John Deere
JD450
Crawler Tractors
Crawler Loaders



Service Manual

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SERVICE MANUAL

JOHN DEERE

JD450

CRAWLER TRACTORS AND CRAWLER LOADERS

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The specifications and design information contained in this manual were correct at the time it was printed. It is John Deere's policy to continually improve and update our machines. Therefore, the specifications and design information are subject to change without notice.

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Group 40
WIRING DIAGRAMS

Figure 100-40-1 is a schematic diagram of the negative-ground electrical system on tractors to Serial No. 15484. One or two 12-volt batteries supply current for the 12-volt system.

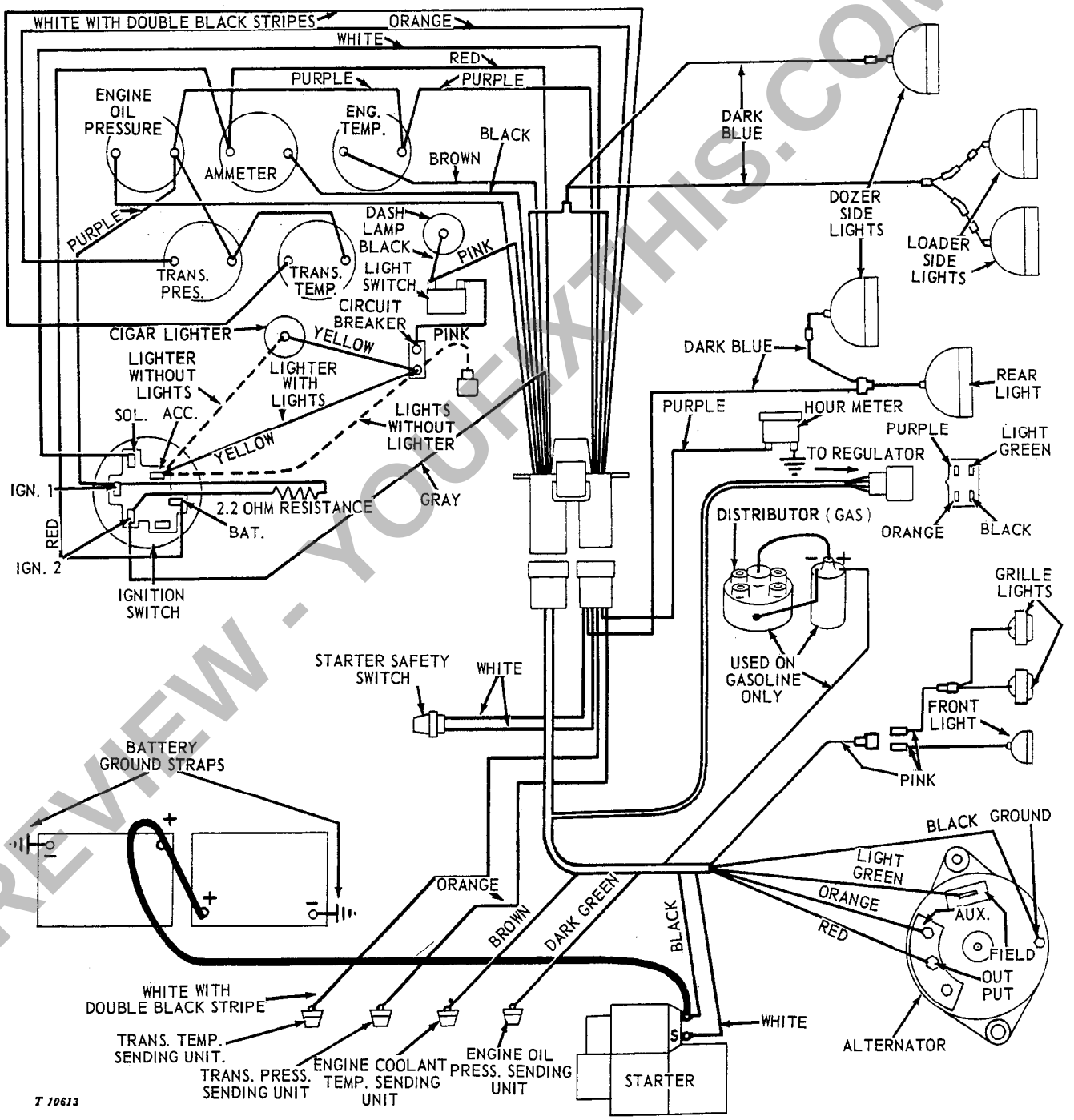
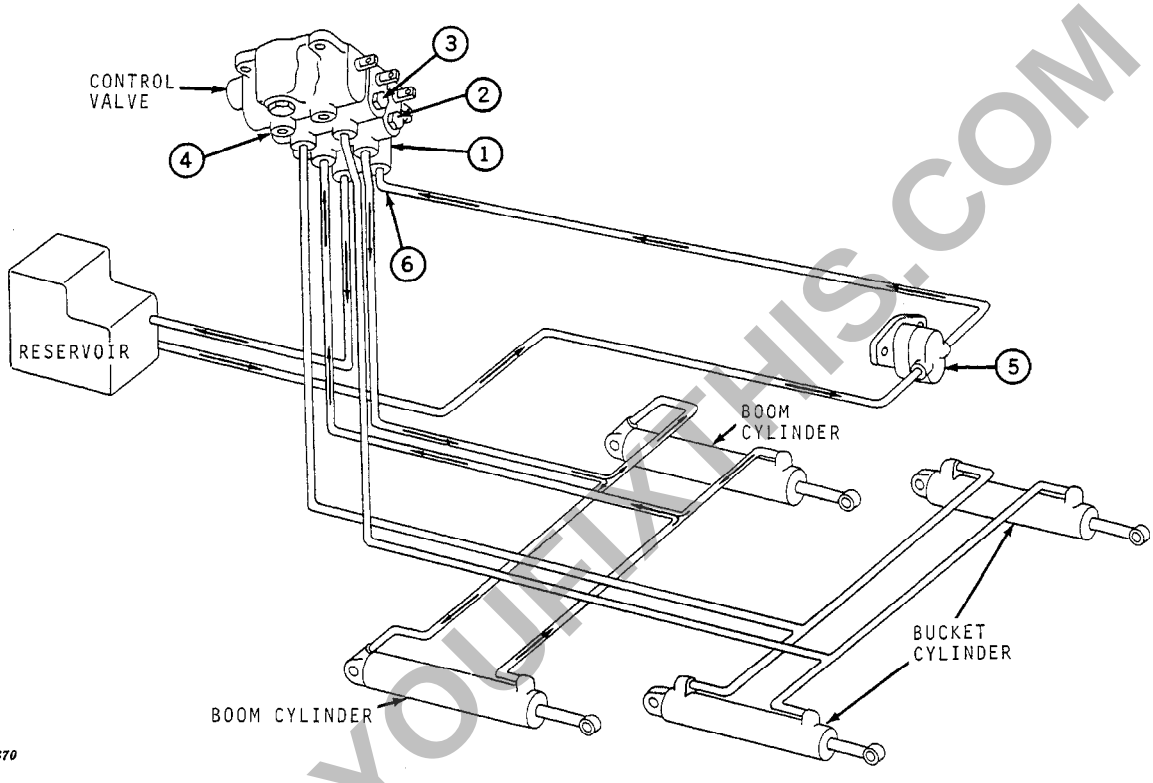


Fig. 100-40-1—Schematic Diagram of the Electrical System (JD450 Tractors to Serial No. 15484)

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Group 10
HYDRAULIC CIRCUIT DIAGRAMS



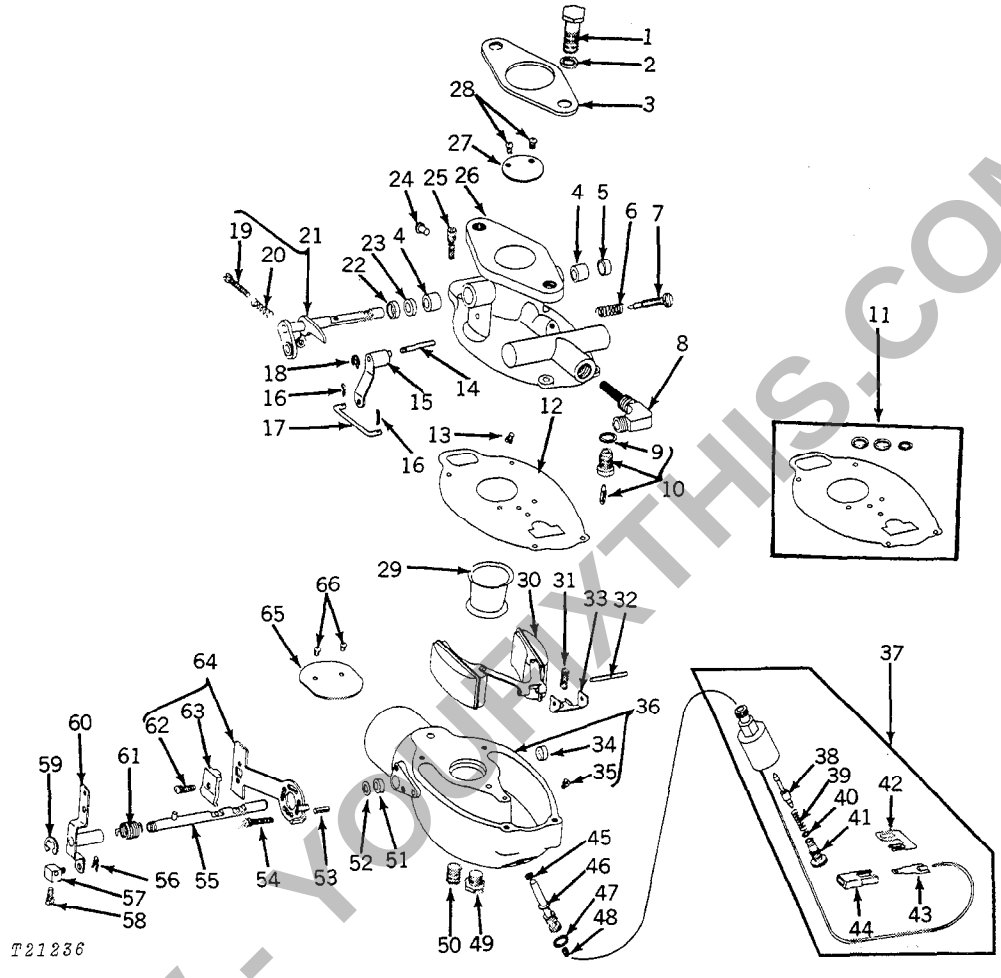
1. System Relief
   2000 psi (-1300)
   2250 psi (1301-Up)
2. Circuit Relief (Boom)
   2500 psi (-1300)
   2000 psi (1301-Up)
3. Circuit Relief (Bucket)
   2500 psi (-1301)
   2000 psi (1301-Up)
4. Circuit Relief (Bucket)
   1000 psi
5. 30 gpm Pump
6. Pressure Test Tap (1301-Up)

Fig. 190-25-1—Crawler-Loader Hydraulic Circuit

Oil is drawn from the reservoir by the pump and is moved to the control valve. With the boom spool retracted to raise the boom, the inlet port to the next valve spool is blocked (see Group 15). Oil then is diverted to the boom cylinders by the boom valve spool.

