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EMERGENCY PUMP OPERATION

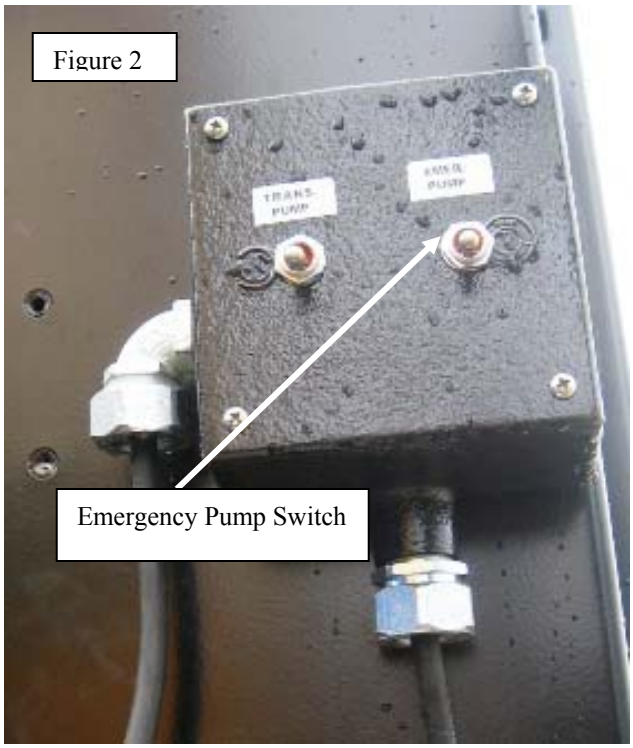
Emergency Operation of Machine's Turntable, Boom Up/Down Cylinders, Traverse Motors, & Squeeze Cylinders.

⚠ CAUTION

BEFORE RAISING WORKHEADS TO THE STORED POSITION, CHECK THAT THE LOCK UP CYLINDER IS IN THE UNLOCKED POSITION

A 24 Volt Emergency Pump Assembly is located below the air dryer on the main frame, cab side of the engine (Figure 1). The nonadjustable relief valve is set to 2000 PSI.

1. The emergency pump switch (Figure 2) is in a control box located above the air dryer. Lift and hold the emergency pump switch while energizing (manually or electrically) the directional control valve for the hydraulic component that needs to be stored.
2. Operate emergency pump in intervals, for a maximum of 15 seconds at a time. **(The emergency pump is designed for emergency use only and is not to be run continuously.)**
3. Engage all lock up devices



⚠ WARNING!

FAILURE TO ENGAGE ALL LOCKUP DEVICES BEFORE TOWING CAN RESULT IN INJURY TO PERSONNEL AND/OR EXTENSIVE DAMAGE TO MACHINE!

SERVICE PARTS

Description	JER Part Number

Filters:

Suction Strainer (Schroeder Suction Filters) ……..BFTSKBFFCG2279
Suction Strainer Element (Cleanable Magnetic Suction Separators) ……..……..... (A-SKB-3-76)

Return Filter (Schroeder Return Filters) ……..……..…….. RT2KZ10S24S24NY2
Element ……..……..…… (KZ10)

Pressure Filter (Schroeder Pressure Filters) ……..…….. KF301KZ10SD5
Element ……..…… (KZ10)

Top Off (24 Volt Transfer Pump) Sotera Systems Series 400 B
Element..... (Napa 1463/Wix 51463)

Fill Cap Lockable ……..…….. J40LX5CL

Desiccant Filter Hydraulic Tank ……..…….. J101

HYDRAULIC COMPONENT SCHEDULE

Hydraulic Component 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					
Test hydraulic oil cleanliness				I/R	
Replace pressure filter				I/R	
Replace return filter				I/R	
Replace tank breathers				I/R	
Drain & replace oil in hydraulic tank					I/R
Inspect suction strainer element					I/R
Steam clean oil cooler					I/R
Hydraulic Cylinders			I/R		

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 at designated Intervals thereafter.

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

TAMPER HYDRAULIC COMPONENTS LOCATIONS

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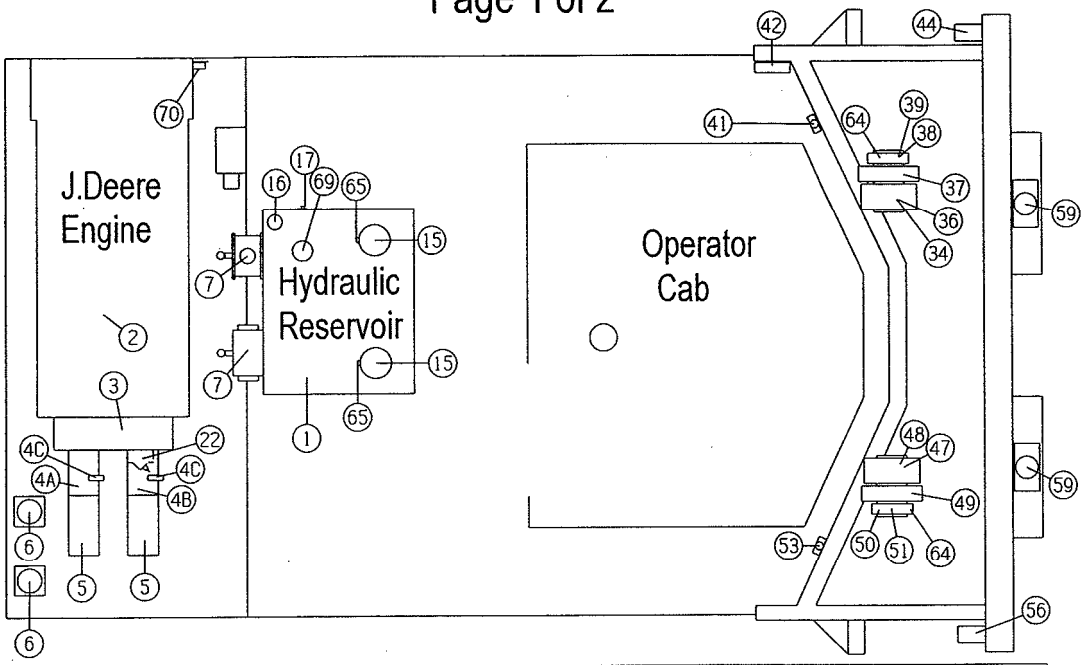
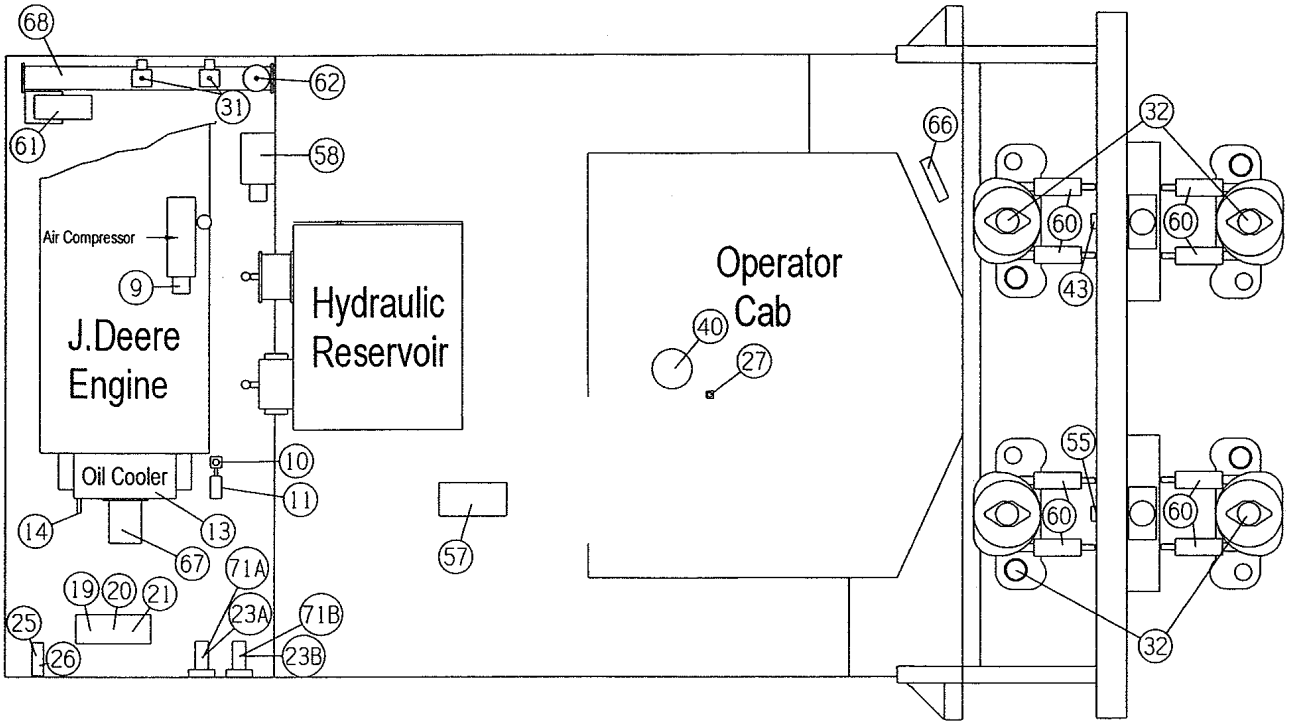


