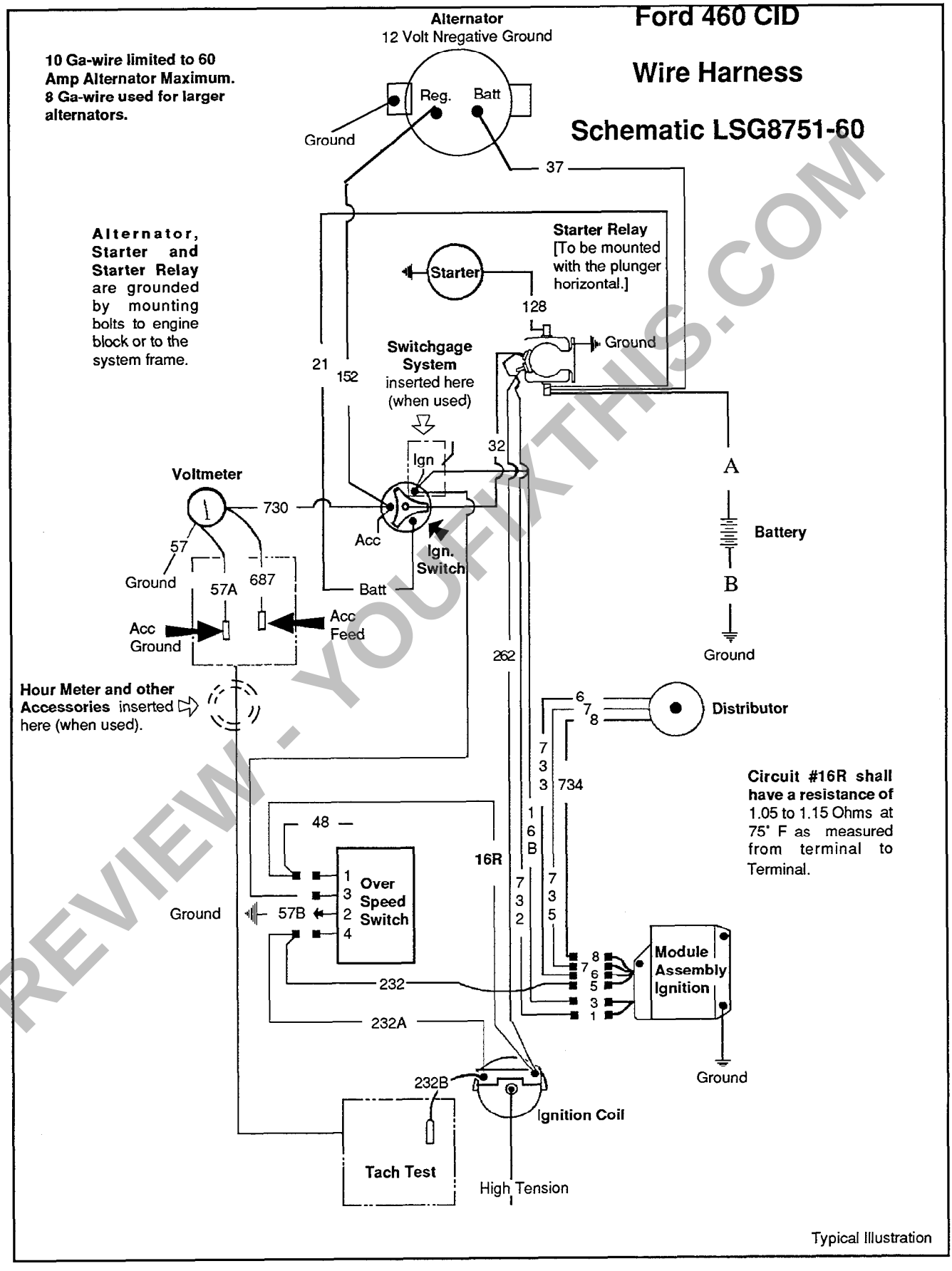
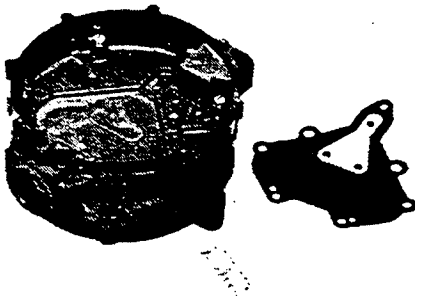


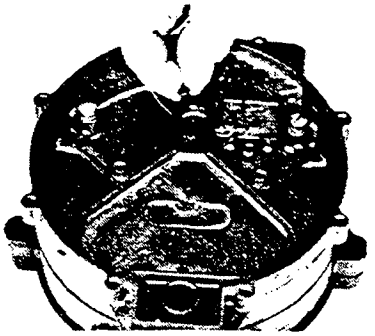
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5. Remove primary springs and diaphragm assembly.



6. Remove primary valve pin.



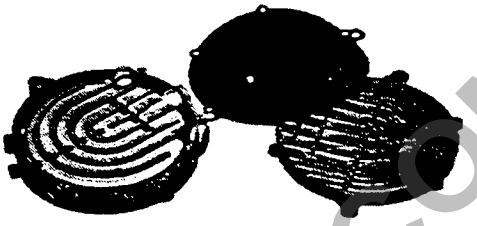
7. Remove the last two screws. Pry loose and remove regulator body and gasket from heat exchanger.



8. Remove sponge and primary regulator valve. Seat is viton (rubber) bonded to an aluminum alloy backing.



9. Turn heat exchanger over. Remove cover and gasket.



Cleaning and Inspection

Pick up repair kit from your Parts Department. Discard old parts which will be replaced by the kit.

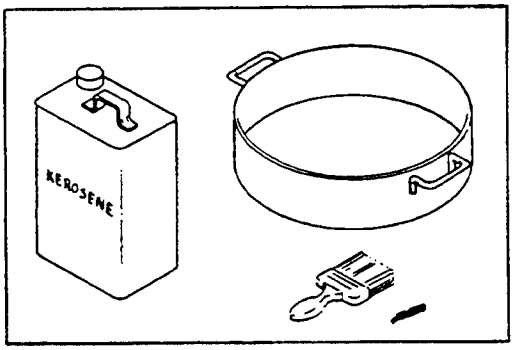
Repair Kit Includes:

1 - Secondary Diaphragm
1 - Secondary Seat
1 - Secondary Seat Pin
1 - Primary Diaphragm
1 - Primary Valve Pin
1 - Primary Seat
1 - Regulator Body Gasket
1 - Sponge
1 - Heat Exchanger Cover Gasket

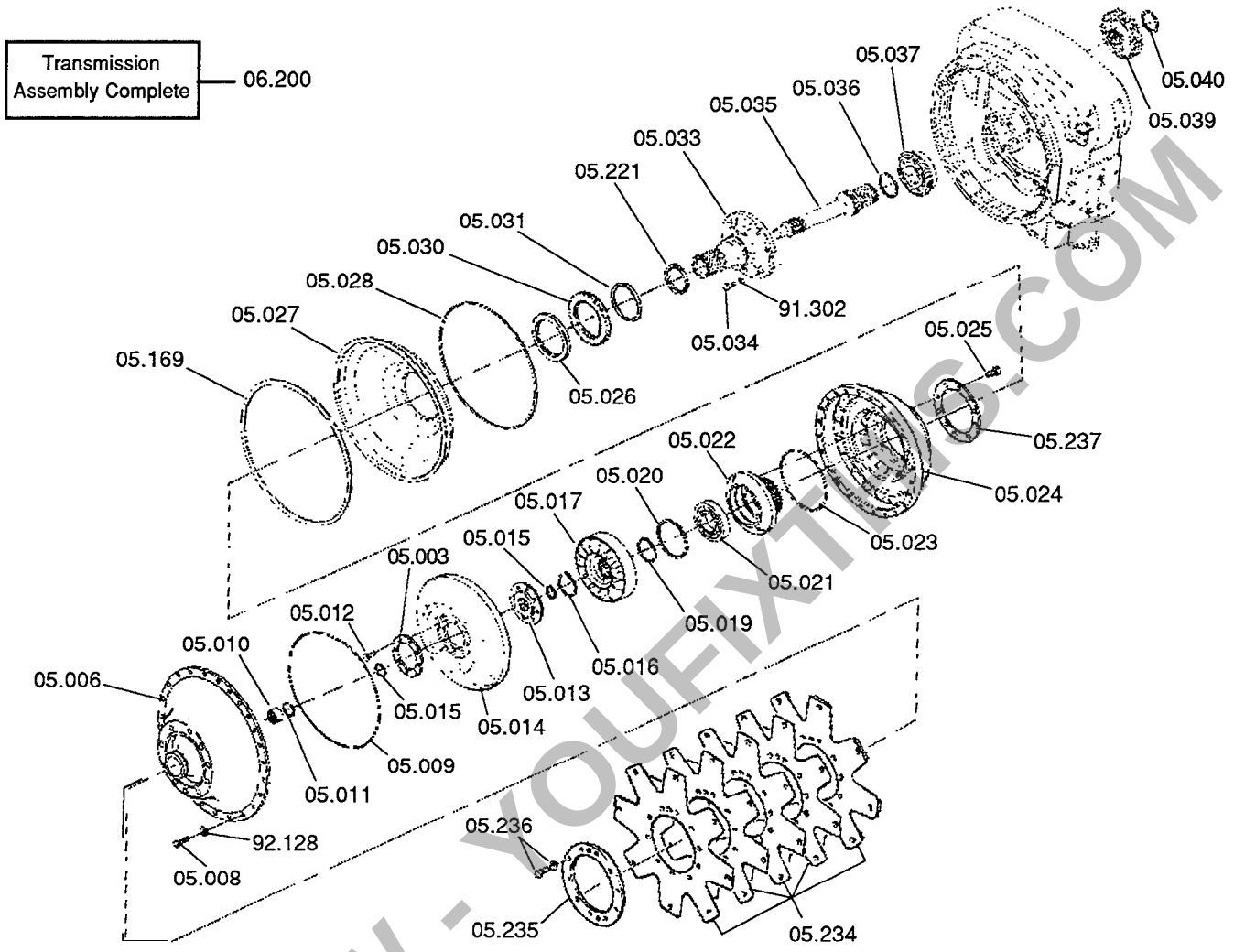
1. Wash all parts clean, particularly valve jet passages and outlet port. Dry with compressed air.

NOTICE

Use kerosene or equivalent petroleum solvent. Do not use carburetor cleaner or lacquer thinner as they will attack special coatings or synthetic rubber seals after assembling.



