Clutch Adjustment

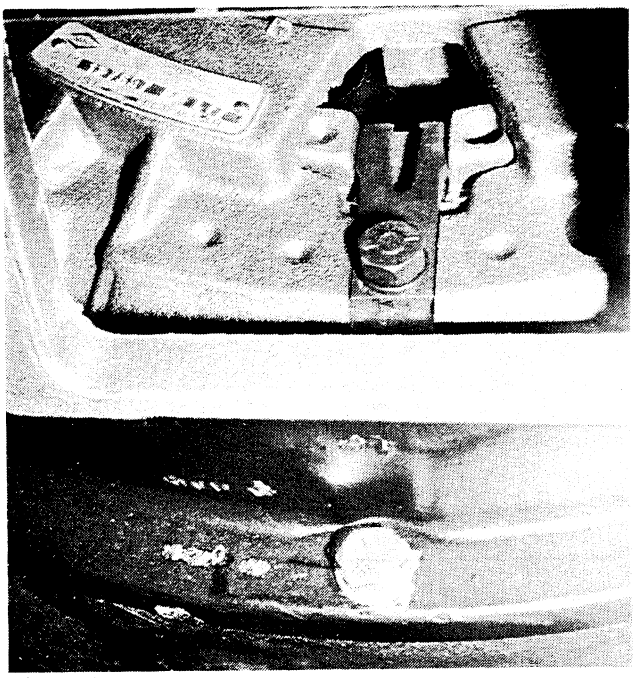


Figure 1:
A—Ring Lock Strap

Do not attempt to adjust the clutch with external linkage. After adjusting the clutch, then adjust external linkage (if required) to get 1/8 inch (3.175 mm) clearance between the tips of the release yoke fingers and the thrust pads of the release bearing assembly.

Procedure

1. Remove the switch key and set the parking brake.
2. Remove the access cover from the flywheel housing (see Fig. 1).
3. Rotate engine until the ring lock strap is visible in the center of the inspection opening (see Fig. 1).

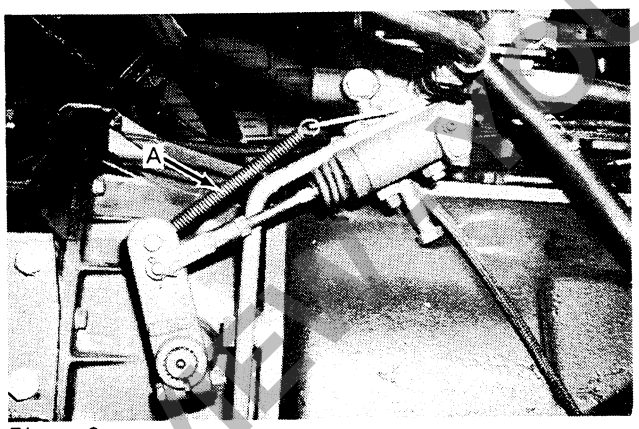


Figure 2:
A—Spring

4. Disconnect the clutch outer arm spring (A-Fig. 2).

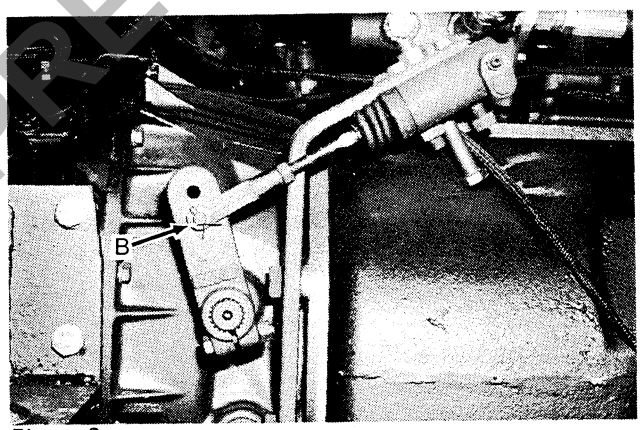


Figure 3:
B—Clevis Pin

5. Remove the pin from the slave cylinder rod clevis (B-Fig. 3).

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14.00" CLUTCH PARTS IDENTIFICATION

