Section

1010

GENERAL ENGINE SPECIFICATIONS
880C EXCAVATOR

504BD DIESEL ENGINE

General

Type	Six Cylinder, Four Stroke Cycle, Natural Aspirated, Valve in Cylinder Head
Firing Order	1-5-3-6-2-4
Bore	4-5/8 Inches (117.5 mm)
Stroke	5 Inches (127 mm)
Piston Displacement	504 Cubic Inches (8 259 cm^3)
Compression Ratio	16.0 to 1
No Load Governed Speed	2280-2320 RPM
Rated Engine Speed	2100 RPM
Engine Idling Speed	725 to 775 RPM
Exhaust Valve Rotators	Positive Type
Rocker Arm-To-Valve Clearance, Cold (Exhaust)	.025 Inch (0.635 mm)
(Intake)	.015 Inch (0.381 mm)

CASE CORPORATION

Rac 8-22970

Printed in U.S.A.
December, 1980

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MAINTENANCE

Introduction

Preventive maintenance and lubrication are the normal operations needed for safe and trouble free operation. Preventive maintenance is the easiest and best way to keep machine down time to a minimum.

Hour intervals are specified according to the number of hours the engine has run. The hourmeter, which operates when the engine is running, indicates the total hours of operation.

Run-In Period

The items given in the run-in section are to be done during the run-in period only.

Preventive Maintenance

The items in this section are separated into maximum hour intervals. These intervals are for "average" operating conditions. When operating under "severe" conditions, for example, severe heat, cold, dust, mud or water, increase the interval (do the maintenance more frequently).

The following chart includes all components that need regular maintenance, the maintenance interval and the section where details of maintenance can be found.

NOTE: See page 1050-5 for list of fluids and lubricants.

NOTE: The following charts show maximum intervals. If the machine operates in severe conditions, do maintenance more frequently.

RUN-IN MAINTENANCE CHART

INTERVAL	MAINTENANCE	INSTRUCTIONS
Run-In Period After First 20 Hours	Drain and fill engine crankcase with new oil	See Operator's Manual
	Change engine oil filter.	See Operator's Manual
	Check fan belt tension	Section 4007
	Replace 10 micron element for hydraulic filter	Section 8201
	Clean 100 mesh screen	Section 8201

PREVENTIVE MAINTENANCE CHART

INTERVAL	MAINTENANCE	INSTRUCTIONS
Every 10 Hours or daily, whichever comes first	Check engine oil level	See Operator's Manual
	Check hydraulic oil level	Section 8201
	Check restriction indicator for air cleaner	Section 2051
	Check coolant level in radiator	See Operator's Manual
	Clean dust cup for air cleaner	See Operator's Manual

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U.S. AND METRIC TORQUE SPECIFICATIONS

Grade 5 Bolts, Nuts and Studs (Dry Threads)

Thread size	Ft-lbs	N m
1/4"-20 NC	5-10	7-13
1/4"-28 NF	10-15	13-20
5/16"-18 NC	15-20	20-27
5/16"-24 NF	15-20	20-27
3/8"-16 NC	25-35	34-47
3/8"-24 NF	30-40	41-54
7/16"-14 NC	45-55	61-74
7/16"-20 NF	50-60	68-81
1/2"-13 NC	65-85	88-115
1/2"-20 NF	80-100	109-135
9/16"-12 NC	100-120	135-163
9/16"-18 NF	110-130	149-176
5/8"-11 NC	135-165	183-223
5/8"-18 NF	160-200	216-271

Thread size	Ft-lbs	N m
3/4"-10 NC	235-285	319-386
3/4"-16 NF	270-330	366-447
7/8"-9 NC	360-440	488-597
7/8"-14 NF	395-490	536-664
1"-8 NC	520-640	705-867
1"-12 NF	575-705	780-955
1-1/8"-7 NC	720-820	976-1111
1-1/8"-12 NF	790-970	1071-1315
1-1/4"-7 NC	1010-1240	1370-1681
1-1/4"-12 NF	1115-1365	1512-1850
1-3/8"-6 NC	1315-1610	1783-2182
1-3/8"-12 NF	1510-1850	2047-2508
1-1/2"-6 NC	1745-2135	2366-2894
1-1/2"-12 NF	1880-2420	2549-3281

Grade 8 Bolts, Nuts and Studs (Dry Threads)

Thread size	Ft-lbs	N m
1/4"-20 NC	10-15	13-20
1/4"-28 NF	15-20	20-27
5/16"-18 NC	20-30	27-40
5/16"-24 NF	25-30	34-40
3/8"-16 NC	40-50	54-67
3/8"-24 NF	45-55	61-74
7/16"-14 NC	60-80	82-102
7/16"-20 NF	70-90	95-122
1/2"-13 NC	100-120	136-162
1/2"-20 NF	110-130	149-176
9/16"-12 NC	135-165	183-223
9/16"-18 NF	155-190	210-257
5/8"-11 NC	200-240	271-325
5/8"-18 NF	215-265	292-359

Thread size	Ft-lbs	N m
3/4"-10 NC	340-420	461-569
3/4"-16 NF	380-460	515-623
7/8"-9 NC	540-660	732-894
7/8"-14 NF	595-725	807-982
1"-8 NC	810-990	1098-1342
1"-12" NF	900-1100	1220-1491
1-1/8"-7 NC	1150-1400	1559-1898
1-1/8"-12 NF	1295-1585	1756-2148
1-1/4"-7 NC	1640-2000	2224-2711
1-1/4"-12 NF	1800-2200	2440-2982
1-3/8"-6 NC	2140-2620	2901-3552
1-3/8"-12 NF	2450-3000	3322-4067
1-1/2"-6 NC	2845-3475	3857-4711
1-1/2"-12 NF	3200-3900	4339-4880



Figure 1

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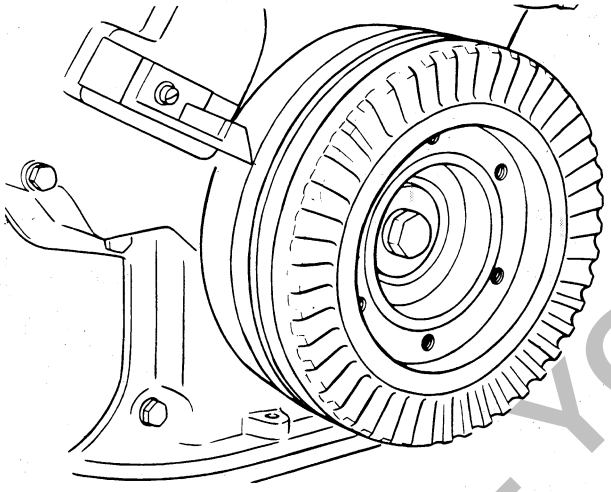
ENGINE TUNEUP PROCEDURE

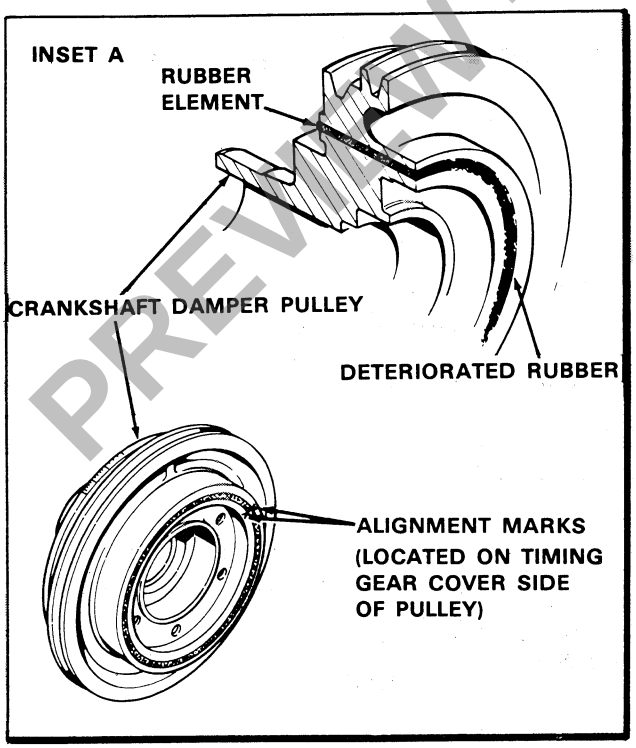
Checking Crankshaft Damper Pulley

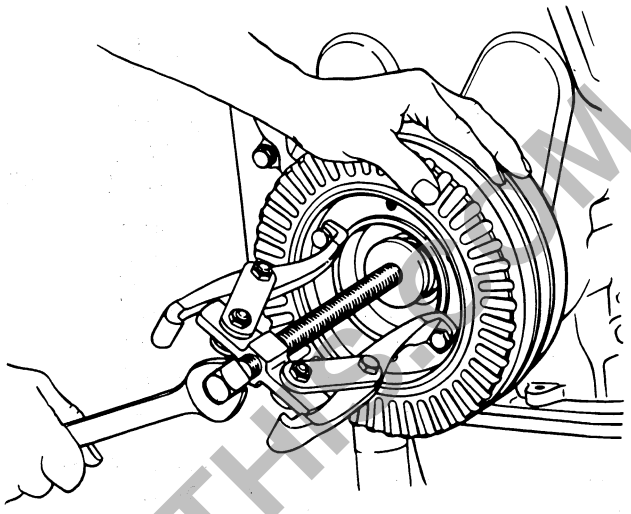
STEP 1

THE RECOMMENDED CHANGE INTERVAL FOR THE CRANKSHAFT DAMPER PULLEY IS 2000 HOURS MAXIMUM. AT ANY TIME OVER 1500 HOURS. CONSIDER CHANGING PULLEY AT ANY MAJOR ENGINE OVERHAUL OR TUNE UP.

