This technical manual is written for an experienced technician and contains sections that are specifically for this product. It is a part of a total product support program.

The manual is organized so that all the information on a particular system is kept together. The order of grouping is as follows:

- Table of Contents
- Specifications
- Component Location
- System Schematic
- Theory of Operation
- Troubleshooting Chart
- Diagnostics
- Tests & Adjustments
- Repair

Note: Depending on the particular section or system being covered, not all of the above groups may be used.

Each section will be identified with a symbol rather than a number. The groups and pages within a section will be consecutively numbered.

We appreciate your input on this manual. To help, there are postage paid post cards included at the back. If you find any errors or want to comment on the layout of the manual please fill out one of the cards and mail it back to us.

All information, illustrations and specifications in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

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Safety
Specifications and Information
Diesel Engine
Electrical
Gear Power Train
Hydrostatic Power Train
SyncReverser™ Power Train
Final Drive Power Train
Steering
Brakes
Hydraulics
Miscellaneous M

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GENERAL VEHICLE SPECIFICATIONS* – 4200

	4200 CST	4200 HST
ENGINE		
Make	John Deere/Yanmar	John Deere/Yanmar
Model	3TNE78A	3TNE78A
Type	4-cycle Diesel	4-cycle Diesel
Bore and Stroke	78x84 mm (3.07x3.31 in.)	78x84 mm (3.07x3.31 in.)
Cylinders	3	3
Valves	Overhead Valves	Overhead Valves
Displacement	1204 cm^3 (73.5 cu in.)	1204 cm^3 (73.5 cu in.)
Compression Ratio	18.0:1	18.0:1
Gross Engine Power	19.6 kW (26.3 hp)	19.6 kW (26.3 hp)
Torque (at rated speed)	63.2 N•m (46.6 lb-ft)	63.2 N•m (46.6 lb-ft)
Torque (max. @ 1600 rpm)	78.5 N•m (57.9 lb-ft)	78.5 N•m (57.9 lb-ft)
Lubrication	Full pressure	Full pressure
Oil filter	Standard Single Element	Standard Single Element
Oil Capacity (w/filter)	3.8 L (4.0 qt)	3.8 L (4.0 qt)
Engine Rated Speed	2700 rpm	2700 rpm
Engine Slow Idle Speed	950 ± 50 rpm	1000 ± 50 rpm
Engine Fast Idle Speed	2920 ± 25 rpm	2920 ± 25 rpm
Cooling system	Liquid w/Pump & Radiator	Liquid w/Pump & Radiator
Air cleaner	Dry-Type w/Safety Element	Dry-Type w/Safety Element
ELECTRICAL		
Volts	12 VDC	12 VDC
Battery Size - 12V (CCA)	500 Cold Cranking Amps	500 Cold Cranking Amps
Alternator	40 amp	40 amp
Regulator	Internal, Current Limiting	Internal, Current Limiting
Starting Motor	1.2 kW (1.61 hp)	1.2 kW (1.61 hp)
Headlights	37.5 W Halogen Bulb	37.5 W Halogen Bulb
Tail Lights	5 W Bayonet Base	5 W Bayonet Base
Hazard Lights	Type 1156	Type 1156
Instrument Panel Lamps	1.7 W Bayonet Base	1.7 W Bayonet Base

*Specifications and design subject to change without notice.

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GENERAL VEHICLE SPECIFICATIONS* – 4300

	4300 CST	4300 SRT	4300 HST
ENGINE			
Make	John Deere/Yanmar	John Deere/Yanmar	John Deere/Yanmar
Model	3TNE84	3TNE84	3TNE84
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.)	84x90 mm (3.31x3.54 in.)
Cylinders	3	3	3
Valves	Overhead Valves	Overhead Valves	Overhead Valves
Displacement	1496 cm^3 (91.3 cu in.)	1496 cm^3 (91.3 cu in.)	1496 cm^3 (91.3 cu in.)
Compression Ratio	18.0:1	18.0:1	18.0:1
Gross Engine Power	24.0 kW (32.2 hp)	24.0 kW (32.2 hp)	24.0 kW (32.2 hp)
Torque (at rated speed)	78.5 N•m (57.9 lb-ft)	78.5 N•m (57.9 lb-ft)	78.5 N•m (57.9 lb-ft)
Torque (max. @ 1700 rpm)	99.1 N•m (73.1 lb-ft)	99.1 N•m (73.1 lb-ft)	99.1 N•m (73.1 lb-ft)
Lubrication	Full pressure	Full pressure	Full pressure
Oil filter	Standard Single Element	Standard Single Element	Standard Single Element
Oil Capacity (w/filter)	4.3 L (4.6 qt)	4.3 L (4.6 qt)	4.3 L (4.6 qt)
Engine Rated Speed	2700 rpm	2700 rpm	2700 rpm
Engine Slow Idle Speed	950 ± 50 rpm	950 ± 50 rpm	1000 ± 50 rpm
Engine Fast Idle Speed	2920 ± 25 rpm	2920 ± 25 rpm	2920 ± 25 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 - 12V (CCA)	500 Cold Cranking Amps	500 Cold Cranking Amps	500 Cold Cranking Amps
Alternator	40 amp	40 amp	40 amp
Regulator	Internal, Current Limiting	Internal, Current Limiting	Internal, Current Limiting
Starting Motor	1.4 kW (1.88 hp)	1.4 kW (1.88 hp)	1.4 kW (1.88 hp)
Headlights	37.5 W Halogen Bulb	37.5 W Halogen Bulb	37.5 W Halogen Bulb
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

*Specifications and design subject to change without notice.

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READING ELECTRICAL SCHEMATICS

The schematic is made up of individual circuits laid out in a sequence of related functions. It is formatted with all power wires (A) across the top and all ground wires (B) across the bottom. Current flow is generally from top to bottom through each circuit and component. All components are shown in the OFF position. The diagram does not list connector (C) information unless needed to avoid confusion. If the connector is shown, the number next to it is the terminal pin location (D) in the connector.

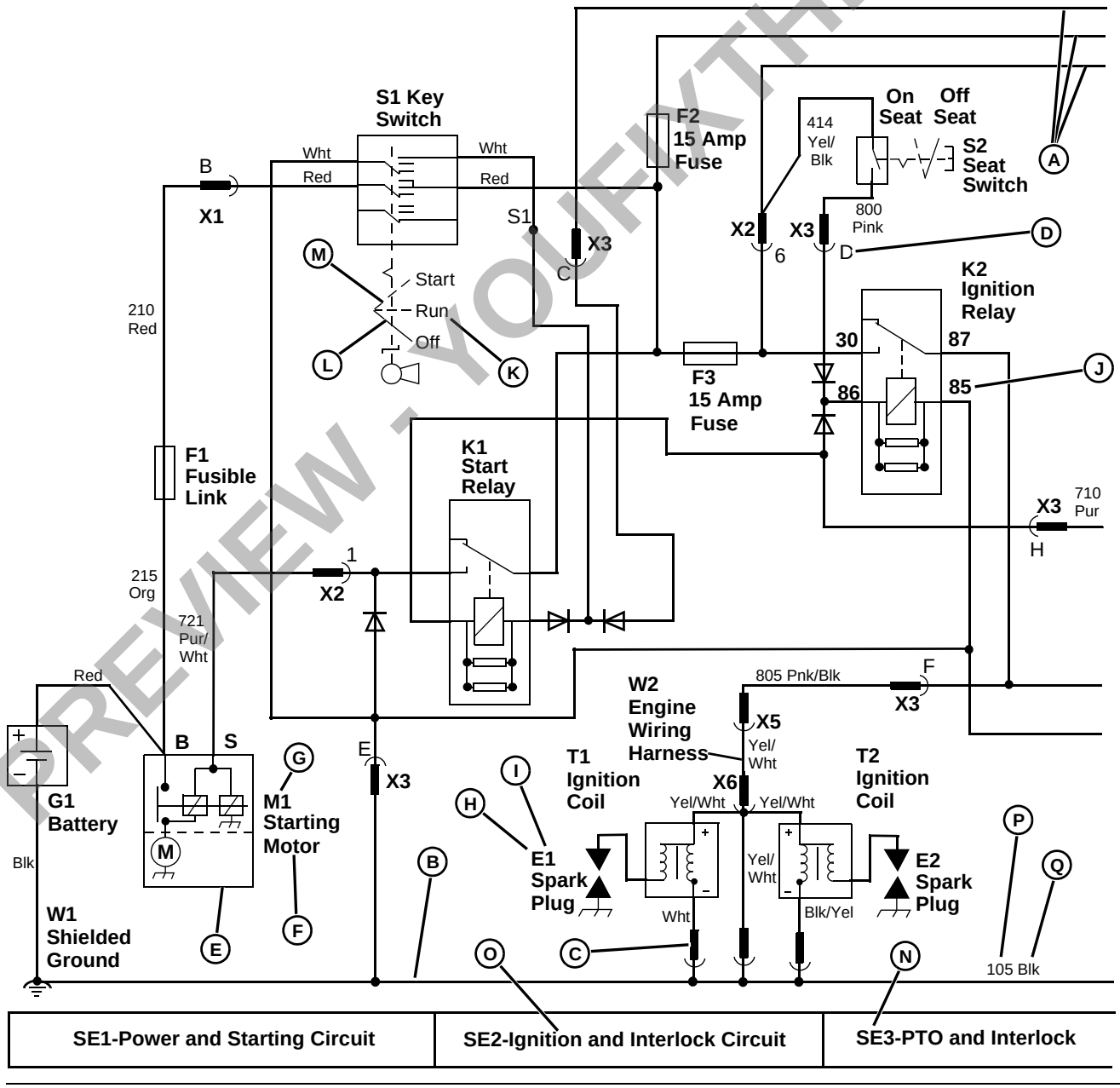
Each component is shown by a symbol (E), its name (F), and an identification code (G). The identification code contains a device identifying letter (H) and number (I).

The identifying letter is always the same for a specific component, but the identifying numbers are numbered consecutively from upper left to lower right. The terminal designation (J) is placed directly outside the symbol next to the connecting wire path. Switch positions (K) are also placed directly outside the symbol. The solid line (L) shows the position the switch is currently in and dash lines (M) represent other switch positions.