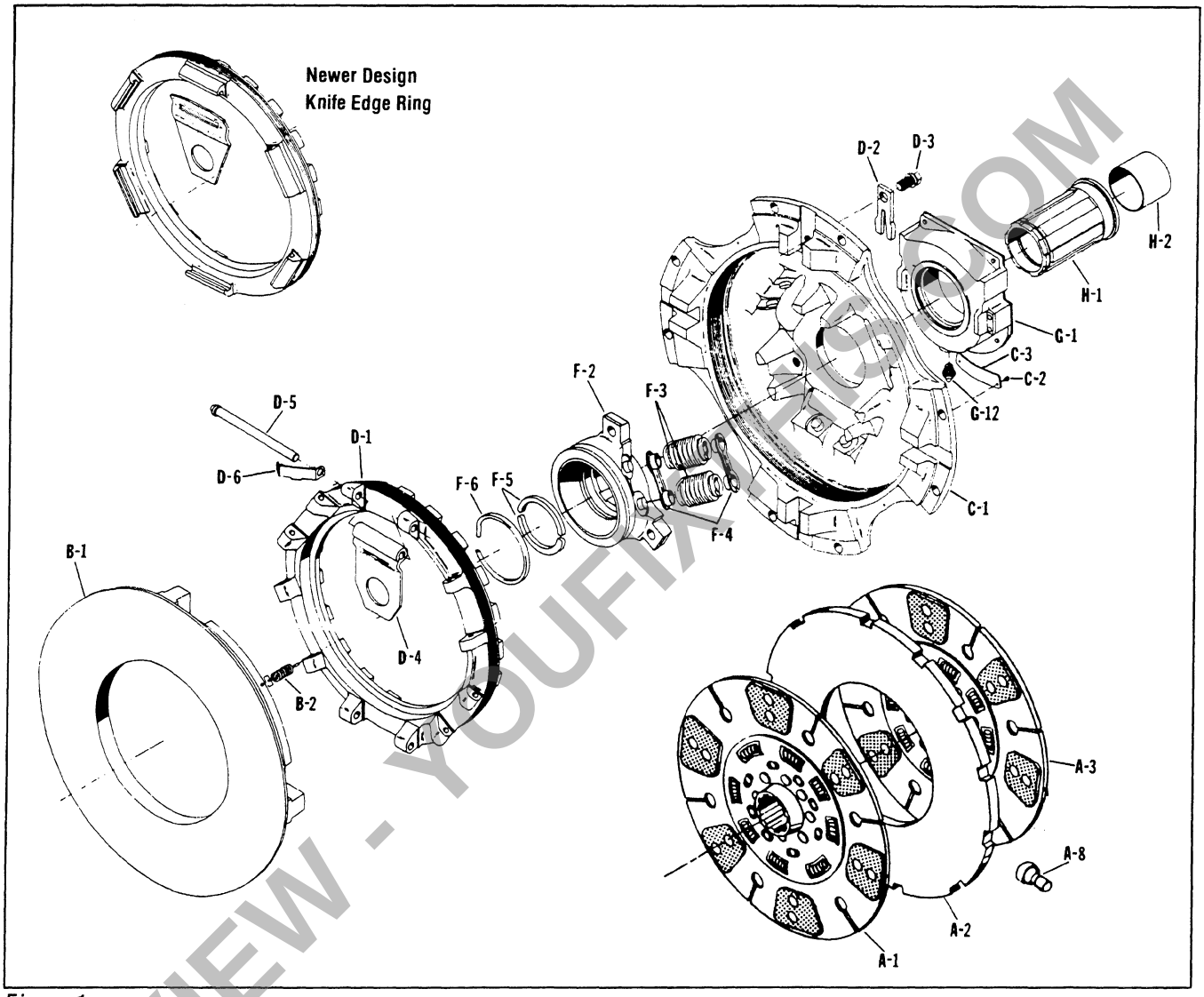
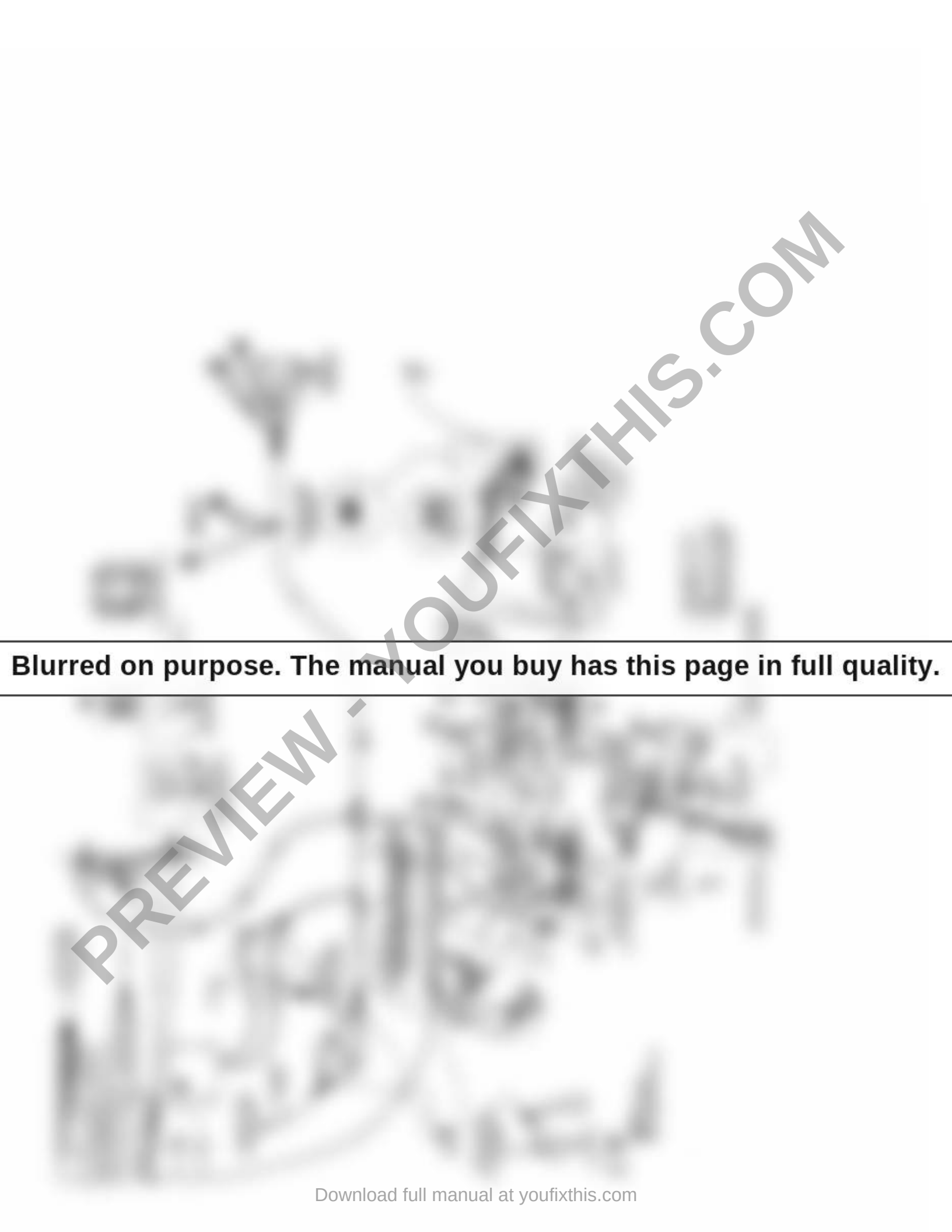


