

Product: New Holland L-451/L-452/L-454/L-455 Skid-Steer Loader Service Repair Manual

Full Download: [https://www.aresairmanual.com/downloads/new-holland-l-451-l-](https://www.aresairmanual.com/downloads/new-holland-l-451-l-452-l-454-l-455-skid-steer-loader-service-repair-manual/)

[452-l-454-l-455-skid-steer-loader-service-repair-manual/](https://www.aresairmanual.com/downloads/new-holland-l-451-l-452-l-454-l-455-skid-steer-loader-service-repair-manual/)

SERVICE MANUAL

SKID-STEER LOADER L-451, L-452, L-454, L-455

NEW HOLLAND



Sample of manual. Download All 104 pages at:

<https://www.aresairmanual.com/downloads/new-holland-l-451-l-452-l-454-l-455-skid-steer-loader-service-repair-manual/>

40045140

Reprinted

INTRODUCTION

This manual provides the technical information needed to properly service and maintain the Models L-451, L-452, L-454, and L-455 skid-steer loaders. Use this manual in conjunction with the operator's manual which is supplied with the loader. Keep both manuals available for ready reference. For information on engine repair, refer to the engine manufacturer's service manual.

On New Holland equipment, left and right are determined by standing behind the unit, looking in the direction of travel.

The easiest and least time-consuming removal, disassembly, and reassembly procedures are detailed in this manual. Modifying these procedures is not recommended.

The Model L-450 series skid-steer loader has been designed with emphasis on safety for operator protection. However, careless and negligent operation can still result in serious injury to persons or property. Be sure to read and follow all safety instructions in this manual.

Your New Holland dealer is interested in your obtaining the most from your investment. He will be glad to answer any questions you may have about your loader. When major service is required, his staff of trained servicemen is ready to serve you.

When in need of parts, always order genuine New Holland service parts from your New Holland dealer. Be prepared to give your dealer the model and serial number of the engine and loader. Locate these numbers now and record them below.

Loader Model _____

Loader Serial Number _____

Engine Model _____

Engine Serial Number _____



CAUTION: THIS SYMBOL IS USED THROUGHOUT THIS BOOK WHENEVER PERSONAL SAFETY IS INVOLVED. TAKE TIME TO READ AND FOLLOW THE INSTRUCTIONS. BE CAREFUL!

IMPROVEMENTS

New Holland is continually striving to improve its products. We reserve the right to make improvements or changes when it becomes practical and possible to do so, without incurring any obligation to make changes or additions to the equipment sold previously.

[Sample of manual. Download All 104 pages at:](https://www.arepairmanual.com/downloads/new-holland-l-451-l-452-l-454-l-455-skid-steer-loader-service-repair-manual/)

ALL SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE
<https://www.arepairmanual.com/downloads/new-holland-l-451-l-452-l-454-l-455-skid-steer-loader-service-repair-manual/>

CONTENTS

SAFETY 0-2

SECTION 1 - OPERATION 1-1

SECTION 2 - STEERING ADJUSTMENTS 2-1

SECTION 3 - HYDROSTATIC TRANSMISSION REMOVAL 3-1

SECTION 4 - HYDROSTATIC PUMP OVERHAUL 4-1

SECTION 5 - HYDROSTATIC TRANSMISSION MOTORS 5-1

SECTION 6 - GEAR PUMP 6-1

SECTION 7 - BOOM AND BUCKET CYLINDERS 7-1

SECTION 8 - CONTROL VALVE 8-1

SECTION 9 - FINAL DRIVE 9-1

SECTION 10 - ELECTRICAL SYSTEM 10-1

SECTION 11 - SEAT ACTIVATED BOOM LOCKOUT 11-1

SECTION 12 - TROUBLESHOOTING 12-1

SECTION 13 - SPECIFICATIONS 13-1





PLEASE READ CAREFULLY!

INCLUDED THROUGHOUT THIS MANUAL AND ON MACHINE DECALS YOU WILL FIND PRECAUTIONARY STATEMENTS SUCH AS “CAUTION”, “WARNING” AND “DANGER”, FOLLOWED BY SPECIFIC INSTRUCTIONS.

THESE PRECAUTIONS ARE INTENDED FOR THE PERSONAL SAFETY OF YOU AND THOSE WORKING WITH YOU. PLEASE TAKE THE TIME TO READ THEM.

PERSONAL SAFETY!

CAUTION: THE WORD “CAUTION” IS USED WHERE A SAFE BEHAVIORAL PRACTICE ACCORDING TO OPERATING AND MAINTENANCE INSTRUCTIONS AND COMMON SAFETY PRACTICES WILL PROTECT THE OPERATOR AND OTHERS FROM ACCIDENT INVOLVEMENT.

WARNING: THE WORD “WARNING” DENOTES A POTENTIAL OR HIDDEN HAZARD WHICH HAS A POTENTIAL FOR SERIOUS INJURY. IT IS USED TO WARN OPERATORS AND OTHERS TO EXERCISE EVERY APPROPRIATE MEANS TO AVOID A SURPRISE INVOLVEMENT WITH MACHINERY.

DANGER: THE WORD “DANGER” DENOTES A FORBIDDEN PRACTICE IN CONNECTION WITH A SERIOUS HAZARD.

ADDITIONAL PRECAUTIONARY STATEMENTS SUCH AS “ATTENTION” AND “IMPORTANT” ARE FOLLOWED BY SPECIFIC INSTRUCTIONS. THESE STATEMENTS ARE INTENDED FOR MACHINE SAFETY.

MACHINE SAFETY!

ATTENTION: THE WORD “ATTENTION” IS USED TO WARN THE OPERATOR OF POTENTIAL MACHINE DAMAGE IF A CERTAIN PROCEDURE IS NOT FOLLOWED.

IMPORTANT: THE WORD “IMPORTANT” IS USED TO INFORM THE READER OF SOMETHING HE NEEDS TO KNOW TO PREVENT MINOR MACHINE DAMAGE IF A CERTAIN PROCEDURE IS NOT FOLLOWED.

IMPORTANT!

FAILURE TO FOLLOW THE “CAUTION”, “WARNING”, AND “DANGER” INSTRUCTIONS MAY POSSIBLY RESULT IN SERIOUS BODILY INJURY OR DEATH.



SAFETY INFORMATION

UNSAFE OPERATING PRACTICES AND IMPROPER USE OF THE LOADER AND ITS ATTACHMENTS ON THE PART OF THE OPERATOR CAN RESULT IN INJURIES. OBSERVE THE FOLLOWING SAFETY PRECAUTIONS AT ALL TIMES.

- 1. GIVE UNDIVIDED ATTENTION TO THE JOB AT HAND SO COMPLETE CONTROL OF THE LOADER IS MAINTAINED AT ALL TIMES.**
- 2. DRIVE SLOWLY OVER ROUGH GROUND AND ON SLOPES. KEEP ALERT FOR HOLES, DITCHES, AND OTHER IRREGULARITIES THAT MAY CAUSE THE LOADER TO OVERTURN.**
- 3. AVOID STEEP HILLSIDE OPERATION WHICH COULD CAUSE THE LOADER TO OVERTURN.**
- 4. REDUCE SPEED WHEN TURNING SO THERE IS NO DANGER OF THE LOADER OVERTURNING.**
- 5. ALWAYS LOOK BEHIND YOU BEFORE BACKING THE LOADER.**
- 6. MAINTAIN PROPER TRANSMISSION OIL LEVEL TO PREVENT LOSS OF BRAKING CONTROL.**
- 7. DO NOT ALLOW CHILDREN TO OPERATE THE LOADER OR RIDE ON THE LOADER AT ANY TIME.**
- 8. DO NOT ALLOW ANYONE TO OPERATE THE LOADER WITHOUT PROPER INSTRUCTION. THIS MACHINE CAN BE DANGEROUS.**

OSHA REQUIRES THAT ALL OPERATORS BE INSTRUCTED ON THE PROPER OPERATION OF THE MACHINE BEFORE THEY OPERATE THE UNIT.

- 9. DO NOT ALLOW PASSENGERS TO RIDE ON THE LOADER AT ANY TIME. THEY COULD BE INJURED OR KILLED.**
- 10. DO NOT OPERATE THE LOADER FROM ANY POSITION OTHER THAN THE OPERATOR'S SEAT WITH THE SEAT BELT SECURELY FASTENED, OR YOU COULD BE RUN OVER OR CRUSHED.**
- 11. BEFORE STARTING THE ENGINE, BE SURE ALL OPERATING CONTROLS ARE IN NEUTRAL.**
- 12. NEVER OPERATE THE LOADER ENGINE IN A CLOSED BUILDING WITHOUT ADEQUATE VENTILATION. ENGINE FUMES COULD INJURE OR KILL YOU.**
- 13. REFUEL THE LOADER OUTDOORS WITH THE ENGINE SHUT OFF. REPLACE THE FUEL CAP SECURELY. USE AN APPROVED FUEL CONTAINER. DO NOT SMOKE WHEN HANDLING FUEL. AVOID SPILLING FUEL.**
- 14. AFTER OPERATING THE ENGINE, NEVER TOUCH THE MUFFLER, EXHAUST PIPE OR ENGINE UNTIL THEY HAVE HAD TIME TO COOL.**
- 15. DRESS APPROPRIATELY. WEAR RELATIVELY TIGHT-FITTING CLOTHING WHEN OPERATING THE LOADER. LOOSE OR TORN CLOTHING CAN CATCH IN MOVING PARTS OR THE CONTROLS.**
- 16. PULL LOADS ONLY FROM THE REAR HITCH YOKE.**
- 17. BEFORE SERVICING THE LOADER OR ANY OF ITS ATTACHED EQUIPMENT, BE SURE THE ATTACHMENTS ARE LOWERED TO THE GROUND OR THE BOOM ARMS ARE SUPPORTED BY THE BOOM LOCKS, THE UNIT IS SECURELY BLOCKED, AND THE ENGINE IS TURNED OFF. IF THE MACHINE WOULD MOVE OR THE BOOM DROP UNEXPECTEDLY, YOU COULD BE KILLED.**
- 18. DO NOT WORK UNDER OVERHANGS, ELECTRIC WIRES, OR WHERE THERE IS DANGER OF A SLIDE.**

-
19. WEAR AN APPROVED SAFETY HAT WHEN OPERATING THE MACHINE AND WHILE IN ANY WORK AREA.
 20. WEAR A SUITABLE HEARING PROTECTIVE DEVICE SUCH AS EAR MUFFS OR EAR PLUGS IF YOU ARE EXPOSED TO NOISE WHICH YOU FEEL IS UNCOMFORTABLE.
 21. WHEN DRIVING THE LOADER ON A ROAD OR HIGHWAY, USE WARNING LIGHTS OR WARNING DEVICES AS MAY BE REQUIRED BY LOCAL OR STATE GOVERNMENTAL REGULATIONS. HEADLIGHTS AND WARNING LIGHT KITS ARE AVAILABLE THROUGH YOUR NEW HOLLAND DEALER. SLOW MOVING VEHICLE SIGNS ARE SUPPLIED AS STANDARD EQUIPMENT.
 22. KEEP THE LOADER CLEAN. DO NOT ALLOW TRASH, DEBRIS, OR OTHER ARTICLES TO ACCUMULATE IN THE CAB OR FLOOR AREA THAT MAY HINDER SAFE MACHINE OPERATION.
 23. NEVER OPERATE THE LOADER WITH ANY OF THE SHIELDING REMOVED. THE SHIELDS ARE THERE TO PROTECT YOU.
 24. NEVER OPERATE THE LOADER WITHOUT THE WINDOWS AND/OR SCREENS IN PLACE.
 25. READ ALL SAFETY MESSAGES ON THE LOADER.
 26. OBSERVE ALL WEIGHT LOAD LIMITS ON DOCKS, BRIDGES, AND TEMPORARY BRIDGING.

OSHA REQUIREMENTS NOW MAKE IT THE EMPLOYER'S RESPONSIBILITY TO FULLY INSTRUCT EACH OPERATOR IN THE PROPER AND SAFE OPERATION OF ALL OPERATIVE EQUIPMENT. BOTH EMPLOYER AND EMPLOYEE SHOULD THOROUGHLY FAMILIARIZE THEMSELVES WITH THE FOLLOWING SECTIONS.



CAUTION: PICTURES IN THIS MANUAL MAY SHOW PROTECTIVE SHIELDING OPEN OR REMOVED TO BETTER ILLUSTRATE A PARTICULAR FEATURE OR ADJUSTMENT.

BE CERTAIN, HOWEVER, TO CLOSE OR REPLACE ALL SHIELDING BEFORE OPERATING THE MACHINE.



DANGER!

**FASTEN SEAT BELT
BEFORE STARTING ENGINE!**

THIS LOADER IS A VERY STABLE UNIT, BUT IT CAN BE UPSET IF STOPPED SUDDENLY WHEN THE BUCKET IS RAISED AND LOADED.

THEREFORE, DO NOT START THE ENGINE BEFORE SECURELY FASTENING THE SEAT BELT, AND CARRY THE LOAD LOW.

