555 TRACTOR SERVICE MANUAL

40055520

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SECTION 1: SERVICING

1 Introduction

This section contains general information about specifications, capacities, lubricants, fluids and fuels for the tractor.

2 Towing/Transporting

2.1 TOWING

NOTE

Tractor cannot be tow started; the clutch requires hydraulic power.

Take the following precautions when towing:

1. Use a strong chain, cable or towbar and attach securely to the front plate or drawbar of tractor.
2. Let engine run, if possible, so that full use is made of power steering.
3. Tow tractor slowly to allow operator to control it.

NOTE

If engine cannot be started, pull tractor in a gradual arc across the field. Steering tractor will be difficult, because the hydraulics will be inoperative.

IMPORTANT

Do not tow tractor faster than 10 mph (17 km/h).

4. Disconnect drivelines when any drive train system requires repair or overhaul.

2.2 TRANSPORTING

Use the following procedures when transporting the tractor:

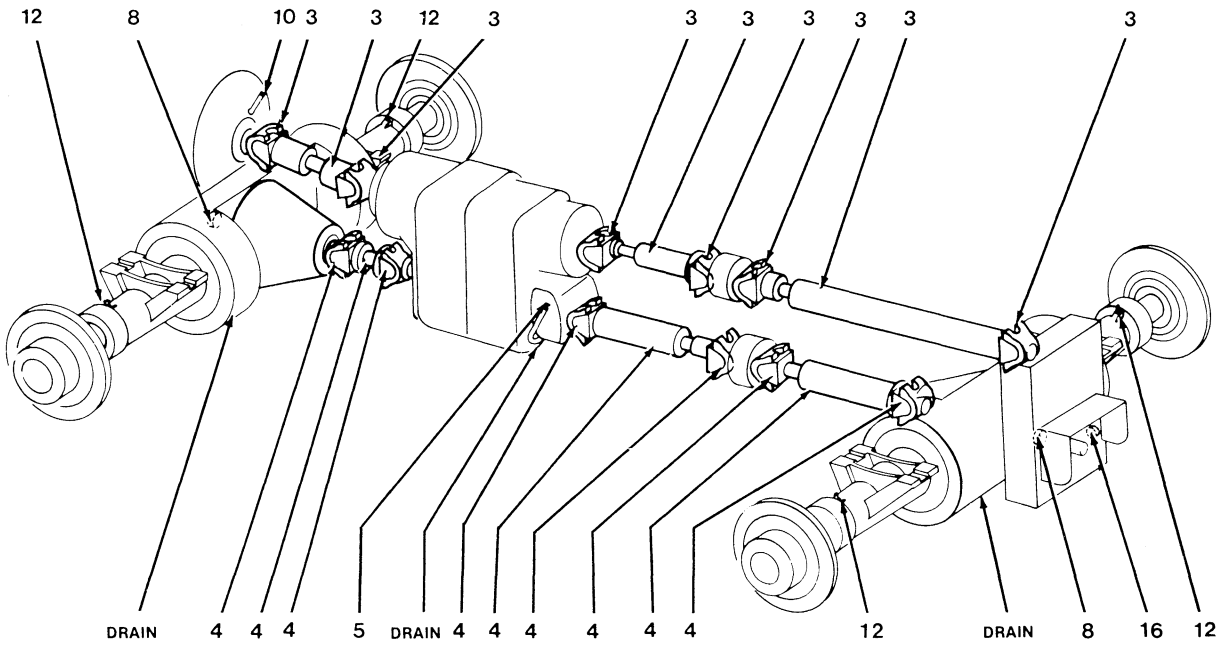
1. Check with local authorities regarding laws, permits required and other information required to transport the tractor.
2. Use a flatbed trailer with a carrying capacity of 30,000 lb (13 608 kg).
3. Use "wide load" signs.
4. Equip trailer with a winch (minimum 10 ton (9 t) capacity) to pull tractor onto trailer.
5. Securely chain tractor to trailer to prevent movement.
6. Block wheels and engage parkbrake to prevent movement.
7. Pin center articulation lock to prevent movement.
8. Inspect chains for cracks, wear, bent links, worn or bent hooks. Repair any damaged links or hooks.

3 Hoists and Jacks

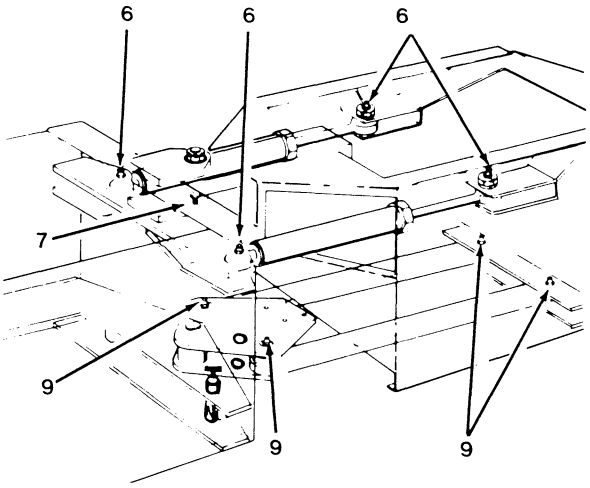
3.1 JACKS

Improper use of jacks or lifting devices can result in a serious accident. Follow these recommendations when raising the tractor with a jack:

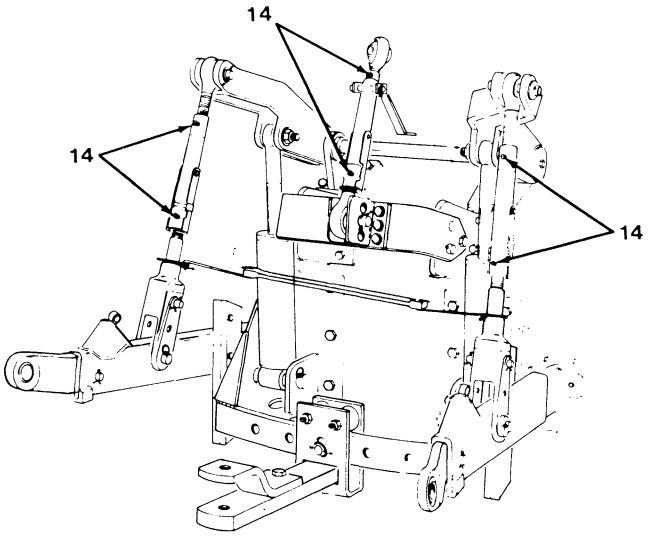
1. Select a jack strong enough to raise the tractor. The minimum jack required is of five ton (4.5 t) capacity.



Drive Train



Steering Cylinders and Articulation Joint



Three-Point Hitch

FIGURE 1-1: Lubrication Points

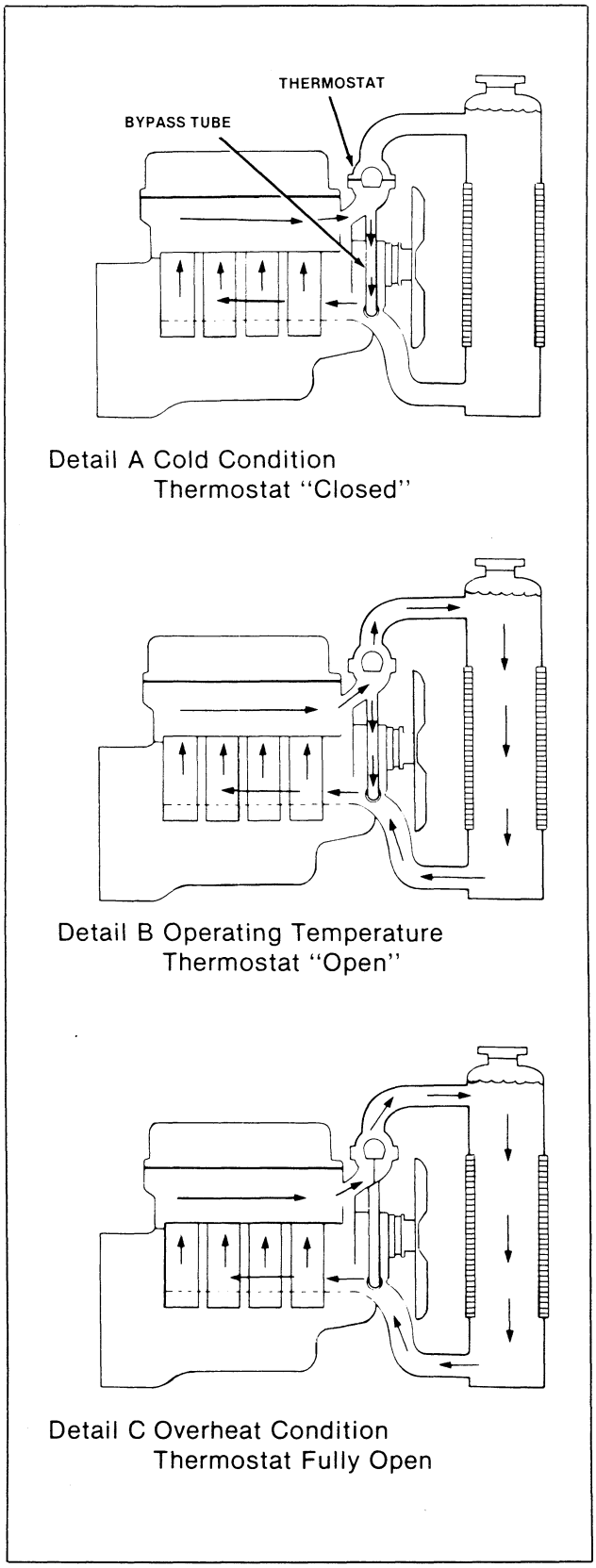


FIGURE 2-3: Cooling System Operation

Operation

When the engine is started, the coolant pump starts to circulate the coolant. If the coolant (engine) temperature is below the normal operating temperature of 165°F (74°C), the thermostat partially blocks and restricts the flow of coolant into the radiator. Coolant can circulate via a bypass tube from the engine outlet to the inlet side of the pump (Ref. Figure 2-3). Coolant circulates through engine and pump, but not through the radiator. As the temperature approaches normal, the thermostat will open. The coolant will circulate through the radiator core to the bottom outlet and back to the pump inlet at the right front corner of the engine. The thermostat regulates the coolant flow to maintain a normal temperature. It does this by diverting a greater or lesser portion of the coolant flow to the radiator, where its heat is transferred to passing air drawn by the fan. In the engine, coolant is circulated through the chambers (water jackets) of the engine block and cylinder heads, cooling the cylinders, valve seats, fuel injectors, engine block and heads. Some of the coolant flows to the surge tank through vent hoses, and returns to the pump inlet via a coolant make-up hose from the bottom of the surge tank (Ref. Figure 2-4). The cooling system is full when the surge tank fluid level depth is 5.5 in. (140 mm) with the coolant hot, and four in. (102 mm) when cold. The top chambers of the radiator and the cylinder head water jackets are vented to the surge tank

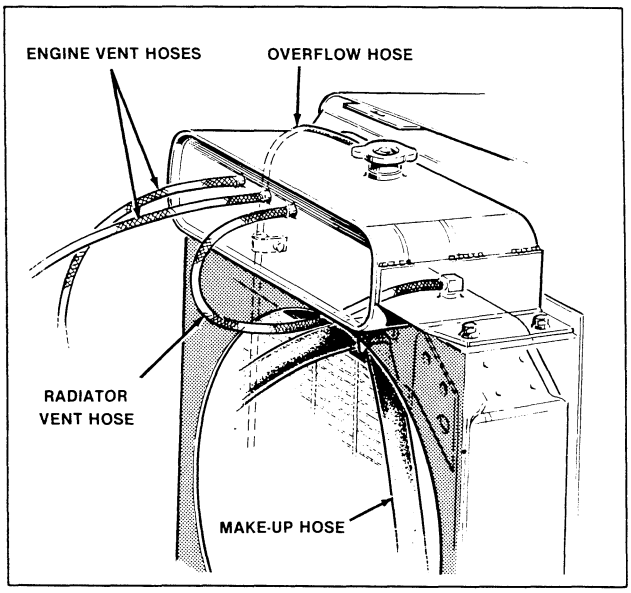


FIGURE 2-4: Surge Tank Circulation

TABLE 2-6: Cold Start System

TROUBLE	PROBABLE CAUSE	REMEDY
Failure of engine to start when cranked	Cylinder empty	Replace cylinder
	Cylinder not fully seated	Screw cylinder down, hand tighten
	Solenoid defective	Check solenoid action
	Defective valve	Actuate the valve and observe ether release. Replace if not working
	Capillary tube or atomizer plugged	Examine tube for damage, replace Remove and clean atomizer

4 Inspection/Check of Subsystems

4.1 GENERAL

The following lists the steps to be taken when determining the serviceability of a component. They include the minimum required corrective action where the reason for malfunction is determined. They do not contain instructions for removal, installation, disassembly, inspection, or overhaul of major components. For removal and installation, refer to subsection 5, Repair and Overhaul.

4.2 FUEL SYSTEM

Special Tools and Equipment

1. Sight glass (Cummins part no. ST-998 or equivalent).

Priming of Fuel Filters

To check fuel filters for priming, remove both filters and completely fill with clean diesel fuel. Install filters; refer to Operator's Manual.

Fuel Shutoff Valve

To check operation of the valve solenoid, proceed as follows (Ref. Figure 2-8):

1. Examine wire terminal connection for tightness.
2. Examine wire insulation for any evidence of short-circuiting and deterioration.
3. Turn manual override knob to full clockwise position.
4. Crank engine with keyswitch ON.

NOTE

If engine starts, circuit test solenoid. If engine does not start, check fuel, refer to Cummins Manual (Ref. Section 6).

2. Remove four mounting screws from gauge.

3. Carefully withdraw entire gauge assembly vertically from tank. If tank contains much fuel, it may be necessary to incline the top of the assembly toward the tank filler neck to start the float arm out of tank.

4. To install gauge, clean the gasket contact area of the tank and put new gasket in place.

5. Orient the mounting flange so the float (3) is toward the filler neck and lower the assembly into tank.

6. Tighten the four mounting screws (1) evenly to give uniform pressure on gasket.

7. Connect the wire to the terminal in the center of the gauge.

8. Observe gauge dial for fuel quantity. Compare this reading with gauge inside cab when keyswitch is ON. They should indicate the same fuel level.

5.5 REMOVAL AND INSTALLATION OF SURGE TANK

To remove and install the cooling system surge tank, proceed as follows (Ref. Figure 2-14):

1. Raise left side of engine hood and put support rod into place.

2. Drain coolant from radiator draincock until surge tank empties.

3. Remove vent hoses, surge tank overflow hose and coolant make-up hose from surge tank, keeping ends high to avoid coolant loss.

