

Model 20

Saline Slush Freezer

Operating Instructions

030990-M



7/23/01

Complete this page for quick reference when service is required:

Taylor Distributor: _____

Address: _____

Phone: _____

Service: _____

Parts: _____

Date of Installation: _____

Information found on the data label:

Model Number: _____

Serial Number: _____

Electrical Specs: Voltage _____ Cycle _____

Phase _____

Maximum Fuse Size: _____ A

Minimum Wire Ampacity: _____ A

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030990-M



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750 N. Blackhawk Blvd.
Rockton, IL 61072

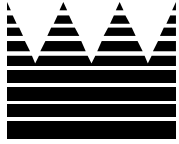


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Note: Continuing research results in steady improvements; therefore, information in this manual is subject to change without notice.

Section 1

To the Installer

The Model 20 is designed for indoor use only.

The Model 20 comes equipped with four casters; two are locking. To install the casters, tip the unit back to expose the front caster pads. (Note: The front of the unit contains the control switch.) Install both locking casters. Block and lock both front casters. Tip the unit forward and install the two remaining casters.



DO NOT install the machine in an area where a water jet could be used. Failure to follow this instruction may result in serious electrical shock.

Electrical Connections

Each freezer requires one power supply. The Model 20 is supplied with a cord and grounding type plug. The wall outlet must be rated 15A minimum and properly grounded.

In the United States, this equipment is intended to be installed in accordance with the National Electrical Code (NEC), ANSI/NFPA 70-1987. The purpose of the NEC code is the practical safeguarding of persons and property from hazards arising from the use of electricity. This code contains provisions considered necessary for safety. Compliance therewith and proper maintenance will result in an installation essentially free from hazard!

In all other areas of the world, equipment should be installed in accordance with the existing local codes. Please contact your local authorities.

Stationary appliances which are not equipped with a power cord and a plug or other device to disconnect the appliance from the power source must have an all-pole disconnecting device with a contact gap of at least 3 mm installed in the external installation.



CAUTION: Always disconnect the power supply before servicing this equipment. Failure to comply may result in electric shock or damage to the equipment.

Air Cooled Units

Always allow a minimum of 3" (76 mm) clearance around all sides of the unit for adequate air flow across the condenser. Failure to allow adequate clearance can reduce the equipment's performance and cause permanent damage to the compressor.

Do not allow the drape cloth to cover the side panel louvers. This may limit air flow to the condenser.



CAUTION: To protect the life of the compressor, continuous "No Load" operation of the unit should NOT exceed two hours. ("No Load" operation of the unit means running the unit with just the heat transfer medium in place.)



If the crossed out wheeled bin symbol is affixed to this product, it signifies that this product is compliant with the EU Directive as well as other similar legislation in effect after August 13, 2005. Therefore, it must be collected separately after its use is completed, and cannot be disposed as unsorted municipal waste.

The user is responsible for returning the product to the appropriate collection facility, as specified by your local code.

For additional information regarding applicable local laws, please contact the municipal facility and/or local distributor.

We at Taylor Company are concerned about the safety of the operator when he or she comes in contact with the freezer and its parts. Taylor has gone to extreme efforts to design and manufacture built-in safety features to protect both you and the service technician.



IMPORTANT - Failure to adhere to the following safety precautions may result in severe personal injury. Failure to comply with these warnings may damage the machine and its components. Component damage will result in part replacement expense and service repair expense.

To Operate Safely:



DO NOT operate the freezer without reading this operator's manual. Failure to follow this instruction may result in equipment damage, poor freezer performance, health hazards, or personal injury.



DO NOT allow untrained personnel to operate this machine. Failure to follow this instruction may result in damage to the machine.



DO NOT operate the freezer unless it is properly grounded. Failure to follow this instruction may result in electrocution.



DO NOT attempt any repairs unless the main power supply to the freezer has been disconnected. Failure to follow this instruction may result in electrocution. Contact your local authorized Taylor Distributor for service.



DO NOT operate the freezer with larger fuses than specified on the freezer data label. Failure to follow this instruction may result in electrocution or damage to the machine. Consult your electrician.



DO NOT use a water jet to clean or rinse the freezer. Failure to follow this instruction may result in serious electrical shock.



DO NOT operate the freezer unless all service panels and access doors are restrained with screws. Failure to follow this instruction may result in severe personal injury from hazardous moving parts.



