SERVICE MANUAL

Tractor

1470

Traction King

9-85831

1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

SERVICE MANUAL

Tractor

1470

Traction King

9-85831

1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

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TYPE 1-4

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HYDRAULIC CYLINDER

3-1/4" X 8" AND 4" X 8"

WITH MECHANICAL LIMIT STOP

(Refer to Figure 3)

1. "O" ring. Install into cylinder head (8). Inset A.
2. Back-up ring. Install into cylinder head (8). Inset A.
3. Oil seal. Press into cylinder head (8) until it bottoms with the lip out. Inset A.
4. "O" ring. Install on cylinder head (8). Inset A.
5. "O" ring. Install on piston (9). Inset B.
6. Back-up rings. Install on piston (9). Inset B.
7. Limit stop. Install on piston rod (11).
8. Cylinder head. Install on piston rod (11).
9. Piston. Install on piston rod (11).
10. Nut. Install on piston rod (11) and torque 200 to 225 ft. lbs. Clamp rod eye end of piston rod in a vise and support the piston rod when torquing the nut.
11. Piston rod. Install into cylinder (15). Care must be taken not to damage the piston and cylinder head "O" rings (4 & 5).
12. Snap ring. Install in cylinder (15).
13. Capscrews and washers. Bolt clamp (7) to cylinder (15) and torque evenly 15 to 18 ft. lbs.
14. Hose connectors. Install into cylinder (15).
15. Cylinder. Connect hoses and check for leaks.

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FUEL INJECTION PUMP

Type ..... Robert Bosch, PES multiple plunger
Rotation ..... Counter-clockwise
Mounting ..... Left hand side of engine
Drive ..... Gear driven at 1/2 engine speed
Lubrication ..... Pressurized engine oil
Governor ..... Centrifugal type, variable speed, flyweight, integral part of pump.

FUEL INJECTOR

Type ..... Roosa Master
Opening pressure (new) ..... 2950 to 3050 PSI
(serviced) ..... 2750 to 2850 PSI
Maximum opening pressure difference between cylinders ..... 100 PSI
Valve lift ..... 3/4 turn off valve seat or .0135″
Spray orifice size ..... .013″
Sac hole size ..... .042″
Number of orifices 4
Orifice length (through sac wall) ..... .031″
Orifice spray angle ..... 150°
Leakoff rate ..... 3 to 10 drops in 30 seconds at 1500 PSI after first drop appears (serviced injector).

Opening pressure control spring:
Free length ..... .536″
No. of coils 7
Wire diameter ..... .056″
O.D. of spring ..... .276″
Compressed to .435″ - .457″ ..... 27 lbs. pressure

Brakes

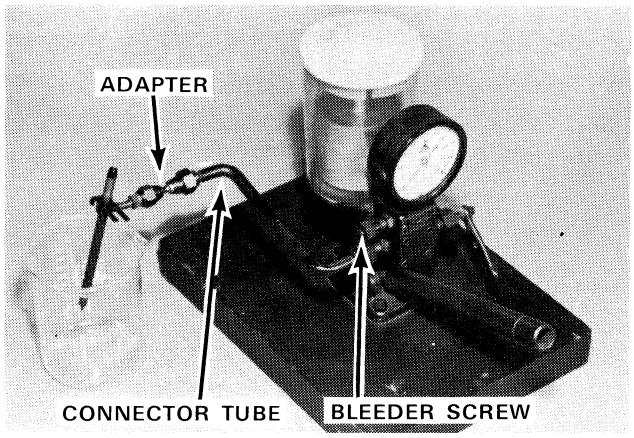
Type fluid ..... 70 R1 Heavy Duty
Free pedal ..... 1″
Master cylinder ..... 1.25″ Bore, 1.44″ Stroke
Manually operated horizontal piston type with integral fluid reservoir
Calipers ..... Two pistons per caliper with 2.25″ bore
Brake Disc ..... 19.0″ Dia., .44″ thick

	Free Length	Spring O.D.	No. of Coils	Extend to	Spring Rate (lbs.)
Brake pedal return spring	6.4″	.75″	30	8.8	48.56

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INJECTOR TEST STAND



An "Approved" Injector Test Stand, Case Part No. M20322 (Bacharach No. 65-934D), is required for testing and adjusting the injectors and can be purchased through the Service Parts Supply, J I Case Co., Racine, Wisc. Except for descriptions referring especially to adjustments on the test stand itself, all of the following instructions will apply to all makes. Operating instructions are also furnished with the test stand.

An injector tool kit, Case Part No. M20520 (Bacharach No. 60-0010), is required to service the injectors. A compression gauge adapter, Bacharach No. 70-314 (D-558) is also included in the tool kit. This kit is used in conjunction with the Case Diesel Tool Kits Case Part No. M20247 (CD-800) and Case Part No. M20246 (CD-350).

The test stand is used to perform the following checks:

1. Check and adjust the injector opening pressure. This is a duplicate of the factory procedure.
2. Check the injector assembly for fuel leakage.
3. Check and adjust the injector leak-off.
4. Accurately check the injector spray pattern.

Fuel injectors must be checked on the test stand when performing the following service operations:

1. Whenever an injector has been removed from the engine for cleaning, the injector must be checked on the test stand prior to installing it on the engine.
2. When a new injector assembly is to be installed, it must be checked on the test stand prior to installing it on the engine.
3. When a complete engine overhaul is performed, the injectors should be removed and checked on the test stand.
4. When an injector is suspected to be the cause of unsatisfactory engine performance, it should be removed from the cylinder head and checked on the test stand prior to disassembling it.