Each circuit is identified at the bottom of the drawing by a section number (N) and section name (O).

The circuit number (P) and wire color (Q) of the wires are shown directly next to the wire path.

The same component name and identification code are used consistently on all diagrams in this section. Components can be easily cross-referenced.



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TROUBLESHOOTING CHART

	Problem or Symtom / Cause	Engine will not start			Low engine output			Poor exhaust color		Loud knocking noise during combustion	Misfiring	Uneven combustion sound	Engine surges		Excessive engine vribration	Poor return to low speed	Excessive fuel comsumption	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																									
			No smoke	Excess 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		
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 vlave timimg
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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TESTS AND ADJUSTMENTS

CYLINDER COMPRESSION TEST

Reason:

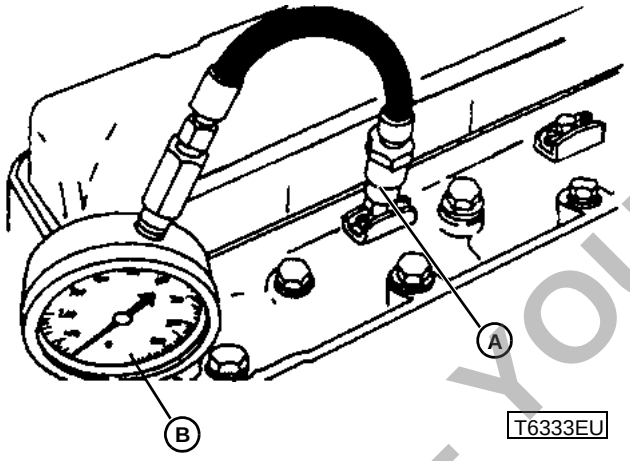
To determine the condition of the pistons, rings, cylinder walls and valves.

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.

Specifications:

Cylinder Compression Pressure

4200 . . . . . 3138 ± 98 kPa (455 ± 14 psi)
4200 (Minimum) . . . . 2555 ± 98 kPa (370 ± 14 psi)
4300 . . . . . 3236 ± 98 kPa (469 ± 14 psi)
4300 (Minimum) . . . . 2550 ± 98 kPa (370 ± 14 psi)
4400 . . . . . 3432 ± 98 kPa (498 ± 14 psi)
4400 (Minimum) . . . . 2746 ± 98 kPa (398 ± 14 psi)

Difference Between Cylinders
(max- All) . . . . . 245 ± 49 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 set to specification.

Specification:

CST and SRT Tractors . . . . . 950 ± 50 rpm
HST Tractors . . . . . 1000 ± 50 rpm

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6. Apply liquid soap and water solution to all joints and connections in the fuel system, and inspect for leaks.

Results:

- Find leaks and repair or replace parts as necessary.

BLEED FUEL SYSTEM

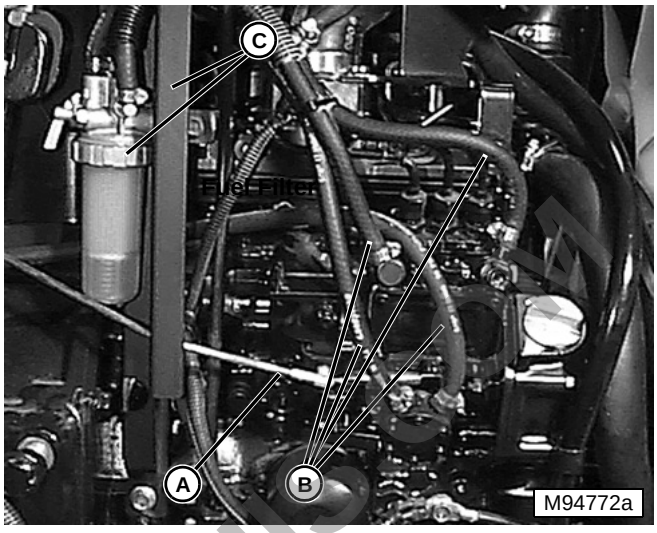
All engines are equipped with an automatic air venting system which makes the fuel system self-bleeding.

- Assure that all fuel line connections are securely tightened.
- Add fuel to the fuel tank.
- Crank the engine to allow fuel system to bleed itself.

ENGINE REPAIR

ENGINE REMOVAL

1. Split the tractor between the flywheel housing and the tunnel. (See “TRACTOR SPLITTING FRONT”) in the Hydrostatic Power Train section for HST tractors; (“TRACTOR SPLITTING FRONT”) in the Gear Power Train section for CST tractors; or (“TRACTOR SPLITTING FRONT”) in the SyncReverser Power Train section for SRT tractors.)
2. Remove the hood.
3. Drain the coolant from the radiator and the engine block.
4. Drain the lubrication oil, and the fuel tank.
5. Remove the battery.
6. Remove the muffler.
7. Remove the coolant overflow tank.
8. Remove the air cleaner.
9. Remove the radiator coolant hoses.
10. Disconnect the hydraulic cooler lines.
11. Remove the radiator.
12. Remove the dipstick and tube.
13. Remove the starting motor wires.
14. Disconnect the intake manifold air heater.



15. Disconnect the throttle rod (A).
16. Label and disconnect the fuel hoses (B).
17. Remove the fuel filter shield and fuel filter (C) from the engine.
18. Disconnect the fuel solenoid.
19. Disconnect the oil pressure sending unit.
20. Remove the hood support.
21. Disconnect the fuel tank sending unit.
22. Remove the flasher, if equipped.
23. Remove the steering wheel.
24. Remove the control panel.
25. Remove the left side shield.
26. Disconnect the wiring harness, oil pressure switch, and ground wires from the engine.
27. Remove the return springs, and the left side brake pedals.
28. Remove the bushing from the brake pedal shaft.
29. Remove the return spring, cotter pin, and washer from the brake pedal shaft, and remove the right side pedal with the pedal shaft from the tractor.
30. Label and remove the fuel hoses from the fuel tank.
31. Loosen the dash board support, and pull the support toward the rear of the tractor.
32. Lift out the fuel tank.
33. Remove the pedal support.
34. Install lifting brackets to the cylinder head.
35. Install the engine hoist to the lift brackets. Lift the engine slightly and safely support the tractor frame.

NOTE: Use more than one support to support the frame. The frame will pivot on the front axle, and could slip off of a single support.

36. Disconnect the front wiring harness.

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CONNECTORS:

X1—W1 Main Wiring Harness to Fusible Link (SE1, W1)

NOTE: X2 supplied with cap and jumper wire if X3 is connected to transmission neutral switch on gear (CST) tractors.
X3 supplied with cap and jumper wire if X2 is connected to transmission neutral switch on hydrostatic (HST) or SyncReverser™ - (SRT) tractors.

X2—W1 Main Wiring Harness to W3 Neutral Start Wiring Harness (HST and SRT) (SE2, W1)

X3—W1 Main Wiring Harness to S4 Transmission Neutral Switch Wiring Harness (CST Only) (SE2, W1)

X4—W1 Main Wiring Harness to W2 Fuel Shutoff Solenoid Wiring Harness (SE2, W1)

X5—W1 Main Wiring Harness to S6 Mid PTO Switch (Option) (SE2, W1)

X6—W1 Main Wiring Harness to Control Panel Circuit Board (SE5, W1)

X7—W1 Main Wiring Harness to Control Panel Circuit Board (SE5, W1)

X8—W1 Main Wiring Harness to Control Panel Circuit Board (SE5, W1)

X9—W1 Main Wiring Harness to W4 Cruise Control Wiring Harness (SE4, W1)

X10—W4 Cruise Control Wiring Harness to S10 Cruise Control Switch (SE5, W4)

X11—W4 Cruise Control Wiring Harness to S11 Brake Switch (SE5, W4)

X12—W4 Cruise Control Wiring Harness to W5 Cruise Control Magnet Wiring Harness (SE5, W4)

X13—W1 Main Wiring Harness to W8 Trailer Connector Wiring Harness (SE4/SE5/SE6, W1)

X16—W1 Main Wiring Harness to E8 RH Work Light (Option) (SE6, W1)

X17—W1 Main Wiring Harness to E7 LH Work Light (Option) (SE6, W1)

X18—W1 Main Wiring Harness to E1 LHTail Light (SE4, W1)

X19—W1 Main Wiring Harness to E2 LH Hazard Light (SE4, W1)

X20—W1 Main Wiring Harness to E1 LH Tail Light and E2 LH Hazard Light (SE4, W1)

X21—W1 Main Wiring Harness to E3 RH Tail Light (SE4, W1)

X22—W1 Main Wiring Harness to E4 RH Hazard Light (SE4, W1)

X23—W1 Main Wiring Harness to E3 RH Tail Light and E4 RH Hazard Light (SE4, W1)

X24—W1 Main Wiring Harness to H9 Backup Alarm (SE2, W1)

WIRING HARNESSES:

W1—Main Wiring Harness

W2—Fuel Shutoff Solenoid Wiring Harness

W3—Neutral Start Wiring Harness (HST & SRT) (included in the W4 Wiring Harness protective wrap)

W4—Cruise Control Wiring Harness

W5—Cruise Control Magnet Wiring Harness

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SAFETY

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.

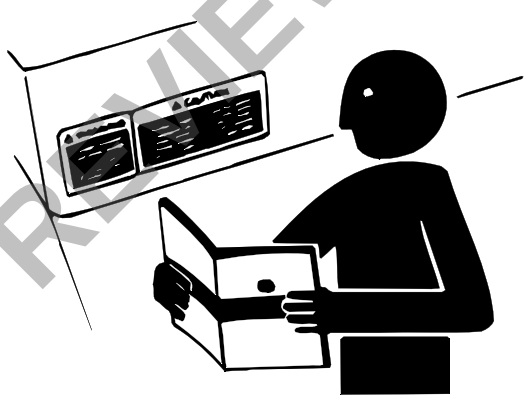
Follow recommended precautions and safe servicing practices.

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.