Description	Item #	Quanity	Part Number
Reservoir Hydraulic	1	1	JHST-1047-2
Engine John Deere	2	1	JES30512
Funk Pump Drive	3	1	C2826XXPXX
Pump (P1) Implement Workhead	4A	1	AA10V045DFR1/3I -PSC62K04 JD4346Y01-HST
Pump (P2) Implement Propel	4B	1	AA10V045DFR1/3I -PSC62K04 JD4346Y01-HST
Pressure Compensator Implement Pump	4C	2	
Pumps (P3,P4,P5,P6) Lt/Rt Virators	5	2	JA0713Y11-2
Filter High Pressure	6	2	JKF501KZ10SD5
ELEMENT High Pressure Filter	6A	2	KZ10
Filter Suction	7	2	BFTSKBFFCG2279
ELEMENT Suction Filter	7A	2	A-SKB-3-76
Return Filters	15	2	RT-1KZ10-S24-S24-NY2 JRT2KZ10
ELEMENT Return Filters	15A	2	KZ10
Cap Fill - Locking	16	1	J40LX5CL
Sight Glass & Temperature Gauge	17	1	J70651
Pressure Relief Valve Propel Return to Tank	22	1	RPIC-LAN-ICM
Flow Control Valve Lt Work Head Up/Down Cyl.	34	2	FDEA-HAN-IBW JHBF
Directional Control Valve Work Head Up/Down Cyl.	36	1	JA4490Y03-2 4WEH22E7X/6EW11
Directional Control Valve Lt Squeeze	37	1	J0-3333037-0-09 4WE10E-3X/CG24N9K4
Flow Control Valve Lt Traverse Circuit	38	1	NCCB-LCN-GBY JGBY

Description	Item #	Quanity	Part Number
Directional Control Valve Lt Traverse Circuit	39	1	J0-3333010-0-50 4WE6E6X/EG24N9K4
Flow Control Valve Lt Squeeze	41	1	J0-3335012-0-01S
Pressure Switch Lt Squeeze	42	1	JL40624
Traverse Moter Left	44	1	JL411545
Flow Control Valve Rt Work Head Up/Down Cyl.	47	1	FDEA-HAN-IBW JHBF
Directional Control Valve Rt Work Head Up/Down Cyl.	48	1	JA4490Y03-2 4WEH22E7X/6EW11
Directional Control Valve Rt Squeeze	49	1	J0-3333037-0-09 4WE10E-3X/CG24N9K4
Flow Control Valve Rt Traverse	50	1	NCCB-LCN-GBY JGBY
Directional Control Valve Rt Traverse Circuit	51	1	JO-3333010-0-50 4WE6E6X/EG24N9K4
Flow Control Valve Rt Squeeze	53	1	J0-3335012-0-01S
Hydraulic Motor Rt Traverse	56	1	JL411545
Cylinder Work Head Up/Down	59	2	JB5761XAA
Cylinder Repair Kit Work Head Up/Down	59A	2	JB5761XAA-Kit
Coil 24 Volt "D03" JB4068415	64	16	JB40684Y15
Gauge Hydraulic Filter	65	2	JCPT-LHT-134-2
Filter Desiccant Hydraulic Tank	69	1	J101
Manifold Turntable	70	1	J50078955
Valve Pilot Check Turntable	70A	1	1605914
Valve Direction Control Turntable	70B	1	1696770
Valve Manual Pull Turntable	70C	1	1697951

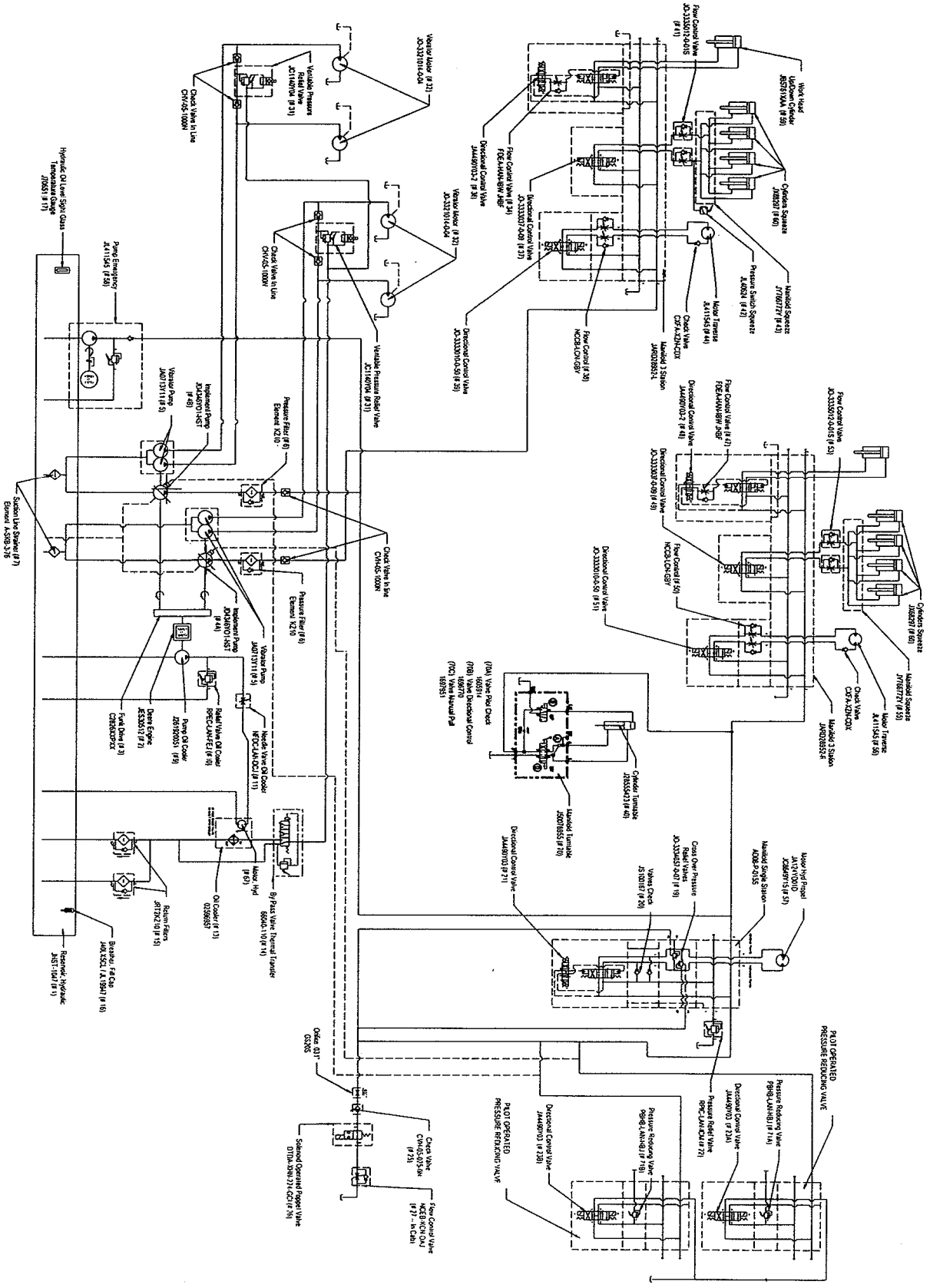
TAMPER HYDRAULIC COMPONENT LOCATIONS
PAGE 2 of 2