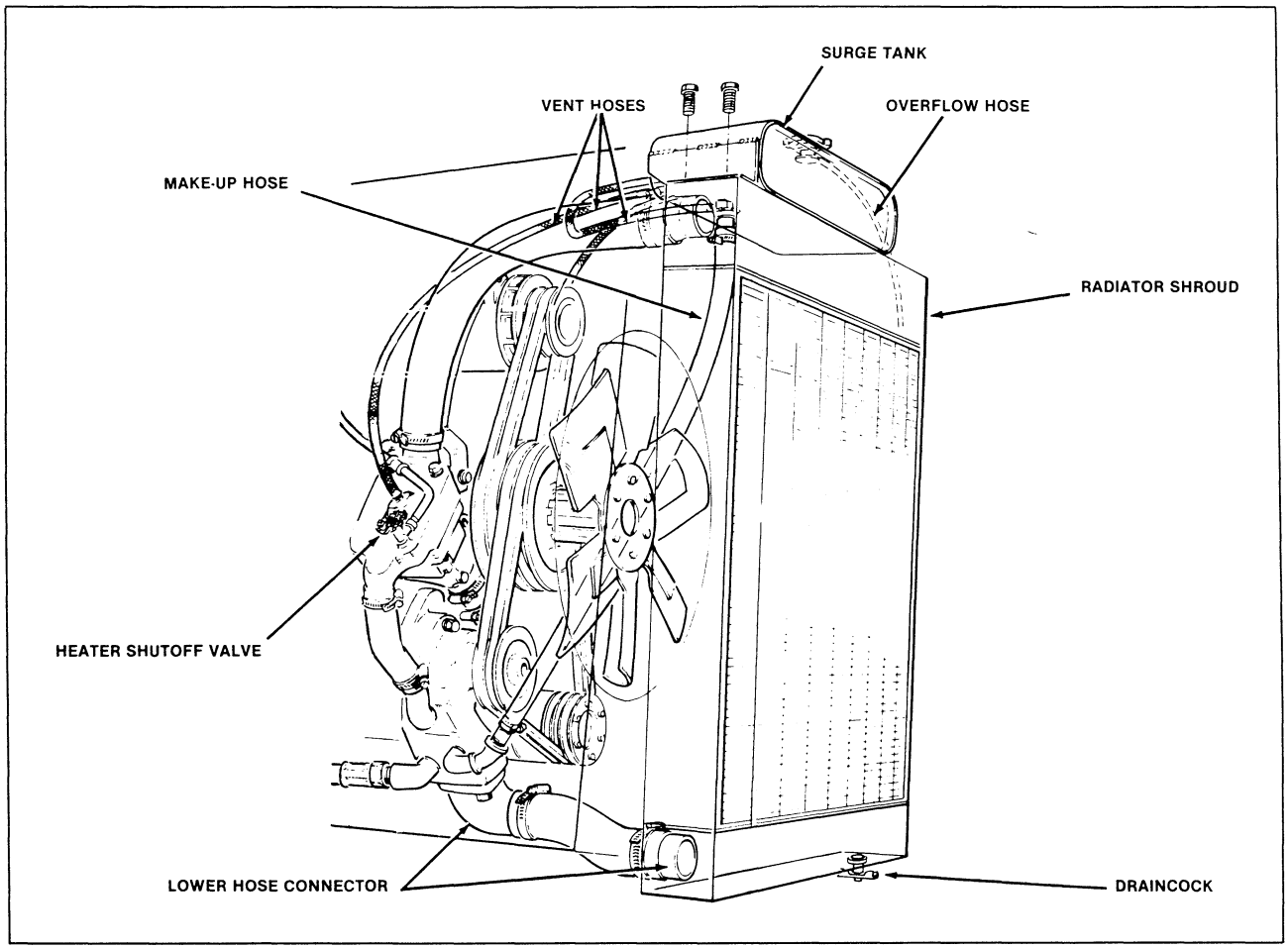


FIGURE 2-14: Removal and Installation of Surge Tank

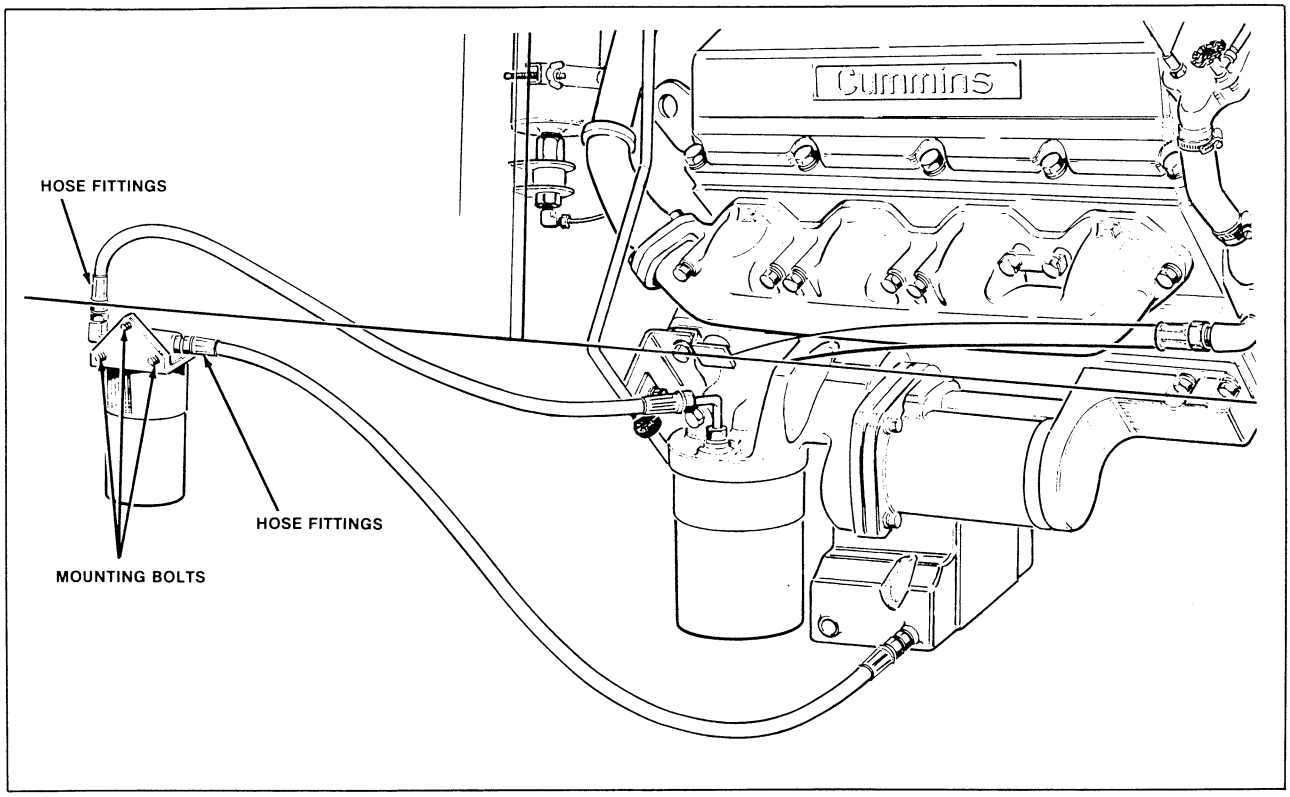


FIGURE 2-20: Removal and Installation of Bypass Filter

5.12 REMOVAL AND INSTALLATION OF COLD STARTING AID VALVE

— DANGER

WHEN MAINTAINING OR TROUBLESHOOTING THESE SYSTEMS, ALWAYS MAKE SURE THAT YOU ARE IN A WELL VENTILATED AREA AWAY FROM HEAT, OPEN FLAMES, OR SPARKS. WEAR GOGGLES WHEN TESTING TO AVOID EYE INJURY. MAKE SURE THAT OPENINGS OF THE VALVE, TUBE, OR ATOMIZER ARE POINTED AWAY FROM YOURSELF WHILE TESTING.

IF FUEL ENTERS EYES OR FUMES IRRITATE EYES, THEY SHOULD BE WASHED WITH LARGE QUANTITIES OF CLEAN WATER FOR 15 MINUTES. A PHYSICIAN, PREFERABLY AN EYE SPECIALIST, SHOULD BE CONTACTED.

DO NOT STORE CYLINDERS IN TEMPERATURES ABOVE 160°F. CONTENTS ARE UNDER PRESSURE. DO NOT INCINERATE, PUNCTURE, OR ATTEMPT TO REMOVE CENTER CORE VALVE OR SIDE SAFETY VALVE FROM CYLINDER.

THE ETHYL ETHER USED IN THIS FUEL FOR THESE SYSTEMS IS EXTREMELY FLAMMABLE, TOXIC, HARMFUL, OR FATAL IF SWALLOWED. AVOID CONTACT WITH THE SKIN OR EYES AND BREATHING THE FUMES. IF SWALLOWED, DO NOT INDUCE VOMITING. CALL PHYSICIAN IMMEDIATELY.

5. Torque radiator anchoring bolts to 55 lbf ft (75 N·m).

6. Mount hydraulic and conditioner cooling rack on hinges. Attach retaining chain and install grill.

- CAUTION

DO NOT OVERTIGHTEN HYDRAULIC FITTINGS AT COOLERS. COOLER PIPING MAY BEND AND A HIGH PRESSURE LEAK MAY RESULT IN EQUIPMENT DAMAGE OR PERSONAL INJURY. USE A BACKING WRENCH WHEN TIGHTENING HOSES TO COOLER FITTINGS.

BE ALERT

6.5.3 Mechanical Assembly

1. Install exhaust pipe from turbocharger to muffler; ensure turbocharger port is clean. Tighten muffler and turbocharger clamps.

2. Install intake pipe from air cleaner to turbocharger intake.

IMPORTANT

Intake port on turbocharger should be clean and free of any foreign matter. Ensure air intake pipe and air filter port are clean. Failure to keep clean will result in engine and turbocharger damage and/or personal injury.

3. Tighten intake clamps until rubber elbow lips are 50 percent compressed or flush with clamp. DO NOT OVERTIGHTEN.

4. Install fuel lines to filters and fuel line return using a backing wrench to tighten.

5. Route aspirator hose and connect to muffler.

6. Route heater hoses to coolant engine receptable and pump. Install hoses.

7. Install hydraulic pump at engine rear. Tighten mounting bolts to 75 lbf ft (100 N·m).

8. Route air conditioner hoses along underside of hood support and connect to receiver/dryer bottle.

NOTE

Replace bottle if ports are found without caps.

9. Connect surge tank make-up hoses and radiator vent hoses.

10. Connect air conditioner compressor hoses and recharge system once engine operation has been verified. Refer to Section 7, ENVIRONMENTAL.

11. Install hydraulic tank vent hoses to fittings on tank.

12. Install throttle cable to fuel pump. Secure cable to hood beam supoort with a tie.

13. Connect temperature probe into receptacle at engine shutoff valve. Route cable along underside of hood beam support.

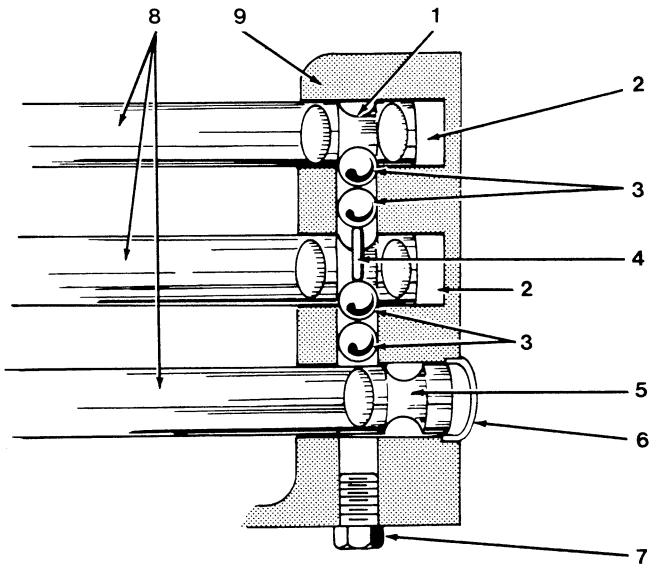
6.5.4 Electrical Connections

1. Connect headlamp leads to wiring harness at engine front. Connect pressure indicator at top left cooler of conditioner system.

2. Connect wires to starter motor. Refer to Section 6, ELECTRICAL.

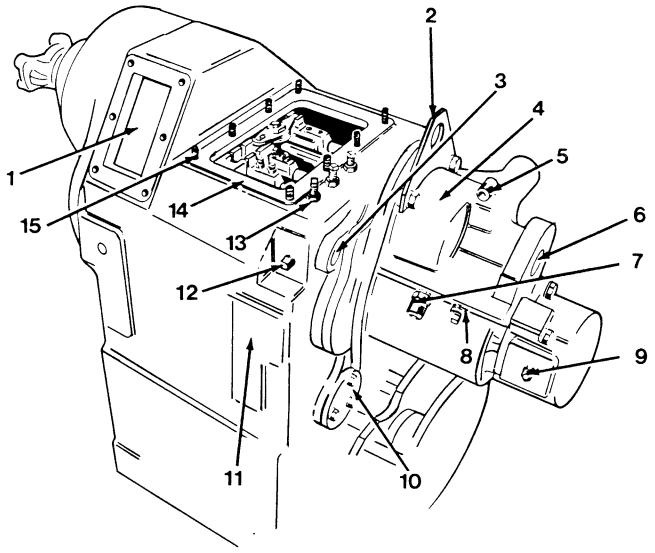
3. Connect wiring harness to fuel solenoid and alternator charge relay lead. Install throttle and tachometer cables.

4. Connect lead to air conditioner compressor.



1. LOCKOUT MECHANISM PASSAGE
2. SHIFT SHAFT BORES
3. LOCKOUT BALL
4. LOCKOUT PIN
5. BALL GROOVE
6. EXPANSION PLUG
7. THREADED PLUG
8. SHAFTS
9. TRANSMISSION CASING

FIGURE 3-5: Gearshift Lockout Mechanism (Top Cutaway View)



1. ACCESS AND OBSERVATION OPENING
2. LIFTING BRACKET
3. EXPANSION PLUG
4. PTO CLUTCH HOUSING
5. MASTER CLUTCH APPLICATION PRESSURE LINE FITTING
6. LUBRICATION PUMP MOUNTING POINT
7. MASTER AND PTO CLUTCH LUBRICATION LINE FITTING
8. LUBRICATION PRESSURE TEST PORT
9. PTO CLUTCH APPLY PRESSURE TEST PORT
10. REVERSE IDLER SHAFT MOUNTING FLANGE
11. SIDE MOUNTING BRACKET ATTACHMENT POINT
12. GEARSHIFT LOCKOUT MECHANISM PLUG
13. GEARSHIFT SHAFT DETENT CAPSCREWS
14. SHIFT CONTROL HOUSING MOUNTING POINT
15. MOUNTING STUDS

FIGURE 3-6: Transmission Left Rear View With Gearshift Housing Removed

1. Disconnect PTO clutch driveline by removing two U-bolt assemblies holding U-joint and yoke together (Ref. Figure 3-13). Remove capscrew, lockwasher, plainwasher and seal ring from end of PTO clutch yoke.

2. Carefully tap yoke off splined PTO clutch output shaft. Store yoke, retaining hardware and U-joint bearing caps in a clean container.

IMPORTANT

Ensure needle bearings do not fall out of caps.

3. Disconnect rear output driveline by removing four capscrews and lockwashers retaining driveshaft flange yoke to disc brake rotor. Remove brake rotor carefully.

IMPORTANT

Be careful when removing fourth capscrew and lockwasher that brake rotor does not drop down to floor.

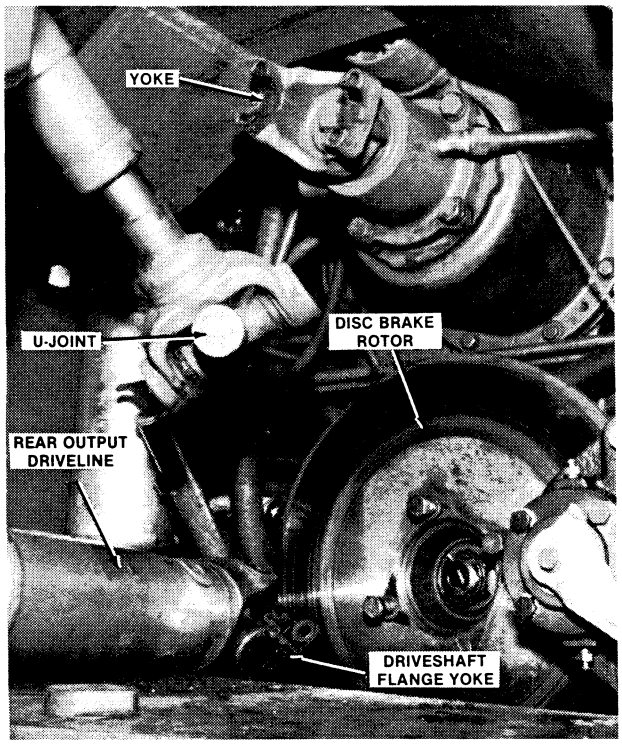


FIGURE 3-13: Driveline Disconnection

4. Disconnect parkbrake cable by removing the capscrew and self-locking nut connecting cable clevis to the brake cable clamp (Ref. Figure 3-14).

5. Remove U-bolt and hex nuts connecting brake cable to its support bracket. Disconnect brake line hose from pipe attached to brake assembly. Plug ends of hose and pipe.

6. Remove four capscrews holding seat to floorboard, remove seat.

7. Remove floormatting and floorboards.

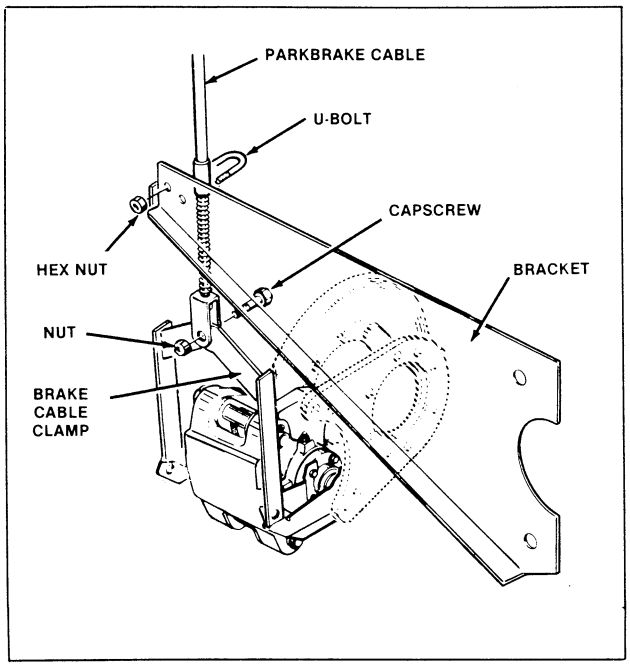
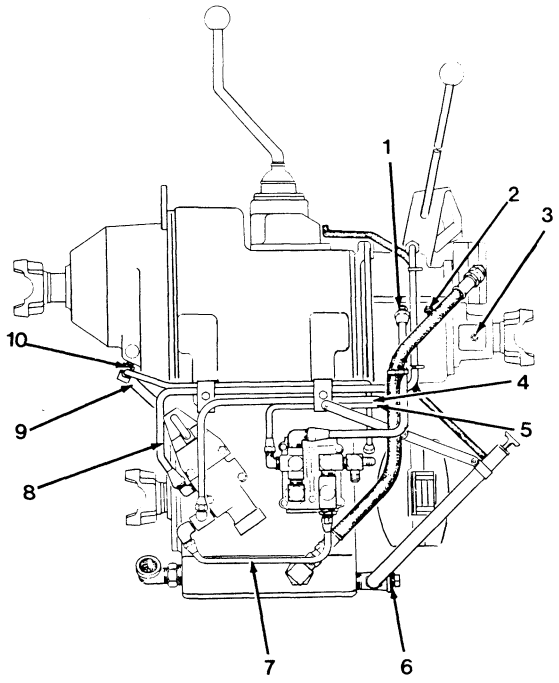


FIGURE 3-14: Disconnect Parkbrake Cable

8. Disconnect and label all electrical wires from PTO and transmission neutral safety switches and clutch and transmission pressure switches.

