SERVICE MANUAL

Loader Backhoe

530

9-70011L

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

TYPE 1-4

SERVICE MANUAL

Loader Backhoe

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9-70011L

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TYPE 1-4

SECTION
IX

MODEL "530" CONSTRUCTION KING LOADER AND BACKHOE

TABLE OF CONTENTS

GROUP A
MODEL 530 CONSTRUCTION KING LOADER

The Model 530 Construction King Loader has been expressly designed for installation on the Model 530 Construction King Diesel and Gasoline Wheel Tractors.

1. LOADER SPECIFICATIONS

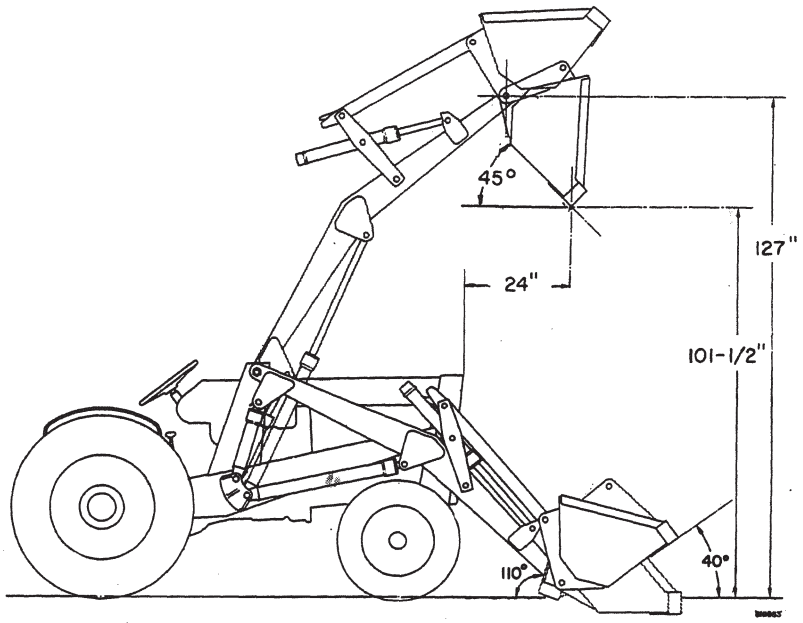

Figure 1 - Loader Specifications

DIMENSIONS

Bucket Clearance (Bucket rolled back — maximum lift)	119 Inches
Dump Clearance (Maximum lift)	101-1/2 Inches
Reach (Maximum lift)	24 Inches
Reach (7 ft. dump height — 45° dump)	39-1/2 Inches
Dump Angle (7 ft. dump height)	55°
Dump Angle (Maximum lift)	45°
Rollback (Ground level — breakout angle)	40°
Digging Depth (Below ground — bucket flat)	7-1/4 Inches
Grading Angle (Ground level)	110°
Overall Width of Tractor	67 to 79 Inches
Height (To top of Loader frame)	65-3/4 Inches
Height (To top of steering wheel)	59-1/4 Inches
Overall Length (Bucket at carry)	171-1/2 Inches
Ground Clearance	11-3/8 Inches
Lift Capacity (With counterweight — to full height)	2500 Pounds
Breakout — Maximum (at ground)	6200 Pounds
Cycle: Lift (To full height)	Approximately 5.0 seconds
Dump	Approximately 1.0 Seconds
Lower (From full height)	Approximately 5.0 Seconds
Weight (With bucket and rear counterweight — Gasoline engine)	*7090 Pounds
(With bucket and rear counterweight — Diesel engine)	*7260 Pounds
Tread, Front	54 Inches
Rear, Adjustable Rims (standard)	56 to 64 Inches
Tires, Front	7.50 x 16, 10 ply
Rear	14.9 x 24, 6 ply

*Add 150 Pounds for Torque Converter Drive.

Tire Pressure, Front	36 P.S.I.
Rear	18 P.S.I.
Front Axle	Extra Heavy Duty, 7000 lb. capacity

HYDRAULIC SYSTEM

Hydraulic System Pump	Direct drive from engine crankshaft
Pump Capacity (Dry clutch drive)	20 G.P.M. @ 1900 R.P.M.
(Torque Converter drive)	22 G.P.M. @ 2100 R.P.M.
Reservoir Refill Capacity (With Loader)	5-1/2 U.S. Gallons
(With Loader-Backhoe)	11 U.S. Gallons
Hydraulic Oil Filter	Return line, full flow type
Control Valve	Dual control valve with independent levers for raising or tilting the bucket
Hydraulic Lines	Steel tubing with brazed fittings; wire-braid high pressure hose with swaged fittings
Loader Main Relief Valve Pressure Setting	1950-2000 P.S.I.
Secondary Relief Valve Pressure Setting (Rollback)	1675-1875 P.S.I.
Secondary Relief Valve Pressure Setting (Dump)	2400-2600 P.S.I.
Hydraulic Oil Recommendation	Case Hi-Lo TCH Oil

HYDRAULIC CYLINDERS

Type	Double-acting with hardened and chrome plated piston rods
Lift Cylinders	3 x 31-1/2 Inch Stroke, 1-1/2 Inch Piston Rod
Dump Cylinders	2-1/2 x 20 Inch Stroke, 1-1/2 Inch Piston Rod
Hydra-Leveling Cylinder	3 x 9-15/16 Inch Stroke, 1-3/4 Inch Piston Rod

2. LOADER SERIAL NUMBER LOCATION

When ordering parts for the 530 Construction King Loader, always specify the Loader serial number. See Figure 2 for the location of this number.

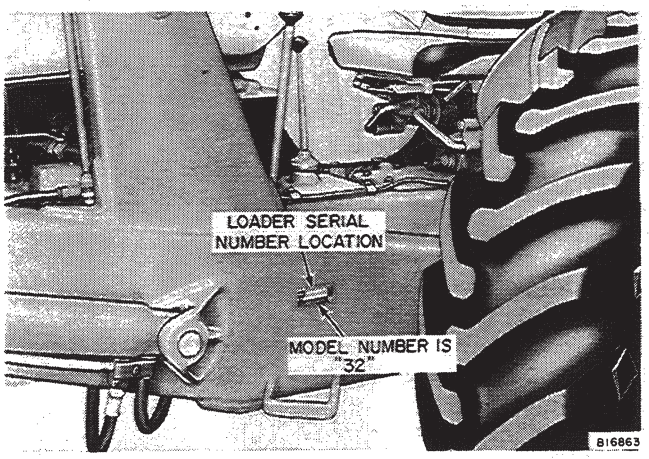

Figure 2 - Loader Serial Number Location

3. LOADER LUBRICATION

The following lubrication information is presented as a guide for the serviceman. Complete lubrication information is shown in the "Model 530 Construction King Loader and Backhoe Operator's Instruction Manual."

RECOMMENDED LUBRICANT

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

PRESSURE FITTINGS

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

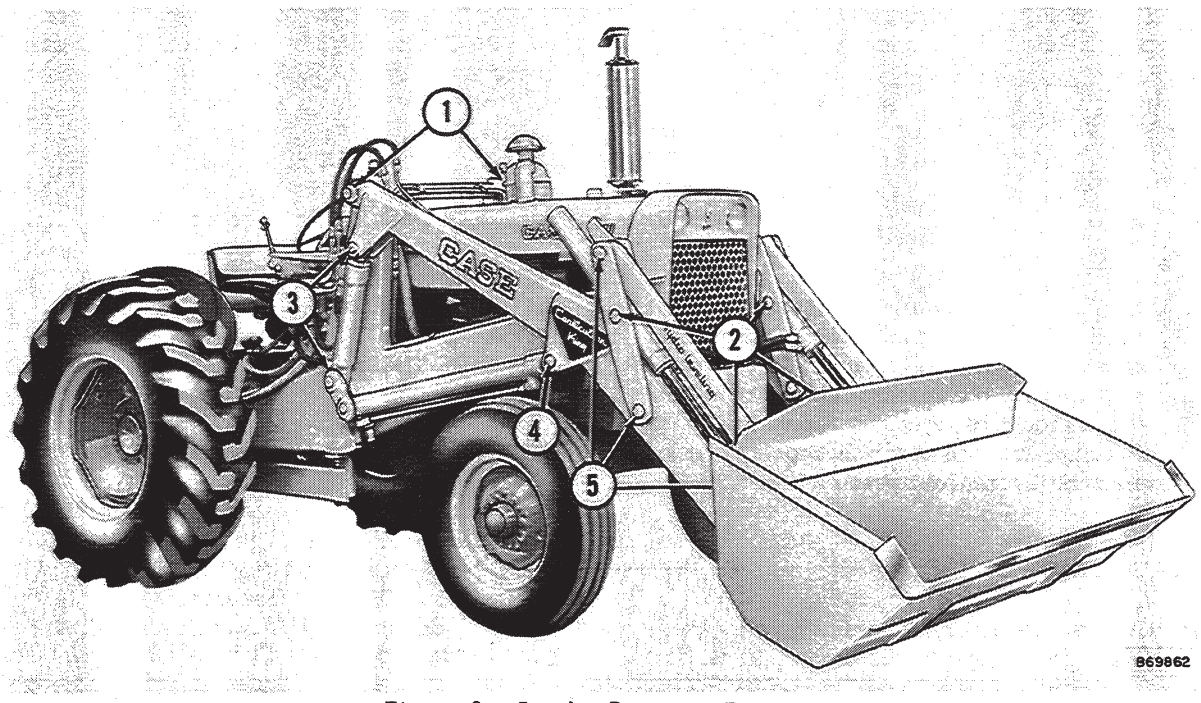

Figure 3 - Loader Pressure Fittings

LOCATION	NO. OF FITTINGS	TIME INTERVAL
1. Cross Shaft	1 on each side	10 Hours
2. Dump Cylinder Pins	1 front, 2 trunnion each side	10 Hours
3. Hydra-Leveling Cylinder	1 each end	10 Hours
4. Lift Cylinder	1 front, 1 rear each side	10 Hours
5. Dump Linkage	3 on each side	10 Hours

4. LOADER-BACKHOE HYDRAULIC SYSTEM

RESERVOIRS

On the Model 530 Construction King Loader or Backhoe, the Loader subframes serve as reservoirs for the hydraulic oil.

