1845 UNI-LOADER TABLE OF CONTENTS AND SERVICE MANUAL INTRODUCTION

Table of Contents

C.E. Div. 9-73926
1845 Uni-Loader
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CASE CORPORATION

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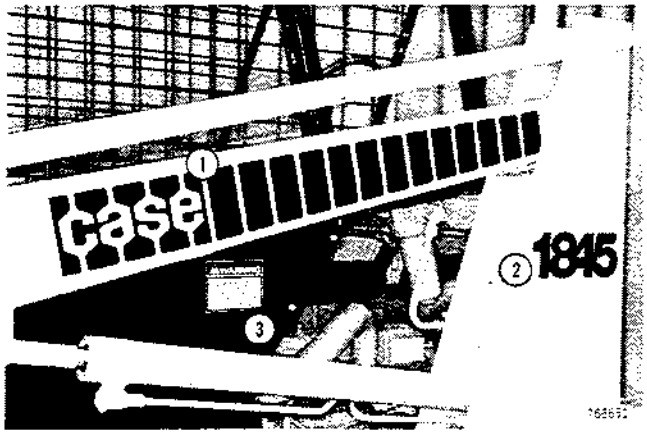
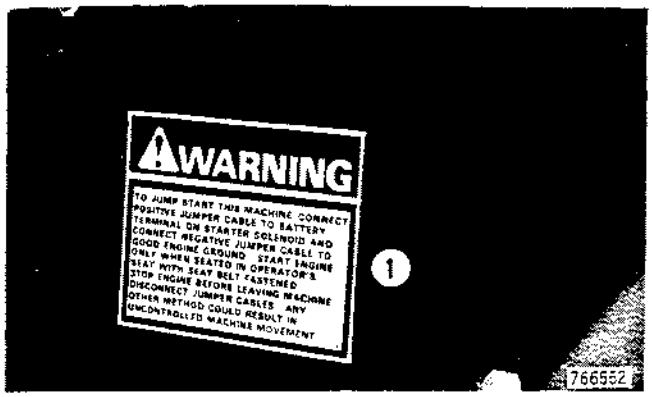


1. 321-3157
2. 321-3153
3. 321-3342 See Figure 5

Figure 3

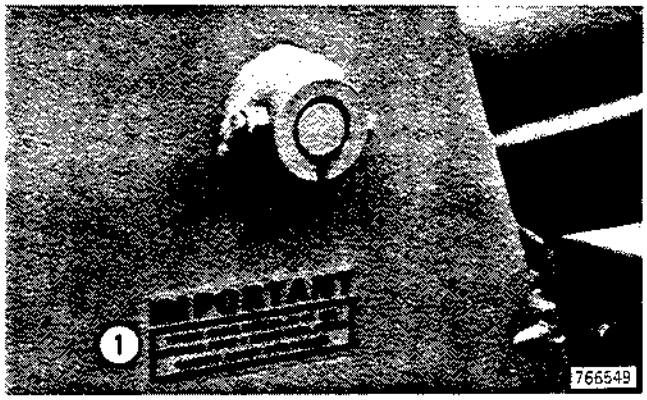
1. 321-3030

Figure 4



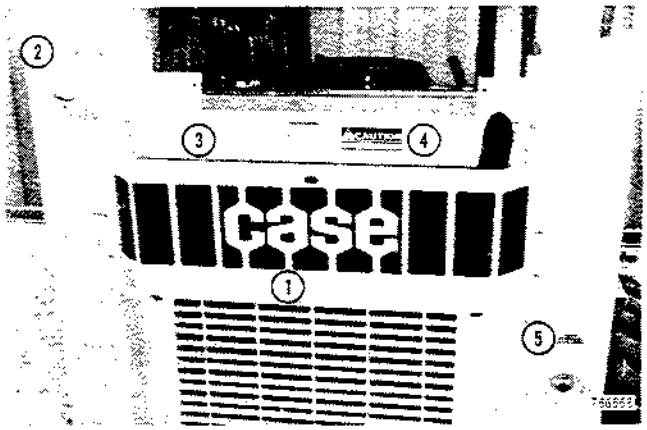
1. 321-3342

Figure 5



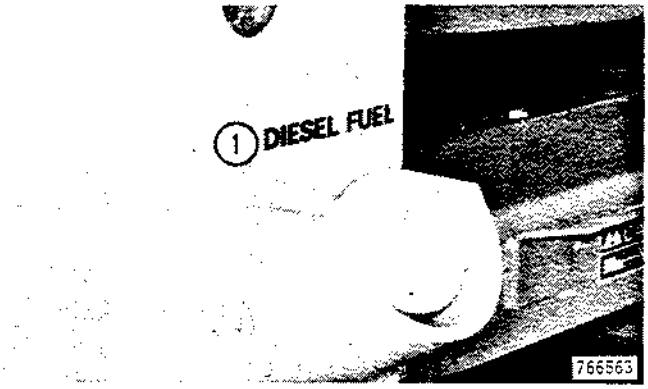
1. 321-2973 Decal is used on each side

Figure 6



1. 321-3076
2. 321-230 Also see Figures 8 and 9
3. 321-1060 See Figure 10
4. 321-3061 See Figure 11
5. 321-2733 See Figure 12

Figure 7



1. 321-230

Figure 8

Crankshaft (Cont'd)

	U.S. Value	Metric Value
Main bearing journal std. O.D.	2.8730 to 2.8740″	72.974 to 73.000mm
.002″ (.051mm) O.D. undersize, grind to	2.8710 to 2.8720″	72.923 to 72.949mm
.010″ (.254mm) O.D. undersize, grind to	2.8630 to 2.8640″	72.720 to 72.746mm
.020″ (.508mm) O.D. undersize, grind to	2.8530 to 2.8540″	72.466 to 72.492mm
.030″ (.762mm) O.D. undersize, grind to	2.8430 to 2.8440″	72.212 to 72.238mm
Main bearing journal bore I.D. without liners	3.066 to 3.067″	77.876 to 77.902mm
Main journal width between cheeks:		
2nd and 4th	1.185 to 1.189″	30.099 to 30.201mm
3rd	1.3740 to 1.3770″	34.900 to 34.976mm
5th	1.745 to 1.755″	44.32 to 44.58mm
Connecting rod journals width between cheeks	1.3105 to 1.3145″	33.287 to 33.388mm

Camshaft

Type	Parabolic	
Bushings	5, Replaceable	
Bushing Lubrication:		
Front bushing	Pressure lubricated from oil pump	
Intermediate bushing	Gravity flow lubricated	
Rear bushing	Pressure lubricated with rear oil metering.	
Oil clearance	.002 to .007″	.051 to .178mm
I.D. of bushing installed	1.752 to 1.753″	44.501 to 44.526mm
Maximum Serviceable Limit	1.755″	44.577mm
Bushing width:		
1st (front)	1.213 to 1.223″	30.810 to 31.064mm
2nd, 3rd and 4th	.490 to .500″	12.446 to 12.700mm
5th (rear)	1.213 to 1.223″	39.810 to 31.064mm
O.D. of each bearing surface	1.749 to 1.750″	44.425 to 44.450mm
Minimum Serviceable Limit	1.748″	44.399mm
Thrust washer thickness	.147 to .149″	3.734 to 3.785mm
Minimum Serviceable Limit	Maintain end clearance	
Camshaft end play	Taken up by thrust washer	
Camshaft end clearance	.003 to .007″	.076 to .178mm

Valve Push Rod Lifters

Material	Hardened Steel	
Type	Mushroom	
O.D. of lifter stem	.5605 to .5610″	14.237 to 14.249mm
I.D. of block bore, including wear	.5625 to .5650″	14.287 to 14.351mm

INTERVAL	SERVICE	INSTRUCTIONS
Every 200 hours of operation	Change engine oil filter.	
Every 250 hours of operation	Check drive chain tension.	Section 6023
	Lubricate distributor shaft.	
	Clean and regap spark plugs.	Section 8013
	Grease axle bearings.	Section 6023
Every 500 hours of operation	Replace fuel filters on diesel engine. Sooner if loss of engine power is noted.	Section 3010
	Inspect ignition points for wear. Check gap and adjust if necessary.	Section 8013
	Clean radiator and oil cooler fins and check radiator for leaks.	
	Inspect the Roll-Over Protection Structure.	Section 9019
	Drain, flush and refill gear reducers.	Section 6036
	Drain, flush and refill chain compartments.	Section 6023
Every 1000 hours of operation	Drain hydraulic reservoir and refill with Case TCH Fluid.	Section 4011
	Change charge circuit and system hydraulic oil filters.	Section 4011
	Replace inline fuel filter on gas engine.	Section 3110
	Clean hydraulic reservoir breather.	Section 4011
	Drain sediment and water from fuel tank.	
Every 2000 hours of operation or yearly whichever occurs first	Drain, flush and refill cooling system.	
As required	Clean or replace air cleaner element when red band on restriction indicator remains in view.	Section 2051
	Replace hydrostatic charge circuit filter when warning light comes on.	Section 4011
	Replace hydraulic oil filter.	Section 4011
	Torque wheel nut every two hours until stable after reinstalling wheels.	Section 6024
	Clean machine; inside and out.	

U.S. AND METRIC TORQUE SPECIFICATIONS

Hydraulic Fittings (Steel)

Dash Size	Tube O.D. Hose I.D.	Thread Size	37° Flare Torque		Straight Thread O-ring Torque	
			Ft-lbs	N m	Ft-lbs	N m
4	1/4"	7/16"-20	6-12	8-16	12-19	16-25
5	5/16"	1/2"-20	8-16	11-21	16-25	22-33
6	3/8"	9/16"-18	10-25	14-33	25-40	34-54
8	1/2"	3/4"-16	15-42	20-56	42-67	57-90
10	5/8"	7/8"-14	25-58	34-78	58-92	79-124
12	3/4"	1-1/16"-12	40-80	54-108	80-128	108-174
14	7/8"	1-3/16"-12	60-100	81-135	100-160	136-216
16	1"	1-5/16"-12	75-117	102-158	117-187	159-253
20	1-1/4"	1-5/8"-12	125-165	169-223	165-264	224-357
24	1-1/2"	1-7/8"-12	210-250	285-338	250-400	339-542

Split Flange Mounting Bolts (Grade 5, Dry Threads)

Flange Size	Thread Size	Torque	
		Ft-lbs	N m
1/2"	5/16"-18 NC	15-20	20-25
3/4"	3/8"-16 NC	20-25	26-33
1"	3/8"-16 NC	20-25	26-33
1-1/4"	7/16"-14 NC	35-45	47-61
1-1/2"	1/2"-13 NC	45-55	61-74
2"	1/2"-13 NC	55-65	74-88
2-1/2"	1/2"-13 NC	80-90	104-122
3"	5/8"-11 NC	140-150	190-203

740314

Exhaust Valve Guides

	U.S. Value	Metric Value
Length	2.438″	61.925mm
O.D.	.6565 to .6575″	16.675 to 16.701mm
I.D. (installed and reamed)	.3422 to .3432″	8.692 to 8.717mm
Maximum Serviceable Limit	.3452″	8.768mm
Protrusion above cylinder head	.844″	21.438mm
Valve stem clearance in guide	.002 to .004″	.051 to .102mm
Maximum Serviceable Limit	.005″	.127mm

Intake Valve

Tappet clearance (COLD and HOT)	.014″	.356mm
Face angle	29°	29°
Face run-out (max.)	.002″	.051mm
Length	5.275 to 5.300″	133.985 to 134.620mm
O.D. of stem	.3406 to .3414″	8.651 to 8.672mm
Minimum Serviceable Limit	.002″ Difference at any point	.051mm Difference at any point
O.D. of head	1.410 to 1.420″	35.814 to 36.068mm
Seat angle	30°	30°
Seat contact width	.045 to .060″	1.143 to 1.524mm
Seat run-out (max.)	.002″	.051mm

Exhaust Valve

Tappet clearance (HOT)	.014″	.356mm
(COLD)	.020″	.508mm
Face angle	44°	44°
Face run-out (max.)	.002″	.051mm
O.D. of head	1.265 to 1.275″	32.131 to 32.385mm
O.D. of stem	.3382 to .3390″	8.590 to 8.611mm
Minimum Serviceable Limit	.002″ Difference at any point	.051mm Difference at any point
Length	5.309 to 5.334″	134.849 to 135.484mm
Insert seat angle	45°	45°
Seat contact width	.090 to .100″	2.286 to 2.540mm
Seat run-out (max.)	.002″	.051mm
Insert height	.198 to .203″	5.029 to 5.842mm
O.D. of insert	1.3765 to 1.3775″	34.963 to 34.989mm
I.D. of insert	1.074 to 1.084″	27.280 to 27.534mm
I.D. of head	1.370 to 1.380″	34.798 to 35.052mm

ENGINE STARTS BUT WILL NOT RUN

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 mixtures and low engine power. Check filter restriction indicator and service final air filter if required.

3. Air In Fuel System

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

4. Low Fuel Supply

Check fuel supply in tank and refill if necessary.

5. Injection Pump Rack Control Sticking

A sticking rack control will not allow the fuel injection pump to accept any fuel.

6. Low Compression

Low compression on several cylinders, makes the engine hard to start and rough running, also does not generate enough heat to properly fire on all cylinders. Make a compression test on the engine.

7. Valve Push Rods Bent

Bent push rods will affect valve operation and not allow cylinders to get a full charge of fuel and air, or not exhaust properly. This can usually be distinquished by excessive valve tappet noise. Remove cylinder cover and check for bent push rods.

8. Camshaft Damaged

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

9. Wrong Fuel or Contaminated Fuel

Wrong fuel (low centane) or contaminated fuel (water and dirt) can cause the engine not to run or to have pre-combustion, causing serious damage to the engine. Drain fuel tank and refill with correct fuel.

10. Clogged Fuel Filter

Check and service fuel filters.

11. Fuel Injection Nozzles Malfunctioning

Low cracking pressure, improper spray pattern, or plugged spray orifice will affect proper combustion in engine cylinders. Remove and test the fuel injection nozzles.

12. Cylinder Head Gasket Blown

A blown cylinder head gasket will cause one or two cylinders to loose power and cause an engine to miss. Compression leaking into the water system can also cause the cooling system pressure to rise and blow engine coolant out the radiator overflow. Take a compression test to help determine a defective head gasket, or remove radiator cap, run engine and check for gas bubbles rising in coolant at radiator opening.

13. Piston Rings Worn

As piston rings become worn, they lose tension and ability to seal and wipe lubricating 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.

HIGH ENGINE OIL CONSUMPTION

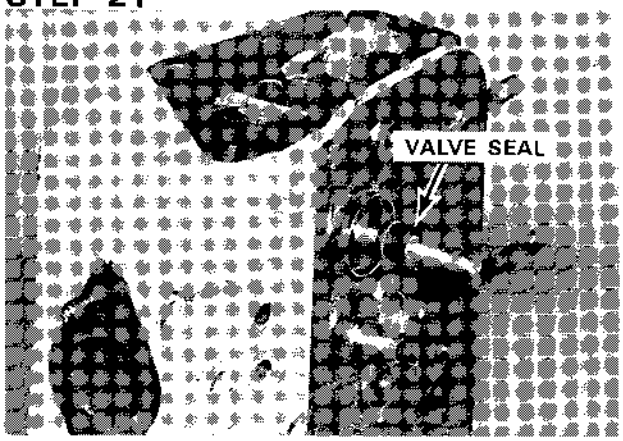
External Leakage

1. Engine External Oil Leakage

Check for engine external oil leaks at the following locations:

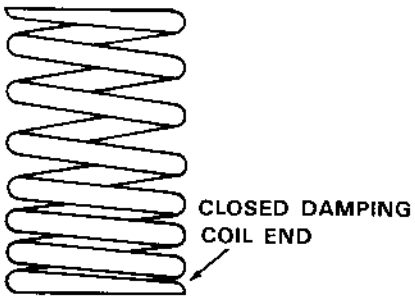
A. Covers
B. Accessories
C. Valve cover gasket
D. Restricted breather
E. Oil pan gasket
F. Timing gear cover gasket
G. External oil lines
H. Camshaft welch plug
I. Engine oil filter
J. Engine oil cooler
K. Oil drain plug gasket
L. Front and rear crankshaft seal

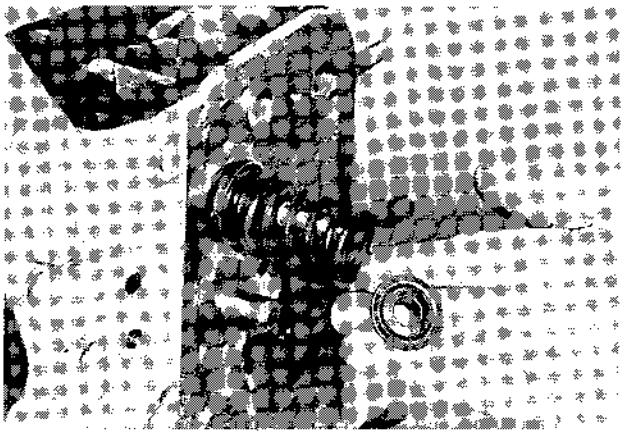
STEP 21



Valve seal installed.

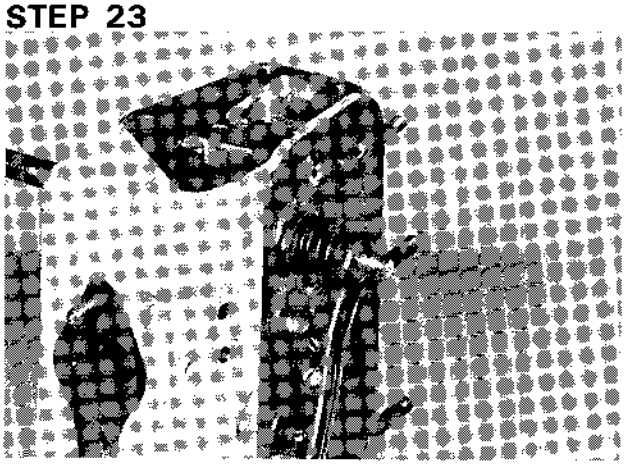
STEP 22





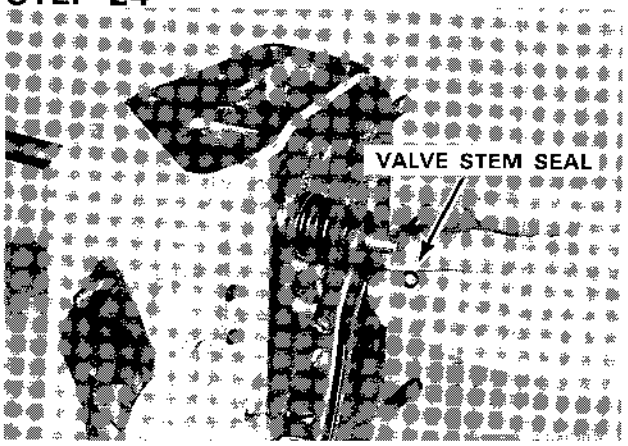
Install spring (damping coil end down) and spring retainer.

STEP 23



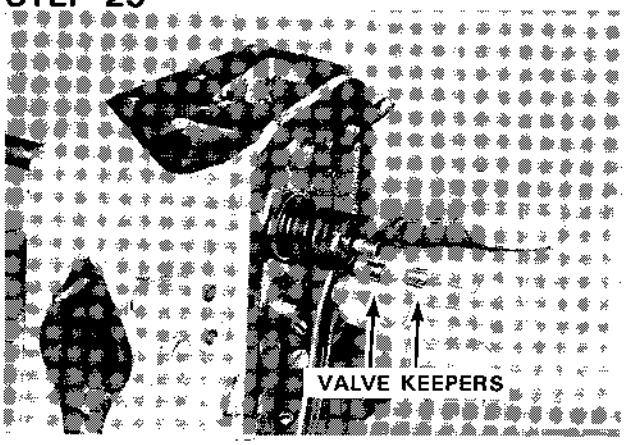
Install valve spring compressor.

STEP 24



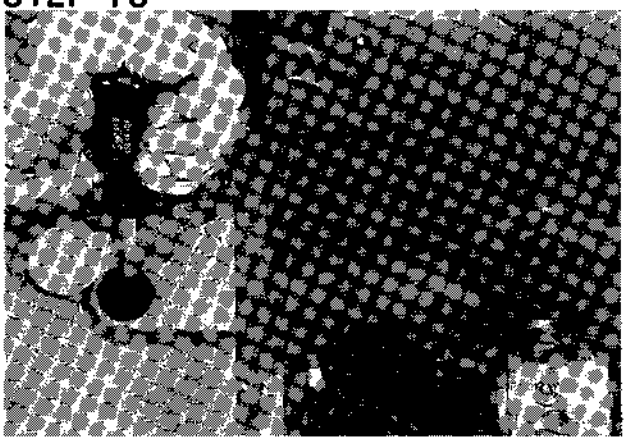
Install stem seal in lower valve stem groove.

STEP 25

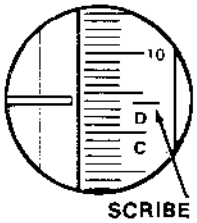


Install valve keepers in outer valve stem groove.

STEP 18

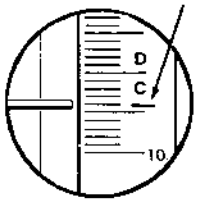


Crank engine clockwise until dial indicator hand stops moving. Reset indicator to zero.



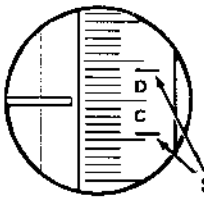
SCRIBE MARK

Crank engine clockwise until .010" shows on the dial indicator. Scribe a mark on the flywheel in line with timing pointer.



Crank engine counter-clockwise past zero mark on indicator until .010" shows on the dial indicator. Again, scribe a mark on the flywheel in line with timing pointer.

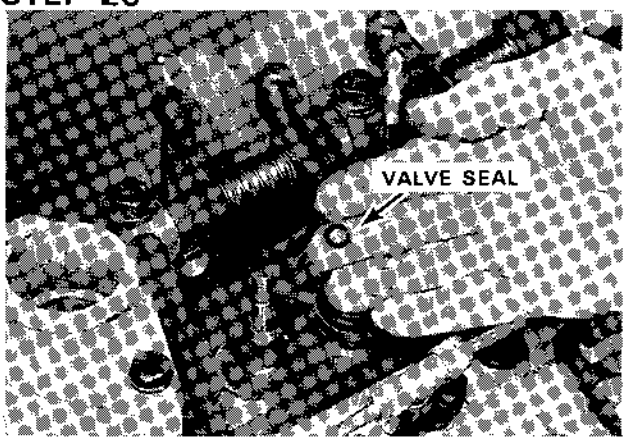
STEP 19



SCRIBE MARKS

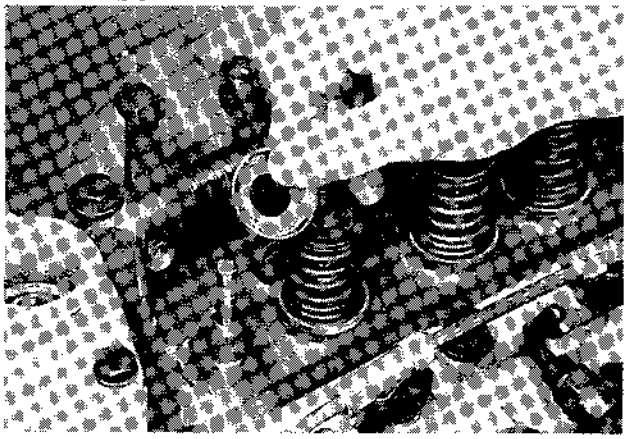
Half the distance between these two scribe marks on the flywheel will be the top dead center (TDC).

STEP 20



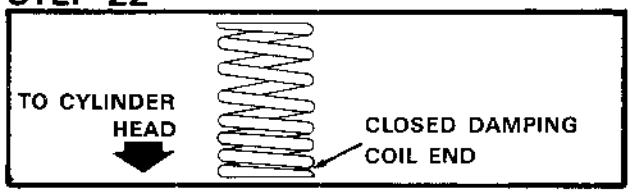
Remove valve stem seal from lower valve stem groove.

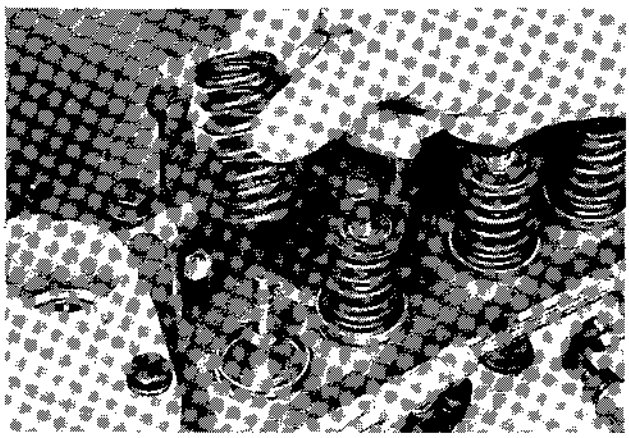
STEP 21



Install the spring seat.

STEP 22





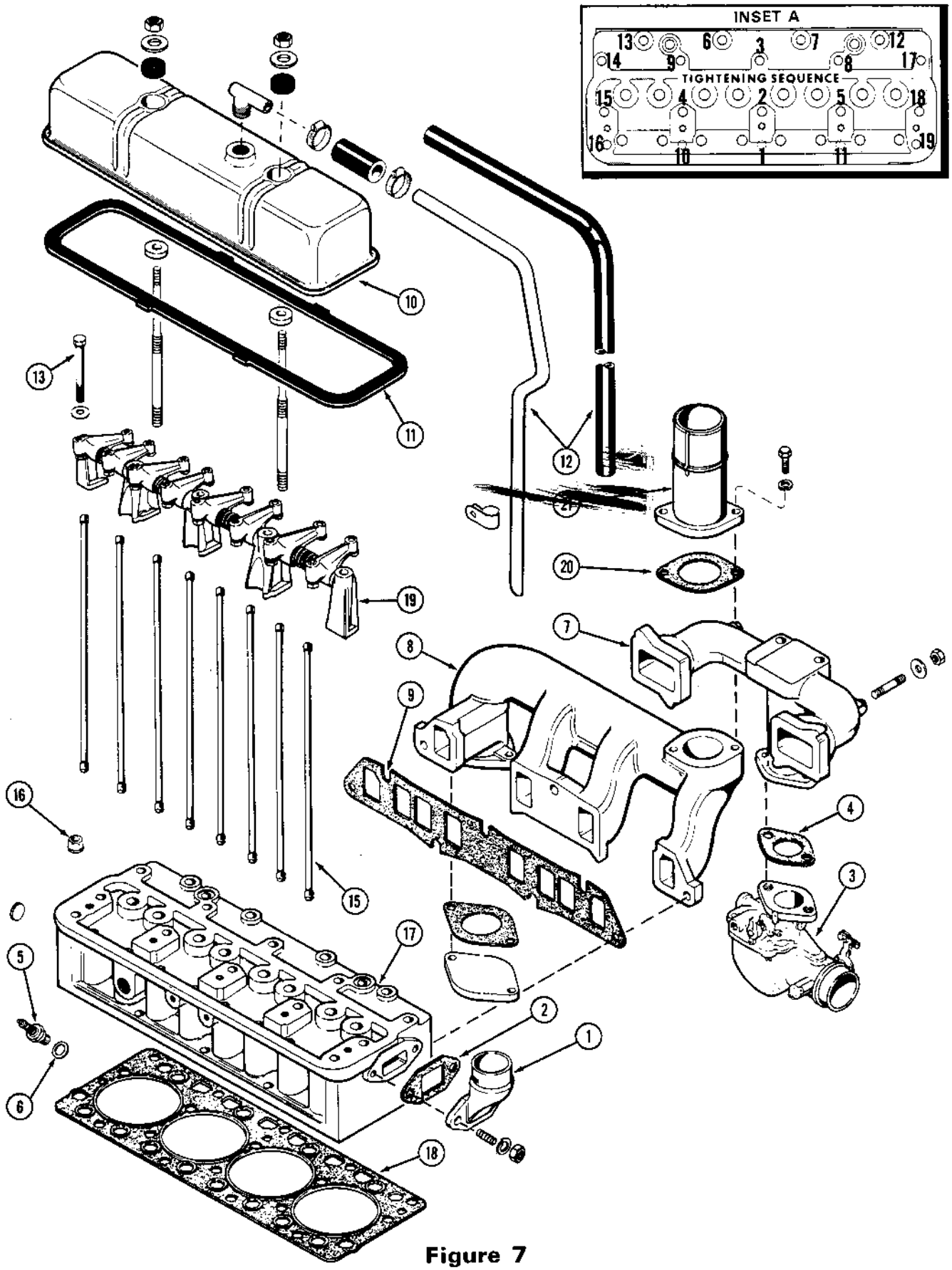
Install the spring with the damping coil end on top of the cylinder head. See inset above.

