



Model U431
SERVICE MANUAL

Manual No. 513572

Rev.5

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.



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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.

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SECTION 1 INTRODUCTION

1.1 DESCRIPTION

The Stoelting U431 floor model freezer is pressure fed. The freezer is equipped with fully automatic controls to provide a uniform product. The freezer is designed to operate with almost any type of commercial soft-serve or non-dairy mixes available, including ice milk, ice cream, yogurt, and frozen dietary desserts.

This manual is designed to assist qualified personnel and operators in the installation, operation and maintenance of the Stoelting Model U431 pressure freezer.



Figure 1. Model U431 Freezer

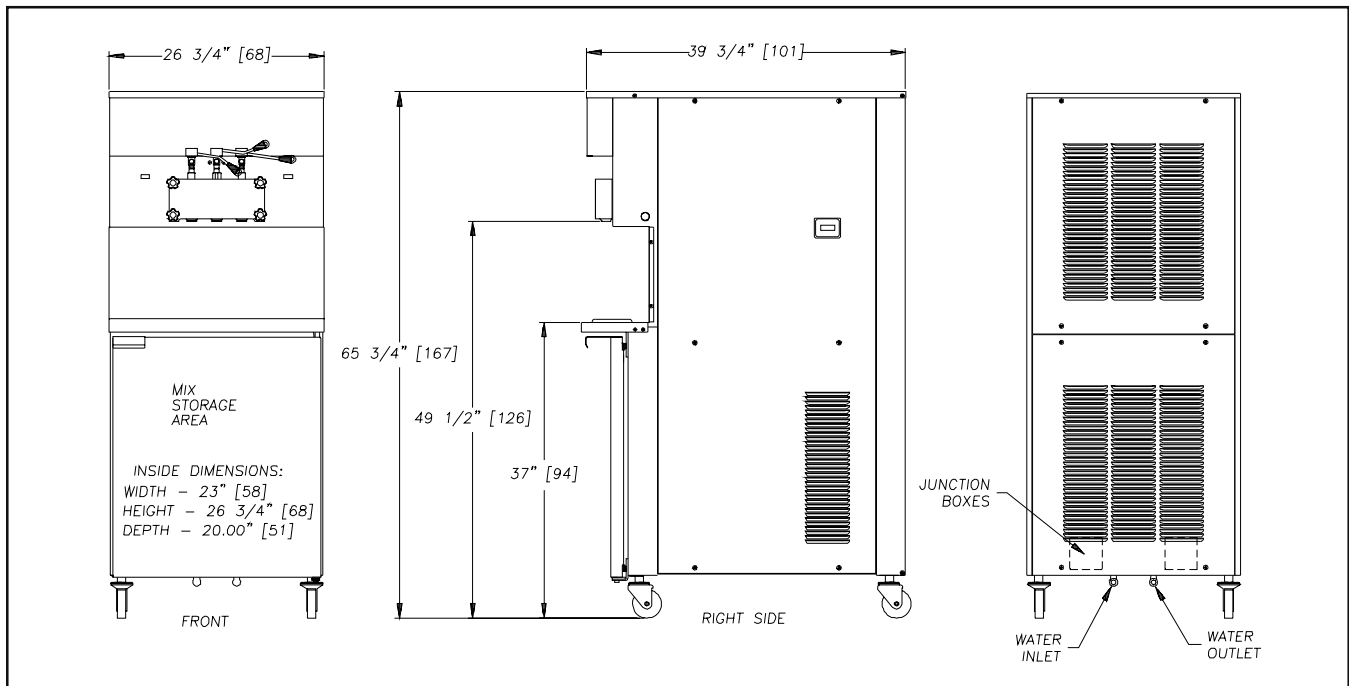


Figure 2. Specification

1.2 SPECIFICATIONS

	MODEL U431
DIMENSIONS	Width: 26-3/4" Depth: 39-3/4" Height: 65-3/4"
WEIGHT	925 LBS. 975 LBS. w/Crate
ELECTRICAL	208/230 volt, 1 Ph or 3 Ph, Two separate circuits. Refer to machine nameplate.
COOLING	Water or air cooled. Air cooled req's 3" all around clearance and 10" top clearance. Water cooled req's 1/2" (12,5mm) NPT water and drain fittings.

SECTION 2 INSTALLATION INSTRUCTIONS

2.1 SAFETY PRECAUTIONS

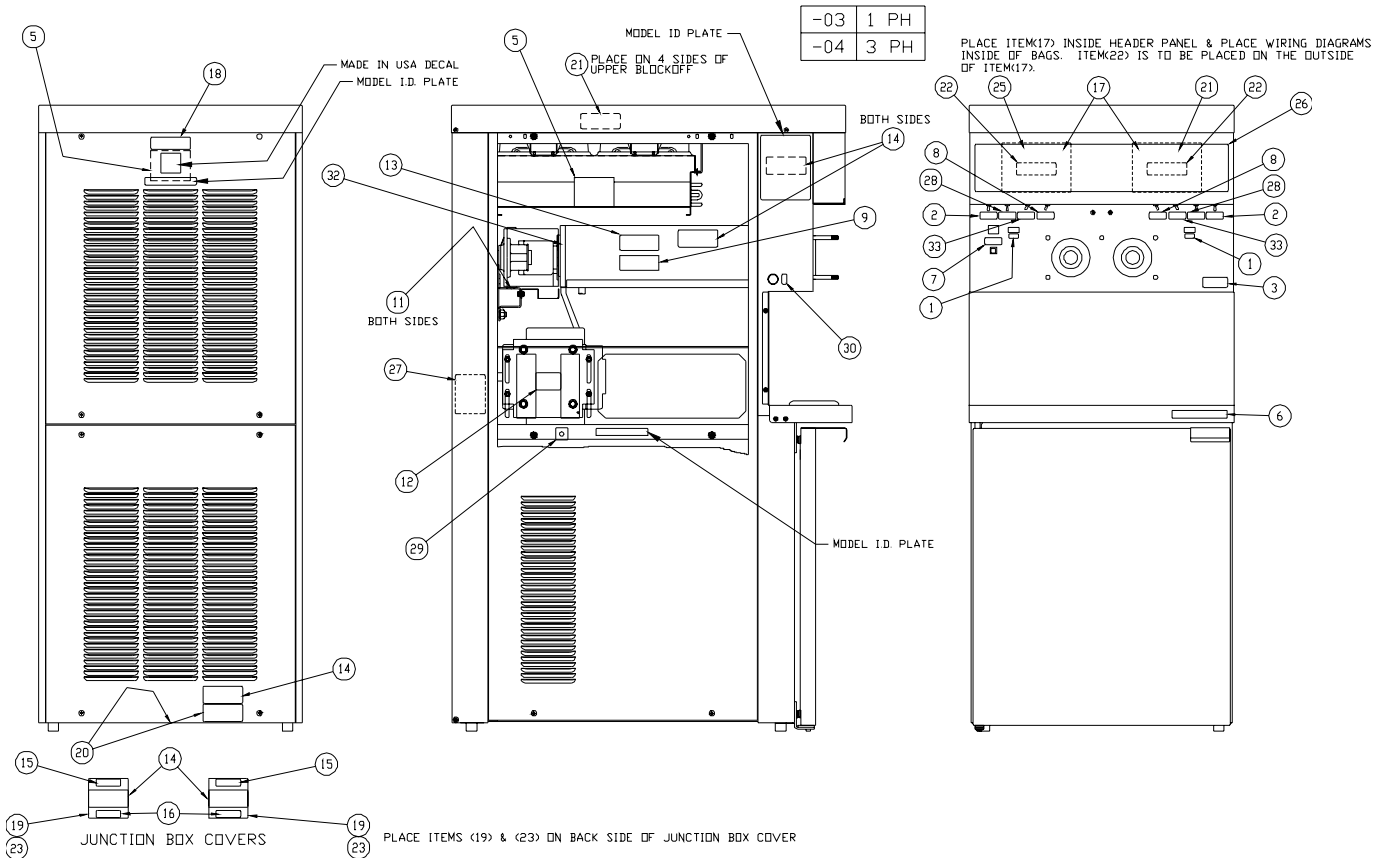
Do not attempt to operate the freezer until the safety precautions and operating instructions in the manual are read completely and are thoroughly understood.

Take notice of all warning labels on the freezer (Fig.3).The labels have been put there to help you 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 freezer. Labels should be checked

periodically to be sure they have not been painted over, rubbed off, fallen off, and can be recognized as warning labels.

If you are in need of replacement labels, indicate the part number, type of label, location of label, and quantity required along with your name and address and mail to:

Stoelting, LLC
Commercial Products
502 Hwy. 67
Kiel, WI 53042



ITEM	STOELTING PN	QTY		DESCRIPTION
		-03	-04	
1	324801	2	2	DECAL - MIX LOW
2	324798	2	2	DECAL CLEAN-OFF-SERVE SWITCH
3	324141	1	1	DECAL CAUTION-ROTATING BLADES
4	723526	1	1	TAG READ MANUAL & ALL DECALS
5	324346	3	3	DECAL HAZARDOUS MOVING PARTS
6	324393	1	1	DECAL STOELTING SWIRL LOGO
7	324800	1	1	DECAL - CAB ON/OFF
8	324799	2	2	PUMP ON/OFF
9	324208	2	2	DECAL REFRIG LEAK CHECK
10	324509	1	1	DECAL CLEANING (SS & SHAKE)
11	324103	2	2	DECAL CAUTION-ROTATING SHAFT
12	324686	4	4	DECAL DANGER AUTOMATIC START
13	324107	2	2	DECAL CAUTION MOVING PARTS
14	324125	7	7	DECAL ELECT SHOCK HAZARD
15	324151	2	2	DECAL FIELD CONNECTIONS
16	324198	-	2	DECAL ATTENTION INSTALLER
17	130000	2	2	BAG ENVELOPE FRONT LOADING
18	324584	1	1	DECAL, ADEQUATE VENTILATION (3')
19	324158	2	2	DECAL COPPER CONDUCTORS ONLY
20	324106	2	2	DECAL CAUTION WIRING MAT'L
21	324107	4	4	DECAL CAUTION MOVING PARTS
22	324566	2	2	DECAL - WIRED ACCORDING TO
23	324015	-	2	DECAL 2X1-1/4 BLK ON WHITE
24	723552	2	2	TAG, CAUTION - SUPPLY VOLTAGE
26	324804	1	1	DECAL - GM HEADER (STOELTING SWIRL)
26	324803	1	1	DECAL - GM HEADER (STOELTING LOGO)
26	324806	1	1	DECAL, A&W HEADER FOR U431 & 4231
27	324346	2	2	DECAL-CAUTION HAZARDOUS MOVING
28	324797	2	2	DECAL, STANDBY/SERVE SWITCH
29	324242	1	1	DECAL,TEMPERATURE CONTROL
30	324200	2	2	DECAL, MANUAL RESET
31
32	324014	2	2	DECAL, ARROW
33	314796	2	2	DECAL, FREEZING

2.2 SHIPMENT AND TRANSIT

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

With the method of packaging used, the equipment 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 freezer 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 ten days and request inspection. The customer must place claim for damage and/or shortages in shipment with the carrier. **Stoelting, Inc. cannot make any claims against the carrier.**

2.3 FREEZER INSTALLATION



WARNING

INSTALLATION MUST BE PERFORMED BY A QUALIFIED ELECTRICIAN/REFRIGERATION SPECIALIST. INCORRECT INSTALLATION COULD CAUSE PERSONAL INJURY, SEVERE DAMAGE TO THE MACHINE AND WILL VOID THE WARRANTY.

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

- A. Uncrate the freezer.
- B. The freezer must be placed in a solid level position.

NOTE

Accurate leveling is necessary for correct drainage of freezer barrel and to insure correct overrun.

- C. The freezer must have a minimum of 3 inches (6 inches high ambient conditions) of space at all sides and 10 inches at the top for proper circulation.



CAUTION

FAILURE TO PROVIDE ADEQUATE VENTILATION WILL VOID WARRANTY!

- D. Water-cooled freezers need an adequate water supply. Install 1/2 inch pipe or 1/2 inch inside diameter copper water line to the freezer. Connect water outlet to a drain using a 1/2 inch inside diameter line. Automatic washer hoses work well for final connections. All water connections must comply with local codes. Figure 4.



CAUTION

FLUSH ALL WATER LINES BEFORE INSTALLATION. IN STORES WITH SEDIMENT IN WATER, ADD SUITABLE FILTER OR STRAINER TO WATER INLET.



Figure 4. Water/Electrical Connections

- E. Place the CLEAN-OFF-ON switches in the OFF position before continuing. Figure 11.

2.4 INSTALLING PERMANENT WIRING

Permanent wiring is required by local codes, the following procedure must be performed:

- A. Refer to the nameplate at the rear of the freezer for specific electrical requirements. Make sure the power source in the building matches the freezer nameplate requirements. Bring the wires into the junction boxes through the access holes in the bottom rear of the freezer. (Figure 4)

NOTE

Three phase freezers in areas of unbalanced electrical loads require special attention when connecting input electrical power. The unbalanced leg of power (called wild or high) must be connected to L2 in the junction box.

- B. Remove the lower back panel and the two junction box covers located at the bottom of the freezer.
- C. Install permanent wiring according to local code.
- D. Check the auger shaft rotation by placing the MAIN DRIVE switch in the CLEAN position. Auger shaft rotation is clockwise as viewed through the clear plastic front door. If the rotation is not clockwise, turn main electrical power OFF. Then reverse L1 and L3 electrical power lines to the junction box (three phase only). Re-check auger shaft rotation. (Figure 5)

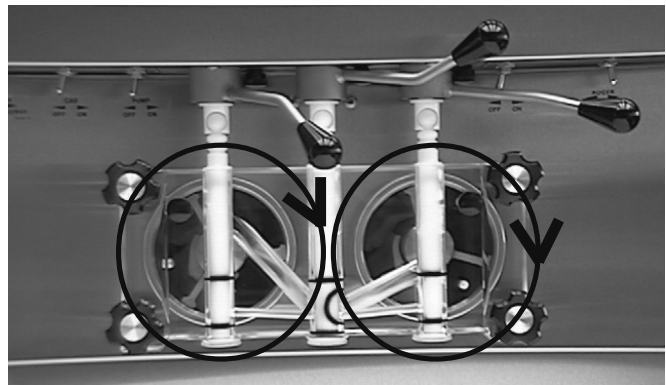


Figure 5. Auger Rotation

2.5 MIX PUMP (Serial #0 thru 17977)

A. Mix Pump Hose Installation

Follow the steps below to install the mix pump hose.

1. Turn pump on.
2. Feed one end of mix pump hose into the entering or pick-up hose side (left) of black cover.
3. Gently push the hose into the black cover until it begins to feed.

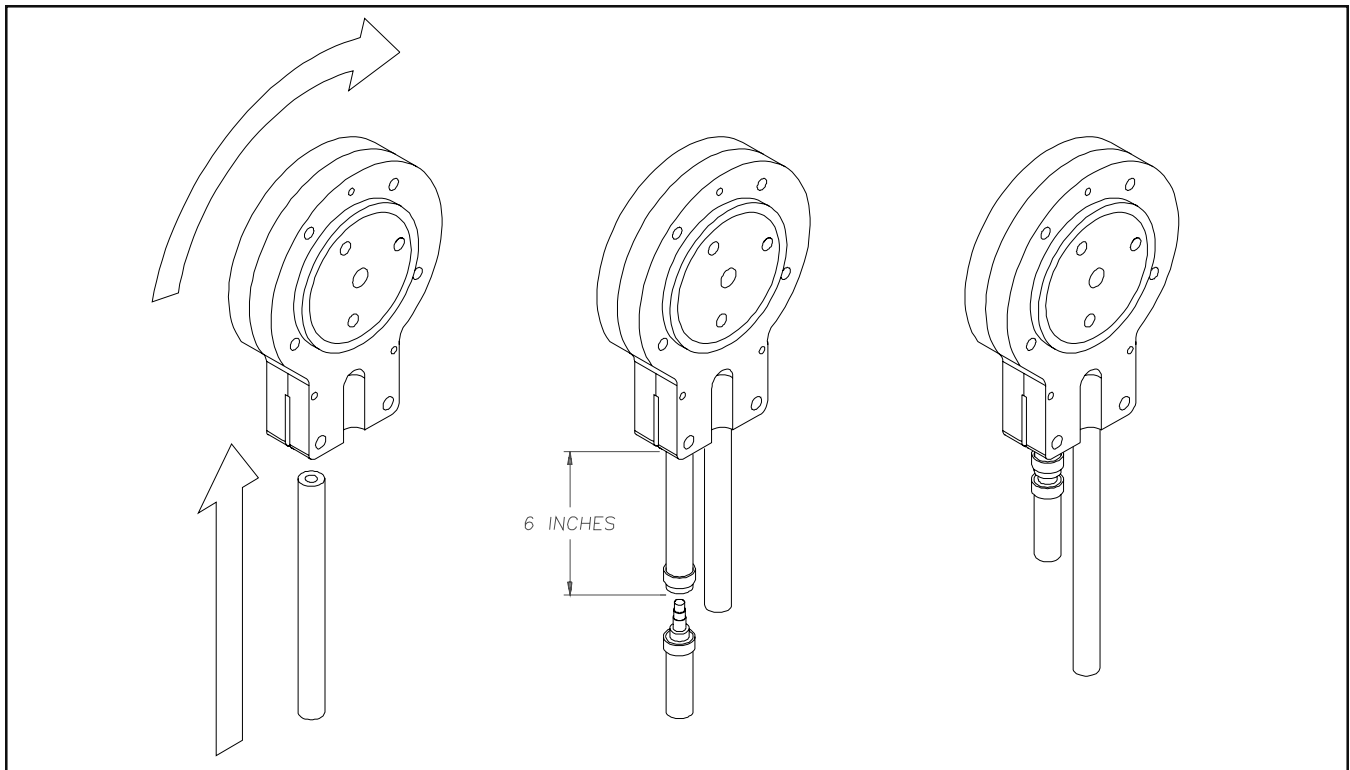


Figure 6. Mix Hose Installation

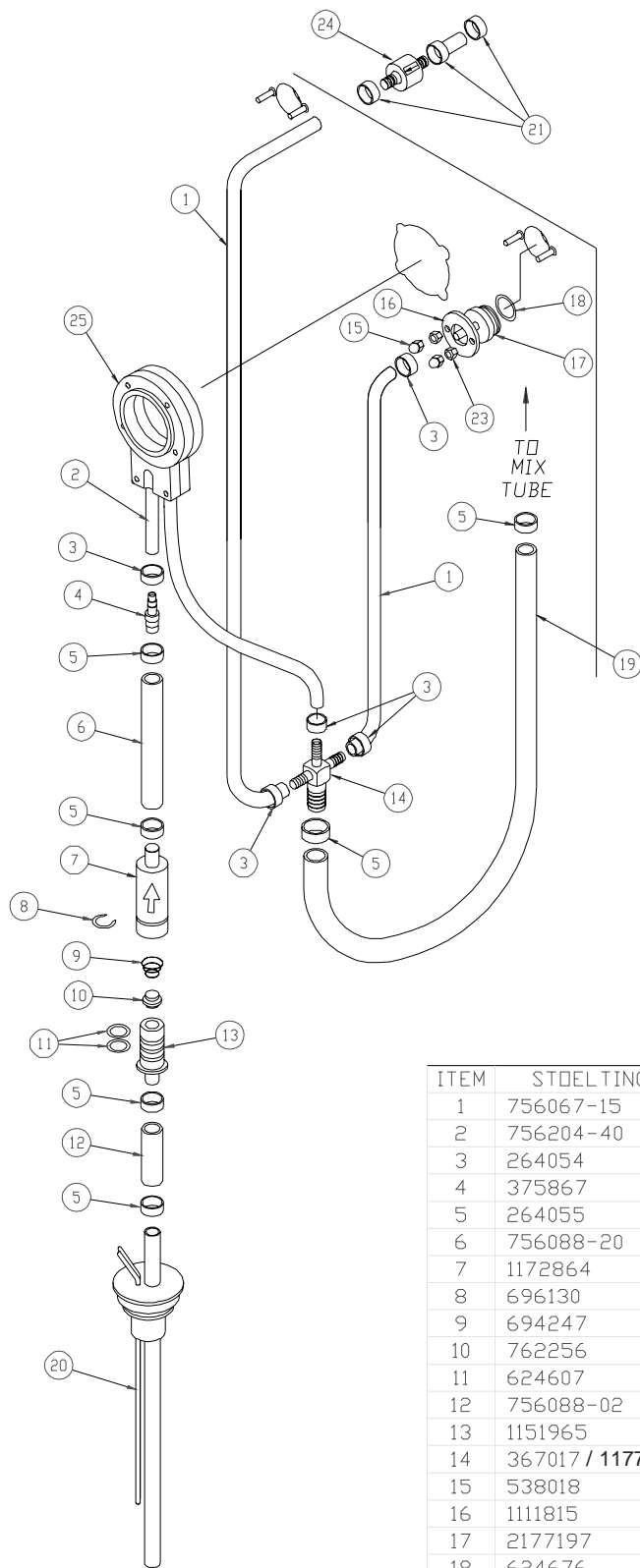
4. Allow the hose to feed itself thru the pump until 6" remains on the entering side.
5. Turn pump off.
6. Connect mix pump hose to pickup hose adapter using small hose clamp.



CAUTION

DO NOT TWIST MIX PUMP HOSE.

7. Turn pump on.
8. Allow remaining 6" of tubing to feed thru pump until hose adapter prevents further feeding.
9. Turn pump off.
10. Connect free end of mix pump hose to "4 way Tee" as shown in Figure 7. When all connections are complete the "4 way Tee" must be lower than the black pump housing. Fig. 8



B. Connect 1/2 inch I.D. plastic food grade tubing to check valve and then to the mix container. Observe check valve flow arrow. Secure with hose clamps. Then place assembly thru hole in cover and install retainer clip. Figure 9.

C. Connect 1/2 inch I.D. plastic food grade tubing between the large port of air/mix tee and refrigerated mix transfer line. Secure with large hose clamp or equivalent. Figure 9.



CAUTION
AIR/MIX TEE MUST REMAIN BELOW THE BLACK COVER/CLAMP. IF THE TEE IS ABOVE THE PUMP MIX WILL DRAIN TO THE AIR COMPRESSOR RESULTING IN PUMP DAMAGE.

D. Connect mix low cords. Figure 9.

ITEM	STOELTING PN	QTY	DESCRIPTION
1	756067-15	4	TUBING PLASTIC 1/4ID X 7/16OD X 15.0" LG
2	756204-40	2	TUBING NORPRENE FOOD .25 ID X 40.0" LG
3	264054	10	CLAMP LOOP JAW TYPE 7/16
4	375867	2	FITTING UNION 1/4" X 1/2" BARBED
5	264055	12	CLAMP LOOP JAW TYPE 11/16
6	756088-20	2	TUBING PLASTIC 1/2ID X 3/4OD X 20.0" LG
7	1172864	2	VALVE BODY - OUTER
8	696130	2	LOCK CLIP FOR VALVE
9	694247	2	SPRING COMP 13/16 X 3/8 X 3/4
10	762256	2	VALVE OUTLET CHECK (MOLDED)
11	624607	4	RING O 11/16 X 7/8 X 3/32 SPECIAL
12	756088-02	2	TUBING PLASTIC 1/2ID X 3/4OD X 2.0" LG
13	1151965	2	VALVE BODY - INNER
14	367017 / 1177816	2	TEE, 4-WAY S'STL AIR/MIX
15	538018	4	NUT, 10-24 ACORN, 18-8 STN STL
16	1111815	2	LOCKING PLATE WASHER
17	2177197	2	FITTING, PRESSURE SWITCH
18	624676	2	RING O 1-1/8 X 1-5/16 X 3/32 70DUR
19	756088-30	2	TUBING PLASTIC 1/2ID X 3/4OD X 30.0" LG
20	2177272	2	MIX PICKUP & PROBE ASSY
21	264235	6	CLAMP HOSE 3-8/9-16 MIN/MAX D
22	508135	.001	LUBRICANT, PETRO-GEL 40Z.TUBES
23	538296	4	NUT HEX #10-24 X 38 SS
24	762258	2	CHECK VALVE
25	3171952	2	COVER CLAMP

Figure 7. Mix Pump

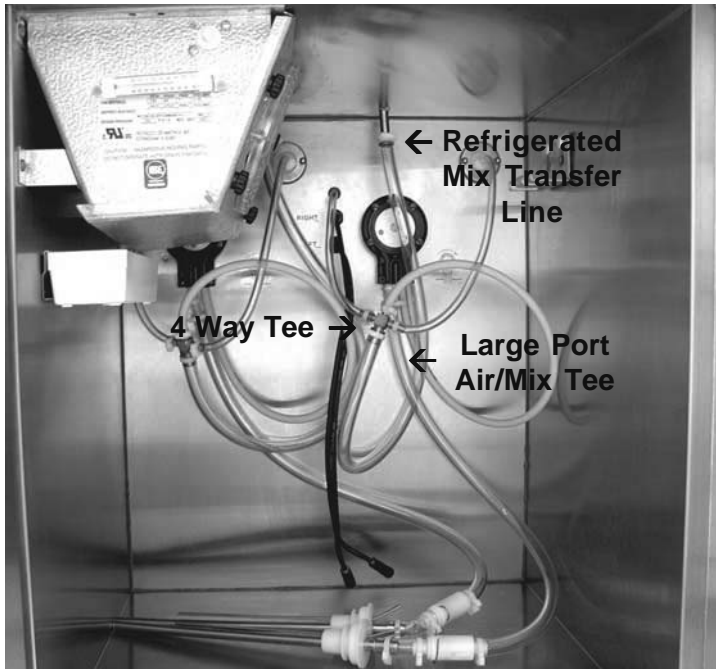


Figure 8. 4 Way Tee

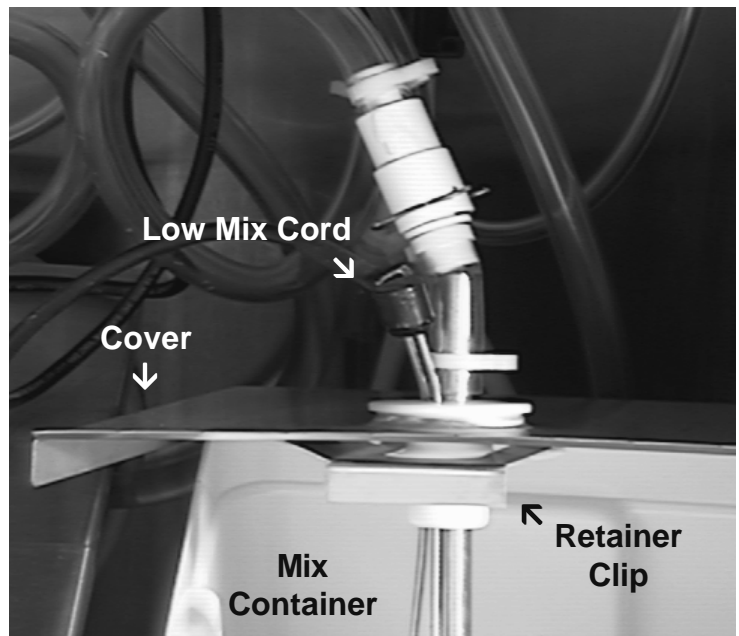


Figure 9. Mix Inlet Tube & Probe Assy. Clip

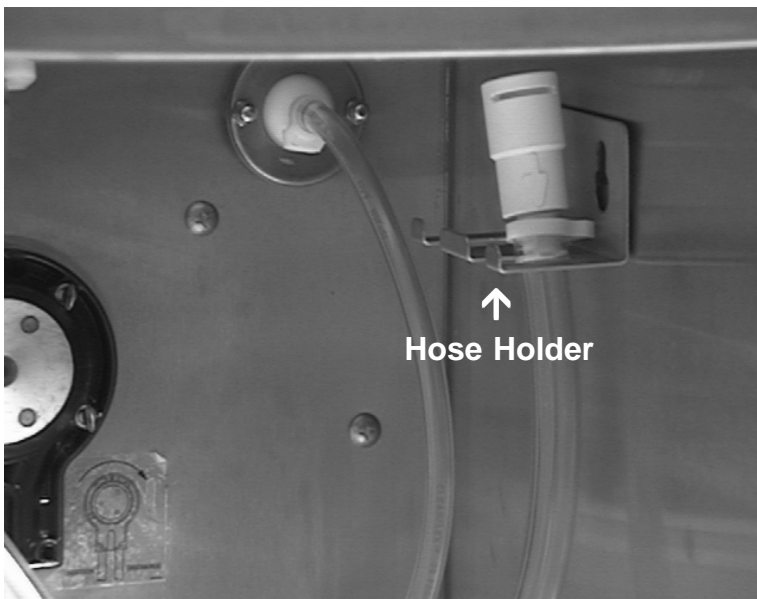


Figure 10. Hose Holder

2.6 MIX PUMP (Serial #17978 and Up)

A. Mix Pump Hose Installation

Follow the steps below to install the mix pump hose.

1. Turn pump on.
2. Feed one end of mix pump hose into the entering or pick-up hose side (left) of black cover.
3. Gently push the hose into the black cover until it begins to feed.

