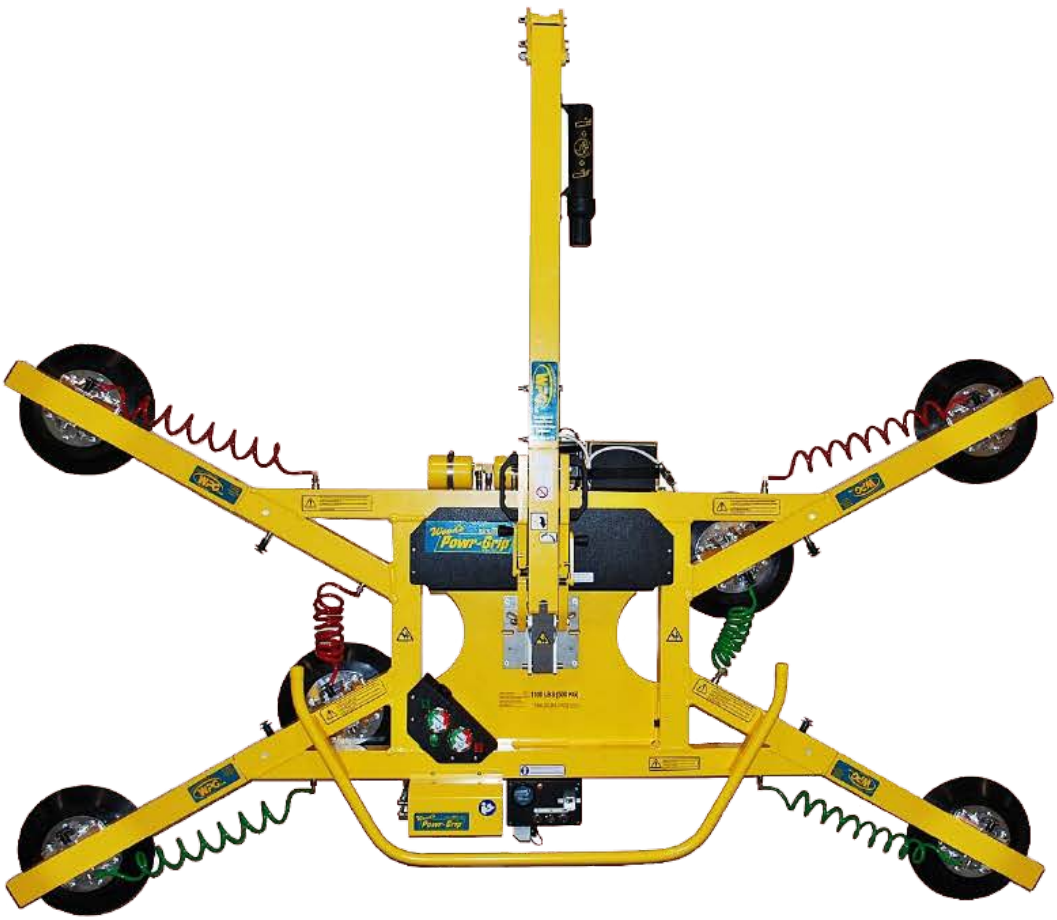
LEAK TEST PROCEDURE

MRTALP6 – DC MODEL – REMOTE READY LIFTERS

APPLICABLE TO DUAL VACUUM SYSTEM LIFTERS WITH SERIAL NUMBERS GREATER THAN # 20100933



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 gauges will be less than 16" Hg [-54 kPa], the red zone of the vacuum gauge.

Moderate leakage is indicated by intermittent cycling of the vacuum pump 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.

Note: This lifter is equipped with quick connect couplings to each vacuum pad. The initial leak test should be performed with all pads attached to verify the condition of the vacuum pads and all system components. A second vacuum test should then be performed with all the quick connects disconnected to verify that the quick connects will seal properly when disconnected. This will verify the integrity of the lifter's vacuum system with all possible configurations. Additionally, testing the lifter both ways (with all vacuum pads connected and alternatively, with all quick connects disconnected) may provide helpful information, should a vacuum leak be noted.

If the vacuum lifter did not leak when all the pads were attached, but did leak when the quick connects were disconnected, this indicates that one or more of the quick connects leak when disconnected. Conversely, if the lifter did leak when all the pads were attached, but did not leak when the quick connects were disconnected, this indicates that one or more of the vacuum pads or the connection from the vacuum pads to the quick connects is the cause of the leak.

In both of the examples above, the vacuum leak is located in the vacuum pad system and not the vacuum generating system. If this is the case, please read the remaining information provided in this section and then proceed to the Pad System Test for information on testing either the quick connects or vacuum pads.

If the vacuum lifter leaked under both circumstances (with all pads connected and also with all quick connects disconnected), the Preliminary Test shown in the following section will need to be performed.

When you perform the vacuum test, we recommend that you note the time and leakage rate, such as "lost 5" Hg [-17 kPa] in 10 minutes". Note that, if both the blue/green and red circuits of the lifter's vacuum system are leaking, you should record this information for each circuit. 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, this indicates that there is still one vacuum leak or more 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 that the information 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, push-in hose adapters and extra vacuum hose of the required sizes. 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. To find out what tools are available, contact our sales staff for additional information.

A set of screwdrivers may also be needed if the valve enclosure or pump cover needs to be removed. Note: Always proceed with caution when removing covers. Since wiring and hoses may be connected to components in the cover, gentle removal is recommended so as not to damage the attached components. Also, if the quick connects need to be removed from the pad frame, a 7/64" hex wrench is required.

When removing a hose from a barbed fitting, take care to avoid damaging the barbs of the fitting to which the hose is attached. 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, it is recommended to cut approximately 1/4" [6 mm] off the end of the hose before reinstalling it on the fitting, in order to remove damaged hose ends.

For push-in fittings, the hose end must be cut square and straight to seal properly. To remove a hose from a push-in fitting press the locking collar in towards the fitting and pull out on the hose. If a hose is removed from a push-in fitting, cut approximately 1/8" [4 mm] off the end of the hose before reinstalling it on the fitting, in order to remove damaged hose ends and to provide a fresh point of contact for the locking collar. When installing a hose in a push-in fitting, push the hose in firmly and then gently pull outward on the hose to ensure that it is fully secured (the hose should not pull out). Additionally, when a hose is installed in a push-in fitting, it needs to run reasonably straight out from the fitting, with minimal sideways pressure on the hose locking collar, to reduce the chance of a vacuum leak.

