SERVICE MANUAL

Grader

845
865
885

6-46503

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

TYPE 1-4

SERVICE MANUAL

Grader

845
865
885

6-46503

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

TYPE 1-4

SERVICE MANUAL

Grader

845
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TYPE 1-4

SERVICE MANUAL

Grader

845
865
885

6-46503

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

TYPE 1-4

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845 - 865 - 885 GRADER
Service Manual
Brz 6-46503

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STARTER

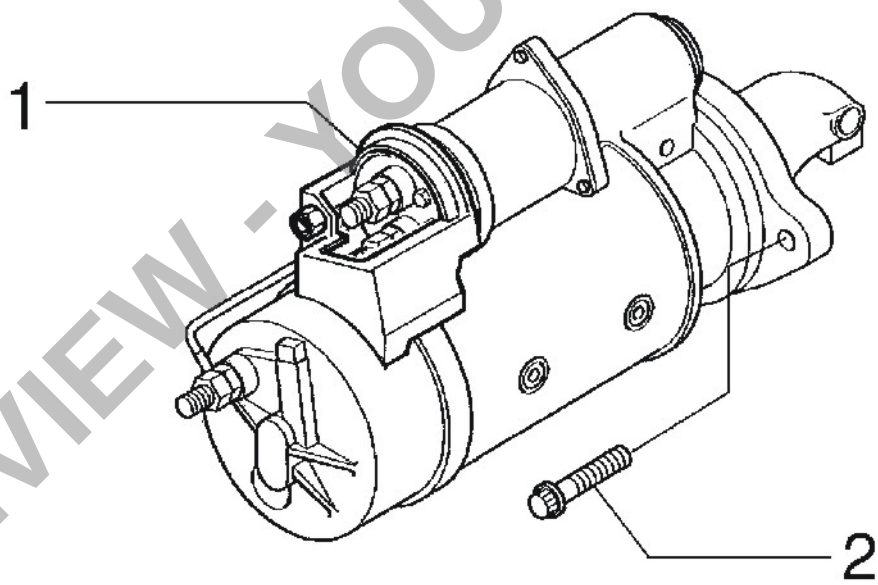
Removal

NOTE: *The starter is located on the left side of the engine, mounted to the engine flywheel housing.*

1. Turn the master disconnect switch to the OFF position.
2. Remove the air cleaner and the air cleaner bracket.
3. Move the cover to gain access to the bolt (2). Refer to the illustration below.

Installation

1. Install the starter (1),and bolts (2) to the machine. Torque the bolt (2) to 41 to 74 Nm (30 to 54 pound-feet).
2. Install the positive cables.