Figure 1:

A-1	DISC, driven front	D-4	LEVER
A-2	PLATE, intermediate	D-5	PIN, pivot
A-3	DISC, driven rear	D-6	CLIP, spring
A-8	DRIVE PIN	F-2	RETAINER, release sleeve
B-1	PLATE, pressure	F-3	SPRING, pressure
B-2	SPRING, return	F-4	PIVOT, spring
C-1	RING, flywheel	F-5	RING, release sleeve
C-2	PIN, name plate	F-6	RING, snap
C-3	PLATE, name	G-1	BEARING & COVER, Sub-Assembly
D-1	RING, adjusting	G-12	NIPPLE, Zerk
D-2	LOCK, adjusting ring	H-1	RELEASE SLEEVE, Sub-Assembly
D-3	BOLT & lock washer assembly	H-2	BUSHING, Release Sleeve

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Mild or light debris indentations or very light pitting Figure 50, are usually considered harmless and the gear can be used if it has no further faults.

Slight lipping of the gearteeth will form a sharp edge at the extreme outside diameter of the gear, usually only on one side of the teeth Figure 51. This condition can be caused from extremely heavy loads which can displace metal on the tooth surface. If there are no other defects, the gear can be used.

Gears that have highly polished teeth are generally acceptable. However, if polishing varies from bright (A) to dull (B, Figure 52), misalignment should be suspected. It would be advisable to test the fit of the gear on its shaft and proper bearing adjustments at reassembly.

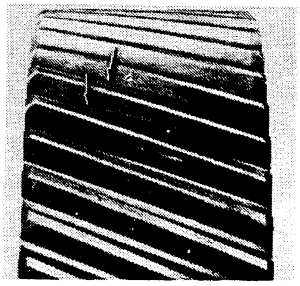


Figure 51

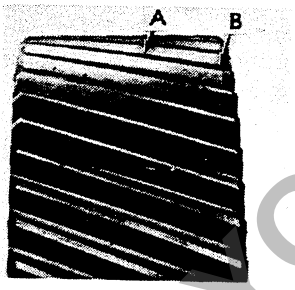


Figure 52

On the gear hub Figure 53, thrust surfaces (A) and bearing bore (B), polishing is allowable as long as the surfaces remain true.

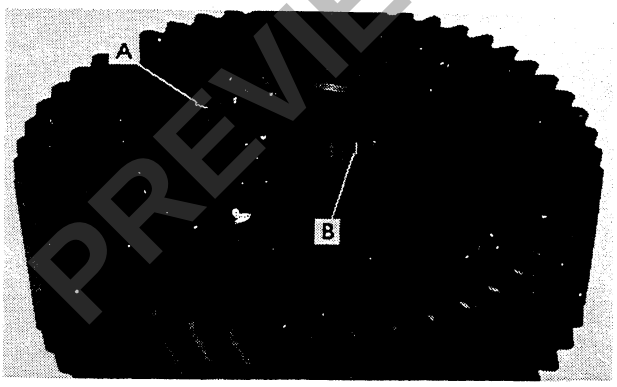


Figure 53

Failure Analysis

General Information:

The contents of the Non-reusable Parts section will explain the most likely cause of excessive wear or failure. Use of broken or damaged parts is out of the question, however, in the examination of worn parts, consideration usually must also be given to the mating parts that could also become worn or damaged during operation.

Non-reusable Parts

Shaft Journals and Splines

Brinelling on this input shaft Figure 54, would eventually cause serious bearing and gear damage. Brinelling can be detected at partial assembly, then rotating. If roughness is noted, do not reuse the part causing the roughness, for it could be caused by a bearing or gear as well as the shaft. Brinelling is usually caused by vibration under load, while the bearing is stationary.

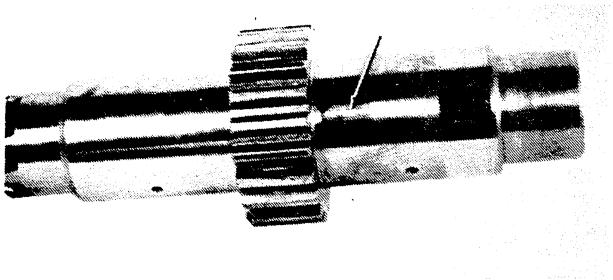


Figure 54

Eroding of the input shaft needle bearing raceway Figure 55, is the result of fatigue beneath the hardened surface of the shaft. Extreme overloads at low speeds are a very likely cause.

