

Durastill, Inc.

Fan-Cooled Electric Water Distiller Model 42-C

Congratulations on your purchase of one of the world's finest water distillers. Durastill, Inc. was a pioneer in the development of the fan-cooled water distiller. Durastill, Inc. has manufactured thousands of distillers since 1970 and is proud of the quality of its product.

Model 42-C consists of an all stainless steel evaporator tank, stainless steel cabinet, stainless steel float, and an Incoloy (stainless steel) heating element. The condensing coils are stainless steel with steel fins. Several safety mechanisms have been incorporated for your safety and the preservation of the unit.

HOW IT WORKS:

The purification process by its very nature will not only kill bacteria by the boiling temperature involved in the evaporator tank, but leaves the dead remains of bacteria in the boiler residue along with the minerals and pollutants in the original raw water. This residue is discarded by draining the evaporator tank occasionally. The steam which moves up the separation column and into the condenser coils will be essentially pure water vapor and this is what is condensed to become distilled water.

SAFETY FEATURES:

1. 24 VAC control circuit; relay controlled power circuit.
2. Float controlled limit switches located on the evaporator tank to control water levels in the tank.
3. Thermal safety switch to disconnect heating elements if unit overheats.
4. Circuit breakers on 24 VAC control circuit and on fan motor.

CAUTION:

Operate this distiller only from a properly grounded 208 or 240 volt A.C. current limited outlet. Failure to do this may result in fire or cause bodily harm.

Do not plug in this distiller until the inlet water supply has been installed and turned on.

Never repair or adjust distiller while it is plugged into line current. Read instructions before operation of distiller.

The distiller is intended for use on a municipal or well water supply. DO NOT ATTEMPT TO PURIFY WATER HEAVILY POLLUTED WITH INDUSTRIAL WASTES OR TOXIC CHEMICALS.

LOCATION OF UNIT:

Due to the transfer of heat from the steam during the condensation process approximately 17,000 BTU's of heat will be released to the surrounding air per hour of operation of this unit. This condition requires proper location of the unit so that the heat may be adequately dissipated, ventilated, or used beneficially. A relatively high temperature of the surrounding air will result in reduced condensing capacity of the distiller and may result in a steamy output of pure water.

INSTALLATION:

1. Unpack distiller. Be sure to remove all packaging materials from inside evaporator tank around float.
2. Unpack water storage tank and stand unit (if also purchased). Remove all packaging material and see that float switch unit is in place on storage tank. Place distiller on top of stand.
3. Hook up water line to distiller using installation kit provided. The plastic tubing should be connected to the brass fitting on the water solenoid valve (located on the left side of distiller). Be sure to use the brass tube inserts when connecting plastic tubing with compression fittings.
4. Connect vinyl tubing from condenser coil to storage tank.
5. Distiller should be level in order for the float to operate properly.
6. Turn on water.
7. Connect four-prong control plug from Durastill, Inc. storage tank to mating control socket located on back side of electrical control box of distiller. This connection controls the operation of the distiller by means of a float switch which senses the water level in the storage tank.

NOTE: Operation of distiller is controlled automatically by a float switch located on Durastill water storage tanks. The control plug located on the storage tank must be plugged into the four prong outlet of the distiller (located on back side) in order for distiller to operate. If a storage tank other than one manufactured by Durastill, Inc. is used, be sure that some type of water level control device is used on the storage tank to prevent overflow and that the distiller has a replacement control plug in its plug outlet.

8. Plug distiller into properly grounded 208 or 240 volt A.C. 60 Hz current limited power source (receptacle N.E.M.A. 6-30R). Turn all toggle switches to ON position. The evaporator tank should now begin to fill with water. Observe the first filling to be sure that the water flow stops before the water level is four inches from top of the tank. If the water flow fails to stop then unplug the unit to determine cause of trouble before proceeding. (See troubleshooting guide).
9. Fasten the evaporator lid.
10. Sterilize unit before first operation. (See sterilization procedure under Maintenance).
11. For normal operation the fan switch and water solenoid valve switch should be turned to ON.
12. The distiller is now ready for continuous automatic operation.
13. Manual Turn-off of distiller may be achieved by flipping top toggle switch located on electrical control box to OFF position.

OPERATING PROCEDURE:

Model 42-C is fully automatic provided that the instructions have been carefully followed. Routine maintenance should be practiced to insure proper operation of distiller.

There are three toggle switches located on distiller unit. These switches allow manual turn-off of the fan and one heating element, the water solenoid valve, or the complete unit.

