4500, 4600 and 4700 Compact Utility Tractors

TECHNICAL MANUAL

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John Deere
Commercial and Consumer
Equipment Division

TM1679 (Jun00)
Replaces TM1679 (Oct99)

Litho in U.S.A

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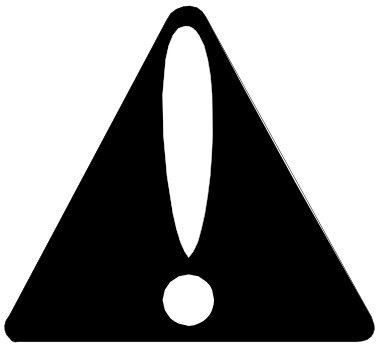
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RECOGNIZE SAFETY INFORMATION



This is the safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

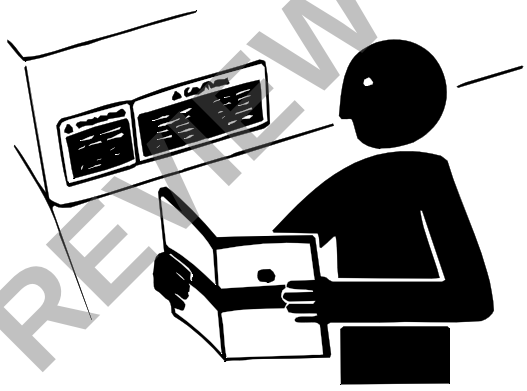
Follow recommended precautions and safe servicing practices.

Understand Signal Words

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.

REPLACE SAFETY SIGNS

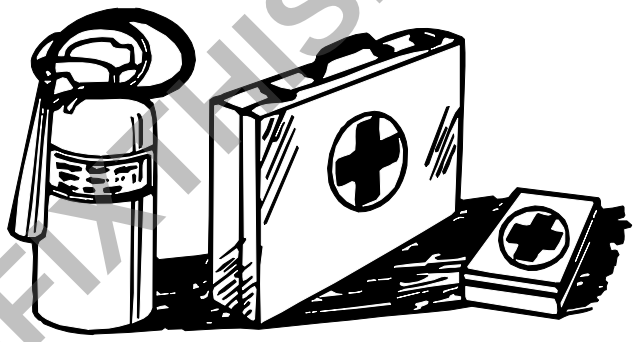


Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.

HANDLE FLUIDS SAFELY-AVOID FIRES

Be Prepared For Emergencies





When you work around fuel, do not smoke or work near heaters or other fire hazards.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.

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GENERAL VEHICLE SPECIFICATIONS – ALL TRACTORS

	4500 Tractors	4600 Tractors	4700 Tractors
ENGINES			
Make	John Deere/Yanmar	John Deere/Yanmar	John Deere/Yanmar
Model	4TNE84-JTC45 4TNE84-EJTF45	4TNE84-JTC46 4TNE84-EJTF46	4TNE88-EJTF47
Type	4-cycle Diesel	4-cycle Diesel	4-cycle Diesel
Bore and Stroke	84x90 mm (3.31x3.54 in.)	84x90 mm (3.31x3.54 in.)	88x90 mm (3.46x3.54 in.)
Cylinders	4	4	4
Valves	Overhead Valves	Overhead Valves	Overhead Valves
Displacement	1995 cm^3 (121.7 cu in.)	1995 cm^3 (121.7 cu in.)	2189 cm^3 (133.6 cu in.)
Compression Ratio	18.0:1	18.0:1	18.0:1
Gross Engine Power	29.1 kW (39 hp)	32.1 kW (43.0 hp)	35.8 kW (48 hp)
Net Engine Power	27.2 kW (36.5 hp)	30.1 kW (40.4 hp)	30.1 kW (40.4 hp)
Torque (at rated speed)	99.9 N•m (73.7 lb-ft)	106.7 N•m (78.7 lb-ft)	117.0 N•m (86.3 lb-ft)
Torque (maximum)	124.9 N•m (92.1 lb-ft)	133.3 N•m (98.3 lb-ft)	144.2 N•m (106.4 lb-ft)
Lubrication	Full pressure	Full pressure	Full pressure
Oil filter	Standard Single Element	Standard Single Element	Standard Single Element
Oil Capacity	4.81 L (5.08 qt)	4.81 L (5.08 qt)	4.81 L (5.08 qt)
Engine Rated Speed	2600 rpm	2600 rpm	2600 rpm
Engine Slow Idle Speed	950 ± 50 rpm	950 ± 50 rpm	950 ± 50 rpm
Cooling system	Liquid w/Pump & Radiator	Liquid w/Pump & Radiator	Liquid w/Pump & Radiator
Air cleaner	Dry-Type w/Safety Element	Dry-Type w/Safety Element	Dry-Type w/Safety Element
ELECTRICAL			
Volts	12 VDC	12 VDC	12 VDC
Battery Rating	45 amp-hr	45 amp-hr	45 amp-hr
Battery Size	600 Cold Cranking Amps	600 Cold Cranking Amps	600 Cold Cranking Amps
Alternator	40 amp	40 amp	40 amp
Regulator	Internal, Current Limiting	Internal, Current Limiting	Internal, Current Limiting
Starting Motor	2.0 kW (2.68 hp)	2.0 kW (2.68 hp)	2.0 kW (2.68 hp)
Headlights	37.5 W Halogen Bulb	37.5 W Halogen Bulb	37.5 W Halogen Bulb

*Specifications and design subject to change without notice.

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FASTENER TORQUE VALUES

JIS FASTENER TORQUE VALUES

J.I.S. Grade and Head Markings			

	Grade 7T				Grade 8.8T				Grade 11T			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
SIZE	N•m	lb-ft	N•m	lb-ft	--	--	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft
8mm	--	--	23-29	17-22	--	--	25-35	19-26	--	--	29-41	22-30
10mm	--	--	44-59	33-43	--	--	51-67	38-49	--	--	61-80	45-59
12mm	--	--	78-98	58-72	--	--	83-113	61-83	--	--	103-132	76-98
14mm	--	--	118-147	87-109	--	--	127-167	94-123	--	--	152-201	112-148
16mm	--	--	167-206	123-152								

DO NOT use these hand torque values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only and include a ±10% variance factor. Check tightness of fasteners periodically. DO NOT use air powered wrenches.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same grade. Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

When bolt and nut combination fasteners are used, torque values should be applied to the **NUT** instead of the bolt head.

Tighten toothed or serrated-type lock nuts to the full torque value.

[a] *"Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated (yellow dichromate - Specification JDS117) without any lubrication. At the time of printing, these numbers were not available.*

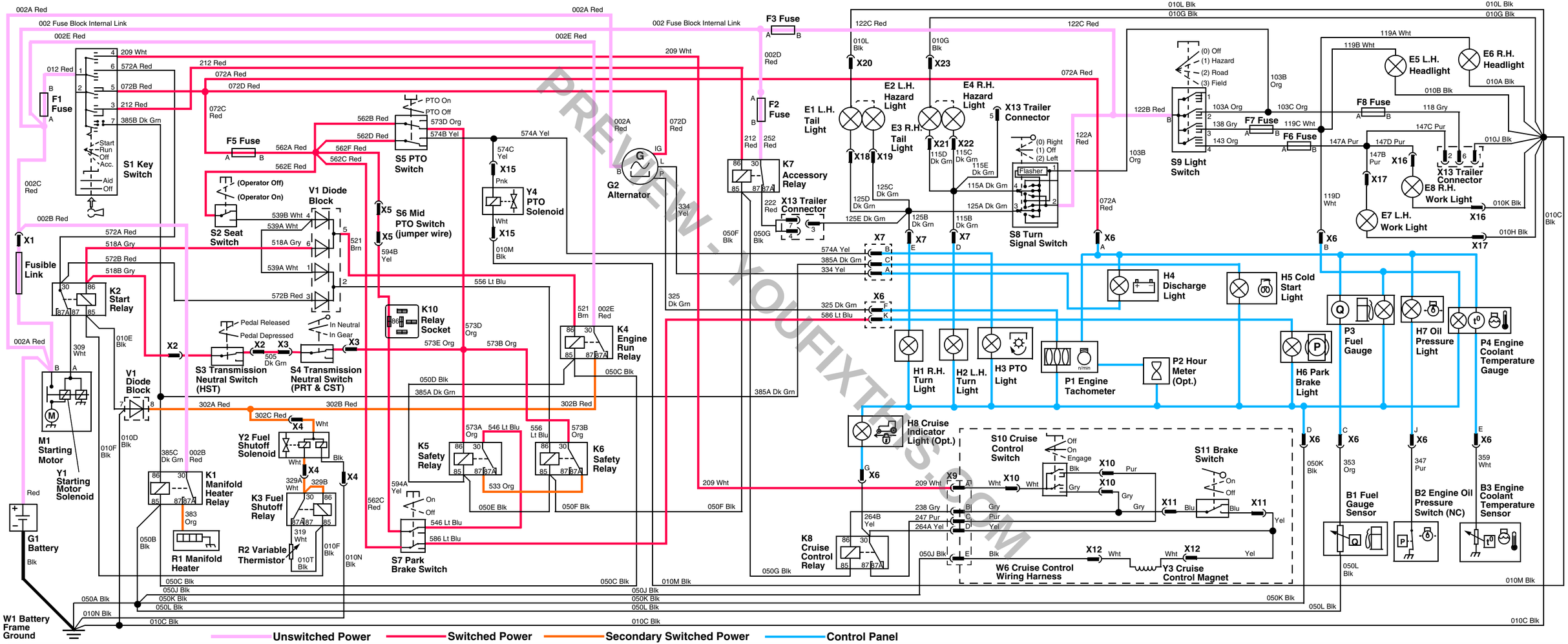
[b] *"Grade 2" applies for hex cap screws (not hex bolts) up to 152 mm (6-in.) long. "Grade 1" applies for hex cap screws over 152 mm (6-in.) long, and for all other types of bolts and screws of any length.*

Reference: JDS—G200.