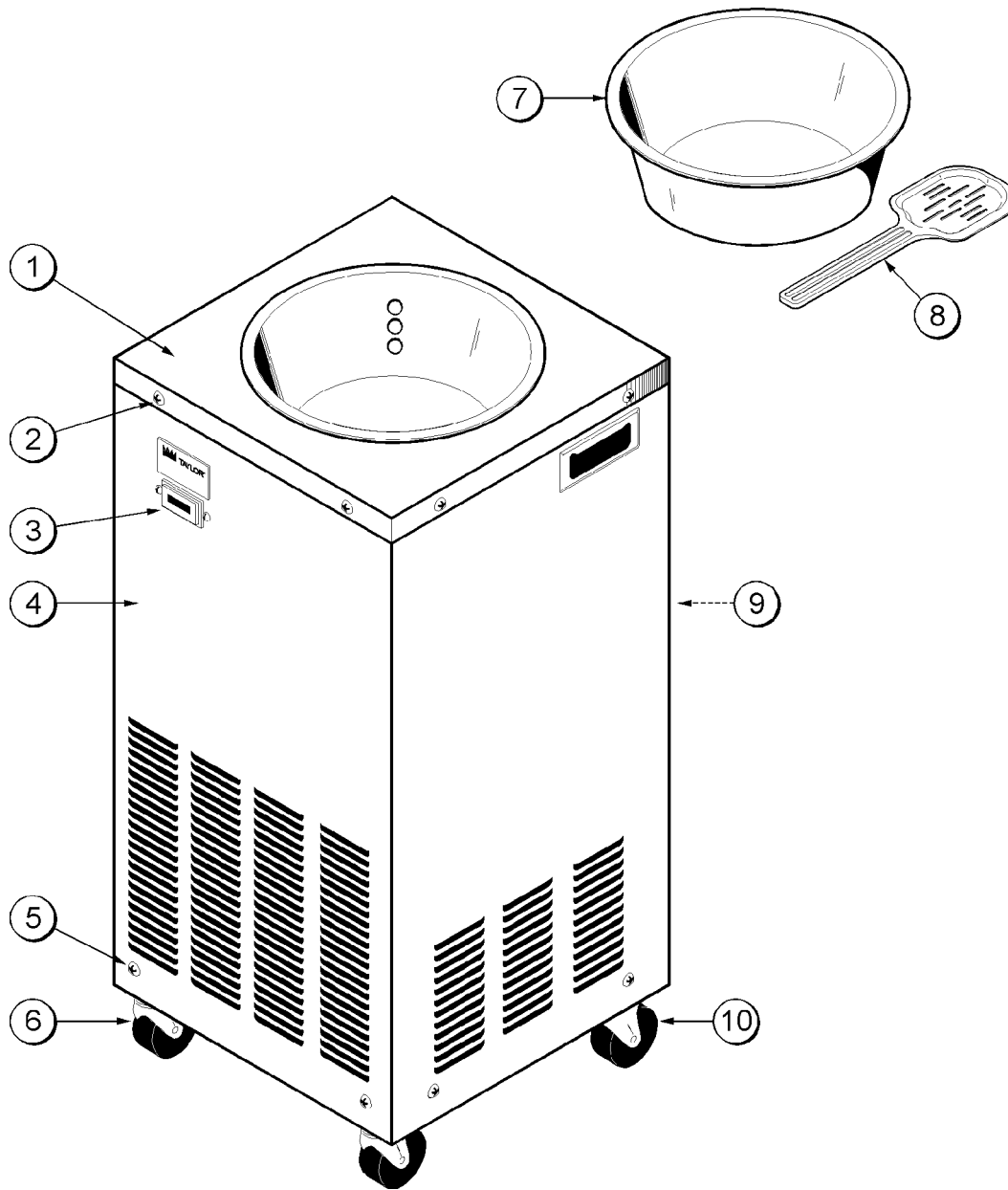
This freezer must be placed on a level surface. Failure to comply may result in personal injury or equipment damage.

DO NOT obstruct air intake and discharge openings: 3" (76 mm) minimum air space on all sides. Failure to follow this instruction may cause poor freezer performance and damage to the machine.

NOISE LEVEL: Airborne noise emission does not exceed 78 dB(A) when measured at a distance of 1.0 meter from the surface of the machine and at a height of 1.6 meters from the floor.

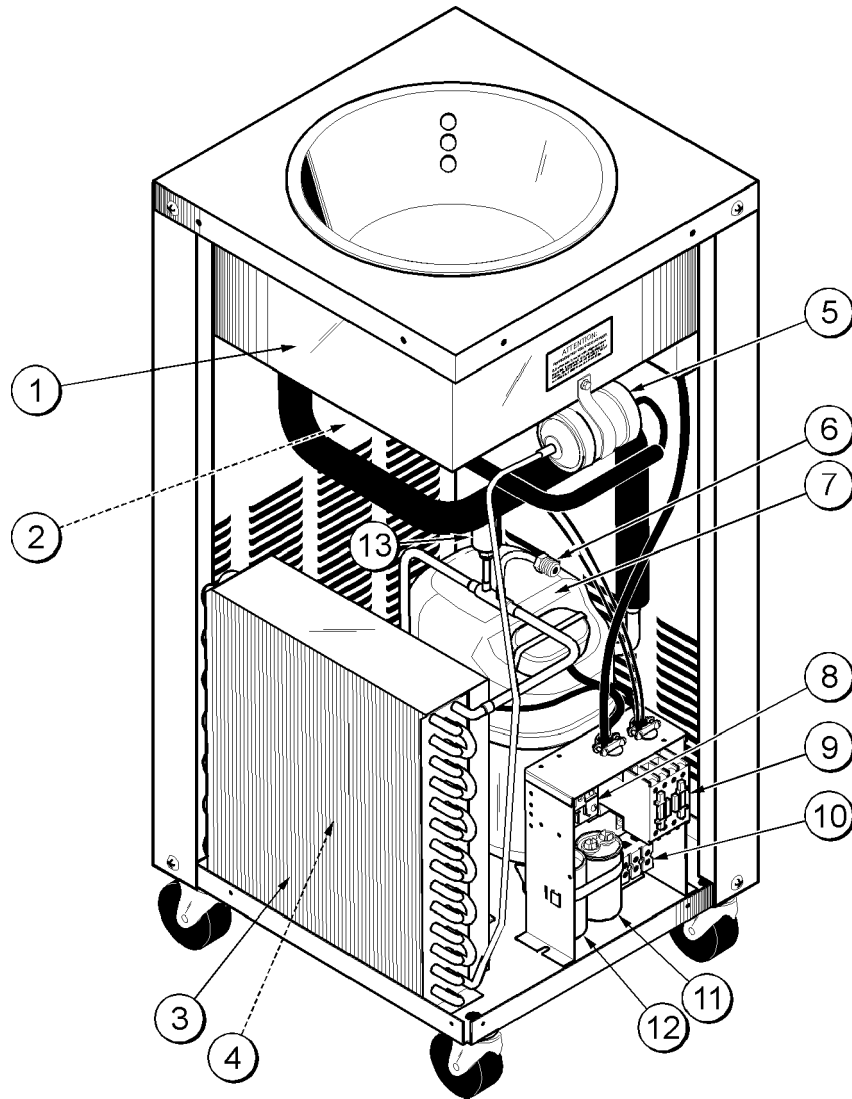
Section 3

Operator Parts Identification



Item	Description	Part No.
1	Evaporator A.-Insulated	X30615
2	Screw-1/4-20 x 3/8 PHL	038872
3	Switch-Pushbutton/Neon Display	030629-12
3a	Button Only-Black	031073
4	Panel A.-Side (Front)	X38874
5	Screw-10-32 x 3/8 PHL	038871

