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Service Manual

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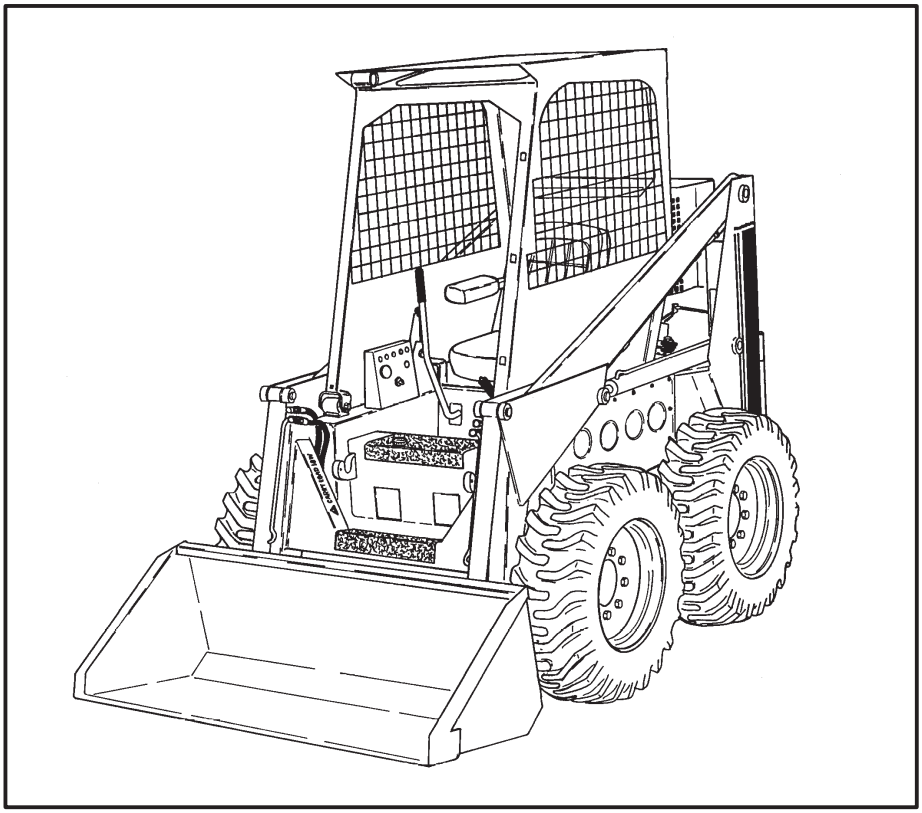

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1–2 SERVICE INTERVALS

Maintenance work must be done regularly. Failure to do so will result in damage to the machine or its engine. The service schedule must be used as a guide to correct maintenance of the Bobcat loader. Use this schedule unless it is to shorten the intervals due to extremely hot, cold, dusty or corrosive operation conditions.

720, 721, 722

Make inspection of the following items every (8–10 hours).

ITEM	SERVICE REQUIRED
Engine air Cleaner	Clean dust cup. Check condition of system.
Engine Oil	Check oil level and add as necessary.
Tires	Check for damage and check air pressure in tires.
All Pivot Points Gauges, etc. lights, etc.	Add lubricant to all fittings. check for correct operation only of all indicators, gauges, switches,
Seat Belt	Check condition of belt & buckle and make replacement if there is a defect.
Operator Guard	Check condition of guard & bolts.
Safety Decals	Be sure all decals are in place and can be read. Make replacement as necessary.
Hydraulic Fluid	Check level and add recommended fluid as necessary.
Engine Cooling System (722)	Check coolant level. Add coolant when low. Remove any debris from radiator grill area.
Engine Cooling Inlet (720 & 721)	Check rear grill & blower inlets for restriction of air flow. Clean cylinder cooling fins and blower housing when necessary.

1–3.6 Engine Electrical System (720, 721 & 722)

The Bobcat has a 12 volt, negative ground, alternator charging system.

General service of the electrical system is as follows:

1. The factory battery is maintenance free. Batteries that are not maintenance free must have electrolyte checked regularly. (See 1–2 Service Intervals).

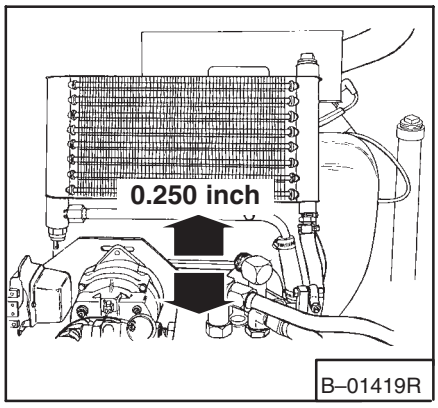


Fig. 1–24 Checking Belt Tension (720)

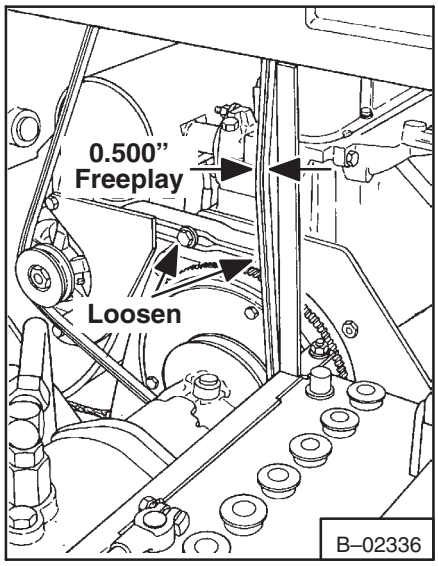


Fig. 1–25 Checking Belt Tension (722)

2. Check battery cables to see that both are clean and tight. Remove corrosion with soda and water solution. Put grease on cable ends to prevent further corrosion.

3. Check alternator belt tension. Make adjustment for belt movement with 5 lbs. (2,27 kg) force (Fig. 1–24, Fig. 1–25 & Fig. 1–26) as shown.

4. Electrical circuit breakers give the electrical system protection from overload. The circuit breakers will automatically turn ON again after the circuit breaker is cool (several minutes).

5. The cover for the cooling fan is not giving enough support to the alternator and muffler. To correct this use, bracket, tube, and adapter as shown in (Fig. 1–25a). See current Parts Manual to order these parts.

Using extra battery as an aid in starting:

If it is necessary to use an extra battery as an aid in starting, it must be correctly connected to the Bobcat electrical system as follows:

⚠ WARNING

Protect eyes, skin and clothing from ACID (in the battery).

1. Fasten one end of cable to positive (+) connector of Bobcat battery.

2. Fasten the other end of the same cable to positive (+) connector of extra battery.

3. Use second cable and fasten one end to the negative (–) connector of extra battery.

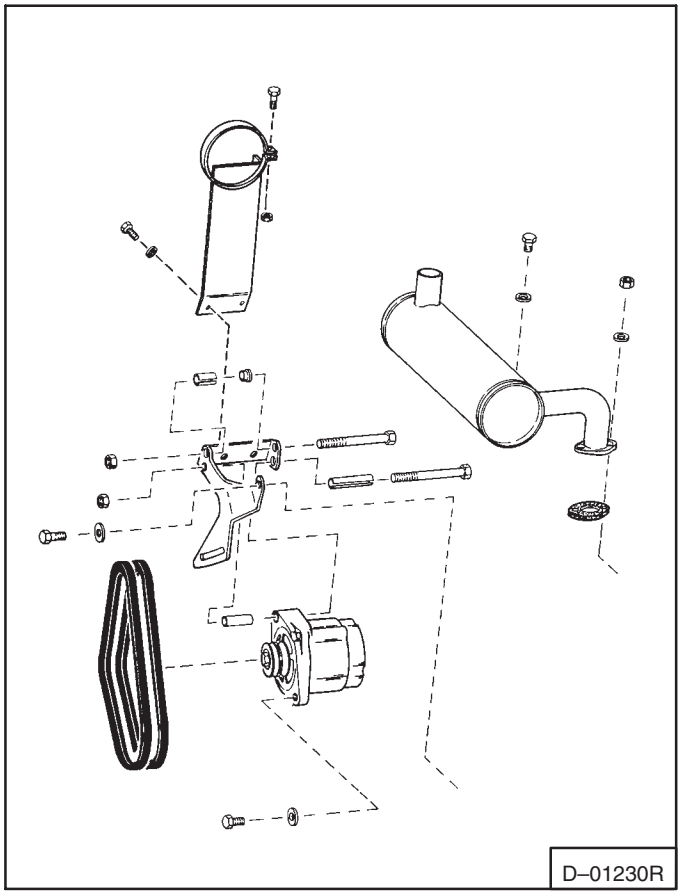


Fig. 1–25a Generator And Bracket Installation (721)

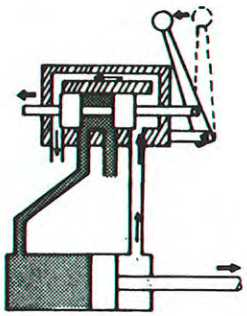
SYSTEM OPERATIONS

bobcat

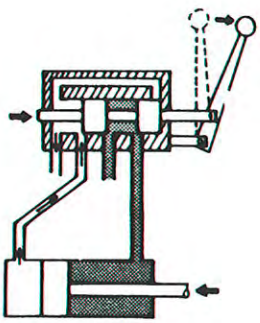
700, 720, 721, 722
HYDRAULIC/HYDROSTATIC SYSTEM
(Chart # PI-2514)

The fluid moves from the reservoir (chaincase) to the inlet of the filter (4) and from the filter (4) to the inlet of the hydraulic pump (7). At the filter "tee" fitting (4) return fluid from the oil cooler (3) joins with the fluid from the filter (4) to supply the hydraulic pump (7). Also at the inlet of the hydraulic pump (7) there is a "tee" fitting where the fluid from the filter (4) is joined by fluid from the by-pass valve (13).

The hydraulic pump (7) is a "vane" type pump and is driven by a shaft through the hydrostatic pumps (5). The fluid goes from the hydraulic pump (7) to the hydraulic control valve (12).



The control valve (12) has a adjustable relief valve (11). When all three spools are in neutral position, the fluid goes through the control valve (12) and back to the filter (14). If one of the spools is activates, the fluid goes out the respective port and to either the base end, or the rod end of the cylinders (8) (10). As the fluid goes into one end of the hydraulic cylinders (8) (10), return fluid comes from the opposite end of the cylinders and back into the control valve (12). When the cylinders (8) (10) reach the end of the stroke, the fluid flow stops and causes hydraulic pressure to increase. When the pressure reaches the setting of the relief valve (11), it will open and let the fluid by-pass the hydraulic control valve (internally) and go back to the filter (14). If you let the spool go back to the neutral position, then there is fluid available for the other sections. Two sections of the control valve (12) can be used at the same time if the main relief valve (11) is not open.



(Chart # PI-2525 & PI-2516)

From the control valve (10) the fluid moves through the "tee" fitting at the by-pass valve (11) into the filter (12). The by-pass

2 LOADER HYDRAULIC SYSTEM

2–1 OPERATION OF THE HYDRAULIC SYSTEM (FIG. 2–1 & 2–2)

The two side tanks onthe Bobcat are connected by a manifold pipe, and make up the hydraulic oil reservoir. The engine drives the vane pump through a universal joint. Hydraulic fluid circuit is as follows: From the reservoir to the 25 micron filter. From the filter to the vane pump. From the vane pump to the control valve.

