FORD

NEW HOLLAND

Service Manual

Tractor
1100

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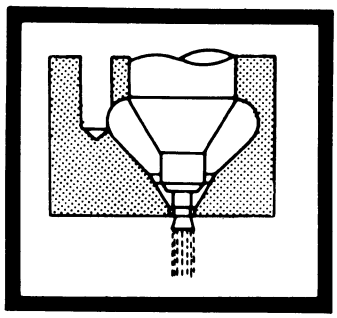
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TROUBLESHOOTING

Condition	Possible Causes
Engine Does Not Develop Full Power	1. Clogged air cleaner. 2. Fuel line obstructed. 3. Improper injection timing. 4. Improper nozzle injection pressure and angle. 5. Low cylinder compression. 6. Insufficient fuel injection. 7. Improper valve lash adjustment. 8. Burned, worn or sticking valves. 9. Blown head gasket. 10. Worn or sticking piston ring.
Low Cylinder Compression	1. Burned, worn, or sticking valves. 2. Bent valve stem. 3. Broken or weak valve spring. 4. Blown cylinder head gasket. 5. Worn or sticking piston ring. 6. Blown piston.
Poor Engine Idling	1. Improper injection timing. 2. Air in injection pump. 3. Improper governor adjustment.
Engine Knocks	1. Diluted or thin oil. 2. Insufficient oil supply. 3. Low oil pressure. 4. Worn crankshaft thrust bearing. 5. Excessive flywheel runout. 6. Excessive connecting rod or main bearing clearance. 7. Seized bearing. 8. Clogged oil passages. 9. Bent or twisted connecting rod. 10. Crankshaft journals out-of-round.

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FUEL SYSTEM

Page

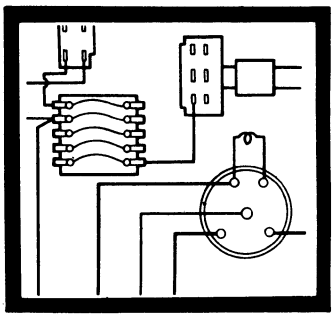
Chapter 1

DIESEL FUEL SYSTEM 1-22

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Part 3



ELECTRICAL SYSTEM

Chapter 1
GLOW PLUGS

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DESCRIPTION AND OPERATION

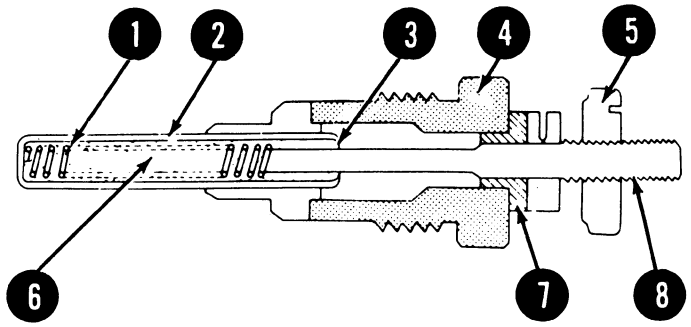
To assist engine starting in cold weather each cylinder has a glow plug threaded into the pre-combustion chamber. The glow plug is a resistance type heating element that will generate heat when an electrical current flows through the glow plug element to ground. The heating element is encased in a stainless steel sheath filled with magnesium oxide powder. One end of the element is welded to the sheath, which acts as the circuit ground, while the other end is welded to the center electrode.

Rotating the starter switch to the HEAT position closes the glow plug circuit and battery current will flow through the glow plug heating element. The heat generated by the glow plug preheats the air in the cylinder making it easier for the fuel injected into the cylinder to vaporize and ignite. An indicator on the instrument panel will glow red when the air in the cylinder has heated to the correct temperature.

WARNING

Never attempt to disassemble a glow plug. The magnesium contained in the glow plug sheath will burn at an extremely high temperature if exposed to air.

1. HEAT WIRE
2. SHEATH
3. ASBESTOS
4. BODY
5. NUT
6. MAGNESIUM OXIDE POWDER
7. INSULATION BUSHING
8. CENTER ELECTRODE



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Chapter 7
ALTERNATOR

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DESCRIPTION AND OPERATION

Alternator

The alternator system consists of an alternator and voltage regulator. The alternator is cooled by a front mounted pulley and fan assembly that draws air into the housing. The air stream is directed across the rectifying diodes, stator, and rotor, and expelled out the openings in the front housing. The rotor assembly is mounted on ball bearings.

The alternator has six silicon diodes built into the rear cover. The alternator converts magnetic and mechanical energy to alternating current by rotating an electromagnet (the rotor) inside the stator assembly. The alternating current and voltage is changed to direct current (D.C.) by a three-phase, full wave rectifier system, employing the six silicon rectifying diodes.