Item	Description	Part No.
6	Caster-Swivel 3/4 Stem 3" Wheel	038993
7	Basin-Plain	030618-BLK
8	Scraper-Saline Ice	030634
9	Panel A.-Side Removable (Rear)	X38873
10	Caster-Swivel 3/4 Stem 3" Wheel	038994



Item	Description	Part No.
1	Evaporator A.-Insulated	X30615
*2	Valve-Expansion-Auto	047232
*	Boot-Expansion Valve	027137
3	Condenser-AC 12 x 14 x 1.87	046556
*4	Motor-Fan 9 Watt	012768-12
*	Enclosure-Fan	014261
*	Bracket-Fan	025675
*	Fan-5 Blade 10" Pull	021371
5	Dryer-Filter HP62	048901

Item	Description	Part No.
6	Valve-Access 1/4 x 3/8	043232
7	Compressor - AJA2419ZXA	051787-12
8	Relay-3 Pole 115 V	012725-12
9	Relay-Start-Compressor	030846-12
10	Block-Terminal 2P, L1, N	039421
11	Capacitor-Run 15UF/370V	027087
12	Capacitor-Start 270-324UF	030847-12
13	Switch-Pressure 440 PSI	048230
*	Cover-Control Box	030631

*Not Shown.

Section 4

Operating Procedures

The Model 20 has been designed to produce a soft, pliable slush for surgical procedures. The volume of slush produced is dictated by the surgical procedure; however, the full capacity of the removable basin is 6 liters.

The following steps illustrate how to prepare the unit to produce the slush. All sterilization procedures should follow hospital standards and local health codes.

Step 1

Plug the power cord into a 115 volt wall receptacle.

Step 2

Place the unit in the "ON" position by pressing the control switch. A light will illuminate, indicating that the refrigeration system is operating.

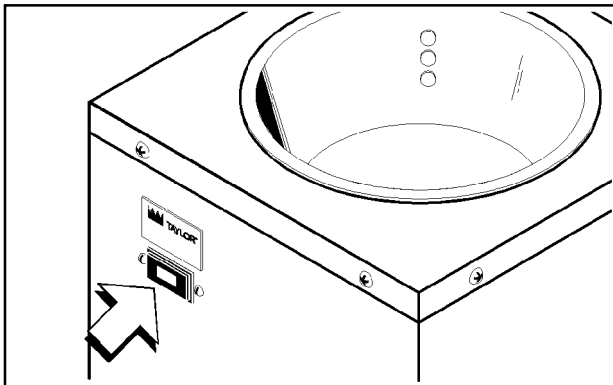


Figure 1

Step 3

Add a heat transfer medium (1200 cc's minimum/1300 cc's maximum) to the insulated evaporator. The heat transfer medium is dictated by the hospital. The solution should be a good conductor of heat, but should not freeze at a temperature above -37.2°C .

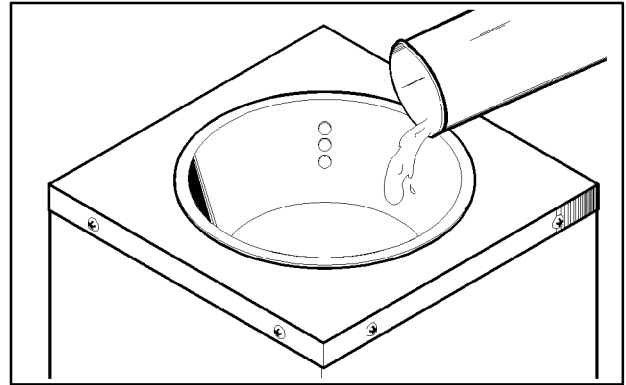


Figure 2

Example 1: 50% by volume solution of alcohol and water.

Example 2: 50% by volume solution of glycerin and water.

Example 3: 50% by volume solution of propylene glycol and water.

Allow the unit to operate for approximately 20 minutes to pre-cool the heat transfer medium. **Note:** This time can be significantly reduced if the heat transfer medium is pre-cooled in a refrigerator.

Step 4

After the pre-cooling period, drape the unit according to acceptable sterile techniques. Lay the sterile drape sheet over the insulated evaporator and over the sides of the unit. Do not cover the louvers.

Step 5

Using sterile techniques, gently place the sterile removable basin onto the drape and into the well of the unit.

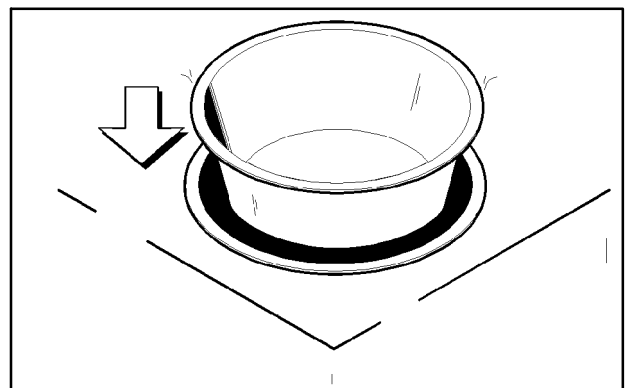


Figure 3

Step 6

Add approximately 1 - 4 liters of saline or an appropriate solution to the removable basin. (**Example:** electrolyte solution and any required membrane preservatives or chemical additives). To improve freezing time, this solution should be pre-cooled to 4°C (40°F) before adding it to the removable basin.

