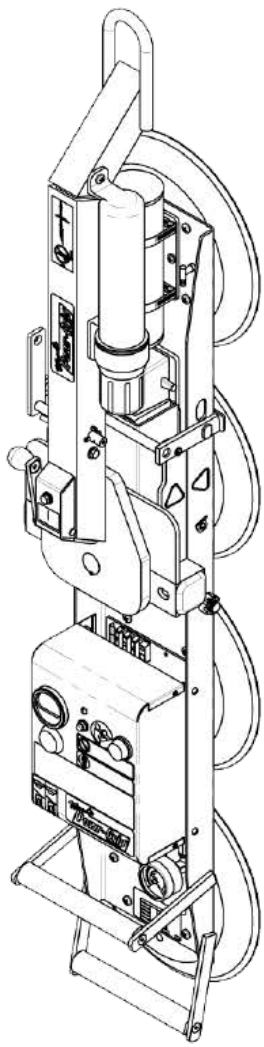
# LEAK TEST PROCEDURE

DC CHANNEL LIFTERS — SINGLE VACUUM SYSTEMS



***TESTING AND MAINTENANCE MUST BE DONE BY A QUALIFIED PERSON***

## KEEP FOR FUTURE REFERENCE

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# SYMPTOMS OF VACUUM LEAK

Severe leakage is evidenced by a lifter's inability to draw full vacuum while attached to a clean, smooth, nonporous surface. In such cases, the vacuum pump will run continuously and the vacuum level shown on the vacuum gauge will be less than 16" hg, the red zone of the gauge.

Moderate leakage is indicated by intermittent cycling of the vacuum pump and the (red) low vacuum warning light during a lift. If the vacuum generating system turns on more than once every 10 minutes, leakage is serious enough to warrant repairing the lifter's vacuum system.

To determine if your lifter has a vacuum leak, perform the Vacuum Test as described in the Maintenance section of your instruction manual.

When you perform the vacuum test, we recommend that you note the time and leakage rate, such as "lost 5" in 10 minutes". This information can assist in diagnosing the location of the leak because there may be more than one component leaking vacuum. For example, when you are performing maintenance, if an isolated section tests positive for a leak but the leakage rate is less than that of the whole lifter, the indication is that there is still one or more vacuum leak elsewhere in the system.

If the rate of leakage is sufficient to warrant repair, proceed as follows:

To locate the cause of leakage, begin by inspecting the vacuum pads, fittings and hoses of the entire vacuum system. Look for contamination, cuts or abrasions on pad faces, cracks, abrasions or cuts in hoses, damaged fittings and loose hoses at connection points. If leakage is severe, the cause is often a visibly damaged part.

Do not apply soapy water to fittings or vacuum hoses in an attempt to find leaks, since it will only be drawn inside the vacuum system.

If the source of leakage is not immediately evident, the various sections of the entire vacuum system must be systematically isolated and tested to determine the leakage point. The process to accomplish this is described in the tests to follow.

Please note, the information that is gathered when performing a vacuum test is only valid if the tools used to perform the test are accurate. Be sure that the tools you use are capable of completely sealing the isolated parts of your system when tested. Recommended tools, in addition to an appropriate test surface, are plugs for hoses and fittings, a ball valve with vacuum gauge attached, and extra vacuum hose. This procedure is written with the assumption that you have access to the appropriate tools.

If needed, test equipment is available from Wood's Powr-Grip Co.

A set of screwdrivers may also be needed if the vacuum generating system cover needs to be removed. Note: Always proceed with caution when removing the vacuum generating system cover. Since wiring is connected to components in the cover, gentle removal is recommended so as not to damage the attached wiring.

Note: When removing a hose from a fitting, take care to avoid damaging the barbs of the fitting the hose is attached to. Cuts or nicks in fitting barbs can create a leak that did not previously exist. Additionally, if a hose is removed from a barbed fitting, cut approximately ¼" off the end of the hose before reinstalling it on the fitting, in order to remove damaged hose ends.

# PRELIMINARY TEST

This test determines whether leakage is located in the vacuum generating system or the pad system.

***CAUTION: Disconnect the battery before removing the vacuum generating system cover.***

1) Carefully remove the vacuum generating system cover (**1A**) and lay it to one side, so that exposed wire terminals do not touch any conductive material, as shown in **FIGURE 1**.