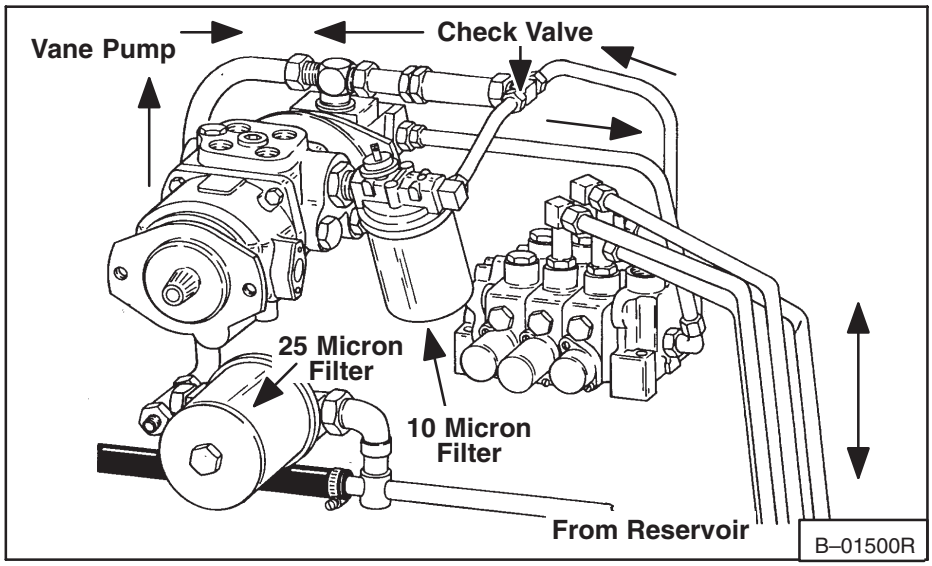


Fig. 2–1 Hydraulic System

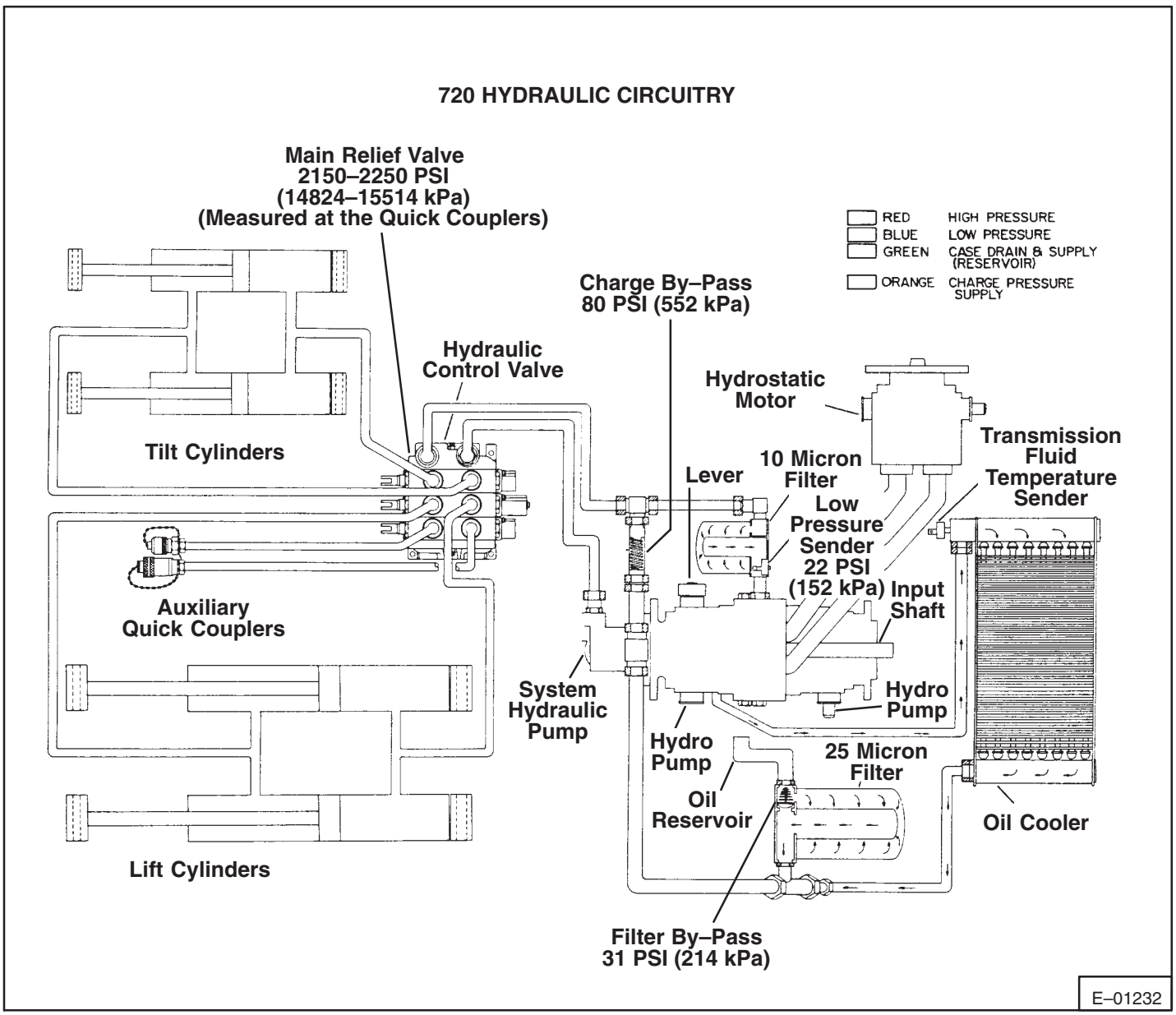


***Fig. 2–2** Hydraulic Circuitry
***Revised Feb. 82**

2. Start the engine and run at idle.

3. Press the heel of the right (tilt) pedal. Look for a leak at the cylinder opening.

4. If fluid flows from the opening, the piston seal is bad and needs replacement. A very small leak here is acceptable.

   If fluid leaks from the rod end of the cylinder, it is an indication of a bad head (rod) seal.

5. If there is no leak or only a very small leak, the problem is probably in the control valve.

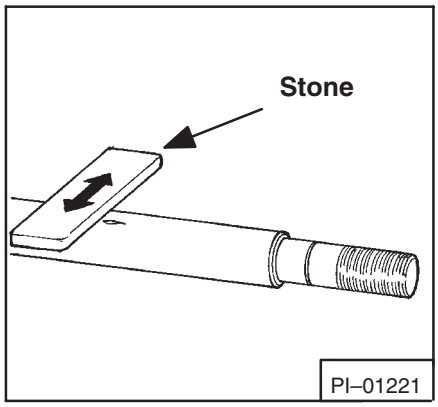


Fig. 2–20 Removing Marks

NOTE: Too large of loads cause the tilt cylinders and pivot points to become damaged. This happens when stopping tilt action. The industrial grapples are sent with restriction kits. The farm and pulpwood grapples are sent without a restrictor. The restriction kit can be used with the farm or pulpwood grapples. (See current Parts Manual for kit).

2–9 HYDRAULIC CYLINDER REPAIR

There are several conditions which can cause hydraulic cylinder failure. They are:

1. Damage marks on the cylinder rod. Inspect the complete rod. Carefully remove small marks with abrasive stone (Fig. 2–20).

2. Small holes caused by defective welding. Use an arc welder to fill holes. Use care to prevent damage to seals and cylinder rods. Do not put the ground clamp on the cylinder rod when welding the case.

3. Damage to cylinder case. Disassemble the cylinder and make parts replacement as needed.

4. Dirt in the cylinder causing wear. Use care when disconnecting fittings and during filter replacement to prevent dirt from getting into the system.

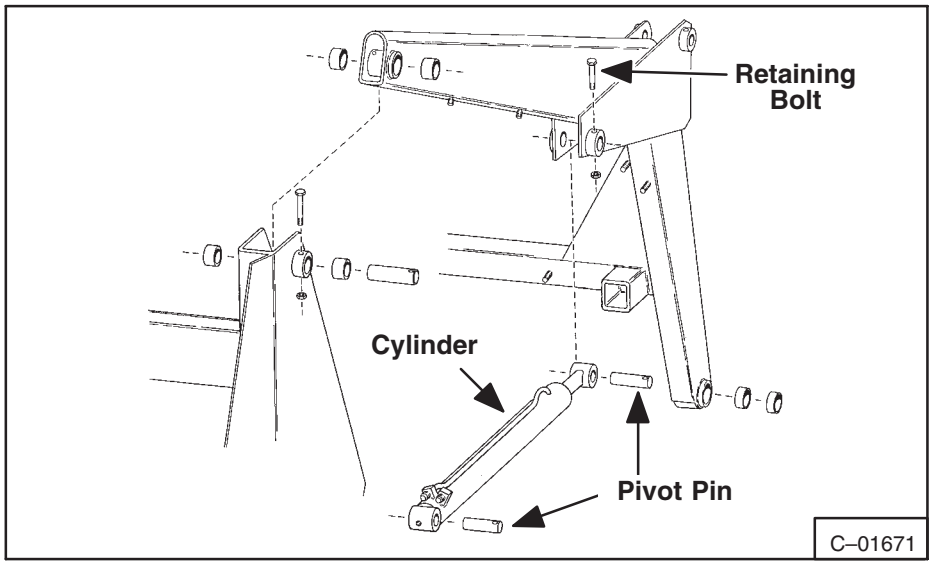


Fig. 2–21 Removing Cylinders

2–9.1 Removing Cylinders

1. Activate the pedals to release pressure from the lines.

2. Remove the 3/8 retaining bolts from the cylinder pivot ends (See Fig. 2–21).

3. Push the pivot pins out.

4. Disconnect the hoses from the cylinder. Put covers on hoses to keep dirt out of the system.

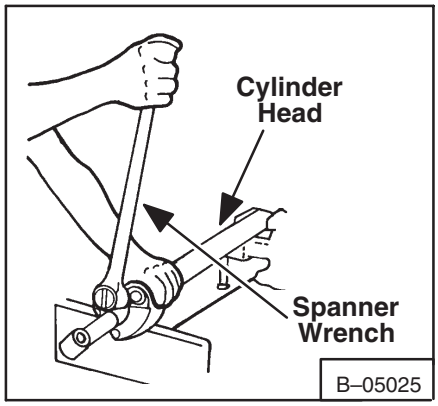


***Fig. 2–22** Cylinder Spanner Wrench

2–9.2 To Disassemble A Hydraulic Lift Or Tilt Cylinder

1. Remove the cylinder from the machine.

2. Use a spanner wrench (MEL1075) to remove the head from the cylinder (Fig. 2–22).

3. Pull the rod and piston assembly from the cylinder case.

3 HYDROSTATIC DRIVE SYSTEM

3–1 CIRCUIT DESCRIPTION (Fig. 3–1)

The by–pass valve holds the fluid at the 10 micron filter above 50 PSI. The pressure sender on the filter base gives warning to the operator (*Trans–Filt* Light) if the pressure is low.

