Group 21

TRANSMISSION (TORQUE CONVERTER)

TORQUEFLITE TRANSMISSION

CONTENTS

DATA AND SPECIFICATIONS

Type	Automatic Three Speed with Torque Converter
Torque Converter Diameter (inches)	12½"
Oil Capacity of Transmission and Torque Converter (Refill)	21 pts. Automatic Transmission Fluid Type "A" Suffix "A"
Method of Cooling	Water
GEAR RATIOS	
1—First	2.45 to 1
2—Second	1.45 to 1
D—Drive	1.00 to 1
R—Reverse	2.20 to 1
N—Neutral	———
FRONT — REAR PUMPS	
Type	Gear (Rotary)
End Clearance (Front Pump)	.001 to .0025 inch
End Clearance (Rear Pump)	.001 to .0025 inch
Tip Clearance	.005 to .008 inch
Outer Rotor Diametral Clearance	.008 inch maximum
THRUST WASHERS	
Input Shaft	.115 to .117 inch (Natural) .097 to .099 inch (Black) .078 to .080 inch (Red) .059 to .061 inch (Orange)
Front Clutch and Sun Gear	.062 to .064 inch
Output Shaft	.062 to .064 inch
SNAP RINGS	
Kickdown Annulus Gear	.060 to .062 inch .064 to .066 inch
Rear Clutch	.060 to .062 inch
Low-Reverse Planet Pinion Carrier	.060 to .062 inch .064 to .066 inch .068 to .070 inch
Front Clutch	.060 to .062 inch

Model	Engine (Cu. In.)	Kickdown Band	Front Clutch Cushion Spring	Front Clutch No. Discs	Accumulator Spring *	Rear Discs	Clutch Spring *	Governor (Type)	High Temperature Seals
PS-1	361	2½ turns	Yes	4	16	5	280	A	No
PS-3, PC-1, PC-2	383	2½ turns	Yes	4	16	5	280	A	No
PS-1, PS-3 (Ram Engine)	383	2 turns	Yes	4	None	5	180	C	Yes
PC-3-300	413	2 turns	No	4	None	5	180	C	Yes
PC-3, PY-1	413	2½ turns	Yes	4	16	5	280	A	No

* Lbs. Spring Tension

Governor Assemblies "A" Type—Standard
"C" Type—Ram

SPECIAL TOOLS

C-452—Puller
C-484—Pliers
C-589—Wrench
C-760—Pliers
C-811—Wrench
C-3203A—Jack
C-3276—Pilots
C-3280—Stand
C-3281—Wrench
C-3283—Pilots
C-3288—Pilots
C-3292—Gauge
C-3293—Gauge
C-3301—Pliers
C-3339—Set-Dial Indicator
C-3355—Straightedge
C-3380—Wrench
C-3461—Fixture
C-3487—Support
C-3527—Gauge
C-3528—Stand—(pr.) Valve Body Holding
C-3529—Compressor Servo Spring
C-3531—Tool
C-3575 or 3533—Compressor
C-3583—Adapter—for C-3380 Torque Wrench
C-3689—Bushing Remover
C-3690—Remover
C-3691—Oil Seal Driver
C-3692—Installer
DD1150—Tachometer

TIGHTENING REFERENCE

	Foot-Pounds	Inch-Pounds
Accumulator Cover Screws	—	180
Compensated Throttle Pressure Tap	—	120
Front Pump Housing to Transmission Case	—	180
Governor Body to Support	—	90
Locating Screw	—	70
Oil Pressure Take-Off Plug	—	120
Line Pressure Take-Off Plug	—	120
Oil Pan Bolts	—	175
Rear Clutch Pressure Tap	—	120
Pump Housing to Support	—	120
Oil Pressure Tap	—	180
Suction Pressure Tap	—	180
Servo Apply Pressure Tap	—	120
Transfer Plate to Transmission Case	—	180
Valve Bodies to Transfer Plate	—	55
Body End Cover	—	25
Band Lever Shaft Plug	35	—
Extension to Transmission Case	25	—
Filler Tube Nut	40	—
Intermediate Support Locating Screw	25	—
Case to Converter Housing	40	—
Kickdown Band Adjusting Screw Nut	35	—
Line Pressure Regulator Valve Retainer	50	—
Low-Reverse Band Adjusting Screw Nut	35	—
Manual Valve Control Cable Housing	—	200
Neutral Starter Switch—Initial Electrical Contact plus ⅓ to ½ Turn	75 Max.	—

TIGHTENING REFERENCES (Continued)

	Foot-Pounds	Inch-Pounds
Output Shaft Support to Case	25	—
Propeller Flange Nut	175	—
Torque Converter Cooler Line Fitting	—	120
Control Valve Retainer	40	—
Reaction Shaft to Case	25	—
Torque Converter Housing		
Housing to Engine Block—3/8 inch screws	30	—
7/16 inch screws	50	—
Dust Cover	—	200
Dust Plate	—	130
Torque Converter		
Crankshaft Nut or Bolt	55	—
Pan Drain Plug	50	—
Converter Drain Plug	—	130
Drive Flange Stud	35	—

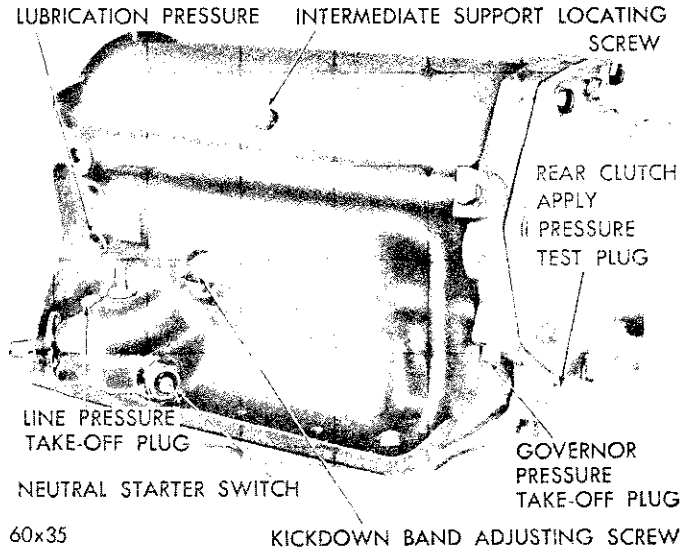


Fig. 1—Transmission Case (Left Side)

