LEAK TEST PROCEDURE

APPLICABLE TO DC3 INTELLI-GRIP LIFTERS – MODELS
MRT4-DC3, MRTA8-DC3, MRTALP8-DC3 AND PC/P1-DC3 SERIES

TESTING AND MAINTENANCE MUST BE DONE BY A QUALIFIED PERSON

KEEP FOR FUTURE REFERENCE

TABLE OF CONTENTS

SYMPTOMS OF VACUUM LEAK

Severe leakage is evidenced by a lifter's inability to hold or draw full vacuum while attached to a clean, smooth, nonporous surface. In such cases, the vacuum pump will cycle every few seconds or 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 or immediately drop into the red zone when the lifter shuts off and then recycles.

Moderate leakage is indicated by intermittent cycling of the vacuum pump during a lift. Intelli-Grip, DC3 lifters, will display a warning message, "High leak rate on circuit #" when the leakage rate of either vacuum circuit exceeds a loss of 4" Hg. in 5 minutes[1] when the vacuum pump finishes cycling. If the warning message is displayed at the end of each cycle, leakage is serious enough to warrant repairing the lifter's vacuum system.

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

During the vacuum test it is recommended that you take notes on amount of air lost in time increments (i.e. "Lost 5" Hg [-17 kPa] in 5 minutes"). Note that, if both the green and red circuits of the lifter's vacuum system are leaking, you should record this information for each circuit. This assists in diagnosing the location of the leak because there may be more than one component leaking vacuum. For example, if an isolated section tests positive for a leak but the leak rate is less than that of the whole lifter, then there is still one or more vacuum leak elsewhere in the system.

ADDRESSING LEAK

If the leak is sufficient to warrant repair:

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

Caution: 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 leak's source 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.

Note: 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 used are capable of completely sealing the isolated parts of the vacuum system when tested.

Recommended tools[2]: Plugs for hoses and fittings, ball valve with vacuum gauge attached, appropriate hose.[3]

The tools and materials used in this procedure are:

#20066 - Test valve w/gauge, 3/8in OD hose push-in fitting – 1 each

#15383 - 3/8IN OD stem X 1/4IN OD hose push-in adapter – 2 each

[1] If the "Leak Rate Threshold" is still set to the default setting in "Lifter Settings". Resets to default at start up.

[2] If needed, test equipment is available from Wood's Powr-Grip. Contact us for additional information.

[3] Procedure assumes operator has access to appropriate tools.

#15384 - 3/8IN OD stem X 5/32IN OD hose push-in adapter – 2 each

#15373 - M7 X 1/4IN OD hose push-in straight fitting – 2 each

#49260 - Vacuum test cap [black] – 1 per vacuum pad, 8 maximum

#53160 - Vacuum cap-plug [yellow] – 8 maximum

#53161 – Vacuum cap-plug [orange] – 4 each

Vacuum hose – 3/8" O.D., 1/4" O.D. and 5/32" O.D. polyurethane hose – recommend minimum of 3 ft. each size available for testing.

3/8" O.D. straight hose – #65440, red or #65437, green

1/4" O.D. straight hose - #65442CA, red or #65249BM, green

5/32" O.D. straight hose - #65439AM, red or #65439BM, green

Vinyl electrical tape – used to cap off non-threaded ports.

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, remove gently to avoid damaging attached components.

Additional general tools may be needed and will be listed in respect to the model and part being discussed.

VACUUM TANKS AND THEIR EFFECT ON LEAK DETECTION

The vacuum tank adds volume to the system to decrease the effect of small leaks. On DC3 series lifters the vacuum tanks are typically located in the vacuum pad system.

Due to this, if the vacuum tank is not part of the section being tested, such as when testing only the vacuum generating system, and the leak is located in the section being tested, the leak may appear significantly faster than first observed, due to the reduced volume.

The significance of this is that, if the section being tested does not include the vacuum tank and a minor leak is noted, the maintenance operator must decide if the time and/or materials required to repair such a leak is cost effective. As an example, if a part or assembly is being tested and the tested volume is ≤ 2 in^3 [16 cc] and it loses 1" HG [3.4 kPa] in 5 minutes, the same part would take approximately 1 hour to lose the same amount of vacuum when connected to a small vacuum tank.

Minor leaks can be difficult to locate and not always cost-effective to repair. Due to this, it may be best to ignore a minor leak, particularly if the vacuum tank is not part of the section being tested, keeping in mind that the minor leak will still exist even if all significant leaks are located and repaired.

Also, since vacuum tanks add volume to reduce the effects of minor leaks, removing the tank from the system can sometimes be an advantage. If the maintenance operator is attempting to locate a minor leak in a section that includes the tank, removing the vacuum tank from the system by capping off the fitting or hose to the tank can make the leak more pronounced and easier to locate.

BASIC REPAIR TIPS

1) When removing a hose from a barbed fitting, avoid damaging the barbs of the fitting. Cuts or nicks in fitting barbs can create a leak that did not previously exist.
2) If a hose is removed from a barbed fitting, examine the end of the hose for any indications of damage. If there is visible damage or if unsure, cut approximately 1/8" to 1/4" [3 to 6 mm] off the end of the hose before reinstalling it on the fitting, in order to remove damaged hose ends.
3) The battery should be disconnected before disconnecting any other electrical part. This provides added safety for both the maintenance operator and the vacuum system.

Note: In release mode, the vacuum system of this lifter provides quick release using a “blow off” feature, where air is pumped into the pad system for faster load release. When testing for leaks, it is often necessary to seal off the system by capping off, plugging fittings and lines, disconnecting the quick connects, or closing all pad shut-offs. Due to this, the **use of the release function is not recommended during the repair process**. Release mode causes pressure to build in the sealed section and may damage components.

4) To release the lifter when testing with capped or closed off sections remove or open the item used to close off the vacuum system to release the vacuum.

   Do not use the lifter’s release mode.

5) **Powering down the lifter without releasing:**

   To power down a DC3 lifter when the system is applied (under vacuum), hold both the **POWER** (⏻) and **FUNCTION** (Fn) push button switches in for approximately 7 seconds until the power system shuts off.

   During this time the warning buzzer will chirp, and the display screen will read “load may be attached”. This is to allow you to determine if shutting down the lifter is intentional.

