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UNITED STATES PATENT: 4809515  
UNITED STATES PATENT: 4981020  
Other US and Foreign Patents Pending

**CYCLEPAK**  
**2090**

**Thermaflo • 3640 Main Street • Springfield, MA 01107**

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# READ ME FIRST

The OZsaver™ CyclePak has been designed to purify refrigerants to levels listed in Table A-1. In order for the CyclePak system to obtain these optimum results, a preconditioning operation on the OZsaver Light recovery unit must be performed before recycling. The preconditioning operation is described in this manual. If the preconditioning operation is not performed, the sample results could be as listed in Table A-2.

**Table A-1**

	R12	R134a	R22	R500	R502
water (ppm)*	<10	<10	<10	<10	<01
oil (%)**	<0.01	<0.01	<0.01	<0.01	<0.01
acid (ppm)*	1	1	1	1	1

**Table A-2**

	R12	R134a	R22	R500	R502
water (ppm)*	10-35	10-35	10-35	10-35	10-35
oil (%)**	0.01-0.02	0.01-0.02	0.01-0.02	0.01-0.02	0.01-0.02
acid (ppm)*	1	1	1	1	1

\* ppm is parts per million by weight.      \*\* (%) is percent of oil by volume.

- NOTES: 1. Results shown in Table A-2 are for aggregate random samples. Exact results are directly related and dependent on contamination levels within the specific recovery unit.
2. Results listed in Tables A-1 and A-2 are based on a 50 lb sample size of each refrigerant.

## SAFETY CONSIDERATIONS

**PRESSURIZED** tanks contain liquid refrigerant. Overfilling of the tank may cause a violent explosion and possible injury or death. The tank must be set on a calibrated scale to prevent overfilling. Use only authorized refillable tanks. ***Do not recover refrigerants into a non-refillable tank.***

**ALL** hoses may contain liquid refrigerant under pressure. Contact with a refrigerant may cause injury. Wear proper eye and skin protective equipment. Disconnect hoses with extreme caution. Replace all worn and damaged hoses.

**HIGH** voltage electricity is present behind panels. Disconnect the power before servicing. Replace frayed, worn and damaged power cords.

**USE** with refrigerants 12, 22, 500, 502, and 134a and other replacement blends. This equipment is not designed for any purpose other than recovering or charging refrigerants.

**FOR** use by qualified and trained personnel only. Operator must be familiar with refrigerants and the danger of pressurized components.

## PRECONDITIONING

Preconditioning is the process used to prepare the CyclePak, the OZsaver Light and the hoses for recycling. It consists of 2 steps: self-evacuation and self-cleaning. This process is necessary to clean all tubing and hoses involved in the transfer of recycled refrigerant.

### STEP 1: SELF-EVACUATION

- 1) Install a new filter in the CyclePak, if required, according to the procedure on page 10.
- 2) Place the CyclePak close to the OZsaver Light unit per physical configuration drawing Figure 1.
- 3) Configure the OZsaver Light and CyclePak hoses per Figure 2.
- 4) Place the CyclePak control valve V1 in the "LIQUID OPERATION" position. Close CyclePak drain valve V2 (see Figure 2).
- 5) Open OZsaver Light valves V1, V2, V3 and CyclePak valve V3 (see Figure 2).
- 6) Close ball valve V6 on hose 1. Keep both valves on the recovery tank closed (see Figure 2).
- 7) Place rocker switch SW2 in the "SELF- EVACUATE" position (see Figure 1).
- 8) Place rocker switch SW1 in the "RECOVER" position (see Figure 1).
- 9) Turn ON "SELF-EVACUATE" valve V5 (see Figure 1).
- 10) Open "SELF-EVACUATE" valve V4 (see Figure 1).
- 11) Press PB1 to start OZsaver (see Figure 1).
- 12) Let OZsaver run until suction gage reaches a minimum vacuum of 28 inches of mercury.  
Let OZsaver run for 3 additional minutes.
- 13) Close "SELF-EVACUATE" valve V4. (see Figure 1).
- 14) Stop OZsaver, turn "SELF-EVACUATE" valve V5 to OFF position (see Figure 1).
- 15) SELF- EVACUATION OF CYCLEPAK, OZSAVER AND HOSES IS NOW COMPLETE.

