STANDARD TORQUE DATA FOR HYDRAULIC TUBES AND FITTINGS

TUBE NUTS FOR 37° FLARED FITTINGS							
				TORQUE			
SIZE	TUBING O.D.		THREAD SIZE	FOOT POUNDS		NEWTON METERS	
	Inches	mm		Min.	Max.	Min.	Max.
4	1/4	6.4	7/16-20	9	12	12	16
5	5/16	7.9	1/2-20	12	15	16	20
6	3/8	9.5	9/16-18	21	24	29	33
8	1/2	12.7	3/4-16	35	40	47	54
10	5/8	15.9	7/8-14	53	58	72	79
12	3/4	19.1	1-1/16-12	77	82	104	111
14	7/8	22.2	1-3/16-12	90	100	122	136
16	1	25.4	1-5/16-12	110	120	149	163
20	1¼	31.8	1⅝-12	140	150	190	204
24	1½	38.1	1⅞-12	160	175	217	237
32	2	50.8	2½-12	225	240	305	325

O-RING BOSS PLUGS, ADJUSTABLE FITTING LOCK NUTS, SWIVEL JIC — 37° SEATS			
TORQUE			
FOOT POUNDS		NEWTON METERS	
Min.	Max.	Min.	Max.
6	10	8	14
10	15	14	20
15	20	20	27
25	30	34	41
35	40	47	54
60	70	81	95
70	80	95	109
80	90	108	122
95	115	129	156
120	140	163	190
250	300	339	407

Above torque figures are recommended for plain, cadmium or zinc plated fittings, dry or wet installations.

Swivel nuts either swaged or brazed.

These torques are not recommended for tubes of ½" (12.7 mm) O.D. and larger with wall thickness of 0.035" (0.889 mm) or less. The torque is specified for 0.035" (0.889 mm) wall tubes on each application individually.

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CLUTCH PARTS INSPECTION

Wear grooves may appear on the armature and magnet surfaces. This is a normal wear condition and does not impair functioning of the unit. Never machine either the armature or magnet contact surfaces to remove grooves or score marks resulting from wear.

Blue marks or metal deposits are a sign of excessive slippage and probable warping of the armature. Replace the armature.

Re-machining the face of a worn armature is not recommended. If a replacement armature is to be used with a used magnet, it is necessary to re-machine the worn magnet face. To reface a magnet:

1. Machine only enough material to clean the complete face of the magnet.

2. Hold the face within 0.005″ (0.13 mm) of parallel with the mounting plate.

Normally the magnet and armature, as a mating pair, will wear at the same rate. It is therefore recommended that both components be replaced at the same time.

Replace the armature if it is less than 3/16″ (5 mm) thick or is warped.

NOTE: Operation with a disconnected or non-working alternator will result in electric clutch failure.

Oil and grease should be cleaned from the magnet and armature as well as any surrounding surface which would allow lubricants to deposit on the clutch.

A severe loss of driving ability will occur if the clutch mating parts are lubricated.

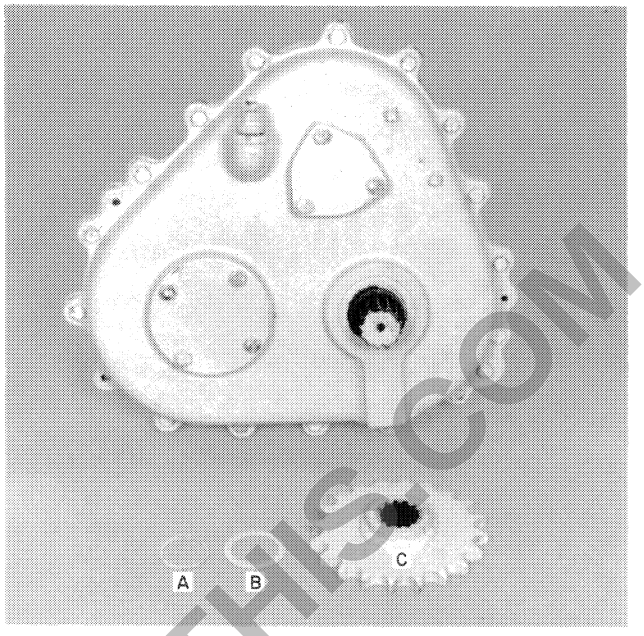


FIGURE 7-13

The magnet resistance should be 2.62 ohms. Replace if resistance is very high. Voltage must be a minimum of 10 volts. Loss of driving ability will occur below 10 volts.

To service the brush holder, B, Figure 7-7, remove the two screws from the cover and pull out the four brushes. If the brushes show wear, they should be replaced.

GEARBOX REPAIR

1. Remove snap ring, A, spacer, B, and output gear, C, Figure 7-13. Drain the gearbox. Spacer, B, is used to align the drive chain.

