



Model U218
SERVICE MANUAL

Manual No. [513637](#)

Rev.1

This manual provides basic information about the machine. Instructions and suggestions are given covering its operation and care.

The illustrations and specifications are not binding in detail. We reserve the right to make changes to the machine without notice, and without incurring any obligation to modify or provide new parts for machines built prior to date of change.

DO NOT ATTEMPT to operate the machine until instructions and safety precautions in this manual are read completely and are thoroughly understood. If problems develop or questions arise in connection with installation, operation, or servicing of the machine, contact Stoelting.



stoeltingfoodservice.com

Stoelting Foodservice Equipment
502 Highway 67
Kiel, WI 53042-1600
U.S.A.

Main Tel: 800.558.5807
Fax: 920.894.7029

Customer Service: 888.429.5920
Fax: 800.545.0662
Email: foodservice@stoelting.com

© 2014 PW Stoelting, LLC

A Few Words About Safety

Safety Information

Read and understand the entire manual before operating or maintaining Stoelting equipment.

This manual provides the operator with information for the safe operation and maintenance of Stoelting equipment. As with any machine, there are hazards associated with their operation. For this reason safety is emphasized throughout the manual. To highlight specific safety information, the following safety definitions are provided to assist the reader.

The purpose of safety symbols is to attract your attention to possible dangers. The safety symbols, and their explanations, deserve your careful attention and understanding. The safety warnings do not by themselves eliminate any danger. The instructions or warnings they give are not substitutes for proper accident prevention measures.

If you need to replace a part, use genuine Stoelting parts with the correct part number or an equivalent part. We strongly recommend that you do not use replacement parts of inferior quality.



Safety Alert Symbol:

This symbol Indicates danger, warning or caution. Attention is required in order to avoid serious personal injury. The message that follows the symbol contains important information about safety.

Signal Word:

Signal words are distinctive words used throughout this manual that alert the reader to the existence and relative degree of a hazard.



The signal word “WARNING” indicates a potentially hazardous situation, which, if not avoided, may result in death or serious injury and equipment/property damage.



The signal word “CAUTION” indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury and equipment/property damage.

CAUTION

The signal word “CAUTION” not preceded by the safety alert symbol indicates a potentially hazardous situation, which, if not avoided, may result in equipment/property damage.

NOTE (or NOTICE)

The signal word “NOTICE” indicates information or procedures that relate directly or indirectly to the safety of personnel or equipment/property.

TABLE OF CONTENTS

Section	Description	Page
1	Description and Specifications	
1.1	Description	1
1.2	Specifications	1
1.3	Modes of Normal Operation	2
1.4	Operation During an Error Mode	3
2	Installation Instructions	
2.1	Safety Precautions	5
2.2	Shipment and Transit	5
2.3	Machine Installation	5
3	Initial Set-Up and Operation	
3.1	Operator's Safety Precautions	7
3.2	Operating Controls and Indicators	7
3.3	Sanitizing	8
3.4	Freeze Down and Operation	9
3.5	Removing Mix From Machine	9
3.6	Cleaning the Machine	9
3.7	Disassembly of Machine Parts	10
3.8	Cleaning the Machine Parts	11
3.9	Sanitize Machine and Machine Parts	11
3.10	Assembly of Machine	12
3.11	Routine Cleaning	12
4	Maintenance and Adjustments	
4.1	Machine Adjustment	13
4.2	Product Consistency Adjustment	13
4.3	Continuous Drive Mode	13
4.4	Drive Belt Tension Adjustment	13
4.5	Preventative Maintenance	13
4.6	Extended Storage	14

Section	Description	Page
5	Refrigeration System	
5.1	Refrigeration System	15
5.2	Refrigerant Recovery and Evacuation	15
5.3	Refrigerant Charging	16
5.4	Compressor	16
5.5	Condenser	17
5.6	Valves	18
A.	Thermostatic Expansion Valve (TXV)	18
B.	High Pressure Cutout	19
C.	Evaporator Pressure Regulator (EPR)	19
D.	Water Valve (Water-Cooled Models Only)	20
5.7	Capillary Tube	21
5.8	Filter Drier	21
6	Electrical and Mechanical Control Systems	
6.1	Control Board	23
6.2	Contactors	23
6.3	Drive Motor	24
6.4	Capacitors	25
6.5	Gearbox	25
6.6	Condenser Fan Motor (Air-Cooled Models Only)	26
6.7	Switches	26
A.	Spigot Switch	26
B.	Torque Switch	26
7	Troubleshooting	
7.1	Light Indicators	27
7.2	Troubleshooting	27
8	Replacement Parts	
8.1	Decals & Lubrication	29
8.2	Accessories, Panels & Screws	29
8.3	Auger Shaft & Faceplate Parts	30
8.4	Hopper Parts	32
8.5	Machine Front & Spigot Switch Assembly	33
8.6	Left Side (Air-Cooled Shown)	34
8.7	Right Side (Water-Cooled Shown)	35
8.8	Machine Back (Water-Cooled Shown)	36
8.9	Refrigeration & Wiring Diagram	37
8.10	Autofill Options	39

SECTION 1 DESCRIPTION AND SPECIFICATIONS

1.1 DESCRIPTION

The Stoelting U218 machine is available as gravity fed or with an optional autofill kit. It is equipped with fully automatic controls to provide a uniform product. The U218 machine will operate with almost any type of frozen beverage mix. This manual is designed to help qualified service personnel and operators with the installation, operation and maintenance of the Stoelting U218 machine.



Figure 1-1 Model U218

1.2 SPECIFICATIONS

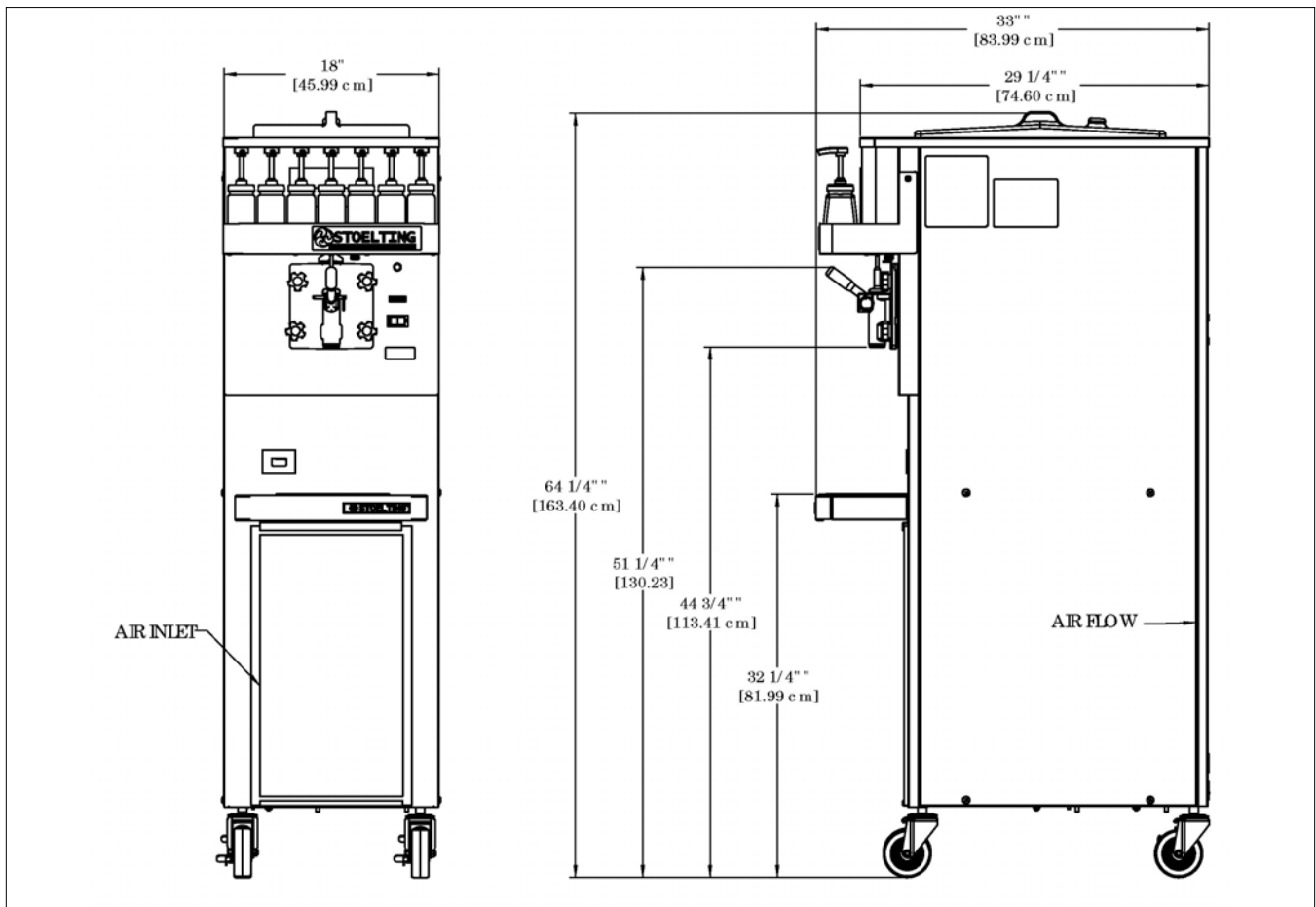


Figure 1-2 Model U218 Dimensions

1.2 SPECIFICATIONS - CONTINUED

Model U218		
Dimensions	Machine	with crate
width	18-1/4" (46,4 cm)	25" (63,5 cm)
height	64-1/2" (163,8 cm)	66" (167,6 cm)
depth	33" (83,8 cm)	51" (129,5 cm)
Weight	315 lbs (142,8 kg)	410 lbs (185,9 kg)
Electrical	1 Phase, 208-240 VAC, 60Hz	
running amps	approximately 12A	
connection type	NEMA6-20P power cord provided	
Compressor	11,000 Btu/hr	
Drive Motor	1/2 hp	
Air Flow	Air cooled units require 3" (7,6 cm) air space at front and back.	
Plumbing Fittings	Water cooled units require 3/8" N.P.T. water and drain fittings.	
Hopper Volume	7 gallon (26,50 liters)	
Freezing Cylinder Volume	2 gallon (8 quart), 7,57 liters	

1.3 MODES OF NORMAL OPERATION

Following is an explanation of the normal operation modes on the U218 (Refer to Figure 1-3).

NOTE

The following modes of operation are for the latest versions of the control boards (521696.2 and 521696.1 Rev72). The older version of the control has the following differences:

- There is no slush mode with continuous drive.
- There is no consistency check during the pre stir in slush mode and the pre stir is 3 seconds.
- The control runs strictly on timers during an error mode, and the cycle time during a drive motor error is 7 minutes off/55 seconds on.

NOTE

Slush mode has two options: normal and continuous drive. The normal mode saves energy. Continuous drive is used in rare situations where very thin slush is required. With the continuous drive option selected, the drive motor will run at all times, including standby. To change the control between the two options, refer to section 4.3.

A. PRE STIR

When the CLEAN-OFF-ON is moved into the ON position or when the spigot is opened, the drive motor will start a 4-second pre stir. During the pre stir, a consistency check will determine if the freezing cycle will begin.

B. FREEZING CYCLE

After the pre stir, a freezing cycle begins. The freezing cycle continues until the torque rod closes the torque switch and keeps the switch closed for 3 seconds. If product consistency is not met within 22 minutes, the machine will operate in the compressor time out mode (See Section 1.4).

NOTE

If the spigot is pulled during a freezing cycle, the 22-minute timer will restart.

C. POST STIR

After the freezing cycle ends, the drive motor will continue to run for an 18 second post stir. The post stir ensures the product does not freeze to the cylinder. If the spigot is opened during the post stir, the machine will check consistency. If the product is at consistency, the machine will move into standby. If the product is not at consistency, the machine will start a freezing cycle.

D. STANDBY

After the post stir, the machine will be in standby. It will remain in standby for 7 minutes or until the spigot is opened.

E. DEFROST MODE

If the spigot is not opened for 3 hours, defrost mode will begin. The auger will run for 90 seconds every 7 minutes and the diagnostic light will remain lit. The compressor does not operate during defrost mode. After 5.5 hours or if the spigot is opened, normal operation mode will begin.

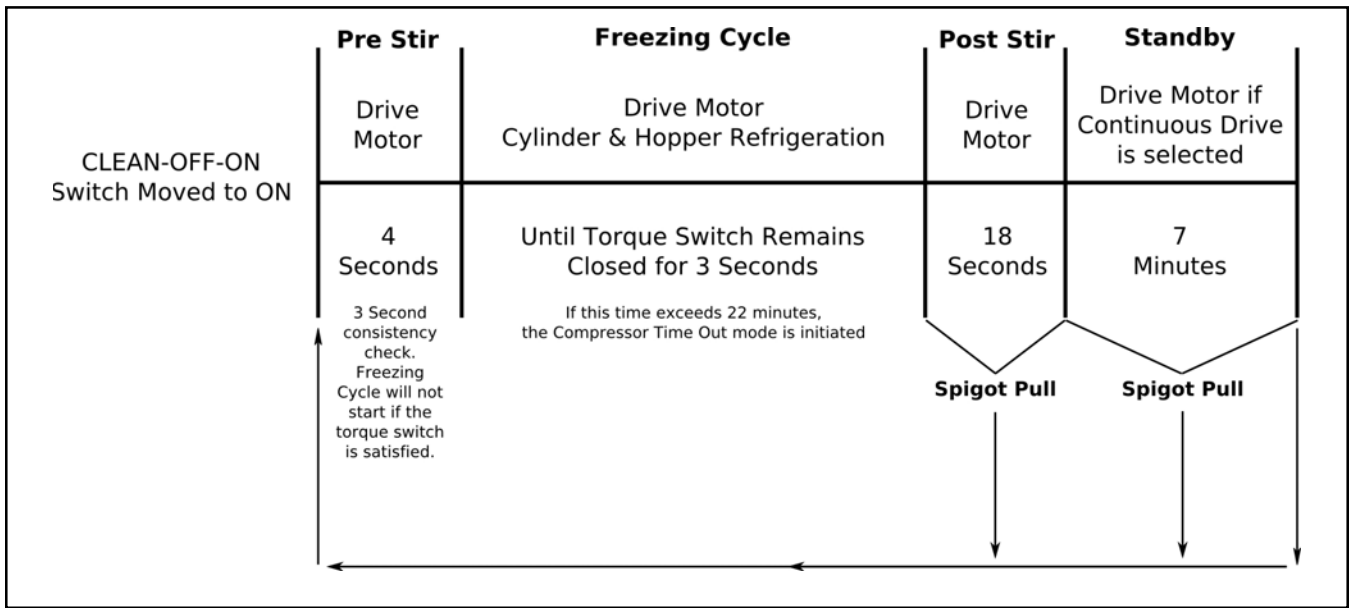


Figure 1-3 Modes of Normal Operation

F. CLEAN MODE

When the CLEAN-OFF-ON switch is in the CLEAN position, the drive motor starts and will run for 20 minutes. After the 20 minutes expire, the drive motor will stop and the diagnostic light will flash three times every 4 seconds. It will continue to flash until the CLEAN-OFF-ON switch is moved out of the CLEAN position.

1.4 OPERATION DURING AN ERROR MODE

A. COMPRESSOR TIME OUT MODE

If the freezing cycle exceeds 22 minutes, the machine will operate on timers. The diagnostic light will flash once every 4 seconds (Refer to Figure 1-4).

