

GROUP A - TRACTOR SPECIFICATIONS

1. SPECIFICATIONS

APPROXIMATE REFILL CAPACITIES

	U. S. Measure
Cooling System	(Gas - 14 Quarts — Diesel 16-1/2 Quarts)
Engine Crankcase (Gas and Diesel)	4 Quarts
(with filter change)	5 Quarts
Air Cleaner Oil Cup (Gas)	1 Quart
(Diesel)	2-3/4 Pints
Torque Tube Hydraulic System and Torque Converter Drive System	16 Quarts
Fuel Tank	22 Gallons
Transmission Case	17 Quarts
Belt Pulley Housing	1 Pint
Independent P.T.O.	1 Quart

★TRAVEL SPEEDS

SPEEDS — DIRECT DRIVE

	Low Range					High Range			
	1st	2nd	3rd	4th		1st	2nd	3rd	4th
Forward	1.9	2.8	3.7	12.9		3.1	4.5	5.9	20.8
Reverse	2.4	3.5	4.6	16.0		3.8	5.6	7.3	25.9

SPEEDS — TORQUE CONVERTER DRIVE

	Low Range					High Range			
	1st	2nd	3rd	4th		1st	2nd	3rd	4th
Forward	1.5	2.2	2.9	10.3		2.4	3.6	4.7	16.6
Reverse	1.9	2.8	3.6	12.9		3.0	4.5	5.9	20.6

*@ 2100 engine R.P.M. with 14.9 x 24 tires

TIRES

TIRE SIZES

Front Tires	7.50-16, 10 ply
Rear Tires	14.9-24, 6 ply

TIRE PRESSURES (DRAWBAR MODEL)

Front Tires	20 P.S.I.
Rear Tires	14 P.S.I.

TIRE PRESSURES (LOADER, BACKHOE, OR OTHER HEAVY EQUIPMENT)

Front Tires	36 P.S.I.
Rear Tires	18 P.S.I.

Referring to Figure 7, unscrew the clamp sufficiently to allow the oil cup to be removed straight down from the air cleaner body. Periodically, when cleaning the cup, extract the inner baffle and clean in solvent.

Refill cup to "Oil Level" mark with oil of the following viscosity (or use same viscosity as in engine crankcase):

Freezing Weather	SAE 10
Warm Weather	SAE 30
Hot Weather	SAE 40

Replace cup and secure with thumbscrew clamp. DO NOT OVERFILL THE OIL CUP. ON DIESEL ENGINES THE SURPLUS WILL BE DRAWN INTO THE ENGINE RESULTING IN EXCESSIVE, UNCONTROLLABLE SPEEDS.

4. TRACTOR LUBRICATION

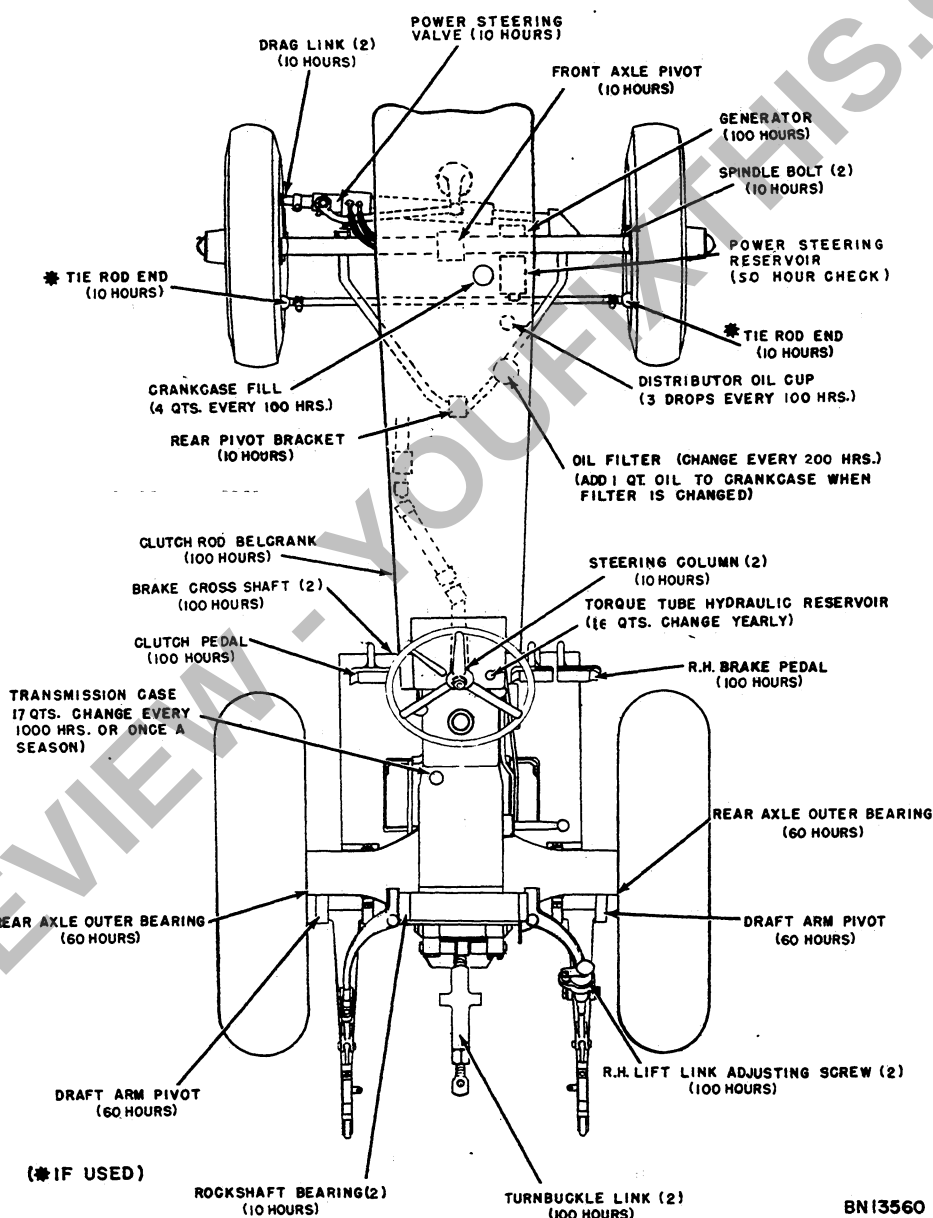


Figure 8 - Basic Tractor Pressure Fittings

PRESSURE FITTINGS

wipe all accumulated dirt from each fitting tip.

Before applying a grease gun to pressure fittings,

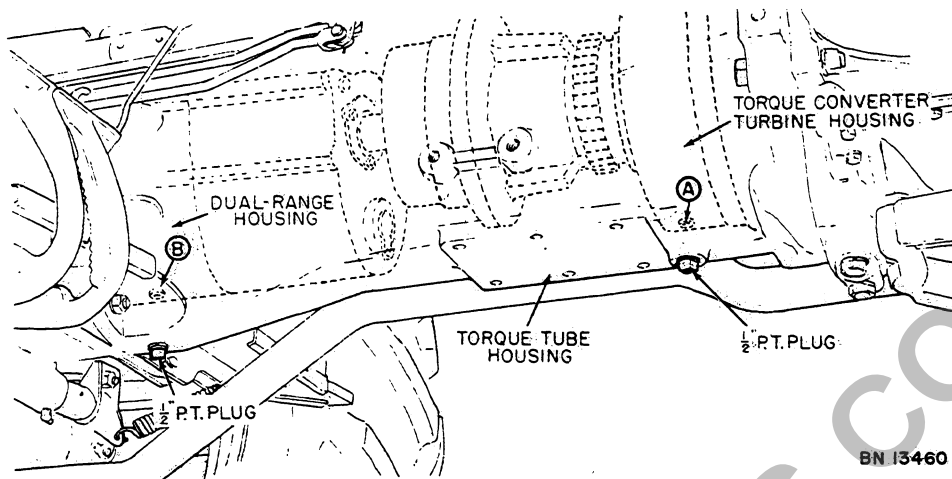


Figure 19 - Torque Tube Drain Plugs

5. Replace pipe plugs "A" and "B". If pipe plug "A" has been inadvertently left out of the converter drum, the Tractor will have a strong tendency to move, even with the foot pedal depressed. Also gear shifting will be very difficult due to gears clashing. This condition is the result of insufficient converter pressure to disengage the multiple disc clutch.
6. Replace two (2) 1/2 inch pipe plugs.
7. Add 16 U. S. quarts of Case Hi-Lo TCH Oil or approved substitute to the reservoir.
8. Start Tractor engine, allow to run for several minutes, and then check oil level with dipstick WITH ENGINE IDLING.
9. Check filter housing(s) for oil leaks.

RESERVOIR BREATHER

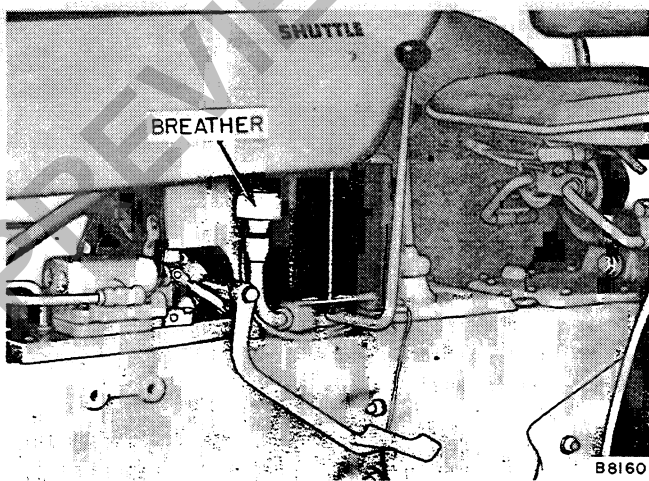


Figure 20 - Torque Tube Breather

This breather should be removed, disassembled and cleaned in solvent after every 200 hours opera-

tion OR MORE OFTEN WHEN OPERATING IN EXTREMELY DUSTY CONDITIONS. See Figure 20 for location of breather; see Figure 9 in Section IV for exploded view of breather. The filter element should be blown dry with compressed air — if damaged the element must be replaced.

Failure to keep the breather clean may result in a pressure build-up in the reservoir, thus, forcing oil past the oil seals and gaskets.

SERVICING OIL FILTER

The importance of changing the Torque Converter Drive oil filter element cannot be overemphasized. The life of the entire system depends a great deal on the cleanliness of the oil. Dirt and foreign matter are the No. 1 enemy of the Torque Converter Drive system. If cleanliness precautions are not followed, trouble will soon develop.