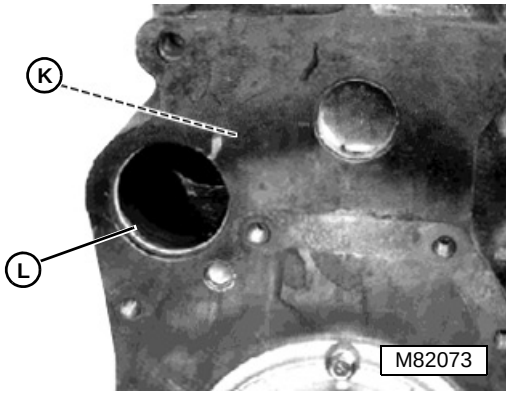
Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.

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Uneven combustion sound	Engine surges: During Idling	Engine surges: Under Load	Excessive engine vribration	Poor return to low speed	Excessive fuel comsumption	Lubricating Oil: Excessive oil consumption	Lubricating Oil: Fuel oil in crankcase	Lubricating Oil: Water in crankcase	Lubricating Oil: Low oil pressure	Low compression	Coolant: Overheating	Coolant: Low water temperature	Intake manifold pressure: Low pressure	Intake manifold pressure: High pressure	Exhaust temperature too high	Problem or Symptom / Solution
													●		●	Adjust valve clearance
					●					●			●		●	Grind valve seat, regrind valves
		●	●				●			●			●			Replace valve and check valve guide
								●			●					Replace head gasket
	●		●			●	●			●	●				●	Replace rings and check cylinder
						●	●			●						Bore or hone cylinder & replace piston
	●	●	●							●						Regrind crank and replace bearings
						●				●						Stagger piston ring gaps
						●				●						Install piston rings correctly
	●	●	●						●							Regrind crank and replace bearings
			●						●							Check for damage and re-torque bolts
						●				●						Remove head and inspect for damage
																Measure timing gear backlash
						●				●						Check valve guides and stems
	●	●	●	●												Repair or replace governor
																Adjust valve clearance. Check vlave timimg
					●							●				Check thermostat
											●				●	Check thermostat, fan belt tension
											●				●	Check cooling system for level/leaks
								●	●		●					Repair or replace water jacket
											●	●				Check or replace thermostat
											●				●	Adjust fan belt tension

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9. Measure the intermediate (K) and flywheel end (L) camshaft bore diameters.
- Standard camshaft bore ID is **45.00 - 45.025 mm (1.772 - 1.773 in.)**
- If the bore diameter exceeds **45.10 mm (1.776 in.)**, replace cylinder block.
- If the bore clearance (bore ID minus camshaft journal OD) exceeds **0.20 mm (0.008 in.)**, replace camshaft, cylinder block or both.
- Apply John Deere Form-In-Place Gasket, or an equivalent, on the outer edge of the plug. Install the plug until it bottoms in the bore.

CAMSHAFT FOLLOWERS

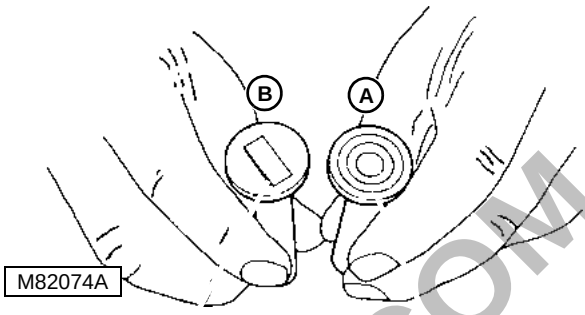
Removal/Installation:

1. Remove the camshaft. (See “CAMSHAFT”).
2. Remove the oil pan and strainer.

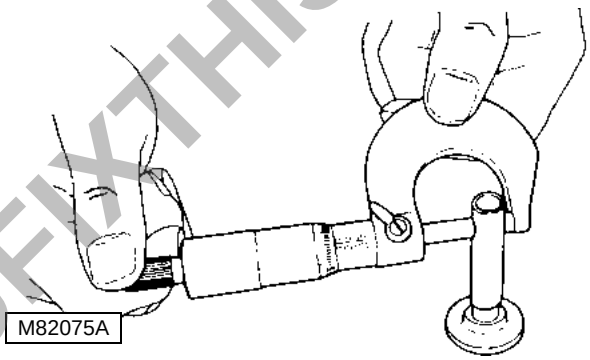
IMPORTANT: Cam followers must be installed in the same bores from which they were removed.

3. Put a mark on each cam follower and the cylinder block bore to aid in installation.
4. Remove the cam followers.
5. Inspect all parts for wear or damage.
6. Apply clean engine oil to all parts during installation.
- Installation is done in the reverse order of removal.

Inspection:



7. Inspect the cam follower contact surface for normal contact (A) or abnormal wear (B). Replace if necessary.



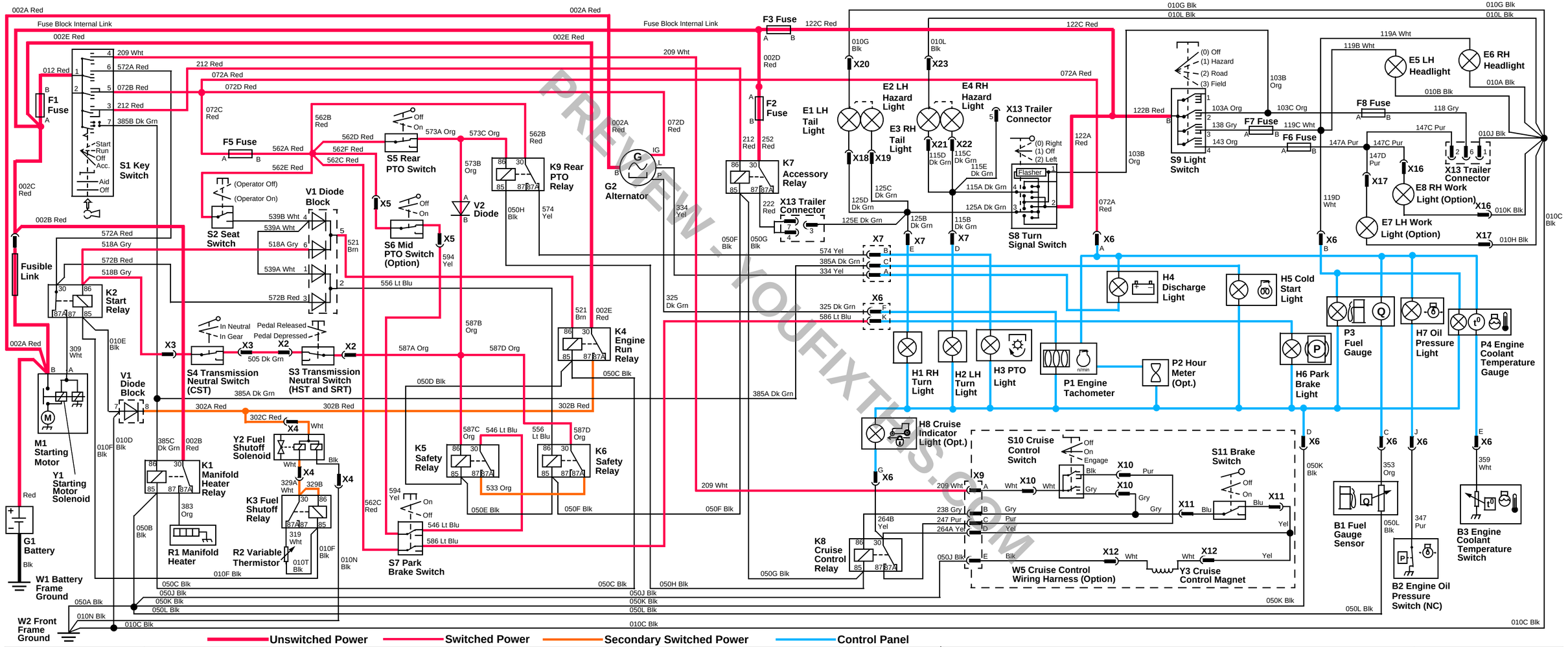
8. Measure the cam follower stem diameter.
- Standard cam follower stem OD is **11.98 - 11.99 mm (0.471 - 0.472 in.)**
- If the stem diameter is less than **11.93 mm (0.470 in.)**, replace cam follower.

9. Measure the cam follower bore diameter in the cylinder block.
- Standard cam follower bore ID is **12.00 - 12.02 mm (0.472 - 0.473 in.)**
- If the cam follower bore diameter exceeds **12.05 mm (0.474 in.)**, replace the cylinder block.
- Standard cam follower bore clearance is **0.01 - 0.04 mm (0.0004 - 0.002 in.)**.
- If the bore clearance (bore ID minus follower stem OD) exceeds **0.12 mm (0.005 in.)**, replace the cam follower, cylinder block or both.

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MAIN ELECTRICAL SCHEMATIC–4200/4300/4400 NA (OLD)



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FUEL SUPPLY DIAGNOSIS

Test Conditions:

- Park brake ENGAGED
- Key switch in RUN position (Engine NOT running)
- V1 diode block removed from load center
- PTO DISENGAGED
- Transmission in NEUTRAL
- Seat switch closed (Operator ON seat)

Test/Check Point	Normal	If Not Normal
1. Rear PTO switch connector	Battery voltage	(See “POWER CIRCUIT DIAGNOSIS”.)
2. Transmission neutral switch	Battery voltage	(See “POWER CIRCUIT DIAGNOSIS”.)
3. Diode block socket (terminal 6)	Battery voltage	Check transmission switch. (See “TRANSMISSION NEUTRAL SWITCH TEST – HST & SRT”.) Check 518B and 518A Gry wires and connections.
4. Seat switch	Battery voltage	(See “POWER CIRCUIT DIAGNOSIS”.)
5. Diode block socket (terminal 4)	Battery voltage	Check seat switch. (See “SEAT SWITCH TEST”.) Check 539B Wht wire and connections.