The fan switch (S5) should be ON except when sterilizing unit.

When the fan switch is off, the fan motor and one heating element is disconnected (the other heating element provides steam for sterilization).

The water solenoid valve switch (S4) should be ON for continuous automatic operation of distiller. (Automatic operation of water solenoid valve is controlled by an internal float switch). It may be turned to OFF for small batch production of distilled water. Approximately one to two gallons of water will be distilled in the OFF position.

NOTE: Never turn off water supply to the distiller while it is operating because a long period of continuous operation of water solenoid valve may damage the solenoid.

The ON/OFF power switch for the complete unit must be ON in order for distiller to operate.

The indicator lamp (L1) on the front of the control box will illuminate when the main power switch is turned to ON and the unit is connected to a live power source. Failure of the indicator lamp to illuminate when the main power switch is ON is an indication that the main power source has been disconnected. The LED indicator (L2) on the front of the control box will illuminate when 24 VAC power is supplied to the power relay (distiller is operating). The LED indicator will be off if any relay control switches are open, i.e., storage tank is full or the evaporator has critically low water level.

MAINTENENCE

The distiller, if properly cared for, requires very little maintenance except for periodic draining and cleaning of the evaporator tank and occasional sterilization of the unit.

An accessory Automatic Drain Valve, Model DV-2, is available for this unit.

CLEANING EVAPORATOR:

The evaporator tank must be drained periodically to remove the concentrated minerals and other impurities which collect during the distilling process. The valve located on the side of this unit is used solely for this purpose. Always unplug distiller when draining tank.

The frequency of cleaning depends upon the impurity content of your water supply. Drain the evaporator after every twenty-five gallons of water have been produced. If no excessive scaling occurs this amount can be increased; if scaling is excessive, drain more often. Failure to clean the evaporator tank periodically will result in excessive scaling which may cause heating element failure. In addition, a large concentration of residue may encourage a foaming action to occur within the evaporator tank. Eventually the foam will rise to the level of the condenser tubing and contaminate the output.

If chemical cleaners are used to remove scale from tank and heating element, be sure tank is rinsed thoroughly after cleaning. It is wise to discard the first 2 1/2 gallons of water after such cleaning.

STERILIZING PROCEDURE:

It is recommended that the distiller be sterilized at the beginning of operation and occasionally thereafter.

To sterilize unit, turn fan switch to OFF. Allow steam to be generated into a separate container for approximately thirty minutes. (Do not allow steam to enter into the storage tank unless it is also being sterilized). This steam will sterilize the system. Remember to turn fan switch back to ON after sterilization cycle.

TROUBLE-SHOOTING GUIDE

NOTE: Two separate float switch mechanisms are embodied in this distiller. One switch (S3) regulates the ON/OFF operation of the water solenoid valve. The other switch (S2) is a safety device that will shut off the heating element and the fan when the water level becomes too low. These switches are preset at the factory and should require no adjustment.

PROBLEM: Evaporator tank will not fill with water automatically.

CAUSE:

- A. Water solenoid valve switch is turned off.
- B. There is no water pressure at water solenoid valve inlet. (Make sure saddle valve is turned on. Check for kinks in plastic tubing).
- C. Float inside evaporator tank is stuck.
- D. Float switch mechanism is incorrectly set.* or water level control switch (S3) is defective.
- E. Water solenoid valve is damaged.
- F. Circuit breaker (CB-3) is open.

* Refer to float switch adjustment instructions.

PROBLEM: Water solenoid valve will not shut off automatically.

- CAUSE:**
- A. Float inside evaporator tank is stuck.
 - B. Float switch mechanism is incorrectly set.*
 - C. Water solenoid valve is damaged.

PROBLEM: Distiller does not operate and indicator lamp (L1) is off and LED (L2) is off.

- CAUSE:**
- A. Main power switch on unit is off.
 - B. Line current (208 or 240V A.C.) is off or unit is not plugged in.

PROBLEM: Distiller does not operate and indicator lamp (L1) is on and LED (L2) is off.

- CAUSE:**
- A. Storage tank is full or storage tank control plug is not plugged into distiller control socket.
 - B. Water level inside evaporator is too low.
 - C. Float switch mechanism on Durastill storage tank is functioning improperly.*
 - D. Circuit breaker CB3 is open.
 - E. Relay coil is burnt out.
 - F. Transformer is damaged

PROBLEM: Distiller does not operate, and indicator lamp (L1) is on and LED (L2) is on.

