

MODEL 6500
REFRIGERANT RECOVERY
CENTER
OPERATING INSTRUCTIONS
115 VAC 60 Hz VERSION

MODEL 6500

REFRIGERANT RECOVERY CENTER

READ INSTRUCTIONS CAREFULLY BEFORE USING

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MODEL 6500 REFRIGERANT RECOVERY CENTER

OPERATING INSTRUCTIONS

Model 6500 Refrigerant Recovery Center was designed for removing refrigerants R-12, R-22, R-500, and R-502 in either liquid (push pull method) or gas form. This unit will remove refrigerant from a system and put it into an external storage tank. It does not reclaim or recycle refrigerant. Model 6500 has no internal storage capacity.

SPECIFICATIONS

VOLTAGE: 115 VAC 60Hz VAPOR REMOVAL RATE: Up to 1/2 lb/min
CURRENT: 6 A LIQUID PUSH-PULL RATE: Up to 10 lb/min
COMPRESSOR: 1/3 HP Cap Start CIRCUIT BREAKER: 10 A
SIZE: 12.5"D x 13"W x 15.5"H WEIGHT: 40 lbs.
REFRIGERANTS: R-12, R-22, R-500 AND R-502
DESIGN PRESSURE: HIGH 310 PSIG, LOW 225 PSIG

! SAFETY WARNING !

This unit should be operated by qualified air conditioning and refrigeration service technician only. Improper use of this unit can cause personal injury. Read instructions carefully before using. Use only approved refillable storage cylinders. Do not overfill any storage cylinder beyond its rated capacity. Do not use disposable cylinders. Use only R-12, R-22, R-500, or R-502 with the 6500. Never mix different refrigerants.

Take proper safety precautions when using the Model 6500. Wear safety glasses and protect skin from flash freezing. Hoses may contain liquid refrigerant under pressure. Use extreme caution when working with refrigerants.

This equipment should be used in locations with mechanical ventilation that provides at least four air changes per hour or the equipment should be located at least 18 inches (457mm) above the floor. Do not operate in the vicinity of spilled or open container of gasoline.

CAUTION: HIGH VOLTAGE ELECTRICITY INSIDE COVER. RISK OF ELECTRIC SHOCK. DISCONNECT POWER BEFORE SERVICING UNIT. MOVING PARTS. HOT PARTS. DO NOT OPERATE WITH COVER REMOVED.

WARNING: TO REDUCE THE RISK OF FIRE, avoid the use of an extension cord because the extension cord may overheat. If an extension cord must be used, the cord should be 14 AWG minimum and as short as possible.

Compressor Motor Thermally Protected.

CONTROL PANEL AND CABINET LAYOUT

POWER SWITCH: Controls power to the #6500. When the switch is in the ON position, the condenser fan will run and the compressor will start. The power switch engages a power relay that starts the 6500 compressor. If the compressor shuts down due to low or high pressure cutout, tripped circuit breaker or power outage, it will not restart until the power switch is turned off then back on. This prevents the compressor from short cycling and trying to start against a load.

POWER LAMP (AMBER, SMALL): Indicates that the power switch has been turned on and power is applied to the 6500.

LOW PRESSURE CUT OUT LAMP (GREEN): Indicates the 6500 has shut down on low pressure cut out.

HIGH PRESSURE CUT OUT LAMP (RED): Indicates the 6500 has shut down on high pressure cut out.

TANK FULL LAMP (AMBER): The storage tank has reached it's 80% fill and has shut the 6500 down.

CIRCUIT BREAKER (10A): Push to reset.

INLET VALVE and FITTING: Controls refrigerant flow into the 6500. An internal check valve prevents refrigerant flow out of the INLET valve.

OUTLET VALVE and FITTING: Controls refrigerant flow out of the 6500. An internal check valve prevents refrigerant flow into the OUTLET valve.

EQUALIZATION SOLENOID: Equalizes high and low side pressures within the 6500. These pressures equalize when the 6500 shuts down for any reason.

VACUUM FITTING: Provides a connection for the vacuum pump and allows evacuation of hoses and the 6500.

