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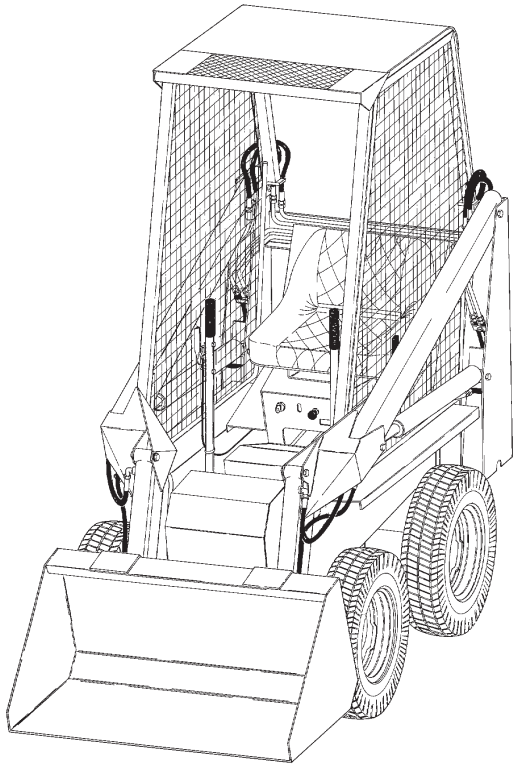
Service Manual

(Gasoline & L.P. Gas)



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INGERSOLL-RAND

6545574 (6-12)

Printed in U.S.A.

bobcat

M–371 Loader
Service Manual

HYDRAULIC SYSTEM SERVICE

M–371 Loader
Service Manual

ENGINE OVERHAUL

Engine overhaul should be accomplished only by a qualified and experienced mechanic. Care must be taken during disassembly of the engine to prevent damage to the various polished surfaces on the crankshaft, camshaft and cylinder wall. Proper tools must be available and used in the removal and installation of bearings. Torques, tolerances and correct gear alignment must be carefully observed to insure proper engine performance and long service life.

The engine should be removed from the machine to a bench and overhauled in a clean work area.

To remove the engine from the machine, follow these steps:

1. Remove the protective grill.
2. Disconnect fuel line, battery cables, wiring, choke and throttle cables.
3. Remove the two drive belts.
4. Remove the stabilizer rod.
5. Remove the engine plate mounting nuts. (Engine is removed with plate attached).
6. Remove the engine from the machine.

To install engine onto the machine, reverse the above steps.

ENGINE SHOCK MOUNTS AND STABILIZER ROD

Engine shock mounts contain sleeve spacers. Tighten the nuts until they fully meet the spacers. Do this before installing the stabilizer rod.

The stabilizer rod must be properly adjusted. Improper adjustment of the stabilizer rod will cause excessive engine vibration. After engine mounting nuts have been tightened securely, install the stabilizer rod. Alternately tighten the rod lock nuts so that there is an even amount of tension on both sides of the rod support tab, against the rubber shock absorbers. The shock absorbers should be equally compressed, but not too tight (Fig. 35A).

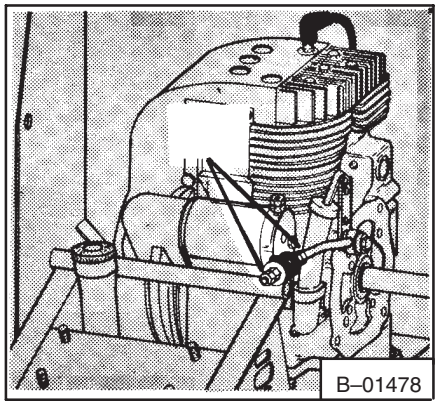

Fig. 35A Engine Shock Mounts

REPAIR–REPLACEMENT METHODS

There are several different methods to choose when repairing a failed engine. If complete shop facilities are available to rebore cylinders and regrind crankshafts, you may choose to completely overhaul the engine using appropriate oversize and/or undersize replacement parts. If bore, piston or connecting rod are damaged but the crankshaft and all other parts are in good condition, the miniblock may be the best repair method.