## STEP 2 : SELF-CLEANING

- 1) Open the low side (vapor) valve on the system being serviced (see Figure 2).
- 2) Open the low side (vapor) valve on the manifold.
- 3) Place OZsaver Light rocker switch SW2 in the "SUB-COOL" position and rocker switch SW1 in the "RECOVERY" position.
- 4) Press the OZsaver Light "START" button PB1 and allow it to run until the OZsaver Light Discharge Pressure Gage reads 220 PSIG.
- 5) Close the vapor valve on the manifold and allow the Suction Gage to fall to 0 PSIG. Do not go below 0 PSIG.
- 6) Close valve V2 on the OZsaver and place rocker switch SW1 in the "OFF" position to turn off the OZsaver Light.
- 7) Turn on the CyclePak (SW1) and allow it to run for one minute to warm it up.
- 8) Place OZsaver Light rocker switch SW2 in the "RECOVERY" position.
- 9) Turn on the OZsaver Light by placing rocker switch SW1 in the "RECOVERY" position and pressing START button PB1.
- 10) Open ball valve V6 on hose 1 and allow the OZsaver Light and the CyclePak to run for 10 minutes.
- 11) Close ball valve V6 on hose 1 and allow the OZsaver Light and the CyclePak to run until the OZsaver Light Suction Pressure Gage reads 0 PSIG. Do not go below 0 PSIG.
- 12) Close OZsaver Light valve V1 and STOP the OZsaver Light by placing rocker switch SW1 in the OFF position. Stop the CyclePak by putting switch SW1 in the OFF position.

### CAUTION:

**DO NOT ALLOW THE SUCTION GAGE TO REACH A PRESSURE BELOW 0 PSIG. STOP THE OZSAVER AT A SLIGHTLY POSITIVE PRESSURE TO ASSURE NO MIGRATION OF NON-CONDENSIBLES INTO THE SYSTEM WHEN CHANGING TO THE HOSE SETUP WHICH IS REQUIRED FOR RECYCLING.**

## SET-UP FOR RECYCLING

PERFORM THE FOLLOWING STEPS TO CONFIGURE THE SYSTEMS FOR RECYCLING.

- 1) Disconnect Hose 1 from the CyclePak and reconnect it to the liquid valve on the recovery tank. Do this operation as quickly as possible to prevent any migration of non-condensibles into the hose. Since the hose pressure is slightly positive, there will be, at most, a deminimus amount of non-condensable contamination.
- 2) Disconnect Hose 2 from the OZsaver "TANK RETURN " port and reconnect it to the CyclePak "REFRIGERANT INLET" port. Non-condensibles are kept out by the pressures within the hoses and CyclePak.
- 3) The hose setup will now be as shown in Figure 3. Proceed to Recycling Instructions on page 6.

# RECYCLING

## FOR SMALL AMOUNTS OF REFRIGERANT WITH SMALL AMOUNTS OF OIL

- 1) Place CyclePak control valve V1 in the "LIQUID OPERATION" position (see Figure 3).
- 2) Turn on the CyclePak (SW1) and allow it to run for 1 minute to warm it up.
- 3) Open OZsaver Light valves V1, V3, CyclePak valve V3 and ball valve V6 on hose 1.
- 4) Open the liquid valve and close the vapor valve on the recovery tank.
- 5) Place OZsaver Light rocker switches SW1 and SW2 in the "RECOVER" position and press the "START" button (PB1).
- 6) Open the low side (vapor) valve on the manifold and the system being serviced. Watch the Ozsaver Suction Gage and allow enough time for the suction pressure to drop to 50 psig.

NOTE: The 50 PSIG level will be reached when the ambient temperature is about 80 degrees F. At lower temperatures, the Ozsaver Suction Gage may read as low as 10 PSIG. These low pressures will not deteriorate the performance of the CyclePak.

- 7) After the system pressure has dropped to 50 PSIG open the liquid valve on the system being serviced and close the vapor valve.
- 8) Open the vapor valve on the recovery tank.
- 9) Continue to operate until all the refrigerant has been processed and the OZsaver Suction Pressure is at 0 PSIG.

CAUTION: Non-condensibles can be pumped into the recovery tank if you are servicing a system which has a leak and the pressure is pulled lower than 0 PSIG. The recovery tank can be purged of non-condensibles using the procedure found on page 9.

- 10) To stop the recycling operation, place the OZsaver and CyclePak rocker switches SW1 in the OFF position.

NOTE: The internal oil separator of the CyclePak will take 300 cc. before the oil drain lite comes on. To collect larger volumes of oil use the LARGE OIL COLLECTOR PROCEDURE described on page 7.