   This process is used during testing when the leak is large enough to cause the lifter to cycle rapidly or when a vacuum sensor (transducer) is disconnected from the system. The system will not automatically shut down if either sensor is disconnected or if the section being tested does not include the sensor.

PART VARIATIONS

In 2021 the module B board was moved to be inside the control enclosure to provide improved moisture resistance. Due to this change the module B board may or may not be visible depending on the age of the lifter used in the shot and may appear slightly different than your lifter.

Also due to this change, the way some wires are connected may vary.

Vacuum system parts of lifters with the externally mounted module B board will be connected to the board using a slide connector with a locking tab. To release the connector, push down on the lock tab and pull the connector straight out. See **FIGURE 1**.

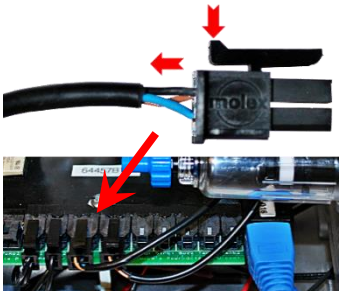


FIGURE 1

Vacuum system parts of lifters with an internally mounted module B board will be connected to a lever connector. To release wires from the connector, lift the lever up and back to remove or insert the wire.

To lock wires in place, close the lever and lightly pull on the wire to ensure the connection is secure. See **FIGURE 2**.

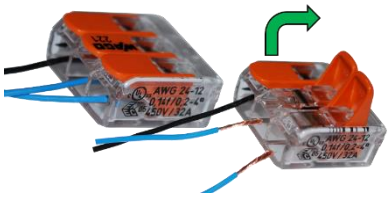


FIGURE 2

PRELIMINARY TEST

Note: The following assumes operator has access to suitable plugs to seal off the section being tested.

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

1) Remove the 4 screws that secure the pump cover to the lifter. Carefully remove the cover to avoid damaging attached wires.

   This exposes the manifold assembly and provides access to the fittings. Fittings **3A** are the pad system connections; these are the large, ¼" barbed fittings attached to the transducer sensor assembly. The fittings shown are for all models except DC3 channel lifters. On channel series lifters, P1 and MRTALPCH, there will be two 45° fittings.

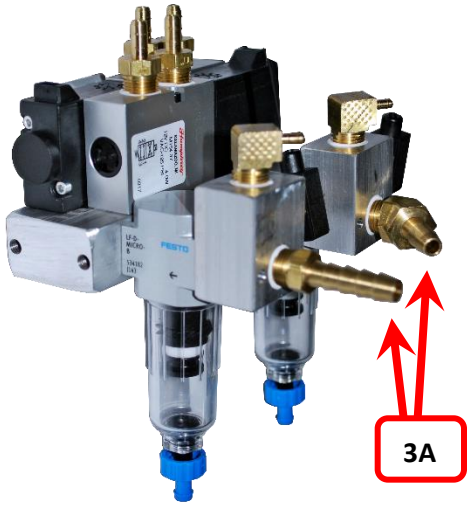


FIGURE 3

2) Remove the hose from the fitting that attaches to the pad system of the affected, leaking circuit, green or red.

3) Cap off the fitting where the hose was removed.

   See **FIGURE 4** – vacuum test cap, #49260, (**4A**) were used.

   The yellow vacuum cap-plug, #53160 could also be used to seal these fittings.

   Note, both pad lines are shown capped off in **FIGURE 4**. If only one pad line is capped-off, the other pad system must be attached to a smooth, clean surface to seal during testing.

   Note **FIGURE 4** shows the MRT series lifter. Although the position of parts may vary between models, the fitting connections will be the same for all the models covered by this document.

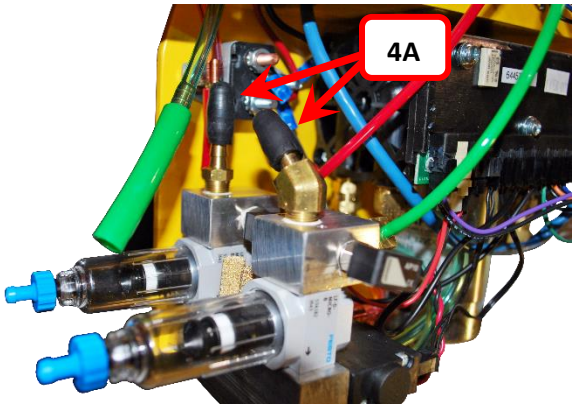


FIGURE 4

4) Switch the power on (⏻) and activate the vacuum system by pressing the apply (|←) push button.

5) Observe the vacuum gauges with the lifter powered on, to locate the general area of leakage.

   Note: Because the vacuum tanks are located in the pad system, if the vacuum generating system is checked separately of the pad system a leak may appear faster than when the lifter was tested as a whole, due to the reduction in volume.

   - If the vacuum level of one or both vacuum gauges decreases rapidly and the vacuum generating system cycles repeatedly, this indicates that the vacuum generating system does leak.

     Note: If the vacuum level (as indicated on the vacuum gauges) 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.

It may be valuable to check the hose ends and connections of the vacuum generating system prior to proceeding to the Pad System Tests. However, the amount of time invested to determine the source of a leak should match the severity of the problem.

Proceed to Vacuum Generating System Test if the leak needs to be located.

- If both vacuum gauges hold steady, this indicates that the vacuum generating system does not leak.

  Proceed to Pad System Tests.

VACUUM GENERATING SYSTEM TEST

Note: The following assumes operator has 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.

The most likely leak points in the vacuum generating system are the check valve, the filter, or the control valve. Leave the filter disconnected (capped-off) from the pad system and test the following:

1) Isolate the check valve from the system.

   The check valves are attached to the vacuum pump assembly. One check valve on each pump head, for the green (**5A**) and red (**5B**) circuits.

   See **FIGURE 5**.