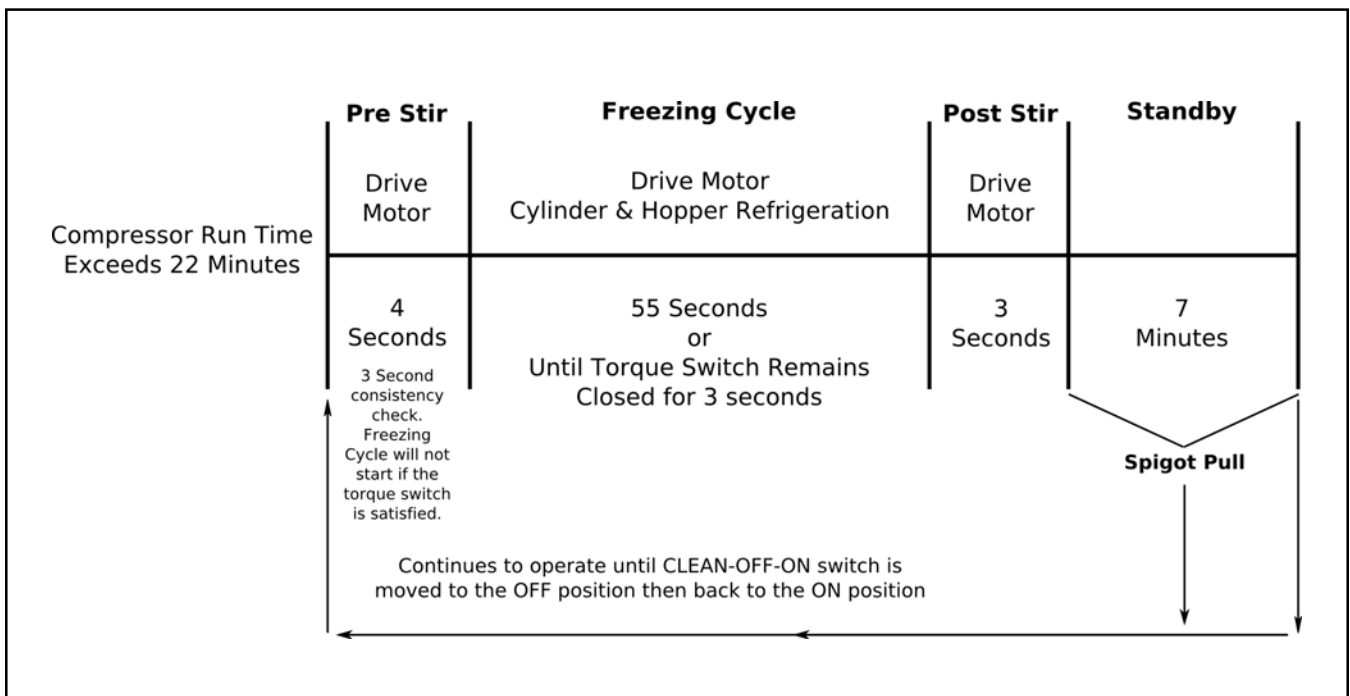


Figure 1-4 Compressor Time Out Mode

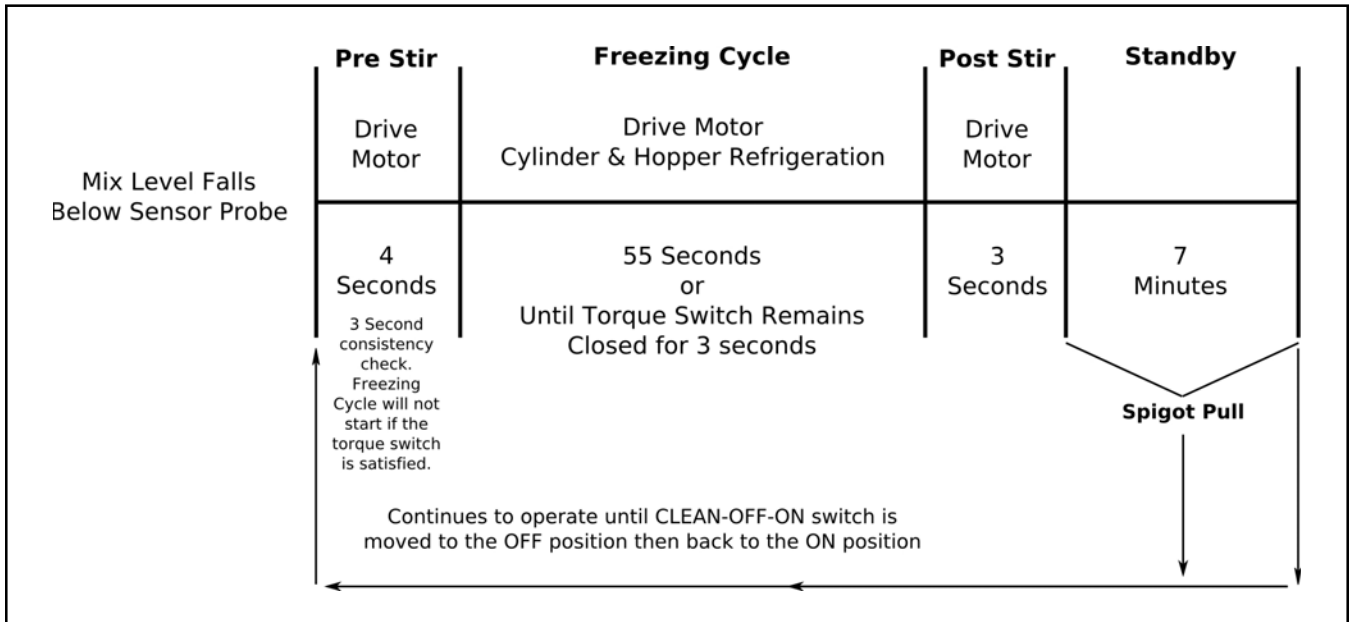


Figure 1-5 Low Mix Mode

B. LOW MIX MODE

If the mix level falls below the long sensor probe in the hopper, the machine will operate on timers. The ADD MIX light will flash. The machine will continue to operate on timers until the mix level in the hopper is above the sensor probe (Refer to Figure 1-5).

NOTE

The hopper has two probes. The longer probe monitors mix level in the hopper. The shorter probe shuts off the optional autofill system if installed.

C. DRIVE MOTOR ERROR MODE

If the control does not sense current from the drive motor during a pre stir, the machine will go into standby mode for 7 minutes. After standby, the control will repeat the pre stir and attempt to sense drive motor current. After the third pre stir without sensing drive motor current, the machine will operate on timers and the diagnostic light will flash twice every four seconds (Refer to Figure 1-6). The attempts to sense the drive motor current can be substituted by pulling the spigot.

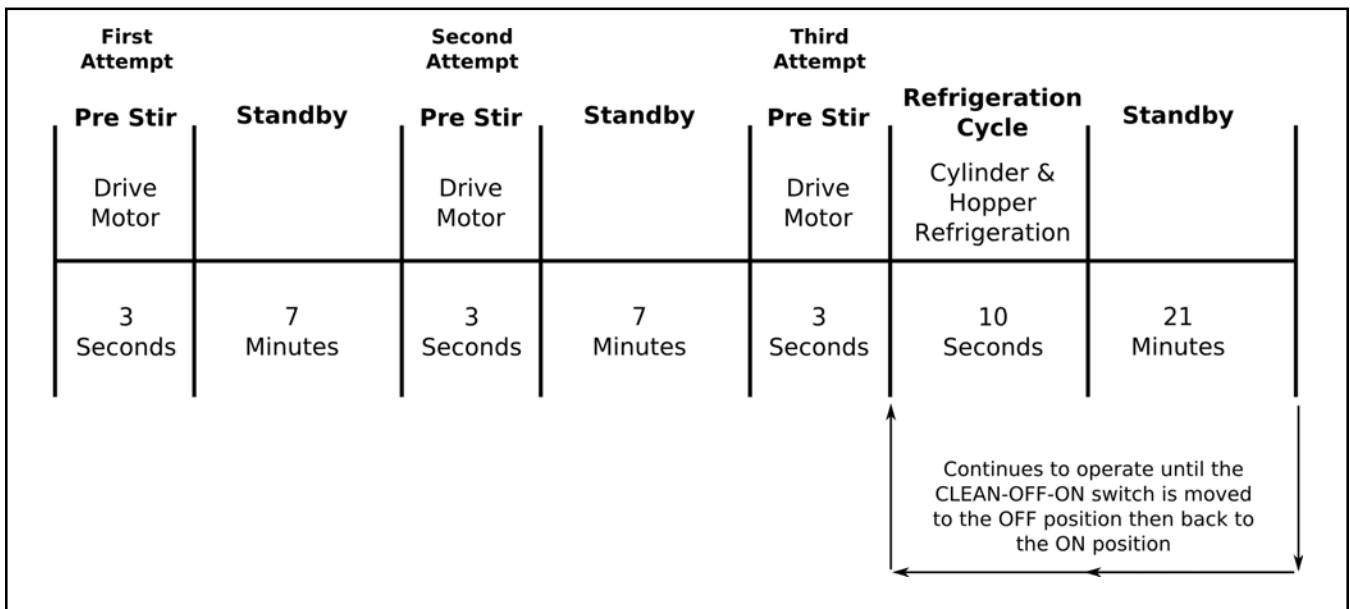


Figure 1-6 Drive Motor Error Mode

SECTION 2 INSTALLATION INSTRUCTIONS

2.1 SAFETY PRECAUTIONS

Do not attempt to operate the machine until the safety precautions and operating instructions in this manual are read completely and are thoroughly understood.

Take notice of all warning labels on the machine. The labels have been put there to help maintain a safe working environment. The labels have been designed to withstand washing and cleaning. All labels must remain legible for the life of the machine. Labels should be checked periodically to be sure they can be recognized as warning labels.

If danger, warning or caution labels are needed, indicate the part number, type of label, location of label, and quantity required along with your address and mail to:

STOELTING, LLC
ATTENTION: Customer Service
502 Hwy. 67
Kiel, Wisconsin 53042

2.2 SHIPMENT AND TRANSIT

The machine has been assembled, operated and inspected at the factory. Upon arrival at the final destination, the entire machine must be checked for any damage which may have occurred during transit.

With the method of packaging used, the machine should arrive in excellent condition. **THE CARRIER IS RESPONSIBLE FOR ALL DAMAGE IN TRANSIT, WHETHER VISIBLE OR CONCEALED.** Do not pay the freight bill until the machine has been checked for damage. Have the carrier note any visible damage on the freight bill. If concealed damage and/or shortage is found later, advise the carrier within 10 days and request inspection. The customer must place claim for damages and/or shortages in shipment with the carrier. Stoelting, LLC cannot make any claims against the carrier.

2.3 MACHINE INSTALLATION

Installation of the machine involves moving the machine close to its permanent location, removing all crating, setting in place, assembling parts, and cleaning.

- A. Uncrate the machine.
- B. Accurate leveling is necessary for correct drainage of machine barrel and to insure correct overrun. Place a bubble level on top of the machine at each corner to check for level condition. If adjustment is necessary, level the machine by turning the nut of each caster in or out.
- C. Correct ventilation is required. Install the rear air baffle to provide the 3" clearance at the front and back (Refer to Figure 2-1). Remove the rear panel screws and use them to attach the baffle. The machine can be placed side-by-side next to other equipment.

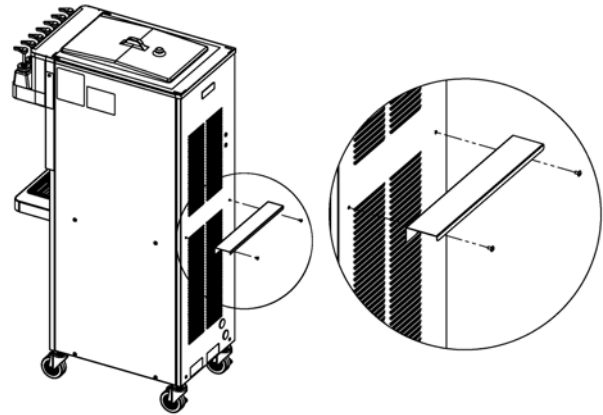


Figure 2-1 Rear Air Baffle

- D. Place the CLEAN-ON-OFF switch in the OFF position.

WARNING

Do not alter or deform electrical plug in any way. Altering the plug to fit into an outlet of different configuration may cause fire, risk of electrical shock, product damage and will void warranty.

- E. Connect the power cord to the proper power supply. The plug on the U218 is designed for 208-240 volt / 20 amp duty. Check the nameplate on your machine for proper supply. The unit must be connected to a properly grounded receptacle. The electrical cord furnished as part of the machine has a three prong grounding type plug. The use of an extension cord is not recommended, if necessary use one with a size 12 gauge or heavier with ground wire. Do not use an adapter to circumvent the grounding requirement.

SECTION 3 INITIAL SET-UP AND OPERATION

3.1 OPERATOR'S SAFETY PRECAUTIONS

SAFE OPERATION IS NO ACCIDENT; observe these rules:

- A. Know the machine. Read and understand the Operating Instructions.
- B. Notice all warning labels on the machine.
- C. Wear proper clothing. Avoid loose fitting garments, and remove watches, rings or jewelry that could cause a serious accident.
- D. Maintain a clean work area. Avoid accidents by cleaning up the area and keeping it clean.
- E. Stay alert at all times. Know which switch, push button or control you are about to use and what effect it is going to have.
- F. Disconnect electrical cord for maintenance. Never attempt to repair or perform maintenance on the machine until the main electrical power has been disconnected.
- G. Do not operate under unsafe operating conditions. Never operate the machine if unusual or excessive noise or vibration occurs.

3.2 OPERATING CONTROLS AND INDICATORS

Before operating the machine, it is required that the operator know the function of each operating control. Refer to Figure 3-1 for the location of the operating controls on the machine.

WARNING

High voltage will shock, burn or cause death. The OFF-ON switch must be placed in the OFF position prior to disassembling for cleaning or servicing. Do not operate machine with cabinet panels removed.

A. **Spigot Switch**

The spigot switch will automatically start the auger drive and refrigeration systems when the spigot is opened to dispense product. When the spigot is closed, the drive motor and compressor will remain on until the product in the freezing cylinder reaches the proper consistency.

B. **CLEAN-OFF-ON Switch**

The CLEAN-OFF-ON switch is used to supply power to the control circuit. When the switch is in the OFF (middle) position, power will not be supplied to the control board or refrigeration



Figure 3-1 Machine Controls

system. When the switch is in the ON position, the machine will operate in the freezing mode. When the switch is in the CLEAN position, all refrigeration will stop and the auger will start rotating.

C. ADD MIX Light

The ADD MIX light will flash to alert the operator to a low mix condition. It does so by monitoring the mix level in the hopper. When the ADD MIX light is flashing, refill hopper immediately.

NOTE

Failure to refill hopper immediately may result in operational problems.

D. Diagnostic Light

The Diagnostic Light will flash if an error occurs. The light will flash once if there is a compressor error. There will be two quick flashes if there is an auger error. And there will be three quick flashes if the machine is left in clean mode for more than 20 minutes. Refer to the troubleshooting section for details.

E. Consistency Adjustment Screw

The Consistency Adjustment Screw increases or decreases product consistency. A tension spring is connected to the screw and changes the amount of torque needed to complete a refrigeration cycle. Turn the screw clockwise to increase consistency or counterclockwise to decrease consistency.

F. Front Door Safety Switch

The front door safety switch prevents the auger from turning when the front door is removed. The switch is open when the door is not in place and closed when the door is properly installed.

G. Autofill Kit - Optional (Part 2187317)

The autofill kit is used with a pump to keep the hopper filled. The autofill kit is for use with non-potentially hazardous food substances; non-dairy. Refer to Section 8 for Autofill options.

3.3 SANITIZING

Sanitizing must be done after the machine is cleaned and just before the hopper is filled with mix. Sanitizing the night before is not effective. However, you should always clean the machine and parts after each use.

The United States Department of Agriculture and the Food and Drug Administration require that all cleaning and sanitizing solutions used with food processing equipment be certified for this use.

When sanitizing the machine, refer to local sanitary regulations for applicable codes and recommended sanitizing products and procedures. The frequency of sanitizing must comply with local health regulations.

Mix sanitizer according to manufacturer's instructions to provide a 100 parts per million strength solution. Mix sanitizer in quantities of no less than 2 gallons (7.5 liters) of 90° to 110°F (32° to 43°C) water. Allow sanitizer to contact the surfaces to be sanitized for 5 minutes. Any sanitizer must be used only in accordance with the manufacturer's instructions.

In general, sanitizing may be conducted as follows:

CAUTION	
Do not allow sanitizer to remain in contact with stainless steel machine parts for prolonged periods. Prolonged contact of sanitizer with machine may cause corrosion of stainless steel parts.	

- A. Prepare Stera-Sheen Green Label Sanitizer or equivalent according to manufacturer's instructions to provide a 100 ppm strength solution. Mix the sanitizer in quantities of no less than 2 gallons of 90° to 110°F (32° to 43°C) water. Check the strength of the sanitizing solution. Use a chlorine test strip and color chart to make sure the solution has 100 ppm. Any sanitizer must be used only in accordance with the manufacturer's instructions.
- B. Pour the sanitizing solution into the hopper and place the switch in the CLEAN position. Check for leaks. Place the switch in the CLEAN position. Check for leaks.
- C. Clean the sides of the hopper and the underside of the hopper cover using a soft bristle brush dipped in the sanitizing solution (Refer to Figure 3-2).
- D. After five minutes, place a bucket under the spigot and open spigot to drain most sanitizing solution. Leave a small amount of the sanitizing solution in the freezing cylinder. Place the switch in the OFF (middle) position.



Figure 3-2 Brush Hopper

- E. Collect the remaining sanitizing solution in a cup and test the chlorine contents with a new test strip. If the reading is less than 100 ppm, sanitize the machine again.
If the reading is less than 100 ppm after sanitizing the second time, disassemble and wash the machine again.

3.4 FREEZE DOWN AND OPERATION

- A. Sanitize just prior to use.
- B. Place the switch in the OFF (middle) position.
- C. Use a refractometer to take brix readings of the mix (Fig 3-3).