A small quantity of this fluid is used to keep the hydrostatic pump and motor circuits full of oil. This fluid enters the circuit through the replenishing valves (Fig. 3–2 & Fig. 3–3).

The remainder of the fluid goes out through the charge relief valve, and back to the hydraulic system. A fluid temperature sending switch is located under the front hydrostatic pump (722 only). It gives warning to the operator (*Trans–Filt* Light) if the hydraulic oil becomes too hot.

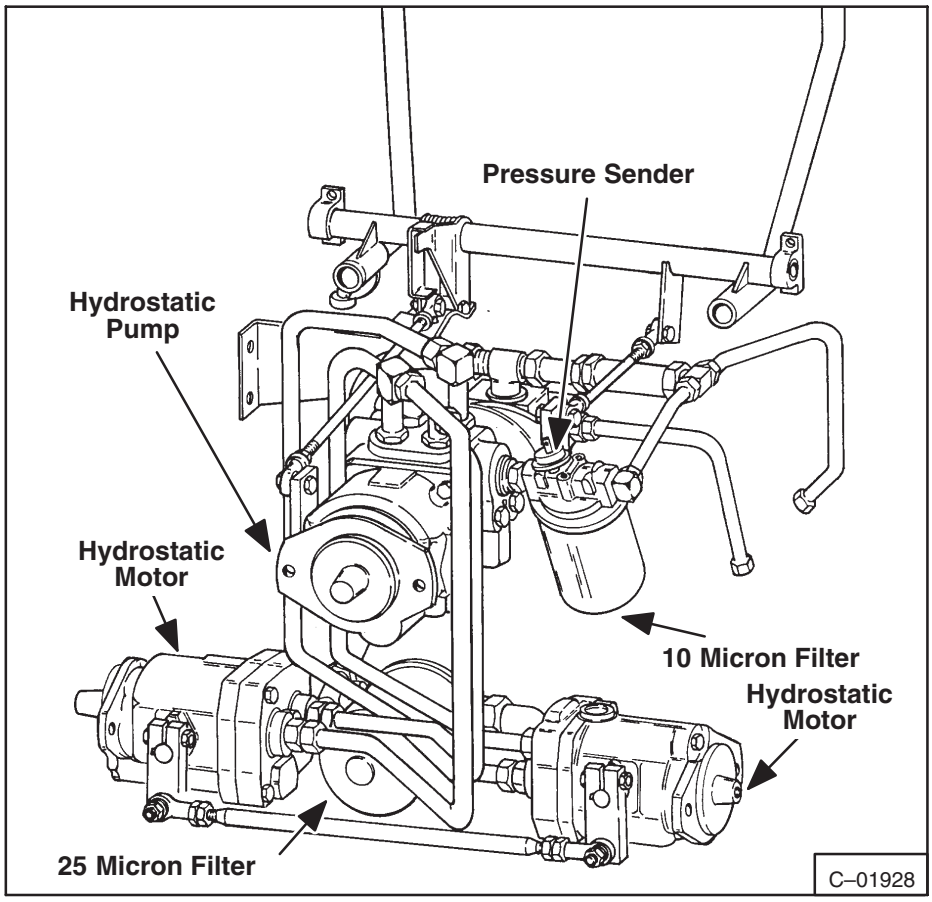


Fig. 3–1 Hydrostatic Transmission Circuitry

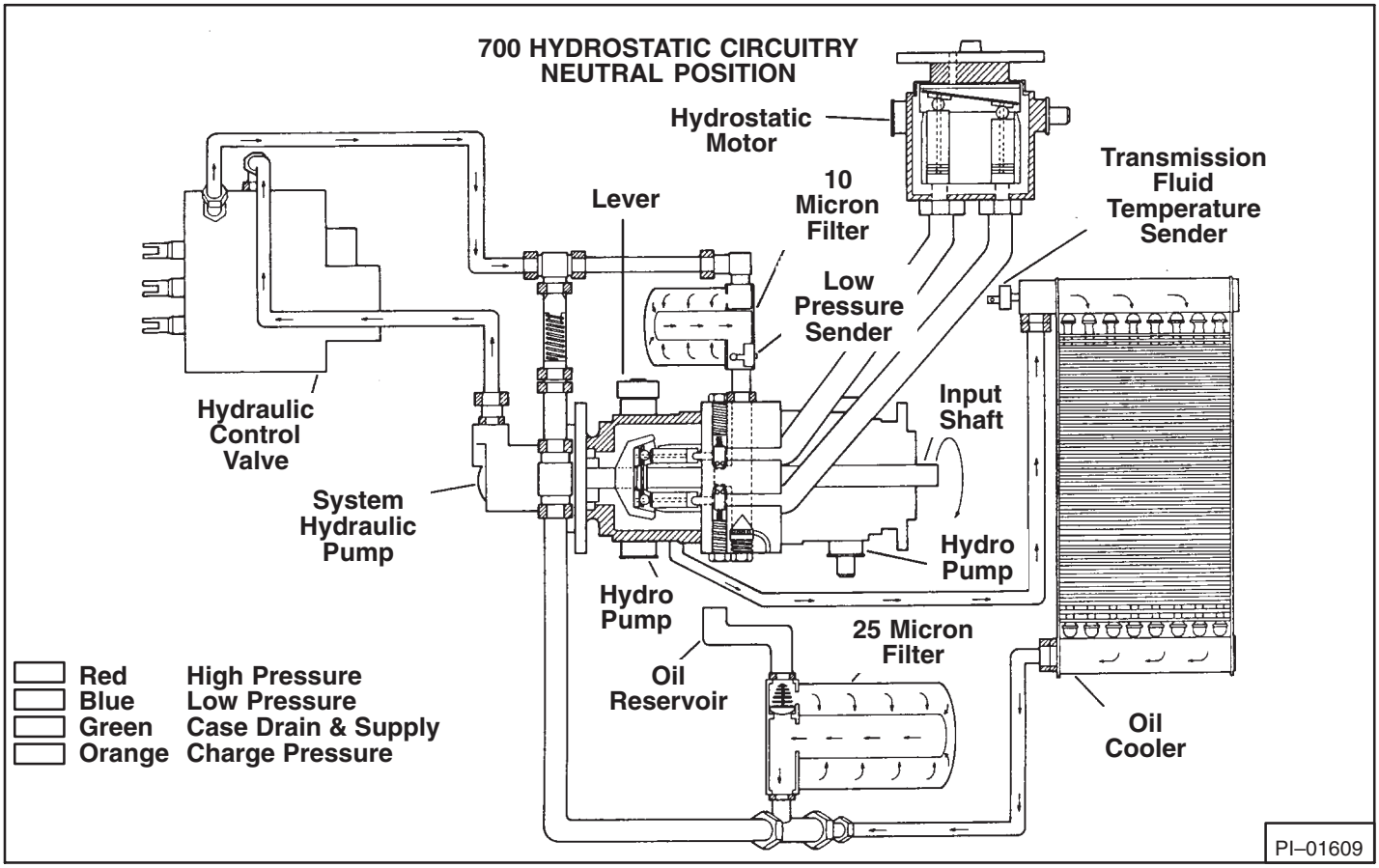


Fig. 3–2 Hydrostatic Circuitry – Neutral

6. Operate the control lever in both directions and check the cam linkage. Be sure the bolt is not hitting on either end of the slot (Fig. 3–10). Be sure the linkage is not hitting the tubelines.

7. Lower the ROPS and install the mounting screws.

3–6 CHECKING THE HYDROSTATIC SYSTEM

NOTE: If the loader is disabled, you can move it onto a transport vehicle or the service shop by using the relief valve release tool (MEL 1179). Remove the high pressure relief valves (Fig. 3–11a, Item 1) from one side of the hydrostatic pumps. Install the bars and the relief valve plugs and move the loader at a slow speed and short distance.

Loss of charge pressure can be caused by one of the following conditions:

1. Dirty hydraulic filters.
2. Low fluid level in the reservoir.
3. Dirt in by–pass valve, or other valve defect.
4. Pump or motor has defect.
5. Charge relief valve has defect.
6. Broken fluid pressure line.
7. Leak in vane pump suction line, letting air into the system.
8. Vane pump has lost its charge.
9. Vane pump defect.

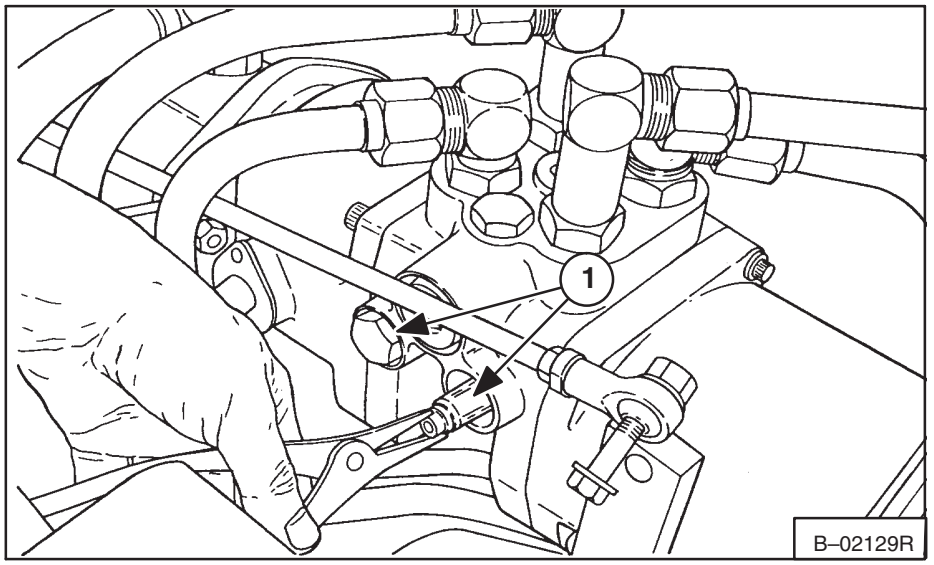


Fig. 3–11a Removing High Pressure Relief Valve

3–6.1 Charge Pressure Check (Levers In Neutral)

To check the charge pressure, proceed as follows:

1. Put the Bobcat on safe blocks. Tilt the ROPS and hold it with a support.
2. Remove the pressure switch located on top of the transmission filter and install a 0–100 PSI (0–1000 kPa) pressure gauge in its place (Fig. 3–12).
3. Put the steering levers in neutral. Start the engine and run at 3/4 throttle.
4. Check the pressure on the gauge. If it is below 45 PSI, check the by–pass valve, If pressure is above 75 PSI (517 kPa), check with the levers engaged.

3–6.2 Charge Pressure Check (Levers Engaged)

Leave the loader as in the above check (Steps 1 & 2).

1. Start the engine and run it at about 3/4 throttle.
2. Hold the parking brake lever at about 1/2 engaged position. On machines without brakes connect the gauge to a hose, lower teh ROPS and operate the machine against a stationary support.
3. Move the steering lever for side of loader being checked. If the pressure drops below 45 PSI (310 kPa) either the pump or motor for that side has damage.

NOTE: If the pump or motor has damage on one side, remove, clean and inspect both the pump and motor for that side.