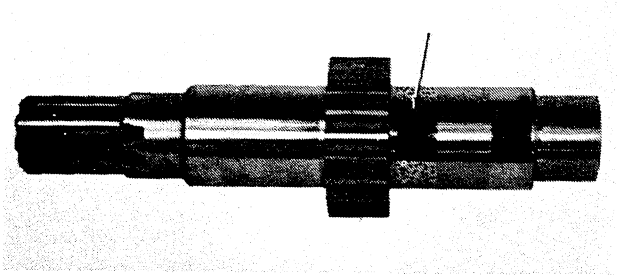


Figure 55

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Troubleshooting

COMMON CLUTCH SERVICING PROBLEMS AND SUGGESTED REMEDIES

POOR RELEASE

POSSIBLE CAUSE	REMEDY
1. Intermediate plate sticking on drive lugs. (14.00'' only)	a. Drive pins must be 90° square to the flywheel surface with .006 min. clearance between drive pins and intermediate plate slots. b. Refer to Figs. 43 & 44 on page 21.
2. Pressure plate not retracting.	a. Check pressure plate drive lugs for proper clearance of .006 min. b. Check pressure plate return springs for being bent or stretched. Replace if necessary. c. Insufficient amount of release travel. d. Lever nose out of groove in release sleeve retainer.
3. Driven disc distorted or warped.	a. Driven disc assembly must be straight within .015'' total indicator reading. Replace discs if they can't be straightened. b. Damage to driven disc can be caused by poor installation methods. Do not force transmission drive gear into disc hubs. This will distort or bend driven disc causing poor release.
4. Splines worn on main drive gear of transmission.	Replace drive gear and check driven disc hubs for excessive wear. If worn, replace disc. Check flywheel housing alignment of engine and transmission. Make sure driven discs slide freely on drive gear splines.
5. Internal clutch adjustment not correct.	Readjust clutch for standard release travel. Refer to adjusting instruction. Proper clutch adjustment must be maintained for good clutch release and proper brake squeeze.
6. Flywheel pilot bearing fitting too tightly in flywheel or on end of drive gear.	Free pilot bearing to a light push. Fit in flywheel and on drive gear pilot. If bearing is rough, replace.

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SUBJECT	14-inch Two-plate	15-1/2-inch Two-plate
Minimum Bell Housing Size for Mounting (S. A. E.)	No. 2	No. 2

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This is your NEW "Part one-clutch" for your Ford FW Tractor Repair Manual SE3920. Remove your old "Part one-clutch" and replace it with this new material.

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Pre-Installation Checks

Before installing any clutch, it is advisable to check the following items:

1. Inspect friction face of flywheel for smoothness, heat checks, scoring, excessive wear or runout on contact surface. The inspection for heat checks and scoring must be visual and based on experience; however, measure friction surface wear with straight edge and feelers. Replace or repair flywheel if wear is excessive. Refer to the manufacturers recommendations concerning replacement or rebuilding.

2. If clutch is new, remove protective coating from pressure plate and intermediate plate.

3. A new pilot bearing should be used with a new or rebuilt clutch. If the old bearing is reused, clean and check the bearing thoroughly. Repack with lubricant.

4. If the flywheel has been replaced, always indicate the face and pilot diameters to make sure total indicator runouts are within engine manufacturer's specifications (see Fig. 38 & 39).

5. Check fit of splined hubs of front and rear friction discs by sliding on main drive gear spline of transmission. Hubs must slide free if clutch is expected to release cleanly and properly.

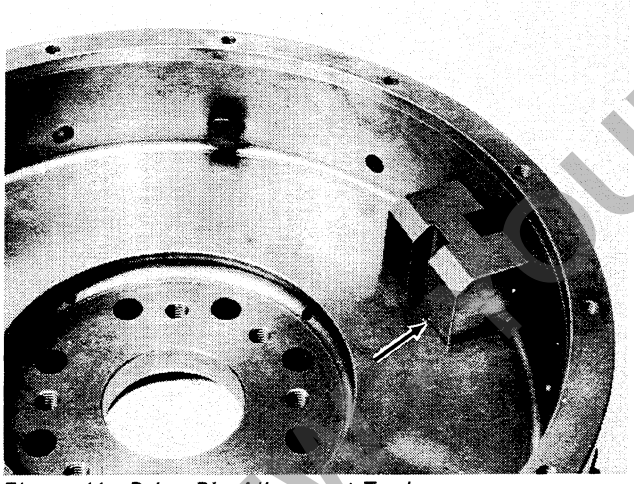


Figure 41: Drive Pin Alignment Tool

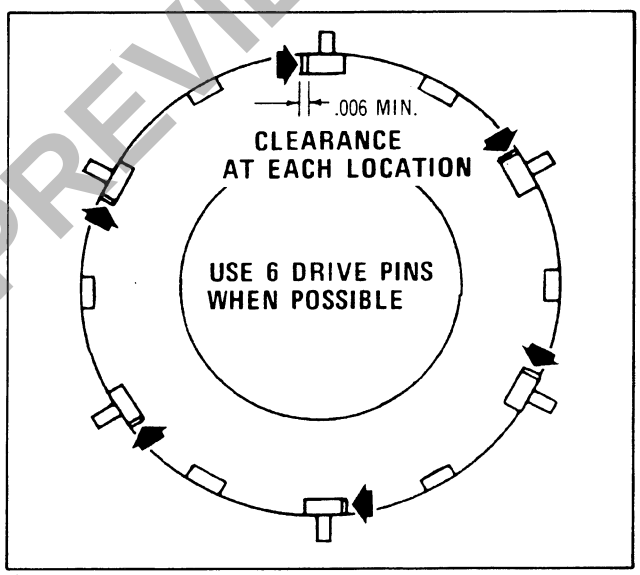


Figure 42:

