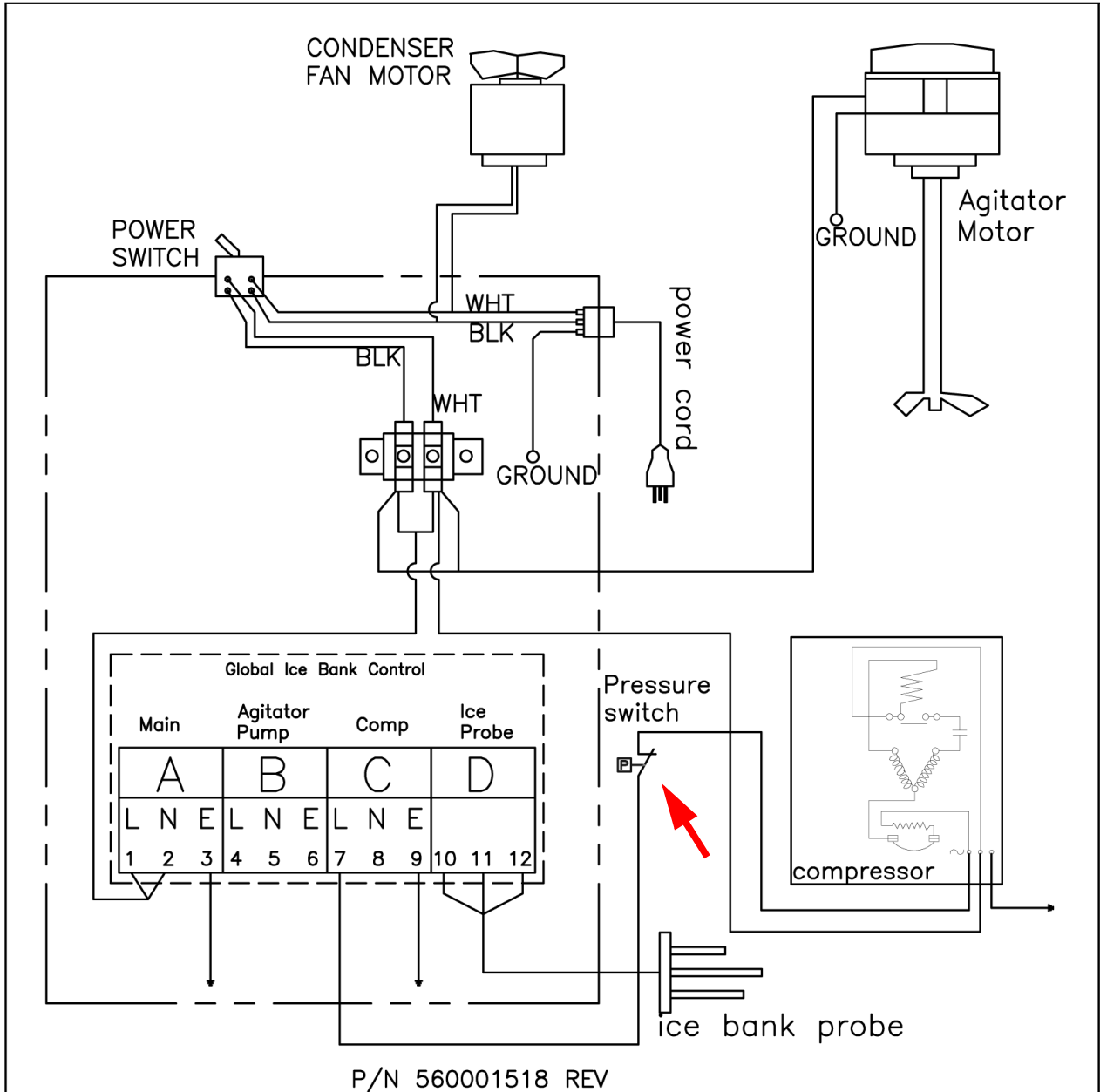
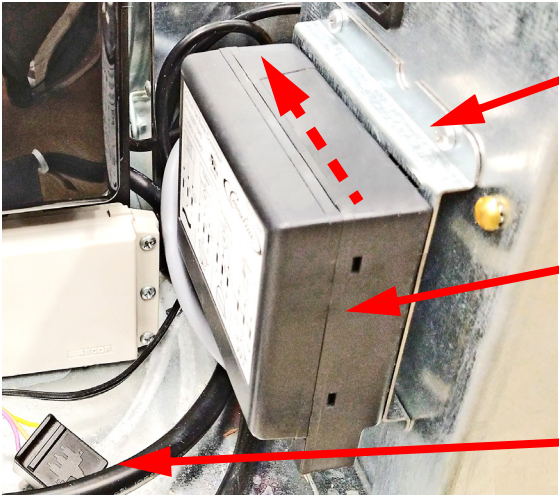
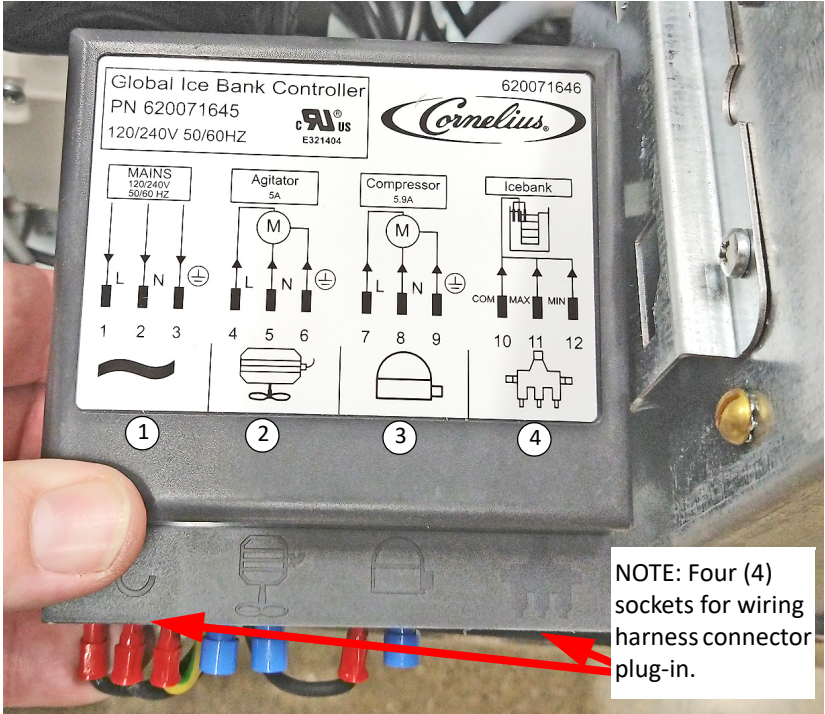