The miniblock can be considered as a crankless block as only the crankshaft and bearing plate are omitted.

If an engine is in bad shape, both internally and externally , it is generally more economical to replace it with a new complete engine of the same specification. See parts book for part number.

Fig. 36 shows the components of a miniblock assembly.

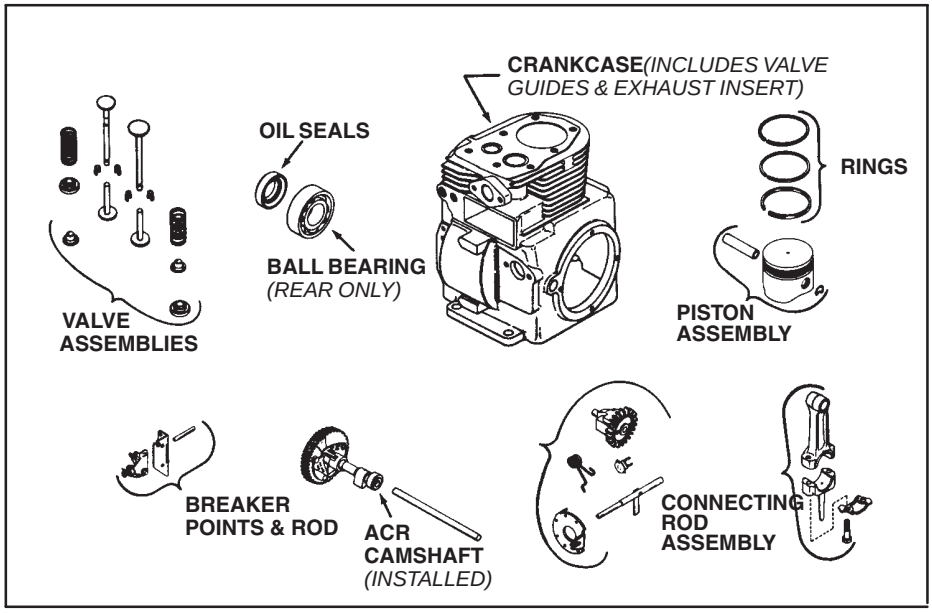

Fig. 36 Miniblock Assembly

2. Inspect brass orifice seating area for nicks. Do not remove unless replacement is necessary.

3. Inspect rubber seat for foreign material or excessive seat indentation. Replace diaphragm lever and seat assembly if necessary.

Reassembly:
1. Make sure all parts are clean and free from dirt.

2. Insert diaphragm lever into position making sure that diaphragm lever and diaphragm are properly engaged.

3. Place diaphragm into position making sure that diaphragm lever and diaphragm are properly engaged.

4. Place adjustment spring on top of diaphragm in proper position. Place housing cover in position making sure that the housing vent is above the outlet of regulator. Start all assembly screws and tighten evenly.

Adjustment: After reassembly it will be necessary to check the outlet pressure. The outlet pressure should be approximately 6 ounces per square inch. If adjustment is necessary, remove the bonnet cap. Using a large screwdriver, adjust the spring tension to vary the pressure. Turning in or clockwise increases the outlet pressure and turning out decreases the outlet pressure.

It is important that the inlet be kept clean when mounting or servicing the regulator. Pipe dope should be used on the inlet fitting but car should be taken that no pipe dope enters into the regulator for it can lodge on the seat and orifice.

SECONDARY REGULATORS (Fig. 66)

Description: The secondary regulators are compact single diaphragm type. This regulator will regulate the flow of gas to the carburetor accurately and will shut the gas off automatically when the engine demand ceases.

Operation: With the engine shut off, the diaphragm spring holds the fuel inlet valve against the fuel inlet valve seat. The diaphragm spring tension is transferred to the fuel inlet valve by the diaphragm lever. Upon cranking the engine, a pressure drop occurs on the fuel outlet side of the regulator diaphragm. Since one side of the diaphragm is exposed (vented) to atmospheric pressure while the outlet side is exposed only to the pressure drop (vacuum) from cranking, the diaphragm pushes against the diaphragm lever and spring. At this pressure drop, the gas inlet valve begins to open and admits fuel to the engine for starting. As the engine accelerates and pulls more and more air through the regulator, the pressure drop in the regulator increases until the fuel inlet valve is completely open.