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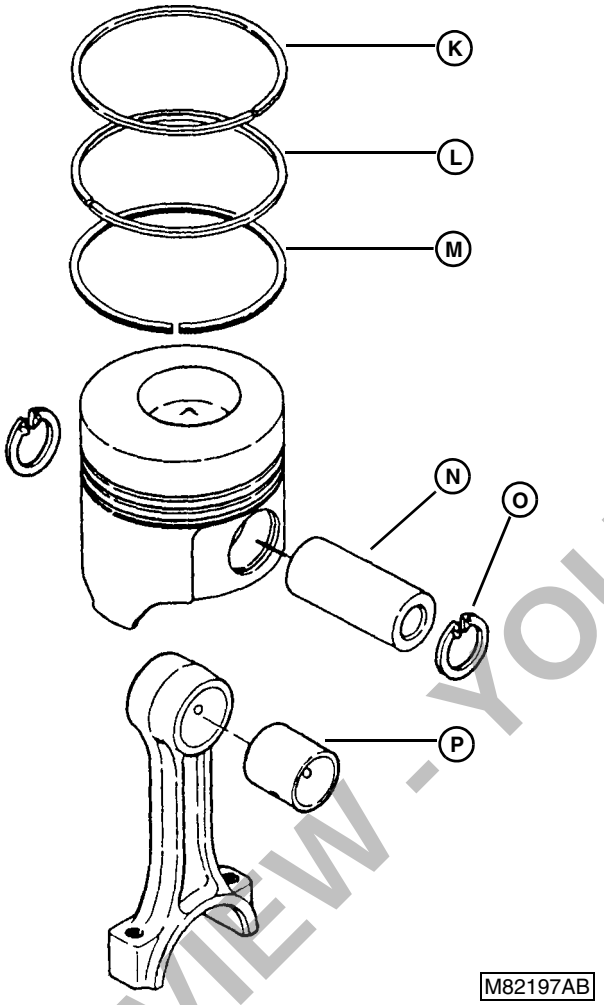
MAIN ELECTRICAL SCHEMATIC – 4500 / 4600



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- Piston pin bushing (P) is a press fit in the connecting rod. Remove the bushing only if replacement is necessary. (See “PISTON AND CONNECTING ROD” on page 36.)
- Inspect all parts for wear or damage. Replace as necessary.



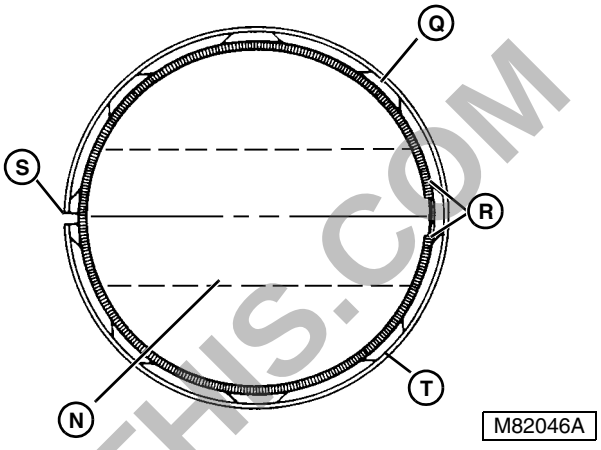
M82197AB

Assembly:

- Apply clean engine oil to all parts during assembly.

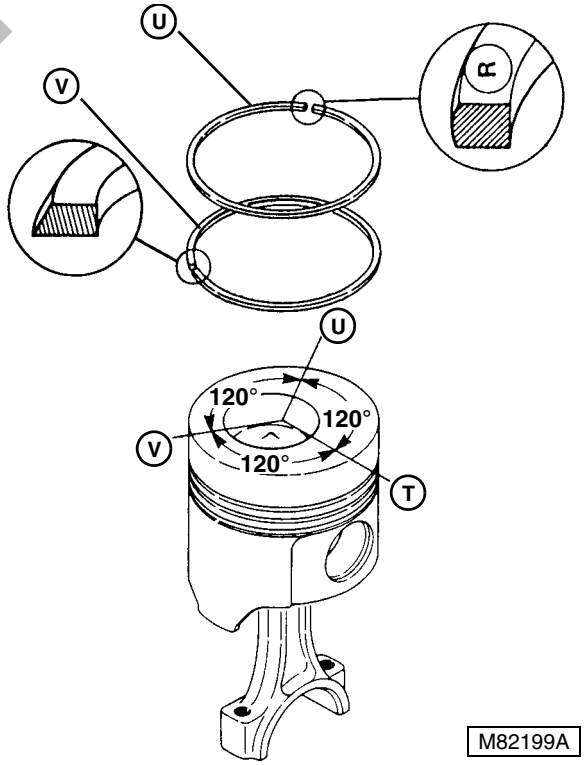
IMPORTANT: Pistons must be installed on the same connecting rod they were removed from.

1. Assemble the piston to the connecting rod with piston mark (E) on the same side as the connecting rod stamped mark (H). If a new connecting rod is used, assemble the piston to the connecting rod with piston mark opposite the connecting rod bearing insert groove. Be sure the oil hole in piston pin bushing is aligned with the hole in connecting rod.
2. Install the piston pin (N) and retaining/snap rings (O).
3. Install an oil ring expander (Q) in bottom ring groove of piston with the ends above either end of the piston pin (R).
4. Install the oil ring (T) over the expander with the ring gap opposite (180°) of the expander ends (S).



M82046A

5. Install the second compression ring (V) , with the small diameter of taper toward top of piston, in the middle groove. Turn the ring until the gap is 120° away from the oil ring gap.



M82199A

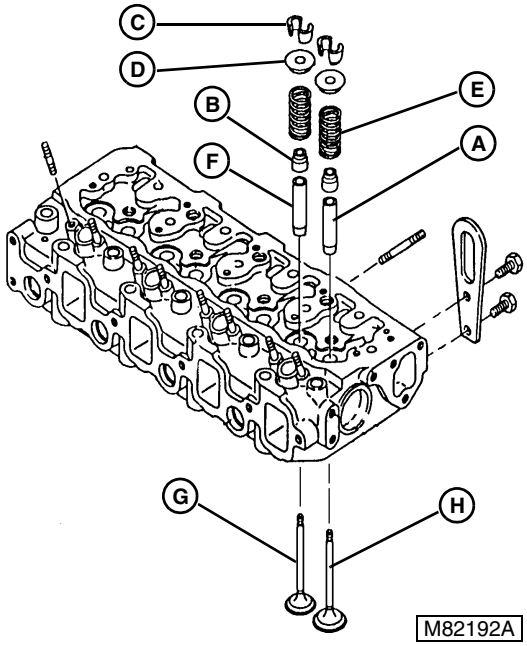
6. Install the first compression ring (chrome plated, U), with manufacturer's mark “R”, “T” or “RN” (near ring gap) toward the top of the piston, in the top groove. Turn ring until the gap is 120° away from the second ring gap.

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CYLINDER HEAD AND VALVES

Disassembly/Assembly:



M82192A

1. Remove the valve caps from the valves. The valve caps should be installed on the valves they were removed from.
2. Compress the valve springs (E) using a valve spring compressor and remove the collet halves (C), retainer (D), valve spring (E) and valve stem seal (B) for each valve (G,H).
3. The intake and exhaust valve guides (A, F) are press fit. Replace the guides only if necessary. (See “Valve Guides:” on page 34.)
4. The valve seats are not replaceable. If inspection of the cylinder head reveals worn valve seats or damaged beyond repair, the cylinder head must be replaced. (See “CYLINDER HEAD AND VALVES” on page 32.)
5. Inspect all remaining parts for wear or damage. (See “CYLINDER HEAD AND VALVES” on page 32.)

IMPORTANT: Do not reuse stem seals if removed. Used seals will leak.

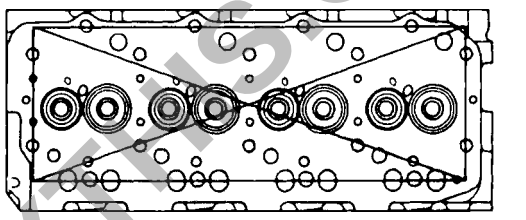
6. Install new valve stem seals over the valve guides.
7. Apply clean engine oil on intake and exhaust valve stems during assembly.
8. Install the springs with smaller pitch end or paint mark toward cylinder head.
9. Compress valve springs and retainer until collet halves are able to be installed in grooves of valve stem.
10. Carefully release tension on spring compressor.
11. Repeat for remaining valves.
12. Measure valve recession if new valves were installed. (See “Valve Seats:” on page 33.)

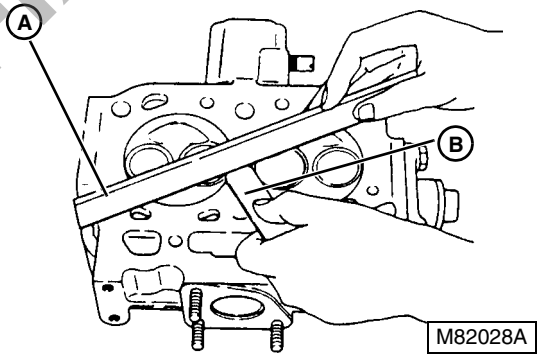
NOTE: After each valve has been assembled, tap on top of valve stem with a plastic hammer to seat the valve retainer and collet halves.

Inspection/Replacement:

Before inspection, thoroughly clean all components of carbon or dirt.

Cylinder Head:


M82027A



M82028A

1. To measure the cylinder head flatness, place a straightedge (A) along each of the four sides and each diagonal. Measure clearance between straight edge and combustion surface with a feeler gauge (B).