1. STARTER
2. BOLT

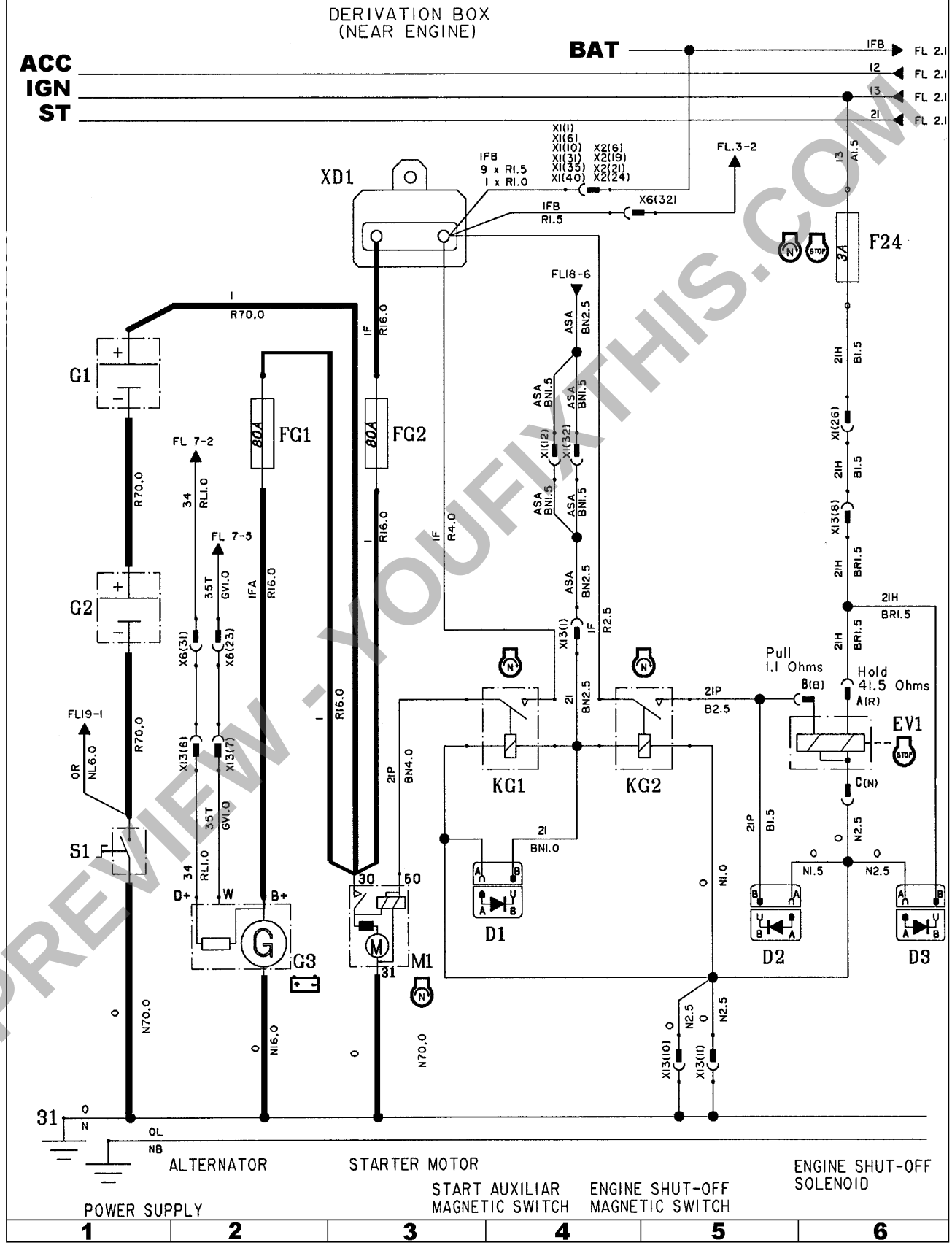
STARTER REMOVAL AND INSTALLATION

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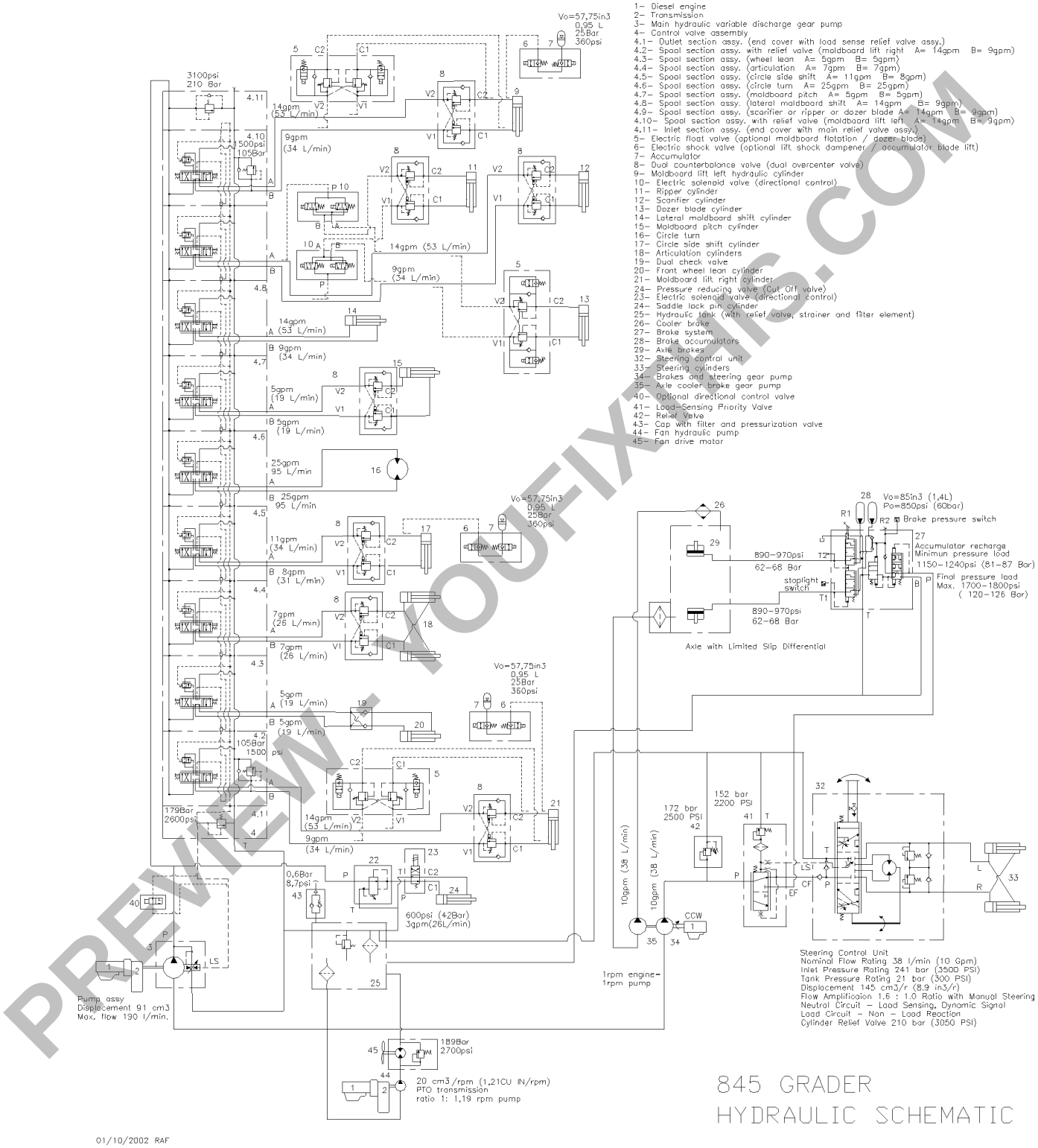
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TORQUE SPECIFICATIONS - DECIMAL HARDWARE

Use the torques in this chart when special torques are not given. These torques apply to fasteners with both UNC and UNF threads as received from suppliers dry, or when lubricated with engine oil. Not applicable if special graphities, Molydisulfide greases, or other extreme pressure lubricants are used.

Grade 5 Bolts, Nuts, and Studs



Size	Pound-Inches	Newton metres
1/4 inch	108 to 132	12 to 15
5/16 inch	204 to 252	23 to 28
3/8 inch	420 to 504	48 to 57
Size	Pound-Feet	Newton metres
7/16 inch	54 to 64	73 to 87
1/2 inch	80 to 96	109 to 130
9/16 inch	110 to 132	149 to 179
5/8 inch	150 to 180	203 to 244
3/4 inch	270 to 324	366 to 439
7/8 inch	400 to 480	542 to 651
1.0 inch	580 to 696	787 to 944
1-1/8 inch	800 to 880	1085 to 1193
1-1/4 inch	1120 to 1240	1519 to 1681
1-3/8 inch	1460 to 1680	1980 to 2278
1-1/2 inch	1940 to 2200	2631 to 2983

