

INDEX	DATE	AMENDMENTS	BY	CHECK BY
00	21/JUL/2013	CREATED	A BRUNER	

Maintenance operation description:

Remove the hydraulic power pump unit to fix or replace.

Level of knowledge required:

The use of this card implies that its user is trained on this kind of machine and that this training was delivered by Haulotte or an authorized representative, following the program for DIAG LEVEL II

It is important that the person performing the work on the machine knows all the relative safety information contained in the instruction manual



Only an authorized and qualified technician can work on HAULOTTE machines

Machines concerned:

3632T (HTT13,) 3522A (HTA13P), 4527A (HTA16P), 5533A (HTA19P), 45XA (HLA16PX), 55XA (HLA19PX)

Summary:

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1. Number of people required for maintenance operation

1 person

2. Duration of maintenance operation

1 hour

3. Necessary parts

<u>Designation</u>	<u>Part Number</u>	<u>Quantity</u>
3632T Hydraulic Power Unit	A-00254HS	1
3522A Hydraulic Power Unit	A-01254HS	1
4527A Hydraulic Power Unit	A-00254HS	1
5533A Hydraulic Power Unit	A-02254HS	1
45XA Hydraulic Power Unit	A-00254HS	1
55XA Hydraulic Power Unit	A-02254HS	1
3632T Pump	B02-15-0470	1
3522A Pump	B02-15-0470	1
4527A Pump	B02-15-0470	1
5533A Pump	B02-15-0512	1
45XA Pump	B02-15-0470	1
55XA Pump	B02-15-0512	1
Hydraulic Motor	B02-15-0471	1
Serial Port Cable	B22-00-0056	1
Pressure Gauge Kit	B22-02-0316	1

4. Safety instructions



- The technician should take all steps to protect themselves and others against all risks of injury related to this maintenance operation.
- The technician should ensure they have the PPE (personal protective equipment) suitable for the job and the particular environmental conditions in which the material can be found (see safety information specific to the operation site).
- Position the machine on flat ground, stabilized and in an open environment.
- Mark out the work area
- Turn the key to the OFF position to remove the key. Unplug the battery connector.
- Place a 'DO NOT USE' label near the start/stop contactor (key switch) to inform personnel that maintenance operations are currently underway on the equipment.
- The pressure in the hydraulic system is hazardous and may cause accidents. Relieve the pressure before any maintenance operation. Never search for oil leaks using your hands.
- Attention to the risk of burns, the hydraulic system works at high temperatures.
- The exhaust fumes of the engines contain harmful products of combustion. Only start and run the engine in a well ventilated Area. In a closed room, you must use a suitable system to remove the exhaust.

5. Tools / Specific procedure / Diagrams / Software



- PPE (Personal Protective Equipment: safety shoes, gloves, glasses, ect...)
- 8, 10, 13, 14, 17, 18, 21 mm wrenches
- 6 and 15 mm Allen wrenches
- Computer with RS232 communication (port or adaptor)
- Configuration program
-
-

6. Preliminary operations



. See security instructions chapter 3



. Mark the work area off correctly

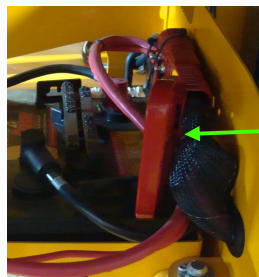
7. Procedure

HYDRAULIC PUMP REPLACEMENT

Hydraulic Power Unit Replacement

Use the following procedure to replace faulty hydraulic power units:

1. Remove the cover for the power unit compartment.
2. Unplug the hydraulic power unit from the battery by pulling the handle at the ground control station. Refer to figure 1.1.



Plug handle

Figure 1.1

3. Remove bolts (3) from under the power unit compartment that hold the hydraulic power unit in place.
4. Place a container under the drain plug. Be sure it is large enough to hold the entire contents of the reservoir. Remove the plug and drain the hydraulic fluid from the reservoir.

Hydraulic Power Unit Replacement (Continued)

5. Rotate the hydraulic power unit to provide easier access to the hoses and plugs attached to the pump. Tag and number all hydraulic hoses that attach to the hydraulic power unit. Use a marker to label where each of the hose attaches. Refer to figure 1.2 and 1.3.