Description	Item #	Quanity	Part Number
Pump Oil Cooler	9	1	J261920051 C20L29162
Pressure Relief Valve Oil Cooler Circuit	10	1	RPEC-LAN-FEJ
Needle Valve	11	1	NFDC-LAN-DCJ
Oil Cooler	13	1	02596957 Hydac ELH51.5H6.35I.BT453
By Pass Valve Thermal Transfer	14	1	66040-110
Cross Over Pressure Relief Valves Propel Circuit	19	1	J0-3334057-0-07
Check Valves Propel Circuit	20	1	JHFM-5641 JS100167
Solenoid Valve Directional Control - Propel Circuit	21	1	JA4490Y03 4WEH22E-7X6EG24N9EK4
Pilot Operated Pressure Reducing Valve (Pump P1)	23A	1	JC0993Y01 JA4490Y03
Pilot Operated Pressure Reducing Valve (Pump P2)	23B	1	JC0993Y01 JA4490Y03
Check Valve Work Decel Circuit	25	1	CVH-05-0250N
Solenoid Operated Poppet Valve- Work Decel Circuit	26	1	DTDA-XHN-224-GCI
Speed Control Valve Work Decel Circuit	27	1	NCEB-KCN-DAJ

Description	Item #	Quanity	Part Number
Solenoid Operated Ventable Relief Valve Vibrator Motors	31	2	JC1140Y04 R900720169
Motor -Vibrator	32	4	J0-3321014-0-04
Turntable Cylinder	40	1	J28555423
Manifold 4 Station (LT) Squeeze Cylinders	43	1	JD-29541
Manifold 4 Station (Rt) Squeeze Cylinders	55	1	JD-28952
Hydraulic Motor Propel	57	1	JD8649Y15 JA124YD01D
Pump Emergency	58	1	JL411545 M-326-08120
Cylinder Squeeze	60	8	JX68297
Hydraulic Pump Top Off	61	1	JB021RF
Filter Top Off Pump Circuit	62	1	NAPA # 1463
Auto Lubricator Work Head Guide Rods	66	1	JB1657Y08-4
Motor, Hydraulic Cooler Fan	67	1	
Manifold Return To Tank	68	1	JY752641-01A
Valve Pressure Reducing	71A	1	PBHB-LAN-HBJ
Valve Pressure Reducing	71B	1	PBHB-LAN-HBJ

TAMPER HYDRAULIC SCHEMATIC



GENERAL

Pressure to the various devices in the hydraulic system is controlled by the Compensator, Pressure Reducing Valves, Vent Valves, and Pressure 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 should be performed after the engine and hydraulics have thoroughly 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 PARKING BRAKE VALVE BUTTON (**Pushed In**). The parking brake valve is located on the outside of the operator's left seat console.

⚠ DANGER

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. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids. If an accident occurs, see a doctor immediately.

PRESSURE CHECKS

Implement Pump Pressure Compensators .....2700 PSI
Propel Crossover Relief Valves ..... 2800 PSI
Propel Return Pressure Relief Valve ..... 300 PSI
Propel Circuit Pilot Operated Pressure Reducing Valve .....1600 PSI
Solenoid Operated Vent Relief Valve Vibrators ..... 2250 PSI
Squeeze Pressure Switch ..... 1000 PSI
Oil Cooler Pressure Relief Valve ..... 500 PSI

⚠ WARNING!

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.

Instructions:

Implement Pump Pressure Compensator 2700 PSI

P1 is on the left
P2 is on the right

Install a pressure gage on the pressure tap at the pressure line out (Figure 3) to the implement pump being checked.

NOTE: BOTH TRANSMISSION SELECTOR SWITCHES (Figure 7) MUST BE IN NEUTRAL TO START THE ENGINE (Forw – Neu – Rev / 1st – Neu – 2nd)

Chock wheels, start engine and turn the Travel/Work switch to the **travel** position, the **STAND BY** pressure at the gauge should read 250 psi. If not loosen lock nut on the STAND BY pressure adjusting screw clockwise to increase pressure and counterclockwise to decrease pressure till the gauge reads 250 psi.

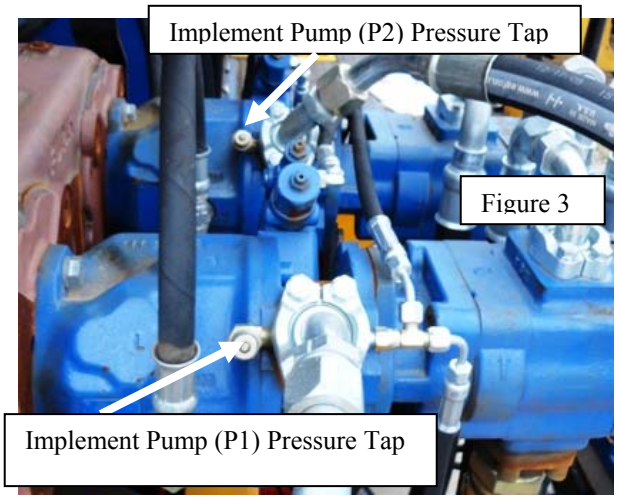


Figure 3

⚠ WARNING

MAKE CERTAIN PARKING BRAKES ARE FULLY ENGAGED AND CAN HOLD MACHINE STATIONARY BEFORE CONTINUING WITH THESE ADJUSTMENTS. FAILURE TO DO SO MAY CAUSE SEVERE BODILY HARM

Manually override the propel reverse directional control valve (B) by pushing in the **push pin** (Figure 5). If the pressure at the gauge is higher than 2700 psi, loosen the lock nut (Figure 4) on the pressure compensator adjusting screw and turn it counterclockwise (CCW) until pressure reads 2700 psi. Tighten lock nut.

If pressure is lower than 2700 psi, turn the pressure compensator adjusting screw clockwise (CW) until pressure reads 2700 psi. Tighten lock nut.

