

START UP
&
TRAINING
GUIDE

TC2670

Refrigerant Management Center

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Manual P/N 035-80388-00

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Basics of A/C Service & Repair

Shops must now be equipped with A/C recovery/recycling/charging equipment. To properly check a modern automotive A/C System it must be filled to capacity. Since there is no dipstick on an A/C System, the only way to ensure this it is to first empty the system with a certified recovery/recycling machine, and then charge the A/C System to the manufacturer's rated capacity.

Once this has been done, the high and low pressures are then checked during the normal cycle where the system automatically builds pressure, shuts off, and then restarts. During these cycles, duct outlet temperatures must be checked and recorded to ensure the entire system is functioning properly.

Finally the system must be checked carefully for leaks with an electronic leak detector. If any repairable leaks are identified, the system must be emptied before the repairs are made. Deep vacuum dehydration and refilling of the system are performed after repairs are made.

Basic Annual Environmentally Safe A/C Service

- 1) Empty A/C System using the TC2670
- 2) Fill the system to capacity
- 3) Check pressures during A/C System operation
- 4) Check compressor drive belt and clutch
- 5) Verify proper low and high pressure control settings
- 6) Verify electric fan switch settings, if equipped
- 7) Check air flow through condenser
- 8) Check duct outlet temperature with thermometer
- 9) Check for leak with electronic leak detector
- 10) If leaks are detected, make estimate for repairs

Basic A/C System Repair Procedure

- 1) Empty A/C System using the TC2670
- 2) Make needed repairs, replace parts as required
- 3) Perform deep vacuum dehydration - 29.5 InHg for 30 minutes
- 4) Perform Steps 2 through 10 of Basic Annual A/C Service (above)

Hint: Fittings on Cylinders and A/C Systems vary dimensionally. When attaching hoses to these fittings, always **tighten the couplings finger tight**. Over tightening of the hose fittings will crush the gaskets, causing premature failure, and slower recovery rates.

Also: If refrigerant will not flow through the hose, check any valve core depressors in the hose coupling. If the depressor is missing or pushed in too far, the valve core will not be depressed, causing the refrigerant to be blocked.

The AC800 is designed to significantly outperform every competitor's machine in terms of quality, speed, and ease of operation when performing this new type of modern, environmentally safe A/C service and repair procedure. Technicians will be more productive, shops more profitable, and customers will be more satisfied.

Filling the Internal Cylinder

When refrigerant is needed in the Internal Cylinder, it is common practice to pull it directly from a cylinder of new refrigerant. This is accomplished by connecting the blue low side hose to the cylinder of new refrigerant and recovering directly into the TC2670. This works for R12 without additional equipment.

R134a uses special Field Service Couplers (FSC) on the ends of the hoses, making connection directly to the cylinder of new refrigerant impossible. An auxiliary adapter shipped with the TC2670 adapts the ACME fitting on the cylinder to the FSC. See the Appendix for proper use of this adapter.

Refer to Figure 1 which illustrates the flow path of refrigerant being transferred from the Cylinder of New Refrigerant to the Internal cylinder. The top panel of the TC2670 is also shown, indicating the positions of the Selector Switches and Valves. Note that the Cylinder is shown in an upright position, allowing recovery of gas/vapor only.

NEVER turn the cylinder of refrigerant up side down. This would introduce liquid refrigerant into the TC2670 which will cause the machine to malfunction, may damage the compressor, and voids the warranty.

HINT: As refrigerant is pulled from the cylinder, the cylinder will become very cold and the recovery process will slow or stop completely. Placing the cylinder in a bucket of warm water will greatly increase the transfer of refrigerant.

Close the valve in the Cylinder of New Refrigerant when the approximately 3 lbs can be seen on the Internal Cylinder Sight Glass, and allow the TC2670 to continue running until the Low Pressure Gauge is in a vacuum before turning off the machine, thus removing the refrigerant from the hose.