As oil flows to the piston end of the cylinder, oil from the cylinder rod end is forced back through the control valve to the reservoir. Oil in the remaining cylinders and lines is trapped by the other valve spools.

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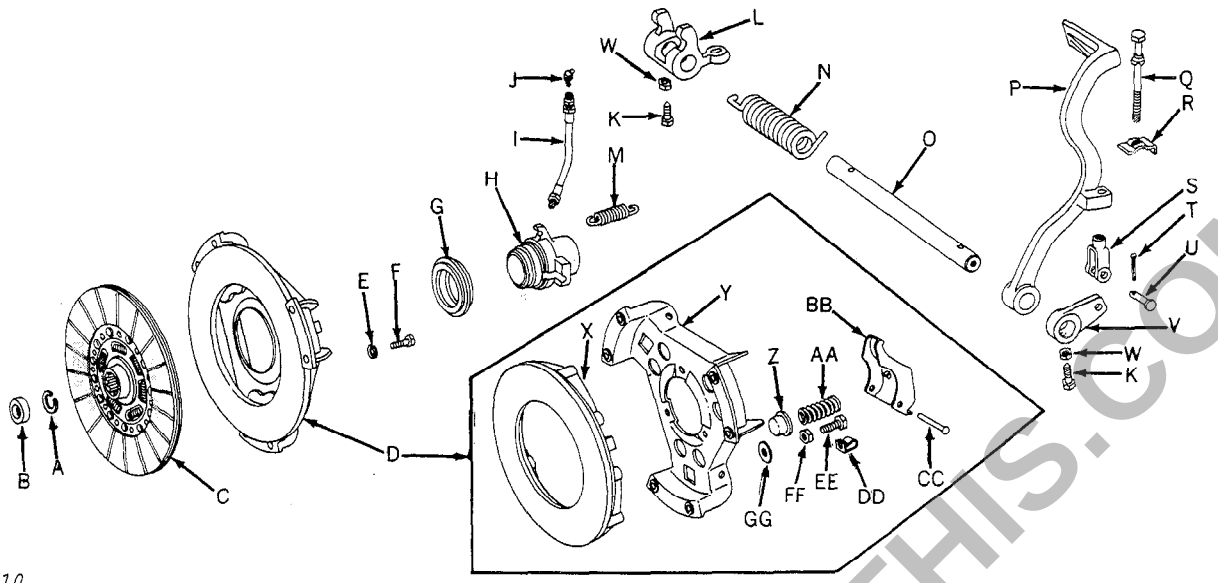


1 – Cap Screw (2 used)
2 – Lock Washer (2 used)
3 – Gasket
4 – Throttle Shaft Bearing (2 used)
5 – Throttle Shaft Cup
6 – Spring
7 – Idle Adjusting Needle
8 – Strainer and Elbow
9 – Gasket
10 – Valve Assembly
11 – Gasket Set
12 – Gasket
13 – Idle Jet
14 – Fast Idle Cam Pin
15 – Fast Idle Cam Lever
16 – Cotter Pin (2 used)
17 – Fast Idle Link
18 – Snap Ring
19 – Screw
20 – Spring
21 – Throttle Shaft Assembly
22 – Retainer
23 – Throttle Shaft Packing
24 – Plug
25 – Screw
26 – Throttle Body Assembly
27 – Fly Throttle
28 – Screw
29 – Venturi
30 – Float and Lever Assembly
31 – Float Support Spring
32 – Float Shaft
33 – Float Support Bracket
34 – Choke Shaft Plug
35 – Plug
36 – Carburetor Bowl Assembly
37 – Solenoid Assembly
38 – Shut-off Needle
39 – Spring
40 – O-Ring
41 – Adjusting Screw
42 – Clip
43 – Male Terminal
44 – Terminal Connector
45 – Nozzle Gasket
46 – Main Nozzle
47 – Gasket
48 – Power Jet
49 – Drain Plug
50 – Headless Plug
51 – Choke Shaft Packing
52 – Special Washer
53 – Spring Pin
54 – Choke Bracket Screw
55 – Choke Shaft Assembly
56 – Snap Ring
57 – Choke Swivel
58 – Screw
59 – Choke Shaft Lever Retainer
60 – Choke Lever Assembly
61 – Spring
62 – Choke Bracket Clip Screw
63 – Choke Bracket Clip
64 – Choke Bracket Assembly
65 – Choke Fly
66 – Special Screw

Fig. 90-25-10—Carburetor Throttle Body and Bowl (15915-)

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A – Snap Ring
B – Pilot Bearing
C – Driven Disk
D – Pressure Plate
E – Lock Washer (6 used)
F – Special Cap Screw (6 used)
G – Throw-Out Bearing
H – Bearing Carrier
I – Grease Tube
J – Grease Fitting
K – Special Set Screw (2 used)
L – Fork (H-L-R) Yoke (Constant Mesh)
M – Spring
N – Return Spring
O – Shaft
P – Clutch Pedal
Q – Clutch Adjustment Bolt
R – Detent Seat
S – Yoke
T – Cotter Pin
U – Pin
V – Clutch Adjusting Lever
W – Nut (2 used)
X – Pressure Plate
Y – Clutch Bracket
Z – Spring Cup
AA – Pressure Spring (6 used)
BB – Clutch Lever (3 used)
CC – Pivot Pin (3 used)
DD – Return Clip (3 used)
EE – Special Adjusting Screw (3 used)
FF – Jam Nut (3 used)
GG – Special Washer (3 used)

Fig. 110-10-2–Exploded View of Clutch Control Linkage

INSPECTION AND REPAIR

NOTE: Refer to Fig. 110-10-2 for parts guide.

CLUTCH HOUSING

Inspect housing for cracks or other damage. Replace if necessary. Examine bushings in pedal shaft bores. Install left bushing until flush with outside edge of housing. Drive in other bushing until flush with inside edge of bore in housing.

CLUTCH CONTROLS

Clutch Throw-out Bearing and Bearing Carrier

Check throw-out bearing for evidence of overheating (blue discoloration of surface). If bearing appears to have been over-heated or is rough, replace bearing.

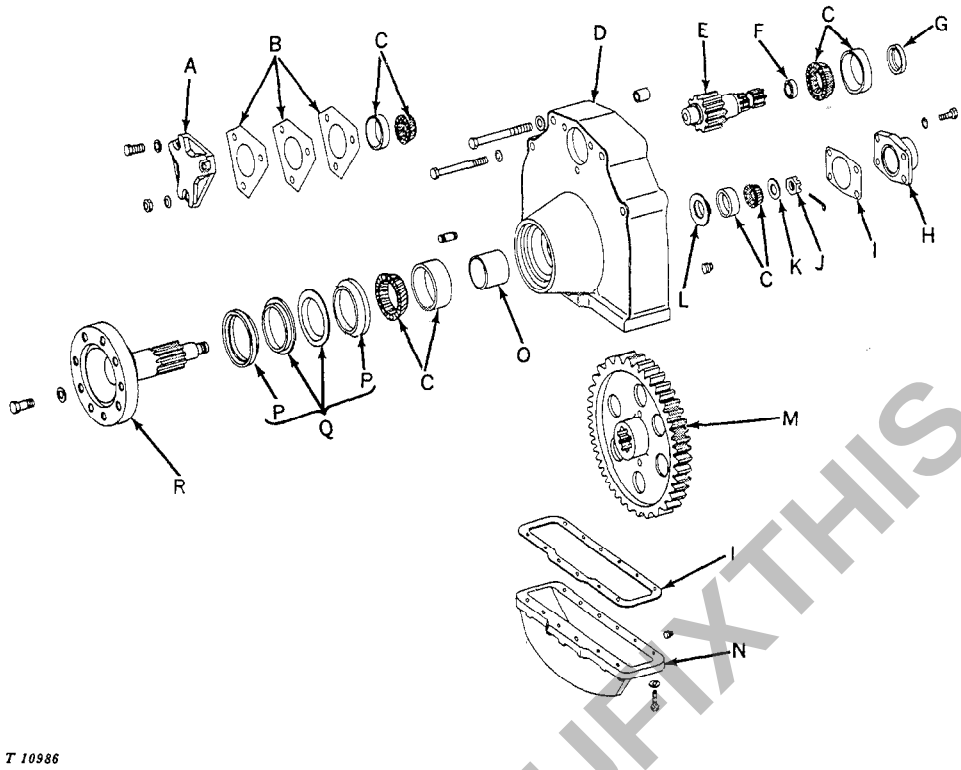
CAUTION: Throw-out bearing should not be soaked in solvent as it is pre-packed with grease. Wipe clean with cloth dampened in solvent. No attempt should be made to oil bearing.

The throw-out bearing is a vital part of the power train for the tractor. If there is any doubt at all about the condition of this bearing, replace it with a new one. If replacement is necessary, use an arbor press to remove old bearing from carrier.

Inspect bearing carrier for evidence of excessive wear, cracks, or other damage. Test carrier on carrier tube to be sure it slides freely. Grease should be added to carrier fitting after every 50 hours of tractor operation.

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INSPECTION AND REPAIR



A – Quill
B – Shims (0.002, 0.005, 0.010 in.)
C – Bearing Cup and Cone
D – Final Drive Housing
E – Pinion Shaft
F – Ball Bearing
G – Oil Seal
H – Inner Bearing Cover
I – Gasket
J – Hex. Nut
K – Washer
L – Spacer (Inner)
M – Final Drive Gear
N – Oil Pan
O – Spacer (Outer)
P – Belleville Washers
Q – Oil Seal
R – Flanged Axle Shaft

Fig. 140-10-3–Exploded View of Final Drive

NOTE: Refer to Fig. 140-10-3 to identify and relate parts.

FINAL DRIVE PINION SHAFT AND BEARINGS

Examine the final drive pinion shaft (E) for excessive spline wear and damage to the oil seal and bearing contact areas. The oil seal and bearing contact areas must be free of nicks, burrs, and roughness. Check pinion for damaged or excessively worn gear teeth. Replace pinion shaft if necessary.

Inspect bearing inside final drive pinion shaft (F). If replacement is necessary, install new bearing in pinion shaft with open side toward the shaft.

Inspect bearing quill (A) and housing (D) for damage or excessive wear and replace if necessary. Examine oil seal (G) in housing and replace if it has permitted oil to leak into clutch housing. Install new seal with lip pointing toward inside of final drive housing. Seal should be pressed in to flush with bottom of bearing bore.