Test Conditions:

- Park brake ENGAGED
- Key switch in RUN position
- PTO DISENGAGED
- Transmission in NEUTRAL
- Seat switch open (Operator OFF seat)
- V1 diode block installed; K4 engine run relay removed from load center

6. Engine run relay socket (terminal 85)	Battery voltage	Check diode block (terminals 6 to 5). (See “DIODE BLOCK TEST”.) Check 521 Brn wire and connections.

Test Conditions:

- Park brake ENGAGED
- Key switch in RUN position
- PTO DISENGAGED
- Transmission in GEAR
- Seat switch closed (Operator ON seat)

7. Engine run relay socket (terminal 85)	Battery voltage	Check diode block (terminals 4 to 5). (See “DIODE BLOCK TEST”.)

Test Conditions:

- Park brake ENGAGED
- Key switch in RUN position
- PTO DISENGAGED
- Transmission in GEAR
- Seat switch closed (Operator ON seat)
- K4 engine run relay installed in load center

8. Fuel solenoid connector	Battery voltage	Check 302B and 302C Red wires and connections.

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ENGINE OIL PRESSURE SWITCH TEST

Reason:

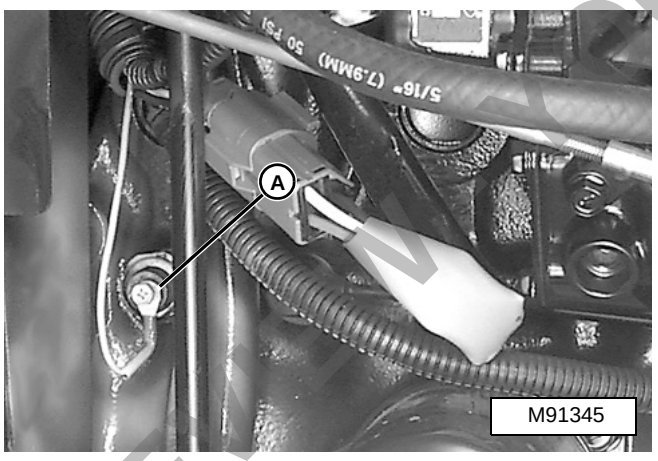
To determine if engine oil pressure switch is functioning properly, to warn operator that oil pressure has dropped below minimum operating pressure.

Equipment:

- Ohmmeter

Procedure:

1. Park machine on level surface.
2. Disengage PTO.
3. Turn key switch to OFF position.
4. Engage park brake.
5. Raise hood.
6. Remove right engine side cover.
7. Disconnect 347 Pur wire from oil pressure switch (A).
8. Connect black lead of ohmmeter to engine block and red lead of ohmmeter to terminal of switch.
9. Measure resistance between terminal and engine block.



Results:

- There should be continuity between terminal and ground.
- If there is NO continuity between terminal and ground; replace the oil pressure switch.

NOTE: Be sure to apply Pipe Sealant with TEFLON® to threads of switch anytime it is installed.

® TEFLON is a registered trademark of the DuPont Company.

10. Start and run engine.
11. Measure resistance between terminal and engine block.

Results:

There should be NO continuity between switch terminal and ground with the engine running.

- If the switch DOES have continuity to engine block (ground) with engine running, check engine oil pressure.
- If oil pressure meets specification; replace the oil pressure switch.

MANIFOLD HEATER TEST

Reason:

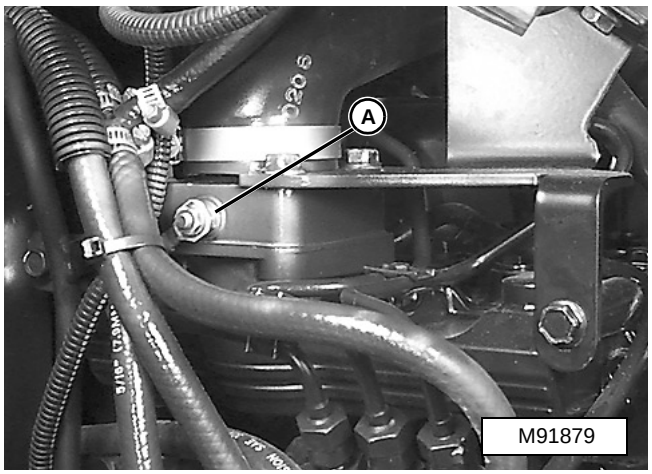
To test proper operation of manifold heater.

Equipment:

- Ohmmeter

Procedure:

1. Park machine on level surface.
2. Disengage PTO.
3. Turn key switch to OFF position.
4. Engage park brake.
5. Raise hood.
6. Remove right engine side cover.
7. Remove manifold heater lead from terminal (A).
8. Check continuity across terminal (A) and frame ground. The reading should be between **0.3 – 0.5 ohms.**



Results:

- If manifold heater does not have between **0.3 – 0.5 ohms** resistance, replace heater unit.

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MAIN WIRING HARNESS–4200/4300/4400 EUROPEAN

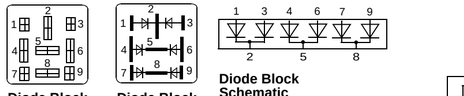
Serial Numbers for Wiring Harness Use:
LV4200E329006–
LV4300E339506–
LV4400E349015–

FUSE WIRE CONNECTIONS

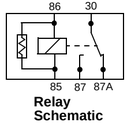
#	SIZE	A	B
F1	30A	002C	012
F2	30A	002D	252
F3	30A	002	122C
F4	20A	002	042A
F5	10A	072C	562A
F6	20A	143	147A
F7	20A	138	119C
F8	20A	103C	118A
F9	20A	103B	128A

DIODE BLOCK

#	1	2	3	4	5	6	7	8	9
DB1	539A	556	572B	539A/539B	521	518A	010D/010E	302A	– – –

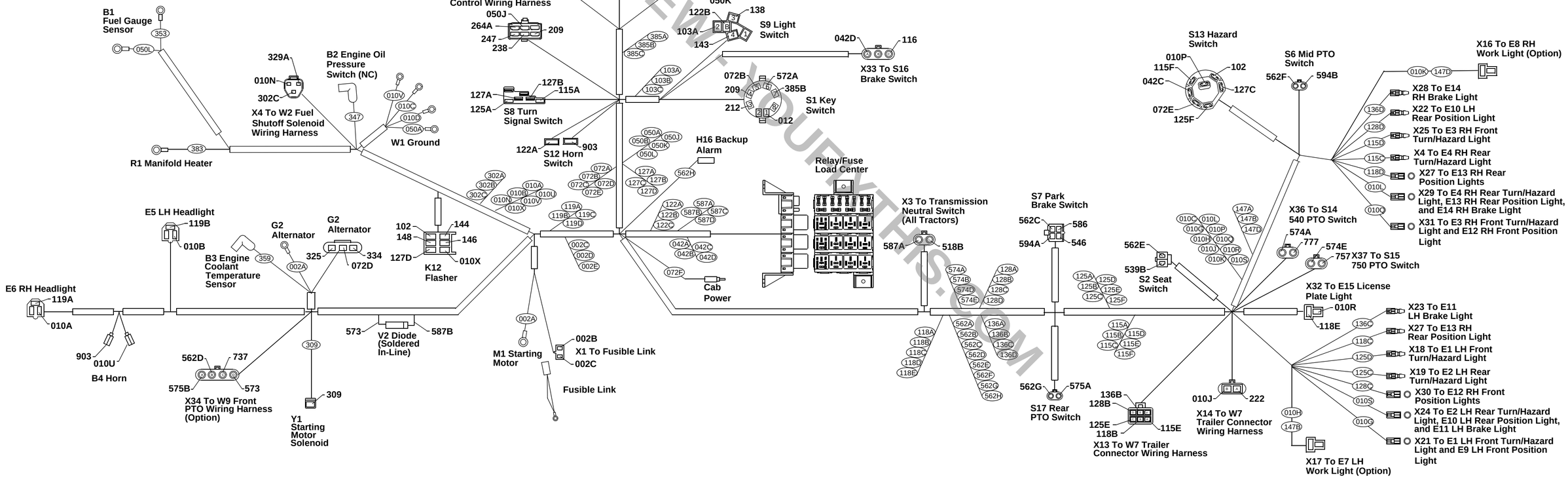






RELAYS

Relay #	86	85	30	87	87A
K1	385C	050B/050C	002B	383	– – –
K2	518A/518B	010E/010F	572A/572B	309	– – –
K3	329B	010F/010T	329A/329B	– – –	319
K4	521	050C/050D	002D	302B	– – –
K5	587C	050D/050E	546	533	– – –
K6	556	050E/050F	587D	– – –	533
K7	212	050F/050G	252	222	– – –
K8	238	050G/050H	264A/264B	247	– – –
K9	575A/575B	050N	562B	– – –	574B
K10	594A/594B	050H/050M	574D	– – –	743
K11	116	050M/050N	042B	136A	– – –



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CHARGING CIRCUIT OPERATION

FUNCTION:

To maintain battery voltage between 12.4 and 13.2 volts.

OPERATING CONDITIONS:

The key switch must be in the RUN position with the engine running for the charging system to operate.

SYSTEM OPERATION:

The charging system consists of the G2 alternator with an integrated voltage regulator/rectifier. Charging output is controlled by a regulator/rectifier. The status of the charge rate is indicated by the H4 discharge light.

With the key switch in the RUN position, battery sensing circuit current flows from battery positive terminal to the starting motor terminal, fusible link, X1, 002C Red wire, F1 fuse, 012 Red wire, S1 key switch, 072B and 072D Red wires to the alternator voltage regulator/rectifier. The battery sensing circuit allows the voltage regulator/rectifier to monitor battery voltage.

A rotating permanent magnet in the alternator induces AC current in the alternator stator coils. The AC current flows to the voltage regulator/rectifier. The voltage regulator/rectifier converts AC current to DC current needed to charge the battery.

If battery voltage is low, the regulator/rectifier allows DC current to flow to the battery to charge it through the battery charging circuit (002A Red). When the battery is fully charged, the voltage regulator/rectifier stops current flow to the battery.

If the alternator output current falls below system usage or is insufficient to maintain a preset voltage, the voltage regulator/rectifier provides current to turn on the discharge light through the 334 Yel wire, X7 connector, and the control panel circuit board runs.

