SERVICE MANUAL

Loader

W36

9-66874

1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

SERVICE MANUAL

Loader

W36

9-66874

1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

SERVICE MANUAL

Loader

W36

9-66874

1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

SERVICE MANUAL

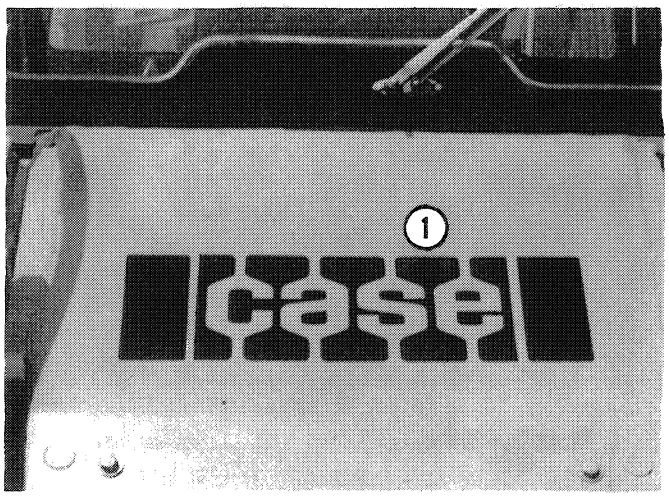
Loader

W36

9-66874

1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

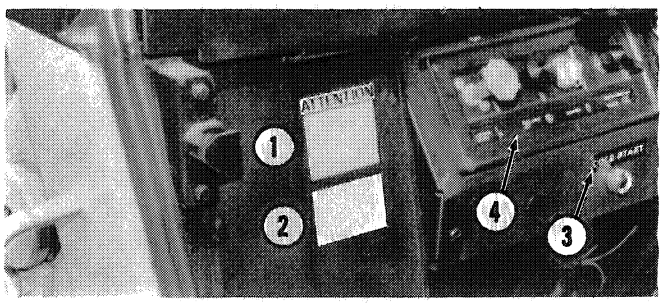
TYPE 1-4



776951

1. 321-3126

Figure 1



776962

1. 321-2605 See Figure 3
2. 321-4454 See Figure 4
3. 321-2653
4. 321-3889 See Figure 5

Figure 2

ATTENTION

Operating Turbocharged Engine

Priming In cold weather, after several weeks standing or with engine oil filter change, pull out fuel shutoff control and crank engine for maximum of 30 seconds

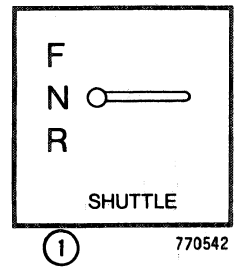
Starting Push in fuel shutoff control and start engine Run at 1000 rpm for two (2) minutes

Stopping Idle engine a few minutes before stopping

730931

1. 321-2605 See Figure 2 For Location

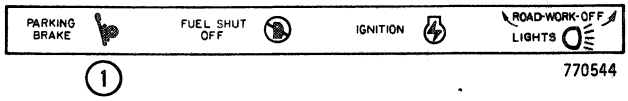
Figure 3



770542

1. 321-4454 See Figure 2 For Location

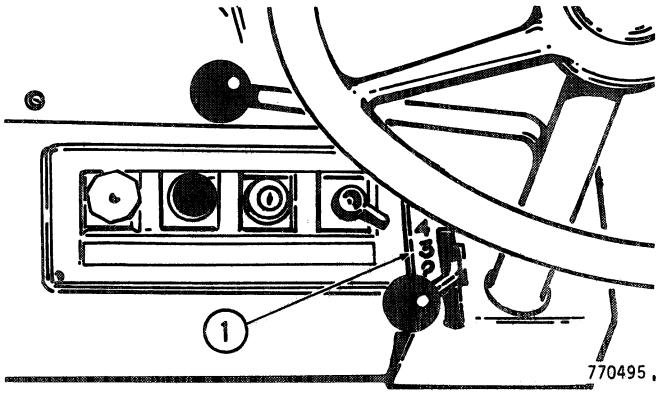
Figure 4



770544

1. 321-3889 See Figure 2 For Location

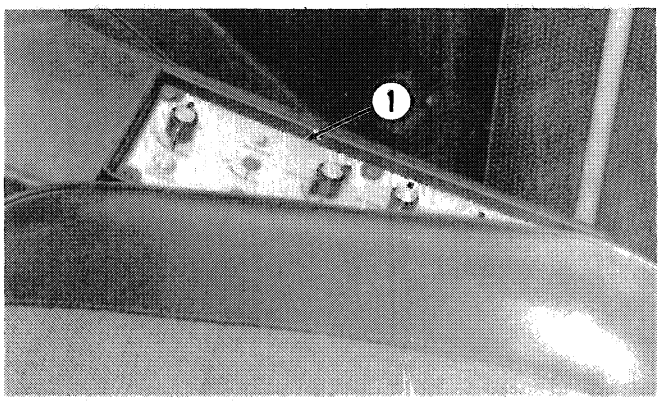
Figure 5



770495

1. 321-4455

Figure 6



776966

1. 321-4137

Figure 7

Piston Pin

	U.S. Value	Metric Value
Type	Full Floating	
O.D. of pin	1.7994 to 1.7996″	45.705 to 45.71mm
Fit in piston	.0005 to .0011″	.013 to .028mm
Fit in rod bushing	.0008 to .0014″	.020 to .035mm

Connecting Rod

Bushing	Replaceable	
Bushing I.D. installed (ream to size)	1.8004 to 1.8008″	45.73 to 45.74mm
Maximum Serviceable Limit	1.8018″	45.766mm
Bushing out of round	.0015″	.038mm
Bearing liners	Replaceable	
Bearing liner width	1.586 to 1.596″	40.284 to 40.538mm
Journal I.D. without bearing liners	3.1503 to 3.1513″	80.018 to 80.043mm
Bearing oil clearance	.0013 to .038″	.033 to .965mm
Maximum Serviceable Limit	.005″	.127mm
Undersize bearings for service	.002,.010,.020,.030″	.051, .254, .508, .762mm
Side clearance	.007 to .016″	.178 to .406mm

Crankshaft

Type	Balanced	
Main bearing liners	Replaceable	
End play, No. 5 main bearing cap	.003 to .012″	.076 to .305mm
Maximum Serviceable Limit	.020″	.508mm
Thrust bearing std. thickness	.155 to .157″	3.937 to 3.988mm
Minimum Serviceable Limit	.147″	3.734mm
Thrust bearing oversize thickness for service	.161 to .163″	4.089 to 4.14mm
Minimum Serviceable Limit	.153″	3.886mm
Connecting rod journal std. O.D.	2.998 to 2.999″	76.149 to 76.175mm
.010″ (.254mm) O.D. undersize, grind to	2.988 to 2.989″	75.895 to 75.921mm
.020″ (.508mm) O.D. undersize, grind to	2.978 to 2.979″	75.641 to 75.667mm
.030″ (.762mm) O.D. undersize, grind to	2.968 to 2.969″	75.387 to 75.413mm
Connecting rod journal maximum taper	.0015″	.038mm
Journals out of round	.0005″	.013mm
Main bearing liner width 1st, 3rd, 5th and 7th	2.1515 to 2.1615″	54.648 to 54.902mm
Main bearing liner width 2nd, 4th and 6th	1.214 to 1.224″	30.836 to 31.09mm
Undersize main bearing liners for service	.002,.010,.020,.030″	.051,.254,.508,.762mm

INTERVAL	SERVICE	INSTRUCTIONS
Every 100 hours of operation (Cont'd)	Grease the top and bottom bellcranks in the loader control valve linkage.	See Figure 3
	Grease the pivot points for the suspension seat.	Section 9061
	Change the engine oil.	
Every 200 hours of operation	Change the engine oil filters.	
Every 250 hours of operation	Check the gear lubricant level in the front and rear axles.	Section 6126
	Clean the filter in the alcohol evaporator.	Section 7111
	Drain the moisture from the main air reservoir and auxiliary air reservoir.	Section 7103
	Change the transmission oil filter.	Section 6102
Every 300 hours of operation	Add two pints of cooling system conditioner, part number 331-508, to the cooling system.	
Every 500 hours of operation	Change the oil filters in the hydraulic oil reservoir.	Section 8002
	Grease the drive shaft universal joints and rear drive shaft slip joint.	
	Grease the front drive shaft support bearing.	
	Check the fluid level in the brake fluid reservoir.	
	Check all drive belts for the correct tension.	Section 4007, Section 7103 and Section 9003
	Change the fuel filters.	Section 3010
	Change the transmission oil.	Section 6102
	Clean the transmission breather and filter screen.	Section 6102
	Inspect the Roll-over Protection Structure.	Section 9061

ENGINE HARD TO START OR WILL NOT START

NO SMOKE FROM EXHAUST

1. Fuel Shut-Off Not Open Completely.

Improper cable adjustment, damaged cable, cable slipping in clamps, misadjusted or inoperative solenoid will not completely return fuel shut-off lever to open position. Check lever to be sure it is opening completely. A partially opened lever limits the amount of fuel to the injection pump and results in low engine horsepower.

2. Final Air Filter Plugged

A dirty filter will cause rich fuel mixture and low engine power. Check filter restriction indicator and service final air filter if required.

3. Slow Cranking Speed

Starter must crank engine 200 to 300 RPM in order to ignite the diesel fuel. Check engine RPM while cranking. If cranking is slow, check starter amperage draw to help determine the following defective areas: batteries, cables, solenoid, and starting motor.

Slow cranking speed can be caused by the following internal and external engine defects: scuffing and scoring of pistons and sleeves, improper crankshaft or camshaft end play, defective rod or crank bearings, oil pump, air compressor, water pump or hydraulic pump.

4. Fuel Supply Shut Off or No Fuel

Check that fuel tank shutoff valve is open. Check fuel supply in tank.

5. Air In Fuel System

Bleed fuel system until fuel flows steadily with no bubbles. Check for air leaks at fittings between tank and fuel pump.

6. Camshaft Damaged

A sheared key in the cam drive gear or a broken cam shaft will throw valve timing out of sequence affecting engine operation. Remove cylinder head cover and check valve timing in reference to crankshaft timing marks with a dial indicator.

7. Fuel Injection Nozzle Not Seated In Head.

A nozzle that is not seated in the cylinder head will let compression leak by and not produce enough heat to fire the injected fuel. Check for damaged nozzle gasket or seals, lose nozzle, or broken stud.

8. Fuel Line Plugged

A fuel line plugged with dirt will not let fuel through to the injection pump. Remove line at fuel filters and check for fuel flow through line.

9. Clogged Fuel Filter

Check and service fuel filters.

10. Wrong Fuel or Contaminated Fuel

Wrong fuel or contaminated fuel can cause the unit not to run, or to have preignition and detonation causing serious damage to the engine. Drain fuel tank and refill with correct fuel.

11. Sticking Rack Control

A sticking rack control will not let the fuel injection pump accept any fuel. Remove cap from front of injection pump to see if rack moves when throttle lever is moved.

12. Piston Rings Worn

As piston rings become worn, they lose tension and ability to seal and wipe lubrication oil off cylinder walls. Take a compression test to determine piston ring condition. If readings are low, squirt a small amount of oil into the cylinder and retest. If compression comes up because the oil helps the rings seal, it will be necessary to install new piston rings and possibly sleeve and pistons.

13. Injection Pump Malfunction

A malfunctioning injection pump will usually under-fuel the engine. Adjust or replace the injection pump.

ENGINE OVERHEATS (Cont'd)

24. Engine Preignition

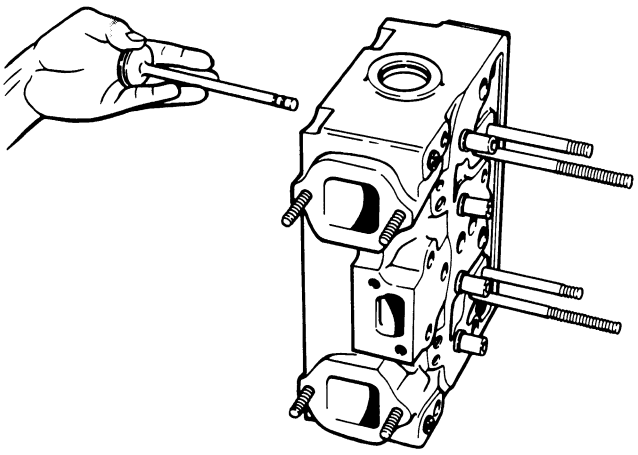
Preignition is the igniting of the fuel before the normal ignition occurs. This causes wild pinging, severe knock, and power loss. High temperature and pressure from preignition usually burns a hole through the center of the piston. The following are causes of preignition:

A. Carbon deposits that remain incandescent.
B. Valves operating at higher than normal temperature because of excessive guide clearance or improper seal with valve seats.
C. Hot spots caused by an inefficient or damaged cooling system.
D. Nozzles set at wrong cracking pressure.
E. Detonation or conditions leading to it.
F. Sharp edges in combustion chamber.
G. Wrong or contaminated fuel.

25. Water Temperature Gauge Malfunction

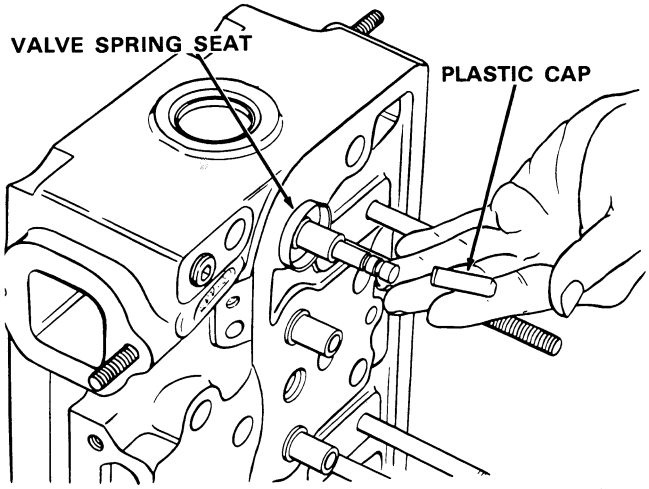
The water temperature gauge, wiring, resistor or sending bulb could give false or no temperature readings. To diagnose, remove wire at sending unit and ground to tractor. Turn key switch on, if gauge comes up, sending unit is malfunctioning. If gauge does not come up, use voltmeter and ohmeter to check wiring circuit.

STEP 10



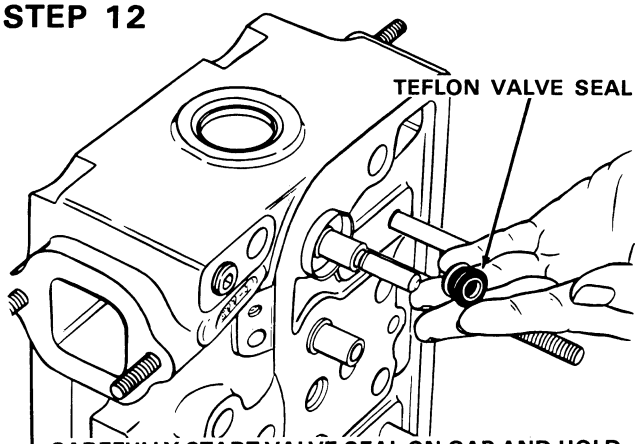
LUBRICATE VALVES WITH CLEAN ENGINE OIL BEFORE REINSTALLING INTO CYLINDER HEAD.

STEP 11



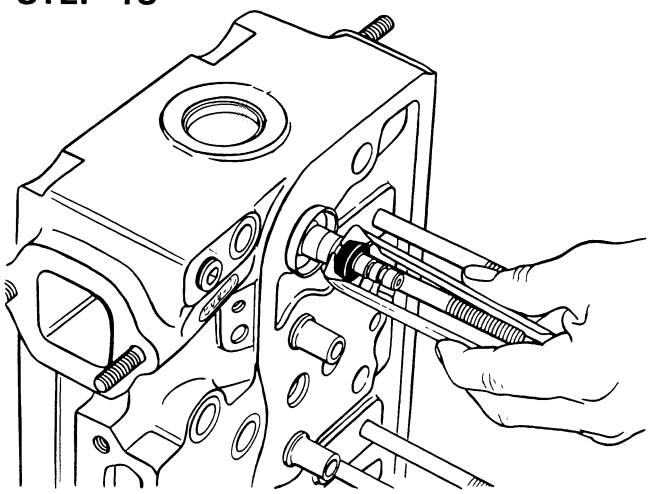
PLACE PLASTIC INSTALLATION CAP, PROVIDED IN KIT, ON THE END OF THE VALVE STEM. NOTE: CAP PREVENTS SHARP EDGES ON VALVE STEM GROOVES FROM CUTTING VALVE SEAL.

STEP 12



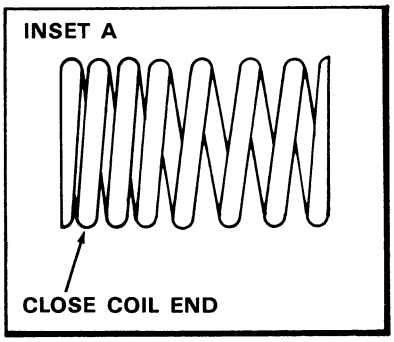
CAREFULLY START VALVE SEAL ON CAP AND HOLD THUMBS AGAINST WHITE SEAL INSERT TO AVOID DISLODGING IT, PUSH SEAL DOWN UNTIL SEAL JACKET TOUCHES TOP OF VALVE GUIDE. REMOVE INSTALLATION CAP AND SAVE, SINCE IT MUST BE REUSED.

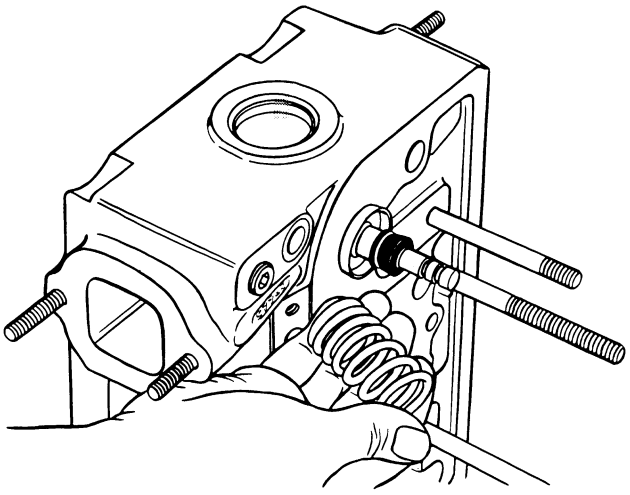
STEP 13



USE M20624 TOOL AND PRESS SEAL DOWN OVER VALVE GUIDE UNTIL SEAL IS FLUSH WITH TOP OF GUIDE.

STEP 14



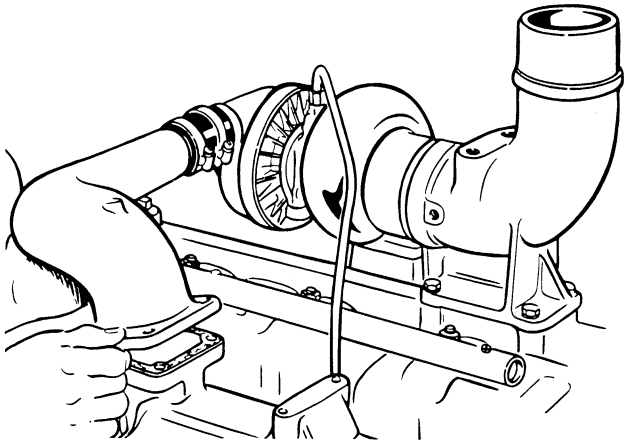


INSTALL THE VALVE SPRING. IMPORTANT: THE CLOSE COIL END OF THE SPRING MUST BE INSTALLED TOWARDS THE CYLINDER HEAD, SEE INSET A.

Adjusting Tappets

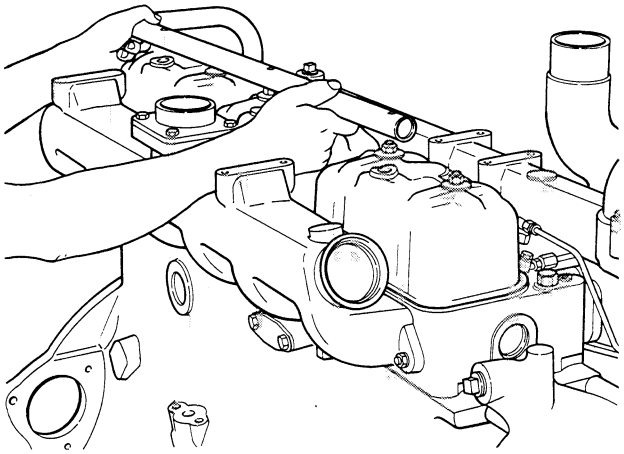
Cold Setting

STEP 21



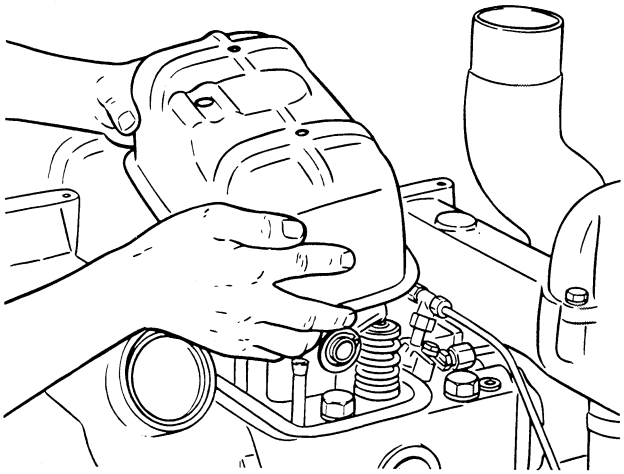
REMOVE TURBOCHARGER INTAKE ELBOW (IF SO EQUIPPED).

STEP 22



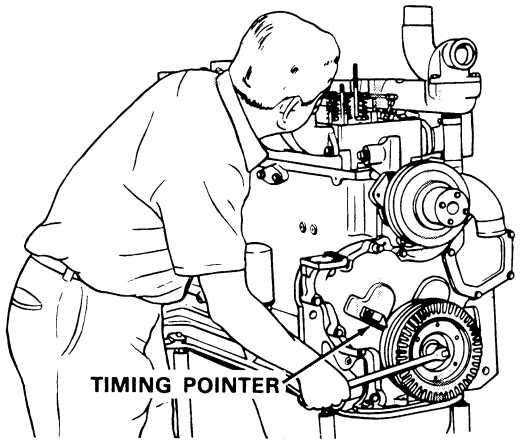
REMOVE BREATHER TUBE.

STEP 23



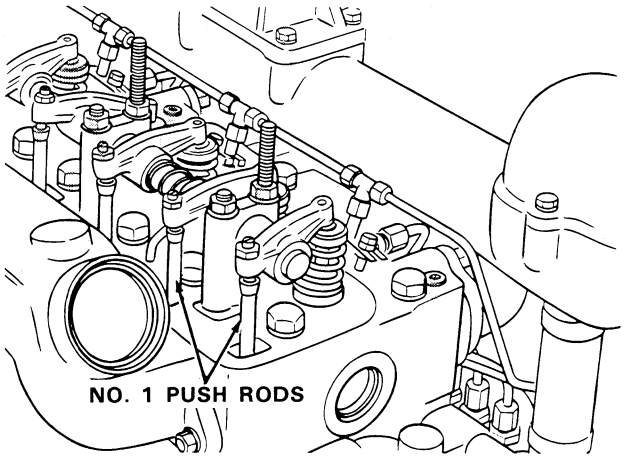
REMOVE VALVE COVERS AND GASKETS FROM ALL CYLINDERS.

STEP 24



CRANK ENGINE UNTIL TIMING POINTER IS ALIGNED WITH TDC TIMING MARK ON CRANKSHAFT PULLEY.

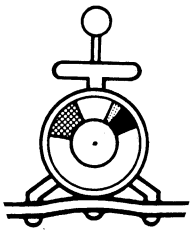
STEP 25



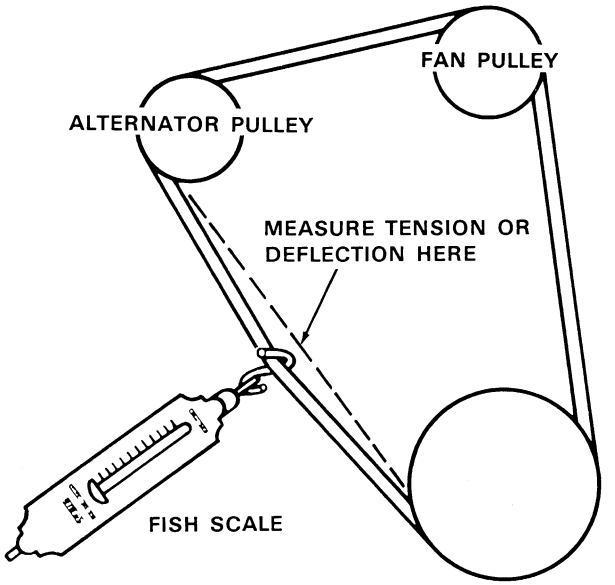
CHECK PUSH RODS ON NO. 1 CYLINDER FOR LOOSENESS. IF PUSH RODS ARE LOOSE, NO. 1 CYLINDER IS AT TDC ON THE COMPRESSION STROKE. IF PUSH RODS ARE TIGHT, CRANK ENGINE ONE COMPLETE REVOLUTION AND ALIGN TIMING POINTER WITH TDC MARK ON PULLEY.

Adjusting Fan Belts

STEP 61

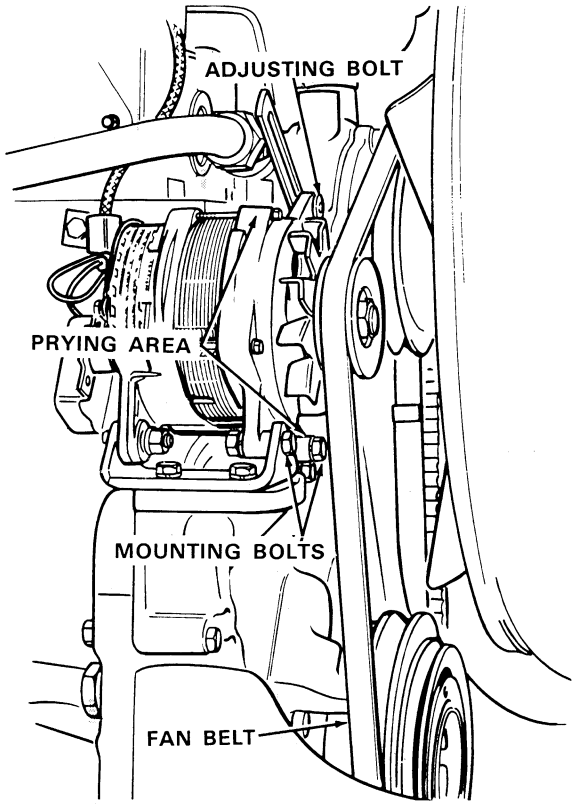


BELT TENSION GAUGE



MEASURE FAN BELT FOR PROPER DEFLECTION USING A FISH SCALE OR BELT TENSION GAUGE. MEASUREMENTS MUST BE MADE BETWEEN ALTERNATOR PULLEY AND CRANKSHAFT PULLEY. REFER TO VEHICLE OPERATORS MANUAL FOR PROPER AMOUNT OF DEFLECTION AND FORCE TO BE APPLIED. NOTE: IF EQUIPPED WITH AIR CONDITIONING, REFER TO AIR CONDITIONING SECTION OF THIS MANUAL FOR COMPRESSOR BELT ADJUSTMENT.

STEP 62



LOOSEN ALTERNATOR ADJUSTING AND MOUNTING BOLTS. USE PRY BAR TO PUT TENSION ON BELT. APPLY PRY BAR ONLY TO FRONT CAST HOUSING AREA AND PIPE SPACER LOCATED ON FRONT TIMING GEAR COVER.

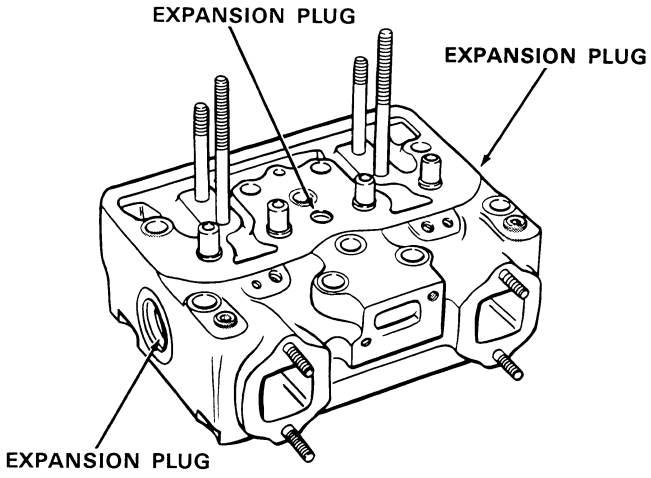
TO REPLACE FAN BELT, SWING ALTERNATOR INWARD TOWARD ENGINE. REMOVE OLD BELT, SLIP NEW BELT OVER FAN AND ONTO FAN PULLEY, THEN ONTO CRANKSHAFT AND ALTERNATOR PULLEY. FOR TIGHTENING SEQUENCE OF BELT, REFER TO OPERATOR'S MANUAL.

STEP 63

INSPECT AND SERVICE THE AIR INTAKE SYSTEM. REFER TO THE AIR INTAKE SYSTEM SECTION OF THIS MANUAL.

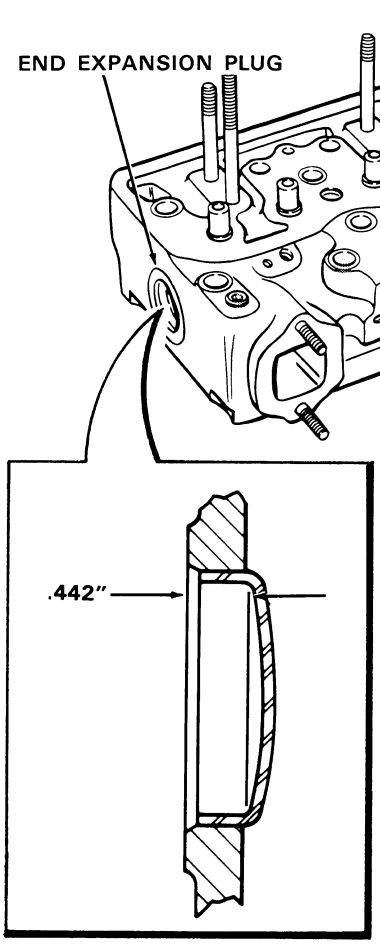
Expansion Plugs and Manifold Studs Replacement

STEP 21



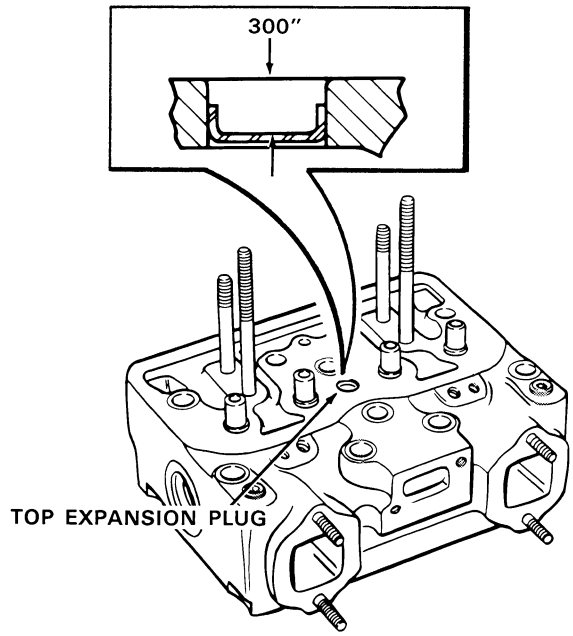
IF THE EXPANSION PLUGS NEED REPLACING, THEY MUST BE DRILLED AND PRYED OUT

STEP 22



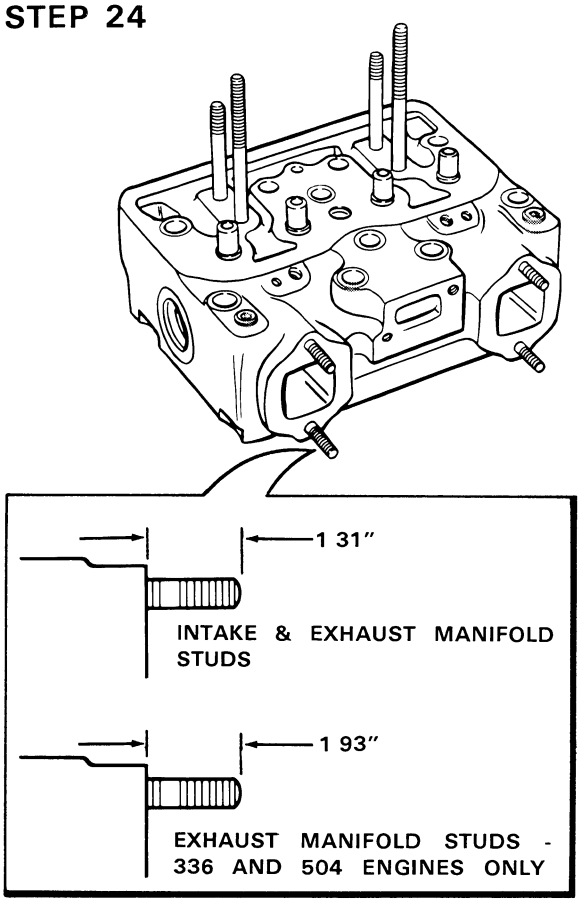
INSTALL NEW END EXPANSION PLUG TO THE DEPTH SHOWN.

STEP 23



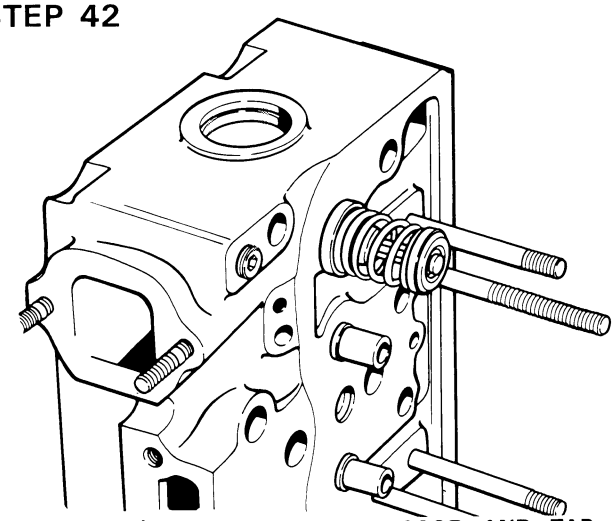
INSTALL NEW TOP EXPANSION PLUG TO THE DEPTH SHOWN

STEP 24



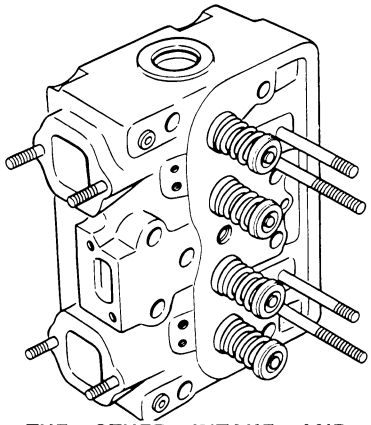
INSTALL NEW MANIFOLD STUDS INTO HEAD UNTIL THEY PROTRUDE AS ILLUSTRATED

STEP 42



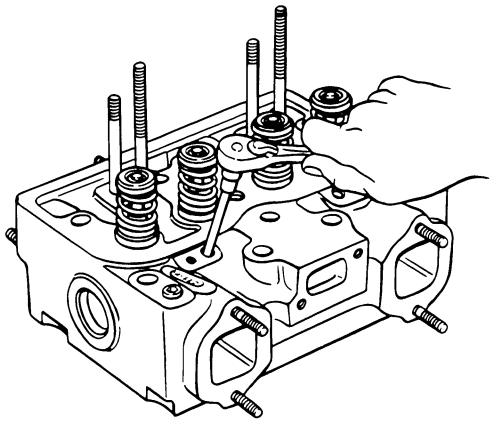
REMOVE THE SPRING COMPRESSOR AND TAP VALVE STEM TO SEAT KEEPERS.

STEP 43



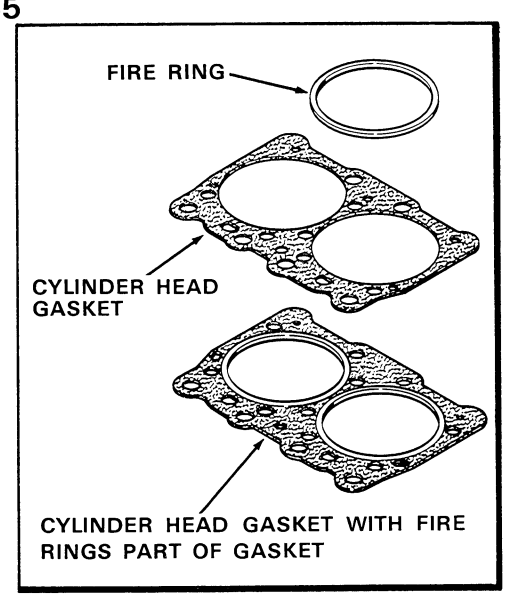
INSTALL THE OTHER INTAKE AND EXHAUST VALVES, FOLLOWING THE PRECEDING PROCEDURE

STEP 44

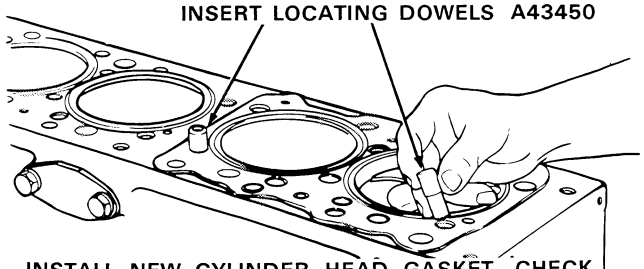


NOTE: BEFORE INSTALLING CYLINDER HEADS ON BLOCK, CLEAN THE INJECTOR BORES USING A43277 REAMER

STEP 45



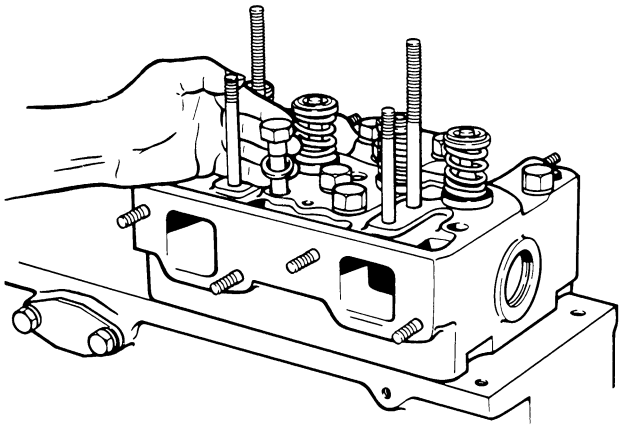
CYLINDER HEAD GASKET WITH FIRE RINGS PART OF GASKET



INSTALL NEW CYLINDER HEAD GASKET, CHECK THAT ALL GASKET HOLES ALIGN WITH BLOCK HOLES

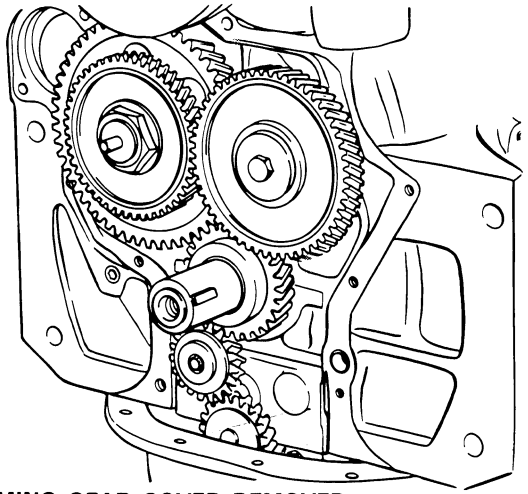
NOTE: REFER TO SECTION 2025, SLEEVE PROTRUSION, IF YOU ARE EXPERIENCING HEAD GASKET LEAKAGE PROBLEMS

STEP 46



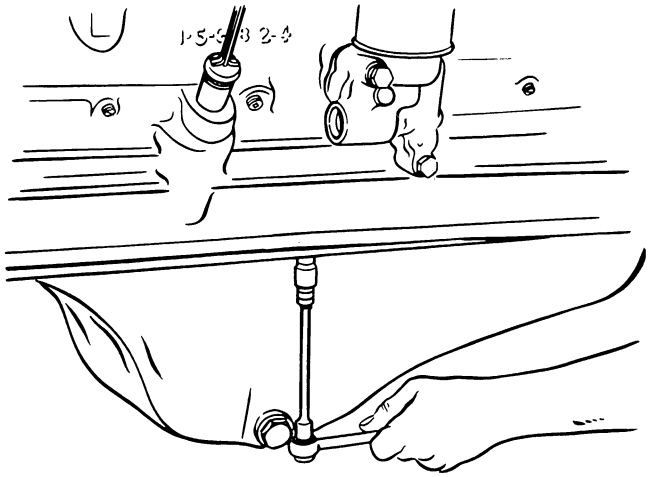
PLACE CYLINDER HEAD ON ENGINE BLOCK AND INSTALL CYLINDER HEAD BOLTS, FINGER TIGHT ONLY, AND WASHERS.