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MANUAL WINCH BRAKE BAND ADJUSTMENT

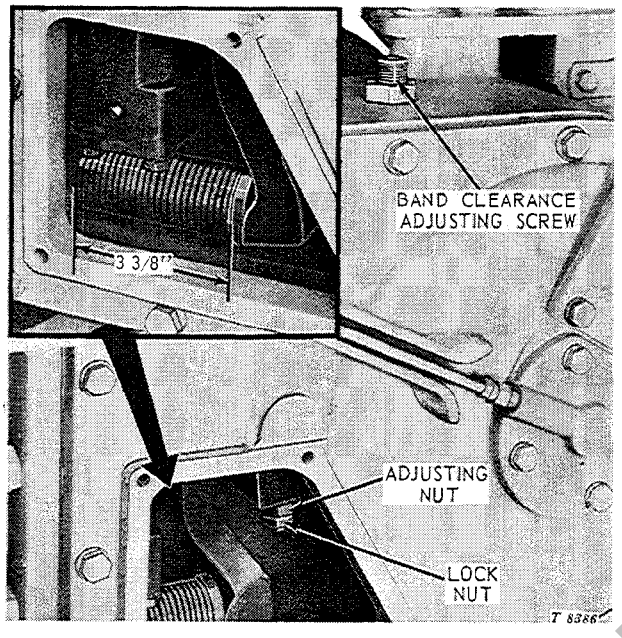


Fig. 40-15-15—Manual Winch Brake Band Adjustment

Back out adjusting screw on top of winch housing. Remove lower cover from left quill and loosen adjusting nut on brake band rod until band is loose. Then tighten adjusting nut until length of brake spring pack (see inset) is 3-3/8 inches from inside edge of housing to front edge of thick washer. Tighten lock nut.

Adjust brake band clearance as follows: Turn in adjusting screw on top of winch housing until you feel screw contact brake anchor. Then turn down screw an extra 1/2-turn. Tighten jam nut to hold screw.

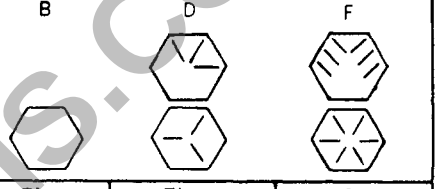
If winch brake band still slips, let it cool for one hour and recheck. Also inspect brake band for grease or fluid soaking and replace if necessary.

7. TORQUING CAP SCREWS AND BOLTS

Check all accessible bolts and cap screws on the tractor for proper tightness. The table below explains how various bolts and cap screws should be torqued.

TORQUE CHART

RECOMMENDED TORQUE IN FT-LBS
COARSE AND FINE THREADS



Bolt Diameter	Plain Head	Three Dashes	Six Dashes
1/4	Not used	10	14
5/16	Not used	20	30
3/8	Not used	35	50
7/16	35	55	80
1/2	55	85	120
9/16	75	130	175
5/8	105	170	240
3/4	185	300	425
7/8	160	445	685
1	250	670	1030
1-1/8	330	910	1460
1-1/4	480	1250	2060

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*The types of bolts and cap screws are identified by head markings as follows:

Plain Head: regular machine bolts and cap screws.

3-Dash Head: tempered steel high-strength bolts and cap screws.

6-Dash Head: tempered steel extra high-strength bolts and cap screws.

**Machine bolts and cap screws 7/8 inch and larger are sometimes formed hot rather than cold, which accounts for the lower torque.

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Group 10
ENGINE AND ENGINE CLUTCH
ENGINE
ENGINE HARD TO START, WILL NOT START

Possible Cause	Possible Remedy	Section-Group Reference
No fuel.	Fill tank with proper fuel.	90-5
Old gasoline in tank.	Drain tank and refill with new regular grade gasoline.	90-5
Fuel shut-off valve closed.	Open valve.	90-10
No gasoline in carburetor.	Clean fuel line, filter, and carburetor.	90-25
Low battery output.	Check electrolyte level and specific gravity of each cell. Recharge if necessary.	100-35
Excessive resistance in starting circuit.	Clean and tighten all connections on battery and starter.	100-35
Too high viscosity crankcase oil.	Drain and fill crankcase with oil of proper viscosity and quality.	30-5
Improper type of fuel.	Use correct grade of fuel.	90-5
Water, dirt, or air in fuel system.	Drain, flush, fill, and bleed system.	90-15
Water in gasoline.	Drain gasoline, clean plugs.	90-5 40-10
Clogged fuel filter (diesel).	Replace first-stage filter element and bleed system.	90-15
Clogged fuel filter (gasoline).	Replace filter.	90-15
No spark (gasoline).	Check points and plugs.	100-25
Dirty or faulty injectors (diesel).	Service injectors.	90-35
Fuel pump primer lever left on upward end of stroke (diesel).	Move lever to lowest point of stroke.	- - -

ENGINE KNOCKS

Insufficient crankcase oil.	Add proper oil.	30-5
Dirt picked up by air intake system.	Check air cleaner for clogging.	90-20
Injection pump or distributor out of time.	Check timing.	40-10
Low octane gasoline.	Change to regular grade gasoline.	90-5

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Section 20
TRACTOR SEPARATION

Group 5
ENGINE REMOVAL AND INSTALLATION

ENGINE REMOVAL

Disconnect battery ground straps for safety.

Remove engine side shields if equipped.

On crawler-loaders, support loader boom (Group 30 of this Section).

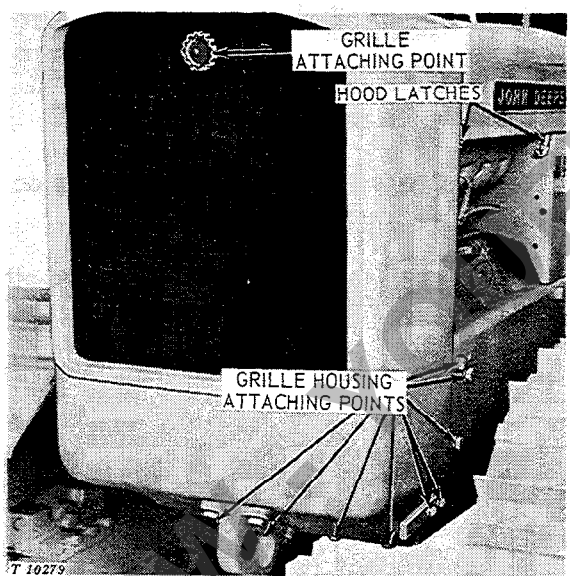


Fig. 20-5-1—Hood and Grille Housing Attaching Points

1. On each side of hood, unhook latches attaching hood to radiator and cowl supports. Remove muffler stack and lift off hood.

2. Remove grille by unscrewing knob (Fig. 20-5-1). Attach chain hoist to grille housing (Fig. 20-5-2).

3. Disconnect front light leads from headlights.

4. Remove cap screws attaching grille housing to bottom plate and side frames. Detach H-L-R oil filter base (if equipped) from inside of grille housing. With the aid of chain hoist, remove grille housing.

5. Drain radiator and disconnect water inlet and outlet hoses. Also disconnect H-L-R transmission oil cooler lines (if equipped).

