3/4/500 EATON 11 HYDROSTATIC TRANSMISSION - WH TRANSAXLE

Table of Contents – Page 1 of 2

FOREWORD

SPECIFICATIONS
- TRANSMISSION:
- TRANSAXLE:
- MAINTENANCE:

GENERAL INFORMATION
- TRANSMISSION DESCRIPTION AND IDENTIFICATION MARKINGS

PRINCIPLES OF OPERATION
- TRANSMISSION SYSTEM
- SYSTEM OPERATION
- TRANSMISSION OPERATION

TROUBLESHOOTING
- PROBLEM DIAGNOSIS
- GENERAL SYSTEM CHECKS
- OIL SYSTEM
- COOLING SYSTEM
- ENGINE AND INPUT DRIVE
- MOTION CONTROL LINKAGE
- TRANSAXLE
- HYDROSTATIC TRANSMISSION

TROUBLESHOOTING GUIDE
- TRACTOR WILL NOT OPERATE IN EITHER DIRECTION
- TRACTOR OPERATES IN BOTH DIRECTIONS, BUT LOSES POWER AS OIL
- TRACTOR DOES NOT RETURN TO NEUTRAL.
- HYDRAULIC LIFT SYSTEM DOES NOT OPERATE

ADJUSTMENTS
- GENERAL
- SINGLE ACTION BRAKE BAND ADJUSTMENT
- DUAL ACTION BRAKE BAND ADJUSTMENT
- MOTION CONTROL FRICTION
- NEUTRAL

TESTING
- SYSTEM PERFORMANCE
- PRESSURE CHECKS
- IMPLEMENT LIFT SYSTEM
- CHARGE PRESSURE

3/4/500 EATON 11 HYDROSTATIC TRANSMISSION - WH TRANSAXLE

Table of Contents – Page 2 of 2

REPAIR OPERATIONS
- GENERAL INFORMATION
- HYDRAULIC HOSES - HYDRAULIC LIFT CONTROL VALVE
- REMOVAL
- INSTALLATION

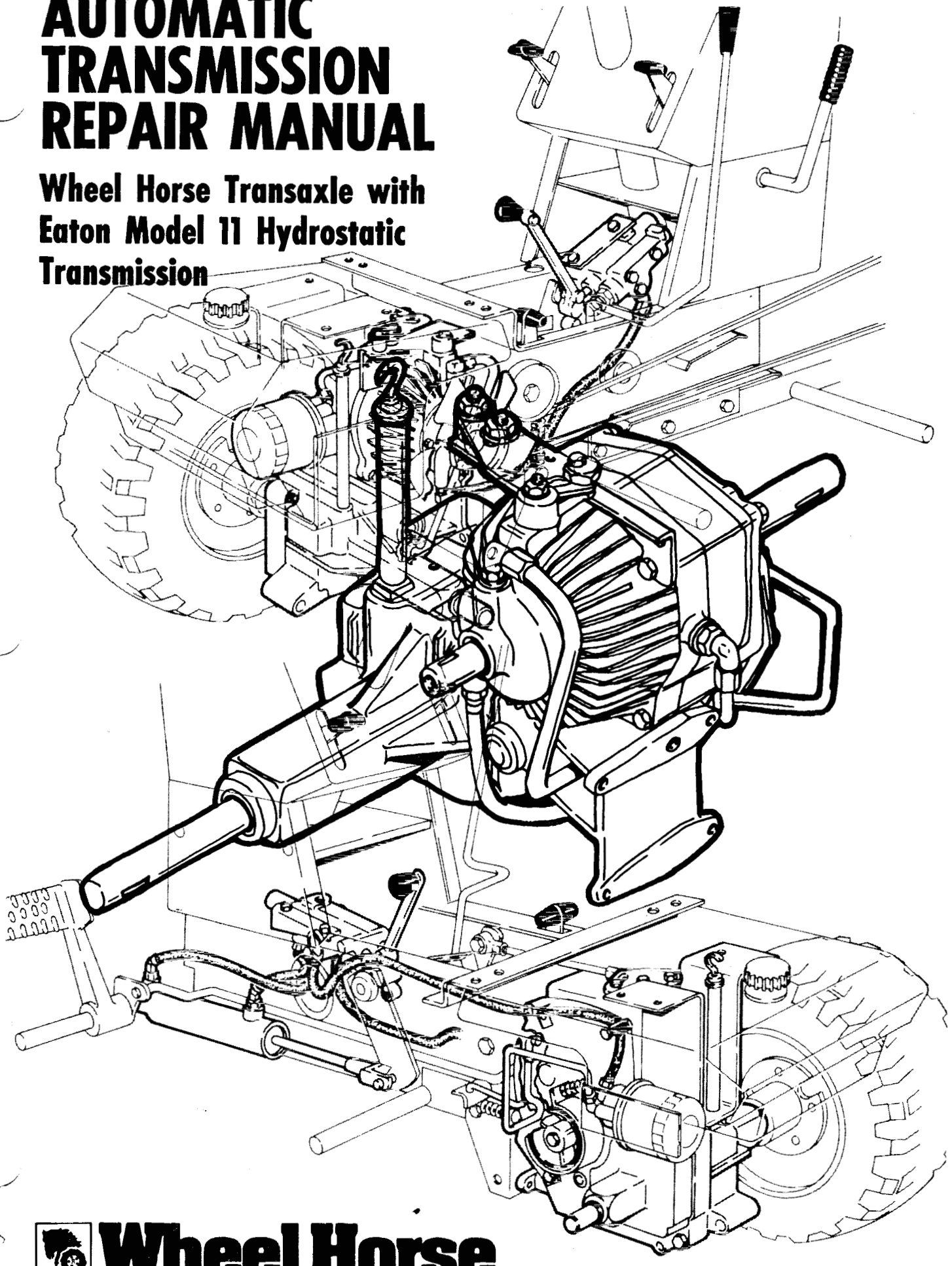
TRANSMISSION
- REMOVAL
- PULLEY, GEAR AND CAM PLATE REMOVAL
- INSTALLATION

TRANSAXLE
- IN-VEHICLE SERVICE
- CASE HALF SERVICE
- INTERMEDIATE GEAR AND DIFFERENTIAL SERVICE
- TRANSAXLE REASSEMBLY

TRANSMISSION SYSTEM
- REMOVAL
- INSTALLATION
- INTERNAL TRANSMISSION SERVICE
- TRANSAXLE
- TRANSAXLE
- TRANSMISSION AND FILTER
- TRANSMISSION AND FILTER
- MOTION CONTROL, CLUTCH LINKAGE
- MOTION CONTROL, CLUTCH LINKAGE
- BRAKE AND LINKAGE SINGLE ACTION BRAKE BAND
- BRAKE, AND LINKAGE SINGLE ACTION BRAKE BAND
- BRAKE AND LINKAGE DUAL ACTION BRAKE BAND
- BRAKE AND LINKAGE DUAL ACTION BRAKE BAND
- EATON MODEL 11 TRANSMISSION

AUTOMATIC TRANSMISSION REPAIR MANUAL

Wheel Horse Transaxle with Eaton Model 11 Hydrostatic Transmission



Wheel Horse

Printed in U.S.A. 1186 Form #492-4205

PART NO. 810243R2

FOREWORD

This service and repair manual has been compiled to provide authorized Wheel Horse service personnel with the proper procedures and techniques for servicing the Wheel Horse automatic transaxle with Eaton Model 11 hydrostatic transmission.

The following Table of Contents lists all areas covered. It is advisable to read all of the introductory sections first to gain a proper understanding of the Wheel Horse automatic transmission system.

The automatic transmission and transaxle are sophisticated pieces of machinery. Maintain strict cleanliness control during all stages of service and repair. Cover or cap all hose ends and fittings whenever they are exposed. Even a small amount of dirt or other contamination can severely damage the system.

This manual covers the transmission system as used during the 1980-87 model year. It may be used to the extent applicable for later model tractors equipped with the Eaton Model 11 hydrostatic transmission and Wheel Horse transaxle.

TABLE OF CONTENTS

SPECIFICATIONS 1

GENERAL INFORMATION 2

Transmission Description & Identification Markings 2

Internal Transmission Service 3

PRINCIPLES OF OPERATION 3

Transmission System 3

System Operation 3

Transmission Operation 5

TROUBLESHOOTING 7

Problem Diagnosis 7

General System Checks 7

Troubleshooting Guide 8-11

ADJUSTMENTS 12

Brake 12

Single Action Brake Band Adjustment 12

Dual Action Brake Band Adjustment 12

Motion Control Friction 12

Neutral 13

TESTING 13

System Performance 13

Pressure Checks 13

REPAIR OPERATIONS 15

General Information 15

Hydraulic Hoses 15

Hydraulic Lift Control Valve 15

TRANSMISSION 16

Removal 16

Pulley, Gear & Cam Plate Removal 16

Installation 18

TRANSAXLE 18

In-Vehicle Service 18

Case Half Service 19

Intermediate Gear and Differential Service 20

Transaxle Reassembly 20

TRANSMISSION SYSTEM 20

Removal 20

Installation 21

Internal Transmission Service 21-28

PARTS DRAWINGS AND PARTS LISTS 29-40

Transaxle 29-30

Transmission 31-32

Motion Control, Clutch Linkage 33-34

Brake and Linkage 35-38

Eaton Model 11 Transmission 39-40

SPECIFICATIONS

TRANSMISSION: Eaton Model 11; Radial, Ball-piston Pump and Motor with Auxiliary Charge Pump.

Displacement:
- Pump, Variable 0-1.10 cu. in/rev.
- Motor, Fixed. 2.09 cu. in./rev.

Speed (as used):
- Input 3400 RMP
- Output 0-1750 RPM

Torque Output (Max.)
- Continuous 360 in. lbs.
- Intermittent 540 in. lbs.

Operating Temperature:
- Maximum Continuous 180°F

Cooling:
- 8" Diameter Fan Plus Oil Flow From Charge Pump

Oil Filter (as used)
- 10 Micron, Full-flow, Spin-on Type

Charge Pump (3400 RPM Input)
- 3.8 GPM Free Flow
- 1.4 GPM @ 700 PSI

TRANSAXLE: Wheel Horse; Single-speed, with Uni-Drive 8-pinion Differential and Double Reduction Gears.

Gears and Shafts
- Heat-Treated Steel

Bearings:
- Ball — 2
- Needle — 6

Case Halves and Hubs:
- Cast Iron

Seals:
- 3, Double-Lip, Spring-Loaded

Ratios and Speeds:
- Drive Belt Pulley Ratio 1:1
- Overall Reduction Ratio 15.64:1
- Axle Shaft Speed:
  - @ 1750 RPM Eaton Output 112 RPM
- Tractor Speeds (approx.):
  - Forward 0-7 MPH
  - Reverse 0-4.2 MPH

MAINTENANCE:

Oil Check — Before Each Use

Replace Oil and Filter:
- Initial — After First 100 Hours of Use
- Periodic — Once a Year, or After Every 100 Hours of Use, Whichever Occurs First
- Oil Specification — 10W-30 or 10W-40 Premium Motor Oil
- Oil Capacity (approx.) — 5 quarts
- Oil Filter — Wheel Horse 108335
- Adjustments — Foot/Parking Brake, Motion Control Friction, Motion Control Neutral } As Required
- Torque Value (Thread Sizes)
  - 1/4-20 — 8 ft. lbs.
  - 5/16-18 — 17-22 ft. lbs.
  - 3/8-16 — 30-35 ft. lbs.
  - 1/2-13 — 75-80 ft. lbs.
  - Wheel Hub Set Screw — 28-32 ft. lbs.

GENERAL INFORMATION

TRANSMISSION DESCRIPTION AND IDENTIFICATION MARKINGS

NOTE

This manual uses the terms "transmission, hydrostatic transmission, and hydrostatic unit" to refer to the Eaton Model 11 Hydrostatic Transmission. The term "transaxle" is used to refer to the assembly of intermediate gears, differential and case halves, less hydrostatic unit. "Transmission System" and "Automatic Transmission System" are used to refer to entire drive train as an assembly, including engine, transmission, transaxle, hydraulic lift system, and all related parts.

The Eaton Model 11 hydrostatic transmission, as used by Wheel Horse, is equipped with an internal charge pressure relief valve, forward and reverse check and acceleration valves, and vibration dampening pistons. Transmission has a splined output shaft and keyed input shaft, both of which are supported by ball bearings. Besides making up for normal internal transmission leakage, charge pump is used to operate tractor's hydraulic lift system. Charge pressure used to operate transmission is 30-90 PSI, regulated by a relief valve inside transmission. Implement lift system pressure is 700 PSI, regulated by a relief valve in hydraulic lift control valve.

Transmission is stamped with model number, manufacturing date code, and direction of rotation. Rebuilt units are also marked with a "1". If viewed from angle used in photo, this information will appear upside-down as in Figure 2.

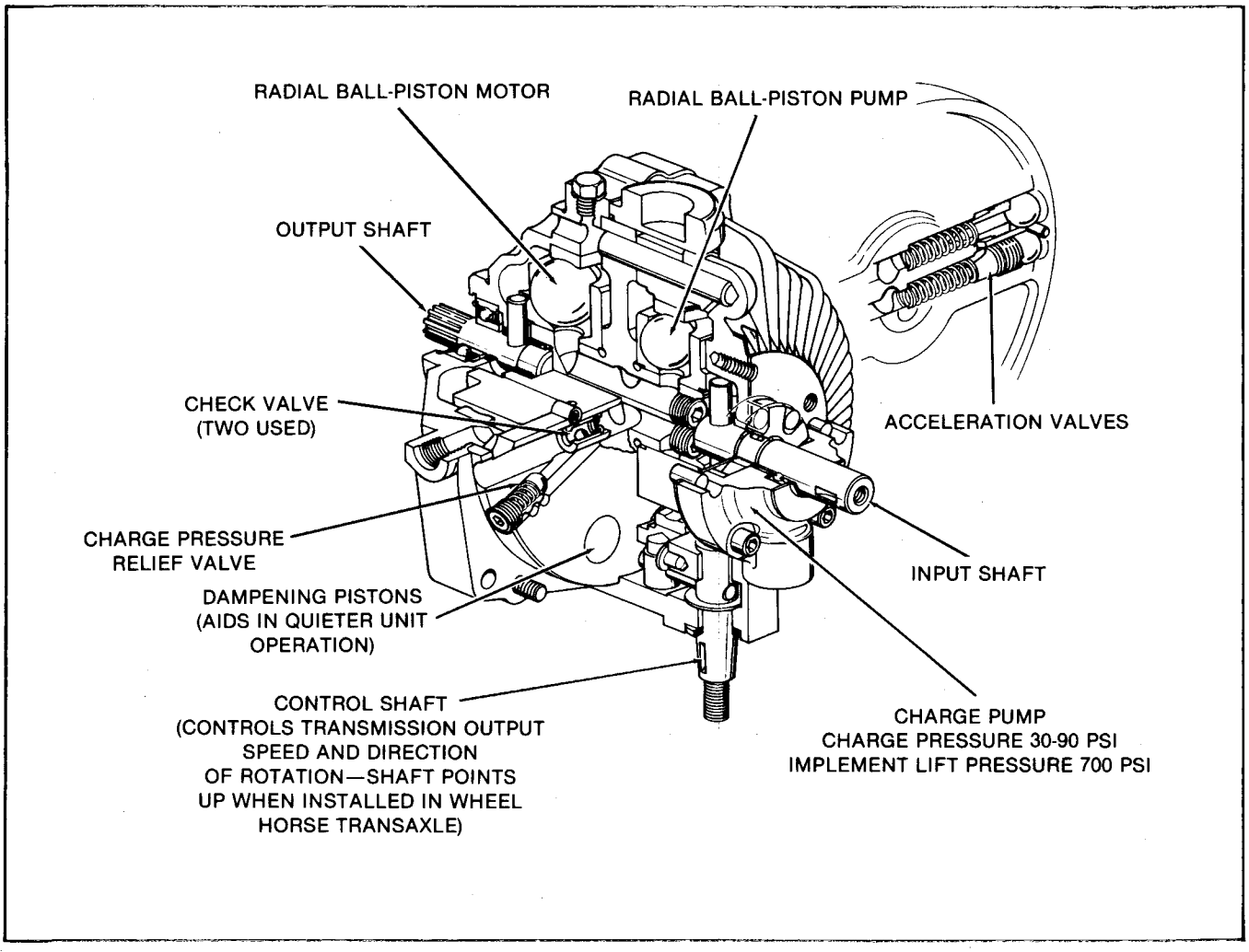


FIG. 1. Internal Transmission Features

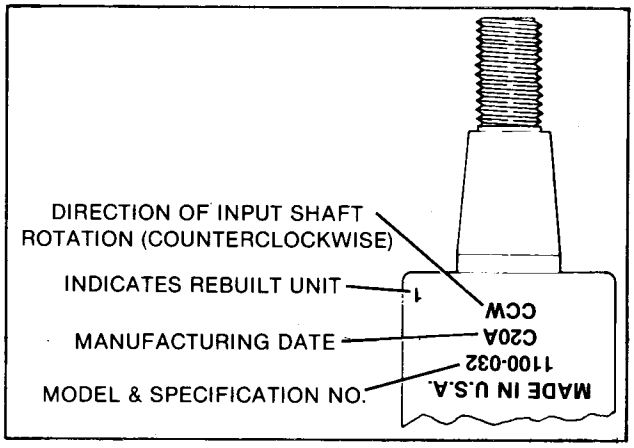


FIG. 2. Identification Markings

PRINCIPLES OF OPERATION

TRANSMISSION SYSTEM

Major parts of Wheel Horse automatic transmission system are identified in Figs. 3-5.

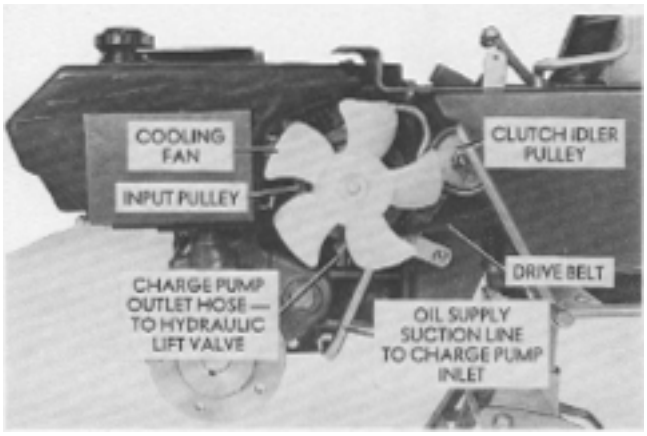


FIG. 3. Right Side

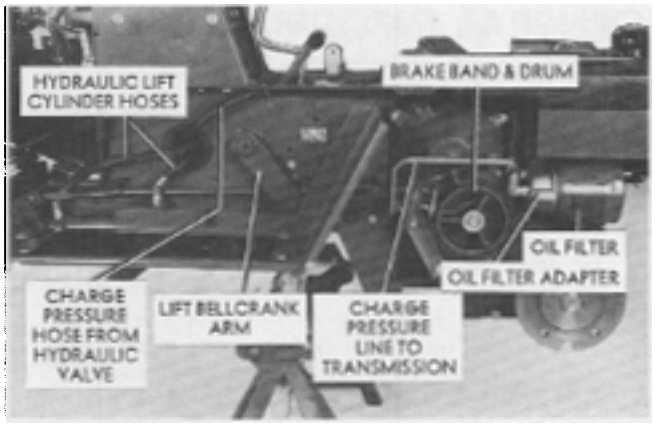


FIG. 4. Left Side

FIG. 5. Controls

SYSTEM OPERATION

Transmission input shaft is driven at engine speed by drive belt. Both charge pump and transmission pump are driven by input shaft. Charge pump draws oil from transaxle to "supercharge" transmission pump, make up for normal internal leakage, and provide a cooling oil flow. Oil travels from outlet of charge pump through a hydraulic hose, passes through open-center hydraulic lift valve and out to oil filter adapter through another hose. After filtering, oil passes through a metal line and into transmission.

Pump section of transmission controls volume and direction of oil flow to motor section depending on position of motion control linkage. As motion control lever is moved away from neutral position flow of oil is increased to motor, making it go faster. Motor output shaft drives tractor axles through two reduction gears and a differential assembly. Torque is generated in direct response to load; higher pump pressure (torque) is generated as resistance to movement increases.

For optimum performance engine should be operated at full throttle, and never less than 3/4 throttle. Under high load conditions tractor should be slowed using motion control lever, which will increase output torque. This is due to lower friction and pumping losses at slower transmission output speeds, and can be compared to the effect of shifting a manual transmission to a lower gear.

System flow is illustrated in Figs. 6 and 7.

