Chevrolet Powerglide Troubles

Transmission Oil Foams and Spews Out of Filler Tube
1. Oil level too high.
2. Damaged suction pipe seal.
4. Dirt on suction pipe in housing too deep.
5. Sand in suction hose in transmission housing or case.
6. Machined hole in suction cavity in valve body.
7. Water in transmission, indicated by everfilled condition and heavy color of transmission oil. Water in transmission usually comes from a leaking oil cooler. In this case there may be excessive oil accumulation in top tank of radiator. Correct cause of leakage and completely drain and refill transmission.

Check Points For Oil Leaks and High Oil Consumption
1. Transmission housing side cover.
2. Low drive valve body and transmission case.
3. Servo cover and transmission case.
4. Transmission housing and transmission case.
5. Front of flywheel housing.
7. Oil cooler pipe connections.
8. Transmission case oil seal.
10. "O" ring seal between converter cover and pump assembly.
11. Front pump "O" ring seal.
12. Front pump oil seal.
13. Oil drain in front pump plugged.
14. Oil leak between oil pump and converter cavity due to sand hole in transmission housing.

Transmission Overheats
1. Low coolant level.
2. Defective transmission thermostat.
3. Defective oil cooler.
4. Excessive slippage of clutch or low band.

Car Will Not Move In Any Range — Rear Wheels Locked
1. Parking lock pawl engaged.
2. Parking brake applied.
3. Lock up due to broken part in transmission or rear axle.

Car Will Not Move In Drive Range Only (1950-52)
1. Defective clutch.
2. Dragging for band.

Car Will Not Move In Reverse Only
1. Low band needs adjusting.
2. Clutch relief valve stuck.
3. Clutch plates binding to hub or flange.
4. Clutch plate not properly installed.
5. Clutch piston stuck.

Excessive Slip In All Ranges
1. Low oil level.
3. Oil suction pipe damaged or not seating properly, allowing air to be sucked into pumps.
4. Oil suction screen clogged.
5. Friction oil pump worn or damaged.
6. Floor pressure regulator valve or gasket.
7. On 1950-52 units, freewheeling idler rollers or secondary pump not properly assembled.

Excessive Slip In Drive Range Only (1950-52)
2. Worn or burnt clutch plates.
3. Defective clutch piston seals.
4. Defective clutch drum oil seals.
5. Defective clutch release valve.

Excessive Slip In Manual Low & First Gear In Drive Range (1953-59)
1. Improper linkage adjustment.
2. Improper low band adjustment or broken band.
4. Accumulator valve stuck.
5. Broken low across piston ring.
6. Worn clutch drum.
7. Defective service release gasket.
8. Defective service body gaskets.

Excessive Slip In Reverse Only
1. Improper linkage adjustment.
2. Improper reverse band adjustment, or broken band.
3. No oil pressure due to stuck accumulator valve, stuck modulator lever or piston (1954).
4. Broken reverse gear or piston ring.
5. Defective valve body gaskets.

Car Creeps In Neutral
1. Improper linkage adjustment.
2. Low band adjusted too tight.
3. Clutch inoperative due to:
   (a) Clutch plates not properly assembled.
   (b) Clutch plates sticking.
   (c) Clutch relief valve stuck closed.
   (d) Defective valve body gasket.
   (e) Control lever not attached to main valve inside transmission.

Car Creeps Forward In Reverse Or Backward In Low
1. Improper manual linkage adjustment.

Low-To-Direct Shift
Abnormally Rough
1. Improper low band adjustment.
2. Worn clutch plates.
3. Clutch plates binding in drum or flange.
5. Improper accumulator dump valve.
8. Throttle linkage misaligned (1950-57).

Engine Races On Low-To-Direct Shift
1. Clutch plates worn or burned.
3. Oil passage to clutch restricted.

Rough Shift, Direct To Low
1. Improper low band adjustment.

No Upshift In Drive Range
(1953-59)
1. Defective governor.
2. Stuck shift valve.
3. Clutch plates worn or burned.

No Down Shift From Direct-To-Low With Accelerator Floored (1953-59)
1. Throttle linkage misaligned.
2. Sticky shift valve.

Rough Shift, Neutral To Reverse
1. Accumulator piston stuck closed.
2. Improper reverse band adjustment.
4. Engine idling speed too high.
5. Excessive oil play in transmission, mainshaft.

Chatter In Manual Low (1950-52)
Chatter In Manual Low & First Gear Drive Range (1953-59)
1. Improper low band adjustment.
2. Worn low band or drum.
3. Defective clutch plate.
5. Clutch relief valve stuck.

Chatter In Reverse
1. Improper reverse band adjustment.
2. Worn reverse band or drum.
3. Worn or damaged reverse ring gear bushing.
4. Worn or damaged transmission case rear bushing.

Bushing In All Ranges
1. Low oil level.
2. Front and rear pump not functioning properly.

Ringing Noise In Converter
1. Low oil level.
2. Oil suction pipe damaged or not seating properly.
3. Defective pressure regulator valve.
4. Front oil pump worn.
NEUTRAL SAFETY SWITCH

This switch prevents operation of the starter in all positions except Neutral.

1952-54

To adjust, loosen the two switch mounting screws. Place the selector lever in Neutral and, with clips over flats on end of shifter shaft, insert pin into switch mounting crevices and healing plate. Tighten screws to secure switch in this position and remove boaring pin.
1955-56
Loosen one of the switch mounting screws and remove the other. Place selector lever in Neutral. Center visible assigned slot in switch mounting with tapped hole in mast jacket. Then tighten screw that was loosened and tighten arm that was removed.

If the engine will not turn over after the switch is positioned as directed above, loosen screws and rotate the switch until it does.

1957
Loosen both the switch mounting screws. Place selector lever in Neutral. Install cotter pins or similar aligning pins into two holes in switch on each side of pointer. Switch may be rotated to pointer between holes. Tighten the screws and remove cotter keys. The slot in the switch must be set on the center line of the tang on the shifter tube.

If, after the switch is positioned, the engine will not turn over, loosen the screws and rotate the switch in the direction necessary until it does. Be sure selector lever is in Neutral when performing this operation.

1958-59
Place selector lever in Neutral. Loosen screws securing switch retaining, then while holding ignition switch in “Start,” adjust position of switch until engine starts cranking. Hold switch in this position and tighten screws.

**LINKAGE, ADJUST**

1952-53.
1. Check clearance between control lever and upper support cover, which should be as shown in Fig. 13.
2. To correct this clearance, remove screws holding upper support to mast jacket and screw upper support up or down as required to gain the desired clearance. Replace upper support screws.
3. Place selector lever in reverse and check clearance between control lever and steering wheel rim which should be 1/2 in. Fig. 14. To adjust, loosen lower support clamp bolts and move up or down as necessary.
4. With selector lever in reverse, check clearance between reverse stop on control shaft lower support and lever lever. Fig. 15. This clearance should be 1/4 in.
5. To adjust, loosen transmission control rod screw and move selector lever as necessary to obtain 1/2 in. clearance and retighten the screw. When making this adjustment, be sure transmission manual valve lever is raised to top detent position and selector lever in reverse position.

1954
Throttle Linkage
1. Set transmission control lever in Drive range with the hand brake set and adjust engine idle speed to 425 rpm with engine and transmission at normal operating temperature. Stop engine when normal operating temperature is attained. The automatic choke must be entirely off and throttle stop screw against lock on fast idle cam.
2. Remove emergency brake rod from bell crank.
3. Disconnect rod "A" from throttle lever "D", Fig. 14.
4. Remove upper rear side cover bolt and rotate clamp 1/4-turn counterclockwise to the full detent position.
5. Install a 1/16 in. diameter gauge pin through the hole in the side cover and the hole in the throttle lever "D" with Positioning Gauge J-5886, Fig. 17. If the gauge pin will enter hole, adjustment of lever "D" is correct. If not, loosen clamp bolt and adjust accordingly. When making adjustment, clamp "C" must be rotated counterclockwise to the full detent position.
6. Connect rod "A" to lever "D".
7. Rotate engine bell crank clockwise to set transmission lever "E" at full detent and adjust rod "F" to length required for free entry of swivel pin into throttle lever when throttle lever is held at wide open (upward) position. Secure swivel pin to carburetor lever with clip.
8. Install a 3/8 in. diameter gauge pin through bell crank "G" and bracket at "E".
9. With rod "F" against idle stop in carburetor, adjust rod "F" for free entry of swivel pin into throttle valve control bell crank. Hold swivel pin from turning and lock check nut securely.
10. Remove 1/16 in. gauge pin.

**Selector Linkage**

1. Place selector lever in reverse and check clearance between selector lever and steering wheel rim, which should be 1 1/2 in. To adjust, loosen lower support clamps and move up or down as necessary. Tighten clamp bolts evenly.