Note: The vacuum system of this model lifter provides release using a "blow off" feature. This is where the pressure side of the vacuum pump is plumbed to the control valve and pumps air into the pad system when release mode is engaged, to help speed the release of the vacuum pads. When testing the lifter for leaks, it is often necessary to seal off the system in some manner (cap off or plug fittings and or lines). Due to this, the use of the release function is not recommended during the repair process, as it will cause pressure to build in the sealed off section and may damage components.

PRELIMINARY TEST

This test determines whether leakage is located in the vacuum generating system or the pad system. Note that the following assumes you have access to suitable plugs and additional hose to seal off the section being tested.

1) Remove the 5 Phillips screws that attach the solenoid valve cover to the frame. Remove the solenoid valve cover (**1A**) and lay it to one side.

   See **FIGURE 1**.

   This exposes the 2 filters (**1B**) that attach to the vacuum switch and pad system manifolds.

FIGURE 1

2) Remove the hose from the filter that attaches to the pad system manifold of the affected circuit (**2A** blue/green or **2B** red). Install a short piece of 1/4" [6.35 mm] O.D. hose that is capped off to create a fitting plug, and install this in the filter as shown in **FIGURE 2.**

   Note, in **FIGURE 2** both filters are shown capped-off.

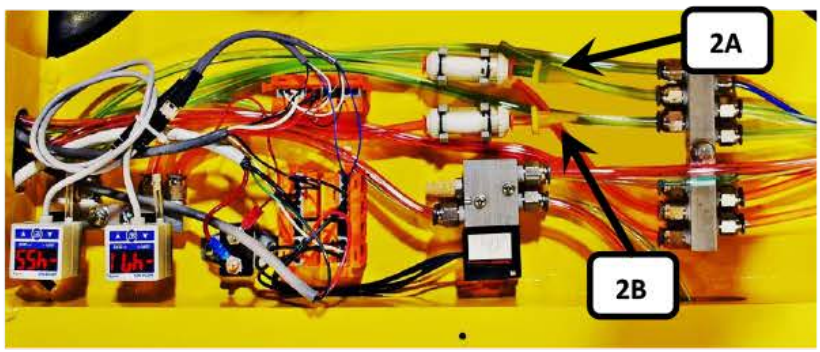

FIGURE 2

   Note that, since the vacuum gauges are located in the pad system, the digital vacuum switches will be used to indicate whether or not the leak still exists.

   Note: If you are testing only one of the two circuits (only one filter capped-off), disconnect the quick connects to all the vacuum pads of the other pad circuit, so the remaining section will seal during testing.

3) Switch the power on (I) and activate the vacuum generating system by pressing the apply ( ) push button.

4) If the lifter does not shut off automatically, this indicates that the vacuum generating system does leak. Proceed to the Vacuum Generating System Tests.

5) If the lifter shuts off automatically, observe the vacuum switches with the lifter still powered on, to locate the general area of leakage.

6) Note: Vacuum switch scales have changed since the initial implementation of the digital switches. The switches may stop at ≥ 18.0 or ≥ -458, depending on the age of the lifter and the scale used to set the switches. Regardless of the scale used, you will be watching for a drop in the vacuum level shown (decreasing number) and a regular cycling of the vacuum generating system. Additionally, if still at factory settings, the lifter cycles when either vacuum switch reaches -425 (16.7" Hg.). On vacuum switches set to the high scale, a drop of approximately 25 points is equivalent to a drop of 1" Hg. [3.3 kPa]. Knowing this, along with the time it takes the system to cycle, allows an approximate evaluation of the leak rate.

- If the vacuum level of one or both vacuum switches decreases rapidly and the vacuum generating system cycles repeatedly, this indicates that the vacuum generating system does leak. Proceed to the Vacuum Generating System Tests.

  Note: If the vacuum level (as indicated on the vacuum switches) drops slightly, but not to the extent that the vacuum generating system cycles in 5 minutes, this indicates that there is a minor leak in the vacuum generating system. Minor leaks can be difficult to locate and not always cost-effective to repair. Due to this, it may be best to proceed to the Pad System Tests, keeping in mind that this minor leak will still exist even if all leaks are located and repaired in the pad system.

  Minor leaks are often caused by faulty hose connections. It may be valuable to check the hose ends and connections prior to proceeding to the Pad System Tests. However, the amount of time invested should match the severity of the problem.

- If both vacuum switches hold steady, this indicates that the vacuum generating system does not leak. Proceed to the Pad System Tests.

Alternate method using ball valve with vacuum gauge:

If you have access to a ball valve with a vacuum gauge and the proper hose adapters, they can be used to seal one filter and provide a clearer reading of the vacuum loss, which can be directly compared to the reading taken from the lifter's vacuum gauges. In this scenario, the lifter can be switched off (O) while the vacuum gauge of the ball valve is monitored for indications of leakage.

This is shown in **FIGURE 3**, where the ball valve is being used to seal one filter and the other has been capped off. Note that, if it was determined that both circuits (red and blue/green) are leaking, the gauge would be used to determine the problem with one circuit and then used to repeat the tests on the other circuit. The ball valve and gauge can be substituted for any cap or plug.

In **FIGURE 3**, the ball valve has been fitted with adapters to attach to the 1/4" push-in hose to the end with the vacuum gauge. This end of the ball valve assembly was then attached to the filter of the circuit being tested. Note that the other filter was capped off so the lifter did not have to be attached to a surface to seal the other circuit.

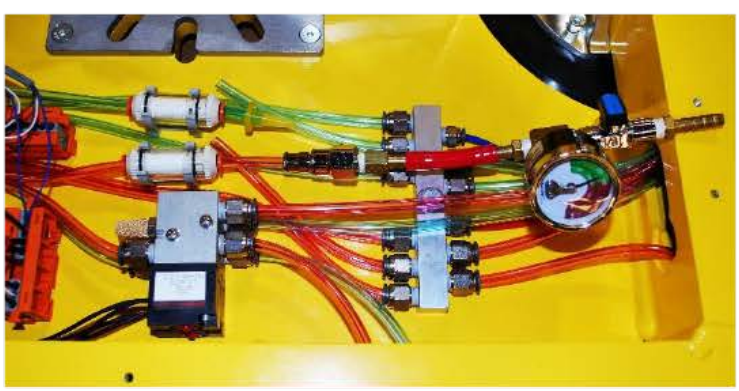

FIGURE 3

With the ball valve closed (handle turned perpendicular to the valve as shown in **FIGURE 3**), the lifter was applied (↕) and then the power was switched to off (O).