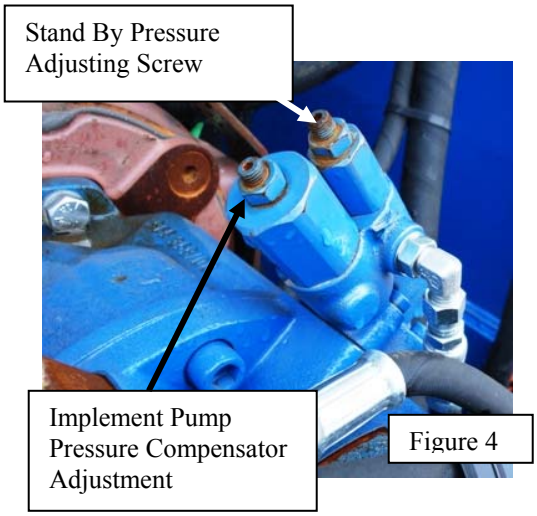


Figure 4

Propel Cross Over Reliefs

WARNING

MAKE CERTAIN PARKING BRAKES ARE FULLY ENGAGED AND CAN HOLD MACHINE STATIONARY BEFORE CONTINUING WITH THESE ADJUSTMENTS. FAILURE TO DO SO MAY CAUSE SEVERE BODILY HARM

Install a pressure gage on the pressure tap at the right implement pump **(P2)** (Figure 3) and at pressure port label **GA** (reverse propel) on the propulsion manifold (Figure 5).

NOTE: Both (RVA & RVB) crossover relief valves are non adjustable.

Loosen right implement pump pressure compensating screw lock nut (Figure 4) and turn the pressure compensator adjusting screw clockwise (CW) two turn.

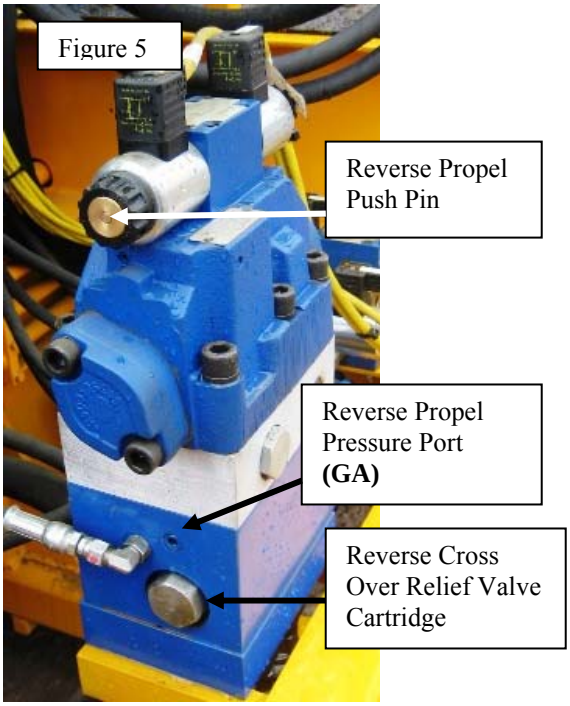
NOTE: BOTH TRANSMISSION SELECTOR SWITCHES (Figure 7) MUST BE IN NEUTRAL TO START THE ENGINE
(Forw – Neu – Rev / 1st – Neu – 2nd)

Chock wheels, start engine, turn the Travel/Work switch to the **travel** position. Manually override the propel reverse directional control valve (B) by pushing in the **push pin** (Figure 5) while adjusting right implement pump pressure compensating screw (Figure 4) counterclockwise (CCW) until pressure at gauge just begins to drop. This is considered cracking pressure. Pressure should be 2800 psi plus or minus 50 psi. If not inspect, repair, or replace the cross over relief valve (Figure 5)

Stop engine and move the pressure gage from (GA) to the pressure tap label (GB) (forward propel) on the opposite side the propulsion manifold. (Figure 5) turn the pressure compensator adjusting screw clockwise (CW) two turn.

Start engine, manually override the propel reverse directional control valve (A) by pushing in the **push pin** while adjusting right implement pump pressure compensating screw (Figure 4) counterclockwise (CCW) until pressure at gauge just begins to drop. This is considered cracking pressure. Pressure should be 2800 psi plus or minus 50 psi. If not inspect, repair, or replace the cross over relief valve (Figure 5)

Reset (P2) pump pressure compensator to system operating pressure (2700 psi). Tighten lock nut on adjusting screw.



Propel circuit return to hydraulic tank relief valve 300 PSI.

⚠ WARNING

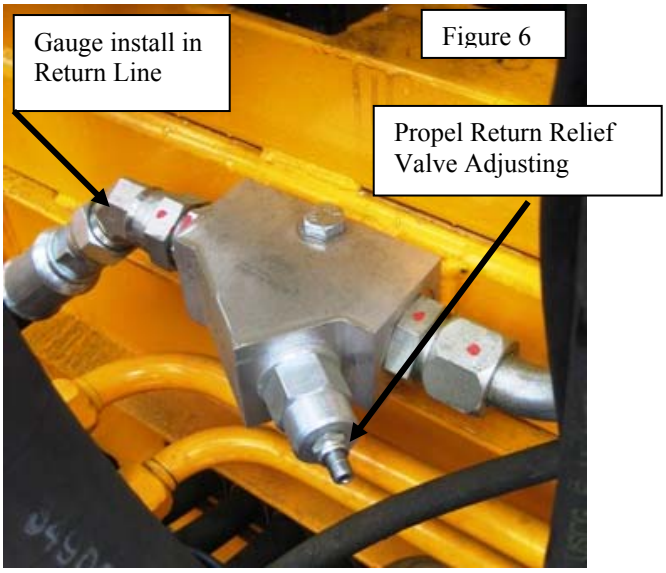
MAKE CERTAIN PARKING BRAKES ARE FULLY ENGAGED AND CAN HOLD MACHINE STATIONARY BEFORE CONTINUING WITH THESE ADJUSTMENTS. FAILURE TO DO SO MAY CAUSE SEVERE BODILY HARM

Used to throttle the flow back to the hydraulic reservoir to allow smoother propel operation at slower speeds and when coasting.

Located under the right implement pump (P2) mounted on the engine frame (Figure 6).

Install a pressure gauge in return hose going into the relief valve. Chock wheels, start engine, turn the Travel/Work switch to the **travel** position. Manually override the propel reverse directional control valve (B) by pushing in the **push pin** (Figure 4) while reading pressure at gauge.

Loosen the lock nut on (Figure 6), if pressure is higher than 300 psi, turn adjusting screw counterclockwise (CCW) until pressure reads 300 psi. Tighten lock nut.
If pressure is lower than 300 psi, turn adjusting screw clockwise (CW) until pressure reads 300 psi. Tighten lock nut.



Propel Circuit Pilot Operated Pressure Reducing Valves 1600 psi

⚠ WARNING

MAKE CERTAIN PARKING BRAKES ARE FULLY ENGAGED AND CAN HOLD MACHINE STATIONARY BEFORE CONTINUING WITH THESE ADJUSTMENTS. FAILURE TO DO SO MAY CAUSE SEVERE BODILY HARM

Install a pressure gage on the pressure tap at the pressure line out to both P1/P2 Implement Pumps (Figure 3).

NOTE: BOTH TRANSMISSION SELECTOR SWITCHES (Figure 7) MUST BE IN NEUTRAL TO START THE ENGINE
(Forw – Neu – Rev / 1st – Neu – 2nd)

Start engines and place Work/Travel switch in **TRAVEL** position and energize a travel directional control valve (Figure 5) push pin and check the pressure reading at each pump.

Pressure should read 2700 psi at both P1/P2 pumps, if not see procedures for setting the Implement Pump Pressure Compensator.

Switch the Work/Travel switch to the **WORK** position, then turn on the Warm Up switch located on the front of the left console to the **ON** position (Figure 7)

The pressure at both gauges installed at P1 and P2 Implement Pumps should now read 1600 psi.

