322, 330, 332 and 430 Lawn and Garden Tractors

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For complete service information also see:

Yanmar Gasoline Engines. CTM12
John Deere Series 220 Diesel Engines . . . CTM3

John Deere Horicon Works
TM1591 (15JUL95)

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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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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 operating practices.



T81389 -UN-07DEC88

DX,ALERT -19-03MAR93

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.



TS187 -19-30SEP88

DX,SIGNAL -19-03MAR93

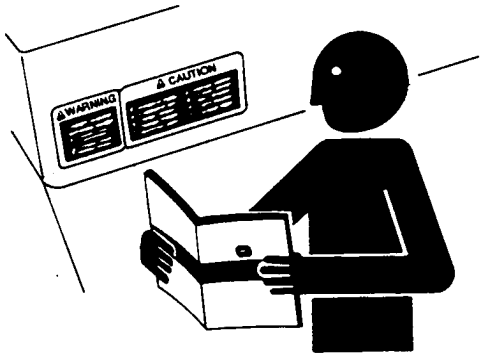
FOLLOW SAFETY INSTRUCTIONS

Carefully read all safety messages in this manual and on your machine safety signs. Keep safety signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from your John Deere dealer.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machine in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.

If you do not understand any part of this manual and need assistance, contact your John Deere dealer.



TS201 -UN-23AUG88

DX,READ -19-03MAR93

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MACHINE SPECIFICATIONS—322 AND 330

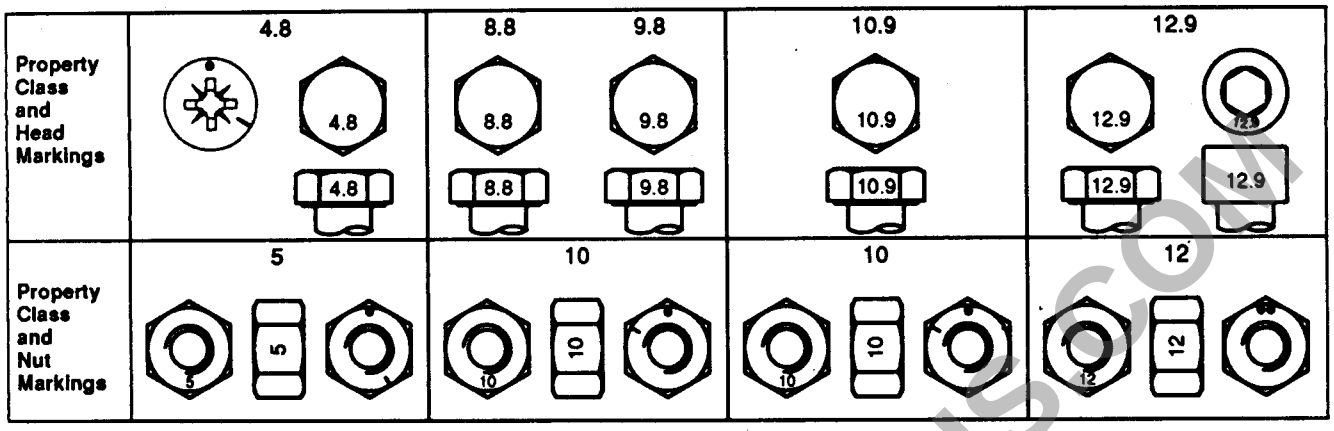
	322	330
ENGINE		
Manufacturer	Yanmar	Yanmar
Model Number	3TG66UJ	3TN66UJ
Horsepower (SAEJ1349)	13.4 kW (18 hp)	12 kW (16 hp)
Torque	4.2 kg m (30.3 ft lbs)	4.2 kg m (30.3 ft lbs)
Engine Rated Speeds		
Fast Idle (No Load)	3500 rpm	3450 rpm
Low Idle (No Load)	1300 rpm	1300 rpm
Number of Cylinders	3	3
Crankshaft Alignment	Horizontal	Horizontal
Stroke/Cycle	4 Cycle	4 Cycle
Bore	66 mm (2.6 in.)	66 mm (2.6 in.)
Stroke	64.2 mm (2.5 in.)	64.2 mm (2.5 in.)
Displacement	658 cm^3 (40.1 cu in.)	658 cm^3 (40.1 cu in.)
Compression Ratio	8.7:1	22.4:1
Cooling	Liquid	Liquid
Coolant Capacity	2.8 L (3 U.S. qt)	2.8 L (3 U.S. qt)
Air Filter Type	Dry with Primary and Secondary Elements	Dry with Primary and Secondary Elements
Lubrication System	Full Pressure w/Filter	Full Pressure w/Filter
Crankcase Capacity (w/o Filter)	2.5 L (2.6 U.S. qt)	2.5 L (2.6 U.S. qt)
Oil Filter	Replaceable	Replaceable
Spark Plugs	NGK BPR4BS Champion RN11YC	N/A
FUEL SYSTEM		
Fuel Tank Location	Rear	Rear
Fuel Gauge	Standard	Standard
Fuel Tank Capacity	17 L (4.5 U.S. gal)	17 L (4.5 U.S. gal)
Fuel	85 Octane Unleaded	No.1 or No.2 Diesel
Fuel Pump Location	Frame	Frame
Fuel Pump Type	Electric	Electric
Fuel Delivery	Fixed Jet Carburetor	Indirect Injection
Injection Pump Type	N/A	In-Line Multi-Plunger
Fuel Shutoff	Electric Solenoid	Manual
ELECTRICAL SYSTEM		
Ignition	Electronic	N/A
Type of Starter	12 Volts, Solenoid	12 Volts, Solenoid
Charging System	Remote Alt. 20 amp	Remote Alt. 20 amp
Battery Type	BCI Group, U1	BCI Group, U1
Battery Voltage	12V	12V
Battery Reserve Capacity @25 amp	44 minutes	44 minutes
Battery		
Cold Cranking amp @0˚F	342 amp	342 amp
Headlights	Standard	Standard
Reflector/Tail Lights	Standard	Standard
Dash Indicator Lights	Standard	Standard
Operator Presence System	Standard	Standard
Hourmeter	Standard	Standard

Continued on next page.

MX,15911010,1 -19-13JUL95

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METRIC BOLT AND CAP SCREW TORQUE VALUES



TS1163 -19-04MAR91

Size	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]		Lubricated[a]		Dry[a]	
	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft	N·m	lb-ft
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	190
M16	100	73	125	92	190	140	240	175	275	200	350	255	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

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

Fasteners should be replaced with the same or higher property class. If higher property class fasteners are used, these should only be tightened to the strength of the original.