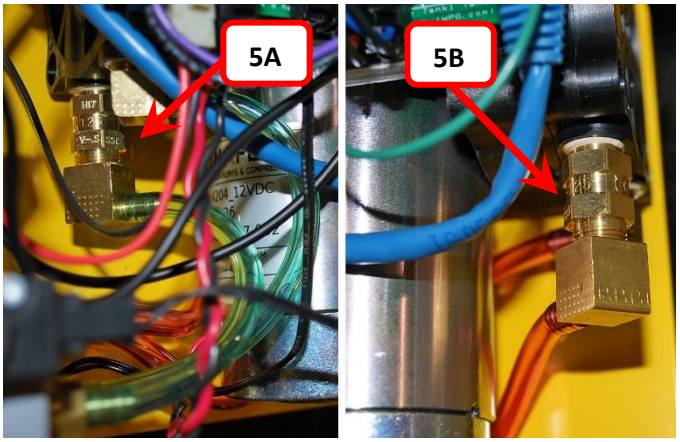


FIGURE 5

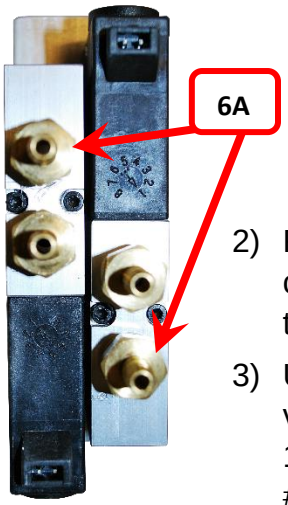


FIGURE 6

2) Remove the hose from the control valve solenoid of the leaking circuit connected to the fitting with the check valve, ports **6A** in **FIGURE 6**; disconnect the hose from the valve of the circuit to be tested.

3) Using the ball valve with vacuum gauge, #20066, 1/4" O.D. hose adapters, #15383, and a piece of 1/4" O.D. hose, attach the ball valve (end with vacuum gauge attached) to the fitting where the hose was removed.

   Attach the other end of the ball valve to the hose that was removed from the fitting (that is attached to the check valve).

   See **FIGURE 7**.

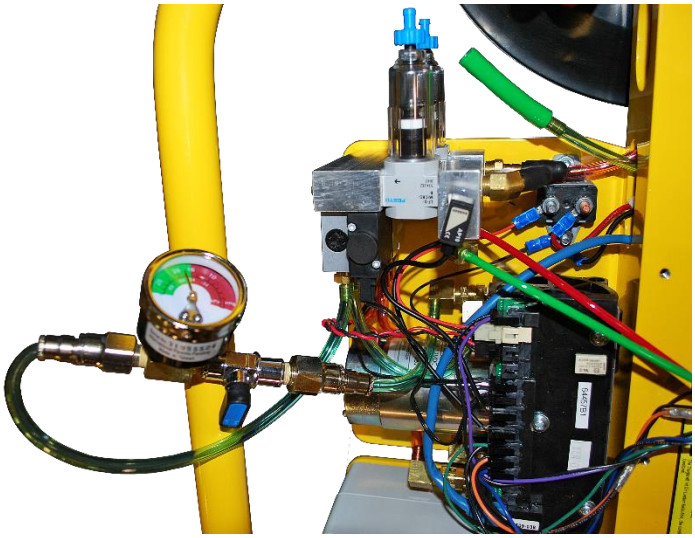


FIGURE 7

4) With the ball valve in the open position (handle in-line with the valve) apply (|←) the lifter.

5) Close the ball valve (handle turned perpendicular to the valve) and observe the vacuum gauge. See **FIGURE 7**.

   - If the vacuum level on the ball valve's vacuum gauge starts and continues to drop, it indicates that the leak is located in the manifold assembly or vacuum gauge connection.

     Proceed to step 6.

- If the vacuum level on the ball valve's vacuum gauge holds steady and does not drop, it indicates that the check valve or the hose connection to the check valve is the cause of the leak.

  Examine the hose to the check valve and fitting. If there are no obvious signs of damage (cuts or abrasions in the hose or nicks in the barb of the fitting) replace the check valve.

6) Isolate the assembly from the lifter's vacuum gauge.

FIGURE 8

7) Create a small fitting plug using a yellow cap plug, #53160, and a short piece of 5/32" O.D. hose.

   See **FIGURE 8**.

8) Remove the hose from the 90° fitting that connects to the vacuum gauge of the leaking circuit. A small flat blade screwdriver can help with removal.

   Using the small fitting plug, cap off the fitting (**9A**) the hose was removed from.

   See **FIGURE 9**.

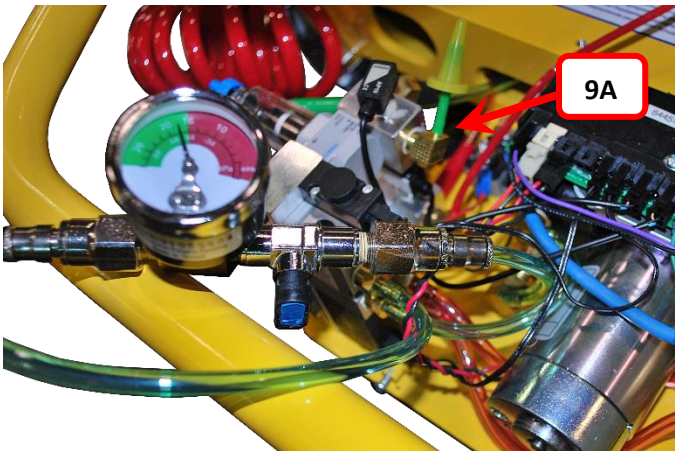


FIGURE 9

9) With the ball valve in the open position (handle in-line with the valve) apply (|←) the lifter.

10) Close the ball valve (handle turned perpendicular to the valve) and observe the ball valve's vacuum gauge. See **FIGURE 9**.

- If the vacuum level on the ball valve's vacuum gauge starts and continues to drop, it indicates that the leak is located in the manifold assembly.

  Proceed to step 11.

- If the vacuum level on the ball valve's vacuum gauge holds steady and does not drop, it indicates that the vacuum gauge or the hose connection to the vacuum gauge is the cause of the leak.

  Examine the hose to the vacuum gauge and connected fitting. If there are no obvious signs of damage (cuts or abrasions in the hose, nicks in the barb or cracks in the body of the fitting) replace the vacuum gauge.

  Note, the gauge can be tested independently using the ball valve by installing a 5/32" O.D. hose adapter, #15384, in the end with the vacuum gauge and leaving the other end of the ball valve connected to the pump/check valve fitting.

  Attach the hose of the vacuum gauge to the ball valve adapter.

  Apply the lifter, then close the ball valve. Power down the lifter by holding both the power (⏻) and function (Fn) push button switches for approximately 7 seconds.

  A leak would be indicated by a drop in vacuum as registered on the vacuum gauge.

11) Isolate the various components of the manifold assembly to determine the cause of the leak.