The alternator is grounded through the mounting hardware to the engine.

If the voltage regulator is grounded to the alternator cover, the alternator produces unregulated amperage. (See "UNREGULATED AMPERAGE TEST")

TACHOMETER CIRCUIT OPERATION

FUNCTION:

To indicate engine rpm to the operator.

OPERATING CONDITIONS:

The key switch must be in the RUN position with the engine running for the tachometer to operate.

SYSTEM OPERATION:

Pulsed current flows from the "P" terminal of the alternator to the control panel (X6 connector, terminal F) through the 325 Dk Grn wire.

HOURMETER CIRCUIT OPERATION

FUNCTION:

To indicate engine hours of use to the operator.

OPERATING CONDITIONS:

The key switch must be in the RUN position with the engine running for the hourmeter to operate.

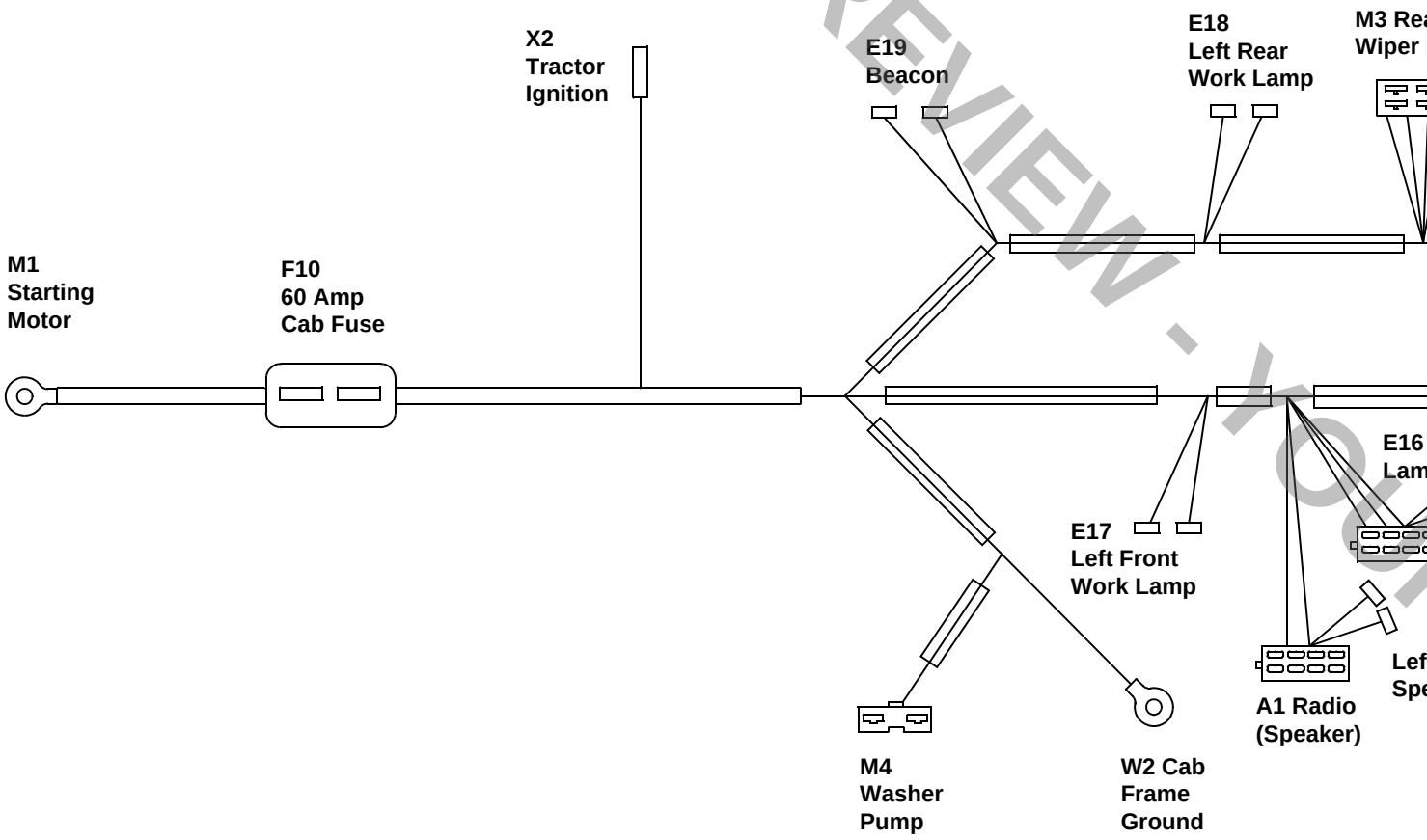
SYSTEM OPERATION:

The hourmeter is integrated into the control panel and does not have any external wiring. The hourmeter operates only when the engine is running. The hourmeter uses the engine tachometer circuit for power. If the tachometer is not functioning, the hourmeter will not work. See "CHARGING CIRCUIT DIAGNOSIS" for information on tachometer and hourmeter diagnosis.

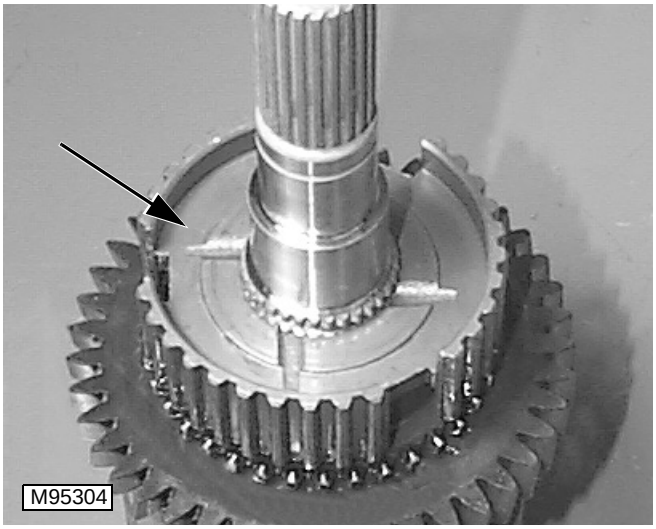
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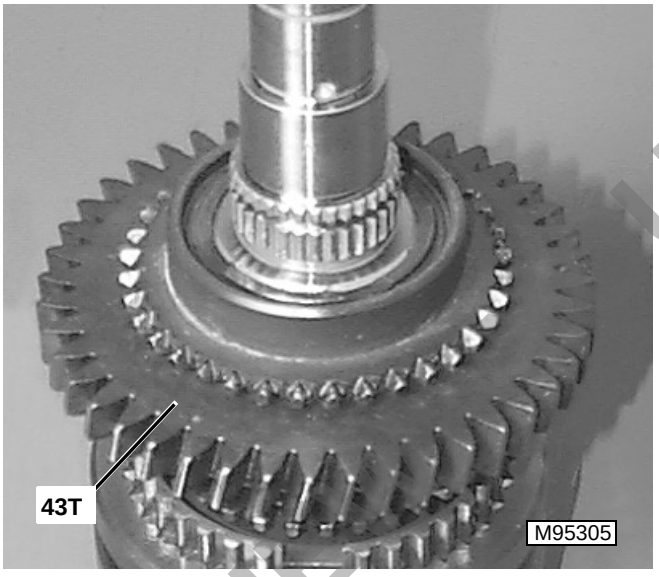
CAB WIRING HARNESS



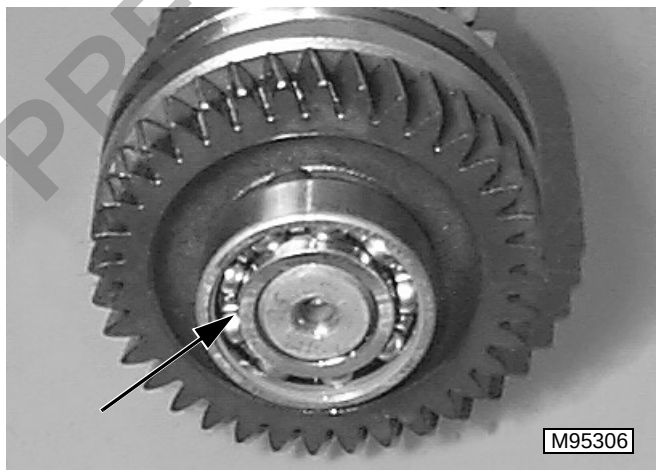
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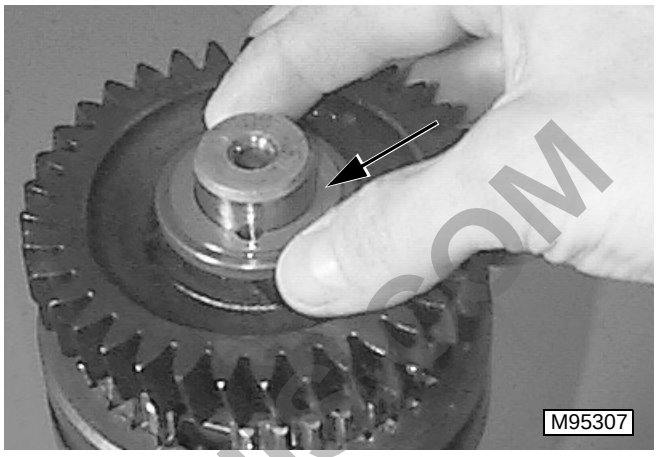
9. Remove shift collar hub.



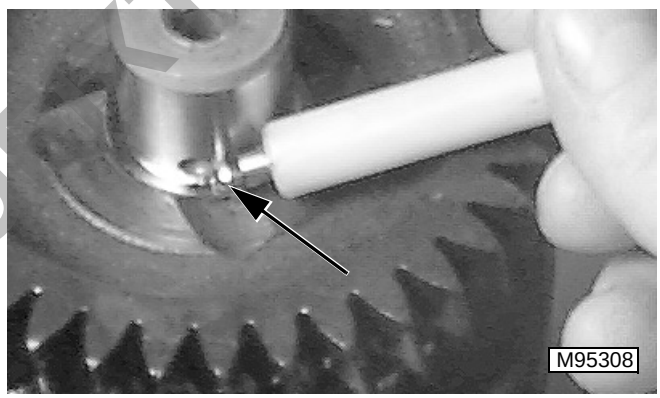
10. Remove 43 tooth gear.



