

OPERATION
&
MAINTENANCE
MANUAL

TC640

Refrigerant Management Center

(Convertible For Use With R12 or R134a)

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Manual P/N 035-80412-00

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CONGRATULATIONS: You have purchased one of the finest Recovery, Recycling, and Charging Machines available at any price.

BEFORE USING THE TC640

Check for any shipping damage. Place a claim with carrier if damage is discovered.

DO NOT USE A DAMAGED UNIT.

The TC640 should not be operated or serviced by any person who has not read all the contents of this manual. Failure to read and comply with these instructions or any one of the limitations noted herein can result in serious injury and/or property damage.

These general instructions describe normal operation and maintenance situations encountered with the TC640. The instructions should not be interpreted to anticipate every possible contingency.

It is the responsibility of the owner/user to operate the TC640 in accordance with all specifications and laws which may apply.

The following pages contain rules for safe operation of the TC640. Taking precedence over any specified rule listed herein, however, is the most important rule of all:

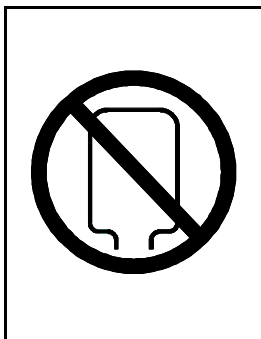
"USE COMMON SENSE"

A few minutes spent reading these instructions can make an operator aware of dangerous practices to avoid and precautions to take for his own safety and the safety of others.

A regular schedule of inspection of the TC640 should be established and records maintained with special attention given to Hoses, Compressor Oil Level, and Filters.

SAFETY PRECAUTIONS

- ! Recover and Charge only the refrigerant for which the machine is configured.
- ! Wear safety glasses and protective gloves. Refrigerant has a very low boiling point and can cause frostbite.
- ! Follow the TC640 operating procedures sequentially to avoid prematurely disconnecting hoses or opening valves which may release refrigerant to the atmosphere.
- ! Do not expose the TC640 to moisture or operate in wet areas.
- ! Use the TC640 in locations with forced ventilation that provides four air changes per hour.
- ! Hoses used with the TC640 must have shutoff devices within 12 inches of the connection point to the system being serviced to minimize the introduction of Non-condensable Gas (Air) into the TC640 and the release of refrigerant when being disconnected.
- ! Disconnect power before performing any maintenance or service on the TC640.
- ! Avoid using an extension cord with the TC640. If necessary, use a good condition, UL listed, 3-wire grounded, #14 AWG extension cord of the shortest possible length.
- ! Connect the TC640 to the proper, grounded power source of sufficient amperage.
- ! Do not allow the TC640 to remain unattended in the Charge Mode with power On.



NEVER TURN THE CYLINDER UP-SIDE-DOWN.

DO NOT CONNECT THE TC640 TO THE LIQUID SIDE OF ANY A/C SYSTEM WITH A CAPACITY GREATER THAN 4 LBS.

REFRIGERANT IN A/C SYSTEMS HAVING LARGER CAPACITIES MUST BE RECOVERED FROM THE VAPOR SIDE ONLY.

NEVER CONNECT THE TC640 TO THE LIQUID PORT OF A CYLINDER OF REFRIGERANT TO FILL THE TC640 CHARGE CYLINDER.

FAILURE TO FOLLOW THE ABOVE MAY CAUSE THE TC640 COMPRESSOR TO FAIL AND VOID THE WARRANTY.

L CAUTION 7

Avoid breathing refrigerant or lubricant vapor or mist.

Exposure may irritate eyes, nose and throat.

If accidental system discharge occurs, ventilate work area before resuming service.

Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.

Special Considerations with R134a

R134a has been shown to be nonflammable at ambient temperature and atmospheric pressure. However, tests under controlled conditions have indicated that, at pressures above atmospheric and with air concentrations greater than 60% by volume, R134a can form combustible mixtures.

While it is recognized that an ignition source is also required for combustion to occur, the presence of combustible mixtures is a potentially dangerous situation and should be avoided.

Under no circumstances should any equipment be pressure tested or leak tested with Air/R134a mixtures. Do not use compressed air (shop air) for leak detection in R134a systems.