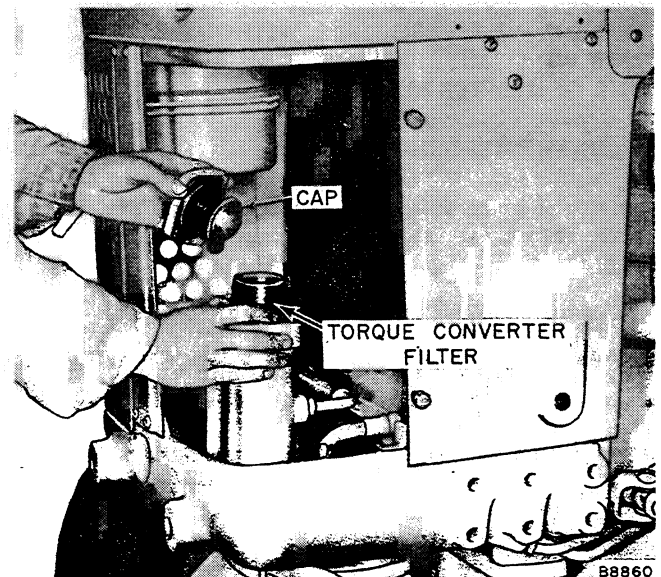


Figure 21 - Changing Torque Converter Oil Filter

GROUP B - SPLITTING TRACTOR

1. REMOVING BACKHOE

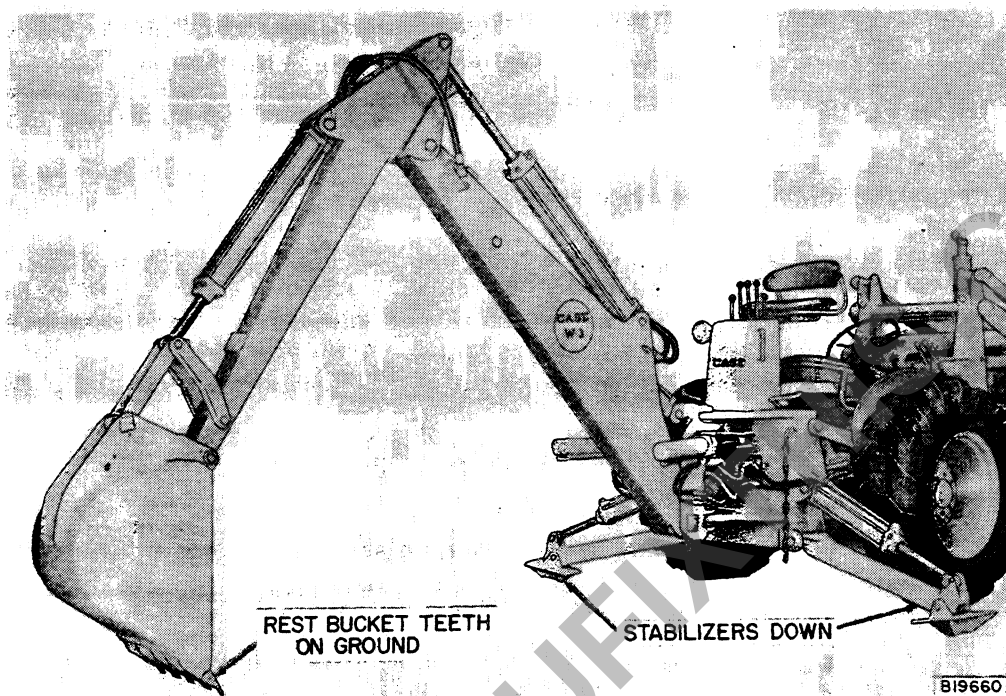


Figure 25 - Backhoe Forming a Tripod

To remove the Backhoe, proceed as follows:

1. Have the unit on a level spot, preferably on concrete or other hard surface.
2. Start the Tractor engine and use control levers to form a "tripod" with the Backhoe, as shown in Figure 25. Lower stabilizers, exerting enough "down-pressure" to take all the weight of the Backhoe from the Tractor.
3. REFERRING TO FIGURE 26: Remove bolts "A" and loosen bolts "B".

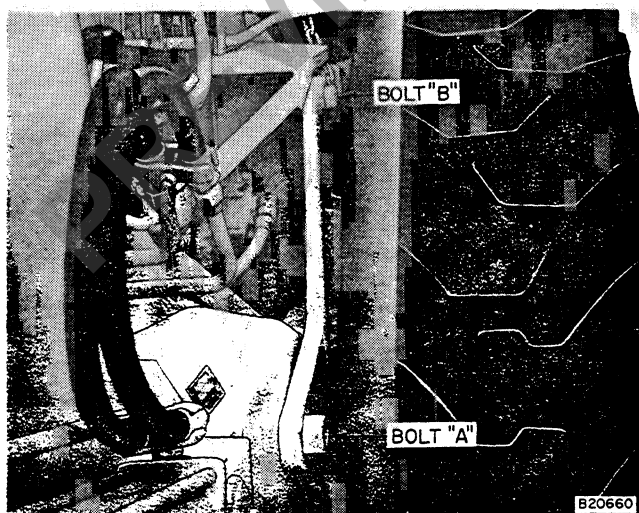


Figure 26 - Bolts to be Removed

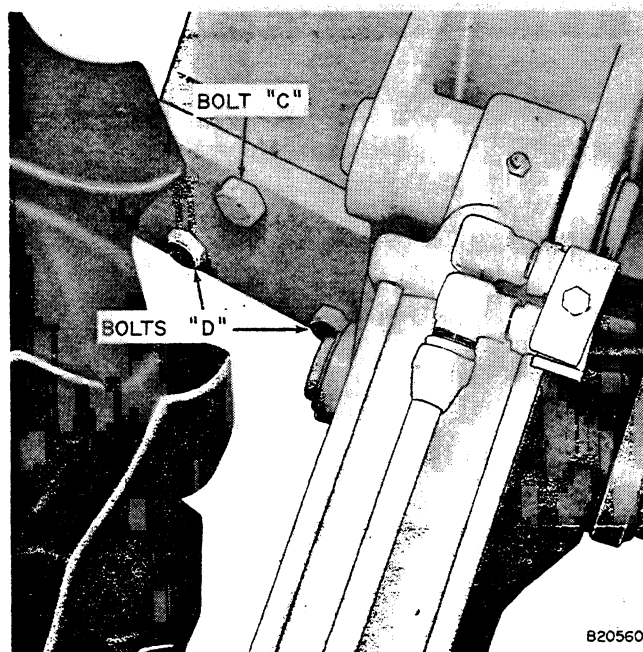
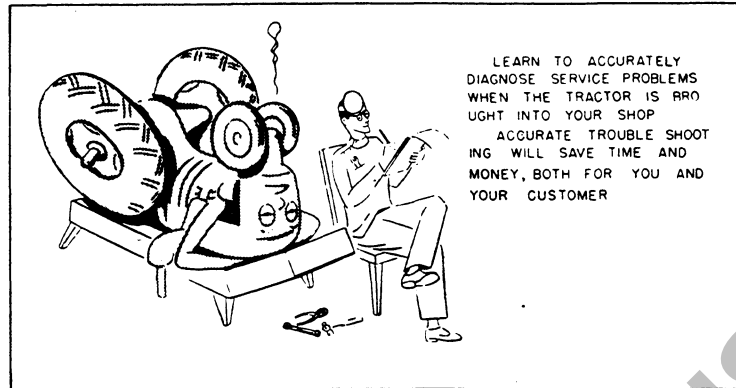


Figure 27 - Bolts to be Removed

4. REFERRING TO FIGURE 27: Remove mounting bolts "C" and "D".

GROUP B - GASOLINE ENGINE TROUBLE SHOOTING CHART



STARTING MOTOR WILL NOT TURN ENGINE OVER

PROBABLE CAUSE

1. Battery discharged.
2. Battery terminals or ground cables loose or corroded.
3. Starting motor faulty.
4. Starter drive gear jammed in flywheel.
5. Piston locked in engine cylinder.
6. Poor starting switch contact.
7. Engine cylinder full of water.

SUGGESTED REMEDY

1. Charge or replace battery.
2. Remove and clean.
3. Have motor serviced.
4. Remove starting motor.
5. Free up piston. Inspect head gasket for leaks.
6. Replace switch.
7. Check head gasket, head, and block.

ENGINE WILL NOT START (NO SPARK)

PROBABLE CAUSE

1. Ignition switch partly on.
2. Ignition switch faulty.
3. Distributor points burned, pitted, or dirty.
4. Distributor points not opening or points not closing.
5. Loose or corroded ground or battery cable connections.
6. Primary wire from coil to distributor broken, grounded or out of terminals.
7. Short-circuit in coil.
8. Short-circuit in condenser or broken condenser lead.
9. Short-circuited or burned distributor cap or rotor.
10. Spark plug, distributor cap, or wires wet (shorted).
11. Spark plug gaps incorrect.
12. Ignition timing incorrect.
13. Ignition wires installed wrong in distributor.
14. Short-circuited wire between ammeter and ignition switch or coil.

SUGGESTED REMEDY

1. Turn on fully.
2. Replace switch.
3. Clean or replace and adjust. Check ground connection and condenser.
4. Replace or clean and adjust.
5. Clean or replace and tighten.
6. Repair or replace.
7. Replace coil.
8. Replace condenser or replace lead.
9. Replace part.
10. Dry and clean thoroughly.
11. Reset gaps.
12. Set timing.
13. Install in proper terminals.
14. Repair or replace wire.

