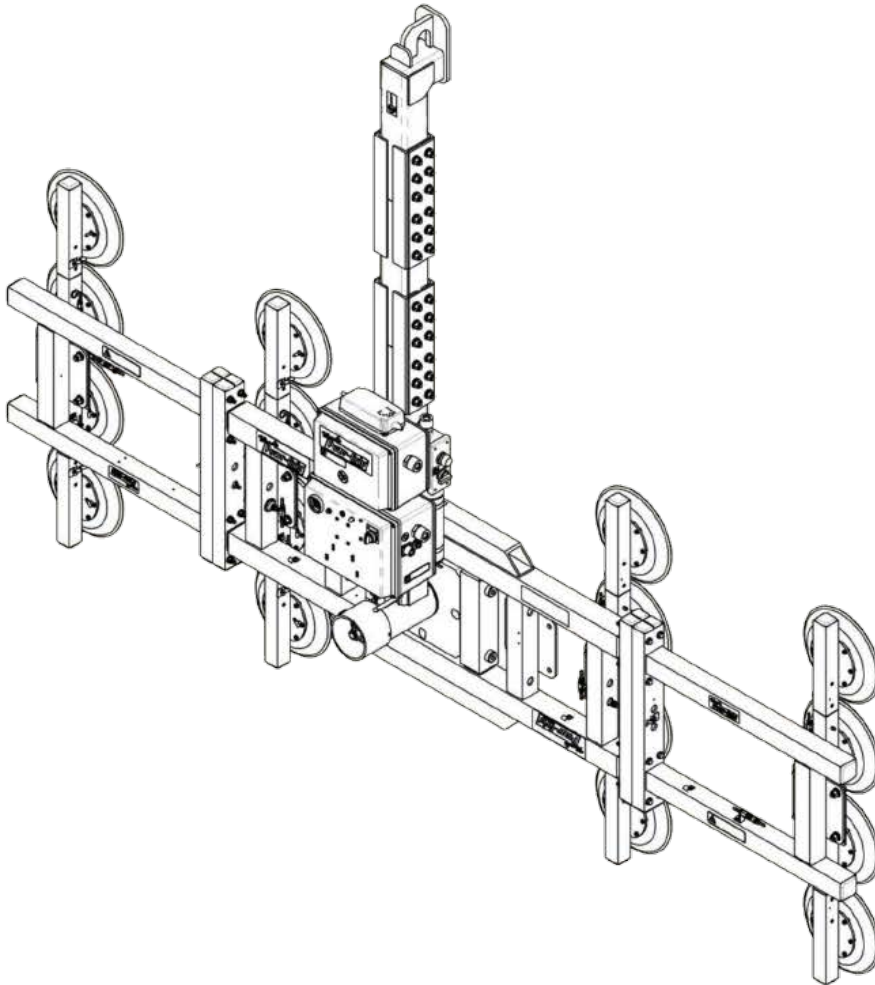


LEAK TEST PROCEDURE

MR1611LDC LIFTERS WITH SINGLE VACUUM SYSTEMS
WITH OR WITHOUT REMOTE CONTROL OPTION



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

KEEP FOR FUTURE REFERENCE

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SYMPTOMS OF VACUUM LEAK

Note, in this type vacuum system, when the lifter is not attached to a surface and power to the lifter is switched off, air is allowed to enter the vacuum reserve tank. During the first application of the lifter (after being in a power off state) the lifter may experience several brief repeated cycles of the vacuum generating system until the vacuum level in the reserve tank and vacuum pad system equalize. If, when first applied, your lifter's vacuum system immediately cycles repeatedly and then holds without cycling this is typical for the vacuum system and is not cause for concern.

Severe leakage is evidenced by a lifter's inability to draw full vacuum while attached to clean, smooth, nonporous surface. In such cases, the vacuum pump runs continuously and the vacuum level shown on the vacuum gauge 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 and (green) vacuum lift 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. Note, since this lifter has quick connects used to reduce the number of vacuum pads, it should be tested with both the quick connects connected and disconnected. See System Confirmation at the end of this document for additional information on how to confirm your lifter holds in all possible configurations.

When performing the vacuum test, if the lifter tests positive for a leak, we recommend that you note the time and leakage rate such as "lost 5" [-17 kPa] 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 in suction stems on the back of pads, cracks, abrasions or cuts in hoses, damaged fittings and loose or damaged 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 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 enclosures need to be opened. Note, 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, and hinged covers open only one way, so open them gently so as not to damage the enclosure or attached wiring.

Note, when removing hoses from fittings 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" [6mm] off the end of the hose before reinstalling it on the fitting to remove damaged hose ends.

PRELIMINARY TEST

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

- 1) Remove the hose from the straight hose fitting, **1A**, of the vacuum filter that connects the vacuum gauge side of the filter to the rotating union.
- 2) Cap the end of the barbed fitting of the vacuum filter, to seal off the vacuum generating system from the pad system.

See **FIGURE 1**.

- 3) Turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then turn the lifter off at the power switch.
- 4) Observe the lifter's vacuum gauge to locate the general area of leakage.



FIGURE 1

- 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, the indication is that the vacuum generating system does not leak, so the leak is located in the pad system. Proceed to the Pad System Test.

VACUUM GENERATING SYSTEM TEST

Note: The following assumes you have access to suitable plugs, a ball with vacuum gauge, and additional 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 filter assembly itself, or the seals located on the intake port of the two main solenoids. Leave the vacuum line to the pad system sealed off at the vacuum filter and test these items as follows.

Isolate filter assembly:

- 1) To begin remove the hose connected to the 90° fitting, 2A, of the vacuum filter that runs from the filter to the valve enclosure. Install the end of the ball valve assembly with the vacuum gauge (2B) into this hose.

Using an additional piece of hose, attach the other end of the ball valve to the filter's 90° fitting, 2A, which the original hose was attached to.

- 2) With the ball valve in the open position (handle in line with the valve) turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then close the ball valve (handle turned perpendicular to the valve as shown in FIGURE 2) and turn the lifter off at the power switch.

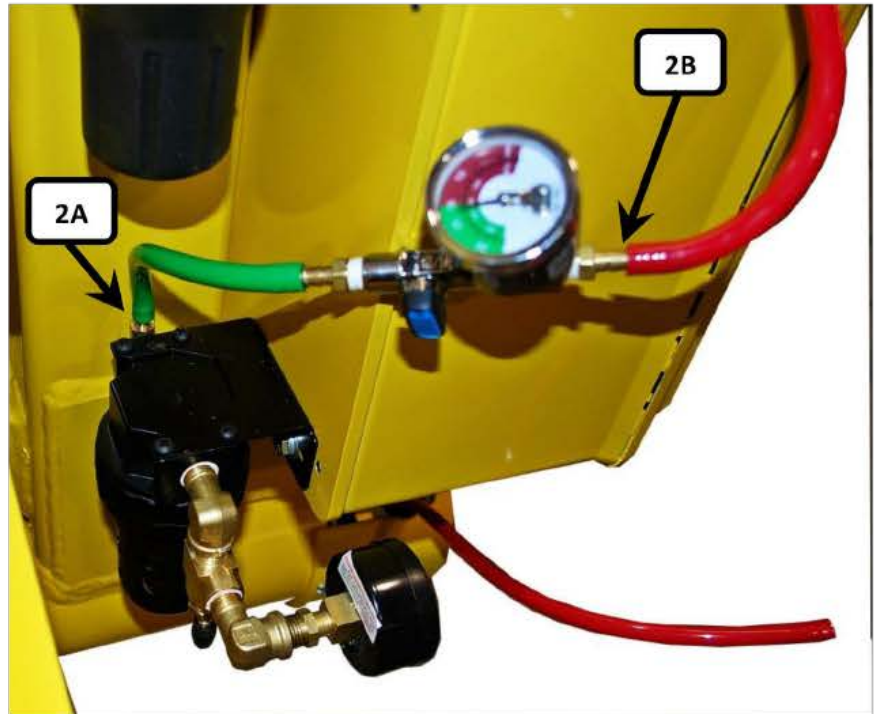


FIGURE 2

- 3) 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, but the vacuum level on the lifter's vacuum gauge starts and continues to drop, this indicates 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 or attached fittings, then retest.