The voltage regulator is designed to exercise automatic control over the charging system, and also to compensate for seasonal temperature changes. The voltage regulator has two sets of points, one for high speed operation and one for low speed operation.

A charge indicator lamp relay, located on the right side of the voltage regulator, switches off the charge indicator lamp circuit and provides a ground for the voltage regulator.

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TROUBLESHOOTING

Before removing the disc and cover assemblies from the tractor, attempt to isolate the trouble by referring to the corrective action for the specific problem listed below.

Problem	Possible Cause	Corrective Action
1. Excessive clutch pedal free play or loss of adjustment reserve.	1. Worn clutch disc 2. Clutch linkage out of adjustment	1. Replace disc. Refer to "Clutch Overhaul." 2. Adjust linkage. Refer to "Adjustments."
2. Clutch noisy when free.	1. Defective release bearing 2. Defective clutch pilot bearing.	1. Replace bearing. 2. Replace bearing.
3. Clutch slipping.	1. Incorrect pedal free travel. 2. Worn disc facings. 3. Clutch pressure springs weak from over-heating.	1. Adjust free travel. Refer to "Adjustments." 2. Replace disc. Refer to "Clutch Overhaul." 3. Overhaul or install new clutch assembly. Refer to "Clutch Overhaul."
4. Clutch fails to engage smoothly.	1. Defective clutch disc. 2. Defective pressure plate assembly. 3. Worn clutch pilot bearing. 4. Defective flywheel.	1. Replace disc. Refer to "Clutch Overhaul." 2. Replace pressure plate assembly. 3. Replace bearing. 4. Refer to Part 1, "Engine System" for removal and installation.
5. Difficulty in engaging gears.	1. Pedal free travel out of adjustment. 2. Damaged or out of adjustment release levers.	1. Refer to "Adjustments" to adjust the pedal free travel. 2. Adjust assembly. Refer to "Adjustments."
6. Pedal will not return completely to release position.	1. Broken clutch pedal return spring.	1. Install a new spring.

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TROUBLESHOOTING

Condition	Cause	Remedy
1. Brake pedal does not return	(1) Rusted brake cam (2) Rusted brake pedal	(1) Correct with sand paper and grease. (2) Correct with sand paper and grease.
2. Insufficient braking	(1) Brake pedal out of adjustment (2) Worn or burnt lining (3) Oil leakage in the brake chamber	(1) Adjust the play. (2) Replace the brake shoe. (3) Replace the oil seal.
3. One side braking	(1) Brake pedal adjustment (2) Trouble in one brake system	(1) Adjust the play of both right and left pedals to the same value. (2) Inspect and correct.
4. Noise in the brake system	(1) Worn out lining (2) Slippery surface of the lining	(1) Replace the brake shoe. (2) Make the surface rough with a file, etc.

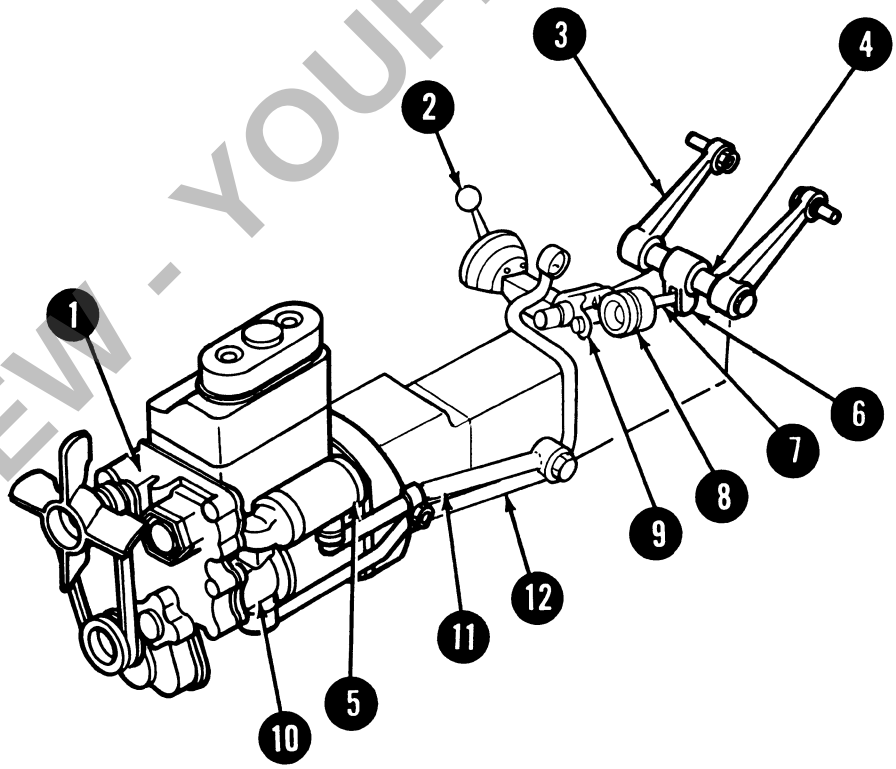
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DESCRIPTION AND OPERATION