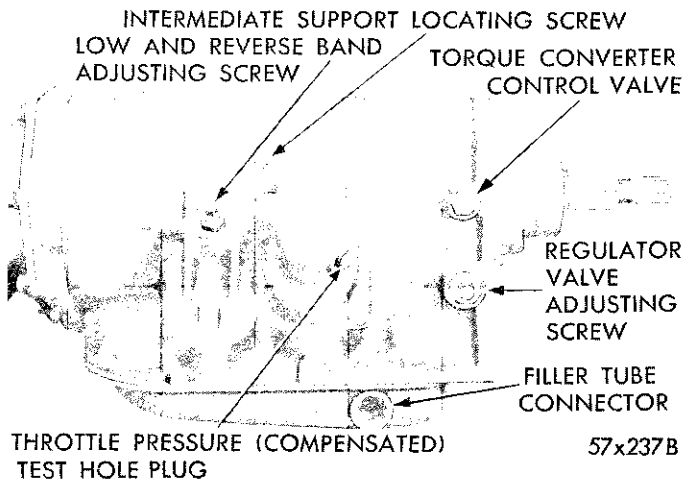


Fig. 2—Transmission Case (Right Side)

TROUBLE DIAGNOSIS CHART

(TorqueFlite Transmission)

ITEMS TO CHECK See "Explanation of Index Items" — Perform Items: A, B, C, and G first — INDEX / ITEM	OPERATING DIFFICULTY: Shift Abnormalities: Harsh N to D or N to R	Shift Abnormalities: Delayed N to D	Shift Abnormalities: Runaway on Upshift and 3-2 K.D.	Shift Abnormalities: Harsh Upshift and 3-2 K.D.	Shift Abnormalities: No Upshift	Shift Abnormalities: No K.D. or Normal Downshift	Shift Abnormalities: Shifts Erratically	Response: Slips in Forward Drive Positions	Response: Slips in Reverse Only	Response: Slips in All Positions	Response: No Drive in Any Position	Response: No Drive in Forward Ranges	Response: No Drive In R (Reverse)	Response: Drives in N (Neutral)	Miscellaneous: Drags or Locks	Miscellaneous: Grating, Scraping, Etc. Noises	Miscellaneous: Buzzing Noises	Miscellaneous: Trans. Hard to Fill—Oil Blows Out Fil. Tb.	Miscellaneous: Trans. Overheats	Miscellaneous: Impossible to Push Start	Miscellaneous: Starter Won't Energize
A. *Oil Level		●	●		●	●	●	●		●	●						●	●	●	●	
B. *Throttle Link Adj.			●	●	●	●	●														
C. *Gearshift Control Cable Adj.						●	●							●							●
D. Pressure Checks—Line, Lube, etc.	●	●	●	●	●	●	●	●	●	●	●	●	●							●	
E. K.D. Band. Adj.			●	●	●	●						●			●				●		
F. Low-Reverse Band Adj.	●								●				●		●				●	●	
G. *Engine Idle	●						●														
H. Neutral Str. Sw.																					●
I. Parking Brake															●	●			●		
J. Regulator—Valve Spring							●			●	●						●	●	●		
K. Converter Control Valve																	●	●	●		
L. Breather																		●			
M. Output Shaft Rear Bushing							●									●					
N. T. C. Cooling																			●		
O. K. D. Servo Band-Linkage			●	●	●	●						●			●						
P. L-R Servo Band-Linkage	●								●				●		●					●	
Q. Oil Strainer							●				●								●		
R. Valve Body—Bolts—Mating Surface		●	●	●	●	●	●	●	●	●	●	●		●						●	
S. Accumulator	●	●	●	●	●	●		●				●									
T. Air Pressure Check		●	●		●	●	●	●	●	●	●	●	●								
U. Governor					●	●	●						●			●					
V. Rear Pump																●			●	●	
a. Front Pump—Drive Sleeve		●					●			●	●					●			●	●	
b. Regulator Valve Body, Gasket, Surface								●	●	●	●							●	●	●	
c. Front Clutch	●	●						●				●		●	●	●					
d. Rear Clutch	●		●	●	●			●				●	●		●	●			●		
e. Planetary Gear Set															●	●					
f. Overrunning Clutch						●		●				●			●						
g. Manual Valve Lever	●	●	●	●	●		●				●			●							

*Always Check Items A.B.C. and G. before performing any other operation.

SERVICE DIAGNOSIS CHART

1. SERVICE DIAGNOSIS CHART

The Trouble Diagnosis Chart has the operating difficulties listed in three general groups. After road testing, match the trouble found to its particular group and the specific difficulty under that group. The Index and Item in the "Items to Check" column are next checked against the "Explanation of Index Items." **Capital letter** items refer to those operations which may be performed without removing the transmission. The **small letter** items refer to those operations done after removal of the transmission from the car.

2. SERVICE DIAGNOSIS — EXPLANATION OF INDEX ITEMS

Never remove a transmission from a vehicle until all of the possible "in vehicle" causes have been checked for the operation difficulty and the oil pan has been removed to check for dirt, metal chips, band material, broken band ends and burned or scored band contacting surfaces, also, check the manual control cable and throttle linkage for adjustment and wear.

a. Oil Level — Refer to the lubrication Group O of this manual. If oil appears to be emulsified, check for possible oil cooler leak.

b. Throttle Linkage — Refer to Paragraph 10.

c. Gearshift Control Cable—Refer to Paragraph 7.

d. Pressure Tap Check — Hydraulic pressure taps have been provided to check the following pressures: line, lubrication, governor, rear clutch apply, and throttle (compensated). These pressures should fall within the specified limits stated in the Hydraulic Control Pressure Check Chart.

e. Kickdown Band Adjustment — the kickdown band adjustment screw is found on the left side of the transmission case (Fig. 1). Refer to Paragraph 9(a).

f. Low and Reverse Band Adjustment — The low and reverse band adjustment screw is found on the right side of the transmission case (Fig. 2). Refer to Paragraph 9(b).