12) Begin by removing the control valve of the affected, leaking circuit (red or green).

Unclip the power lead from the control valve by pushing down on the connector's release tab and pulling the connector straight out. See **FIGURE 10**.

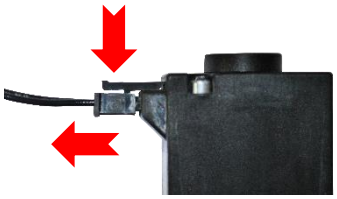


FIGURE 10

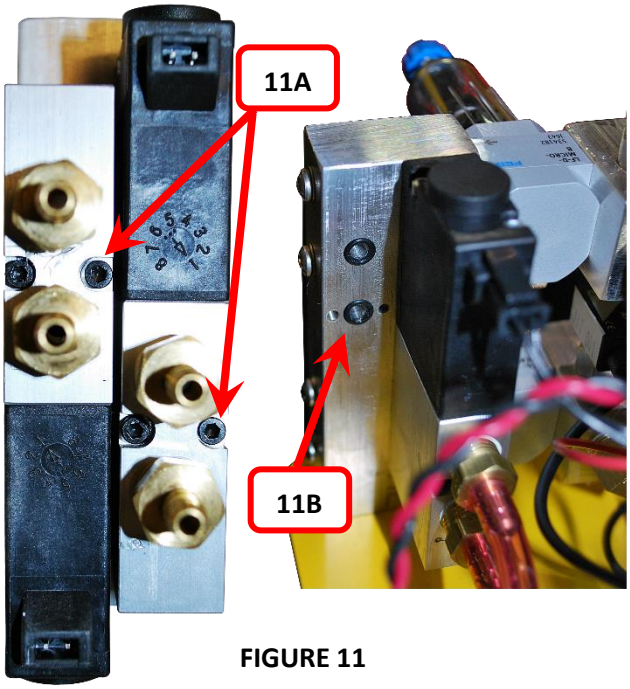


FIGURE 11

13) The screws (**11A**, two per valve) require a 5/64" hex wrench to remove.

Note, do not lose the O-rings (**11B**) located between the control valve and the manifold.

14) The hoses with the ball valve installed will need to be connected for the test.

With the adapters for the 1/4" O.D. hose installed, attach the end of the ball valve without the vacuum gauge to the hose connected to the check valve on the vacuum pump.

Using an additional piece of hose, attach the gauge end of the ball valve to the bottom fitting (furthest from black coil) of the control valve. Reference **FIGURE 6**.

To seal off the (unthreaded) port of the valve that was attached to the manifold clean the surface with alcohol (to remove any grease) and place a piece of vinyl electrical tape over the port as shown in **FIGURE 12** (circled area).

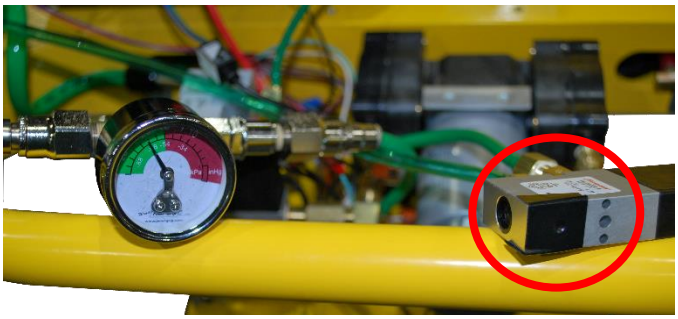


FIGURE 12

The tape needs to be flat and smooth around the port (no wrinkles).

15) With the ball valve in the open position (handle in-line with the valve) apply (|←) the lifter.

Note: Since the valve is no longer connected to the sensor assembly, the lifter will not shut off automatically.

Once the lifter reaches a suitable vacuum level, close the ball valve and power down the lifter by pressing both the function (Fn) and power ( ) push button switches until the lifter shuts down (the buttons must be engaged for approximately 7 seconds to shut down with vacuum applied).

16) Observe the ball valve's vacuum gauge.

- If the vacuum level on the ball valve's vacuum gauge starts and continues to drop, it indicates that the control valve does leak.

  Replace the control valve.

- If the vacuum level on the ball valve's vacuum gauge holds steady and does not drop, it indicates that the control valve does not leak, and the leak is located elsewhere in the manifold assembly.

17) If the control valve does not leak, it will be necessary to test the remaining manifold assembly components.

    Remove the hose from the control valve. Remove the adapter from the gauge end of the ball valve.

    Remove the cap plug (installed in **FIGURE 4**) from the pad line fitting of the section, green or red, that is being tested and, using a piece of 3/8" O.D. hose (**13A**), attach the ball valve to the pad line fitting.

18) To seal off the (unthreaded) port of the manifold where the valve was attached, remove the two O-rings (**FIGURE 11,** detail **11B**), clean the surface with alcohol (to remove any grease) and place a piece of vinyl electrical tape over the port as shown in **FIGURE 13** (circled area).

19) With the ball valve in the open position (handle in-line with the valve) apply (|←) the lifter.

20) Observe the ball valve's vacuum gauge.

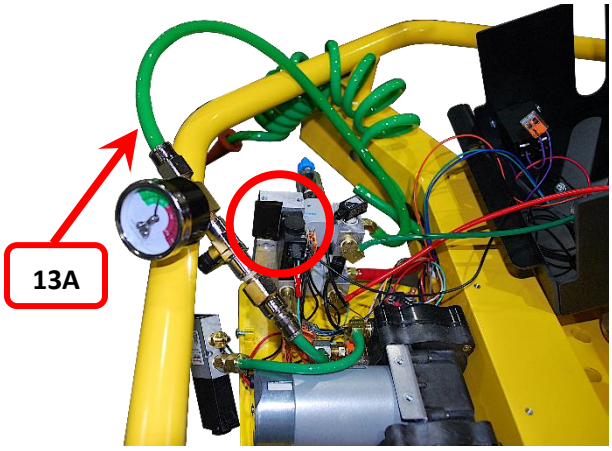


FIGURE 13

- If the vacuum level on the ball valve's vacuum gauge holds steady and does not drop, it indicates that the leak is not located in the manifold assembly. If neither the control valve nor the manifold assembly without the valve attached leak, the indication is that the leak is located at the O-rings mounted between the control valve and the manifold assembly.