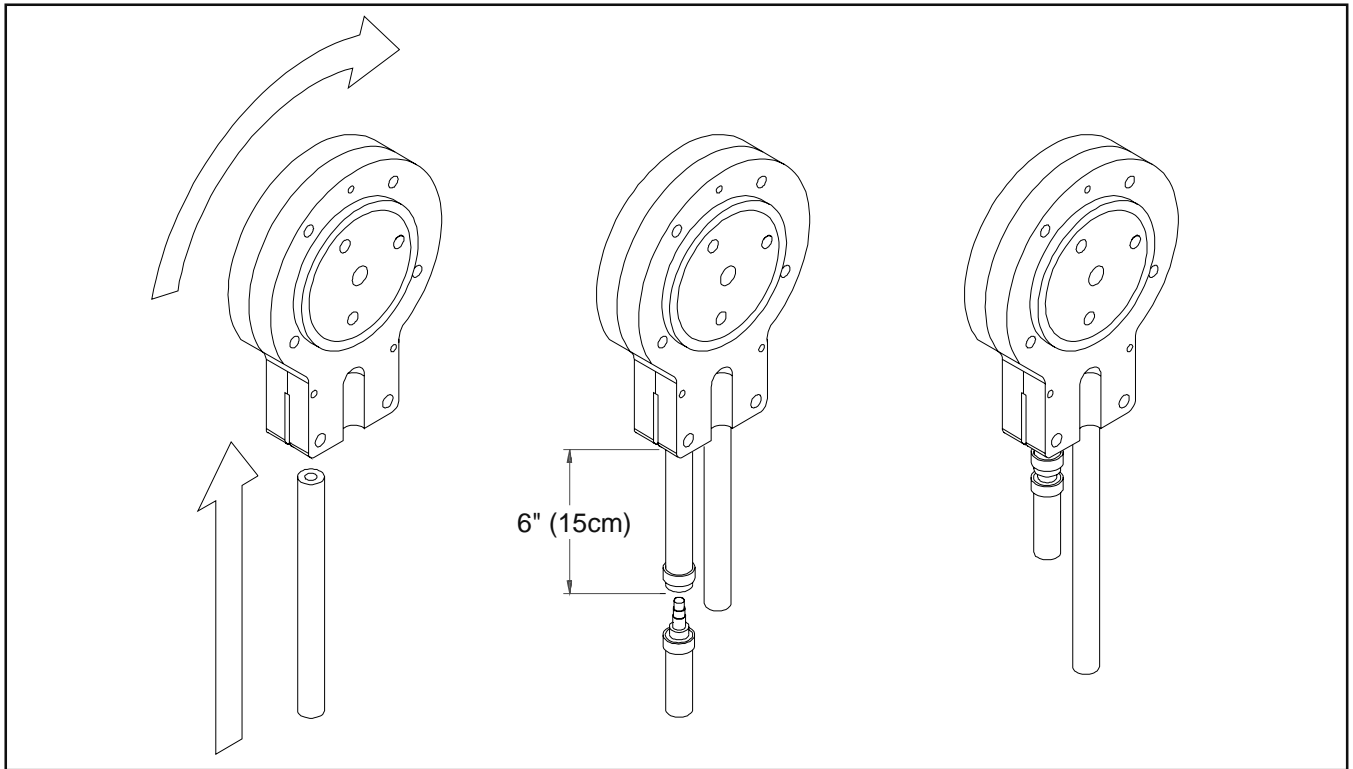


Figure 11. Mix Hose Installation

4. Allow the hose to feed itself thru the pump until 6" (15cm) remains on the entering side.
5. Turn pump off.
6. Connect mix pump hose to pickup hose adapter using small hose clamp.
7. Turn pump on.
8. Allow remaining 6" (15cm) of tubing to feed thru pump until hose adapter prevents further feeding.
9. Turn pump off.
10. Connect free end of mix pump hose to 3-way Tee as shown in Figure 7. When all connections are complete the 3-way Tee must be lower than the black pump housing. Figure 8.

 **CAUTION**
DO NOT TWIST MIX PUMP HOSE.

ITEM	STOELTING PN	QTY	DESCRIPTION
1	756067	33.5'	TUBING PLASTIC 1/4IDX7/16OD
2	756204-40	2	TUBING NORPRENE FOOD .25 ID X 40.0' LG
3	264235	8	CLAMP HOSE 3-8/9-16 MIN/MAX D
4	375867	2	FITTING UNION 1/4"X1/2" BARBED
5	264241	12	CLAMP HOSE 9/16 TO 13/16 STEEL
6	756088-26	2	TUBING PLASTIC 1/2IDX3/4OD X 26.0' LG
7	1172864	2	VALVE BODY - OUTER
8	696152	2	LOCK CLIP FOR VALVE
9	694247	2	SPRING COMP 13/16X3/8X3/4
10	762256	2	VALVE OUTLET CHECK (MOLDED)
11	624607	4	RING O 11/16X7/8X3/32 SPECIAL
12	756088-02	2	TUBING PLASTIC 1/2IDX3/4OD X 2.0' LG
13	1151965	2	VALVE BODY - INNER
14	376041	2	TEE, 3-WAY, S'STL, AIR/MIX
15	756088-30	2	TUBING PLASTIC 1/2IDX3/4OD X 30.0' LG
16	2177272	2	MIX PICKUP & PROBE ASSY
17	508135	AS REQ	LUBRICANT, PETRO-GEL 40Z.TUBES

B. Connect 1/2 inch (12,7mm) I.D. plastic food grade tubing to mix check valve (Item 7) and then to the mix container. Observe check valve flow arrow. Secure with hose clamps. Then place assembly thru hole in cover and install retainer clip. See Figure 9.

C. Connect 1/2 inch (12,7mm) I.D. plastic food grade tubing between the large port of air/mix tee and refrigerated mix transfer line. Secure with large hose clamp or equivalent. See Figure 9.



CAUTION
AIR/MIX TEE MUST REMAIN BELOW THE BLACK COVER/CLAMP. IF THE TEE IS ABOVE THE PUMP MIX WILL DRAIN TO THE AIR COMPRESSOR RESULTING IN PUMP DAMAGE.

D. Connect mix low cords. Figure 9.

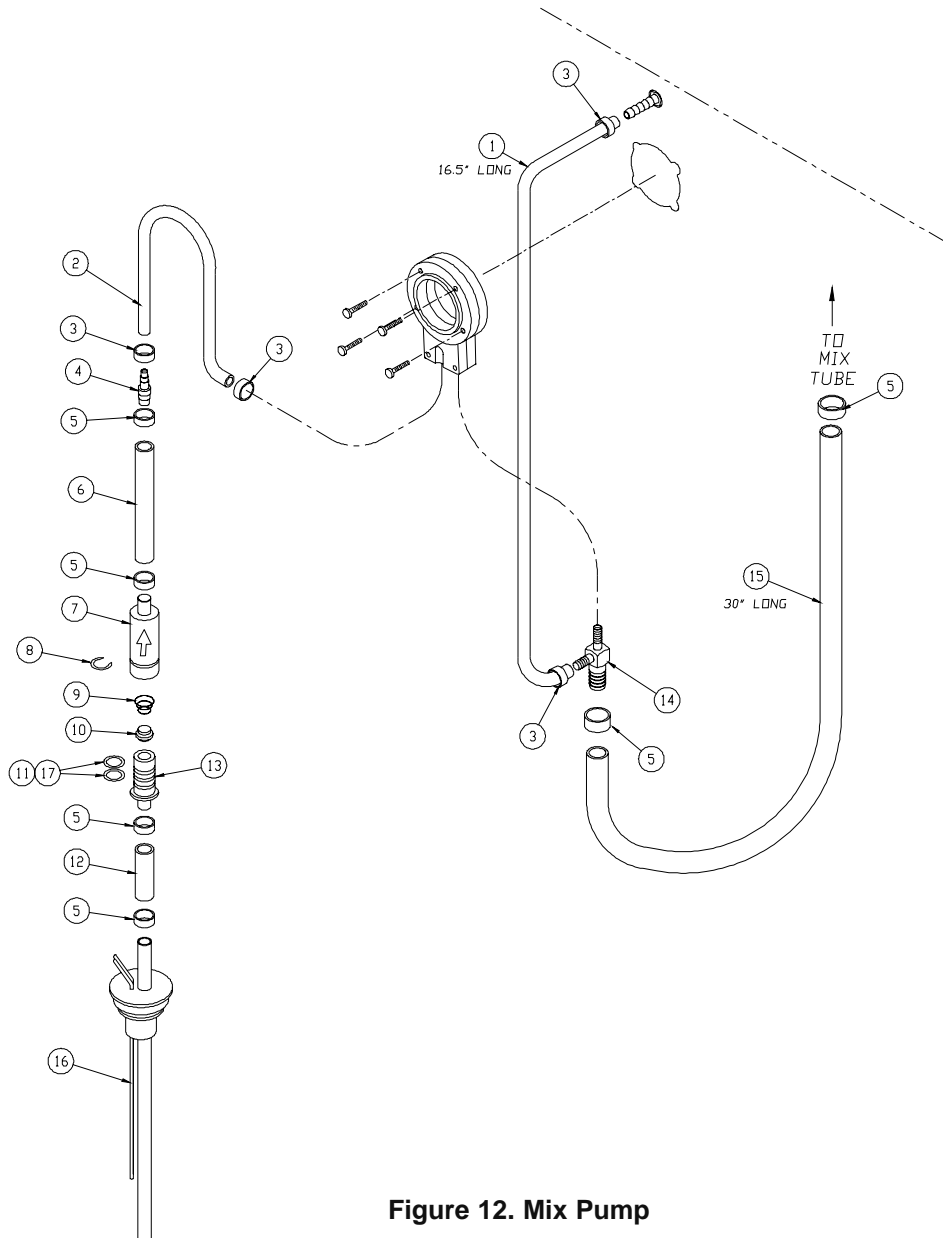


Figure 12. Mix Pump



Figure 13. 3-way Tee

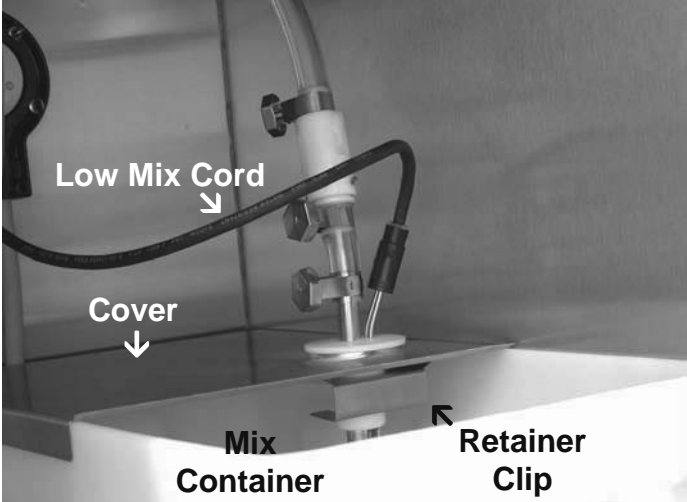


Figure 14. Mix Inlet Tube & Probe Assy. Clip



Figure 15. Hose Holder

SECTION 3 INITIAL SET-UP AND OPERATION

3.1 SAFETY PRECAUTIONS

SAFE OPERATION IS NO ACCIDENT; observe these rules:

- A. **Know the freezer.** Read and understand the operating instructions.
- B. **Notice all warning labels on the freezer.**
- C. **Wear proper clothing.** Avoid loose fitting garments, and remove watches, rings or jewelry which could cause a serious accident.
- D. **Maintain a clean work area.** Avoid accidents by cleaning 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 power for maintenance.** Never attempt to repair or perform maintenance on the freezer until the main electrical power has been disconnected.
- G. **Do not operate under unsafe operating conditions.** Never operate this freezer if unusual or excessive noise or vibration occurs.

3.2 OPERATING CONTROLS AND INDICATORS

Before operating the freezer, it is required that the operator know the function of each operating control. Refer to Figure 11 for the location of the operating controls on the freezer.

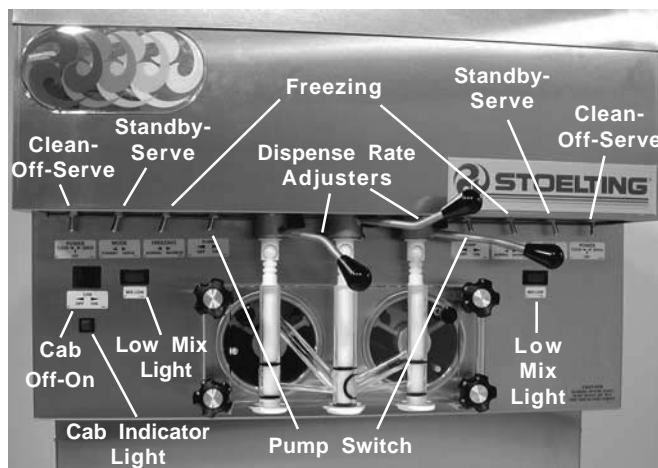


Figure 16. Operating Controls

! WARNING

The **CLEAN-OFF-SERVE** switch must be placed in the **OFF** position when disassembling for cleaning or servicing. The freezer must be disconnected from electrical supply before removing any access panel.

A. Spigot Switch

When the spigot handle is opened the SPIGOT switch will start the auger drive and refrigeration systems. When the spigot handle is closed, the drive

B. Clean-Off-Serve Switch

The CLEAN-OFF-SERVE switch is a three position toggle switch used to control the operation of the refrigeration system and auger. When the switch is placed in the CLEAN position, the refrigeration system will be off and auger **will** rotate for cleaning.

When the switch is placed in the OFF position, the refrigeration system and auger **will not** operate.

When the switch is placed in the SERVE position, the refrigeration system and auger **will** operate automatically. The switch should be placed in the SERVE position for normal operation.

C. Cabinet-Off-On Switch

The CABINET-OFF-ON switch is a two position toggle switch. When the switch is placed in the OFF position, the lower cabinet refrigeration system **will not** run. When the switch is placed in the ON position, the lower cabinet refrigeration system **will** run until the preset temperature is reached; then cycle ON and OFF to maintain that temperature.

D. Cab Indicator Light

A flashing light indicates the cab OFF-ON switch is in the OFF position, no refrigeration. Place the OFF-ON switch in the ON position for cab refrigeration.

E. Pump Switch

The pump motor switch is a two position toggle switch. When the switch is placed in the OFF position, the pump **will not** run. When the switch is placed in the ON position, the pump **will** run until the preset pressure is reached, then cycle ON and OFF as product is drawn to maintain that pressure.

F. Standby/Serve Switch

The standby/serve switch is a two position toggle switch. When the switch is placed in the Standby position the freezer will cycle to maintain a temperature below 41°F. When the switch is in the Serve position the freezer will cycle to maintain a servable product.

G. Freezing Switch

The freezing switch is a two position toggle switch. When the switch is placed in the ON position the freezer will be forced to run 30 seconds after the temperature control is satisfied.

H. Dispense Rate Adjusters

The dispense rate adjuster limits the opening of the spigot. To adjust product dispense rate, turn the adjusting knob clockwise for slower flow and counter-clockwise for faster flow.

I. High Head Pressure Cut Out

If the head pressure exceeds 445 PSIG (28 bar) air cooled and water cooled, the high head pressure cutout will trip. The reset button can be accessed from the side of the freezer.

J. Low Mix Light

The low mix light will illuminate when the liquid level in the mix container drops below two gallons.

K. 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 removed and closed when the door is properly installed.

3.3 IMPORTANT INFORMATION REGARDING CLEANING AND SANITIZING

Soft serve and shake freezers require special consideration when it comes to food safety and proper cleaning and sanitizing.

The following information specifically covers issues for cleaning and sanitizing frozen dessert freezers. This information is meant to *supplement* a comprehensive food safety program.

Soil Materials Associated with Frozen Dessert Machines

MILKFAT/BUTTERFAT – As components of ice-cream/frozen custard mix, these soils will accumulate on the interior surfaces of the machine and its parts. Fats are difficult to remove and help attribute to milkstone build-up.

MILKSTONE – Is a white/gray film that forms on equipment and utensils that come in contact with dairy products. These films will accumulate slowly on surfaces because of ineffective cleaning, use of hard water, or both. **Milkstone is usually a porous deposit, which will harbor microbial contaminants and eventually defy sanitizing efforts.**

Once milkstone has formed, it is very difficult to remove. Without using the correct product and procedure, it is nearly impossible to remove a thick layer of milkstone.
(NOTE: general-purpose cleaners DO NOT remove milkstone.) ***This can lead to high bacteria counts and a food safety dilemma.***

IT IS BEST TO CONTROL MILKSTONE ON A DAILY BASIS BEFORE IT CAN BECOME A SIGNIFICANT FOOD SAFETY PROBLEM.

In addition to food safety, milkstone can cause premature wear to machine parts which can add to costs for replacement parts or possibly more expensive repairs if worn machine parts are not replaced once they have become excessively worn.

Important Differences Between Cleaning and Sanitizing

CLEANING vs. SANITIZING

It is important to distinguish between cleaning and sanitizing. Although these terms may sound synonymous, they are not. BOTH are required for adequate food safety and proper machine maintenance.

CLEANING

- Is the removal of soil materials from a surface.
- Is a prerequisite for effective sanitizing.

NOTE

An UNCLEAN surface will harbor bacteria that can defy sanitizing efforts.

Bacteria can develop and resist sanitizing efforts within a layer of soil material (milkstone). ***Thorough cleaning procedures that involve milkstone removal are critical for operators of frozen dessert machines.***

SANITIZING

- Kills bacteria.
- Can be effective on clean surfaces only.
- **DOES NOT** clean or remove milkstone.

NOTE

Using a SANTITIZER on an unclean surface will not guarantee a clean and safe frozen dessert machine.

Proper Daily Maintenance: The Only Way to Assure Food Safety and Product Quality

Proper daily maintenance can involve a wide variety of products and procedures. Overall, the products and procedures fall into three separate categories. *(Please note that this is a brief overview intended for informational purposes only.)*

1. **CLEANING** – This involves draining mix from the freezer barrel and rinsing the machine with water. Next, a cleaner is run through the machine. Then, the machine is disassembled and removable parts are taken to the sink for cleaning.
2. **MILKSTONE REMOVAL** – Since almost all cleaners do not have the ability to remove milkstone, the use of a delimer becomes necessary. Although this procedure may not be needed on a daily basis, it will usually follow the cleaning procedure. It requires letting a delimer solution soak in the machine for an extended period of time. Individual parts are also soaked in a deliming solution for an extended period of time (more about delimers in *Additional Information*).
3. **SANITIZING** – After the machine has been cleaned and contains no milkstone, the machine is reassembled. Then a FDA-approved sanitizing solution is run through the machine to kill bacteria. The machine is then ready for food preparation.

As a recommended cleaner and sanitizer for your frozen dessert machine, STERA-SHEEN has proven to be one of the best daily maintenance products for:

- **CLEANING** – Thorough removal of all solids including butterfat and milk fat.
- **MILKSTONE REMOVAL** – Complete removal of milkstone.
- **SANITIZING** – FDA-approved no rinse sanitizer for food contact surfaces.

Additional Information

THE USE OF DELIMERS

A delimer is a strong acid that has the ability to dissolve milkstone. This type of chemical may become necessary once high levels of milkstone have developed. While these products are very effective for removing HIGH levels of milkstone, they are not ideal for two reasons:

1. **PRODUCT SAFETY** – Strong acids are dangerous chemicals and handling them requires safety
2. **MACHINE DAMAGE** – Strong acids will attack metal and rubber causing premature wear of parts. The use of a delimer needs to be closely monitored to avoid damage to machine surfaces and parts.

With proper daily use of STERA-SHEEN or it's equivalent, there is no need for the use of a *DELIMER*.

DO NOT USE BLEACH

- BLEACH HAS ABSOLUTELY **NO** CLEANING PROPERTIES.
- BLEACH IS CORROSIVE. It can and will damage components of the machine causing premature wear and metal corrosion.

GENERAL PURPOSE CLEANERS

General purpose cleaners **do not** have the ability to remove milkstone. Milkstone will become a problem *if not remedied* with additional products and procedures.

THE USE OF CHLORINE TEST STRIPS

“Test strips” are used to determine concentrations of active chlorine in sanitizing solutions. To use the strips, tear off a small portion and submerge it into the sanitizing solution. Then, compare the color change to the color key on the side of the test strip dispenser to determine the approximate chlorine concentration.

The ideal concentration of chlorine needs to be 100 ppm (as stated by the FDA).

NOTE

Follow the directions on the container for proper concentration.

There are two main factors that contribute to falling chlorine concentrations in a sanitizing solution.

1. **PRODUCT USE** – As the chlorine in the solution is being used, chlorine concentrations fall.
2. **TIME** – As time passes, small amounts of chlorine “evaporate” from the solution. (That is why you can smell it.)

Sanitizing solutions *should not* be allowed to fall below 100 ppm chlorine. New solutions should be mixed once old solutions become ineffective.

3.4 DISASSEMBLY OF FREEZER PARTS

⚠ WARNING

Moving machinery can grab, mangle and dismember. Place the CLEAN-OFF-SERVE toggle switch in the OFF position before disassembling for cleaning or servicing. Placing the CLEAN-OFF-SERVE toggle switch in the SERVE position during cleaning or servicing may result in serious personal injury.

Before using the freezer for the first time, complete freezer disassembly, cleaning and sanitizing procedures will need to be followed. Routine cleaning intervals and procedures must comply with the local and state health codes. Inspection for worn or broken parts should be made at every disassembly of the freezer for cleaning or other purposes. All worn or broken parts should be replaced to ensure safety to both the operator and the customer and to maintain good freezer performance and a quality product. Two normal wear areas are the auger flights and front auger support bushing (see Figure 12).

To disassemble the freezer, refer to the following steps:



Figure 17. Auger Flight Wear & Front Auger Support Bushing Wear

A. Disassembly Of Front Door

1. Remove the front door by turning off the circular knobs and then pulling the front door off the studs.
2. Remove the air bleed valve by unscrewing the knob while holding the valve stem from behind. Remove the compression spring and push air bleed valve through the rear of the front door.
3. Remove the spigot through the bottom of the front door (see Figure 13). Remove all O-rings from spigots and air bleed valve.

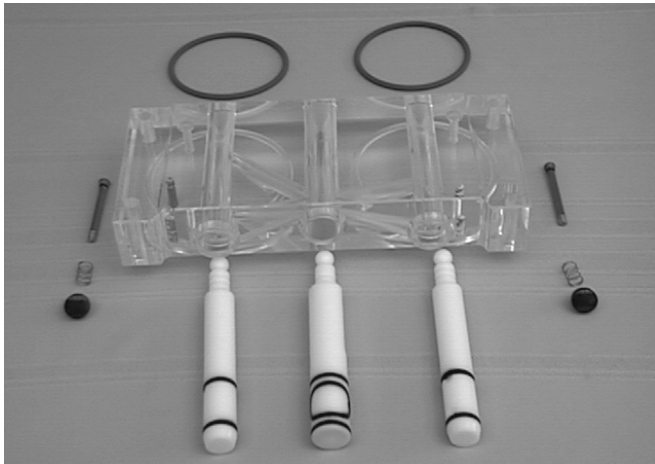


Figure 18. Front Door Disassembly

B. Disassembly Of Auger

1. Remove the front auger support by pulling it straight out of the freezer barrel.
2. Remove the plastic bearing from the front auger support.
3. Remove the auger by pulling slowly and rotating out of the freezer barrel. As the auger is withdrawn, remove each plastic flight and spring from the auger. Be careful not to scratch inside of freezer barrel when removing flights or auger. Remove the spring from each auger flight.

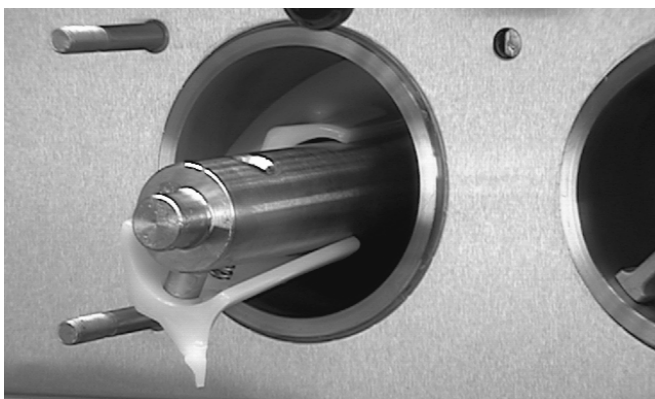


Figure 19. Auger Flight Removal

4. Keep the rear of the auger tipped up once it is clear of the freezer barrel.
5. Wipe spline lubricant off hex end of auger with a paper towel. Remove the rear seal. Figure 15.

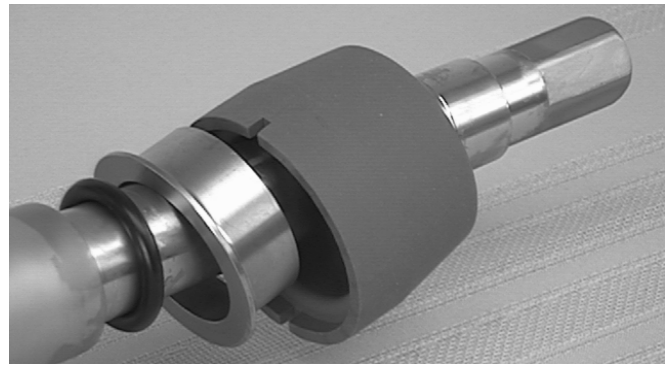


Figure 20. Rear Seal Removal

3.5 CLEANING DISASSEMBLED PARTS

Disassembled freezer parts require complete cleaning, sanitizing and air drying before assembling. Local and state health codes will dictate the procedure required. Some state health codes require a four sink process (pre-wash, wash, rinse, sanitize, air dry), while others 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. To clean the freezer parts, disassemble all parts. (Refer to section 3.4 for the disassembly of freezer parts.)
- B. Place all front door and auger parts in clean 90° to 110°F (32°C to 43°C) water and wash thoroughly (four sink procedure only).
- C. Place all parts in 90° to 110°F (32°C to 43°C), mild detergent water and wash thoroughly.
- D. Rinse all parts with clean 90° to 110°F (32°C to 43°C) water.
- F. Sanitize all freezer parts following procedures outlined below.

3.6 SANITIZE FREEZER PARTS

- A. Use a sanitizer mixed according to manufacturer's instructions to provide a 100 parts per million strength solution. Mix sanitizer in quantities of no less than 2 gallons of 90° to 110°F (32°C to 43°C) water. Allow the sanitizer to contact the surfaces to be sanitized for 5 minutes. Any sanitizer must be used only in accordance with the manufacturer's instructions.
- B. Place all parts in the sanitizing solution for 5 minutes, then remove and let air dry completely before assembling in freezer.

3.7 CLEANING THE FREEZER

CAUTION

Risk of Product Damage

Do not use acid cleaners, strong caustic compounds or abrasive materials to clean any part of the freezer exterior or plastic parts.

The exterior should be kept clean at all times to preserve the lustre of the stainless steel. A good grade of stainless steel has been used on the freezer to ease clean-up. To remove spilled or dried mix, simply wash the exterior in 90° to 110°F (32°C to 43°C), soapy water and wipe dry.

Do not use highly abrasive materials as they will mar the finish. A mild alkaline cleaner is recommended. Use a soft cloth or sponge to apply the cleaner. For best results, wipe in the direction of the grain of the steel.

- A. Clean the rear seal surface from inside of the freezer barrel.
- B. Using this sanitizing solution and the large barrel brush provided, sanitize the barrel by dipping the brush in the sanitizing solution and brushing the inside of the barrel.
- C. Remove the rear drip tray by pulling from side panel. Clean and replace drip tray.

3.8 ASSEMBLING FREEZER

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

NOTICE

Petro-Gel sanitary lubricant or equivalent must be used when lubrication of freezer parts is specified.

NOTICE

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.
- B. Lubricate rear seal area on auger shaft with a thin layer of sanitary lubricant. Install the rear seal O-ring. Lubricate outside of rear seal O-ring with sanitary lubricant.
- C. Install stainless steel rear seal adapter into rear seal dry (without lubricant). Lubricate inside surface of rear seal adapter and install onto auger shaft. **DO NOT** lubricate outside of rear auger seal (see Figure 16).

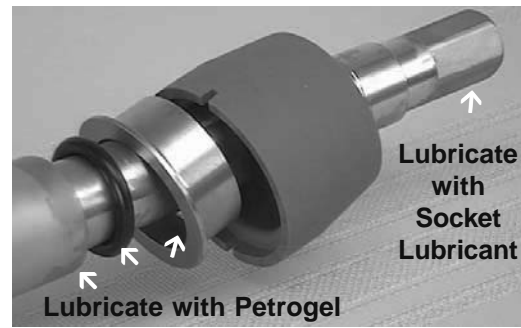


Figure 21. Rear Seal Lubrication

- C. Lubricate the hex drive **end** of auger with a small amount of white socket lubricant. A small container of socket lubricant is shipped with the freezer.
- D. Screw the springs onto the studs in plastic flights. **Spring must be screwed into the flights completely** to provide proper tension (see Figure 17).



Figure 22. Spring Installation

- E. Install first flights to bottom of auger, rotate, add successive flights from bottom as the auger is pushed slowly into the freezer barrel. Carefully engage auger with drive socket in speed reducer by rotating auger slowly and pushing on end of auger.
- F. Apply a thin film of sanitary lubricant to the inside and outside of the front auger support bearing, then place on the front of the auger. Assemble the front auger support onto the auger bearing.

NOTICE

Position the front support on auger so legs do not interfere with the pin on the back of the front door assembly. Front door must push auger in slightly when it is being tightened to prevent the rear seal from leaking.

- G. Assemble O-rings onto the spigot dry, without lubrication. Then apply a thin film of sanitary lubricant to the outside of the O-rings and spigot bodies.
- H. Install the spigots through the bottom of the front door (see Figure 18).

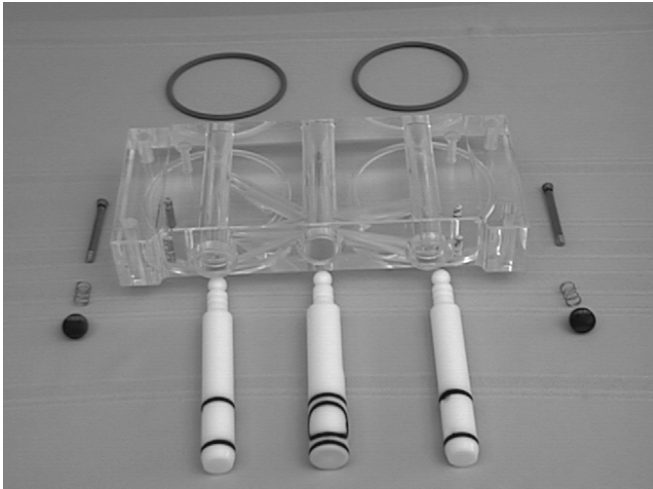


Figure 23. Front Door Assembly

- I. Assemble the air bleed valve O-ring onto the air bleed valves. Position the O-ring in groove close to the wide part. Apply a thin film of sanitary lubricant to the O-rings.
- J. Insert the air bleed valves from the back of the front door. Install compression springs onto air bleed valves, then screw knobs on finger tight.
- K. Apply a thin film of sanitary lubricant to the door seal O-rings, and fit into the grooves on the rear of the front door.
- L. Place the front door assembly on the mounting studs and push front door against the freezer carefully.
- M. Secure front door assembly by placing the knobs on the studs and alternately tighten opposite corners until **finger tight only**. Do **not** overtighten. Proper O-ring seal can be observed through the transparent front door.
- N. Move the spigot handles to the closed position.

