8100, 8200, 8300, 8400
8110, 8210, 8310, 8410
Tractors
Repair

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TECHNICAL MANUAL
8100, 8200, 8300, 8400
8110, 8210, 8310, 8410
Tractors Repair
TM1575 21JAN03 (ENGLISH)

For complete service information also see:

8100, 8200, 8300, and 8400 Tractors:	
- Operation and Test	**TM1576**
6076 Engines	**CTM42**
6081 Engines:	
- Repair	**CTM86**
- Operation and Test	**CTM134**
Engine Fuel Injection	**CTM68**
Starting Motors and Alternators	**CTM77**
8110, 8210, 8310 and 8410 Tractors:	
- Operation and Test	**TM1797**
- Diagnostics	**TM1796**

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10
05
1

Recognize Safety Information

This is a 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 –19–29SEP98–1/1

Handle Fluids Safely—Avoid Fires

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.



TS227 –UN–23AUG88

DX,FLAME –19–29SEP98–1/1

Prevent Battery Explosions

Keep sparks, lighted matches, and open flame away from the top of battery. Battery gas can explode.

Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.

Do not charge a frozen battery; it may explode. Warm battery to 16°C (60°F).



TS204 –UN–23AUG88

DX,SPARKS –19–03MAR93–1/1

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General Specifications

	8100-8110	8200-8210	8300-8310	8400-8410
Power (Factory Observed):				
PTO (8000 Series)	119 kW (160 hp)	134 kW (180 hp)	149 kW (200 hp)	168 kW (225 hp)
.. (8000 TEN Series)	123 kW (165 hp)	138 kW (185 hp)	153 kW (205 hp)	175 kW (235 hp)
Rated Speed	2200 rpm	2200 rpm	2200 rpm	2200 rpm
Engine Speed at PTO Operating Speed:				
.. 1000 rpm	2200 rpm	2200 rpm	2200 rpm	2200 rpm
.. 540 rpm	1930 rpm	1930 rpm	1930 rpm	1930 rpm
Governed Speed Range	800—2400 rpm	800—2400 rpm	800—2400 rpm	800—2400 rpm
Operating Speed Range	1500—2200 rpm	1500—2200 rpm	1500—2200 rpm	1500—2200 rpm
Slow Idle Speed	790—810 rpm	790—810 rpm	790—810 rpm	790—810 rpm
Fast Idle Speed	2275—2325 rpm	2275—2325 rpm	2275—2325 rpm	2275—2325 rpm
Engine:				
Type	Diesel	Diesel	Diesel	Diesel
Cylinders	In-line 6	In-line 6	In-line 6	In-line 6
Aspiration	Turbocharged and Air-to-Air Aftercooled	Turbocharged and Air-to-Air Aftercooled	Turbocharged and Air-to-Air Aftercooled	Turbocharged and Air-to-Air Aftercooled
Lubrication	Full-Flow Filtration with Bypass	Full-Flow Filtration with Bypass	Full-Flow Filtration with Bypass	Full-Flow Filtration with Bypass
P.I.N. (—010000):				
Displacement	7.6 L (466 $in.^3$)	7.6 L (466 $in.^3$)	7.6 L (466 $in.^3$)	8.1 L (496 $in.^3$)
Bore	116 mm (4.56 in.)	116 mm (4.56 in.)	116 mm (4.56 in.)	116 mm (4.56 in.)
Stroke	121 mm (4.75 in.)	121 mm (4.75 in.)	121 mm (4.75 in.)	128.5 mm (5.06 in.)
Compression Ratio	15.0:1	15.0:1	15.0:1	15.8:1
Valve Clearance:				
.. Intake	0.38 mm (0.015 in.)	0.38 mm (0.015 in.)	0.38 mm (0.015 in.)	0.46 mm (0.018 in.)
.. Exhaust	0.51 mm (0.020 in.)	0.51 mm (0.020 in.)	0.51 mm (0.020 in.)	0.71 mm (0.028 in.)
P.I.N. (010001—):				
Displacement	8.1 L (496 $in.^3$)	8.1 L (496 $in.^3$)	8.1 L (496 $in.^3$)	8.1 L (496 $in.^3$)
Bore	116 mm (4.56 in.)	116 mm (4.56 in.)	116 mm (4.56 in.)	116 mm (4.56 in.)
Stroke	128.5 mm (5.06 in.)	128.5 mm (5.06 in.)	128.5 mm (5.06 in.)	128.5 mm (5.06 in.)
Compression Ratio	16.5:1	16.5:1	16.5:1	16.5:1
Valve Clearance:				
.. Intake	0.46 mm (0.018 in.)	0.46 mm (0.018 in.)	0.46 mm (0.018 in.)	0.46 mm (0.018 in.)
.. Exhaust	0.71 mm (0.028 in.)	0.71 mm (0.028 in.)	0.71 mm (0.028 in.)	0.71 mm (0.028 in.)
Electrical System:				
Type	12 Volt	12 Volt	12 Volt	12 Volt
Alternator	140 amp	140 amp	140 amp	140 amp
Batteries	2	2	2	2
Cold Cranking Amps	1850	1850	1850	1850

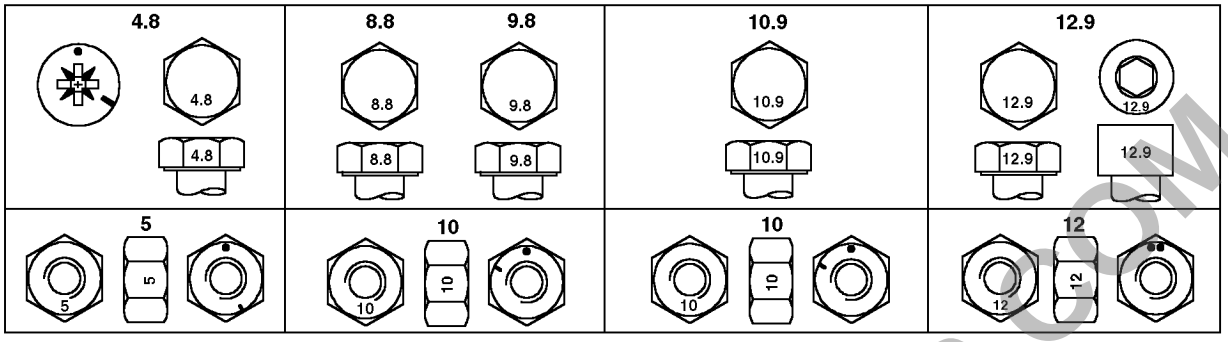
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AG,OURX113,7 –19–04NOV99–1/3