FILLING THE CHARGING CYLINDER

A/C Systems requiring service often do not have a full charge of refrigerant. To avoid unnecessary repositioning of hoses it is recommended that the TC640 be filled until about 1.5Kg of liquid refrigerant can be seen in the Charging Cylinder Sight Glass. The Sight Glass is visible through a slotted opening on the front of the TC640.

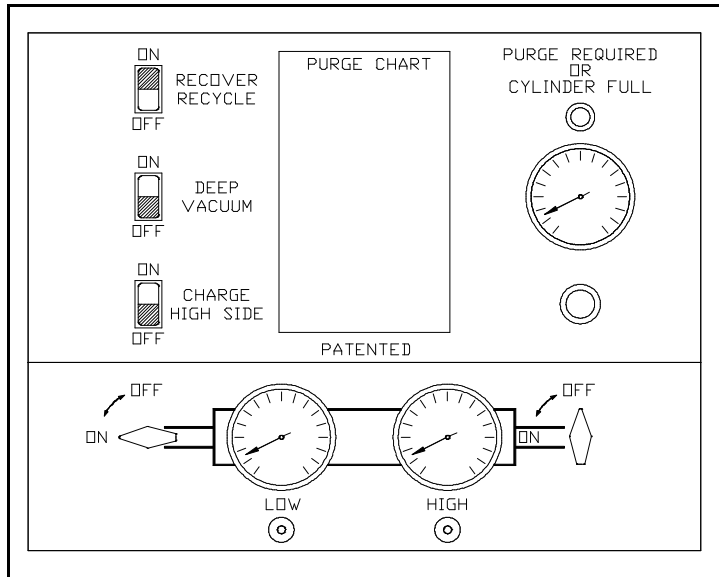


Figure 1 Filling the Cylinder

To fill the TC640 Charge Cylinder, refer to Figure 1 and follow these steps:

1. Connect the Low Side Blue Hose to the **VAPOR** port of a cylinder of new or recycled refrigerant. An adapter is provided with the TC640 (R134a) which permits the Field Service Coupler to be attached to the .500 ACME fitting on the cylinder of refrigerant.

If the cylinder has two ports, observe that the embossed marking on the cylinder knob says **VAPOR** or **GAS**. Do not rely on color coding of the knobs on the valves.



DO NOT CONNECT TO THE LIQUID VALVE.
DO NOT TURN THE CYLINDER UP-SIDE-DOWN.

INTRODUCTION OF LIQUID INTO THE TC640 MAY DAMAGE THE COMPRESSOR AND VOID THE WARRANTY.

2. Press top (ON) of rocker switch marked RECOVER/RECYCLE.

The TC640 will recover and recycle refrigerant into the Charging Cylinder. Observe the liquid refrigerant level rise in the Charging Cylinder Sight Glass and when at approximately 1.5Kg close the valve on the refrigerant cylinder. Allow the TC640 to continue running until the Low Side Gauge shows a vacuum. This will evacuate the Blue Hose.

3. Press bottom (OFF) of rocker switch marked RECOVER/RECYCLE.

RECOVER/RECYCLE

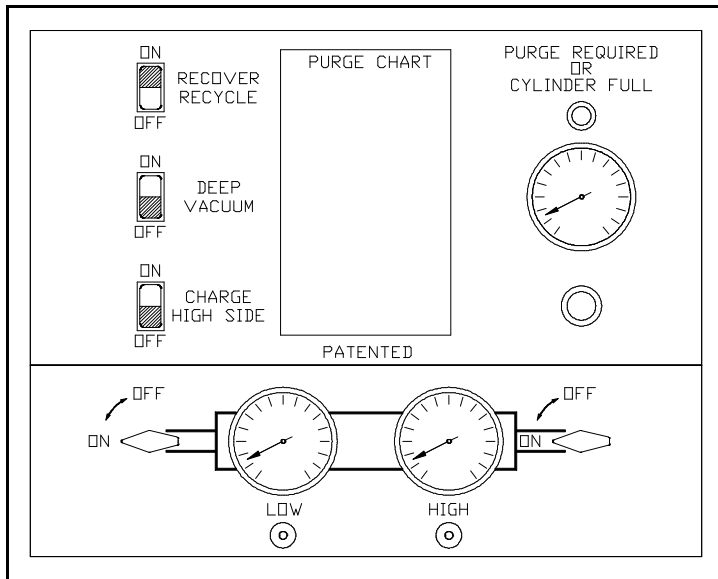


Figure 2 Recover/Recycle

To Recover/Recycle, refer to Figure 2 and follow these steps:

1. Attach Red and Blue Hoses to the A/C system per the vehicle manufacturer's instructions.

Note For R134a Machines

Field Service Couplings on the ends of Service Hoses are of a special design.

