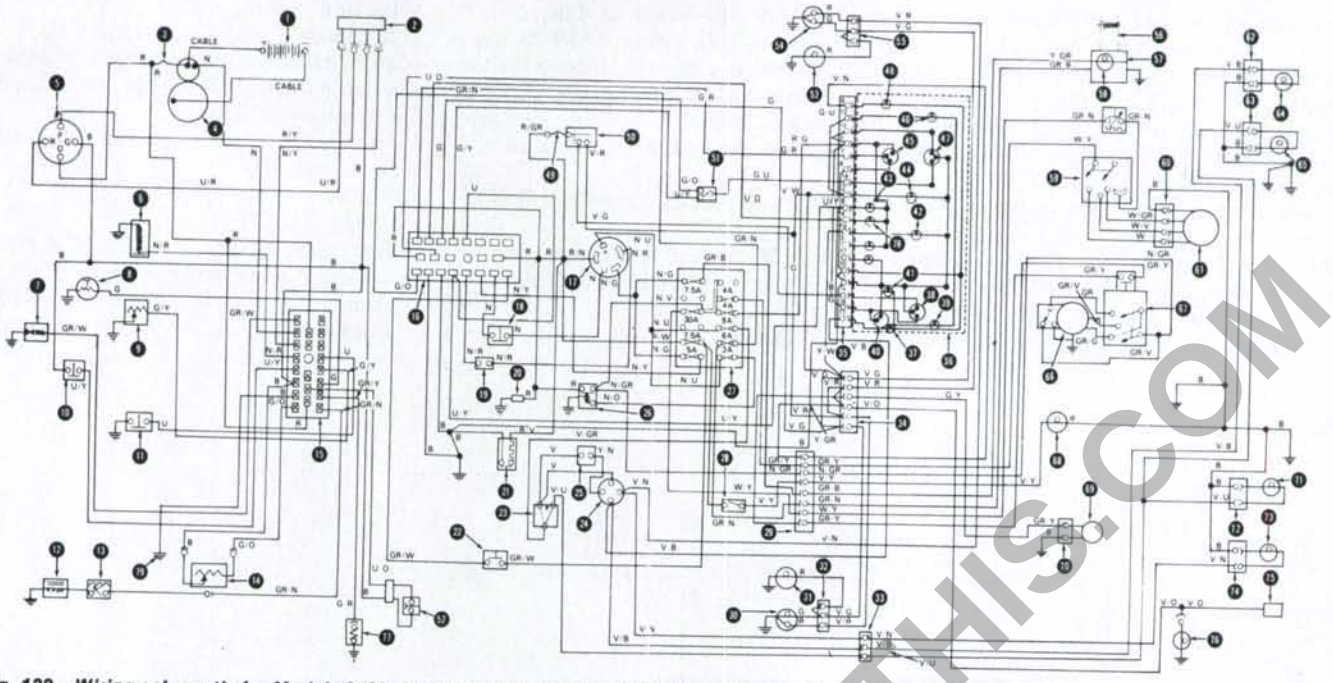


Fig. 132—Wiring schematic for Models 8700, 9700, TW-10, TW-20 and TW-30 equipped with a cab. Note that TW models are equipped with instrument panel gages while 8700-9700 models are equipped with a temperature gage and warning lights. Component (52) is a diode on 8700-9700 models and an oil pressure sender on TW models. Models 8700 and 9700 aren't equipped with components (77, 78 or 79).

B. Black
G. Green
GR. Gray
N. Brown
O. Orange
R. Red
U. Blue
V. Violet
W. White
Y. Yellow
1. Battery
2. Regulator
3. Fuse link
4. Starter motor
5. Alternator
6. Ether solenoid
7. Horn
8. Temperature sender
9. Main fuel level sender
10. Air cleaner restriction switch
11. Oil pressure sender
12. Air compressor clutch
13. De-icing switch
14. Auxiliary fuel level sender
15. Front main harness connector
16. Rear main harness connector
17. Ignition switch
18. Safety start switch
19. Ether start button
20. Condenser
21. Cigar lighter
22. Horn button
23. Implement/hazard light switch
24. Turn signal switch
25. Flasher unit
26. Ignition relay
27. Fuse block
28. Dome light switch
29. Cab roof harness connector
30. Hi-lo beam lamp, L.H.
31. Work lamp, L.H.
32. Work & headlamp connector
33. Implement & flasher lights connector, rear
34. Main extension harness connector
35. Instrument cluster connector
36. Instrument cluster
37. Turn signal indicator, R.H.
38. Temperature gage
39. Panel light
40. Alternator warning light or gage
41. Panel light
42. Hi-lo beam indicator
43. Air cleaner warning light
44. Panel light
45. Oil pressure warning light or gage
46. Panel light
47. Fuel gage
48. Turn signal indicator, L.H.
49. Fuse
50. Headlight switch
51. Fuel selector switch
52. Diode or oil sender
53. Work lamp, R.H.
54. Hi-lo beam lamp, R.H.
55. Work & headlamp connector
56. Speaker
57. Radio
58. Radio dial light
59. Blower motor switch
60. Blower motor connector
61. Blower motor
62. Flasher connector, R.H.
63. Implement lamp connector, R.H.
64. Flasher light, R.H.
65. Implement lamp, R.H.
66. Wiper motor
67. Wiper/washer switch
68. Dome light
69. Washer pump motor
70. Washer pump connector
71. Implement lamp, L.H.
72. Implement lamp connector, L.H.
73. Flasher light, L.H.
74. Flasher light connector, L.H.
75. Trailer socket
76. Tail light
77. Trans. oil pressure switch
78. Trans. oil pressure warning light
79. Front hood R.H. support

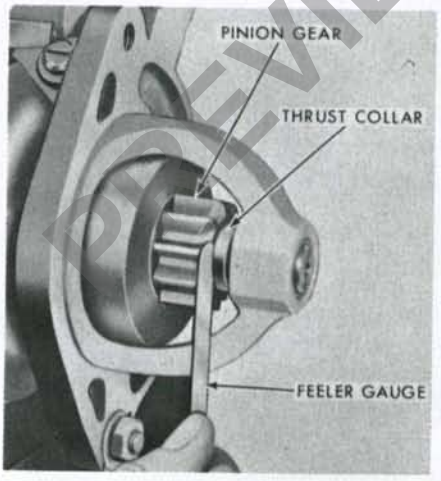


Fig. 133—Measuring starting motor drive pinion clearance. Refer to text for procedure and to Fig. 134 for adjustment of clearance.