   Note: Various models of vacuum pumps have been used in our assemblies. Although your vacuum pump (**1B**) may be different from the one shown, the fittings and connections will be the same.

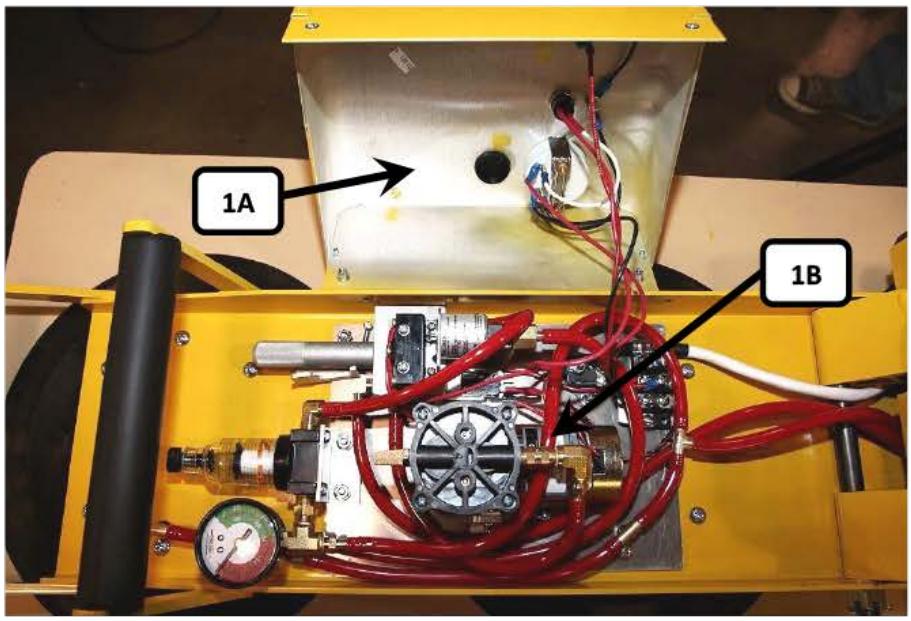


FIGURE 1

2) Remove the vacuum hose attached to the gauge side of the vacuum filter.
3) Cap the open end of the barbed fitting (**2A**), to seal off the vacuum generating system from the pad system, as shown in **FIGURE 2**.
4) Reconnect the battery and activate the vacuum generating system (pull handle of control valve out to the apply position).
5) Allow the vacuum system to reach a suitable vacuum and, with the valve handle still pulled out to the apply position, disconnect the battery.

   Note: Since the vacuum switch is located in the vacuum pad system, the lifter will not shut off automatically.

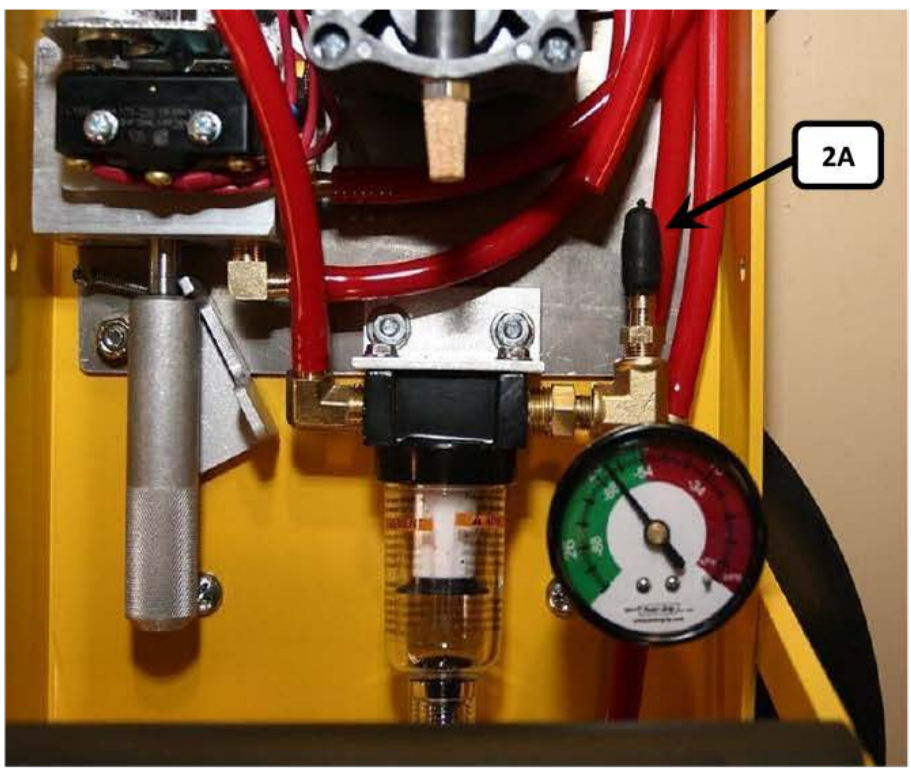


FIGURE 2

6) Observe the vacuum gauge to locate the general area of leakage.