SECTION 1

OPERATION

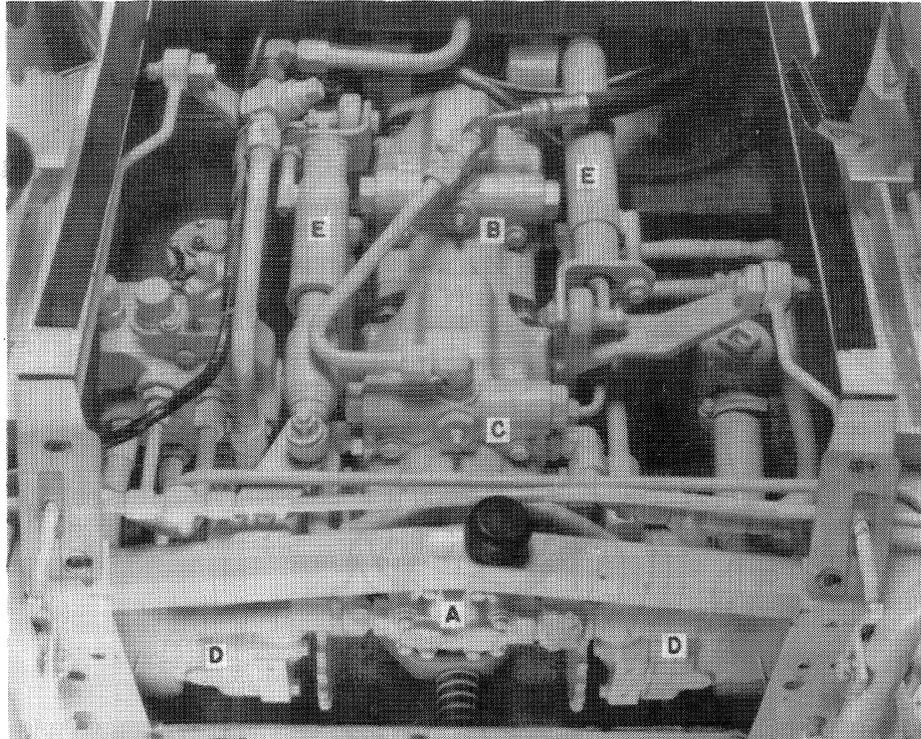


FIGURE 1-1

Figures 1-1 and 1-2 show the hydrostatic transmission and boom hydraulic systems of the skid-steer loader and point out the major components involved.

The New Holland loader features a fully hydrostatic drive with a tandem pump configuration. Two variable displacement piston pumps, B and C, Figure 1-1, operate the propulsion system, and one gear pump operates the hydraulic system, A, Figure 1-1. They are assembled as a unit and receive power directly from the engine. The two piston pumps are connected to two piston motors, D, Figure 1-1, (one for each final drive) by high pressure hoses.

The transmission pumps are controlled with two steering control levers. The control levers are connected to two neutralizers (spring-

loaded shock absorbers), E, Figure 1-1, which automatically return the pintle arms to a positive neutral position. As the control levers are moved, they stroke the hydrostatic transmission pump pintle arms to the desired position. Hydrostatic pulsations and the torque feedback generated by drive train loads are resisted by the internal shock absorber neutralizer rather than by the operator's arms. This results in smoother operation and less operator fatigue.

Skid-steer loader usage is typified by rapid changes of speed and direction, with accompanying low speeds at times of heavy loader power demands. It is under those conditions that a hydrostatic transmission is more efficient than a mechanical drive train.

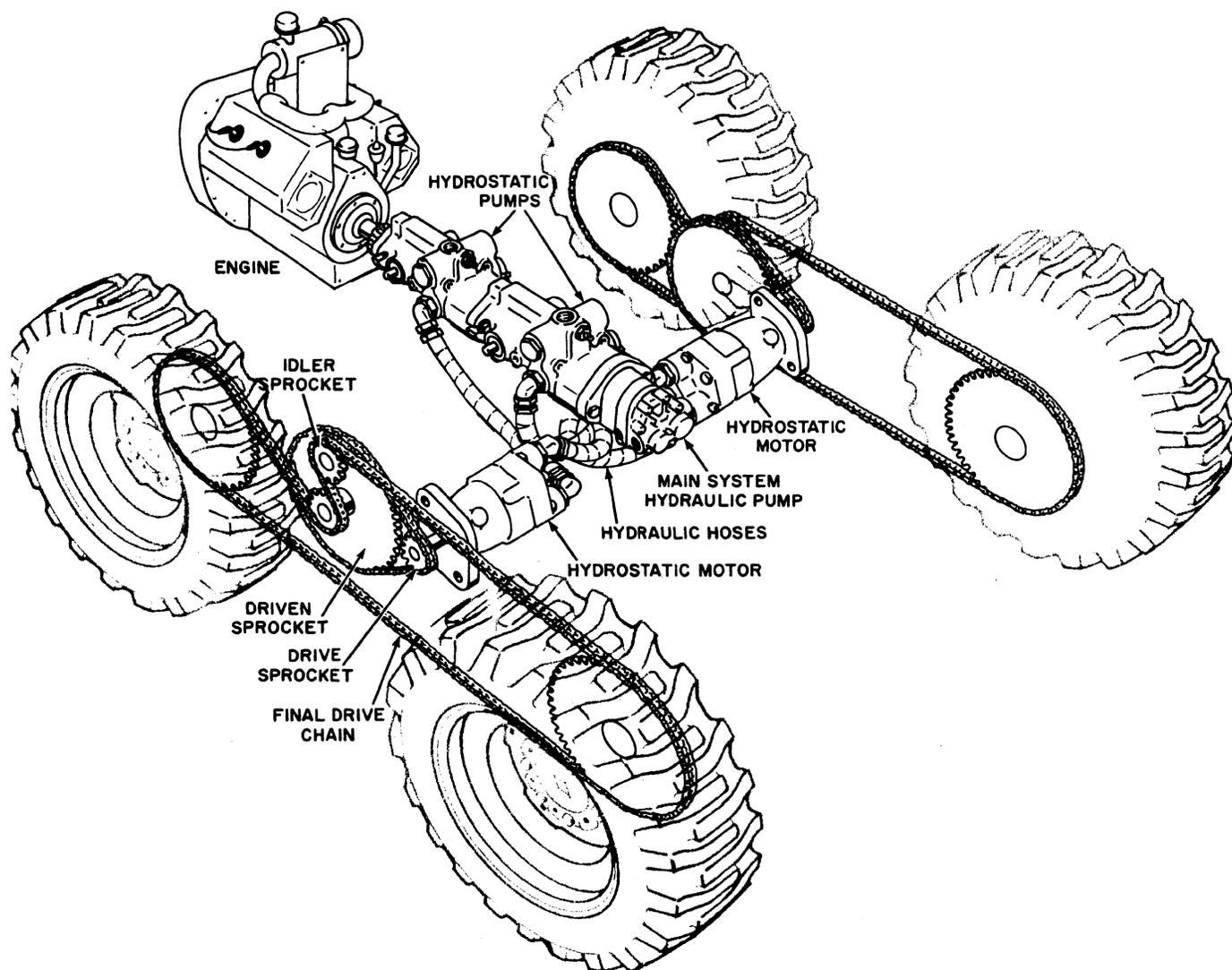


FIGURE 1-2



CAUTION!

BE A SAFE OPERATOR. Before attempting to operate the loader, thoroughly acquaint yourself with:

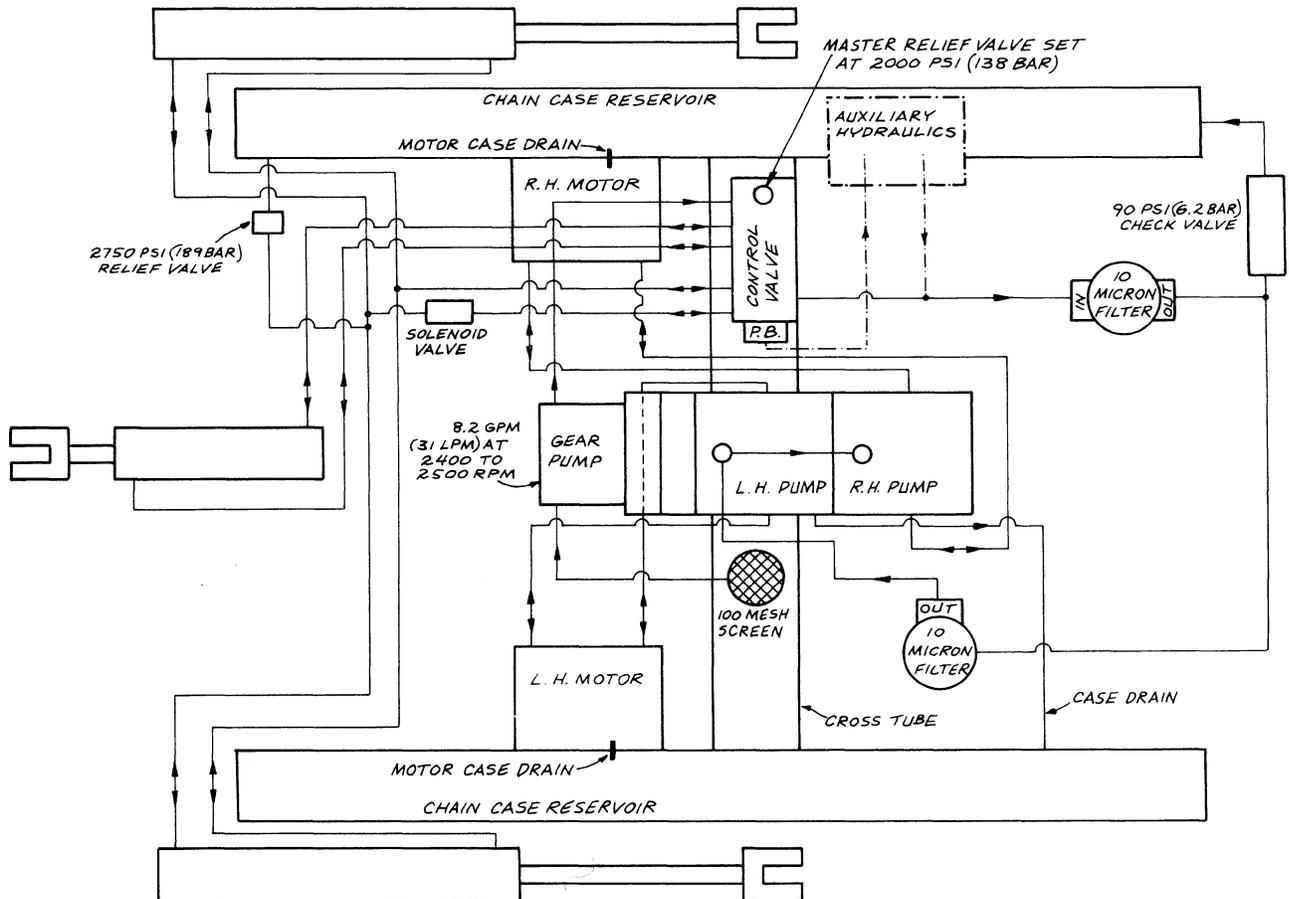
1. The safety information in the *Operator's Manual* and *Skid-Steer Loader Safety Manual*.
2. The operating instructions in the *Operator's Manual*.
3. The controls on the loader.

When a loader digs into a pile of dirt, the operator strives to exert maximum tractive effort with very little speed. The variable displacement hydrostatic units are destroyed so

they drive the motors at the required slow speed while generating maximum torque. Minimum power losses occur because input speeds are reduced drastically below levels attainable with slipping clutches as used in mechanical drives.

To obtain maximum torque at the wheels, the control levers should be close to the neutral position. This differs from a mechanical drive unit where the operator pushes the control levers as far forward as possible to prevent the clutches from slipping. The positiveness of the hydrostatic drive at low speeds allows the operator to ease the bucket into loads, rather than using the impact loading technique which is so often necessary when using mechanically driven units.