9. Tie back brake and clutch pedals.

10. Disconnect range shift rods from range selector bellcranks on right side of transmission by removing cotterpins, plainwashers and bushings (Ref. Figure 3-15).



1. MASTER AND PTO CLUTCH LUBRICATION LINE
2. TEST PORT-MASTER AND PTO CLUTCH LUBRICATION PRESSURE
3. TEST PORT-PTO CLUTCH APPLY PRESSURE
4. PTO CLUTCH APPLY PRESSURE LINE
5. PTO LOW PRESSURE LINE
6. LUBRICATION PUMP SUCTION HOSE
7. CLUTCH APPLY PRESSURE CONTINUATION LINE
8. MASTER CLUTCH APPLY PRESSURE LINE
9. LUBRICATION OIL TRANSFER TUBE
10. LUBRICATION PRESSURE SWITCH

FIGURE 3-27: Transmission Lines and Hoses (Left Side)

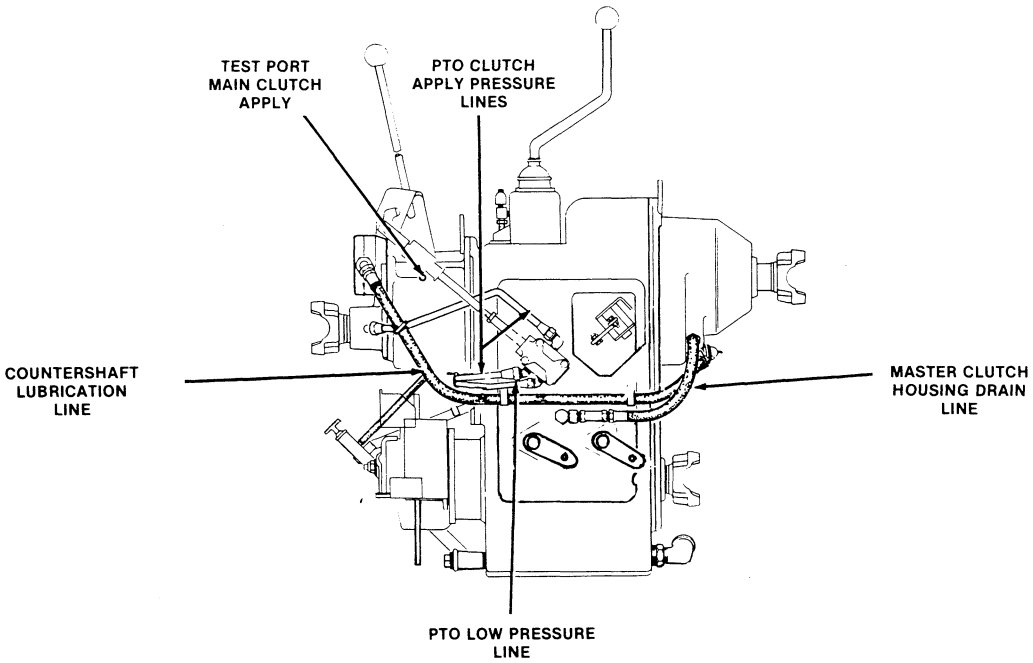


FIGURE 3-28: Transmission Lines and Hoses (Right Side)

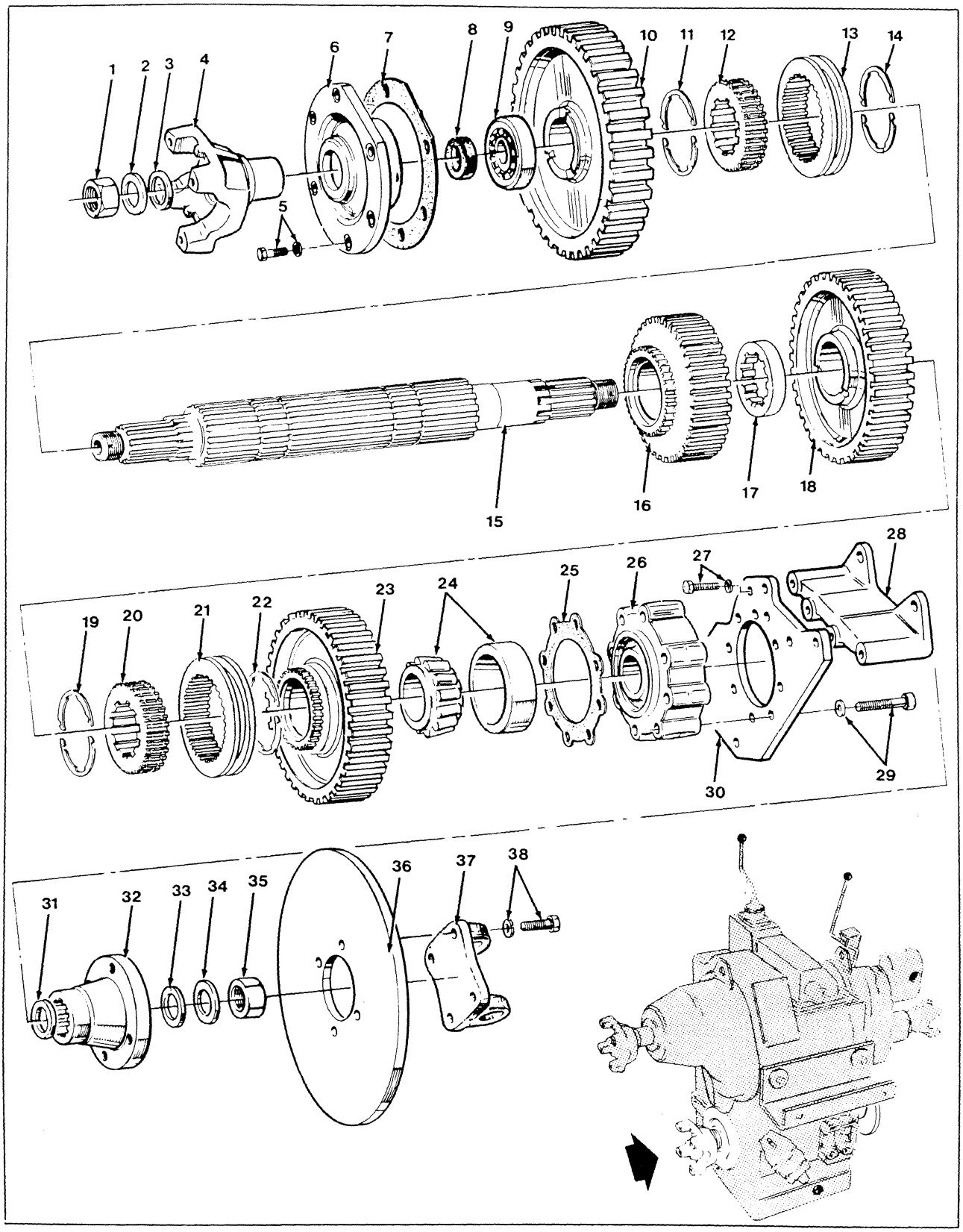


FIGURE 3-35: Output Shaft Components

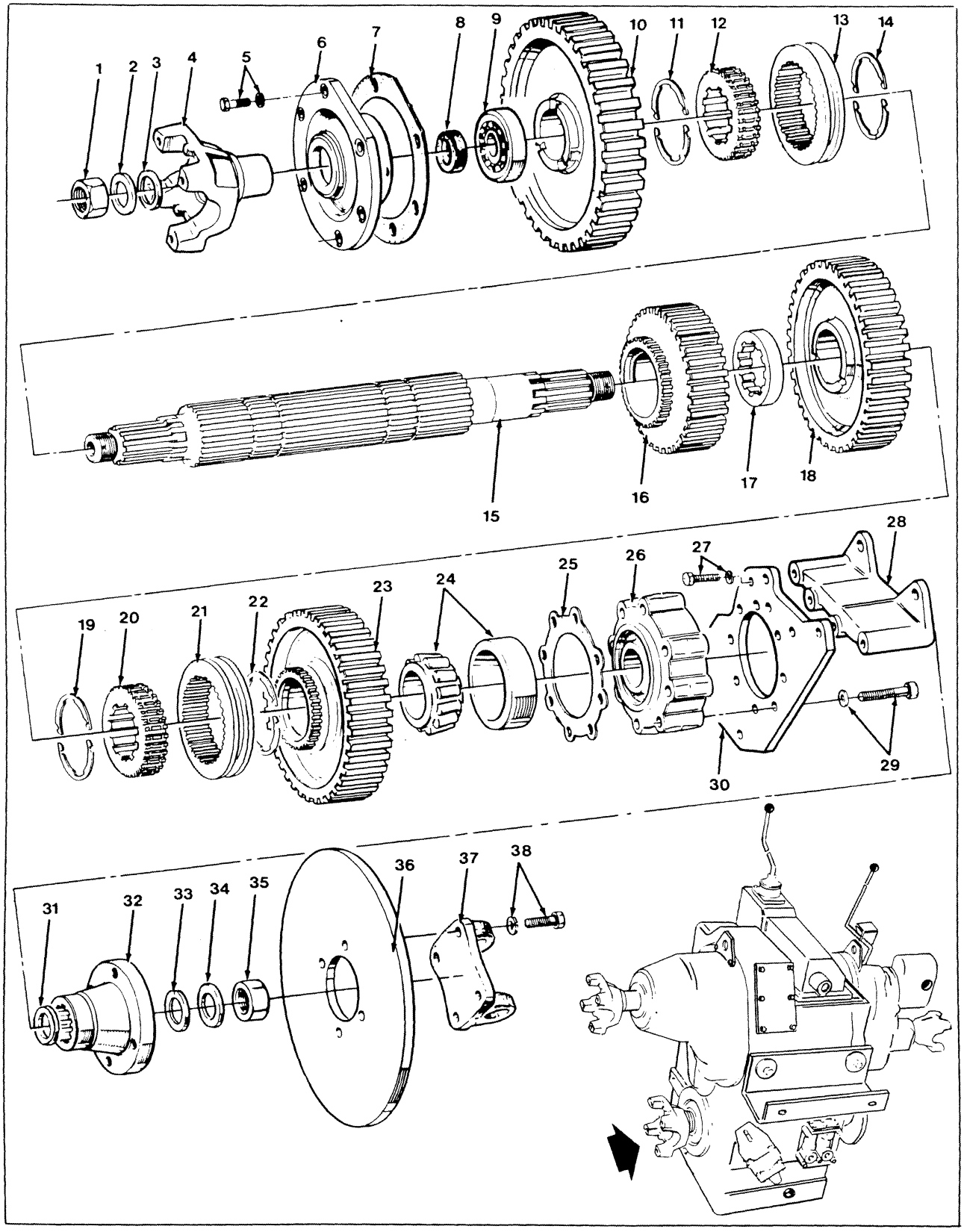


FIGURE 3-39: Output Shaft Components

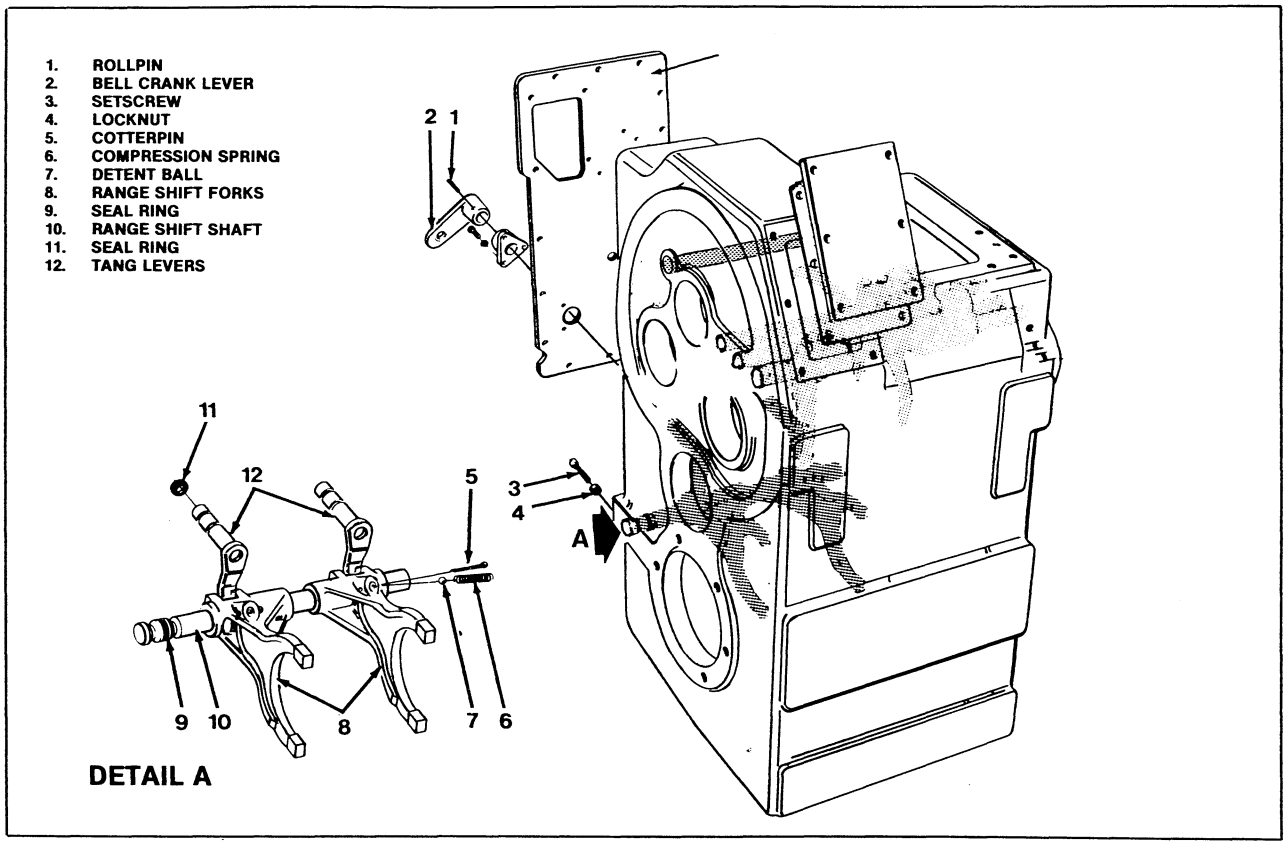


FIGURE 3-44: Range Shift Shaft and Fork Installation

3.4.3.10 Shaft End Play Adjustments

GENERAL

Refer to Subsection 8, Specifications. Adjust countershaft and output shaft end play according to tolerances using special tools listed in Subsection 9.

1st, 2nd AND 3rd COUNTERSHAFTS

1. Align ring adjusting tool no. 33908 over 1st, 2nd and 3rd countershaft end bores (Ref. Figure 3-45).

2. Thread adjusting sleeve to contact bearing cup. Lightly tighten adjustor setscrew to maintain setting.

3. Position adjusting tool on shop press stand. Place self-adjusting ring into top recess (Ref. Figure 3-46).

4. Place a flat metal plate on top of self-adjusting ring. Compress plate until flush with tool. This will provide proper adjusting ring thickness to allow .003 to .005 in. countershaft end play.

5. Apply gasket sealant to surface of casing contacted by PTO housing adaptor cover.

6. Install adaptor cover gasket, ensuring holes align and press in place.

7. Put preloaded self-adjusting rings in end bores for each countershaft.

8. Install PTO adaptor cover and align holes and aligning pins.

9. Apply sealant to the six capscrews and install. Tighten to correct torque specifications, refer to Subsection 8, Specifications.

2. Temporarily install shift lever housing on top of transmission to prevent contamination during transmission installation.

3. Install expansion plugs in exposed shift shaft bore in rear of transmission and range shift shaft bore in front of transmission case.

4. Make final installation of remaining clips and tie straps.

5. Ensure that test port plugs are installed for master clutch apply pressure, PTO clutch apply pressure and master and PTO clutch lubrication.

6. Connect transmission breather components after transmission is installed in tractor.

7. Connect main suction hose to elbow assembly in front of transmission. Pull hose up over master clutch housing and secure with wire or cord.

4 CLUTCHES

4.1 Description and Operation

4.1.1 MASTER CLUTCH AND INPUT SHAFT

Description

Refer to Figures 3-53 and 3-54 for component location.

Operation

The function of the master clutch is to couple and decouple engine torque to the transmission power section. It allows range and gear selection without gear clash.

The clutch is always engaged when the tractor is running. When the clutch is disengaged, the input shaft continues to turn, supplying torque to the PTO clutch and transmission lubrication pump.

When clutch is engaged, oil pressure is applied to the clutch piston. The clutch piston compresses the clutch plates and steel plates together, causing drum and gear assembly to turn.