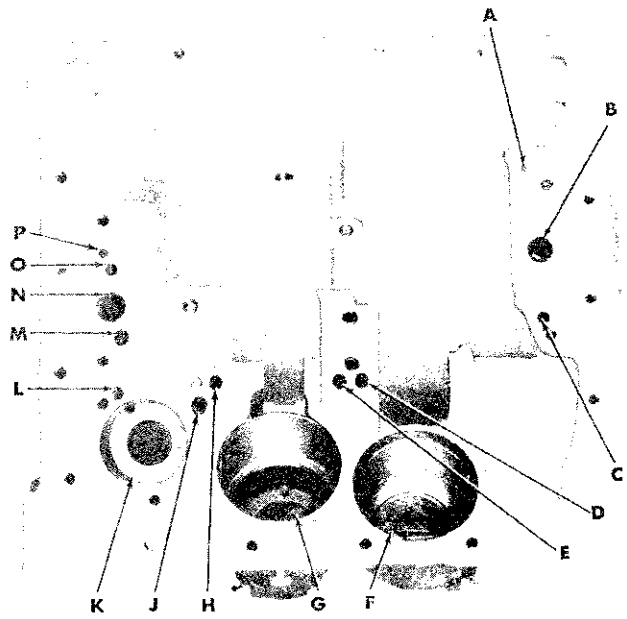
g. Engine Idle — Adjust to 475 to 525 r.p.m. in Neutral.

h. Neutral Starter Switch — If the starter will not energize, the neutral starter switch and connections should be tested.

i. Parking Brake — Check for excessive drag. Refer to Brakes Section for method of adjusting parking brake.

j. Regulator Valve, Spring — The regulator valve may be removed by removing the regulator valve spring retainer, which is on the right side of the transmission case (Fig. 2). Check for a stuck or badly scratched valve and/or buckled spring. Be sure spring cup is correctly positioned and not binding in valve body bore.

k. Converter Control Valve, Spring — The converter control valve may be removed by removing the converter control valve spring retainer, which is on the right side of the transmission case (Fig. 2). Check for a stuck or badly scratched valve and/or buckled spring.



A—GOVERNOR PRESSURE
B—REAR PUMP INLET
C—REAR CLUTCH 'APPLY' (Line pressure)
D—LOW AND REVERSE SERVO 'APPLY' (Line pressure)
E—KICKDOWN SERVO 'APPLY' (Throttle compensated pressure)
F—LOW AND REVERSE SERVO (Location)
G—KICKDOWN SERVO (Location)
H—KICKDOWN SERVO 'APPLY' (Line pressure)
J—KICKDOWN SERVO 'RELEASE' (Line pressure)
K—ACCUMULATOR (Location)
L—FRONT CLUTCH AND ACCUMULATOR 'APPLY' (Line pressure)
M—LINE PRESSURE
N—FRONT PUMP INLET
O—REVERSE UPSET (Reverse blocker 'Apply') (Line pressure)
P—LINE PRESSURE GAUGE 56x712A

Fig. 3—Oil Passages in Transmission Case

l. Breather — Check to determine whether the breather is free of dirt and undercoating.

m. Output Shaft Rear Bushing — Check for rough, scored or worn bushing.

n. Torque Converter — Check oil cooler lines for being bent, kinked or having loose connections.

o. Kickdown Servo, Band and Linkage — Check for broken seal rings, stuck servo pistons or broken linkage.

p. Low and Reverse Servo, Bank and Linkage — Check for torn seal, broken band and/or linkage.

q. Oil Strainer — Check for possible air leakage or clogged screen.

r. Valve Body Attaching Bolts and Mating Surface — Check for loose bolts, burrs or scratches on mating surfaces. Clean valve body assembly. Check for stuck valves, dirt, scratched valves or body, and burrs on valves. Torque valve body bolts to specifications.

s. Accumulator — Check accumulator piston for sticking, rough bore in case, and/or rings.

t. Air Pressure Check — The front clutch, rear clutch, kickdown servo, and low reverse servo may be checked by applying air pressure to their respective passage when the valve body is removed. To make the complete air pressure check, proceed as follows: (Refer to Fig. 3.)

CAUTION

Compressed air supply must be free of all dirt and moisture.

(1) Raise the vehicle on a hoist, drain the transmission fluid and remove the transmission oil pan. Remove the accumulator cover and valve bodies assembly.

(2) Apply air pressure to the front clutch passage as shown in Figure 3 (L). Listen for a dull "thud" which indicates that the front clutch is operating. Hold the air pressure on for a few seconds and observe for excessive oil leaks in the system.

(3) Apply air pressure to the rear clutch passage, as shown in Figure 3 (C). Listen for a dull "thud" which indicates that the rear clutch is operating, also check for excessive oil leaks.

(4) Apply air pressure to the kickdown "apply" (line) pressure passage, as shown in Figure 3 (H). Observe the operation of the kickdown servo, lever and band when air pressure is applied.

(5) Apply air pressure to the kickdown "apply" (compensated throttle) pressure passage, as shown in Figure 3 (E). Observe the operation of the kickdown servo.

(6) Apply air pressure to the low and reverse servo passage as shown in Figure 3 (F). Observe the operation of the low and reverse servo, lever, and band when air pressure is applied.

If this usually occurs when line pressure fails, an erratic or no upshift condition exists and the clutches and servos operate properly, it indicates that a possible malfunctioning exists in the control valve body assembly. Disassemble, clean, inspect and service the valve body assembly as described in the "Reconditioning of the Valve Body and Transfer Plate Assemblies," Paragraph 109.

Upon completion of the air pressure check, and servicing the valve body assembly, install the valve body assembly and the transmission oil pan. Fill the transmission to proper level with fluid, and adjust the control cable and the throttle linkage.

u. Governor — Clean assembly, check weight assembly and valve for burrs, scratches or sticky operation. Examine the governor valve shaft, snap rings and seal rings.

v. Rear Pump — Clean and inspect assembly for side and diametral clearance. Note whether the rear oil pump pinion ball is in place. Examine the output shaft support face for scoring.

a. Front Pump Drive Sleeve — Inspect assembly for side and diametral clearance. Examine oil pump inner and outer rotor for heavy scoring. Check front pump drive sleeve seal rings.

b. Regulator Valve Body, Mating Surfaces and Gasket — Clean and inspect the valve body for heavy scratches and scoring on the valve bores and face which bears against the front pump housing. Examine the valve body to determine if the secondary reaction orifice is free of dirt. Check gasket for uniformness of compression by the valve body.

c. Front Clutch — Clean and inspect discs, plates, drive hub, return spring, piston levers and retainer. Check the following front clutch circuit for leakage possibilities:

(1) Valve body and valve body to case mating surface.