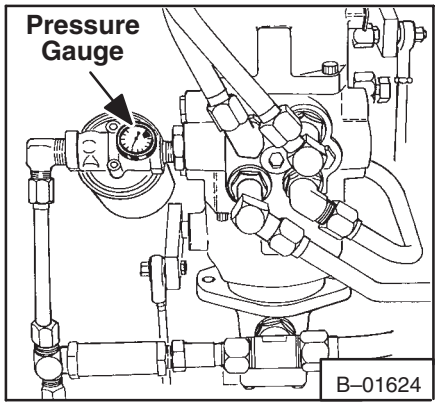


Fig. 3–12 Checking Charge Pressure

Put the shaft onto the driver, then put the seal in position and drive it into the housing as shown in figure 3–46. Shaft seal driver dimensions are given in figure 3–47.

Figure 3–48 shows the seal in place.

Use a torque wrench to tighten all bolts. Tighten to 45 ft.–lbs. (61 Nm) torque (Fig. 3–49, 3–50).

START–UP AFTER REPAIR

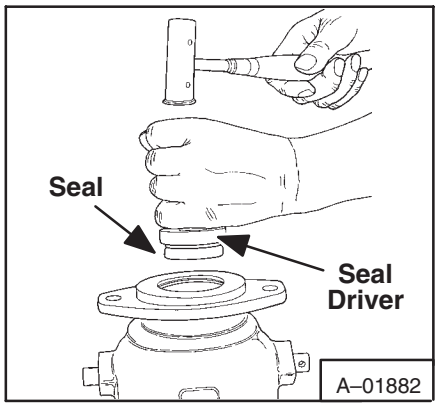


Fig. 3–46 Installing Shaft Seal

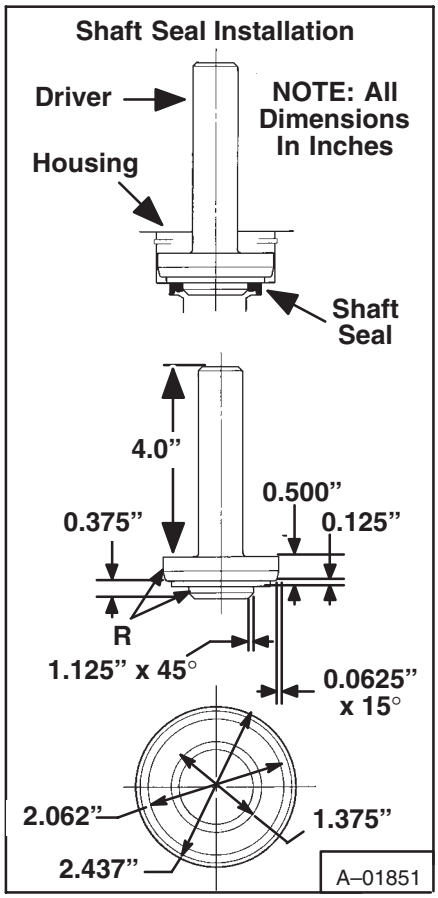


Fig. 3–47 Shaft Seal Installation

IMPORTANT

Correct preparation before starting must be made or damage to the transmission units can result.

The hydrostatic transmission pumps and motors must have thorough lubrication with hydraulic fluid before starting and operating the loader.

1. Lift the machine and put it on safe blocks.
2. Charge the vane pump and inspect for suction leaks in outlines in Section 2.
3. With the steering levers in neutral, start the machine and run at idlespeed. The filter light must go out within 30 seconds.
4. Activate the steering levers, forward and reverse, until the wheels turn smoothly.
5. Activate the hydraulic controls until the hydraulic cylinders operate smoothly
6. The loader is now ready for service.

NOTE: If hydraulic action is still rough, see Section 2 to check for air leaks.

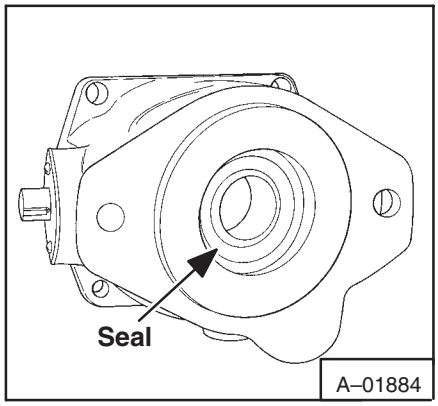


Fig. 3–48 Seal In Place

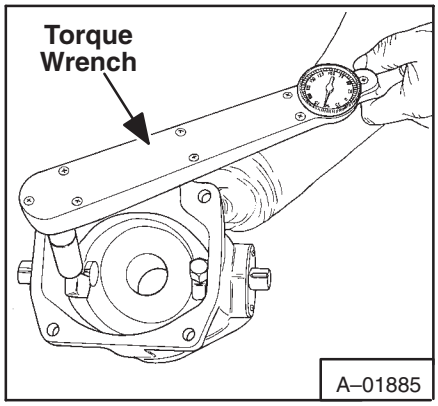


Fig. 3–49 Tightening Yoke Bolts

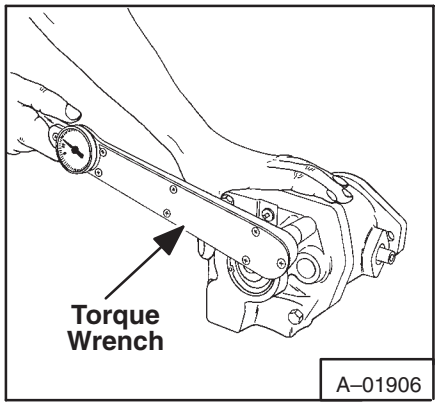


Fig. 3–50 Tightening Valve Plate Mtg. Bolts

4–6.2 Assembly (Fig. 4–21)

1. Install center snap ring (Item 3) in sprocket.
2. Press bearing race (Item 2) into sprocket.
3. Install outer spacer (Item 5). One of four holes must line up with a hole in sprocket.
4. Press bearing race into sprocket (Item 8) to hold spacer.
5. Install inner spacers (Item 6 & 7) in the outer spacer. Install bearings.

NOTE: The bearings and spacers are made in sets. Do not mix with other parts.

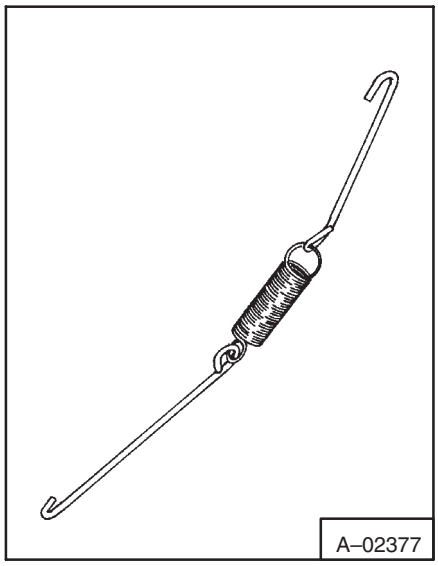


Fig. 4–19 Installation Tool

4–6.3 To Install Upper Jackshaft Sprocket

1. Install sprocket assembly in loader with secondary chain over sprocket.
2. Fit bolt (Fig. 4–21, Item 1) through side tank and sprocket assembly.
3. Turn nut (Item 9) on bolt and tighten.
4. Install primary chain on sprocket. See Section 1 for adjustment.
5. Connect brake adjustment rod and check brake adjustment.
6. Install side cover.

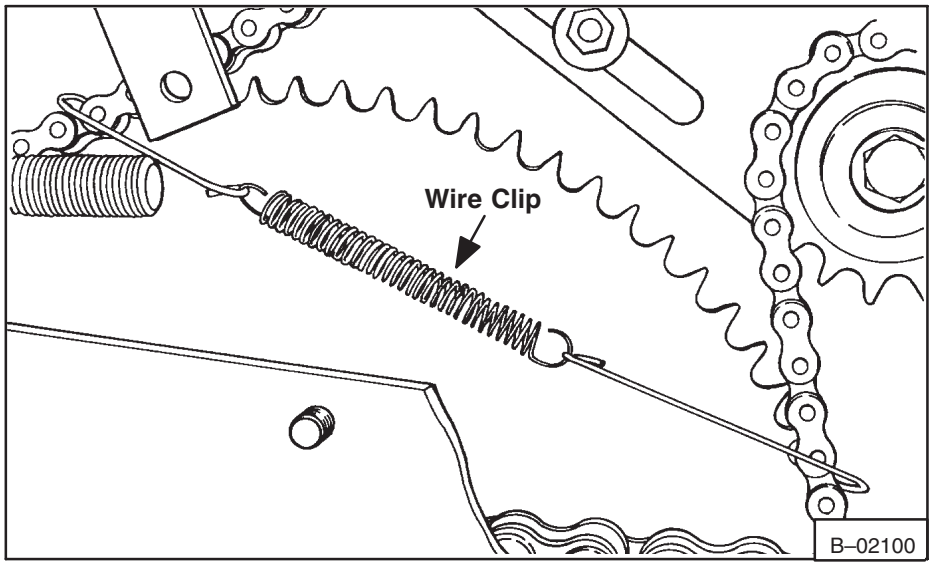


Fig. 4–20 Wire Clip Installed

4–7 IDLER SPROCKET SERVICE (PRIMARY AND SECONDARY)

When making replacement of idler bearings, both the bearings and the race must be installed.

1. Remove idler assembly from machine.
2. Remove 1/2 inch bolt, and remove sprocket from idler bracket.
3. Press out the old bearing.

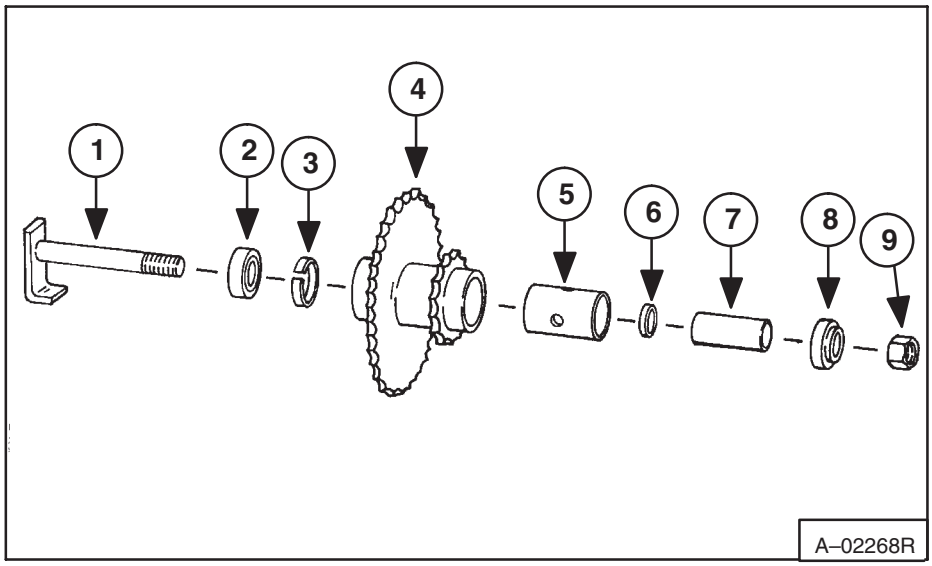


Fig. 4–21 Upper Jackshaft

5 MAIN FRAME

5–1 THE BOB–TACH

Make a replacement of worn or damaged Bob–Tach wedges (Fig. 5–1 & Fig. 5–2). Also check the compression springs for damage.