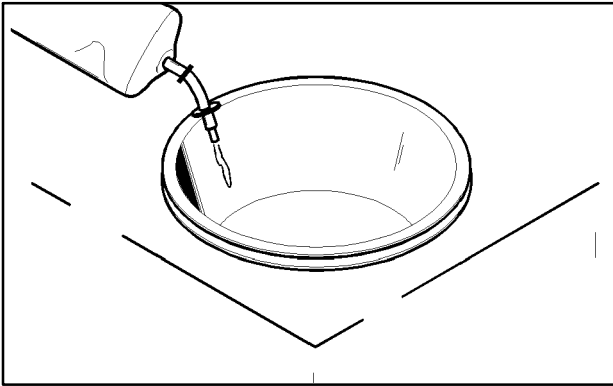


Figure 4

Step 7

When ice begins to form (approximately 15 minutes), begin scraping and stirring the solution. A polycarbonate scraper is supplied with the unit and may be gas or steam sterilized. Continue stirring the solution until the slush is ready for use. Constant scraping will improve freezing time. If the unit is left unattended for prolonged periods, the slush could freeze to the sides of the basin. If this should occur, scrape and stir the solution until it returns to a soft slush consistency.

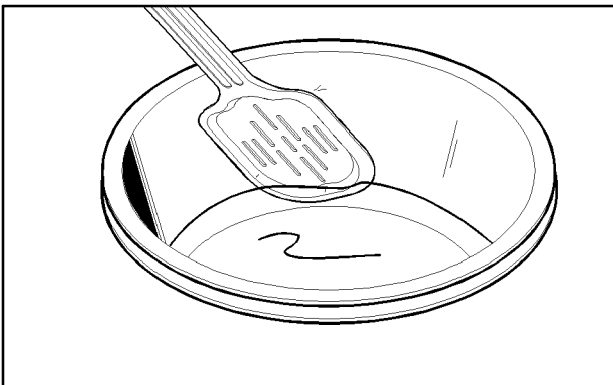


Figure 5

Step 8

As the slush is used, it can be replaced with an equal volume of pre-cooled solution.

Step 9

Once the slush is no longer required, place the control switch in the "OFF" position. Remove the basin for cleaning.

Step 10

To drain the insulated evaporator, place a collection pan under the right rear corner of the unit, directly below the copper drain tube.

Using a screwdriver, loosen the drain plug in the center of the insulated evaporator until all transfer solution has been drained. Tighten the drain plug.

IMPORTANT: It is assumed that all operating rooms are under strict clean and sterile conditions. However, even under the best of conditions, there will always be the threat of minute airborne particles of lint and dust. The Model 20 uses a small fan, fan blade and condenser for the removal of heat from the refrigerant. Air travels through the rear louver, across a condenser, and is blown out the sides and the front of the unit. This small amount of air movement allows lint and dust to travel into the machine to collect on the condenser. If the condenser is not cleaned, a sufficient amount of dust may break loose and escape out the sides and front of the machine. In addition, a dirty condenser will reduce the unit's refrigeration capabilities to produce slush in a sufficient amount of time.

Therefore, routine maintenance must be performed. The rear panel must be removed and the condenser and inside of the machine must be vacuumed. Use a soft brush to clean the condenser.

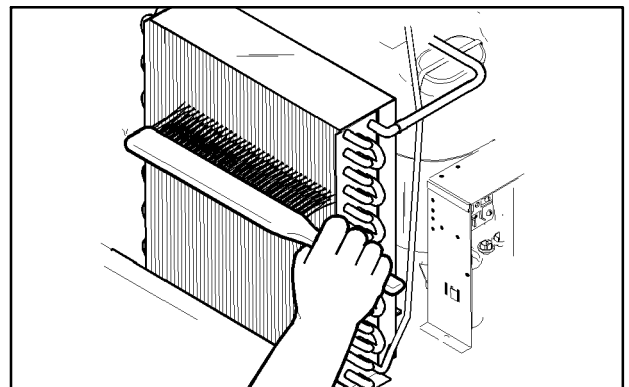


Figure 6

The intervals at which this job is performed are dictated by hospital standards and by how often the Model 20 is operated. It is suggested that the machine be inspected after each use.



When cleaning the condenser, use caution with the sharp metal fins. Failure to comply may result in personal injury.

Section 5

Refrigeration Principle

The insulated evaporator assembly has copper tubing coiled and soldered around the outer diameter. An automatic expansion valve sprays liquid refrigerant through the copper tubing. This refrigerant rapidly boils, picking up heat from the solution in the removable basin. As a low pressure gas, the refrigerant now travels out the copper tubing and down to the compressor.

The automatic expansion valve is pre-set from the factory at 9-10 PSI. To make any adjustments to the automatic expansion valve, place the low side line of a gauge set to the low side access port near the compressor. Place the pushbutton control switch in the ON position. While observing the gauge, turn the adjustment knob of the automatic expansion valve. A clockwise adjustment increases the low side pressure. A counterclockwise adjustment decreases the low side pressure.

Low Side: The point between the outlet of the automatic expansion valve as it enters the insulated evaporator, all the way to the compressor.

Low Side Pressure: Automatic expansion valve setting of 9-10 PSI.