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

If leakage persists, service the filter according to the filter maintenance section of the instruction manual, or replace the filter assembly.

- If the vacuum level on the ball valve's vacuum gauge starts and continues to drop, this indicates the leak is between the ball valve and the solenoid manifold assembly.

Remove the ball valve from the filter assembly and reconnect the original hose to the filter assembly. Leave the vacuum line to the pad system sealed off at the vacuum filter and test the manifold assembly as follows.

Isolate solenoid manifold assembly:

CAUTION: *This requires vacuum enclosure to be opened. This enclosure has a hinged lid with wiring attached, open carefully.*

- 1) Open the vacuum enclosure. Note, this is a hinged lid with the hinges located on the bottom of the cover. When opened it can contact the rotation release lever; placing a cloth or piece of foam rubber over the end of the rotation release lever, **3A**, will help protect the enclosure lid when opened.

See **FIGURE 3**.

Note: Various models of vacuum pumps have been used in our assemblies. Although your vacuum pump (shown in **FIGURE 4**) may be different from the one shown, the fittings and connections will be the same.

The other variation that may be noted is that the manifold assembly shown in **FIGURE 4** has two hose nipples located on the top of the manifold and a check valve located next to the vacuum switch. This is the design used in this assembly beginning with S.N. 20101140.

If the serial number of your lifter is before #20101140, there will be only one hose nipple on the top of the manifold and no additional check valve.

The following test will be the same regardless of which version you have.

- 2) Remove the hose that connects the vacuum filter to the straight barbed hose nipple, **4A**, on the center of the valve manifold. Attach an additional piece of hose to the end of the ball valve with the vacuum gauge and attached the other end of this hose to the barbed nipple of the valve manifold.

Attach the other end of the ball valve to the hose, **4B**, which was removed from the manifold. See **FIGURE 4**.

- 3) With the ball valve in the open position (handle in line with the valve) turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then close the ball valve (handle turned perpendicular to the valve as shown in **FIGURE 4**) and turn the lifter off at the power switch.

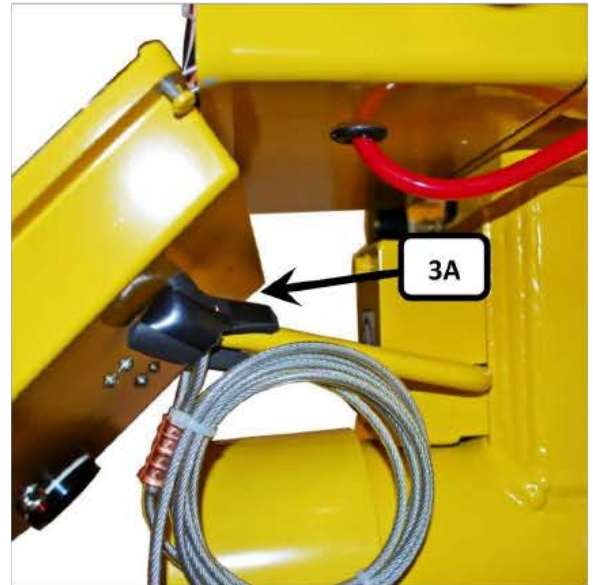


FIGURE 3

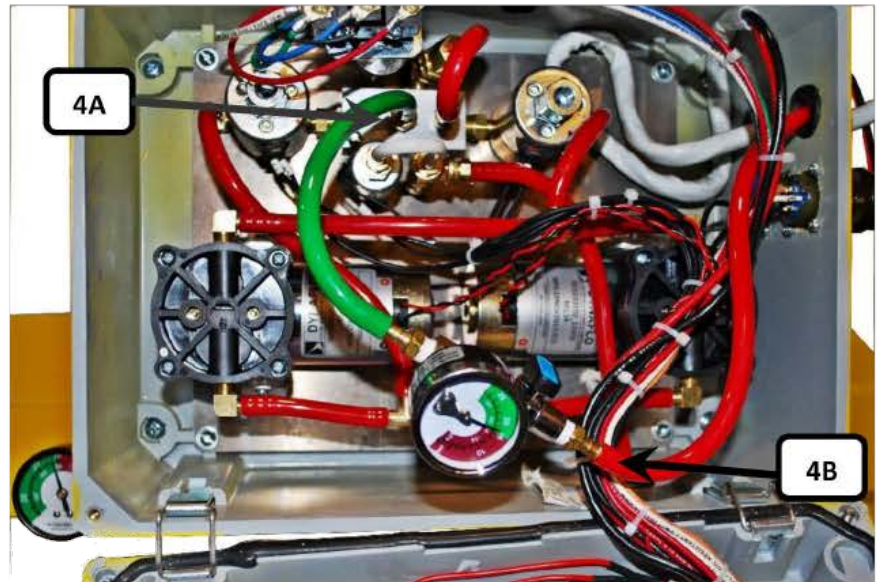


FIGURE 4

- 4) Observe the vacuum gauges on the ball valve and the lifter to locate the area of leakage.
- If the vacuum level on the ball valve's vacuum gauge holds steady and does not drop, but the vacuum level on the lifter's vacuum gauge starts and continues to drop, this indicates the leak is located in the hose running to the filter assembly. Replace the hose and retest.
 - If the vacuum level on the ball valve's vacuum gauge starts and continues to drop, and the lifter's vacuum gauge holds steady the indication is that the leak is in the solenoid assembly.

If the leak is determined to be in the solenoid assembly contact Wood's Powr-Grip Co, Inc. for additional assistance.

- 5) If the vacuum generating system has been tested and all leaks repaired, reattach the hose from the rotating union to the filter assembly and retest the lifter.

Repeat the original vacuum test, making any additional repairs as needed.

See System Confirmation for additional information.

PAD SYSTEM TEST

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

If it was determined that the leak is in the pad system reconnect the hose from the rotating union to the vacuum filter and isolate the pad system components as follows.

- 1) Remove the two hoses from the tee fitting, **5A**, that is attached to the pad side of the rotation shaft and cap off the two barbed fittings. See **FIGURE 5**.
- 2) Turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then turn the lifter off at the power switch.
- 3) Observe the lifter's vacuum gauge for leakage.
 - If the vacuum level on the vacuum gauge starts and continues to drop, the indication is that the leak is between the filter and the (capped) tee fitting. Inspect the hose connecting the filter to the rotating union, the condition of the rotating union and attached fittings and the condition of the tee and attached fittings on the pad side of the rotation shaft. Inspect and replace parts as needed.
 - If the vacuum level on the vacuum gauge holds steady and does not drop, this indicates the leak is between the vacuum pads and the rotation shaft tee fitting.



FIGURE 5

Note, due to the large number of components and the possibility that more than one component within the vacuum pad system may be the cause of the leak it is recommended to determine if the leak exists in one half of the pad frame assembly and to deal with that one section then move on to the other section. The following approaches the repair in that manner.