Leakage in the circuit with the ball valve attached (shown on red circuit) will be indicated on the ball valve's vacuum gauge.

- If the vacuum level of the ball valve's vacuum gauge decreases rapidly, this indicates that this circuit of the vacuum generating system does leak. If both circuits originally indicated a leak, repeat the test for the other circuit.

  Once both circuits have been tested and it has been verified that one or both circuits leak, proceed to the Vacuum Generating System Tests.

- If the vacuum level of the ball valve's vacuum gauge holds steady and does not drop, the indication is that this circuit of the vacuum generating system does not leak. If both circuits originally indicated a leak, repeat the test for the other circuit.

  Once both circuits have been tested and it has been verified that the vacuum generating system does not leak, proceed to the Pad System Tests.

VACUUM GENERATING SYSTEM TEST

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

Note: If you are testing only one of the two circuits, disconnect the quick connects to the vacuum pads of the other circuit to allow the remaining section to seal during testing.

The most likely leak points in the vacuum generating system are the check valve, the hose connections to the filter, or the control valve. Leave the filter(s) disconnected and test these items as follows:

Isolate the filter from the control valve / check valve assembly:

Based on the Preliminary Test, it should have been determined that, with the filters capped off, the leak is still present. Proceed as follows to determine the location of the leak.

Note: If, during the Preliminary Test, the vacuum level of only one of the vacuum switches indicated a decrease in the vacuum level and the other held or increased when the system cycled, it is the circuit that lost vacuum (red or blue/green) that needs to be tested.

1) Remove the hose from the vacuum switch manifold that connects to the filter. Remove the capped hose from the filter and attach it to the manifold assembly where the filter hose was removed.

   See **FIGURE 4**, items **4A** and **4B**, where both circuits are shown capped-off.

2) Switch the power on (I), and activate the vacuum generating system by pressing the apply ( ) push button.

3) With the lifter still turned on, observe the vacuum switches to locate the general area of leakage.

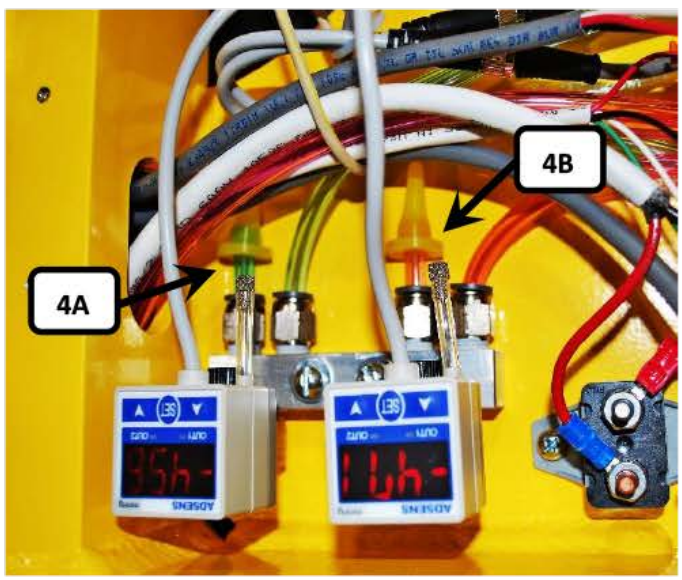

FIGURE 4

- If the vacuum level on the lifter's vacuum switch holds steady, this indicates the filter is the source of the leak. Verify that the O-ring seal of the filter cap is in good shape, that the cap is tight and that the filter housing is clean. Check the filter and the ends of the hose attached to the filter. Cut approximately 1/8" [4 mm] from the ends of the hoses, ensuring that the cuts are straight and square. Reattach the hoses to the filter in the same manner as done in the Preliminary Test and retest the lifter. If the lifter continues to leak, replace the filter and or hoses.

  Note: When the filter is installed in its holder, it is critical that the hoses be positioned so that there is minimum sideways pressure on the filter hose.

- If the vacuum level on the vacuum switch drops and the lifter cycles repeatedly, this indicates that the leak is located in the vacuum switch manifold assembly, control valve assembly or check valve.

Switch the power off (O) and proceed to next step.

Isolate the vacuum switch, control valve and check valve assemblies:

4) Note: This step requires the use of the ball valve with vacuum gauge and appropriate adapters for the 1/4" O.D. hose. If you have only one ball valve assembly, only one circuit (blue/green or red), can be tested at a time. Each circuit can be addressed individually.

5) The ball valve assembly required for the next step consists of the standard ball valve with vacuum gauge and barbed fittings (for 1/4" I.D. hose), two barbed fitting to 3/8" O.D. push-in hose adapters and two 3/8" O.D. push-in hose to 1/4" O.D. push-in hose adapters. See the following graphic.

6) Remove the hose (**5A**) from the vacuum switch manifold assembly that connects to the control valve. Connect the end of the ball valve with the vacuum gauge to this hose.

7) Using additional hose and fitting adapters (**5B**), attach the other end of the ball valve to the vacuum switch manifold. See **FIGURE 5**.

8) With the ball valve in the open position (handle in line with the valve), switch the power on (I), and activate the vacuum generating system by pressing the apply ( ) push button.

9) Allow the vacuum system to shut off automatically and, with the lifter still on and in apply mode, close the ball valve (turn handle perpendicular to valve) as shown in **FIGURE 5**.