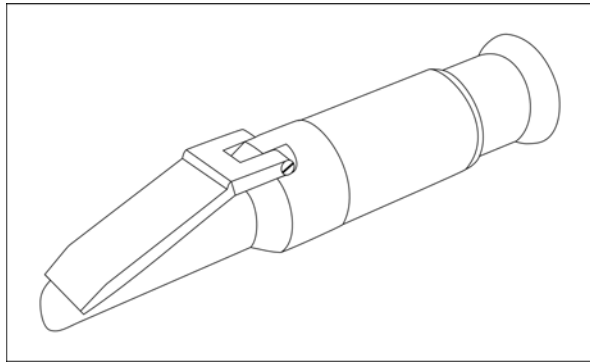


Figure 3-3 Refractometer

NOTE

A refractometer is required to get an accurate measurement of the brix. To use a refractometer, place a drop of the mix on the window and read the brix level through the eyepiece (Fig 3-4).

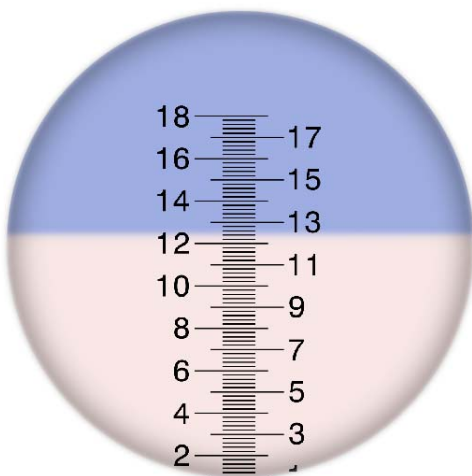


Figure 3-4 Refractometer Reading

- D. Make sure that the brix is at the manufacturer's recommendation (between 8% and 14%).
- C. Fill the hopper with mix.

- D. Open spigot and drain a small amount of mix to remove any remaining sanitizer.
- E. Place the switch in the ON position.

NOTE

After the drive motor starts, there is a 3 second delay before the compressor starts.

- F. After 8 to 12 minutes the product will be at consistency and will be ready to serve. Freeze down time may vary depending on mix type and ambient temperatures.
- G. To dispense, pull the spigot handle down to open the spigot.

The machine is designed to dispense the product at a reasonable draw rate. If the machine is overdrawn, the result is a soft product or a product that will not dispense at all. If this should occur, allow the machine to run for approximately 30 seconds before dispensing additional product.

Do not operate the machine when the ADD MIX light is on. Refill the hopper immediately.

3.5 REMOVING MIX FROM MACHINE

To remove the mix from the machine, refer to the following steps:

- A. Place the switch in the CLEAN position to rotate the auger. Allow the mix to agitate in freezing cylinder until the mix has become liquid, about 5 minutes.
- B. Drain the mix by opening the spigot. A container should be placed under the spigot to collect the liquid mix.
- C. Place the switch in the OFF (middle) position.

3.6 CLEANING THE MACHINE

NOTE

The frequency of cleaning the machine and machine parts must comply with local health regulations.


After the mix has been removed from the machine, the machine must be cleaned. To clean the machine, refer to the following steps:

- A. Make sure the spigot is closed and fill the hopper with 2 gallons (8 liters) of tap water.
- B. Place the switch in the CLEAN position. The auger will start to rotate.
- C. Allow the water to agitate for approximately 30 seconds.
- D. Open the spigot to drain the water. Remember to place a container under the spigot to catch the water. When the water has drained, place the switch in the OFF (middle) position. Allow the freezing cylinder to drain completely.

- E. Prepare sanitizing solution according to manufacturer's instructions to provide a 100 ppm strength solution. Mix the sanitizer in quantities of no less than 2 gallons of 90° to 110°F (32° to 43°C) water. Check the strength of the sanitizing solution. Use a chlorine test strip and color chart to make sure the solution has 100 ppm. Repeat steps A through D using the sanitizing solution.

3.7 DISASSEMBLY OF MACHINE PARTS

Inspection for worn or broken parts should be made each time the machine is disassembled. All worn or broken parts should be replaced to ensure safety to both the operator and the customer and to maintain good machine performance and a quality product. Frequency of cleaning must comply with the local health regulations.

 CAUTION
<p>Hazardous Moving Parts. Revolving auger shaft can grab and cause injury. Place the switch in the OFF (middle) position before disassembling for cleaning or servicing.</p>

To disassemble the machine, refer to the following steps:

- A. Make sure the machine has been drained of mix. Remove hopper cover.
- B. Pull out the spigot pin by its ring (Refer to Figure 3-5).

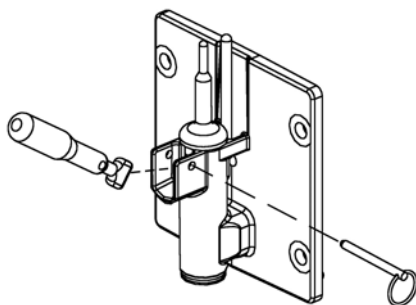


Figure 3-5 Remove Spigot Pin

- C. Remove the spigot handle.
- D. Remove front door by turning the circular knobs and then pulling door off the studs.

NOTE

When removing front door, entire door and stator assembly will come out as well.

- E. Remove torque rod from stator assembly.
- F. Remove quad ring from groove in front door.

- G. Remove stator bar. Remove o-ring and white bushing from stator bar.
- H. Remove auger support bushing.
- I. Turn the spigot body until the ice breaker bar can be removed. Remove breaker bar (Refer to Figure 3-6).

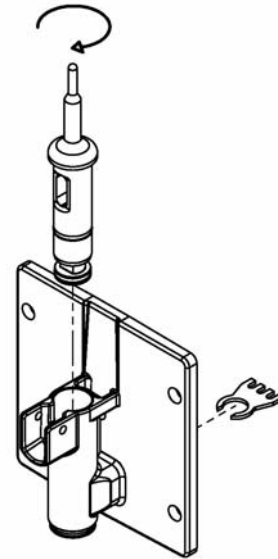


Figure 3-6 Spigot and Ice Breaker Bar Removal

- J. Remove spigot body from the front door.
- K. Remove o-rings (2) from the spigot by first wiping off the lubricant using a clean paper towel. Then squeeze the o-ring upward with a dry cloth. When a loop is formed, roll the o-ring out of the groove (Refer to Figure 3-7).
- L. Remove auger assembly from the freezing cylinder and remove auger blades.
- M. Remove rear seal and o-ring from auger.
- N. Remove the flavor pumps from the bottles.
- O. Remove drain tray, drip tray and drip tray grid.



Figure 3-7 Remove O-Ring

3.8 CLEANING THE MACHINE PARTS

Place all loose parts in a pan or container and take to the wash sink for cleaning. Local and state health codes dictate the procedure required. Some health codes require a four-sink process (pre-wash, wash, rinse, sanitize, and air-dry), while other codes require a three-sink process (without the pre-wash step). The following procedures are a general guideline only. Consult your local and state health codes for procedures required in your location.

- A. Prepare detergent water by mixing 2 oz. of Palmolive detergent or equivalent in 2 gallons of 90° to 110°F (32° to 43°C) water. Place all parts in detergent solution and clean with provided brushes. Prepare detergent water by mixing 2 oz. of Palmolive detergent or equivalent in 2 gallons of 90° to 110°F (32° to 43°C) water.
- B. Prepare sanitizing solution according to manufacturer's instructions to provide a 100 ppm strength solution. Mix the sanitizer in quantities of no less than 2 gallons of 90° to 110°F (32° to 43°C) water. Check the strength of the sanitizing solution. Use a chlorine test strip and color chart to make sure the solution has 100 ppm.
- C. Place all parts in detergent solution and clean with provided brushes. Rinse all parts with clean 90° to 110°F (32° to 43°C) water. Place the parts in the sanitizing solution.
- D. Wash the hopper and freezing cylinder with the 90° to 110°F (32° to 43°C) detergent water and brushes provided (Refer to Figure 3-8).



Figure 3-8 Brush Freezing Cylinder

- E. Clean the rear seal surfaces from the inside of the freezing cylinder with the 90° to 110°F (32° to 43°C) detergent water.

3.9 SANITIZE MACHINE AND MACHINE PARTS

- A. Use Stera-Sheen or equivalent sanitizing solution mixed according to manufacturer's instructions to provide 100 parts per million strength solution.

CAUTION
Do not allow sanitizer to remain in contact with stainless steel machine parts for prolonged periods. Prolonged contact of sanitizer with machine may cause corrosion of stainless steel parts.

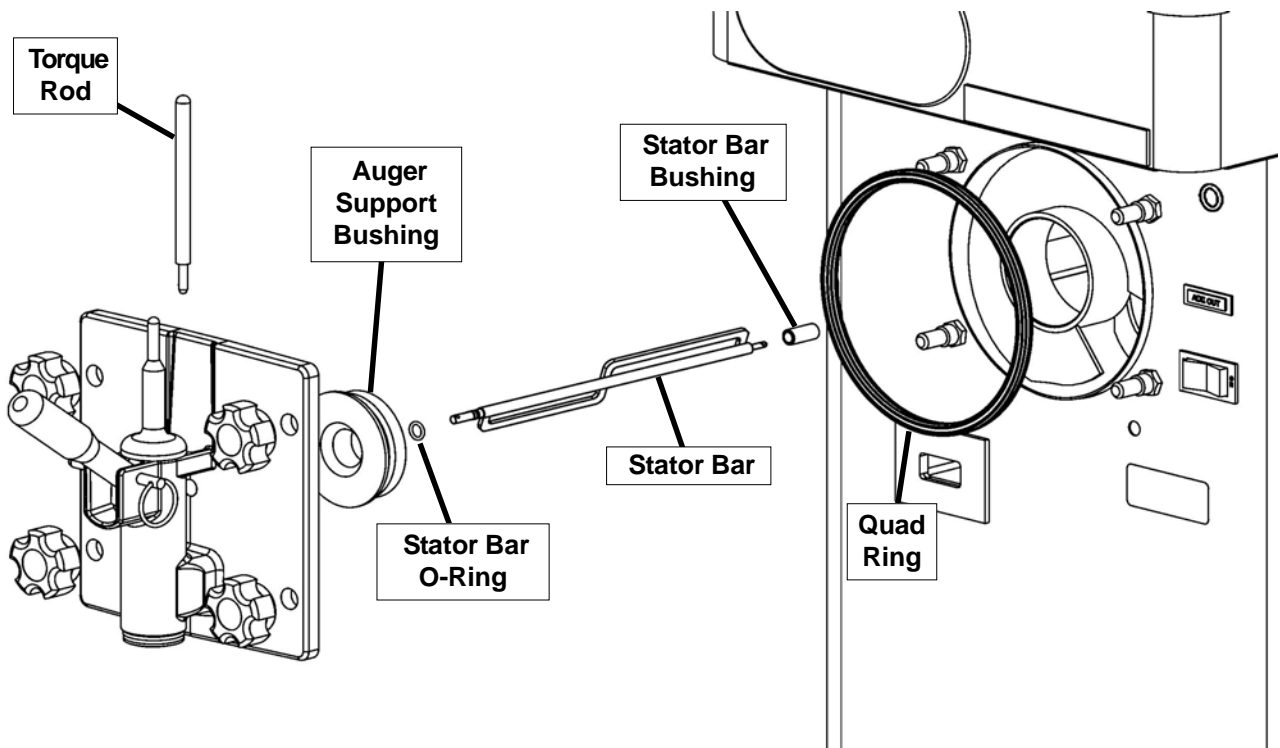


figure 3-9 Door and Stator Assembly

Mix sanitizer in quantities of no less than 2 gallons (7.5 liters) of 90° to 110°F (32° to 43°C) water. Any sanitizer must be used only in accordance with the manufacturer's instructions.

- B. With the large brush provided, sanitize the rear of the freezing cylinder by dipping the brush in the sanitizing solution and brushing the rear of the cylinder.

3.10 ASSEMBLY OF MACHINE

To assemble the machine parts, refer to the following steps:

NOTE

Petrol Gel sanitary lubricant or equivalent must be used when lubrication of parts is specified.

NOTE

The United States Department of Agriculture and the Food and Drug Administration require that lubricants used on food processing equipment be certified for this use. Use lubricants only in accordance with the manufacturer's instructions.

- A. Assemble all o-rings onto parts dry, without lubrication. Then apply a thin film of sanitary lubrication to exposed surfaces of the o-rings. Also apply a thin film of sanitary lubricant to the inside and outside of the auger support bushing, and to the inside and outside of the stator bar bushing.
- B. Assemble the rear seal onto the auger with the large end to the rear. Be sure the o-ring is in place

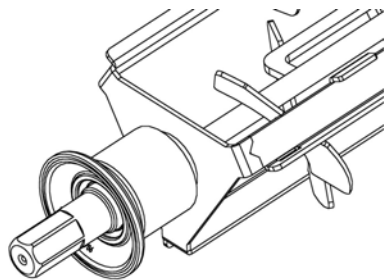


Figure 3-9 Install Rear Seal

before installing the rear seal (Refer to Figure 3-9).

- C. Put a small amount of white Hex Drive Anti Seize (spline lube) on the hex end of the auger shaft. A small container of Anti Seize is shipped with the machine.
- D. Install the plastic auger blade onto the auger.

- E. Push the auger into freezing cylinder and rotate it slowly until it engages the drive shaft.
- F. Insert the spigot body into front door.

NOTE

Press the o-rings against the spigot body when inserting it into the front door to prevent damage.

- G. Turn spigot body until the ice breaker bar can be inserted. Insert breaker bar and rotate spigot body 90°.
- H. Install auger support bushing onto front door so beveled edge of bushing is against door.
- I. Install the white stator bar bushing onto the rear of the stator bar and insert stator into spigot.
- J. Insert the torque rod. The rod should be placed through the hole in stator bar.
- K. Install the front door onto the machine.

NOTE

When installing the door onto the machine, the torque rod must be placed in the center of the metal torque actuator arm.

- L. Install the knobs on the machine studs.
- M. Look for a proper seal between the freezing cylinder, quad ring, and front door
- N. Insert the spigot handle so the hole lines up and insert the spigot pin.
- O. Install the flavor pumps onto the bottles and place them into the flavor rack.
- P. Install the hopper cover, drain tray, drip tray, and drip tray grid.

3.11 ROUTINE CLEANING

To remove spilled or dried mix from the machine exterior, wash in the direction of the finish with warm soapy water and wipe dry. Do not use highly abrasive materials as they will mar the finish.

SECTION 4 MAINTENANCE AND ADJUSTMENTS

4.1 MACHINE ADJUSTMENT

This section is intended to provide maintenance personnel with a general understanding of the machine adjustments. It is recommended that any adjustments outlined in this section be made by a qualified person.

4.2 PRODUCT CONSISTENCY ADJUSTMENT

The Consistency Adjustment screw increases or decreases product consistency by changing the amount of torque needed to complete a refrigeration cycle. Turn the screw clockwise to increase consistency.

4.3 CONTINUOUS DRIVE MODE

The U218 can operate in standby mode either with the motor running continuously or with the drive motor not running. The modes are controlled by the jumper on the control board. The small jumper will run standby without the drive motor running. The large jumper (pictured below) is used to run the drive motor continuously.

NOTE

The large jumper is only available on the 513696.2 control boards and the 513696.1 Rev72 control boards.

The U218 is shipped from the factory with the small jumper installed. The large jumper is in a bag near the control board.

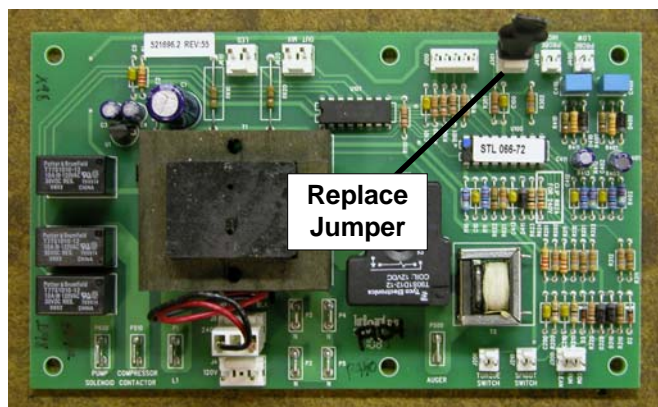


Figure 4-1 Slush Drive Jumper

4.4 DRIVE BELT TENSION ADJUSTMENT

To check belt tension, refer to Figure 4-2 and follow the steps below:

- A. Remove the right side panel.
- B. Use a Burroughs Belt Tension Gauge to set the tension for the drive belt. Set the belt tension to 15-25 lbs.

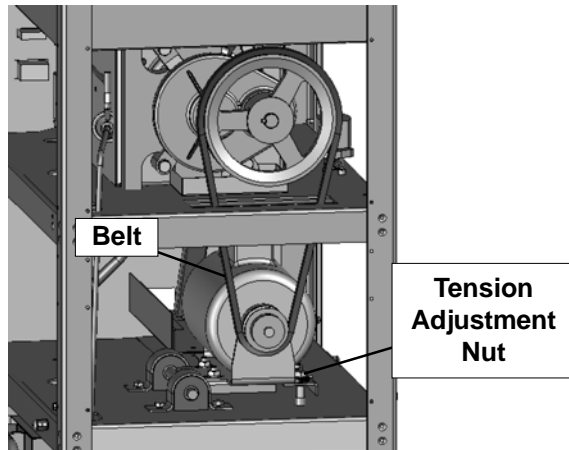


Figure 4-2 Belt Tension

- C. If an adjustment is necessary, loosen the four motor plate retaining nuts, adjust belt tension then retighten the four nuts.

