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EMERGENCY OPERATION

Emergency Operation of Machine's Cylinders

Emergency Procedures for Parking Brakes is on Page H-6 & H-7

Emergency Pump is located on right side of machine's frame behind engine (Figure 1). The emergency pump internal relief valve is set to 2250 PSI. To check or adjust the emergency pump relief valve go to page H-21.

1. Make certain the ball valve at the implement pump is in the closed position (Figure 2). (Decal on valve will indicate open and closed position).
2. At the overhead console make certain the following switches are in the OFF position:
 - A. Warm Up
 - B. Snow Auger (If equipped)
 - C. Broom

Having these switches ON puts additional stresses on the pump, only one circuit at a time can be used.

3. Turn ignition switch to the ON position to activate controls.
4. On the overhead panel press and hold the emergency pump switch in the ON position while operating the controls for each component that needs to be stored.



Operate the 24 volt emergency pump in intervals for a maximum of 30 seconds to one minute, and then let electric motor cool for one minute before using again.

The 24 volt emergency pump is designed for emergency use ONLY and is NOT to be run continuously.

5. If lifting ballast or snow wings, place joystick switch on center console in the ON position to activate joysticks.
6. Engage component's lock up.



Figure 1
Emergency Pump



Figure 2

Emergency Pump disengaging parking brakes to allow towing

1. Make certain the ball valve at the implement pump is in the closed position (Figure 2 above). (Decal on valve will indicate open and closed position).
2. With the machine on level track, chock ALL wheels to prevent movement.
3. At the overhead console make certain the following switches are in the OFF position:
 - A. Warm Up
 - B. Snow Auger (If equipped)
 - C. Broom

Having these switches ON puts additional stresses on the pump, only one circuit at a time can be used.

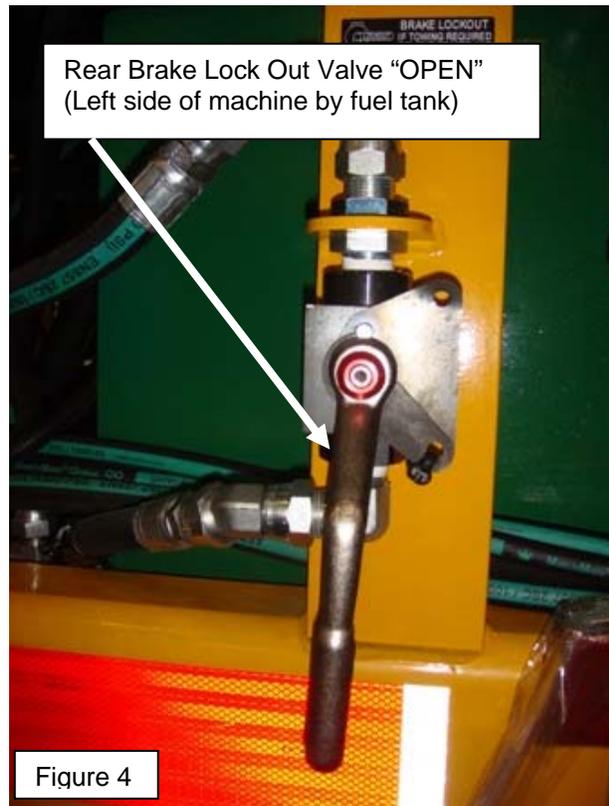
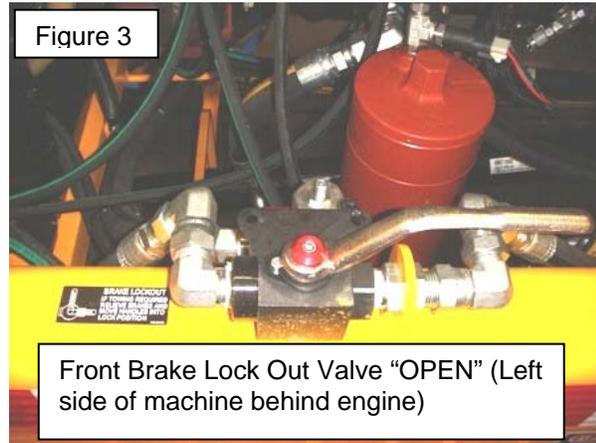
4. Turn ignition switch to the ON position to activate controls.
5. Place Parking Brake Switch in Run position.
6. On the overhead panel press and hold the emergency pump switch in the ON position until all four brake assemblies are disengaged from the wheels.



Operate the 24 volt emergency pump in intervals for a maximum of 30 seconds to one minute, and then let electric motor cool for one minute before using again.

The 24 volt emergency pump is designed for emergency use ONLY and is NOT to be run continuously.

7. Close the Brake Lock Out Valves located behind engine (Figure 3 – front brakes) and on left frame by fuel tank (Figure 4 – rear brakes) and Lock in the CLOSED position (CLOSED is perpendicular to the hose line, OPEN is parallel to the hose line).
8. Return the ball valve at the implement pump to the open position & remove wheels chocks.
9. The M-7 can now be towed.



Manually Disengaging Brakes to allow for towing of machine

(8) Bolt 5/8"-11 X 16" Long
Part # 620117

1. With the machine on level track, chock ALL wheels to prevent movement.
2. Remove & use two bolts from storage rack (left side machine below fuel tank) (figure 5) for each wheel.
3. Install on each brake cylinder (figure 6) and tighten both bolts equally until brake pads are released from each wheel.
4. After the machine has been towed, remove and store bolts.



Figure 5



Figure 6

SERVICE PARTS

Description **NORDCO Part Number**

Filters (Nordco P/N in parentheses):

| | |
|-------------------------------------|----------------|
| Suction Strainer (500619) | |
| Element..... | 500092 |
| Return Filter (3880323) | |
| Element..... | 3894289 |
| Pressure Switch..... | 5193975 |
| Gasket Kit..... | ALFT503 |
| Reservoir Breather..... | 1673250 |
| Pressure Filter (3880259) | |
| Element..... | 3894289 |
| Pressure Switch..... | 5193970 |
| Top off (Push-Pull) (460390) | |
| Element..... | DMS11AN |
| Pump (Push –Pull)..... | G-199 |

HYDRAULIC MAINTENANCE COMPONENT SCHEDULE

| Hydraulic Component Maintenance Schedule | | | | | |
|--|----------------------|--------------------|-------------------------|-------------------------|--------------------------|
| Item | 10 Hours (Day) | 50 Hours (Week) | 250 Hours (Month) | 750 Hours (3 Months) | 1500 Hours (6 Months) |
| Hydraulic Oil | I/F | | | | |
| Oil Cleanliness | | | | I/T | |
| Return Line Filter | | I | I | | |
| Suction Line Filter | | I | I | | |
| Pressure Filter | | I | I | | |
| Hoses and Fittings | I | | | | |
| Oil Cooler | | | CL | | |
| Pressure Checks🕒 | | | I/T | | |

Key:

Some maintenance requires that a two step procedure be performed.
For example, I/F requires inspection and Filling.

A = Adjust C = Change CL = Clean I = Inspect
L = Lube R = Replace S = Service T = Test
F = Fill

Hydraulic filters require inspection during the first 40 hours of service
and designated Intervals thereafter.

🕒 Monthly pressure checks are recommended. Fluctuation of hydraulic
power may require more frequent checks.

GENERAL

Pressure to the various devices in the hydraulic system is controlled by the Compensator, Pressure Reducing Valves, Counterbalance Valves, and Relief Valves. It is important for the proper operation of the machine that pressures are maintained at the correct levels as shown below. Adjustments may also be necessary anytime the machine is not operating normally. Test and adjust pressure as shown on the following pages.

PERIODIC ADJUSTMENTS

Pressure checks can be performed anytime. Flow controls adjustments are performed after the hydraulics oil is warmed up (oil temperature has reached 100° F minimum).

Before performing these checks, read and understand all OPERATION instructions, warnings and cautions. These testing procedures require at least two workers in order to be performed correctly.

All checks should be performed with the machine's BRAKE LOCK VALVES in the locked position and wheels chocked. There are two brake lock valves that are located on the left side of the M7.



WARNING

Serious personal injury or death may result if hydraulic oil penetrates the skin. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines.

Tighten all connections before applying pressure. Protect hands and body from high pressure fluids. If an accident occurs, see a doctor immediately.

PRESSURE CHECKS

| | |
|--|----------|
| Broom Circuit Pressure Relief Valve | 2600 PSI |
| Implement Pump Pressure Compensator | 2500 PSI |
| Implement Circuit Pressure Relief Valve | 2900 PSI |
| Blower Pressure Relief Valve | 2600 PSI |
| Lock Up Pressure Reducing Valve | 400 PSI |
| Traction Pump Charge Pressure Relief Valve..... | 350 PSI |
| Traction Pump Pressure Limiter Valve (For & Rev) | 5200 PSI |
| Transmission Charge Pump Pressure Relief Valve | 275 PSI |
| Emergency Pump Pressure Relief Valve | 2250 PSI |
| Traction Motor Pressure Compensator Override..... | 2250 PSI |

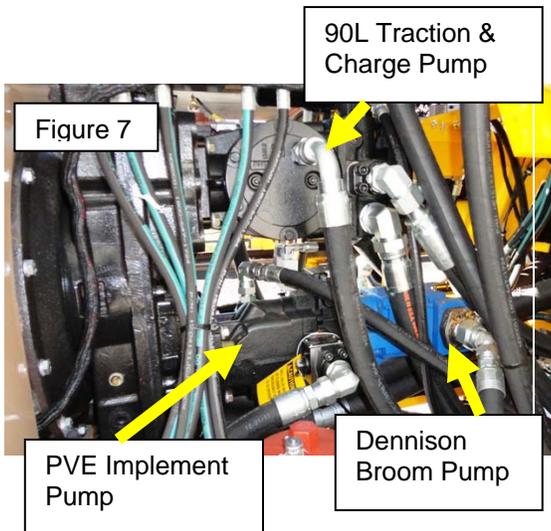


DANGER

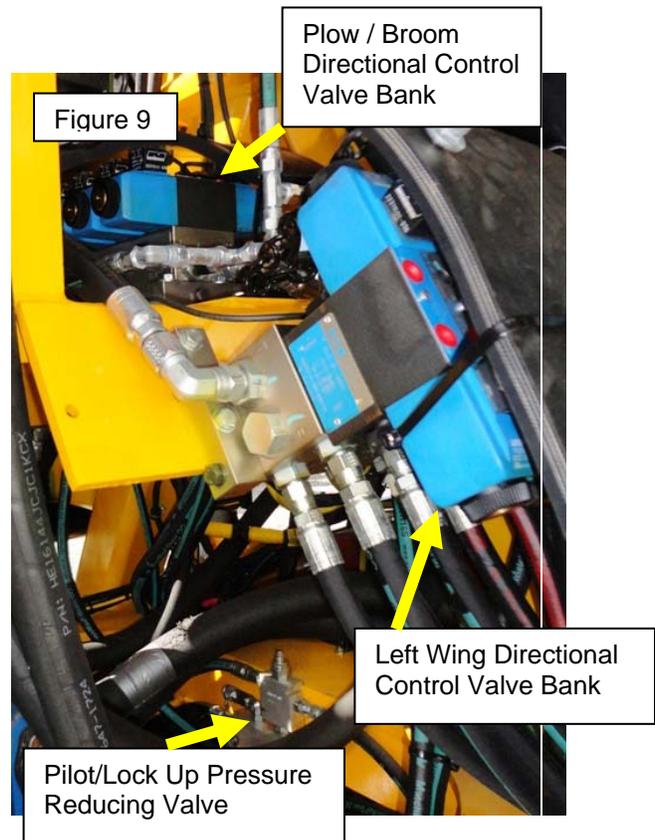
Always turn off machine when performing maintenance, making adjustments, or whenever unintended movement of machine could occur; unless directed otherwise. Failure to comply could result in personal injury and/or damage to the machine.

HYDRAULIC COMPONENT LOCATIONS

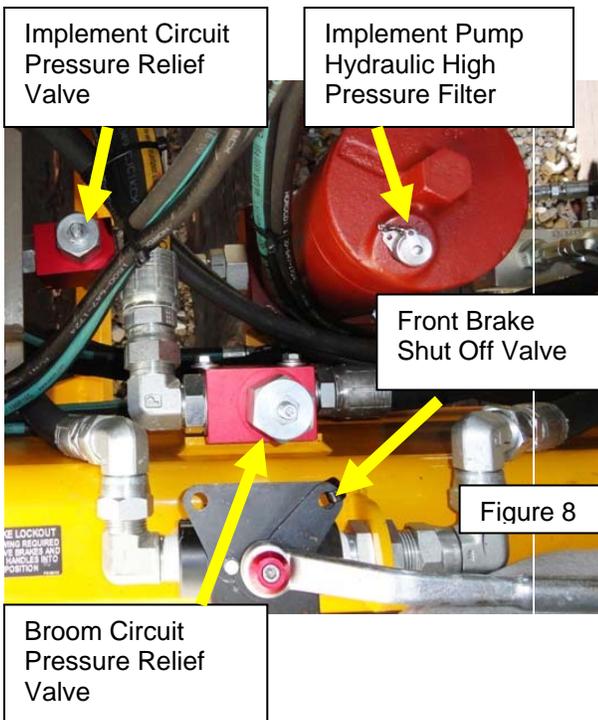
M7 Ballast Machine Left Side



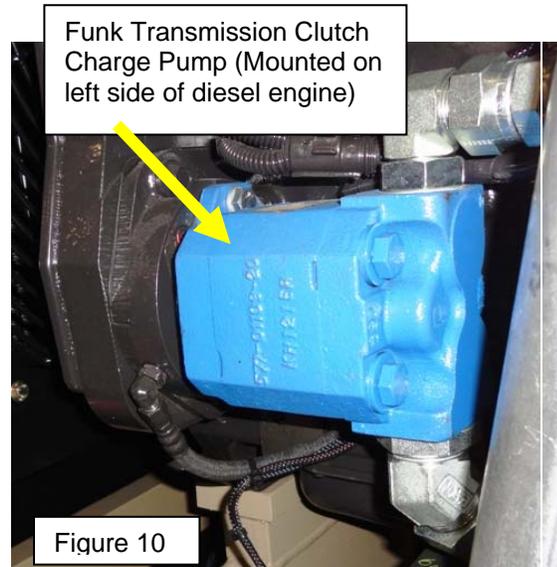
M7 Ballast Machine Left Side



M7 Ballast Machine Left Side



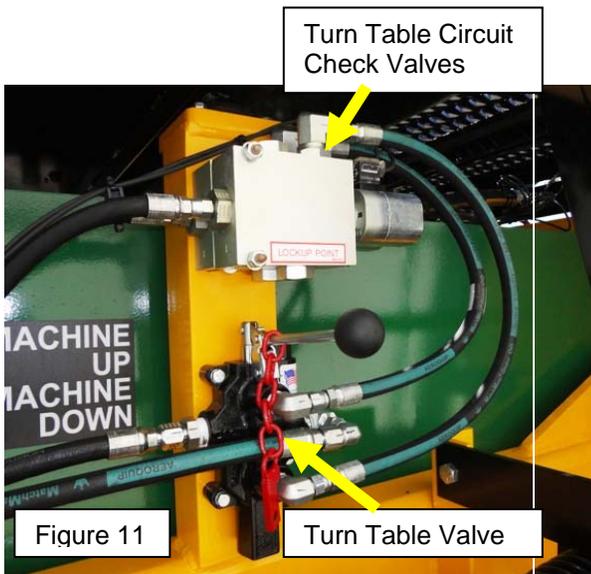
M7 Ballast Machine Left Side



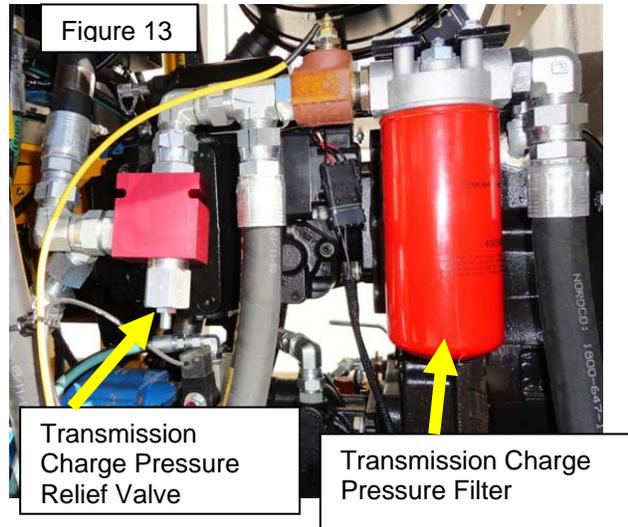
HYDRAULIC

M7 Ballast Regulator/Snow Fighter

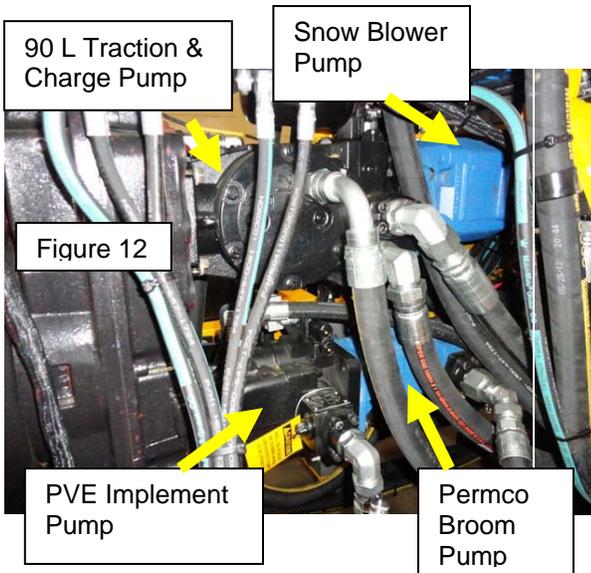
M7 Ballast Machine Left Side



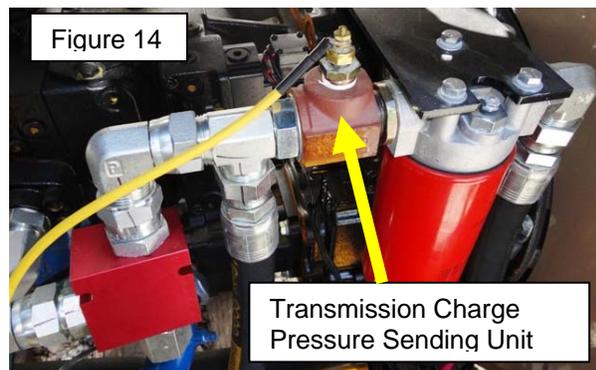
M7 Ballast Machine Right Side



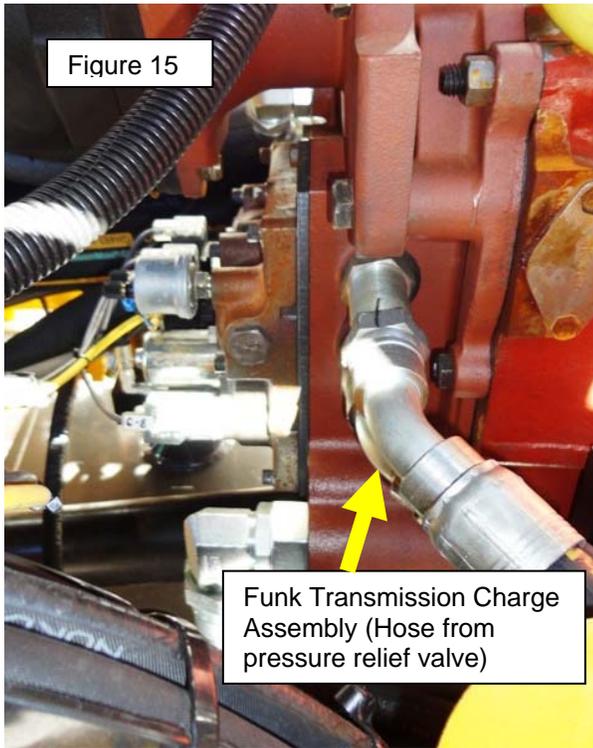
M7 Ballast/Snow Machine (Option) Left Side