# RECYCLING

## WITH LARGE OIL COLLECTOR

SETUP THE LARGE OIL COLLECTOR AS SHOWN IN FIGURE 4. THIS METHOD IS CAPABLE OF COLLECTING IN EXCESS OF ONE GALLON OF OIL. THE OIL COLLECTOR IS EQUIPPED WITH A HIGH LEVEL FLOAT SWITCH AND A 200 WATT HEATER. THE HEATER WILL FORCE THE REFRIGERANT FROM THE OIL SO THAT WHEN IT IS DRAINED THE FOAM WILL BE REDUCED TO A MINIMUM. THE SYSTEM SHOWN IN FIGURE 4 IS A MANUAL SYSTEM WHICH CAN BE OPTIONALLY UPGRADED TO A FULLY AUTOMATIC SYSTEM.

**CAUTION: DRAINED OIL WILL BE HOT. USE CARE WHEN DRAINING.**

- 1) Place the CyclePak control valve V1 in the "LIQUID OPERATION" position.
- 2) Turn on the CyclePak (SW1) and allow it to run for 1 minute to warm it up.
- 3) Open OZsaver Light valves V1, V3, CyclePak valves V2 and V3, and oil collector valves V6 and V7.
- 4) Open the liquid valve on the recovery tank. The vapor valve remains closed.
- 5) Place OZsaver Light rocker switches SW1 and SW2 in the "RECOVER" position and press the "START" button (PB1).
- 6) Open the high side valve on the manifold and the low side (vapor) valve on the system being serviced. Watch the OZsaver Suction Gage and allow enough time for the suction pressure to drop to 50 PSIG.
- 7) After the system pressure has dropped to 50 PSIG, open the liquid valve on the system being serviced and close the high side manifold valve. Open the low side manifold valve. This allows refrigerant vapor from the oil collector to be recovered by the CyclePak.
- 8) Continue to operate until all refrigerant has been processed and the OZsaver suction pressure is at 0 PSIG.

**CAUTION:** Non-condensibles can be pumped into the recovery tank if you are servicing a system which has a leak and the pressure is pulled lower than 0 PSIG. The recovery tank can be purged of non-condensibles using the procedure found on page 9.

9) To stop the recycling operation , place the OZsaver and CyclePak switches SW1 in the OFF position.

## EMPTYING THE OIL SEPARATOR

If the indicator light on top of the CyclePak turns on anytime during recycling, the oil separator is full and must be drained using the following procedure:

- 1) Close the high side (liquid) and low side (vapor) valves on the manifold.
- 2) Close the vapor valve on the recovery tank.
- 3) Run the OZsaver Light and the CyclePak until the OZsaver Light Suction Pressure Gage reads 5 to 10 PSIG.
- 4) Turn off the OZsaver Light and the CyclePak.
- 5) Drain the oil from the CyclePak separator via drain valve V2.

## CHANGING THE FILTER

If changing the CyclePak filter is required during or before recycling, as indicated by a moisture sight glass (optionally supplied by user), care must be taken to first eliminate the pressure inside the CyclePak.

- 1) Close the valves on the system being serviced.
- 2) Close the vapor valve on the recovery tank.
- 3) Allow the OZsaver Light and the CyclePak to continue running until the OZsaver Light Suction Pressure Gage reads approximately 0 PSIG.
- 4) Close OZsaver Light inlet valve V1 and CyclePak outlet valve V3.
- 5) Turn off the OZsaver Light (SW1) and the Cyclepak (SW1).
- 6) Remove Hose 4 from CyclePak outlet valve V3.
- 7) Open valve V3 on the CyclePak and vent filter to 0 PSIG.
- 8) Remove the CyclePak filter cap and replace the filter (Thermaflo part number FP100-4).
- 9) Open vapor valve on the recovery tank. Open valve V3 on the CyclePak and vent the filter housing for 2 to 3 seconds. Close CyclePak valve V3.
- 10) Close the recovery tank vapor valve.
- 11) Reconnect Hose 4 to valve V3 on the CyclePak.
- 12) Return to the Recycling operation.

## REPLACING THE OIL SEPARATOR FULL LIGHT

If the oil separator full indicator light on the top of the CyclePak requires changing, replace it with Thermaflo part number 2090-17.