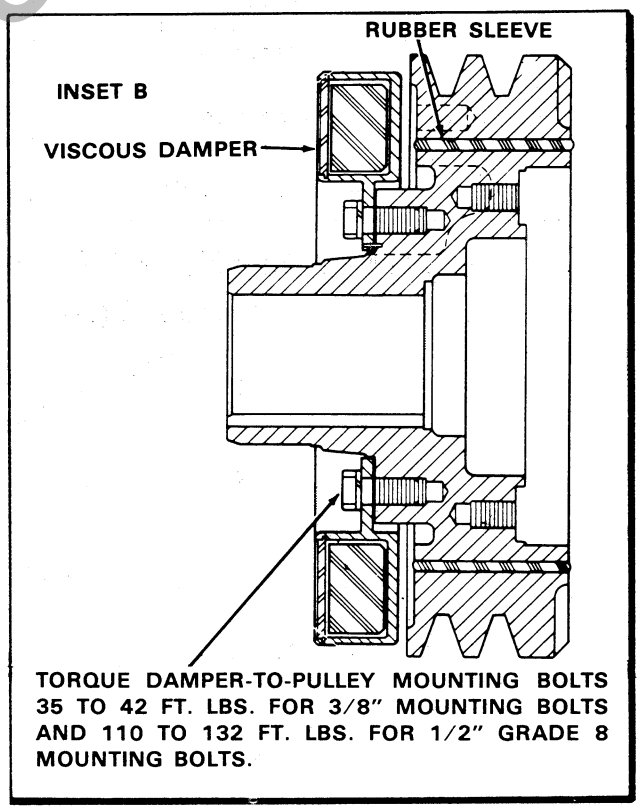
EVERY 500 HOURS AND AT ENGINE TUNEUP, VISUALLY INSPECT RUBBER ELEMENT FOR PEEL AREAS OR RUBBER MISSING. CHECK ALIGNMENT OF THE "V" MARKS BETWEEN THE INNER AND OUTER MEMBERS. IF "V" MARKS SHIFT, ENGINE TIMING WILL BE OFF AND DAMPER PULLEY MUST BE REPLACED.







USE BOLT ON TYPE PULLER TO REMOVE PULLEY. REMOVE VISCOUS DAMPER FROM PULLEY (IF SO EQUIPPED). DO NOT PULL OR HAMMER ON OUTSIDE OF PULLEY OR VISCOUS DAMPER; SERIOUS DAMAGE TO PULLEY, DAMPER, AND RUBBER SLEEVE COULD RESULT.

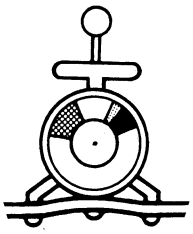


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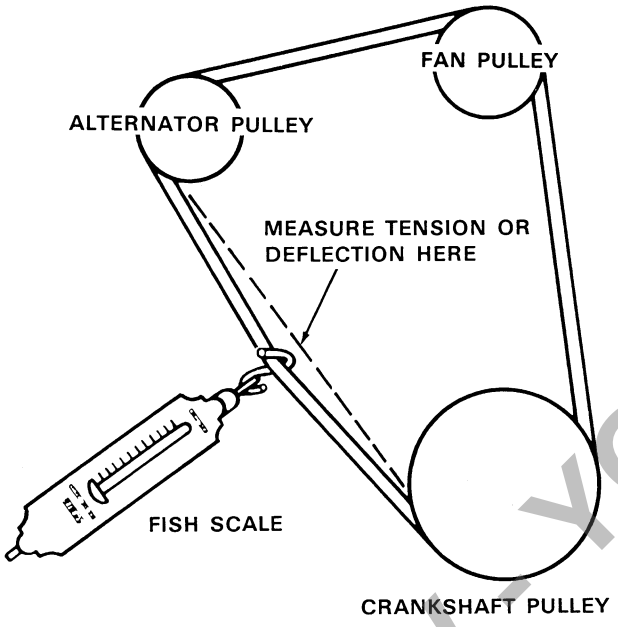
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Adjusting Fan Belts

STEP 61

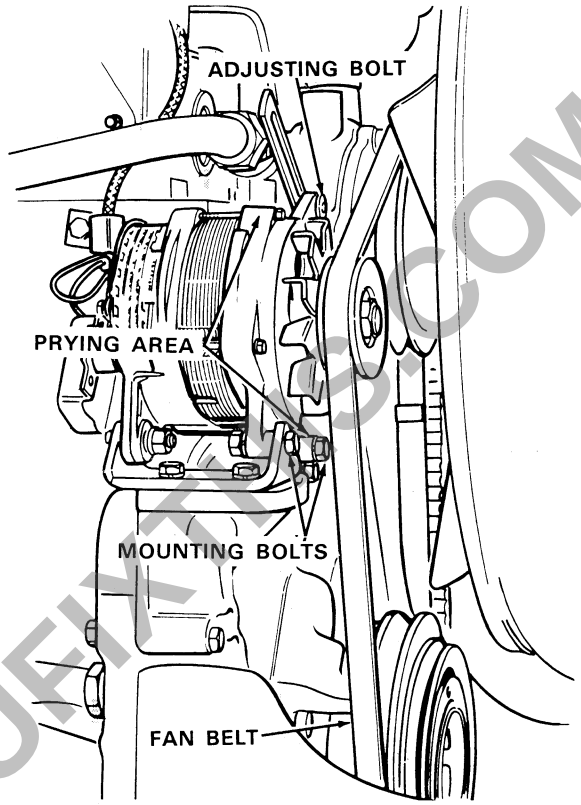


BELT TENSION GAUGE



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.

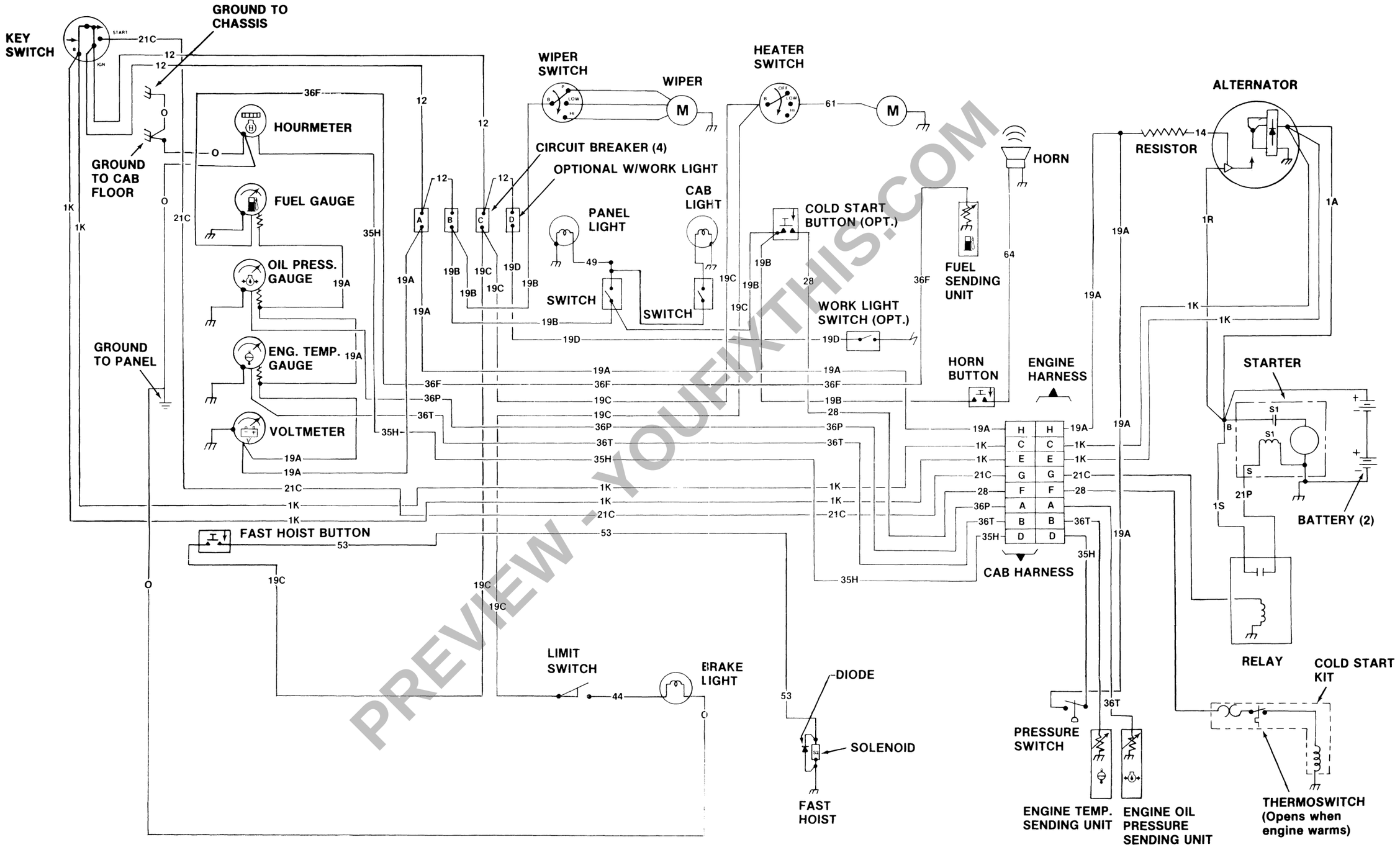
TO REPLACE FAN BELT, SWING ALTERNATOR INWARD TOWARD ENGINE. REMOVE OLD BELT, SLIP NEW BELT OVER FAN AND ONTO FAN PULLEY, THEN ONTO CRANKSHAFT AND ALTERNATOR PULLEY. FOR TIGHTENING SEQUENCE OF BELT, REFER TO OPERATOR'S MANUAL.

STEP 63

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

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Figure 1. Electrical Schematic (Machines Prior to PIN 6205236)