Make sure fasteners threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

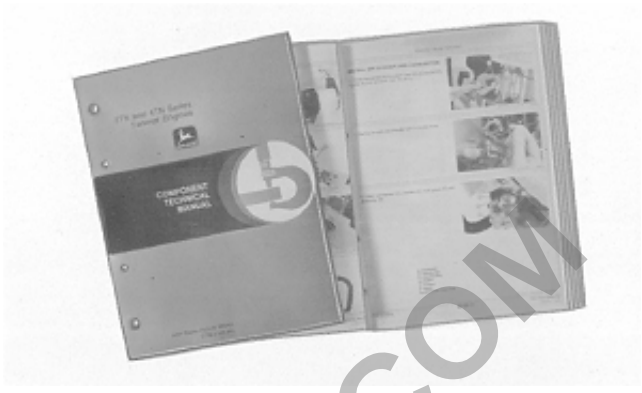
[a] *"Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.*

DX,TORQ2 -19-20JUL94

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YANMAR GASOLINE ENGINE REPAIR—USE CTM12

For complete repair information, the component technical manual (CTM) is also required. Use the component technical manual in conjunction with this machine manual.



TS225 -UN-17JAN89

MX,15912005,1 -19-13JUL95

REMOVE AND INSTALL ENGINE—322

1. Remove grille, side panels, battery, battery base and belly screen.

2. Disconnect headlight and hour meter leads.

3. Remove hood, hood support and battery base support.



TS281 -UN-23AUG88

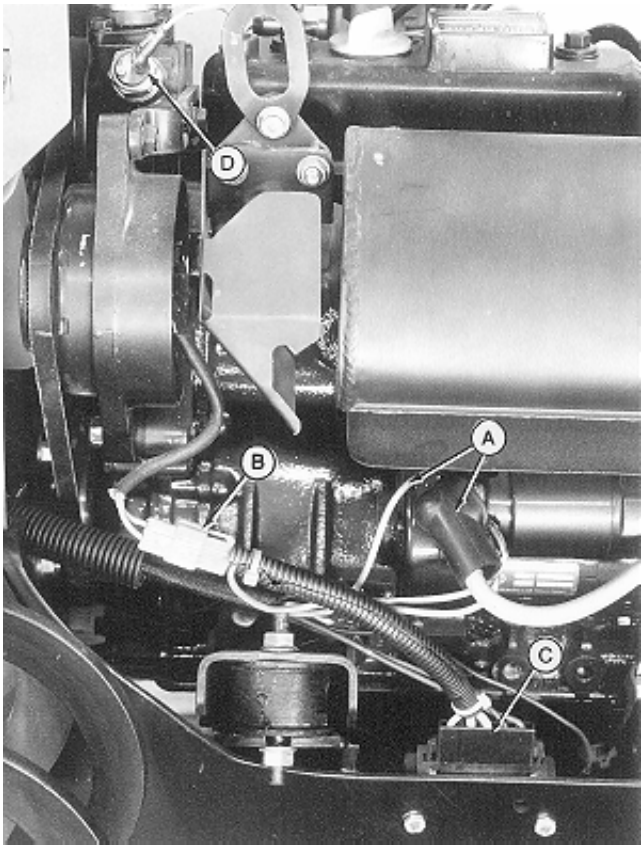
CAUTION: Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove filler cap when cool enough to touch with bare hands. Slowly loosen cap to first stop to relieve pressure before removing completely.

4. Drain radiator. Approximate capacity is 2.8 L (3 U.S. qt).

5. Disconnect items (A—D).

A—Starter Cable and Leads
B—Alternator Lead
C—Voltage Regulator Lead
D—Temperature Coolant Lead