NOTE

Belt life will be increased if new drive belts are tightened after two or three weeks of operation.

4.5 PREVENTATIVE MAINTENANCE

A. DAILY

1. The exterior should be kept clean at all times to preserve the luster of the stainless steel. A mild alkaline cleaner is recommended. Use a soft cloth or sponge to apply the cleaner.

B. WEEKLY

1. Check the o-rings and the rear seal for excessive wear and replace them if necessary.
2. Remove the drip tray by gently lifting it up and pulling it out. Clean behind the drip tray and front of the machine with a soap solution.

C. QUARTERLY

Air Cooled Machine

The air-cooled condenser is a copper tube and aluminum fin type. Condensing is totally dependent upon airflow. A plugged condenser filter, condenser, or restrictions in the louvered panel will restrict airflow. This will lower the capacity of the system and damage the compressor.

The condenser must be kept clean of dirt and grease. The U218 must have a minimum of 3" (7.6 cm) of ventilation at the front and back of the unit for free flow of air. Make sure the air entering the machine is under 100° F (37° C).

The condenser and condenser filter require periodic cleaning. To clean, refer to the following procedures.

Condenser Filter Cleaning

1. The condenser filter is located at the front of the machine. It is mounted to the machine by brackets at the top and bottom of the front panel. Remove the filter by sliding it to the side.
2. Visually inspect the filter for dirt. If it is dirty, shake or brush the excess dirt off the filter and wash it in warm, soapy water.
3. Once the filter is clean, rinse it thoroughly in warm, clear water and shake dry, taking care not to damage the filter in any way.

Condenser Cleaning

1. Disconnect (unplug) the machine from the electrical supply source.
2. Remove the Phillips head screw from the bottom of the right side panel, and then slide the panel down and out.
3. Visually inspect the condenser for dirt by shining a light through the coil from the back (inside) of the condenser.
4. If the condenser is dirty, place a wet towel over the front (outside) of the condenser.
5. Using a vacuum, carefully clean the condenser coil from the inside and outside of the machine. A stiff bristled brush may help in releasing debris from between the condenser coils.

Water Cooled Machine

The water-cooled condenser is a tube and shell type. The condenser needs a cool, clean supply of water to properly cool the machine, inlet and discharge lines must be 3/8" N.P.T. minimum. Make sure the machine is receiving an unrestricted supply of cold, clean water.

E. SEMI-ANNUALLY

1. Disconnect the machine from the power source.
2. Check drive belt for proper tension. Use a Burroughs Belt Tension Gauge to set the tension for the drive belt. Set the belt tension to 15-25 lbs.
3. Lubricate condenser fan motor with S.A.E. 20 weight oil. Three to six drops are required.

4.6 EXTENDED STORAGE

Refer to the following steps for storage of the machine over any long period of shutdown time:

- A. Place the CLEAN-OFF-ON switch in the OFF (middle) position.
- B. Disconnect (unplug) from the electrical supply source.
- C. With warm detergent water, thoroughly clean all parts that come in contact with mix. Rinse the parts in clean water and dry them. Do not sanitize.

NOTE

Do not let the cleaning solution stand in the hopper or in the freezing cylinder during the shutdown period.

- D. Remove, disassemble and clean the front door and auger parts.
- E. In a water cooled machine, disconnect water lines and drain water. With a flathead screwdriver, hold the water valve open and use compressed air to clear the lines of any remaining water.

SECTION 5 REFRIGERATION SYSTEM

5.1 REFRIGERATION SYSTEM

The U218 refrigeration systems have two functions:

Medium-Temperature - Maintaining product temperature in the hopper.

Low-Temperature - Producing and maintaining high quality product in the freezing cylinder.

The system is designed for efficient use with R404A refrigerant. The proper charge is indicated on the information plate.

5.2 REFRIGERANT RECOVERY AND EVACUATION

Refer to the following procedures to properly recover and evacuate the refrigeration system. Do not purge refrigerant into the atmosphere.

NOTE

For qualified service personnel only. Anybody working with refrigerants must be certified as a Technician TYPE I as required by 40 CFR 82 Subpart F and hold all State and/or local refrigerant handling certifications. In addition, all handling, storage, and disposal of refrigerants must be in accordance with Environmental Protection Agency (EPA) guidelines and standards and all State and local guidelines and standards.



WARNING

Hazardous voltage

The CLEAN-OFF-ON switch must be placed in the OFF position when disassembling for servicing. The machine must be disconnected from electrical supply before removing any access panel. Failure to disconnect power before servicing could result in death or serious injury.

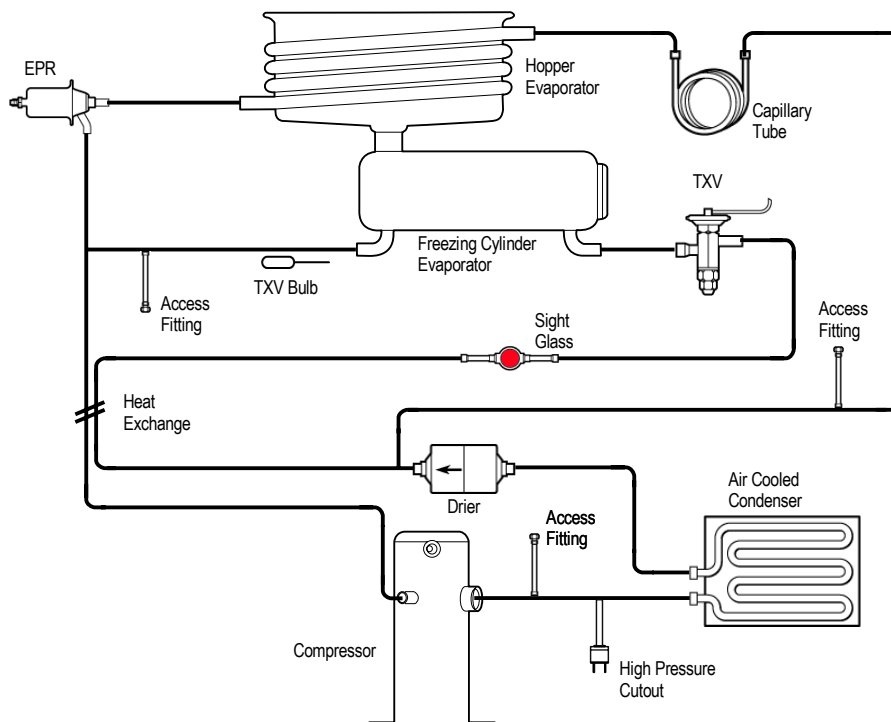


Figure 5-1 Refrigeration Diagram

- A. Disconnect the machine from electrical supply before removing any panels for servicing.
- B. Remove the side panels.
- C. If evacuating the system, connect a vacuum gauge to the Schrader valve next to the hopper evaporator.
- D. Connect the recovery or evacuation unit to the suction and discharge service valves of the compressor.
- E. Perform the recovery or evacuation:
 - For recovery
 - Operate the recovery unit per manufacturer's instructions.
 - For evacuation
 - Evacuate the system until the gauge reads 300 microns of mercury (300 μ Hg). Turn off evacuation unit and wait 5 minutes.
 - If the gauge stays below 500 μ Hg, the system is properly evacuated.
 - If the gauge slowly rises to 1500-2000 μ Hg, there is still moisture in the system and further evacuation is required.
 - If the gauge rises to atmosphere, the system has a leak which must be resolved before continuing.
- F. Remove evacuation or recovery unit and gauge.

5.3 REFRIGERANT CHARGING

Refer to the following procedures to properly charge the refrigeration system. Stoelting recommends liquid refrigerant charging.

NOTE

For qualified service personnel only. Anybody working with refrigerants must be certified as a Technician TYPE I as required by 40 CFR 82 Subpart F and hold all State and/or local refrigerant handling certifications. In addition, all handling, storage, and disposal of refrigerants must be in accordance with Environmental Protection Agency (EPA) guidelines and standards and all State and local guidelines and standards.



WARNING

Hazardous voltage

The CLEAN-OFF-ON switch must be placed in the OFF position when disassembling for servicing. The machine must be disconnected from electrical supply before removing any access panel. Failure to disconnect power before servicing could result in death or serious injury.

- A. Ensure the electrical supply has been removed before continuing.
- B. If the system has been opened or if there was a leak, refer to Section 5.2 - Refrigerant Recovery and Evacuation to evacuate the system prior to charging.
- C. Refer to machine's information plate for total charge requirements.

NOTE

The refrigeration system of the U218 is critically charged. Be sure to charge the system to the weight listed on the machine's information plate.

- D. For liquid refrigerant charging, connect refrigerant cylinder to the discharge Schrader valve of the compressor.
- E. Add the proper amount of refrigerant according to the machine's information plate.

5.4 COMPRESSOR

The U218 has a scroll type compressor (Fig. 5-2). This compressor type uses two spiral shaped scrolls to compress gas. One scroll rotates around an identical stationary scroll. Gas is drawn into the compression chamber by the rotating scroll and is compressed as it moves towards the center of the chamber. Operation of this compressor is continuous because, during each rotation, several gas 'pockets' are compressed simultaneously. Details of the compressor's starting components are in Section 6.



Figure 5-2 U218 Compressor

A. WINDING TEST

To test the compressor motor windings for possible problems, perform the following steps:

- A. Disconnect the machine from electrical supply before removing any panels for servicing.
- B. Remove the right side panel.



Figure 5-3 Compressor Connection

- C. Pull the compressor connector plug off of the compressor. The compressor has three terminals; C (common), R (run), and S (start). (Fig. 5-3)
- D. Connect an ohmmeter to the C and R terminals. Resistance through the run winding should be $1.81\Omega \pm 10\%$.
- E. Connect an ohmmeter to terminals C and S. Resistance through the start winding should be $2.27\Omega \pm 10\%$.
- F. Connect an ohmmeter to the R and S terminals. Resistance through the start winding should be $4.08\Omega \pm 10\%$.
- G. To check if windings are shorted to ground, connect one ohmmeter lead to a bare metal part on the compressor (such as any copper line leading to or from the compressor) and check terminals C, R, and S.

NOTE

The compressor is equipped with an internal overload protector. If the compressor is warm and ohmmeter readings indicate an open winding, allow up to one hour for overload to reset.

B. COMPRESSOR REMOVAL

- A. Disconnect the machine from electrical supply before removing any panels for servicing.
- B. Disconnect the electrical plug from the compressor.
- C. Recover refrigerant charge per the instructions in Section 5.2.
- D. Leave a port open to prevent pressure buildup during compressor removal.
- E. Remove six inches of insulating tubing on the suction line going to the compressor and unsweat the suction and discharge line from the compressor.
- F. Remove the four nuts and washers from the base of the compressor.
- G. Remove the compressor.

- H. Remove the four rubber compressor mounts from the compressor.
- I. Plug all open ports of the old compressor.

NOTE

A compressor returned to Stoelting with any open ports will void the warranty. ALWAYS plug ports on a compressor that has been removed.

C. COMPRESSOR INSTALLATION

- A. Make sure the machine is disconnected from the electrical supply before servicing.
- B. Install the four rubber mounts on the compressor.
- C. Install the compressor into the machine, fitting the base over the four bolt holes.
- D. Install the four washers and nuts onto the bolts and tighten securely.
- E. Remove all tubing plugs from the replacement compressor.

NOTE

The compressor plugs protect the compressor from moisture in the air. Do not remove the plugs until you are ready to install. The compressor must not be opened to the atmosphere for more than 10 minutes.

- F. Leave a port open to prevent pressure buildup. Braze the suction and discharge line to the compressor.
- G. Connect the wires to the compressor terminals.
- H. Replace the drier per the instructions in Section 5.8.
- I. Evacuate the system per the instructions in Section 5.2
- J. Recharge the system per the instructions in Section 5.3.
- K. Replace the insulating tubing on the suction line.

5.5 CONDENSER

The U218 has either an air-cooled or water-cooled condenser. The capacity of the machine is directly related to keeping the condenser clean and free of debris, regardless of cooling type.

The air-cooled condenser is a copper tube and aluminum fin type. There must be a minimum of 3" of clearance at the front and back of the machine.

The water-cooled condenser is a tube and shell type. This condenser requires cool, clean water to function properly. Inlet and discharge lines must be 3/8" ID minimum.

CONDENSER TESTING

The condenser can be checked for leaks using the bubble test or using a leak detector.

5.6 VALVES

A. THERMOSTATIC EXPANSION VALVE (TXV)

The Thermostatic Expansion Valve (TXV) is used to meter the refrigerant to the evaporator. It does so by maintaining a low, constant superheat in the evaporator. The self-regulating TXV is preset by the manufacturer and adjustment is not recommended. (Fig. 5-4)

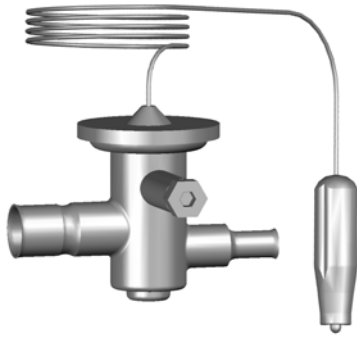


Figure 5-4 TXV

TXV TESTING & ADJUSTMENT

NOTE

The TXV bulb has an indent which must be positioned against the tubing. Good contact between the bulb and the suction line is necessary for proper operation of the valve. The bulb must also be well insulated.

- A. Connect a gauge to the Schrader valve on the suction line.
- B. Connect a thermocouple to the suction line next to the evaporator. Make sure the thermocouple is making direct contact with the suction line and insulate the thermocouple to obtain a correct reading.
- C. Immediately before the refrigeration cycle ends, the superheat should be 10°F. This temperature is based on a full load in the freezing cylinder and an ambient temperature of 70°F. The gauge should read 29-31 psig.
- D. If the readings are higher than expected, check to see if there is an overcharge of refrigerant. Also make sure the TXV bulb is making good contact with the suction line and it is well insulated.
- E. If the readings are lower than expected, check to see if there is a low refrigerant charge or if there is a restriction in the system.

NOTE

The TXV is the LAST component to adjust in the refrigeration system.

- F. The TXV can be adjusted after the steps above are completed. When adjusting, do not turn the valve over 1/4 turn (90°). Turn the valve stem clockwise to increase the superheat or counterclockwise to decrease the superheat.

TXV REMOVAL

- A. Remove the side panels.
- B. Remove bulb from suction line exiting from the evaporator.
- C. Recover refrigerant charge per instructions in Section 5.2.
- D. Leave a port open to prevent pressure buildup during TXV removal.
- E. Remove any insulation from the TXV and immediate surrounding lines.
- F. Apply a heat sink (wet cloth) to the valve dome. (Fig. 5-5)
- G. Unswear the TXV and remove.

TXV REPLACEMENT

To replace the TXV, perform the following procedures:

- A. Position the TXV with a heat sink into the system.
- B. With an open port, braze the TXV into the system using appropriate brazing material.
- C. Remove the heat sink from the TXV.
- D. Install bulb on suction line exiting the evaporator using existing clamp. The bulb has an indent which must be placed against the tubing.

NOTE

The TXV bulb should ALWAYS be mounted on the horizontal line, with the capillary end facing the flow of refrigerant. Good contact between the bulb and the suction line is necessary for proper operation of the valve. The bulb must also be well insulated.

- E. Tighten clamp to 20 in/lb using a torque wrench.
- F. Replace insulation to the TXV and surrounding lines.
- G. Replace the drier per the instructions in Section 5.9.
- H. Evacuate the system per the instructions in Section 5.2.
- I. Recharge the system per the instructions in Section 5.3.

B. HIGH PRESSURE CUTOUT

The high pressure cutout (Fig. 5-6) will stop the compressor if the discharge pressure reaches 445 psig \pm 9.



Figure 5-6 High Pressure Cutout

HIGH PRESSURE CUTOUT TEST

- A. Connect a gauge to the Schrader valve on the discharge line.
- B. Disconnect cooling:
 - Air-Cooled - Disconnect evaporator fan
 - Water-Cooled - Shut off water supply
- C. High pressure cutout should trip when pressure reaches 445 psig \pm 9.

HIGH PRESSURE CUTOUT REMOVAL

- A. Remove the rear panel.
- B. Disconnect terminals from high pressure cutout.
- C. Recover refrigerant charge per instructions in Section 5.2.
- D. Leave a port open to prevent pressure buildup during removal.
- E. Apply a heat sink (wet cloth) to the cutout.
- F. Unsweat cutout from discharge line.

HIGH PRESSURE CUTOUT REPLACEMENT

- A. Apply a heat sink (wet cloth) to the new cutout.
- B. With an open port, braze the cutout to the discharge line.
- C. Replace the drier per the instructions in Section 5.9.
- D. Evacuate the system per the instructions in Section 5.2.
- E. Recharge the system per the instructions in Section 5.3.
- F. Connect the high pressure cutout.