Figure 39

COMPONENT REPLACEMENT

Ice Bank Controller Replacement

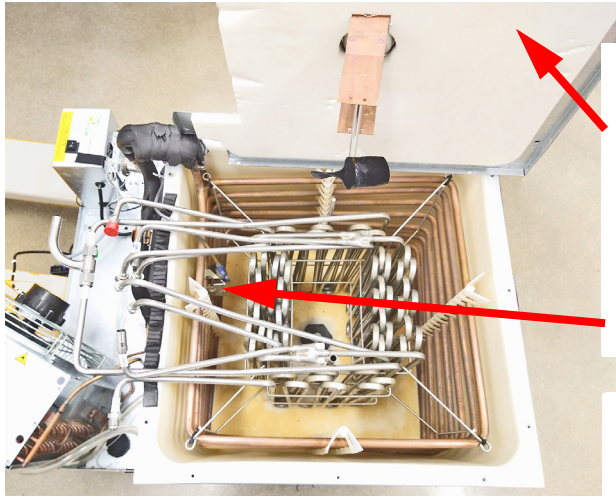
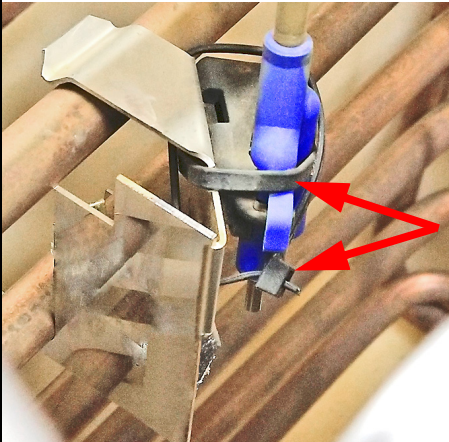
Table 7

