Membrane Extraction Tool

Part Number: VST-MET-100

VST ECS Membrane Replacement Procedure

Vapor Systems Technologies, Inc.
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PURPOSE

The purpose of the Membrane Replacement procedure is to provide a safe method to remove and replace a membrane in the membrane housing.

PREPARATION

Follow these steps to prepare the ECS unit for replacing or inspecting the membrane.

1. Put the TLS 350 in the manual "OFF" mode.
2. At the disconnect switch, disconnect power to the heat trace cable, HC sensor, the vacuum pump, and the blower. Use lockout/tagout procedures.
3. Close the three (3) ball valves between the ECS Unit and the vent risers.

FUNCTIONAL REMOVAL PROCEDURES

1. Disconnect and remove the ½" 45° flare tubing from the top and side of the membrane housing: See Figure 1.

   CAUTION: The membrane housing temperature may be 100 – 150 deg. F.

   NOTE: The nuts on the tubing are ½" 45° flare. Use caution not to damage the flared ends on the tubing or the threads on the nuts after removal.
2. Remove the (4) ¼" bolts/washer/lock washers from the top plate (on top of the membrane housing). Keep the (4) bolts/washers/lock washers for reuse.
3. Remove the top plate. Using moderate force, remove the top plate from the membrane housing. The top plate seals against the vertical tube with an O-ring. Use caution not to damage the vertical tube O-ring.

   The membrane is now exposed. See Figure 2.
4. Gently screw the membrane extraction tool into the top of the membrane until the locknut on the extraction tool bottoms out on the membrane top. See Figure 3.

   CAUTION: Do not over tighten the extraction tool when screwing into the membrane.
5. Gently move the extraction tool side-to-side while pulling up with moderate force until the membrane becomes loose, then remove.
6. **CAUTION:** Do not use excessive force or a twisting action to remove the membrane as these items may cause damage to the membrane epoxy potting.

   There are two O-rings on the inside bottom of the vertical tube causing resistance in removing the membrane.
7. An aluminum insert (Figure 4.) may still be attached to the bottom of the membrane or will stay in the membrane-housing base.

   NOTE: Do not lose the insert as it will be needed to complete the membrane installation and make the membrane operation functional.
8. Remove the extraction tool from the membrane.
9. Remove and discard the (4) O-rings:
   a) (2) O-rings on the membrane
   b) (2) O-rings on the base insert
   c) Keep the vertical tube top O-ring for re-use.

Figure 1.
Membrane Housing

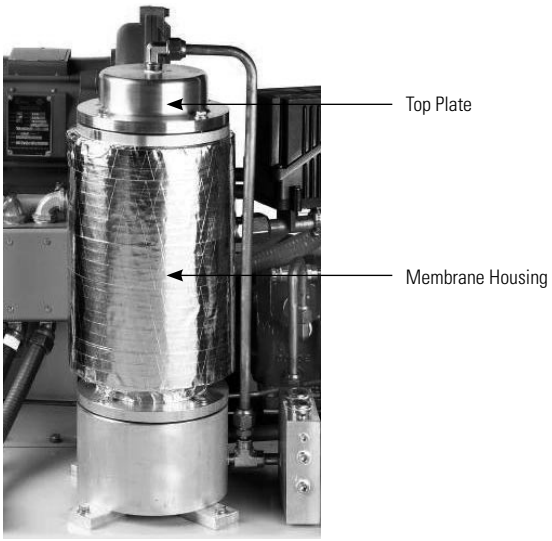

Figure 2.
Exposed Membrane with Top Plate Removed

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FUNCTIONAL INSTALLATION PROCEDURES

1. Install (4) new O-rings:
   a) (2) O-rings on the membrane (VST Part #5006-012).
   b) (2) O-rings on the base insert (VST Part #5006-013).
2. Use only silicon grease (not hydrocarbon-based grease) on the O-rings prior to installation.

   Hydrocarbon-based grease or lubricant will emit hydrocarbon vapors, which will be measured by the HC sensor and will cause inaccurate gas-level readings.
3. With (2) new O-rings installed on the "insert," place the "insert" into the bottom of the base as orientated in Figure 4.
4. With the (2) membrane O-rings installed, place the membrane into the membrane housing.
5. Apply a moderate downward force on the membrane with a mild side-to-side action to seat the membrane in the membrane base.
6. Install the existing top vertical tube O-ring (re-lubricated).
7. Install the top plate. The top plate will seat on the vertical tube O-ring and the membrane while bolting the top plate in place.

   CAUTION: Do not use excessive force to seat the top plate on the vertical tube and the membrane as this may cause possible damage to the o-rings
8. Install the (4) ¼" bolts/washers/lock washers in the top plate/retaining ring to secure the top plate.
9. Tighten the (4) bolts to 85 in-lbs in a cross-pattern using 20%, 40%, 60%, 80%, 90%, 100% of torque.

   This cross-pattern torque procedure will evenly seat the top plate to the vertical tube.
10. Re-install the ½" 45° flare tubing from the top/side of the membrane housing.

    NOTE: When tightening the 45° flare nuts: Clamp the tube flare between nut and nose body of the tube by screwing the nut on finger tight. Tighten with a wench an additional ¼ turn for a metal-to-metal seal.
11. Perform a ECS Unit Leak Test.
12. After all work and testing is complete:
    a) Open the ball valves between the ECS Unit and the vent risers.
    b) Remove the lock(s) and tags from the lockout & tagout.
    c) Turn ON power to the heat trace, HC sensor, vacuum pump, and blower.
    d) Put the TLS-350 in the AUTOMATIC mode.

Figure 3.
Membrane Extraction Tool

Figure 4.
Membrane Base Insert