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Metric Bolt and Cap Screw Torque Values



TORQ2 –UN–07SEP99

Top, Property Class and Head Markings; Bottom, Property Class and Nut Markings

	Class 4.8		Class 8.8 or 9.8		Class 10.9		Class 12.9	
Size	**Lubricated[a] N•m(lb-ft)**	**Dry[b] N•m(lb-ft)**	**Lubricated[a] N•m(lb-ft)**	**Dry[b] N•m(lb-ft)**	**Lubricated[a] N•m(lb-ft)**	**Dry[b] N•m(lb-ft)**	**Lubricated[a] N•m(lb-ft)**	**Dry[b] N•m(lb-ft)**
M6	4.7 (3.5)	6 (4.4)	9 (6.6)	11.5 (8.5)	13 (9.5)	16.5 (12.2)	15.5 (11.5)	19.5 (14.5)
M8	11.5 (8.5)	14.5 (10.7)	22 (16)	28 (20.5)	32 (23.5)	40 (29.5)	37 (27.5)	47 (35)
M10	23 (17)	29 (21)	43 (32)	55 (40)	63 (46)	80 (59)	75 (55)	95 (70)
M12	40 (29.5)	50 (37)	75 (55)	95 (70)	110 (80)	140 (105)	130 (95)	165 (120)
M14	63 (46)	80 (59)	120 (88)	150 (110)	175 (130)	220 (165)	205 (150)	260 (190)
M16	100 (74)	125 (92)	190 (140)	240 (175)	275 (200)	350 (255)	320 (235)	400 (300)
M18	135 (100)	170 (125)	265 (195)	330 (245)	375 (275)	475 (350)	440 (325)	560 (410)
M20	190 (140)	245 (180)	375 (275)	475 (350)	530 (390)	675 (500)	625 (460)	790 (580)
M22	265 (195)	330 (245)	510 (375)	650 (480)	725 (535)	920 (680)	850 (625)	1080 (800)
M24	330 (245)	425 (315)	650 (480)	820 (600)	920 (680)	1150 (850)	1080 (800)	1350 (1000)
M27	490 (360)	625 (460)	950 (700)	1200 (885)	1350 (1000)	1700 (1250)	1580 (1160)	2000 (1475)
M30	660 (490)	850 (625)	1290 (950)	1630 (1200)	1850 (1350)	2300 (1700)	2140 (1580)	2700 (2000)
M33	900 (665)	1150 (850)	1750 (1300)	2200 (1625)	2500 (1850)	3150 (2325)	2900 (2150)	3700 (2730)
M36	1150 (850)	1450 (1075)	2250 (1650)	2850 (2100)	3200 (2350)	4050 (3000)	3750 (2770)	4750 (3500)

[a] *"Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings.*

[b] *"Dry" means plain or zinc plated without any lubrication.*

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.

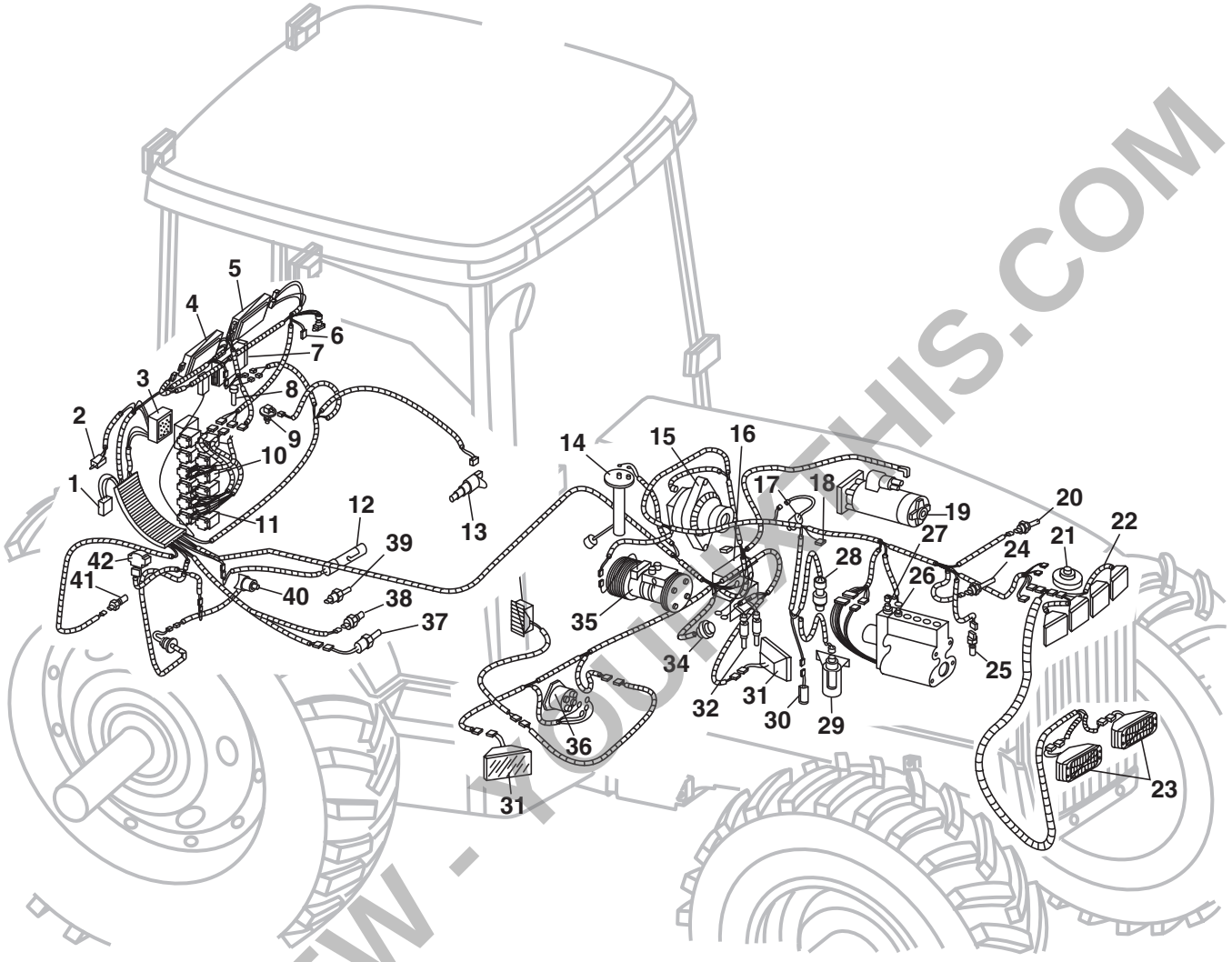
Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

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.