COMPRESSOR CRANKCASE SIGHT GLASS: Located in the rear of the 6500. Allows the compressor oil level to be monitored.

TANK CUTOFF SOCKET: Located on top of unit near the power cord. Connection for storage tanks with float switch.

CRANKCASE OIL OUTLET FITTING: Allows the compressor oil to be changed. This fitting should always be capped when not being used.

OIL TRAP OUTLET FITTING: Allows the oil trap to be drained. This fitting should always be capped when not being used.

GENERAL NOTES AND PRECAUTIONS

Refrigerant should be removed from systems as a liquid whenever possible. When refrigerant is removed as a gas, the removal process will take much longer. Boiling the liquid refrigerant into a gas reduces its pressure and temperature thus slowing the recovery process.

The #6500 cannot process liquid refrigerant directly, however the 6500 can use the push-pull method of moving liquid refrigerant. See diagrams on the following pages.

This unit must use an in-line filter, to protect the 6500 compressor. This filter will not clean refrigerant sufficiently, and the filter should not be used for multiple services. Refrigerant removed with the 6500 must be recycled before reusing, when recovering refrigerant from a system that is a burnout or a suspected burnout. A larger filter should be used at the inlet to protect the 6500 from contamination.

Model 75PKS Prefilter Kit provides a 48 cu. in. of filter media, this will clean and dry refrigerant when pulling out large amounts of liquid using the push pull method. The 75PKS uses a replaceable filter core. Different filter cores can be used in the 75PKS for a variety of needs, e.g. high acid, high moisture etc.

INLET (RIV) and OUTLET (ROV) valves should always remain closed and flare caps in place until the 6500 is used.

Good sealing brass flare caps should always be used on this unit. The flare caps seal is especially important during evacuation as the valve cores will not hold a vacuum.

This unit has a processing rate of up to 1/2 lb/min when removing vapor. The removal rate of the 6500 will vary for field applications. The type of refrigerant, ambient temperatures, and system connections will all have an effect on flow rate.

During normal operation the 6500 will shut down automatically when it reaches 10 inches vacuum.

The 6500 must not be used on systems known to have water mixed in with the refrigerant. The 6500 cannot process refrigerant containing liquid water.

The Model 6500 is supplied with valve core depressor valve for draining oil from the oil outlet fittings.

Use only refrigerant hoses that have a good sealing gasket in the quick couplers. The outer jackets of the charging hoses must also be in good condition.

Two refrigeration hoses are supplied with Model 6500. These hoses have a shut off fitting on one end of each hose. The fitting will close whenever the hoses are disconnected. Shut off hoses have snap rings that hold the shut off valve together, if these valves are tightened too much these snap rings may come out of the groove that holds the valve assembly together.

STORAGE TANKS

The Model 6500 must be used with a Thermal refillable storage tank equipped with a float switch to prevent overflowing of the tank. The attachment cord plugs into the top of the 6500 and to the top of the float switch on the tank. The 6500 will not operate unless the tank is plugged in. The unit cannot be operated with storage tanks that do not have the float switch.

The storage tank float switch will shut down the 6500 when the tank becomes full. The unit will not operate until the full storage tank is replaced with a tank that is not full.

Use only Thermal DOT approved refillable storage tanks. DO NOT USE disposable refrigerant tanks. Disposable tanks could explode and cause injury.

Thermal refillable tanks have both liquid and vapor valves. Use the vapor valve for recovery. Using the liquid valve (unless using the push-pull method) will cause the 6500 outlet pressure to rise. This will slow the recovery process and may cause the high pressure safety switch to engage, shutting down the 6500.

When removing large amounts of vapor from a system and under certain conditions such as high ambient temperatures, it may be necessary or advisable to use ice or cold water to cool down the storage tank to facilitate refrigerant removal. If the high pressure safety switch shuts down the 6500 before the storage tank is full, the tank should be cooled to reduce the tank pressure.

Empty storage tanks should be evacuated and charged before each use. Charge the empty tank using the same type of refrigerant that is to be recovered until the tank is at ambient pressure. If an empty tank under vacuum is used, the initial surge of refrigerant into the 6500 could cause liquid to slug the compressor.