(2) Accumulator small and large piston rings.

(3) Regulator valve body to case mating surface.

(4) Torque converter reaction shaft seal ring.

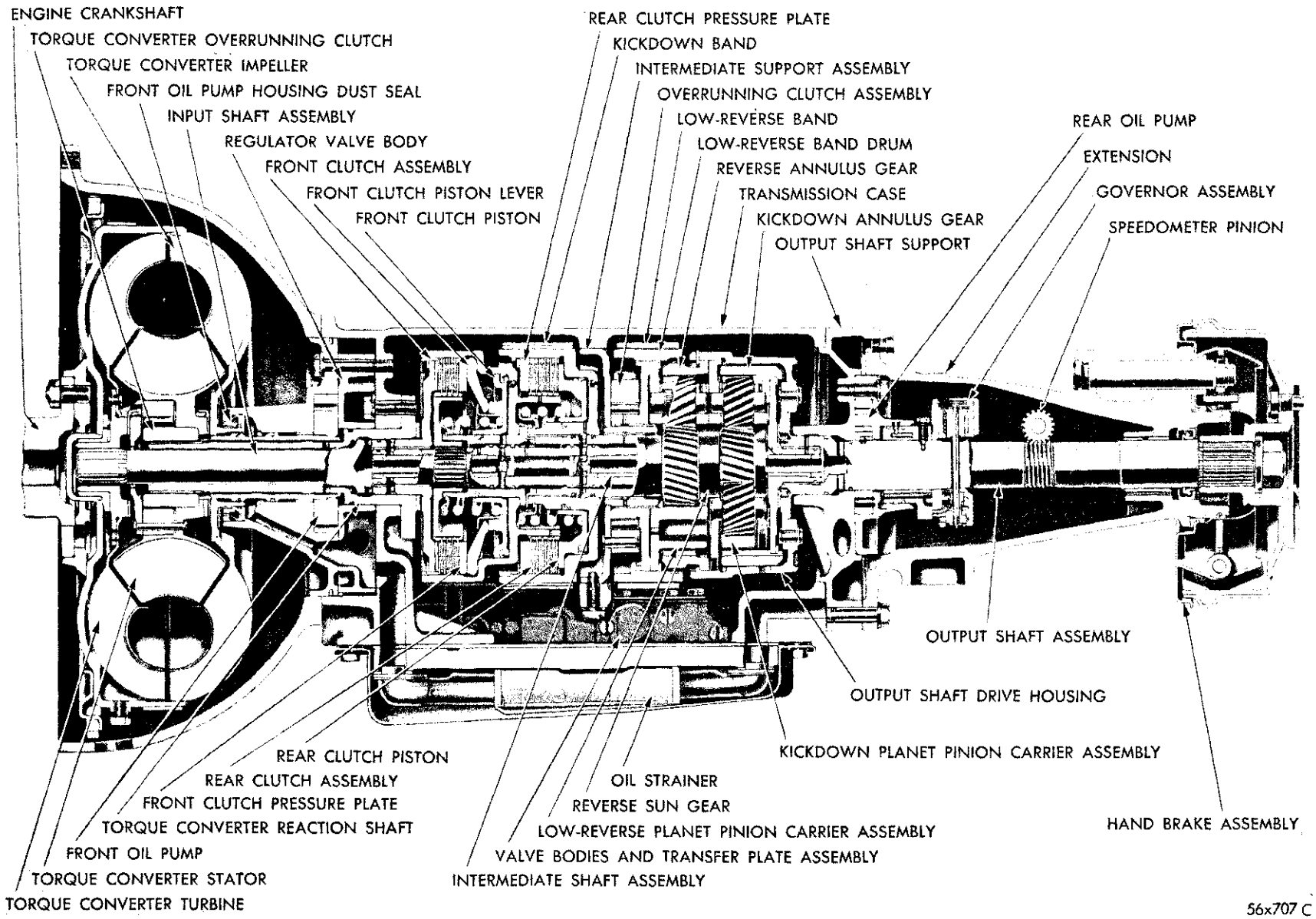


Fig. 4—Typical TorqueFlite Transmission and Torque Converter

(5) Input shaft small and large seal rings.

(6) Intermediate shaft No. 1, 2, and 3 seal rings.

(7) Front clutch oil feed tube.

(8) Front clutch piston inner and outer seal rings.

(9) Front clutch retainer ball check.

d. Rear Clutch — Clean and inspect discs, plates, return spring and piston. Check the following rear clutch circuit for leakage possibilities.

(1) Valve body and valve body to case mating surface.

(2) Output shaft support to case mating surface.

(3) Output shaft small and large seal rings.

(4) Intermediate shaft No. 4, 5, and 6 seal rings.

(5) Rear clutch oil feed tube.

(6) Sun gear rear clutch seal rings.

(7) Rear clutch piston inner and outer seal rings.

(8) Rear clutch retainer ball check.

(9) Kickdown piston rod guide seal ring and rod guide to kickdown rod fit.

(10) Large kickdown piston seal ring.

e. Planetary Gear Set — Clean and inspect gear set for worn thrust washers, nicked or rough gear teeth, and excessive pinion end clearance.

f. Low Speed Over-Running Clutch — Clean and inspect the overrunning clutch assembly from brinnelled rollers and/ or cam and improperly assembled rollers or springs. Check the cam roller ramps for being worn.

g. Manual Valve Lever — A loose or badly worn manual valve lever cam should be replaced. If loose, it may be silver soldered only so as not to require high temperatures that could destroy its hardness, otherwise it should be replaced.

TORQUEFLITE TRANSMISSION

3. TORQUEFLITE OPERATING PRINCIPLES

The transmission, as shown in Figure 4, combines a torque converter and an automatic planetary three speed transmission. The torque converter extends torque multiplication over a wide range of engine speeds. The transmission consists of two multiple disc clutches, an overrunning clutch, two bands, and two planetary gear sets to provide three forward ratios and a reverse ratio.

a. Gearshift Control Unit

The transmission is operated by a gearshift control unit consisting of five push buttons, identified by R (reverse), N (neutral), D (drive), 2 (second) and 1 (first).