- 4) Reconnect one hose to one of the barbed fittings on the tee fitting and leave the other barbed fitting capped off (see **FIGURE 6**) so that only one half of the pad frame assembly is being tested. Connect all the quick connects attached to this half of the pad frame section.
- 5) With all the vacuum pads of this half of the pad frame attached to a clean, smooth non-porous surface, turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then turn the lifter off at the power switch.
- 6) Observe the vacuum gauge for leakage.
 - If the vacuum level on the lifter's vacuum gauge holds steady and does not drop go to **Condition A** below.
 - If the vacuum level on the lifter's vacuum gauge starts and continues to drop go to **Condition B** below.



FIGURE 6

Condition A – If, when testing this half of the pad frame assembly, the vacuum level on the vacuum gauge held steady and did not drop, this indicates that the vacuum pads of this section do not leak and that the quick connects do not leak when connected. Since quick connects may leak when disconnected additional testing is recommended as follows.

Verify quick connects to outer pad arm assembly:

There are two quick connects used to attach the outside pad assembly back to the main pad frame assembly. One, **7A**, is mounted through the main frame member directly over the pad arm mounting plate and the other, **7B**, is mounted on the bolt-on pad frame extension.

See **FIGURE 7**.

- 7) Disconnect the quick connect on the frame extension (**7B**) from the outer pad arm assembly and repeat the vacuum test.
- 8) With the remaining vacuum pads attached to a clean, smooth non-porous surface, turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then turn the lifter off at the power switch.

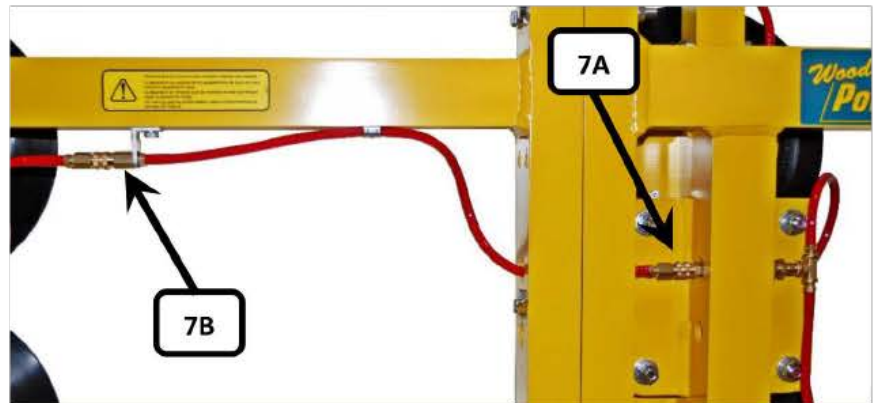


FIGURE 7

- 9) Observe the lifter's vacuum gauge for leakage.
 - If the vacuum level on the vacuum gauge holds steady and does not drop this quick connect does not leak when disconnected.
 - If the vacuum level on the vacuum gauge starts and continues to drop this quick connect does leak when disconnected and will need to be replaced.Note, the next test can be performed prior to replacing this quick connect.
- 10) Disconnect quick connect **7A**, mounted through the main frame member that runs to quick connect **7B**, and repeat the vacuum test.
 - If the vacuum level on the vacuum gauge holds steady and does not drop this quick connect does not leak when disconnected.
 - If the vacuum level on the vacuum gauge starts and continues to drop this quick connect does leak when disconnected and will need to be replaced.

Since it was determined in a previous test that these quick connects do not leak when connected they can be reconnected and the next test performed. However, once it is determined that a component leaks it must be repaired or replaced before returning the lifter to service.

Reconnect both quick connects **7A** and **7B** and proceed to step 11.

Verify outer quick connects of each pad arm:

- 11) Disconnect the four outer vacuum pads from each of the two pad arm assemblies at the quick connect (8A) leaving the two center pads of each arm connected. See **FIGURE 8**.
- 12) With the vacuum pads attached to a clean, smooth non-porous surface, turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then turn the lifter off at the power switch.



FIGURE 8

- 13) Observe the lifter's vacuum gauge for leakage.

- If the vacuum level on the vacuum gauge holds steady and does not drop the quick connects to the outer pads do not leak when disconnected.

After verifying that this half of the pad frame assembly does not leak return to Pad System Test, step 4, reverse the barbed fitting that is capped off (**FIGURE 6**) with the one that the hose attached to and repeat the process for the other half of the pad frame.

If the entire pad frame has been tested (both halves) and leakage repaired, reattach both hoses to the rotation shaft tee fitting and proceed to System Confirmation.

- If the vacuum level on the vacuum gauge starts and continues to drop, the indication is that one or more of the four outer pad arm quick connects leak when disconnected.

These will need to be tested on an individual basis as follows.

Testing individual quick connects with a ball valve and vacuum gauge assembly:

- 14) Remove the hose attached to one of the outer pad quick connects (9A). Using an additional piece of hose, attach the end of the ball valve assembly with the vacuum gauge to one end of this hose and attach the other end of the hose to the barbed fitting of the quick connect. See FIGURE 9. Attach the other end of the ball valve to the hose (9B) that was removed from the quick connect.

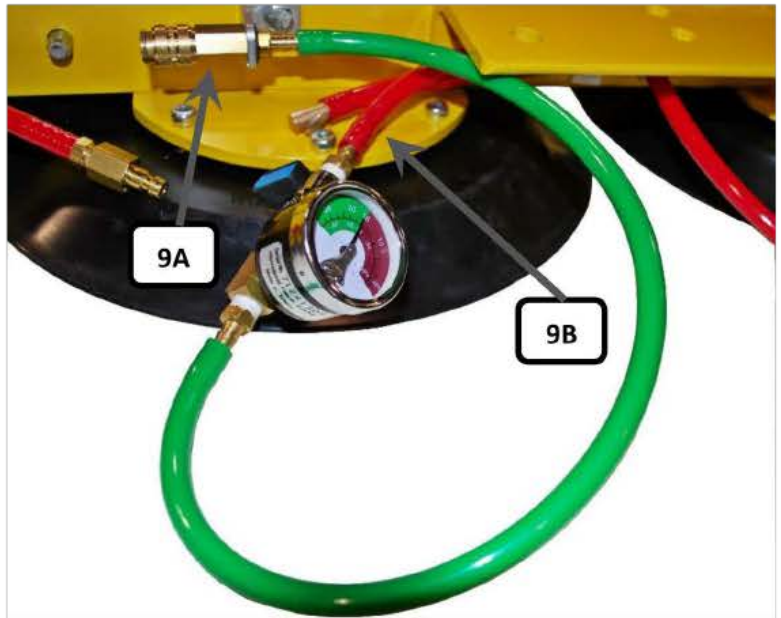


FIGURE 9

Note, if your lifter was built before February 2010 the quick connect is attached to a tee pad fitting and is located further out on the pad arm; if it was built after February 2010 the quick connect is attached to a Y-fitting and the quick connect is mounted where shown in FIGURE 9.

Regardless of the configuration the process to test the quick connect remains the same.

- 15) With the ball valve in the open position (handle in line with the valve) and the vacuum pads attached to a clean, smooth non-porous surface, turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then close the ball valve (handle turned perpendicular to the valve as shown in FIGURE 9) and turn the lifter off at the power switch.
- 16) Observe the ball valve's vacuum gauge for leakage.
- If the vacuum level on the ball valve's vacuum gauge holds steady and does not drop this quick connect does not leak.
 - If the vacuum level on the ball valve's vacuum gauge starts and continues to drop, this indicates that the quick connect being tested does leak when disconnected and will need to be replaced.