The valves have **LEFT HAND** threads which makes operation opposite to that of others.

To Close... Turn Counter-clockwise

To Open... Turn Clockwise

The valves **MUST BE CLOSED** before connecting or disconnecting Field Service Couplings.

2. Open High and Low Gauge Valves.
3. Open Red and Blue Hose Valves.
4. Press top (ON) of rocker switch marked RECOVER/RECYCLE.

The TC640 will automatically recover and recycle refrigerant from the A/C System. The vacuum level reached can be seen on the Low Side Gauge.

! TURN THE TC640 OFF, LEAVE THE HOSES CONNECTED !

A small quantity of Liquid refrigerant will probably still remain in the A/C System. This can be detected by observing an increasing pressure reading on the Low Side Gauge.

The Low Side Gauge should remain at a stable vacuum level for at least 2 minutes before removing the hoses from the A/C system.

... NOTE ...

As refrigerant is processed by the TC640, temperature variations can cause vapor to change to liquid which may temporarily settle in various internal components.

If a known amount of refrigerant has been introduced into the TC640 it may not all be seen in the Charging Cylinder Sight Glass.

This is normal and nothing to be concerned about. Refrigerant has not been lost.

The sight glass does not indicate the amount of refrigerant recovered. It is only accurate for determining the amount of refrigerant charged out to the vehicle A/C System while in the Charge Mode of operation.

Turn the TC640 back on again if the Low Side Gauge goes above 0 bar. Repeat this process until a stable vacuum is reached.

5. Close Red and Blue Hose Valves.
6. Close High and Low Gauge Valves.
7. Press bottom (OFF) of rocker switch marked RECOVER/RECYCLE.

PURGE REQUIRED OR CYLINDER FULL LIGHT:

This Light will illuminate if either...

- 1) The Charging Cylinder has filled to capacity: Go to Page 12.

OR

- 2) Pressure on the Purge Gauge approaches 17 bar: Go to Page 9.

OIL DRAIN & AIR PURGE

Oil and Non-condensable Gas (Air) are separated from the recovered refrigerant and **MUST** be removed following **EACH** recycling procedure as follows:

1. **PRESS** and hold the Purge Button (To the right of the Purge Chart) for 5 seconds.
2. **SLOWLY** open the Oil Drain Valve (Bottom of Long Combo Filter on back of TC640) to vent Non-condensable Gas and drain any oil which may have been removed from the A/C System.

Unless the A/C System had previously been overfilled, the TC640 will typically not remove more than a tablespoon of oil, making replenishment unnecessary.

Leave the Oil Drain Valve open.

3. Determine the room temperature.
4. Locate the pressure (Bar) corresponding to this room temperature (°C) in the chart on the top of the TC640. This chart is reproduced at the right.

If the pressure indicated on the gauge is greater than that determined from the chart...

PRESS and hold open the Purge Button until the gauge pressure equals that shown in the chart. Any Non-condensable Gas will be vented through the Oil Drain Valve.

5. Close the Oil Drain Valve.
6. **PRESS** and hold the Purge Button for 5 seconds again. This permits any residual Non-condensable Gas to be recirculated for reprocessing during the next recycle procedure.

Pressure in Bars

°C	R12	R134
1	3.15	3.01
2	3.28	3.10
3	3.38	3.28
4	3.52	3.45
5	3.66	3.66
6	3.79	3.81
7	3.93	3.97
8	4.07	4.12
9	4.24	4.28
10	4.41	4.41
11	4.57	4.57
12	4.73	4.73
13	4.89	4.89
14	5.05	5.05
15	5.22	5.24
16	5.38	5.42
17	5.54	5.60
18	5.70	5.79
19	5.87	5.97
20	6.07	6.34
21	6.28	6.59
22	6.48	6.83
23	6.69	7.07
24	6.90	7.31
25	7.11	7.56
26	7.31	7.80
27	7.52	8.04
28	7.73	8.28
29	7.94	8.52
30	8.14	8.76
31	8.35	9.04
32	8.55	9.32
33	8.80	9.59
34	9.05	9.87
35	9.30	10.15
36	9.55	10.43
37	9.79	10.71
38	10.04	10.99
39	10.29	11.26
40	10.62	11.52
41	10.83	11.81
42	11.08	12.09
43	11.32	12.42
44	11.60	12.77
45	11.88	13.12
46	12.16	13.47
47	12.44	13.82
48	12.73	14.16
49	13.01	14.51
50	13.29	14.86