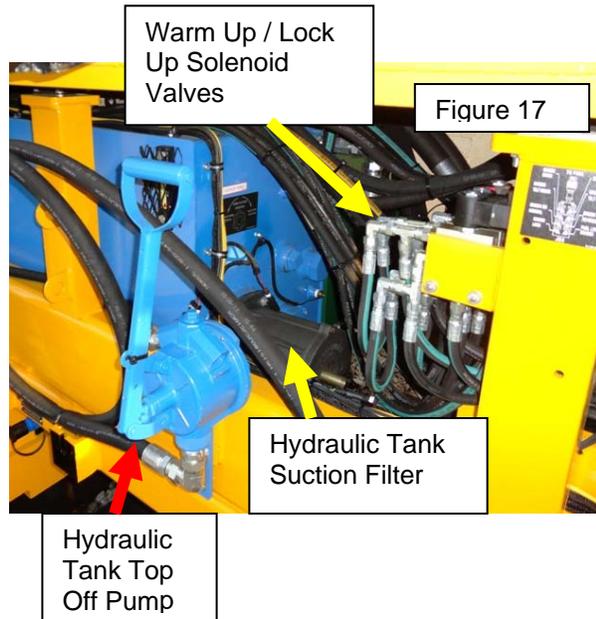
M7 Ballast Machine Right Side



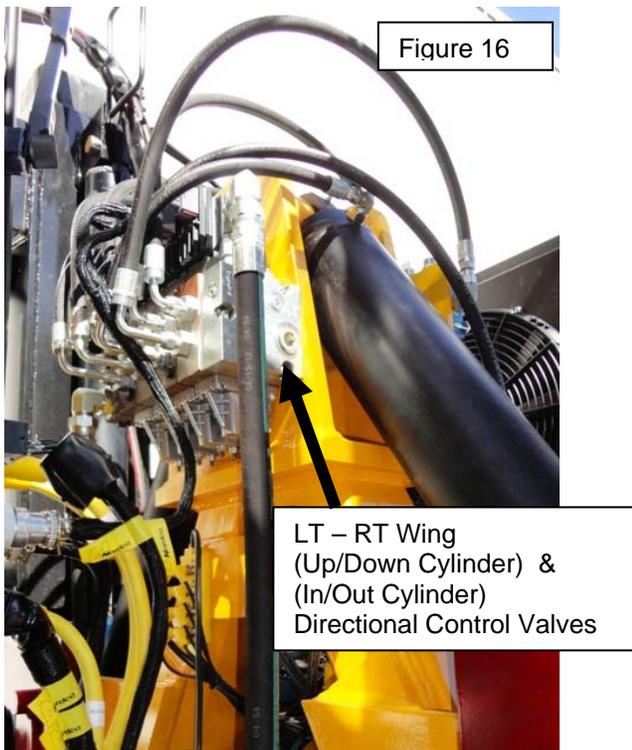
M7 Ballast Machine Right Side



M7 Ballast Machine Right Side



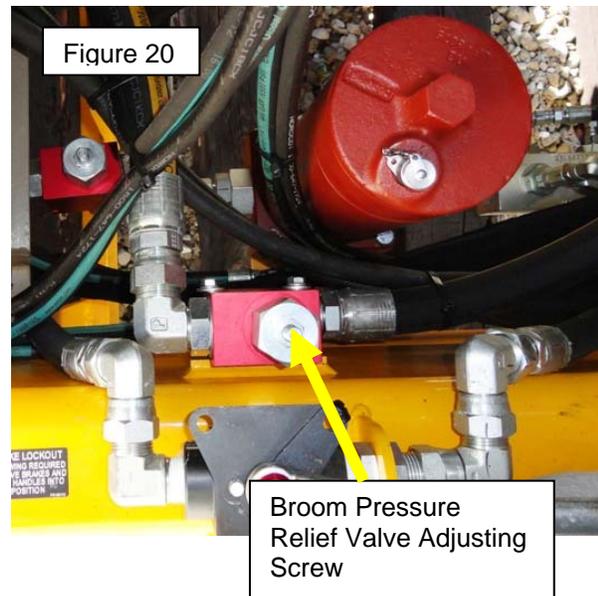
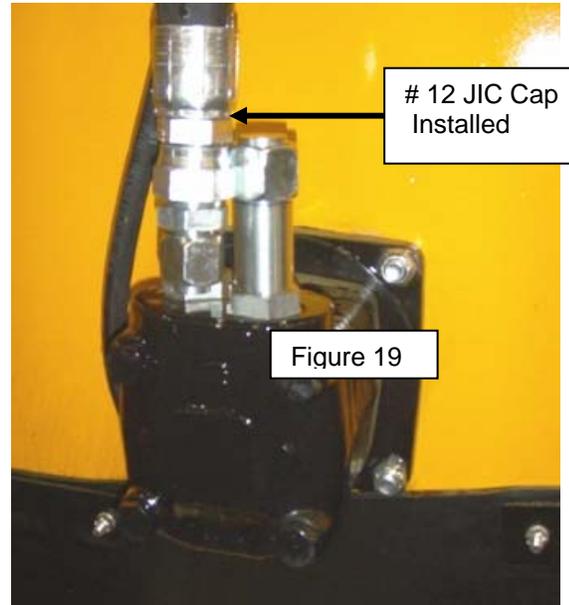
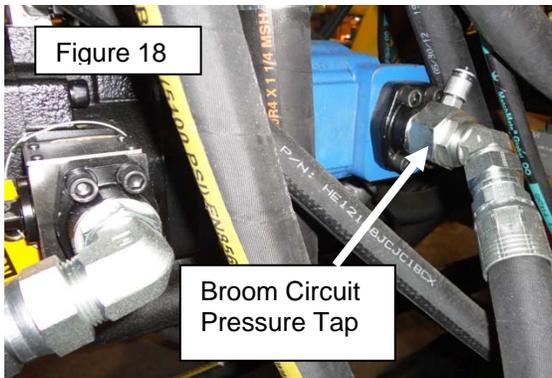
M7 Ballast Machine Right Side



Ballast Regular Hydraulic Instructions

Broom Circuit Pressure Relief Valve

1. Install a (0-3000 PSI) pressure gage on the pressure tap on broom pump (Figure 18).
2. Plug and cap off either hydraulic hose at broom hydraulic motor (Figure 19).
3. Start Engine, at the overhead console place the broom sweep switch in **ON** position, and read the pressure at the broom circuit pressure tap.
4. Loosen lock nut to the broom circuit relief valve adjusting screw (Figure 20).
5. If pressure is higher than 2900 psi, turn adjusting screw counterclockwise (CCW) until pressure reads 2900 psi. Hold adjusting screw at new location while tightening lock nut.
6. If pressure is lower than 2900 psi, turn adjusting screw clockwise (CW) until pressure reads 2900 psi.
7. Hold adjusting screw at new location while tightening lock nut.



Implement Pump Pressure Compensator

1. Install a pressure gage on the pressure tap on top of the pressure filter (Figure 21).
2. Start engine, put implement pump switch in **on** position, and read pressure.
3. If pressure is higher than 2500 psi, loosen the adjusting plug set screw (Figure 22), then turn adjusting plug counterclockwise (CCW) until pressure reads 2500 psi. Tighten set screw.
4. If pressure is lower than 2500 psi, loosen the adjusting plug set screw (Figure 22), then turn the adjusting plug clockwise (CW) until pressure reads 2500 psi. Install a pressure gage on the pressure tap on top of the pressure filter.
5. If the pressure compensator adjustment does not increase to 2500 psi the implement system relief valve may require adjustment/repair. The implement system relief is set to 2900 psi for proper operation.

THIS IS IMPLEMENT CIRCUIT PRESSURE!
 When adjusting Implement System Relief Valve always return Implement Pump Pressure Compensator back to 2500 psi.

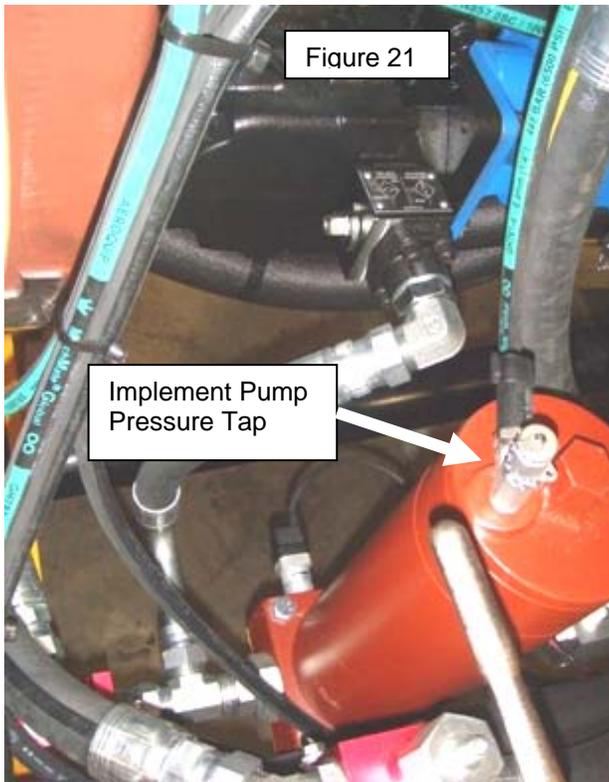


Figure 21

Implement Pump Pressure Tap

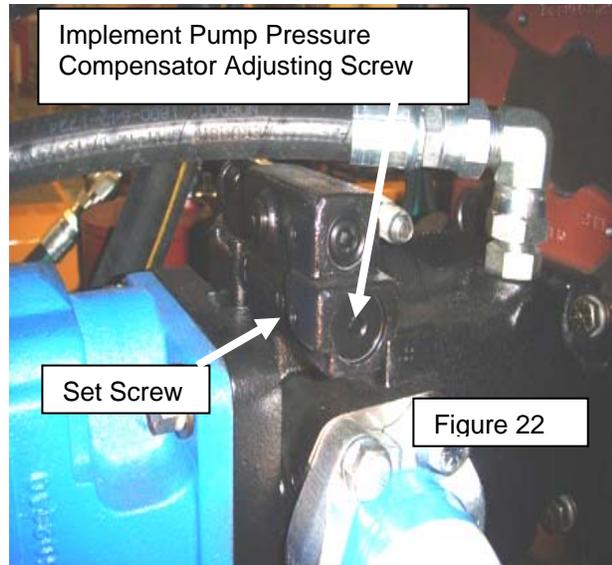


Figure 22

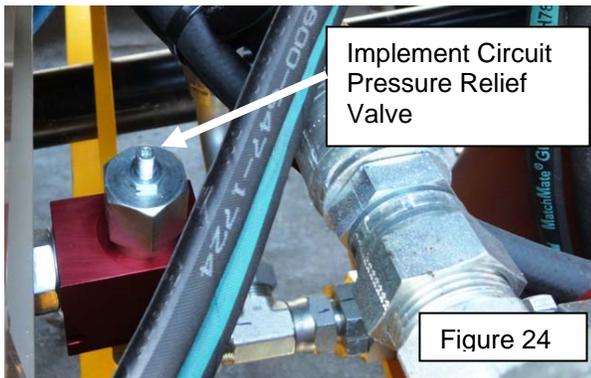
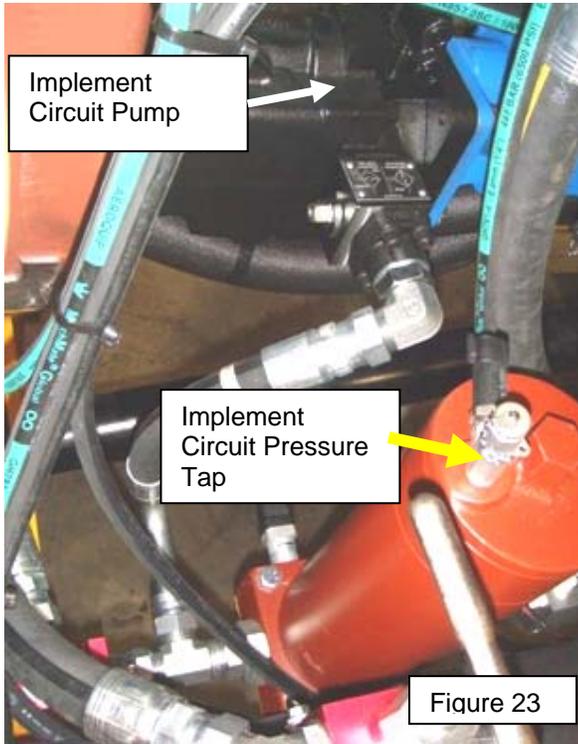
Set Screw

Implement Circuit Pressure Relief Valve

1. Install a pressure gage on the pressure tap on top of the pressure filter (Figure 23).
2. On the Implement Circuit Pressure Relief Valve (Figure 24) loosen the lock nut on relief valve adjusting screw and turn relief valve adjusting screw to full clockwise (CW) position (maximum pressure).
3. Loosen set screw to the implement pump compensator adjusting plug (Figure 22).
4. Turn pump compensator adjusting screw (figure 22) counterclockwise (CCW) (about 2-3 turns), but do not remove screw. Leave enough thread engagement to prevent leakage.
5. Start engine, put implement pump switch to **on** position.
6. Turn pump compensator adjusting screw (figure 22) clockwise (CW) until 2900 psi has been reached. Read this pressure at the pressure tap on top of the pressure filter.
7. Turn implement relief valve adjusting screw (figure 24) counterclockwise (CCW) until pressure at gauge just begins to drop. This is considered cracking pressure. Turn back 1/8 of a turn and tighten nut on valve.

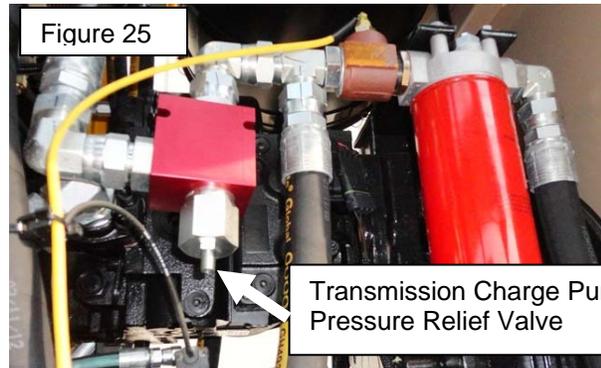
Return Implement Pump Compensating Pressure to 2500 psi.

THIS IS IMPLEMENT CIRCUIT PRESSURE!



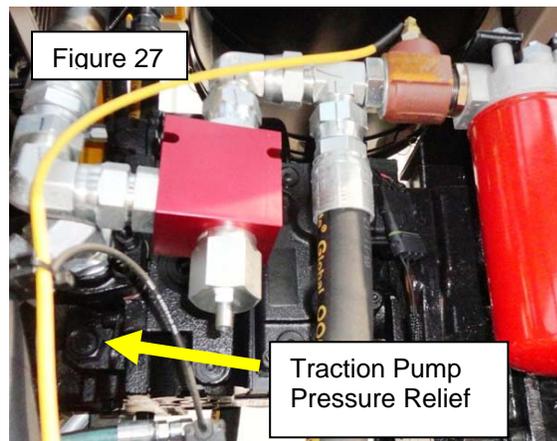
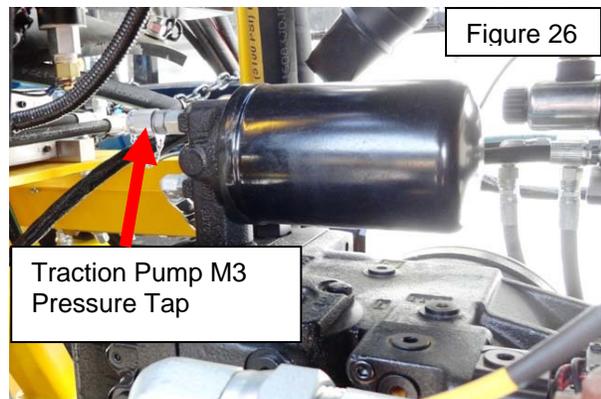
Transmission Charge Pump Pressure Relief Valve

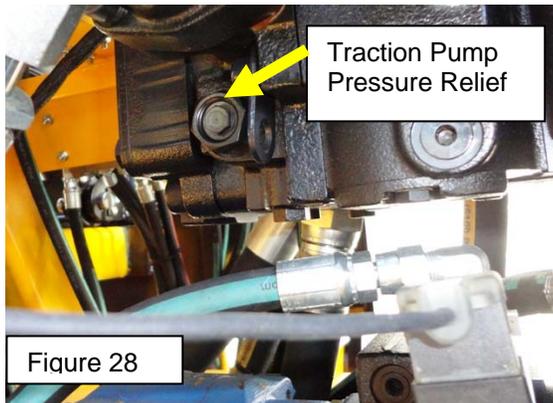
1. Start Engine, on the center control console check that the transmission control switch is in the NEUTRAL position. Read pressure at transmission pressure gage at overhead panel in operator cab, it should about 275 psi.
2. Loosen pressure relief adjusting screw lock nut (Figure 25) and turn pressure adjusting screw counterclockwise (CCW) until pressure reads under 200 psi.
3. Slowly turn adjusting screw clockwise (CW) until pressure reads 230 psi, **then** turn screw an additional two full turns clockwise and tighten lock nut.



Traction Pump Pressure Relief Valve

1. Install a pressure gage at the M3 Charge Pressure Filter assembly pressure port (figure 26).
2. If pressure is higher than 350 psi, turn pressure adjusting screw (figure 27 & 28) counterclockwise (CCW) until pressure reads 350 psi.
3. If pressure is lower than 350 psi, turn pressure adjusting screw (figure 27 & 28) clockwise (CW) until pressure reads 350 psi.



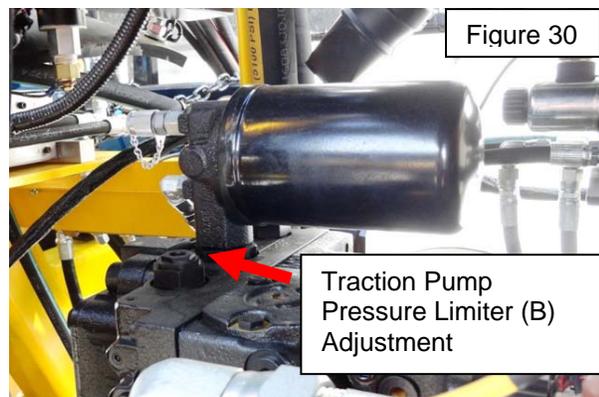
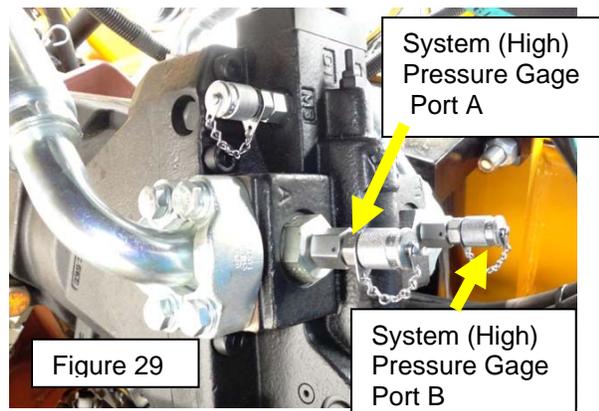


Traction Pump Pressure Limiter



1. All personnel need to be aware of safety concerns & their individual responsibility prior to proceeding.
2. The following procedure requires 2 or more persons to perform.
3. Verify that the plow, broom, and both wings are stored and in locked up position,
4. Using the turntable valve carefully raise the M7 until all FOUR wheels are off the rails a couple of inches.
5. Turn off engine
6. On the traction motor install 2 (10,000 psi) pressure gauges in SYSTEM (HIGH) PRESSURE GAUGE PORTS A & B (Figure 29).
7. On the center control console check that the parking brake is in (ON) position (PUSHED IN).
8. Start engine, on the center control console engage transmission clutch by pressing drive switch to the DRIVE position. Turn gear select switch to the 4th position. The engaged light LED should be lit.
9. Hold the engine speed switch in the UP position until maximum (high) rpms is reached.
10. Move the directional control forward all the way and check pressure at gages.

11. Pressure should be 5200psi on gage (A), if not, it can be reset by loosening lock nut to Traction Pump Limiter Adjustment (A) (Figure 30 & 31), and then turning internal adjusting screw. Clockwise increases pressure, counterclockwise decreases pressure.
12. Press the drive switch to NEUTRAL position.
13. Leave the gear select switch in 4th position. Press the drive switch to the DRIVE position. The engaged light LED should be lit.
14. Move the directional control rearward all the way and check pressure at gages.
15. Pressure should be 5200 psi on gage B, if not, it can be reset by loosening lock nut to Traction Pump Limiter Adjustment (B) (Figure 30 & 31), and then turning internal adjusting screw. Clockwise increases pressure, counterclockwise decreases pressure.



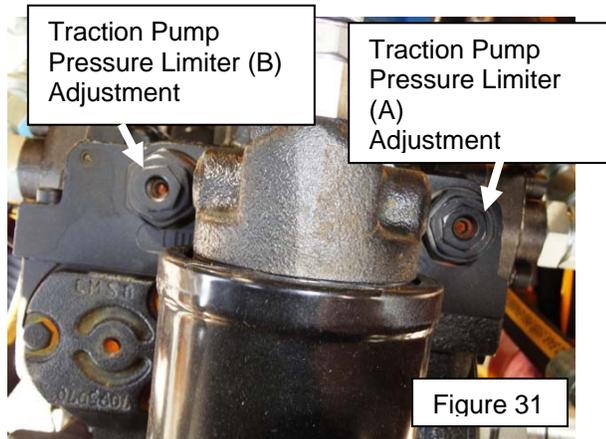


Figure 31

Traction Motor Pressure Compensator Override



1. All personnel need to be aware of safety concerns & their individual responsibility prior to proceeding.
2. The following procedure requires 2 or more persons to perform.
3. Verify that the plow, broom, and both wings are stored and in locked up position,
4. Using the turntable valve carefully raise the M7 until all FOUR wheels are off the rails a couple of inches.
5. Turn off engine.
6. Install 2 (10,000 psi) pressure gauges in SYSTEM (HIGH) PRESSURE GAUGE PORTS A & B (Figure 29).
7. Install a (10,000 psi) pressure gage in M4 port on motor (Figure 32).
8. On the center control console PULL the parking brake to the OFF position.
9. On the center control console engage transmission clutch by pressing drive switch to the DRIVE position. Turn gear select switch to the 4th position. The engaged light LED should be lit.
10. Hold the engine speed switch in the UP position until maximum (high) rpms is reached.

11. Move the directional control forward all the way to bring the wheel speed up to maximum, then apply brakes, and check pressure at gages.
12. Pressure should be 3750 psi on gage (A), if not, see pump pressure limiter adjustment. The motor threshold will climb from 0 to the same pressure as the pump pressure (gage A).
13. If not, an adjustment can be made on the motor by adjusting the bolt located on the top of the motor control block (figure 33).