Grade 8 Bolts, Nuts, and Studs



Size	Pound-Inches	Newton metres
1/4 inch	144 to 180	16 to 20
5/16 inch	288 to 348	33 to 39
3/8 inch	540 to 648	61 to 73
Size	Pound-Feet	Newton metres
7/16 inch	70 to 84	95 to 114
1/2 inch	110 to 132	149 to 179
9/16 inch	160 to 192	217 to 260
5/8 inch	220 to 264	298 to 358
3/4 inch	380 to 456	515 to 618
7/8 inch	600 to 720	814 to 976
1.0 inch	900 to 1080	1220 to 1465
1-1/8 inch	1280 to 1440	1736 to 1953
1-1/4 inch	1820 to 2000	2468 to 2712
1-3/8 inch	2380 to 2720	3227 to 3688
1-1/2 inch	3160 to 3560	4285 to 4827

NOTE: *Use thick nuts with Grade 8 bolts.*

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TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	TEST	SOLUTION
Wheel lean fails to function	Wheel lean safety bolt installed Control valve malfunction Wheel lean link frozen or seized Damaged hydraulic cylinder Damaged hydraulic hose	Observation Conduct pressure test Observation Conduct pressure test Observation	Remove bolt Repair valve if pressure incorrect Free link joint Replace Replace
Front wheels will not remain in desired position	Leaking control valve Leaking hydraulic cylinder Hydraulic lines or joints leaking	Conduct pressure test Observation	Repair valve if pressure incorrect Repair hydraulic cylinder Repair or replace
Front wheels wobble	Improper toe-in Rims improperly installed on wheel Wheel bearing loose Steering arm loose Spindle bearing loose Drag link damage	Observation Observation Observation Observation Observation Observation	Correct toe – in Straighten rim or wheel Adjust wheel bearings Tighten nut Adjust bearing Repair
Hard to steer in either direction	Low air pressure in front tires Steering links Improper toe-in Malfunction in power assist hydraulic system Damaged wheel lean link Axle pivot pin and bushing worn	Observation Conduct pressure test	Inflate to proper pressure Repair Adjust toe-in Insure pressure is correct Repair or replace Replace
Excessive free play in steering wheel	Worn drag link socket or swivel joints Loose wheel or spindle bearing Damaged or worn power steering Loose steering arm		Repair or replace Adjusting bearings Repair or replace Adjusting bearings
Improper caster in front wheels	Worn or loose spindle bearing Wheel bearings loose Bent wheel lean link Knuckle bushing or pin worn		Replace bearing and / or adjust shims Adjust bearings Straighten link or replace Replace
Uneven or abnormal tire wear	Tires over or under inflated Misalignment of tires		Inflate to specified pressure Correct alignment

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LUBRICATION & MAINTENANCE CHART model 845

HOURS	SERVICE POINTS	ITEM	POINTS	SERVICE INTERVAL (hours)				
				CHECK	CHANGE	LUBRICATE	ADJUST	CLEAN/DRAIN
As needed	Air cleaner (Note 1)	1		★				
	Hydraulic filter (Note 2)	2		★				
	Alternator / Air conditioner belt	3		★				
10h or daily	Engine oil level (including filters)	4	1	10				
	Radiator (coolant level) (Note 3)	5	1	10				
	Transmission oil level (warm, engine running)	6	1	10				
50h or weekly	Hydraulic tank (complete system)	7	1	50				
	Fuel filters / separator filter (drain water)	8	2	50				
100h or each 15 days	Blade lift cylinder pivots	9	2			100		
	Side shift cylinder pivots	10	2			100		
	Drawbar pivot and socket	11	1			100		
	Front axle pivot	12	2			250		
	Articulation pivots	13	2			100		
	Articulation cylinders pivots	14	4			100		
	Moldboard lift cylinders balls	15	2			100		
250h or monthly	Engine oil and oil filter	16	1		250			
	Universal joints and drive shaft	17	2			250		
	Differential and planetary drives oil level (Note 4)	18	3			250		
	Circle turn gear housing	19	1			250		
	Alternator and ar conditioning belts	20	2	250				
	Moldboard adjusting link ends	21	4	250				
	Moldboard side shift link ends	22	2			250		
	Front wheel lean link and knuckle pivot	23	8			250		
	Front axle spindle pivot	24	2			250		
	Front wheel lean cylinder	25	2			250		

NOTE: *See "FLUIDS AND LUBRICANTS" table on previous pages for lubricants and fluids detailed specifications and capacities.*

NOTE 1: *Service the air filter elements if air filter restriction indicator is in the red area.*

NOTE 2: *Service the hydraulic filters if hydraulic filter indicator lamp iluminates.*

NOTE 3: *Check the radiator coolant level if the coolant level warning lamp iluminates.*

NOTE 4: *Change the rear axle oil after the first100 hours of operation.*

NOTE 5: *Change the transmission oil and replace the filter after the first100 hours of operation.*

NOTE 6: *Contact your dealer and see the service manual.*

NOTE 7: *Change every 2.000 hours or once a year, whichever comes first.*

★: *As needed*

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SECTION INDEX

GENERAL

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SECTION INDEX

FUEL SYSTEM

Section Title **Section Number**

FOR FUEL SYSTEM REPAIR, SEE THE ENGINE SERVICE MANUAL

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May 2003

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SPECIFICATIONS

45 Ampere Alternator

Rated output	28 volts at 45 amperes
Resistance of rotor	8.1 to 9.9 ohms
Maximum runout for slip rings	0.05mm (0.002 inch)
Minimum diameter of slip rings	26.8 mm (1.055 inch)
Resistance of stator	0.20 to 0.24 ohms
Minimum length of brushes	7mm (0.27 inch)
Torque nut for pulley	60 to 73 Nm (45 to 54 pound-feet)