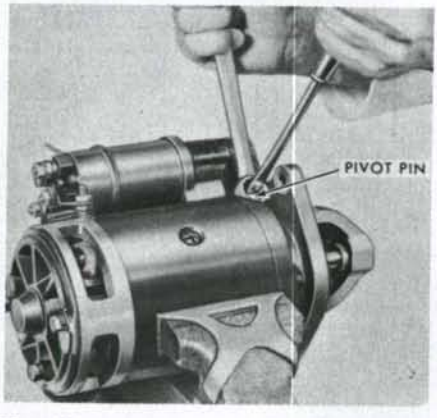


Fig. 134—Adjusting drive pinion clearance; refer also to Fig. 133 and to text.

CLUTCH

All except TW-20 and TW-30 models are equipped with a 13-inch diameter single plate clutch assembly; TW-20 and TW-30 models are equipped with a 14-inch diameter clutch. The clutch friction disc on 8000 models is fitted with five cera-metallic pad inserts, while 8600, 9000 and TW-10 models have six cera-metallic pad inserts. 8600 model discs can be used on prior 8000 models. The disc used on 8700, 9600 and 9700 models is equipped with nine pad inserts and can be used on earlier 9000 models. The disc used on TW-20 and TW-30 models has eight cera-metallic pad inserts. Clutch disc is renewable as an assembly only. The clutch cover, thrust plates, pressure springs and adjusting nuts are available separately. There are 12 pressure springs in pressure plate and

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4. Control linkage damaged or disconnected.
5. Leak in pump suction (intake) pipe.
6. Sticking exhaust control valve (34—Fig. 219).
7. Sticking or improperly installed exhaust pressure valve (36—Fig. 219).

B. FAILURE TO LIFT UNDER LOAD. Could be caused by:

1. Faulty hydraulic pump.
2. System pressure relief valve opening at too low a pressure or faulty relief valve.
3. Safety relief valve faulty.
4. Exhaust pressure valve (36—Fig. 219) sticking.
5. Clogged pump inlet screen.

C. OCCASIONALLY FAILS TO LIFT NOT DUE TO OVERLOADING. Could be caused by:

1. Flow control valve spool sticking occasionally.
2. Exhaust pressure valve (36—Fig. 219) sticking occasionally or valve installed backwards.
3. Lift control valve improperly adjusted.

D. EXCESSIVE LIFT CORRECTIONS (WILL NOT HOLD LOAD AFTER STOPPING ENGINE). Could be caused by:

1. Drop valve poppet or poppet ball leaking.
2. Lift piston seal leaking.
3. "O" ring seals between control valve body and lift cylinder leaking.
4. Safety valve leaking.

E. LIFTS TOO SLOWLY. Could be caused by:

1. Flow control valve stuck in slow lift position.
2. Flow control valve scored or not properly fit in valve bore.
3. Faulty pump.

F. OVER CORRECTS IN DRAFT CONTROL. Could be caused by:

1. Flow control valve adjusting knob not properly set.
2. Lift control valve not properly adjusted.
3. Binding draft control linkage or lower lift hanger binding in bushings.
4. Flow control override linkage binding and not releasing variable flow valve from fast flow position.

G. SYSTEM DOES NOT RESPOND TO CHANGES IN DRAFT OF IMPLEMENT. Could be caused by:

1. Draft control linkage out of adjustment.

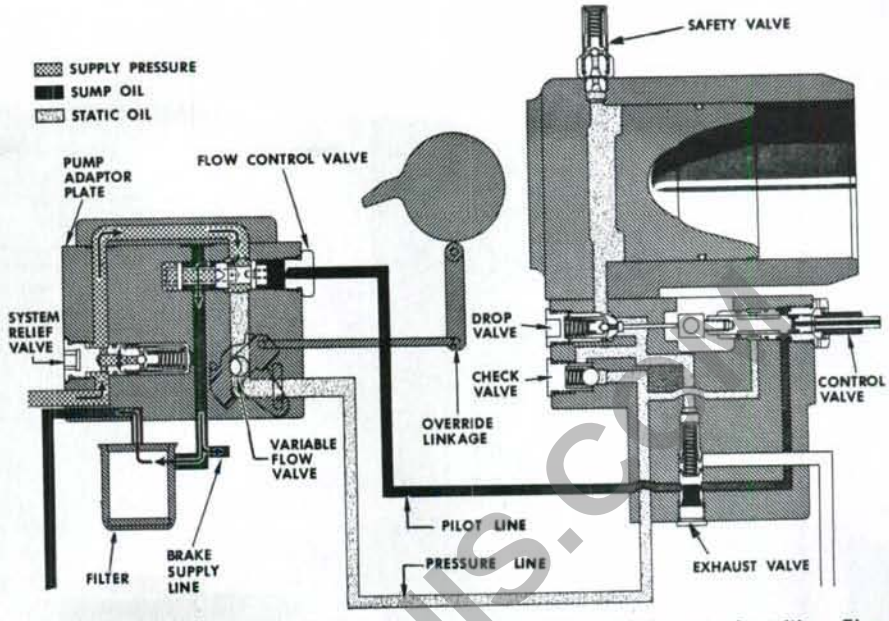


Fig. 203—Schematic diagram of hydraulic system with control valve in neutral position. Flow control valve returns oil to sump through filter and brake supply line and maintains static pressure in pressure line with the control valve in neutral or lowering position. When the control valve is placed in raising position, pressure is directed to pilot line, closing the flow control valve, thus directing fluid flow to pressure line and lift cylinder. When control valve is placed in lowering position, drop valve is forced open allowing fluid in cylinder to return to sump past the exhaust valve. Pressure in pilot line holds exhaust valve closed when line is pressurized with control valve in raising position. Variable flow valve restricts flow to lift cylinder pressure line, causing flow control valve to direct part of pump flow to sump depending upon position of variable flow valve. Thus, rate of lift can be varied by varying position of variable flow valve with control (F—Fig. 209) on console. When control valve lever is placed in full raise position, override linkage returns variable flow valve to full flow position.