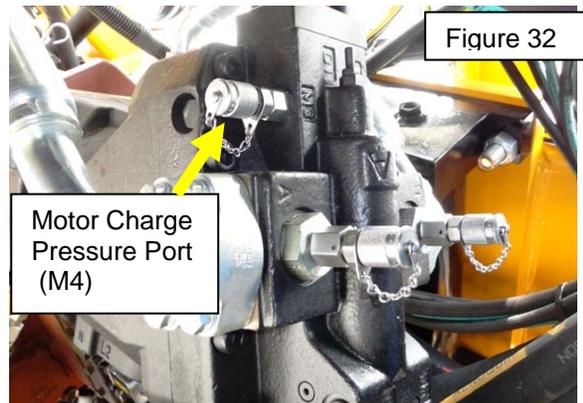


Figure 32

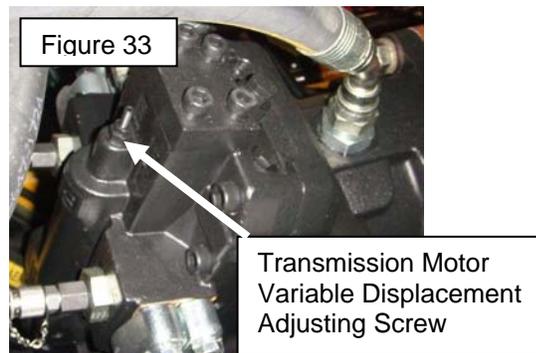
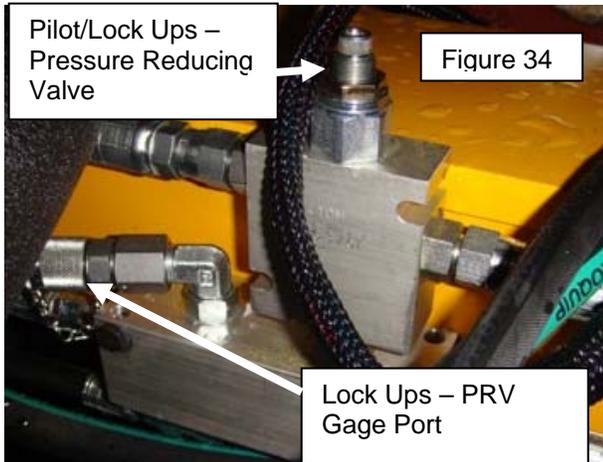


Figure 33

Pilot/Lock Up Pressure Reducing Valve

1. Install gage at pressure tap on Pilot/Lock Up Pressure Reducing Valve (Figure 34).
2. Turn on pump and read pressure.
3. If pressure is higher than 400 psi loosen pressure reducing adjusting screw lock nut (Figure 18), then turn the adjusting screw counterclockwise (CCW) until pressure reads 400 psi.
4. Tighten lock nut.
5. If pressure is lower than 400 psi loosen pressure relief adjusting screw lock nut (Figure 34), then turn adjusting screw clockwise (CW) until pressure reads 400 psi.
6. Tighten lock nut.

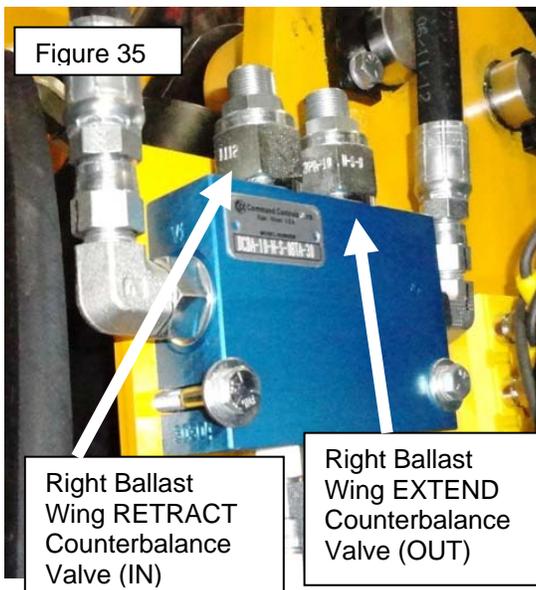
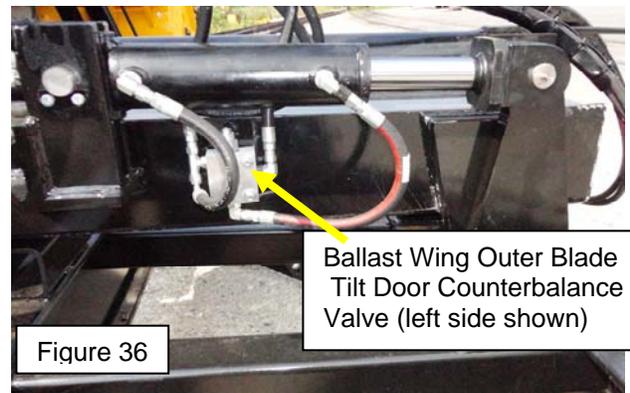


Lt/Rt Ballast Wing Outer Blade Tilt Door Counterbalance Valve

1. Ballast Wing Tilt Door cylinder should not drift in or out during operation or out when the machine is shut down.
2. To reset, start engine, turn on pump, loosen lock nut (Figure 36) and turn counterbalance valve adjusting screw clockwise (CW) all the way in. Then 1 ½ turns counterclockwise (CCW) back out.
3. Tighten lock nut.
4. If more adjustment is needed, adjust in ¼ turn increments.

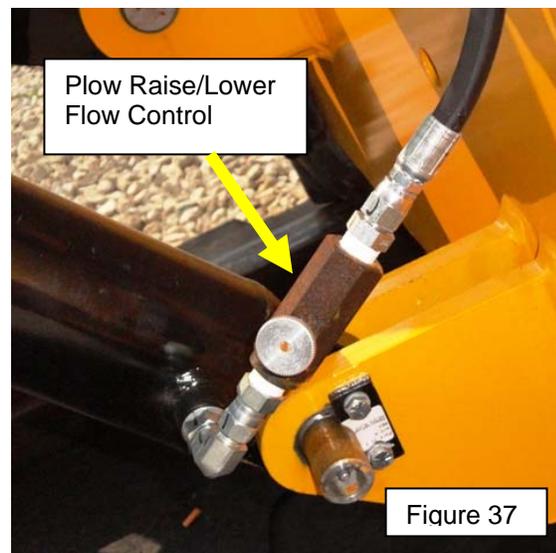
Lt/Rt Ballast Wing In/Out Cylinder Counterbalance Valve

1. The left or right Ballast Wing in/out cylinder should not drift in or out during operation or out when the machine is shut down.
2. To reset, start engine, turn on pump, loosen lock nut (Figure 35) and turn counterbalance valve adjusting screw clockwise (CW) all the way in. Then 1 ½ turns counterclockwise (CCW) back out.
3. Tighten lock nut.
4. If more adjustment is needed, adjust in ¼ turn increments.



Plow Raise/Lower Flow control

The Front Plow Raise/Lower Flow Valve (Figure 37) controls the speed at which the plow lowers. Reset by turning adjusting screw all the way in clockwise (CW) and then turning back out counterclockwise (CCW) 1 and a ½ turns.

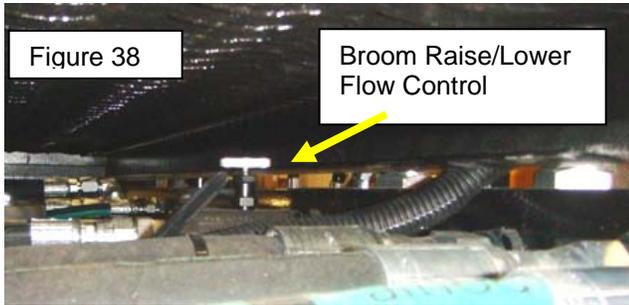


HYDRAULIC

M7 Ballast Regulator/Snow Fighter

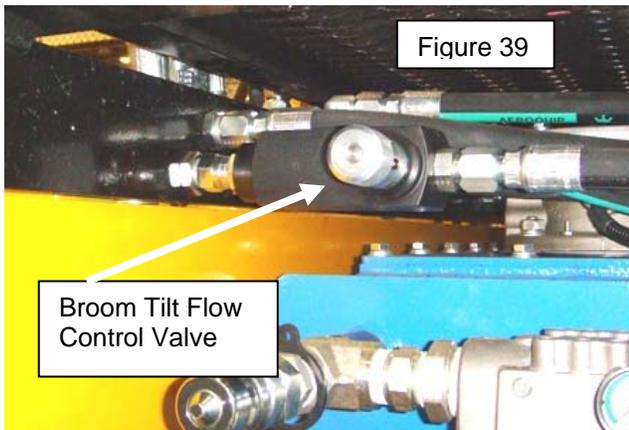
Broom Raise/Lower Flow Control Valve

Broom Raise/Lower Flow Control Valve is located on left side of machine, located above fuel tank/ under cab entry walkway (Figure 38). Controls the speed at which the broom lowers. Reset by turning adjusting screw all the way in clockwise (CW) and then turning back out counterclockwise (CCW) 2 full turns.



Broom Tilt Flow Control Valve

Broom Tilt Flow Control Valve is located on right side of machine, located above hydraulic tank/ under cab entry walkway (figure 39). Controls the speed at which the broom lowers. Reset by turning adjusting screw all the way in clockwise (CW) and then turning back out counterclockwise (CCW) 1 and ½ turns.

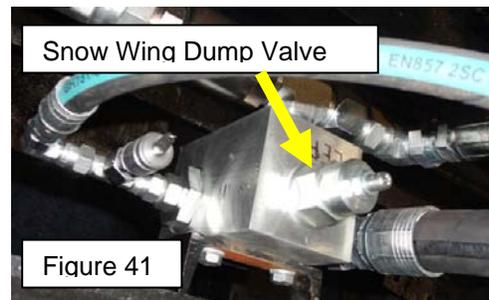
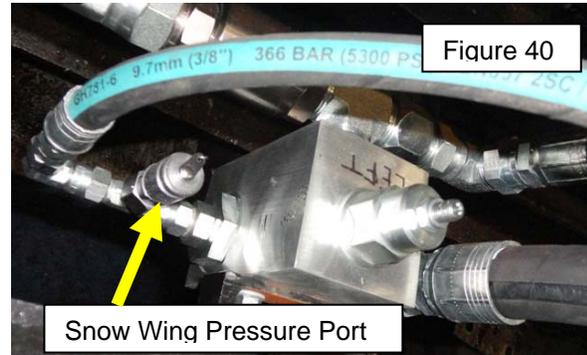


Snow Wings Hydraulic Adjustments

Snow Wing Dump Valve

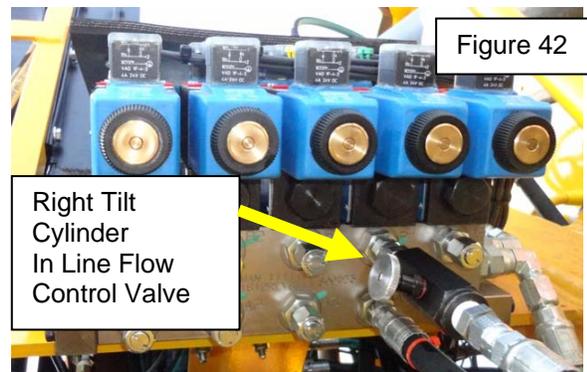
1. Install a pressure gage on the snow wing pressure port (Figure 40).
2. Extend snow wing out from machine and read pressure at end of cylinder stroke.

3. If pressure is higher than 2000 psi, loosen snow wing dump valve adjusting screw lock nut (Figure 41) and turn adjusting screw counterclockwise (CCW) until pressure reads 2000 psi.
4. If pressure is lower than 2000 psi, loosen snow wing dump valve adjusting screw lock nut (Figure 41) and turn adjusting screw clockwise (CW) until pressure reads 2000 psi.
6. Tighten lock nut and remove the pressure gage.



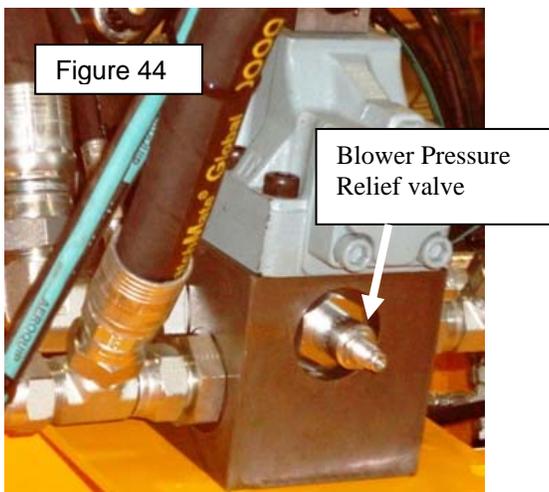
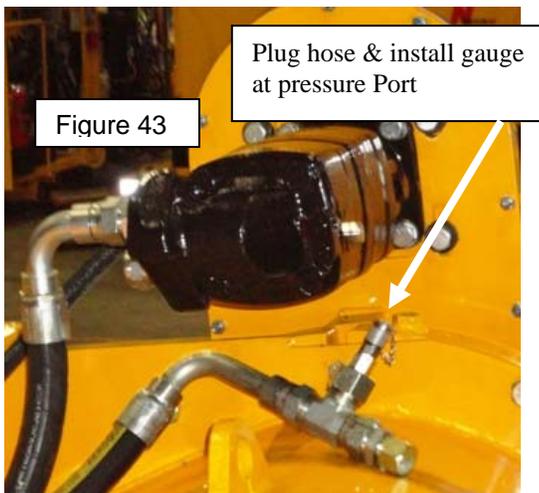
Rt/Lt Snow Wing (Blade Tilt Cylinder) Flow Control Valve

Rt/Lt Snow Wing (Blade Tilt Cylinder) Flow Control Valve controls the speed at which the snow wing tilts in/out (Figure 42) (adjust if there is jerking motion) Set cylinder travel speed by turning adjusting screw in clockwise (CW) to slow down and turn out counterclockwise (CCW) to speed up .



Blower Pressure Relief Valve

1. Remove and plug top right hydraulic line going to blower hydraulic motor (Figure 43) and install a pressure gage to the #12 female fitting (Figure 43).
2. Start engine, turn on blower sweep switch and read pressure.
3. If pressure is higher than 2600 psi loosen pressure relief adjusting screw lock nut (Figure 44) 3 and then turn adjusting screw counterclockwise (CCW) until pressure reads 2600 psi.
4. If pressure is lower than 2600 psi loosen pressure relief adjusting screw lock nut (figure 44), then turn adjusting screw clockwise (CW) until pressure reads 2600 psi.
5. Tighten lock nut.
6. Remove gage and reattach hose to blower valve.



Emergency Pump Pressure Relief Valve

This will require, one person to operate controls and switches in cab & another person to read gauge and adjust emergency pump.

Emergency pump (figure 45) is located on right side of machine behind the diesel engine on the inside of the frame.

1. Install a pressure gage (0-3000 psi) at pressure tap on the top of the pressure filter (Figure 46).
2. Turn the implement pump ball valve to closed position (Figure 47) (Indicator line on ball valve off) will be perpendicular to flow in the pressure line.
3. At the overhead console make certain the following switches are in the OFF position:
 - A. Warm Up
 - B. Snow Auger (If equipped)
 - C. Broom

Having these switches ON puts additional stresses on the pump, only one circuit at a time can be used.

4. Turn ignition switch to the ON position to activate controls.
5. Place emergency pump switch on the overhead in the ON position and push left joystick controller forward to retract the left wing into it's rest. Read maximum hydraulic pressure reached.

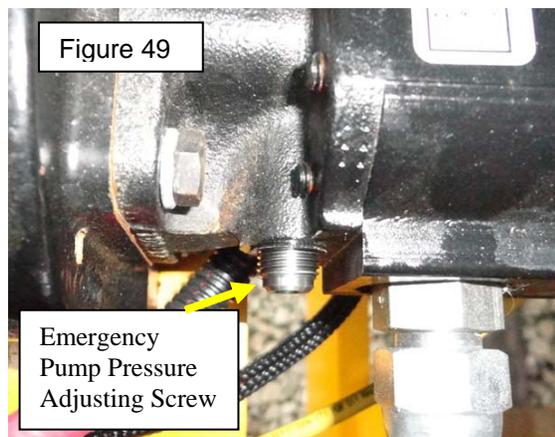
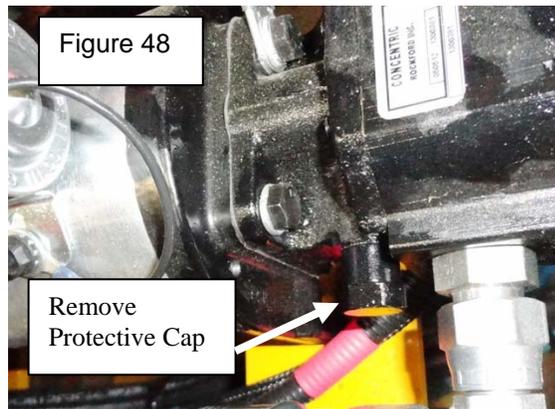
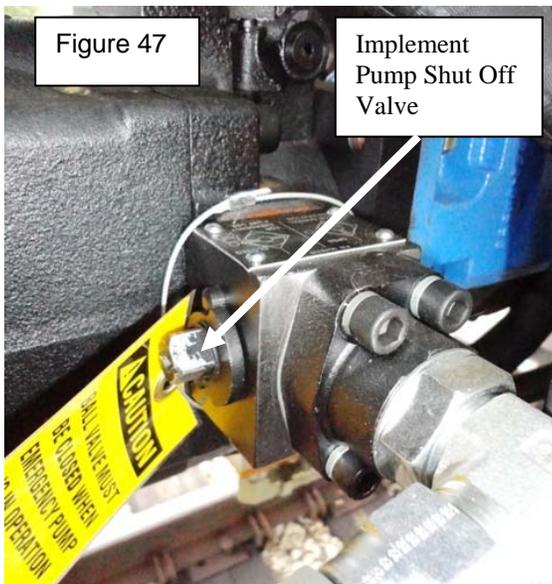
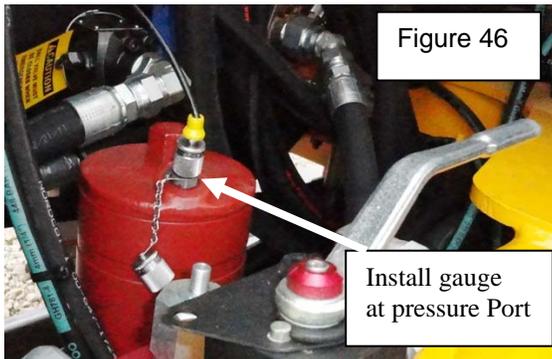
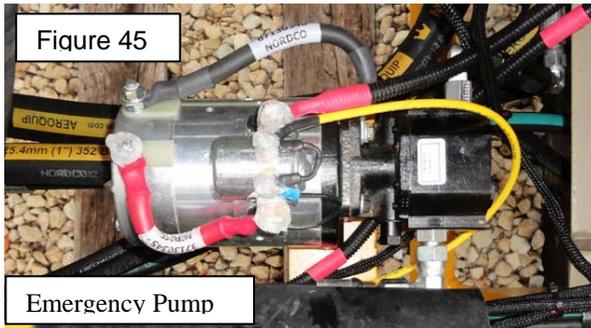


Operate the 24 volt emergency pump in intervals for a maximum of 30 seconds to one minute, and then let electric motor cool for one minute before using again.

The 24 volt emergency pump is designed for emergency use ONLY and is NOT to be run continuously.

6. If pressure is higher than 2250 psi remove protective cap (figure 48) and turn adjusting screw counterclockwise (figure 50) (CCW) to decrease pressure.
7. Repeat test and if ok install protective cap.
8. If pressure is lower than 2250 psi remove protective cap (figure 48) and turn adjusting screw clockwise (figure 49) (CW) to increase pressure.

9. Repeat test and if ok install protective cap.
10. When finished and before turning on implement hydraulic pump, open the main pump ball valve (Figure 47) (Indicator line on shut off) will be in line to flow.



HYDRAULIC RESERVOIR

Oil Level

Inspect the oil level on a daily basis (or every 10 hours of operation) by reading the sight gauge located on the left side of the reservoir. At full level, the oil should be to the top of the sight gauge. The M7 hydraulic system uses SAE-20 (ISO 46) oil (UNLESS OTHERWISE STENCILLED ON THE HYDRAULIC TANK). See recommend lubricants in the maintenance section of this manual. Before filling the system with hydraulic oil, be sure that the fluid is as specified and that it is clean. Do not use cloth strainers or fluid that has been stored in contaminated containers.

Inspection of Oil

Care should be taken to keep the hydraulic oil free of dust, water, sealing compounds and other foreign matter. While using the sight gauge, verify oil quality. If oil becomes dark or milky colored, it should be changed as soon as possible.

NOTE: Never add hydraulic oil to reservoir by any other means than through a manual/electric pump and filter.

NEVER OVERFILL RESERVOIR.

Never use hydraulic brake fluid in lieu of hydraulic oil.

Suction Line Filter

This machine is equipped with a lockout device as a replacement for a handle on the suction strainer. This lockout prevents the valve from being opened or closed without the operator's knowledge.

The suction line strainer is located on the reservoir, remove and inspect the filter after the first 40 hours of operation and refer to Hydraulic Component Maintenance Schedule inspection for designated intervals.

To access suction line filter cartridge:

1. Turn off engine.
2. Remove Lock out device & plug.
3. Turn internal socket head cap screw out counterclockwise (OUT) till it stops.

Do not try removing screw!

4. Remove the six front cover cap screws and lift off the front cover.
5. Remove and clean suction line strainer.
6. When suction line strainer is cleaned reinstall.
7. Install front cover and six cap screws.
8. Turn suction line socket head lock screw clockwise (IN) till it stops.
9. Replace the plug.
10. Put padlock (Lockout) back on.

If for any reason removal of suction line filter for any length of time necessary, you must seal the hydraulic tank to prevent external contamination.

Contamination on the outlet side of the filters can be flushed into the system and cause malfunctions. Contamination on the inlet side reduces the life of the filter element.

Hydraulic Warm Up Valve

The warm up valve (figure 50) is installed on the M7 as an option where the machine may be exposed to cold conditions to aid in bringing the hydraulic oil in the reservoir to operating temperature.



The M7 should not be put into High speed or high pressure operation UNTILL the hydraulic fluid is warmed up to operational temperature (above 70 degrees Fahrenheit).

Use the level / temperature gauge mounted on the reservoir's right side to check hydraulic oil temperature (figure 51).