Mechanical connection between the gearshift control housing and the transmission manual control valve is obtained through the use of a single push-pull cable, as shown in Figure 5. One end of the wire cable is secured to the cable actuator in the gearshift control housing, while the other end enters the transmission case to engage the manual control valve lever assembly.

Should the R (reverse) button be pushed in, above approximately 10 to 12 MPH, it will move the manual control lever to the neutral position and when the car speed drops below 10 to 12 MPH, it will again be necessary to re-engage the R (reverse) push button.

A back-up light switch (when so equipped) is incorporated in the gearshift control housing and is operated by the R (reverse) push button slide.

b. Operating Instructions

Starting the Engine

As a safety precaution, always apply parking or foot brake. The transmission N (neutral) control button must always be pushed in before the car can be started. This is necessary since the starter electrical circuit is completed only when the neutral safety switch on the transmission is closed, thus preventing the car from being accidentally started while in gear.

Push Starting

Should the need arise, the engine can be started as follows by having the car pushed:

(1) Push in the N (neutral) button.

(2) Turn on the ignition switch.

(3) When a speed of approximately 20 M.P.H. has been attained, push in the 1 (first) button and the engine should start.

Towing the car to start is not recommended due to the sudden surge of power when the engine starts.

g. How to Drive the Vehicle

(1) After the engine is started, better fuel economy and quicker engine warm up can be obtained by

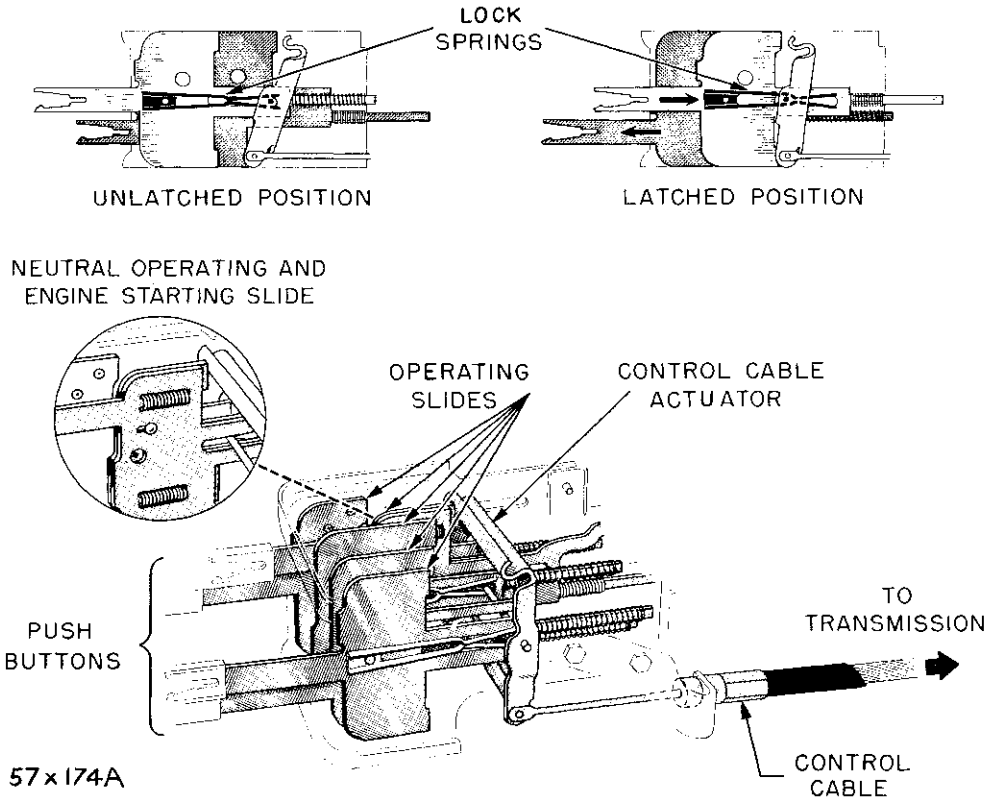


Fig. 5—Typical Gearshift Control Unit (Operational Sketch)

starting to drive immediately. If the engine is cold (engine on fast idle), apply the foot brake lightly so as to prevent a tendency of vehicle to creep when making a push button selection.

(2) D (drive button). All normal forward driving will be done in this range. The vehicle will have a slight tendency to creep after pushing the button from N (neutral) to D (drive) at idle. This can be prevented by applying the foot brake lightly. As soon as the accelerator is depressed, the vehicle will move forward in the drive (breakaway) range. Depending on the amount the accelerator is depressed, the transmission will automatically upshift to second. As the vehicle speed increases, the transmission will automatically upshift from second to direct. When slowing the vehicle down (at closed throttle) the transmission will automatically downshift to breakaway at approximately 10 M.P.H.

(3) 2 (second) position provides driving characteristics similar to D (drive) except that the transmission will remain in second until wide open 2-3 upshift speed is attained, as indicated in the Shift Pattern Summary Chart below. As soon as the accelerator is depressed, the vehicle will move forward in the drive (breakaway) range. Depending on the amount of accelerator is depressed and car speed, the transmission will automatically upshift into second. If the vehicle speed falls before 8 M.P.H., or if the accelerator is completely depressed provided vehicle speed is below 30 M.P.H., the transmission will automatically downshift to breakaway. It is possible to push the buttons from 2 (second) to D (drive) at any speed. Shifts D (drive) to 2 (second) may be made at any speed and the transmission will downshift to second gear when speeds below the 3-2 kickdown limit are obtained.

NOTE: All shift speeds vary somewhat due to production tolerances, tire sizes and rear axle ratios. All shifts, however, should be smooth, responsive, and with no noticeable engine runaway.

(4) **1 (first)** provides driving characteristics similar to D (drive-breakaway) except that the transmission will not upshift into any other range regardless of vehicle speed and throttle opening. **To prevent overspeeding of engine, do not operate vehicle above 40 mph in 1 (first) position.** It is possible to push the buttons from D (drive) to 1 (first) at any speed; however, the transmission will not downshift to low if vehicle is above speeds shown in Shift Pattern Summary Chart (above 3-1 Kickdown limit).

(5) **R (reverse).** Stop the vehicle and with foot brake lightly applied, push the R (reverse) button in.