Installing 14.00" Clutch on Flywheel

1. Install the drive pins (A-8) in the flywheel. Make sure that shanks of drive pins are a press fit in the flywheel rim and the heads are square with the friction face (see Fig. 41).

2. Worn or damaged drive pins can cause faulty clutch operation. Use 6 drive pins, positioned as shown in Fig. 42, whenever possible.

3. Two set screws are used per drive pin to lock the drive pin in position. These set screws must be loosened or removed to turn or to replace drive pins.

NOTE: *Drive pins must be square with flywheel to insure proper clearance with notches in intermediate pilot Figure 41.*

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GENERAL INFORMATION

Identification

Two Speed Transfer Case

The identification plate location is on the left rear surface of the transfer case housing near the oil reservoir Figure 1. If the unit lacks an identification plate, it may be identified by the following characteristics:

1. A shift detent block mounted on the front.
2. Shaft centers are all in line.
3. Internal oil reservoir and dipstick.
4. Model E gear ratio direct in low range.

Refer to general specification.

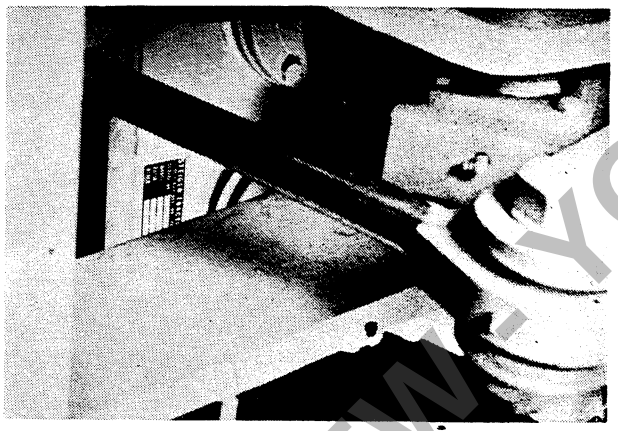


Figure 1

Application

The Model E transfer case is available as optional equipment on the Ford FW-20, 30, 40 and 60 tractors. This unit is mounted stationary on rubber mounts in the tractor frame.

General Specifications

Model E:

Ratio — Low range, 1 to 1
Ratio — High range, .88 to 1
Type — Helical gearing, with sliding clutch arrangement for range selection. Tapered roller bearings on shafts.
Lubrication — Pressure lubricated with filtered, air cooled oil pumped from integral reservoir.

OPERATING PRINCIPLES

Power Flow

Driving forces from the tractor's transmission are admitted to the top shaft (input shaft) of the transfer case. The input shaft is fitted with a sliding clutch which contains internal splines that are constantly in mesh with the input shaft splines.

By means of a shift fork and rod, the clutch is moved either fore or aft. The internal splines mesh with the external splines of the selective gear hub that it is moved toward, thus mechanically locking the input shaft and selected gear together.

As the input shaft is forced to turn, the selected gear must turn with it. Since the selected gears are always in mesh with their mating gears, the center shaft and output shaft are also forced to turn. The non-selected gear will also turn, but the rate of speed will differ from that of the input shaft. The non-selected gear will idle on caged roller bearings between its bore and input shaft journal.

By studying the following power flow diagrams Figures 2-4, you can visualize how drive ratios (or ground speed) are dependent upon which gears are utilized for a given range selection.