The following conditions will occur:

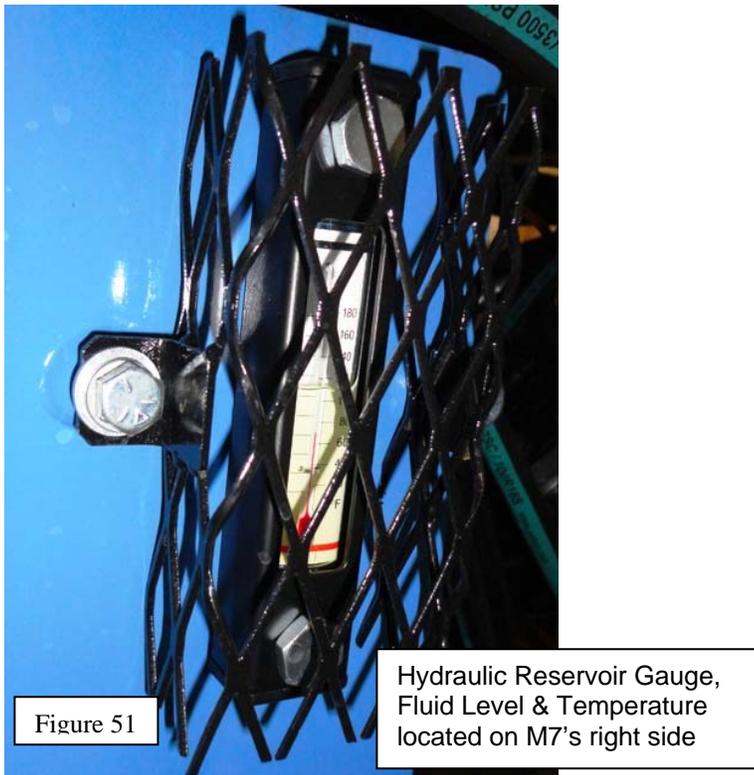
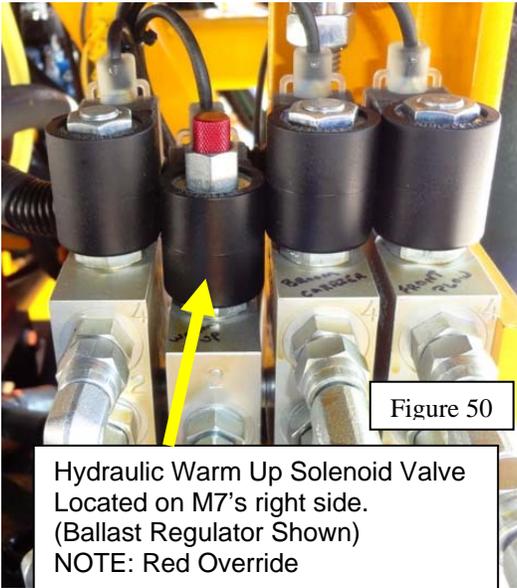
Pump cavitation – at lower temperatures the oil is too viscous (thicker) to easily flow into the pump inlet.

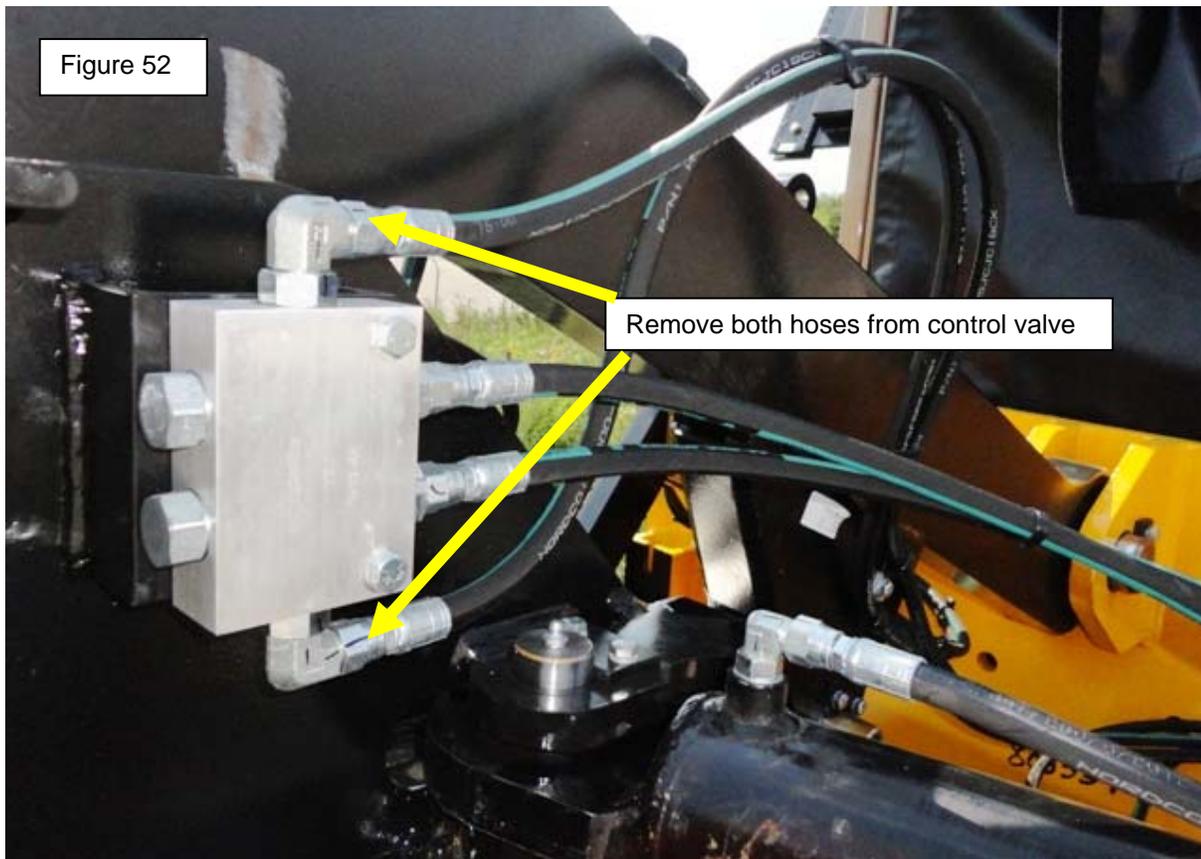
There will be slow / sluggish operation of hydraulic components. Lubrication of hydraulic internal components will be reduced.

Filters will be by passing because of the higher back pressure to flow. Thus contamination will not be removed until the temperature of the oil is at operational temperature.

1. When the M7 has been sitting (not operated) in temperatures below 32 degrees Fahrenheit / 0 degrees Celsius.
2. Start the engine
3. Located on the overhead console place the hydraulic warm up switch in the ON position.
4. Turn on the implement pump.

- When the oil in the reservoir reaches 70 degrees (use gauge shown in figure 51) Fahrenheit turn OFF the Hydraulic Warm Switch.
- At temperatures below 32 degrees Fahrenheit / 0 degrees Celsius, continue to observe the hydraulic fluid temperature through out the work day and while the machine is idle.

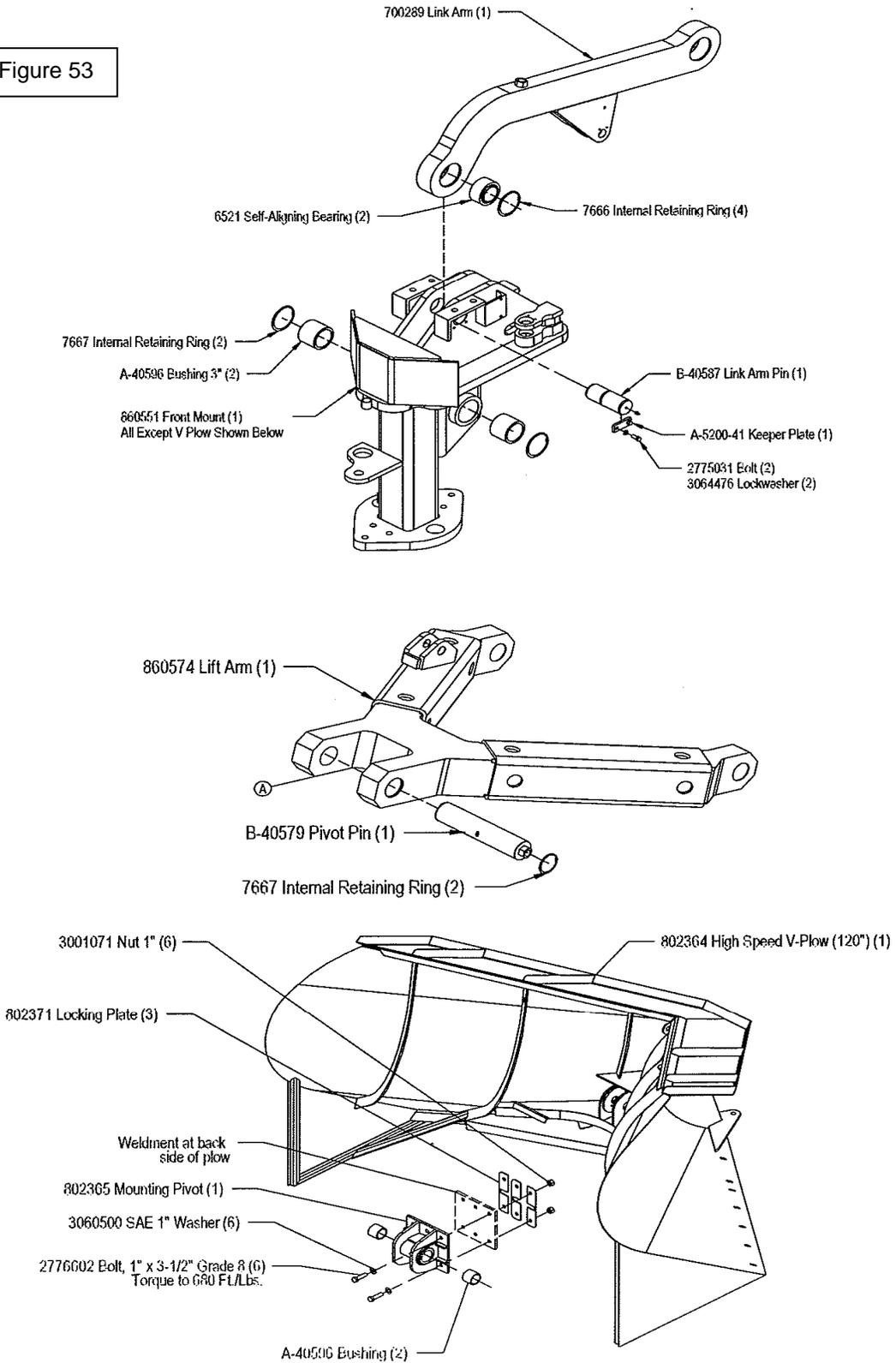


PLOW ASSEMBLY (Moveable Blades) HOSE CONNECTIONS

1. When changing from a moveable blade plow assembly (ballast or curl) to install the one piece snow V plow without the moveable blades, do the following procedures while referring to figure 52 & 53.
2. Lower the ballast plow assembly until it is just resting on the ground prior.
3. Follow all of your company's lock out/tag out rules before proceeding.
4. Before removing hoses from right/left plow blade check valves, label hoses and their valve fittings so the hoses can be reinstalled with ease at a latter date.
5. Carefully open each hose fittings (1/8 – 1/4) of a turn counterclockwise (CCW) to allow pressurize oil to bleed off that may be trapped between the check valve and the directional control valve. Finish removing each hose after the steady flow of hydraulic oil is gone.
6. Install hydraulic JIC plugs into the hose ends to prevent hydraulic oil leaks during snow operation. Cap off the two fittings on both plow blade check valves to keep contamination from entering into the system.
7. Tie wrap the disconnected hoses and secure out of the way during Snow V Plow operation.

PLOW ATTACHMENT PINS

Figure 53



Removal procedure for Right Ballast Wing

Before removing Right Ballast Wing Assembly:



Hydraulic oil operates under extreme pressure, and can become very hot, so use caution when opening the hydraulic system for maintenance or repair.

Hydraulic hoses have a steel wire(s) or spiral braiding reinforcing jacket underneath the outer cover, and when exposed, they can cause nasty cuts or abrasions.

1. Run the Right Ballast Wing Assembly and check that all components work.
2. Turn off machine and walk around the M7 and check and inspect the Right Ballast Wing Assembly that is being removed for:
 - a. Oil leaks,
 - b. Damage or leaks at cylinders
 - c. Hydraulic hoses for kinks, age, exposure, cracked, and if the braided or wires are showing.
 - d. Worn or broken component parts
3. Fix damage components

Removal of Right Ballast Wing Assembly:

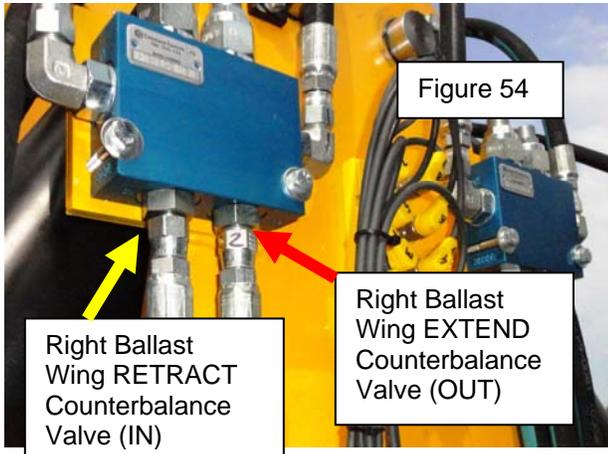
1. Start engine and lower the right ballast wing assembly till it is resting on the ground.
2. Turn off the engine, check that park brake is on.
3. Follow all of your company's lock out/tag out rules before proceeding.
4. You will be taking off hoses at the right counterbalance valve (figure 54) and the right wing valve (figures 57, 60, & 62). Keep track of each hose and fitting before removing (example of a method shown in figure 56). So later, each hose is will be installed at the right fitting.
5. Be aware that some hydraulic oil may leak from connections, and the oil that is remaining in the hose will also dump out, so having a bucket handy to catch the hydraulic oil is a good idea.

6. Carefully open each hose fitting (1/8 – 1/4) of a turn counterclockwise (CCW) to allow pressurize oil to bleed off that may be trapped in the hydraulic circuit.
7. Finish removing each hose after the steady flow of hydraulic oil is gone.
8. Install hydraulic JIC plugs into the hose ends to keep contamination from entering into the Ballast Broom hydraulic system.
9. Cap off the valve fittings (example shown figure 57) to keep contamination from entering into the M7's hydraulic circuit & to prevent hydraulic oil leaks during machine operation if that valve section is not used on the attachment being installed.
10. Use proper lifting device capable of supporting, raising, and moving the Snow Broom/Blower Assembly.
11. Remove the right ballast wing attaching pins (see figures 63).
12. Check all the pins and bushes for wear / damage.
13. Check pin attachment points for cracks / wear.
14. Use proper lifting device move the right ballast wing assembly.

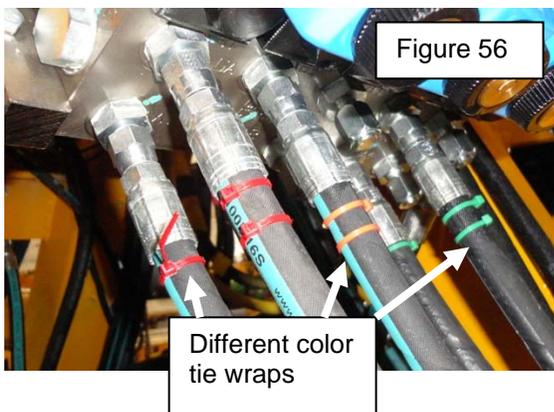
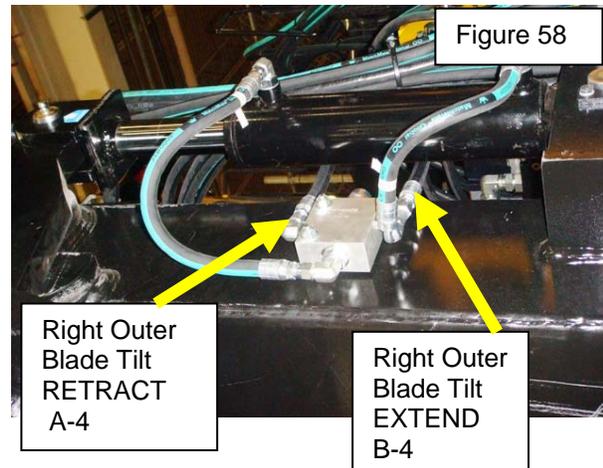
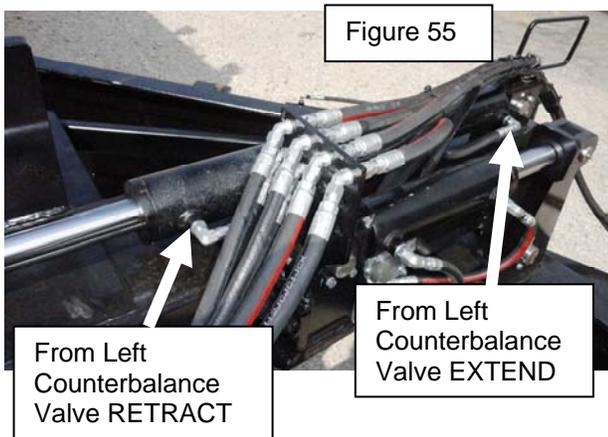
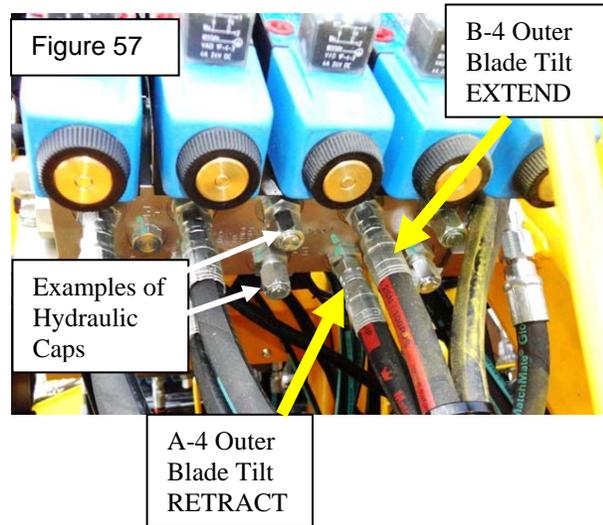
Installation of Right Ballast Wing Assembly:

1. Before installation inspect the right ballast wing for:
 - a. Oil leaks,
 - b. Damage or leaks at cylinders
 - c. Hydraulic hoses for kinks, age, exposure, cracked, and if the braided or wires are showing.
 - d. Worn or broken component parts
2. Fix damage components
3. Reverse the procedures listed (items 14 thru 1).