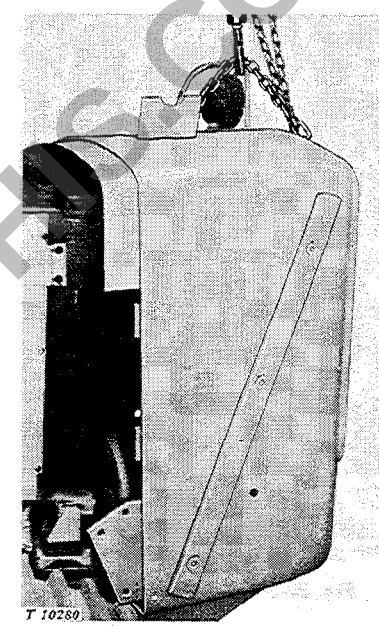


Fig. 20-5-2—Removing Grille Housing

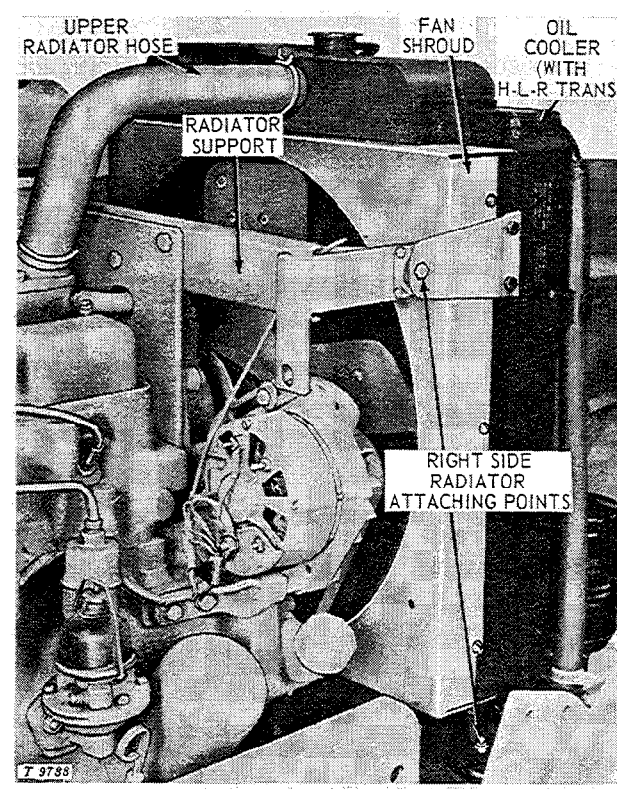


Fig. 20-5-3—Removing Radiator

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Group 10
SPECIFICATIONS

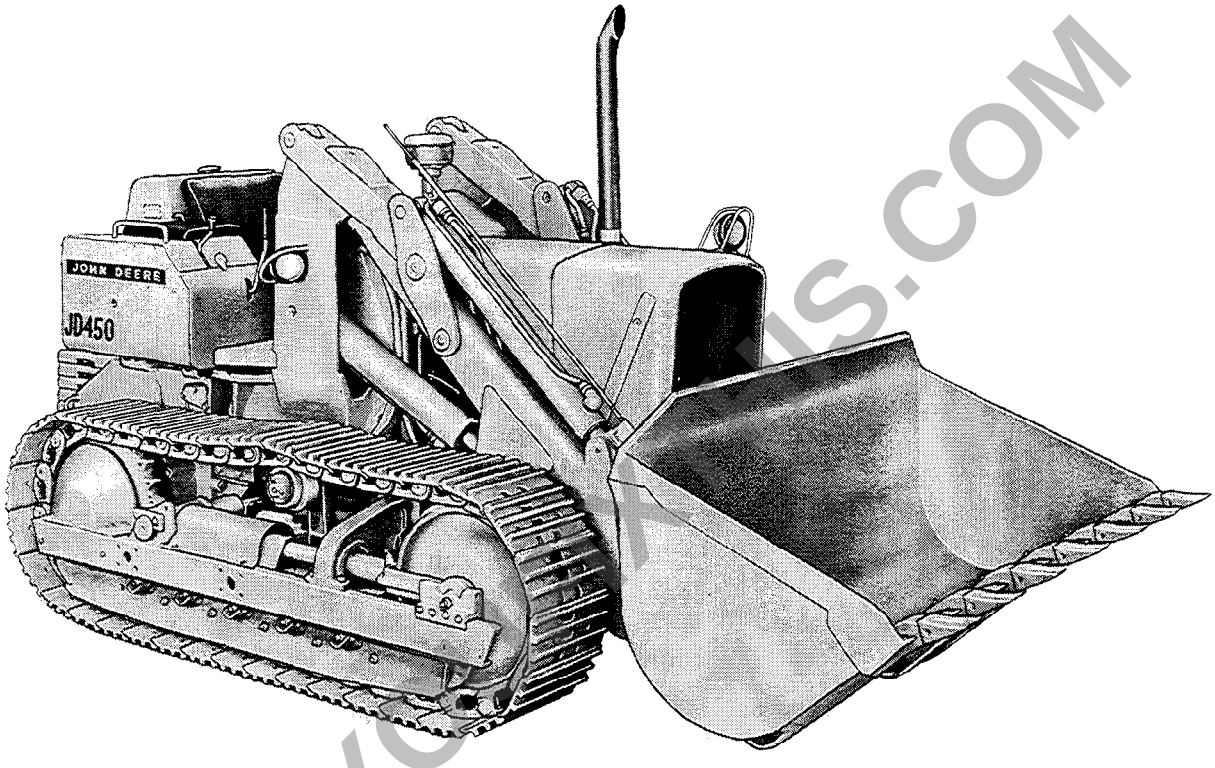


Fig. 10-10-1—Right-Hand View of JD450 Crawler Loader

TRACTOR SPECIFICATIONS

ENGINE	Diesel	Gasoline**
Flywheel horsepower (observed)	57.0	57.0
Torque in ft-lbs at 1300 rpm (observed) (nominal)	145.0	145.0
Number of cylinders	4	4
Bore and stroke, inches	3.86 x 4.33	3.86 x 3.86
Displacement in cubic inches	202.0	180.0
Compression ratio	16.3 to 1	7.5 to 1*
N.A.C.C. or A.M.A. horsepower rating for tax purposes	23.84	23.84
Slow-idle (rpm)	800	375 (15905) 600 (15906-up)
Fast-idle (rpm)	2650	2770
Governed speed range (rpm)	800 to 2650	600 to 2770
Intake valve clearance	0.014 in.	0.014 in.
Exhaust valve clearance	0.018 in.	0.022 in.
Engine clutch	with Constant Mesh: 12-in. dry disk, foot-operated; with H-L-R: 11-in., spring-loaded dry disk, foot-operated.	

**8.6 to 1 with high altitude pistons.*

TRANSMISSIONS

Constant Mesh: High, low and reverse gears grouped to shift mechanically in series with 4 shift stations to give eight forward speeds and 4 reverse speeds.

H-L-R: High, low, and reverse gears grouped to shift (under full load with a hydraulic assist) in series with 4 shift stations to give 8 forward speeds and 4 reverse speeds.

***Gasoline engine available on early models only.*

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TRAVEL SPEEDS, MPH (No Slip)

H-L-R Transmission		Constant Mesh Transmission	
Range	2500 rpm	Range	2500 rpm
No. 1		No. 1	
Hi Gear	1.8	Hi Gear	1.8
Lo Gear	1.3	Lo Gear	1.5
Rev. Gear	1.7	Rev. Gear	1.7
No. 2		No. 2	
Hi Gear	2.8	Hi Gear	2.8
Lo Gear	2.0	Lo Gear	2.3
Rev. Gear	2.7	Rev. Gear	2.7
No. 3		No. 3	
Hi Gear	4.3	Hi Gear	4.3
Lo Gear	3.0	Lo Gear	3.5
Rev. Gear	4.1	Rev. Gear	4.1
No. 4		No. 4	
Hi Gear	6.7	Hi Gear	6.7
Lo Gear	4.7	Lo Gear	5.5
Rev. Gear	6.4	Rev. Gear	6.4

CAPACITIES (U.S. Standard Measures)

Fuel tank . . . . . 31 gals.
Cooling system . . . . . 4 gals.
Engine lubrication (including filter) . . 9 qts.
Transmission case . . . . . 8 gals.
Final drive cases (each) . . . . . 7 qts.

DIMENSIONS

Height to top hood . . . . . 57-1/16 in.
Over-all height (without stack) . . . . . 76 in.
Over-all width, minimum, (with 12-in. shoes) . . . 65-3/8 in. (tractor)
Over-all length . . . . . 109-1/4 in. (tractor)
171 in. (loader)
Ground clearance (at rear crossbar) . . . . . 14-1/4 in.
Total weight (approx.). . . . . 10,590 lbs. (diesel tractor)
15,630 lbs. (diesel loader)

STEERING — Manually or hydraulically operated clutch-brake system

Clutch . . . . . 11-inch dry multiple disk type
No. of friction surfaces (each clutch) . . 16
Brakes . . . . . Contracting band-bonded lining
Turning clearance circle. 180 in. (tractor)
253 in. (loader)

FINAL DRIVES

Gear reduction ratio in first gear (engine to axle) . . . . . 144 to 1
Gear reduction ratio in eighth gear (engine to axle) . . . . . 27.2 to 1

TRACK EQUIPMENT

Track frame 5-roller
Track shoes (types and sizes):
Grouser . . . . . 12, 14, 16, or 18 in.
Notched grouser (snow shoe) . . . . . 12, 14, 16, or 18 in.
Triple semi-grouser . 12, 13, 14, or 16 in.
Open center grouser . . 12, 14, 16, or 18 in.
Rubber . . . . . 13 in.
Track gauge (center to center). 52 in. (fixed)
Number of track shoes (each side) 36
Total ground contact area (sq. in.):
12-inch shoes 1711
13-inch shoes 1857
14-inch shoes 2032
16-inch shoes 2294
18-inch shoes 2585
Ground pressure (lbs. per sq. in.) with 12-inch shoes . . . . . 5.7 (tractor)
8.8 (loader)
Length of track on ground (inches) . . 72-3/4

WINCHES (Manual and Power Types)

Drum speed (at 2200 rpm engine speed) . . . . . 58-1/2 rpm
Drum diameter . . . . . 6 inches
Drum capacities*
(with 1/2-inch cable) . . . . . 185 feet
(with 5/8-inch cable) . . . . . 115 feet
(with 3/4-inch cable) . . . . . 90 feet
Cable speed (at 2200 rpm engine speed)
(with bare drum) . . . . . 100 fpm**
(with full drum) . . . . . 159 fpm**
Cable pull (at 2200 rpm engine speed)
(with bare drum) . . . 13,900 lbs. (manual)
15,000 lbs. (power)
(with full drum) . . . . 8,700 lbs. (manual)
9,600 lbs. (power)

**Calculated capacities — allowance must be made for loose or uneven spooling.*

*** With 5/8-inch cable.*

(Specifications and design subject to change without notice. Wherever applicable, specifications are in accordance with IEMC standards.)

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Section 30
PERIODIC LUBRICATION

Group 5
LUBRICATION TIMETABLE

Effective use of lubricating oils and greases is perhaps the most important step towards low upkeep cost, long tractor life, and satisfactory service. Use only lubricants specified in this section: apply them at intervals and according to the instructions in the lubrications and periodic service section.

ENGINE LUBRICATING OILS



X3377

We recommend John Deere Torq-Gard or Torq-Gard Supreme engine oil for use in the engine crankcase. This oil is compounded specifically for use in John Deere engines, and provides superior lubrication under all conditions. NEVER PUT ADDITIVES IN THE CRANKCASE. Torq-Gard oil is formulated to provide all the protection your engine needs. Additives could reduce this protection rather than help it.

If oil other than Torq-Gard or Torq-Gard Supreme is used, it must conform to the following specifications.

SINGLE VISCOSITY OILS

API Service CD/SD
MIL-L-2104C
Series 3

MULTI-VISCOSITY OILS

API Service CC/SD
MIL-L-46152

Depending on the expected prevailing temperature for the fill period, use oil of viscosity as shown in the following chart.

Air Temperature	John Deere Torq-Gard Oil	Other Oils: Single Viscosity Oil	Other Oils: Multi-Viscosity Oil
Above 32°F.	SAE 30	SAE 30	Not recommended.
-10°F. to 32°F.*	SAE 10W-20	SAE 10W	SAE 10W-30
Below -10°F.	SAE 5W-20	SAE 5W	SAE 5W-20

**SAE 5W-20 oil may also be used to insure optimum lubrication at starting, particularly when engine is subjected to -10°F. or lower temperatures for several hours.*

Some increase in oil consumption may be expected when SAE 5W-20 or SAE 5W oils are used. Check oil level more frequently.

TRANSMISSION HYDRAULIC OILS

Use only John Deere Type 303 Special-Purpose Oil or an equivalent in the transmission hydraulic system. Other types of oil will not give satisfactory service, and may result in eventual damage. This special oil, available from your John Deere dealer, may be used in all weather conditions.

GREASES

Use John Deere Multi-Purpose Lubricant or an equivalent SAE Multi-Purpose type grease for all grease fittings. Application of grease as instructed in the lubrication section will provide proper lubrication and will keep contamination out of bearings.

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Section 210
TROUBLE SHOOTING

Group 5
INDEX TO DIFFICULTIES

INTRODUCTION

Whenever tractor service is required due to complaint or failure, you must be able to determine the cause or causes of the trouble and find the quickest and easiest solution.

If you can do this without costly and time-consuming removal or disassembly, the job will go faster, costs will be reduced, and customer-irritating delays may be avoided.

The purpose of this Section is to help you diagnose quickly and easily most of the problems of failures with which you will be faced. Individual Groups of this Section contain difficulties that may develop in a specific component or system of the tractor. For instance, faults or failures that may be found in the tractor engine are given in one Group (Group 10), those that may be found in the electrical system are given in another Group (Group 25), etc. Following each difficulty is a list of the possible causes and their remedies, plus added service information in references to other Sections and Groups of this manual.

Using this information as a guide, you can diagnose the trouble by an orderly process of eliminating probable causes one by one until the solution is found.

For ready reference, an index to the common difficulties listed in this Section is provided below.