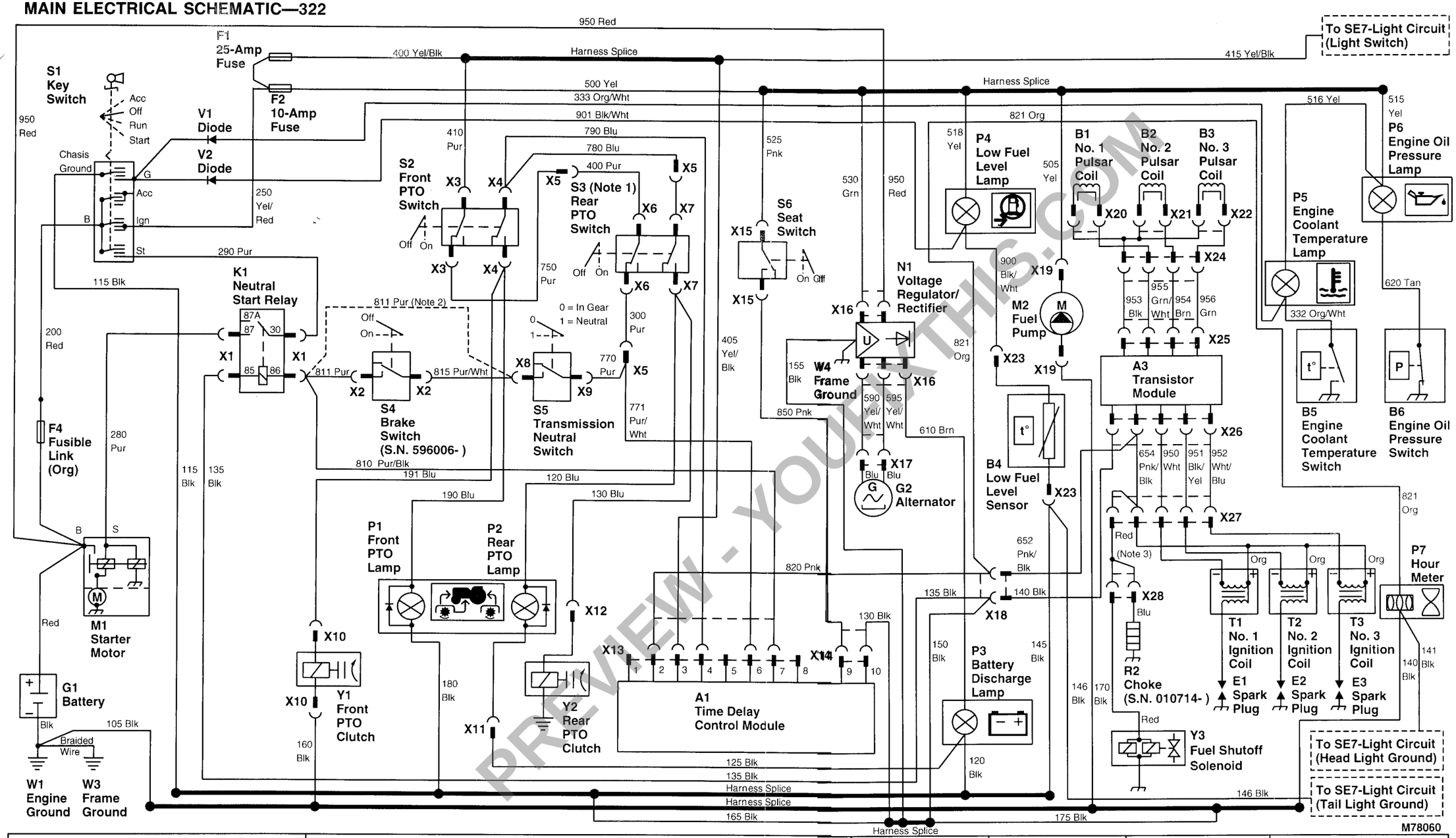


M77901 -UN-15DEC94

MX,15912005,2 -19-13JUL95

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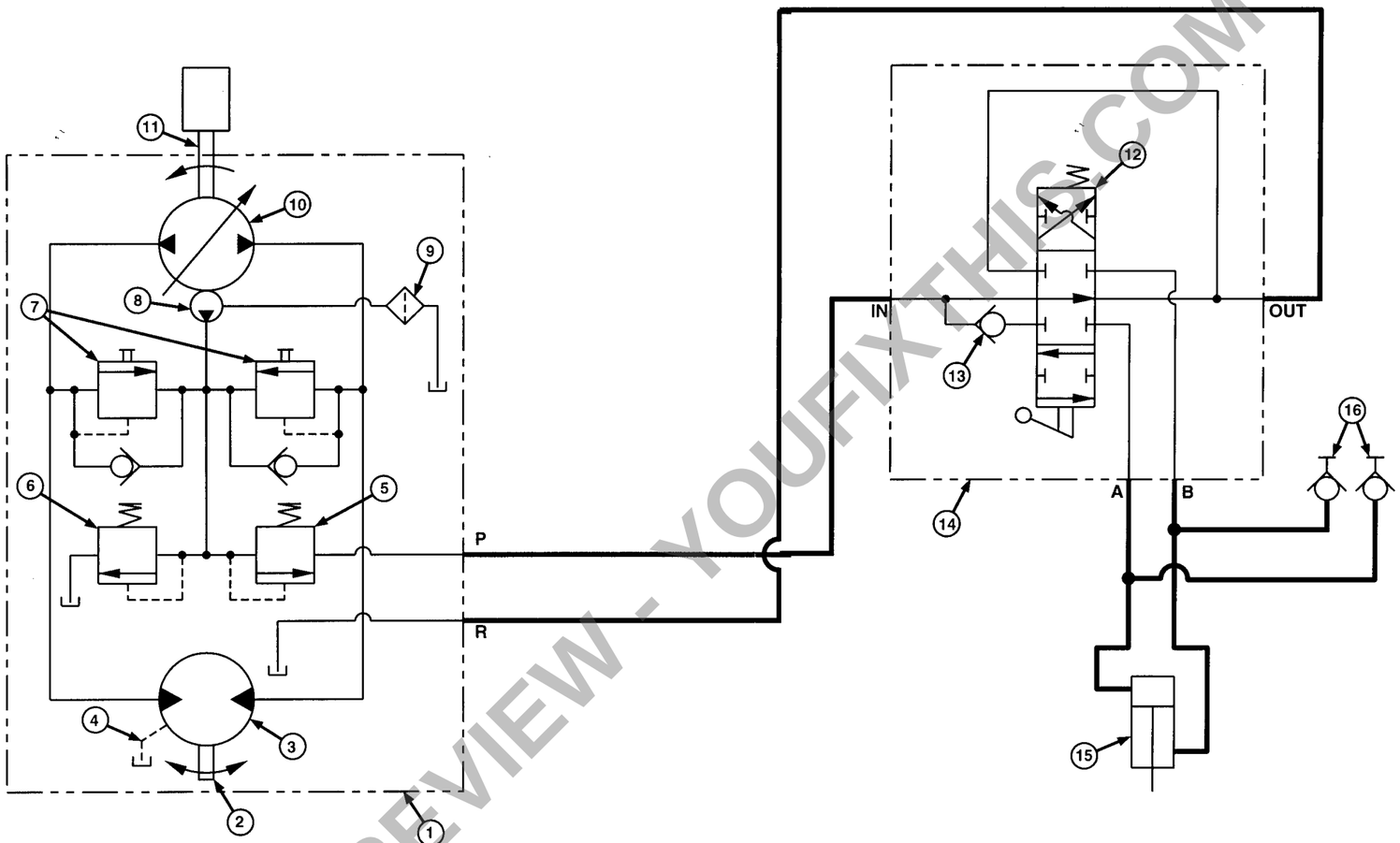
MAIN ELECTRICAL SCHEMATIC—322



SE1-Power and Starting Circuits	SE2-PTO and Interlock Circuits	SE3-Charging Circuit	SE4-Fuel Circuit	SE5-Ignition Circuit	SE6-Engine Instrumentation Circuits

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M78851

HYDRAULIC SYSTEM SCHEMATIC — 330

1060X660

MX,159127010,2 -19-13JUL95

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ABOUT THIS GROUP

Always perform the system checkout procedures in Group 05 BEFORE making any tests or adjustments in this group. The step-by-step procedures in this group provide you with the detailed diagnostic information you will need to isolate a malfunction. Basic diagnostic equipment is used.

It is assumed that you are familiar with the machine and its engine, fuel and air system components.

Engine rpm and temperature are critical in most engine tests. Be sure to follow test specifications carefully.

Always start with the first step and follow the sequence from left to right. Read each step completely before performing the test.

Upon completing a test or adjustment, check to see whether the problem is corrected by performing the checkout procedures in Group 05.

NOTE: For clarity in this section, machines (S.N. —596005) will be referred to as "Early Models". Machines (S.N. 596006—) will be referred to as "Later Models".

Later model machines have a brake switch added to the neutral start circuit, which is activated by depressing the brake pedals.

MX,159122010,1A-19-13JUL95

; TROUBLESHOOTING GUIDE

If engine does not operate properly, select the appropriate symptom from the list below. (If engine does not crank, see Section 240.)

- ENGINE WILL NOT START OR STARTS HARD: GO TO A
- ENGINE BACKFIRES: GO TO B
- ENGINE MISSES: GO TO C
- ENGINE SURGES OR STALLS FREQUENTLY: GO TO D
- ENGINE DOES NOT DEVELOP FULL POWER: GO TO E
- ENGINE RUNS ERRATICALLY: GO TO F
- ENGINE OVERHEATS OR RUNS COLD: GO TO G
- ABNORMAL ENGINE NOISE: GO TO H
- LOW OIL PRESSURE: GO TO I
- ENGINE USES TOO MUCH OIL: GO TO J
- ENGINE USES TOO MUCH FUEL: GO TO K

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10
20
40
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60
70
80
220
240
250

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TUBE AND HOSE FITTING, 37° FLARE AND 30° CONE SEAT CONNECTOR TORQUE

10 15 10

Thread Size	Torque[1] N·m	Torque[1] (lb-ft)	New[2] Number of Flats	Used [3] Number of Flats
3/8-24 UNF	8	(6)	2-1/2	1
7/16-20 UNF	12	(9)	2-1/2	1
1/2-20 UNF	16	(12)	2-1/2	1
9/16-18 UNF	24	(18)	2	1
3/4-16 UNF	46	(34)	2	1
7/8-14 UNF	62	(46)	1-1/2	1
1-1/16-12 UN	102	(75)	1	3/4
1-3/16-12 UN	122	(90)	1	3/4
1-5/16-12 UN	142	(105)	3/4	3/4
1-5/8-12 UN	190	(140)	3/4	3/4
1-7/8-12 UN	217	(160)	1/2	1/2

1. Tolerance of ± 10 percent.

2. To be used if a torque wrench cannot be used. After tightening fitting by hand, put a mark across the fittings, then tighten fitting the number of flats shown.