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Problem	Possible Cause	Correction
10. Excessive free play at steering wheel.	Loose steering wheel nut. Steering column shaft worn or damaged. There should be very little free play in the unit itself.	Repair or replace steering wheel connection or column.
11. Excessive free play at steered wheels.	Broken or worn linkage between cylinder and steered wheels.	Check for loose fitting bearings and anchor points in steering linkage between cylinder and steered wheels.
	Leaky cylinder seals.	Replace cylinder seals.
12. Binding or poor centering of steering wheel.	Binding or misalignment in steering column or splined input connection.	Align column pilot and spline to steering control unit.
	High back pressure in tank line can cause slow return to center. Should not exceed 300 psi.	Revise circuit return line.
	Large particles can cause binding between the spool and sleeve.	Clean the unit and filter the oil. If another component has failed generating contaminants, flush the system while bypassing the steering control unit.
13. Steering unit locks up.	Large particles in meter section.	Clean the unit.
	Insufficient hydraulic power (units over 15 in^3).	Check hydraulic power supply.
	Severe wear and/or broken pin.	Replace the unit.
	*Thermal shock.	Replace the unit.
14. Steering wheel oscillates or turns by itself.	Parts assembled wrong. Steering unit improperly timed.	Correct timing.
	Lines connected to wrong ports.	Reconnect lines correctly.
15. Steered wheels turn in wrong direction when operator activates steering wheel	Lines connected to wrong cylinder ports.	Reconnect lines correctly.
16. Steering wheel kicks at start of steering.	No inlet check valve on steering control unit.	Install a check valve.

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PROPORTIONAL VALVES

CONNECTOR PINOUT

SIGNAL DESCRIPTION	TRANSMISSION CONNECTOR PIN	TCU PIN
SOLENOID 1	J6-2	J3-A3
SOLENOID 1 RETURN	J6-1	J3-B1
SOLENOID 2	J6-3	J3-B2
SOLENOID 2 RETURN	J6-15	J3-B3
SOLENOID 3	J6-4	J3-C1
SOLENOID 3 RETURN	J6-19	J3-C2
SOLENOID 4	J6-5	J3-C3
SOLENOID 4 RETURN	J6-6	J3-D1
SOLENOID A	J6-10	J3-D2
SOLENOID A RETURN	J6-17	J3-D3
SOLENOID B	J6-12	J3-E1
SOLENOID B RETURN	J6-11	J3-E2
SOLENOID C	J6-23	J3-E3
SOLENOID C RETURN	J6-22	J3-F1
SOLENOID D	J6-8	J3-F2
SOLENOID D RETURN	J6-7	J3-F3

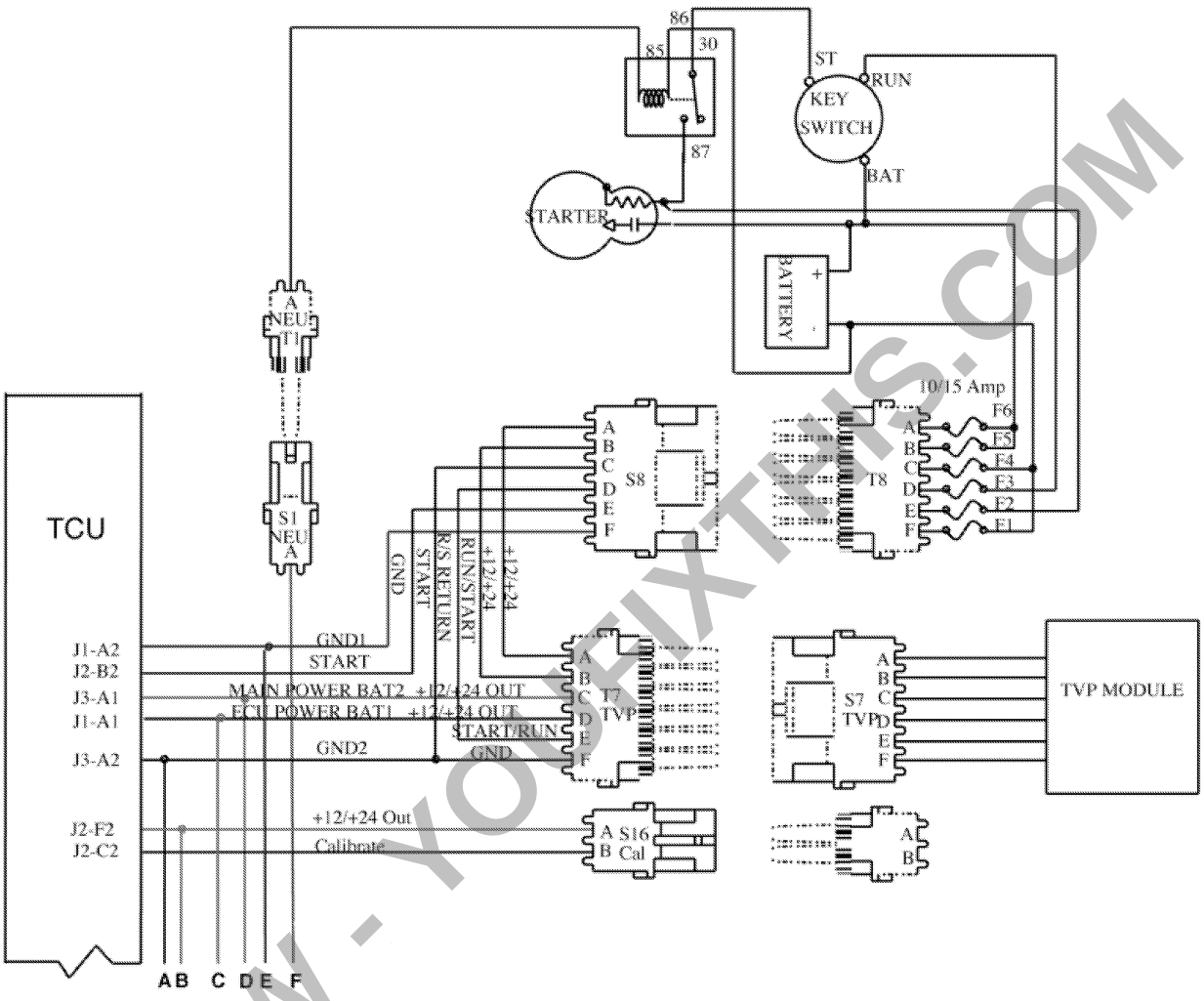
Transmission Eight Speeds Forward and Four Reverse