Purge Chart

VACUUM

If the A/C System is "opened" for replacing components, it is important to draw a vacuum on the system before recharging with refrigerant. The following steps should be followed:

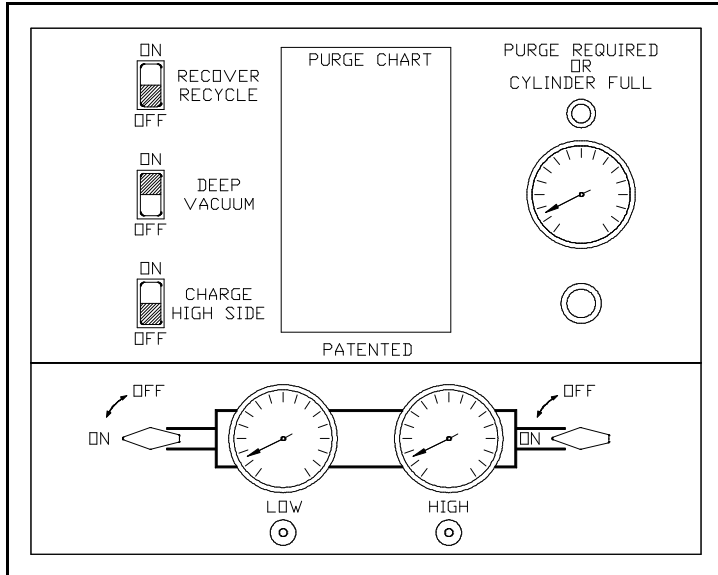


Figure 3 Deep Vacuum

To Deep Vacuum the A/C System, refer to Figure 3 and follow these steps:

1. Connect Red and Blue Hoses to the high and low sides of the A/C System.
2. Open Low and High Gauge Valves.
3. Open Red and Blue Hose Valves.
4. Press top (ON) of rocker switch marked DEEP VACUUM.
5. The Pump will start and the TC640 will start drawing a vacuum which will be indicated by a dropping pressure on the Low Gauge.
6. Press bottom (OFF) of rocker switch marked DEEP VACUUM when complete.

NOTE: It is normal for the TC640 to have a 20 to 30 second discharge when the pump is started.

HOSE EVACUATION

It's important that Air not be introduced into the A/C System during a Charging procedure. If a Vacuum procedure was performed previously, the following Hose Evacuation Procedure is not required. If the service valves on the hoses have been open, the following procedure must be performed:

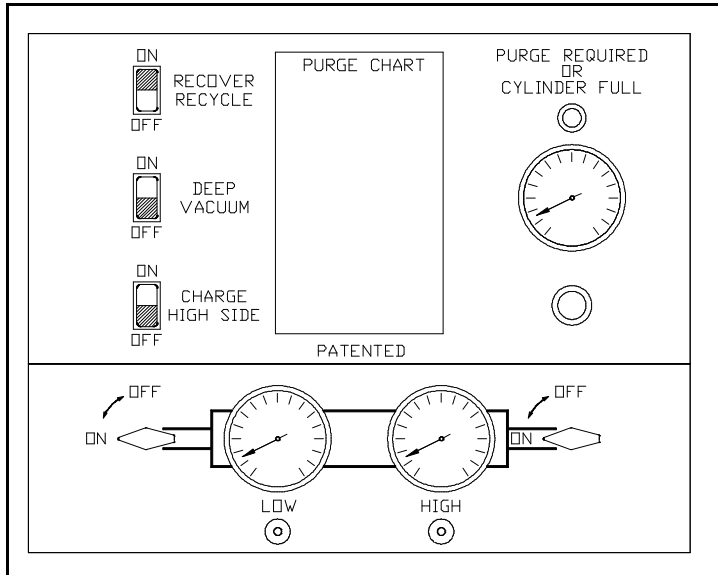


Figure 4 Hose Evacuation

To Evacuate Hoses, refer to Figure 4 and follow these steps:

1. Close Red and Blue Hose Valves.
2. Open High and Low Gauge Valves.
3. Press top (ON) of rocker switch marked RECOVER/RECYCLE.
4. Let the TC640 run until a vacuum is seen on the Low Side Gauge.
5. Turn High and Low Gauge Valves to OFF.
6. Press bottom (OFF) of rocker switch marked RECOVER/RECYCLE. All Air has now been removed from the Hoses.
7. Vent any Non-condensable Gas as described in the previous section.