---

**Positive Linkage Adjustment**

1. Loosen shifter tube lever clamp nut enough to allow upper control rod to move freely in the swivel.
2. Push the control bell crank (left side of transmission case) toward the front of the car as far as it will go to establish transmission in the Park position.
3. Place shift control lever in Park position.
4. Loosen shifter tube lever clamp nut securely.
Throttle Valve Linkage, 1955 Six
1. With selector lever in Drive Range and hand brake set, adjust engine idle to 425 rpm with engine at normal operating temperature and transmission warm.
2. After setting idle, shut off engine.
3. Disconnect rod "C", Fig. 19, from throttle lever "E".
4. Remove the extreme lower bolt from the rear low and drive body cover.
5. Rotate throttle valve control outer lever assembly counterclockwise to the open throttle position (to a definite stop). Hold in this position and, with the gauge pin 1 5/16" from hole in shake pin and hole in throttle lever, if the gauge pin will enter hole, adjust throttle lever to a 3/4" in clearance. If adjustment is not possible, loosen lever-to-crank attaching bolt and adjust outer lever as necessary.
6. Connect rod "C" to lever "E".
7. Disconnect rod "B" from carburetor throttle valve lever and rod "E" from accelerator and throttle valve lever on cylinder block.
8. With engine idle set as in Step 1 and rod "C" forced forward against stop in transmission (open throttle), adjust rod "D" for free entry of twist pin in carburetor throttle valve lever, with carburetor throttle valve in wide-open position.
9. With carburetor-throttle valve rod in wide-open position, and accelerator pedal fully depressed, adjust rod "D" for length required for free entry of twist pin in bell crank.

Throttle Valve Linkage, 1956-57 Six
1. With selector lever in Drive and hand brake set, adjust engine idle to 425 rpm with engine and transmission at operating temperature.
2. After setting idle, shut off engine.
3. Disconnect rod C from lever B, Fig. 19.
4. Remove lower rear bolt from transmission side cover.
5. Rotate lever A counterclockwise to...
the full detent position. Hold in this position and, with gage shown in Fig. 29 set at 1.15", measure distance between hole A in side cover and hole B in lever E. If gauge pin enter holes, adjustment of lever E is correct. If not, loosen clamp A and adjust lever E as necessary.

6. Install rod C.

7. Disconnect end C from carburetor throttle valve lever, and rod D from accelerator and throttle valve lever on cylinder block.

8. Move lever F to the wide open position and adjust rod E for free entry into lever D.

9. With accelerator pedal depressed, placing lowest point on accelerator rod D above toe panel, and lever D rotated to the wide open position, adjust rod D for free entry of screw pin in accelerator bell crank.

10. Check adjustment by releasing and depressing accelerator pedal. If lever F does not reach the wide open position it will be necessary to repeat Steps 5 and 9.

Throttle Valve Linkage, 1955 V8

1. With engine and transmission warm and set idle at 1200 rpm, shut off engine.

2. Disconnect rod "D" from throttle lever "B", Fig. 29.

3. Remove bolt from extreme lower rear hole and drive body cover.

4. Rotate throttle valve control outer lever counterclockwise to the open throttle position (to a definite stop). Hold in this position and with the gauge shown in Fig. 23 set at 0.3", measure distance between the hole in the side cover and hole in throttle lever, Fig. 29. If pin of gauge will enter holes, adjustment of lever "F" is correct. If adjustment is not correct, loosen lever-to-clamp attaching screw and adjust the clamp as necessary.

5. Connect rod "F" to lever "E".

6. Disconnect rods "E" and "G" from carburetor throttle valve lever.

7. With engine idle set as recommended and rod "F" forced forward against stop in transmission, adjust rod "C" for free entry of screw pin in carburetor throttle valve lever with carburetor throttle valve in wide open position.

8. With throttle in wide open position and accelerator pedal fully depressed, adjust rod "D" for free entry of screw pin in throttle valve lever.

Throttle Valve Linkage, 1955 V8 With Powerglide and 4-Barrel Carburetor

1. With engine and transmission at operating temperature, set idle at 1230 rpm and shut off engine.

2. Disconnect rod C from lever B, Fig. 24.

3. Remove bolt from lower rear hole of transmission left hand side cover.

4. Rotate clamp A counterclockwise to the full detent position. Hold in this position and, with the gauge shown in Fig. 23 set at 2.5", measure distance between hole in side cover and hole in lever E. If pin of gauge enter holes freely, the adjustment is correct. If not, loosen clamp A and adjust as necessary.

5. Disconnect rod C to lever E.

6. Disconnect rods G and E from lever F.

7. Rotate lever F to wide open position and adjust rod E to enter freely while holding it forward against

transmission internal stop.

8. With accelerator pedal depressed, place lever point on accelerator rod D above toe panel, and lever F rotated to wide open position, adjust rod G for free entry into lever F before attaching it.

9. Check adjustment by releasing and depressing accelerator pedal. If lever F does not reach the wide open position it will be necessary to repeat Steps 7 and 8.

Throttle Valve Linkage, 1955 V8 With Powerglide and 4-Barrel Carburetor

1. With engine and transmission at operating temperature, set idle at 1230 rpm and shut off engine.

2. Disconnect rod G from lever F, Fig. 26.

3. Remove bolt from lower hole of transmission lower left side cover.

4. Rotate clamp F counterclockwise to the full detent position. Hold in this position and, with the gauge shown in Fig. 23 set at 2.5", measure distance between hole in the side cover in the hole in lever E. If pins of gauge enter holes freely, adjustment is correct. If not, loosen clamp F and adjust as necessary.

5. Install rod G.

6. Disconnect rod B from lever J and rod H from lever E.

7. Place lever J to wide open position and pull rod G upward until it is stopped by transmission internal stop. Adjust rod H for free entry into lever E.

8. With accelerator pedal depressed, place lever point on accelerator rod D above toe panel, and lever F rotated to wide open position, adjust rod E for free entry into lever F.

9. Check adjustment by releasing and depressing accelerator pedal. If lever F does not reach the wide open position it will be necessary to repeat Steps 7 and 8.
9. Check adjustment by releasing and depressing accelerator pedal. Lever J should reach wide open position. If not, it will be necessary to repeat Step 8.

**Throttle Linkage, Adjust**

**1957 V8 Powerglide**

1. Referencing to Fig. 29, loosen assembly lever K to clamp A.

2. Insert Gauge J-686 between transmission left hand side cover lower rear axle bolt and lever B. Dimension between bolt and hole center lines should be 2.70 inches as shown in Fig. 29. With gauge in place, and holding clamp A counter clockwise in full decelerate position, tighten lever B to clamp A. Remove gauge.

3. Install rod C.

4. Install rod E in cross shaft D.

5. Place lever F in wide open position and pull rod E forward until it is stopped by transmission internal stop. Adjust swivel in rod E for ease of movement in lever F before fixing swivel in Lever F.

**1958-59**

**Shift Linkage**

1. With engine stopped, lift up on range selector lever and move the lever in the position where transmission Drive detent is felt. Fig. 27. Slowly release lever to see if lever lock pin (see next) enters lock plate. Check Reverse range in similar manner. If the lock pin does not freely enter the lock plate in both Drive and Reverse ranges, adjust as follows:

2. Place range selector lever in Drive. Lower clamp on shift control rod until it is flush. Adjust swivel in rod end of clamp at either end of the shift control rod so that the lever pin is in the center of the shift control lever.

3. Hold shift control lever (at lower rear end of linkage) against the Drive stop of the range selector lock plate while the reverse and reverse shift stop lever is inserted through the transmission. With the linkage held in this position, carefully tighten the clamp nut on the shift control rod.

**Throttle Linkage, Cyl.**

1. Referencing to Fig. 29, loosen assembly lever B to clamp A.

2. Insert Gauge J-686 between transmission left hand side cover lower rear axle bolt and lever B. Dimension between bolt and hole center lines should be 2.70 inches as shown in Fig. 29. With gauge in place, and holding clamp A counter clockwise in full decelerate position, tighten lever B to clamp A. Remove gauge.

3. Install rod C.

4. Install rod E in lever D. Place lever F in wide open position and pull rod E up until it is stopped by transmission internal stop. Adjust swivel in rod E for free movement in lever F before fixing swivel in lever F.

5. Check adjustment by placing linkage in idle position, then return to wide open. Position by rotating lever F upward on lever B to see if rod C deflection, causing transmission is not on internal stop. If rod C deflection, or lever F will not reach wide open position, repeat Step 4.

6. With accelerator pedal depressed until lever B contacts stop and lever D rotated to wide open position, adjust swivel or rod E for free entry into lever D before fixing swivel in lever D.

7. Check adjustment by releasing, then depressing, accelerator pedal. Check lever F for wide open position; if it doesn't reach repeat Step 6.

**Powerglide, Replace**

**1958-59**

1. Drain transmission oil and remove filler pipe.

2. Disconnect oil cooler lines, vacuum modulator hose and speaker hose from fluid line of transmission. Remove line at A.

3. Disconnect cooling lines at transmission.

4. Disconnect control rods at transmission.

5. Remove propeller shaft.

6. Attach suitable transmission lifting device.
Fig. 30 Shift linkage ad- justments for TurboHug Typical of 1959

37. Install engine support bar or crossmember to support engine.
38. Position hydraulic jack under transmission; raise and fasten equipment to transmission.
39. Remove rear engine mountings.
40. Remove three remaining attaching bolts through toe panel opening.
41. Move transmission to rear slightly and install a suitable converter holding tool.
42. Lower transmission on jack and remove from under car.
43. Reverse the order of removal procedure to install the transmission.