INITIAL STARTUP PROCEDURE

NOTE: This unit has been factory charged with nitrogen which must be removed before using the 6500.

1. Remove the flare cap from the refrigerant OUTLET fitting and open the refrigerant OUTLET valve to remove the nitrogen.
2. Connect the 6500 to power, plug in the storage tank and turn the POWER switch ON. The storage tank with the float switch should not have any refrigeration hoses connected to it at this time. Allow the 6500 to shut down on the low pressure control, but don't turn off the power switch. The power switch must remain on in order for the equalization solenoid to remain open.
3. When the nitrogen has been removed, put the flare cap back on the OUTLET fitting. The cap should be snug.
4. Connect a vacuum pump to the VACUUM fitting.

5. Connect a cylinder containing the type of refrigerant to be charged with to the refrigerant INLET fitting. A pressure gauge or manifold will be needed to monitor inlet pressure. Use the vapor valve of the cylinder. The cylinder valve should remain closed, until step #9.
6. Open the INLET valve on the 6500. The OUTLET valve of the 6500 should remain open.
7. Turn on the vacuum pump and open the VACUUM valve. Evacuate to 300 microns.
8. Isolate the vacuum pump. The 6500 should hold approximately 500 microns or lower for five minutes. If the unit does not hold a vacuum, check hose and flare connections.
9. Open the refrigerant cylinder valve and allow gas to enter the 6500. Allow gas to flow until the pressure is about 30 PSI in the 6500. Turn off the POWER switch of the 6500 now. Close the OUTLET valve of the 6500.
10. Close the refrigerant cylinder valve.
11. Turn back ON the POWER switch of the #6500 and allow the unit to pull in the remaining refrigerant from the hose.
12. When the 6500 shuts down on low pressure cutout, close the inlet and vacuum valves of the 6500. Cap the fittings.

When recovering the same refrigerant, it is not necessary to evacuate and charge the 6500 each time. The unit will contain enough refrigerant for proper operation from the previous use. However, if the unit was used on a system with an electrical burnout, it is advisable to evacuate and charge before the next use. When removing a different refrigerant, follow the Initial Startup Procedure. The 6500 must be evacuated and charged with the refrigerant that is to be recovered.

VAPOR RECOVERY PROCEDURE

The system from which refrigerant is being removed must be OFF. Do not remove refrigerant while the system is operating.

1. The 6500 INLET and OUTLET valves should always remain closed until used.
2. With the charging manifold connected to the refrigeration system, (vapor only). Take the hose from the center port of the manifold and connect it to a flared fitting filter drier (5 cu. in. or larger), and then to the inlet of the 6500. The Shut off hose connects from the 6500 to the filter, with the Shut off fitting connected to the filter.
3. Connect the outlet of the 6500 to the vapor valve of the storage tank. The Shut off fitting connects to the tank.

4. All valves are still closed. Connect a vacuum pump to the VACUUM fitting. Start the vacuum pump and open the VACUUM valve, evacuate the hoses. The storage tank can be evacuated by opening the vapor valve on the tank. The vapor valve should remain closed if the tank contains refrigerant or has been previously evacuated.
5. If the storage tank has been evacuated and is empty, open the manifold valves to allow refrigerant from the system to pressurize the storage tank. The VACUUM valve must be capped and then opened. Allow the pressures to equalize.
6. If the storage tank is already charged, close the VACUUM valve and open both manifold valves (vapor only), then open both the inlet and outlet valves of the 6500 and the vapor valve of the storage tank. The tank should be upright.
7. Turn POWER switch ON, the 6500 will draw refrigerant from the system until all the vapor is gone and the system is pulled into a vacuum of 10 inches.
8. Close the manifold valves and the storage tank valve.
9. Turn POWER switch off. The Model 6500 should remain attached to the system being serviced. After five minutes, observe the system pressure. If refrigerant remains in the system, open the manifold and storage tank valves and repeat steps 7 through 9.
10. Restart the 6500, close the OUTLET valve and slowly crack open the VACUUM valve (VACUUM fitting must be capped) the vacuum valve should not be opened fully, only cracked open. After shut down, close the INLET valve of the 6500, Disconnect hoses, dispose properly of the filter-drier. The system is now ready to be serviced.
11. If the 6500 should shut down on high pressure cutout, close the VACUUM valve and open the OUTLET valve on the 6500, reopen the vapor valve on the storage tank. This will purge any excess liquid refrigerant out of the 6500 and into the storage tank. Turn the POWER switch OFF and repeat step 10.