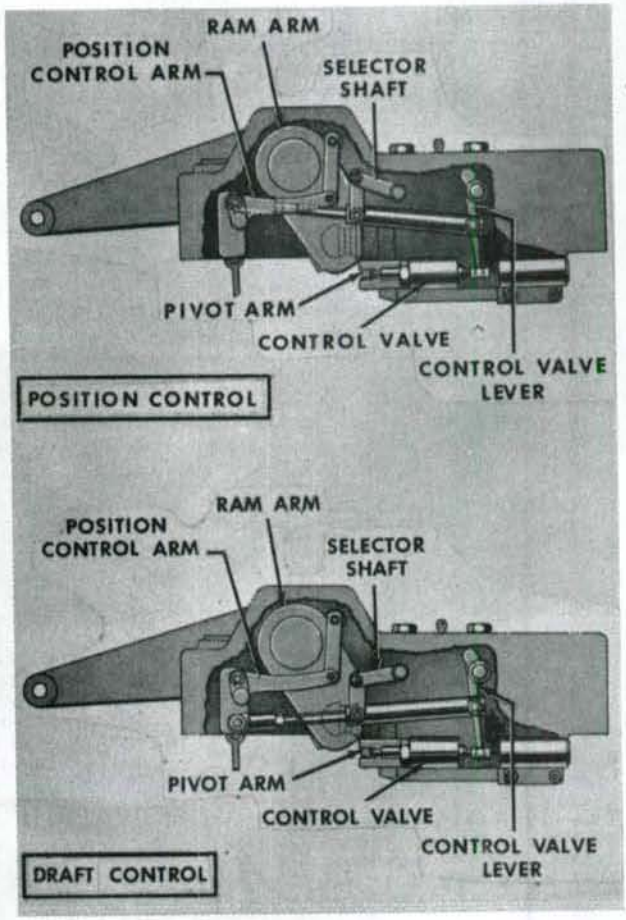


Fig. 204—Selector lever (S—Fig. 209) controls position of selector shaft which moves rear end of actuating rod attached to control valve lever to position control (top view) or draft control (bottom view) position in position control arm. Also, detent positions between full position control and full draft control provide varying degrees of draft control. Refer to exploded view of detent mechanism in Fig. 223.

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removal procedure, making sure a thrust washer (17) is placed on each pivot pin. Tighten pivot pin support and center steering arm cap screws to a torque of 180-220 ft.-lbs., then bend locking plates against steering arm cap screw heads.

2. **SPINDLE BUSHINGS.** To renew spindle bushings, support front of tractor and remove front wheels. Remove steering arm clamp bolts on models so equipped, pull arms from spindles and remove Woodruff keys (8—Fig. 1). On models equipped with spindles having splined end is shown in Fig. 1, remove retaining nut (24) and pull steering arm from spindle. Withdraw spindles downward out of axle extensions. Remove seals (7) and thrust bearing (3). Remove thrust bearing spacers (2) if worn or damaged. Drive bushings from axle extensions and install new bushings using piloted drift or driver; bushings are presized and should not require reaming if carefully installed. Be sure grease holes are aligned. Pack thrust bearings with grease.

NOTE: Upper ends of early spindles with a key were 1½ inches in diameter whereas late spindles with a key are approximately 1-5/8 inches. Only the large diameter spindle is available. If renewing small spindle, a new large diameter steering arm must also be installed. Be sure correct size spindle seal is installed. Tighten steering arm clamp bolts on models equipped with keyed spindles to a torque of 135-165 ft.-lbs. On models with splined spindles, tighten retaining nuts (24—Fig. 1) to a torque of 200-250 ft.-lbs. Stake spindle threads to nut.

3. **AXLE CENTER MEMBER, PIVOT PINS AND BUSHINGS.** To remove axle center member (20—Fig. 1), support front of tractor, remove clamp bolts from tie rods and unbolt axle extensions from center member. Withdraw axle extensions with spindles and wheels from center member and tie rod sleeves. Unbolt and remove center steering arm with tie rods. Support center member and unbolt front pivot pin support. Move center member and front pivot forward until clear of rear pivot pin and lower to floor. Unbolt and remove rear pivot pin and support.

Pivot pins are integral parts of pivot pin supports; renew the pin and support assembly if pin is excessively worn. Renew bushings (18) in center member if member is otherwise serviceable; bushings are pre-sized and should not require reaming if carefully installed. Be sure grease holes are aligned and install plug (19) in bore through axle tube. Renew thrust washers (17) if worn.

Reinstall by reversing removal procedure. Tighten pivot pin support and center steering arm cap screws to a torque of 180-220 ft.-lbs., then bend locking plates against steering arm cap screw heads. Tighten tie rod clamp bolts to a torque of 25-35 ft.-lbs. and check toe-in as outlined in paragraph 4.

4. **TIE RODS AND TOE-IN.** Tie rod ends are of the non-adjustable automotive type and procedure for renewing same is evident. Tighten clamp bolts on outer tie rod ends to a torque of 25-35 ft.-lbs. and tighten jam nut at inner end of tie rods to a torque of 100-125 ft.-lbs.