If a pressure is lower than 1600 psi loosen the jam nut on the Implement Pump Vent Pressure adjusting screw (Figure 8) that needs adjusting, turn the adjusting screw in clockwise (CW) until pressure reads 1600 psi then tighten the lock nut.

If a pressure is higher than 1600 psi loosen the jam nut on the Implement Pump Vent Pressure adjusting screw (Figure 8) that needs adjusting, turn the adjusting screw in counterclockwise (CCW) until pressure reads 1600 psi then tighten the lock nut.

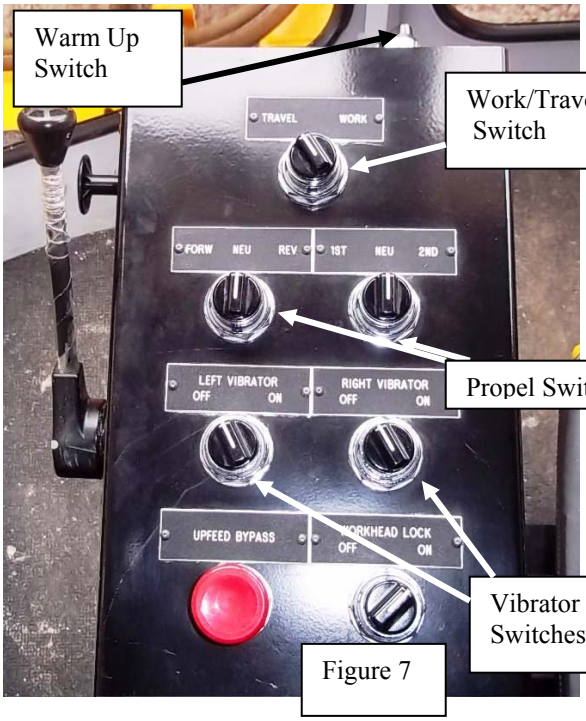


Figure 7

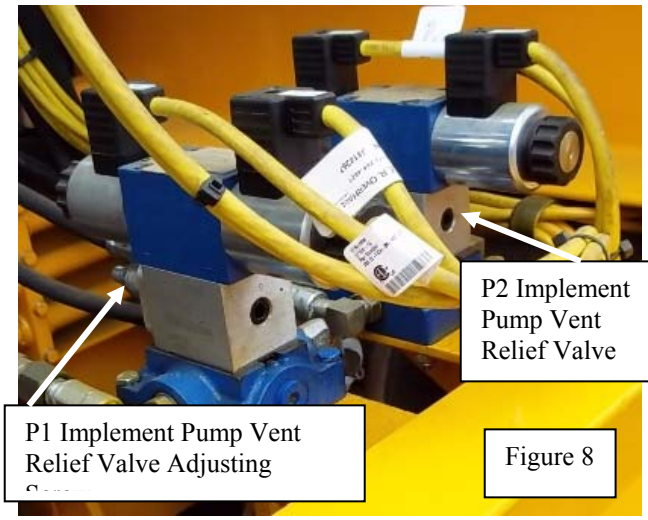


Figure 8

Solenoid Operated Vent Relief Valve: Vibrator Pumps (P3, P4, P5, & P6)

The Solenoid Operated Ventable Relief Valves for the 4 vibrator pumps are located on the left rear side of machine under the engine radiator (Figure 9). The left valve is for the (P3 & P4 Vibrator Pumps) and the right valve is for the (P5 & P6 Vibrator Pumps). The normally open valves dumps oil into the return manifold, thru the hydraulic cooler, and then back to the hydraulic tank until the valve's solenoid is energized (24 volts). (Figure 10) shows the location of each vibrator pump.

Install a gauge at the pressure tap at of the vibrator relief valve being checked (Figure 11).

You must cap and plug the pressure hose on all 4 motors for the vibrator circuit being tested (Figure 12). **NOTE: The hydraulic hose on the forward side of the each motor is the pressure hose.**

CAUTION: Use caps and plugs that can with stand high hydraulic pressure.

Chock wheels, Start engines and place the Work/Travel switch in **TRAVEL** position and turn the Vibrator Switch (For circuit being tested) to the **ON** position (Figure 7).

If a pressure is lower than 2250 psi loosen the jam nut above the adjusting knob for the Vibrator Pressure Relief valve (Figure 11) that needs adjusting, turn the knob out clockwise (CW) until pressure reads 2250 psi then tighten the lock nut.

If a pressure is higher than 2250 psi loosen the jam nut above the adjusting knob for the vibrator Pressure Relief valve (Figure 11) that needs adjusting, turn the knob in counterclockwise (CCW) until pressure reads 2250 psi then tighten the lock nut.

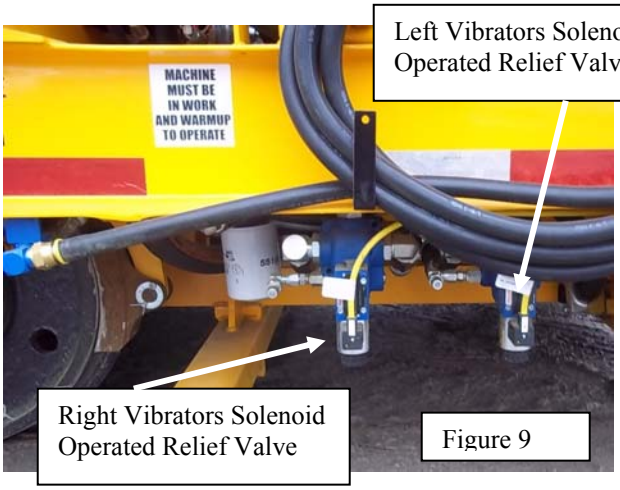


Figure 9

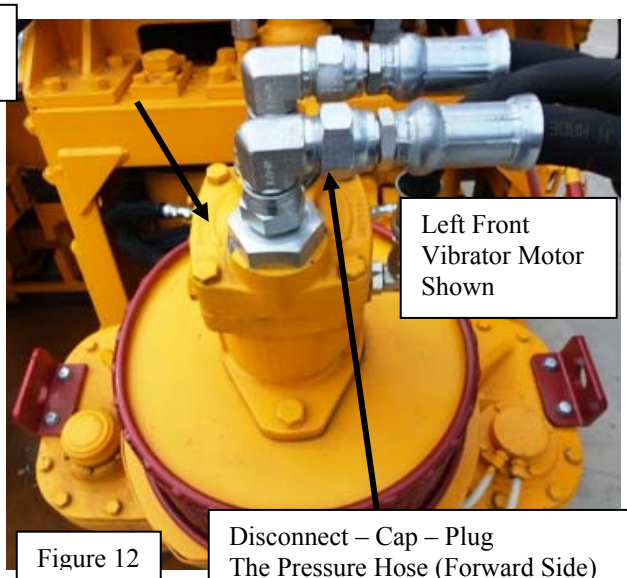


Figure 12

Disconnect – Cap – Plug
The Pressure Hose (Forward Side)

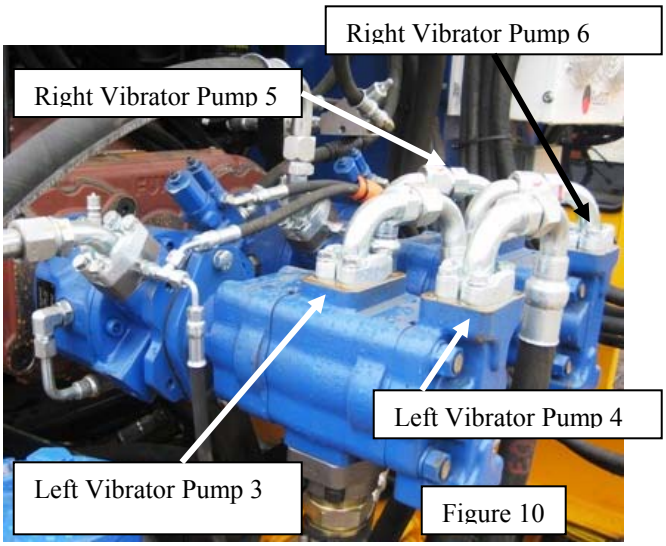


Figure 10

Left/Right Squeeze Pressure Switch

Procedures for the adjustment of the Squeeze Pressure Switch are listed in the Set Up & Operation Section.