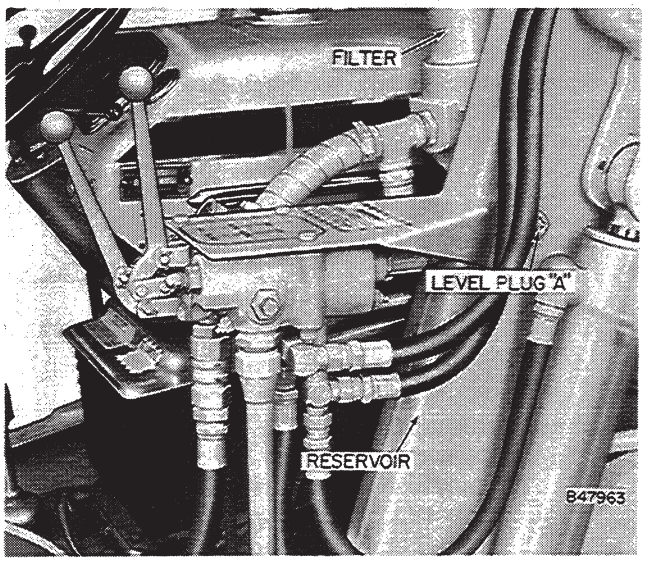

Figure 4 - Hydraulic Reservoir (Loader Only)

CHECKING HYDRAULIC OIL LEVEL

To check the hydraulic oil level, proceed as follows:

If the Tractor is equipped with a Loader only, the right hand reservoir contains hydraulic oil, see Figure 4. If Tractor is equipped with both a Loader and Backhoe, both the right hand and left hand reservoirs contain hydraulic oil, see Figure 5.

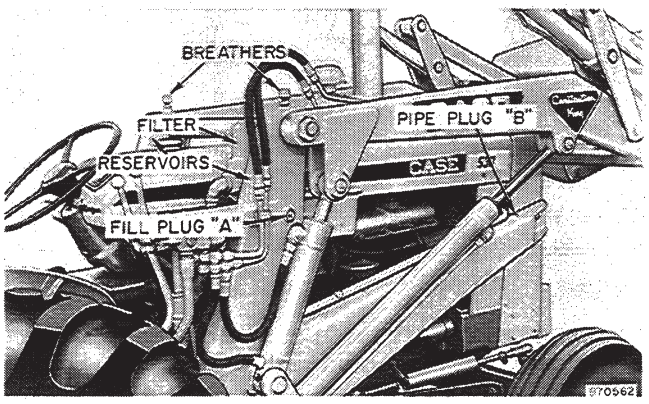

Figure 5 - Hydraulic Reservoir (Loader and Backhoe)

In order to obtain an accurate measurement of the reservoir oil level, it is necessary to:

a. Have the Tractor standing on a level spot;
b. Run the hydraulic system until the oil has had an opportunity to warm up; and
c. Have the Backhoe (if used) in transport position, the loader lift cylinders retracted, and the bucket floor in a level position.

Remove the fill plug from the top of the right hand reservoir, see Figure 4. The hydraulic oil should be even with the opening. If the oil level is too high, it could overflow the reservoir through the breather. If the oil level is too low, there is a possibility of starving the pump, causing foaming, overheating, and damage to the hydraulic system.

DRAINING HYDRAULIC OIL

After the first 100 hours operation, and every 1000 hours thereafter, drain the hydraulic oil and replace it with clean, new Case Hi-Lo TCH Oil.

To drain the reservoir(s), proceed as follows:

1. Drive the Tractor onto a level spot, retract the loader lift cylinders, level the bucket floor, and place the Backhoe (if used) in transport position.

2. Remove the fill plug from the right hand reservoir.

3. ON, LOADER ONLY MODELS — Remove the pipe plug from the elbow at the bottom of the right hand reservoir and allow the oil to drain into a suitable container, see Figure 6.

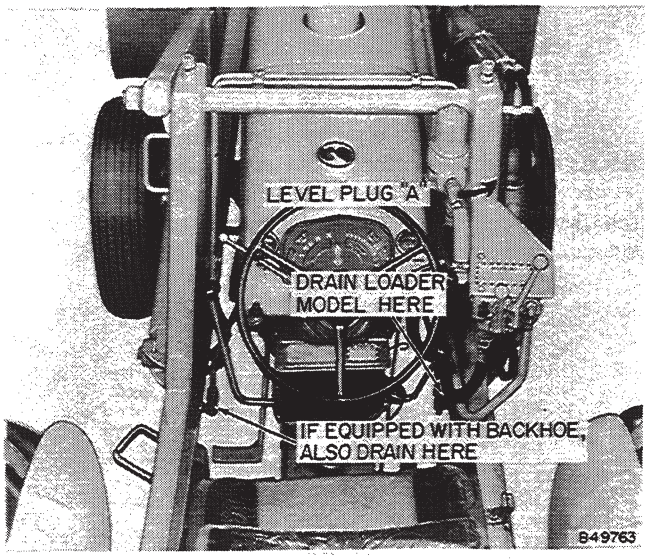

Figure 6 - Reservoir Drain(s)

ON LOADER-BACKHOE MODELS — Remove the plugs from the elbows at the bottom of both the right hand and left hand reservoirs and allow the oil to drain into a suitable container, see Figure 6.

The Loader hydraulic system holds approximately 9 U.S. Gallons of oil and the Backhoe system holds approximately 11 U.S. gallons of oil — a total of 20 gallons. However, only approximately 5-1/2 U.S. gallons will drain from each reservoir as the lines, valves, cylinders, and pump all hold oil. It is not necessary to drain the oil from these components unless it has been contaminated.

IMPORTANT: DO NOT RUN THE TRACTOR ENGINE WITH THE OIL DRAINED FROM THE RESERVOIR. THIS COULD DAMAGE THE HYDRAULIC PUMP IN A FEW SECONDS TIME.

FILLING HYDRAULIC OIL RESERVOIRS

Remove fill plug "A" and pipe plug "B" from the right hand reservoir, see Figure 5. (On Loader-Backhoe Models remove pipe plug "B" from both reservoirs.) Fill the reservoir using Case Hi-Lo TCH Oil or an approved substitute until the oil begins to run from pipe plug hole "B". Then, replace pipe plug "B" and continue filling until the oil is up to the level plug opening. Replace fill plug "A".

Start the Tractor engine, and put each hydraulic control through several operational cycles to make sure all air is out of the system. After this has been done, check the oil level as described on page IX-3 and add oil if necessary.

HYDRAULIC OIL RECOMMENDATIONS

With high precision and complex hydraulic pumps and systems, the choice of a superior type hydraulic oil is the key to long life and low maintenance. In cooperation with one of the leading refineries, the Case Hi-Lo TCH Oil has been developed as a scientific answer to the protection of these finely machined components.

This non-foaming oil is for all season use — remains stable from -55° F. to +230° F. Central Parts Division in Racine has this oil in stock. It is recommended as the best oil available for use in the Model 530 Construction King Loader-Backhoe hydraulic system.

Reservoir Capacity (Loader Only) . . . . . 5-1/2 U.S. Gallons
(Loader-Backhoe). . . . . 11 U.S. Gallons

Alternate Oil Recommendations. . . . Heavy-Duty Motor Oil meeting American Petroleum Institute (A.P.I.) service designation, MS-DG. Only a good grade oil, with non-foaming characteristics should be used.

Viscosity Recommendations (Above +32° F.) . . . . . SAE 10-W
(Below +32° F.) . . . . . *SAE 5-W

*If SAE 5-W is not obtainable locally, Automatic Transmission Fluid, type "A", may be used.

CHEAP GRADES OF OIL ARE NOT SUITABLE FOR USE IN HYDRAULIC SYSTEMS.

OIL VISCOSITY

If Case Hi-Lo TCH Oil for all season use is not used, be sure to follow the viscosity recommendations for the alternate oil — MS-DG service designation motor oil.

Too high an oil viscosity may cause the system to be slow, because the pump will not be able to draw in the required amount of oil. Vacuum bubbles will form, resulting in accelerated wear on pump gears, plates, etc.

Too low an oil viscosity may also cause the system to be slow, because of thin oil escaping through the normal operating clearances of the pump. The thin oil will not lubricate the system properly, and the pump will wear excessively.

Both of the above conditions may cause the system to overheat, with resultant damage to pump, valves, seals, etc.

COLD WEATHER OPERATION

During cold weather, the Tractor engine should be allowed to operate for approximately fifteen minutes, to allow the hydraulic oil to "warm up" before checking the level or operating the system.

FOREIGN MATERIAL IN SYSTEM

If foreign material enters the system, the entire system must be disassembled and the component parts cleaned. Flushing reservoirs alone will not remove all foreign matter and the remaining material will ruin system components.

INFERIOR GRADE OF OIL

If an inferior grade of oil must be added during an EMERGENCY, the entire system (reservoirs and components) must be drained immediately, and refilled with Case Hi-Lo TCH Oil.

CLEANLINESS

DIRT IS THE ENEMY OF ANY HYDRAULIC SYSTEM. THE BEST WAY TO FIGHT THIS ENEMY IS TO PREVENT ITS ENTRY INTO THE SYSTEM.

WHEN ADDING OIL TO THE SYSTEM, BE SURE OIL, FUNNELS, AND CONTAINERS ARE CLEAN.

RESERVOIR BREATHER

The breather, located on top of the reservoir(s) contains an "edge wound" cartridge element, see Figures 5 and 7. So air may enter or escape the reservoir rapidly as the cylinders are extended or retracted, clean the element in solvent after every 50 hours operation.

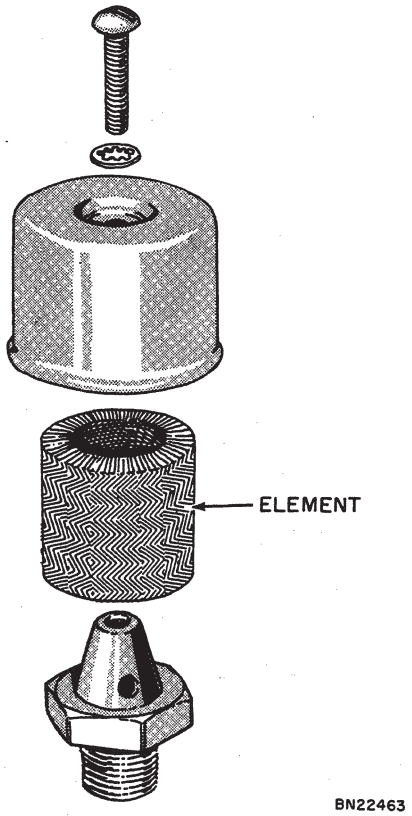

Figure 7 - Reservoir Breather

HYDRAULIC SYSTEM FILTER

A few units were equipped with the filter marked "A" in Figure 8. This filter did not have a by-pass relief in the head and used a metal shrouded paper element.