Repeat this test for each of the pad arm quick connects noting which, if any, leak. Any quick connect identified as leaking will need to be replaced.

- 17) After repairing and/or verifying that this half of the pad frame assembly does not leak return to step 4, reverse the barbed fitting of the rotation shaft tee that is capped off (FIGURE 6) with the one that the hose attached to and repeat the process for the other half of the pad frame. If the entire pad frame has been tested (both halves) and leakage repaired, reattach both hoses to the rotation shaft tee fitting and proceed to System Confirmation.

Condition B – If, when testing this half of the pad frame assembly, the vacuum level on the vacuum gauge started and continued to drop, the indication is that there is a leak in this half of the pad frame when the quick connects are connected. It may be an issue with one or more vacuum pads and/or fittings, quick connect or hose.

Test individual vacuum pads:

Begin by isolating the vacuum pads from the arm assembly.

- 18) Remove the pad fitting from each vacuum pad of both pad arms and cap off each of the pad fittings. See **FIGURE 10**, circled pad fittings with caps.

Note: **FIGURE 10** shows four 90° elbow pad fittings. If your lifter was built before February 2010 it will have tee pad fittings on the center two pads. Regardless of the configuration the process is the same, remove and cap the pad fittings.

- 19) Turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then turn the lifter off at the power switch.
- 20) Observe the lifter's vacuum gauge for leakage.
 - If the vacuum level on the vacuum gauge starts and continues to drop leave the pad fittings capped off and proceed to step 26.
 - If the vacuum level on the vacuum gauge holds steady and does not drop the indication is that the leak is in one or more of the vacuum pads. Continue to next step.

Reattaching vacuum pads:

- 21) Reattach one vacuum pad at a time by removing the cap from the pad fitting and installing the pad fitting back into the vacuum pad.
- 22) Repeat the vacuum test with the pad being tested attached to a clean, smooth non-porous surface. Observe the lifter's vacuum gauge for leakage.
 - If the vacuum level on the vacuum gauge holds steady and does not drop the vacuum pad being tested does not leak and can be left attached.
 - If the vacuum level on the vacuum gauge starts and continues to drop the vacuum pad does leak and will need to be replaced.

Replace the cap on the pad fitting to this vacuum pad before continuing.

- 23) Repeat this process for each vacuum pad until all the vacuum pads of both pad arms have been checked and all that leak identified.
- 24) Once all the vacuum pads have been checked, replace any pads that were identified to be leaking or leave the leaking vacuum pads capped off and continue with the other half of the pad frame (step 4). Once all the vacuum pads that are leaking are identified they must be replaced.
- 25) Once the pad frame passes vacuum test with all the pads and quick connects connected go to **Condition A**, above, to verify that the quick connects seal when disconnected.

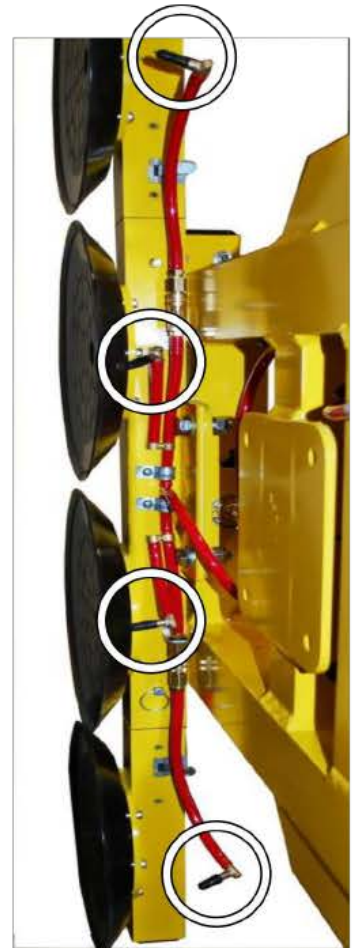


FIGURE 10

Separate the two pad arms:

- 26) If, in step 20, it was determined that the vacuum system continued to leak when all the vacuum pads of both pad arms were capped the indication is that the leak is located in either the fittings or hose that connect to the vacuum pads.
- 27) Begin by separating the two pad arms. Disconnect the inner quick connect to the outer pad arm (**7A** shown in **FIGURE 7**).
- 28) Turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then turn the lifter off at the power switch. Observe the lifter's vacuum gauge for leakage.
- If the vacuum level on the vacuum gauge starts and continues to drop the indication is that there is a vacuum leak in the first pad arm. Continue to next step.
 - If the vacuum level on the vacuum gauge holds steady and does not drop the indication is that the first pad arm does not leak and that the quick connect, **7A**, does not leak when disconnected. Continue to next step.
- 29) Verify that quick connect (**7A**) does not leak when connected.

Disconnect the hose from the male quick connect and cap off the barbed fitting, **11A**. Attach the capped off male connector to the female coupler of the quick connect.

See **FIGURE 11**.

- 30) Turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then turn the lifter off at the power switch.
- 31) Observe the lifter's vacuum gauge for leakage.
- If, as in step 28, the vacuum level on the vacuum gauge starts and continues to drop the indication is that the leak is located in the first pad arm and that having the quick connect connected did not change the result. Disconnect the male connector (but do not remove the cap from the barbed fitting yet) and proceed to step 32.
 - If, as in step 28, the vacuum level on the vacuum gauge holds steady and does not drop the indication is that the first pad arm does not leak and that the quick connect **7A** does not leak when connected or disconnected. Proceed to step 58.
 - If, in step 28, the vacuum level on the vacuum gauge held but now the vacuum level on the vacuum gauge starts and continues to drop, the indication is that the quick connect leaks when connected.

Replace the quick connect assembly.

Note, the leaking quick connect must be repaired before the outer pad arm can be tested.



FIGURE 11

Verify hose and 1st quick connect assembly:

32) The quick connect assembly is attached to a tee fitting (12A) with two barbed fittings attached.

Remove the hose (12B) attached to the quick connect tee that connects it to the rotation shaft tee and install the ball valve (valve end) in the hose. Using an additional piece of hose, attach the end of the ball valve assembly with the vacuum gauge to the barbed fitting of the quick connect tee.

Remove the other hose (12C) from the quick connect tee that attaches the quick connect tee to the pad arm assembly and cap the barbed fitting. See FIGURE 12.