IMPORTANT: ALWAYS CHECK THE PERFORMANCE OF AN INJECTOR ON THE TEST STAND BEFORE DISASSEMBLING IT. IF IT CHECKS OUT SATISFACTORILY, THERE IS NO NEED TO DISASSEMBLE OR ADJUST IT.

Preparing Test Stand

1. After filling the test stand fuel reservoir, loosen the bleeder screw.
2. When the fuel flowing from the bleeder screw opening is free of air bubbles, tighten the screw.
3. Wash the connector tube and adapter in clean diesel fuel. Blow clean with filtered compressed air and connect securely to the test stand.
4. Operate the hand lever slowly until clean fuel flows from the adapter.
5. The test stand is now ready for use. *NOTE:* Complete maintenance instructions are furnished with the test stand. Follow the instructions carefully.

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DIESEL ENGINE

General

Type ..... 6 Cylinder, 4 Stroke Cycle, Valve-in-Head Turbo Charged
Firing Order 1-5-3-6-2-4
Bore ..... 4-5/8 Inches
Stroke ..... 5 Inches
Piston Displacement ..... 504 Cubic Inches
Compression Ratio ..... 16.5 to 1
Cylinder Sleeves ..... Removable Wet Type
No Load Governed Speed ..... 2160 RPM
Rated Engine Speed ..... 2000 RPM

Engine Idling Speed ..... 750 RPM
*Valve Tappet Clearance (Exhaust) ..... (Hot) .020 Inch
(Cold) .015 Inch
(Intake) ..... (Hot and Cold) .015 Inch

*Hot Settings Are Made After the Engine Has Operated At Thermostat Controlled Temperature For At Least Fifteen Minutes.

Piston and Connecting Rods

Rings per Piston 3
Number of Compression Rings 2
Number of Oil Rings 1
Type Pins ..... Full Floating Type
Type Bearing ..... Replaceable Precision, Steel Back, Copper-Lead Alloy Liners.

Main Bearings

Number of Bearings 7
Type Bearings ..... Replaceable Precision Steel Back, Copper-Lead Alloy Liners.

Engine Lubricating System

Oil Pressure ..... 45 to 55 Pounds with Engine Warm and Operating at Rated Engine Speed.
Type System ..... Pressure and Spray Circulation
Oil Pump ..... Gear Type
Oil Filter ..... Full Flow Spin on Type

Fuel System

Fuel Injection Pump ..... Robert Bosch, Type PES(Multiple Plunger).
Pump Timing ..... 29 Degrees Before Top Dead Center (Port Closing).
Fuel Injectors ..... Pencil Type (Opening Pressure 2800 PSI).

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Fuel Transfer Pump ..... Plunger Type, Integral Part of Injection Pump.

Governor ..... Variable Speed, Fly-Weight Centrifugal Type, Integral Part of Injection Pump.

1st Stage Fuel Filter ..... Full Flow Spin on Type

2nd Stage Fuel Filter ..... Full Flow Spin on Type

Fuel Tank Water Trap and Drain ..... Located in Base of Fuel Tank

Fuel Tank Capacity ..... 100 U.S. Gallons

Fuel Level Gauge ..... Float, Located on Top of Fuel Tank.

GENERAL SPECIFICATIONS

Cooling System

Capacity ..... 40 U.S. Quarts

Type of System ..... Pressurized Thermostat Controlled By-Pass Type; Forced Circulation (Impeller Type Pump).

Thermostat ..... Starts to Open at Approximately 179^{0}F. Fully Open at 202^{0}F.

Pressure Cap ..... 7 PSI

Radiator Shutter ..... Available

When using a properly operating pressure cap, the engine temperature can safely rise to 230^{0}F.

Electrical System

Type of System - Diesel ..... 24 Volt Negative Ground

Batteries ..... (2) 12 Volt Batteries Connected in Series Group Size 30H, Rated at 1.255 to 1.265 Specific Gravity. Discharge Rate 300 Amps at 0^{0}F. Voltage drops to 9.2 after 10 seconds. Voltage drops 1.0 Volt per cell after 5 minutes.

Alternator ..... 24 Volt 35 Amp Output

Voltage Regulator ..... 24 Volt, Transistor

Starter Motor ..... 24 Volt with Solenoid Switch

Lights (4) Front Driving and Flood ..... 24 Volt 50 Watt, Sealed Beam

Lights (2) Rear Flood ..... 24 Volt 50 Watt, Sealed Beam

Amber Warning Lights (2) ..... 24 Volt, Double Face, Flasher Type

Rear Warning Lights (2) ..... 24 Volt, Combination Stop and Tail Light

Parking Brake

Type ..... Cable Actuated by Orchlin Type Handle - Adjustable from Operator's Seat.