LIQUID RECOVERY PROCEDURE, PUSH PULL METHOD

The system from which refrigerant is being removed must be OFF. Do not remove refrigerant while the system is operating.

1. The 6500 INLET and OUTLET valves should always remain closed until used.
2. With the charging manifold connected to the refrigeration system, take the hose from the center port of the manifold and connect it to the OUTLET fitting of the 6500.
3. Take the hose from the storage tank vapor valve and connect it to a flared fitting filter drier (5 cu. in. or larger), and then to the inlet of the 6500. The Shut off hose connects from the 6500 to the filter, with the Shut off fitting connected to the filter.

4. Connect another hose from the liquid receiver to the LIQUID valve on the storage tank. This hose may need to be purged of air if the storage tank is not being evacuated at the same time. See step #6.
5. All valves are still closed. Connect a vacuum pump to the VACUUM fitting. Start the vacuum pump and open the VACUUM valve, evacuate the hoses. The only hoses that are being evacuated at this point are the OUTLET hose connected to center fitting of the manifold (manifold valves closed) and the hoses and the filter-drier connected to the vapor valve of the storage tank. The vapor valve should remain closed when the tank contains refrigerant or has been previously evacuated.
6. If the liquid receiver has a shut off valve on it, then evacuation can be performed on the hose (connecting to the liquid valve of the tank to the receiver access valve) at the same time that the storage tank is evacuated. Open both the liquid and vapor valves of the storage tank and the hose going to the receiver will be evacuated too.
7. Close the VACUUM valve, open the storage tank vapor and liquid valve, the manifold high side valve and the 6500's INLET and OUTLET valves. START the 6500, allow the 6500 to run until the receiver is empty.
8. After all of the liquid refrigerant is gone, set up the 6500 to pull the remaining vapor out of the system as described in the VAPOR RECOVERY PROCEDURE.

DRAINING OIL TRAP

The Oil Trap removes contaminated oil from the refrigerant being recovered. The 6500 should be drained after every use. Use the valve core depressor to push in the valve core in the OIL TRAP OUTLET fitting. The refrigerant pressure in the 6500 will push the oil through the outlet fitting. Use caution when draining the oil. Measure the oil drained to determine the approximate amount of oil removed from the system. Add new refrigeration oil to the system (not to the 6500) to replace the contaminated oil removed.

NOTE: Failure to drain the OIL TRAP can allow the contaminated oil to flow into the compressor and cause premature failure.

HIGH PRESSURE SAFETY SWITCH

The 6500 has a built-in high pressure switch that will shut down the unit when the refrigerant outlet pressure exceeds 350 PSI. This is a safety feature only and should not be used on a regular basis for filling storage tanks. It will not prevent overfilling of the storage tank. The overfilling of any storage tank beyond its rated capacity can cause the tank to explode or burst.

If the 6500 shuts down, check the storage tank. If the tank is full, replace with an empty tank. If storage tank is not full, determine the cause of high pressure shutdown. If the OUTLET fitting was connected to the liquid valve of a two valve storage tank, reconnect to the vapor valve. If high ambient temperatures caused the shutdown, the tank will

need to be cooled to continue recovery.

CRANKCASE SIGHT GLASS AND OIL OUTLET

The compressor is equipped with a crankcase sight glass. The sight glass should be approximately one third full to one half full (measured from the bottom) when the 6500 is recovering refrigerant. The sight glass reading can be used when the unit is off after high and low side pressures have equalized. **NOTE:** Do not use the sight glass reading for the compressor while the 6500 is under a vacuum. The sight glass may indicate a high oil level.