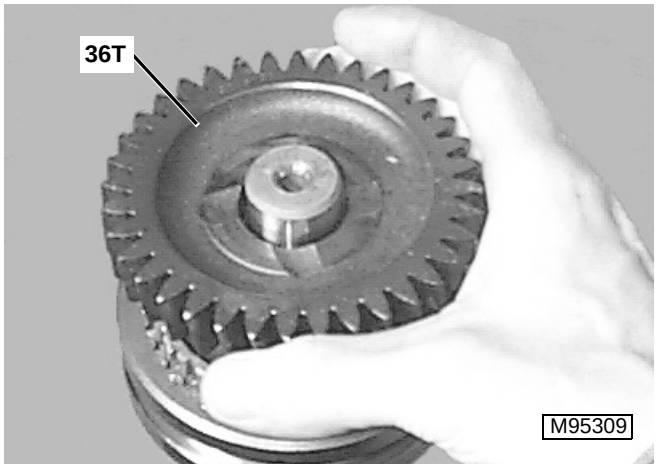
11. Remove bearing from other end of shaft.



12. Remove thrust washer.



13. Remove ball.



14. Remove 36 tooth gear.

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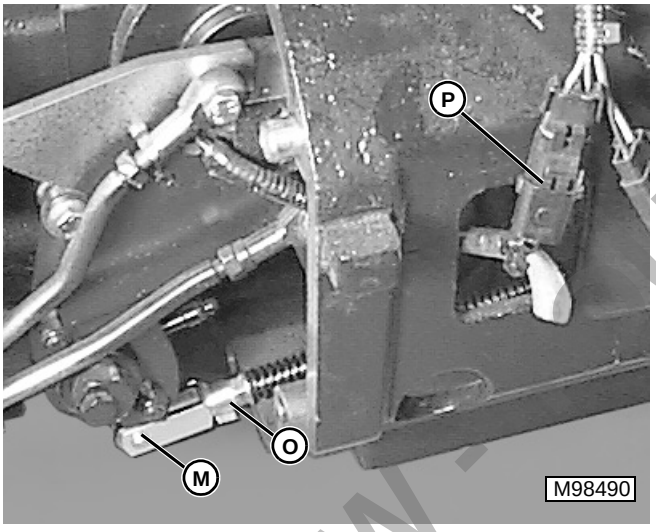
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29. Gently pry around edges of flanges to separate tractor halves.
30. Roll tractor halves apart.

Assemble Tractor Sections:

NOTE: Splines on all drive shafts and couplers must be aligned before tractor sections are bolted together.

1. Align splines on hydrostatic transmission drive shaft and engine flywheel.
2. Move tractor sections together and retain with nine cap screws. Tighten cap screws to **126 - 154 N•m (95 - 115 lb-ft)**.
3. Remove cap screws retaining splitting stands to tractor sections. Remove splitting stands.

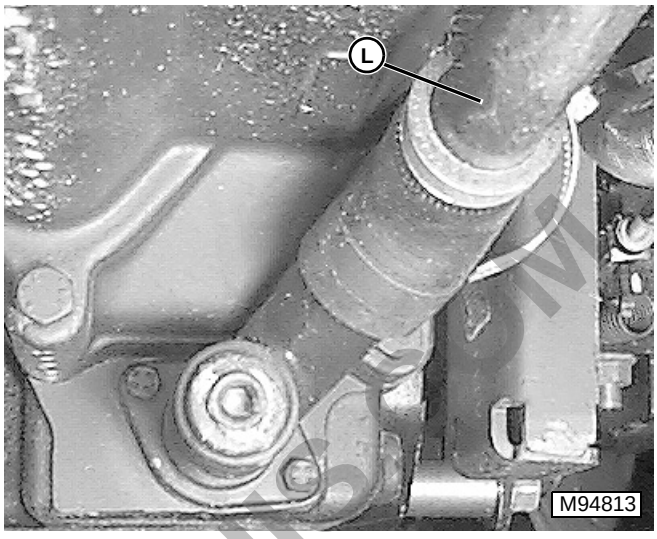


NOTE: Tractor shown split for clarity.

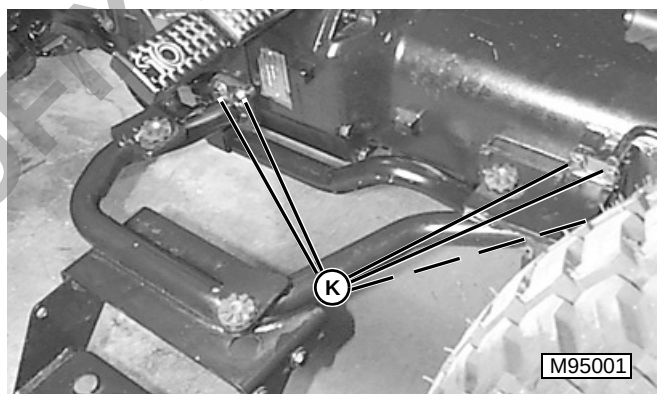
CAUTION

Tensioned spring. Wear eye protection and gloves when disconnecting spring to reduce the risk of personal injury.

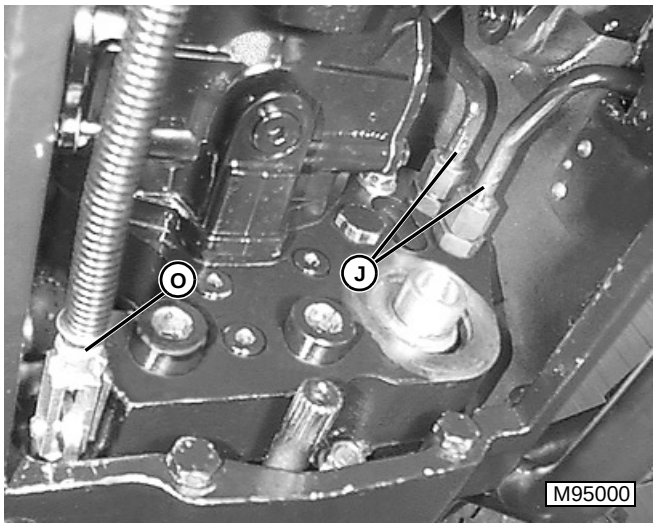
4. Install neutral return spring, rod (O), and clevis as an assembly. Attach clevis to hydrostatic control linkage and retain with clip pin (M).
5. Connect neutral switch connector (P).



6. Connect suction tube (L) to manifold. Tighten hose clamp.

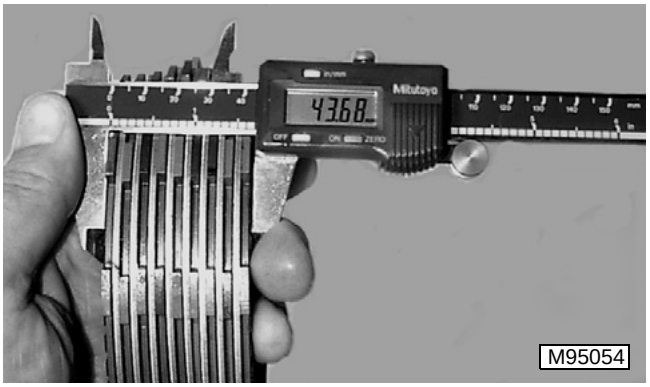


7. Install LH operator's platform support. Retain with five cap screws (K).

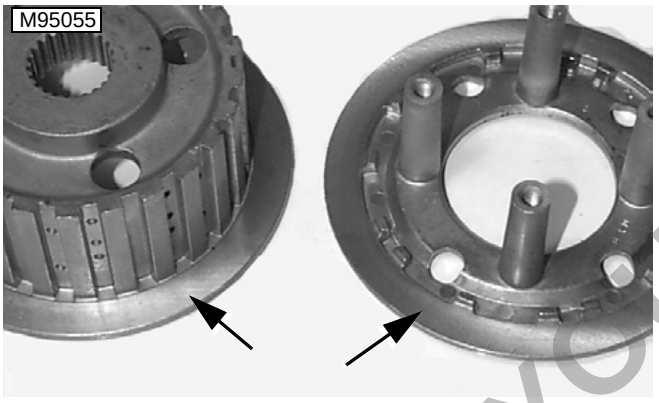


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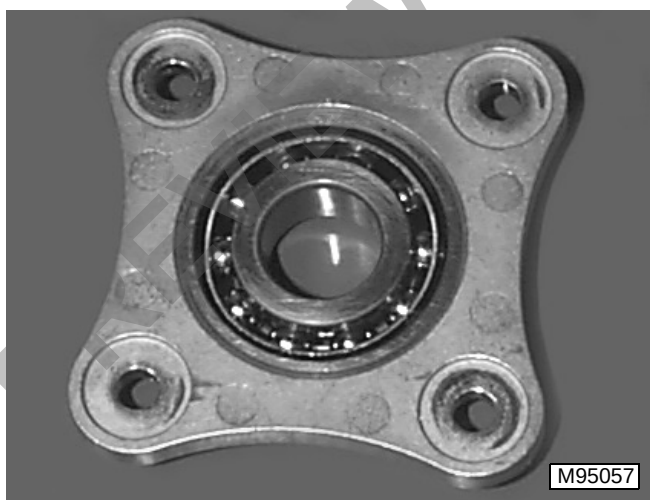
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5. Measure thickness of entire clutch plate pack. Minimum thickness: **42.34 mm (1.66 in.)** Replace clutch pack if below minimum thickness.