3.9 SANITIZING

Sanitizing must be done after the freezer is clean and just before the freezer is filled with mix. **Sanitizing the night before is not effective.** However, you should always clean the freezer and parts after using it.

WARNING

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 freezer, 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 of 90°F to 110°F 90° to 110°F (32°C 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.

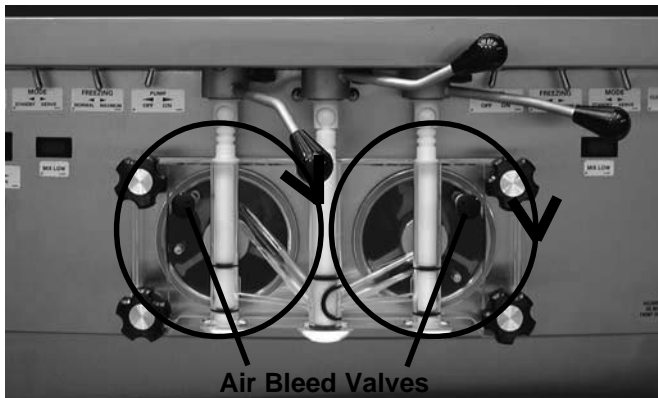


Figure 24. Air Bleed Valves

CAUTION

Risk of Product Damage

Avoid prolonged contact of sanitizer with freezer parts. Prolonged contact of sanitizer with freezer may cause corrosion of stainless steel parts.

- A. Prepare 3 gallons of sanitizing solution following manufacturer's instructions, and pour into storage container.
- B. Place the mix pump switch in the ON position and open air bleed valve on the front door by pushing valve in and holding (see Figure 19).

- C. Let sanitizing solution fill the freezer barrel to air bleed valve, then close the valve by pulling out to lock in place.
- D. Place the CLEAN-OFF-SERVE toggle switch in the CLEAN position.



Figure 25. Draining Sanitizer

- E. Check for leaks when the freezer barrel is first pressurized with sanitizing solution.
 1. Check for leaks at the plastic front door, the O-rings may not be sealed.
 2. Check the drain located at the center of the Drip Tray for leaks coming from the rear of the Rear Auger Seal.
 3. Check inside cab unit for leaks at hose connections.
- F. Using a sanitized soft bristle brush or equivalent, dipped in sanitizing solution, clean mix container.
- G. After five minutes, open spigot to expel sanitizing solution. Drain all solution from freezer using all three spigots (See Figure 20).
- H. Close the spigot and place the mix pump switch and the CLEAN-OFF-SERVE switch in the OFF position.

The freezer is now sanitized and ready for adding mix.

3.10 INITIAL FREEZE DOWN AND OPERATION

This section covers the recommended operating procedures to be followed for the safe operation of the freezer.

- A. Sanitize just prior to use according to instructions outlined in this manual.
- B. Prepare the desired amount of mix and then fill each storage container with approximately 3 gallons or more of mix. Place a container(s) of mix in the refrigerated cabinet. If drawing from a storage container, place the draw tube through the cover to the bottom of the container. If drawing from a bag in a box, remove the cap, push out all of the air, and insert the adaptor.

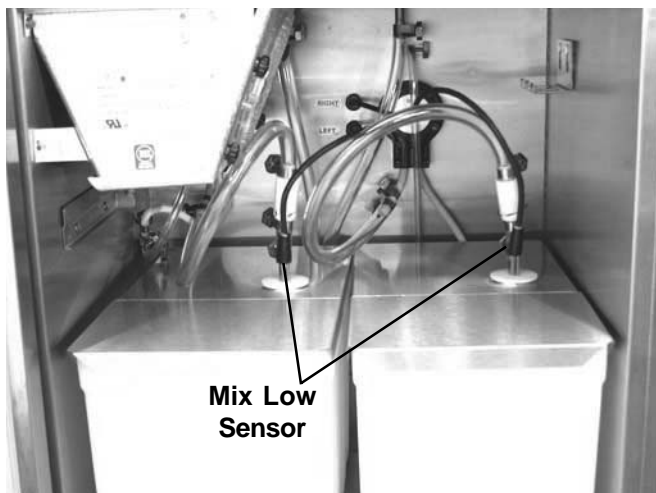


Figure 26. Refrigerated Cabinet

- C. Place the mix pump switch in the ON position. Immediately open the spigot and let approximately 8 ounces of liquid mix with sanitizing solution drain out of the spigot.
- D. Close the spigot and open the air bleed valve on the front door by pushing the valve in and holding. Allow the barrel to fill until the mix level is 1/2" (2.7 cm) below air bleed valve, then release valve and pull closed to lock in place.
- E. Start the compressor and drive by placing the CLEAN-OFF-SERVE switch in the SERVE position
- F. The product will be ready to serve after the compressor and drive have cycled off, or in approximately 12 minutes.
- G. The refrigeration is automatically actuated when the spigot is opened. For normal dispensing, open the spigot no more than 90°. (This is when the handle knob is pointed directly away from the front door.) This position provides excellent control over the product and aids in making desired shaped portions. Spigot Rate Adjusters are located under the Header Panel, to the immediate right of each Spigot Handle. Turning the Spigot Rate Adjuster clockwise will increase the dispense rate. (see Figure 22)

The freezer is designed to dispense the product at a reasonable draw rate. If the freezer is overdrawn, the result will be a soft product and air pops. If this should occur, allow the freezer to run for approximately 30 seconds before dispensing additional product. After a while the operator will sense or feel when the freezer is beginning to fall behind, and will slow down on the rate of draw so as not to exceed the freezer's capacity.

Do not operate the freezer when the MIX LOW light is on or with less than 1-3/4" (4.4 cm) of mix in the mix container. Refill the mix container immediately.

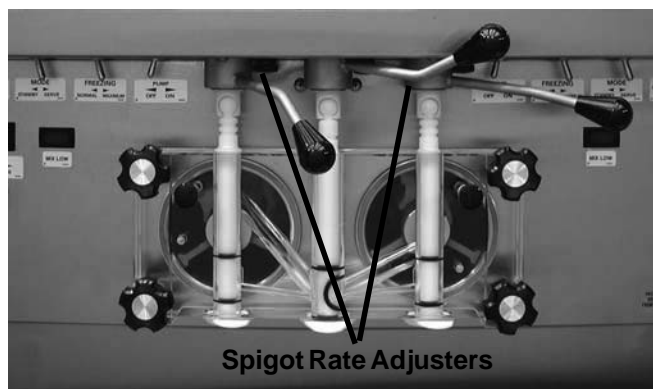


Figure 27. Dispensing Product

3.11 MIX INFORMATION

Mix can vary considerably from one manufacturer to another. Differences in the amount of butter-fat content and quantity and quality of other ingredients have a direct bearing on the finished frozen product. A change in freezer performance that cannot be explained by a technical problem may be related to the mix.

Proper product serving temperature varies from one manufacturer's mix to another. Mixes should provide a satisfactory product in the 17° to 20°F (-7° to -6°C) range. Diet and low-carb mixes typically freeze to proper consistency at higher temperatures.

When checking the temperature, stir the thermometer in the frozen product to read the true temperature.

Mix does not improve with age. Old mix, or mix that has been stored at too high a temperature, can result in a finished product that is less than satisfactory from the appearance and taste standpoint. To retard bacteria growth in dairy based mixes, the best storage temperature range is between 36° to 40°F (2.2° to 4.4° C).

3.12 OPERATION OF MIX PUMP

The pump switch is located on the front of the freezer. When the pump switch is placed in the ON position, the mix pump motor will be actuated to pump mix into the freezer cylinder. When the set pressure is reached, the mix pump will shut off automatically. When the switch is placed in the OFF position, the mix pump will be inoperative.

NOTE

The mix pump motor is equipped with an internal overload that will “trip”, disabling the pump when the motor is overloaded. Consult the trouble shooting section for corrective information. The internal overload will automatically reset after cooling. If the condition continues, contact a qualified service person.

CAUTION

Risk of Product Damage

Mix pump hose must be repositioned every 1 -2 weeks or 60 hours of operation. Failure to comply will result in reduced mix pump liquid capacity, dispense stoppage, popping, and possible mix pump hose leakage. Hose leakage may damage the pump roller assembly and void the factory warranty.

- A. Mix Operation: The peristaltic mix pump contains one continuous mix pump hose. When looking at the face of the peristaltic mix pump, the left side of the hose is the suction or pickup. The right side of the hose is the discharge. Mix is drawn up the suction side of the hose and transferred thru the discharge side to the freezer (see Figure 23).
- B. Air Operation: The air compressor operates whenever the peristaltic mix pump is running. Air enters thru a check valve on the piston downstroke. The air is discharged thru a second check valve, on the piston upstroke. The air and mix join at the tee and then travel to the freezer.

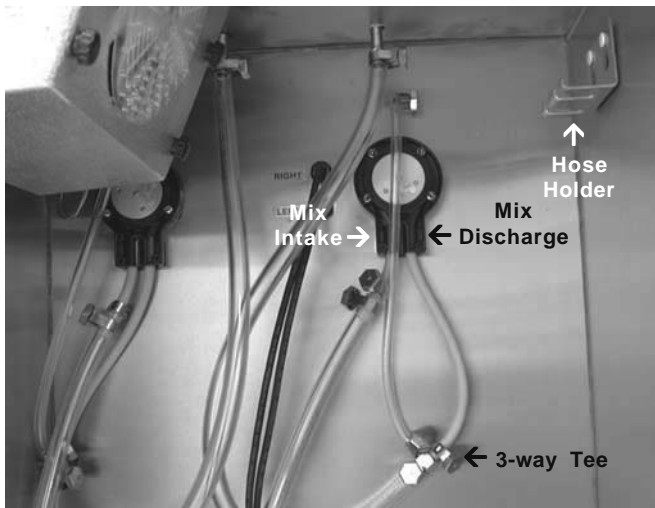


Figure 28. Mix Pumps

- C. The over-run adjustment is preset at the factory. If an adjustment becomes necessary, refer to Section 4.

NOTICE

Any cleaning procedure must always be followed by sanitizing before filling freezer with mix. (Refer to section 3.3)

3.13 MIX PUMP CLEANING

The mix pump is approved for CIP (clean in place) and is thoroughly cleaned as cleaning solutions are pumped thru the freezer. We recommend completely disassembling the pump and connecting tubing every 14 days for inspection of parts to confirm the CIP has been properly performed. If any residue is detected clean or replace those parts as outlined below.

1. Place CLEAN-OFF-SERVE switch in CLEAN position. Allow the auger to agitate for 5 to 10 minutes.
2. Remove suction tube from mix container. Draw off the mix remaining in freezer barrel.
3. Pump 2 gallons (7.5 liters) of cold potable water thru freezer until water at spigot is free of mix.
4. Pump 2 gallons (7.5 liters) of 90° to 110°F (32°C to 43°C) detergent solution water thru freezer. The use of soft water is recommended, along with dishwashing detergents such as “Joy,” “Dawn,” or equivalent.
5. Place mix pump switch in OFF position. Open spigot to relieve remaining pressure.
6. Place CLEAN-OFF-SERVE switch in OFF position.

3.14 DISASSEMBLY AND INSPECTION OF REMOVABLE PARTS

Inspection of removable parts should be made whenever maintenance is performed or pump requires disassembly.



WARNING

Hazardous Moving Parts

Revolving pump head can grab, mangle, and cause serious crushing injury. The Power switch must be placed in the OFF position for cleaning and power must be disconnected when disassembling or servicing.



CAUTION

System Under Pressure

Never disconnect hoses from freezer or pump without first opening spigot to relieve pressure.

NOTE

If the mix lines or air line is difficult to remove, soften with a rag soaked in hot water. Hose connections may be sprayed with Haynes Sanitary Lubricant for ease of removal. Do not loosen or remove the mix pump cover wingnuts. Maintain the mix pump hose in its operational condition.

1. Loosen clamp and remove air hose from pump compressor.
2. Loosen clamp and disconnect mix pump hose. Remove the pickup hose, mix check valve and pickup hose adapter (and bag adapter if applicable) as an assembly from mix container.
3. Completely disassemble both hose assemblies and check valve. Place hoses, tee, check valve assembly, and pickup hose adapter in 90° to 110°F (32°C to 43°C), mild detergent water and wash thoroughly. Use soft bristle brushes to clean inside of fittings. Rinse all parts in clean 90° to 110°F (32°C to 43°C) water (see Figure 24).
4. Carefully inspect each part for wear or damage. Replace worn or damaged parts.
5. Wash feed tube and air tube with 90° to 110°F detergent water and brushes provided. Rinse with clean, 90° to 110°F water (See Figure 25 and 26).
6. Prepare two gallons (7.5 liters) of sanitizing solution using a USDA certified grade sanitizing solution. Sanitize all removed parts, then air dry.
7. Check Hose Service Record decal to determine if hose reposition or replacement is required at this time.
8. Reassemble both hose assemblies per the diagram located on the inside of the cab door. Reconnect assemblies to the pump and discharge hose, using the clamps. (See Figure 27 or refer to Section 2.5 Mix Pump).

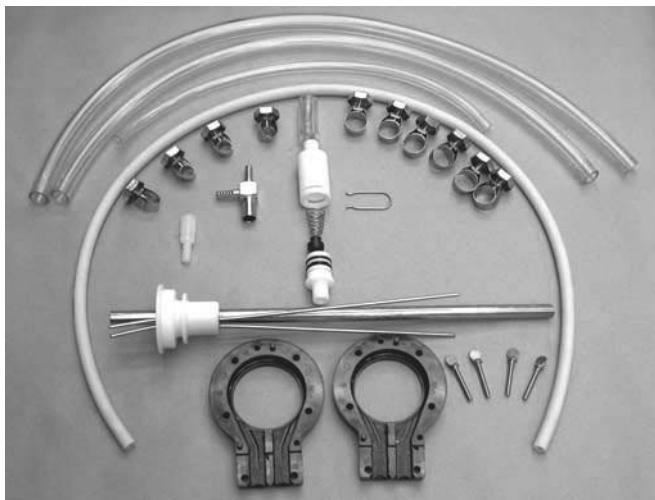


Figure 29. Removable Parts

9. Sanitize assembled freezer as per instructions outlined in Section 3.9).

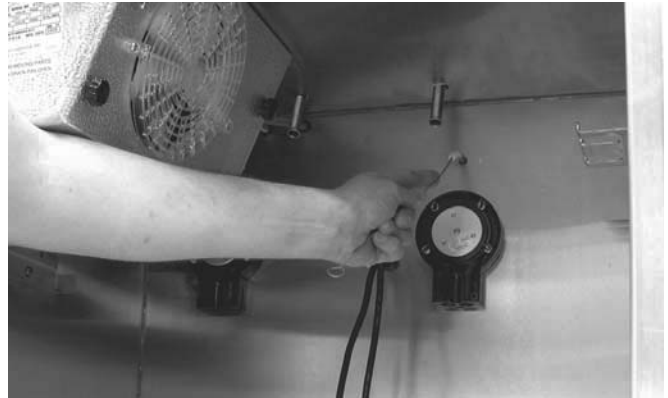


Figure 30. Cleaning Air Tube



Figure 31. Cleaning Feed Tube

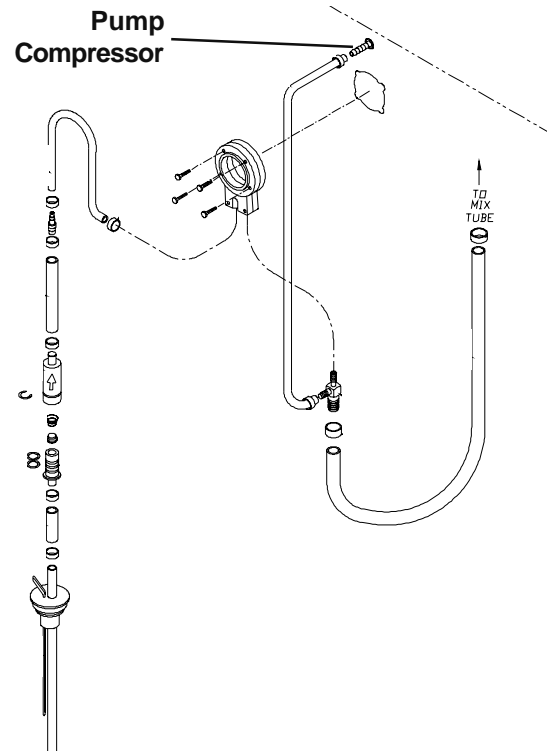


Figure 32. Mix Pump Tube Routing

SECTION 4 MAINTENANCE INSTRUCTIONS

4.1 FREEZER ADJUSTMENT

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

4.2 PRODUCT TEMPERATURE ADJUSTMENT

A potentiometer is used to control the product temperature.

NOTE

Proper assembly of freezer, worn parts, leaks, proper "prime" level, clean condenser, worn drive belts all attribute to product temperature. Be sure your machine is properly maintained before adjusting temperature, you may be masking another problem.

To change the temperature of the product, follow the steps below:

- A. Loosen the two screws under the header display sign, then pull sign out and down.
- B. Use a screw driver to make desired adjustment. A label near the potentiometer will give complete instructions. Figure 26.



Figure 33. Potentiometer

4.3 OVERRUN ADJUSTMENT

The product when served is a combination of air and mix. Overrun is a measure of the amount of air blended into the mix.

Overrun can be expressed in terms of the amount of weight loss for a given volume. For example, if a pint of liquid mix weighs 18 ounces and a pint of frozen product with air added weighs 12 ounces, the overrun is said to be 50 percent ($18 \text{ oz.} - 12 \text{ oz.} = 6 \text{ oz.}$, $(6/12) \times 100 = 50\%$).

The overrun can be checked by placing a one pint container on an ice cream scale and zeroing out the scale. Then fill a one pint container with frozen product. The container should be filled over the top and leveled with a straightedge. The product should not contain any air pockets. When weighed on an ice cream scale, one pint of product should weigh 12 to 13 ounces.

The mix pump has been preset at the factory to produce a product with approximately 40% overrun. Because of differences in mix formulation, temperatures and barometric pressure, this figure may vary. It will be necessary for approximately 2 gallons of mix to be pumped thru the freezer before changes in the product are noticeable due to adjustments in overrun.

Overrun is controlled by the length of the air compressor piston stroke within the piston cylinder. Lengthening the stroke within the cylinder will increase overrun. Conversely, shortening the stroke will decrease overrun. To perform an overrun adjustment, refer to the following procedure:

- A. Turn the mix pump switch to the OFF position. Disconnect power sources/circuit breakers.
- B. Remove the lower back panel from freezer.
- C. On air compressor side of pump, locate the long/slender piston rocking arm. The rocking arm downward travel is limited by a stationary cam. On the face of the cam there is an overrun setting indicator plate numbered 3 thru 8 and an adjustment knob. Figure 27.

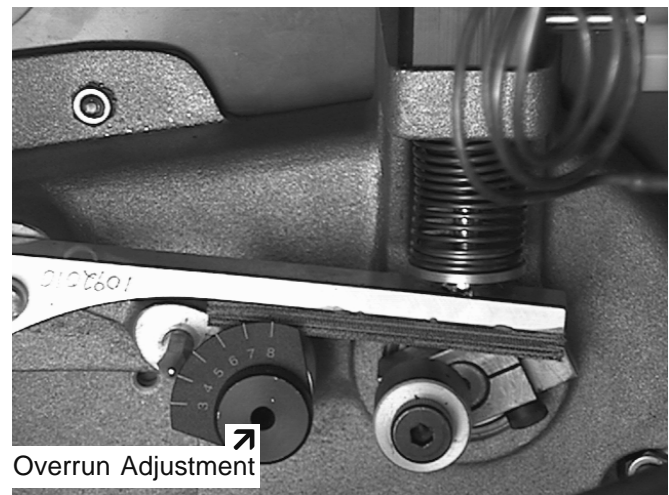


Figure 34. Overrun Adjustment

- D. The overrun setting is indicated by a pointed pin.
- E. To adjust overrun, loosen the allenhead screw (located within the center of the adjustment knob) with the 5/32" allen wrench provided. Rotate the adjustment knob counterclockwise to a higher number for higher overrun, or clockwise to a lower number for lower overrun. Each number multiplied by 10 represents the overrun percentage (ie: #4 = 40% overrun).

- F. Tighten the allen screw, then place the wrench back in its clip. Replace the lower back panel and secure with the four screws. Turn the mix pump power switch to the ON position.

4.4. MIX PUMP HOSE REPOSITION (every one or two weeks.)

NOTE

Mix pump hose must be repositioned every 1 - 2 weeks. Failure to comply will result in reduced mix pump liquid capacity, dispense stoppage, popping, and possible mix pump hose leakage.

Find a system that works for you. Operating until hose breaks shortens pump life, causes downtime and increases cleaning costs. Hours of (pump) operation approx. 60, Gallons of (material), Time frame = Bi-Weekly.

1. Run cleaning solution through pump.
2. Turn pump off and relieve any pressure by opening the spigot.
3. Grasp the pick-up hose end of the mix pump hose with one hand and turn the pump on. Pull down on the pick-up hose end until 12 to 14 inches of tubing has reversed fed through the pump, then turn the pump off.
4. Loosen small clamp at the pick-up hose adapter and (viewed from back) disconnect mix pump hose.
5. Cut 7-1/2 inches off the end of the mix pump hose.
6. Reconnect mix pump hose to adapter.
7. Continue normal operation. Mix hose will automatically reposition itself with adapter near black cover.

NOTE

Each hose is long enough for 3 repositions before replacement is required. Record each event on Hose Service Record decal.

4.5 MIX PUMP HOSE REPLACEMENT

NOTE

Mix pump hose must be replaced when tubing cannot be further repositioned (every four to eight weeks). Failure to comply will result in hose failure and possible pump damage.

1. Run cleaning solution through pump.
2. Turn pump off and relieve any pressure by opening the spigot.



WARNING

THE MIX PUMP SWITCH MUST BE IN THE "OFF" POSITION WHEN SERVICING OR CLEANING PUMP.



CAUTION

NEVER DISCONNECT HOSES FROM FREEZER OR PUMP WITHOUT FIRST OPENING SPIGOT TO RELIEVE PRESSURE.

3. Disconnect mix pump hose at each end.
4. Grasp the discharge hose end with one hand and turn the pump on. Pull down on the hose until all of the remaining hose is removed from the pump.
5. Turn pump roller assembly so one roller is at 6:00.

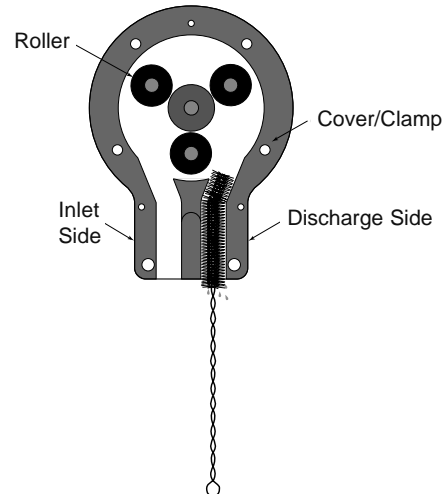


Figure 35. Pump Roller Assembly

6. Use a brush that fits in the opening and brush up and down, first with detergent water and then clear water.
7. Connect new mix pump hose to pick-up hose adapter, using small clamp.
8. Insert free end of hose into the pick-up (suction side) hose side of the black cover. Gently push the hose into the black cover until it begins to self-feed. Allow the hose to feed itself through the pump until the pick-up hose adapter prevents further feeding, then turn the pump off.
9. Reconnect mix pump hose to T using small clamp. Pump is now ready to sanitize.

4.6 CAB TEMPERATURE ADJUSTMENT

A temperature control is used to control cab temperature. To change the temperature disconnect power sources and then follow the steps below:

- A. Remove the six screws holding the left side panel and remove panel.
- B. Use a small screwdriver to adjust the temperature control. Turn counterclockwise for a warmer temperature and clockwise for a colder temperature. It will take about an hour for the cab temperature to change. Figure 29.

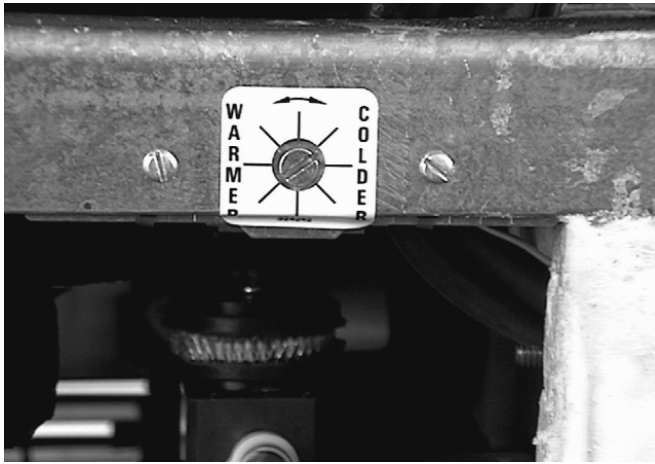


Figure 36. Temperature Control Cab

- C. Install side panel and secure with the six retaining screws.

4.7 DRIVE BELT TENSION ADJUSTMENT

To check belt tension, refer to Figure 30 and follow the steps below:



WARNING
DISCONNECT ELECTRICAL SUPPLY TO FREEZER BEFORE SERVICING.

- A. Remove either side and back panels.
- B. Press firmly on one belt. Figure 30.

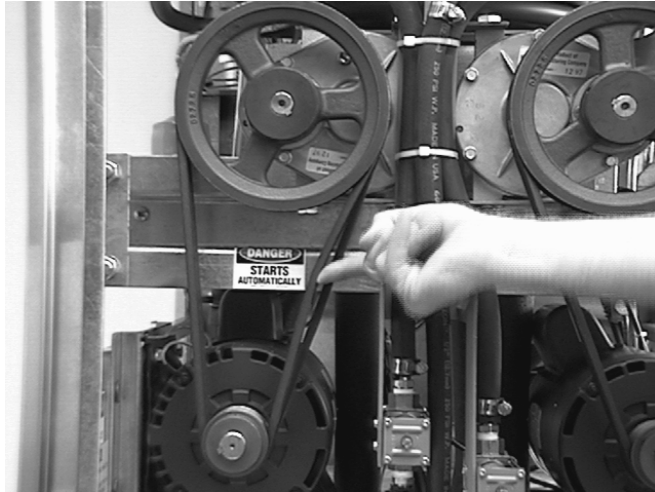


Figure 37. Belt Adjustment

- C. When the tension is properly adjusted, the outside of the depressed belt should be approximately in line with the inside of the other belt.
- D. If an adjustment is necessary, loosen the four motor plate retaining nuts, adjust belt tension then re-tighten the four nuts.

NOTE

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

4.8 CONDENSER CLEANING (AIR-COOLED FREEZERS)

The condenser requires periodic cleaning. To clean the condenser, refer to the following steps:

NOTE

Some freezers have a condenser filter, to clean remove and wash in warm soapy water. Rinse in clean water and shake dry, taking care not to damage filter in any way.

- A. Visually inspect the condenser for dirt.
- B. If the condenser is dirty, place a wet towel under the condenser.
- C. Using compressed air or CO2 tank, blow out the dirt from the top of the condenser. Most of the dirt will cling to the wet towel.



CAUTION
THIS PROCEDURE EMITS A LOUD NOISE.

- D. An alternative method is to clean with a condenser brush and vacuum.

NOTE

If the condenser is not kept clean, loss of refrigeration efficiency will result.

4.9 PREVENTATIVE MAINTENANCE

It is recommended that a preventative maintenance schedule be followed to keep the freezer clean and operating properly. The following steps are suggested as a preventative maintenance guide.



WARNING
NEVER ATTEMPT TO REPAIR OR PERFORM ANY MAINTENANCE ON FREEZER UNTIL ALL MAIN ELECTRICAL POWER HAS BEEN DISCONNECTED.

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

A. Daily Checks

Check for any unusual noise or condition and repair immediately.

B. Monthly Checks

1. Check drive belts for wear and tighten belts if necessary. (Refer to Section 4.7.)
2. Check the condenser for dirt. (Refer to Section 4.8).



WARNING

NEVER ATTEMPT TO REPAIR OR PERFORM MAINTENANCE ON FREEZER UNTIL ALL MAIN ELECTRICAL POWER HAS BEEN DISCONNECTED.

4.10 EXTENDED STORAGE

Refer to the following steps for winterizing the freezer or for storing the freezer over any long period of shutdown time.