If the oil level drops to the bottom of the sight glass, add oil to the compressor. If the oil level starts to rise steadily, the Oil Trap may be full and system oil may be entering the compressor, or the 6500 may be taking in liquid refrigerant. If this has occurred, check to be sure that the 6500 is not pulling liquid or drain the Oil Trap and change the compressor crankcase oil. Oil acid tests should be performed periodically on the compressor crankcase oil to determine the condition of the oil. If the oil tests marginal or bad, it should be changed. **NOTE: COMPRESSORS THAT FAIL DUE TO LACK OF OIL WILL NOT BE WARRANTED.**

To Drain the Compressor Crankcase: Use the supplied valve core depressor to push in the valve core in the CRANKCASE OIL OUTLET fitting. This fitting is located below the OUTLET fitting. The refrigerant pressure in the 6500 will push the oil through the CRANKCASE OIL OUTLET fitting. Use caution when draining the oil. Replace with 150 viscosity Refrigeration Oil.

To Add Oil to the Compressor Crankcase: New oil can be pumped directly into the compressor crankcase by using a refrigeration oil pump that can pump against pressure such as the Model 1702 Charge-Oil Pump. Purge the connecting hose from the oil pump with oil to remove air. Connect the hose to the core depressor valve on the CRANKCASE OIL OUTLET fitting and depress the valve core. Oil can now be pumped into the compressor. Add oil until the compressor sight glass is approximately one third to one half full (Usually requires 8 to 10 ounces of oil, if the compressor has been completely drained). If the oil level appears low while recovering a large quantity of refrigerant, oil can be added while the 6500 is operating.

If the 6500 is to be evacuated after draining the compressor oil, the vacuum can be used to pull new oil into the compressor. Connect a short hose (or a short 1/4" flared copper tube) to the core depressor valve. Place the remaining end of the hose (or tube) into the container of oil. Depress the valve core in the CRANKCASE OIL OUTLET fitting until 8 ounces of oil is drawn into the compressor. **NOTE:** Do not use the sight glass reading while the Model 6500 is under a vacuum. The sight glass may indicate a high oil level.

CHANGING REFRIGERANT TYPE

Refrigerant must be removed from the 6500 before changing refrigerant types. Refrigerant can be removed from the 6500 using a second recovery unit. Remove the refrigerant through the OUTLET fitting with the POWER switch ON, and after the 6500 has shut down on low pressure cutout.

If another unit is not available, refrigerant release to the atmosphere can be minimized by following the procedure below.

1. Connect a hose from the OUTLET fitting of the 6500 to the vapor valve of the storage tank. The storage tank must contain the same type of refrigerant that is in the 6500. All valves are closed. Connect a vacuum pump to the VACUUM fitting. Start the vacuum pump and open the VACUUM valve, evacuate the hose. Close the VACUUM valve, remove the vacuum hose and cap the VACUUM fitting. Open the OUTLET valve and start the 6500, open the vapor valve of the storage tank.
2. A chilled storage tank or a tank that has a deep vacuum pulled on it will draw the greatest amount of refrigerant out of the 6500. The larger the evacuated tank, the more refrigerant will be removed. When removing refrigerant by means of an evacuated tank, it's best not to have the 6500 running. Allow the 6500 to shut down on low pressure cutout before connecting an evacuated tank to it. Evacuate the connecting hose
3. Restart the 6500 several times until the 6500 will not push any more refrigerant into the evacuated storage tank. The pressure on the high side will drop with each run. When the pressure does not drop, no more refrigerant can be pushed into the storage tank. When all refrigerant flow stops, close the valve on the storage tank and purge any remaining refrigerant left in the Model 6500.

When changing refrigerant types follow INITIAL STARTUP PROCEDURE, page 4.

CHANGING STORAGE TANKS DURING RECOVERY

When the storage tank becomes full, the 6500 will shut down (the TANK FULL lamp will go on) and will not operate until the tank has been replaced. The replacement tank can contain refrigerant (Do Not Mix Refrigerants) but must not be full.