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TORQUE CONVERTER & FLEX DRIVE PLATES 06-631

06.200	Transmission Assembly (continued)
05.003	Plate, Converter Drive & Reinforcing
05.006	Cover, Converter Impeller
05.008	Fastener, Impeller Cover
05.009	Seal, Impeller Cover
05.010	Bearing, Impeller Cover
05.011	Ring-Retaining, Cover Bearing
05.012	Fastener, Turbine To Hub
05.013	Hub, Converter Turbine
05.014	Turbine, Torque Converter
05.015	Ring-Retainer, Turbine Hub
05.016	Ring-Retainer, Reaction Member
05.017	Reaction Member, Torque Converter
05.019	Spacer, Reaction Member
05.020	Ring-Retainer, Impeller Hub Bearing
05.021	Bearing, Impeller Hub
05.022	Hub, Converter Impeller
05.023	Seal, Converter Impeller Hub
05.024	Impeller, Torque Converter
05.025	Fastener, Impeller To Hub
05.026	Seal, Converter Oil Baffle
05.027	Baffle, Torque Converter Oil
05.028	Seal, Converter Oil Baffle
05.030	Gear, Impeller Hub
05.031	Ring-Retainer, Impeller Hub Gear
05.033	Stator Support Assembly, Converter
05.034	Fastener, Stator Support
05.035	Shaft, Converter Turbine
05.036	Seal, Turbine Shaft
05.037	Bearing, Turbine Shaft
05.039	Gear, Turbine Shaft
05.040	Ring-Retaining, Turbine Shaft Gear
05.169	Ring-Retaining, Converter Oil Baffle
05.221	Expander, Stator Support Seal
05.234	Plates, Flex Drive Assembly
05.235	Ring, Flex Drive Plate Backing
05.236	Fastener, Flex Drive Plate Backing
05.237	Ring, Hub To Impeller Backing
91.302	Lockwasher, Stator Support Fastener

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FOREWORD

This manual has been prepared to provide the customer and the maintenance personnel with information and instructions on the maintenance and repair of the **CLARK-HURTH COMPONENTS** product.

Extreme care has been exercised in the design, selection of materials and manufacturing of these units. The slight outlay in personal attention and cost required to provide regular and proper lubrication, inspection at stated intervals, and such adjustments as may be indicated will be reimbursed many times in low cost operation and trouble free service.

In order to become familiar with the various parts of the product, its principle of operation, trouble shooting and adjustments, it is urged that the mechanic study the instructions in this manual carefully and use it as a reference when performing maintenance and repair operations.

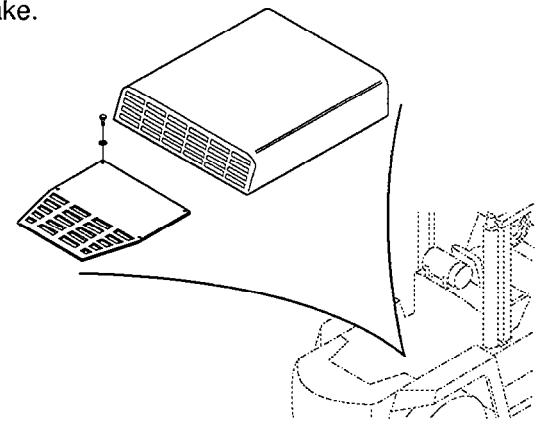
Whenever repair or replacement of component parts is required, only **Clark-Hurth Components**-approved parts as listed in the applicable parts manual should be used. Use of ''will-fit'' or non-approved parts may endanger proper operation and performance of the equipment. **Clark-Hurth Components** does not warrant repair or replacement parts, nor failures resulting from the use of parts which are not supplied by or approved by **Clark-Hurth Components.** IMPORTANT: **Always furnish the Distributor with the serial and model number when ordering parts.**

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ENGINE REMOVAL

1. Park truck on a level surface. Chock front and back wheels. Lower forks to floor. Set parking brake.

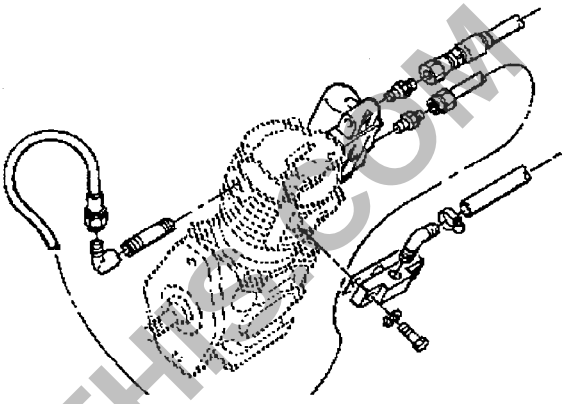


2. Remove hood and counterweight grill.

3. Remove positive and negative battery cable from engine and battery cables from battery.

⚠ WARNING

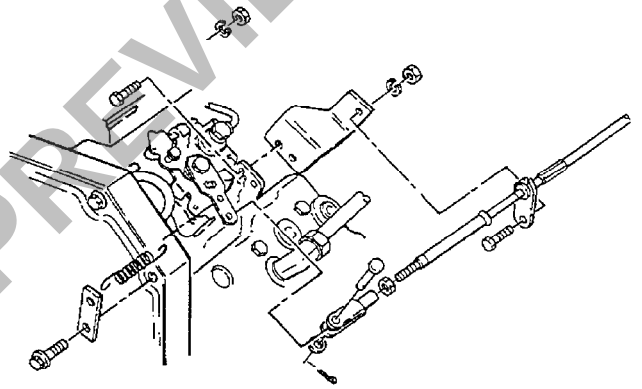
Whenever disconnecting battery cables, always disconnect negative ground terminal first.



5. Disconnect air brake lines from air compressor as shown.

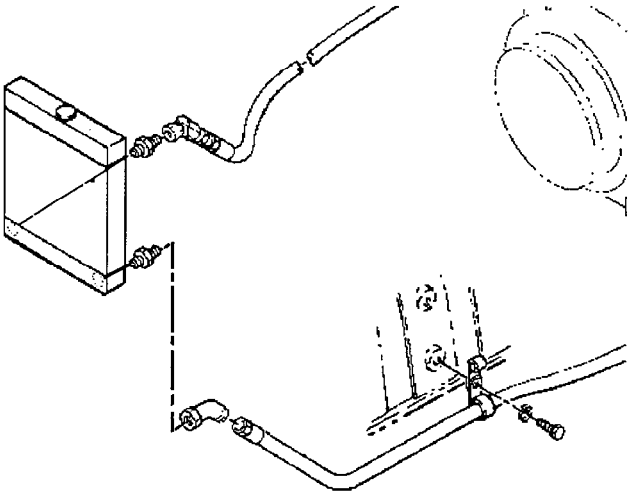
⚠ DANGER

Depressurize air system by applying brakes until gauge reads zero pressure. Severe injury or death can result if air system components are removed while system is still pressurized.



Typical Illustration

4. Disconnect accelerator cable from engine fuel pump and from cable support bracket. Lay cable back where it will be out of the way when engine is lifted out.



6. Disconnect transmission cooling lines at oil cooler and radiator. Cap or plug exposed fittings or ports. Remove cooling line supporting clip and lay hose back where they will not interfere with engine removal.

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CONDITION	POSSIBLE CAUSE	SUGGESTED CORRECTION
Engine will not crank or cranks slowly.	1. Battery(ies) discharged. 2. Battery and/or starter terminals loose or corroded. 3. Starter defective. 4. Neutral start switch defective. 5. Wiring defective.	1. Charge battery(ies). Perform heavy load tests. If battery(ies) not defective, recharge battery(ies). 2. Clean and tighten. 3. Replace starter. 4. Replace switch 5. Replace defective section of wiring.
Engine cranks but will not start (no smoke from exhaust).	1. Engine out of fuel. 2. Incorrect type or grade of fuel. 3. Air intake or exhaust plugged. 4. Fuel shutoff solenoid defective. 5. Water in fuel system. 6. Air in fuel system. 7. Fuel filters clogged. 8. Damaged fuel line. 9. Camshaft timing incorrect. 10. Fuel transfer pump defective. 11. Fuel injection pump defective. 12. Internal damage to engine.	1. Check fuel level and fill as required. 2. Drain fuel system. Flush and refill with correct fuel. 3. Visually check and remove obstruction. 4. Replace solenoid. 5. Check fuel filter. Drain and replace filter. 6. Bleed fuel system. Locate and correct cause of air in fuel system. 7. Replace fuel filter. 8. Repair or replace fuel line(s). 9. Adjust camshaft timing. 10. Remove outlet line from pump and place in suitable container. Crank engine and check for fuel from hose. If no fuel is observed, replace fuel transfer pump. 11. Replace fuel injection pump. 12. Repair engine.
Engine hard to start or will not start (smoke from exhaust).	1. Low cranking speed. 2. Incorrect type or grade of fuel. 3. Damaged fuel line(s). 4. Fuel transfer pump defective. 5. Air in fuel system.	1. Check battery(ies), electrical wiring and connections, or starter. Charge battery(ies) and check electrical system for shorts. Clean and tighten connections and replace any defective wiring. Replace starter. 2. Drain fuel system. Flush and refill with correct fuel. 3. Repair or replace fuel line(s). 4. Remove outlet line from pump and place in suitable container. Crank engine and check for fuel from hose. If no fuel is observed, replace fuel transfer pump. 5. Bleed fuel system. Locate correct cause of air in fuel system.