20. ELECTRICAL SYSTEM

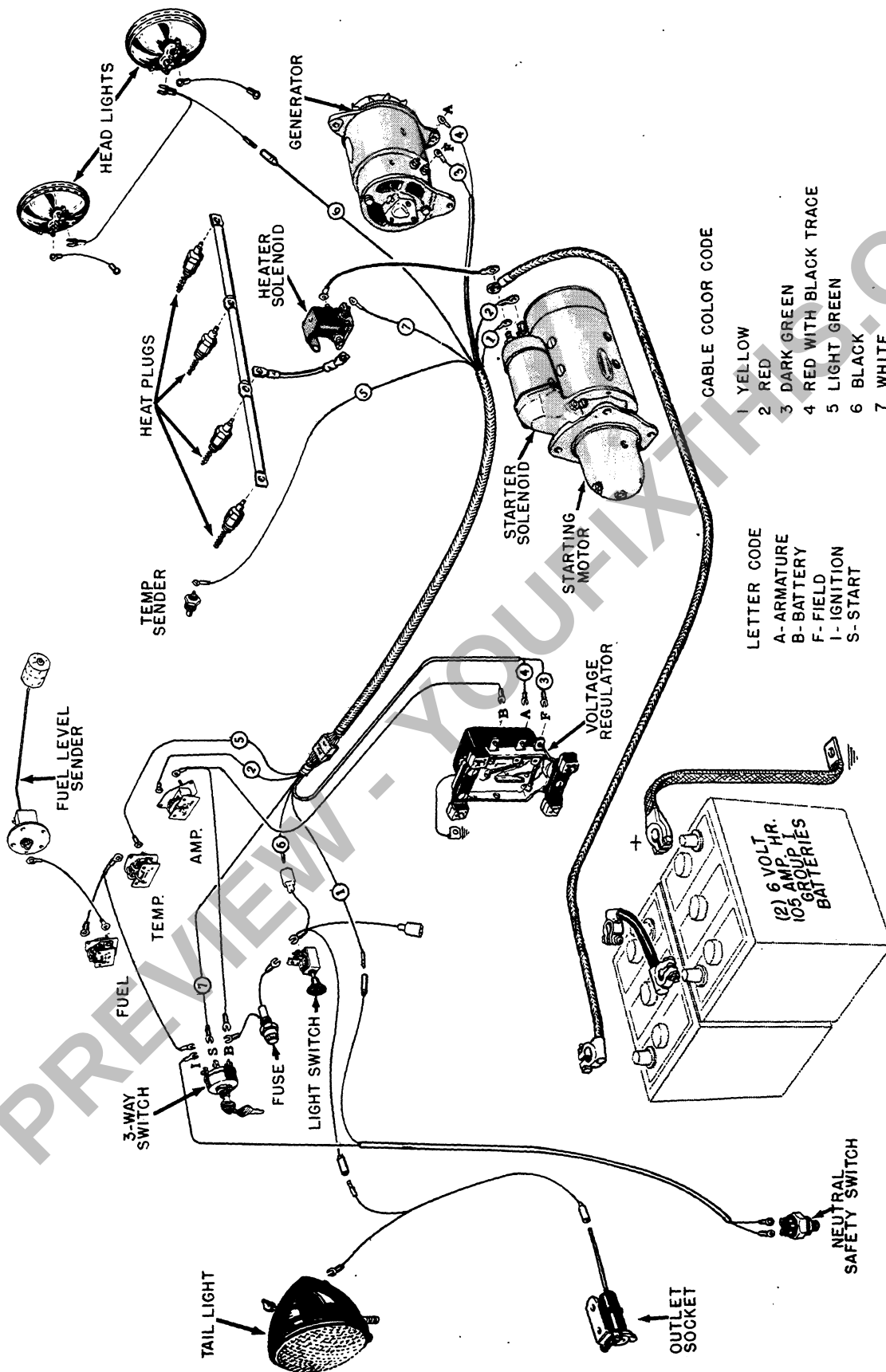


Figure 250 - Wiring Diagram

GROUP C - SCHEMATIC ILLUSTRATIONS

Use the Schematic Illustrations to trace the various hydraulic circuits. Keep in mind that Schematic Illustrations are drawn to show the flow of the various circuits and relative location of components — THEY DO NOT NECESSARILY ILLUSTRATE (PICTORIALLY) THE LOCATION OF ANY GIVEN COMPONENT.

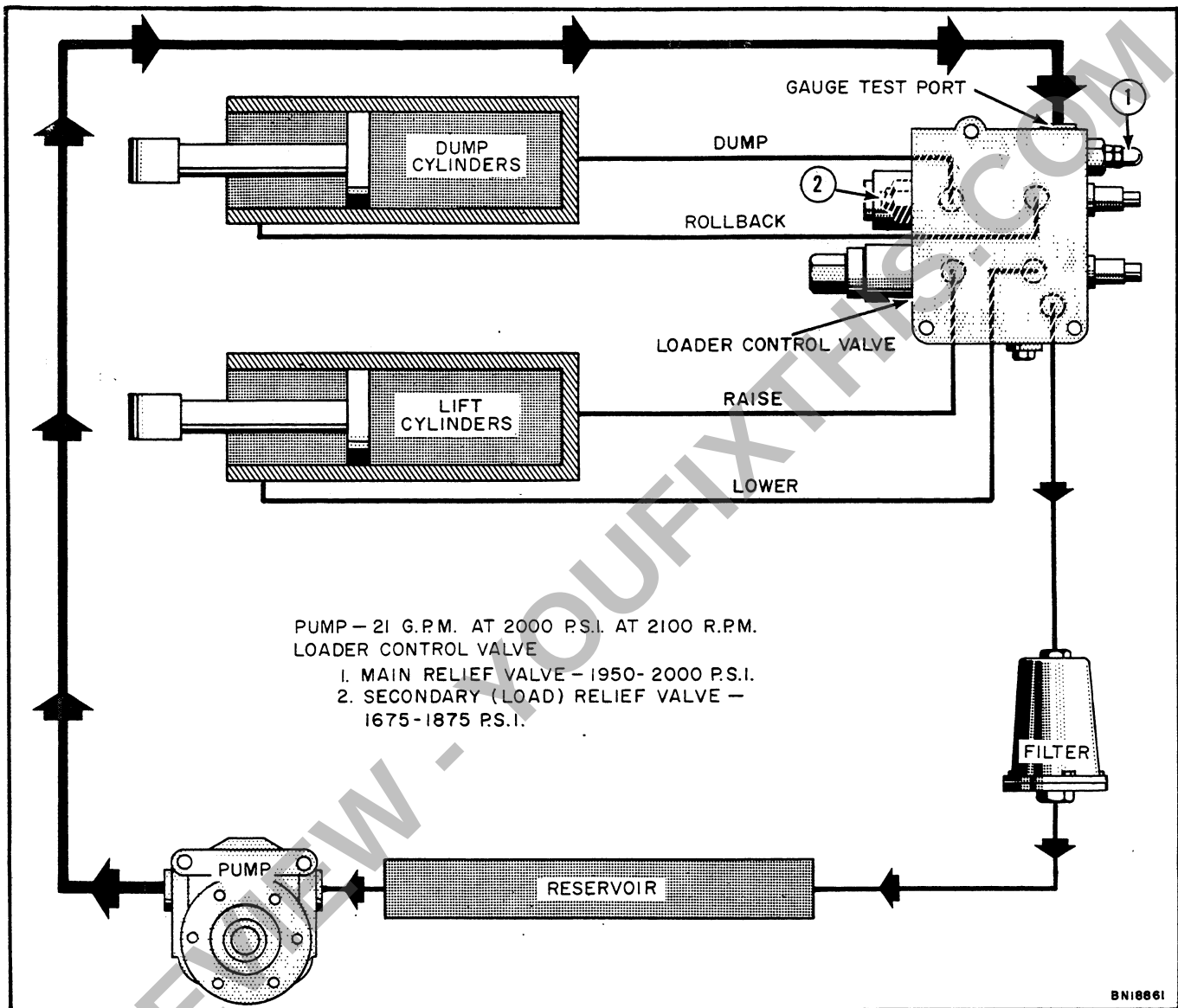


Figure 1 - Model "W3" Wheel Tractor with Loader Only

W3 WHEEL TRACTOR LOADER TABLE OF CONTENTS

SECTION	DESCRIPTION	FORM NO.
I	Splitting the Tractor	9-70451
II	Gasoline Engine	9-70451
III	Diesel Engine	9-70451
IV	Torque Converter Drive	9-70451
V	Part One - Four Speed Transmission and Rear Axle Assembly	9-70451
	Part Two - Dual Range Assembly	9-70451
	Part Three - Shuttle Assembly	9-70451
VI	Loader and Backhoe	9-70451
P	Servicing the Power Steering Pump	9-74741
R	Servicing the 2000 Series Gear Type Hydraulic Pump	9-74741
S	Servicing the Hydraulic Power Shuttle	9-74741
	Servicing the Hydraulic Cylinders on Case W5 Gasoline Terraload'rs	9-74451

SECTION I

SPLITTING TRACTOR

AND

TRACTOR SPECIFICATIONS & LUBRICATION

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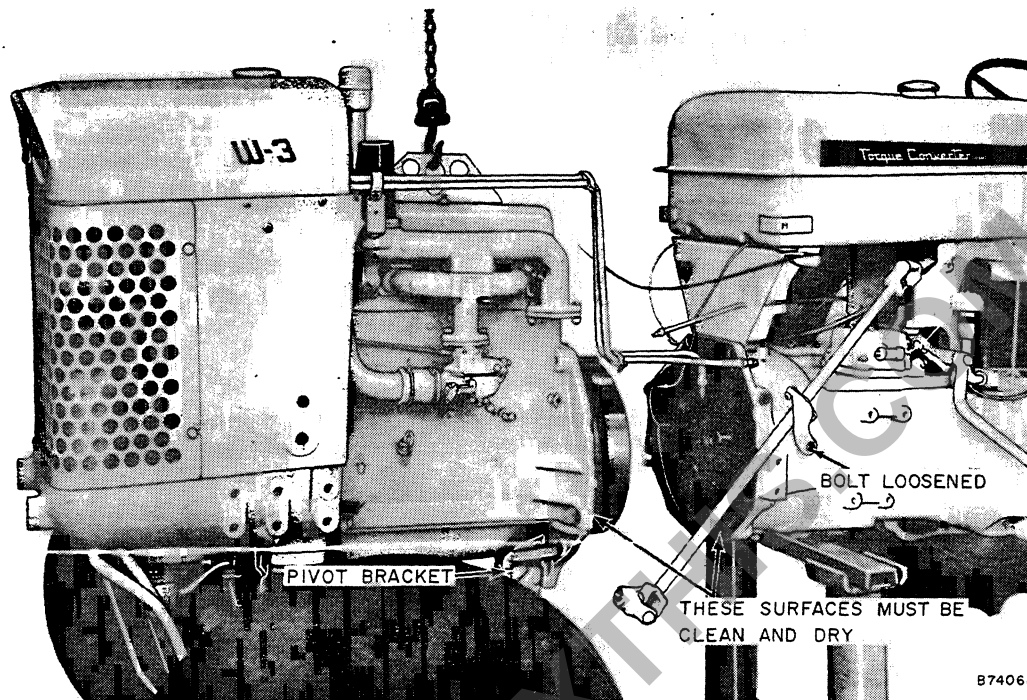


Figure 53 - Connecting Torque Tube to Engine

3. With engine block approximately one inch from torque tube, align groove in universal joint with Woodruff key in steering shaft and start universal over shaft, Figure 53.

NOTE: If shaft appears to be too far forward the steering shaft (at the wheel) probably has slipped down. Lift up on steering wheel and the shaft will move back.

4. A screwdriver or similar tool may be used to turn engine over to engage flywheel splines and torque converter.

it may be necessary to loosen the engine to get pivot bracket into place, Figure 53.

6. Tighten all nuts on studs securing engine to torque tube to 150 ft. lbs. torque in sequence shown in Figure 54.
7. With a new gasket on starter housing and contacting surfaces completely dry, install starter and tighten cap screws to 40 ft. lbs. torque, Figure 51.
8. Connect wires to starter solenoid and insert master cable through opening under front of fuel tank and connect under instrument panel. Bolt conduit in place under fuel tank, Figure 49.
9. Secure tachometer to generator, Figure 49.
10. Connect throttle control rod and governor return spring on gasoline Tractors.
11. Connect oil pressure gauge tube to engine block. On Diesel Tractors connect fuel lines and shut-off control cable to injection pump with cable under the clip on side of block, Figure 50.
12. Connect inside oil line for Torque Converter Drive to control valve, Figure 50.

NOTE: Have clamps removed from tubes when assembling control valve so tubes may be handled one at a time for easier installation. Be sure to tighten inside tube at control valve before installing outside tube. Next install outside tube and clamps.