1. Turn POWER switch OFF. Close storage tank valve and manifold valves. Disconnect the Shut off end of the hose from the tank. Care must be taken when removing the refrigeration hose, some liquid refrigerant may be released from the hose even with the shut off fitting.
2. Unplug the float switch cable from the full tank and plug back into the next tank. This tank needs to be evacuated and precharged with the same refrigerant.
3. Connect the shut off end of the hose from the 6500's refrigerant OUTLET fitting back to the vapor valve of the next tank. Restart the 6500, reopen the closed valves and resume recovery.

MAINTENANCE

The 6500 contains no replaceable internal filter driers. External filters must be placed in line with the flow of the refrigerant as it enters the 6500. It is recommended that the filter be no smaller than 5 cu.in. size. The filter should be replaced after every use in order to insure relatively clean vapor will enter the 6500.

Monitoring the oil level and condition is important to the longevity of the 6500. Check for high acid level in the crankcase of the 6500 regularly. If a high acid level is indicated in the compressor oil, remove the oil and recharge with 8 to 10 ounces of 150 viscosity refrigeratin oil.

The axial fan has sealed bearings and requires no maintenance.

ACCESSORIES

PART # DESCRIPTION:

8025 Dual Valve 25 lb. DOT approved Refillable Storage Tank With Float Switch.

8050 Dual Valve 50 lb. DOT approved Refillable Storage Tank With Float Switch.

LIMITED WARRANTY

Model 6500 is warranted against defects in workmanship or materials under normal use for one year. Manufacturer assumes no liability on the actual use of this equipment. Components subjected to abnormal wear and tear are specifically excluded from this warranty.

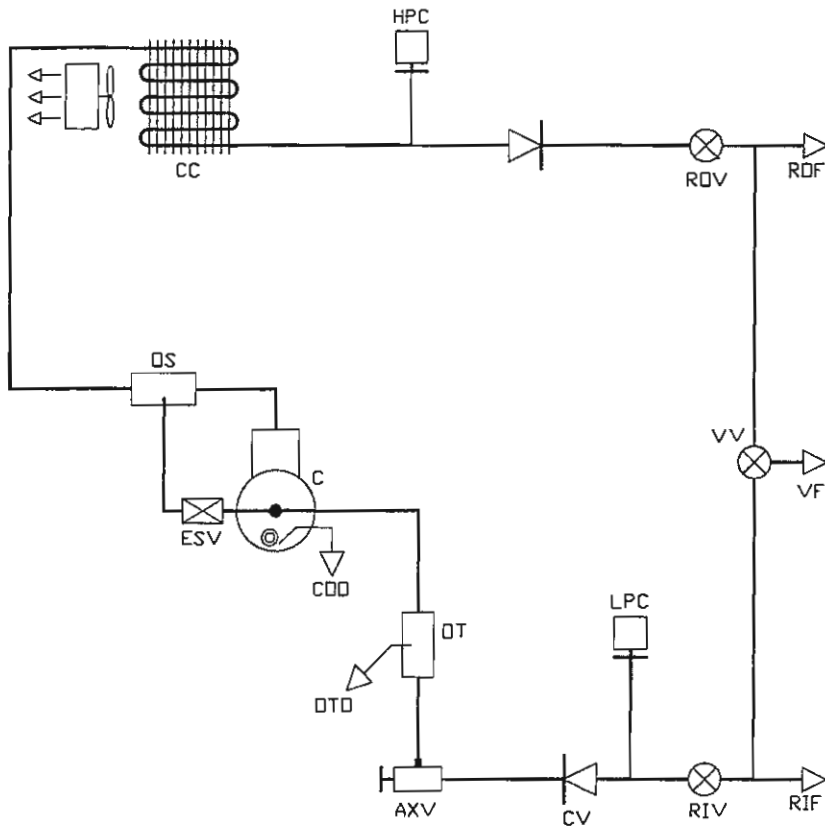
Compressors that fail due to lack of oil will not be warranted. Safety responsibility lies with the user.

In return for shipping merchandise PREPAID to factory service location, Thermal Engineering Company will make a good faith effort for prompt disposition regarding any product which proves to be defective within or out of warranty. A complete description of the problem should be included. If product was damaged in transit to you, file claim with carrier.