The major components in the hydraulic system are shown below:

1. ENGINE
2. LIFT CONTROL LEVER
3. LIFT ARM
4. LIFT SHAFT
5. FILTER
6. RAM ARM
7. PISTON ROD
8. PISTON
9. CONTROL VALVE ASSEMBLY
10. HYDRAULIC PUMP
11. SUCTION LINE
12. PRESSURE LINE



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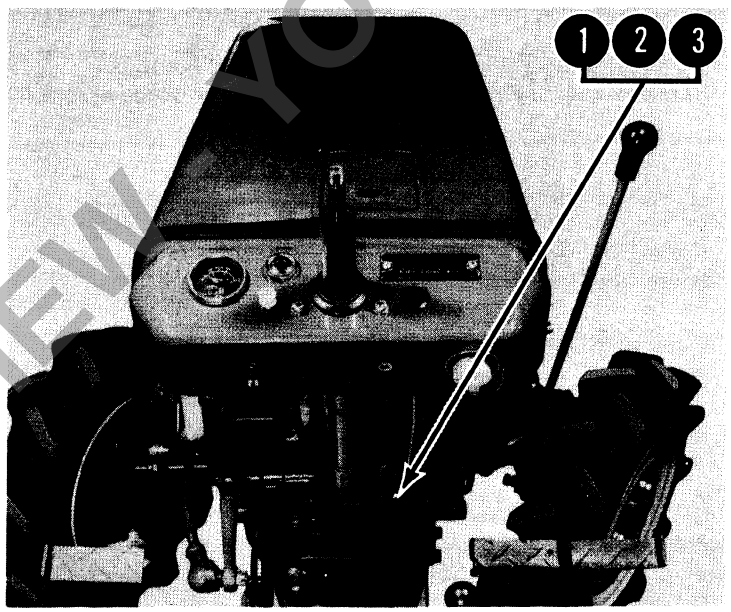
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ADJUSTMENTS

Steering Wheel Free -Travel

The standard value of steering wheel free-travel is 0.79-1.18 in. (20-30mm) in outer circumference. If the free travel exceeds 1.97 in. (50mm) adjust as follows:

1. Loosen lock nut.
2. Turn adjusting bolt clockwise to decrease free-travel and counterclockwise to increase.
3. After adjustment, tighten lock nut.



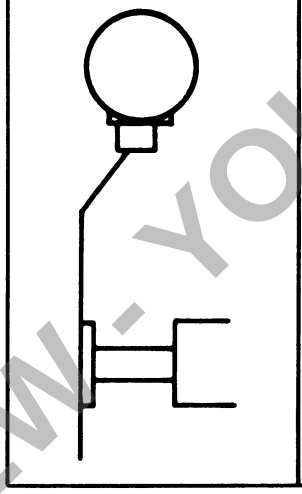
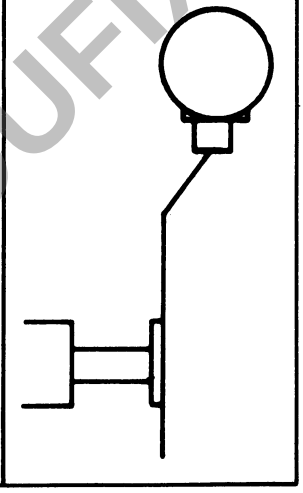
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REAR WHEEL TREAD SETTINGS

The rear wheels are adjustable from 35.4 to 41.3 in. (90 cm - 105 cm).

NOTE: After changing the rear wheel tread setting, the wheel bolts should be torqued to 69-87 lbs-ft (93-117 Nm).

STANDARD	INTERCHANGE L & R WHEEL
35.4 in. (90cm)	41.3 in. (105cm)
	

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FORD

1100
1300
1500
1700
1900

TRACTOR REPAIR MANUAL

SUPPLEMENT

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FORD

TRACTOR REPAIR MANUAL

REMOTE VALVE . . . . . 1700—1900 SERIES WITH DRAFT CONTROL

POWER STEERING. . . 1700-1900 SERIES

SUPPLEMENT

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SPECIFICATIONS

GENERAL SPECIFICATIONS

Tractor Model	1300	1500	1700	1900
Engine Model	LEK802D	LET852C	LE892	LEM853
Number of Cylinders	2	2	2	3
Bore x Stroke	3.15 x 3.15 in. (80 x 80mm)	3.35 x 3.94 in. (85 x 100mm)	3.54 x 3.94 in. (90 x 100mm)	3.35 x 3.31 in. (85 x 84mm)
Displacement	49.1 $in.^2$ (804cc)	69.2 $in.^3$ (1,134cc)	77.7 $in.^2$ (1,272cc)	82.7 $in.^3$ (1,429cc)
Compression Ratio	23:1	21:1	21:1	21:1
Rated Speed (rpm)	2700	2500	2500	2800
Muffler	Vertical	Vertical	Vertical	Vertical
Firing Order	2-1	2-1	2-1	1-2-3
Idle Speed	750-850	750-850	700-800	700-800
Maximum No. — Load Speed	2900-2950	2650-2700	2650-2700	2900-2950
Cylinder Arrangement	In-line Vertical	In-line Vertical	In-line Vertical	In-line Vertical
Valve Arrangement	Overhead	Overhead	Overhead	Overhead