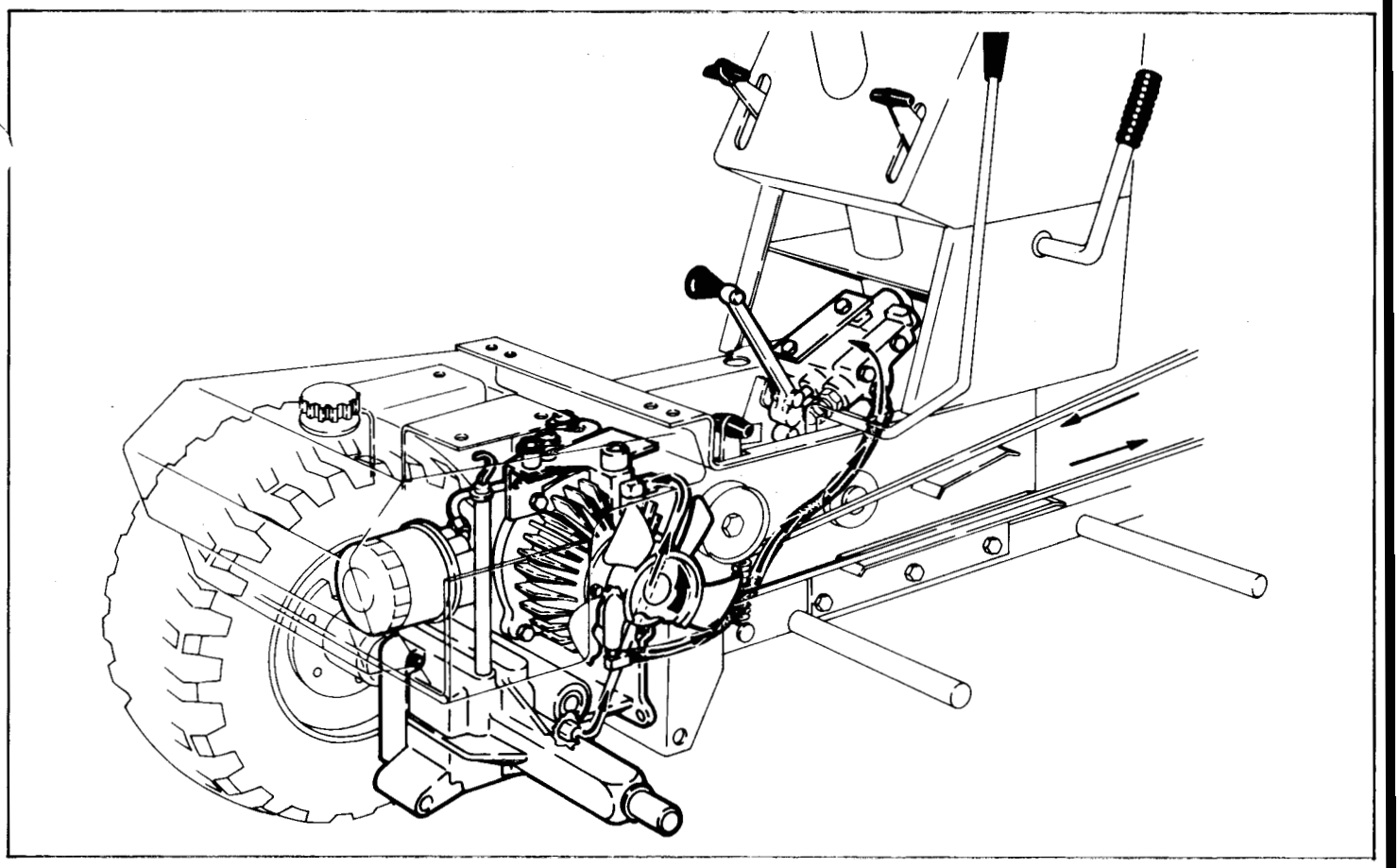


FIG. 6. Oil Flow to Hydraulic Valve

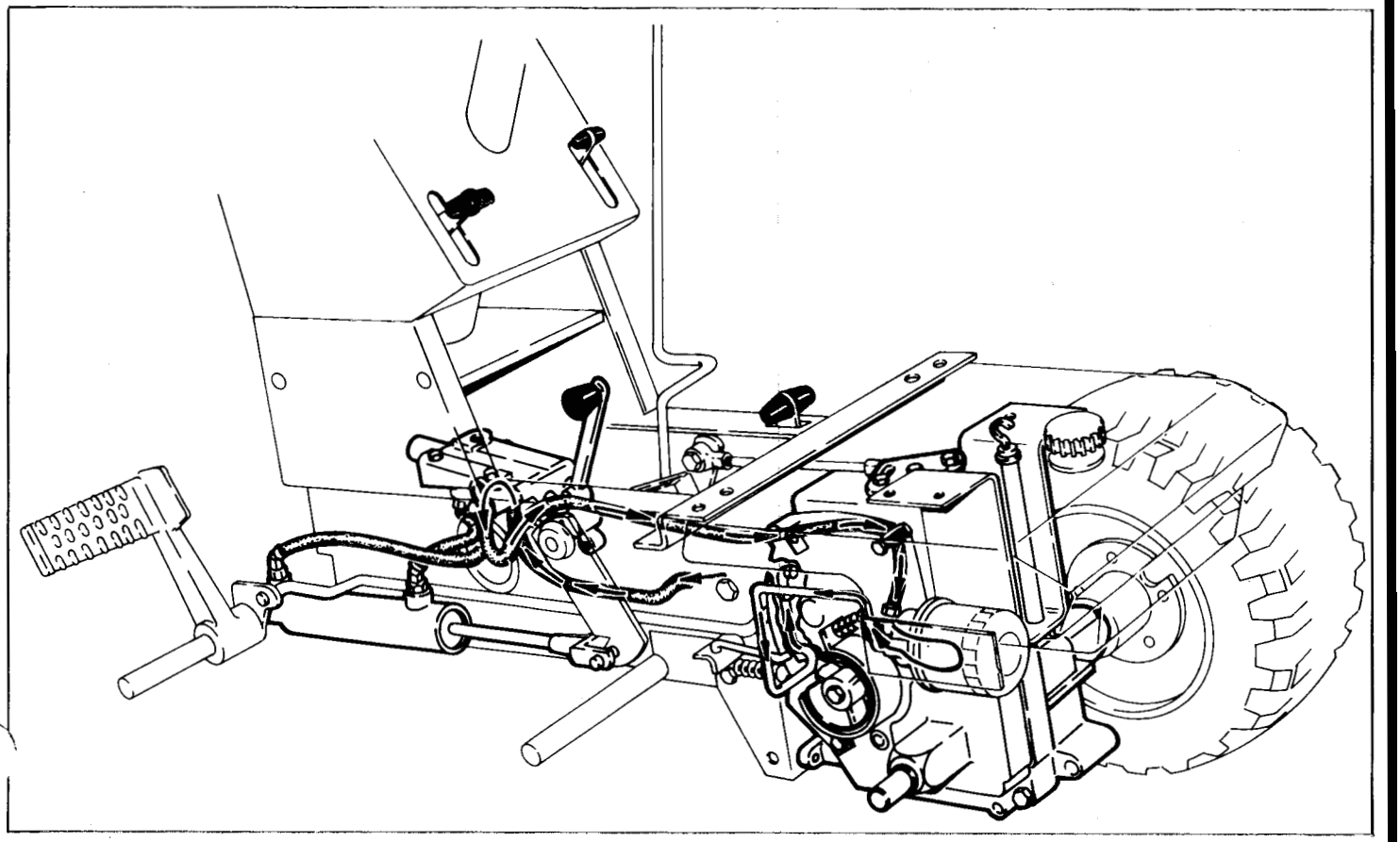


FIG. 7. Oil Flow to Transmission

Hydraulic lift circuit is also operated by charge pump. When lift control valve is moved to Raise or Lower position, charge pump output is diverted to one of hoses attached to lift cylinder. Other hose is connected through control valve to charge pressure hose leading to oil filter, permitting bleed-off of oil on that side of lift cylinder's piston. Implement relief valve located in control valve regulates lift system pressure to 700 PSI. When this valve opens excess oil is bled off into charge pressure hose leading to oil filter.

TRANSMISSION OPERATION

Flow diagrams show hydraulic circuits inside hydrostatic unit and illustrate high and low pressure areas during operation (Fig. 8 and 9).

Pressurized oil from charge pump is maintained between 30 and 90 PSI by charge relief valve located inside hydrostatic unit. When valve opens excess oil pressure is bled back to transaxle sump through open ball bearing on output shaft. Charge pump oil enters transmission pump section, which is turning at engine speed, and "supercharges" it.

Operator controls transmission by moving control shaft connected to cam ring within pump. With control shaft in neutral, or its centered position, no flow is generated by pump and therefore motor portion is at rest.

When control shaft is moved from neutral in "forward" direction, cam ring in pump is moved off center and pump ball-pistons create a flow of fluid. Position of control shaft/cam ring is infinitely variable and any flow rate is possible up to maximum cam ring movement/maximum pump displacement.

Flow created by pump moves to fixed displacement motor through internal passageways. Because motor is a fixed displacement unit, motor requires a specific volume of fluid for it to make one complete revolution.

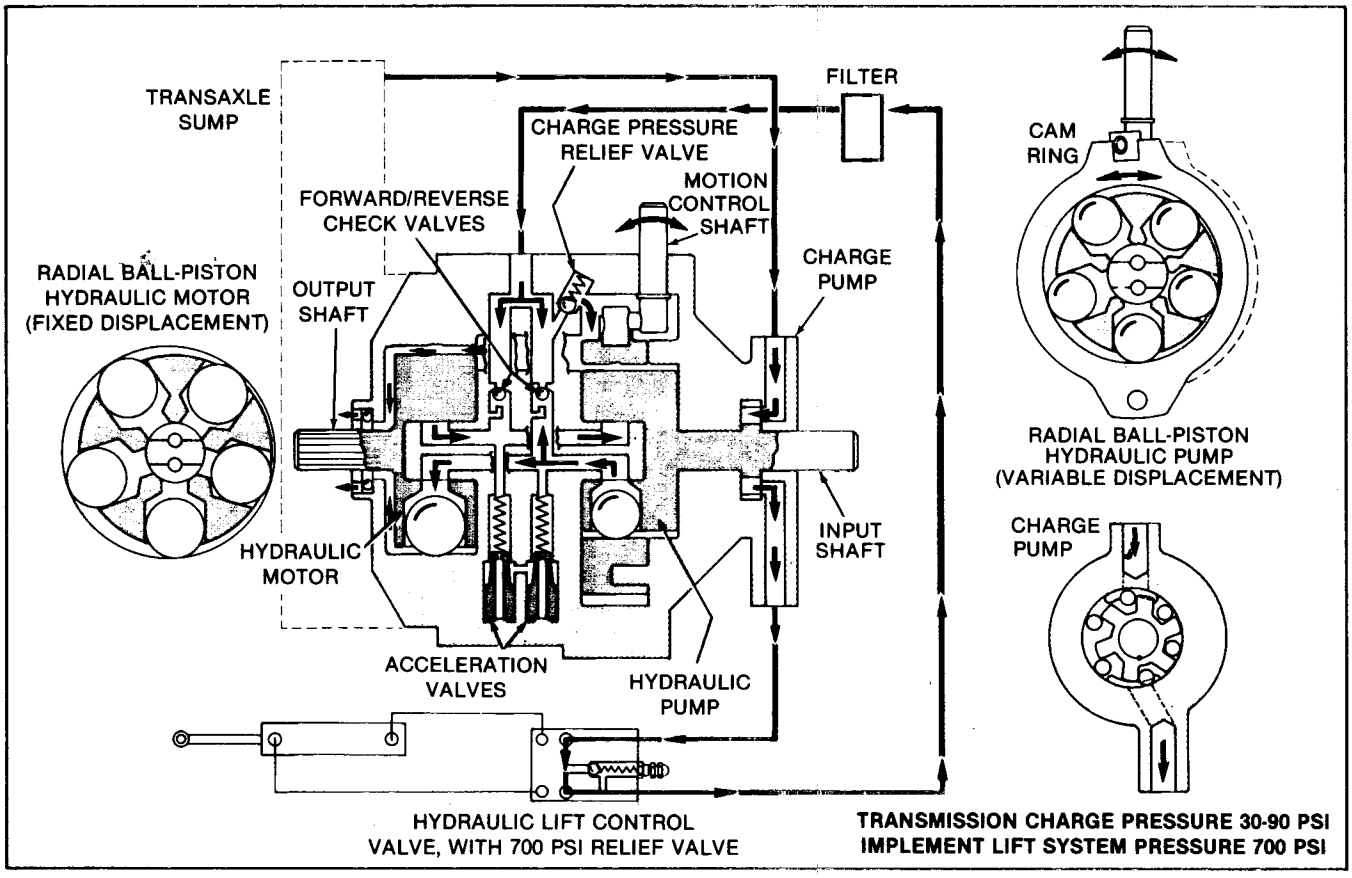


FIG. 8. Hydrostatic Transmission Flow Diagram

When control shaft is moved from neutral to "reverse" direction, cam ring is swung off center to opposite side of pump and flow from pump is "reversed". This flow is directed to other side of motor causing its output shaft to rotate in opposite direction. Pump input shaft always rotates in one direction, dictated by engine, while motor output shaft rotates in either direction depending on direction of flow from pump.

Pump discharge flow is high pressure (dictated by load) fluid. Flow returned from motor to pump is low (or charge) pressure fluid.

Due to internal leakage, fluid being returned to inlet side of pump from exhaust side of motor is less than required by pump. To replace this needed fluid, check valves are located in each side of closed loop. The check valve located on low pressure side of pump will open allowing fluid to enter loop, from charge pump circuit, to make up leakage losses.

Internal acceleration valves are used in both forward and reverse directions. These valves are spring loaded to close "slowly" as pressure (load) increases. These valves control rate of acceleration of motor output shaft, assist in providing a positive neutral, and permit hand pushing tractor without operating engine.

In operation, as tractor's motion control lever is moved out of neutral, appropriate acceleration valve bleeds off some of the high pressure oil before it closes. This initial temporary pressure reduction results in smoother tractor acceleration from a stand-still.

Model 11 has two dampening pistons, which rest against cam ring and are controlled by system pressure. In operation they reduce control shaft vibration and transmission noise.

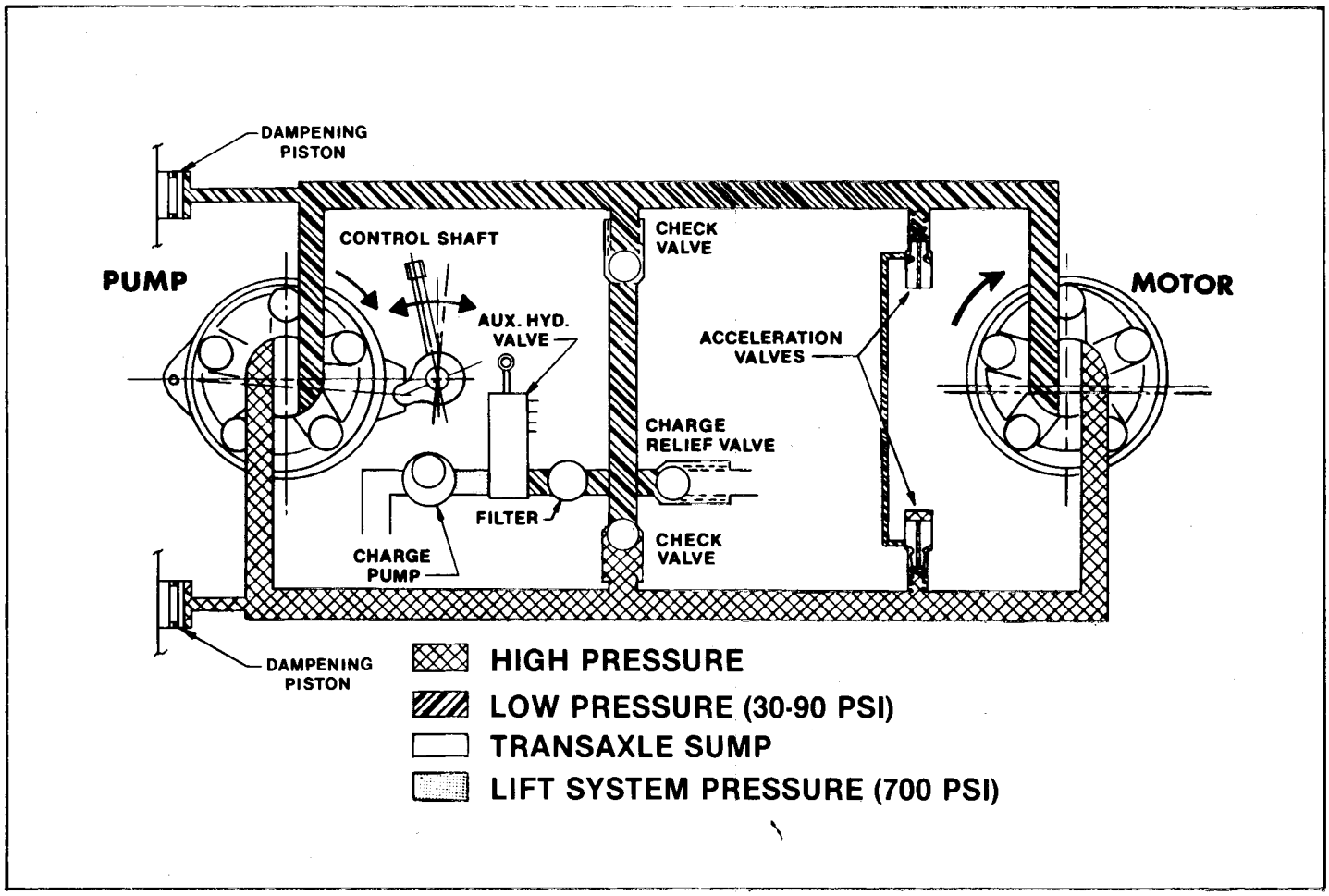


FIG. 9. System Pressure Schematic

TROUBLESHOOTING

PROBLEM DIAGNOSIS

To save time and expense, a systematic approach should be used when troubleshooting any transmission problem, starting with a thorough understanding of how the system operates. Trouble symptoms should be carefully noted and compared to Troubleshooting Guide.

Whenever a problem occurs **ALWAYS CHECK THESE ITEMS FIRST:**

1. Transmission oil level and condition.
2. Motion control linkage.
3. Gaskets, seals, oil lines and fittings.
4. Transmission drive belt, pulleys and transmission clutch.
5. Owner modifications to transmission system.

GENERAL SYSTEM CHECKS

OIL SYSTEM

1. Check oil level when cold; overfilling transaxle sump reduces the available expansion area and may result in overflow at operating temperature. A low oil level will cause erratic operation and may cause permanent damage to the hydrostatic unit. Replace leaking seals and gaskets.
2. Check color of oil; if natural color has changed to black, overheating is indicated. If oil is a milky white color, water contamination is indicated. Change transmission oil and filter before further operation or tests.
3. Oil filters that have not been replaced at specified interval can become clogged and cause loss of power, overheating or non-operation.
4. Check tightness of all mounting bolts and oil line fittings. Air can enter system without having an oil leak.

COOLING SYSTEM

1. Cooling system consists of cooling fan, cast fins in the aluminum transmission cover, and oil circulated by the charge pump. Fan, cover fins, and area surrounding transmission should be kept clean for maximum cooling efficiency. Replace a broken or cracked cooling fan.

Use care to prevent water from entering transaxle when using high pressure or steam cleaning equipment. Cover oil filler tube and avoid directing spray at seals.

ENGINE AND INPUT DRIVE

1. Check engine for correct no-load RPM.
2. Run engine at load and check for proper performance.
3. Check drive belt, transmission clutch, pulleys, keys and keyways.

MOTION CONTROL LINKAGE

1. Check condition of all linkage and securing hardware. Replace worn parts to minimize free movement.
2. Check for damage or binding parts that prevent full forward and reverse travel.
3. Check motion control friction and neutral adjustments.
4. Check condition of control arm, key and transmission control shaft.

TRANSAXLE

1. Roll tractor slowly and check for unusual noises or seizing.
2. Check for differential action and smooth operation of gear train. This can be done by raising rear of tractor and holding one wheel stationary while turning other wheel. If necessary open transaxle and inspect gears, bearings, keys and keyways.

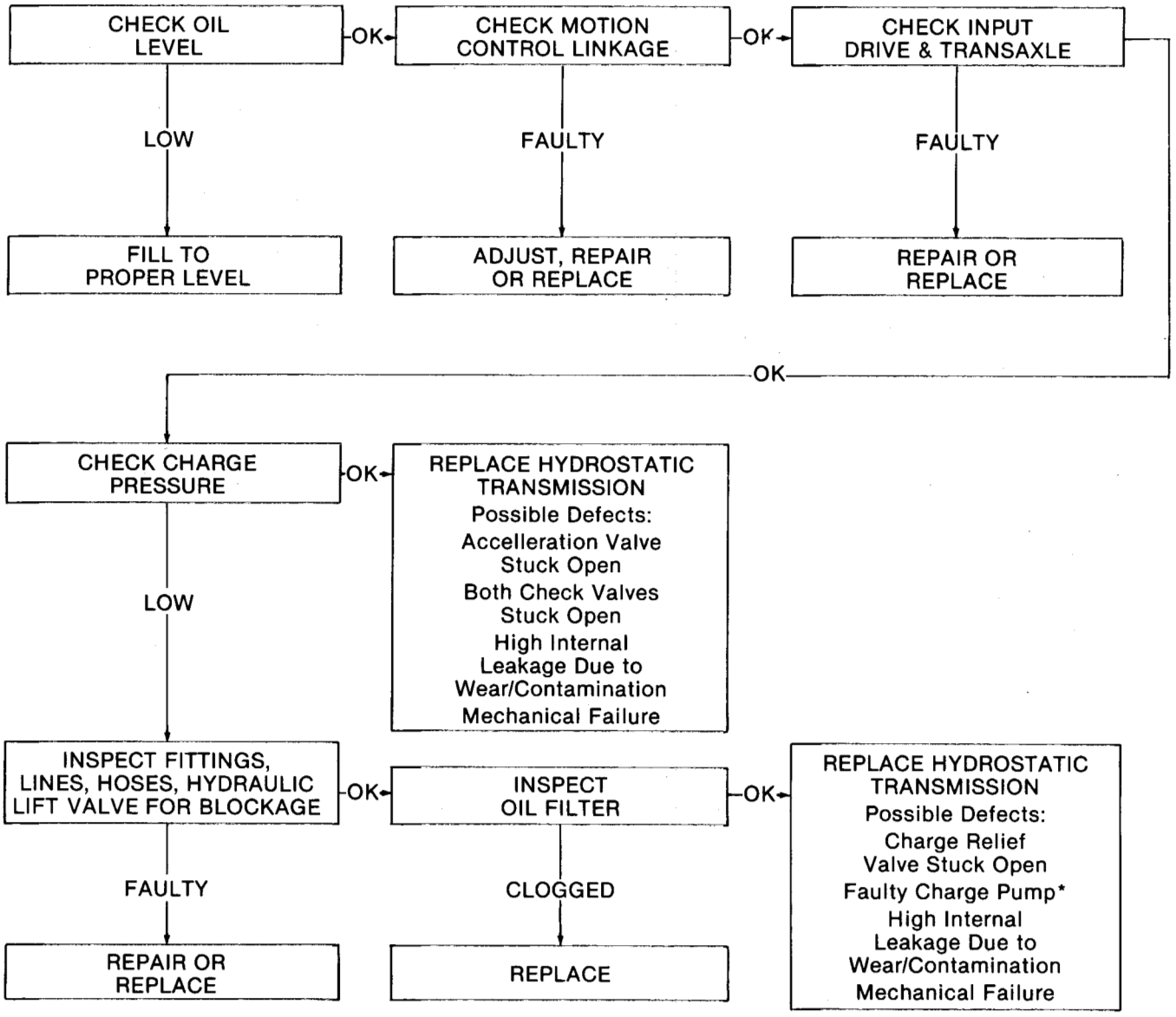
HYDROSTATIC TRANSMISSION

1. Rear wheels should "lock up" if tractor is pushed at about walking speed. This is a rough check of transmission condition. If all other parts of the system are good and tractor's wheels do not lock, it is likely that transmission has excessive internal wear or an internal failure. Conduct a charge pressure and power test.