DX,TORQ2 –19–01OCT99–1/1

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Main Chassis Harness Routing and Component Identification



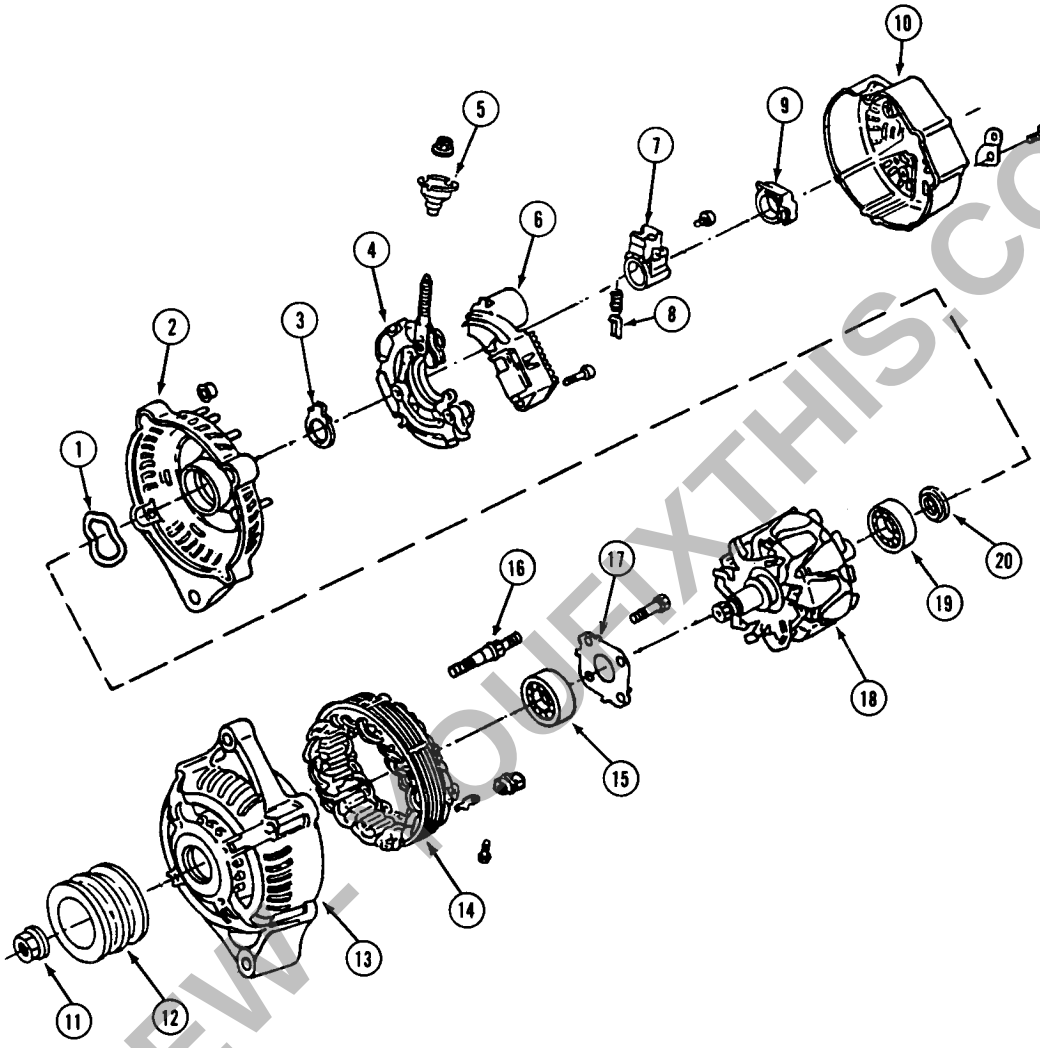
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AG,OUOD008,307 –19–27OCT99–1/2

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Exploded View—*Alternator*



1—Seal
2—Rear End Frame
3—Seal
4—Rectifier
5—"S" Terminal Insulator
6—IC Regulator/TVP (Transient Voltage Protector)
7—Brush Holder
8—Brush
9—Seal
10—Rear End Cover
11—Nut
12—V-Ribbed Pulley
13—Drive End Frame
14—Stator
15—Bearing
16—Stud Bolt
17—Retainer Plate
18—Rotor
19—Bearing
20—Bearing Cover

AG,OUOD008,321 –19–27OCT99–1/1

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Remove Engine

Disconnect battery ground cable.

Remove hood and side shields.

Drain coolant from engine and radiator.

Disconnect lower end of aftercooler pipe (A).

Disconnect parts (B—E).

Loosen air intake duct retaining bracket (F).

Remove parts (G) and (H).

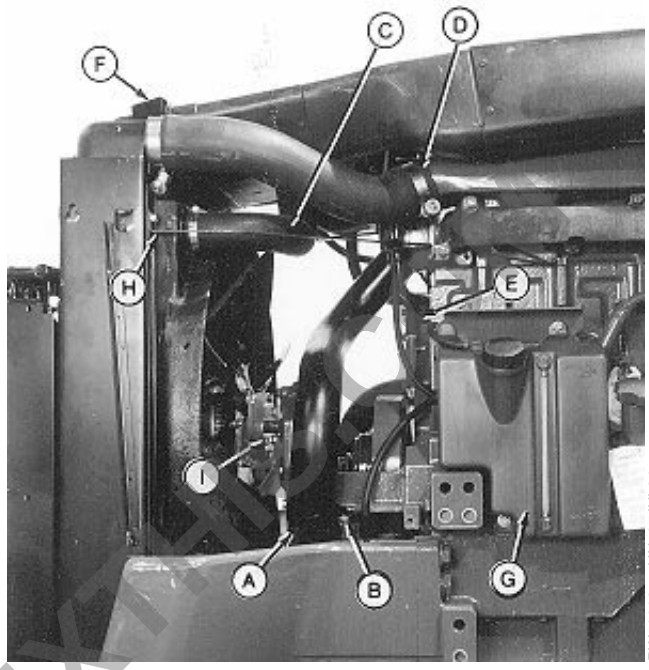
Remove and tie fan/viscous drive (I) to shroud.