Check the operation of the levers. The levers must go over center when they are pushed down (Fig. 5–3 & Fig. 5–4). The wedges must be fully extended when the levers are in engaged position.

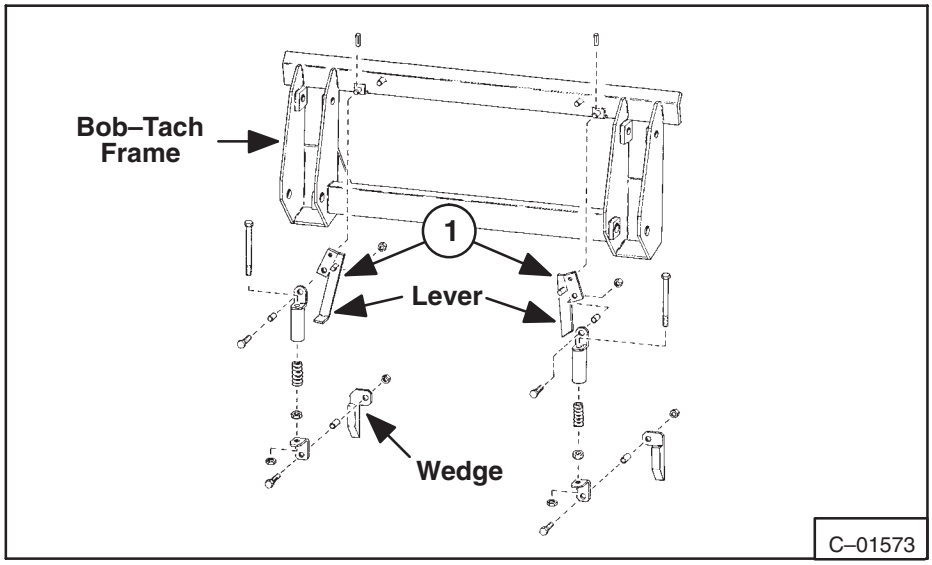


Fig. 5–1 Bob–Tach Breakdown (Early Models)

Be sure the lever stopping points are in place (Item 1). Otherwise the levers can damage the tilt cylinder during loader operation.

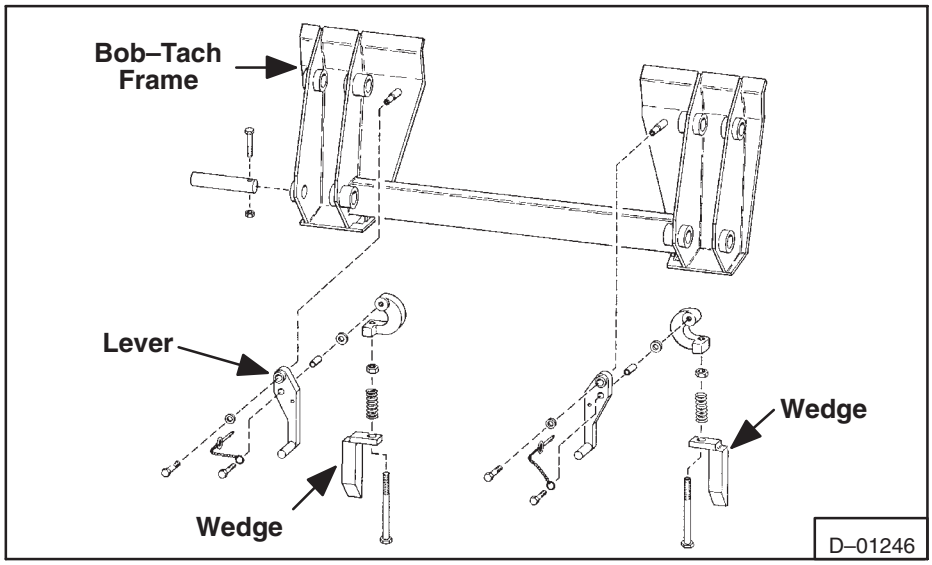


Fig. 5–2 Bob–Tach Breakdown (Current Models)

5–1.1 Removal And Replacement of Bob–Tach

1. Remove the attachment from the Bob–Tach.
2. Remove the 3/8 inch bolts which hold the pivot pins to the Bob–Tach, and push the pins out.
3. Assembly is the reverse of disassembly.

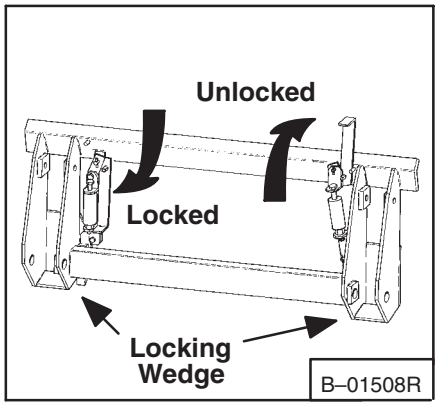


Fig. 5–3 Bob–Tach Levers (Early Models)

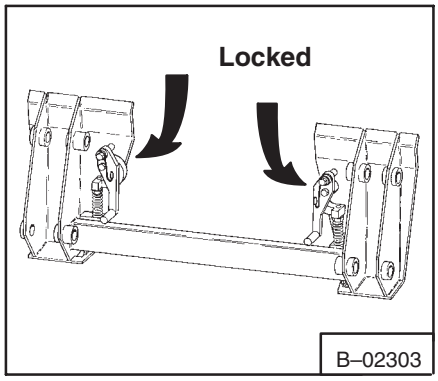


Fig. 5–4 Bob–Tach Levers (Current Models)

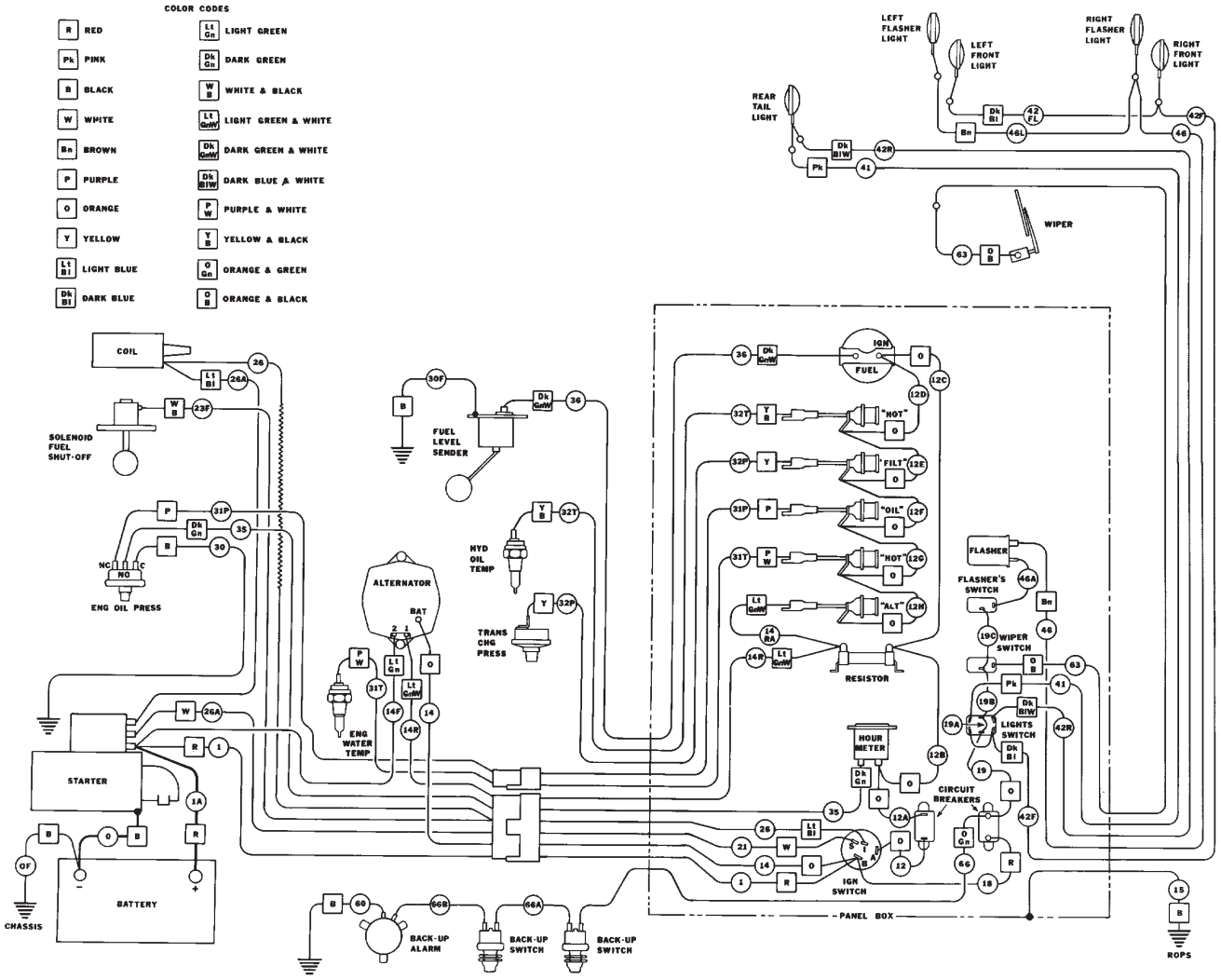


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Fig. 6–6 Schematic Of Electrical System (722)

ENGINE SERVICE

⚠ WARNING

DO NOT service the Bobcat loader without instructions or taking the necessary safety precautions. Before working on the loader, see the warnings and instructions at the beginning of this Service Manual. After making the repair or adjustment, always check the function of the loader. Failure to obey warnings may cause injury or death.

7A–5.1 To Remove The LP Carburetor From The Engine

1. Close the fuel valve on the fuel tank.
2. Remove the muffler from the exhaust manifold.
3. Disconnect the fuel line from the carburetor and remove the air cleaner hose.
4. Disconnect the choke and throttle linkage.
5. Remove the fastening bolts and remove the carburetor.

7A–5.2 Disassembly

1. Remove the adjustment jet and idle adjustment screw (Fig. 7A–10).
2. Remove the five screws which hold the diaphragm assembly in place. Lift the complete assembly off the carburetor (Fig. 7A–11).
3. Disconnect the connecting rod (Fig. 7A–12, Item 22) from the choke. Remove the valve retainer (Item 23) and slide the starting valve out of the body, with the rod attached.
4. Loosen throttle stop screw until throttle plate is fully closed (Fig. 7A–13).
5. Put a mark on the throttle plate to make sure of correct assembly. Remove throttle plate, shaft and shaft seals.
6. Remove the plug and axle (Items 49 and 51). Lift the diaphragm lever out of the carburetor.
7. Remove the set screw and nylon plug (Fig. 7A–14).
8. Remove the inlet orifice (Fig. 7A–12, Item 39). The fuel valve and spring will then lift out (Items 41, 42 and 43).
9. Do not remove the choke unless it has wear or damage.

7A–5.3 Cleaning And Inspection

Clean all parts in carburetor solution, except rubber or fiber parts. Inspect all parts for damage or wear.