- CAUSE:**
- A. Relay coil is burnt out.

PROBLEM: Fan does not operate automatically.

- CAUSE:**
- A. Fan switch is turned OFF. (Steam will be produced).
 - B. Water level inside evaporator is too low.
 - C. Fan motor is bad. (Steam will be produced through condenser coils).
 - D. Circuit breaker CB1 or CB2 is open.

PROBLEM: Fan operates but no water is produced.

- A. Thermostat button needs to be reset. Distiller must be cooled down before thermal switch can be reset. (This reset button is for your safety. It is designed to stop the unit from operating should the water level get too low).*

***NOTE:** Anytime the thermal protective switch needs to be reset it indicates that the float switch mechanism needs adjusting.*

- B. Both heating elements are bad.

SPECIFICATIONS:

1. Electrical : 208 or 240 volt A.C., 60 Hz, 1 phase, 5000 watts.
2. Shipping weight : 72 pounds
3. Dimensions : Height = 17", Length = 23", Width = 18".
4. Output : Approximately 42 gallons per day.

* Refer to float switch adjustment instructions.

Float Switch Adjustment Instructions
FOR QUALIFIED SERVICE PERSONNEL ONLY

Two separate float switch mechanisms, located on the front of the evaporator tank behind the front panel, are embodied in this distiller. These switches are activated by the float stem compression nut (connected to the float which is inside of evaporator tank). The float must rest freely on the surface of water in order to properly activate the switches.

The switches are preset at the factory and generally require no further adjustment. Switches will require adjustment when replaced or possibly after replacement of the float. The following procedure is recommended in the event that adjustment is required.

BOTTOM SWITCH ADJUSTMENT:

The bottom switch, S2, is a safety device that disconnects the heating elements and fan if the water level inside the evaporator tank becomes too low. The following steps are recommended for setting this switch:

1. UNPLUG distiller from electrical source.
2. Fill evaporator tank to minimum level of operation (recommended at 2 1/2 inches from bottom of evaporator tank).
3. Loosen the two mounting screws of bottom microswitch, S2.
4. Rotate this switch fully clockwise.
5. Slowly rotate switch counter-clockwise until a "click" is heard. (If difficulty is encountered during this step then major adjustment of microswitch may be required as outlined below).
6. Tighten the mounting screws while being careful not to alter the position of the microswitch.
7. Check for proper setting by pulling float upward until first "click" is heard (heating elements and fan turn-on level); now slowly release float downward while listening for second "click" (heating elements and fan turn-off level). Second "click" should occur at approximately the preset water level. If the switch does not "click" at this level then repeat steps 3 through 7 until acceptable.

TOP SWITCH ADJUSTMENT:

The top microswitch, S3, determines the water levels at which the water inlet solenoid valve turns on (low level) and turns off (full). The following steps are recommended for setting this switch.