When the clutch pedal is depressed, clutch application oil pressure is interrupted at the clutch modulator valve. Clutch lubrication pressure is constantly fed through the lube port and gallery in the input shaft to the port at the plate side of the clutch engagement piston. With engagement pressure interrupted, the combined force of lube oil pressure and the return springs the piston is forced to retract. Oil on the return side of the piston is relieved through the ball valve in the end of the shaft and into the clutch housing.

The plates are then allowed to separate, and torque transfer is interrupted. Some clutch drag is inherent in wet-type clutches. To overcome residual rotation, the last in. (25 mm) of clutch pedal travel activates the transmission brake. Within 10 seconds of full pedal application, gear and range shifts can be made without gear clash.

4.1.2 MASTER CLUTCH HOUSING

The master clutch housing is attached to the transmission housing. Its main function is to mount the clutch/input shaft driven end bearing, and protect the front end of the countershafts.

4.1.3 PTO CLUTCH

Description

The PTO clutch is a hydraulically operated, multiple disc, shaft-mounted assembly. Its purpose is to couple and decouple engine torque between the transmission input shaft and the PTO gearbox. Refer to Figure 3-55 for component location.

Operation

The PTO clutch assembly is mounted inside the PTO clutch housing. The clutch gear is driven by the input shaft mounted gear.

With the PTO selector valve in the engaged position, oil pressure between 125 and 150 psi (850 to 1 000 kPa) is applied to the forward port of the PTO shaft. The shaft gallery routes this pressure into the cavity between the separator plate and

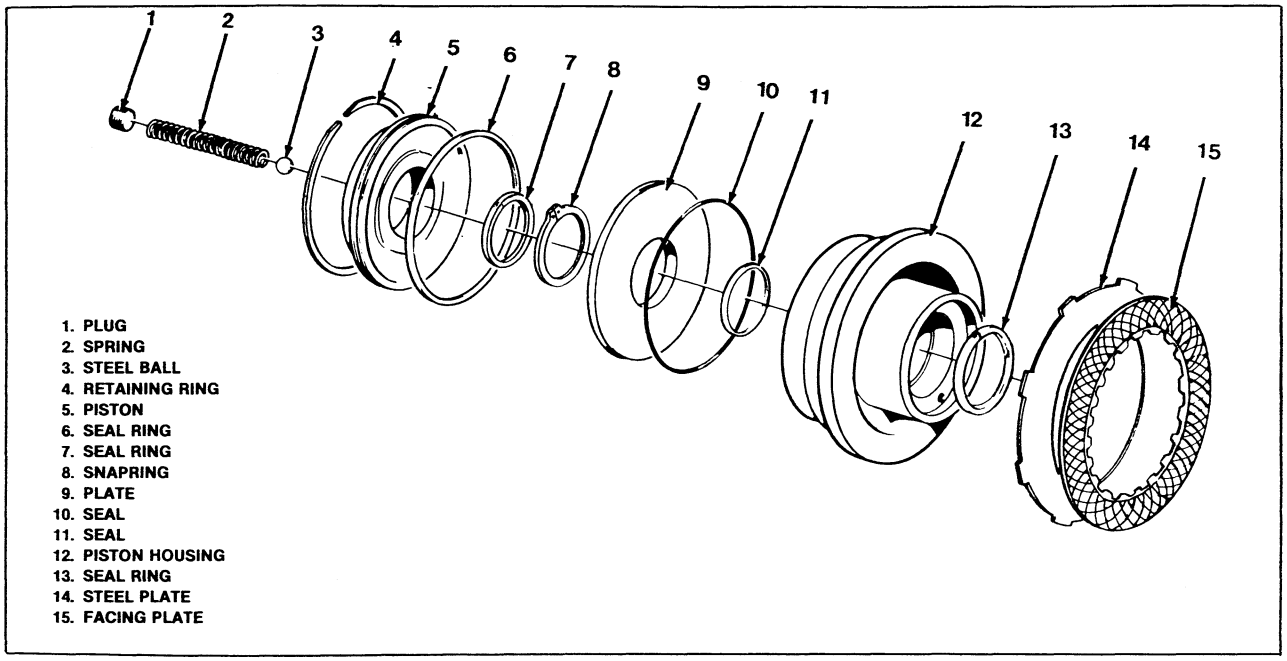


FIGURE 3-58: Master Clutch Facing Plates Replacement

NOTE

Seal (13) must be compressed to allow passage of piston housing (12). After piston housing has moved approx one in. (25 mm) over seal ring, resistance will be met. At that point, an internal chamfer must again compress the seal ring.

5. Gently work piston housing onto seal ring (13) until the piston housing rests against spring retainer in the hub, and springs can be compressed when the piston housing is pushed farther onto shaft.

6. Install O-ring seal (11) in the groove located against the shaft shoulder. This groove and shoulder are located inside piston housing (12).

7. Insert tool no. 60378 in piston housing retainer ring groove.

8. Install O-ring seal (10) on separator plate (9).

9. Lubricate O-ring seal with crystalline-type grease.

10. Put separator plate (9) on shaft, holding O-ring (10) against the lead-in chamfer on piston housing.

IMPORTANT

One edge of the separator plate is chamfered. This chamfer must be toward O-ring seal (11).

11. Gather the excess O-ring seal (10) into a loop at one area of the separator plate. While covering unlooped portion of the O-ring with the piston housing, feed the loop back into the cavity formed between groove and piston housing.

12. When O-ring is completely contained within the cavity, separator plated may be moved into the piston housing and positioned against O-ring seal (11).

13. Put external retaining ring (8) over shaft against separator plate. Position tool no. TRA-60374 on shaft with the legs against separator plate. Install and tighten nut on shaft to push separator plate against shoulder. Install retaining ring (8) in shaft groove.

4. Remove external retaining ring (41) from anti-pressure cap end of shaft. Remove bearing assembly (40).

IMPORTANT

Note relative position of all spacers, thrust bearings and thrust washers.

5. Remove the following: trust washer (39), thrust bearing (38), thrust washer (37), gear and drum assembly (34), straight roller bearing (36), bearing spacer (35), thrust washer (33), thrust bearing (32) and thrust washer (31).

If bearing assembly cannot be removed easily, use tool no. 33870. Position puller legs between gear and drum of assembly. Pulling against gear, remove all the above listed components from shaft.

NOTE

If the above method was used, thrust washers and thrust bearing and straight roller bearing should be closely checked for damage.

6. Position the clutch pack vertically with pipe plug up.

NOTE

Assembly and disassembly is more convenient with clutch pack supported vertically between two benches or with the shaft placed through a hole in a bench.

7. Remove internal retaining ring (30).

8. Remove split ring retainer by pressing hub away from split ring retainer (29).

9. Put hands over the outside diameter of steel clutch plates and lift off the final hub assembly including plate stack, hub, etc.

10. Remove internal spiralox ring and external retaining ring (27). Lift off backing plate (26).

11. Remove facing plates (25) and clutch plates (24) from hub. Do not remove retainer and springs contained inside hub.

12. Reposition shaft with pipe plug down.

13. Remove internal retaining ring (13) and insert tool no. 60377 into the snapring groove.

NOTE

The removing tool fills the ring groove preventing lathe cut seal ring from lodging in the open groove during piston removal.

14. Using a soft-faced hammer, tap around the outer diameter of the piston housing to move it down over lathe cut seal ring (15) and O-ring seal (19).

IMPORTANT

Do not strike piston housing with excessive force or allow it to drop.

15. Remove piston from shaft (14). Remove lathe cut seal ring from piston and O-ring seal from separator plate (18). Remove piston hook-type seal ring (16) from shaft.

16. Remove external retaining rings (17, 20) from shaft.

18. Using a hacksaw, cut radially through the separator plate stopping the saw cut 1/8 in. from the shaft (to prevent blade from contacting shaft).

19. Remove the saw and drive a wedge into the outside end of a slot to split the plate.

4.4.2.3 Preparation for Assembly

Thoroughly clean, oil and inspect all parts. Parts with excessive wear should be replaced before assembly begins.

4. Pull axle tube (6) from differential housing.

5. Remove stub shaft-sun gear (2) from differential housing (1).

IMPORTANT

Because differential unit is offset to the right in the housing, the long stub shaft-sun gear is located in the left front and right ends of differential housing.

6. Remove retaining ring (19), capscrews (18) and washers (17) from axle outer end.

7. Install capscrews in threaded holes (20) and tighten evenly until taper bushing (21) separates from hub (22).

8. Remove capscrews (12), retainer plate (11) and shims (10) connecting planetary gear carrier (9) to outer axle shaft (23).

9. Remove dust cap (16) and oil seal (15) from outer end of axle tube and discard seal.

10. Pull outer axle shaft out of axle tube being careful not to damage splines or bearing cups.

NOTE

Remove bearings only if worn.

11. Press bearing (14) off axle shaft, and bearing cup (13) from axle tube.

12. Press bearing (3) off plant carrier (9) and bearing cup (4) from axle tube.

13. Remove oil seal (5) if bearing cup (4) is removed.

NOTE

O-ring (24) should always be replaced when axle is removed.

5.2.3 REMOVAL AND DISASSEMBLY OF DIFFERENTIAL CARRIER

5.2.3.1 Removal

1. Remove axle assembly from tractor (para 5.2.1).

2. Separate axle tubes from differential housing and remove sun gears (para 5.2.2, Steps 2 to 5).

3. Remove bolts and washers and pull differential carrier out of differential housing (Ref. Figure 3-71).

4. Replace gasket.

5.2.4 REMOVAL AND DISASSEMBLY OF PLANETARY AND RING GEARS

NOTE

Do not remove planetary ring gear from differential housing unless damaged.

5.2.4.1 Removal of Ring Gear

1. Thread two bolts into holes in ring gear and force gear from differential housing (Ref. Figure 3-72).

2. When bolts have reached their limit, unthread and insert a metal spacer approx one in. (25 mm) thick under threaded hole. Alternately tighten bolts until ring gear is free of housing.

3. Drive two groove pins from holes with pin drift.

4. Clean differential housing and both sides of ring gear with a putty knife and solvent.

5.2.4.2 Removal of Planetary Gears

With planetary carrier removed from axle tube (para 5.2.2, Step 6), proceed as follows (Ref. Figure 3-73):

1. Drive each planetary gear pin out of housing, alternately shearing off groove pin.

17. Seat bearing cup by alternately tightening and loosening the bearing adjuster within a range of two notches.

18. When the bearing cup is seated, locate the point where the adjuster just contacts the bearing cup. From this point, continue to tighten the adjuster two to three notches. Torque capscrews to approx 20 lbf ft (27 N.m).

19. Measure backlash between ring and pinion gears. This backlash should be between 0.006 and 0.016 in. (0.15 and 0.4 mm).

20. Paint ring gear teeth with prussian blue. Rotate differential case until a wear pattern is visible on the gear.

21. Check wear pattern (para 5.3.2). Add or remove shims and/or adjust bearing adjuster to correct ring gear engagement with drive pinion. Recheck wear pattern after each adjustment.

22. Align notch on adjusters (7, 17), then install adjuster locks (6, 19) with cotterpins (5, 22).

23. After adjustment is complete, torque capscrews (3, 20) to 75 to 85 lbf ft (102 to 115 N·m).

24. Torque capscrews (12) to 90 to 100 lbf ft (122 to 135 N·m); refer to Figure 3-76.

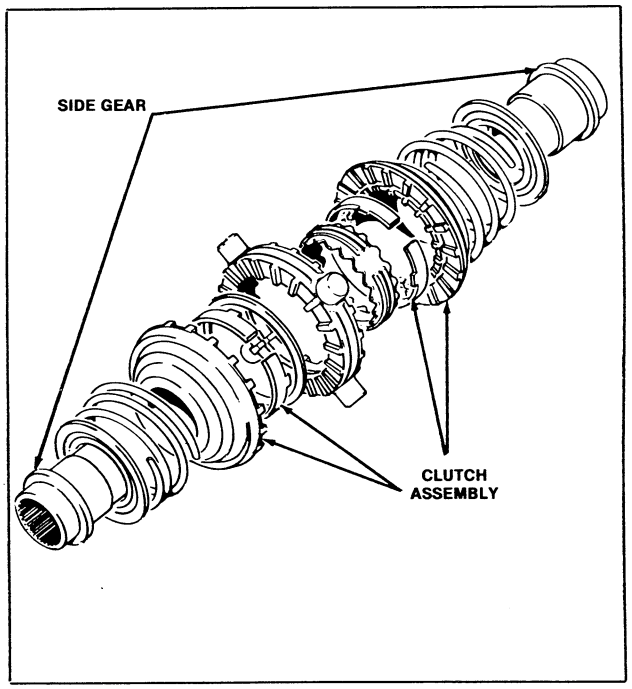


FIGURE 3-80: No-Spin Overhaul

5.4.2 NO-SPIN UNIT OVERHAUL

With No-Spin unit removed from differential carrier (Ref. para 5.4.2, Steps 1 to 10), proceed as follows (Ref. Figure 3-80):

1. Check clutching action by manually rotating side gears alternately in each direction while holding body of unit stationary. Unit should allow free running in one direction but should lock in the other.

2. Disassemble No-Spin unit by removing the capscrew wing nut and washers used during disassembly of differential case (para 5.4.1 Step 8).

3. Inspect both internal and external splines on side gears (1, 7). If external splines are damaged, replace both side gear and clutch assembly.

4. Inspect teeth on spider and clutch assemblies. If any teeth are worn or damaged, replace both spider and clutch assemblies.

5. Lightly lubricate all parts, then insert assembly capscrew with washer at its head end into one side gear. Place side gear on workbench with bolt head downward (Ref. Figure 3-81).

6. Assemble the remaining parts. Compress assembly and install other large washer and wing nut. Hand tighten wing nut.

7. Place differential case half on workbench with ring gear upwards. Position No-Spin unit into differential case half aligning punch marks made during disassembly.

8. Install capscrews; torque to 90 to 110 lbf ft (122 to 150 N·m). Lockwire capscrews and remove wingnut, capscrews and washers.

6.3 Removal and Installation

6.3.1 REMOVAL AND INSTALLATION OF DRIVELINES

6.3.1.1 Removal

1. Remove eight nuts and washers from four U-bolts; (Ref. Figure 3-89).
2. Compress drivelines at slip yoke and remove.
3. With driveline on bench, the slip yoke can be disassembled by unscrewing dust cap and pulling driveline apart.
4. Cross and bearings can be removed by releasing clips, pressing out each bearing cap and removing cross pinion.

6.3.1.2 Installation

1. Place cross pinion between yoke and press on bearing caps and retain with clips.
2. Align driveline slip yoke and screw on dust cap.
3. Install driveline and hold in place with U-bolts and nuts and washers.
4. Lubricate U-joints and slip yoke with SAE multi-purpose grease.

6.3.2 REMOVAL AND INSTALLATION OF STEADY BEARINGS

6.3.2.1 Removal

1. Disconnect driveline at steady bearing (para 6.2.1).
2. Remove capscrews, nut and lockwashers and remove steady bearing to work bench (Ref. Figure 3-90).
3. Remove cotterpins from each end bolt and remove both bolts and washer.
4. Use puller to remove steady bearing yokes from shaft.
5. Drive out bearings.