Hydraulic Brakes

Type ..... Hydraulic, Self-Adjusting Caliper Disc Type

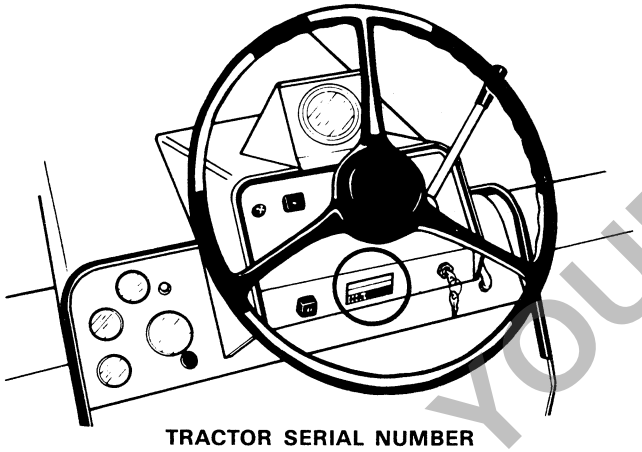
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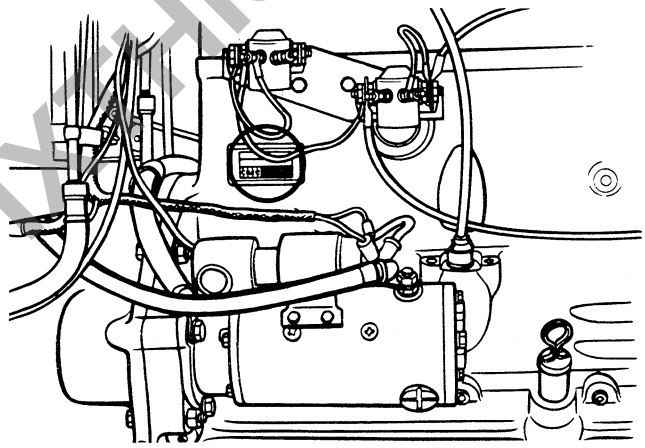
Section 11