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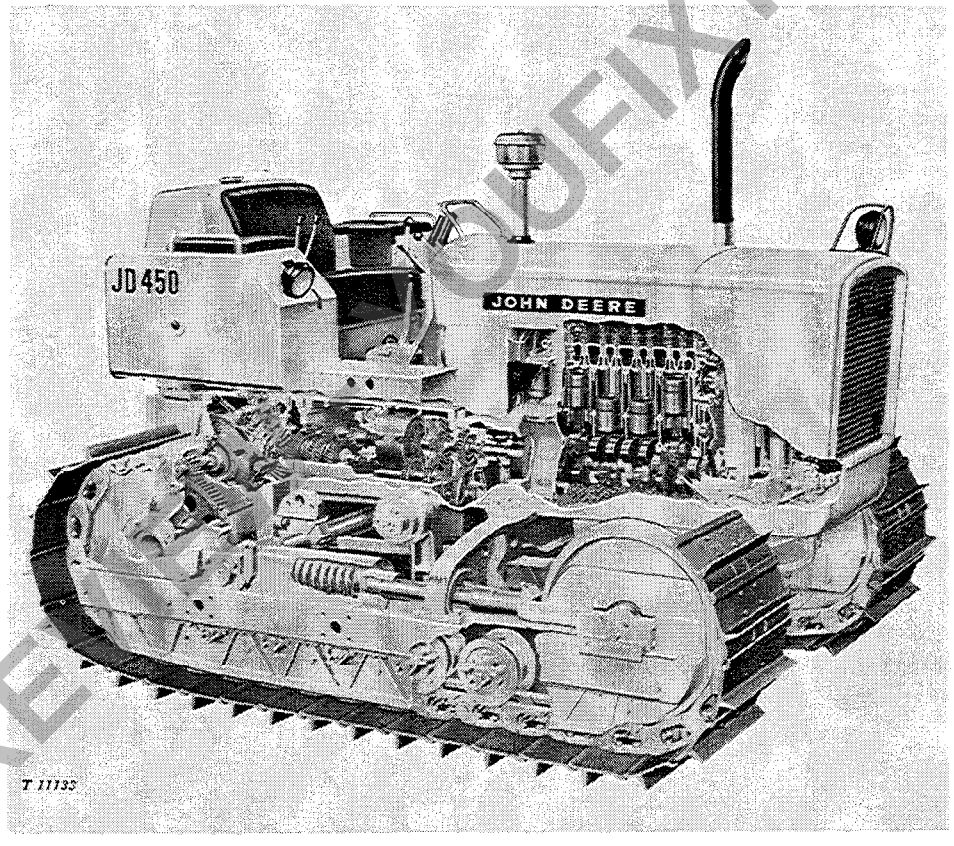
TO THE JOHN DEERE SERVICEMAN

This service manual contains maintenance instructions for John Deere JD450 Crawler Tractors and Loaders. Included are complete instructions for removal, disassembly, inspection, repair, assembly and installation of the major parts and assemblies of the tractor.

In addition, the manual contains brief descriptions of the more complicated systems of the tractor, and tells how they operate. Dimensions of many new wearing parts are given as an aid in determining when parts replacement is necessary. Tests and adjustments, required to keep the tractor operating efficiently, are explained in detail.

This manual was planned and written for the Service Department; its place is in the shop. Use the manual whenever in doubt about correct maintenance procedures. Use it as a text book for training new Service Department personnel who are unfamiliar with John Deere Tractors.

Daily use of the Service Manual as a guide for any and all service problems will reduce error and costly delay to a minimum and assure you the best in finished service work. In many instances your customer's confidence in your work will be improved when he sees you using the Service Manual. He knows you are following approved maintenance procedures and making proper adjustments. There is no guesswork when you use the manual.



Right-Hand Cutaway View of John Deere JD450 Crawler Tractor

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All Units

5. Move hand throttle fully forward. Engine speed should be 2770 ± 20 rpm. If not, loosen fast idle stop clamp (6) and adjust it against cable sheath end at the correct speed.

6. With engine running at fast idle, turn in carburetor load needle (10) until engine begins to falter. Screw needle out until engine begins to run smoothly, then screw out an extra one turn.

7. Place tractor under load and readjust carburetor load needle (10) as necessary. If engine backfires as clutch is engaged, open the load needle slightly. If black smoke comes out of muffler, close the load needle slightly. If carburetor cannot be properly adjusted, clean and overhaul it as covered in Section 90.

8. Move hand throttle back and forth to check friction on lever. Drag should be 7-9 pounds at end of throttle lever. Adjust, if necessary, at friction adjusting nut (2). Continue moving hand throttle to check speed control linkage for binding or looseness.

GASOLINE ENGINE SPEEDS

Units Serial No. –15905	Units Serial No. 15906–Up
Fully rearward past detent— 375± 25 rpm Rearward to detent— 800 ±100 rpm Fully forward— 2770±20 rpm	Fully rearward— 600±20 rpm Fully forward— 2770 ±20 rpm

5. DIESEL FUEL SYSTEM

FUEL TANK AND LINES

Inspect fuel tank and lines for dirt or foreign matter and remove to clean if necessary.

FUEL PUMP SEDIMENT BOWL

Remove and clean fuel pump sediment bowl (Fig. 40-10-16). Reinstall filter screen, gasket, and bowl. Use a new gasket and be sure gasket and screen are properly seated before tightening jam nut.

Check the first stage (front) filter element for dirt or water-soaking (Fig. 40-10-16). Replace element and gaskets if element is dirty or water-soaked.

FIRST STAGE FUEL FILTER

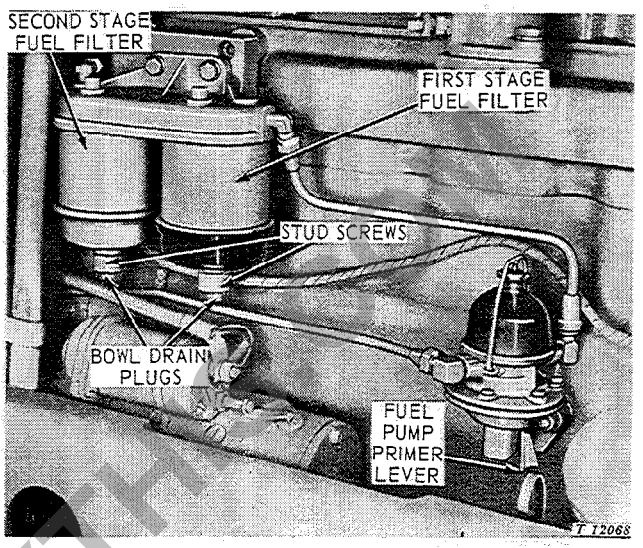


Fig. 40-10-16—Diesel Fuel Pump and Filters

Replace the first stage filter element as follows: Back off large screw under filter bowl and remove bowl and stud. Remove and discard filter element and sealing rings. Wash out sediment bowl in diesel fuel and dry it. Place new sealing rings in groove in filter head and on inner rim of sediment bowl (be sure screen is down on inner edge of bowl). Slip new element under filter head and reinstall bowl and stud. Be sure sealing rings are not crimped and tighten stud screw until snug. Also be sure drain plug in end of stud is tight.

Always bleed air from filters after a filter change (see next page).

TIMING DIESEL INJECTION PUMP

NOTE: Refer to Section 90, Group 30 for timing Model C injection pumps.

To check the timing on Model DB injection pumps, do the following:

1. Remove timing screw from flywheel housing (Fig. 40-10-17).

2. Turn engine in direction of rotation (counterclockwise when viewed from flywheel end) until No. 1 piston is on a compression stroke. Reverse timing screw and insert it into the flywheel housing hole. Rock the flywheel until screw slides into hole in flywheel rim.

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INSTALLING BALANCER SHAFTS

Apply a light film of oil on the balancer shaft journals and bushings and insert shafts into their respective bushings in the cylinder block.

CAUTION: When installing balancer shafts, be careful not to damage journals or bushings.

Position thrust plates between balancer shaft journal and drive gear (Fig. 50-25-3). Secure to front plate with cap screws and lock washers and tighten to 35 ft-lbs torque.

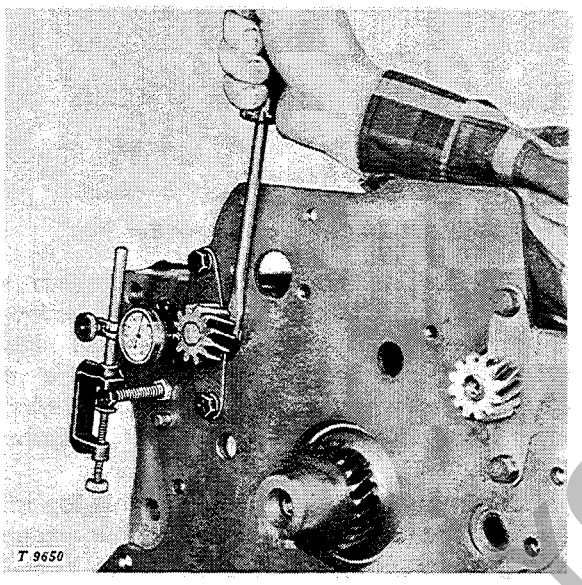


Fig. 50-25-12–Checking Balancer Shaft End Play

Check balancer shafts for specified end play of 0.002 to 0.008 inch (Fig. 50-25-12). New shaft, bushings, and thrust plate should restore this. The maximum allowable end play for used parts is 0.015 inch.

CAUTION: If end play is excessive and thrust plate does not seem to be excessively worn, check to see that balancer shaft gear is located within 0.001 inch of flush with end of shaft (Fig. 50-25-10).

Install oil pump gear (Section 60, Group 5).

NOTE: Before installing lower idler gear, set flywheel at "TDC" with No. 1 (front) piston on compression stroke and align timing mark on balancer shaft drive gears with center of crankshaft using timing tool. Refer to Group 30 of this Section for proper procedure.

IMPORTANT: While balancer shaft timing marks are aligned with crankshaft, observe keyways in shaft gears; both should point straight up towards top of engine. If not, balancer shafts have been accidentally switched and must be installed in opposite bores.

With timing marks aligned, install lower idler gear and secure to front plate with flat washers and cap screw. Tighten cap screw to 85 ft-lbs torque.

ASSEMBLY

Install timing gear cover (Group 30 of this Section).

Spread a thin even coat of Permatex No. 3 Sealing Compound on the side of the oil pan gasket that will face the cylinder block. Also coat the oil pan gasket surface. Place new gasket on oil pan and attach pan to block with cap screws. Tighten all cap screws to 30 ft-lbs torque.

Position front bottom plate under tractor and secure with attaching cap screws.

Position radiator on front end support and secure with hex. nuts. Secure radiator to top braces with attaching cap screws. Connect water inlet and outlet hoses to radiator.

Fill crankcase with proper quantity and viscosity of oil (see chart in Section 30).

Fill cooling system with clean soft water. Add antifreeze solution or John Deere Summer Engine Coolant Conditioner as needed (Section 80).

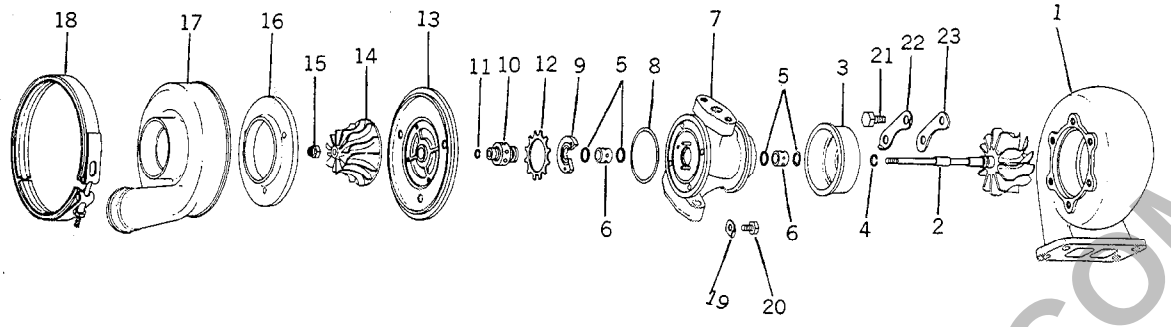
Install tractor grille housing, grille, and hood. Also install engine side shields (if so equipped).