GEAR ENGAGED	ACTIVE SOLENOIDS
F 8th	2 and D
F 7th	1 and D
F 6th	2 and B
F 5th	1 and B
F 4th	2 and C
F 3rd	1 and C
F 2nd	2 and A
F 1st	1 and A
Neutral	
R 1st	3 and A
R 2nd	3 and C
R 3rd	3 and B
R 4th	3 and D

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TRANSMISSION WIRING HARNESS 1 OF 4



NOTE: Letters A,B,C,D,E,F are labels to link to the next page.

Wiring harness is + 24Volts grader 885

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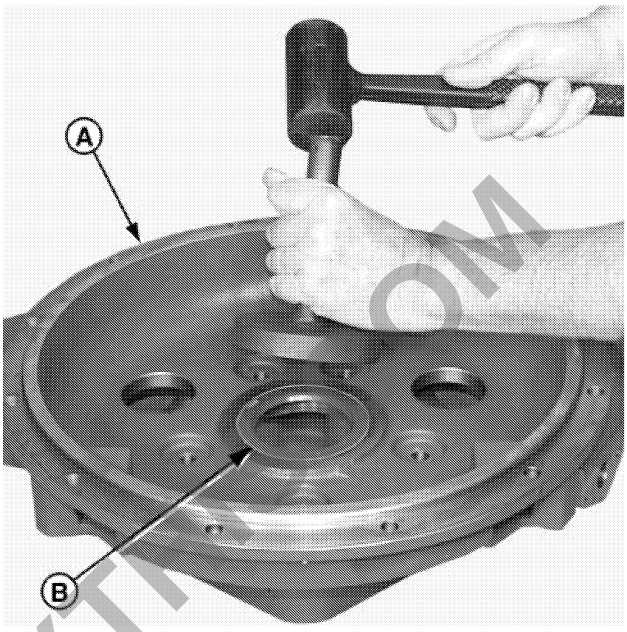
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INSTALL OIL SEAL

1. Position input housing (A) with engine side up.

IMPORTANT: If the new oil seal is not coated on the outside diameter with a sealer, apply LOCTITE® #620.

2. Install new oil seal (B) flush with machined surface on input housing.



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REMOVE ALL CLUTCH STAGE ASSEMBLIES

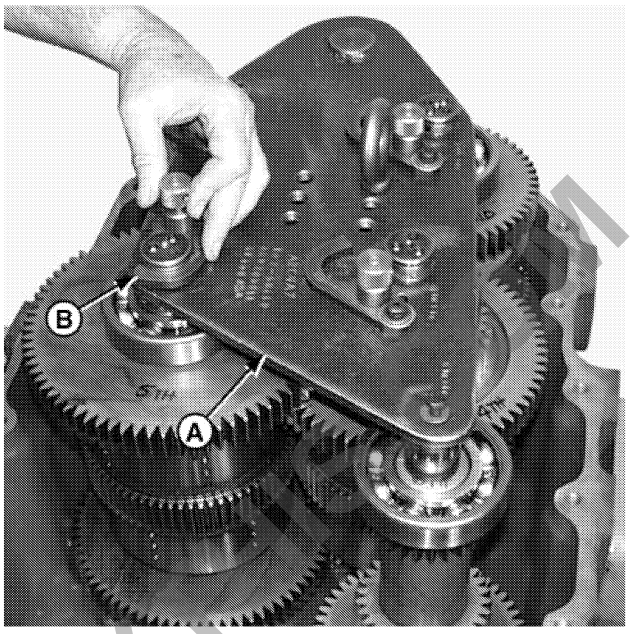
CAUTION: Approximate weight of all clutch stage assemblies is 272 Kg (600 lbs).

IMPORTANT: Lift all clutch stage assemblies at one time using lift tool.

NOTE: See Section 6002 for special tools.

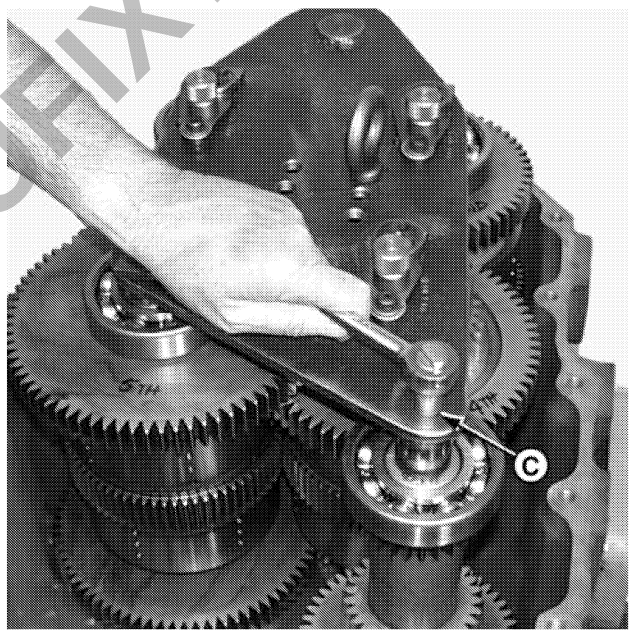
1. Install lift tool (A).