## PROCEDURE FOR PURGING NON-CONDENSABLE GASES

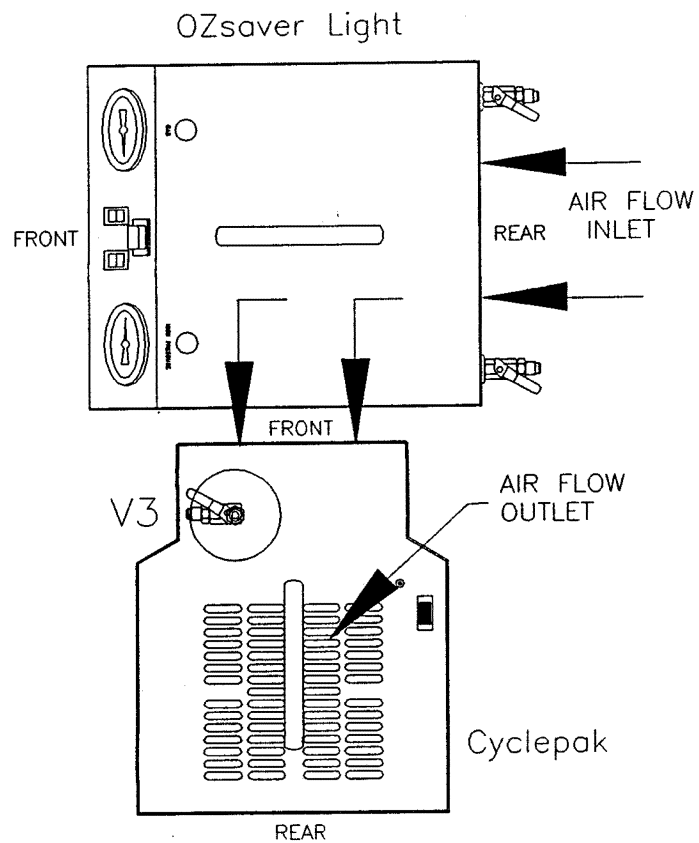
THIS PROCEDURE IS RECOMMENDED FOR PURGING AIR FROM TANKS CONTAINING RECOVERED REFRIGERANT.

1. ALLOW THE TANK TO STABILIZE FOR 24 HOURS.
2. CONNECT A PRESSURE GAGE TO THE TANK AND READ THE TANK PRESSURE.
3. DETERMINE THE AMBIENT TEMPERATURE IN THE ROOM.
4. REFER TO THE CHART BELOW. FOR THE ROOM TEMPERATURE, FIND THE CORRESPONDING REFRIGERANT PRESSURE. IF THE TANK PRESSURE IS HIGHER THAN THE CHART PRESSURE, THE TANK VALVE MUST BE SLOWLY OPENED TO PURGE OUT THE NON-CONDENSABLES. WHEN THE TANK PRESSURE FALLS BELOW OR IS EQUAL TO THE CHART PRESSURE, CLOSE THE TANK VALVE.
5. ALLOW THE TANK TO STABILIZE AND CHECK THE PRESSURE AGAIN.
6. REPEAT STEPS 3 THRU 5 IF TANK PRESSURE STILL EXCEEDS CHART PRESSURE.

EXCESS GAS CHARGE			EXCESS GAS CHARGE		
ROOM TEMP (F)	R-12 GAGE PSIG	R-22 GAGE PSIG	ROOM TEMP (F)	R-12 GAGE PSIG	R-22 GAGE PSIG
50	57	93	88	107	172
52	59	97	90	110	177
54	61	101	92	113	182
56	63	104	94	117	187
58	65	107	96	120	192
60	68	112	98	123	197
62	70	116	100	127	203
64	73	120	102	130	209
66	75	123	104	133	217
68	78	127	106	139	224
70	80	132	108	142	230
72	83	136	110	146	237
74	86	140	112	150	243
76	88	144	114	155	248
78	91	148	116	159	255
80	94	152	118	163	262
82	97	157	120	168	269
84	100	162	122	172	278
86	103	167	124	177	287



# FIGURE 1: PHYSICAL CONFIGURATION



NOTE: PLACE CYCLEPAK FRONT NEAR RIGHT SIDE OF OZSAVER LIGHT SO THAT CYCLEPAK CAN TAKE IN EXHAUST AIR COMING OUT OF OZSAVER LIGHT.