TROUBLESHOOTING GUIDE

TRACTOR WILL NOT OPERATE IN EITHER DIRECTION

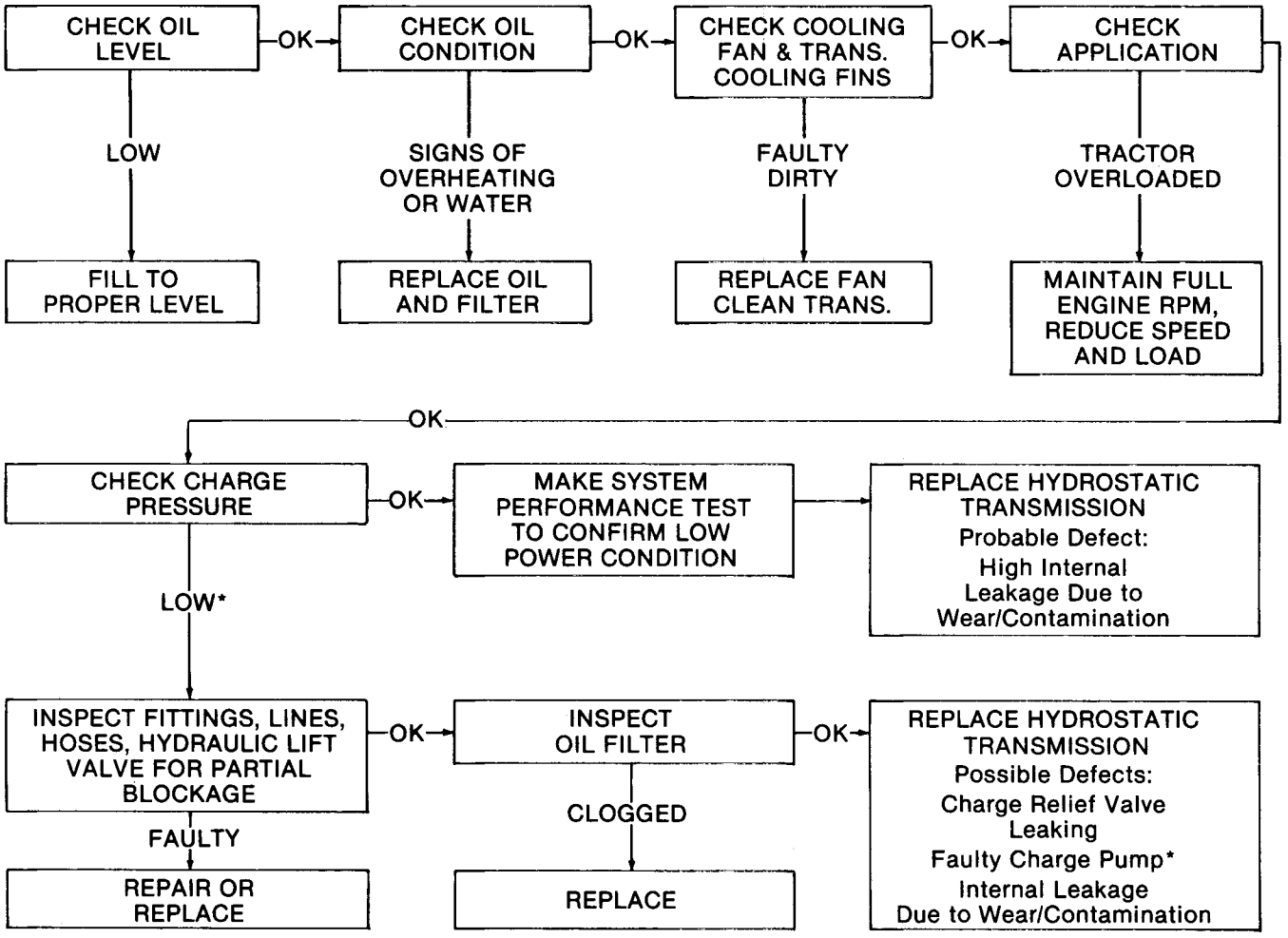
NOTE
IF THE HYDRAULIC LIFT SYSTEM OPERATES NORMALLY THE TRANSMISSION CHARGE PUMP IS WORKING.



*Charge Pump Can be Damaged by Improperly Set Implement Relief Valve. See "Charge Pressure Check".

TRACTOR OPERATES IN BOTH DIRECTIONS, BUT LOSES POWER AS OIL BECOMES HOT.

TRANSMISSION OVERHEATS

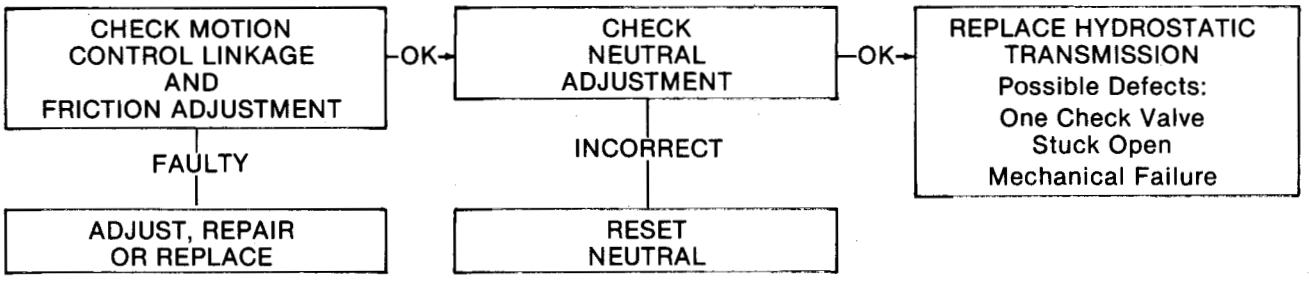


*Charge Pump Can be Damaged by Improperly Set Implement Relief Valve. See "Charge Pressure Check".

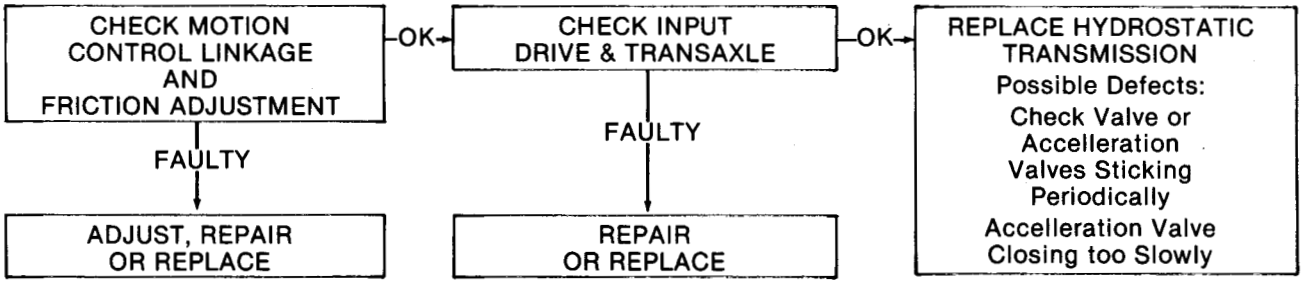
TRACTOR DOES NOT RETURN TO NEUTRAL.

TRACTOR OPERATES NORMALLY IN ONE DIRECTION, BUT IS VERY SLOW IN OPPOSITE DIRECTION.

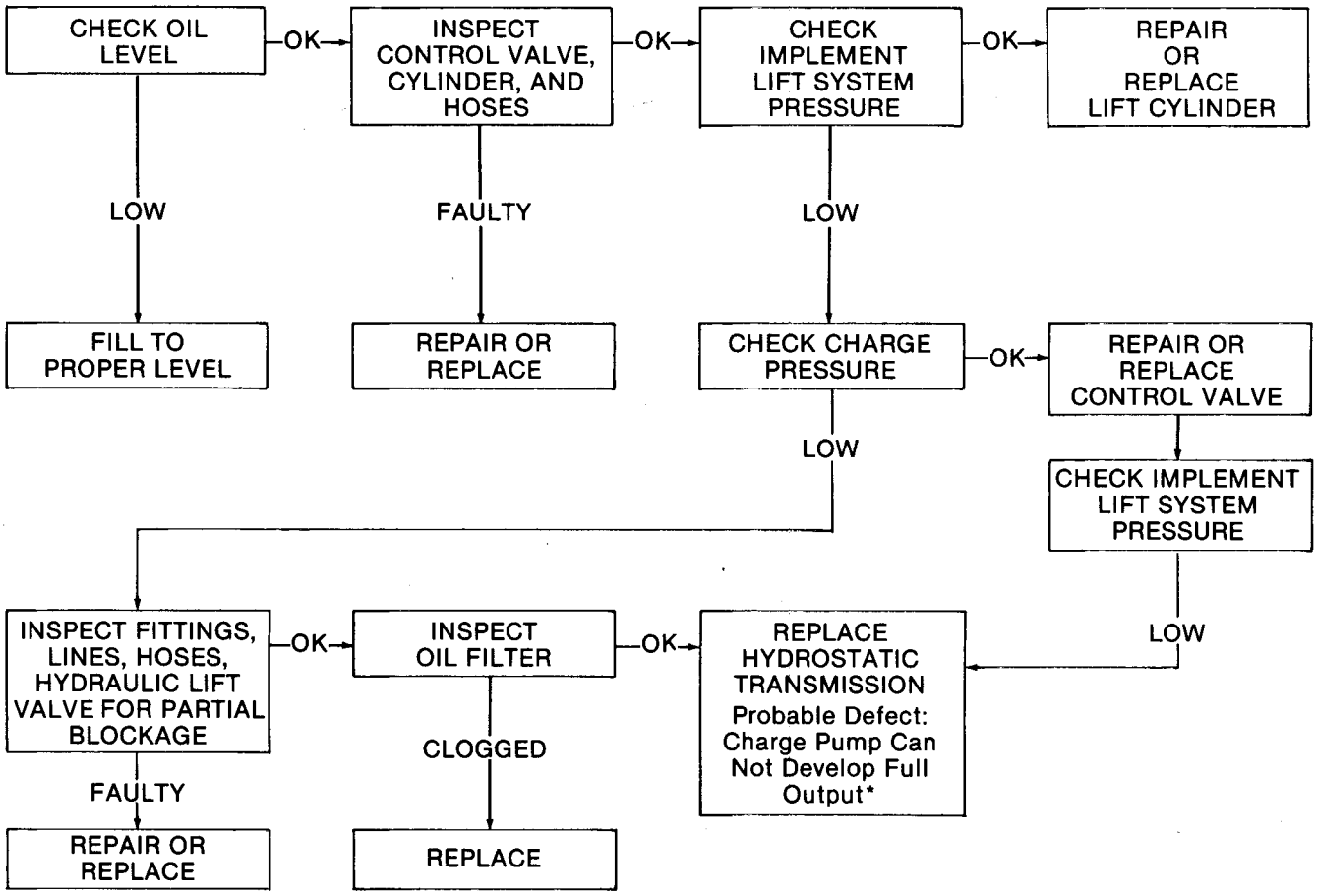
TRACTOR OPERATES IN ONLY ONE DIRECTION.



TRACTOR OPERATES ERRATICALLY



HYDRAULIC LIFT SYSTEM DOES NOT OPERATE, OR DOES NOT OPERATE PROPERLY; TRACTOR OPERATES NORMALLY.



*Charge Pump Can be Damaged by Improperly Set Implement Relief Valve. See "Transmission Pressure Checks".

ADJUSTMENTS

GENERAL

Brake drum is mounted on first intermediate gear shaft, which extends through a needle bearing and seal in left transaxle case half. Brake band is applied by rods connected to Brake/Return to Neutral pedal. Brake is applied only after transmission is returned to neutral, and is used to keep tractor from rolling after it has been stopped. Brake also serves as tractor's parking brake.

SINGLE ACTION BRAKE BAND ADJUSTMENT

To adjust brake band, depress brake pedal and set parking brake lever so it latches in first notch of return-to-neutral cam plate. Turn brake drum mounting bolt clockwise with a torque wrench. Drum should turn when 30-35 ft. lbs. is applied to bolt. Use adjustment nut to increase or decrease tension as required. DO NOT OVERTORQUE.

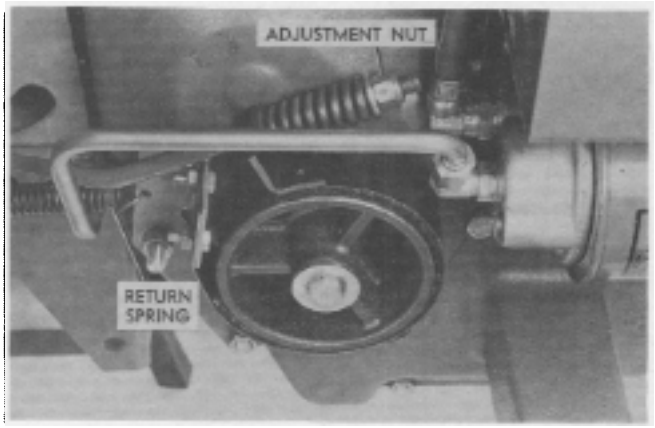
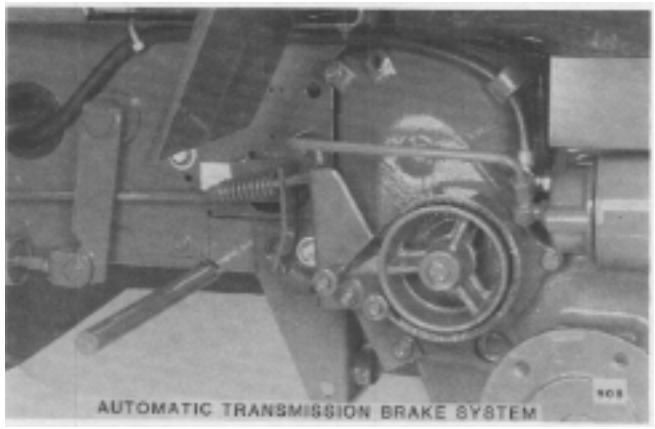


FIG. 10. EARLY MODEL BRAKE BAND

DUAL ACTION BRAKE BAND ADJUSTMENT

To adjust brake band, depress brake pedal and set parking brake so it latches in first notch of cam plate. Tighten adjustment nut and compress spring all the way. Back nut off 1/2 turn. Brake band should not drag on drum when released.



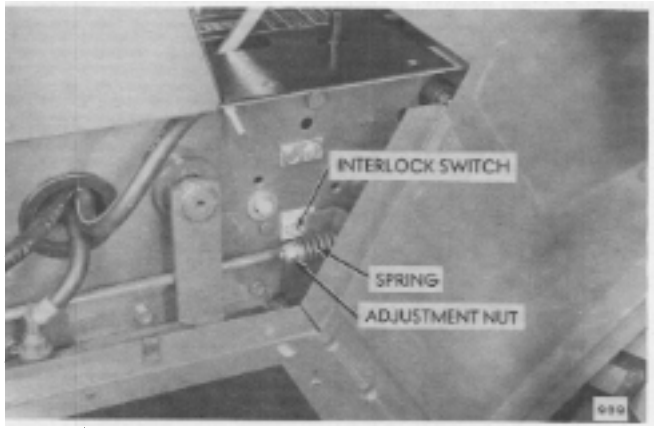


FIG. 11. Late Model Brake Band

MOTION CONTROL FRICTION

Motion control lever should move when approximately 6 lbs. of pressure is applied to it. A hole is provided in tractor's rear fender for access to the motion control friction adjustment. Tighten or loosen adjustment nut as required.

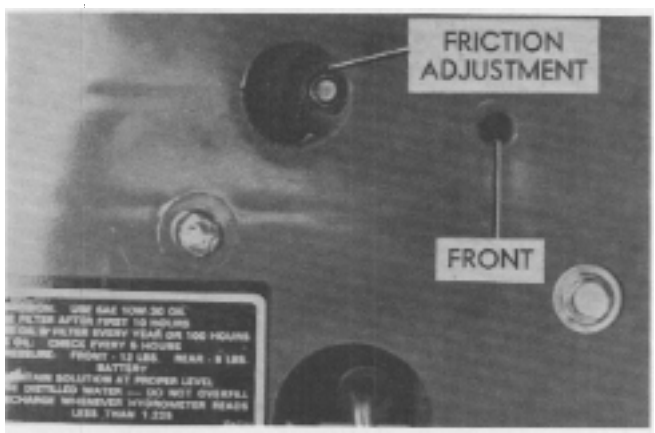


FIG. 12A. Early Model Friction Adjustment

FIG. 12B. Late Model Friction Adjustment

NEUTRAL

To test neutral adjustment tractor should be brought to a stop from both directions on a level surface, using Brake/Return to Neutral pedal. Once tractor is stopped, release pedal. If tractor "creeps" in either direction, neutral adjustment is necesary.

1. If applicable, disconnect wiring as required and remove seat and rear fender on early models only (Fig. 12).
2. Support rear of tractor so both wheels are off ground.
3. Start engine and run at full throttle. Move motion control lever forward and wait for drive train to reach normal operating temperature.
4. Depress brake pedal fully and release.
5. Slightly loosen lock bolt and turn large eccentric with a wrench until rear wheels stop turning. Turn eccentric in opposite direction until wheels start turning, then set eccentric mid-way between these two positions.
6. Tighten lock bolt and retest for neutral, from both directions, at full throttle.

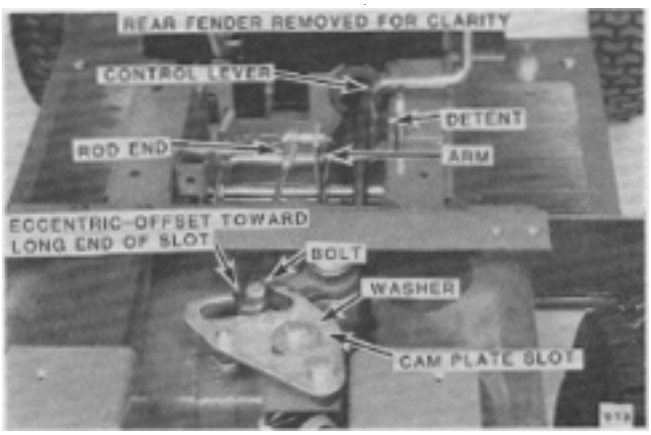


FIG. 13. Neutral Adjustment

7. If tractor can not be neutralized in both directions with eccentric, control rod length should be reset and neutral then re-adjusted:
   A) Remove control cover plate (Fig. 14).
   B) Set parking brake.
   C) Disconnect front end of control rod from motion control arm.
   D) Adjust position of cam plate so that right edge of friction washer is even with right end of slot in cam plate.
   E) Adjust rod end on control rod so that bolt enters hole in control arm exactly at a right angle (square) to it.
   F) If a satisfactory neutral still cannot be obtained, check linkage for wear or damage.
8. After neutral has been set, check that motion control lever is centered in notch of detent spring. Spring has slotted bolt holes so it may be adjusted to line up notch with lever. Belt cover and control cover plate in front of seat must be removed to make this adjustment.
9. If applicable, reinstall fender and seat. Reconnect wiring.

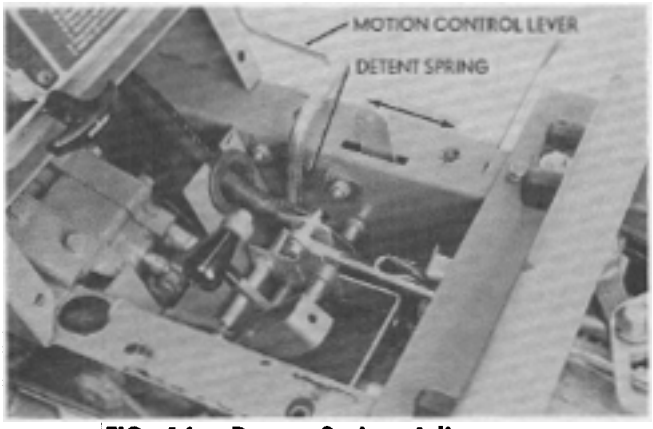


FIG. 14. Detent Spring Adjustment

TESTING

SYSTEM PERFORMANCE

A test for observing transmission system performance under load can be helpful when checking a "low power", or "tractor loses power" condition.

1. Operate tractor to bring engine and drive train to normal operating temperature.
2. Anchor rear of tractor to an immoveable object (tree, beam, etc.) with a chain secured to transaxle case. Rear wheels must be on a high friction surface, such as unfinished concrete or asphalt. Front wheels may be placed against a curb or wall as an alternative, **but provision must be made to keep front of tractor on ground.**
3. Set engine at half throttle and move motion control lever fully forward. Tractor should have enough power to spin rear wheels with an operator in seat.
4. If wheels do not spin, carefully note engine, drive belt, and transmission/transaxle performance to isolate problem.
5. If test results are marginal, tractor should be used under actual operating conditions to isolate problem.

PRESSURE CHECKS

Perform pressure checks at locations described below. Do not connect a pressure gage in a way that cuts off flow to hydraulic valve, which eliminates relief valves from system. Charge pump pressure will build until internal failure occurs.

IMPLEMENT LIFT SYSTEM

Because no tractor disassembly is required in order to gain access to test point, it is suggested that implement system pressure be checked early in any troubleshooting routine as a matter of convenience. A correct lift system pressure reading indicates a good charge pump.

A suggested gauge system is illustrated in Fig. 15.

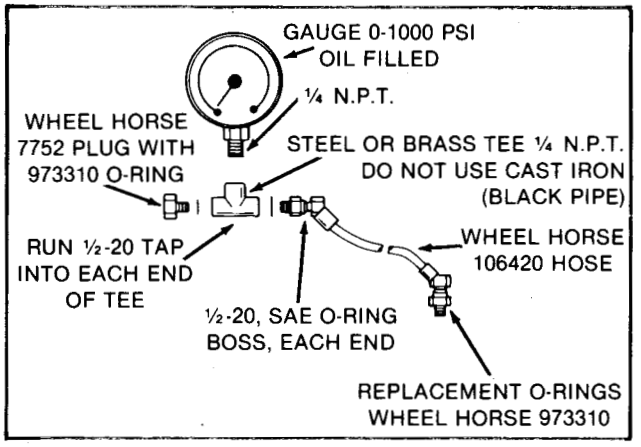


FIG. 15. Pressure Test Equipment

FIG. 16. Pressure Test Point — Lift System

To check implement lift system pressure:

1. Connect gauge system to front lift cylinder hose. Gauge can be connected to place hydraulic lift cylinder either in or out of circuit, as desired.
2. With engine running, hold lift control valve in "Down" direction. Normal pressure reading is 700 ± 50 PSI. If pressure is over 800 PSI, replace hydraulic lift control valve. **Do not attempt adjustment of relief valve setting without factory assistance. Severe transmission damage can occur if adjusted improperly.**

   Refer to appropriate Troubleshooting Chart for troubleshooting procedure.