Toe-in on both row crop and all purpose models should be ¼- to ½-inch. Position center steering arm at center line of tractor as shown in Fig. 2 or Fig. 3 before checking toe-in at spindle height. If toe-in is not correct, remove

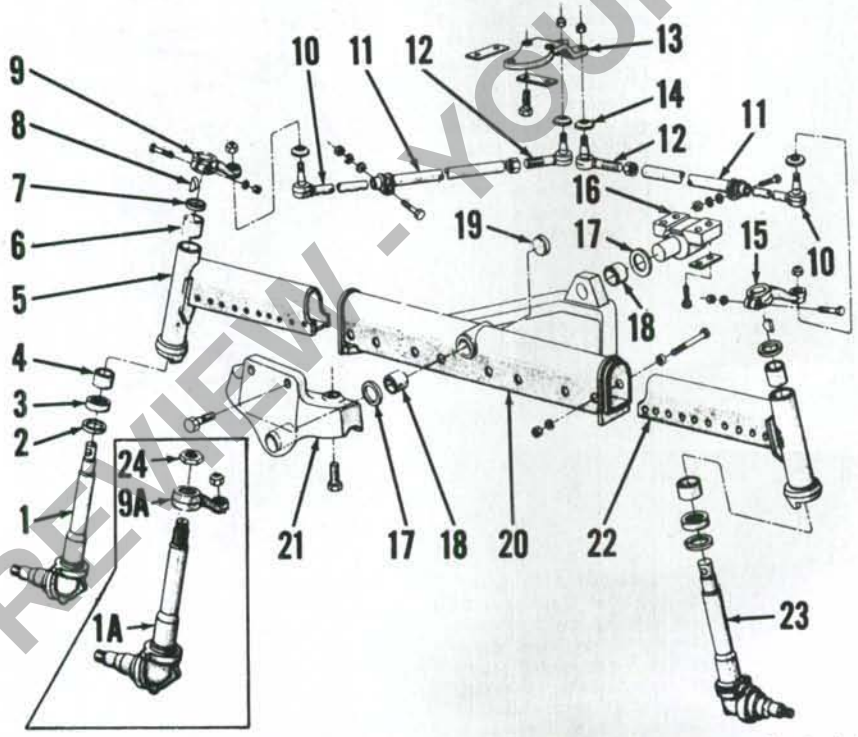


Fig. 1—Exploded view of row crop type wide adjustable front axle. All purpose type front axle is similar except that center member (20) is reversed to provide shorter wheelbase. Note that later models are equipped with spindles (1A) and steering arms are retained by a nut as shown in inset. All parts except center steering arm (13) and inner tie-rod ends (12) are interchangeable between row crop and all purpose types. Refer to Figs. 2 and 3 for center steering arm views.

1. & 1A. Spindle, R.H.
2. Thrust spacer
3. Thrust bearing
4. Lower bushing
5. Axle extension, R.H.
6. Upper bushing
7. Seal
8. Woodruff key
9. & 9A. Steering arm
10. Tie rod ends, outer
11. Tie rod tube
12. Tie rod ends, inner
13. Steering arm, center
14. Dust seals
15. Steering arm, L.H.
16. Rear pivot pin & support
17. Thrust washers
18. Pivot pin bushings
19. Plug
20. Axle center member
21. Front pivot pin & support
22. Axle extension, L.H.
23. Spindle, L.H.
24. Nut

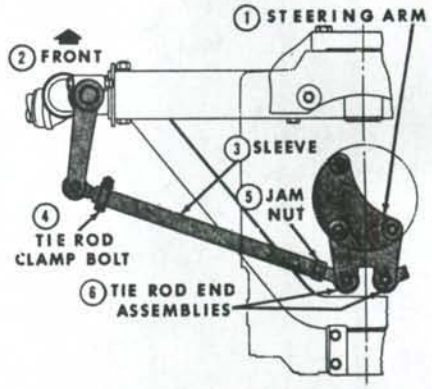


Fig. 2—When checking toe-in on row crop wide adjustable axle, be sure steering arm is centered as shown. View is from top. When installing center steering arm, be sure steering motor is centered and install arm as shown.

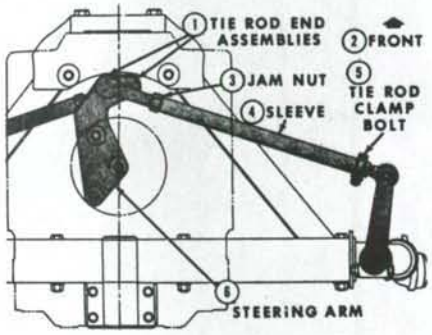


Fig. 3—View showing position of all purpose type center steering arm for checking toe-in. Note that center arm (6) and tie rod inner ends are different than those used on row crop front end. View is from top.

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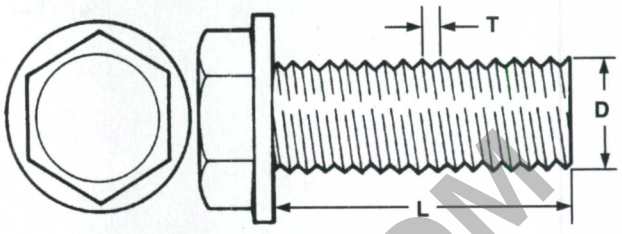
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General Torque Recommendations

Use the following torque *recommendations* as a guideline when a specification for a particular fastener is not available. In many cases manufacturers do not provide torque specifications, especially on older models.

Consider fastener condition carefully when referring to either a recommendation or a specification. If fastener reuse is appropriate, select the minimum value to account for fastener stretch. Softer fasteners or those securing softer materials, such as aluminum or cast iron, typically require less torque. In addition, lubricated or unusually long fasteners typically require less torque.

Determine fastener strength by referring to the grade mark on the bolt head. The higher the grade is, the stronger the fastener.