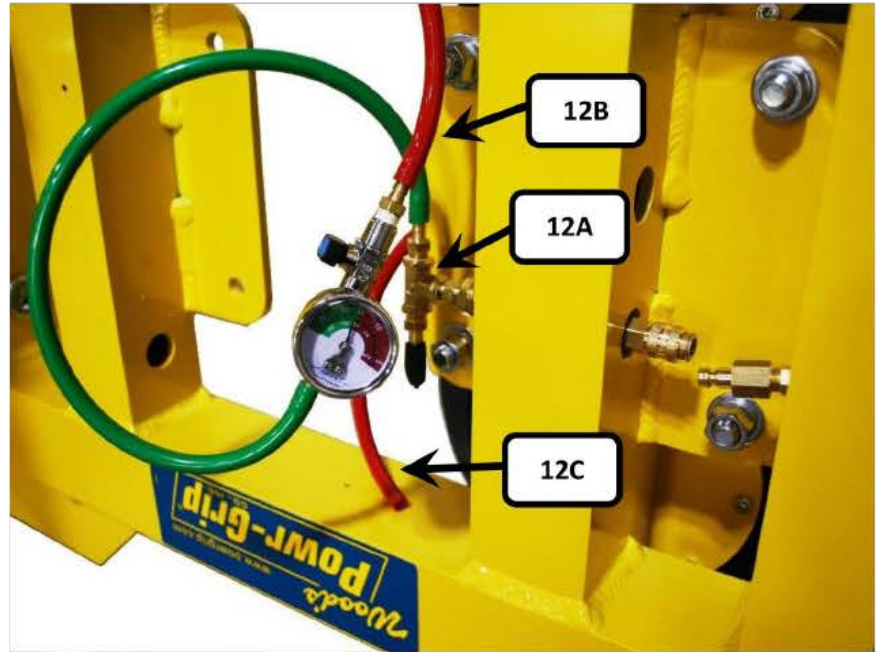


FIGURE 12

33) With the ball valve in the open position (handle in line with the valve) turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then close the ball valve (handle turned perpendicular to the valve) and turn the lifter off at the power switch.

34) Observe the vacuum gauges for leakage:

- If the vacuum level on the lifter's vacuum gauge starts and continues to drop, this indicates that the hose from the rotation shaft tee leaks and will need to be replaced.
- If the vacuum level on the ball valve's vacuum gauge starts and continues to drop, indication is that either one of the fittings in the quick connect assembly leaks and will need to be replaced or that the quick connect leaks when disconnected.

Reconnect the capped, male connector to the female coupler and retest. If the vacuum level on the ball valve's vacuum gauge now holds steady replace the quick connect.

If vacuum level on the ball valve's vacuum gauge still starts and continues to drop, as it did previously, the assembly will need to be removed. Note, the two barbed fittings attached to the tee fitting will need to be removed from the tee fitting before the assembly can be unscrewed from the frame member. Once the assembly has been removed visually examine the fittings for cracks. Alternately the barbs can be reattached and the assembly checked by applying 15 - 20 psi air pressure to the assembly (one barbed capped and pressure applied to the other) and submersing the assembly in water to bubble test.

If no cracks or leaks are found or indicated replace the quick connect.

- If vacuum level on both vacuum gauges holds steady and does not drop, this indicates that the quick connect does not leak when disconnected and that the hose from the rotation shaft tee does not leak. Continue to next step.

35) Reconnect the hose from the rotation shaft tee, **13A**, to the quick connect tee. Attach the ball valve, end with vacuum gauge, to the hose attached to the pad arm assembly tee, **13B**. Using an additional piece of hose, **13C**, attach the other end of the ball valve to the quick connect tee.

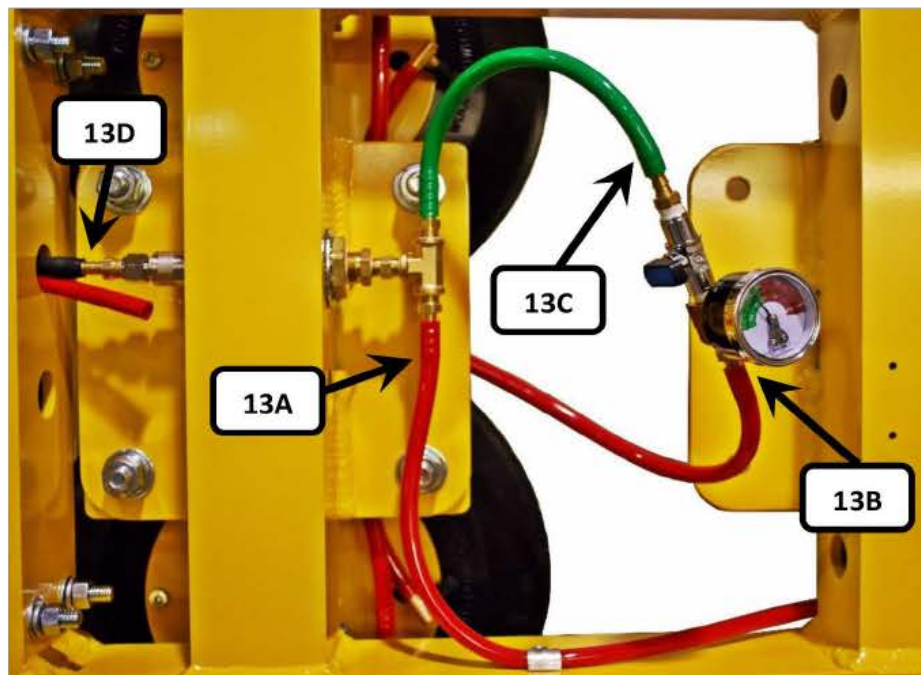


FIGURE 13

Reconnect the (capped) male connector, **13D**, to the female quick connect. See **FIGURE 13**.

36) With the ball valve in the open position (handle in line with the valve) turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then close the ball valve (handle turned perpendicular to the valve) and turn the lifter off at the power switch.

37) Observe the vacuum gauges for leakage:

- If the vacuum level on the lifter's vacuum gauge starts and continues to drop the indication is that the quick connect leaks when connected to the male. Replace the quick connect assembly.
- If the vacuum level on the ball valve's vacuum gauge starts and continues to drop this indicates that a component between the quick connect tee assembly and the vacuum pads is leaking. The parts involved need to be identified before the vacuum pads themselves can be added back to the assembly. Isolate sections of the pad arm as follows.

Test individual pad arm components (no pads attached):

38) Remove the hose clips that secure the pad arm hose tee, **14A**, to the pad arm. Remove the two hoses from the pad arm hose tee that connect to the vacuum pad hoses and cap the barbed fittings. The center barb of the tee will still be connected to the hose connected to the ball valve. See **FIGURE 14**.

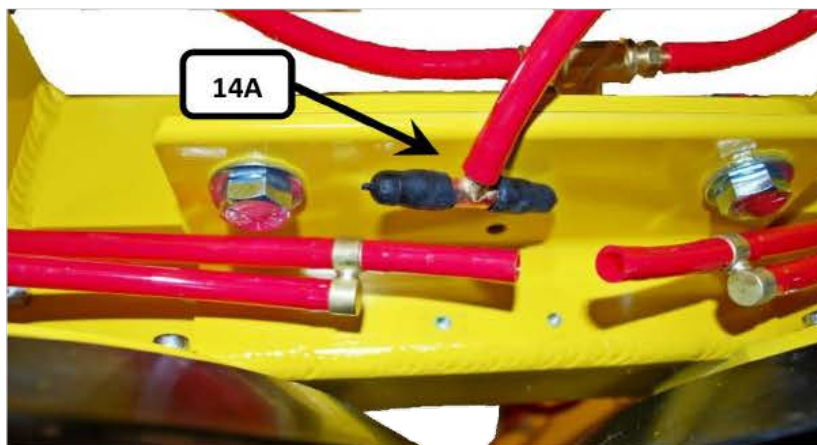


FIGURE 14

39) With the ball valve in the open position (handle in line with the valve) turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then close the ball valve (handle turned perpendicular to the valve) and turn the lifter off at the power switch.

40) Observe the ball valve's vacuum gauge for leakage:

- If the vacuum level on the ball valve's vacuum gauge starts and continues to drop the pad arm hose tee does leak and will need to be replaced.
- If the vacuum level on ball valve's the vacuum gauge holds steady and does not drop the hose tee does not leak. Continue to next step.

41) Remove the cap from one barb of the pad arm hose tee, 15A, and connect one side of the pad arm assembly (FIGURE 15).