GENERAL SPECIFICATIONS 1470 TRACTORS

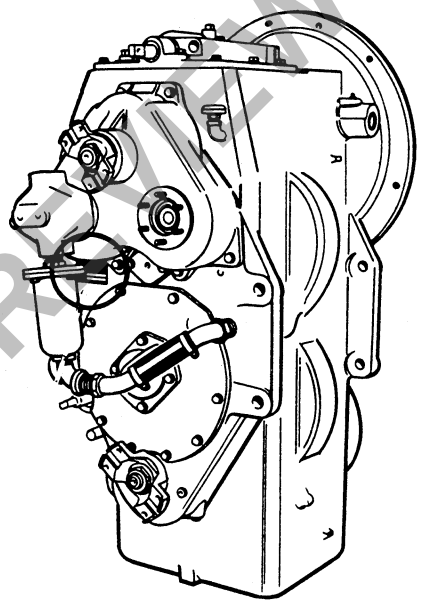
SERIAL NUMBERS



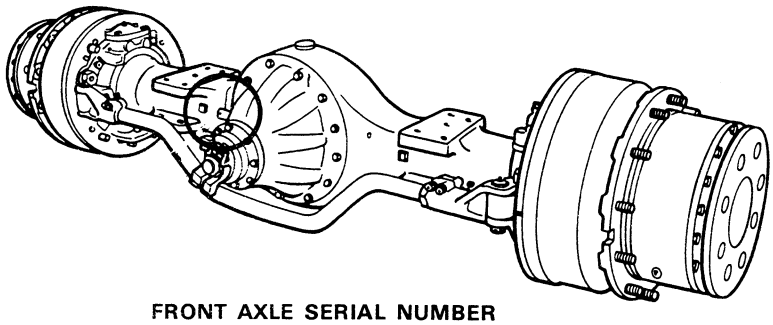
TRACTOR SERIAL NUMBER



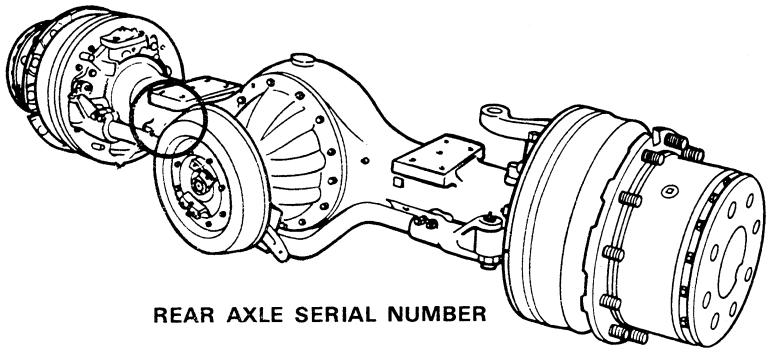
ENGINE SERIAL NUMBER



TRANSMISSION SERIAL NUMBER



FRONT AXLE SERIAL NUMBER



REAR AXLE SERIAL NUMBER

RAC. FORM 9-80141

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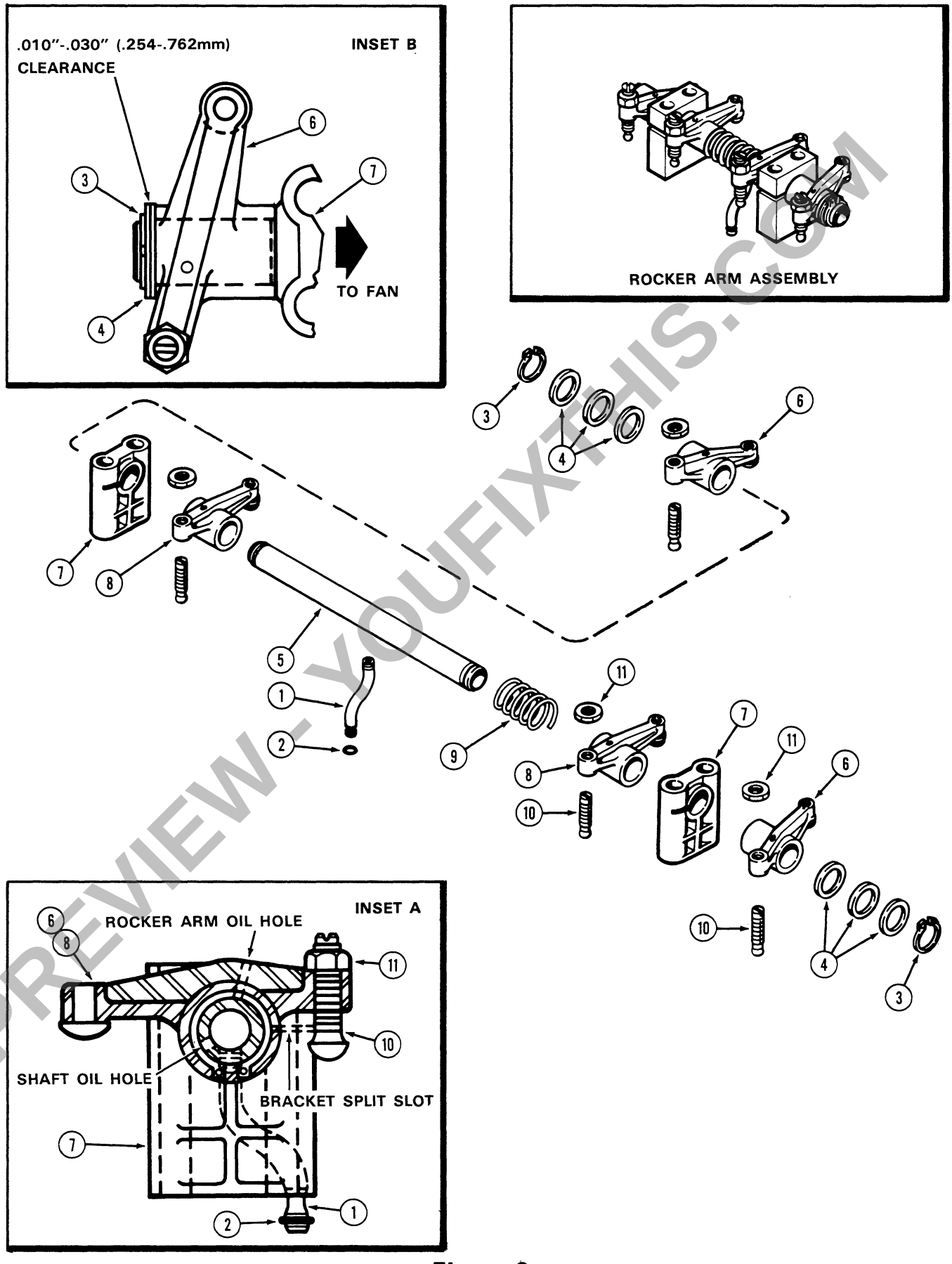


Figure 6

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PISTON, CONNECTING ROD AND PISTON RINGS

(Refer to Figure 20)

Assembly and Installation

1. Clean the inside surface of the piston pin bushing hole in the connecting rod before installing new bushing.

2. Install the new bushing (9), Inset A, into the rod (10) while aligning the oil holes in the bushing and rod. Press in the bushing using the same arbor that was used for removal.

3. Carefully ream the bushing 1.8004″ to 1.8008″ if new piston pins are to be installed. If piston pins (7) are to be reused, ream the bushings .0008″ to .0014″ larger than piston pin diameter. Check the bushing (9) after reaming for a clean smooth surface. **NOTE:** This is a full floating type piston pin and a press fit must not be used.

4. Check the piston pin bore in the piston (6). It should not exceed .0005″ to .0011″ larger than the piston pin diameter.

5. Install one piston pin retainer ring (8) and warm the pistons to 50^{0}F. warmer than the piston pin temperature.

6. Lubricate the piston pin (7) and bushing (9), with clean SAE 10W engine oil. Assemble the piston (6) to the rod with the recess in the piston top (for the valves) and stamped arrow toward the numbered side of the rod. The arrow must point toward the engine fan. Use hand pressure only to install the piston pin and retain in place with retainer ring (8).

7. Thoroughly clean the inner surfaces of the cylinder block that contacts the sleeves and the outer surfaces of the cylinder sleeves (1), including the ''O'' ring grooves.

8. Install each sleeve into the block without the ''O'' rings to check for the free movement.

9. Remove the sleeves from the block and carefully install new ''O'' rings (2) into the groove on each sleeve. Lubricate the inside surfaces of the cylinder block and the ''O'' rings with a thin coating of vaseline or water soluble grease.

10. Carefully install the sleeves (1) into the block and press into place by hand. Do not rotate the sleeves while they are being installed, they must be installed in the same position and location they were in before removal.

    NOTE: Prior to installing the piston, compression top ring (3), second compression ring (4) and oil ring (5) to piston (6), the ring end gap must be checked. Install each ring into the cylinder sleeve approximately 1″ from the bottom of the sleeve and check end gap with a feeler gauge. The end gaps must meet specifications as listed.

11. Install the oil ring spring into the groove on the inside of the oil ring into the bottom groove of the piston. The oil ring can be installed with the spring either up or down, See Inset B. Check the side clearance of the oil ring (5) in the piston, Inset C. The side clearance should not exceed .005″. When the side clearance exceeds .005″, the piston must be replaced.

12. The top (1st compression) piston ring (3) is a Keystone ring (double tapered face) and is stepped. This ring is marked with ''TOP''. The ''TOP'' mark and the step must be toward the top of the piston. See Inset D. The vertical plane in the step has a 15^0 slope.

13. The intermediate (2nd compression) piston ring (4) is a Keystone ring (double tapered face) and is stepped. This ring is marked with ''TOP'' and is identified by a painted red stripe at least 0.50″ wide across ring face. The ''TOP'' mark and the step must be toward the top of the piston. See Inset E. The horizontal plane in the step has a 15^0 slope.

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ENGINE SPEED ADJUSTMENTS (Continued)

Supplementary Idle Screw Adjustment

If a governor condition should be encountered in which the engine low idle speed suddenly drops to a very low RPM and then surges or speeds up, the condition can be remedied by adjusting the Supplementary Idle Adjusting Screw in the injection pump governor housing.

