T2210, T2220 – BOOMER 2030, BOOMER 2035 REPAIR MANUAL COMPLETE CONTENTS

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The following pages are the collation of the contents pages from each section and chapter of the T2210, T2220 – Boomer 2030, Boomer 2035 Repair manual. Complete Repair part # 84122964.

The sections used through out all New Holland product Repair manuals may not be used for each product. Each Repair manual will be made up of one or several books. Each book will be labeled as to which sections are in the overall Repair manual and which sections are in each book.

84122969 8/08
1st Printing

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SAFETY

PRECAUTIONARY STATEMENTS

A careful operator is the best operator. Most accidents can be avoided by observing certain precautions. To help prevent accidents, read the following precautions before operating this equipment. Equipment should be operated only by those who are responsible and instructed to do so.

Carefully review the procedures given in this manual with all operators. It is important that all operators be familiar with and follow safety precautions.

THE TRACTOR

1. Read the Operator's Manual carefully before using the tractor. Lack of operating knowledge can lead to accidents.
2. Use an approved roll bar and seat belt for safe operation. Overturning a tractor without a roll bar can result in death or injury. If your tractor is not equipped with a roll bar and seat belt, see your New Holland Dealer.
3. Always use the seat belt. The only instance when the seat belt should not be used is if the roll bar has been removed from the tractor.
4. If a front end loader is to be installed, always use a FOPS (Falling Object Protective Structure) canopy to avoid injury from falling objects.
5. Use the handholds and step plates when getting on and off the tractor to prevent falls. Keep steps and platform cleared of mud and debris.
6. Do not permit anyone but the operator to ride on the tractor. There is no safe place for extra riders.
7. Keep all safety decals clean of dirt and grime, and replace all missing, illegible, or damaged safety decals. See the list of decals in the Decal section of this manual.

SERVICING THE TRACTOR

1. The cooling system operates under pressure which is controlled by the radiator cap. It is dangerous to remove the cap while the system is hot. Always turn the cap slowly to the first stop and allow pressure to escape before removing the cap entirely.
2. Keep any type of open flame away from the tractor and do not smoke while refueling. Wait for the engine to cool before refueling.
3. Keep the tractor and equipment, particularly brakes and steering, maintained in a reliable and satisfactory condition to ensure your safety and comply with legal requirements.
4. Keep open flame or cold weather starting aids away from the battery to prevent fires or explosions. Use jumper cables according to instructions to prevent sparks which could cause explosion.
5. Stop the engine before performing any service on the tractor.
6. Escaping hydraulic/diesel fluid under pressure can penetrate the skin causing serious injury. If fluid is injected into the skin, obtain medical attention immediately or gangrene may result.
   - DO NOT use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks.
   - Stop the engine and relieve pressure before connecting or disconnecting lines.
   - Tighten all connections before starting the engine or pressurizing lines.
7. Do not modify or permit anyone else to modify or alter this tractor or any of its components or functions without first consulting a New Holland Dealer.
8. The fuel oil in the injection system is under high pressure and can penetrate the skin. Unqualified persons should not remove or attempt to adjust a pump, injector, nozzle, or any other part of the fuel injection system. Failure to follow these instructions can result in serious injury.
9. Continuous long-term contact with used engine oil may cause skin cancer. Avoid prolonged contact with used engine oil. Wash skin promptly with soap and water.

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SPECIFICATIONS

	Model T2210/Boomer2030—Hydrostatic/Gear	Model T2220/Boomer2035—Hydrostatic
ENGINE		
Type	Diesel	Diesel
Engine Gross Horsepower	23.1 kw (31)	26.1 kw (35)
Cylinders	3	3
Bore	84 mm (3.31″)	84 mm (3.31″)
Stroke	80 mm (3.15″)	100 mm (3.94″)
Displacement	1.33 L (81.2 cu. in.)	1.65 L (101.1 cu. in.)
Compression Ratio	22.7:1	22.2:1
Firing Order	1-2-3	1-2-3
Low Idle Speed	1000 rpm	1000 rpm
Maximum Speed:		
High Idle	2840 ± 25 rpm	2840 ± 25 rpm
Rated	2600 rpm	2600 rpm
Valve Clearance (Cold):		
Intake	0.20 mm (0.008″)	0.20 mm (0.008″)
Exhaust	0.20 mm (0.008″)	0.20 mm (0.008″)
CAPACITIES		
Fuel Tank	27.6 liters/ 7.3 U.S. gals.	27.6 liters/ 7.3 U.S. gals.
Cooling System	5.2 liters/ 5.5 U.S. qts.	5.2 liters/ 5.5 U.S. qts.
Engine Crankcase:		
With Filter	4.0 liters/ 4.2 U.S. qts.	4.0 liters/ 4.2 U.S. qts.
Rear Axle & Transmission (Includes Hydraulics)		
Gear	32.5 liters/ 8.6 U.S. gals.	
HST	33.3 liters/ 8.8 U.S. gals.	33.3 liters/ 8.8 U.S. gals.
Front Axle Final Reduction	0.8 liters/ 0.85 U.S. qts.	0.8 liters/ 0.85 U.S. qts.
Differential Gear Case	1.4 liters/ 1.5 U.S. qts.	1.4 liters/ 1.5 U.S. qts.

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MINIMUM HARDWARE TIGHTENING TORQUES

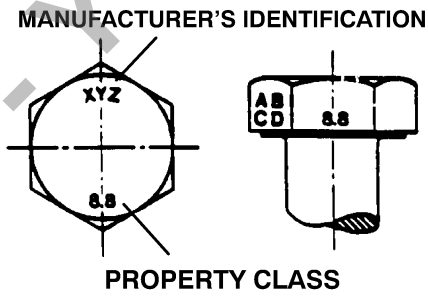
IN NEWTON-METERS (FOOT POUNDS) FOR NORMAL ASSEMBLY APPLICATIONS

METRIC NON-FLANGED HARDWARE AND LOCKNUTS

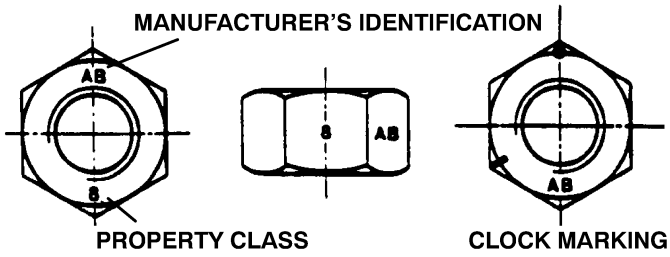
NOMINAL SIZE	CLASS 5.8		CLASS 8.8		CLASS 10.9		LOCKNUT CL.8 W/CL8.8 BOLT
	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	
M4	1.7 (15)*	2.2 (19)*	2.6 (23)*	3.4 (30)*	3.7 (33)*	4.8 (42)*	2.3 (20)*
M6	5.8 (51)*	7.6 (67)*	8.9 (79)*	12 (102)*	13 (115)*	17 (150)*	7.8 (69)*
M8	14 (124)*	18 (159)*	22 (195)*	28 (248)*	31 (274)*	40 (354)*	19 (169)*
M10	28 (21)	36 (27)	43 (32)	56 (41)	61 (45)	79 (58)	38 (28)
M12	49 (36)	63 (46)	75 (55)	97 (72)	107 (79)	138 (102)	66 (49)
M16	121 (89)	158 (117)	186 (137)	240 (177)	266 (196)	344 (254)	164 (121)
M20	237 (175)	307 (226)	375 (277)	485 (358)	519 (383)	671 (495)	330 (243)
M24	411 (303)	531 (392)	648 (478)	839 (619)	897 (662)	1160 (855)	572 (422)

NOTE: Torque values shown with * are inch pounds.