OPERATION



L-451 - L-452 LOADER HYDRAULIC DIAGRAM

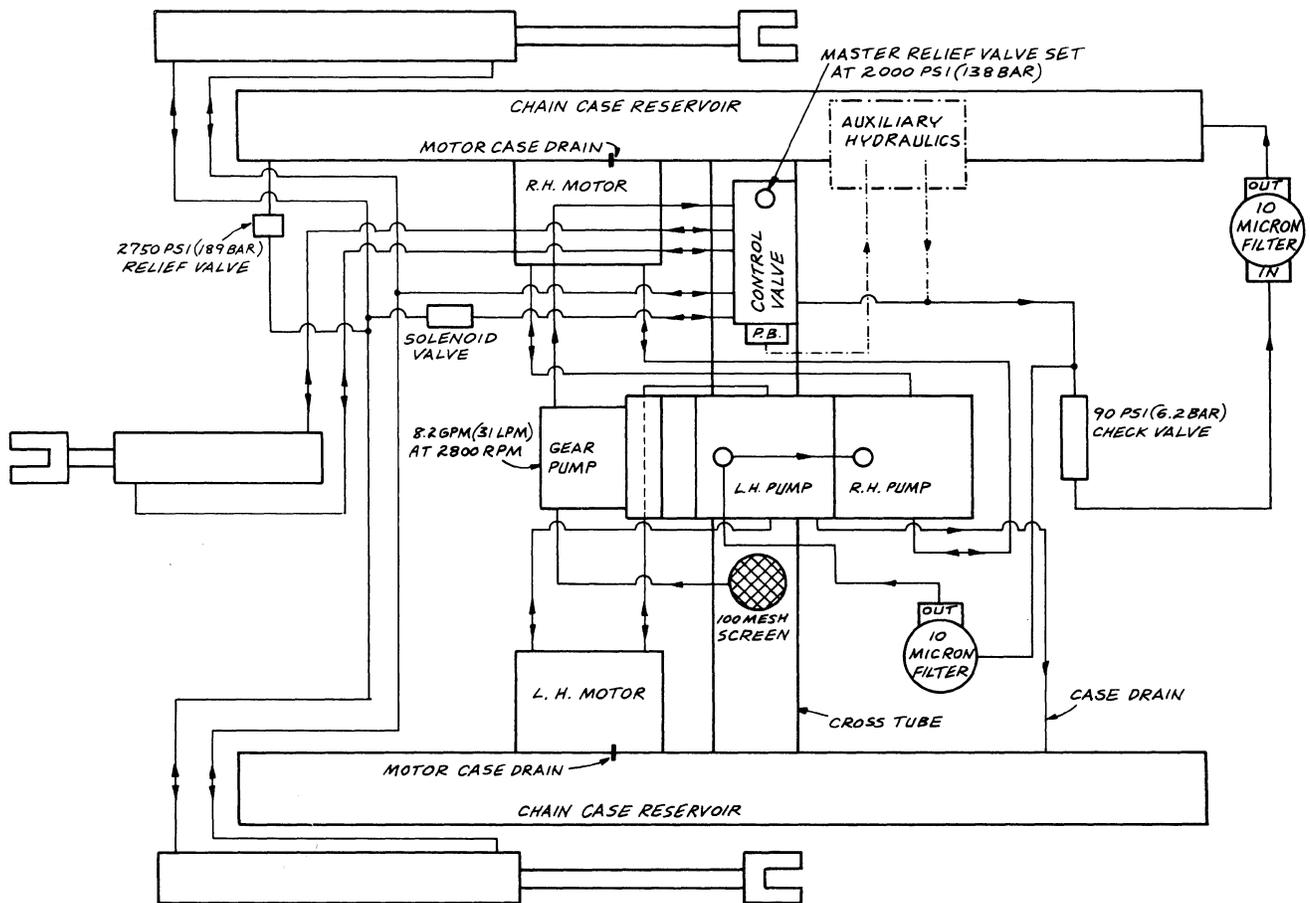
FIGURE 1-3

Because of the positive relationship between the hydrostatic pumps and motors, the units work to aid deceleration of the machine when the pump is stroked toward the neutral position. This is the automatic braking characteristic of the hydrostatic drive. Infinitely variable speed means a full range from full speed reverse through neutral to full speed forward and any speed in between, with no jumps, jerks, or flat spots. Fast shuttle loading work is accomplished with no lost time changing directions. The smooth power application thus gained from the

transmission gives maximum tractive effort on any terrain. The operator can ease the loader into a tough load without breaking traction because he has precise control.

Figures 1-3 and 1-4 show the hydraulic circuit and components used on the L-450 series loaders. To trace the oil flow through the hydraulic system, start with the chain case reservoir on either side of the loader. A cross tube connects both chain cases and serves as a supply point for oil to the gear pump.

OPERATION



L-454 — L-455 LOADER HYDRAULIC DIAGRAM

FIGURE 1-4

The loader lift system consists of the oil strainer, gear pump, control valve, boom cylinders, and bucket cylinder. Hydraulic oil is pulled from the chain case reservoir through the 100-mesh strainer screen and into the gear pump. The gear pump supplies oil to the main control valve with a master relief valve set at 2000 PSI (138 bar) to limit the maximum system pressure. Oil is then supplied to the boom or bucket cylinders on demand. Return oil from the open center control valve flows through the 10-micron bypass-type filter to the left side (front) hydrostatic pump. Oil then flows through the back plate to the right side (rear) hydrostatic pump to provide adequate oil flow. A 90 PSI (6.2

bar) check valve is used in between the control valve and 10-micron filter which will direct oil flow over 90 PSI (6.2 bar) through a 10-micron bypass-type filter and return it to the chain case reservoir.

The left and right piston pumps supply oil to the piston motors whenever the steering levers are activated. A case drain line moves leakage oil from the piston pump cases to the reservoir. The piston motor cases drain directly into the reservoir through the output shaft bearings.

A pressure-beyond fitting supplies oil from the main control valve to the auxiliary hydraulic kit if this option has been installed.

SECTION 2

STEERING ADJUSTMENTS

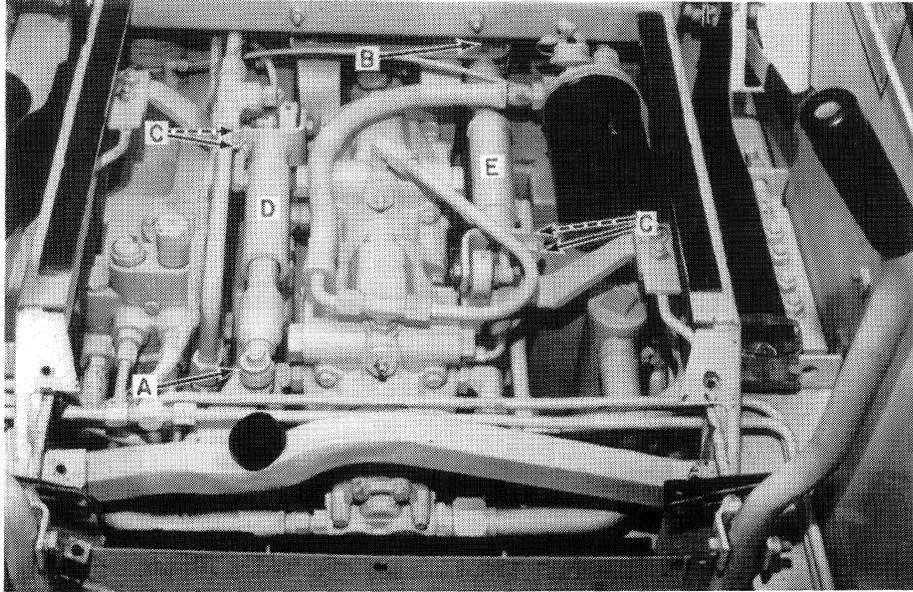


FIGURE 2-1



CAUTION: MAKE ALL ADJUSTMENTS WITH THE ENGINE STOPPED UNLESS OTHERWISE SPECIFIED.

If the machine creeps or the transmissions make a noise indicating they are being slightly stroked, a neutralizing adjustment is required.

Neutralizer, D, Figure 2-1, controls the right drive wheels. Neutralizer, E, controls the left drive wheels. Check for free play in the neutralizer tube assembly first. If free play is found, adjust nuts, C, on the side being adjusted until no free play is present. Tighten nuts, C, securely.

Remove all free play from the neutralizer tube assembly before adjusting the creep to insure the steering levers return to the set position each time.



CAUTION: TO ADJUST THE NEUTRALIZERS, BLOCK THE MACHINE OFF THE GROUND SO THE WHEELS TURN FREELY. RAISE THE BOOM AND PLACE IT ON THE BOOM LOCK ARMS. WHEN THE ENGINE IS RUNNING, STAY CLEAR OF THE ROTATING WHEELS AND ENGINE DRIVE SHAFT.

First loosen the bolts retaining the neutralizers (front end on right neutralizer, A, and rear end on left neutralizer, B, Figures 2-1 and 2-2). Start the engine. If the wheels creep forward, adjust one or both neutralizers to the rear. If the unit creeps rearward, adjust the neutralizers to the front. Stop the engine. Retighten the hardware.

STEERING ADJUSTMENTS

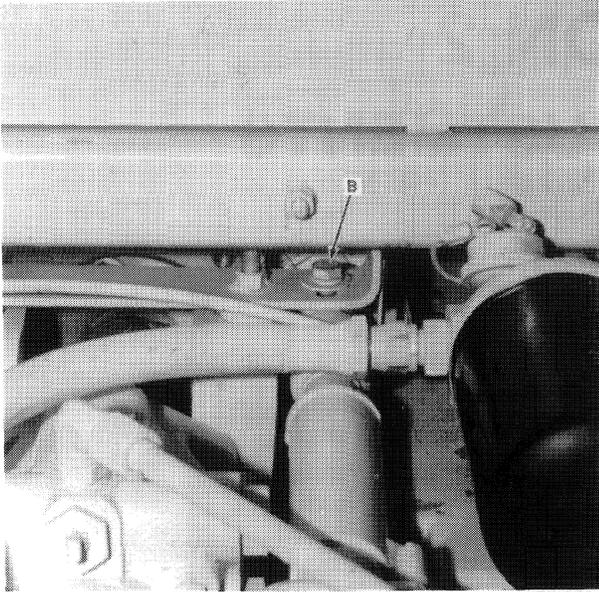


FIGURE 2-2

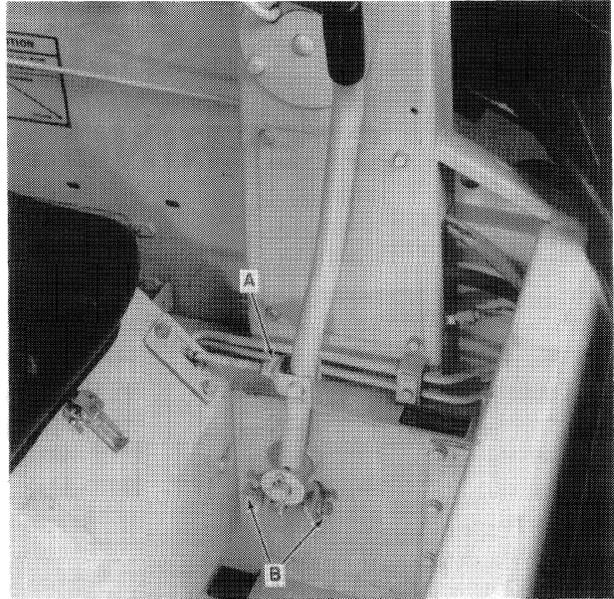


FIGURE 2-3

This procedure works best if the neutralizer hardware is left snug and the adjustment is achieved by bumping the control arms with the palms until proper adjustment is achieved. If, after adjusting the neutralizers, the control arms are not vertical, adjust the yoke on the end of the control rod so this is achieved, A, Figure 2-3.

If the control arm yokes must be adjusted, readjust the control arm stop bolts. Rotate bolts, B, Figure 2-3, at the bottom of the control levers so they just touch the control levers when fully stroked in each direction. Then screw in all four bolts an additional 1/2 turn so they, rather than the transmissions, provide the stop.



CAUTION: STOP THE ENGINE BEFORE LOOSENING OR TIGHTENING BOLT, B, FIGURES 2-1 AND 2-2.

IMPORTANT: If the external stops are not accurately set, the transmission pintle shaft and the rubber connector in the control linkage are susceptible to damage.

Use the jam nuts to lock the bolts in place. Any further adjustment to provide equal speed of both sides at full stroke should be done by further screwing in the stop on the faster side, B, Figure 2-3.

LABOR GUIDE

The following labor amounts are listed as a guide only. Working conditions and experience will vary the time it actually takes to complete each job.

Job	Man-Hours
Adjust neutral - both drives	1 hr.
Remove and rebuild one neutralizer assembly	1 hr.

SECTION 3

HYDROSTATIC TRANSMISSION REMOVAL

SPECIFICATIONS

HYDROSTATIC PUMPS

Hydrostatic pump to engine

Bell housing bolt torque $\frac{3}{8}$ " x $2\frac{1}{4}$ " - 25 ft. lbs. (34 N·m)

Hydrostatic pump mount to isolation mount

Bolt torque $\frac{3}{8}$ " x $1\frac{1}{2}$ " - 25 ft. lbs. (34 N·m)

Hydrostatic pump isolation mount

Bolt torque $\frac{3}{8}$ " x 2" - 20 ft. lbs.-25 ft. lbs. (27 N·m-34 N·m)

Cam plate control arm clamp bolt $\frac{3}{8}$ " x 2" - 25 ft. lbs. (34 N·m)

HYDROSTATIC MOTORS

Hydrostatic motor housing to final drive

chain housing $\frac{1}{2}$ " x $1\frac{3}{4}$ " - 66 ft. lbs. (89 N·m)



CAUTION: BEFORE SERVICING THE LOADER OR ANY ATTACHED EQUIPMENT, BE SURE THE ATTACHMENTS ARE LOWERED TO THE GROUND OR THE BOOM ARMS ARE SUPPORTED BY THE BOOM LOCK ARMS.