6. Inspect friction areas of hub and piston for wear. Replace parts as needed.



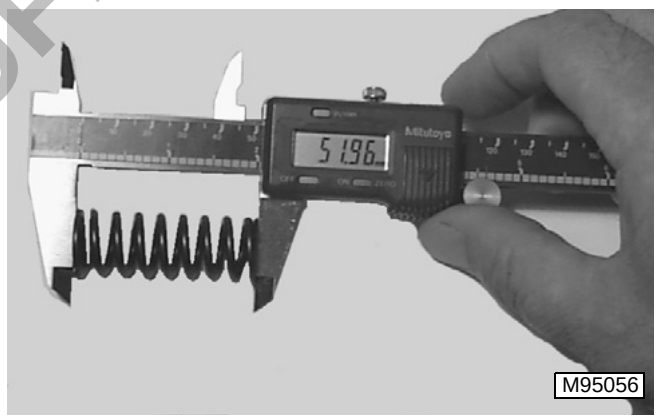
IMPORTANT: DO NOT spin bearings using compressed air. Damage to bearing balls, cage and races could result.

7. Clean spring retainer plate bearings in suitable solvent. Dry with compressed air.
8. Inspect both bearings for discolored or burned balls and/or races. Check balls and races for spalling or cracking. Roll bearing by hand to check for rough turning or excessive looseness or play between balls and races. Replace bearings as required.



Front Towards Flat Side of Spring Plate **Back Towards Raised Side of Spring Plate**

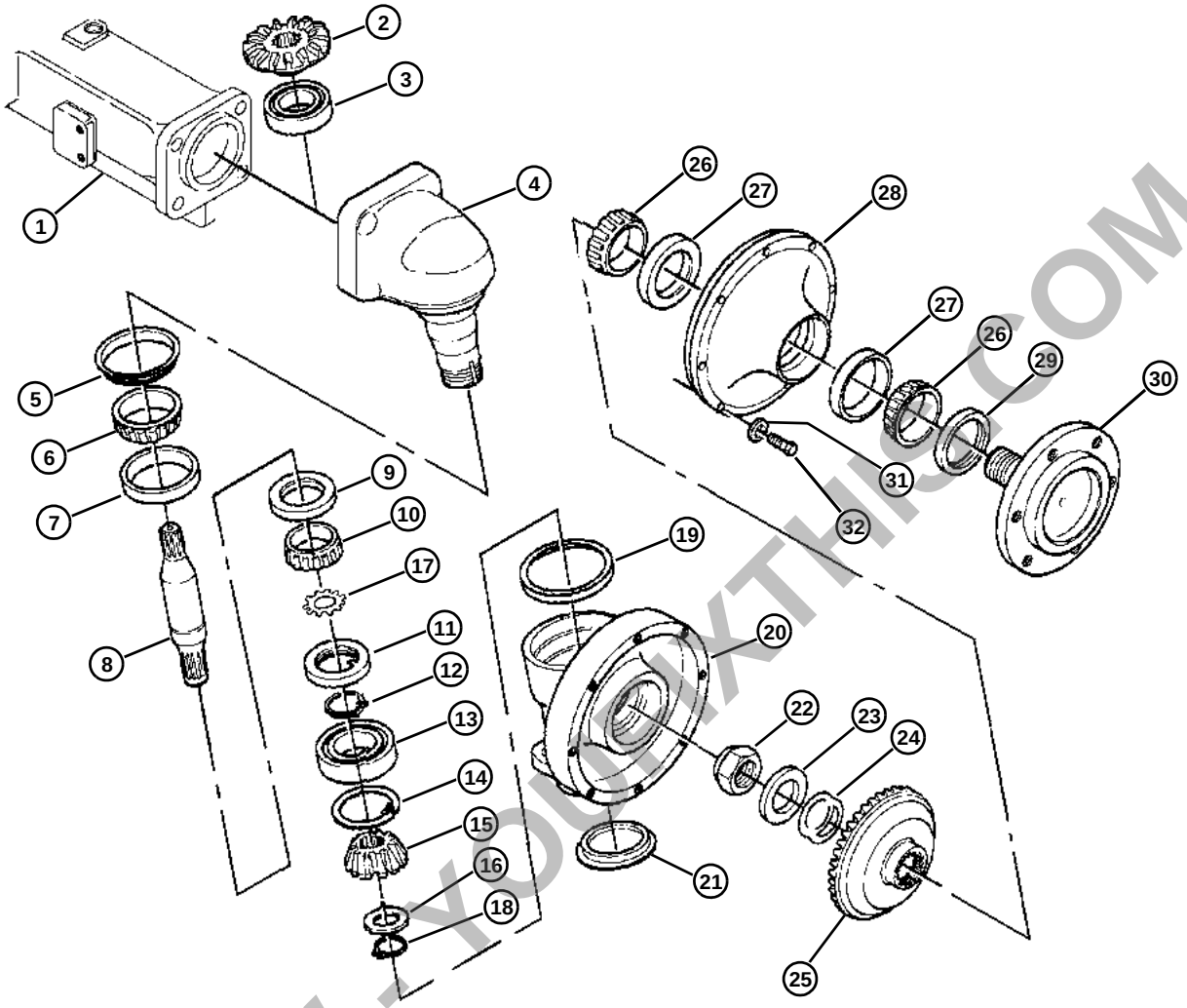
NOTE: Bearings are designed for side loads and must be installed in the proper direction as shown.



9. Measure no load length of each spring. If spring length is less than **51.3 mm (2.02 in.),** replace spring.

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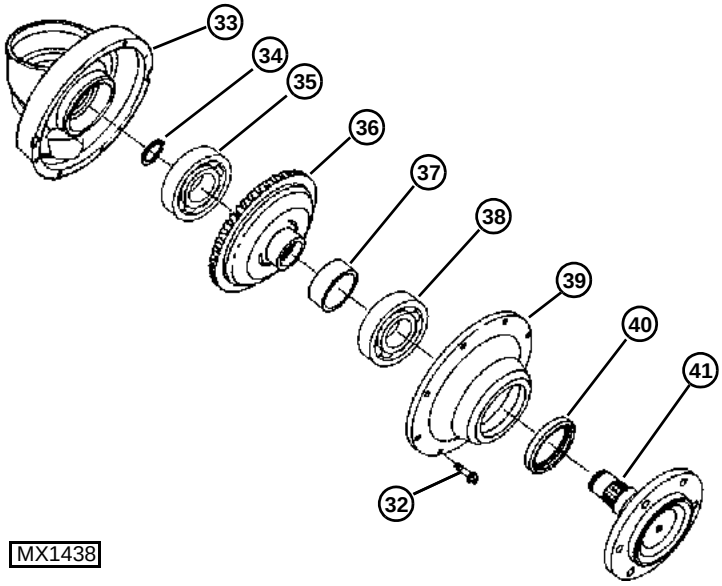
MFWD FINAL DRIVE COMPONENT LOCATION



M91837

NOTE: Use drawing above (M91937) for axles with final drives that use a nut to hold the hub shaft , numbered A20BZ103-1, S20BZ105-1.

Use the drawing to right (MX1438) for axles with final drives that use a snap ring to hold the hub shaft, numbered S20BZ107-1, S20BZ109-1.



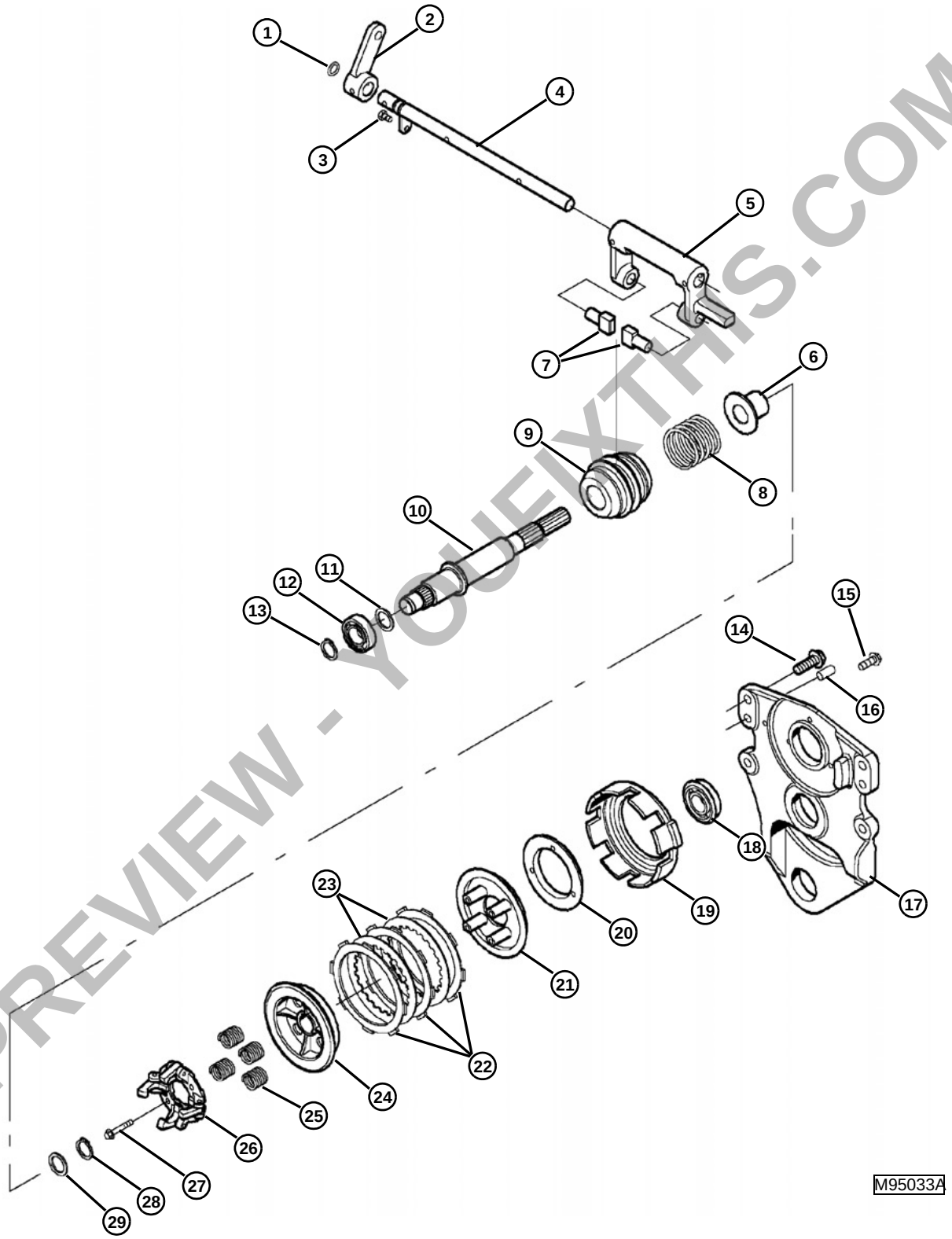
MX1438

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PTO COMPONENT LOCATION

PTO BRAKE



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SPECIFICATIONS

Steering:

Steering Wheel OD . . . . . 356 mm (14.0 in.)