For tractors WITH MFWD, perform the following step:

Remove MFWD fender bumper shield.

For tractors WITHOUT MFWD, perform the following step:

Remove lower side shields.



RW50063 –UN–07JUL94

A—Aftercooler Pipe
B—Aftercooler Pipe Clamp
C—Hose
D—Air Intake Hose
E—Engine Speed Sensor Harness (7.6 L Engine)
F—Air Intake Duct Retaining Bracket
G—Coolant Recovery Tank
H—Radiator Support Bracket
I—Fan/Viscous Drive

Continued on next page

AG,OUOD008,264 –19–27OCT99–1/8

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Capacities:

Fuel Tank	512 L (135 gal)	512 L (135 gal)	512 L (135 gal)	512 L (135 gal)
Cooling System:				
.. P.I.N. (—010000)	27.2 L (7.2 gal)	27.2 L (7.2 gal)	27.2 L (7.2 gal)	28.4 L (7.5 gal)
.. P.I.N. (010000—)	34.0 L (9 gal)	34.0 L (9 gal)	34.0 L (9 gal)	34.0 L (9 gal)
Crankcase	21.5 L (5.7 gal)	23.5 L (6.2 gal)	25.0 L (6.6 gal)	27.0 L (7.1 gal)
Transmission and Hydraulics	140 L (37 gal) [a]	140 L (37 gal) [a]	140 L (37 gal) [a]	140 L (37 gal) [a]
MFWD Differential	10.9 L (2.9 gal)	10.9 L (2.9 gal)	10.9 L (2.9 gal)	10.9 L (2.9 gal)
MFWD Wheel Hubs	3 L (3.2 qt)	3 L (3.2 qt)	3 L (3.2 qt)	3 L (3.2 qt)

[a]Includes 22.7 L (6 gal) for Clean-Oil Reservoir

Cooling System:

Type ..... 70 kPa (0.7 bar) (10 psi) Liquid with Gear-Driven Centrifugal Pump and Enclosed Recovery Tank
Fan – P.I.N. (—010000) ..... Viscous Drive – Gear-Driven
Fan – P.I.N. (010001—) ..... Viscous Drive – Belt-Driven
Thermostats ..... Two Heavy-Duty

Fuel System:

Injection Pump Type ..... In-Line with Electronic Governor
Fuel Filter ..... Standard Clamp-On Final Filter with Optional Spin-On Primary Filter with Water Separator Bowl
Air Cleaner ..... Dry-Type with Secondary Element

Hydraulic System:

Type ..... Pressure/Flow Compensated
Tandem Gear Pump (Steering-Brakes-Charge):
.. Maximum Pressure ..... 20 000 kPa (2900 psi)
.. Rated Flow at Charge Pump (8000 Series) ..... 1.8 L/s (28 gpm)
.... (8000 TEN Series) ..... 2.0 L/s (31 gpm)
.. Rated Flow at Primary Pump (8000 Series) ..... 1.3 L/s (21 gpm)
.... (8000 TEN Series) ..... 1.4 L/s (23 gpm)
Secondary Axial Piston Pump (Hitch-SCV)
.. Available Flow (45 cm^3) (8000 Series) ..... 1.9 L/s (30 gpm)
.... (8000 TEN Series) ..... 2.1 L/s (33.5 gpm)
.. Available Flow (Optional 57 cm^3) (8000 Series) ..... 2.4 L/S (38 gpm)
.... (8000 TEN Series) ..... 2.7 L/s (42.5 gpm)
Available Flow at SCVs ..... 1.9 L/s (30 gpm)
Hitch Lift Capacity:
.. Standard:
.... 8100, 8110, 8200, 8210 ..... 4717 kg (10400 lb)
.... 8300, 8310, 8400, 8410 ..... 5307 kg (11700 lb)
.. Optional:
.... 8100, 8110, 8200, 8210 ..... 6425 kg (14165 lb)
.... 8300, 8310, 8400, 8410 ..... 7099 kg (15650 lb)

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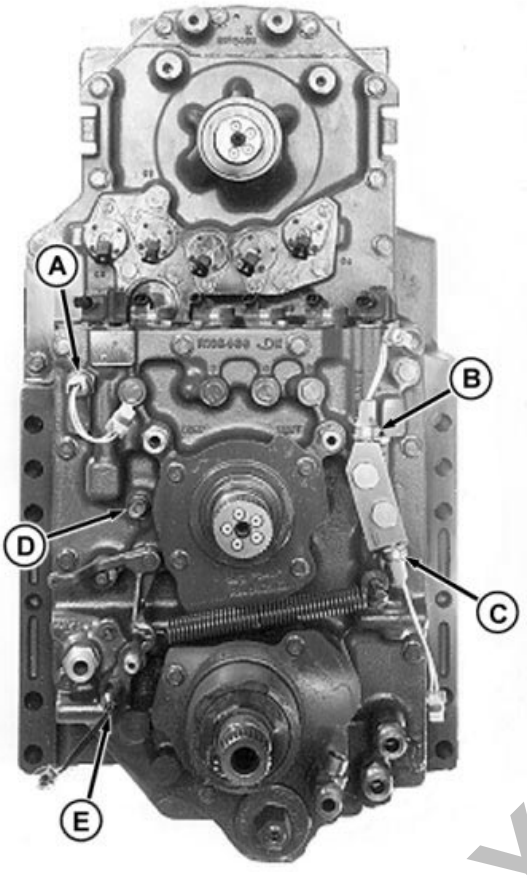
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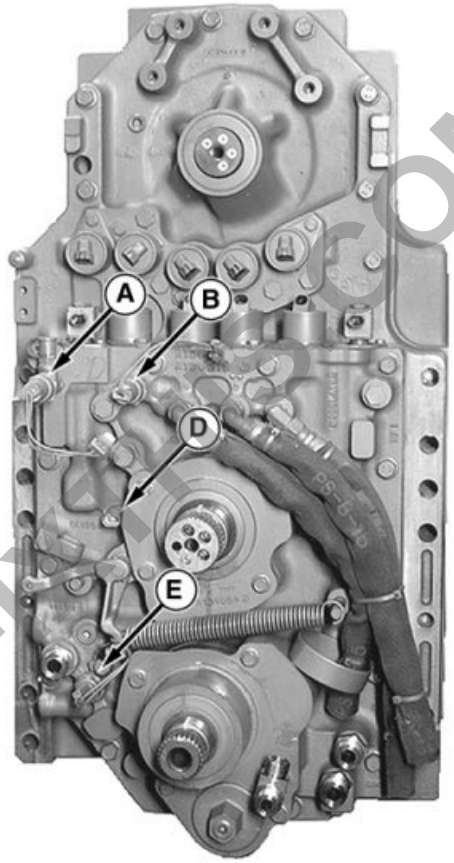
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Replace Transmission Manifold Electrical Switches