L = Length T = Thread pitch D = Diameter

Determine fastener size by measuring the thread diameter (D), fastener length (L) and thread pitch (T).

Size and Pitch	SAE grade 1 or 2 bolts	SAE grade 5 bolts	SAE grade 8 bolts
1/4—20	4-6	6-10	9-14
1/4—28	5-7	7-11	10-16
5/16—18	6-12	8-19	15-29
5/16—24	9-13	15-21	19-33
3/8—16	12-20	19-33	28-47
3/8—24	17-25	26-37	36-53
7/16—14	22-32	31-54	51-78
7/16—20	27-36	40-60	58-84
1/2—13	34-47	56-78	80-119
1/2—20	41-59	64-87	89-129
9/16—12	53-69	69-114	102-169
9/16—18	60-79	78-127	115-185
5/8—11	74-96	112-154	156-230
5/8—18	82-110	127-175	178-287
3/4—10	105-155	165-257	263-380
3/4—16	130-180	196-317	309-448
7/8—9	165-206	290-382	426-600
7/8—14	185-230	342-451	492-665
1—8	225-310	441-587	650-879
1—14	252-345	508-675	742-1032
1 1/8—7	330-480	609-794	860-1430

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3. Never attempt to polarize the alternator.

4. Always disconnect all battery ground straps before removing or replacing any electrical unit.

5. Never operate the alternator on an open circuit; be sure that all leads are properly connected and tightened before starting the engine.

158. A Motorola alternator (Ford part No. C7NN-10300-B 55 amp, D5NN-10300-D 51 amp or D7NN-10300-B 72 amp), and transistorized voltage regulator (Ford part No. C7NN-10316-A, D1NN-10316-A, D7NN-10316-B or D8NN-10316-AA) are used. Service specifications follow:

All Alternators

Max. output at 160°F., 2400 engine rpm and 14.4 volts	*47 amps
Minimum brush length	3/16-inch
Min. brush spring tension with new brush	4 ounces
Field current	1.8-2.4 amps
Field resistance	6 ohms

*Max. output for D7NN-10300-B alternator is 67 amps.

All Regulators

Voltage regulation with 10 ampere load:

Ambient Temperature	Output Terminal Voltage
40°F.	14.2-15.0
60°F.	14.1-14.9
80°F.	13.9-14.7
100°F.	13.8-14.6
120°F.	13.6-14.4

STARTING MOTOR

159. Engine is equipped with a Ford starting motor and relay assembly. Closing the starter switch energizes the solenoid; movement of the solenoid plunger engages the drive pinion and closes a two-stage switch. If the teeth of the drive pinion butt against teeth on flywheel, only the first stage of the

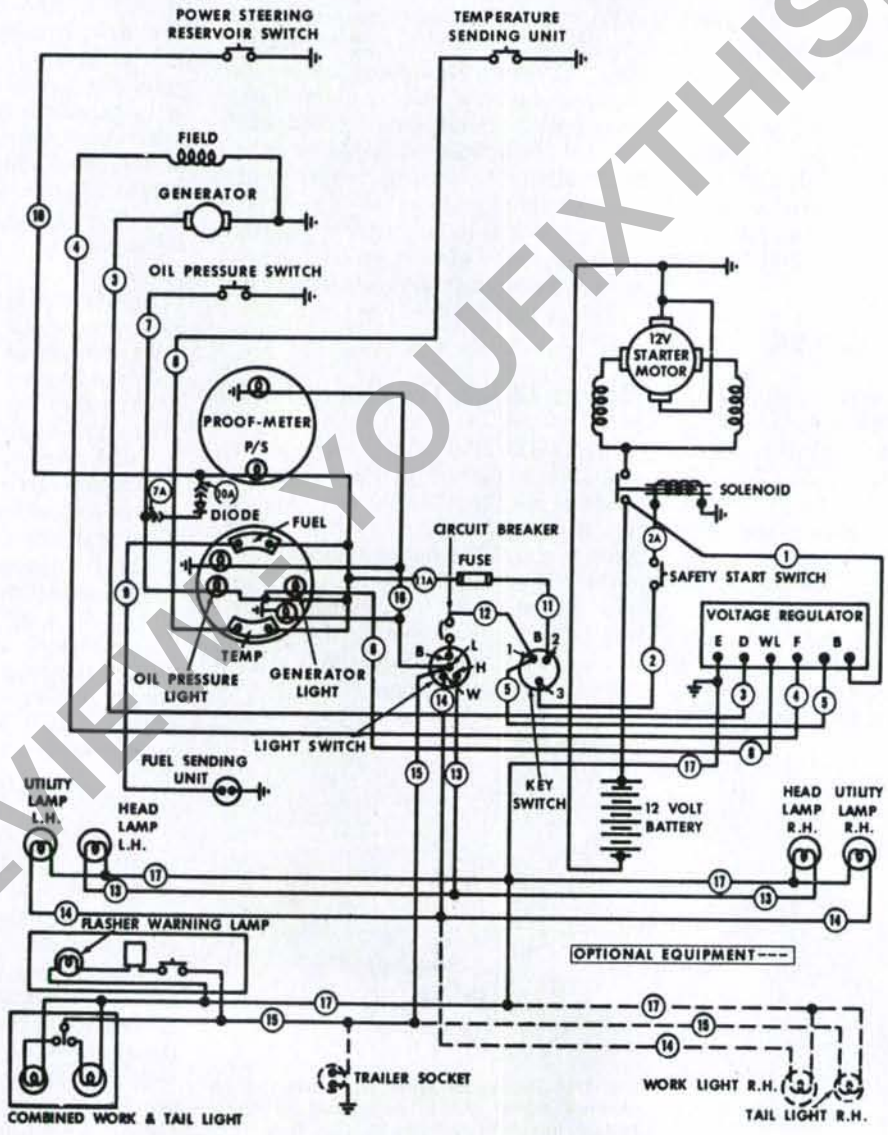


Fig. 128—Wiring diagram for models with generator. Refer to Fig. 130 for models with alternator. Code for regulator connections are as follows: (E) ground, (D) armature, (WL) warning light, (F) field and (B) battery. Color code for wiring is given in legend.