SPECIFICATIONS (Continued)

		Maximum Limit Including Wear
INTAKE VALVE GUIDE		
Length (188 and 201)	3.125″	
Length (148 and 159)	2.688″	
O.D.	.6565″ to .6575″	
I.D. (Installed and Reamed)	.3422″ to .3432″	.002″
Protrusion Above Cylinder Head	1.000″	
VALVE SPRING (Exhaust Valve)		
Color Code	Silver Stripe Full Length	
Free Length	2-3/16″	
Total Coils	7-3/4	
Wire Diameter	.162″	
I.D.	.970″ to .990″	
Compressed to 1.332″ (Valve Open)	110 to 118 lbs.	
Compressed to 1.686″ (Valve Closed)	53 to 59 lbs.	
VALVE SPRING (Intake Valve)		
Free Length	2-3/8″	
Total Coils	8-1/4	
Wire Diameter	.162″	
I.D.	.958″ to .978″	
Compressed to 1.521″ (Valve Open)	110 to 118 lbs.	
Compressed to 1.875″ (Valve Closed)	53 to 59 lbs.	
ROCKER ARM ASSEMBLY		
O.D. of shaft	.622″ to .623″	
I.D. of Rocker Arm (Installed and Reamed on 148 and 159)	.624″ to .625″	
Shaft Spring (188 and 201):		
Free Length	2-1/2″	
I.D.	11/16″	
Wire Diameter	.072″	
Compressed to 1-3/4″	7.5 to 8.5 lbs.	
Shaft Spring (148 and 159):		
Free Length	1-3/16″	
Total Coils	7	
I.D.	11/16″	
Wire Diameter	.072″	
Compressed to 11/16″	7.5 to 8.5 lbs.	
Lubrication	Engine oil, camshaft metering.	
Shaft Oil Holes	Toward valve side of engine. Shaft cannot be rotated.	

SPECIAL TORQUES

Cylinder Head Flanged Nuts (188 and 201)	90 to 100 ft. lbs.
Cylinder Head Stud Nuts (148 and 159)	95 to 105 ft. lbs.
Intake and Exhaust Manifold Stud Nuts	25 to 30 ft. lbs.
Rocker Arm Bracket Stud Nuts and Bolts	25 to 30 ft. lbs.
Valve Cover Stud Nuts	5 to 8 ft.lbs.
Water Pump Stud Nuts	20 to 25 ft. lbs.
Spark Plugs	32 to 35 ft. lbs.


INSET A
13
6
3
7
12
14
9
8
17
TIGHTENING SEQUENCE
15
4
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5
18
16
19
10
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11
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11
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17
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6
18

Figure 7

INSPECTION OF VALVES, GUIDES, HEAD AND SPRINGS (Cont'd)

Heavy carbon or varnish deposits on the valves, Figure 17, should be removed before valves are ground. This condition is usually caused by worn piston rings and sleeves which allow too much oil to reach the combustion chamber. This conditions could also be caused by worn valve guides or bad seals on the valves. Low operating temperature is still another cause.

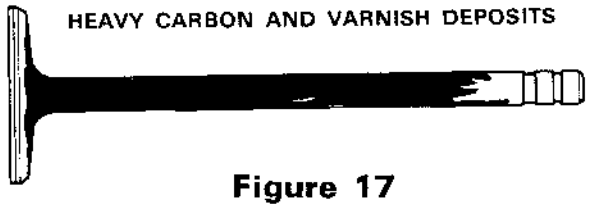


Figure 17

Inspect the valve head for dishing and the valve face for deep burned spots, Figure 16. These conditions cannot be corrected by grinding the valves. The valves must be replaced. These conditions are usually caused by running the engine under excessive loads at high engine temperatures.

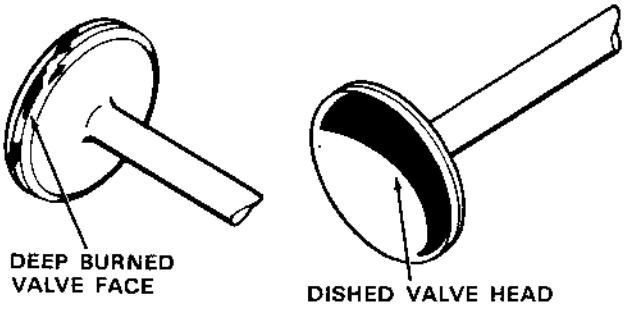


Figure 18

Valves with worn keeper grooves or if the stem tip is worn or dished beyond the chamfer, replace the valves, Figure 19.

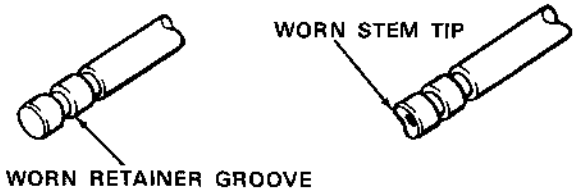


Figure 19

The checking of the valve stem diameter can be best be done with a good, accurate micrometer, Figure 20. The valve stem being straight, should be measured at three points along the stem, Figure 20. Wear limit must not exceed .002" at all points of measurement. If the wear is greater, replace the valve.

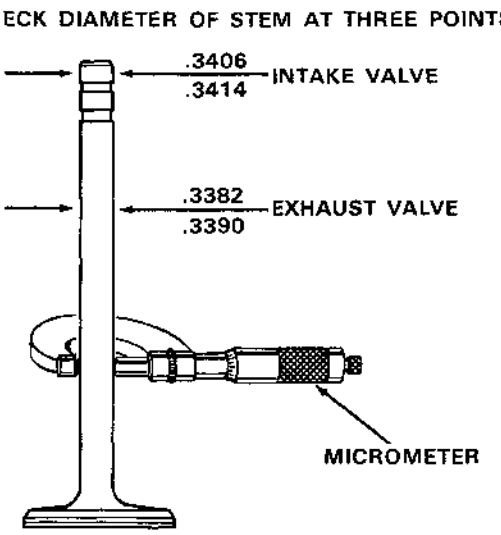


Figure 20

The checking of the valve face runout should be done after the valves have been ground. A Vee block type holder with a dial indicator, Figure 21 can be used to check the valve face and stem runout. The valve face runout should not exceed more than .002". The valve stem runout should not exceed .002". If the valve face and/or valve stem runout is greater, the valve must be replaced.

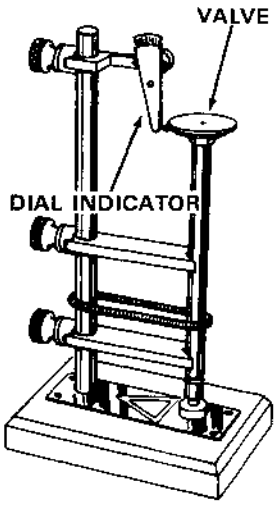


Figure 21

NOTE: Small amounts of very fine pitting, Figure 22, may be found on the surfaces of the valves faces and seats after the valves are cleaned. These are normal and will not affect engine performance. This fine pitting is caused by a normal oxidation process and can happen on any engine during the run-in period. It is not necessary to grind valves or seats if this fine pitting is found as the pitting will generally reoccur after the engine is run for a few hours.

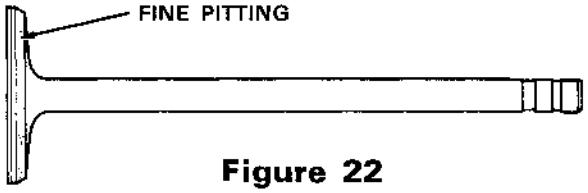
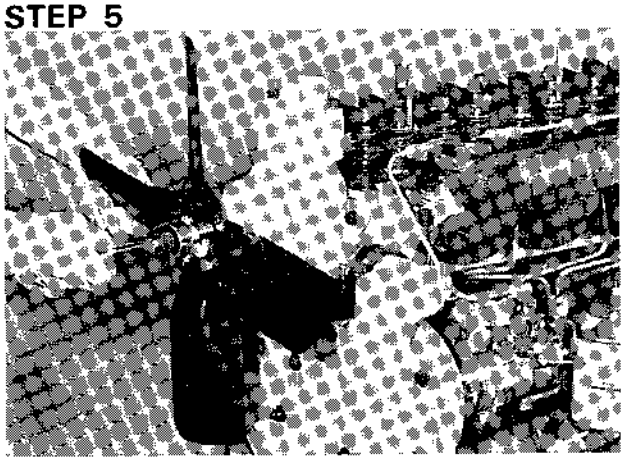


Figure 22

STEP 5

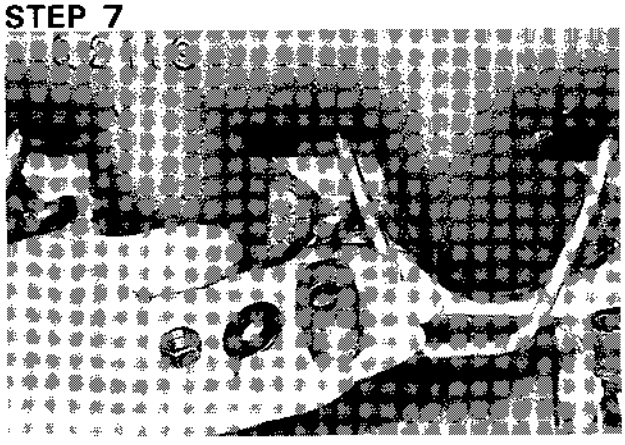


Remove fan, fan spacer (if equipped) and fan pulley.

STEP 6

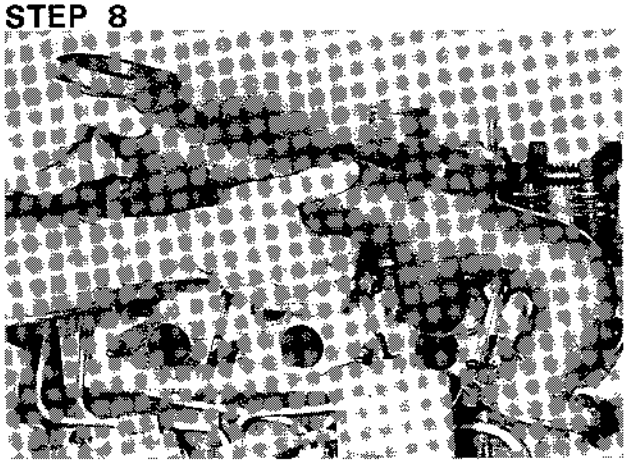
If engine is equipped with one piece timing cover, remove outer bolts secured to cylinder head. *NOTE:* If a stud and nut is located at point "A", the water pump must be removed to remove the inner socket hd. bolt in the housing.

STEP 7



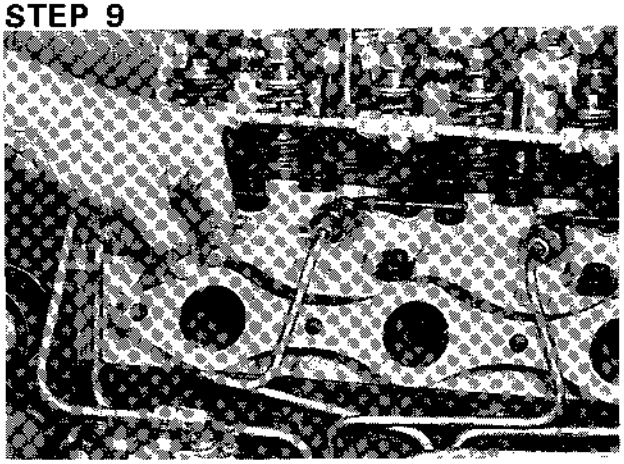
Remove the exhaust manifold retaining nuts, washers and clamps.

STEP 8



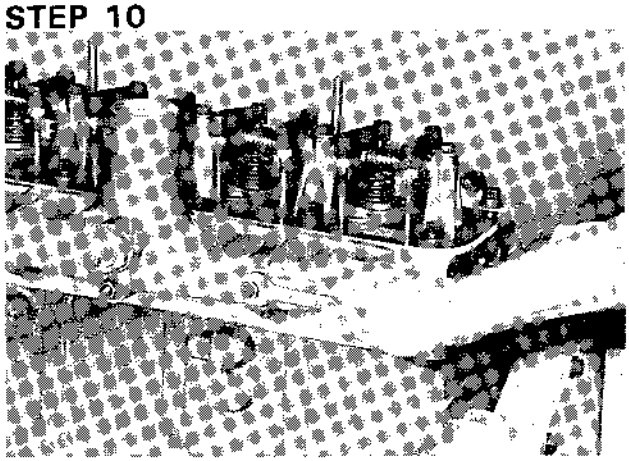
Pull the front of manifold from the front stud, swing the manifold upward and pull manifold off of rear stud and away from engine.

STEP 9



Remove exhaust manifold gasket.

STEP 10



Remove intake manifold retaining nuts.

Valves and Valve Seats Inspection

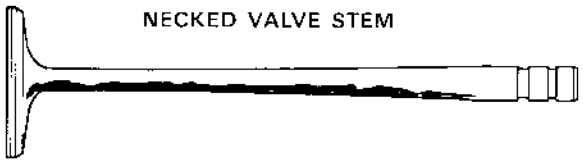
STEP 53

Clean valves with a fine power driven wire brush, being careful not to scratch valve stems.

STEP 54

INSPECT THE VALVES FOR THE FOLLOWING CONDITIONS.

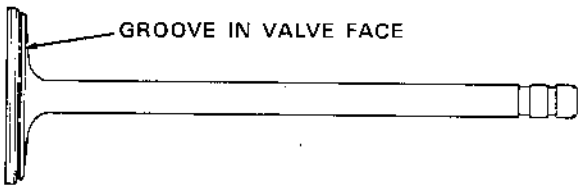
NECKED VALVE STEM



NOTE: REPLACE VALVE IF THIS CONDITION EXISTS.

This condition can be caused by lack of lubrication, plugged water passages or operating the engine under continuous overload at excessive RPM.

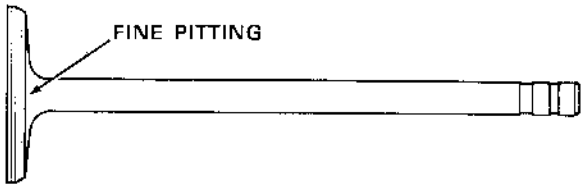
GROOVE IN VALVE FACE



NOTE: REFACE OR REPLACE VALVE IF THIS CONDITION EXISTS.

This condition can be caused by abrasives entering the engine through the intake system or not servicing the air intake system regularly.

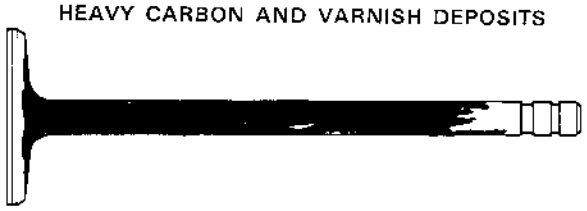
FINE PITTING



NOTE: THIS IS A NORMAL CONDITION

Small amounts of very fine pitting may be found on the surfaces of the valve face or seat after the valves are cleaned. This condition is normal and will not affect engine performance. This fine pitting is caused by a normal oxidation process and can happen on any engine during the run-in period. It is not necessary to grind valves or seats if this fine pitting is found, since pitting will generally recur after the engine is run for a few hours.

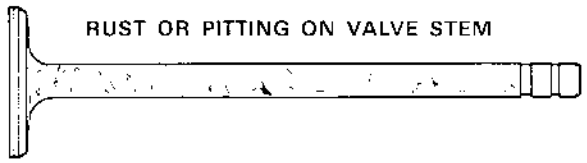
HEAVY CARBON AND VARNISH DEPOSITS



NOTE: CLEAN AND REFACE VALVES IF THIS CONDITION EXISTS OR REPLACE VALVES.

This condition is usually caused by worn valve guides or bad seals on the valves, allowing oil to pass by the valves. Low operating temperature is still another cause or worn piston rings and sleeves will allow too much oil to reach the combustion chamber.

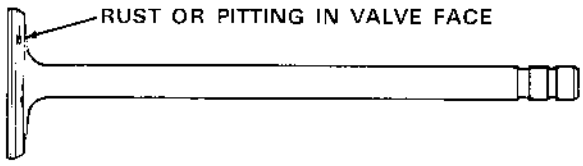
RUST OR PITTING ON VALVE STEM



NOTE: REPLACE VALVE IF THIS CONDITION EXISTS.

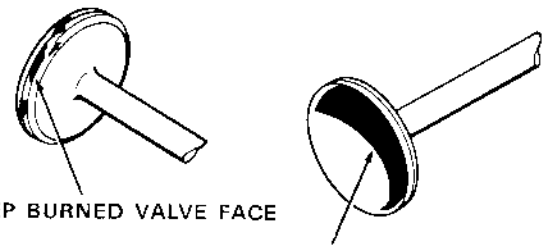
This condition can be caused by using poor quality engine oil or fuel and by improper engine storage.

RUST OR PITTING IN VALVE FACE



NOTE: REFACE OR REPLACE VALVE IF THIS CONDITION EXISTS.

This condition can be caused by using poor quality engine oil or fuel.



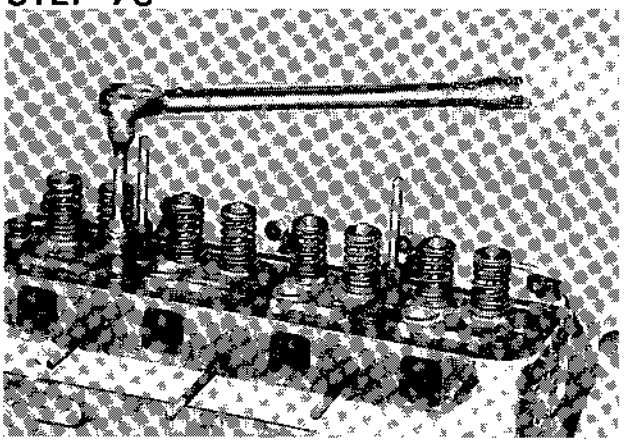
DEEP BURNED VALVE FACE

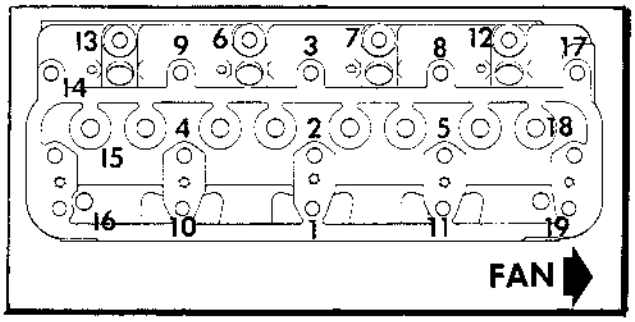
DISHED VALVE HEAD

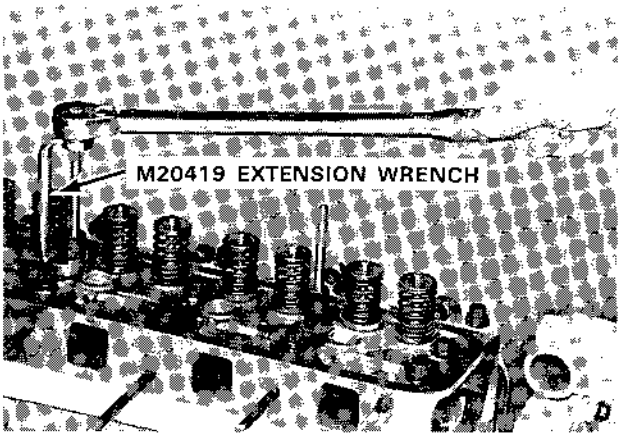
NOTE: IF EITHER OF THESE CONDITIONS EXIST, REPLACE THE VALVES.

These conditions are usually caused by running the engine under excessive loads at high engine temperature, grinding valve face too thin or improper valve grinding.

STEP 78



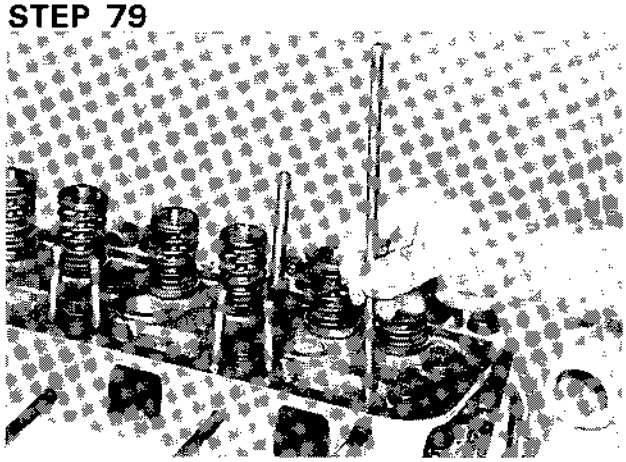




Coat bolt threads, washers and underside of bolt heads or nuts (where used) with HDM #30 oil. Torque all cylinder head bolts and nuts (on to stud) using a torque of 50% to 70% of final torque listed below and in a sequence as shown in inset. Repeat torquing sequence and bring nuts or bolts to full torque.

1. Nuts w/hardened washers-torque 95-105 ft. lbs.
2. Grade 8, 12 pt. hd. bolts - torque 110-115 ft. lbs.
3. Flanged nuts - torque 90-100 ft. lbs.

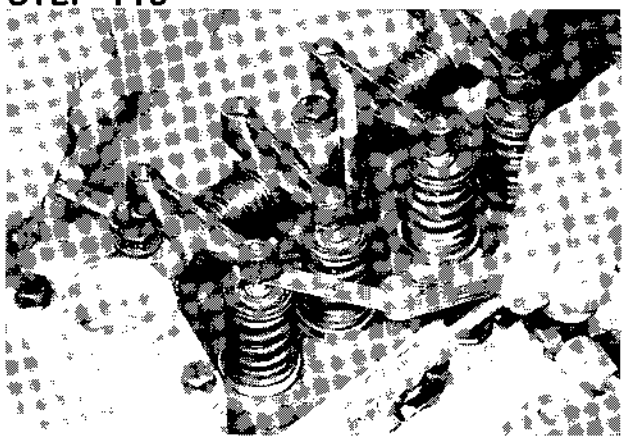
STEP 79



Check push rods for wear and straightness before installing into cylinder head. Coat push rods with HDM #30 oil.

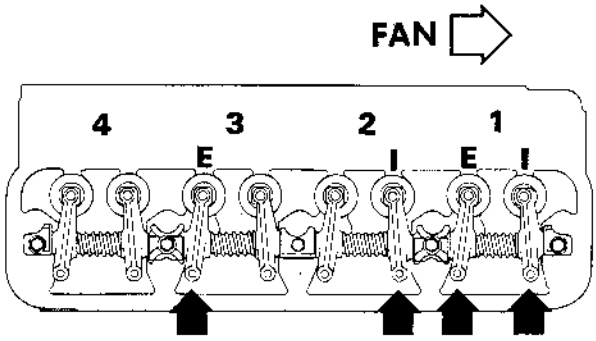
Valve Tappet Adjustment - Hot Setting With Engine Stopped

STEP 119



Check and adjust the intake and exhaust valves as pointed out by the arrows below.

Tappet Clearance Hot - Intake Valves .012"
Exhaust Valves .014"

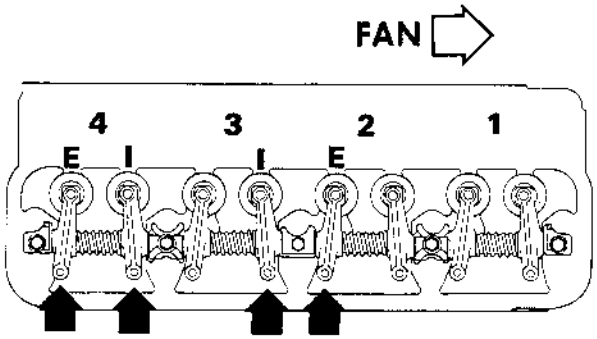


NO. 1 TDC COMPRESSION STROKE

STEP 120

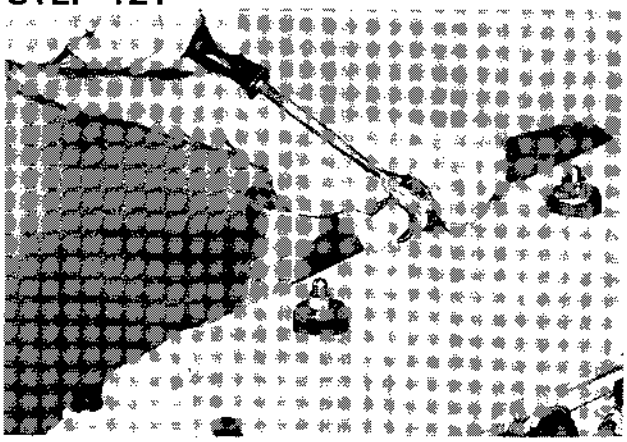
Crank the engine one complete revolution and align the timing pointer with the TDC mark on the flywheel. Check and adjust the intake and exhaust valves as pointed out by the arrows below.

Tappet Clearance Hot - Intake Valves .012"
Exhaust Valves .014"



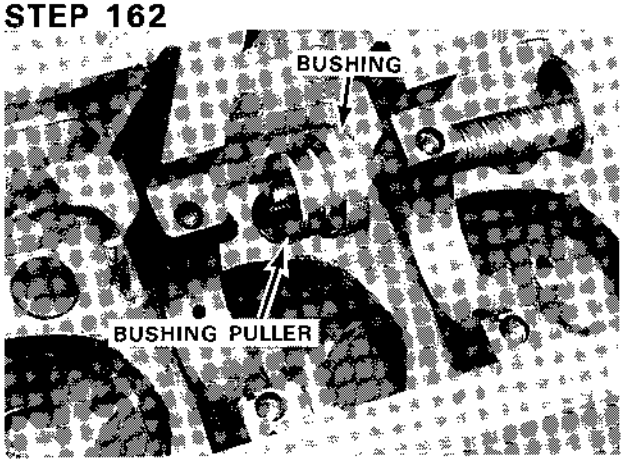
NO. 4 TDC COMPRESSION STROKE

STEP 121



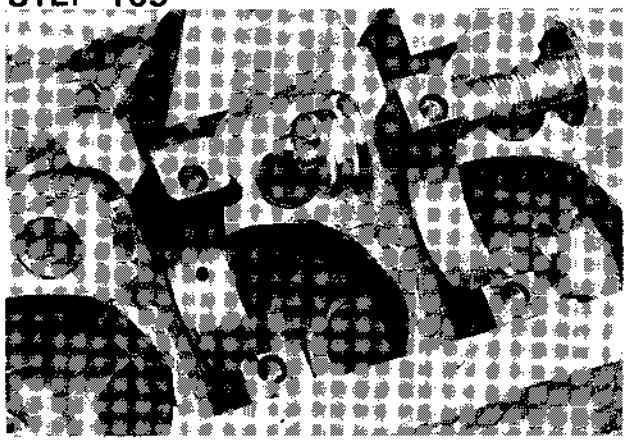
Install the cylinder head gasket and cover, torque cover nuts 4 to 6 ft. lbs. Reinstall breather tube.

STEP 162



Install the bushing on the puller (with oil holes aligned) and pull bushing into place.