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GROUP	SECTION	DESCRIPTION
		Forward
		Introduction
		PM Section
00		ENGINE
00	1	Engine Troubleshooting
00	2	Engine Removal
00	3	Ford Engine Specifications
00	4	Cummins Engine Specifications
01		COOLING SYSTEM
01	1	Troubleshooting
01	2	Radiator Removal
01	3	Testing and Maintenance
01	4	Radiator Repair
02		FUEL SYSTEM
02	1	Troubleshooting
02	2	Induction System
02	3	Accelerator Linkage
02	5	Impco LPG Lock-off Valve
02	7	Impco LPG Vaporizer-Regulator
06		TRANSMISSION
06	1	Troubleshooting
06	2	Transmission Stall Test
06	3	Transmission Removal
06	4	Transmission Clutch Modulation
06	5	Transmission Maintenance and Service
06	6	Linkage and Controls
14		ELECTRICAL
14	1	General Troubleshooting
14	2	Starter and Battery Troubleshooting
14	3	Alternator Troubleshooting
14	4	Wiring Diagram
14	5	Electrical Tools
20		DRIVE AXLE
20	1	Troubleshooting
20	2	Drive Axle Removal
20	3	Drive Axle Wheel Bearing Adjustment
20	4	Clark-Hurth and Rockwell Drive Axle Maintenance and Service

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Pistons, Rods and Bearings - continued -

- **Connecting Rod Bearings**

  Type: Replaceable Insert Select Fit

  Material: Steel Backed Copper Lead

- Effective Length Each Bearing (Crank End):

  0.841 in. (21.361 mm)

- Total Effective Surface Area (Crank End):

  52.84 in.^{2} (340.924 mm^2)

- **Pistons**

  Type: Autothermic

  Material: Die Cast Aluminum Alloy

  Finish: Tin Plate

  Length: 3.74 in. (95.00 mm)

Piston Rings and Pins

- **Piston Rings**

  Number: 3

- **Top Compression Ring**

  Type: Inside Bevel Straight Face

  Material: Cast Iron Alloy

  Finish: Moly Filled Groove

- **Second Compression Ring**

  Type: Tapered Face

  Material: Cast Iron

  Finish: Phosphate Coated

- **Oil Control Ring**

  Type: 3 Piece Segmented

  Material: Steel

  Finish: Chrome Faced Rails, Oxide Coated Expander Rustless Steel

- **Piston Pins**

  Type: Press Fit in Rod, Tubular

  Material: Heated Treated SAE-5015 Steel

- Length:

  3.29 / 3.31 in. (83.566 / 84.074 mm)

- Diameter:

  1.0398 / 1.0403 in. (26.411 / 26.424 mm)

- Piston Fit:

  0.0003 / 0.0006 in. (0.076 / 0.015 mm)

Valves and Valve Operating Mechanisms

- **Intake Valve**

  Type: Recessed Head

  Material: Forged Silchrome #1

- Head Diameter:

  2.075 / 2.090 in. (52.71 / 53.09 mm)

- Stem Diameter:

  0.3416 / 0.3423 in. (8.677 / 8.694 mm)

- Stem Oil Control: Nylon Umbrella Type

- Seat Material (Cylinder Head):

  Induction Hardened

- Seat Angle: 45°

- Totator Type: Ford Free Turn

- Spring Pressure - Open:

  229 lbs. @ 1.33 in. (103.9 kg @ 33.8 mm)

- Spring Pressure - Closed:

  80 lbs. @ 1.81 in. (36.3 kg @ 46.00 mm)

- **Exhaust Valve**

  Type: Recessed Head

  Material: Forged 21-4N Steel, Tungsten Cobalt Faced (Hardened)

- Head Diameter:

  1.500 / 1.515 in. (38.100 / 38.481 mm)

- Stem Diameter:

  0.3416 / 09.3423 in. (8.677 / 8.694 mm)

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Removal

CAUTION

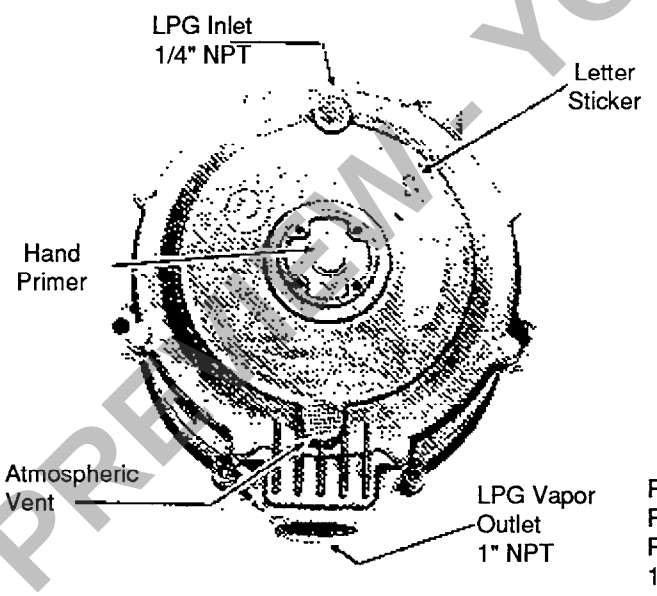
Wear safety glasses at all times to protect your eyes.

1. Close manual shut-off valve at LPG tank.
2. Start engine. Allow to run until engine stops. Turn off ignition switch.
3. Drain radiator.

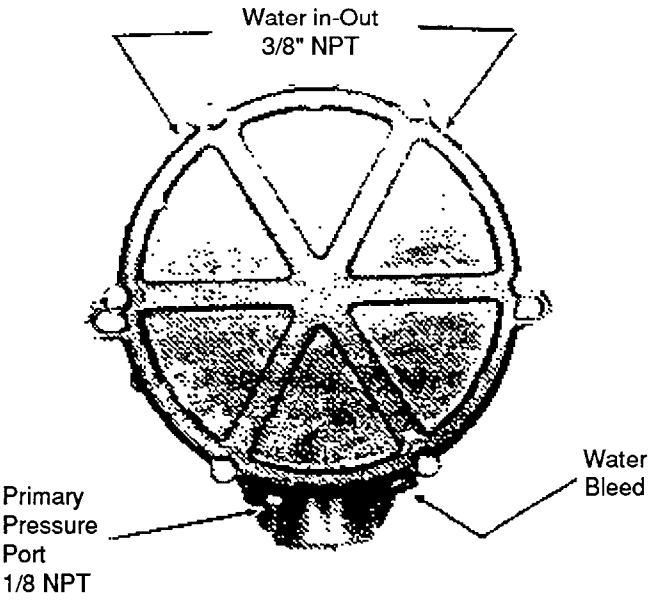
WARNING

Do not smoke while removing any assemblies from the LPG system. Disconnect the grounded cable (-) at the battery to prevent accidental sparking. LPG is high inflammable.

4. Disconnect fuel and water lines from the vaporizer-regulator. Plug or cap the end of the lines.
5. Remove mounting bolts and the vaporizer-regulator.



SECONDARY COVER

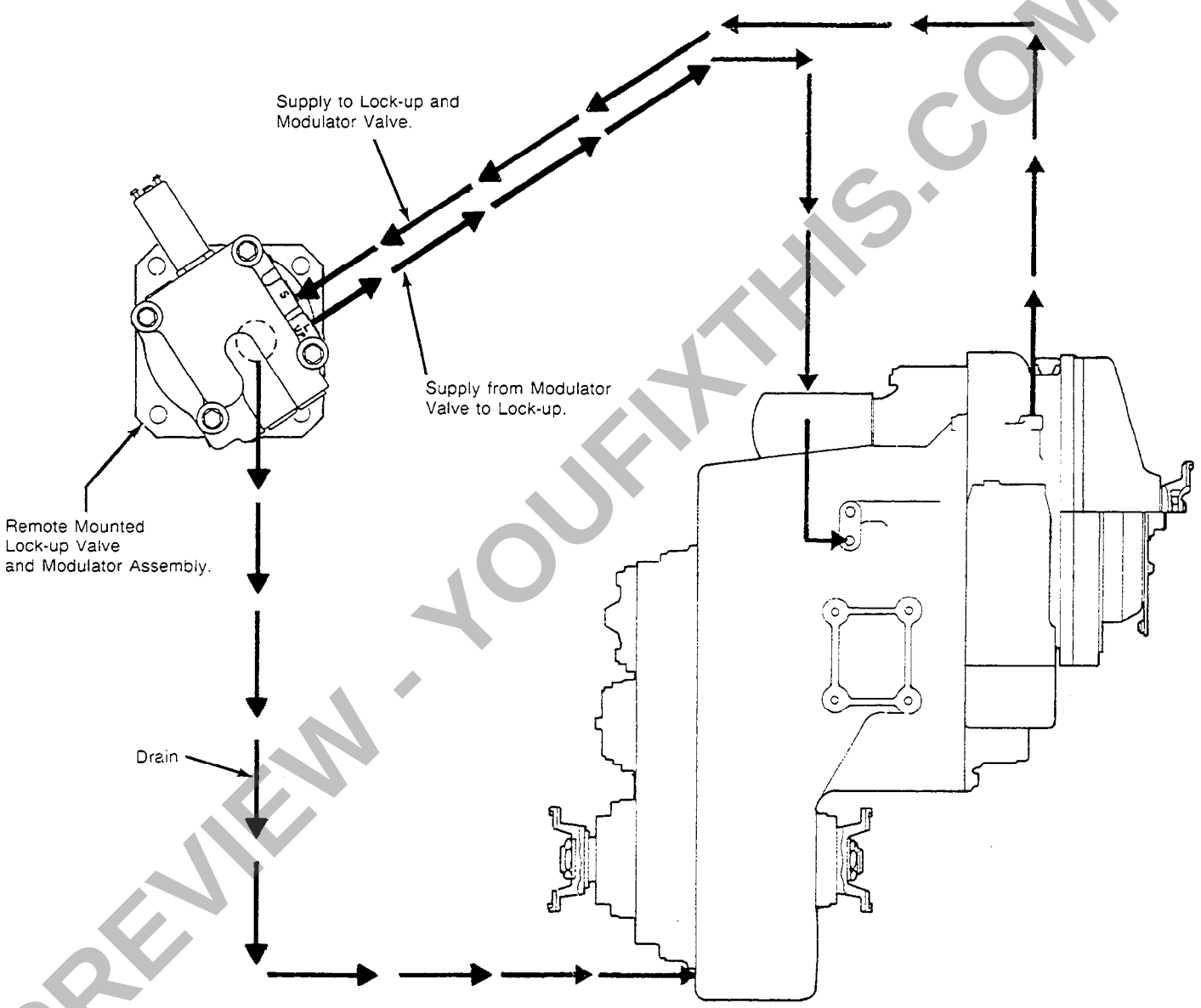


HEAT EXCHANGER COVER

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18000 AND 24000 SERIES



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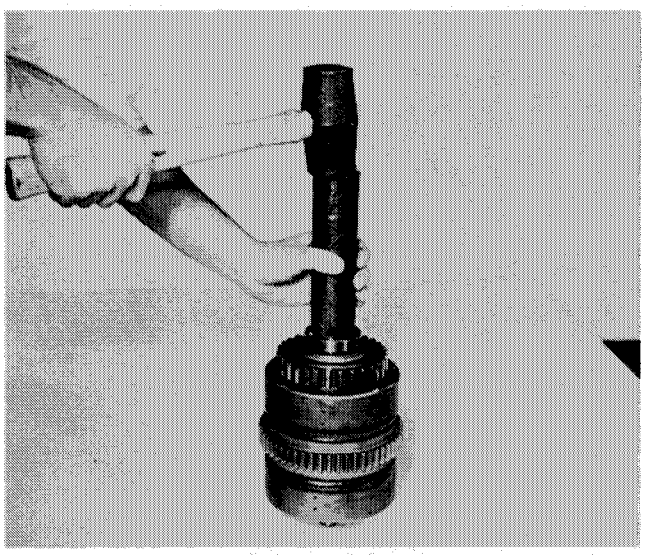