- If the vacuum level on the vacuum gauge starts and continues to drop, this indicates the vacuum generating system does leak. Proceed to the Vacuum Generating System Test.
- If the vacuum level on the vacuum gauge holds steady and does not drop, this indicates the vacuum generating system does not leak; therefore the leak is located in the pad system. Proceed to the Pad System Test.

# VACUUM GENERATING SYSTEM TEST

Note: The following assumes that you have access to suitable plugs, a ball valve with vacuum gauge, and a short additional piece of hose for connecting the ball valve to the lifter's vacuum lines and fittings.

The most likely leak points in the vacuum generating system are the check valve, the filter assembly, or the control valve. Leave the vacuum line to the pad system sealed off at the vacuum filter and test these items as follows:

## Test the check valve for leakage:

1) The check valve (**3A**) is located on the vacuum pump (may be on opposite end of pump shown if your vacuum pump is different). See **FIGURE 3**.

   Remove the hose between the vacuum pump (from the fittings with the check valve) and the control valve.

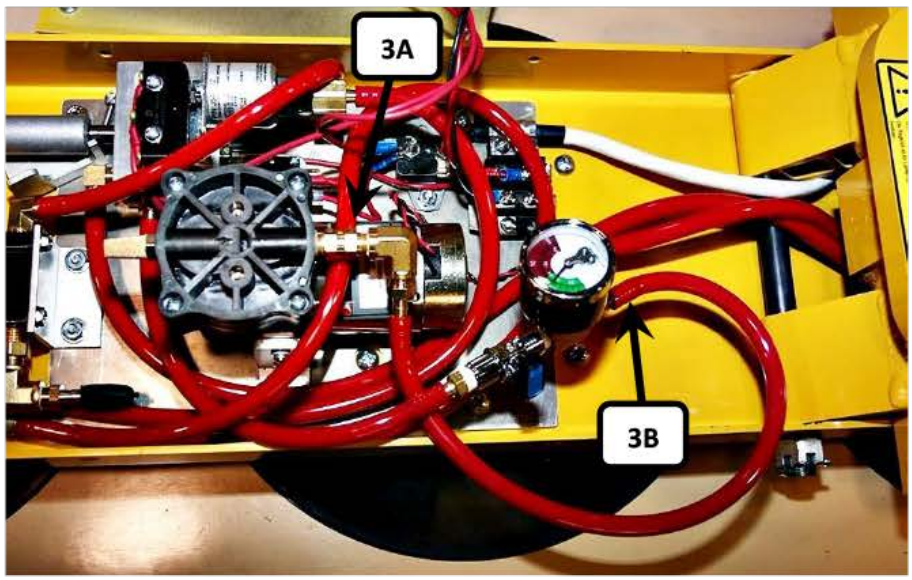


FIGURE 3

2) Attach a short piece of hose to the end of the ball valve with the vacuum gauge (**3B**), and attach the other end of this hose to the vacuum pump. Attach the other end of the ball valve to the original hose that was removed from the pump in step 1. With the ball valve in the open position (handle in line with the valve), reconnect the battery and activate the vacuum generating system (pull handle of control valve out to the apply position).
3) Allow the vacuum system to reach a suitable vacuum and, with the valve handle still pulled out in the apply position, close the ball valve (turn handle perpendicular to valve) and disconnect the battery.
4) Observe the vacuum gauges on the ball valve and lifter to locate the area of leakage.
   - If the vacuum level on the ball valve's vacuum gauge starts and continues to drop and the lifter's vacuum gauge holds steady **OR** if both vacuum gauges hold steady, this indicates the check valve is the source of the leak.

     Note: The reason the check valve is indicated if both vacuum gauges hold steady is because the check valve may leak intermittently, whereas a leak in the control valve or filter assembly will continuously leak until repaired.