SHIFT PATTERN SUMMARY CHART

Condition	PS1 & 3	PC1	PC2	PC3	PY1	PS1 & 3 Ram Man.	PC3 C300 Ram Man.
Closed Throttle 1-2 Upshift	8-13	8-15	8-15	9-15	9-16	10-15	11-15
Closed Throttle 2-3 Upshift	10-16	12-18	12-19	12-19	13-20	14-19	13-20
Wide Open Throttle 1-2 Upshift	29-41	31-46	31-47	32-48	33-49	37-42	38-44
Wide Open Throttle 2-3 Upshift	61-74	67-83	68-84	69-86	72-90	60-74	61-75
3-2 Kickdown Limit	58-71	63-80	64-82	66-83	69-87	57-65	58-67
3-1 Kickdown Limit	28-39	30-43	31-44	32-45	33-47	36-42	37-43
Closed Throttle Downshift	6-11	6-13	6-13	6-13	7-14	8-12	8-13

(6) Kickdown (forced downshift). At speeds below the 3-2 or 3-1 kickdown speed limits shown in Shift Pattern Summary Chart, after the transmission has upshifted, into D (drive) or 2 (second) the transmission will downshift to the next lowest gear by completely depressing the accelerator; thereby giving maximum acceleration for passing or climbing steep grades. The transmission will automatically upshift to second if the accelerator is released or speeds shown in Shift Pattern Summary Chart (wide open throttle 1-2 upshift) are reached. In D (drive) range from second gear, the transmission will automatically upshift into direct if the accelerator is partially released or if speeds as shown in Shift Pattern Summary Chart (wide open throttle 2-3 upshift) are reached.

c. Mountain Driving

When driving in the mountains with either heavy load or when pulling a trailer, the 2 (second) or 1 (first) position should be selected on upgrades which require heavy throttle for ½ mile or more. Lower ratios reduce the possibility of overheating the transmission under these conditions. 1 (first) position is for severe operation and to provide better control when descending steep grades.

d. Transmission Inoperative

Tow the vehicle with the rear end picked up or remove the propeller shaft.

e. Transmission Operating Properly

The vehicle may be towed safely in N (neutral) at moderate speeds. For long distances towing (over 100 miles), the propeller shaft should be removed.

4. POWER FLOW IN THE TRANSMISSION

D (Drive) Position Breakaway (see Fig. 6)

The power flow is from the converter turbine through

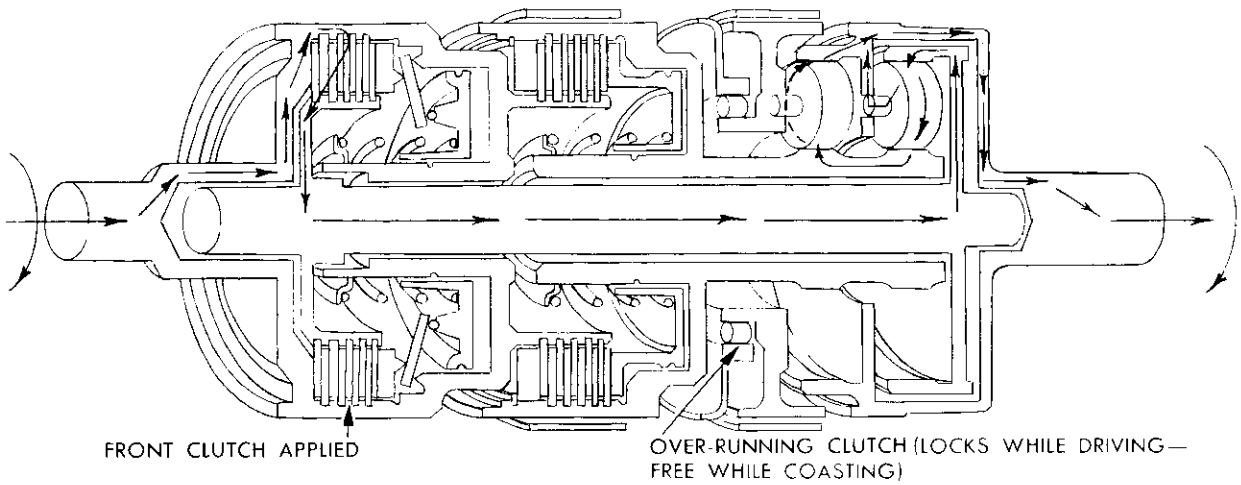


Fig. 6—Power Flow in D (Drive) Position—Breakaway

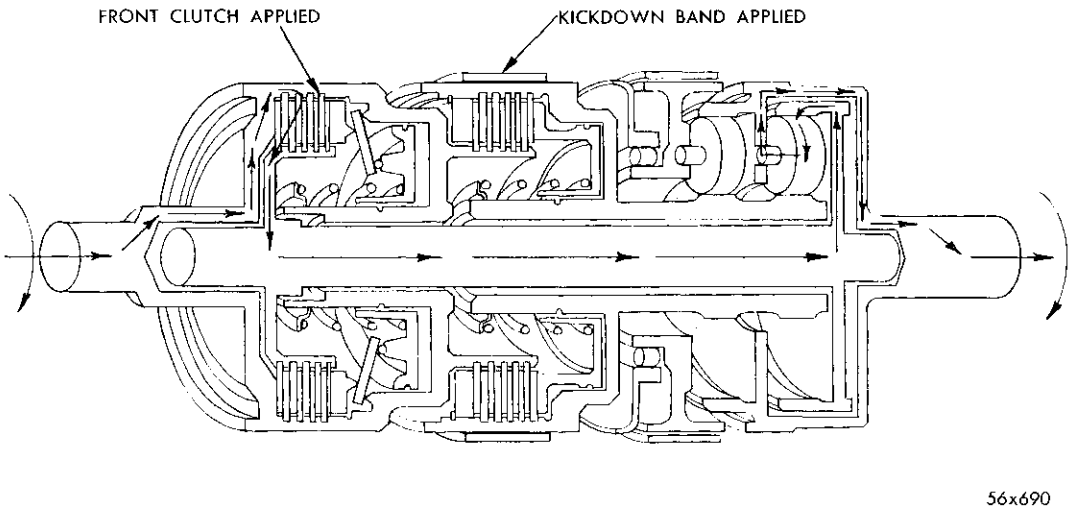


Fig. 7—Power Flow in D (Drive) Position—2nd Speed and 2 (Second) Position 2nd Speed

the input shaft and front clutch retainer (one unit). The front clutch is applied and the drive continues through the clutch hub to the intermediate shaft and the kickdown annulus gear (one unit). The kickdown annulus gear drives the kickdown planet pinion gears, rotating them in the same direction. The kickdown planet gears are meshed with the kickdown sun gear which in turn is integral with the reverse sun gear. Both sun gears are forced to rotate in a reverse direction by the reaction of the kickdown planet pinion carrier together with the reverse annulus gear, both of which are splined to the output shaft driving housing. The reverse planet pinion carrier is attached to and prevented from turning backward by an overrunning clutch and becomes stationary in forward drive (overruns on coast). Therefore, the reverse planet carrier pinions are forced to rotate in a forward direction and force the reverse annulus to rotate in the same direction transmitting the power flow to the output shaft with the resulting ratio of the kickdown and reverse planetary gear sets of 2.45 to 1.