IDENTIFICATION
HEX CAP SCREW AND CARRIAGE BOLTS
CLASSES 5.6 AND UP



HEX NUTS AND LOCKNUTS
CLASSES 05 AND UP



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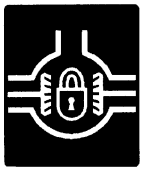
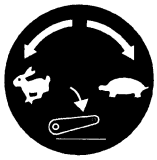


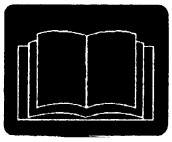
Differential Lock
PART NO:
86532901
LOCATION:
Left Side Operator's Platform (HST)
Right Side Operator's Platform (Gear)

Starter Switch
PART NO:
86400175
LOCATION:
Right Console Panel



Flow Control Valve
PART NO:
86532897
LOCATION:
Top of Flow Control Knob

Engine Oil
PART NO:
86532916
LOCATION:
Engine Oil Filler Cap



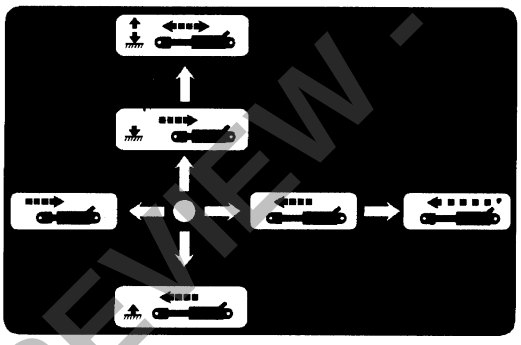
Hyd. Manifold Operation
(See Operator's Manual)
PART NO:
86532914
LOCATION:
Top Side of Hyd. Manifold/Air Filter Cap

(Optional)
Coupler-Extending
PART NO:86532920

(Optional)
Coupler-Retracting
PART NO:86532919

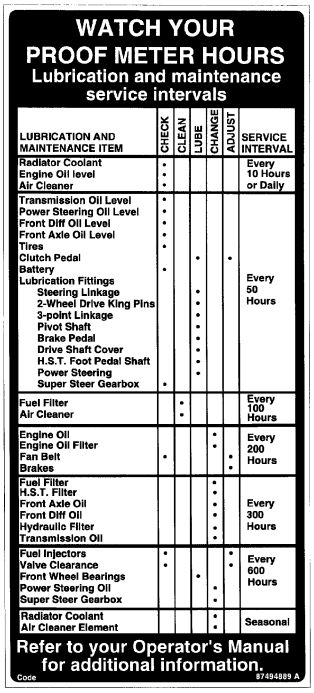
(Optional)
Coupler-Extending
PART NO:86532921

(Optional)
Coupler-Retracting
PART NO:86532922



Optional)
Operating Remote Control Valve-Double Spool
PART NO:
86532911
LOCATION:
Cover of 2-Spool Remote Valve

Lubrication and Maintenance Intervals
PART NO:
87494889
LOCATION:
Inside of Hood



WATCH YOUR PROOF METER HOURS
Lubrication and maintenance service intervals

LUBRICATION AND MAINTENANCE ITEM	CHECK	CLEAN	LUBE	CHANGE	ADJUST	SERVICE INTERVAL
Radiator Coolant	•					Every 10 Hours or Daily
Engine Oil level	•					
Air Cleaner	•					
Transmission Oil Level	•					Every 50 Hours
Power Steering Oil Level	•					
Front Diff Oil Level	•					
Front Axle Oil Level	•					
Tires	•					
Clutch Pedal			•		•	
Battery	•					
Lubrication Fittings						
Steering Linkage			•			
2-Wheel Drive King Pins			•			
3-point Linkage			•			
Pivot Shaft			•			
Brake Pedal			•			
Drive Shaft Cover			•			
H.S.T. Foot Pedal Shaft			•			
Power Steering			•			
Super Steer Gearbox	•					
Fuel Filter		•				Every 100 Hours
Air Cleaner		•				
Engine Oil				•		Every 200 Hours
Engine Oil Filter				•		
Fan Belt	•				•	
Brakes					•	
Fuel Filter				•		Every 300 Hours
H.S.T. Filter				•		
Front Axle Oil				•		
Front Diff Oil				•		
Hydraulic Filter				•		
Transmission Oil				•		
Fuel Injectors	•				•	Every 600 Hours
Valve Clearance	•				•	
Front Wheel Bearings			•			
Power Steering Oil				•		
Super Steer Gearbox				•		
Radiator Coolant				•		Seasonal
Air Cleaner Element				•		

Refer to your Operator's Manual for additional information.

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TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	CORRECTION
Engine does not develop full power	Clogged air cleaner	Inspect and replace air cleaner if necessary
	Fuel line obstructed	Check for crimped fuel line. Inspect fuel filter for cleanliness
	Improper injection timing	Repair/ replace components as required
	Improper nozzle injection pressure and angle	Check injection timing Inspect for proper injection pressure an angle
	Low cylinder compression	Check engine compression
	Insufficient fuel injection	Repair at authorized shop
	Improper valve lash adjustment	Adjust valves to correct tolerances
	Burned, worn or sticking valves	Inspect and replace as necessary
	Blown head gasket	Replace head gasket
	Worn or sticking piston rings	Overhaul as necessary
	Faulty engine stop solenoid	Replace stop solenoid
Low oil pressure	Engine oil level low	Fill to proper level
	Wrong grade of oil	Replace with correct grade oil
	Clogged oil pump filter	Change oil and filter
	Faulty oil pressure relief valve	Replace relief valve
	Worn oil pump drive shaft gears, or broken oil pipe	Inspect oil system and components. Replace defective components
	Excessive main or connecting rod bearing clearances	Replace bearings or shaft if necessary
	Oil pump axial clearance not properly set	Check pump clearance and shim as needed to proper tolerance
Engine will not stop	Faulty engine stop solenoid	Replace the stop solenoid
	Faulty starter switch	Replace starter switch
Low cylinder compression	Burned, worn or sticking valves	Replace valves
	Bent valve stem	Replace valves
	Broken or weak valve spring	Replace valve spring
	Blown cylinder head gasket	Replace head gasket
	Worn or sticking piston rings	Replace piston rings
	Scored piston	Replace piston
Poor engine idling	Improper injection timing	Correct the injection timing
	Air in injection pump	Purge air from the system
	Improper governor adjustment	Adjust the governor

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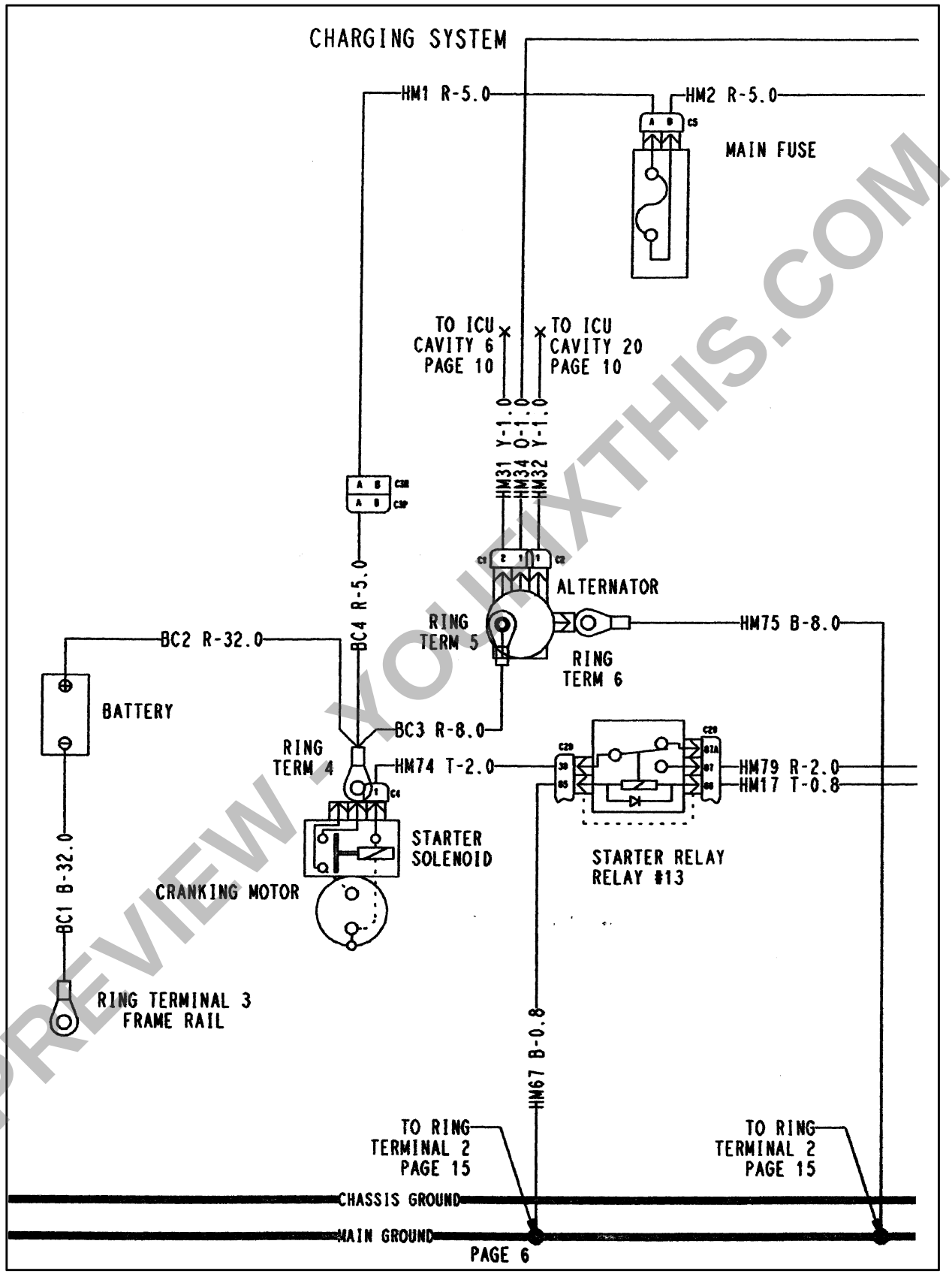