     Replace the check valve.

- If the vacuum level on the ball valve's vacuum gauge holds steady and does not drop, and the vacuum level on the lifter's vacuum gauge starts and continues to drop, this indicates that the leak is located in either the control valve or filter assembly. Proceed to the next step.

## Test the control valve and filter assembly for leakage:

1) Remove the ball valve from the vacuum pump and reattach the original hose to the pump.
2) Remove the hose from the vacuum filter (**4A**) that connects it to the control valve. See **FIGURE 4**.
3) Attach the end of the ball valve with the vacuum gauge to the hose (**4B**) attached to the control valve. Using an additional short piece of hose, attach the other end of the ball valve to the vacuum filter.
4) With the ball valve in the open position (handle in line with the valve) reconnect the battery and activate the vacuum generating system (pull handle of control valve out to the apply position).

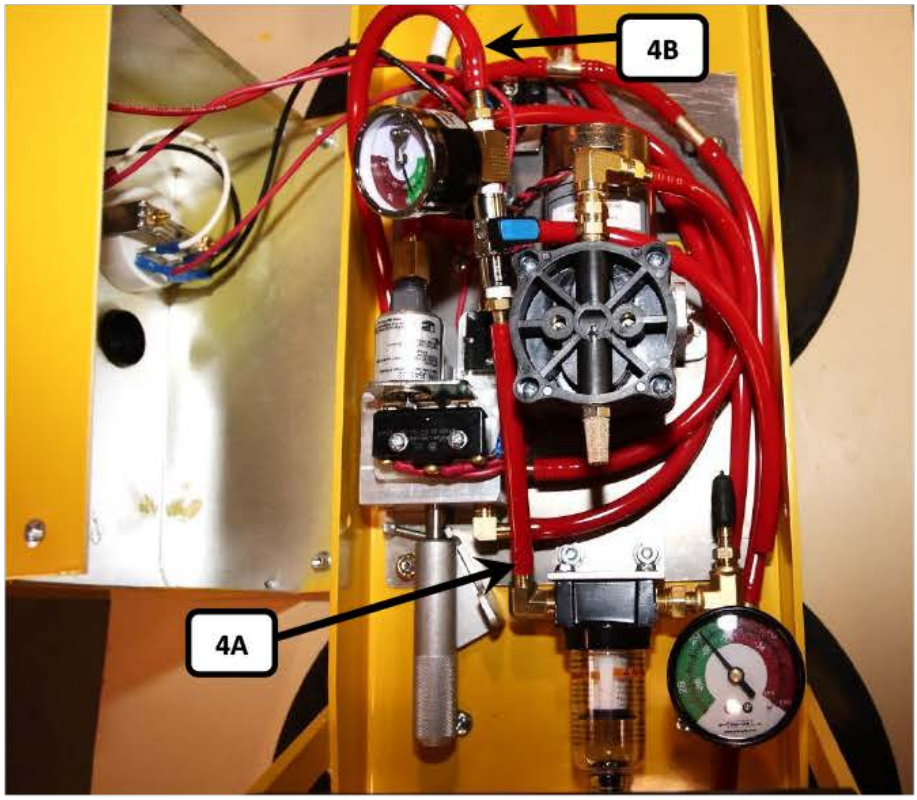


FIGURE 4

5) Allow the vacuum system to reach a suitable vacuum and, with the valve handle still pulled out in the apply position, close the ball valve (turn handle perpendicular to valve) and disconnect the battery.
6) Observe the vacuum gauges on the ball valve and lifter to locate the area of leakage.
   - If the vacuum level on the ball valve's vacuum gauge holds steady and does not drop, and the vacuum level on the lifter's vacuum gauge starts and continues to drop, this indicates that the leak is located in the filter assembly. Make certain the filter bowl is tight and that there is no evidence of cracks or damage to the filter bowl assembly, and then retest.

     ***CAUTION: Do not use any tools to tighten the bowl; it should only be finger-tight.***

     If leakage persists, service the filter according to the filter maintenance section of the instructions manual, or replace the filter assembly.
   - If the vacuum level on the ball valve's vacuum gauge starts and continues to drop and the vacuum level on the lifter's vacuum gauge holds steady and does not drop, this indicates that the leak is located in the control valve assembly. In this instance, the vacuum generating system should be serviced by the manufacturer or an authorized service center. Contact Wood's Powr Grip for further assistance. Note: If the vacuum level of both gauges start and continue to drop, leaks in both the control valve and filter are indicated and the vacuum system should be serviced.