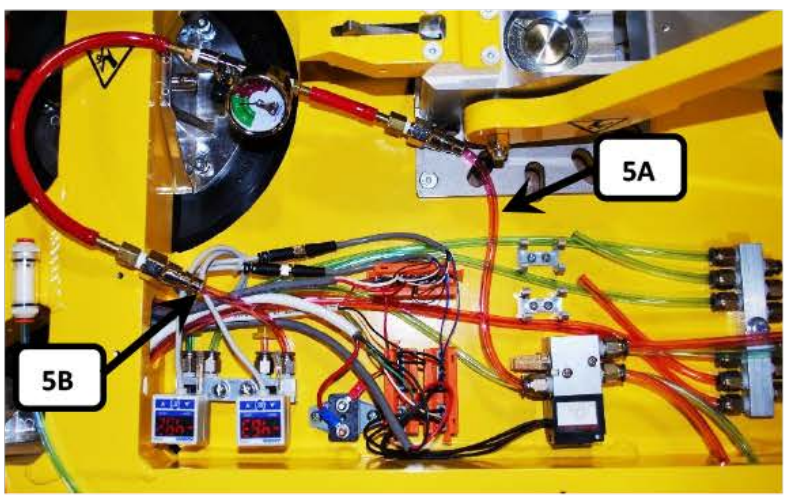

FIGURE 5

10) Observe the vacuum gauge on the ball valve and the vacuum switch readout, to locate the area of leakage.

- If the vacuum level on the vacuum switch starts and continues to drop, this indicates that the vacuum switch manifold assembly does leak. Note, this will cause the pump to run, but the lifter will not regain vacuum since the ball valve is closed between the solenoid valve and the vacuum switch. Check the hose connections to the push-in fittings and look for any indication of damage. Replace parts or assembly as needed.
- If the vacuum level on the vacuum switch holds steady and does not drop, this indicates that the leak is located in the control valve assembly or the check valve.

Although this will typically be indicated by a drop in vacuum as shown on the ball valve's vacuum gauge this will not always be the case. If the cause of the leak is the check valve, the leak may be intermittent.

Based on this, if both the vacuum switch and the ball valve's vacuum gauge hold steady and do not drop, this indicates that the check valve is the likely cause of the leak. Check the hose connections to the push-in fittings and, if no problems are found with the hose or connected fittings, replace the check valve.

- If the vacuum level on the ball valve's vacuum gauge does start and continue to drop, the cause of the leak may be either the solenoid valve or the check valve. Switch the power to off (O) and proceed to next step.

11) Remove the ball valve assembly from the solenoid valve / vacuum switch manifold hose and reconnect the hose to the vacuum switch manifold. Note, the vacuum switch manifold should still be capped-off.

12) Remove the hose (**6A**) from the opposite side of the solenoid that connects to the vacuum tanks. Attach the end of the ball valve with the vacuum gauge to this hose and attach the other end of the ball valve to the solenoid valve (**6B**). See **FIGURE 6**.

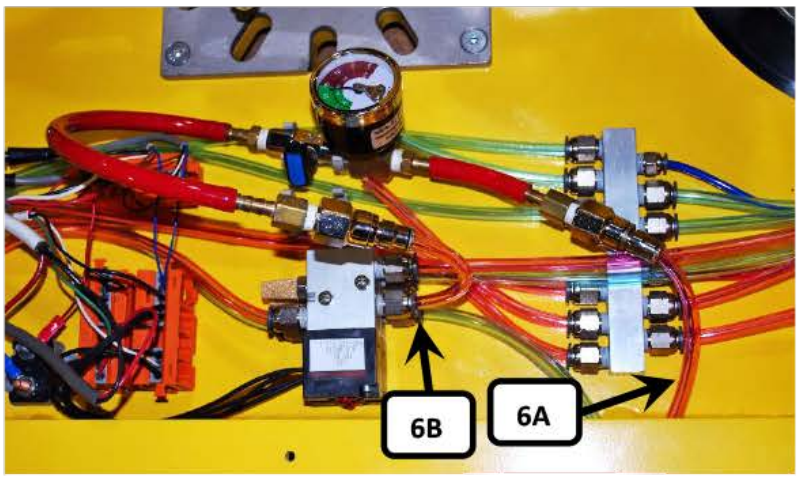

FIGURE 6

13) With the ball valve in the open position (handle in line with the valve), switch the power to on (I), and activate the vacuum generating system by pressing the apply ( ) push button.

14) Allow the vacuum system to shut off automatically and, with the lifter still on and in apply mode, close the ball valve (turn handle perpendicular to valve) as shown in **FIGURE 6**.

15) Observe the vacuum gauge on the ball valve and the vacuum switch readout, to locate the area of leakage.

- If the vacuum level on the vacuum switch starts and continues to drop, this indicates that the leak is located in the solenoid assembly. Note, this will cause the pump to run, but the lifter will not regain vacuum since the ball valve is closed between the solenoid valve and the check valve. Check the hose connections to the push-in fittings and look for any indication of damage. Replace parts or assembly as needed.
- If the vacuum level on the vacuum switch holds steady and does not drop, and the vacuum level of the ball valve's vacuum gauge starts and continues to drop, this indicates that the check valve is the cause of the leak. Note, the check valve is also indicated if both the vacuum switch and the vacuum gauge of the ball valve hold steady. This is because the check valve may leak intermittently, whereas a leak in the solenoid valve will continue until the assembly is repaired or replaced. Check the hose connections to the push-in fittings and, if no problems are found with the hose or connected fittings, replace the check valve.

Note: Leaks in the vacuum generating system should be repaired prior to performing repairs to the pad system. This can be confirmed by repeating the Preliminary Test, where the filters were capped off and the system then tested.

Once the vacuum generating system is confirmed to hold (no significant leaks noted per the vacuum readings), reconnect the filters to the pad system manifold, proceed to System Confirmation and retest the vacuum system as described. If leaks are known or determined to be in the pad system proceed to Pad System Tests.

PAD SYSTEM TESTS

Note: This section assumes either that it was determined that the vacuum generating system does not leak or that any existing leaks in the vacuum generating system have been repaired.

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

Note: If you are testing only one of the two circuits, the quick connects to the remaining section can be disconnected so this circuit will seal during testing.

If the Preliminary Test was performed, reattach all vacuum hose connections, including those that attach the filter to the pad system manifold to reconnect the vacuum generating system to the pad system.

To determine where to begin testing, identify which previous test indicated the pad system to be the cause of the leak.

Condition A:

If, during the initial vacuum test of the whole lifter, it was determined that the lifter's vacuum system did leak when all the vacuum pads were connected but it did not leak when all the quick connects were disconnected, go to **Isolating vacuum pads and pad line fittings**.