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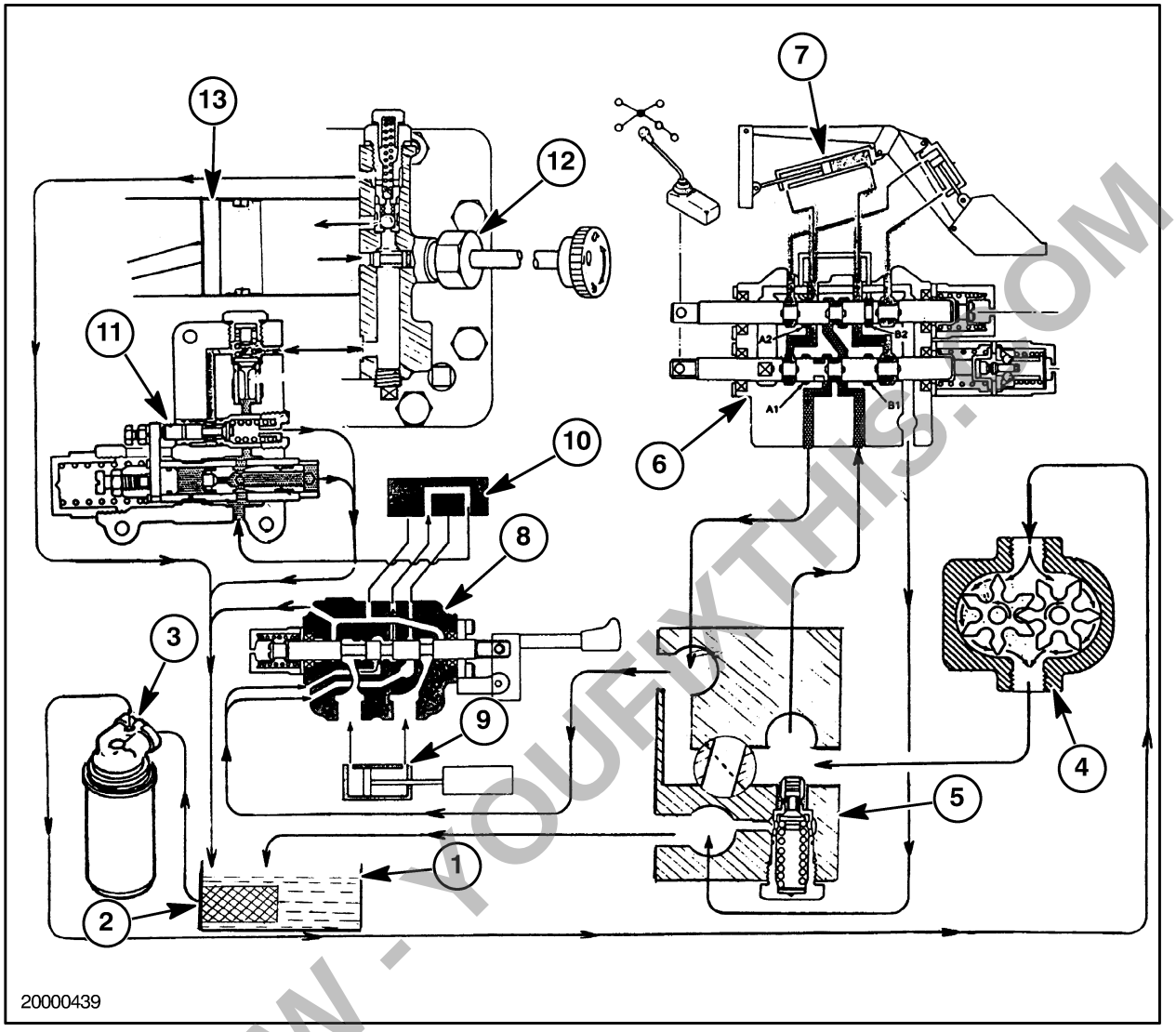

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Hydraulic Flow Diagram/Component Description

1. Hydraulic Fluid Reservoir
2. Sump Screen Filter
3. Hydraulic Fluid Filter
4. Hydraulic Pump
5. Relief/Diverter Valve
6. Front Double Spool Remote Valve
7. Front Boom Lift Cylinder
8. Rear Single Spool Remote Valve
9. Rear Remote Lift Cylinder
10. Rear Remote Endcap (Attached to HPL Valve)
11. HPL Valve (Control Valve)
12. Flow Valve
13. 3 Point Hitch Lift Piston

FLUID FLOW

Flow Priority

This diagram shows hydraulic oil flow priority within the tractor's hydraulic system.

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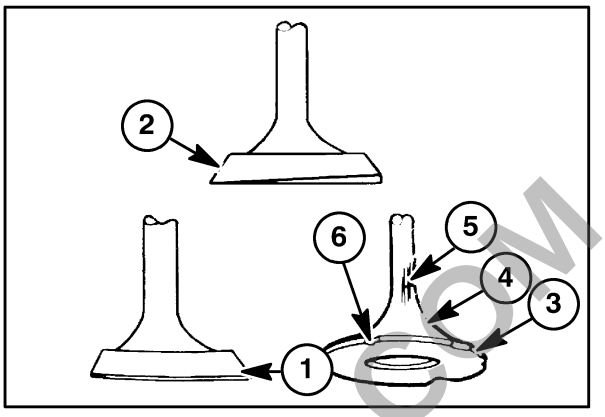
VALVES

Inspection and Replacement

1. Clean all deposits from the valves using a soft wire brush. Inspect the condition of the valves and discard any that are badly burned, cracked, or bent.



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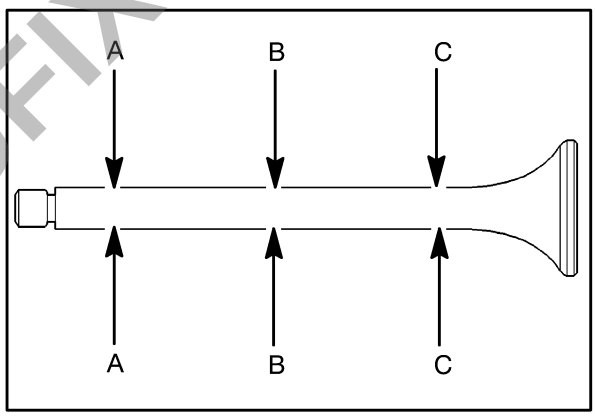
1. Margin Too Thin Min. 0.5 mm (0.02″)
2. Bent Valve
3. Pitting
4. Indented
5. Wear or Nicking
6. Burned

2. Using a micrometer, measure the valve stem at points “A,” “B” and “C.”



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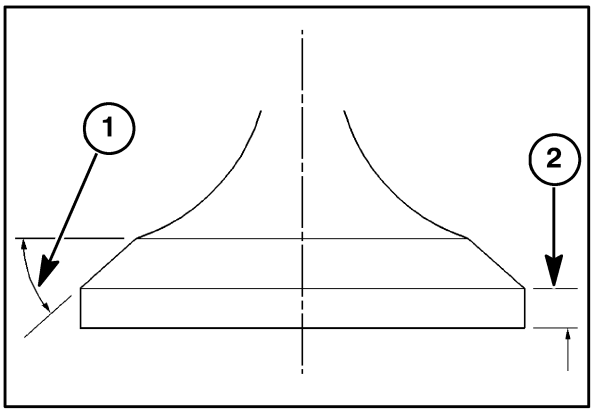
3. If inspection indicates that the valve may be reused, the valve should be ground.
4. After grinding the valve and seat, check to ensure the seat contacts the center of the valve face. Using Prussian Blue, lightly coat the valve seat, place the valve in position and rotate the valve slightly while holding a light pressure against the valve. If the blue is transferred to the center of the valve face, the contact is correct.