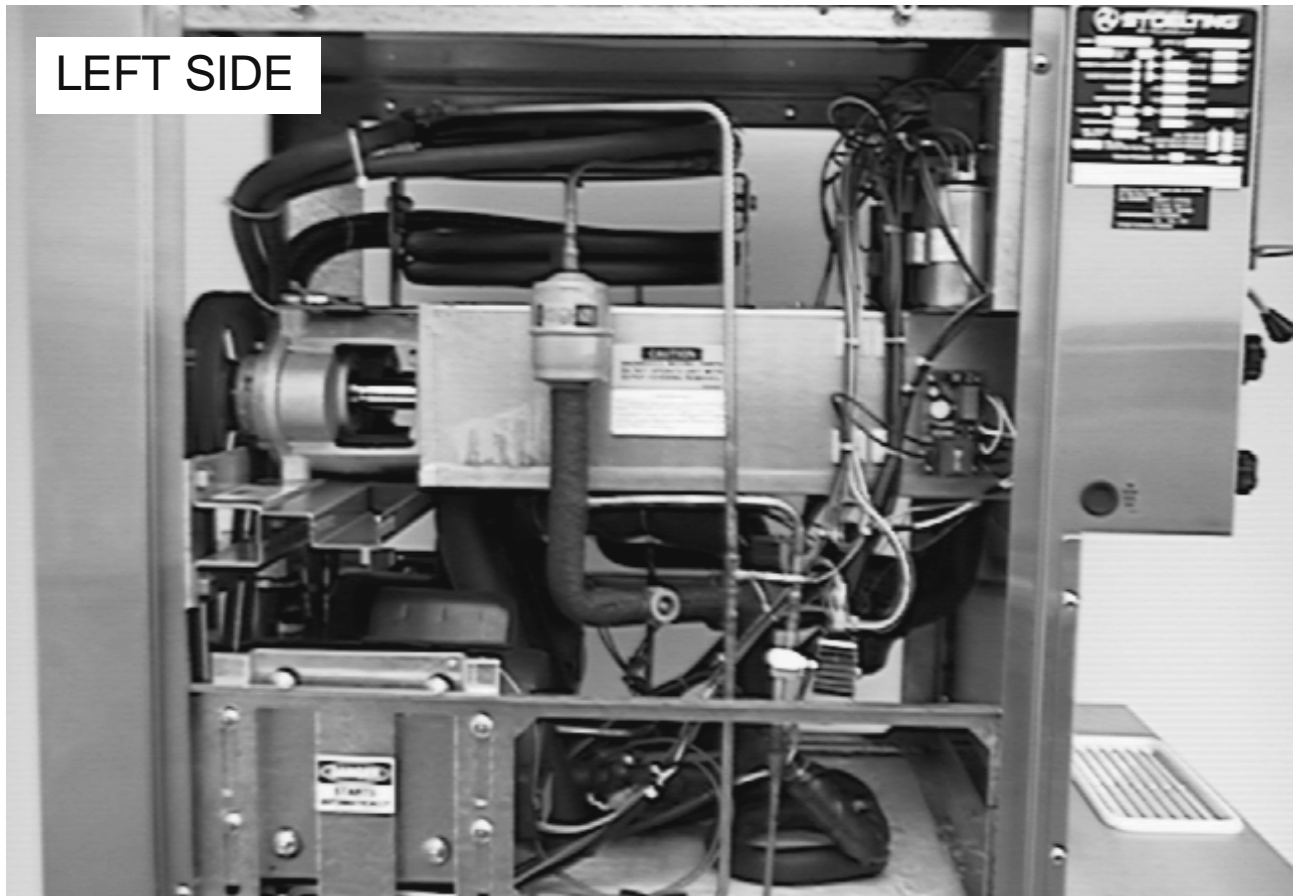
- A. Clean thoroughly with warm detergent all parts that come in contact with mix. Rinse in clear water and dry all parts. Do not sanitize.

NOTE

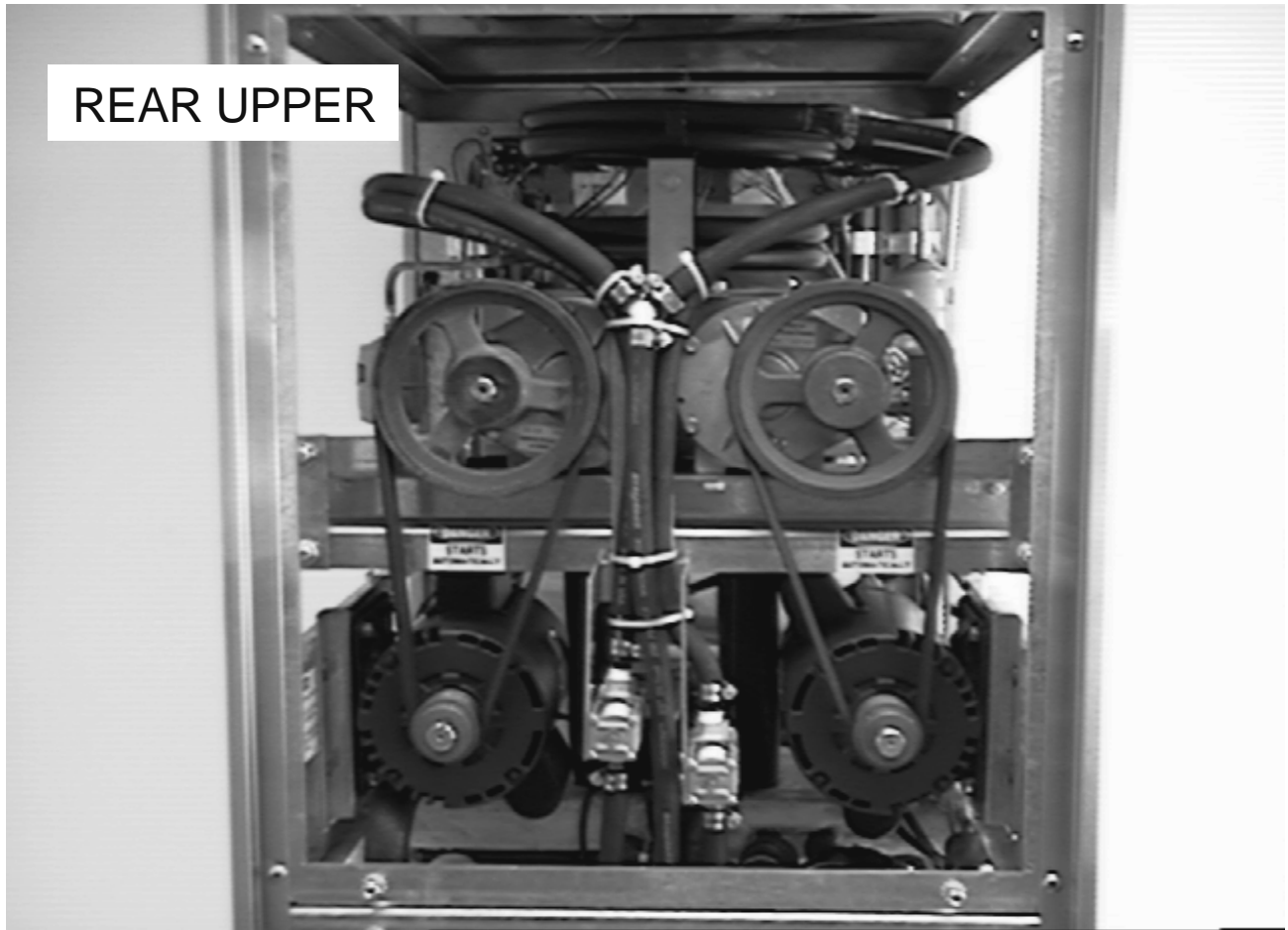
Do not let cleaning solution stand in freezer barrel or mix pump during the shutdown period.

- B. Remove, disassemble, and clean the front door, auger shaft, and mix pump. Leave disassembled during the shutdown period.
- C. Place plastic auger flights in a plastic bag with a moist paper towel. This will prevent flights from becoming brittle if exposed to dry air over an extended period of time (over 30 days).
- D. For water-cooled freezers that are left in unheated buildings, or buildings subject to freezing, the water must be shut off and disconnected. Disconnect fittings at water valve inlet and water outlet lines at the freezer. The fittings are located at the rear of the freezer. Run the compressor for 2 - 3 minutes to open water valve. Blow out all water, first through water inlet, then through water outlet lines with air or carbon dioxide. Also drain water supply line to the freezer.
- E. Place the mix pump ON-OFF switch, and the freezer CLEAN-OFF-SERVE switch in the OFF position.
- F. Disconnect from the source of electrical supply in the building.

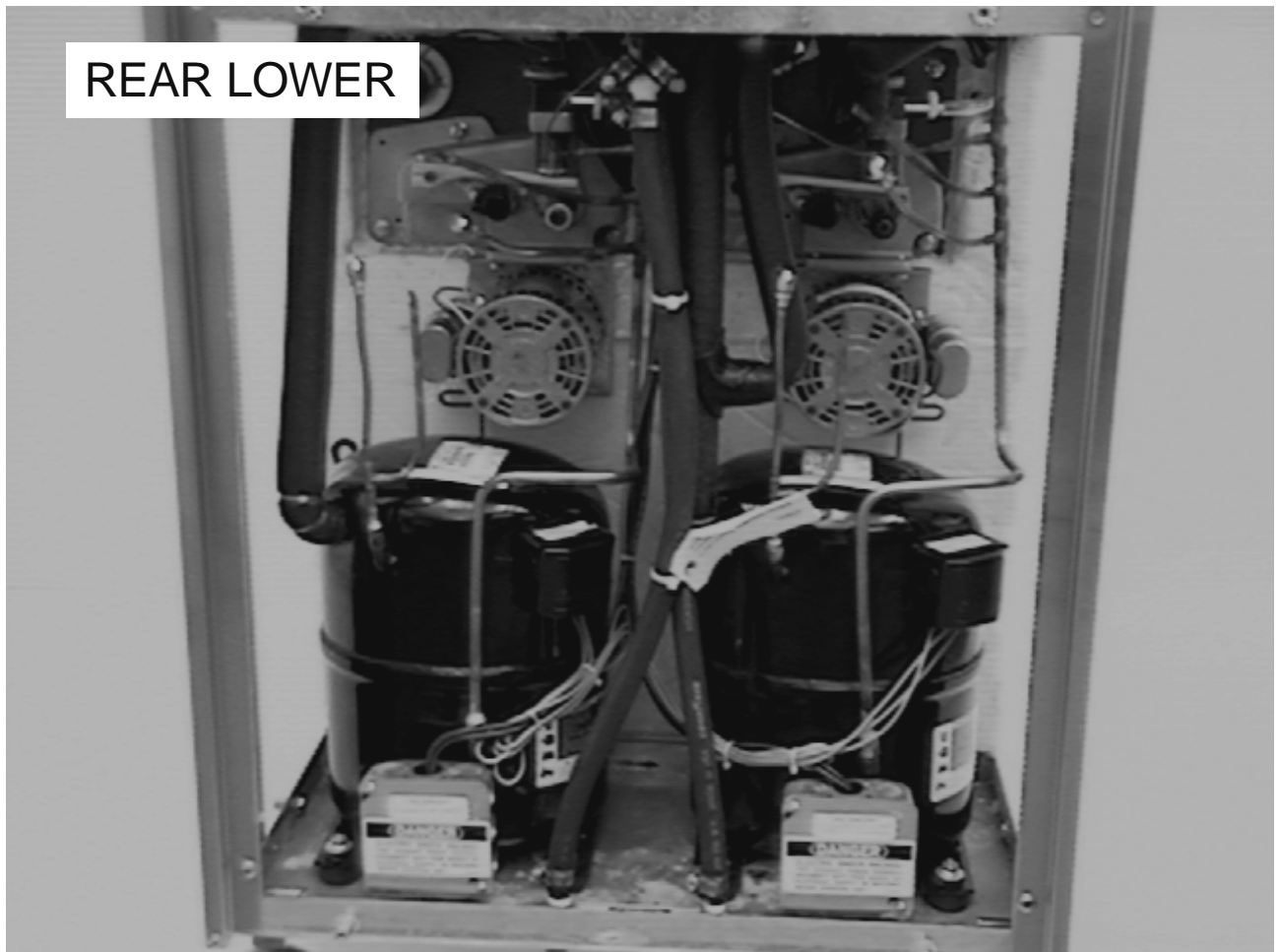
4.11 FREEZER REFERENCE PHOTOS



REAR UPPER



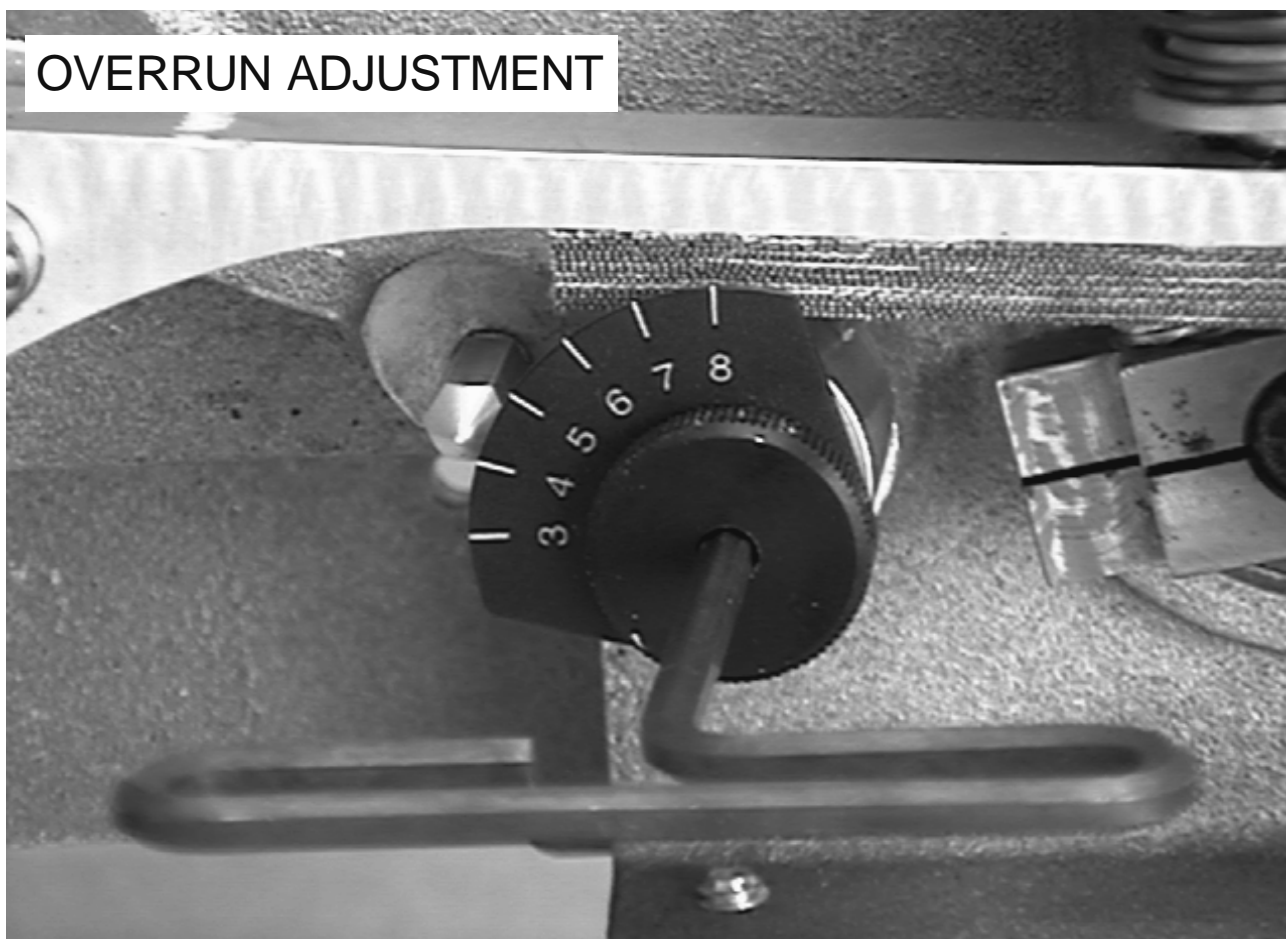
REAR LOWER



AIR COOLED TOP



OVERRUN ADJUSTMENT



SECTION 5 REFRIGERATION SYSTEM

5.1 REFRIGERATION SYSTEM

The refrigeration system is designed for efficient use with the refrigerant and charge shown on the nameplate. Figure 31.

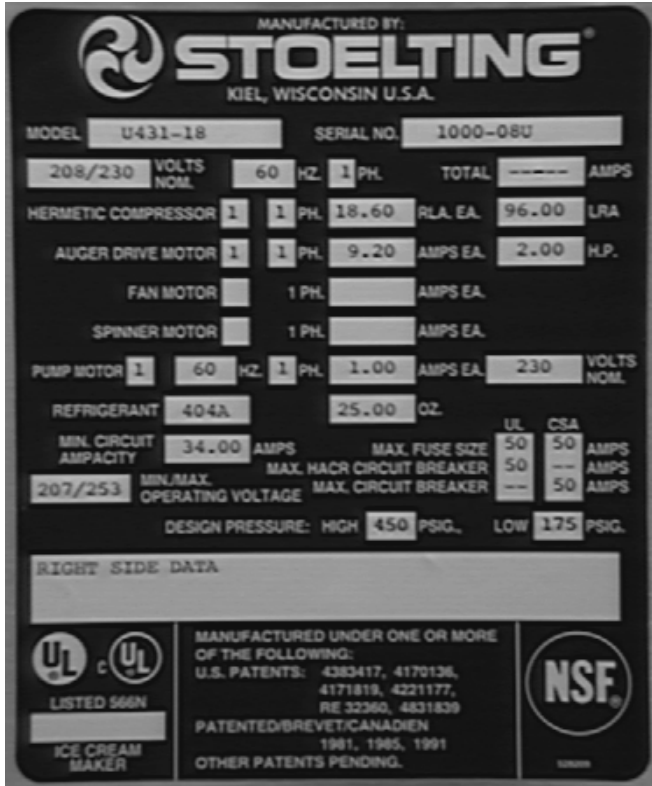


Figure 38. Nameplate

5.2 COMPRESSOR

The compressor is designed specifically for use with the refrigerant shown on the nameplate.

A. Winding Test

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



WARNING
DISCONNECT FREEZER FROM ELECTRICAL SUPPLY BEFORE SERVICING.

1. Remove the Philips head screws from the side panels and slide the side panels down and out.
2. Remove the compressor terminal cover by inserting standard screwdriver between the terminal cover and retaining frame, pry out side then hold with your hand while prying the other side then remove cover. Figure 32.



Figure 39. Terminal Cover Removal

3. Remove wires C, R, and S at compressor. Figure 33.

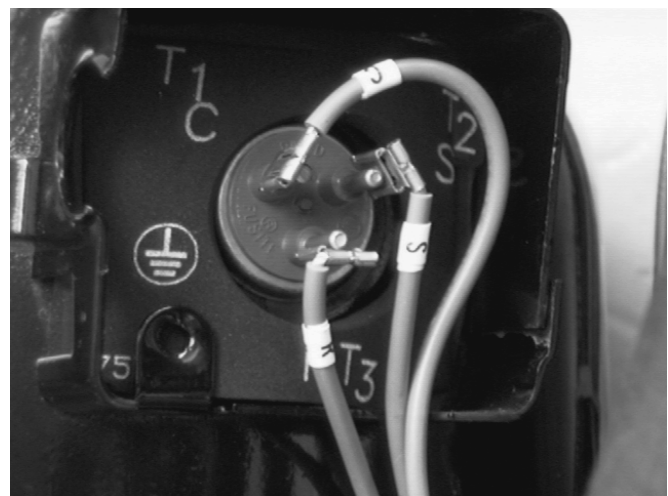


Figure 40. Compressor Connections

4. Connect ohmmeter to terminals C and R. To check resistance through run windings, set your ohmmeter to X1. Consult your Service Data Manual for the proper value.
5. Connect ohmmeter to terminals C and S. To check resistance through the start windings, set your ohmmeter to X1. Consult your Service Data Manual for proper value.
6. 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 checking terminals C, R, and S.

NOTE

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

5.3 CONDENSER

The condenser is a water cooled tube and shell type. Condensing is totally dependent on water supply. Water flow to the condenser for controlling head pressure is regulated by a water valve. The water supply must not be restricted on either the inlet or outlet. Air cooled models must have adequate clearance for proper air flow.



WARNING

DISCONNECT FREEZER FROM ELECTRICAL SUPPLY SOURCE BEFORE SERVICING.

5.4 EVAPORATOR

The evaporator is a flooded type. It has a stainless steel inner shell with a solid aluminum wrap and a stainless steel outer shell shrunk over it. The insulation is a foam type.

A. T.X.V. Adjustments

A T.X.V. (Thermostatic Expansion Valve) is used to meter the refrigerant to the evaporator. The self-regulating T.X.V. is preset at the factory. Figure 34.



Figure 41. Expansion Valve

To determine whether or not the T.X.V. is in need of adjustment, perform the following procedures:

NOTE

There are two T.X.V.'s one for each side.



WARNING

DISCONNECT FREEZER FROM ELECTRICAL SUPPLY SOURCE BEFORE SERVICING.

1. Remove the Philips head screws from the right side panel and slide the panel down and out.
2. Remove the cap from the low side Schrader valve and install a 0 to 100 P.S.I.G. gauge.

3. Connect the freezer to the electrical supply, start the refrigeration cycle and read the pressure.
4. The proper gauge reading should be 25-31 P.S.I.G. (404A) at 75°F ambient temperature just prior to shut off. If the readings are not within these parameters, continue following these steps:

NOTE

To adjust the side panel must be removed. Before performing the following procedures be absolutely certain it is necessary to adjust the T.X.V.

5. Remove the cap on the T.X.V. and, using a service wrench, turn the valve stem 1/4 (90°) turn counterclockwise for more cooling or clockwise for less cooling. Figure 34.
6. Should the reading still not reach 25-31 P.S.I.G., repeat step 5 until the correct reading is obtained.
7. Once the 25-31 P.S.I.G. reading is obtained, replace the cap on the T.X.V., remove the pressure gauge and replace the low side Schrader valve cap.

B. T.X.V. Removal



CAUTION

IF THE T.X.V. IS REPLACED, A HEAT SINK (WET CLOTH) MUST BE USED TO PREVENT DAMAGE TO THE VALVE.



WARNING

DISCONNECT FREEZER FROM ELECTRICAL SUPPLY SOURCE BEFORE SERVICING.

1. Assuming the left or right side panel is removed, perform the following procedures for removing the T.X.V.
2. Remove bulb from suction line exiting from the evaporator.
3. Recover refrigerant charge and leave a port open to prevent pressure build-up during T.X.V. removal.
4. Remove any insulation from the T.X.V. and immediate surrounding lines.
5. Remove or push back any foam insulation from surrounding lines.
6. Apply a heat sink (wet cloth) to the valve dome. Figure 35.
7. Unswear the suction line and liquid line from T.X.V. and remove the T.X.V. with heat sink.



Figure 42. Expansion Valve Removal

C. T.X.V. Replacement

To replace the T.X.V., perform the following procedures:



CAUTION

WHEN REPLACING THE T.X.V., A HEAT SINK (WET CLOTH) MUST BE USED TO PREVENT DAMAGE TO THE VALVE.

1. Position the T.X.V., with heat sink, so the liquid line and suction line correspond with the proper valve points.
2. With an open port braze the liquid line and suction line to the T.X.V. using appropriate brazing material.
3. Remove the heat sink from the T.X.V.
4. Replace any foam insulation to the surrounding lines.
5. Replace any insulation to the T.X.V. and immediate surrounding areas.
6. Purge and evacuate the system.
7. Break the vacuum to 0 pounds per square inch with dry nitrogen.
8. Remove the dryer by cutting the refrigeration lines then with an open port sweat in the replacement dryer. Make certain the arrow points in the direction of flow.
9. Triple evacuate the system. Evacuate twice to 1500 microns of mercury, breaking the vacuum each time with dry nitrogen. Then evacuate to 500 microns of mercury.
10. Replace insulation.

11. Recharge system to nameplate specification.

NOTE

The T.X.V. bulb should ALWAYS be mounted on the horizontal line (opposite from the sensor), 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.

12. Install bulb on suction line exiting the evaporator.



Figure 43. Drier

D. Water Valve Adjustment

To determine whether or not the water valve is in need of adjustment, perform the following procedures:

NOTE

There are two valves-one for each side.



WARNING

DISCONNECT FREEZER FROM ELECTRICAL SUPPLY SOURCE BEFORE SERVICING.

1. Remove the Philips head screws from the upper back panel and remove panel.
2. Remove the cap from the high side Schrader valve and install a 0 to 500 P.S.I.G. gauge.
3. Connect the freezer to the electrical supply, start the refrigeration cycle, and read the pressure.
4. The proper gauge reading should be approximately 220 to 230 P.S.I.G. This would result in an exit water temperature of approximately 95-107°F.

To adjust the water valve, turn the adjustment screw counterclockwise to increase head pressure and clockwise to decrease head pressure.

E. Water Valve Removal

 **WARNING**
DISCONNECT FREEZER FROM ELECTRICAL SUPPLY BEFORE SERVICING.

Assuming the necessary panels are removed, perform the following procedures for removing the water valve.

1. Turn off and disconnect the water supply and drain. Blow out the water lines with compressed air or CO₂.
2. Recover the refrigerant charge and disconnect the capillary tube.



Figure 44. Water Valves

3. Remove the water lines from the valve. Figure 37.
4. Remove the two screws holding the water valve to the frame and remove the valve.

F. Water Valve Replacement

To replace the water valve, perform the following procedures:

1. Position the water valve and attach to the frame using the two screws.
2. Connect the water lines to the valve.
3. Connect the capillary tube.
4. Purge and evacuate the system.
5. Break the vacuum to 0 pounds per square inch with dry nitrogen.
6. Remove the dryer by cutting the refrigeration lines then with an open port sweat in the replacement dryer. Make certain the arrow points in the direction of flow.

7. Triple evacuate the system. Evacuate twice to 1500 microns of mercury, breaking the vacuum each time with dry nitrogen. Then evacuate to 500 microns of mercury.
8. Replace insulation.
9. Recharge system to nameplate specification.
10. Connect the water supply line and turn on the water.
11. Check for leaks.
12. Replace the side panel and connect to the source of electricity.

5.5 CAB UNIT

The cab is refrigerated using the left side compressor. If the compressor is not running to freeze the barrel it will be activated by a separate temperature control as needed to keep the cab cool. The cab is independent of the main control system and will maintain temperature even if the left and/or right side of the freezer is not in use.

To adjust temperature perform the following procedures:

1. Remove the six phillips head screws from the left side panel, then pull the panel down and out.
2. Use a straight bladed screwdriver to turn the temperature control clockwise for a colder temperature and counterclockwise for a warmer temperature.
3. Replace side panel.

NOTE

It takes approximately 15 minutes for the temperature to change. If going from colder to warmer leave the cab door open for a few minutes then close and wait 15 minutes.

SECTION 6 ELECTRICAL CONTROL SYSTEM

6.1 CONTROL SYSTEM

The control system is the "brain" of the freezer. To understand how to service the freezer, it is essential to understand how the control system operates. The control system used on the Model U431 Freezer has one temperature control per barrel.

NOTE

The cab has a separate temperature control found behind the left side panel.

To gain complete access to the front control box and its components, perform the following procedures:

1. Loosen the two Phillips head screws from the bottom of the decorative panel and pull the panel out and down.

The front control box and its components are now completely accessible and any necessary testing and adjusting can now be done. Figures 38 and 39.

NOTE

Subsections 6.1 through 6.6 will deal specifically with the control system.



Figure 45. Front Electrical Box

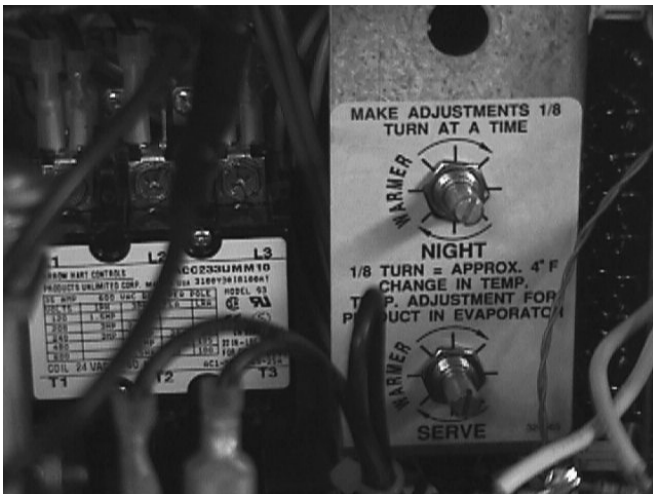


Figure 46. Front Electrical Box Close Up

To provide easier access to components inside or on the back side of the electrical box, remove the four Phillips head screws holding the box to the frame. The electrical box can now be positioned as necessary to service the components. The side panel can be removed to aid in positioning the box for servicing. Figure 40.

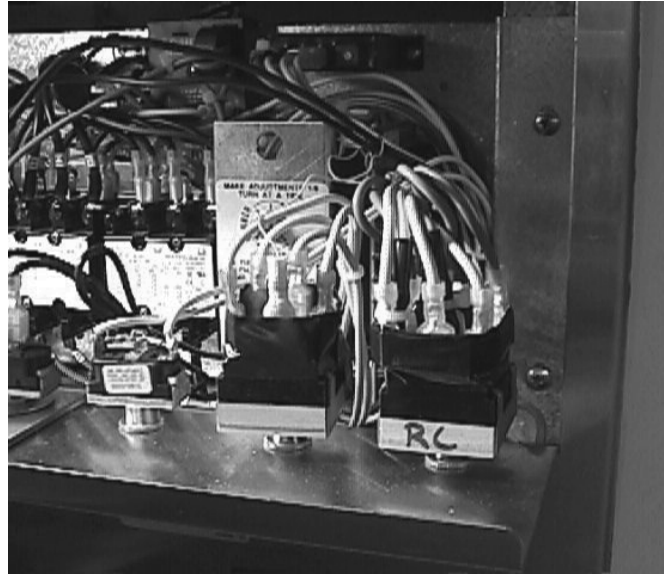


Figure 47. Electrical Panel Screws

A. Indicator Lights

1. The red indicator light when illuminated indicates that the temperature control is receiving power.
2. The yellow light when illuminated indicates that the high temperature relay (day/night, cut in at 29°F, out at 19°F) has been activated.
3. The green light when illuminated indicates that the low temperature relay (serve position, cut in at 22°F, out at 6°F) has been activated.

B. Sequence of Operation

1. The red light is illuminated whenever the board is furnished with power.
2. At start-up, power to the freezer is switched on (any temperature) - red and yellow come on.
 - a. If the standby-serve switch is in "serve position", then as the high relay low set point is satisfied, the yellow light goes off. Green light illuminates. When low relay low set point is satisfied, green light goes off. Yellow and green are both off. The green light will cycle on and off with the system upon spigot opening or call from the temperature sensor.