2. Remove the bolts around the gearbox and separate the two halves.

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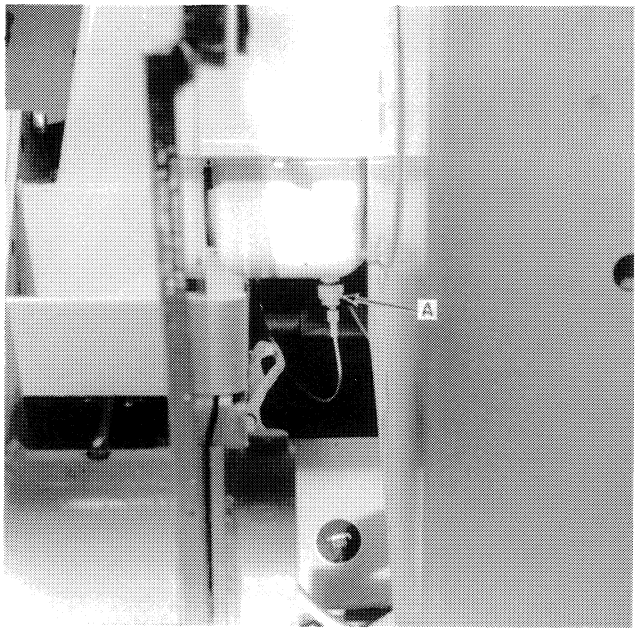


FIGURE 4-2



FIGURE 4-3

3. Drain the oil.

   NOTE: Drain plug, A, Figure 4-2, must be removed for the gearbox to clear the harvester frame when it is removed.

4. MODEL 1915 - Remove the four cap screws fastening the gearbox to the cutterhead bearing housing.

   MODEL 2115 - Remove four nuts, A, Figure 4-3, fastening the gearbox to the cutterhead bearing housing.

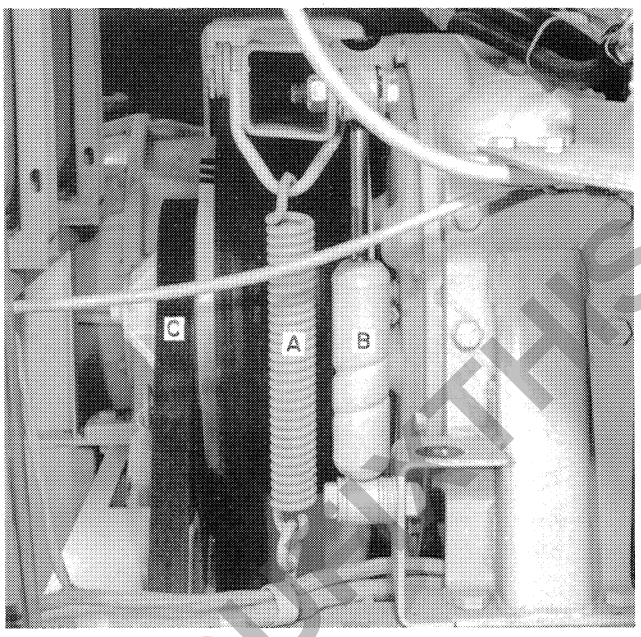
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SECTION 1

1915 BELT DRIVE

MAIN DRIVE BELTS



SHIELDS SHOWN OPEN FOR CLARITY. **FIGURE 1-1**

SPECIAL TOOLS - NONE

REMOVAL

1. Remove the belt tension spring, A, Figure 1-1, and shock absorber, B.

   NOTE: If bolts are to be replaced, removal will be easier if they are cut off. Then remove other parts as described.

2. Remove the hydraulic pump drive belt, C, Figure 1-1.

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TROUBLESHOOTING

Excessive vibration can cause excessive wear and failure of shafts and bearing. Driveline vibration can originate in any component. To isolate a problem:

1. Start the machine and engage the drives.
2. Increase engine RPM until vibration is at its maximum.
3. Shut off the cutterhead clutch. If vibration stops, the problem is in the cutterhead, blower, or cutterhead clutch assembly.

   NOTE: Vibration may lessen because there is less mass rotating.

   To isolate vibration in the cutterhead, blower, and cutterhead clutch, remove the shear bolts to isolate the cutterhead. Remove the blower drive belt to isolate the blower.
4. If vibration continues even at a lessened rate when the cutterhead clutch is disengaged, the problem is in the engine drive, main idler, or sheave and drive ring assembly. To isolate the problem, remove the main drive belts. If the vibration is eliminated, the cause could be:

   a. Shock absorber
   b. Main drive belt idler
   c. Main drive belts
   d. Drive ring on sheave and drive ring assembly
5. Continued vibration after the main belts have been removed indicates the problem is in the engine drive assembly or engine. Drive assembly vibration can be caused by dirt in the sheave, worn rubber block drive or worn bearings. Engine vibration can occur if the low idle is too low. Vibration will increase as engine idle drops below 1000 RPM. Low idle vibration will cause excessive wear in the belt drive.

BEARING FAILURES

Most bearing failures at low hour levels are due to two causes: (1) Preload on the bearings when installed and (2) no lubrication during assembly. Bearing failures after a few hundred hours are generally caused by vibration or lack of periodic lubrication which flushes out moisture and dirt or vibration.

SHAFT FAILURES

Shaft failures generally occur due to misalignment of the shaft or vibration. Either cause will result in flexing and resultant fatigue. Spline failures are almost always due to an improper fit up between the mating parts. This can occur due to paint or dirt on the splines, splines not seated properly, or loose mounting bolts.

LABOR GUIDE

The following labor amounts are listed as a guide only. Work experience and conditions will vary the amount of time it actually takes to complete each job.