TURBOGLIDEx 
For details on this transmission see the TurboHug Chapter.
TURBOGLIDE LINKAGE
1959 Adjustments
Shift Linkage—
1. Check transmission shift linkage for proper adjustment as follows: With engine stopped, remove range selector lever to the position where Drive detent is felt. Slowly release lever to feel if lever lock pin freely enters lock plate. Check Reverse range in similar manner. If lock pin does not enter lock plate freely in both ranges, adjust as follows:
2. Position selector lever in "R." Disconnect shift control rod at its manifold end to the shift control lever on the lower end of the mast jacket by loosening clamp bolt.
3. Place transmission shift control lever in Drive position. Drive detent in transmission is the firstocker under front cover in the fully counterkruve position (Fig. 20).
4. Hold shift control lever (at lower end of mast jacket) against the Drive stop of the range selector lock plate while at the same time adjusting the length of the shift rod for free entry into the shift lever on the mast jacket. With the linkage held in this position, carefully retighten the assembly nut.
5. Test transmission shifts in all ranges.

Throttle Linkage—
1. Disconnect transmission throttle rod from carburetor lever and accelerator rod from carburetor throttle lever.
2. Pull throttle valve rod toward front of car; its full limit of travel, then adjust TV rod swivel for free entry into carburetor throttle lever with lever in wide open throttle position. Secure swivel to lever.
3. Check adjustment by placing carburetor throttle lever in wide open position, then pushing downward (counterclockwise) on transmission throttle valve lever and noting if in carburetor throttle valve rod attached to carburetor throttle lever deflects (transmission rod in internal stop). If rod deflects or carburetor throttle lever will not reach wide open position, repeat adjustment.
4. Position carburetor throttle lever at wide open throttle and with an assistant depressing the accelerator pedal to hold the accelerator pedal lever in contact with the lever stop, adjust swivel on accelerator rod to permit free entry into carburetor throttle lever. Secure swivel to lever.
5. Check for dent feel by depressing accelerator pedal by hand. Dent should be felt before accelerator pedal rod strikes carpet or floor mat.

Neutral Safety Switch—
1. Park shift lever in neutral.
2. Loosen screws securing switch retainer and loosen switch in "Start", adjust position of switch to meet specified overrun.
3. Hold switch in this position and secure screws.
4. Check adjustment by cranking in both directions.

1958 Adjustments
Shift Linkage—Follow instructions as outlined for 1959 models.

Throttle Linkage—
1. Disconnect transmission throttle valve (TV) rod at throttle bellcrank and check TV rod swivel for free entry into carburetor throttle lever.
2. Place wood block 1/4" thick beneath accelerator pedal assembly and measure clearance between wood floor mat and have an assistant hold accelerator pedal fully down to block.
3. Pull transmission TV rod toward front of car its full limit of travel (through detent, and adjust TV rod swivel in housing bolts in throttle bellcrank.
4. Connect TV rod swivel to throttle before with clip, remove block from beneath accelerator pedal rod and check for greatest "feel" by depressing accelerator pedal by hand. Transmission detent should be felt before accelerator pedal rods strikes carpet or floor mat.
5. Read test and adjust to insure that stall high angle is achieved at full throttle.

Neutral Safety Switch—This adjustment is described in the same manner given for 1959.
POWERGLIDE
For Linkage Adjustment See Car Chapter

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1950-52 Powerglide

This transmission consists of a combination torque converter and auxiliary gearbox. The converter constitutes a complete transmission within itself, the gearbox being used solely for the purpose of providing a neutral position, a reverse gear, a parking brake, and a rarely used emergency low gear. During practically all actual driving, the gearbox is inactive.

The torque converter consists essentially of a primary pump, a secondary pump, a turbine, primary and secondary stators (required) and an overrun coupling. The overrun coupling is included in the torque converter to facilitate engine braking and starting of the engine by pushing the car.

The planetary unit and clutch in the gearbox, provide reverse and an emer-
"In Car" Repairs


![Diagram of oil pressure check points](image)

Transmission In High Range

<table>
<thead>
<tr>
<th>Pressure</th>
<th>Light</th>
<th>Turn</th>
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OIL PRESSURES, 1950-54

Pressure tests will reveal the cause of slippage as well as several other conditions or improper operation. Pressure gauge should be connected to the oil pressure switch. Low pressure (less than 60 psi) indicates a low oil level, poor bearing lubrication or a loose oil pan. High pressure (over 90 psi) indicates a low oil level, poor bearing lubrication or a loose oil pan. Reduced oil pressure may also be caused by a clogged oil filter.

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Drive Range

1. Adjust hot engine idle speed to 430-450 rpm.
2. Place selector lever in "D", and check idle pressure which should be 40-65 psi.
3. Increase speed to about 10 mph and note pressure; then load engine several times by partially applying the brakes while maintaining 10 mph. If vacuum modulator is operating properly, pressure will rise each time. If pressure drop is excessive, check vacuum lines for leaks. If vacuum leaks are found, the trouble is in the vacuum modulator.
4. Apply brakes and accelerate engine to about 25 mph (1500 rpm). Pressure should be 70-110 psi.

Rev. Servo

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OIL PRESSURES, 1955-59

All pressures given in the tables below may vary approximately 2% (higher or lower) from the means pressure shown. Location of the pressure take-off points are shown in Figs. 1 and 2.

For 1955-56 Models

- All models are equipped with a hydraulic clutch. The clutch is actuated by oil pressure.
- Pressure from the oil pump is supplied to the clutch actuating mechanism.
- When the clutch is applied, oil pressure is transmitted to the transmission case and to the differential.
- Oil pressure is also supplied to the rear axle differential.

Charging Oil

- The oil pressure gauge is connected to the oil line going to the transmission case. The oil pressure gauge should read 20-40 psi when the engine is running at idle speed.

Note: The oil pressure gauge should read 20-40 psi when the engine is running at idle speed. If the oil pressure is low, check the oil pump, oil filter, and oil pressure gauge for leaks or damage.

Maintenance

- Oil pressure should be checked before and after each oil change.
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In Car" Repairs

![Diagram of oil pressure check points](image)

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<td>85-95</td>
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<tr>
<td>Governor</td>
<td>Fig. 4</td>
<td>Fig. 4</td>
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<tr>
<td>Throttle Valve</td>
<td>Fig. 4</td>
<td>Fig. 4</td>
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Transmission In Low Range

<table>
<thead>
<tr>
<th>Pressure</th>
<th>Light</th>
<th>Turn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmit.</td>
<td>10 MPH</td>
<td>45 MPH</td>
</tr>
<tr>
<td>Clutch Apply</td>
<td>85-95</td>
<td>85-95</td>
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<tr>
<td>Governor</td>
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<td>Throttle Valve</td>
<td>Fig. 4</td>
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**BANDS ADJUST**

**Low Band, 1953-59**

It is essential that the low servo piston design used in a specific transmission be identical to the low servo piston construction dictated by the low band adjustment required. Fig. 8 shows the differences in design between the two types. With the servo cover removed, positive identification of the "apply spring" retaining ring will enable the low band retaining ring to be installed. After determining that the band is properly seated, the low band gap may then be adjusted as follows (see Fig. 9).

1. Remove servo adjusting screw 5 to 7 lb. ft.

2. Back off adjusting screw three complete turns if piston has no apply spring, or two complete turns if piston with apply spring. 90° is measured at back-off and is specified—not approximately.

**Low Band, 1950-52**

Tighten the low band adjusting screw down tight and back off three complete turns and tighten lock nut.

**Reverse Band, 1953-59**

As a means of obtaining a more precise measurement of the reverse band, it is recommended that a predetermined measurement of required reverse band piston travel be used to calculate the necessary reverse band adjustment. The procedure is as follows:

1. Pull reverse brake drum to center it in the reverse band. Then tighten the adjusting screw until all and play between the linkage and the band is removed without compressing the band. Fig. 7. This adjustment should provide a reverse piston travel of 5/8 to 3/4" from the retracted to the applied positions. To check the adjustment:

1. Measure distance from face of reverse piston outward to side of case with piston in its retracted (reversed) position with a scale rule. Record this dimension.

2. Pull reverse piston outward to full travel by grasping its hub with a pair of pliers. Again measure the distance from the face of the piston to the outboard side of the case. Record this dimension.

3. Subtract one dimension from the other; the difference will be the piston travel, which should be 5/8 to 3/4".

4. If the travel is too great, tighten adjusting screw one notch. If travel is too little, back off adjusting screw one notch.

5. When correct adjustment is obtained, tighten adjusting screw lock nut 20-28 lb. ft.

**Reverse Band, 1950-54**

Using one hand to turn down the adjusting screw, Fig. 7, check and play in linkage by applying reverse servo return spring. If not correct, sometimes turning down adjusting screw slowly until and play, or full by hand and piston assembly, is taken up. Then back off adjusting screw 1/4 to 1/2 turn and tighten lock nut snugly.

This is a sensitive adjustment and must be done carefully. When used, the movement of the piston is just taken up, and before backing off the adjusting screw, the band must be free on the drum so that the drum can easily be rotated by hand.