RW60067A –UN–22JAN99

(Serial No. —019999)



RW60435 –UN–17OCT97

(Serial No. 020000—)

A—Park Brake Pressure Switch
B—Clutch Engage Switch
C—Transmission Pressure Switch
D—Clutch Disengage Switch
E—Ground-Driven Pump Pressure Switch

Remove switches as required.

Remove mid-frame cover plate from bottom of tractor near rear of transmission to access switches (C—E).

Disconnect switch harness connector.

NOTE: Use JDG913 Pressure Switch Socket to aid removal of switches (B) and (C) for tractors through (S. N. —019999).

Later transmissions will not have pressure switch (E).

Install replacement switches.

Install mid-frame cover plate.

IMPORTANT: The mid-frame cover is a structural member of the tractor frame and must be installed correctly.

The mid-frame, cover, and cap screws must be cleaned and tightened correctly to prevent machine failure.

Clean mid-frame and mid-frame cover bolting surfaces.

Clean, install, and tighten mid-frame cover-to-mid-frame cap screws.

Continued on next page

AG,OUOD008,350 –19–27OCT99–1/3

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Drain transmission by removing plug (A). (See Drain Hydraulic System—Section 70, Group 05.)

Disconnect radar sensor, if equipped.

NOTE: Newer tractors have different bolt pattern for plate with larger cap screws on one end.

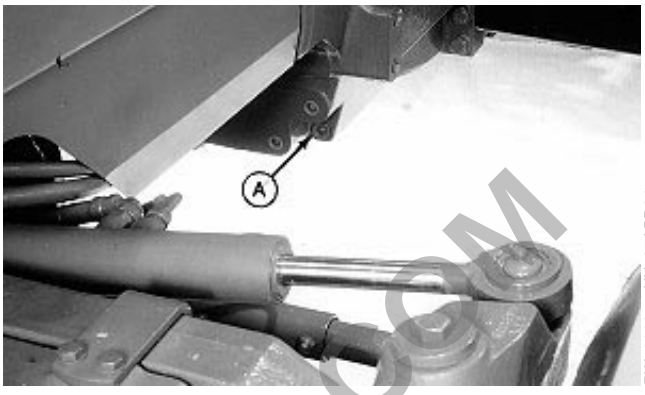
Remove bottom plates (B) from mid-frame.

Disconnect drive shafts (C).

Disconnect harness and remove sensor (D).

Disconnect and plug six oil lines (E).

A—Plug
B—Plates
C—Shafts
D—Sensor
E—Lines



RW50062 –UN–27APR94



RW50018 –UN–27APR94



RW50019 –UN–27APR94

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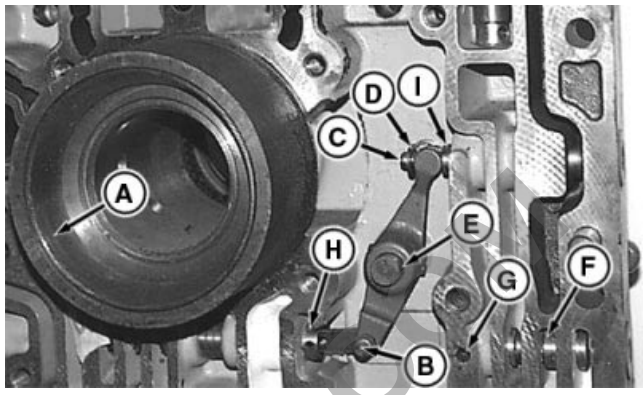
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Remove the output shaft bearing cup (A), if necessary.

Remove parts (B—I).

A—Bearing Cup
B—Arm-to-Valve Pin
C—Retaining Ring
D—Washer
E—Pedal Arm Shaft Assembly
F—Transport Sump Valve
G—Sump Valve Stop Pin
H—Clutch Valve Assembly
I—Park Brake Release Valve



RW37299 –UN–22SEP99

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AG,OURX078,223 –19–09NOV99–3/11

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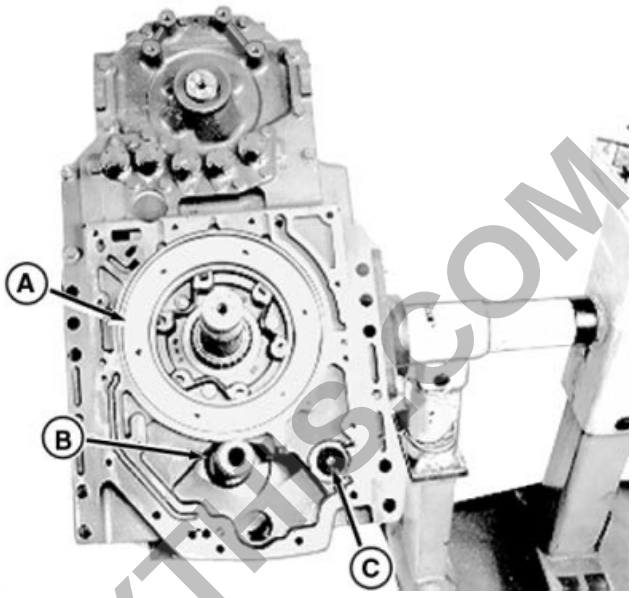
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Remove park brake plate, separator plates, and disks (A).

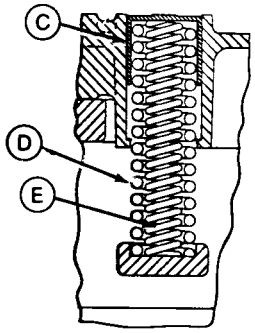
Remove auxiliary drive shaft (B).