Job	Man-Hours
Remove and replace belts	2.5
Remove engine drive assembly	2.0
Disassemble and rebuild	1.0
Reinstall assembly and belts	2.0
Remove, rebuild, install sheave and drive ring	5.0

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7. Install hub, C. Use a washer and locking tab, D, under nut, G. Torque the nut to 125 ft. lbs. (169 N·m). Then bend the locking tab around nut, E.

8. Install forward magnet, B. Install shims, Q, to obtain 0.010″-0.060″ (0.76 mm-1.52 mm) clearance to the armature. The clearance will vary around the magnet.

9. Install brush holder, A. Torque the holder to 15 ft. lbs. (20 N·m).

10. Connect the wires to the brush holder.

NOTE: The wires can be hooked to either terminal.

LABOR GUIDE

The following labor amounts are listed as a guide only. Working conditions and experience will vary the amount of time it actually takes to complete each job.

Job	Man-Hours
Remove and replace	4.0
Rebuild	2.0-4.0

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SHEAR BAR

ADJUSTING THE SHEAR BAR

NOTE: The amount of use from a shear bar depends on maintaining proper shear bar-to-knife clearance, the type of material being cut, and the soil conditions. Replace the shear bar when it becomes worn to save fuel and horsepower and to get a quality cut. Replace or turn the shear bar when the hard-surfacing is worn off the vertical edge at any point.

For maximum efficiency and product quality, the shear bar must be set as close to the knives as possible without hitting.

If the shear bar is not adjusted and kept close to the knives, the knives and shear bar will wear much faster. The horsepower requirements will also increase and a slower operating speed may have to be used. (See Figures 6-1, 6-2, and 6-3.) Adjust the shear bar 2-3 times between sharpenings, more often is better.

The shear bar, kept properly adjusted at all times, will help keep the knives sharp and decrease the frequency of sharpenings. The shear bar has two hardened cutting edges. These edges must be up and toward the knives. See the "Shear Bar Removal and Installation" portion of this section.

Always be sure the knives are in good condition before moving the shear bar. The cutterhead diameter must be true for best shear bar adjustments.

To adjust the shear bar to the knives:

1. Turn the engine on and engage the cutterhead. The engine speed should be near low idle.

   NOTE: The cutterhead can be turning in forward or reverse.

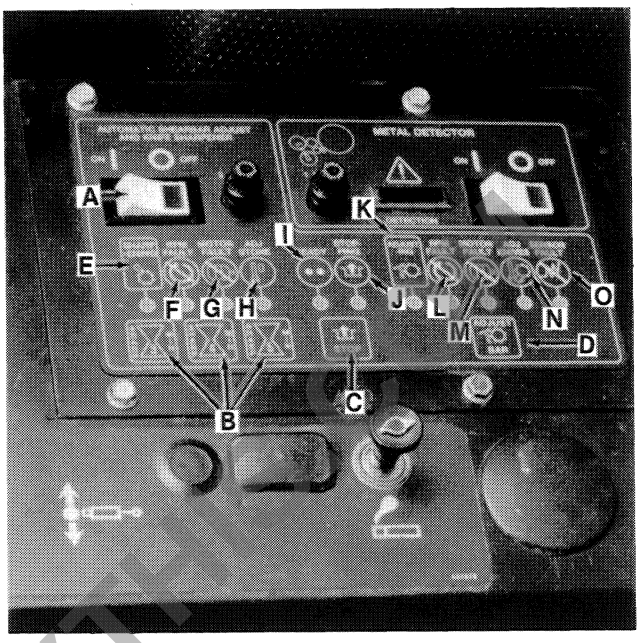


FIGURE 6-17

2. Turn on the sharpener/shear bar adjust switch, A, Figure 6-17. The indicator lights will come on.
3. After the indicator lights have shut off and the ready light, I, is on, press the adjust shear bar key, D.
4. The shear bar adjusting light, K, will be on indicating the shear bar is being adjusted. Refer to Section 19 if any of the indicator lights are on and the system is not working.
5. The ready light will come on, and the alarm will sound when the shear bar is properly adjusted.
6. Turn the on/off switch, A, Figure 6-17, off.

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DRIVE BELT INSTALLATION

Before installing belts, check and service the following as needed.

A Engine drive shaft end play
B Main drive idler bearings
C Shock absorber
D Hydraulic pump drive belt idler
E Hydrostatic pump shaft and drive hub splines
F Driven sheaves assembly bearings

1. Install one of the main belts on the engine drive assembly first.
2. Place the second belt on the driven sheave and then install on the front grooves of the engine.
3. Install the other belt on the driven sheave.

   NOTE: Replace belts only as matched sets.

   It may be necessary to remove the engine sheave to install the new belts. See "Engine Drive Assembly" (later in this section) for removal procedure.
4. Install rear hub, B, Figure 1-4, and spacer block, A. Hand tighten the spacer block mounting bolts, then rotate the shaft one full turn to allow the spacer block to center itself. Fully tighten the hardware.
5. Install idler arm, C, Figure 1-2. Install washers on either side of the arm to center it on the belts. Install the snap ring.
6. Install idler wheel, D, Figure 1-2, and angle, E, as shown in Figure 1-6. The idler bolt must be installed as shown.
7. Install engine mount, B, Figure 1-5, and all braces. Tighten the engine mount to the engine before tightening the hardware to the frame.
8. Install the hydraulic drive belt, F, as shown in Figure 1-2.
9. Install the hydraulic drive belt idler, G, as shown in Figure 1-2.
10. Install the main drive belt spring, B, Figure 1-2, as shown.
11. Install shock absorber, A, Figure 1-2. Align the shock absorber using flat washers at the top and bottom.