1. Remove the seal cap nut and loosen the locknut.

2. Turn the supplementary idle adjusting screw clockwise approximately 1/8 of a turn. This is an adjustment used as a starting point. If the governor continues to cause engine speed to suddenly drop and then surge upwards erratically, turn the adjusting screw a little at a time until the engine idles smoothly. Tighten the locknut, reinstall the cap nut, and reseal.

IMPORTANT: Do not turn the supplementary idle adjusting screw too far clockwise or it will increase the low idle speed.

Turn it just far enough to overcome the erratic idle condition. Turning the supplementary idle adjusting screw counterclockwise will only aggravate the condition.

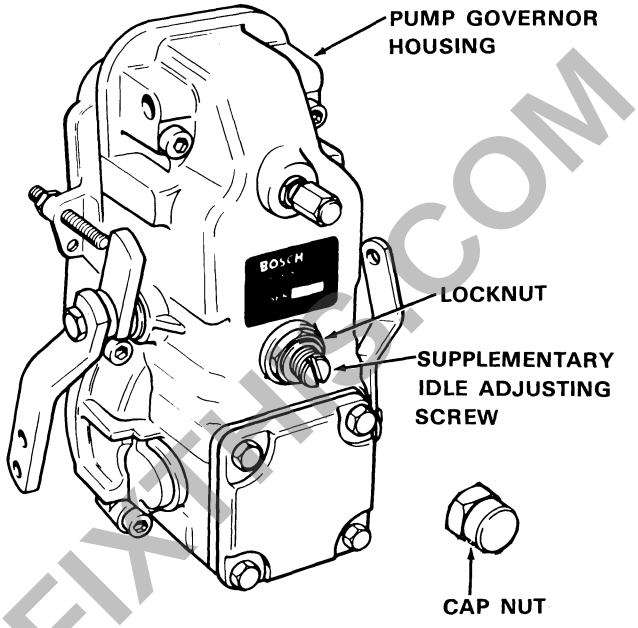


Figure 12

IMPORTANT: Recheck the engine idle speed with an accurate tachometer.

Low Idle Speed Adjustment

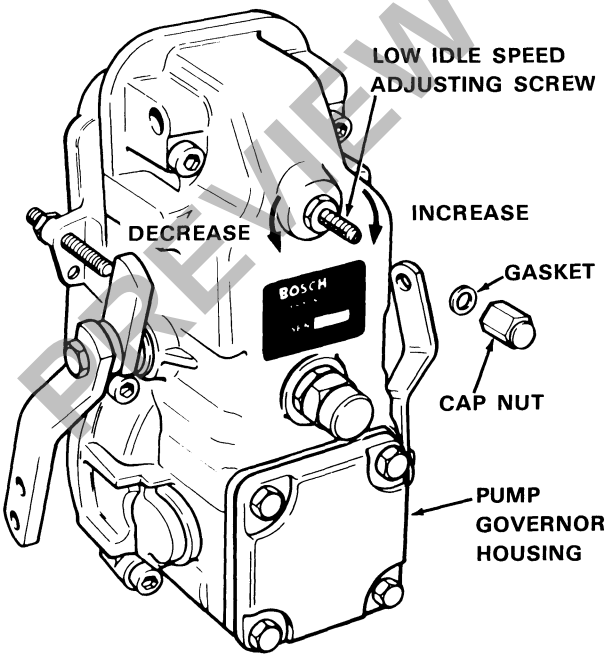


Figure 13

When the low idle speed does not fall between 725 RPM to 775 RPM proceed as follows:

1. Remove the seal cap nut and gasket and loosen the locknut.

2. Turn the low idle speed adjusting screw clockwise to increase speed or turn counterclockwise to decrease speed.

3. Check the speed with a tachometer each time the adjustment is made. Once the low idle speed is correct, hold the adjusting screw and tighten the locknut. Install the gasket and seal cap nut.