STEP 12



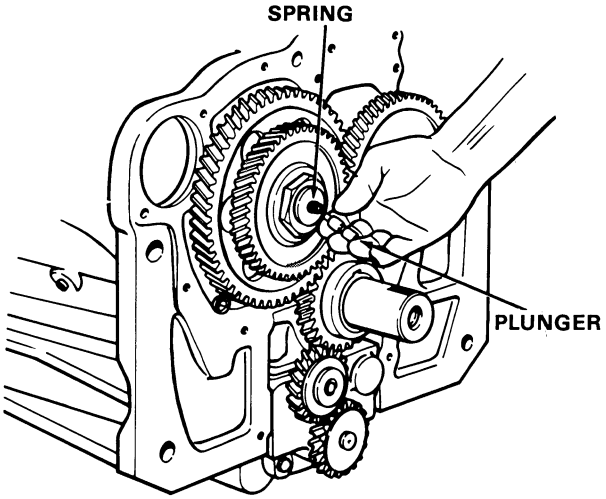
TIMING GEAR COVER REMOVED.

STEP 13



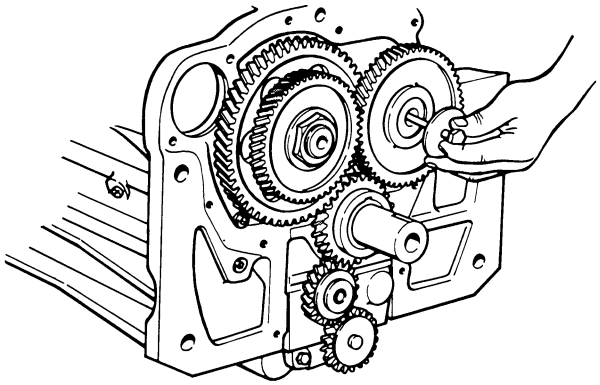
REMOVE THE ENGINE OIL PAN.

STEP 14



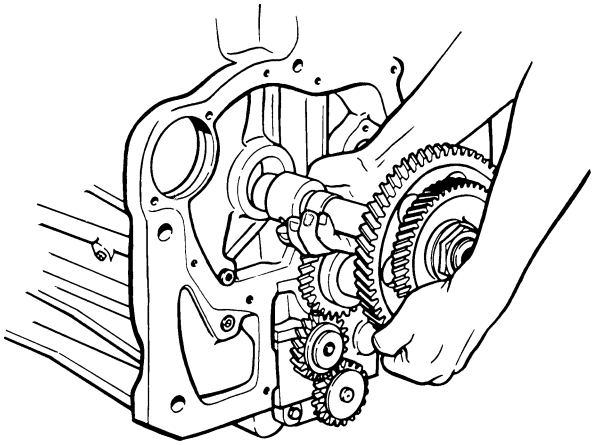
REMOVE THE CAMSHAFT THRUST PLUNGER AND SPRING.

STEP 15



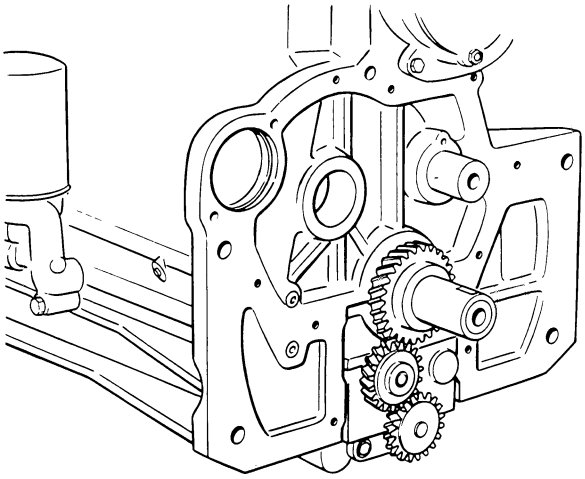
REMOVE THE CAMSHAFT IDLER GEAR.

STEP 16



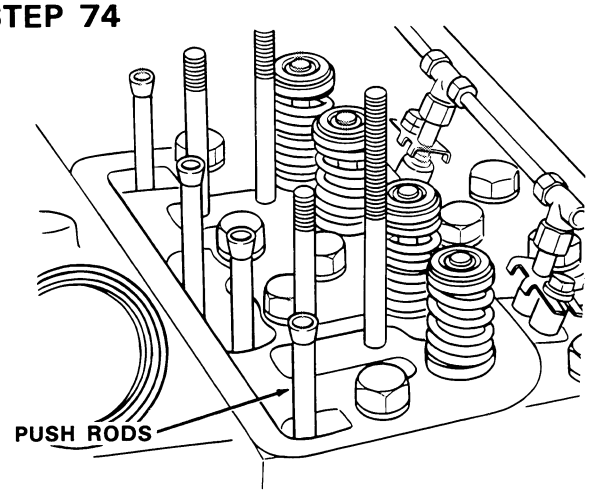
REMOVE THE CAMSHAFT FROM THE ENGINE

STEP 17



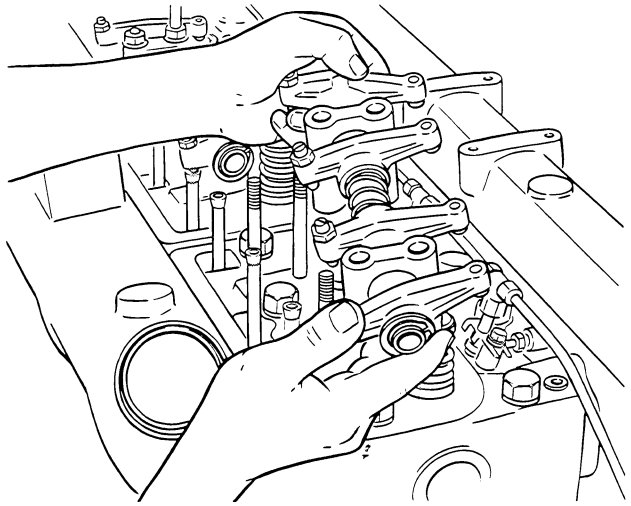
CAMSHAFT REMOVED FROM ENGINE.

STEP 74



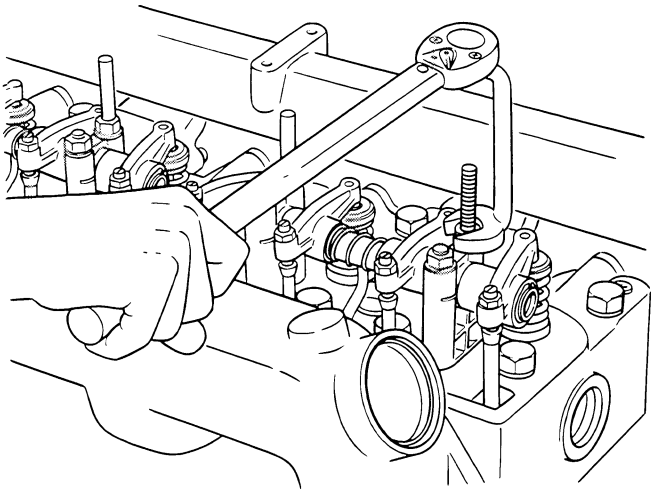
INSTALL THE PUSH RODS.

STEP 75



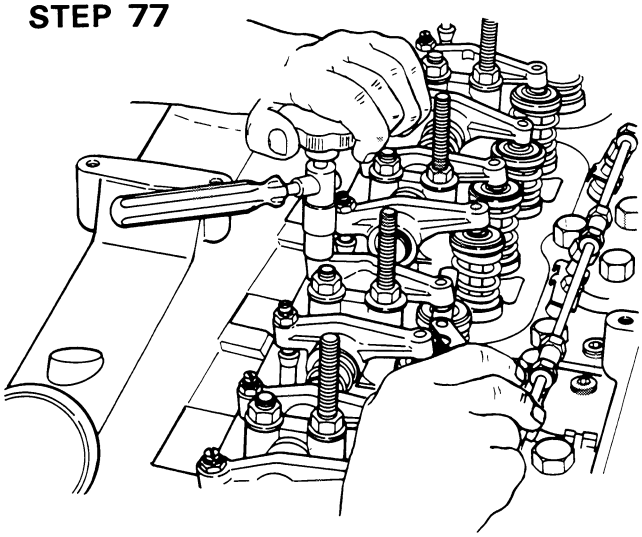
INSTALL THE ROCKER ARM ASSEMBLIES.

STEP 76



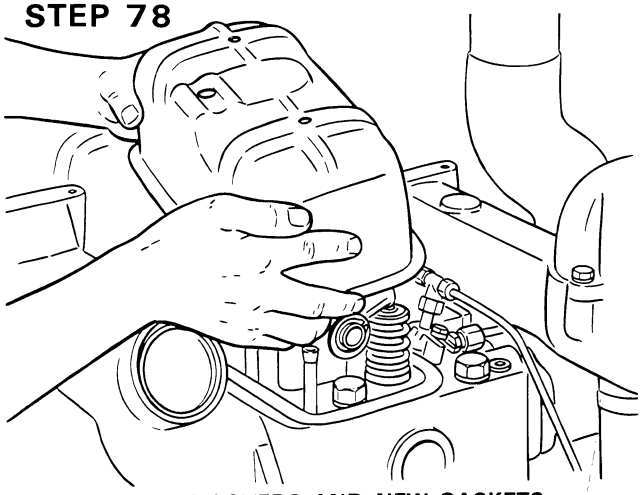
TORQUE THE ROCKER ARM RETAINING NUTS 40 TO 45 FT. LBS.

STEP 77



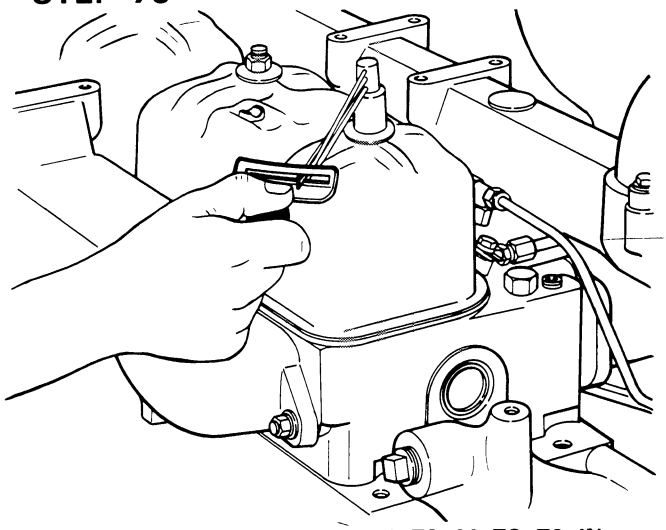
ADJUST THE VALVE TAPPETS, REFER TO STEPS 69 AND 70 ON PAGE 25.

STEP 78



INSTALL VALVE COVERS AND NEW GASKETS

STEP 79



TORQUE COVER RETAINING NUTS 60 TO 70 IN. LBS.

STEP 18

AFTER DEGLAZING, SWAB CYLINDER SLEEVE WITH A CLEAN CLOTH DAMPENED IN WARM WATER AND A MILD DETERGENT SOAP. AFTER SWABBING THE CYLINDER SLEEVES, WIPE THEM OUT WITH CLEAN CASE HDM OIL OR SAE 10W ENGINE OIL.

NOTE: SWAB AND WIPE OUT THE CYLINDER SLEEVES UNTIL A CLEAN CLOTH REMAINS ABSOLUTELY CLEAN, ONE SWABBING - WIPING OPERATION IS NOT ENOUGH.

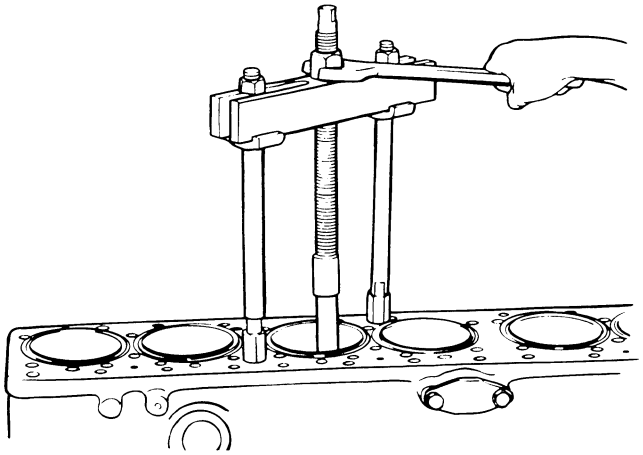
IMPORTANT: DO NOT USE GASOLINE, DIESEL FUEL OR KEROSENE TO CLEAN SLEEVES, SINCE THESE MATERIALS WILL NOT REMOVE THE ABRASIVES FROM SLEEVE SURFACE.

Cylinder Sleeve Removal and Installation

STEP 19

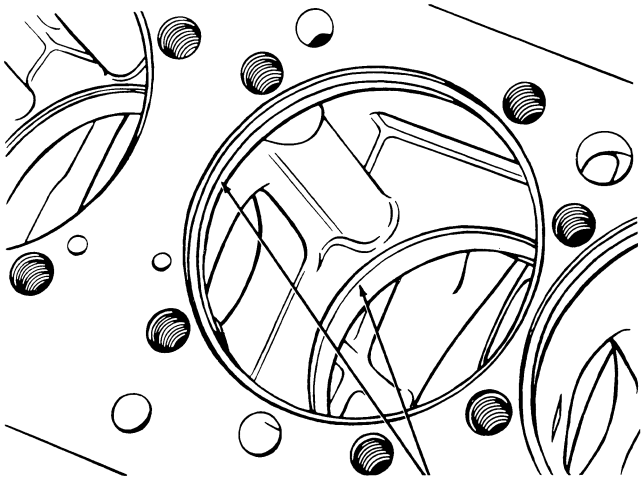
IMPORTANT: BEFORE REMOVING CYLINDER SLEEVES, COVER THE CRANKSHAFT AND MAIN BEARING TO PREVENT SEDIMENT FROM THE BLOCK DAMAGING THESE PARTS.

STEP 20



MARK THE CYLINDER SLEEVES WITH PAINT IN RELATION TO THE BLOCK, IF THE SAME SLEEVES ARE GOING TO BE REINSTALLED. USE A SLEEVE PULLER TO REMOVE CYLINDER SLEEVES.

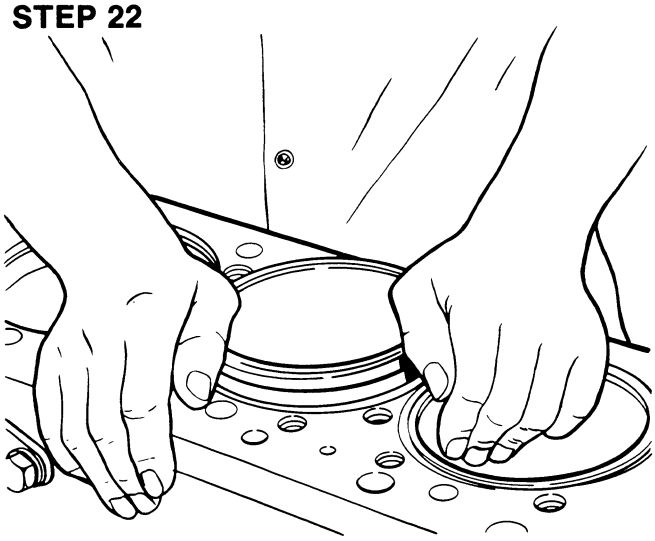
STEP 21



CLEAN ALL DEPOSITS FROM UNDER THE FLANGE OF THE SLEEVE AND IN THE BORE IN THE BLOCK. THE SLEEVE MUST REST FLAT TO PREVENT DISTORTION. CLEAN THE LOWER SEALING SURFACES IN THE BLOCK AND ON THE SLEEVE TO PREVENT COOLANT LEAKS WHEN THE SLEEVE IS INSTALLED.

NOTE: CHECK THE LOWER BORE CHAMFER IN THE BLOCK. THE CHAMFER MUST BE SMOOTH. SEE SETION 2290 IF THE CHAMFER IS NOT SMOOTH.

STEP 22

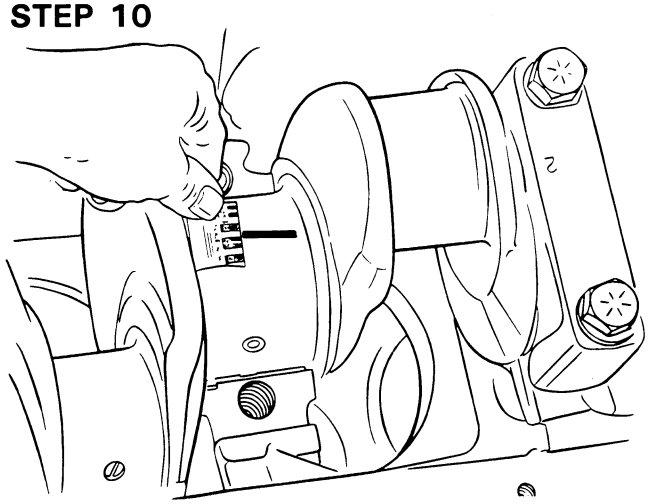


PUSH SLEEVES IN THE BLOCK.

IMPORTANT: INSTALL THE SLEEVE WITHOUT THE O-RINGS.

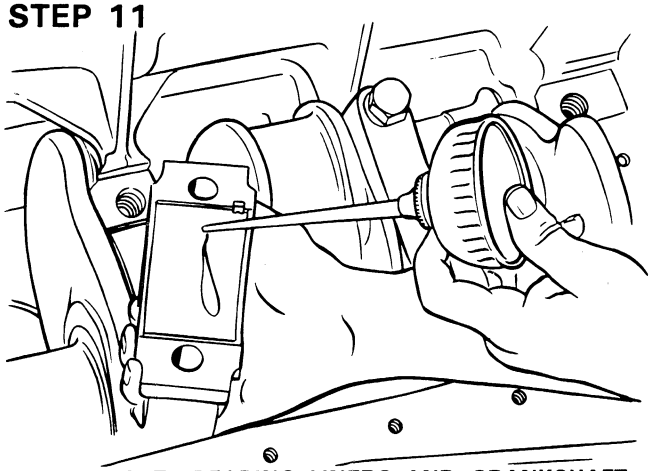
TABLE OF CONTENTS

STEP 10



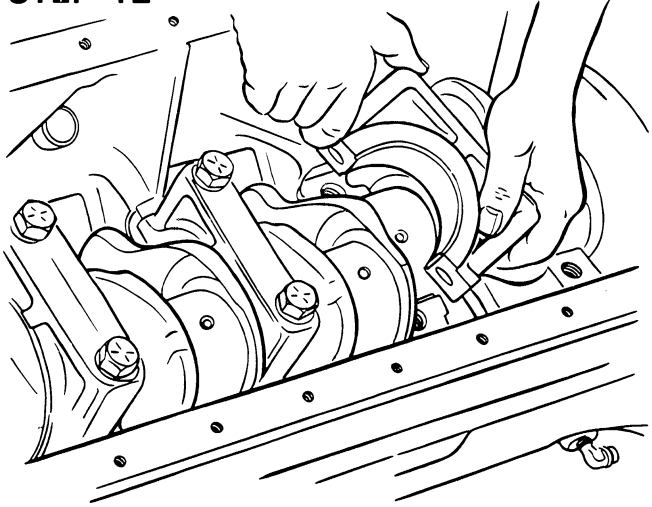
Remove the bearing cap and check the clearance. Clearance must be between 0.0016 to 0.005". If clearance exceeds 0.005", undersize liners must be installed. Install undersize liners which will provide 0.0016 to 0.0046" clearance.

STEP 11



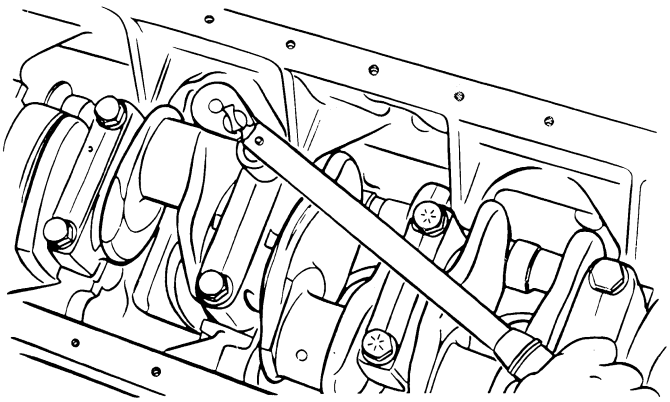
LUBRICATE BEARING LINERS AND CRANKSHAFT JOURNALS WITH CLEAN ENGINE OIL.

STEP 12



INSTALL THE BEARING CAP.

STEP 13



Install the bearing cap. Tighten the retaining bolts to the following torques:

Without hardened washers - 145 to 155 ft. lbs. (197 to 210 Nm)(19.7 to 21.0 kgm).

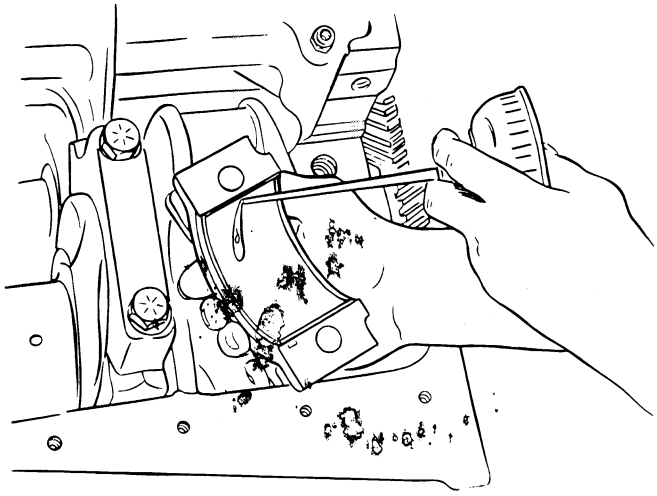
With hardened washers - 195 to 215 ft. lbs. (264 to 292 Nm)(26.4 to 29.2 kgm).

NOTE: *Add lubrication to threads and under bolt heads with 30W oil.*

STEP 14

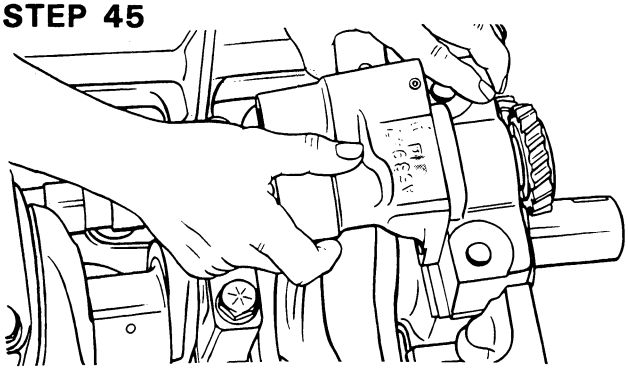
ON ENGINES WITH FRONT MOUNTED OIL PUMPS, FOLLOW THE PRECEDING STEPS FOR BEARING REPLACEMENT.

STEP 15



LUBRICATE THE FRONT BEARING LINER WITH CLEAN ENGINE OIL AND PLACE ON CRANKSHAFT.

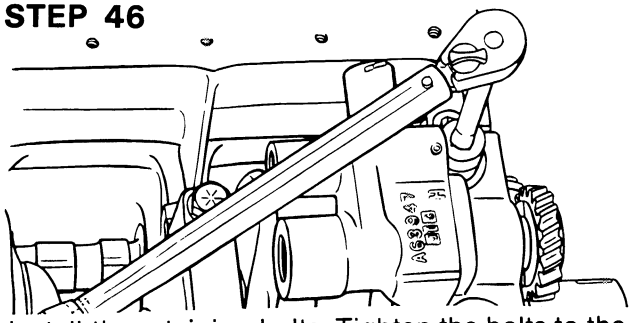
STEP 45



Install the oil pump.

NOTE: *Put a piece of 0.003" (0.08 mm) shim stock between the o-ring and the engine block to prevent damage to the o-ring during installation.*

STEP 46



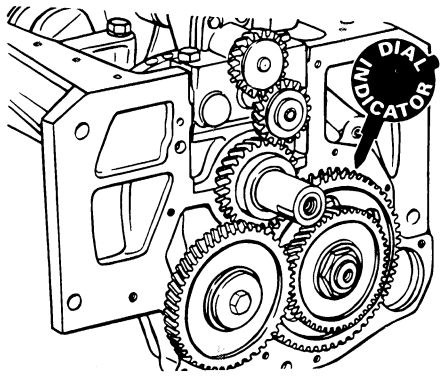
Install the retaining bolts. Tighten the bolts to the following torques:

Without hardened washers - 145 to 155 ft. lbs. (197 to 210 Nm) (19.7 to 21.0 kgm).

With hardened washers - 195 to 215 ft. lbs. (264 to 292 Nm)(26.4 to 29.2 kgm).

NOTE: *Add lubrication to threads and under bolt heads with 30W oil.*

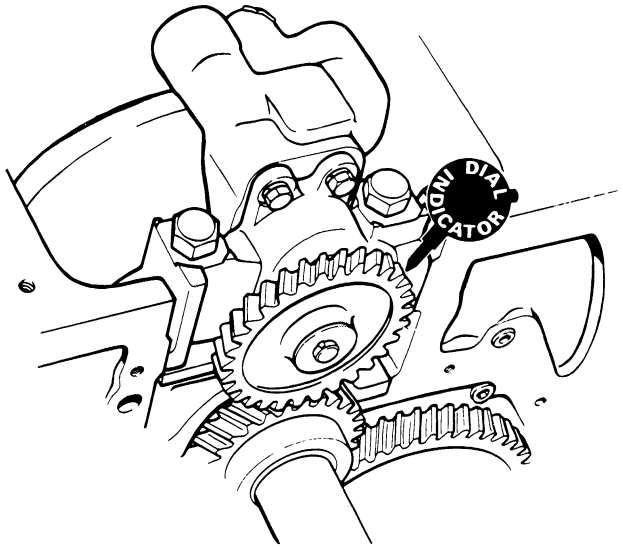
STEP 47



Place a dial indicator on the camshaft gear and check backlash between camshaft gear and crankshaft gear. Backlash must be 0.004" to 0.011". If backlash exceeds 0.011" the gears must be replaced. **NOTE:** *Excessive backlash could also be caused by worn camshaft bushings.*

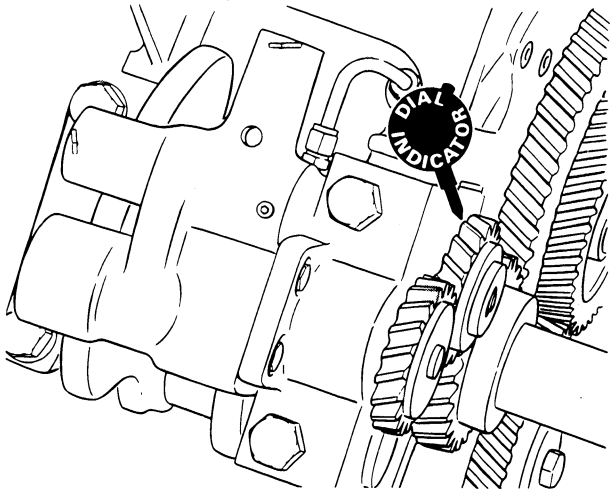
STEP 48

SINGLE GEAR OIL PUMP



Place a dial indicator on the oil pump drive gear and check backlash between pump gear and crankshaft gear. Backlash must be 0.006" to 0.011". If backlash exceeds or is under above specified range, add or delete shims between oil pump and No. 1 bearing cap to obtain correct backlash, see Step 43, Page 2035-23.

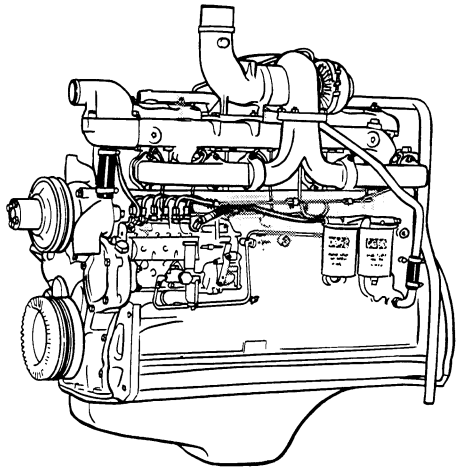
TWO GEAR (High Capacity) OIL PUMP



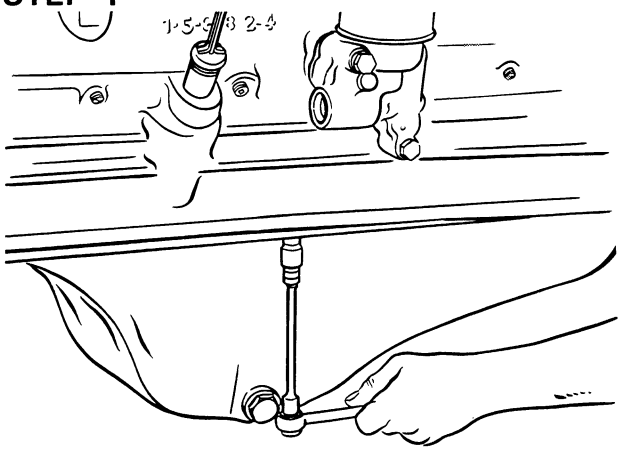
Place a dial indicator on the oil pump idler gear and check backlash between idler gear and crankshaft gear. Backlash must be 0.006" to 0.011". If backlash exceeds or is under the above range, add or delete shims between oil pump and No. 1 bearing cap to obtain correct backlash, see Step 43.

TWO GEAR (High Capacity) OIL PUMP

Removal

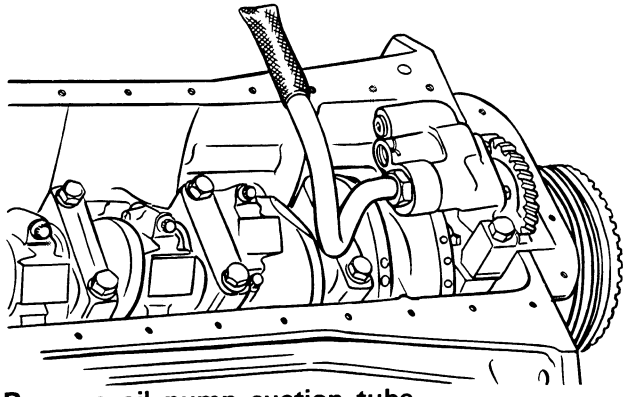


STEP 1



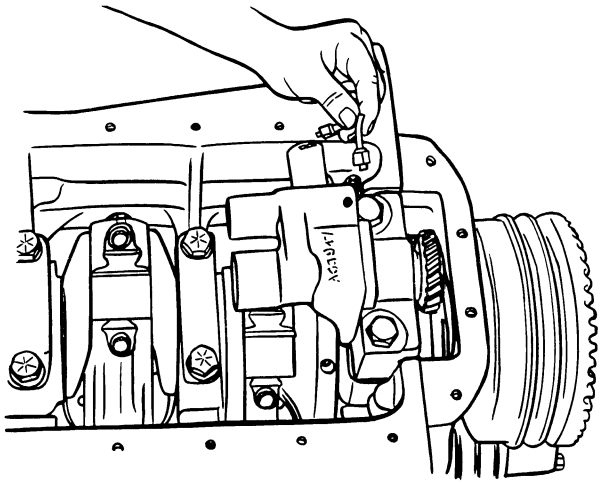
Remove the engine oil pan.

STEP 2



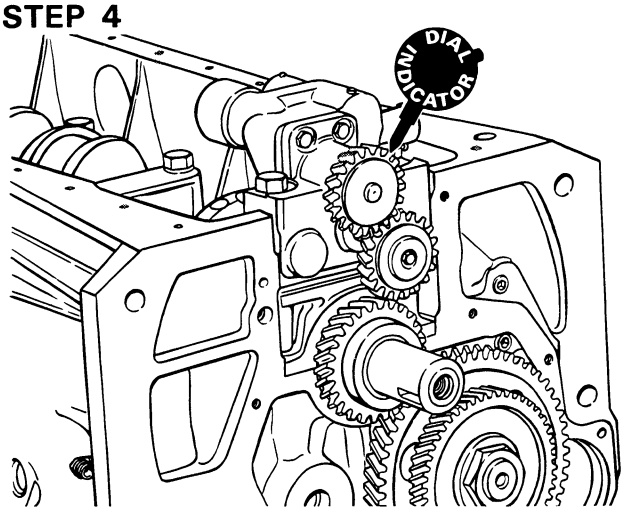
Remove oil pump suction tube.

STEP 3



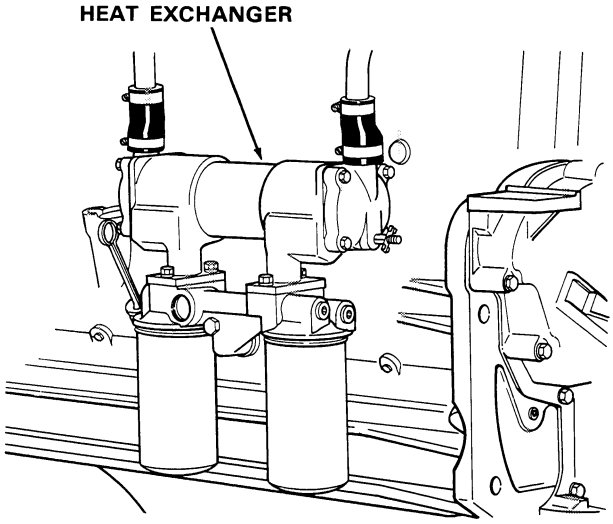
Remove the pump-to-engine block pressure sensing tube.

STEP 4



Place a dial indicator on the oil pump drive gear and check backlash between drive gear and idler gear. Backlash must be .003 to .008". If backlash exceeds .008", the pump must be replaced.

HEAT EXCHANGER



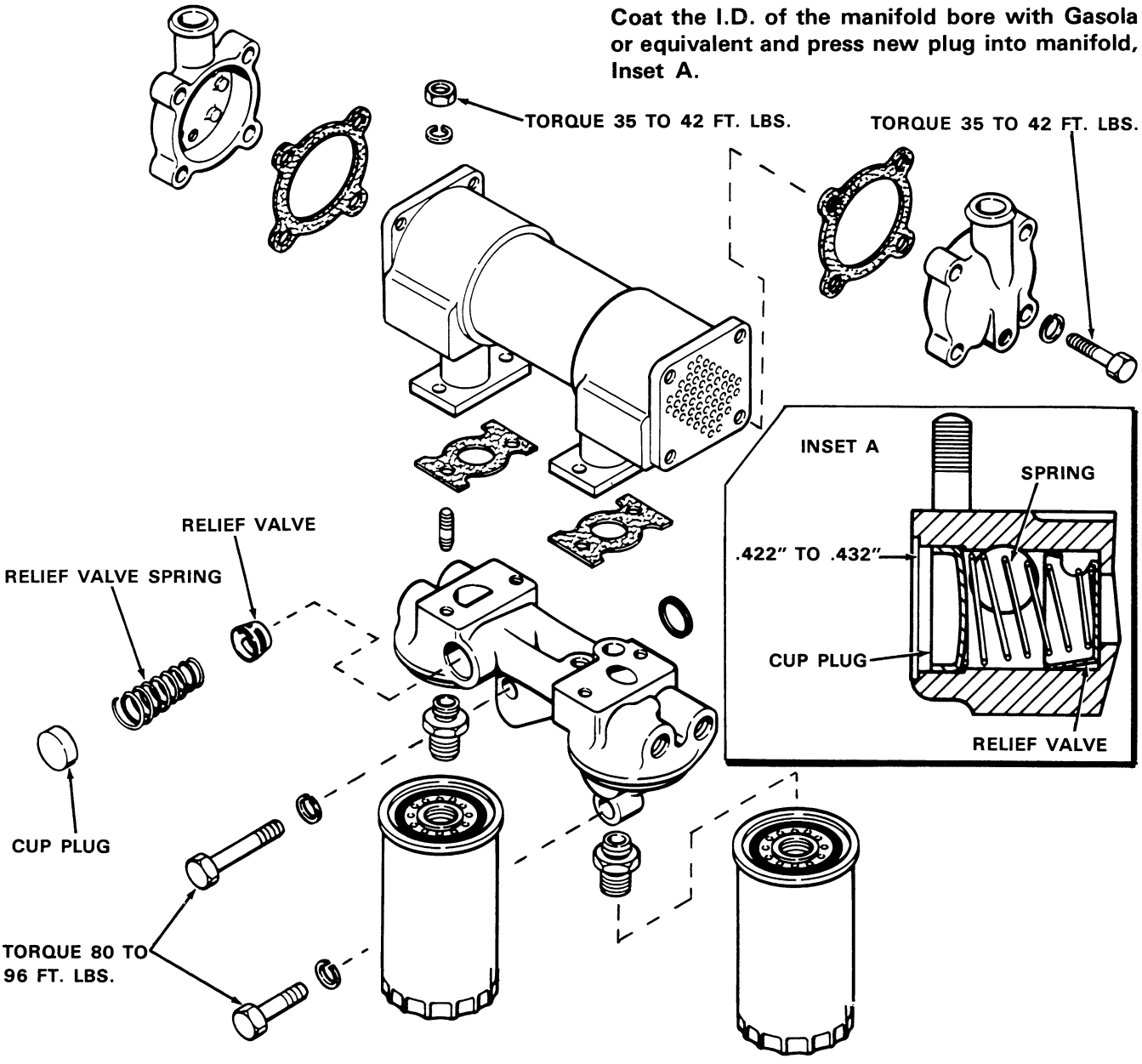
Check for water in the oil; oil will appear brown, milky and full of air bubbles if checked immediately after shutting down engine. Also, check for oil in the cooling system; cooling system fluid will have a thin film of oil on its surface.

After disassembly, thoroughly flush the filter manifold and heat exchanger. Check heat exchanger tubes for cracks.

Relief Valve Spring Specifications:

Free Length	2.81"
No. Coils	9
Wire Dia.	.063"
Compress to 1.40"	5.33 to 5.83 lbs.

Coat the I.D. of the manifold bore with Gasola or equivalent and press new plug into manifold, Inset A.



Section 2051

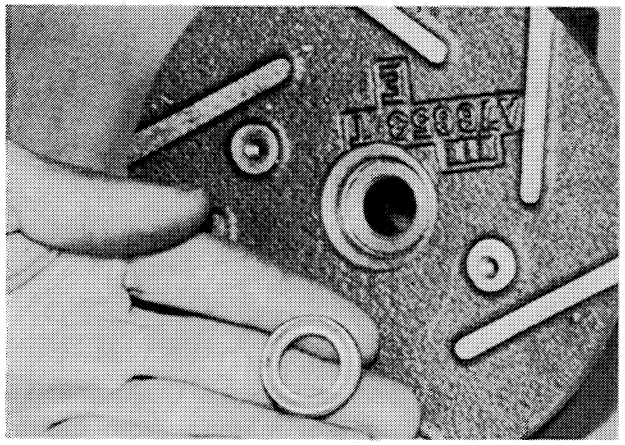
AIR CLEANER

CASE CORPORATION

C.E. Div. 9-66871
October 1977

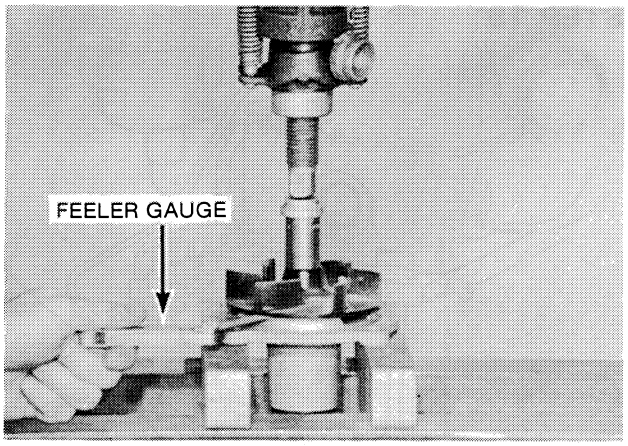
PRINTED IN U.S.A.