Power Flow Diagram — Low Range

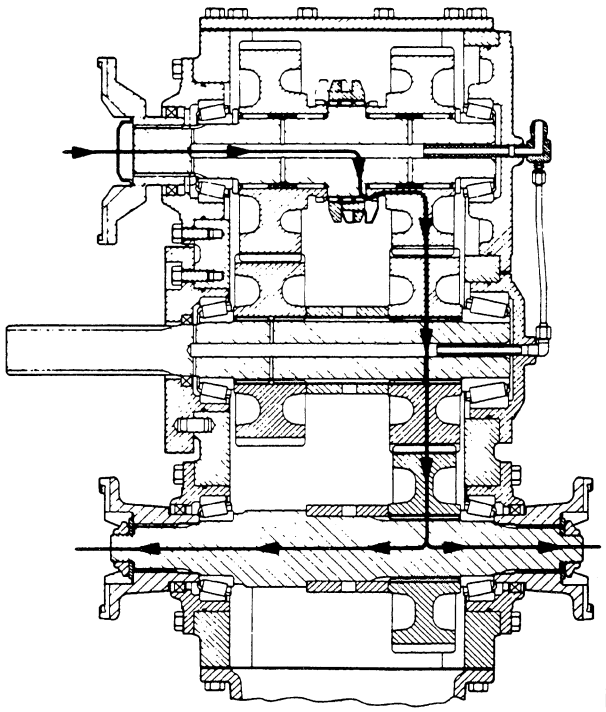


Figure 2

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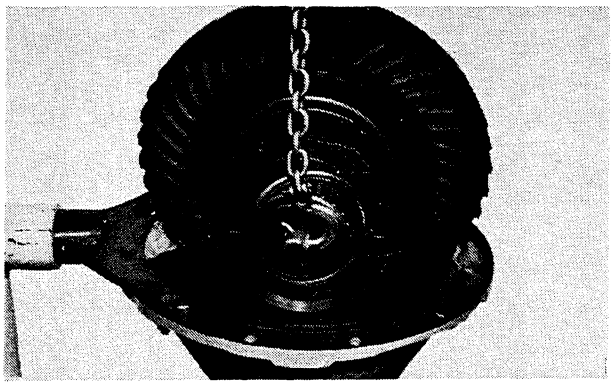


Figure 23

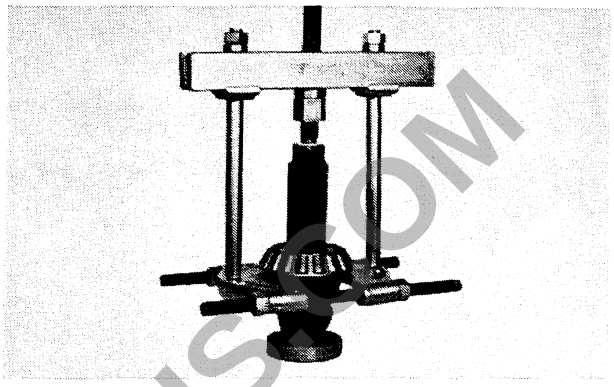


Figure 25

6. Remove the drive pinion flange nut and pull the flange from the pinion shaft. Use a jaw type puller if necessary.

7. Tap the drive pinion from the cage, then drive the oil seal assembly from the counterbore of the pinion bearing cage. The outer pinion bearing cone will be free at this time.

8. If the drive pinion bearing cup replacement is necessary, the cups may be removed from the pinion bearing cage using a jaw type puller, Figure 24.

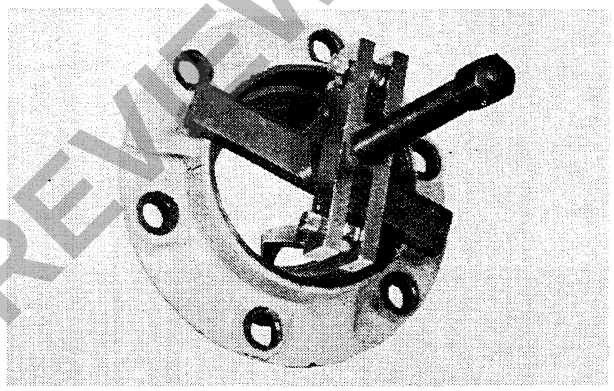


Figure 24

9. Remove the bearing spacer and selective thickness washer from the drive pinion shaft. Remove the remaining bearings from the drive pinion using a bearing separator and a puller arrangement or a press, Figure 25.

10. Remove the nuts and bolts fastening the ring gear to the flanged differential case if ring gear or differential case pair required replacement. Force the ring gear from the flanged differential case using a soft heavy mallet.

11. Punch mark the differential case halves for correct location if they are to be reused at reassembly. Cut the lock wires and remove the capscrews, Figure 26. Separate the case halves and remove the side gears, side gear thrust washers, spider, spider pinions and spider pinion thrust washers (or no-spin differential unit if so equipped), Figure 27, (Figure 28 NoSPIN).

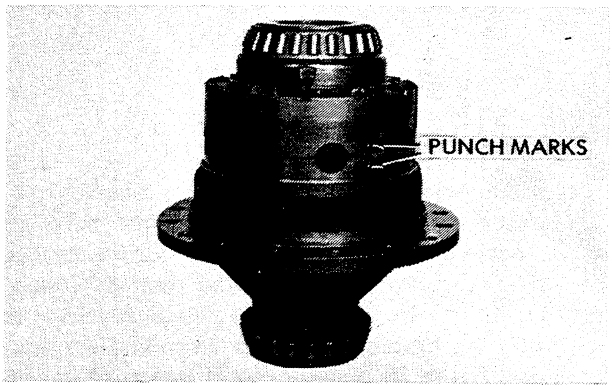


Figure 26

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Introduction

The purpose of this manual is to provide you with service information and procedures for disassembly and reassembly of the Model 54 and 76 Hydrostatic Pumps after removal from the chassis. We feel the procedures outlined in this manual should allow you to better service the pumps, and obtain the best results possible.

To assure accuracy of repair, and prevent loss or damage, certain components or subassemblies are disassembled, inspected and reassembled upon removal from main pump. Refer to list of contents (below) for various sections.

Cleanliness is most important: The level of cleanliness maintained in the disassembly and reassembly procedure, along with that of the entire hydrostatic circuit, has a direct effect on the performance of the Hydrostatic Pump.