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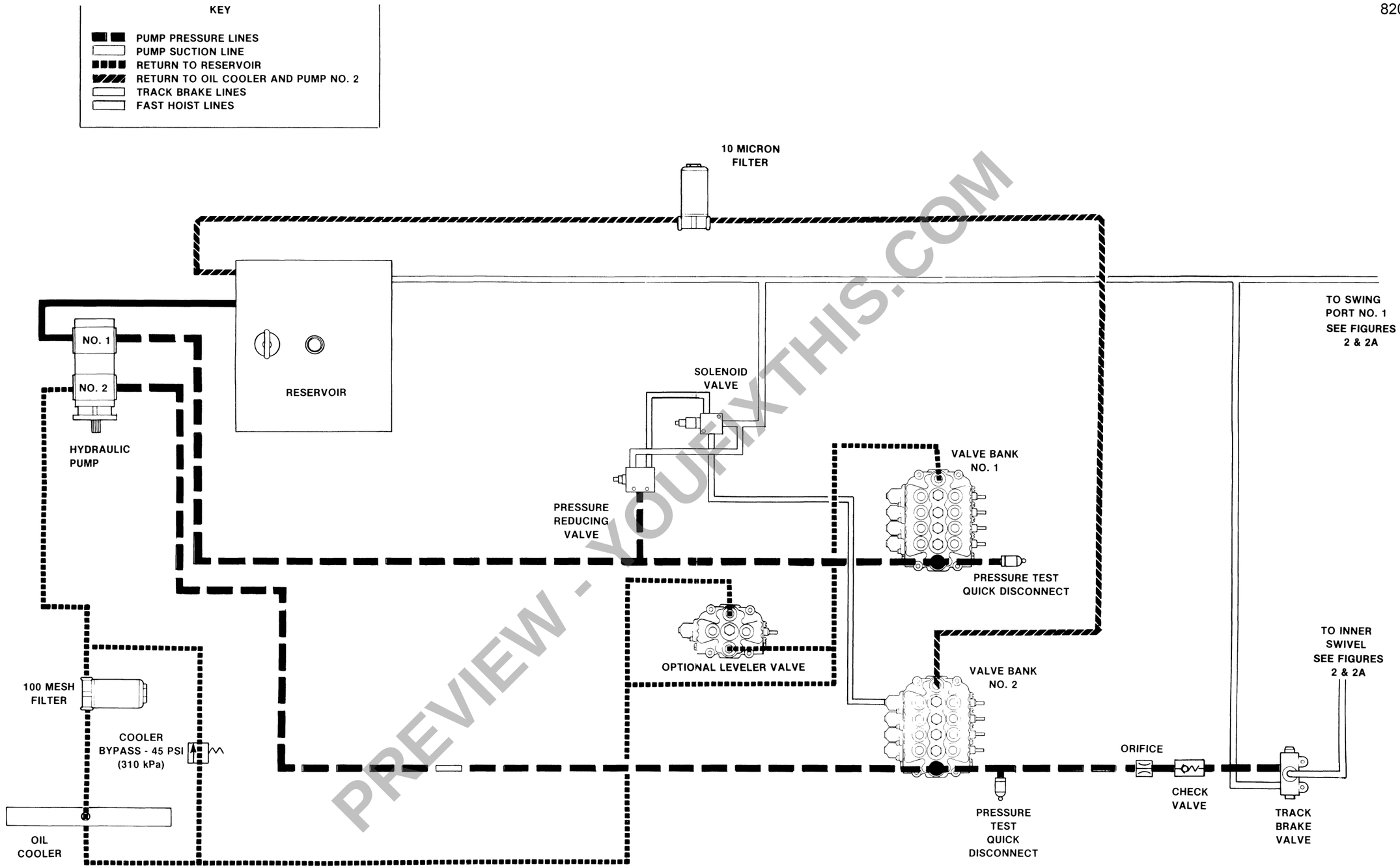
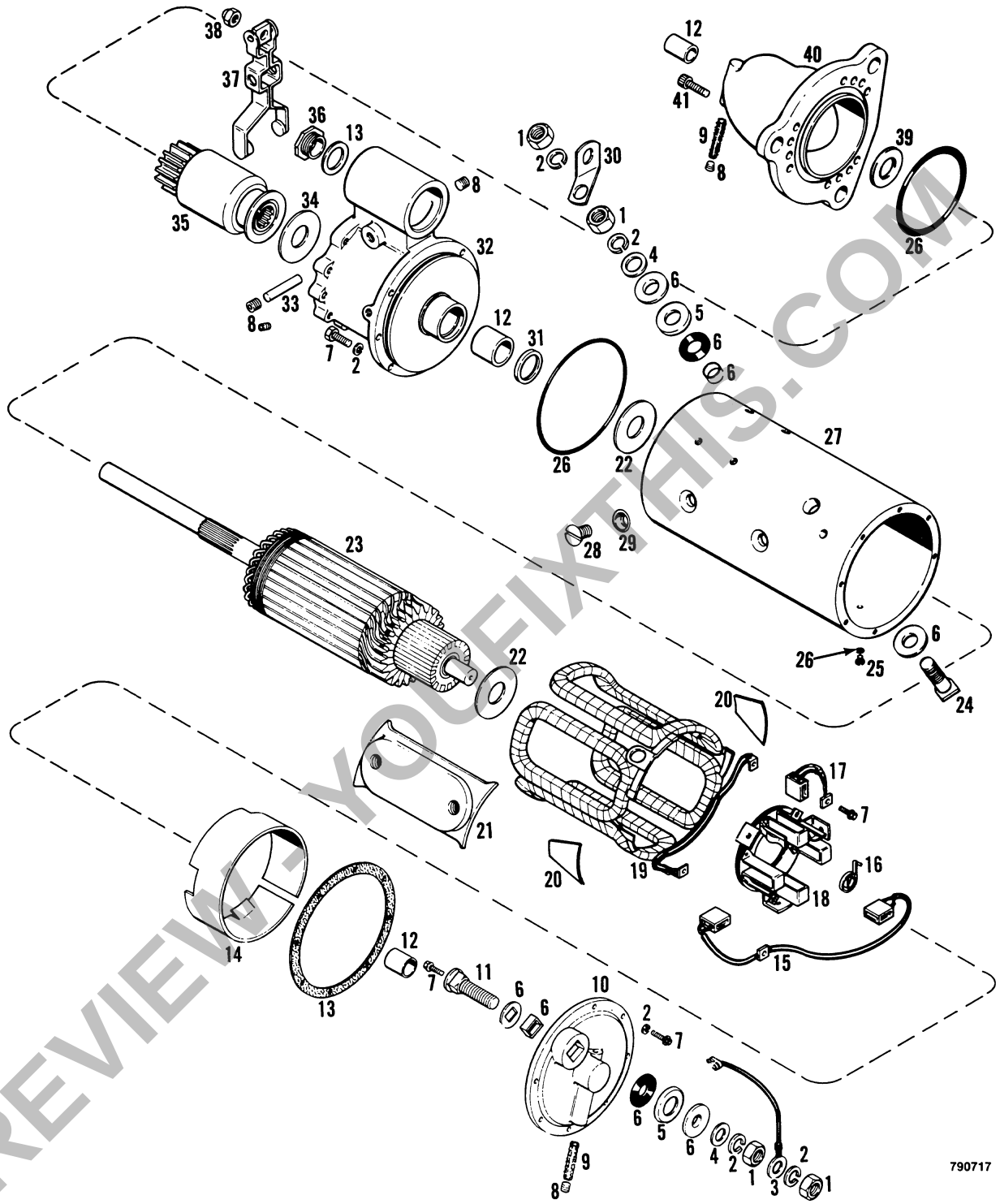


Figure 1. Hydraulic System Diagram, Reservoir To Hydraulic Valves

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1. NUT
2. LOCK WASHER
3. STARTER SOLENOID LEAD
4. FLAT WASHER
5. RETAINER
6. INSULATOR
7. CAP SCREW
8. PIPE PLUG
9. OIL WICK
10. END FRAME
11. GROUND TERMINAL
12. BEARING
13. GASKET
14. BRUSH INSULATOR
15. NEGATIVE BRUSHES
16. SPRING
17. POSITIVE BRUSH
18. BRUSH HOLDER
19. FIELD COIL
20. FIELD COIL INSULATOR
21. POLE SHOE
22. CARDBOARD THRUST WASHER
23. ARMATURE
24. FIELD TERMINAL
25. SELF-TAPPING SCREW
26. O-RING
27. FIELD FRAME
28. POLE SHOE SCREW
29. COPPER GASKET
30. CONNECTOR
31. OIL SEAL
32. SHIFT LEVER HOUSING
33. PIVOT SHAFT
34. BRAKE WASHER
35. STARTER DRIVE
36. PLUG
37. SHIFT LEVER
38. SELF-LOCKING NUT
39. METAL THRUST WASHER
40. STARTER DRIVE HOUSING
41. ALLEN HEAD SCREW

Figure 10 - Prestolite Starter

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880C EXCAVATOR
TABLE OF CONTENTS

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	General Maintenance	1050	9-69760
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	General Cleaning Instructions	1055	9-66735
	Safety Rules	1056	9-68141
	Specification Details - 504BD Engine	1420	8-20050
20	SERIES - ENGINE		
	Engine Tune-Up	2002	9-76379
	Cylinder Head, Valve Train and Camshaft	2015	8-22560
	Cylinder Block, Sleeves, Piston and Rods	2025	9-76176
	Crankshaft, Main Bearings, Flywheel and Oil Seals	2035	9-76187
	Lubrication System	2046	8-22780
	Air Cleaner	2051	9-69760
	Pump Drive Plate	2053	9-68141
	Cooling System	2055	9-76337
	Engine Troubleshooting	2201	8-20110
	Reconditioning Engine Cylinder Block	2290	8-21170
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	Fuel System and Filters	3010	9-75297
	Fuel Injection Pump	3012	9-74937
	Fuel Tank, Fuel Lines and Fuel Storage	3052	9-68141
	Fuel Injectors	3213	8-20240
40	SERIES - ELECTRICAL		
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50	SERIES - TRACK AND SUSPENSION		
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	Troubleshooting	5502	9-68141
	Track Chain and Shoes	5503	9-68141
	Track Rollers, Carrier Rollers, Idlers and Sprockets	5506	9-68141
60	SERIES - POWER TRAIN		
	Maintenance Service	6301	9-68141
	Troubleshooting	6302	9-68141
	Drive Motor Circuit and Lines	6311	9-68141
	Drive Motor	6312	9-68141
	Final Drive Transmission (Drive)	6317	9-68142

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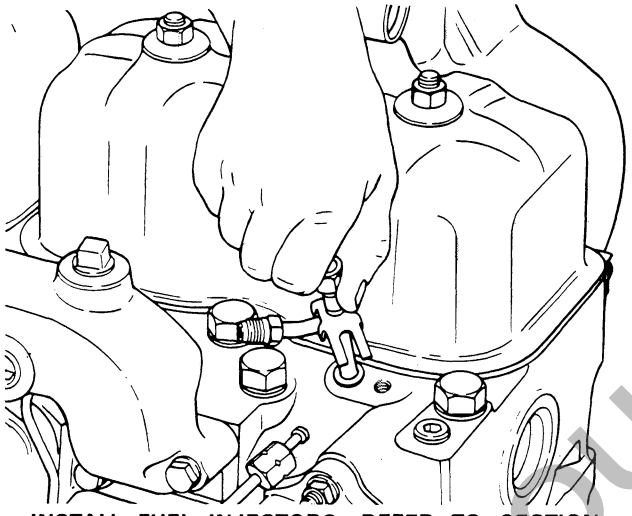
Printed in U.S.A.
Issued November 1980
Revised August 1981
Revised September 1983

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STEP 50

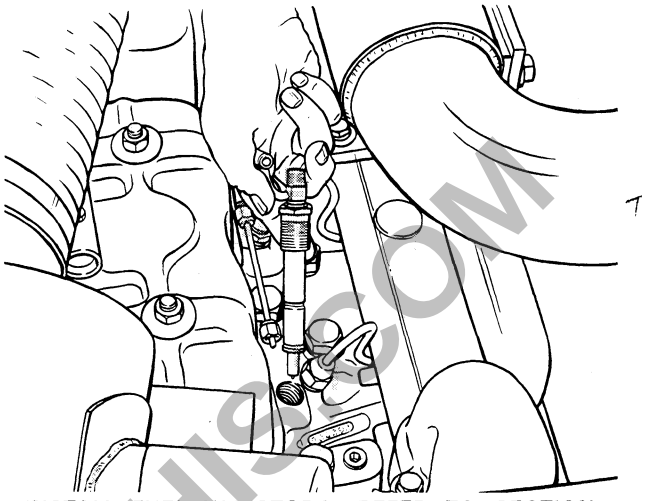
NOTE: TO MAKE A SIMPLE TEST WHEN A COMPRESSION LEAK IS INDICATED, SQUIRT A TEASPOON OF OIL INTO CYLINDER AND RECHECK COMPRESSION. IF PRESSURE RISES TO NEAR NORMAL, COMPRESSION LOSS IS PAST THE RINGS. VERY LITTLE CHANGE IN COMPRESSION INDICATES LEAKAGE PAST THE VALVES.