The compressor is a pump which circulates refrigerant throughout the system. This compressor receives the low pressure gas from the insulated evaporator. It compresses the gas and sends it to the condenser as a high pressure gas. As a safety measure, the compressor has an internal overload. Should an overload occur, the compressor will automatically shut down. Once it has cooled, the compressor will start up again.

The condenser receives the high pressure gas from the compressor. A fan motor and blade pull air through the rear of the unit, and across the condenser. At this time, heat is removed from the refrigerant gas and is dissipated out the sides and front of the machine. Once heat is removed from the gas, the refrigerant turns into a liquid and drops to the bottom of the condenser.

The filter dryer receives the liquid refrigerant from the condenser. It filters impurities from the refrigerant before it reaches the automatic expansion valve. Any time the refrigerant is discharged from the system, a new filter dryer must be installed.

The heat exchanger consists of the liquid line and suction line soldered together. This is used to sub-cool the liquid refrigerant in the high side before it reaches the automatic expansion valve. The colder the refrigerant is before it reaches the automatic expansion valve, the more heat it will pick up when it enters the insulated evaporator. More importantly, the heat exchanger vaporizes any liquid refrigerant that might leave the insulated evaporator before it reaches the compressor.

If the frozen slush in the removable basin was left unattended for prolonged periods, the liquid refrigerant entering the insulated evaporator would not be able to boil off rapidly enough, due to the lack of heat. This would cause the refrigerant to leave the insulated evaporator as a liquid. If this occurred, frost would build up near or on the compressor. Liquid refrigerant allowed to enter the compressor would boil rapidly because of the heat in the compressor. This violent boiling action would allow the refrigerant to pick up excessive oil in the compressor.

If the machine is subject to this condition, the excessive oil will separate from the refrigerant as it enters the insulated evaporator. The oil will occupy space that the refrigerant must occupy to sufficiently remove heat from the solution. In addition, oil leaving a compressor could cause damage to the compressor.

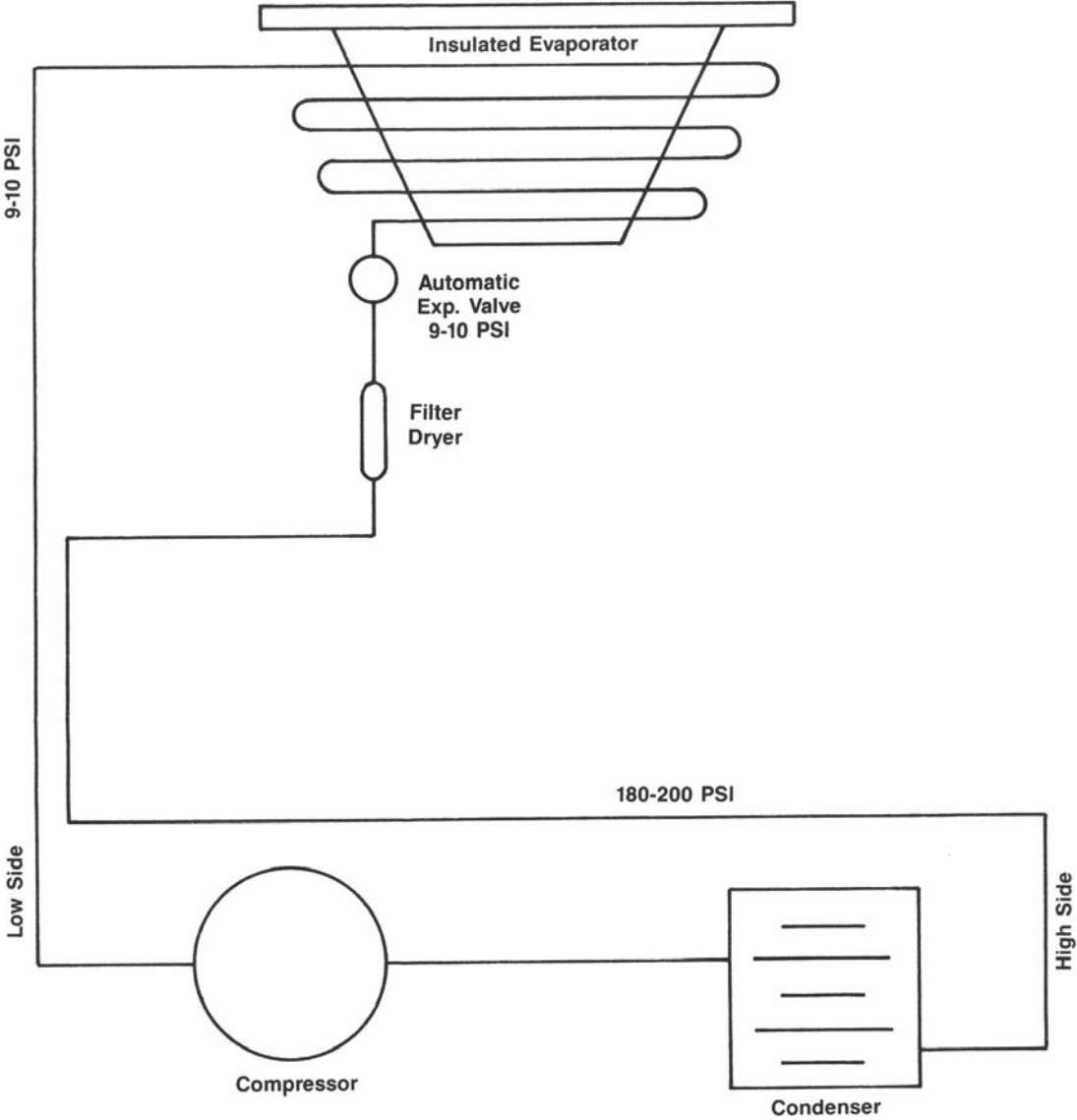
To correct an oil-logged insulated evaporator, open the automatic expansion valve to approximately 20 PSI. Pour hot water into the insulated evaporator and place the unit in the ON position. This will cause the refrigerant to flow into the insulated evaporator very rapidly. It will then boil violently because of the hot water. This violent boiling will allow the refrigerant to pick up the oil and carry it back down to the compressor. Once the hot water begins to cool, place the machine in the OFF position. Adjust the automatic expansion valve to the original setting.