With cold oil, this element presented some problems. Consequently, the units in the field were converted to a metal type element which is reusable, see "B" in Figure 8.

Subsequent production uses the same metal shrouded paper element as original production in conjunction with a by-pass relief in the filter head see "C" in Figure 8. .

CAUTION: DO NOT INSTALL A METAL SHROUDED PAPER ELEMENT IN FILTER HEAD REQUIRING A REUSABLE METAL ELEMENT. METAL SHROUDED PAPER ELEMENTS CAN BE USED ONLY IN FILTER HEADS CONTAINING A BY-PASS RELIEF.

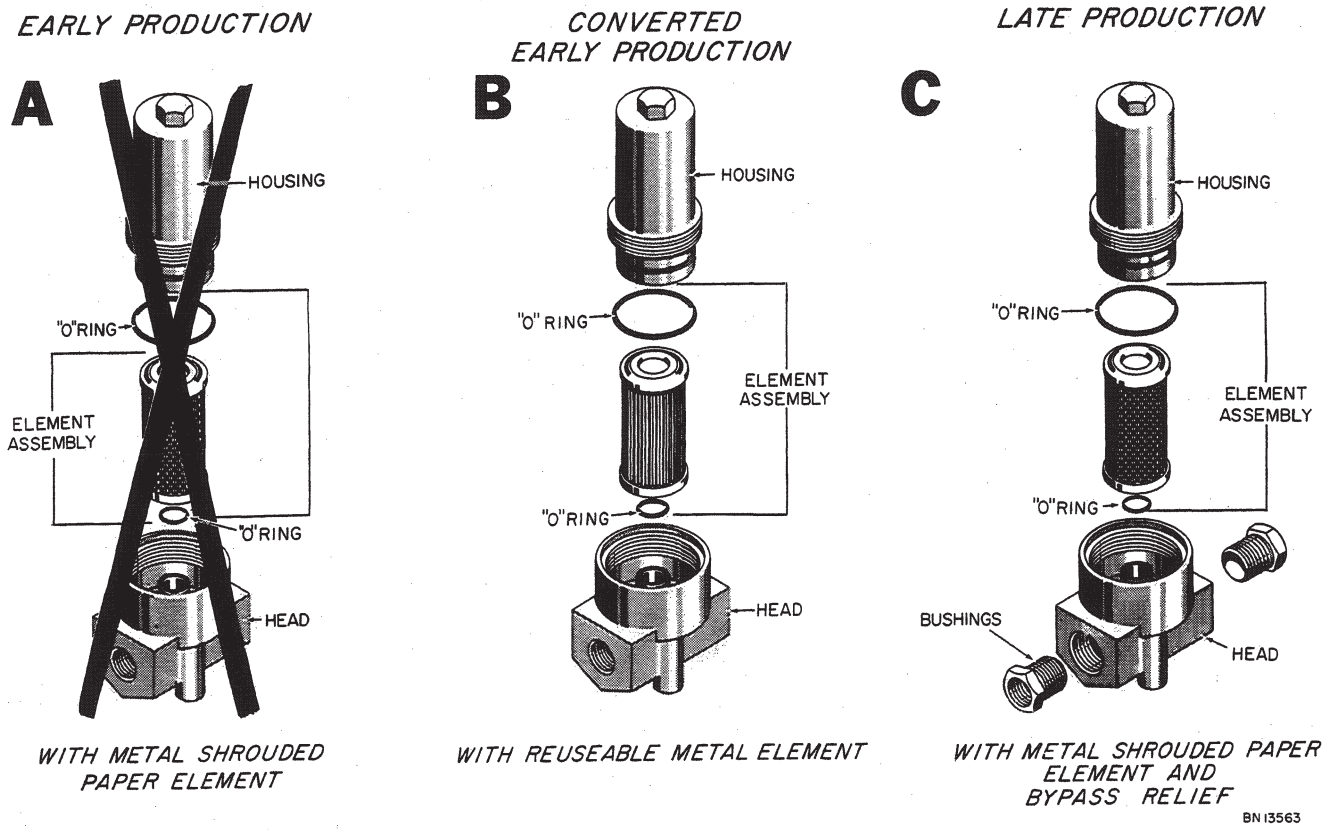

Figure 8 - Hydraulic System Filters

FILTER CONDITION INDICATOR GAUGE

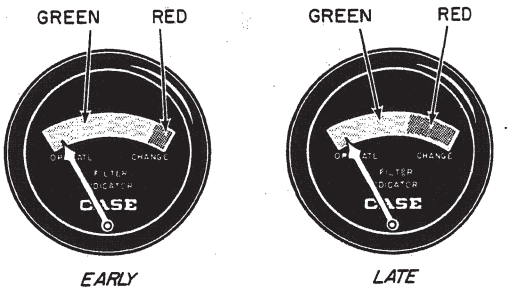

Figure 9 - Filter Condition Indicator Gauge

This gauge indicates return line pressure. As the filter element removes particles from the hydraulic oil, it tends to plug, causing more restriction in the return line. As the pressure increases, the indicator gauge will show higher reading.

The gauge is calibrated in two colors — green and red. On some units the green zone covers most of the scale leaving only 1/4 inch in the red zone. When needle is in the red zone (45 P.S.I.), the filter should be serviced.

Later units are equipped with a gauge which has the green scale covering one half of the scale; red covering the other half. When the indicator needle starts in the red zone (45 P.S.I.), the filter should be serviced.

When reading the gauge, the oil must be at operating temperature and engine operating at 1800 R.P.M. with hydraulic control levers in neutral position. Disregard reading when oil is cold or engine is operating at low R.P.M.

After the first 20 hours operation and each 200 hours operation thereafter, service the hydraulic filter regardless of condition indicated by the indicator gauge.

5. HYDRAULIC PUMP

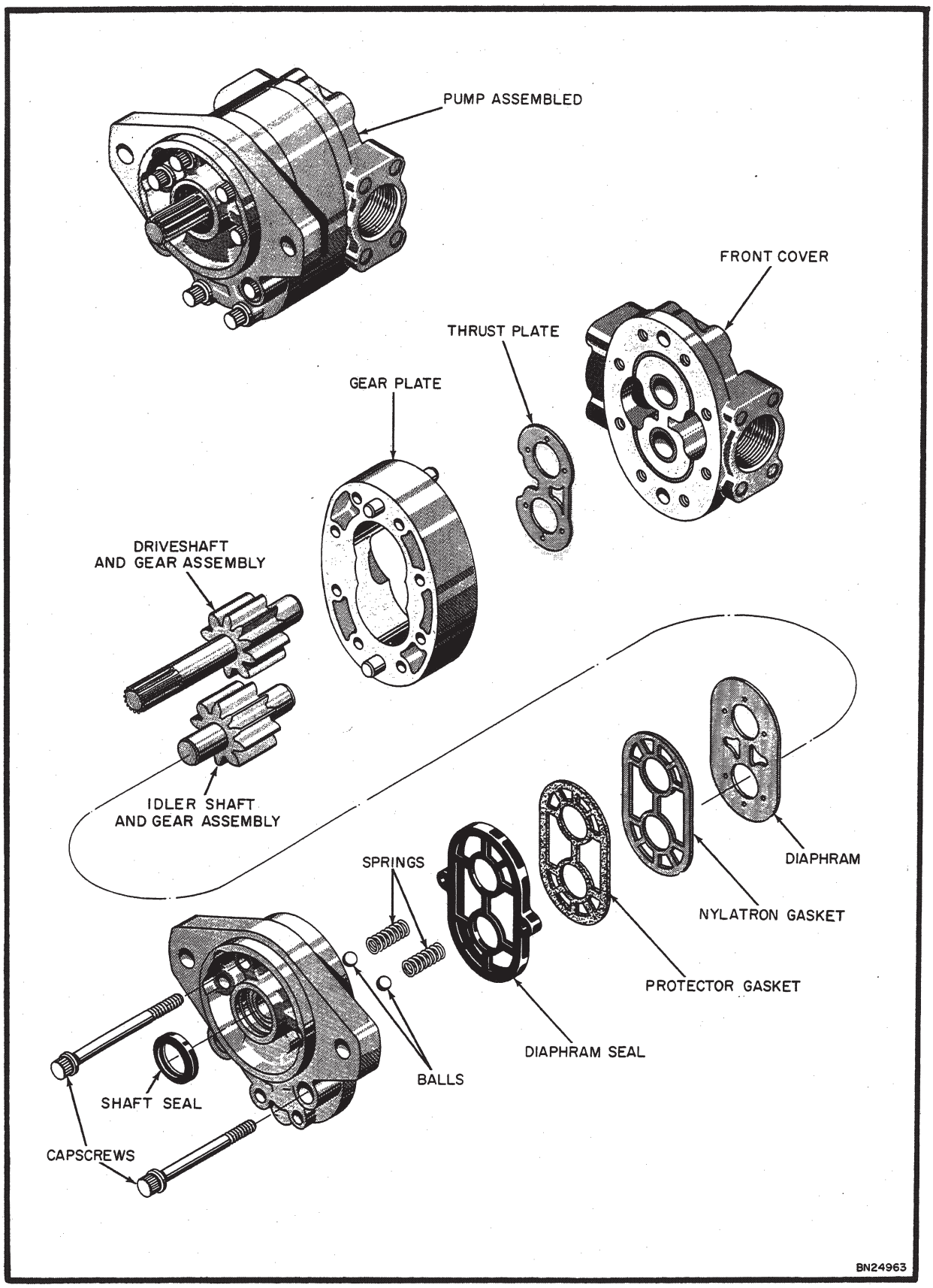

Figure 10 - Exploded View of Cessna Pump

The Loader-Backhoe hydraulic pump is attached to the front of the Tractor and is connected to the Tractor engine by means of a splined shaft and coupling.

REMOVING PUMP

Drain hydraulic oil from reservoir(s) as instructed under heading "Draining Hydraulic Oil."