Step	Action	
1	Disconnect electrical power from the pre-chiller.	
2	<p>Unlock the ice bank controller from its mounting bracket by pressing it leftward (inward) toward the condenser fan.</p> <p>Mounting bracket is slotted left to right.</p>	 <p>Mounting bracket is slotted left to right. (Note bracket in Fig. 43).</p> <p>Slide controller to the left to unlock it from the mounting plate.</p> <p>Harness plug for ice bank controller. Note Ice Probe symbol on plug.</p> <p style="text-align: center;">Figure 40</p>
3	<p>Hold controller as shown and disconnect the four harness plugs from the controller sockets.</p> <p>Note the symbols on the plugs that match the controller-label and embossed component symbols.</p>	 <p>Global Ice Bank Controller PN 620071645 120/240V 50/60HZ 620071646 Cornelius E321404</p> <p>MAINS 120/240V 50/60 HZ Agitator 5A Compressor 5.9A Icebank</p> <p>1 2 3 4 5 6 7 8 9 10 11 12 COM MAX MIN</p> <p>NOTE: Four (4) sockets for wiring harness connector plug-in.</p> <p style="text-align: center;">Figure 41</p>
4	Connect a replacement ice bank controller to the four coded, harness plugs.	
5	Mount the controller onto its bracket by inserting its back pins in the bracket and pressing it to the right to lock it.	
6	Reconnect power to the unit.	

COMPONENT REPLACEMENT

Ice Probe Replacement

Table 8

Step	Action	
1	Disconnect electrical power from the pre-chiller.	
2	Drain the pre-chiller reservoir water using the manual drain on the underside of the unit (or pump it out).	
3	Disconnect the chiller electrical and plumbing lines. (Refer to PRE-CHILLER ACCESS AND REMOVAL section.)	
4	Unlock and slide out and remove the chiller from the ABS 2.0 compartment using an hydraulic lift-truck.	
5	Unplug the Agitator motor lead connector from the Ice Bank Controller. Note the lead routing.	
6	<p>Remove the fasteners securing the Ice Bank cover.</p> <p>CAUTION: With an assistant, lift the cover <u>straight upward</u> and off to protect the Agitator motor shaft and impeller blade.</p>	 <p>CAUTION: Do Not tilt ice bank cover during removal or agitator shaft may be damaged by impacting cooling coils.</p> <p>Note Ice Probe location.</p>
Figure 42		
7	Allow the ice on the copper refrigeration coils to thaw adequately for Ice Probe access and removal. Ensure that melt-water drainage is accommodated by routing the manual drain output to a bucket or drain.	
8	<p>Remove the Ice Probe from its mounting bracket by clipping the two (2) cable-tie bands securing it in place.</p> <p>NOTE the Ice Probe orientation in the bracket and the cable-tie placement in a criss-crossing pattern.</p>	 <p>Two (2) cable ties securing the Ice Probe to the bracket.</p> <p>Be sure to notice the Ice Probe mounting orientation as well as that of the cable ties.</p>
Figure 43		
9	Install the replacement Ice Probe by securing it in the mounting bracket. Do not over-tighten the cable ties beyond what's adequate to firmly secure the probe in place.	
10	Connect the Ice Probe lead plug to the designated Ice Bank Controller socket.	
11	Re-install the Ice Bank into the ABS 2.0 compartment.	
12	Reconnect the electrical & plumbing lines.	
13	Refill the Ice Bank with water until it runs out of the overflow line.	