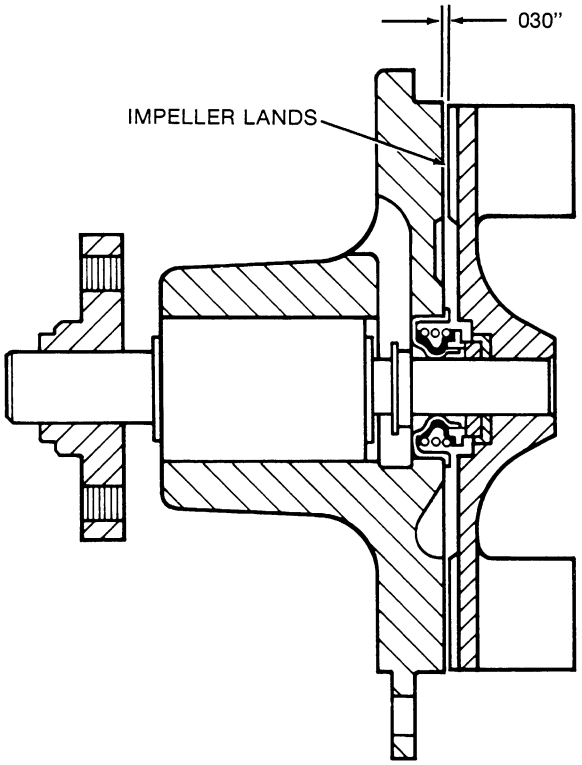
STEP 17



Install new pump seat assembly in impeller.

STEP 18





Press impeller assembly on pump shaft until a gap of .030" is achieved between impeller lands and pump housing.

IMPORTANT: Put a support under the bearing shaft before pressing the impeller so that the bearing does not receive the pressing force.

11. Remove the nuts and lock washers that hold the turbocharger in place.

12. Remove the turbocharger.

13. Put a cover over the opening in the exhaust manifold, large hose and small hose.

INSTALLING THE TURBOCHARGER

1. Remove any remaining gasket material from the exhaust manifold and the flange on the return oil tube.

2. Put a new gasket on the exhaust manifold.

3. Check the condition of the hoses that are connected to the turbocharger. If they are damaged in any way or show signs of deterioration, install new hoses.

4. Engage the turbocharger with the hoses and the studs in the exhaust manifold.

5. Install the lock washers and nuts that hold the turbocharger in place. Tighten the nuts evenly. The nuts are antiseize nuts; if new nuts are needed they must be the ones listed in the parts catalog.

6. Put a new gasket between the return oil tube and the turbocharger. Then install the cap screws with lock washers that hold the return oil tube in place.

7. Connect the oil supply tube to the top of the turbocharger.

8. Tighten the hose clamps for the large and small hoses at the turbocharger. Check to make sure the other hose clamps are tight.

9. Engage the outlet elbow with the turbocharger. Then install and tighten the cap screws with lock washers that hold the outlet elbow in place.

10. Install and tighten the cap screws that hold the support on the outlet elbow.

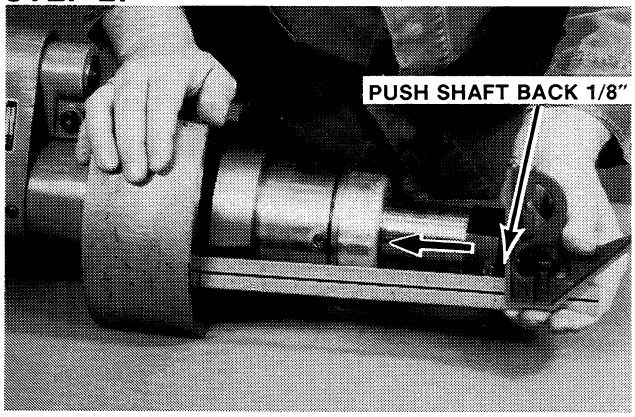
11. Install the muffler in the outlet elbow and tighten the clamp.

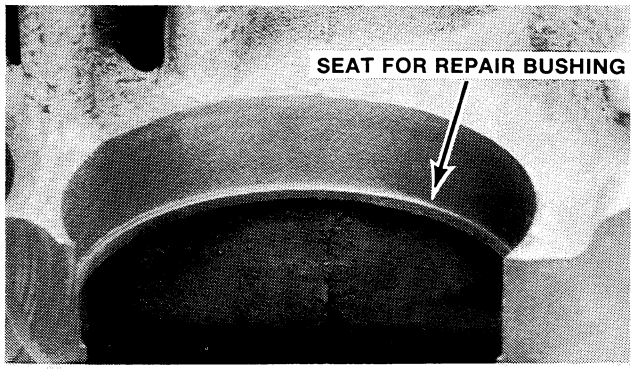
12. Prime the turbocharger as instructed in this section.

13. Stop the engine after it has ran 5 minutes and check for oil leaks.

14. Install the right side of the hood.

STEP 27

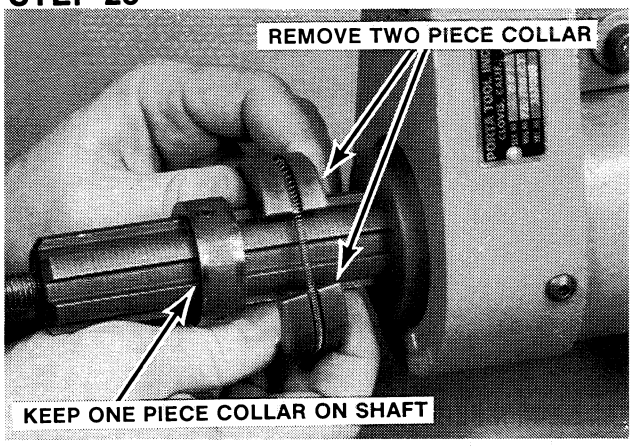




Push the main shaft back 1/8" (3.175 mm). This adjustment will leave a small seat in the bore after the cutting operation. The seat in the bore is used to position the repair bushing.

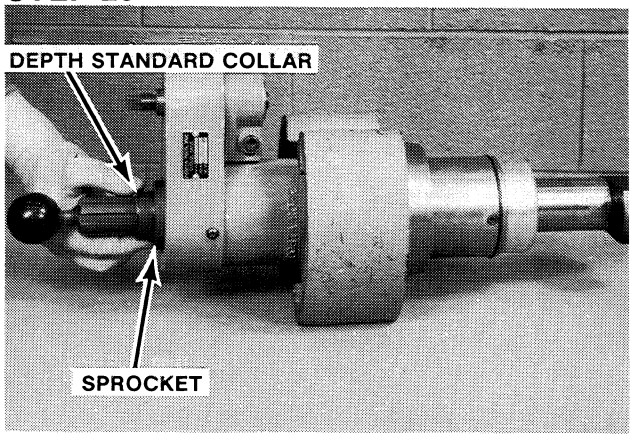
NOTE: *Because this is a cast surface, there can be times when a small seat will not remain. Check your depth, the depth must not be over 9.12" (231.6 mm).*

STEP 28



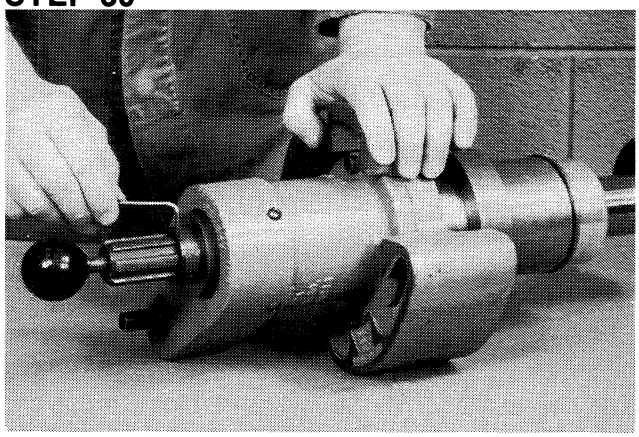
Make sure that the two piece collar, which controls the chamfer depth, is not on the splined shaft. Keep the one piece depth standard collar, which controls the bore depth for the repair bushing, on the splined shaft.

STEP 29



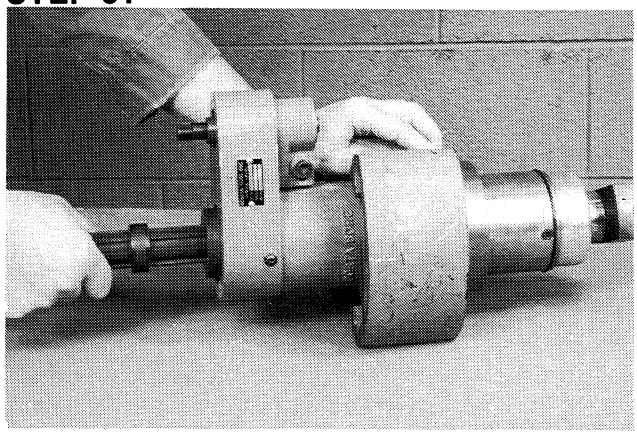
Slide the one piece depth standard collar down on the splined shaft until the depth standard collar hits the sprocket on the main shaft.

STEP 30



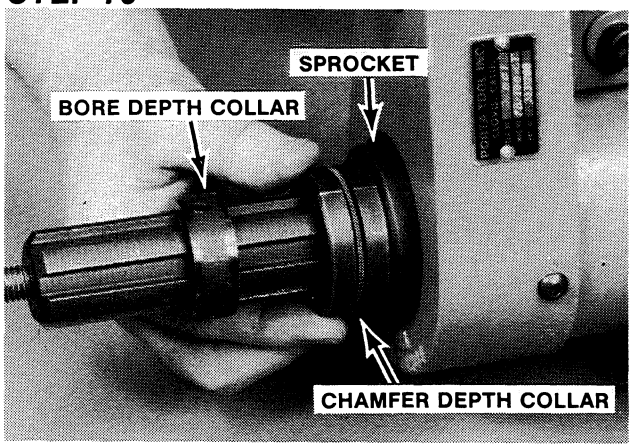
Lock the depth standard collar in position by tightening the set screws that are in the depth standard collar.

STEP 31



Pull on the knob to fully retract the cutter head.

STEP 79



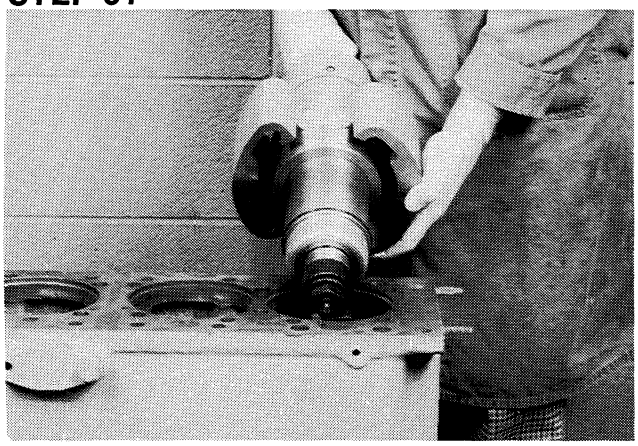
Push the chamfer depth collar against the sprocket.

NOTE: *Do not change the setting on the bore depth collar.*

STEP 80

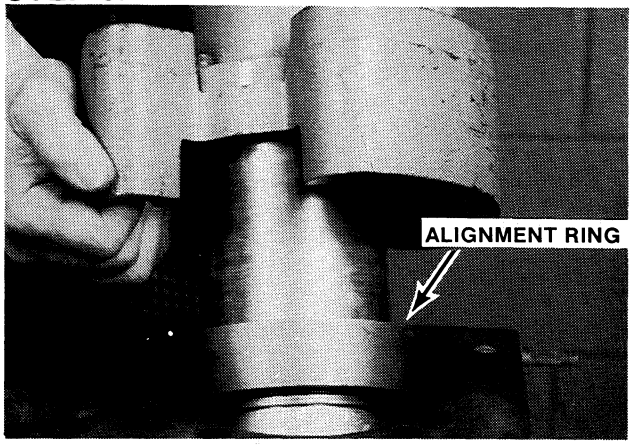
Find the mark on the main shaft sprocket before installing the tool in the bore. This mark shows the position of the cutter in the cutter head. Position the mark on the sprocket towards you before installing the tool in the engine block. This procedure will make sure that the cutter enters the bore freely to prevent damage to the cutter.

STEP 81



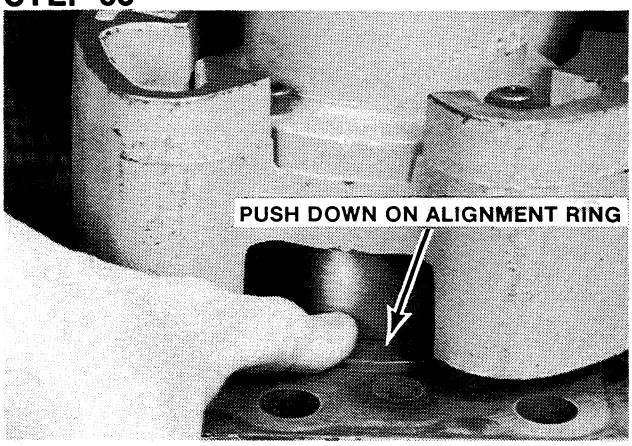
Tilt the top of the tool towards you and install the cutter head in the block bore.

STEP 82



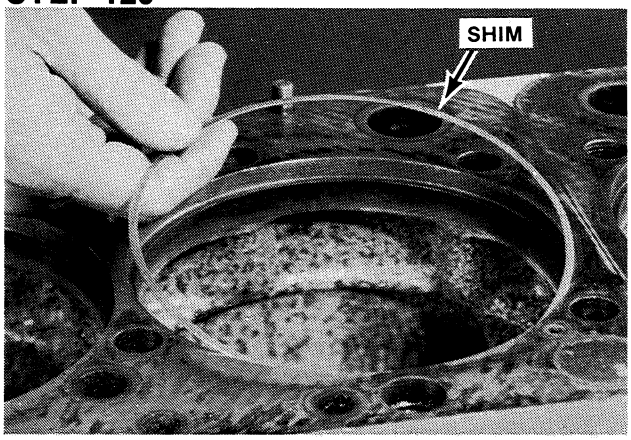
Put the alignment ring in the upper counterbore of the block.

STEP 83



Push down on the top of the alignment ring on both sides to make sure that the tool is centered.

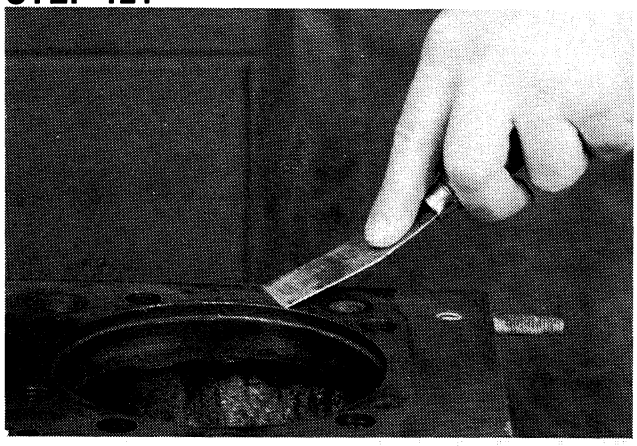
STEP 120



Shims for correcting sleeve protrusion are available in thickness of 0.005" (0.127 mm) and 0.010" (0.254 mm) for the 4-1/8" (104.775 mm), 4-3/8" (111.125 mm) and 4-5/8" (117.475 mm) bore engines.

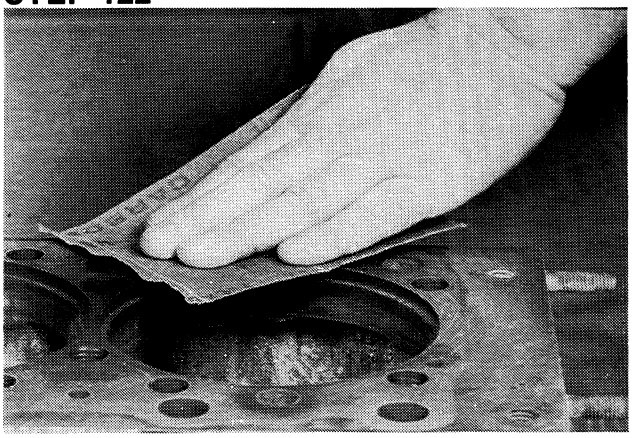
Shims are available in thickness of 0.20 mm, 0.25 mm, 0.30 mm, 0.50 mm and 0.75 mm for the 5" (127.000 mm) bore engines.

STEP 121

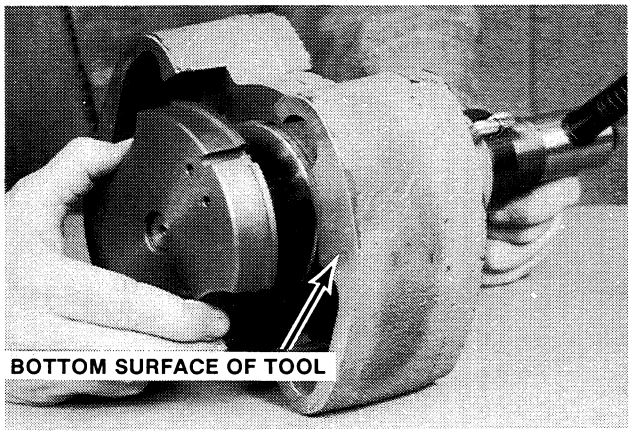


The top surface of the cylinder block must be clean. Remove dirt and gasket material.

STEP 122

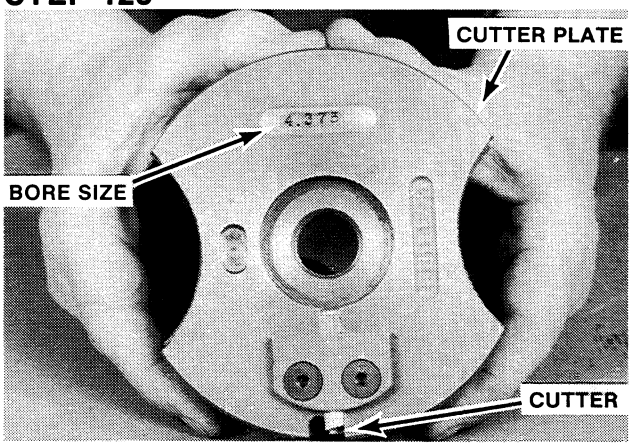


The top surface of the cylinder block must be flat and free of rough areas which can result in a serious cutting error. Use emery cloth or a flat file to smooth the top surface.



The bottom surface of the tool must also be clean, flat and free of rough areas.

STEP 123

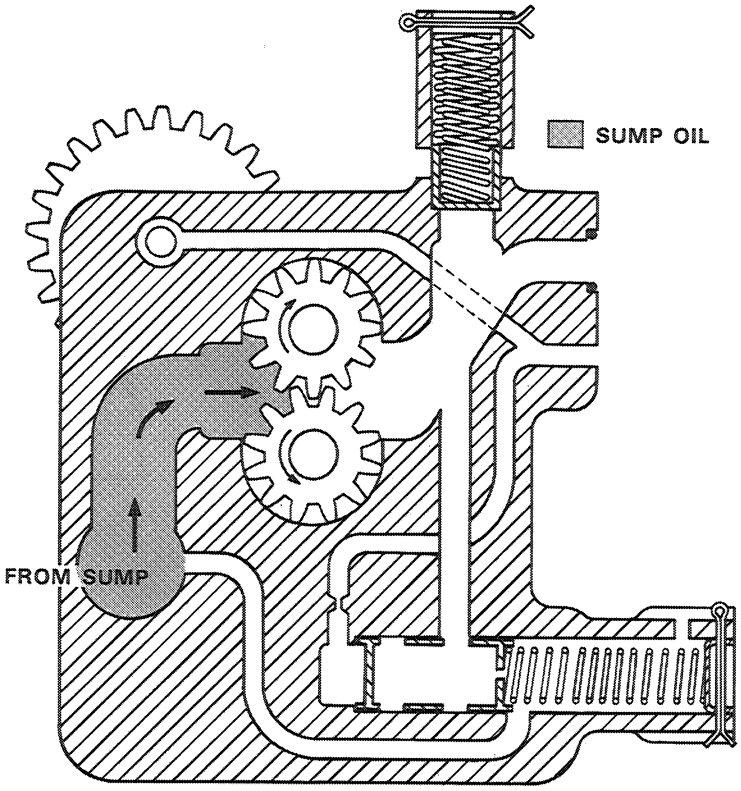


Select the cutter plate for the correct bore size. The bore size is found on the top of each cutter plate.

ENGINE OIL PUMP FLOW

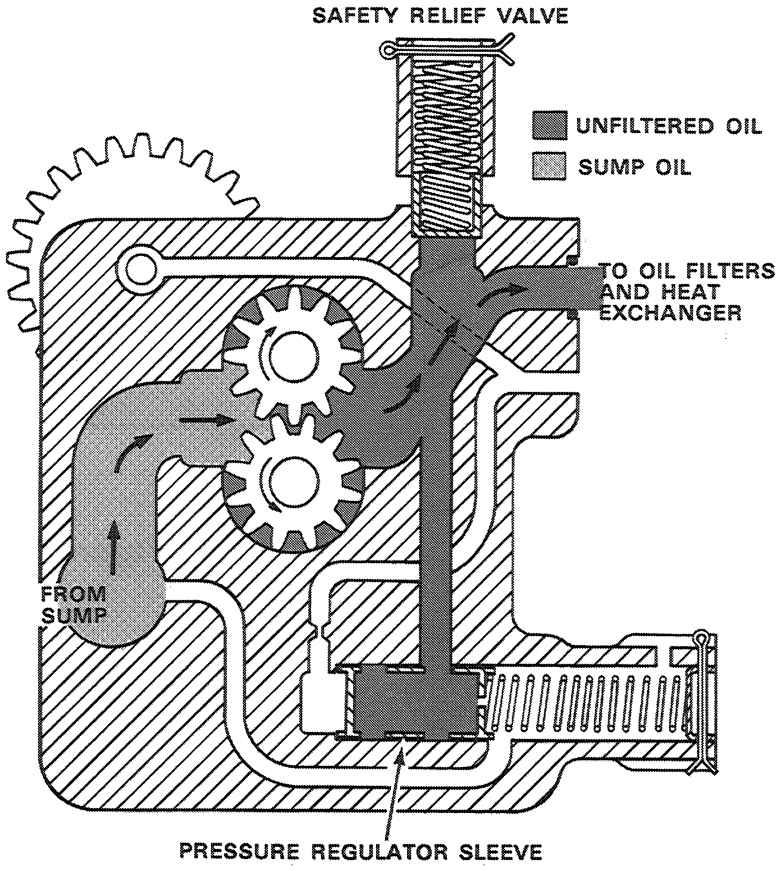
STEP 1

Oil is drawn from the engine oil sump by the pump gears thru the suction pick-up tube and enters the pump cavity.



STEP 2

The oil is forced by the pump gears thru internal passages to the safety relief valve and to the pressure regulator valve where it deadheads. The oil then flows to the engine oil filters and heat exchanger.



Section

3010

FUEL SYSTEM AND FILTERS
FOUR AND SIX CYLINDER "B" SERIES
DIESEL ENGINES

CASE CORPORATION

Rac. 9-75297

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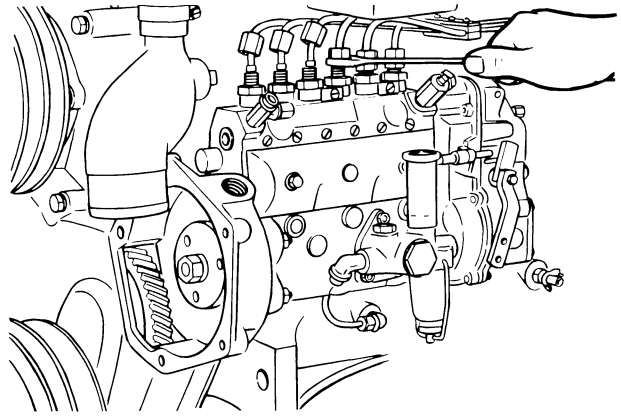
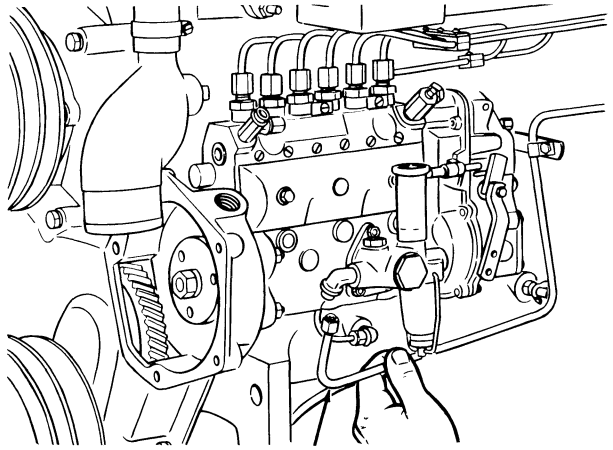
STEP 22



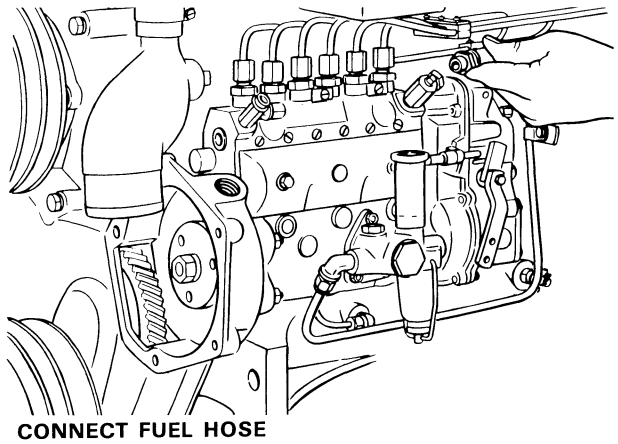
CONNECT HIGH PRESSURE FUEL LINES FINGER TIGHT PLUS 1/8 TURN.

STEP 23



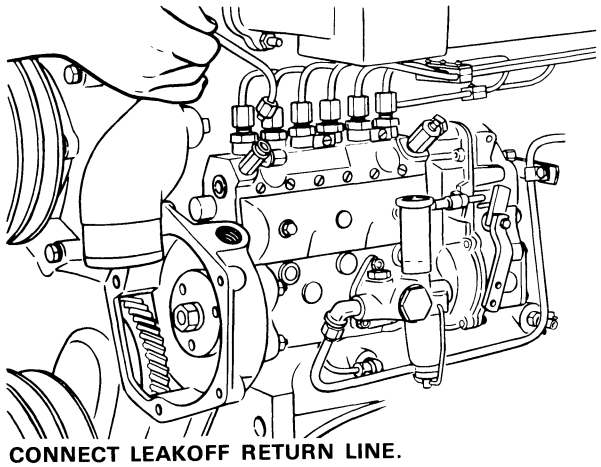
CONNECT LOW PRESSURE LINE. NOTE: NUT MUST SEAT AGAINST SHOULDERS OF FITTINGS. RUBBER SLEEVES MUST SEAT PROPERLY AND NOT BIND.

STEP 24



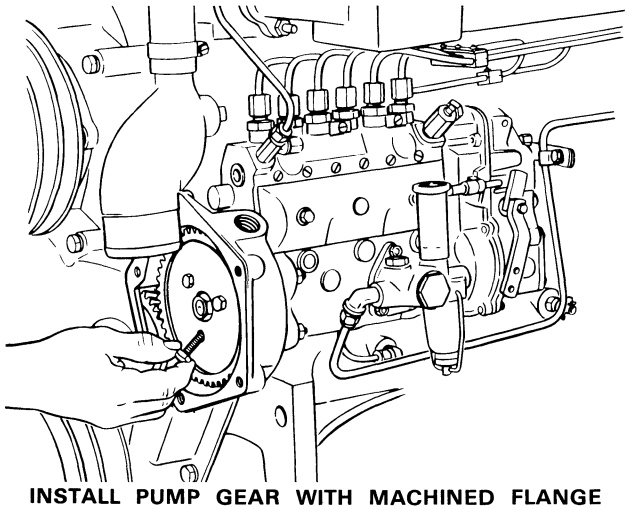
CONNECT FUEL HOSE

STEP 25



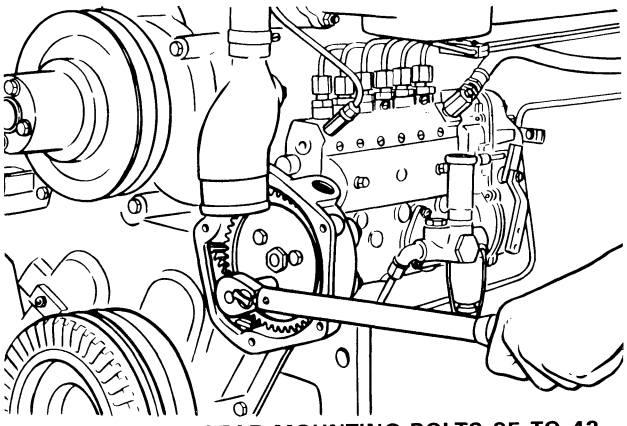
CONNECT LEAKOFF RETURN LINE.

STEP 26

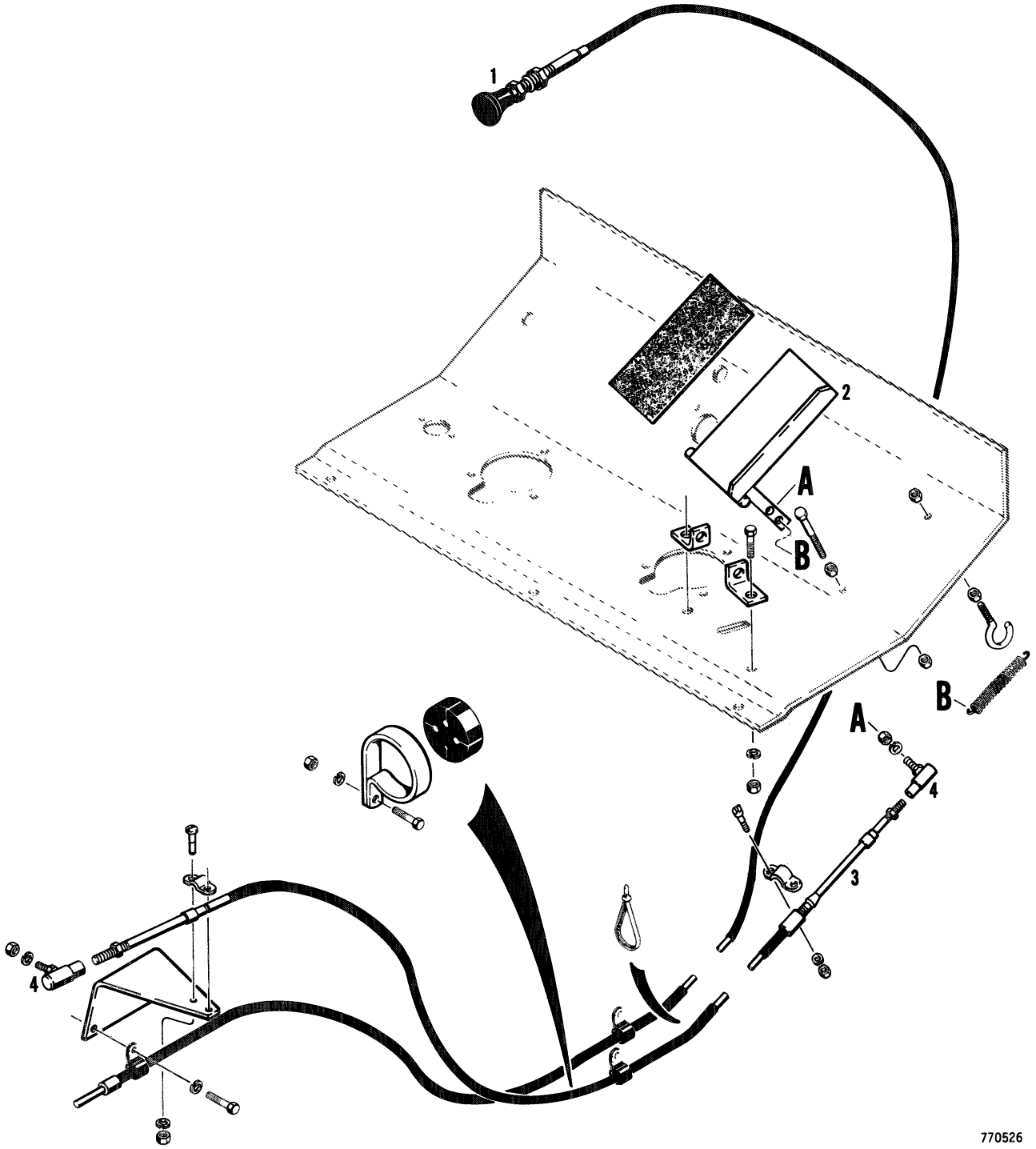


INSTALL PUMP GEAR WITH MACHINED FLANGE TOWARD PUMP FLANGE. INSTALL MOUNTING BOLTS.

STEP 27



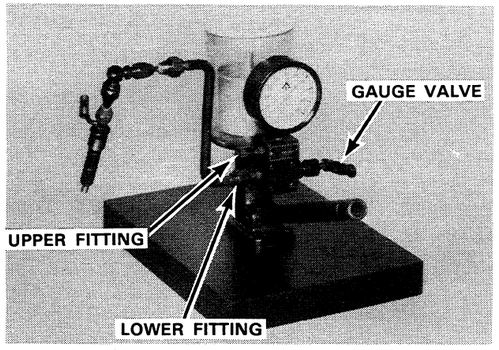
TORQUE PUMP GEAR MOUNTING BOLTS 35 TO 42 FT. LBS.



1. FUEL SHUTOFF CABLE
2. FOOT PEDAL
3. THROTTLE CABLE
4. BALL JOINTS

Figure 1 - Throttle and Fuel Shutoff Cables

INJECTOR TEST STAND



An "Approved" Injector Test Stand, Case Part No. M20322 (Bacharach No. 65-934D), is required for testing and adjusting the injectors and can be purchased through the Service Parts Supply, J. I. Case Co., Racine, Wisc. Except for descriptions referring especially to adjustments on the test stand itself, all of the following instructions will apply to all makes. Operating instructions are also furnished with the test stand.

An injector tool kit, Case Part No. M20520 (Bacharach No. 60-0010), is required to service the injectors. This kit is used in conjunction with the Case Diesel Tool Kits, Case Part No. M20247 (CD-800) and Case Part No. M20246 (CD-350).

The test stand is used to perform the following checks:

1. Check and adjust the injector opening pressure.

2. Check the injector assembly for fuel leakage.

3. Accurately check the injector spray pattern.

Fuel injectors must be checked on the test stand when performing the following service operations:

1. Whenever an injector has been removed from the engine for cleaning, the injector must be checked on the test stand prior to installing it on the engine.

2. When a new injector assembly is to be installed, it must be checked on the test stand prior to installing it on the engine.

3. When a complete engine overhaul is performed, the injectors should be removed and checked on the test stand.

4. When an injector is suspected to be the cause of unsatisfactory engine performance, it should be removed from the cylinder head and checked on the test stand prior to disassembling it.

IMPORTANT: ALWAYS CHECK THE PERFORMANCE OF AN INJECTOR ON THE TEST STAND BEFORE DISASSEMBLING IT. IF IT CHECKS OUT SATISFACTORILY, THERE IS NO NEED TO DISASSEMBLE OR ADJUST IT.

Preparing Test Stand

1. Open the gauge valve.

2. Fill supply cup with fluid. Although the test stand is self-priming, several strokes of the pump handle may be necessary to evacuate entrapped air. A vent screw in the side of the housing, directly behind the lower discharge fitting can be opened for thorough venting and a priming aid.

3. The test stand has two discharge fittings to facilitate various tests. When nozzle under test is connected to the lower fitting, closing the gauge valve, isolates the gauge for prolonged pumping when flushing nozzle or checking spray form. Using the upper connection and closing the gauge valve isolates the gauge and nozzle from the test stand permitting accurate measurement of leakage rates or pressure drop.

4. The lower discharge fitting is used for conventional tests on hydraulically operated nozzles. The upper fitting is used for leakage rate measurements.

Section 4002

ELECTRICAL SYSTEM SPECIFICATIONS AND TROUBLE SHOOTING

CASE CORPORATION

C. E. Div. 9-66871
October 1977

PRINTED IN U.S.A.

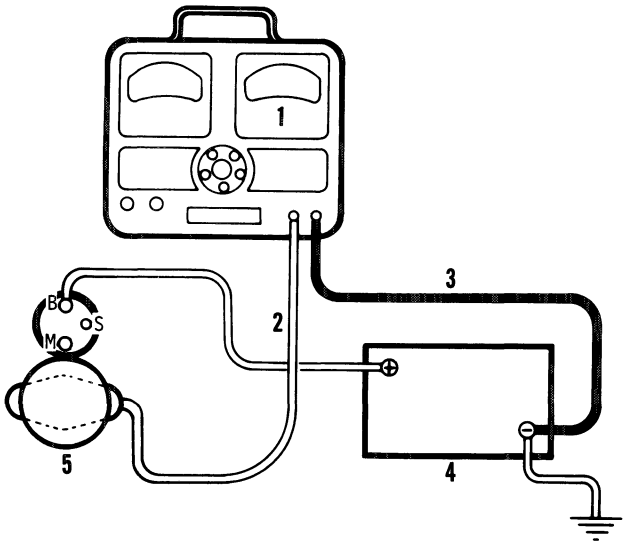
Test 4 - Ground Circuit Test

Excessive resistance in the ground circuit can cause sluggish cranking action or failure to crank and can also seriously interfere with the operation of the charging system.

1. Refer to Figure 4. Connect the voltmeter negative lead to negative battery post. Connect the voltmeter positive lead to the grounded end of the ground cable.

2. Crank engine. If voltage drop is over .5 volt, clean and tighten the ground cable connections.

3. Recheck the voltage drop, if still over .5 volt, replace the ground cable.



760519

1. VOLTMETER
2. VOLTMETER POSITIVE LEAD
3. VOLT METER NEGATIVE LEAD
4. BATTERY
5. STARTER

Figure 4 - Ground Circuit Test

e. If wire is good, remove the gauge as instructed in this Section and replace gauge.

2. If gauge operation is erratic or is suspected of being wrong:

a. Check for loose or corroded connection at the sending unit and gauge terminal.

b. Check for the possibility of the wire or harness being grounded (short circuited) part of the time.

c. If steps a and b do not correct the problem, replace the gauge.

BATTERY CHECK SHEET

TEST RESULT	SUMMARY	INDICATION	REMEDY
Visual Inspection			
1. Dirty battery top		Battery OK	Clean
2. Clogged vents		Battery OK	Clean
3. Corrosion		If severe, possible battery defect.	Clean and continue testing.
4. Low water level		Battery OK	Add water
5. Cracked case		Defective battery	Replace
6. Other defects noted			
Specific Gravity Check			
Cell No.1	Cells vary more than .030 gravity points.	Defective, discharged or worn out battery.	Recharge battery. Repeat test. If cell readings still vary, replace battery.
Cell No. 2	Most cells below 1.230 and even within .030 points.	Discharged	Recharge and perform Capacity Test.
Cell No. 3	Most cells at or near full charge (1.260) and even within .030 points.	Charged	Recharge and perform Capacity Test.
Cell No. 4	Most cells above full charge (1.260).	Overcharged	Check voltage regulator as instructed in Section 4007.
Cell No. 5			
Cell No. 6			
NOTE: Specific gravity readings apply to original equipment or Case supplied replacement batteries only. Other makes may vary.			
Load Test			
Load equals 20-hour amp rating x 3 (2.5) or 200 amps			
12-volt battery	Over 9.6 volts	Battery OK	Recharge if necessary.
	Under 9.6 volts	Battery discharged or defective.	Make Individual Battery Cell Test.
6-volt battery	Over 4.8 volts	Battery OK	Recharge if necessary.
	Under 4.8 volts	Battery discharged or defective.	Make Individual Battery Cell Test.
Individual Cell Test			
Cell No. 1	Cell readings vary over .1 volt	Battery defective	Replace
Cell No. 2			
Cell No. 3	Cell readings even within .1 volt	Battery discharged	Charge battery.
Cell No. 4			
Cell No. 5			
Cell No. 6			

770150

MAGNETIC SWITCH (SOLENOID)

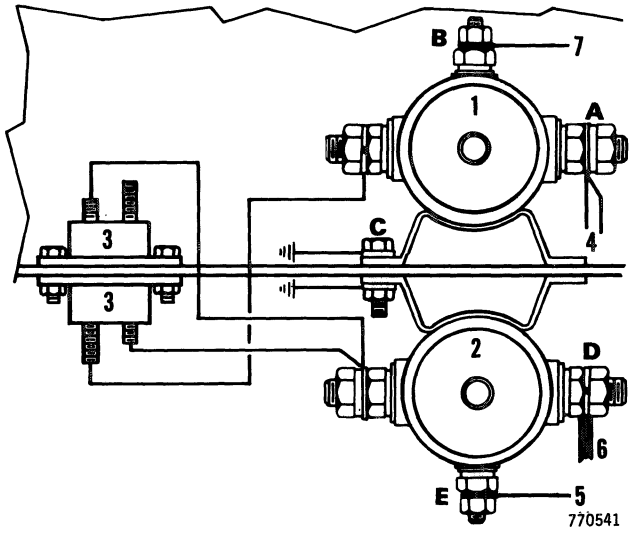
A magnetic switch is a part of the starting circuit and the cab wiring circuit.