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**POWERGLIDE**

**Fig. 3** Low servo piston. Apply spring design is used on all 1952-57 and late production 1958-59.

**Fig. 4** Governor graph. 1955-58

**Fig. 5** Adjusting reverse servo

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Repairs Requiring Transmission Removal

TRANSMISSION, DISASSEMBLE
1950-52

1. Place transmission in fixture.
2. Remove right side cover and all upper section screws.
3. Install turbin housing retaining strap to tur-
   bine, attaching by means of bolt to one of flywheel flanging boles. This is
   necessary to hold unit stationary while housing turbin cover retain-
   ing bolts.
4. After all retaining bolts have been re-
   moved, screw three 10-32 x 1-1/2" screws into three tapped holes in
turbin cover to loosen and remove cover and turbin assembly; Fig. 8.
5. Remove primary and secondary sta-
   tions as a unit, and test valves for
   slipage, rotating by hand. The over-
   running clutch mechanisms should
   allow rotation in one direction only.
6. Check secondary pump free wheel-
ing clutch as in Step 5.
7. Remove converter retaining ring and
   washer.
8. Slide primary pump from stator sup-
   port and remove. Examine possible
   damage to bearing surface.
9. Remove modulator. When remov-
   ing modulator cover, be careful as
   hydraulic plunger and body does not
   fall out and become damaged.
10. Remove servo cover and gasket. Re-
    move servot spring and pressure regu-
    lator springs until pressure against
    this cover. Cover should be tested
    when cover is removed to determine
    pressure against cover to eliminate
    possible cover breakage.
11. Remove reverse servo spring and
    pressure regulator springs and valve,
    Fig. 9. Install this valve carefully
    and log angle of reverse damage.
12. Loosen low band adjusting screw
    lock nut and tighten low band ad-
    justing lever to hold clutch in place.
13. Unfasten transmission from turbin
    housing and carefully separate these
    parts.
14. Remove manual valve from valve
    body, Fig. 10, and manual valve lever
    from turbine housing. Remove
    thrust washer from valve body.
    Then remove body and gasket.
15. Install new pump driven tool, Fig.
    11, and remove pump from turbine
    housing.
16. Loosen low servo adjusting screw
    and remove transmission input shaft
    and clutch from transmissio.
17. Back off adjusting screw and re-
    move low servo band and ring as-
    sembly, low servo piston and release
    spring.
18. Remove retainer bolt, lockwasher
    and universal joint yoke washer and
    sleeve. Universal front yoke off outlet
    shaft.
19. Using soft hammer, tap on end of
    output shaft to remove planet carrier
    from case when remove reverse valves
    down.
20. Loosen reverse servo lock out, back
    off adjusting screw and remove re-
    verse servo band and piston.
21. Take off rear pump and gasket.
22. Using tool J-6211, Fig. 12, engage
    packing lock pawl spring and rotate
    spring to release pawl from case. Re-
    move spring and packing lock pawl.
23. Remove transmission packing lock
    lever and steel washer. Then re-
    move parking lock lever shaft and
    apply spring from case.
24. Remove lubrication check valve
    parts of which are shown in Fig. 12.

1953-59

1. Remove converter assembly.
2. Remove right side cover and gasket,
   and oil pump suction screen.

Fig. 8 Removing turbine and cover
assembly. 1950-52

Fig. 9 Removing pressure regulator valve

Fig. 10 Removing manual valve

Fig. 11 Removing rear oil pump

Fig. 12 Removing parking lock pawl

Fig. 13 Lubrication check valve parts
Fig. 14 Removing low and drive valve body. 1953-59

Fig. 15 Removing lubrication pressure relief valve. 1953-55

Fig. 16 Installing secondary pump to primary pump hub. 1950-52

1. Remove transmission Low and Drive valve body assembly, Fig. 14, and gasket. The thrust valve control outer lever assembly should not be removed at this time so it retains the thrust valve inner lever assembly to cover.

2. Remove modulator assembly and gasket. When removing the modulator housing be careful modulator pistons do not fall out and become damaged.

3. Remove actuator cover and gasket. Reverse spring, pressure regulator valve springs and low servo piston return spring cotter pin. Against this cover; therefore, care should be taken when this cover is removed to maintain a pressure so as to eliminate possibility of cover breakage.

4. Remove reverse servo spring and pressure regulator valve springs and pressure regulator valve. Remove valve carefully and lay it aside to prevent damage.

5. Remove low band adjusting screw cover, loosen adjusting screw, lock nut, and tighten adjusting screw to hold clutch assembly in place.

6. Working from inside converter housing, remove converter housing to transmission case self-locking bolt.

7. Remove bolts and carefully separate transmission from converter housing. Take off valve body to transmission case gasket.

8. Remove manual valve from valve body and manual lever from converter housing. Also remove the reverse thrust washer from the valve body oil delivery sleeve.

9. Remove valve body and gasket from converter housing.

10. Remove pump from converter housing.

11. Back off low servo adjusting screw and remove transmission band shaft, clutch assembly, and low servo gear thrust washer from transmission.

12. Remove low servo band, strut, low servo piston and its return spring.

13. Remove speedometer driven gear.

14. Remove governor cover and gasket.

15. Remove governor, allowing it to turn in a clockwise direction when removing it from the bore.

16. Engage parking lock pawl, spring and bushing from case. Remove spring and lock shaft and bushing.

17. Remove parking lock lever and steel washer.

18. Remove parking lock lever shaft and oil seal from case.

19. Install removing and replacing tool J-808 to the planet carrier output shaft and to the rear face of the transmission case. This tool was originally designed for the 3-speed transmission but should be remodeled so it will work on Powerglide.

20. Then pull off bolts clockwise to form the planet output shaft out of rear housing. Disconnect tool from output shaft and case and remove planet carrier through front of case.

21. Remove reverse brake drum.

22. Using tool J-277, loosen reverse servo adjusting screw, back off adjusting screw and remove reverse brake band and reverse servo piston.

23. Remove rear pump and gasket from transmission.

24. Remove lubrication pressure relief valve, Fig. 13.

CONVERTER REPAIRS 1950-52

Primary Pump

Disassembly:

1. Remove stator case thrust snap ring and thrust washer.

2. Rotate secondary pump in clockwise direction and withdraw from primary pump.

3. Remove overrun cam roller and spring retainer and remove cam rollers, spring retainers, springs and overrun cam thrust washer.

Inspection:

1. Wash and dry all parts.

2. Inspect cam rollers for scoring or galling.

3. Inspect cam roller springs for dis-

Fig. 17 Use of handling tool for assembly picture. 1950-52

Fig. 18 Layout of turbine pump. 1950-52

Fig. 19 Use of gear housing tool for assembly picture. 1950-52

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tortion, and spring retainers for excessive wear or damage.
4. Suspect inner and outer primary pump hub for galling or scoring and inspect nitriding for excessive wear.
5. Check primary and secondary pump valve for looseness or damage.

Assembly:
1. Assemble overrun cam roller and spring retaining so that probe on retainer fits in the rear.
2. Assemble cam rollers, spring retainers and springs in case pockets.
3. Install overrun cam thrust washer, holding retainer on opposite side of thrust washer not pushed out of position.
4. Ensure housing bolt 1-3/16 in. torque the bolt finger tight and do not overtighten, Fig. 16, and rotate secondary pump in clockwise direction and lock with cam rotated in a counterclockwise direction.
5. Remove housing tool and install stator race thrust washer and snap ring.

Stators

Disassembly:
1. Remove stator race thrust snap ring and thrust washer.
2. Rotate secondary stator clockwise and remove from stator race. Then carefully rotate stator race and remove from primary stator. Caution—Describe care when separating parts so that cam rollers and springs may not become lost.
3. Remove cam roller and spring retainer from secondary and primary stator and remove cam rollers, springs and retainers. Cam thrust washers, springs and spring retainers only are interchangeable.

Inspection—Inspect these parts for same conditions as outlined for primary pump.

Assembly:
1. Install cam roller and spring retainer to secondary stator. Secondary stator roller and spring require long tabs to accommodate long rollers.
2. Install cam rollers, springs and spring retainers. In assembly of spring retainers, curvature of retainers must follow curvature of hub.
3. Install overrun cam thrust washer.
4. Install cam roller and spring retainer to prinzipy stator.
5. Install cam rollers, springs and spring retainers, being sure that curvature of retainers follow curvature of hub.
6. Install overrun cam thrust washer.
7. Carefully inspect stator housing Fig. 17, as stator race and primary stator over tool with cold stator race with thrust washer down.

Carefully rotate stator in free spin direction (clockwise) to eliminate possibility of pushing cam rollers out of position.
8. Carefully rotate secondary stator over housing and with thrust washer down and unto spring snap ring, be careful not to dislodge cam roller.
9. Install housing thrust washer and snap ring.
10. Check operation of stators. Turn shows free wheel in clockwise direction and back to stator races in other direction.

Turbine

Disassembly—Fig. 18.
1. Remove "O" ring from cover.
2. Remove turbine bolt with washer, flat washer and cotter pin.
3. Lift turbine cover from turbine end.
4. Bend down ears of lock plate and remove three turbine hub-to-turbine capscrews.

Fig. 17 Exploded view of torque converter, 1953-59

Fig. 20 Removing converter cover housing. 1953-59

Fig. 21 Curvature of spring retainers. 1953-59

Fig. 22 Use of loading tool to assemble stator. 1953-59

Fig. 18 Disassembly of stator.
5. Remove turbine hub and bolt from turbine.
6. Remove turbine bolt and two thrust washers from hub.
7. Remove "O" ring from turbine bolt.