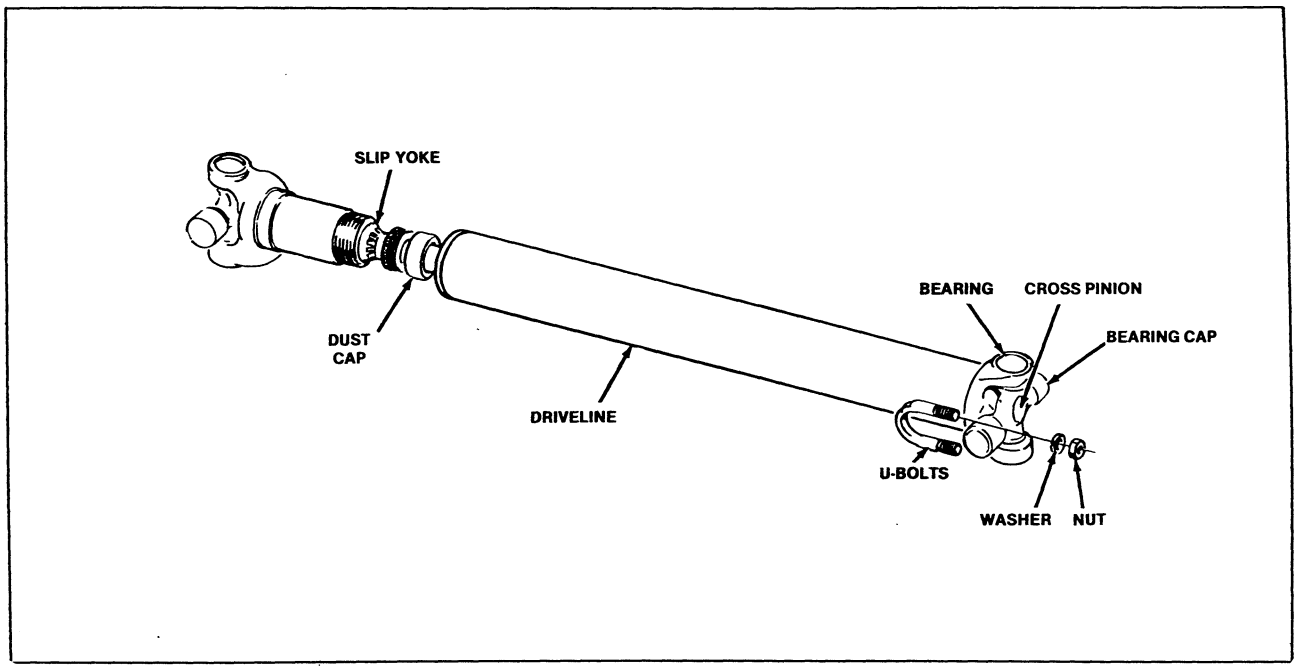
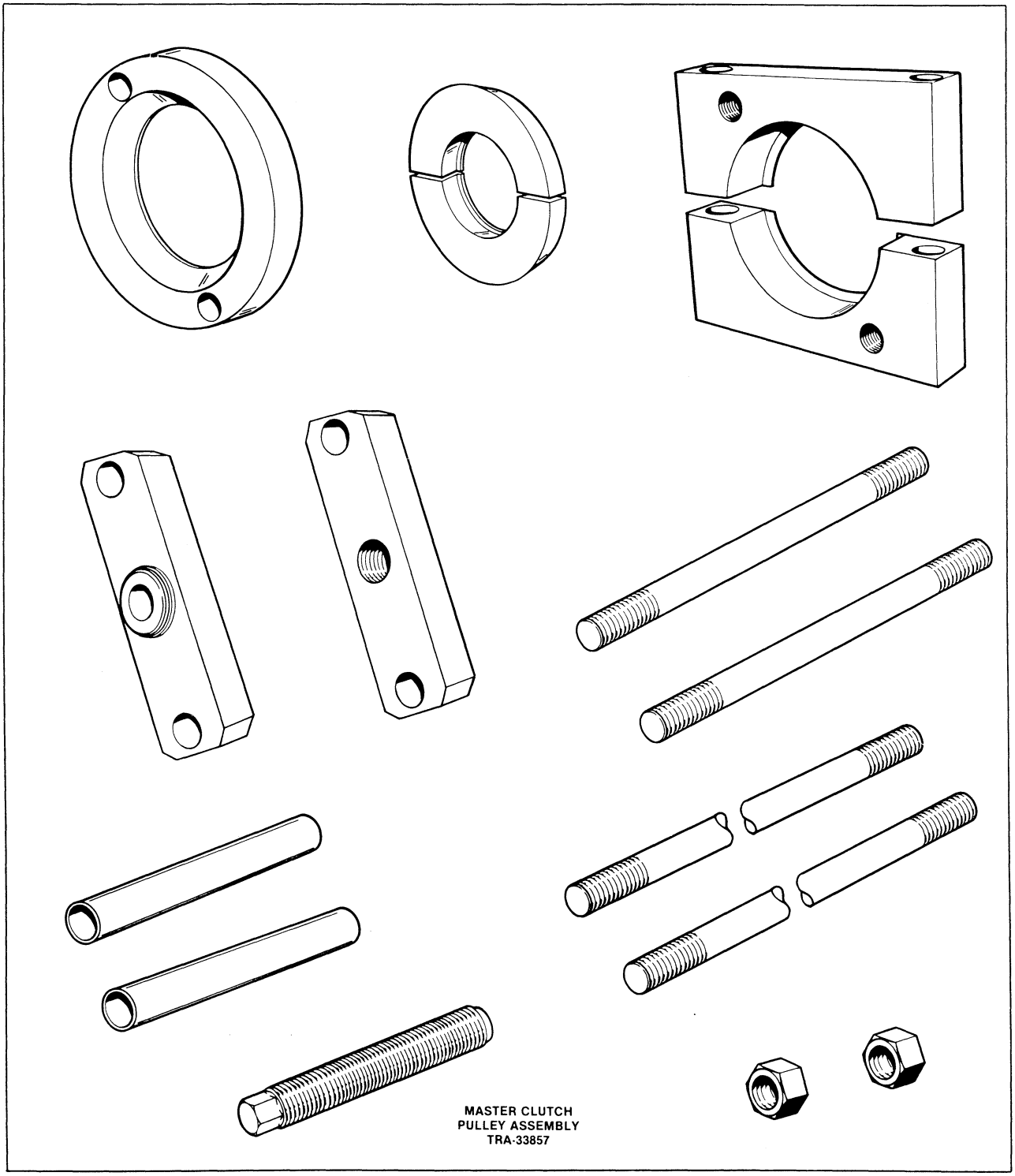


FIGURE 3-89: Driveline Disassembly and Assembly

9 SPECIAL TOOLS AND EQUIPMENT

The toolage listed in this subsection will be required when servicing the transmission and related components.



MASTER CLUTCH
PULLEY ASSEMBLY
TRA-33857

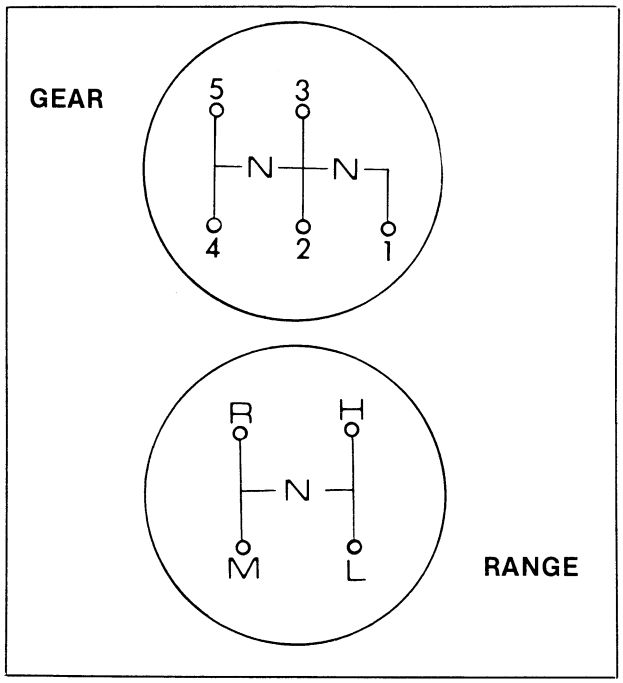


FIGURE 4-3: Gear and Range Selectors

TEMPERATURE CONTROLS

The two knobs marked COOLER and WARMER control the temperature of the cab air.

The COOLER knob is part of the air conditioner thermostatic control, selecting the temperature at which the air conditioner will operate. Turning the knob clockwise from its detented OFF position will produce increased cooling.

The WARMER knob operates the heating system flow control valve, which is continuously variable from OFF to MAXIMUM. Turning the knob clockwise will produce increased heating. Turning the knob to OFF will not completely shut off heat flow. This can only be achieved by shutting off the heater line valve at the engine; refer to Section 2.

PRESSURE INDICATOR LIGHT

These two lights warn the operator of excessively high or excessively low pressure in the air conditioning system. In either situation the compressor clutch is automatically disengaged until normal pressure is restored.

PRESSURIZING FAN MOTOR CONTROL SWITCH

This three-point switch selects low, medium or high speed operation of the cab pressurizer fan motor which runs continuously as long as the keyswitch is on. The fan forces pressurized air into the cab through three adjustable louvers, two of which face the operator and one of which faces the windshield for defrosting.

WIPER SWITCH

The windshield wiper control switch is turned clockwise to select low or high speed operation. When the switch is returned to the OFF position, the wiper blade returns to its parked position before stopping.

AIR INTAKE CONTROL

The air intake control is the one environmental control not grouped with the others on the headliner panel, refer to Section 7. This ceiling mounted lever is next to the rear air intake louver behind the operator's head. Moving the lever between the INSIDE and OUTSIDE positions permits a continuously variable selection of the ratio of inside air being recirculated to outside air being recirculated being drawn into the cab. In order to maintain cab pressurization at all times, an internal stop prevents total shutoff of outside air when the lever is at the full INSIDE position. In the full OUTSIDE position, however, the lever selects only outside air.

REAR WIPER SWITCH (optional)

The rear wiper switch is located on the hydraulic console. It operates the same as the front wiper switch.

Accessories

RADIO

The ceiling-mounted AM/FM cassette stereo has four knobs for the primary controls. The inner left knob is the ON/OFF volume control and the outer left knob is the tone control. The inner right knob is for the radio tuning and outer right knob balances the two speakers. When the FF/EJ button is depressed slightly, the cassette tape ad-

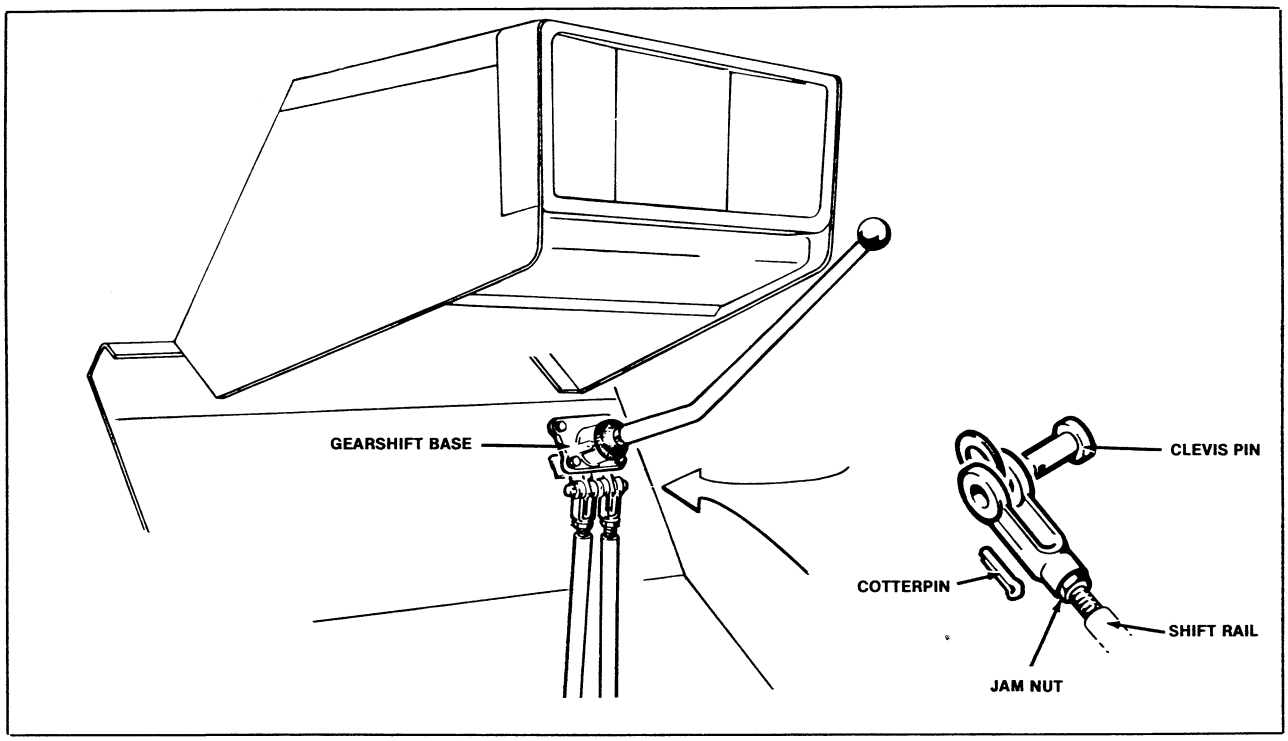


FIGURE 4-18: Range Selector Linkage Adjustment

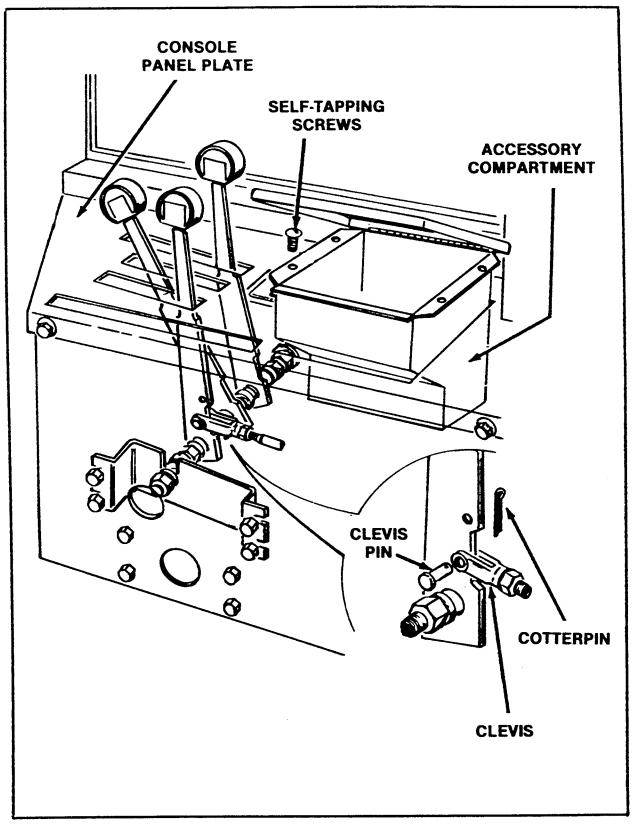


FIGURE 4-19: Implement Control Valve Linkage

4. Remove cotterpin, withdraw clevis pin and turn clevis to move the control lever forward or backward.

5. Install clevis pin, tighten jam nut, install cotterpin. Install necessary compartment.

6. Test operation of implement control valves.

Three-Point Hitch (Option) Linkage Adjustments

Refer to Section 5.

3.7 PTO CLUTCH LINKAGE ADJUSTMENT

Access to the PTO clutch linkage is by removing seat and floormat above the transmission. Adjust as follows (Ref. Figure 4-20):

1. Place PTO clutch lever to the ON position.

2. Remove clevis pin from lower clevis. Loosen jam nut. Push spool valve fully IN; adjust clevis so that holes in spool valve and clevis line up.

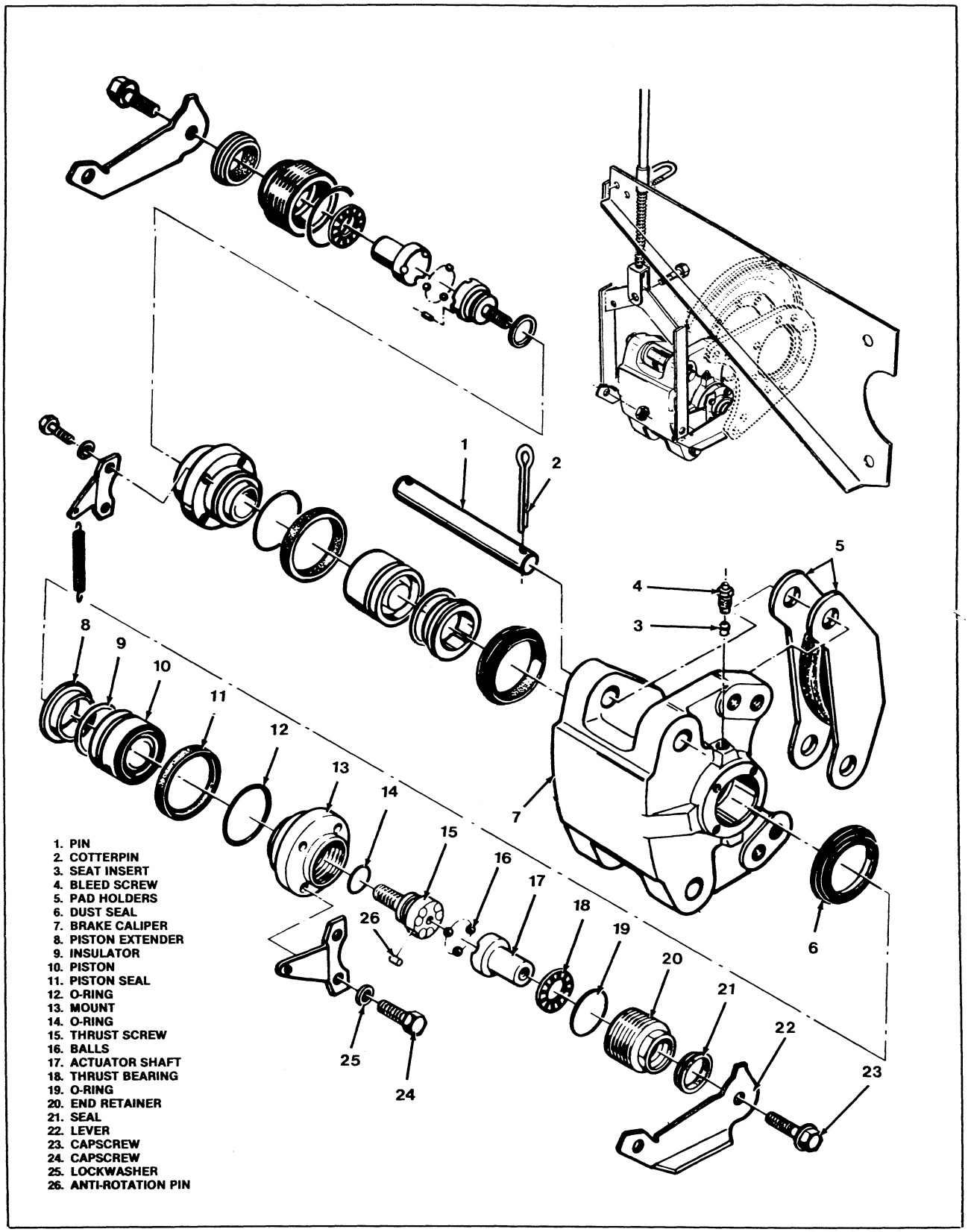


FIGURE 4-27: Overhaul of Brake Caliper

3 TROUBLESHOOTING

This section contains a troubleshooting chart for each subsection. The charts do not present an exhaustive review of all possible troubles, nor of all possible causes. The intent is simply to direct the reader to the most probable cause, recognizing that the improbable can always occur in any system.

