9030 VERSATILE TRACTOR
SAFETY, OPERATION AND GENERAL INFORMATION

SAFETY PRECAUTIONS

Practically all service work involves the need to drive the tractor. The Operator's Manual, supplied with each tractor, contains detailed safety precautions relating to driving, operating and servicing. These precautions are as applicable to the service technician as they are to the operator, and should be read, understood and practiced by all personnel.

Prior to undertaking any maintenance, repair, overhaul, dismantling or reassembly operations, whether within a workshop facility or out "in the field," consideration should be given to factors that may have an effect upon safety, not only upon the mechanic carrying out the work, but also upon bystanders.

PERSONAL CONSIDERATIONS

- Loose clothing can cause accidents. Check to see that you are suitably clothed.
- Some jobs require special protective equipment.
- **Skin Protection**
  Used motor oil may cause skin cancer. Follow work practices that minimize the amount of skin exposed and the length of time used oil stays on skin.
- **Eye Protection**
  The smallest eye injury may cause loss of vision. Injury can be avoided by wearing eye protection when engaged in chiselling, grinding, welding, and painting.
- **Breathing Protection**
  Fumes, dust and paint spray are unpleasant and harmful. These can be avoided by wearing respiratory protection.
- **Hearing Protection**
  Loud noise may damage your hearing, and the greater the exposure the worse the damage. If the noise is excessive, wear ear protection.
- **Hand Protection**
  It is advisable to use a protective cream before work to prevent irritation and skin contamination. After work clean your hands with soap and water. Solvents may harm the skin.
- **Foot Protection**
  Substantial or protective footwear with reinforced toe-caps will protect your feet from falling objects. Additionally, oil-resistant soles will help to avoid slipping.
- **Special Clothing**
  For certain work it may be necessary to wear flame or acid-resistant clothing.
- Avoid injury through incorrect handling of components. Make sure you are capable of lifting the object. If in doubt, get help.

EQUIPMENT CONSIDERATIONS

- **Machine Guards**
  Before using any machine, check to be sure that the machine guards are in position and serviceable. These guards not only prevent parts of the body or clothing from coming in contact with the moving parts of the machine, but also ward off objects that might fly off the machine and cause injury.
- **Lifting Appliances**
  Be sure that lifting equipment, such as chains, slings, lifting brackets, hooks and eyes are thoroughly checked before use. If in doubt, select stronger equipment than is necessary.

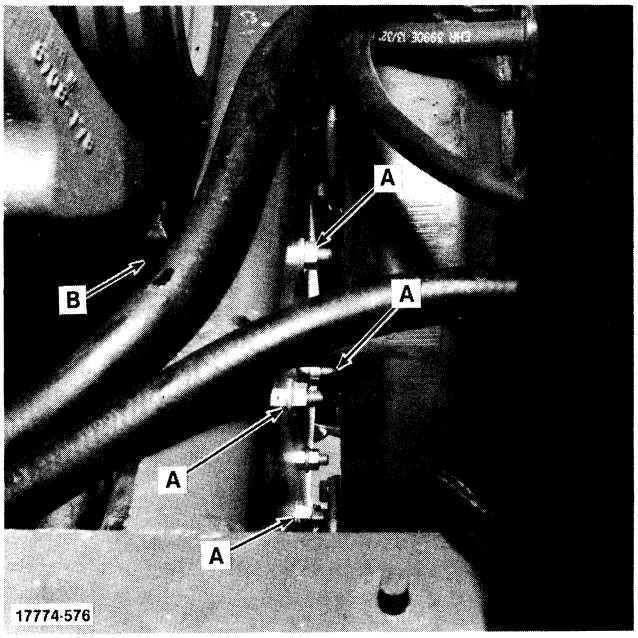
  Never stand under a suspended load or a raised implement.
- **Compressed Air**
  The pressure from a compressed air line is often higher than 100 psi (6.9 bar). It is perfectly safe, if used correctly. Misuse may cause injury.

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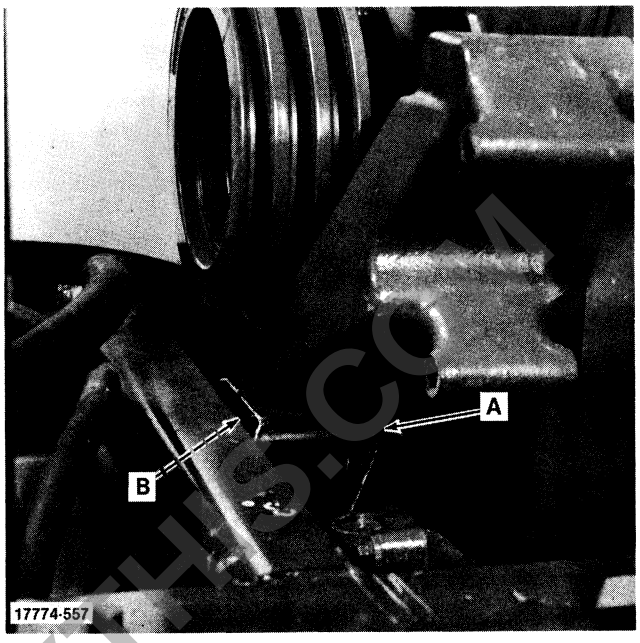
SYMPTOM	PROBABLE CAUSES	REMEDY
Engine knocks	1. Diluted or thin oil	1. Drain and refill with specified oil and renew filter. Ascertain cause of dilution
	2. Insufficient oil supply	2. Check oil level and top up as necessary. Overhaul or renew pump as necessary. Check pump filter not clogged
	3. Low oil pressure	3. Overhaul pump or relief valve as necessary
	4. Excessive crankshaft end play	4. Install new thrust bearing liner
	5. Flywheel or ring gear run out excessive	5. Skim flywheel or fit new ring gear
	6. Excessive connecting rod or main bearing clearance	6. Install new bearing inserts and/or re-grind crankshaft
	7. Bent or twisted connec-connecting rods	7. Renew connecting rods
	8. Crankshaft journals out-of-round	8. Re-grind crankshaft and fit undersize bearing inserts
	9. Excessive piston-to-cylinder bore clearance	9. Re-bore/re-sleeve block and fit new pistons
	10. Excessive piston ring clearance	10. Fit new pistons and rings
	11. Broken rings	11. Fit new rings. Check bore/pistons for damage
	12. Excessive piston pin clearance	12. Fit new piston pin and bushing
	13. Piston pin retainer loose or missing	13. Install new retainer. Check bore/pistons for damage
	14. Excessive camshaft end play	14. Install new thrust plate
	15. Imperfections on timing gear teeth	15. Renew timing gear
	16. Excessive timing gear backlash	16. Renew timing gear

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Engine Mount **Figure 1B-9**
A Bolts
B Engine mount



Engine Mount Center Bolt **Figure 1B-10**
A Engine mount
B Center bolt

21. Be sure the engine is level and move it forward. At the same time observe that all cables, electrical leads, tubes, and fuel lines are disconnected. When the engine is clear of the flywheel housing lift it straight up until it clears the frame.

22. Place the engine in a suitable stand.

ENGINE — INSTALLATION

Before installing the engine in the tractor, verify that all required parts have been transferred from the replaced engine. Determine that the front engine mount is in the frame as far to the right as it will go.

1. Lower the engine into the tractor frame with the flywheel end slightly lower than the front end.

2. Carefully align the splitter box splines.

   NOTE: Engage the PTO clutch so the splitter box shaft will not rotate. Rotate the engine flywheel until the splitter box shaft splines engage in the flexplate.

3. Install the flywheel housing bolts, B, Figure 1B-8, and socket head bolts, A. Install bolts, D, Figure 1B-4. Torque the bolts to 125 lbs.-ft. (170 N·m).

4. Install the front engine mount, B, Figure 1B-9, and secure with the four bolts, nuts, and washers, A.

5. Install the front engine mount center bolt, B, Figure 1B-10. The bolt passes through the mount and the rubber mounting pads.

6. Position the starter in place and secure with bolts, C, Figure 1B-4. Install the electrical leads and the positive battery cable, A.

7. Install the battery ground cables, B.

8. Install the upper and lower radiator hoses.

9. Install the heater hoses to the inlet valve and return hose fitting. Open the heater inlet valve.

10. Connect the throttle cable, G, to the throttle lever on the injection pump. Install the fuel line and leak-off lines.

11. Install the engine speed sensor in the flywheel housing. See "Engine Speed Sensor — Installation", Section 3, Electrical, in this manual.

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ENGINE REMOVAL AND INSTALLATION

The engine removal and installation subsections describe the process for replacing the original, 4.4-liter engine with the new, 5.0-liter engine used in the 9030E. For service on the 4.4-liter engine, refer to Section 1 of this manual. Service procedures for the 5.0-liter engine follow in this section.

To overhaul components without removing the engine from the tractor, refer to the relevant headings and paragraphs in the main overhaul procedure section for your engine.

You can service the following engine components with the engine still in the tractor:

- Cylinder head and associated components
- Fuel injection pump and related parts
- Water pump, thermostat, oil cooler and other cooling system components
- Oil pump relief valve and filter assembly
- Turbocharger
- Front pulley assembly

Remove the engine from the tractor to replace or repair the following:

- Engine front cover
- Oil pan
- Timing gears
- Oil pump
- Camshaft
- Crankshaft
- Pistons
- Any other lower end work

The hydrostatic, hydraulic, and air conditioning systems need not be emptied when removing the engine as long as the lines and connections remain intact.