Connect all battery ground straps.

CAUTION: Batteries are NEGATIVE grounded only. Never attempt to polarize an alternator-equipped tractor.

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T 16933

1 – Turbine Housing
2 – Turbine Wheel with Shaft
3 – Wheel Shroud
4 – Piston Ring
5 – Retaining Ring (4 used)
6 – Bearing (2 used)
7 – Center Housing
8 – Seal Ring
9 – Thrust Bearing
10 – Thrust Collar
11 – Piston Ring
12 – Thrust Spring
13 – Back Plate
14 – Impeller
15 – Lock Nut
16 – Diffuser
17 – Compressor Housing
18 – Clamp
19 – Lock Plate (4 used)
20 – Bolt (4 used)
21 – Bolt (6 used)
22 – Lock Plate (3 used)
23 – Clamp (3 used)

Fig. 90-20-4–Turbocharger Assembly

Remove the clamps and lock plates which hold the compressor (17) and turbine (1) housings to the center housing group. Tap with a soft hammer if force is needed for removal.

NOTE: Use caution when removing housings to prevent damage to compressor or turbine wheel.

Place the center housing group in a suitable fixture which will prevent the turbine wheel from turning (see "TOOLS").

Use a double universal joint when removing the wheel nut to avoid possible bending of the shaft.

Remove the compressor wheel from the shaft. Remove shaft wheel from center housing, keeping it centered with bearings until clear of center housing.

Remove bolts from back plate.

Tap back plate with soft mallet to remove from recess in center housing.

Remove thrust collar and thrust bearing from center housing.

Remove bearings and retainers from center housing. Discard seal ring.

The turbine wheel shroud is not retained to the center housing and will fall free when the shaft wheel is removed.

Cleaning

Before cleaning, inspect all parts for signs of rubbing, burning, or other damage which might not be evident after cleaning.

Soak all parts in a clean carbon solvent. After soaking use a stiff bristle brush and remove all dirt particles. Dry parts thoroughly.

Normally a light accumulation of carbon deposits will not affect turbine operation.

Inspection

General

Parts must not show signs of damage, corrosion or deterioration. Threads must not be nicked, crossed, or stripped.

Shaft Wheel

Turbine wheel must show no signs of rubbing, and vanes must not be torn or worn to a feather edge. Shaft must show no signs of scoring, scratches, or seizure with the bearings. Inspect for cracks on blades, especially in fillet area.

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Using hands, apply equal pull to opposite sides of stator and pull it straight out of the rear housing (Fig. 100-20-5).

Remove the three nuts and lock washers holding the stator wires to the terminals (Fig. 100-20-5).

NOTE: Tag the wires to insure proper installation when assembling the alternator.

REMOVING DIODE PLATE

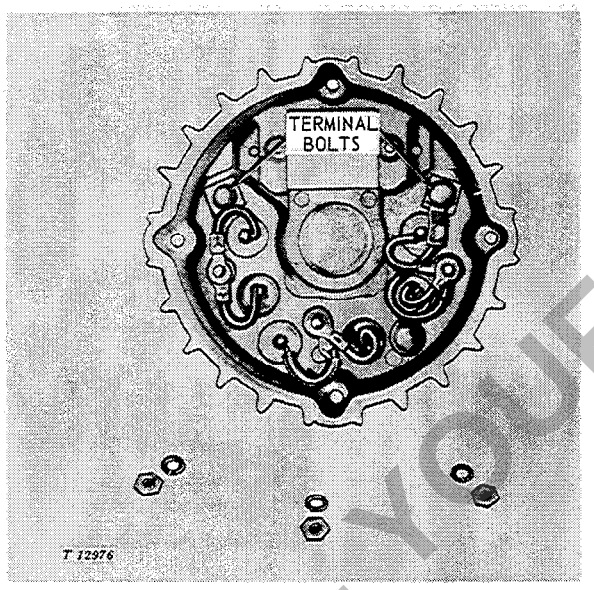


Fig. 100-20-6–Removing Diode Plate

Remove the three terminal nuts from outside of housing. Remove the two terminal bolts from inside of housing (Fig. 100-20-6). Remove diode connector wires from screw terminals and remove diode plate.

CAUTION: Carefully note locations of insulators and insulating washers to insure correct reassembly. Improper installation of insulators or insulators not installed will damage the alternator.

REMOVING ROTOR

Remove the three screws from outside of the front housing to loosen the bearing retainer plate (Fig. 100-20-7).

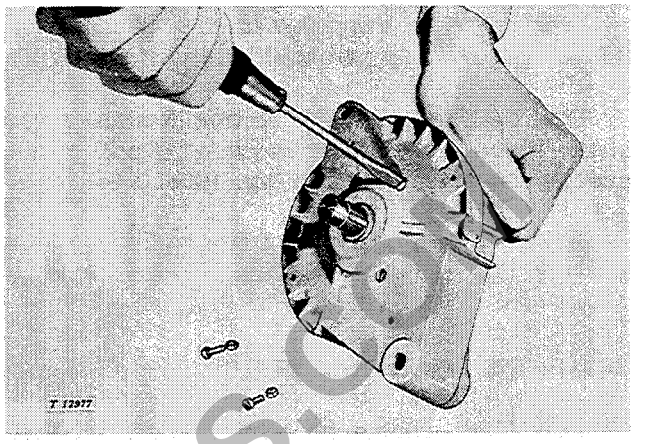


Fig. 100-20-7–Loosening Bearing Retainer Plate

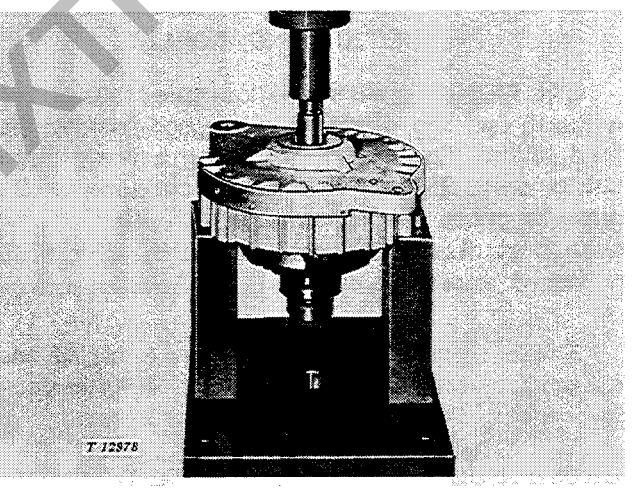


Fig. 100-20-8–Removing Rotor

Using a press as shown in Fig. 100-20-8, press rotor out of front housing.

REMOVING FRONT BEARING

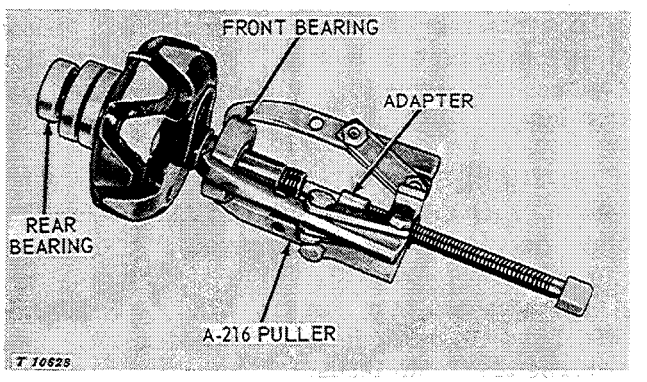


Fig. 100-20-9–Removing Front Bearing

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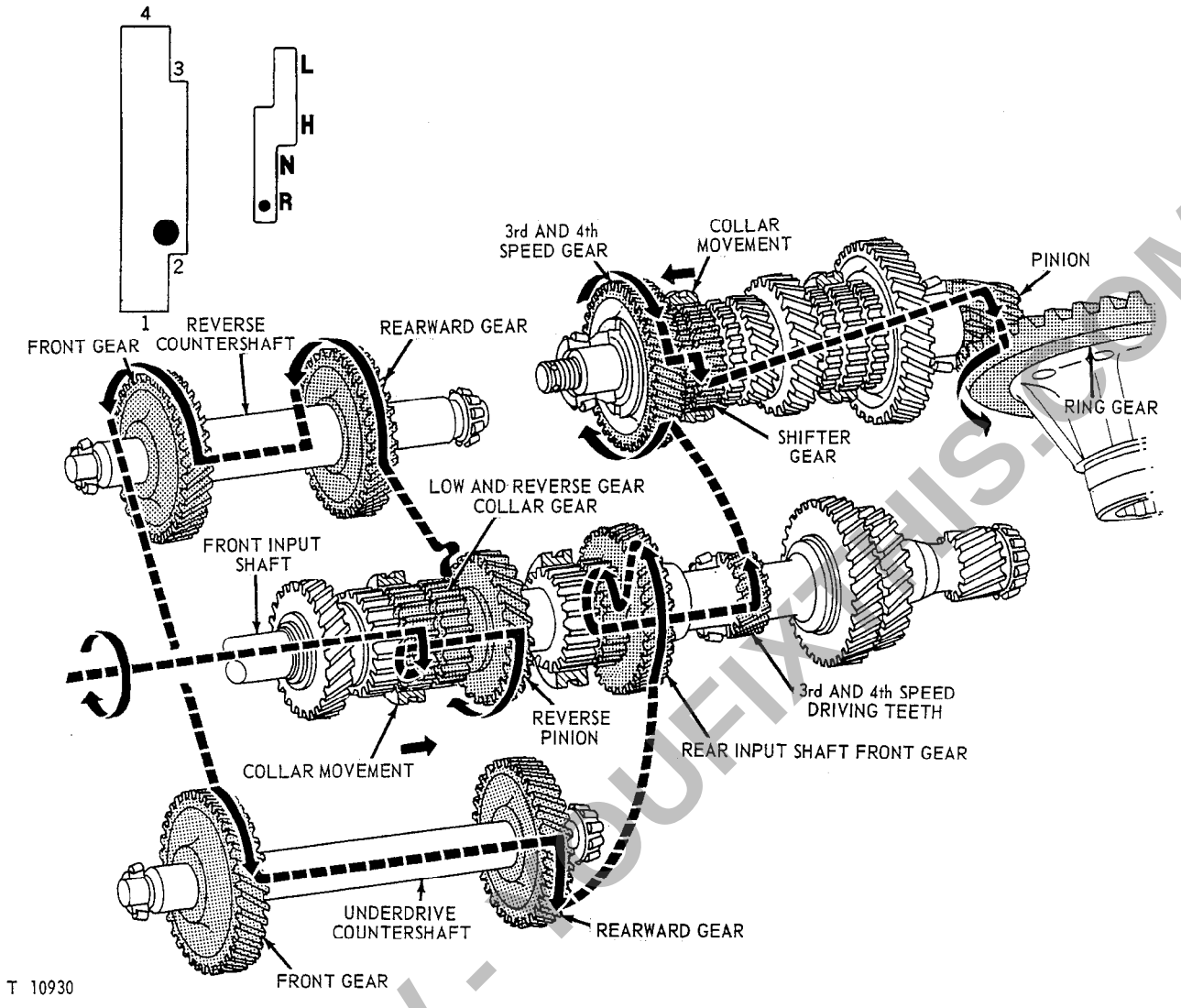


Fig. 120-5-11—Transmission Second Shift Station — Reverse Gear

Second Shift Station—Reverse Gear:

A shifter collar couples the reverse gear pinion to the low and reverse gear collar gear. This collar gear is keyed to the front input shaft. The reverse gear pinion is in constant mesh with the rearward gear on the reverse countershaft, and the front gear on the reverse countershaft is in constant mesh with the forward gear on the underdrive countershaft. All four gears carried on the two countershafts are keyed to their respective shafts. The rearward gear on the underdrive countershaft is in constant mesh with the rear input shaft front gear. The rear input shaft front gear is keyed to its shaft. The forward teeth on the rear input shaft are the third and fourth speed driving teeth, and are in constant mesh with the third and fourth speed gear which is carried on the pinion shaft. By coupling the gear shifter collar onto the third and fourth speed gear, the third and fourth speed gear is joined to the shifter gear. The shifter gear is splined to the pinion shaft which transmits power to the ring gear (Fig. 120-5-11).