# PAD SYSTEM TESTS

Isolate the vacuum pads, fittings and vacuum line sections until the leak point can be located, as follows:

1) Remove the cap from the filter's barbed fitting and reconnect the vacuum line from the pad system.
2) Remove each pad fitting (**5A**), disconnecting all the pads from the vacuum system.
3) Cap all the pad fittings, to seal off the vacuum lines as shown in **FIGURE 5**.
4) Activate the vacuum generating system (pull handle of control valve out to the apply position).
5) Allow the vacuum system to reach its maximum attainable vacuum or to shut off automatically and, with the valve handle still pulled out in the apply position, disconnect the battery.

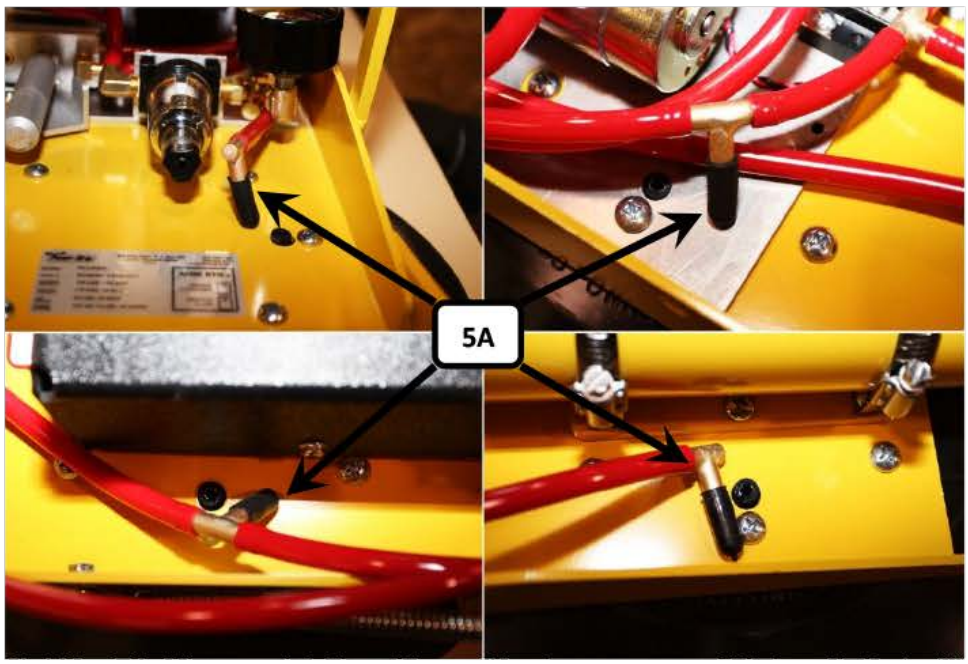


FIGURE 5

- If the vacuum level on the vacuum gauge holds steady and does not drop, this indicates the leakage is in one or more pads. Reconnect one pad to its vacuum line and retest. If indications of leakage resume, replace that pad. Continue testing until all pads have been reconnected and all defective pads have been replaced.
- If the vacuum level on the vacuum gauge starts and continues to drop, this indicates the leakage is in the fittings or vacuum lines between the vacuum pads and the vacuum filter.

Fittings may be tested in the same manner as the pads, by removing each fitting from its vacuum line and plugging the hose or fitting. Vacuum line sections may be tested by moving up each line (toward the vacuum generating system) to the next fitting, removing the hose and plugging it at the fitting.

In **FIGURE 6** the hoses that connect to the vacuum pad lines have been removed from the tee fitting (**6A**) that connects to the valve assembly. If a leak is still present when tested, this fitting (or the hose connecting it to the filter assembly) would be the cause, since these are the only parts connected.

Apply this method to add or remove fittings, using the vacuum test as the indicator to determine which part is the cause of a leak.