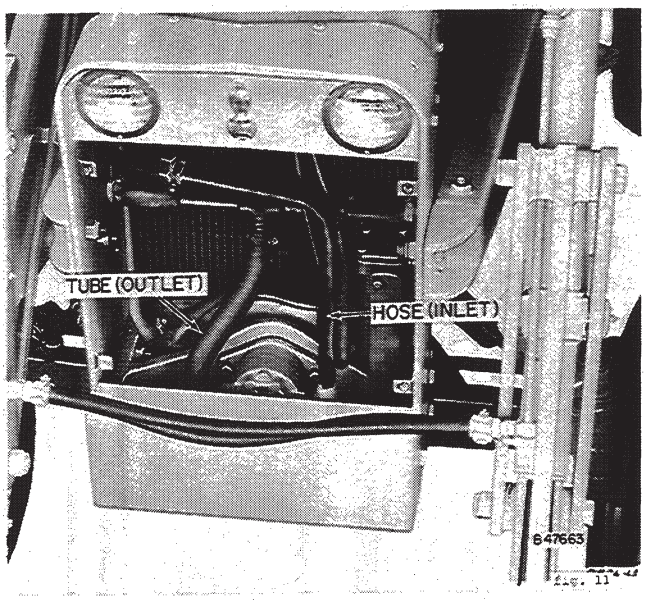

Figure 11 - Hydraulic Lines to Pump

REFERRING TO FIGURE 11: Clean exterior of pump thoroughly with solvent. Then remove hose and tube from pump and plug the ports. The pump shown is for Loader-Backhoe installation. The pump installation for Loader only is very similar, except it has a hose from R.H. hydraulic reservoir only, rather than from both R.H. and L.H. hydraulic reservoirs.

REMEMBER, DIRT IS THE ENEMY OF ANY HYDRAULIC SYSTEM. THE BEST WAY TO FIGHT THIS ENEMY IS TO PREVENT ITS ENTRY INTO THE HYDRAULIC SYSTEM. MAKE SURE YOU DISASSEMBLE AND REASSEMBLE THIS PUMP IN A SPOTLESSLY CLEAN WORK AREA.

Plug all openings and clean exterior of pump thoroughly with solvent.

IMPORTANT PRECAUTION TO OBSERVE BEFORE OPERATING NEW OR REBUILT HYDRAULIC PUMP

To avoid possible damage to new or rebuilt hydraulic pump due to excessive hydraulic pressure, back off the main relief valve adjusting screws on BOTH the Loader and Backhoe main relief valves before operating pump. Then, AFTER THE PUMP HAS RUN-IN FOR 30 MINUTES AT ZERO PRESSURE (all control levers in neutral position), adjust BOTH Loader and Backhoe main relief valve pressures. See "Adjusting Loader Main Relief Valve Pressure", also "Adjusting Backhoe Main Relief Valve Pressure."

Failure to observe this precaution can result in almost immediate failure of the hydraulic pump — if original relief valve pressure setting(s) were excessive.

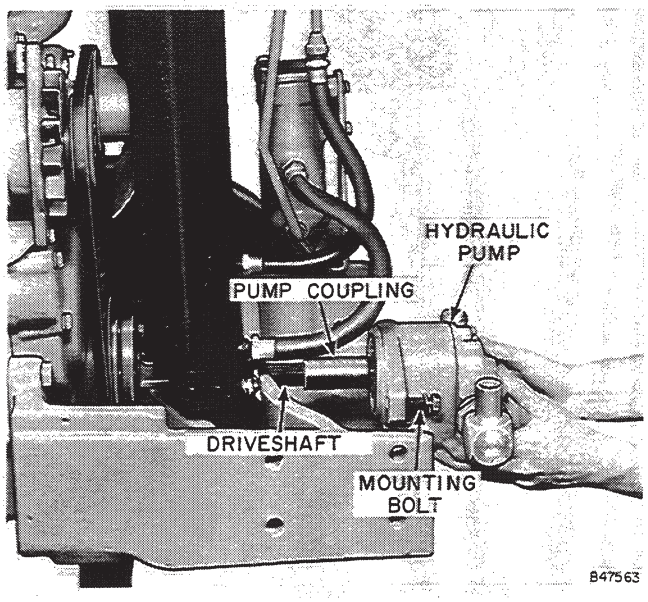

Figure 12 - Removing Pump

DISASSEMBLING PUMP

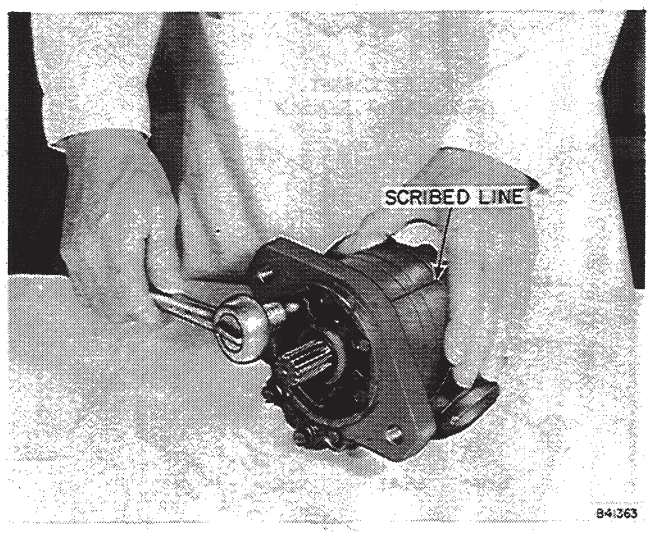

Figure 13 - Disassembling Pump Section

REFERRING TO FIGURE 13: After thoroughly cleaning the exterior of pump, scribe a line across the three sections of pump. The pump can easily be reassembled in the same position. Always reassemble the sections — front cover, rear cover and gear plate — in the same position.

Use a standard 7/16 inch, 12 point socket to remove the eight capscrews which hold the pump together.

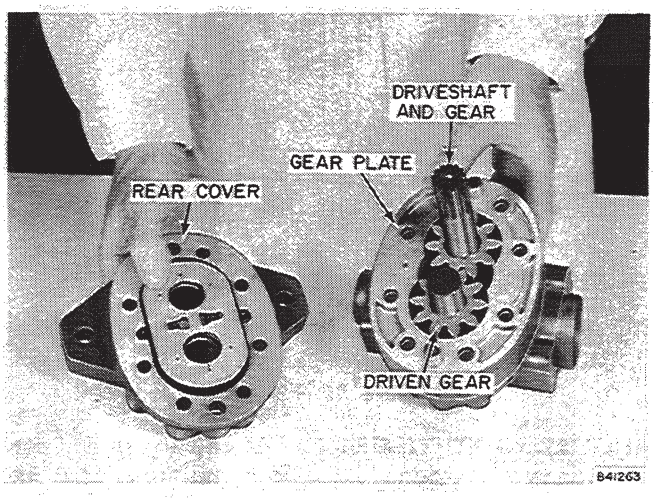

Figure 14 - Rear Cover Removed

REFERRING TO FIGURE 14: Using a soft metal hammer, tap the rear cover from gear plate. The gear plate and front cover usually will remain together.

CAUTION: Under no conditions try to pry the sections apart as the machined surfaces will be damaged.

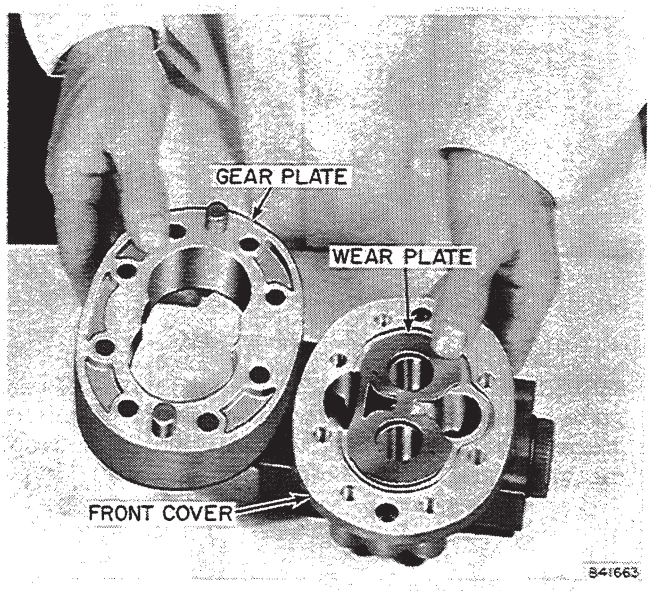

Figure 15 - Gear Plate and Front Cover

REFERRING TO FIGURE 15: To separate gear plate and front cover, place the drive gear in bearing and tap end of shaft with soft hammer. Avoid causing the gear plate to "cock" on dowel pins.

REFERRING TO FIGURE 16: To remove diaphragm (wear plate) from rear cover, slip a sharp instrument under diaphragm and gently pry loose. Remove the springs and balls.

REFERRING TO FIGURE 17: Remove the nylatron gasket, protector gasket, and "V" seal. Discard the sealing components. New seals must be installed when pump is reassembled.