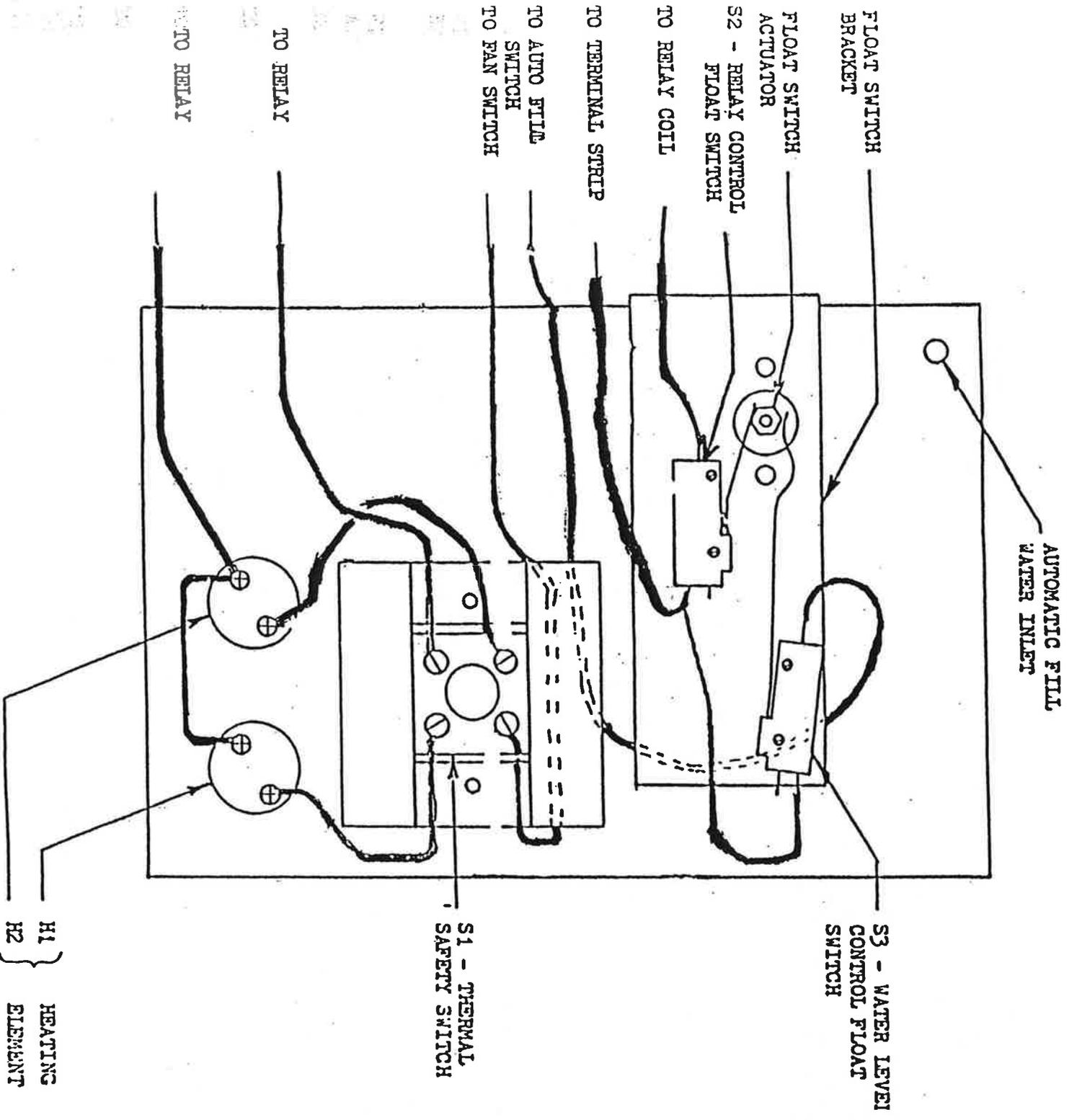
1. UNPLUG distiller from electrical source.
2. Fill evaporator tank to maximum desired level of operation (recommended at 6 inches from bottom of evaporator tank).
3. Loosen the two mounting screws of top microswitch, S3.
4. Rotate switch fully counter-clockwise.
5. Slowly rotate switch clockwise until a "click" is heard. (If difficulty is encountered during this step then major adjustment of microswitch may be required as outlined below).
6. Tighten the mounting screws while being careful not to alter the position of the microswitch.
7. Check for proper setting by pushing float downward until first "click" is heard (water turn-on level); now slowly release float upward while listening for second "click" (water turn-off level). Second "click" should occur at approximately the preset water level. If the switch does not "click" at this level then repeat steps 3 through 7 until acceptable.

NOTE: It is necessary that the water solenoid turn-on level is above the heating element and fan turn-off level. This allows the evaporator to fill with water automatically before the distiller shuts off. A simple method to check this setting is to pull float upward to top of evaporator tank. Now slowly release float and listen for the clicks. The top microswitch S3 must click before the bottom microswitch S2.