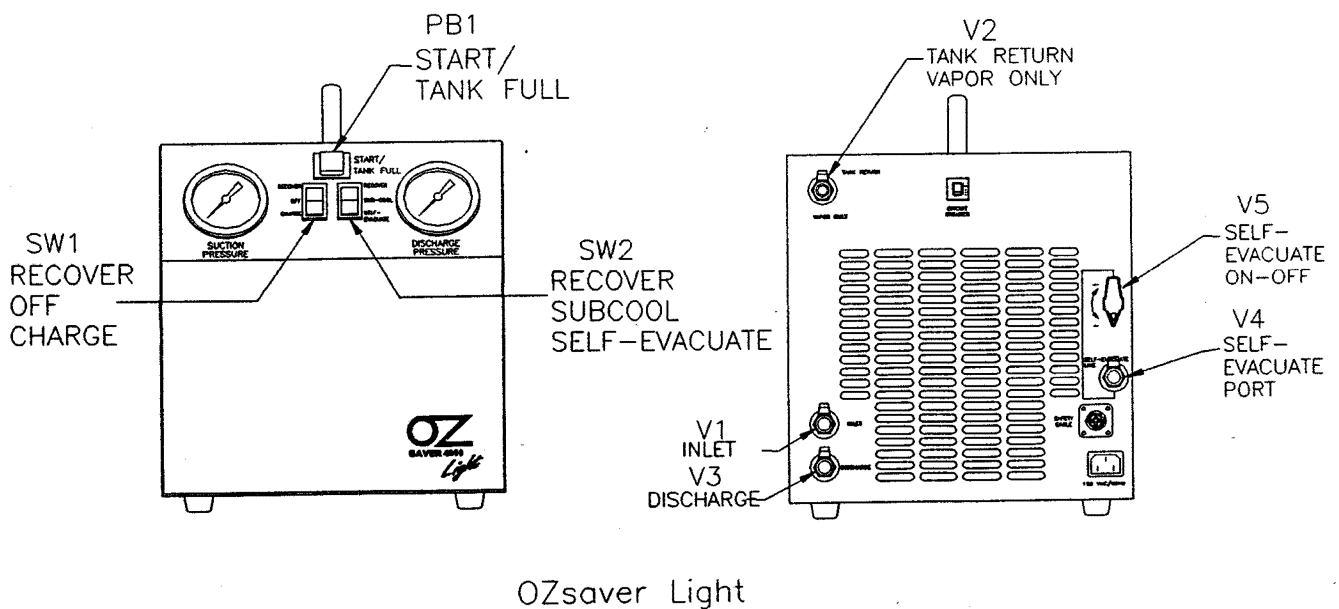
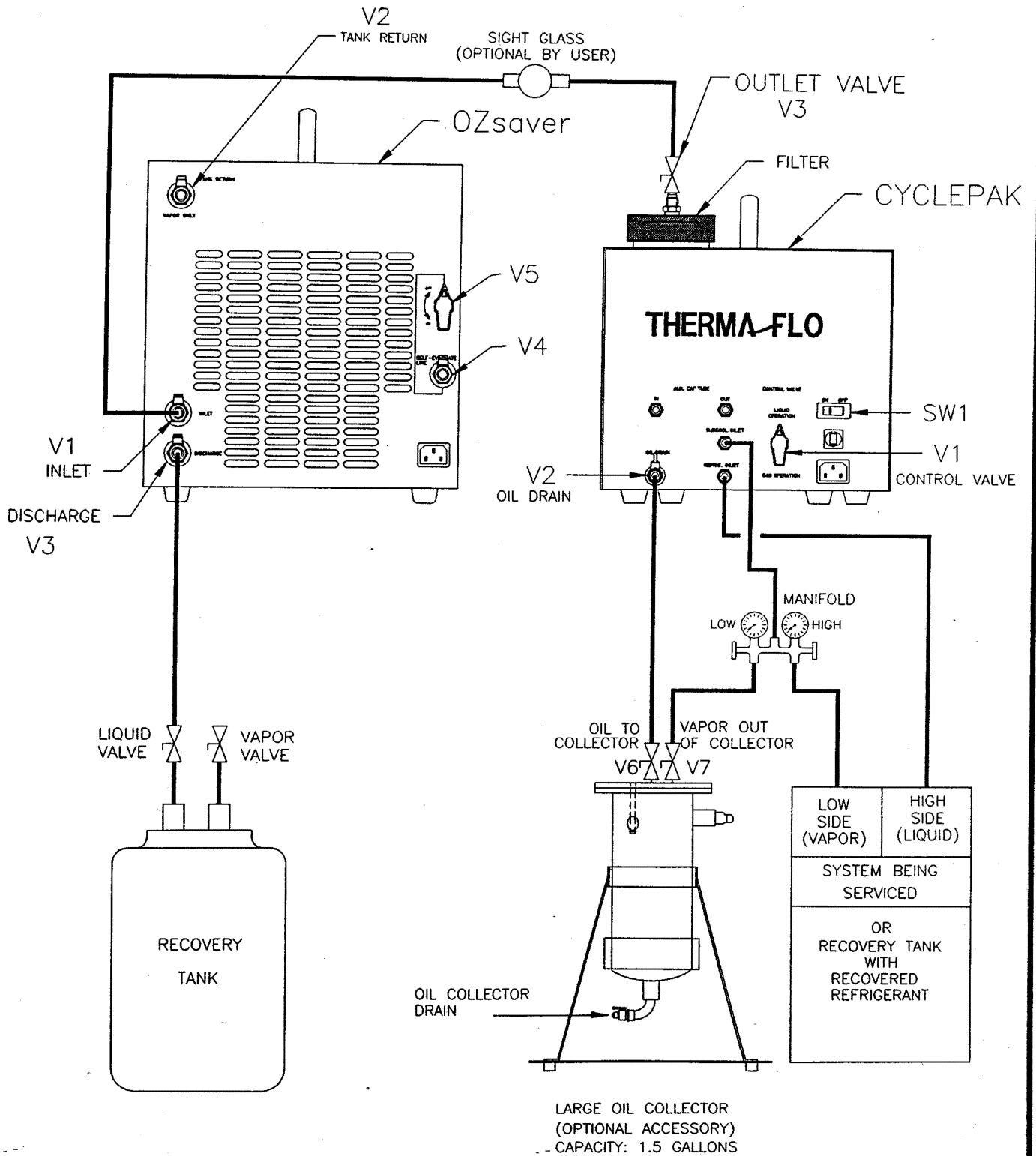