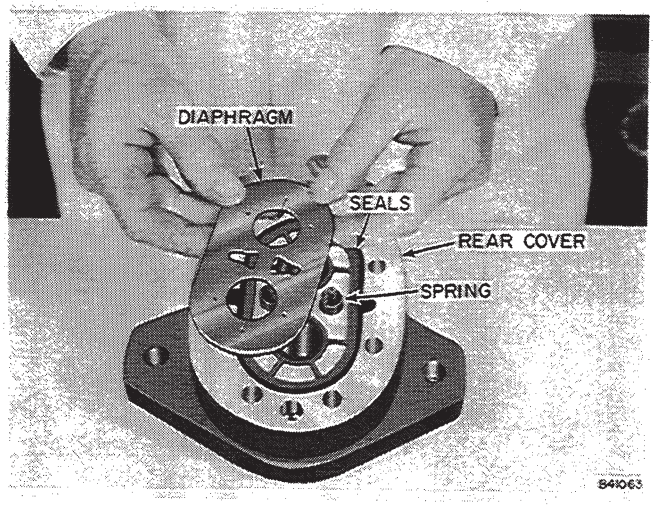

Figure 16 - Removing Diaphragm

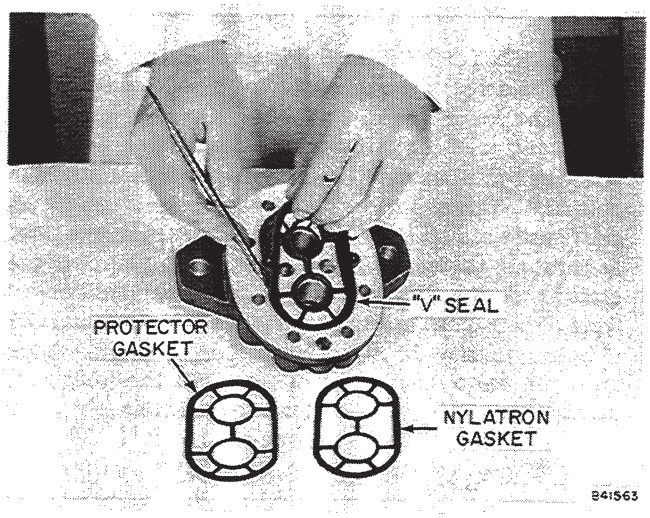

Figure 17 - Removing Seals

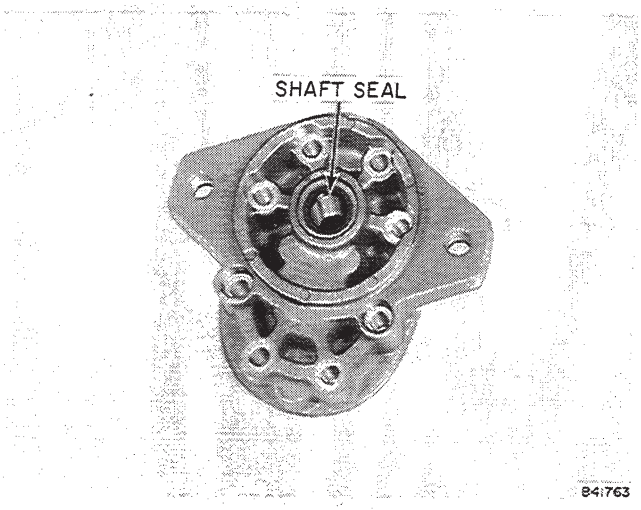

Figure 18 - Rear Cover and Shaft Seal

REFERRING TO FIGURE 18: Remove and discard shaft seal from rear cover.

INSPECTING PUMP

Clean all parts and inspect for nicks and burrs. Remove all imperfections on machined surfaces with fine emery cloth.

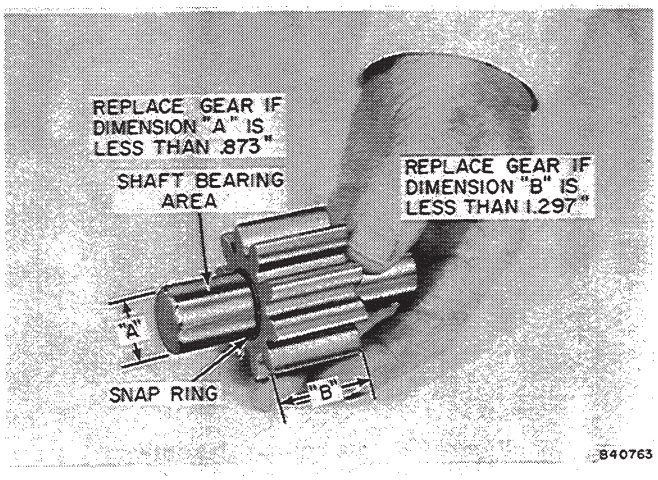

Figure 19 - Idler Gear and Shaft

REFERRING TO FIGURE 19: Inspect splines on drive-shaft for small cracks, wear at shaft seal contact area, and rough spots. Inspect idler gear and shaft. If bearing area of shaft measures less than .873, the shaft and gear assemblies should be replaced. One gear and shaft assembly may be replaced. Shaft and gears are sold as an assembly and are not available separately as gear only, or shaft only. Inspect gear ends for scoring, bluing (due to heat) and excessive wear. Minimum width of serviceable gear is 1.297 if below this width, gear must be replaced. Make sure the snap rings are in place. If the gear teeth have sharp edges, break corner with emery cloth.

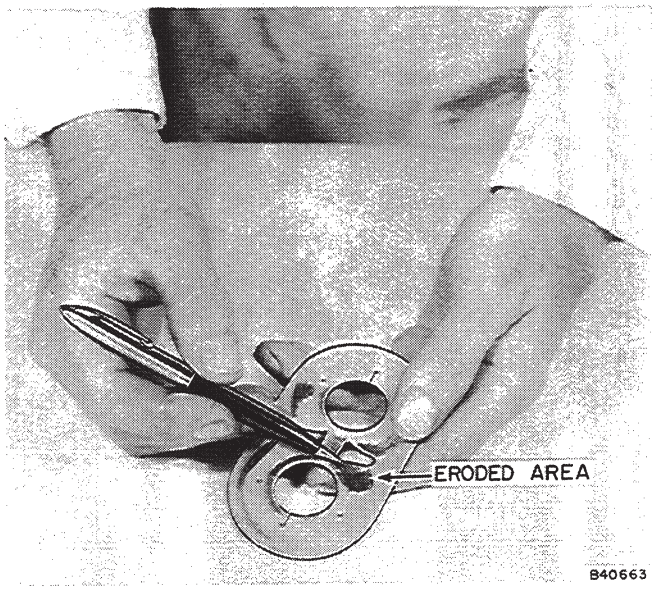

Figure 20 - Wear Plate

REFERRING TO FIGURE 20: Check the plates for score marks and erosion pits. If noticeably eroded in center, deeply scored or burned, replace.

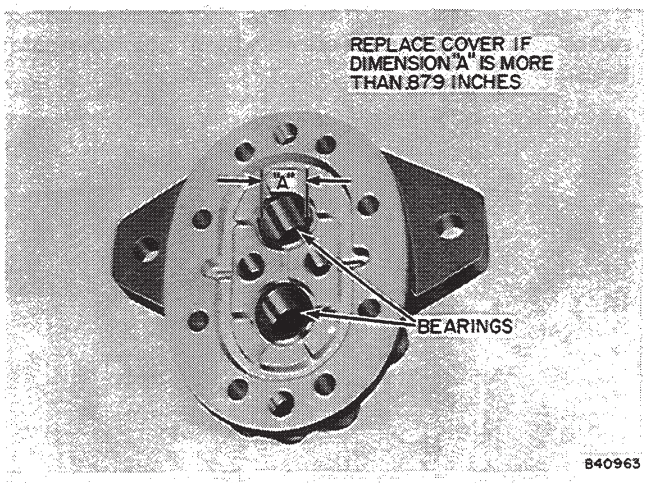

Figure 21 - Bearings

REFERRING TO FIGURE 21: If bearing inside diameter is more than .879, both the front and rear cover must be replaced as an assembly with bearings. Bearings are not supplied separately. Bearings in front cover are flush with edge of cover.

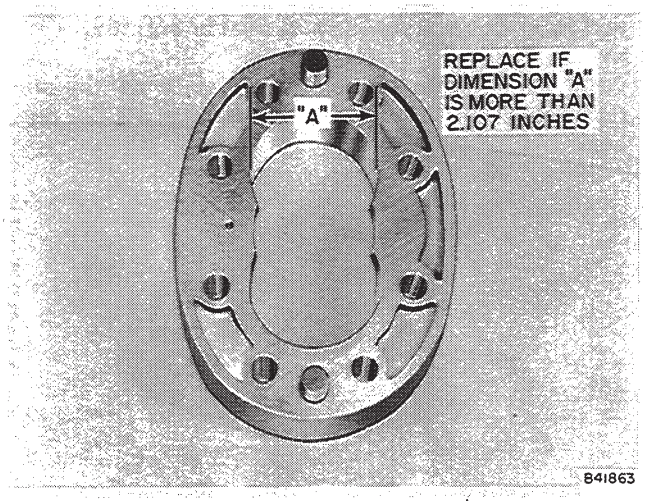

Figure 22 - Gear Plate

REFERRING TO FIGURE 22: Check inside of gear plate for excessive wear or score marks. If inside diameter of gear pocket measures more than 2.107 the gear plate must be replaced.

REASSEMBLING PUMP

NOTE: The thrust plate (wear plate) diaphragm (wear plate), nylatron gasket, protector gasket, "V" seal, and shaft seal should be replaced with new parts.

REFERRING TO FIGURE 23: Place "V" seal on rear cover with "V" down. Using a dull instrument, tuck "V" seal into rear cover. Install protector gasket in the "V" seal. Then install nylatron gasket.

REFERRING TO FIGURE 24: Place one ball in each hole in the rear cover. Place a spring on top of each ball.

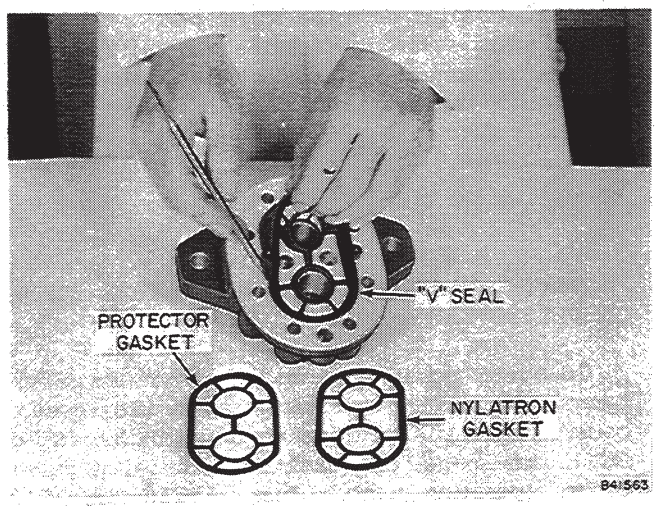

Figure 23 - Installing Seals

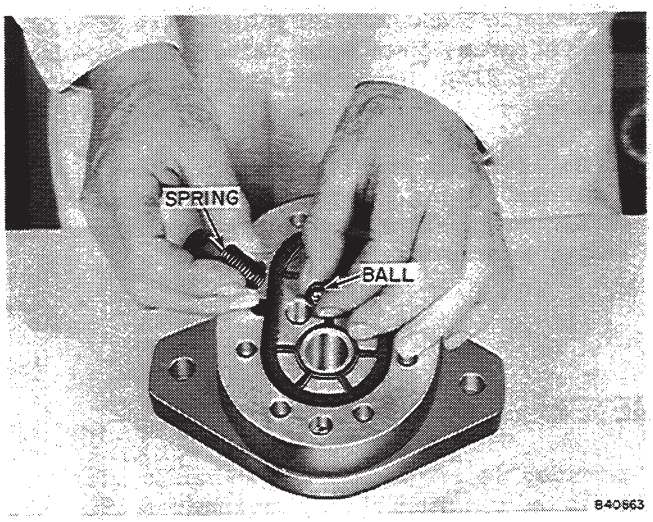

Figure 24 - Installing Balls and Springs

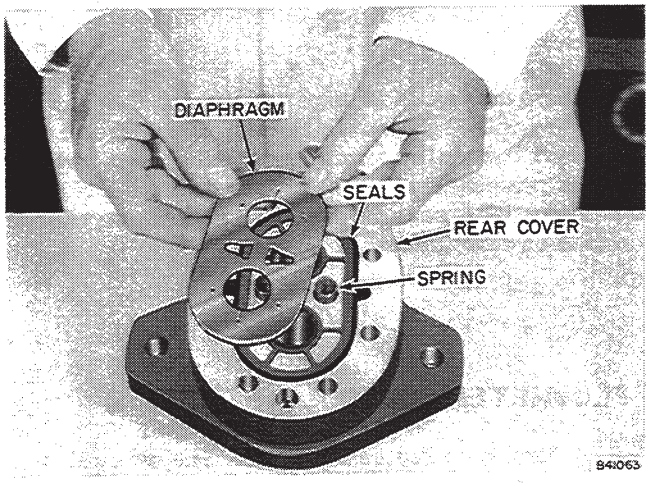

Figure 25 - Rear Cover and Diaphragm

REFERRING TO FIGURE 25: Install diaphragm with bronze side up. The diaphragm must fit inside of the rim on "V" seal. Make sure coils of the springs are not between diaphragm and rear cover.