C. EVAPORATOR PRESSURE REGULATOR (EPR)

There is one EPR in the refrigeration system (Fig. 5-7). It is located on the suction line of the hopper evaporator and regulates refrigerant pressure.

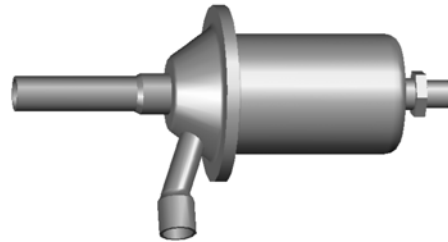


Figure 5-7 EPR Valve

EPR TEST AND ADJUSTMENT

- A. Place the CLEAN/OFF/ON switch in the OFF position.
- B. Connect a gauge to the Schrader valve on the suction line.
- C. Place the CLEAN/OFF/ON switch to the ON position.
- D. If the gauge does not read 70 psig \pm 1 then adjustment is needed.
- E. Remove the plastic cap and loosen the locknut on the EPR. Using a small screwdriver, turn the adjustment screw counterclockwise 1/2 turn, then adjust as necessary. Turn the valve stem clockwise for less cooling or counterclockwise for more cooling.
- F. Allow the system to stabilize for 5 minutes to ensure pressure remains stable.

EPR REMOVAL

- A. Remove the side panel.
- B. Recover refrigerant charge per instructions in Section 5.2.
- C. Leave a port open to prevent pressure buildup during EPR removal.
- D. Unsweat the EPR and remove.

EPR REPLACEMENT

To replace the EPR, perform the following procedures:

- A. Apply a heat sink (wet cloth) to the EPR.
- B. With an open port, braze the EPR into the system using appropriate brazing material.
- C. Remove the heat sink from the hot gas bypass.
- D. Replace the filter drier. Refer to Section 5.8 for details.
- E. Evacuate and recharge system per instructions in Section 5.2.
- F. Adjust the suction pressure to 60 psig ±2.

D. WATER VALVE (WATER COOLED MODELS ONLY)

The water valve monitors refrigerant pressure and opens on an increase of pressure. The opening point pressure is the refrigerant pressure required to lift the valve disc off the valve seat. (Fig. 5-8)

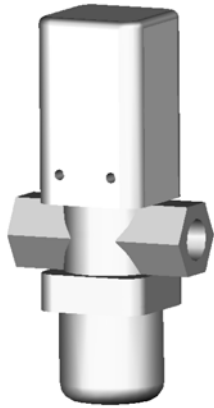


Figure 5-8 Water Valve

WATER VALVE ADJUSTMENT

- A. Remove the back panel.
- B. Connect a gauge to the compressor discharge Schrader valve.
- C. Take the temperature of the inlet water.
- D. Connect the machine to the electrical supply, start the refrigeration cycle, and read the pressure.
- E. Refer to the chart below for correct pressures and water outlet temperatures:

Inlet Water Temperature	Discharge Pressure	Outlet Water Temperature
60°F	218-228 psig	88° - 100°F
70°F	225-235 psig	89° - 101°F
80°F	236-246 psig	91° - 103°F
90°F	254-264 psig	94° - 106°F
100°F	285-295 psig	103° - 115°F
110°F	320-330 psig	112° - 124°F

Table 5-1 Water Cooled Pressure/Temperature Table

- F. If the water temperature is too low, the opening point pressure should be increased to slow the water flow. Turn the adjustment screw counterclockwise.
- G. If the water temperature is too high, the opening point pressure should be decreased to increase the flow of water. Turn the adjustment screw clockwise.

WATER VALVE REMOVAL

The water valve is connected to the refrigeration system by capillary tube brazed to the discharge line.

- A. Turn off and disconnect the water supply. Blow out the water lines with compressed air or CO₂.
- B. Recover refrigerant charge per instructions in Section 5.2.
- C. Unsweat the capillary tube from the discharge line.
- D. Remove the clamps from the water lines at the valve.
- E. Remove the two screws holding the water valve to the frame and remove the valve.

WATER VALVE REPLACEMENT

To replace the water valve, perform the following procedures:

- A. Position the water valve and attach to the frame using the two screws.
- B. Install the water lines onto the valve with hose clamps.
- C. Braze the capillary tube into the system using BCuP-3 or BCuP-5 brazing material.
- D. Connect the water supply line and turn on the water supply.
- E. Check for leaks in the water lines. If there are no leaks, turn off the water supply.
- F. Replace the filter drier. Refer to Section 5.8 for details.
- G. Evacuate and recharge system per instructions in Section 5.2.
- H. Turn on the water and check for leaks in the water lines with the refrigeration system running.
- I. Adjust the valve as necessary.

5.7 CAPILLARY TUBE

The capillary tube meters refrigerant flow in the hopper evaporator (Fig. 5-9). The amount of flow is dependent on the length and ID of the capillary tube as well as the refrigerant charge.

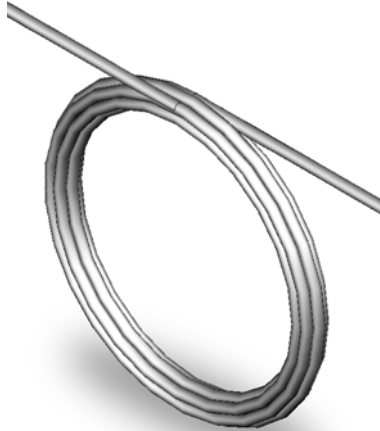


Figure 5-9 Capillary Tube

CAPILLARY TUBE REMOVAL

- A. Recover refrigerant charge per instructions in Section 5.2.
- B. Leave a port open to prevent pressure buildup during capillary tube removal.
- C. Remove foam insulation from the capillary tube at the evaporator inlet.
- C. Unsweat the capillary tube and remove.

CAPILLARY TUBE REPLACEMENT

- A. Position the capillary tube in place.
- B. Apply a heat sink (wet cloth) to the capillary tube and drier assembly.
- C. With an open port, braze the capillary tube into the system using appropriate brazing material.
- D.. Replace foam insulation to the capillary tube at the evaporator inlet.
- E. Evacuate the system per instructions in Section 5.2.
- F. Recharge the system per instructions in Section 5.3.

5.8 FILTER DRIER

The filter drier must be replaced every time the refrigeration system is opened for service. A new filter drier improves operation of the entire refrigeration system by stopping the circulation of moisture and by removing harmful contaminants (Fig. 5-10).

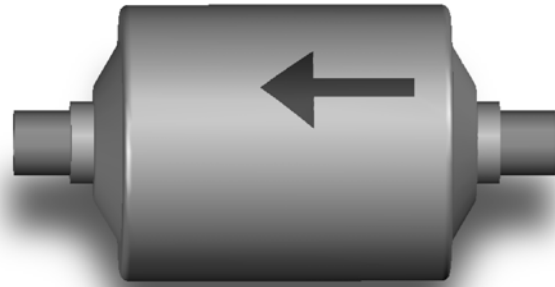


Figure 5-10 Filter Drier

FILTER DRIER REMOVAL

- A. Recover refrigerant charge per instructions in Section 5.2.
- B. Cut the refrigeration line as close to the filter drier as possible and remove drier.
- C. Cap the ends of the drier using the plugs from the new drier.

NOTE

The drier must be capped to prevent moisture from the environment

FILTER DRIER REPLACEMENT

- A. Position the filter drier so the arrow is pointing towards the evaporators (pointing away from the condenser).
- B. Apply a heat sink (wet cloth) to the filter drier.
- C. With an open port, braze the filter drier into the system using appropriate brazing material.
- D. Evacuate the system per instructions in Section 5.2.
- E. Recharge the system per instructions in Section 5.3.

SECTION 6 ELECTRICAL AND MECHANICAL CONTROL SYSTEMS

NOTE

The wiring diagram is located in Section 8.

6.1 CONTROL BOARD

The control board uses a microprocessor to control all timing and mode operations. It processes information from the motor and spigot and sends signals to the compressor and motor.

CONTROL BOARD TEST

The following test will show if the control board has proper voltage.

1. Remove the header panel.
2. When the CLEAN-OFF-ON switch is in the ON position, read voltage on the control board across the L1 terminal and one of the neutral terminals (P2, P3, P4 or P5). Voltage should be near line voltage.

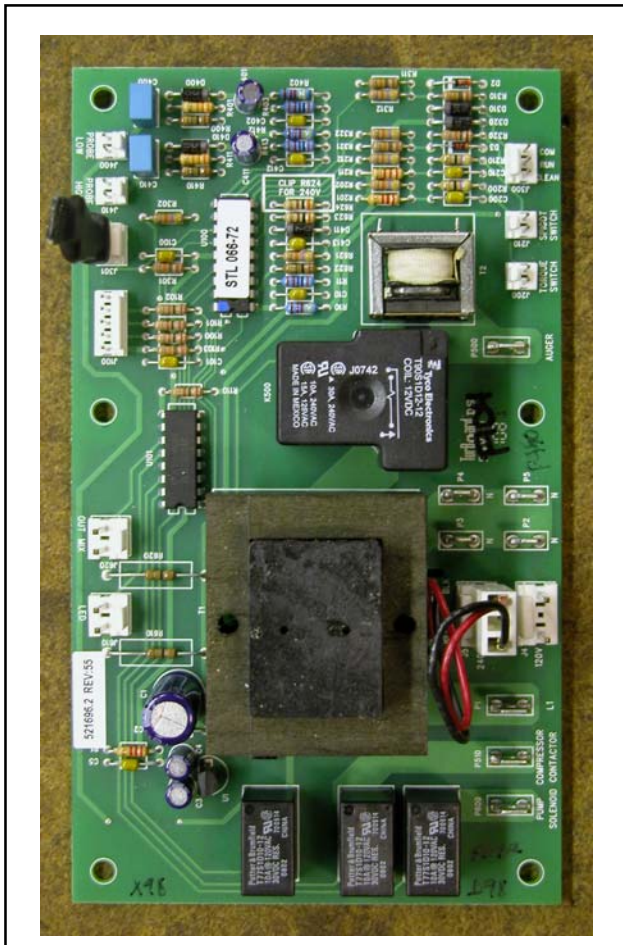


Figure 6-1 Control Board

WARNING

Service to the machine must be completed by a qualified electrician/refrigeration specialist.

Any tests or work done on the machine must be done by a qualified technician. Service to the machine done by an unqualified person, could result in serious personal injury.

6.2 CONTACTOR

The compressor contactor is in the electrical box behind the left panel. The control board sends electronic signals to trigger the contactor and start the compressor.

A. CONTACTOR TESTS

The following test will show if the control board is sending a voltage signal to the contactor.

1. Remove the header panel.
2. When the CLEAN-OFF-ON switch is in the ON position, read voltage on the control board across the L1 terminal and one of the neutral terminals (P2, P3, P4 or P5). Voltage should be near line voltage (208-240VAC).
3. Read voltage on the control board across the L1 terminal and the COMPRESSOR CONTACTOR terminal during a freezing cycle. Voltage should be 0V.

The following test will show if a contactor is receiving a voltage signal from the control board.

1. Remove the header panel.
2. Read voltage across the coils of the contactor during a freezing cycle. Voltage should be near line voltage (208-240VAC). If there is no voltage reading, refer to Section 7 Troubleshooting.

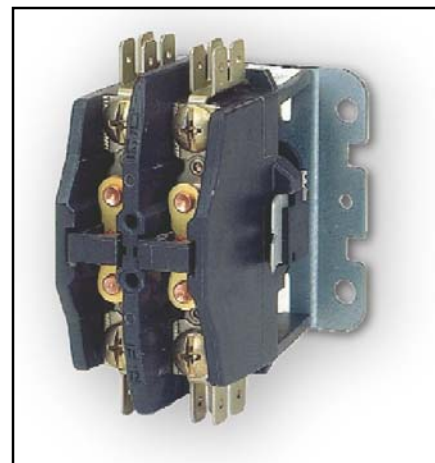


Figure 6-2 Contactor

6.3 DRIVE MOTOR

The drive motor is used to rotate the auger assembly. An internal, normally closed, centrifugal switch starts the drive motor. The motor has an internal thermal overload.

A. DRIVE MOTOR VOLTAGE TEST

The following test will show if the relay on the control board is working properly and sending a voltage signal to the drive motor.

1. Remove the header panel.
2. When the CLEAN-OFF-ON switch is in the CLEAN position, read voltage on the control board across the L1 terminal and one of the neutral terminals (P2, P3, P4 or P5). Voltage should be near line voltage (208-240VAC).
3. Read voltage across the L1 terminal and the AUGER terminal. Voltage should be 0V.

B. DRIVE MOTOR REMOVAL

1. Disconnect machine from electrical supply before removing any panels for servicing.
2. Remove the back panel and the left side panel.
3. Remove the ground wire from the machine frame.
4. Loosen the motor cradle clamps at the front and back of the motor.
5. Rotate the motor so that the electrical cover plate can be removed. Remove the cover plate from the back of the motor.
6. Identify (mark) wires and remove them from the motor.
7. Remove the belt tension adjustment nut and remove the belt.
8. Remove the two bolts from the bushing clamp at the rear of the machine and pull the motor out through the back of the machine.
9. Remove the bolts that connect the motor to the mounting plate.

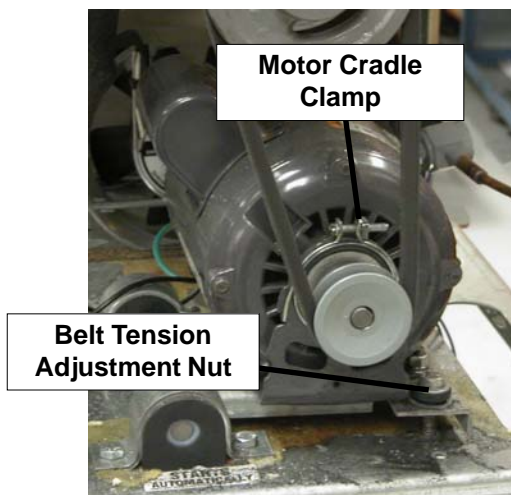


Figure 6-3 Drive Motor

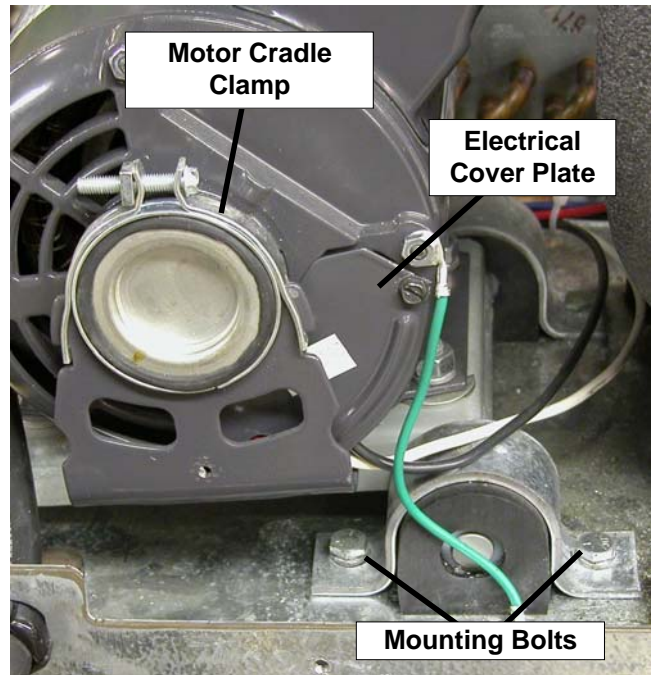


Figure 6-4 Drive Motor Mounting

10. Loosen the two allen head screws from the pulley.
11. Remove the pulley and key from the motor shaft.

C. DRIVE MOTOR INSTALLATION

1. Place the drive motor on the mounting plate and install the four mounting bolts.
2. Place the pulley and key on the motor shaft.

NOTE

Do not tighten the pulley screws until after the belt tension has been properly adjusted.

3. Install the motor and mounting plate in the machine to the bushing clamp using the mounting bolts.
4. Install the belt and the tension bolt. Tighten the tension bolt.
5. Test for proper belt tension using a Burroughs Belt Tension Gauge to set the tension for the drive belt. Set the tension to 15-25 lbs.
6. Using a straightedge, align the drive motor pulley with the gearbox pulley. Tighten the two allen head screws on the drive motor pulley.
7. Loosen the motor cradle clamps at the front and back of the motor.
8. Rotate the motor so that the electrical cover plate can be removed. Remove the cover plate from the back of the motor
9. Install wiring according to the wiring diagram. Install electrical cover plate.
10. Tighten the motor cradle clamps.
11. Install back and side panels.

6.4 CAPACITORS

The compressor start and run capacitors are located in the electrical box behind the left side panel. The capacitor for the drive motor is mounted directly on the motor body.