Inspection—
1. Clean all parts in solvent and air dry.
2. Inspect turbine bolt, hub and thrust washers for excessive wear or scoring.
3. Inspect turbine blades for looseness or damage.

Assembly—Fig. 18
1. Install new "O" ring on turbine bolt.
2. Install thick thrust washer to turbine, indexing ribs with locating holes in turbine.
3. Install turbine bolt.
4. Install thin thrust washer to turbine hub and install hub over bolt, indexing ribs with locating holes in turbine.
5. Install lock plate and three turbine hub-to-turbine capscrews, tighten securely and lock.
6. Install turbine cover over turbine bolt.

7. Install slotted washer over turbine bolt, indexing temples with locating holes in split. Then install flat washer and nut, tighten securely and lock with outer hex.
8. Install new "O" ring on turbine cover.

CONVERTER REPAIRS

1953-59

Disassembly, Fig. 19
1. Remove converter cover bolts and, with a small pinch, drive two split dowel pins out of converter cover.
2. Remove cover, turbine, stator, stator thrust washers and converter pump thrust washer.
3. Remove thrust washer from turbine hub.
4. Remove "O" ring seal from converter cover.
5. Remove stator race from stator.
6. Remove snap ring and over-run cam retaining thrust washer. Exercise care when separating the parts so that the cam rollers, springs and guides do not become disengaged from the stator hub and become damaged.
7. Remove snap ring and the over-run cam roller and spring retainer. Exercise care that the cam does not become disengaged from the stator hub and become damaged.

Inspection
1. Wash all parts in cleaning solvent. Do not use rags to dry parts; use air.
2. Inspect converter pump hub cover and outer surface for galling or scoring.
3. Inspect converter pump thrust washer for galling or scoring.
4. Check converter pump vanes for looseness or damage.
5. Inspect turbine hub and thrust washer for galling or scoring.
6. Check turbine vanes for looseness or damage.
7. Inspect converter cover bushing for galling, scoring or excessive wear.
8. Inspect stator race and cam rollers for galling or scoring.
9. Inspect cam springs for distortion and spring guides for excessive wear or damage.

10. Inspect over-run cam thrust washer and cam roller and spring retainer for excessive wear or damage.
11. Inspect stator thrust washers for galling, scoring or excessive wear.
12. Inspect stator vanes for looseness or damage.

Converter Cover Bushing. Replace—A precision type converter cover bushing, part number 3700276, should be used for field service replacement. The bushing will not require reaming after installation. Should the converter cover bushing, during an overhaul inspection show evidence of being galled, scored or excessively worn, it may be replaced easily and accurately using the following procedures:

Insert the cover bushing remover, tool J-5841, in bore of bushing and turn pulley screw clockwise, Fig. 20. Place the new bushing on pin and of the bushing remover, tool J-5842, and press bushing into position.

Assembly
1. Assemble over-run cam roller and spring retainer to stator so that the journals of the stator are pointed toward the rear of the stator. In-
stall retaining snap ring, making sure it is properly seated in groove. The front of the stator can be identified by the vanes, which are thicker at the front than they are at the rear. The word “Front” are also cast on the stator.

2. Assemble cam rollers, springs and guides in cam pockets. Spring guides are curved and this curvature should fit curvature of unit, Fig. 8.

3. Install over-run cam thrust washer and retaining snap ring. Be sure snap ring is properly seated in its groove.

4. Coat stator race and bearing tool, J-5006, with a light film of oil. Then place stator race on pilot end of loading tool and carefully rotate stator over tapered end of loading tool and stator race, Fig. 22. Carefully rotate stator in free wheel direction (clockwise) to eliminate possibility of dislocating cam rollers.

5. Check operation of stator. It should freely wheel in clockwise direction when viewed from the front.

6. Place converter pump on bench.

7. Install thrust washer to converter pump hub, being sure tabs are engaged in notches of the hub flange.

8. Assemble both thrust washers to stator and install to converter pump as an assembly. Be sure that the cut-outs in the over-run cam roller and spring retainer are facing upward, toward the turbine.

9. Install thrust washer on turbine hub and assemble turbine to converter pump.

10. Install new "O" ring seal on converter cover.

11. Align dowel pin holes in converter cover and drive pins in pump and install converter cover.

12. Install pump-to-cover attaching bolts and lock nuts, tightening them to 18-18 lbs. ft. torque.

**CLUTCH, 1950-52**

**Disassembly, Fig. 23**

1. Remove clutch flange retaining ring and release.

2. Remove low sun gear and clutch.
Inspection
1. Wash all parts in cleaning solvent and air dry.
2. Inspect drum brake band surface for excessive scoring or burning.
3. Also check drum for scoring.
4. Check brake valve for free operation and see that valve is not bent or damaged in any way.
5. Check fit of clutch flange in drum slots. There should be no perceptible radial play between these two parts. Also check low sun gear for noise or bore.
6. Check clutch plate for burning or metal pickup. Also check to see that composition plates are a free fit over clutch hub and that steel plates are a free fit in clutch flange.

Clutch Relief Valve, Replace
1. With a sharp chisel, cut inside of relief valve spring retainer rivets. With a small punch, drive rivets out of drum and remove valve spring and valve.
2. Install new relief valve, spring and two new rivets.
3. Carefully support drum and peen over ends of rivets securely.

Assembly
1. Install new piston outer seal ring on clutch piston, being careful not to stretch seal. Lip of seal should be installed so that it is toward oil pressure side of piston.
2. Install new piston inner seal ring on inner hub of clutch drum with lip of seal toward bottom of piston pocket.
3. Place small amount of transmission oil on inner diameter of clutch drum and on seals. Then carefully install piston into clutch drum, using a piece of feeler stock to insure seating of outer ring seal in clutch drum. Fig. 27.
4. Install clutch spring and spring seat. Place unit in press and, using tool J-554, compress spring and install snap ring. When compressing spring, be careful spring seat does not hang up or snap ring groove which will cause damage to groove.
5. Place clutch plate in clutch flanges and inner hub of clutch drum and then the outer hub plate. Alternately start with a steel plate. Steel plates are dipped and must be installed with the dished side toward the low sun gear and clutch flange.
6. Install clutch drum over clutch flanges, insert and install clutch flange retainer and flange retainer screw. Fig. 28.
7. Check end play with feeler gauge between clutch flanges drive hub and drive slot in drum. Fig. 29. Maximum allowable end play is .012".
Retainer rings are available in three sizes in .170", .200" and .220" to control end play of sun gear and clutch flanges in drum.

CLUTCH, 1953-59
Disassembly, Figs. 27 to 29
1. Remove clutch flange retainer ring and retainer.
2. Remove low sun gear and clutch flange from clutch drum.
3. Remove clutch hub thrust washer, hub and clutch plates from clutch drum.
4. Place clutch drum in bench press and install piston ring compression tool, J-5133, to compress clutch release spring.
5. Remove clutch spring snap ring. Release pressure slowly and remove clutch spring seat and spring.
6. Forskilly roll the clutch drum, face down, on a wood surface to remove clutch plate.
7. Remove outer ring seal from piston.
8. Remove piston inner ring seal from hub of clutch drum.

Inspection
1. Wash all parts in cleaning solvent and air dry.
2. Inspect drum brake band surface for excessive scoring or burning. Also check drum for scoring.
3. Check steel ball in clutch piston that acts as a relief valve. Be sure that it is free to move in the hole and that the orifice leading to the rear of the piston is open.
4. Check fit of clutch flanges in drum.
1. Check diaphragm spring for distortion or loss of tension.
2. Check diaphragm for cracks or breaks that would cause leaks.
3. Inspect outer cover for cracks.
4. Inspect hydraulic passages for leaks and make sure they operate freely in modulator cover.

Assembly
1. Place assembly tool J-2388 in hydraulic bore of modulator. Place diaphragm in position and place spring on diaphragm.
2. Install two 10-24 x 3" guide pins (part of Pilot Stud Set J-2347) and install modulator cover. Install screws and tighten securely.
3. Install hydraulic passages with cover toward modulator lever and diaphragm.

1958-59
The vacuum modulator is installed in the servo cover. Fig. 33, see Servo Cover for modulator exact alignment procedure.

SERVO COVER, 1950-54
Disassembly
1. Remove bio-metal strip retaining screw, strip and retainers from cover, Fig. 74.
2. Remove lubrication by-pass ball plug and copper gasket. Remove spring and ball from cover.
3. Remove cover by cleaning solvent and blow out all oil passages.

Inspection
1. Inspect cover for cracks or leaks which would result in oil leaks.
2. Inspect by-pass ball spring for distortion.
3. Inspect modulator control lever for free operation. It is important that this lever does not bind on side pin.

Assembly
1. Install by-pass ball in servo cover.
2. Install by-pass ball seating.
3. Using new plug gasket, install plug and tighten BODY.
4. Install bimetal strip retainers, strip and retaining screw and tighten securely.

1955-57

To disassemble, remove booster valve parts and wash all passages. Wash all parts in cleaning solvent and blow out all passages.
- Using a small pump and working through opening in by-pass disc seat, exert pressure to be sure there is evidence of damage.
- When assembling, do not press down on the booster valve sleeve as the sleeve has been properly located by the servo cover bossing.