STEP 51 (CLAMP TYPE INJECTOR)



INSTALL FUEL INJECTORS. REFER TO SECTION 3013.

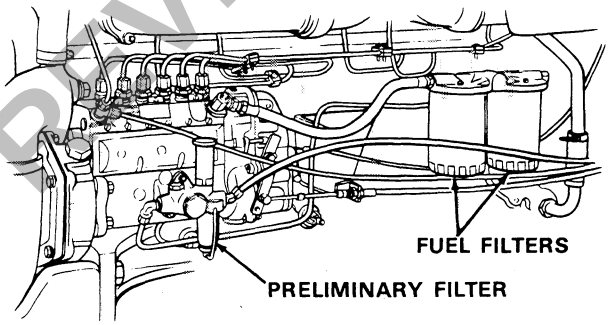
STEP 52 (SCREW-IN TYPE INJECTOR)



INSTALL FUEL INJECTORS. REFER TO SECTION 3113.

Cleaning Fuel Line Screen and Filters

STEP 53

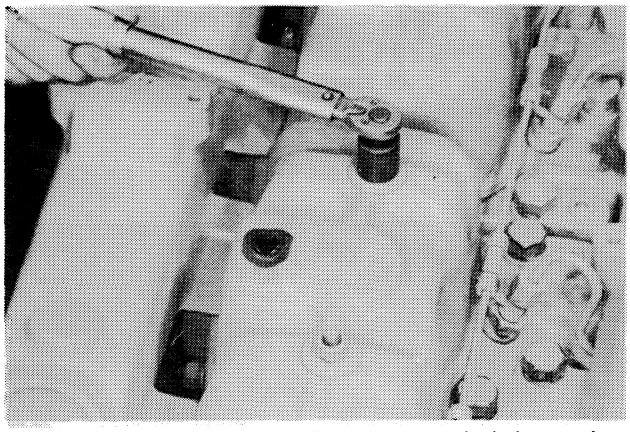


REFER TO SECTION 3010 FOR CLEANING AND SERVICING THE FUEL FILTERS AND SYSTEM.

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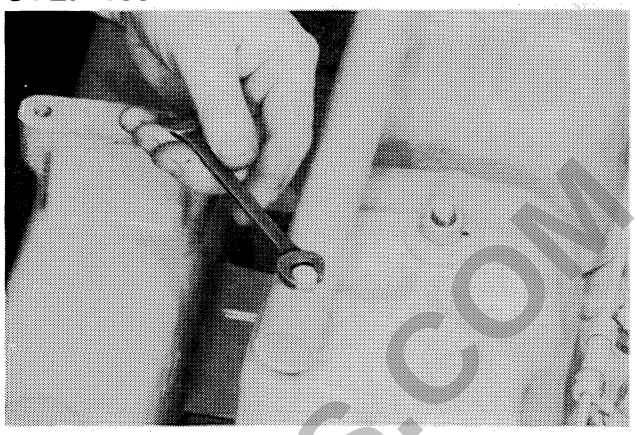
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STEP 152



Install the cylinder head covers and tighten the cover nuts to a torque of 8 to 10 ft. lbs. (11 to 14 Nm)(1.1 to 1.4 kgm).

STEP 153

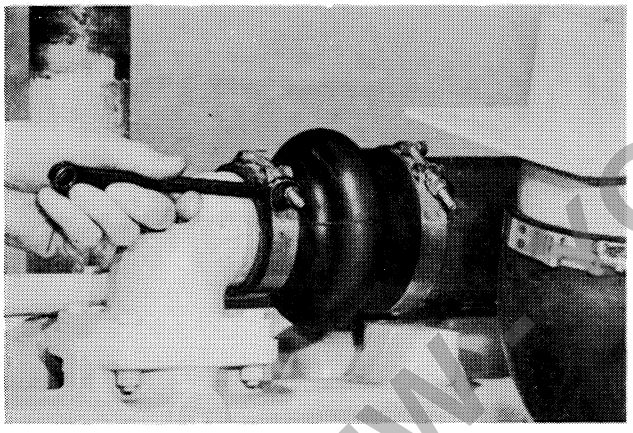


Install the breather tube and gaskets.

CAMSHAFT, VALVE TRAIN AND BACKLASH

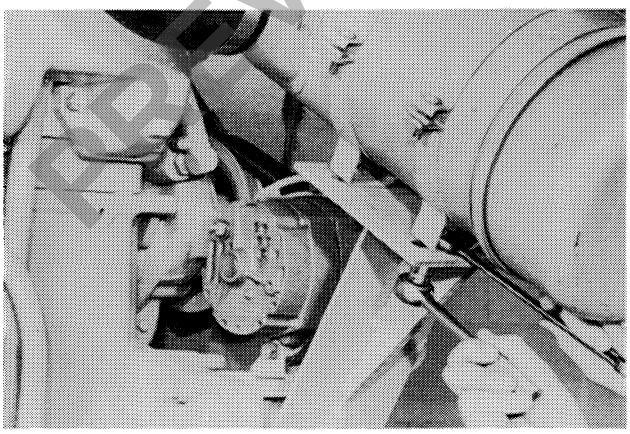
Removal

STEP 154



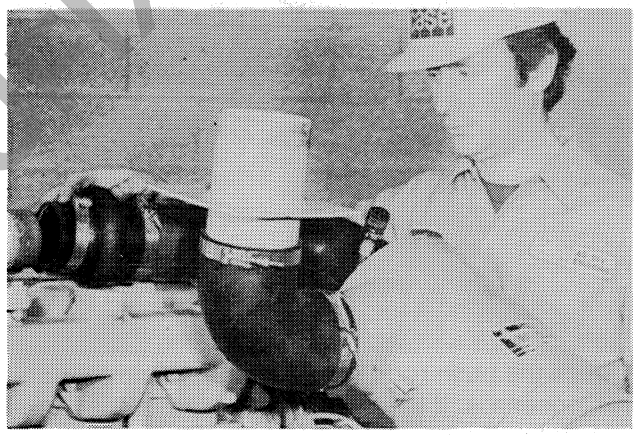
Loosen the hose clamp on the air filter assembly to intake manifold hose.

STEP 155



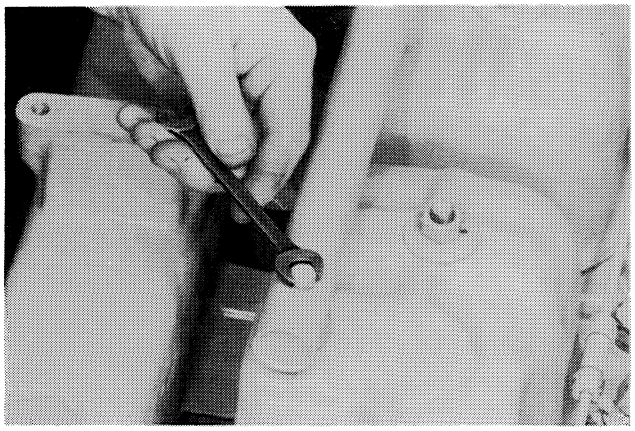
Remove the mounting bolts for the air filter assembly.

STEP 156



Remove the air filter assembly.

STEP 157



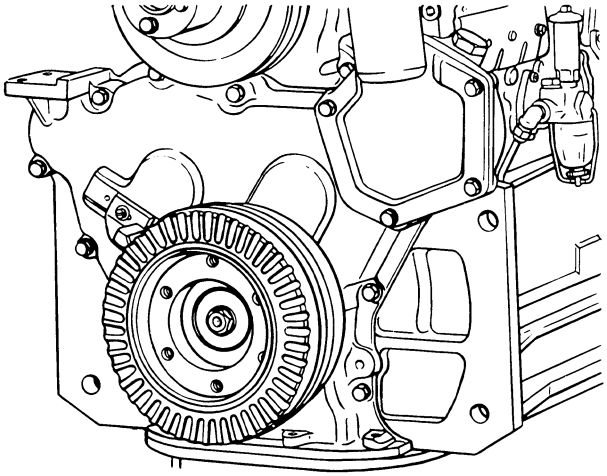
Remove the mounting bolts from the breather tube.

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STEP 11



CRANKSHAFT PULLEY INSTALLED ON ENGINE.

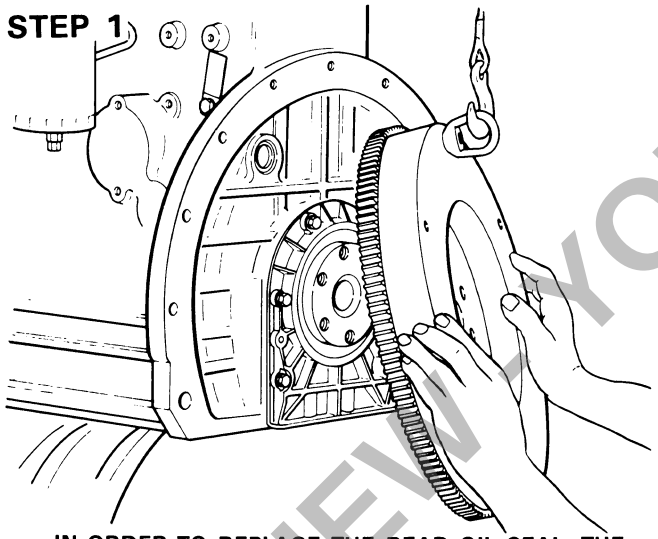
STEP 12

INSTALL FAN BELTS AND AIR CONDITIONING BELT. REFER TO VEHICLE OPERATOR'S MANUAL FOR CORRECT BELT INSTALLATION AND ADJUSTMENT.