Figure 78

Install driven gear outer bearing. **(See page 32 for proper Shielded Bearing Installation.)**

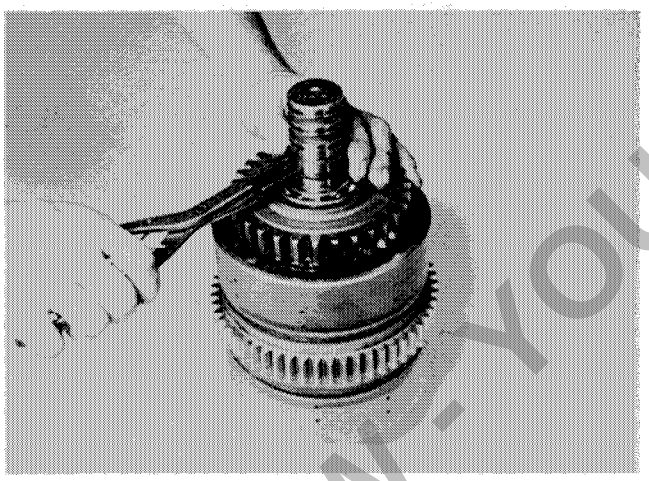


Figure 79

Install front bearing locating ring.

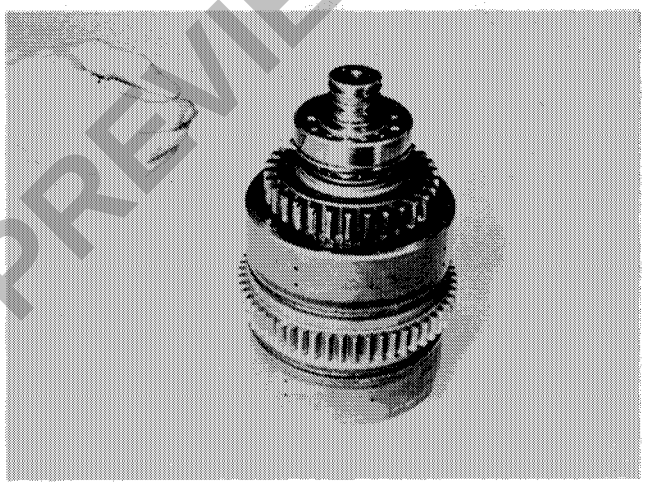


Figure 80

Install front bearing.

NOTE: Snap ring groove in front bearing must be down.



Figure 81

Install front bearing retainer ring.

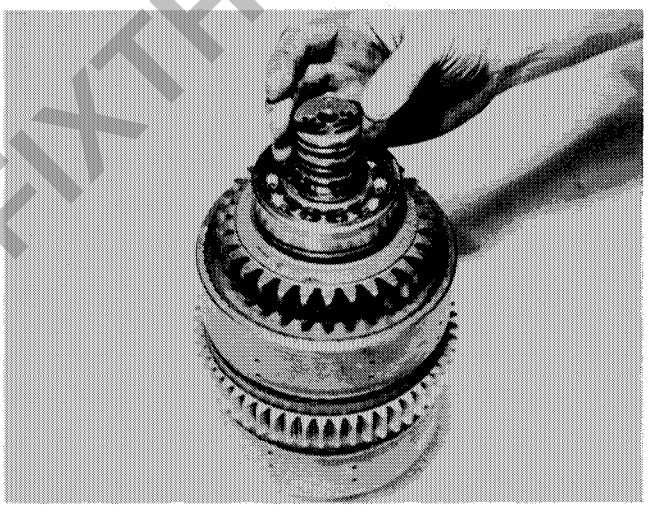


Figure 82

Install clutch shaft oil sealing rings and expander springs per instructions on page 39.

LOW CLUTCH REASSEMBLY

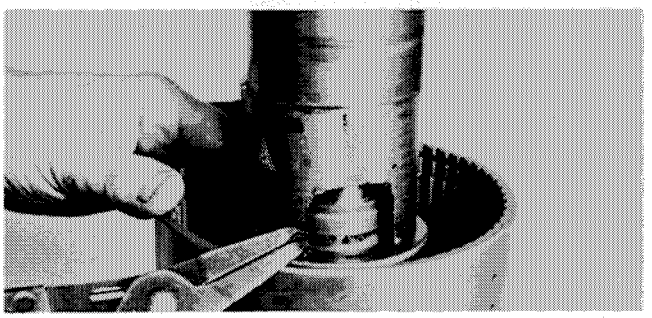


Figure 83

Install new clutch piston inner and outer sealing ring. Insert piston into clutch drum using caution as not to damage seals. Position piston return spring, spring retainer and retainer snap ring. Compress spring and retainer and install snap ring.

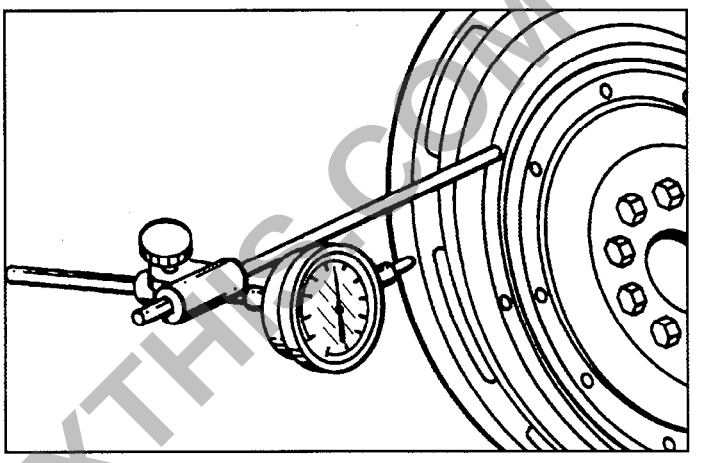
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CLARK-HURTH
COMPONENTS

ENGINE FLYWHEEL AND FLYWHEEL HOUSING INSPECTION PROCEDURE

FLYWHEEL HOUSING RUNOUT

Face Runout (axial eccentricity) of the Flywheel Housing:

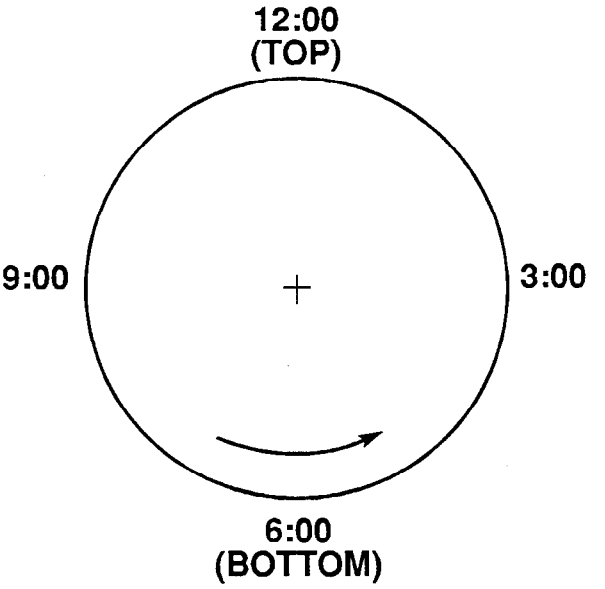


Dial Indicator Installed

1. Fasten a dial indicator to the crankshaft flange so the anvil of the indicator will touch the face of the Flywheel housing.

2. Put a force on the crankshaft toward the rear before reading the indicator at each point.

3. With dial indicator set at 0.000 in. (0,0 mm) at location (6:00), turn the crankshaft and read the indicator at locations (3:00), (12:00) and (9:00).



4. The difference between lower and higher measurements taken at all four points must not be more than 0.008 in. (0.203 mm), which is the maximum permissible face runout (axial eccentricity) of the Flywheel housing.

6:00 _____

3:00 _____

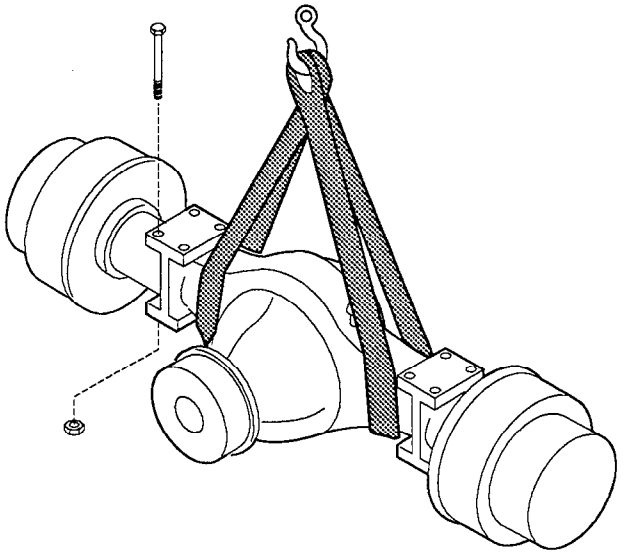
12:00 _____

9:00 _____

Face Runout: _____
(Maximum Value - Minumum Value)=

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8. Rig chain or web belt sling around both sides of differential to support drive axle in balanced manner. Attach suitable hoist and lift so that all slack is out of sling and axle will be supported when mounting bolts are removed.
Note: Drive axle weight 1700 pounds [771 kg].

9. Remove mounting bolts as shown.

10. Position a fork truck at approximately right angles to drive axle and position forks to support axle. Avoid lifting on brake shafts.