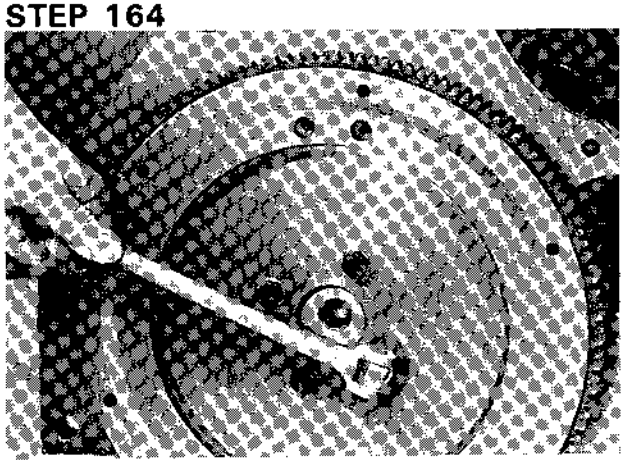
STEP 163



Pull the bushing into block bore. Remove bushing tool.

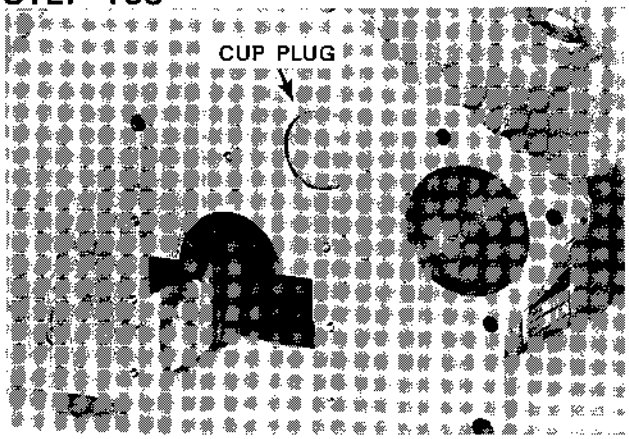
Rear Camshaft Bushing Replacement

STEP 164



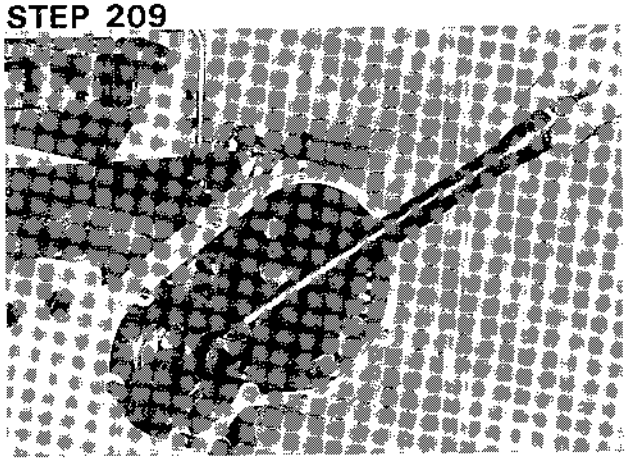
To replace the rear camshaft bushing, the engine must be removed from the machine and then the flywheel must be removed.

STEP 165



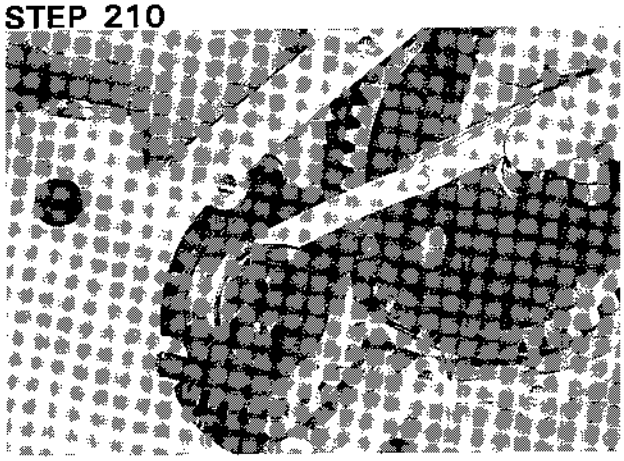
The rear camshaft cup plug must be removed before the rear camshaft bearing can be removed from the engine block.

STEP 209



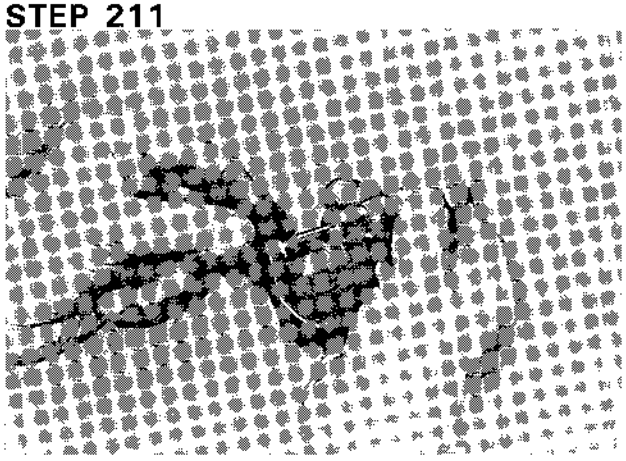
Torque idler gear retaining bolts 35 to 42 ft. lbs.

STEP 210



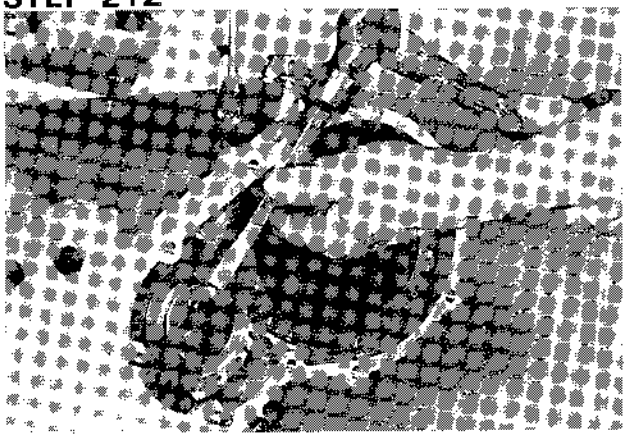
With a feeler gauge check the running clearance between thrust washer and idler gear. The running clearance should be .003".

STEP 211



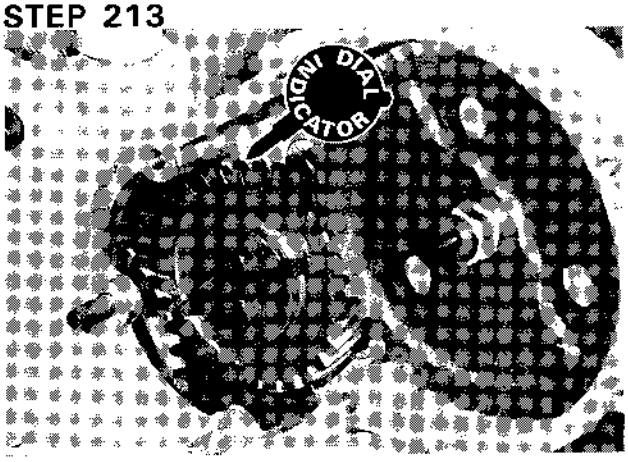
Remove mounting bolts and by measuring the thickness of the shims with a micrometer, add or deduct shims to obtain correct clearance.

STEP 212



Reinstall mounting bolts in idler gear, torque 35 to 42 ft. lbs. Then bend lock plate over retaining bolts.

STEP 213



Take a screwdriver and hold cam gear so it can't move. Install a dial indicator to check back lash. Backlash must not exceed .006". If backlash exceeds .006", replace the gears.

SPECIFICATIONS (Cont'd)

Crankshaft (Continued)

		Maximum Limit Including Wear
Grind to:		
.010" O.D. undersize, (201G, 188G)	2.8630 to 2.8640	
.020" O.D. undersize, (201G, 188G)	2.8530 to 2.8540	
.030" O.D. undersize, (201G, 188G)	2.8430 to 2.8440	
.010" O.D. undersize, (159G, 148G)	2.6130 to 2.6140	
.020" O.D. undersize, (159G, 148G)	2.6030 to 2.6040	
.030" O.D. undersize, (159G, 148G)	2.5930 to 2.5940	
Main journal bore I.D. w/o liners (201G, 188G)	3.066 to 3.067	
(159G, 148G)	2.816 to 2.817	
Main journal width between cheeks:		
2nd (159G, 148G)	1.499 to 1.502	
2nd (201G, 188G)	1.3740 to 1.3770	
3rd	1.745 to 1.755	
Connecting rod journal width between cheeks	1.3105 to 1.3145	

Camshaft

Type	Parabolic	
Bushings (201G, 188G)	4, Replaceable	
Bushings (159G, 148G)	3, Replaceable	
Bushing lubrication:		
Front bushing	Pressure lubricated from oil pump.	
Intermediate bushing	Gravity flow lubricated	
Oil clearance	.002 to .005	.007
I.D. of bushing installed	1.752 to 1.753	
Bushing width:		
1st (front) (159G, 148G)	1.307 to 1.317	
1st (front) (201G, 188G)	1.213 to 1.223	
2nd (159G, 148G)	.713 to .723	
2nd, & 3rd. (201G, 188G)	.490 to .500	
3rd (rear) (148G, 159G)	1.177 to 1.197	
4th (rear) (201G, 188G)	1.213 to 1.223	
O.D. of each bearing surface	1.749 to 1.750	.004
Thrust plate thickness	.149 to .147	

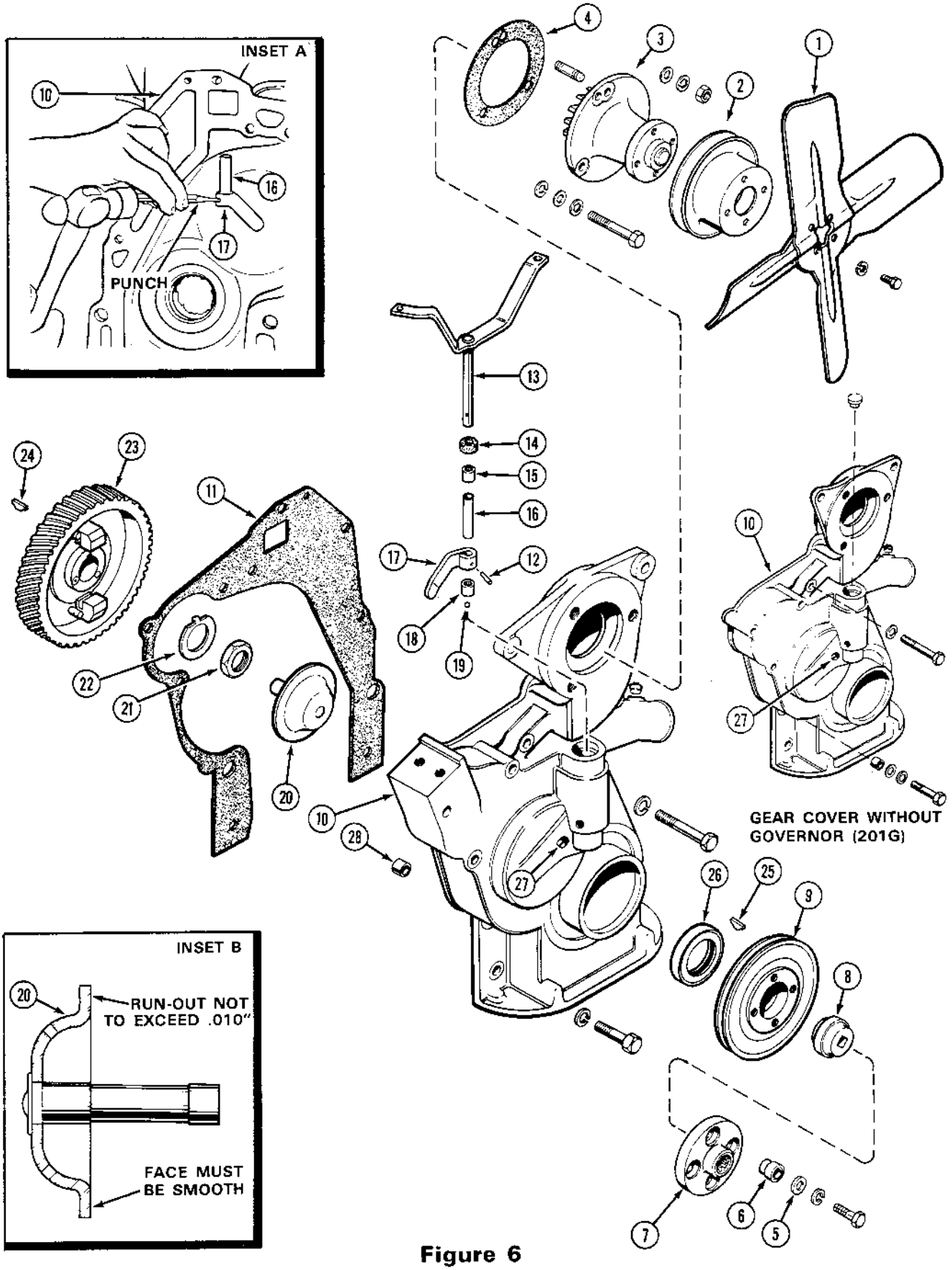

INSET A
PUNCH
GEAR COVER WITHOUT GOVERNOR (201G)
INSET B
RUN-OUT NOT TO EXCEED .010"
FACE MUST BE SMOOTH

Figure 6

CYLINDER SLEEVES (Cont'd)

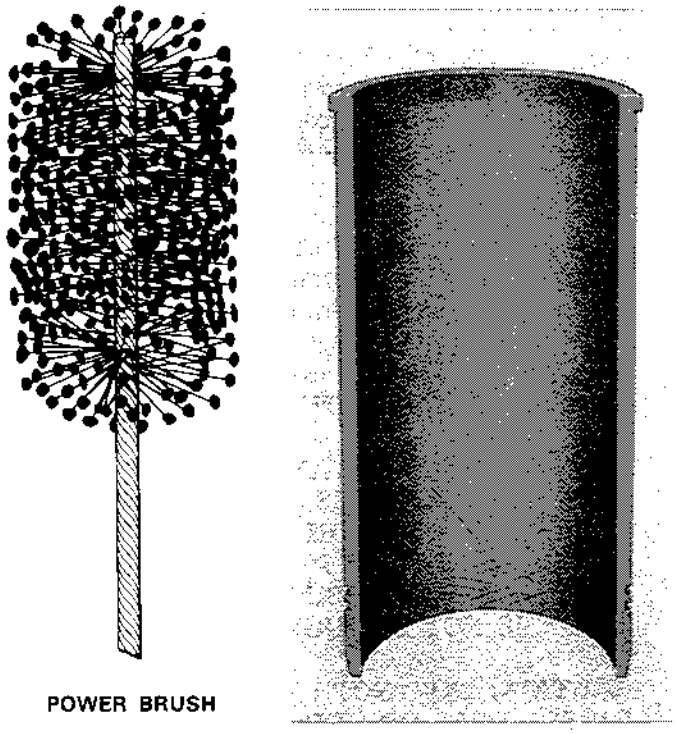
Deglazing

Figure 15 illustrates a self-centering power brush deglazer that can be used to remove the glaze formed on the inner surface of the cylinder sleeves.

The glaze must be removed so that the piston rings can properly seat themselves within a reasonable period of run-in-time.

The necessary deglazing can be done by using 180 grit silicone carbide double spiral brush. The necessary size brush can be purchased from the J I Case Co. Service Parts Supply, Racine,Wisc.

Part No.	Bore Range
A42451	3.00″ thru 3.50″
A42452	3.50″ thru 4.00″



POWER BRUSH

CROSS HATCHED SLEEVE

Figure 15

Power the brush with a 3/8″ or 1/2″ drill with a 300 to 350 RPM speed and using a good grade of oil as a lubricant. The heavier the lubricant, the finer the finish.

The brush must be rotating before entering the cylinder sleeve and when removed to prevent scratches and to insure an even finish. This will also bring the cross hatching up and out on removal.

Actuating the brush up and down at a rate of 30 to 40 times per minute, a fast even and perfect cross hatch finish is obtained in 20 to 30 seconds, Figure 15.

IMPORTANT: Use the following procedure to protect the engine from abrasives.

1. BEFORE BRUSH DEGLAZING:
   Cover the crankshaft journals with clean rags to prevent abrasives and dirt, resulting from the brushing operation, from dropping onto the crankshaft.

2. AFTER BRUSH DEGLAZING:
   Wipe as much of the abrasives from the cylinder sleeves as possible, then swab each sleeve with a clean cloth dampened in warm water and a mild detergent soap. After swabbing the sleeves with the damp cloth, wipe them out with SAE 10W engine oil.

IMPORTANT: SWAB AND WIPE OUT THE CYLINDER SLEEVES UNTIL A CLEAN WHITE CLOTH WILL REMAIN ABSOLUTELY CLEAN WHEN IT IS RUBBED ON THE SLEEVE. ONE SWABBING - WIPING OPERATION IS NOT ENOUGH!

CAUTION: DO NOT USE GASOLINE, DIESEL FUEL OR KEROSENE TO CLEAN THE SLEEVES AS THIS WILL NOT REMOVE THE ABRASIVES FROM THE SURFACE OF THE SLEEVES.

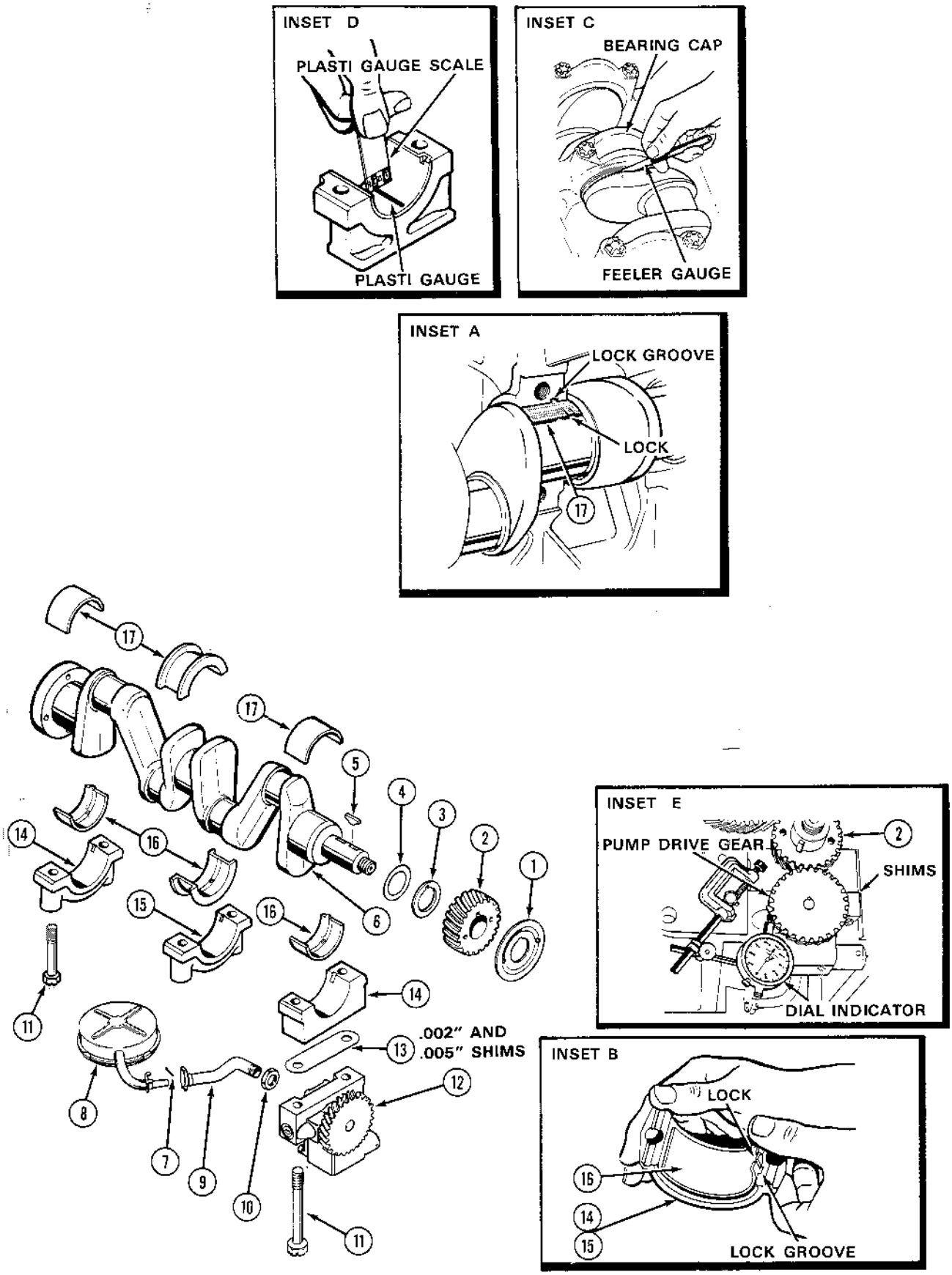
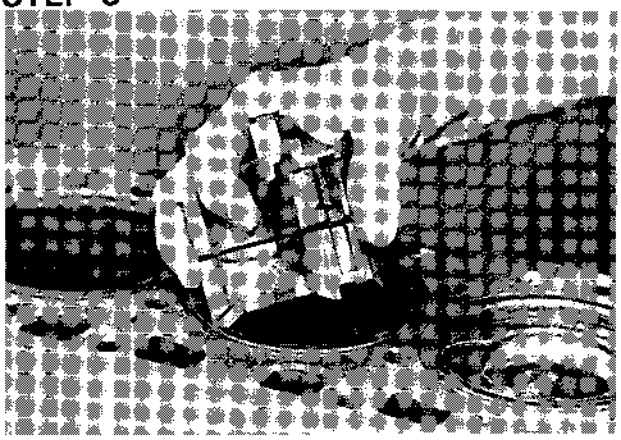

INSET D
PLASTI GAUGE SCALE
PLASTI GAUGE
INSET C
BEARING CAP
FEELER GAUGE
INSET A
LOCK GROOVE
LOCK
17
INSET E
PUMP DRIVE GEAR
SHIMS
DIAL INDICATOR
INSET B
LOCK
LOCK GROOVE
.002" AND
.005" SHIMS

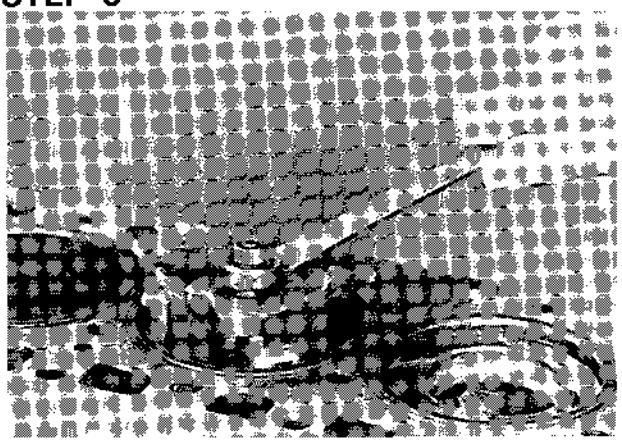
Figure 24

STEP 5



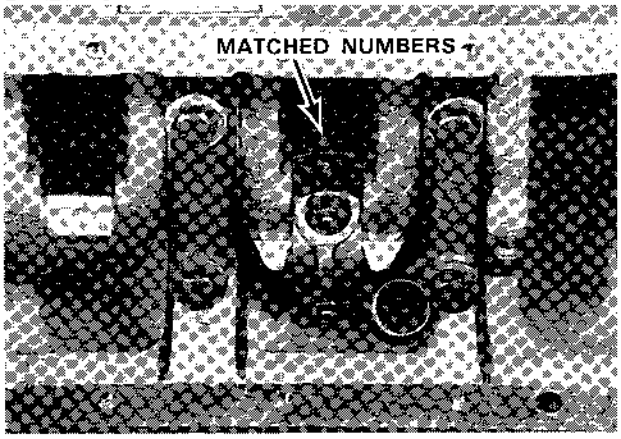
Install ridge reamer in piston sleeve.

STEP 6



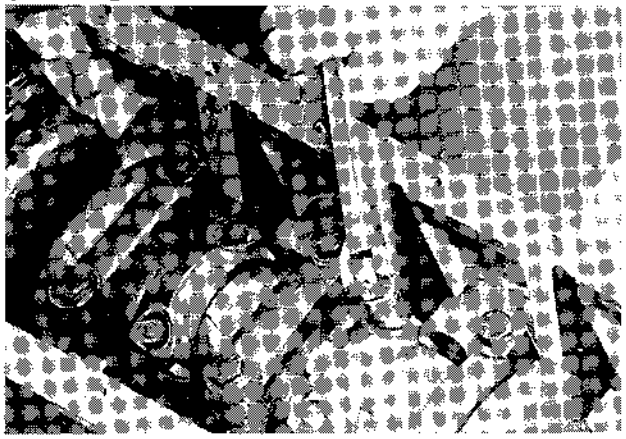
Use the ridge reamer to remove the ridge or damage to the piston rings and lands will result.

STEP 7



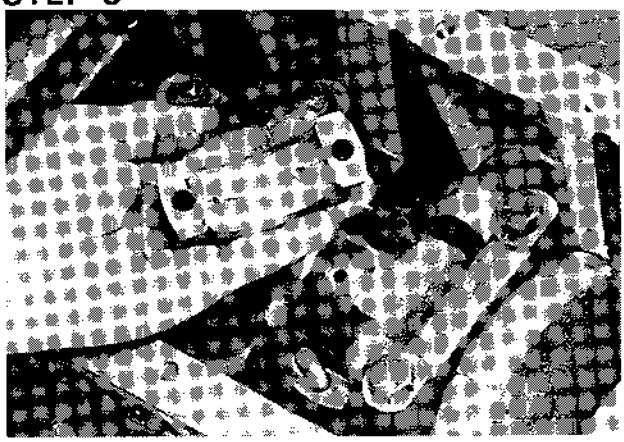
Check connecting rods and caps to see if they are numbered as to their location in the engine. If not, they must be numbered on the side facing the engine camshaft for re-installation in their original locations.

STEP 8



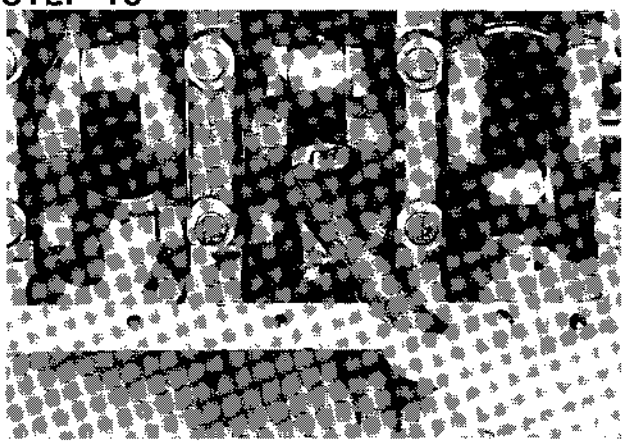
Remove connecting rod cap mounting nuts.

STEP 9



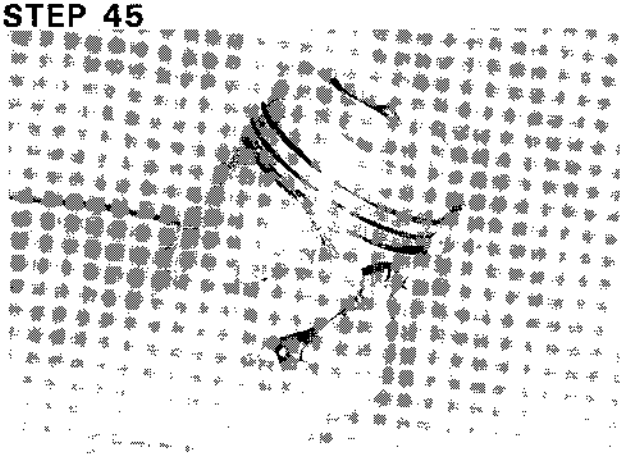
Remove connecting rod caps.

STEP 10



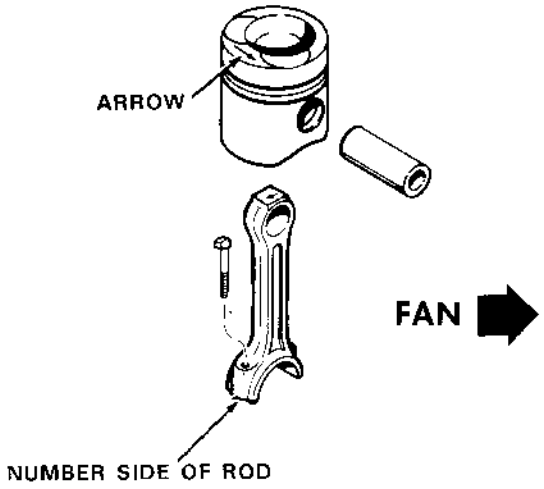
Push the piston and rod up through the engine block.