Remove accumulator piston (C) and accumulator springs (D) and (E).

A—Park Brake Plate, Separator Plates, and Disks
B—Auxiliary Drive Shaft
C—Accumulator Piston
D—Outer Accumulator Spring
E—Inner Accumulator Spring



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Remove MFWD Clutch

Loosen MFWD drive shaft shield clamps and remove shield.

CAUTION: Ignition must be in the "OFF" position when checking position of MFWD drive shaft snap ring (A).

Position tractor so MFWD drive shaft snap ring (A) is in the downward position.

Disconnect battery ground cable from rear of transmission.

Disengage MFWD shaft snap ring and slide shaft forward to disengage from MFWD clutch.

Remove steering line clamp(s) (B) from front of MFWD clutch.

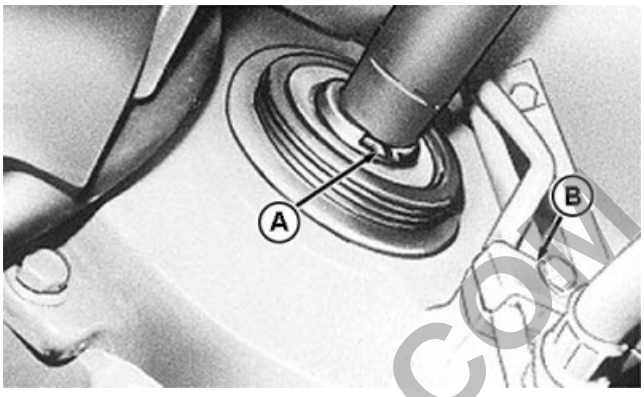
Remove side panels and hood.

Remove battery box cover and disconnect battery ground cables from transmission.

Remove front weights.

Drain coolant from engine block and radiator.

Disconnect starter cables and remove tie bands.

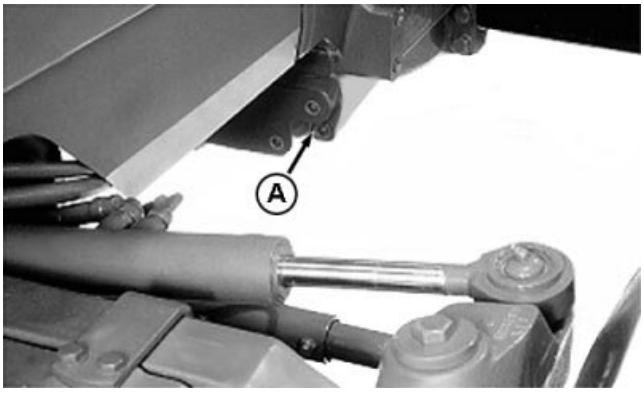


A—Snap Ring
B—Clamp

AG,OUOD004,345 –19–10NOV99–1/11

Drain transmission by removing plug (A). (See Drain Hydraulic System—Section 70, Group 05.)

A—Plug



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AG,OUOD004,345 –19–10NOV99–2/11

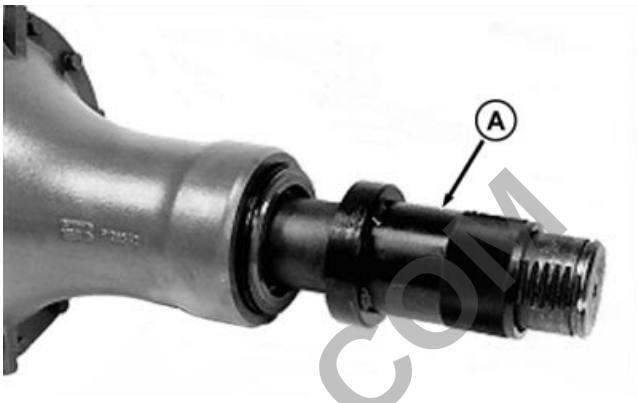
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Install final drives. (See Remove and Install Final Drives, Group 00.)

IMPORTANT: DO NOT disassemble the seal. Disassembly will damage the seal.

Install outer axle seal using JDG867 *(8100-8200-8010-8210)* or JDG868 *(8300-8400-8310-8410)* Rear Axle Housing Seal Installer (A).

A—Seal Installer



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Item	Measurement	Specification
Axle Housing Oil Seal Wear Sleeve[1]	Height (From End of Yoke)	44.5—45.5 mm (1.751—1791 in.)
Knuckle Spindle Housing Bushing[1]	Inner Diameter (New)	56.05—56.12 mm (2.206—2.210 in.)
Wheel Hub Bushing	Inner Diameter	56.05—56.12 mm (2.206—2.210 in.)
Knuckle Spindle Bushing	Inner Diameter	75.15—75.17 mm (2.957—2.961 in.)
Knuckle Spindle Sleeve Bushing	Inner Diameter	56.05—5.12 mm (2.206—2.210 in.)
Lower Kingpin Cap Screw	Torque	310 N•m (229 lb-ft)
Spanner Wrench	Torque	220 N•m (162 lb-ft)
Retaining Screw	Torque	50 N•m (37 lb-ft)
Planet Pinion Retaining Screw	Torque	310 N•m (229 lb-ft)
Carrier Assembly-to-Wheel Hub Cap Screws	Torque	126 N•m (92 lb-ft)
Axle Housing-to-Differential Case Cap Screws	Torque	310 N•m (229 lb-ft)
Tie Rod End Nuts	Torque	185 N•m (136 lb-ft)
Wear Sleeve	Height (From End of Yoke)	44.5—45.5 mm (1.75—1.79 in.)
Axle Inner Yoke Bushing (Early Design)	Inner Diameter (New)	56.05—56.12 mm (2.206—2.210 in.)

[1]*Later Seal Design*

Continued on next page

AG,OUOD008,597 –19–11NOV99–3/5

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IMPORTANT: Make sure the overflow line is unrestricted and the plug is removed.

Hold the reservoir overflow hose extension tube (A) over the container. Observe for oil flow from the hose and immediately CLOSE the valve (B) on the bleed hose.

Stop engine.