- Standard distortion is **0.05 mm (0.002 in.)** or less.
- If the distortion exceeds **0.05 mm (0.006 in.), but is less than 0.15 mm (0.006 in.)** resurface the cylinder head.
- If the distortion is **0.15 mm (0.006 in.) or more,** replace the cylinder head.

2. If cylinder head was resurfaced:

- Measure piston-to-cylinder head clearance. (See “Measure Piston-to-Cylinder Head Clearance:” on page 36.)
- Measure valve recession. (See “CYLINDER HEAD AND VALVES” on page 32.)
- Measure valve seat width. (See “Valve Seats:” on page 33.)

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TESTS AND ADJUSTMENTS

CYLINDER COMPRESSION TEST

Reason:

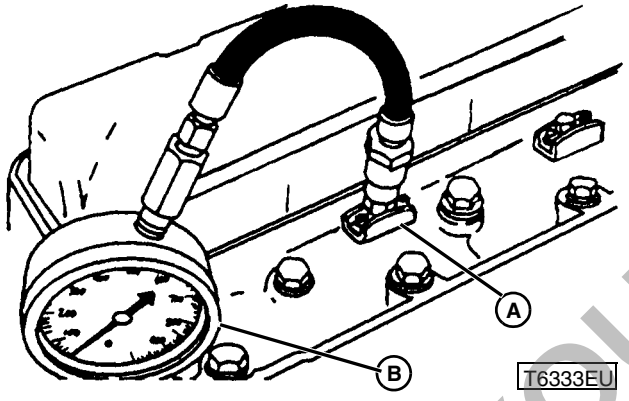
To determine the condition of the pistons, rings, cylinder walls and valves.

Equipment:

- JT01682 Compression Gauge Assembly
- JDG560 Adapter

Procedure:

1. Remove the injection nozzles.



2. Install the heat protector from end of injector and install JDG560 adapter (A).
3. Install JT01682 Compression Gauge Assembly (B) and JDG560 Adapter.
4. Disconnect the fuel control solenoid connector.

IMPORTANT: DO NOT overheat starting motor during test.

5. Crank the engine for five seconds with the starting motor. Minimum cranking speed is 250 rpm.
6. Record the pressure reading for each cylinder.

Compression Pressure:

Standard . . . . . 3233 ± 97 kPa (469 ± 14 psi)
Minimum . . . . . 2551 ± 97 kPa (369 ± 14 psi)
Maximum difference between cylinders . . . . . 248 ± 48 kPa (36 ± 7 psi)

Results:

- If the pressure reading is below specification, squirt clean engine oil into the cylinders through the injector ports and repeat the test.
- If the pressure increases significantly, check piston, rings, and cylinder walls for wear or damage.
- If the pressure does not increase significantly, check for leaking valves, valve seats or cylinder head gasket.

SLOW IDLE ADJUSTMENT

IMPORTANT: The slow idle adjustment is the only adjustment that can be made on this engine.

The fast idle and torque capsule adjustments are pre-set by the engine manufacturer to comply with strict EPA/CARB emissions requirements, and are adjustable ONLY by authorized diesel service facilities.

Reason:

To achieve proper slow idle rpm setting. Provides adequate rpm to keep the engine running smoothly without stalling.

Equipment:

- JT05719 Hand Held Digital Tachometer

NOTE: Make sure the air cleaner is clean and not restricted. Replace the air cleaner element as necessary.

Procedure:

1. Place a small piece of reflective tape on the crankshaft pulley.
2. Start the engine and run for 5 minutes to attain operating temperature.
3. Move the throttle lever to slow idle position.
4. Use JT05719 Hand Held Digital Tachometer to check engine speed at the crankshaft pulley.
5. Visually check that the injection pump throttle lever is against slow idle stop screw. Slow idle speed is **950 ± 50 rpm.**

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TROUBLESHOOTING CHART

	Problem or Symptom / Cause	Engine will not start			Low engine output			Poor exhaust color		Loud knocking noise during combustion	Misfiring	Uneven combustion sound	Engine surges		Excessive engine vibration	Poor return to low speed	Excessive fuel consumption	Lubricating Oil				Low compression	Coolant		Intake manifold pressure		Exhaust temperature too high	Problem or Symptom / Solution
			Engine starts but does not continue to run		Exhaust Color			Under load																				
		Engine will not start	Exhaust smoke		Normal	White	Black	White	Black				During Idling	Under Load				Excessive oil consumption	Fuel oil in crankcase	Water in crankcase	Low oil pressure		Overheating	Low water temperature	Low pressure	High pressure		
			No smoke	Excess smoke																								
Engine System	Improper intake or exhaust valve clearance	●	●		●						●														●		●	Adjust valve clearance
	Compression leakage from valve seat				●		●		●		●						●					●			●		●	Grind valve seat, regrind valves
	Seized intake/exhaust valve	●		●	●		●		●		●			●	●				●			●			●			Replace valve and check valve guide
	Leaking cylinder head gasket				●															●			●					Replace head gasket
	Broken or seized piston ring	●		●		●		●			●		●		●			●	●			●	●				●	Replace rings and check cylinder
	Piston ring, piston or cylinder worn	●		●		●		●										●	●			●						Bore or hone cylinder & replace piston
	Crankshaft pin or bearing seized	●	●								●		●	●	●							●						Regrind crank and replace bearings
	Piston ring end gaps not correct		●			●												●				●						Stagger piston ring gaps
	Piston rings installed incorrectly					●		●										●				●						Install piston rings correctly
	Crankshaft pin or bearing worn				●						●		●	●	●						●							Regrind crank and replace bearings
	Connecting rod bolt loose										●				●						●							Check for damage and re-torque bolts
	Foreign matter in combustion chamber	●									●							●				●						Remove head and inspect for damage
	Excessive timing gear backlash										●																	Measure timing gear backlash
	Intake/exhaust valve guides worn					●												●				●						Check valve guides and stems
	Governor not functioning properly		●										●	●	●	●												Repair or replace governor
	Improper timing between injection pump, intake & exhaust valves	●				●	●	●	●		●																	Adjust valve clearance. Check valve timing
Cooling System	Engine running too cool							●									●						●					Check thermostat
	Engine running too hot						●																●				●	Check thermostat, fan belt tension
	Coolant level low						●																●				●	Check cooling system for level/leaks
	Cracked water jacket																			●	●		●					Repair or replace water jacket
	Malfunctioning thermostat						●																●	●				Check or replace thermostat
	Water pump/alternator belt loose						●																●				●	Adjust fan belt tension

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	4500 Tractors	4600 Tractors	4700 Tractors
Tail Lights	5 W Bayonet Base	5 W Bayonet Base	5 W Bayonet Base
Hazard Lights	Type 1156	Type 1156	Type 1156
Instrument Panel Lamps	1.7 W Bayonet Base	1.7 W Bayonet Base	1.7 W Bayonet Base

FUEL SYSTEM

System Type	Direct Fuel Injection	Direct Fuel Injection	Direct Fuel Injection
Injection Pump	In-Line w/Solenoid Shutoff	In-Line w/Solenoid Shutoff	In-Line w/Solenoid Shutoff
Fuel type	Diesel	Diesel	Diesel
Fuel Tank Capacity	47.3 L (12.5 gal)	47.3 L (12.5 gal)	47.3 L (12.5 gal)
Fuel Filter	Clear Bowl Water Separator with Disposable Paper Element, Water Floating Red Ring	Clear Bowl Water Separator with Disposable Paper Element, Water Floating Red Ring	Clear Bowl Water Separator with Disposable Paper Element, Water Floating Red Ring

3–POINT HITCH

Type	Category One	Category One	Category One
Lift Capacity at 61.0 cm (24 in.) Behind Link Arms	1135 kg (2500 lb)	1135 kg (2500 lb)	1135 kg (2500 lb)

HYDRAULIC SYSTEM

	(Measurements Taken At 2600 Engine rpm)	(Measurements Taken At 2700 Engine rpm)	(Measurements Taken At 2700 Engine rpm)
Type	Open System	Open System	Open System
Working Pressure	17237 kPa (2500 psi)	17237 kPa (2500 psi)	17237 kPa (2500 psi)
Pump	Dual Gear Type	Dual Gear Type	Dual Gear Type

PTO

Type	Continuous Live with Electric Released Hydraulic Clutch	Continuous Live with Electric Released Hydraulic Clutch	Continuous Live with Electric Released Hydraulic Clutch
Rotation Direction	Clockwise	Clockwise	Clockwise
Clutch	Multiple Wet Disk	Multiple Wet Disk	Multiple Wet Disk
Brake	Wet Disk	Wet Disk	Wet Disk

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If either of above recommended engine coolants are available use any Automobile and Light Duty Engine Service **ethylene glycol base coolant**, meeting the following specification:

- ASTM D3306 (JDM H24C1).

Read container label completely before using and follow instructions as stated.

IMPORTANT: To prevent engine damage, DO NOT use pure antifreeze or less than a 50% antifreeze mixture in the cooling system. DO NOT mix or add any additives/conditioners to the cooling system in equipment. Water used to dilute engine coolant concentrate must be of high quality—clean, clear, potable water (low in chloride and hardness–Table 1) is generally acceptable. DO NOT use salt water. Deionized or distilled water is ideal to use. Coolant that is not mixed to these specified levels and water purity can cause excessive scale, sludge deposits, and increased corrosion potential.

Table 1: Water Quality

Property	Requirements
Total Solids, Maximum	340 ppm (20 grns/gal)
Total Hardness, Max.	170 ppm (10 grns/gal)
Chloride (as Cl), Max.	40 ppm (2.5 grns/gal)
Sulfate (as SO_4), Max.	100 ppm (5.8 grns/gal)

Mix 50 percent antifreeze concentrate with 50 percent distilled or deionized water. This mixture and the pre-diluted mixture (TY16036) will protect the cooling system down to -37 °C (-34 °F) and up to 108 °C (226 °F).