COMPONENT REPLACEMENT

Agitator Motor Replacement

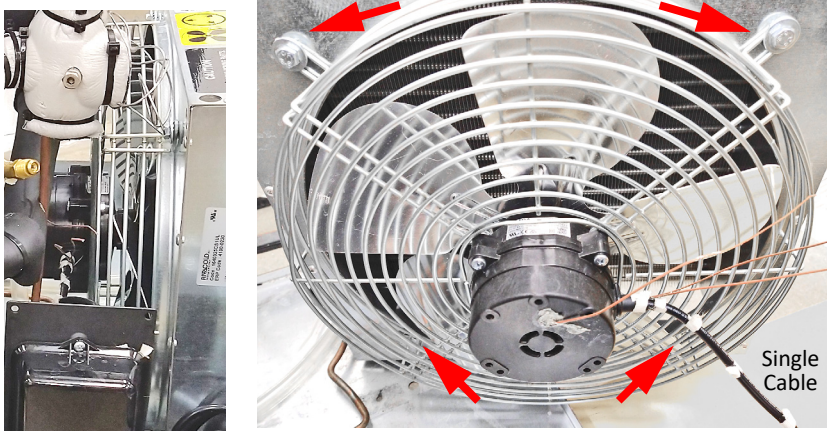
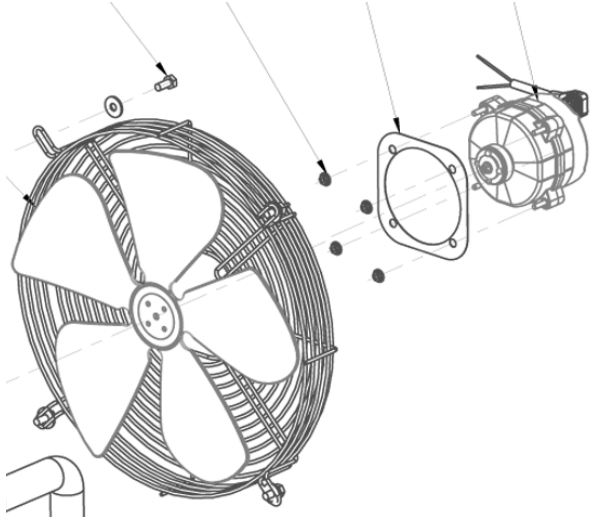
Table 9

Step	Action	
1	Disconnect electrical power from the pre-chiller. Drain or partially drain the reservoir to reduce weight.	
2	Disconnect the chiller electrical & plumbing lines. (Refer to PRE-CHILLER ACCESS AND REMOVAL section.)	
3	Unlock and slide the pre-chiller out enough to allow access to the Agitator motor shown below.	
4	Unplug the Agitator motor lead connector from the Ice Bank Controller. Note the lead routing.	
5	Remove the four (4) screws securing the Agitator motor to the Ice Bank top cover and the copper, heat-transfer brackets.	<p>Remove four (4) screws indicated.</p> <p>Figure 44</p>
6	Lift and angle the Agitator assembly to withdraw it from the Ice Bank cover.	
7	Install the new Agitator and secure it with the four screws while taking care to include and align the heat-transfer brackets.	
8	Re-install the pre-chiller by performing steps 1 - 4 in reverse order.	
9	Reconnect power to the unit.	

COMPONENT REPLACEMENT

Condenser Fan Replacement

Table 10

Step	Action	
1	Disconnect electrical power from the pre-chiller. Drain or partially drain the reservoir to reduce weight.	
2	Disconnect the chiller electrical & plumbing lines. (Refer to PRE-CHILLER ACCESS AND REMOVAL section.)	
3	Unlock and slide the pre-chiller out enough to allow access to the Agitator motor shown below.	
4	Disconnect the two (2) condenser-fan wires from the electrical box terminals (Figs. 38 & 39). Note the wire routing.	
5	Unbolt the condenser from its mounting on the pre-chiller base plate. Move the condenser backwards away from the Ice Bank while taking care to avoid fan-shroud interaction with the expansion-valve, sensor-bulb capillary tube.	
6	Remove the four (4) bolts securing the Condenser Fan to the condenser.	 <p>Remove four (4) bolts indicated.</p> <p>Figure 45</p>
7	Lift the Condenser Fan from the unit.	
8	Disassemble the motor from the fan blade and shroud. Install the new motor with its stabilizing Motor Plate as shown.	 <p>Figure 46</p>
9	Re-install the Condenser Fan by performing steps 1 - 7 in reverse order.	
10	Reconnect power to the unit.	