Before removing the hydrostatic transmission pumps or motors from the loader, make a complete check of the hydraulic system. Use the "Troubleshooting" section of this manual as a guide to eliminate external transmission failures. The hydrostatic pumps or motors can be removed independently of each other if the problem is in only one component.

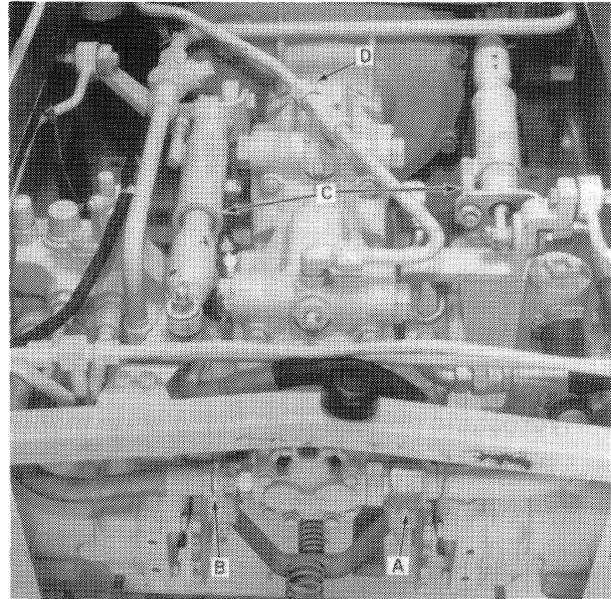


CAUTION: FOR EASIER ACCESS TO THE TRANSMISSION AREA, RAISE THE BOOM AND REST IT ON THE BOOM LOCK ARMS. IF THE LOADER MUST BE LIFTED OFF THE GROUND, ALWAYS USE JACK STANDS OR BLOCKS OF GOOD QUALITY. NEVER WORK BENEATH THE UNIT WHEN IT IS SUPPORTED BY THE HYDRAULIC SYSTEM.



SHIELDS REMOVED FOR CLARITY.

FIGURE 3-1



SHIELDS REMOVED FOR CLARITY.

FIGURE 3-2

HYDROSTATIC PUMP REMOVAL

Steam clean the loader before any repairs are made to the hydraulic system. To insure maximum cleanliness of internal transmission parts, remove the tandem pump assembly as a unit, and plug all ports and lines as they are opened.

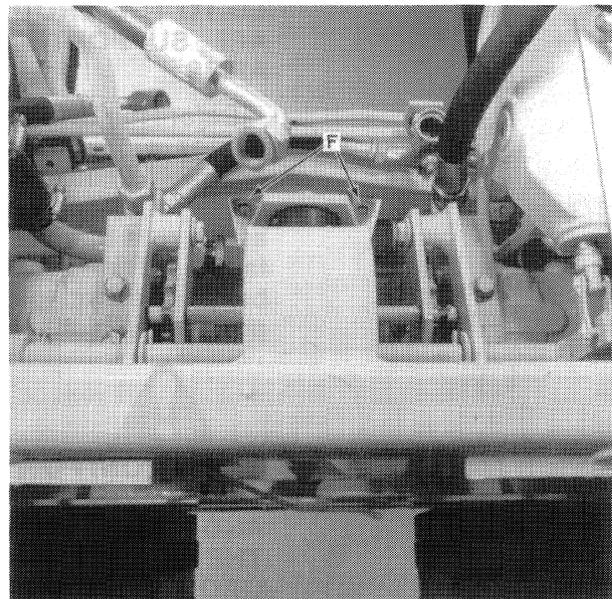
1. Raise the boom and extend the boom lock arms, A, Figure 3-1. Stop the engine. Turn the key to the "ON" position and work the boom and bucket pedals to relieve any residual hydraulic pressure before dismounting from the loader. Turn the ignition key off.
2. Jack up the loader and block it securely, B, Figure 3-1.

NOTE: Hydrostatic pumps and motors can be removed without removing the fuel tank. Depending on the severity of the problem, you may want to remove the fuel tank at this time.

3. Remove the seat and front panel.
4. Remove suction hose, A, and high pressure hose, B, from the gear pump, Figure 3-2.
5. Remove the two retaining cap screws from the pump mount flange and slide the gear pump off the hydrostatic pumps.
6. Remove the steering neutralizers C, Figure 3-2, from the pintle lever control arms.

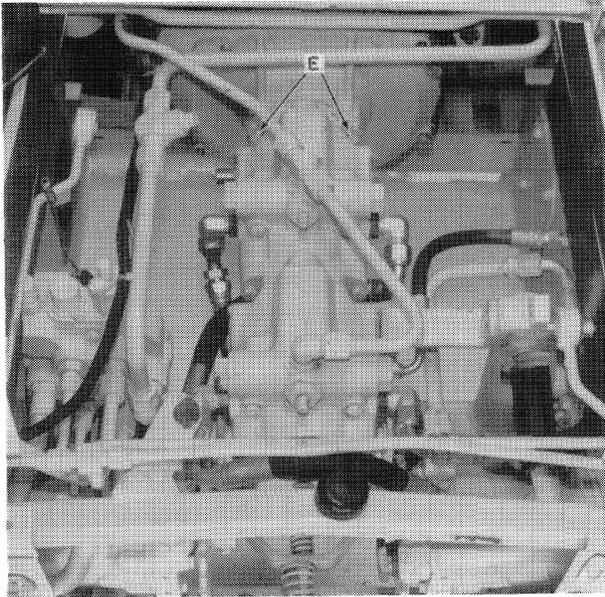
7. Remove charge pressure line, D, Figure 3-2, and all the hydraulic hoses from the hydrostatic pumps.
8. Remove the two mounting bolts, F, Figure 3-3.

NOTE: The hydrostatic pumps were removed for clarity in Figure 3-3.



SHIELDS REMOVED FOR CLARITY.

FIGURE 3-3



SHIELDS REMOVED FOR CLARITY.

FIGURE 3-4

9. Remove the two mounting bolts, E, Figure 3-4, and slide the hydrostatic pumps out of spline, G, Figure 3-5.

NOTE: Some models may use a U-joint drive coupler.

10. The complete hydrostatic pump assembly, Figure 3-6, can now be removed through the top or, if the belly pan and fuel tank have been removed, through the bottom.

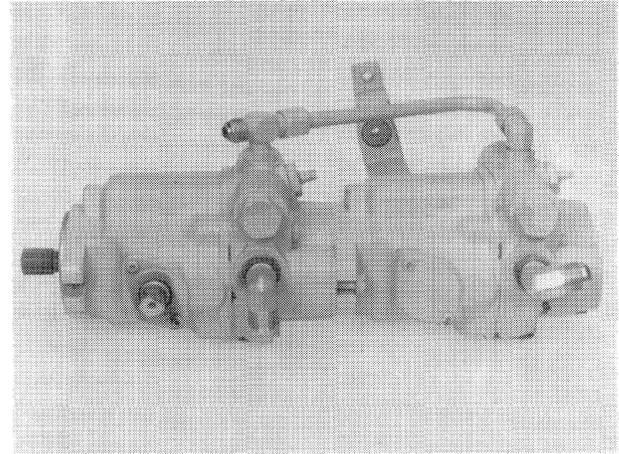


FIGURE 3-6

HYDROSTATIC MOTOR REMOVAL

Steam clean the loader before any repairs are made to the hydraulic system. Drain the hydraulic oil before removing the hydrostatic motors. To insure maximum cleanliness of the internal transmission parts, plug all ports and lines as they are opened.

1. Follow steps 1, 2, and 3 in the "Hydrostatic Pump Removal" section.
2. Remove the eight cap screws that secure the chain case side cover, Figure 3-7.
3. Either remove snap ring, A, Figure 3-7, so the motor shaft can be pulled out of the motor drive sprocket, or loosen the final drive chain and remove the #50 chain from the motor drive sprocket.

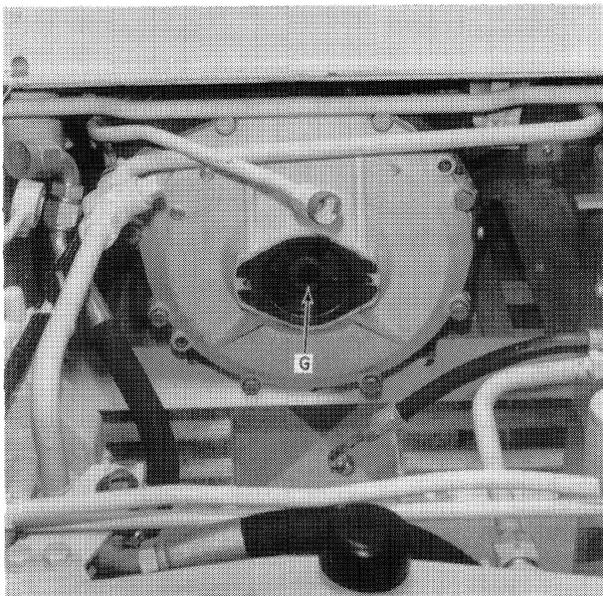


FIGURE 3-5

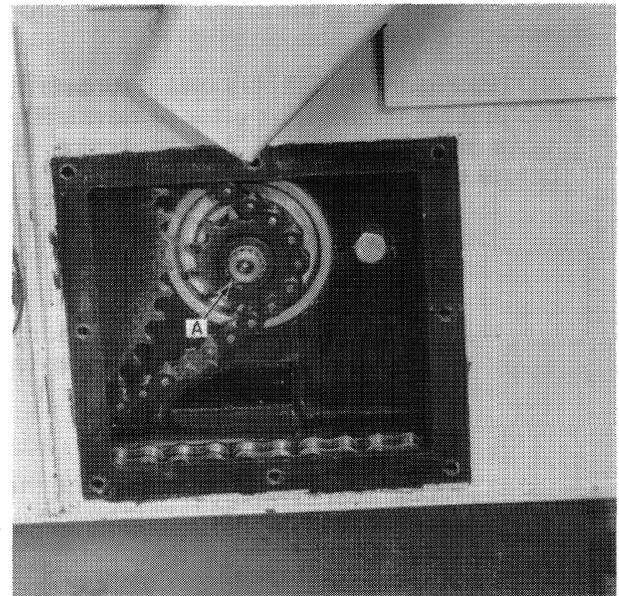
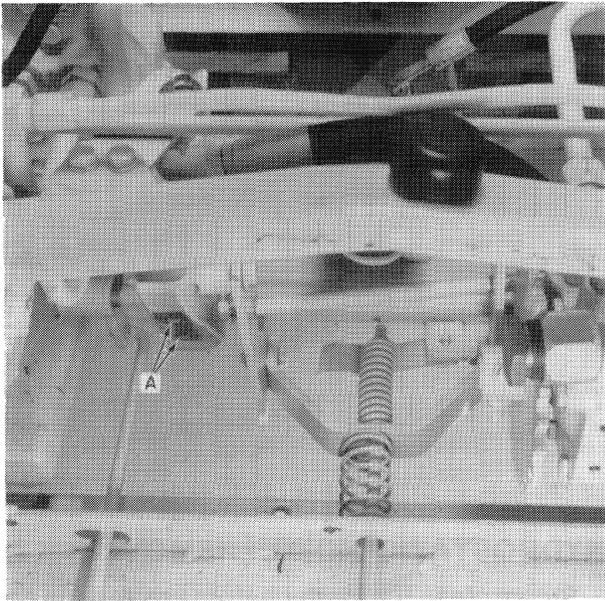


FIGURE 3-7



SHIELDS REMOVED FOR CLARITY.

FIGURE 3-8

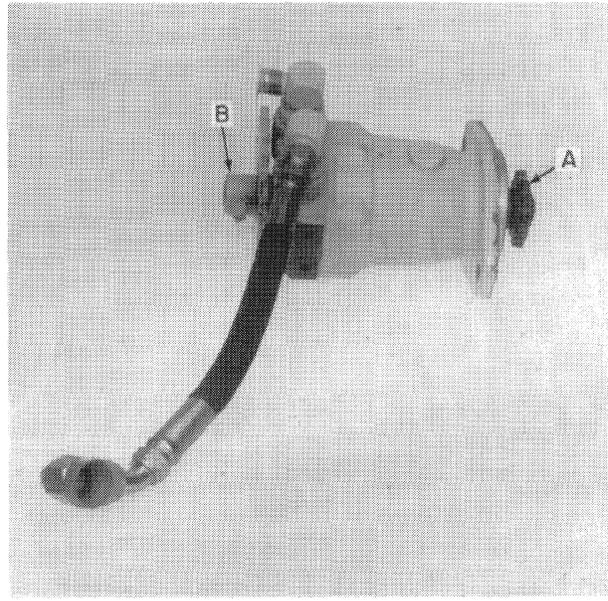


FIGURE 3-9

4. Remove the two brake bracket mount bolts, A, Figure 3-8. Be sure brake is disengaged before removing mount bolts.

NOTE: Figure 3-8 shows one hydrostatic motor removed. The two brake bracket mount bolts are used to secure the bracket shown in Figure 3-8 to the rear of the hydrostatic motor.