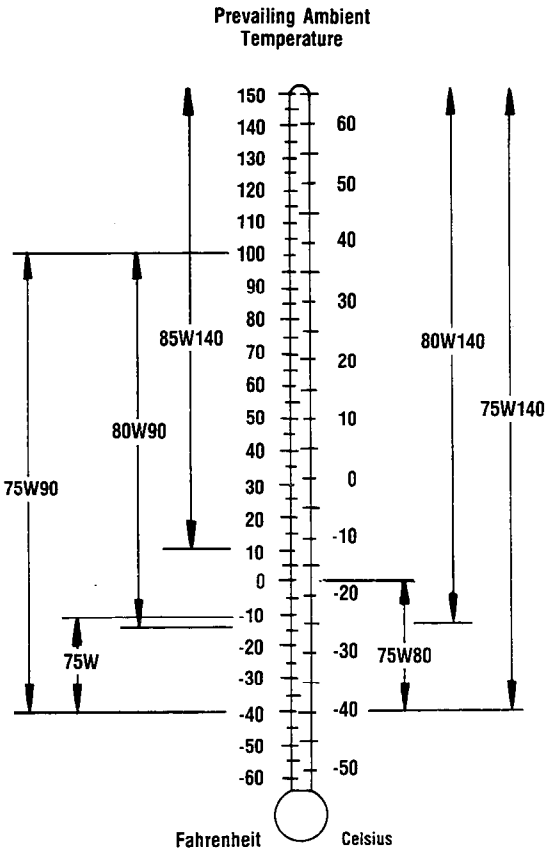
11. Lower hoist and ensure that drive axle is resting securely on forks. If necessary, chain axle to forks. Pull axle out from under truck and set on floor or suitable stand. Avoid setting on brake shafts.

12. Reverse procedure to reinstall drive axle. Torque axle to frame bolts to 447-503 lbf-ft [606-681 N•m]. Refer to Group 23 for wheel lug nut torque and tightening sequence.

13. To reactivate the piggyback/spring parking brake portion of the brake chambers from their manually released position, reverse procedure a. thru f. Reinstall the release bolt, flat washer and nut into the storage pocket using 10 lbs-ft torque on nut against flat washer.

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For proper viscosity lube, refer to fahrenheit or celsius chart below.

Gear Lubricant Chart

Ambient Temperature Ranges				Multigrade Viscosities MIL-L-2105C
				See (a) note below.
-40°F	to	-10°F	(-40°C to -23°C)	75W See (b) note below.
-40°F	to	0°F	(-40°C to -18°C)	75W80
-40°F	to	+100°F	(-40°C to -38°C)	75W90
-40°F	+	Above	(-40°C + Above)	75W140
-15°F	to	100°F	(-26°C to 38°C)	80W90
-15°F	+	Above	(-26°C + Above)	80W140
+10°F	+	Above	(-12°C + Above)	85W140

Notes:

(a) The MIL-L-2105C Specification replaced the MIL-L-2105B Specification.

(b) The MIL-L-2105C 75W Classification replaced the MIL-L-10324A Subartic Specification.

Note: Specifications are subject to change.

Checking Oil Level in Drive Axles

For off-highway operation, check lubricant level after each 250 hours of operation. Always maintain lubricant level to bottom of filler plug hole. Drain oil every 2500 hours, or one year whichever comes first.

For highway operation, lubricant should be checked each 5000 miles [8000 km]. Maintain lubricant level to bottom of filler plug hole. Drain oil every 25,000 miles [40,000 km] or one year whichever comes first.

To check oil level in axles with differential drive and planetary wheel ends, the axle should be run first, then allowed to stand for a minimum of five minutes on level ground. This procedure will allow oil to drain back to its normal level. After the five minute interval, remove oil filler plug in axle center and in the planetary wheel ends for oil level inspection. If oil level is not to the bottom of the filler hole, add necessary lubricant.

Checking and Filling Planetary Wheel Ends

Always check lubricant level in planetary wheel ends with wheel hub oil level plug and/or arrow in a down position. Remove oil level plug. If lubricant is below oil level hole, remove filler plug and fill to oil level hole. Reinstall plugs.

Filling Drive Axles

Axles with single or double reduction at center: Fill axle housing through filler hole until lubricant is at bottom of filler hole.

Axles with planetary wheel ends. Follow procedure in "checking and filling planetary wheel ends."

Draining

Draining is best accomplished immediately after vehicle has operated a short time or completed a trip. The lubricant is then warm and will flow freely, allowing full drainage in minimum time. This is particularly desirable in cold weather.

Remove plug at bottom of axle housing and allow sufficient time for lubricant to drain. With planetary wheel ends, rotate wheel until filler hole is down. Remove plug and allow sufficient time for draining. Be sure planet cover oil level hole is in proper position when refilling wheel ends.

Flushing

After draining, axles should be flushed. Replace drain plugs and fill axles to proper level with a light flushing oil. Operate the axles for a short period of time, then drain. Be sure to drain all of the flushing oil before refilling with new oil. Inspect the magnetic drain plug for metal particles or other foreign matter indicative of wear or possible failure. When refilling, cleanliness is extremely important.

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section 1 Introduction

Standard Single Reduction Carriers Without Diff. Lock

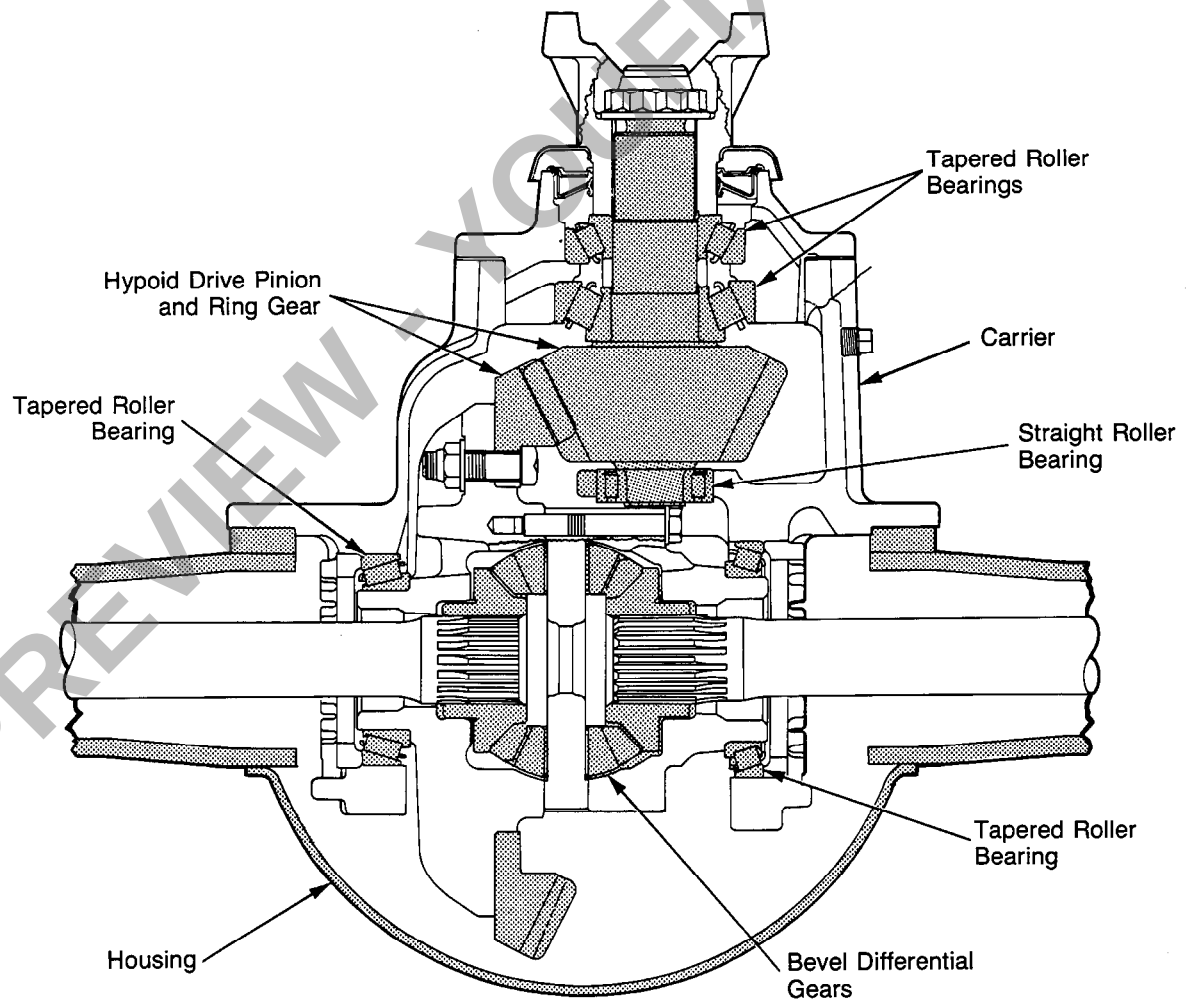
Rockwell single reduction standard carriers, Figure 1, are used in most Rockwell single axles, rear of tandem axles and front drive steering axles.

The single reduction carrier models are front mounted into the axle housing. These carriers have a hypoid drive pinion and ring gear set and bevel gears in the differential assembly.

A straight roller bearing (spigot) is mounted on the head of the drive pinion. All other bearings in the carrier are tapered roller bearings.

When the carrier operates, there is normal differential action between the wheels all the time.

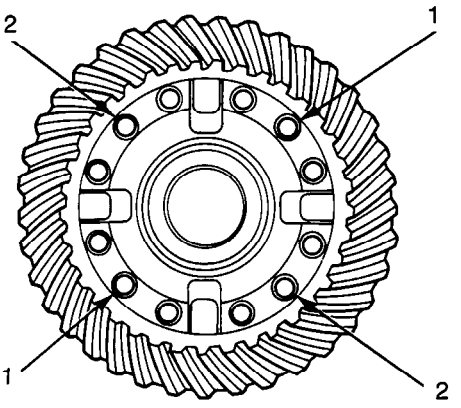
Figure 1 **Standard Carrier**



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Figure 92



B. Install the other fasteners into the case halves. Tighten the fasteners to the correct torque value. See the torque chart on page 65. T

16. Check the rotating resistance of the differential gears. Use the following procedure.

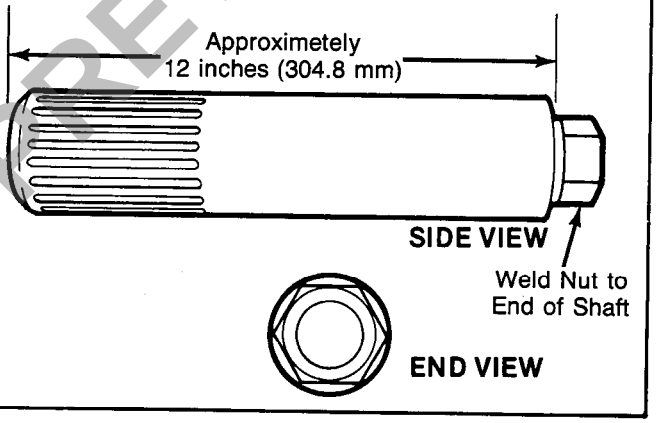
Rotating Resistance Check of Differential Gears

Specification:
50 lb.-ft. (67.8 N.m) torque maximum applied to one side gear.