Front Steering Angle: Maximum Inward . . . . . 54°

Front Steering Angle: Maximum Outward . . . . . 62°

Maximum Rotation of Steering Wheel - Steering at Maximum Right or Left and Constant Torque Applied to Steering Wheel . . . . . 5 rpm

Toe-In . . . . . 0 - 3 mm (0 - 0.125 in.)

Lubrication Interval:

Tie Rod Ends, Front Axle Pivot Pin (Normal Conditions) . . . . . Every 50 hours

Tie Rod Ends, Front Axle Pivot Pin (Dusty Conditions). . . . . Every 10 hours

TORQUE SPECIFICATIONS

Steering Wheel Nut. . . . . 39 - 49 N•m (29 - 36 lb-ft)

Wheel Mounting Bolts:
- Front and Rear Wheel Mounting Bolts . . . . . 98 N•m (72 lb-ft)
- Front wheels (Model 4200 Equipped With 4.0 x 15 F2 Ribbed Tires) 68 N•m (50 lb-ft)
- Front Wheels (Model 4300 Equipped With 5.0 x 15 F2 Ribbed Tires) 68 N•m (50 lb-ft)

Steering Cylinder Hose Ends
- Hose to Cylinder Adaptor . . . . . 17 - 24 N•m (150 - 212 lb-in.)
- Tube Nut to Hose at Cylinder . . . . . 33 - 47 N•m (24 - 34 lb-ft)

SCU Hose Ends
- Cylinder Tube to Hose at SCU . . . . . 33 - 47 N•m (24 - 34 lb-ft)
- Pressure or Return Tube to Hose at SCU. . . . . 40 - 58 N•m (30 - 42 lb-ft)
- Steering Cylinder Hose to Adaptor Fitting on SCU . . . . 17 - 24 N•m (150 - 212 lb-in.)
- Pressure or Return Hose to Adaptor Fitting on SCU . . . . . 33 - 47 N•m (24 - 34 lb-ft)

SCU to Tractor Cap Screws . . . . . 30 - 38 N•m (22 - 28 lb-ft)

Adaptor Fittings to SCU Ports. . . . . 14 - 16 N•m (124 - 142 lb-in.)

Tie Rod to Spindle Arm Nut (2-WD) . . . . . 115 - 129 N•m (85 - 95 lb-ft)

Tie Rod to Spindle Arm Nut (4-WD) . . . . . 115 - 129 N•m (85 - 95 lb-ft)

Tie Rod to Steering Cylinder Rod . . . . . 115 - 129 N•m (85 - 95 lb-ft)

Steering Cylinder (Dual End):

Steering Cylinder to Mounting Bracket . . . . . 25-31 N•m (18-22 lb-ft)

LH Bracket to Front Axle . . . . . 115-122 N•m (85-90 lb-ft)

Steering Hoses . . . . . 26-37 N•m (19-27 lb-ft)

Ball Joint to Cylinder Rod . . . . . 115-129 N•m (85-95 lb-ft)

Steering Cylinder (Single End):

Cylinder to Spindle Arm Castle Nuts. . . . . 115-129 N•m (85-95 lb-ft)

Hose Ends. . . . . 26-37 N•m (19-27 lb-ft)

Steering Cylinder to Mounting Bracket Cap Screws . . . . . 31 - 38 N•m (22 - 28 lb-ft)

Steering Cylinder Bracket to Front Axle Cap Screws and Nuts . . . . . 126 - 154 N•m (94 - 115 lb-ft)

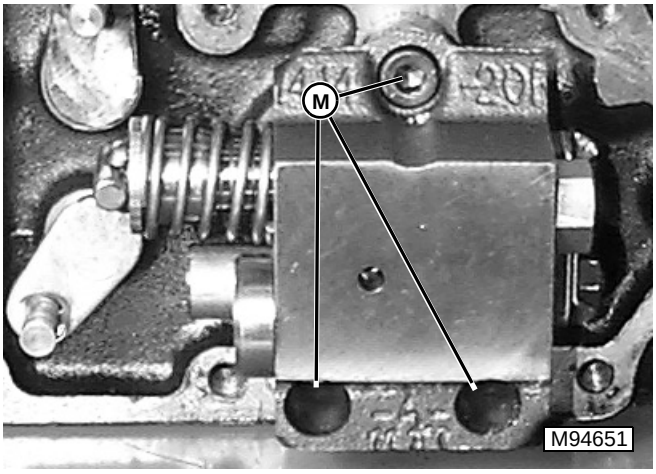
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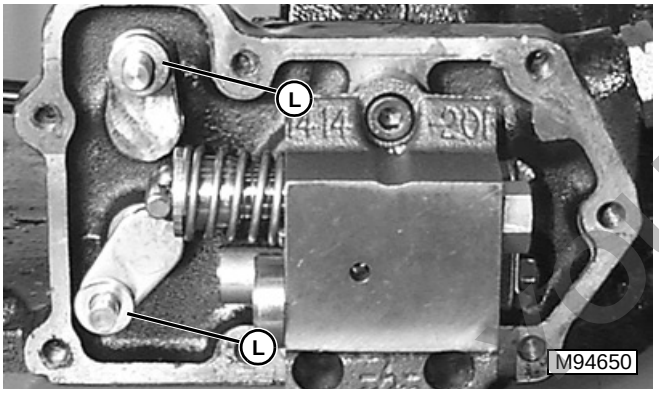
ROCKSHAFT DISASSEMBLY AND ASSEMBLY 39
SELECTIVE CONTROL VALVE REMOVAL AND INSTALLATION 46
SELECTIVE CONTROL VALVE DISASSEMBLY, INSPECTION, & ASSEMBLY . . . 47

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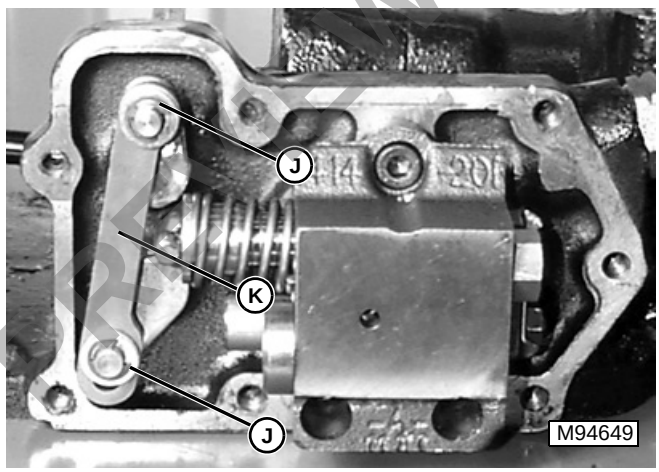
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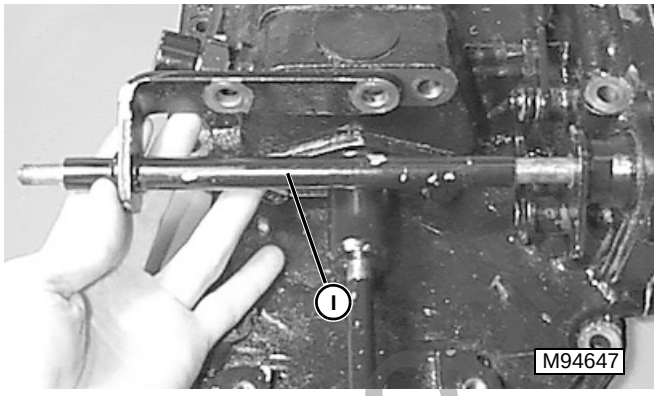
21. Install rockshaft control valve and retain with three socket head cap screws (M). Tighten cap screws to **47 N•m (35 lb-ft)**.



22. Install two washers (L).



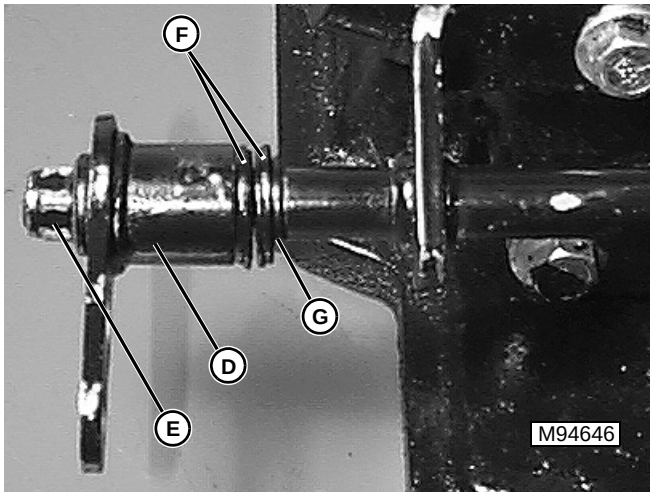
23. Install link (K). Retain with two flat washers, and two snap rings (J).



24. Install shaft support tube (I) onto lift control shaft and retain with two cap screws. Tighten cap screws to **80 N•m (60 lb-ft)**.

IMPORTANT: Make sure that Belleville washers are correctly installed with cupped sides of each pair of washers facing each other.

NOTE: Lever arm should be installed so that when the lever if in the full forward (down) position, the lever arm is parallel to the ground.



25. Install washer (G), four belleville washers (F), and lever arm (D) to shaft. Retain with lock nut (E).

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