The magnetic switch in the starting circuit is used to actuate the starter solenoid.

The magnetic switch in the cab wiring circuit is used to supply battery voltage to all electrical accessories that are controlled by the operator in the cab.

Basically, the magnetic switch is many turns of wire around a hollow cylinder (a winding) and metal disc connected to a plunger. The other parts are the housing, the terminals necessary to make a circuit connection and a return spring.

When electricity flows through the windings, the cylinder and winding is made an electric magnet and pulls the plunger into the cylinder. The magnetic force holds the metal disc tightly against the two large terminals to complete the electrical circuit.



1. CAB CIRCUIT MAGNETIC SWITCH
2. STARTER CIRCUIT MAGNETIC SWITCH
3. CIRCUIT BREAKER
4. TO CAB CONTROL PANEL
5. TO NEUTRAL START SWITCH
6. TO STARTER S TERMINAL. REMOVE CABLE FOR MAGNETIC SWITCH TEST
7. TO 5 AMPERE CIRCUIT BREAKER IN INSTRUMENT PANEL

Figure 7

Magnetic Switch Tests

1. To test the cab wiring switch:

   a. Turn the key switch to the ON position.

   b. Use a voltmeter and check for battery voltage at test point A on the switch. If there is an indication of battery voltage the magnetic switch is good.

   c. If there was no indication of battery voltage, connect the voltmeter to test point B and test point C. If there is an indication of battery voltage the key switch and wiring between the key switch and magnetic switch are good. A new magnetic switch must be installed.

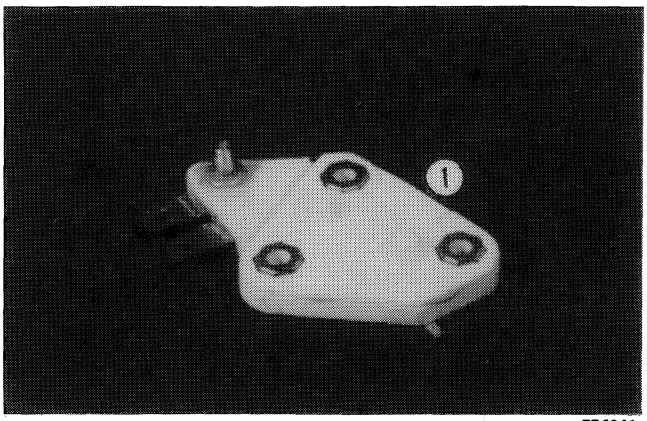
2. To test the starting circuit switch:

   a. Remove the nut, lock washer and orange wire from test point D on the magnetic switch.

   b. Have a person hold the key switch in the START position. Use a voltmeter and check for battery voltage at test point D. If there is an indication of battery voltage the magnetic switch is good.

   c. If there was no indication of battery voltage, connect the voltmeter to test point E and test point C. Hold the key switch in the START position. If there is an indication of battery voltage the key switch and the wiring between the key switch and magnetic switch are good. A new magnetic switch must be installed.

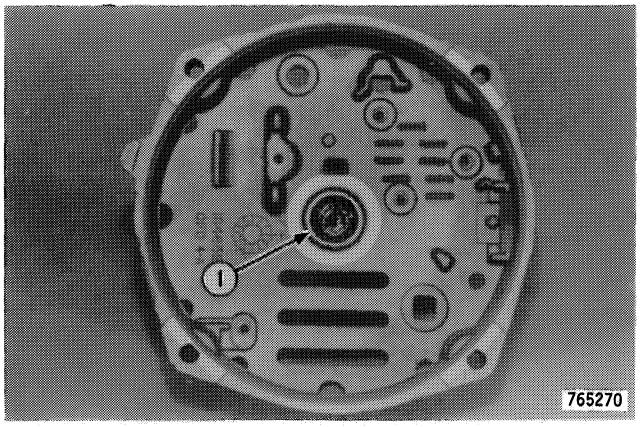
   d. When the test is finished, connect the orange wire to the magnetic switch with the lock washer and nut.



1. Voltage Regulator (Regulators May Vary in Appearance but are Completely Interchangeable)

Figure 16

10. Do not remove bearing from rear housing unless it is to be replaced. Reasons for replacement are; worn or damaged seal and/or bearing rollers, and lack of lubricant. DO NOT attempt to lubricate bearing.



1. Bearing

Figure 17

11. To remove bearing from rear housing, support housing under bearing bore with a piece of pipe or other suitable support. The support must be long enough to prevent the housing from touching the work bench or press bed. Then use a suitable driver and press or drive bearing from housing.

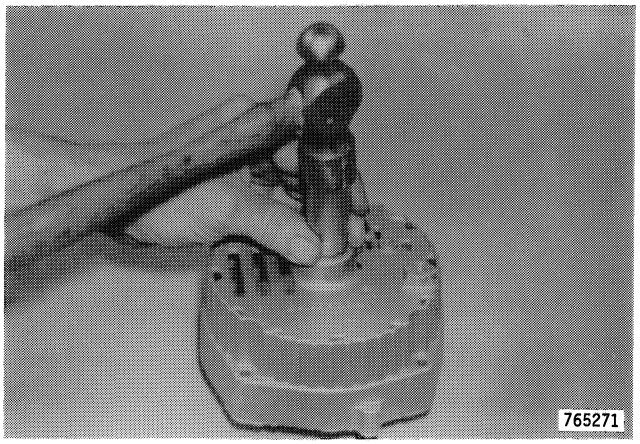


Figure 18

12. Put the rotor on a vise. Tighten the vise just enough to keep the rotor from turning. Then remove the pulley nut.

NOTE: A special tool, part number CAS-1375, is available in the U.S. from Service Tools and in Canada from Jobborn Manufacturing Co. See Special Tools in service manual introduction for the correct address. The special tool can be used on all Delco-Remy alternators. Use the special tool and box end wrench to remove the pulley nut.

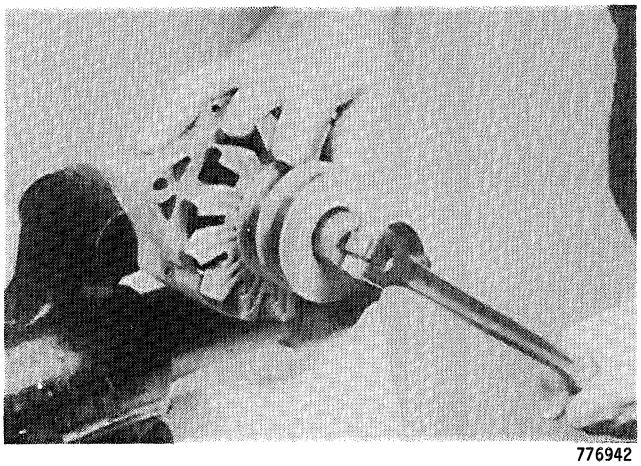


Figure 19

ALTERNATOR BELT ADJUSTMENT

The alternator drive belts must be checked for the correct tension and wear after every 500 hours of operation.

The correct tension of the belt will result in a deflection of 1/2 inch (17 mm) between the fan and crankshaft pulley when pushing against the belt with firm thumb pressure.

If a belt tension gauge is used to adjust the belt tension, the tension for a used belt must be 90 pounds (41 kg).

New belts must be adjusted to 110 pounds (50 kg). After a new belt has been run for 20 hours, adjust the belt tension to 90 pounds (41 kg).

NOTE: When adjusting the alternator belt, pry against the front housing only.

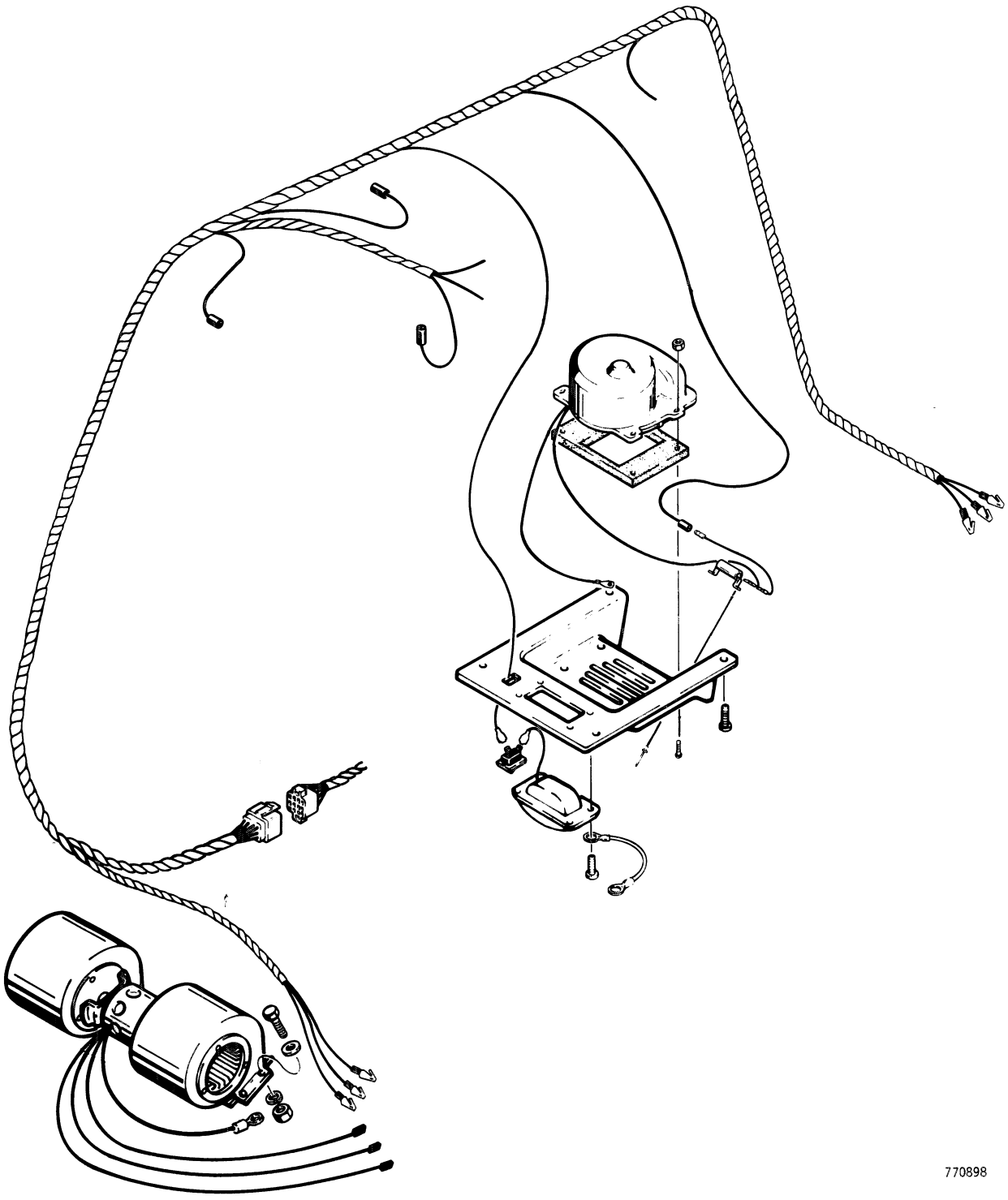


Figure 8 - Defogger, Cab Light and Blower

STEERING SYSTEM RELIEF VALVE PRESSURE CHECK AND ADJUSTMENT

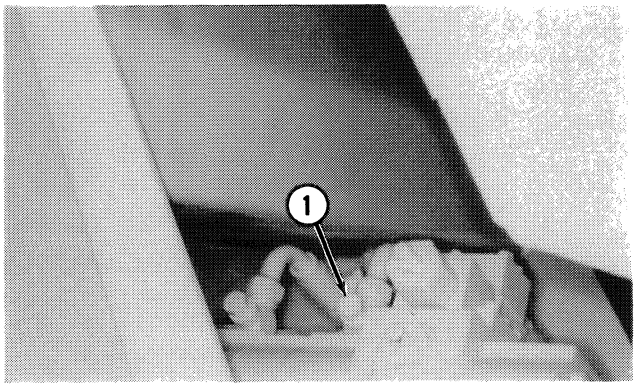
The steering system relief valve is located at the front of the transmission.

The specified pressure setting for the steering system relief valve is 2450-2550 psi (16 892-17 581 kPa) with the engine running at full throttle.

1. Turn the machine all the way to the left for easier access to the steering system relief valve. Stop the engine. Then turn the steering wheel to the right until it stops moving.

2. Loosen the hydraulic reservoir fill plug to release the air pressure in the hydraulic reservoir.

3. See Figure 2. Remove the plug from the steering pump outlet tube. Tighten the fill plug.



776281

1. Plug

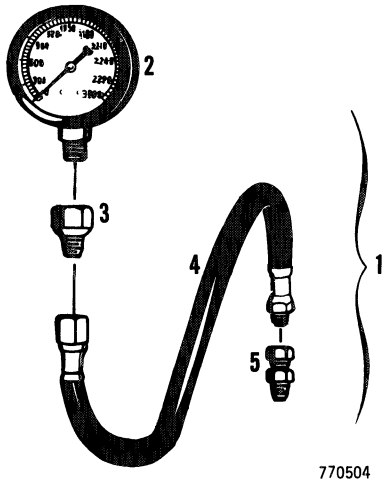
Figure 2

4. Install a 3/4 x 1/8 NPT reducer (part no. 221-57) in the outlet tube.

5. Connect a 0-3000 psi (0-20 684 kPa) pressure gauge to the reducer.

6. Engage the parking brake. Start the engine and run it at full throttle for 1-1/2 minutes to heat the oil.

7. With the engine running at full throttle, turn the steering wheel all the way to the left and hold it in place.



770504

1. CAS-10117-COMPLETE KIT
2. CAS-10117-1 GAUGE
3. CAS-10117-2 SNUBBER
4. CAS-10117-3 HOSE
5. CAS-10117-4 UNION

Figure 3

8. Look at the pressure gauge. The pressure gauge must indicate 2450-2550 psi (16 892-17 581 kPa).

9. If the pressure setting is not as specified, stop the engine and adjust the pressure setting of the relief valve.

   a. Remove the acorn nut from the adjusting screw in the relief valve.

   b. Loosen the lock nut on the adjusting screw.

   c. Turn the adjusting screw in to make an increase in the pressure setting.

   d. Turn the adjusting screw out to make a decrease in the pressure setting.

   e. After turning the adjusting screw, tighten the lock nut.

10. Do steps 7, 8 and 9 as many times as needed to get the correct pressure setting.

Cont'd. on next page

REMOVING THE STEERING CONTROL VALVE

1. Lower the bucket to the floor. Engage the parking brake.

2. Loosen the hydraulic reservoir fill plug to release air pressure from the hydraulic reservoir.

3. Remove the cover on the front of the front chassis. Hold the cover in place as the last cap screw in removed; there are no blocks to hold the cover in place.

4. Have a smooth 1 inch (25 mm) diameter plug available to put in the steering control valve return hose. If the return hose is not plugged, the hydraulic reservoir must be drained or use a vacuum pump to hold the oil in the hydraulic reservoir.

5. Disconnect the return hose from the steering control valve. Quickly put the plug in the return hose. Then disconnect the other hoses from the steering control valve. Put a tag on two of the hoses that indicate their installed location. Put a plug in each hose.

6. Loosen one of the cap screws in the steering column flexible coupling.

7. Connect a safety chain to the steering control valve. Use a cap screw with 1/2-NC threads in one of the threaded holes in the top of the steering control valve. It is our recommendation that another person be available to help remove the steering control valve.

8. Remove the three cap screws that hold the steering control valve in place.

9. Remove the steering control valve from the steering column and remove the steering control valve from the machine.

INSTALLING THE STEERING CONTROL VALVE

1. Connect the safety chain to the steering control valve.

2. Engage the steering column with the flexible coupling. Then remove slack from the safety chain to hold the steering control valve in place.

3. Put the mounting holes in the steering control valve in alignment with the holes in the mounting bracket. Then install the cap screws with lock washers that hold the steering control valve in place. Tighten the cap screws.

4. Tighten the cap screw in the flexible coupling. Then turn the steering wheel to put one spoke at the bottom and straight up and down.

5. Connect the three hoses with swivel connections to the steering control valve. If a tag was not put on the hoses as instructed during removal, refer to Figure 1 to be sure your connections are correct.

6. Remove the plug from the return hose and quickly put it on the fitting in the steering control valve. Then tighten the hose clamp.

7. If the hydraulic reservoir was drained, fill the hydraulic reservoir to the correct level. If new oil is being used, use the oil specified in Section 1050. If the oil drained from the hydraulic reservoir is to be used again, filter the oil before putting it in the hydraulic reservoir.

8. Start the engine. Do not run the engine above 1000 rpm (r/min) until the low air pressure warning buzzer stops making noise.

9. Turn the steering wheel all the way to the right and left 5 times to remove air from the steering system.

10. Stop the engine. Check for oil leaks at the steering control valve and correct as needed.

11. Install the cover on front of the front chassis.

in the rotor with the drive shaft. The punch mark on the drive shaft, Figure 33 must be in alignment with a valley in the rotor. If there is no punch mark, the pin in the sleeve and spool assembly must be in alignment with 2 valleys in the rotor. Make a mark that shows the position of the pin.

776931

Figure 32

776924

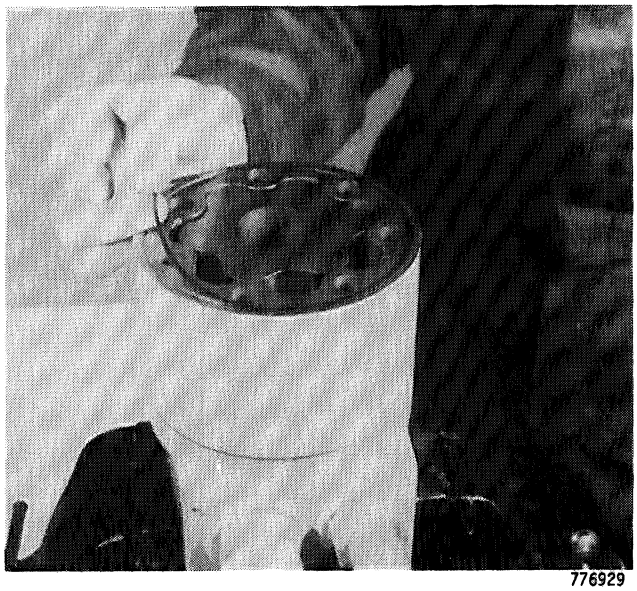
Figure 33

17. Put clean hydraulic oil on the lobes on the stator. Lower the stator over the rotor. The groove in the end of the stator must be up.

776928

Figure 34

18. Put a new quad ring in the groove in the stator. Turn the stator as needed to make an alignment of the cap screw holes.



776929

Figure 35

TABLE OF CONTENTS

CLARK EQUIPMENT

CLARK EQUIPMENT

TRANSMISSION ASSEMBLY

The transmission and hydraulic torque portion of the power train enacts an important role in transmitting engine power to the driving wheels. In order to properly maintain and service these units it is important to first understand their function and how they operate.

The transmission and torque converter function together and operate through a common hydraulic system. It is necessary to consider both units in the study of their function and operation.

To supplement the text below, and for reference use therewith, the following illustrations are provided:

The R, HR, and MHR Model Transmissions are of three basic designs.

The R Model consists of a separate torque converter, mounted to the engine with the powershift transmission remotely mounted and connected to the torque converter with a drive shaft.

The HR Model consists of a torque converter and powershifted transmission in one package mounted directly to the engine.

The MHR version is a mid-mount torque converter and transmission assembly connected to the engine by means of a drive shaft. (See Fig. A for basic design silhouette.)

The shift control valve assembly may be mounted directly on the side of the converter housing or front transmission cover, or remote mounted and connected to the transmission by means of flexible hoses. The function of the control valve assembly is to direct oil under pressure to the desired directional and speed clutch. A provision is made on certain models to neutralize the transmission when the brakes are applied. This is accomplished through use of a brake actuated shutoff valve. The speed and direction clutch assemblies are mounted inside the transmission case and are connected to the output shaft of the converter either by direct gearing or drive shaft. The purpose of the speed or directional clutches is to direct the power flow through the gear train to provide the desired speed range and direction.

An axle disconnect is optional and is located on the output shaft. The drive to the front or rear axle can be disconnected or connected by manual shifting.

CLARK EQUIPMENT

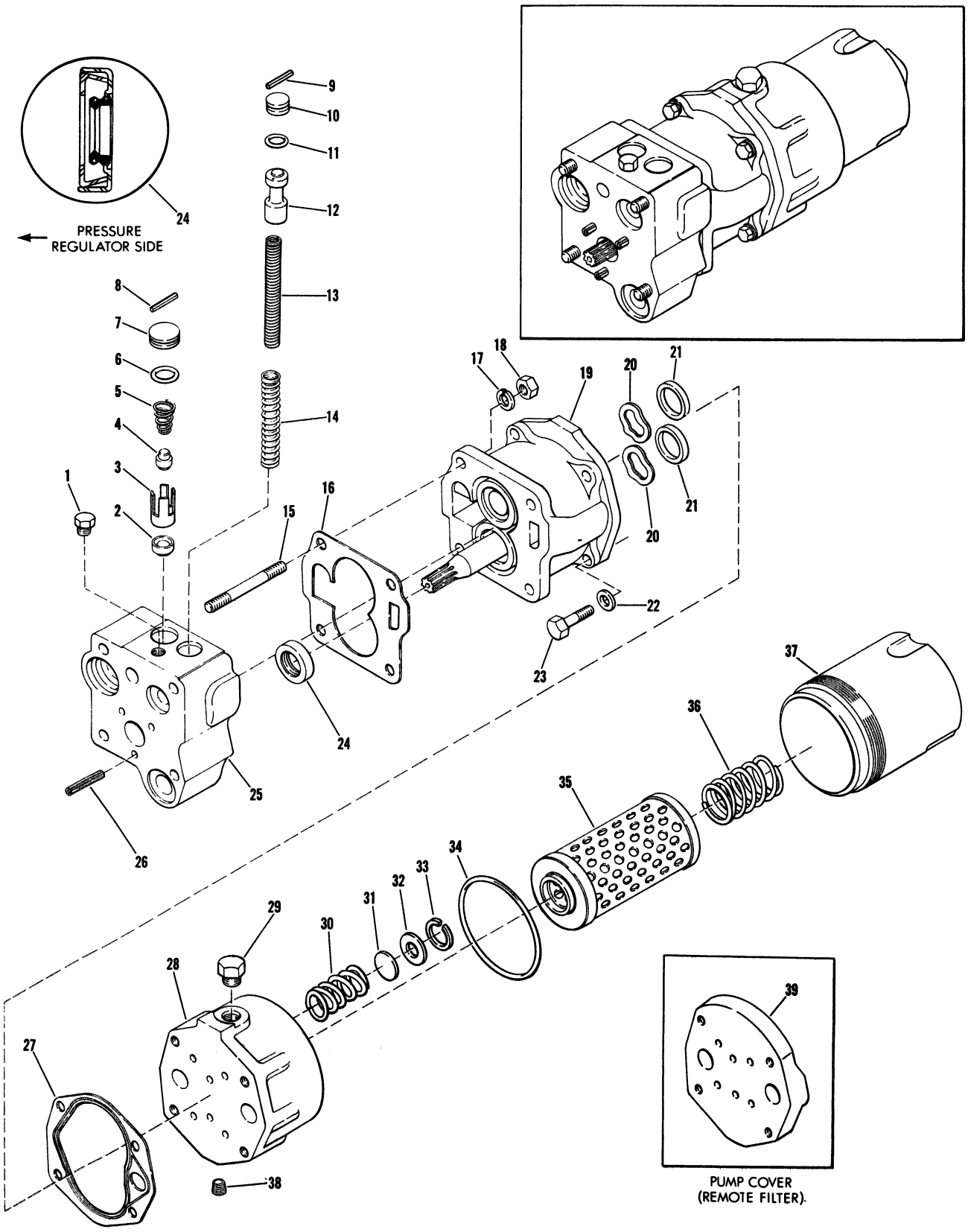


Figure F

CLARK EQUIPMENT

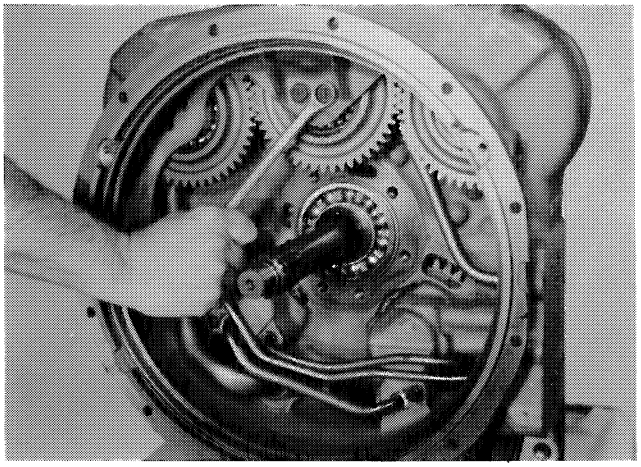


Figure 23
Remove pump drive gear bearing support bolts.

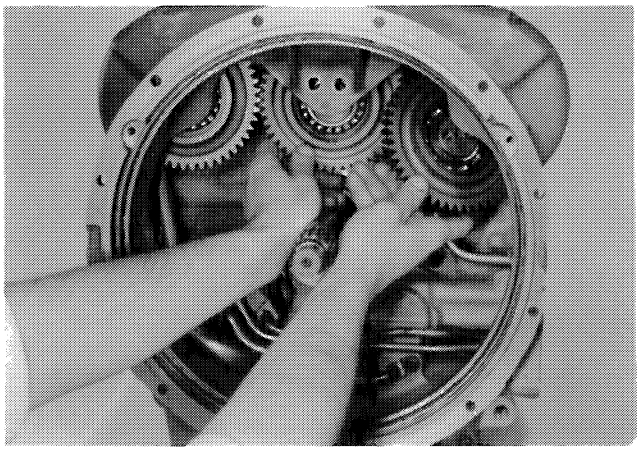


Figure 24
Move center gear toward the rear of converter housing. Remove pump drive gear on the right.

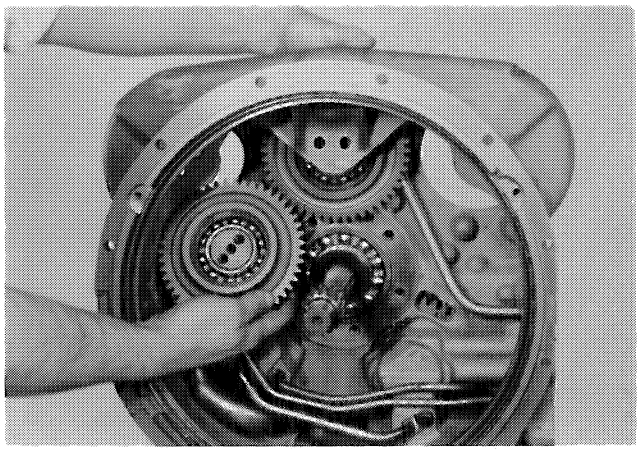


Figure 25
Remove pump drive gear on the left.

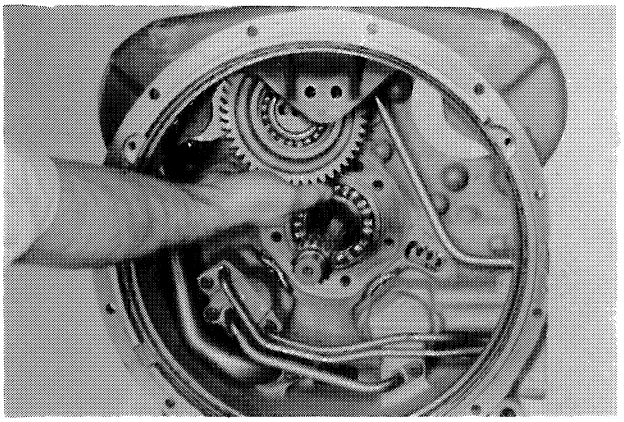


Figure 26
Remove center pump drive gear.

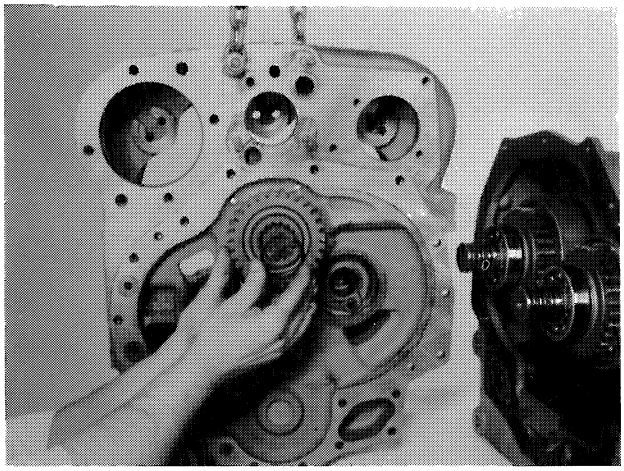


Figure 27
Remove turbine shaft gear retainer ring and gear.

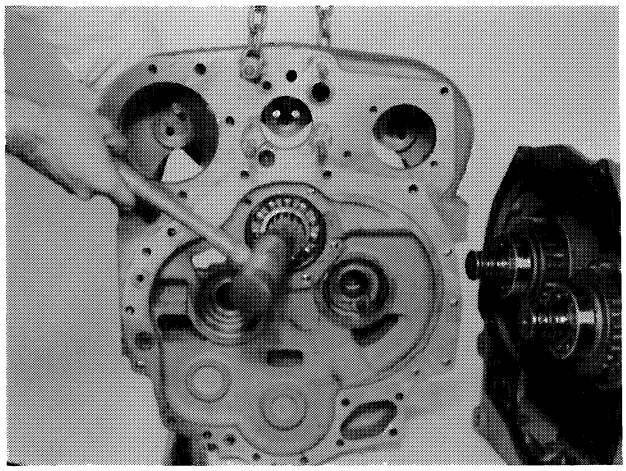


Figure 28
From rear of converter housing tap turbine shaft and bearing from housing.

CLARK EQUIPMENT

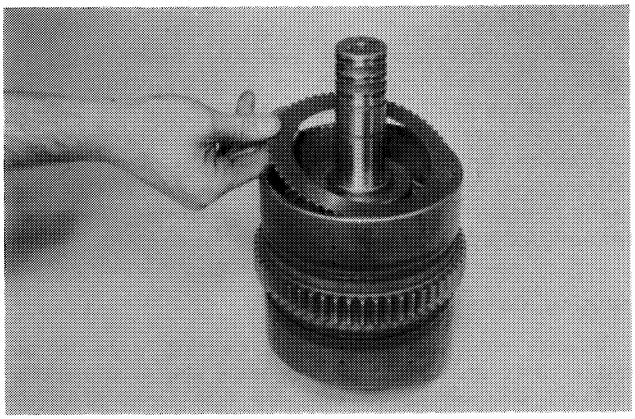


Figure 83

Install clutch piston return spring, spring retainer and retainer snap ring. Insert one steel disc. **NOTE: The 4th speed clutch does not use a snap ring retainer.**

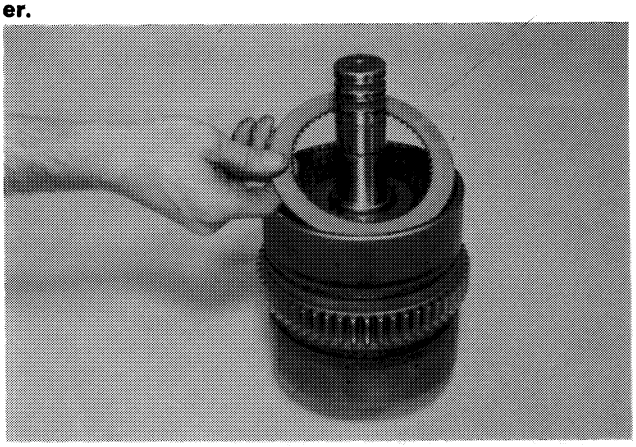


Figure 84

Install one friction disc. Alternate steel and friction discs until the proper amount of discs are installed. First disc next to the piston is steel, last disc installed is friction.

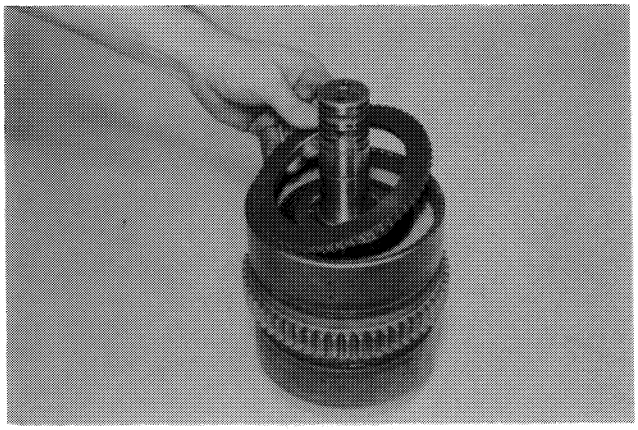


Figure 85

Install end plate.

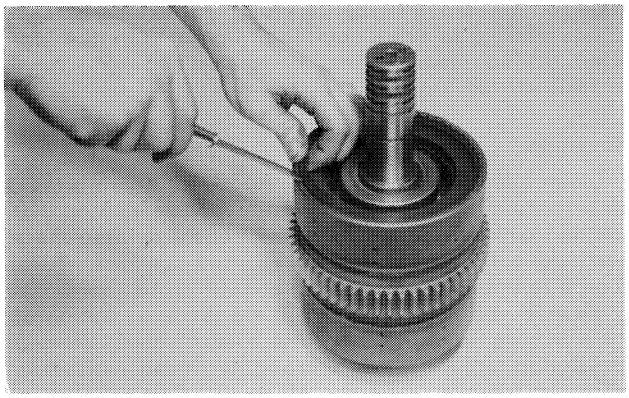


Figure 86

Install end plate retainer ring.

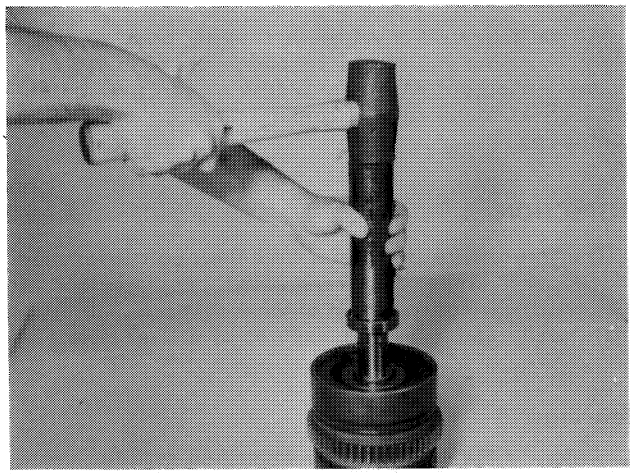


Figure 87

Install clutch driven gear inner bearing.

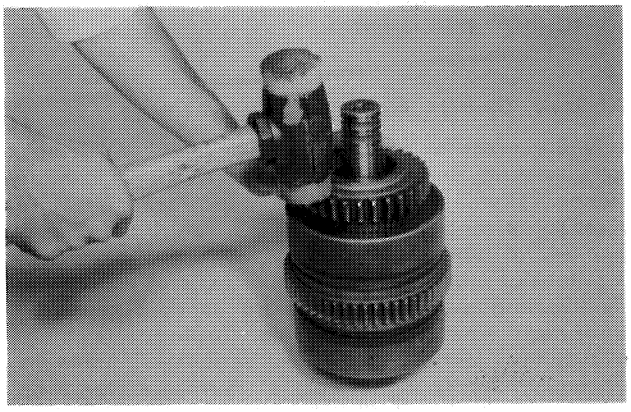


Figure 88

Install clutch driven gear into clutch drum. Align splines on clutch gear with internal teeth of friction discs. Tap gear into position. Do not force this operation. Gear splines must be in full position with internal teeth of all friction discs.

CLARK EQUIPMENT

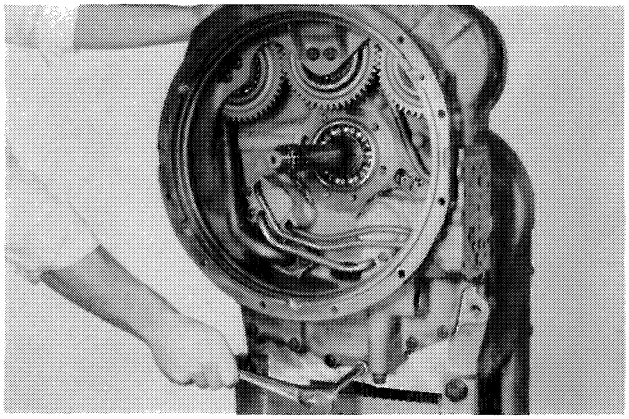


Figure 149

Secure converter housing to transmission case with bolts and washers. Tighten to specified torque.

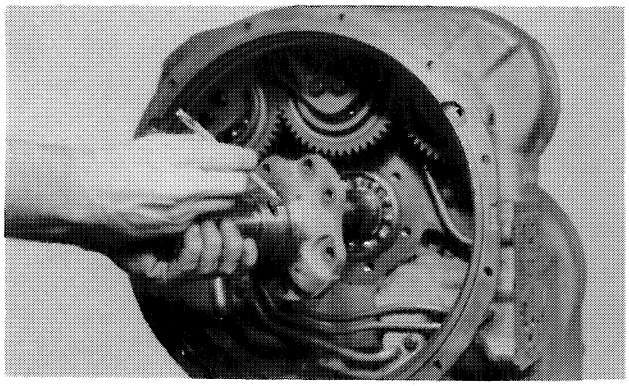


Figure 150

Install new sealing ring expander spring and oil sealing ring on support. **NOTE:** Expander spring gap to be 180° from sealing ring hook joint. Position support on turbine shaft to clear pump drive gear. Align support holes with converter housing.

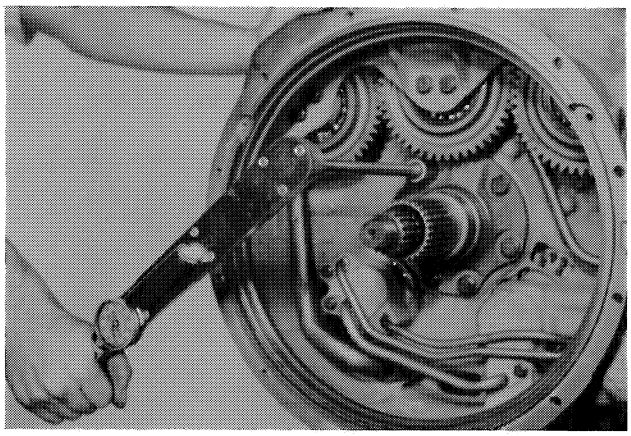


Figure 151

Install stator support bolts and tighten to specified torque.

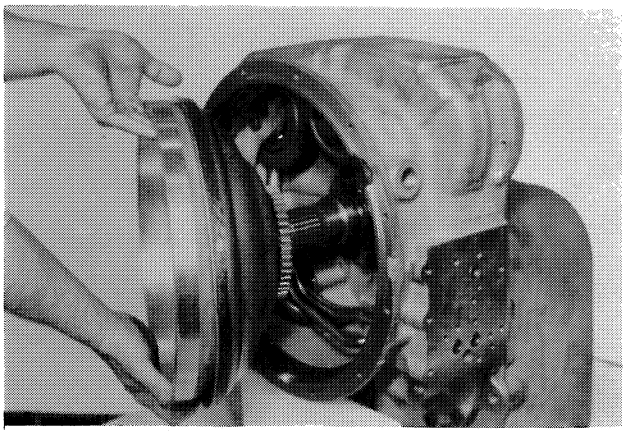


Figure 152

Grease stator support piston ring, oil baffle oil seal and seal ring to facilitate reassembly. Install impeller and oil baffle assembly in converter housing.