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SPECIFICATIONS

Type of system	Pressurized liquid w/recirculating bypass
Water Pump: Type Drive Belt Deflection (Tension)	Centrifugal V-belt 7/16 to 9/16 inch (10 to 15mm) when 20-25 lbs. (9-11 Kg) is applied midway between pulleys
Fan Diameter	1300 — 11.4 inches (29.0cm) All Others — 11.8 inches (30.0cm)
Thermostat Starts to Open Fully Open	160°F. (71°C.) 185°F. (85°C.)
Radiator Cap Pressure Rating	13 PSI (0.9 Kg/cm^2)
Coolant Capacity	Ethylene glycol and water in a 50/50 mixture.

	Liters	Qts.—U.S.	Qts.—Imp.
1300	4.0	4.2	3.5
1500	5.3	5.6	4.6
1700	5.3	5.6	4.6
1900	6	6.3	5.2

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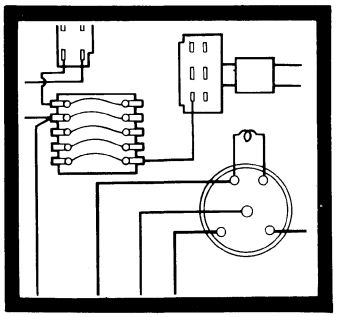
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SPECIFICATIONS

Injection Pump	
Pump Model	
1300	NP-PFR2KD65/2NP7
1500	NP-PES2K65C210RS2N1
1700	NP-PES2K70A210RSZN2
1900	NP-PES3K65C210RS1T1
Pump Manufacturer Assembly Number	
1300	4296-202
1500	4302-608
1700	4302-419
1900	700125-116
Type	
All Models	In-Line
Timing (Before TDC)	
1300	23°-24°
1500	23°-24°
1700	20°-22°
1900	26°-27°
Timing (Piston Displacement Before TDC)	
1300	0.160 in.-0.174 in. (4.055-4.407mm)
1500	0.20-0.23 in. (5.09-6.00mm)
1700	0.15-0.18 in. (3.87-4.67mm)
1900	0.21-0.22 in. (5.24-5.60mm)
Injection Nozzle	
Nozzle Type	Pintle
Needle Valve Diameter	.024 in. (.6mm)
Pintle Diameter	.004 in. (.1mm)
Injection Pressure	1706 PSI (120 kg/cm^2)
Spray Angle	12°
Service Adjustments	
Idle Speed	
1300 - 1500	750-850 RPM
1700 & 1900	700-800 RPM
Maximum No-Load Speed	
1300	2900-2950 RPM
1500	2650-2700 RPM
1700	2600-2650 RPM
1900	2900-2950 RPM

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Chapter 6
STARTER MOTOR

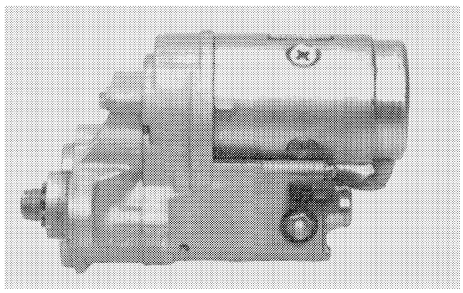
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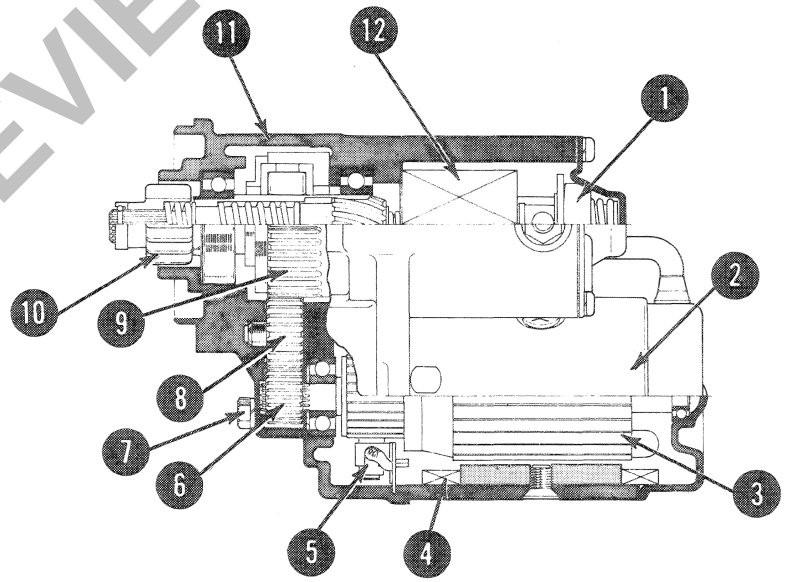
DESCRIPTION AND OPERATION