    NOTE: At least one flat washer should be against the rubber mounts.
12. Lubricate the assemblies. Reinstall any removed shields.

BELT TENSION ADJUSTMENT

Main Drive Belt

Adjust the tension spring to 12-3/4″ (32 cm) between the hooks. See Figure 1-2.

Hydraulic Pump Belt

Adjust the idler spring to a length of 13″ (33 cm) between the hooks. See Figure 1-2.

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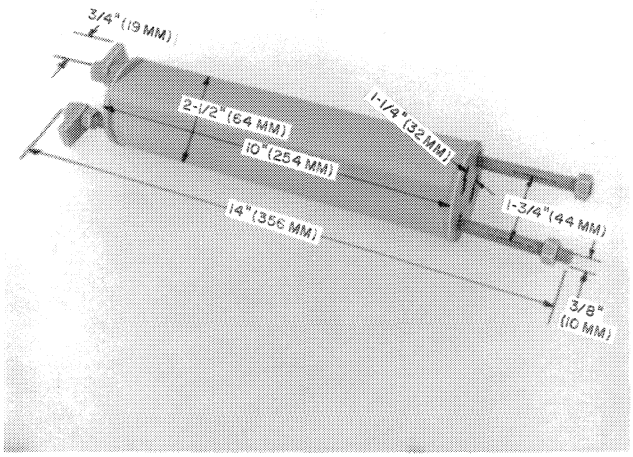


FIGURE 5-3

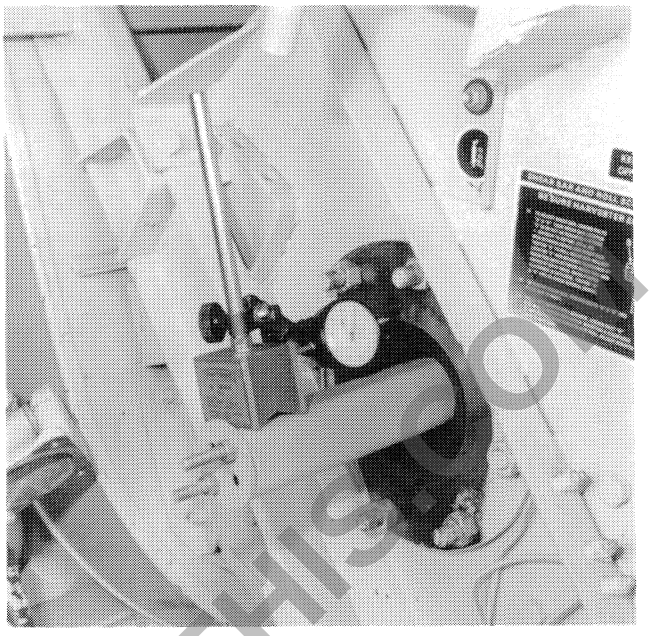


FIGURE 5-4

PARTS INSPECTION

Replace the cups and cones if there is any pitting or wear.

INSTALLATION

1. Install the cups and cones. They should be firmly seated.

   NOTE: Pack the cones with grease before installing on the cutterhead.

2. Install the bearing housings on the cutterhead.

   NOTE: Support the cutterhead while installing the bearing. Make sure the cup and cone are aligned to prevent damaging the bearing and housing.

Shimming the Bearing

The bearing housings must be aligned with the cutterhead. This is necessary to prevent spline wear or shaft damage.

Alignment is measured by checking runout on the mounting surfaces for the gearbox. A special tool, Figure 5-3, is required to mount the dial indicator.

CAUTION: SOME PICTURES IN THIS MANUAL SHOW SHIELDS REMOVED OR OPEN TO SHOW PARTS BEING SERVICED OR FOR CLARITY. ALL SHIELDS SHOULD BE CLOSED OR REPLACED PRIOR TO OPERATING THE MACHINE.

To install the special tool, insert it into the bearing housing until it is flat against the cutterhead. Extend the hooks into the splined hole and hook over the inside edge of the spline. Tighten the hooks until the tool is solid. Rotate the cutterhead one revolution to be sure the tool does not contact the bearing housing. See Figure 5-4.

NOTE: Use the wide set of holes for the right side and the narrow set for the left side.

Mount a dial indicator as shown in Figure 5-4. Position the contact where it will not hit the mounting bolts or aligning holes.