3. Flare connection seal by deforming or squeezing the tube between the nut and the connector. More deformation is possible with new parts than with old. Therefore, if a torque
rench is not used for re-assembly, the values in this column must be used to
revent damage.

MX,15901015,5 -19-17JAN95

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Section 40
ELECTRICAL REPAIR

Contents

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Install—322, 330 and 332 40-05-6
Install—430 40-05-7

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ASSEMBLE TRANSMISSION COVER

IMPORTANT: Do not nick or scratch lapped or machined surfaces of the center section, valve plates or cylinder block.

Keep pump and motor components separate. They are not interchangeable.

Always use new seals and O-rings. Damaged or used parts will leak.

NOTE: Lubricate all seals and O-rings with petroleum jelly during assembly.

1. Install two needle bearings. Drive bearings into housing until they are approximately 3 mm (0.118 in.) above the surface of the housing using a 5/8 in. driver disk (A).



M36132 -UN-29AUG88

50 05 22

MX,15905005,28 -19-23FEB95

2. Put clean John Deere Low Viscosity HY-GARD® oil on valve plates and housing surface.

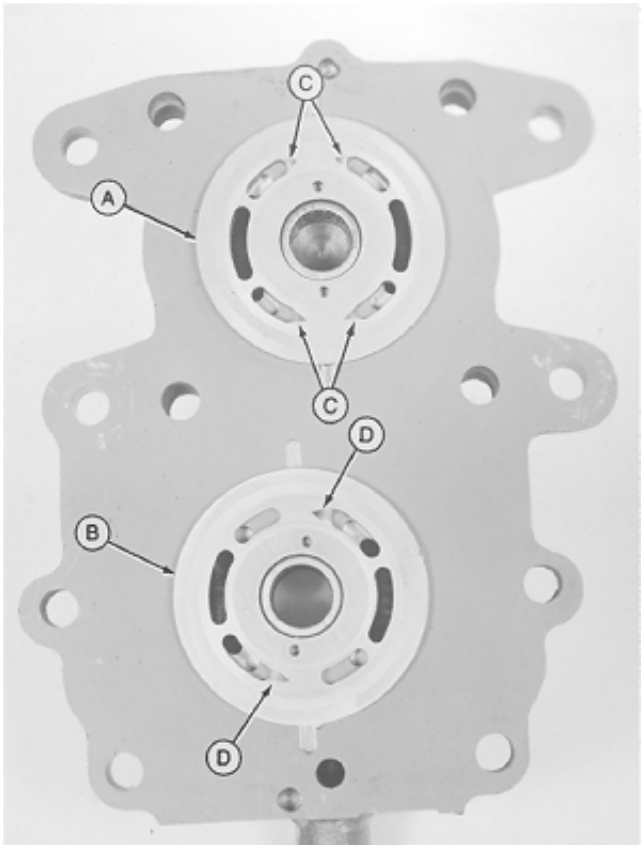
IMPORTANT: Pump valve plate (B) has TWO slotted ports (D).

Motor valve plate (A) may, or may not have slotted ports. Early models have FOUR slotted ports (C). Quiet hydro's (later models) have no slotted ports. All service or replacement plates will not have slotted ports.

NOTE: The motor valve plates are interchangeable between quiet hydros and early models.

3. Install pump valve plate (B) and motor valve plate (A) over the protruding bearings and align slots in plates with pins in housing.

A—Motor Valve Plate
B—Pump Valve Plate
C—Slotted Ports (4) (Early Models)
D—Slotted Ports (2)



M36133 -UN-22NOV89

MX,15905005,29 -19-23FEB95

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OTHER MATERIAL

Number	Name	Use
M79292	MPG-2® Multi-Purpose Polymer Grease	Prevents parts from seizing. Apply to axle shafts.
LOCTITE® PRODUCTS U.S./Canadian/LOCTITE No.		
TY6305/TY9485/764	Clean and Cure Primer	Cleans parts and speeds cure of sealant.
T43512/TY9473/242	Thread Lock and Sealer (Medium Strength)	Apply to threads of brake plate-to-axle cap screws.

®MPG-2 is a registered trademark of DuBois USA.

®LOCTITE is a registered trademark of the Loctite Corp.

MX,15905020,OTH-19-07MAR95

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1

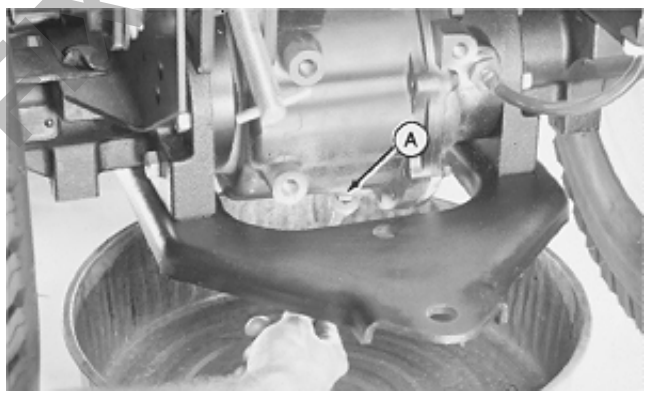
REMOVE AXLE

1. Disconnect battery negative (—) cable.

2. Remove drain plug (A) to drain transmission oil. Approximate capacity is 4.7 L (5 U.S. qt). After oil is completely drained, install and tighten drain plug.

3. Raise rear of tractor and install support stands.

4. Remove rear wheel.



M33430 -UN-25AUG88

MX,15905020,1 -19-23FEB95

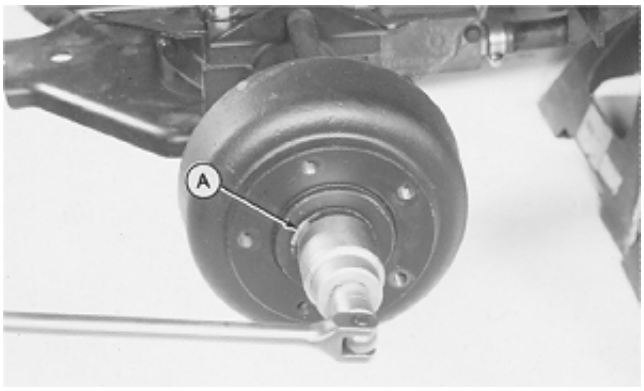
5. Bend edge of washer (A) flat against drum.

6. Remove nut and washer.

7. Pull drum off axle.

If drum hits shoes, turn the adjuster to reduce the drag on the drum from shoes.