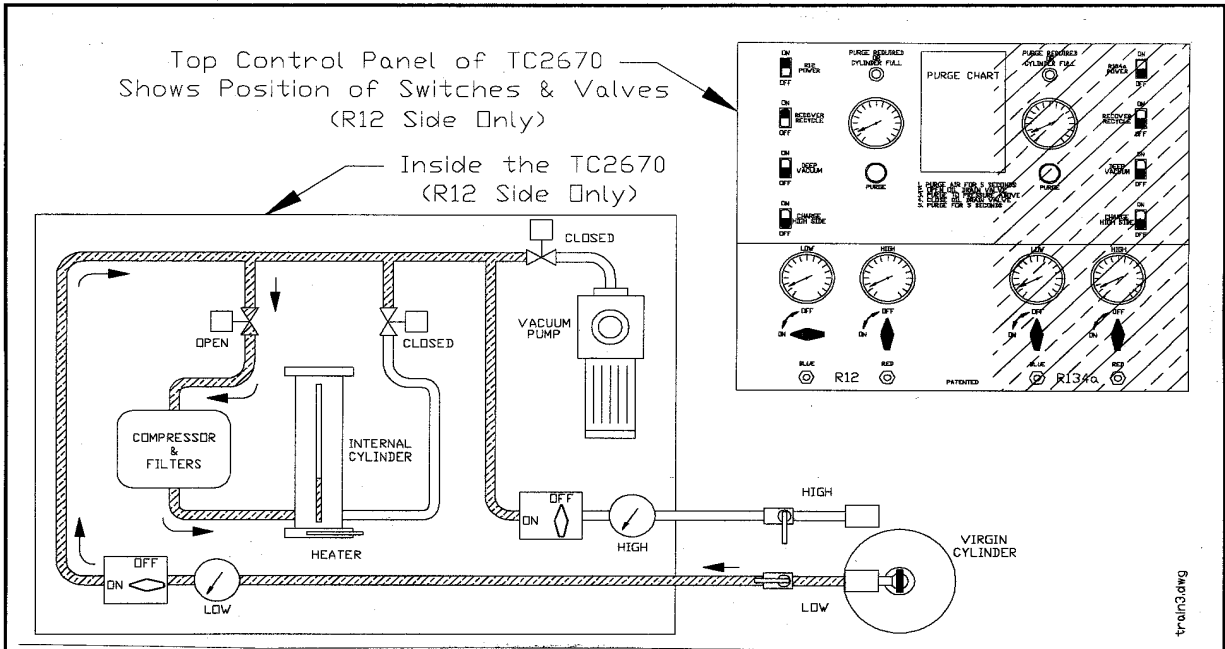


Figure 1 Filling the Internal Cylinder

Removing Air & Oil from the Recovered Refrigerant

The refrigerant recovered from the A/C System is collected in the Internal Cylinder. This refrigerant may be mixed with some air removed from the recovery hoses, the A/C System, and inadvertently introduced during the Oil Draining procedure below. Determine the room temperature. Read the pressure on the gauge on the top of the TC2670. Compare this pressure to the pressure on the chart corresponding to the temperature previously mentioned to determine if there is air, or other contaminants in the Internal Cylinder which must be removed.

Any oil removed from the A/C System has also been separated from the refrigerant and stored by the TC2670. This oil is drained from the valve on the rear of the TC2670.

The TC2670 combines the oil draining and air removal processes to prevent introducing more air into the unit during the oil draining. Normally the Oil Drain Valve is in a vacuum, opening it out of sequence will introduce large quantities of air which will shut the TC2670 down in a high pressure condition.

Perform the following steps after every A/C Recovery and Refrigerant Transfer process:

Note: TC2670 Power Supply Cord must be connected for following steps.

- 1) Press and hold the Purge Button (located below the pressure gauge on the top of the TC2670) and hold for 5 seconds. This will pressurize the Suction Accumulator where any oil removed from the A/C is stored. Release the Purge Button.
- 2) Hold the Measuring Cup under the Oil Drain Valve and open the valve. Any oil removed from the A/C System will drain into the Cup. Normally the TC2670 does not remove enough oil to make replacement necessary. Only after replacing a major component is it necessary to add oil. The A/C manufacturer will specify the amount of oil to add when replacing a major component.