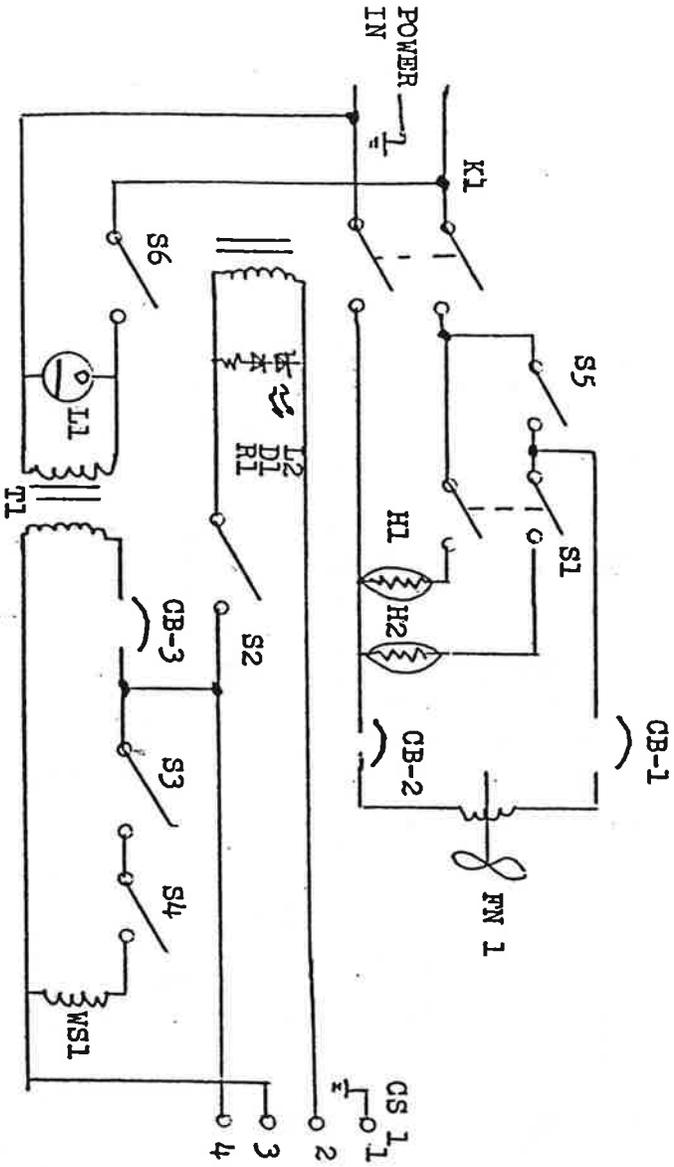
MAJOR ADJUSTMENT OF MICROSWITCH:

Occasionally it is necessary to perform a major adjustment on the microswitch if the switch is unable to be rotated far enough to allow proper setting. This adjustment is performed by bending the lever arm of the microswitch. It is recommended that the lever arm be held stationary near the plastic hinge to prevent breaking of the plastic. A needlenose pliers is ideal for this operation.

If S2 needs more counter-clockwise rotation or if S3 needs more clock-wise rotation, bend lever toward switch body. If S2 needs more clockwise rotation or if S3 needs more counter-clockwise rotation bend lever away from switch body. After a major adjustment, set the switch as indicated in switch adjustment instructions.



MODEL 42-C CIRCUIT DIAGRAM



- CB-1 1 Amp Fan Circuit Breaker
- CB-2 1 Amp Fan Circuit Breaker
- CB-3 5 Amp 24 Volt Circuit Breaker
- CS1 Four Prong Socket
- FN1 Fan & Motor
- FS-2 Storage Float Control Switch
- H1, H2 Heating Element, 2500 W
- L1 Power ON Indicator Lamp
- L2 Relay Indicator Light

- K1 Control Relay, 24 VAC Coil
- S1 Thermal Safety Switch
- S2 Relay Control Float Switch
- S3 Water Level Control Float Switch
- S4 Automatic Fill Switch
- S5 Fan Switch
- S6 Power Control Switch
- T1 Class 2, 24 VAC Sec. Transformer
- WS1 Water Solenoid Valve