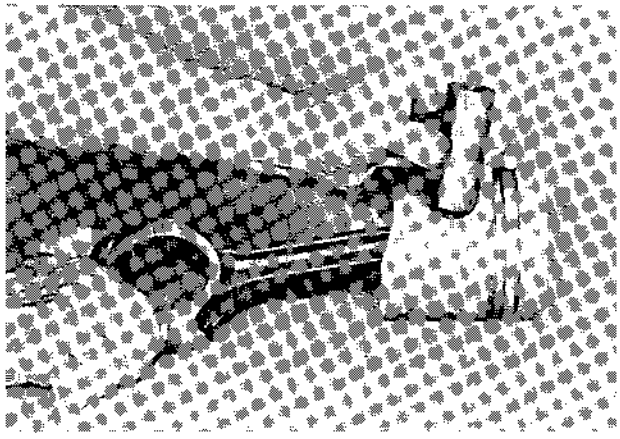
STEP 45



Clean piston oil holes using a small drill or fine wire.

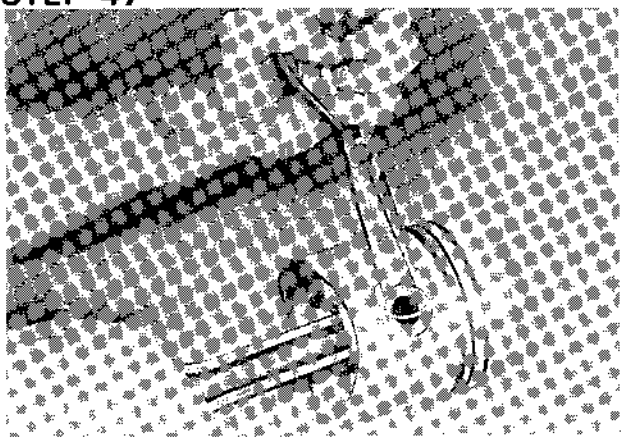
STEP 46





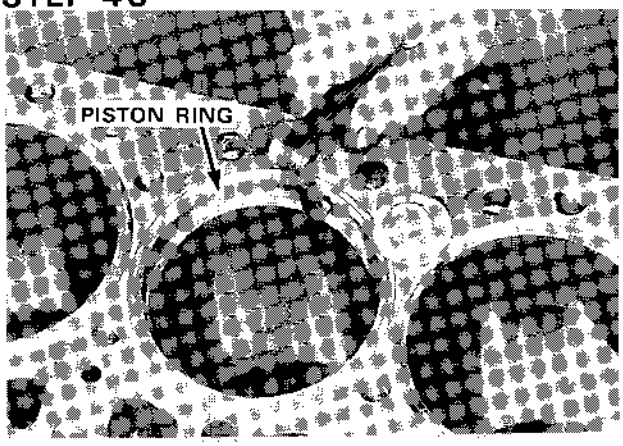
Assemble connecting rod to piston. Make sure numbered side of rod is towards arrow side of piston. Use hand pressure only to install the piston pin.

STEP 47



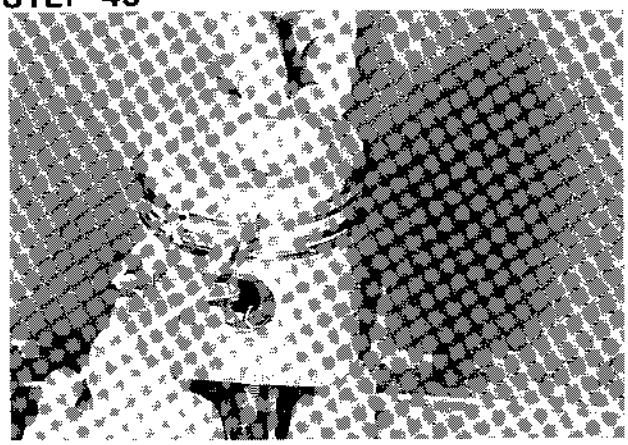
Install piston pin retaining rings.

STEP 48



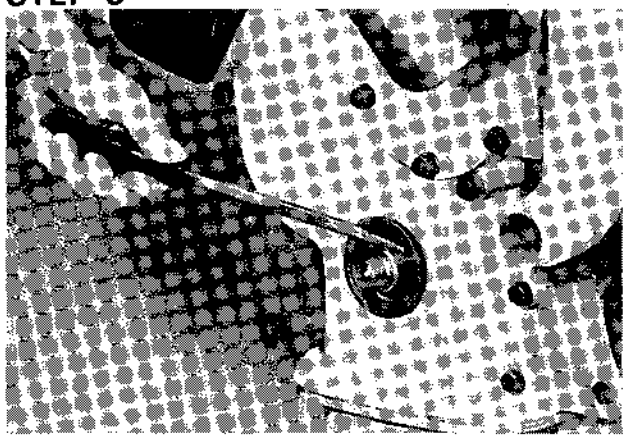
Place piston rings in cylinder sleeve and check end gap of each ring using a feeler gauge. End gap must be less than .035" for compression rings and less than .065" for oil control ring.

STEP 49



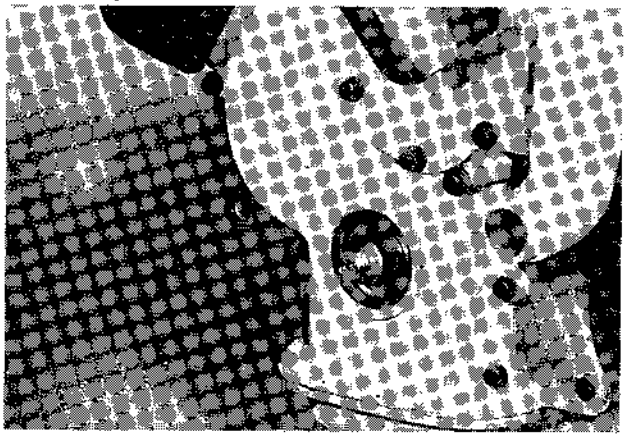
Install piston rings on piston using a ring expander.

STEP 5



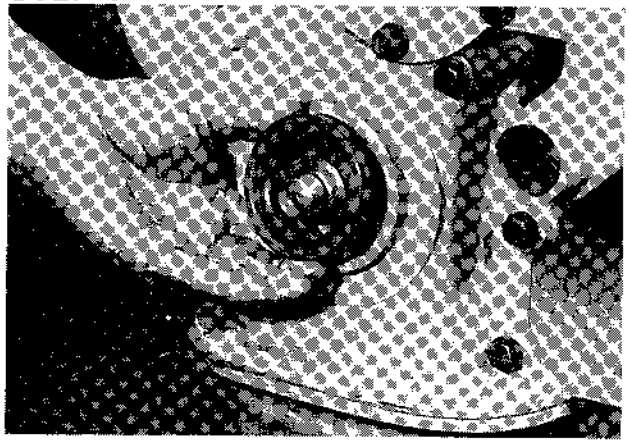
Remove front oil seal from timing gear cover.

STEP 6



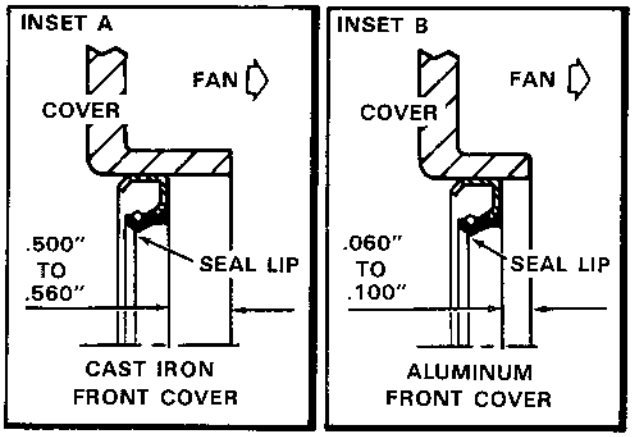
Front oil seal removed.

STEP 7

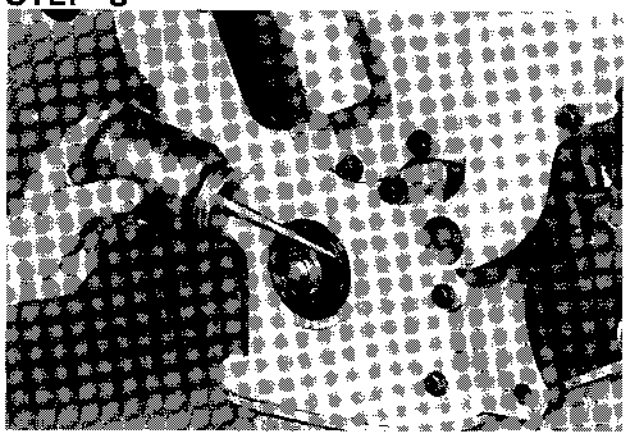


Install a new seal in the timing gear cover, with the seal lip inward, to a depth from the outer edge as shown in Inset A or B.

STEP 7 (Cont'd)

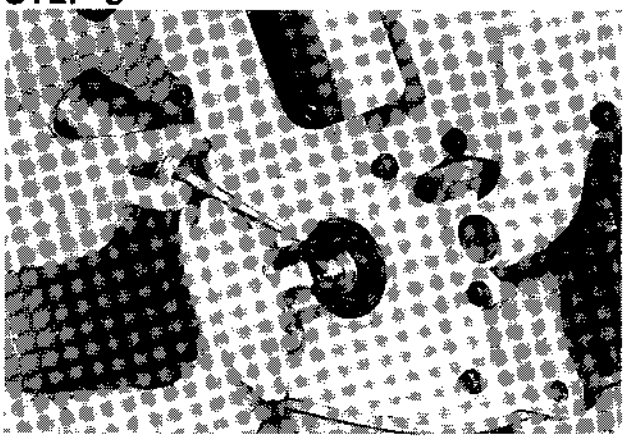


STEP 8



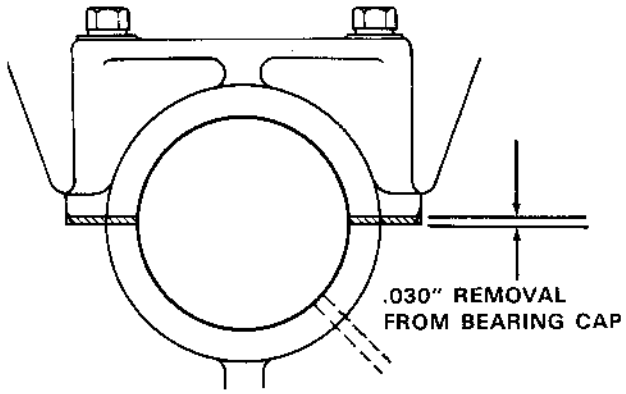
Apply HDM No. 30 oil to front oil seal.

STEP 9



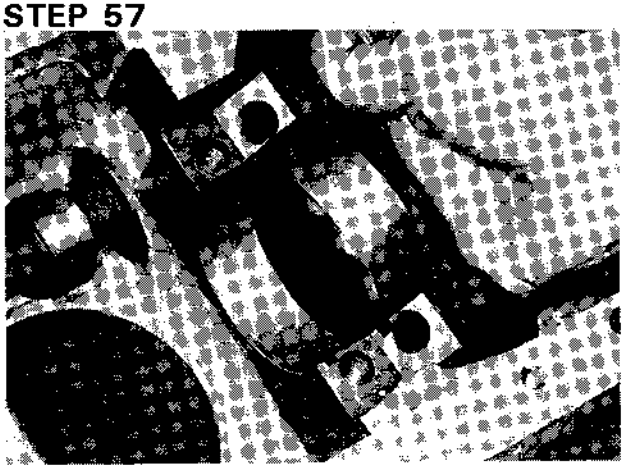
Apply HDM No. 30 oil to shaft of crankshaft pulley. Install pulley on crankshaft.

STEP 56



If vertical dimension is out of tolerance or cap is shifted side-wise, rework cap by removing .030" stock from mating surface and then bore out to meet tolerance as specified in Step 55. *IMPORTANT:* If .030" stock was required to be removed, the same amount must be machined from the lock groove, to prevent interference when installing liners.

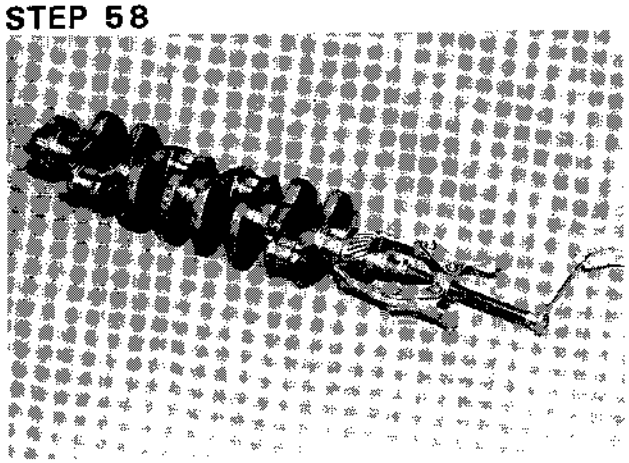
STEP 57



Be sure to machine new mounting surface flat, so that cap will set solid without wobbling in block.

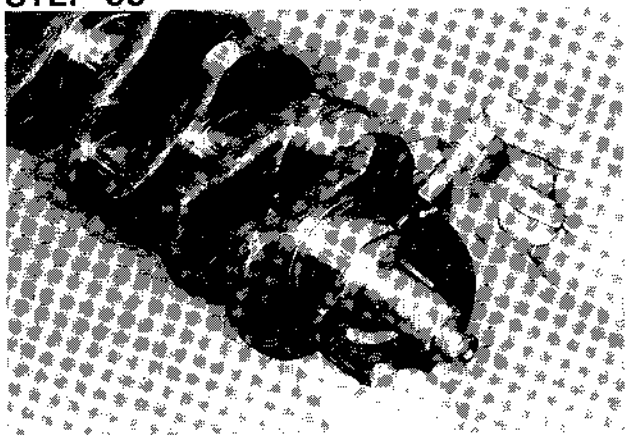
Crankshaft Inspection and Installation

STEP 58



Using a puller, remove crankshaft gear from crankshaft.

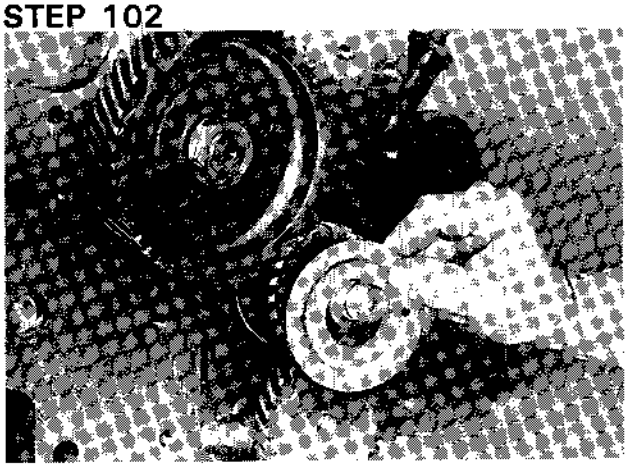
STEP 59



Measure the main bearing journals for wear. Measure front and rear of each journal. If diameters are smaller than 2.8730", undersize bearing liners (.002") must be used.

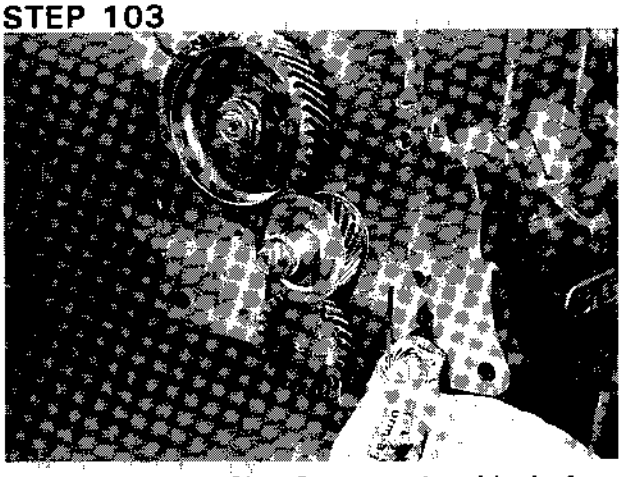
NOTE: When journals are worn more than .002", the crankshaft must be ground undersize .010",020" or .030". Refer to Specifications, Sections 1026 or 1027 for grinding dimensions.

STEP 102



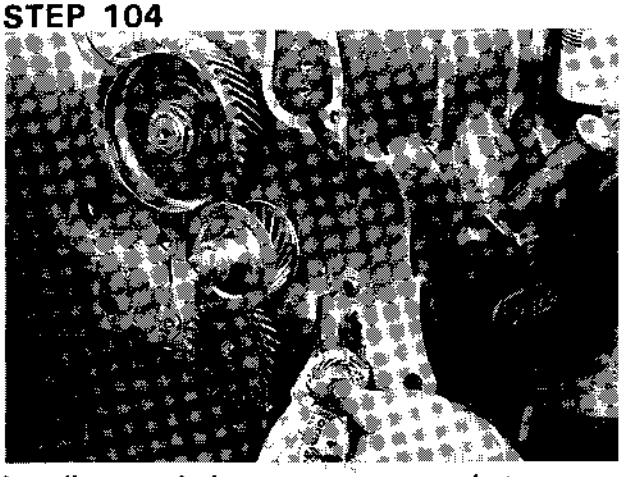
Install oil slinger on crankshaft with concave side facing outward.

STEP 103



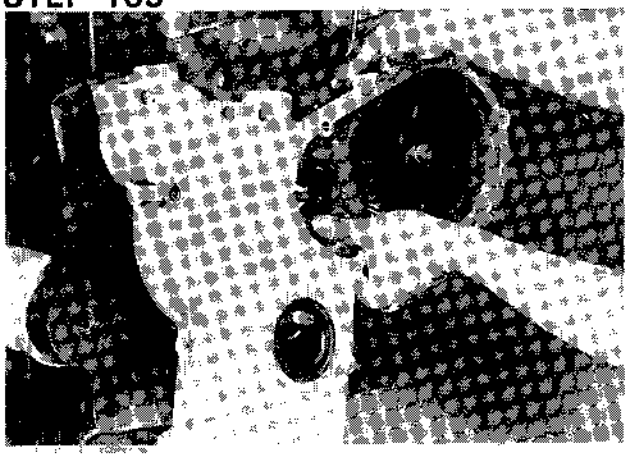
Apply Permatex No. 2 to engine block from bottom timing gear cover mounting hole to bottom of engine block.

STEP 104

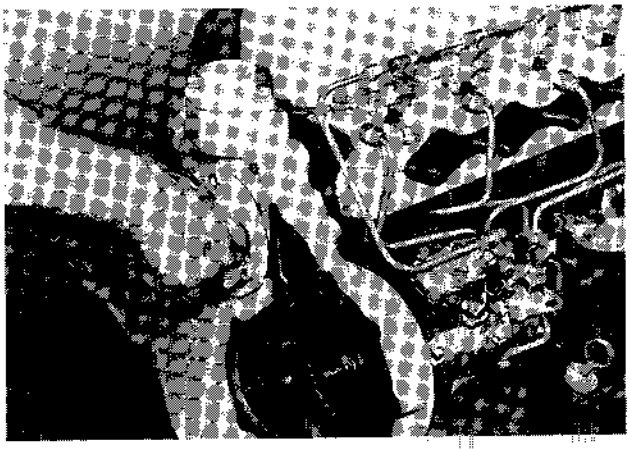


Install new timing gear cover gasket on engine block. Apply Permatex No. 2 to gasket from bottom timing gear cover mounting hole to bottom of engine block.

STEP 105

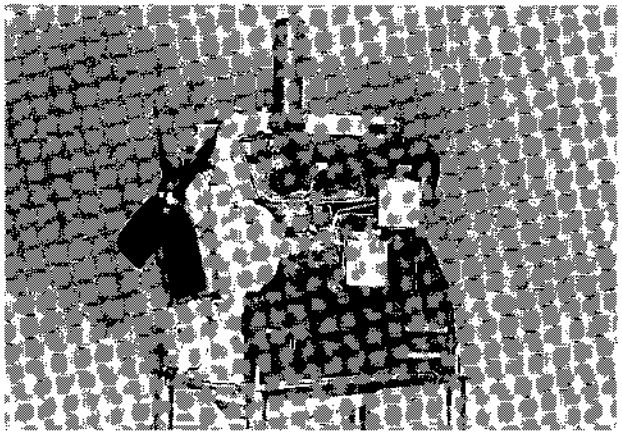


Install timing gear cover on engine block.



If equipped, install one piece timing gear cover and water pump housing.

OIL PUMP



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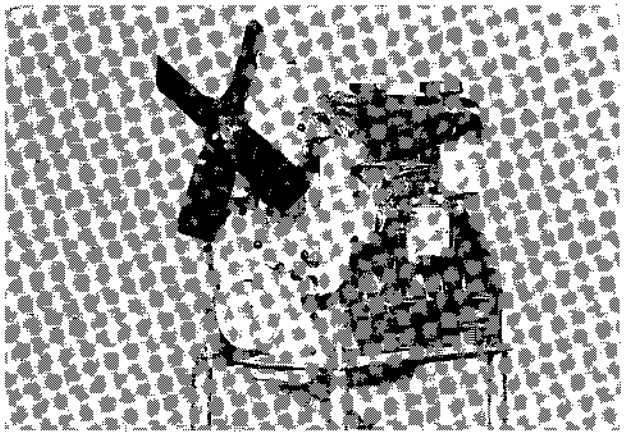

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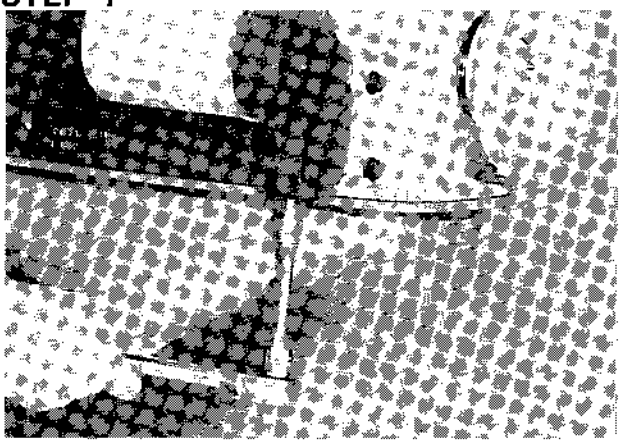
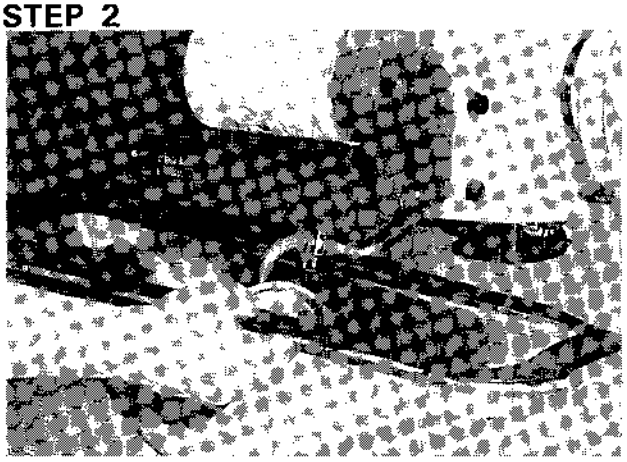
Oil Pump Removal

STEP 1



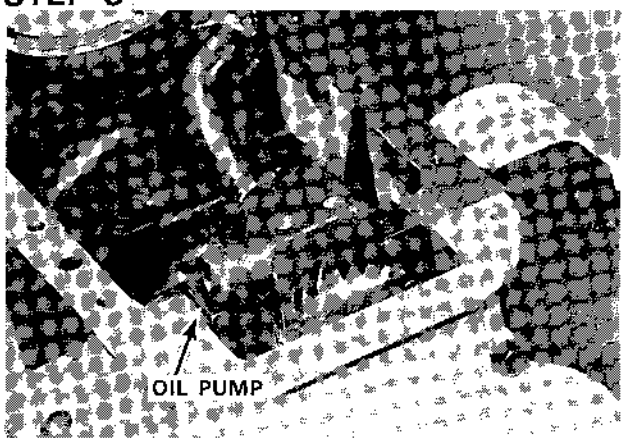
Remove oil pan drain plug and drain oil from engine. Remove oil pan mounting bolts.

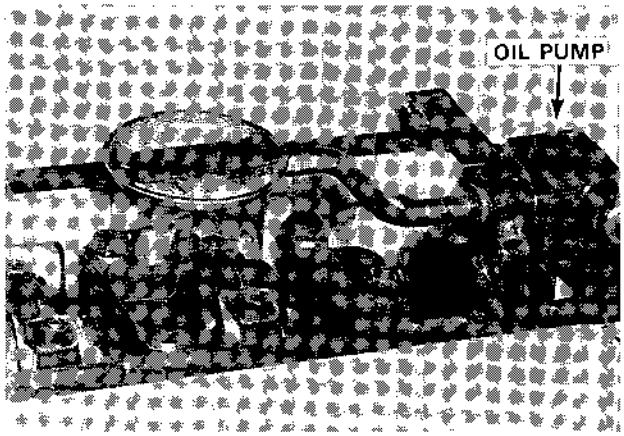
STEP 2



Remove oil pan and gasket from engine.

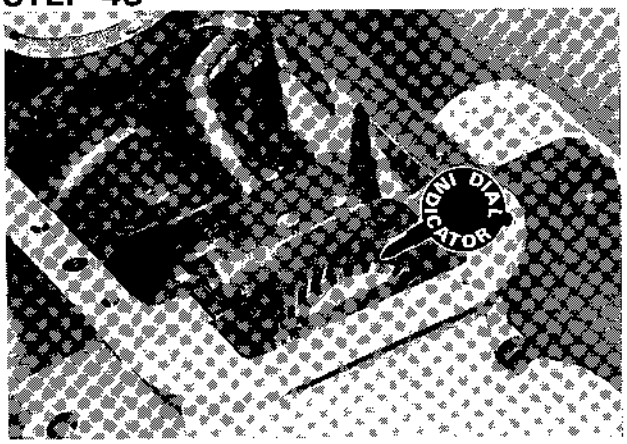
STEP 3





Oil pan removed from engine.

STEP 43

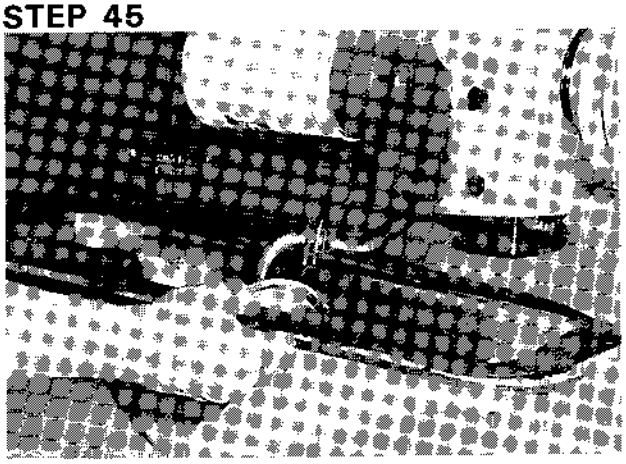


Place a dial indicator on the oil pump drive gear and check backlash between drive gear and crankshaft gear. Backlash must be .002 to .008 inch. If backlash exceeds or is under the above range, add or delete shims between oil pump and No. 1 main bearing cap to obtain correct backlash. See Step 35. *NOTE:* Oil pump shims are .002 and .005 inch thick.