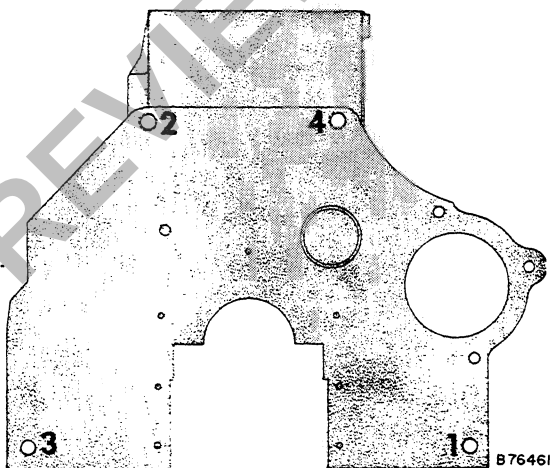


Figure 54 - Bolt Tightening Sequence

5. After assembly, install 5/8 inch nuts and lock-washers on the studs. Do not tighten until cap screws have been installed. If they are tightened

3. While pump is being serviced, reinstall the place bolts to hold front bearing cap in position.

DISASSEMBLING PUMP

1. Remove cap screws and pump cover.
2. Pull lower internal driven gear from shaft pressed in housing.
3. Remove cotter pin and extract retainer, spring, and relief valve.

SERVICING PUMP

1. Wash all parts thoroughly with cleaning fluid.
2. Examine pump body and replace with a new assembly if there are signs of excessive wear.

NOTE: The pump body, external and internal drive gear, and shaft are furnished as an assembly for repair purposes. If any one of the parts are worn or damaged, replace entire assembly, see Figure 53.

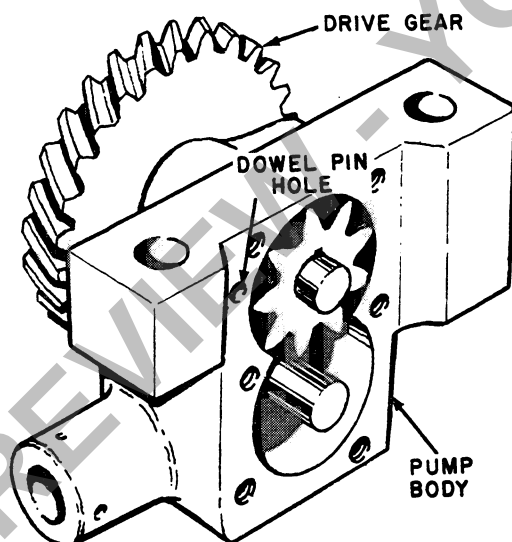


Figure 53 - Oil Pump Body and Drive Gear Assembly

3. Check relief valve spring with specifications shown in Figure 54. The relief valve is set to maintain pressure of *28 to 32 P.S.I. pressure on instrument panel oil gauge.

*NOTE: Early production tractors had 14 to 20 P.S.I. oil pressure.

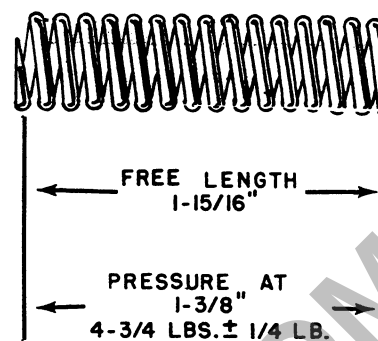


Figure 54 - Relief Valve Spring

Do not place washer under retainer cap to increase oil pressure. Replace the relief valve spring with one conforming to specifications shown in Figure 54.

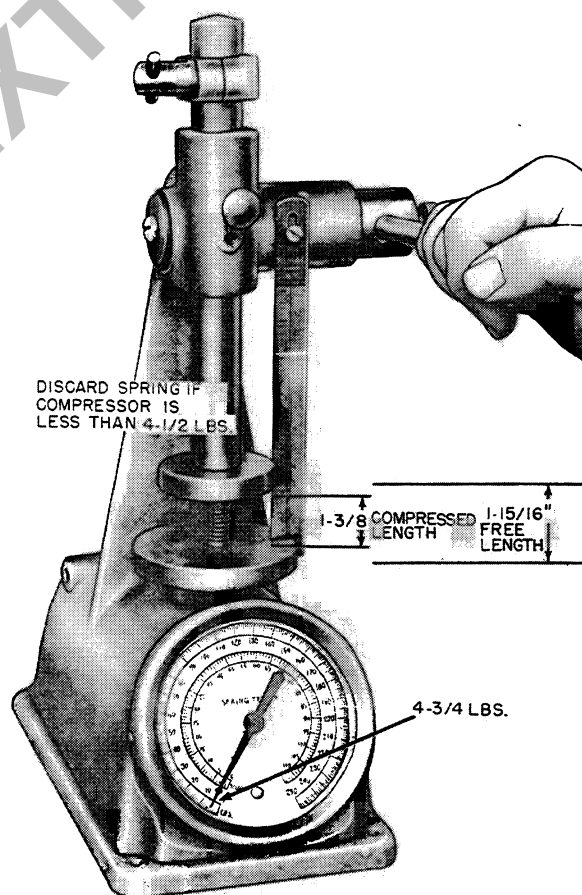


Figure 55 - Testing Spring Tension

NOTE: Proper installation of spring retainer is shown in Figure 56. Do not reverse; as sporadic oil pressure will result.

4. Install relief valve, external and internal drive gear, and pump body assembly.

(j) **Float Level.** Check position of float assembly for correct measurement to obtain proper float level using a depth gauge.

(1) With bowl cover assembly (4) in an inverted position as viewed from free end of float the float bodies must be centered and at right angles to the machined surface. The float setting is measured from the machined surface (no gasket) of cover to top side of float bodies at highest point.

(2) **Bending Float Lever.** To increase or decrease distance between float body and machined surface, use long nosed pliers and bend lever close to float body. NOTE: Replace with new float if position is off more than 1/16 inch.

(k) Insert venturi (19) in fuel bowl bore, small opening down. NOTE: The flat side of venturi must be toward the well vent jet (31).

ASSEMBLE CARBURETOR BODIES

(a) Assemble the two completed bodies and four screws and lockwashers (14) and tighten screws evenly and firmly.

(b) Hold the throttle lever in a closed position and turn the throttle stop screw (11) in until it just contacts the stop pin, then turn screw in 1-1/2 additional turns as a preliminary adjustment of the idle speed.

MARVEL – SCHEBLER CARBURETOR

The Marvel-Schebler Carburetor used on this engine is a Model TSX-799 with a S.A.E. 1-1/4 inch flange.

SERVICE COMPLAINTS

LOW POWER AND ECONOMY: When complaints are received from the field that the engine will not pull or develop its maximum horsepower or that it develops good power, but uses too much fuel. Too often a serviceman will at once change the carburetor to correct these complaints, but by so doing may not be successful in overcoming the trouble.

It must be clearly understood by all servicemen that when a new engine is designed and developed the management first decides what horsepower they want this engine to produce at a definite rated speed. The engineering department develops the new engine to pull the required

horsepower. In the design, there are certain fixed dimensions that never change. For instance, the bore and stroke, the displacement, compression ratio, diameter of valves, lift of valves, diameter of intake passage. The carburetor engineer works out the diameter of throttle bore, venturi size, and provides for means of adjusting and regulating the power fuel mixture ratio, as well as the idle.

Now in service, consider, that the compression, ignition, and timing have been checked and found to be 100% in the engine. If the air intake temperature and water temperature is held constant, then the only variable we have that affects maximum horsepower is the fuel mixture ratio.

If compression, ignition, and timing are set to factory specifications, very little difficulty will be experienced in adjusting the carburetor to give maximum horsepower and economy.

With present type construction, not very much can go wrong with the possible exception that carburetor may foul with dirt. There are only two places that are subject to wear - the throttle shaft and bushings and the float valve and seat. The wear on the throttle shaft and bushings, and resultant air leak therefrom results in a lean idle, and to compensate for the air more fuel must be turned on for idle. Wear on the float valve and seat results in a high fuel level in fuel bowl and flooding trouble.

Both faults can easily be observed, and corrected by replacing worn parts with new ones. The proper functioning of the carburetor is obtained by a series of holes drilled to exact size and location, which do not wear or change location in service. It must be remembered that if the carburetor worked correctly at first, it will always function the same, provided these passages are all free from dirt.

On a carburetor complaint from the field, the only thing a serviceman can do to the carburetor is disassemble it. BE SURE that the passages are open and free from dirt, that there is no wear on the throttle shaft and bushings, that float valve and seat are O.K., float height is correct, and a good airtight seal exists around the bowl gasket. If carburetor does not then correct the trouble, a complete check of the engine must again be made.

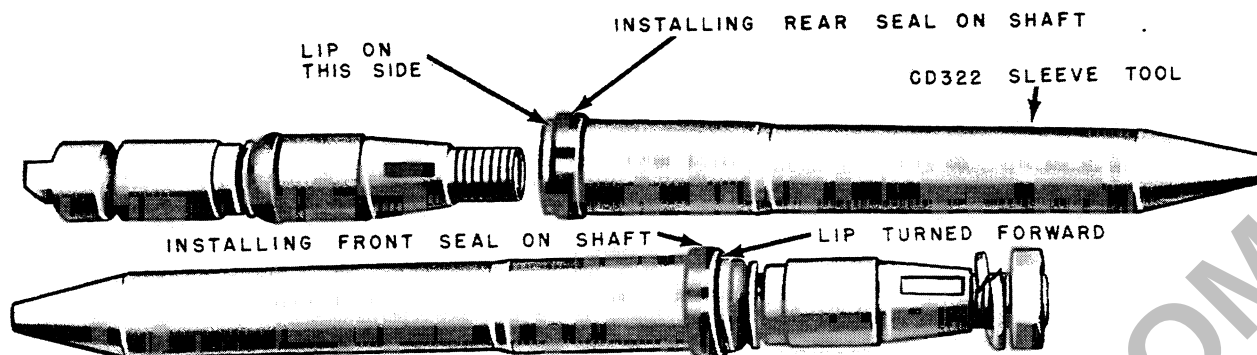


Figure 24 - Using CD322 Sleeve Tool to Install Seals on Pump Driveshaft

8. After cover is removed, pump drive gear and shaft may be pulled out the front of housing.
9. Remove jam nut from pump drive shaft and drive shaft out of gear.

To replace the seals on pump driveshaft, a special tool is provided for this purpose to prevent damage to seals during assembly.

If pump driveshaft seals leak, there is a possibility of fuel leaking into crankcase or the engine oil into the pump. The seals on the drive-shaft must be installed with lip of each seal pointing in opposite direction, see Figure 25.

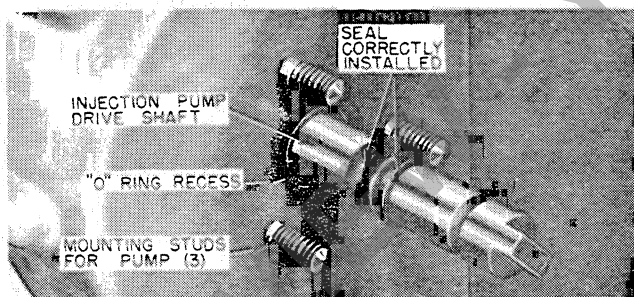


Figure 25 - Seals Correctly Installed

You will note that the special tool is considerably larger than the pump driveshaft. This is to aid in installation of the second seal.