- b. If the standby-serve switch is in the "standby position", then as the high relay low set point is satisfied, the yellow light goes off; the green light illuminates. On the next temperature cycle, when refrigeration is required, the yellow light will illuminate as the compressor starts and the green light will go out. When satisfied, the yellow light goes out, and the green light illuminates.
3. When the freezer is in the normal serve mode (not initial start-up) and the yellow and green lights are off.
 - a. Switch from "serve" to "standby". When the low relay high point is reached, the green light will illuminate, but no equipment is switched on. When the high relay high set point is reached, the yellow light illuminates as the compressor starts and the green light goes out. When the high relay low set point is satisfied, the yellow light goes out and the green light illuminates, and they alternate like this until switched back to the "serve" mode.
 4. Freezer in the normal night mode. Yellow light off; green light on.
 - a. Switch from the "standby" to the "serve" mode. The green light remains illuminated while the compressor runs. When the low relay low set point is satisfied, the green light goes out. Both lights are now off.

C. Temperature Control Sensor

The thermistor sensor is used to sense the temperature of the suction line. As the suction line temperature decreases, the internal resistance of the thermistor will increase. The temperature control board will compare the thermistor resistance with an established resistance on the control board. When the resistances are equal, the circuit board will shut off the compressor. A phenomenon in the thermistor sensors is that resistance values can be different at any given temperature depending upon whether the temperature (just before a reading is taken) has been rising or dropping. Readings are especially difficult to predict if the temperature is rising. However, if the temperature is dropping, resistances are predictable. Therefore,

before checking the resistance in a sensor, always make certain the temperature in the sensor is dropping. When troubleshooting a sensor, remove the blue wire from the circuit board and the blue wire from the night/serve switch or terminal board. The internal resistance between the two wires should be 1,000 +/- 400 ohms when the sensor is at 70°F. If the resistance is not within this range, replace it. In most cases, if there is a sensor failure, it will be shorted out (0 resistance) or open (infinite resistance).

6.2 CURRENT SENSOR

The current sensor is used to activate the condenser fan contactor (air cooled only).

6.3 CONTACTORS

The compressor and drive contactors are mounted inside the electrical box. The left side compressor has two contactors. One contactor activates the compressor to freeze the barrel and the other contactor activates the compressor to cool the cab. The right side compressor and the two drive motors have one contactor each. There is one contactor to start the condenser fan motors (air cooled only).

The temperature control sends an electronic signal to trigger the contactors. The electronic signal tells when to operate the contactor for the compressor. A separate signal is used to control the drive motor contactors. The signals to the contactors are staggered so the drive motor will always start and stop two or three seconds before the compressor and condenser fan. By staggering the stopping and starting of the drive motor, maximum starting torque is available and voltage spikes are reduced. The condenser fan motor contactor gets its signal from a current sensor (air cooled only).

6.4 DRIVE MOTOR

The drive motors are designed specifically for the U431 freezers. The drive motors are used to rotate the auger assemblies. For single phase, the start and run capacitors are located on the motor. An internal, normally closed, centrifugal switch starts the drive motor. The motors have an internal thermo overload.

SECTION 7 MAJOR COMPONENT REMOVAL AND INSTALLATION

7.1 PREPARATION FOR COMPONENT REMOVAL

The procedures set forth in the section **MUST** be followed completely and in the order in which they appear.

To remove any or all of the major components of the freezer, remove necessary panels.



WARNING
DISCONNECT FREEZER FROM ELECTRICAL SUPPLY SOURCE BEFORE SERVICING.

1. Remove the Phillips head screws from each side panel and remove the side panels by pulling down and out.
2. Remove the Phillips head screws from the back panel and remove the back panel by pulling down and out.
3. Remove the eight Phillips head screws from the top panel and lift off.
4. Remove the two 1/4" cap screws and remove the blockoff panel to access the fan motors (air cooled only). Figure 41.

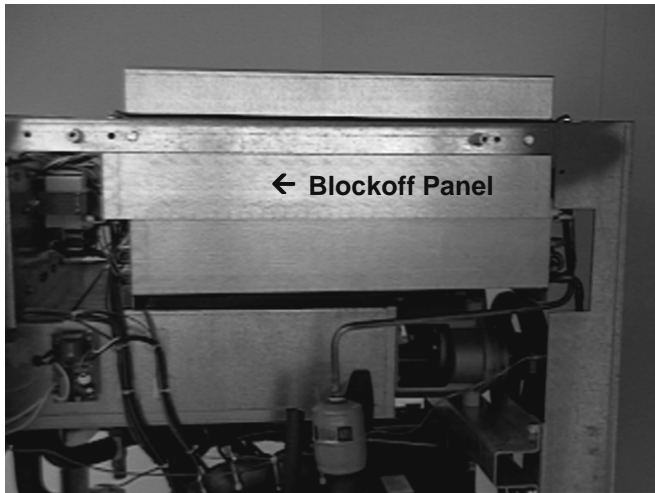


Figure 48. Block Off Panel

7.2 COOLING FAN MOTOR REMOVAL

After the **ELECTRICAL SUPPLY HAS BEEN DISCONNECTED** and the previous steps have been completed, the fan motor can be removed by performing the following procedures:

1. Disconnect the wires leading from the fan motor.
2. Remove the four hex nuts securing the fan bracket to the frame.
3. Remove the fan and bracket through the top of the freezer.

7.3 DRIVE MOTOR REMOVAL

1. Remove the electrical wires from the motor.
2. Loosen and remove the belts. Figures 42 and 43.

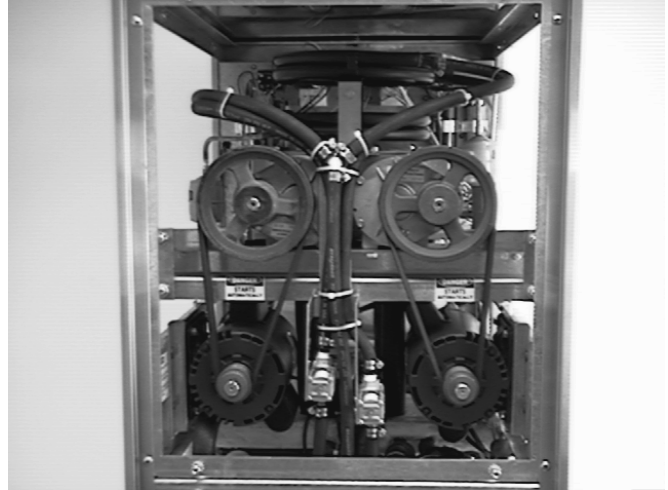


Figure 49. Drive Motor and Belt Removal

3. Remove the four mounting bolts and remove the motor through the rear of the freezer. Figure 43.
4. Loosen the two allen head screws and remove the pulley.

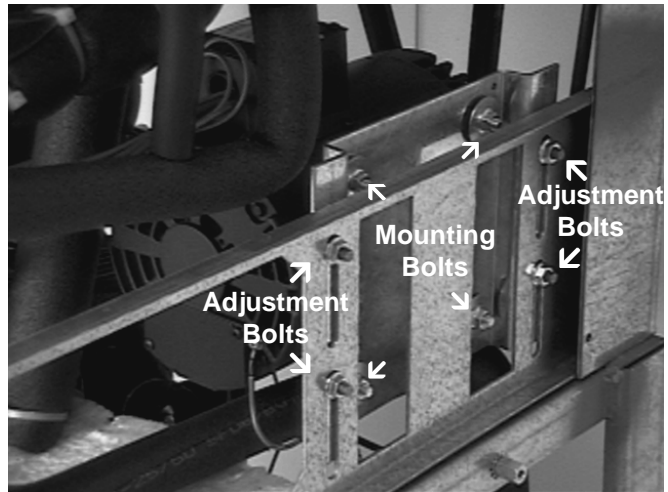


Figure 50. Drive Motor Removal

7.4 GEAR BOX REMOVAL

1. Loosen and remove the belts Figures 42 and 43.
2. Remove the pulley by loosening the allen head screws and remove the pulley.
3. Remove the four bolts holding the gear box to the barrel. Figure 44.
4. Remove the two bolts holding the gear box to the mounting bracket and remove the gear box through the rear of the freezer.

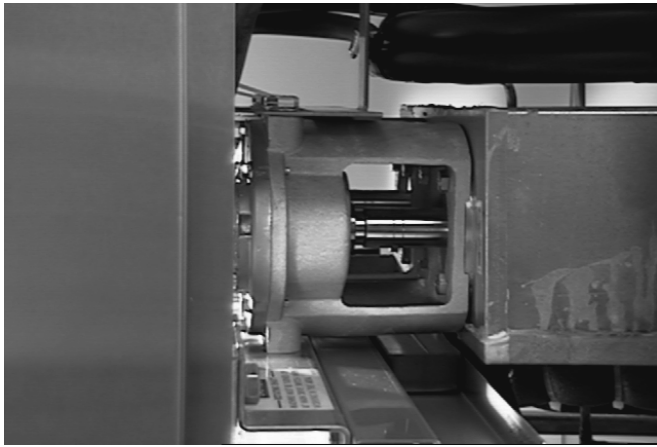


Figure 51. Gear Box Removal

7.5 COMPRESSOR REMOVAL

After the ELECTRICAL SUPPLY HAS BEEN DISCONNECTED, and the panels have been removed, the compressor can be removed by performing the following procedures:

1. Remove the compressor terminal cover by inserting a standard screwdriver under the terminal cover retaining clip and gently pry off. Figure 45.



Figure 52. Compressor Connections

2. Identify and remove the three wires from inside the compressor electrical box. Figure 46.

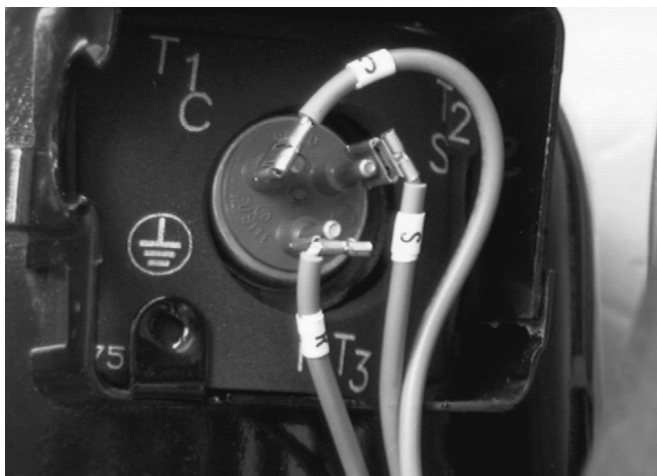


Figure 53. Compressor Connections

3. Recover refrigerant charge and leave a port open to prevent pressure build-up during compressor removal.
4. Remove six inches of insulating tubing on the suction line going to the compressor and unsweat the suction and discharge line from the compressor.
5. Remove the four nuts and washers from the base of the compressor.
6. Remove the compressor through the side of the freezer.
7. Remove the four rubber compressor mounts from the old compressor.

NOTE

Rubber mounts are not always furnished with replacement compressor.

8. Check the compressor for a burn-out condition using an acid test kit. **If acid is found, clean out the system per the compressor manufacturer's instructions.**
9. Plug all open ports of the old compressor.

NOTE

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

7.6 COMPRESSOR INSTALLATION

After the ELECTRICAL SUPPLY HAS BEEN DISCONNECTED, all panels have been removed, and the old compressor has been removed, the replacement compressor can be installed by performing the following procedures:

1. Before the replacement compressor can be installed the entire refrigeration system must be thoroughly purged.



CAUTION

IF ACID IS FOUND IN THE SYSTEM, CLEAN OUT PER COMPRESSOR MANUFACTURER'S INSTRUCTIONS.

2. Install the four rubber compressor mounts on the replacement compressor.
3. Install the replacement compressor into the freezer, fitting the base over the four bolt holes.
4. Install the four washers and nuts onto the bolts and tighten securely.
5. Remove all plugs from the replacement compressor.
6. Leaving a port open to prevent pressure build-up, braze the suction and discharge line to the compressor.



Figure 54. Drier

7. Connect the wires in the compressor electrical box and install the electrical box cover and retainer.
8. Purge and evacuate the system.
9. Break the vacuum to 0 P.S.I.G. with dry nitrogen, then open an access port.
10. Remove the dryer by cutting the refrigeration lines, then with an open port sweat in the replacement drier. Make certain the arrow points in the direction of flow. Figure 47.
11. Triple evacuate the system. Evacuate twice to 1500 microns of mercury, breaking the vacuum each time with dry nitrogen. Then evacuate to 500 microns of mercury.
12. Replace insulation.
13. Recharge system to nameplate specifications.
14. Leak check all fittings and connections.
15. Replace the six inches of insulating tubing to the suction line.

7.7 GEAR BOX INSTALLATION

1. Place the gear box in position from the rear of the freezer and fasten the four bolts through the gear box to the rear of the barrel. Figure 48.

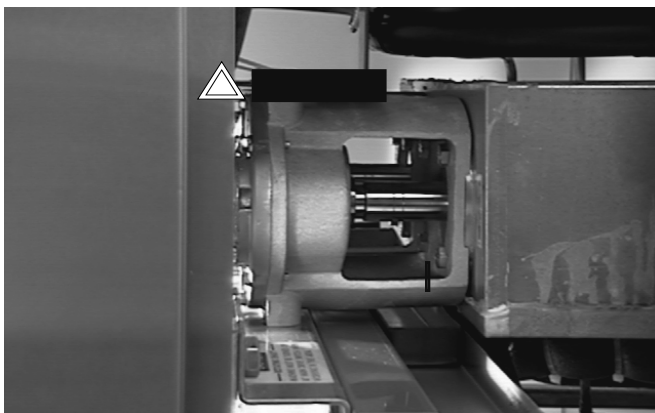


Figure 55. Gear Box Removal

2. Fasten the two bolts through the mounting bracket at the rear of the freezer.
3. Mount the pulley on the gear box shaft and align with the motor pulley, then tighten the allen head set screws.
4. Tighten the drive belts. Figure 49.



Figure 56. Belt Tension

7.8 DRIVE MOTOR INSTALLATION

1. Place the drive motor in position from the rear of the freezer and install the four mounting bolts.
2. Mount the pulley on the motor shaft and align with the gear box pulley. Then tighten the two allen head screws.
3. Tighten drive belts. Figure 49.

7.9 CONDENSER FAN MOTOR INSTALLATION (AIR COOLED)

1. Install the fan motor through the top of the freezer (Figure 50) and position in place.
2. Install the four hex nuts and tighten securely.
3. Connect the wires leading from the fan motor.



Figure 57. Motor Installation

7.10 FINAL ASSEMBLY OF FREEZER

Upon completion of the removal and installation of any or all of the major components of the freezer, the panels can be replaced by performing the following procedures:

1. Position the back panels into place and install the Phillips head screws, tighten securely.
2. Position the right side panel into place and install the Phillips head screws through the side panel and tighten securely.
3. Position the block off panel and secure with the two 1/4" cap screws.
4. Position the left side panel into place and install the Phillips head screw through the side panel and tighten securely.
5. The freezer electrical supply can now be connected.

SECTION 8 TROUBLESHOOTING

8.1 Troubleshooting - Freezer

PROBLEM	FREEZER POSSIBLE CAUSE	REMEDY
Drive motor (auger) "kicks-out", or does not run.	<ol style="list-style-type: none"> 1. Power to freezer is off. 2. Drive motor overloaded. 3. Low line voltage. 4. Product too hard. 5. Front door not installed securely. 	<ol style="list-style-type: none"> 1. Check power to freezer. 2. Wait 15-20 min. for Thermo overload to reset. 3. Check, must be +/-10% of nameplate voltage. 4. Raise overrun and/or product temperature. (See Section 4.3 or 4.2) 5. Install front door securely.
Compressor does not operate.	<ol style="list-style-type: none"> 1. Power to freezer off. 2. Drive motor overloaded. 3. Low line voltage. 4. Compressor internal overload is cut-out. 5. Front door not installed securely. 	<ol style="list-style-type: none"> 1. Check power to freezer. 2. Wait 15-20 min. for Thermo overload to reset. 3. Check, must be +/-10% of nameplate voltage. 4. Check condenser (air cooled)(See Sect. 4.8), or water supply (water cooled). Check capacitors and relay (1Ph Only) 5. Install front door securely.
Product too soft.	<ol style="list-style-type: none"> 1. Temperature setting is too high. 2. Product break down. 3. Standby-Serve Switch in Standby position. 	<ol style="list-style-type: none"> 1. Adjust temperature. (See Section 4.2) 2. Fill with fresh product. 3. Place Standby-Serve Switch in Serve position.
Freeze-up. (Product will not dispense easily.)	<ol style="list-style-type: none"> 1. Temperature setting is too low. 2. Low overrun setting. 3. Low pump pressure. 4. Large air pocket in barrel. 5. Auger turning counter-clockwise. 6. Spigot limit knobs restrictive. 	<ol style="list-style-type: none"> 1. Adjust temperature. (See Section 4.2) 2. Raise overrun. (See pump manual) 3. Check pump pressure. 4. Purge air from barrel. 5. Change rotation to clockwise. 6. Open rate adjustment for faster flow rate.
Rear auger seal leaks.	<ol style="list-style-type: none"> 1. Rear auger seal not lubricated. 2. Seal missing or installed wrong. 3. Worn or scratched shaft. 	<ol style="list-style-type: none"> 1. Lubricate seal. (See Section 3.13) 2. Check. (See Section 3.13) 3. Replace shaft.
Spigot leaks.	<ol style="list-style-type: none"> 1. Spigot parts are not lubricated. 2. Chipped or worn o-rings. 3. O-rings on spigot installed wrong. 4. Nicks or scratched on front door where spigot is located. 	<ol style="list-style-type: none"> 1. Lubricate. (See Section 3.13) 2. Replace o-rings. 3. Remove spigot and check o-rings. 4. Replace front door.
Drive belts slipping or squealing.	<ol style="list-style-type: none"> 1. Drive belt tension not correct. 2. Worn belt(s). 3. Temperature setting is too low. 4. Low overrun. 	<ol style="list-style-type: none"> 1. Adjust belt tension. (See Section 4.7) 2. Replace belts. 3. Adjust temperature. (See Section 4.2) 4. Check for air leak.
Mix temperature too warm in cab.	<ol style="list-style-type: none"> 1. System low on refrigerant. 2. Temperature control set too warm. 	<ol style="list-style-type: none"> 1. Add refrigerant. (Refrig. Service) 2. Remove left side panel and locate temperature control and follow instructions on decal.
Mix temperature too cold in cab.	<ol style="list-style-type: none"> 1. Temperature control set too cold. 	<ol style="list-style-type: none"> 1. Remove left side panel and locate temperature control and follow instructions on decal.

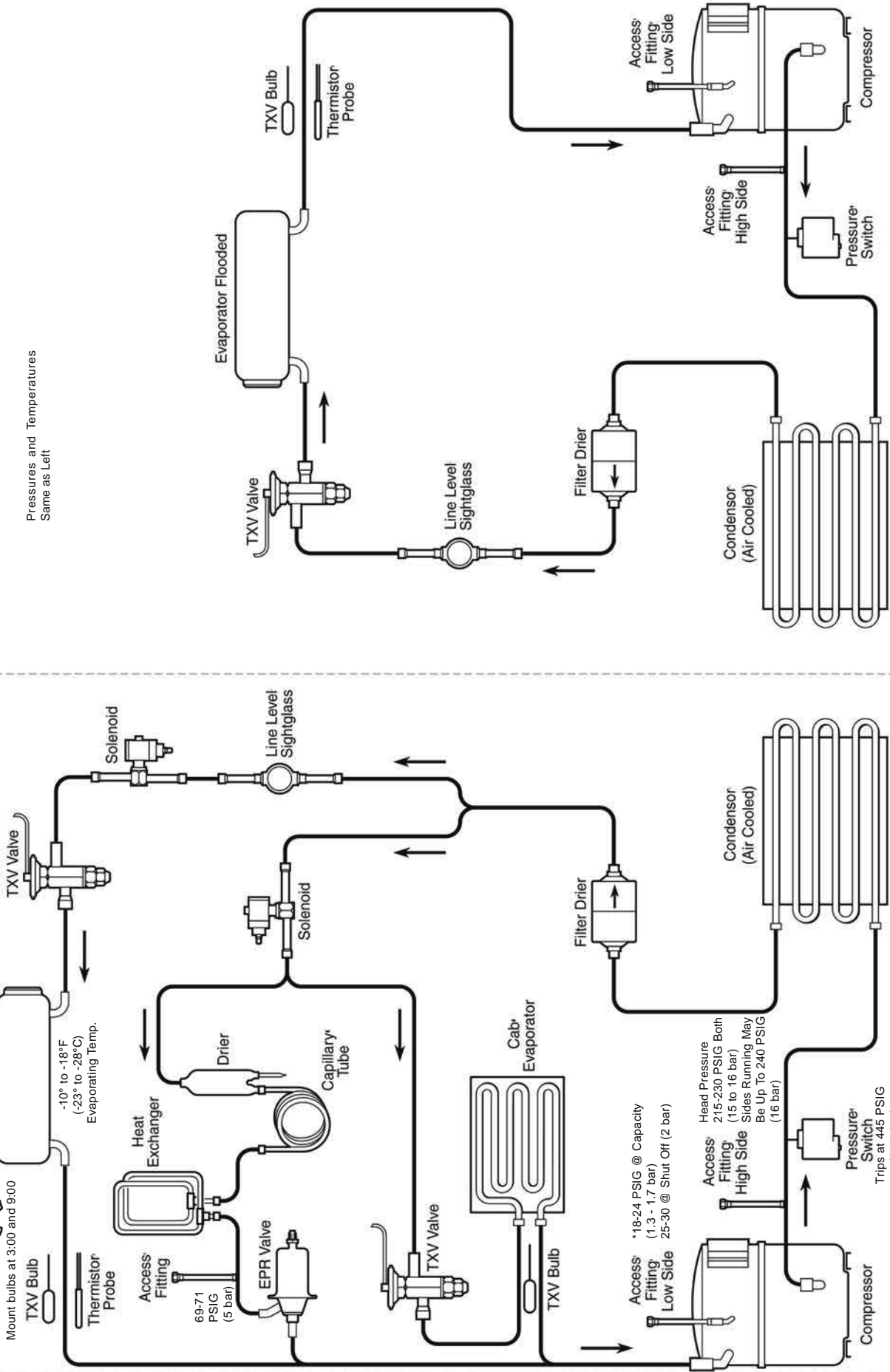
Super Heat - 6 to 11°F
(-14.4° to -11.7°C)

Mount bulbs at 3:00 and 9:00

Left Side

Right Side

Pressures and Temperatures
Same as Left



Air Cooled Version

*w/Cab. & Evap. Calling For Refrig. Add 10 PSIG

8.3 Troubleshooting - Mix Pump

PROBLEM	FREEZER POSSIBLE CAUSE	REMEDY
Pump motor does not run.	<ol style="list-style-type: none"> 1. Power to pump is off. 2. Low voltage. 3. Mix pump hose jammed inside black cover/clamp. 4. Pump motor overloaded. 5. Pressure switch on pump is defective. 6. Defective motor/capacitor. 7. Defective toggle switch. 	<ol style="list-style-type: none"> 1. Supply power to pump. 2. Check for low voltage. 3. Disconnect pump from power source. Remove four cover/clamp thumb screws. Separate cover/clamp halves and remove outer half. Remove jammed hose. Clean and re-install cover/clamp and tighten four thumb screws securely. Allow motor thermal overload to reset. See Sec. 4.2 for hose replacement. Do not use jammed portion of hose. 4. Allow internal thermal overload to reset; determine overload cause and repair. 5. Check mechanical operation and continuity of pressure switch. 6. Check motor amperage draw and/or capacitor. Replace motor or capacitor. 7. Check continuity; repair or replace.
Pump operates but cylinder will not fill.	<p>NOTE 1: A PROPERLY WORKING PUMP WILL FILL AN 8 OZ. CUP WITH MIX IN ABOUT 9 SECONDS.</p> <p>NOTE 2: IMMEDIATELY AFTER A "BAG CHANGE" THE PUMP MAY BE UNABLE TO RE-ESTABLISH IT'S PRIME WITH THE SYSTEM AT OPERATING PRESSURE. IN THIS CASE, TURN THE PUMP OFF. DRAW 2-3 PINTS TO REDUCE SYSTEM PRESSURE TO ZERO. TURN PUMP ON. PURGE REMAINING AIR IN MIX BAG AND PICK-UP HOSE.</p> <p>IMPORTANT: Before connecting the pick-up hose to the mix bag, purge the mix bag of air to the extent possible.</p>	
	<ol style="list-style-type: none"> 1. Out of Mix. 2. Mix pump hose kinked inside black cover/clamp. 3. Hoses assembled incorrectly. 4. Mix pump hose service life is exceeded. 5. Mix pump hose not connected to freezer. 6. Ice crystals in mix. 7. Mix bag drawn against adapter. 8. Foreign objects in mix. 9. Check valve is backwards. 	<ol style="list-style-type: none"> 1. Replenish mix supply. 2. Follow mix pump hose jammed repair. (See #1 above.) 3. Refer to diagram for correct hose connections. 4. Reposition/replace mix pump hose. See Sec. 4.2. 5. Connect mix pump hose to freezer. 6. Completely thaw mix prior to use. 7. Assure bag is clear of pick-up tube. 8. Clear blockage. Use fresh mix. 9. Observe flow arrow for proper orientation.
Overrun too low or no overrun.	<ol style="list-style-type: none"> 1. Overrun setting too low. 2. Air leak. 3. Air compressor not pumping air. 4. Air check valve in backwards. 	<ol style="list-style-type: none"> 1. Increase overrun setting. 2. Tighten all hose clamps. 3. Contact local Stoelting Distributor. 4. Check arrow for direction of flow.
Overrun too high.	<ol style="list-style-type: none"> 1. Mix pump hose service life is exceeded. 2. Out of mix. 3. Overrun setting too high. 4. Pick-up leg of mix pump hose is collapsing. 	<ol style="list-style-type: none"> 1. Reposition/replace mix pump hose. 2. Replenish mix supply. 3. Decrease overrun setting. 4. Reposition hose.
	NOTE: ALSO SEE "2" ABOVE.	

PROBLEM	FREEZER POSSIBLE CAUSE	REMEDY
Replacement mix pump hose won't feed through pump.	<ol style="list-style-type: none"> 1. Feeding hose into discharge hole of mix pump cover. 2. Hose ends not cut squarely. 3. Force feeding too quickly. 4. Pump motor not running. 	<ol style="list-style-type: none"> 1. Feed hose into suction side of cover. 2. Carefully cut hose end off squarely (no tails). 3. Gently and slowly assist feeding of hose up into pick-up hose side of cover. 4. Turn on motor switch. Also see Item 1 above.
Air exiting mix pick-up hose.	<ol style="list-style-type: none"> 1. Pickup tube check valve missing. 	<ol style="list-style-type: none"> 1. Contact local Stoelting Distributor.
Dispensed product air "pops"	<ol style="list-style-type: none"> 1. Overrun setting too high. 2. Mix pump hose service life is exceeded. 3. Overdrawing the freezer's capacity. 4. Recent "mix-out" condition. <p>NOTE: Also See "2" Above.</p>	<ol style="list-style-type: none"> 1. Reposition/replace mix pump hose. 2. Reposition/replace mix pump hose. 3. Reduce dispense rate. 4. Open spigot fully and allow excess air to "belch" out.
Mix leakage from pump.	<p>CAUTION: To prevent mix pump damage from dried mix deposits, immediately disassemble and clean pump.</p>	
	<ol style="list-style-type: none"> 1. Mix pump hose service life is exceeded. 	<ol style="list-style-type: none"> 1. Remove mix pump hose. Disconnect pump from power source. Remove mix pump cover/clamp. THOROUGHLY rinse three squeeze rollers using a spray bottle filled with hot water. Thoroughly clean all mix from pump. See Sec. 4.2 for hose replacement. Lubricate squeeze roller bearings, see Item #10 below.
Pump has poor capacity.	<ol style="list-style-type: none"> 1. Lift and run limits are exceeded. <p>NOTE: Also See 2, 4, 6 & 7.</p>	<ol style="list-style-type: none"> 1. Pump is limited to 10' lift, 20' run.
Pump is noisy/squeaking.	<p>NOTE: THE ACTION OF THE AIR COMPRESSOR ROCKING ARM CREATES A REPETITIVE CLICKING SOUND DURING OPERATION. THIS IS NORMAL.</p> <p>NOTE: THE PERISTALTIC MIX PUMP HAS THREE SQUEEZE ROLLERS WHICH USE SELF LUBRICATING BEARINGS. IF SQUEAKING EXISTS WITH THE MIX PUMP HOSE IN PLACE, AND STOPS WITH THE HOSE REMOVED, THE SQUEEZE ROLLER BEARINGS CAN BE LUBRICATED USING A SILICONE BASED SPRAY. REMOVE THE MIX PUMP HOSE. DISCONNECT PUMP FROM ELECTRICAL POWER. REMOVE FOUR COVER/CLAMP THUMBSCREWS. REMOVE ENTIRE COVER/CLAMP AS ONE UNIT. SPRAY SILICONE BASED LUBRICANT ON EACH END OF EACH SQUEEZE ROLLER. SPIN ROLLERS TO WORK LUBRICANT INTO BEARINGS. REPEAT AS NEEDED.</p> <p>CAUTION: DO NOT USE CLEANING/DISSOLVING TYPE LUBRICANTS LIKE WD-40. THESE LUBRICANTS ARE NOT BEARING FRIENDLY AND WILL ACCELERATE BEARING WEAR.</p>	
Mix in air hoses.	<ol style="list-style-type: none"> 1. Air/mix tee above black cover/clamp. 2. Air leak. 3. Mix hose on wrong air/mix tee fitting. 4. Pressure control manifold o-ring leak. 	<ol style="list-style-type: none"> 1. Air/mix tee must be below black cover/clamp. 2. Tighten all hose clamps. 3. Refer to diagram for correct hose connections. 4. Check o-ring and manifold; replace as required.