Certain geographical areas may require lower air temperature protection. See the label on your antifreeze container or consult your John Deere dealer to obtain the latest information and recommendations.

COOLANT DRAIN INTERVAL

When using **John Deere Pre-Diluted (TY16036)** Automobile and Light Duty Engine Service coolants, drain and flush the cooling system and refill with fresh coolant mixture every **36 months or 3,000 hours** of operation, whichever comes first.

When using **John Deere Concentrate (TY16034)** Automobile and Light Duty Engine Service coolants or **John Deere Cool-Gard Coolant Concentrate** for Automobile and Light Duty Engine Service, drain and flush the cooling system and refill with fresh coolant mixture every **24 months or 2,000 hours** of operation, whichever comes first.

If above John Deere Automobile and Light Duty Engine Service coolants **are not** being used; drain, flush, and refill the cooling system according to instructions found on product container or in equipment operator's manual or technical manual.

PRODUCT IDENTIFICATION LOCATIONS

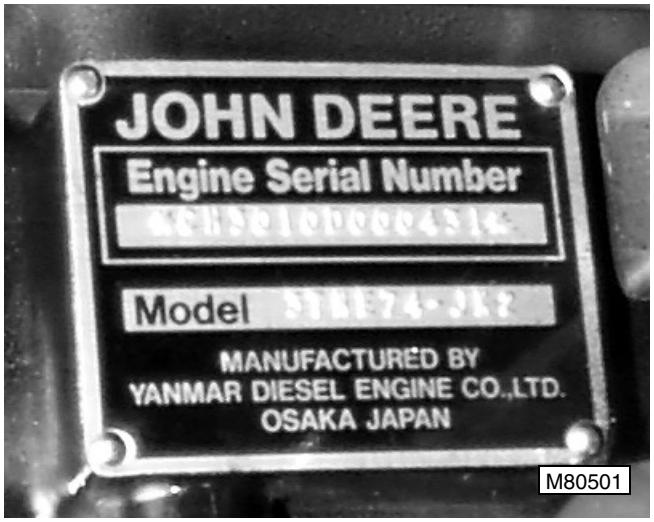
When ordering parts or submitting a warranty claim, it is IMPORTANT that you include the product identification number, and the component product identification numbers.

The location of the product identification numbers and component product identification numbers are shown.

PRODUCT IDENTIFICATION NUMBER



ENGINE PRODUCT IDENTIFICATION NUMBER



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8. Install the fuel injection lines.
9. Tighten all fasteners to specification.

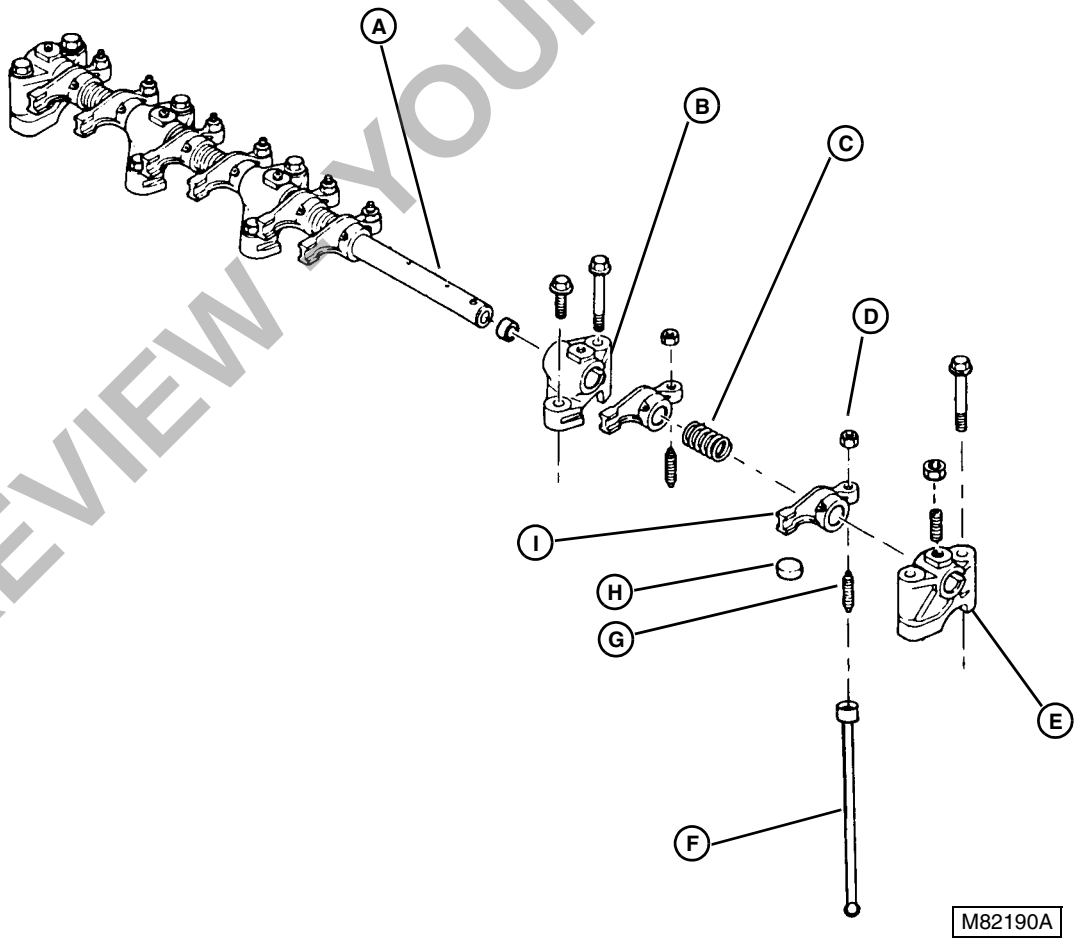
ROCKER ARM ASSEMBLY

Removal/Installation and Disassembly/Assembly:

1. Remove the rocker cover. (See "ROCKER COVER" on page 28.)
2. Remove the rocker arm end support (E) and rocker arm center support (B) mounting cap screws.
3. Lift the rocker arm assembly from the cylinder head and set the assembly on a bench.

NOTE: If the rocker arm assembly is to be disassembled, replace components in same location on the rocker arm shaft they were removed from.

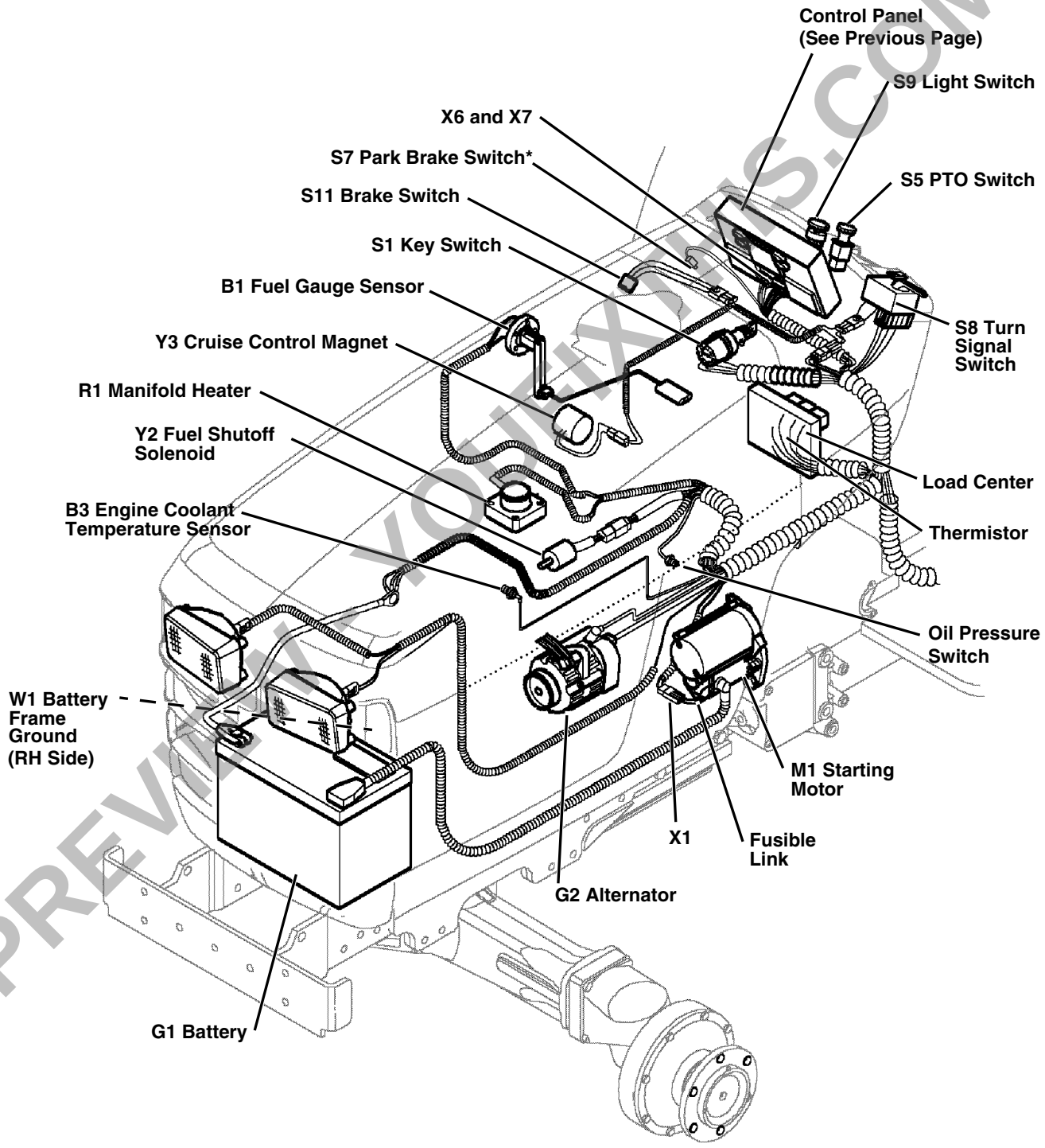
4. Note the positions of the rocker arm assembly components. Slide the components off the rocker arm shaft (A).
5. Lift the push rods (F) from the cylinder head and note the order of removal for reassembly.
6. Inspect the rocker arms (I), valve adjusting components (D, G), valve caps (H), and push rods.
7. Lubricate all parts with clean oil during assembly.
8. Reinstall the push rods to their original location in the cylinder head, with the ball shaped end down in head.
9. Assemble the rocker arm assembly components in the reverse order of removal.
10. Place the rocker arm assembly on the cylinder head. Align the rocker arms with the valves and push rods. Align the rocker arm end supports and center supports with the corresponding holes in the head.
11. Install the rocker arm support mounting cap screws.
12. Adjust the valve clearance. (See "VALVE CLEARANCE CHECK AND ADJUSTMENT" on page 16.)