All parts must be removed from shaft prior to installation of seals.

To install rear seal (with lip turned rearward on shaft) insert front end of shaft into sleeve, then slide seal off sleeve and into groove in shaft.

Next put sleeve over rear end of shaft and slide seal into place, see Figure 24.

INSTALLING FUEL INJECTION PUMP

1. Install pump driveshaft into pump drive gear and secure with washer and jam nut. Tighten nut to 35 to 40 ft. lbs. torque, see Figure 26.
2. Insert shaft and gear into position on engine making sure punch marks on pump drive gear and camshaft gear are in alignment with pointer on pump drive idler gear, see Figure 26.

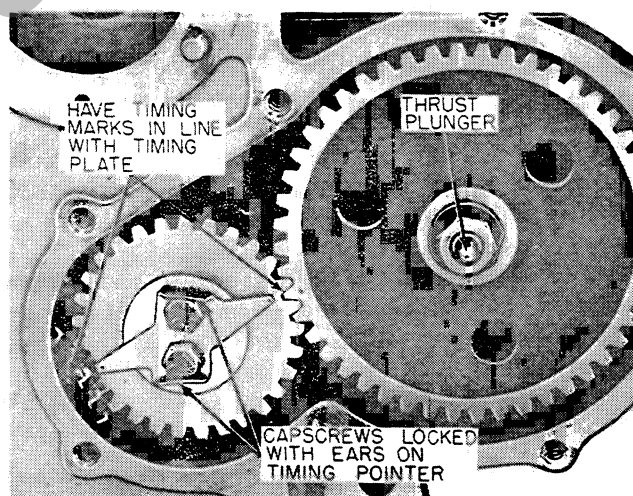


Figure 26 - Timing Marks on Camshaft Gear and Injection Pump Drive Gear Correctly Aligned

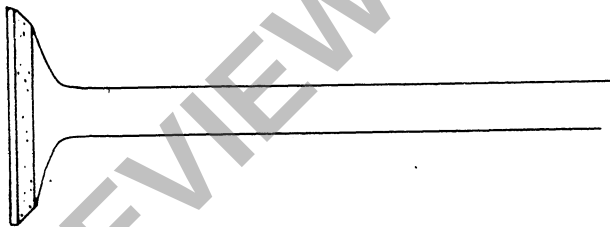
GREASE PUMP SHAFT SEAL THOROUGHLY BEFORE INSTALLING PUMP



Figure 27 - Grease on Pump Shaft Seals

Technical drawing of a valve seat. The drawing shows a cross-section of a valve seat with a horizontal seat surface. The left side of the seat is angled at 45° . The right side of the seat is angled at 0.82° . The width of the seat is dimensioned as 1.4325 TO 1.4425 . The text "INTAKE VALVE SEAT" is written below the seat.

2. Grind intake seats to a 45° angle with a finishing wheel only. Do not use a roughing wheel on intake valve seats.
3. Apply very light pressure on the grinding wheel and check the seat with dial indicator frequently.
4. Do not remove any more material than absolutely necessary from valve face or seat. Compression ratio will drop rapidly if position of head or intake valve is changed due to excessive grinding of valve face or seat.



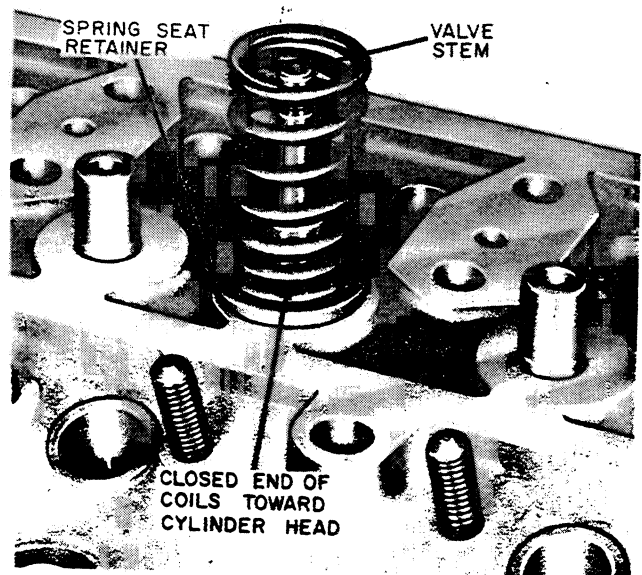
NOTE: If small amounts of very fine pitting is found on valve seat and valve face, this indicates a normal condition and is not necessary to grind valves and seats in this condition. This is caused by a normal oxidation process which can happen during run-in period.

1. Inspect springs for cracks, breakage, and correct tension. Also check ends of springs to be sure ends are flat and that the springs are squared up. If not, install new springs.

-

Free Length(approximate) 2-3/8 inches
Pressure @ 1-33/64 inches 110-118 lbs.
 @ 1-7/8 inches 53-59 lbs.

3. Install springs with closed end or dampening coils against cylinder head as shown in Figure 114.



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2. After removing the sleeve, discard the two "O" rings used on the bottom of the sleeve. Never attempt to use "O" rings the second time.
3. Clean inner surfaces of block which contact cylinder sleeves.
4. If sleeve removed is to be replaced, clean the outside surface thoroughly, especially if there are any scale deposits on the outside of the sleeve. Scale acts as an insulator and prevents heat from being properly dissipated from cylinders.
5. Check sleeve by inserting in the block without "O" rings. Turn sleeve by hand to make sure it does not bind.
6. With sleeve in place, top surface of sleeve must be .001 to .005 of an inch above surface of the block, see Figure 203. This is to insure a good seal where gasket contacts sleeve. If necessary, shift sleeve from one bore to another to obtain desired projection.

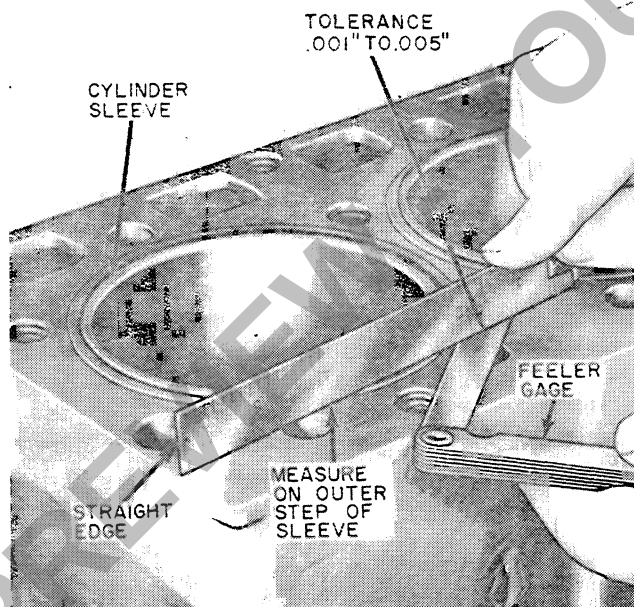


Figure 203 - Measuring the Height of Sleeve Above Engine Block

You will note that there are two projections or raised steps on top of the sleeve, which extend above the block. Use the outer surface when measuring height of sleeve above block. Inner step or projection is to aid in obtaining a better seal between sleeve and cylinder head.

7. Install new "O" ring seals in grooves on the sleeves. Seals must not be twisted during assembly as leakage may result. To prevent any twist, slip finger under "O" rings, and run finger around sleeve two or three times, allowing "O" rings to slide back into grooves without a twist, see Figure 204.

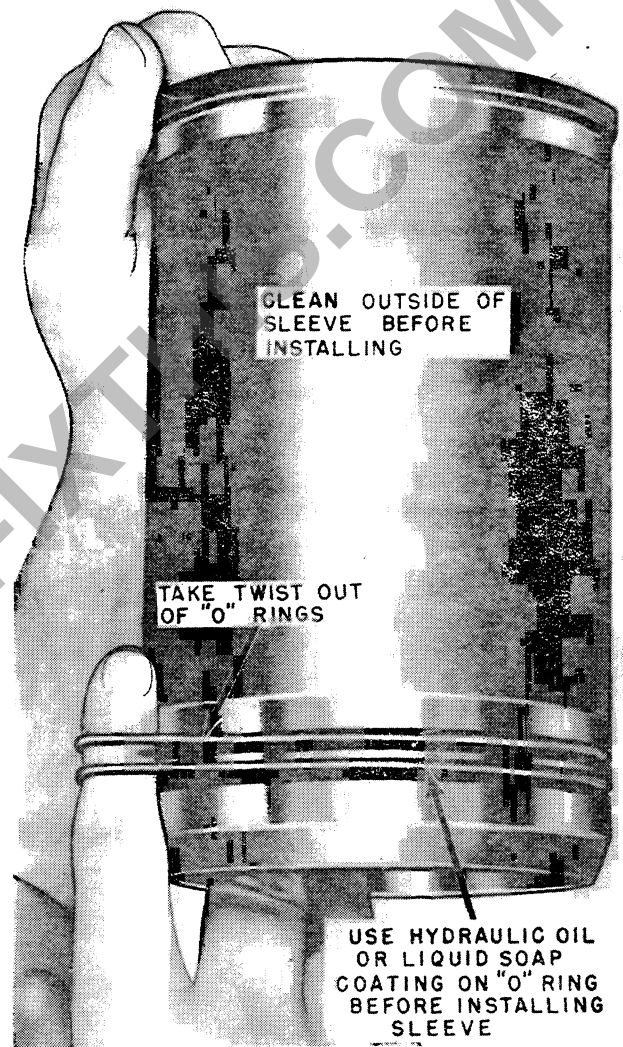


Figure 204 - Taking Twist Out of "O" Rings on Cylinder Sleeve

8. Lubricate machined surfaces of block and "O" rings on sleeve with hydraulic oil or liquid soap to prevent damage to "O" ring during assembly.
9. Insert sleeve into block and press into place with palm of hand. If more than hand pressure is necessary, "O" ring probably will be damaged.

NOTE: In handling sleeves, care must be used. A very slight blow on the side of sleeve will make it out-of-round.

EXCESSIVE FUEL CONSUMPTION — CONTINUED

PROBABLE CAUSE	SUGGESTED REMEDY
2. Operating temperature too low.	2. Operating temperature must be up to 180° to obtain complete combustion.
3. Faulty injectors. Incorrect spray pattern, incorrect opening pressure, and broken spring in injector.	3. Remove and check injector on nozzle test stand and make corrections.
4. Leaking fuel system.	4. Check and repair leaks.
5. Incorrect injection pump timing.	5. Check pump timing.
6. Injection pump delivering excess fuel.	6. Have pump serviced at authorized Roosa-Master Service Station.
7. Low compression resulting in incomplete combustion.	7. Check compression.
8. Overloading engine.	8. Reduce load.
9. Engine speed increased beyond recommended speed.	9. Set engine at correct governed speed.
10. Restricted air and exhaust system not permitting complete combustion.	10. Service air cleaner, and check for restriction in system.
11. Fuel leaking past driveshaft seal on injection pump and entering crankcase.	11. Replace both seals on pump driveshaft.