STEP 44

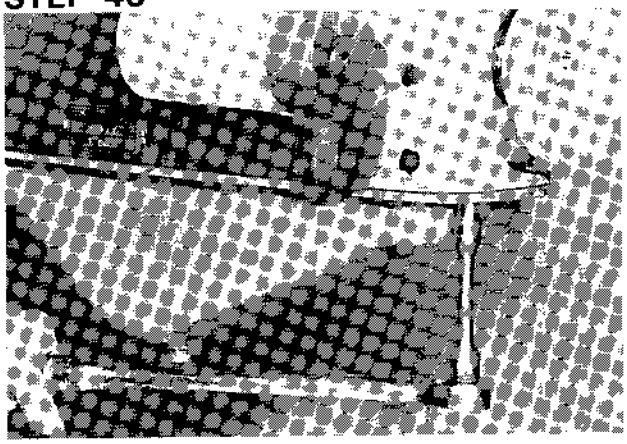
Apply No. 2 Permatex on both sides of new oil pan gasket at the front and rear portions only.

STEP 45

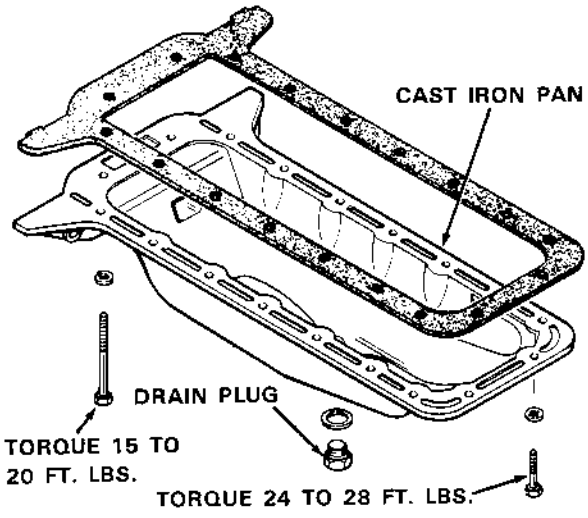


Install oil pan and gasket on engine.

STEP 46



Torque stamped steel oil pan mounting bolts 10 to 12 ft. lbs.



If equipped with cast iron oil pan, install long bolts to the rear of the engine and torque 15 to 20 ft. lbs. Torque remaining mounting bolts 24 to 28 ft. lbs.
NOTE: Torque drain plug 29 to 31 ft. lbs. Refill crankcase with proper amount and type of oil. Refer to Operator's Manual.

AIR CLEANER SERVICE

Service Interval

The air cleaner filter element must be serviced when the red band on the air cleaner restriction indicator remains in full view. In addition to filter service the dust cup should be cleaned daily or more often as conditions warrant.

Filter Element Service

Washing is the preferred method of cleaning the element as it removes more dust and soot, thus restoring the element to an almost new condition.

Wash the filter in Case Filter Element Cleaner, Part No. A40910. Mix according to instructions on container. Do not use water pressure over 40 psi (275 kPa) at the nozzle. Let the element dry completely before installing. Do not use compressed air to dry the element.

Use of compressed air to clean the element is permissible but not recommended as it does not remove carbon and soot. When using compressed air, use no more than 30 psi (206 kPa) at the nozzle and keep the nozzle a reasonable distance (no closer than 1 inch (25 mm) away from the filter. Move the nozzle up and down each pleat, blowing from the inside only.

Inspect the filter after it is clean and dry. Place a light inside the filter and inspect for holes, tears, and dented or bent metal covering. If metal covering is dented or bent, inspect filter paper for holes or rub spots in that area. If holes or rub spots are noted, discard the filter and install a new filter element.

NOTE: Inspect new filter element in the same manner. Do not accept a defective filter.

The element must be replaced after it has been cleaned six times or once a year, whichever occurs first.

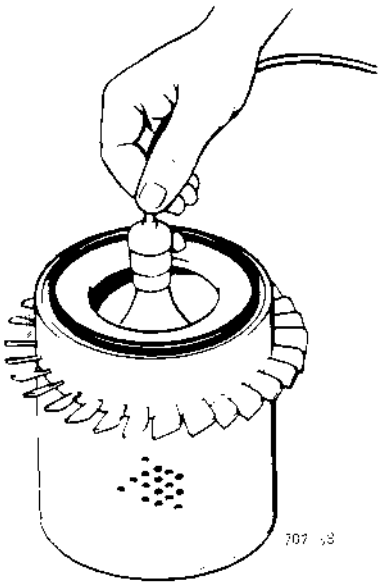


Figure 2 - Inspecting the Element

Precleaner

The precleaner is used on all Fertilizer Special (1845S) machines. The precleaner is located to the right of the air cleaner, Figure 1. Remove and clean the bowl when the dust level reaches mark on bowl (about 1/2 inch (17 mm) from top of bowl). Clean the base with a brush periodically.

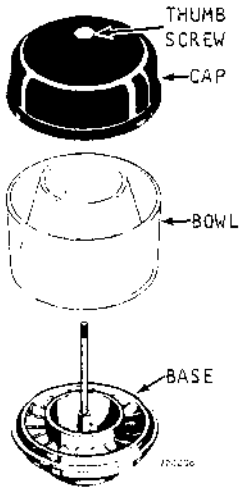
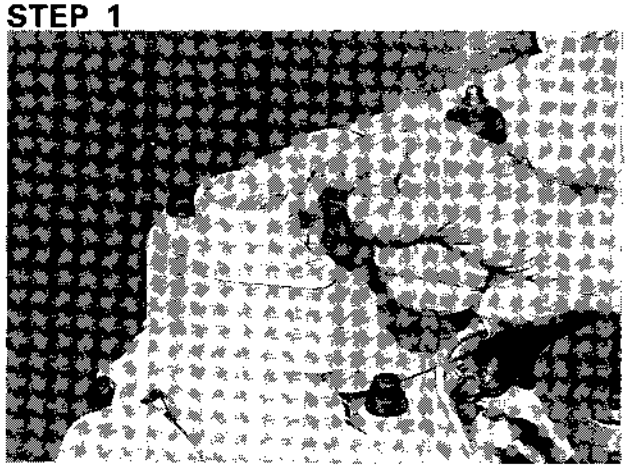


Figure 3 - Precleaner

THERMOSTAT REPLACEMENT

Removal

STEP 1

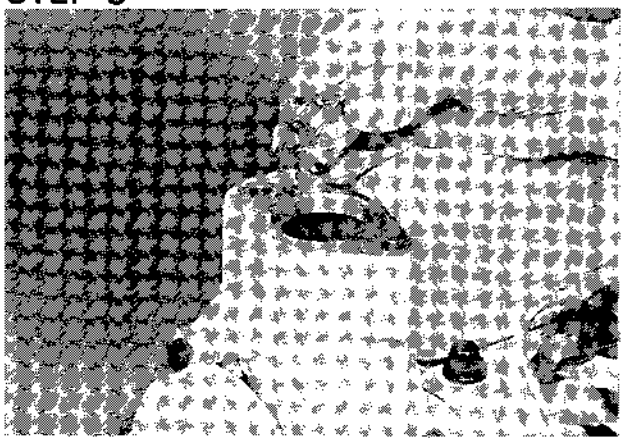


Disconnect and remove hose from thermostat housing. Remove thermostat housing bolts.

STEP 2

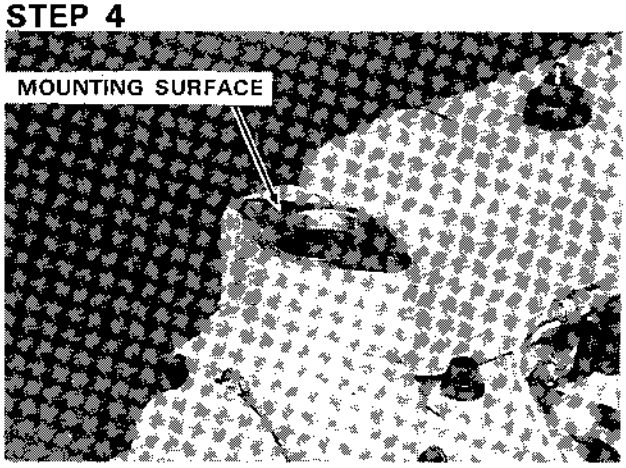
Remove thermostat housing and gasket.

STEP 3



Lift thermostat out of water pump housing

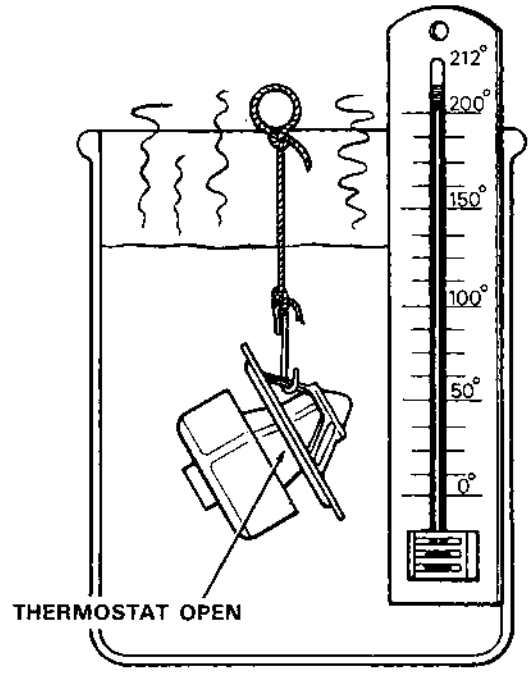
STEP 4



Remove all old gasket material from mounting surfaces.

Inspection

STEP 5



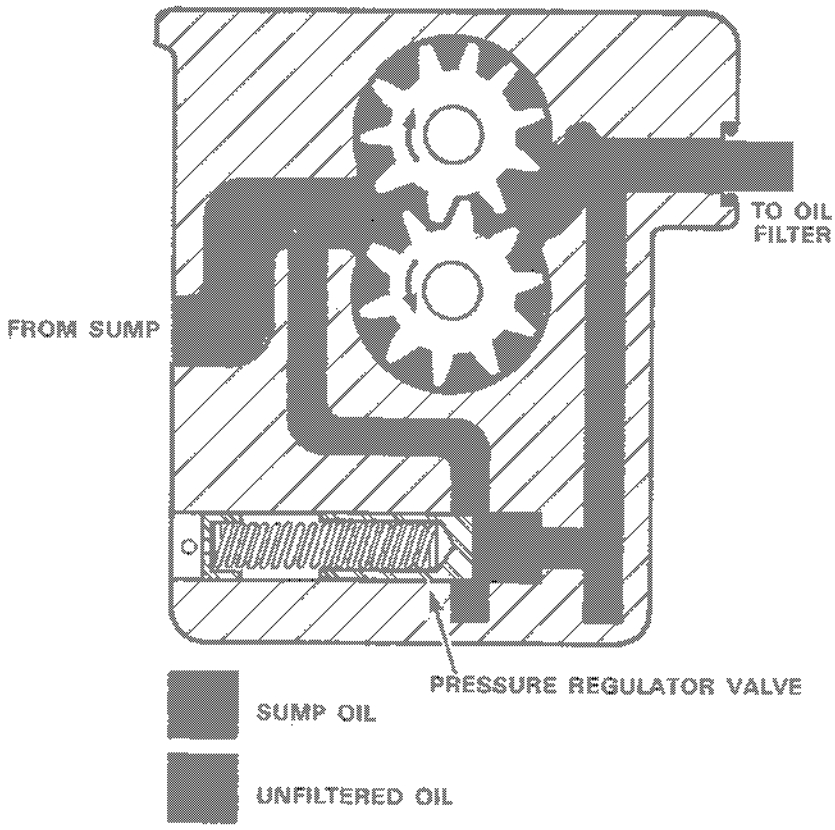
Check thermostat for proper operation by submerging in a container of hot (approximately 175°F) water. The thermostat should be completely open at 202°F. Replace the thermostat if it does not meet the above specification.

ENGINE OIL PUMP FLOW

STEP 3

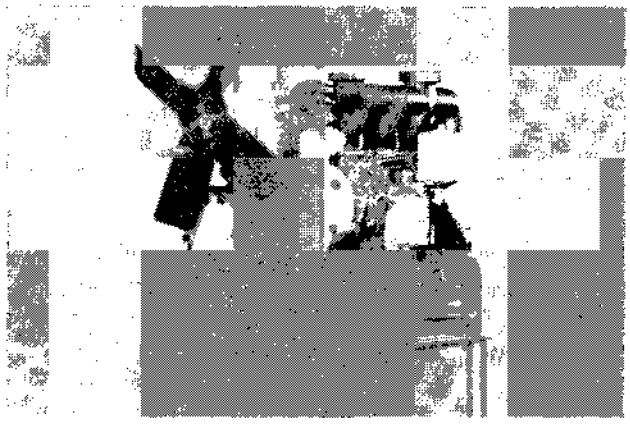
As the oil pressure builds up within the engine oil galleries, the pressure is sensed at the pump. This pressure is then exerted on the back side of the pressure regulator sleeve. As pressure builds up to 50 to 75 PSI, the regulator sleeve is moved, opening an internal passage to the inlet side of the pump cavity.

Should the oil pressure drop below 50 to 75 PSI, the regulator spring moves the sleeve back, closing off the passage to the inlet side the pump cavity.



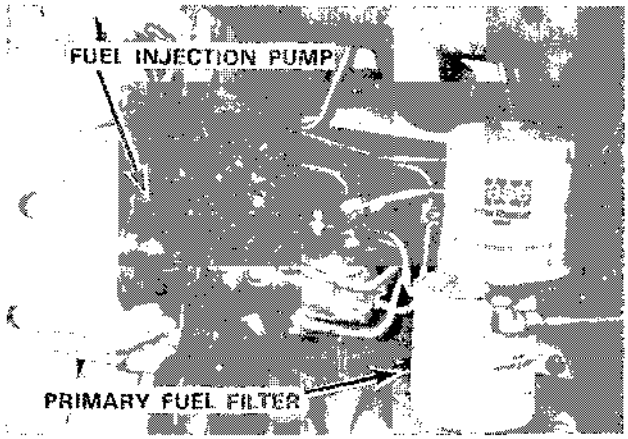
FUEL PUMP REMOVAL

188 DIESEL ENGINE



207 DIESEL ENGINE

STEP 1

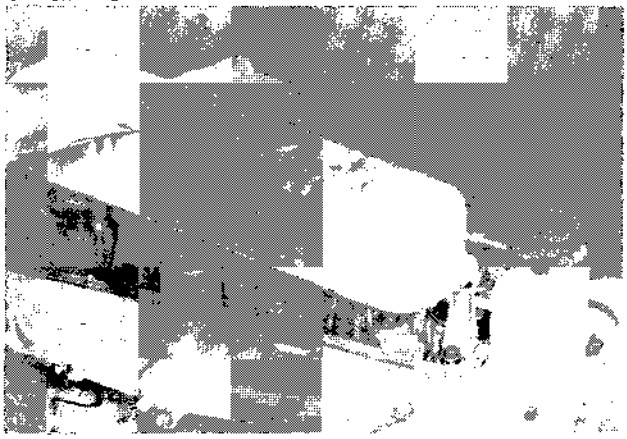


Prior to performing any service work, steam clean the engine thoroughly in the area of the fuel injection pump and lines. Close the fuel tank shutoff valve. Remove the drain plug from the primary fuel filter to drain the filters.

STEP 2

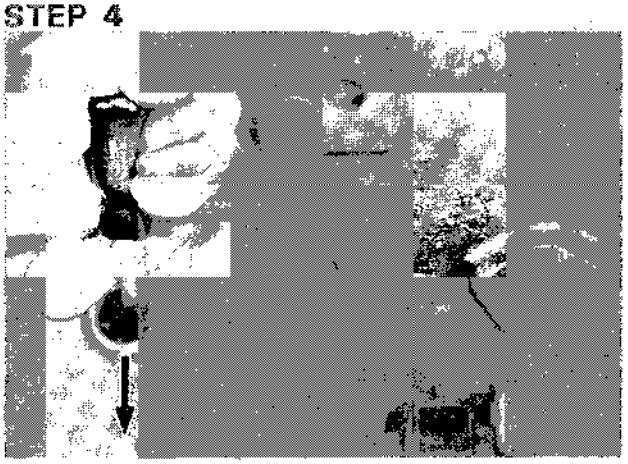
Remove the breather hose.

STEP 3



Remove valve cover from cylinder head.

STEP 4



Crank engine clockwise until TDC mark on flywheel is in line with timing pointer as seen through the flywheel housing timing hole.

STEP 48

Torque connector bolts to 35 ft. lbs.

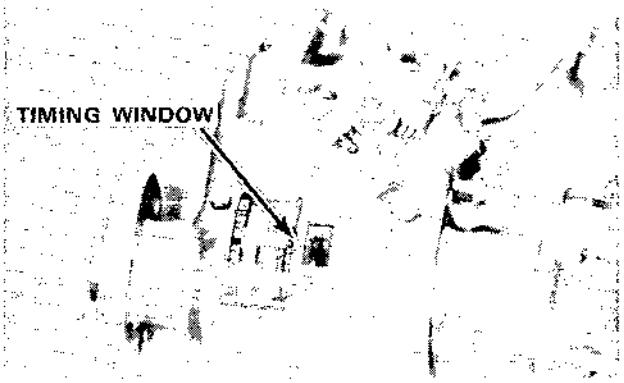
STEP 49

IMPORTANT: If engine has been cranked after pump was removed, repeat steps 4 thru 6 to assure correct timing.

STEP 50

Remove the timing window cover from injection pump.

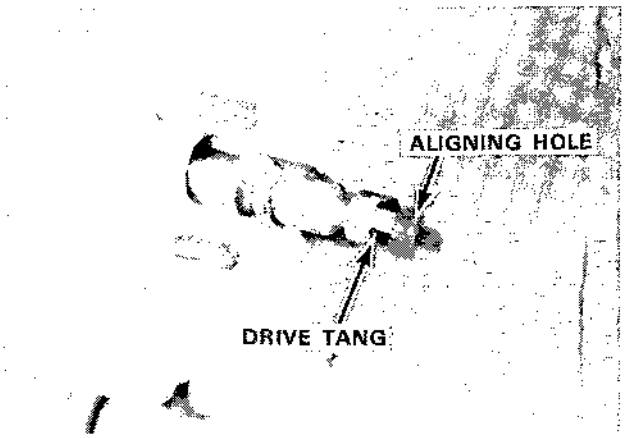
STEP 51



Fuel pump timing window.

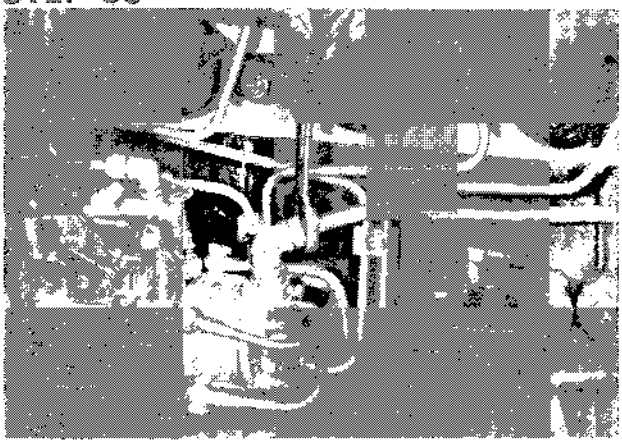
STEP 52

Using a *clean,* wide bladed screwdriver inserted into the drive end of the pump, rotate the distributor rotor until the timing lines in the timing window are aligned.



IMPORTANT: The rear end of drive shaft is equipped with a drive tang which has a hole in one side. This hole must line up with a hole located internally in pump on the distributor rotor. Turn pump rotor to approximately the position as tang on end of drive shaft so holes correspond with each other. If holes are not aligned, pump would be 180° out of time.

STEP 95



Connect fuel filter line to fuel pump.

STEP 96

Install new primary and final fuel filters.

188 DIESEL ENGINE

207 DIESEL ENGINE

OPERATING PRINCIPLES

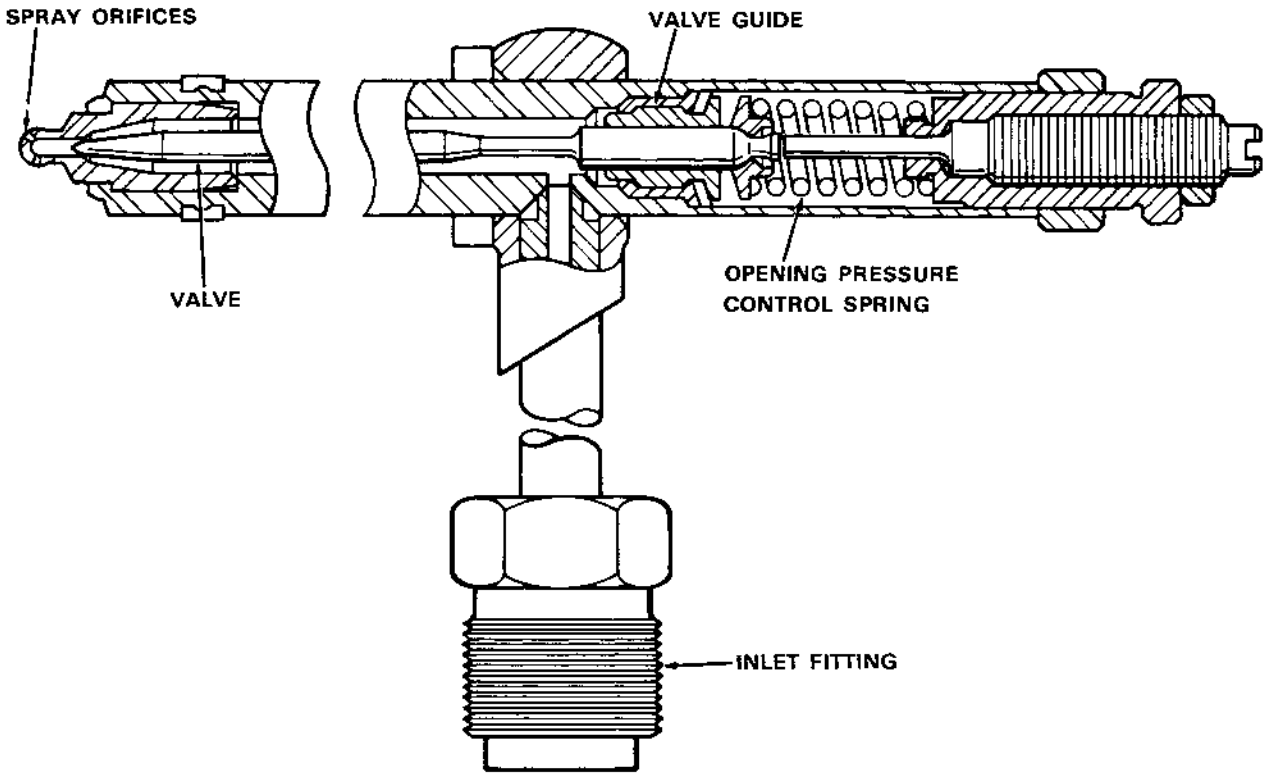
The operation of the injector is simple and positive.

A metered quantity of fuel under high pressure from the injection pump flows through the inlet line of the injector around the injector valve.

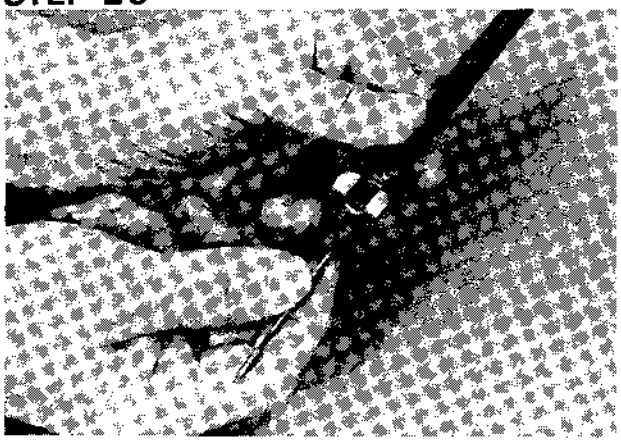
At the instant the pressure of the fuel against the valve exceeds the predetermined spring force, the valve is forced from its' seat allowing fuel under high pressure to flow through the four spray orifices to the combustion chamber.

The instant the fuel delivery ceases, the pressure against the valve is reduced and the control spring snaps the valve to its' seat. This eliminates any possibility of dripping after the metered amount of fuel has been delivered. In actual operation, the valve opens and closes very rapidly with a distinct chatter.

During injection, a small amount of fuel leaks through the closely controlled clearance at the guide, lubricating all the moving parts in the injector. This fuel then flows off through leak-off lines at the top of the injector and returns to the fuel tank.

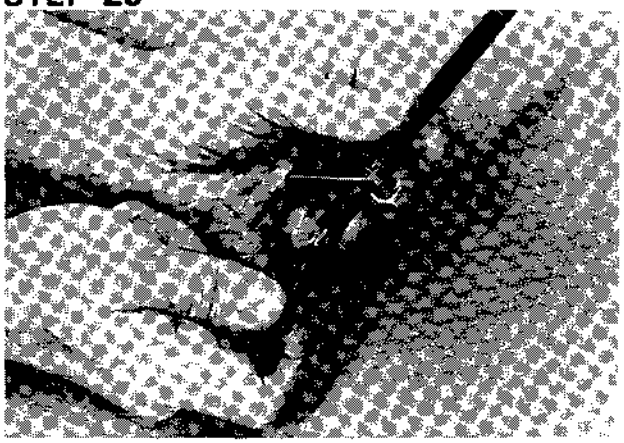


STEP 28

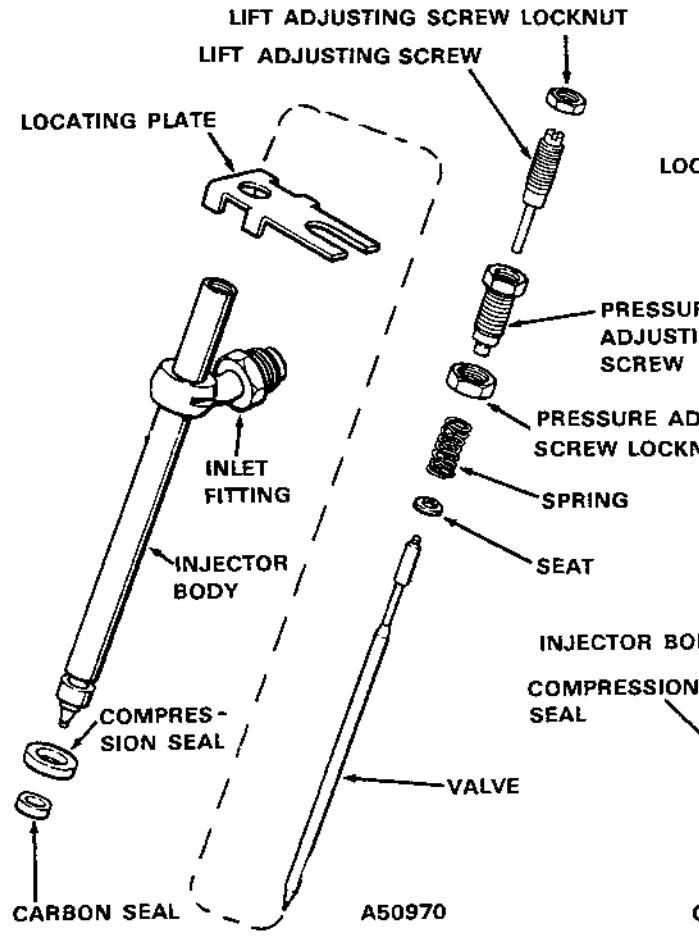


The valve may slide out of the body at this time and should be handled carefully by its' stem.

STEP 29



If the valve does not slide freely from the body, use valve retractor Bacharach Part No. 56-0148, to remove the valve. To prevent bending the valve, bottom it in the body with the retractor. Push down on the retractor body to mount the collet. Turn the knurled nut counterclockwise to secure the collet and withdraw the valve.