ENGINE REMOVAL

1. Pressure wash the engine and surrounding area to prevent dirt and debris from contaminating the internal engine components.
2. Park the machine on a level surface within reach of an overhead hoist or crane. Apply the parking brake and block the wheels to prevent accidental movement of the machine while pulling the engine.
3. Remove the hood and side panels.
4. Remove the battery(s) from the tractor.

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DESCRIPTION AND OPERATION

The fuel system used on the 9030 tractor, Figure 2-1, consists of two fuel tanks, fuel pump, fuel filter/sediment separator, fuel injection pump, fuel injectors, and the connecting fuel lines.

NOTE: Beginning with serial number D932000 (1993) an electric fuel pump was installed on production 9030 tractors. For electric fuel pump installation on 9030 tractors prior to 1993 see Service Bulletin 2/90-T10.

The 9030 tractor has two fuel tanks connected by a fuel crossover pipe. Fuel is drawn from the crossover pipe through a hose to a filter assembly, to the lift pump in the injection pump. The lift pump draws the fuel through a water separating filter and fuel filter to the injection pump. The injection pump meters the fuel to the injectors. Excess fuel flow, used in cooling, is returned from the fuel pump to the left side fuel tank or to the right side fuel tank connections. Part of the fuel is recirculated back to the clean fuel line.

SPECIAL TOOLS

	Number
Kit-Injector Cleaning	FNH01720
Injection Nozzle Tester	FNH01721 or FNH03161
Socket - Nozzle Nut Torque	FNH08126
Adaptor Set	FNH01728
DPS Injection Pump Test Kit	FNH00883
3 Bar Gauge Set	FTC213312

TROUBLESHOOTING — BASIC

There are certain items that must be checked and verified before any parts are replaced.

CAUTION: DO NOT SERVICE THE FUEL SYSTEM UNLESS THE ENGINE IS COOL. FUEL SPILLED ONTO A HOT EXHAUST MANIFOLD MAY CAUSE A FIRE.

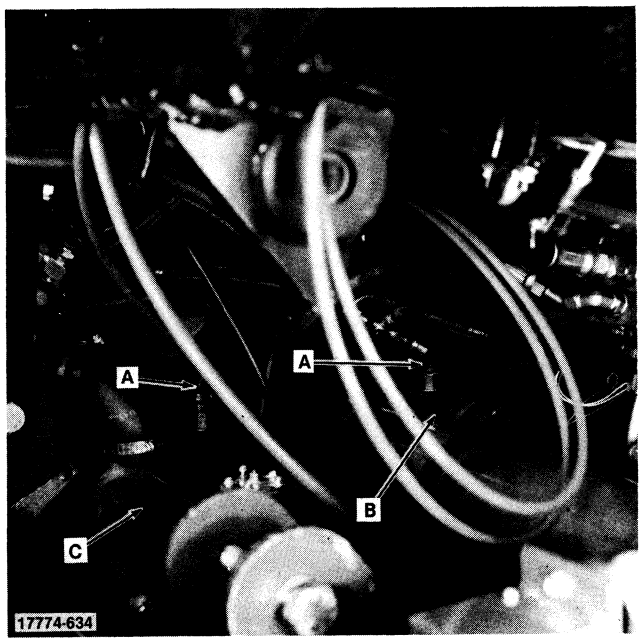
- Be sure the throttle linkage is properly adjusted.
- Check the fuel shut off solenoid and the electric fuel pump if installed.
- Check the fuel supply and return hoses for restrictions in the articulation joint or under the cab.
- Inspect the fuel filters. Be sure they are clean and primed with clean fuel when they are replaced.
- Check the lines and hoses for leaks. Tighten all loose connections.
- Drain the fuel tanks of accumulated condensation at the drain plug.

IMPORTANT: Whenever effecting a repair the reason for the cause of the problem must be investigated and corrected to avoid repeat failures.

The following tables list problems and their possible causes with recommended remedial action.

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Breather Lines **Figure 2B-5**

A Breather lines
B Fuel tank — right
C Fuel tank — left

10. Remove the breather lines, A, Figure 2B-5, at each tank connection.

11. Slide the left fuel tank rearward and to the center and remove it. Then remove the right tank in a similar manner.

Inspection

Inspect the fuel tanks for cracks, broken projections and wear on the strap contact points. Replace the tank if required.

FUEL TANK — INSTALLATION

1. Install the fuel gauge sender in the left tank with the float pointing toward the cab end axle and parallel to the tractor center line. Secure with the hardware removed.

2. Set the right tank in place and then the left tank.

3. Install the hanger straps on the fuel tanks and install the retaining nuts, A, Figure 2B-3.

4. Install the crossover tube, B, Figure 2B-2, and secure with the hose clamps, C.

5. Install the fuel supply line, A.

6. Install the fuel return line, D, in the front corner of the right fuel tank.

7. Install the cab end drive axle and drive shaft. See "Drive Axles", Section 7, in this manual.

8. Install the breather lines, A, Figure 2B-5, at each tank connection. Connect the fuel gauge sender ground and electrical leads.

9. Install the filler tube and secure with the hose clamp, B, Figure 2B-4, and U-clamp, C.

10. Remove the cab support tool FNH01033 and lower the cab. Install the cab mounting bolts. See "Cab, Seat, Frame and Environmental", Section 11, in this manual.

11. Fill the fuel tanks with clean fuel.

12. Bleed the fuel system. See "Bleeding the Fuel System" in this section. Start the tractor and correct any fuel leaks.

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1. Inspect the cylinder to see whether it is empty. An empty cylinder weighs 510 g (18 oz.).
2. Remove the atomizer, 1, and capillary tube, 2, from the engine. Connect the atomizer to the tube.
3. Bypass the Thermoguard™ sensor, 3, with a jumper wire. Activate the system. The atomizer should emit a fine spray of ether.
4. If no ether sprays from the atomizer, remove the atomizer and try again. If ether comes out of the tube, replace the atomizer.
5. If no ether comes out of the tube, remove it and activate the system. If ether discharges from the valve, 4, without the tube attached, replace the tube.
6. If no ether discharges from the valve, remove the ether cylinder. Activate the system. The plunger should move up until the switch is released.
7. If the valve does not function, the problem is electrical. Refer to Section 3 - Electrical System.

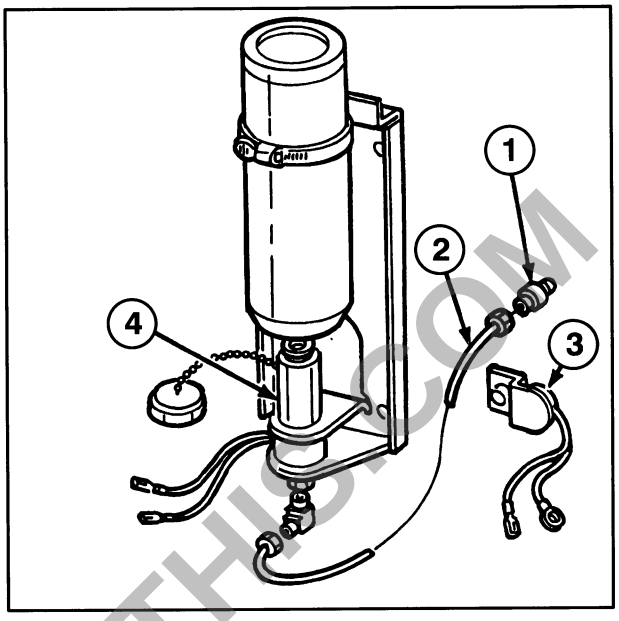


Figure 2D-7

Replacing the Ether Cylinder

1. Clean the area around the ether cylinder and valve.
2. Loosen the clamp, 1, securing the cylinder to the bracket.
3. Turn the cylinder, 2, counterclockwise to remove it. Install a protective cap in the valve.
4. Inspect the valve gasket. Replace it if it is damaged or worn.
5. Install a new ether cylinder, threading it hand-tight to seat the valve.

NOTE: The cylinder must only be hand-tight. The valve will not operate if more than one gasket is used.

6. Install the clamp and tighten it securely.

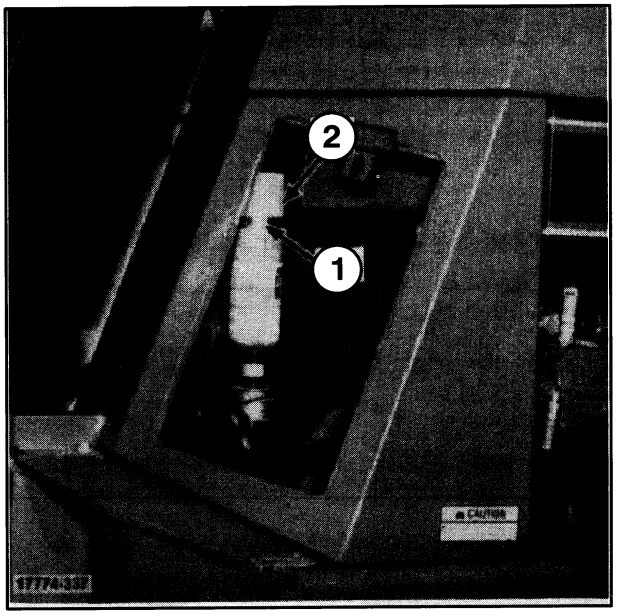


Figure 2D-8

CAUTION: IN CASE OF ETHER ODOR, BRUSH SOAPY WATER OVER THE SUSPECTED LEAK AREA(S) TO FIND THE LEAK.