1. Brown
2A. Red
3. Yellow-black stripe
4. Blue
5. Brown-white stripe
6. Yellow-black stripe
7A. White
8. Red-white stripe
9. Orange
10A. Green-blue stripe
11A. Black-green stripe
12. Yellow
13. Green
14. Red
15. Blue-white stripe
16. Blue-red stripe
17. Black

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voir). Refer to the following paragraphs for checking causes of steering system malfunction:

HARD STEERING. Check column bearings and bearings in Hydramotor unit; renew if rough or damaged. Check ring, rotor and vanes for wear and renew the assembly if necessary. Check for sticking control valve spool or blocking spool in Hydramotor; clean valves or renew Hydramotor parts as required.

EXCESSIVE WHEEL DRIFT. Check blocking spool spring and guide assembly and renew if spring is broken. Check for leakage past blocking valve; if excessive, renew valve body housing assembly. Check seals on steering cylinder pistons and renew pistons and/or cylinders as required.

STEERING WHEEL TURNING UNAIDED. Check the Hydramotor unit for sticking control valve spool, broken valve spool spring, actuator shaft binding or torque shaft (inside actuator shaft) broken. Clean spool and bore or renew valve body housing assembly as required.

STEERING WHEEL SLIPPAGE. Hydramotor control valve spool scored (renew valve body housing assembly) or rotor seals leaking (renew seals).

EXCESSIVE NOISE. Hydraulic lines vibrating against tractor frame or broken control valve spool spring; insulate lines from tractor or renew valve body housing assembly if spring is broken.

ERRATIC MOVEMENT OF FRONT WHEELS. Check Hydramotor ring, rotor or vanes for scoring, wear or binding condition; renew the ring and rotor assembly if necessary.

WILL NOT STEER IN EITHER DIRECTION. The manual steer check ball between pump return and pressure passages in Hydramotor unit may not be seating. Disassemble unit and clean passage with solvent and dry with compressed air. Renew pressure plate assembly if check ball cannot be made to seat.

FRONT WHEELS JERK OR TURN WITHOUT MOVING STEERING WHEEL. Check for sticking rotor vanes, rotor springs out of place or broken, scored pressure plate, scored rotor ring, scored housing, ball check valves in pressure plate leaking, improper assembly causing gap between rotor components. Disassemble the Hydramotor unit, carefully clean and inspect all parts and renew components as necessary.

10. **STEERING SYSTEM TROUBLESHOOTING. (Models with integral pump and reservoir**). Refer to the following paragraphs for checking causes of steering system malfunction:

HARD STEERING. Check column bearings and bearings in steering motor; renew if rough or damaged. Check rotor and stator assembly for wear or damage and renew assembly if necessary. Check for leaks from damaged valve spool; renew steering motor if spool is damaged. Check for binding at all pivot points in steering; free up and lubricate as necessary. Check for jammed valve spool; if unable to free up, renew steering motor assembly.

EXCESSIVE WHEEL DRIFT. Check for leakage past valve spool; if spool is worn or damaged, renew spool assembly.

EXCESSIVE NOISE. Hydraulic lines vibrating against tractor frame. Insulate lines from tractor.

ERRATIC WHEEL MOTION. Rotor vanes sticking or damaged. Check vanes, rotor and stator for free movement; renew if necessary.

WHEELS JERK FROM STOP-TO-STOP. Rotor vane springs jammed; check for proper seating of vane springs, renew complete assembly if damaged.

11. **R&R AND OVERHAUL PUMP. (REMOTE RESERVOIR**). Thoroughly clean pump, lines and surrounding area. Disconnect lines from pump and allow fluid to drain. Cap all openings to prevent dirt from entering pump or lines, then unbolt and remove pump assembly from engine front plate. When reinstalling pump, use new sealing "O" ring and tighten retaining bolts to a torque of 23-30 ft.-lbs. Reconnect lines, fill and bleed system as in paragraph 7.

Refer to exploded view of remote reservoir model pump in Fig. 7 and disassemble pump as follows: Scribe an assembly mark across pump covers and body. Straighten tab on washer (34) and remove nut (35). Pull drive gear (33) from pump shaft and remove key (36). Remove the four through-bolts and separate rear cover assembly (15), plate (18), body (24) and front cover (29). Remove bearing blocks (21 and 26) and gears (22 and 23) from pump as a unit. Remove caps (1, 7 and 13) from rear cover (15) and withdraw flow control valve (3), pressure relief valve (10) and related parts. Remove locating snap ring (31) and the oil seal (30) from front cover. Clean all parts in a suitable solvent, air dry, then lightly oil all machined surfaces.

Inspect bearing blocks (21 and 26) for signs of seizure or scoring on face of journals. (When disassembling bearing block and gear unit, keep parts in relative position to facilitate reassembly). Light score marks on faces of bearing blocks can be removed by lapping bearing block on a surface plate using grade "O" emery paper and kerosene. Examine body for wear in gear running track. If track is worn deeper than 0.0025 inch on inlet side, body must be renewed. Examine pump for excessive wear or damage on journals, journal bores in bearing blocks or teeth. Runout across the gear face to gear tooth edge should not exceed 0.001 inch. If necessary, the gear journals may be lightly polished with grade "O" emery paper to remove wear marks. The gear faces may be polished by sandwiching grade "O" emery paper between gear and face of scrap bearing block, then rotating the gear. New gears are available in matched sets only. If flow control valve (3) or rear cover (15) are scored or damaged, they must be renewed as a matched set only.