NOTE:

***Make a tool for checking the rotating resistance of the differential gears. The tool can be made from an axle shaft that matches the spline size of the differential side gear.* See Figure 93.**

Figure 93

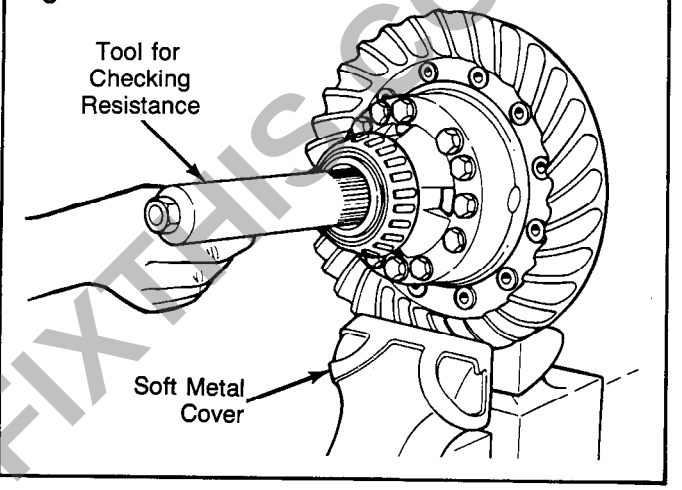


A. Install soft metal covers over vise jaws to protect the ring gear. **Figure 94.**

B. Put the differential and ring gear assembly in the vise.

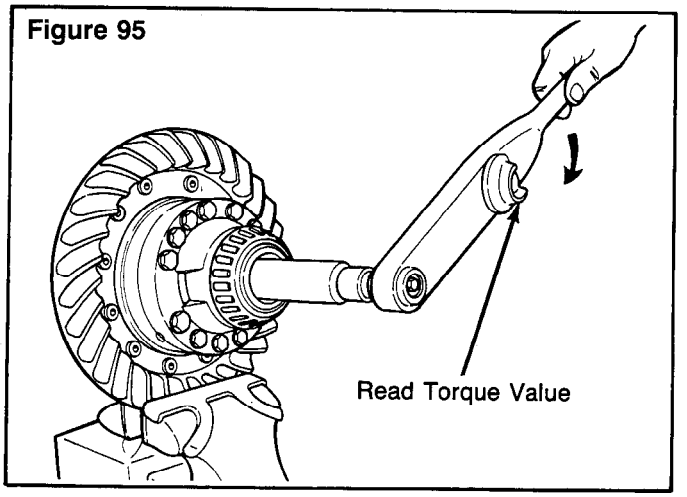
C. Install the tool into the differential until the splines of the tool and one side gear are engaged. **Figure 94.**

Figure 94



D. Attach a torque wrench to the nut of the tool and rotate the differential gears. As the differential gears rotate, read the value indicated on the torque wrench. **Figure 95.**

Figure 95



E. If the torque value exceeds the specification, disassemble the differential gears from the case halves.

F. Check the case halves, spider, gears and thrust washers for the problem that causes the torque value to exceed the specification. Repair or replace parts.

17. After the parts are repaired or replaced, assemble the parts and repeat steps A to F.

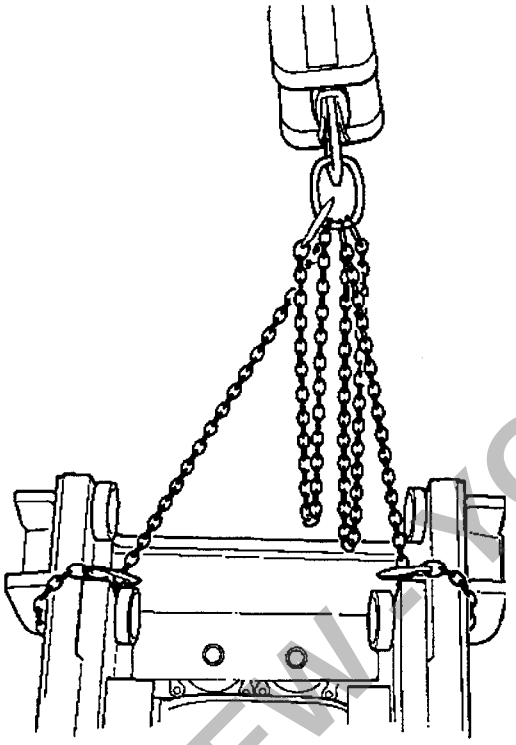
**Some Rockwell carriers do not have the parts described.*

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LIFTING, JACKING AND BLOCKING

Lifting or jacking any large piece of equipment such as your fork truck presents obvious hazards. It must be done with great care and forethought. Consult the truck weight tabulations in the Specifications Section of this manual to ensure that your lifting equipment is of adequate capacity.

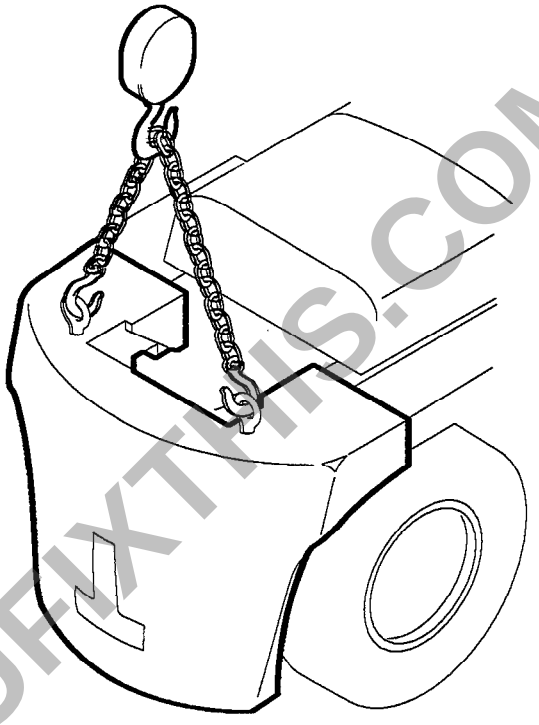


1. The proper way to lift the front of the truck is by rigging a chain fall or hoist to the upright as shown. Chock the steer wheels before lifting. Place wheel stands under the drive tires or solid blocking under the base of the upright rails.

WARNING

The Upright should be fully down before lifting.On uprights with negative drop such as Marina trucks, clamp or chain the rails together so they cannot move.

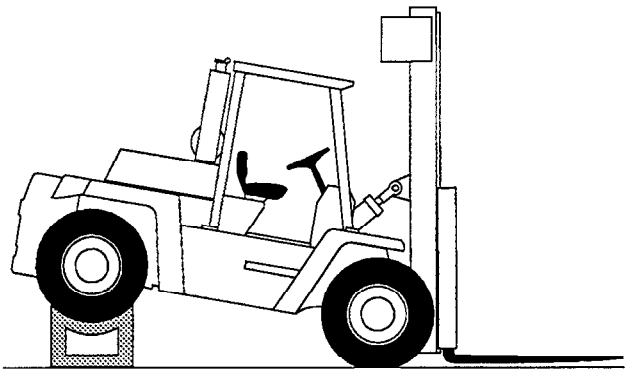
If at all possible, remove the forks before lifting the upright.



2. The rear of the truck may be lifted by the counterweight as shown. Chock the drive wheels before lifting and be sure lifting equipment is of adequate capacity.

WARNING

Check to see if the counterweight bolt is in place and properly torqued before lifting. Never attempt to lift the rear of the truck with another fork truck.



3. Place wheel stands under the steer tires as shown or put solid blocking under the truck frame.

WARNING

Take care to place block unter the frame back far enough from the truck center of gravity so that it is stably supported.

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8. Install spring (8) and valve inlet (11) on valve seat (6).
9. Compress valve inlet (11) and valve seat (6) until spring (5) snaps and holds the assembly together.
10. Install preformed packing (7) on valve seat (6).
11. Place valve assembly in body (20).

⚠ CAUTION

Internal spring pressure generates 50 pounds of force during assembly. Be sure retainers or retaining rings are seated correctly before releasing pressure on spring.

12. Depress valve assembly, and install retaining ring (1) making sure that ring snaps in groove.

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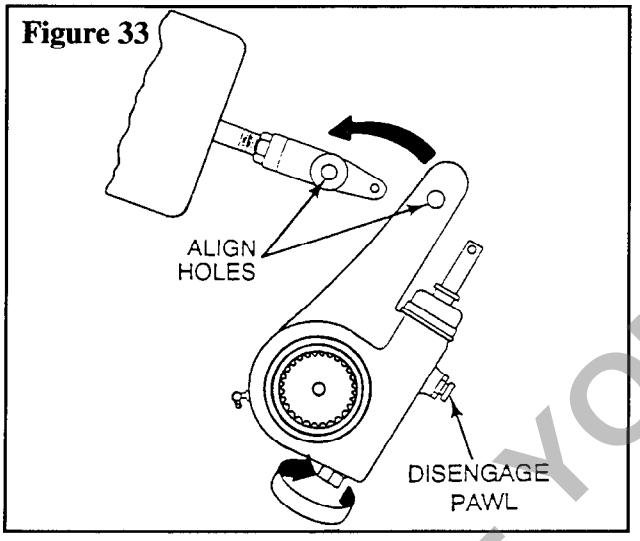
Section 4
Assemble Brakes

⚠ CAUTION

You must remove or disengage the pawl before rotating the manual adjusting nut, or you will damage the pawl teeth. A damaged pawl will not allow the slack adjuster to automatically adjust the brake clearance. Replace damaged pawls before putting the vehicle in service.

4. Remove or disengage the pawl. Turn the manual adjusting nut to align the holes in the slack adjuster arm and the clevis. **Figure 33.**

Figure 33



5. Rotate the slack adjuster by hand to make sure that nothing prevents the slack adjuster from rotating when the brakes are applied. The chart below shows the maximum stroke that you should check for clearance for each size chamber.