Starter Motor

Model 1300 — Reduction Gear Starter

The starter motor used on 1300 Model tractors is a gear reduction design providing approximately a 3 to 1 reduction of armature shaft speed at the pinion. The lower speed is compensated for by the increased torque generated by a gear reduction system. The pinion assembly is driven by an idler gear which in turn is driven by a gear splined to the armature shaft. Engagement of the pinion with the ring gear is accomplished through a push rod connected to the solenoid plunger.





1. PLUNGER
2. FRAME
3. ARMATURE
4. FIELD COIL
5. BRUSH
6. DRIVE PINION
7. THROUGH BOLT
8. IDLER GEAR
9. CLUTCH
10. PINION GEAR
11. PINION HOUSING
12. MAGNET COIL

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SPECIFICATIONS

CLUTCH SPECIFICATIONS

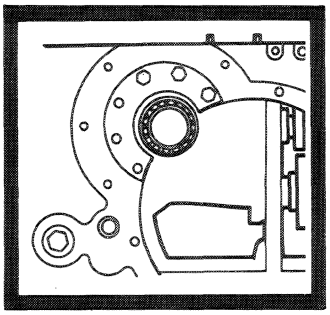
Item	Model 1300	Model 1500	Model 1700	Model 1900 Single Clutch	Model 1900 Dual Clutch
No. of clutch plates	1 (2 Facings)	1 (2 Facings)	1 (2 Facings)	1 (2 Facings)	2 (4 Facings)
Facing:					
Outside Diameter	7.09 in. (180mm)	8.50 in. (216mm)	8.50 in. (216mm)	8.50 in. (216mm)	8.50 in. (216mm)
Inside Diameter	4.92 in. (125mm)	5.12 in. (130mm)	5.12 in. (130mm)	5.12 in. (130mm)	5.12 in. (150mm)
Thickness	0.1259 in. (3.2mm)	0.1259 in. (3.2mm)	0.1259 in. (3.2mm)	0.1259 in. (3.2mm)	0.1377 in. (3.5mm)
Recess of rivet	.0472 in. (1.2mm)	.0472 in. (1.2mm)	.0472 in. (1.2mm)	.0472 in. (1.2mm)	.0472 in. (1.2mm)
Height of release lever	1.18 ± .0039 in. (30 ± 0.1mm)	2.13 ± .0314 in. (54 ± 0.8mm)	2.13 ± .0314 in. (54 ± 0.8mm)	2.13 ± .0314 in. (54 ± 0.8mm)	4.45 ± .0393 in. (113 ± 0.7mm)
Clearance between driveshaft and clutch disc	.0078-.0137 in. (0.2-0.35mm)	.0078-.0137 in. (0.2-0.35mm)	.0078-.0137 in. (0.2-0.35mm)	.0078-.0179 in. (0.2-0.45mm)	.0078-.0137 in. (0.2-0.35mm)
Allowable clearance limit	.0236 in. (0.6mm)	.0236 in. (0.6mm)	.0236 in. (0.6mm)	.0393 in. (0.7mm)	.0236 in. (0.6mm)
Clearance between driveshaft and clutch disc in the rotational direction	.0009-.0039 in. (0.025-0.1mm)	.0019-.0039 in. (0.05-0.1mm)	.0019-.0039 in. (0.05-0.1mm)	.0008-.0059 in. (0.02-0.15mm)	.0008-.0059 in. (0.02-0.15mm)
Allowable clearance limit	.0098 in. (0.25mm)	.0098 in. (0.25mm)	.0098 in. (0.25mm)	.0118 in. (0.3mm)	.0118 in. (0.3mm)
Clearance between retainer and release hub	.0009-.0039 in. (0.025-0.1mm)	.0009-.0039 in. (0.025-0.1mm)	.0009-.0039 in. (0.025-0.1mm)	—	—
Allowable clearance limit	.0314 in. (0.8mm)	.0314 in. (0.8mm)	.0314 in. (0.8mm)	—	—
Length of release hub return spring	1.28 in. (32.5mm)	1.28 in. (32.5mm)	1.28 in. (32.5mm)	—	—
Thickness of clutch disc	.31 in. (7.8mm)	.34 in. (8.6mm)	.34 in. (8.6mm)	.34 in. (8.6mm)	.34 in. (8.6mm) (Both Main and PTO Disc)
Allowable limit	.24 in. (6.0mm)	.28 in. (7.2mm)	.28 in. (7.2mm)	.28 in. (7.2mm)	.28 in. (7.2mm)
Sink of clutch disc rivet	.0472 in. (1.2mm)	.0472 in. (1.2mm)	.0472 in. (1.2mm)	.0472 in. (1.2mm)	.0472 in. (1.2mm)
Allowable limit	.0118 in. (0.3mm)	.0196 in. (0.5mm)	.0196 in. (0.5mm)	.0196 in. (0.5mm)	.0196 in. (0.5mm)
Height of release lever from flywheel surface	—	—	2.13 in. (54mm)	2.13 in. (54mm)	4.45 in. (113mm)
Allowable limit	—	—	2.09-2.16 in. (53.2-54.8mm)	2.09-2.16 in. (53.2-54.8mm)*	4.42-4.48 in. (112.3-113.7mm)*
Deflection of clutch disc	—	—	—	.0393 in. (1.0mm) or more	.0393 in. (1.0mm) or more
Standard play of clutch pedal	.79-1.18 in. (20-30mm)	.79-1.18 in. (20-30mm)	.79-1.18 in. (20-30mm)	.79-1.18 in. (20-30mm)	.79-1.18 in. (20-30mm)
Maximum allowable play	1.57 in. (40mm)	1.57 in. (40mm)	1.57 in. (40mm)	1.57 in. (40mm)	1.57 in. (40mm)