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1. 45° Angle Seat
2. Minimum Valve Margin

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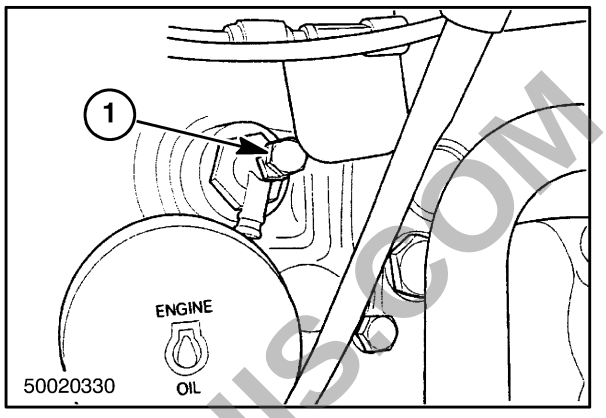
OVERHAUL

ENGINE

Preparation

1. Turn coolant tap bolt, 1, counterclockwise to drain fluid. Remove the radiator assembly. See “Radiator Removal”, discussed later in this section.



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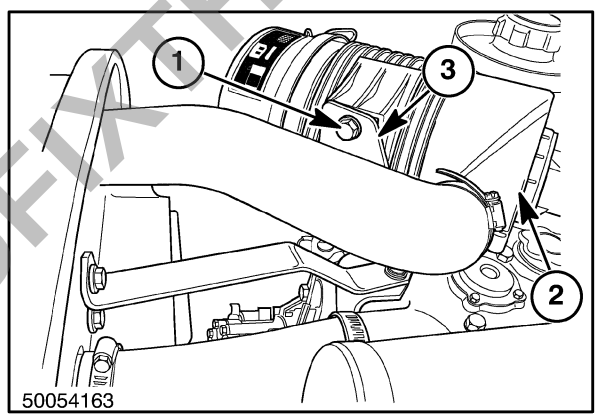
2. Remove bolts, 1, fastening the air cleaner assembly, 2, to the tractor. Remove the mounting bracket, 3, from engine.



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SECTION 10 - ENGINE

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Chapter 1 - Engine Systems (Continued)

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	Model T2210/Boomer2030—	Model T2220/Boomer2035—
TRANSMISSION SPEEDS (Hydrostatic)		
	(2,600 rpm Engine Speed with 11.2 x 24 Rear Tires)	(2,600 rpm Engine Speed with 11.2 x 24 Rear Tires)
Gear Position:		
Low	0–6.30 kph (0–3.91 mph)	0–6.30 kph (0–3.91 mph)
Mid	0–13.09 kph (0–8.13 mph)	0–13.09 kph (0–8.13 mph)
High	0–26.70 kph (0–16.59 mph)	0–26.70 kph (0–16.59 mph)
Reverse Low	0–4.7 kph (0–2.92 mph)	0–4.7 kph (0–2.92 mph)
Reverse Mid	0–9.82 kph (0–6.10 mph)	0–9.82 kph (0–6.10 mph)
Reverse High	0–20.02 kph (0–12.44 mph)	0–20.02 kph (0–12.44 mph)

TRANSMISSION SPEEDS (Gear)	
	(2,600 rpm Engine Speed with 11.2 x 24 Rear Tires)
Gear Position:	
1st	1.47 kph (0.91 mph)
2nd	2.17 kph (1.35 mph)
3rd	3.11 kph (1.93 mph)
4th	4.64 kph (2.88 mph)
5th	6.85 kph (4.26 mph)
6th	9.83 kph (6.11 mph)
7th	11.88 kph (7.38 mph)
8th	17.54 kph (10.90 mph)
9th	25.16 kph (15.63 mph)
Reverse 1	2.17 kph (1.35 mph)
Reverse 2	6.85 kph (4.26 mph)
Reverse 3	17.54 kph (10.90 mph)

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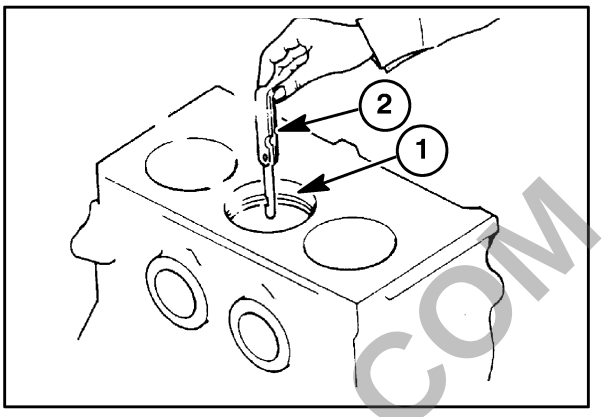
PISTON RINGS

Disassembly and Inspection

1. Position the piston rings, 1, one at a time, in the cylinder to the lowest point of travel. Use an inverted piston to square the ring in the bore.
2. With a feeler gauge, 2, measure the ring gap.

   The ring is shown at the top of its travel for clarity.
3. Replace worn rings with end gap clearance in excess of 1.0 mm (0.039″).



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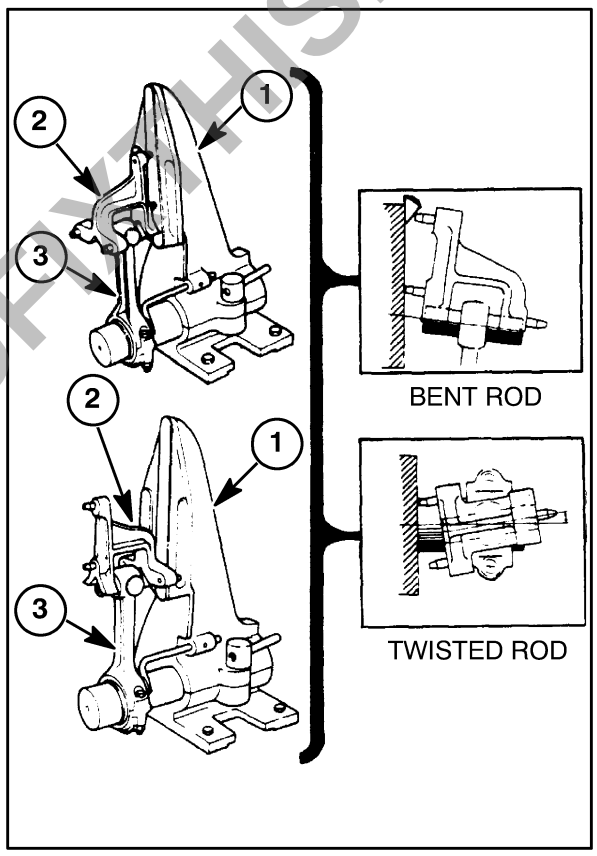
CONNECTING RODS

Disassembly and Inspection

1. Check the connecting rods for damage and alignment. Place each rod in an alignment fixture to check for bent or twisted condition.
2. Straighten or replace rods that are bent or twisted more than the following dimensions:

   Max. Bend: 0.15 mm (0.0059″) per 100 mm (3.94″)

   Twist: 0.2 mm (0.0078″) per 100 mm (3.94″)



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1. Alignment Fixture
2. Gauge
3. Connecting Rod

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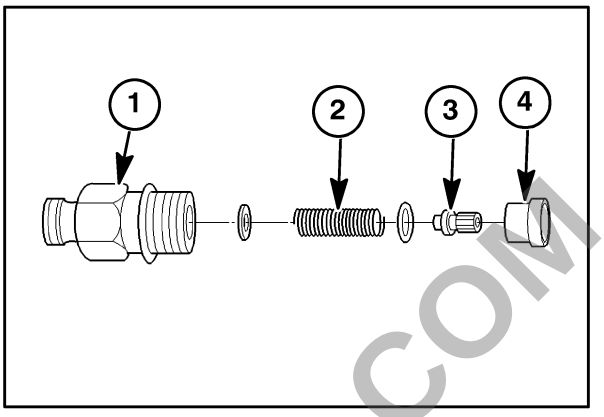
DELIVERY VALVES

Located above each pumping element is a delivery valve assembly. The delivery valve consists of a delivery valve holder, 1, spring, 2, piston and stem assembly, 3, operating within a cylindrical guide, 4, which terminates in a conical seat. The lower part of the stem has four vertical flutes which accurately locate within the guide while permitting fuel to pass. Above the flutes is a piston which is a lapped fit in the bore of the valve guide.