Note: Leave the Oil Drain Valve open.

- 3) Determine the room temperature. Locate this temperature on the chart on the top of the TC2670. Compare the pressure, for the appropriate refrigerant, with the actual pressure on the gauge on the top of the TC2670.
- 4) If the gauge pressure is about the same as the chart pressure then go to Step 5. Otherwise, press and hold the Purge Button to lower the gauge pressure. When the gauge shows the same pressure as that determined from the chart, release the Purge Button.
- 5) Close the Oil Drain Valve.

WARNING: Failure to purge Air after each recovery may cause the TC2670 to stop recovering due to a high pressure shutdown. The TC2670 automatically shuts down if the pressure in the Internal Cylinder exceeds 250 PSIG (as indicated on the gauge on the top of the unit.) If this occurs it will be necessary to stop recovering and perform the above air purge procedure.

Due to the interruption of the recovery process, there may be higher than normal refrigerant pressure at the oil drain. Use caution and slowly open this valve.

Always turn the R12 Power Switch to the OFF position before purging air.

Charging Oil into the A/C System

The TC2670, using special pressure-controlled recovery, typically does not remove enough oil from an A/C System to make replacement necessary. When a major component is replaced, the manufacturer will specify an amount of oil which needs to be replaced. Replacement oil should be added to the component itself before installation. If the recovery process is performed in haste (See Hints in section on recovery procedures) on a cold system, there may be more oil removed than is normal. Finally, it's possible that the A/C System was overfilled to start with.

If it is absolutely determined that oil must be added to the A/C System, using the traditional oil injection method, an Oil Fill Kit is available. This kit consists of special hoses and fittings with a calibrated oil bottle.

The A/C System must be drawn into a deep vacuum as described on the preceding page. The Oil Fill Kit then allows oil from the oil bottle to be pulled into the A/C System. Any oil remaining in the hose is pushed into the A/C System as refrigerant is charged.

Refer to Figure 4 which illustrates the flow path of oil being transferred into the A/C System. The top panel of the TC2670 is also shown, indicating the positions of the Selector Switches and Valves.

While performing a Deep Vacuum on the A/C System, close High Side Gauge Manifold Valve. Open valve on top of the oil bottle. Watch as the oil level drops and close the valve when the desired amount of oil has been pulled into the A/C System. Disconnect the oil bottle from the Tee fitting, and then charge refrigerant into the A/C System.