REAR OIL SEAL REPLACEMENT

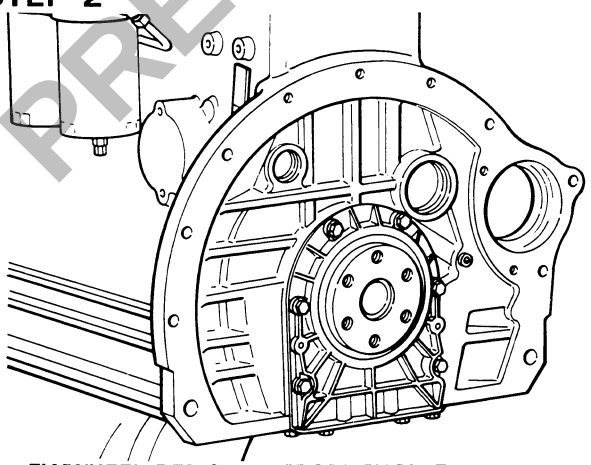
(Refer to oversize seal installation)

STEP 1



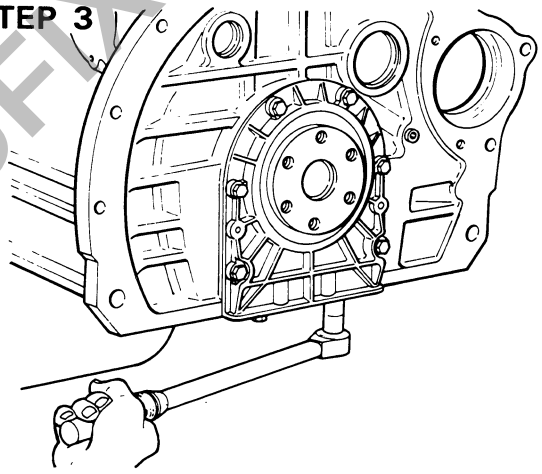
IN ORDER TO REPLACE THE REAR OIL SEAL, THE ENGINE MUST BE REMOVED FROM THE MACHINE AND FLYWHEEL REMOVED FROM ENGINE.

STEP 2



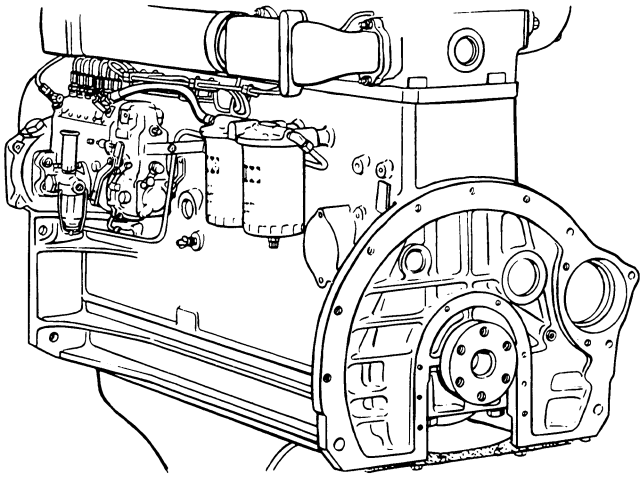
FLYWHEEL REMOVED FROM ENGINE.

STEP 3



REMOVE THE REAR SEAL CARRIER FROM THE ENGINE.

STEP 4



SEAL CARRIER REMOVED FROM ENGINE.

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SAFETY PRECAUTIONS



CAUTION: Care should be exercised to avoid expelled steam and coolant when servicing components of the cooling system or draining the system. The system is pressurized and there is a danger of being sprayed by hot coolant when opening drains or removing the radiator cap.

Relieve the system pressure by turning the radiator cap counter-clockwise to the FIRST stop. This will allow a gradual reduction in pressure and minimize coolant loss.

NEVER pour cold coolant into a hot engine. The engine block or cylinder heads may crack by the sudden contraction caused by the difference in temperature between the metal and the coolant.

CLEANING THE COOLING SYSTEM

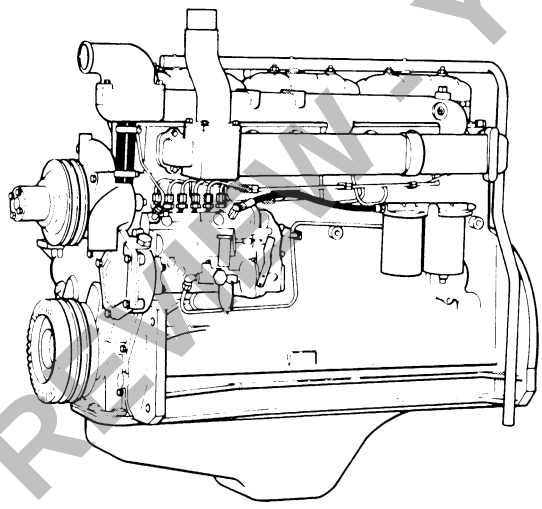
It is recommended that the cooling system be cleaned at least once a year. In areas where water containing scale forming minerals is all that is available, clean the system more often.

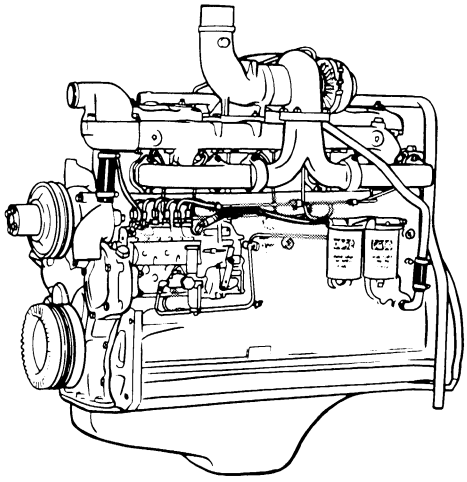
1. While the coolant is still hot, open the radiator drain valve, the engine block drain valve and the heat exchanger drain valve.

2. Add any nationally known commercial brand cleaner marketed by a reputable manufacturer. Follow the directions provided with the cleaner.

3. After draining the cleaning solution, flush the system with clean water before refilling for operation.

NOTE: If water is used in the cooling system during the summer months, always add a reputable brand rust (or corrosion) inhibitor.

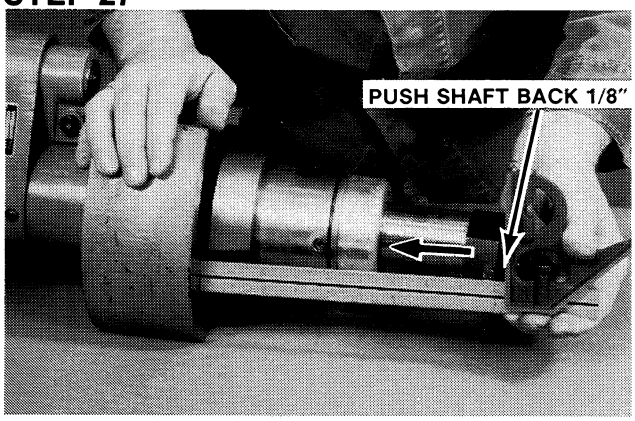


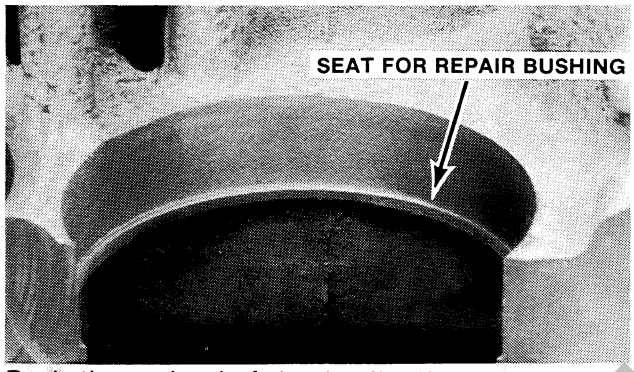


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STEP 27

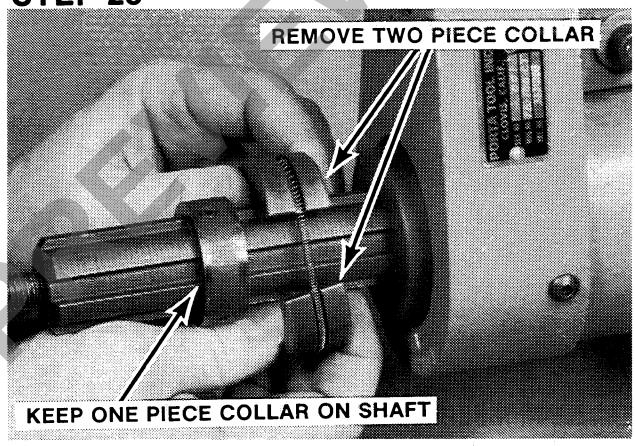




Push the main shaft back 1/8" (3.175 mm). This adjustment will leave a small seat in the bore after the cutting operation. The seat in the bore is used to position the repair bushing.

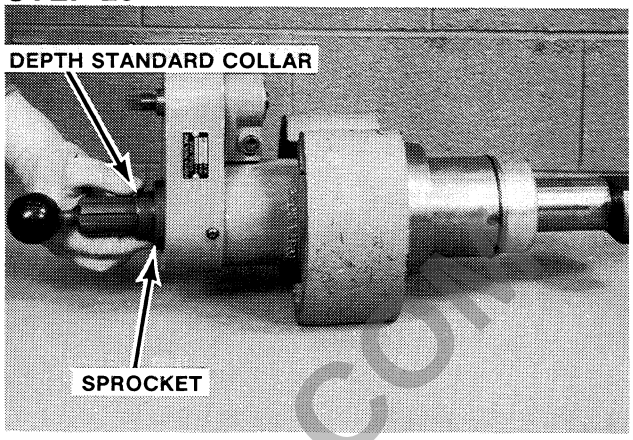
NOTE: *Because this is a cast surface, there can be times when a small seat will not remain. Check your depth, the depth must not be over 9.12" (231.6 mm).*

STEP 28



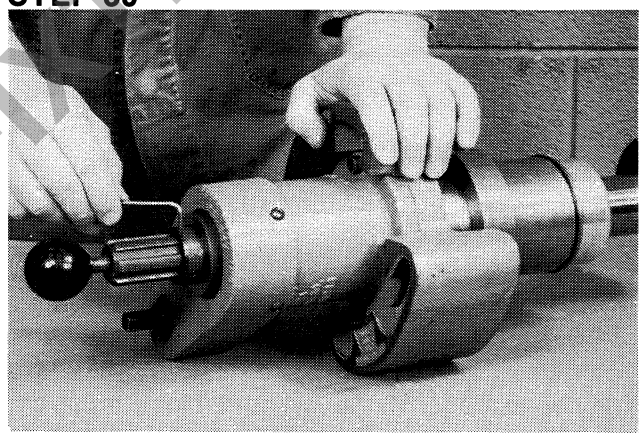
Make sure that the two piece collar, which controls the chamfer depth, is not on the splined shaft. Keep the one piece depth standard collar, which controls the bore depth for the repair bushing, on the splined shaft.