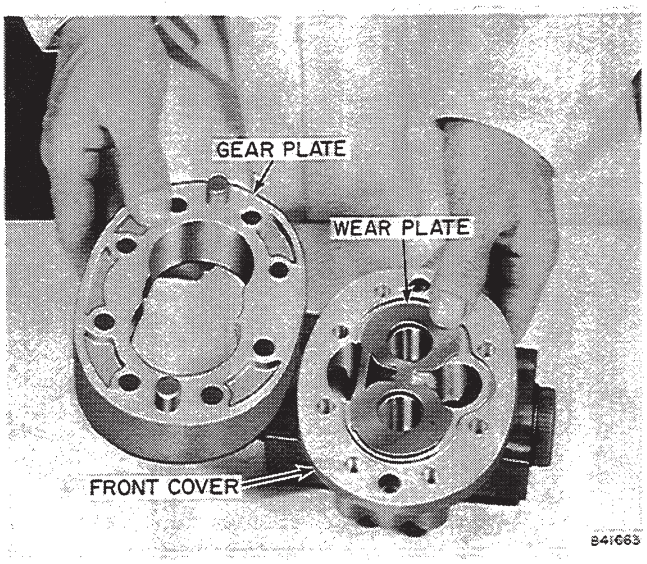

Figure 26 - Front Cover and Gear Plate

REFERRING TO FIGURE 26: Install thrust plate (wear plate) with bronze side toward the gears. Side with cut-away must be on suction side of pump. Thrust plate (wear plate) fits inside of gear plate when gear plate is seated on front cover.

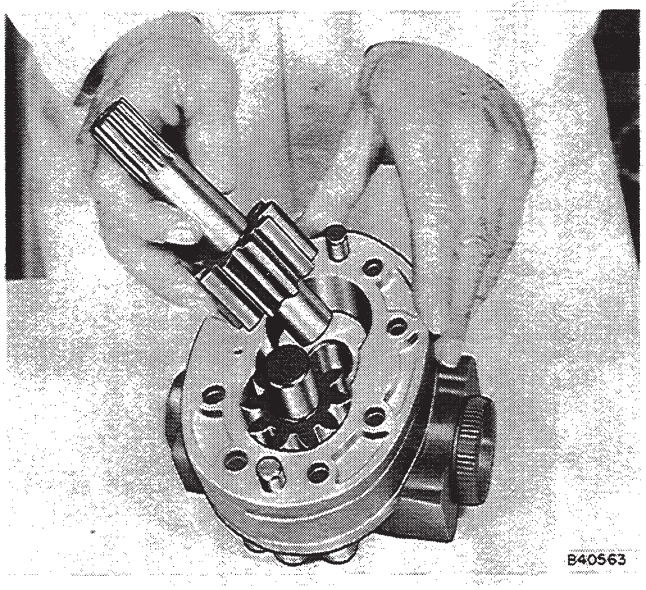

Figure 27 - Installing Gears

REFERRING TO FIGURE 27: Lubricate the gears in hydraulic oil and install assemblies in front cover. Apply a thin coat of heavy grease to machined surfaces of gear plate and install over gears. Do not allow the plate to "cock" as this could cause damage to gear plates if gear teeth rub on the machined surfaces. Half moon ports of gear plate must face away from diaphragm on rear cover.

Notice the small hole drilled in one of the cavities. This must be on the high-pressure port side.

REFERRING TO FIGURE 28: Slip front cover in place, install bolts, and evenly tighten to 40 ft. lbs. torque.

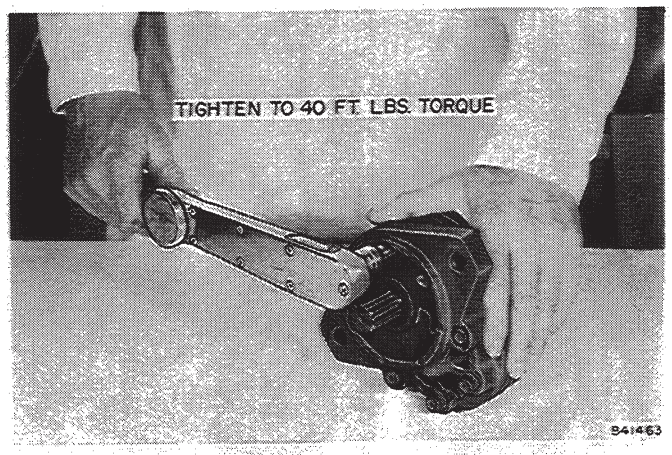

Figure 28 - Assembling Pump

Install seal protector (sleeve, tape, etc.), on pump shaft. Carefully slip seal over shaft. Using a 1-5/16" O.D. seal driver and hammer, tap the seal until it is seated in counterbore of cover.

Using a wrench or similar tool, rotate the pump shaft. After rotating shaft 10 revolutions, the pump should be almost free enough to rotate shaft by hand. If friction is excessive, pump must be disassembled and reinspected for burrs, bent wear plates, etc.

Pour hydraulic oil in the larger port of the pump. Rotate pump a few revolutions. Install pump on Tractor; reconnect hydraulic circuits to pump. Fill reservoir(s) with hydraulic oil, see "Loader-Backhoe Hydraulic Circuit."

IMPORTANT PRECAUTION TO OBSERVE BEFORE OPERATING NEW OR REBUILT PUMP.

To avoid possible damage to new or rebuilt hydraulic pump due to excessive hydraulic pressure, back off the main relief valve adjusting screws on BOTH the Loader and Backhoe main relief valves before operating pump. Then, AFTER THE PUMP HAS RUN-IN FOR 30 MINUTES AT ZERO PRESSURE (all control levers in neutral position), adjust BOTH Loader and Backhoe main relief valve pressures. See "Adjusting Main Relief Valve Pressure — Loader", also "Adjusting Main Relief Valve Pressure — Backhoe."

Failure to observe this precaution can result in shortened pump life or immediate failure of the hydraulic pump — if original settings of the main relief valves were excessive.

6. FLOWMETER

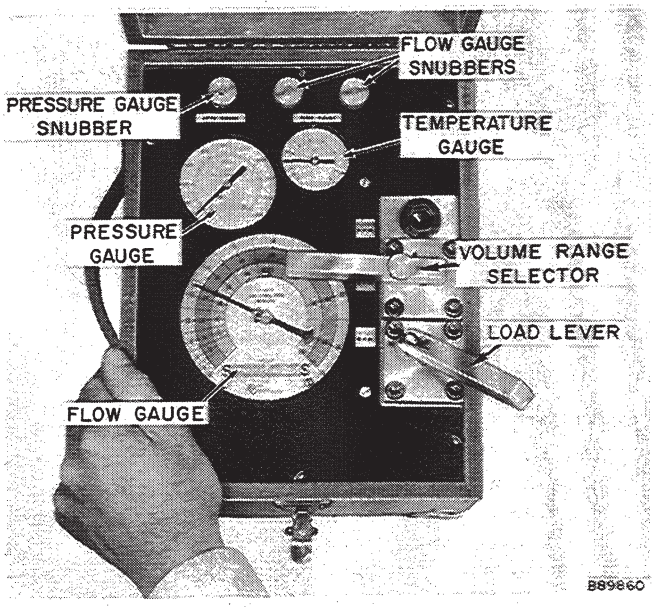

Figure 29 - Flowmeter (PT series)

The Schroeder Portable Hydraulic Circuit Tester is a lightweight, compact unit, which can easily be transported and used in shop or field.

Incorporated in this unit is a flowmeter, pressure gauge, temperature gauge, and load valve, which provides the serviceman with hydraulic information as to the condition of the pump, valves, cylinders, etc. By following the test procedure listed below, you will be provided with the information necessary to analyze the conditions of the complete hydraulic system.

There are two Models of "Hydraulic Circuit Testers" — the PT series which has proven the importance of hydraulic circuit analyzing, and the new lower priced "Hydra-Sleuth", which is lighter in weight, less sensitive to oil temperature change, and less complicated to operate.

FLOWMETER CONTROLS (PT SERIES)

Referring to Figure 29, familiarize yourself with the controls.

PRESSURE GAUGE SNUBBER: Protects pressure gauge from shock and pulsating loads. To assure long life, close snubber, and then open it about 1/4 turn before starting test. Open or close snubber as necessary as test is being made to secure steady gauge reading.

FLOW GAUGE SNUBBERS: Protect flow gauge from shock and pulsating loads. To assure long life, close snubbers, and open them about 1/4 turn before starting test. Open or close snubbers as test is being made to secure steady gauge readings.

VOLUME RANGE SELECTOR: Three position valve for using one of three scales:

Low (Yellow)	4 to 25 G.P.M.
Medium (Green)	12 to 50 G.P.M.
High (Orange)	32 to 100 G.P.M.

When making the test, read the corresponding scale on the flow gauge.

LOAD LEVER: Depressing the load lever restricts oil flow through the tester. This enables the operator to load a hydraulic circuit to the desired test pressures.