Right Ballast Wing (IN/OUT) Cylinder Counterbalance Valve



Right Ballast Wing (OUTER BLADE TILT) Cylinder



Right Ballast Wing (Front Template Door) Cylinder

Figure 59

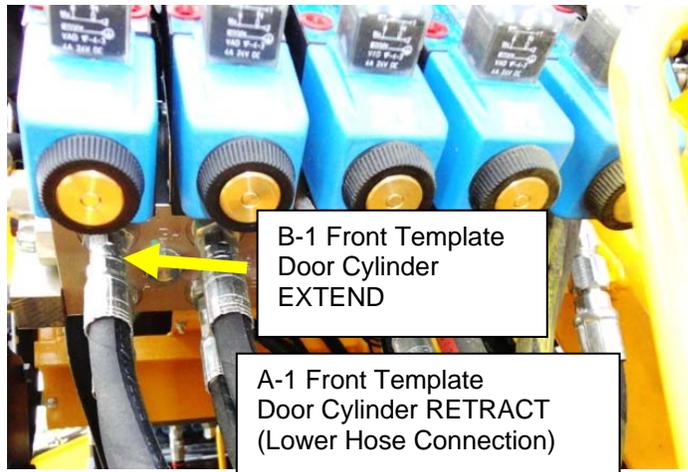
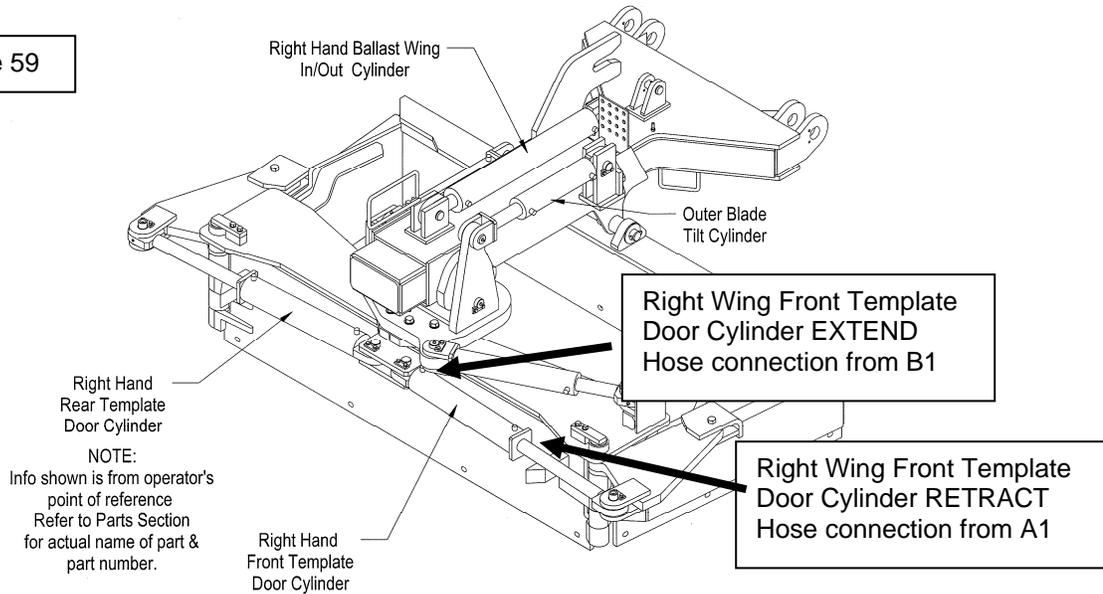
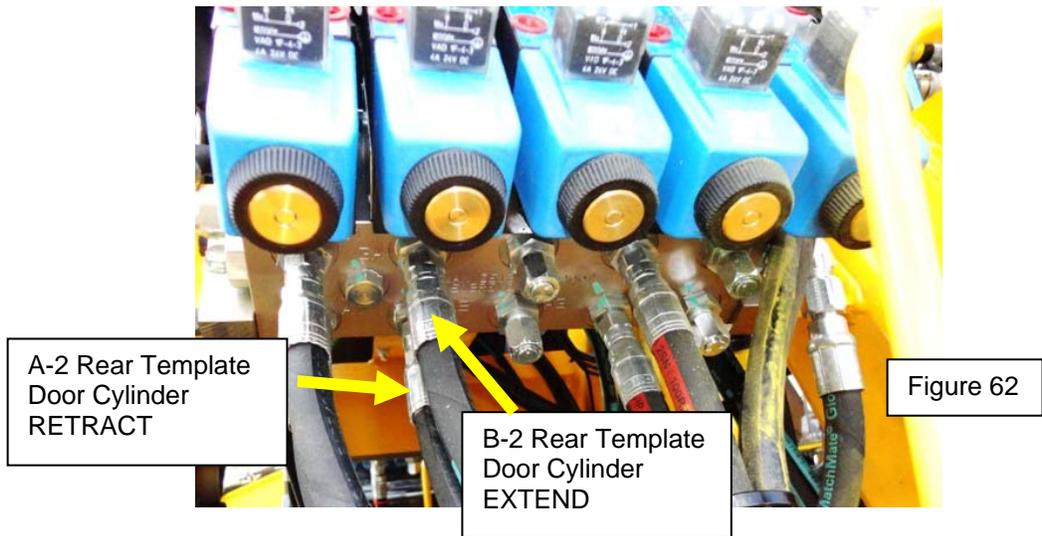
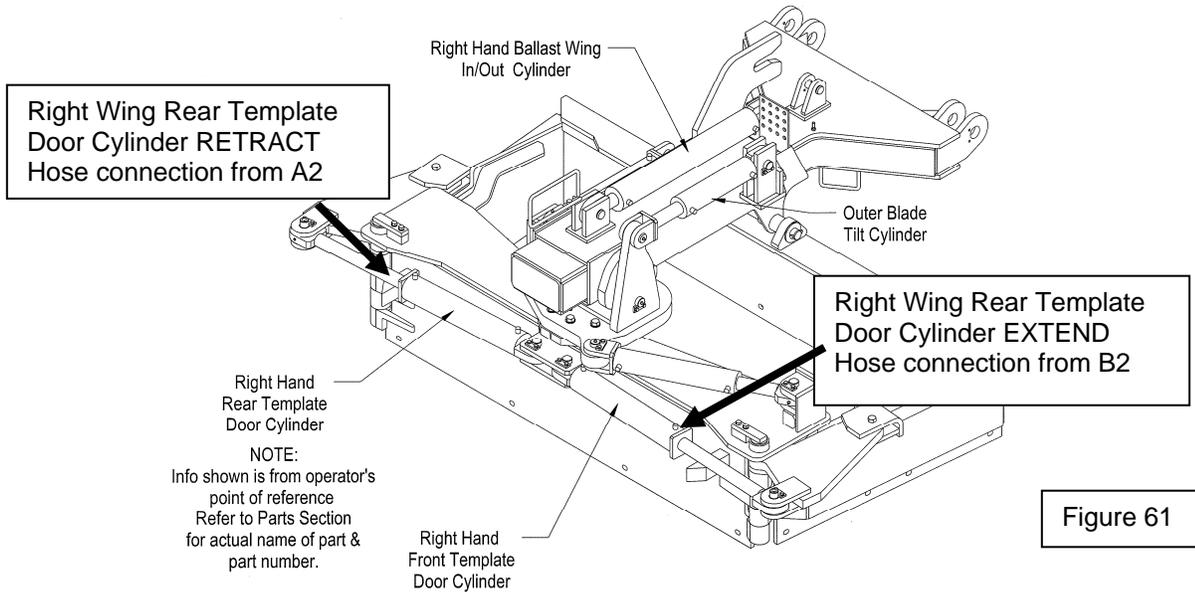
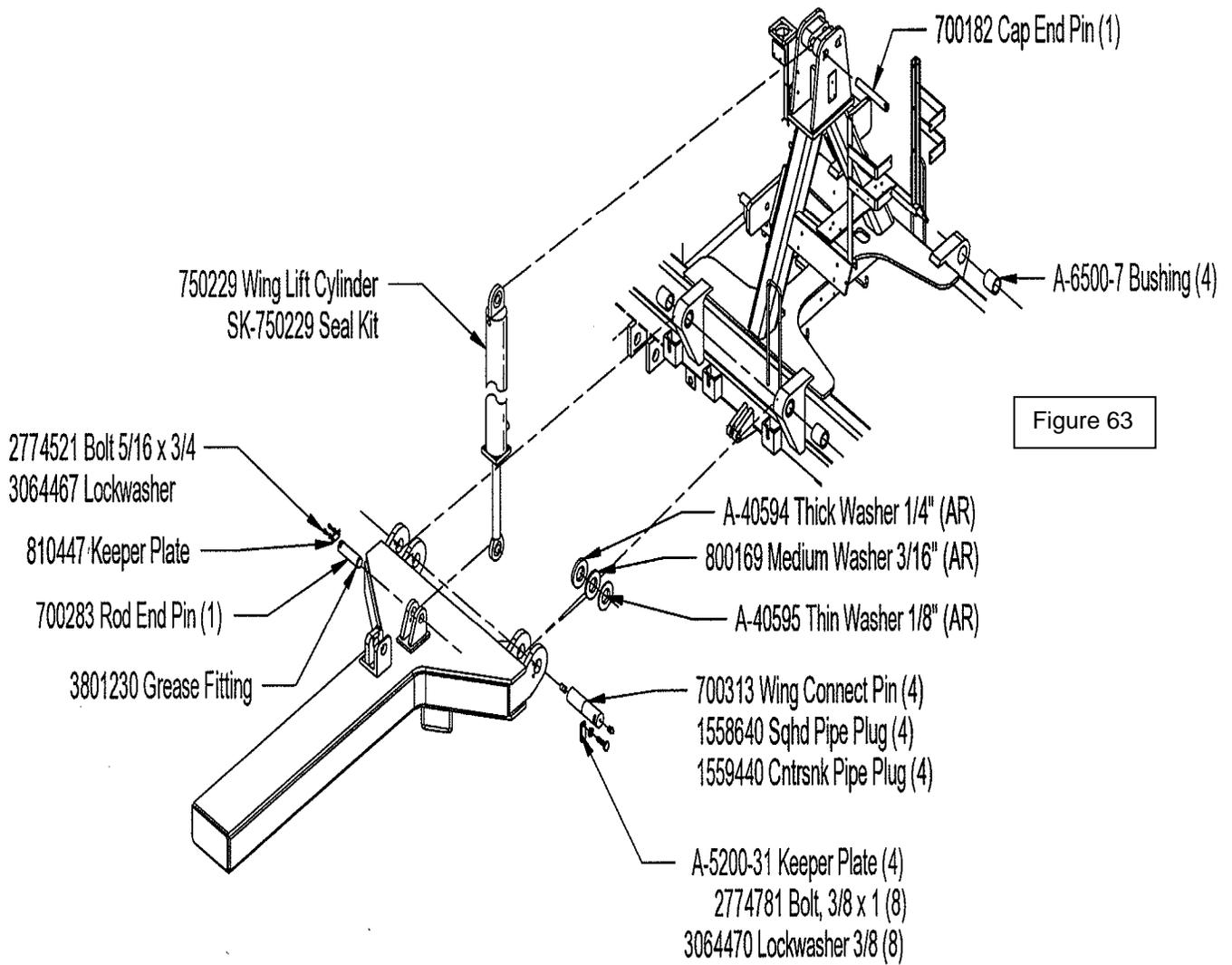


Figure 60

Right Ballast Wing (Rear Template Door) Cylinder



BALLAST WINGS ATTACHMENT PINS



Removal procedure for Right Snow Wing

Before removing Right Snow Wing Assembly:



Hydraulic oil operates under extreme pressure, and can become very hot, so use caution when opening the hydraulic system for maintenance or repair.

Hydraulic hoses have a steel wire(s) or spiral braiding reinforcing jacket underneath the outer cover, and when exposed, they can cause nasty cuts or abrasions.

1. Run the Right Snow Wing Assembly and check that all components work.
2. Turn off machine and walk around the M7 and check and inspect the Right Snow Wing Assembly that is being removed for:
 - a. Oil leaks,
 - b. Damage or leaks at cylinders
 - c. Hydraulic hoses for kinks, age, exposure, cracked, and if the braided or wires are showing.
 - d. Worn or broken component parts
3. Fix damage components

Removal of Right Snow Wing Assembly:

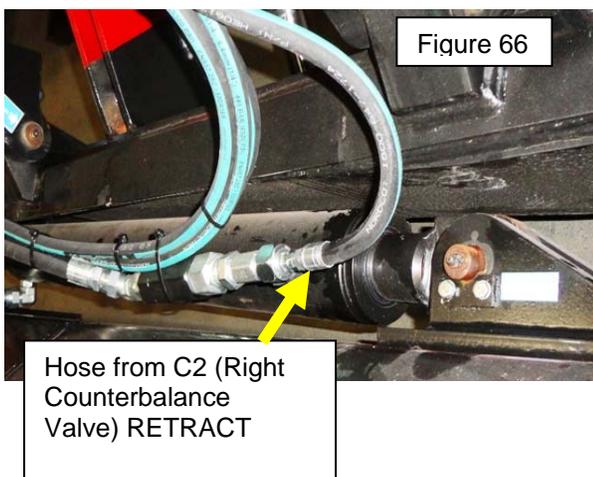
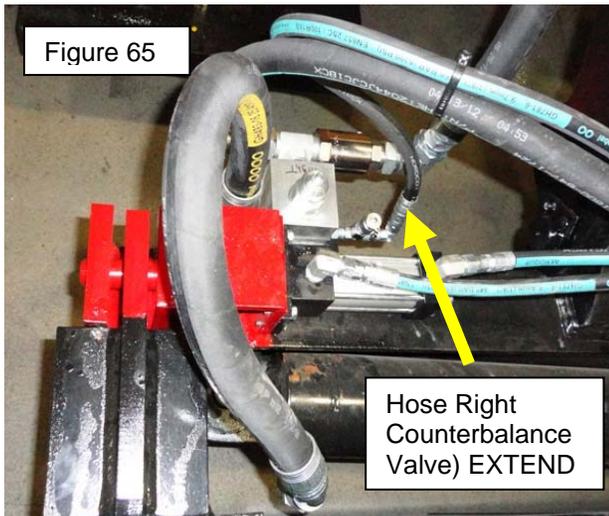
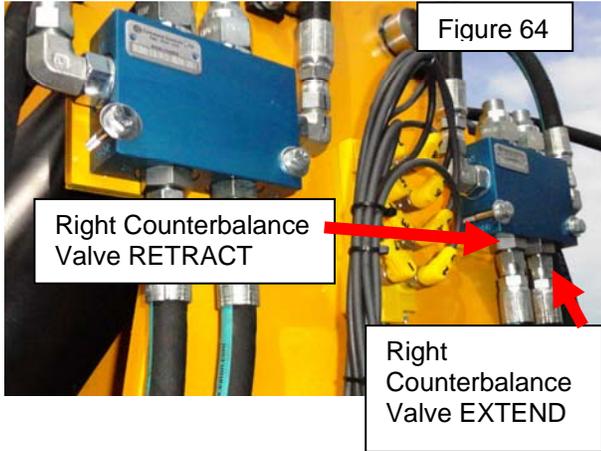
1. Start engine and lower the right snow wing assembly till it is resting on the ground.
2. Turn off the engine, check that park brake is on.
3. Follow all of your company's lock out/tag out rules before proceeding.
4. You will be taking off hoses at right counterbalance valve and the right wing valve (figures 64 & 67). Mark each hose and fitting before removing so later, each hose is will be installed at the right fitting.

5. Be aware that some hydraulic oil may leak from connections, and the oil that is remaining in the hose will also dump out, so having a bucket handy to catch the hydraulic oil is a good idea.
6. Carefully open each hose fitting (1/8 – 1/4) of a turn counterclockwise (CCW) to allow pressurize oil to bleed off that may be trapped in the hydraulic circuit.
7. Finish removing each hose after the steady flow of hydraulic oil is gone.
8. Install hydraulic JIC plugs into the hose ends to keep contamination from entering into the Ballast Broom hydraulic system.
9. Cap off the valve fittings to keep contamination from entering into the M7's hydraulic circuit & to prevent hydraulic oil leaks during machine operation if that valve section is not used on the attachment being installed.
10. Use proper lifting device capable of supporting, raising, and moving the Snow Broom/Blower Assembly.
11. Remove the right snow wing attaching pins (figures 69).
12. Check all the pins and bushes for wear / damage.
13. Check pin attachment points for cracks / wear.
14. Use proper lifting device move the Right Snow Wing Assembly.

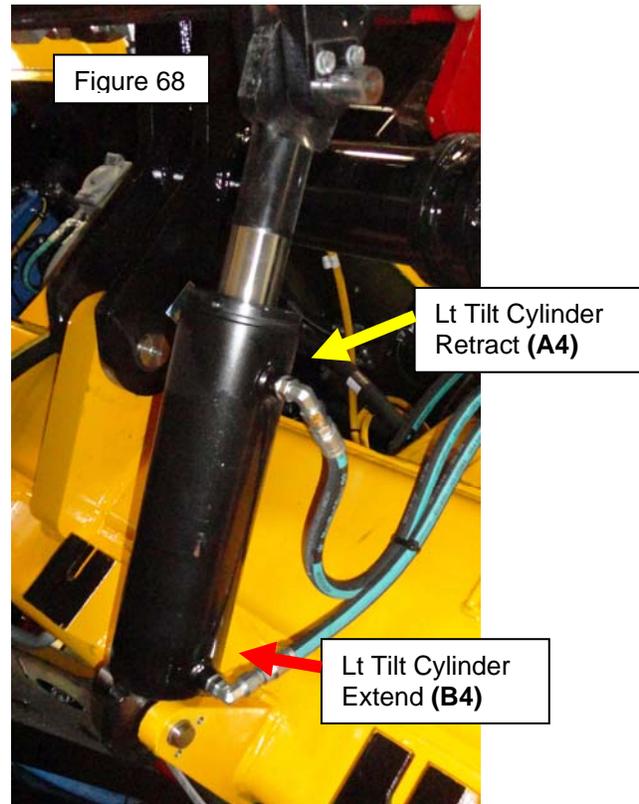
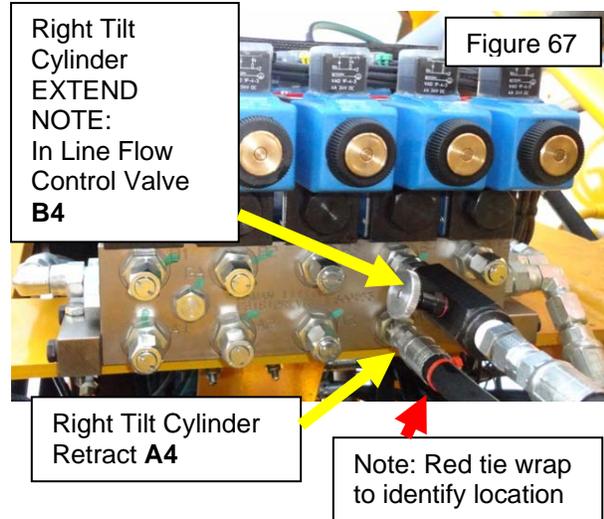
Installation of Right Ballast Wing Assembly:

1. Before installation inspect the Ballast Broom for:
 - a. Oil leaks,
 - b. Damage or leaks at cylinders
 - c. Hydraulic hoses for kinks, age, exposure, cracked, and if the braided or wires are showing.
 - d. Worn or broken component parts
2. Fix damage components
3. Reverse the procedures listed (items 14 thru 1).

Right Snow Wing (In/Out Cylinder)

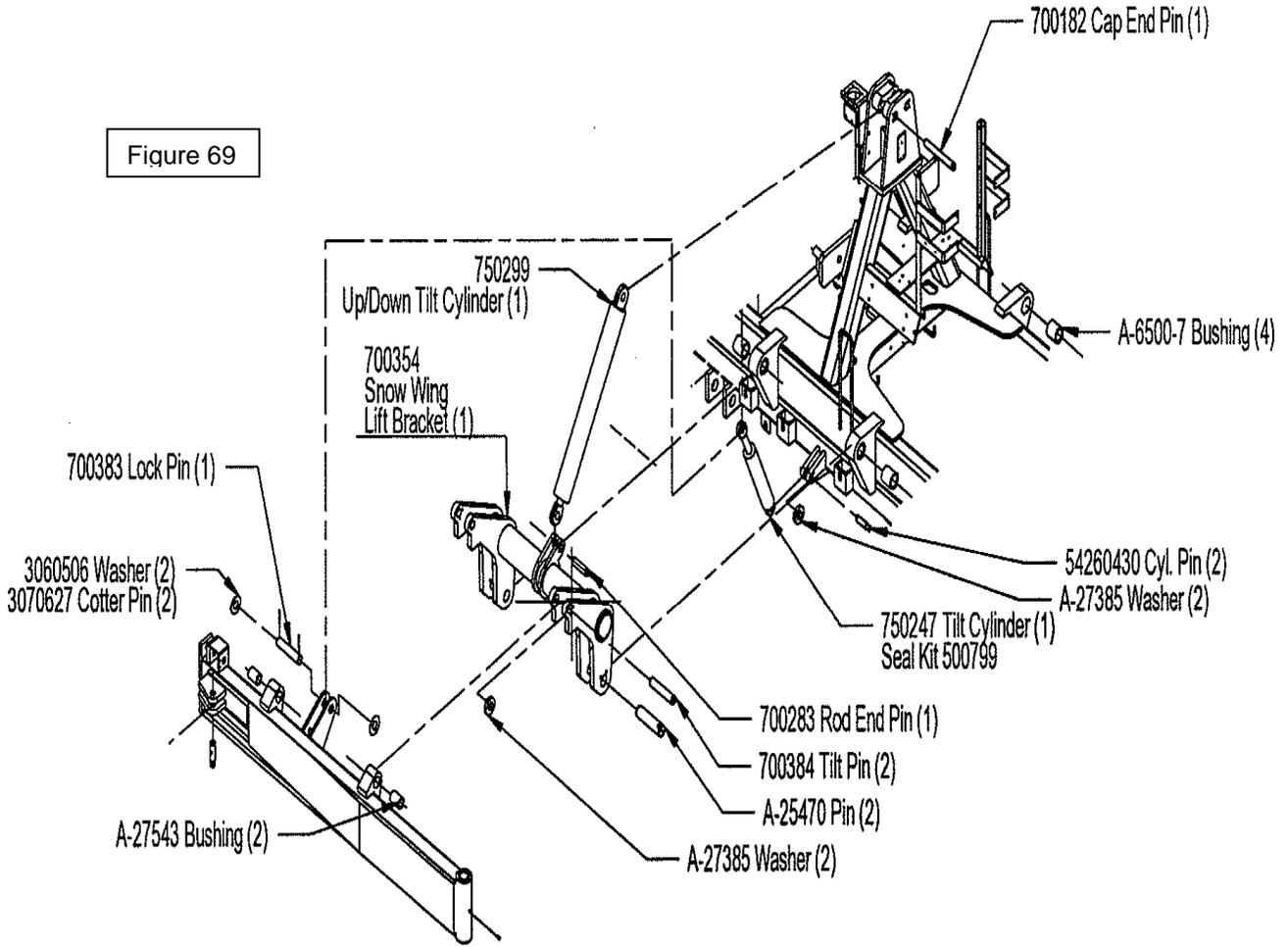


Right Snow Wing (Blade Tilt Cylinder)



SNOW WINGS ATTACHMENT PINS

Figure 69



Removal procedure for Left Ballast Wing

Before removing Left Ballast Wing Assembly:



Hydraulic oil operates under extreme pressure, and can become very hot, so use caution when opening the hydraulic system for maintenance or repair.

Hydraulic hoses have a steel wire(s) or spiral braiding reinforcing jacket underneath the outer cover, and when exposed, they can cause nasty cuts or abrasions.

1. Run the Left Ballast Wing Assembly and check that all components work.
2. Turn off machine and walk around the M7 and check and inspect the Left Ballast Wing Assembly that is being removed for:
 - a. Oil leaks,
 - b. Damage or leaks at cylinders
 - c. Hydraulic hoses for kinks, age, exposure, cracked, and if the braided or wires are showing.
 - d. Worn or broken component parts
3. Fix damage components

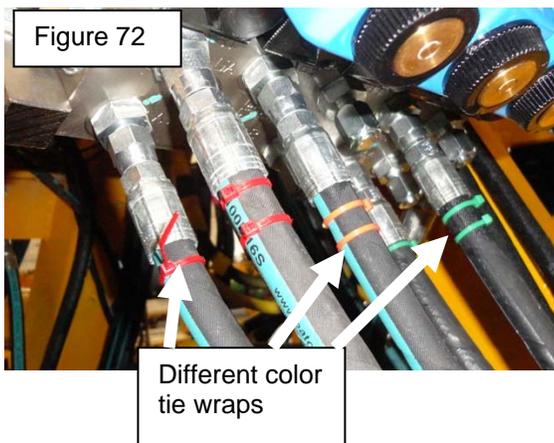
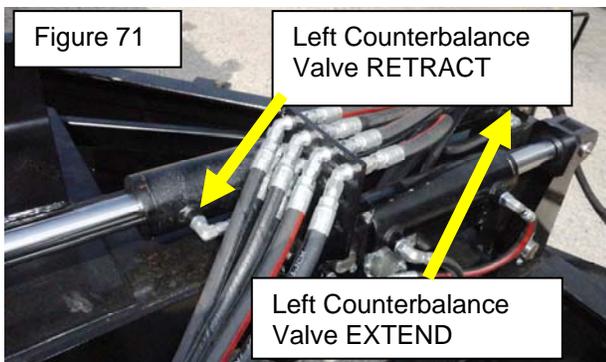
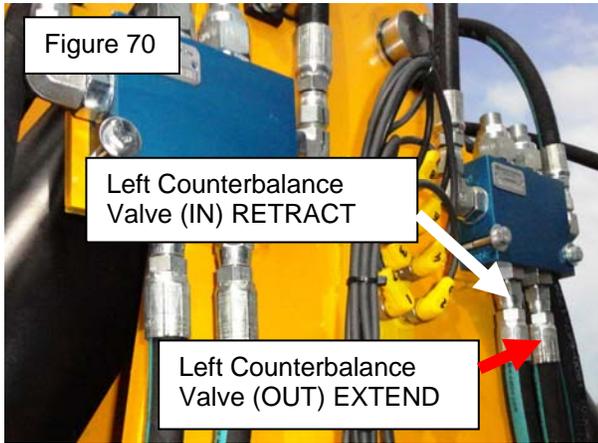
Removal of Left Ballast Wing Assembly:

1. Start engine and lower the left ballast wing assembly till it is resting on the ground.
2. Turn off the engine, check that park brake is on.
3. Follow all of your company's lock out/tag out rules before proceeding.
4. You will be taking off hoses at the left counterbalance valve (figure 70) and left wing valve (figure 73, 76, & 78) so mark each hose and fitting before removing. So later each hose is reinstalled at the right fitting.
5. Be aware that some hydraulic oil may leak from connections, and the oil that is remaining in the hose will also dump out, so having a bucket handy to catch the hydraulic oil is a good idea.
6. Carefully open each hose fitting (1/8 – 1/4) of a turn counterclockwise (CCW) to allow pressurize oil to bleed off that may be trapped in the hydraulic circuit.
7. Finish removing each hose after the steady flow of hydraulic oil is gone.
8. Install hydraulic JIC plugs into the hose ends to keep contamination from entering into the Left Ballast Wing hydraulic system.
9. Cap off the valve fittings (example shown in figure 73) to keep contamination from entering into the M7's hydraulic circuit & to prevent hydraulic oil leaks during machine operation if that valve section is not used on the attachment being installed.
10. Use proper lifting device capable of supporting, raising, and moving the Left Ballast wing Assembly.
11. Remove left ballast wing attaching the pins (see figures 79).
12. Check all the pins and bushes for wear / damage.
13. Check pin attachment points for cracks / wear.
14. Use proper lifting device move the Left Ballast Wing Assembly.