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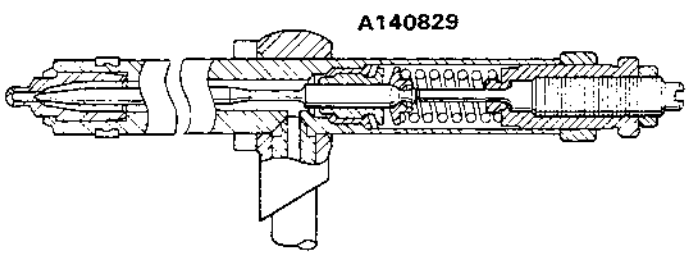

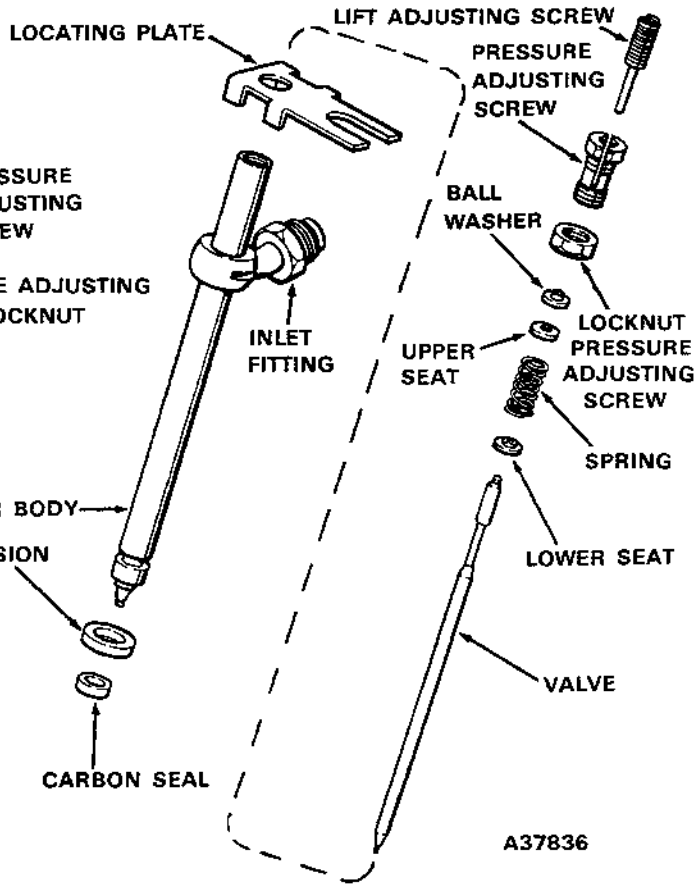

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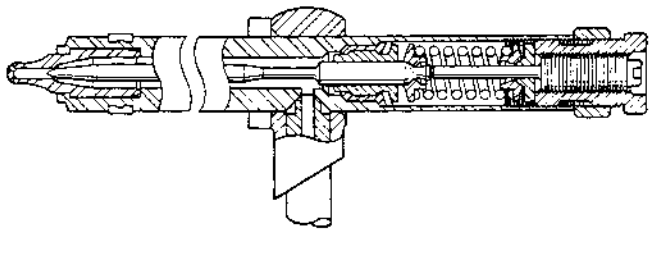


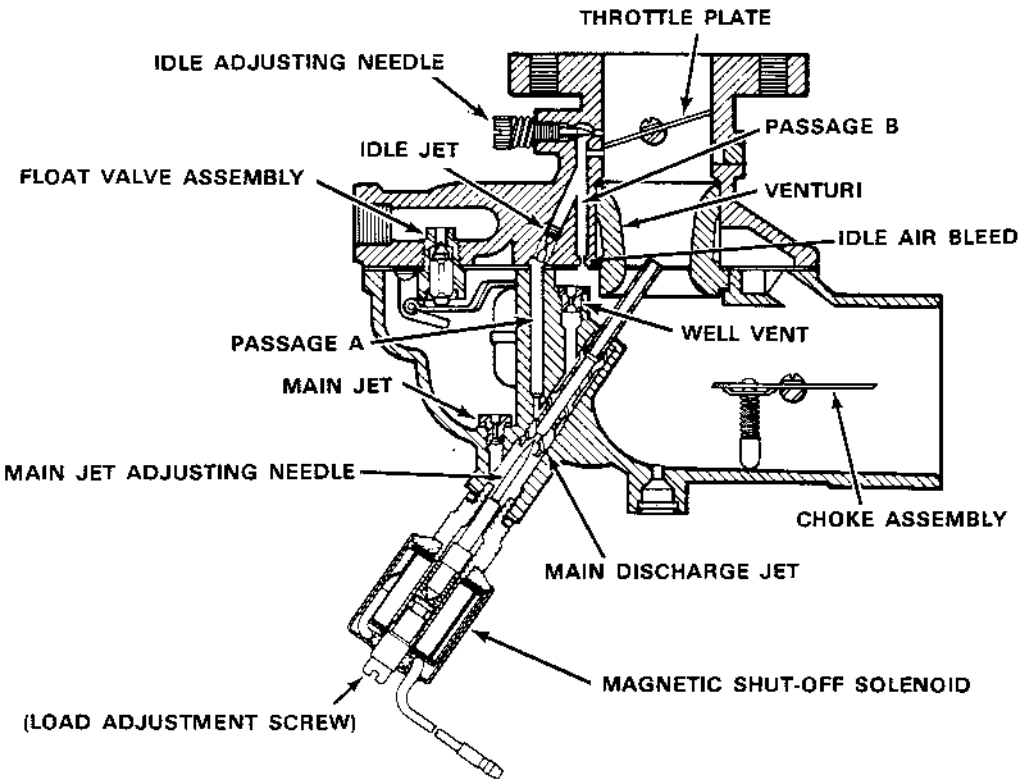

THROTTLE PLATE
IDLE ADJUSTING NEEDLE
PASSAGE B
IDLE JET
FLOAT VALVE ASSEMBLY
VENTURI
IDLE AIR BLEED
WELL VENT
PASSAGE A
MAIN JET
MAIN JET ADJUSTING NEEDLE
CHOKE ASSEMBLY
MAIN DISCHARGE JET
MAGNETIC SHUT-OFF SOLENOID
(LOAD ADJUSTMENT SCREW)

Figure 1

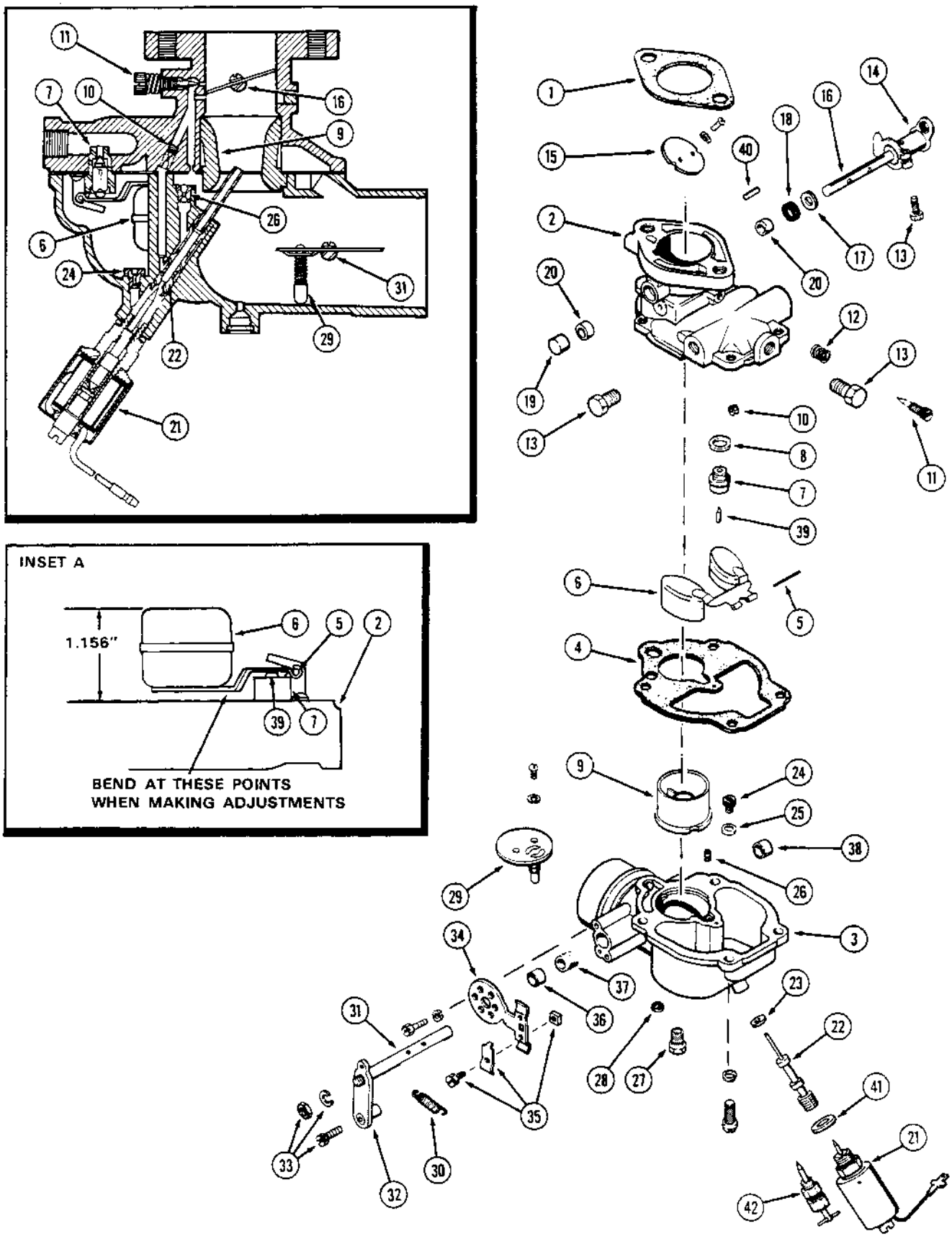


Figure 6

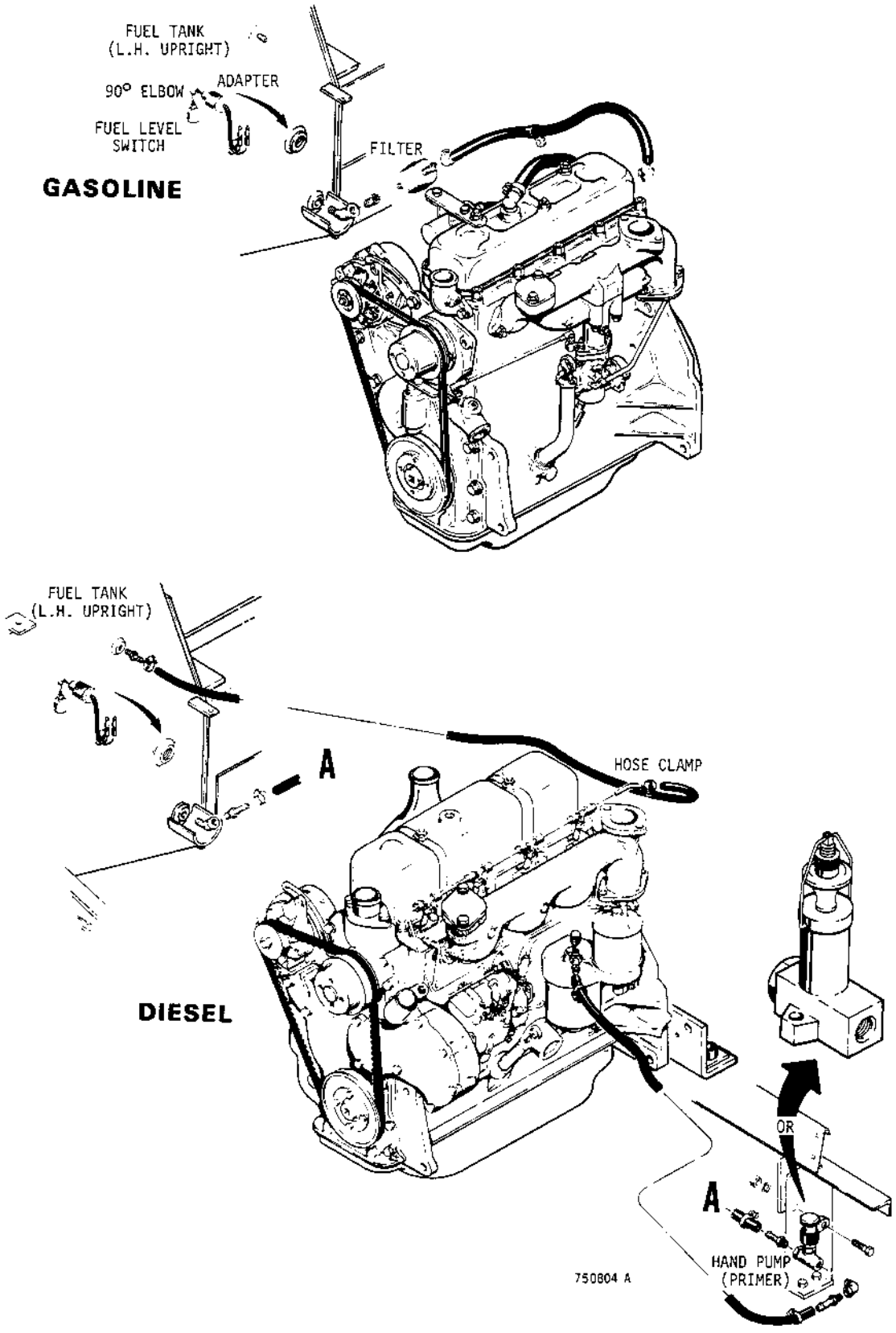


Figure 3 - Fuel Tank and Fuel Lines, Gas and Diesel Engines

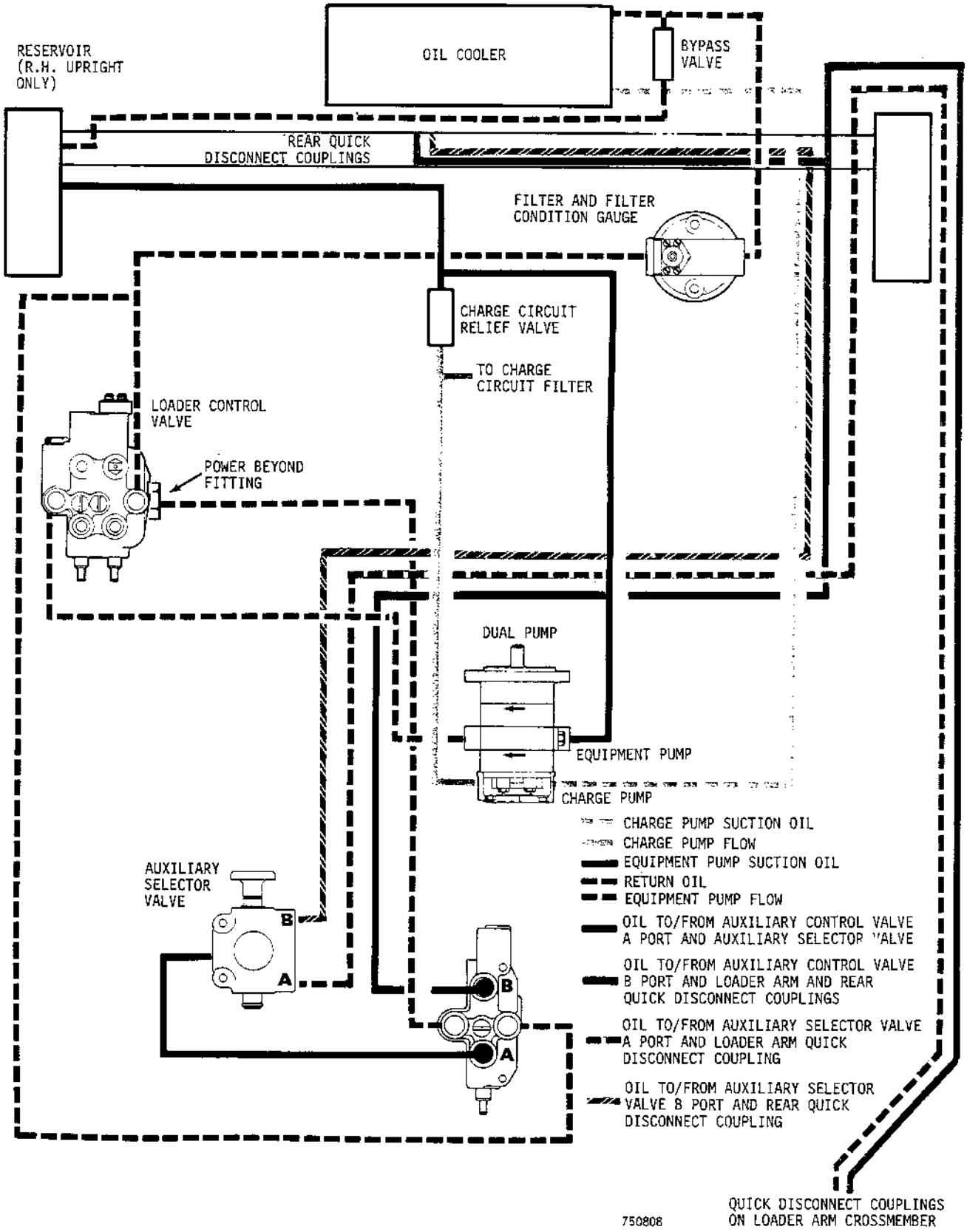


Figure 4 - Combined Loader Arm and Rear Auxiliary Hydraulic Diagram

TESTING THE HYDRAULIC SYSTEM WITH A FLOWMETER

Hydraulic troubles in this and other Case machines can be quickly and positively diagnosed with the aid of a flowmeter. This prevents trial and error replacement of parts.

The flowmeter is portable and can be used in the shop or easily transported to the field for on the spot trouble shooting.

Two Flowmeters Available

Two flowmeters are offered through the Case Service Tool Program. Refer to the Case Service Tools Catalog.

Either flowmeter may be used when performing tests on this machine.

Description of Tests

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

By interpreting these measurements as described on the following pages, hydraulic faults can be identified.

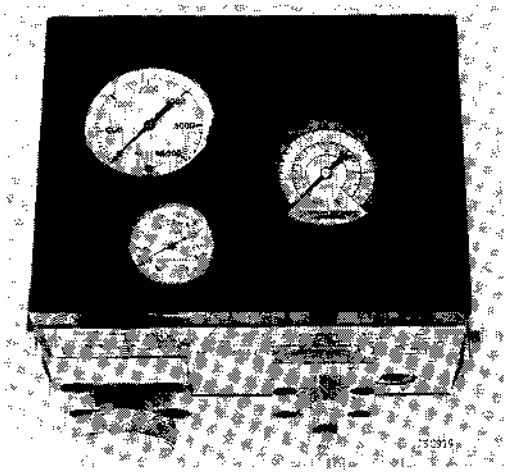


Figure 7 - 60 gpm Flowmeter

The test procedure consists of:

1. First, learning how much oil the pump delivers to the system at no load.

2. Then, by applying a fixed, normal operating pressure on all the components, finding out how much oil is unavailable for work because it is:

   a. Not being delivered by the pump due to internal slippage caused by wear, or because of a leak or restriction in the suction line.

   b. Not being delivered to the cylinders because it is leaking back to the reservoir by passageways that are supposedly closed, namely valve leakage.

   c. Not being used by the cylinders because it is leaking past the cylinder packing and returning to the reservoir.

Test Procedure

Preliminary Checks

1. Before connecting flowmeter into the system, check the following and make corrections as required.

   a. Oil level. Make sure reservoir is filled to the proper level with oil specified on page 4011-3.

   b. Oil filter. Check condition of filter as described on page 4011-10 and change filter if necessary.

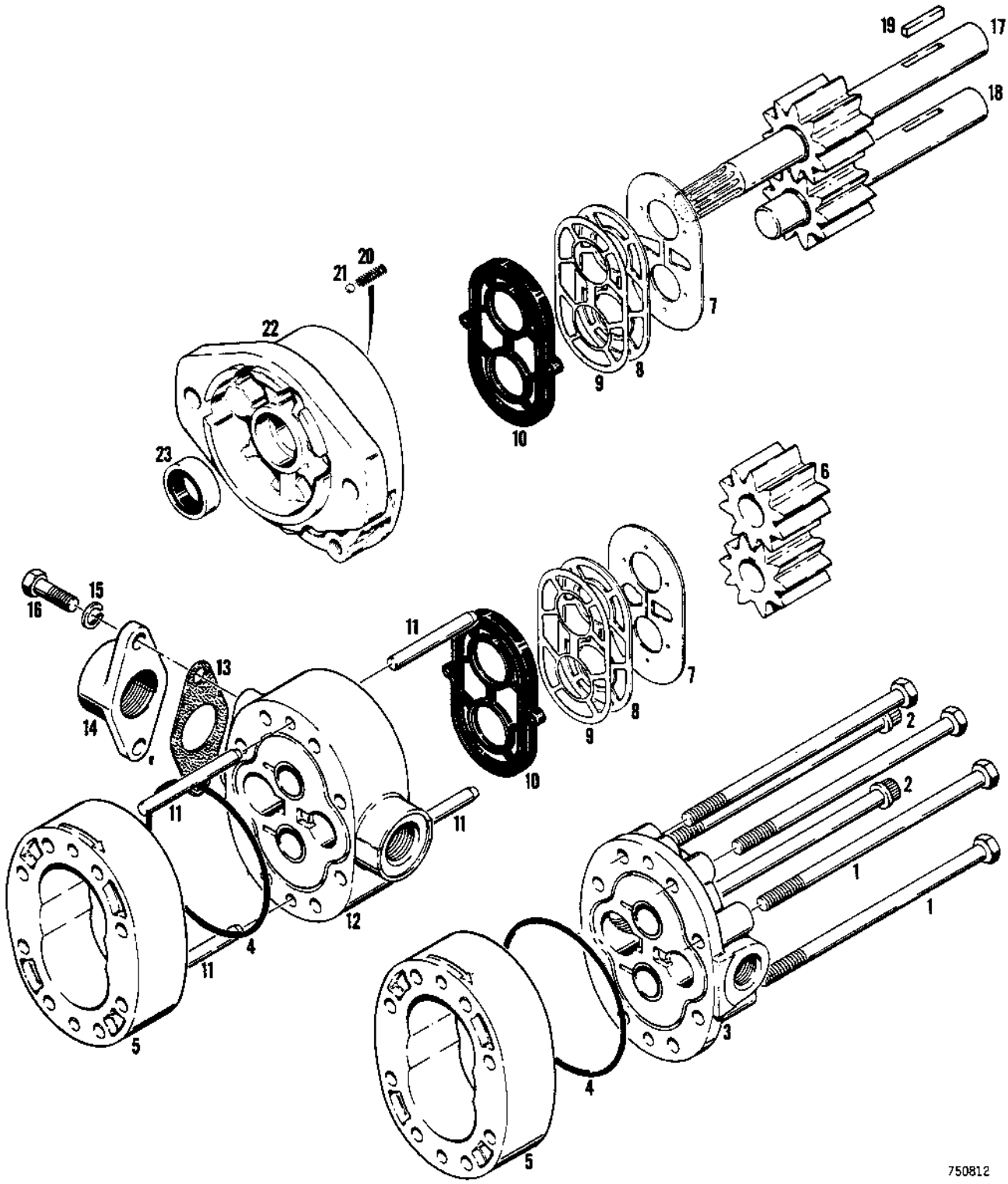
2. Check engine compression and ignition timing. A faulty engine will result in poor loader performance.

Test No. 1 - Equipment Pump Output

NOTE: A check sheet is on page 4011-22 and can be copied on any office copier.

1. Before disconnecting any lines, remove floor plate and remove accumulated dirt from the pump, fittings and surrounding area.

   NOTE: If pump opening notch in frame is not 14" (355 mm) wide, increase opening an equal amount on both sides of center for easier access to the equip-



1. HEX HEAD TIE BOLT
2. FERRYHEAD TIE BOLT
3. PORT END COVER
4. O-RING
5. GEAR PLATE
6. CHARGE PUMP GEAR SET
7. DIAPHRAGM
8. BACKUP GASKET (THICK)
9. PROTECTOR GASKET (THIN)
10. DIAPHRAGM SEAL
11. DOWEL PIN
12. ADAPTER PLATE
13. GASKET
14. PORT ADAPTER
15. LOCK WASHER
16. CAP SCREW
17. DRIVE GEAR
18. DRIVEN GEAR
19. KEY
20. SPRING
21. STEEL BALL
22. DRIVE END COVER
23. SEAL

Figure 2

Oil Flow, Lift Spool Actuated

In Figure 3 the lift spool is moved out of the valve body which:

a. Blocks the open center passage. With open center blocked, all oil from the pump flows through the spool being actuated. No oil is available down stream to operate the auxiliary control valve.

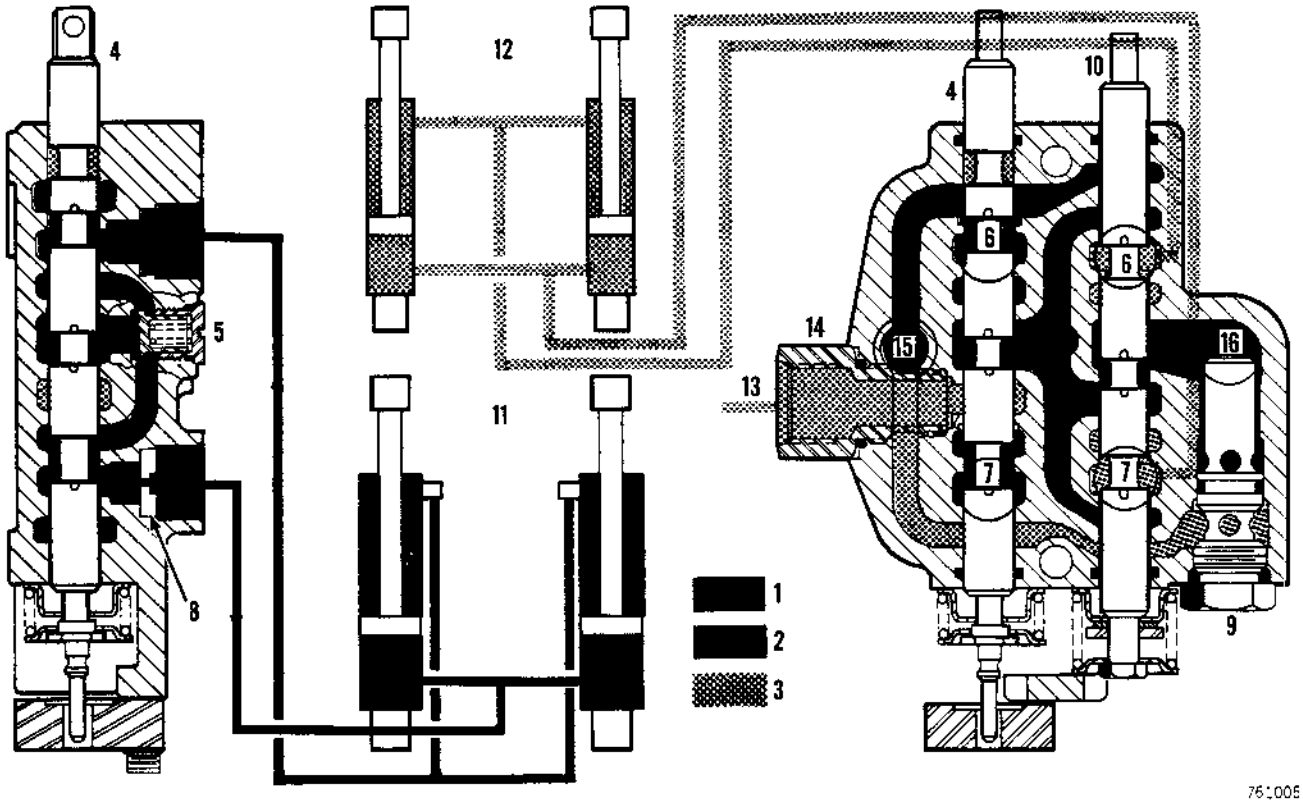
b. As pressure in the open center passage increases, the check valve opens, permitting oil to flow to the B port. From the B port, oil is directed to the closed end of the lift cylinders causing the loader frame to raise.

c. Simultaneously, the A port is opened to the return passage, allowing oil displaced from the rod end of the lift cylinders to flow through the top outlet port.

When the spool is returned to Neutral, oil is locked between the control valve and the lift cylinders, preventing further movement of the loader frame.

To lower the loader frame, the spool is moved into the valve body and oil flow is reversed.