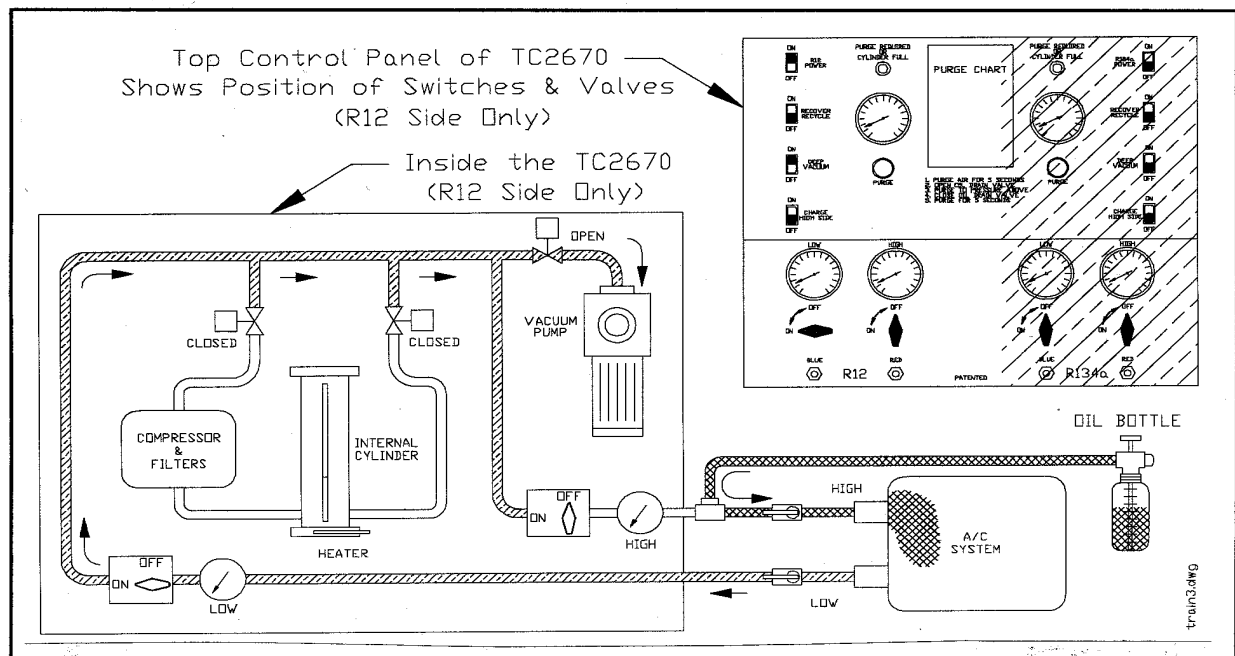


Figure 4 Charging Oil into the A/C System

Charging Refrigerant into the A/C System

- 1) Determine the amount of refrigerant to be charged into the A/C System. This amount is usually printed on a tag mounted near the A/C suction accumulator or on the fire wall. The capacity may be shown in pounds and ounces or pounds and tenths of a pound. A conversion table is included in the Appendix for use in converting pounds and ounces to pounds and tenths.
- 2) Note the level of the refrigerant in the Internal Cylinder Sight Glass. Subtract the A/C System capacity (determined in Step 1) from this level and set the rubber ring at the result. This is where the level of refrigerant will be when the charge is complete.

HINT: The TC2670 sight glass is marked in **pounds and tenths of a pound** by the white numbers. The blue numbers indicate kilograms. Also note that scales for R12 and R134a are shown. Be sure to use the proper scale for the refrigerant being charged.

- 3) Open the High Side Gauge Manifold Valve and watch the Sight Glass to see the refrigerant level fall (this happens very quickly). When the correct amount of refrigerant has been charged into the A/C System, immediately close the High Side Gauge Manifold Valve.

HINT: A heater imbedded in the Internal Cylinder heats the refrigerant to cause it to transfer to the A/C System. Charging on a cool day may be slower than on a warmer day. To increase the speed, leave the valves closed until the pressure on the gauge on the side of the unit increases above 100 PSIG.

- 4) The A/C System can now be checked for proper operation.

Refer to Figure 5 which illustrates the flow path of refrigerant from the Internal Cylinder into the A/C System during charging. The top panel of the TC2670 is also shown, indicating the positions of the Selector Switches and Valves.