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SECTION 3

ELECTRICAL SYSTEM - GENERAL

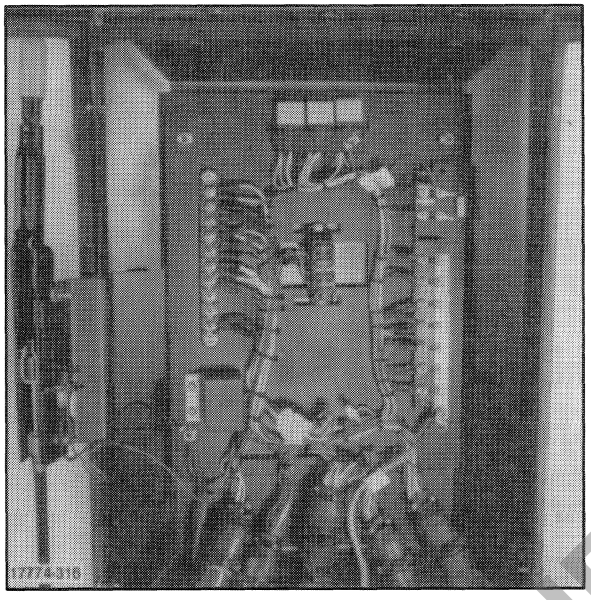


FIGURE 3-1

DESCRIPTION AND OPERATION

The 9030 tractor electrical system is a negative ground type consisting of two 625 CCA, 12-volt batteries, an 85-amp alternator, a positive engagement, solenoid-operated starter, connecting wiring and various electrical devices. For convenience, the relays, fuses and circuit breakers are located in the junction box in the cab, Figure 3-1.

SPECIAL TOOLS

NOTE: Special tools are available from OTC Tool Co. See the special tool catalog for details.

The special tools required for this section are:

- Battery load tester (OEM 1053)
- Charging system analyzer (OEM 1289)
- Multi-meter (FNH00115)
- 12-volt test lamp
- Signal generator/counter (FNH01031A)

TROUBLESHOOTING - BASIC

Before any electrical components are replaced or repaired, check the following:

- Alternator belt - adjusted
- Battery cables - tight, corrosion free
- Starter - cables tight, corrosion free
- Wiring connectors - coupled, corrosion free
- Neutral switches - adjusted and operating correctly
- Ground connections - tight and corrosion free
- Batteries - full of electrolite and fully charged
- Fuses - all functioning
- Switches in operating position

The above items should be checked as a routine service practice prior to extensive diagnostic procedures.

ELECTRICAL SCHEMATICS

The following illustrations show the location of various important parts of the electrical system. When troubleshooting any of the electrical circuits, it will be necessary to refer to these illustrations, or schematics.

Figures 3-2, 3-3, 3-4, 3-5 and 3-6 are electrical schematics for individual tractors by serial number.

Figure 3-7, 3-8, and 3-9 are junction box layouts by serial number.

Figure 3-10 is a basic diagram of wire harness routing in the cab.

NOTE: Figure 3-10 is a representative diagram only. Small changes to component location or harness routing may be evident as compared to Figure 3-10.

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TACHOMETER DOES NOT WORK CORRECTLY

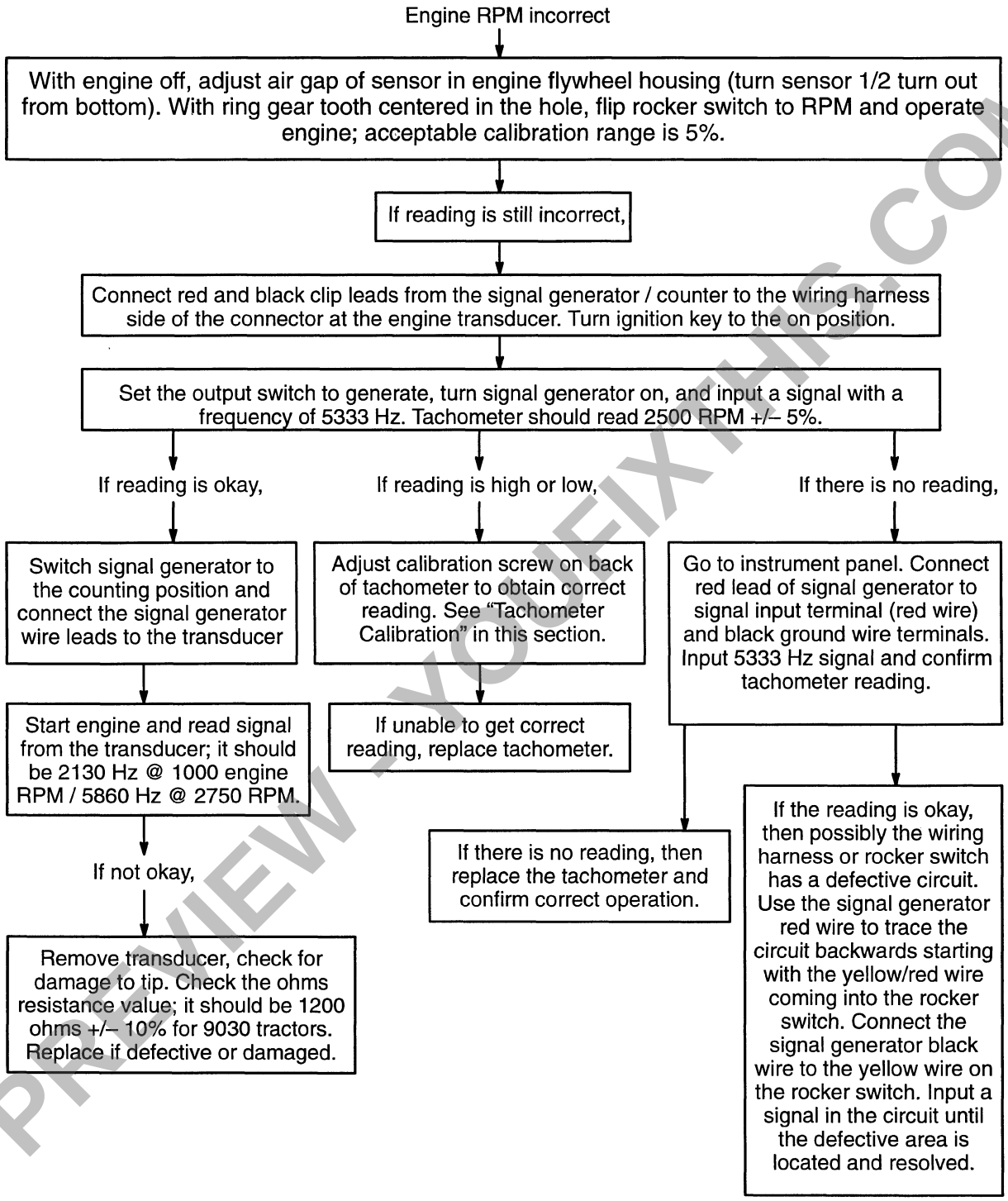


FIGURE 3A-6

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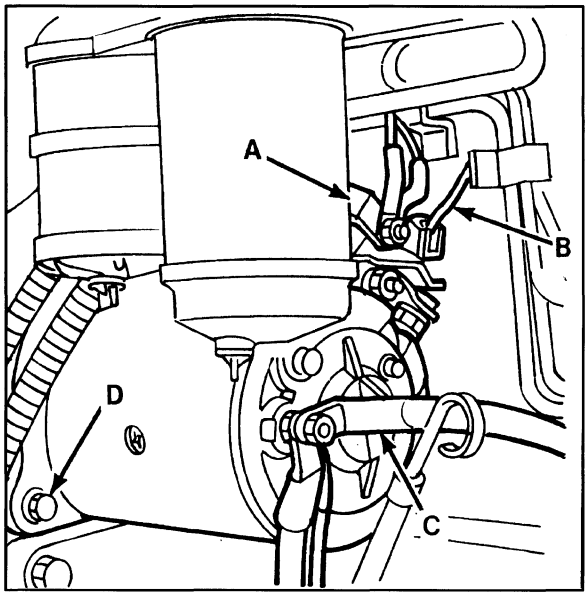


FIGURE 3C-5

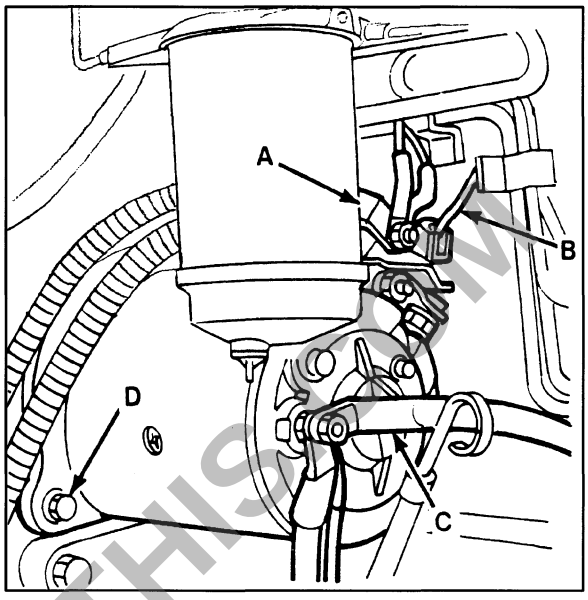


FIGURE 3C-6

Starting Motor Ground Connections

1. Connect the voltmeter positive lead to the starting motor ground stud.
2. Connect the voltmeter negative lead to battery negative terminal.
3. Crank the engine while observing the voltmeter reading. If the voltmeter reading exceeds 0.2 volts, check the ground connections for unwanted resistance.