*Bolt clearance: Standard — .0669 in. (1.7mm) Limits — .0629-.0708 in. (1.6-1.8mm)

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Part 5



DIFFERENTIAL, REAR AXLE AND RELATED PARTS

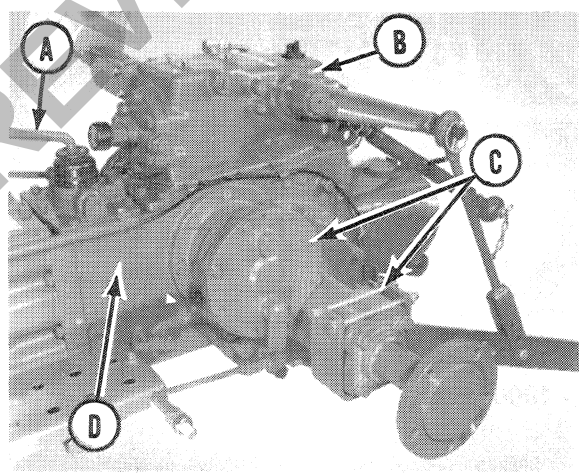
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DIFFERENTIAL

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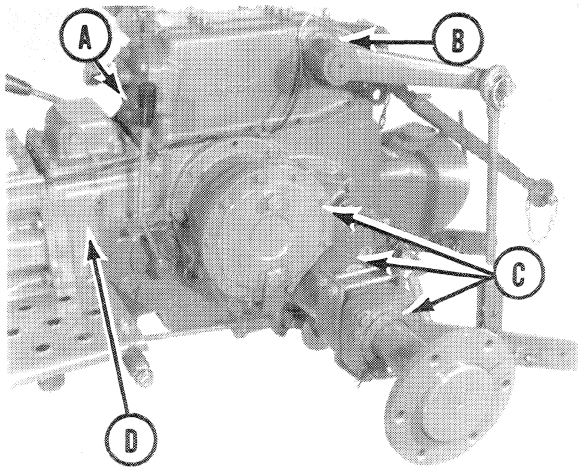
DESCRIPTION AND OPERATION

The differential is composed of the differential gear assembly, PTO, and, if installed, creeper gear and front-wheel drive gear.