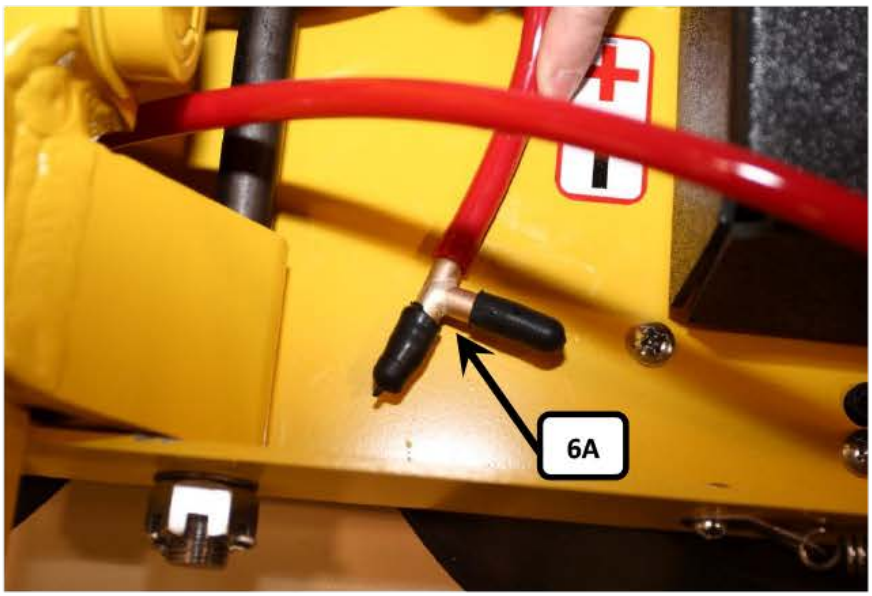


FIGURE 6

Parts can also be tested by using the ball valve assembly and plugs. In **FIGURE 7** a pad suction fitting (**7A**) is being individually tested by connecting the capped fitting to a short piece of hose and connecting it to the end of the ball valve assembly with the vacuum gauge. The other end of the ball valve is connected to the original hose that was previously connected to the suction fitting currently being tested.

Leakage on the ball valve's gauge would indicate that the attached fitting leaks. Leakage on the filter's vacuum gauge would indicate that the leak is located between this fitting and the filter assembly.


FIGURE 7

Continue testing until all fittings and lines are tested or the leak is located.

# SYSTEM CONFIRMATION

Once the leak is identified and repaired, reassemble all parts of the lifter.

A vacuum test, as described in the instruction manual, should be performed following any repair or service to a vacuum lifter. All parts must be verified in relation to their function and the lifter must pass the Vacuum Test before returning to operation.

# ADDITIONAL INFORMATION

**NOTES:**

1) When requesting information on a particular lifter, please have the model number and serial number available, in order for us to properly identify components.
2) **CAUTION:** Always proceed with caution when opening enclosures containing electrical wiring. Wiring is often connected to components in the cover, as well as the enclosure itself.
3) In some cases a leak may be identified to be in an assembly (such as a filter or valve assembly) but the actual cause is not apparent (neither the filter or the valve itself are the cause). In these cases the leak may be caused by a cracked fitting. Cracks in fittings may be visible but are often virtually impossible to locate except under factory test conditions. They may appear as dark lines along the seam of female fittings, along the hex nut section of female hose nipples, or at the base of the threads on male fittings. If a leak is traced to an assembly and the cause is not visibly apparent, it may be best to simply replace the whole assembly rather than a single component.
4) If any metal fittings are disassembled during testing, ***always*** apply thread sealant (Teflon tape or similar product) to the male threads prior to reassembly, in order to avoid vacuum leaks.

   For plastic fittings use only Teflon tape; liquid sealants must not be used because they may damage plastic parts.
5) When assembling fittings, do not over tighten. After first applying adequate thread sealant or tape, the fitting should be finger-tightened as much as possible.

   A straight fitting should be tightened no more than two additional revolutions with a wrench.

   An elbow fitting should be tightened no more than one and one-half additional revolutions with a wrench.

   Once an elbow or tee fitting is tightened with a wrench, the fitting should be aligned in the clockwise direction with a wrench
6) Please note: The information that is gathered when performing a vacuum test is only valid if the tools used to perform the test are accurate. Be sure that the tools you use are capable of completely sealing your system.

If needed, test equipment is available from Wood's Powr-Grip Co.

There are various ways to approach testing vacuum lifters.

For further suggestions or information, please contact our staff at:

***Wood's Powr-Grip Co., Inc.***
***908 West Main***
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***800.548.7341***
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***ALL LIFTERS MUST BE TESTED AFTER MAINTENANCE***
***SEE INSTRUCTION MANUAL***