High Side: The point between the outlet of the compressor, all the way to the expansion valve.

High Side Pressure: Should be maintained between 180-200 PSI, depending on room ambient conditions.

Section 6

Refrigeration Schematic



Section 7

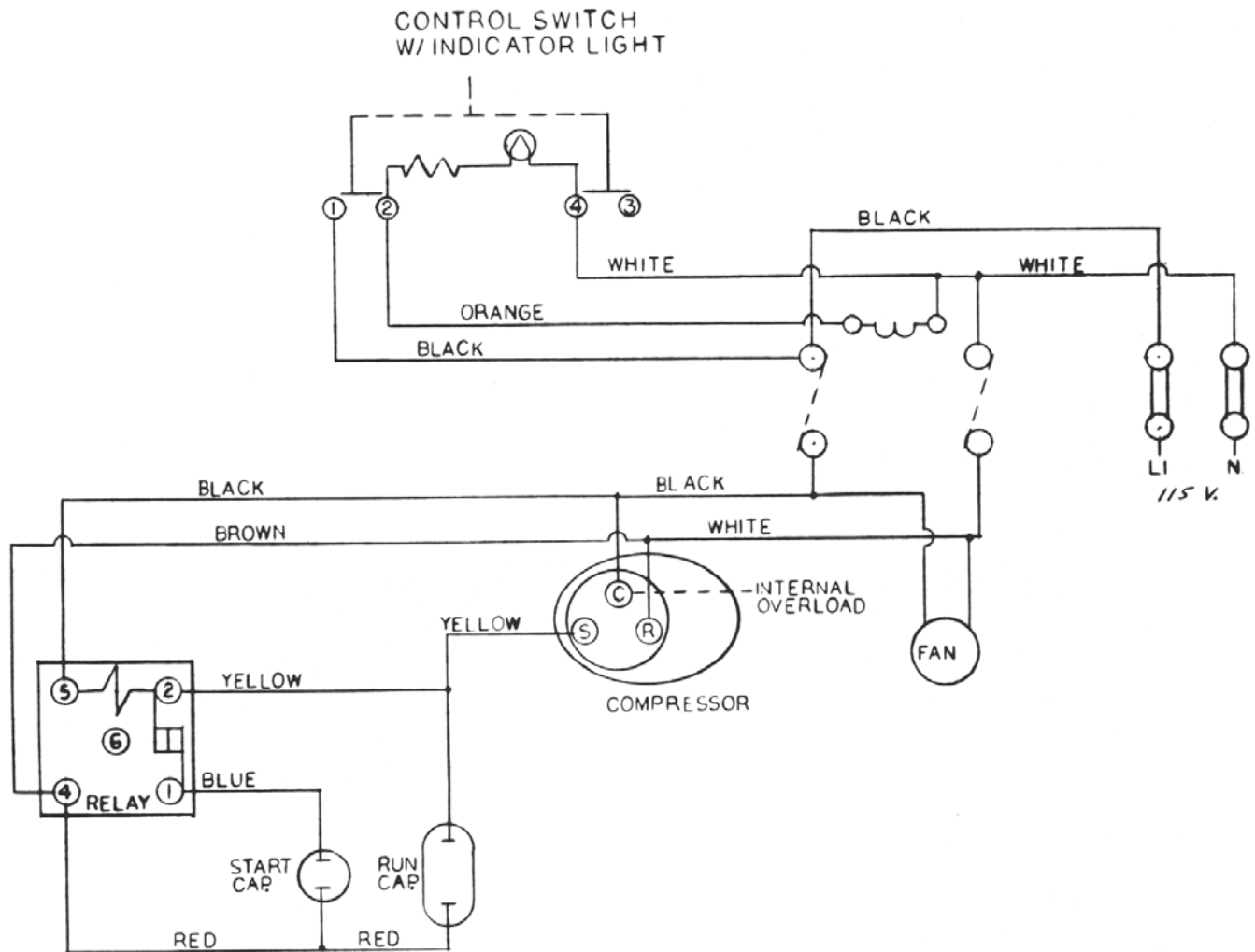
Electrical Principle

The pushbutton control switch starts and stops the refrigeration cycle. Once the pushbutton control switch is pressed, the compressor and fan should run. In addition, a light located inside the button will illuminate, which indicates that the machine is on. Once the pushbutton control switch is pressed again, the refrigeration cycle will stop, and the light will go out.

Under no circumstances should the pushbutton control switch be pressed repeatedly. This will cause the compressor start and stop, thus causing

possible damage to the compressor and other electrical components.

The start and run capacitors are located in the terminal box. These components are used in conjunction with the compressor. Once the pushbutton control switch is placed in the ON position, power will travel to the start capacitor to get the compressor started. After the compressor has started, the run capacitor takes over to keep the compressor running.