EXCESSIVE OIL CONSUMPTION

PROBABLE CAUSE	SUGGESTED REMEDY
1. Oil getting past piston rings in new or overhauled engine.	1. Allow sufficient time for rings to seat. Run-in period may require 250 hours of operation or more. See NOTE.
2. Excessive amount of oil getting to top of cylinder head from rocker arm assembly, resulting in oil being sucked down intake valve guides.	2. Check for leaks or loose connection in rocker arm assembly with engine running. Tighten or repair damaged and worn parts.
3. Poor quality lubricating oil, or oil too light for operating temperatures.	3. Replace crankcase oil with oil meeting "Case" specifications.
4. Engine overheating.	4. Refer to "Engine Overheating".
5. Breather plugged on valve cover resulting in pressure build up in crankcase, and forcing oil past seals.	5. Service breather.
6. Leaking seals, gaskets, welch plug or pipe plugs.	6. Check for external and internal leaks on rear end of block such as welch plug, pipe plug, and oil seal.
7. Rubber rings missing from groove on intake valve resulting in oil being sucked down intake valve guides.	7. Install rubber rings.
8. Worn or damaged valve guides, rings, pistons, or cylinder sleeves resulting in poor oil control.	8. Replace worn parts.
9. Excessive main or connecting rod bearing oil clearance. Excessive camshaft bushing oil clearance.	9. Inspect and replace worn parts.
10. Excessive clearance between connecting rod and crankshaft journal cheek.	10. Replace worn parts.
11. Excessive crankshaft end play.	11. Install new center main bearing.
12. Oil level too high.	12. Reduce to proper level on dipstick.
13. Oil pressure too high as a result of stuck relief valve in oil pump.	13. Repair relief valve.

NOTE: On a new (or overhauled engine where new sleeves and pistons have been installed), the engine can be expected to use several quarts of oil per 10 hour day. It usually takes 250 hours or more of field operation before the engine can be considered "run-in".

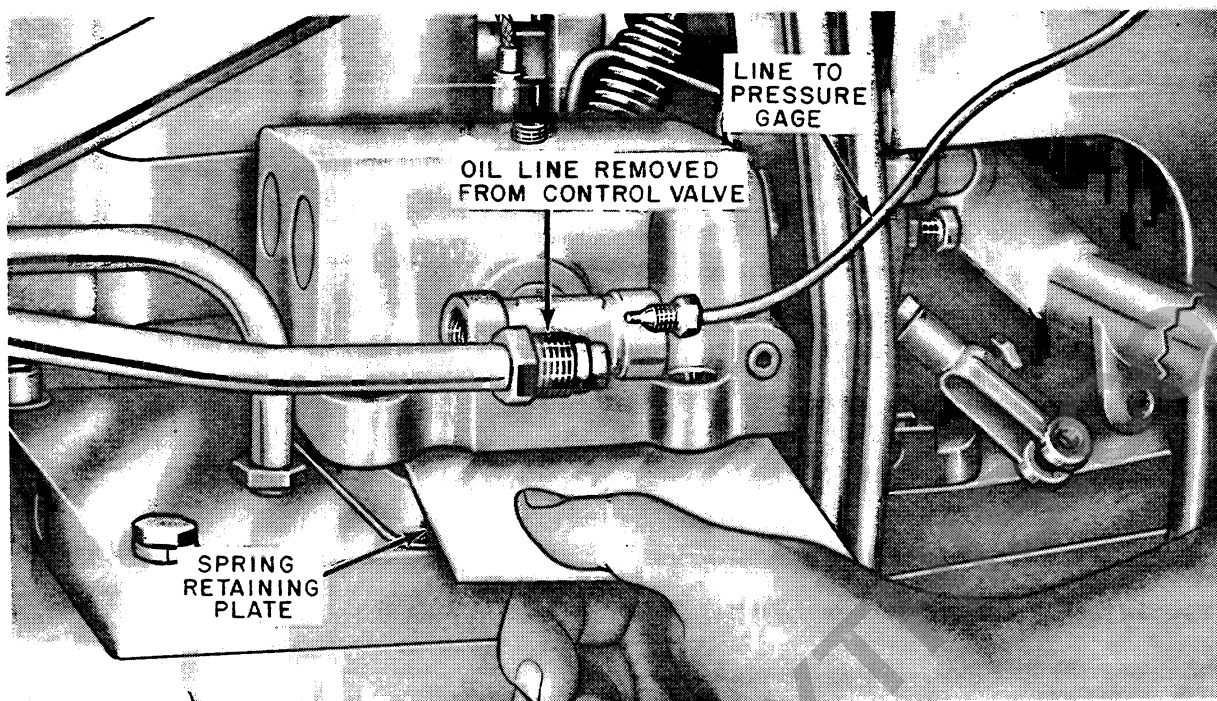


Figure 19 - Removing Clutch Pressure Valve from Tractor

7. Tap the valve with a plastic hammer to break the gasket seal AFTER FOUR CAP SCREWS MENTIONED IN STEP 6 HAVE BEEN REMOVED. No dowel pins are used here — use wedge to remove valve ONLY IF ABSOLUTELY NECESSARY. IF WEDGE IS USED, BE SURE MACHINED MATING SURFACES ARE NOT DAMAGED.
8. Raise up the outside of the valve SLIGHTLY. Slide spring retaining tool (4 x 6 inch sheet metal) under valve to prevent loss of springs and balls.
9. Lift valve from Tractor. Remove oil distribution plate and clean and inspect oil passages.

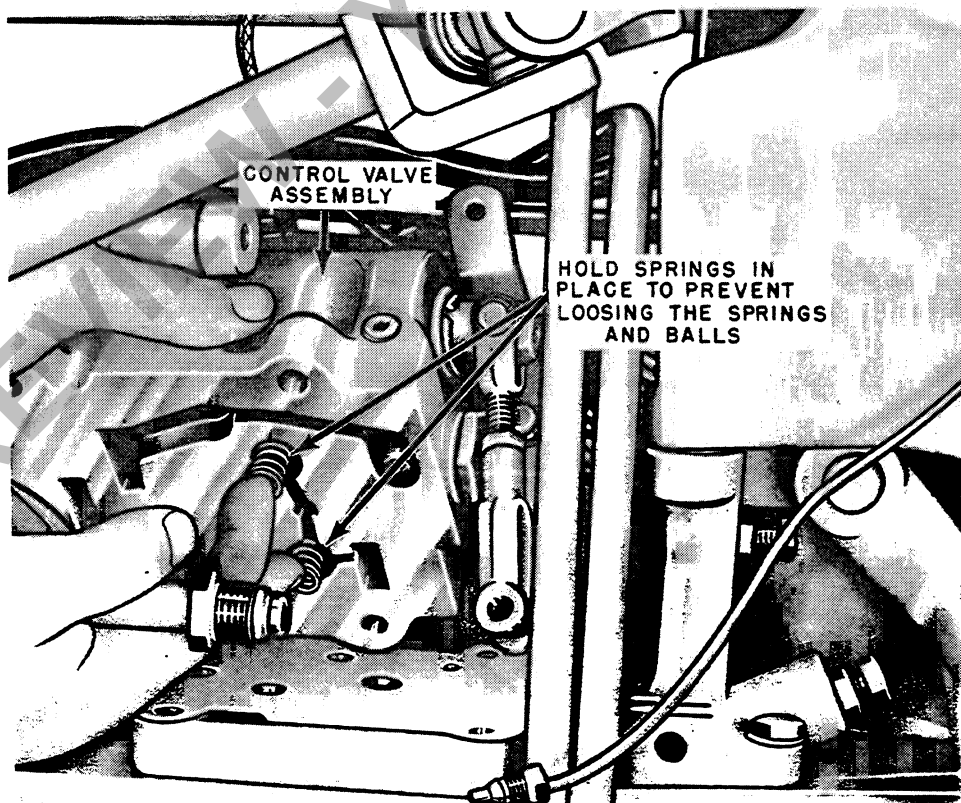


Figure 20 - Removing Clutch Pressure Control Valve from Tractor

GROUP B-TORQUE CONVERTER SCHEMATIC ILLUSTRATIONS

Use the Schematic Illustrations to trace the various Torque Converter Drive hydraulic circuits. Keep in mind that Schematic Illustrations are drawn to show the flow of various circuits and relative location of components — THEY DO NOT NECESSARILY ILLUSTRATE (PICTORIALLY) THE LOCATION OF ANY GIVEN COMPONENT.

To replace oil seal in carrier -

1. Place the carrier on a bench, Figure 54.
2. Use a G15016 plug to install oil seal in carrier, Figure 54. Check with a straight edge to make certain seal is flush with surface of carrier.

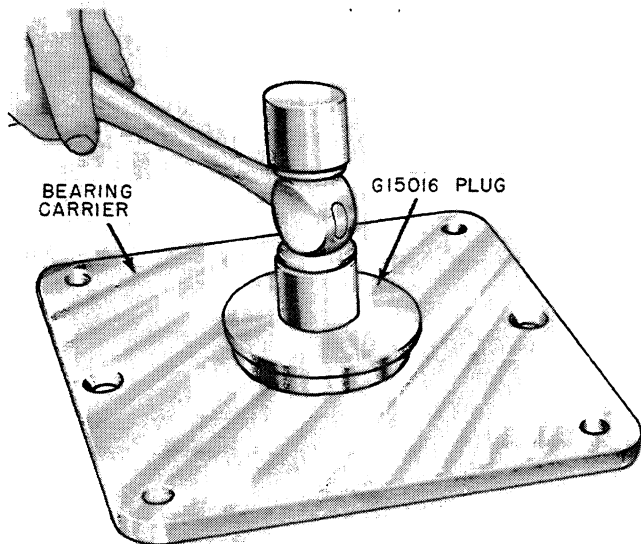


Figure 54. Installing Oil Seal

Installing Differential

1. Lay parts out behind case or on workbench to insure proper assembly. The right and left hand bearings are the same size, however, bearing carriers and side gear as-

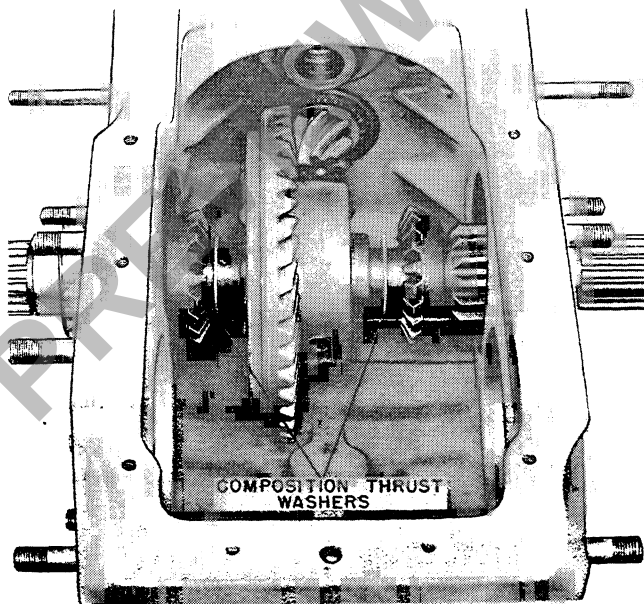


Figure 55. Installing Differential

semblies must not be interchanged because of the adjustments which have already been made for backlash and end play as outlined on Pages 20 and 21.