NOTE: The restrictor at the B port, Figure 3, prevents the loader from "dropping" as it is being lowered by regulating the flow of oil returning to the reservoir from the lift cylinders.



1. PUMP FLOW
2. RETURN OIL
3. STATIC OIL
4. LIFT SPOOL
5. CHECK VALVE
6. A PORT
7. B PORT
8. RESTRICTOR
9. MAIN RELIEF VALVE
10. BUCKET SPOOL
11. LIFT CYLINDERS
12. BUCKET CYLINDERS
13. TO AUXILIARY CONTROL VALVE
14. POWER BEYOND FITTING USED WHEN EQUIPPED WITH AUXILIARY HYDRAULICS
15. OUTLET PORT
16. INLET PORT

Figure 3 - Oil Flow, Lift Spool Actuated

Section 4031

AUXILIARY CONTROL VALVE

CASE CORPORATION

C. E. Div. 9-73926
1845 Uni-Loader
Rev. October 1976

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Section 4057

CYLINDERS

CASE CORPORATION

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1845 Uni-Loader
Rev. October 1976

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GRAPPLE CYLINDER

Removal

1. Lower manure fork to the floor and close grapple.
2. Move grapple control in both directions to equalize circuit pressure.
3. Remove hose clamps on top of grapple frame. Disconnect hoses to cylinder at tee fittings.
4. Check for bent piston rod. Replace if bent; do not attempt to straighten.

Disassembly

1. Remove hoses from cylinder.
2. Secure cylinder in a vise using care not to distort the tube. Remove the outer lock ring and push gland into cylinder about 1 inch (25 mm).
3. Remove lock ring spacer and inner lock ring.
4. Carefully pull the piston rod from the cylinder. Pull the rod straight out to prevent damage to the cylinder wall.
5. Secure piston rod yoke in vise and remove piston nut and piston. Then remove O-rings and backup rings from piston and O-ring from piston rod.
6. Remove gland from rod and remove wiper, seal and O-rings from gland.

Inspection

1. Discard O-rings, backup rings, wiper and seal.
2. Clean all parts in cleaning solvent and dry with moisture free compressed air.
3. Shine a light into cylinder tube. If it has deep score marks or grooves, or has been damaged in any way, the cylinder tube should be replaced.
4. Check for bent piston rod. Replace if bent; do not attempt to straighten.
5. Before assembling cylinder, remove any minor nicks, scratches, etc. on the rod or in the cylinder with a medium grit emery cloth. Polish with a rotary motion.

Assembly

1. Install quad ring in groove around gland. Install O-ring and seal in inner groove in gland bore. Install seal with lip to the inside. Then install wiper in outer groove with lip to the outside.

   NOTE: The seal and wiper are identical parts and must be installed as instructed in step 1.

2. Lubricate piston rod and gland bore with hydraulic oil. Install gland on piston rod.
3. Secure piston rod yoke in vise. Install new O-ring in groove in piston rod and install piston. Install piston nut and torque to 110-130 foot-pounds (149-176 N m). Install new backup rings and O-ring in groove in piston. The O-ring must be between the backup rings.
4. Thoroughly lubricate cylinder wall and piston with hydraulic oil. Secure cylinder tube in vise and install piston straight into cylinder. Push the piston into the cylinder about 2 inches (55 mm).
5. Slide gland into cylinder about 1 inch (25 mm) beyond the inner lock ring groove. Then install inner lock ring. Be sure ring is seated in groove.
6. Pull piston rod out of cylinder to seat gland against the inner lock ring. Then install lock ring spacer and outer lock ring. Be sure ring is seated in groove.

Installation

1. If hoses were removed or a new cylinder is being installed, connect hoses to cylinder using new O-rings.
2. Attach cylinder to grapple and frame.

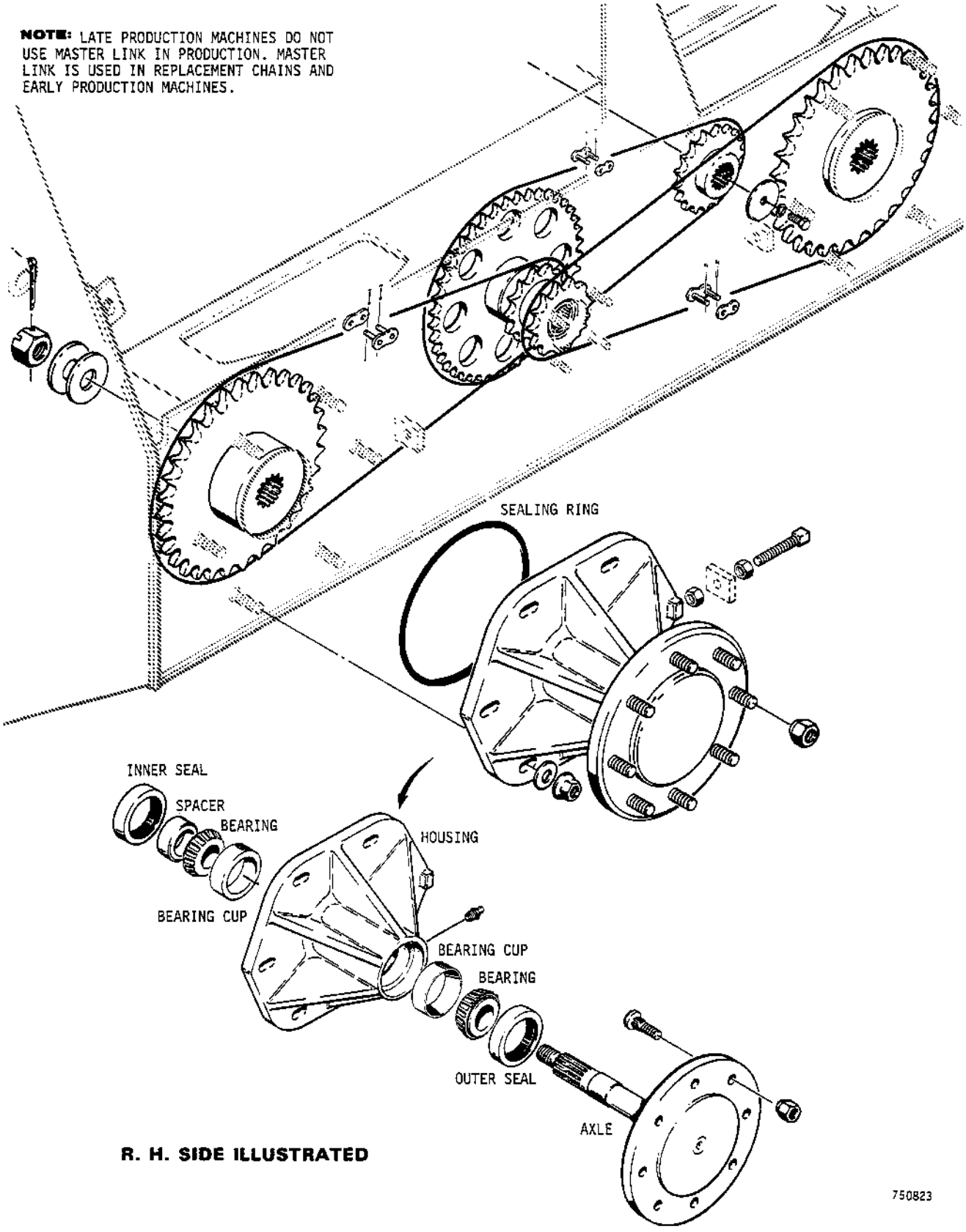

Figure 3 - Axle and Housing Assembly

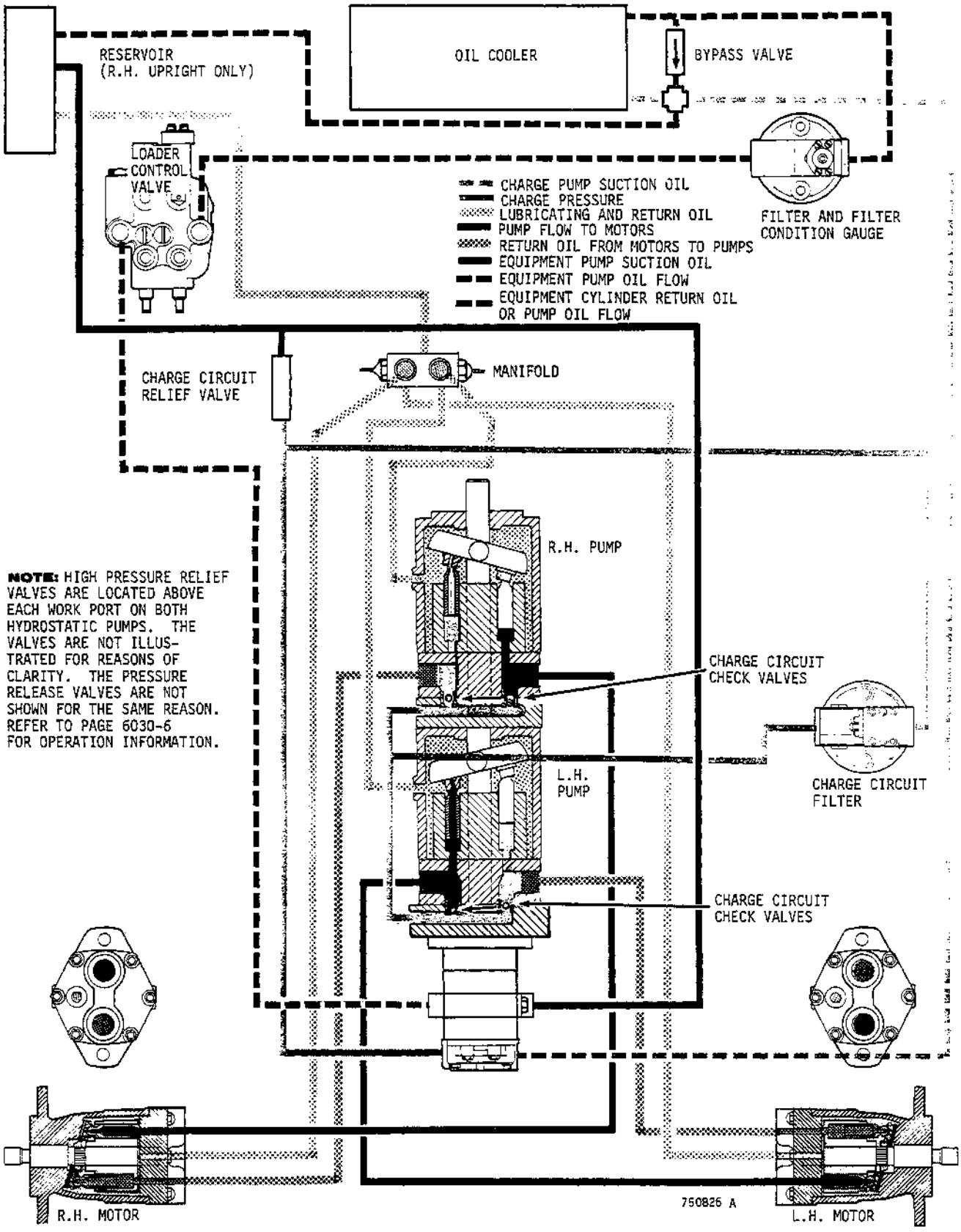

Figure 2 - Oil Flow, Machine Moving Forward

Section 6031

START UP PROCEDURE

AND

CLEANING AND FLUSHING PROCEDURE

CASE CORPORATION

C. E. Div. 9-73925
1845 Uni-Loader
October 1975

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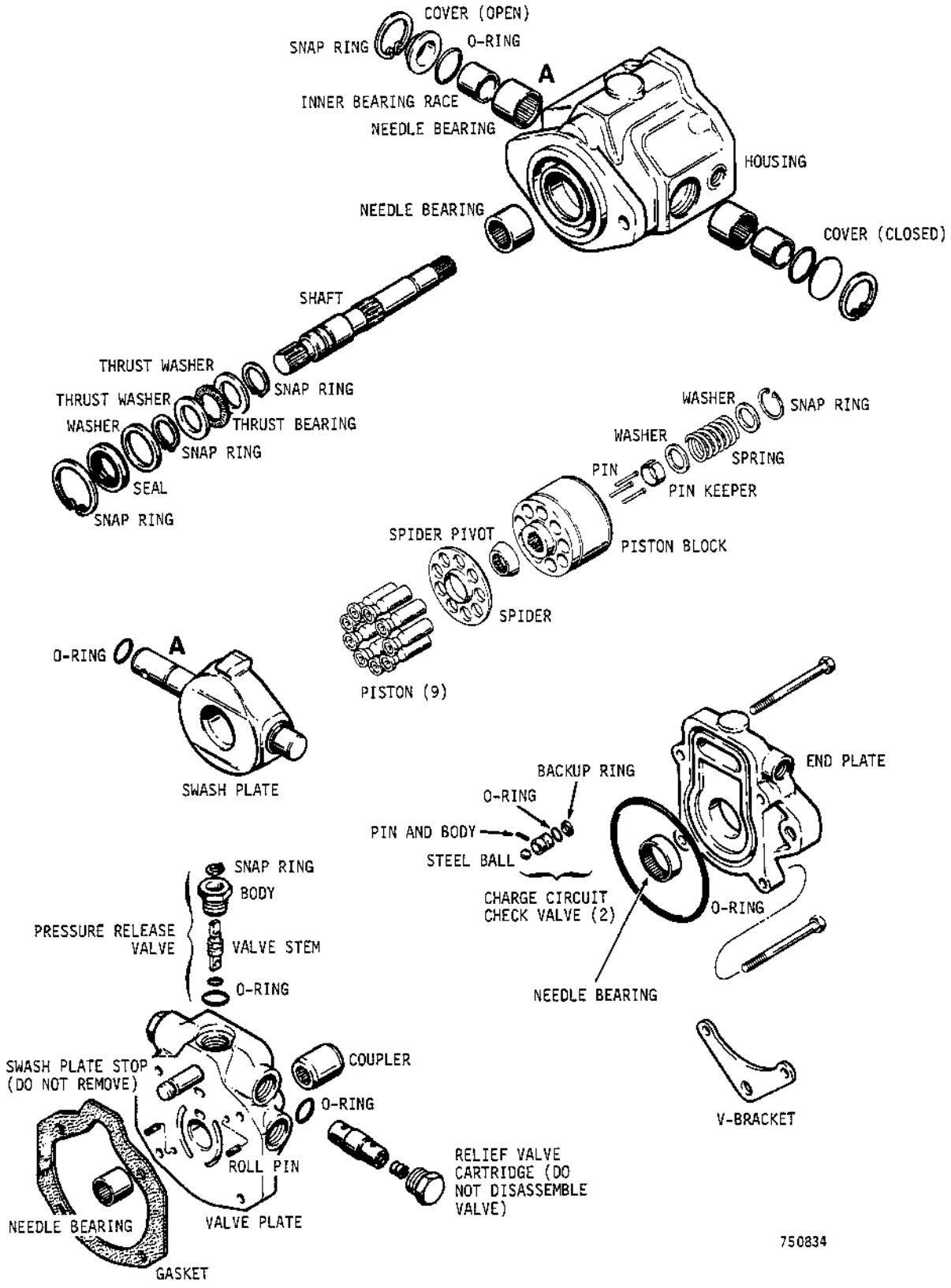

Figure 3 - Left Hand Hydrostatic Pump

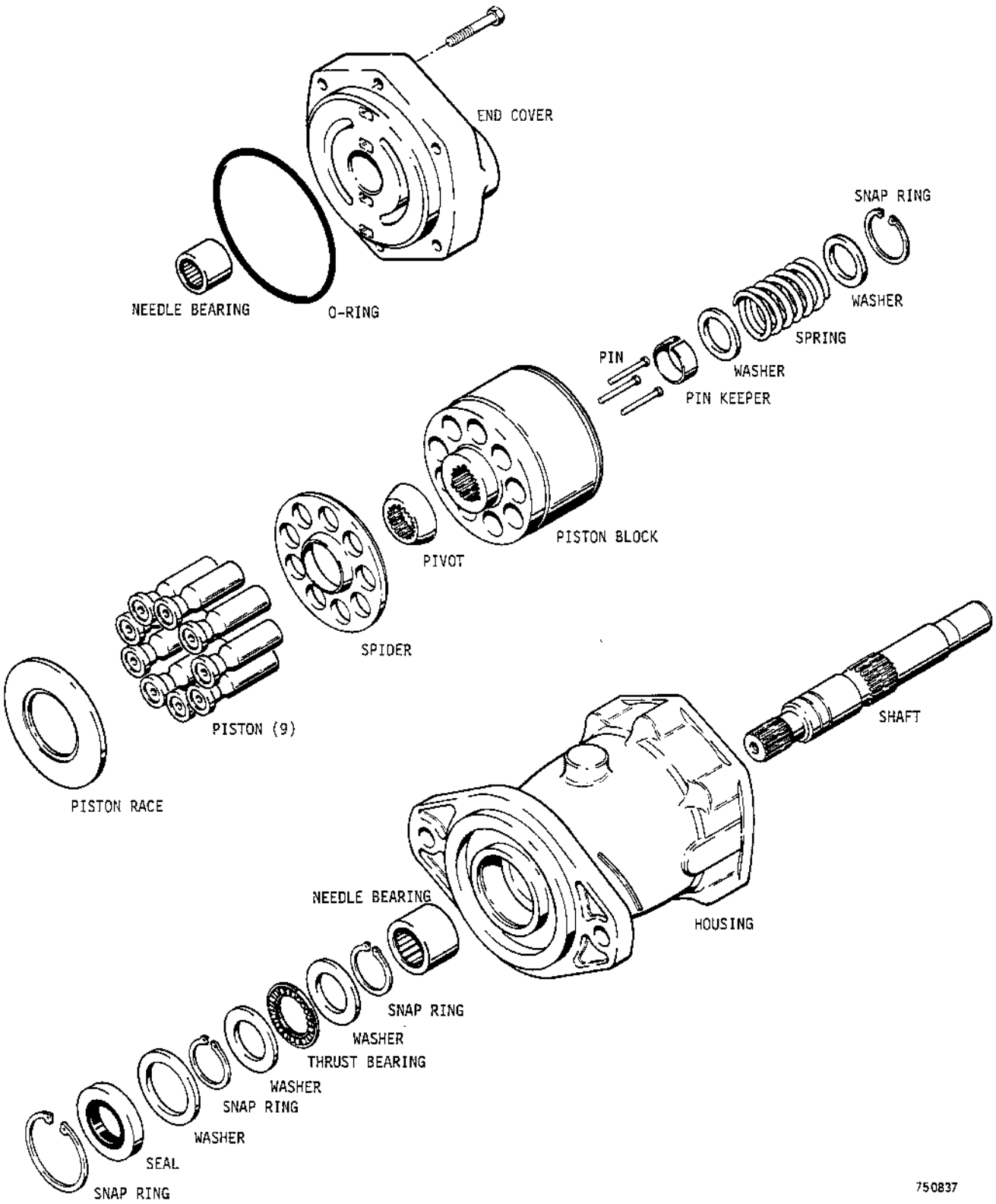

Figure 2 - Hydrostatic Motor

3. Remove shim(s) and O-ring from housing.

4. Remove input shaft retaining snap ring from adapter. Position E-clip so open space is next to ends of snap ring to aid in snap ring removal, Figure 2.

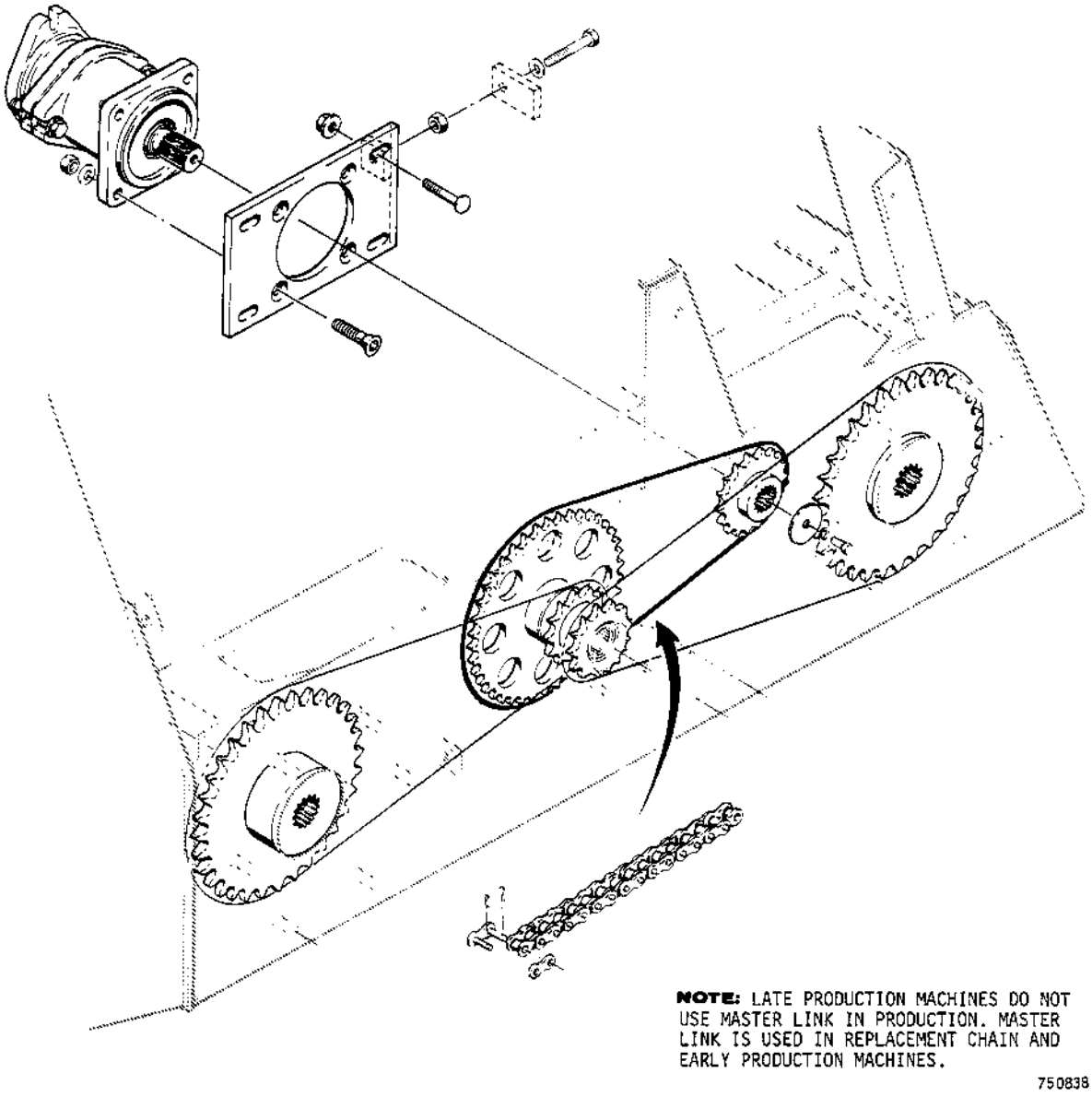

Figure 1 - Gear Reducer Installation

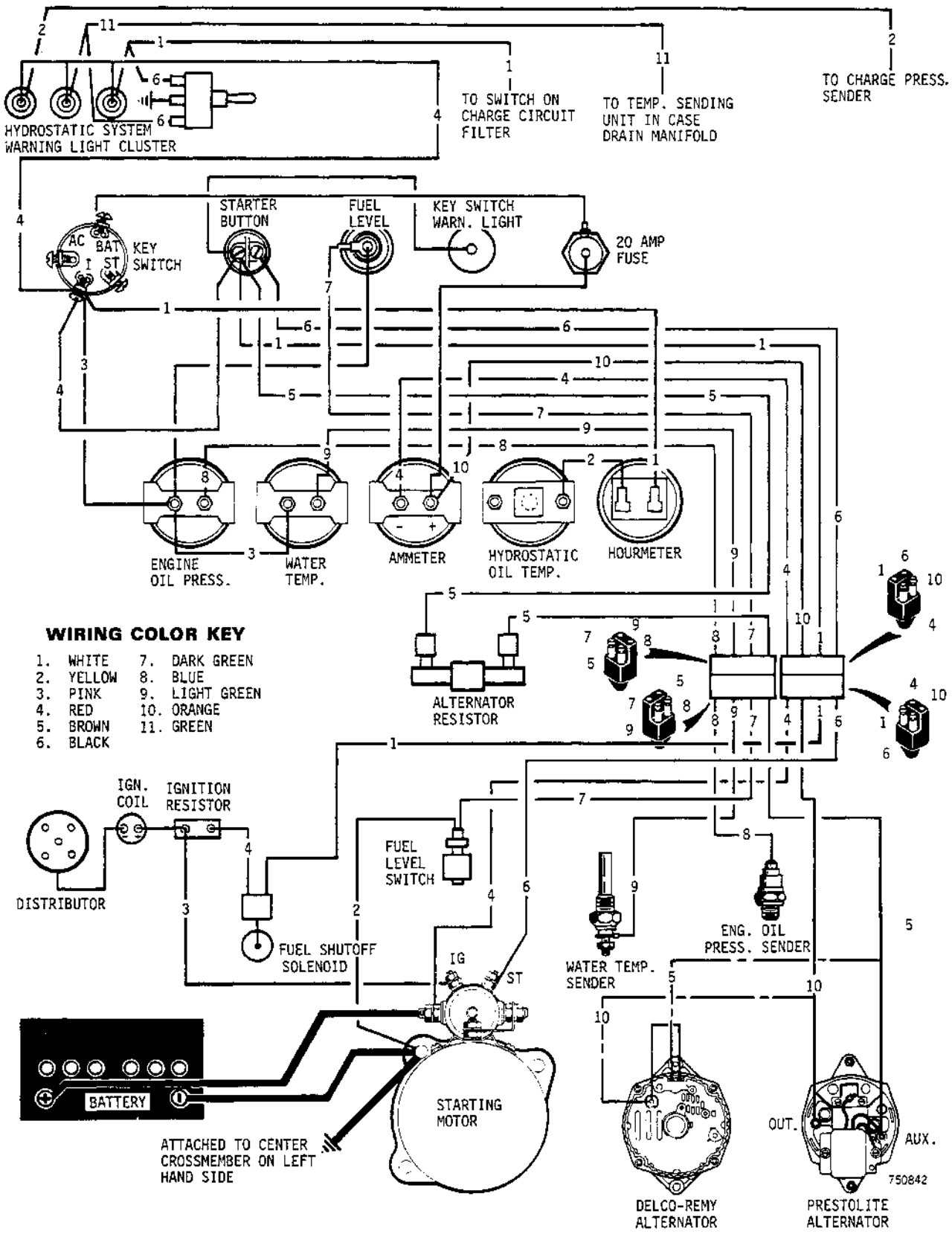

Figure 2 - Wiring Diagram, Gas Engine

CHECK	DETAILED INSTRUCTIONS
Check voltage at alternator terminals (Cont'd)	2. All machines with Prestolite alternator except the fertilizer special. Turn key switch on and check voltage at the alternator Output, Auxiliary and Field terminals. a. Voltage at the Output terminal should be about 1/2 volt less than battery voltage (reading obtained in step 1). b. Voltage at the Auxiliary terminal should be about 1/2 volt less than battery voltage (reading obtained in step 1). c. Voltage at the Field terminal should be about 1 volt less than battery voltage (reading obtained in step 1). 3. Fertilizer special machines. Turn key switch on and check voltage at the alternator Output, Auxiliary and Field terminals. a. Voltage at the Output terminal should be about 1/2 volt less than battery voltage (reading obtained in step 1). b. Voltage at the Auxiliary terminal should be about 1 volt less than battery voltage (reading obtained in step 1). c. Voltage at the Field terminal should be about 1/2 volt less than battery voltage (reading obtained in step 1). 4. All machines with a Delco-Remy alternator, turn key switch on and check voltage at the alternator Bat and No. 1 and No. 2 terminals. a. Voltage at the Bat terminal should be battery voltage to about 1/2 volt less than battery voltage. b. Voltage at terminal No. 1 should be about 2-1/2 volts to 3 volts less than battery voltage. c. Voltage at terminal No. 2 should be battery voltage to about 1/2 volt less than battery voltage.