Disassembly:
1. Remove assembly screws.

2. Remove housing cover.

3. Remove diaphragm and gasket(s). Some diaphragms are attached to the diaphragm lever. To remove diaphragm, put a knife under the retainer clip on the end of the lever assembly so that the end of the pusher pin will come up and slide out the end of the retainer clip.

4. Remove diaphragm lever and spring. The inlet plunger or valve must be removed through the fuel inlet fitting hole by first removing the brass orifice. The brass orifice should not be removed unless absolutely necessary; it should, however, be inspected for dirt or nicks on the seating surface.

Reassembly:
1. Make sure all parts are clean and free from dirt.

2. Insert diaphragm lever and spring and secure with retaining screw. Do not tighten the retaining screw more than enough to hold the lever in place. If it is too tight, it will bind the lever. The inlet plunger (valve) is inserted through the fuel inlet fitting hole.

3. Place leaf spring on tip of adjusting screw. Tighten fuel inlet fitting.

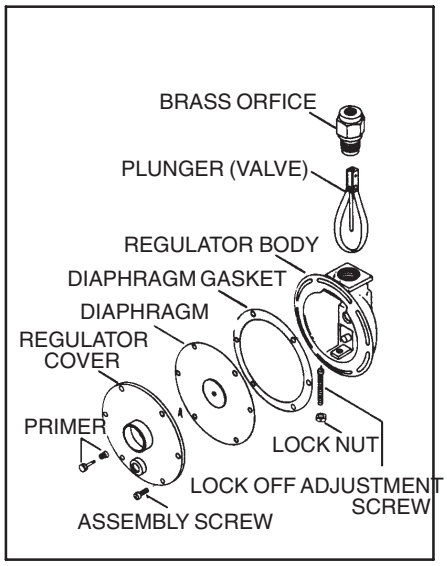

Fig. 66 Secondary Regulator

3. Drop the steel balls into their seats and place the springs over the balls.

4. Place the diaphragm over the phenolic gasket, bronze face up.

NOTE: The entire diaphragm must fit inside the raised rim of the diaphragm seal.

5. Put the gear assemblies into oil and install them into the front plate bearings.

6. Apply a thin coat of heavy grease on both faces of the pump body (gear plate) and place the gear plate over the gears. Check the scratch marks on the sides of the plates to be sure you assemble the pump correctly.

7. Slide the back plate over the gear shafts until the dowel pins are engaged. Check the scratch marks on the sides of the plates to be sure you assemble the pump correctly.

8. Insert bolts and tighten to 25–28 ft.–lbs. (34–38 mm) torque.

9. Install the pump drive shaft seal over the shaft. Use care to not cut the rubber sealing edge. Apply oil to the seal for easier installation. Tap the seal with a plastic hammer to seal it.

The pump should turn with hand pressure if it was assembled correctly.

10. Install the spacer & sheave on the pump. The spacer goes around the snap ring on the Parker pump & against the snap ring on the Cessna pump.

NOTE: Use care when tightening the sheave holding nut. If it is over–tightened it may break the pump shaft at the threaded area. If the nut is under–tightened, the sheave may become loosened and wear the shaft and sheave.

After the sheave is seated on the shaft, the sheave nut must be tightened to 35 ft.–lbs. (47.5 Nm) torque.