If drum is tight on shaft from corrosion, remove drum using a three-leg wheel puller. Do not use impact puller.



M36560 -UN-25JAN90

5M3,5020K,C -19-18DEC87

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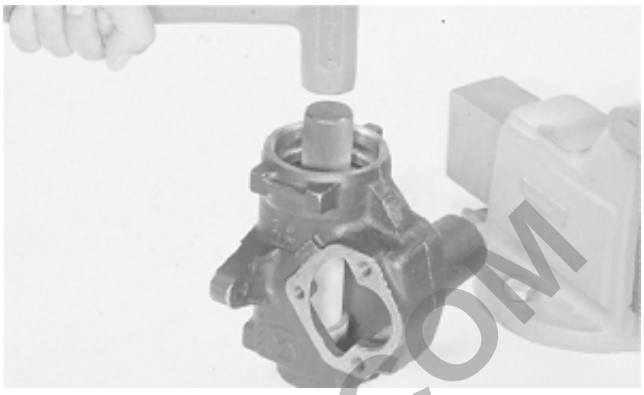
ASSEMBLE STEERING GEARBOX AND SHAFT

IMPORTANT: Always use new seals and gasket. Damaged or used parts will leak.

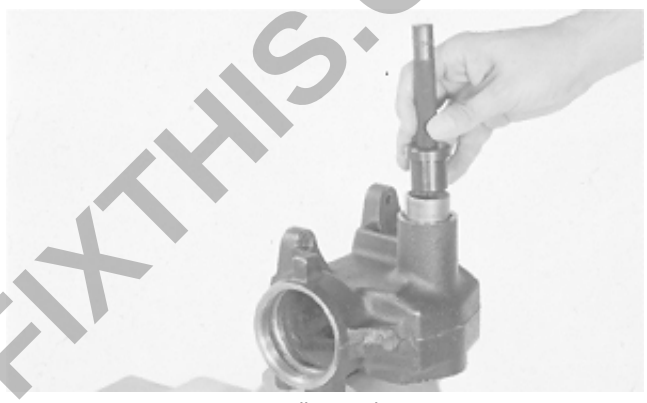
NOTE: Apply clean multipurpose grease on all internal parts during assembly.

1. Install new worm shaft bearing cup in gearbox housing, if removed, using a driver set.

2. Install new needle bearing in gearbox housing, if removed, using a driver from JDG457 Steering Gear Service Set.



Bearing Cup

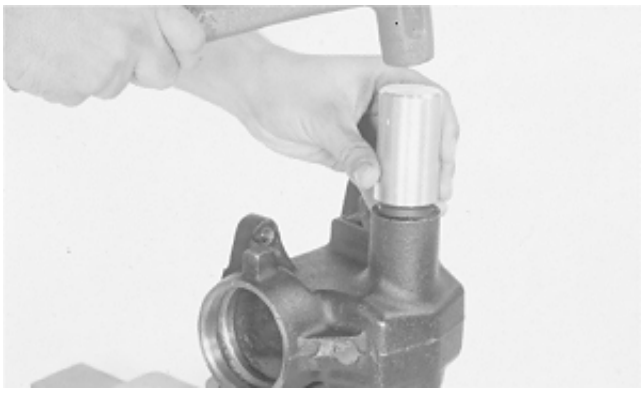


Needle Bearing

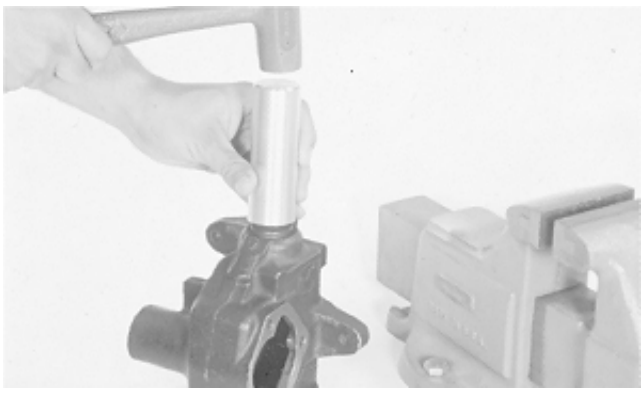
MX,15916005,16 -19-13JUL95

3. Install new pitman shaft and worm shaft seals into gearbox housing using drivers from JDG457 Steering Gear Service Set.

4. Apply multipurpose grease to lip of seals.



Pitman Shaft Seal



Worm Shaft Seal

MX,15906005,33 -19-01MAR95

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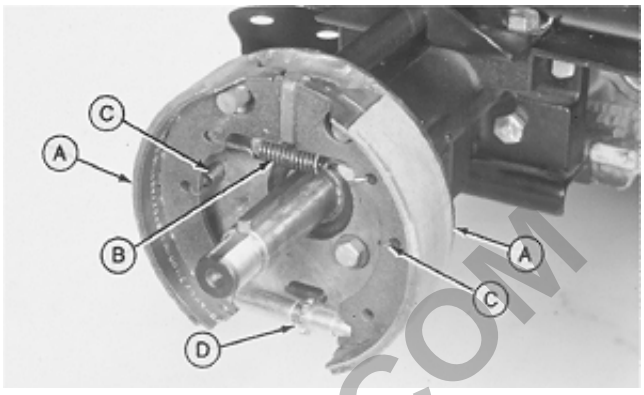
7. Inspect lining on brake shoes (A) for wear or oil contamination. Replace shoes if worn. Inspect axle oil seal if shoes are oily.

8. Inspect return spring (B) and hold-down springs (C) for wear or stretching.

9. Check adjuster assembly (D) for ease of movement.

10. Remove brake return spring (B), hold-down springs (C), adjuster (D), and shoes (A).

A—Brake Shoes
B—Return Spring
C—Hold-Down Springs
D—Adjuster Assembly



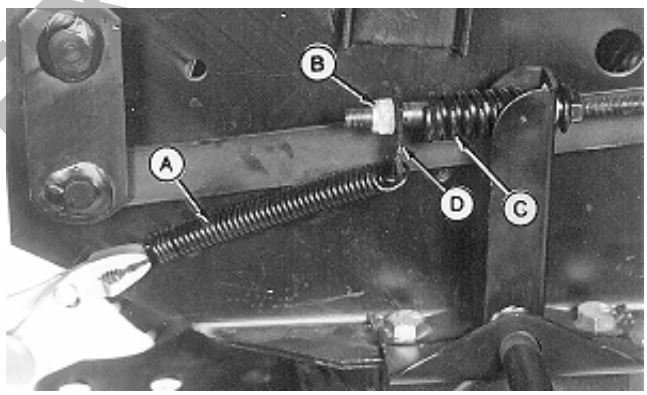
-UN-25JAN90
M36573

MX,15905010,20 -19-14FEB95

11. Disconnect return spring (A).

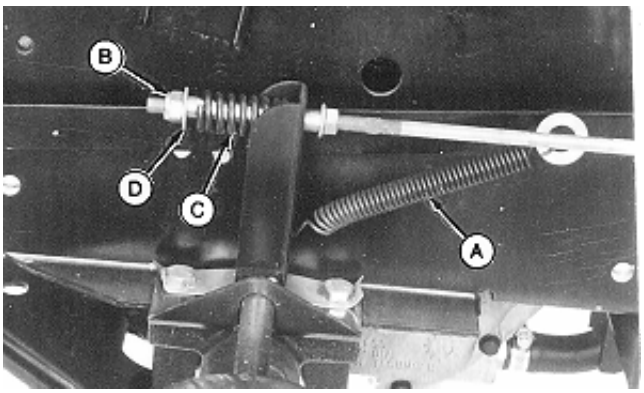
12. Remove nut (B), plate or washer (D) and spring (C).