1958-59

To disassemble, Fig. 38, remove the pressure regulator reverse booster valve unit. Wash all parts and clean out all passages. Wash all parts in cleaning solvent and blow out all passages.
- Wash the servo cover, before tightening the cover bolts, the vacuum modulator being in the servo cover and modulator strut hole in the transmission case must be carefully cleaned. Failure to do so can cause the modulator strut to bind, resulting in improper pressure, harsh shifts and possible clutch failure. The following alignment procedure is recommended:
  1. Cut the hex-headed threaded fitting from the end of the disassembled vacuum modulator and screw the fitting into the modulator strut hole in the cover.
  2. Insert a shaft of a 1/16" drill through both the hole in the fitting and the strut hole in the transmission case. The rod should slip freely through the two holes if alignment is correct. If not correct, shift by tapping the threads of the screw cover with a soft hammer.
  3. When alignment is correct, tighten all servo cover bolts to a torque of 15-20 lb. ft., then remove the threaded fitting and drill, and install the strut and vacuum modulator.

**FRONT PUMP, 1950-52**

**Disassembly, Fig. 37**

1. Remove stator support from pump body.
2. Remove pump gears from body.
3. Remove pump seal ring.
4. Remove "O" ring from pump body.

**Inspection**

1. Wash all parts in cleaning solvent and blow out all oil passages.
2. Inspect pump gears for nicks or damage.
3. Inspect drive gear oil ring and all ring groove. Make sure ring is free of burrs and is free in ring groove. Also inspect ring in pump body bore and make sure holdout ring ends have clearance.
4. Inspect stator support pump face for nicks or scoring.
5. Inspect pump body for nicks or scoring.
6. Inspect pump body oil seal for excessive wear or damage or evidence of leakage.
7. If oil seal is damaged or in leaking, pry out and install new seal.
8. Wash parts clean and dry, install pump gears and check. (A) Clearances between outside diameter of gear and body should be 005-008".
   (B) Backlash of gears should be 0.015-0025".
9. Install new "O" ring in pump body.
10. Remove gears from body, install oil pump seal ring, oil gears generously with transmission oil before assembly into body. Drive nuts on drive gear protrude through oil seal.
11. Assemble stator support through drive gear aligning attaching bolts.

**1953-59**

**Disassembly, Fig. 38**

1. Remove stator support from pump body.
2. Remove pump gears from body.
3. Install new "O" ring in pump body.
4. Wash parts clean and dry, install pump gears and check.

**Inspection**

1. Wash all parts and air dry.
2. Inspect pump gears for nicks or damage.
3. Inspect stator support pump face for nicks or scores.

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REAR PUMP, 1950-52

Disassembly. Fig. 40
1. Remove two flat sheeted head screws and remove pump body plate.
2. Remove pump gears, wash all parts in cleaning solvent and blow all oil delivery hoses.

Inspection
1. Inspect rear bearing for roughness by rotating by hand.
2. If bearing is rough, remove three retaining screws and take out old bearing.
3. Press new bearing into place and install cap screws.
4. With parts clean and dry, install pump gears and check clearances in same manner as outlined in Step 6 for front oil pump.

Assembly
1. Remove gears from body and oil generously with automatic transmission oil.
2. Assemble gears to body.
3. Install pump body plate and secure with two flat sheeted head screws.

1953-59

Disassembly—Remove two slotted flat head screws and remove pump body plate. Remove pump gears, wash all parts, blow out all oil delivery holes and inspect all parts for damage. Install gears and check clearances which should be the same as in the front pump.

Assembly—Remove gears from body and install generously with automatic transmission oil. Assemble gears to body, install body plate and tighten screws to Fig. 41. Note: torque.

1958-59 Service Note
A hollow bolt has been added to the 1958 transmission. This bolt is mounted in the top rear pump-to-case hole. The bolt is used for venting purposes to facilitate the addition of oil. The dipstick markings of “add” and “full” are 2½ quart apart, and some transaxles without the hollow bolt were taken off one pint to change the oil level for "add" to "full". Subsequent running, of course, brought the level down to midway between the marks on the dipstick.

VALVE BODY, 1950-52

Disassembly. Fig. 42
1. Remove accumulator special snap ring.
2. Remove accumulator valve spring, washer, valve spring and valve.
3. Remove accumulator valve body and platen from bore.
4. Remove accumulator inner and outer pistons and gasket, top from pump bore.
5. Remove two clutch drum oil seal rings.
6. Remove pressure relief valve.
Fig. 43 Installing oil seal rings. 1950-52

Inspection
1. Wash all parts in cleaning solvent, air dry and blow out all oil passages.
2. Inspect valve body for scoring and make sure fibre valve operates freely.
3. Check body to be sure that it operates freely.
4. Check piston for scoring and make sure it operates freely in valve body bore.
5. Check valve for scoring and make sure it operates freely in accumulator body bore.
6. Check ring in bore.
7. Check oil seal rings for nicks or burrs and make sure they are free in ring grooves. Also install rings in clutch drum bore and make sure hooked ring ends have clearance.

Assembly
1. Install piston inner and outer springs and piston way in valve body bore.
2. Install accumulator piston, making sure that it seats over inner and outer springs.
3. Install valve body into its bore.
4. Install accumulator valve into accumulator valve body bore and install accumulator valve spring.
5. Install accumulator valve spring washer, compensating spring and install special snap ring, making sure it seats in groove.
6. Install pressure relief valve assembly.
7. Install two clutch drum oil seal rings, Fig. 43.

VALVE BODY, 1953-54

Disassembly, Fig. 44
1. Using pliers 2-4245, remove accumulator special snap ring.
2. Remove accumulator valve spring washer, spring and valve.
3. Remove valve body and piston.
4. Remove inner and outer springs and piston stop from bore.
5. Remove clutch hub servo valve from body.
6. Place valve body face down on two wood blocks of equal thickness and, with a small pin punch, drive the pressure regulator governor valve retaining pin from valve body.
7. Remove pressure regulator governor valve spring and valve.
8. Using a small pin punch, drive the accumulator pressure regulator valve retaining pin from valve body and remove spring and valve.
9. Remove two clutch drum oil seal rings.

Inspection
1. Wash all parts, air dry and blow out all oil passages.
2. Inspect accumulator valve body for scoring and make sure fibre valve operates freely.
3. Check accumulator body in valve body bore to see that it operates freely.
4. Check accumulator piston for scoring and make sure it seats in valve body bore.
5. Check accumulator valve for scoring and make sure it operates freely in accumulator body bore.
6. Check springs for distortion.
7. Inspect clutch hub servo valve and make sure helical valve operates freely.
8. Inspect converter pressure regulator valve spring for distortion.
9. Inspect converter regulator valve for scoring and seating.
10. Check converter pressure regulator
11. Inspect pressure regulator governor valve spring for distortion.
12. Inspect pressure regulator governor valve spring for galling or scoring.
13. Check pressure regulator governor valve and make sure it operates freely in valve bore.
14. Check oil seal rings for nicks or burrs and make sure they are free in the ring grooves. Also install rings in clutch drum bore and make sure hooked ring ends have clearance.

Assembly
1. Install accumulator piston inner and outer springs, and piston stop in accumulator piston. Then install piston in valve body.
2. Install accumulator valve and spring in valve body.
3. Install accumulator valve body in valve body bore.
4. Install accumulator valve spring washer, compress and install special snap ring, making sure it is properly seated in groove.
5. Install catch lower servo valve.
6. Place valve body face down on wood blocks.
7. Assemble spring to converter pressure regulator valve and install assembly. Install retaining pin. Do not confuse the converter pressure regulator valve spring with the pressure regulator governor valve spring. The converter spring is longer and has a longer leg.
8. Assemble spring to pressure regulator governor valve and install assembly in valve bore.
9. Install two clutch drum oil seal rings.

1955-57
Disassemble, Fig. 45
1. Use needle nose pliers to remove the forced downshift cushion valve rea-
tainer from valve body.
2. Remove forced downshift cushion valve from bore.
3. Using needle nose pliers, remove the closed throttle downshift cushion valve retainer from valve body and remove spring and valve from bore.
4. Place valve body face down on two wood blocks of equal thickness and with a small punch drive out the converter pressure regulator valve retaining pin and remove spring and valve from bore.
5. Remove two clutch drum oil seal rings from oil delivery sleeve.
6. Remove front and rear pump check valve.

Inspection
Wash all parts and air dry. Check all springs for distortion or damage. Check all valves for nicks, burrs, scoring or galling. Also see that they are free in their respective bores. Check all oil seal rings for damage and make sure they are free in the ring grooves.

Assemble
Reassemble the parts in the reverse order of their removal. Do not confuse the forced downshift cushion valve spring with the closed throttle downshift cushion valve spring. This forced downshift spring is the longer of the two and is of heavier gauge wire.

The interlocking type cast iron rings in this transmission are easily removed from, or installed in, their grooves by applying pressure to the ring with the index finger and thumb at the proper points.

1958-59
Disassemble, Fig. 46
1. Remove hairpin from vacuum modu-
lator valve and remove valve.
2. Place valve body face down on two blocks of wood and with a punch drive out the converter pressure regulator valve retaining pin; remove spring and valve.
3. Remove two clutch drum oil seal rings from oil delivery sleeve.
4. Remove front and rear pump check valve.
5. Remove pressure regulator valve and spring.
6. Remove manual control valve.