Size of Chamber (Square Inches)	Maximum Stroke Available (Inches)
9	1-3/4
12	1-3/4
16	2-1/4
20	2-1/4
24	2-1/4
30	2-1/2
36	3

⚠ CAUTION

Do not reuse clevis pin retainer clips when you remove them to service the automatic slack adjuster or chamber. Always replace used retainer clips with new ones each time you service the automatic slack adjuster or chamber. Discard used clips. When removed for service, clevis pin retainer clips can be bent or "gapped apart" and can lose retention.

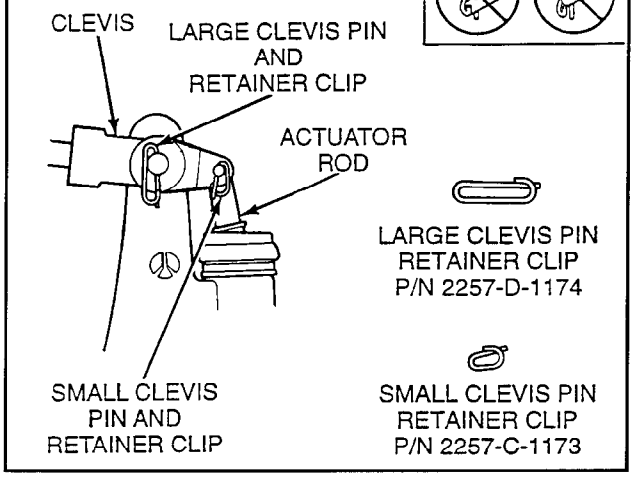
A bent retainer clip that is reused on the large clevis pin can dislodge from the clevis pin. Brake application can be affected if the clevis pin works its way out of the automatic slack adjuster.

A bent retainer clip that is reused on the small clevis pin can dislodge and affect the automatic adjustment of the automatic slack adjuster if the small retainer clip and clevis pin are lost.

6. Apply anti-seize compound to the two clevis pins. Install the clevis pins through the clevis and the slack adjuster and install the cotter pins or clevis pin retainer clips to hold the clevis pins in place. **Figure 34.**

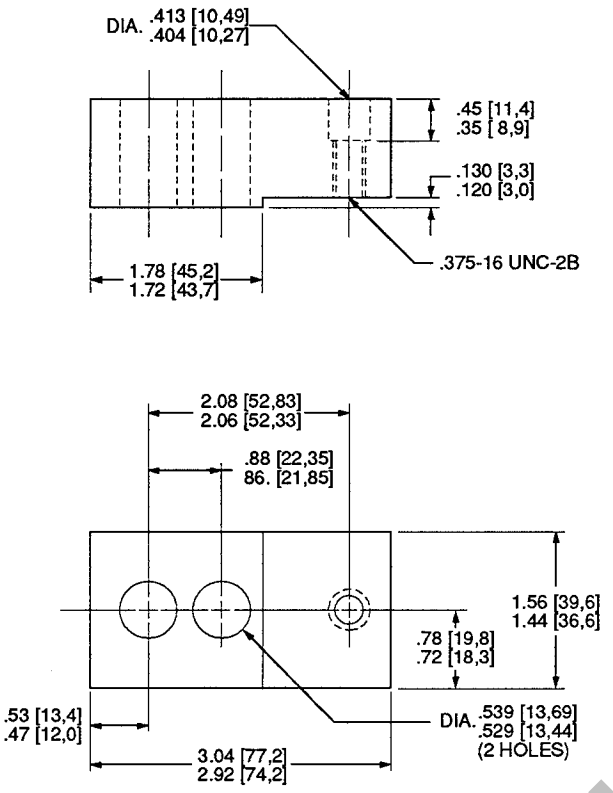
7. Adjust the brake.

Figure 34

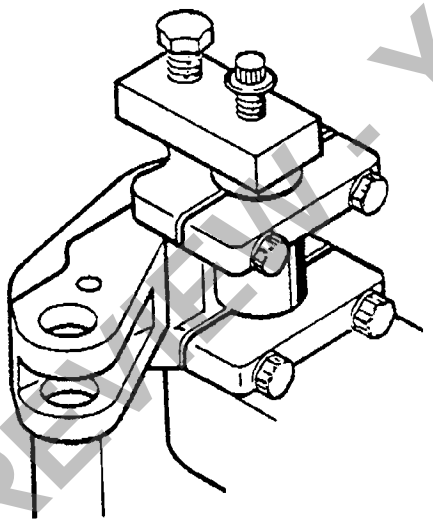


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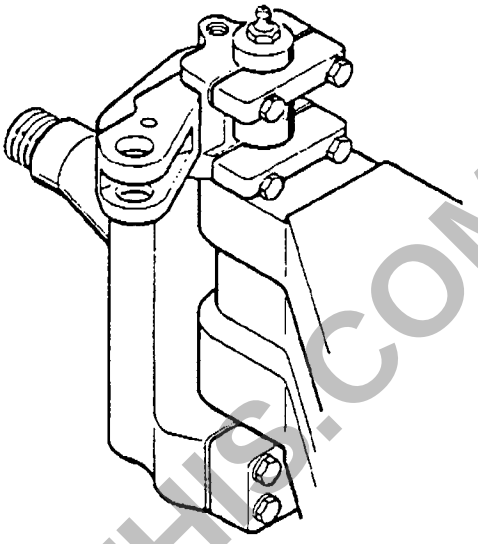
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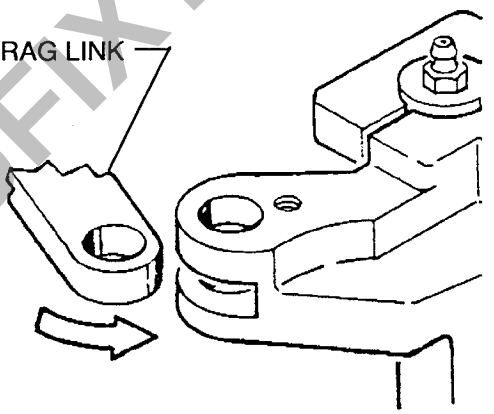
24. Pre-Load bracket.



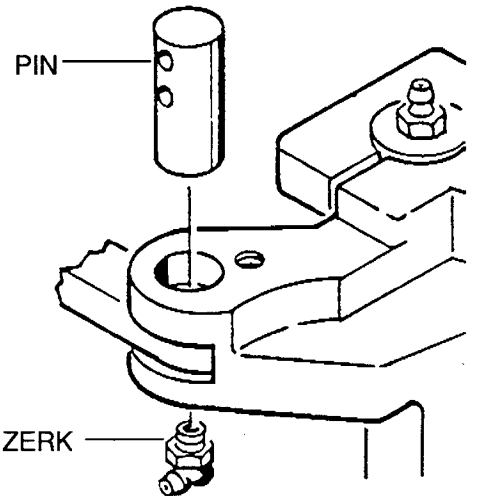
25. Screw down 1C624H until top of pin is level with top of knuckle and clamp. Torque 1C624H at 20-25 lbf-ft [27 - 34 N•m]. Remove bracket. Torque clamp bolts at 407-449 lbf-ft [551 - 608 N•m].



26. Add grease zerks to top and bottom pins and grease with MS9 grease.



27. Swing drag link into steering knuckle.



28. Add grease zerk to pin. Add pin through knuckle and drag link.

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CONDITION	POSSIBLE CAUSE	SUGGESTED CORRECTION
No lift, tilt or auxiliary functions.	1. Hydraulic fluid very low. 2. Hose broken. 3. Hydraulic pump defective. 4. Defective main lift valve.	1. Check fluid level. Fill as required. 2. Replace hose. 3. Repair or replace hydraulic pump. 4. Replace main lift valve.
Load cannot be lifted to maximum height.	1. Hydraulic fluid very low. 2. Hydraulic pump defective.	1. Check fluid level. Fill as required. 2. Repair or replace hydraulic pump.
Oil leak at top of lift cylinder(s).	1. Worn or damaged lift piston seal. 2. Scored cylinder wall. 3. Plugged vent line.	1. Replace seal. 2. Repair or replace cylinder. 3. Clean or replace vent line.
Oil leak at top or end of tilt or auxiliary function cylinder.	1. Worn or damaged seal. 2. Scored piston rod.	1. Replace seal. 2. Repair or replace cylinder(s).
Pump not delivering hydraulic fluid.	1. Hydraulic fluid level low. 2. Fluid intake pipe clogged. 3. Suction filters dirty. 4. Air leak in suction line. 5. Fluid viscosity too high for pump to pick up prime. 6. Defective hydraulic pump.	1. Check fluid level. Fill as required. 2. Remove obstruction from intake pipe. 3. Replace filter cartridges. 4. Tighten suction line or replace if defective. 5. Replace hydraulic fluid with correct grade for given temperature and service. 6. Repair or replace hydraulic pump.

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c. Place wear plate (7) on port section (15) with bronze face up and notch facing inlet port.

d. Lubricate bronze face of wear plate (7). Install center section (21) on top of wear plate (7) and into locating holes of port section (15) with major diameter facing port section and notch facing inlet port. Make sure wear plate and center section set flush against port section.

e. Tape the spline area (long spline) of drive gear (19) to prevent cutting shaft seal(s) during assembly.

f. Lubricate drive gear (19) and driven gear (20). Install drive gear (19) into port section (15) with short spline towards port section. Install driven gear (20).

g. Lubricate bronze face of wear plate (7). Install wear plate (7) over locating pins of center section (G30 series) (21) with bronze face towards center section and notch facing inlet port.

h. Install seal retainer (16) and seal gland (12) into cavity located on face of shaft end cover (18). Install "O" ring (5). Apply petroleum jelly around seal pack area on face of front cover.

i. Carefully position shaft end cover (18) over studs, gears and center section guide pins. Gently slide shaft end cover over the gears until it is flush against wear plate (7).

j. Lubricate stud (25) threads with hydraulic fluid. Install washers (17) and nuts (16) on ends of studs. Cross torque nuts to 150±5 lb.ft. on G30** series and 70 ±5 lb.ft. on G20** series.