Note, in FIGURE 15 the pad arm hose tee is connected to a Y-fitting, which goes to the 90° (single) pad fitting and the quick connect to the outer pad.



FIGURE 15

If your lifter was built before February 2010 the pad arm hose tee will connect to a tee pad fitting and from that fitting to the quick connect to the outer pad. The quick connect will be mounted further out on the pad arm.

Repeat the vacuum test and observe the ball valve's vacuum gauge for leakage.

- If the vacuum level on the ball valve's vacuum gauge starts and continues to drop this half of the pad arm assembly does leak. Proceed to step 42.
- If the vacuum level on the ball valve's vacuum gauge holds steady and does not drop this half of the pad arm assembly does not leak. Repeat this test (step 41) with the other half of pad arm assembly attached to the pad arm hose tee to determine if the other half of the pad arm leaks. Remove the remaining cap from the barb of the pad arm hose tee (FIGURE 15, 15A), attach the hose to other half of the pad arm assembly and repeat the vacuum test.

If both halves of the pad arm have been tested and either passed or repaired proceed to step 57.

42) Disconnect the quick connect (16A) to the outer pad.

See FIGURE 16.

With the ball valve in the open position (handle in line with the valve) turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then close the ball valve (handle turned perpendicular to the valve) and turn the lifter off at the power switch.



FIGURE 16

43) Observe the ball valve's vacuum gauge for leakage.

- If the vacuum level on the ball valve's vacuum gauge starts and continues to drop this indicates that the leak is located in either the Y-fitting, the pad fitting, or the quick connect. Note, on older lifters without the Y-fitting it will be the pad tee fitting or the quick connect that is leaking.

Proceed to step 44.

- If the vacuum level on the vacuum gauge holds steady and does not drop the indication is that either the quick connect leaks when connected or the pad fitting of the outer vacuum pad leaks. Proceed to step 51.

44) To further inspect the individual fittings begin with the Y-fitting, **17A**, shown in **FIGURE 17**.

Note, on older lifters without the Y-fitting start with the pad tee fitting. In this case the barb that connects to the quick connect and the suction stem that goes into the vacuum pad will be capped off.

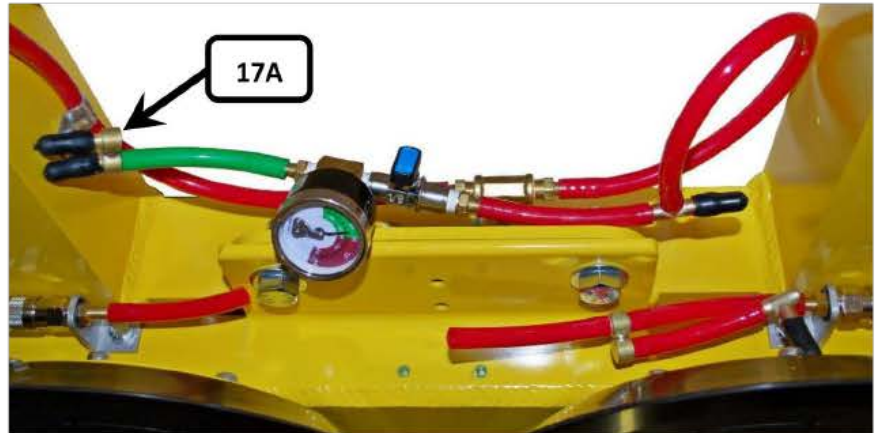


FIGURE 17

Remove the ball valve and the extra hose from the hose that connect the pad arm tee to the quick connect tee (**FIGURE 13**). Reconnect the hose from the pad arm tee back in its' original location on the quick connect tee.

Remove all the hoses from the Y-fitting. Note: The Y-fitting has only a single barb on each port. Take care to not damage any of the barbs when removing the hoses as this may cause a leak that did not previously exist.

Attach the valve end of the ball valve to the hose connected to the pad arm hose tee. Attach an additional piece of hose to the end of the ball valve with the vacuum gauge. Attach the Y-fitting (or pad tee fitting) to this hose and cap off any open ports. See **FIGURE 17**.

45) With the ball valve in the open position (handle in line with the valve) turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level then close the ball valve (handle turned perpendicular to the valve) and turn the lifter off at the power switch.

46) Observe the ball valve's vacuum gauge for leakage.

- If the vacuum level on ball valve's vacuum gauge starts and continues to drop this indicates that the Y-fitting leaks. Replace the Y-fitting (or pad tee fitting on older lifters).
- If the vacuum level on ball valve's vacuum gauge holds steady and does not drop the Y-fitting (or pad tee fitting) does not leak.

If testing a newer lifter with the Y-fitting continue as follows. If testing an older lifter with the pad tee fitting proceed to step 48.

47) Remove the cap from the barb of the Y-fitting that was attached to the hose attached to the pad fitting and reattach the pad fitting to the Y-fitting.

Repeat the vacuum test and observe the ball valve's vacuum gauge for leakage.

- If the vacuum level on ball valve's vacuum gauge starts and continues to drop this indicates that the pad fitting does leak. Replace the pad fitting.
- If the vacuum level on ball valve's vacuum gauge holds steady and does not drop the pad fitting does not leak. Continue to next step.

48) To test the quick connect remove the ball valve from the Y-fitting (or pad tee fitting) and reattach the original hoses.

Remove the hose that attaches the Y-fitting (or pad tee fitting) to the quick connect from the quick connect and attach the ball valve (valve end) to this hose, **18A**. Attach a piece of additional hose to the quick connect and attach the other end of this hose to the end of the ball valve with the vacuum gauge. See **FIGURE 18**.

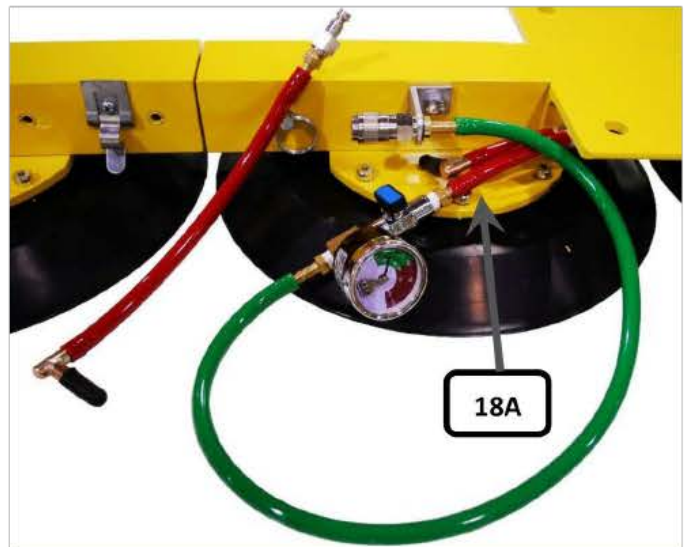


FIGURE 18

49) With the ball valve in the open position (handle in line with the valve) turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then close the ball valve (handle turned perpendicular to the valve) and turn the lifter off at the power switch.

50) Observe the ball valve's vacuum gauge for leakage.

- If the vacuum level on ball valve's vacuum gauge starts and continues to drop this indicates that the quick connect leaks when disconnected. Replace the quick connect.
Note, since quick connects have varied over the years and since often it is the male quick connect that has damage the internal seals of the female coupler it is recommended that both the male and female halves of the quick connect be replaced.
- If the vacuum level on ball valve's vacuum gauge holds steady and does not drop the quick connect does not leak when disconnected. Proceed to next step.