8.4 TROUBLESHOOTING THE CHALLENGER TEMPERATURE CONTROL AND SENSOR

The specifications given are for the circuit Board PN 296657 using the 1/8" x 1" stainless steel sensor with blue wires.

This is a guide to troubleshooting the challenger type temperature control without removing the sensor wires and therefore allowing the freezer to run while checking. Using this method you can determine if the problem is the sensor, circuit board or super heat setting. We have found many good sensors are replaced because the ohm reading was not correct, when in fact it wasn't the sensor at all; the superheat was too high or low causing that reading. Using the control voltage reading after the potentiometer and sensor, and the suction gas temperature we can pinpoint the problem.

FOLLOW THE STEPS BELOW TO TROUBLESHOOT:

Warning Disconnect From Source Of Electrical Supply Before Servicing

- Verify voltage at terminals 1&2 on the circuit board. The voltage should be about 24 volts AC.
 - Check serve potentiometer, it must be set at 2000 ohms, (Be sure power is off) (Fig. 1).
 - Connect Volt/ohm meter to terminal 8 and 2nd solder spot (Fig. 2). You must have good contact. The meter should read volts (V) DC not milli volts (mV).
 - Remove insulation from around suction line at rear of evaporator (barrel). Make sure line is clean; we need a good clean contact surface. Turn on thermometer and firmly press the surface probe to the suction line to read suction temperature. If you have a clamp type surface probe, clamp to suction line (Fig. 3 & 4). Read meters on off cycle after 1 minute. Note: Clamp on meters will yield the most accurate measurements.
 - Compare the voltage reading to the suction gas temperature using the chart found on page 3-62.
- Freezer must have a full barrel of product and be frozen down if possible.
 - Remove front header panel and side panel.

FIGURE 1

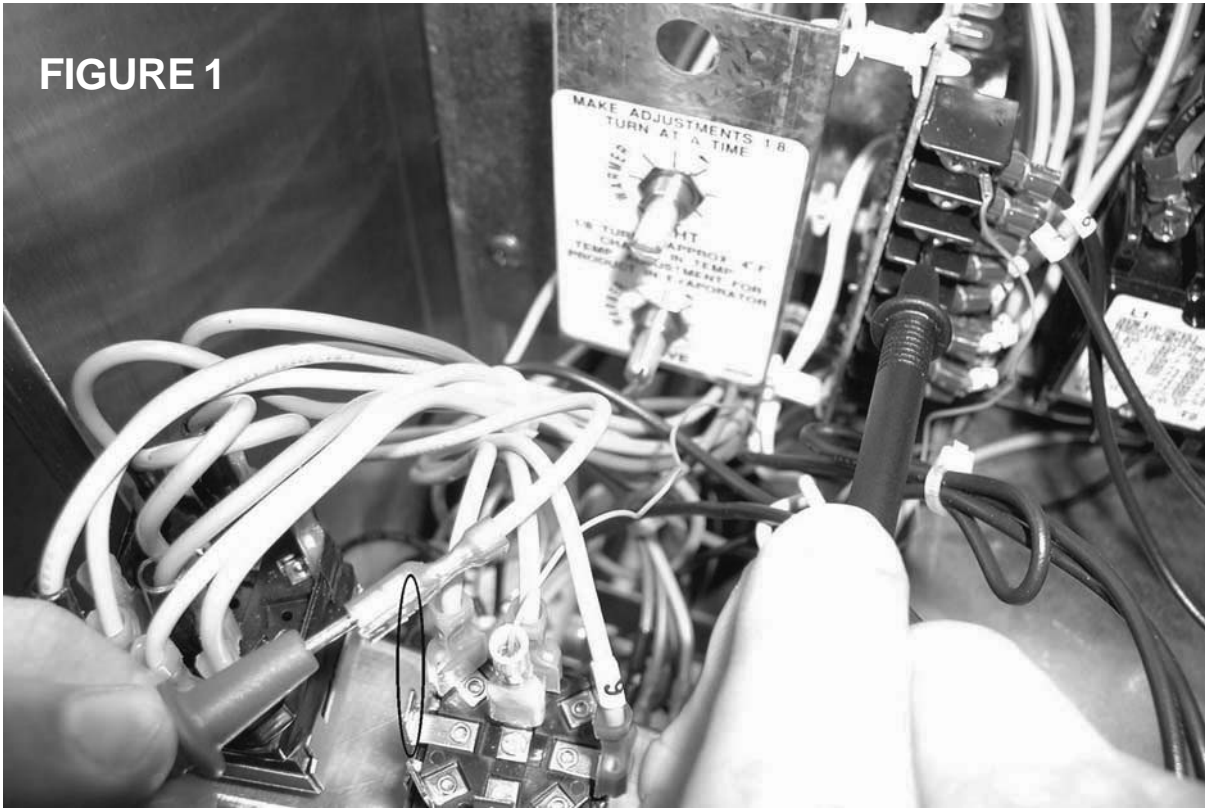
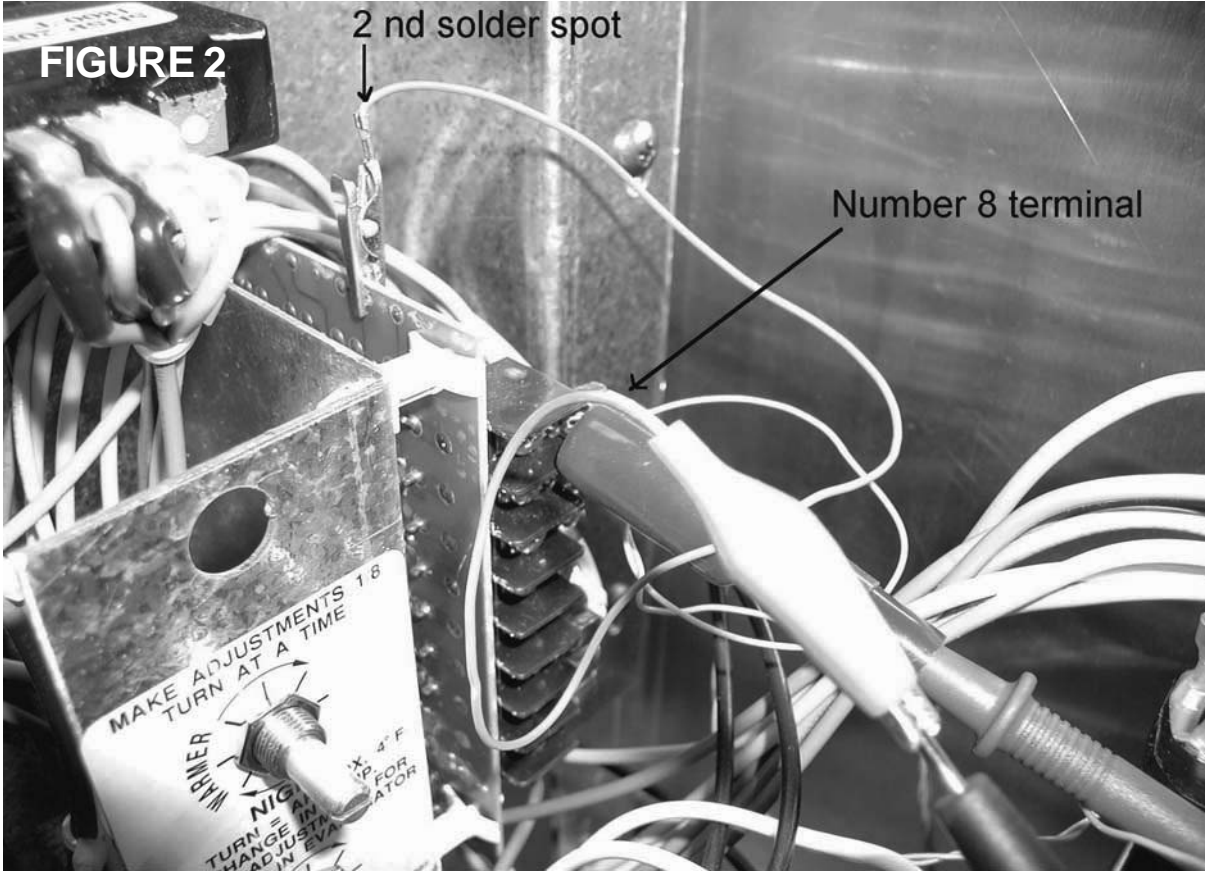
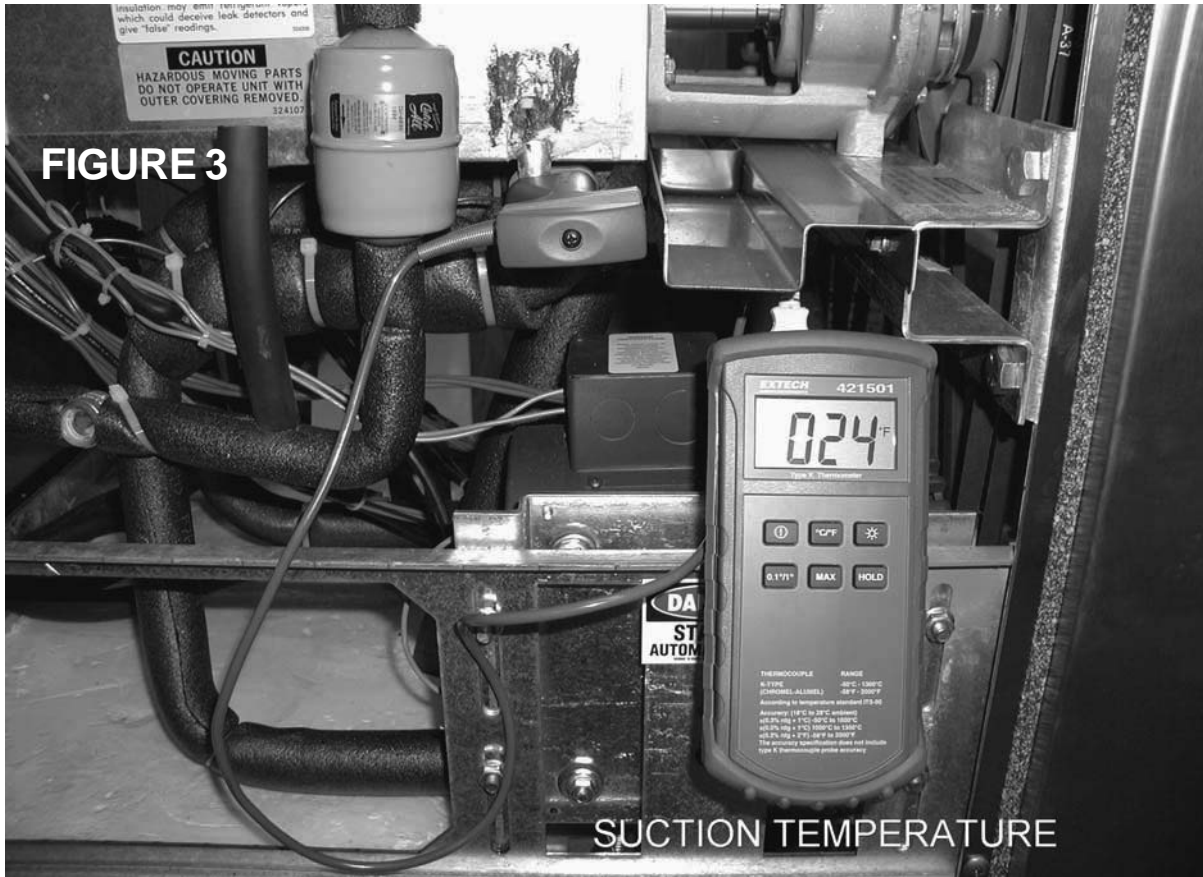


FIGURE 2





Supply 220V AC
Control Circuit Volts at Terminals 1 and 2 = 24 volts AC
Temp Control #296657
Challenger Series - Models U431, 237R/238R, 217/217R

Volts DC at Control
Terminal No. 8 & 2nd
Solder Spot

Suction Gas
Temperature °F

cycled off = 7.53V

-5°F

-4

-3

-2

-1

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

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21

22

23

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26

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28

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30

31

32

33

34

35

36

37

38

39

7.91

8.03

8.07

8.11

8.13

8.16

8.20

8.23

8.24

8.26

8.29

8.35

8.40

8.46

8.50

8.55

8.58

8.62

8.66

8.71

8.74

8.78

8.82

8.86

8.90

8.94

8.96

8.98

9.04

9.09

9.14

9.21

9.26

cycled ON

+/- .20

No Resistance,
Sensor Wire at Terminal 8 Disconnected
Voltmeter Connections
Terminal 7 and 2nd Solder Spot

Control Volts DC

Supply Volts AC
at Terminal 1 and 2

13.24

22

13.25

23

13.26

24

13.29

25

13.31

26

13.34

27

13.36

28

STOELTING - 64 SENSOR

TEMP DEG.F	RESISTANCE OHMS	VOLTS DC	TEMP DEG.F	RESISTANCE OHMS	VOLTS DC
-17.00	8865.54		25.00	2811.54	
-16.00	8608.83		26.00	2741.20	
-15.00	8360.33	7.08*	27.00	2672.89	
-14.00	8119.89		28.00	2606.44	
-13.00	7887.19		29.00	2541.91	
-12.00	7661.88		30.00	2479.19	
-11.00	7443.93	7.50*	31.00	2418.21	
-10.00	7232.97		32.00	2358.91	
-9.00	7028.59		33.00	2301.30	10.50*
-8.00	6830.67		34.00	2245.26	
-7.00	6639.07		35.00	2190.77	
-6.00	6453.44	7.90*			
-5.00	6273.70				
-4.00	6099.63				
-3.00	5930.83				
-2.00	5767.43				
-1.00	5609.02				
0.00	5455.53	8.50*			
1.00	5306.70				
2.00	5162.53				
3.00	5022.76				
4.00	4887.16				
5.00	4755.75				
6.00	4628.25				
7.00	4504.66	9.00*			
8.00	4384.79				
9.00	4268.53				
10.00	4155.67				
11.00	4046.25				
12.00	3940.01				
13.00	3836.98				
14.00	3736.92				
15.00	3639.89				
16.00	3545.66				
17.00	3454.21	9.70*			
18.00	3365.40				
19.00	3279.13				
20.00	3195.43				
21.00	3114.16				
22.00	3035.15				
23.00	2958.42				
24.00	2883.94				

CALIBRATION SPECIFICATIONS CHALLENGER SOFT SERVE

Sensor P/N 737011 (Two Blue Wires)

		OHMS	
		<u>Cut-In</u>	<u>Cut-Out</u>
“HI” Stage	Sensor	1516 (50°F)	2269 (34°F)
	+ <u>External Pot</u>	<u>+2000</u>	<u>+2000</u>
	= Calibration	3516	4269

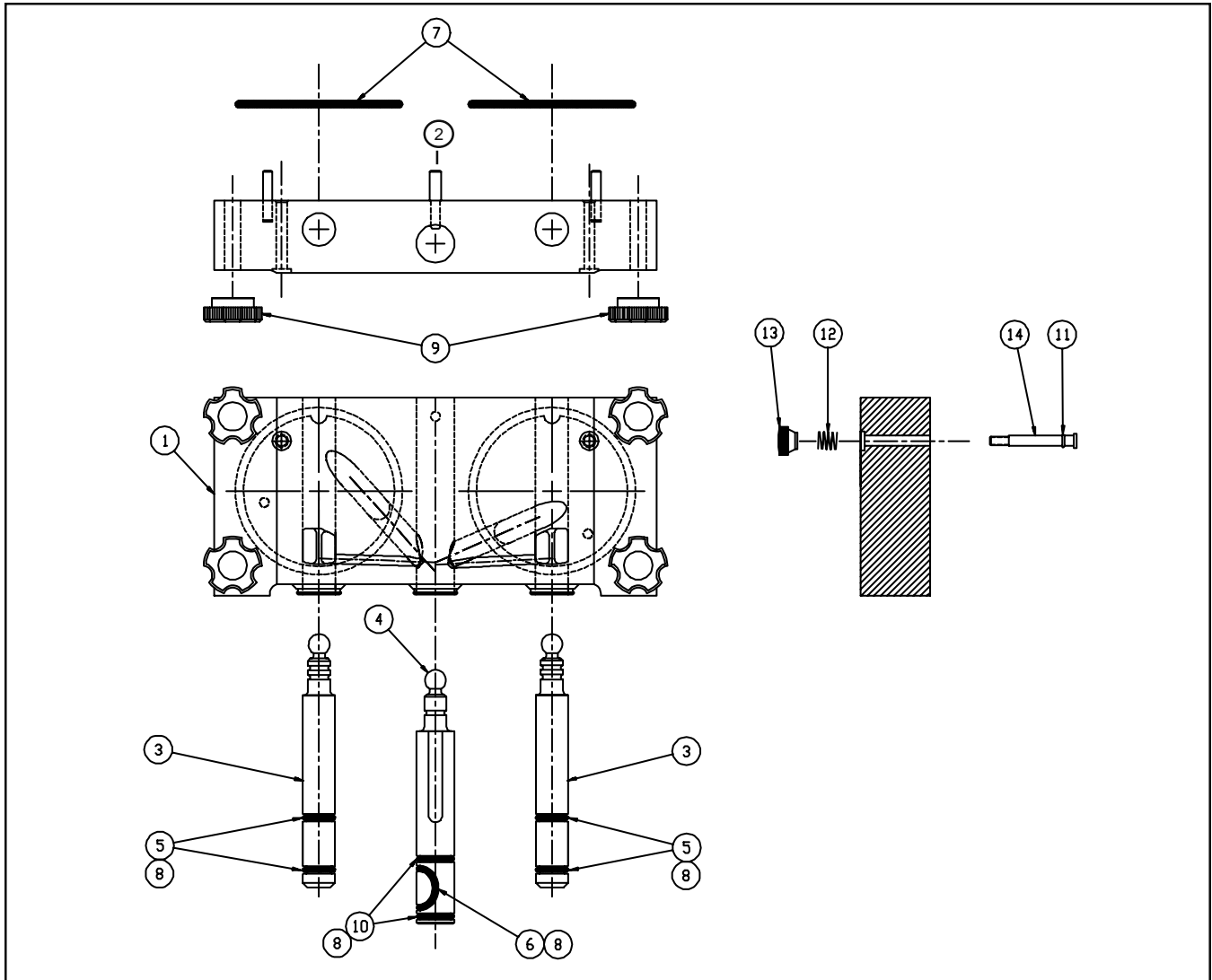
“LO” Stage	Sensor	2327 (33°F)	5420 (0°F)
	+ <u>External Pot</u>	<u>+2000</u>	<u>+2000</u>
	= Calibration	4327	7420

SHAKE BOARD

	<u>Cut-In</u>	<u>Cut-Out</u>
Sensor	2137 (36°F)	3265 (19°F)
Pot	<u>1960</u>	<u>1960</u>
	4100	5225

For Additional Information, See Master Manual.

SECTION 9 REPLACEMENT PARTS INFORMATION



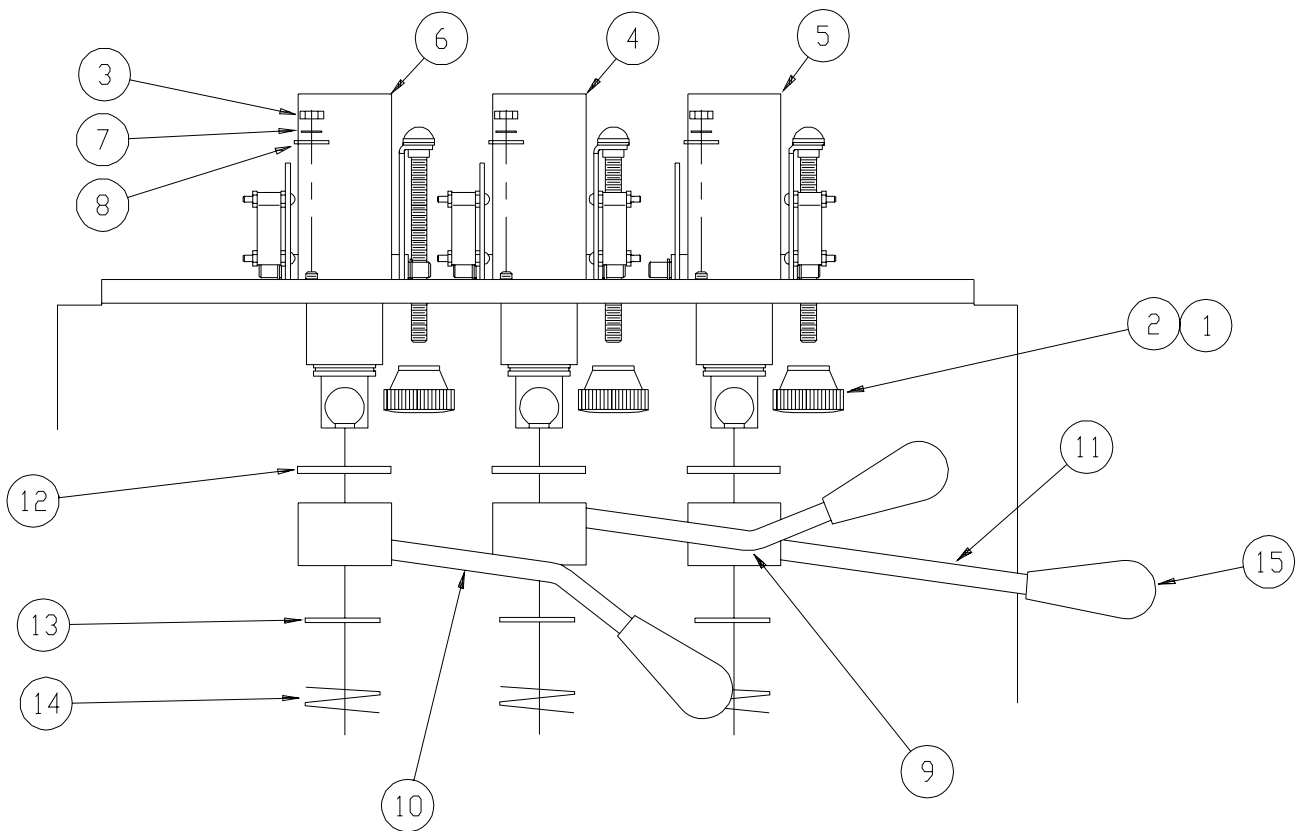
FRONT DOOR PARTS

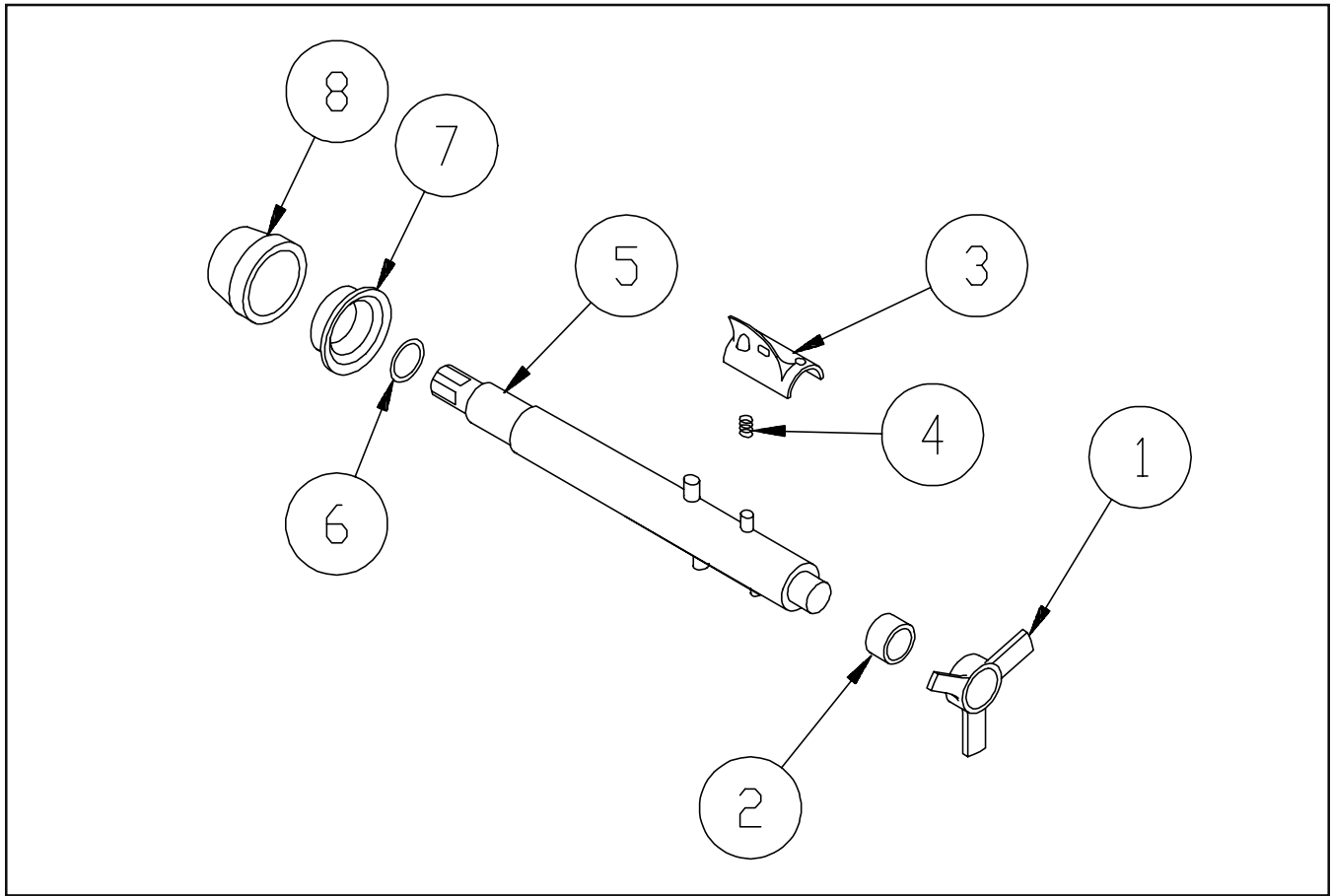
Item	Stoelting P/N	Qty.	Description	Item	Stoelting P/N	Qty.	Description
1	2177427	1	Door (Side ID Grooves)	2	109018	1	Actuator, Door Safety
	2177072		38mm (1.5 inch) Spigot Ext.	3	3159696	2	Spigot, Outside
	2177073		64mm (2.5 inch) Spigot Ext.	4	3158086	1	Spigot, Center
	2177074		76mm (3 inch) Spigot Ext.	5	624598	4	O-Ring
	232734		Rosette Cap	6	624664	1	O-Ring (CS)
	624677		Castle Top O-Ring	7	625133	2	O-Ring (Silicone)
	2177588	1	Door w/Pins - CE	8	508135	AsReq	Lubricant, Petrogel
624654		"O" Ring Spigot Extension	9	482019	4	Knob Black	
2158070		38mm (1.5 inch) Spigot Ext.	10	624614	2	O-Ring (CS)	
2159688		64mm (2.5 inch) Spigot Ext.	11	624520	2	O-Ring	
2157869		76mm (3 inch) Spigot Ext.	12	694200	2	Spring Comp.	
232732		Rosette Cap	13	482004	2	Knob	
			14	2110116	2	Valve Stem	

NOTE

If you are replacing a front door without side grooves you must order the extensions and rosettes also.