FIGURE 4: RECYCLING WITH LARGE OIL COLLECTOR



# FIGURE 3: RECYCLING

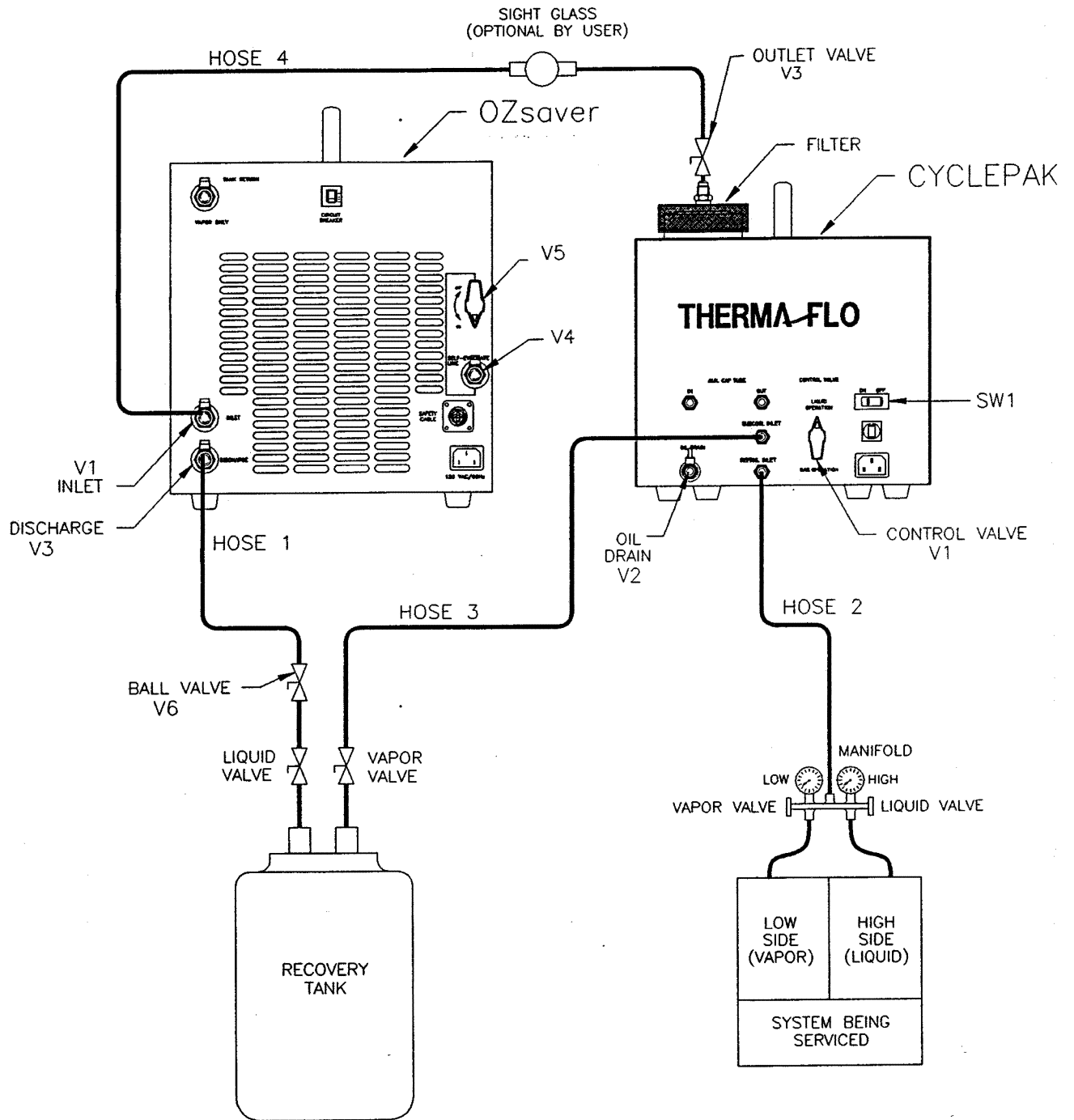