The conclusions that can be made based on the results of the test as described above are:

a) The vacuum generating system does not leak.
b) The internal vacuum lines of the vacuum pad system do not leak up to the quick connects.
c) The quick connects do not leak when disconnected.

Condition B:

If, during the initial vacuum test of the whole lifter, it was determined that the lifter's vacuum system did not leak when all the vacuum pads were connected but it did leak when all the quick connects were disconnected, go to **Isolating quick connects and internal vacuum lines**.

The conclusions that can be made based on the results of the test as described above are:

a) The vacuum generating system does not leak.
b) The internal vacuum lines of the vacuum pad system do not leak up to the quick connects.
c) The quick connects do not leak when connected.
d) Neither the vacuum pads nor the lines running from the quick connects to the vacuum pads leak.

Condition C:

If, per the Preliminary Test, you have determined that the vacuum generating system does not leak and if, when the lifter was vacuum tested as a whole, the lifter's vacuum system did leak when all the vacuum pads were connected and continued to leak when all the quick connects were disconnected, begin testing the pad system at **Isolating quick connects and internal vacuum lines**.

At this point, all that has been determined is that the vacuum generating system does not leak.

Isolating quick connects and internal vacuum lines:

This section will deal with vacuum testing of the internal hose and the quick connects when they are disconnected from the vacuum pads. It assumes that the vacuum generating system has been verified to not leak up to the filter connection.

Begin testing by isolating the pad system manifold and vacuum gauge connections from the pad system as follows:

1) Remove the 4 blue/green and/or red (translucent) 1/4" [6.35 mm] O.D. hoses from the pad system manifold leaving the blue and red (opaque) 5/32" [4 mm] O.D. hoses attached. The small hoses are attached to the vacuum gauges.
2) Install short pieces of 1/4" O.D. hose that are capped off to create fitting plugs (**7A**), and install these in the ports of the pad system manifold where the 1/4" O.D. hoses were removed.

   See **FIGURE 7.** The blue/green circuit is shown being tested.

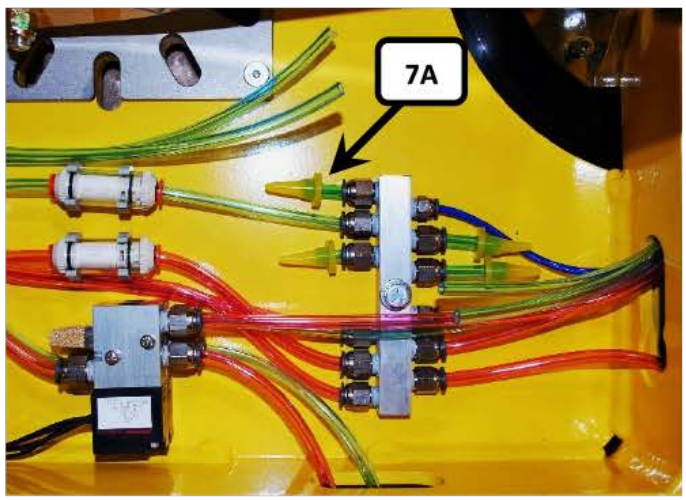

FIGURE 7

3) Switch the power to on (I) and activate the vacuum generating system by pressing the apply ( ) push button.
4) Allow the vacuum system to shut off automatically, and switch the power to off (O).
   - If the vacuum level on the lifter's vacuum gauge, for the circuit being tested, holds steady and does not drop, the indication is that neither the pad system manifold nor the connection to the vacuum gauge leak. Proceed to step 12.
   - If the vacuum level on the lifter's vacuum gauge starts and continues to drop, this indicates that there is a leak in either the manifold or the connection to the vacuum gauge. Proceed to next step.
5) To isolate the vacuum gauge from the pad system manifold the ball valve will need to be set up with the 5/32" O.D. hose adapters as shown below.

6) Disconnect the 5/32" [4 mm] O.D. hose to the vacuum gauge (**8A**) from the manifold. Connect the end of the ball valve assembly without the gauge to this hose.

   Using an additional piece of 5/32" O.D. hose, connect the end of the ball valve with the vacuum gauge to the pad system manifold. See **FIGURE 8.**

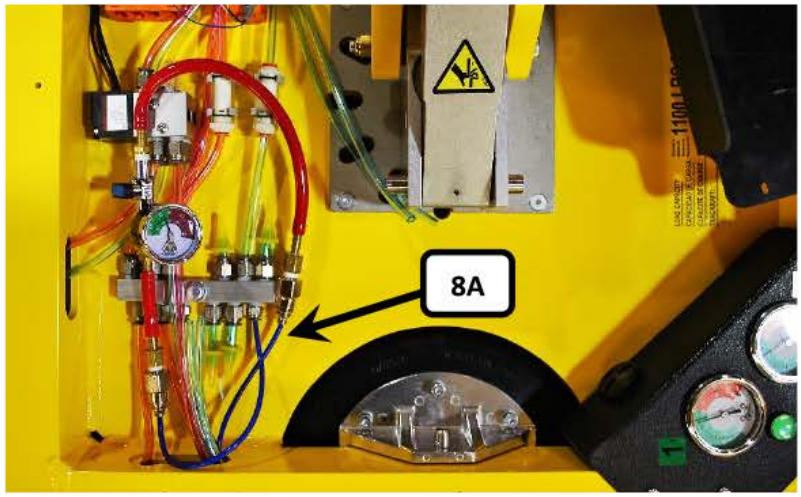

FIGURE 8

7) With the ball valve in the open position (handle in line with the valve), switch the power to on (I) and activate the vacuum generating system by pressing the apply (⇄) push button.

8) Allow the vacuum system to shut off automatically, close the ball valve (turn handle perpendicular to valve) and switch the power to off (O).

   - If the vacuum level on the lifter's vacuum gauge holds steady and does not drop and the vacuum level on the ball valve's vacuum gauge starts and continues to drop, this indicates that the leak is located in the pad system manifold. Examine all hose connections and fittings. Replace parts or assembly as needed.
   - If the vacuum level on the ball valve's vacuum gauge holds steady and the vacuum level on the lifter's vacuum gauge starts and continues to drop, the indication is that the leak is in either the hose connection to the vacuum gauge, the gauge fitting or the vacuum gauge.