Battery Ground Cable

1. Connect the voltmeter positive lead to the ground cable frame connections on the engine end frame.
2. Connect the voltmeter negative lead to one of the battery negative terminals.
3. Crank the engine while observing the voltmeter reading. If the reading exceeds 0.2 volts, check and tighten the ground cable connections. Recheck the voltage; if it is still excessive, install a new ground cable.

STARTING MOTOR - REMOVAL

1. Disconnect the battery ground (negative) cable from both batteries.
2. Disconnect the ground cables, C, Figure 3C-5 for the 9030 and Figure 3C-6 for the 9030E, from the starting motor brush end plate.
3. Remove the plastic terminal cover. Disconnect the positive battery cables, A, from the solenoid, and the relay lead from terminal, B.
4. Remove the starting motor mounting bolts, D, and remove the starting motor.

STARTING MOTOR - INSTALLATION

1. Set the starting motor in place and secure with bolts, D, Figure 3C-5 for the 9030 and Figure 3C-6 for the 9030E.
2. Attach the circuit breaker power and battery positive cables to terminal, A.
3. Attach the lead to the relay terminal, B. Reinstall the terminal cover.
4. Attach the ground leads to terminal, C.
5. Connect the battery ground cables to the batteries.

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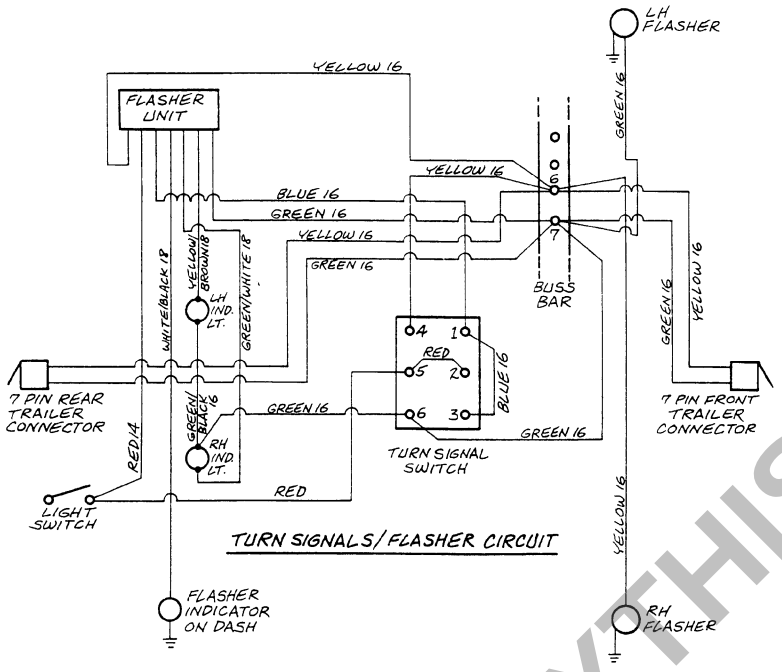
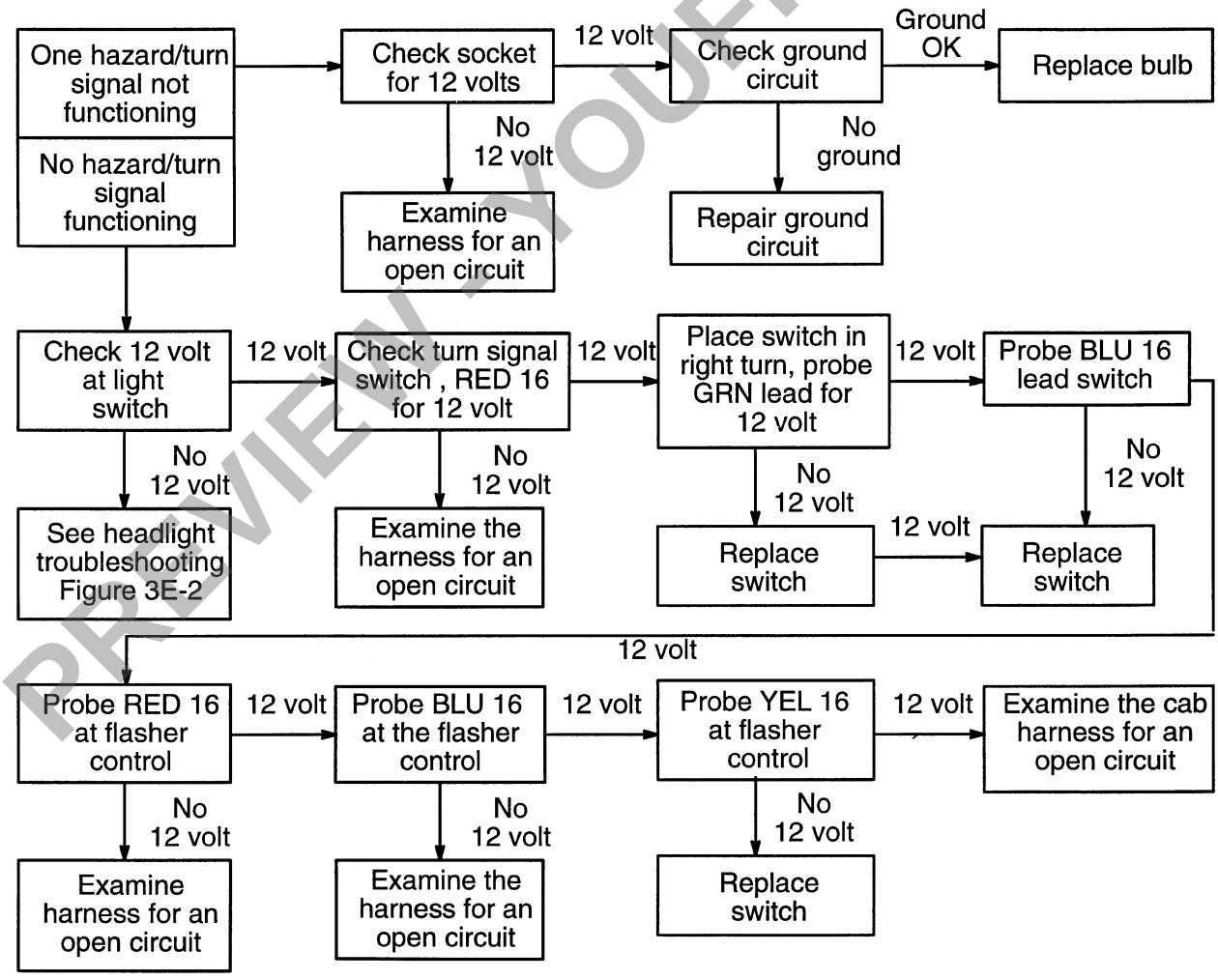


FIGURE 3E-6



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SECTION 3F
SPECIFICATIONS

GENERAL ELECTRICAL DATA

Electrical System	12 volt negative ground
Batteries	Two 12 volt maintenance free Cold Cranking Amps (CCA)-625 Reserve capacity-160 min @ 25 amp draw
Alternator	12 volt 85 amp, Voltage regulator-Integral
Starting Motor	12 volt
Circuit breakers:	
Driving lamps/Tail lamps	30 amp
Work lamps	30 amp
Air conditioning	30 amp
Ignition/Cigar lighter	30 amp
Brake lamps	8 amp
Windshield wiper -(front)	8 amp
- (rear)	8 amp
Fuses	
3 point Hydraulic lift	10 amp
Ignition	10 amp
Heater/ A C blower	10 amp
Accessories	10 amp
PTO	5 amp
Head lamps	55 watt
Work lamps	55 watt
Trailer connector - (front)	Standard 7 pin
- (rear)	Standard 7 pin

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SPECIAL TOOLS

General

- Overhead hoist of at least 1000 lbs. (0.454 kg) capacity
- Lift cables and chains
- Torque wrench 300 lbs.-ft. (450 N·m)
- Snap ring pliers — Straight and 90°

Transmission

- Bearing puller
- Bearing cup installers FNH10950 FNH10954
- Bearing cone installers FNH10947 FNH10953
- Seal installer FNH10956
- Dial indicator
- Brass drift

Brakes

- Disc brake piston tool FNH00771
- Crocus cloth
- Denatured alcohol
- 2-3/4 in. hose clamp
- Pump type oil can (for bleeding)

Hydrostatic pump and motor

- Hydrostatic drive test kit FNH03132
- Hydraulic flow meter FNH02755 or Equivalent
- Rotating seal puller FNH00335

NOTE: Fabricate the following tools locally. See instructions in Overhaul Section.