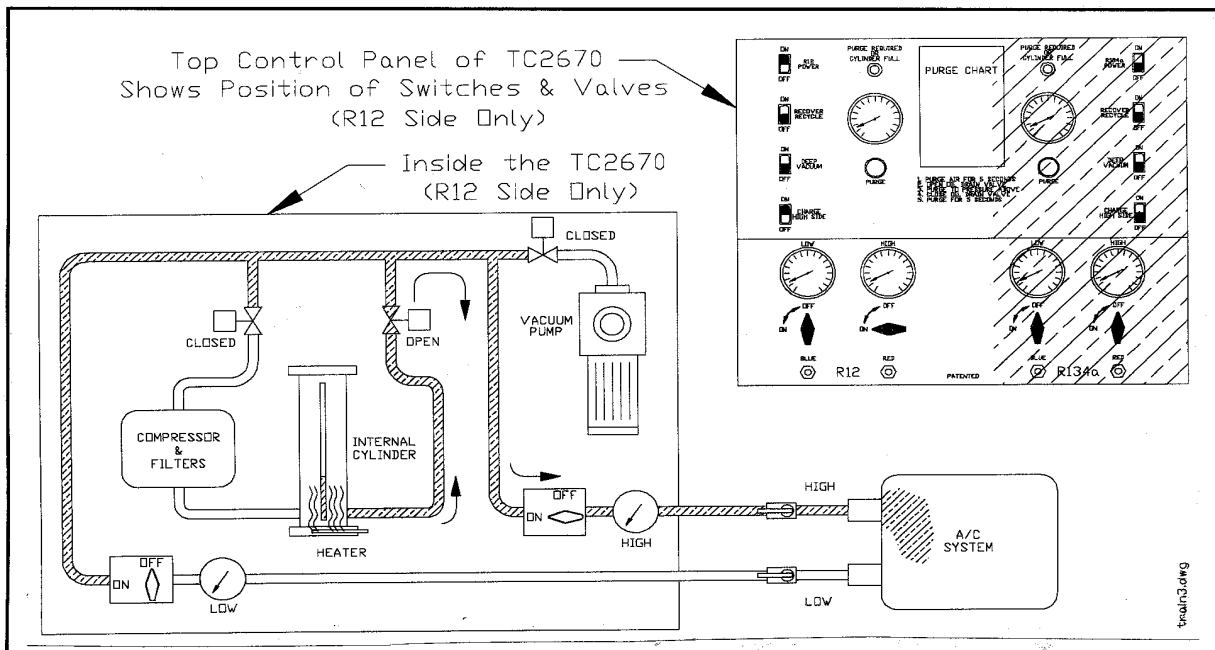


Figure 5 Charging Refrigerant into the A/C System

Maintenance & Long Term Storage

The TC2670 requires very little maintenance. To keep the unit operating at the maximum level of efficiency, the following items should be monitored.

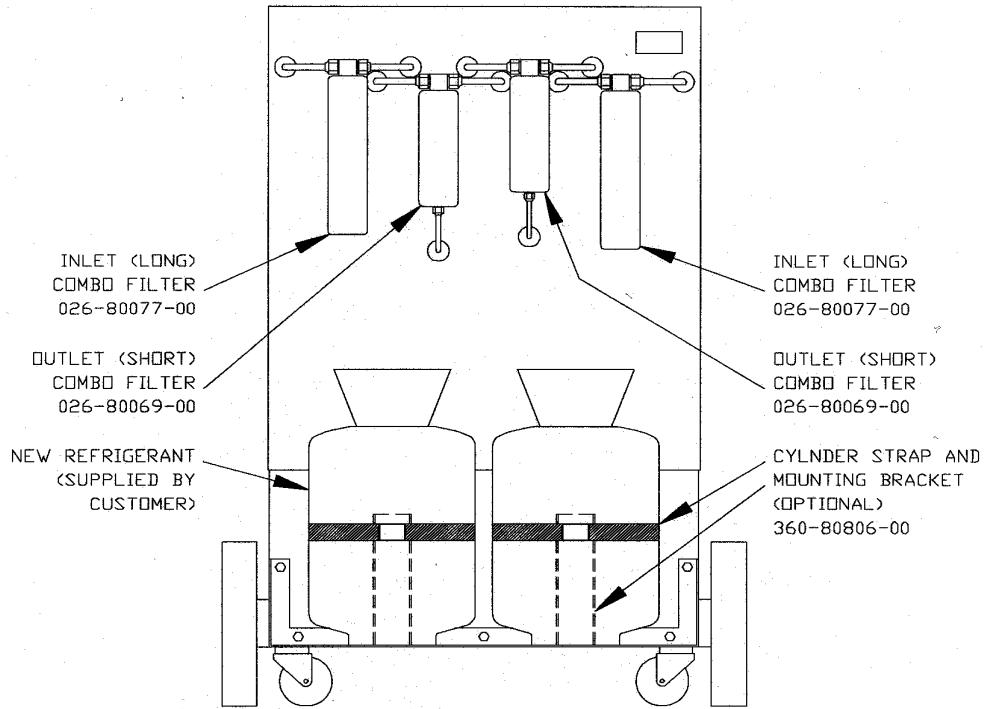
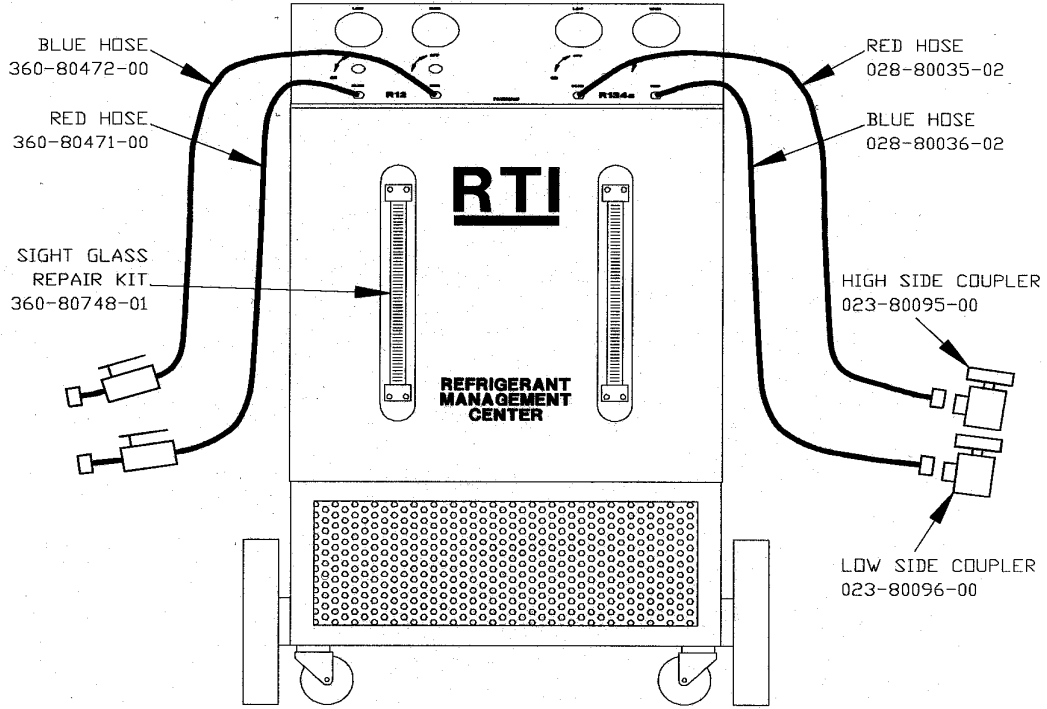
- ☞ Filters should be changed at least annually at the end of the peak season of A/C work. This will maintain the highest possible recovery rates. It will also prepare the TC2670 for that first A/C service procedure at the start of the next A/C season.