  Examine the O-rings that were installed between the control valve and the manifold for any indication of damage. If there are no obvious indications of damage, lubricate the O-rings with a rubber compatible grease and reinstall the control valve. Note: Snug both valve mounting screws then fully tighten the screws to ~10 in-lbs. [1.1 N-m].

  Retest the manifold assembly as shown in **FIGURE 9**. If a leak is noted, contact Wood's Powr-Grip for additional information.

- If the vacuum level on the ball valve's vacuum gauge starts and continues to drop, the indication is that the leak is located in the remaining parts of the manifold assembly.

  Proceed to next step.

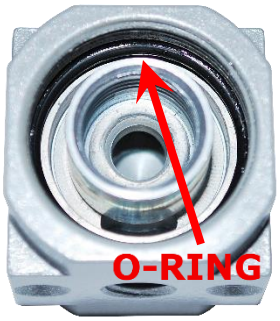


FIGURE 14

21) If the vacuum filter has been recently serviced, verify that the O-ring, **FIGURE 14**, located between the filter bowl and body is not pinched or damaged and properly lubricated and seated.

    Note: If the filter has not been serviced since the leak began, it is not necessary to dis-assemble it to check the O-ring.

22) Check that the (blue) drain plug, in **FIGURE 15**, is securely tightened (clockwise). Note: As stated in the lifter's instructions, the drain plug should never be used.

FIGURE 15

23) Repeat the vacuum test to see if tightening the drain plug resolved the issue.

24) If the manifold assembly continues to leak, it will need to be dis-assembled to continue testing.

25) Disconnect the ball valve from the pad line fitting.

26) The filter is mounted between the primary manifold and sensor assembly. Each filter is retained by two 6-32 Philips head screws that run through the primary manifold and filter and are threaded into the sensor assembly. See **FIGURE 16**.

FIGURE 16

27) Prior to removing the filter or manifold assembly, disconnect the power system from the battery.

28) Note: For in-line channel series lifters (P1 and MRTALPCH), it will be necessary to remove the manifold assembly from the channel to access the filter mounting screws.

    For all other models, proceed to step 31.

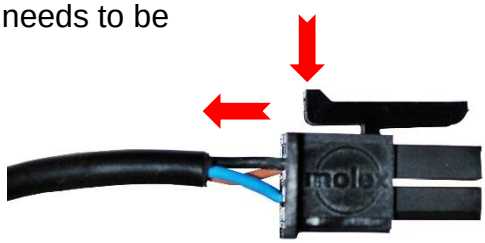
29) It may be prudent to disconnect the transducer lead before removing the manifold assembly to avoid damaging wires.

    The transducer wires may be connected the circuit board with a connector similar to the control valve connector, where a tab needs to be pressed down before pulling the connector straight out from the circuit board, or each wire will be connected to a lever nut.

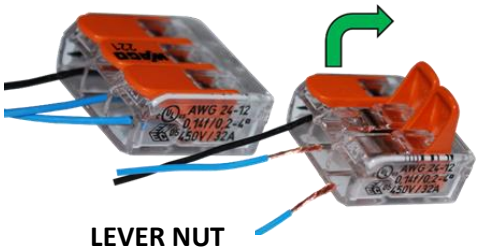
    See **FIGURE 17**.

    Note: Both transducer leads must be connected to the circuit board for the system to shut off automatically.

    If either transducer is not hooked up when a vacuum test is performed, you will need to power down the lifter by engaging both the function (Fn) and power ( ) push button switches for approximately 7 seconds.



CIRCUIT BOARD CONNECTOR



LEVER NUT

FIGURE 17

30) The manifold is secured by three Phillips head screws; one against the edge of the channel and two on the opposite side. See **FIGURES 16** and **17**. Remove these screws to access the filter screws on the bottom of the manifold assembly.

31) Remove the screws securing the filter, shown in **FIGURE 16**. Do not lose the O-rings located between the filter and the manifolds.

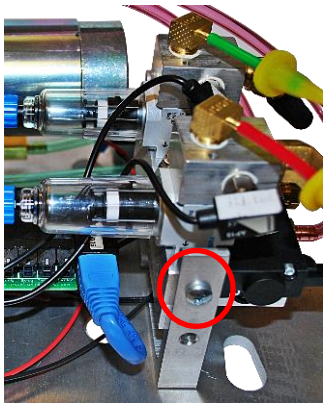


FIGURE 18

FIGURE 19

FIGURE 20

32) To separately test the filter, install an M7 X 1/4" O.D. hose adapter, #15373, into each filter port. The adapters have a hex in the center of the fitting; use a 4mm or 5/32" hex wrench to tighten the adapters to the filter. Do not use thread sealant on these fittings.

See **FIGURE 20**.

33) Create a small fitting plug using a yellow cap plug and a short piece of 1/4" O.D. hose.

Install the fitting plug in the pad line filter port (end opposite of arrow direction).

34) Attach a short piece of 1/4" O.D. hose to the other filter port and, using a 1/4" O.D. hose adapter, attach the gauge end of the ball valve to this hose.

The other end of the ball valve should still be connected to the vacuum pump.

See **FIGURE 21**.

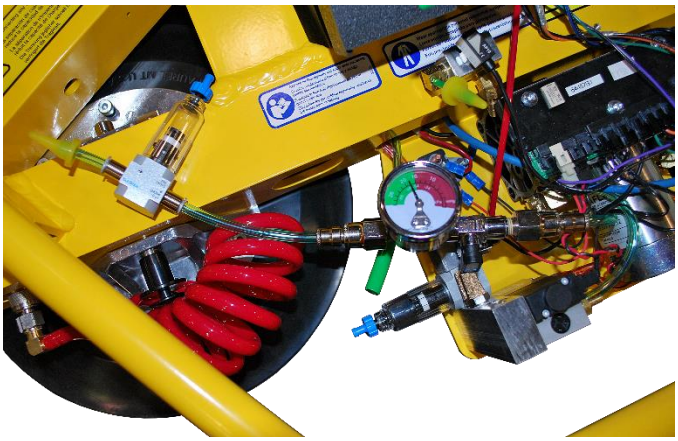


FIGURE 21

35) With the ball valve in the open position (handle in-line with the valve) apply (|←) the lifter.

Note: Since the filter is no longer connected to the sensor assembly, the lifter will not shut off automatically.

Once a suitable vacuum level is attained, close the ball valve, and turn off the lifter by pressing both the function (Fn) and power ( ) push button switches until the lifter shuts down (the buttons must be engaged for approximately 7 seconds to shut down with vacuum applied).