- Low clearance bearing puller
- Cylinder barrel clamping tool
- Shaft bearing cone driver
- Bearing cone stop
- Check valve puller
- Bearing cone support spacer

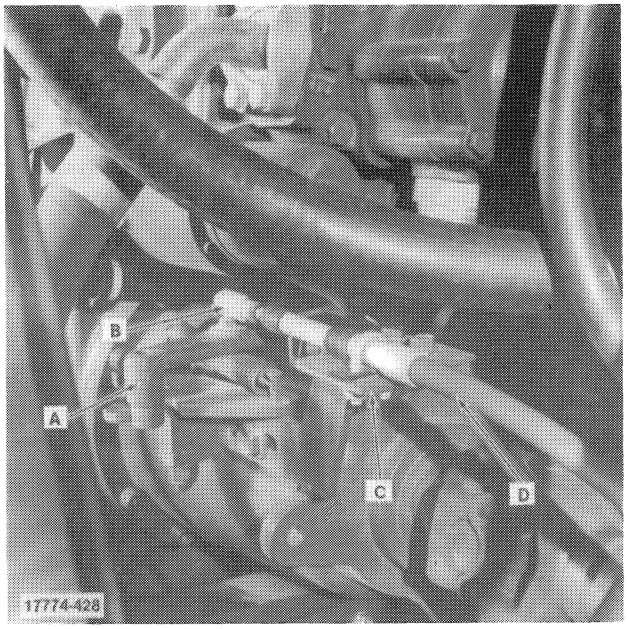
Splitter Box

- Ratchet type snap ring pliers Owatonna OEM 6180
- Special shaft and bearing puller — Fabricate locally. See instructions in Overhaul Section.

NOTE: Where applicable, the New Holland Special Tool number is given. See your New Holland Special Tool Catalog for ordering information.

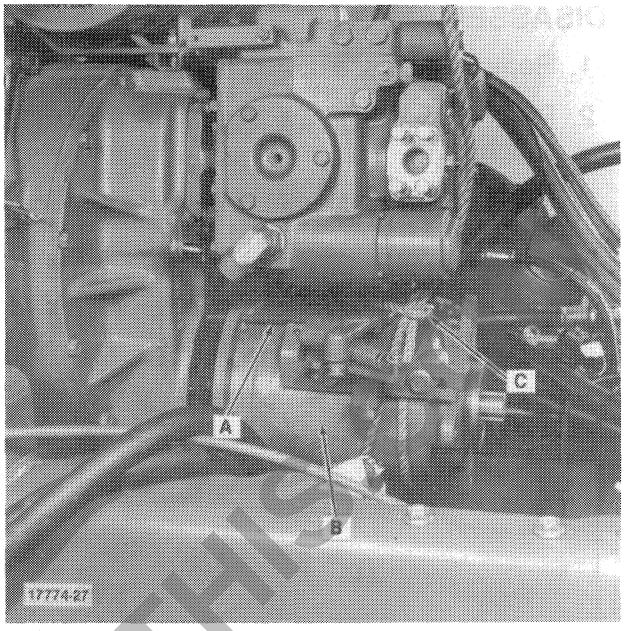
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PTO-Clutch Cable — Figure 6A-3

A Control lever
B Ball joint
C Support bracket
D Cable



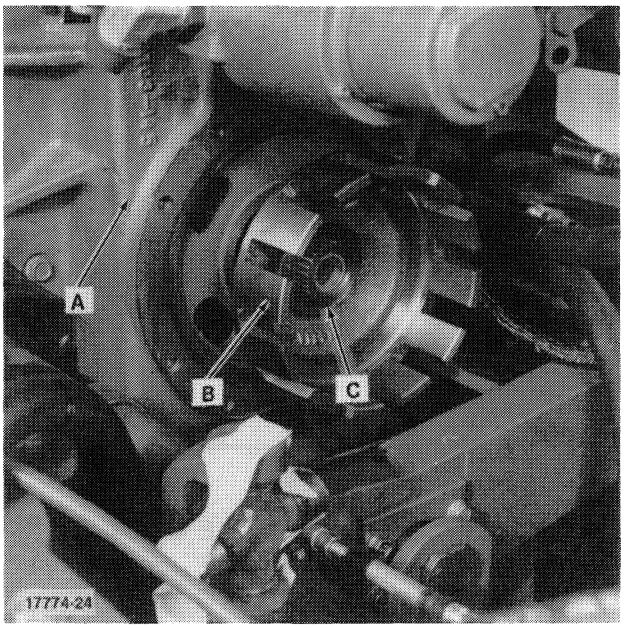
Sling On Clutch Case — Figure 6A-4

A Guide studs
B Clutch case
C Rope sling

5. Disconnect the PTO clutch control cable ball joint, B, Figure 6A-3, from the clutch control lever, A, and the cable support bracket, C. Remove the bracket and the cable, D.
6. Remove the drain plug from the bottom of the splitter box to drain the splitter box and PTO clutch.

   NOTE: A funnel, or trough can be made from plastic, or cardboard to direct oil from the drain hole over the axle into a container. This will reduce oil spillage.

7. Form a rope sling, C, Figure 6A-4, to support the PTO clutch assembly, B, and connect the sling to an overhead hoist. Be sure any hoses, or cables are on the forward side of the sling so they will not cause interference when the clutch is pulled to the rear.
8. Remove the eight allen head cap screws, A, Figure 6A-1, which attach the clutch assembly, D, to the splitter box, B.
9. Pull the clutch assembly toward the cab end. When it is free of the splitter box, lift with the sling, and take it out to the left side. The spider, B, Figure 6A-5, will remain on the output shaft of the splitter box, A.
10. Remove the snap ring, C, Figure 6A-5, and remove the spider, B, from the splitter box.

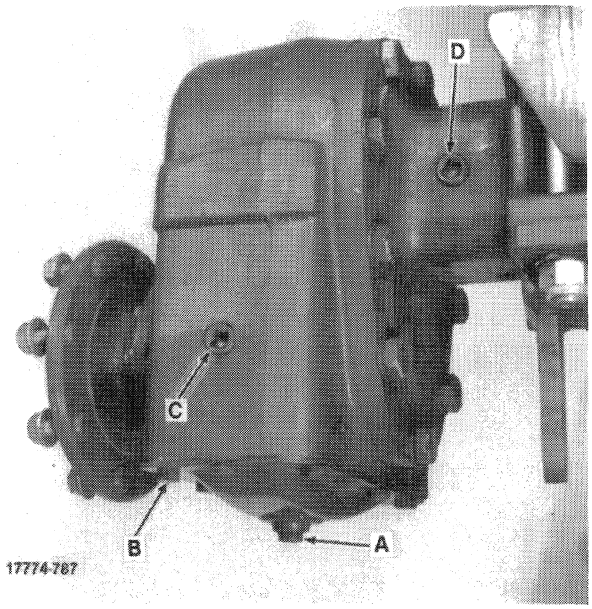


Spider — Figure 6A-5

A Splitter box
B Spider
C Snap ring

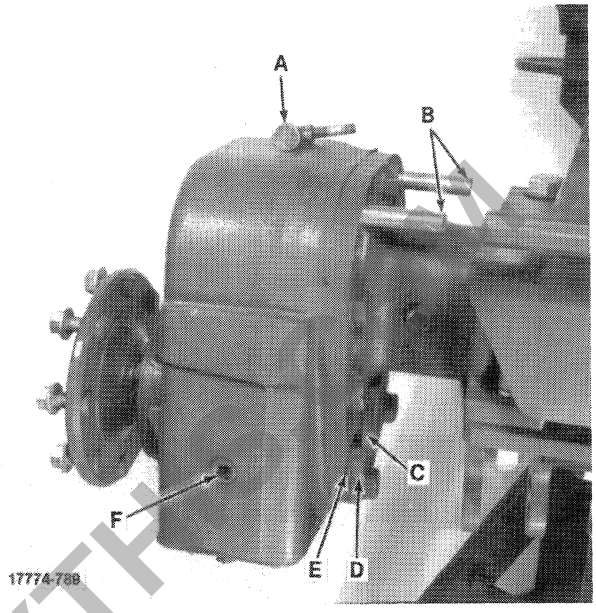
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Drop Box **Figure 7-4**

A Drain plug
B Cover cap screws
C Drop box level/fill plug
D Differential fill plug



Preparing Drop Box for Removal **Figure 7-5**

A Breather
B Headless M20 x 2.5 x 100 cap screws (pilot bolts)
C Dust cover (s/n D470100 - D932002 only)
D Cap screws (10)
E Special hardened washers (10)
F Fill/level plug

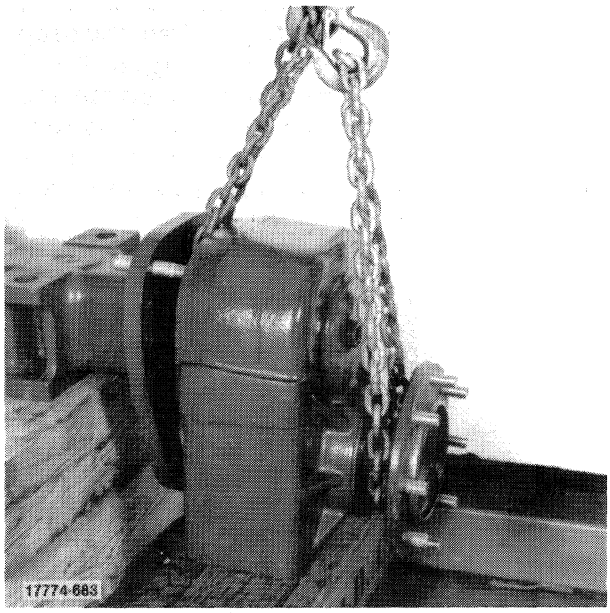
FINAL DRIVE DROP BOX OVERHAUL

Removal

1. Engage the articulation lock, set the parkbrake, and chock the wheels.
2. Raise the tractor and support it with suitable jack stands or blocking. Remove the tractor wheel.
3. Drain the oil from the drop box at plug, A, Figure 7-4.
4. Throughly clean the outside of the housing and the end of the axle tube. Remove the breather tube, A, Figure 7-5.
5. Replace the two top cap screws, B, with headless M20 x 2.5 x 100 cap screws to serve as pilot bolts. Remove the remaining cap screws securing the final drive to the axle.
6. Separate the drop box from the axle far enough to install a suitable sling and hoist around the axle shaft behind the flange and around the axle drive shaft, Figure 7-6.