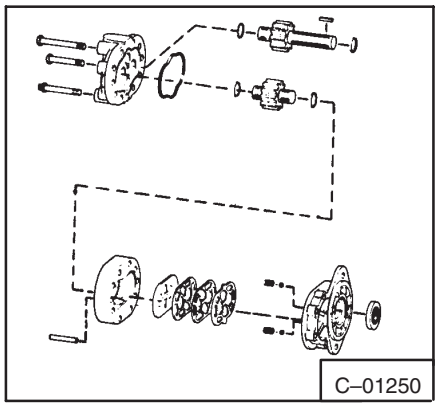

Fig. 80 Cessna Hydraulic Pump

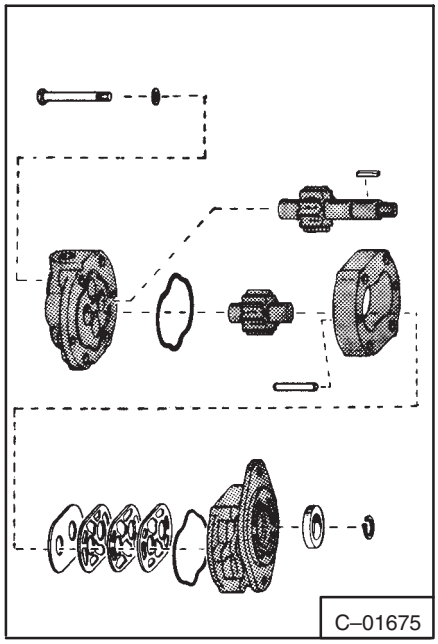

Fig. 80A Parker Hydraulic Pump

CONTROL VALVE BANK REPAIR

If the control valve is leaking or otherwise needs repair, it should be removed from the machine and disassembled in a clean work location.

Use care in the disassembly of the valve. Do not allow parts to become mixed with parts from another valve section. Repair only one valve section at a time. Spools are not interchangeable between valve sections. Each spool is factory "lapped" to fit it' s particular valve body only.

Refer to the parts manual for correct assembly of internal parts.

To repair the control valve:

1. Disconnect the pedal linkage and tube lines and remove the control valve from machine. Clean the outside of the valve thoroughly.

2. Remove the tie rod nuts and carefully slide the valve sections off the tie rods. Be careful to avoid losing the circuit check and poppet spring, which is enclosed between valve sections. The poppet must be kept with it's valve section. An "O" ring is also installed between the sections.

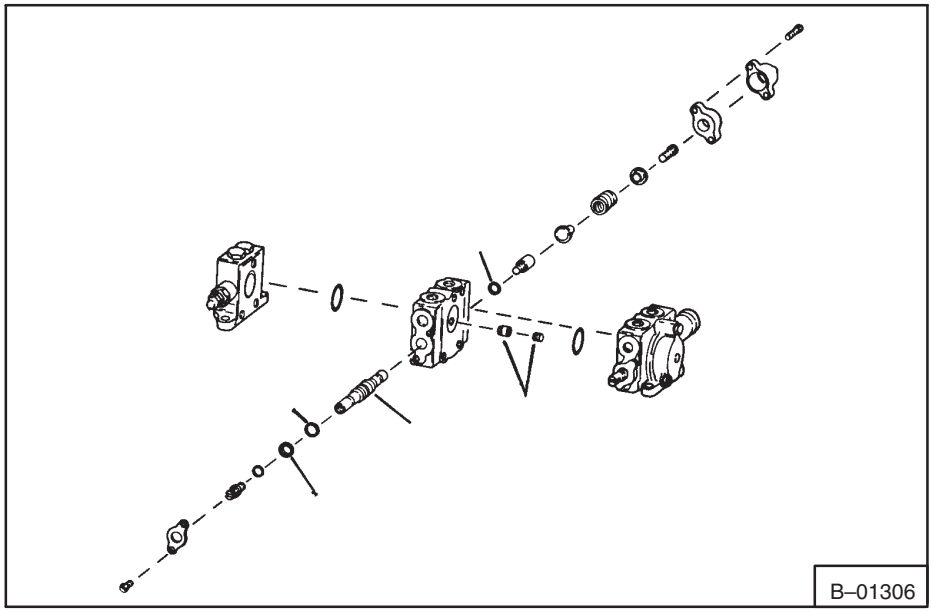

Fig. 81 Valve Section Disassembly (Husco)