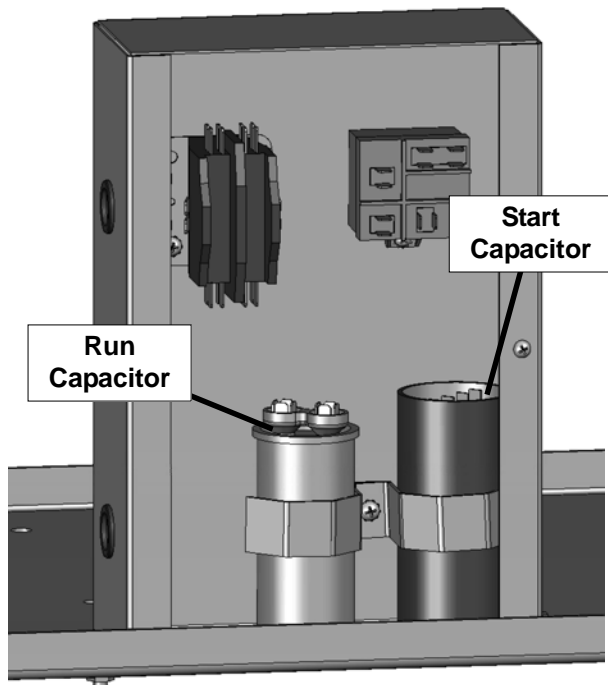


Figure 6-5 Compressor Capacitors

A. CAPACITOR TEST

1. Place the CLEAN-OFF-ON switch in the OFF position.
2. Remove a lead from one of the capacitor terminals.
3. Using insulated pliers, create a short across the capacitor terminals with a 20KΩ 5W resistor to discharge the capacitor.

NOTE

Create the short even if there is a bleeder resistor across the terminals. There may be an open in the bleeder resistor preventing it from working properly.

4. Disconnect the bleeder resistor from the circuit.
5. Measure capacitance across the terminals. The results should be as follows:

Capacitor	Part	Rating	
		MFD	VAC
Drive Motor Start	230440	378-454 MFD	110 VAC
Compressor Start	230638	88-106 MFD	330 VAC
Compressor Run	231057	35 MFD	370 VAC

B. CAPACITOR REPLACEMENT

1. Place the CLEAN-OFF-ON switch in the OFF position.
2. Remove leads from the capacitor terminals.
3. Using insulated pliers, create a short across the capacitor terminals with a 20KΩ 5W resistor to discharge the capacitor.

NOTE

Create the short even if there is a bleeder resistor across the terminals. There may be an open in the bleeder resistor preventing it from working properly.

4. Pull the capacitor out of its holder and replace.
5. Connect the leads to the terminals.

6.5 GEARBOX

A. GEARBOX INSPECTION

Inspect the gearbox and listen for unusual noise. A grinding sound generally indicates a bad gear.

B. GEARBOX REMOVAL

1. Disconnect machine from electrical supply before removing any panels for servicing.
2. Remove the back panel and the side panels.
3. Remove protective shield from side of machine.
4. Remove the belts.
5. Remove the pulley by loosening the set screws.
6. Remove the three bolts holding the gearbox to the barrel.
7. Remove the two bolts holding the gearbox to the mounting bracket and remove the gear box through the rear of the machine.

C. GEARBOX INSTALLATION

1. Place the gear box in position from the rear of the machine. Fasten the three bolts through the gear box to the rear of the barrel.
2. Fasten the gearbox to the mounting bracket using the two bolts.
3. Mount the pulley on the gear box shaft and align with the motor pulley, then tighten the allen head screws.
4. Install the belt.
5. Test for proper belt tension using a Burroughs Belt Tension Gauge to set the tension for the drive belt. Set the tension to 15-25 lbs.

6.6 CONDENSER FAN MOTOR (AIR-COOLED ONLY)

A. FAN MOTOR REPLACEMENT

1. Disconnect machine from electrical supply before removing any panels for servicing.
2. Remove a side panel and the header panel.
3. Trace and disconnect the wires on the T1 and T2 terminals on the compressor contactor.
4. Remove the screws on the fan bracket and remove the bracket and fan. Be careful to not damage the fins of the condenser with the fan blades.
5. Loosen set screw on fan blade.
6. Remove the three bolts from the fan motor mounting plate and remove the motor.

B. FAN MOTOR INSTALLATION

1. Attach motor to the fan bracket with the three bolts.
2. Place fan blade on motor shaft and tighten the set screw so it is snug to the shaft. Do not fully tighten the set screw until the fan is in place in the machine.
3. Install the fan bracket in the machine.
4. Adjust the fan blade so that is at least 3/8" from the fins on the condenser. Tighten the set screw.
5. Route the wires to the compressor contactor.
6. Connect the black wire to the T1 terminal. Connect yellow wire to the T2 terminal.

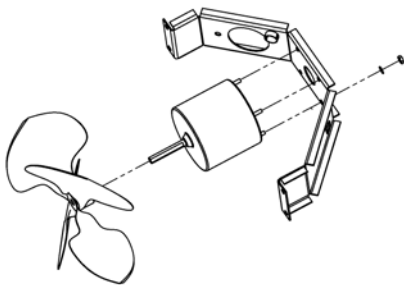


Figure 6.6 Fan Motor Replacement

6.7 SWITCHES

A. SPIGOT SWITCH

The spigot switch is a normally closed, held open switch. When a spigot is pulled, the spigot switch sends a signal to the control board to start the drive motor.

SPIGOT SWITCH TESTING - ELECTRICAL

1. Disconnect the switch from the circuit by unplugging the connector.
2. Check resistance readings across the common (COM) and normally closed (NC) terminals. When the spigot is closed (not dispensing), the resistance should show an open. When the spigot is opened

(during dispensing), the switch will close and the resistance should be 0 ohms.

SPIGOT SWITCH REPLACEMENT

1. Remove the header panel.
2. Disconnect the connector from the switch and remove the switch.
3. Install the replacement switch onto the spigot assembly.
4. Attach the connector to the spigot switch.
5. Replace the header panel and secure with the two Phillips head screws.

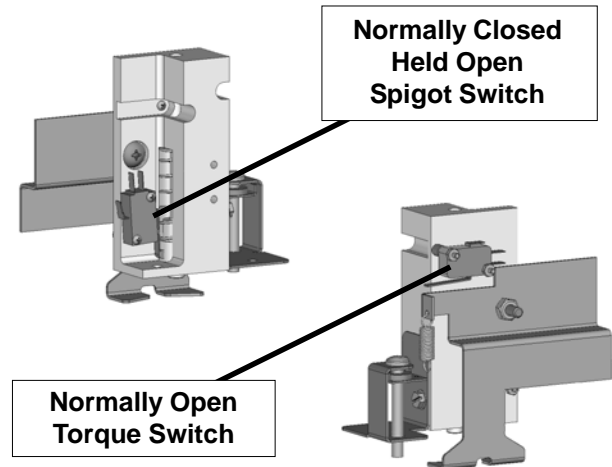


Figure 6-7 Spigot & Torque Switches

B. TORQUE SWITCH

The torque switch is a normally open switch. During the freezing cycle, the product in the freezing cylinder increases consistency. As product consistency increases, the stator bar rotates and moves the torque rod. When the torque rod activates the torque switch, the product in the freezing cylinder is at consistency.

TORQUE SWITCH TEST

1. Disconnect the switch from the circuit by unplugging the connector.
2. Check resistance readings across the common (COM) and normally open (NO) terminals. When the switch is open, the resistance should show an open. When the switch is closed, the resistance should be 0 ohms.

TORQUE SWITCH REPLACEMENT

1. Remove the header panel.
2. Disconnect the connector from the switch and remove the switch.
3. Install the replacement switch onto the torque assembly.
4. Attach the connector to the torque switch.
5. Replace the header panel and secure with the two Phillips head screws.

SECTION 7 TROUBLESHOOTING

7.1 LIGHT INDICATORS

The machine has two lights that will alert the user if a problem occurs: an ADD MIX light and a Diagnostic Light.

The ADD MIX light will flash to alert the operator to a low mix condition. It does so by monitoring the mix level in the hopper. When the ADD MIX light is flashing, refill hopper immediately.

The Diagnostic Light will flash if an error occurs. Refer to the chart below for details.

Indication	On	One Blink	Two Blinks	Three Blinks
Conditions	Defrost Mode	Torque is not met after 22 minutes	Drive current is not sensed	Machine left in clean mode for over 20 minutes
Self Correction	N/A	N/A	The machine attempts to sense drive current with a 3 second pre-stir. If current is sensed, the machine will return to normal operation. If current is not sensed, the machine will wait 7 minutes and try to sense current with another 3 second pre-stir. After the third attempt, the compressor will run on timers.	N/A
Operation	Every 7 minutes the auger will run for 90 seconds.	Timers or until torque switch remains closed for 3 seconds.	Timers	Off
Corrective Action	N/A	Check if the condenser is dirty, check the refrigeration system.	Check for power at the motor.	Turn CLEAN-OFF-ON switch to OFF (middle) position then turn the switch to ON.

7.2 TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY
Machine does not run.	<ol style="list-style-type: none"> 1. Power to machine is off. 2. Blown fuse or tripped circuit. 3. Freeze-up (auger will not turn). 4. High pressure cut-out tripped. 5. Front door not in place. 	<ol style="list-style-type: none"> 1. Supply power to machine. 2. Replace or reset. 3. Turn CLEAN-OFF-ON switch to OFF (middle) position for 15 minutes, then restart. 4. Wait until automatic reset for machine to start. 5. Assemble front door in place.
Machine will not shut off.	<ol style="list-style-type: none"> 1. Drive belt failure. 2. Consistency temperature setting is too firm. 3. Refrigeration problem. 	<ol style="list-style-type: none"> 1. Replace drive belt. 2. Turn Consistency Adjustment knob counter-clockwise. 3. Check system.
Product is too firm.	<ol style="list-style-type: none"> 1. Consistency setting is too firm. 	<ol style="list-style-type: none"> 1. Turn Consistency Adjustment screw counter-clockwise.

7.2 TROUBLESHOOTING - CONTINUED

PROBLEM	POSSIBLE CAUSE	REMEDY
Product is too thin.	<ol style="list-style-type: none"> 1. No vent space for free flow of cooling air. 2. Air temperature entering condenser is above 100°F. 3. Condenser is dirty. 4. Consistency setting too soft. 5. Stabilizers in mix are broken down. 6. Auger is assembled incorrectly. 7. Refrigeration problem. 	<ol style="list-style-type: none"> 1. A minimum of 3" of vent space required. (See Section 2) 2. Change location or direct hot air away from machine. 3. Clean. (See Section 3) 4. Turn Consistency Adjustment knob clockwise. 5. Remove mix, clean, sanitize and freeze down with fresh mix. 6. Remove mix, clean, reassemble, sanitize and freeze down. 7. Check system.
Product does not dispense.	<ol style="list-style-type: none"> 1. No mix in hopper. 2. Drive motor overload tripped. 3. Drive belt failure. 4. Freeze-up (Auger will not turn). 	<ol style="list-style-type: none"> 1. Fill hopper with mix. 2. Wait for automatic reset. If condition continues, check the belt and belt tension, check the starting components, check points on the contactor for pitting or if they are burnt. 3. Replace drive belt. 4. Turn CLEAN-OFF-ON switch to OFF (middle) position for 15 minutes, then restart.
Drive belt slipping or squealing.	<ol style="list-style-type: none"> 1. Worn drive belt. 2. Freeze-up (Auger will not turn). 3. Not tensioned properly 	<ol style="list-style-type: none"> 1. Replace drive belt. 2. Turn CLEAN-OFF-ON switch to OFF (middle) position for 15 minutes, then restart. 3. Adjust belt tension
Rear auger seal leaks.	<ol style="list-style-type: none"> 1. Outside surface of rear auger seal is lubricated. 2. Rear seal missing or damaged. 3. Seal o-ring missing, damaged or installed incorrectly. 4. Worn or scratched auger shaft. 	<ol style="list-style-type: none"> 1. Clean lubricant from outside of rear seal, lubricate inside of seal and reinstall. 2. Check or replace. 3. Check. or replace. 4. Replace auger shaft.
Front door leaks.	<ol style="list-style-type: none"> 1. Front door knobs are loose. 2. Spigot parts are not lubricated. 3. Chipped or worn spigot o-rings. 4. O-rings or spigot installed wrong. 5. Inner spigot hole in front door nicked or scratched. 	<ol style="list-style-type: none"> 1. Tighten knobs. 2. See Section 3. 3. Replace o-rings. 4. Remove spigot and check o-ring. 5. Replace front door.

SECTION 8 REPLACEMENT PARTS

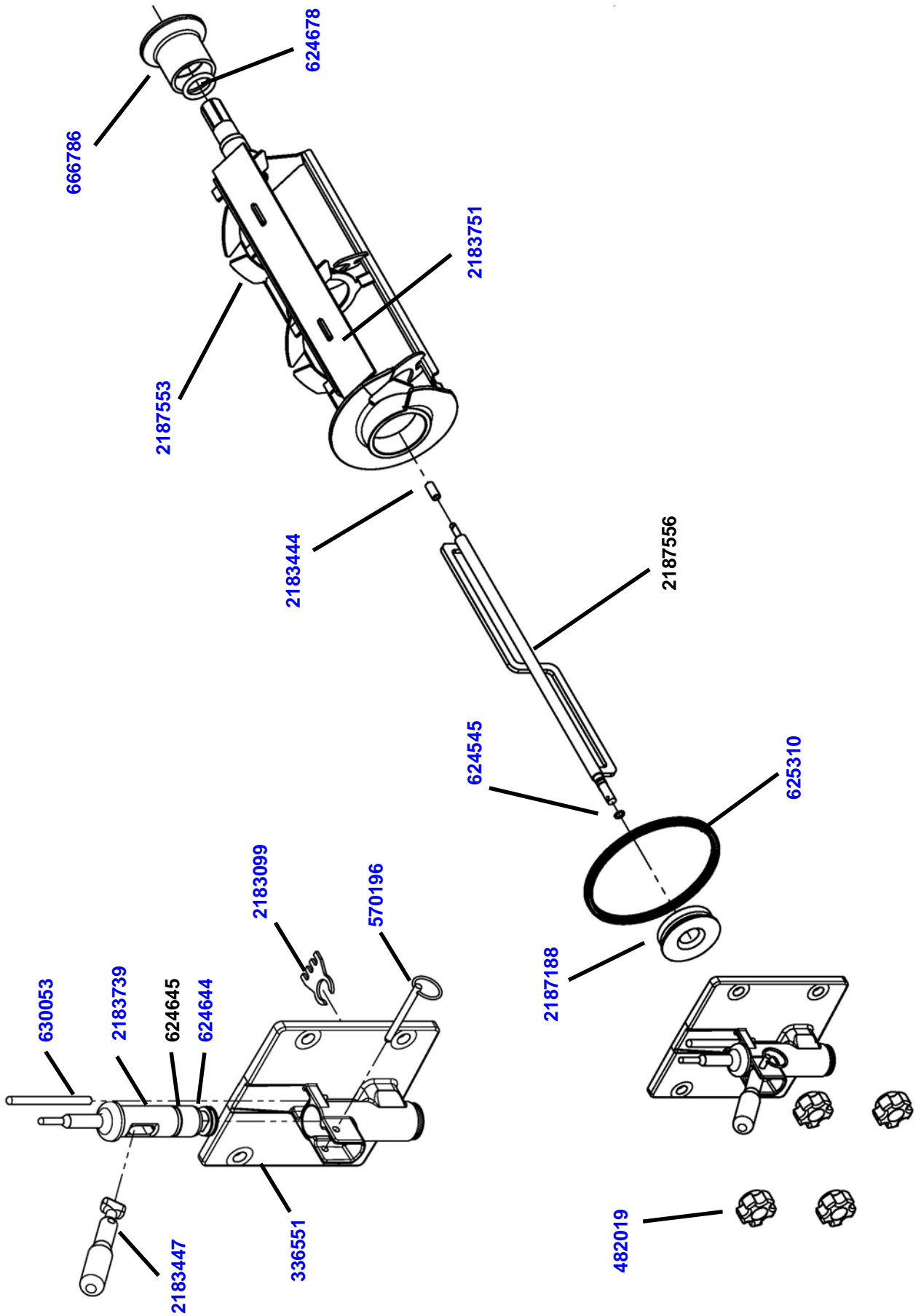
8.1 DECALS & LUBRICATION

Part	Description	Quantity
208135	Brush - 4" X 8" X 16" (Barrel)	1
208380	Brush - 1/4" X 3" X 14"	1
208401	Brush - 1" X 3" X 10"	1
236049	Card - Cleaning Instructions	1
324065	Decal - Water Inlet	1
324105	Decal - Caution Electrical Shock	1
324106	Decal - Caution Electrical Wiring Materials	1
324107	Decal - Caution Hazardous Moving Parts	1
324141	Decal - Caution Rotating Blades	1
324208	Decal - Attention Refrigerant Leak Check	1
324393	Decal - Stoelting Swirl Logo	1
324509	Decal - Cleaning Instructions	1
324548	Decal - Adequate Ventilation 6"	1
324566	Decal - Wired According To	1
324686	Decal - Danger Automatic Start	1
324803	Decal - Domed Stoelting Logo (Large) (Header Panel)	1
324864	Decal - A&W Logo	1
324865	Decal - Standby Light	1
324877	Decal - Sonic Logo (Header Panel)	1
508048	Lubricant - Spline (2 oz Squeeze Tube)	1
508135	Petrol Gel - 4 oz Tube	1
513631	Manual - Owner's	1