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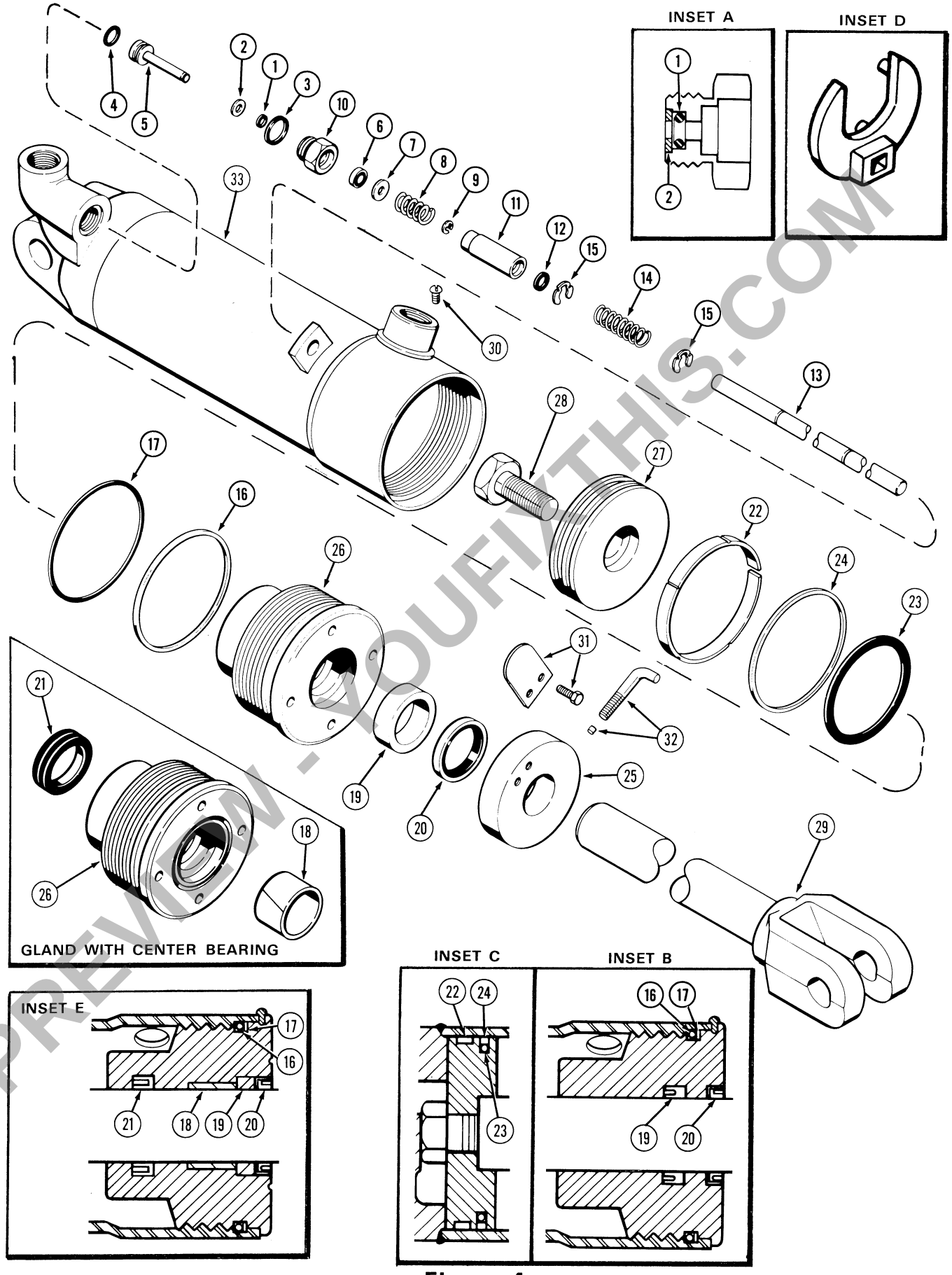


Figure 4

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OIL FLOW-NEUTRAL POSITION

(Refer to Figure DD-2)

Hydraulic Pump

When the engine is running, the hydraulic pump operates continuously, drawing oil thru the outlet filter of the reservoir and pumping it to the control valve inlet port.

Remote Control Valve

With the hand control levers and the valve spools in neutral position, the pressurized oil passes directly thru the valve and into the hydraulic mounting block where it is returned to the reservoir inlet filter and into the reservoir. Blocking of the spool outlet and inlet end glands keeps all ball checks closed. Oil is prevented from entering or exiting the control valve.

The rear valve head incorporates two thermal valves. These valves operate if the system is subjected to excessive pressure due to heat. This may occur after the tractor has been operated during high temperatures. The valves will open, relieving the excess pressure in the cylinder hoses and allowing the oil to return to the valve sump and reservoir.

Hydraulic Mounting Block

The hydraulic mounting block is located below the control valve and serves as a sump passage for the remote system return oil and directs the oil back to the hydraulic reservoir or to the hitch valve and back to the reservoir on machines so equipped.

Remote Hydraulic Cylinders

The remote cylinders are double acting type which requires pressurized oil to retract or extend the cylinder. With the valve in neutral, the oil is static at both sides of piston, preventing it from extending or retracting.

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SERVICING THE FLOW DIVIDER

(REFER TO FIGURES O-4 AND O-5)

Should it become necessary to inspect the flow divider proceed as follows:

1. Remove valve from tractor and plug lines.
2. Clean valve thoroughly in mineral spirits.
3. Assemble puller screw in the end cap (11).
4. With press or suitable means push end cap (11) into the body (1) just far enough to remove the retainer ring (13).

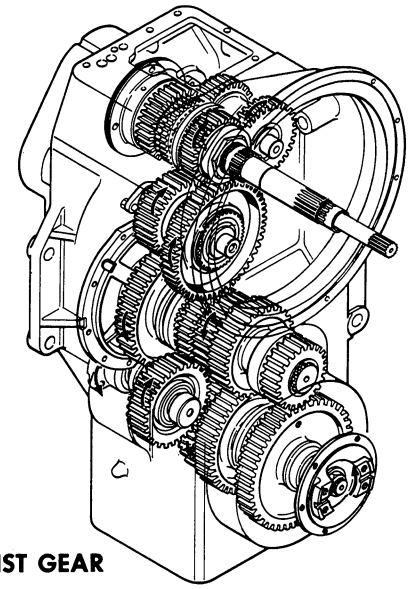
   NOTE: When assembling or disassembling, push the end cap in only enough to permit removing or installing the retainer ring (13). If the cap is pushed too far the "O" ring (12) will catch in passage "F" and make disassembly very difficult. When assembled the possibility of a cut "O" ring may result in a leaking valve.

5. Pull end cap (11) from body.
6. Remove spring (10), orifice plate (8) and spool (9).
7. Inspect parts for burrs, excessive wear, pluged orifice holes or other damage. The spool can be checked for freedom of movement in the body by working it back and forth with your finger.
8. Replace damaged parts. Lube internal parts in Case TCH and install piston in body.
9. Install orifice plate (8). **NOTE:** Be sure it is right side up.
10. Install the spring (10).
11. Put a new "O" ring (12) on end cap (11). Lube with Case TCH and install in body (1).
12. Install a new retainer ring (13).