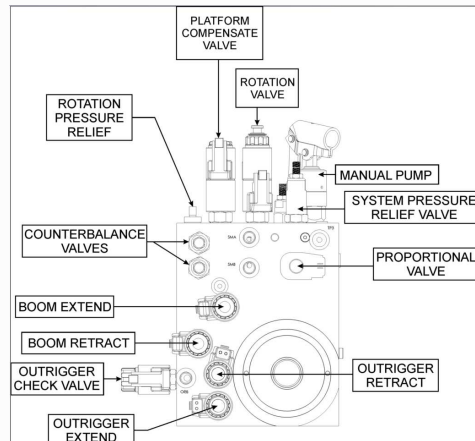


Figure 1.2

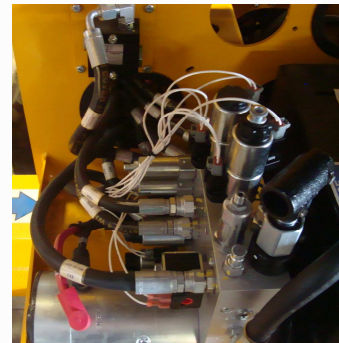


Figure 1.3

6. Remove and plug all hydraulic hoses to the pump.
7. Unplug and label the location of all the wires and battery cables attached to the hydraulic power unit.
8. Remove hydraulic power unit from the machine.
9. Reinstall or replace the hydraulic power unit to the power unit compartment.
10. Attach the hoses and wires to the same location indicated by the labeling done in step 5. Tighten #6 hose fittings to 30 ft lbs and #8 hose fittings to 40 ft lbs.
11. Bolt the hydraulic power unit to the power unit compartment. Tighten bolts to 37 ft lbs.
12. Refill the reservoir with hydraulic fluid.
13. If replacing contact Bil-Jax Technical Support to receive the configuration program for adjusting the board for proper operation. Install the program on a computer that can be moved to the machine.
14. With the configuration program installed, plug the computer into the box on the machine. A serial port cable will be required to connect to the box.

Hydraulic Power Unit Replacement (Continued)

15. Turn the key to the ground control box position. Lower the outriggers until weight is transferred to the outriggers and the machine is level.
16. Open the program on the computer. A pop up will appear, click enter. If another pop up appears and asks if you want to read the configuration parameters click yes and allow time for parameters to be read then move on to step 17. Otherwise at the top of the program go to controller/read. This will read all the values that are stored in the control box and allows adjustments to be made from the computer. Refer to figure 1.4.



Figure 1.4

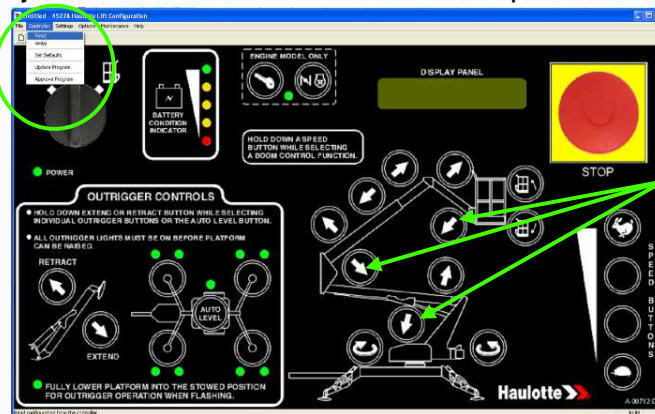


Figure 1.5

17. Set the down functions of the primary, secondary and jib lift cylinders. This is done by altering the speed section for each function when clicking on the specific function from the program on the computer. Refer to figure 1.5 and 1.6. When adjusting the jib boom, start with the boom at full height and record the time it takes to come to rest at the bottom of its stroke. An 8 foot chain should be attached to the latch hook for the primary boom, and for the secondary boom the chain should be attached to the platform cage. Refer to figures 1.7 and 1.8. For the primary and secondary down functions the boom should be raised until the bottom of the chain is just above the ground. As the boom is being lowered the time should be recorded when the bottom of the chain touches the ground until the boom comes to its resting position. Use the following tables to adjust the mAmp in the speed section in order to achieve the proper time required for the boom to lower at the particular speed setting. Each boom should have a high speed setting of 100 mAmp. Complete this at each speed setting for each lift cylinder. Multiple trials may be required for each function and speed setting.