A—Return Spring
B—Nut
C—Spring
D—Plate (Early 430)
—Washer (All and Later 430)



-UN-13FEB95
M78048

Early 430



-UN-13FEB95
M78049

All and Later 430

MX,15915010,13 -19-13JUL95

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6. Place a floor jack under center of axle.

7. Remove cotter pin from pivot bolt.

8. Remove pivot bolt nut and remove bolt through axle (towards rear). Remove axle.

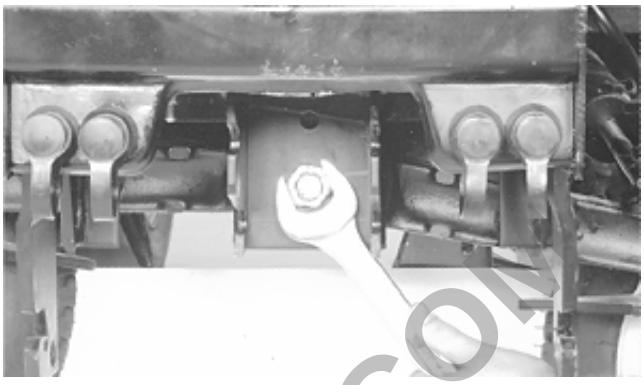
9. Inspect axle and pivot bushings for damage or wear. (See procedure in this group.)

10. Installation is done in the reverse order of removal.

• Apply multipurpose grease to pivot bolt before installing.

• Tighten pivot bolt nut until axle is snug, but still free to pivot.

• Adjust axle deflector adjustment bolts for smooth up and down operation of axle. Axle should move freely without sticking in one spot.



M32002 -UN-03AUG89

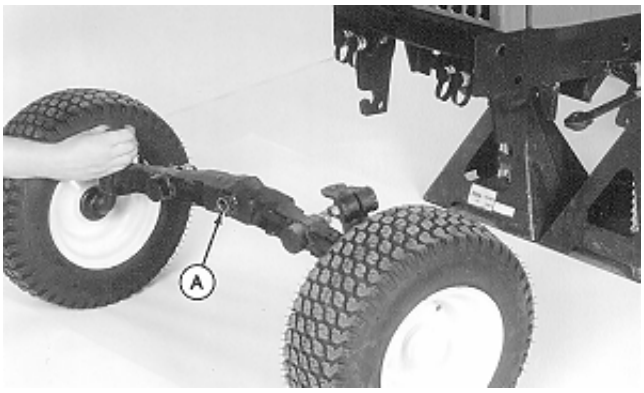
MX,15908005,3 -19-08MAR95

INSPECT AND REPLACE PIVOT BUSHINGS—322, 330 AND 332

1. Inspect pivot bushings (A) and pivot bolt for wear or damage. The pivot bolt should not be bent or have stripped threads.

2. Replace bushings if necessary, using a driver set.

3. Inspect the axle for bends, cracks, or damage. Replace any damaged components.



M31582 -UN-17FEB95

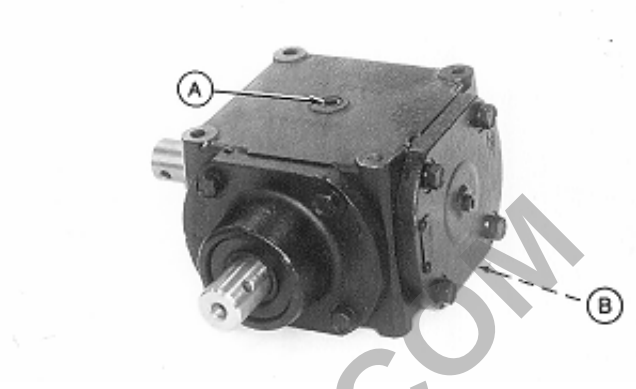
MX,15918005,2 -19-13JUL95

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DISASSEMBLE AND INSPECT MOWER GEAR CASE—LATER 60-INCH MOWER (PEERLESS)

1. Remove drain plugs (A and B) and drain oil from gear case.



M77311 -UN-24FEB95

MX,15908015,19 -19-22FEB95

2. Remove four cap screws (A) and input shaft assembly.

3. Remove lock nut (B), washer (C) and bevel gear (E) and bearing from shaft.

NOTE: Bearing cone is press-fit on bevel gear. Remove bearing cone only if replacement is necessary.

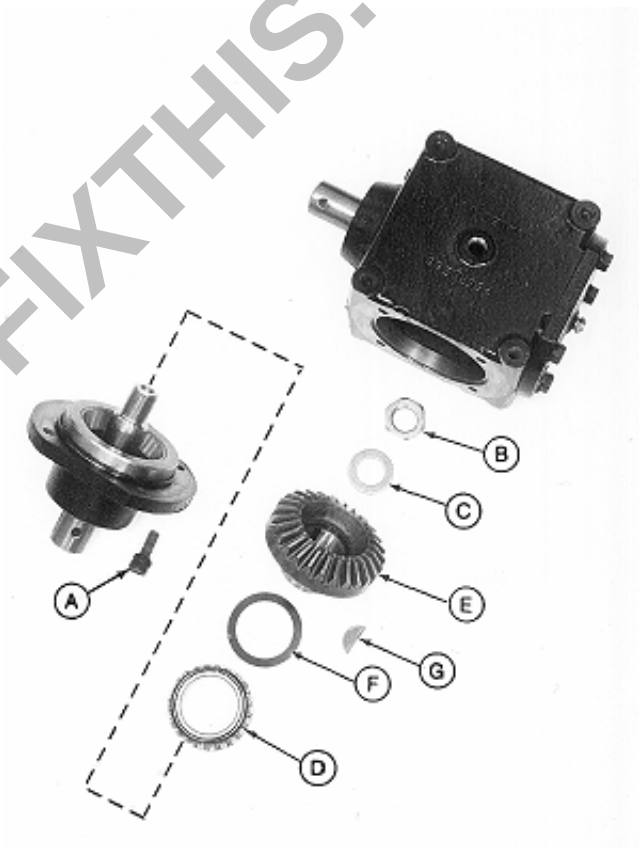
Bearing cone, cup in pillow block and shim(s) are matched and must be replaced as complete assemblies.