2. Lock holders (B) into place.



3. Install bolt (C) into sixth stage assembly.

4. Lift all clutch stage assemblies from rear housing.



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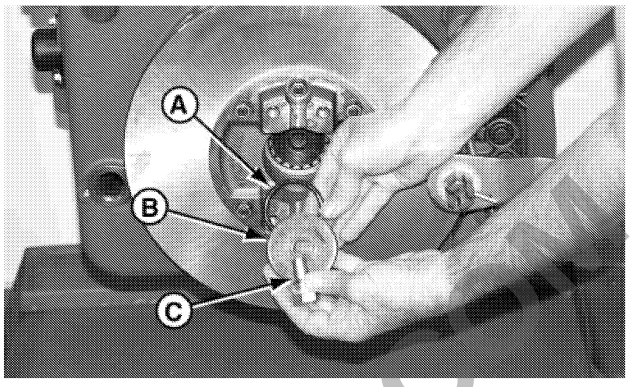
IMPORTANT: O-ring is positioned flat against the face of the output shaft.

17. Lubricate and install new O-ring (A).

IMPORTANT: The machined face of the washer must be installed next to the O-ring.

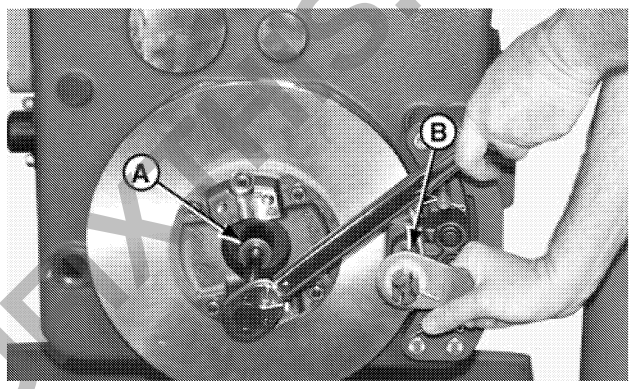
18. Install yoke washer (B).

19. Install cap screw (C).



NOTE: Use brake caliper (B) to keep output shaft from turning.

20. Tighten cap screw to 215 N·m (159 lb-ft).



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ASSEMBLE DIRECT DRIVE INPUT ASSEMBLY

1. Align the oil passage and bolt holes in the direct drive input bearing retainer with oil passage and bolt holes in the front housing.

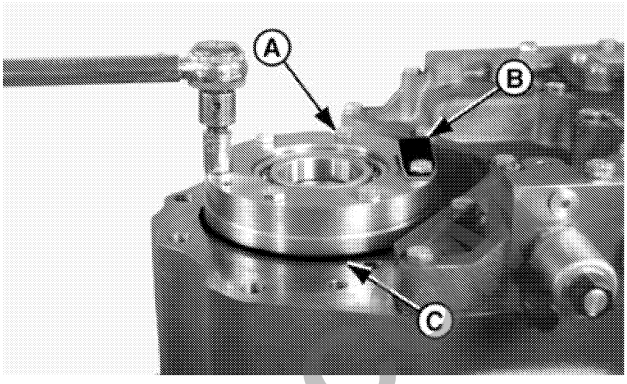
IMPORTANT: Deflector (B) must be in place and installed correctly to properly direct oil flow. It also must not interfere with installing the input housing.

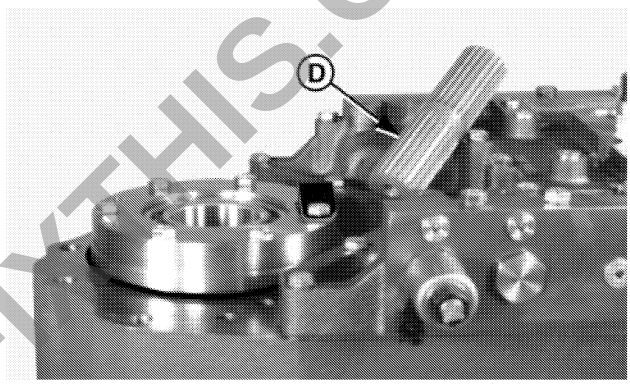
2. Install cap screws (A) and deflector (B).

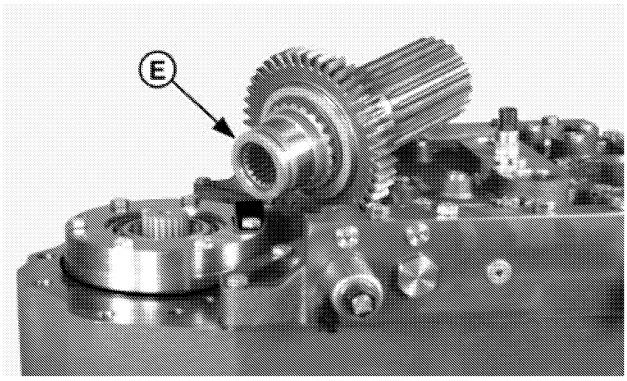
3. Lubricate and install new o-ring (C).

4. Tighten cap screws to 37 N·m (27 lb-ft).

5. Install coupling shaft (D).







6. Install input assembly (E).

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NOTE: Fourth and fifth stage assemblies have special pistons and will not interchange with second and third stage assemblies.