CHARGE - HIGH SIDE

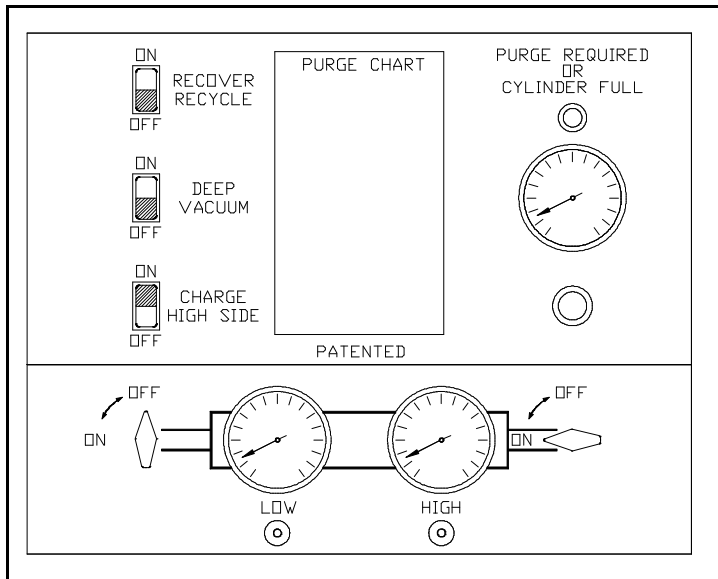


Figure 5 Charge - High Side

To Charge Refrigerant, refer to Figure 5 and follow these steps:

1. Perform Hose Evacuation described previously.
2. Connect Red Hose to the A/C System high side per the vehicle manufacturer's instructions. Do not open the hose valve.
3. Press top (ON) of rocker switch marked CHARGE/HIGH SIDE.
4. Open High Gauge Valve. The Low Gauge Valve and both Hose Valves should be closed.
5. Determine the refrigerant capacity of the A/C system to be charged. This data is usually printed on a tag located on the accumulator or under the hood of the vehicle.

The following will determine where to set the indicator prior to starting the charge mode:

$$(\text{TC640 Liquid Level}) - (\text{A/C System Capacity}) = \text{Indicator Setting}$$

EXAMPLE: The level of liquid visible in the TC640 Charging Cylinder Sight Glass is 3.4Kg and the A/C system capacity is 2.0Kg. The following calculation results...

$$(3.4) - (2.0) = 1.4$$

Therefore, the sliding indicator should be set at 1.4Kg in this example. When the liquid level lowers to the 1.4Kg mark, a charge of 2.0Kg will have been delivered

NOTE... **The Sight Glass on the Charging Cylinder has markings for both R12 and R134a. Always use the correct scale for accurate charging.**

6. Open Red Hose Valve. **Do not start the Vehicle's Engine.** Refrigerant will flow into the high side of the A/C System. Closely monitor the liquid level as it lowers in the Charging Cylinder Sight Glass.
7. Close High Gauge Valve as soon as the refrigerant level drops to the sliding indicator.
9. Press bottom (OFF) of rocker switch marked CHARGE/HIGH SIDE.

The vehicle can now be started and the A/C system checked by monitoring Gauge pressures.

Evacuate the hoses per the preceding section "Hose Evacuation"

Always close all valves before disconnecting hoses.

NOTE: The preceding is the recommended method of charging with the TC640.

Some vehicle manufacturers may specify connecting only to the Low Side of the A/C System. Always follow the manufacturer's recommended procedures. The above instructions would have to be modified accordingly.

SCHEDULED MAINTENANCE

BEFORE EACH USE...

Check the oil level in the Compressor **DAILY** before using.

The Oil Level Sight Tube is visible through a cut-out in the left side of the black Compressor Cover at the bottom of the TC640. The oil level should be no higher than half way up in the nylon tube.