Inspection
Wash all parts and air dry. Check all springs for distortion or damage. Check all valves for nicks, burrs, scoring or galling. Also see that they are free in their respective bores. Check all oil seal rings for damage and make sure they are free in the ring grooves.

Service Note
The downshift timing valve must not be removed from the case. Replacement is neces-
sary as indicated by poor coast down-
shift. However, all linkage adjustments should be checked before it can be deter-
mined that the downshift timing valve is faulty. If necessary to replace the downshift timing valve, pry the old valve out with a small pin punch, using care not to damage its bore. To install, use an arbor press and an A socket and press the new valve in the bore until the lip on
LOW & DRIVE VALVE BODY, 1953-59

Inspect
1. Wash all parts, air dry and bear out all oil passages.
2. Inspect detent valve, spring and throttle valve spring, regulator and throttle valve for nicks, bumps, scoring or galling.
3. Check spring and throttle valve for free operation in their respective bores.
4. Check throttle valve spring regulator for free operation in opening of detent valve.
5. Inspect detent valve spring and throttle valve spring for distortion.
6. Inspect low and drive regulator valve stems and valve for nicks, burrs, scoring or galling.
7. Check low and drive regulator valve for free operation in valve sleeve.
8. Check low and drive regulator valve sleeve and valve for free operation in their respective bores.
9. Inspect low and drive valve inner and outer springs for distortion.
10. Inspect drive exhaust primary and secondary control valves for nicks, burrs, scoring or galling.
11. Check clutch exhaust primary and secondary control valves for nicks, burrs, scoring or galling.
12. Inspect clutch primary and secondary control valve springs for distortion.
13. Inspect throttle valve inner lever shaft for scoring or galling and the lever boss being right on the shaft.
14. Check throttle valve inner lever shaft for free operation in the bore in the side cover.
15. Inspect detent valve sleeve in side cover for distortion or damage. Replace with new stop if necessary.
16. Inspect boiling pist in valve body and side cover for distortion or damage. Replace with new pist if necessary.
17. Inspect mating surfaces of valve body and side cover to be sure they are free from nicks or burrs.

Assembly
1. Install detent and drive valve in valve body bore. The valve must be seated to the bore to prevent damage to the bore. This can be accomplished with a piece of tubing. Insert it into the valve sleeve bore, in the rear of the valve body, stretching the fit in the run of the shaft in the opening of the tubing. Then slowly move the valve into its proper position.
2. Install low and drive regulator valve and spring in valve body bore.
3. Assemble low and drive regulator valve and spring and cap to the valve sleeve. Then install as an assembly in the valve body. Be sure inner spring is properly seated on sleeve.
valve assembly into valve body and install retainer with snap ring pliers. Be sure retainer is properly seated in six grooves in valve body.
5. Install clutch exhaust primary control valve. Then install the spring and stop in clutch exhaust primary control valve. Do not install the primary control valve into stop and spring with the secondary control valve stop and spring. The primary stop is longer and the primary spring is shorter.
6. Assemble clutch exhaust secondary control valve spring and stop to piston. Then install this assembly in the valve body.
7. Install throttle valve spring and valve in valve body.
8. Place low and drive body end plate in position and install attaching screws and lockwashers, tightening screws to 1-1/2-2 ft. lbs. torque. Apply pressure on end plate while tightening screws to assure proper installation.
9. Install clutch exhaust cover plate and tightening attaching screws to 2-1/2-3-1/2 ft. lbs. torque.
10. Install throttle valve spring regulator, being sure it is seated on the throttle valve spring.
11. Install detent valve spring seat in the valve body, threading the pin of the throttle valve spring regulator through the opening in the detent valve spring seat.
12. Install detent valve spring and valve, threading the pin of the throttle valve spring regulator through the opening in the detent valve.
13. Place the side cover in a vise face up. Align the locating pin hole in valve body and locating pin in side cover. Front pressure on the valve spring provides tension on the locating pin and causes the locating hole and the locating pin to be compressed. Rotate the valve counter-clockwise until the locating pin in the valve body enters the locating hole in the side cover. Be sure that the face of the detent valve is resting against the detent valve stop pin in side cover.
14. Install low and drive body attaching bolts and lockwashers, tightening bolts to 3-1/2-4-1/2 ft. lbs. torque.
15. Install throttle valve inner lever to side cover. Install new seal over shaft and into counterbore in cover. Then install shield.
16. Install throttle valve control outer lever on inner lever shaft.
17. From the underside, install outer lever attaching bolt, washer and nut and tighten securely.

THROTTLE VALVE INNER LEVER, ADJUST, 1953-59

If new throttle valve parts have been installed, the throttle valve should be readjusted. It has two settings and the procedure is as follows:
1. Rotate the throttle valve inner lever until it just contacts the face of the detent valve. Hold the lever in this position and turn adjusting screw "A", Fig. 69, until it just contacts the flat surface of the stop in the lever. Back off one complete turn and lock in this position by tightening the lock nut securely.
2. Place throttle valve inner lever positioner gauge, J-5315, Fig. 69, between the face of the detent valve and throttle valve inner lever. Hold in this position and turn adjusting screw "B" until it contacts threaded body of adjusting screw "A". Tighten lock nut securely.

GOVERNOR, 1953-59

All the components of the governor assembly, Fig. 96, with the exception of the oil seal rings on the governor sleeve, are of a select fit and each assembly is calibrated. Therefore, the only part
Disassembly

1. Cut off one end of each of the governor weight pins and remove pins, thrust cap, weights, and valve from sleeve. The diameter of the pins should be measured with a micrometer after their removal as the same gauge pins were used to assist when reassembling, otherwise the operation of the assembly will be upset.

2. Remove oil seal rings from sleeve.

Inspection

1. Wash all parts, air dry and blow out all passages.

2. Inspect sleeve for nicks, burrs, scoring or galling.

3. Check sleeve for free operation in transmission case bushing.

4. Inspect valve for nicks, burrs, scoring or galling.

5. Check valve for free operation in bore of sleeve.

6. Inspect driven gear for nicks, burrs or damage.

7. Check driven gear for looseness on sleeve.

8. Inspect weight springs for distortion or damage. Do not disassemble weights.
Fig. 37 Reverse brake band. 1950-59

1. Place piston in press with the notched end of the piston rod on a wood block. With tool J-2877, compress piston spring and remove rod retainer.

2. Remove piston, spring and washer from piston rod.

3. Remove ring and install in low piston bore. Check ring gap which should be 0.0055 to 0.0075". Fig. 54.

4. Assemble in the reverse order of disassembly, being sure rod retainer is properly seated in piston rod groove.

Fig. 58 Low brake band. 1950-59

5. Check clevis pin for wear, and back out all oil passages.

6. Install check valve body. If valve body is found to be damaged, replace with new valve body. Fig. 54.
the exception of the bolt over the pressure regulator valve. This bolt should be torque tightened to 8 ft. lbs.
5. Align holes in starter support with holes in front oil pump body and install two 7/16-20 x 1-1/4" guide pins in front pump, Fig. 54. Install pump to converter housing, using pump drive as 1-4705. When installing pump, be sure suction and delivery holes are at the side of pump.
6. Install five self-locking bolts through valve body into front pump. Torque two bolts over regulator valve to 8 lbs. ft. and remaining bolts to 10 lbs. ft. After tightening two bolts over pressure regulator valve bore, check valve to make sure it operates freely.
7. Check to be sure front pump operates freely.

ASSEMBLING GEAR BOX, 1950-52

1. Install two 7/16-20 x 1-1/4" guide pins in rear pump attaching holes. Install new gasket and pump, aligning suction and delivery holes. Install bolts and tighten 174-19 lbs. ft. torque.
2. Install reverse gear position, using reverse gear tool, J-4277. Note: Each of the small bolts should be positioned toward front of transmission case.
3. Install reverse brake band and strut with thin end of band away from pinion. Thread adjusting screw in until it contacts with lock in anchor.
4. Install前进 thrust washer on hub of reverse drive and install drum on reverse carrier hub.
5. Rotate rear pump drive gear lug to top of pump. Install blasted collar in reverse gear drive gear. Check around end of thrust washer using gear tool, J-4709. This should be a minimum of 0.06 and indicates proper seating of pump drive gear lug in carrier thrust plate.
6. While holding plate, center in, install universal joint front axle, universal joint washer, separator and bolt and tighten securely. This provides a sealed forward seal.
7. Tighten reverse servo adjusting screw, using tool J-4277, as tight as

POWERGLIDE

the exception of the bolt over the pressure regulator valve. This bolt should be torque tightened to 8 ft. lbs. Tighten bolts in a cross-over manner and after bolts are installed, check to make sure main valve and pressure regulator valve operate freely.

Fig. 60 Guide pins in front pump, 1932-59

Fig. 67 Measuring sun gear depth, 1930-39

It will go, then back off 2/3 turns and look the lock nut.

7. To determine thickness of low syn gear, turn removal sun gear thrust washer, proceed as follows: (A) Install reverse thrust washer and clutch on oil delivery shaft. (B) To measure distance from rear flange to reverse gear, install notches of tool J-4270. Fig. 65, and place hole of tool against rear flange with tool J-4270.
16. Install low serve piston release spring on servo piston shaft and install servo piston and spring in case, using ring compressor J-3460.