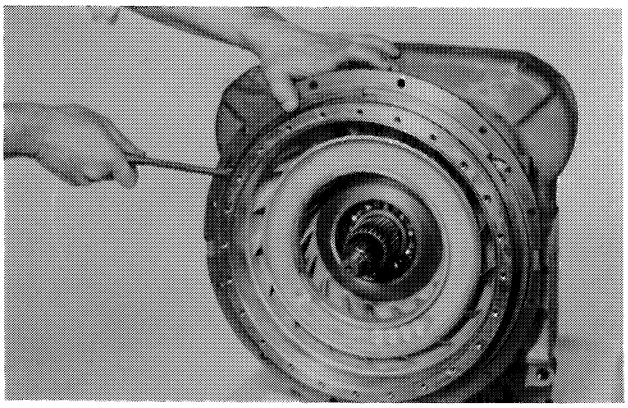


Figure 153

Position oil baffle in housing. Secure with oil baffle retainer ring, being sure ring is in full position in ring groove.

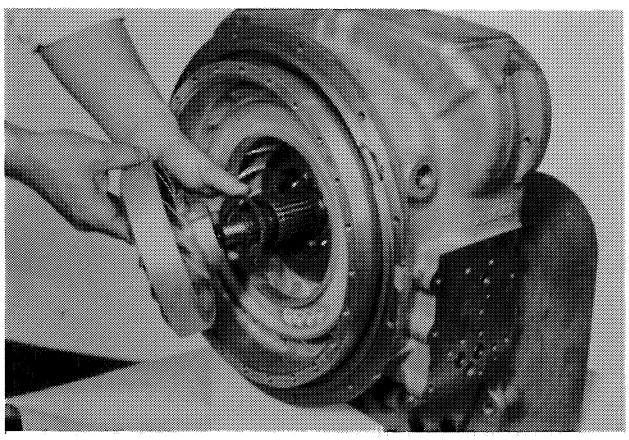


Figure 154

Install reaction member spacer with tang of spacer out. Install reaction member.

CLARK EQUIPMENT

DISASSEMBLY OF LOW CLUTCH UTILIZING REAR DOUBLE TAPER BEARING (HELICAL GEARS)

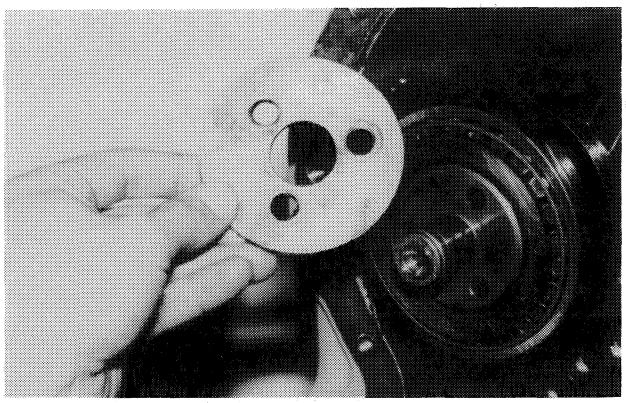


Figure 1
Remove low clutch rear bearing retaining plate.

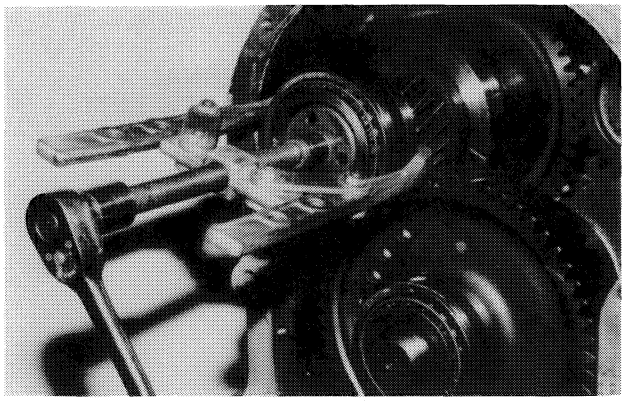


Figure 2
Remove low clutch rear bearing.

REASSEMBLY

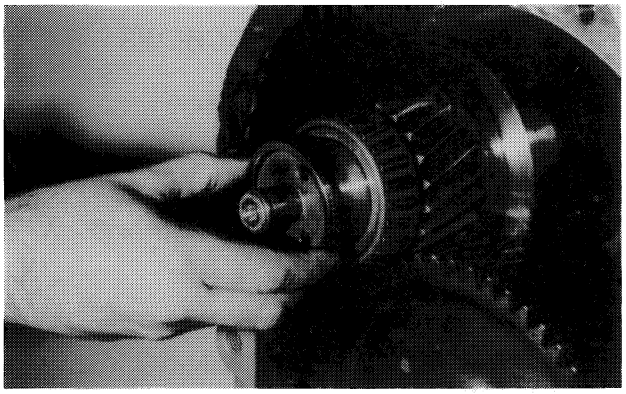


Figure 3
Install inner low clutch rear taper bearing with the large diameter of the bearing towards the low gear. Install the taper bearing spacer.

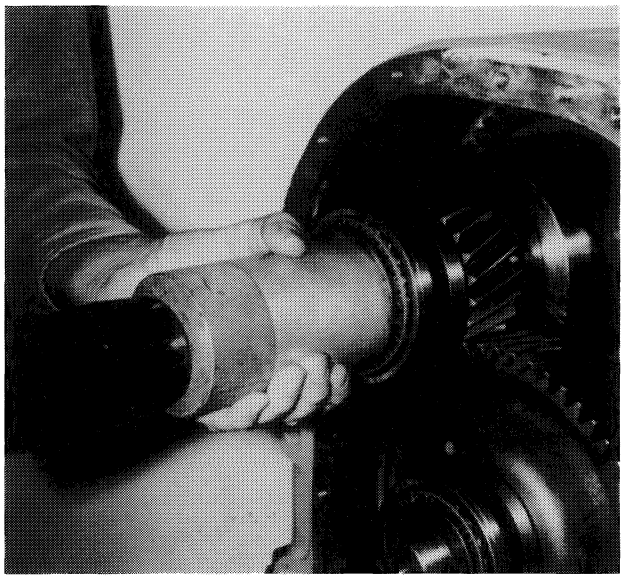


Figure 4
Install low clutch rear taper bearing race with the locating ring groove to the rear. Install the outer low clutch rear taper bearing.

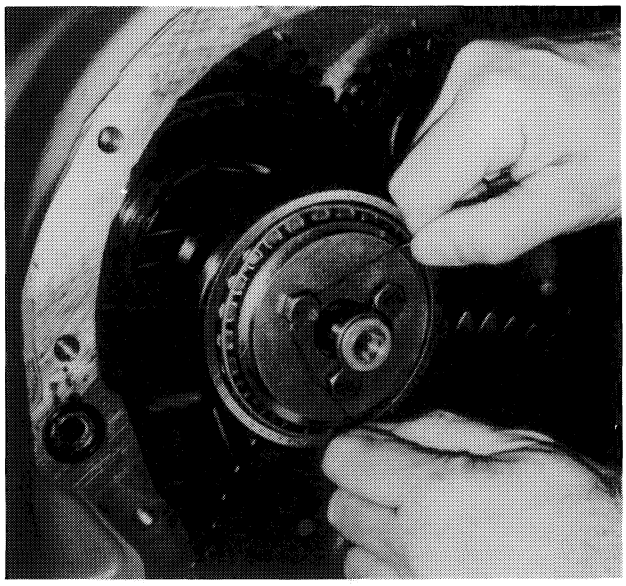


Figure 5
Install low clutch rear bearing retainer plate with the chamfer on the inside diameter of the plate toward the bearing. Install the bolts of the retainer plate and tighten to a torque of 26-29 lbs. ft. [35,3-39,3 N.m] [3,6-4,0 kgf.m]. Install lockwire.

Pressure Indication	Possible Cause and Repair
Charge pump pressure good, no forward clutch or reverse clutch pressure (Cont'd)	Another cause for no forward or reverse clutch pressure is that the piston in the clutch cutout cylinder is stuck. Check to see that the piston moves freely.
High torque converter out (cooling circuit) pressure	A pressure gauge indication considerably higher than specified is an indication of a restriction in the oil cooling circuit. Remove the hoses between the transmission and the oil cooler in the bottom of the radiator. Check to make sure the hoses and oil cooler are completely open.

AUXILIARY LUBRICATION PUMP FLOWMETER TEST

Flowmeters

Two flowmeters are available from Service Tools in the United States and Jobborn Manufacturing Co. in Canada. The part numbers are CAS 10085 for the 60 U.S. gpm flowmeter and CAS 10092 for the 100 U.S. gpm flowmeter. See Special Tools in the service manual introduction for the correct address.

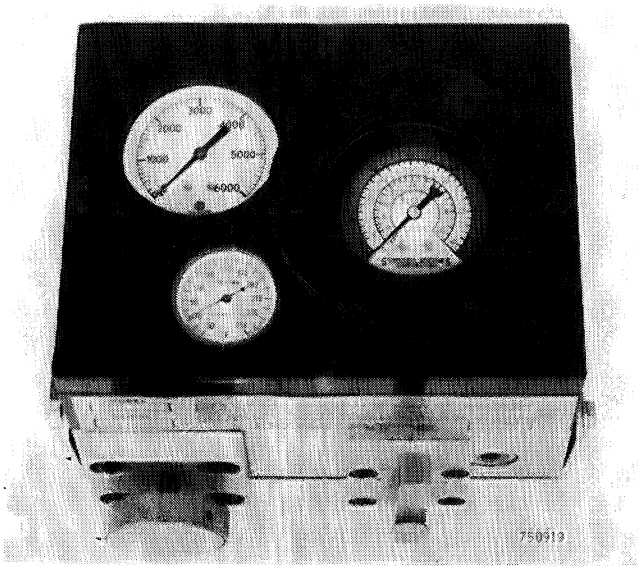


Figure 3

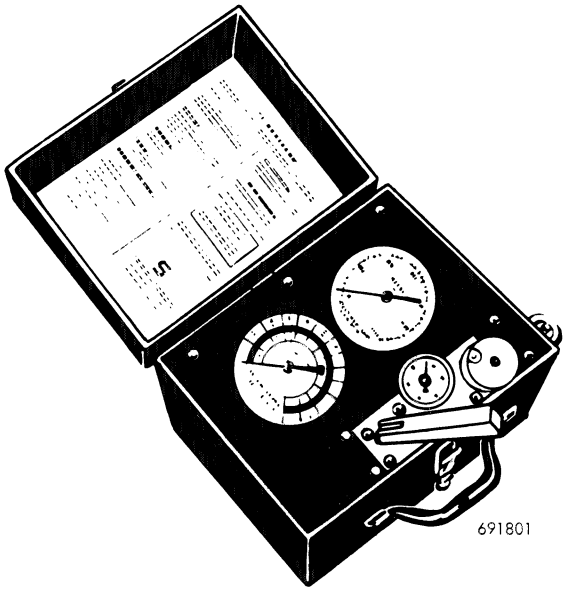


Figure 4

Description of Test

The flowmeter measures the volume, pressure and temperature of the oil as it moves through the flowmeter.

During the test you:

1. Learn the output of the auxiliary lubrication pump at zero pressure.

3. Put the 90° elbow in a vise as shown in Figure 5. Loosen the lock nut and remove the auxiliary lubrication pump from the 90° elbow.

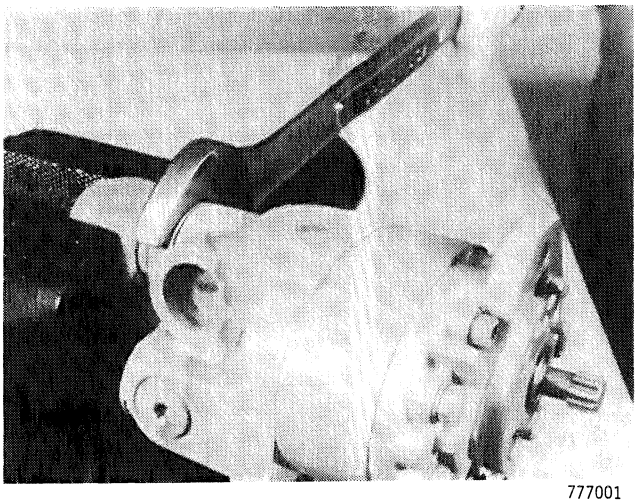


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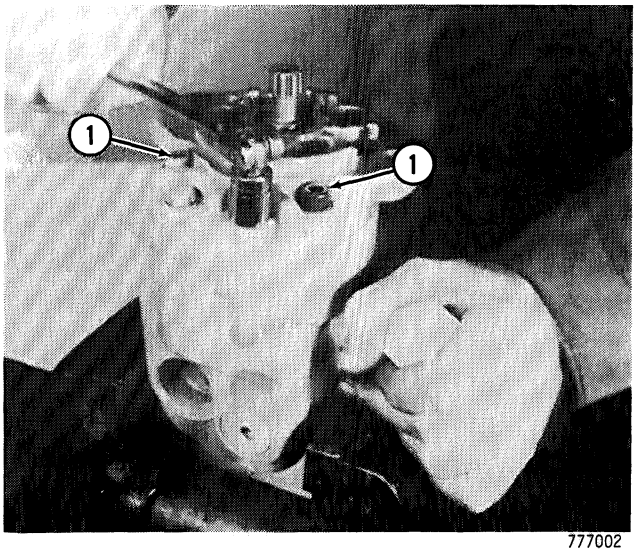
Figure 5

4. Remove the cap screws that hold the sections of the auxiliary lubrication pump together.



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1. Allen Head Screw

Figure 6

5. Remove the drive end cover, Figure 7.

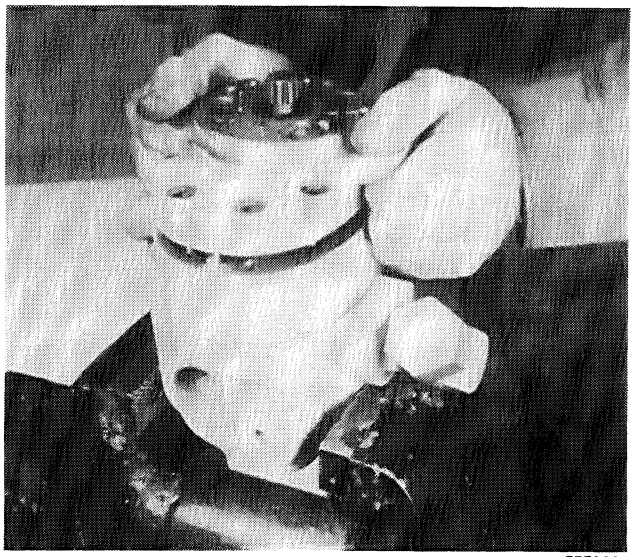

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Figure 7

6. Use a screwdriver to remove the wear plate, Figure 8.

777006

Figure 8

REMOVING THE TRANSMISSION

The transmission cannot be removed without removing the engine.

1. Do steps 1 through 41 under Removing the Engine in Section 2050.
2. Disconnect the two hoses from the bottom of the hydraulic reservoir.
3. Disconnect the suction hose from the hydraulic pump.
4. Disconnect the hoses connected to the pressure reducing valve on the auxiliary air reservoir.
5. Remove the nuts, washers and bolts that hold the hydraulic reservoir in place.
6. Connect a chain hoist to the hydraulic reservoir and remove the hydraulic reservoir from the rear chassis.
7. Disconnect the wires from the neutral start switch in the transmission control valve.
8. Disconnect the wires from the backup alarm switch in the transmission control if so equipped. Then remove the backup alarm switch from the transmission control valve.
9. Disconnect the cables from the direction and range spools in the transmission control valve.
10. Disconnect the hose from the clutch cutout cylinder on the transmission control valve.
11. Remove the cap screws that hold the bracket for the transmission control cables in place. Then put the bracket out of the way.
12. Disconnect the hoses from the hydraulic pump.
13. Disconnect the wires from the clutch pressure switch on top of the transmission.
14. Disconnect wire from the torque converter temperature sensor on the left side of the transmission.
15. Disconnect the front and rear wiring harness. Then remove the rear wiring harness plug from its mounting bracket and put the rear wiring harness out of the way.
16. Disconnect the center drive shaft from the transmission output flange.
17. Disconnect the rear drive shaft from the transmission output flange.
18. Remove the cap screws that hold the steering relief valve mounting bracket to the front of the transmission.
19. Remove the nuts, washers and bolts that hold the transmission to the rear chassis.
20. Remove the engine oil pan cap screws that hold the transmission oil cooler hose clamps in place.
21. Connect a lifting sling to the engine and transmission. Then connect a chain hoist to the lifting sling and remove the slack from the chain.
22. Remove the rear engine mounting bolt.
23. Lift the engine until the rear engine support is out of contact with the rear chassis.
24. Remove the rear engine support from the engine.
25. Remove the transmission mounting bracket from the rear of the transmission.
26. Carefully lift the engine and transmission assembly out of the rear chassis. Check to make sure all hoses, cables, etc. have been removed or disconnected.
27. Lower the engine and transmission assembly until the bottom of the transmission is on the floor.

TABLE OF CONTENTS

Section 6126

ROCKWELL AXLE

CASE CORPORATION

9-66872

Printed in U.S.A.
Issued October 1977
Revised September 1983

rier adapters) under the differential carrier.

13. Remove the nuts and washers from the studs. Connect the differential carrier to the transmission jack.

14. Carefully remove the differential carrier from the axle housing.

Installing the Front Differential Carrier

1. Before the differential carrier is installed, clean the inside of the center bowl with cleaning solvent and dry with compressed air.

2. Inspect the axle housing for cracks, loose studs and damage to the machined surface around the center bowl. Make the needed repairs or parts replacement.

3. A gasket is not used between the axle housing and the differential carrier. Use form-in-place gasket material, part number M20704, 3 ounce (88 ml) tube or part number M20705, 12 ounce (354 ml) cartridge.

4. Put the form-in-place gasket material on the machined surface on the differential carrier according to the instructions on the container.

5. Put the differential carrier on the jack. Lift the differential carrier into alignment with the studs in the axle housing. Push the differential carrier onto the studs.

6. Put the washers and nuts on the four long studs. Alternately tighten the nuts to pull the differential carrier into place.

7. Install the washers and nuts on the remainder of the studs. Then tighten all the nuts to the torque value specified on page 6126-3.

8. Install the axles. Be sure the axles are pushed all the way in.

9. Remove any gasket material from the planetary cover and housing. Put the form-in-place gasket material on the machined surface on the cover according to the instructions on the container.

10. Hold the cover in place against the planetary housing. Install the cap screws that hold the cover in place. Tighten the cap screws to the specified torque value on page 6126-3.

11. Connect the front drive shaft to the differential output flange. Tighten the universal joint nuts or cap screws to the specification on page 6126-3.

12. Install the bolts that hold the front drive shaft support bearing in place. The grease fitting in the front drive shaft support bearing must be to the left. Then install the lock washers and nuts on the bolts. Tighten the nuts to 135-165 foot-pounds (183-223 N m).

13. Connect the center drive shaft to the front drive shaft. Tighten the universal joint nuts or cap screws to 95-110 foot-pounds (128-149 N m).

14. Fill the planetary ends and center bowl as instructed in this section.

15. Start the engine and run it at 1000 rpm (r/min) to make an increase in the main air reservoir, if necessary. Then stop the engine.

16. Push the knob for the parking brake control valve until it stops moving. Connect the parking brake lever to the links with the pin. Hold the pin in place with a new cotter pin.

12. Install the bearing cap cap screws and washers. Tighten the cap screws to the torque value specified on page 6126-3.

13. Adjust the differential preload and pinion gear as described below.

Adjusting Differential Bearing Preload

After the differential has been installed in the differential carrier the differential bearing preload must be adjusted before the ring gear backlash is adjusted.

NOTE: Before checking bearing preload, make sure there is some backlash between the pinion and ring gear. Setting bearing preload without some backlash will result in a false bearing preload setting.

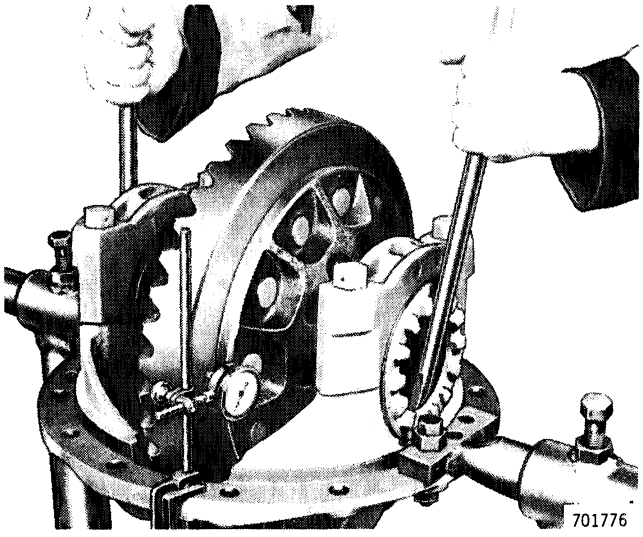


Figure 33 - Checking for End Play

1. Using a dial indicator on the backface of the ring gear, loosen the bearing adjusting nut on the backface side of the ring gear only. This adjusting nut must be loosened enough to notice end play on the dial indicator, Figure 33.

2. Tighten this same adjusting nut just enough to obtain no (zero) end play.

3. Turn the ring gear through several complete turns and check the runout. If runout is more than .008 inch (0.2 mm), remove the differential and check for cause.

   a. Bearing or bearing cup not installed correctly.

   b. Improperly tightened case halves or bearing cap bolts.

   c. Damaged bearing or bearing cup.

   d. Improperly installed ring gear.

4. After all end play has been removed and runout is at a minimum, the bearings must be preloaded. Tighten the adjusting nuts one notch each from zero end play. This will put the proper load on the bearings.

Adjusting Ring Gear Backlash

After the differential bearing preload has been adjusted, the backlash between the pinion and ring gear must be checked and adjusted.

1. The backlash must be checked with a dial indicator. Position the dial indicator as shown in Figure 34.

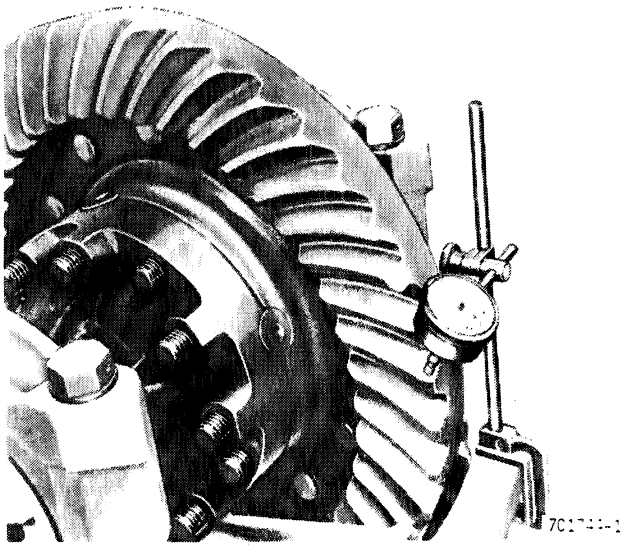


Figure 34 - Checking Backlash

2. The backlash for new ring gear and pinion is .010 inch (0.25 mm). If using old gears, use backlash reading obtained before diassembly.

3. With the dial indicator positioned as shown in Figure 34, prevent the pinion from turning and move the ring gear, noting reading on dial indicator.

TROUBLESHOOTING

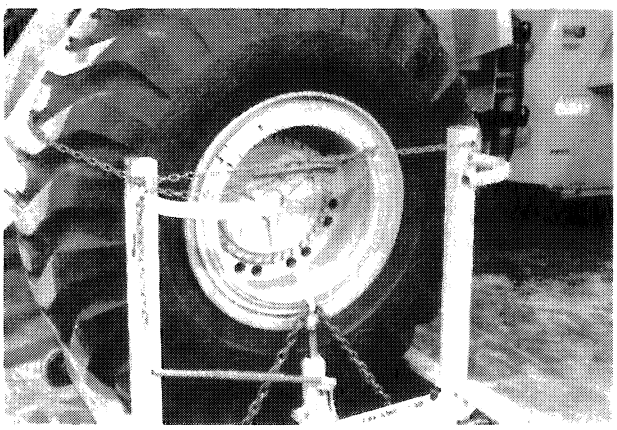
PROBLEM	POSSIBLE CAUSE	CORRECTION
Vibration	Damaged tires.	Replace damaged or worn tires.
	Damaged drive line components.	See Finding Noise and Vibration on page 6127-5.
	Loose pinion nut.	Tighten the pinion nut to 600 pound-feet (813 N m, 83 kg/m).
	Differential bearings not adjusted correctly.	Adjust the differential bearings according to the instructions on page 6127-50. Also check the backlash of the ring gear and pinion and tooth contact patterns.
	Worn or damaged bearings.	Replace bearings as necessary.
	Damaged gear teeth.	Install new gears.
Noise	Damaged drive line components.	See Finding Noise and Vibration on page 6127-5.
	Worn or damaged bearings.	Replace bearings as necessary.
	Worn or damaged gears.	Install new gears as necessary.
	Worn thrust washers.	Replace thrust washers. Check for damaged gears and other parts.
	Backlash of the ring gear and pinion not adjusted correctly.	Check the backlash of the ring gear and pinion according to the instructions on page 6127-51.
	Differential bearings not adjusted correctly.	Check the adjustment of the differential bearings according to the instructions on page 6127-50.
	Wheel bearings not adjusted correctly.	Check the wheel bearings and adjust according to the instructions on page 6127-60.
	Worn or damaged wheel bearings.	Replace wheel bearings.
Loss of lubricant	Damaged or worn seal for pinion shaft.	Replace seal.
	Loose cap screws that fasten the differential carrier to the axle housing.	Tighten the cap screws to the specifications on page 6127-3.
	Damaged differential carrier or axle housing.	Use new parts as necessary.
	Loose cap screws on the cover for the planetary.	Tighten the cap screws to the specifications on page 6127-3.

10. Tighten the two Allen screws in the inner race of the center bearing.

NOTE: *If a replacement bearing has been installed, install the locking collar and tighten the Allen screw in the locking collar.*

11. Connect the brake line to the tee fitting at the center of the front axle.

12. Install the wheels on the front axle.



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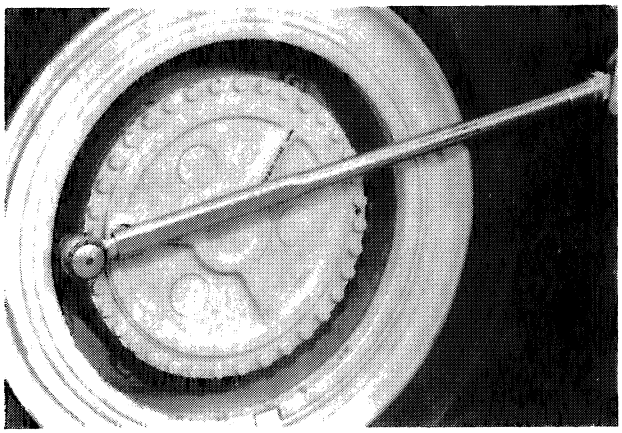
13. Tighten the wheel nuts evenly to 340 to 420 pound-feet (461 to 569 N m, 47 to 58 kg/m).



316842

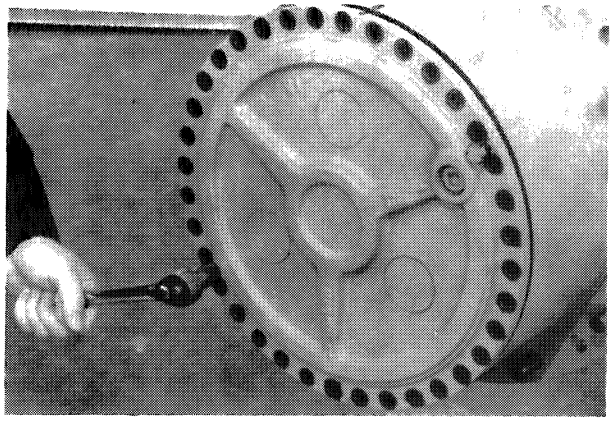
14. Raise the front of the machine and remove the supports. Lower the machine until the tires are on the floor.

15. See Section 7121 and remove the air from the brake system.

16. If the oil was drained from the axle, fill the axle with Case FDL Fluid. See page 6127-3 for the capacity of the axle.

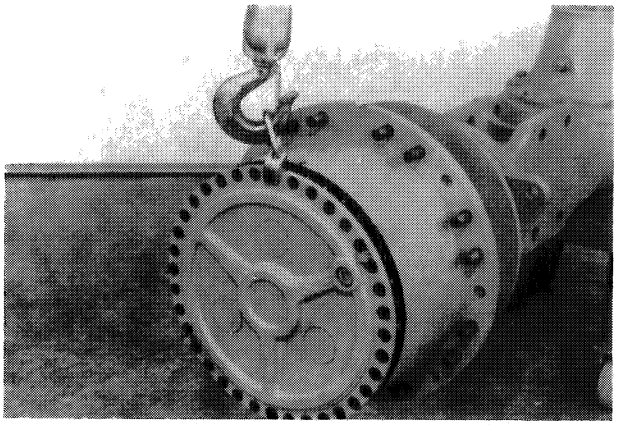
17. Check the torque of the wheel nuts and axle mounting nuts after every two hours of operation until the torque does not change.

7. Tighten the two cap screws evenly to push the planetary from the hub.



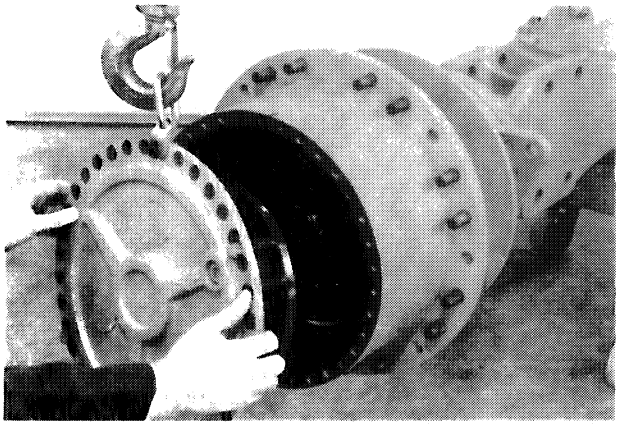
315724

8. Fasten lifting equipment to the planetary.



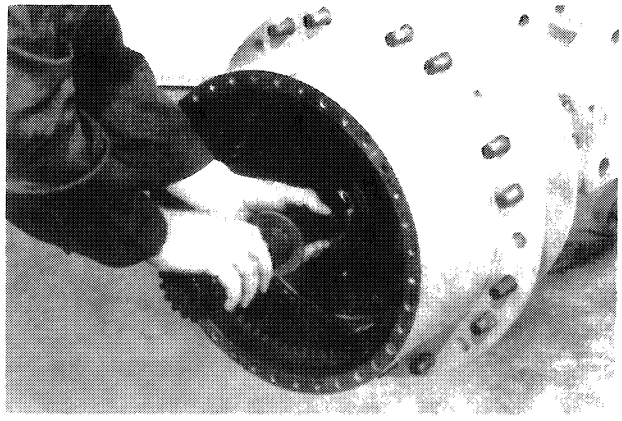
315725

9. Remove the planetary.



315727

10. Pull the axle shaft and sun gear out of the hub approximately one foot (305 mm).



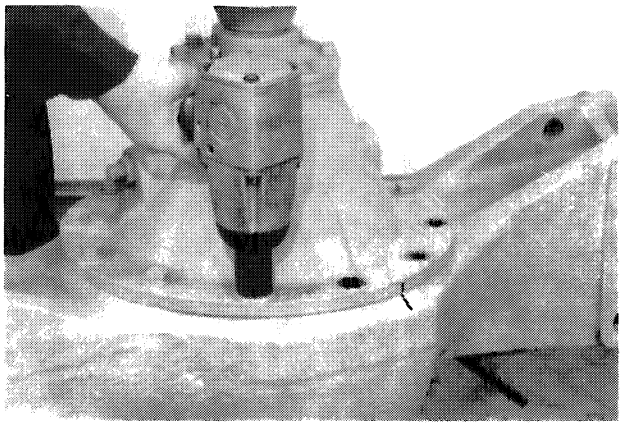
315728

11. Repeat steps 3 through 10 for the other end of the axle.

12. Make an alignment mark on the differential carrier and axle housing.

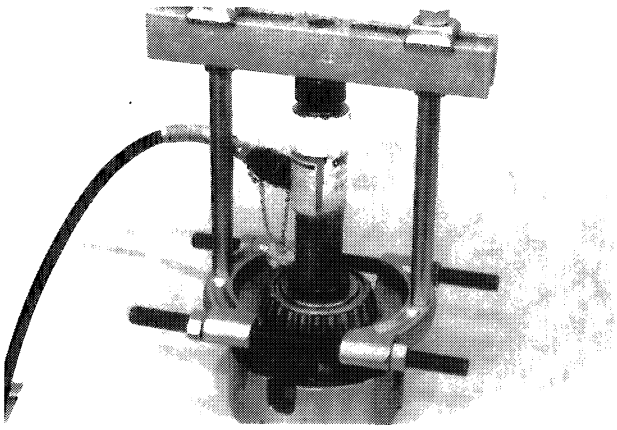
315730

13. Loosen and remove the cap screws and flat washers that fasten the differential carrier to the axle housing.



315731

a. Connect an acceptable puller to the bearing.

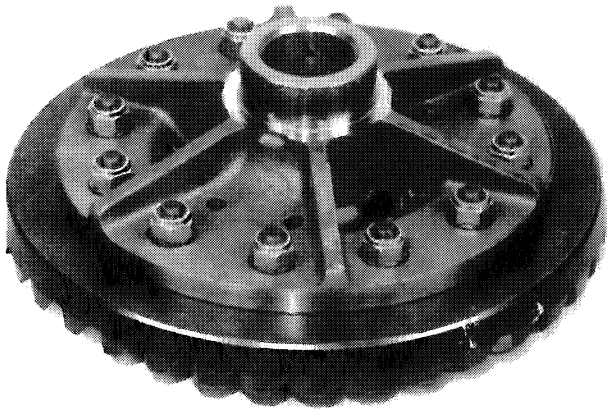


315928

b. Operate the puller to remove the bearing.

15. See Inspection on page 6127-40 and inspect the ring gear and pinio shaft. If the ring gear or pinion shaft is damaged, you must replace both the pinion shaft and ring gear. The pinion shaft and ring gear are a matched set. To replace the ring gear, do the following steps:

a. Loosen and remove the self-locking nuts, hardened washers and bolts that fasten the ring gear to the flange case half.



315812

b. Press the flange case half from the ring gear.

c. Be sure that there are no rough areas on the flange case half that will prevent the ring gear from fitting correctly.

d. Be sure that the flange on the flange case half is clean.

e. Be sure that the back face of the new ring gear is clean.

f. Put the new ring gear in an oven. Heat the ring gear to 300° F (149° C).

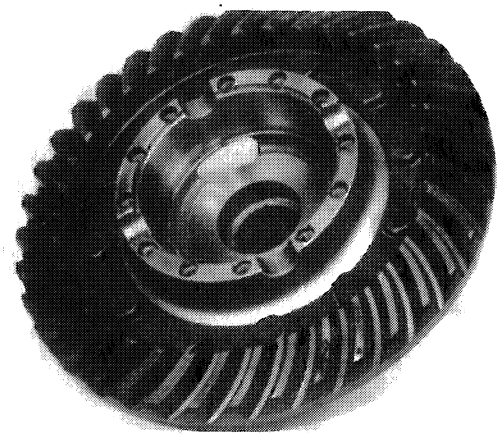
g. Install four new bolts in the flange case half. These bolts will be used as guides when you install the ring gear.

h. Put the flange case half on blocks that will hold the bolts in place.

WARNING: *Use insulated gloves or mittens when working with hot parts.* 47-41A

i. When the ring gear has been in the oven at the specified temperature for at least 10 minutes, remove the ring gear and install the ring gear on the flange case half. Do not use force to install the ring gear. If the ring gear does not fit, heat the ring gear again.

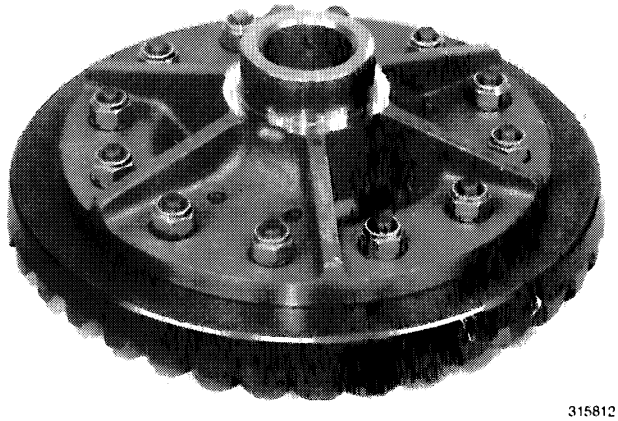
j. Remove the four bolts and install all bolts so that the heads of the bolts are on the tooth side of the ring gear.



315925

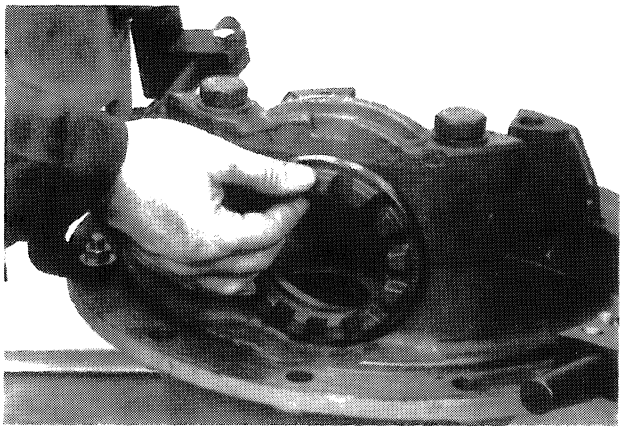
k. Install the hardened washers and new self-locking nuts.

l. Tighten the self-locking nuts to 230 to 280 pound-feet (312 to 379 N m, 32 to 39 kg/m).



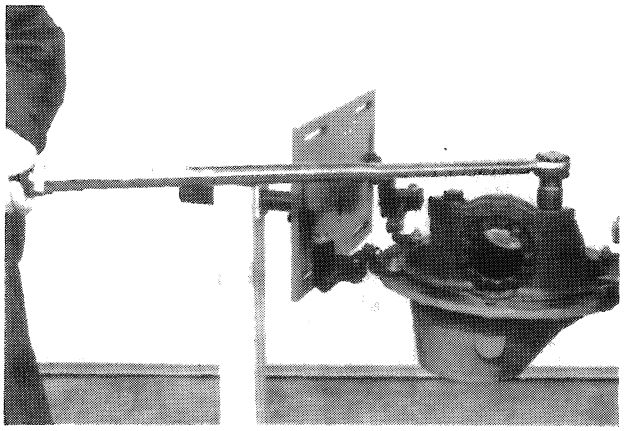
315812

3. Install the adjusting ring.



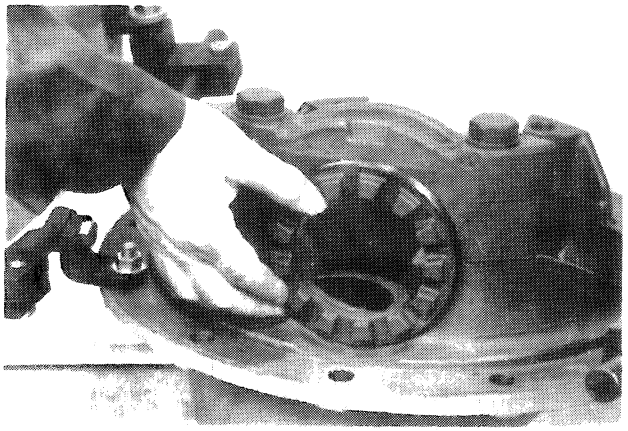
316641

4. Tighten the cap screws to 450 to 473 pound-feet (610 to 641 N m, 62 to 65 kg/m).



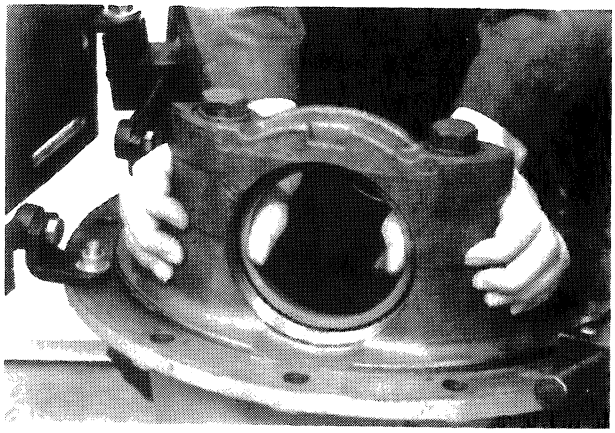
316642

5. Remove the adjusting ring.



316643

6. Check the fit of the bearing cup. If the bearing cup does not move easily, use emery cloth to remove material from the bearing cap and differential carrier so that the bearing cup moves easily.