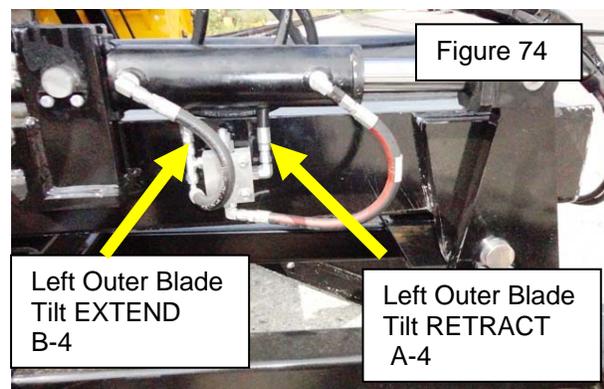
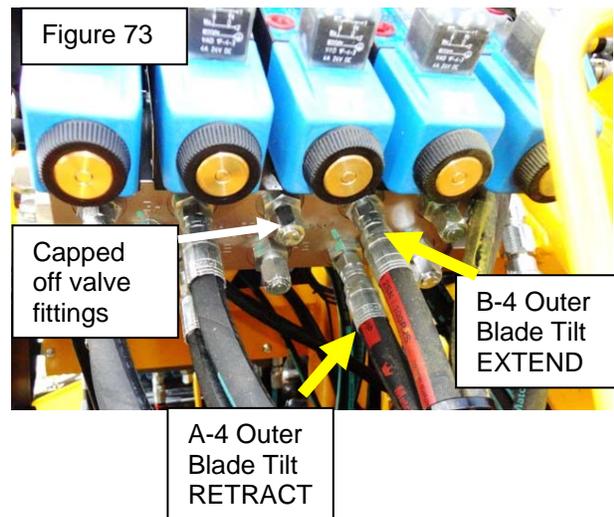
Installation of Right Ballast Wing Assembly:

1. Before installation inspect the right ballast wing for:
 - a. Oil leaks,
 - b. Damage or leaks at cylinders
 - c. Hydraulic hoses for kinks, age, exposure, cracked, and if the braided or wires are showing.
 - d. Worn or broken component parts
2. Fix damage components
3. Reverse procedures listed (items 14 thru 11).

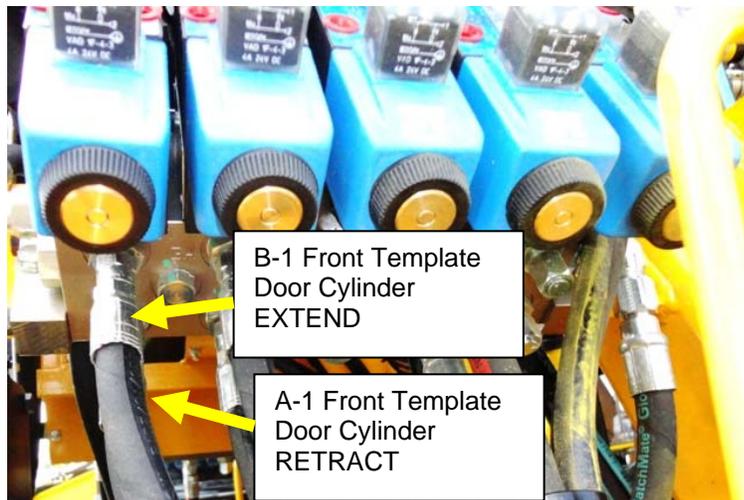
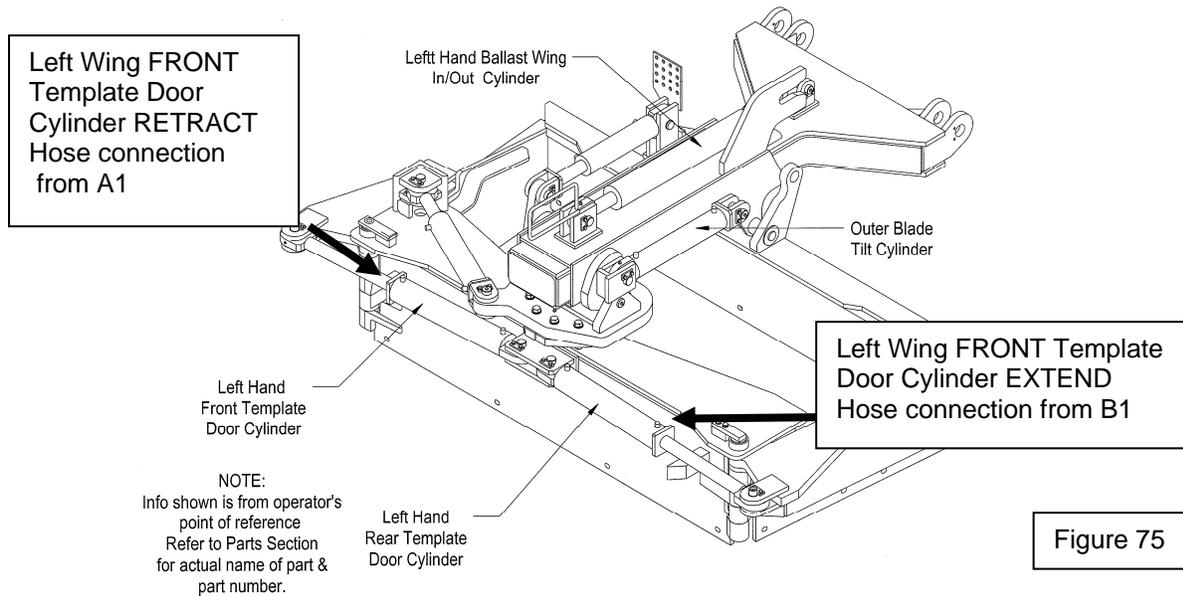
Left Ballast Wing (IN/OUT) Cylinder



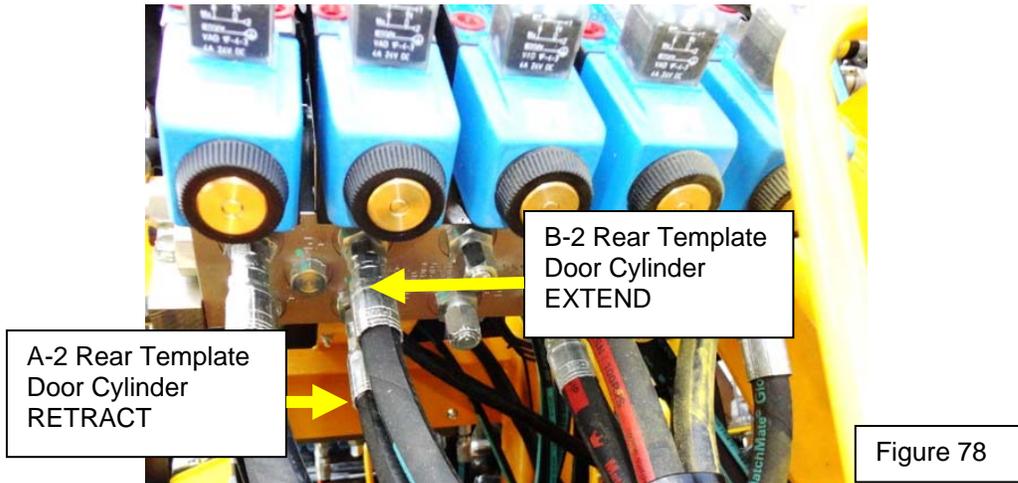
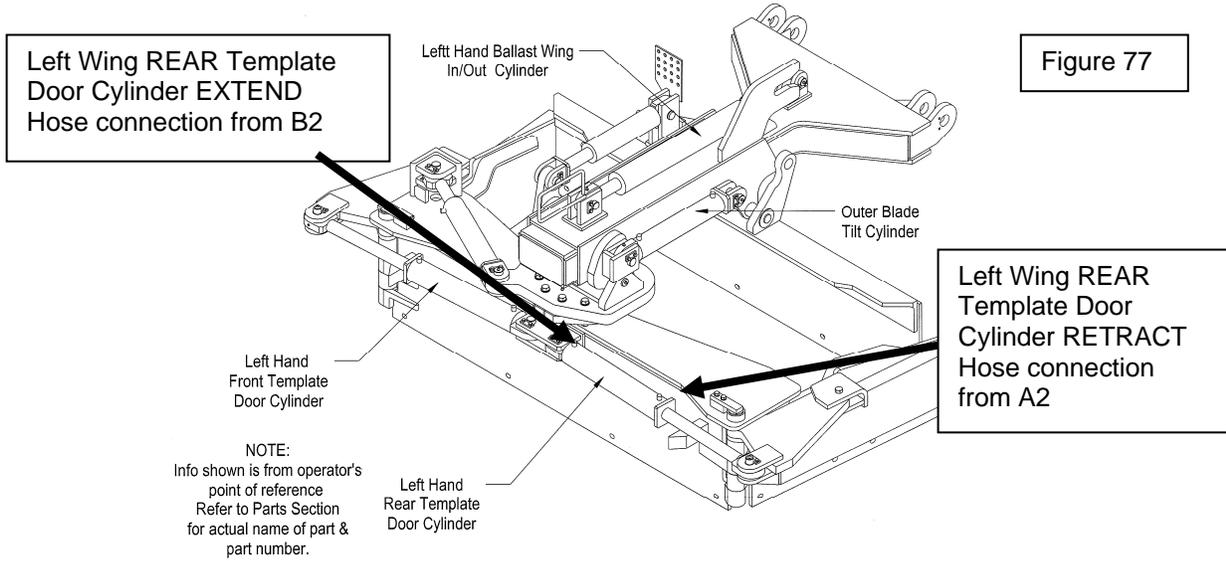
Left Ballast Wing (OUTER BLADE TILT) Cylinder



Left Ballast Wing (Front Template Door) Cylinder



Left Ballast Wing (Rear Template Door) Cylinder



BALLAST WINGS ATTACHMENT PINS

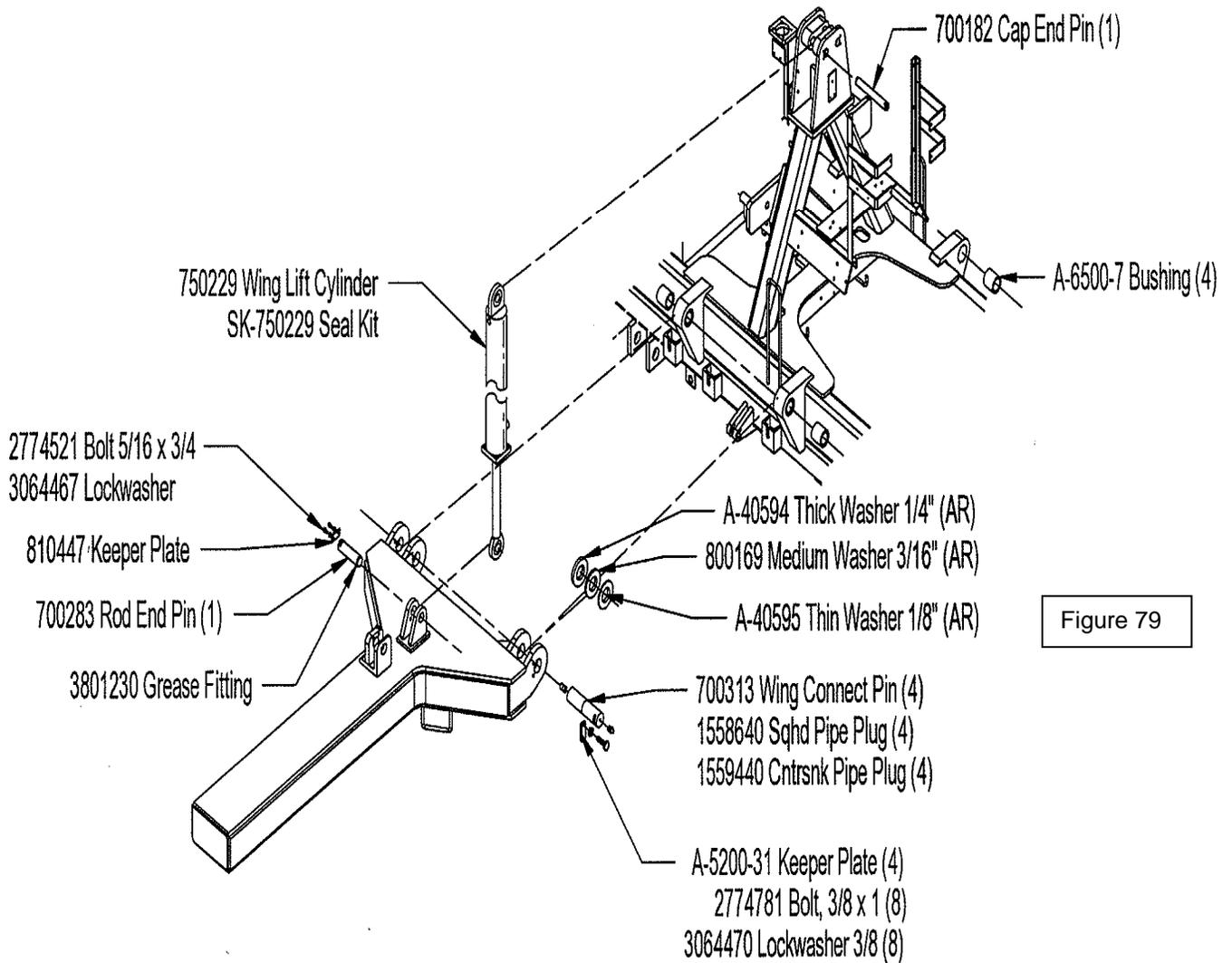


Figure 79

Removal procedure for Left Snow Wing Assembly

Before removing Left Snow Wing Assembly:



Hydraulic oil operates under extreme pressure, and can become very hot, so use caution when opening the hydraulic system for maintenance or repair.

Hydraulic hoses have a steel wire(s) or spiral braiding reinforcing jacket underneath the outer cover, and when exposed, they can cause nasty cuts or abrasions.

1. Run the Left Snow Wing Assembly and check that all components work.
2. Turn off machine and walk around the M7 and check and inspect the Snow Snow Wing Assembly that is being removed for:
 - a. Oil leaks,
 - b. Damage or leaks at cylinders
 - c. Hydraulic hoses for kinks, age, exposure, cracked, and if the braided or wires are showing.
 - d. Worn or broken component parts
3. Fix damage components

Removal of Left Snow Wing Assembly:

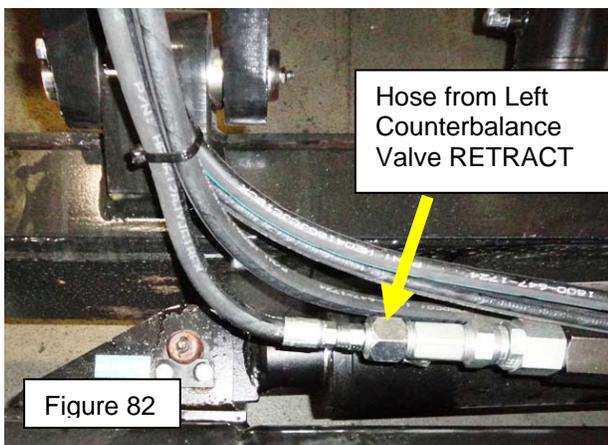
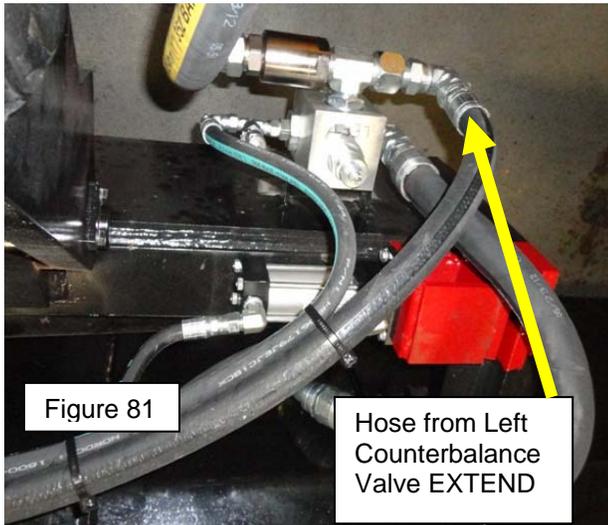
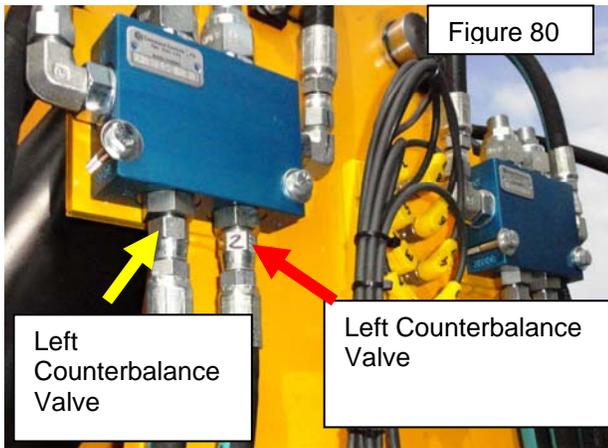
1. Start engine and lower the left snow wing assembly till it is resting on the ground.
2. Turn off the engine, check that park brake is on.
3. Follow all of your company's lock out/tag out rules before proceeding.
4. You will be taking off hoses at the left counterbalance valve (figure 80) and the left wing valve (figure 83). Mark each hose and fitting before removing so later each hose is reinstalled at the right fitting.
5. Be aware that some hydraulic oil may leak from connections, and the oil that is remaining in the hose will also dump out, so having a bucket handy to catch the hydraulic oil is a good idea.

6. Carefully open each hose fitting (1/8 – 1/4) of a turn counterclockwise (CCW) to allow pressurize oil to bleed off that may be trapped in the hydraulic circuit.
7. Finish removing each hose after the steady flow of hydraulic oil is gone.
8. Install hydraulic JIC plugs into the hose ends to keep contamination from entering into the Left Snow Wing hydraulic system.
9. Cap off the valve fittings (figure 83) to keep contamination from entering into the M7's hydraulic circuit & to prevent hydraulic oil leaks during machine operation if that valve section is not used on the attachment being installed.
10. Use proper lifting device capable of supporting, raising, and moving the Left Snow Wing Assembly.
11. Remove left snow wing attaching the pins (see figures 85).
12. Check all the pins and bushes for wear / damage.
13. Check pin attachment points for cracks / wear.
14. Use proper lifting device move the Left Snow Wing Assembly.

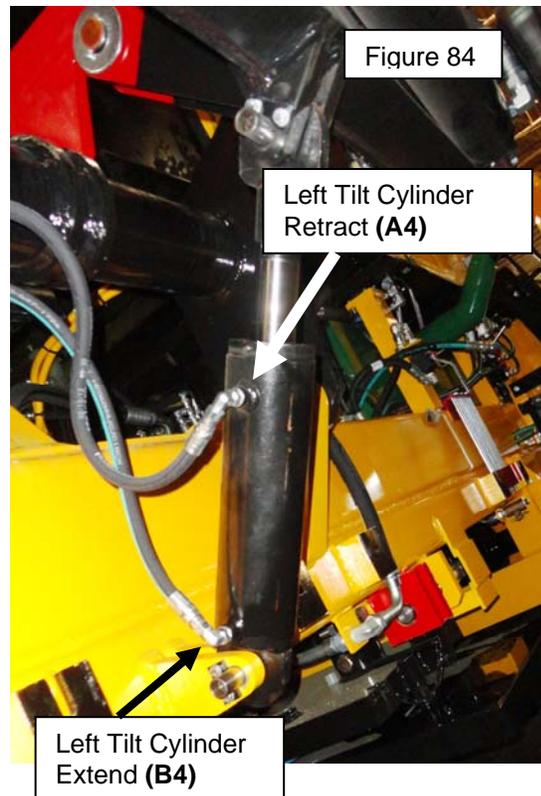
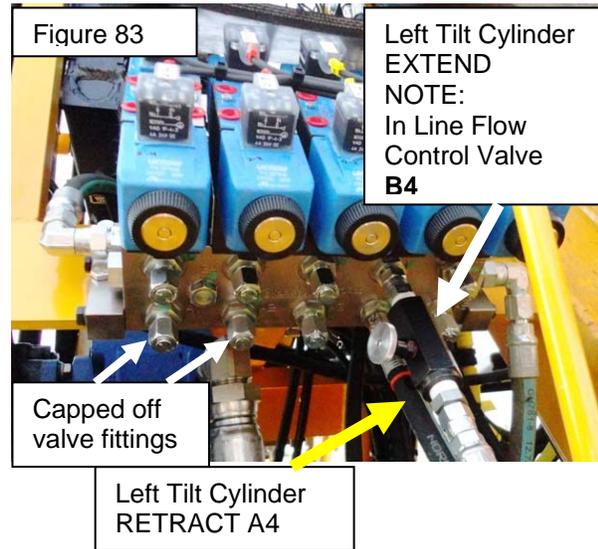
Installation of Left Snow Wing Assembly:

1. Before installation inspect the Left Snow Wing Assembly for:
 - a. Oil leaks,
 - b. Damage or leaks at cylinders
 - c. Hydraulic hoses for kinks, age, exposure, cracked, and if the braided or wires are showing.
 - d. Worn or broken component parts
2. Fix damage components
3. Reverse procedures listed (items 14 thru 1).