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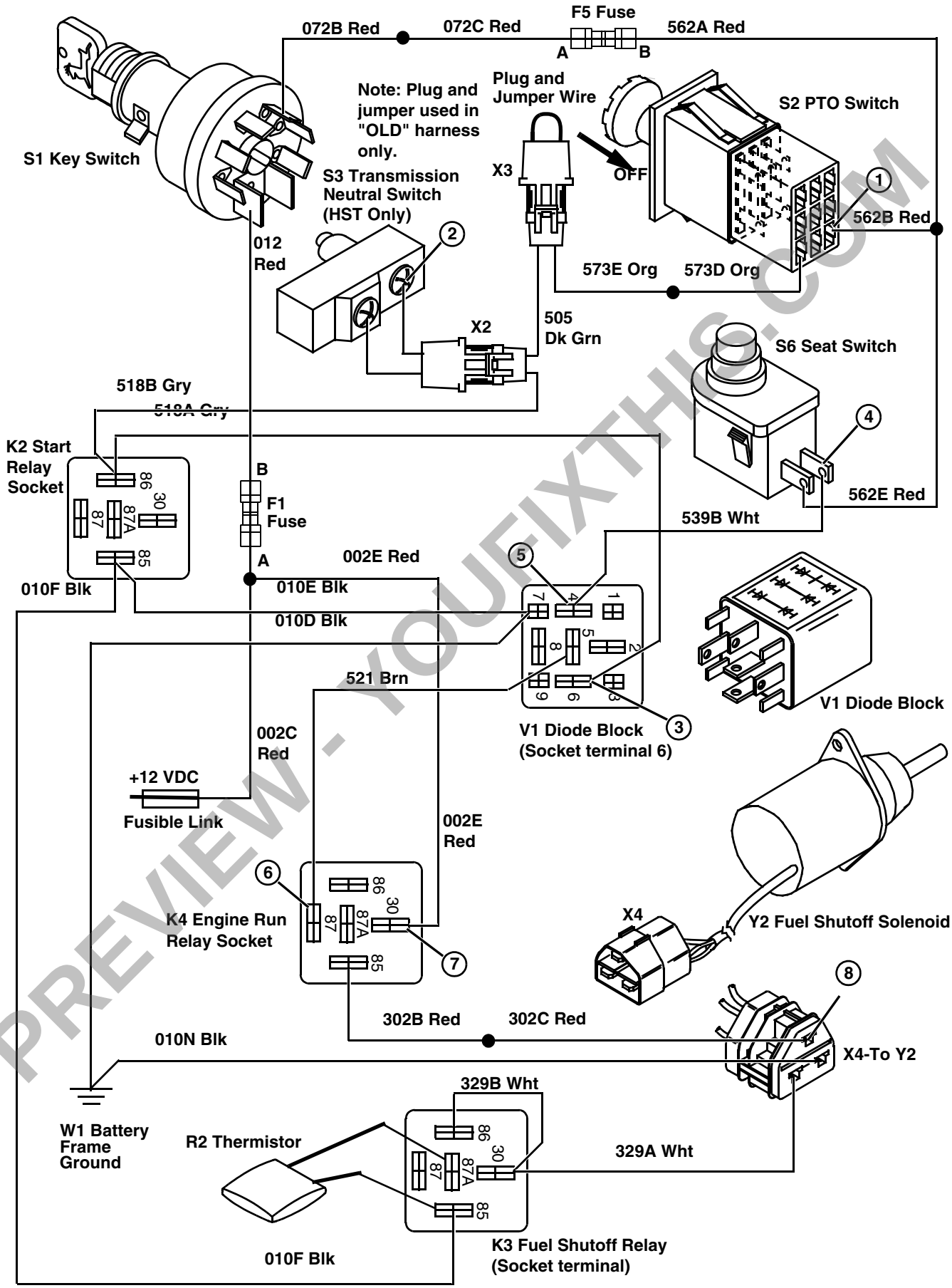
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COMPONENT LOCATION – TRACTOR



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PARK BRAKE SWITCH TEST

Reason:

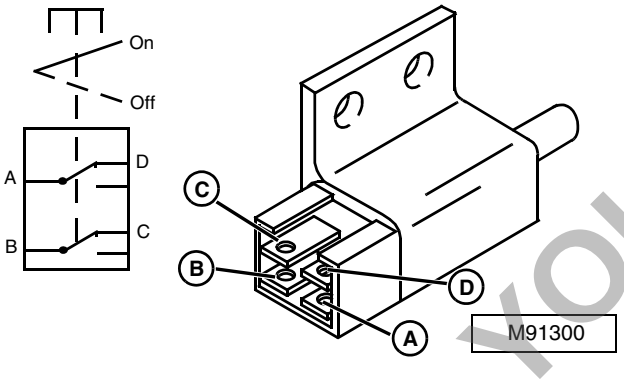
To verify switch functions are operating properly.

Equipment:

- Ohmmeter or continuity tester

Test Procedure:

1. Park machine on level surface.
2. Disengage PTO.
3. Turn key switch to OFF position.
4. Release parking brake.
5. Disconnect brake switch connector.
6. Use an ohmmeter or continuity tester to test switch continuity.



Switch Continuity:

Switch Position	Terminal Continuity
RELEASED	B and C
	A and D

Results:

- If continuity is NOT correct, or continuity exists in any other combination than listed above, replace switch.

Adjustment Procedure:

1. Engage parking brake.
2. Loosen switch bracket hardware.
3. Move switch until switch plunger is about **3 mm (1/8 in.)** from bottoming.
4. Check that switch does not bottom when parking brake is fully set. Increase clearance if needed.
5. Tighten bracket hardware.
6. Check switch operation.

FUEL GAUGE SENSOR TEST

Reason:

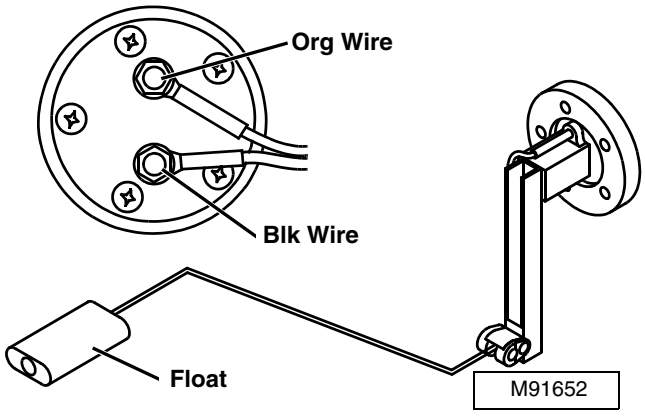
To verify that the fuel gauge sensor is operating properly.

Equipment:

- Ohmmeter or continuity tester

Procedure:

1. Park machine on level surface.
2. Disengage PTO.
3. Engage park brake.
4. Raise hood.
5. Turn key switch to ON position.
6. Disconnect Org wire from fuel sensor and check fuel gauge. The fuel gauge must drop to EMPTY. If not, see “POWER CIRCUIT DIAGNOSIS” on page 30.
7. Short the Org wire to the black wire connector on the fuel sensor. The gauge must rise to FULL. If not, test the fuel sensor ground circuit.
8. If the gauge does not correctly indicate fuel levels based on the two tests above, proceed to step 9.
9. Disconnect fuel gauge sensor wires.
10. Remove sensor from fuel tank.
11. Using an ohmmeter connected to fuel gauge sensor contacts, check if continuity exists between terminals. If continuity exists, measure resistance across terminals as float and float arm are moved through full range of motion.