FIGURE 6: ELECTRICAL SCHEMATIC

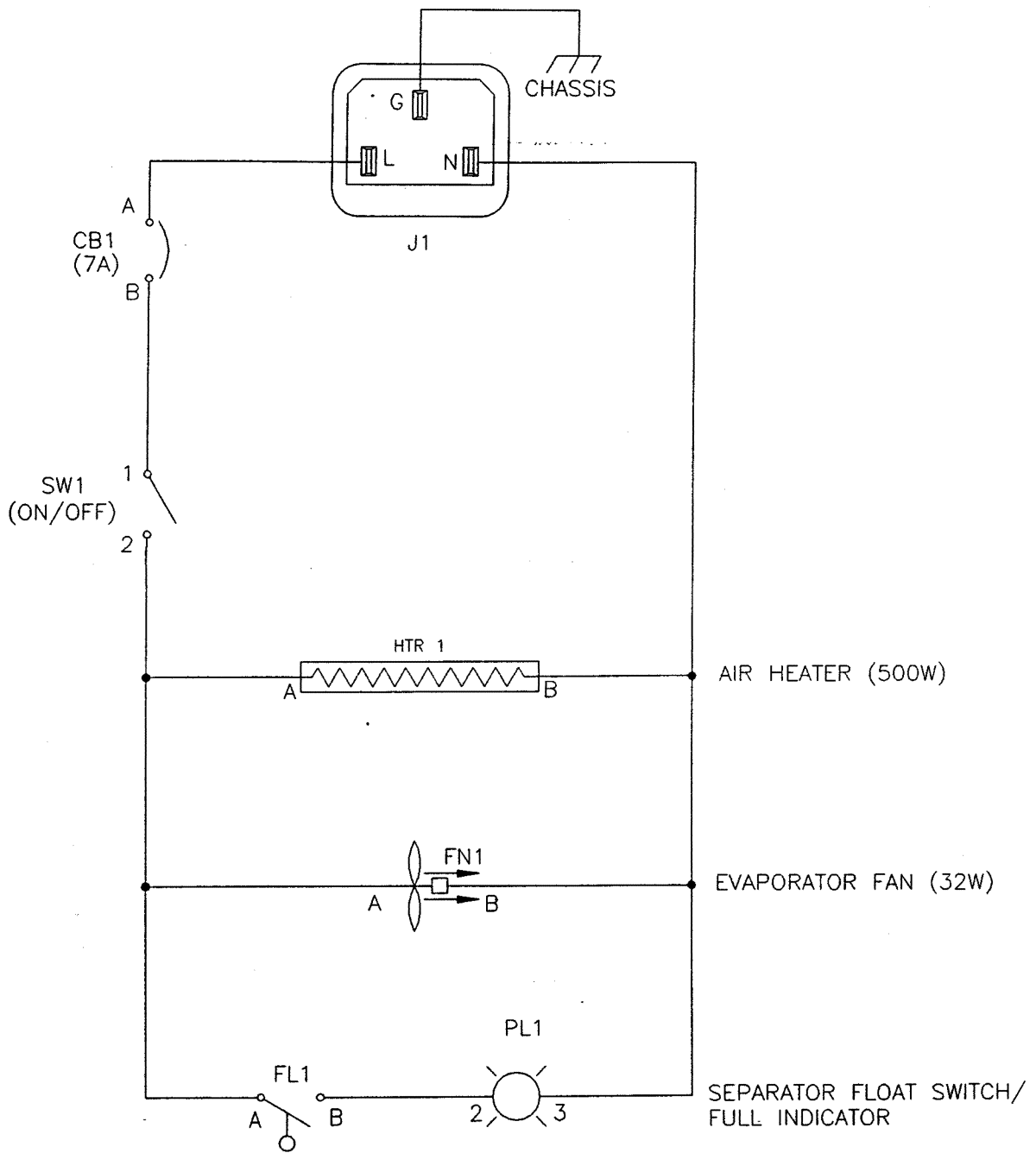
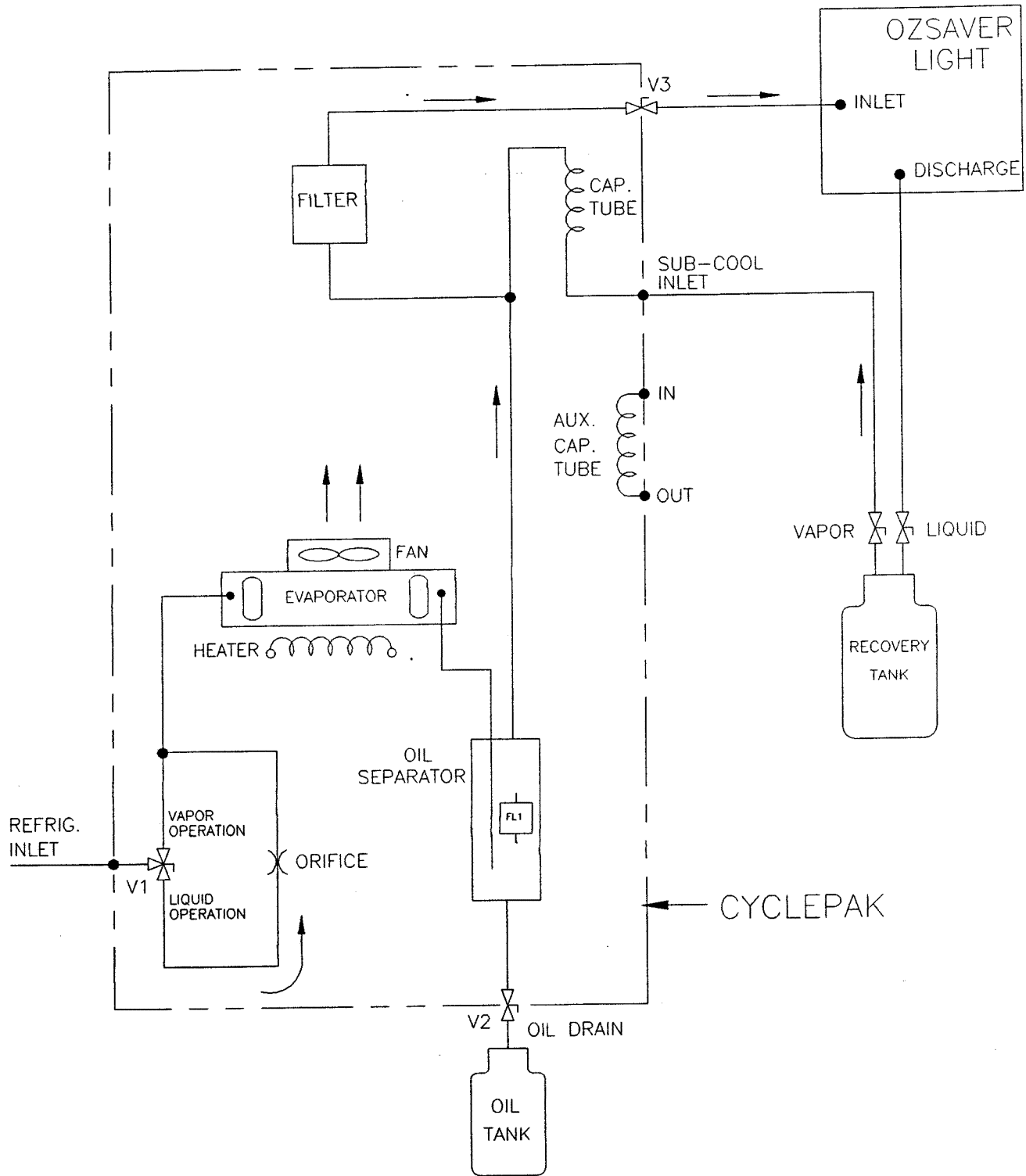


FIGURE 5: MECHANICAL SCHEMATIC



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