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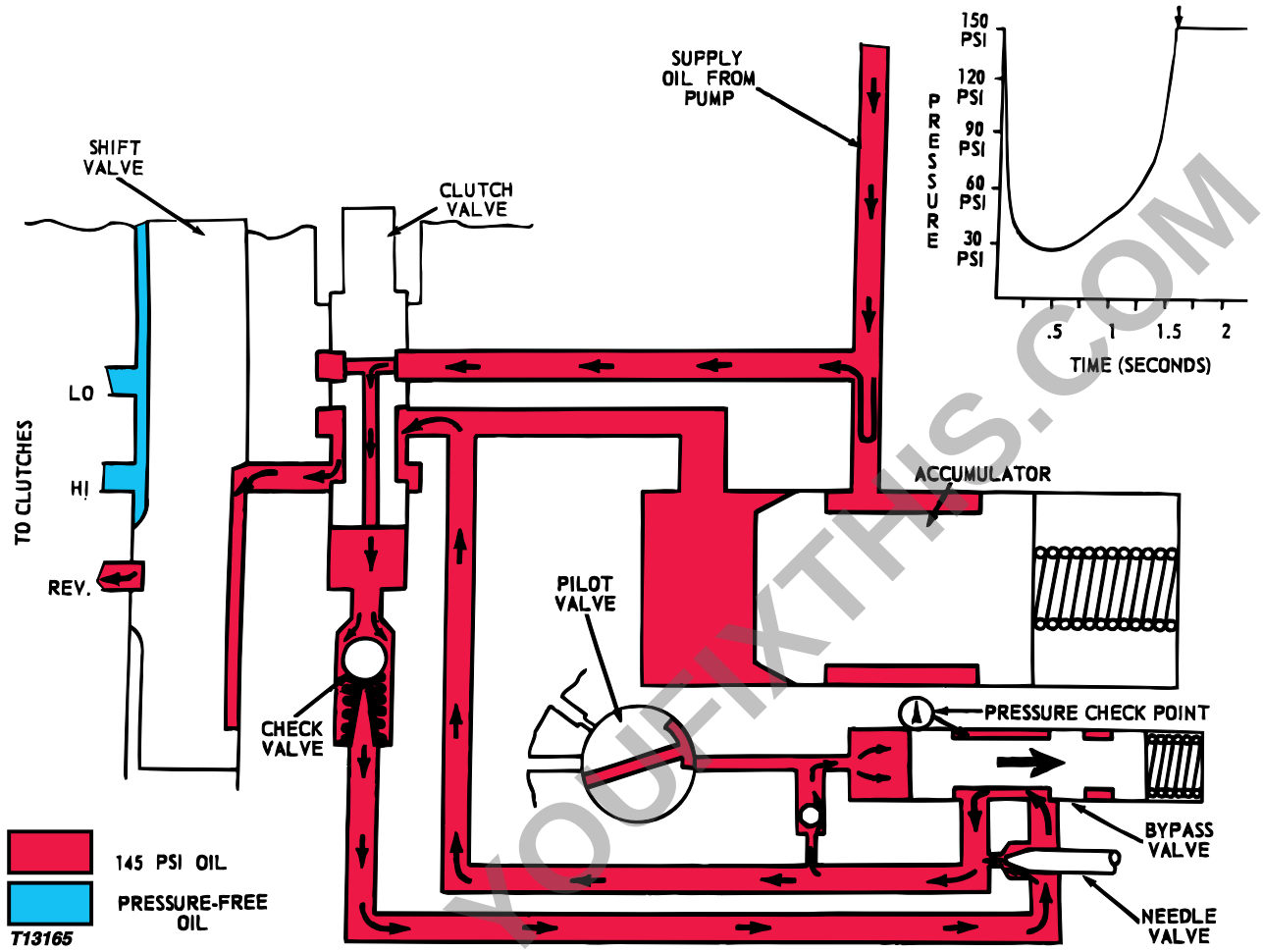


Fig. 130-5-10—Step 5 - Clutch Control Unit Shifting High to Reverse Gear

Step 5 — At 1.5 Seconds (Fig. 130-5-10)

When pressure reaches about 55 psi, the bypass valve opens suddenly and admits a full flow of oil to completely engage and hold the reverse clutch. This should cause an instant rise in pressure from 55 to 145 psi at about 1.5 seconds after start of shift. Pressure on engaged clutch should stay at 145 psi until a new shift is made.

This occurs because the pressure backing up from the reverse clutch is admitted to the pilot valve through a small orifice. At 55 psi, pressure is high enough against the end of the bypass valve to open it. This gives pressure oil a free flow around restricting orifice at needle valve.

The accumulator has also reloaded for the next shift.

NEUTRAL

The neutral cycle is the same as "Step 1" on page 130-5-6. Oil flow is shown in Fig. 130-5-6. The pilot valve dumps oil, allowing the bypass valve to close. This seals off the full flow passage to the clutches. At the same time, the shift valve dumps oil from the engaged clutch and the pressure slot in the shift valve is closed off.

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AXLE AND FINAL DRIVE GEAR

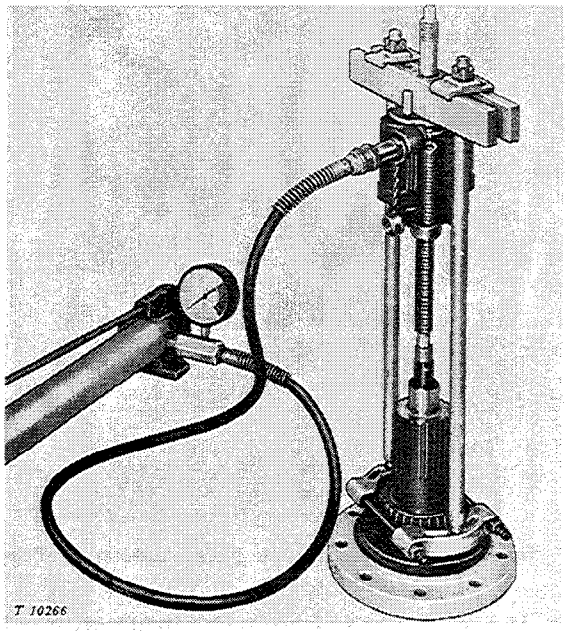


Fig. 140-10-4—Removing Bearing from Flanged Axle

Remove bearing and seal housing from flanged axle by attaching a knife-edge puller under housing (Fig. 140-10-4).

Examine splines on axle shaft for galling or excessive spline wear. Remove all metal deposits from splines caused by galling. Inspect final drive gear (M) for wear or damage to gear teeth or splines.

Carefully inspect bearings for wear which may have been caused by foreign material entering the housing through a damaged seal. Inspect the final drive housing for any damage which would make it unserviceable.

FLANGED AXLE OIL SEAL

IMPORTANT: Belleville washers on the flanged axle oil seal must be replaced every time axle shaft is removed from final drive housing.

Examine sealing faces for wear to determine whether seal rings can be reused or must be replaced. If highly polished sealing band is in the middle or toward the outside of the seal face, sealing rings can be reused. If highly polished sealing band is not uniform or is toward the inside of the seal face, sealing rings must be replaced.

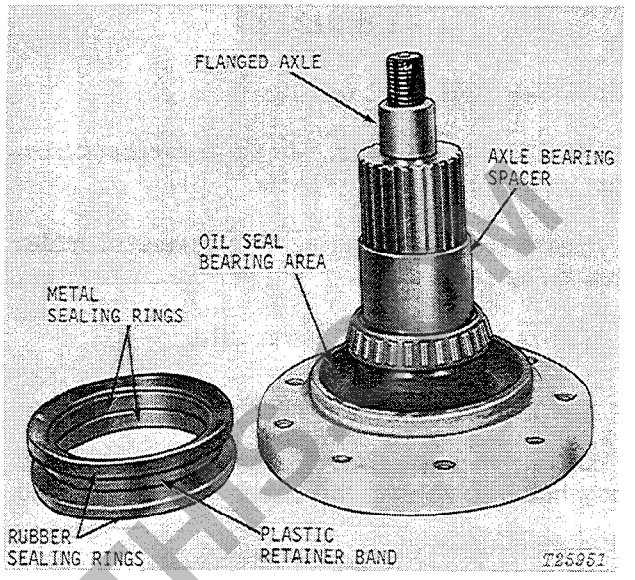


Fig. 140-10-5—Replacing Flanged Axle Oil Seal

1. Clean the bores and shoulders where oil seal fits with a cleaning solvent and wipe dry. Surfaces that contact rubber sealing rings must be free of grease, oil, dirt, and scale.

2. Remove and discard retainer band from seal. Check rubber sealing rings to be sure they are flush against the inside shoulder of the metal sealing rings.

3. All seal parts must be free of grease, oil, dirt and scale.

4. Sealing rings must be handled with care. The lapped sealing faces of the metal sealing rings must not be damaged, scratched, or contaminated with dirt or grease.

5. Install one seal half (metal ring and rubber ring) into the final drive housing. Install second seal half (metal ring and rubber ring) into the flanged axle. Check each seal half to be sure that seal is not cocked and that rubber rings are seated evenly at the bottom of the bore.

6. Wipe both metal sealing faces with a lint free wiper and apply a thin film of clean SAE 30 oil.

IMPORTANT: Oil must not wet areas other than the lapped surface of the metal sealing rings.

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WINCH CLUTCH

The winch clutch is a disk pack located inside the clutch and brake drum. A pressure plate hydraulically engages the clutch by forcing a piston against the clutch pack. A release spring disengages the clutch pack after pressure oil is released in response to control lever movement.

WINCH BRAKE

The winch brake is a contracting band around the winch drum and is operated by a hydraulic piston and cylinder mechanism controlled by the winch control valve. The brake band is released by pressure oil in response to control lever movement.