NOTE: The axle drive shaft will come out of the axle tube along with the drop box.

7. Move the complete assembly to a suitable work area.



Removing the Drop Box **Figure 7-6**

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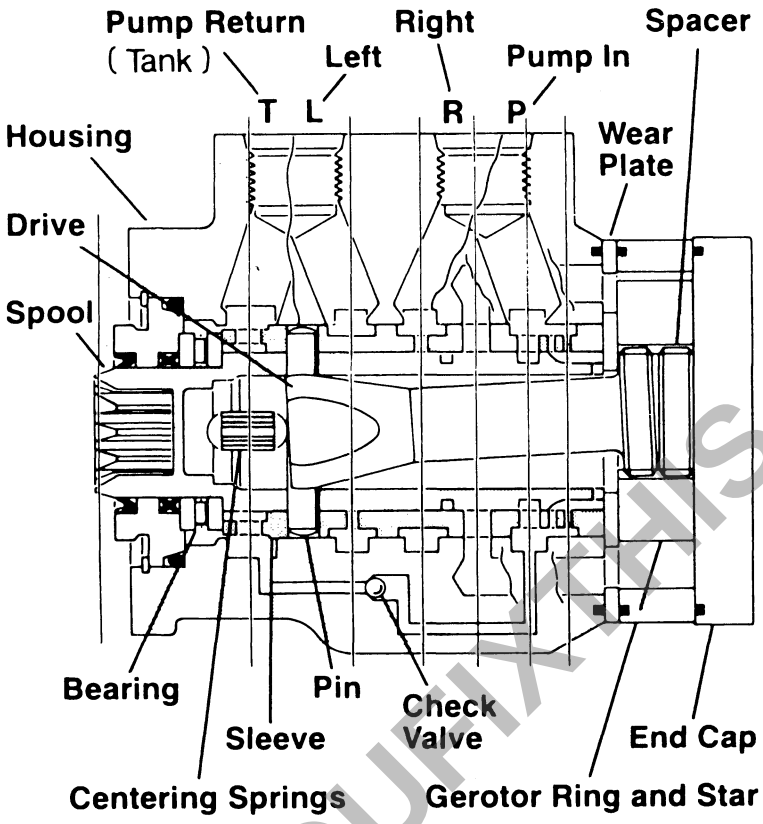


Figure 8-27

STEERING VALVE

The Char-Lynn (Eaton) steering control valve is located at the top of the steering control console and is connected by a splined shaft to the steering wheel. The valve directs oil through the rotating seat base to the double acting steering cylinders.

Steering wheel rotation determines the direction and rate of flow to the cylinders. When the steering wheel is released, oil is trapped in the cylinders which will maintain their position until the steering wheel is turned again. Return oil is routed back through the rotating seat base, the steering valve and then to the return filter and reservoir.

A check valve in the steering pump provides a flow path for manual control of the steering system with the engine turned off. Under normal conditions, the check valve will always be seated.

Steering Control - Neutral

Oil flows from the pump to the "P" port (pump in), through the center of the spool, out the "T" port (tank), and back to the reservoir.

Note that the higher pressure at the inlet side of the valve seats the manual steering control check valve.

Steering Control - Right Turn

Oil flows in the "P" port to the gerotor pump. Oil is moved around the gerotor pump and then sent to the "R" port. Oil then flows out the "R" port to the steering cylinder to turn the tractor for a right turn. Oil forced out of the steering cylinder by the piston movement returns to the "L" port, through the center spool, out the "T" port, and back to the reservoir.

Note that the higher pressure at the inlet side of the valve seats the manual steering control check valve.

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TROUBLESHOOTING - GENERAL SYSTEM

Use the following troubleshooting chart to check the three-point hitch system for proper operation or if a concern arises.

For more specific information on the electrical or hydraulic portion of the three-point hitch system, refer to the individual sections of the three-point hitch system in this manual, as directed by the chart.

NOTE: The troubleshooting chart covers both the engine-end and cab-end three-point hitch.

NOTE: Prior to troubleshooting the three-point hitch hydraulic system, operate the remote valves. Determine that the hydraulic remote valves and hydraulic pump function properly. If there is any doubt, see Section 8, "Hydraulics and Steering" in this manual.

SYMPTOM	PROBABLE CAUSE	REMEDY
Hitch will not raise	Solenoid plugged	*Disassemble and clean
	Valve spool binding	*Disassemble and clean
	Solenoid malfunction	**Replace solenoid
	Load too heavy	Lighten load
	Pressure too low	*Adjust pressure
	Electrical malfunction	**Correct malfunction
	Linkages binding	Repair linkage
	Shuttle valve plugged	*Clean/replace
	Solenoid back pressure	*System restriction
Hitch will not lower	Solenoid back pressure	*System restriction
	Solenoid plugged	*Disassemble and clean
	Valve spool binding	*Disassemble and clean
	Solenoid malfunction	**Replace solenoid
	Lowering rate controller set wrong	Adjust control
	Electrical malfunction	**Correct malfunction
	Linkages binding	Repair linkage
Hitch lowers when engine is shut off	Excessive valve bypass	*Repair valve
Hitch lowers too quick or slow	Lowering rate control set wrong	Adjust control
Insufficient transport clearance	Top link too long	Adjust top link
	Lift links too long	Adjust lift links
	Implement not level	Level implement
	Implement adjusted incorrectly	Adjust implement

* See Section 9B "Three-Point Hitch - Hydraulic" ** See Section 9A "Three-Point Hitch - Electrical"

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WHEEL TREAD ADJUSTMENT

Manual Rims

The tractor wheel tread can be adjusted by repositioning the rim on either side of the center disc and/or reversing the wheel center disc for a total of eight different wheel positions.

NOTE: For some of the positions, the wheels will have to be reversed and installed on the opposite side of the tractor so the arrows on the tire (and treads) are facing in the correct direction of travel.

1. Stop the tractor, place the transmission in neutral, engage the park brake, and install the articulation lock.
2. Securely block the drive wheels.
3. To change the wheels, raise one drive wheel off the ground at a time, unless it is necessary to install a wheel on the opposite side of the tractor.

CAUTION: DO NOT WORK UNDER A RAISED TRACTOR UNLESS THE FRAME IS SECURELY BLOCKED AND THE ARTICULATION LOCK IS ENGAGED. DO NOT RELY ON THE JACK, OR HOIST ONLY.

THE FRONT AXLE ASSEMBLY OSCILLATES. BE SURE THE JACK IS PROPERLY POSITIONED AND WILL NOT SLIP WHEN RAISING.

WHEEL ASSEMBLIES ARE HEAVY, ESPECIALLY IF BALLAST HAS BEEN INSTALLED. USE A HOIST, OR TIRE CARRIER FOR MOVING WHEEL ASSEMBLIES.

4. If the tractor is equipped with duals, remove the outer wheel and hub extension before adjusting the inner wheel position.

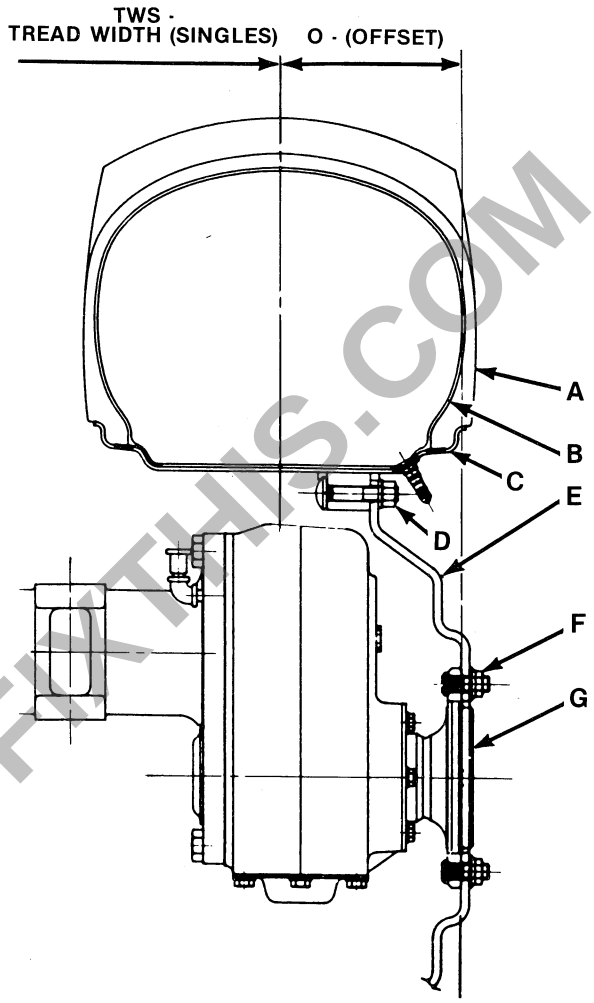


Figure 10 -1

Wheel and Tire Assembly

A	Tire	E	Disc
B	Tube	F	Nut
C	Rim	G	Axle hub
D	Nut		

5. Remove the nuts, F, Figure 10-1, securing the disc, E, to the axle hub, G, or remove the bolts, nuts and washers, D, securing the wheel rim, C, to the disc, depending on the position selected. Figure 10-2 shows the tread width obtained with each position.