Left Snow Wing (In/Out Cylinder)



Left Snow Wing (Blade Tilt Cylinder)



SNOW WINGS ATTACHMENT PINS

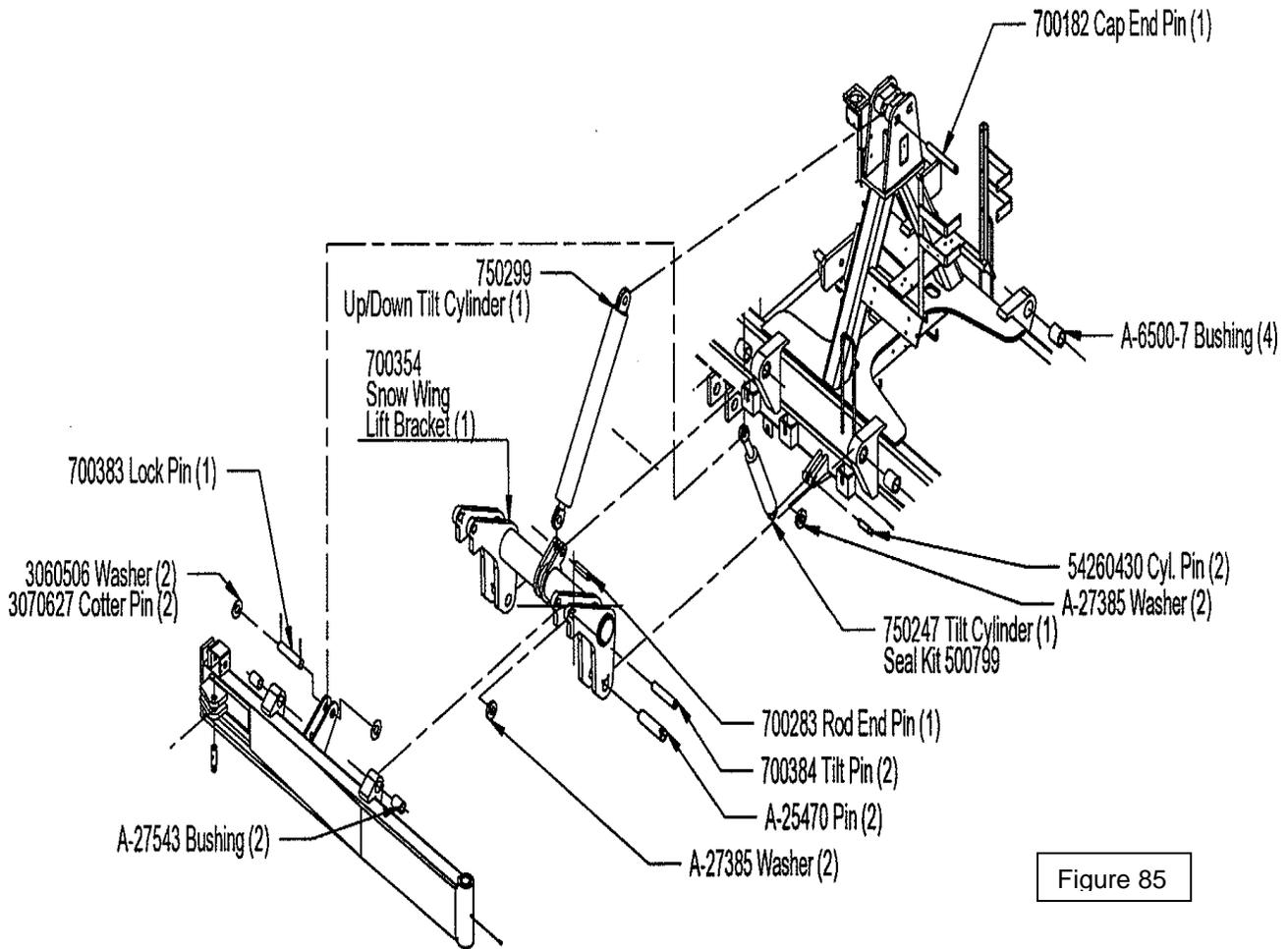
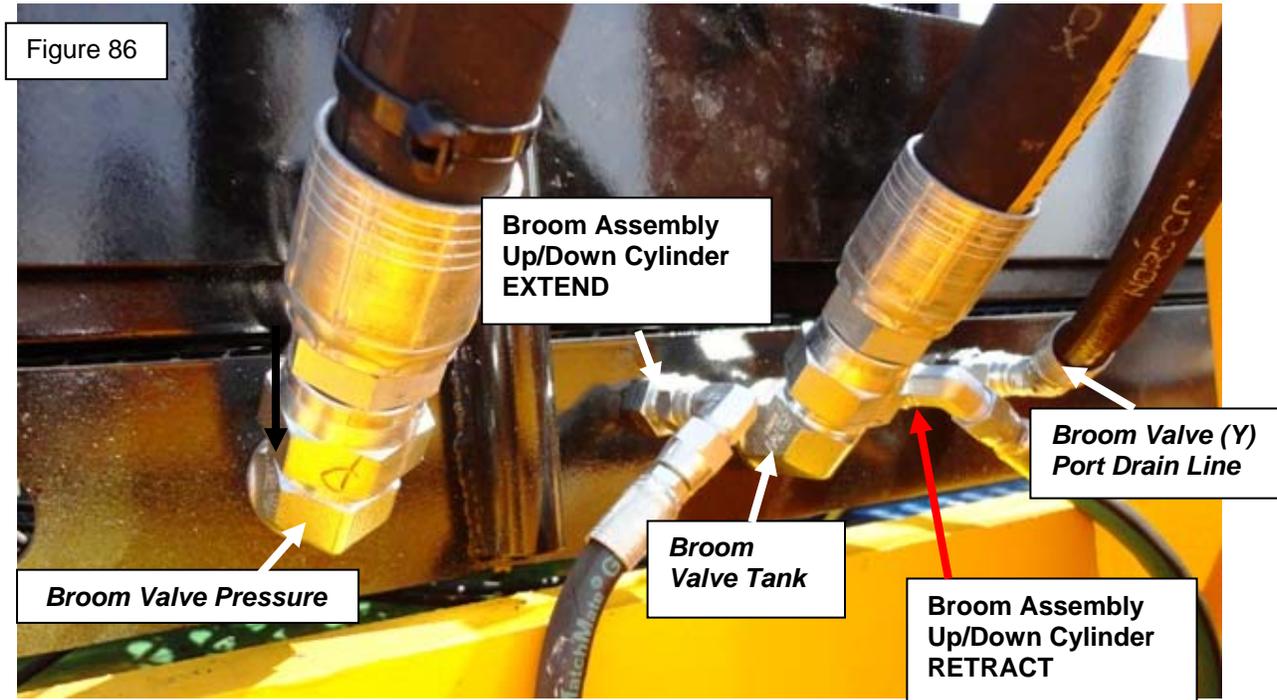
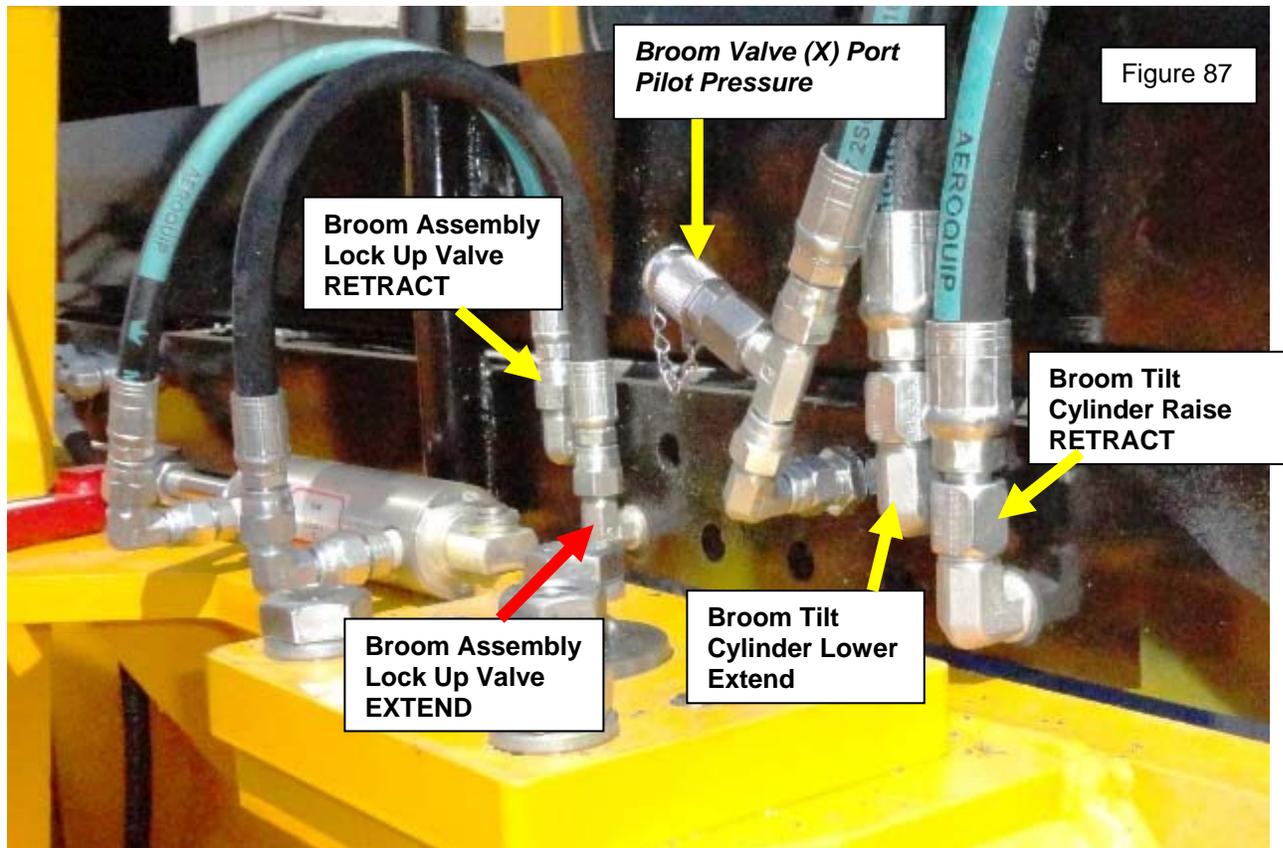


Figure 85

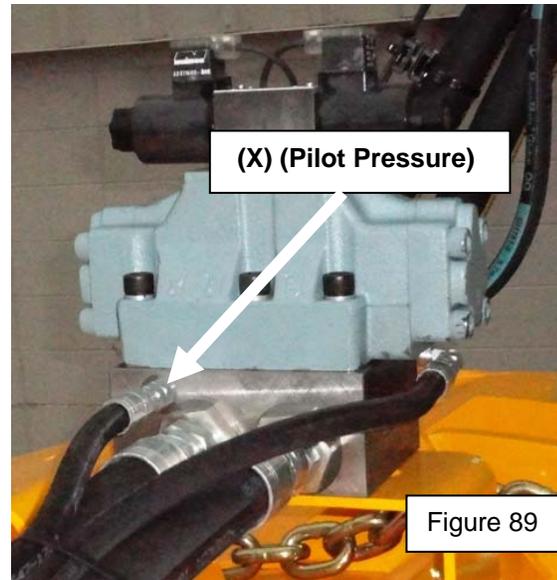
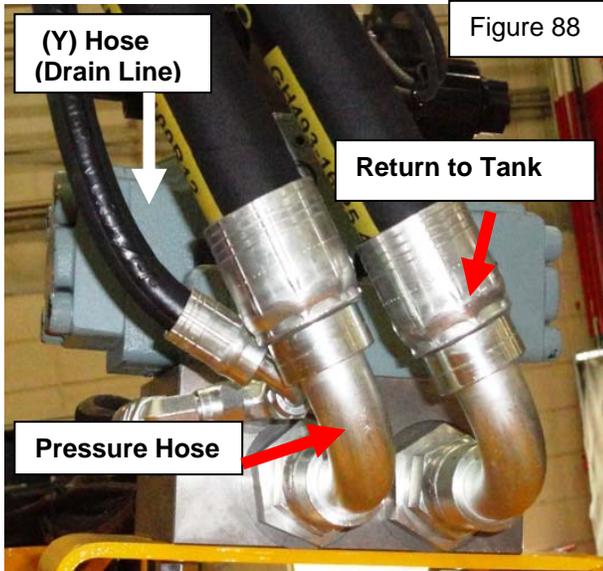
BALLAST BROOM ASSEMBLY HOSE CONNECTIONS (Left Side)



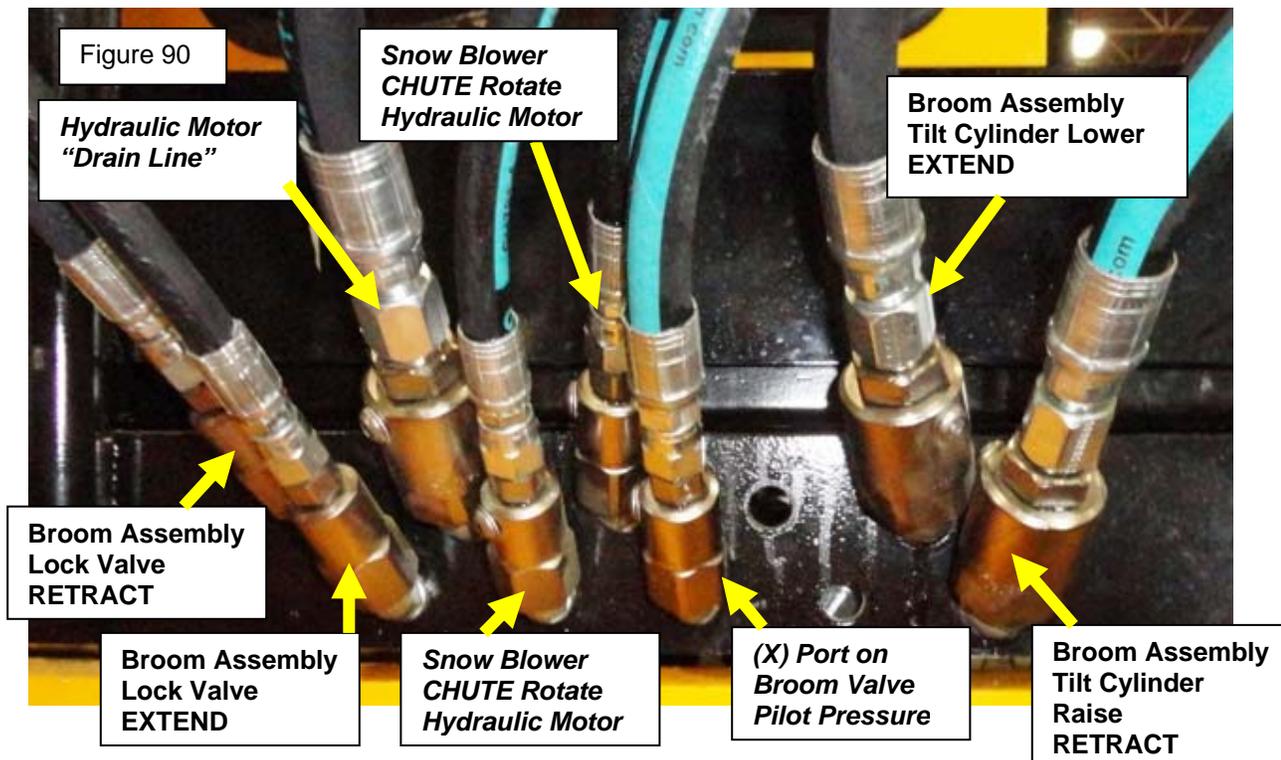
BALLAST BROOM ASSEMBLY HOSE CONNECTIONS (Right Side)



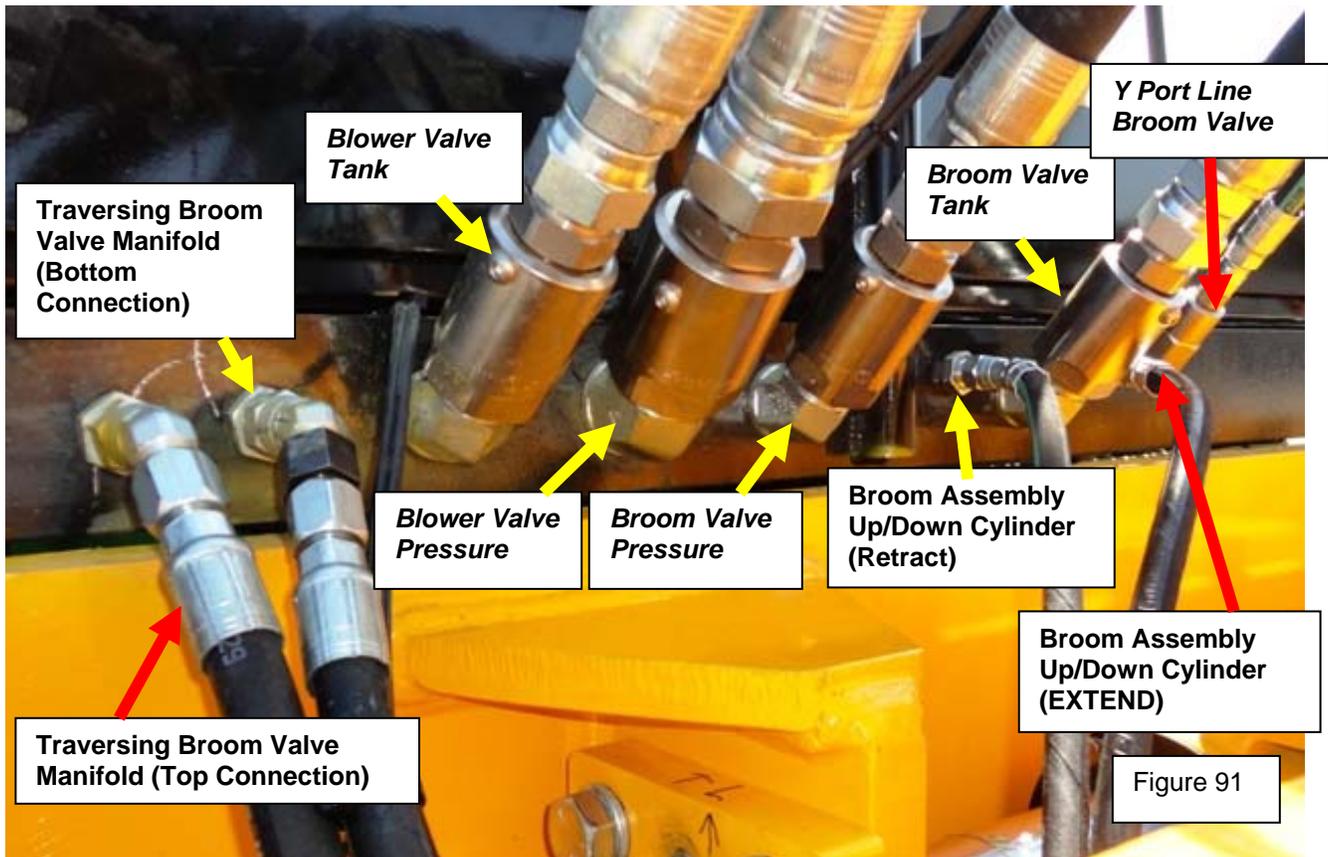
BROOM HYDRAULIC VALVE ASSEMBLY



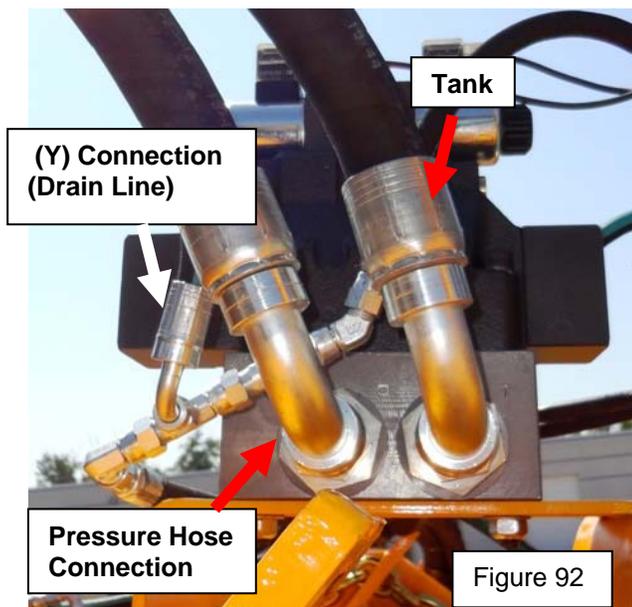
Snow Blower (Option) Hose Connections Right Side of Machine