Add oil to the Compressor as follows:

1. Determine the correct amount of oil to add: Add 4.7cc of oil per 1mm increase in level.
2. Turn both High and Low Side Gauges to OFF.
3. Press the top (ON) of the switch marked RECOVER/RECYCLE.
4. Add oil to Compressor through the capped fitting below the Oil Drain Valve on the rear of the TC640. Use a standard oil injecting device or simply attach one end of a charging hose to the port and the other end dipped into the oil being added.

NOTE: Use ISO 100 (500 sus viscosity) mineral based refrigerant oil.

5. Press the bottom (OFF) of the switch marked RECOVER/RECYCLE and allow unit to sit for a few minutes before attempting to read the oil level in the nylon tube.

MONTHLY...

Clean the Condenser to maintain high efficiency performance of the TC640. Disconnect power and remove the Compressor Compartment Cover and blow compressed air through the cooling fins of the Condenser to remove any debris.

Do not bend the fins on the Condenser coil. Air flow will be restricted and cause damage to the TC640. Replace the Compressor Compartment Cover before applying power to the TC640.

FILTER MAINTENANCE

Two Combo Filters are installed on the rear of the TC640.

Both Filters must be changed when oil is added to the compressor **OR** at least once a year.

PROBLEMS & SOLUTIONS

On rare occasion the TC640 may seem to be performing differently or not at all. Experience has shown that varying operating conditions can affect the performance characteristics of the TC640. The temperature of the vehicle A/C System will affect how the TC640 performs.

Following are typical problems with explanations of the possible cause and solution.

PROBLEM: My TC640 worked fine all last Summer. I got it out today for the first service job this Spring and it is very slow in evacuating the system.

SOLUTION: Today's Spring temperature may be much lower than the average temperatures during the summer months. Maybe the vehicle was brought in from outside where the temperature is very low.

The refrigerant in the vehicle will not be under as high a pressure at lower temperatures and the TC640 will take longer to draw a vacuum. More cycles may be required to completely recover the refrigerant.

PROBLEM: I put 2.5Kg of refrigerant into the TC640 using the Recycle Mode. When I checked the sight glass on the Charging Cylinder, there was less than 2.5Kg. I lost Refrigerant. The unit must leak.

SOLUTION: Due to temperature changes, some refrigerant may condense into liquid form and stay in tubes and other components in the circuit preceding the Charging Cylinder. This is normal and will explain why all refrigerant is not visible in the sight glass.

PROBLEM: I can not get the TC640 to draw a vacuum as indicated on the Low Side Gauge.

SOLUTION: Check Hoses for restrictions.

PROBLEM: When I try to fill the Charging Cylinder from an auxiliary cylinder of clean refrigerant, the TC640 is really slow or shuts down.

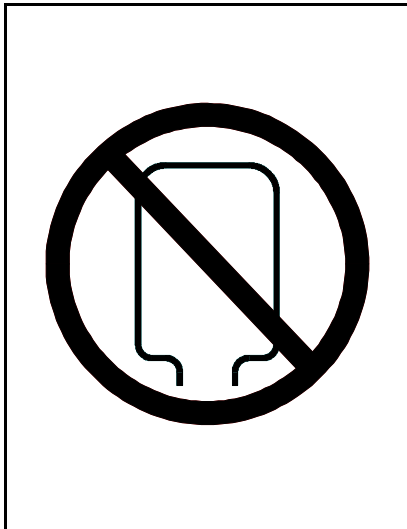
SOLUTION: The auxiliary cylinder will cool due to the vaporization of refrigerant. This causes the pressure to decrease.

Use a heat belt to increase the speed of recycling by the TC640.

PROBLEM: I turned a cylinder of new refrigerant up-side-down to pre-charge the Charging Cylinder with liquid. The Charging Cylinder didn't fill and now the TC640 won't recover from an A/C system.

SOLUTION: The TC640 has been overloaded with liquid refrigerant (See Safety Precaution Section at the beginning of this manual).

... WARNING ...



IF A CYLINDER IS TURNED UP-SIDE-DOWN, THE TC640 WILL OVERFILL WITH LIQUID REFRIGERANT. THIS OVER FILLS THE SUCTION ACCUMULATOR WITH LIQUID.

FROST ON THE OIL DRAIN ON THE BOTTOM OF THE LONG COMBO FILTER ON THE REAR OF THE TC640 IS AN INDICATION OF THIS OCCURRENCE.