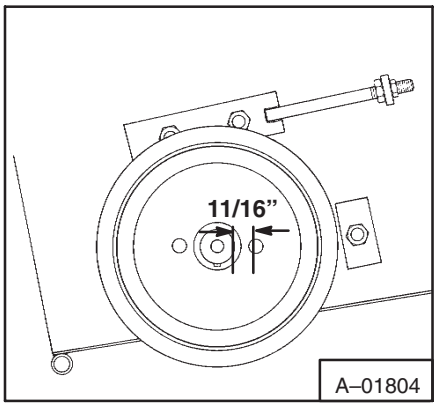

Fig. 103A Sprocket Assembly Bushings

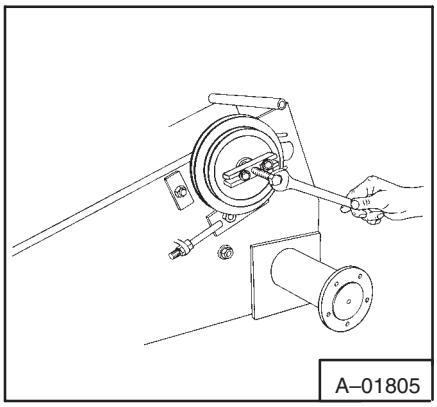

Fig. 103B Removing Sheaves.

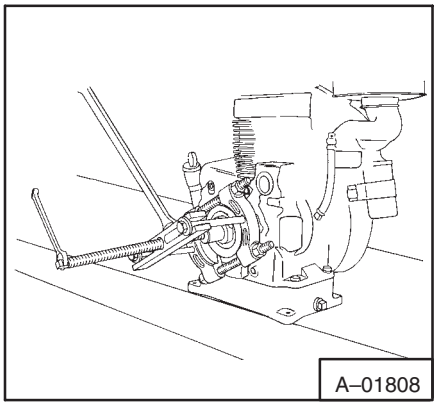

Fig. 103C Removing pump drive sheaves.

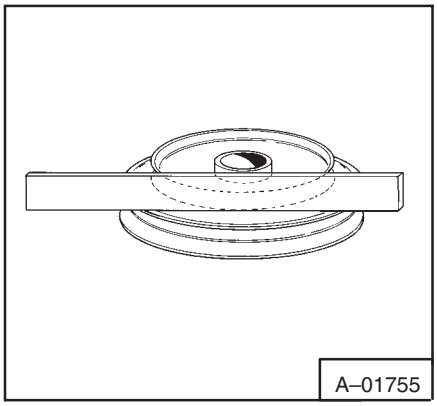

Fig. 103D Checking sheave clearance.

8. Fasten the end cap to the axle using the 3/8” lock washers and 3/8” x 1” cap screws. Put Loc–Tite on the screws first. Torque the screws to 20 ft.–lbs. Tap the end cap with a rubber or plastic mallet and retorque the screws to 20 ft.–lbs. Be sure the axle can be rotated by hand.

9. Re–install the final drive chain. See “Re–installing Chains” and “Drive Chain Adjustment”.

TRANSMISSION CASE & COVER

Transmission case cover and tank sealing must be maintained to prevent fluid leaks and/or foreign matter from entering the reservoir. Be sure that the contact surfaces are flat and free of dents. If the cover becomes bent it must be straightened or replaced.

When installing a new gasket, staple the corners together to aid in holding the gasket sections in place while mounting the cover . Torque the 3/8” screws to 12–15 ft.–lbs. Do not over–tighten.

DRIVE AND DRIVEN SHEAVES

The drive sheave assembly consists of three separate sheaves; one each for high and low range and the hydraulic pump drive sheave. On early model M–371 Bobcats the three sheaves were made up into one single unit.

The driven sheave assembly which is installed on the upper jackshaft consists of two separate sheaves, one for each speed range.

The sheaves are keyed to their shafts and fit tightly, making their removal difficult.

To remove sheaves which do not already have the 1/2” holes drilled on each side of the hub, first drill the holes as shown in Figure 103A. The sheaves can then be removed using a puller as shown in figure 103B.

To remove the inner (pump drive) sheave on the engine, use the method shown in figure 103C.

When reassembling sheaves, prior to their installation, first check the sheave spacing using a straight edge ruler as shown in figure 103D. Arrange the two sheaves so that the most belt clearance is obtained.