STEP 29



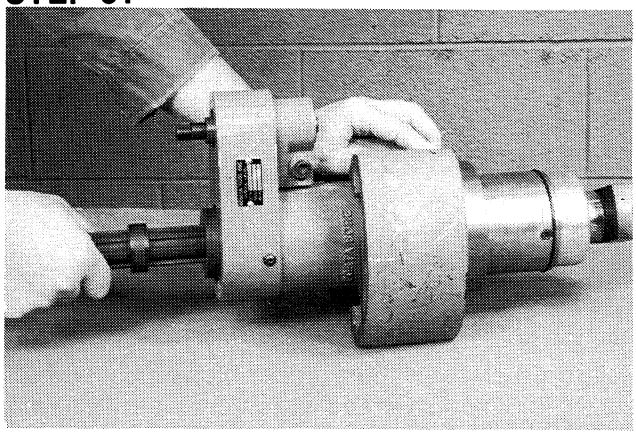
Slide the one piece depth standard collar down on the splined shaft until the depth standard collar hits the sprocket on the main shaft.

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.

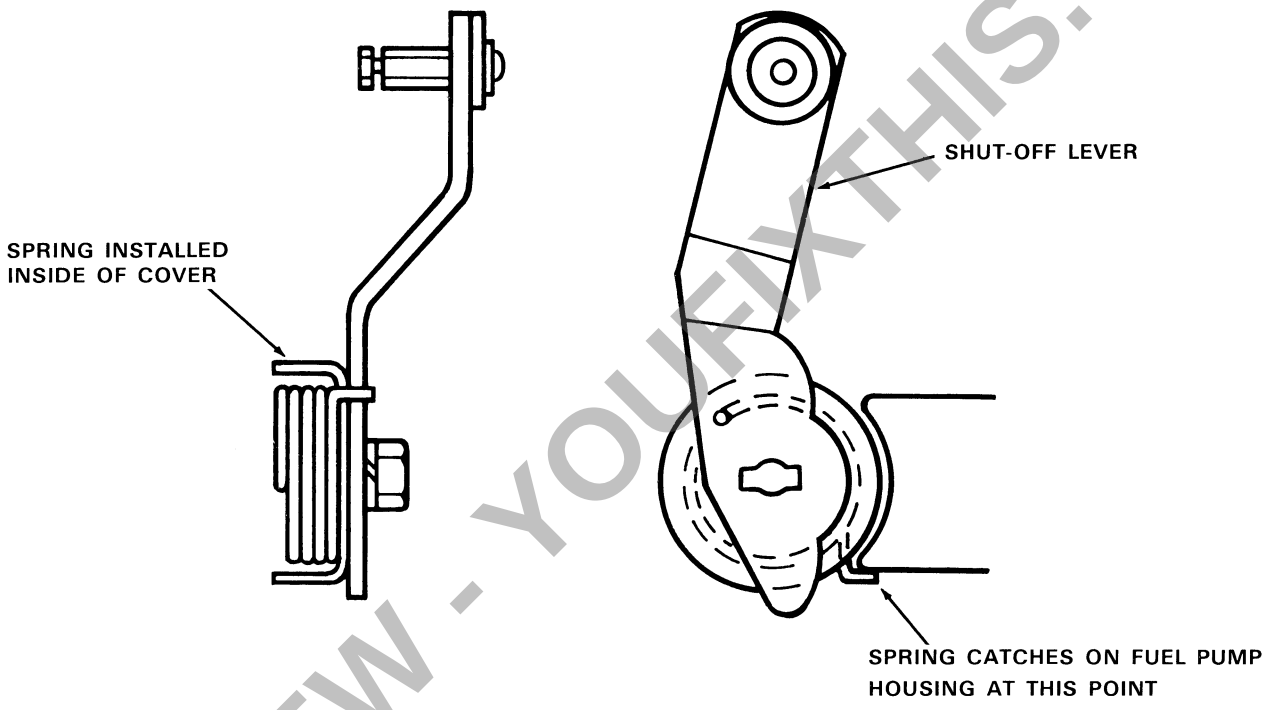
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MANUAL FUEL PUMP SHUT-OFF CABLE ON 2470 TRACTORS

Occasionally, the fuel shut-off cable will work out and as a result, fuel flow is restricted and a decrease in horsepower is noted.

If this problem is experienced, it can be corrected by installing A45277 torsion spring inside the pump spring cover and a new A45273 shut-off lever with bowden wire connector as illustrated below:

NOTE: Spring and lever were install on fuel pumps starting with tractor S/N 8763129.



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VOLTMETER

CHART 1		
Voltage Measured	**Engine Speed**	**Condition of Charging System**
0-21 Volts	Stopped or Low Idle	Very low battery charge
	Stopped or Low Idle	Low-to-normal battery charge
22-24 Volts	Above Low Idle	Problem in charging system. See Troubleshooting - Charging System
24-26 Volts	Stopped or Low Idle	Normal battery charge
	Above Low Idle	Problem in charging system. See Troubleshooting - Charging System
26-30 Volts	Stopped or Low Idle	If needle is on the line between 26 and 27 volts, the battery is newly charged
	Above Low Idle	Normal operation range
30 or more Volts	Above Low Idle	Overcharge. See Troubleshooting - Charging System

CHART 2				
Voltmeter Reading	**Engine Speed**	**Load**	**Problem**	**Ammeter Reading for Similar Condition**
Less than 26 Volts	Above Low Idle	No Load or Normal Load	1. Alternator Failure	No Reading
			2. Broken Drive Belt	
		More than Alternator Output	3. Low Alternator Output	
			4. Shorted or Open Diodes	
			5. Low Battery Charge	
		No Load or Normal Load	6. No Voltage Regulator Output	
		Overload	7. Too Much Accessory Draw	High Discharge
24-26 Volts	Above Low Idle	No Load or Normal Load	1. Voltage Regulator Setting too Low	No Reading
Over 30 Volts	Above Low Idle	No Load or Normal Load	1. Voltage Regulator Failure	No Reading
			2. Voltage Regulator Set too High	
	Low Idle	No Load or Normal Load	1. Uncontrolled Voltage Regulator Output	High Current Charge
Continued decrease in battery voltage	Engine Stopped	No Load	1. Slow Battery Failure	No Reading

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13. Remove the rubber cover from the core assembly.

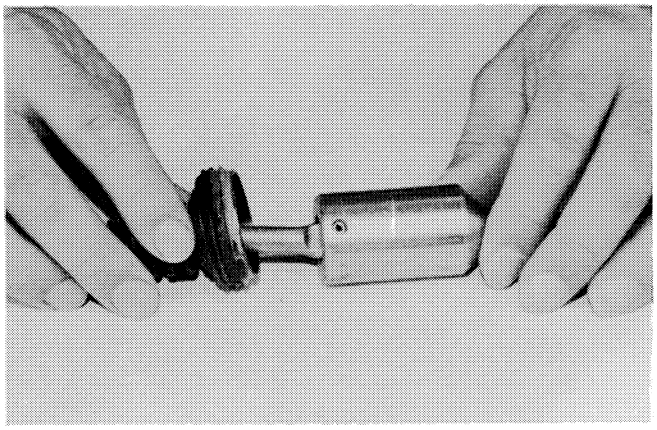


Figure 147

14. Remove the flat washer from the rubber cover.

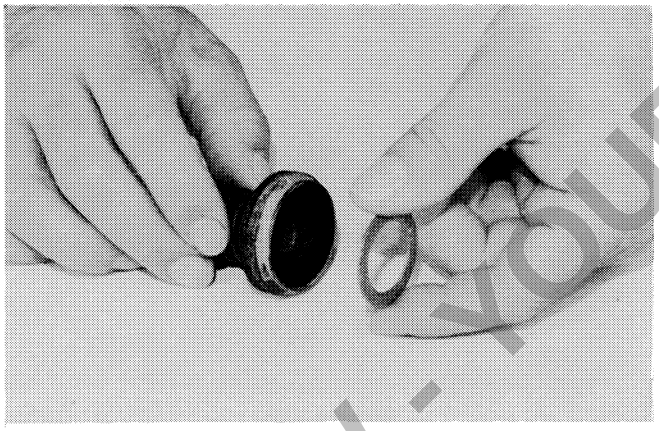


Figure 148

15. Disassemble the end cover only if replacement parts are indicated.

Inspection

1. Discard the gasket.
2. Clean all metal parts in cleaning solvent.
3. Use a dry cloth to clean the rubber cover.
4. Check the rubber cover for cracks. The rubber cover must be flexible.
5. Check all parts for wear or damage.

Assembly

1. If necessary, assemble the end cover, See Figure 134.

2. Put the flat washer in the rubber cover.

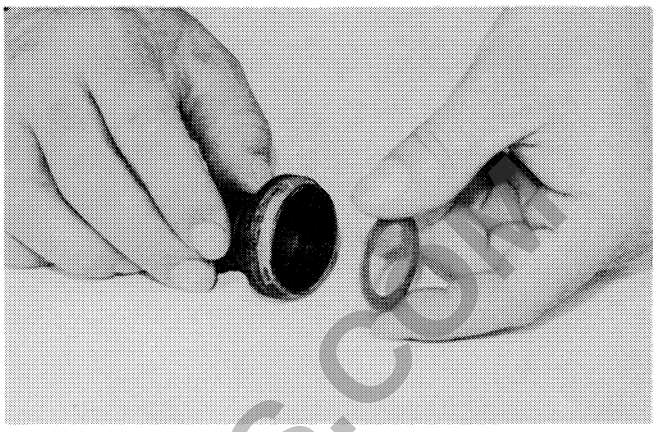


Figure 149

3. Install the rubber cover on the plunger.

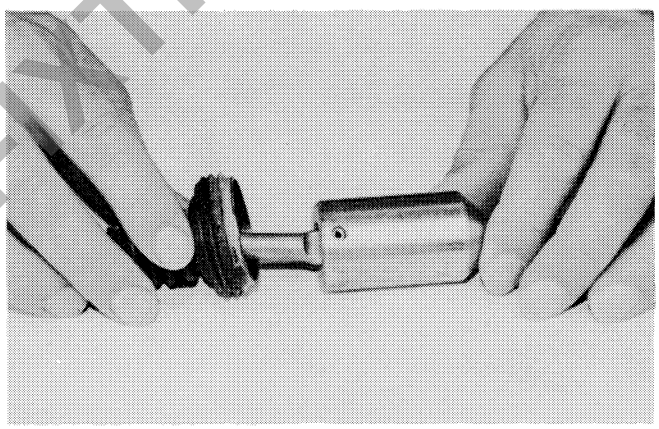


Figure 150

4. Install the inner spring retainer, spring, and outer spring retainer on the plunger.

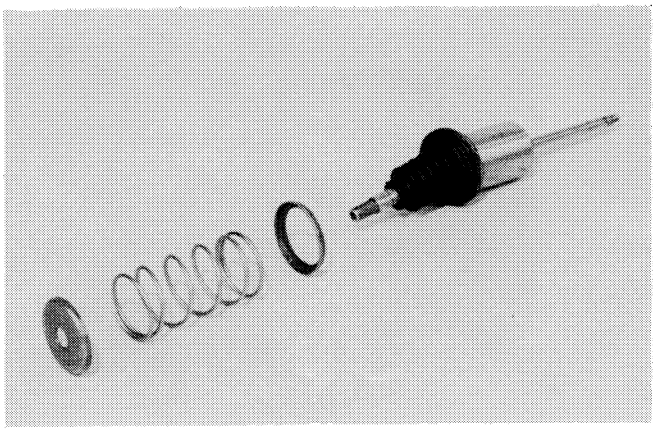


Figure 151

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Alternator Output Test

1. Remove the negative (ground) battery cable from the battery. Install a battery post adapter shown in Figure 2 on the negative battery post. Then connect the negative battery cable to the battery post adapter.