51) To test the quick connect when connected, first remove the hose connected to the male quick connect and cap off the barbed fitting. Attach the male quick connect to the female coupler and repeat the vacuum test using the same set up shown in **FIGURE 18** but with the male connector capped off and attached, as shown in **FIGURE 19**.



FIGURE 19

52) Observe the ball valve's vacuum gauge for leakage.

- If the vacuum level on ball valve's vacuum gauge starts and continues to drop this indicates that the quick connect leaks when connected.

Replace the quick connect.

Note, since quick connects have varied over the years and since often it is the male quick connect that has damage the internal seals of the female coupler it is recommended that both the male and female halves of the quick connect be replaced.

- If the vacuum level on ball valve's vacuum gauge holds steady and does not drop the quick connect does not leak when connected.

In this instance the indication is that the leak is in either the pad fitting or the hose between the fitting and the quick connect.

53) Remove the ball valve and reattach the original hose to the female quick connect.

Remove the cap from the male quick connect and reattach the hose that is attached to the pad fitting.

Remove the pad fitting from the other end of the hose and attach the valve end of the ball valve to this hose.

Attach the pad fitting to an additional piece of hose and attach the other end of this hose to the end of the ball valve with the vacuum gauge. See **FIGURE 20**.



FIGURE 20

54) With the ball valve in the open position (handle in line with the valve) turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then close the ball valve (handle turned perpendicular to the valve) and turn the lifter off at the power switch.

55) Repeat the vacuum test and observe the vacuum gauges for leakage.

- If the vacuum level on ball valve's vacuum gauge starts and continues to drop this indicates that the pad fitting leaks. Replace the pad fitting.
- If the vacuum level on ball valve's vacuum gauge holds steady and does not drop, but the vacuum level on the lifter's vacuum gauge starts and continues to drop this indicates that the hose running from the pad fitting to the male quick connect leaks. Replace the hose.

56) Once it determined this half of the pad arm assembly does not leak (with the vacuum pads still capped off) return to step 41 and repeat the tests with the other half of the pad arm assembly attached to the pad arm hose tee. . Remove the remaining cap from the barb of the pad arm hose tee (**FIGURE 15, 15A**), attach the hose to other half of the pad arm assembly and repeat the vacuum test.

If both halves of the first pad arm assembly have been tested and either passed or repaired continue to next step.

57) Remove the ball valve and additional hose from the assembly. Leave the vacuum pads capped off. Reattach all original hoses and quick connects of the first pad arm assembly. Reattach the vacuum hose to the male quick connect (**21A** of **FIGURE 21**) that was capped off in step 29.

58) Run vacuum test to verify the outer quick connect, **21B**. See **FIGURE 21**.

Turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then turn the lifter off at the power switch.

59) Observe the lifter's vacuum gauge for leakage.

- If the vacuum level on the lifter's vacuum gauge holds steady and does not drop this indicates that the hose does not leak and the quick connect does not leak when disconnected. Proceed to step 62.

- If the vacuum level on the lifter's vacuum gauge starts and continues to drop this indicates that either the hose leaks or the quick connect leaks when disconnected. Continue to next step.

60) Disconnect the hose, **22A**, from the female quick connect. Attach the valve end of the ball valve to this hose and, using a short piece of additional hose, attach the end of the ball valve with the vacuum gauge to the quick connect.

See **FIGURE 22**.

61) Repeat the vacuum test and observe the vacuum gauges for leakage.

- If the vacuum level on the lifter's vacuum gauge starts and continues to drop this indicates that the leak is in the hose. Replace the hose.

- If the vacuum level on the ball valve starts and continues to drop this indicates that the quick connect leaks when disconnected. Replace the quick connect.

Note, since quick connects have varied over the years and since often it is the male quick connect that has damage the internal seals of the female coupler it is recommended that both the male and female halves of the quick connect be replaced.

- If both vacuum gauges hold steady and do not drop the indication is that the hose does not leak and the quick connect does not leak when disconnected. Continue to next step.

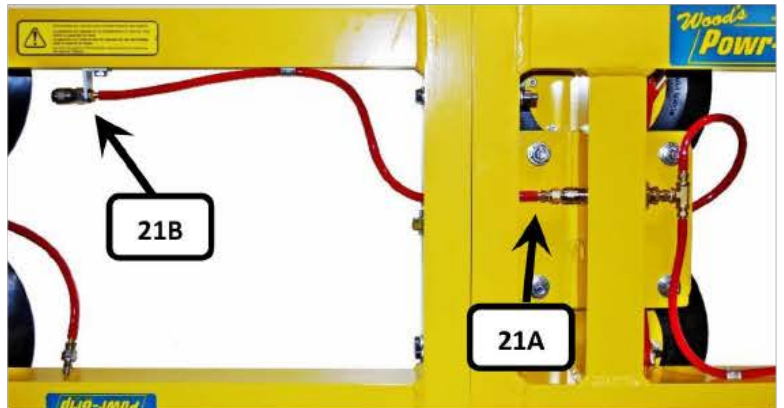


FIGURE 21

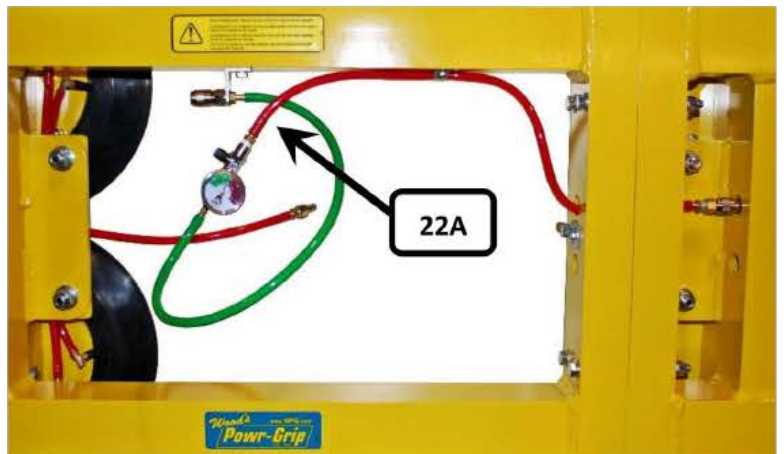


FIGURE 22

62) To verify that the quick connect does not leak when connected to the male connector remove the hose (23A) connected to the male quick connect and cap off the barbed fitting. Attach the male quick connect to the female coupler.

If still connected, remove the hose (23B) from the female coupler. Connect an additional piece of hose to the female coupler and attach the end of the ball valve with the vacuum gauge to this hose (23C). Attach the other end of the ball valve (valve end) to the hose removed from the female coupler, 23B.