HYDRAULIC PUMP REPLACEMENT (CONTINUED)

Hydraulic Power Unit Replacement (Continued)

Jib Down Full Stroke No Weight in Basket	
High	15-17 sec
Mid High	19-21 sec
Mid Low	23-25 sec
Low	31-33 sec

Primary Boom Down (8') No Weight in Basket	
High	19-21 sec
Mid High	23-25 sec
Mid Low	30-32 sec
Low	39-41 sec

Secondary Boom Down (8') No Weight in Basket	
High	11-13 sec
Mid High	15-17 sec
Mid Low	24-26 sec
Low	37-39 sec

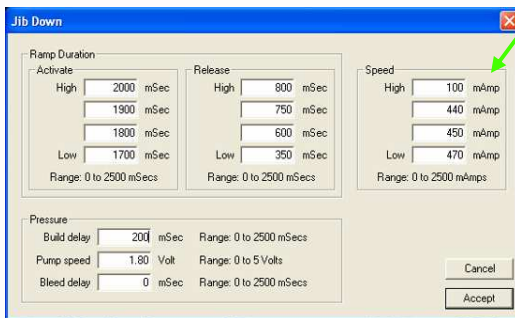


Figure 1.6

Speed section



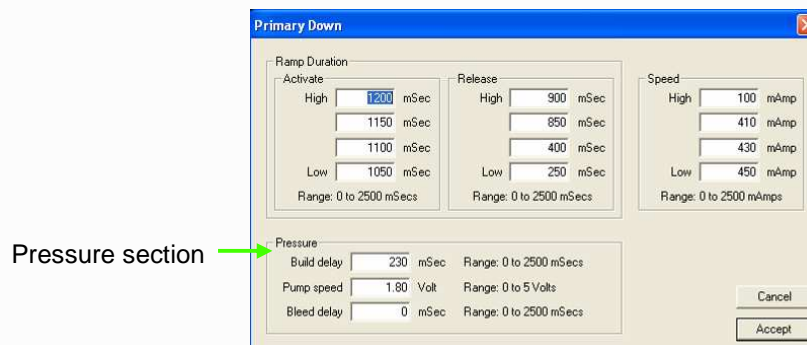
Figure 1.7



Figure 1.8

Latch hook

- Set the lift cylinders pressure section by adjusting the build delay and pump speed for both the up and down functions in the high speed setting. Refer to figure 1.9. Make adjustments to make the boom movement smooth, if the boom “drops” increase either the build delay or pump speed and if the boom “jumps” decrease the build delay or pump speed. When setting the values have 250-300 pounds in the platform cage. Adjust each function until the boom moves with the least “jump” or “drop”. The build delay average range is 200-400 milliseconds while the pump speed average range is 1.8-2.2 Volts. Complete this for each of the lift cylinders.



Pressure section

Figure 1.9

19. Raise the booms out of the stowed cradle at the front of the machine.
20. Adjust the rotation force by turning in or turning out the rotation pressure relief. When rotating a person should be able to stand at the opposite end of the pivoting point and stop the machine from turning by applying a force against the machine. If the person cannot stop the machine the rotation pressure relief should be screwed out. Refer to figure 1.10.

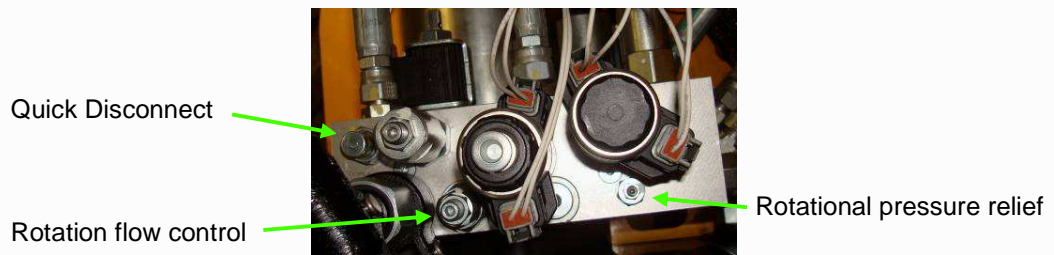


Figure 1.10

21. Go to the configuration for the rotation and adjust the voltage value for high speed to 3.5 Volts or higher if necessary.
22. Time the high rotation speed for a quarter of a rotation. Based on the table below for rotation timing adjust the rotation flow control by turning it in or turning it out. Only turn the rotation flow control when adjusting for the high speed setting. Other speed settings will be changed in a future step. Refer to figure 1.10.

Rotation Speeds ¼ Turn (seconds)				
Machine	High	Mid High	Mid Low	Low
26	21-23	26-28	34-36	44-46
36	24-26	30-32	40-42	44-46
46	18-20	30-32	40-42	52-54
35	21-23	26-28	34-36	44-46
45	24-26	30-32	40-42	44-46
55	24-26	30-32	40-42	46-48

23. Attach a pressure gauge to the quick disconnect in order to take the running pressure. Re-adjust the high speed voltage so the running pressure is between 1000 and 1500 psi. Refer to figure 1.10.