   NOTE: Before doing step 2, close the switch on the Sun Electric battery post adapter or turn the switch nut up several turns to close the switch on the Snap-On battery post adapter.

2. Connect the leads from the ammeter to the battery post adapter. See Figure 2 for instructions.

3. Connect the positive lead from the voltmeter to the OUTPUT terminal on the alternator. Connect the negative lead from the voltmeter to the NEG terminal on the alternator.

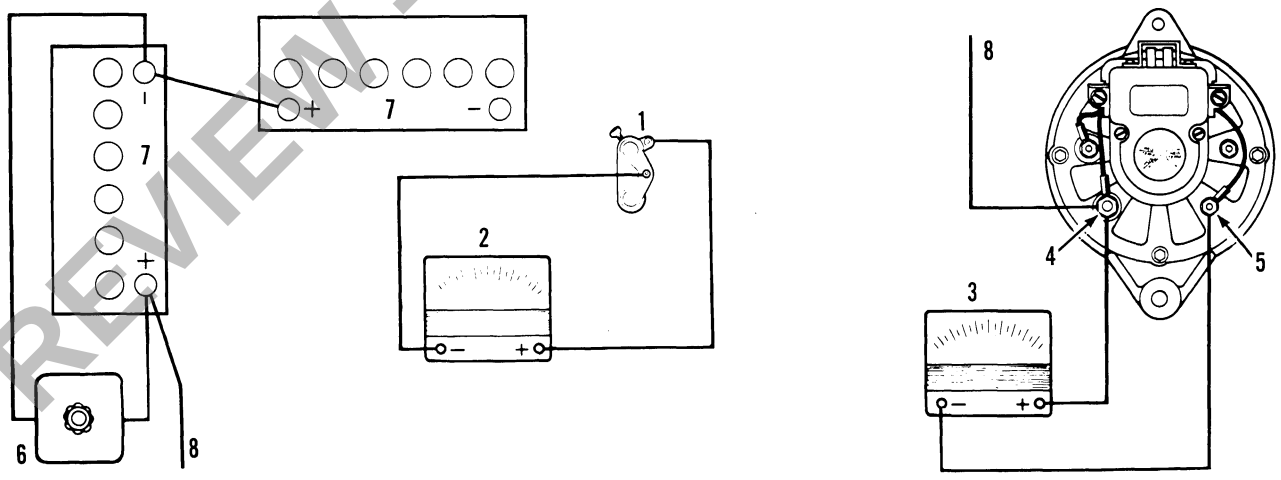
4. Connect the carbon pile (or load control) to one battery as shown in Figure 4. The control for the carbon pile (or load control) must be in the Off position before making connections.

5. Start and run the engine at 800 rpm (r/min). Open the switch on the battery post adapter. Turn the switch nut down on the Snap-On battery post adapter until the top plate is free of the post. If the ammeter indication is less than 10 amperes, turn the control on the carbon pile (or load control) until the ammeter indication is 10 amperes. Run the engine 5 minutes to make the temperature of the charging circuit components equal.

6. Increase the engine speed to 1500 rpm (r/min). Adjust the carbon pile (or load control) to get the maximum current output (amperes). The ammeter indication must be 42 amperes. The voltage must be between 25 volts and 29 volts.

7. Stop the engine. Turn the carbon pile (or load control) control to the Off position.

8. If the alternator output is not equal to the specification in step 6, the alternator must be removed for repair. Disassemble the alternator and do the tests for the stator, rotor and rectifier diodes.



1. SNAP-ON BATTERY POST ADAPTER SHOWN. INSTALL BATTERY POST ADAPTER ON NEGATIVE BATTERY POST. CONNECT CABLE TO BATTERY POST ADAPTER.
2. AMMETER
3. VOLTMETER
4. OUTPUT TERMINAL
5. NEG TERMINAL
6. CARBON PILE
7. 12 VOLT BATTERY
8. CONNECTED TO BAT TERMINAL ON THE SOLENOID FOR THE STARTER

Figure 4

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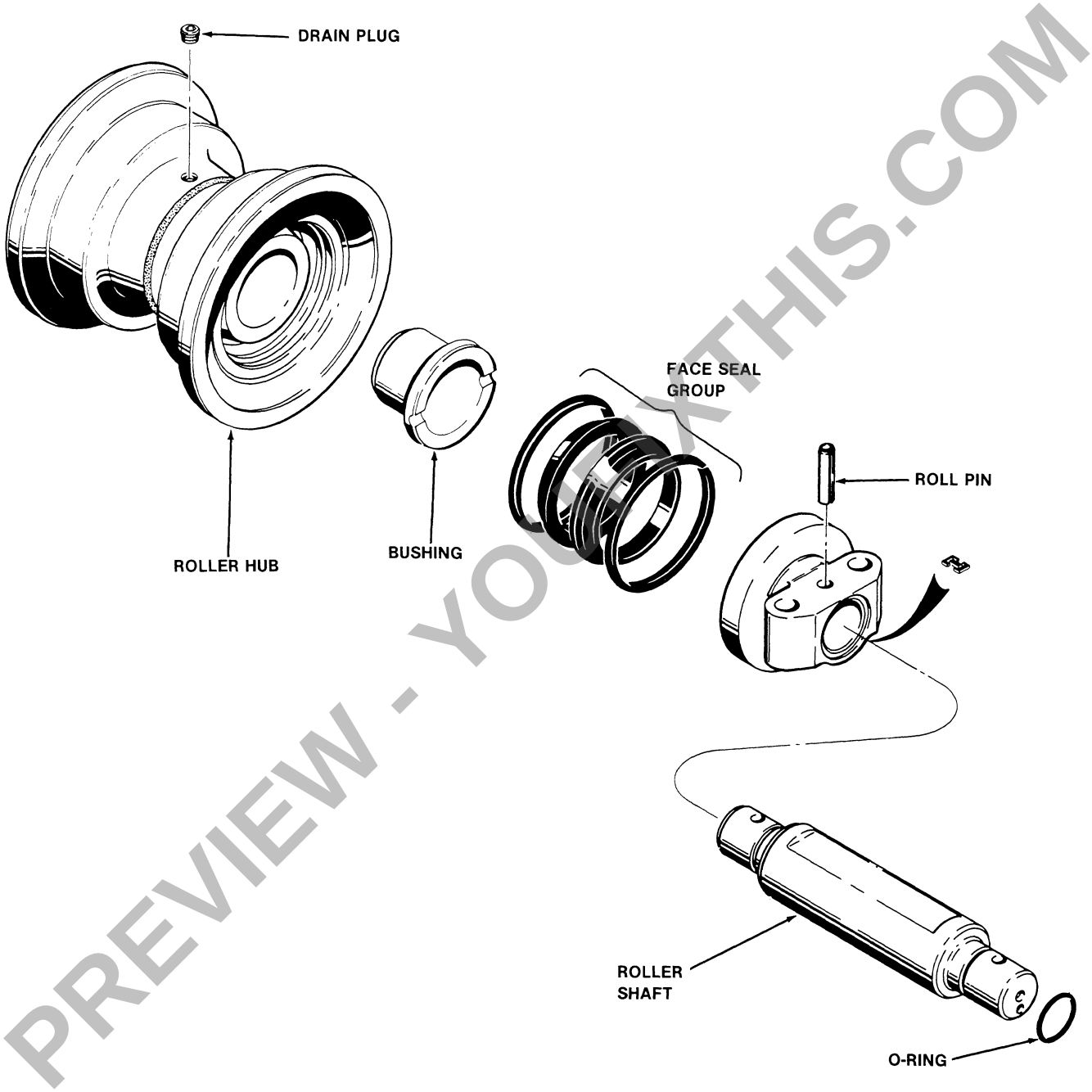


Figure 8. Track Roller Exploded View

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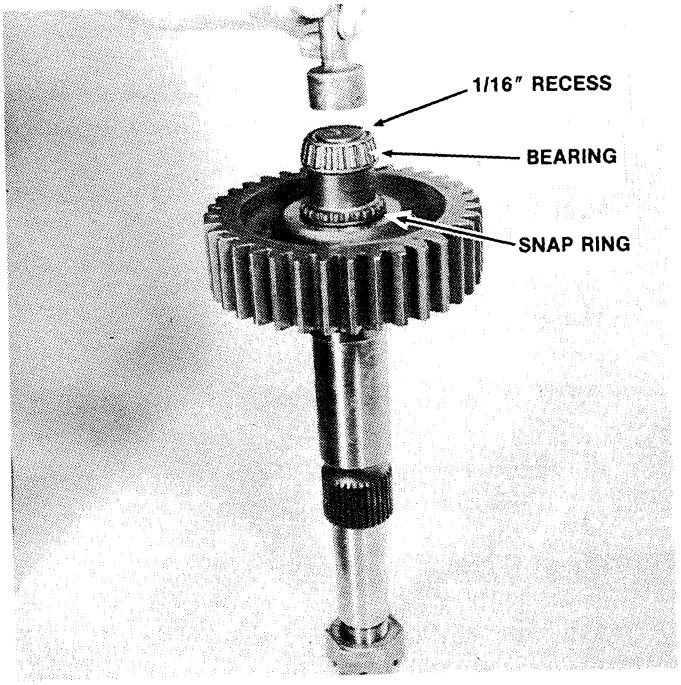


Figure 4.

3. Install bearing onto output end of output shaft. Use a brass drift pin to tap this bearing carefully into position. Tap only on inner race. After installing snap rings, lay this assembly aside temporarily.