TEMPERATURE GAUGE: Measures temperature of hydraulic oil. Operate the unit until the temperature gauge reaches 120° F. Depressing flowmeter load lever and building up 1000 P.S.I. pressure will assist in heating the oil. This gauge has a range of 50° F. to 250° F.

FLOW GAUGE: Records the flow through flowmeter in gallons per minute (G.P.M.). Read the gauge scale corresponding to Volume Range Selector setting. It has a range of 4 to 100 G.P.M.

PRESSURE GAUGE: Records pressure per square inch of oil going through flowmeter. This gauge has a range of 0 to 2000 P.S.I.

FLOWMETER CONTROLS (HYDRA SLEUTH)

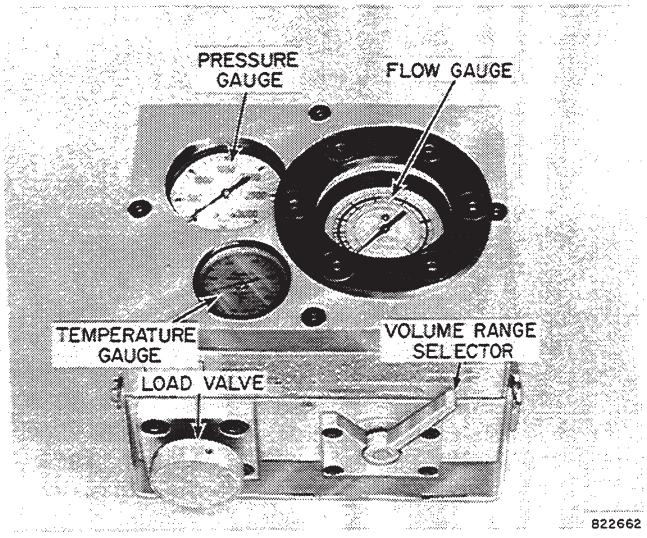

Figure 30 - Flowmeter (Hydra Sleuth)

Referring to Figure 30, familiarize yourself with the controls prior to operating flowmeter.

VOLUME RANGE SELECTOR: The position of flow valve determines the volume of hydraulic oil which may be properly tested.

Low (Yellow)	4 to 20 G.P.M.
High (White)	18 to 60 G.P.M.

When making the test, read the corresponding scale on the flowmeter gauge.

LOAD VALVE: Closing the load valve restricts oil flow through the tester. This enables the operator to load a hydraulic pump to desired test pressures.

TEMPERATURE GAUGE: Measures temperature of the hydraulic oil passing through the flowmeter. Operate the unit until the temperature gauge reaches 120° F. closing load valve and building up 1000 P.S.I. pressure will assist in heating the oil. This gauge has a range of 30° F. to 240° F.

FLOW GAUGE: Records the oil flow through flowmeter in gallons per minute (G.P.M.). Read the gauge scale corresponding to Volume Range Selector position. It has a range of 4 to 60 G.P.M.

PRESSURE GAUGE: Records pressure per square inch (P.S.I.) of oil going through flowmeter. This gauge has a range of 0 to 3000 P.S.I.

CONNECTING FLOWMETER (PUMP TEST)

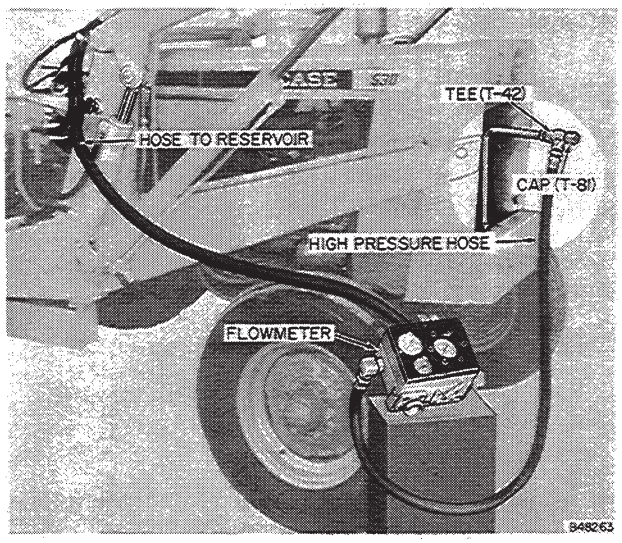

Figure 31 - Flowmeter Connections — Pump Test

Disconnect tube as shown in Figure 31, install tee (part #T-42) cap (part #T-81) and hose from flowmeter to pump tube. Attach return line hose from flowmeter to reservoir.

On Loader-Backhoe models, remove the breather and install a 1/4 inch NPT pipe plug in the hole, see Figure 32.

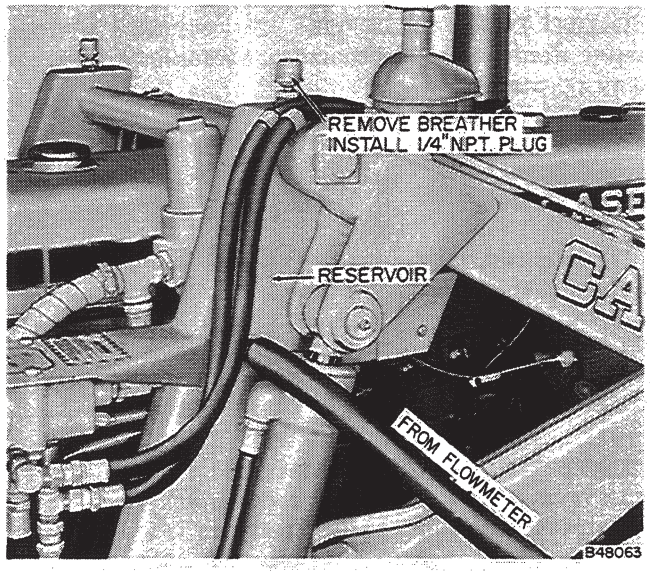

Figure 32 - Flowmeter Connections

If the breather is not removed and the hole is not plugged, the oil will overflow out the breather when testing the pump. The pump is drawing oil from both reservoirs, but all the oil is being returned to R.H. reservoir. Therefore, more oil is being pumped into R.H. reservoir than can quickly transfer to the L.H. reservoir, which causes the overflow situation.

On Loader models the oil is drawn from R.H. reservoir only. Therefore, the pump is removing from and returning the same amount of oil to the reservoir. This prevents the possibility of oil overflowing through the breather.

TESTING PUMP

1. With the reservoir filled to proper level, start the engine, and set speed to the exact R.P.M. stated in the chart below.

2. To heat up the oil, apply the load valve until pressure reaches 1000 P.S.I.

3. Operate unit until oil has warmed up to 120° F.

4. Take the G.P.M. reading without load (free flow) and record for future reference. The reading should be at least 20 G.P.M. at 1900 R.P.M.

   Free flow test means the reading is taken with load valve open which means no restriction is being applied to the flow of oil.

   A badly worn pump usually will have full G.P.M. capacity when tested at free flow. The free flow test is to determine if there is a restriction, air leak, etc., in the hose from reservoir to the pump.

   Pump specifications in chart below show the proper readings for a new pump.

5. With engine running at R.P.M. specified in chart, GRADUALLY apply load (restriction) with the load valve. As load is applied, the engine R.P.M. speed must be corrected as it will drop approximately 150 R.P.M. when full load is applied.

   ALWAYS REMEMBER WHEN MAKING HYDRAULIC TESTS, THREE CONDITIONS MUST BE STRICTLY CONTROLLED — TEMPERATURE, ENGINE SPEED, AND PRESSURE.

   When testing pump only, there is no relief valve in the circuit. Therefore, DO NOT exceed the recommended test pressure when applying load with flowmeter load valve.

6. Take readings at 1000, 1500, and 2000 P.S.I. using the exact R.P.M. specified. Record the readings for use when testing the remaining circuits.

   CAUTION: Limit time the load valve is set for a reading of 2000 P.S.I. to 30 seconds. Extended period of time with load of 2000 P.S.I. could damage the pump.

If the pump output is not at least 75% of the value given in the chart below, replace or repair the pump. Chart below is new pump specifications.

Case Part No.	Mfgs. Part No.	P.S.I.	G.P.M.	R.P.M.
D31254	Cessna 20110-1DBE	2000	20	1900
*D31254	same	2000	22	2100

*Torque Converter Drive models

NOTE: When testing pump, if reading drops below 10 G.P.M., discontinue test at once. Continued testing may cause damage to the gears, which possibly would have been in reuseable condition.

FLOWMETER TEE TEST

Refer to "Schematic Illustration" in this manual of "Construction King" Loader-Backhoe hydraulic system.

Due to the design of the circuit, the "TEE TEST" hook-up can be used with the flowmeter.

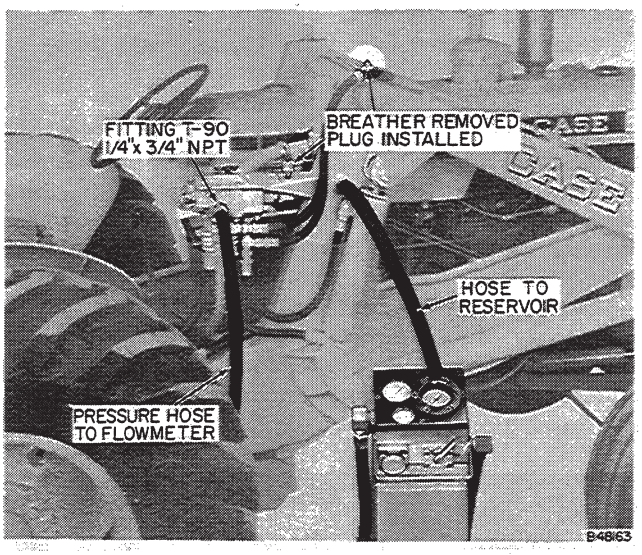

Figure 33 - Flowmeter Connections — Tee Test

When the flowmeter is connected to the control valve as shown in Figure 33, the following tests can be performed:

1. Loader Main Relief Valve Pressure
2. Backhoe Main Relief Valve Pressure
3. Low Pressure Secondary Relief Valves Pressures
4. Cylinder Leakage
5. Valve Spool Leakage
6. "Power Beyond" Sleeve "O" Ring Leakage
7. "O" Rings on Main and Secondary Relief Valves
8. Individual Valve Spool Large Volume Leakage

Actually the complete system can be analyzed with the flowmeter connected at this point.