ITEM	STOELTING PN	QTY	DESCRIPTION
1	M820172	.001	ADHESIVE LOCTITE 242-31
2	482004	3	KNOB
3	538297	6	NUT HEX FULL 10-24 ZP
4	3156992	1	CAM CENTER
5	3157854	1	CAM RIGHT
6	3157855	1	CAM LEFT
7	766948	6	WASHER SHAKEPROOF 10 ZINC
8	766430	6	WASHER ROUND
9	2156997	1	HANDLE CENTER
10	2156999	1	HANDLE LEFT
11	2157850	1	HANDLE RIGHT
12	221619	3	SPACER BUSHING
13	1154703	3	WASHER
14	625440	3	RING RETAINING 1.00" DIA
15	482039	3	KNOB





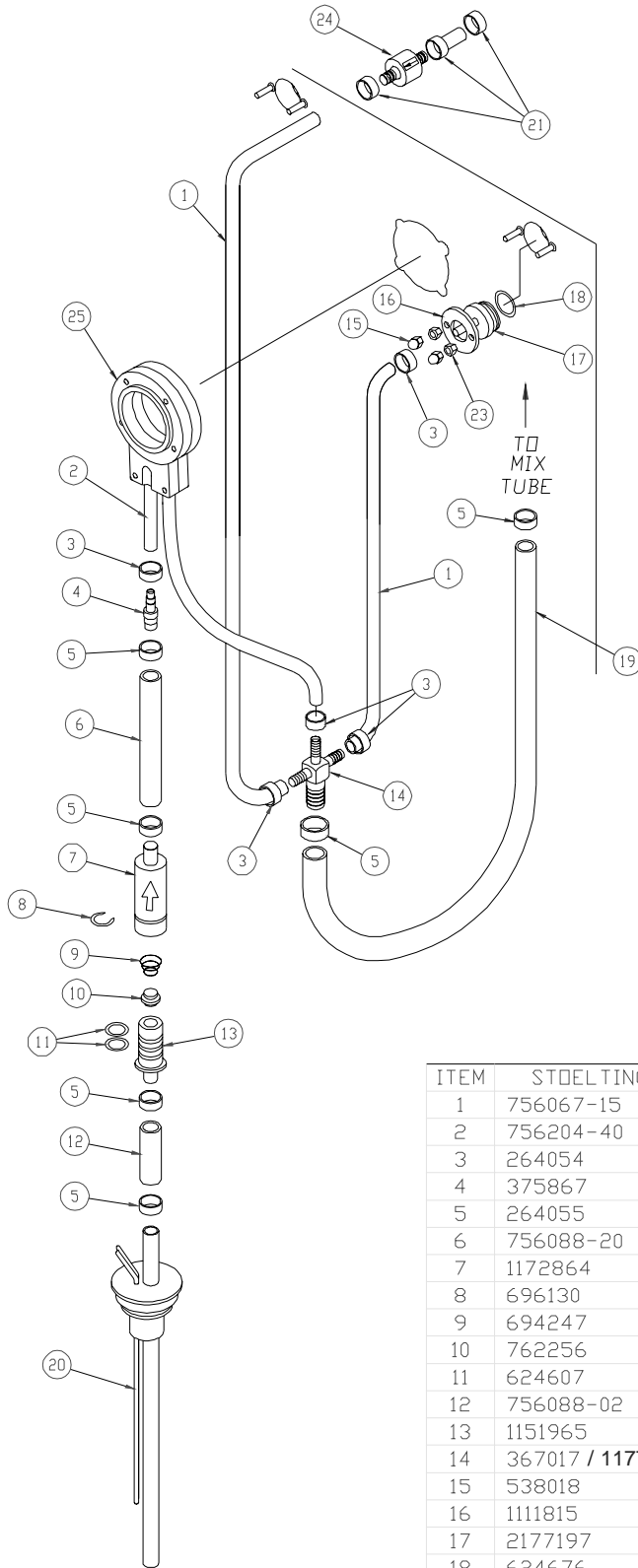
AUGER PARTS

<u>Drawing Index No.</u>	<u>Part Number</u>	<u>Qty.</u>	<u>Description</u>
1	2104552	1	Auger Front Support
2	149003	1	Front Bearing
3	381804	6	Plastic Flight
4	694255	6	Spring
5	4151178	1	Auger
6	624678	1	Rear Seal "O" Ring
7	1151859	1	Rear Seal Adaptor
8	667868	1	Rear Seal

MISCELLANEOUS PARTS

<u>Description</u>	<u>Part No.</u>
Haynes Spray (12 oz.) -----	508017
Petro-Gel Tube (4 oz.) -----	508135
Spline Lubricant (2 oz.) -----	508048
Brush (4" x 8" x 16") -----	208135
Brush (2.5" x 4" x 12") -----	208146
Brush (.25" x 4" x 14") -----	208380
Brush (1" x 3.5" x 18") -----	208465
Drip Tray -----	744273
Drip Tray Grid -----	417006

Pump Assembly (Serial #0 - 17977)



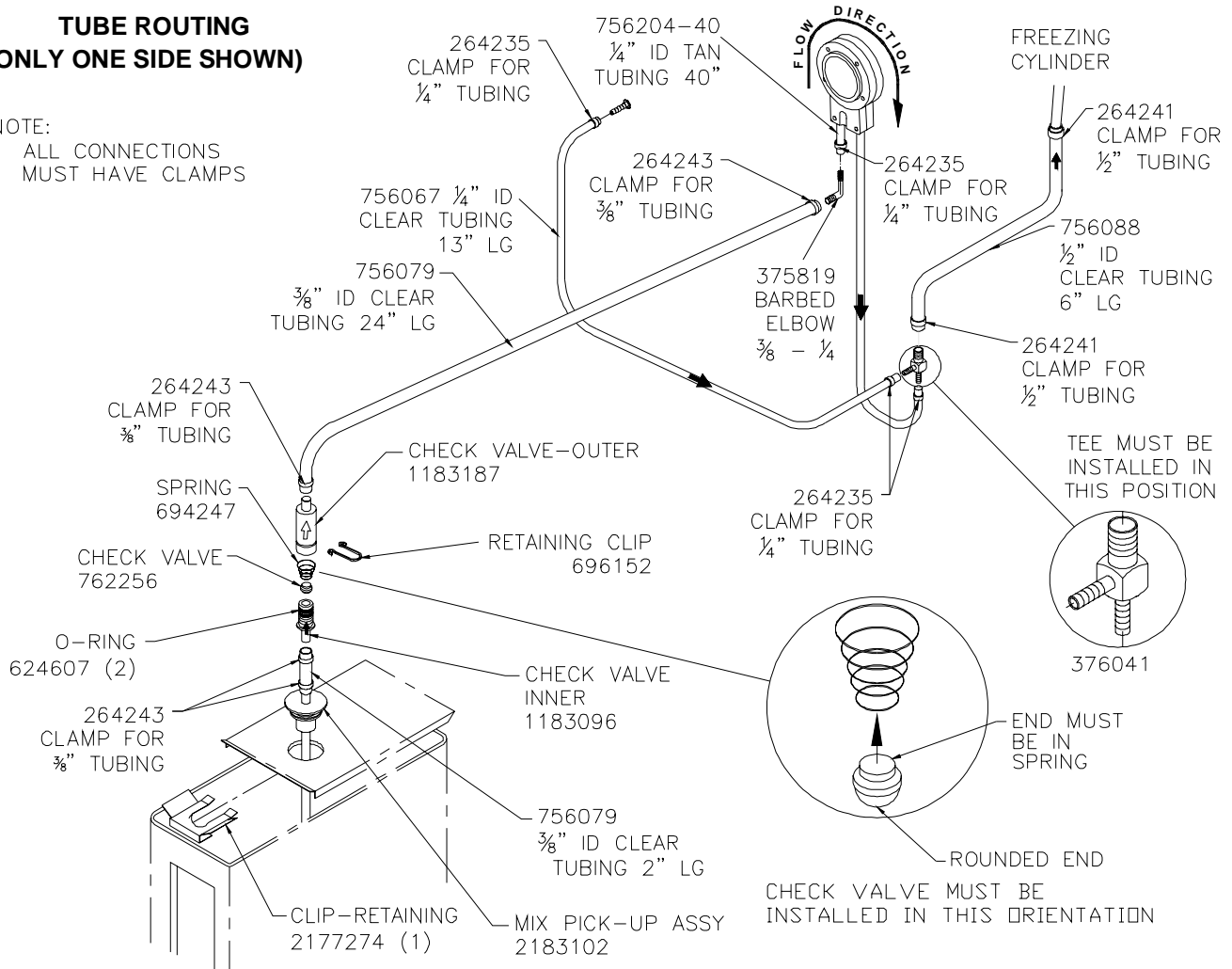
ITEM	STOELTING PN	QTY	DESCRIPTION
1	756067-15	4	TUBING PLASTIC 1/4IDX7/16OD X 15.0" LG
2	756204-40	2	TUBING NORPRENE FOOD .25 ID X 40.0" LG
3	264054	10	CLAMP LOOP JAW TYPE 7/16
4	375867	2	FITTING UNION 1/4"X1/2" BARBED
5	264055	12	CLAMP LOOP JAW TYPE 11/16
6	756088-20	2	TUBING PLASTIC 1/2IDX3/4OD X 20.0" LG
7	1172864	2	VALVE BODY - OUTER
8	696130	2	LOCK CLIP FOR VALVE
9	694247	2	SPRING COMP 13/16X3/8X3/4
10	762256	2	VALVE OUTLET CHECK (MOLDED)
11	624607	4	RING O 11/16X7/8X3/32 SPECIAL
12	756088-02	2	TUBING PLASTIC 1/2IDX3/4OD X 2.0" LG
13	1151965	2	VALVE BODY - INNER
14	367017 / 1177816	2	TEE, 4-WAY S'STL AIR/MIX
15	538018	4	NUT, 10-24 ACORN, 18-8 STN STL
16	1111815	2	LOCKING PLATE WASHER
17	2177197	2	FITTING, PRESSURE SWITCH
18	624676	2	RING O 1-1/8X1-5/16X3/32 70DUR
19	756088-30	2	TUBING PLASTIC 1/2IDX3/4OD X 30.0" LG
20	2177272	2	MIX PICKUP & PROBE ASSY
21	264235	6	CLAMP HOSE 3-8/9-16 MIN/MAX D
22	508135	.001	LUBRICANT, PETRO-GEL 40Z.TUBES
23	538296	4	NUT HEX #10-24 X 38 SS
24	762258	2	CHECK VALVE
25	3171952	2	COVER CLAMP

Figure 7. Mix Pump

Pump Assembly (Serial #17978 and up)

TUBE ROUTING (ONLY ONE SIDE SHOWN)

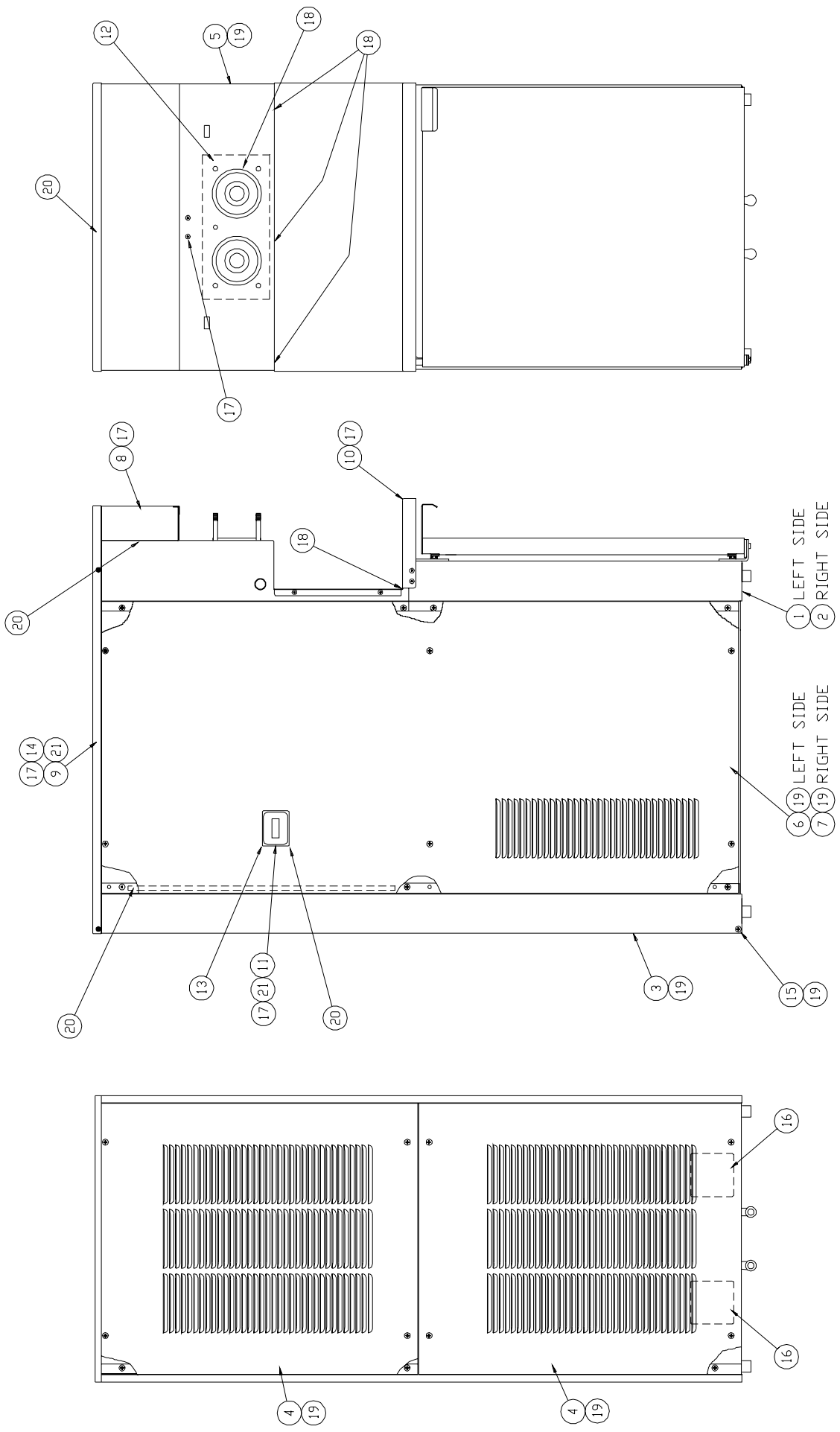
NOTE:
ALL CONNECTIONS
MUST HAVE CLAMPS



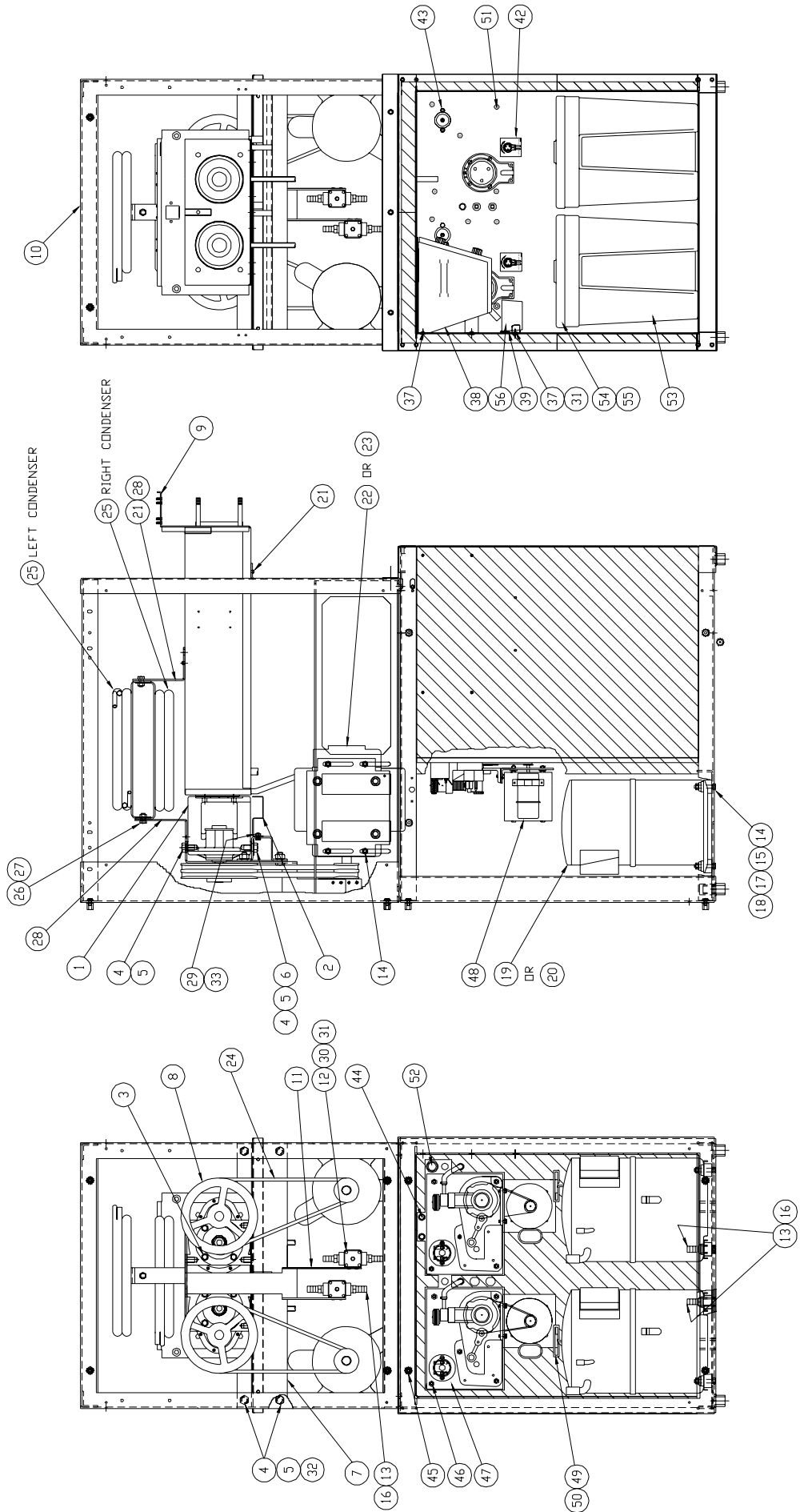
DECALS

<u>Qty.</u>	<u>Part Number</u>	<u>Description</u>
2	324200	H.P. Manual Reset
2	324798	Clean-Off-Serve
2	324797	Standby/Serve
1	324800	Cab Off-On
2	324799	Pump Off On
1	324141	Caution, Haz. Rot. Blade - Front Panel
1	324509	Cleaning - Right Side
2	324014	Auger Rotation - Evap. Enclosure Rear
4	324686	Danger - Start Auto, on Evap. Support between belts & motors support brkt.
1	723525	Winterizing, Attach to water hose near bottom
2	324720	Charge Decals R404A ____ oz.
2	324106	Caution - Elec. Wiring Mat'ls must conform between water couplings, one rear panel bottom
2	324346	Caution - Haz. Mov. Parts, on inside of mtr support brkt @ rear
3	324107	Caution - Haz. Mov. Parts, on cond. bkt. rear & (2) on evap. enclosure sides
2	324208	Attn - Ref. Lk Chk, on evap. enclosure sides
2	723552	Tag - Supply volt., inside J-Box
1	723517	Card - Inside one J-Box
2		ID Tags, Back Panel Top
1	324548	Add. Vent Back Panel Ctr Top
1		Made in U.S.A. - Back panel
2	324103	Caution - Rot. Shaft, on gearbox support bracket
2	324151	Field Connections, J-Box cover, outside
3	324125	Danger Elec.Shock, J-Box covers outside, back panel bottom
1	324242	Warm/Cold, @ T-Stat
2	324565	Nigh/Serve - Temp. Control Bracket
2	324158	Use copper cond. only, inside both J-boxes
2	324566	Wired According to, on elec. schematic envelope
2	130000	Elec. Schematic Envelope
1	324065	Water Inlet - Back panel above inlet coupling
1	324803	Header Panel Decal (Stoelting Logo)
1	324804	Header Panel Decal (Stoelting Swirl)
1	324806	Header Panel Decal (A & W Logo)

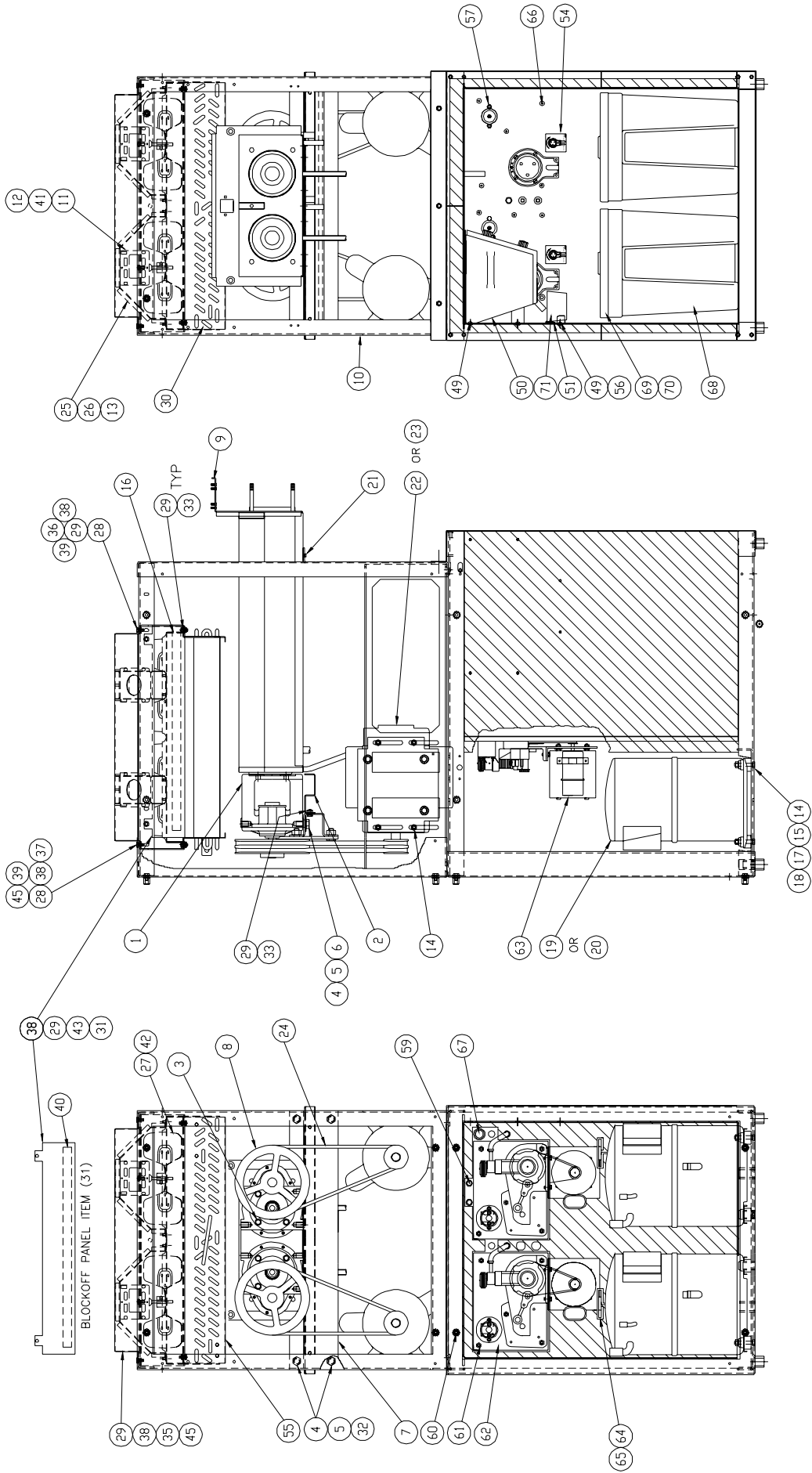
ITEM	STOELTING PN	QTY	DESCRIPTION
1	3177240	1	TRIM STRIP - LEFT
2	3177250	1	TRIM STRIP - RIGHT
3	3177236	2	TRIM STRIP - REAR
4	4177238	2	BACK PANEL
5	4177239	1	FRONT SHROUD
6	4177242	1	SIDE PANEL - LEFT
7	4177243	1	SIDE PANEL - RIGHT
8	3177244	1	HEADER PANEL
9	4177245	1	TOP PANEL, WATER COOLED
10	3177246	1	DRIP TRAY SUPPORT
11	1154886	1	SIDE PANEL COVER
12	3170804	1	GASKET INSULATION
13	744252	1	DRAIN TRAY 4231
14	4177222	1	TOP PANEL, AIR COOLED
15	538335	2	NUT HEX 1/4-20 X 7/16 STL ZP
16	314290	2	COVER SQUARE 4IN FOR OUTLET BX
17	647653	18	SCREW MACH 10-24 X 3/8 TRS HD
18	M820309	.001	SEALANT DOW CORNING ALUMINUM
19	647899	40	SCREW MACH 1/4-20 X 3/8 TRS HD
20	714003	.001	STRIP 3/8 WIDE CORK/RUBBER
21	538917	6	NUT SPEED 10-24X13/16X3/8



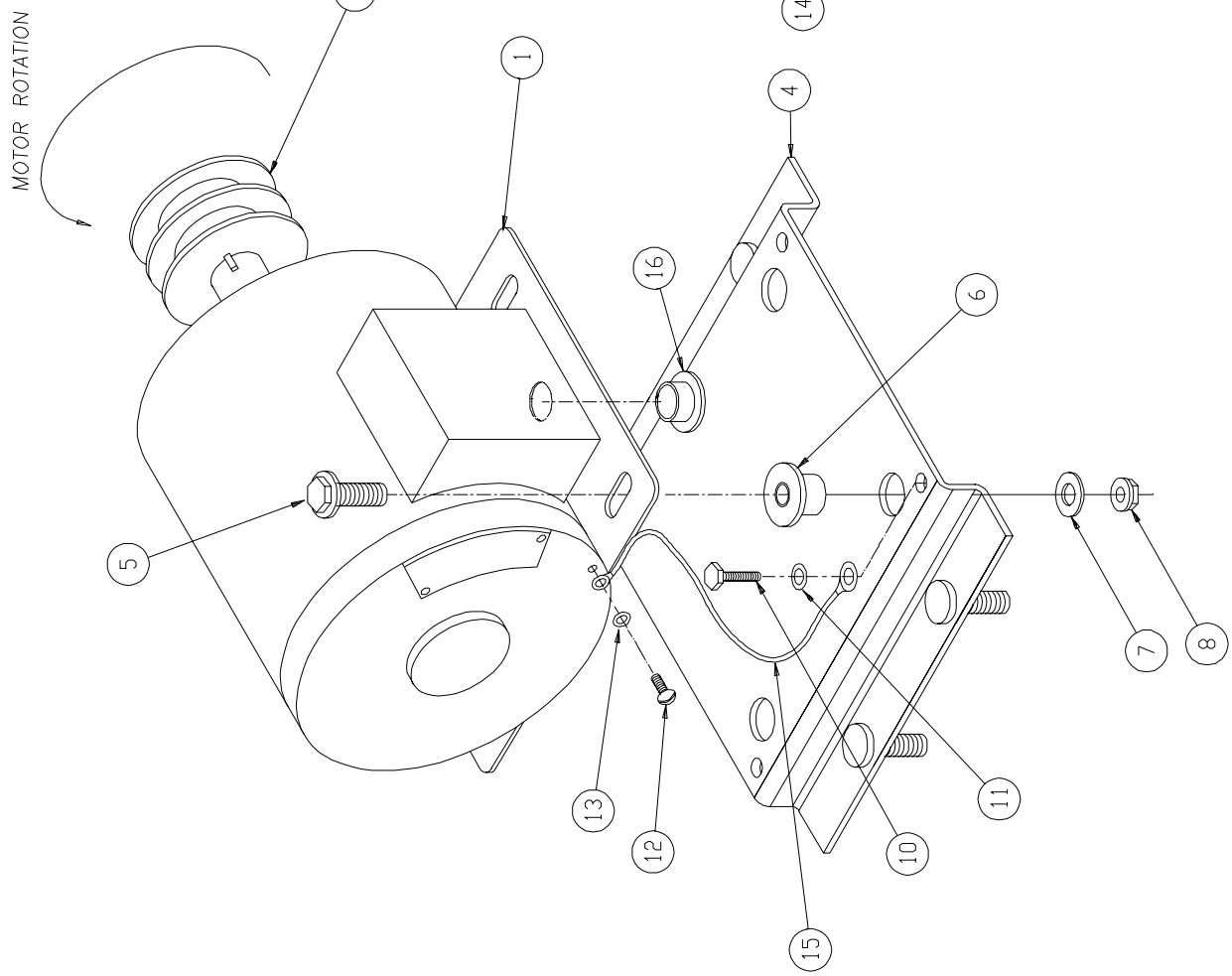
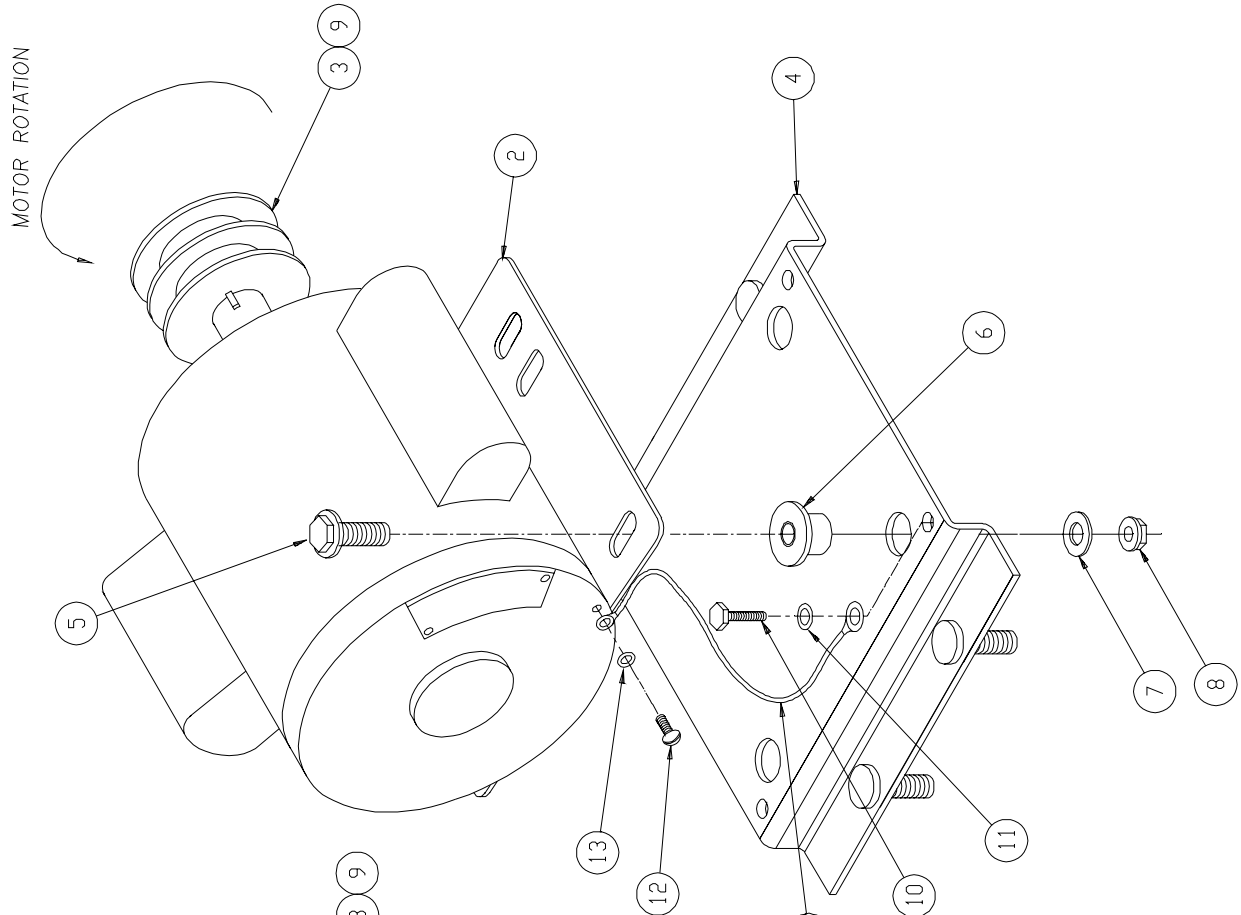
ITEM	STOELTING PN	QTY1	QTY2	DESCRIPTION
		-01	-02	
1	614231	2	2	SPEED REDUCER 5.2:1 REDUCTION
2	3177251	1	1	DRAIN TRAY SUPPORT BRACKET
3	644542	8	8	SCREW CAP 3/8-24 X 1 HX HD
4	644985	12	12	SCREW CAP 1/2-13UNC X 7/8 HX
5	766997	12	12	WASHER SHAKEPROOF 1/2X7/8
6	767226	4	4	WASHER FLT 1/2X1-3/8X9/16HV ZP
7	3177219	1	1	REDUCER SUPPORT BRACKET
8	2147034	2	2	PULLEY, 7.00 PD MACHINED
9	4177217	1	1	EVAP WELDMENT & FOAMED
10	4177208	1	1	FRAME WELDMENT
11	2177225	1	1	WATER VALVE BRACKET
12	763181	2	2	VALVE WATER 3/8NPT
13	369833	6	6	FITTING,BARBED 1/2X3/8 BRASS
14	538351	16	16	NUT HEX 5/16-18 LOCKING FLANGE
15	422156	2	2	GROMMET KIT WITH SLEEVES
16	728190	.001	.001	TEFLON THRD SEAL TAPE 520"/ROL
17	644371	8	8	SCREW CAP 5/16-18 X 1-3/4 HX
18	767211	8	8	WASHER FLAT 5/16,7/8X3/8X14GA
19	282025	2	.	COMPRESSOR, 208-230/60/1PH
20	282026	.	2	COMPRESSOR, 208-230/60/3PH
21	649081	5	5	SCREW DRILL & TAP 8-18 X 1/2
22	522869	.	2	DRIVE MOTOR 3PH
23	522844	2	.	DRIVE MOTOR 1PH (SER #0-16058)
23	522856	2	.	DRIVE MOTOR 1PH (SER #16059 PLUS)
24	152294	4	4	BELT V 39.2 O.L. X 38.3 P.L.
25	284104	2	2	WATER COOLED CONDENSER
26	538356	2	2	3/8-16 NUT HEX LOCKING FLANGE ZP
27	644522	2	2	SCREW CAP 3/8-16 X 3/4 HX HD
28	2177226	2	2	WATER CONDENSER BRACKET
29	644091	2	2	SCREW CAP 1/4-20 X 1/2 HX HD
30	644024	4	4	SCREW MACH 8-32 X 1/4 HX HD ZP
31	M820172	.001	.001	LOCTITE ADHESIVE #242 BLUE
32	538395	4	4	NUT HEX 1/2-13X3/4X5/16 ZP
33	538335	2	2	1/4-20 SPIN L/N ZC
34	714003	.001	.001	3/8" X 100' ROLL/RUBBER
35	628007	5	5	RIVET 1/8"
36	524091	5	5	MOUNT TIE
37	647653	6	6	SCREW MACH 10-24 X 3/8 TRS HD
38	3177257	1	1	CAB EVAPORATOR ASSY
39	2177235	1	1	BRACKET, DRIP TRAY, CAB
40	M850004	ASREQ	ASREQ	RTV DOW CORNING 734
41	M980178	ASREQ	ASREQ	PERMAGUM
42	324724	2	2	DECAL, TUBE FEED
43	538296	4	4	NUT HEX #10-24 X 3/8 SS
44	422057	2	2	GROMMET RBR 3/8X5/8X1/4X1/16
45	717917-SV	2	2	SWITCH, AIR PRESSURE
46	538335	10	10	NUT HEX 1/4-20 X 7/16 STL ZP
47	3177221	2	2	PLATE, PUMP MOUNTING
48	522229	2	2	PUMP MOTOR, ONLY
49	266018	2	2	CLIP ADHESIVE BACKED "J"
50	778027	2	2	WRENCH, ALLEN 5/32 X 3.0 LG.
51	647915	10	10	SCREW MACH 1/4-20 X 7/8 TRS HD SSTL
52	422074	1	1	GROMMET RUBBER BLACK
53	558113	2	2	PAN, MIX CONTAINER
54	3177262	2	2	COVER, FRONT
55	3177229	2	2	COVER, REAR
56	744272	1	1	DRIP TRAY, CAB