4. Inspect bearing cone (D) for wear or damage. Replace if necessary.

5. Remove bearing cone from bevel gear using a knife-edge puller and a press.

6. Remove shim(s) (F) and key (G).

A—Cap Screw (4 used)
B—Lock Nut
C—Washer
D—Bearing Cone
E—Bevel Gear
F—Shim (as required)
G—Key



M77312 -UN-24FEB95

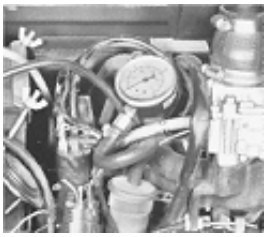
Input Shaft Side

MX,15908015,20 -19-13MAR95

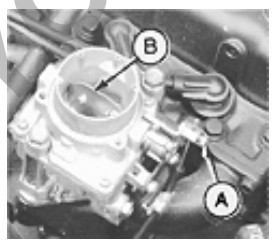
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Õ **FUEL TRANSFER PUMP TEST**	 M49171 -UN-20DEC89	Disconnect fuel hose from carburetor. Put end of hose in a graduated container. Turn key switch to RUN position for 30 seconds and record amount of fuel in container. DO NOT start engine. Minimum fuel flow is 200 mL/30 seconds (7 oz/30 seconds).	

 M49172 -UN-20DEC89	Connect JDG356 Pressure Test Kit to outlet side of fuel filter. Turn key switch to RUN position, then record pressure reading. DO NOT start engine. Minimum pressure is 14 kPa (2 psi).	**OK:** Connect fuel hose. **NOT OK:** Check fuel filter, fuel lines and fuel tank suction screen for plugged condition. Repeat test. If pump output still low, replace fuel transfer pump. MX,159122010,18-19-13JUL95

Ú **CHOKE ADJUSTMENT**		Remove air intake hose from carburetor. MX,159122010,19-19-13JUL95

8a **Early Models (Choke Cable)**	Inspect choke linkage for loose screws, wear or damage. Pull choke knob out, then push knob in. *LOOK: Choke plate must be completely closed, then completely open.*	 M44143 -UN-07SEP88	If necessary, loosen screw (A) and push choke control knob in. Hold choke plate (B) straight up in carburetor and tighten screw (A). Check for completely open and completely closed positions.	Install air intake hose on carburetor. MX,159122010,20-19-13JUL95

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10 **OPERATOR COMPLAINT NOT IDENTIFIED**	If you completed the checkout procedure and did not isolate a malfunction, the problem may be intermittent. Try to duplicate the conditions of the malfunction identified by the operator. Perform battery tests and ground tests as instructed in Group 20. Verify system grounds and battery condition. (See steps A and B in Group 20).	PERFORM BATTERY TESTS AND GROUND TESTS AS INSTRUCTED IN GROUP 20 AND AND REPEAT THE CHECKOUT PROCEDURE IN THIS GROUP. IF A MALFUNCTION IS NOT IDENTIFIED AFTER REPEATING SYSTEM CHECKOUT PROCEDURE, FACTORY ASSISTANCE IS AVAILABLE THROUGH THE DEALER TECHNICAL ASSISTANCE CENTER (DTAC). MX,159124005,17-19-13JUL95

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STARTING CIRCUIT OPERATION

The function of the starting circuit is to crank the engine by energizing starter motor (M1). PTO switches (S2 and S3), transmission neutral switch (S5), and brake switch (S4) are used as interlock switches within the starter circuit.

For the starter motor to energize, the following conditions must be met:

- Front and rear PTO switches in “OFF” position.
- Hydrostatic Control Lever in N/STOP position.
- Brake pedal depressed.
  322 (S.N. 596006—)
  332 (S.N. 596723—)
  430 (S.N. 596048—)
- Key Switch in “START” position.

PTO switches (S2 and S3) are used in the starting circuit to prevent the engine from cranking while the PTO is engaged. Each PTO switch contains two sets of contacts; one for the PTO circuit and the other as a safety interlock for the starting circuit. When the PTO switch is in the ON position (PTO engaged), the PTO switch “interlock” contacts are open, preventing starter operation. When the PTO switch is in the OFF position (PTO disengaged), the “interlock” contacts are closed, allowing current to flow to transmission neutral switch (S5).

The transmission neutral switch is used in the starting circuit to prevent the engine from cranking when the transmission is in gear. When the hydrostatic control lever is in the forward or reverse position, the transmission neutral switch contacts are open, preventing starter operation. Moving the hydrostatic control lever to the N/STOP position closes the contacts, allowing current to flow to brake switch (S4).

NOTE: Brake switch equipped on 322 (S.N. 596006—), 332 (S.N. 596723—) and 430 (S.N. 596048—) only. For all other machines, current flows from the transmission switch, directly to neutral start relay (K1).

The brake switch will prevent the engine from cranking unless the brake pedal is depressed. Depressing the brake pedal closes the brake switch contacts, allowing current to flow to neutral start relay (K1).

Key switch (S1) initiates current flow through the starting circuit. When the key switch is turned to the START position, the ignition contacts (A) and start contacts (B) close. If all the interlock switch contacts in the start circuit are closed, current from the battery positive (+) terminal flows through fusible link (F4) to terminal “B” on the key switch. Current flows across contacts (A) and out terminal “IGN” (322, 330 and 332) or terminal “BR” (430) to the 25 amp fuse (F1). From fuse (F1), current flows through the PTO, transmission, and brake (if equipped) switches to terminal “86” of the neutral start relay. The current flows through the relay coil windings and out terminal “85” to ground, thus energizing the relay and closing the normally open relay contacts (D).

The closed relay contacts complete the starter circuit which allows current to flow from key switch start contacts (B) to terminal “30” on the neutral start relay. Current flows across the relay contacts and out terminal “87”. From terminal “87”, current flows to starter solenoid (K2), through the solenoid coil windings, then to ground.

Starter solenoid (K2) contains two coils; one called the pull-in and the other called the hold-in. Current flowing through these coils produces a strong magnetic field, which pulls a plunger inward and closes solenoid main contacts (C). Because the starter is a shift type (solenoid is mounted on starter), the plunger also moves the starter drive gear outward to mesh with the flywheel ring gear.

When the solenoid contacts close, high current from the battery flows across the solenoid contacts to starter motor (M1), causing it to turn. Because the pull-in coil is grounded through the starter, current will flow through the pull-in coil only as long as the solenoid main contacts are open.

When the solenoid contacts close, both ends of the pull-in coil have the same voltage. This causes the current to stop flowing through the pull-in coil. Current continues to flow through the hold-in coil, which is grounded directly to the chassis. This keeps the solenoid energized (main contacts closed; starter drive engaged) until the key switch is released to the ON/RUN position or turned to the OFF position.

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; DASH LAMP CIRCUIT TESTS

Listed at right are symptoms that may occur in a malfunctioning dash lamp circuit. Locate the symptom that applies, then proceed to the appropriate test.