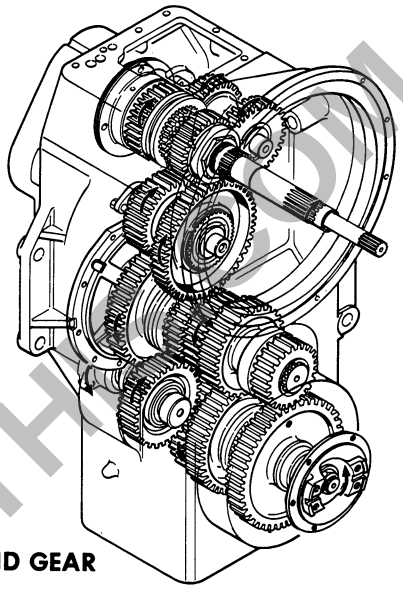
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REVERSE POWER PATHS



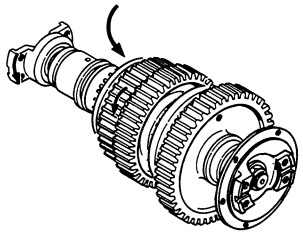
1ST GEAR

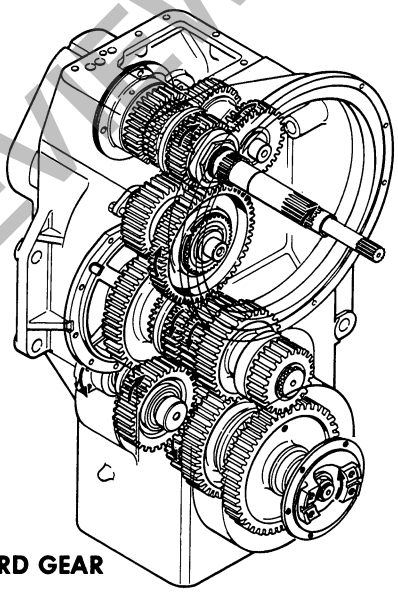


2ND GEAR

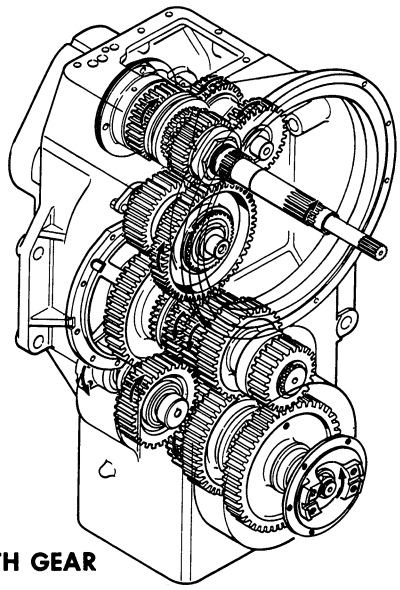
☐ INDICATES POWER PATH

REVERSE SHIFTER
HUB ENGAGED





3RD GEAR



4TH GEAR

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INTRODUCTION

The operation of the clutch assembly is basically the same as the operation of any standard single disc type clutch.

The clutch cover is attached to the engine flywheel. The pressure plate is driven by means of driving lugs and mating slots in the clutch cover.

Depressing the clutch pedal disengages the clutch by forcing the release bearing into contact with the release levers, moving them toward the engine flywheel. This retracts the pressure plate from contact with the driven disc assembly thereby disengaging the clutch.

Releasing the clutch pedal engages the clutch by allowing the release bearing and release levers to move away from the engine flywheel and the pressure springs to exert pressure against the pressure plate, resulting in the disc assembly being gripped between the friction surfaces of the engine flywheel and the pressure plate; thereby completely engaging the clutch.