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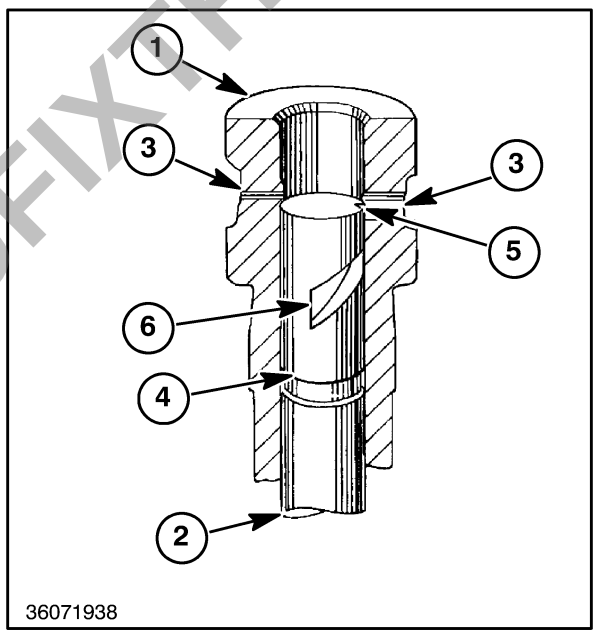
The delivery valve serves as a non-return valve and also as a means of rapidly reducing the fuel pressure in the injector line when injection ceases. Rapid pressure reduction is required to be sure injector needle valve “snaps” shut to prevent fuel “dribble”, a condition which can cause carbon formation on the injector tip.

Fuel Delivery

The pumping elements accurately meter and deliver the fuel to the injectors. Each of the pumping elements consists of a barrel, 1, and plunger, 2, lapped together to give an accurate fit. Two diametrically opposed drillings in the barrel form fuel inlets, 3, and the barrel is splined, with a master spline, for correct location within the pump body.

An annular groove, 4, is machined around the plunger into which fuel leaking between the barrel and plunger may accumulate. This leakage provides lubrication of the barrel and plunger surfaces. The plunger has a fuel port, 5, which terminates in a helical groove, 6, machined in the periphery of the plunger. The purpose of the groove is to control the effective pumping stroke of the plunger.



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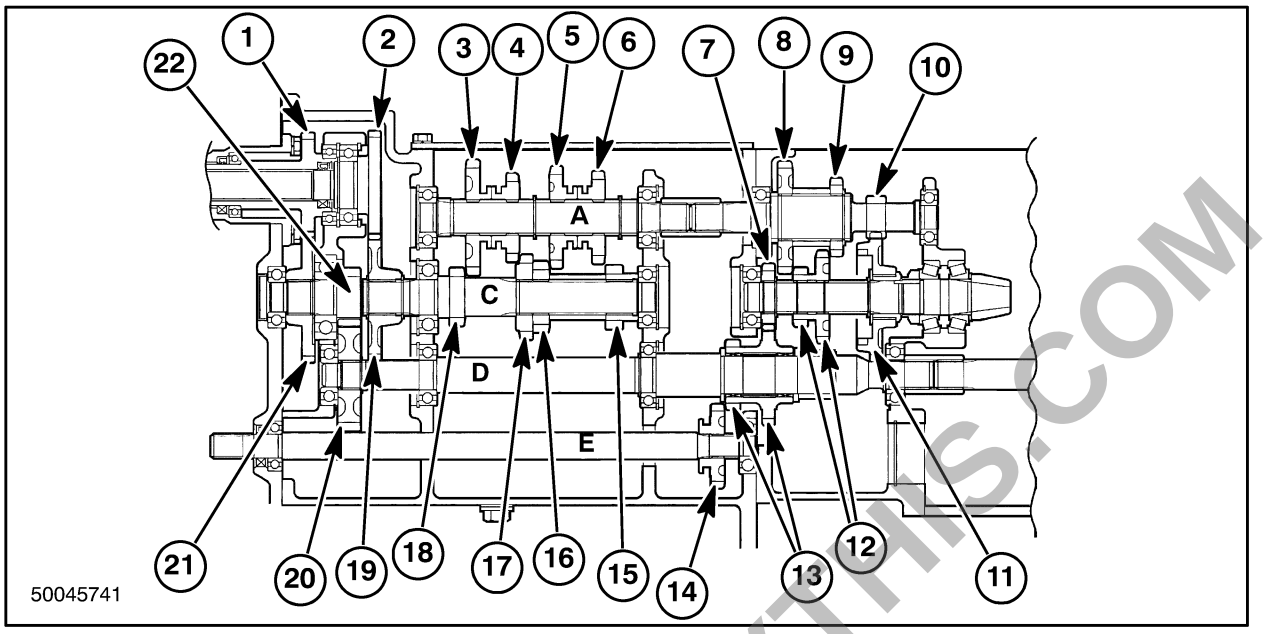

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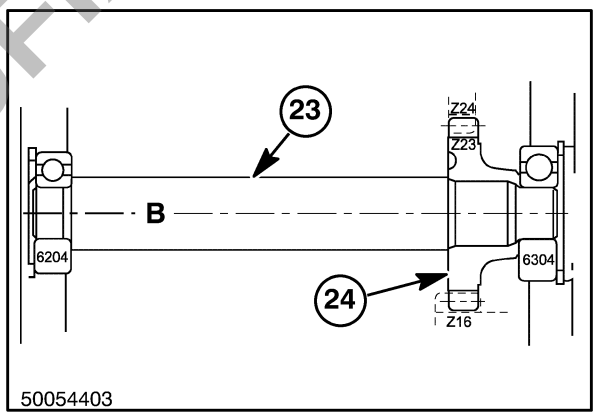
Cross Section - 9 x 3 Gear Transmission



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1. PTO Input Shaft Fixed Gear-33T
2. Transmission Input Shaft Fixed Gear-37T
3. Sliding Gear (1st gear)-31T
4. Sliding Gear (3rd gear)-23T
5. Sliding Gear (2nd gear)-27T
6. Sliding Gear (Reverse gear)-24T
7. FWD Fixed Gear (Pinion Shaft)-22T
8. High Range Gear (Fixed)-36T
9. Mid Range Gear (Fixed)-24T
10. Low Range Gear (Fixed, Main Shaft)-11T
11. Low Range Gear (Fixed, Pinion Shaft)-42T
12. Sliding Gear (High, Mid, Low)-17T/29T
13. FWD Counter Gear (Fixed)-18T/30T
14. FWD Sliding Gear (FWD Shaft)-22T
15. Fixed Reverse Gear (Countershaft)-16T
16. Fixed 2nd Gear (Countershaft)-18T
17. Fixed 3rd Gear (Countershaft)-22T
18. Fixed 1st Gear (Countershaft)-14T
19. Transmission Counter Gear (Countershaft)-39T
20. Front PTO Countershaft Gear-30T
21. Upper PTO Countershaft Gear-42T
22. PTO Countershaft Fixed Gear-14T
23. Reverse Idler Gear Shaft
24. Reverse Idler Gear - 23T

A. Transmission Main Shaft
B. Reverse Idler Shaft
C. Transmission Counter Shaft
D. PTO Countershaft
E. FWD Output Shaft

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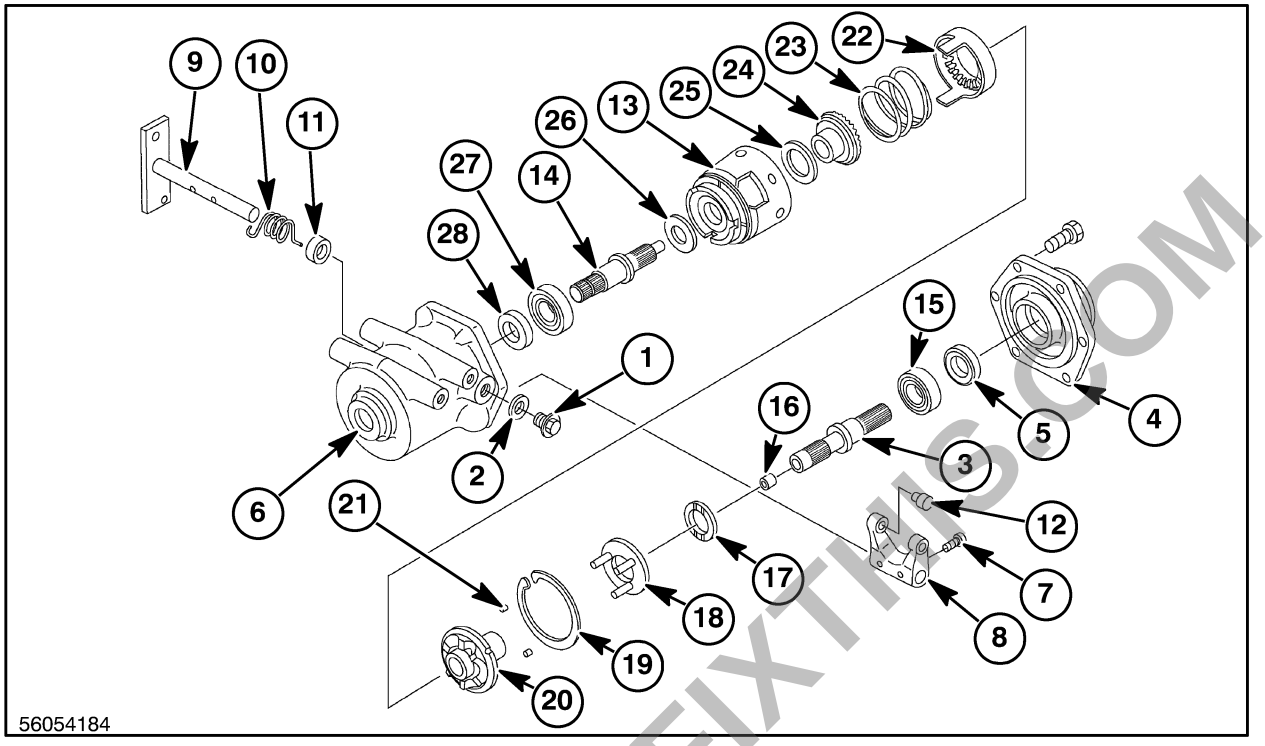

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Disassembly

1. Remove the oil plug, 1, and seal washer, 2, and drain the oil from the case into a suitable container.
2. Place the assembly in a vise with the input shaft, 3, facing upward. Remove the cover bolts and remove the cover, 4, and oil seal, 5, from the case, 6.
3. Remove the two socket head bolts, 7, from the shifter fork, 8, and shift arm, 9.