L1
L2

Power ON Lamp
Relay Indicator

S5, Fan Switch
T1 24 VAC Sec. Transformer

K1

Control Relay

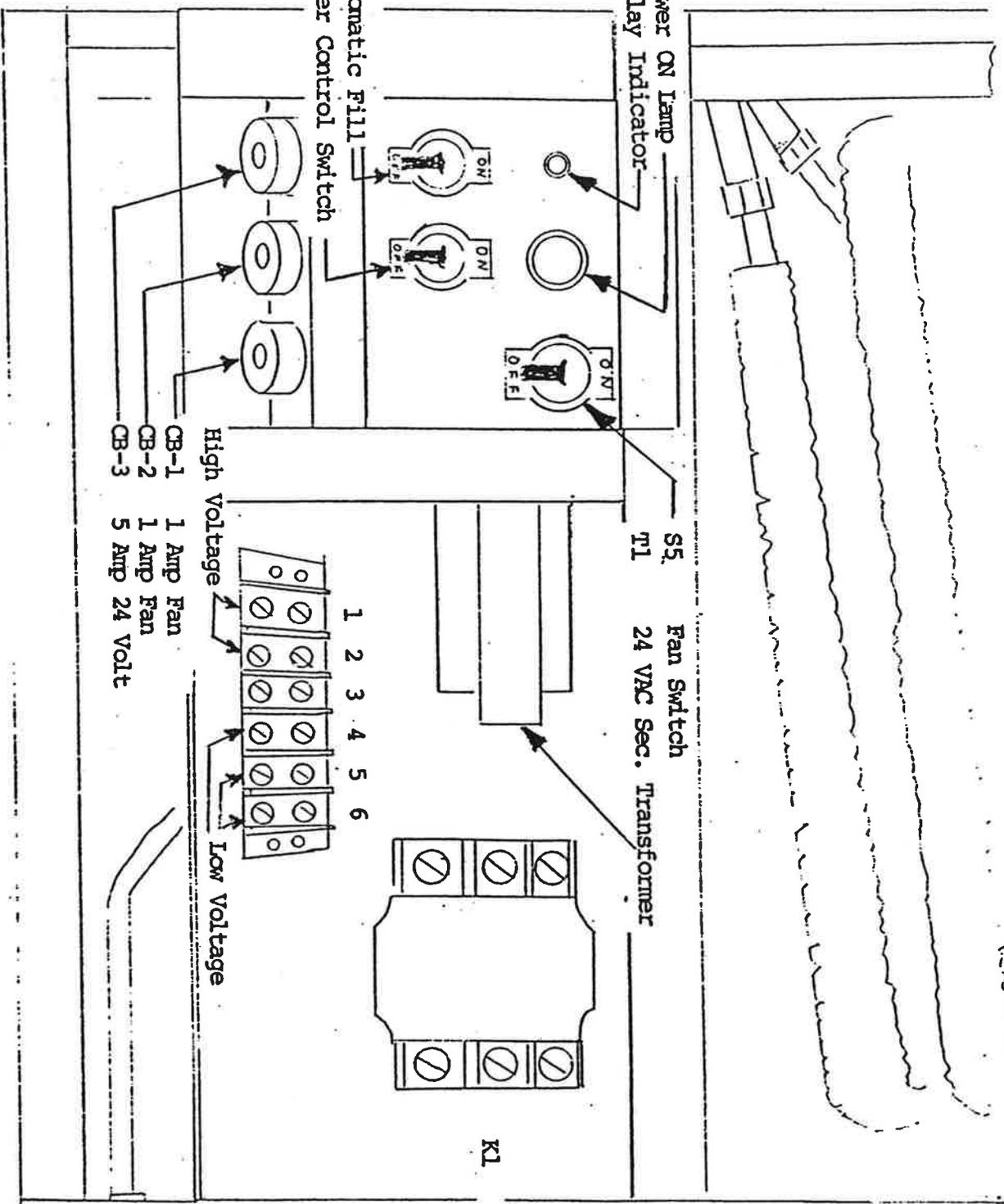
S4
S6

Automatic Fill
Power Control Switch

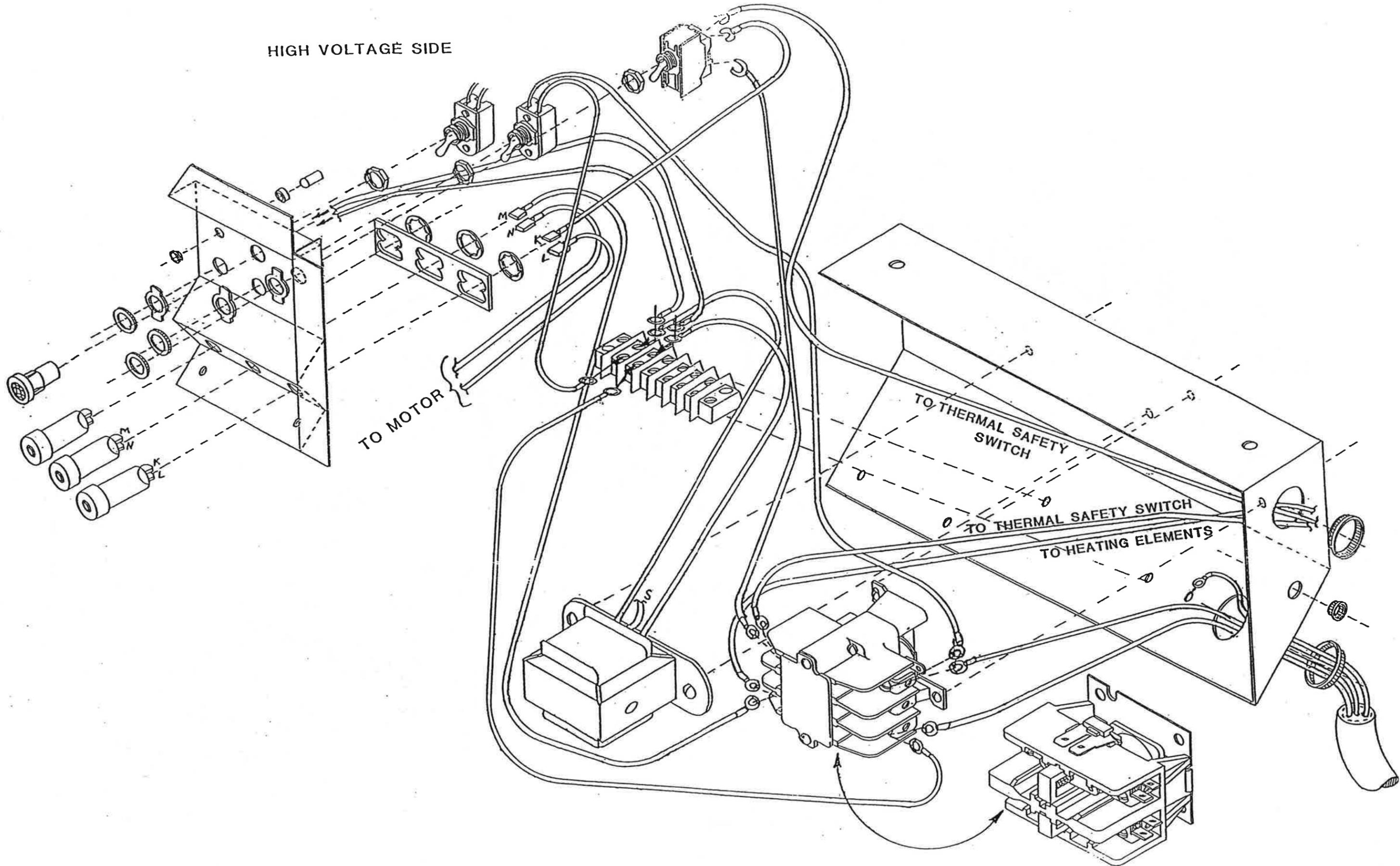
High Voltage

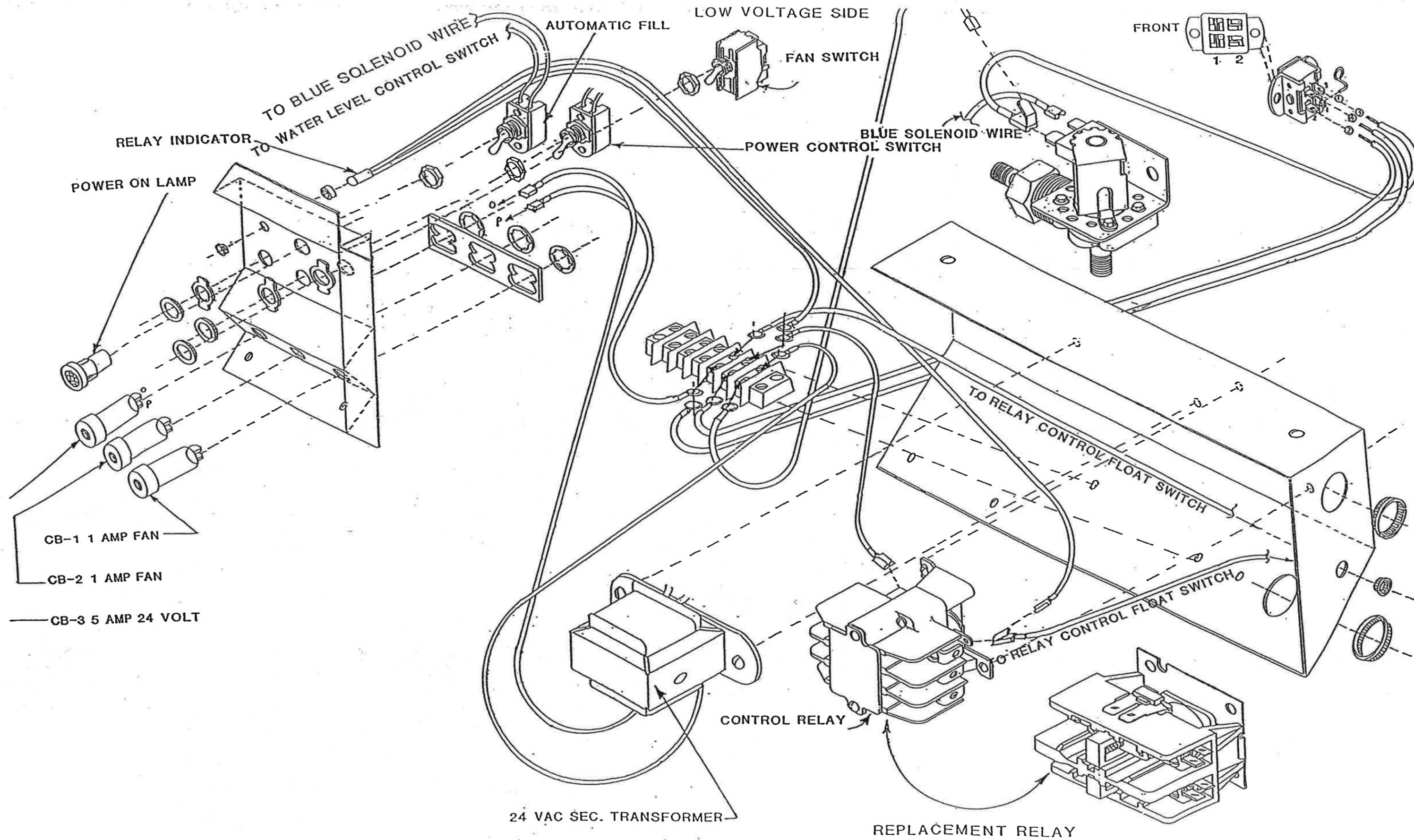
Low Voltage

CB-1 1 Amp Fan
CB-2 1 Amp Fan
CB-3 5 Amp 24 Volt



HIGH VOLTAGE SIDE





HEATING ELEMENT REPLACEMENT INSTRUCTIONS
FOR DISTILLER MODELS 21-C, 42-C, 100-C

FOR QUALIFIED SERVICE PERSONNEL ONLY

1. CHECK VOLTAGE AND WATTS RATING ON NEW HEATING ELEMENT TO BE SURE IT IS THE PROPER RATING. THE 21-C AND 42-C REQUIRE 2500 WATT HEATING ELEMENTS; THE 100-C REQUIRES 3500 WATT HEATING ELEMENTS.