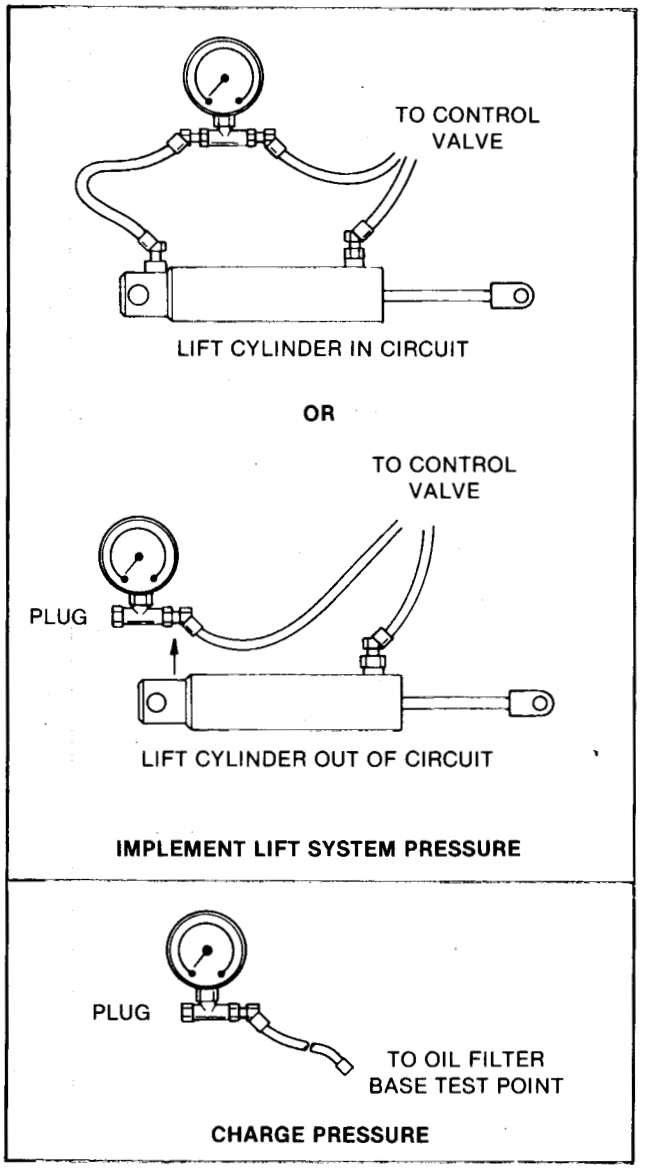


FIG. 17. Hose Connections

CHARGE PRESSURE

Charge pressure is checked at oil filter base.

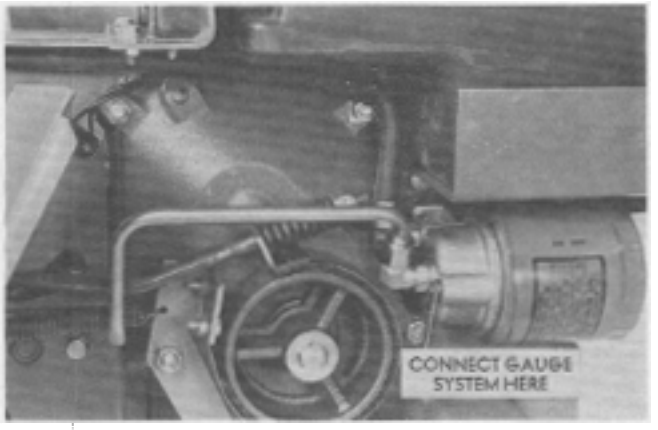


FIG. 18. Charge Pressure Test Point

1. Remove pipe plug and connect gauge directly to filter base. Although thread is ¼-18 NPT, it will accept a ½-20 SAE fitting for test purposes.
2. Operate engine. Normal charge pressure is 30-90 PSI. Refer to appropriate Troubleshooting Chart for troubleshooting procedures.

Always check implement lift pressure relief valves for signs of tampering if charge pressuer is low. A relief valve set too high will cause permanent internal damage to charge pump and hydrostatic transmission. If damage has occurred, replace transmission — do not operate lift system until hydraulic lift control valve has been replaced, or relief valve adjusted. Do not adjust relief valve without factory assistance.

REPAIR OPERATIONS

GENERAL INFORMATION

Hydrostatic transmission, transaxle, and hydraulic lift system may all be serviced without removing complete transmission system from tractor. Detailed repair operations are given for in-vehicle service. A procedure for removing transmission/transaxle from tractor as an assembly is also given at end of this section.

An 11/16" Crow Foot wrench is necessary to perform in-vehicle transmission and transaxle service. Two sources of this wrench are: Distributors of Williams products (Williams #BC-1003) and Sears Roebuck & Co. (Sears #9HT4362).

HYDRAULIC HOSES
HYDRAULIC LIFT CONTROL VALVE

REMOVAL

1. If applicable, remove battery (Fig. 19C).
2. Remove seat and rear fender.
3. Remove control cover plate and rear hoodstand cover plate.
4. Remove LH side cover.
5. Support rear of tractor with jack stands placed under rear footrest cross rod.
6. Remove LH wheel. If replacing charge pump hose, also remove RH wheel.
7. Disconnect three hoses (Fig. 19A). Remove two control valve bracket bolts shown in Fig. 19A or 19C. Free long hose from clamp and tie securing it to tractor.

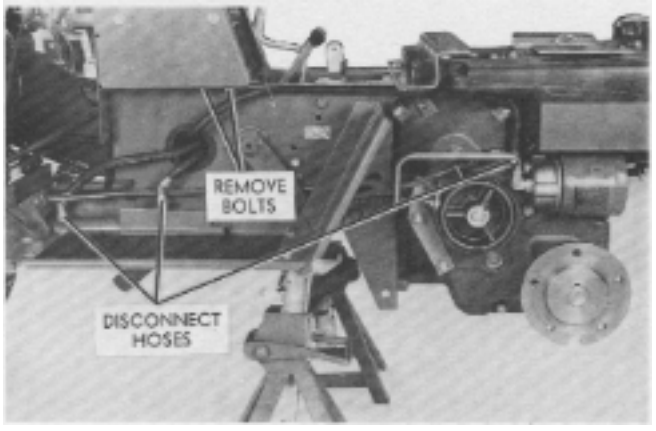


FIG. 19A. Disconnect Hoses

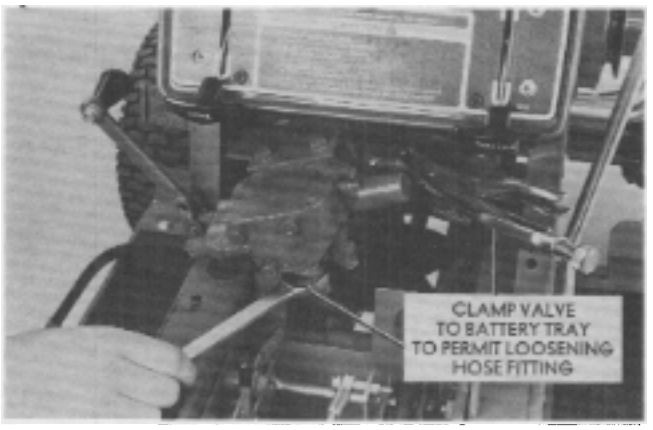


FIG. 19B. Early Model Control Valve

8. Pull control valve out enough to permit clamping it to rear edge of battery tray (Fig. 19B). Do not secure valve by its handle when loosening hose or it may break.
9. Disconnect charge pump output hose, connected to "IN" port on control valve.
10. Remove control valve from tractor for repair or replacement of valve/hoses.
11. If replacing charge pump output hose, free it from clamp inside hoodstand. Disconnect hose from charge pump outlet, and pull hose out of hoodstand toward rear.

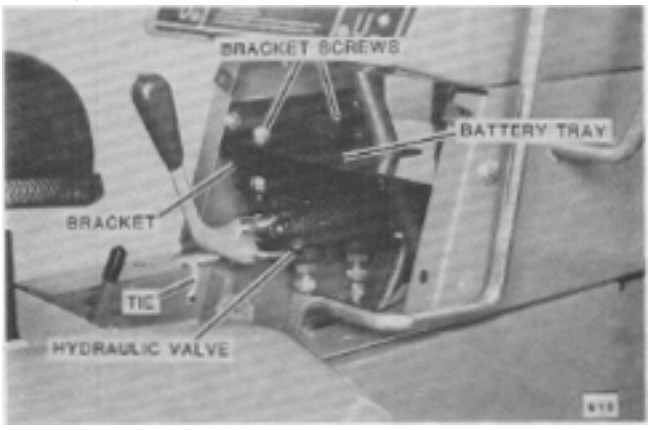


FIG. 19C. Late Model Control Valve

INSTALLATION

1. Follow removal instructions in reverse.
   a. Use care to prevent dirt from entering system, particularly when working charge pump outlet hose through hoodstand.
   b. Clamp valve as shown in Fig. 19B or 19C when tightening charge pump outlet hose.
   c. Operate hydraulic system before installing covers. Check performance and for oil leaks. Exercise lift system for one minute to expel any trapped air.
   d. If control valve was rebuilt or replaced, perform an implement lift system pressure check.
   e. Check that hoses are routed properly and secured with clamps and ties as required.

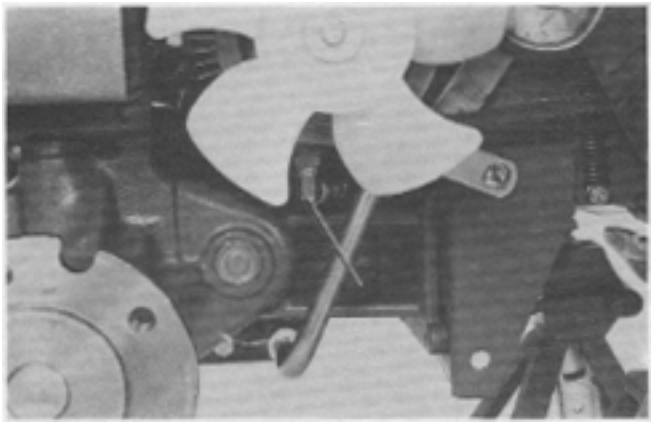


FIG. 20. Charge Pump Outlet Hose

TRANSMISSION

REMOVAL

1. Remove seat, rear fender, and control cover plate.
2. Support rear of tractor with jack stands placed under rear footrest cross rods.
3. Drain transmission oil from transaxle.
4. Remove rear wheels.
5. Close fuel shut-off valve. Remove and plug fuel hose.
6. Remove two bolts, bracket and lift tube from top of transaxle.
7. Remove two bolts securing oil filter base to seat support.

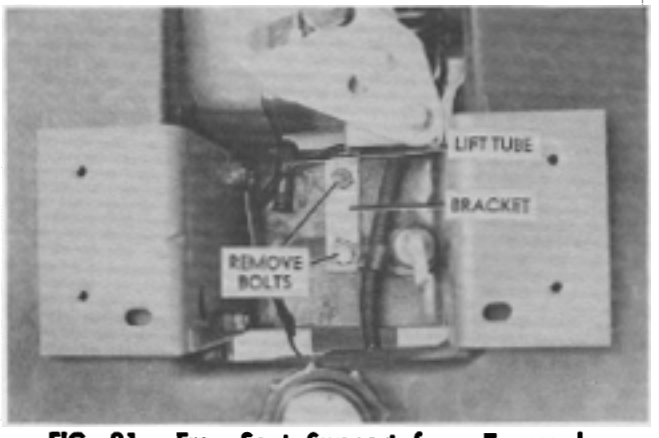


FIG. 21. Free Seat Support from Transaxle

8. Remove two bolts and nuts securing front seat support bracket to hoodstand.
9. Remove fuel tank, seat and fender support as an assembly.

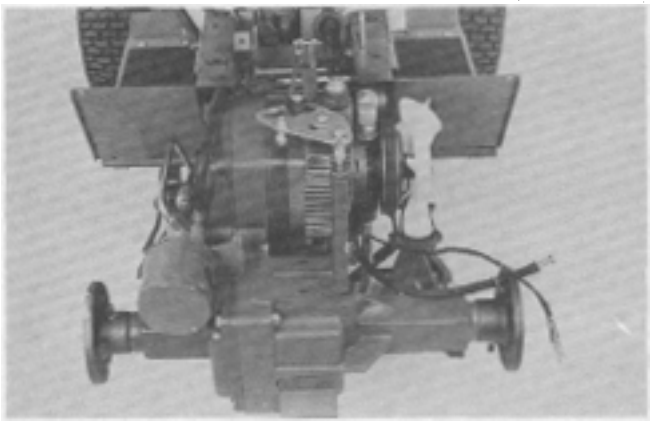


FIG. 22. Fuel Tank/Seat Support Removed

10. Remove cooling fan. Note direction of installation.
11. Disengage transmission clutch and remove drive belt from input pulley.
12. Disconnect rear end of motion control rod from cam plate.

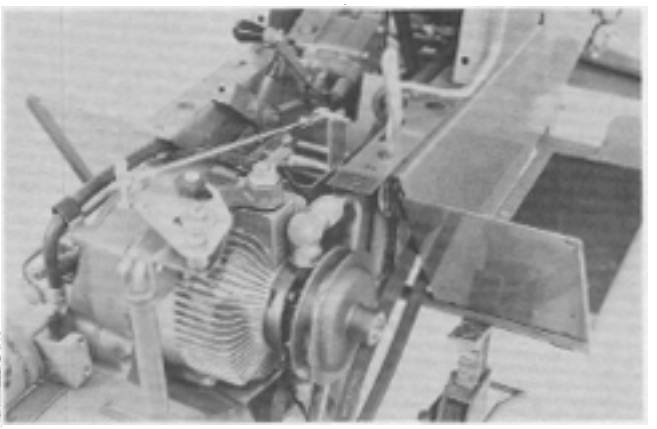


FIG. 23. Fan, Drive Belt, Control Rod Removal

13. Loosen lower fitting and disconnect upper fitting of suction tube; rotate tube forward.
14. Cut plastic tie holding wires to front of cam plate. Pull wiring and fuel hose forward, out of hoodstand, and secure out of way. Pivot control rod up and forward, out of way.
15. Disconnect outlet hose connected to bottom of charge pump.

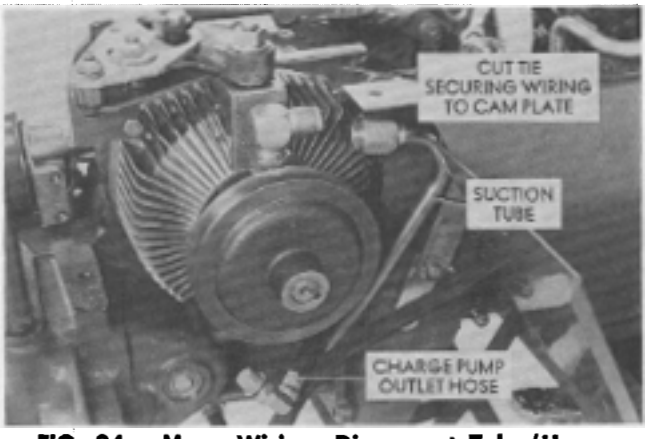


FIG. 24. Move Wiring, Disconnect Tube/Hose

16. Use an 11/16" Crow Foot wrench to disconnect metal line (from oil filter) at front of transmission. Move motion control lever forward for easier access after loosening fitting.

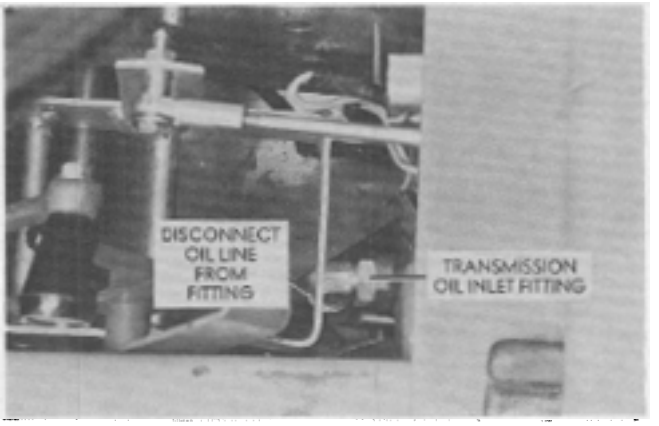


FIG. 25. Disconnect Metal Line

17. Transmission drains through open bearing behind the output gear. Transmission will still be half filled with oil when removed. Remove two bolts securing bottom of transmission. Remove two bolts securing top of transmission. Remove transmission and discard gasket.

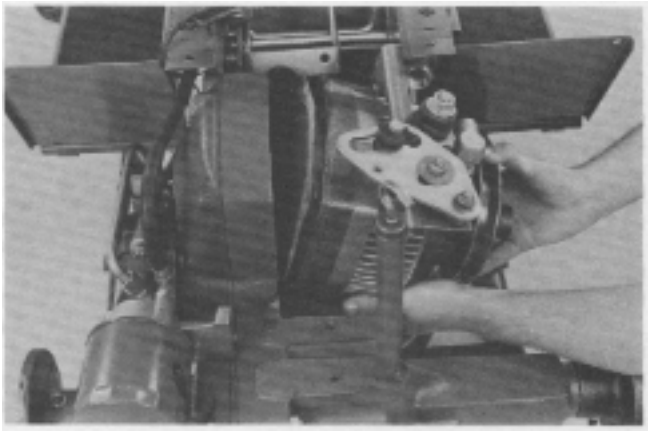


FIG. 26. Transmission Removal

PULLEY, GEAR AND CAM PLATE REMOVAL

1. The input pulley is keyed to charge pump input shaft and is a slip fit.
2. The output gear is a slip fit and is retained by a snap ring, which is installed with sharp edge out (away from gear). A splined washer is installed behind gear.

Output shaft can be moved inward under moderate pressure, making it impossible to install snap ring in its groove. In this case, slip spacer and gear on shaft. Use cooling fan washer and bolt, plus one or two ¾ washers, as a "jack" to pull shaft back out.

3. Suction line elbow fitting at top of charge pump can not be removed without transmission disassembly and is supplied with replacement transmissions. Elbow fitting at front of transmission is removable.

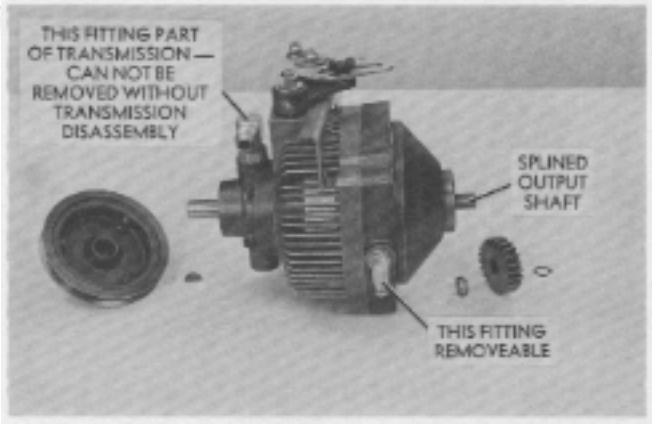


FIG. 27. Gear, Pulley and Fitting Removal

4. Remove lock bolt and eccentric from control arm. Work cam plate and bracket out from under arm as shown in Fig. 28.

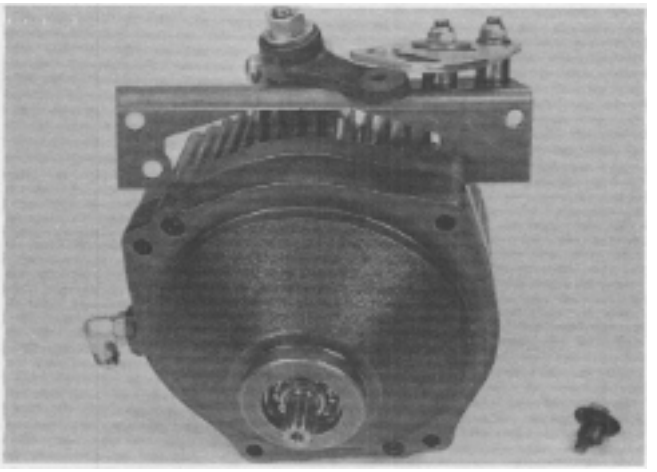


FIG. 28. Cam Plate and Bracket Removal

5. Fig. 29 shows cam plate pivot and friction assembly sequence.

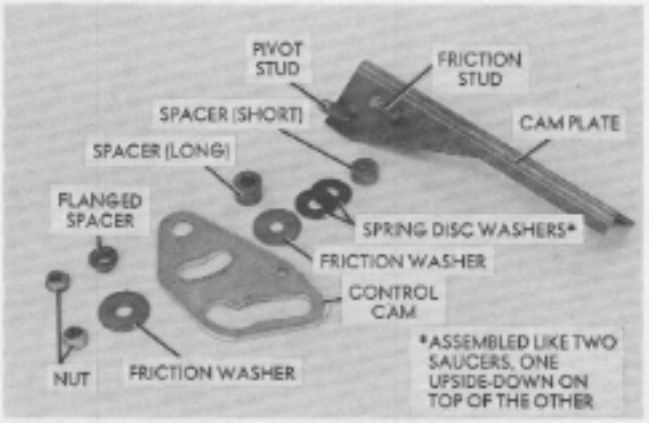


FIG. 29. Cam Plate Disassembled

6. Remove control arm **with a puller only.** Transmission control shaft is tapered, as well as havink a keyway, for retaining control arm. **Striking end of control shaft to remove control arm can cause permanent internal damage to transmission.**

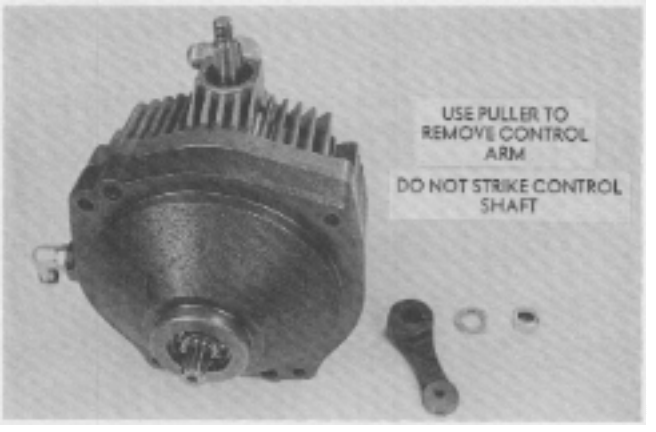


FIG. 30. Control Arm Removed

INSTALLATION

1. Transfer linkage, pulley and fittings to new transmission, as applicable. Use an anti-rust compound on input pulley shaft (Texaco Rust Preventative, Code 1976, Compound "L" Light, or equivalent).
2. Place a new gasket on transmission, using grease to hold it in place.
3. Install transmission on transaxle and secure in place. Use new Eslok bolts and nuts, or lockwashers. Before completely tightening hardware, start upper suction line nut onto transmission fitting. Torque bolts to 30-35 ft. lbs.
4. Connect metal line to front transmission fitting and tighten with 11/16" Crow Foot wrench.
5. Tighten suction line fittings.
6. Route fuel hose and wiring harness under transmission.
7. Connect hydraulic hose to bottom of charge pump.
8. Install drive belt, engage transmission clutch and install cooling fan — side with manufacturer's name faces out.
9. Reattach control rod to control cam.
10. Cable tie wiring harness to control plate.
11. Fill transaxle with 10W-30 or 10W-40 motor oil.
12. Install fuel tank/seat support assembly.
13. Secure oil filter base to seat support.
14. Install lift tube, bracket and bolts. Be sure front of lift tube enters hole at front of transaxle mounting flange. Use lockwashers or new Eslok bolts. Refer to Fig. 21 and reference photo below.