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SECTION 11A

CAB

DESCRIPTION AND OPERATION

The cab is located on the rear frame and is carried on four isolation mounts. The cab frame incorporates the necessary components to form the Roll Over Protective Structure (ROPS) for the operator. Tinted six millimeter thick tempered safety glass is used on the windows. The doors contain a handle with a lockable latch. The window in the rear of the cab opens and is supported in the open position with gas filled spring struts.

Access to the heater, A/C, radio, windshield wipers and blower is through the cab inner roof. The side consoles contain the hydrostatic lever, throttle, and hydraulic controls.

The operator's seat, steering column, and instrument panel can be rotated 180° for operation in either direction.

A brake pedal is located at both ends of the cab to provide braking for either position.

SPECIAL TOOLS

Cab Support Bracket - FNH 01033

CAB TROUBLESHOOTING

Increased cab noise or vibration indicates cab mounts that are damaged or have lost resiliency. The cab mounts must be replace it they have lost 35-40% of the original loaded thickness of 2.88 in. (73 mm).

CAB MOUNTS - REPLACEMENT

Replacing the cab mounts consists of tilting the cab up on the side to be replaced.

Tilting the Cab

1. Remove the loader, if so equipped.
2. Park the tractor on a level surface and install the articulation lock. Set the park brake and chock the wheels securely to prevent tractor movement.
3. Remove nuts, A, Figure 11A-1, on the side of the cab which is being raise.
4. Connect a hoist to the cab, Figure 11A-2, and lift the cab just enough to remove cap screw, B, spacers, C, and plain washers, D.

   NOTE: A grab hook can be inserted next to the heater hose line to raise the cab.

5. Lift the cab about 10″ and install the cab support bracket FNH 01033, A, Figure 11A-2. Remove the rubber bushings, E, Figure 11A-1.

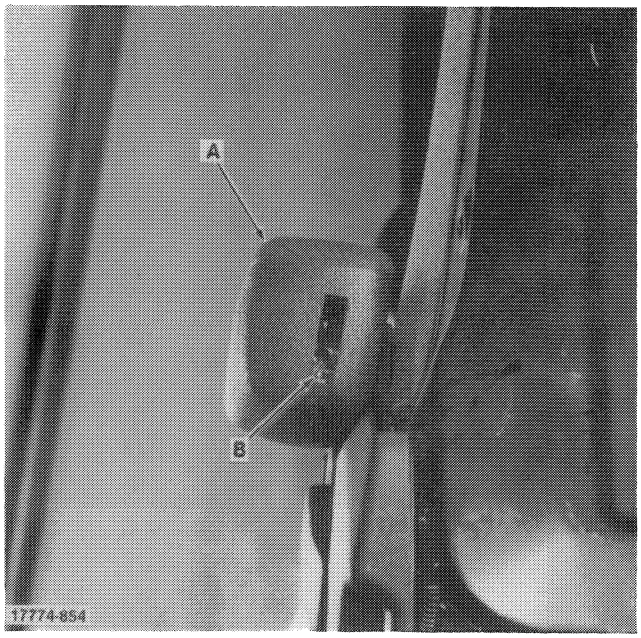
Examine the rubber bushings for cracks and wear. Examine the bolts and spacers for wear. Replace all necessary parts.

Lowering the Cab

1. Connect a suitable hoist to the cab an take the weight off the cab support bracket, FNH 01033.
2. Remove the cab support bracket, A, Figure 11A-2. Lower the cab back into place.
3. Install the cab bushings, spacers, and plain washers as shown in Figure 11A-1.
4. Torque the cab mount cap screws and nuts to 140 lbs. ft. (193 N·m).

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Armrest **FIGURE 11B-3**

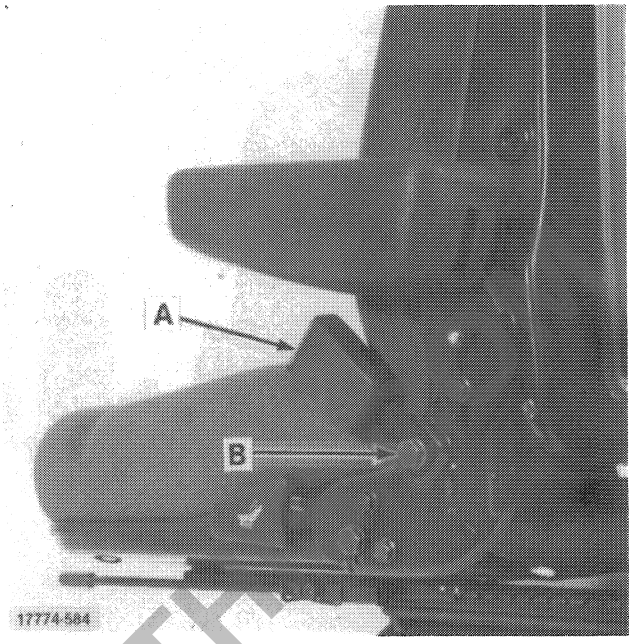
A Armrest
B Slotted screw

ARMREST - REMOVAL

1. Rotate the armrest, A, Figure 11B-3, until it is horizontal.
2. Using a blade type screwdriver remove slotted screw, B.
3. Pull the armrest from the support.

ARMREST - INSTALLATION

1. Slide the armrest onto the support.
2. Insert the screw, B, Figure 11B-3, and tighten securely.



Seat Belt **FIGURE 11B-4**

A Seat belt
B Seat belt bolt

SEAT BELT - REMOVAL

1. Rotate the armrest to the vertical position and remove the trim piece covering the seat belt attaching bolt. The trim piece will pull off.
2. Remove bolt, B, Figure 11B-4, and remove the seat belt, A.

SEAT BELT - INSTALLATION

1. Position the seat belt and secure with bolt, B, Figure 11B-4. Torque the bolt to 60 ft. lbs. (81 N·m).
2. Attach the trim piece to the seat frame by snapping it back into position.

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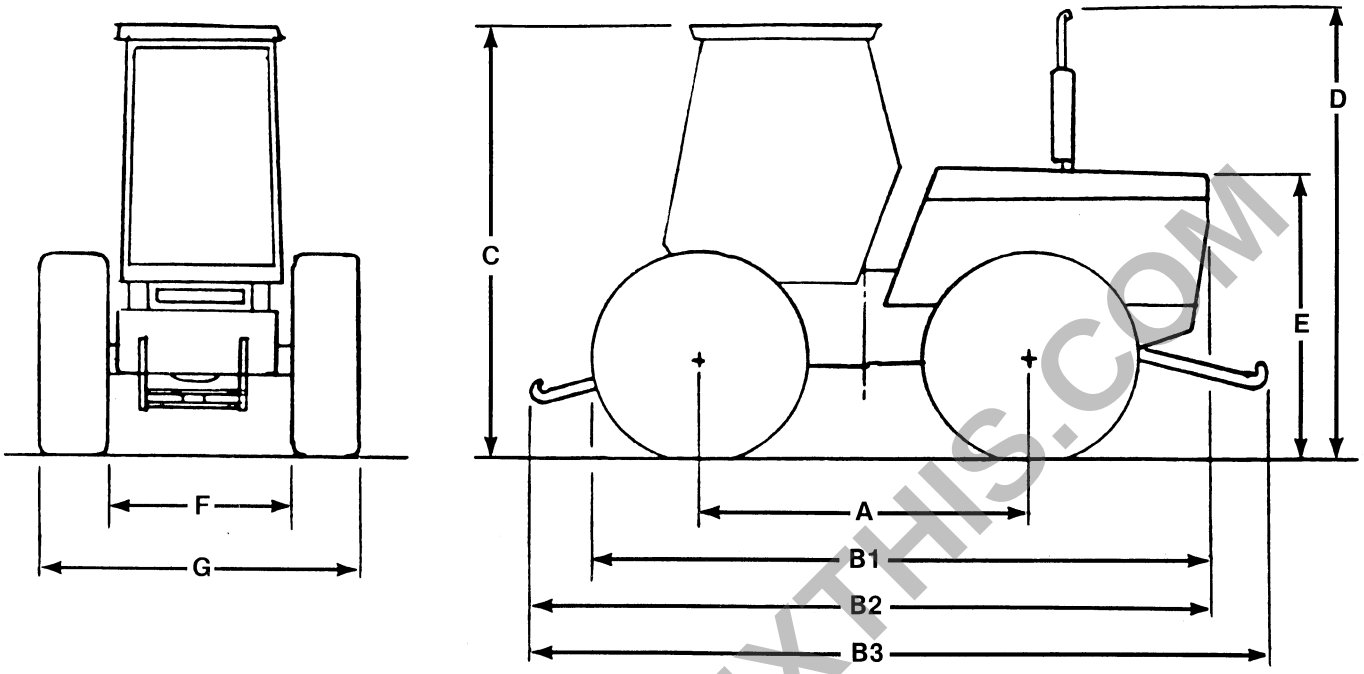
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TROUBLESHOOTING - HEATING SYSTEM