When reassembling pump, install all new seals, "O" rings and sealing rings. Insert new drive shaft oil seal (30) in front plate and install locating snap ring. Install flow control valve (3), spring (4) and plugs (1 and 13) with new "O" rings (2 and 14). Install pressure relief valve (10), spring (9) and plug (7), being sure that all shims (6) are in plug and using new "O" ring (8). Assemble pump gears to bearing blocks and insert the unit into pump body. Be sure the two bolt rings (hollow dowels) are in place in pump body, then position the front cover on body. Place the rear plate (18) at rear of body and install rear cover. Tighten the four cap screws (through-bolts) to a torque of 13-17 ft.-lbs. Install the pump drive gear key, drive gear, tab washer and nut. Tighten the nut to a torque of 55-60 ft.-lbs. and bend tab of washer against flat on nut.

12. **R&R AND OVERHAUL INTEGRAL RESERVOIR PUMP**. For exploded view of parts used on models with integral pump and reservoir refer to Fig. 8. Clean pump and surrounding area and disconnect pump pressure and return lines. Remove the two cap screws securing pump to engine front cover and lift off pump and reservoir as a unit. Drain the reservoir and remove through-bolt (1), reservoir (2) and filter (3).

Relief valve cartridge (32) can now be removed if service is indicated. For ac-

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CONDENSED SERVICE DATA CONT.

TUNE-UP	8000, 8600, 8700	9000, 9600, 9700	TW-10	TW-20, TW-30
Firing Order	1-5-3-6-2-4			
Compression, Gage Lbs. at Cranking Speed of 200 Rpm	380-480	380-480	300-400	275-375
Maximum Allowable Variation Between Cylinders, Psi	20	20	20	20
Valve Tappet Gap, Intake, Hot	0.014-0.016 inch			
Valve Tappet Gap, Exhaust, Hot	0.017-0.019 inch			
Engine Low Idle Rpm	700-800	700-800	700-800	700-800
Engine High Idle Rpm	2530-2580	2420-2470	2530-2580	2420-2470
Engine Rpm at Rated Load	2300	2200	2300	2300
Engine Rpm for 540 Pto Rpm	1900	*1900	1873	*1873
Engine Rpm for 1000 Pto Rpm	1935	1935	1918	1918
Injection Timing	23° BTDC			
Battery Terminal Grounded	Neg.			

*540 rpm pto shaft not available on 9000, TW-30 and some 9600 models.

SIZES—CAPACITIES—CLEARANCES [INCHES]				
Crankshaft Journal Diameter	See Paragraph 98			
Crankpin Diameter	See Paragraph 97			
Camshaft Journal Diameter	2.3895-2.3905			
Piston Pin Diameter	1.4997-1.5000	1.6246-1.6251	1.4997-1.5000	1.6246-1.6251
Valve Stem Diameter, Intake	0.3711-0.3718			
Valve Stem Diameter, Exhaust	0.3701-0.3708			
Main Bearing Running Clearance	0.002-0.0045			
Rod Bearing Running Clearance, Aluminum Bearings	0.0025-0.0046			
Copper-Lead Bearings	0.0017-0.0038			
Camshaft Bearing Running Clearance	0.001-0.003			
Crankshaft End Play	0.004-0.008			
Camshaft End Play	0.001-0.007			
Piston Skirt Clearance	See Paragraph 95			
Cooling System, Quarts	18	19	20	20
Crankcase, Quarts, Without Filter Change	10	12	18	18
With Full Flow Filter Change Only	12	14	20	20
With Both Filters Changed	13 (8000 only)			
Rear Axle & Hydraulic Systems, Quarts	See Paragraph 197			
Power Take-Off, Quarts	See Paragraph 217			
Transmission, Quarts	See Paragraph 197			
Fuel, Gallons	43	43	58	**100
Power Steering System, Quarts	4.2	4.2	3.9	3.9

**TW-20 fuel capacity is 58 gallons.

FRONT SYSTEM AND STEERING MODELS 8000—8600—9000—9600

WIDE ADJUSTABLE FRONT AXLE

Exploded view of row crop axle is shown in Fig. 1; all purpose type is similar except center (main) member is reversed. All parts except center steering arm (13) and inner tie rod ends (12) are interchangeable between row crop and all purpose types. Refer to Figs. 2 and 3 for center steering arm and tie rod installation.

1. **R&R FRONT AXLE ASSEMBLY.** To remove either the row crop or all purpose type front axle, proceed as follows: Straighten tabs of locking plates and unbolt center steering arm (13—Fig. 1) from steering motor shaft. Support front end of tractor, unbolt front pivot pin support (21) from front support and roll axle assembly forward. Unbolt and remove rear pivot pin support (16).

Reinstall front axle by reversing

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without applying undue pressure. Use a 0.012-inch diameter wire probe.

The valve seats in nozzle are cleaned by inserting the valve seat scraper into the nozzle and rotating scraper. Refer to Fig. 99. The annular groove in top of nozzle and the pressure chamber are cleaned by using (rotating) the pressure chamber carbon remover tool as shown in Fig. 100.

When above cleaning is accomplished back flush nozzle and needle by installing reverse flushing adapter (8124) on the nozzle tester and inserting nozzle and needle assembly tip end first into the adapter and secure with knurled nut as shown in Fig. 101. Rotate the needle in nozzle while operating tester lever. After nozzle is back flushed, the seat can be polished by using a small amount of tallow on the end of a polishing stick and rotating stick in nozzle as shown in Fig. 102.