LAMP CIRCUIT SYMPTOMS:

—Fuses Blow When Any Of The Lamp Circuits Are Energized. Check For Shorts In The Power Circuit: GO TO Ô, Group 25.

—No Lamps Come ON: GO TO 1a

—Oil Pressure Lamp Does Not Come On: GO TO 1c

—Oil Pressure Lamp On All The Time: GO TO 1e

—Coolant Temperature Lamp Does Not Come On: GO TO 1f

—Coolant Temperature Lamp On All The Time: GO TO 1h

—Coolant Temperature Lamp Comes On When Low Fuel Lamp Comes On: GO TO 1i.

—Low Fuel Lamp Does Not Come On—322/332 (All) and 430 (S.N. 475001—): GO TO 1k

—Low Fuel Lamp Does Not Come On—430 (S.N. —475000): GO TO 1l

—Low Fuel Lamp On All The Time: GO TO 1n

—Battery Discharge Lamp Does Not Come On—322, 330 and 332: GO TO 1o

—Battery Discharge Lamp Does Not Come On—430: GO TO 1p

—Battery Discharge Lamp On All The Time—430: GO TO 1s

—Engine Preheat Lamp Does Not Come On: GO TO 1t

—Engine Preheat Lamp On All The Time: GO TO 1v

—Water-In-Fuel Lamp Does Not Come On—430: GO TO 1w

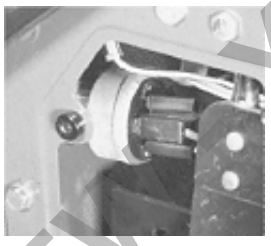
—Water-In-Fuel Lamp On All The Time—430: GO TO 1×a

MX,159124020,11-19-13JUL95

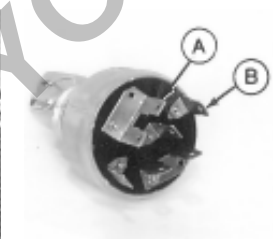
1a No Lamps Work

NOTE: The dash lamps receive power from the 10-amp fuse. When no lamps work, check for a problem in the power circuit.

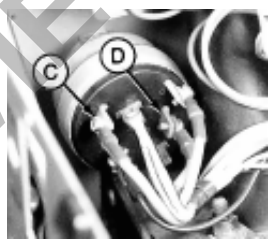
Check 10-amp fuse.



M49010 -UN-08JAN90



M55135 -UN-28APR95



M36599 -UN-27APR95

NOTE: Top photos show key switch for 322, 330 and 332.

Lower photo shows key switch for 430.

322, 330 and 332; Check for voltage at “BAT” terminal (B).

430; Check for voltage at “B” terminal (D).

NO VOLTAGE: GO TO 1b

VOLTAGE: Turn key switch to ON/RUN position.

322, 330 and 332; Check for voltage at “IGN” terminal (A).

430; Check for voltage at “BR” terminal (C).

VOLTAGE: Power circuit and key switch OK. Check for voltage at 10-amp fuse. If no voltage at fuse, wire between key switch and fuse is open. Repair or replace wire as necessary, then GO TO ;, Group 05.

NO VOLTAGE: GO TO Æ, Group 25.

MX,159124020,12-19-13JUL95

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Check for voltage difference between battery voltage and coil voltage as follows: —Measure voltage between battery positive (+) and negative (—) terminals by touching voltmeter leads to top of battery posts, not to the battery cable clamps. —Measure voltage at the positive (+) terminal of each ignition coil. Attach ground lead of voltmeter to the engine block. Do not attach ground lead to battery negative (—) terminal or machine frame.			NO VOLTAGE DIFFERENCE: (Voltage at battery and at each coil is the same or is less than 0.7 volts difference), GO TO 7h VOLTAGE DIFFERENCE IS 0.7 VOLTS OR MORE: Check the following connections: Battery terminals. Battery ground at engine block. Wire connections between battery (+) terminal and ignition coil (+) terminal. Repair connections as necessary, then GO TO Õ, Group 05.	
				MX,159124020,82-19-13JUL95
7h **Pulsar Coil Voltage Output Test**	PTO switch OFF. Hydrostatic lever in N/STOP position. Later Models; Park brake engaged. *NOTE: Pulsar coils are identified by wire color at pulsar 4-pin connector.* *No. 1 Pulsar—GRN/WHT* *No. 2 Pulsar—BRN* *No. 3 Pulsar—GRN*	 M45214 -UN-12JAN90	Disconnect pulsar 4-pin connector. Attach black (ground) lead of voltmeter to terminal with black wire (A) (Pulsar side of connector). Attach red lead of voltmeter to one of the three remaining terminals. Crank engine to check for AC voltage from pulsar. Each pulsar should produce a minimum of 0.05 VAC. Repeat voltage check at two remaining terminals.	VOLTAGE 0.05 VAC OR MORE: Pulsars OK. Check all circuit connections. If OK, GO TO 7m VOLTAGE LESS THAN 0.05 VAC: GO TO 7i
				MX,159124020,83-19-13JUL95

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ABOUT THIS GROUP

Always perform the system checkout procedures in Group 05 BEFORE making any tests or adjustments in this group. The step-by-step procedures in this group provide you with the detailed diagnostic information you will need to isolate a malfunction. Basic diagnostic equipment is used.

It is assumed that you are familiar with the machine and its power train components. If you need additional information, read the theory of operation in Group 10 or refer to the overall hydraulic schematics in Section 270, Group 10.

Engine rpm and temperature are critical in most hydraulic tests. Be sure to follow test specifications carefully.

Always start with the first step and follow the sequence from left to right. Read each step completely before performing the test.

Upon completing a test or adjustment, check to see whether the problem is corrected by performing the checkout procedures in Group 05.

MX,159025015,1 -19-20APR95

; TROUBLESHOOTING GUIDE

If machine does not operate properly, select the appropriate symptom from the list below.

- MACHINE MOVES IN ONE DIRECTION ONLY: GO TO A
- MACHINE WILL NOT MOVE IN EITHER DIRECTION: GO TO B
- MACHINE CREEPS IN ONE DIRECTION CONSISTENTLY: GO TO 1! OR 1@
- HYDRO CONTROL LEVER DOES NOT RETURN TO NEUTRAL WHEN BOTH BRAKES ARE APPLIED: GO TO 1ô
- TRANSMISSION OPERATION HAS ERRATIC OR LOW POWER OR SPEED WILL NOT INCREASE: GO TO C
- MACHINE WILL NOT REACH FULL SPEED: GO TO D
- TRANSMISSION OPERATES HOT: GO TO E
- MACHINE FREEWHEELS: GO TO F
- HYDRAULIC SYSTEM IS NOISY: GO TO G
- NO HYDRAULICS AFTER BEING SERVICED: GO TO H
- CHARGE PUMP SEAL REPEATEDLY FAILS: GO TO I

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