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SECTION 8

FEED ROLLS AND FEED ROLL DRIVE

FEED ROLL JAW CLUTCH REPAIR

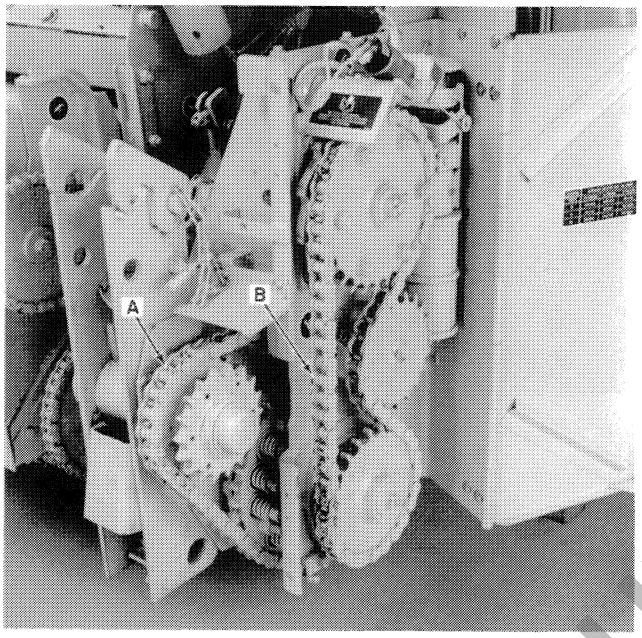
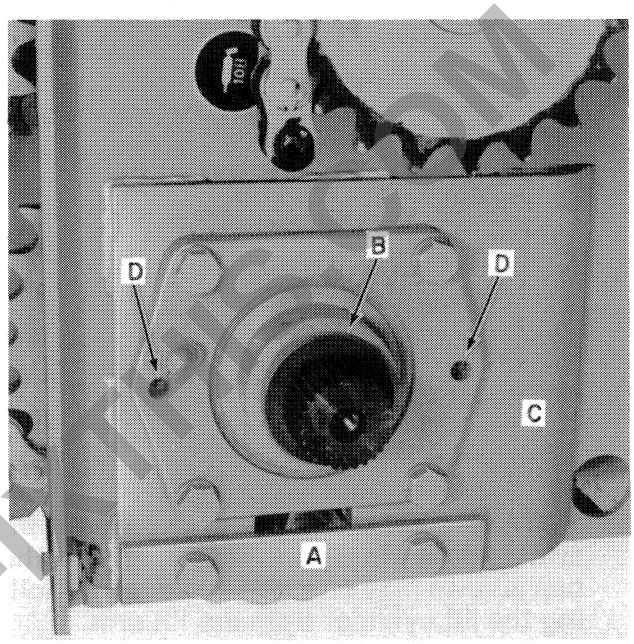


FIGURE 8-1

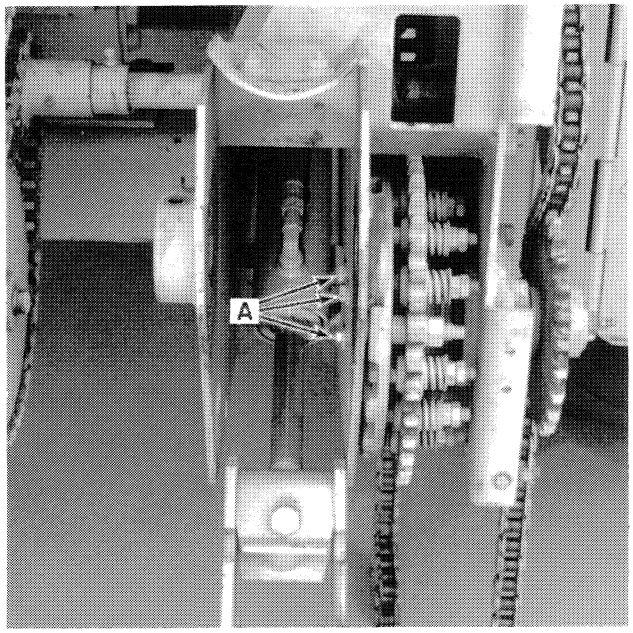


SHIELDS SHOWN OPEN FOR CLARITY. **FIGURE 8-2**

REMOVAL

NOTE: The clutch slip torque can be adjusted without removing the clutch from the harvester.

1. Disconnect drive chain, A, and feed roll drive chain, B, Figure 8-1. Remove the length-of-cut sprocket.
2. Remove strap, A, Figure 8-2. Remove locking collar, B. Remove the four bearing housing bolts and pull the bearing out until the bearing is free of the frame, C. 1/2″ cap screws can be turned into the threaded holes, D, to push the bearing off the shaft.
3. Support the clutch assembly and remove three cap screws, A, Figure 8-3, located on the inside of the frame channel.



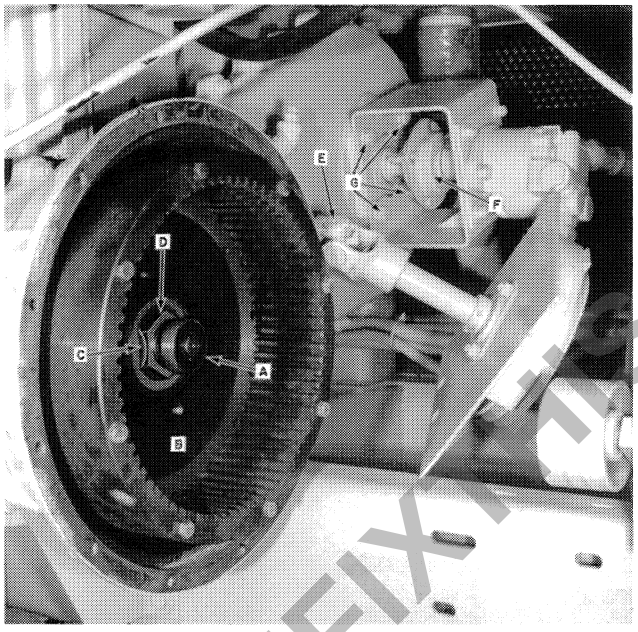
SHIELDS SHOWN OPEN FOR CLARITY. **FIGURE 8-3**

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SECTION 2

2115 TRANSFER GEARBOX



SHIELDS REMOVED FOR CLARITY. **FIGURE 2-1**

SPECIAL TOOLS

Three 7/16″ X 2″ headless bolts
Support bracket (Figure 2-5)

NOTE: The transfer gearbox can be disassembled without removing it from the machine. This is recommended if a forklift is not available.