17. Install low pump bush over clutch drum with thin end of bush toward case.

18. Place strut guide spring over pin and install strut in piston slot with other end of anchor strut engaging slot.

19. Place brake band assembly on pin and adjust to over strut and locate with adjusting screw.

20. Install speedometer driven gear.

1953-59

1. Install two guide pins (J-3687) in rear pump attaching holes. Install pump bush with clutch drive and alignment section and delivery holes. Install bolts and tighten to 25-45 lbs. ft. torque.

2. Check lubrication pressure relief valve, making sure that its openings are free of obstructions and that the valve disc and spring operate freely.

3. Install and tighten lubrication pressure relief valve to rear of transmission case.

4. Install reverse servo piston, using ring compressor J-3460. Note that shaft should be toward front of transmission case, Fig. 61.

5. Install reverse brake band and strut assembly with thin end of band away from piston and thread adjusting screw in until it indexes with hole in anchor.

6. Install bronze thrust washer on hub of reverse drum and install drum using friction disk and spring operated freely.

7. Rotate rear pump drive gear lug to top of pump. Then install planet carrier assembly in drum, aligning slot on carrier shaft with lug of pump drive gear. On 1958-60, split shaft should protrude out of bearing b. Fig. 62 and indicates proper seating of pump gear drive lug in a.

8. Install shaft of tool J-438 into threaded hole, planet carrier output shaft and bolt yoke of tool to rear face of transmission case. Turn tool handle counter-clockwise until the output shaft is seated in the rear bearing. Disconnect tool from pump shaft and case.

9. On Chevrolet units, install universal joint from side, washer, lockwasher, bolt and bolt to 28-38 lbs. ft. torque.

10. Adjust the reverse servo band as specified at the beginning of this chapter.

In determining the thickness of the low sun gear thrust washer, follow the procedure in Step 7 for 1953-52 models.

11. Install parking lock lever shaft in case. Install small lip seal over end of parking lock lever shaft and its counterclockwise of case by lip seal inward inside of case.

12. Install lever washer and parking lever end on end of parking lock lever shaft, pushing lever onto shaft to establish seat to 900 lbs. tension between lever and washer. The tightly clamp screw to 8-12 lbs. ft. torque.

13. Install parking lock gear over pin support rod and install parking pawl spring.

14. Wind up pawl spring, using tool J-3533, so that spring catches on inside of case.

15. Install input shaft to clutch unit. Install thrust washer previously selected (Step 8) and then splineopposing with oil hole in reverse arm gear splines of input shaft, Fig. 65.

16. Install driving input shaft with planet carrier assembly in place. Install low pump bush in planet carrier, Fig. 66.

17. In determining the thickness of the low sun gear thrust washer, follow the procedure in Step 7 for 1953-52 models.

18. Install parking lock lever shaft in case. Install small lip seal over end of parking lock lever shaft and its counterclockwise of case by lip seal inward inside of case.

19. Install lever washer and parking lever end on end of parking lock lever shaft, pushing lever onto shaft to establish seat to 900 lbs. tension between lever and washer. The tightly clamp screw to 8-12 lbs. ft. torque.

20. Install parking lock gear over pin support rod and install parking pawl spring.

21. Wind up pawl spring, using tool J-3533, so that spring catches on inside of case, Fig. 67.

22. Install input shaft to clutch unit. Install thrust washer previously selected (Step 8) and then splineopposing with oil hole in reverse arm gear splines of input shaft, Fig. 65.

23. Install driving input shaft with planet carrier assembly in place. Install low pump bush in planet carrier, Fig. 66.

22. Install governor in case, allowing it to rotate in a counter-clockwise direction as the governor driven gear meshes with the drive gear of the output shaft, locating other end of anchor over adjusting screw.

23. Install two guide pins (A, A-2x8) as guides for governor cover and install new gasket.

24. Install governor cover and tighten attaching bolts to 65-15 lbs. ft. torque.

25. Install speedometer drive gear and tighten to 45-60 lbs. ft. torque.

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**ASSEMBLING TRANSMISSION TO TURBINE HOUSING, 1950-52**

1. Install manual valve in valve body and manual valve inner lever in turbine housing. Index lever pin with pickup set in valve, Fig. 68.

2. Set manual valve on end of valve protrudes 1/8" from face of valve body, Fig. 69. This places valve in reverse position.

3. Install new servo body to case gasket.

4. Raise transmission manual valve lever to stop detent position, which is reverse. This aligns reaction to be indexed with manual valve inner lever.

5. Place clutch drum thrust washer over oil delivery sleeve.

6. Install two 1/16x9/32" guide pins in turbine housing, turn push plate and turbine housing together, checking to see that reaction lever indexes properly with manual valve inner lever. Then install plate-to-housing bolts and tighten securely. Remove left hand pump cover to observe markings on manual valve lever lever and reaction lever, Fig. 70.

7. Install lubrication check valve parts into case. Following order: Spring, ball, seal and lubrication valve. Install ball bore with radius toward ball.

8. Install two 1/8x9/32" guide pins as guides for servo cover and install new servo, cover gasket.

9. Install pressure regulator valve and inner and outer valve springs. Install reverse servo return spring.

10. Install servo cover, applying pres- sure to cover to compress springs. Hold cover with cover bolts. Tighten securely. Be sure pressure regulator spring and servo spring use proper seats in pocket of servo cover.

11. Install new distributor cover gasket and cover, and tighten bolts securely.

12. Adjust low servo band as outlined at the beginning of this chapter.

13. Assemble primary pump, aligning front pump drive gear tangs with drive slots in pump hub, Fig. 71. Pass of pump must be flush with face of bell housing.


15. Install stator to stator support, with small (primary) stator to rear.

16. Install two 3/16x3/8" guide pins in primary pump bolt holes, align dowel pin hole of turbine cover and dowel pin holes in pump and install primary pump and turbine cover. Remove guide pins and secure with 13 pump bolts.

17. Install one bolt on back side of band pin, skip one bolt and install two bolts alternately around assembly.

18. Install right hand pump cover and new gasket. Secure with capscrews and tighten securely.

19. On Chevrolet units, install universal joint and "O" ring, ball and collar and add or remove shims to allow a snug fit. If ball cannot be moved by hand, add a shim until a smooth firm adjustment is obtained. If ball moves freely by hand, remove shims until proper adjustment is obtained. After number of shims for proper adjustment have been determined, remove universal joint ball and collar and ball seat. Note number of shims used for later assembly and replace universal ball and collar on end of propeller shaft.

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**Fig. 68 Indexing manual valve with lever, 1950-52**

**Fig. 69 Setting manual valve in reverse position, 1950-59**

**Fig. 70 Indexing manual valve inner lever and reaction lever, 1950-53**

**Fig. 71 Aligning primary pump with front pump drive logs, 1950-52**

**Fig. 72 Positioning of turbine coverpins, 1950-52**
ASSEMBLING TRANSMISSION TO CONVERTER HOUSING, 1933-59

1. Install manual valve in valve body and manual valve interior lever in converter housing. Index lever pin with pick up slot in valve.

2. Set manual valve so it protrudes 1 7/32" from face of valve body. This places valve in reverse position.

3. Install new valve body gasket.

4. Raise transmission manual valve lever to top detent position, which is reverse. This aligns reaction lever so that it will index with manual valve inner lever.

5. Place clutch drum thrust washer over oil delivery sleeve.

6. Install two guide pins (1 3/32 x 3/16") in converter housing. Then push case and converter housing together, checking to see that reaction lever indexes properly with manual valve inner lever. Then install attaching bolts and tighten to 25-30 lbs. ft. torque.

7. From front of converter housing, install special self-locking bolt and tighten to 12-15 lbs. ft. torque.

8. Install two guide pins (1/2 x 3/8") as guides for servo cover and install servo gasket.

9. Install pressure regulator valve and inner and outer valve springs. Install reverse servo return spring.

10. Install servo cover, applying pressure to cover to compress springs and secure with bolts, tightening them to 175-19 lbs. it. torque. Be sure springs seat properly in pockets of servo cover.

11. Install new modulator cover gasket and cover and tighten attaching bolts to 12-1/2 lbs. ft. torque.

12. Adjust low band as outlined at the beginning of this chapter.

13. Install converter in its housing, aligning front pump drive gear boss with drive slots in converter pump hub. After converter is installed, check to assure engagement of converter pump hub drive slots in slots of front pump drive gear. This dimension should be measured as shown in Fig. 73. If it should be &gt; or less.

14. Install converter holding tool J-5384. Fig. 74, to converter housing.

15. After transmission is assembled, remove the extreme lower rear ball from the low and drive valve body.

16. Rotate the throttle valve control lever, Fig. 75. If the large throttle valve position (to a definite stop).

17. Reinstall the valve body bolt previously removed and tighten it to 12-1/2 lbs. ft. torque.

18. On 1953-54 units, install "O" ring seal on universal joint ball seat. Install universal joint ball seat, using four new universal ball shims, install ball and collar and tighten bolts to 8-12 lbs. ft. torque. If ball cannot be moved by hand, add a shim until a smooth firm adjustment is made. If ball moves freely by hand, remove shims to obtain proper adjustment. Ball joint collar end of seal should not be installed with screwdriver (to adjust). After adjustment, remove ball, collar and seat. Note number of shims used for inter assembly and replace universal ball, collar and seat on unit of propeller shaft.