A. PTO CONTROL
B. HYDRAULIC SYSTEM COVER
C. REAR AXLE
D. DIFFERENTIAL



Models 1300 - 1500



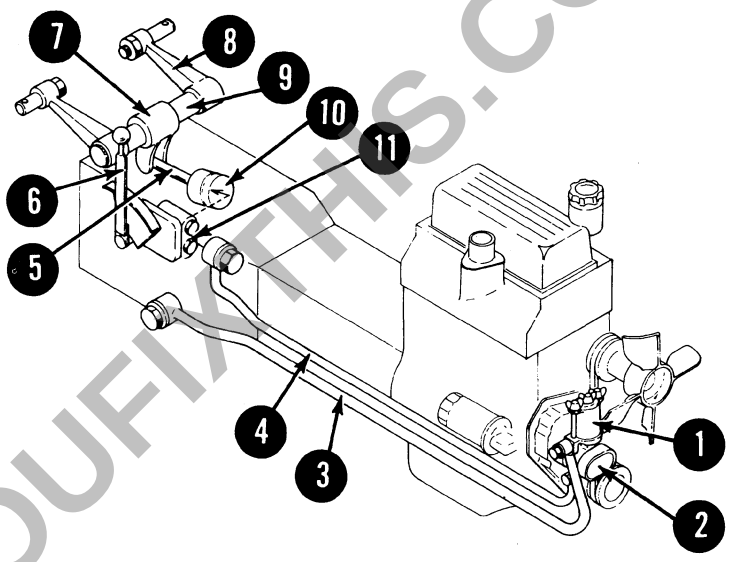
Models 1700 - 1900

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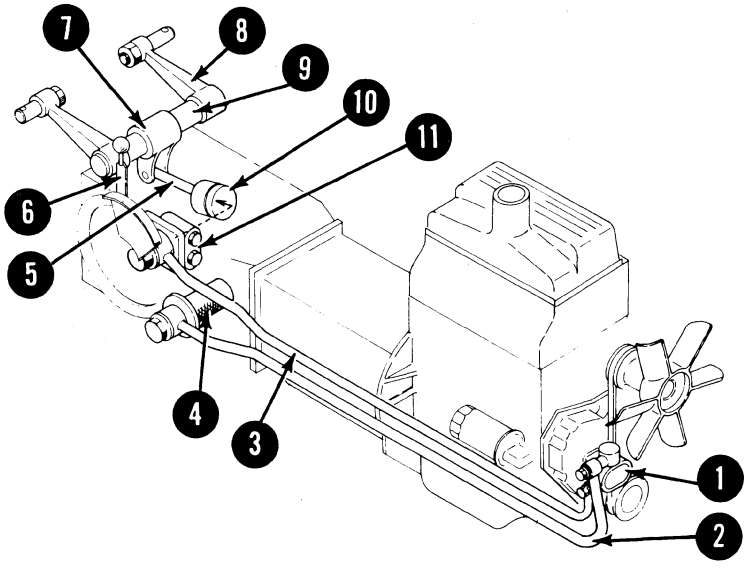
DESCRIPTION AND OPERATION

The major components in the hydraulic system are shown below:

1 LINE FILTER (STRAINER)
2 OIL PUMP
3 OIL PIPE: SUCTION
4 OIL PIPE: DELIVERY
5 PISTON ROD
6 CONTROL LIFT LEVER
7 HYDRAULIC ARM
8 LIFT ARM
9 HYDRAULIC ARM SHAFT
10 PISTON
11 CONTROL VALVE



Models 1300 - 1500



1 OIL PUMP
2 OIL PIPE: SUCTION
3 OIL PIPE: DELIVERY
4 LINE FILTER (STRAINER)
5 PISTON ROD
6 CONTROL LIFT LEVER
7 HYDRAULIC ARM
8 LIFT ARM
9 HYDRAULIC ARM SHAFT
10 PISTON
11 CONTROL VALVE

Models 1700-1900

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ADJUSTMENTS

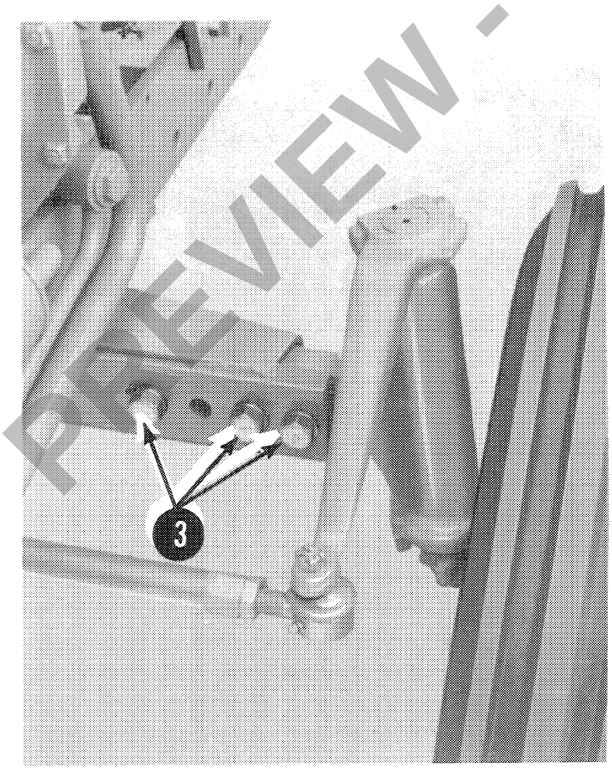
Front Wheel Tread Width

The front wheel tread setting is adjustable from 41.3 to 43.3 in. (105-110cm) on the standard non-adjustable front axle (Models 1300 and 1500 only) by reversing the front wheels.

IMPORTANT: Do not reverse the front wheels on a front-wheel drive unit.

IMPORTANT: It is not recommended that the front wheels be set at maximum tread width in rough terrain because of high steering wheel effort and kickback.