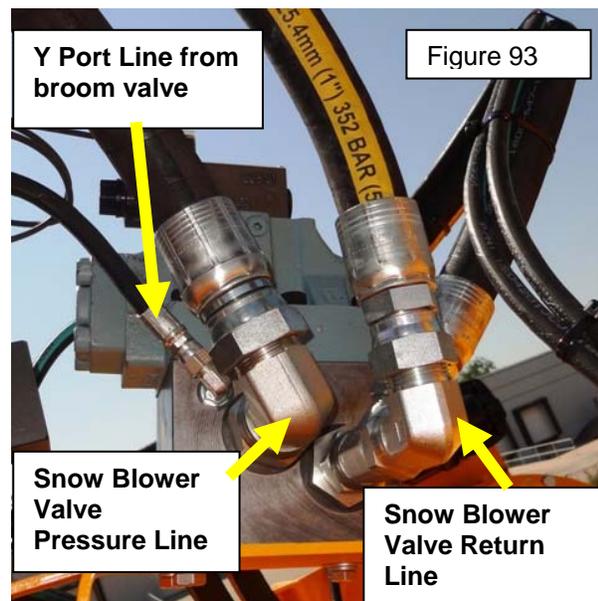
Snow Blower (Option) Hose Connections Left Side of Machine



SNOW BROOM HYDRAULIC VALVE ASSEMBLY



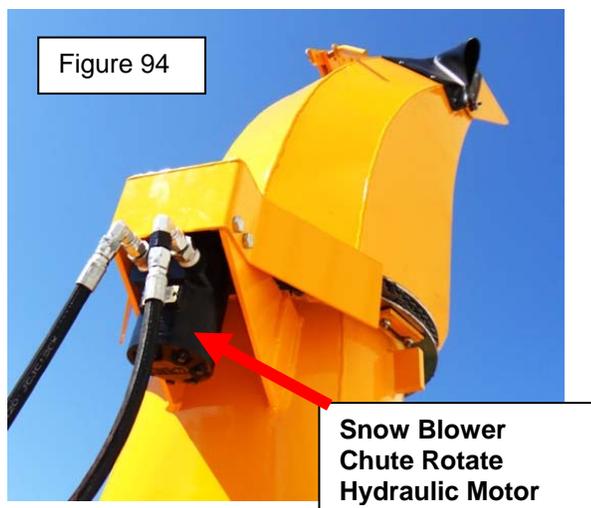
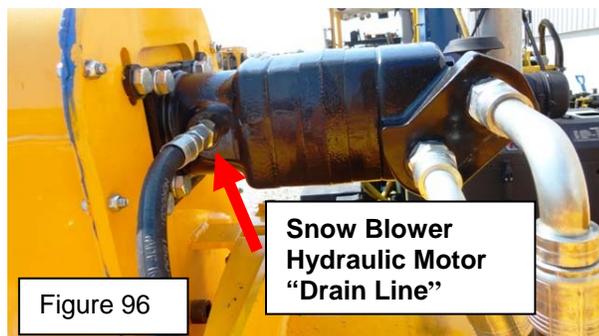
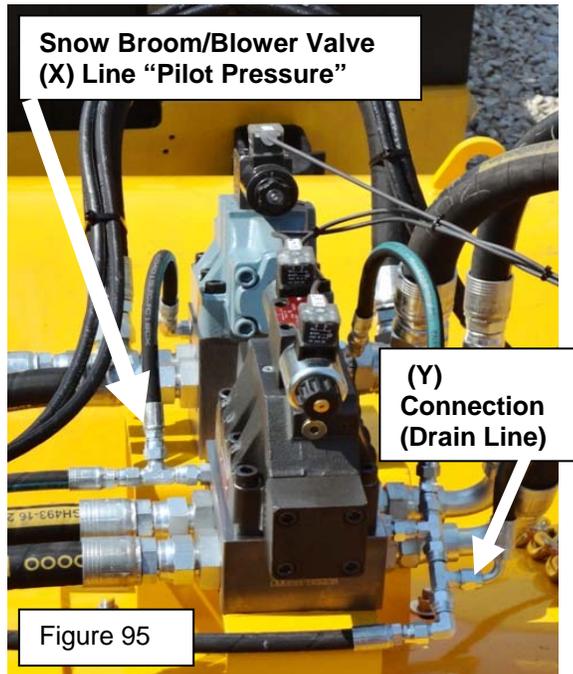
SNOW BLOWER HYDRAULIC VALVE ASSEMBLY



HYDRAULIC

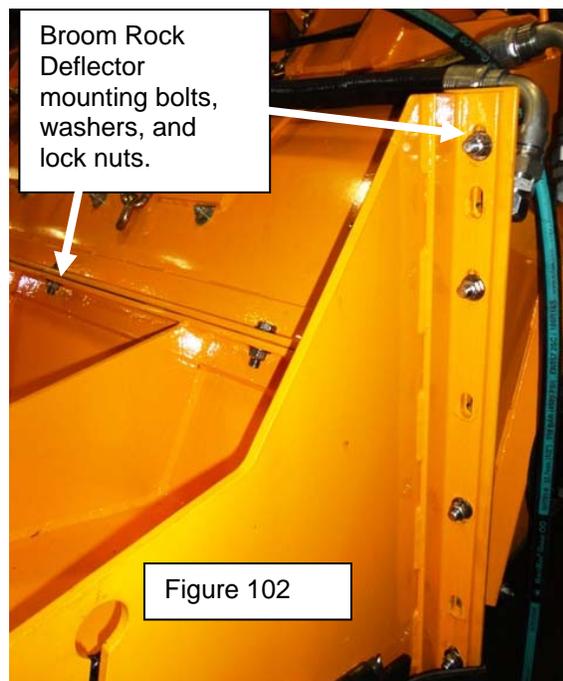
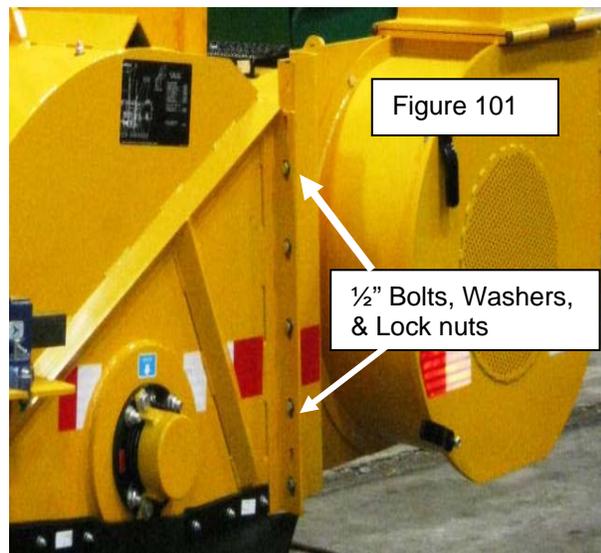
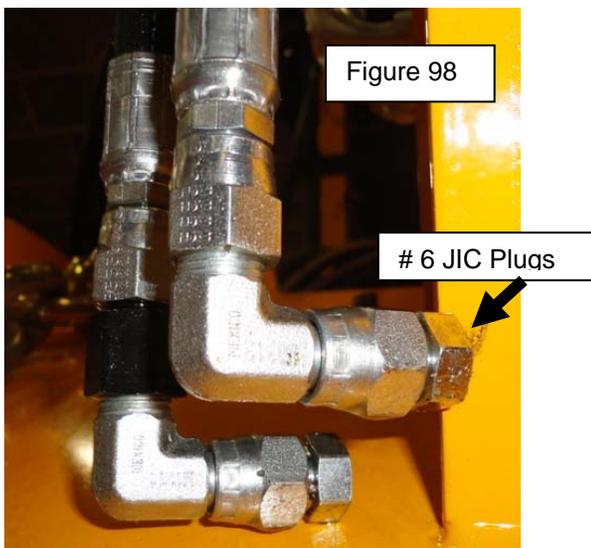
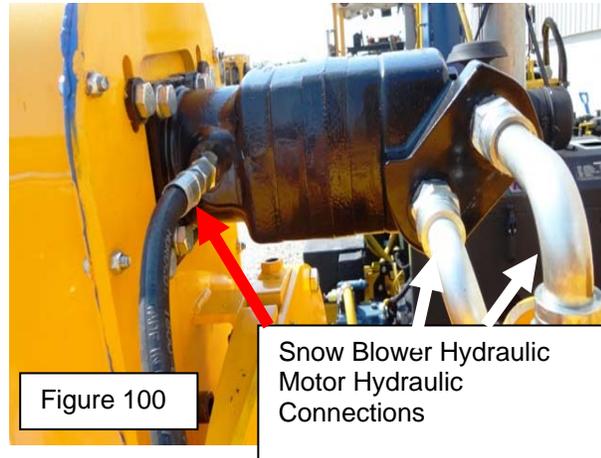
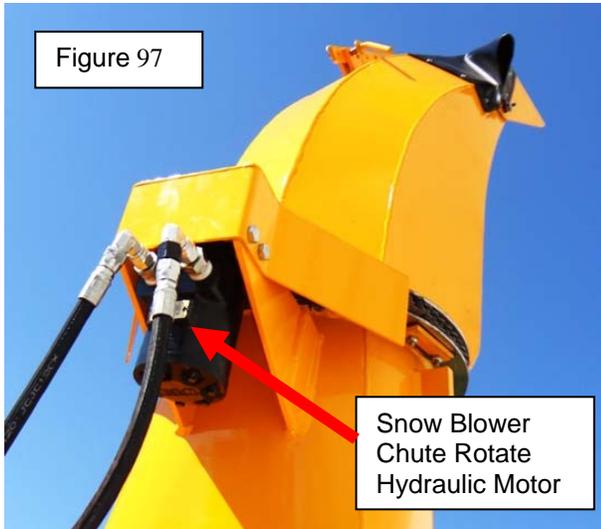
M7 Ballast Regulator/Snow Fighter

SNOW BROOM/BLOWER HYDRAULIC VALVE ASSEMBLY



Procedure for removal of the snow screw blower assemble to install the ballast stone deflector.

1. Start engine and lower the snow broom / blower assembly till it is resting on the ground.
2. Turn off the engine, check that park brake is on.
3. Follow all of your company's lock out/tag out rules before proceeding.
4. At the snow discharge chute (figure 97) carefully open the two hose fittings (1/8 – 1/4) of a turn counterclockwise (CCW) to allow any pressurize oil to bleed off that may be trapped in the hydraulic circuit.
5. Install hydraulic JIC plugs into the hose ends (figure 98) to keep contamination from entering into the hydraulic system.
6. Install # JIC caps on the snow discharge chute rotate hydraulic motor fittings (figure 99) to keep contamination from entering into the hydraulic motor.
6. At the snow blower hydraulic motor (figure 100) carefully open the three hoses, turn fitting (1/8 – 1/4) of a turn counterclockwise (CCW) to allow pressurize oil to bleed off that may be trapped in the hydraulic circuit.
7. Install # 12 JIC caps onto the hydraulic motor to keep contamination from entering into the hydraulic motor.
8. Install # 12 JIC plugs into the hose ends to keep contamination from entering into the hydraulic system.
9. The five hoses removed will not be used during the ballast operation so tie wrap them in a safe place.
9. Install a lifting device (crane) onto the two lifting lugs capable of lifting, and moving the snow blower assembly
11. Remove the snow blower assembly attachment bolts, washers, and lock nuts along top edge and the sides (figures 101).
12. Move the Snow Blower Assembly out of the way.
14. Using a proper lifting device move the ballast deflector Assembly into position and install the mounting bolts, washers, and lock nuts (figure 102).



TROUBLESHOOTING - GENERAL

Troubleshooting is a matter of quickly and logically isolating the cause of a problem and taking corrective action. Operating experience, a thorough understanding of the information in this manual, and accurate maintenance and operation records are the best troubleshooting tools an operator can have. The Model M7 Machine is a group of rather simple systems. If you understand the basic workings of these systems individually and how they relate to each other, troubleshooting becomes a relatively simple task.

This is intended to give you basic troubleshooting guidelines for the hydraulic systems on this machine.

Local conditions and operating methods may result in problem causes and remedies not covered in this guide. To use the guide most efficiently, locate a problem that matches the one being experienced and, in a step-by-step method, check the causes listed until the correct remedy is found and the problem solved.



Always turn off machine when performing maintenance, making adjustments, or whenever unintended movement of machine could occur; unless directed otherwise. Failure to comply could result in personal injury and/or damage to the machine.



To avoid possible personal injury and/or engine damage from accidental engine startup, always disconnect the battery before servicing this machine.

INSPECTION

Inspect the hydraulic system for clues to the malfunction. Check to see if the unit can be operated without further damage. If not, shut down machine immediately. Always check these items before starting the machine:

1. Check hydraulic oil level.
2. Look for loose or disconnected hoses. An oil spot below the machine is a good indication of a loose hose or hydraulic component.
3. Make certain shut-off valve on suction strainer is OPEN. Opening valve can often correct what appears to be a malfunction.
4. Inspect all vital hose connections, especially at main pump and the main pump hose connection at the manifold.



Loosen fittings only when system is not pressurized. High pressure leaks can cause personal injury.

5. Look for cover damage and/or indications of twisted, worn, crimped, brittle, cracked, or leaking hoses. Hoses with their outer cover worn through or otherwise damages should be considered unfit for further service.
6. Cap off all disconnected lines and open ports.
7. Use only recommended replacement parts.
8. Examine all prematurely worn or malfunctioned parts for clues as to the cause of the failure.
9. Discard all used O-rings to avoid re-uses.

10. Lubricate all sliding parts during assembly.
11. Cover sharp grooves and threads with thimble or shim stock when installing O-rings and other seals.

While machine is running, and before working, inspect for leaks. If the machine has not been run for some time, oil may thicken causing a variety of malfunctions. If this is true, make certain that the oil tank has been properly drained, cleaned and refilled.

If your visual inspection does not indicate the possible malfunction, refer to the troubleshooting guide that follows.

FLUID CONTAMINATION

Contamination comes in many forms. It may be air, water and cutting oils, rust, chips and grit. It is usually easier to keep contaminants **out** of a system rather than remove them after they are **in** the system.

Bulk handling and the re-use of oil containers almost guarantees you that "new" oil will be dirty. Make it a practice to filter all "new" oil before adding it to your system. Make it another practice to change filters on a regular basis **before** they become clogged.

LOCATING LEAK SOURCES

Petroleum oils are used in most hydraulic application to lubricate parts as well as transmit power. As oil temperature increases, however, the lubricating film thins out. The result is rubbing parts supported by the oil film move closer together; friction and wear increase; seal materials age more quickly, become stiff and hard, and may readily permit leakage.

The first step in locating leaks is to eliminate the possibility that an over-filled reservoir or spill created the "suspected" leak. The next step would be to clean the suspected area and watch. Leaks usually occur in fittings, hoses, O-rings, and other seals.

Most leaks occur at fittings, but too often, finding the fitting that is leaking is difficult because the fluid runs along the hose and drips off at some other point. Leaks in high pressure lines sometimes are difficult to pin-point because the fluid comes out as a mist.

Once you find the location of a leak, the specific cause has to be determined before it can be corrected. A scratch in a fitting seat or a cut in a seal lip that is big enough to leak excessively can still be too small to find with the naked eye. The use of a magnifying glass would assist you.

HOSE LIFE

Hose leakage or failure many times occurs where the end fitting grips the hose. Check the system for pressure spikes or surge. If bulges or bubbles occur on a flexible hose, a leak is taking place within the layers. The hose should be replaced.

High oil temperatures (over 200 degrees Fahrenheit, 93 degrees Celcius) quickly harden or stiffen a rubber hose. When pressure pulses flex a hardened hose, it fails by cracking. Every increase of 25 F (14 C) cuts hose life in half. Use a replacement hose rated for actual fluid temperatures. Keep a log of hose use so replacement can be made before failure occurs.

If a hose is installed with a twist in it, high operating pressures tend to force it straight. This can loosen the fitting or even burst the hose at the point of the strain.

HYDRAULIC SYSTEM TROUBLESHOOTING GUIDE

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|---|--|---|
| Hydraulic pump(s) do not develop pressure | <p>No hydraulic oil in tank (NOTE: if pump is run without oil in tank, pump damage will occur.)</p> <p>Shut-off valve closed. (NOTE: if pump is run with valve closed, pump damage will occur.)</p> <p>Relief valve bypassing. (NOTE: oil blowing past any relief valve can cause oil to overheat.)</p> <p>.Pump is defective.</p> | <p>Check oil level. Refill tank.</p> <p>Open valve completely.</p> <p>Increase pressure setting on relief valve. (See Pressure checks)</p> <p>Refer to pump manual or replace pump.</p> |
| Traction pump / implement pump does not develop pressure | <p>Pump compensator setting is too low</p> <p>Implement pump pressure relief setting is low</p> | <p>Adjust compensator setting. (See Pressure Checks)</p> <p>Adjust implement pump pressure relief setting. (See Pressure Checks)</p> |
| Hydraulic pump excessively noisy | <p>Cold oil.</p> <p>Low oil level.</p> <p>Oil viscosity too high (oil too thick)</p> <p>System relief valve set too low.</p> <p>Intake hose to pump restricted.</p> <p>Defective pump.</p> | <p>Allow unit to warm up.</p> <p>Check and add oil.</p> <p>Drain and add correct oil as specified under "RECOMMENDED LUBRICANTS".</p> <p>Increase pressure setting on relief valve (see Pressure Checks)</p> <p>Inspect and repair.</p> <p>See pump manual, repair or replace pump.</p> |
| Hydraulic Oil Filter Restriction Indicator Light stays on all the time (optional equipment) | <p>Restricted hydraulic oil filter.</p> <p>Hydraulic oil filter restriction switch</p> <p>Note: Hydraulic oil must be close to operating temperature (not cold) otherwise indicator may light up</p> | <p>Replace filter.</p> <p>Replace switch.</p> |

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|---|---|---|
| Hydraulic Oil Overheats | <p>Oil viscosity too high (oil too thick)</p> <p>Relief valve set too low.</p> <p>Oil lines damaged causing excessive internal restriction</p> <p>Travel relief set too low</p> <p>Oil Cooler is not sufficiently cooling the system</p> | <p>Drain and add correct oil as specified under "RECOMMENDED LUBRICANTS".</p> <p>Increase pressure setting on relief valve (see Pressure Checks)</p> <p>Inspect and repair.</p> <p>Check and reset</p> <p>Check airflow – check for debris Input air temperature – Clean, repair or replace</p> |
| Hydraulic Oil Foams | <p>Water in oil</p> <p>Using wrong oil</p> <p>Low hydraulic level</p> <p>Damaged hydraulic oil lines</p> <p>Air leak in suction line to hydraulic pump or pump shaft seal leaking</p> | <p>Inspect oil for water. Drain and add correct oil as specified under "RECOMMENDED LUBRICANTS".</p> <p>Drain and add correct oil as specified under "RECOMMENDED LUBRICANTS".</p> <p>Fill</p> <p>Inspect, repair or replace.</p> <p>Inspect, repair or replace.</p> |
| Track travel not functioning in either direction. | <p>Suction line shut-off valve closed.</p> <p>Clogged suction filter.</p> <p>Suction line gate valve closed.</p> <p>Four speed transmission not in gear.</p> <p>Pump control block faulty.</p> <p>Pump control cable faulty.</p> <p>Defective motor or problem at drive shaft</p> | <p>Open valve and lock in open position.</p> <p>Check vacuum reading, if more than 10-inches of Hg at working temperature, change filter elements.</p> <p>Open valve and lock in the open position.</p> <p>Put in gear, check linkage if necessary.</p> <p>Inspect, repair or replace.</p> <p>Inspect, repair or replace.</p> <p>Repair or replace motor or drive shaft</p> |

HYDRAULIC

M7 Ballast Regulator/Snow Fighter

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|---|---|---|
| Front Door won't rotate | <p>Lockup engaged.</p> <p>Obstruction at pinch points.</p> <p>Pressure problem at lift cylinder.</p> <p>Bent guide rods.</p> | <p>Disengage lock.</p> <p>Remove obstruction.</p> <p>Adjust main relief or replace cylinder.</p> <p>Replace guide rods.</p> |
| Outer Boom moves slow | <p>Engine not at full RPM</p> <p>Brooming depth is too deep</p> <p>Too much ballast</p> <p>System pressure problem</p> <p>Bent inner or outer boom</p> | <p>Adjust throttle</p> <p>Reset broom depth</p> <p>Plow out</p> <p>Adjust system pressure</p> <p>Repair or replace</p> |
| Broom lift/tilt, plow blade, plow lift, right wing, & left wing will not work | <p>Implement pump unloading valve on</p> <p>Implement pump unloading valve stuck open</p> | <p>Turn off</p> <p>Repair or replace unloading valve</p> |
| 2-Way Plow Positioning Cylinder won't function | <p>Optional Turntable Control valve was left in detent position.</p> <p>Check for foreign obstruction</p> <p>Hinge pins not lubricated.</p> <p>Cylinder is defective.</p> <p>Cross line check valve is defective.</p> | <p>Reposition to center</p> <p>Remove obstruction.</p> <p>Lubricate.</p> <p>Repair or replace cylinder.</p> <p>Repair or replace valve.</p> |
| Ballast Wing Won't Lift | <p>Port relief is out of adjustment.</p> <p>Main relief is out of adjustment.</p> <p>Hinge pins not lubricated.</p> | <p>Readjust</p> <p>Readjust.</p> <p>Lubricate</p> |
| Ballast Wing Won't Go into Storage Position | <p>Foreign material at hinge point.</p> <p>Lift cylinder bearings damaged.</p> <p>Lift cylinder seal damage</p> <p>Hinge pins not lubricated.</p> | <p>Remove</p> <p>Repair or replace</p> <p>Repair or replace</p> <p>Check for damage & lube</p> |

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|--|--|--|
| Broom or snow blower won't lift or lower | Lockup engaged. Obstruction at pinch points. Pressure problem at lift cylinder. Bent guide rods. | Disengage lock. Remove obstruction. Adjust main relief or replace cylinder. Replace guide rods. |
| Broom or snow blower won't maintain RPM | Engine not at full RPM Brooming depth is too deep Too much ballast System pressure problem Defective broom drive motor | Adjust throttle Reset broom depth Plow out Adjust system pressure Repair or replace drive motor |
| Excessive Noise-Transmission | Charge pump defective Excessive backlash in gear train Auxiliary driven pump bad Internal problems | Replace pump Replace bearing and inspect for defective gears Remove pump and check Check for contamination of oil |