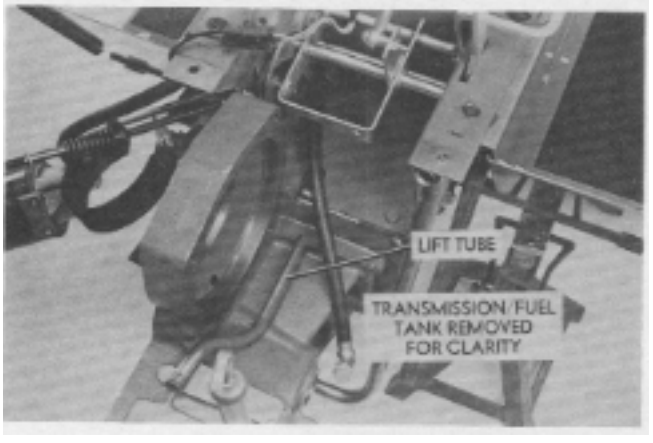


FIG. 31. Lift Tube Location

15. Connect fuel hose and open shut-off valve.
16. Set transmission neutral, check for leaks, and recheck oil level.
17. Install rear wheels and lower tractor.
18. Install rear fender and seat.

TRANSAXLE

IN-VEHICLE SERVICE

1. Remove, seat, rear fender, and control cover plate.
2. Support rear of tractor with jack stands placed under rear footrest cross rods.
3. Drain transmission oil from transaxle.
4. Remove rear wheels.
5. Close fuel shut-off valve. Remove and plug fuel hose.
6. Remove two bolts, bracket and lift tube from top of transaxle (Fig. 21).
7. Remove two bolts securing oil filter base to seat support (Fig. 21).
8. Remove two bolts and nuts securing front seat support bracket to hoodstand.
9. Remove fuel tank, seat and fender support as as assembly (Fig. 22).
10. If hydrostatic unit is to be removed, follow instructions for transmission removal. To leave transmission installed while servicing transaxle:
    a. Remove cooling fan.
    b. Remove drive belt from input pulley.
    c. Loosen lower fitting and disconnect upper suction tube fitting.
    d. Leave transmission bolt indicated in Fig. 32 installed, which will hold transmission in place during transaxle service.

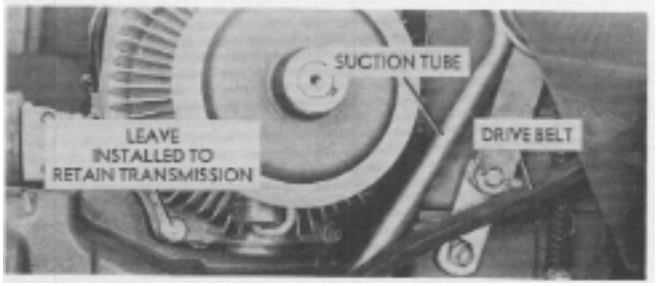


FIG. 32. Transaxle Service, Transmission Installed

11. Remove both wheel hubs and axle keys. Thoroughly remove burrs and corrosion from axle shafts Failure to do so may cause damage to needle bearing in case halves, as well as damage new axle seals when installed.
12. Disconnect metal line from front of transmission, using an 11/16" Crow Foot wrench (Fig. 25). Move metal line and oil filter out of way as shown in Fig. 33.
13. Disconnect brake return spring.
14. Remove brake drum. Thoroughly remove any burrs or corrosion from shaft

    If brake drum will not come off, removal can be delayed until case half is removed. Brake shaft can then be pressed out of drum. Needle bearing will probably be damaged as shaft is pressed through it; replacement is recommended.

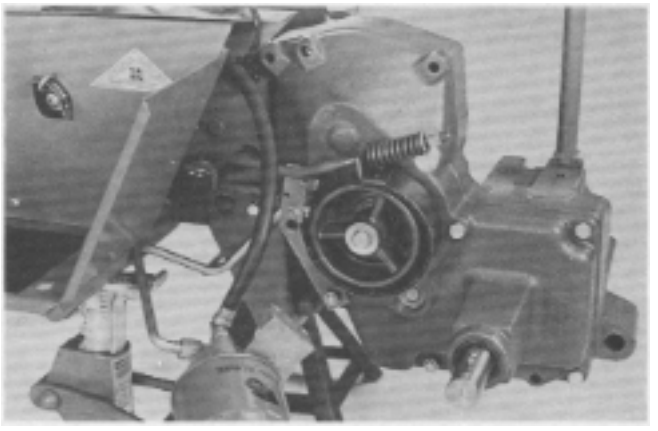


FIG. 33. Remove Wheel Hubs, Disconnect Metal Line

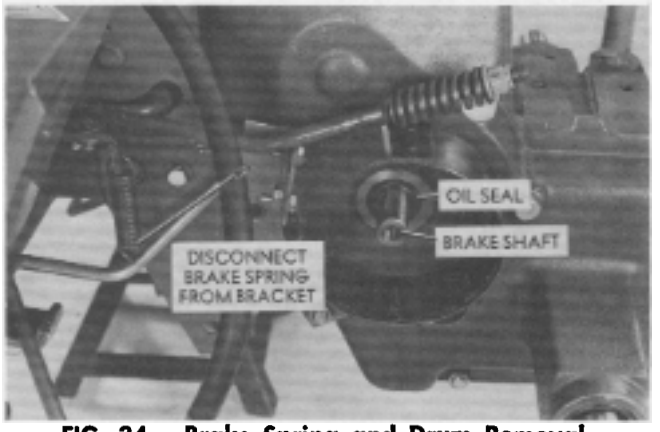


FIG. 34. Brake Spring and Drum Removal

15. Remove eight bolts securing case halves together.
16. Swing brake band and bracket out of way. Carefully remove left case half. A soft-faced mallet may be used to break seal. Discard gasket.

Some early production transaxles required two gaskets. Use two new gaskets when reassembling these units.

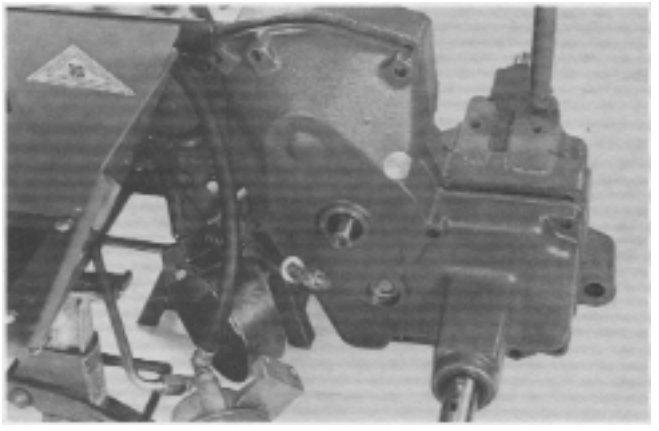


FIG. 35. Case Half Removal

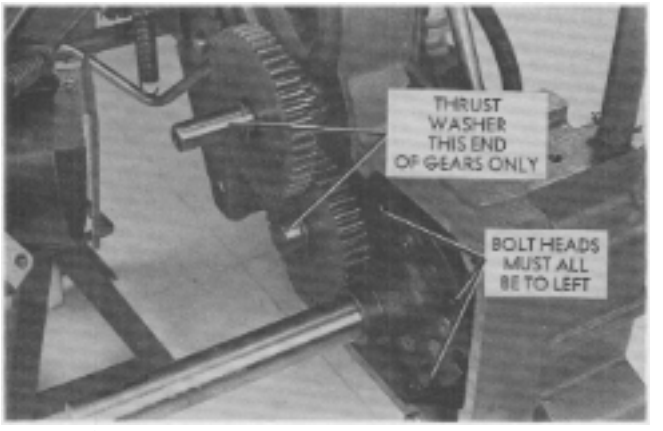


FIG. 36. Case Half Removed

17. Remove two intermediate gears and differential assembly from right case half.

CASE HALF SERVICE

1. Remove and discard brake shaft seal and both axle seals. Do not install new seals until transaxle is reassembled.
2. Carefully inspect bearings in both case halves. If replacement is required, two axle shaft needle bearings can be driven out from either inside or outside of case. All other bearings should be driven out from outside of case half. To remove uppermost bearing in RH case, use a 3/16-1/4" punch inserted through small opening behind bearing.
3. Axle needle bearings should be pressed in from outside. All other bearings are pressed in from inside case. All bearings are pressed flush with machined surface around bearing bore.

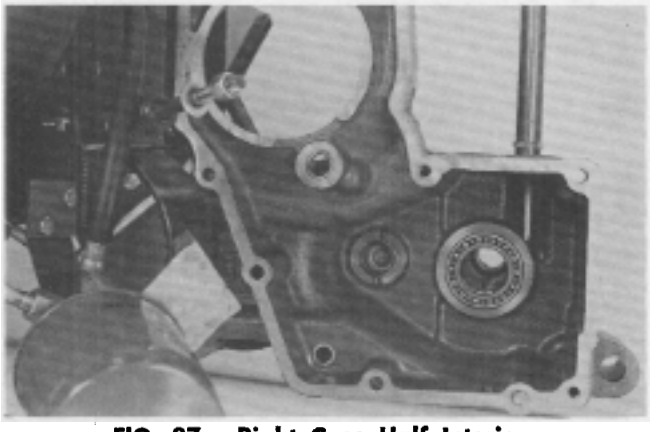


FIG. 37. Right Case Half Interior

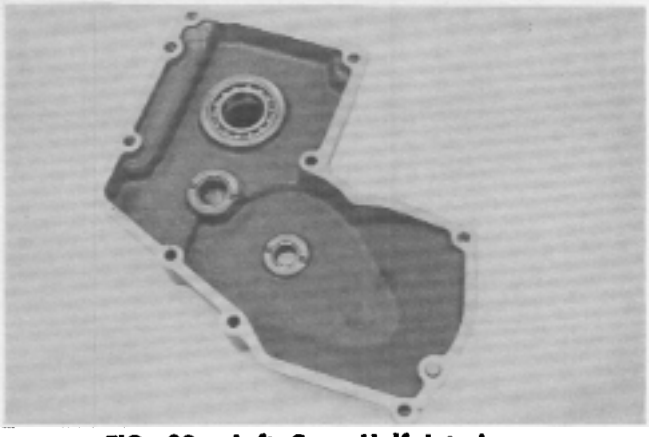


FIG. 38. Left Case Half Interior

INTERMEDIATE GEAR AND DIFFERENTIAL SERVICE

NOTE: When ordering repair parts, carefully identify part numbers from parts manual that matches your tractor VIN number. Inside diameter of differential end cap bearing was changed from 1½ inch diameter to 40MM diameter.

1. First intermediate gear assembly order is shown in Fig. 39. Parts are a slip-to-light press fit. Second intermediate gear and pinion are very tight fits and normally require a large press to separate them.

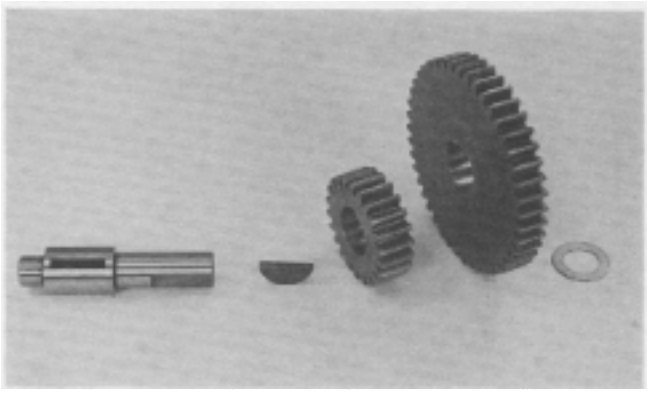


FIG. 39. Intermediate Gear Assembly

2. Differential assembly should be disassembled for inspection during a general overhaul. Check for loose hardware, cracks, enlarged holes, and gear wear or damage. Note that adjacent differential pinions are installed in opposite directions (teeth up, teeth down, teeth up, etc.).

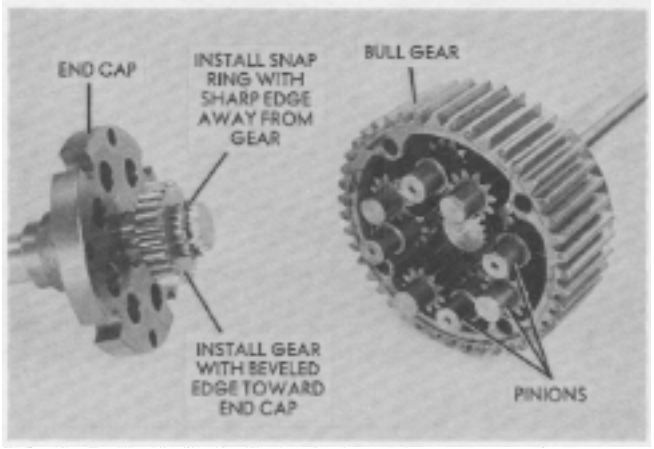


FIG. 40. Differential Disassembled

3. Use new nuts when reassembling, which are special high-tensile parts. Use new Grade 8 bolts, also, if necessary. Note location of hardened washers and direction of bolt installation (Fig. 41). Torque bolts to 30-35 ft. lbs.

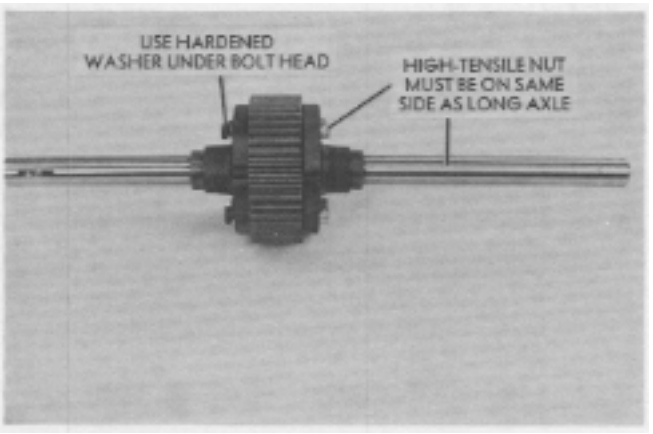


FIG. 41. Differential Assembly

TRANSAXLE REASSEMBLY

Follow disassembly instructions in reverse order to reassemble transaxle. Following assembly notes apply:

1. Use grease to hold case gasket in place when reassembling.
2. Use lockwashers or new Eslok nuts and bolts. Case bolt torque is 30-35 ft. lbs.
3. After assembling case halves, install new oil seals. Use tape over axle keyways to prevent damage to seal; use a seal bullet (sleeve) when installing oil seal on brake shaft. Use a seal driver or other suitable tool to drive seals. Seals should be flush to slightly below flush with outside of case.
4. Use an anti-rust compound on axle shafts (Texaco Rust Preventative, Code 1976, Compound "L" Light or equivalent). Apply a very light coat of this compound on brake drum shaft also.
5. Wheel hub set screw torque is 28-32 ft. lbs.
6. Brake adjustment should be checked after reassembly.
7. Cooling fan — side with manufacturer's name faces out.

TRANSMISSION SYSTEM

REMOVAL

In some cases, removal of transmission/transaxle as an assembly may simplify repairs.

1. Perform Steps 1-12 under "Transmission Removal".
2. Cut plastic tie securing wiring harness to cam plate (Fig. 24).
3. Remove brake pedal return spring. Remove brake adjustment nut, washer and spring (Fig. 10 or 11).
4. Disconnect hydraulic hose from oil filter base.
5. If desired, install rear wheels and tires to permit rolling assembly away from tractor.
6. Support weight of transaxle and remove four bolts securing front of transaxle to frame.

INSTALLATION

Follow disassembly instructions in reverse order to reinstall assembly. Following notes apply:

1. On early models only, be sure to guide brake rod through brake band as assembly is moved up to tractor (Fig. 10).
2. It is helpful to insert a couple of 3/8-16 x 2 bolts through a pair of holes in frame plate, then temporarily thread them into transaxle. They will serve as pilots for hole alignment and permit easy installation of first two normal-length bolts. Use new lockwashers on bolts. Torque to 30-35 ft. lbs.
3. Cooling fan — side with manufacturer's name faces out.
4. Adjust brake and make neutral adjustment after reinstallation.

INTERNAL TRANSMISSION SERVICE

The following repair procedures for the Model 11 Eaton Transmission is for OUT-OF-WARRANTY transmissions ONLY. Transmissions within warranty period must be serviced with new or rebuilt complete units. Repair parts are available using regular Wheel Horse procedures. Repair part numbers are listed in this manual and on Blue Color Microfiche Card for the Model 11 Transmission Repair Manual.

SUGGESTED ITEM AIDS

(1) 2" x 6" Wood Block with 3/4" Hole
(1) 2" x 2" x 2½" Wood Block
(2) Large ½" Wide Rubber Bands
(1) Hardened 3/16" Dia. x 10" Long Rod
(1) Tube of Vaseline

IMPORTANT: When compressed air is used in cleaning, do not expose lip seals or bearing surfaces to high pressure.

Clean transmission exterior thoroughly before repairs are started. Use a cleaning solution that will not affect paint, gaskets, rubber seals and plastic.

Drain fluid from transmission out through shaft bearing.

Mark fan using felt marker to identify "Outside" position.

Remove snap ring, gear, fan and pulley from transmission.

Place transmission on 2" x 6" with splined shaft up.

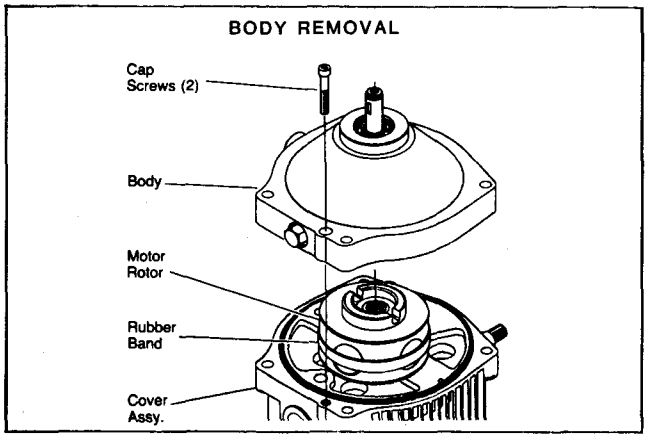


FIG. 42.

IMPORTANT: Motor ball piston assembly must remain intact as ball pistons are matched to motor rotor. Use rubber band to retain ball pistons in place during handling.

Use a 1/4" Allen wrench to remove two socket head bolts.

Separate body from cover.

If cover does not separate easily, tap body with plastic hammer to break seal.

Place rubber band on motor rotor.

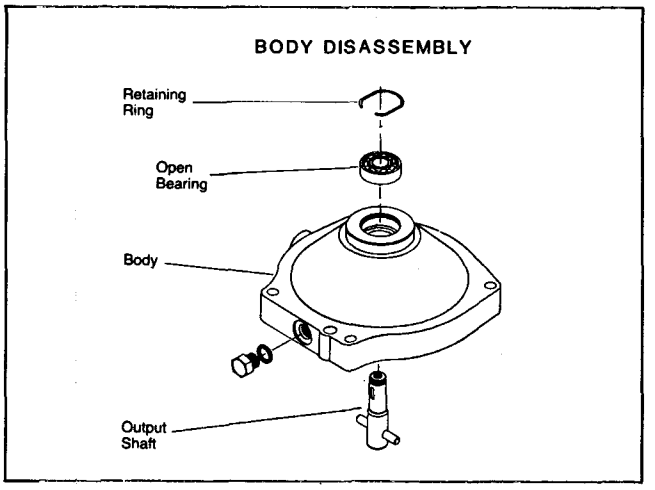


FIG. 43.

Remove bearing retaining ring and press output shaft inward. Press bearing out from body.

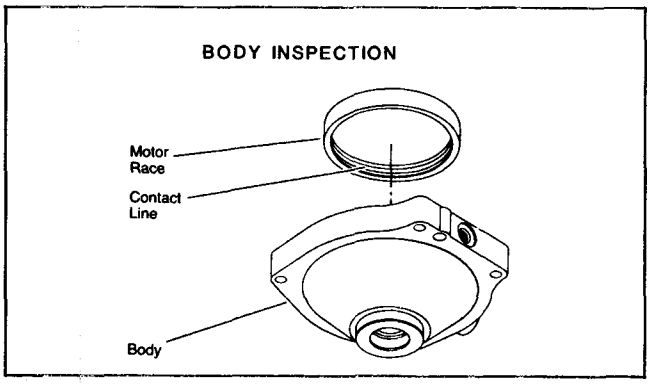


FIG. 44

Inspect contact line of motor ball pistons on race located in body. Contact area must be smooth and completely free of any irregularities.

If race is damaged, carefully inspect ball pistons.

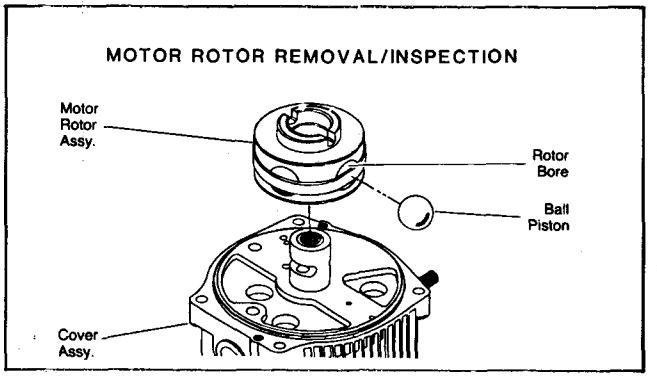


FIG. 45

Hold pintle assembly in position against cover and remove motor rotor assembly.

IMPORTANT: Each ball must be replaced in same bore from which it was removed. Use egg carton for ball storage and identification.