24. Adjust other speeds using the configuration program and changing the speed section for the rotating function. Be sure all values used for the direction being used for timing are set in the other direction in the same speed setting. Refer to figure 1.11.

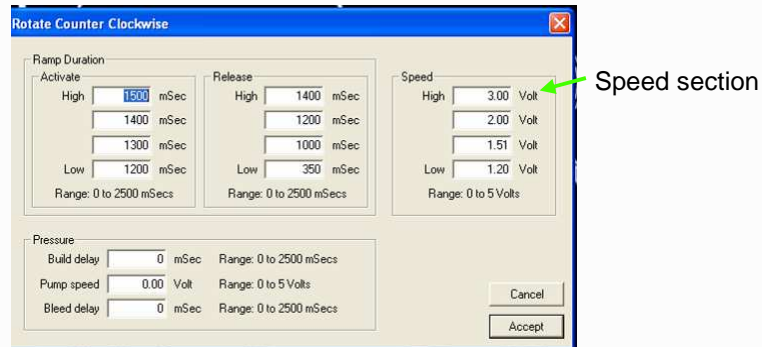


Figure 1.11

25. Refill the reservoir with hydraulic fluid to the fill line. Tighten plug to 118 ft lbs.

Pump Replacement

Use the following procedure to replace faulty pumps in a hydraulic power unit:

1. Follow the above procedure through step 8.
2. Unbolt and remove the valve housing from the reservoir. Refer to figure 1.12.

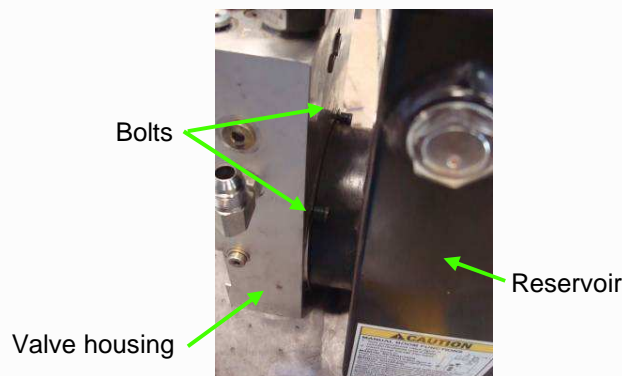


Figure 1.12

HYDRAULIC PUMP REPLACEMENT (CONTINUED)

Pump Replacement (Continued)

3. Unbolt and remove the pump from the valve housing. Refer to figure 1.13.

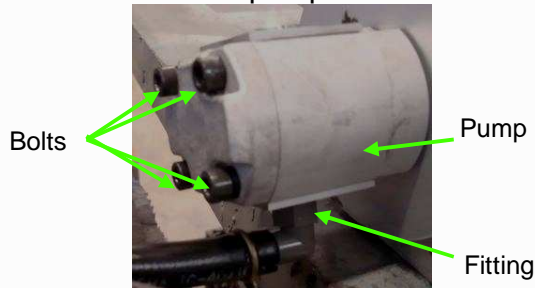


Figure 1.13



Figure 1.14

4. Remove the fitting from the pump. Refer to figure 1.13. Remove the plug from the pump. Refer to figure 1.14.
5. Install the fitting and plug to the new pump. Tighten the plug to 22 ft lbs and the fitting to insure it is free from leakage.
6. Reinstall or replace the pump to the valve housing. Apply 1 drop of locktite to the coupling. Be sure the coupling is correctly lined up with the pump. If necessary rotate the coupling using pliers to line it up with the new pump. Tighten bolts to 22 ft lbs. Refer to figure 1.15.

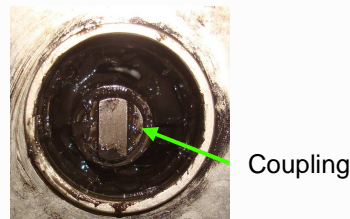


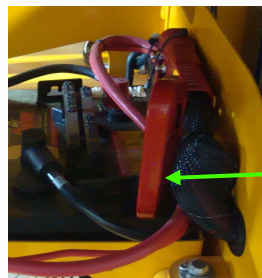
Figure 1.15

7. Bolt the valve housing to the reservoir. Tighten reservoir nuts to 15 ft lbs.
8. Reinstall or replace the hydraulic power unit to the power unit compartment.
9. Attach the hoses and wires to the same location indicated by the labeling done in step 5 of the previous procedure. Tighten #6 hose fittings to 30 ft lbs and #8 hose fittings to 40 ft lbs.
10. Bolt the hydraulic power unit to the power unit compartment. Tighten bolts to 37 ft lbs.
11. Refill the reservoir with hydraulic fluid.
12. Follow the above procedure starting at step 13 to reconfigure the machine for the new pump. If the values