2. Position ring gear and shaft in case.
3. Place the composition washers (and shims, if required) on the differential shaft and install the side gears in place, Figure 55.
4. Install new "O" rings on bearing carriers, Figure 60. Dip ring in light oil and slide into groove making certain they are not damaged on edges of machined surfaces.
5. Slide shim pack over studs, Figure 56. Use the same number as were removed, unless adjustment is required. If the tractor has been used for a considerable period of time and parts have had an opportunity to wear, it is advisable to remove a .005" shim from the right hand bearing carrier to take up bearing adjustment. Leave the same number of shims on left hand carrier so that adjustment for backlash between ring gear and pinion will not be changed. See Page 20 on ring gear and pinion adjustment.

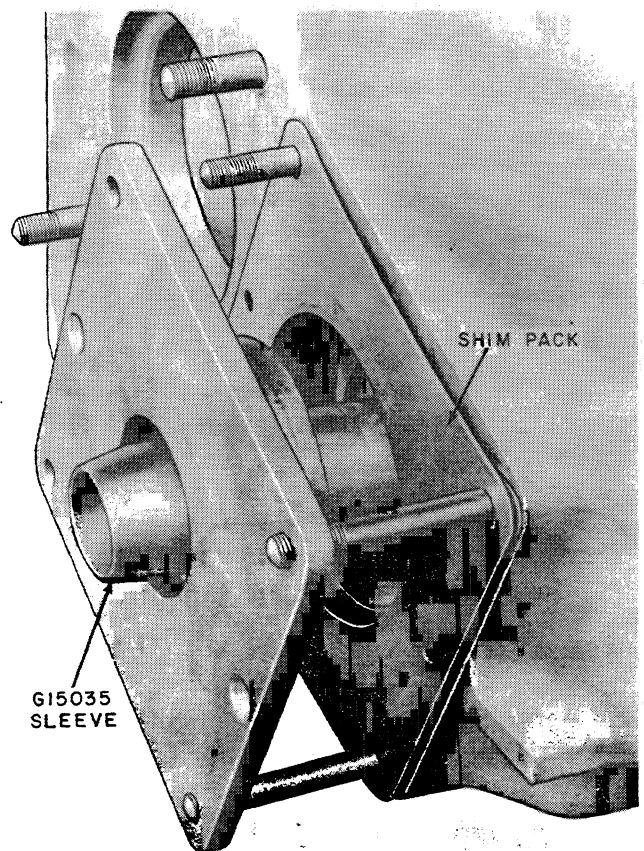
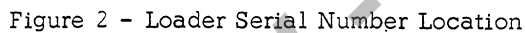


Figure 56. Installing Bearing Carrier

Hydraulic System Pump	Direct drive from engine crankshaft
Pump Capacity (Commercial)	21 G.P.M. @ 2000 P.S.I. @ 2100 R.P.M.
Reservoir Refill Capacity (With Loader)	6 U.S. Gallons
(With Loader and Backhoe)	12 U.S. Gallons
Hydraulic Oil Filter	Return line — Full flow
Control Valve	Dual control valve with independent levers for raising or tilting the bucket
Hydraulic Lines	Steel tubing and double steel wire mesh braided hose
Main Relief Valve Pressure Setting	1950-2000 P.S.I.
Hydraulic Oil Specifications	Case Hi-Lo TCH Oil

Lift Cylinders	3 x 31-1/2 Inch Stroke, 1-1/2 Inch Piston Rod
Dump Cylinders	2-1/2 x 23-7/16 Inch Stroke, 1-1/2 Inch Piston Rod

When ordering parts for the Model "W3" Loader, always specify the Loader serial number — see Figure 2 for location.



The following lubrication information is presented as a guide for the serviceman. Complete lubrication information is shown in the Model "W3" Loader-Backhoe Operator's Instruction Manual.

Before applying a grease gun to pressure fittings, wipe all accumulated dirt from each fitting tip.

Pressure Fittings . . .Lithium "Soap-Base" Grease	
Grade Recommendations (Winter)	#1
(Summer)	#2
(Tropical Areas)	#3

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3. BACKHOE LUBRICATION

The following lubrication information is presented as a guide for the serviceman. Complete lubrication information is shown in the Model "W3" Operator's Instruction Manual.

Grade Recommendations (Winter) #1
(Summer) #2
(Tropical Areas) #3

RECOMMENDED LUBRICANT

Pressure Fittings . . . Lithium "soap-base" grease

PRESSURE FITTINGS

Before applying a grease gun to pressure fittings, wipe all accumulated dirt from each fitting tip.

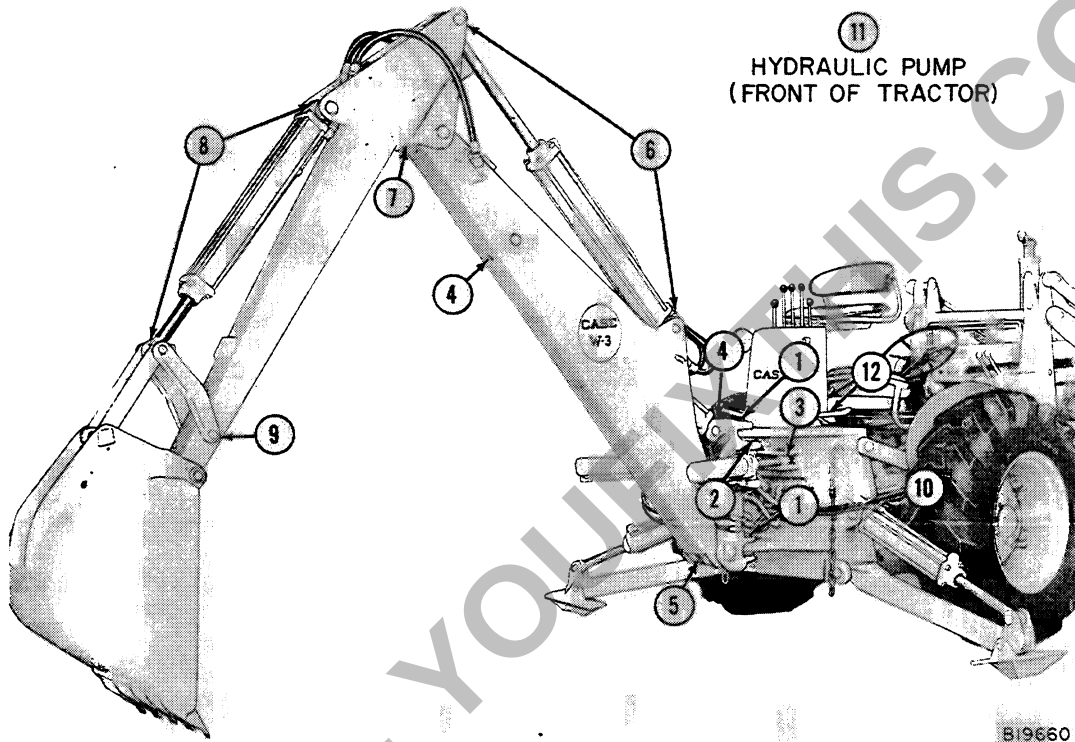


Figure 3 - Backhoe Lubrication Fittings

<u>LOCATION</u>	<u>NO. OF FITTINGS</u>	<u>TIME INTERVAL</u>
1. Tower Swing Pins	1 top, 1 bottom	10 Hours
2. Swing Cylinder Trunnions	2 each side	10 Hours
3. Swing Cylinder Yokes	1 each side	10 Hours
4. Boom Cylinder	1 top, 1 bottom	10 Hours
5. Boom Pivot Pin	1	10 Hours
6. Crowd Cylinder	1 each end	10 Hours
7. Dipper Arm Pivot Pin	1	10 Hours
8. Bucket Cylinder	1 each end	10 Hours
9. Bucket Pivot Pin	2	10 Hours
10. Stabilizer Cylinders	1 upper end	10 Hours
11. Hydraulic Pump	1	100 Hours
12. Swing Foot Pedals	3 (If used)	10 Hours

4. BACKHOE - LOADER HYDRAULIC SYSTEM

SEE PAGE XII-5 FOR INFORMATION ON HYDRAULIC SYSTEM.

REMOVING BACKHOE COMPONENTS

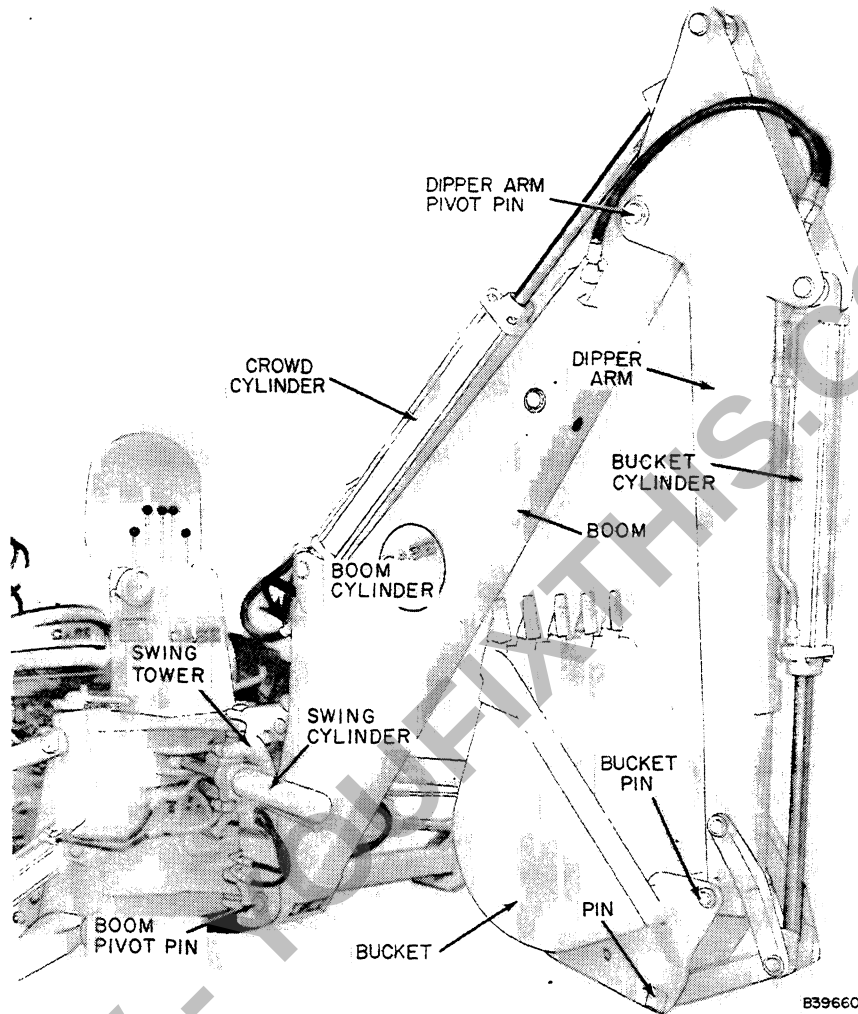


Figure 129 - Bucket, Dipper Arm, and Boom

BUCKET

Early production Backhoes utilized bucket pivot pins of the snap ring type. Later production machines used lock head pins, held in place by means of a cap screw.