WHEN ENGINE R.P.M. IS STATED, IT MUST BE WHEN UNDER HYDRAULIC LOAD. USUALLY THE ENGINE SPEED DECREASES 150 R.P.M. WHEN HYDRAULIC LOAD IS APPLIED.

CONNECTING FLOWMETER (TEE TEST)

Both Hydra-Sleuth and the larger PT series flowmeter are connected in the same manner.

Using the 1/4 x 3/4 fitting Part #T-90 from the flowmeter fitting kit, connect flowmeter high pressure hose to loader control valve test port, see Figure 33.

Connect the return hose to flowmeter and reservoir.

NOTE: On loader with backhoe models, remove breather from R.H. reservoir and plug the hole with plug removed from loader valve test port.

If the breather is not removed and the hole not plugged, the oil will overflow out the breather when testing the circuits. The pump is drawing oil from both reservoirs, but all is being returned to R.H. reservoir. Therefore, more oil is being pumped into R.H. reservoir than can quickly transfer to the L.H. reservoir, which causes the overflow situation.

On loader models, the oil is drawn from R.H. reservoir only. Therefore, the pump is removing and returning the same amount of oil to the reservoir. This prevents the oil overflow through the breather.

TESTING THE CIRCUITS

With the flowmeter installed as described above, proceed to conduct the test.

NOTE: When flowmeter is connected in circuit for "Tee Test", the circuits — loader and backhoe — will not operate unless flowmeter load valve is closed.

Oil Temperature

Before taking flow test readings, the oil temperature should be approximately 120° F. to 150° F. If temperature is higher than specified, the readings will be slightly lower than normal. If the temperature is below specified temperature, the readings will be slightly higher than normal.

To help warm the oil, apply hydraulic load to system. Actuate a control lever and close load valve on tester. When cylinder is fully extended or retracted, the loader main relief valve will bypass. With control valve actuated, adjust load valve on meter to provide 1000 P.S.I. pressure and allow oil to warm up to specified temperature.

TESTING LOADER CIRCUITS (Tee Test)

When a circuit is defective (leaking oil) the G.P.M. flowing through the flowmeter will be less than for a good circuit. For example, when testing loader lift circuit the flow through flowmeter is 18 G.P.M., but only 14 G.P.M. when testing loader bucket circuit. The leakage is 4 G.P.M. from the bucket circuit. Therefore, a chart as follows should be made before starting test.

	P.S.I.	R.P.M.	TEMP.	G.P.M.
Main Relief Valve	2000	1800	130° F.	0
Loader Lift	1500	1800	130° F.	18
Loader Lower	1500	1800	130° F.	18
Loader Bucket (Dump)	1500	1800	130° F.	14
Loader Bucket (Rollback)	1500	1800	130° F.	18

The chart should be as above except the G.P.M. spaces are filled in as the tests are being made. Notice the fourth test, "Loader Bucket (Dump)". The G.P.M. through the flowmeter has dropped four G.P.M. This indicates the circuit is leaking four G.P.M.

The important point to remember in the above paragraph is — oil leaking from the circuit does not flow through the flowmeter.

When a defect is found, refer to "Hydraulic Trouble Shooting Chart" in this manual.

Main Relief Valve Pressure

To test the Loader main relief valve pressure, run tractor engine at 1800 R.P.M. and close the flowmeter load valve. Then push the loader lift lever forward. When the cylinder is fully retracted, read the gauge. If pressure reading is above or below 2000 P.S.I., adjust the main relief valve.

PUMP TEST

With the main relief valve pressure set to specifications, pump condition (output) under pressure, may be tested using this "Tee Test" procedure. If the pump output, when tested using the following procedure, is not at least 75% of maximum (18 G.P.M. at 1800 R.P.M.), it does not necessarily indicate a defective pump.

There may be a leak in the main relief valve or other component in the circuit. Therefore, if the output of the pump using the "Tee Test" is not as specified above "pump only" test must be made to determine if the pump or circuit is defective.

Testing Typical Circuit

To analyze the oil leakage from a circuit, actuate the control lever for circuit being tested. Apply flowmeter load valve until cylinder has stopped at end of stroke. Adjust load valve until pressure reading is 1500 P.S.I. Read the flow through flowmeter. Record the reading on chart. If the reading for all cylinders on the loader are about equal, there is no defect.

If a circuit is defective, refer to "Hydraulic Trouble Shooting Chart."

TESTING BACKHOE CIRCUITS (Tee Test)

Refer to "Flowmeter" (Tee Test), and install flowmeter.

NOTE: The hydraulic oil to the backhoe valve is pumped through the loader valve first (see Schematic Illustrations). Therefore, the pressures in the backhoe valve are also in the loader valve making it possible to test both circuits at the loader valve.

The backhoe circuits are tested in the same manner as loader circuits, except "boom down" and "swing circuits." The boom down and swing circuits have built-in Secondary Relief Valves, set lower than 1500 P.S.I.

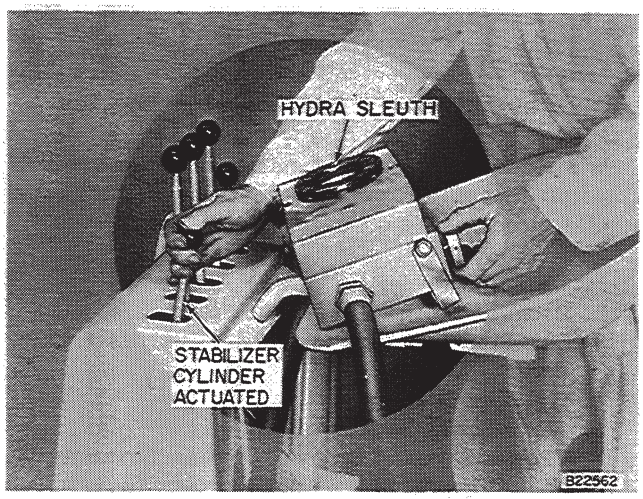

Figure 34 - Testing Backhoe Main Relief Valve

To test the pressure setting of swing Secondary Relief Valves, proceed as follows:

With tractor engine running at 800 R.P.M., swing boom until it stops to right hand or left hand side. Hold swing pedal down with flowmeter load valve closed. Read the gauge; the pressure should be 1200 to 1400 P.S.I. To test opposite Secondary Relief Valve, swing boom in opposite direction.

Boom Down Secondary Relief Valve

With loader bucket on ground and slight down pressure applied, extend bucket, dipper, and boom to ground level. With tractor engine running at 800 R.P.M., apply boom down pressure. With flowmeter load valve closed, read the pressure gauge. The pressure should be 1200 to 1400 P.S.I.

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7. LOADER CONTROL VALVE

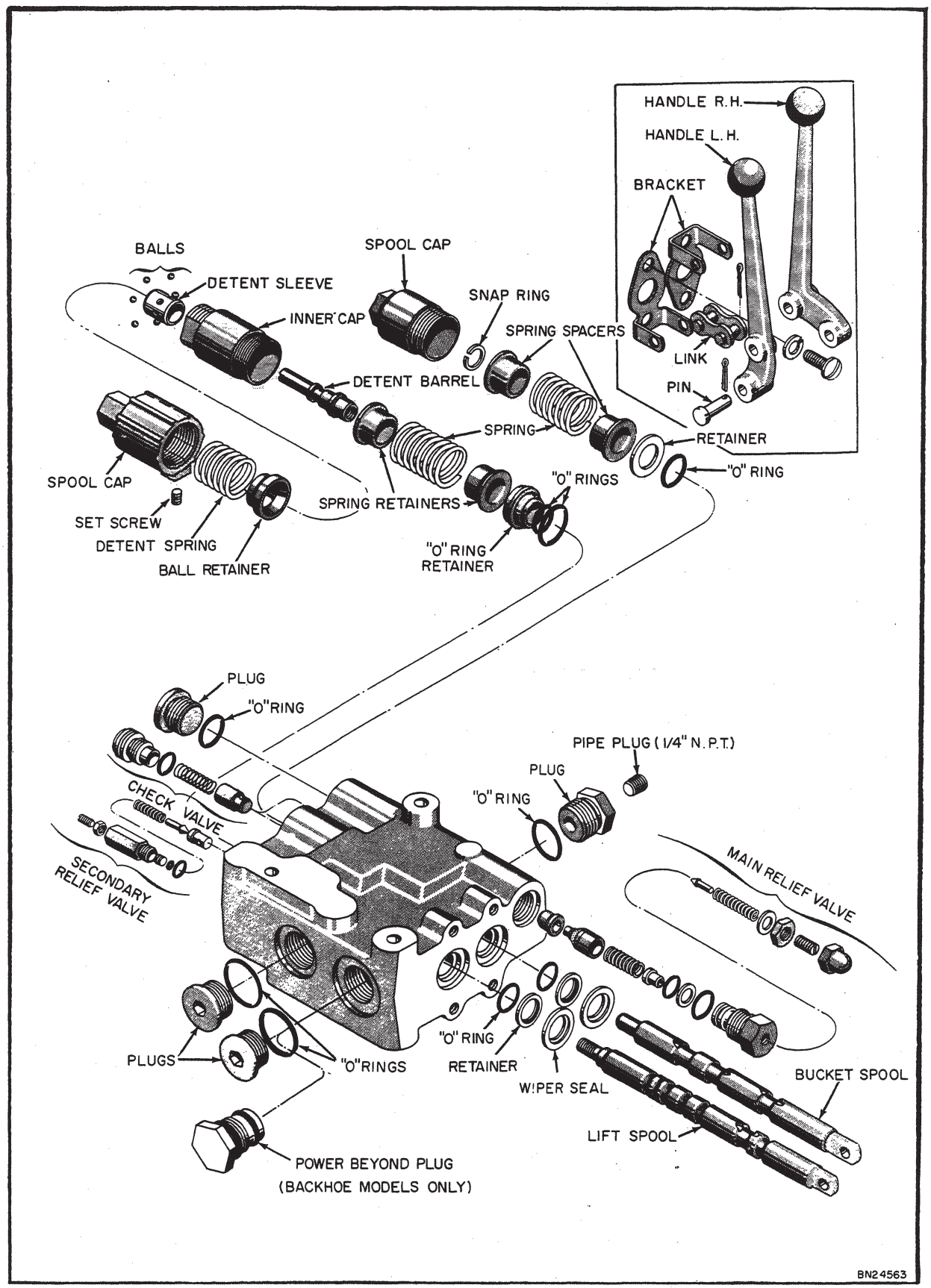

Figure 35 - Exploded View of Parker Loader Control Valve