Left/Right Squeeze Flow Control Valves

Procedures for the adjustment of the Squeeze Flow Controls are listed in the Set Up & Operation Section.

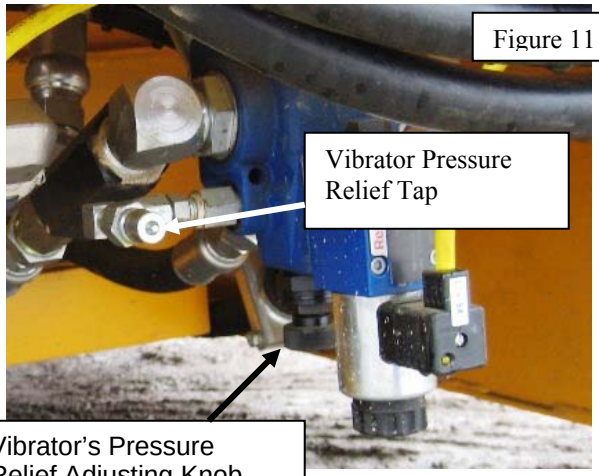


Figure 11

Work Head Up Pilot Flow Control Valves (LEFT & RIGHT)

Located in between the work head up/down control valve and the pilot operated directional control valve (Figure 13).

Controls the speed of the work head cylinder as it begins to travel up (retract).

Loosen lock nut on adjusting screw and turn the adjusting screw counterclockwise (CCW) to increase cylinder speed up and turn the adjusting screw clockwise (CW) to decrease cylinder UP speed.

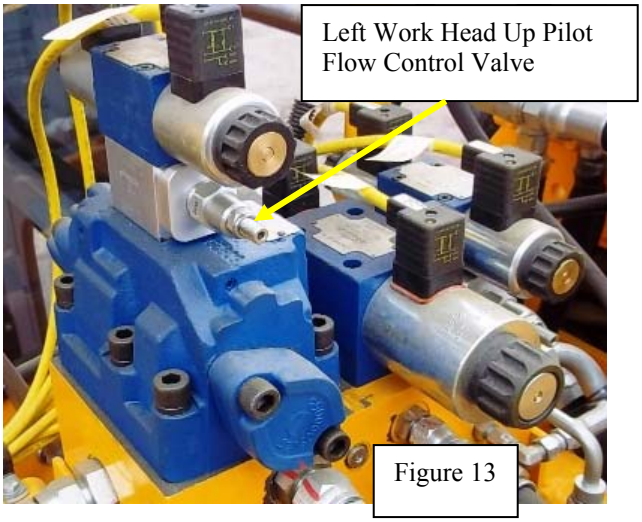


Figure 13

Traverse Motor Flow Control Valves (LEFT & RIGHT)

Located under the traverse motor directional control valves (Figure 14).

Controls the speed of the left/right work head traverse hydraulic motor (Figure 15) as it travels left to right.

Loosen lock nut on adjusting screw and turn the adjusting screw counterclockwise (CCW) to increase motor chain drive speed and turn the adjusting screw clockwise (CW) to decrease motor chain drive speed.

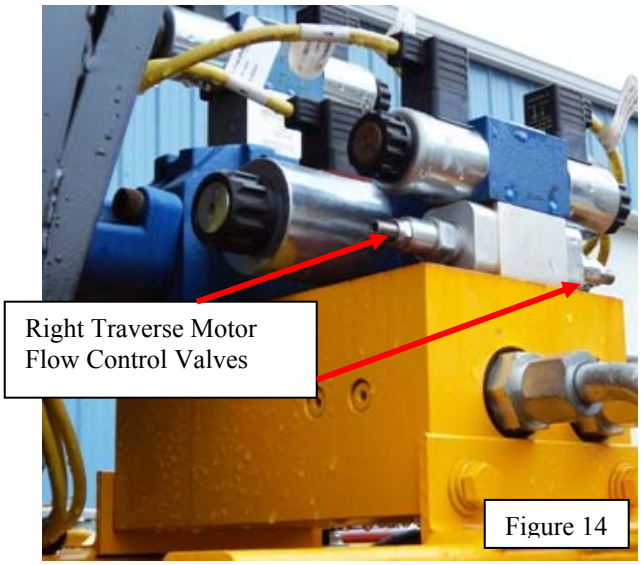


Figure 14

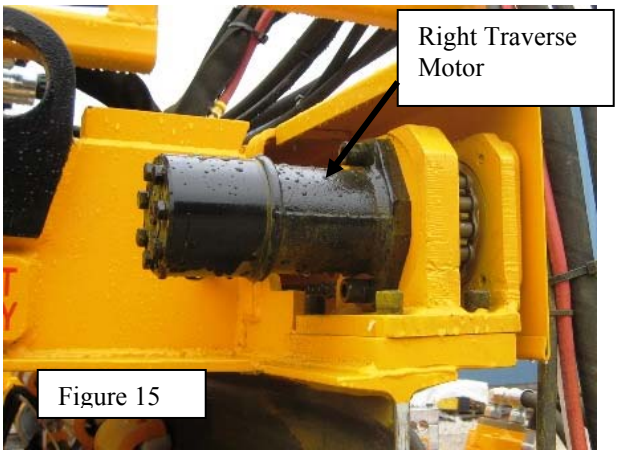


Figure 15

Oil Cooler Pressure Relief Valve 500 PSI

The relief valve for the oil cooler circuit (Figure 16) is mounted on a bracket to the right of the oil cooler. The oil cooler pump is mounted onto the back of the engine driven air compressor (Figure 17). The oil cooler hydraulic motor (Figure 18) is mounted onto the oil cooler fan assembly..

Install a pressure gauge at the oil cooler relief valve assembly (Figure 16).

Start engine and read the pressure at the gauge, if higher than 500 psi, loosen the lock nut on the oil cooler relief valve adjusting screw and turn the adjusting screw counterclockwise (CCW) to decrease the pressure to 500 psi. Tighten lock nut.

If the pressure at the gauge is lower than 500 psi, loosen the lock nut on the oil cooler relief valve adjusting screw and turn the adjusting screw clockwise (CW) to increase the pressure to 500 psi. Tighten lock nut.