REMOVAL

1. Remove the hinged shield and the shield over the hydrostatic pump.
2. Remove the cutterhead clutch assembly. See Section 3, "Cutterhead Clutch Assembly", for procedure.
3. Remove pilot bearing, A, Figure 2-1.
4. Remove drive ring assembly, B, by flattening locking tab, C, and removing nut, D. Use a puller to remove the drive ring.
5. Remove the cutterhead reverse drive assembly by unbolting U-joint, E, Figure 2-1.
6. Remove the hydraulic pump by first disassembling chain coupler, F, Figure 2-1. Then remove the four mounting bolts, G.

   NOTE: It is not necessary to remove the hydraulic hoses.
7. Reinstall at least two mounting bolts, G, after the pump bracket is removed.

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SECTION 5
CUTTERHEAD
BEARINGS

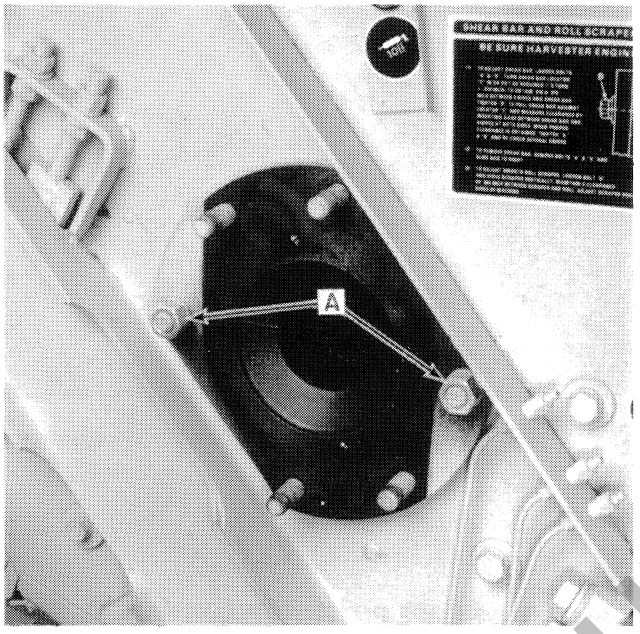


FIGURE 5-1

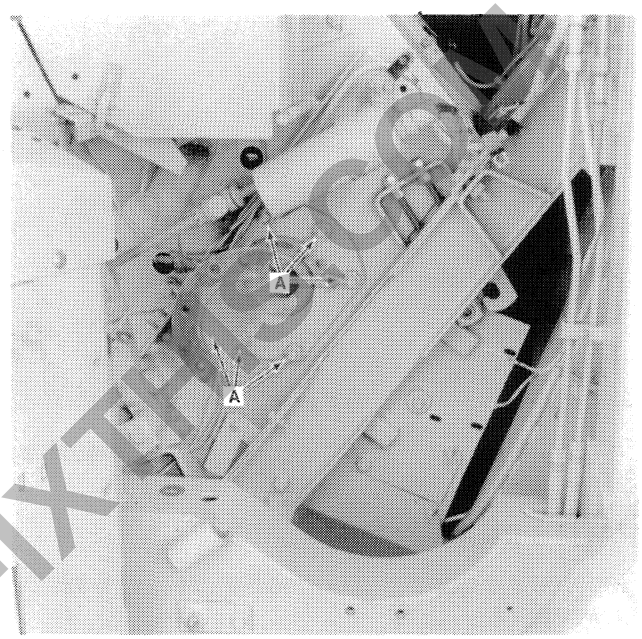


FIGURE 5-2

SPECIAL TOOLS

Shaft extender (Figure 5-3)

REMOVAL

NOTE: To properly adjust the bearings, it is necessary to remove both the cutterhead gearbox and the reversing gearbox.

1. Remove the cutterhead gearbox. See Section 4, "Cutterhead Gearbox" for the procedure.
2. Remove the reversing gearbox. See Section 7, "Reversing Gearbox" for the procedure.
3. Remove nuts, A, Figure 5-1 (2115 shown), holding the right side bearing to the cutterhead side sheet.

   NOTE: To make removal easier, support the cutterhead.

4. Remove the left side bearing by removing six nuts, A, Figure 5-2.

   NOTE: Support the cutterhead while removing the bearing. Note shims used behind the bearing housings on both sides. For fastest reassembly, note the amount of shims at each stud.

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PRECAUTIONARY STATEMENTS

PERSONAL SAFETY

Throughout this manual and on machine decals, you will find precautionary statements ("CAUTION", "WARNING", and "DANGER") followed by specific instructions. These precautions are intended for the personal safety of you and those working with you. Please take the time to read them.