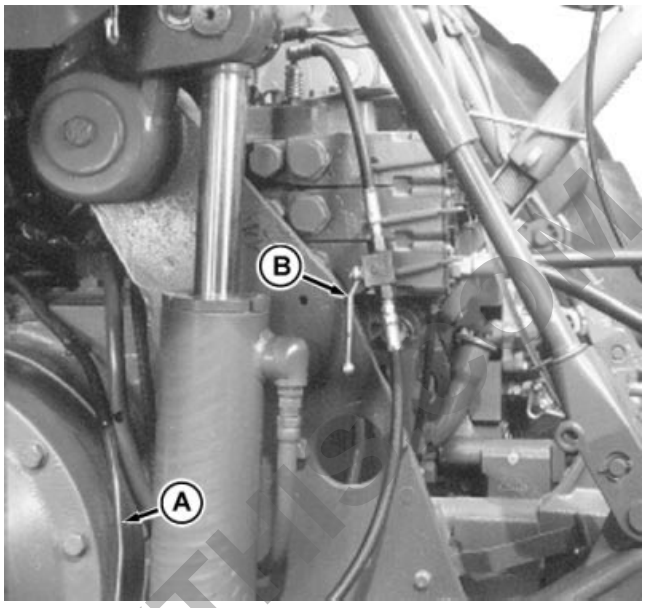
Remove the hose extension, install the cap screw plug (C) in the overflow hose, install and tighten the hose clamp (D), and put the overflow hose behind the other lines.

Remove secondary brake bleed hose from the DRs.

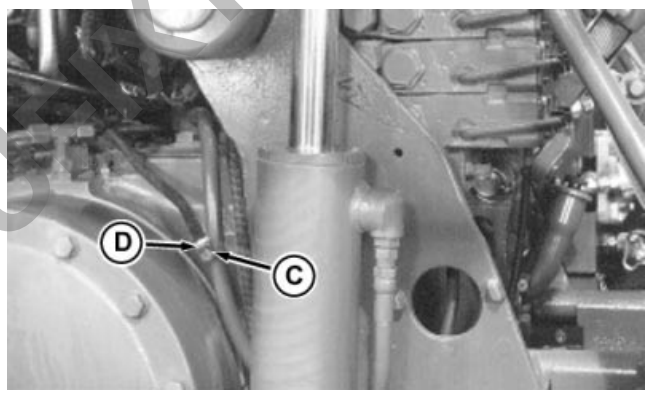
Remove the brake bleed hose, front axle clear plastic hoses and oil containers.

Install engine side panel and wheel.

A—Overflow Hose Extension
B—Shut-off Valve
C—Cap Screw Plug
D—Hose Clamp



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RW35726A –UN–10DEC98

AG,OUOD008,536 –19–27OCT99–7/7

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BACKLASH SHIM PACK EXAMPLE AND WORKSHEET

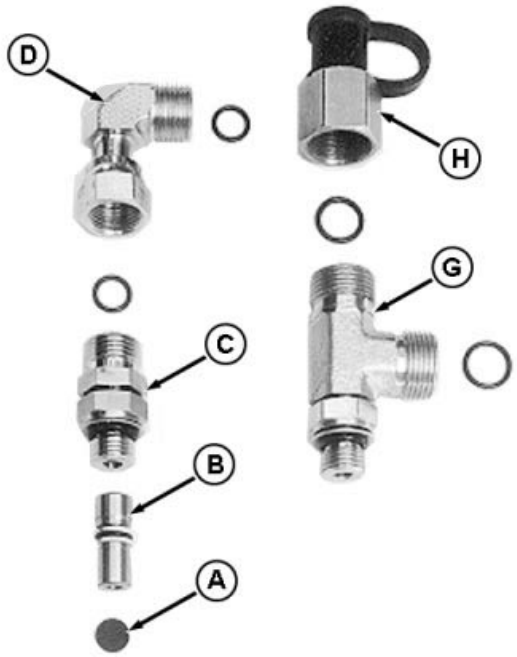
NOTE: Use nominal shim pack and JDG1217-4 Dummy Bearing Cup

Step Number			Example Value		Measured Value
	BACKLASH READINGS				
3	Reading One		1.27 mm		_____
	Reading Two	+	1.52 mm	+	_____
	Reading Three	+	1.40 mm	+	_____
	Total of Three Readings	=	4.19 mm	=	_____
	AVERAGE BACKLASH READING				
4	Divide (Total Readings of Step 3) by 3	=	1.36 mm	=	_____
	TARGET BACKLASH	—	0.25 mm	—	0.25 mm
5	Subtract Target Backlash From Step 4	=	1.11 mm	=	_____
	RELATION OF SHIMS TO BACKLASH	x	1.170	x	1.170
6	Multiply 1.170 by Step 5	=	1.30 mm	=	_____
	BEARING GROWTH FACTOR	—	0.13 mm	—	0.13 mm
7	Subtract Bearing Growth From Step 6	=	1.17 mm	=	_____
	NOMINAL SHIM PACK		2.75 mm		2.75 mm
8	Subtract Step 7 From Nominal Shim Pack	—	1.17 mm	—	_____
	FINAL BACKLASH SHIM PACK	=	1.58 mm	=	_____

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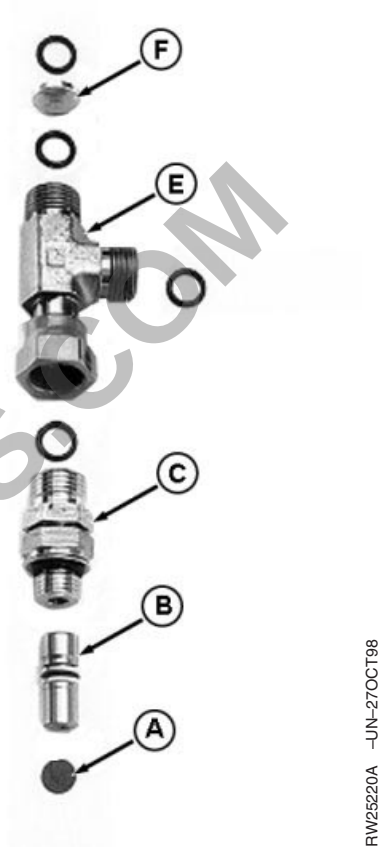
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RW25219A –UN–27OCT98

Load-Sense and Pressure Fittings



RW25220A –UN–27OCT98

Power Beyond Load-Sense Fittings

A—Shuttle Valve
B—Spacer
C—Connector
D—Load-Sense Elbow
E—Load-Sense and Power Beyond Tee
F—Check Valve
G—Pressure Tee
H—Pressure DR

Inspect load-sense (A—F) and replace as required.