For repair return to your local distributor or:

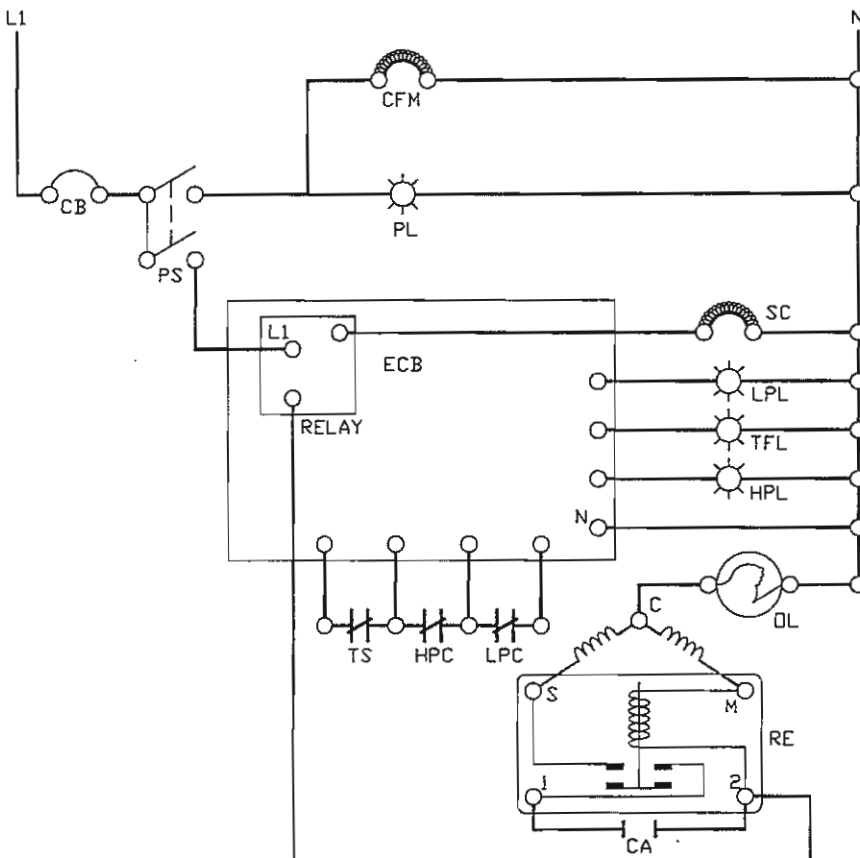
Thermal Engineering Company
2022 Adams Street
Toledo, OH, USA 43624
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FORM 6500-1



- RIF- INLET FITTING
- RIV- INLET VALVE
- LPC- LOW PRESSURE CONTROL
- CV- CHECK VALVE
- AXV- AUTOMATIC EXPANSION VALVE
- DT- OIL TRAP
- DTO- OIL TRAP OUTLET
- C- COMPRESSOR
- COO- COMPRESSOR OIL OUTLET
- OS- OIL SEPERATOR
- ESV- EQUALIZATION SOLENDID VALVE
- CC- CONDENSER COIL
- HPC- HIGH PRESSURE CONTROL
- ROV- OUTLET VALVE
- ROF- OUTLET FITTING
- VV- VACUUM VALVE
- VF- VACUUM FITTING