2. DISCONNECT DISTILLER FROM ELECTRICAL SOURCE.
3. DRAIN EVAPORATOR.
4. REMOVE COVER TO OBTAIN ACCESS TO HEATING ELEMENT. ON THE 100-C THE STAND PIPE ASSEMBLY MUST BE REMOVED.
5. REMOVE WIRING FROM THE ELEMENT TO BE REPLACED. (LABEL WIRING)
6. LOOK INSIDE EVAPORATOR AND NOTE THE POSITION OF THE ELEMENT TO BE REMOVED. THE NEW ELEMENT MUST BE INSTALLED IN THE SAME POSITION.
7. REMOVE NUTS FROM THE HEATING ELEMENT BRACKET BOLTS.
8. REMOVE OLD HEATING ELEMENT.
9. REMOVE COLLAR AND HALF WASHER FROM THE OLD ELEMENT.
10. CHECK MOUNTING BOLTS FOR LEAKAGE. IF BOLTS ARE LEAKING, REMOVE THEM, WRAP THEM WITH TEFLON TAPE AND REPLACE. IF BOLTS ARE NOT LEAKING, DO NOT DISTURB THEM.
11. PLACE COLLAR ON NEW ELEMENT.
12. PLACE NEW GASKETS AND HALF WASHERS ON NEW ELEMENT AS SHOWN IN FIGURE 1. TIP MACHINE ONTO ITS BACK. HEATING ELEMENT IS PUT PARTIALLY INTO PLACE. PLACE HALF WASHERS AROUND HEATING ELEMENT POSTS, MAKING SURE THEY DON'T OVERLAP.
13. REPLACE HEATING ELEMENT IN THE SAME POSITION AS THE OLD ELEMENT.
14. REPLACE BRACKET AND TIGHTEN NUTS.
15. THE HEATING ELEMENT MUST BE LEVEL AND MUST NOT TOUCH THE BOTTOM OF THE DISTILLER. TO MAKE ADJUSTMENTS, TIGHTEN OR LOOSEN NUTS.
16. REPLACE WIRES. FILL EVAPORATOR WITH WATER. CHECK FOR LEAKS.
17. REPLACE COVER AND RECONNECT DISTILLER TO ELECTRICAL SOURCE.
18. OBSERVE DISTILLER OPERATION TO SEE THAT IT IS WORKING PROPERLY.