Inspect rotor assembly. Remove piston balls from rotor, one at a time, working clockwise from letter stamped in face of rotor and place in egg carton.

Inspect ball pistons. They must be smooth and free from any marks.

Inspect rotor bores, bushing and pintle for damage or excessive clearance. Ball piston to rotor bore clearance is select fit to .0002-.0006". When damage is found, replace complete rotor assembly. If damage is not found, reinstall balls in their removed bores and retain with rubber band.

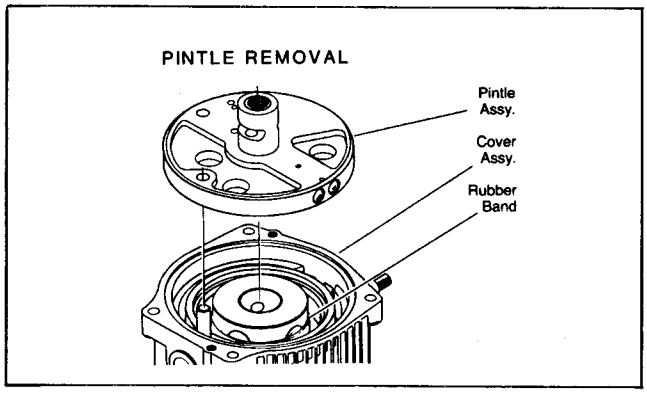


FIG. 46

IMPORTANT: Pump rotor piston balls must remain in pump rotor, a repeat of previous Motor rotor assembly. Use second rubber band to retain piston balls.

Make sure pump rotor remains in cover and tap on cover with plastic hammer to remove pintle assembly.

Place rubber band on motor rotor assembly.

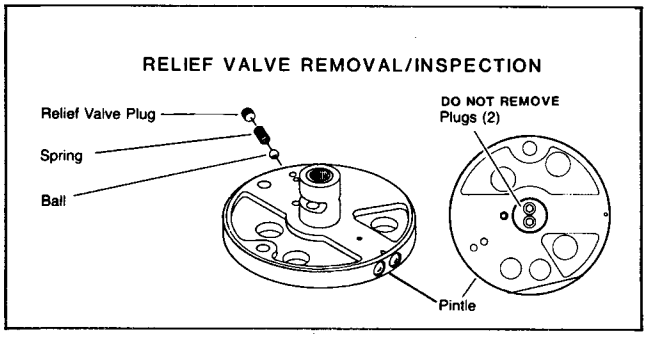


FIG. 47

WE DO NOT RECOMMEND COMPLETE DISASSEMBLY OF PINTLE ASSEMBLY FOR CLEANING, FLUSHING SHOULD BE ALL THAT IS NEEDED. IF REPAIR IS REQUIRED, USE FOLLOWING PINTLE DISASSEMBLY AND INSTALLATION PROCEDURES.

Do not remove two large plugs located on pintle journal.

Use a ¼" Allen wrench to remove relief valve plug. Remove spring and ball. Inspect ball seat and all parts for damage. Replace any damaged parts.

Install ball, spring and plug into pintle. SCREW PLUG END IN JUST BELOW SURFACE OF PINTLE, DO NOT TIGHTEN COMPLETELY.

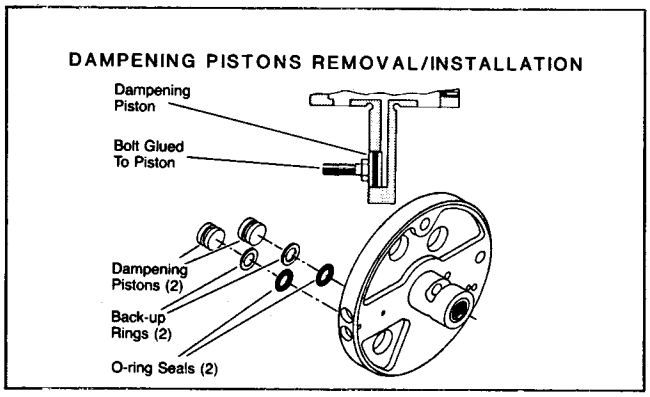


FIG. 48

IMPORTANT: When removing dampening piston, do not hit pintle journals or damage to pintle will occur.

To remove dampening pistons, use adhesive to cement a bolt or similar object to pistons and pull them from pintle bores. Remove back-up rings and O-rings from pistons. Replace pistons if damaged.

Install new back-up rings nearest to smooth piston face and O-rings in groove on pistons.

Lubricate outer surface of pistons and press pistons into pintle bores with smooth face up. Piston smooth face should be flush with pintle surface.

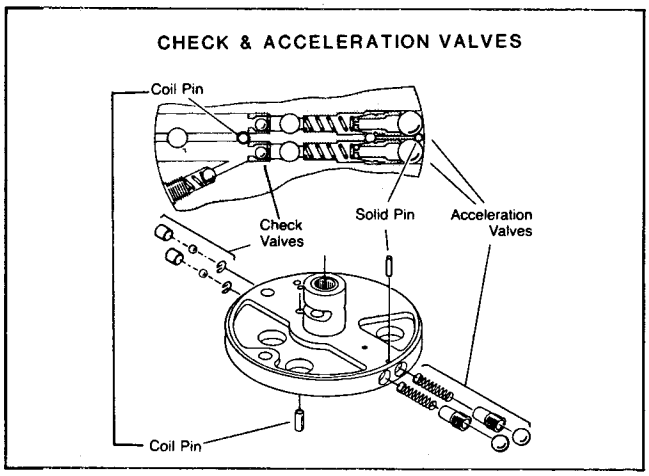


FIG. 49

Press coil pin and solid pin from pintle housing.

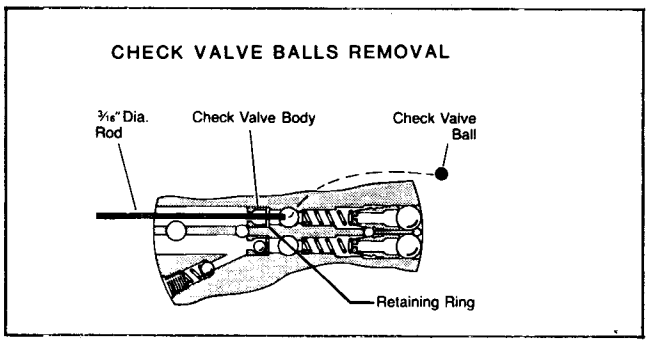


FIG. 50

Insert 3/16" rod through check valve body to contact ball. Tap rod to push ball through retaining ring and into center port of pintle. Repeat for second check valve ball. Shake pintle to remove balls from center port of pintle.

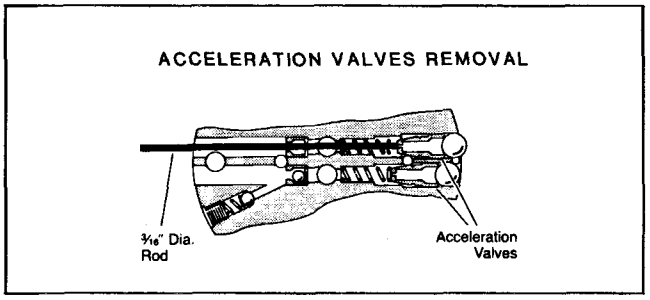


FIG. 51

IMPORTANT: Some models use different springs for forward and reverse. Be sure to identify springs used with acceleration valves so they can be replaced in same bore from which they were removed.

Insert rod through check valve body against acceleration valve body and drive both valve bodies and balls out pintle bore. Repeat method for second valve body and ball. Remove springs.

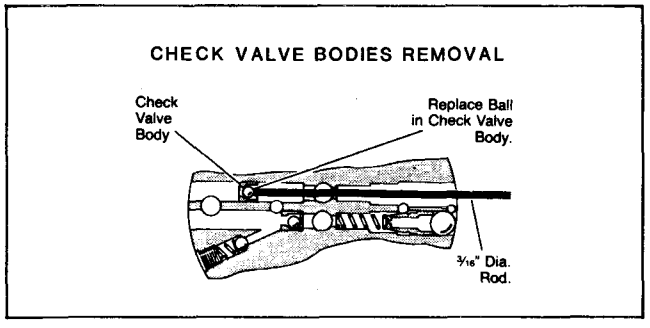


FIG. 52

Reinstall check valve balls through center port of pintle. Place 3/16" rod through acceleration valve bore against check valve ball and drive check valve and ball out pintle bore. Remove check valve retaining ring. Repeat for second check valve and retaining ring.

Clean all parts thoroughly. Inspect all parts for damage. Replace all defective parts. You must replace check valve retaining rings.

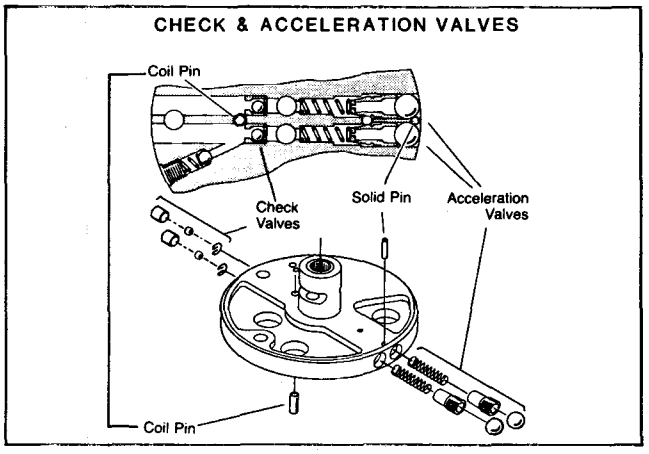


FIG. 53

Install acceleration valve springs in their respective pintle bores. Install acceleration valves into pintle bores with smaller diameter of valves inward. Be sure that both valves slide freely in bores. Press two balls against acceleration valve bodies until balls clear solid pin hole in pintle. Install solid pin in pintle. Insert 3/16" rod through check valve ports of pintle and move acceleration valve bodies and balls against solid pin.

Install ball into check valve and fill valve cavity with vaseline. Place retaining ring on end of valve so that vaseline holds it. Press check valve assembly into pintle bore, retaining ring first, until valve body clears coil pin hole and bottoms out in bore. Repeat for second check valve, ball and retaining ring. Check that retaining rings hold balls in check valve bodies. Install coil pins in pintle.

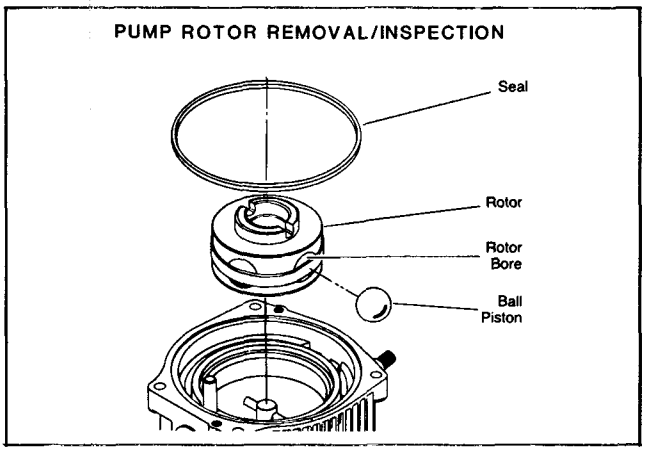


FIG. 54.

Remove seal from cover.

IMPORTANT: Use a wide rubber band to retain ball pistons in place during handling. Pump ball piston assembly must remain intact as ball pistons are matched to pump rotor.

Lift pump rotor assembly from cover assembly.

Inspect rotor assembly. Remove piston balls from rotor, one at a time, working clockwise from letter stamped in face of rotor and place in egg carton for storage and identificaiton.

Inspect ball pistons. They must be smooth and free from any marks.

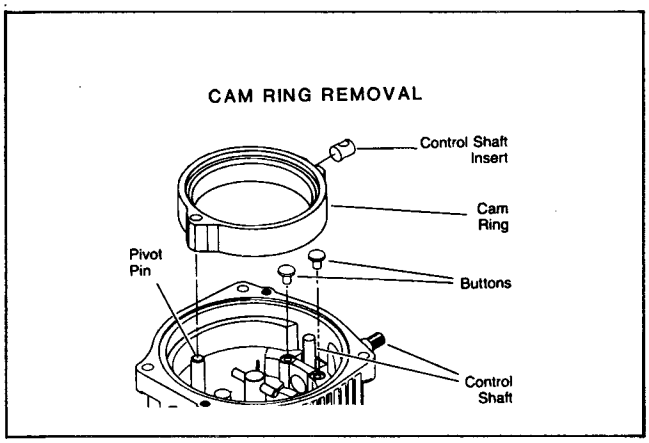


FIG. 55

Inspect rotor bores, bushing and pintle for damage or excessive clearance. Ball piston to rotor bore clearance is select fit to .0002-.0006". When damage is found, replace complete rotor assembly. If damage is not found, reinstall balls in their removed bores and retain with rubber band.

Slide cam ring from pivot pin and control shaft in cover. Then lift ring from cover. Remove control shaft insert from cam ring.

Remove two buttons from cover.

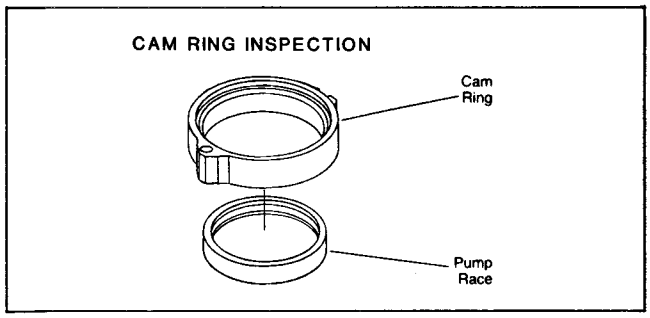


FIG. 56

Inspect area where ball pistons contact race. This area must be smooth and completely free of damage.

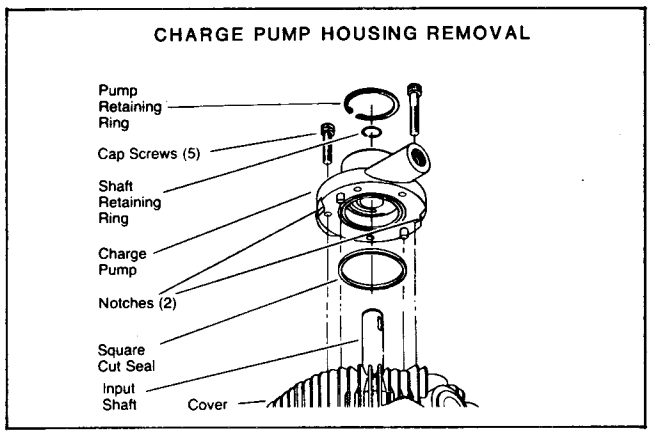


FIG. 57

IMPORTANT: Support bottom of input shaft with 2 x 2 x 2½" wood block with cover assembly placed on flat surface with input shaft up.

Remove bearing retaining ring. Remove shaft retaining ring.

Use ¼" Allen wrench to remove five bolts.

IMPORTANT: Do not pound on bearing puller while removing charge pump body. Apply steady pull only. Do not damage bore or input shaft during removal.

Use two jaw bearing puller, inserted in two notches machined in housing, to remove charge pump housing.

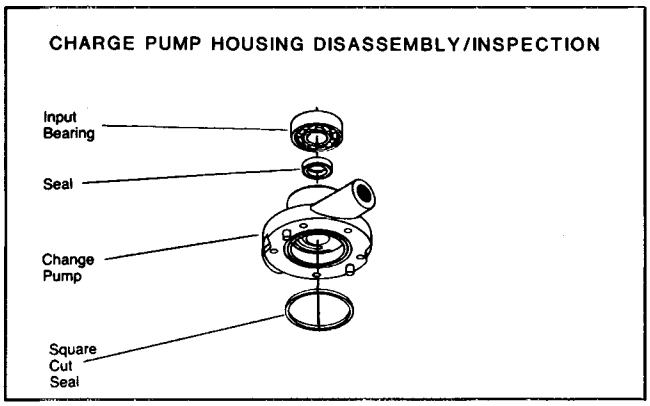


FIG. 59

Remove square seal from housing assembly. Use a bearing puller to remove bearing and seal. Discard oil seal.

Inspect ball bearing. If damage is found, obtain new bearing.

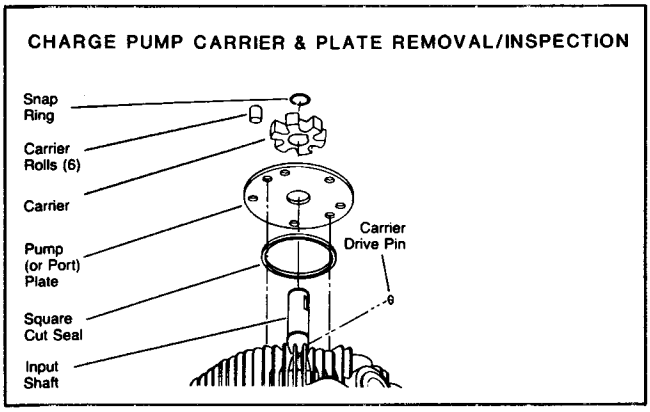


FIG. 60

Remove six carrier rolls. Remove input shaft snap ring.

Remove carrier and carrier drive pin from input shaft. Remove pump plate. Remove square seal from cover and discard.

Inspect carrier, rolls, inner race contact areas in charge pump housing and pump plate. If any damage is found, obtain complete new charge pump assembly.

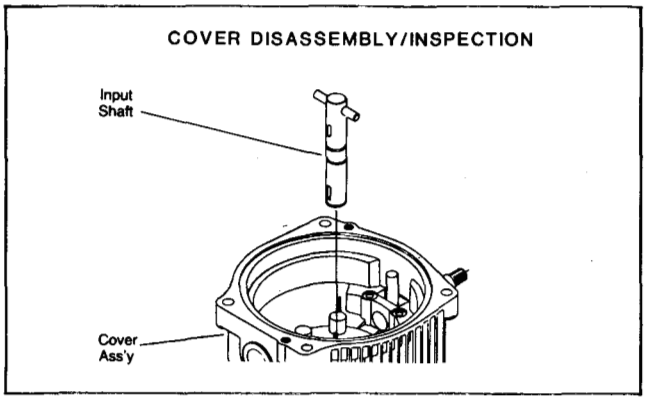


FIG. 61

IMPORTANT: Be careful not to damage input shaft bushing in cover.

Remove input shaft from cover.

Inspect input shaft for stripped keyway or other damage. If damage is found, obtain new input shaft.

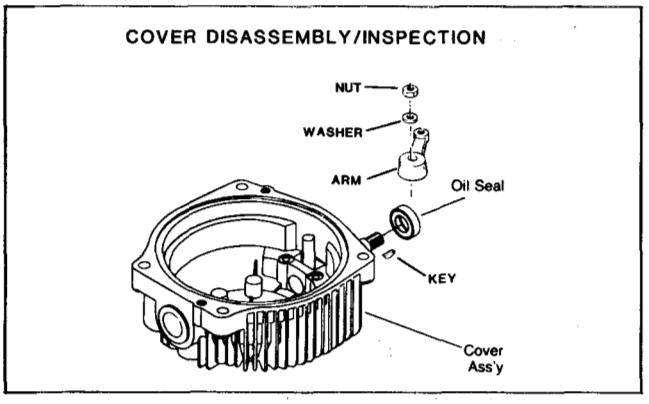


FIG. 62

IMPORTANT: Do not scratch control shaft or distort seal counter bore when removing seal. Do not use hammer on shaft when removing arm.

Remove nut and washer from control shaft. Use a puller to remove arm from shaft. Remove key from shaft. Use a sharp narrow edged tool to pierce top metal part of oil seal and remove seal from cover and shaft. Discard seal.

Inspect input shaft bushing, if damage is found obtain new cover.

If cover is broken, cracked or if side clearance between control shaft and cover exceeds .006", obtain new cover.

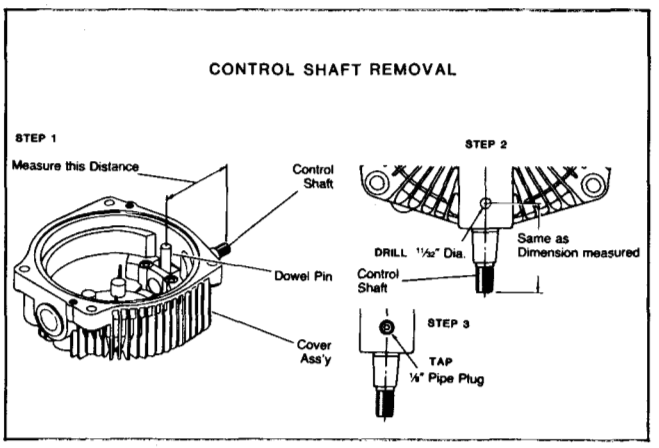


FIG. 63

Replace control shaft dowel if loose or broken. To remove shaft, measure distance between center of dowel and end of shaft. Turn cover over. Use measured distance to locate dowel pin in cover face. Drill $^{11}/_{32}$" diameter hole at center point of dowel pin. Drill hole exactly in line with center of shaft. Press damaged pin from control shaft. Remove control shaft and washer. Tap hole drilled in cover with $^{1}/_{8}$" pipe tap. Install $^{1}/_{8}$" pipe plug flush with cover.

Obtain new control shaft and washer if damage is found.

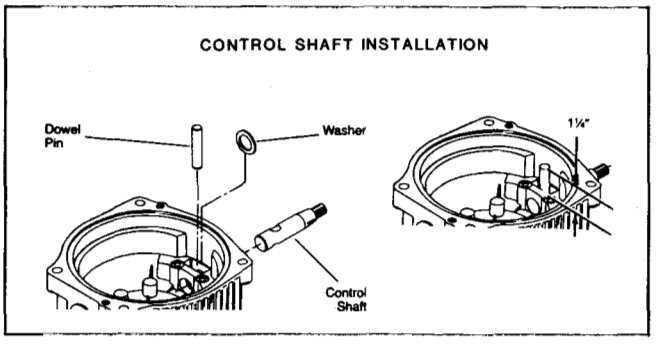


FIG. 64

Install control shaft and washer in cover. Press new dowel pin through shaft leaving 1¼" of dowel extending from shaft.