NOTE: *All requests or inquiries must be accompanied by the complete model and serial number.*

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Hydraulic Service Manual

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Although pumps vary in design, the units used by Steiger have pressure plates on both sides of the gears. When pump discharge pressures are low, the plates assume a relaxed position—meaning they have very little pressure (due to resistance to flow or load). The plates squeeze against the gears to increase pump efficiency during working pressure conditions by minimizing internal leakage at the gear sides. The amount of pressure of the discharge flow will govern the pressure upon the plates since a passage connects the discharge and plate seal chambers. (See Fig. 99)

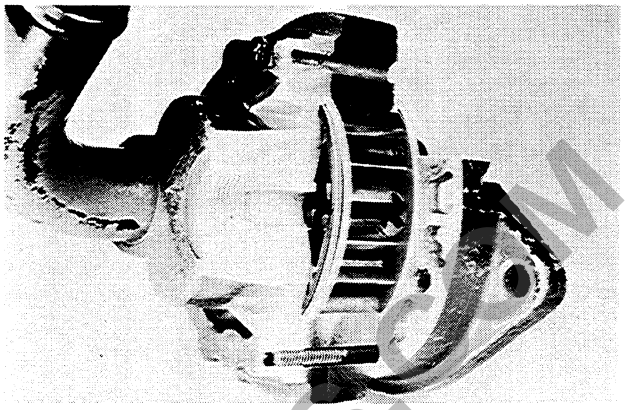


Figure 99:

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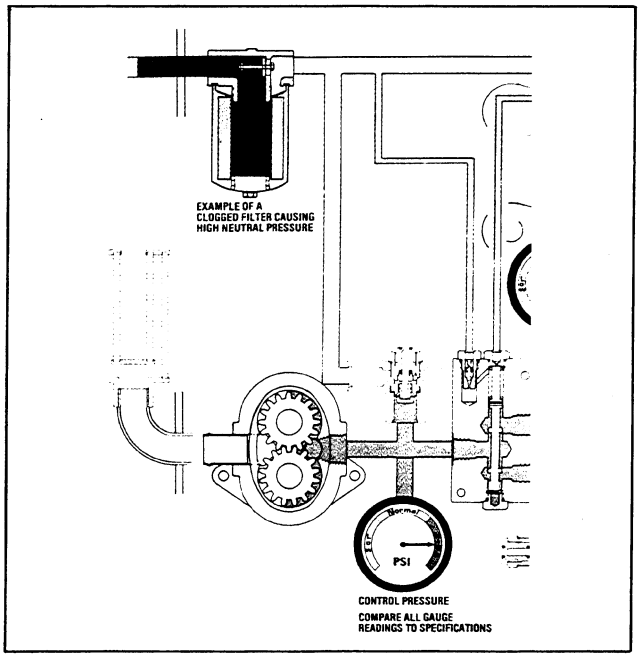


Figure 53:

If the minimum reading is lower than specified, there may be spring breakage or weakening on the priority spool, or the spool may be damaged or sticking in a position against spring pressure, thus allowing oil to enter the implement circuit too freely. This is usually associated with poor steering response or no steering. However, if these parts are not the cause, you must investigate further. (See Fig. 51)

Remove the line at the supply port of the steering valve. Close the openings with a cap and plug of the proper type. Run the engine again to obtain your readings as before. If the minimum control pressure is now met, the steering valve is faulty due to excessive leakage through the unit. But, if it is still not high enough, the problem is in the flow regulator, which will be covered later. (See Fig. 52)

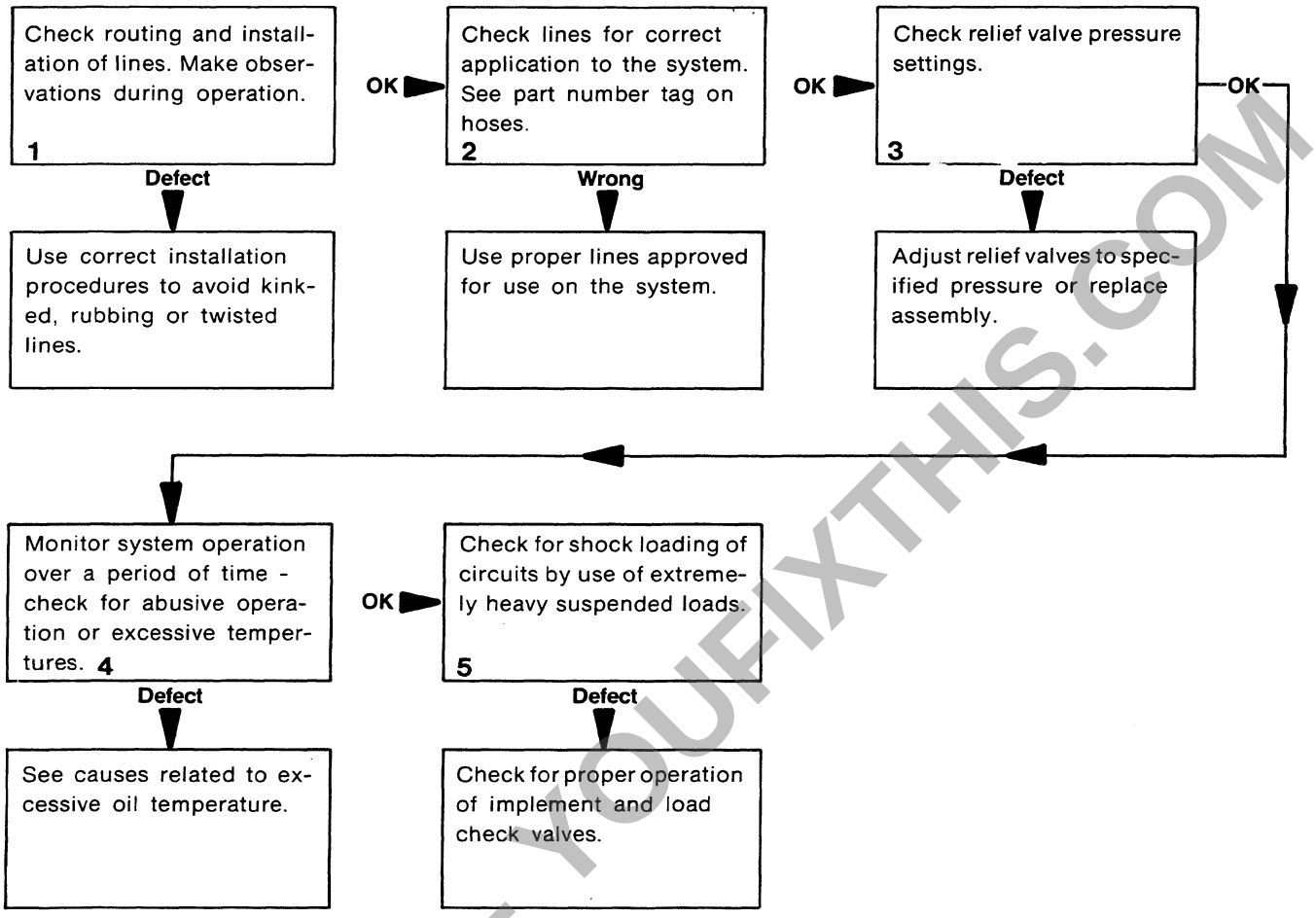
In reference to our first test with the steering valve still fully connected, if the maximum control pressure reading was higher than specified, then check for a clogged oil filter or an inoperative bypass valve in the filter head. Again, be sure the oil is near the test temperature. (See Fig. 53)