5. Remove both hydraulic hoses from the hydrostatic motor.
6. Remove the two nuts that secure the hydrostatic motor to the chain case and slide the motor out.

NOTE: Figure 3-9 shows one hydrostatic motor as it would look after removal. Remove motor sprocket, A, and brake, B, before disassembling the motor.

INSTALLATION OF HYDROSTATIC PUMPS AND MOTORS

Reverse the removal procedures.

NOTE: When installing the hydrostatic motors, lightly coat the two mounting bolt studs and mounting surfaces with silicone sealer. Be sure the hydraulic tubes and hoses are not rubbing anything that would damage them. Torque all hardware.

LABOR GUIDE

The following labor amounts are listed as a guide only. Working conditions and experience will vary the time it actually takes to complete each job.

Job	Man-Hours
Remove, repair, and replace the tandem pumps	7 hrs.
Remove, repair, and replace one hydrostatic motor	6 hrs.

SECTION 4

HYDROSTATIC PUMP OVERHAUL

SPECIFICATIONS

Pump housing to valve plate bolts

5/16" x 2" or 5/16" x 2½" Grade 5 cap screw 15 ft. lbs.-18 ft. lbs. (20 N·m-24 N·m)

Hydrostatic pump coupler bolts

¾" x 1¾" Grade 5 cap screw 27 ft. lbs.-31 ft. lbs. (37 N·m-42 N·m)

Front and rear transmission mount bolts

¾" x 2" or ¾" x 1½" Grade 5 cap screw 27 ft. lbs.-31 ft. lbs. (37 N·m-42 N·m)

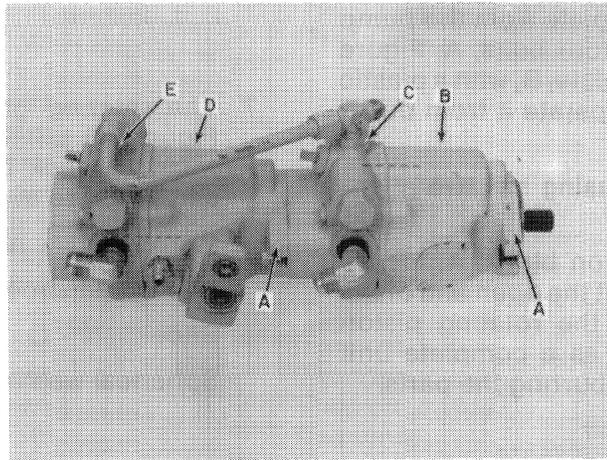


FIGURE 4-1

The hydrostatic pump assembly, Figure 4-1, consists of the right transmission pump, B, the right valve block, C, the left transmission pump, D, and the left valve block, E.

The valve blocks carry high pressure oil from the pumps to the motors via high pressure hoses. Low pressure oil from the motors flows back to the pumps through the valve blocks to complete the closed loop circuit.

NOTE: Dealer adjustment requests for oil leak repairs, other repairs, or overhaul of transmission pumps must include the model number of the transmission and the date code. These are stamped in the flange of the pump housings, A, Figure 4-1.

DISASSEMBLY

1. Clean the complete pump assembly, Figure 4-1, before teardown.
2. To insure proper reassembly, use a scratch awl to scratch lines across the pump housing and valve plates as shown by the dotted lines in Figure 4-1.
3. As the transmission pump is being overhauled, lay the parts on a clean wooden bench top or heavy cardboard to prevent damage to the machined surfaces.

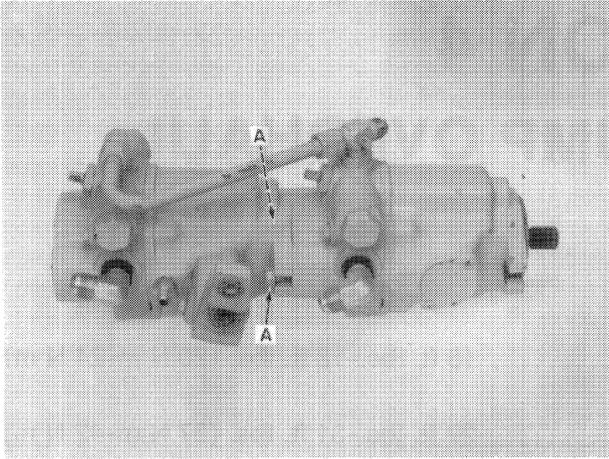


FIGURE 4-2

4. Remove the two bolts, A, Figure 4-2, and tap the housings with a plastic or rubber mallet to separate the two pumps. The pumps are coupled with a coupler which will remain on one of the splined shafts.
5. To separate the valve plate from the pump housing, remove the four bolts, A, Figure 4-3, and tap the valve plate, B, with a plastic or rubber mallet to separate it from pump housing, C.

NOTE: The pump housing has two alignment dowel pins.

6. Hold the rotating piston block, A, Figure 4-4, in one hand and tilt the open end of the housing down. Turn the rotating piston block and pull it out as a complete unit without scratching or burring the parts.

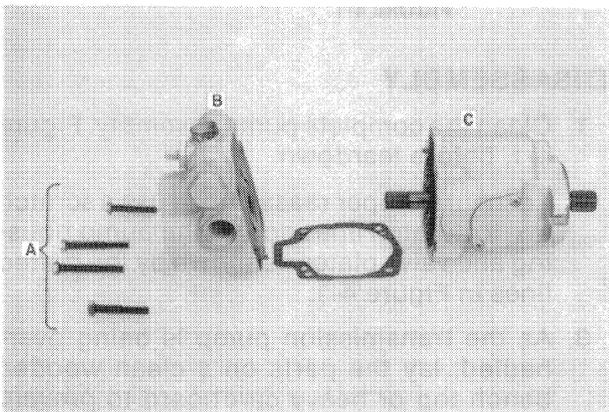


FIGURE 4-3

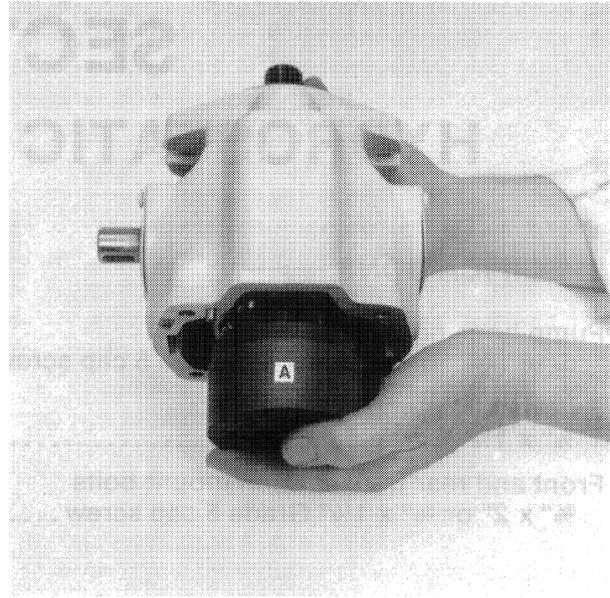


FIGURE 4-4

7. The rotating group parts are shown in Figure 4-5. Lift these parts out of the pump rotating block and carefully lay them on cardboard to avoid damage.

Piston block - A

Piston and shoe assembly - B

Shoe plate - C

Spherical washer - D

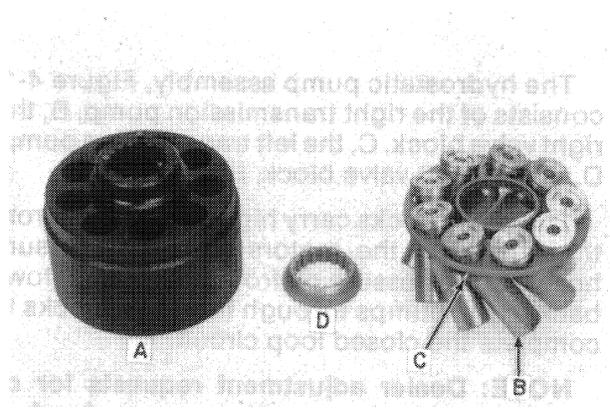


FIGURE 4-5

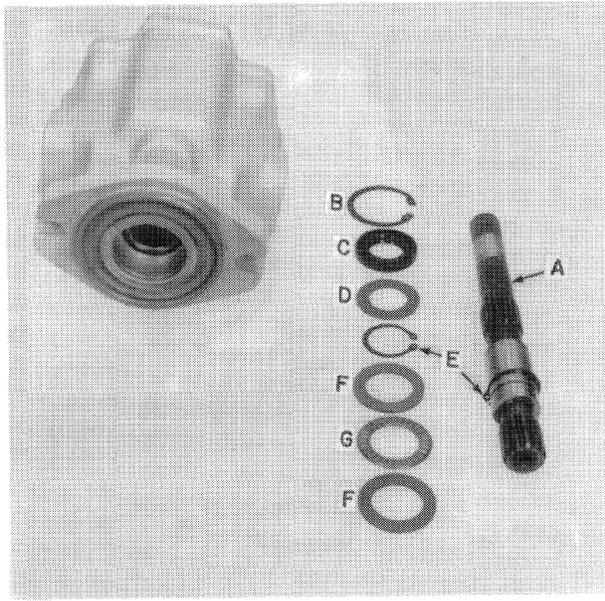


FIGURE 4-6

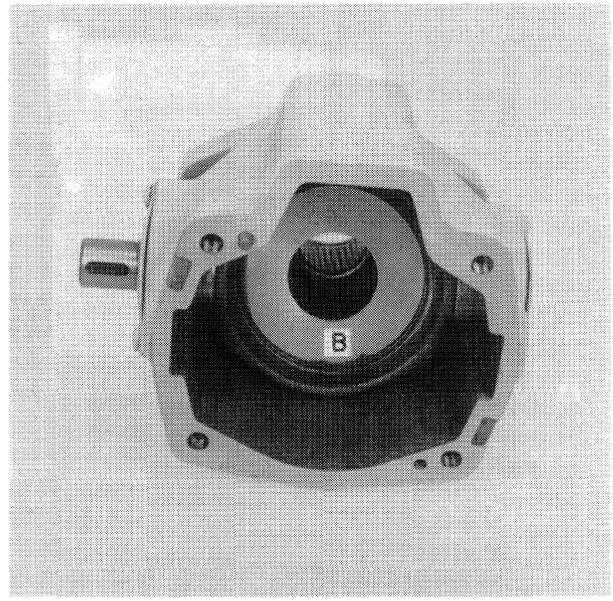


FIGURE 4-7

8. To remove the pump shaft, A, Figure 4-6:

- a. Remove the large snap ring, B, Figure 4-6.
- b. Use an arbor press to remove the shaft, oil seal, and thrust bearing from the housing. The shaft is pressed out toward the snap ring.
- c. The shaft and related parts are shown in Figure 4-6.

Shaft - A

Large snap ring - B

Shaft seal - C

Spacer washer - D

Snap rings - E

Thrust washers - F

Thrust bearing - G

9. To remove cam plate, B, Figure 4-7:

- a. Remove the torx head screws, A, and cover plate, B, Figure 4-8.

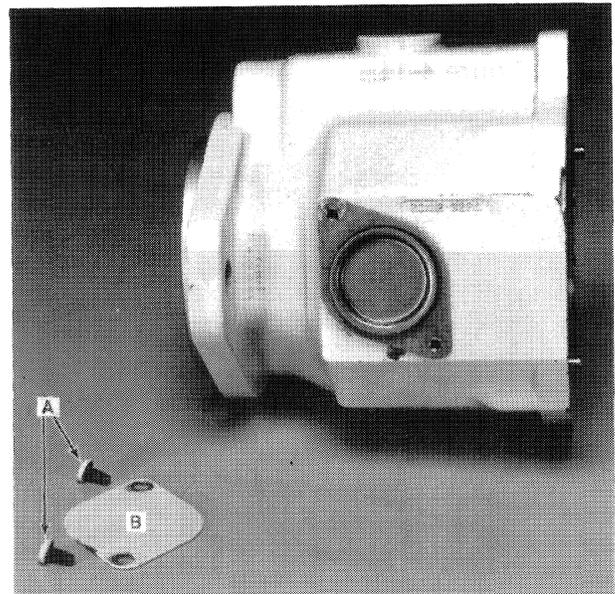


FIGURE 4-8

HYDROSTATIC PUMP OVERHAUL

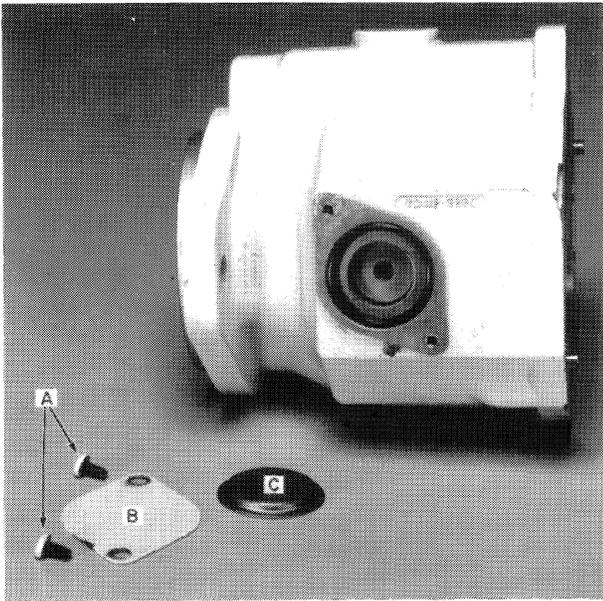


FIGURE 4-9

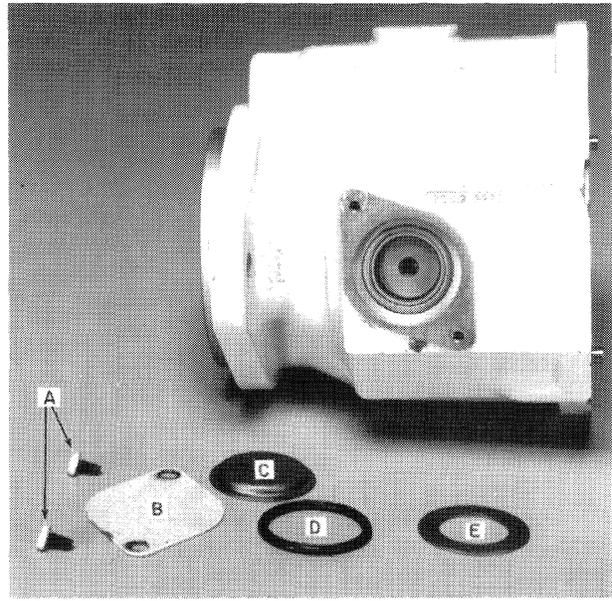


FIGURE 4-11

b. Remove O ring cover, C, Figure 4-9, O ring, D, Figure 4-10, and washer, E, Figure 4-11.

c. Remove the torx head screws, A, Figure 4-12, and cover plate, B, from the pintle shaft side.