OIL FILTER

The power winch is equipped with a full flow-type oil filter (Fig. 170-5-3). Pressure oil flows through the filter when the control lever is in the "HOLD" position. The oil filter uses a replaceable filter element of the corrugated paper type.

WINCH CONTROL VALVE

The control valve (Fig. 170-5-3) is mounted on the front of the winch housing and contains a valve spool which directs oil to the filter and back to the reservoir, to the clutch and brake, or to the brake. The control valve spool is manually operated by a control lever which is mounted on the right side of the operator's seat. The lever has three positions:

(1) "HOLD" (vertical position): winch drum in neutral.

(2) "WIND" (forward position): winch drum engaged.

(3) "FREE-SPOOL" (rear position): winch drum released.

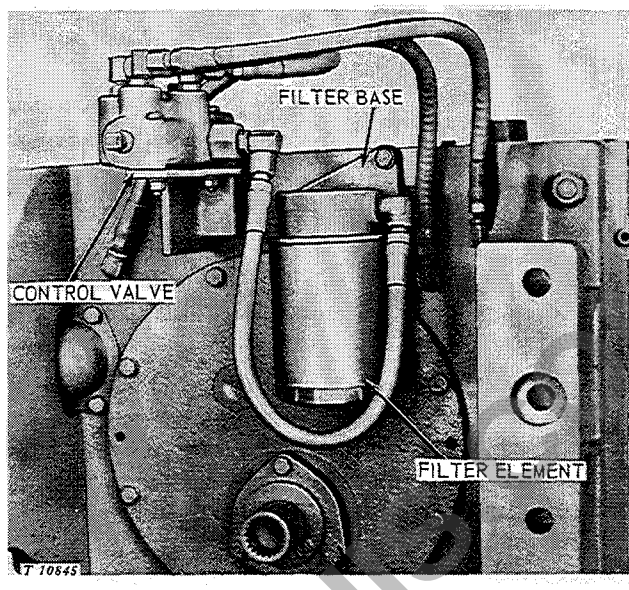


Fig. 170-5-3–Full-Flow Oil Filter and Control Valve

(1) In the HOLD position (Fig. 170-5-4), pressure oil from the pump flows to the control valve. The oil then passes through the valve spool, through the filter and into the reservoir.

(2) In the WIND position (Fig. 170-5-5), pressure oil from the pump flows to the control valve. The valve spool is moved to the right, closing off the passage to the filter and regulating pressure oil flow to engage the clutches. Back-up pressure from the engaged clutches releases the brake and the gear train winds in the winch drum. Any excess oil in the pressure system is relieved through the relief valve in the pump.

(3) In the FREE-SPOOL position (Fig. 170-5-6), pressure oil from the pump flows to the control valve. The valve spool is moved to the left, preventing oil from passing through the valve. Pressure backs up to the brake cylinder and disengages the brake. Oil in the pressure system is relieved through the relief valve at the pump.

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WINCH ADJUSTMENT

CLUTCH BAND ADJUSTMENT

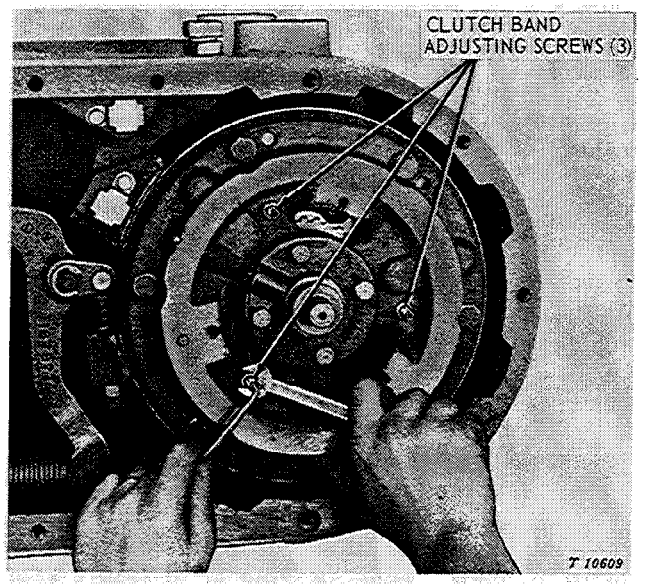


Fig. 180-15-47—Adjusting Winch Clutch Band

Loosen jam nuts on each screw and turn all three screws down evenly as far as possible until clutch assembly is locked tight. Then loosen each screw one full turn (to allow for running clearance).

NOTE: Do not attempt to adjust each clutch adjusting screw individually. This might "cock" the primary disk. All three screws must be tightened down evenly before any of them are backed off.

BRAKE BAND ADJUSTMENT

Install the left quill and gasket on the winch housing, while aligning brake anchor pin with quill. Torque the attaching cap screws to 45 ft.-lbs.

Back out the brake band clearance adjusting screw on top of housing (Fig. 180-15-48). Remove cover from lower, left side of housing and loosen adjusting nut on the brake rod until the brake band is loose. Tighten the adjusting nut until the length of the spring pack (see insert) is set at 3-3/8 inches from the inside edge of the housing to the front edge of the washer (use a proper length of heavy wire as a measuring device). Tighten hex. locking nut.

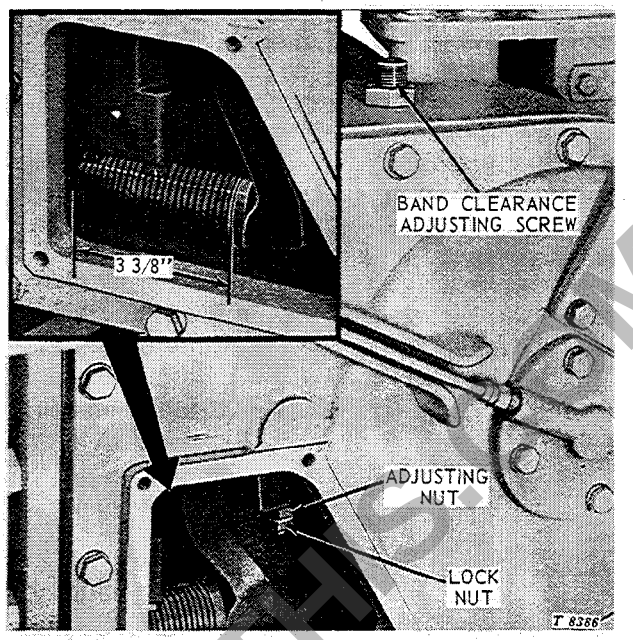


Fig. 180-15-48—Adjusting Winch Brake Band

Adjusting Band Clearance

With the brake band in the hold position and the brake spring pack adjusted to 3-3/8 inches, turn in on the set screw on top of the housing until it contacts the brake anchor and then turn down an extra 1/2 turn. Tighten jam nut to hold the screw.

INSTALLING WINCH

Lubricate lips on block vee packings using brake fluid (not bearing grease). Install inlet sleeve and inlet cover being careful not to invert lips. (Pack cavity between quill and inlet cover with John Deere Winch Bearing Grease during assembly.) Connect brake fluid line from inlet cover to the adapter connector.

Install the winch adapters on the winch housing and tighten the hex. nuts to 150 ft-lbs torque.

Install winch on the tractor and tighten the adapter cap screws to 300 ft-lbs torque.

Fill the housing with proper lubricant to the level of the oil level hole. See chart in Section 30 for recommendations.

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Group 35

HYDRAULIC COMPONENTS

RESERVOIR AND FILTERS

GENERAL INFORMATION

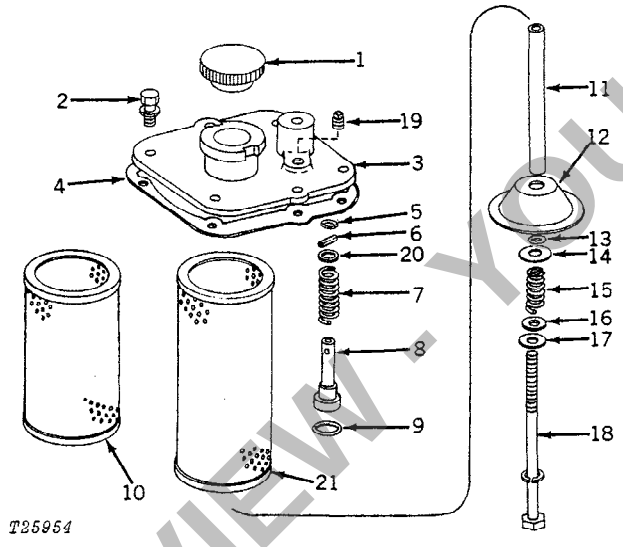
The hydraulic reservoir is the sump area for the hydraulic functions and is pressurized to keep out dirt and to hold pressure for positive flow to the pump.

The hydraulic system filtering unit consists of a return filter element that filters the oil as it returns to the reservoir, and a wire mesh filter that filters the suction oil as it goes to the pump.

Should the return filter become plugged, a valve at the top of the reservoir allows oil to bypass the filter and enter the reservoir.

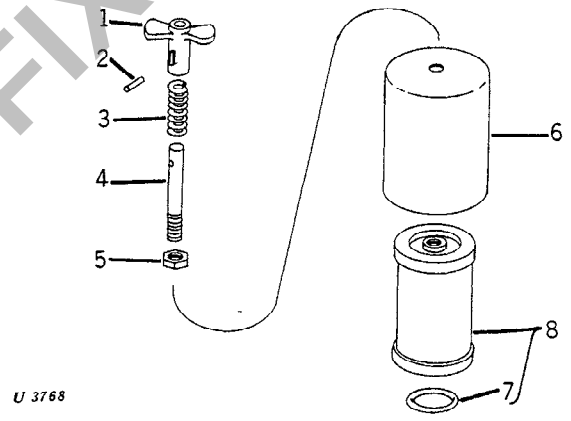
Because the return filter has a finer filtering capacity than the wire mesh filter, dirty oil bypassing the plugged return element will pass through the wire mesh filter. This prevents pump oil starvation.

REPAIR



1 – Pressure Cap
2 – Cap Screw (6 used)
3 – Filler Cap
4 – Gasket
5 – O-Ring
6 – Spring Pin
7 – Spring
8 – Piston Indicator
9 – O-Ring
10 – Micronic Element (early units)
11 – Spacer (early units)
12 – Filter Cup
13 – O-Ring (early units)
14 – Washer (early units)
15 – Spring (early units)
16 – Washer (early units)
17 – Washer
18 – Bolt (with lock washer - later units)
19 – Plug (later units)
20 – Special Washer (later units)
21 – Micronic Element (later units)

Fig. 190-35-1–Return Filter



1 – Latch
2 – Spring Pin
3 – Spring
4 – Rod
5 – Nut
6 – Filter Can
7 – O-Ring
8 – Wire Mesh Filter

Fig. 190-35-2–Wire Mesh Filter

Replace the return filter at the service periods outlined in the operator's manual. Also replace return filter when major service work is performed on the crawler hydraulic components.

The wire mesh filter may be washed in a solvent such as diesel fuel and the impurities blown out with compressed air.

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