36) Observe the ball valve's vacuum gauge.

- If the vacuum level on the ball valve's vacuum gauge starts and continues to drop, the filter does leak.

  A leak in the filter may be caused by damage to the filter bowl's O-ring (shown in **FIGURE 14**), or the drain plug was used and now has contamination on its sealing ring.

Check the filter bowl O-ring (**FIGURE 14**) for damage. The O-ring should be lightly lubricated to keep it from pinching when installed in the bowl; if needed (and the O-ring does not appear to be damaged) apply a thin film of rubber compatible grease to the O-ring. Examine the sealing ridge of the filter bowl for any indication of scratches or contamination along the upper edge that contacts the O-ring. If the O-ring or bowl are damaged replace the filter.

If it is possible that the drain plug has been used it can be removed and cleaned.

To remove the drain plug, first loosen it a few turns by turning the blue cap counter-clockwise. The blue cap is pressed onto the plug stem, pry or pull the cap straight off (this may require a pair of pliers or screwdriver). Once the cap is removed, fully unscrew the drain plug and push it into the filter bowl to remove it. The O-ring seal is located just beneath the plug head. See **FIGURE 22**. Remove the O-ring and clean the O-ring and plug body with a mild soap and water solution. Apply a thin film of rubber compatible grease to the O-ring and reinstall it on the drain plug.

FIGURE 22

Clean the inside base of the filter bowl where the O-ring seats. A mild soap and water solution can be used. Install the drain plug in the filter bowl and tighten by hand as much as possible. Holding the bowl vertically, align the cap with the drain plug (the cap's recess is oblong, to fit only one way) and, with the cap against a firm surface, press the bowl/drain plug assembly onto the cap. Fully tighten the drain plug.

Retest the filter. If it continues to leak, replace the filter.

- If the vacuum level on the ball valve's vacuum gauge holds steady and does not drop, the filter does not leak.

37) Test the transducer sensor assembly.

38) Disconnect the ball valve from the filter and remove the 1/4" O.D. hose adapter.

39) Using a piece of 3/8" O.D. hose, attach the ball valve to the fitting (pad line fitting) of the sensor assembly. See **FIGURE 23**.

40) To seal off the (unthreaded) port of the sensor assembly where it was attached to the filter, remove the O-ring from the assembly, clean the surface with alcohol (to remove any grease) and place a piece of vinyl electrical tape over the port as shown in **FIGURE 23** (circled area).

41) Apply the lifter and observe the ball valve's vacuum gauge.

- If the vacuum level on the ball valve's vacuum gauge holds steady and does not drop, the sensor assembly does not leak.

  Proceed to the next step.

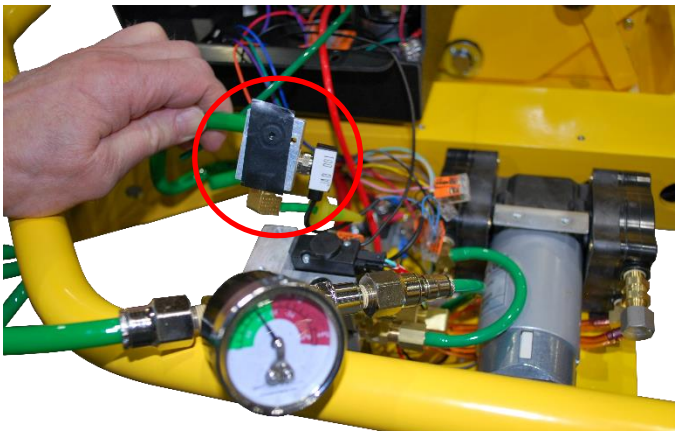


FIGURE 23

- If the vacuum level on the ball valve's vacuum gauge starts and continues to drop, the sensor assembly does leak.

  Closely examine the fittings for any indication of cracks or damage, particularly around the nipple of the gauge fitting. Check the base of the transducer for cracks. Replace any part that appears damaged.

  To check the transducer: With vacuum applied, apply slight pressure to the transducer and pivot the part while under vacuum to see if this affects the leak rate (checks that transducer seal is still in good condition). If the leak rate changes, replace the transducer.

42) To test the primary manifold the control valve must be mounted. Lubricate the O-rings with a rubber compatible grease and reattach the control valve to the primary manifold but leave the power lead to the valve disconnected. Note: Snug both valve-mounting screws then fully tighten the screws to ~10 in-lbs. [1.1 N-m].

43) Using a 1/4" O.D. adapter and short piece of 1/4" O.D. hose, connect the ball valve to the vacuum port of the control valve.

    See **FIGURE 24**.

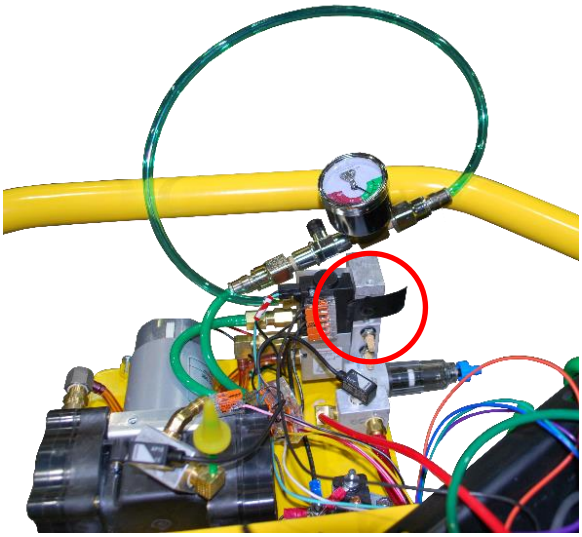


FIGURE 24

44) To seal off the (unthreaded) port of the manifold assembly where the filter was attached, remove the O-ring from the assembly, clean the surface with alcohol (to remove any grease) and place a piece of vinyl electrical tape over the port as shown in **FIGURE 24** (circled area).

    Note: Since the valve is no longer connected to the sensor assembly, the lifter will not shut off automatically.

    Once the lifter reaches a suitable vacuum level, turn off the lifter by pressing both the function (Fn) and power ( ) push button switches until the lifter shuts down (the buttons must be engaged for approximately 7 seconds to shut down with vacuum applied).

    Observe the ball valve's vacuum gauge.