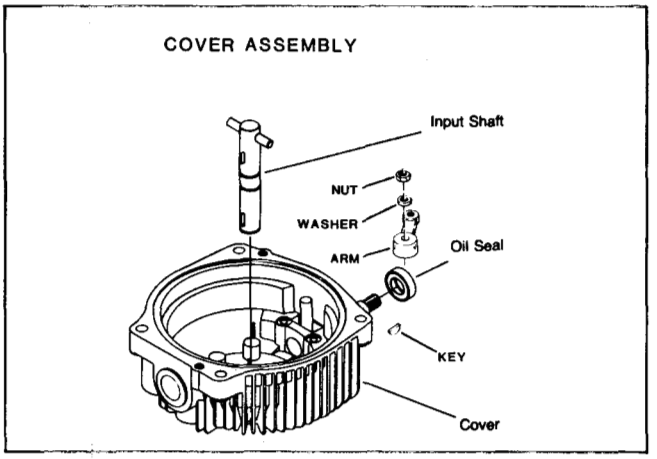


FIG. 65

IMPORTANT: Be careful not to damage inner portion of oil seal. Excessive pressing or driving of seal will damage rubber portion of seal.

Lubricate I.D. of new oil seal with clean lubricant. Install seal in bore. Reinstall key, arm, washer and nut on control shaft. Install input shaft in cover.

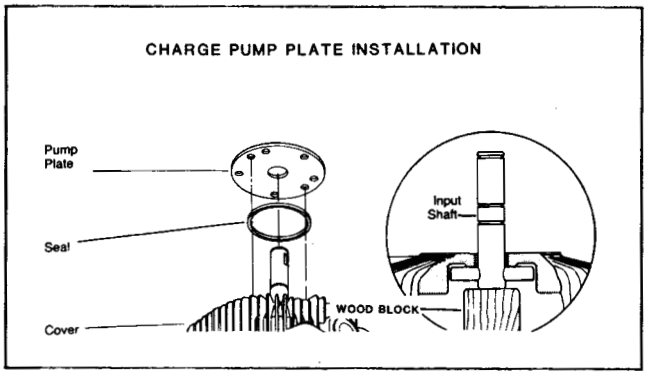


FIG. 66

IMPORTANT: Support bottom or input shaft with 2 x 2 x 2½" wood block with cover assembly placed on flat surface with input shaft up.

Lightly lubricate new square seal and install seal in groove of cover. Install pump plate on cover. Either side of pump plate may face cover regardless of input rotation. Make sure all holes line up.

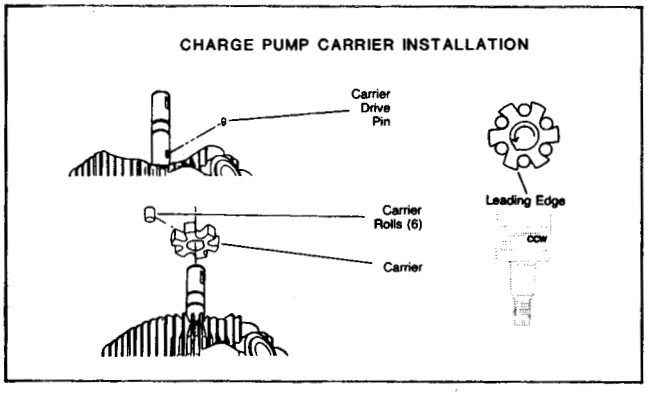


FIG. 67

Apply vaseline to drive pin and install in keyway of input shaft.

IMPORTANT: For correct carrier rotation, leading edge of carrier must rotate in same direction as input shaft.

Install carrier over input shaft. Be sure keyway in carrier fits over carrier drive pin on input shaft. Apply vaseline to six carrier rolls and place in cavities of carrier.

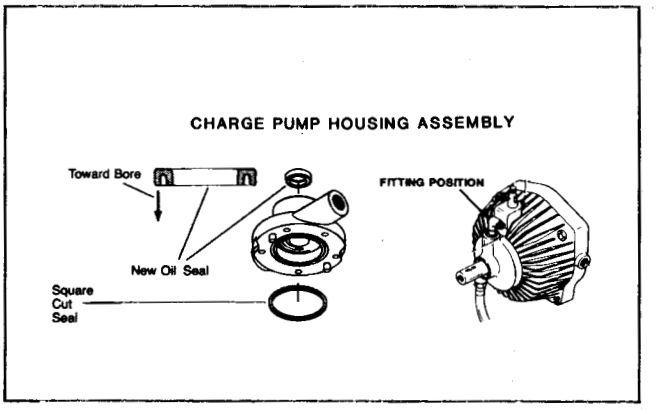


FIG. 68

IMPORTANT: Excessive pressing or force on oil seal may cause damage to rubber sealing portion or may distort counterbore of housing.

Lubricate inner surface of new oil seal and install in charge pump housing with rubber lip toward bore.

IMPORTANT: Inlet elbow fitting must be installed on charge pump before mounting.

Lubricate new square seal and install in seal groove of pump housing.

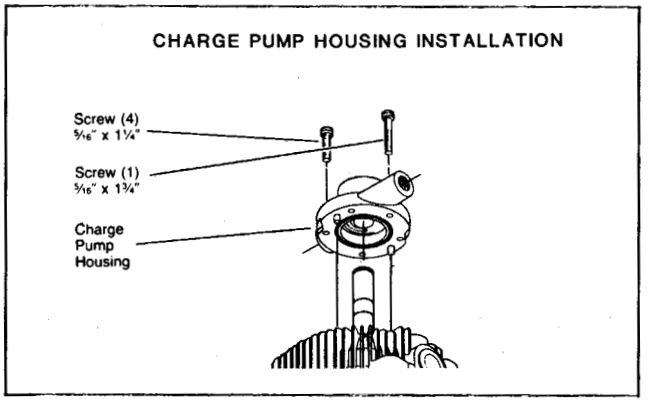


FIG. 69

IMPORTANT: Install 1¾" screw in thicker section of charge pump body. If installed and tightened in any of other four holes, internal damage could occur.

Align charge pump dowel pins with holes in cover. Protect oil seal lip from keyways, snap ring grooves and shaft splines. Then guide pump over shaft, carrier and rolls until pins engage holes in cover.

Install 5 screws in pump housing and torque to 15 ft. lbs.

CHARGE PUMP BEARING INSTALLATION

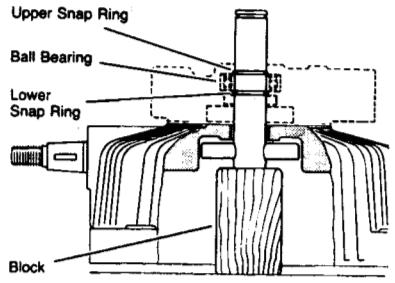


FIG. 70

Install snap ring in lower groove of input shaft.

Make sure input shaft is supported and press bearing on shaft until it contacts lower snap ring. Install upper snap ring on shaft.

CHARGE PUMP RETAINING RING INSTALLATION

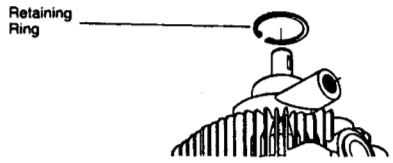


FIG. 71

IMPORTANT: Input shaft should rotate freely by hand. If not, recheck charge pump installation.

Reinstall bearing retaining ring in charge pump housing.

CAM RING INSTALLATION

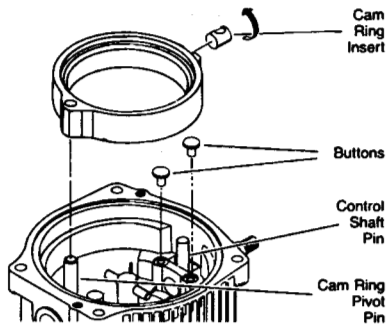


FIG. 72

Install 2 buttons in cover.

Install cam ring insert with hole away from cam ring.

Align cam ring with control shaft pin and cam ring pivot pin.

Install cam ring with flush side of bearing race facing cover. Press in firmly until cam ring has bottomed in cover assembly.

IMPORTANT: Cam ring must move freely from stop to stop. If binding occurs at either stop rotate cam ring insert 180 degrees. Check cam ring movement again.

PUMP ROTOR INSTALLATION

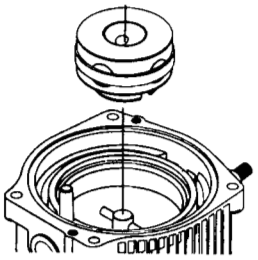


FIG. 73

IMPORTANT: Make sure piston balls stay in rotor assembly during rotor installation. Leave rubber band on rotor until installed in cover. Pump rotor is smaller diameter than motor rotor.

Align slot in pump rotor with input shaft cross pin. Install rotor assembly on shaft. Remove rubber band from rotor.

PINTLE & MOTOR ROTOR INSTALLATION

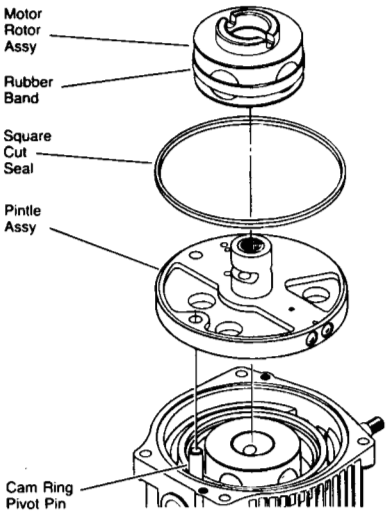


FIG. 74

IMPORTANT: Do not force pintle over rotor assembly. It is a slip fit and pintle must turn freely by hand during installation. If it does not, recheck pintle installation.

Position pintle with dampening pistons down and align dowel pin hole in pintle assembly with cam ring pivot pin and install over pump rotor assembly.

Lightly grease a new square seal and install seal in groove in housing.

Leave rubber band on motor rotor assembly and install rotor on pintle with notches up.

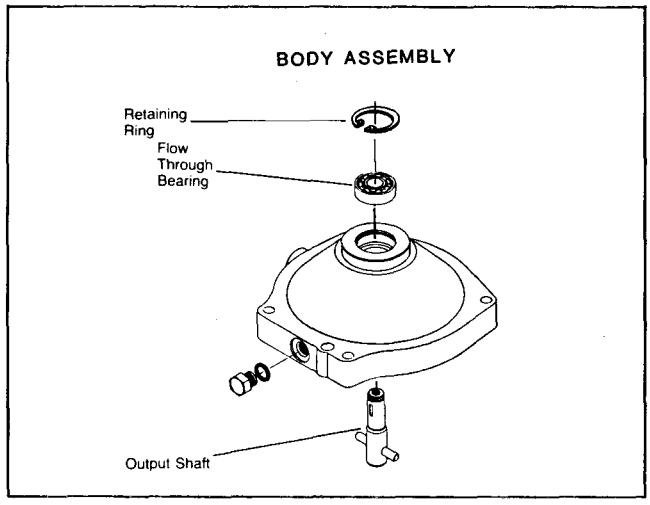


FIG. 75

Install output bearing. Position bearing on body and press on outer bearing race to bottom position in body.

Install bearing retaining ring.

Install output shaft. This is a press fit. Be sure to support inner race of ball bearing while pressing shaft into bearing.

IMPORTANT: Be sure output shaft rotates freely by hand. If not, recheck body assembly.

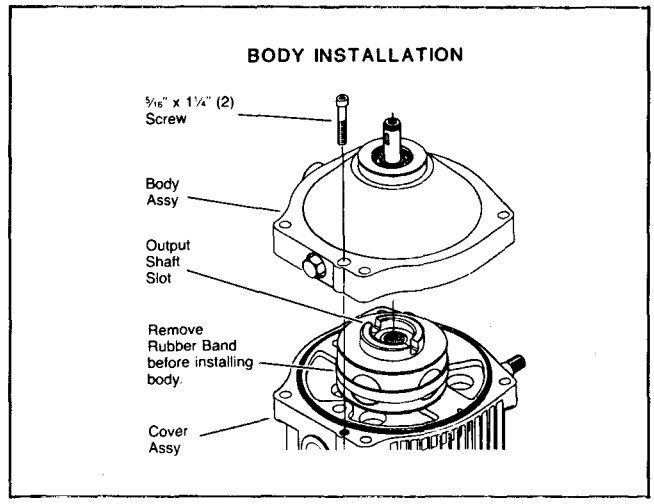


FIG. 76

IMPORTANT: When removing rubber hand make sure piston balls stay in rotor assembly.

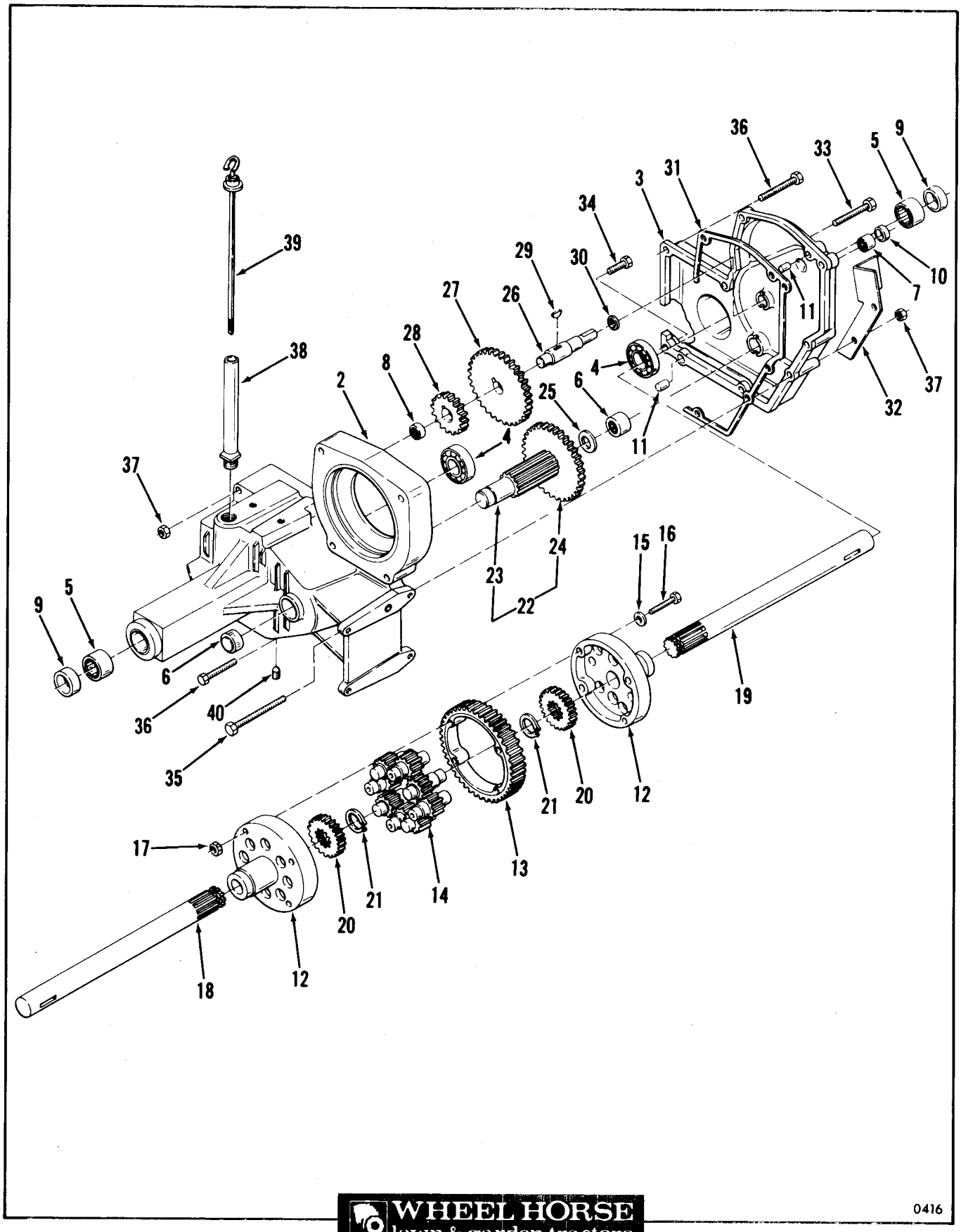
Align output shaft with bearing and shaft cross pin in rotor. Carefully remove rubber band from rotor and install cover assembly on transmission. Secure cover with two socket head screws and torque to 15 foot pounds.

Fill transmission with 10W-30 oil through bearing and rotate input and output shafts. Drain approximately 1/2 pint of oil from transmission.

Reinstall gear, snap ring, pulley and fan on transmission.

Transmission is now ready to be installed in tractor.

TRANSAXLE

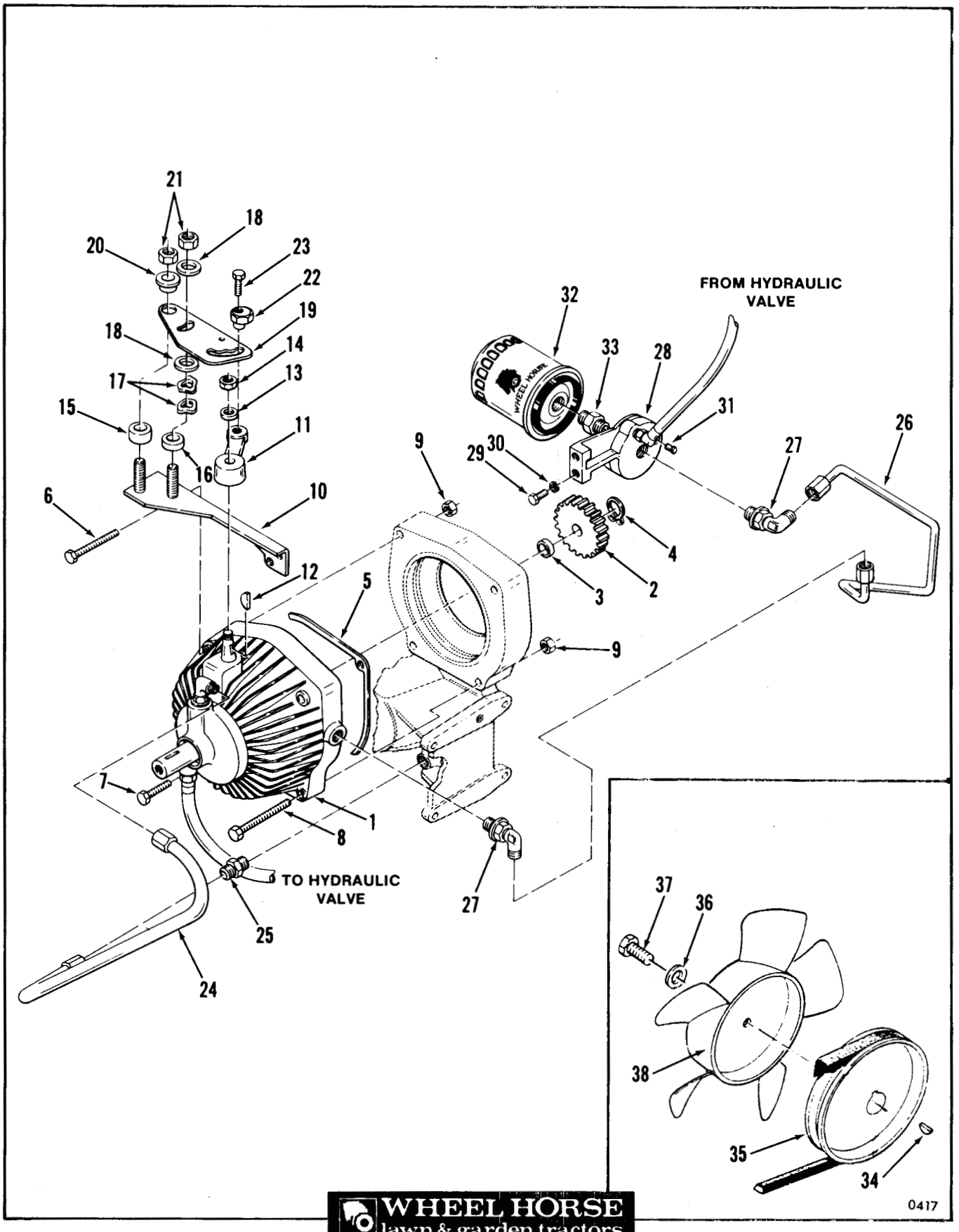


0416

TRANSAXLE

Item	Description	
1	Transaxle Complete	1
2	Case-Transaxle RH	1
3	Case-Transaxle LH	1
4	Ball Bearing	2
5	Needle Bearing	2
6	Needle Bearing	2
7	Needle Bearing	1
8	Needle Bearing	1
9	Seal Axle	2
10	Seal	1
11	Dowel Pin	2
12	Differential End Cap	2
13	Differential Ring Gear 43 Tooth	2
14	Differential Pinion Gear 11 Tooth	8
15	Special Washer-Case Hardened	4
16	Bolt 3/8-16 X 3 1/2 Grade 8	4
17	Nut 3/8-16 High-Tensile	4
18	Rear Axle RH-Long (13 1/8 in.)	1
19	Rear Axle LH-Short (10 1/8 in.)	1
20	Differential Axle Gear 24 Tooth	2
21	Special Snapring	2
22	Gear Assembly	1
23	Gear-Pinion 11 Tooth	1
24	Gear-Reduction 44 Tooth	1
25	Thrust Washer	1
26	Shaft	1
27	Gear 44 Tooth	1
28	Gear 22 Tooth	1
29	Woodruff Key 3/16 X 1 1/8	1
30	Thrust Washer	1
31	Gasket-Case	1
32	Bracket-Brake	1
33	Bolt 3/8-16 X 2 1/2 Eslok	1
34	Bolt 3/8-16 X 1 1/4 Eslok	1
35	Bolt 3/8-16 X 5	1
36	Bolt 3/8-16 X 3	2
37	Nut 3/8-16 Eslok	3
38	Filler Tube	1
39	Dipstick	1
40	Allen HD Pipe Plug 1/4	1