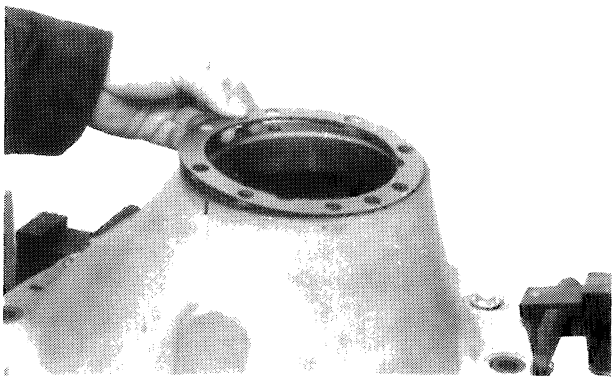


316644

7. Check the fit of the other bearing cup.

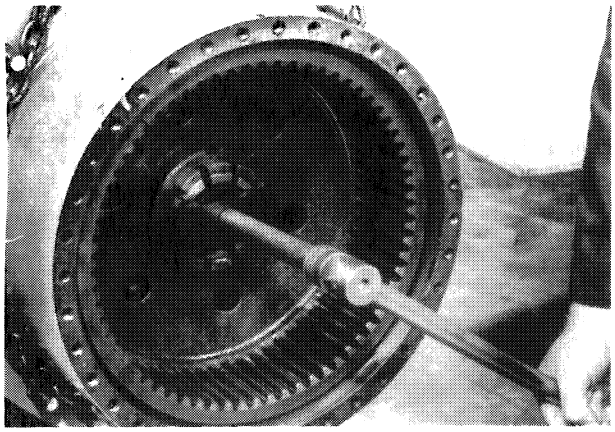
8. Loosen and remove the cap screws and flat washers. Remove the bearing caps and bearing cups.

9. Install the shims for the pinion cage. If the original ring gear and pinion shaft are used, use the shims that were removed. If the pinion shaft is new, install an additional .020 inch (0.50 mm) of shims.



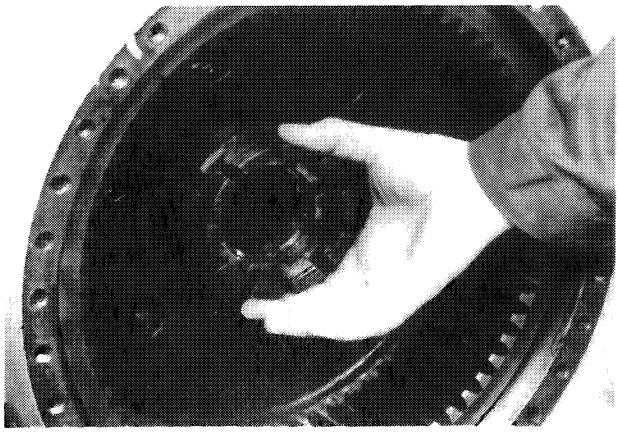
316601

21. Use the tool shown on page 6127-3 to loosen the wheel bearing nut.



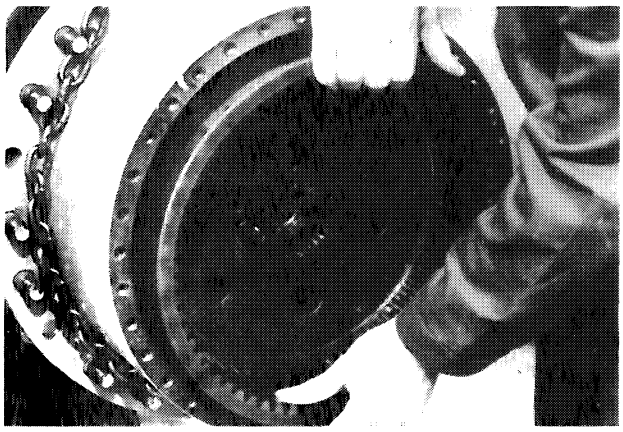
316243

22. Remove the wheel bearing nut.



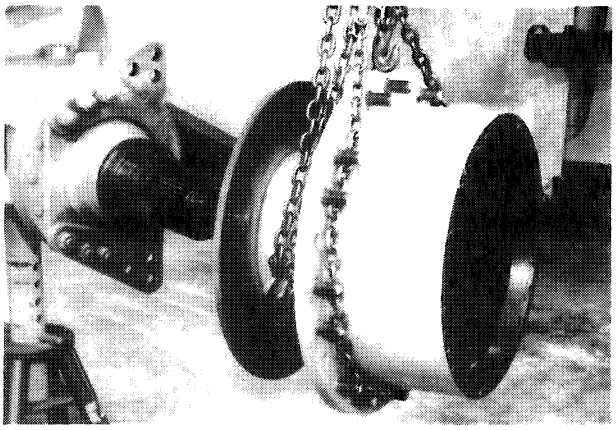
316244

23. Remove the ring gear and ring gear hub.



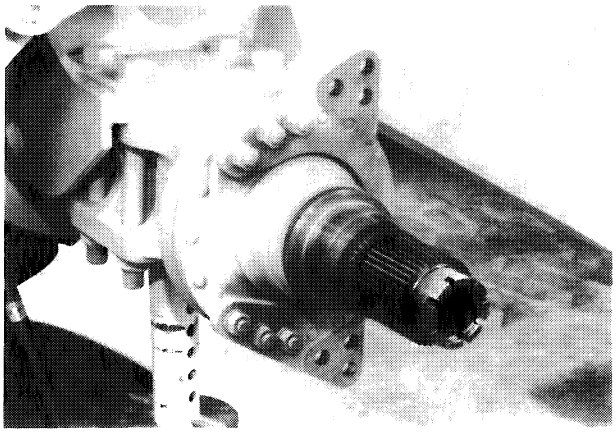
316201

24. Remove the hub and brake disc.



316203

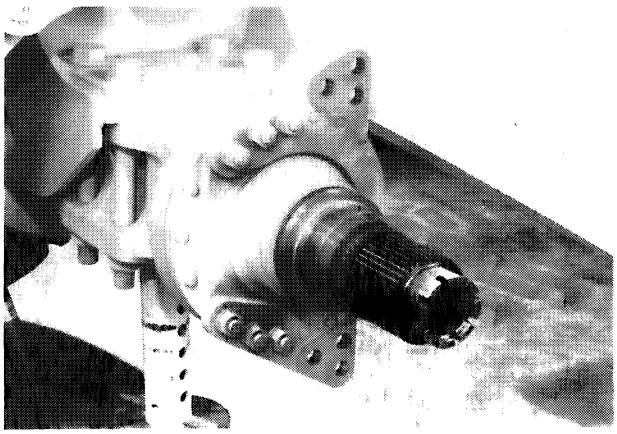
25. If the spindle must be replaced, loosen and remove the cap screws and flat washers. Remove the caliper mounting plate and the spindle.



316204

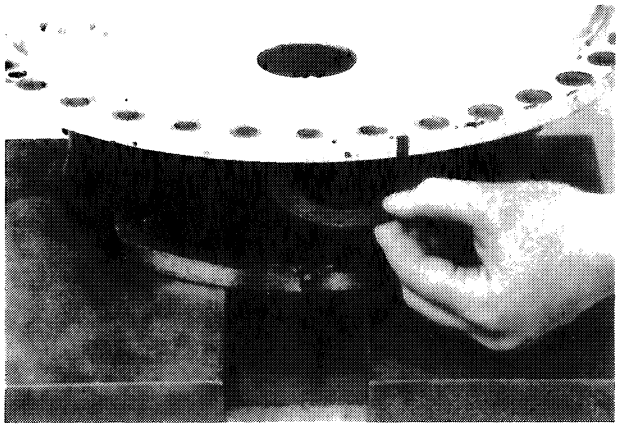
Installation

1. If the spindle was removed, install the spindle and caliper mounting plate. Tighten the cap screws and nuts to 470 to 494 pound-feet (637 to 669 N m, 65 to 68 kg/m).



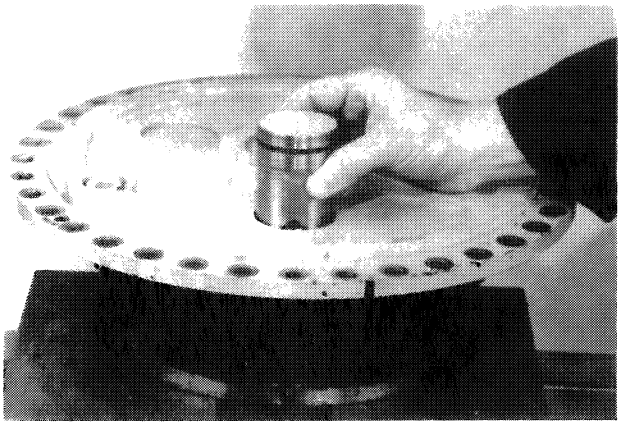
316204

14. Install the other thrust washer.



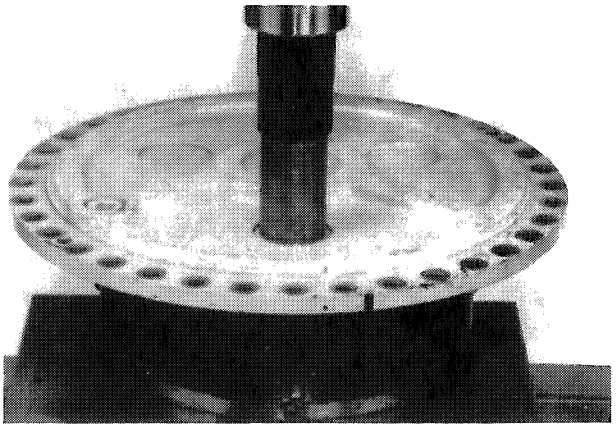
316342

15. Align the thrust washers and pinion gear with the hole in the planetary body. Lubricate the pinion shaft. Install the pinion shaft. Make sure that the flat side of the pinion shaft is toward the lock screw.



316344

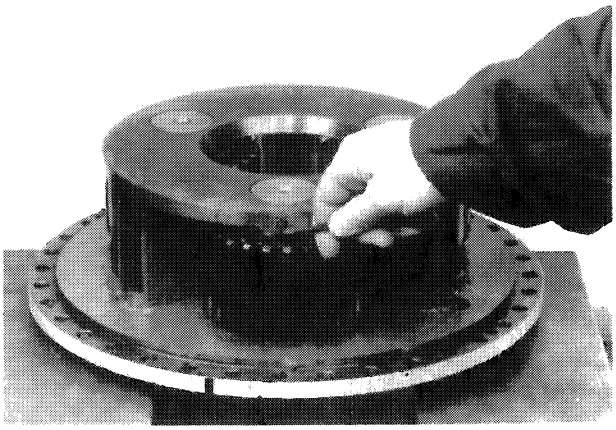
16. Press the pinion shaft into the planetary body until the other end of the pinion shaft is even with the planetary body.



316301

17. Use a similar procedure to install the other pinion gears, thrust washers, and pinion shafts.

18. Tighten the lock screws.



316333

Section 7103

AIR COMPRESSOR, GOVERNOR, AIR RESERVOIRS AND MOISTURE EJECTION VALVE

CASE CORPORATION

C.E. Div. 9-66871
October 1977

PRINTED IN U.S.A.

4. Remove the governor mounting cap screws with lockwashers. Remove the governor and gasket.

5. Bend the lock away from the connecting rod bolts. Remove the bolts, locks and rod caps.

6. Push piston and connecting rods out through top of cylinder block. Put rod caps on respective connecting rods.

7. Remove the piston rings from the pistons.

8. If pistons are to be removed from the connecting rods, remove the wrist pin lock wire and press the wrist pin from the piston and connecting rod.

9. Remove six cylinder block mounting cap screws with lockwashers. It may be necessary to tap cylinder block with a soft hammer to break the gasket seal. Remove the gasket.

10. Remove the air inlet elbow from cylinder block.

11. Remove unloader spring, spring saddle and spring seat from cylinder block.

12. Remove plunger and plunger guide from unloader piston. Then apply air pressure to the unloader port and remove unloader pistons from cylinder block.

13. Remove cap screws and bearing retainer from crankcase. Scrape off gasket.

14. Remove oil seal from bearing retainer and discard.

15. Remove cap screws and end cover from crankcase. Scrape off gasket and remove O-ring from end cover.

16. Press crankshaft and ball bearing from crankcase, then press ball bearing from crankshaft.

Inspection

CRANKSHAFT

Check crankshaft screw threads, keyways, tapered ends and all machined and ground surfaces for wear, scores, or damage. Crankshaft journals which are out of round more than .001 inch (8.03 mm) must be reground. Connecting rod bearing inserts are available in .010 inch (8.3 mm), .020 inch (8.6 mm) and .030 inch (0.9 mm) undersizes for reground crankshafts.

Make sure oil passages in crankshaft are open and clean.

CRANKCASE

Check the crankcase, end cover and bearing retainer for cracks and broken lugs. The crankshaft main bearings should be a tight press fit in the bearing bores. If the bearings are a loose fit, the crankcase must be replaced.

MAIN BEARINGS

A ball bearing is used on the drive end of the crankshaft. Check the bearing for freedom of movement, flat spots and bearing races for signs of cracking.

A bushing (sleeve bearing) is pressed into the opposite end cover. Inspect the bushing for scoring and excessive wear. Replacement bushings are available in the following sizes 1.381 inch (35 mm) - standard and 1.371 inch (34 mm), 1.361 inch (33 mm) and 1.351 inch (32 mm) undersize. When replacing the bushing, press bushing in until flush with end cover.

CONNECTING ROD BEARINGS

Worn or damaged rod bearings should be replaced. Inserts are available in .010 inch (0.3 mm), .020 inch (0.6 mm), and .030 (0.9 mm) undersized. Measure the crankshaft journal and order inserts so that the clearance between the journal and insert is .0003 inch (0.007 mm) to .0021 inch (0.05 mm).

Connecting rod caps are not interchangeable. The locking slots of the connecting rod and cap must be placed next to each other.

CYLINDER BLOCK

Cylinder bores which are scored or out of round by more then .002 inch (0.05 mm)

Removing and Installing the Auxiliary Air Reservoir

1. Remove dirt from the three hose connections to the auxiliary air reservoir.

2. Engage the parking brake.

3. Depressurize the main air reservoir as instructed in Section 7102. Open the drain valve on the bottom of the auxiliary air reservoir to release air pressure in the hydraulic reservoir and the auxiliary air reservoir.

4. Disconnect the three hoses connected to the auxiliary air reservoir.

5. Remove the nut and lock washer from the two auxiliary air reservoir clamp bolts. Then remove the bolts.

6. Open the clamps and remove the auxiliary air reservoir.

7. Install the auxiliary air reservoir in the reverse order of steps 4 through 6.

Air Reservoir Service

1. The auxiliary air reservoir must be drained after every 250 hours of machine operation. Open the drain valve on the bottom of the auxiliary air reservoir to remove any moisture.

2. A moisture ejection valve is connected to the bottom of the main air reservoir to remove moisture. It is recommended that the main air reservoir be drained manually when the auxiliary air reservoir is drained. Do this by pushing up on the pin in the bottom port of the moisture ejection valve.

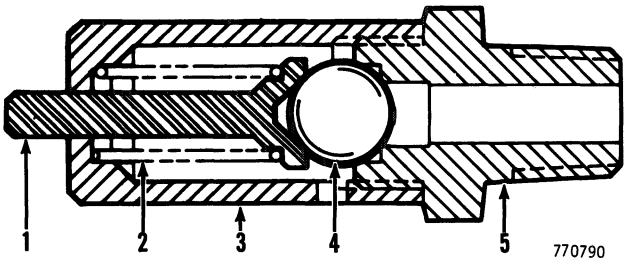
3. Depending on operating conditions and the condition of the air compressor, excessive sludge can accumulate in the reservoir. When this condition occurs have a radiator repair shop clean the reservoir.

4. If the reservoir is suspected of leaking and the leak cannot be located with normal operating pressure the reservoir must be sent to a repair shop that can safely test the reservoir.

SAFETY VALVE

General Information

The safety valve limits the air system pressure to 150 psi (1034 kPa) in case the air compressor governor fails to operate correctly. When air system pressure is greater than 150 psi (1034 kPa), the steel ball is pushed off its seat and air is allowed to escape to the atmosphere.



1. RELEASE PIN
2. SPRING
3. SPRING CAGE
4. STEEL BALL
5. BODY

Figure 20

It is recommended that the safety valve be disassembled and cleaned once a year. The safety valve is installed in the fitting at the rear of the main air reservoir.

Removing the Safety Valve

1. Depressurize the main air reservoir as instructed in Section 7102.

2. Loosen the safety valve without turning the fitting in the rear of the main air reservoir.

3. Remove safety valve from fitting.

Disassembly

1. Put the body of the safety valve in a vise with the spring cage up.

2. Loosen the spring cage. Then remove the cage for the spring from the body of the safety valve. The spring and

15. Make an alignment of the pedal and the mounting plate. Then install the pedal shaft part way.

16. Make an alignment of the hole in the pedal shaft and pedal. Then push the shaft into the pedal until the holes are in alignment. Push roll pin into hole to hold the pedal shaft in place.

Installation

1. Put the brake valve in the hole in the cab floor. Put the mounting bolts in the holes in the mounting plate. Put lock washers and nuts on the bolts and tighten the nuts.

2. Put Teflon tape on the pipe threads of the brake valve fittings and turn the fittings into the brake valve until tight.

3. If the left-hand brake valve was removed, use Teflon tape as a sealer and install the double check valve/stoplight switch. Connect wire to stoplight switch.

4. Connect the air lines to the brake valve fittings.

5. Start the engine and pressurize the air system. When the needle on the air pressure gauge stops moving, stop the engine and check for air leaks. Also do the Operating Test and the Leakage Test.

Brake Valve Tests

The following test must be made after the brake valve has been rebuilt. The tests are useful to determine if a brake valve is in need of repairs.

Operating Test

1. Remove one of the pipe plugs from the top ports in the brake valve and install a 1/2-1/8 NPT reducer (part no. 221-54).

2. Connect an accurate pressure gauge that will indicate at least 150 psi (1034 kPa) to the reducer.

3. Start the engine and run 1000 rpm (r/min). Push the brake pedal down slowly and look at the pressure gauge. The pressure gauge must indicate increasing pressure as the brake pedal is pushed down.

4. Run the engine at 1000 rpm (r/min) until the air pressure gauge needle stops moving. Then stop the engine. The pressure gauge must indicate the pressure in the main air reservoir; approximately 125 psi (861 kPa).

Leakage Test

1. With the brake pedal fully released, put a soap solution on the brake valve exhaust port (opening at bottom of brake valve). There must be no indication of air leaking.

2. Have another person hold the brake pedal all the way down. Put a soap solution on the brake valve exhaust port. There must be no indication of air leaking.

3. If a rebuilt brake valve fails step 1 and/or 2, it means:

   a. An O-ring was damaged when the valve was assembled.

   b. A damaged part was overlooked during inspection.

4. If a brake valve that has been in use for some time fails step 1 and/or 2, the brake valve must be repaired or a new brake valve must be installed.

5. Remove the poppet spring and spring seat from the body.

6. Remove the O-ring from the bore in the body.

Inspection

1. Clean the metal parts in cleaning solvent. Clean the plastic parts with a clean, dry cloth.

2. Inspect the springs for distortion and signs of cracks. If a spring requires a replacement, the complete pressure reducing valve must be used.

3. Inspect the plastic parts for damage that will result in air leakage or poor operation. Replacement parts are available, see the parts catalog.

4. It is recommended that new O-rings be used.

Assembly

1. Put a light coat of Lubriplate or other suitable lubricant on the O-rings, piston and poppet bores in the body, and on the O.D. of the piston.

2. Put the O-ring in the bore of the body.

3. Put the spring seat and poppet spring in the bore in the body.

4. Put the poppet guide on the poppet. Then put this assembly on top of the poppet spring.

5. Put a new O-ring on the piston. Put the piston on top of the poppet guide. Push down on the piston until a "click" is heard.

6. Put the pressure regulating spring on top of the piston.

7. Turn the cover assembly onto the body until it is tight.

8. Check and adjust the pressure setting of the pressure reducing valve.

Pressure Check and Adjustment

1. Open the drain valve on the bottom of the auxiliary air reservoir to release air from the auxiliary air reservoir. Then close the drain valve.

2. If you are checking the adjustment of the pressure reducing valve for the hydraulic reservoir:

   a. Remove one of the Allen head plugs from the pressure reducing valve.

   b. Connect a 0-150 psi (0-1034 kPa) pressure gauge to the pressure reducing valve.

3. If you are checking the adjustment of the pressure reducing valve for the loader control levers and the machine does not have the small valve to the left of the pressure reducing valve, Figure 2:

   a. Remove an elbow or the straight connector from the pressure reducing valve.

   b. Connect a 0-150 psi (0-1034 kPa) pressure gauge to the pressure reducing valve.

4. If checking the adjustment of the pressure reducing valve for the loader control levers and the machine has the small valve to the left of the pressure reducing valve shown in Figure 2, use a tire pressure gauge to check the pressure setting of the pressure reducing valve.

5. Pull the cap on the pressure reducing valve away from the body to unlock the adjusting screw. Then turn the cap clockwise to close the pressure reducing valve.

6. Start the engine and run at 1000 rpm (r/min) until the needle on the air pressure gauge stops moving. Then stop the engine.

7. Slowly turn the cap on the pressure reducing valve counterclockwise while looking at the pressure gauge. Turn the

General Information

When the outside temperature falls below 32° F (0° C), the brake system can fail to work because of frozen moisture in one or more components of the air system. The purpose of the alcohol evaporator is to provide an alcohol vapor that can be pulled into the brake system.

There are two Teflon tubes connected between the air compressor and the alcohol evaporator. One tube is connected to the air compressor inlet and the other tube is connected to a port in the governor for the air compressor. When the air compressor is compressing air, there is vacuum at the air compressor inlet. This vacuum pulls an alcohol vapor made by air passing through the alcohol into the air compressor. The alcohol vapor is mixed with the pressurized air that is held in storage in main and auxiliary air reservoirs for delivery to the components of the air system to prevent any moisture in the air system from becoming ice.

The check valve (item 5, Figure 1) is connected to the governor by a Teflon hose. The check valve closes when the compressor is not operating and prevents usage of alcohol.

Trouble Shooting

If the jar of the alcohol evaporator is plastic, remove it and use a glass Mason jar. Put the alcohol in the glass jar and turn the glass jar into the body of the alcohol evaporator.

Start the engine and run at low idle. Make a reduction in the pressure in the main air reservoir to make the air compressor compress air by applying and releasing the foot brakes until the needle on the air pressure gauge is about 1/8 inch (3 mm) away from the red zone.

Air bubbles must be seen in the alcohol while the air compressor is compressing air.

If air bubbles are not present, check to make sure that the jar, fill plug and hose connections are tight. Check again to see if bubbles are present in the alcohol. If this does not correct the problem, remove and disassemble the alcohol evaporator to find the cause.

Removal and Installation

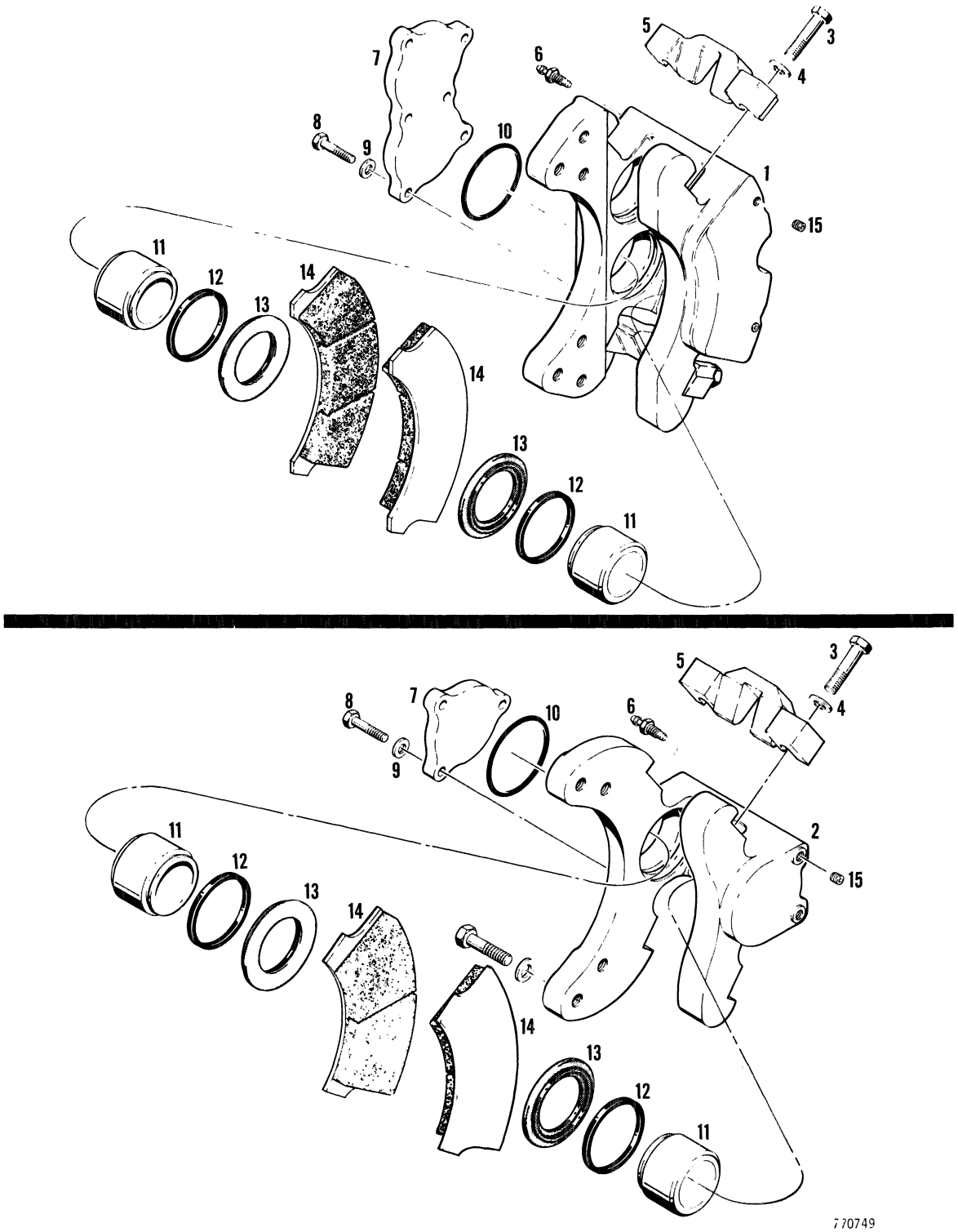
1. Disconnect the tubes at the alcohol evaporator.
2. Remove the nuts and lock washers from the three mounting bolts and remove the alcohol evaporator from the mounting bolts.
3. Reverse steps 1 and 2 to install the alcohol evaporator.

Disassembly

1. Remove the jar and put the jar out of the way. Remove the gasket from the body.
2. Remove the snap ring that holds the filter in place. Then remove the filter.
3. Remove the check valve assembly from the body.
4. Remove the cap from the housing. Remove the check valve from the cap and the spring from the housing.
5. Remove the tube from the body. Remove the sealing ring from the tube.

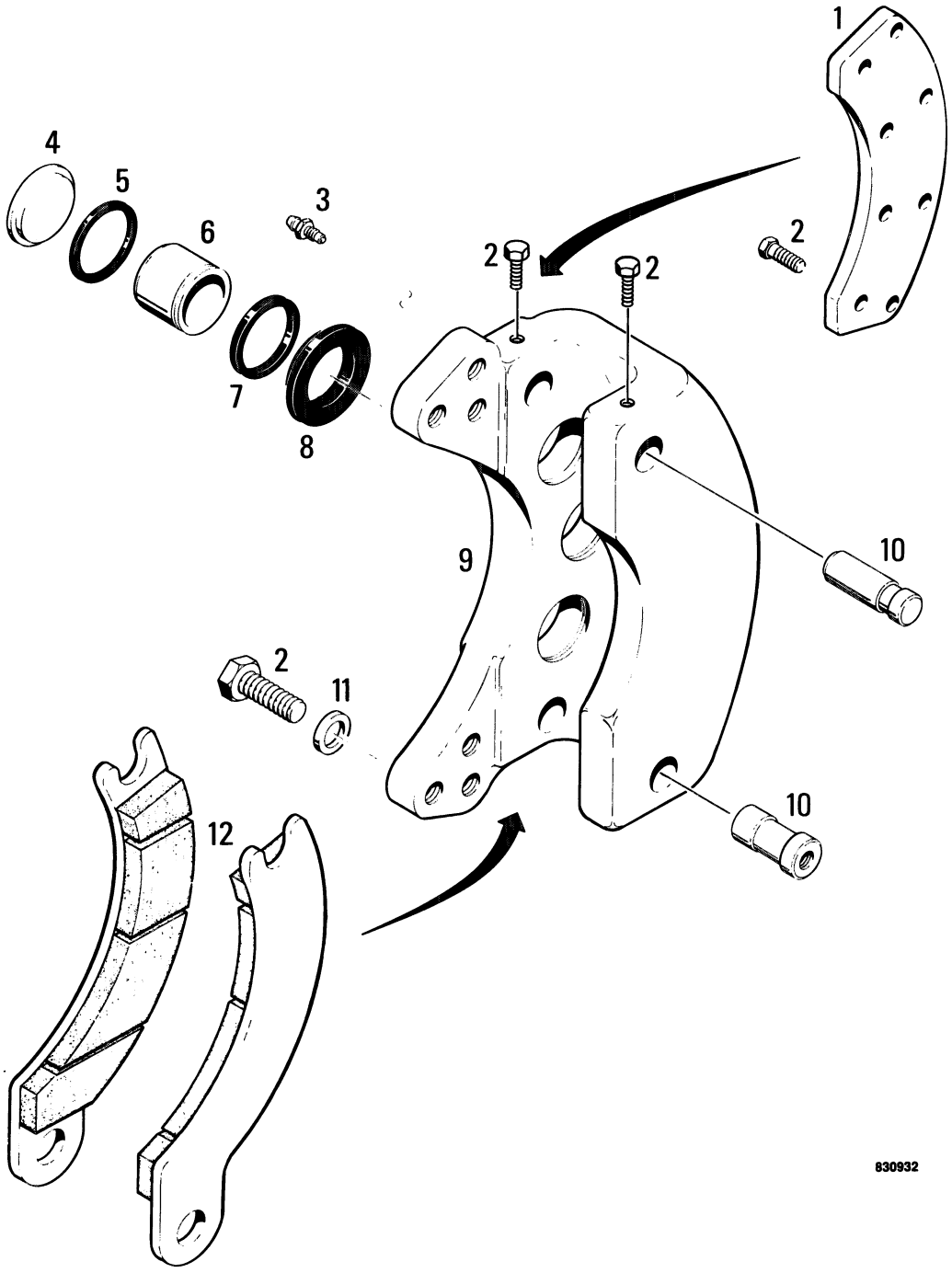
Inspection

1. Clean all metal parts in cleaning solvent. Wipe the rubber parts with a clean, dry cloth.
2. Make sure the inside of the tube is clean and the hole at the bottom of the tube is open.
3. Inspect the rubber parts for damage and deterioration.
4. Inspect the seat on the check valve and in the housing for wear and damage that will keep the check valve from sealing against the housing.



1. 4 PISTON BRAKE CALIPER
2. 2 PISTON BRAKE CALIPER
3. GRADE 8 CAP SCREW
4. HARDENED WASHER
5. BRAKE SHOE RETAINER
6. VENT SCREW
7. COVER
8. CAP SCREW
9. FLAT WASHER
10. O-RING
11. PISTON
12. PISTON SEAL
13. RUBBER COVER
14. BRAKE SHOE
15. PLUG

Two and Four Piston Calipers



1. *Cover*
2. *Cap Screw*
3. *Air Removal Screw*
4. *Plug. Used On Cover Side Only.*
5. *Gasket. Used On Cover Side Only.*
6. *Piston*
7. *Seal*
8. *Boot*
9. *Body*
10. *Retaining Pin*
11. *Flat Washer*
12. *Brake Shoes*

Six Piston Caliper

Section 8002

HYDRAULIC DIAGRAM

MAINTENTENANCE

TROUBLE SHOOTING

PRESSURE CHECKS

CASE CORPORATION

C. E. Div. 9-66872
June 1978

PRINTED IN U.S.A.

TROUBLE SHOOTING

Poor Operation of a Single Circuit

If only one circuit is performing poorly the problem is in that circuit. Possible causes are worn cylinder packing, secondary relief valve (if used) setting too low or leaking, leaking load check valve or worn spool or spool bore.

CHECK	DETAILED INSTRUCTIONS
1. Check cylinder packing.	1. Loosen the fill cap on the hydraulic reservoir to relieve air pressure. With the fill cap loosened, make these checks:
a. Loader lift cylinder.	a. Raise loader arm to full height and block in place. Disconnect tube at rod end of each cylinder, loosen clamp and slide tube away from fitting. Install plug 218-779 in end of each tube. Start engine and run at full throttle. Move control lever to the Raise position. Hold in place and check for leakage at each cylinder. Any leakage indicates worn packing and repair of that cylinder. Checking leakage in the opposite direction can not be done unless the pistons are prevented from bottoming in the cylinder. In almost all cases, leakage in one direction will result in leakage in the opposite direction.
b. Loader bucket cylinder.	b. Raise loader arm, completely dump bucket and rest bucket on the floor. Disconnect hose at rod end or each cylinder. Install cap 218-758 on end of each hose. Start engine and run at full throttle. Move control lever to the Dump position, hold in place and check for leakage. Any leakage indicates worn packing and repair of that cylinder. Checking leakage in the opposite direction can not be done unless the pistons are prevented from bottoming in the cylinder. In almost all cases, leakage in one direction will result in leakage in the opposite direction.
c. Clam cylinders (if equiped).	c. Close the clam. Stop the engine. Disconnect hose at rod end of each cylinder. Install cap 218-758 on end of each hose. Start engine and run at full throttle. Move control lever to the Close position, hold in place and check for leakage. Any leakage indicates worn packing and repair of that cylinder. Checking leakage in the opposite direction can not be done unless the pistons are prevented from bottoming in the cylinder. In almost all cases, leakage in one direction will result in leakage in the opposite direction.
2. If no leakage was found, or cylinder was repaired and circuit still operates poorly, check secondary relief valve if in the circuit.	2. One or more secondary relief valves are located in the bucket, lift, and clam circuits. Refer to Figure 1 and Testing Secondary Relief Valves with a Hand Pump in this section and check the pressure setting of the relief valve(s).

5. Start the engine and do Test No. 2 again. Stop the engine. If the pressure is not as specified, adjust the pressure again by turning the adjusting screw.

6. Repeat step 5 until the unloading pressure is as specified. Tighten the lock nut. Install the cap.

If Correct Adjustment is Not Possible

If you cannot make a correct adjustment after repeated testing and adjusting, the unloading valve must be replaced.

1. Apply a vacuum to the hydraulic reservoir with a vacuum pump.
2. Remove the unloading valve from the pump.
3. Remove the O-rings and backup ring from the plug and spool. Replace them with new parts.
4. Inspect the spool for score marks, damage and wear. Replace the spool if necessary.
5. Inspect the pilot plunger and its seat.Replace them with new parts if damaged or worn.
6. Check for dirt that can prevent movement of the spool and pilot plunger. If you find dirt or sludge, remove it completely.
7. Check the springs for damage. Replace them if necessary.
8. Assemble the unloading valve. Install the pump and do Test No. 2 again.

Flowmeter Testing

This test determines the efficiency of the loader pump, steering pump and demand pump. Do tests 1 and 2 and make adjustments as required before doing this test.

The flowmeter simulates the load conditions met during operation of the loader and steering system and measures the temperature, volume and pressure of the oil passing through the flowmeter.

By interpreting these measurements as described on the following pages, pump, valve and cylinder faults can be identified.

NOTE: A check sheet will be found on pages 8002-40 to 8002-43 that can be copied on any office copier.

Test procedure consists of:

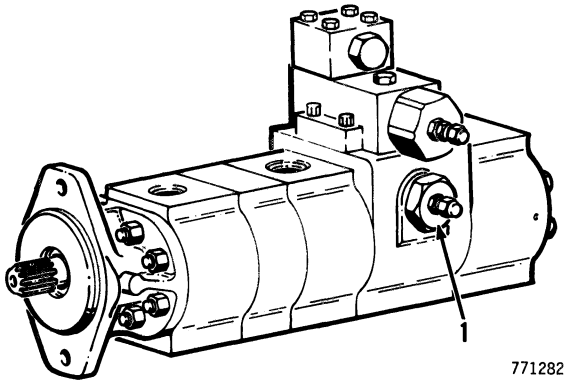
1. First, learning how much oil each pump delivers to the system at no load.
2. Then, by operating each pump at the same speed but against a pressure of 2000 psi (13 789 kPa), finding out how much oil is unavailable for work because it is:
   a. Not delivered by the pump, due to an air leak or restriction in the suction line.
   b. Not delivered by the pump, due to internal damage or wear in the pump.
3. If the pump output is within specifications, the circuit is tested to find leakage in the valves and cylinders.

Before you hook up the flowmeter,make sure all the checks described under Poor Operation of All Circuits, page 8002-13, have been done. Be sure to check the condition of the filters in the hydraulic reservoir. The tests to follow are done with the hydraulic reservoir open to atmosphere, therefore, the filters must be clean.

Test No. 3 - Loader Tests

Loader Pump Efficiency Test

1. Rest the loader bucket on the floor.
2. Apply a vacuum to the hydraulic reservoir with the vacuum pump.
3. Install the CAS-1451 spacer shown in Figure 4 in the demand valve to keep demand valve spool from moving during the test.
   a. Remove the large plug with acorn nut and adjusting screw from spool bore, Figure 14.



1. REMOVE THIS PLUG

Figure 14

3. Connect the flowmeter to the demand section of the pump as shown in Figure 21. Open the flowmeter load valve.

4. Start the engine and run at full throttle.

5. Check the setting of the unloading valve:

   a. Gradually close the flowmeter load valve. Watch the flow gauge; the volume will slowly drop as the load increases. At the crack point the volume will start to decrease more rapidly. At this point, stop closing the load valve and read the pressure gauge. The pressure reading is the crack point of the unloading valve. This pressure must be no less than 2050 psi (14 134 kPa) to permit you to make an accurate efficiency test of the demand pump.

   b. Continue to close the load valve. When the volume drops to zero or very near zero, read the pressure gauge. This pressure is the setting of the unloading valve. Open the flowmeter load valve and stop the engine.

   c. If the pressure is not correct, adjust the unloading valve as instructed on page 8002-22.

Demand Pump Efficiency Test

1. Open the load valve and start the engine.

2. Run the engine at 2200 rpm (r/min). Record the reading from the flow gauge.

3. Hold the bucket control lever in Rollback position. Close the load valve until the pressure gauge indicates 2000 psi (13 790 kPa). Adjust the engine speed if required. Record the reading from the flow gauge.

4. Open the load valve and stop the engine.

Section 8003

HYDRAULIC POWER ASSIST

Remote Control Valves

Accumulator

Pressure Reducing Valve

CASE CORPORATION

9-66871
December 1980

PRINTED IN U.S.A.

CHECK	DETAILED INSTRUCTIONS
	d. The system has overheated severely if the oil is dark, thick or smells scorched. If the oil is found to be contaminated, the oil must be replaced and the filter changed. See Cleaning the Hydraulic System in Section 8002. After replacing the oil, check pump output with a flowmeter to determine how much damage, if any, the pump has sustained from the bad oil.
8. Check the type of oil used in the system.	8. If possible, learn the type of oil used. If it is not Case TCH oil or an approved substitute (see Section 1050), replace the oil.
9. Test and adjust the pump.	9. Refer to Section 8002 for test procedure.