8.2 ACCESSORIES, PANELS & SCREWS

Part	Description	Quantity
644116	Screw - Cap (Drip Tray Support)	-
647899	Screw - Side Panel	-
649105	Screw - Self-Tapping (Bottle Rack, Header & Rear Panels)	-
763458	Valve - Solenoid (AWU218)	-
1177990	Caster Kit - 4" (Set Of 4)	-
1187338	O-Ring Kit	-
2177072	Extension - Spigot - 1.5"	1
2177073	Extension - Spigot - 2.5"	1
2177074	Extension - Spigot - 3.2"	1
2187153	Rack - Flavor Bottle	-
2187162	Panel - Front	1
2187175	Panel - Side	1
2187201	Panel - Rear (Ser. # 0 - #25490)	1
2187391	Panel - Rear (Ser. #25491 Plus)	1

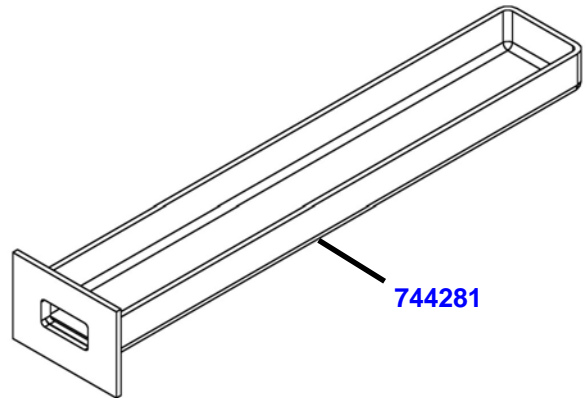
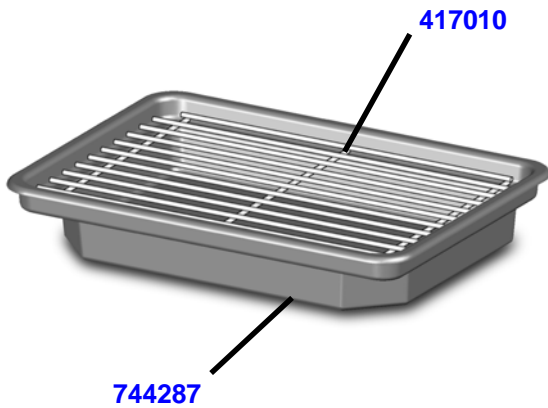
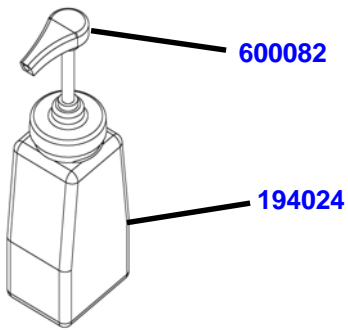
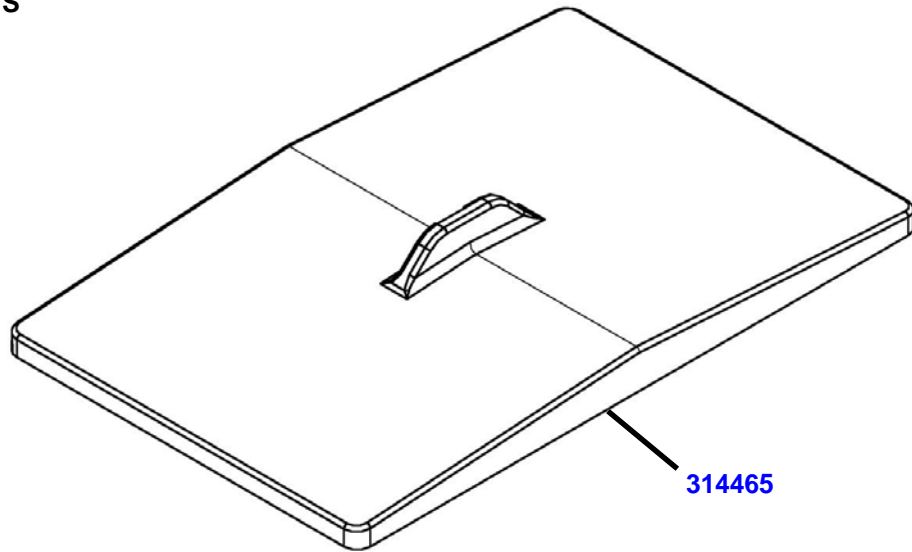
8.3 AUGER SHAFT & FACEPLATE PARTS



8.3 AUGER SHAFT & FACEPLATE PARTS - CONTINUED

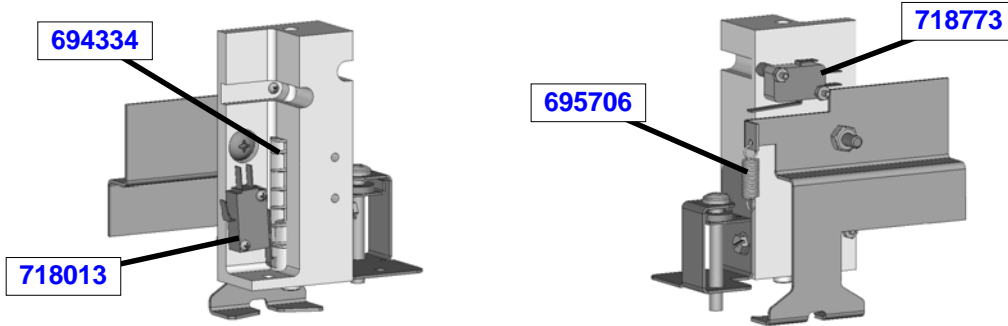
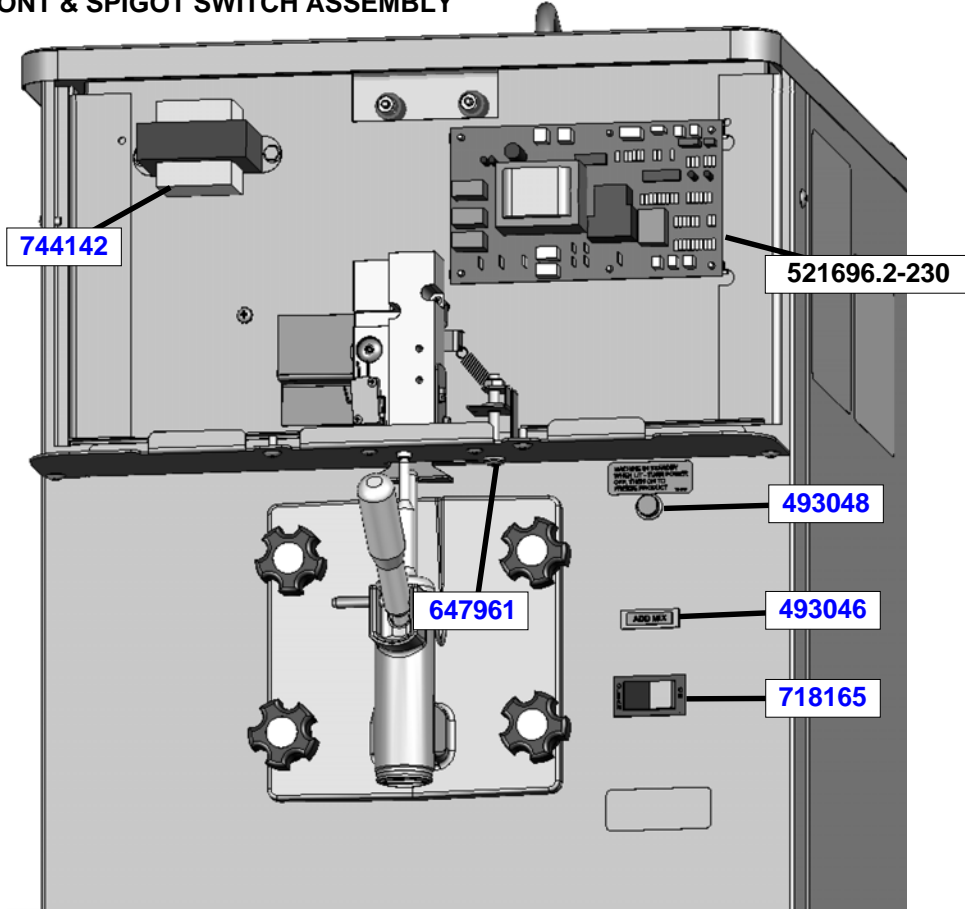
Part	Description	Quantity
336551	Door - Front	1
482019	Knob - Front Door (Black)	4
570196	Pin - Cotterless Clevis (Front Door)	1
624545-5	O-Ring - Stator Bar (5 Pack)	1
624644-5	O-Ring - Spigot Body (Bottom) (5 Pack)	1
624645-5	O-Ring - Spigot Body (Top) (5 Pack)	1
624678-5	O-Ring - Rear Seal - Black (5 Pack)	1
625310	Quad-Ring - Front Door - Black	1
630053	Rod - Torque Actuator	1
666786	Seal - Rear Auger - Black	1
2183099	Breaker Bar - Spigot Body	1
2183444	Bushing - Stator Support (Rear)	1
2183447	Spigot Handle	1
2183739	Spigot Body	1
2183751	Blade - Scraper	1
2187188	Bushing - Front Auger Support	1
2187553	Auger Shaft	1
2187556	Stator Bar	1

8.4 HOPPER PARTS



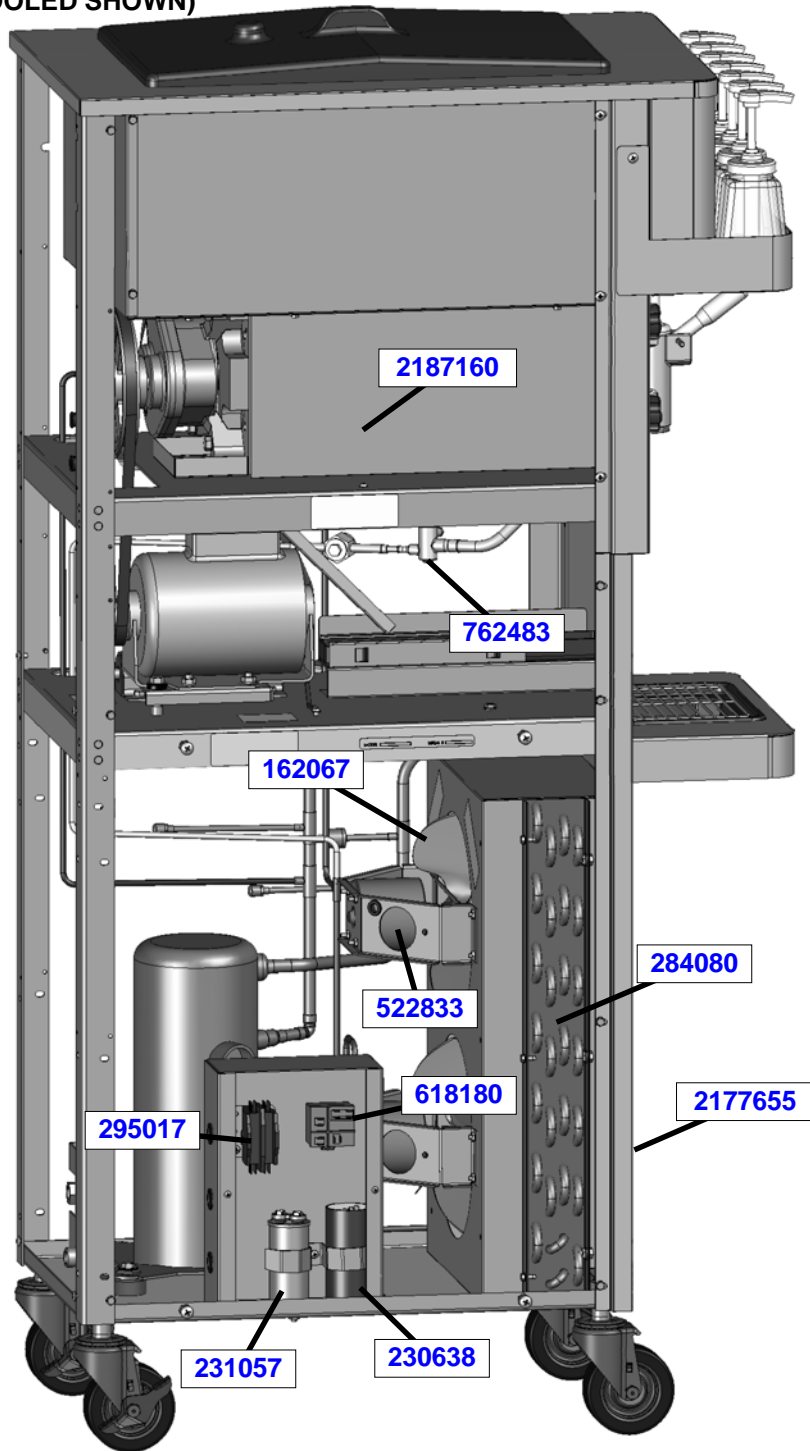
Part	Description	Quantity
194024	Bottle - Flavor	7
314465	Cover - Hopper	1
417010	Grid - Drip Tray	1
600082	Pump - Flavor	7
744281	Tray - Drain	1
744287	Tray - Drip	1
2177315	Cover - Hopper (AWU218)	1

8.5 MACHINE FRONT & SPIGOT SWITCH ASSEMBLY



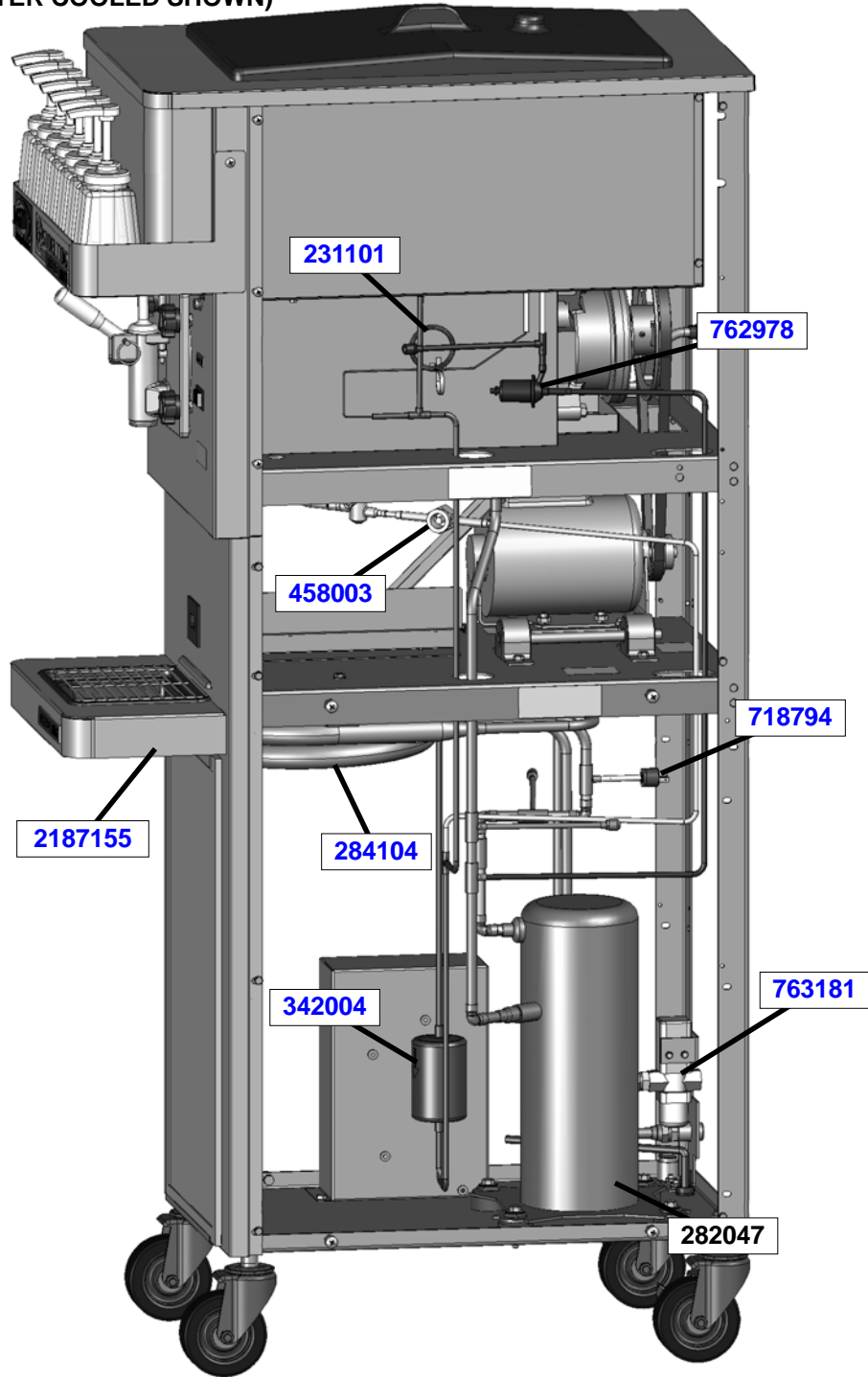
Part	Description	Quantity
493046	Light - Mix Low	1
493048	Light - Diagnostic (Round)	1
521696.2-230	Program Control Board	1
647961	Screw - Consistency Adjustment	1
694334	Spring - Compression (Spigot Switch)	1
695706	Spring - Consistency Adjustment (Slush) (Green)	1
718013	Switch - Roller (Spigot)	1
718165	Switch - Rocker (Clean-Off-On)	1
718773	Switch - Limit (Torque Consistency)	1
744142	Transformer (AWU218)	1
2187151	Panel - Header	1