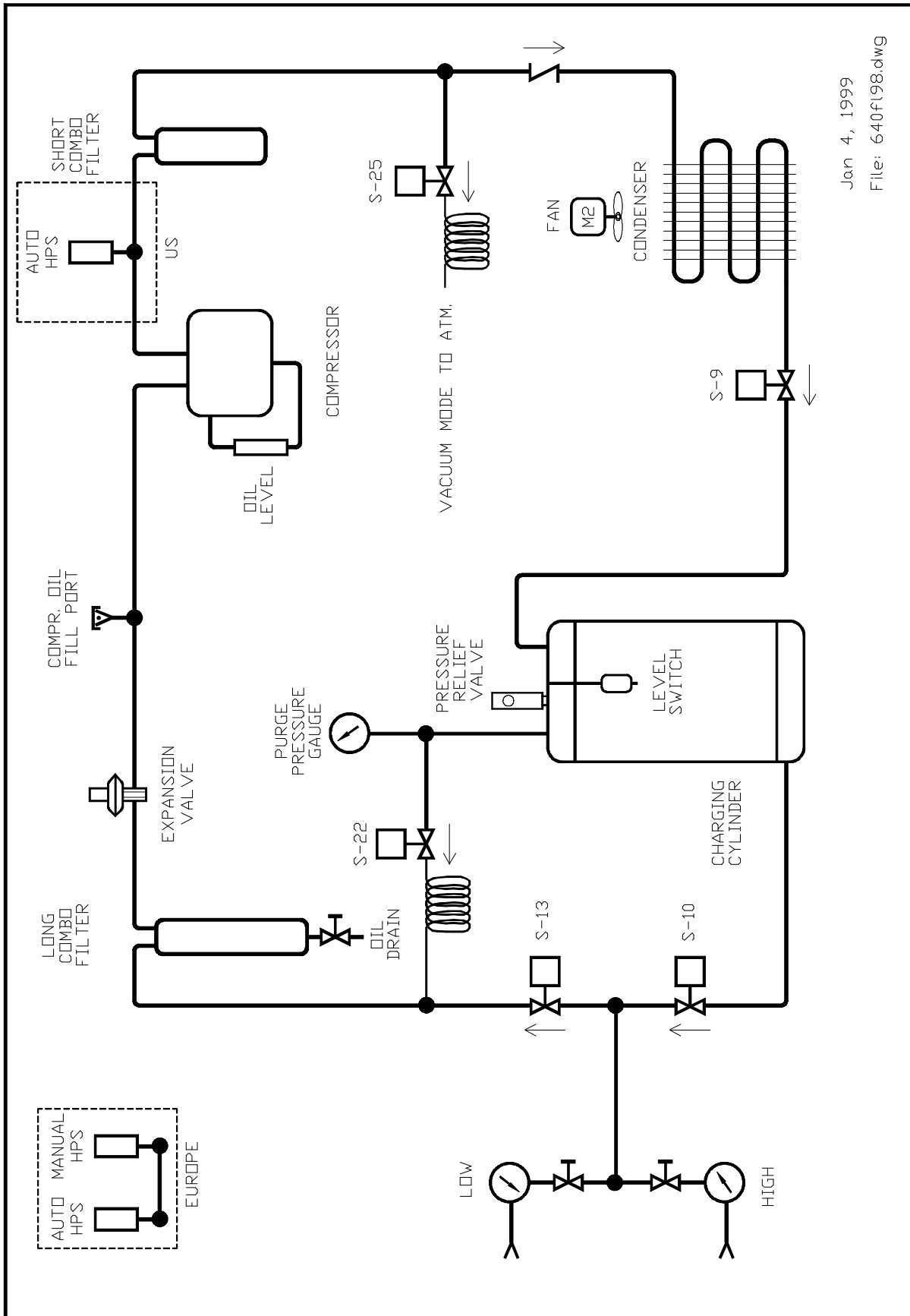
THIS SYMPTOM IS CAUSE FOR CONCERN AS LIQUID REFRIGERANT WILL BE FORCED INTO THE COMPRESSOR.

THIS CAN DESTROY THE COMPRESSOR AND WILL VOID THE WARRANTY.

The safest method to remove the excess liquid which has collected in the Suction Accumulator is to drain it from the Oil Drain on the back of the TC640 as follows:

Draw a vacuum (50 to 100mbar) on an empty cylinder with a standard vacuum pump and connect it to the Oil Drain Valve. Open the cylinder valve and the Oil Drain valve.