COMPONENT REPLACEMENT

Start Capacitor (230V) / Start Tower (115V) Replacement

NOTE: The start capacitor in 230V units may be replaced individually; but for 115V units, capacitor replacement entails replacing the Start Tower assembly as a unit.

Table 11

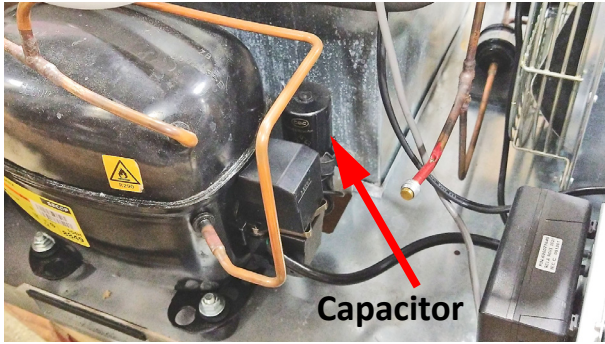
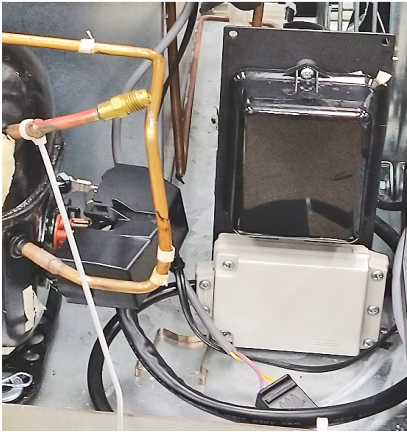

Step	Action	
1	Disconnect electrical power from the pre-chiller. Drain or partially drain the reservoir to reduce weight.	
2	Disconnect the chiller electrical & plumbing lines. (Refer to PRE-CHILLER ACCESS AND REMOVAL section.)	
3	Unlock and slide the pre-chiller out enough to allow access to the refrigeration compressor, as shown.	<div style="text-align: center;">  <p>Capacitor</p> <p>230V Units</p> </div> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>115V Units - Start Tower</p> </div> <div style="text-align: center;">  <p>Capacitor (behind)</p> </div> </div> <p style="text-align: center;">Figure 47</p>
4		<p>For 230V units: Remove the wiring shield from the compressor and safely discharge it using a Supco CapDis tool. Unfasten the mounting band securing the capacitor. Disconnect the capacitor & replace it. Reassemble the items removed.</p>
5		<p>NOTE on 115V units: The Start (Capacitor) Tower assembly bracket is riveted to the pre-chiller base plate. To remove it, either clip off or drill out the two rivets accessible from the top. (Bracket bending may be necessary.)</p>

Table 11

Step	Action	
6	<p>115V units (from here onward) Open the Tower junction boxes as shown at right. Safely discharge the capacitor using a Supco CapDis tool across the applicable junction box terminals 1, 2 and 4 as shown in the junction-box cover diagram at right (or Blue/ Gray & Black and Terminal 1 on the Potential Relay leads).</p>	<div style="text-align: right; margin-bottom: 10px;"> Start Tower Junction Boxes </div> <p style="text-align: center;">Figure 48</p>
7	Detach the Start Tower bracket from the pre-chiller base plate by clipping or drilling out the two rivets.	
8	Examine the replacement Start Tower and disconnect the appropriate wires of the old start tower.	
9	Reconnect the system wiring to the new Start Tower as applicable.	
10	Mount the Start Tower bracket to the base plate.	
11	Re-install the pre-chiller by performing steps 1 - 3 in reverse order. Refill water reservoir if previously drained.	

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