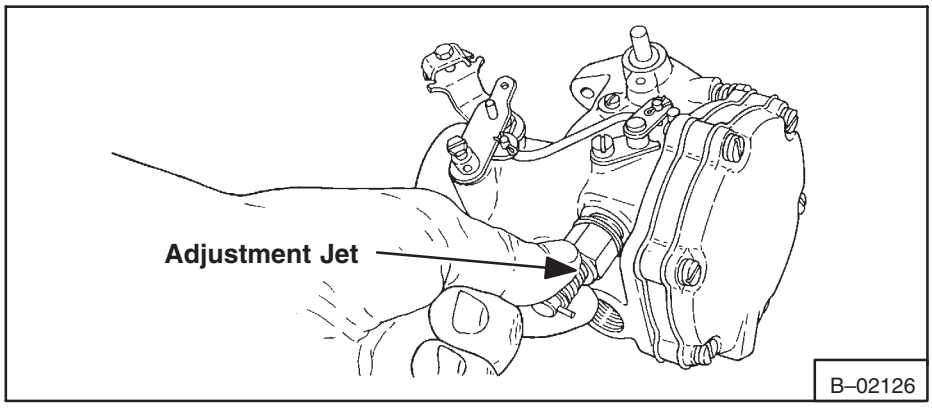

Fig. 7A–10 Removing Adjustment Jet & Idler Adjustment Screw

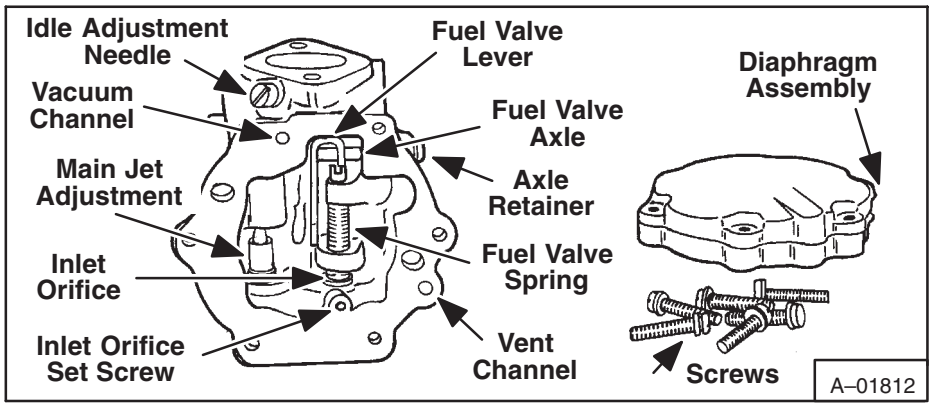

Fig. 7A–11 Diaphragm Assembly

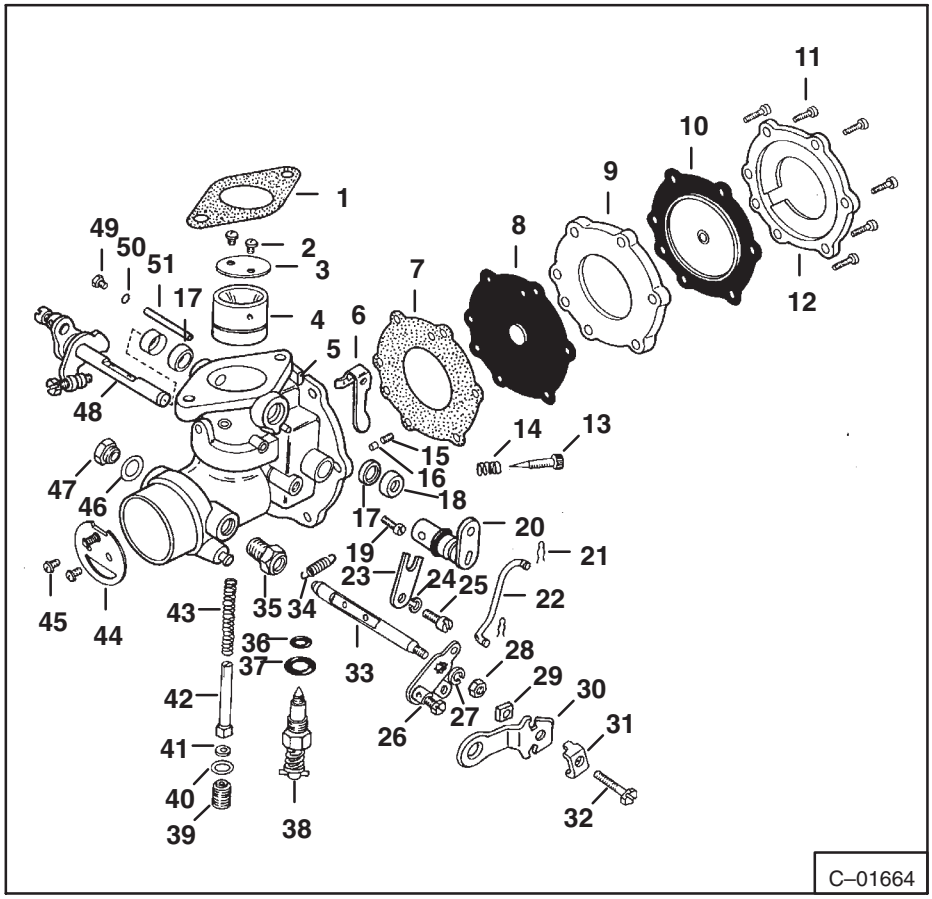

Fig. 7A–12 LP Gas Carburetor Breakdown

Special service notes on the three bearing engine are:

1. Crankshaft seal (Fig. 7A–46, Item 1) must be installed even to end of bearing support (Item 2).

2. When installing new third bearing, push on number side of bearing until it is even with inside of bearing support (Fig. 7A–47).

3. Put LOCTITE adhesive on the inside diameter of the bearing race before installing the race.

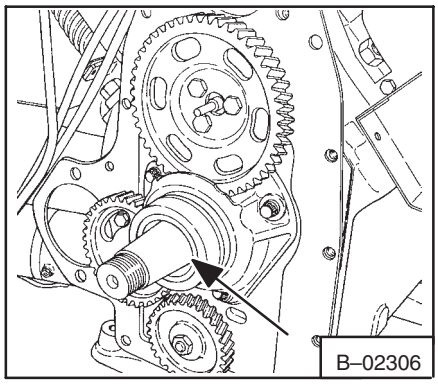

Fig. 7A–46 Crankshaft Seal Location (3 Bearings)

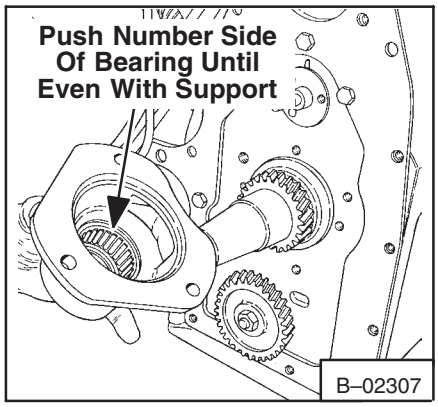

Fig. 7A–47 Bearing Location (3 Bearings)

4. If a new bearing support is installed, crankshaft end play must be checked. If end play adjustment is necessary, add or remove gaskets from front bearing plate of engine.

7A–6.17 Camshaft

The camshaft must be pulled from the flywheel end of the engine (Fig. 7A–48). During replacement, be sure the spring and plunger are in place in the end of the camshaft.

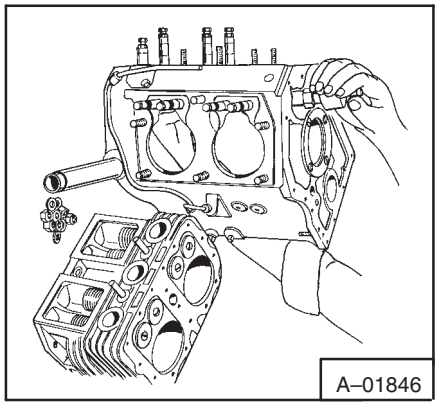

Fig. 7A–48 Removing Camshaft

7A–6.18 Valve Tappets

Remove the valve tappets after the camshaft is removed. In assembly, the tappets must be put in their correct position in the crankcase before camshaft is installed.

After the cylinder blocks have been assembled to the crankcase, make an adjustment of the valve tappets (Fig. 7A–49) with the tappets in their lowest positions (engine cold).

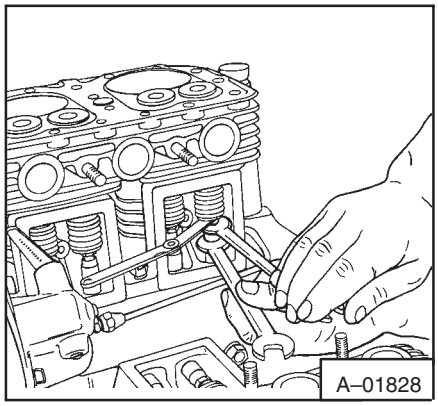

Fig. 7A–49 Adjusting Valve Tappets

7A–6.19 Governor Adjustment

The control rod between the governor and carburetor must have adjustment of correct length, or the governor action will be wrong. With the engine stopped, the governor spring will hold the flyweights in, and the control rod must be of correct length for holding the carburetor throttle fully open at that point. The accuracy of this adjustment can be tested by disconnecting the control rod from the governor lever, then pushing the rod toward the carburetor as far as it will go. This will open the throttle fully. Then move the governor lever as far as possible in the same direction; while the rod is in alignment with the hole in the lever. Then turn the rod in two more turns. Put the rod into the hole in the governor lever and install the cotter pin. When the governor lever is pushed toward the carburetor as far as it will go, there must be about 0.625 inch clearance between the throttle lever and the top pin on the carburetor. The clearance will cause the lever to move back from the stop pin and not stop against the pin, during sudden load application.

The governor lever as twelve holes (Fig. 7A–50) for installing the governor spring. Install the governor spring in the No. 11 hole for the VH4D engine. The full load speed of the engine will be about 90 RPM less than no load RPM. See Section 8 for the no load RPM. Use a tachometer and adjust the screw on the spring until you get this speed.

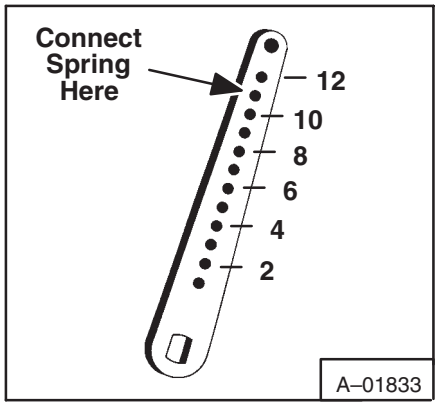

Fig. 7A–50 Governor Lever

Assembly

Assembly is the reverse of disassembly. Put high temperature grease in the bearings before assembly.

7B–5.3 Cylinder Head and Valves

Removal

1. Remove the blower and air housing.
2. Remove the manifolds and injection tubelines.
3. Remove the four bolts which hold the head in place with a No. 10 socket. (Loosen the bolts evenly.)
4. Lift the cylinder head of f. The push rod tubes will come of f with the head.