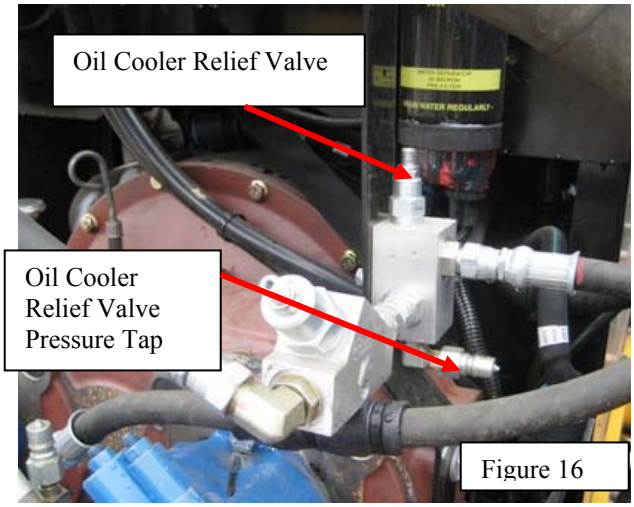


Figure 16

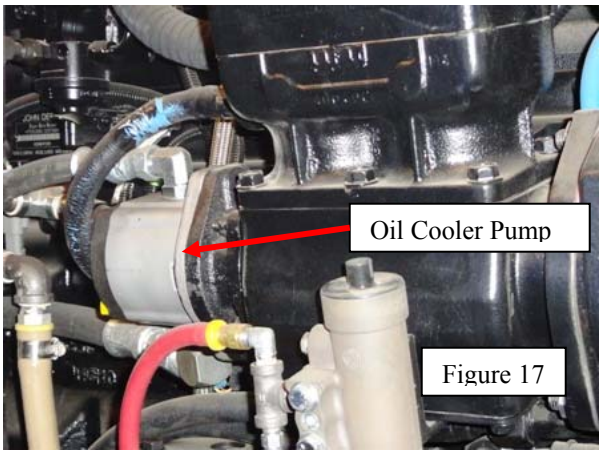


Figure 17

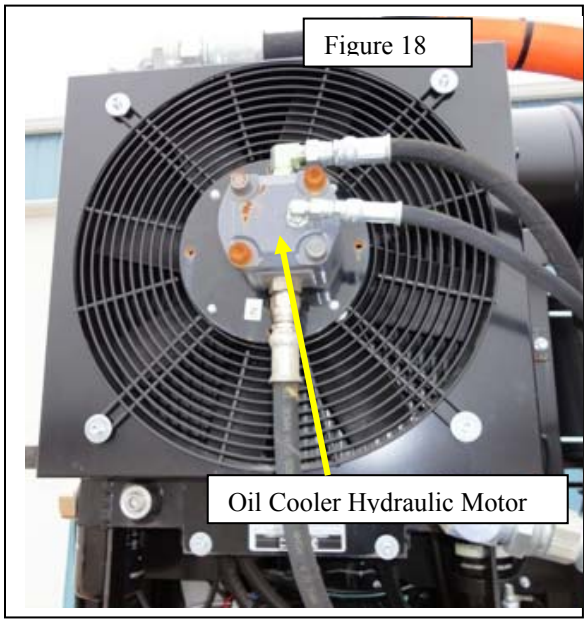


Figure 18

Oil Cooler Needle Valve

The oil cooler needle vale (Figure 19) controls the hydraulic oil flow to the oil cooler fan motor.

To increase the rpms of the cooler fan, start engine, loosen the lock nut and turn the needle valve out counterclockwise (CCW), to decrease the speed of the cooler fan turn the needle valve clockwise (CW), tighten lock nut when done.

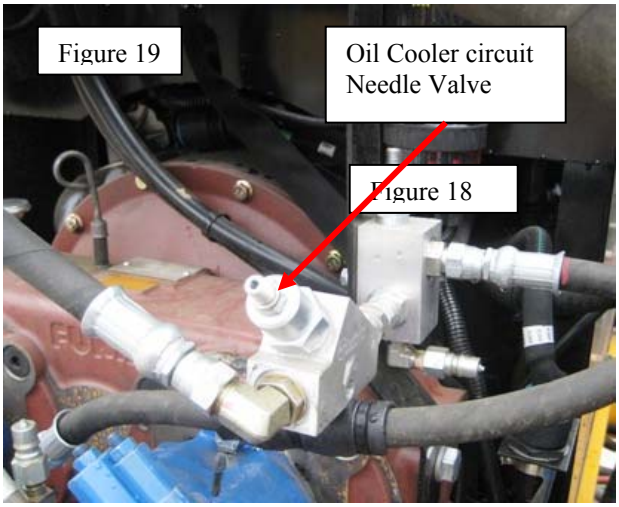


Figure 18

Work Decel Valve

This adjustable flow control in the cab (Figure 19) controls the rate of deceleration in work mode. Turning the knob clockwise in will result in a hard/faster deceleration, turning the knob counterclockwise smoother/slower deceleration.

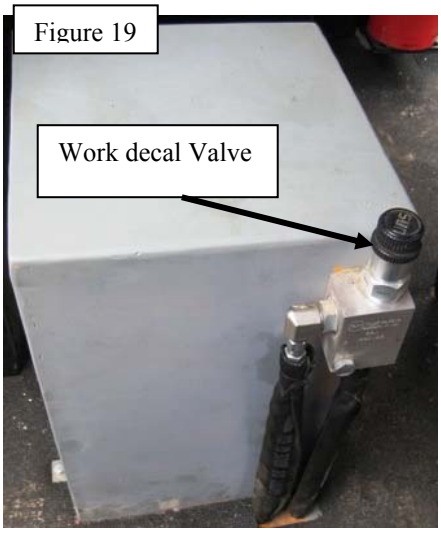


Figure 19

GENERAL TROUBLESHOOTING

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. This 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 problems, causes and remedies not covered in this guide. To use the guide most efficiently, locate a problem that matches the one being experience and, in a step-by-step method, check the causes listed until the correct remedy is found and the problem solved.

⚠ CAUTION

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 SYSTEM - GENERAL

Hydraulic components are precision devices. Careless handling of them or other parts of the system can result in malfunction or failure. In order to ensure efficient operation of components, it is essential, if repairs become necessary, to follow the instructions supplied in the Component Data section of this manual for a particular component. Whether assembling or taking apart, it is important that the internal parts of the component be kept clean. Maintenance and operation are dependent on the conditions under which the equipment is working.

To avoid creating problems when installing or repairing hydraulic components, follow these tips:

1. Clean away the dirt in and around equipment before taking apart lines and removing parts.

2. Cap off all disconnected lines and open ports.

3. Protect the overhaul area from grinding dust, machining chips, and wind driven dirt.

4. Work only on metal or hard finished bench tops that are easy to keep clean.

5. Handle parts carefully to avoid nicks and burrs.

6. Use lint-free cloths to wipe parts.

7. Use smooth burr-less tools, especially when working with O-rings.

8. Lubricate all sliding parts during assembly.

9. Cover sharp grooves and threads with thimble or shim stock when installing O-rings and other seals.

10. Discard all used O-rings to avoid re-use.

11. Make certain that seals are of the right size and material.

12. Use only recommended replacement parts.

13. Examine all prematurely worn or malfunctioned parts for clues as to the cause of the failure.

14. Test the overhauled device before reinstalling it, if possible.

HYDRAULIC OIL AND RESERVOIR

Level

Inspect the oil level on a daily basis (or every 10 hours of operation) by reading the sight gauge located on the side of the reservoir. At full level, the oil should be to the top of the sight gauge. The hydraulic system uses SAE-20 (ISO 46) **(CP uses Hydrex XV)** oil. 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

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 the 24 volt top off pump and filter. NEVER OVERFILL RESERVOIR. Never use hydraulic brake fluid in lieu of hydraulic oil.

OIL CLEANLINESS

Proper fluid condition is essential for long and productive life of hydraulic components and systems. Thorough precautions should always be observed to insure the hydraulic system is clean:

1. Filter each change of oil to prevent introduction of contaminants into the system.

2. Maintain the proper oil level and regularly service filters, breathers, and reservoirs.

3. Take precautions to prevent moisture contamination. Change fluid whenever contamination occurs because even small amounts of water can affect system performance as well as induce corrosion and oil breakdown.

Our pump manufacturer recommends a target cleanliness level of ISO15/13. Representative sampling should be made at the return line directly ahead of the return line filter. In all sampling, it is critical that the system be running or just shut down. Sampling should be done every 2 months on systems running more than 8 hours per day.