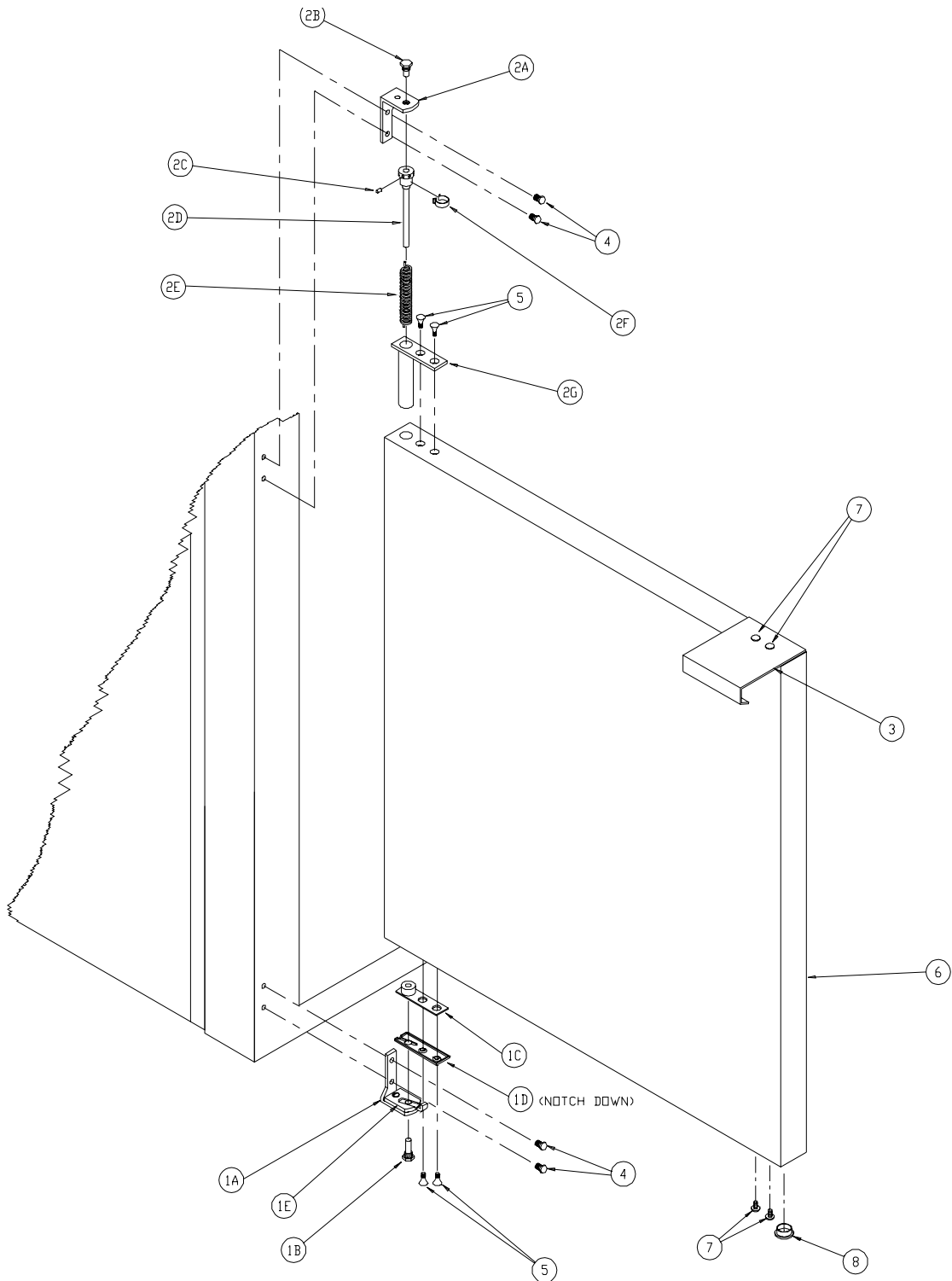
ITEM	STOELTING PN	QTY1	QTY2	DESCRIPTION
		-01	-02	
1	614231	2	2	SPEED REDUCER 5.2:1 REDUCTION
2	3177251	1	1	DRAIN TRAY SUPPORT BRACKET
3	644542	8	8	SCREW CAP 3/8-24 X 1 HX HD
4	644985	8	8	SCREW CAP 1/2-13UNC X 7/8 HX
5	766997	8	8	WASHER SHAKEPROOF 1/2X7/8
6	767226	4	4	WASHER FLT 1/2X1-3/8X9/16HV ZP
7	3177219	1	1	REDUCER SUPPORT BRACKET
8	2147034	2	2	PULLEY, 7.00 PD MACHINED
9	4177217	1	1	EVAP WELDMENT & FOAMED
10	4177208	1	1	FRAME WELDMENT
11	522833	4	4	FAN MOTOR
12	538280	16	16	NUT, #8-32
13	766948	16	16	WASHER #10 SHAKEPROOF
14	538351	16	16	NUT HEX 5/16-18 LOCKING FLANGE
15	422156	2	2	GROMMET KIT WITH SLEEVES
16	4177262	1	1	CONDENSER SHROUD
17	644371	8	8	SCREW CAP 5/16-18 X 1-3/4 HX
18	767211	8	8	WASHER FLAT 5/16.7/8X3/8X14GA
19	282025	2	.	COMPRESSOR, 208-230/60/1PH
20	282026	.	2	COMPRESSOR, 208-230/60/3PH
21	649081	3	3	SCREW DRILL & TAP 8-18 X 1/2
22	522869	.	2	DRIVE MOTOR 3PH
23	522844	2	.	DRIVE MOTOR 1PH (SER #0-16058)
23	522856	2	.	DRIVE MOTOR 1PH (SER #16059 PLUS))
24	152294	4	4	BELT V 39.2 O.L. X 38.3 P.L.
25	3171824	4	4	FAN MOTOR BRACKET
26	538297	16	16	NUT, 10-24 ZC
27	162067	4	4	FAN BLADE 9"
28	4177261	2	2	CONDENSER BRACKET
29	644091	14	14	SCREW CAP 1/4-20 X 1/2 HX HD
30	284082	1	1	CONDENSER
31	2177069	2	2	BLOCKOFF PANEL
32	538395	4	4	NUT HEX 1/2-13X3/4X5/16 ZP
33	538335	6	6	1/4-20 SPIN L/N ZC
34	463010	8	8	THREADED INSERT, 1/4-20
35	4177070	1	1	UPPER BLOCKOFF PANEL
36	222997	1	1	BUSHING SNAP 9/32 ID, 3/8 HOLE
37	584200-04	1	1	PLUG HOLE .375 DIA MTG HOLE
38	766964	12	12	WASHER SHAKEPROOF 1/4 ZINC
39	766456	4	4	WASHER ROUND 5/8X9/32 STEEL
40	M820323	.001	.001	TAPE INSUL 1 X 1/4 IN THICK
41	766940	16	16	WASHER SHAKEPROOF 8 ZINC PLATE
42	M820172	.001	.001	ADHESIVE LOCTITE 242-31
43	538928	4	4	NUT SPEED 1/4-20X63/64X1/2
44	714006	.001	.001	1" X 100' ROLL/RUBBER
45	644106	4	4	SCREW CAP 1/4-20 X 5/8 HX HD
46	714003	.001	.001	3/8" X 100' ROLL/RUBBER
47	628007	5	5	RIVET 1/8"
48	524091	5	5	MOUNT TIE
49	647653	6	6	SCREW MACH 10-24 X 3/8 TRS HD
50	3177257	1	1	CAB EVAPORATOR ASSY
51	2177235	1	1	BRACKET, DRIP TRAY, CAB
52	M850004	ASREQ	ASREQ	RTV DOW CORNING 734
53	M980178	ASREQ	ASREQ	PERMAGUM
54	324724	2	2	DECAL, TUBE FEED
55	368102	2	2	FILTER AIR
56	M820172	.001	.001	ADHESIVE LOCTITE 242-31
57	538296	4	4	NUT HEX #10-24 X 3/8 SS
58	223005	2	2	BUSHING, SNAP 1/2 ID .625 HOLE
59	422057	2	2	GROMMET RBR 3/8X5/8X1/4X1/16
60	717917-SV	2	2	SWITCH, AIR PRESSURE
61	538335	10	10	NUT HEX 1/4-20 X 7/16 STL ZP
62	3177221	2	2	PLATE, PUMP MOUNTING
63	522229	2	2	PUMP MOTOR ONLY
64	266018	2	2	CLIP ADHESIVE BACKED "J"
65	778027	2	2	WRENCH, ALLEN 5/32 X 3.0 LG.
66	647915	10	10	SCREW MACH 1/4-20 X 7/8 TRS HD SSTL
67	422074	1	1	GROMMET RUBBER BLACK
68	558113	2	2	PAN, MIX CONTAINER
69	3177262	2	2	COVER, FRONT
70	3177229	2	2	COVER, REAR
71	744272	1	1	DRIP TRAY, CAB



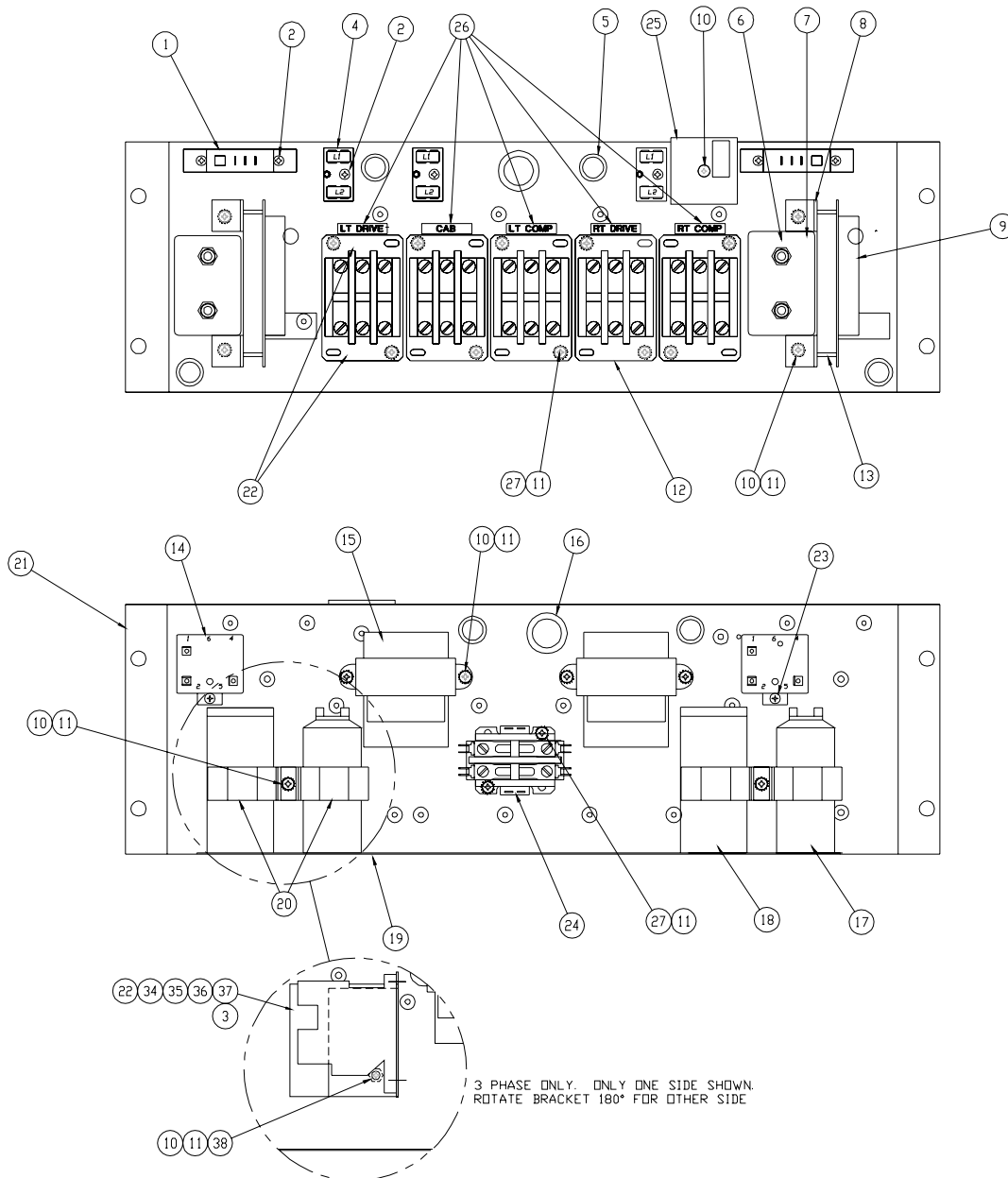
ITEM	STOELTING PN	QTY	DESCRIPTION
1	522869	1	MOTOR 2HP 208-230/60/3 1740RPM
2	522844	1	MOTOR 2HP 208-230/60/1 1740RPM
			SERIAL #0-16058
2	522856	1	MOTOR 2HP 208-230/60/1 1740RPM
			SERIAL #16059 PLUS
3	2117987	1	PULLEY 2 GROOVE 2.10 A.P.D.
4	2177223	1	MOTOR MOUNTING PLATE WELD'T
5	644328	4	SCREW CAP 5/16-18 X 1 HX HD ZP
6	524035	4	MOUNT MOTOR RUBBER 1.0 X .75
7	766496	4	WASHER,FENDER 5/16 X 1-1/4 DD
8	538351	4	NUT HEX 5/16-18 LOCKING FLANGE
9	650333	1	SCREW SSS 5/16-18NC X 3/8 DV
10	649107	1	SCREW TAP 10-16 X 1/2 HX HD ZP
11	766940	1	WASHER SHAKEPROOF 8 ZINC PLATE
12	649104	1	SCREW TAP 10-24 X 3/8 RD HD PH
13	766948	1	WASHER SHAKEPROOF 10 ZINC
14	430028	1	WNP04D2T HARNESS
15	430255	1	WPP08E2T HARNESS
16	223058	1	BUSHING SNAP 11/16 ID HOLE 7/8

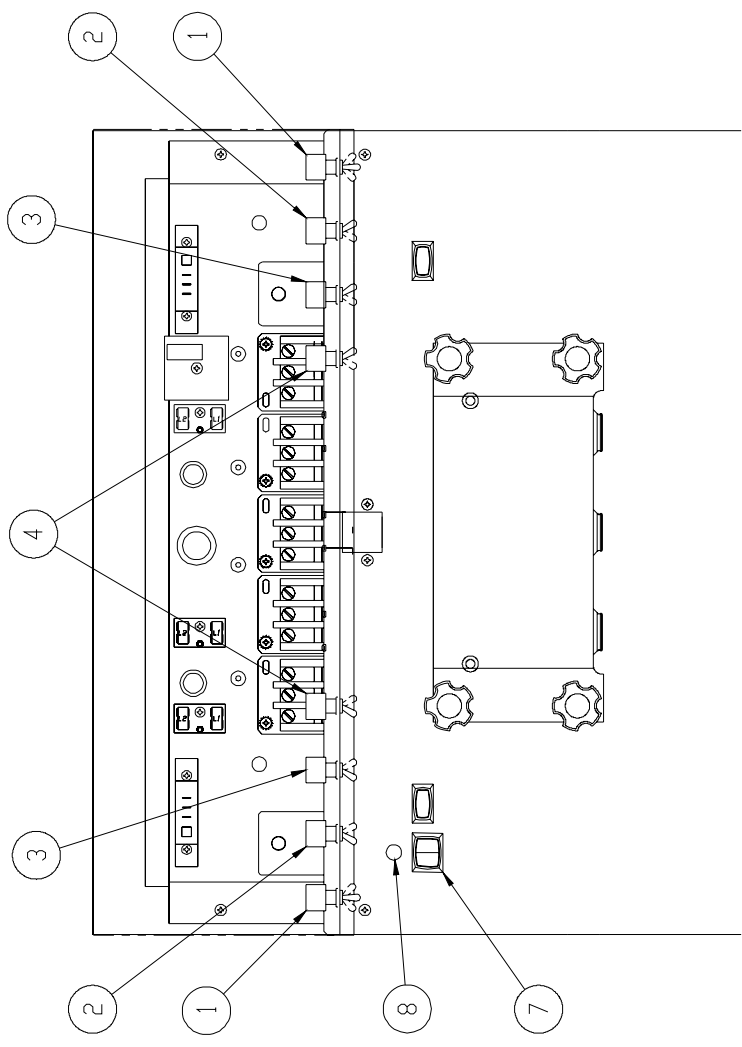
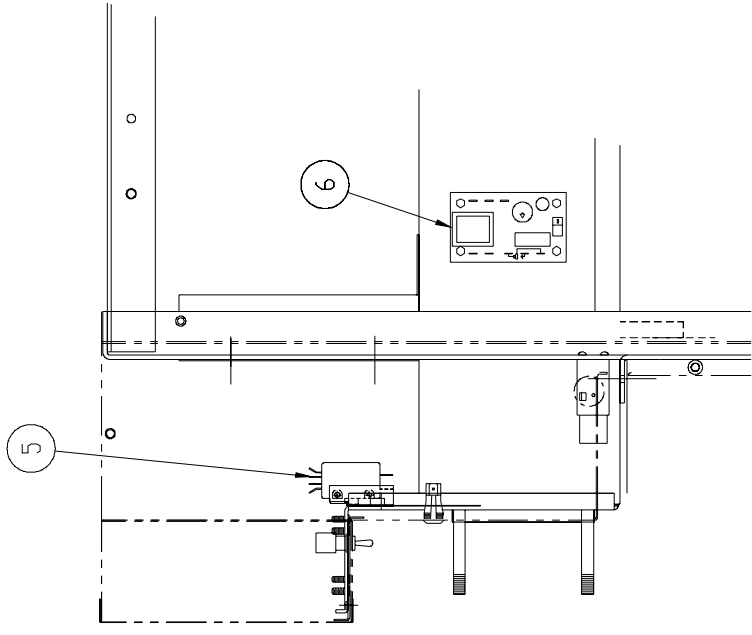


ITEM	STOELTING PN	QTY	DESCRIPTION
1	442191-L	1	HINGE, LOWER LEFT
2	442192-L	1	HINGE, UPPER LEFT
3	3177231	1	HANDLE, CAB DOOR
4	644093	4	SCREW CAP 1/4-20 X 1/2 HX HD
5	647671	4	SCREW MACH 10-24 X 1/2 FL HD
6	4177232	1	DOOR, CAB
7	647653	4	SCREW MACH 10-24 X 3/8 TRS HD
8	584200-10	1	PLUG HOLE .750 DIA MTG HOLE

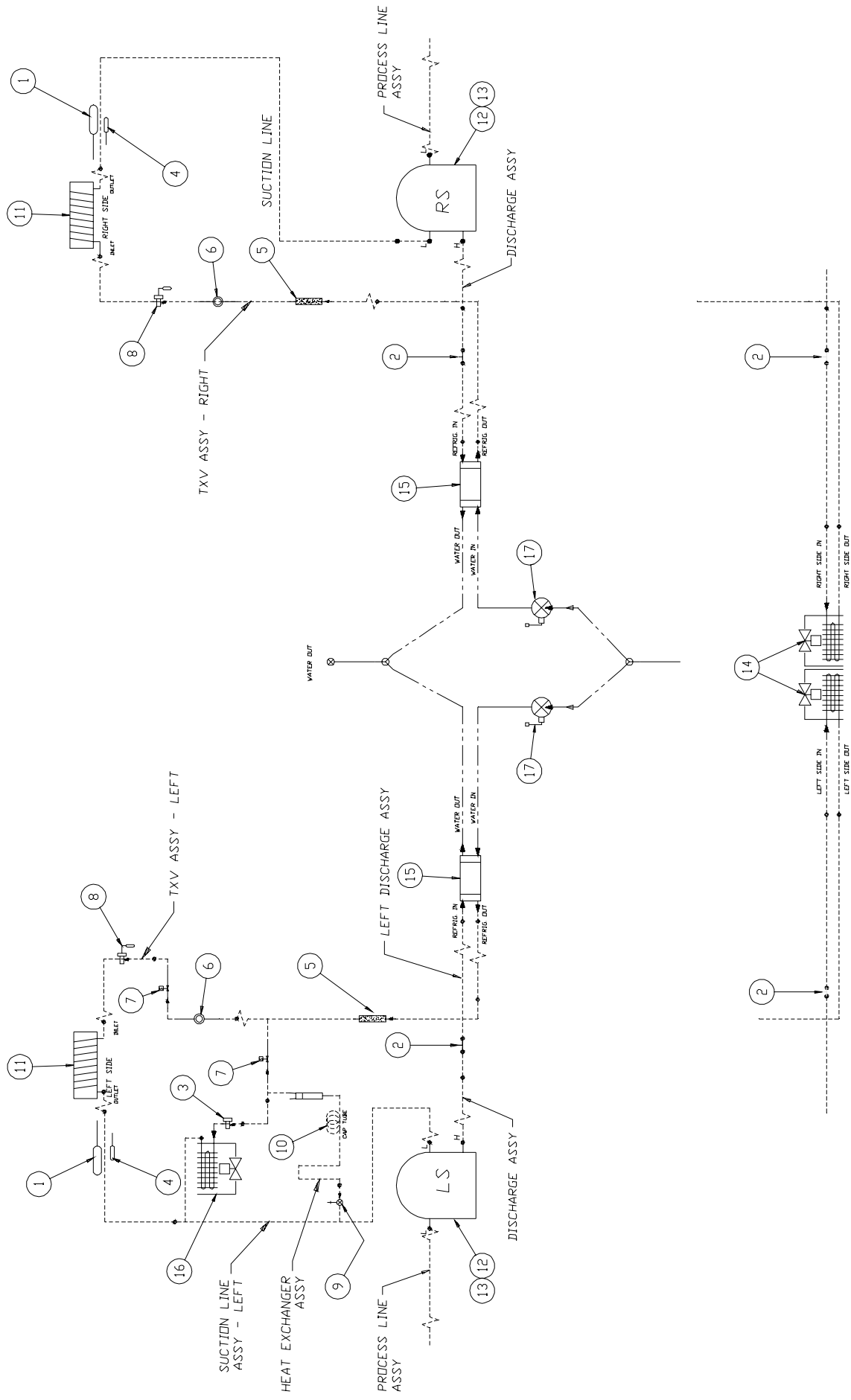


ITEM	STDELTNG PN	QTY1	QTY2	DESCRIPTION
1	739527	2	2	TIMER,INTERVAL 24 VAC
2	647529	7	7	SCREW MACH 8-32 X 1/2 RD HD PH
3
4	732010	3	3	TERMINAL BLOCK
5	223007	4	4	BUSHING SNAP 5/8ID 3/4 MTG
6	591001	4	4	POTENTIOMETER
7	324565	2	2	DECAL-TEMPERATURE ADJUSTMENT
8	3177252	2	2	BRACKET, TEMP CONTROL
9	1172733	2	2	CONTROL TEMP W/EXTERNAL SWITCH
10	647658	11	9	SCREW MACH 10-24 X 3/8 RD HD
11	766948	22	20	WASHER SHAKEPRODF #8 ZINC
12	295109	5	5	CONTACTOR MAG 3-POLE 24V
13	524087	8	8	MOUNT DUAL LOCK CIRCUIT SPACER
14	618142	2	0	RELAY MOTOR START (COPE-COMP)
15	2177218	2	2	TRANSFORMER ASSY
16	223015	1	1	BUSHING SNAP 1-1/8 MTG HOLE
17	231057	2	0	CAPACITOR RUN 35 MFD 370VAC
18	231058	2	0	CAPACITOR START 145/174 MFD
19	714006	1.50 FT	1.50 FT	1" X 100' ROLL/RUBBER
20	2156689	4	0	CAPACITOR BRACKET (2.0 DIA)
21	4177237	1	1	ELECTRICAL PANEL
22	714003	1.67 FT	1.67 FT	STRIP 3/8 WIDE CORK/RUBBER
23	647393	2	0	SCREW MACH 6-32 X 3/8 RD HD PH
24	295011	1	1	CONTACTOR MAGNETIC 2 POLE
25	672680	1	1	SENSOR, CURRENT, 24VAC (AC ONLY)
26	324728	1	1	DECALS, CONTACTOR IDENT.
27	647641	12	12	SCREW MACH 10-24 X 1/4 RD HD
34	618231	0	2	OVERLOAD RELAY 3.7-12 AMP
35	2177911	0	2	BRACKET OVERLOAD RELAY
36	647536	0	2	E*SCREW MACH 8-32 X 5/8 RD PH
37	766941	0	2	E*WASHER SHAKEPRODF #8
38	538297	0	4	NUT HEX FULL 10-24 ZP





ITEM	STOELTING PN	QTY	DESCRIPTION
1	718534	2	SWITCH TOGGLE <CLEAN OFF ON>
2	718539	2	SWITCH TOGGLE <NIGHT SERVE>
3		2	SWITCH TOGGLE <FORCED REFRIGERATION>
4	718532	2	SWITCH TOGGLE <PUMP>
5	718776	1	SWITCH, LIMIT <DOOR SAFETY>
6	296179	2	CONTROL LIQUID LEVEL 24V
7	718895	1	SWITCH, CAB ON - OFF
8	493042	1	LIGHT, INDICATOR



ITEM	STOELTING PN	QTY	DESCRIPTION
1	4172725	2	BULB & SENSOR MOUNTING
2	718710	2	SWITCH PRESSURE
3	762410	1	VALVE, EXPANSION ADJUSTABLE
4	1172731	2	THERMISTOR PROBE ASSEMBLY
5	342008	2	DRIER, FILTER
6	458009	2	INDICATOR SIGHTGLASS
7	763455	2	VALVE SOLENOID
8	762412	2	VALVE, TXV 1/2 TON
9	762978	1	VALVE EPR R22
10	231101-SV	1	CAPILLARY TUBE .072X.026
11	4177217	1	EVAP WELDMENT & FOAMED
12	282025	2	COMPRESSOR, 208-230/60/1PH
13	282026	2	COMPRESSOR, 208-230/60/3PH
14	284082	1	CONDENSER, AIR-COOLED
15	284104	1	CONDENSER, WATER-COOLED
16	355002	1	CAB EVAPORATOR
17	763181	2	VALVE, WATER 3/8 NPT