D (Drive Position — 2nd Speed and 2nd (Second) Position — 2nd Speed (see Fig. 7)

The power flow is from the torque converter turbine

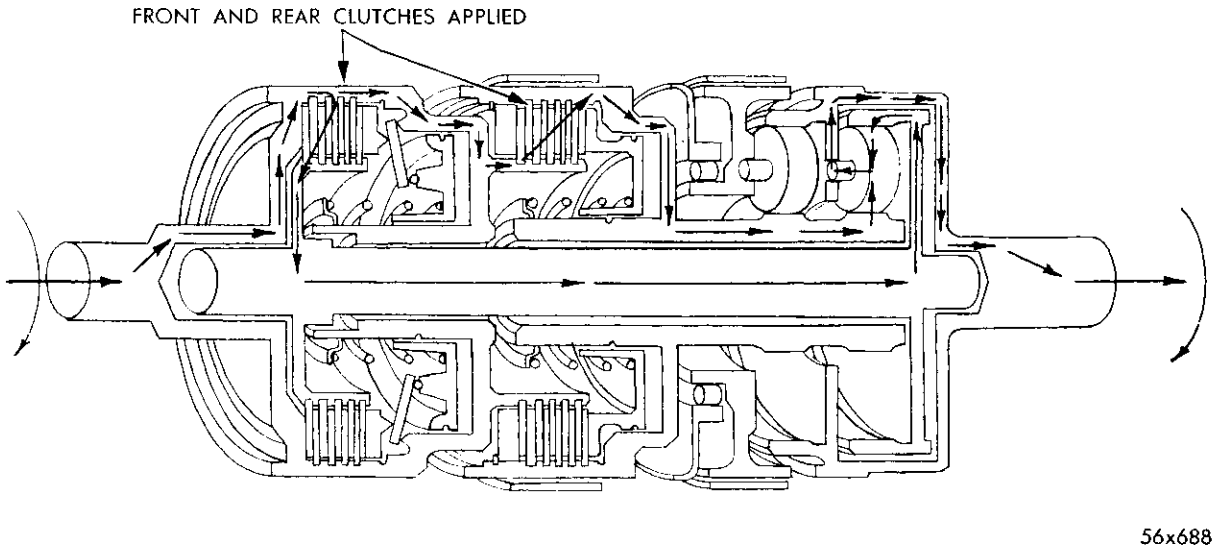


Fig. 8—Power Flow in D (Drive) Position—Direct

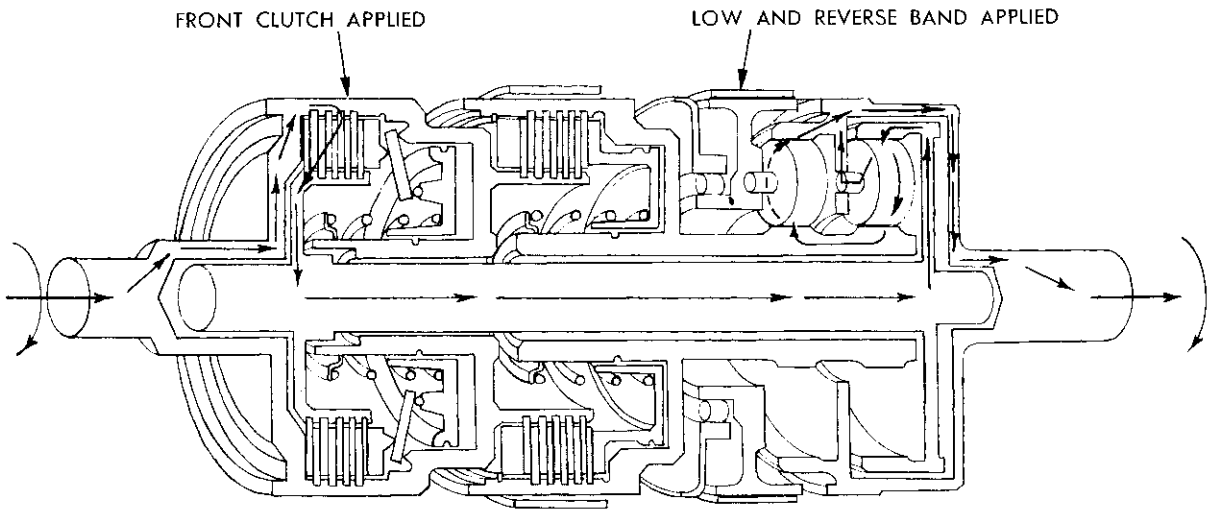


Fig. 9—Power Flow in 1 (First) Position—Low Speed

through the input shaft to the front clutch (which is applied).

From the front clutch through the intermediate shaft to the annulus gear of the kickdown (rear) planetary gear set. The kickdown band is applied which holds the sun gear stationary. The annulus gear drives the kickdown planet pinions which rotate in the same direction as the input and intermediate shafts. The kickdown planet pinions are meshed with the sun gear; therefore, they walk around this gear and exert force through the kickdown planet pinion shafts to rotate the kickdown planet pinion carrier. The carrier, which is splined to the output shaft drive housing, rotates at a slower speed than the annulus gear, thus providing a gear ratio of 1.45 to 1.

D (Drive Position) — Direct (see Fig. 8)

The power flow from the torque converter goes directly through the transmission because the planetary elements of the gear train are locked up by two multiple disc clutches and both bands are released. The torque converter provides all of the torque multiplication.

Kickdown (Forced Downshift) in D (Drive) Position Below 25 M.P.H.