Results:

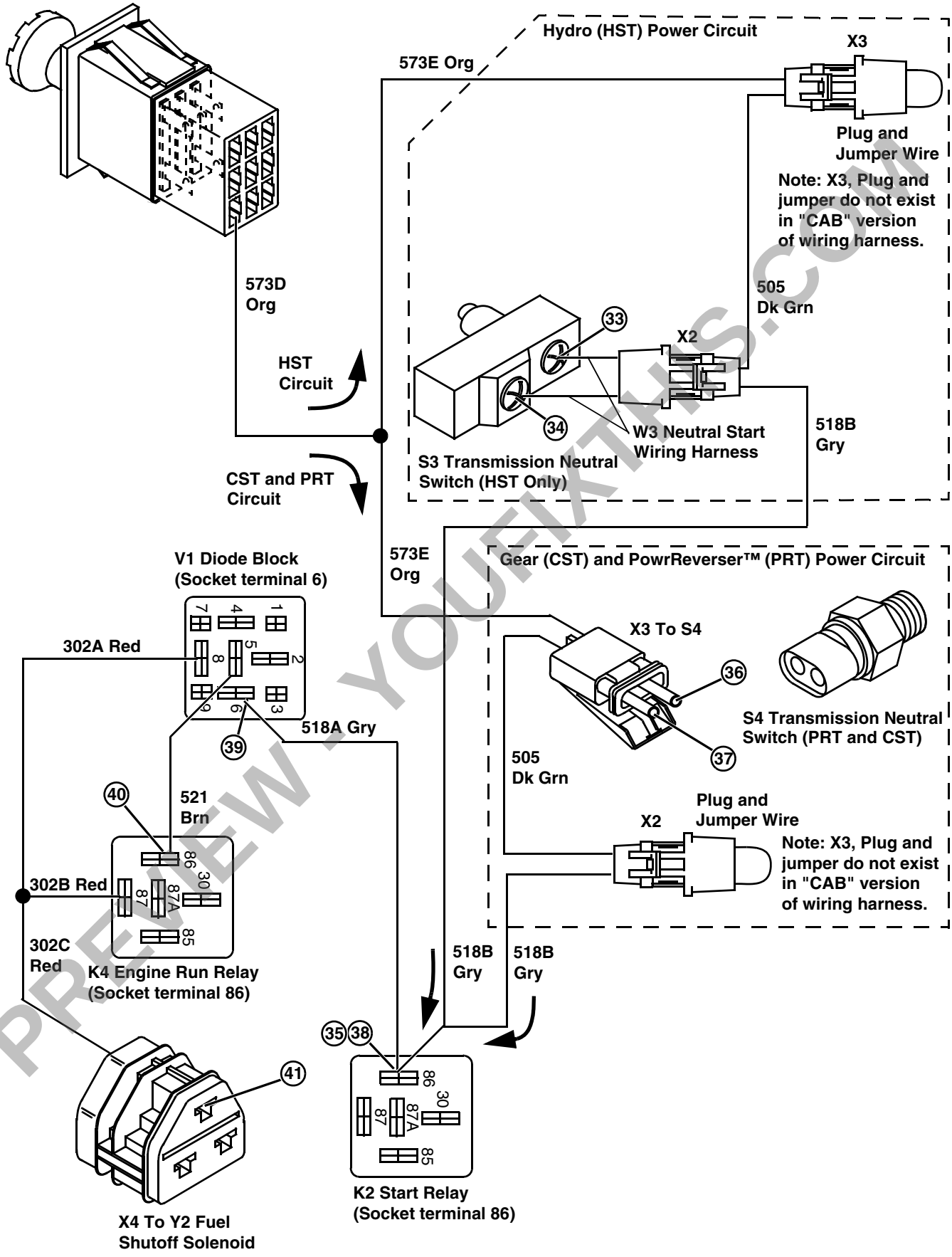
12. If resistance does not meet specifications, replace fuel gauge sensor.

Specifications:

Variable Resistance . . . . . 5 – 95 ohms

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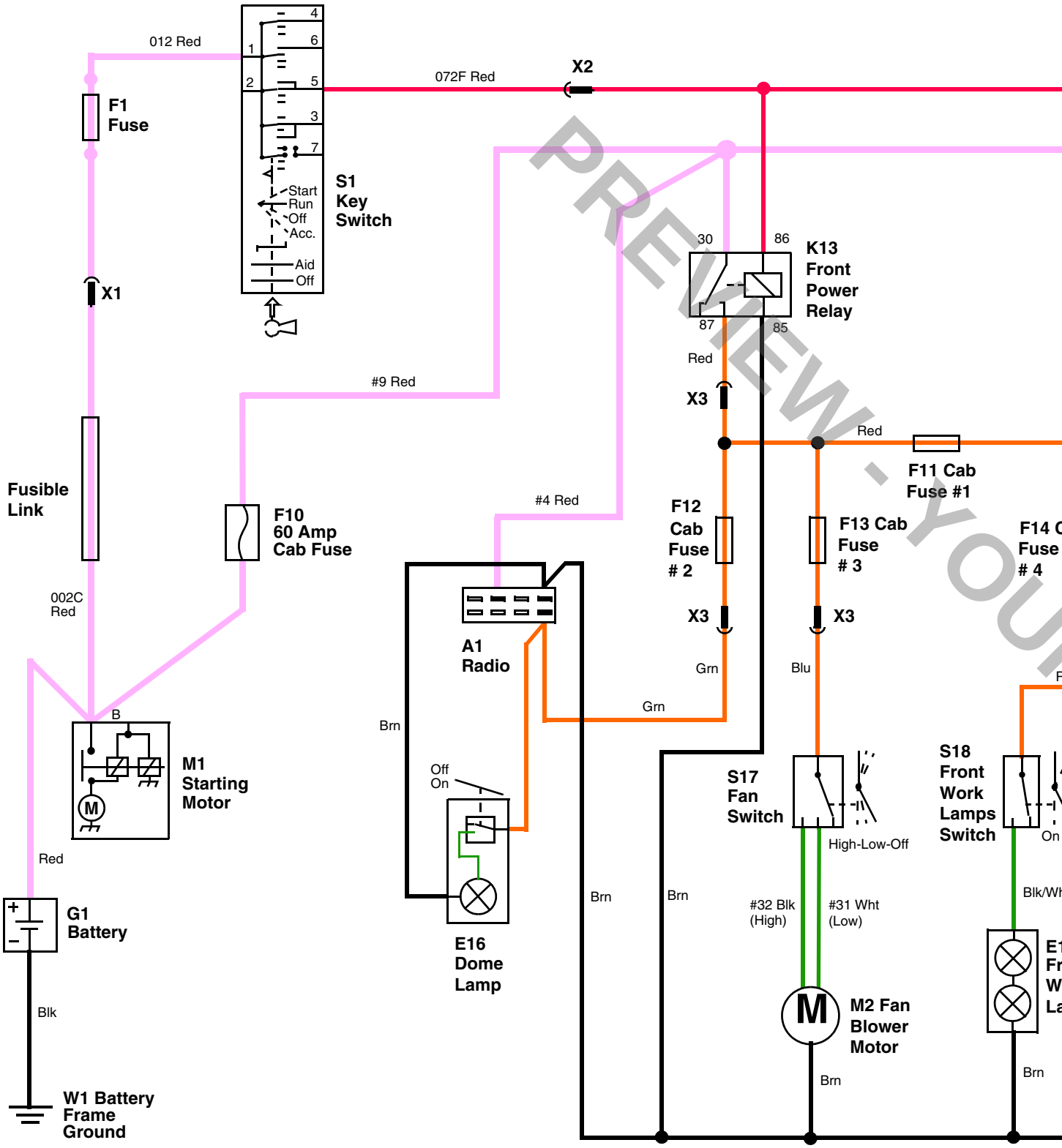
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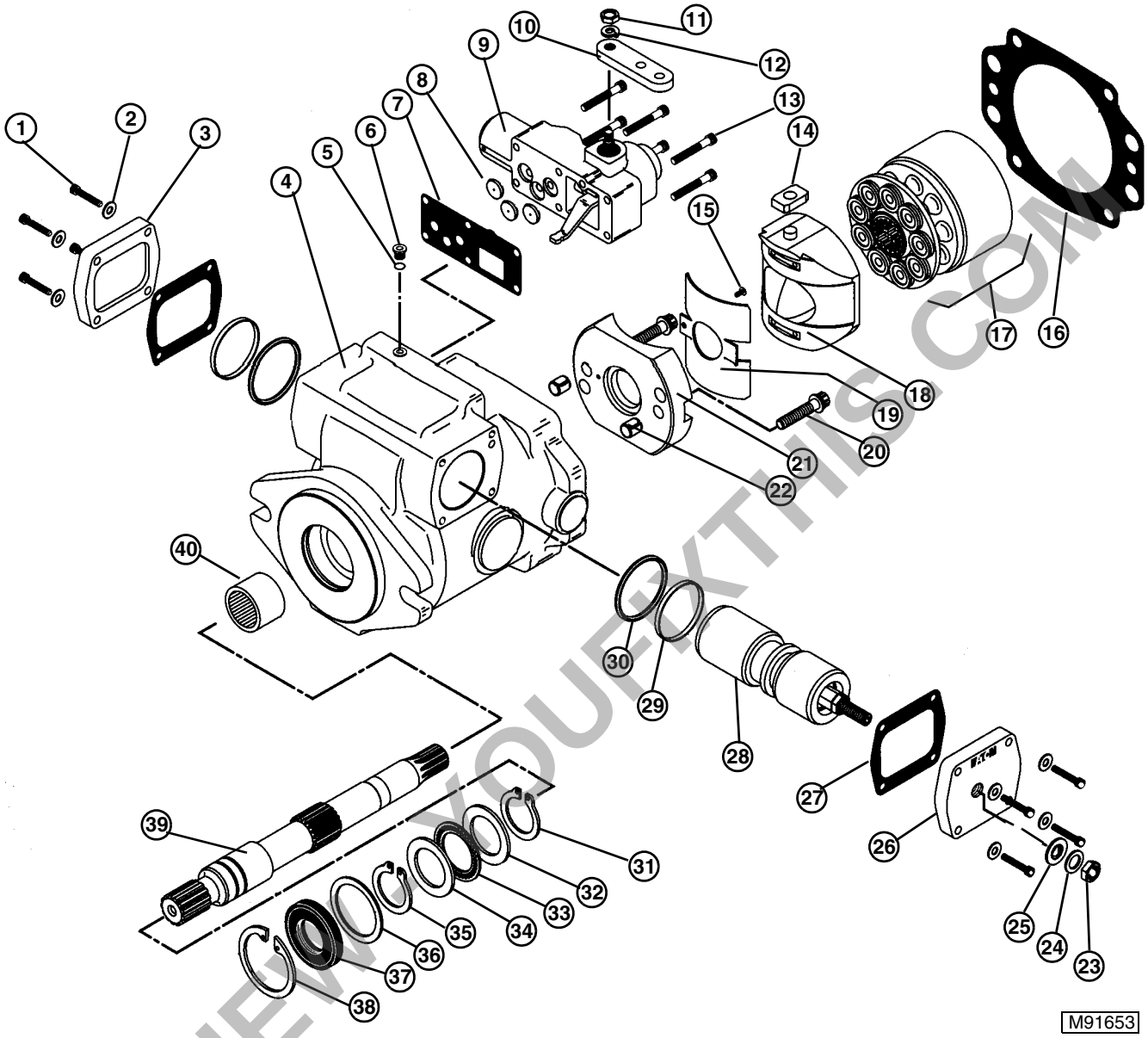
CAB ELECTRICAL SCHEMATIC