CAUTION: THE WORD "CAUTION" IS USED WHERE A SAFE BEHAVIORAL PRACTICE ACCORDING TO OPERATING AND MAINTENANCE INSTRUCTIONS AND COMMON SAFETY PRACTICES WILL PROTECT THE OPERATOR AND OTHERS FROM ACCIDENT INVOLVEMENT.



WARNING: THE WORD "WARNING" DENOTES A POTENTIAL OR HIDDEN HAZARD WHICH HAS A POTENTIAL FOR SERIOUS INJURY. IT IS USED TO WARN OPERATORS AND OTHERS TO EXERCISE EVERY APPROPRIATE MEANS TO AVOID A SURPRISE INVOLVEMENT WITH MACHINERY.



DANGER: THE WORD "DANGER" DENOTES A FORBIDDEN PRACTICE IN CONNECTION WITH A SERIOUS HAZARD.

FAILURE TO FOLLOW THE "CAUTION", "WARNING", AND "DANGER" INSTRUCTIONS MAY RESULT IN SERIOUS BODILY INJURY OR DEATH.

MACHINE SAFETY

Additional precautionary statements ("ATTENTION" and "IMPORTANT") are followed by specific instructions. These statements are intended for machine safety.

ATTENTION: The word "ATTENTION" is used to warn the operator of potential machine damage if a certain procedure is not followed.

IMPORTANT: The word "IMPORTANT" is used to inform the reader of something he needs to know to prevent minor machine damage if a certain procedure is not followed.

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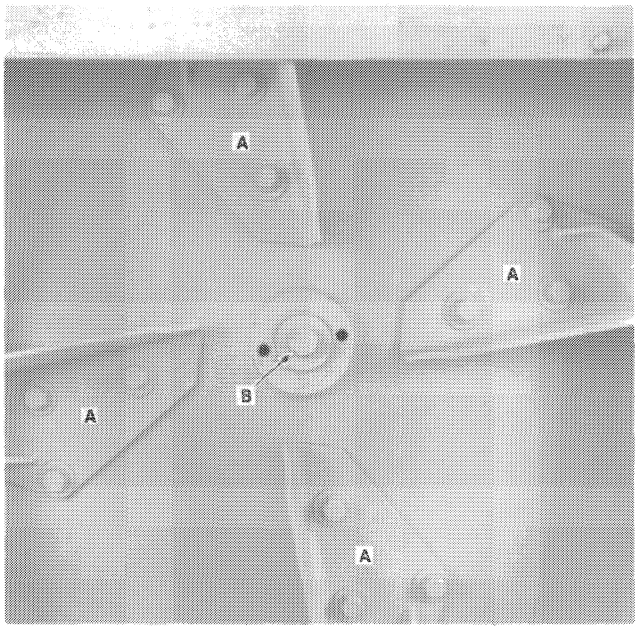


FIGURE 9-20

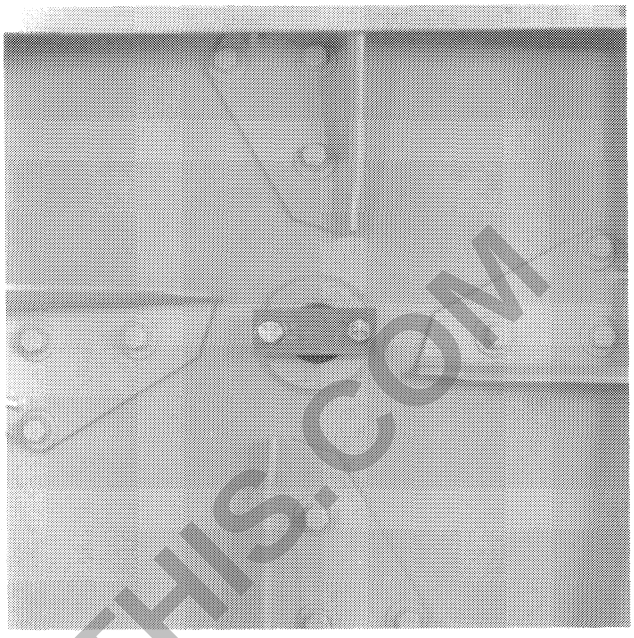


FIGURE 9-21

Blower Cone Removal

1. Remove the blower band and liner.
2. Remove the four blower paddles, A, Figure 9-20.
3. Remove the cap screw and hardened washer, B, Figure 9- 20, holding the cone on the blower shaft. Use a puller as shown in Figure 9-21 to loosen the cone from the tapered spline. See Figure 9-22 for dimensions of the puller.

CAUTION: THE CONE IS HEAVY. BE CAREFUL WHEN REMOVING IT FROM THE HARVESTER.