9) Remove the ball valve assembly and reconnect the 5/32" [4 mm] O.D. hose to the pad system manifold.

10) Remove the 4 Phillips screws (**9A**) holding the gauge cover.

11) Carefully tilt the cover back as shown in **FIGURE 10**. Note, there are wires and hoses connected to this cover.

    Remove the 5/32" [4 mm] O.D. hose (**10A**) connected to the vacuum gauge fitting. Connect the end of the ball valve with the vacuum gauge to this hose. Using an additional piece of hose (**10B**), connect the other end of the ball valve to the lifter's vacuum gauge as shown in **FIGURE 10**.

FIGURE 9

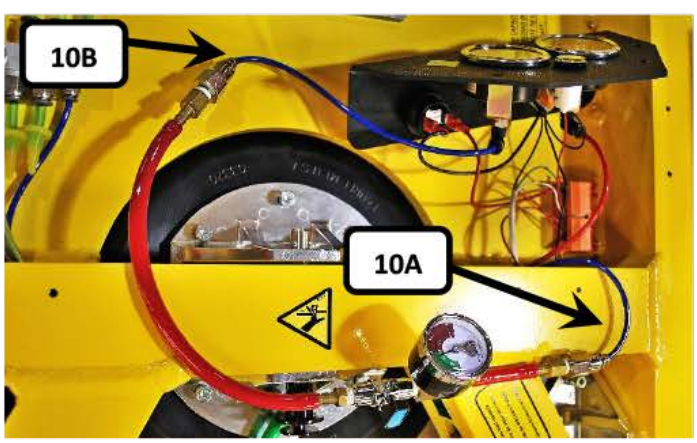

FIGURE 10

- 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, the indication is that the leak is in the lifter's vacuum gauge or the connected fitting. Note, the fitting on the vacuum gauge is a 90° composite swivel fitting. The seals may be worn or the fitting may have cracked at the bend point of the elbow. With vacuum applied, gently pull out on the elbow and swivel the fitting; if the rate of the leak changes replace the fitting. If the fitting does not appear to be the cause of the leak, replace the vacuum gauge.
- If the vacuum level on the lifter's vacuum gauge holds steady and does not drop and the vacuum level on the ball valve's vacuum gauge starts and continues to drop, the indication is that the connecting hose between the manifold and gauge is the cause of the leak. Recut the ends of the hose, reattach the hose to the lifter's vacuum gauge and pad system manifold, and retest. If the vacuum level on the lifter's vacuum gauge starts and continues to drop, replace the hose.

  Note, if the vacuum level of both vacuum gauges holds steady and does not drop, this also indicates that the hose is the issue. However, the indication is that it is a connection problem and not a damaged hose. Re-cutting the ends of the hose and reattaching the hose to both the gauge and vacuum pad system manifold should resolve the leak.

12) Once it has been verified that the pad system manifold and vacuum gauge connections do not leak the quick connects can be tested as follows.

13) Reconnect one of the 1/4" [6.35 mm] O.D. quick connect hoses to the pad system manifold, leaving the other ports plugged, as shown in **FIGURE 11**. In **FIGURE 11** the hose to the quick connect (**11A**) has been reattached to the top-right port of the manifold; the plugs have not been removed from the other ports.

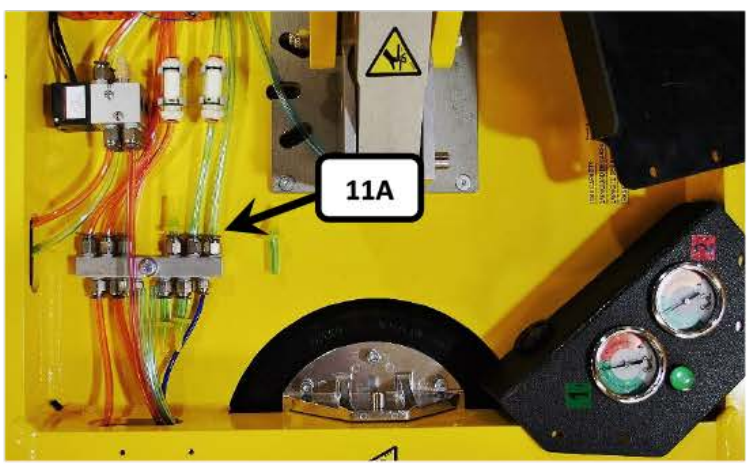

FIGURE 11

14) Switch the power to on (I) and activate the vacuum generating system by pressing the apply ( ) push button.

15) Allow the vacuum system to shut off automatically, switch the power to off (O). Observe the lifter's vacuum gauge of the circuit (blue/green or red) that is being tested to determine the location of the leak.

- If the vacuum level of the lifter's vacuum gauge holds steady and does not drop, the indication is that the attached hose and quick connect assembly do not leak.

  Leave this quick connect hose attached and attach one of the other quick connect hoses. Repeat the test. Once it has determined that the quick connects do not leak, proceed to the Pad System Tests.
- If the vacuum level of the lifter's vacuum gauge starts and continues to drop, the indication is that the attached hose and/or quick connect assembly does leak. Check the end of the hose connection to the pad system manifold. If needed, recut the end of the hose, reattach it to the manifold and repeat the test. If this repairs the leak and it has been verified that all the quick connect connections hold vacuum, proceed to Isolating vacuum pads and fittings.

- If the hose connection to the pad system manifold is not suspected as being the cause, disconnect this hose, noting that this quick connect leaked. Replace the plug on the pad system manifold and connect one of the other quick connect hoses.

  Repeat this process for each of the remaining quick connect hoses. Once it has been determined which, if any, leak, proceed to the next step to test the quick connects.

16) To test the individual quick connect assemblies they will need to be removed from the pad frame. The quick connects are attached to a manifold that is secured to the inside wall of the pad frame tubes by two socket head cap screws (**12A**) located in opposite corners of the manifold. A 7/64" hex wrench is required to remove these screws. See **FIGURE 12**.