- If the vacuum level on the ball valve's vacuum gauge starts and continues to drop, the primary manifold does leak.

  Since the manifold is simply a ported aluminum block, it is unlikely that it itself is the cause of the leak. Check that the electrical tape covering filter port is sitting flat to the surface surrounding the port and there are no wrinkles or obstructions that could cause the tape to not fully seal.

  If the taped-over port looks properly sealed, remove the control valve and examine the O-rings installed between the control valve and the manifold. If there are no obvious indications of damage reattach the control valve in the same manner as step 42 and repeat the test.

  If the leak is still present, contact Wood's Powr-Grip for additional assistance.

- If the vacuum level on the ball valve's vacuum gauge holds steady and does not drop, the primary manifold does not leak. Note, this result also verifies that the O-rings between the manifold and the control valve are properly seated and sealing.

45) If all the individual components of the assembly have passed vacuum testing, it indicates that the leak was likely caused by the O-rings located between the filter and the primary manifold and/or sensor assembly. Examine the O-rings for any indication of damage. If there are no obvious indications of damage, lubricate the O-rings with a rubber compatible grease and reassemble the filter and sensor assembly to the manifold.

    At this point the manifold assembly should be fully reassembled with the control valves and filters.

    If not still capped-off, cap off the pad line fittings and vacuum gauge fittings, as shown in **FIGURE 9**, and repeat the vacuum test of the isolated manifold assembly.

46) Observe the ball valve's vacuum gauge.

- If the vacuum level on the ball valve's vacuum gauge holds steady and does not drop, it indicates that the leak within the manifold assembly has been repaired.

  Reattach the vacuum gauge lines and retest the assembly with the gauges attached (pad lines still capped-off and ball valve installed between the check valve and control valve) to verify the assembly with gauges.

  If the vacuum level still holds steady, remove the ball valve from the system and reconnect the control valve to the pump fitting with the check valve. Repeat the vacuum test. This provides confirmation that the vacuum generating system holds vacuum with all parts attached.

  After it is verified that the vacuum generating system holds vacuum and no longer leaks, reattach the pad lines and test the lifter as a whole.

  If the lifter leaks with the pad lines connected, proceed to **Pad System Tests**. If the lifter passes the vacuum test proceed to **System Confirmation** for additional information.

- If the vacuum level on the ball valve's vacuum gauge starts and continues to drop, contact Wood's Powr-Grip for additional information.

PAD SYSTEM TESTS

Note: The following assumes operator has 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.

If it was determined that there is a vacuum leak, but the vacuum generating system does not leak, or if all existing leaks in the vacuum generating system have been repaired, proceed with the following:

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

Lifter models with quick connect valves to all vacuum pads:

[MRTA8-DC3 and MRTALP8-DC3 series lifters]

For lifter models without quick connects proceed to step 8.

1) Disconnect all the quick connect valves of the circuit, green or red, to be tested.

   Note: All the quick connects can be disconnected to avoid having to have the vacuum pads of the connected circuit attached to a smooth surface.

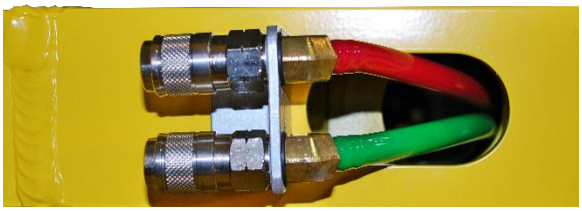


FIGURE 23

2) Repeat the vacuum test.

   - If the vacuum level of the lifter's vacuum gauge holds steady and does not drop, the vacuum pad system does not leak between the vacuum filter and the quick connect valves when the valves are disconnected.

     Proceed to step 8.

   - If the vacuum level of the ball valve's vacuum gauge starts and continues to drop, a leak does exist between the vacuum filter and the quick connect valves.

     Examine the hoses, hose connections and fittings for any indication of loose connections, cuts or abrasions, cracked or damaged fittings. If there is no visible damage, use the ball valve with gauge and/or cap plugs to cap off individual fittings and lines to determine where the leak is located.

3) Test the system with the quick connects removed.

   Note: The quick connects of **MRTA8-DC3** are externally accessible. See **FIGURE 23**.

   The quick connects of **MRTALP8-DC3** are attached to a manifold that is secured to the inside wall of the pad frame tubes by two socket head cap screws, located in opposite corners of the manifold. See **FIGURE 24**. A 7/64" hex wrench is required to remove these screws.

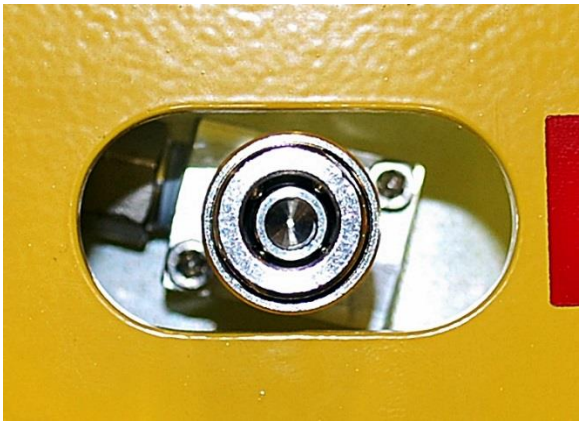


FIGURE 24

4) Disconnect the vacuum lines from the quick connects of the circuit being tested.

5) Cap off all the vacuum lines of the quick connects of the circuit being tested.

The vacuum line used on the **MRTA8-DC3** is 3/8" O.D. hose and is capped-off with the large orange, #53161, cap plug. See **FIGURE 25**.

The vacuum line used on the **MRTALP8-DC3** is 1/4" O.D. hose and is capped-off using the small yellow, #53160, cap plug. See **FIGURE 26**.

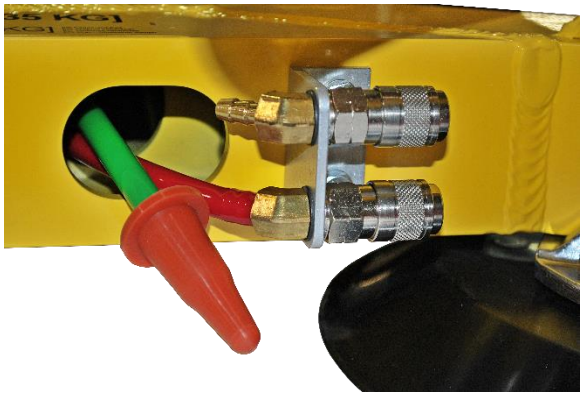


FIGURE 25

FIGURE 26

6) With the vacuum lines capped-off, apply the lifter and observe the vacuum gauges.