Loader Control Valve

SYMPTOM	POSSIBLE CAUSE	REMEDY
End caps leak oil externally	Loose end cap retaining screws or defective O-ring or seal retainer.	Tighten end cap screws or replace O-ring or seal retainer if necessary.
Spool does not return to neutral	Centering spring in end cap(s) broken.	Replace spring.
	Bent spool.	Replace valve section.
	Damaged spool bore.	Replace valve section.
	Warped valve.	Loosen valve mounting bolts and shim at low spot.
Sluggish operation	Incorrect main relief valve setting.	Check and adjust relief valve.
	Remote control circuit pressure reducing valve setting incorrect.	Check and adjust setting pressure reducing valve as instructed on page 8003-21.
	Main relief valve leaking internally.	Disassemble valve and check for defective seating surfaces, O-rings and broken poppet spring.
	Excessive clearance between spool and spool bore.	Replace control valve.
	Spool not properly positioned.	Remove end caps and check for broken springs.
	Bucket circuit: Regeneration mechanism within spool worn, damaged, or dirty.	Disassemble valve. Clean and repair as required.

4. Remove six screws and washers securing console outside cover to control console tower. Remove console outside cover, Figure 15.

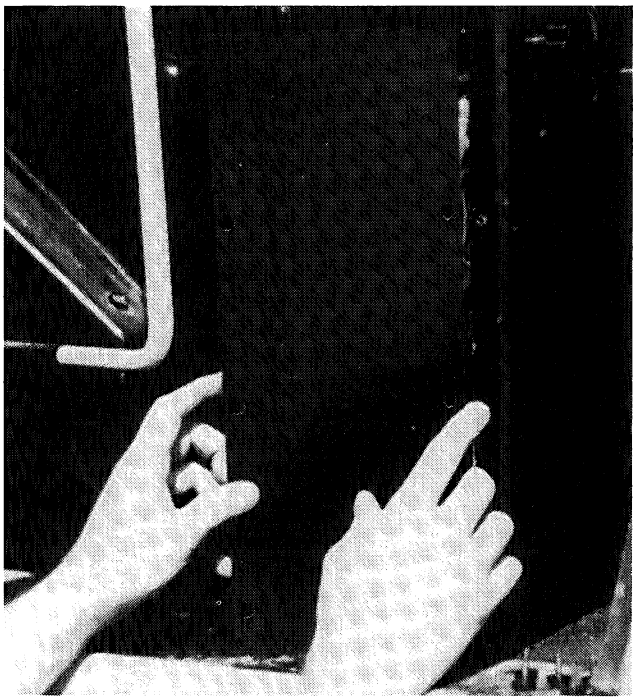


Figure 15

5. Loosen, but do not remove, two cap screws securing double lever remote control valve to control console tower; these two screws are towards front and rear of machine. Remove two remaining cap screws, lockwashers and nuts and remove boot retainer rings, Figure 16.

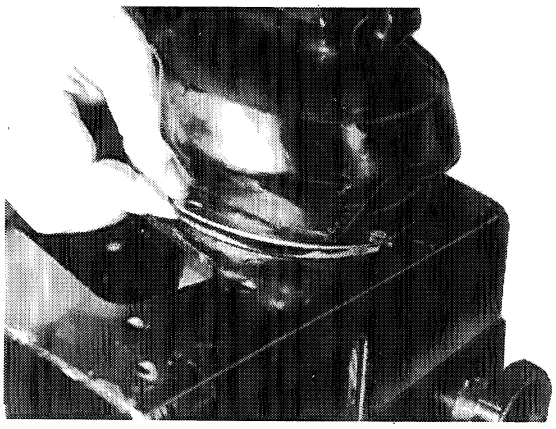
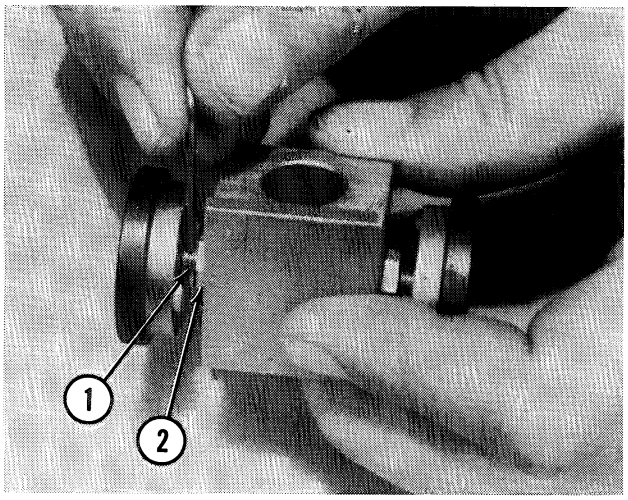


Figure 16

6. Remove two control knobs from control levers and carefully remove boot.

7. Loosen lock nut on disc mount, Figure 17. Insert small punch or pin into hole in special screw securing disc to mount. Turn special screw counterclockwise using punch or pin until one screw thread is between hole in special screw and lock nut when lock nut is tightened.



1. Special Screw 2. Lock Nut

Figure 17

8. Turn key switch to On position; do not start engine.

9. Place control lever in detent position and check that lever stays in detent. If necessary, loosen lock nut, insert small punch or pin into hole in special screw and turn special screw clockwise one revolution at a time and checking if lever stays in detent. When control lever stays in detent, tighten lock nut while holding special screw with punch or pin. Remove small punch or pin from special screw.

10. Turn key switch to Off position and repeat steps 7 through 9 above for remaining detents.

11. Carefully reinstall boot by slipping boot over control levers and pulling it down. Reinstall two control knobs and position boot retainer rings.

14. Remove Allen head screw securing solenoid to mounting bracket, Figure 48. Remove solenoid.

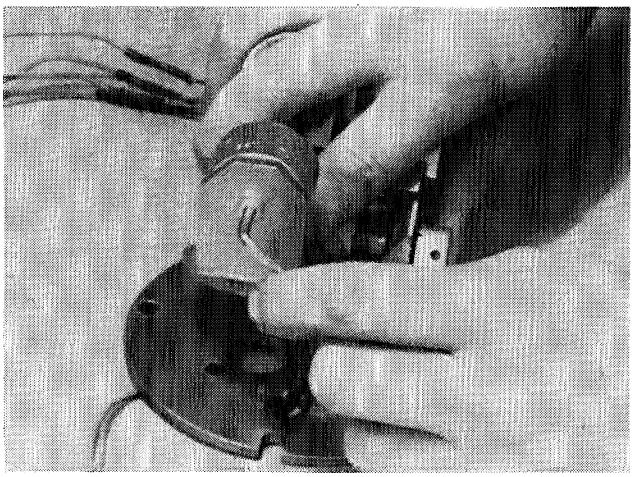


Figure 48

15. Remove one Allen head screw and remove solenoid mounting bracket from pivot bracket plate, Figure 49.

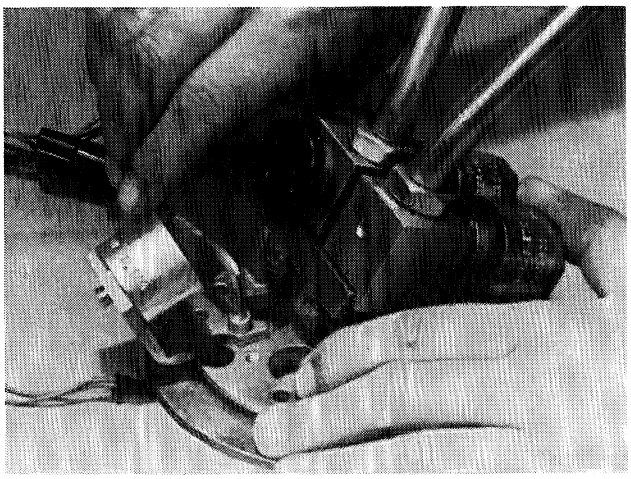
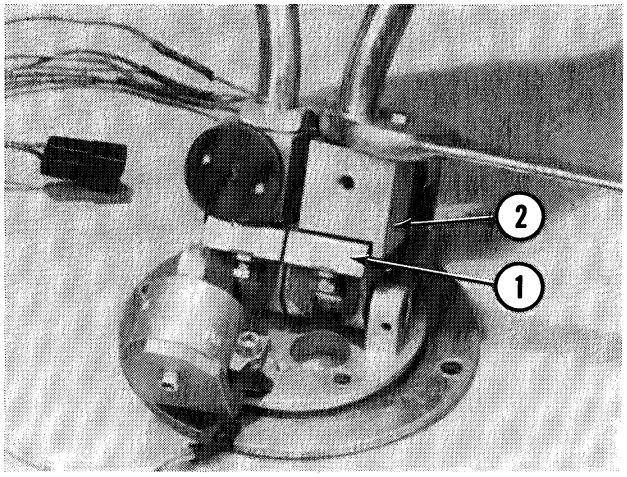


Figure 49

16. Perform steps 14 and 15 above to remove remaining solenoids and mounting brackets if necessary.

17. Loosen nut and remove control lever by unscrewing it from lever pivot, then remove disc mount, Figure 50.

NOTE: If discs or special screw requires replacement, proceed to step 19 below; it is not necessary to remove disc mount to replace these parts.

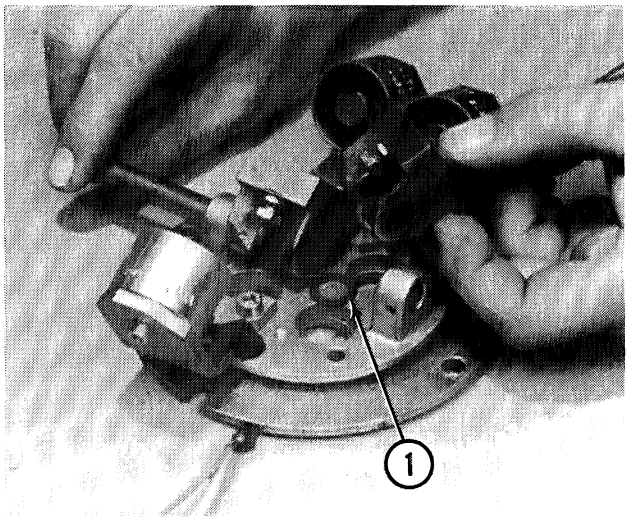


1. Lever Pivot 2. Disc Mount

Figure 50

18. Perform step 17 to remove remaining control lever and disc mount.

19. Remove roll or cotter pin. Withdraw shaft and remove lever pivots and spacer, Figure 51.

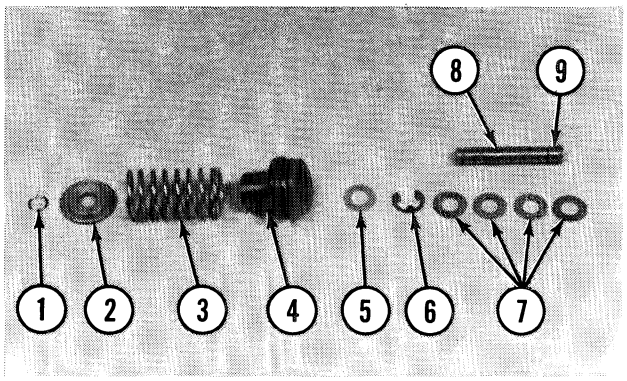


1. Spacer

Figure 51

5. Depress spring and remove top snap ring. Remove spring retainer and spring, then pull guide bushing from guide stud, Figure 78.

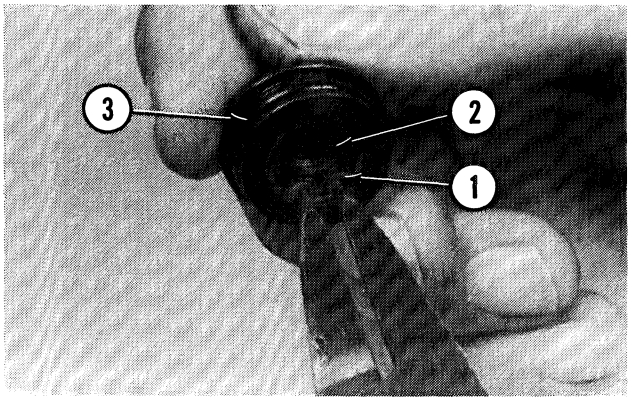
6. Remove top shim spacer(s) from guide stud; record thickness and number to aid in reassembly. Remove snap ring and remove lower shim spacer(s). Record thickness and number to aid in reassembly. Refer to Figure 78.



1. Top Snap Ring
2. Spring Retainer
3. Spring
4. Guide Bushing
5. Top Shim Spacer
6. Snap Ring
7. Bottom Shim Spacers
8. Guide Stud
9. Snap Ring

Figure 78

7. Remove retaining ring from guide bushing recessed bore, Figure 79. Remove and discard stud seal. Pry O-ring from groove in guide bushing and discard O-ring.



1. Retaining Ring 2. Stud Seal 3. O-ring

Figure 79

8. Remove upper spring and spacer from valve body by tipping valve body over and letting these parts fall into your hand, Figure 80.

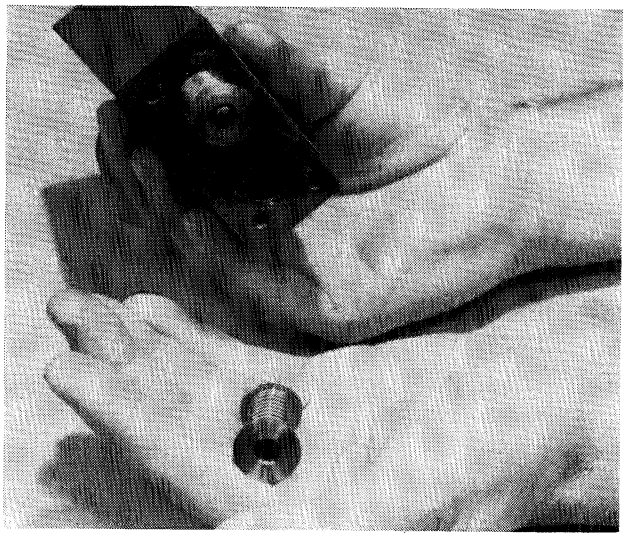


Figure 80

9. Remove retaining ring from valve body bottom port. Remove guide washer and spring.

10. Remove washer and spool using mechanic's wire inserted through top of valve, Figure 81.

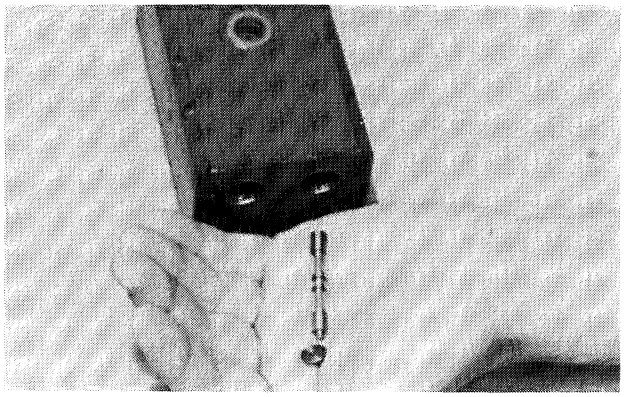


Figure 81

11. Perform steps 4 through 10 above for remaining valve bore. Be careful not to intermix parts.

12. Loosen nut and unscrew and remove control lever from lever pivot.

13. Remove cotter pin. Remove pivot pin and lever pivot.

Installation

1. Install new O-ring on elbow. Install elbow in accumulator port, Figure 108.

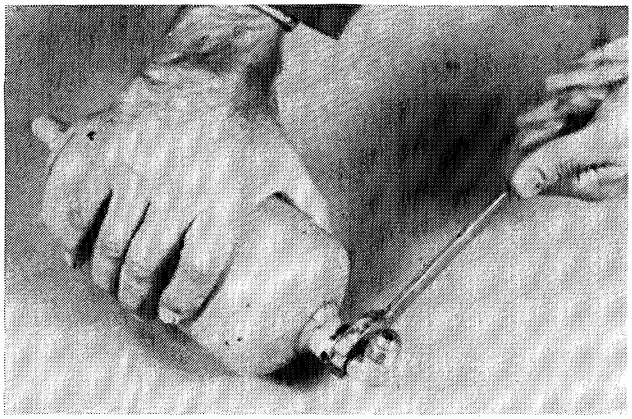


Figure 108

2. Insert accumulator through clamp on bracket with charging valve towards front of machine while connecting tube fitting to accumulator. Tighten clamp to secure accumulator, Figure 109.

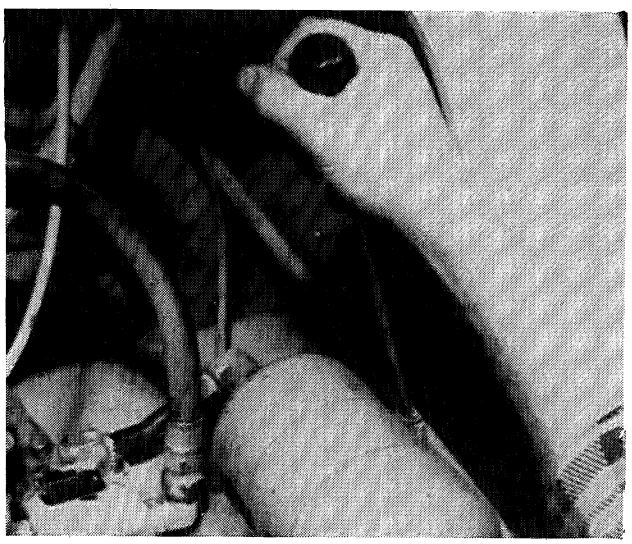
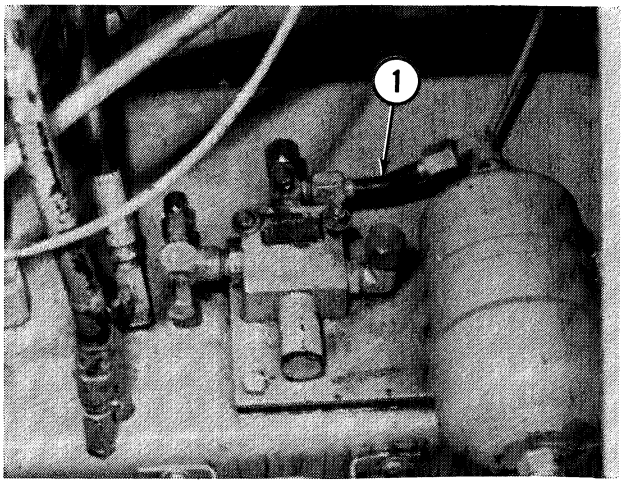


Figure 109

3. Tighten tube fitting, Figure 110.



1. Tube Assembly

Figure 110

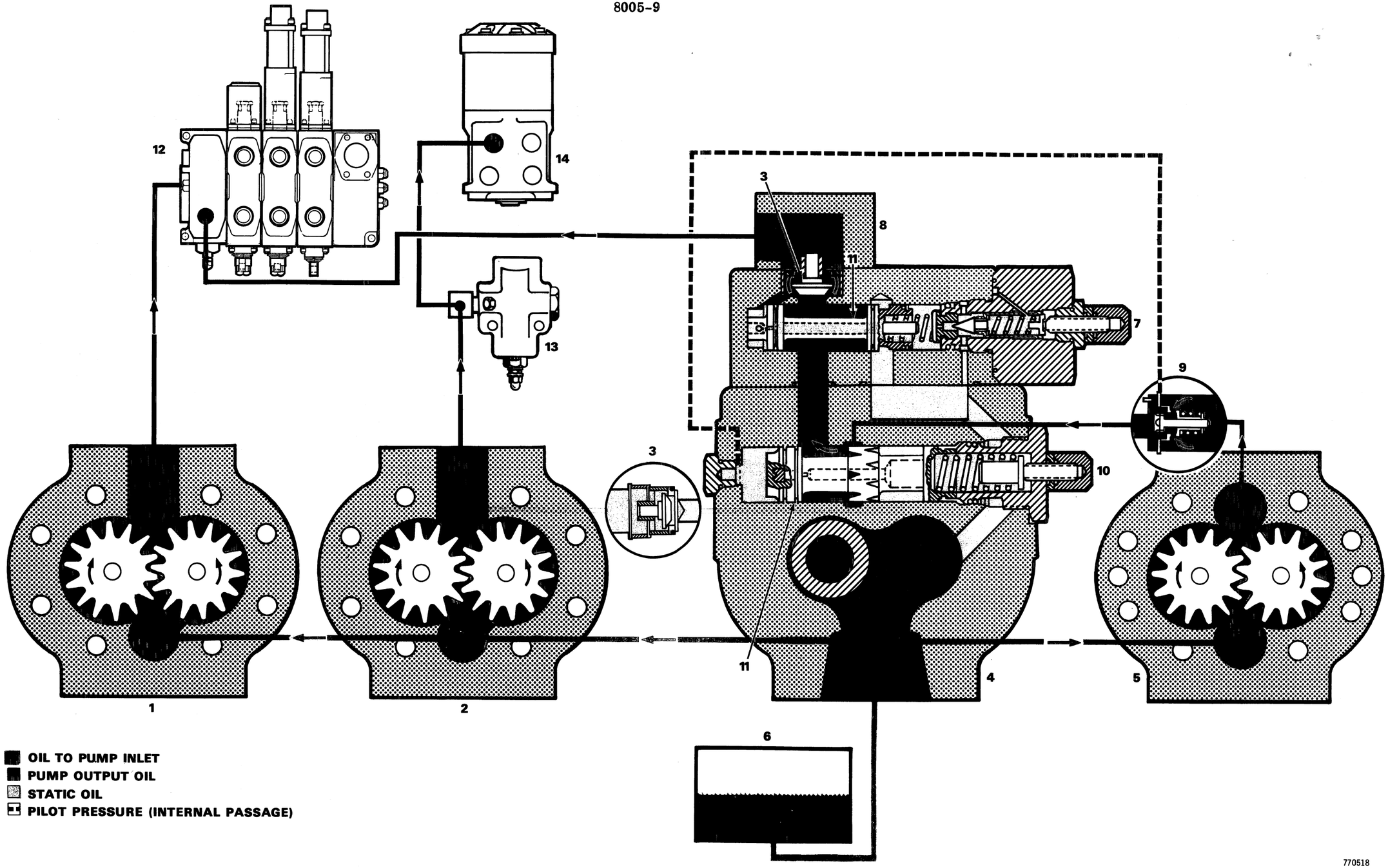
4. Tighten reservoir fill cap.

5. Start engine and run at low idle for 30 seconds to fill line between the accumulator and pressure reducing valve with oil and to build up air pressure in the hydraulic reservoir.

7. Run engine at 1000 rpm. Operate the bucket control lever in both directions until the cylinders move without hesitation.

8. Repeat above procedure for the lift and clam cylinders.

9. Turn engine off.



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1. LOADER SECTION
2. STEERING SECTION
3. CHECK VALVE
4. INLET SECTION WITH DEMAND VALVE
5. DEMAND SECTION
6. RESERVOIR
7. UNLOADING VALVE
8. MANIFOLD
9. ORIFICE AND BYPASS VALVE
10. DEMAND VALVE
11. SPOOL
12. LOADER CONTROL VALVE
13. RELIEF VALVE
14. STEERING CONTROL VALVE

Figure 7

18. Remove bearing carrier section, Figure 27. If it sticks on the dowels, hit the edges with a soft hammer to loosen it.

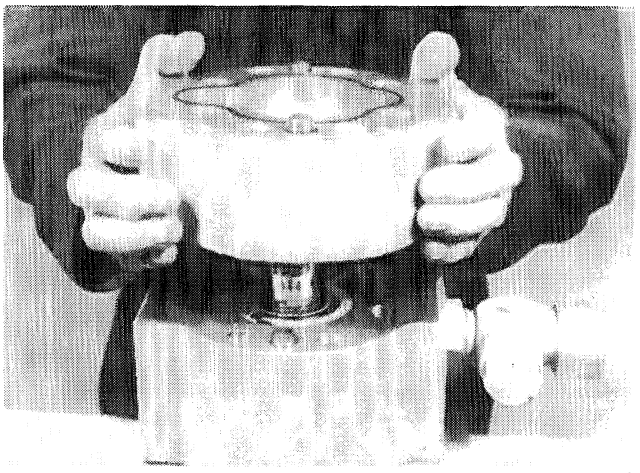

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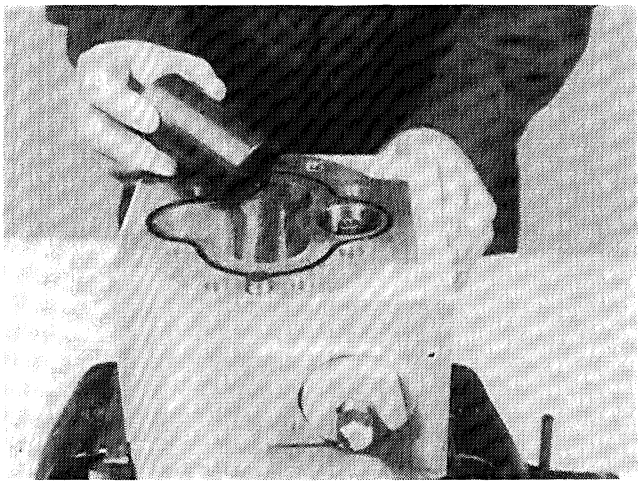
Figure 27

19. To disassemble the steering section, repeat steps 9 through 13.

20. Remove splined coupling, Figure 28.



776689

Figure 28

21. Remove the remaining pump sections from the vise. Put soft covers on the vise and pump the remaining pump section in the vise as shown in Figure 29. Then loosen and remove the capscrews flat washers.

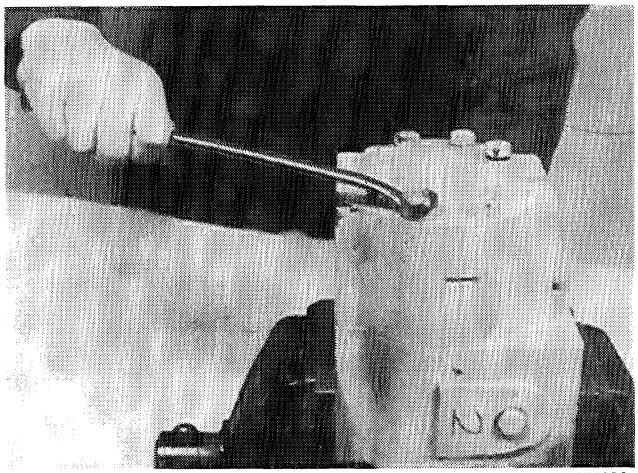


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Figure 29

22. Take pump sections from vise. Hit the inlet section with a soft hammer to separate the pump sections, Figure 30.

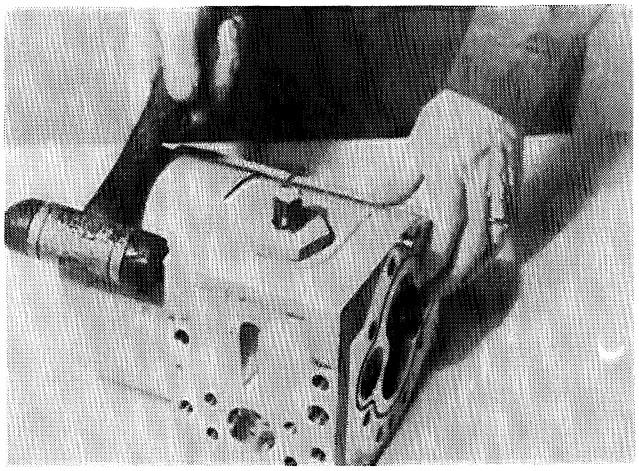

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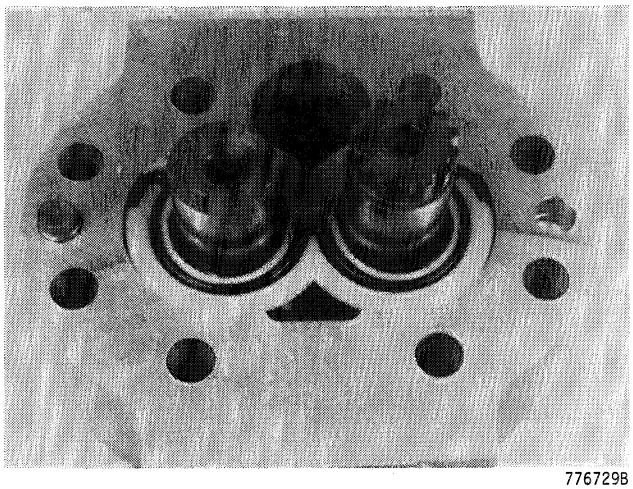
Figure 30

24. Install pressure plate, isolation plate, ring retainer, O-ring and backup ring as described in steps 7 and 8, Figure 65.



776729B

Figure 65

25. Install O-ring in groove on both sides of bearing carrier section, Figure 66. Use grease to hold O-rings in position.

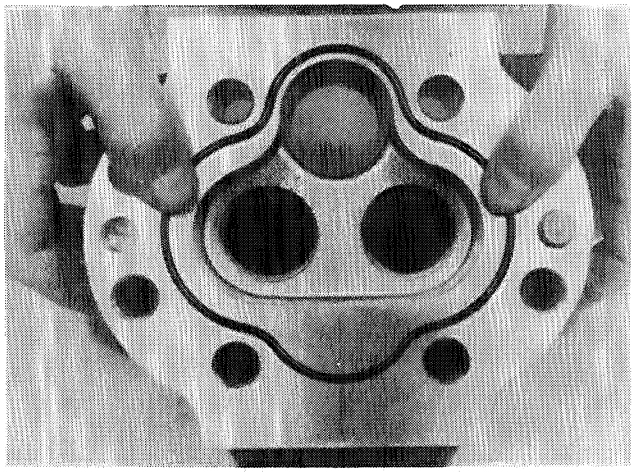


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Figure 66

26. With numbers on housings lined up, install the bearing carrier section, Figure 67.

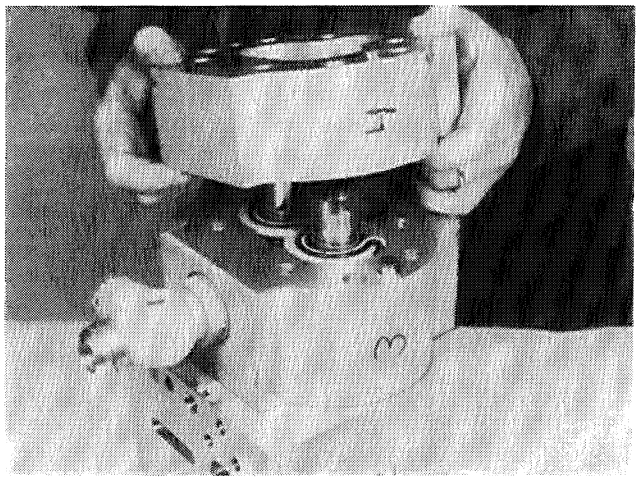

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Figure 67

27. Install coupling with snap ring, Figure 68.

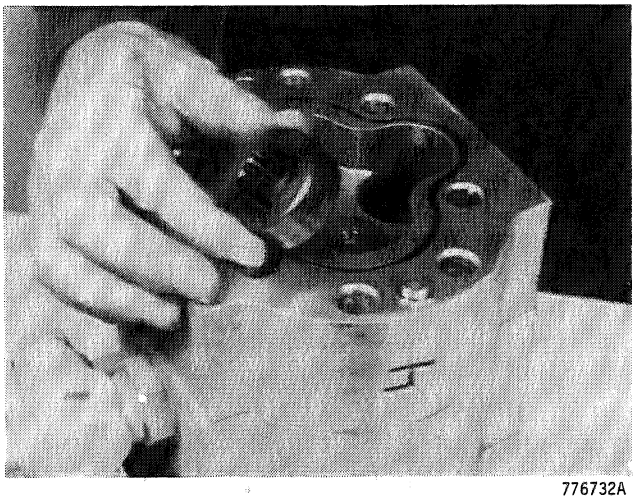

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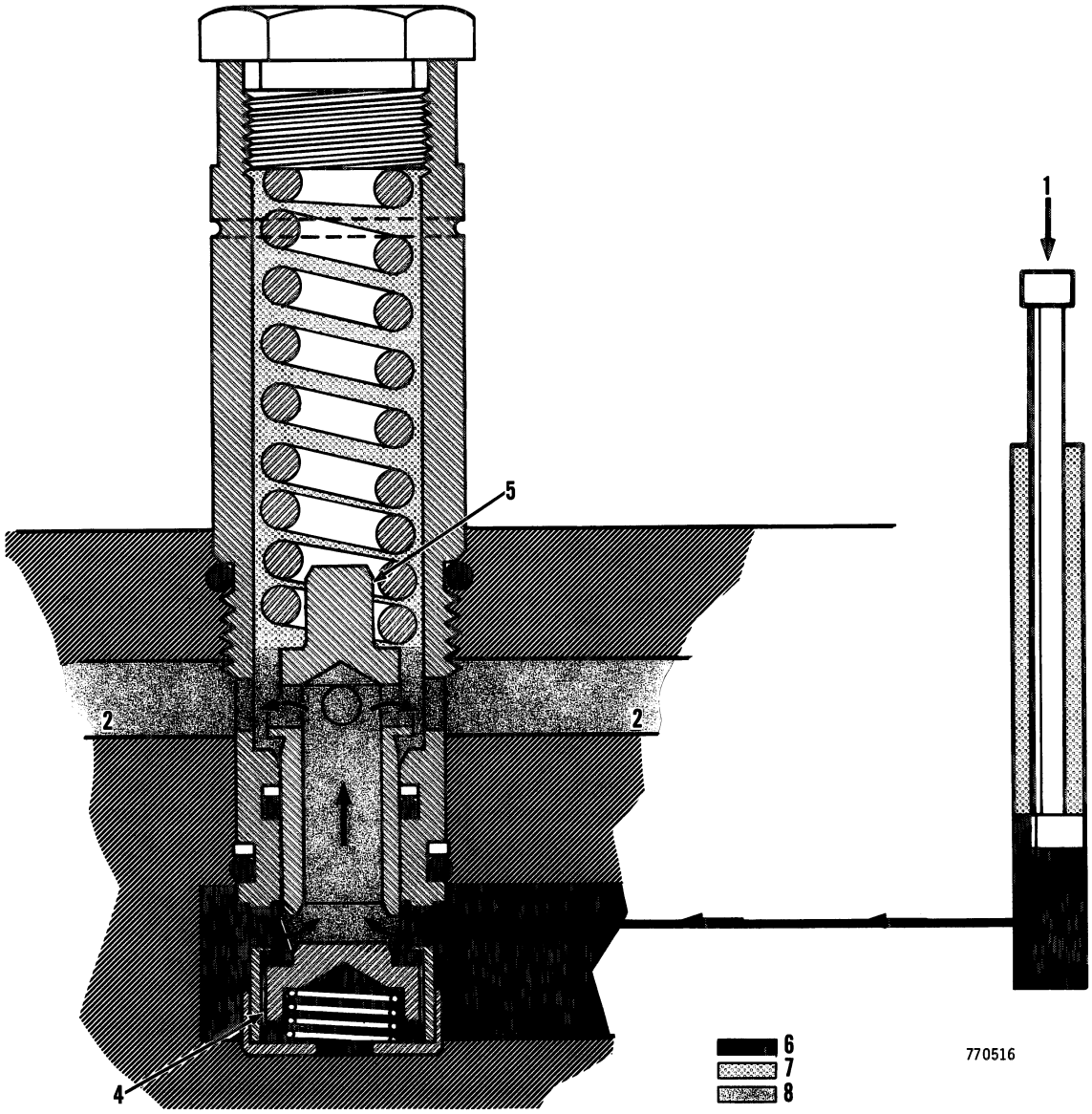
Figure 68

Oil Flow - Spools in Neutral

With the spools in Neutral, oil flows from the inlet section to the outlet section through the open center passage. From the outlet section the oil flows to the reservoir.

Oil flow to or from the cylinders is blocked by the spools. Thus the cylinders cannot move.

NOTE: Oil flow from the demand pump (item 16) does not start until engine speed is 1300 rpm (r/min). Refer to Section 8005.



1. EXTERNAL FORCE ON CYLINDER
2. RETURN PASSAGE (TO RESERVOIR)
3. PASSAGE TO WORK PORT
4. CHECK POPPET
5. FLOATING SEAT
6. HIGH PRESSURE OIL
7. STATIC OIL
8. RETURN OIL TO RESERVOIR

Figure 9 - Oil Flow, Secondary Relief Valve Open

tap the seat into the bore of the housing as far as it will go Figure 32.

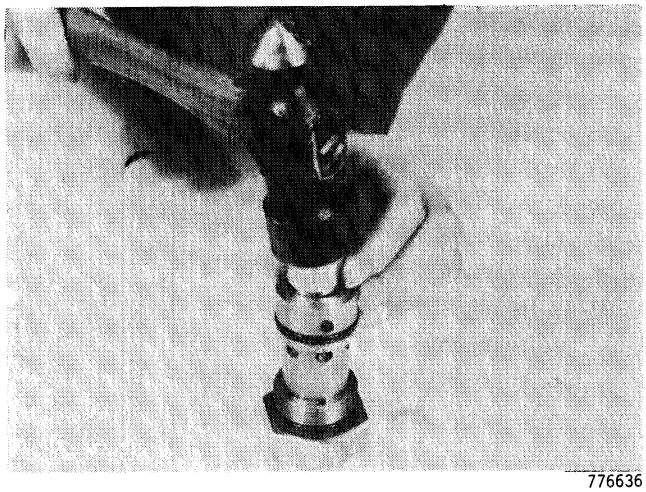


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Figure 32

7. Install seat retainer, Tighten two set screws, Figure 33.

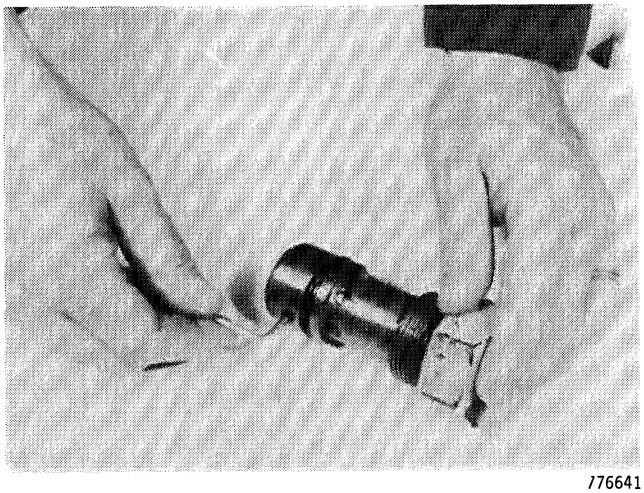

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Figure 33

8. Install pilot plunger and spring into adjusting screw housing, Figure 34.

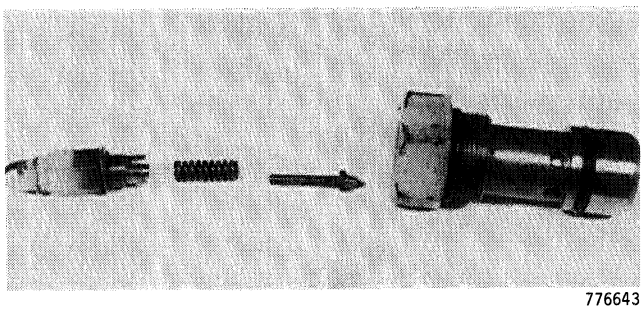

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Figure 34

9. Install adjusting screw housing in valve housing. Tighten securely, Figure 35. Turn the adjusting screw counterclockwise to reduce the pressure setting. The relief valve will be adjusted during installation.