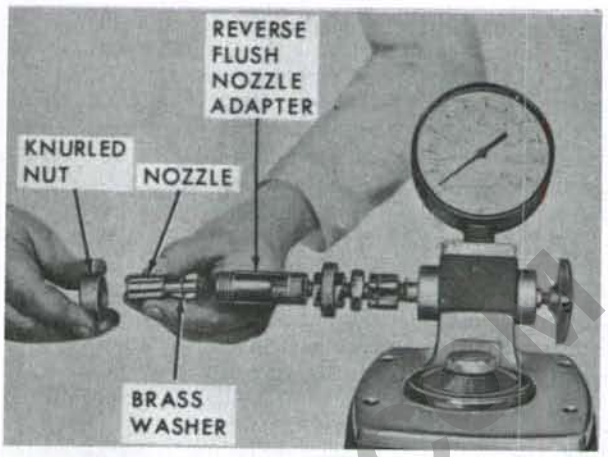


Fig. 101—A back flush attachment is installed on nozzle tester to clean nozzle by reverse flow of fluid; note proper installation of nozzle in the adapter.

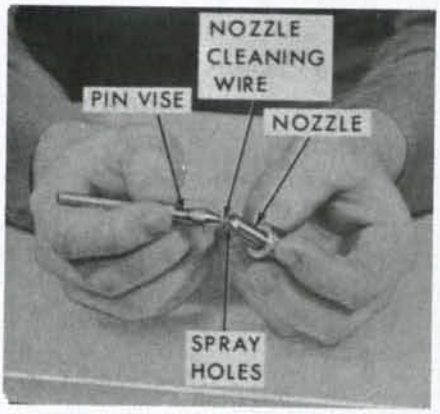


Fig. 98—Cleaning nozzle spray holes with wire probe held in pin vise.

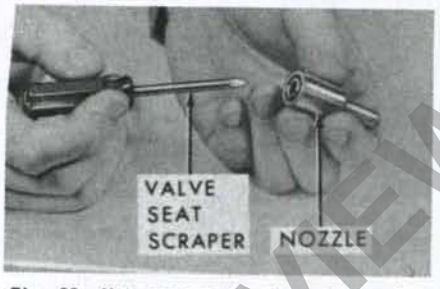


Fig. 99—Use scraper to clean carbon from valve seat in nozzle body.

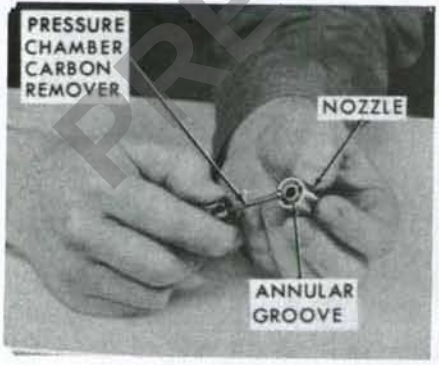


Fig. 100—Pressure chamber carbon remover is used to clean annular groove as well as clean carbon from pressure chamber in nozzle.

If the leak-back test time was greater than 40 seconds (refer to paragraph 121), or if needle is sticking in bore of nozzle, correction can be made by lapping the needle and nozzle assembly. This is accomplished by using a polishing compound (Bacharach No. 66-0655 is suggested) as follows: Place small diameter of nozzle in a chuck of a drill having a maximum speed of less than 450 rpm.

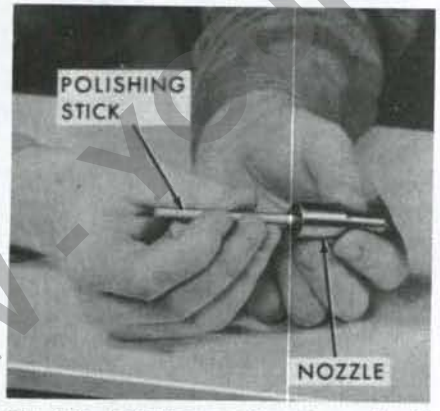


Fig. 102—Polishing needle valve seat with tallow and polishing stick.

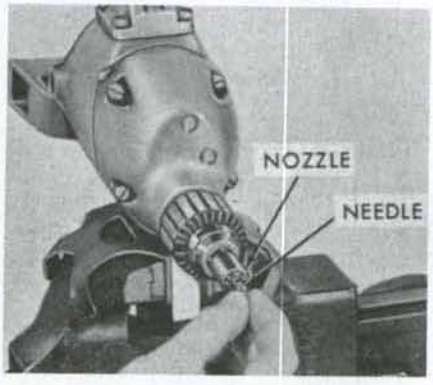


Fig. 103—Chuck small diameter of nozzle in slow speed electric drill to lap needle to nozzle if leak back time is excessive or if needle sticks in nozzle. Hold pin end of needle with vise grip pliers.

Apply a small amount of polishing compound on barrel of needle taking care not to allow any compound on tip or beveled seat portion, and insert needle in rotating nozzle body. Refer to Fig. 103.

NOTE: Do not lap valve for more than five seconds at a time and allow parts to cool between lapping. It is usually necessary to hold upper pin end of needle with vise-grip pliers to keep the needle from turning with the nozzle. Work the needle in and out a few times taking care not to put any pressure against seat, then withdraw the needle, remove nozzle from chuck and thoroughly clean the nozzle and needle assembly using back flush adapter and tester pump.

Prior to reassembly, rinse all parts in clean fuel oil or calibrating fluid and assemble while still wet. Position the nozzle and needle valve on injector body and be sure dowel pins in body are correctly located in nozzle as shown in Fig. 104.

NOTE: Place injector in holding fixture (1719) and tighten nut and new washer with socket (8126).

Install the spindle, spring, upper spring disc and spring adjusting screw. Connect the injector to tester and adjust opening pressure as in paragraph 118. Use a new copper washer and install cap nut. Recheck nozzle opening pressure to

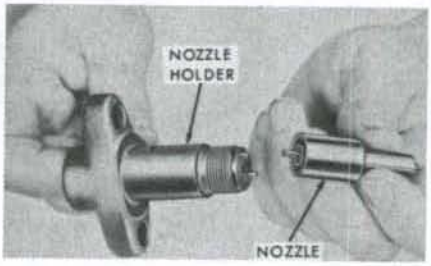


Fig. 104—Be sure dowel pins in nozzle holder enter mating holes in nozzle body.

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