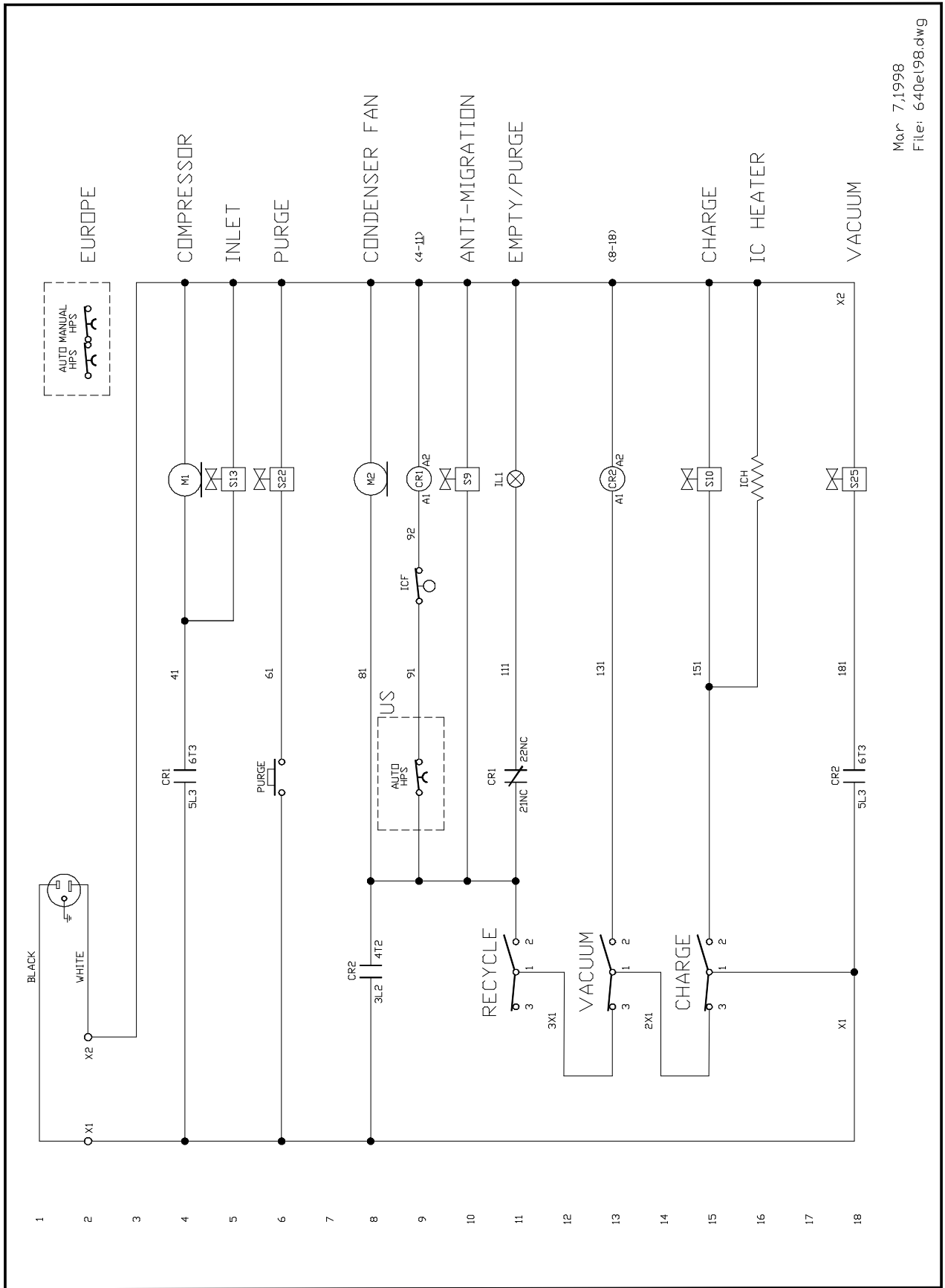
Close the valves and disconnect the cylinder after the liquid has been drawn into the cylinder. This refrigerant can now be recycled by the TC640 following normal recycling procedures.



Jan 4, 1999

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640 FLOW (1998)



Mar 7,1998
File: 640e198.dwg

640 SCHEMATIC (1998)