22. Remove piston from cylinder.

23. Remove outer piston seal (A) and O-ring (B) from piston.

24. Inspect all parts.



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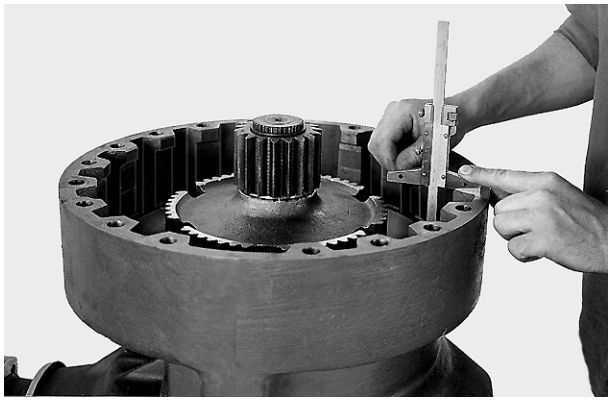
DIFFERENTIAL ASSEMBLY

ITEM	Q.TY.	DESCRIPTION
1	1	CENTRAL BODY
2	1	VENT PLUG
3	1	FILL PLUG
4	2	PLUG O-RING
5	1	MAGNET DRAIN PLUG
6	1	DIFFERENTIAL CARRIER AND CAP ASSY.
7	1	CARRIER CAP
8	1	DIFFERENTIAL CARRIER
9	4	CARRIER CAP WASHER
10	4	CARRIER CAP CAPSCREW
11	1	DOWEL PIN
12	30	LOCKWASHER
13	24	CAPSCREW
14	1	O-RING
15	2	ADJUSTING NUT CAPSCREW
16	2	NUT LOCK
17	2	TAPERED BEARING
18	2	ADJUSTING NUT
19	1	BEARING
20	1	CENTER PINION BEARING
21	1	SPACER
22	1	O-RING
23	AR	SHIM
24	1	BEARING RETAINER
25	6	BEARING RETAINER CAPSCREW
26	1	GREASE FITTING
27	1	OUTER PINION BEARING CUP
28	1	OIL SEAL
29	1	GREASE SEAL
30	1	THRUST WASHER
31	1	V-RING SEAL
32	1	BUSHING
33	1	O-RING
34	1	NUT
35	1	CARRIER ASSEMBLY
36	20	CARRIER CAPSCREW
37	20	CARRIER WASHER
38	1	THRUST WASHER
39	1	DIFFERENTIAL SIDE GEAR (LEFT)
40	1	DIFFERENTIAL SIDE GEAR (RIGHT)
41	1	THRUST WASHER
42	1	CROSS
43	4	DIFFERENTIAL PINION GEAR
44	4	THRUST WASHER
45	1	DIFFERENTIAL CASE SEAL
46	1	RING & PINION SET
47	12	CAPSCREW
48	1	PISTON HOUSING
49	1	PLUG
50	12	NUT
51	1	PISTON
52	1	OUTER SEALING RING
53	1	INNER SEALING RING
54	1	BUSHING
55	1	SEAL RETAINER
56	6	PLUG
57	4	SEALING RING
58	1	PISTON
59	3	PISTON SEAL
60	1	ADAPTOR
61	1	O-RING
62	1	FILTER
63	2	PLUG
68	1	CLUTCH DRIVER
69	1	SNAP-RING
70	6	INNER DISC.
71	6	OUTER DISC.
72	1	FLANGE
73	AR	PINION BEARING SHIM

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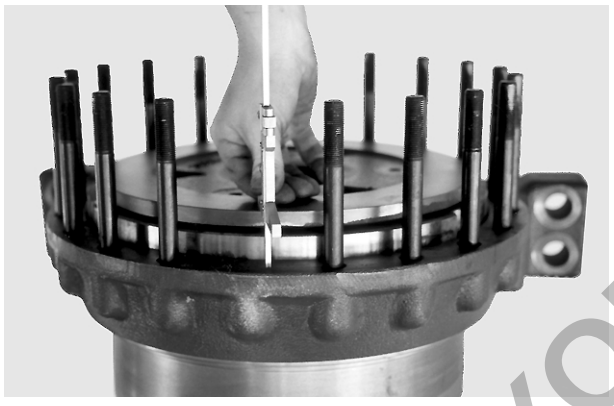
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Determine pressure plate shims



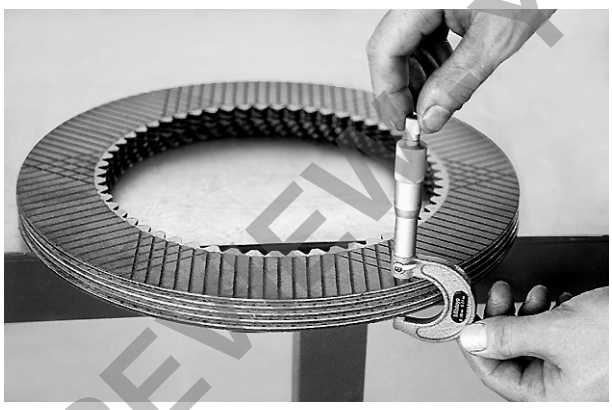
STEP 29

Position the pressure plate in its seat, measure the distance between the central housing surface and the pressure plate in three points making the average: measurement ***"A"****.*



STEP 30

Measure distance from planetary spider hub to surface of axle support housing at three points and average,measurement ***"B"****.*



STEP 31

Measure thickness of five brake friction discs, measurement ***"C"****.*



STEP 32

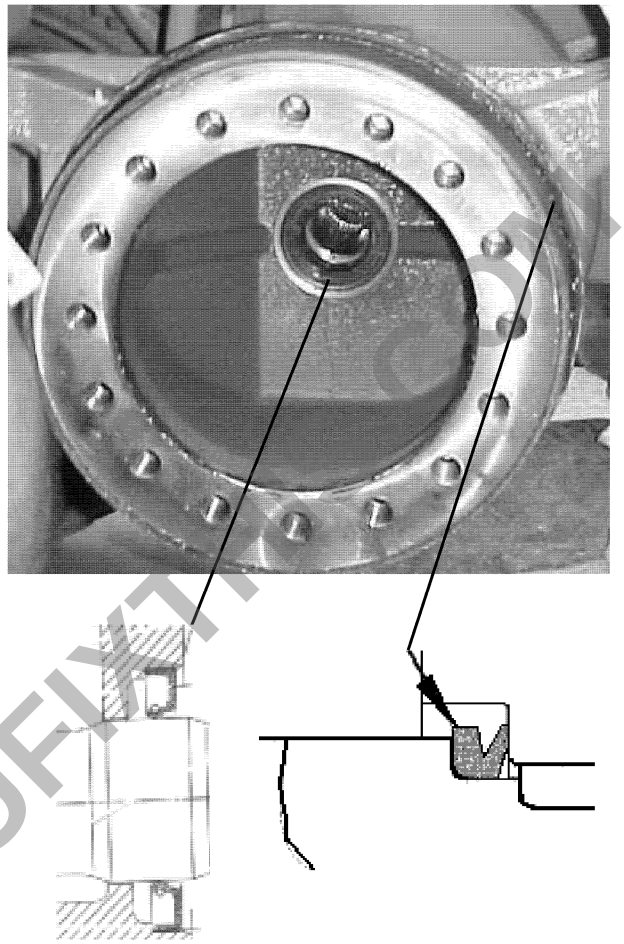
Measure thickness of four brake steel discs, measurement ***"D"****.*