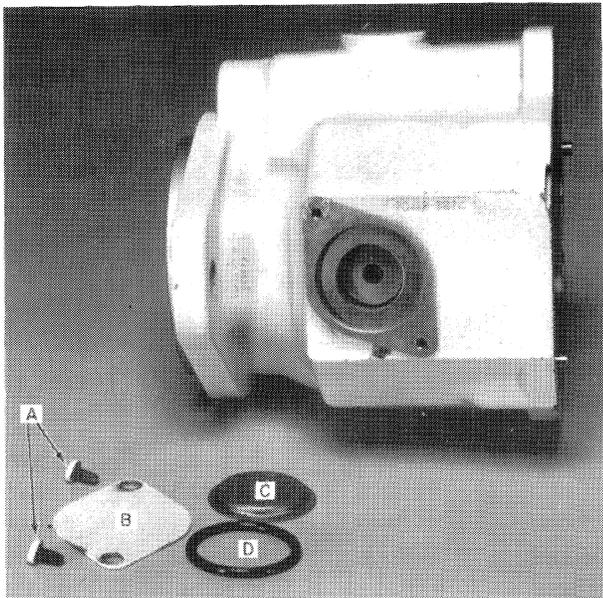


FIGURE 4-10

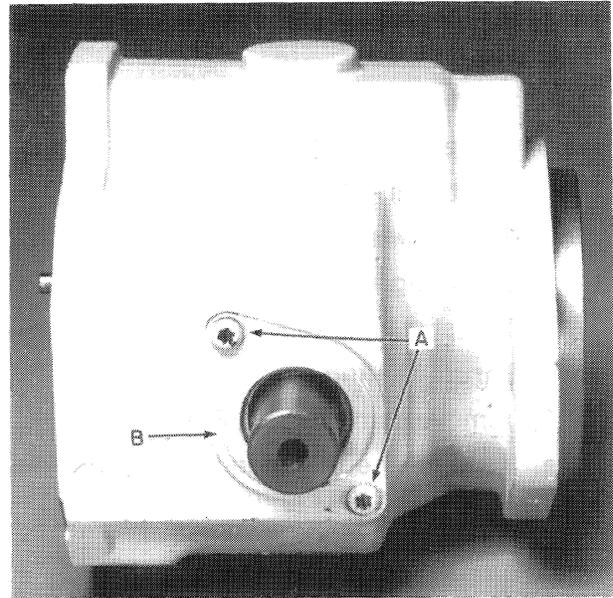


FIGURE 4-12

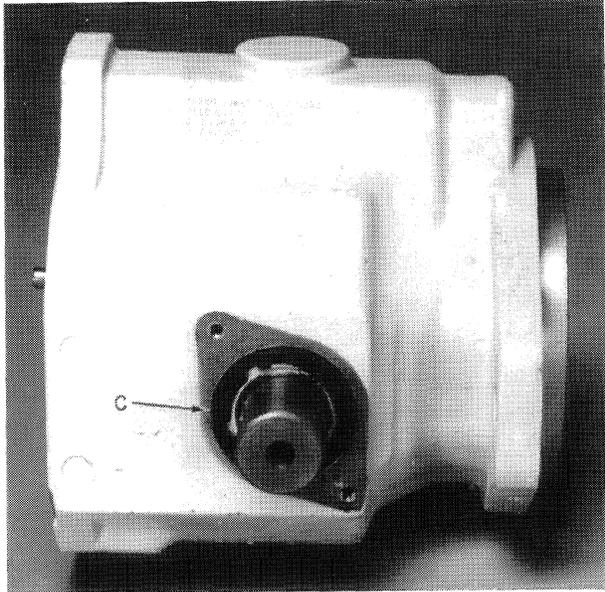


FIGURE 4-13

- d. Remove seal, C, Figure 4-13, and washer, D, Figure 4-14.
- e. Remove bearing race, A, and bearings, B, Figure 4-15, by sliding cam plate, C, back and forth until the bearings can be grasped.

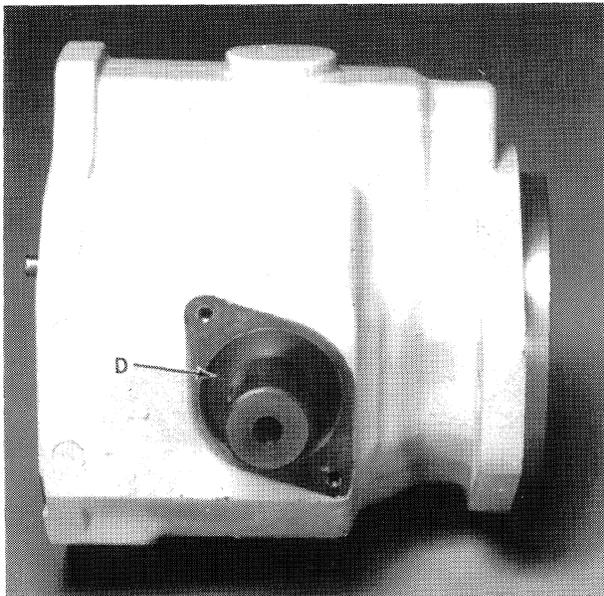


FIGURE 4-14

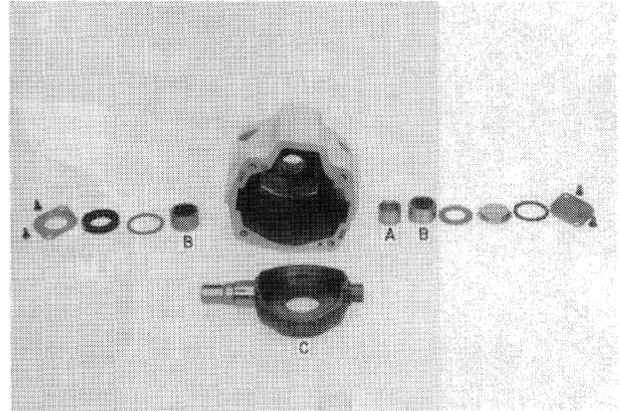


FIGURE 4-15

- f. Remove cam plate, C, Figure 4-15, by cocking the cam plate and sliding the short side of the cam plate out of the pump housing first. Figure 4-15 shows all the parts used on the cam plate.

NOTE: A bearing race is not used on the pintle shaft side of the cam plate. Figure 4-16 shows the pump housing with all parts removed.

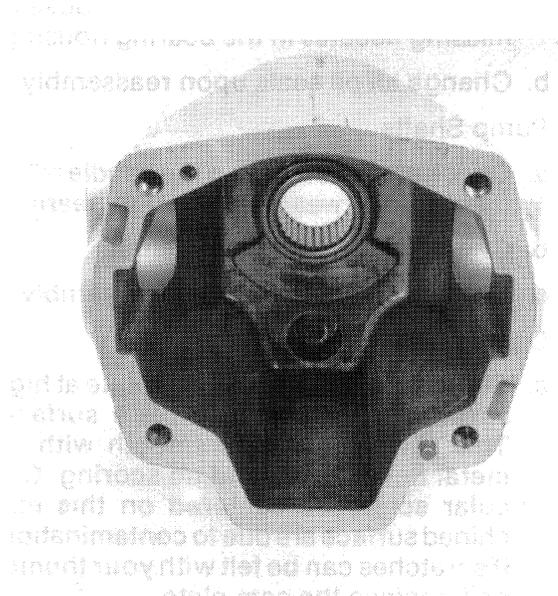


FIGURE 4-16

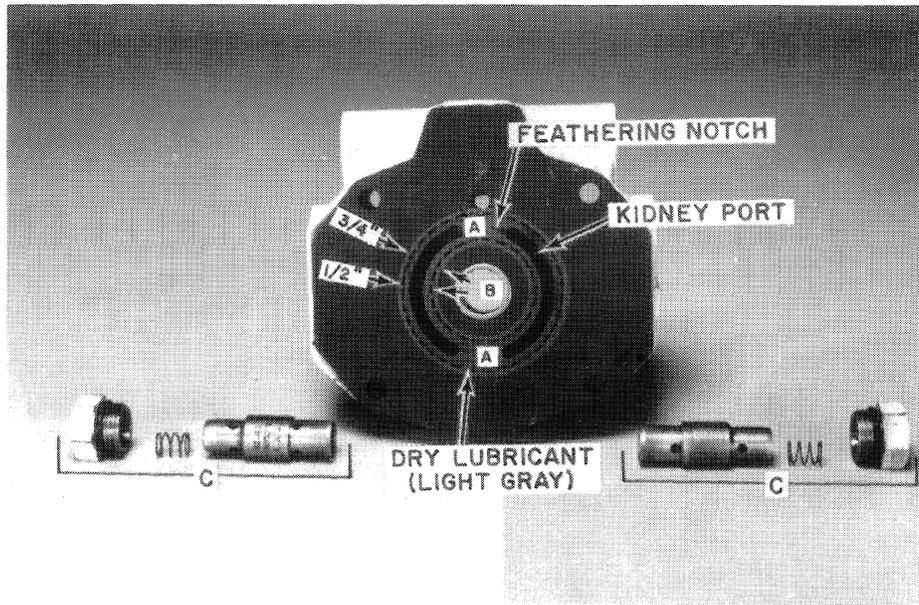


FIGURE 4-17

10. The valve block relief valves have been removed in Figure 4-17. These are non-adjustable and should be replaced if not operating properly.

INSPECTION OF PARTS

1. Pump Housing

- a. Shaft needle bearings are a press fit in the housing. Check for a loose bearing in the housing. Also check for loose or missing needles in the bearing housing.
- b. Change all oil seals upon reassembly.

2. Pump Shafts

- a. Check areas contacting the needle roller bearings for wear and a rough bearing.
- b. Check for a bent or worn shaft.
- c. Change all oil seals upon reassembly.

3. Cam Plates

- a. Shoes of the pump pistons rotate at high speed against the cam plate surface. This surface must be smooth with no metal flaked away and no scoring. Circular scratches centered on this machined surface are due to contamination. If scratches can be felt with your thumb-nail, replace the cam plate.
- b. Inspect the bearing surfaces for wear.

4. Piston and Shoe Assemblies (Figure 4-18)

Replace the rotating groups if:

- a. The pistons have side play in the piston block.
- b. The edges of the shoes are worn from contact with the cam plate.
- c. The shoes are a loose fit on the ball end of the piston.
- d. The flat surfaces of the shoes show metal flaking or are deeply scratched. Light or shallow scratches in the shoes will not cause any harm. Do not lap the shoes.