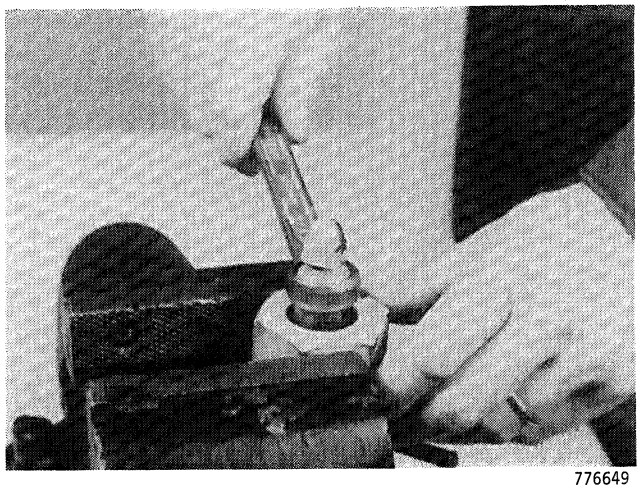

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Figure 35

Bucket and Lift Sections

Disassembly

1. Remove four Allen head screws and lock washers, Figure 36.

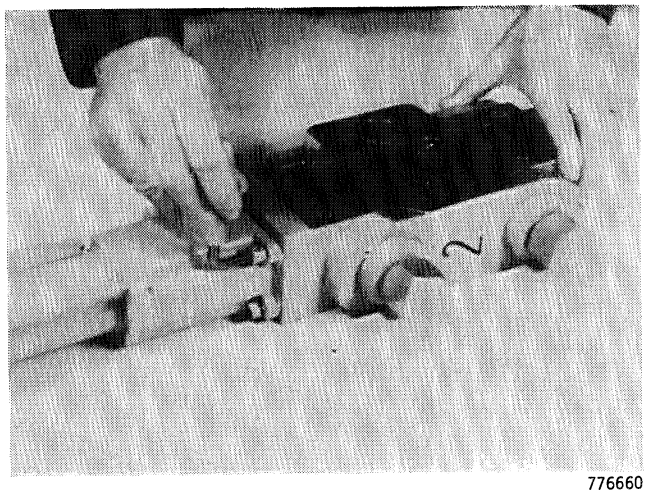

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Figure 36

20. Install sleeve, Figure 80. Slots in sleeve fit over solenoid wires.

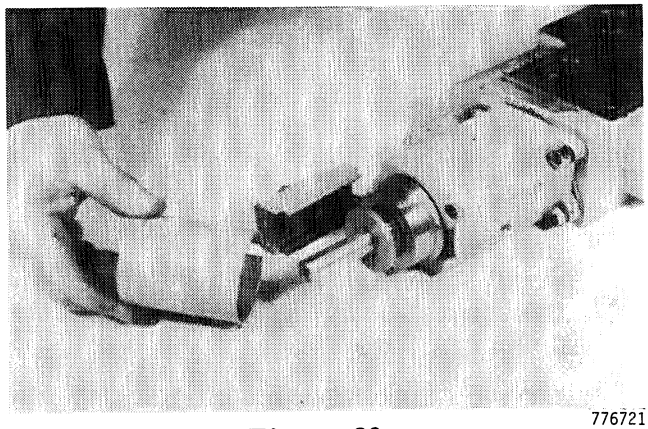

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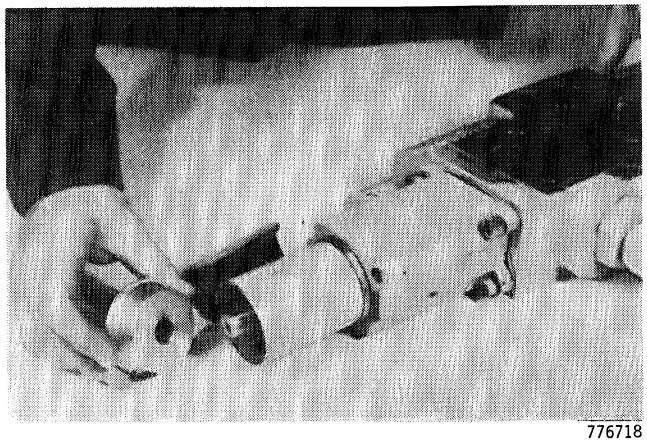
Figure 80

21. Bucket Spool: Install spacer in sleeve, Figure 81. Lift spool: Install coil in sleeve.



776718

Figure 81

22. Install spring and spring guide in end cap, Figure 82.

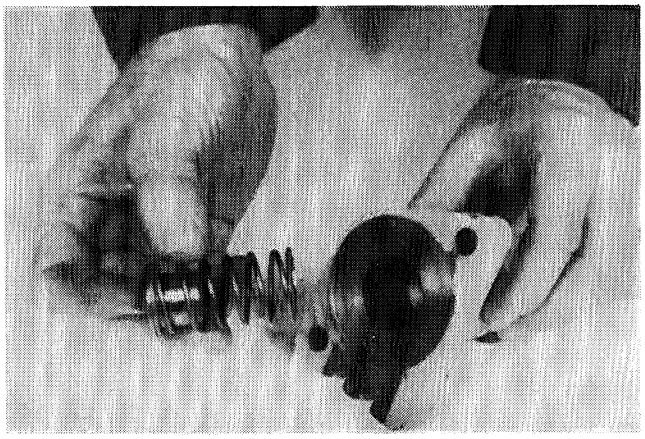


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Figure 82

23. Install end cap. Install two Allen head screws and lockwashers, Figure 83. Make sure coils(s) is properly seated in centering spring housing.

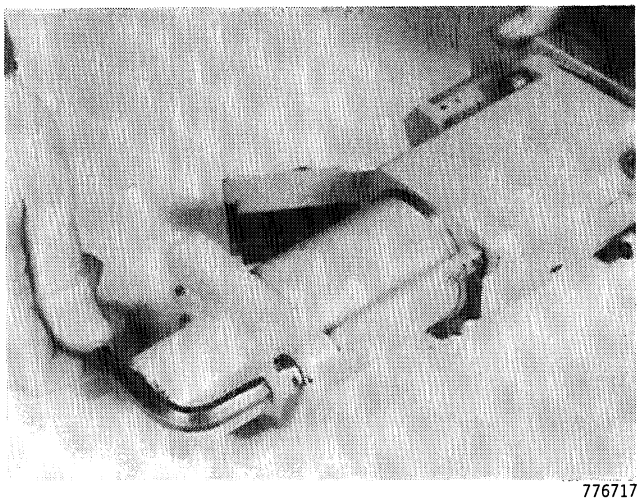

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Figure 83

24. Fasten wiring connector housing to end cap with Allen head screws and lock washers, Figure 84.

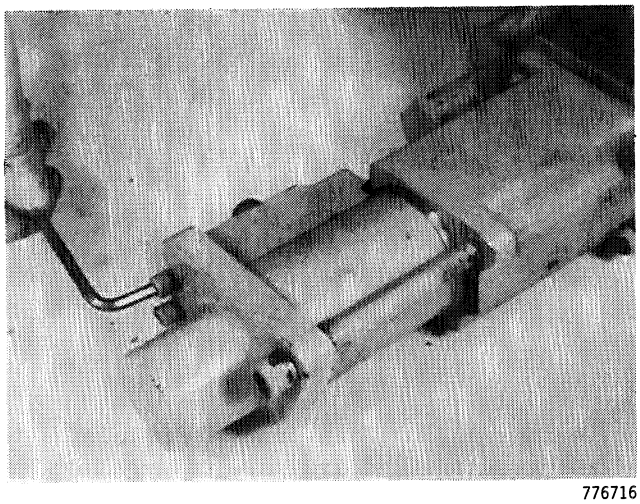

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Figure 84

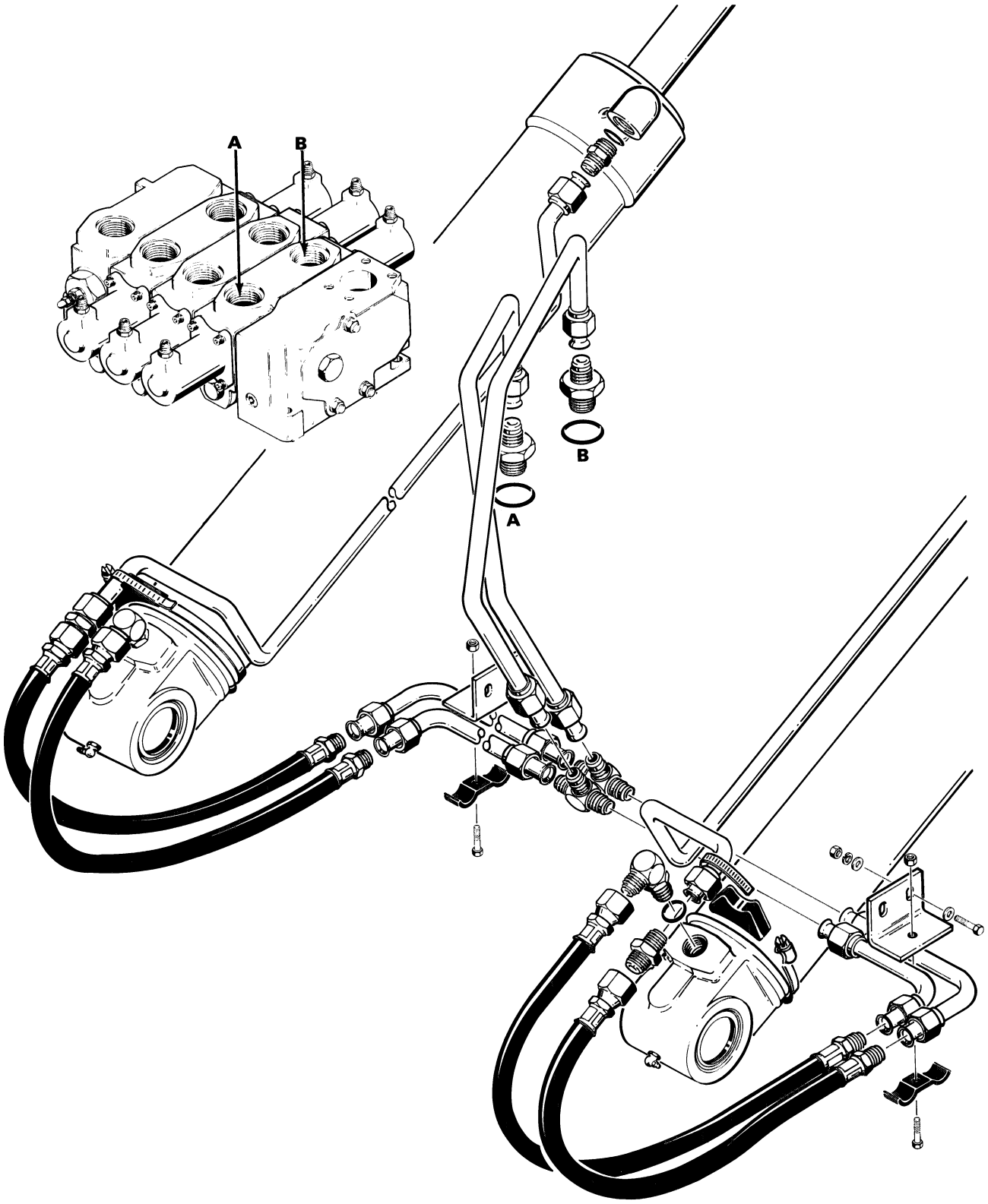
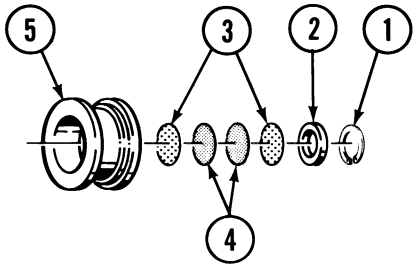


Figure 8 - Installation of Lines to Lift Cylinders

Assembly

1. Install one coarse mesh screen in poppet, followed by two fine mesh screens and one coarse mesh screen, Figure 31.



1. Snap Ring
2. Spacer
3. Coarse Mesh Spring
4. Fine Mesh Spring
5. Poppet

Figure 31

2. Install snap ring in poppet, Figure 32.

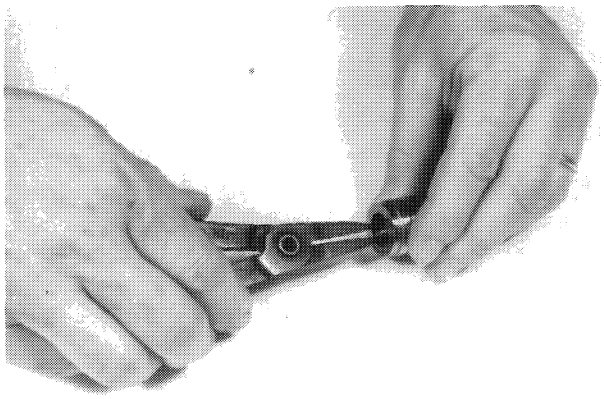


Figure 32

3. Install a new O-ring and backup ring on the pilot plunger seat. The backup ring is nearest the end with the flange.

4. Use a drift punch and hammer to install the pilot plunger seat.

5. Install the spring and poppet in the housing. The poppet is a very close fit with the bore of the housing. When aligned correctly, the poppet slides into place.

6. Install a new O-ring and backup ring on seat. The backup ring is nearest the tapered end.

7. Put the seat into the bore of the housing. Use a 3/4 inch socket and hammer and tap the seat into the bore of the housing as far as it will go, Figure 33.

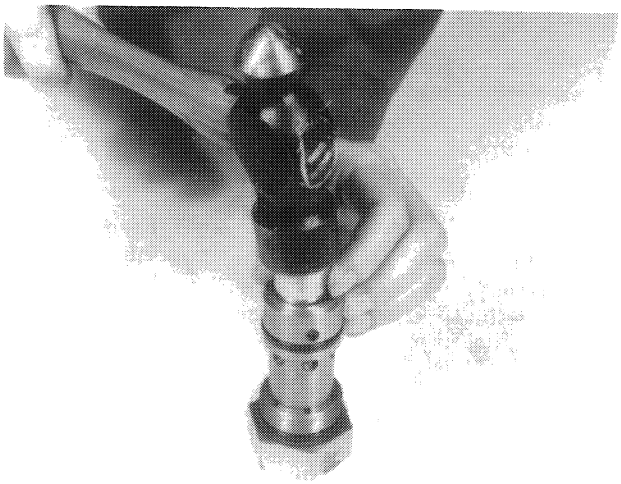


Figure 33

8. Install seat retainer. Tighten two set screws, Figure 34.

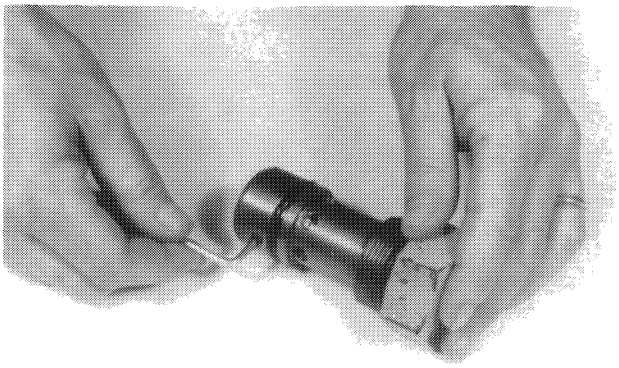


Figure 34

10. Clamp spool in vise equipped with soft jaws or use brass strips. Tighten special plugs, Figure 65.

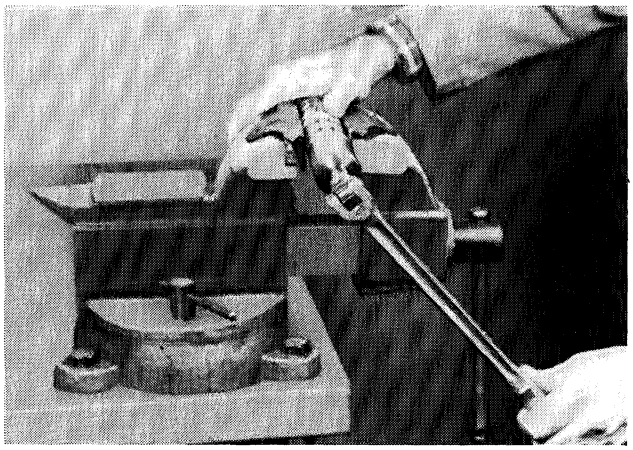


Figure 65

11. Install two new backup rings in B port side of spool bore, Figure 66.

NOTE: On early models, install backup ring and O-ring.

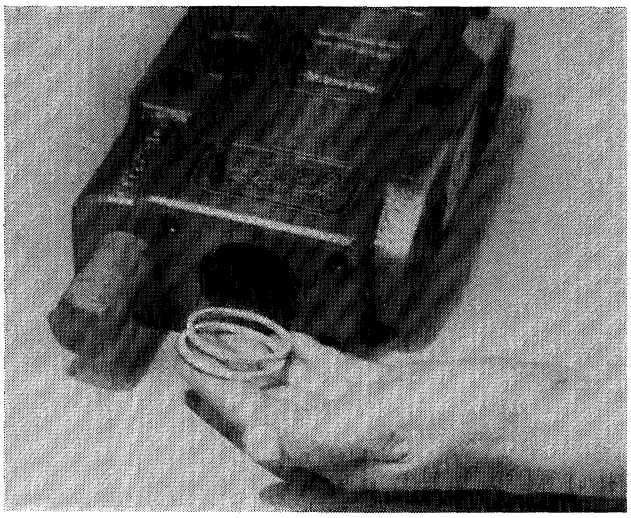
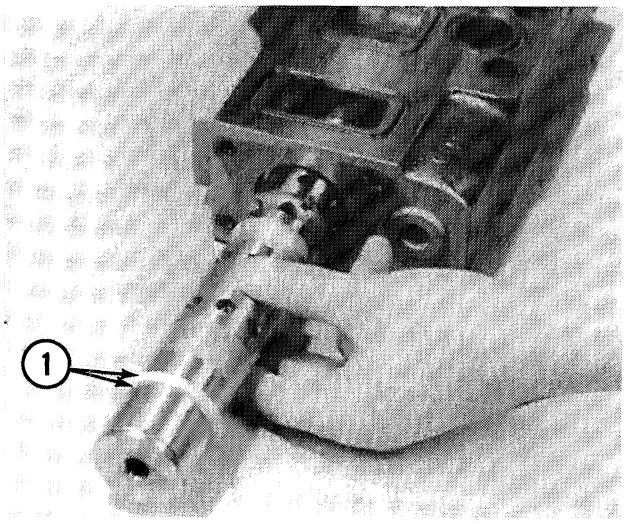


Figure 66

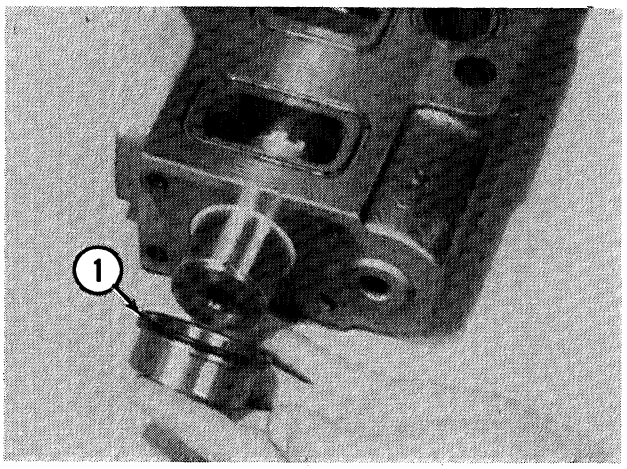
12. Install spool in valve section, Figure 67. Install two new backup rings in A port side of spool bore. Check that backup rings in B port side of spool bore have not pulled out of bore.



1. Backup Rings

Figure 67

13. Install new O-ring on seal retainers. Install seal retainer with O-ring on A port side of valve section, Figure 68.



1. O-ring

Figure 68

Section 8090

CYLINDERS

CASE CORPORATION

C.E. Div. 9-66871
October 1977

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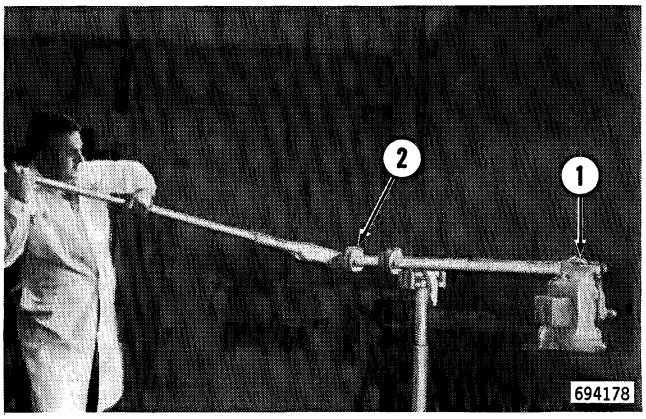
rod. Tighten the piston bolt to the specification on page 8090-3.



1. Piston Rod Eye or Yoke in Vise
2. Tighten to Specification on page 8090-3

Figure 8

9. Remove the piston rod from the vise and put the cylinder in the vise. Tighten the vise just enough to keep the cylinder from turning when the gland is tightened.

10. Put a small amount of clean hydraulic oil on the piston and inside surface of the cylinder.

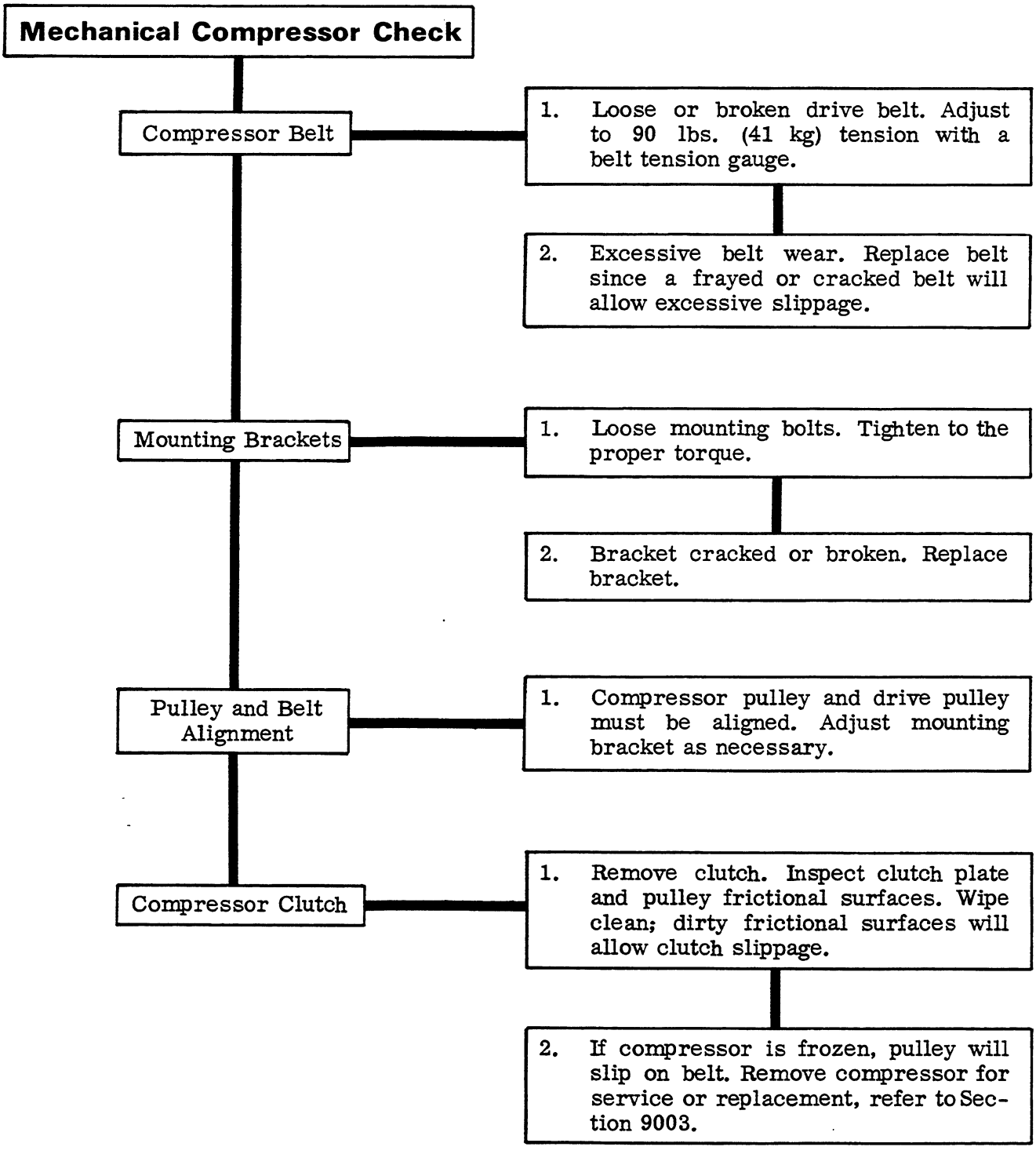
11. Push the piston rod straight into the cylinder. Be careful not to damage the vee rings on the threads in the cylinder. When the piston is in the smooth portion of the cylinder, turn the gland into the cylinder. Then push the piston rod farther into the cylinder.

12. If the old cylinder and gland are being assembled, tighten the gland with a torque wrench until the gland lock screw hole in the gland and cylinder are in alignment and the torque is between 100 and 200 foot-pounds (135 and 271 N m). Then install the gland lock screw.

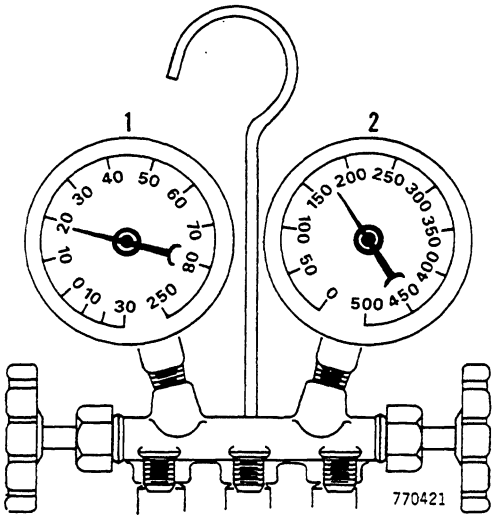
13. If a new cylinder or gland is being used, tighten the gland to 100-200 foot-pounds (135-271 N m). Then use a No. 26 (3.7 mm) drill and drill a hole that is half in the gland and half in cylinder. Make the hole 5/16 inch (7.9 mm) deep. Then install the self-tapping gland lock screw.

NOTE: The cylinder assembly part number is stamped into the gland or cylinder at the factory. The same number must be stamped on the new part.

SYSTEM CHECKS



Complaint - Insufficient Cooling



1. LOW PRESSURE GAUGE READING NORMAL, 7 TO 30 PSI (48 TO 207 kPa)
2. HIGH PRESSURE GAUGE READING NORMAL, CORRESPONDS WITH PRESSURE-TEMPERATURE CHART, PAGE 9002-13

Air in System Symptoms

a. Sight glass free of bubbles or shows only an occasional bubbles.

b. Suction line warm to touch.

c. Evaporator discharge air only slightly cool.

1. Test system for leak, refer to page 9002-11. Possible leak has allowed entry of air; check compressor seal closely, refer to Section 9003.

2. Discharge system of refrigerant. Refer to Section 9003.

3. Repair system leak(s) as necessary. Refer to Discharging the System in Section 9003.

4. Replace receiver-drier, moisture absorbing material if saturated with moisture and evacuation can not remove it from drier.

5. Check compressor oil level. Compressor may have lost oil, refer to Section 9003.

(Continued on next page)

Section 9003

AIR CONDITIONING SYSTEM

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October 1977

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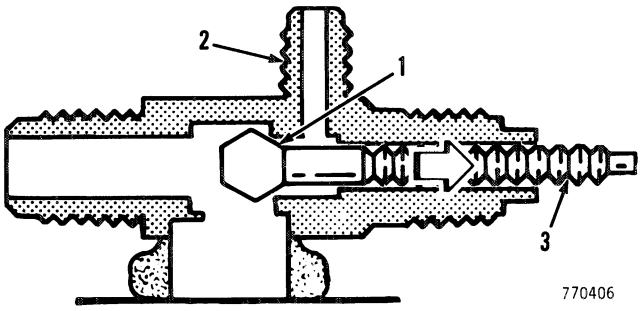
5. If machine is equipped with a suction fan, clip a thermometer in the center of the grille. If machine is equipped with a pusher fan, clip a thermometer in the air flow to the radiator. Start and run the engine at 1500 rpm (r/min) with controls set for maximum cooling and high blower speed.

6. Continue charging the system until 57 ounces (1685.6 ml) of R-12 refrigerant is in the system or until the sight glass clears. Close low pressure gauge valve and refrigerant container dispensing valve.

7. Check the low and high pressure gauge readings. The refrigerant charge is correct when the low pressure gauge reads 7 to 30 psi (48 to 207 kPa) and the high pressure gauge reads according to the Pressure/Temperature Chart. Check the temperature reading of thermometer and determine proper high pressure reading.

NOTE: Excessive high pressure reading with the correct low pressure reading indicates an overcharge of refrigerant or air in the system. Refer to Section 9002 to correct the problem.

8. After the correct charge of refrigerant is obtained, stop engine and rear seat both service valves. See Figure 15.



1. REAR SEATED
2. TEST PORT
3. VALVE STEM. TURN OUT OF THE VALVE TO REAR SEAT VALVE

Figure 15 - Rear Seated Service Valve

WARNING: *Always wear safety goggles when working with refrigerant. Liquid refrigerant in your eyes can cause blindness. If you get any near your eyes, rinse them immediately with mineral oil to absorb the refrigerant. Follow by flooding your eyes with a weak solution of boric acid and contact a doctor immediately.* 46-86

9. Loosen the gauge hoses at service valve ports until refrigerant starts to escape from the hoses. Allow refrigerant to escape from the gauges and hoses until both gauges read 0. Then remove hoses from valve ports and install port caps and service valve stem caps.

3. Install clutch retaining cap screw and washer. Hold clutch drive plate with spanner wrench and tighten cap screw to 20 foot-pounds (27 N m). Clutch must turn freely with no evidence of binding or rubbing. If rubbing or binding occurs, replace clutch.

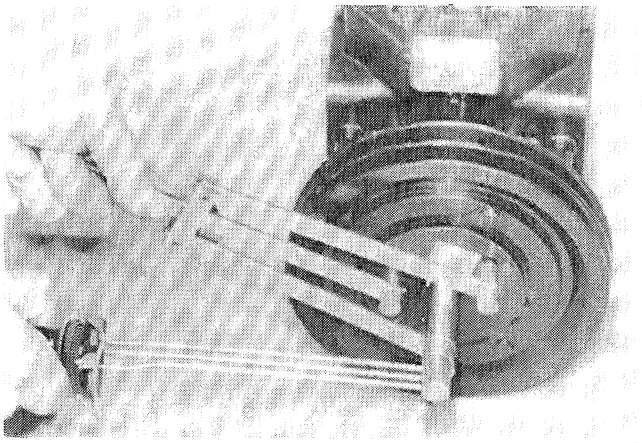


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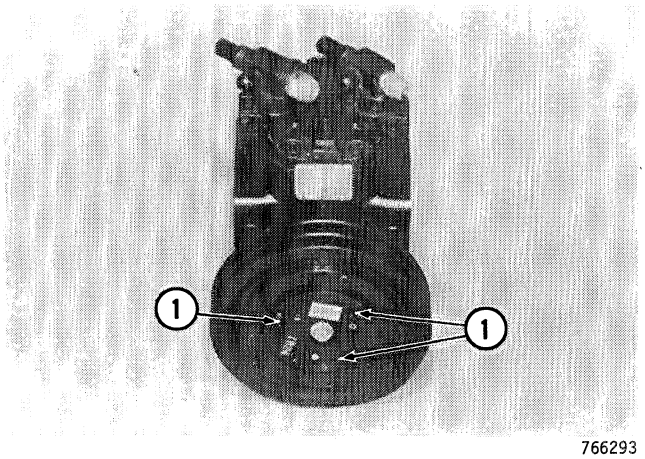
Figure 49

4. Install the three rubber dust plugs.



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1. Dust Plugs

Figure 50

Base Plate Gasket Replacement

1. Remove compressor from machine as instructed on page 9003-13. Remove accumulated dirt from the compressor. Service compressor on a clean bench.

2. Remove compressor drain plug. Drain and discard the oil.

3. Remove crankcase base plate retaining cap screws.

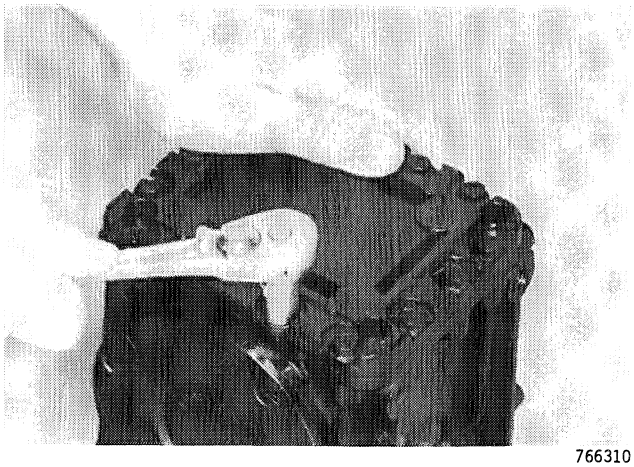

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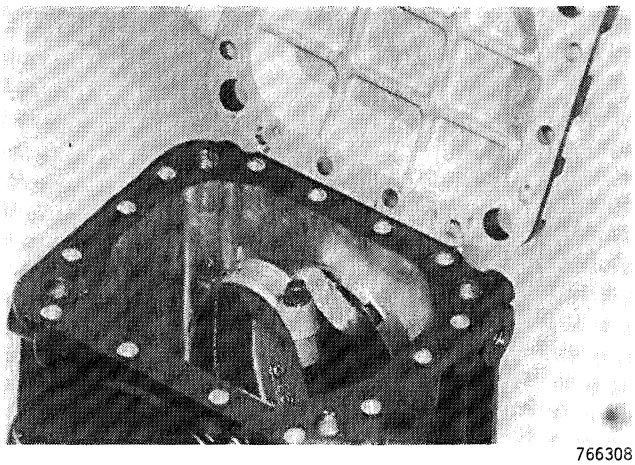
Figure 51

4. Remove base plate, remove and discard gasket. Be sure all parts of the gasket are removed from the machined surfaces.



766308

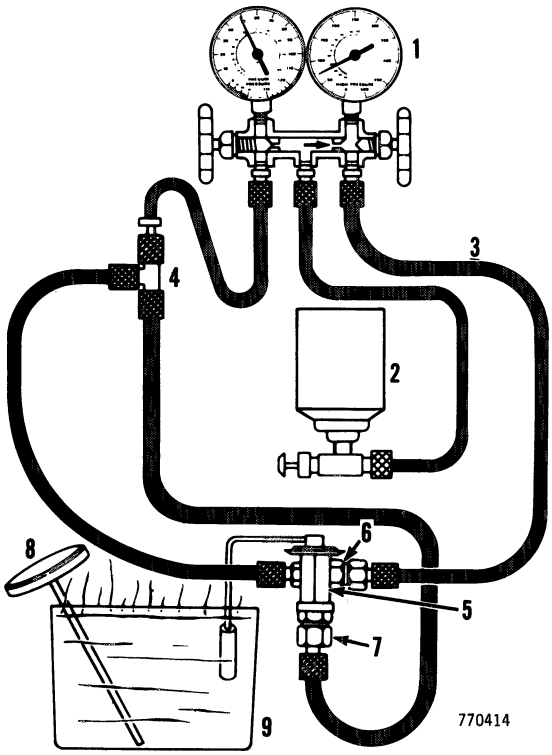
Figure 52

Testing and Adjusting

WARNING: *Always wear safety goggles when working with refrigerant. Liquid refrigerant in your eyes can cause blindness. If you get any near your eyes, rinse them immediately with mineral oil to absorb the refrigerant. Follow by flooding your eyes with a weak solution of boric acid and contact a doctor immediately.* 46-86

Test No. 1

1. Connect thermal expansion valve as shown in Figure 79. Put sensing bulb in 125 ° F (52° C) water.
2. Turn the refrigerant container upside down. This will insure that liquid refrigerant will be supplied to thermal expansion valve.



1. GAUGE MANIFOLD, REFER TO FIGURE 2
2. R-12 REFRIGERANT CONTAINER
3. REFRIGERATION HOSES (5), REFER TO FIGURE 2
4. 222-735 TEE. DRILL A HOLE IN TEE BODY WITH A NO. 71 DRILL (0.66 mm)
5. THERMAL EXPANSION VALVE
6. REDUCER, IMPERIAL EASTMAN NO. UR3-64 3/8 INCH TO 1/4 INCH
7. REDUCER, IMPERIAL EASTMAN NO. UR3-84 1/2 INCH TO 1/4 INCH
8. THERMOMETER, REFER TO FIGURE 2
9. WATER AT 125° F (52° C)

Figure 79 - Thermal Expansion Valve Minimum Flow Test

3. Open the refrigerant container dispensing valve. Open the high pressure manifold gauge valve and adjust valve so that gauge pressure reads 70 psi (482 kPa)
4. Check low pressure gauge. Pressure must be 43 to 55 psi (296 to 379 kPa).
   a. Pressure below 43 psi (296 kPa) indicates low refrigerant flow.
   b. Pressure above 55 psi (379 kPa) indicates high refrigerant flow.
5. Adjust valve as instructed on this page.

Test No. 2

1. The thermal expansion valve connections are the same as for Test No. 1. Put the sensing bulb in a container with water and cracked ice, Figure 80. Rock salt can be added to speed up the cooling process.
2. Open the high pressure manifold gauge valve and adjust valve so that gauge pressure reads 70 psi (482 kPa).
3. Check low pressure gauge, pressure must be 19.5 to 22.5 psi (134 to 155 kPa).

Adjustment

1. If low pressure gauge reads too high, increase spring tension by turning the adjusting screw into the valve.
2. If low pressure gauge reads too low, decrease spring pressure by turning the adjusting screw out of the valve.

NOTE: When increasing or decreasing spring pressure, turn adjusting screw one turn at a time and retest valve. If valve continues to fail the flow tests, a new valve must be installed.

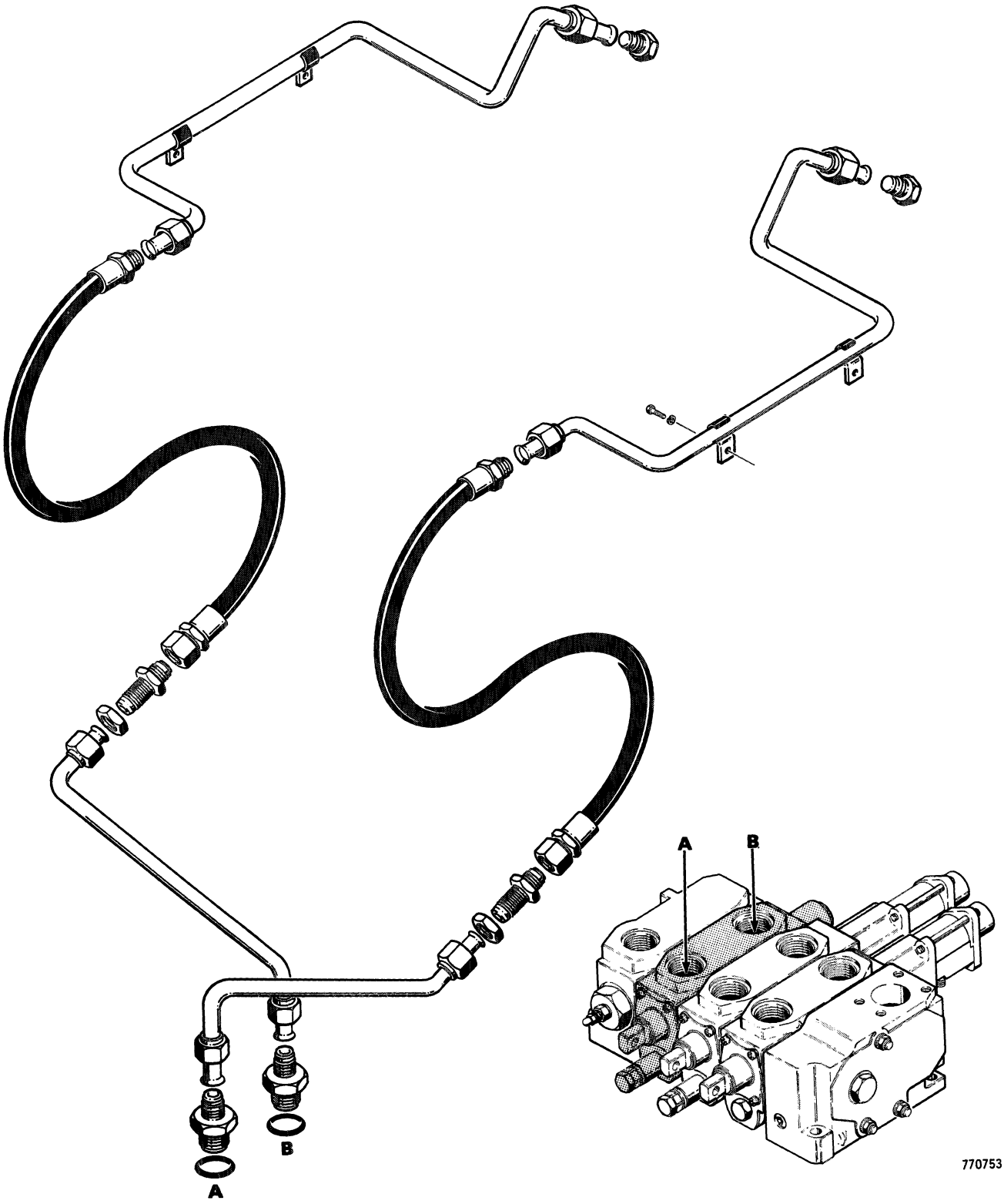


Figure 4 - Clam Cylinder Loader Arm Hydraulic Installation