Removing Bucket

To remove bucket, lower to ground level, then pull the pins as shown.

DIPPER ARM

Instructions for removal of hydraulic cylinders are covered under the heading "9. Hydraulic Cylinders".

Removing Dipper Arm

After hydraulic cylinders have been removed (if necessary) and hydraulic lines disconnected, remove bucket.

Then extend dipper arm and lower boom. Attach chain hoist to dipper arm. Remove dipper arm — boom pivot pin and lift dipper arm from Backhoe.

BOOM

After hydraulic cylinders have been removed (if necessary) and hydraulic lines disconnected, remove bucket and dipper arm.

Removing Boom

Lower boom to ground level. Attach chain hoist to boom. Remove boom—swing tower pivot pin and lift boom from Backhoe.

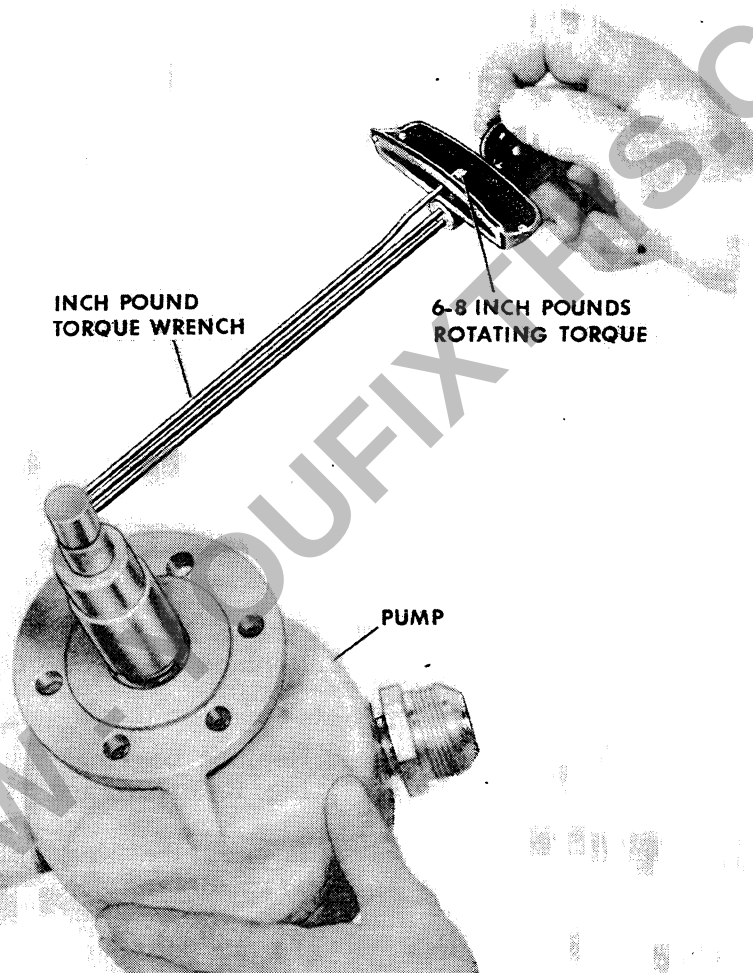
SPLITTING BACKHOE

Referring to Figure 130, attach chain hoist to swing tower as shown, then lower bucket to ground level.

CHECKING PROPER GEAR CLEARANCE

When the pump has been completely assembled, the clearance between the gears and wear plates must be checked for proper running clearance. To check the clearances proceed as follows:

Using an inch pound torque wrench on the splined end of the pump drive shaft, rotate the drive shaft with the torque wrench. A small amount of drag should be felt while turning the drive shaft. The proper rotating torque of the drive shaft should be approximately 6 - 8 inch pounds torque.



Adjustment Procedure

1. If the rotating torque is MORE than 6 - 8 inch pounds torque, disassemble the pump and ADD either .001" or .002" thick shim to bring the rotating torque to approximately 6 - 8 inch pounds.
2. If the rotating torque is LESS than 6 - 8 inch pounds torque, disassemble the pump and REMOVE either .001" or .002" thick shim to bring the torque reading to within 6 - 8 inch pounds.
3. Repeat either step 1 or 2 if necessary to obtain a torque reading of 6 - 8 inch pounds.

Installation Of The Forward Gear And Drive Shaft

1. First install the snap ring onto the forward drive shaft. Then press the shaft down through the bearing until the bearing is against the snap ring, Figure S-59.

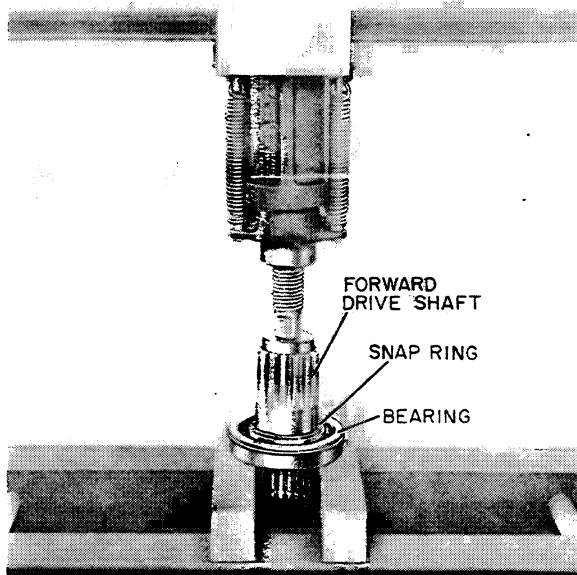


Figure S-59

2. Now press the needle bearing into the rear of the forward drive shaft using an OTC No. T-806 bushing driver, Figure S-60.

IMPORTANT Always press against the numbered side of the needle bearing.

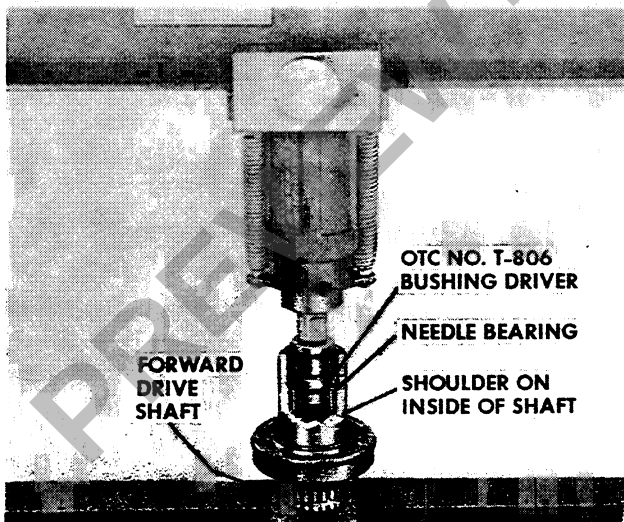


Figure S-60

NOTE: Press the bearing in carefully until it seats on the shoulder inside the shaft.

3. Install the snap ring on the outside diameter of the forward drive shaft bearing. Then manually push the drive shaft assembly into the housing (from clutch or rear side) until the snap ring on the outside diameter of the bearing is against the shoulder in the bore of the housing, Figure S-61.

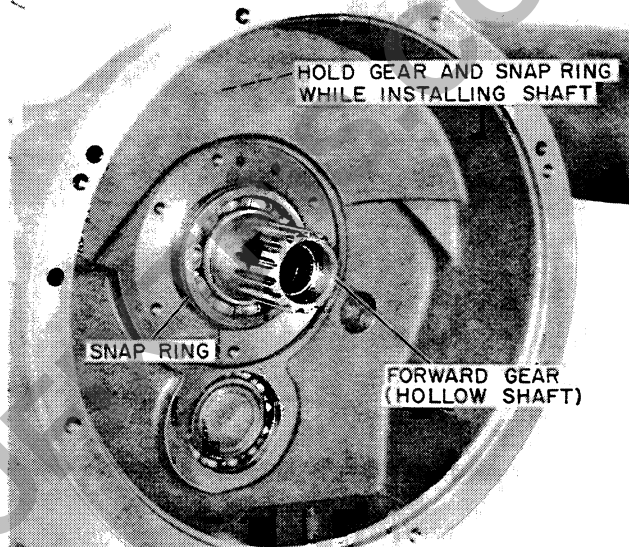


Figure S-61

4. Install the forward gear on the forward drive shaft.

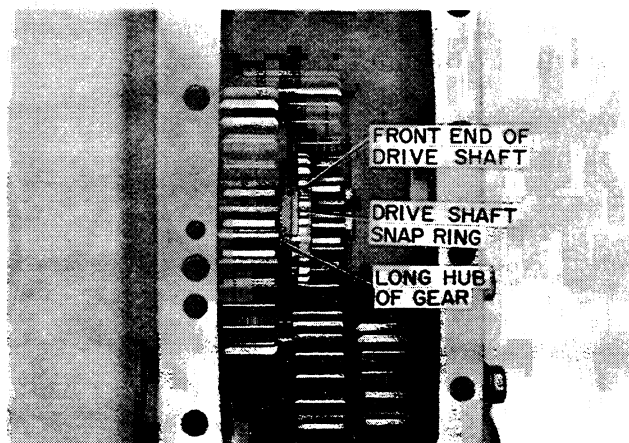


Figure S-62

NOTE: Install gear with long hub toward front end of drive shaft. Now install the snap ring on the front end of the forward drive shaft, Figure S-62.

LIFT CONTROL LEVER IN THE RETAINED FLOAT POSITION
TILT CONTROL LEVER IN THE TILT DOWN POSITION

The flow of hydraulic oil in the tilt cylinder circuit is the same as that described in Page 14.

The W-5 Terraload'r lift arms will descend at approximately the same speed when the lift control lever is in either the retained float position or in the lower position. By using the retained float position of the lift control lever to lower the lift arms, the W-5 Terraload'r operator can work the tilt control lever to tilt the bucket down to the correct angle for the next phase of a work cycle, such as excavating.

The tilt reaction of the W-5 tilt cylinder piston rods is faster than the float reaction of the lift cylinder piston rods, therefore the W-5 Terraload'r bucket will be at the correct angle for the next phase of the work cycle before the lift arms reach the required height.

The oil pump speed is directly dependant on the W-5 Terraload'r engine speed: therefore, a Terraload'r operated at the highest engine RPM, suitable to the working conditions, can shorten not only the time required between various phases of a work cycle, but the actual time required to complete each phase of a work cycle.

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