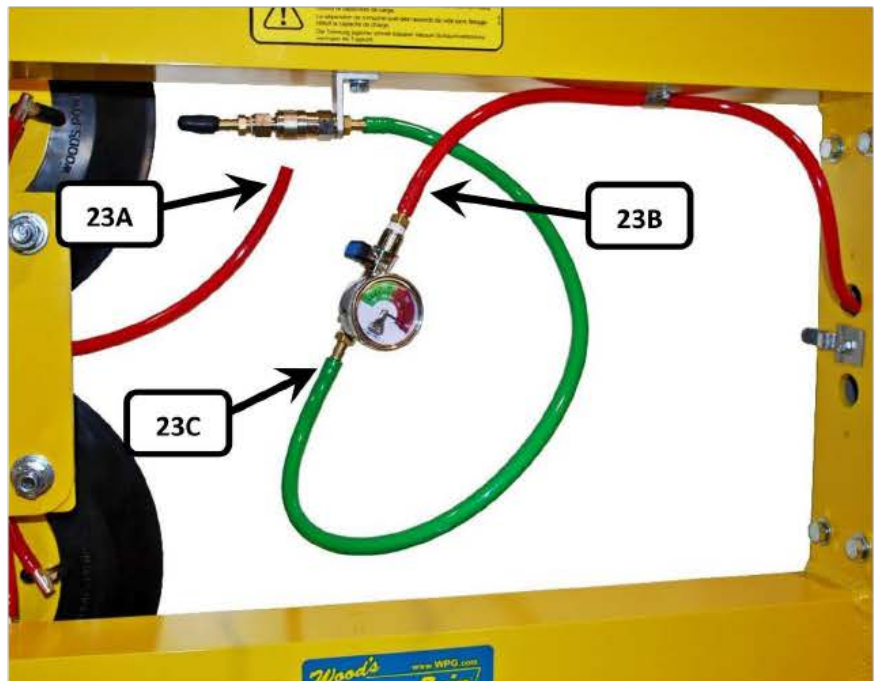


FIGURE 23

See FIGURE 23.

63) With the ball valve in the open position (handle in line with the valve) turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then close the ball valve (handle turned perpendicular to the valve) and turn the lifter off at the power switch.

64) Observe the ball valve's vacuum gauge for leakage.

- If the vacuum level on the ball valve starts and continues to drop this indicates that the quick connect leaks when connected. Replace the quick connect.

Note, the leaking quick connect must be repaired before the outer pad arm can be tested.

- If the vacuum level on the ball valve's vacuum gauge holds steady and does not drop this indicates that the quick connect does not leak. Continue to next step.

65) Test the outer pad arm and hose.

Remove the ball valve from the female quick connect and reattach the original hose.

Remove the cap from the male quick connect and reattach the original hose.

Disconnect the hose from the outer pad arm hose tee, 24A. Connect an additional piece of hose to the pad arm hose tee and attach the end of the ball valve with the vacuum gauge to this hose, 24B. Attach the other end of the ball valve (valve end) to the hose removed from the pad arm tee. See FIGURE 24.

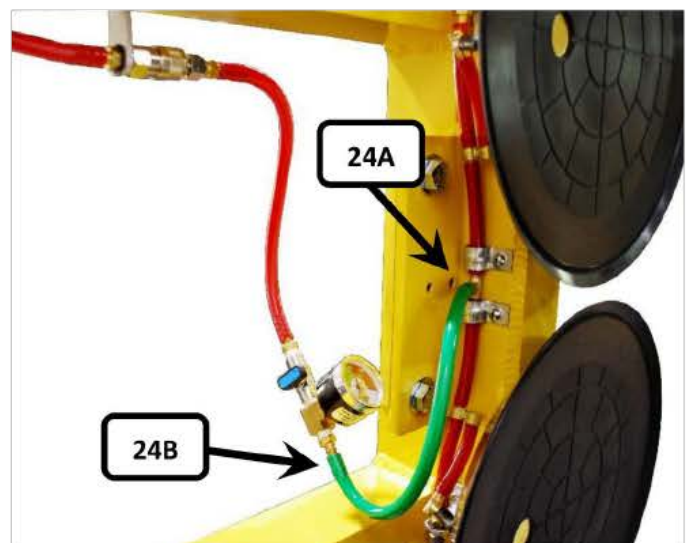


FIGURE 24

66) With the ball valve in the open position (handle in line with the valve) turn on the lifter and switch the lifter to the apply position. Allow the system to reach a suitable vacuum level or to shut off automatically, then close the ball valve (handle turned perpendicular to the valve) and turn the lifter off at the power switch.

67) Observe the vacuum gauges for leakage.

- If the vacuum level on the lifter's vacuum gauge starts and continues to drop this indicates that the hose between the ball valve and the male quick connect leaks. Replace the hose.
- If the vacuum level on the ball valve's vacuum gauge starts and continues to drop the indication is that there is a leak located in one of the components of the outer pad arm. Test the individual pad arm components in the same manner as shown for the inner pad arm. Go to step 38 and repeat the tests described with this pad arm.
- If both vacuum gauges hold steady and do not drop this indicates that the hose does not leak and that the components of the outer pad arm do not leak when the quick connects are connected. Continue to next step.

68) Remove the ball valve and reattach all hoses to their original location.

Reattach the vacuum pads. Note, all the vacuum pads can be reattached or they can be reattached individually as described in step 21. However, if all the vacuum pads are reattached and a leak is noted when the vacuum test is repeated they will need to be tested individually to identify which vacuum pads leak, as described in step 21.

69) Repeat the vacuum test and observe the lifter's vacuum gauge for leakage.

- If the vacuum level on the lifter's vacuum gauge starts and continues to drop this indicates that at least one of the vacuum pads leak. Remove and cap off the pad fittings. Go to step 21 for information on reattaching the individual vacuum pads.
- If the vacuum level on the lifter's vacuum gauge holds steady and does not drop the indication is that the vacuum pads do not leak and that all the leaks in the fitting and hose assemblies have been repaired.

70) After repairing and/or verifying that this half of the pad frame assembly does not leak return to step 4 of the Pad System Test, reverse the barbed fitting of the rotation shaft tee that is capped off (FIGURE 6) with the one with the hose is attached to and repeat the process for the other half of the pad frame.

If the entire pad frame has been tested (both halves) and leakage repaired reattach both hoses to the rotation shaft tee fitting and proceed to System Confirmation.

SYSTEM CONFIRMATION

Once any and all leaks have been repaired reassemble all parts to the lifter.

A vacuum test, as describe 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.

Once the lifter is tested as a whole (all pads and quick connects connected) it should be retested with the quick connects disconnected to confirm the system is vacuum tight regardless of system configuration. Test as follows:

- 1) Perform a vacuum test to the lifter as a whole, all pads and quick connects connected.
- 2) Repeat the vacuum test with all the outer pads of the 4 pad arms disconnected (reference **FIGURE 8**). Disconnect all 8 quick connects to the outer pads.
- 3) Disconnect the outer quick connect to the outer pad arm assembly (**7B** in **FIGURE 7**) and repeat the vacuum test.
- 4) Disconnect the inner quick connect to the outer pad arms (**7A** in **FIGURE 7**) and repeat the vacuum test.

The lifter must pass vacuum test under all conditions described above.

This verifies that the systems holds as a whole and that all the quick connects hold regardless of whether they are connected or disconnected.

The lifter is now ready to return to service.

ADDITIONAL INFORMATION

NOTES:

- 1) When requesting information on a particular lifter please have model number and serial number information 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 in a filter or valve assembly) but the actual cause is not apparent (neither the filter nor valve itself are the cause). In these cases it may be a cracked fitting. Cracks in fittings may be visible, but often are virtually impossible to locate except under factory test conditions; they will often appear as a dark line 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 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, to avoid vacuum leaks.
For plastic fittings use only Teflon tape; liquid sealants must not be used on plastic parts and may damage the parts.
- 5) When assembling fittings do not over tighten. After first applying adequate thread sealant or tape, the fitting is finger tighten as much as possible.
A straight fitting is tightened no more than two additional revolutions with a wrench.
An elbow fitting is tightened no more than one and a half additional revolutions with a wrench
Once an elbow or tee fitting is tightened with a wrench, the fitting is 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
INSTRUCTIONS FOR ADDITIONAL INFORMATION**