Continued on next page

DISTRIBUTOR

Removal

1. Disconnect the distributor primary wire at the coil and remove distributor cap.

2. Scribe an alignment mark on the distributor body and the engine block. Then scribe a mark on the distributor body to indicate rotor position.

3. Remove the distributor clamp retaining capscrew. Then lift the distributor out of the block. DO NOT turn the crankshaft over while the distributor is removed or it will be necessary to time the engine.

Installation

1. If the crankshaft was rotated while the distributor was removed from the engine, the engine will have to be timed. Crank the engine until the No. 1 piston is at TDC on the compression stroke. Align the TDC mark on the crankshaft pulley with the timing pointer. Position the distributor in the block with the rotor in the No. 1 firing position.

2. If the crankshaft was not rotated, position the rotor so it will be aligned with mark on distributor body when the distributor is seated. Then position the distributor in the block with the marks on distributor body and block in alignment and install clamp retaining capscrew.

3. Position the distributor cap on distributor and snap spring clamps into place. Then connect the distributor primary wire to the coil.

4. Adjust ignition timing as instructed on page 8013-7.

BREAKER POINTS AND CONDENSER

Removal

1. Remove distributor from engine and secure in a vise or distributor tester.

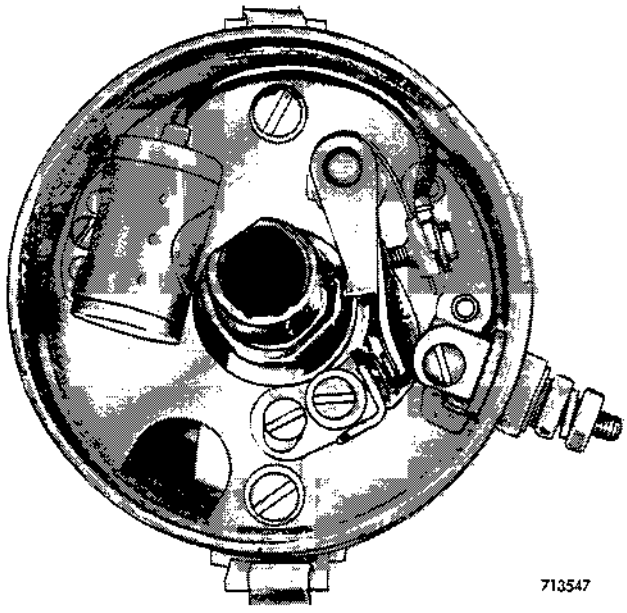

Figure 2 - Distributor

2. Remove the breaker point and condenser retaining screws. Then remove the screw which secures the primary wire and the breaker point and condenser leads.

3. Lift the breaker points and condenser out of the distributor.

Installation

1. Position the breaker points and condenser in the distributor and install the retaining screws.

2. Position the primary wire, breaker point and condenser leads in the terminal clip. Tighten the retaining screw.

3. Align and adjust the breaker points assembly as instructed on page 8013-6.

4. Install distributor in engine and adjust ignition timing as instructed on page 8013-7.

Section 8014

BATTERIES

CASE CORPORATION

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1845 Uni-Loader
October 1975

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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. Battery OK	Clean and continue testing. Add water
4. Low water level ____			
5. Cracked case ____		Defective battery	Replace
6. Other defects noted ____			
Specific Gravity Check			
Cell No. 1 ____	1. More than 30 gravity points variation between cells	1. Defective, discharged or worn out battery.	1. Recharge battery. Repeat test. If cell readings still vary, replace battery.
Cell No. 2 ____	2. Most cells below 1.230 and even within 30 points	2. Discharged	2. Recharge and make Capacity Test
Cell No. 3 ____	3. Most cells at or near full charge (1.260) and even within 30 points.	3. Charged	3. Make Capacity Test
Cell No. 4 ____	4. Most cells above full charge (1.260)	4. Overcharged	4. Check regulator.
Cell No. 5 ____			
Cell No. 6 ____			
NOTE: Specific gravity readings apply to original equipment or Case supplied replacement batteries only. Other makes may vary.			
Capacity 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	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			
Soft top battery or battery with exposed cell connectors only: Terminal voltage after 3 minutes	Over 7.75 volts (6V battery) or 15.5 volts (12V battery)	Battery sulfated or worn out	Replace
	Under 7.75 volts (6V battery or 15.5 volts (12V battery)	Battery discharged or defective	Measure individual cell voltages
All Batteries			
Cell No. 1 ____	Cell readings vary over .1 volt	Battery defective	Replace
Cell No. 2 ____	Cell readings even within .1 volt	Battery discharged	Charge battery
Cell No. 3 ____			
Cell No. 4 ____			
Cell No. 5 ____			
Cell No. 6 ____			720427

2. Place armature in a lathe and turn down commutator until all indications of wear are removed.

3. Undercut insulation between commutator bars 1/32" (0.8 mm) wide and 1/32" (0.8 mm) deep. Use 00 sandpaper to remove any burrs from commutator.

FIELD COILS

1. Check field coils as instructed under Field Coil Tests.

BUSHINGS

1. Inspect bushing in center bearing plate, commutator end frame and drive housing for wear. If bushing is to be replaced, soak bushing in 30 weight oil before installation.

Assembly (Diesel)

1. Lubricate bushing in commutator end frame and drive housing.

2. Place thrust washer, center bearing plate, woodruff key and starter drive on armature shaft.

3. Place the starter drive retainer on the armature shaft with the cupped surface facing the snap ring.

4. Place snap ring on end of armature shaft. Place a piece of wood over snap ring and force the snap ring onto the shaft with a light hammer blow. Then slide snap ring down into groove.

5. To force the retainer over the snap ring, place a suitable washer over snap ring and squeeze retainer and washer together with pliers.

6. Remove washer and install thrust washer on armature shaft.

7. Install armature in drive housing and reinstall shift lever and solenoid.

8. Assemble field frame assembly to drive housing using care not to damage brushes.

9. Position commutator end frame on field frame and install thru bolts. Tighten thru bolts securely.

Assembly (Gas)

1. Replace brushes if required. Then pull each brush up in brush holder and position brush spring against side of brush to aid in installing field frame on armature.

2. Press new bushing into drive housing, and end plate as required.

3. Install the thin thrust washer and center bearing plate on armature shaft. Then place Woodruff key in keyway on armature shaft and install the starter drive.

4. Position drive housing against center bearing plate and secure in place with screws and lockwashers.

5. Place field frame on armature and against drive housing. Then push brushes down and make sure springs are on top of each brush.

6. Place thick thrust washer on armature shaft and install the end frame. Then install the thru bolts and tighten securely.

7. Secure solenoid to field frame and reconnect field connector to the field coil terminal.

Installation

1. Position starter against flywheel housing using care not to push mounting bolts out of flywheel housing. Secure starter in place with nuts and lockwasher.

2. Connect wiring to starter solenoid.

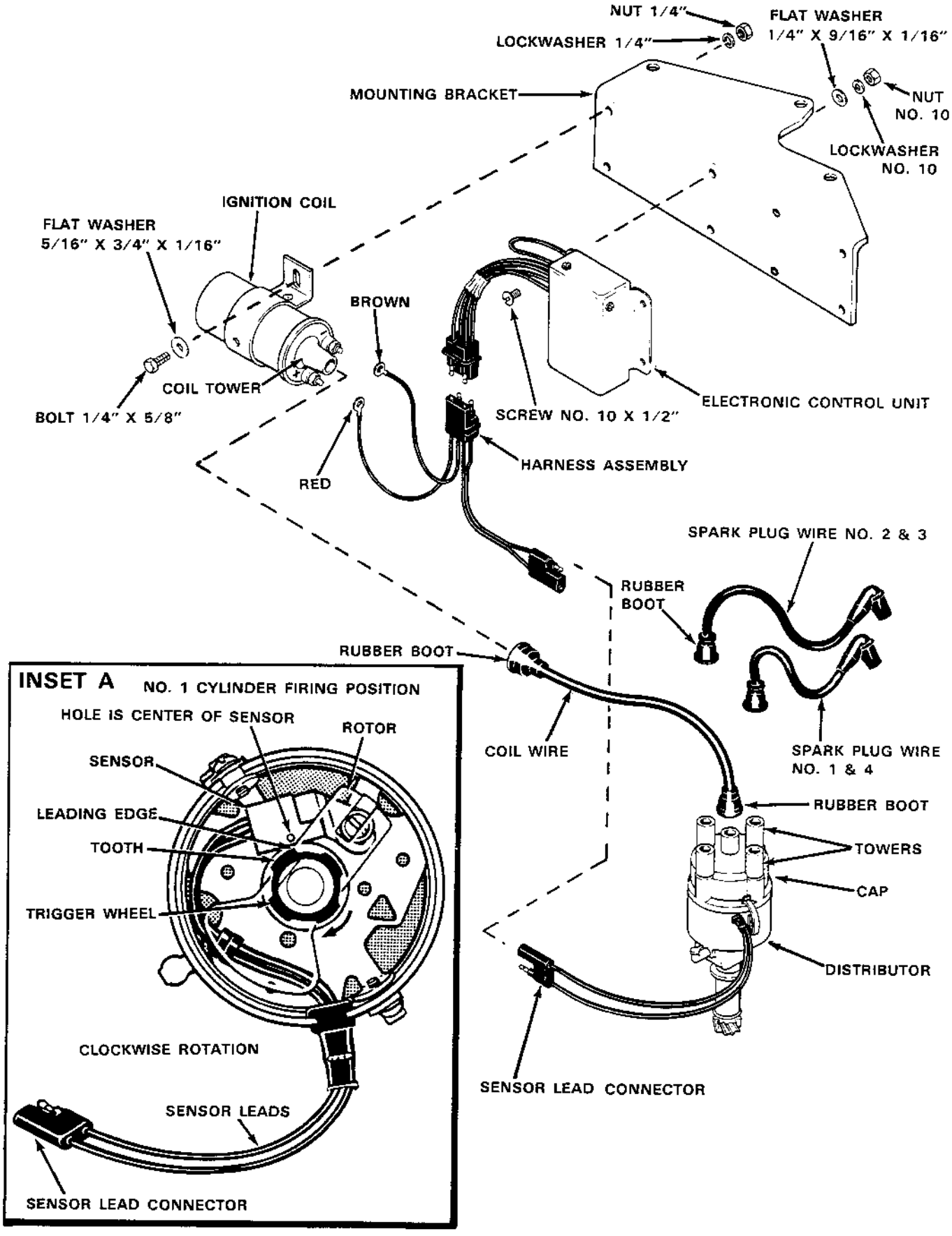
3. Connect ground cable to battery.

Armature Tests

ARMATURE GROUND TESTS

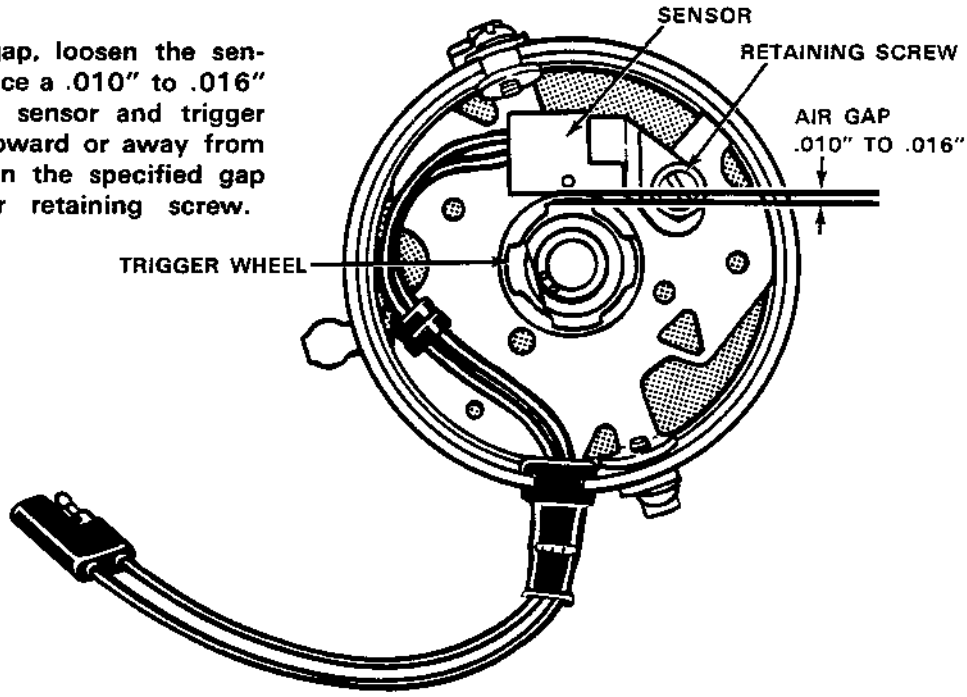
1. Place armature in growler of tester. Turn on power, Figure 5.

GENERAL INFORMATION



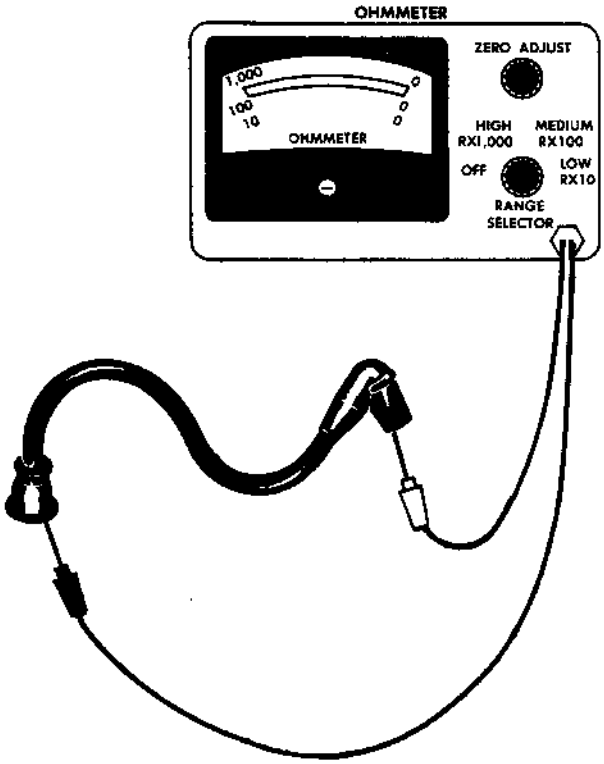
SENSOR AIR GAP ADJUSTMENT

To adjust the sensor air gap, loosen the sensor retaining screw and place a .010" to .016" feeler gauge between the sensor and trigger wheel. Move the sensor toward or away from the trigger wheel to obtain the specified gap and retighten the sensor retaining screw.



CHECKING SPARK PLUG AND CENTER COIL WIRES FOR RESISTANCE

Connect an hommeter to each end of a spark wire and check the resistance. The resistance of the No. 2 & No. 3 spark plug wires ohms should equal 2,875 to 4,956 ohms. The No. 1 and No. 4 spark plug wires ohms should equal 2,030 to 6,705 ohms. The center coil wire should equal 2,900 to 7,000 ohms. Replace any wire not within the specified limit.



3. D.C. ammeter, 0-100 amp scale.

4. Rheostat, 0-50 ohms resistance, 50 watts.

5. 1/4 ohm, 25 watt resistor, Sun Electric RES-1 or equivalent with leads for connection in the alternator output circuit.

6. Carbon pile, Sun Electric Y-20 or equivalent, capable of 600 amp load, knob controlled.

7. 120 volt test lamp with a 25 watt bulb.

8. 12 volt test lamp with number 57 bulb. Used during bench testing.

9. Ohmmeter, Simpson 260 or equivalent. Used during bench testing.

Prestolite Alternator Tests

Test No. 1 - Alternator Output

1. Remove ground cable from battery. Install battery post adapter, Figure 1, on negative battery post and connect cable to adapter.

   NOTE: Before completing step 2, close switch on Sun adapter or turn switch nut up several turns on Snap-on adapter.

2. Connect test ammeter to battery post adapter as indicated in Figure 1.

3. Connect voltmeter positive lead to the output terminal and the negative lead to the alternator frame.

4. Connect carbon pile (or load control) to the battery terminals. Make sure carbon pile is OFF before making connections.

5. Start engine and run at full throttle and open battery post adapter switch. Adjust the carbon pile until the voltmeter indicates 14.2 volts. The test ammeter should indicate 35 amps for all machines except fertilizer special and 20 amps for fertilizer special (1845S).

6. Turn off carbon pile and stop engine.

7. If the output was not as specified, remove alternator, disassemble and test alternator components.

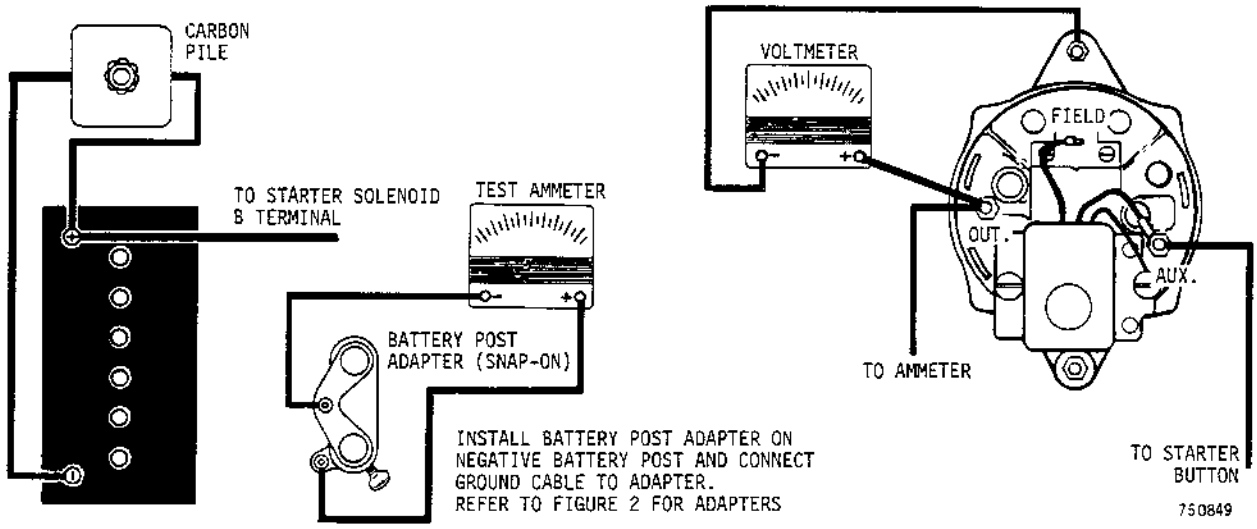


Figure 2 - Alternator Output Test Hookup

of holder, Figure 11. Place holder in rear housing and install gasket and cover over field terminal. Secure parts in place with screws. Remove wire and listen for clicks as brushes contact the slip rings.

9. Secure voltage regulator to rear housing with screws. If voltage regulator has three leads, the black lead should be attached to regulator mounting screw. The brown lead (red, if two lead regulator) is connected to the auxiliary terminal and the green lead to the field terminal.

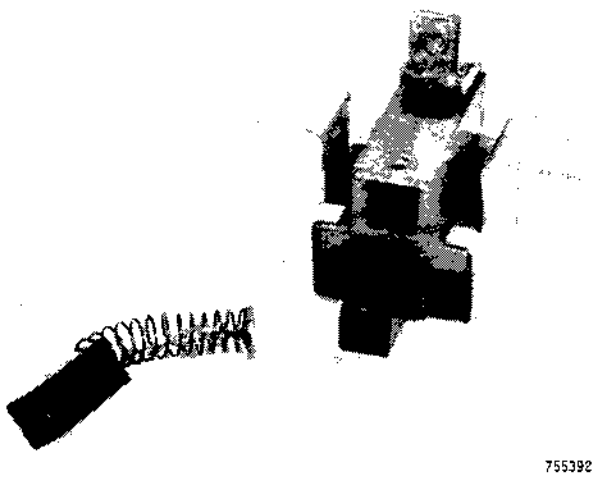
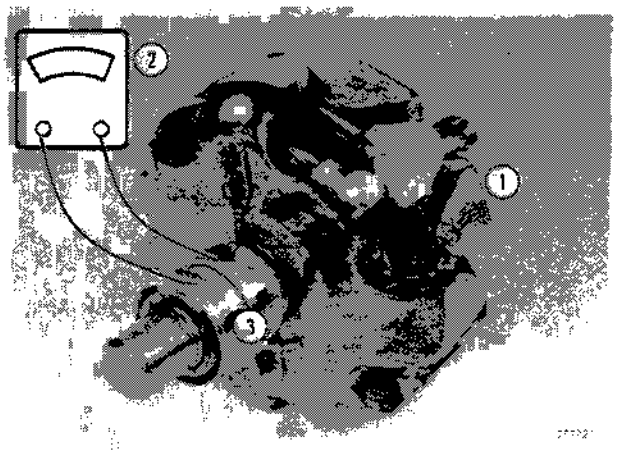


Figure 16

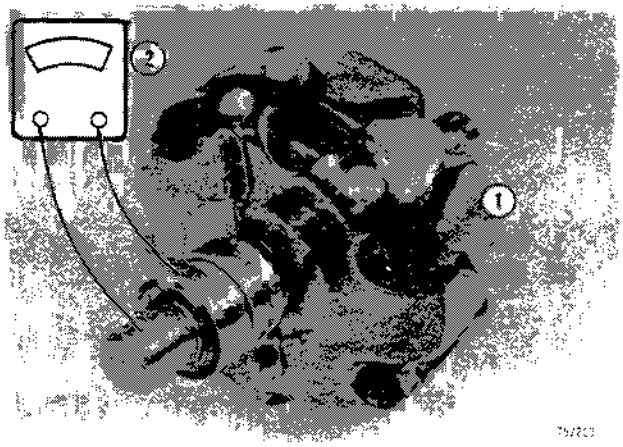
meter to the slip rings as shown in Figure 41. The ohmmeter should indicate 2.7 to 3 ohms at 80° F (26.7° C). The ohmmeter reading will also vary when tested at higher or lower temperatures. A reading higher or lower than specified indicates replacement of the rotor.



1. Rotor
2. Ohmmeter
3. Slip Ring

Figure 41

Rotor Ground Test



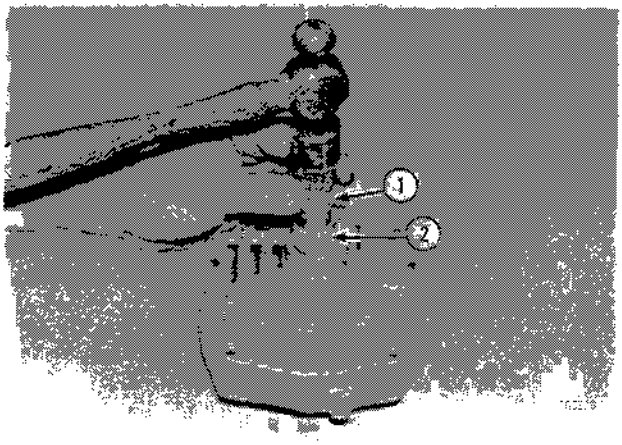
1. Rotor
2. Ohmmeter

Figure 42

Connect an ohmmeter to a slip ring and the rotor shaft and observer ohmmeter. If the ohmmeter needle moves, the winding is grounded and the rotor must be replaced.

Assembly

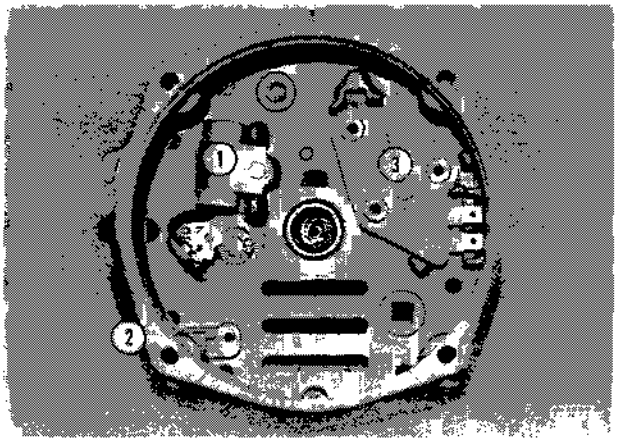
1. If bearing was removed from rear housing, press or drive in a new bearing. The housing must be supported under the bearing bore and the support must be long enough to prevent the housing from touching the bench or press bed. Drive bearing in until flush with outer end of bearing bore.



1. Driver
2. Bearing

Figure 43

2. Secure condenser to rear housing and place voltage regulator in housing as illustrated in Figure 44.



1. Condenser
2. Rear Housing
3. Voltage Regulator

Figure 44

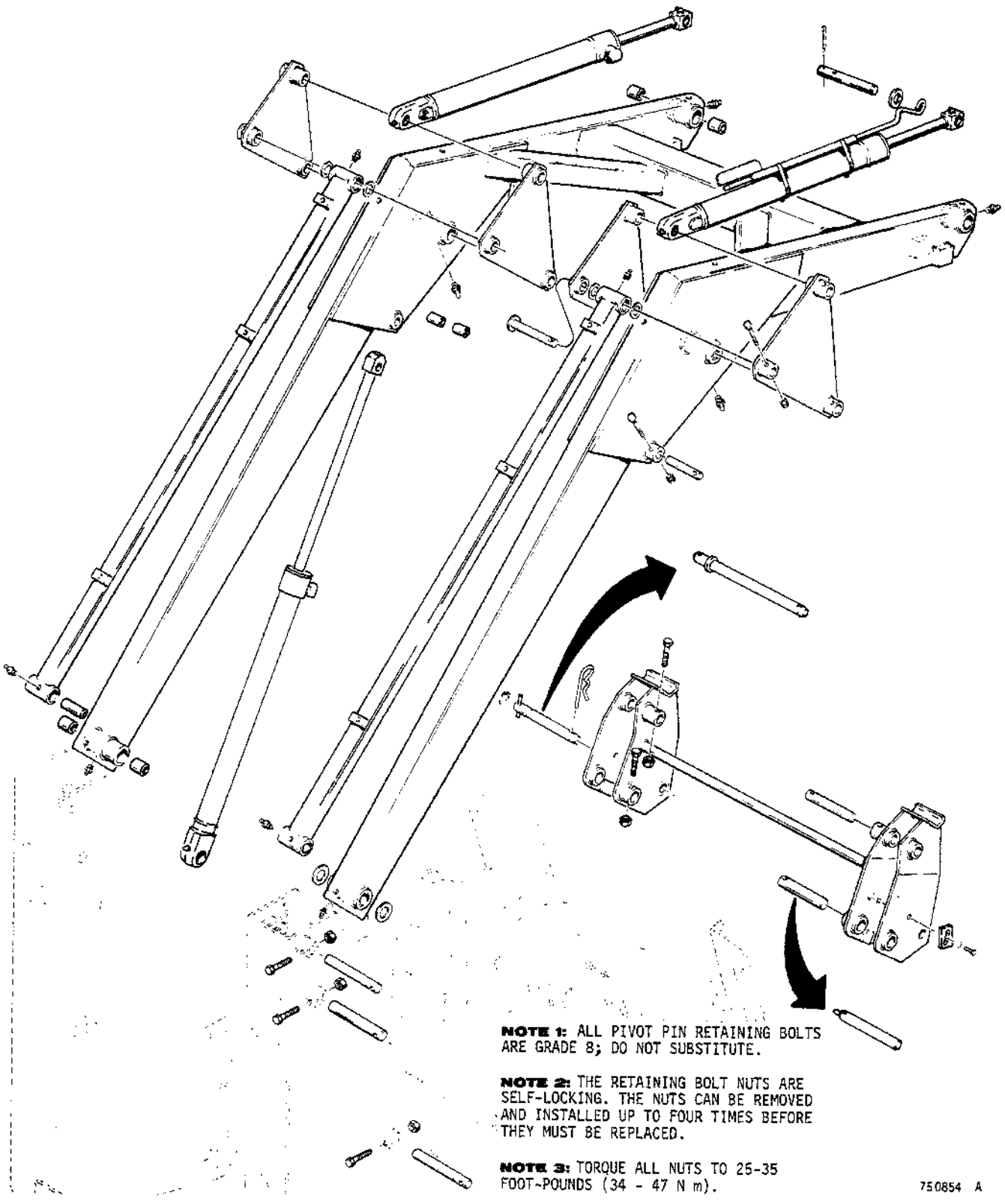


Figure 4 - Loader Arm Installation