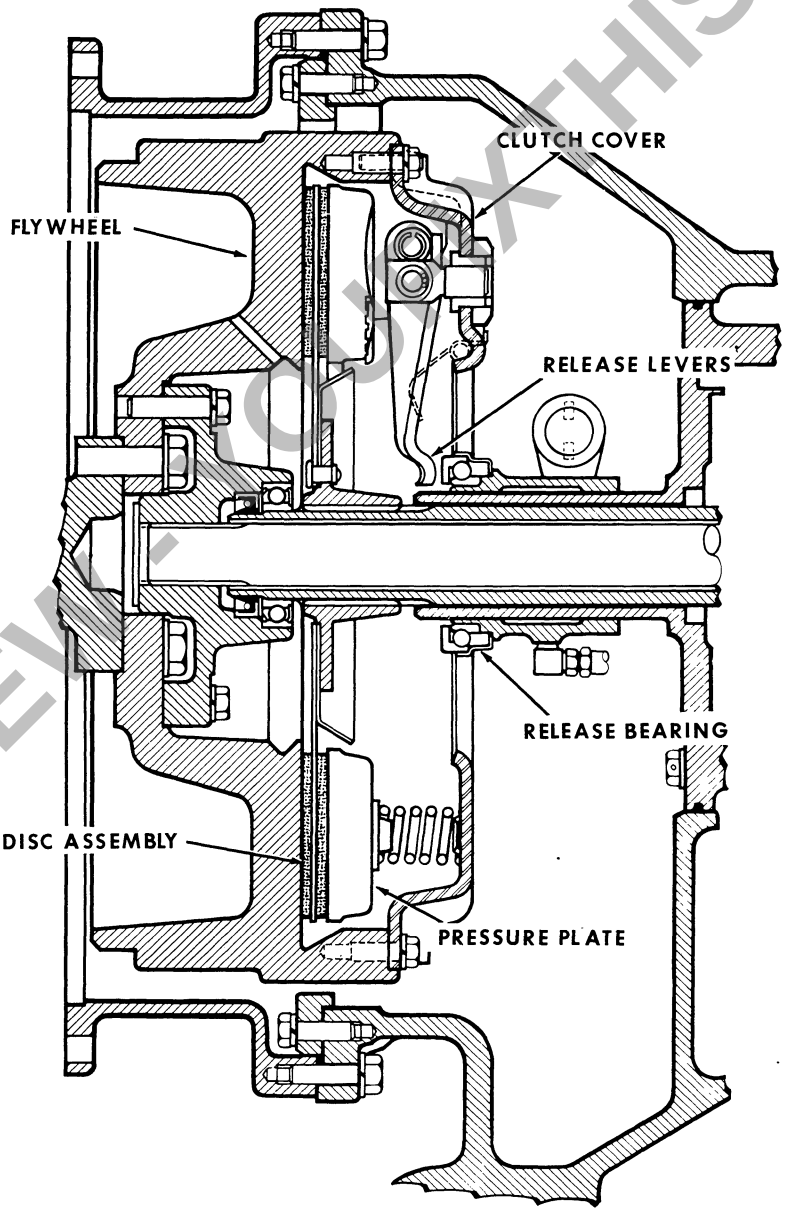


Figure SS-1

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DISASSEMBLY OF THE DRIVE SHAFTS

Care must be taken when removing and installing the drive shafts and universal joints. Careless handling may result in misalignment and cause premature failure of these parts.

1. Remove the cap screws from the differential yoke.
2. Remove the cap screws from the transmission yoke.
3. Remove the drive shaft. Sometimes the bearings stick tightly in the flanges and it will be necessary to tap with a soft hammer to unseat them. When doing this, partially support the drive shaft.
4. Bend the lock tang (1) away from the cap screws (2), if equipped. **NOTE:** Some Models are equipped with lock washers.
5. Remove the cap screws (2) & lock washers (3) if equipped, that hold the universal joint (4) to the drive shaft yoke (5).
6. Tap the top of the bearing (6) at an angle if sealed to the yoke.
7. Now remove the retainer (7) outer retainer washer (8), felt washer (9) and inner retainer washer (10) from the slip yoke.
8. Now the slip joint can be separated for cleaning and inspection.

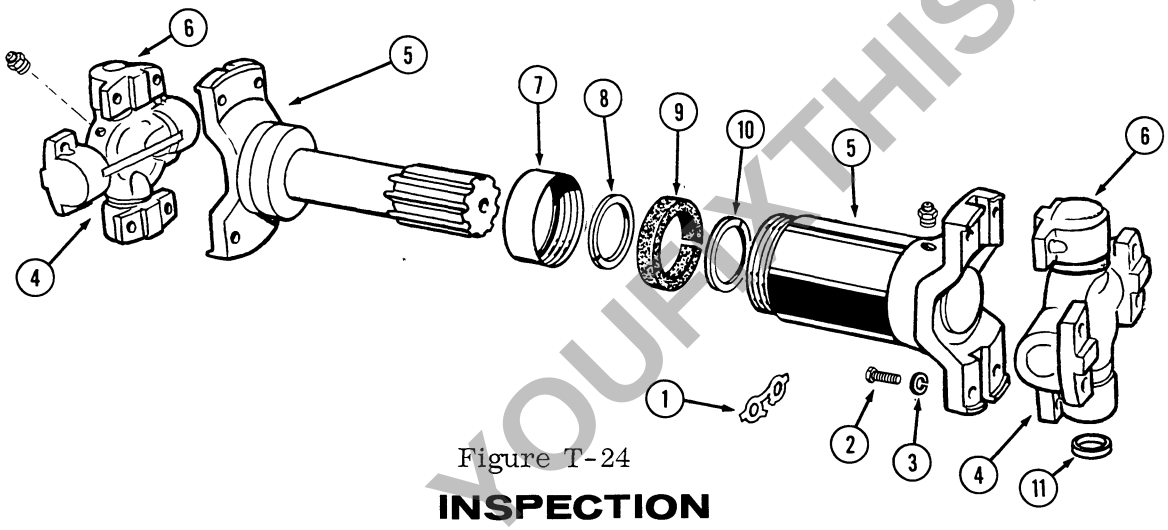


Figure T-24

INSPECTION

After the Drive Shaft and Universal Joints have been disassembled, all parts must be thoroughly cleaned in mineral spirits and inspected. All damaged or worn parts must be replaced during assembly.

The Drive Shaft Assembly, Figure T-24, must be carefully inspected for cracked or broken splines that may cause binding of the slip joint. Any time the drive shaft is disassembled a new felt washer (9) must be installed.

Carefully inspect for cracks, chips, dents, burrs and worn bearings. If the cross is cracked or the bearings worn the complete assembly must be replaced. If any burrs are found on the bearing housing mounting flange they can be removed. Any time the universal joint is disassembled the cork washers (11) must be replaced.

ASSEMBLY OF THE DRIVE SHAFTS

Before starting to reassemble the drive shaft and universal joints make sure all parts have been thoroughly cleaned, inspected and all worn or damaged parts replaced.

1. Place retainer (7), retainer washer (10), felt washer (9) and retainer washer (8) over the splined end of the tubular yoke.
2. Apply a liberal amount of lubricating grease to the splines then slide the two halves together and install the washers and retainer onto the slip yoke.
3. Install the universal joint (4) onto the drive shaft yokes. Tap lightly to insure proper seating and install capscrews (2) and lock washers (3), then torque at 35 to 40 foot pounds.

   NOTE: On assembly, lock tangs (1) must be replaced with lock washers (3).

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