Do not attempt to operate hydraulic equipment which has a pressure/flow requirement, above or below the regulated capabilities of the system.

NOTE

It is assumed in all circumstances that the fluid level has been checked and the viscosity is proper for the ambient temperature.

TABLE 5-1: Troubleshooting Hydraulic System

TROUBLE	PROBABLE CAUSE	REMEDY
Implement will not lift or lower	Mismatched or defective couplers	Replace hydraulic couplers
	Fluid circuit blocked	Check hoses for kinks or collapsing
	Faulty relief valve	Determine cause and repair
	Spool linkage disconnected	Connect
	Filter very dirty	Replace filter
Implement will not lift	Relief valve setting too low	Refer to para 4.8 for System Pressure Check
	Cylinder pressure requirement too high	Cylinder not suitable if required pressure is over 2 000 psi (14 000 kPa)
	Faulty cylinder	Test cylinder by connecting it to an alternate hydraulic pressure source
No steering or implement hydraulics	Defective pump	Refer to para 5.2 Refer to para 5.4
No steering	Plugged suction filter	Replace filter
	Blown piston seals in cylinders	Overhaul

4.7 REMOVAL AND INSTALLATION OF IMPLEMENT CONTROL VALVE

General

IMPORTANT

Unless the necessary special tools are available and the serviceman is competent to carry out overhaul of an hydraulic component, overhaul should not be attempted.

Prior to overhaul of the valve, ensure that extremely clean working conditions are available. Before placing the valve on the work bench, thoroughly clean the outside of the valve with a clean petroleum based solvent and blow dry with compressed air.

Removal

Refer to Figure 5-6 and proceed as follows:

– CAUTION –

BEFORE STARTING REMOVAL OF THE VALVE, SHUT THE ENGINE OFF. MOVE ALL IMPLEMENT CONTROL LEVERS TO THE FULL FORWARD POSITIONS SEVERAL TIMES TO DISSIPATE ALL PRESSURE IN THE HYDRAULIC SYSTEM. IF THREE-POINT HITCH IS FITTED, SELECT THE 'DOWN' POSITION. DISCONNECT ANY IMPLEMENT THAT MAY BE CONNECTED TO THE HOSES.

1. Label all hoses connected to the unit for identification during installation. Disconnect control linkage at the spools, flow control cable and hoses connected to the unit. Place rags under unit to catch leakage. Cap or plug all hose ends.

2. Remove three nuts, washers and isolation pads fastening valve assembly to mounting bracket. Drain fluid from assembly.

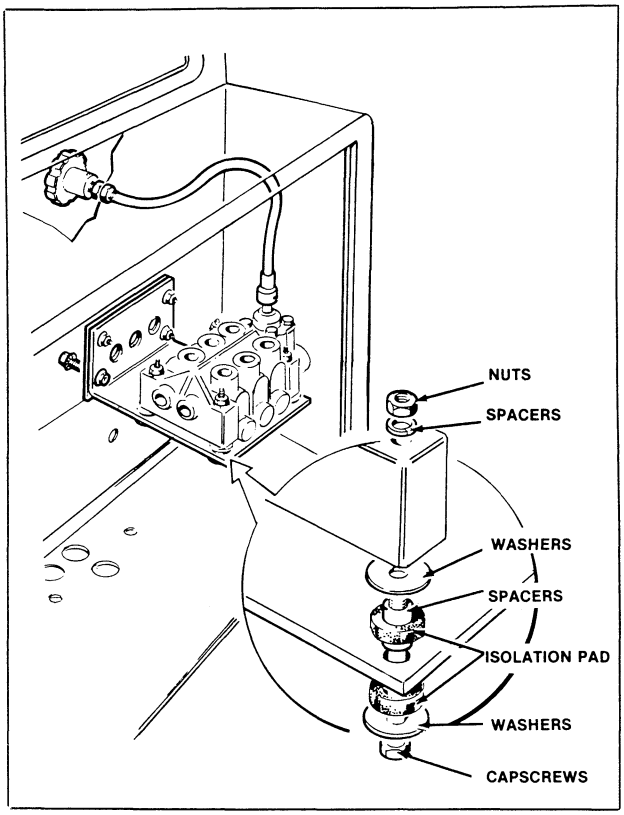


FIGURE 5-6: Mounting of Implement Control Valve

3. Thoroughly clean all exterior surfaces and blow dry. Place assembly on clean workbench.

Installation

Refer to Figure 5-6 and proceed as follows:

1. Place the unit on the mounting bracket. Assemble mounting hardware and install capscrews through mounting plate and valve assembly. Secure in position using washers, nuts, isolation pads and spacer.

2. Remove cap or plug from end of hoses and connect them to their respective port of the valve. Tighten hose connections.

3. Connect flow control cable to flow control valve and secure in position with the setscrew.

4. Connect control linkage to the spools.

1. Install cylinder in the reverse of removal.

2. Start engine and actuate three-point hitch lever several times to bleed air from hydraulic systems.

4.14 ADJUSTMENTS TO THREE-POINT HITCH

To perform these adjustments it is mandatory that the system be completely assembled and installed on the tractor.

- CAUTION

STOP ENGINE. SET PARK-BRAKE, CHOCK FRONT AND REAR OF THE WHEELS AND INSTALL ARTICULATION LOCKPIN. KEEP PERSONNEL WELL CLEAR OF THE TRACTOR AND THREE-POINT HITCH WHEN ENGINE IS RUNNING. STOP ENGINE FOR LINKAGE ADJUSTMENTS.

BE ALERT

Implement Lowering Rate Adjustment

The following adjustment is to be made with an implement attached to the three-point hitch.

Refer to Figure 5-17 and proceed as follows:

1. Start the engine and run at 1 500 rpm. Raise the hitch to the fully raised position then lower it.

2. Observe the implement as it is lowered. If the implement drops too fast or too slow, stop the engine before making an adjustment.

3. If drop rate is too fast, turn the lowering speed adjustment screw 1/2 turn clockwise.

4. If drop rate is too slow, turn lowering speed adjustment screw 1/2 turn counterclockwise.

NOTE

Do not turn the adjustment screw more than 1/2 turn at a time.

5. Repeat Steps 1 to 4 until the drop rate is satisfactory.

6. Remove wheel chocks and articulation lockpin.

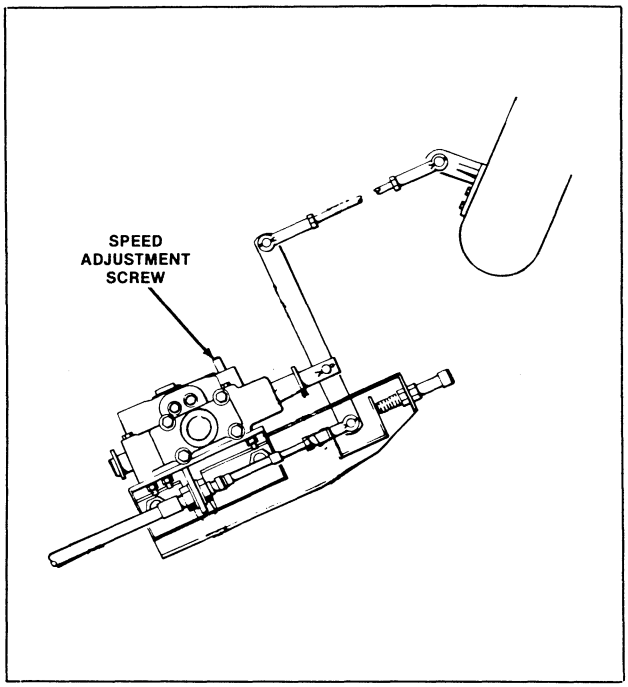


FIGURE 5-17: Depth Control Valve Linkage

Valve Lowering Piston Adjustment

SPECIAL TOOLS AND EQUIPMENT

1. Depth micrometer (0 to 1 in., 25 mm)

2. Torque wrench, 0 to 25 lbf ft (35 N·m)

PREPARATION

1. Remove top plate from rear frame by removing four capscrews from corners of top plate.

2. Move hydraulic coupler hoses to the left as far as possible without putting any strain on them.

Alternate Procedure

If it has been established that the malfunction of the steering valve originates in the metering section (lower end) or if the spool section has been overhauled and the problem persists, perform the following procedure.

SPECIAL TOOLS AND EQUIPMENT

1. Source of compressed air and duster gun
2. Vise
3. Clean petroleum base solvent
4. Two assembly posts, threaded one end, 3/8 -24 x 4 in.
5. Depth micrometer: 0 to 1 in. (0 to 25 mm)
6. Tapered thickness gauges 0.001 to 0.010 in. in 0.001 in. increments (0.025 to 0.25 mm)
7. Torque wrench, 0 to 100 lbf ft (135 N·m)

DISASSEMBLY

Refer to Figure 5-26 and proceed as follows:

1. Drain as much fluid as possible out of the valve. Screw a plumbing fitting into one of the valve ports. Place the valve in a vise with the lower end up. Close the vise on the fitting. Do not overtighten.
2. Remove the seven cover screws (1). Gently tap the cover upwards to loosen. Remove cover.

IMPORTANT

The pin in the center of the inside of the cover is a press fit. If damaged, the cover will have to be replaced.

3. Remove and discard O-ring (3) and washer (4).
4. Use two cover screws (Ref. Figure 5-27) to lift components.

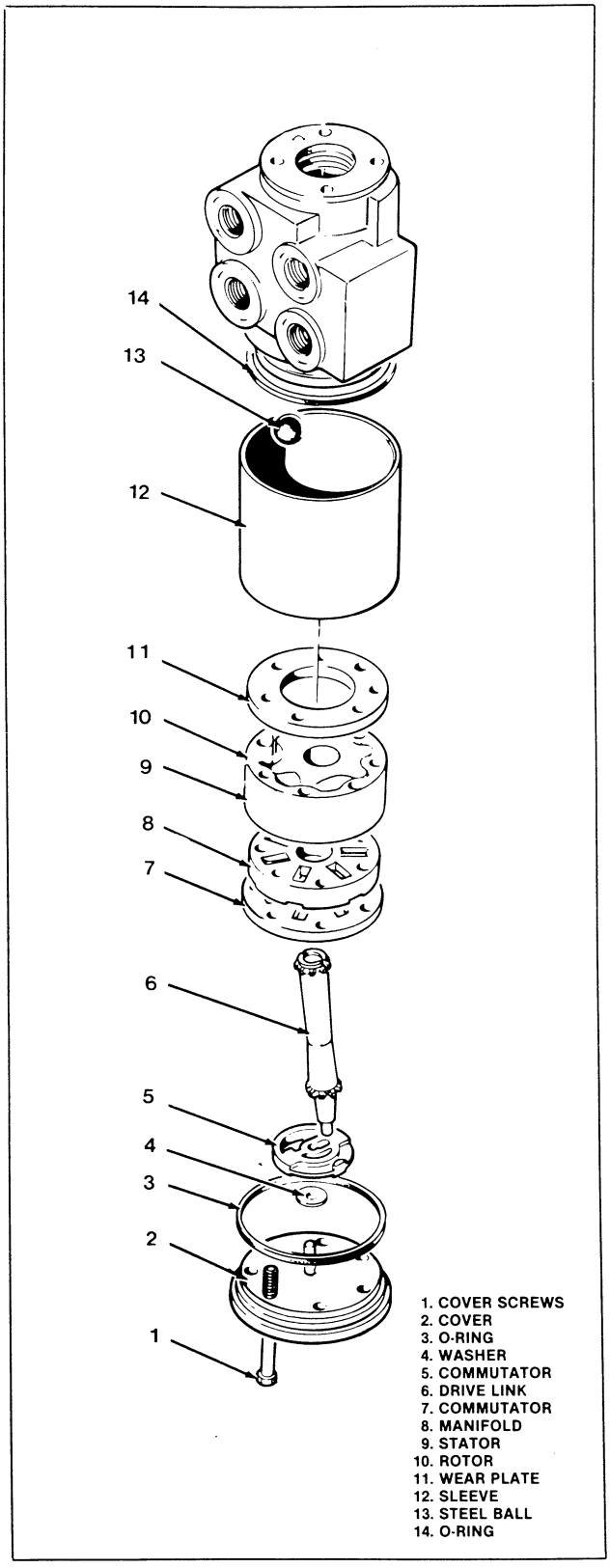


FIGURE 5-26: Steering Valve Overhaul, Alternative Procedure

4. Screw port into end plate and ensure end of port enters over back-up washer and O-ring. Tighten port.

Splitting Sections of Implement Control Valve

GENERAL

This procedure should only be performed if it is definitely established there is a leak between sections which torquing the stud nuts to 20 lb ft (27 N·m) will not cure or if inspection of sections determines replacement of a section.

DISASSEMBLY

It is assumed the implement control valve has been removed from the tractor, refer to para 4.8 and all exterior surfaces have been cleaned.

1. Using a center punch and hammer, punch mark each section body with an identification number of marks for correct assembly sequence of sections.

2. Remove the nuts from the three assembly studs and pull them from the unit (Ref. Figure 5-34).

3. Remove and discard all O-rings from the mating faces of the sections.

INSPECTION

1. Thoroughly clean all machined mating surfaces of the sections with emphasis on the O-ring grooves. Use a petroleum base solvent. Blow dry.

2. Inspect all machined surfaces and O-ring grooves for scratches, nicks or burrs. The surfaces must be unmarked.

ASSEMBLY

1. Lightly wet the O-rings with hydraulic fluid before putting in their respective grooves.

2. Carefully place the sections in assembly sequence ensuring the O-rings remain in position.

3. Push the assembly studs through the holes. Secure with lockwashers and nuts. Tighten the nuts finger tight and observe that O-rings are still in position. Progressively tighten nuts to a torque of 210 lbf in. (24 N·m).

NOTE

Uneven torquing of mounting nuts could cause distortion of the valve sections.

NOTE

Sections are not to be split except to repair a leak between sections or replacement of a section. Shown split for clarity only.

5.6 REPAIRS TO HYDRAULIC COOLER

Repairing a cooler (radiator) core is a highly specialized trade requiring special tools and equipment. This equipment includes the special torch with the necessary tanks of gas, a regulated air supply, plugs and a testing tank.

Unless a person is trained and experienced in this work and possesses all of the special tools and equipment to do the repairs, it is recommended that the cooler be repaired at a radiator repair facility.

5.7 OVERHAUL OF LIFT CYLINDERS (THREE-POINT HITCH)

Refer to para 5.4 of this Section.

5.8 OVERHAUL OF DEPTH CONTROL VALVE

It is assumed the valve is removed from the tractor. The work area and workbench top is to be clean.