Disassembly

1. Remove the two bolts which hold the push rod tubes, and slide the tubes out.
2. Remove injector (See injector removal).
3. Remove the socket head screw which holds the rocker arms in place (Fig. 7B–26). Slide the bushings out and lift the rocker arms out (Fig. 7B–27).
4. Use a valve spring compressor to remove the valves and springs (Fig. 7B–28).
5. Remove the four socket head screws which hold the rocker box to the head. (Loosen the screw evenly). Separate the two halves carefully.

Repair And Assembly

1. Inspect the head gasket surface for damage. Light scratches can be removed by grinding the head on the cylinder with fine grinding compound. Special tool No. 124410 is used when there is more damage (Fig. 7B–29).
2. If the old valves are not badly worn, they can be used again. Check the clearance to the valve guides (Fig. 7B–30). If clearances are over maximum, heat the head to 250° C and use tool No. 123310 to drive out guides (Fig. 7B–31). Put the snap ring on the new guide and use drive tool to push it in place when the head is hot, until the snap ring hits the head (Fig. 7B–32). Use reamer No. 123510 to ream out new guide (Fig. 7B–33).

Fig. 7B–26 Remove Rocker Arm Screen

Fig. 7B–27 Removing Bushing

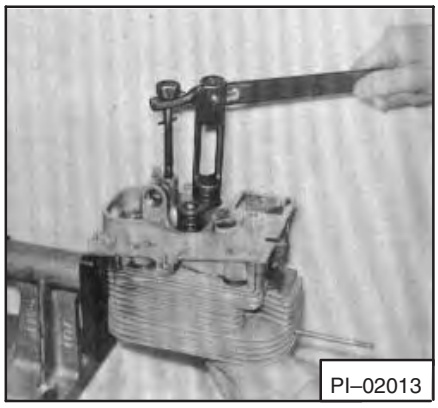

Fig. 7B–28 Removing Valve Spring

Fig. 7B–29 Removing Damage

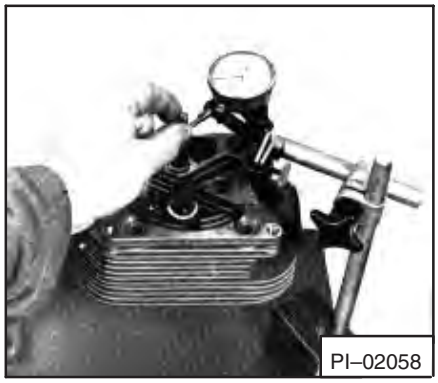

Fig. 7B–30 Checking Valve Guide Clearance

Fig. 7B–31 Removing Valve Guides

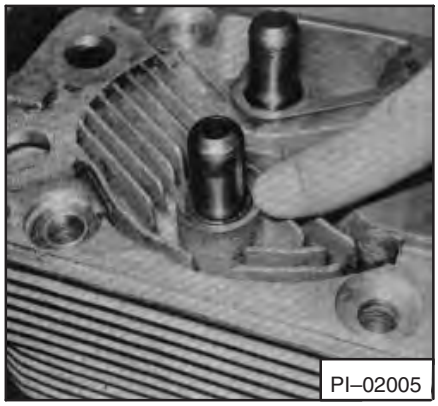

Fig. 7B–32 Snap Ring Installed

Fig. 7B–33 Reaming Out Guide

2. Put grease on the thrust washer to hold it in position. Be sure the tang on the washer is in the slot in the block (Fig. 7B–98).

3. Install bearings of the correct size in the center bearing support, and install the support on the crankshaft. Be sure the numbers on the support are together (Fig. 7B–99).

4. Slide the crankshaft into the block. Use care not to damage the bearing in the block during installation. Be sure the hole in the bearing support is in alignment with the hole in block (Fig. 7B–100).

5. Install the bearing of the correct size in the end plate. Install the thrust washer, seal and gasket. Be sure the hole in the bearing is in alignment with the hole in the plate. Slide the plate into place and install two or three bolts (Fig. 7B–101).

6. Measure the end movement of the crankshaft (Fig. 7B–102). If it is not within the specification, install shim gaskets or thrust washers as needed, to get correct clearance. Use the same size thrust washers on both sides of crankshaft, or use one size thicker on the blower side.

7. Tighten all the bolts in the end plate and the bolt in the bearing support. Turn the crankshaft to be sure it is free.

8. Install the cylinder and rod assemblies, the oil pan, the crankshaft gear and all other parts removed. Be sure the crankshaft gear fits on the pin in the crankshaft, and the timing marks are in alignment (Fig. 7B–103 & 7B–104).

7B–5.9 FLYWHEEL

The ring gear for the starter is removed by cutting it with a chisel (Fig. 7B–105).

To install the new gear , heat it to about 200°C, and it will slide onto the cool flywheel.

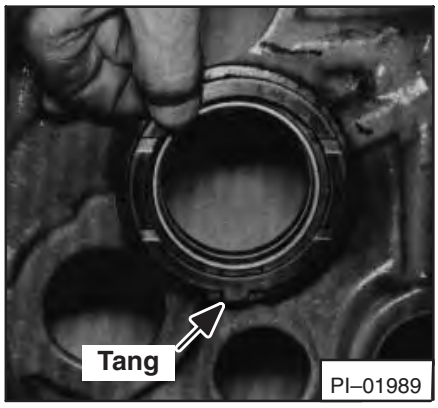

Fig. 7B–98 Installing Thrust Washer

Fig. 7B–99 Bearing Support Check Marks

Fig. 7B–100 Installing Crankshaft

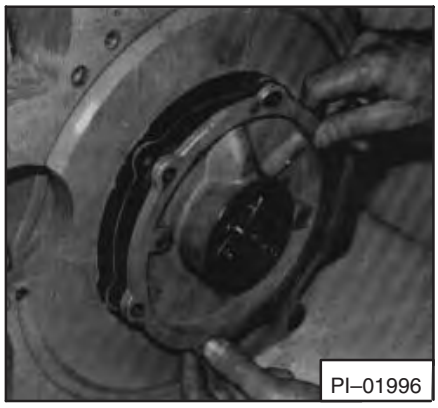

Fig. 7B–101 Installing End Plate

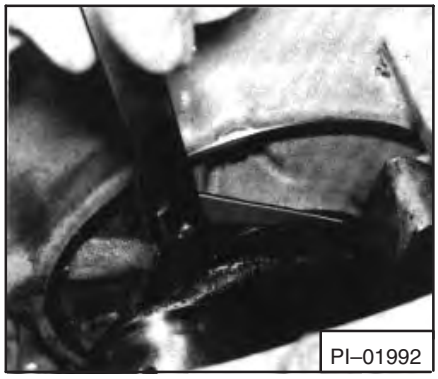

Fig. 7B–102 Checking Crankshaft End Play

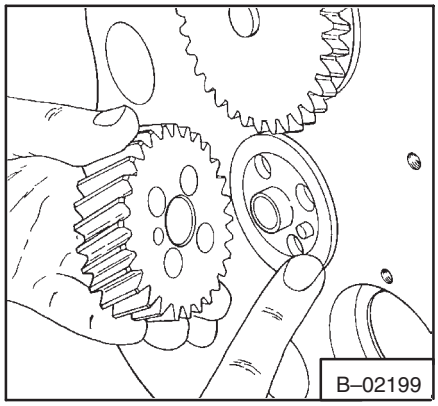

Fig. 7B–103 Aligning Gear W/Crankshaft

Fig. 7B–104 Align Timing Marks

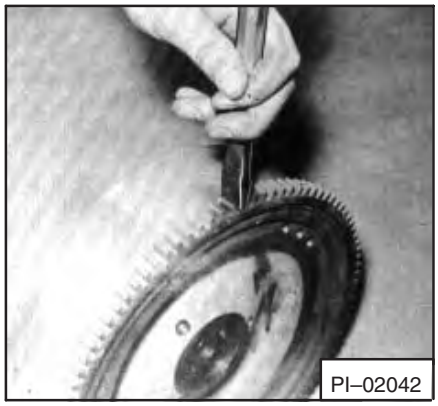

Fig. 7B–105 Removing Ring Gear

7C–2.5 Ignition System

7C–2.5a Coil To Ground Voltmeter Test

1. Connect the voltmeter wires as shown in figure 7C–9.
2. Operate starter until breaker points are closed.
3. Turn all lights and accessories off.
4. Turn the ignition switch on.
5. If the voltmeter reading is 0.25 volt or less, the primary circuit from coil to ground is good.
6. If the voltmeter reading is more than 0.25 volt, test the voltage loss between each of the following:

   a. The connector marked *DIST* on the coil and the connection on the distributor.

   b. The moving breaker point and the stationary breaker point.

   c. The breaker point and the distributor.

   d. The distributor housing and the engine ground.

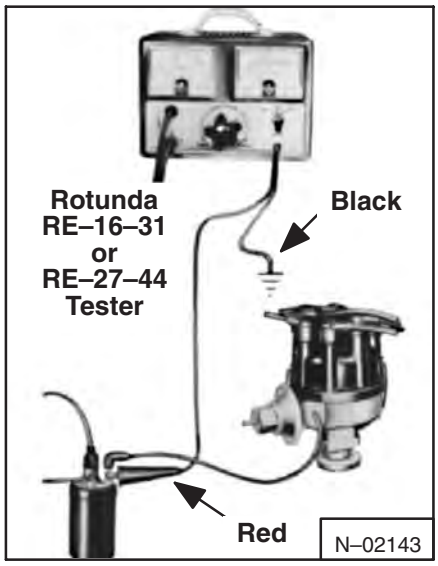

Fig. 7C–9 Coil to Ground Test

If voltage loss of all above has a total of more than 0.25 volt, it will cause poor engine performance.

7C–2.5b Coil Relocation & Vacuum Hose Installation (Early 722 Loaders)

1. Remove the coil and mounting bracket from engine.
2. Rotate bracket 90 degree and slide to bottom of coil.
3. Remove the nut from the air cleaner mounting bracket (Fig. 7C–9a).
4. Install the coil (Fig. 7C–9b).
5. Order vacuum hose, and barbed fitting (See current Parts Manual).
6. Install vacuum hose at the existing fitting on the distributor vacuum advance diaphram (Fig. 7C–9c).
7. Remove the pipe plug on the engine intake manifold and install barbed fitting, connect the vacuum hose (Fig. 7C–9c).

NOTE: When timing the engine, remove the vacuum hose at the manifold and plug the barbed fitting to prevent loss of vacuum in engine.

NOTE: When timing the engine, disconnect the vacuum hose at the manifold first then plug the barbed fitting to prevent loss of vacuum in engine.