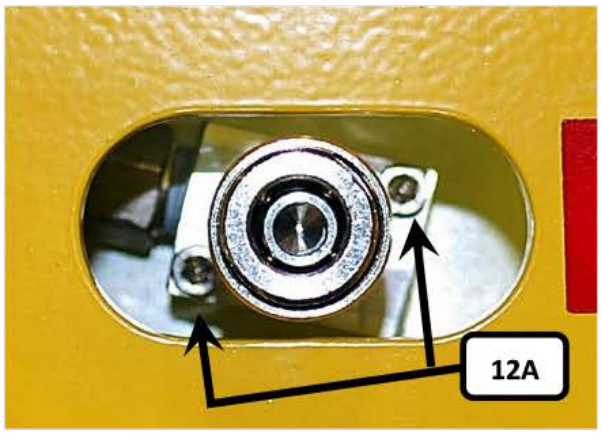

FIGURE 12

17) Remove the two screws securing the quick connect manifold. If the hose for this quick connect (**13A**) is still attached to the pad system manifold, disconnect it. Pull the quick connect manifold out of the tube, taking care to not pull the opposite end of the hose, that connected it to the pad frame manifold, into the pad frame. See **FIGURE 13**.

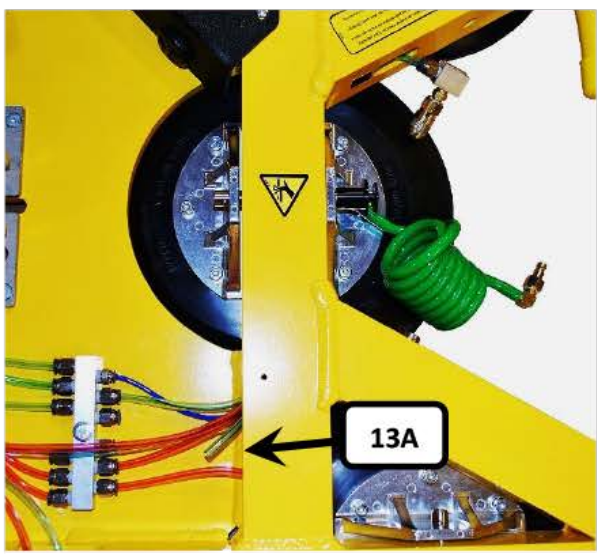

FIGURE 13

18) Disconnect the hose from the quick connect manifold (**14A**) and connect the end of the ball valve assembly without the gauge to this hose. Using an additional piece of hose, connect the end of the ball valve assembly with the gauge to the quick connect manifold (**14B**). See **FIGURE 14**.

Reconnect the hose of this assembly (**15A**) back onto the pad system manifold. Note, in order to make this hose connection the end of the ball valve assembly may need to slide part way into the pad frame tube. Reference **FIGURE 15**.

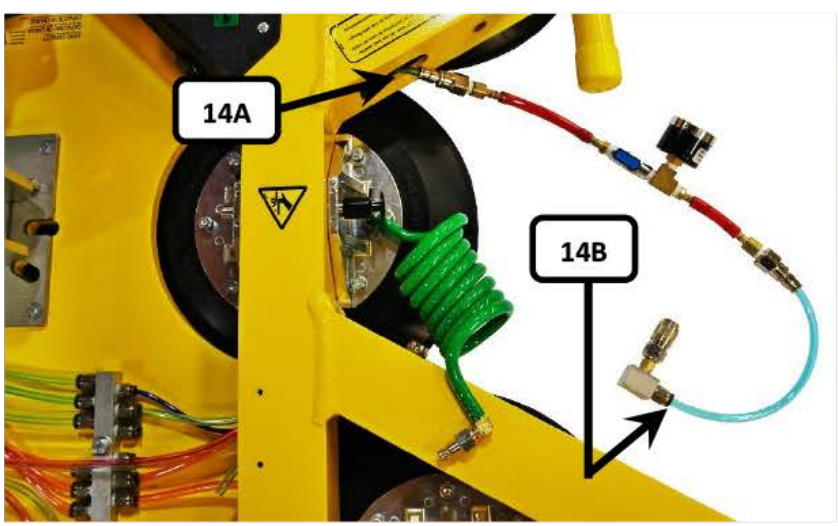

FIGURE 14

FIGURE 15

19) With the ball valve in the open position (handle in line with the valve), switch the power to on (I) and activate the vacuum generating system by pressing the apply ( ) push button.

20) Allow the vacuum system to shut off automatically, close the ball valve (turn handle perpendicular to valve) and switch the power to off (O).

- If the vacuum level on the ball valve's vacuum gauge holds steady and does not leak, but the vacuum level on the lifter's vacuum gauge starts and continues to drop, the indication is that the hose from the quick connect manifold to the pad system manifold is the cause.

  Check both ends of the hose, recut them if needed and retest. If this does not repair the leak, replace the hose.

  Note: If it is necessary to replace internal hoses, it is recommended that a drawing of the internal hose routing be obtained prior to proceeding further, in order to understand how the hoses are routed. Please contact Wood's Powr-Grip Co. for additional assistance.

- If the vacuum level on the ball valve's vacuum gauge starts and continues to drop, the indication is that the quick connect assembly is the cause.

  Check the fitting for the hose connection and the one used to attach the female quick connect coupler to the manifold for indications of cracks. Note, since the quick connect manifold has been removed, testing can be accomplished by applying pressure (15–20 psi [100–140 kPa]) to the assembly and spraying it with soapy water. Any crack should be indicated by bubbles. However, since pressure (as opposed to vacuum) will help both the hose connection and the quick connect seal, you may not see any indication of a leak if these were to be the cause.

  If there is no indication of cracks in the threads of the fittings and the hose has been checked and not determined to be the cause of the leak, replace the quick connect.

21) Repeat this process for all the quick connects that were determined to leak. Once all the leaks have be repaired to this point and the pad system seals with all the quick connects disconnected, proceed to Isolating vacuum pads and pad line fittings.

Isolating vacuum pads and pad line fittings:

Note: This section assumes that you have verified that the lifter does not leak when the quick connects are disconnected.

If it has not already been determined that the pad system does not leak when all the pads are connected, with the lifter attached to a smooth, clean, non-porous surface, repeat the vacuum test with all pads connected.

If the vacuum level on the lifter's vacuum gauges holds steady and does not drop, proceed to System Confirmation. If the vacuum level on either of the lifter's vacuum gauges starts and continues to drop, proceed as follows to test the individual pads.