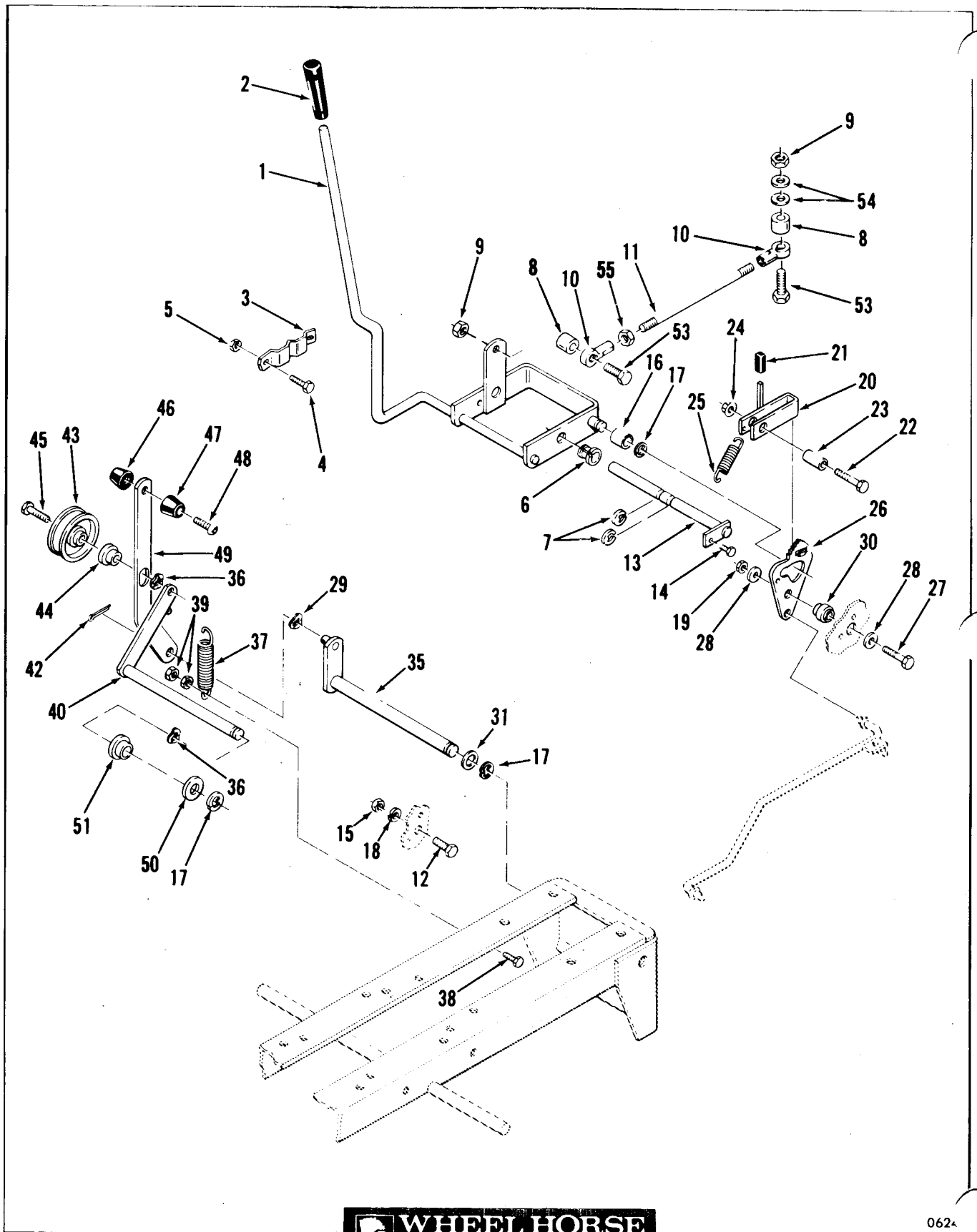
TRANSMISSION AND FILTER



TRANSMISSION AND FILTER

Item	Description	
1	Pump & Motor	1
2	Gear 22 Tooth	1
3	Spacer-Drive Gear	1
4	Snapring	1
5	Gasket	1
6	Bolt 3/8-16 X 5	2
7	Bolt 3/8-16 X 2 1/2 Eslok	1
8	Bolt 3/8-16 X 6 1/2	1
9	Nut 3/8-16 Eslok	3
10	Control Plate	1
11	Cam Follower Arm	1
12	Woodruff Key 1/8 X 5/8	1
13	Washer 1/2 SAE	1
14	Nut 1/2 Eslok	1
15	Spacer (Long)	1
16	Spacer (Short)	1
17	Washer-Spring Disc	2
18	Washer-Friction	2
19	Cam-Speed Control	1
20	Spacer	1
21	Nut 3/8-16 Conelock	2
22	Eccentric Cam	1
23	Bolt 5/16-18 X 1 Eslok	1
24	Tube-Suction	1
25	Fitting	1
26	Tube Assembly	1
27	Elbow	2
28	Base-Oil Filter	1
29	Bolt 5/16-18 X 3/4	2
30	Lockwasher 5/16	2
31	Plug 1/4 NPT	1
32	Oil Filter	1
33	Fitting	1
34	Woodruff Key 3/16 X 3/4	1
35	Transmission Drive Pulley	1
36	Washer	1
37	Eslok Bolt 1/4-20 X 5/8	1
38	Fan	1

MOTION CONTROL, CLUTCH LINKAGE



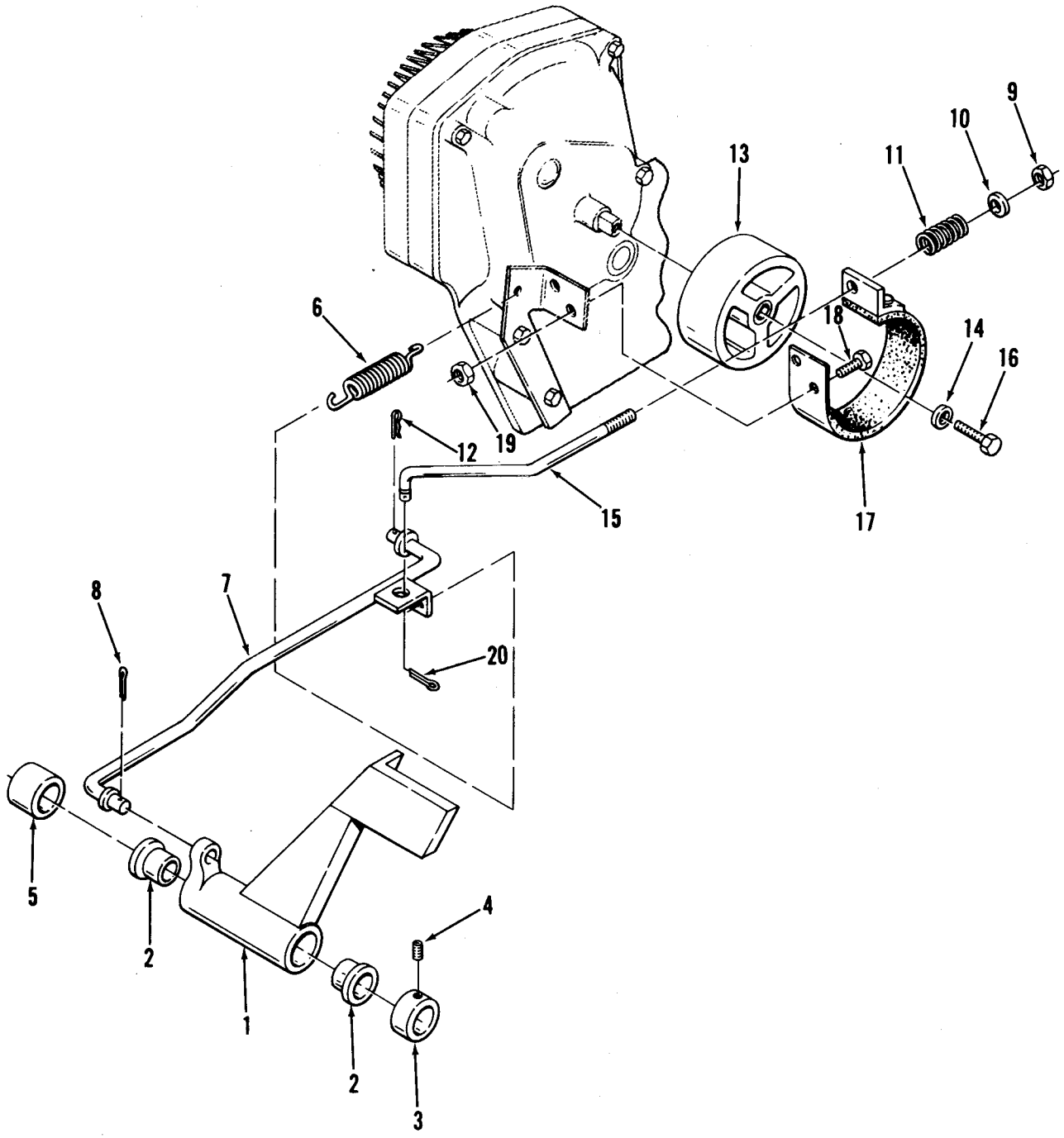
WHEEL HORSE lawn & garden tractors

062

MOTION CONTROL, CLUTCH LINKAGE

Item	Description	
1	Motion Control Lever	1
2	Knob-Motion Control Linkage	1
3	Detent-Motion Control Lever	1
4	Bolt 5/16-18 X 1/2	2
5	Eslok Nut 5/16-18	2
6	Bushing	2
7	E-Ring	2
8	Spacer	2
9	Nut Eslok 1/4-20	3
10	Rod End	2
11	Rod Control	2
12	Bolt 1/4-20 X 3/4	1
13	Pivot Rod-Motion Control Lever	1
14	S.T. Bolt 5/16-18 X 5/8	1
15	Nut 1/4-20	1
16	Cam Bearing	1
17	E-Ring 1/2	4
18	Lockwasher 1/4 Ext. Tooth	1
19	Eslok Nut 3/8-16	1
20	Parking Brake Lever	1
21	Grip-Parking Brake Lever	1
22	Bolt 3/8-16 X 1 1/2	1
23	Spacer	1
24	Special Flanged Nut	1
25	Spring	1
26	Cam Plate	1
27	Bolt 3/8-16 X 1 1/4	1
28	Washer 3/8 SAE	2
29	Wave Washer	1
30	Spacer	1
31	Washer 1/2 SAE	1
35	Shaft	1
36	Wave Washer	2
37	Spring	1
38	Bolt 1/4-20 X 1	1
39	Eslok Nut 1/4 X 20	2
40	Pivot Rod	1
42	Cotter Pin 1/16 X 3/4	1
43	Idler Pulley	1
44	Spacer	1
45	Special Bolt 3/8-16 X 1 1/2	1
46	Knob	1
47	Knob	1
48	Screw #10-24 X 1 1/4	1
49	Handle	1
50	Washer 1/2 SAE	1
51	Bushing	1
53	Bolt 1/4-20 X 1 1/2	2
54	Washer 1/4 SAE	2
55	Nut 1/4-28	1

BRAKE AND LINKAGE
SINGLE ACTION BRAKE BAND

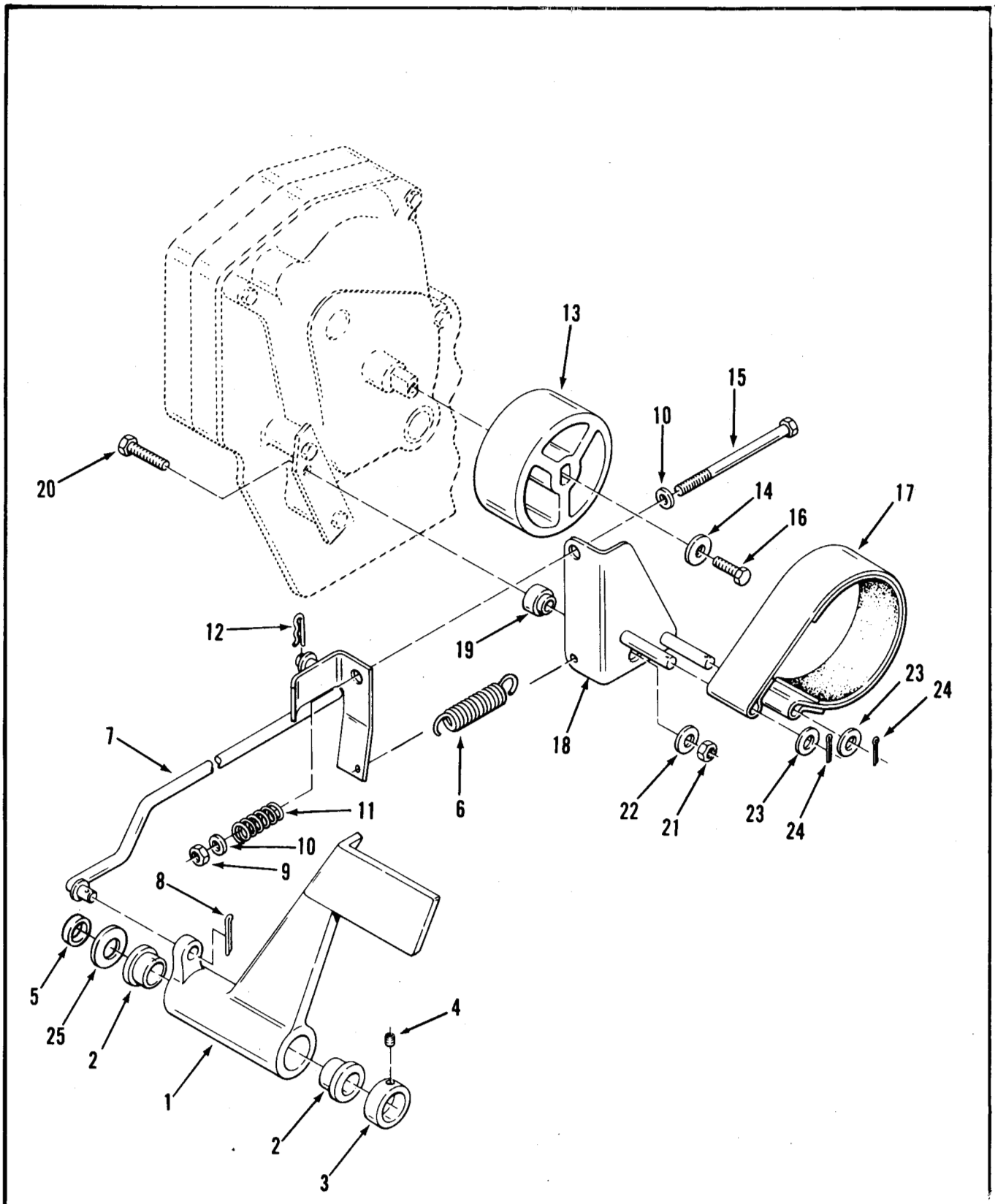


0625

BRAKE AND LINKAGE
SINGLE ACTION BRAKE BAND

Item	Description	
1	Brake/Return To Neutral Pedal	1
2	Bushing	2
3	Collar	1
4	Set Screw 1/4-20 X 1/4 Cup Pt	1
5	Spacer	1
6	Spring-Brake Return	1
7	Brake Rod-Front	1
8	Cotter Pin 1/8 X 1	1
9	E.S. Nut 3/8-16	1
10	Washer 3/8 SAE	1
11	Spring	1
12	Hairpin Cotter	1
13	Brake Drum	1
14	Special Washer	1
15	Brake Rod-Rear	1
16	Bolt 3/8-16 X 1	1
17	Brake Band	1
18	Bolt 1/4-20 X 1/2	2
19	Nut 1/4-20	2
20	Cotter Pin 1/8 X 3/4	1

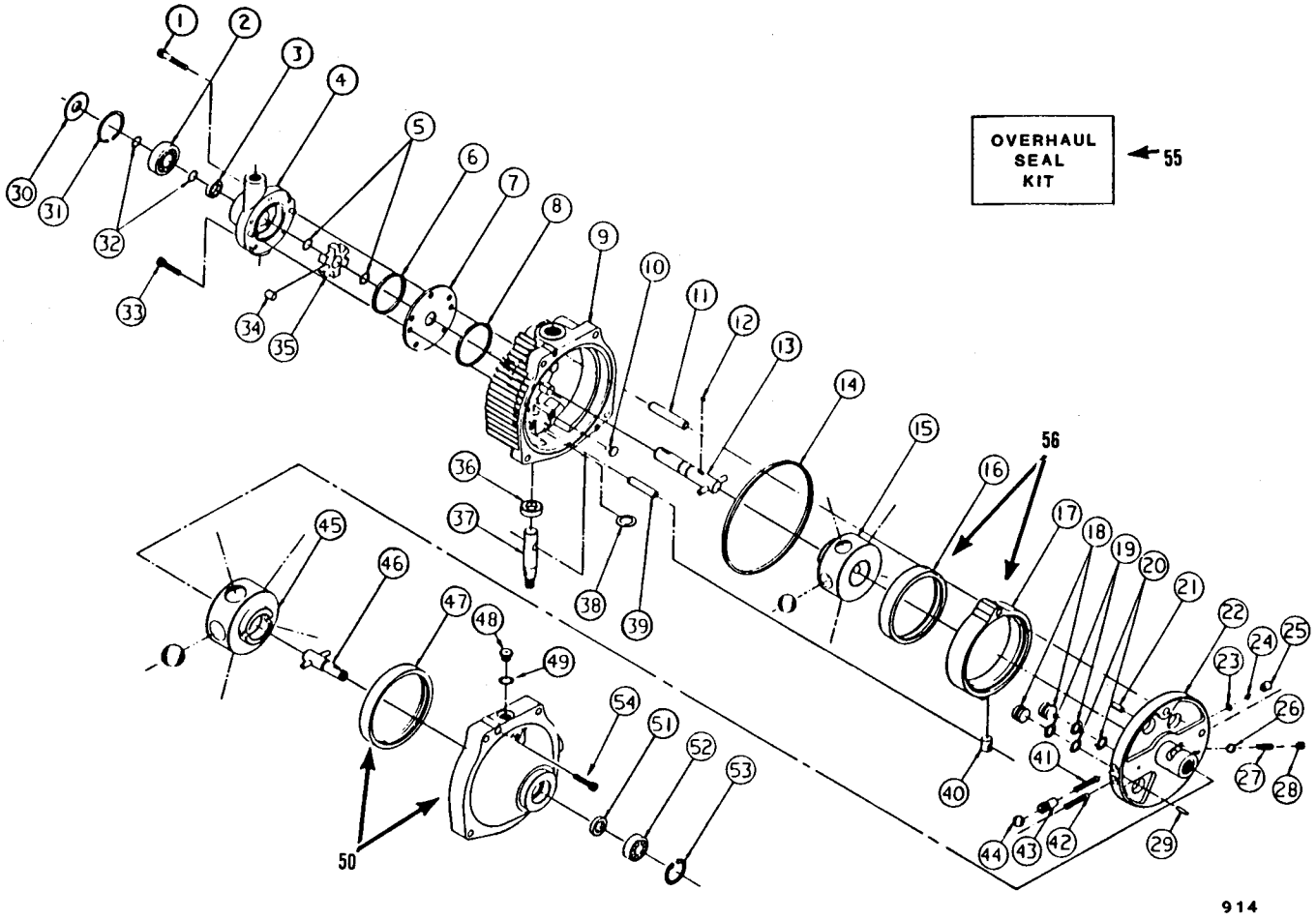
BRAKE AND LINKAGE
DUAL ACTION BRAKE BAND



BRAKE AND LINKAGE
DUAL ACTION BRAKE BAND

ITEM	DESCRIPTION	Automatic
	Figure 6-3 **CLUTCH, BRAKE AND SPEED CONTROL LINKAGE**	
1	Brake/Return To Neutral Pedal	1
2	Bushing	2
3	Collar	1
4	Eslok Set Screw 1/4-20 x 1/4	1
5	Spacer 312-A Only	1
	Spacer 417-A and 420-LSE Only	1
6	Spring-Brake Return	1
7	Brake Rod-Front 312-A Only	1
	Brake Rod-Front 417-A and 420-LSE Only	1
8	Cotter Pin 1/8 x 1	1
9	E.S. Nut 3/8-16	1
10	Washer 3/8 SAE	2
11	Spring	1
12	Hairpin Cotter	1
13	Brake Drum	1
14	Special Washer	1
15	Bolt 3/8-16 x 4-1/2	1
16	Eslok Bolt 3/8-16 x 1	1
17	Brake Band	1
18	Brake Pivot Arm	1
19	Bushing	1
20	Bolt 3/8-16 x 1-1/2	1
21	Eslok Nut 3/8-16	1
22	Washer 3/8 U.S.	1
23	Washer 3/8 SAE	2
24	Cotter Pin 3/32 x 3/4	2
25	Shim Washer	X

EATON MODEL 11 TRANSMISSION



ITEM #	PART #	DESCRIPTION	QTY.
1	112635	Capscrew	1
2	112636	Bearing — Input	1
3	112604	Seal (Part of Item 4 and 55)	
4	112637	Charge Pump Housing w/Seal	1
5	112654	Snap Ring (Same as Item 32)	2
6	112638	Seal Ring (Included in Item 55)	1
7	112639	Plate	1
8	112640	Seal Ring (Included in Item 55)	1
9	112641	Subassembly Cover	1
10	112595	Button (Part of Item 9)	2
11		Pivot Pin (Part of Item 9)	1
12	112642	Pin	1
13	112643	Subassembly — Input Shaft	1
14	112644	Seal Ring	1
15	112645	Subassembly — Pump Rotor	1
16	113136	Pump Race (Part of Item 56)	1
17		Cam Ring (Part of Item 56)	1
18	113041	Piston	2

EATON MODEL 11 TRANSMISSION

ITEM #	PART #	DESCRIPTION	QTY.
19		Back Up Ring (Part of Item 55)	2
20		O-Ring (Part of Item 55)	2
21	112608	Coil Pin (Part of Item 22)	1
22	112646	Subassembly — Pintle	1
23	112611	Retaining Ring (Part of Item 22)	2
24	112610	Ball (Part of Item 22)	2
25	112647	Body — Check Valve (Included in Item 22)	2
26	112648	Ball (Included in Item 22)	1
27	112649	Spring — Relief Valve (Included in Item 22)	1
28	112650	Plug — Relief Valve (Included in Item 22)	1
29	112651	Pin (Included in Item 22)	1
30	112652	Shield	1
31	112653	Retaining Ring	1
32	112654	Snap Ring	2
33	112616	Capscrew	4
34	112656	Roller	6
35	112657	Carrier	1
36	112658	Seal (Included in Item 9 and 55)	1
37	112659	Control Shaft Kit	1
38		Washer (Part of Item 9 and 37)	1
39		Dowell (Part of Item 9 and 37)	1
40	112660	Insert — Cam Ring	1
41	112661	Spring — Acc. Valve (Included in Item 22)	1
42	112661	Spring — Acc. Valve (Included in Item 22)	1
43	112662	Body — Acc. Valve (Included in Item 22)	2
44	112663	Ball (Included in Item 22)	2
45	112664	Subassembly — Motor Rotor	1
46	112665	Subassembly — Output Shaft	1
47	113137	Motor Race (Included in Item 50)	1
48	112613	Subassembly O-Ring Plug	1
49	112614	Tube Fitting O-Ring (Included in Item 48)	1
50	112669	Subassembly Body	1
51		Seal (Part of Item 50 and 55)	1
52	112666	Output Bearing	1
53	112600	Retaining Ring (Part of Item 50)	1
54	112616	Capscrew (Part of Item 50)	2
55	112667	Overhaul Seal Kit (Includes Items 3, 6, 8, 14, 19, 20, 36, 49 and 51)	1
56	112668	Subassembly Cam Ring (Includes Items 16 and 17)	1