IMPORTANT: *Apply heat to remove bolts, 7, from shifter fork.*

4. Slide the shift arm, 9, with spring, 10, and oil seal, 11, out of the shifter fork and case.
5. Remove the shifter fork and rollers, 12, from the case.
6. Remove one-way clutch assembly, 13, out of the case and off the output shaft, 14.
7. Pull the input shaft, 3, with bearing, 15, and bushing, 16, out of the assembly and remove the thrust washer, 17, and sleeve, 18.
8. Remove the snap ring, 19, and remove the drive cam, 20, keeper pins, 21, center cam, 22, compression spring, 23, driven cam, 24, and thrust washer, 25, from the one-way clutch, 13.
9. Remove the thrust washer, 26, from the output shaft.
10. Remove the case from the vise and lightly tap the output shaft, 14, to remove its bearing from the case counter bore, and remove the shaft with bearing, 27. Remove oil seal, 28, from case, 6.

Inspection and Repair

1. Replace all seals during assembly.
2. Inspect the shifter fork blocks. The blocks should be smooth and free of any nicks or scratches. Minor nicks or scratches can be removed using fine emery cloth on a flat surface.
3. Inspect the drive cam, center cam, and driven cam mating areas for excessive wear. Replace if found defective.
4. Inspect all thrust washers for excessive wear and replace if necessary.
5. Inspect the compression spring for distortion. Replace as required.
6. Inspect the bearings for excessive wear or binding when rotated by hand. Replace if necessary.

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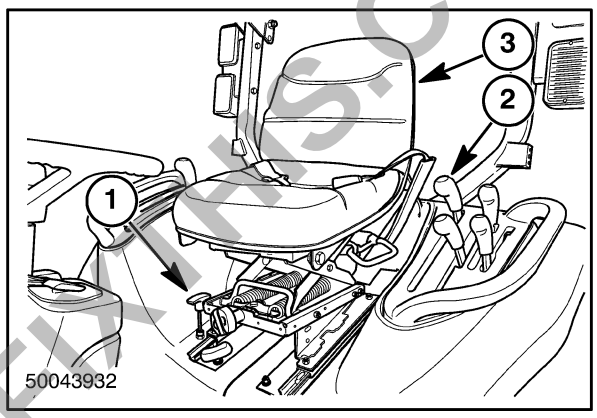
OVERHAUL – DIFFERENTIAL ASSEMBLY

DIFFERENTIAL

Removal

The differential assembly may be removed without removing the center housing from the tractor. To do so, remove both of the rear axle housings and the hydraulic lift cover and related components, see “Lift Cylinder Removal” Section 35. If the center housing needs to be removed, see “Separating, Transmission/Differential” Section 21.

1. Remove the ROPS assembly.
2. Disconnect the park brake lever, 1, from the fender.
3. Remove the lever knobs, 2, from the PTO and drive train controls, by pulling them off.
4. Disconnect the seat safety switch connector and remove the seat assembly, 3.



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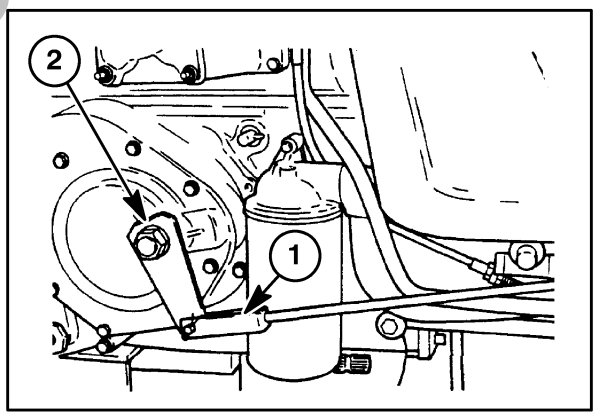
5. Remove the rear wheels and fenders from the tractor.
6. Remove the floor platform.
7. Drain the fluid from the combined transmission, rear axle, and hydraulic reservoir system.
8. Remove the lower lift links and stabilizers.
9. Disconnect the brake control rod, 1, from the brake cover lever, 2, Figure 8.



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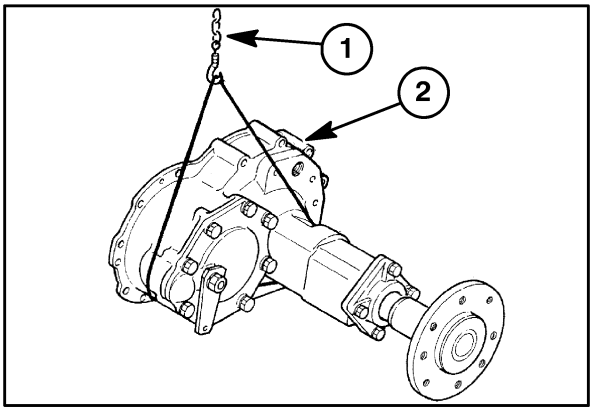
10. Disconnect all hydraulic lines that connect to the differential.
11. Attach a suitable overhead lifting device, 1, to the rear axle assembly, 2, and remove the axle housing retaining bolts.
12. Carefully move the axle assembly out and away from the tractor. The final gear and final differential pinion remain with the axle assembly.

⚠ WARNING ⚠

The axle housing is difficult to balance. Exercise care during removal to avoid personal injury.



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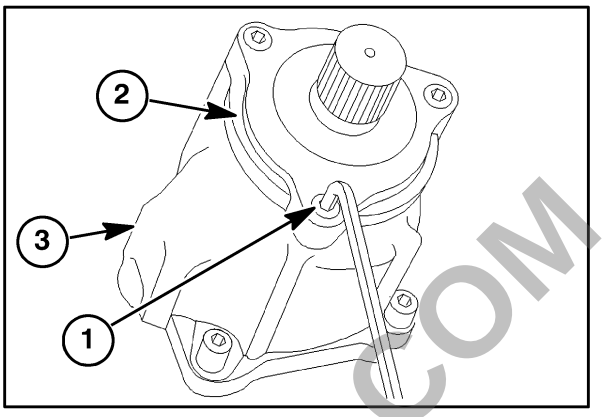
HYDROSTATIC MOTOR SHAFT

Disassembly

1. Remove the three allen socket bolts, 1, retaining the cover, 2, to the motor housing, 3, and remove the cover.



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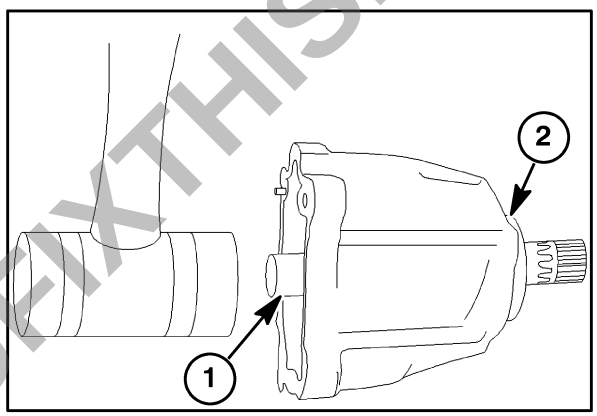
2. Using a soft hammer gently drive the shaft, 1, and bearing, 2, as an assembly out of the housing.