22) Remove each pad fitting from the vacuum pads of the leaking circuit, or from all the pads if both circuits are leaking, to disconnect the pads from the vacuum system. Cap off each pad fitting to seal off the pad lines. See the circled areas in **FIGURE 16**.

Note, if testing only one circuit disconnect the quick connects of the other circuit so the other circuit will seal during testing.

FIGURE 16

23) Switch the power to on (I) and activate the vacuum generating system by pressing the apply ( ) push button.

24) Allow the vacuum system to shut off automatically and switch the power to off (O).

- If the vacuum level on the vacuum gauge of the circuit, red or green, that is being tested holds steady and does not drop, this indicates that one or more vacuum pads leak.

  Reconnect one pad to its vacuum line and, with the vacuum pad attached to a smooth, clean surface, repeat the test. If indications of leakage resume, replace that pad. Continue testing until all pads have been reconnected and all defective pads have been replaced. Once the lifter is determined to seal with all pads attached, proceed to System Confirmation.

- If the vacuum level on the vacuum gauge of the circuit, red or green, that is being tested starts and continues to drop, this indicates the leak is in the fittings or coiled hoses between the quick connects of that section and the vacuum pads or that one or more quick connects leak when connected. Proceed as follows.

25) Disconnect the quick connects of all but one pad line of the circuit, red or green, that indicated a leak. Repeat the test above with just the one pad line attached.

- If the vacuum level on the vacuum gauge of the circuit, red or green, that is being tested holds steady and does not drop, the indication is that this pad line does not leak.

  Repeat this process for each pad line to determine which of the pad lines leak.

- If the vacuum level on the vacuum gauge of the circuit, red or green, that is being tested starts and continues to drop, this indicates that this pad line does leak. Disconnect this pad line, noting that it leaks.

Repeat this process for each individual pad line to determine which of the pad lines leak. Once it has been determined which pad lines leak, proceed as follows.

26) Remove the coiled hose from the 90° fitting connected to the male quick connect plug (**17A**) from one of the pad lines determined to leak. Cap off this fitting and connect the male quick connect to the female coupler. See **FIGURE 17**.

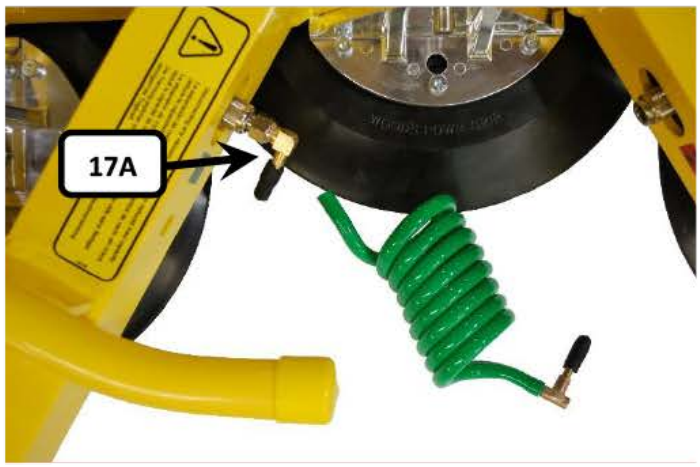

FIGURE 17

27) Switch the power to on (I) and activate the vacuum generating system by pressing the apply ( ) push button.

28) Allow the vacuum system to shut off automatically and switch the power to off (O).

- If the vacuum level on the vacuum gauge of the circuit, red or green, that is being tested holds steady and does not drop, the indication is that this quick connect assembly does not leak.

  Repeat this process for each pad line to determine if the quick connects are the cause of the leak. If no leaks are found in the quick connect assemblies proceed to step 29.

- If the vacuum level on the vacuum gauge of the circuit, red or green, that is being tested starts and continues to drop, this indicates that this quick connect does leak when it is attached to the female coupler. Disconnect this quick connect noting that it leaks when connected.

  Repeat this process for each of the remaining assemblies determined to leak, to determine if the quick connects, are the cause of the leak.

  Check the 90° fitting of the quick connect assemblies determined to leak for any indication of cracks. If no cracks are found, replace the quick connect. Note, since the male plug of the quick connect seals on an O-ring located in the female coupler, it is recommended that both halves, male and female, be replaced.

29) At this point, you should have determined that one or more of the pad lines leak, but that the leak is not caused by the connected quick connect assembly. This leaves the coiled hose and pad fitting, of the pad line that is leaking, as the possible cause.

To determine which part is the cause reconnect the coiled hose to the 90° fitting of the quick connect. Remove the pad fitting (**18A**) from the other end of the coiled hose. Attach the end of the ball valve without the vacuum gauge to the coiled hose and, using an additional piece of hose, connect the pad fitting to the end of the ball valve with the gauge. Cap off the pad fitting.

See **FIGURE 18.**

FIGURE 18

30) With the ball valve in the open position (handle in line with the valve), switch the power on (I), and activate the vacuum generating system by pressing the apply ( ) push button.

31) Allow the vacuum system to shut off automatically, close the ball valve (turn handle perpendicular to valve) and switch the power to off ( ).

32) Observe the vacuum gauges to determine the area of the leak.

- If the vacuum level on the lifter's vacuum gauge starts and continues to drop, the indication is that the coiled hose leaks. Replace the coiled hose.
- If the vacuum level on the ball valve's vacuum gauge starts and continues to drop, the indication is that the pad fitting leaks. Replace the pad fitting.

33) Repeat this process for any pad line determined to have a leak until all lines have been tested and repaired.

34) Once all parts have been reassembled and all leaks have been identified and repaired, proceed to System Confirmation and retest the vacuum system as described.

SYSTEM CONFIRMATION

Once all leaks have been identified and repaired, reassemble all parts of the lifter.

The Vacuum Test, as described in the instruction manual, should be performed following any repair or service to a vacuum lifter. Note: On lifters such as this one, with quick connects installed, a second vacuum test should be performed with all quick connects disconnected. All parts must be verified in relation to their function and the lifter must pass the Vacuum Test before returning the lifter 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 nor 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
Laurel, Montana 59044
800.548.7341
406.628.8231
406.682.8354 (fax)
www.WPG.com

ALL LIFTERS MUST BE TESTED AFTER MAINTENANCE
SEE INSTRUCTION MANUAL