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ASSEMBLY OF THE TANDEM

Install bushing and tandem pivot seal (see figure).



Apply light coat of graphite grease on the outside diameter of phenolic bushing.

Install new lip seal (see figure).

Mark covers to identify the tandem stop angle.

Remove the cover,bearing and sprocket.

Remove the wheel reduction axle assembly.

NOTE: For rear axle disassembly and assembly see section 6005.

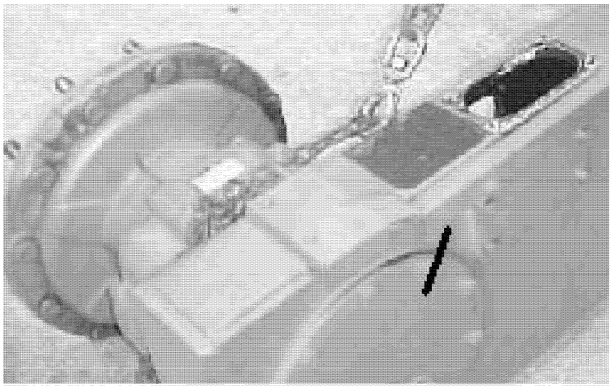
Install the wheel reduction axle assembly, apply Loctite 1114 on the surface and studs thread.

Nuts torque to 267 ~ 273 Nm (198 ~202 lb ft.).

Install sprocket,bearing.

Apply Loctite 1114 on the cover and capscrews thread.

Install cover and capscrews torque to 122 ~ 136 Nm (90 ~100 ft lb.).

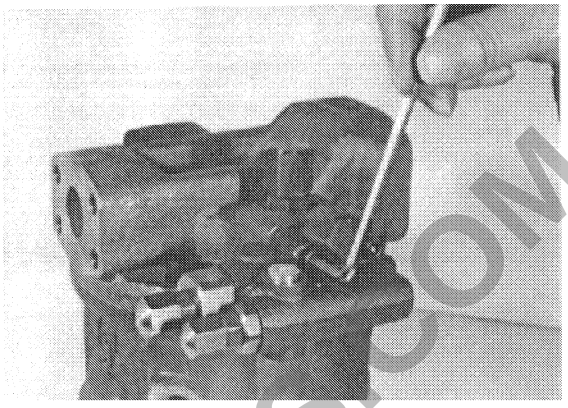


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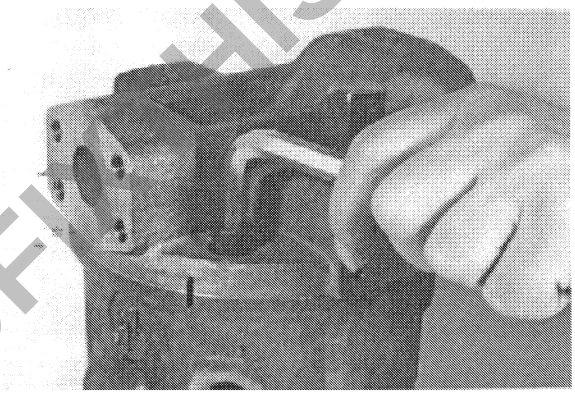
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GRADER 865 - 885 PUMP REPAIR INSTRUCTIONS

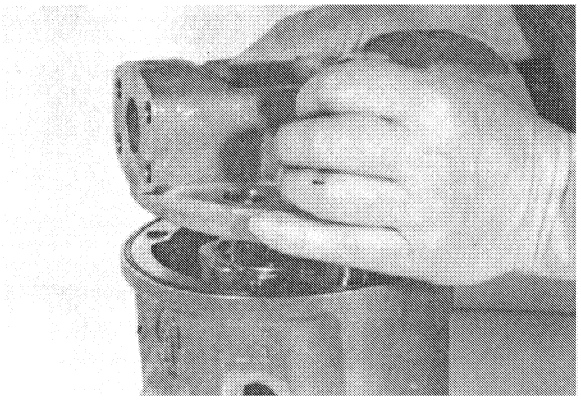
Disassemble the pilot valve.



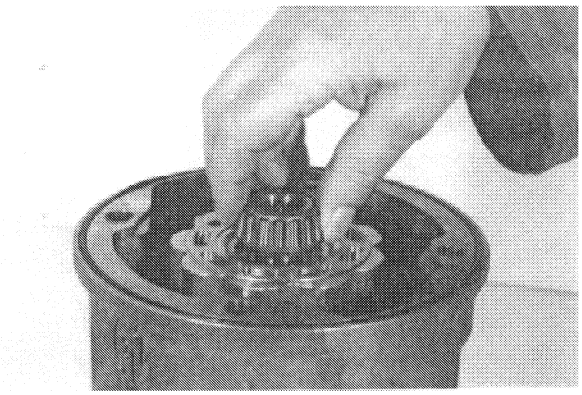
Mark the position of the cover in relation to the casing when it is in place, and remove the allen head screws.



Remove the cover together with the control components.



Remove the cone roller bearing and the wedges.



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