Hydraulic Motor Replacement

Use the following procedure to replace a broken or faulty hydraulic motor:

1. Remove the cover for the power unit compartment.
2. Unplug the hydraulic power unit from the battery by pulling the handle at the ground control station. Refer to figure 1.16.



Plug handle

Figure 1.16

3. Remove bolts (3) from under the power unit compartment that hold the hydraulic power unit in place.
4. Place a bucket under the drain plug. Remove the plug and drain the hydraulic fluid from the reservoir.
5. Rotate the hydraulic power unit to provide easier access to the hoses and plugs attached to the pump. Tag and number all hydraulic hoses that attach to the hydraulic power unit. Use a marker to label where each of the hose attaches. Refer to figure 1.17 and 1.18.

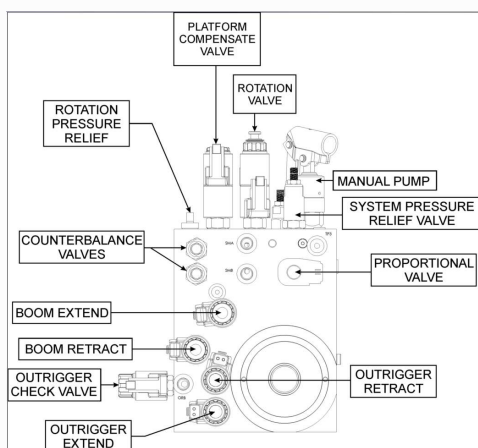


Figure 1.17

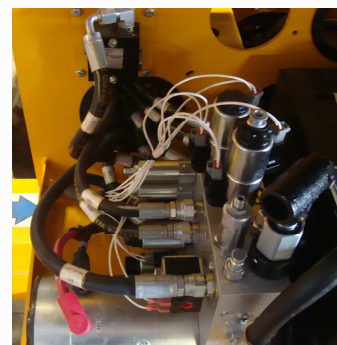
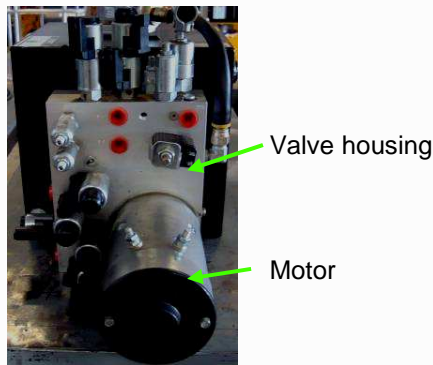


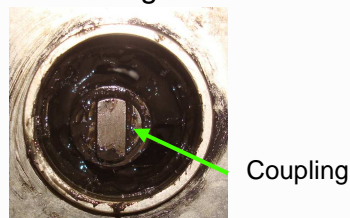
Figure 1.18

Hydraulic Motor Replacement (Continued)

6. Remove and plug all hydraulic hoses to the pump.
7. Unplug and label the location of all the wires attached to the hydraulic power unit.
8. Remove hydraulic power unit from the machine.
9. Unbolt the motor from the valve housing. Refer to figure 1.19.

**Figure 1.19**

10. Remove the motor from the valve housing.
11. Replace the motor. Be sure the coupling is correctly lined up with the motor bearing. If necessary rotate the coupling using pliers to line it up with the new motor. Apply 1 drop of loctite to the male threads of the bolts. Tighten bolts to 53 in lbs. Refer to figure 1.20.

**Figure 1.20**

12. Reinstall or replace the hydraulic power unit to the power unit compartment.
13. Attach the hoses and wires to the same location indicated by the labeling done in step 5 of the previous procedure. Tighten #6 hose fittings to 30 ft lbs and #8 hose fittings to 40 ft lbs.
14. Bolt the hydraulic power unit to the power unit compartment. Tighten bolts to 37 ft lbs. Refill the reservoir with hydraulic fluid. Tighten plug to 118 ft lbs.

8. Complementary operations

Refill the reservoir with hydraulic fluid. Clean up oil spilt during replacement.

9. Checks

Operate the machine to be sure the hydraulic power unit is working properly.