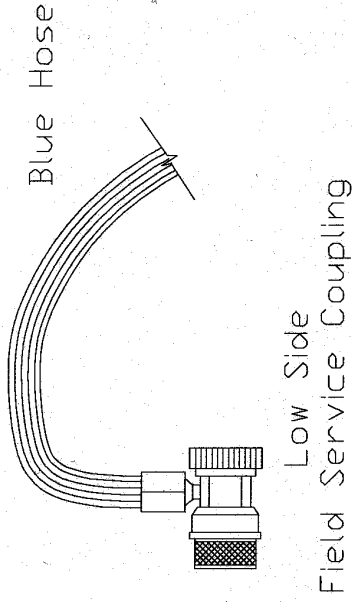
- ☞ Check the oil level in the Compressors daily before operating the TC2670. If oil is not visible, call the 800 number shown in the Operation Manual for instructions.

- ☞ At the beginning of each day during the A/C season, be sure the Internal Cylinders have at least 3 lbs. of refrigerant and there is not any excess air left over from previous jobs when air may not have been purged properly.

- ☞ When storing the TC2670 for extended periods of time, all but about ½ lb. of refrigerant should be charged out of both Internal Cylinders. This will extend the life of O-rings and gaskets in the unit.

- ☞ An attractive dust cover is available for the TC2670. This will keep dust and grime off of the unit during extended storage.