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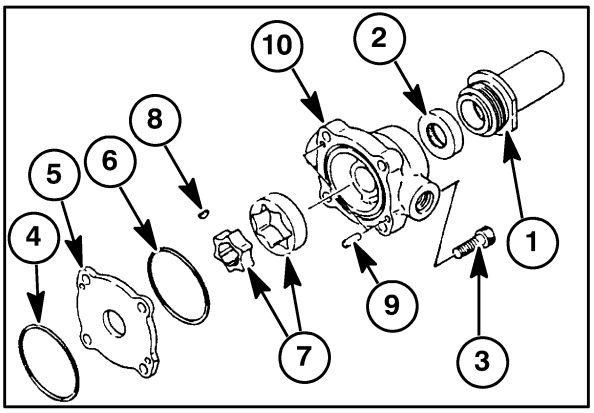
CHARGE PUMP

Disassembly

1. Remove the throw-out bearing hub, 1, and seal, 2.
2. Remove the four M8 x 35 allen head socket bolts, 3, retaining the charge pump to the housing and remove O ring, 4, wear plate, 5, O ring, 6, rotors, 7, key, 8, and pin, 9, from the housing, 10, and shaft.

NOTE: *Identify the position of the inner and outer rotor so as to assemble in their original position. Rotate shaft until the key, 8, is on the top of the shaft. The large notch on the inside rotor will help reference the position of the rotors on the shaft.*

3. Remove the snap ring from the inner case, drive out the shaft and bearing as an assembly from the front of the case.



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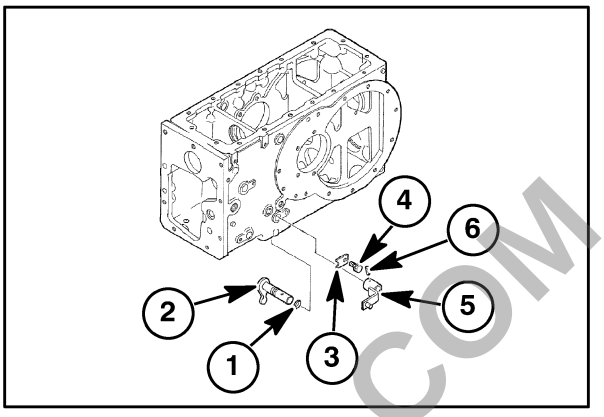
SHIFTER ARM

Assembly

NOTE: *Install shifter arm assembly before mid-PTO case is attached to rear axle housing.*

1. Using new O-ring, 1, install the shift arm, 2, and secure with plate, 3, and M8 x 16 bolt, 4.
2. Install the change lever, 5, and roll pin, 6.



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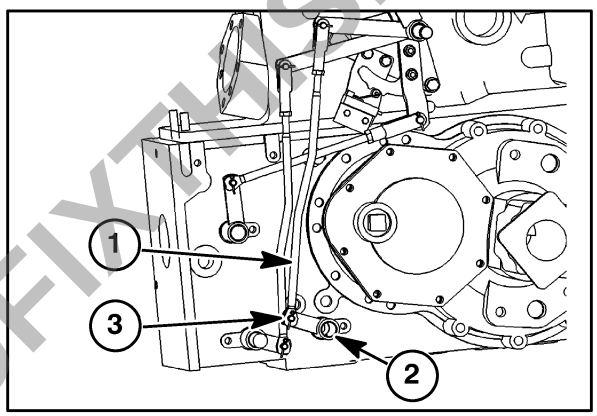
3. Connect the link, 1, to the change lever, 2, by installing cotter pin, 3.

NOTE: *Make sure mid-PTO safety switch operates correctly when linkage is installed.*



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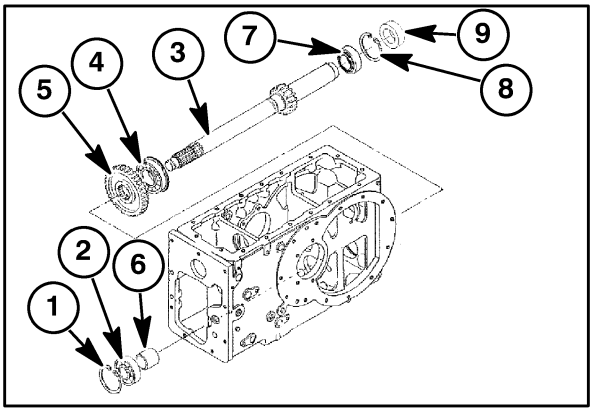
1. Mid-PTO Link
2. Mid-PTO Change Lever
3. Cotter Pin

COUNTERSHAFT

Assembly

1. Install snap ring, 1, and bearing, 2, into housing.
2. Install the countershaft (13T), 3, and bearing, 4, in the case.
3. Install fixed gear, 5, and spacer, 6, on the countershaft, as it is placed into the case.
4. Install bearing, 7, snap ring, 8, then sealing cover, 9.



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1. Snap Ring
2. Bearing
3. Countershaft—13T
4. Bearing
5. Fixed Gear—37T (9 x 3), 35T (HST)
6. Spacer
7. Bearing
8. Snap Ring
9. Sealing Cover

REAR PTO COMPONENTS ASSEMBLY

1. Install the PTO rear countershaft. See “Rear PTO Countershaft Assembly,” discussed earlier in this section.
2. Install the PTO center countershaft. See “PTO Center Countershaft Assembly,” discussed earlier in this section.
3. Install the PTO output shaft. See “PTO Output Shaft Installation,” discussed earlier in this section.

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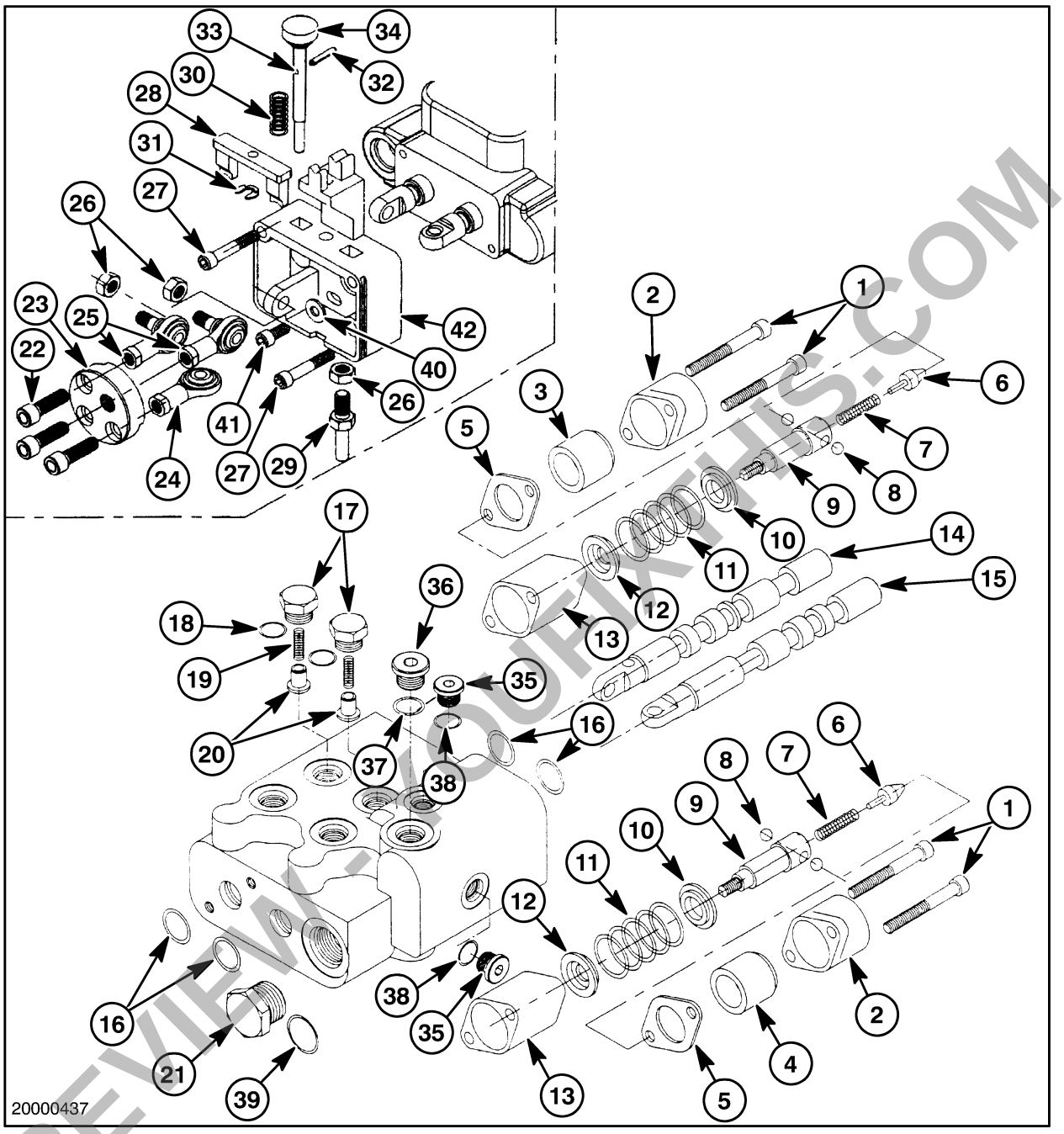