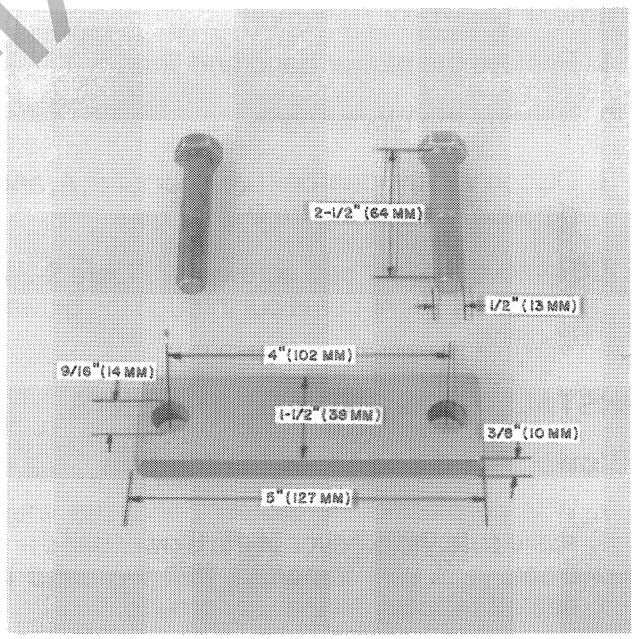


FIGURE 9-22

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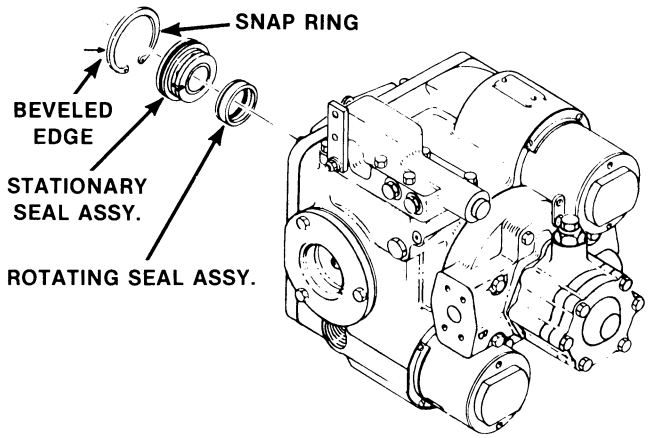


FIGURE 14-55

SHAFT SEAL REASSEMBLY

IMPORTANT: For best sealing results, keep all sealing surfaces clean.

102. Lubricate the O ring seal of the rotating seal assembly. Then install the rotating seal assembly. See Figure 14-55.

103. Lubricate the O ring seal of the stationary seal assembly. See Figure 14-55.

104. Use a No. 5 or No. 7 snap ring pliers to install the snap ring (beveled side of ring out).

TORQUE SPECIFICATIONS

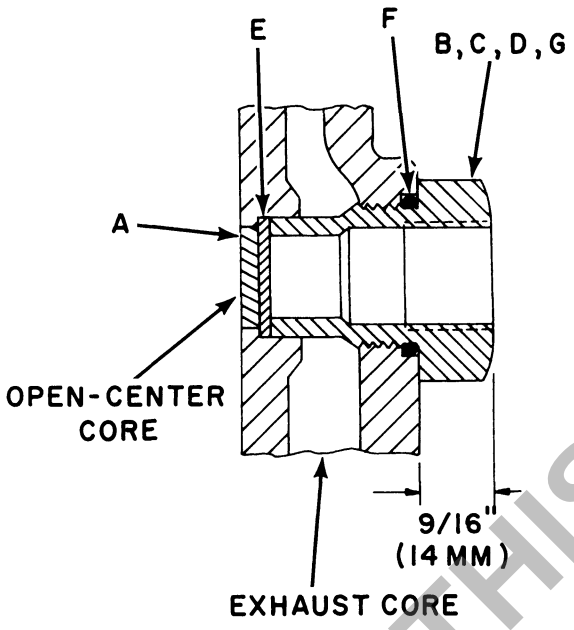
Where Used	Torque Requirement (ft. lbs.)
Cap plug/relief valve	44-53
Charge pump bolts	16-19
Relief valve (charge pressure)	120-145
Control housing bolts	16-19
End cover bolts	44-53
Mounting flange bolts	44-53
No. 4 gage port plugs	16-19
Servo retainer cap screws	*26-31
Trunnion bolts	44-53
Servo piston shoulder bolts	16-19

*Torque value (in. lbs.)

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POWER-BEYOND FITTING



POWER-BEYOND SLEEVE SERVICE KITS

FIGURE 16-44

POWER-BEYOND FITTING

Figure 16-44

The power-beyond fitting is included with the optional auxiliary hydraulics kit.

It is installed in the outlet cover and separates the open center core from the exhaust core at the outlet port. This allows hydraulic oil under pressure to be carried through the attachment lift valve section and thus makes it available for the auxiliary hydraulics control valve. A separate return line runs from the auxiliary hydraulic control valve to the reservoir.

NOTE: The hydraulic oil is available to the auxiliary hydraulics control valve only when the spout and attachment lift valves are in the neutral position.

ATTENTION: If the auxiliary hydraulics are removed, be sure to remove the power-beyond fitting and reinstall the original plug. Do not put a plug in the power-beyond fitting!

Figure 16-44

Ref.	Qty.	Description
A	1	Seal
B	1	P.B. sleeve (1/2-14 NPT)
C	1	P.B. sleeve SAE 8 (3/4-16 UNF)
D	1	P.B. sleeve SAE 10 (7/8-14 UNF)
E	1	Back-up washer
F	1	O ring seal
G	1	P.B. sleeve SAE 16 (1″ tube) male fitting

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