Special Tools and Equipment

1. Torque wrench, 0 to 25 lbf ft (35 N·m)

2. Snap ring pliers

3. Clean petroleum-base solvent

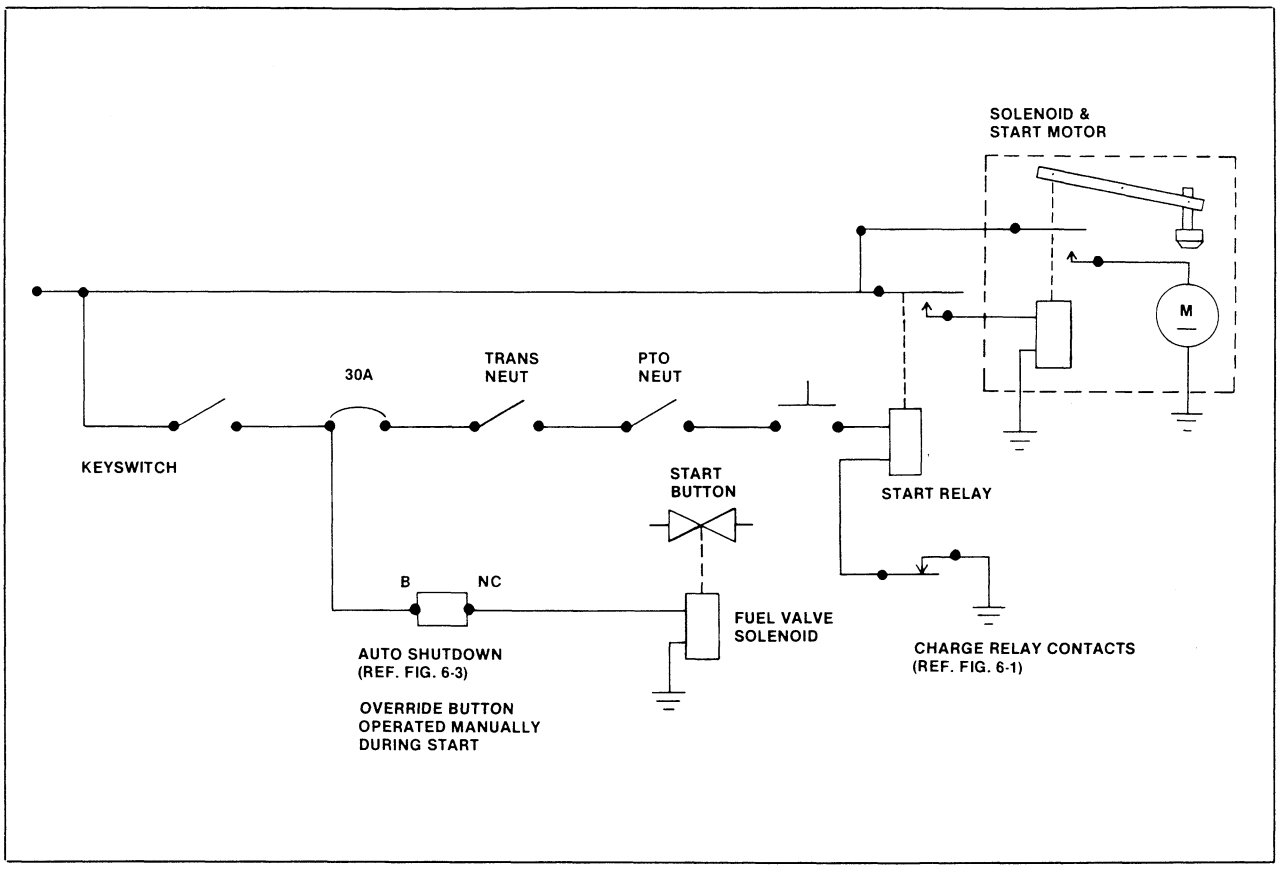


FIGURE 6-2: Engine Start

2.3 ENGINE STARTING CIRCUIT

Description

The engine starting circuit (Ref. Figure 6-2) consists of the keyswitch, start button, 30 amp circuit breaker, the starting relay, the starting solenoid/switch, starting motor, the fuel valve solenoid, the transmission neutral safety switch, and the PTO neutral safety switch.

The circuit branch containing the fuel valve solenoid passes through the automatic engine shutdown circuit which must be manually deactivated during the starting sequence by depressing the manual override button. For operation of that circuit, refer to para 2.4.

A safety circuit is employed to prevent accidental reengagement of the starting motor. This circuit employs a set of contacts in the charge relay that open, preventing energizing of the start relay, as soon as the alternator begins to charge.

Operation

When the keyswitch is closed, the manual override button is depressed, the fuel valve solenoid is energized via the safety shutdown circuit, causing the fuel valve to open and to deliver fuel to the engine.

When the transmission is put in neutral, the transmission neutral safety switch is closed; when the PTO is disengaged, the PTO neutral safety switch is closed. When the start button is depressed, current flows through the coil of the start relay and through the normally closed contacts of the charge relay to ground. With the start relay energized, the contacts close and permit current to flow from the batteries to the starting solenoid which then engages. When the solenoid has completely engaged, its own internal relay contacts close, permitting current to flow through the starting motor to ground. The starting motor then operates and turns the engine crankshaft.

Fuel gauge indicates inaccurately	Incorrect sender capsule (resistance should be 0 to 30 ohms)	Test sender capsule. Replace if incorrect
	Incorrect receiver gauge (should read FULL with a 30 ohm resistive load)	Test receiver gauge. Replace if incorrect
	Defective sender capsule	Test sender capsule; replace if defective
Fuel gauge indication does not move	Mechanical obstruction of tank float	Clear obstruction, refer to Section 2
Transmission oil pressure warning lamp does not illuminate when clutch pedal is depressed	Lamp burned out	Replace lamp
	Defective sensor switch (should be closed at zero psi)	Test switch, refer to para 5.5. Replace if defective
	Blown fuse	Replace fuse
Transmission oil pressure warning lamp does not go out when clutch pedal is released	Blown fuse	Replace fuse
	Low oil level	Check transmission, refer to Sections 3, 4
	Defective sensor switch (should open at 4 psi)	Test switch, refer to para 5.5. Replace if defective
Air conditioning compressor magnetic clutch does not operate	Open connection	Inspect and correct
	Open circuit breaker (5 ampere in roof compartment or 30 ampere in console)	Check breakers, replace if defective
	Defective thermostat	Check thermostat, replace if defective
	Open field coil in clutch (Resistance should be approximately 3 ohms)	Check coil, replace if defective
	Open high pressure or low pressure switch	Troubleshoot air conditioning system, refer to Section 7
Air conditioning magnetic clutch slips	Low voltage at clutch due to high resistance in circuit	Inspect and correct
	Defective clutch	Check clutch, replace if defective

Removal of Motor

1. From outside cab, remove nut (1), lockwasher (2), wiper arm (3) with blade, knurled driver (4), cap (5), nut (6), washers (7, 8), and capscrews (9, 10, 11) that secure wiper mounting bracket (13) to cab frame.

2. Remove cab roof cover panel.

3. Carefully loosen caulking on wiper housing panel (12). Remove capscrews (14, 15, 16, 17) that secure this panel to roof structure. Remove wiper housing panel.

4. Remove and save foam packing around motor. Remove wiper motor with mounting bracket from cab frame.

5. Carefully unwrap plastic bag surrounding wiper switch (18).

6. Mark or otherwise identify the three color-coded leads connected to wiper switch.

7. Disconnect leads from wiper switch and work them free from obstructions along their entire length back to wiper motor.

8. Remove wiper motor and mounting bracket (13) from tractor.

9. Remove nut (19), lockwasher (20) and drive arm (22) from motor shaft.

10. Remove the three screws (21) that secure motor to mounting bracket. Remove motor from bracket.

Installation of Motor

1. Install new motor on mounting bracket (13) with three screws (21).

2. Install drive arm (22) on motor shaft. Secure with lockwasher (20) and nut (19).

3. Install motor with bracket on tractor frame. Secure with capscrews (9, 10, 11) from front of cab. Install foam packing around motor.

4. Install washers (7, 8), nut (6), cap (5) knurled driver (4), wiper arm (3) with blade, lockwasher (2) and nut (1).

5. Run the three color-coded leads from motor back to wiper switch. Connect leads to their proper terminals on switch. Carefully wrap and tie plastic switch. Carefully wrap and tie plastic bag around switch.

6. Install wiper housing panel (12) around motor and secure with screws (14, 15, 16, 17). Press caulking carefully into place.

7. Install cab roof cover panel. Tighten bolts evenly in sequence. Do not compress seal more than 50 percent.

4.6 REPLACEMENT OF PRESSURIZING FAN MOTOR

To replace the pressurizing fan motor, refer to Section 7, ENVIRONMENTAL SYSTEMS.

4.7 REPLACEMENT OF STARTING MOTOR

To replace the starting motor, refer to Section 2, ENGINE SYSTEMS.

4.8 REPLACEMENT OF ALTERNATOR

To replace the alternator, refer to Section 2.

4.9 REPLACEMENT OF EXTERIOR LIGHTING FIXTURES

Exterior lighting fixtures are occasionally damaged and can be replaced without special tools. Replacement fixtures are equipped with quick-connect terminals. Consult the parts manual for replacement part numbers.

4.10 HEADLIGHT ADJUSTMENT

The sealed beam headlights are mounted in adjustable brackets on the tractor front plate. For travel on public roads, the headlights must be aimed downward. To adjust the headlights, proceed as follows (Ref. Figure 6-15):

NOTE

This procedure must be carried out on level ground.

6 Repair

6.1 WIRING DIAGRAMS AND ROUTING CHARTS

The wiring diagrams (Ref. Figure 6-26) cover the engine compartment and rear cab, the instrument console and cab roof. The wiring harness routing charts (Ref. Figures 6-24, 6-25) show the paths of wiring harnesses through the structures of the tractor.

6.2 WIRING HARNESS REPAIR/REPLACEMENT

A wiring harness can be repaired by replacing a broken wire with a new wire of equal or heavier gauge. When more than one wire in a harness is defective, the entire harness should be replaced. Consult the parts manual for replacement part numbers.

6.3 ALTERNATOR REPAIR AND OVERHAUL

Alternator overhaul should be considered whenever the engine is overhauled. For complete information on repair and overhaul of the alternator, refer to Delco Remy Service Bulletin IG-275. For detailed test information, refer to Delco Remy Test Specification Booklet DR-3245-2 for alternator part no. 1117242.

TABLE 6-8: Metric Conversion for Wire Gauging

SWG/AWG No.	Metric (mm^2)
6	13
8	8
10	5
14	2
16	1

SECTION 7: ENVIRONMENTAL SYSTEMS

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energizing circuit when exposed to refrigerant pressure of 400 psi (2760 kPa) or more. The low pressure switch breaks the same circuit if exposed to refrigerant pressure below 25 psi (170 kPa). Thus either switch can stop the compressor. These switches are threaded onto Schrader-type valve stems plumbed into the refrigerant piping and can be removed for testing or replacement without disturbing the remainder of the system. For detailed discussion of environmental system controls, refer to Section 6.

The diaphragm chamber has one side connected by a capillary tube to the thermal sensing bulb at the evaporator outlet and the opposing side connected by an equalizing line to the evaporator outlet. An operating pin transfers pressure exerted upon the diaphragm to the metering valve. An adjustable spring forces the metering valve against the operating pin and metering orifice to an extent whereby spring pressure equals orifice back pressure plus the net force on the diaphragm.

3 Troubleshooting

This section contains a troubleshooting chart for each subsection. The charts do not present an exhaustive review of all possible troubles, nor of all possible causes. The intent is simply to direct the reader to the most probable cause, recognizing that the improbable can always occur in any system.

3.1 TROUBLESHOOTING THE CAB PRESSURIZING AND HEATING SYSTEM

Turn the FAN knob to H and turn the WARMER knob clockwise. Start the engine and run until it reaches operating temperature. Close all cab windows and slam the door one or two times, watching for dust expulsion from the cab intake air filter. If heated air does not circulate through the cab from the ceiling louvers, find the observed trouble in the left column of the troubleshooting chart and isolate the probable cause and remedy applicable, in the center and right hand columns (Ref. Table 7-1).

TABLE 7-1: Cab Pressurizing Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	REMEDY
Inadequate air flow	Clogged inside or outside air filter	Operate air intake control and check if a difference in air flow results. Clean appropriate filter.
	Dirty or blocked heater/ evaporator. Insufficient cooling or heating may also be noted.	Clean heater/evaporator. Check also that blower fans are clean
	Clogged recirculation filter	Clean recirculation filter
	Clogged air inlet screen	Clean screen
	Evaporator air flow restricted	Clean evaporator and housing with compressed air
	Evaporator core fins dirty	Flush out core fins
	Evaporator core fins iced up	Turn COOLER control to OFF for 10 minutes. Turn fan to high
	Defective pressurizer fan	Repair or replace

NOTE

Evacuation to a thermistor vacuum gauge reading of 50 microns is considered sufficient for the tractor air conditioning system, and no altitude correction is necessary.

6. Close vacuum control valve and stop pump.

7. Set thermistor vacuum gauge on NULL and observe gauge for movement.

NOTE

A leak into the system will cause thermistor dial to show gradual pressure increase. Moisture from the receiver/dryer or ice in the system will cause gradual pressure rise, much like a leak. Refer to para 4.7 for discussion of leak isolation.

4.6 CHARGING THE SYSTEM

Because charging cans have a predetermined charge, the directions on the can should be followed.

System charging is carried out for two purposes: partial charging to replace refrigerant which has been lost over a period of years through diffusion, and complete charging to restore the system after total refrigerant loss.

In the latter case, charging should always be preceded by oil level check (Refer to para 4.8) and system evacuation (Refer to para 4.5).

– CAUTION ————————————

WEAR PROTECTIVE GOGGLES AND GLOVES WHEN CHARGING SYSTEM.

————————————————

When using refrigerant cans, follow label directions. When using charging station with thermistor proceed as follows:

1. With vacuum control valve closed and vacuum pump stopped, close thermistor control valve.

IMPORTANT

The thermistor vacuum gauge is easily damaged by positive pressures and by oil, so it should be isolated from system at all times except when taking readings during maximum vacuum in the system.

2. With refrigerant bottle and dial-a-charge cylinder connected to system (Ref. Figure 7-14), open cylinder charging valve and allow a minimum of 4 lb 8 oz (2 kg) of refrigerant into dial-a-charge cylinder. Close cylinder charging valve.

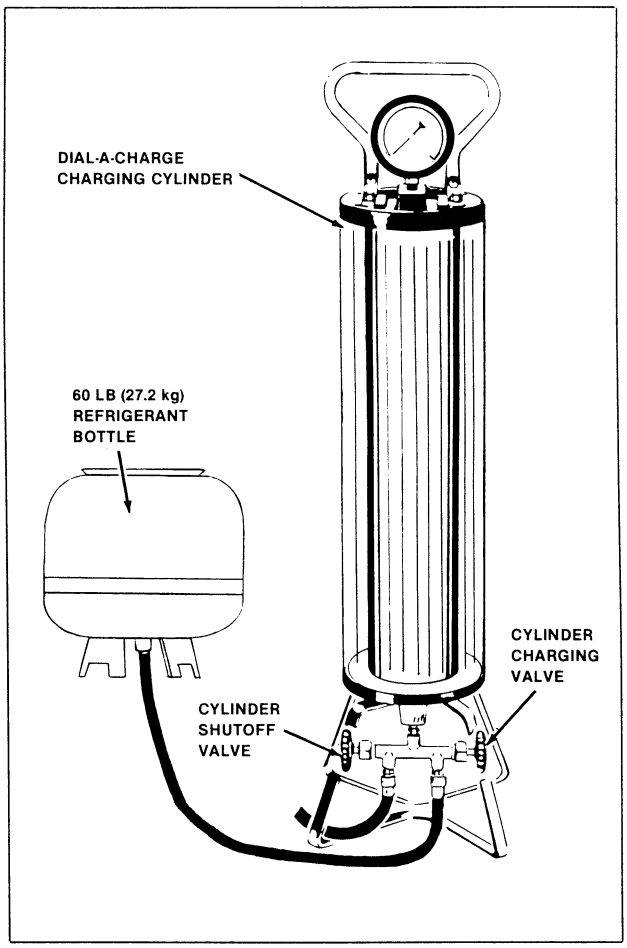


FIGURE 7-14: Filling Dial-A-Charge Cylinder

5.6 REPLACEMENT OF AIR CONDITIONER THERMOSTAT

To replace thermostat proceed as follows (Ref. Figure 7-22):

1. Remove access panel from top of cab roof.
2. Pull COOLER knob off its stem inside cab.
3. Remove nut from threaded mount under knob and push thermostat into roof compartment. Untie plastic bag to expose wires.
4. Label wires and terminals with masking tape and pull connectors off terminals.
5. Push out grommet.
6. Repel, straighten and retract thermostatic probe (Detail B) from evaporator core; refer to para 5.5.
7. Remove thermostat and probe from cab roof. Save grommet.
8. Install new thermostat by weaving probe through grommet and hole, and inserting end through evaporator core. Form hook on end of probe (Detail B) and pull it securely in between evaporator plates.
9. Before mounting thermostat, connect the two leads removed from their terminals in Step 4. Test thermostat circuit by turning keyswitch on and listening for compressor clutch movement as stem of thermostat is rotated. Turn keyswitch off.
10. Place thermostat in plastic bag and insert stem through control panel, rupturing bag such that switch stem protrudes through it. Thread on nut from inside cab taking care that plastic bag is sealed by the seating of the thermostat switch against panel.
11. Push on knob, tie plastic bag around wires and thermostat tube. Replace roof access panel.