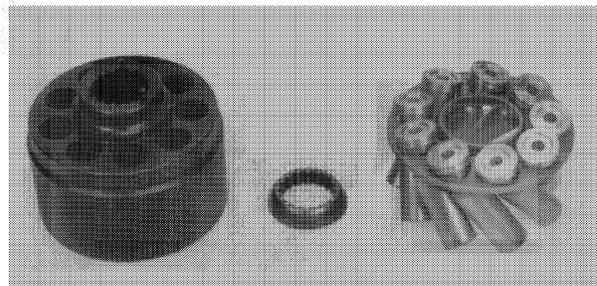


FIGURE 4-18

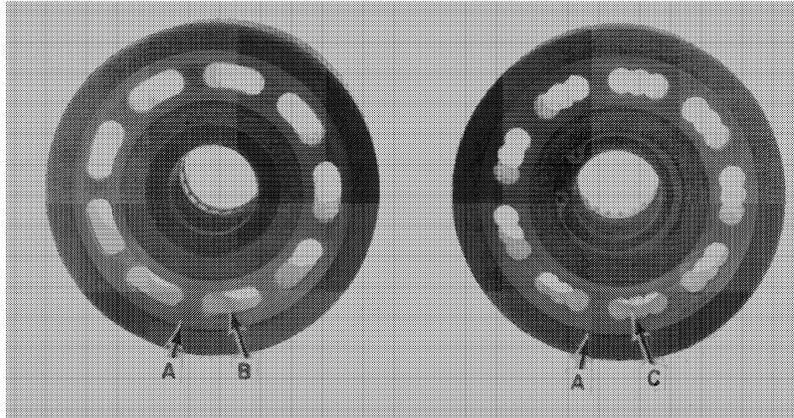


FIGURE 4-19

5. Shoe Plate

Check for cracks at the holes for the spherical washer or shoes. The shoe plate is only available as part of the rotating group.

6. Spherical Washer

Check for wear on the top surface where the shoe plate fits. The spherical washer is only available as part of the rotating group.

7. Rotating Piston Block

Replace the rotating group if:

- a. Cylinders, C, Figure 4-20, are worn or scored so the pistons do not move freely.
- b. Surface, A, Figure 4-19, is worn or grooved or shows metal buildup. Nicks must not extend from the cylinders to the edge of the raised area, A.
- c. Cylinder ports may be milled, B, or drilled, C, Figure 4-19 (two types of blocks).
- d. The three block loading pins, A, Figure 4-20, are spring loaded. They are held in place by the pin keeper (split bushing), B.

Check loading pin action by placing the pin side of the piston block on a flat steel surface. Press on the opposite end (top) of the block with both hands to compress the large spring. Release the pressure, and the spring should force out the three pins. All the pins should extend out of the block the same distance and must be straight.

8. Valve Plates

ATTENTION: The outer layer of the heat-treated sides of the valve plate is less than 0.001" thick (0.025 mm) and dull black. Do not try to smooth or polish the side of the valve plate by lapping.

After heat-treating, a 3/4" (20 mm) wide band of dry-film lubricant is applied to both sides of the valve plate, Figure 4-17.

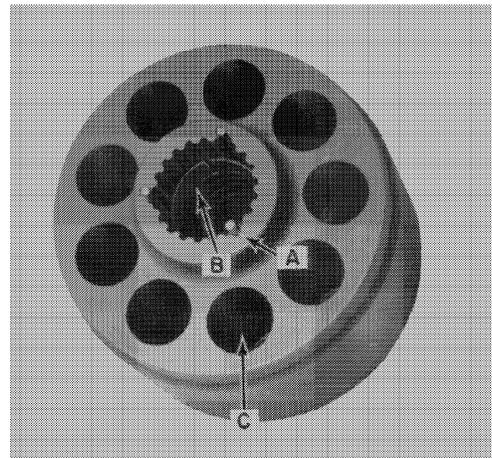


FIGURE 4-20

This lubricant:

- a. Is a light gray color.
- b. Is centered across the two kidney ports.
- c. Is usually 0.0005"-0.001" (0.01 mm-0.03 mm) thick, but may be thicker.
- d. Can be scraped off with your thumbnail (but should be used as is).
- e. Will be smoothed or polished off down to the black surface by the ½" (13 mm) wide raised land of the rotating cylinder block. Polishing will be complete within 200 hours' use so two valve plates with the same amount of use may not look the same.
- f. Usually will be completely polished off (along with the black outer layer) between the two PISTON kidney ports, Figure 4-17.

Check the sides of the valve plate for wear, grooves, or metal buildup in the ½" (13 mm) wide area contacted by the rotating piston block, A, Figure 4-17. This area should not feel rough or grooved when scraped cross-ways with your thumbnail. Sometimes the unpolished edge of the dry-film lubricant can be felt, but the valve plate is not worn and can be used.

Check the needle bearings for wear, B, Figure 4-17. These bearings are pressed into the valve plate, with bearing numbers to the outside.

Two directional relief valves are located in each transmission, C, Figure 4-17. These relief valves limit the maximum system pressure to 4000 PSI (27,560 kPa).

Relief valve pressure is factory set and should not be readjusted.

Clean the outside of the transmission before removing the valves. A small amount of oil will be lost when replacing the valves. Add oil to the reservoir as needed.

REASSEMBLY

After reading the following notes, reverse the disassembly procedures previously outlined.

1. Use a suitable solvent to thoroughly clean all parts. Lay the parts on a clean cardboard and air dry.
2. Use a clean universal tractor fluid (meeting J20A specifications) to lubricate all moving parts as they are reassembled.
3. Install the new gaskets, O rings, seals, and snap rings included with the repair kit.
4. Install the needle bearings with the lettered side of the bearings outward. Install the pintle shaft bearing inner race(s) with the chamfered end inward.
5. Before installing the pump hydrostatic units, fill both pumps with oil through the case drain hole.

LABOR GUIDE

The following labor amounts are listed as a guide only. Working conditions and experience will vary the time it actually takes to complete each job.

Job	Man-Hours
Remove, repair, and replace right transmission pump	6 hrs.
Remove, repair, and replace both transmission pumps	7 hrs.
Remove and replace complete right transmission pump	4 hrs.
Remove and replace complete left transmission pump	5 hrs.

SECTION 5

HYDROSTATIC TRANSMISSION MOTORS

SPECIFICATIONS

End cap bolt torque	27 ft. lbs.-31 ft. lbs. (37 N·m-42 N·m)
Mount bolt torque	66 ft. lbs. (89 N·m)

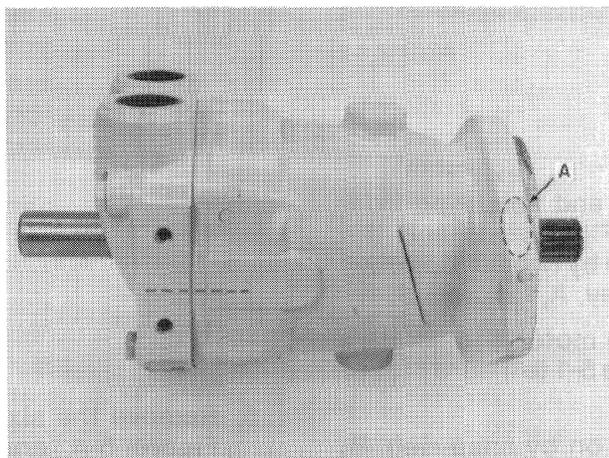


FIGURE 5-1

This section contains basic overhaul information for the Cessna fixed displacement piston-type motors.

NOTE: Dealer adjustment requests for oil leak repairs, other repairs, or overhaul of the transmission motor must include the model number of the transmission motor and the date code. These are stamped in the flange of the motor housing, A, Figure 5-1.

DISASSEMBLY

1. Remove the motor from the skid-steer loader. Then remove the motor's external fittings and/or hoses.

HYDROSTATIC TRANSMISSION MOTORS

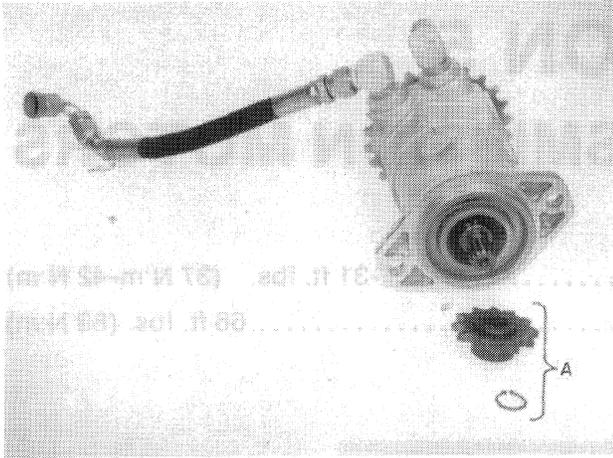


FIGURE 5-2

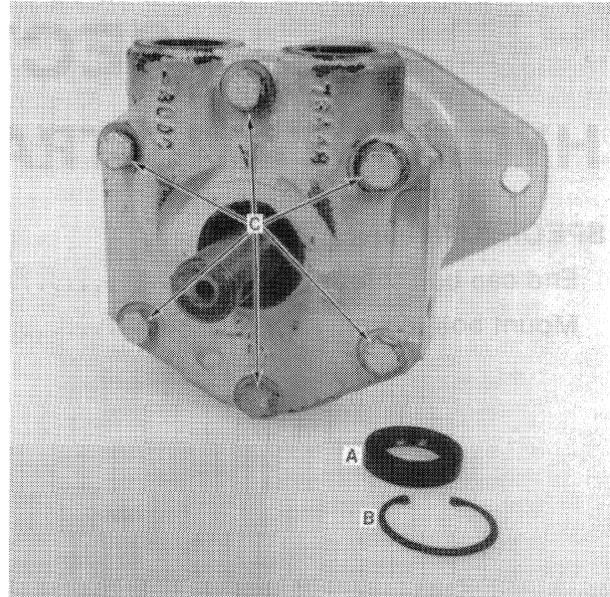


FIGURE 5-4

2. Remove the sprocket and snap ring from the motor shaft, A, Figure 5-2, and the sprocket brake held on by two 90° opposed setscrews and shaft key, A, Figure 5-3.
3. Thoroughly clean the motor and scribe a line as shown in Figure 5-1 to insure proper reassembly.
4. Remove seal, A, held on by snap ring, B, Figure 5-4.

5. Remove the six retaining cap screws, C, Figure 5-4, and remove back plate, A, Figure 5-5, from the motor housing.

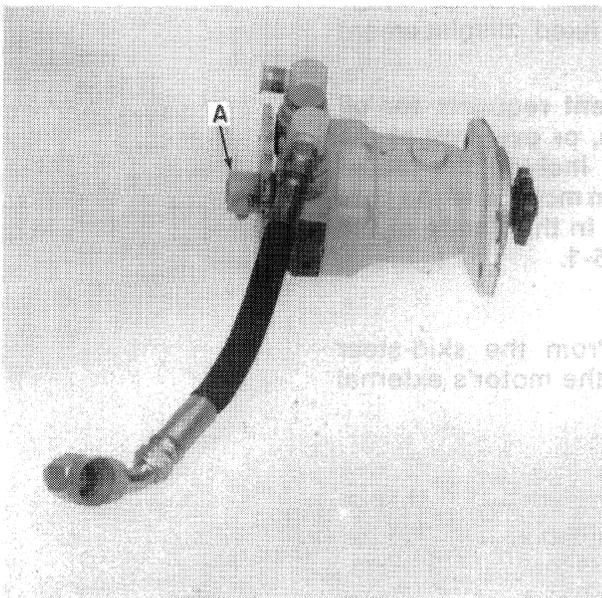


FIGURE 5-3

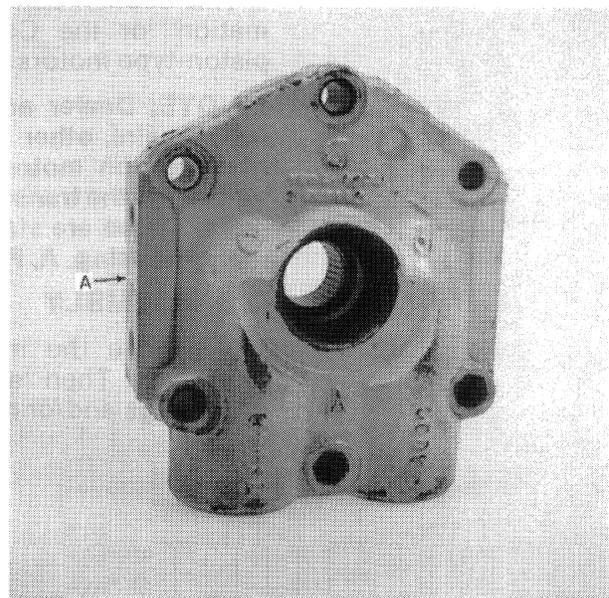


FIGURE 5-5

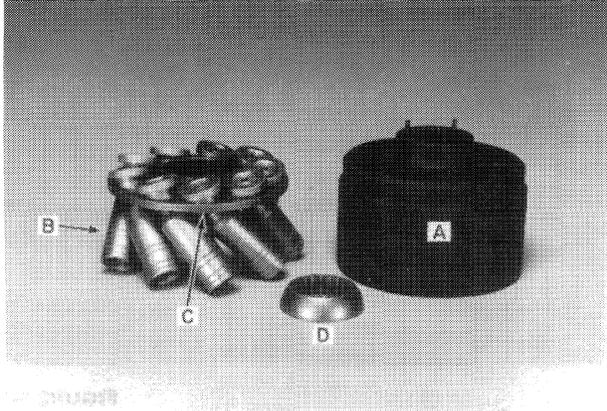


FIGURE 5-6

6. Hold the rotating piston block, A, Figure 5-7, in one hand and tilt the open end of the housing down. Turn the rotating piston block and pull it out as a complete unit without scratching or burring the parts.
7. The rotating group parts are shown in Figure 5-6. Lift these parts out of the rotating block and carefully lay them on cardboard to avoid damage.