If the supply line to the steering valve was disconnected, reconnect at this time and proceed testing if the problem is not yet found. Excessive control pressures usually cause overheating of oil because more pressure is required to shift the spool against spring pressure, at which time a pressure drop is formed by the spool's metering edge at the implement port of the valve. As in relief valves, the greater the pressure drop, the more heat the oil will absorb. But, keep in mind that the system may be aggravated with other performance deficiencies, not just overheating alone. Usually a hissing sound can be heard in the faulty area. (See Fig. 54)

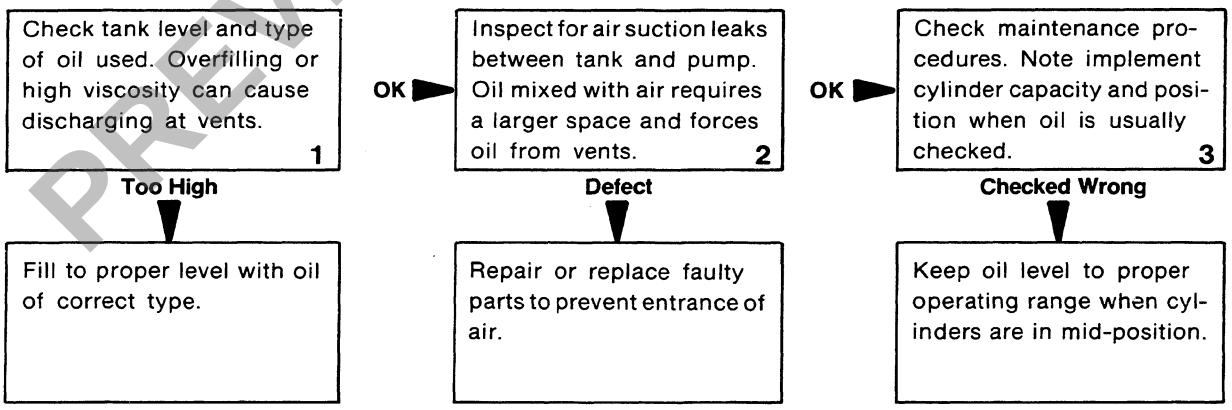
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Failed Hydraulic Lines



Reservoir Discharges Oil



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Removal Procedures

1. Loosen the instrument panel and brace it into a raised position (Fig. 1).

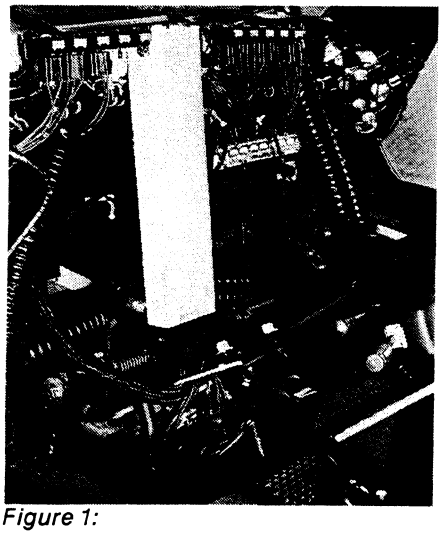


Figure 1:



Figure 2:

2. On the lower end of the column housing remove the retaining clamps (Fig. 2).



Figure 3:

3. Disconnect the signal/hazard switch harness after dismounting it from the column jacket (Fig. 3).

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