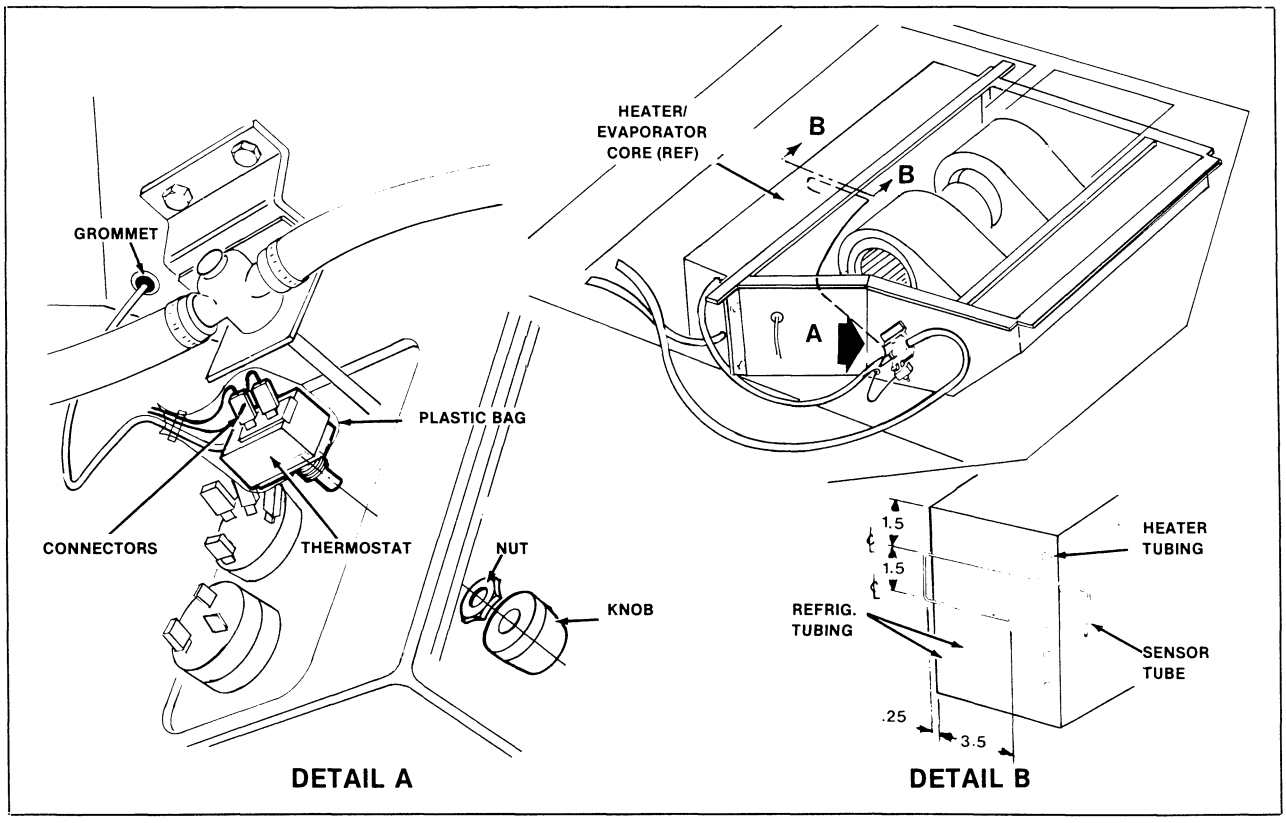


FIGURE 7-22: Replacement of Air Conditioner Thermostat

6.3 REPLACEMENT OF CLUTCH FIELD COIL

Special Tools and Equipment

1. Wrench, VERSATILE® part no. 33791
2. Puller, No. 33793
3. Internal pulley puller, No. 33795 with shaft adaptor
4. Press 300 lb (1 500 N)
5. Rotor installer kit (33802)
6. Clutch face installer (33803)

To replace clutch and field coil proceed as follows (Ref. Figure 7-30):

1. Remove dust cover (1), clutch front plate, (3), and Woodruff Key (4) as described in para. 6.2.
2. Remove external front housing snapring (6) and internal bearing snapring (7) with snapring pliers.

IMPORTANT

Do not tap on front housing around shaft. Even a soft brass rod can collapse the snapring groove if struck against this part.

3. Insert jaws (tool no. 33805) into snapring groove. Install shaft protector and puller (tool no. 33795), tighten thumb head bolts, and two center bolts clockwise until pulley (8) and bearings (9) are free.

IMPORTANT

Do not attempt to use any other puller. Traction on outer edge of pulley will warp and strain the clutch face or collapse pulley groove.

4. Loosen field coil lead wire from clip on top of compressor, remove snapring (10) and remove field coil (11).
5. Press the bearings (9) free from pulley, using rotor installer set (tool no. 33802).
6. Press in new bearings using same tool.

NOTE

Pulley bearings are a matched set. Replace both if one is defective.

7. Install field coil to compressor using snapring (10).
8. Support the compressor in a vise by the ear only.
9. Using rotor installer set (tool no. 33802) tap the rotor down until a distinct change of sound is heard.
10. Install snaprings (6, 7).

NOTE

All snaprings have a straight edge and a bevel edge on the circumference. Position the snap rings so that the flat edge is toward compressor.

11. Install shims (5) and Woodruff Key (4).
12. Replace clutch front plate assembly using installer (tool no. 33803).
13. Replace front nut and dust shield.

6.4 REPLACEMENT OF HEAD AND VALVE PLATE

Special Tools and Equipment

1. Socket, 13 mm, VERSATILE® part no. 33799
2. Torque wrench (to 50 lb ft (70 N·m)) No. 33800
3. Broad putty knife, No. 33801

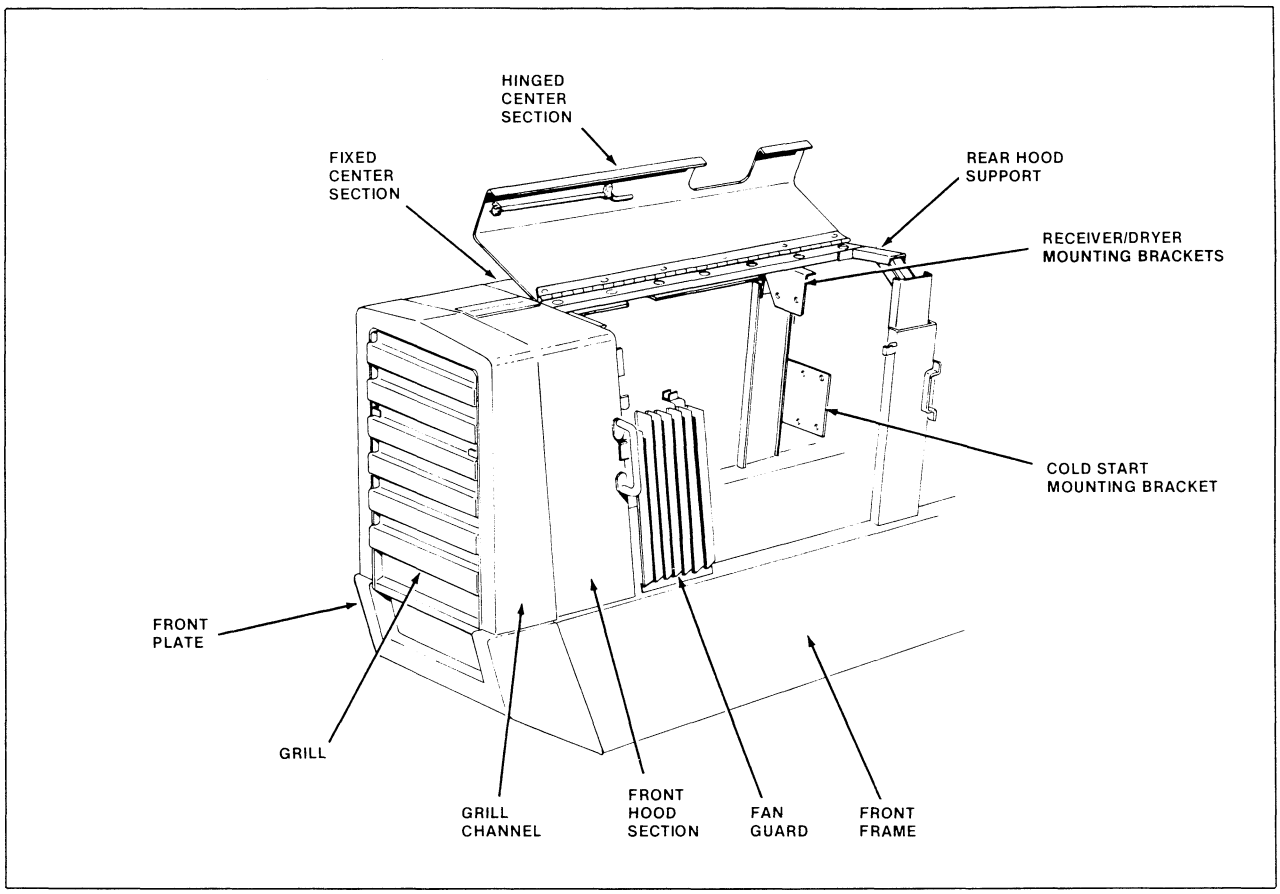


FIGURE 8-2: Engine Hood Assembly

sion lubrication system, refer to Section 4, CONTROLS. This frame can be unlatched and swung downward, where it is retained by a chain in a position suitable for inspecting the radiators.

2.3 OPERATOR'S CAB

Cab Structure

The operator's cab (Ref. Figure 8-3) is attached to the tractor frame at four points through shock isolating mountings and is designed to provide roll-over protection.

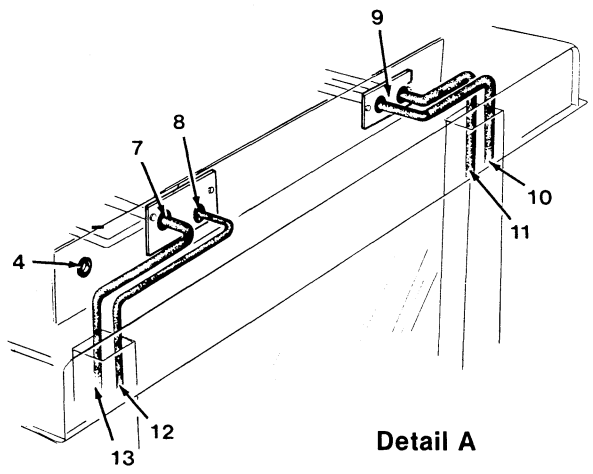
The tractor's controls are grouped in three primary areas in the cab: the instrument console, the hydraulic console and the ceiling headliner panel.

The right front post of the cab carries the pipes of the air conditioning system, refer to Section 7, ENVIRONMENTAL SYSTEMS, and a wiring harness of the electrical system, refer to Section 6. The left front post carries the pipes for the heating system, refer to Section 7.

Door and Window Frames

The right front and left front windows are mounted in hinged frames which permit them to swing outward, providing ventilation. The window latches can be disassembled by loosening and removing the knurled knobs. The windows are then free to swing to their maximum open position (Ref. Figure 8-4).

The door latch mechanism is operated by two handles which are connected to it by release rods. An external key lock and internal pushbutton lock override the handles and stop the release rods from moving.

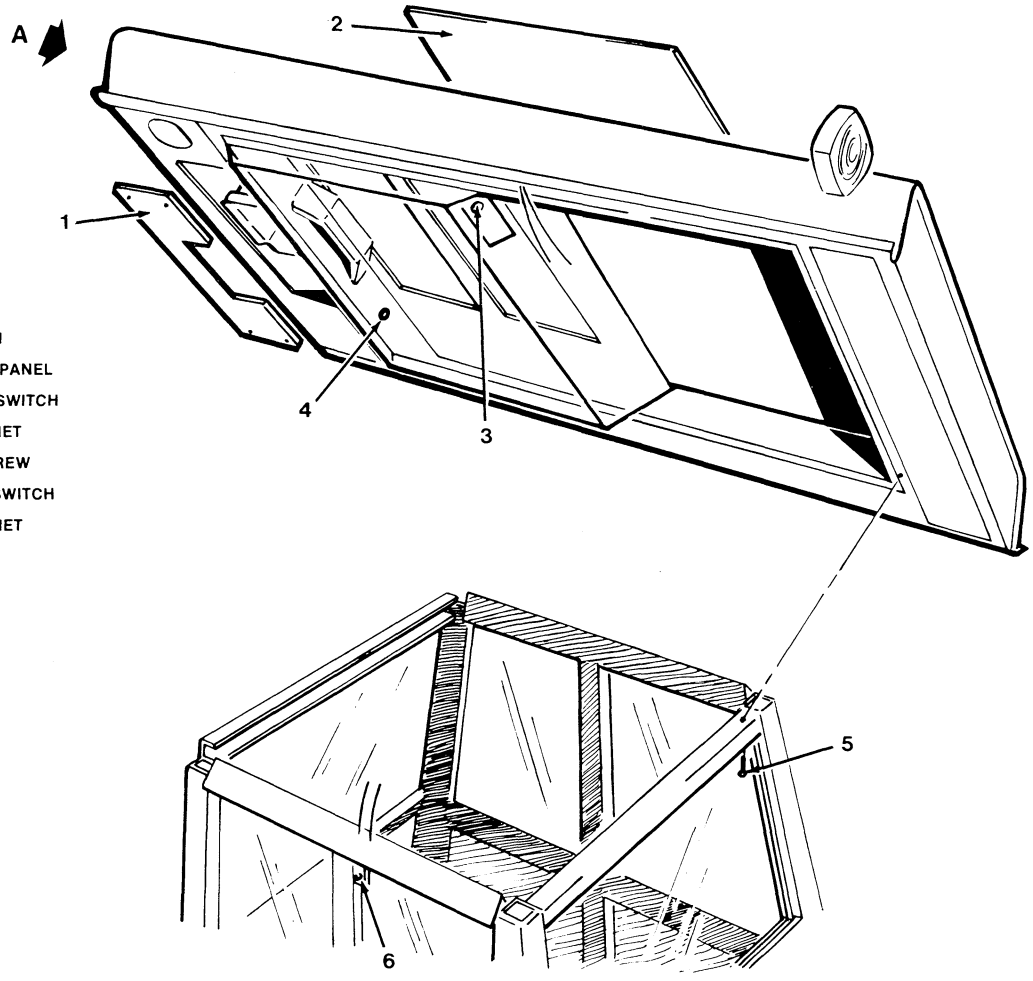


Detail A

Preparation for Removal

Removal of the cab roof requires the preparations listed below. Proceed as follows (Ref Figure 8-14):

1. Chock wheels to prevent tractor movement in either direction.
2. Disconnect negative (–) leads from both batteries and tie leads to battery compartment frame to prevent accidental reconnection.
3. From inside cab, remove the 15 capscrews (5) securing roof to top rails of cab frame.



1. SCREEN
2. COVER PANEL
3. WIPER SWITCH
4. GROMMET
5. CAPSCREW
6. DOOR SWITCH
7. GROMMET
8. PLATE
9. PLATE
10. PIPE
11. PIPE
12. PIPE
13. PIPE

FIGURE 8-14: Cab Roof Structure

2. Tap pivot pin (7) into secure subframe to front frame. Assemble flatwasher (3) and torque slotted nut (2) to 400 lbf ft (540 N·m). Install new cotterpin (1), pin retainer (4), lockwashers (5) and capscrews (6).

3. Lift drag links and slide ends into subframe and rear frame.

4. Put grease seals (15, 18) and spacers (17) into position.

NOTE

Remove grease fitting on pivot pins (14) before beginning to install pins.

5. Tap in the four pivot pins (14) to secure drag links to subframe and rear frame. Assemble flatwashers (13) and torque slotted nuts (12) to 400 lbf ft (540 N·m). Install new cotterpins (11) and grease fittings. Lubricate pivots, refer to Section 1, SERVICING.

6. Attach steady bearing to subframe with the four bolts, lockwashers and nuts. Torque bolts to 160 lb ft (220 N·m).

7. Install driveline and lubricate, refer to Section 1.

8. Install cover plate on rear frame.

9. Remove frame supports, chocks. Connect battery terminals. Remove articulation lockpin.

4.2 REPAIRS AND OVERHAUL OF GRAMMER SEAT

Special Tools and Equipment

1. Metric wrenches
2. Roll pin punches 3/32 in., 1/8 in. (2 mm, 3 mm)
3. Two 6 in. C clamps
4. Torque wrench 70 lb ft (95 N·m)

4.2.1 Removal of Seat Assembly From Swivel Base and Disassembly of Seat

1. Remove four capscrews at backrest pivot brackets which secure brackets (Ref. Figure 8-19) and remove backrest.

2. Disassemble backrest adjusting knob by removing plastic knob cover and socket head capscrew.

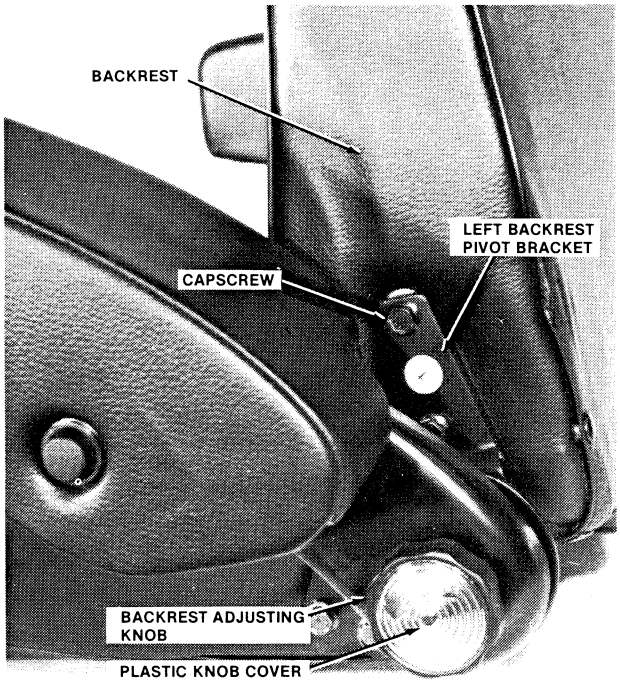


FIGURE 8-19: Left Seat Pivot

3. Remove locknut from left pivot bracket and pull off nylon washer and armrest (Ref. Figure 8-20).

4. Remove plastic nut cover, locknut, nylon washer, and right armrest.

NOTE

When removing pivot bracket capscrew, it may be necessary to hold nut on inside of seat with a wrench.

5. Remove capscrews and spacers which secure two pivot brackets to seat.

D

E

Section 7: Environmental Systems