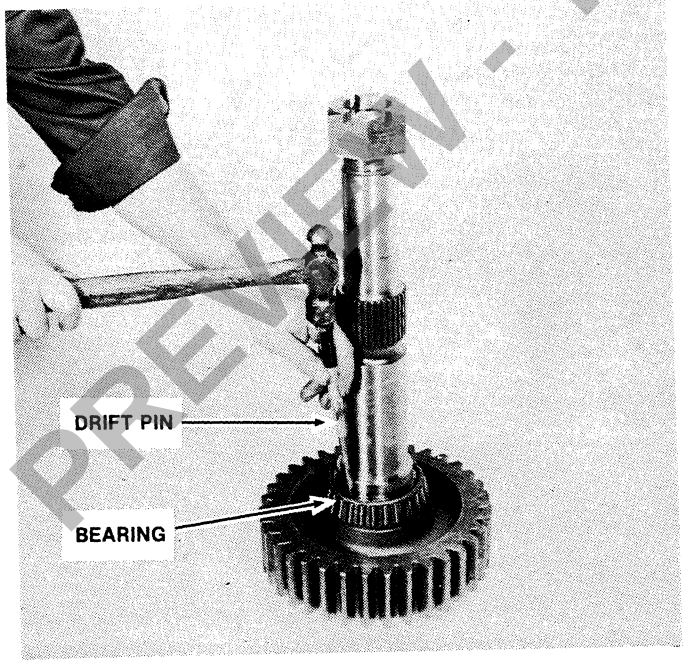


Figure 5.

4. Install the bearings onto each end of the second intermediate gear. Use driver No. S 215707. The shaft must protrude 1/16 in. (1.6 mm) beyond bearings (Figure 6).

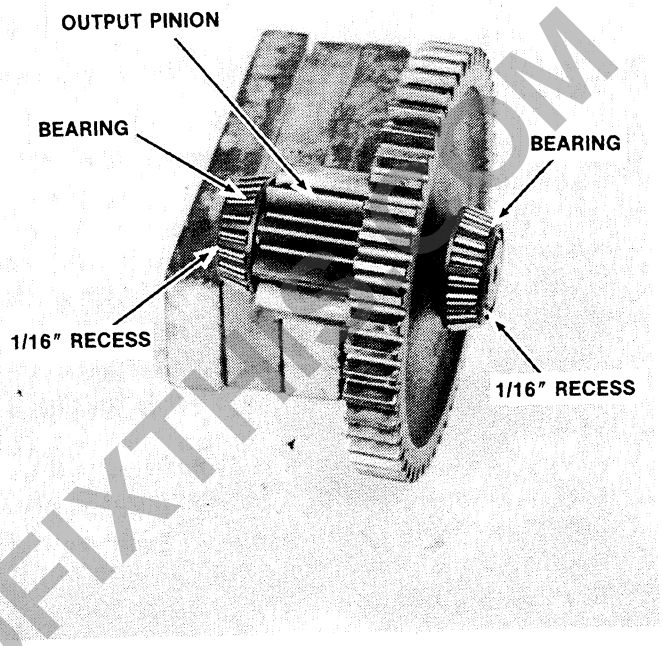


Figure 6.

5. Drive the bearings into place on each end of the input shaft with driver No. S 215703. (Figure 7)

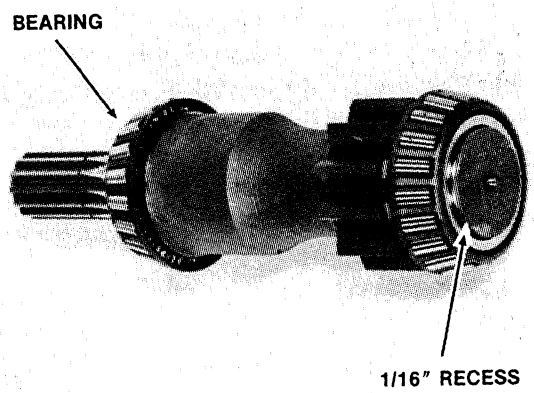


Figure 7.

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Control Valves (Con't.)

PROBLEM	POSSIBLE CAUSE	REMEDY
Sluggish operation (con't.)	Excessive clearance between spool and spool bore	Replace valve section
Control lever in Neutral; cylinders drift	Spool or relief valve leakage	Replace the defective parts

Hoses and Fittings

PROBLEM	POSSIBLE CAUSE	REMEDY
Hose cover separated from wire braid	Hose twisted	Install hose properly; connect at swivel fitting last and make sure hose does not twist when fitting is tightened
Fitting pulled from hose or burst hose	Hose twisted	Same as above
	Improperly adjusted or faulty secondary relief valve.	Adjust relief valve as instructed in this section. If valve cannot be adjusted, replace valve
Damaged threads	Over torqued	Torque to specifications, Section 1051

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The relief valve will remain open until the cylinder moves or the control valve spool is returned to neutral.

Secondary Relief Valve

The swing, crowd, right track, hoist, tool, left track and auxiliary circuits are equipped with either a high or low pressure secondary relief valve. Pressure settings are given on page 8207-3. High pressure meaning that the secondary valve pressure is set above main relief pressure and low pressure meaning that it is set below main relief pressure. Each spool in the control valve has two secondary relief valves. One for the "A" port, spool eye end port and one for the "B" port, or rear port.

The purpose of a high pressure secondary relief valve is to protect the circuit from shock loads or buildup of excessive pressures when the spool in is neutral. The excessive pressure created in the circuit is relieved by the high pressure relief valve.

The purpose of a low pressure secondary relief valve is to maintain working pressures in a hydraulic circuit below main relief. All circuits, except the hoist, are protected by low pressure secondary reliefs. The pressure settings on the secondary relief are set below the main relief. When the working pressures for any function, other than the hoist, are to be adjusted, the low pressure secondary relief valves on each working circuit are to be individually adjusted. Do not adjust the Main Relief.

Operation as a High or Low Pressure Relief

The operation of the secondary relief valve is similar to the main relief valve. It is pilot operated, which means a spear shaped pilot poppet controls the pressure at which the valve opens and permits the gradual opening of the relief valve. Note that the main poppet has a small sensing tube through it. This permits the same pressure to be maintained on both sides of the poppet during normal operation and helps control the gradual opening of the relief valve when pressures reach the specified setting. Figure 4.

1. Figure 8. When pressure in the working circuit is below the setting on the relief valve the spear shaped pilot poppet and main poppet are positioned on their seat.

2. Figure 9. When pressure reaches the setting on the relief valve, the spear shaped pilot plunger is forced back off its seat compressing the adjustment spring. When this happens, a partial drop in pressure occurs in the area between the poppet and the spear shaped pilot plunger, due to the flow of oil through the orifice in the sensing tube.

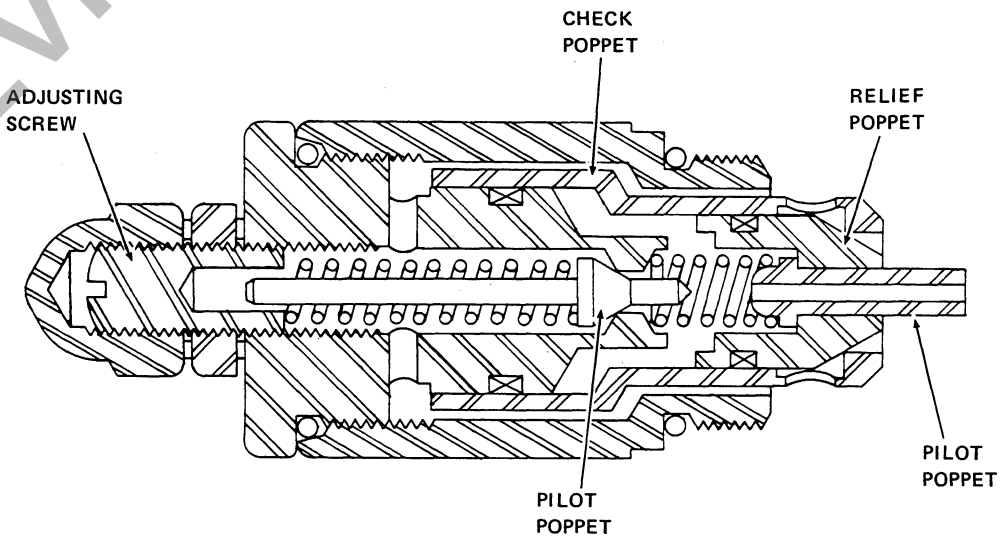


Figure 7. Secondary Relief Valve Cutaway View

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GENERAL

The hydraulic swivel is located at the center of the turntable and is used to transmit hydraulic fluid between the non-rotating lower structure and the turntable. Its design maintains a constant flow of oil to the upper hydraulic components through 360° turntable rotation.

The swivel consists of a ported housing (female) which is fitted over a ported and cored shaft (male). Each port in the housing has a corresponding ported groove in the shaft. Each of the grooves in the shaft is sealed against bypassing or internal leakage by replaceable seals which fit closely against the housing. The housing is attached to the turntable and rotates with it. The shaft is affixed to the lower structure and remains stationary.

Swivel Porting

The number of each port is stamped on the upper swivel flange. The inner swivel shaft is ported in numerical order from top to bottom. Swivel porting functions are shown in Figure 1.

Swivel Maintenance

The swivel normally requires little or no maintenance, and if the hydraulic fluid is kept clean and free of contaminants there should be no worry about broken or damaged rings. If you find that the swivel is leaking fluid from one port to another, it should be removed from the machine and the o-rings and teflon back-up rings replaced.

Troubleshooting the Swivel

A broken o-ring or broken casting between two ports of the swivel is usually very easy to identify; some function of the upperstructure will behave erratically.

It is important to know the arrangement of the grooves (oil flow paths) inside the swivel. Once the swivel porting functions are known, it can easily be determined whether the swivel is the cause of the problem.

Hydraulic fluid follows the path of least resistance. If a leak develops between a swivel gallery carrying high pressure oil and one carrying low pressure oil, the fluid will flow into the low pressure passage instead of performing the work intended for it. For example, a leak between Port 1 and Port 3 of the swivel would cause erratic right track reverse operation. You would experience a pull or drag to the right when traveling in reverse. High pressure from Port 3 would escape back to tank through Port 1 and result in lack of power in the right track motor.

Study the arrangement of the internal passages in the swivel carefully. The function of each passage is listed in Figure 1. Ports 4 and 5 are used only on machines equipped with a leveler.

SERVICE

Removal

Park machine on level surface, with dipperstick vertical and bucket resting on ground. Shut down engine. Cycle track drive control several times while cranking engine with shutoff pulled to relieve drive circuit pressure.

If machine is equipped with a leveler, put blocks on both sides of turntable to support turntable when swivel is removed.

Apply digging brake to release pressure in brake line. Then remove swivel as follows:

1. Clean swivel area thoroughly to prevent entry of dirt into the system. Steam cleaning is recommended.

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