8.6 LEFT SIDE (AIR COOLED SHOWN)



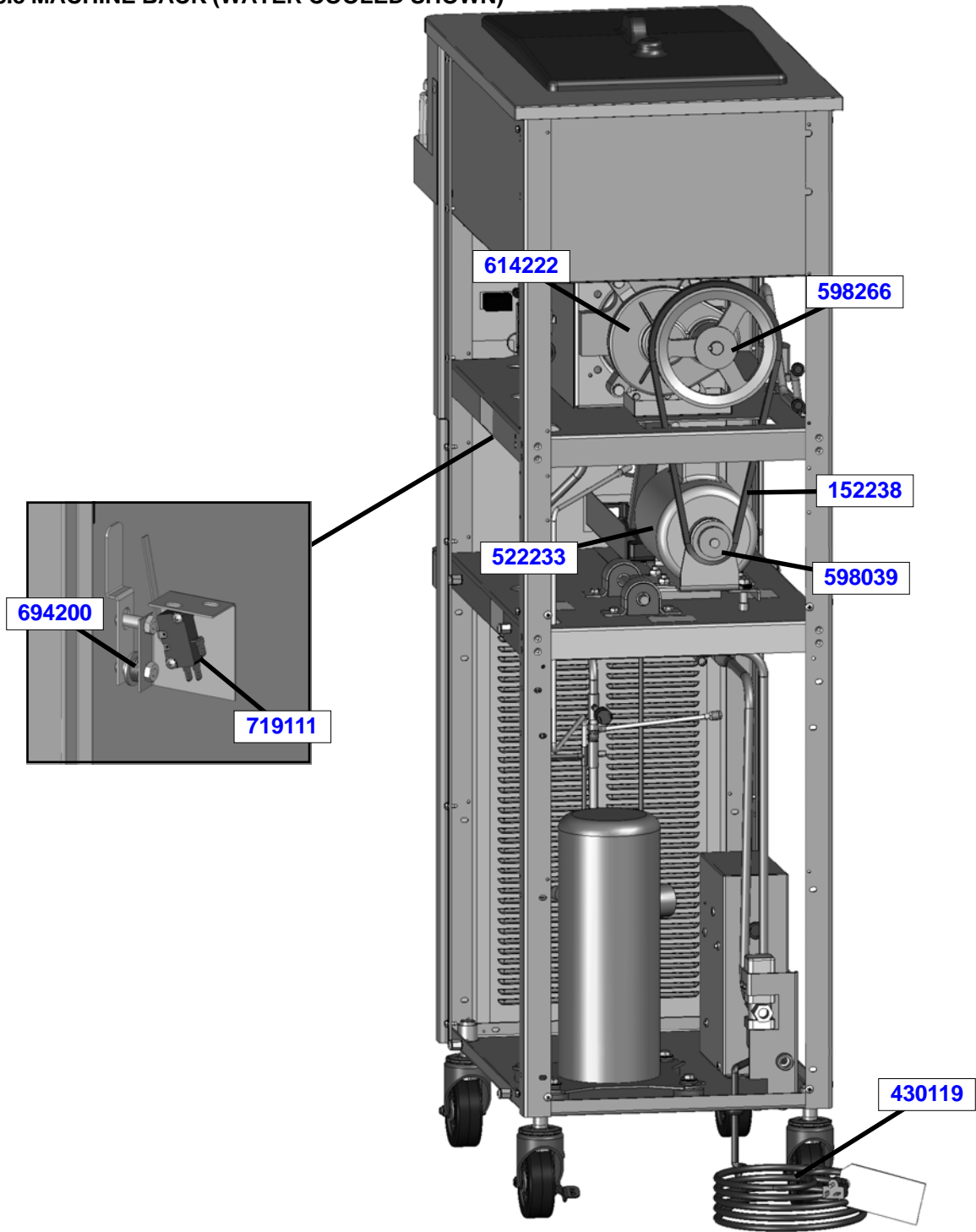
Part	Description	Quantity
162067	Blade - Fan (Air-Cooled Condenser)	2
230638	Capacitor - Start (#282047 Compressor)	1
231057	Capacitor - Run (#282047 Compressor)	1
284080	Condenser (Air-Cooled)	1
295017	Contactor (45CG20AG)	1
368236	Filter - Air Condenser	1
522833	Motor - Fan	2
618180	Relay - Start	1
762483	Valve - Expansion	1
2177655	Bracket - Air Filter	1
2187160	Evaporator Assembly	1

8.7 RIGHT SIDE (WATER COOLED SHOWN)



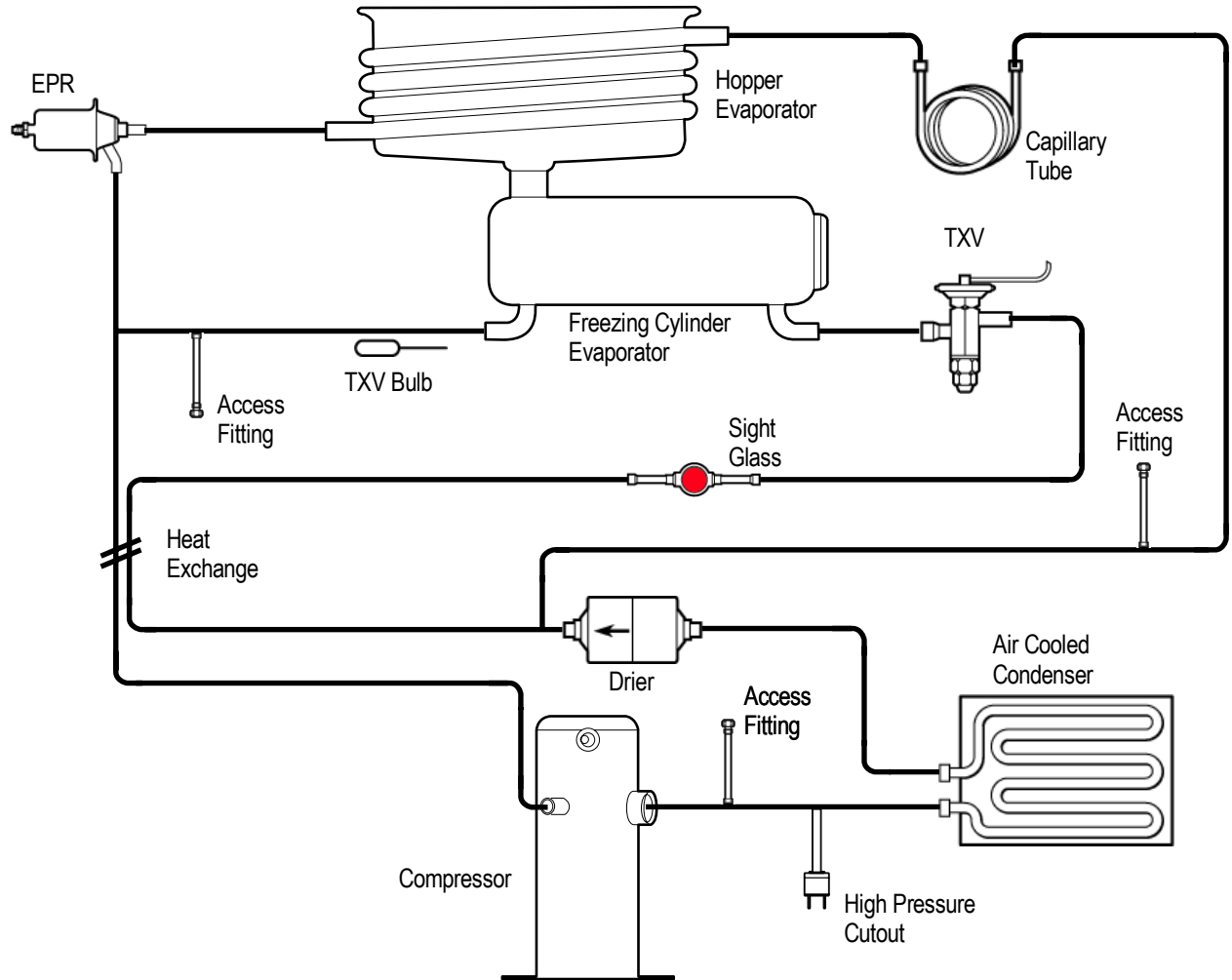
Part	Description	Quantity
231101	Cap Tube Only	1
282047	Compressor - 1 PH - 60 Hz (Scroll) (No Capacitors)	1
284104	Condenser (Water-Cooled)	1
342004	Drier	1
458003	Indicator - Liquid Line	1
718794	Switch - High Pressure Reset	1
762978	Valve - EPR	1
763181	Valve - Water	1
2187155	Support - Drip Tray	1

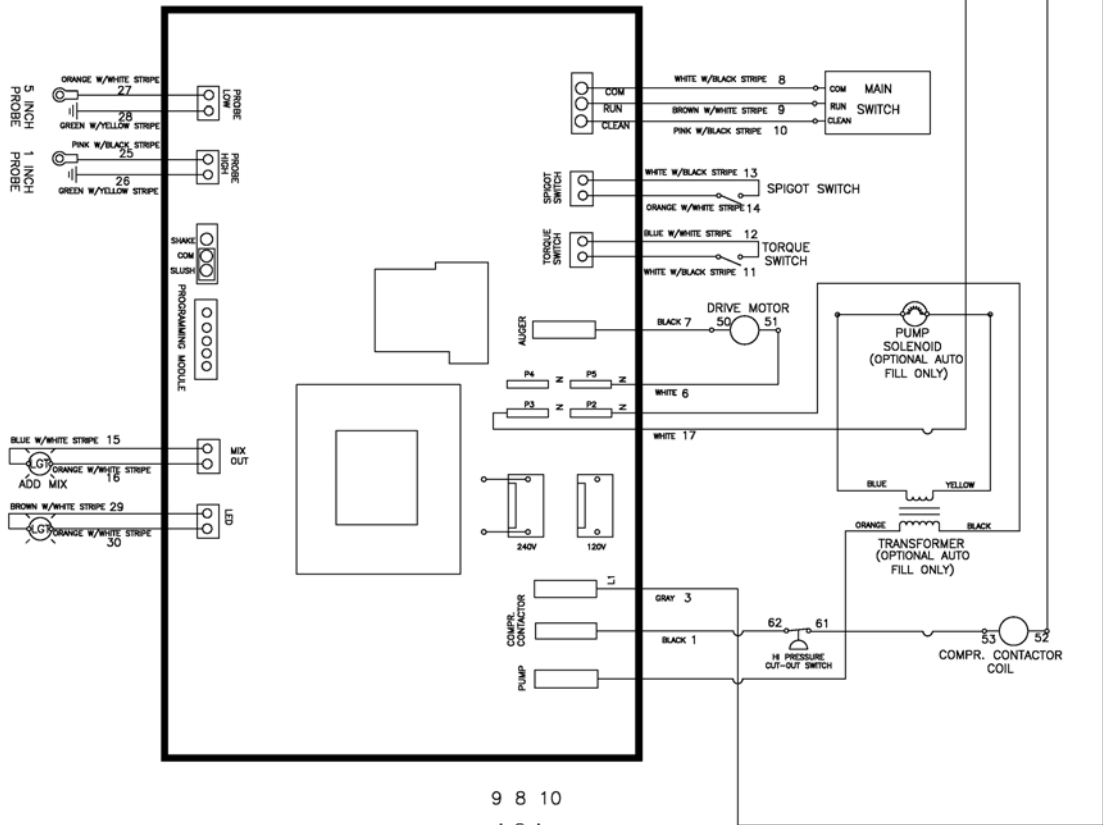
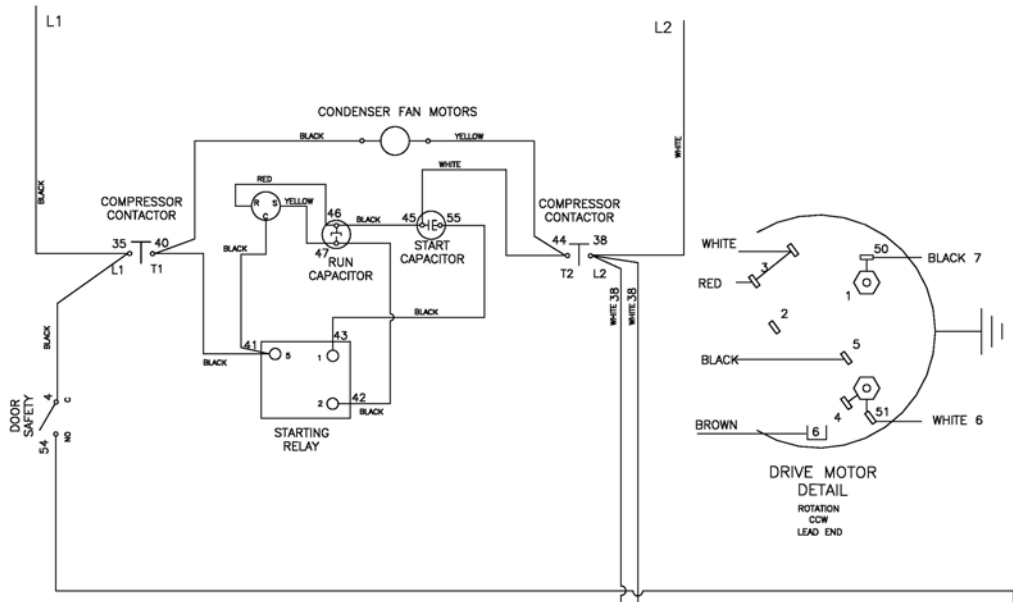
8.8 MACHINE BACK (WATER COOLED SHOWN)



Part	Description	Quantity
152238	Belt - Gripnotch (AX34)	1
230440	Capacitor - Start (#522233 Motor)	1
230441	Capacitor - Start (#522235 Motor)	1
430119	Cord - Power	1
522233	Motor - Drive - 1/2 HP	1
598039	Pulley - Drive Motor	1
598266	Pulley - Speed Reducer	1
614222	Speed Reducer	1
694200	Spring - Door Interlock	1
719111	Switch - Limit (Door Interlock)	1

8.9 REFRIGERATION & WIRING DIAGRAM





8.10 AUTOFILL OPTIONS

The U218 machine can easily be configured to use an Autofill System. The Autofill System provides a constant supply of non-dairy mix to the machine.

AUTOFILL KIT

An autofill kit is needed to use an Autofill System. The kit includes a solenoid, tubing, and a new hopper cover. See below for the Autofill Kit part numbers.

AUTOFILL SYSTEMS

There are two Autofill Systems available: the Fill-O-Matic II and the Fill-O-Matic III. See below for details on the Autofill Systems.

Fill-O-Matic II

The Fill-O-Matic II is powered through an electrical outlet and pumps up to 60 gallons per hour.

Fill-O-Matic III

The Fill-O-Matic III is powered by gas and pumps up to 45 gallons per hour.



Fill-O-Matic II & Fill-O-Matic III

Fill-O-Matic II	
Part Numbers	Autofill System: 4177349 Autofill Kit: 2187101
Usage	For use with non-potentially hazardous food substances; non-dairy
Dimensions	L 11-1/2" x W 11-1/2" x H 32-1/2"
Electrical	115VAC 60Hz 15A power cord provided
Mix Storage	15 gallon plastic tank
Clean Process	Removable strainer allows for easy cleaning
Output	Pumps up to 60 gallons per hour

Fill-O-Matic III	
Part Numbers	Autofill System: 4177370 Autofill Kit: 2187101
Usage	For use with non-potentially hazardous food substances; non-dairy
Dimensions	L 11-1/2" x W 11-1/2" x H 27-1/2"
Electrical	No electrical connections required Powered by CO ₂ , Nitrogen or compressed air
Mix Storage	15 gallon plastic tank
Clean Process	Clean-in-place by pumping solution through hoses
Output	Pumps up to 45 gallons per hour