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1. Cap Screws, socket head 1/4″ x 2″-N.C.
2. End Cap
3. Float Detent Sleeve
4. Regen Detent Sleeve
5. Retainer
6. Poppet
7. Detent Spring
8. Detent Balls
9. Detent Retainer
10. Spring Seat
11. Spring
12. Spring Seat
13. Spacer
14. Float Spool (Boom)
15. Regen Spool (Bucket)
16. O-ring
17. Check Plug
18. O-ring
19. Spring
20. Loads Check Poppet
21. Plug
22. Cap Screw, socket head 5/16″ x 3/4″-N.F.
23. Joystick Flange
24. Rod End
25. Rod End Assemblies
26. Nuts, 5/16″-N.F.
27. Cap Screw, socket head 1/4″ x 1-3/4″-N.C.
28. Lock
29. Spool Stud
30. Spring
31. E Clip
32. Roll Pin
33. Lockout Pin
34. Knob
35. Plug
36. Plug
37. O-ring
38. O-ring
39. O-ring
40. Washer
41. Cap Screw, socket head 1/4″ x 3/4″-N.C.
42. Clevis

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Inspection

1. Inspect the inside of the tube for any scuffing or scarring, or unusual wear.
2. Inspect the piston for scuffing, score marks, or other damage.
3. Using micrometers, measure the inside diameter of the cylinder tube and the outside diameter of the piston to determine the working clearance. Replace if the clearance is in excess of 0.7 mm (0.028″).
4. Inspect the cylinder rod for excess wear, straightness, and scoring. Replace if damaged.
5. Inspect the anchor pins and bearings for excess wear and excessive clearance. Replace the anchor pins or bearings if the clearance in greater than 0.5 mm (0.019″).
6. Check the rod to gland head clearance. Replace the bushing if the clearance is in excess of 0.3 mm (0.012″).
7. On assembly replace all O-rings and seals with new.

Assembly

1. Install new bushings and O-rings, 10 - 16, on the gland head, 1, and insert the assembly over the piston rod.
2. Assemble the back-up rings and O-ring, 7 – 9, on the piston, 3, and install on the piston rod, 2. Tighten the piston nut to 35 N·m (26 ft-lbs).
3. Insert the assembly into the cylinder tube, 1, and tighten the gland head, 1, to 127 N·m (94 ft-lbs).
4. Crimp the end of the cylinder tube at the gland head to prevent the gland head from loosening.

Installation

1. Install the cylinder on the tractor.
2. Using sealing tape connect the power steering hoses to the cylinder.
3. Start the tractor, operate the steering system, and check for any leaks.

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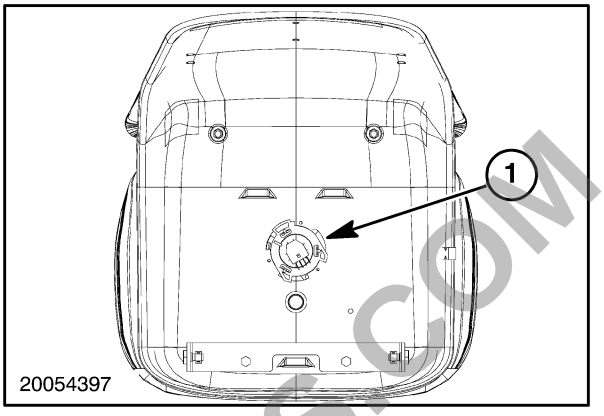
SEAT SAFETY SWITCH

Description

The seat safety switch, 1, is a double pole, button type switch mounted to the bottom side of the seat pan. When the operator is not seated, the switch contacts are open and will not allow the tractor to start. When the operator is seated, the switch contacts are closed, allowing the tractor to start.



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Removal

NOTE: *The seat safety switch may be tested by removing the switch harness from the switch and placing ohmmeter test leads on the switch terminals. Push down on the middle of the seat to check for switch continuity However, it is recommended to remove the seat switch from the seat for testing.*

1. Tilt the seat forward to reveal the seat safety switch.
2. Disconnect the seat switch harness from the switch.
3. Rotate the switch counter-clockwise to release the locking tabs and remove the switch from the seat.

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SAFE OPERATION CIRCUIT (OPERATOR PRESENT)

NOTE: *The operating circuit is shown with:*

- Operator in the seat

1. Current starts at the battery, and flows through the positive (+) battery cable to the engine starter motor.
2. From the starter motor, current flows through the 40-amp fuse to a wire splice. The wire splice sends current into two directions:
   - To the “B” terminal of the ignition switch
3. When the ignition switch is placed in the “ACC/RUN” position current is transferred across the following ignition switch terminals:
   - “B” to “C” terminals

Terminal “C” of ignition switch

1. Current flows from the “C” terminal of the ignition switch to the fuse panel bussbar, from the bussbar current travels through the following fuses.
   - #2, 10-amp fuse
   - #5 15-amp fuse
2. The #2 10-amp fuse supplies current to the fuel shutoff relay.
3. The #5, 15-amp fuse supplies current to the operator safety switch.

Seat switch and operator safety module

1. When the operator is in the seat, the seat switch closes and sends current to terminal #4 of the switch, sending current to terminal “E” of the operator safety module. Also terminals #1 and #3 are connected, sending current to terminal “3” of the park brake alarm.
2. When current is present at terminal “E” of the operator safety module, the ground path is completed by terminals “B” and “C” of module for the fuel shutoff relay.

Fuel shutoff relay

1. When current is provided to the fuel shutoff relay by the 10-amp fuse and ground circuit is completed by the operator safety module, the fuel shutoff relay is energized.
2. When the fuel shutoff relay is energized terminals #5 and #3 are latched providing current to the fuel shutoff solenoid. When the solenoid is energized the solenoid plunger retracts and allows fuel to flow to the fuel injection pump. This allows the engine to remain operating.

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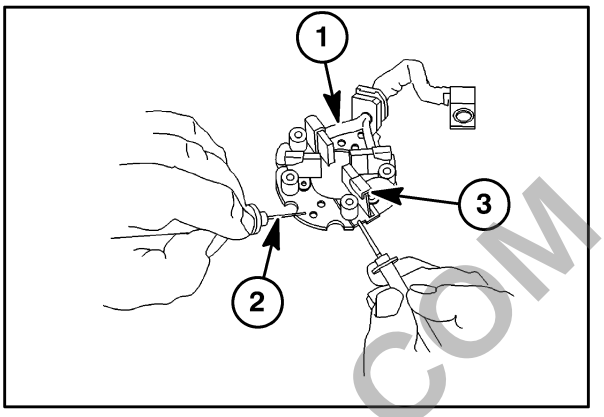
Brush Holder Inspection

1. Use and ohmmeter to test the brush holder assembly, 1.
2. Touch one test probe to the insulated brush holder, 3, and the other test probe to the brush holder plate, 2.
3. Observe the ohmmeter. Repeat the test for the opposite insulated brush holder.
4. A reading high resistance indicates no continuity and the brush holder is good. Little or no resistance indicates that there is continuity and the brush holder is defective and needs replaced.



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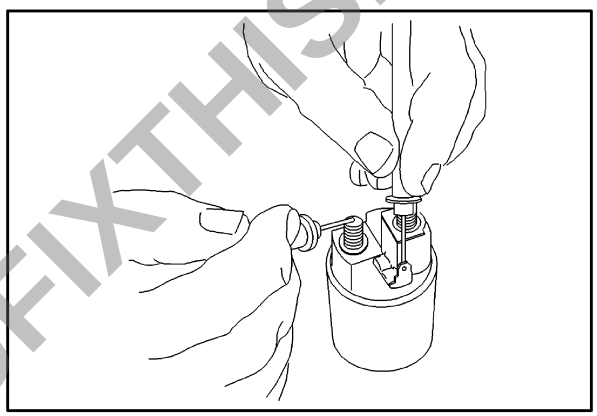
Starter Solenoid Inspection

1. Use an ohmmeter to check the starter solenoid for proper operation and continuity.
2. Touch one ohmmeter test probe to terminal “M” of the starter solenoid.
3. Touch the other ohmmeter test probe to the body (ground) of the solenoid.
4. Observe the ohmmeter. There should be little or no resistance, indicating continuity. If there is no continuity, the starter solenoid is defective and needs replaced.



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