MODEL #6500 PLUMBING DIAGRAM

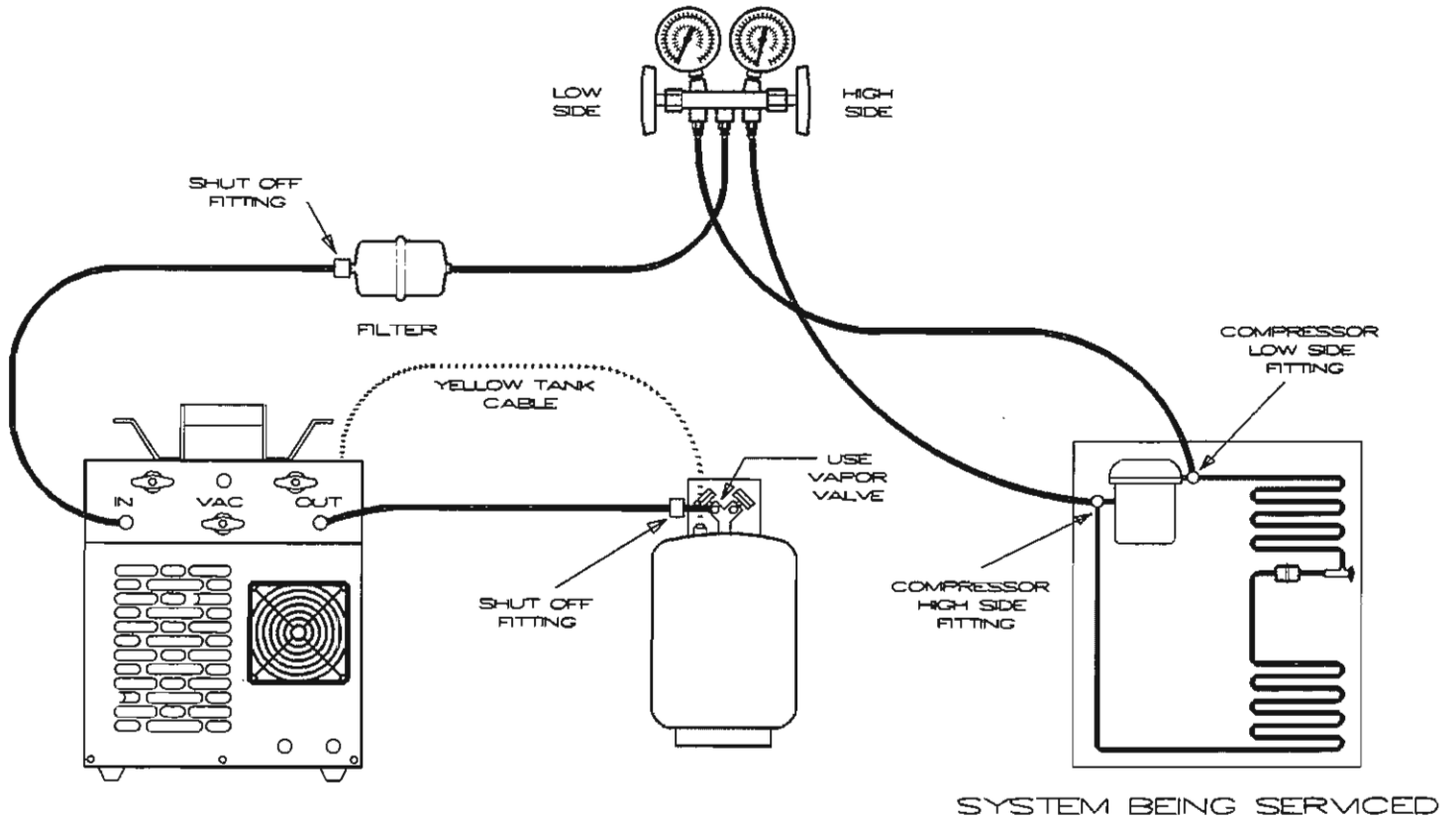


- CB- CIRCUIT BREAKER
- PS- POWER SWITCH
- PL- POWER LIGHT
- CFM- CONDENSER FAN MOTOR
- ECB- ELECTRONIC CIRCUIT BOARD
- TS- TANK SWITCH
- HPC- HIGH PRESSURE CONTROL
- LPC- LOW PRESSURE CONTROL
- TFL- TANK FULL LIGHT
- HPL- HIGH PRESSURE LIGHT
- OL- OVERLOAD
- RE- RELAY
- CA- CAPACITOR
- SC- SOLENDID COIL
- LPL- LOW PRESSURE LIGHT

MODEL #6500 WIRING DIAGRAM

MODEL 6500 VAPOR RECOVERY

SERVICE MANIFOLD



MODEL 6500 PUSH-PULL LIQUID RECOVERY

SERVICE MANIFOLD