1. Lock parking brake and raise the front of the tractor with a jack placed under the center of the front axle. Support with safety stands.
2. Remove the bolt from the tie rod clamp.
3. Remove the positioning bolts and move the axle sections in or out until the desired setting is obtained, then reinstall the positioning bolts.
4. Position the front wheels in the straight-ahead position, then reinstall the tie rod clamp bolt.
5. Torque all nuts to 43-54 lbs. ft. (58-73 N·m) and remove the jack.
6. Check the toe-in as outlined in this Chapter.





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FOREWORD

This supplement contains service and repair information not included in the 1000 Series Tractor Repair Manual, SE 3771.

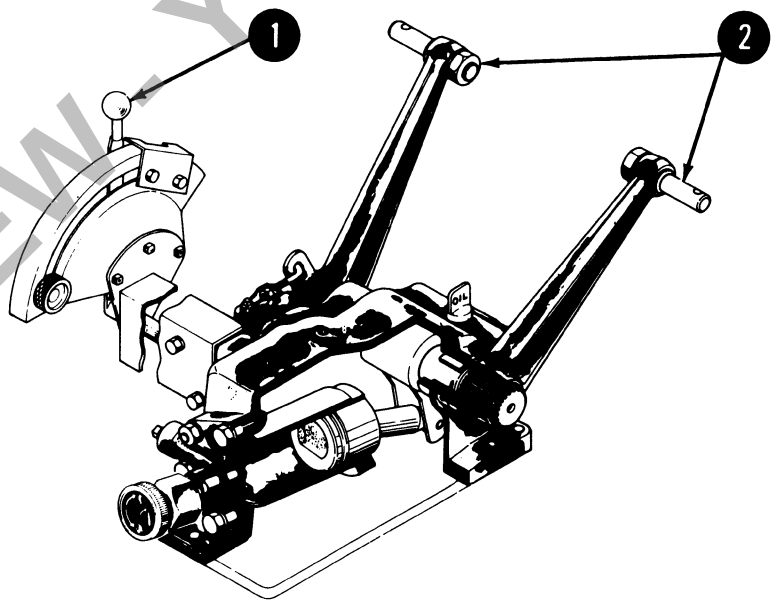
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OVERHAUL

Cylinder Housing — Removal

1. Before removal, return oil in the hydraulic cylinder to the reservoir by setting the control lever to the lowering position.
2. Push the lift arms down to the lowest position.
3. Disconnect rear wiring harness at fenders and move wiring harness out of way.
4. Remove seat and seat support plate.
5. Disconnect hydraulic line at cylinder housing.
6. Remove bolts attaching housing to differential.
7. Attach chain hoist to housing and remove from tractor.



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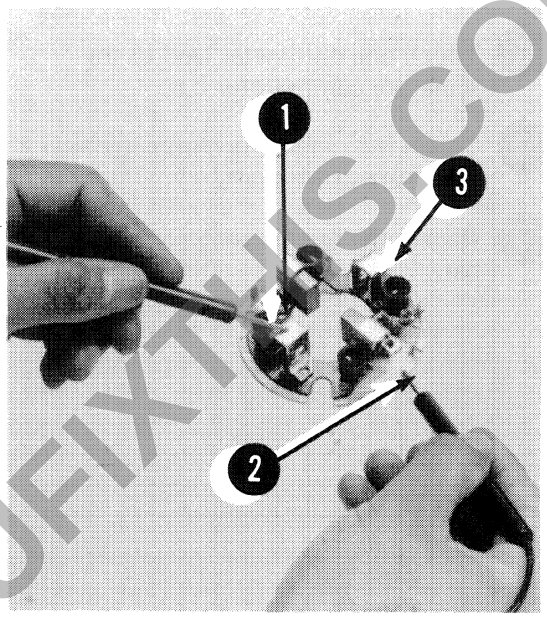
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COMPONENT TESTS

Brush Holder Insulation

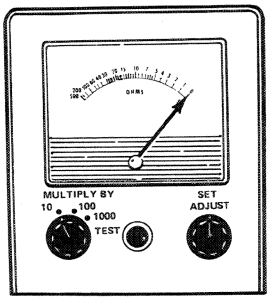
Models 1500, 1700 and 1900

1. Touch one ohmmeter lead to the insulated brush holder.
2. Touch the remaining ohmmeter lead to the brush holder plate and observe the ohmmeter.
3. Repeat the test on the remaining brush holder.



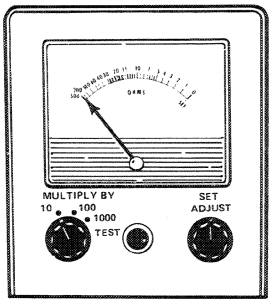
TEST RESULTS

- **LOW RESISTANCE READING**



OK

- **HIGH RESISTANCE READING**



REPLACE BRUSH HOLDER

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