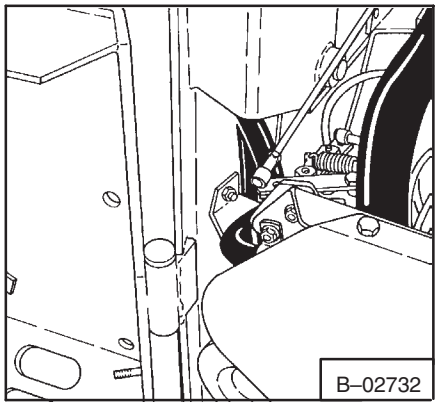

Fig. 7C–9a Coil Mounting Location

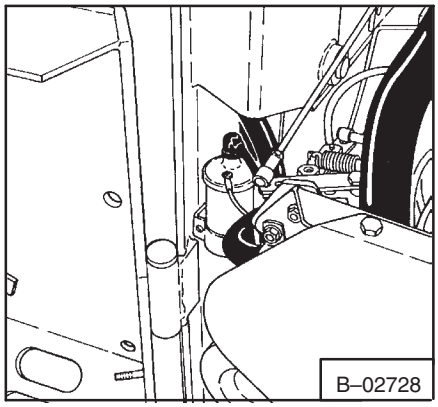

Fig. 7C–9b Coil Installed

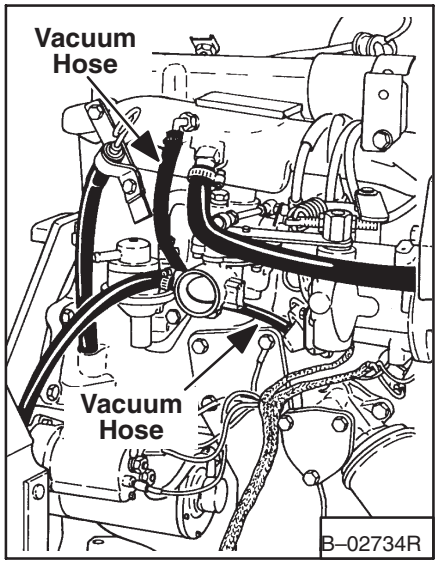

***Fig. 7C–9c** Vacuum Hose Installed

***Revised Feb. 82**

7C–4.13 Installing Piston Pins

Pistons and piston pins are available as a unit only and can not be purchased as individual items. Keep correct pins and pistons together.

7C–4.14 Valve Rocker Arm And/Or Shaft Assembly

Use a hone to remove minor surface defects on the rocker ams shaft and in the rocker arm bone.

If the valve end of the rocker arm hasa grooved radius, make replacement of the rocker arm. Do not grind this surface.

7C–4.15 Push Rods

Check the push rods for straightness.

If alignment is off more than the maximum limit at any point, do not use the push rod. Do not straighten push rods.

7C–4.16 Cylinder Block

Finishing Cylinder Walls

Before any cylinder is machined, all main bearing caps must be in place and tightened to the correct torque. Finish only the cylinder or cylinders that need it. All pistons are the same weight, both standard and oversize; and various sizes of pistons can be used without changing engine balance. Finish the cylinder with the most wear first to find the maximum oversize. Finish the cylinder to within 0.001 inch (.038 mm) of the oversize diameter. This will leave enough material for the final step of honing for correct surface finish and pattern. Use a motor–driven, spring pressure–type hone at a speed of 300–500 RPM and hones of grit sizes 180–200. Use a lubricant mixture of equal parts of kerosene and SAE NO. 20 motor oil.

7C–4.17 Cylinder Heads

Cleaning

With the valves installed to protect the valve seats, remove deposits from the combustion chambers and valve heads with a scraper and a wire brush. Be careful not to damage the cylinder head gasket surface. Remove the valves and clean the valve guide bores with a valve guide cleaning tool. Use cleaning solvent to remove, grease and other deposits. Clean all bolt holes. Remove all deposits from the valves with a fine wire brush or buffing wheel.

Inspection

Check the cylinder head for cracks and inspect the gasket surface for foreign material and scratches.

When a cylinder head is removed because of gasket leaks, check the flat area of the cylinder head gasket surface for correct specifications. If necessary to finish the cylinder head gasket surface, do not machine off more than 0.010 inch (0,254 mm).

Check the valve seat with a gauge. If wear is beyond limits, grind the valve and valve seat. Measure the valve seat width. Grind valve seat when width is not within specifications.

Inspect the valve face and the edge of the valve head for damage. Inspect the stem for a bent condition and the end of the valve stem for wear.

Check the valve stem to valve guide clearance of each valve in its respective valve guide.

Check the springs for correct pressure at the specified spring lengths (Tool 6513 DD). Make replacement of any springs not within specifications.

7C–14 FRONT OIL SEAL

7C–14.1 Removal

1. Remove timing cover.
2. Push seal out from the inside of cover.

7C–14.2 Installation

1. Push new seal into housing (Fig. 7C–32). Put a support under the housing near the seal to keep housing from breaking.
2. When installing the cover it is important that the oil seal is in alignment with the crankshaft and sheave boss.

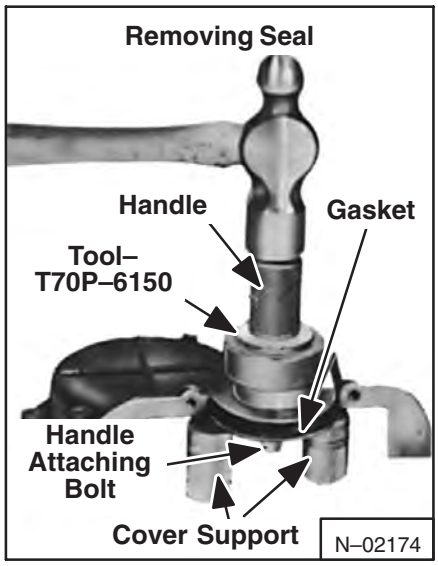

Fig. 7C–32 Installing Front Cover OilSeal

7C–15 TIMING CHAIN TIGHTENER

7C–15.1 Removal

1. Remove the timing chain cover (and oil pan if necessary).
2. Remove the timing chain tightener and arm by removing the two fastening bolts (Fig. 7C–33).

7C–15.2 Installation

1. Install the tightener arm on the pivot pin.
2. Install the tightener and install the two bolts.
3. Install the timing chain cover (an oil pan if necessary).

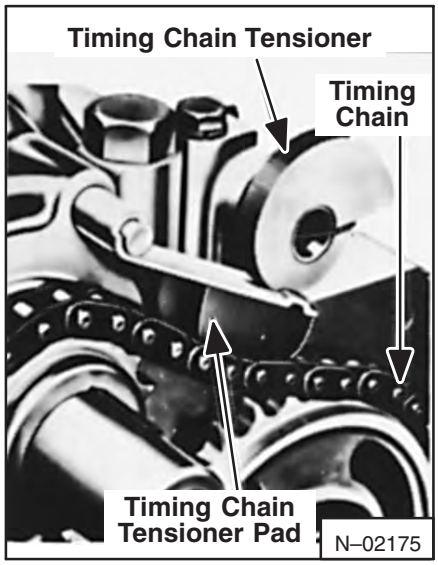

Fig. 7C–33 Timing Chain Tensioner

7C–16 CAMSHAFT AND VALVE LIFTERS

7C–16.1 Removal

1. Remove the engine assembly and put the engine on a stand. Remove the crankcase oil.
2. Disconnect the fuel line at the fuel pump.
3. Loosen the governor adjustment bolts and remove the belt.
4. Remove the water pump sheave.
5. Remove the oil and fuel pumps from the cylinder block.
6. Disconnect the spark plug wires from the spark plugs and remove the rocker cover. Clean all gasket material from rocker arm cover and cylinder head.
7. Remove the distributor from the cylinder block.
8. Remove the rocker shaft bolts evenly and lift off the rocker shaft.
9. Remove the push rods from the cylinder block and keep them in correct order.
10. Turn the complete engine over on the stand and remove the oil pan and gaskets.
11. Remove the crankshaft sheave, the timing cover and oil thrower.

ENGINE SPECIFICATIONS (700, 720 WISCONSIN)

8B–1.6 Lubrication System

Oil Pressure . . . . . 28.5 psi (196,5 kPa) at 1500 RPM
End Clearance in Oil Pump Gear . . . . . 0.004 (0,1 mm)

Check oil level after every 8 hours of operation. (Check oil every 4 hours on new engine during the first 50 hours of operation.)

Oil level must be maintained between the *ADD* and *FULL* mark on the dipstick. Use a good quality detergent motor oil that meets the API service classification CC.

Use oil of proper SAE viscosity for expected temperature conditions at the time of starting, not for the highest temperature expected during the working day. See chart on page 8B–2.

8B–1.7 Torque Specifications (Deutz Engine)

ITEM	PRELOADING	TIGHTENING	TOTAL
Cylinder Head Bolt s	21.5 ft.–lbs. (29 Nm)	30° 60° 60°	150°
Injector Hold Down	21.5 ft.–lbs. (29 Nm)	60° 60°	120°
Connecting Rod	21.5 ft.–lbs. (29 Nm)	30° 60°	90°
Camshaft			
Flange	–	– – –	25 ft.–lbs. (34 Nm)
Bearing Support	21.5 ft.–lbs. (29 Nm)	30° 30° –	60°
Blower Mounting Bolts	–	– – –	25 ft.–lbs. (34 Nm)
V–Belt Pulley	21.5 ft.–lbs. (29 Nm)	90° – –	90°
Intake Manifold	–	– – –	11 ft.–lbs. (15 Nm)
Crankshaft Gear	21.5 ft.–lbs. (29 Nm)	30° 30° –	60°
Oil Suction Pipe	–	– – –	36 ft.–lbs. (49 Nm)
Flywheel	21.5 ft.–lbs. (29 Nm)	60° 30° –	90°
Rocker Arm Bolts	21.5 ft.–lbs. (29 Nm)	45° – –	45°
Balance Weight	21.5 ft.–lbs. (29 Nm)	30° 30° –	60°

8B–1.8 Special Tools (Deutz)

100020	Compression checking tool
100030	Compression checking tool
101900	Angle of turn gauge for head bolts
101910	Angle of turn gauge for other bolts
110030	Tool for nozzle removal (use with 150800)
121100	Valve spring tool
122100	Valve service tools
122230	Valve service tools
122800	Valve service tools
122970	Valve service tools
123310	Valve service tools
123830	Valve service tools
124020	Valve service tools
130300	Piston ring tool
130510	Piston ring compressor
131000	Wrist pin mandrel
139000	Heater for piston
141000	Puller for end cover and gears
143620	Tool for installing camshaft bearings
150010	Tool for reconditioning cylinder face on crankcase
150800	Puller tool

TECHNICAL DATA

MELROE
INGERSOLL-RAND

bobcat®

720–001
Revision Number

1 MAY 79
Date

SERVICE MANUAL REVISION

ROUTE TO ATTENTION

PARTS MANAGER	☐
SERVICE MANAGER	☒
SALES MANAGER	☐

AFFECTING:

Product BOBCAT LOADER

Model 720, 721 & 722

Manual No. 6556619

NOTICE **Insert This Sheet With The Appropriate Manual For Future Reference.**

SUBJECT: No clearance Between hydrostatic pump elbow and ROPS

PROBLEM: A loss of fluid at the hydrostatic pump elbows.

CAUSE: If the seat plate, of the ROPS, has no clearance between the elbows (the longer elbows), of the hydrostatic pump, the elbows will loosen and leak.

CORRECTION: Install extra spacer washers at the rear ROPS mount (between rubber bushing and ROPS). Be sure there is 0.250–0.375 inch (6,35–9,52 mm) clearance between seat plate and the top of the elbows.

This Service Bulletin includes one page which is to be put in the 700, 720, 721 and 722 Service Manual (6556619 [3–79]).

TAKE OUT	PUT IN
3–17	3–17, Added 3–18

POLICY: Melroe will give compensation for the washers and 1/2 hour labor for loader in warranty which have the above problem.

Printed in U.S.A.