PROBLEM	POSSIBLE CAUSE	CORRECTION
No heat	Low coolant level	Replenish coolant
	Air in heater/evaporator core	Bleed system
	Defective engine thermostat	Replace thermostat
	Pinched heater hose	Check hoses
	Temperature control valve plugged	Clean or replace valve and flush system
	Heater shut-off valve closed	Open valve
	Heater shut-off valve installed backwards	Reposition valve
Coolant smell in cab	Heater/evaporator leaking	Repair or replace heater/evaporator core
	Heater hose leaking	Repair or replace hose
	Temperature control valve leaking	Replace temperature control valve
Insufficient air flow	Cab air filter plugged	Clean or replace filter
	Faulty blower	Repair or replace blower
	Heater/evaporator core fins plugged	Clean heater/evaporator core
	One or more cab air ducts disconnected	Reconnect cab air duct(s)
	Air intake on cab plugged	Remove obstruction (shipping foam)
Noisy system	Faulty blower	Repair or replace blower
No air flow	Faulty blower switch	Replace switch
	Faulty blower	Repair or replace blower
	One or more cab air ducts disconnected	Reconnect cab air duct (s)
Excessive heat	Heater hose improperly connected	Reconnect hose to proper position
	Defective engine thermostat	Replace engine thermostat
	Plugged radiator fins	Clean radiator fins

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DIMENSIONS

A Wheelbase ..... 89.0" (2260 mm)

Length
B1 Hood to tire ..... 172.5" (4380 mm)
B2 Hood to rear three-point ..... 180.0" (4570 mm)
B3 Front three-point to rear three-point ..... 194.0" (4930 mm)

C Cab Height ..... 114.5" (2910 mm)

D Exhaust Height ..... 117.0" (2975 mm)

E Hood Height ..... 74.0" (1880 mm)

F Minimum Inside Tire Dimension ..... 45.1" (1145 mm)

G Overall Width ..... 81.3"-113.1" (2065 mm-2873 mm)

All Dimensions are with 16.9 x 28 R1 Tires and Assume Loaded Tractor

Clearance Under:
Differentials ..... 26.0" (660 mm)
Drawbar (Rails) ..... 16.3" (415 mm)
Axle Drop Boxes ..... 21.0" (533 mm)

Turning Radius to Center Line of Tractor ..... 137" (3480 mm)

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Never use compressed air to blow dust, filings and dirt away from your work area unless the correct type of nozzle is fitted and eye protection is used.

Compressed air is not a cleaning agent, it will only move dust, from one place to another. Look around before using an air hose as bystanders may get grit into their eyes, ears or skin.

- **Hand Tools**
  Many cuts, abrasions and injuries are caused by defective tools. Never use the wrong tool for the job, as this generally leads either to some injury or to a poor job.

  Never use:

  — A hammer with a loose head or split handle.
  — Spanners or wrenches with splayed or worn jaws.
  — Spanners or files as hammers; or drills, clevis pins or bolts as punches.

For removing or replacing hardened pins use a copper or brass drift rather than a hammer alone.

For dismantling, overhaul and assembly of major and sub components, always use the Special Service Tools recommended. They will reduce the work effort, labor time and the repair cost.

Always keep tools clean and in good working order.

- **Electricity**
  Electricity has become so familiar in day to day usage, that its potentially dangerous properties are often overlooked. Misuse of electrical equipment can endanger life.

  Before using any electrical equipment — particulary portable appliances — make a visual check to make sure that the cable is not worn or frayed and that the plugs and sockets are intact. Make sure you know where the nearest isolating switch for your equipment is located.

GENERAL CONSIDERATIONS

- **Solvents**
  Use only cleaning fluids and solvents that are known to be safe. Certain types of fluids can cause damage to components, such as seals, and can cause skin irritation. Solvents should be checked that they are suitable not only for the cleaning of components and individual parts, but also that they do not affect the personal safety of the user.

- **Housekeeping**
  Many injuries result from slipping or tripping on objects or material left lying around by a careless worker. Prevent these accidents from occurring. If you notice a hazard, don't ignore it — remove it.

  A clean, hazard-free place of work improves the surroundings and daily environment for everybody.

- **Fire**
  Fire has no respect for persons or property. The destruction that a fire can cause is not always fully realized. Everyone must be constantly on guard.

  — Extinguish matches, cigars, and cigarettes, before throwing them away.
  — Work cleanly, disposing of waste material into proper containers.
  — Locate the fire extinguishers and find out how to operate them.
  — Do not panic — warn those near and raise the alarm.
  — Do not allow or use an open flame near the fuel tank, battery or component parts.

- **First Aid**
  In the type of work that mechanics are engaged in, dirt, grease, and fine dusts settle upon the skin and clothing. If a cut, abrasion or burn is disregarded, it may be found that a septic condition has formed within a short time. What appears at first to be trivial could become painful and injurious. It only takes a few minutes to have a fresh cut dressed, but it will take longer if you neglect it. Make sure you know where the First Aid box is located.

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The number of times the current flow reverses polarity (direction of travel) in a second is called the frequency. Example: (Reference Figure 3A-3) A tractor engine flywheel ring gear with 128 teeth. Assume the engine is idling at 1000 RPM.

128 teeth
X 1000 RPM
128,000 cycles per minute
divided by 60 = 2133 Hz (cycles per second)

TROUBLESHOOTING - TACHOMETER/ ENGINE SPEED SENSOR

The troubleshooting logic charts, Figures 3A-5, 3A-6, and 3A-8 show a step-by-step procedure that can be used to analyze problems with the speedometer, or tachometer. Figure 3A-4 details the complete tach/speedometer circuit.

Example #1: 9030 Bidirectional tractor with a tachometer that does not provide an engine RPM readout, but the hour meter and ground speed functions work properly.

Step 1: See Figure 3A-5. Follow the logical flow through to Figure 3A-6.

Step 2: Figure 3A-6 leads through a logic pattern of checking for correct sensor installation.

Step 3: Connect the signal generator into the tractor wiring harness and input a signal as directed to confirm the tachometer is working properly.

Step 4: After determining the tachometer works properly with the duplicated signal, confirm the transducer is working correctly.

Step 5: Connect the signal generator/counter to the short wire lead coming out of the transducer and start the engine. The signal should be counted and displayed as either RPM, or Hz, depending upon mode of operation. The flywheel ring gear in this example has 128 teeth.

NOTE: The signal generator/counter is a very accurate instrument and will be more precise than the tractor tachometer; therefore, allow for a 5-10% margin of error when comparing the readings.

Step 6: Assume the signal from the transducer was incorrect and the transducer was subsequently replaced. Then use the signal generator/counter to verify correct operation.

Results: This example has used the signal generator/counter in both the generating and counting modes.

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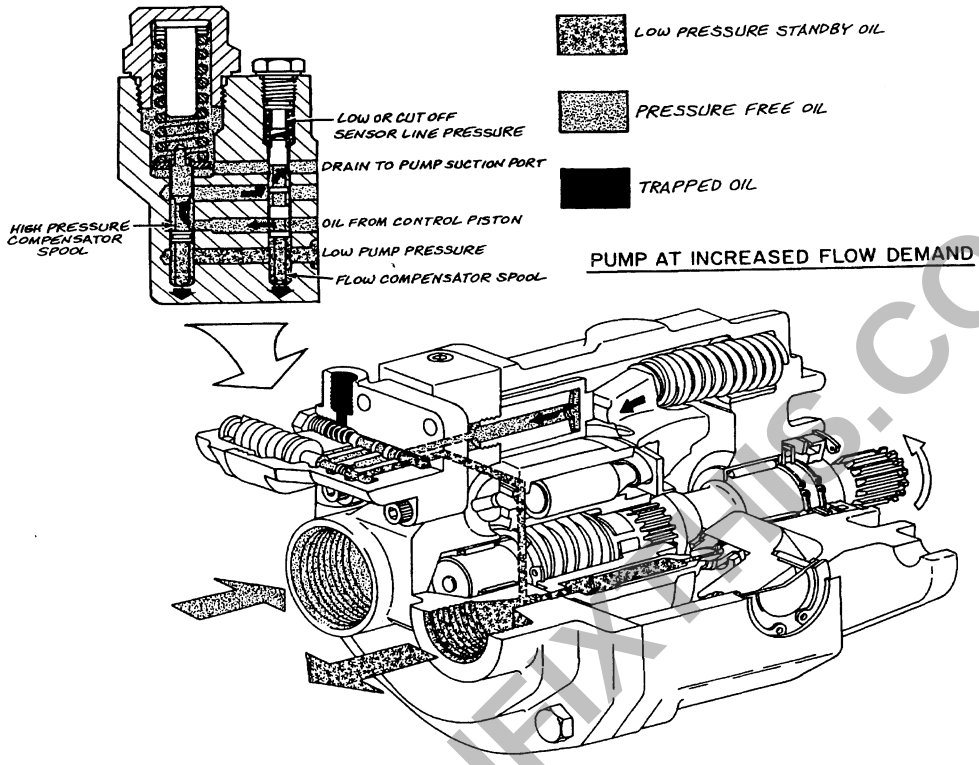


Figure 8-5

Increased Flow Demand Mode

When the hydraulic pump is in the increased flow demand mode, the following criteria are met:

- The engine is running.
- A cab end or engine end implement valve section is activated or the steering system is operating.

The pump will react in the following manner:

Should a demand for increased or full flow be required from the pump, the pressure in the pump supply passage will drop, causing the flow compensator spool to be seated. This will open an oil drain path from the camplate control piston to the drain passage in the compensator. The camplate control spring will force the camplate to a greater cam angle, causing the pump to provide more oil. When the flow demand is met, the pressure will stabilize, causing the compensator flow spool to allow oil to meter back to the control piston. The camplate will stabilize at any position from 0 to 17 degrees to satisfy the flow demand requirement of the system.

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