3. Clamp port section (15) into vise with studs facing down. Make sure port section is clamped securely. Assemble rear cover portion of pump as follows:

a. Install "O" ring (14) into groove located on face of port section (15). Install "O" ring (5).

b. Install lubricated coupling (13) on spline of drive gear (19). Install cover end pump.

c. Lubricate locating pins and face of port section (15). Install adapter section (11) over locating pins of port section with notch facing inlet port.

d. Place wear plate (7) on adapter section (11) with bronze face up and notch facing inlet port.

e. Lubricate bronze face of wear plate (7) with clean hydraulic fluid. Install center section (10) on top of wear plate (7) with major diameter facing the wear plate and the notch facing inlet port. Locating pins of center section should mate with adapter section (11) holes.

f. Make sure the assembly thus far is flush and solid. Lubricate the drive gear (8) and driven gear (9). Install both gears in place. The splined end of drive gear (8) must engage into coupling (13).

g. Lubricate bronze face of wear plate (7) and place over locating pins of center section (10) with bronze face down and notch facing inlet port.

h. Lubricate seal retainer (6) area and face of real cover (4) with petroleum jelly. Carefully place rear cover (4) over locating pins of center section (10) with outlet port opposite inlet port.

i. Lubricate threads of four long screws (3). Place lock washers (2) on screws. Install screws through rear cover (4) and into port section (15). Cross torque screws to values shown in Table 6.

j. Lubricate threads of four short screws (1). Place lock washers (4) on screws. Install screwws through rear cover (4) and into adapter section (11). Cross torque screws to values shown in Table 6.

MODEL	TORQUE (lb. ft.)
	REAR COVER SECTION
G2020	65-75
G3020	65-75
G3030	145-155

Table 6. Rear Cover Screw Torque

4. Turn the drive gear (19) one revolution with a suitable socket wrench. No binding shall be evident during this operation. The breakaway torque necessary to turn the drive gear must not exceed the values noted in Table 7.

MODEL	TORQUE (lb. in.)
G2020	140
G3020	150
G3030	160

Table 7. Breakaway Torque

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Typical Valve Section

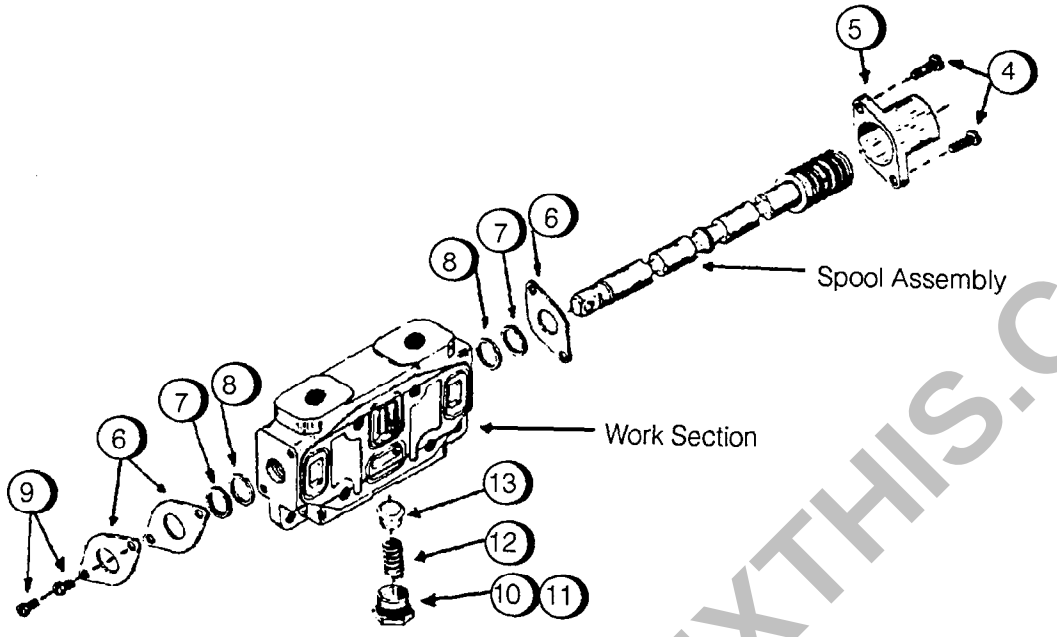


Figure 3

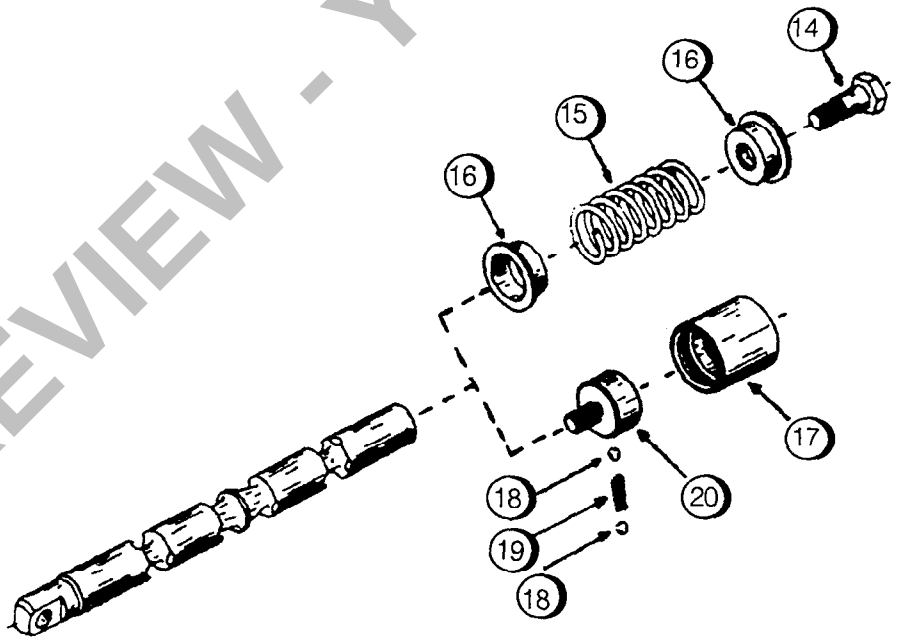


Figure 4

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Assemble Cylinder Gland

Seals and energizer rings must be handled carefully. Cutting, scratching or nicking these components impairs their efficiency.

- Lubricate gland assembly with hydraulic fluid.
- Prior to installation, insect seal to be sure the *sealing step* is free of damage.
- Lubricate the square energizer ring with hydraulic fluid.

Step 1 Locate energizer ring in gland glove. Refer to opposite illustration.

Step 2 Fold Step Seal as shown in opposite column. The use of tool shown (ref. A,B,C) in illustration is recommended for seal installation.

Step 3 Next, Lubricate and position the seal within the energizer. *The "Seal Step" must face toward the "pressure side" of the gland.* Check to be certain the "step" is facing in the right direction. You can do this by feeling the seal with your finger. Refer to Cut-A-Way in circle ~ opposite column.

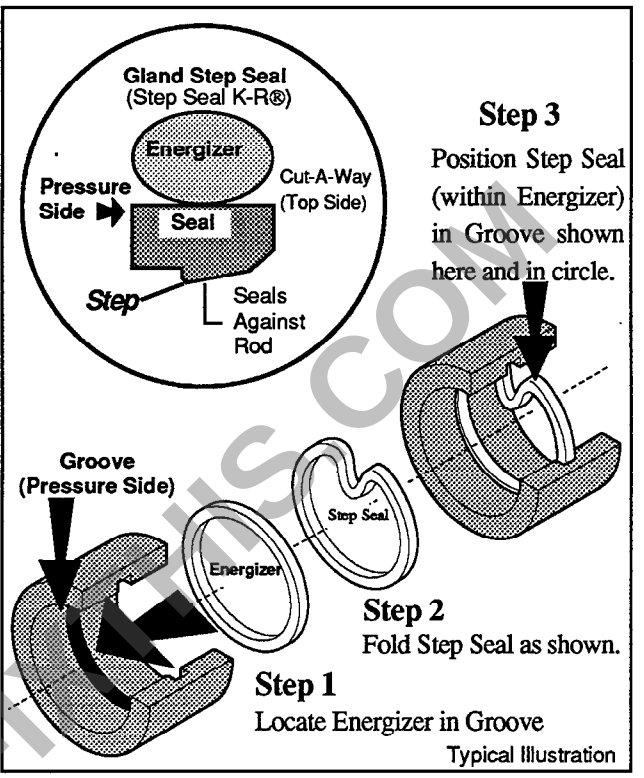
NOTE

If the seal was installed incorrectly, it may be removed and reinstalled at this point.

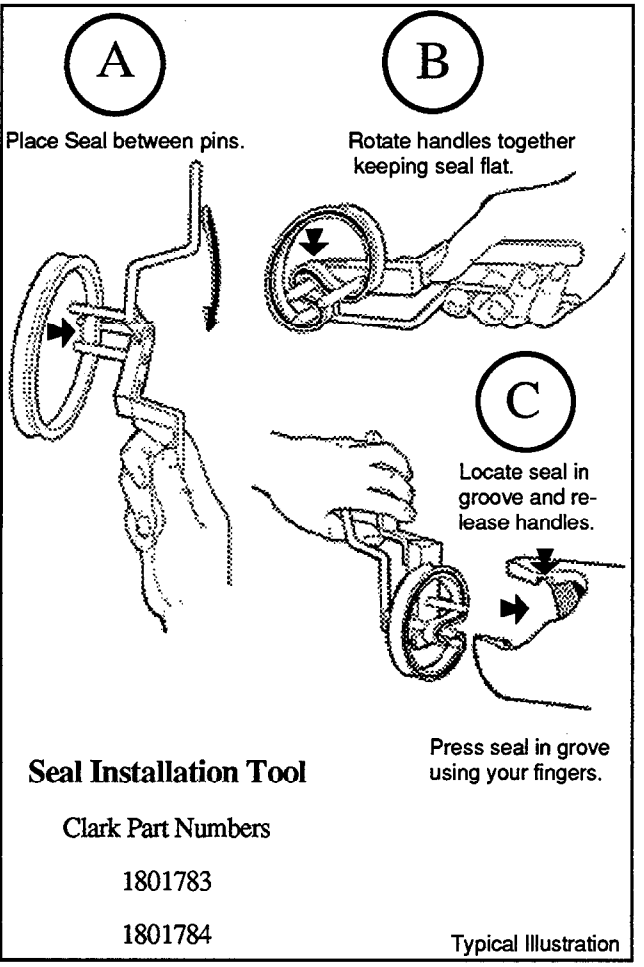
Now, press the *kidney shaped area* into the groove with your fingers. *Do not use a sharp tool.*

CAUTION

If you press the seal into the groove and then discover the seal is installed incorrectly, remove and discard seal. Once a seal has been pressed into position and then removed it must be discarded or leakage will result.



Typical Illustration



Typical Illustration

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