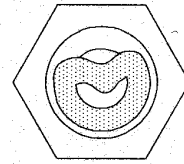
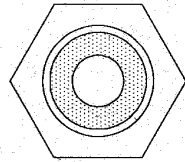
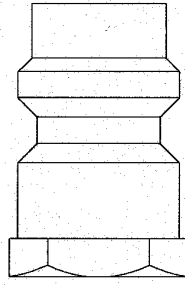


Install Adapter on Port slightly more than finger tight



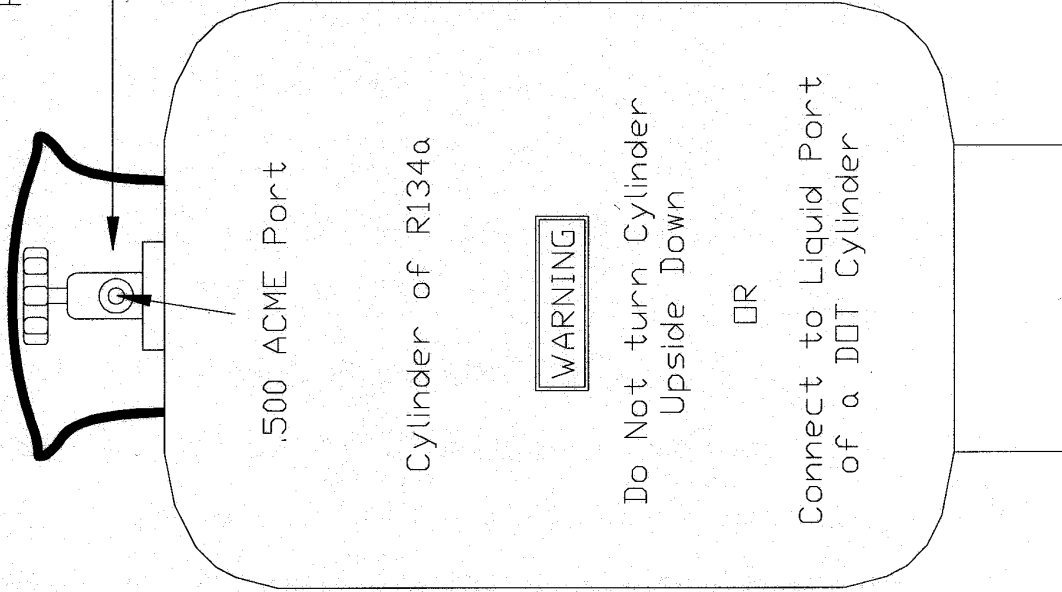
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Low Side Field Service Coupling



Over-tightening will distort O-ring and cause Port to be blocked as shown

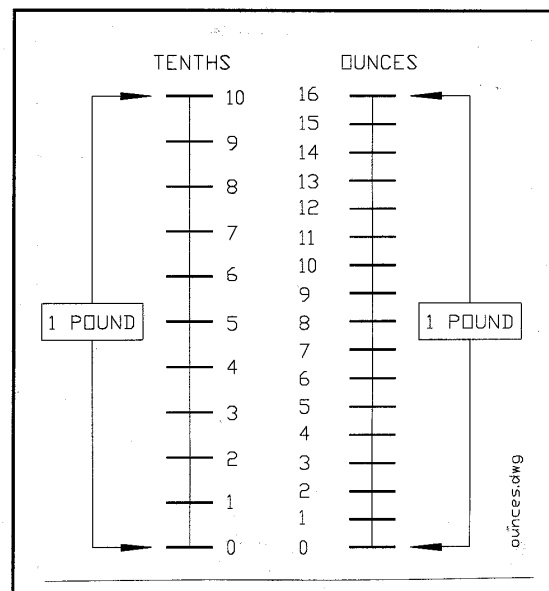
Insert a round tool or piece of 14 ga wire through O-ring during tightening to prevent the O-ring from deforming



Conversion Chart

lbs & ozs / lbs & tenths of lbs

OUNCES	TENTHS OF A POUND
1	1
2	1
3	2
4	2.5
5	3
6	3.5
7	4
8	5
9	6
10	6
11	7
12	7.5
13	8
14	9
15	9



lbchart.wpd

FORMULA: Multiply ounces by 0.625 to obtain Tenths of a Pound