Replace O-rings and backup rings as required.

AG,OUOD010,670 –19–20OCT99–3/3

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Turn the pump housing to the vertical position.

Install **new** O-rings (A). Lubricate with petroleum jelly.

Install bearing (B) on shaft.

Lubricate surface of cylinder block assembly (C) with clean hydraulic oil.

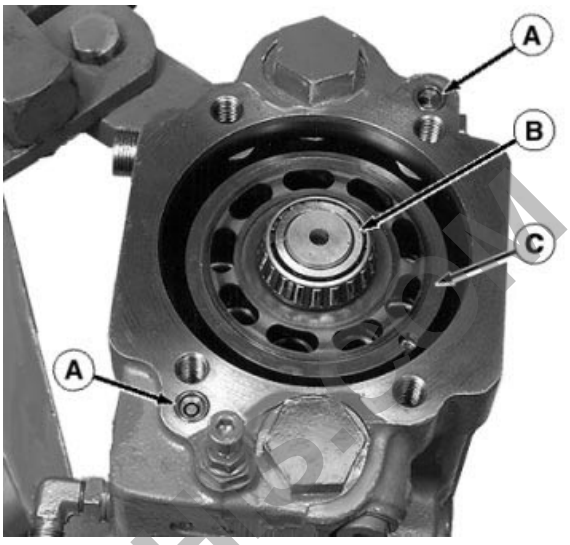
Check to make sure the valve plate is correctly installed on the end cap.

Install the end cap and valve plate, making sure the end cap is positioned correctly on the pump housing.

Insert the four end-cap bolts and snug tighten. Continue cross tightening the bolts to specification.

End-Cap Bolts—Specification

—Torque..... 96 N•m (70 lb-ft)



RW25886 –UN–20DEC97

A—O-Ring (2 used)
B—Bearing
C—Cylinder Block Assembly

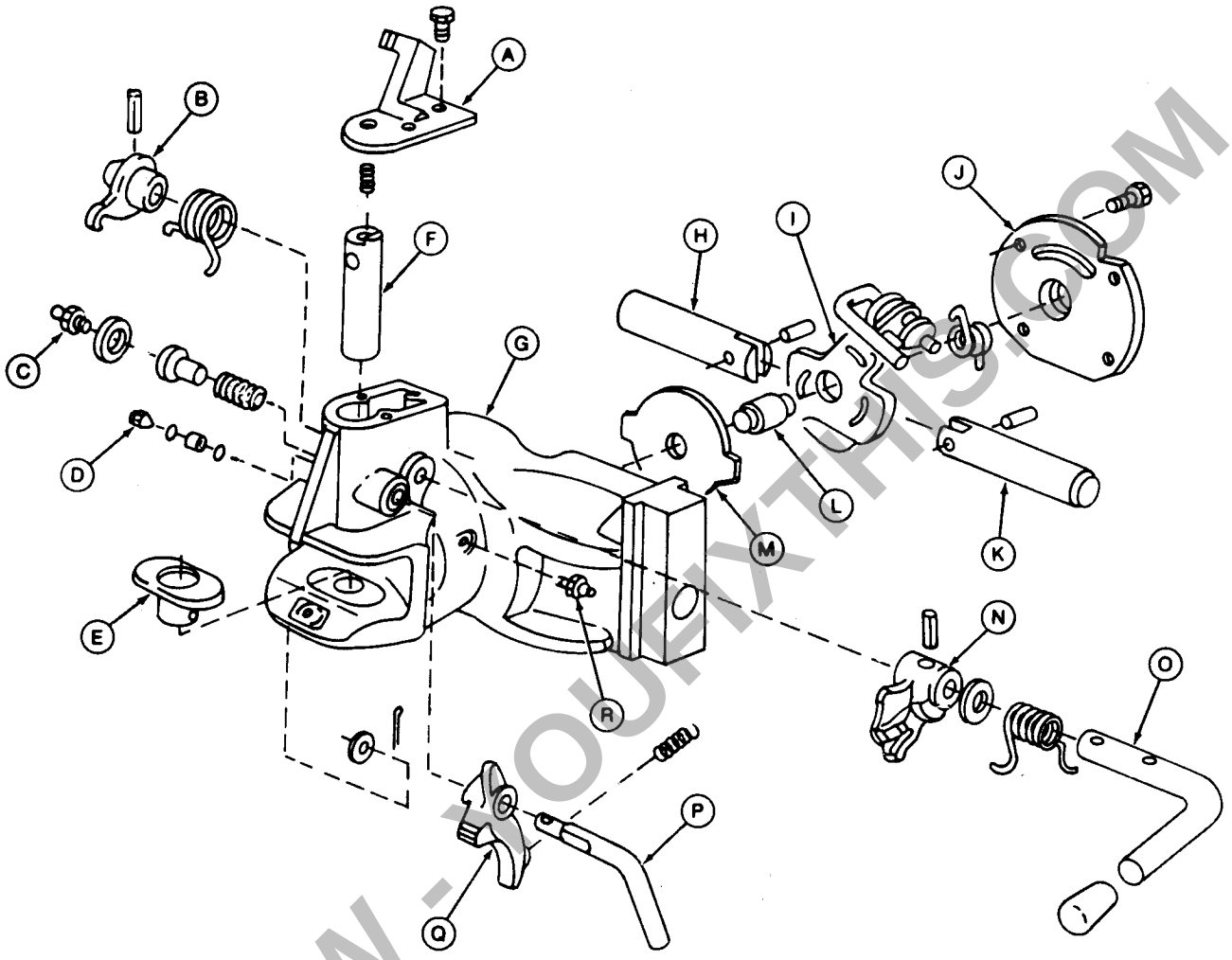
AG,OUOD010,499 –19–30AUG99–3/3

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Repair Wagon Hitch



A—Cover
B—Cable Lever
C—Grease Fitting
D—Adjusting Screw
E—Bushing
F—Hitch Pin
G—Hitch Coupling
H—Locking Pin
I—Cam Plate
J—End Plate
K—Locking Pin
L—Bearing Pin
M—Bearing Plate
N—Locking Latch
O—Control Lever
P—Release Lever
Q—Locking Lever
R—Grease Fitting

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