Section 8

Troubleshooting Guide

PROBLEM	PROBABLE CAUSE	REMEDY
<p>1. Solution takes excessively long to freeze to a slush consistency.</p>	<ul style="list-style-type: none"> a. Solution added to removable basin was above 4°C (40°F). b. Improper use of heat transfer medium. c. Shortage of refrigerant as evidenced by low suction and head pressures. d. Solution was left in removable basin unattended. No scraping. Ice formed on basin walls; therefore, solution in center of basin remains liquid. e. Faulty automatic expansion valve as evidenced by suction pressure not stabilizing at 3 - 4 PSI (21 - 28 kPa). (Pressure fluctuates.) f. Dirty condenser as evidenced by high head pressure. g. Compressor is going out on overload. h. Fan does not operate as evidenced by high head pressure. i. Oil is trapped in copper tubing around the insulated evaporator. 	<ul style="list-style-type: none"> a. Solution added to the removable basin should be below 4°C (40°F). b. Heat transfer medium must be a good conductor of heat and pre-cooled prior to adding the solution. c. Call a service technician. d. Constant scraping and agitating is necessary to refrigerate the solution. e. Call a service technician. f. Clean the condenser regularly. g. Allow the compressor to cool. It will automatically start up again. Check to make sure the unit is the only appliance running on the same 15A circuit. h. Call a service technician. i. Call a service technician.
<p>2. Unit does not operate after control switch is pressed (no fan or compressor operation).</p>	<ul style="list-style-type: none"> a. Unit is unplugged. b. Control switch is defective. c. Faulty coil in compressor contactor as evidenced by line voltage at the coil, but no compressor or fan operation. 	<ul style="list-style-type: none"> a. Plug into appropriate wall receptacle. b. Call a service technician to replace the control switch. c. Call a service technician to replace the compressor contactor.

PROBLEM	PROBABLE CAUSE	REMEDY
<p>3. Compressor does not operate after the control switch is pressed, but the fan motor <i>does</i> operate.</p>	<ul style="list-style-type: none"> a. Faulty start capacitor. b. Faulty capacitor relay. c. Faulty run capacitor, as evidenced by compressor which started but was unable to stay running. d. Compressor is going out on overload. 	<ul style="list-style-type: none"> a. Call a service technician to replace the start capacitor. b. Call a service technician to replace the capacitor relay. c. Call a service technician to replace the run capacitor. d. Allow the compressor to cool. It will automatically start up again.
<p>4. Compressor continually goes out on overload.</p>	<ul style="list-style-type: none"> a. Compressor motor windings short to ground. Disconnect power and check all three terminals in the compressor terminal box for continuity to compressor casing. b. Low or high line voltage. While the unit is running, check voltage supply at the compressor relay. c. Tight bearings, causing the motor to overheat as evidenced by a high amperage reading at the compressor terminal box. The RLA of the motor is stamped on the side of the compressor. d. Faulty run capacitor. e. Faulty start capacitor. f. Faulty capacitor relay as evidenced by compressor which does not start, or the start capacitor will continue to break down. 	<ul style="list-style-type: none"> a. Call a service technician. b. Contact an electrician to correct incoming voltage. If low voltage, check to be sure the unit is the only appliance running on the same 15A circuit. c. Call a service technician to replace the compressor. d. Call a service technician to replace the run capacitor. e. Call a service technician to replace the start capacitor. f. Call a service technician to replace the relay and, if needed, replace the start capacitor.

Section 9

Parts List

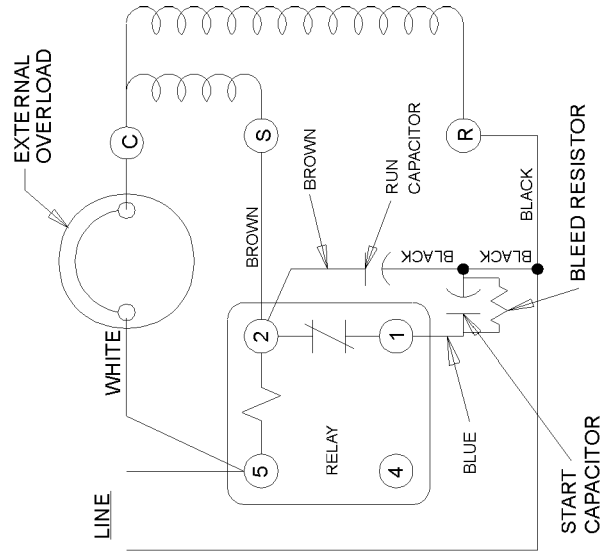
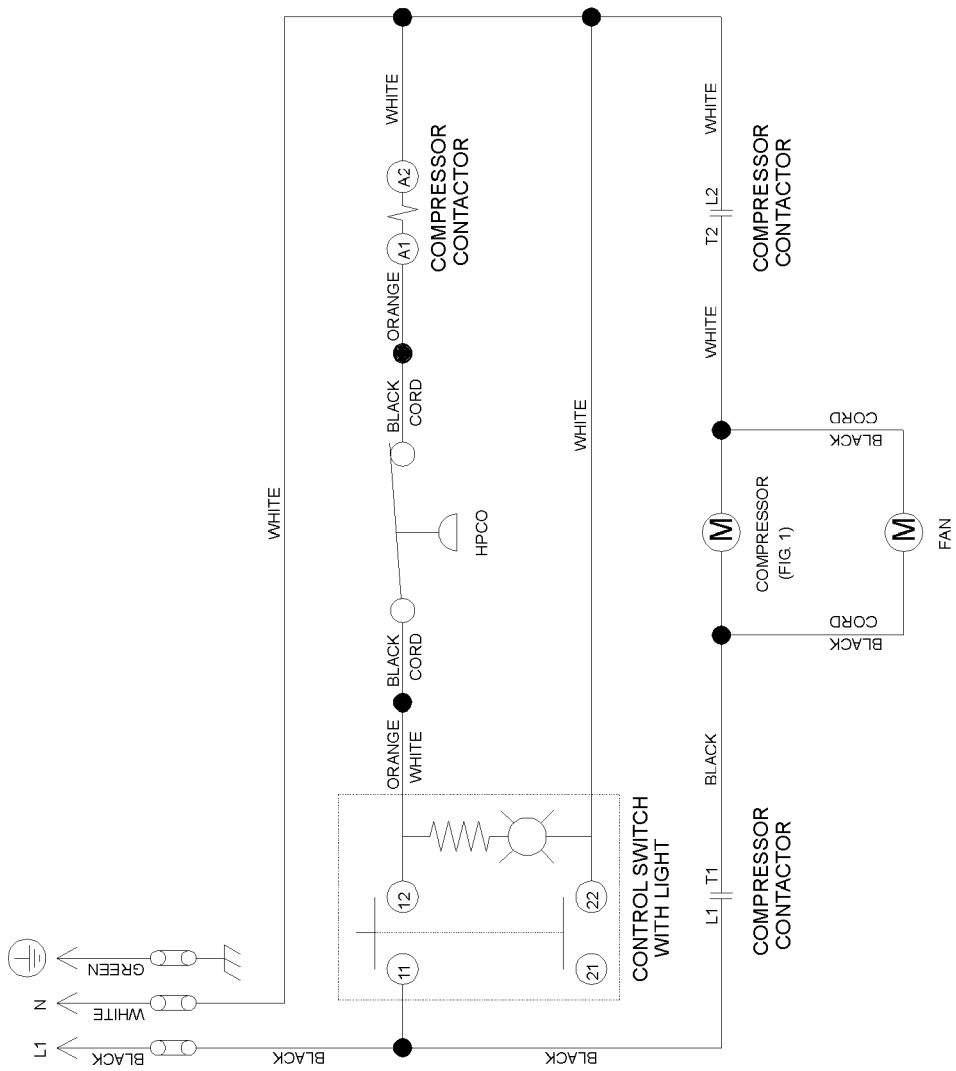
HP62 - J7128501/Up