Piston block - A

Piston and shoe assembly - B

Shoe plate - C

Spherical washer - D

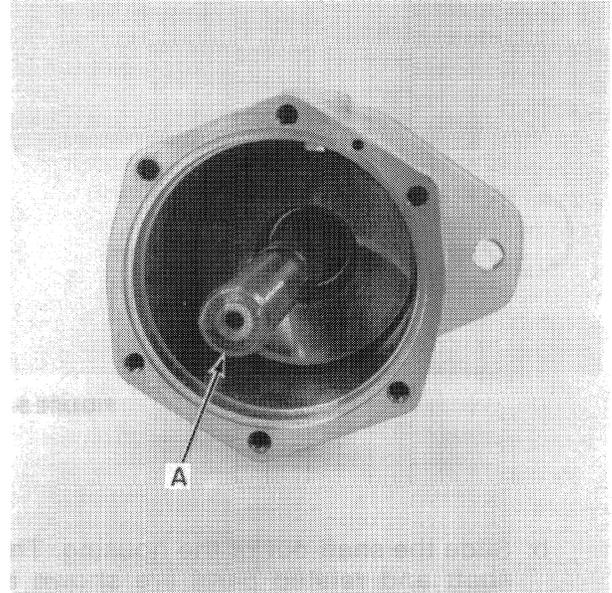


FIGURE 5-8

8. Remove the replaceable cam plate, B, Figure 5-7.
9. To remove the motor shaft, A, Figure 5-8:
 - a. Remove snap ring, A, seal, B, and spacer washer, C, Figure 5-9.

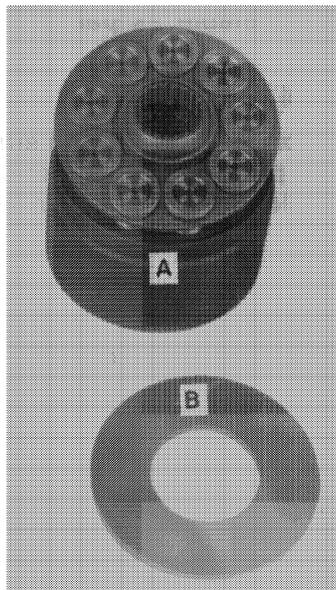


FIGURE 5-7

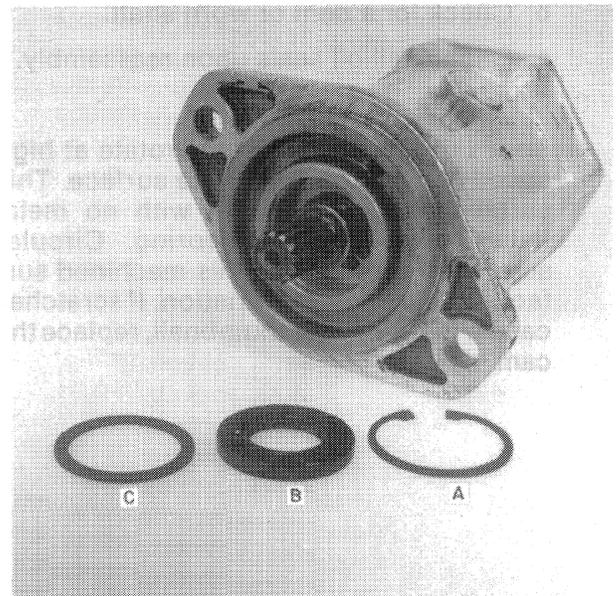


FIGURE 5-9

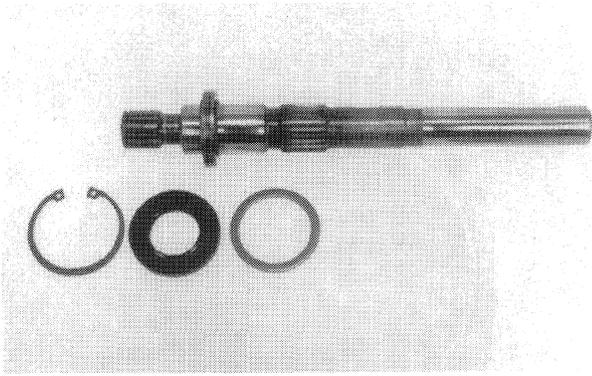


FIGURE 5-10

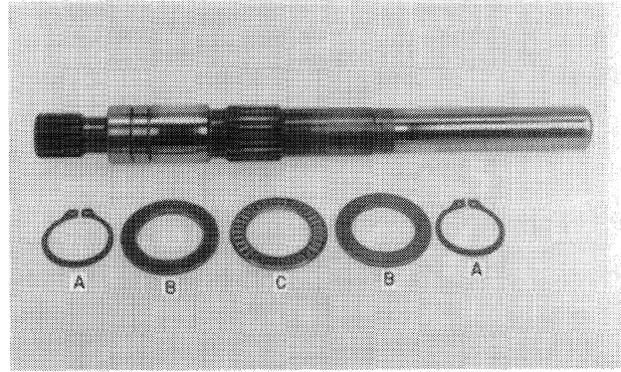


FIGURE 5-11

- b. Slide the shaft out of the housing. The shaft and related parts are shown in Figure 5-10.
- c. Remove snap rings, A, thrust washers, B, and thrust bearing, C, Figure 5-11.

INSPECTION OF PARTS

1. Motor Housing

- a. Shaft needle bearings are a press fit in the housing. Inspect for a loose bearing in the housing. Also check for loose or missing needles in the bearing housing.
- b. Change all oil seals upon reassembly.

2. Motor Shaft

- a. Check areas contacting the needle roller bearings for wear or a rough bearing.
- b. Check for a bent or worn shaft.
- c. Change all oil seals upon reassembly.

3. Cam Plate

Shoes of the motor pistons rotate at high speed against the cam plate surface. This surface must be smooth with no metal flaked away and no scoring. Circular scratches centered on this machined surface are due to contamination. If scratches can be felt with your thumbnail, replace the cam plate.

4. Piston and Shoe Assemblies

Replace the rotating groups if:

- a. The pistons have side play in the piston block.
- b. The edges of the shoes are worn from contact with the cam plate.
- c. The shoes are a loose fit on the ball end of the piston.
- d. The flat surfaces of the shoes show metal flaking or are deeply scratched. Light or shallow scratches in the shoes will not cause any harm. Do not lap the shoes.

5. Shoe Plate

Check for cracks at the holes for the spherical washer or shoes. The shoe plate is only available as part of the rotating group.

6. Spherical Washer

Check for wear on the top surface where the shoe plate fits. The spherical washer is only available as part of the rotating group.

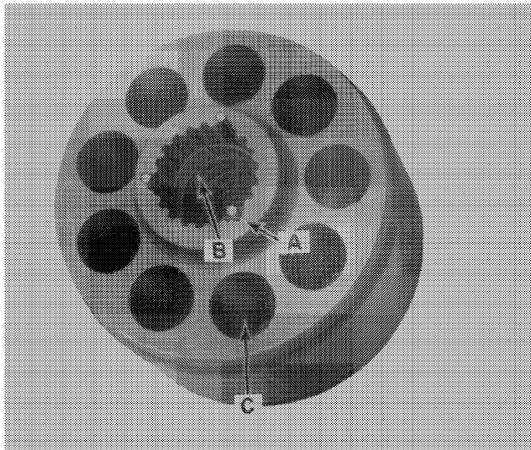


FIGURE 5-12

7. Rotating Piston Block

Replace the rotating group if:

- a. Cylinders, C, Figure 5-12, are worn or scored so the pistons do not move freely.
- b. Surface, A, Figure 5-13, is worn or grooved or shows metal buildup. Nicks must not extend from the cylinders to the edge of the raised area, A.
- c. Cylinder ports may be milled, B, or drilled, C, Figure 5-13, (two types of blocks).
- d. The three block loading pins, A, Figure 5-12, are spring loaded. They are held in place by the pin keeper (split bushing), B.

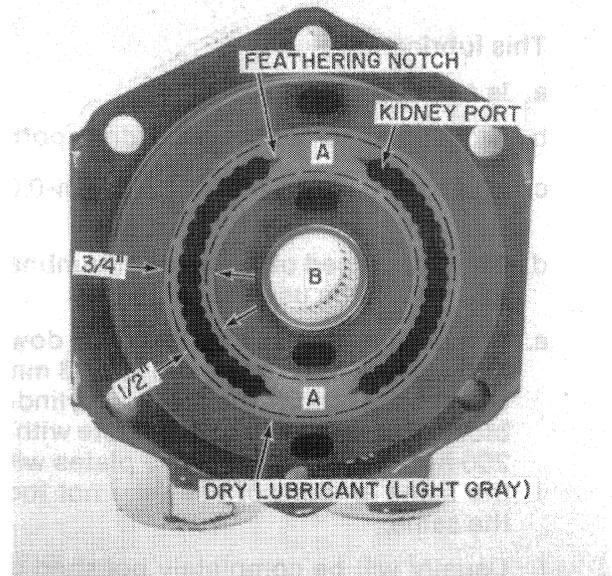


FIGURE 5-14

Check loading pin action by placing the pin side of the piston block on a flat steel surface. Press on the opposite end (top) of the block with both hands to compress the large spring. Release the pressure, and the spring should force out the three pins. All the pins should extend out of the block the same distance and must be straight.

8. Valve Plate

ATTENTION: The outer layer of the heat-treated sides of the valve plate is less than 0.001" thick (0.025 mm) and dull black. Do not try to smooth or polish the side of the valve plate by lapping.

After heat-treating, a 3/4" (20 mm) wide band of dry-film lubricant is applied to the back plate, Figure 5-14.

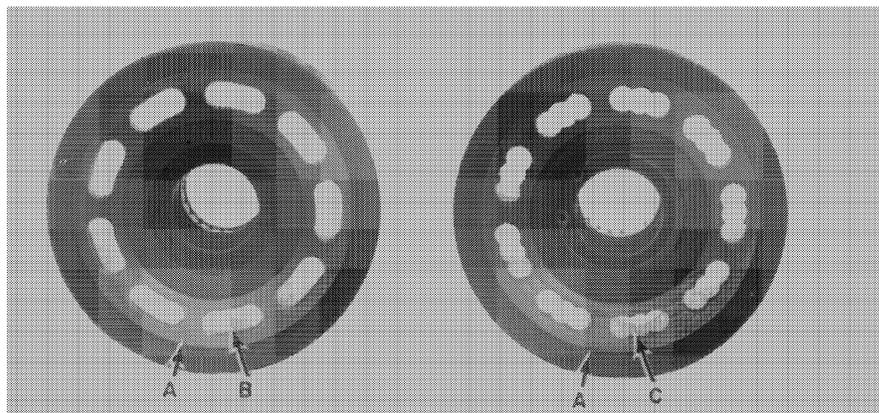


FIGURE 5-13

This lubricant:

- a. Is a light gray color.
- b. Is centered across the two kidney ports.
- c. Is usually 0.0005"-0.001" (0.01 mm-0.03 mm) thick, but may be thicker.
- d. Can be scraped off with your thumbnail (but should be used as is).
- e. Will be smoothed or polished off down to the black surface by the ½" (13 mm) wide raised land of the rotating cylinder block. Polishing will be complete within 200 hours' use so two valve plates with the same amount of use may not look the same.
- f. Usually will be completely polished off (along with the black outer layer) between the two PISTON kidney ports, Figure 5-14.

Check the sides of the valve plate for wear, grooves, or metal buildup in the ½" (13 mm) wide area contacted by the rotating piston block, A, Figure 5-14. This area should not feel rough or grooved when scraped crossways with your thumbnail. Sometimes the unpolished edge of the dry-film lubricant can be felt, but the valve plate is not worn and can be used.

Check the needle bearings for wear, B, Figure 5-14. These bearings are pressed into the valve plate, with bearing numbers to the outside.

REASSEMBLY

After reading the following notes, reverse the disassembly procedures previously outlined.

- 1. Use a suitable solvent to thoroughly clean all parts. Lay the parts on a clean cardboard and air dry.
- 2. Use a clean universal tractor fluid (meeting J20A specifications) to lubricate all moving parts as they are reassembled. Fill the transmission cases with oil through the case drain hole after completing assembly of the component.
- 3. Install the new gaskets, O rings, seals, and snap rings included with the repair kit.
- 4. Install the needle bearings with the lettered side of the bearings outward.
- 5. Before installing the motor hydrostatic hoses, fill the motor(s) with oil.

LABOR GUIDE

The following labor amounts are listed as a guide only. Working conditions and experience will vary the time it actually takes to complete each job.

Job	Man-Hours
Remove, repair, and replace one hydrostatic motor	6 hrs.
Remove and replace one hydrostatic motor	5 hrs.