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SE1 - TRACTOR	

TRANSMISSION MAIN PUMP CASE

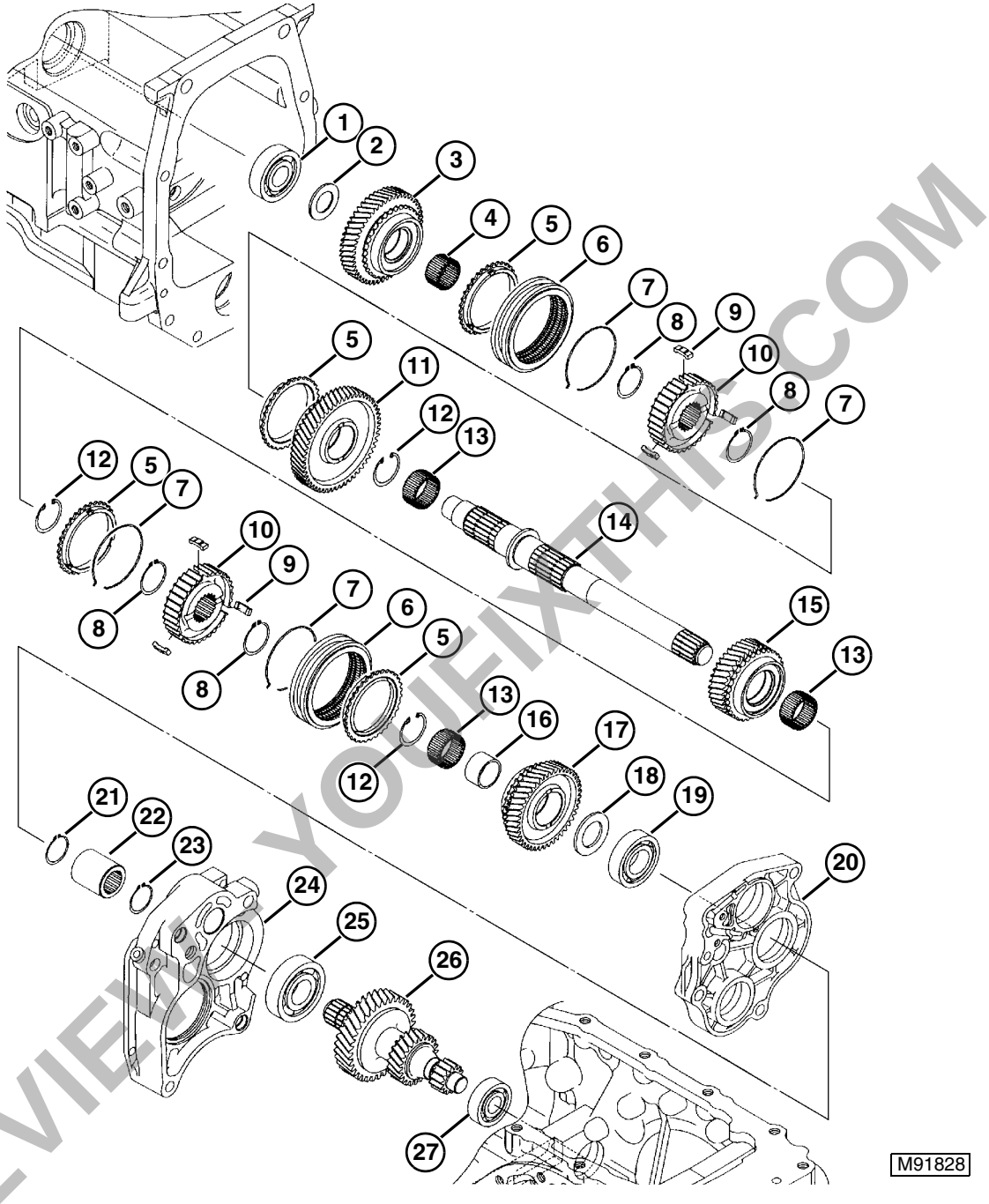


1. Cap Screws (8)
2. Washers (8)
3. Cover
4. Housing, Main Pump
5. O-ring
6. Plug
7. Gasket
8. Orifices (3)
9. Servo Valve
10. Lever
11. Nut
12. Lock Washer
13. Cap Screws (4)
14. Servo Piston Follower
15. Screw, Retaining
16. Gasket
17. Rotating Assembly
18. Cam Plate
19. Wear Plate
20. Cap Screws (2)
21. Cradle
22. Dowel Bushings (2)
23. Lock Nut
24. Flat Washer
25. Seal Washer
26. Cover, Cylinder
27. Gasket (2)
28. Servo Piston
29. Seal
30. O-ring
31. Ring, Retaining
32. Washer, Thrust
33. Bearing, Thrust
34. Washer, Thrust
35. Ring, Retaining
36. Washer
37. Seal
38. Ring, Retaining
39. Shaft
40. Bearing, Needle

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DRIVEN & REDUCTION SHAFT

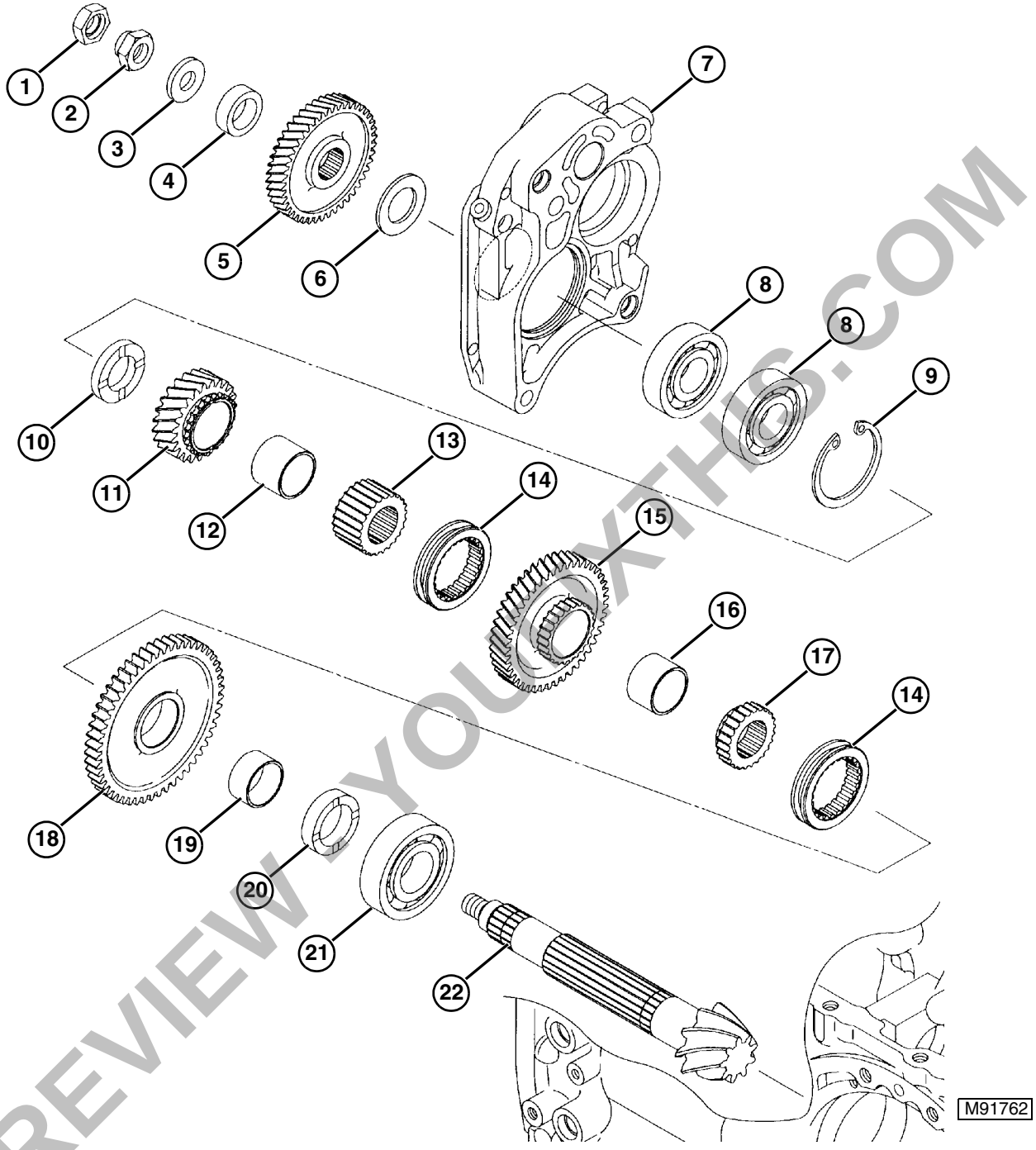


1. Ball Bearing
2. Washer, 20x43x2.5
3. Gear, Driven (49T)
4. Needle Bearing
5. Ring, Synchromesh
6. Collar, Shift
7. Spring, Synchromesh
8. Snap Ring, 34
9. Key, Synchromesh
10. Hub, Synchromesh
11. Gear, Driven (53T)
12. Snap Ring, 40
13. Needle Bearing
14. Shaft, Driven
15. Gear, Driven (38T)
16. Ring, Inner
17. Gear, Driven (44T)
18. Washer, 30x45x3
19. Ball Bearing
20. Plate, Center
21. Snap Ring, 30
22. Splined Coupling
23. Snap Ring, 30
24. Housing, Bearing
25. Ball Bearing
26. Gear, Reduction
27. Ball Bearing