DESCRIPTION	PART NUMBER	QTY.	WARR. CLASS	REMARKS	PARTS UPDATE
BASIN-PLAIN	030618-BLK	1	103		
SCRAPER-SALINE ICE	030634	2	103		
BLOCK-TERMINAL 2P-L1,N	039421	1	103	115/60/1	
BLOCK-TERMINAL 2P-L1,L2	039422	1	103	208-230/60/1	
BLOCK-TERMINAL-7 POLE GREEN	024156	1	103	220-240/50/1	
CASTER-SWV 3/4 STEM 3IN WHEEL	038994	2	103		
CASTER-SWV 3/4STM3IN WHL W/BRK	038993	2	103		
COMPRESSOR AJA2419ZA	051787-	1	512		
CAPACITOR-RUN- 15UF/370V	027087	1	103	ANY VOLTAGE	
CAPACITOR-START- 88-108UF/330V	030847-27	1	103	220-240/50/1	
CAPACITOR-START-161-193UF/330V	051698	1	103	208-230/60/1	
CAPACITOR-START-270-324UF/110V	030847-12	1	103	115/60/1	
RELAY-START-COMPRESSOR	030846-12	1	103	115/60/1	
RELAY-START-COMPRESSOR	031789	1	103	208-230/60/1	
RELAY-START-COMPRESSOR	051792	1	103	220-240/50/1	
CONDENSER-AC-12LX14HX1.87T 3RW	046556	1	103		
CORD A. *20*	X31080-SER	1	103		
DIAGRAM-WIRING *M 20*	051813-	1	000		
DRYER-FILTER-HP62-3/8 X 1/4S	048901	1	000		
EMBLEM-TAYLOR MODEL 20	031002	1	000		
ENCLOSURE-FAN	014261	1	103		
EVAPORATOR A.-INSULATED *20*	X30615	1	512	WITH HOOD	
HANDLE-STNLS FLUSH PULL	019043	2	103		
HOOK-CORD *20*	031850	2	103		
LABEL-CAUTION-GROUND-CORD-MULT	032165	1	000		
LABEL-DANGER-EXPLOSION RISK	030902-C	1	000		
LABEL-WARNING-COVER	051433	3	000		
LABEL-WARNING-COVER	051433	1	000		
MAN-OPER 20	030990-M	2	000		
MOTOR-FAN 9 WATT	012768-	1	103		
FAN-5 BLADE 10" PULL 28DEG CW	021371	1	103		
PANEL A.-SIDE *M 20*	X38874	1	103		
PANEL A.-SIDE REMOVABLE *M 20*	X38873	1	103		

+ Available Separately

DESCRIPTION	PART NUMBER	QTY.	WARR. CLASS	REMARKS	PARTS UPDATE
PLUG-DRAIN-WYOTT	023953-5	1	103	BASIN	
O-RING-.424 ID X .103 W	023953-6	1	000		
RELAY-3 POLE	012725-	1	103		
SWITCH-PRESSURE 440 PSI-SOLDER	048230	1	103		
SWITCH-PUSHBUTTON/NEON DISPLAY	030629-	1	103		
BUTTON	031073	1	000	COVER POWER SWITCH	
VALVE-ACCESS 1/4FL X 3/8SOLDER	043232	1	103		
VALVE-ACCESS-1/4 MFLX1/4 S-90	047016	1	103		
VALVE-EXP-AUTO-1/4S X 1/4FPT	047232	1	103		
BOOT-EXPANSION VALVE	027137	1	000		

+ Available Separately



TECUMSEH COMPRESSOR WIRING
FIG.1

GROUND FRAME SECURELY

**Model 20
051813-12**