- If the vacuum level of the lifter's vacuum gauge holds steady and does not drop, it indicates that one or more of the quick connects leak when disconnected.

  Proceed to step 7.

- If the vacuum level of the ball valve's vacuum gauge starts and continues to drop, it indicates that a leak exists in the vacuum lines, between the filters and the cap plug.

  If this is the case, it is recommended to contact Wood's Powr-Grip for a hose route drawing for your model lifter. Please have model and serial number information available when requesting information.

  For additional information on testing the individual components proceed to step 13.

7) If it is determined that one or more of the quick connects of a particular circuit leak when disconnected, test each individual quick connect using the ball valve, additional hose and the appropriate adapter, if needed.

See **FIGURE 27** for the **MRTA8-DC3** and **FIGURE 28** for the **MRTALP8-DC3** which requires the 1/4" push-in hose adapters.

- Replace any leaking quick connects.

FIGURE 27

FIGURE 28

For lifter models without quick connect valves [MRT4-DC3 and PC/P1-DC3 series lifters] or if it was determined that there is no leak up to the quick connect valves:

8) Remove the pad fitting from each of the vacuum pads of the circuit, green or red, being tested. Cap off all the pad fittings, **29A**, as shown in **FIGURE 29**.

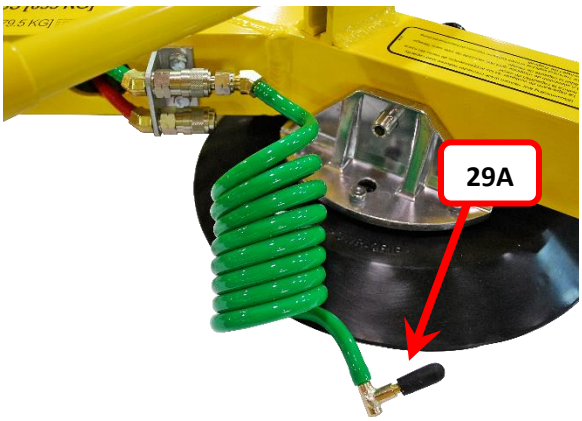


FIGURE 29

9) Observe the vacuum gauge.

- If the vacuum level of the lifter's vacuum gauge holds steady and does not drop the leak is located in one or more of the vacuum pads.

  Re-attach one pad at a time to determine which vacuum pads are leaking. Repair or replace the vacuum pads as needed.

- If the vacuum level of the lifter's vacuum gauge starts and continues to drop a leak exists between the pad fittings and the filter **or**, if the lifter has quick connect valves and has been tested up to those parts, the leak is located between the pad fittings and the quick connect valves.

10) The typical process for this is to move back to the next fitting and repeat the vacuum test. For lifters with quick connects this would be with the male quick connect installed. See **FIGURE 30**.

FIGURE 30

If the system leaks with the male quick connects attached and capped-off but did not leak when tested up to the quick connects when they were disconnected from the male half, the quick connects can be tested assembled, in the same manner as they were when unassembled.

See step 7 and **FIGURES 27** and **28**.

- Replace any quick connects found to leak. Since quick connects may leak when assembled due to a damaged O-ring located in the female half, it is recommended to replace both the male and female quick connect.

11) For **MRT4-DC3** lifters, the next test point will be the 90° barbed elbow, used to connect the coiled hose to the internal vacuum lines. See **FIGURE 31**.

FIGURE 31

- In respect to the **MRT4-DC3** lifter, if the system still leaks when the 90° barbed elbows are capped-off, this indicates that the leak is located between the 90° barbed elbows and the filter. If this is the case, remove the 90° barbed elbows from the vacuum lines of the circuit being tested and cap off the lines using the large orange cap plugs.

- If the leak continues, it is recommended to contact Wood's Powr-Grip for a hose route drawing for your model lifter. Please have model and serial number information available when requesting information.
- If the leak is no longer present when the lines were capped-off, it indicates that the leak is located in one or more of the 90° barbed elbows. **To test individual lines or fittings proceed step 13.**

12) The vacuum lines of **PC/P1-DC3** lifters are fully accessible.

- Continue testing the pad lines, moving back from the pad fittings to the next fitting towards the filters. Move up the line to the next fitting and cap off the fitting. Once the leak is no longer present the last fitting or section of hose that was removed is the cause of the leak.

  To test the individual lines or fittings proceed to step 13.

13) The ball valve with gauge and cap plugs can be used to test individual lines, sections, fittings, or parts.

Check individual fittings and parts by attaching the ball valve to any active vacuum line as was done for the quick connect valves in **FIGURES 27** and **28**.

- Attach the part to be tested to the gauge end of the ball valve. With the ball valve open, apply vacuum. After vacuum is applied, the ball valve is closed so the only part being tested is the part connected to the gauge end of the ball valve. A drop in vacuum on the ball valve's vacuum gauge indicates that the part being tested leaks. If the vacuum level holds steady and does not drop the part being tested does not leak.

Other examples are shown in **FIGURES 32** and **33** where individual fittings are being tested using the ball valve and cap plugs. Whenever a part is being tested, any open ports that may exist must be plugged or capped-off to get a vacuum seal.

FIGURE 32

FIGURE 33

This process can be used to test any individual part, assembly, or section.

Continue testing, working back towards the filters, to locate the vacuum leaks.

Once all leaks have been identified and repaired, proceed to System Confirmation and retest the vacuum system.

SYSTEM CONFIRMATION

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

A vacuum test, as described in the instruction manual, should be performed following any repair or service to a vacuum lifter.

Note: If the lifter is equipped with pad shut-offs or quick connects, a vacuum test should be performed with these parts in every manner of use, i.e. shut-off valves should be tested in both the open and closed position, quick connect valves should be tested both when connected and disconnected.

All parts must be verified in relation to their function and the lifter must pass all vacuum tests before returning to service.

ADDITIONAL INFORMATION

1) When requesting information on a particular lifter, please have the model number and serial number available.
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 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 or paste 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 clockwise with a wrench.
6) Please note: 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 your system.

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

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