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4500 – DIFFERENTIAL PINION SHAFT (PRT & 4-WD)



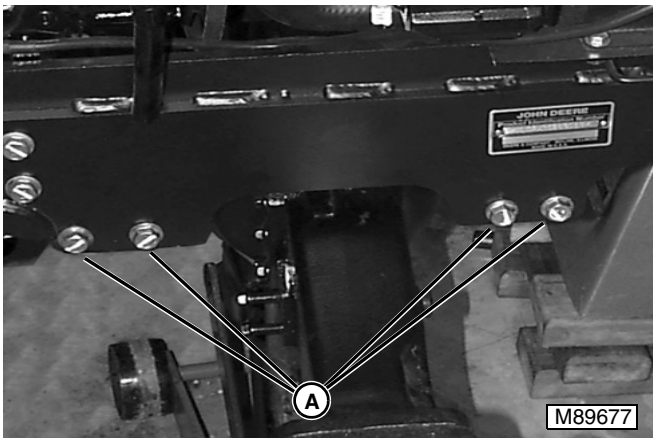
1. Nut, Upper
2. Nut, Lower
3. Washer, 16x38x4.5
4. Bushing, 25x38x12
5. Pinion, Drive (44T)
6. Washer, 30x45x3
7. Housing, Bearing
8. Bearing
9. Ring, Snap
10. Washer, 30x50x8
11. Gear, Counter (23T)
12. Bushing, 34x40x30
13. Sleeve, Splined
14. Shifter
15. Gear, Counter (45T)
16. Bushing, 34x40x26
17. Sleeve, Splined
18. Gear, Counter (53T)
19. Bushing, 35x40x19
20. Spacer, 35x50x12
21. Bearing
22. Shaft, Pinion

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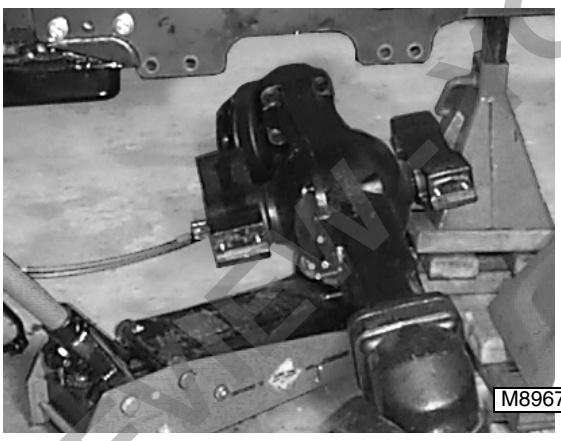
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4-WD REMOVAL

1. Remove the differential drive shaft.
2. Label and remove the power steering hoses from the front axle steering cylinder.
3. Raise the front of the tractor and support the frame to allow 4-WD removal.
4. Support the 4-WD with a floor jack.



5. Remove the axle support mounting cap screws (A).
6. Partially remove the axle pin by pulling the pin toward the front of the tractor. Remove and save any shims.



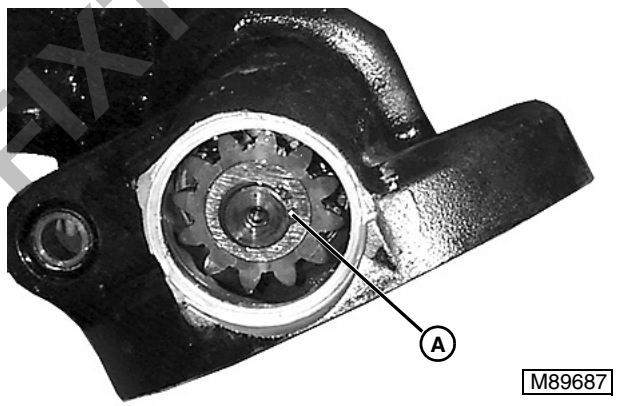
7. Remove the axle pin completely. Lower the axle from the frame with a floor jack. Set the axle on a workbench or blocks to disassemble.
8. Inspect the axle pin and replace if required.
9. Inspect the axle pin bushings in the frame and replace if worn or damaged.

SPINDLE SHAFT

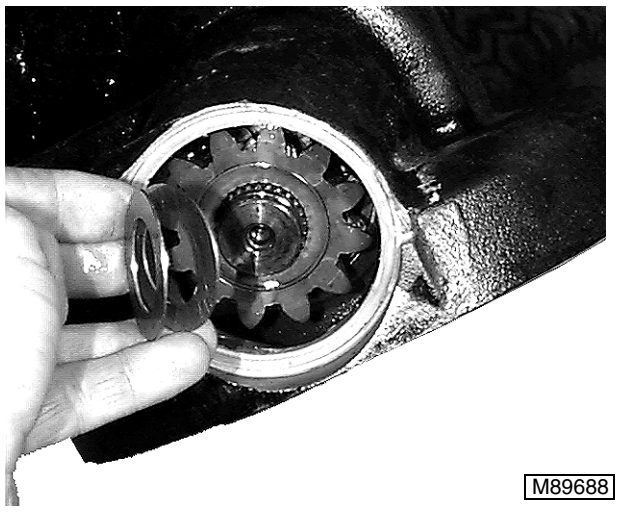
Removal and Disassembly:



1. Carefully remove the spindle cap from the housing.



2. Remove the snap ring (A) from the spindle shaft.



3. Remove the washer, shim, and bevel gear from the spindle shaft. Save any shim(s) from between the spacer and the bevel gear.

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1. Nut
2. Shaft key
3. Washer
4. Pedal
5. Spring
6. Lever
7. Washer
8. Bushing
9. Bushing
10. Shaft
11. Cotter Pin
12. Washer
13. Clevis
14. Pin
15. Tube
16. Washer
17. Bearing
18. Rod
19. T-Pin
20. Nut
21. Bushing
22. Washer
23. Cap Screw
24. Cotter Pin
25. Washer
26. Rod
27. Bellcrank
28. Cap Screw
29. Washer
30. Spacer
31. Lever
32. Nut
33. Bushing
34. Snap Ring
35. Pedal
36. Cap Screw
37. Nut
38. Pedal
39. Bellcrank
40. Rod

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arms should raise to maximum without engaging the relief valve.

NOTE: If draft signals fail to raise draft arms at desired performance, it may be necessary to adjust the draft control response. (See "DRAFT CONTROL RESPONSE ADJUSTMENT" on page 33.).

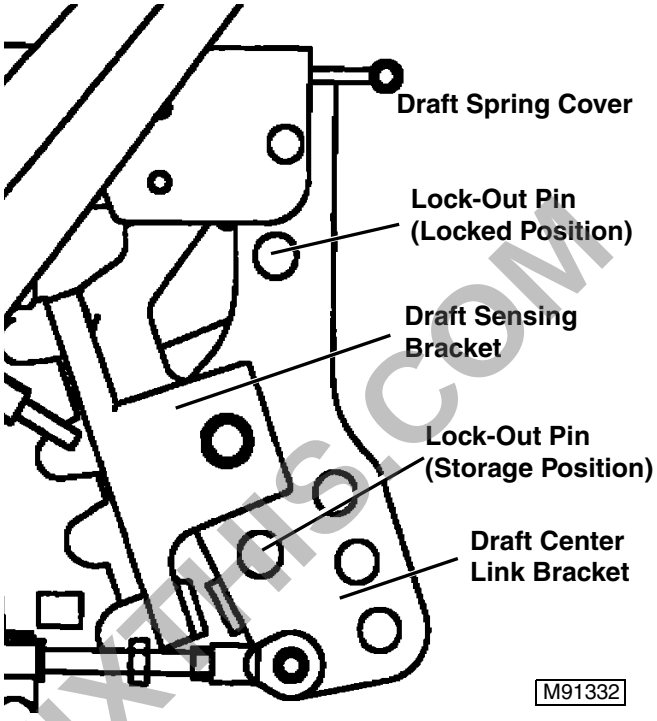
DRAFT CONTROL RESPONSE TEST (DRAFT SENSING OPTION)

Reason:

To ensure that draft sensing mechanism is operating at highest possible efficiency when the draft sensing is engaged.

Procedure:

1. If not already done, adjust rockshaft position feedback. (See "ROCKSHAFT POSITION FEEDBACK LINKAGE ADJUSTMENT" on page 30.)
2. If not already done, adjust draft feedback. (See "DRAFT FEEDBACK LINKAGE ADJUSTMENT (DRAFT SENSING OPTION)" on page31.
3. Park tractor on a level surface and set park brake.
4. Shift transmission to "neutral".
5. Open drop/stop valve completely.
6. Move lift control and draft sensing control levers to full forward (down) position.
7. Provide enough weight on lift arms to allow self lowering.
8. Remove center link from center link bracket.



9. If not already done, move center link lock-out pin from locked position to storage position.
10. Install two draft pins in adjacent lower holes in center link bracket. Retain with quick-lock pins.
11. Start engine and run at high idle.
12. Very slowly move the draft sensing control lever rearward. Stop moving the lever immediately when the lift arms start to raise. The lift arms will continue to rise, and then stop.

⚠ CAUTION

The draft sensing spring requires approximately 72 kg (160 lb) of force to compress. If necessary, obtain assistance.

13. Place a large pry bar between two draft pins installed in step 10 and pry UP against spring pressure until draft bracket pivots. Draft sensing should cause the draft arms to lower.
14. Release pressure exerted on center link with pry bar.
15. Pry DOWN against spring pressure until the draft bracket pivots. Draft sensing should cause the draft arms to raise.

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