SUCTION LINE STRAINER

Located on the bottom engine side of the reservoir, remove and inspect the strainer/magnets after the first 40 hours of operation and every month thereafter. Clean as required.

NOTE: ENSURE SUCTION VALVE IS REOPENED BEFORE STATING ENGINE.

NOTE: If for any reason removal of suction line filter assembly is necessary, you must seal the hydraulic tank to prevent external contamination.

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 tbe 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.

HOSES AND FITTINGS

Inspect all hoses, fittings and components for damage, wear, or leaks. Nordco recommends that all hose, hose assemblies, and/or fittings replaced by the customer equal or exceed the original equipment specifications.

All hoses should be replaced during major overhaul and/or after a maximum of five years of service.

When removing hydraulic hoses, fittings or components the following procedure must be followed:

- Stop engine
- Always wear appropriate safety gear.
- Make certain locks and brakes have been applied.
- Make certain hydraulic system has been depressurized. Escaping fluid can whip hoses and expel fittings or components at high velocity.
- Remove hoses, fittings or components slowly to release any trapped pressure.
- Do not sustain full system flow through system relief valve for more than 10 seconds. Full system flow at high pressure through relief valve will create extremely high temperatures.

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.

OIL COOLER (EXTERIOR ONLY)

Brush debris from outside of oil cooler with a soft brush. Inspect fins for damage or obstructions every 200 hours of operation. Blow out debris from cooler fins with compressed air as required.

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.

Old and contaminated oil cannot be improved by topping off with fresh oil. It is more practical to drain the system while the oil is still at working temperature, clean the reservoir and replace with fresh oil.

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.

Disposing of Waste Oil

Dispose of used hydraulic and lubricating oil and filters in an environmentally responsible manner, according to recommendations of the Environmental Protection Agency (EPA), your local and/or State laws, and the recommendations of your employer. Store waste oil only in properly designated containers and dispose of only in authorized fills. Do not pour waste onto the ground, down a sewerage drain, or into any water source. Ground contamination by toxic waste is costly both to you and to the environment

HYDRAULIC SYSTEM
TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	SOLUTION
Hydraulic pump(s) do not develop pressure	No hydraulic oil in tank (NOTE: if pumps are run without oil in tank, pump damage will occur.)	Check oil level sight glass. Refill tank.
	Suction shut-off valve closed. There are two suction filters. (NOTE: if pump is run with valve closed, pump damage will occur.)	Open valve completely.
	Relief valve bypassing. (NOTE: oil blowing past any relief valve can cause oil to overheat.)	Increase pressure setting on relief valve. (See Pressure checks)
	.Pump is defective.	Refer to pump manual or replace pump.
A Hydraulic pump is excessively noisy	Cold oil.	Allow unit to warm up.
	Low oil level.	Check and add oil.
	Oil viscosity too high (oil too thick)	Drain and add correct oil as specified under "RECOMMENDED LUBRICANTS".
	System relief valve set too low.	Increase pressure setting on relief valve (see Pressure Checks)
	Intake hose to pump restricted.	Inspect and repair.
	Defective pump.	See pump manual, repair or replace pump.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Hydraulic Oil Overheats	Hydraulic reservoir oil level low	Add hydraulic oil to proper level
	Oil viscosity too high (oil too thick)	Drain and add correct oil as specified under “RECOMMENDED LUBRICANTS”
	System relief valve set to low	Increase pressure setting (see pressure checks).
	Orifice, hydraulic passage way, or other internal restriction.	Inspect, repair, or replace. Check filters
	Inspect oil cooler – insufficient air flow. input air temperature, debris in cooling fins.	Clean, repair, or replace oil cooler.
Hydraulic Oil Filter Restriction Indicator Light stays on all the time (optional equipment)	Restricted (dirty) oil filter	Replace filter
Note: Hydraulic oil must be close to operating temperature (not cold) otherwise indicator may light up	Hydraulic Oil Filter Restriction Indicator switch defective	Replace switch
Hydraulic Oil Foams	Water in oil	Drain and add correct oil as specified under “RECOMMENDED LUBRICANTS”
	Using wrong oil	Drain and add correct oil as specified under “RECOMMENDED LUBRICANTS”
	Low Hydraulic oil level	Fill reservoir to recommended level
	Air leak in suction line to hydraulic pump or pump shaft seal leaking.	Inspect, repair or replace

PROBLEM	POSSIBLE CAUSE	SOLUTION
An individual work head function is slow or does not work in manual mode	P1-P2 pump circuit	Check that the propel Travel/Work switch is not in **neutral** Is theP1/P2 vent valves directional control valve shifting: Travel pressure 2700 psi Work pressure 1600 psi Neutral vent back to tank
	Problem at directional control valve	Check for voltage (24 v) at the directional control valve's coil Check that coil becomes magnetized Check that the directional control valve spool shifts
	Cylinder or motor is defective	Inspect, disassemble, repair, and or replace
Machine will not propel	Parking Brakes on Service brakes on	Pull out parking brake release Push service brake control lever forward
	P1 – P2 pumps not developing pressure	Check that the propel Travel/Work switch is not in **neutral** Is theP1/P2 vent valves directional control valve shifting: Travel pressure 2700 psi Work pressure 1600 psi Neutral vent back to tank
	Check that the: Forw/Rev switch is not in **neutral** 1st/2nd switch is not in **neutral**	Place switches in desired position
	Work Decel Valve Closed	Turn work decal valve counterclockwise
	A propel counterbalance valve is defective – debris in valve allowing fluid back to tank	Debris in valve, disassemble, inspect, clean, repair, or replace valve.
	Defective propel hydraulic motor	Disassemble, inspect, clean, repair, or replace motor.
	Propel directional control valve spool will not shift	Check for voltage at coil, check coil, check for stuck valve spool, disassemble, inspect, clean, repair, or replace valve. .

PROBLEM	POSSIBLE CAUSE	SOLUTION
Work Head(s) do not raise/lower	Lock up cylinder is engaged	Release the lock up air cylinder
	Problem at directional control valve	Check for voltage (24 v) at the directional control valve's coil
		Check that coil becomes magnetized
		Check that the directional control valve spool shifts
	Up pilot flow control malfunctioning (Debris)	Inspect, disassemble and look for debris, repair, and or replace flow control valve
	Cylinder is defective	Inspect, disassemble, repair, and or replace cylinder
Turntable (center jack) does not lift machine	Low hydraulic pressure	See Hydraulic Troubleshooting
	Bad cylinder	Inspect, repair, or replace cylinder
Vibrator(s) not working	Travel/Work switch wrong position or defective	Switch Work/Travel switch to **Work** position – check wiring
	Right and/or Left Vibrator off/on switch not turned **on**	Turn the switch to on
	Vibrator Vent valve(s) not shifting	Check for voltage from vibrator on/off switch at the valves coil
		Check that coil becomes magnetized
		Check that the directional control valve spool shifts freely
	Vent valve pressure relief low	Inspect and adjust
	P3,P4,P5 or P6 pump defective	Check for pressure and flow from a pump to it's vibrator motor

PROBLEM	POSSIBLE CAUSE	SOLUTION
Oil Cooler fan not turning	Hydraulic pump mounted to air compressor is defective	Inspect, disassemble, repair, or replace pump
	Oil cooler pressure relief valve malfunction	Check pressure at relief valve and adjust
	Debris in relief valve or needle valve	Inspect, disassemble, repair, or replace relief valve or needle valve
	Oil cooler hydraulic motor defective	Inspect, disassemble, repair, or replace relief valve or needle valve