This will force the transmission to downshift and the power flow will be the same as D (drive) position (breakaway).

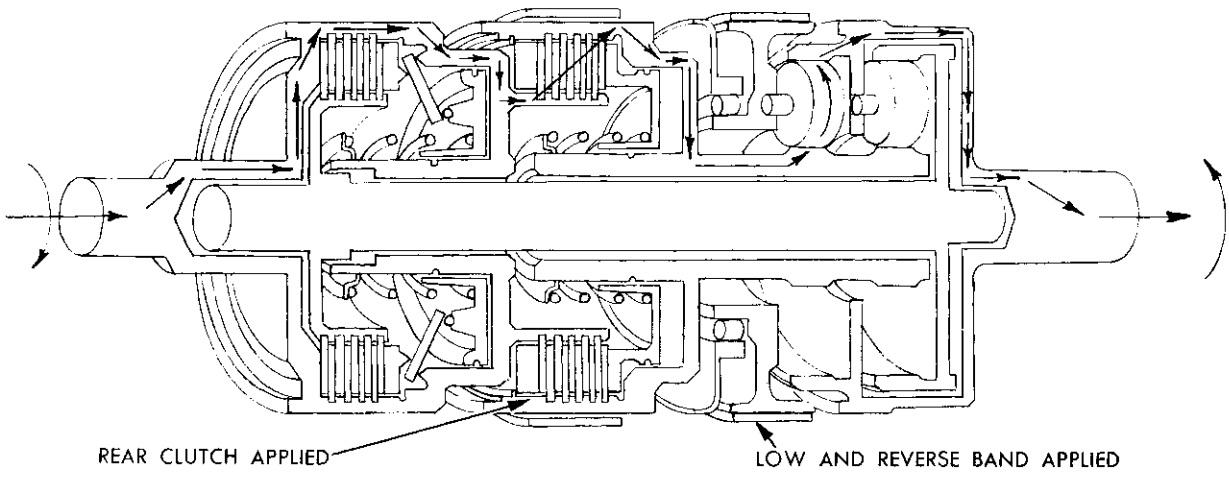


Fig. 10—Power Flow in R (Reverse) Position

Kickdown (Forced 3-2 Downshift) in D (Drive) Position 25 to 70 M.P.H.

This will force the transmission to downshift and the power flow will be the same as D (drive) position 2nd speed.

I (First Position) — First Speed (see Fig. 9)

In 1 (first) position the power flow is the same as D (drive) position (breakaway) or 2 (second) position (breakaway) with one exception, the low-reverse band is applied, locking the overrunning clutch to provide engine braking.

R (Reverse) Position (see Fig. 10)

The rear clutch and the low-reverse band are applied. All other friction elements are released. The power flow is from the torque converter turbine through the input shaft to the rear clutch hub (part of the front clutch retainer). The rear clutch is splined to the reverse sun gear. The carrier of the reverse (front) planetary gear set is held stationary by the low-reverse band; therefore, the set acts as a reverse train through the reverse planet pinions to the reverse annulus (which is splined to the output shaft drive housing) and provides a reverse ratio of 2.20 to 1.

N (Neutral) Position

All friction elements are released. Hence, there is no drive connection between the engine and the rear wheels.

Power Flow Summary

The chart summarizes power flow conditions in the various ranges as regards to gear train elements involved and the ratios obtained.

5. THE HYDRAULIC CONTROL SYSTEM

The hydraulic control system has four important functions to perform.

The pressure supply system, the clutches and band servos, the pressure regulating valves and the flow control valves.

a. The Pressure Supply System

Front Pump

Under all normal operating conditions (up to a forward speed of approximately 35 mph) the front pump, driven at engine speed, provides oil needed for torque converter pressure, control pressures, and lubrication.

CLUTCH ENGAGEMENT AND BAND APPLICATION CHART

Button Position and Drive Condition	Front Clutch	Rear Clutch	Over Running Clutch	Front (Kickdown) Band	Rear (Low & Rev.) Band
Neutral	Disengaged	Disengaged	Over Runs	Released	Released
Drive "D" Breakaway 2.45 to 1	Engaged	Disengaged	Holds	Released	Released
Drive "D" Second 1.45 to 1	Engaged	Disengaged	Over Runs	Applied	Released
Drive "D" Direct 1.00 to 1	Engaged	Engaged	Over Runs	Released	Released
Second "2" 1.45 to 1	Engaged	Disengaged	Over Runs	Applied	Released
First "1"	Engaged	Disengaged	No Movement	Released	Applied
Reverse "R" 2.20 to 1	Disengaged	Engaged	No Movement	Released	Applied

The front pump delivers oil at approximately 90 psi to fulfill these conditions at all engine speeds above approximately 700 rpm. In reverse, the front pump pressure is increased to approximately 225 psi in order to handle the high torque loads imposed during reverse operation.

Rear Pump

The rear pump (smaller than the front pump and driven by the output shaft) furnishes all of the oil required by the transmission in normal driving at all vehicle speeds above approximately 35 mph.

b. Clutches and Band Servos

Front Clutch

The front clutch transmits full engine and converter torque in all forward drive positions.

In order to develop the required capacity, a system of eight levers is used to actuate the clutch apply plate.

Rear Clutch

The rear clutch locks the gear train for direct drive operation in the forward range and transmits full input torque to the gear train in reverse operation.

Kickdown Servo

The kickdown piston actuates the kickdown band through the kickdown lever, strut, and anchor, holding the sun gear of the rear planetary set stationary and resulting in a forward ratio of 1.45 to 1 through the rear planetary gear set.

Low-Reverse Servo

The low-reverse servo has two functions which are performed independently. The first reverse servo piston is moved hydraulically to apply the first reverse band through the first reverse band lever, strut, and anchor (Fig. 10).

Accumulator

An accumulator helps to cushion the front clutch engagement when a forward drive button is pushed in and the application of the kickdown band in the upshift from breakaway to second. It is connected in parallel and to the passage which supplies line pressure to the apply side of the kickdown servo.

c. Pressure Regulating Valves

Regulator Valve

The regulator valve controls line pressure at a value of approximately 90 psi for all operating conditions except reverse.

For reverse operation, oil must be at a pressure of 225 psi. This is accomplished by shutting off the source of line pressure to the regulator valve secondary reaction area, with the result that a line pressure of 225 psi, applied to the primary reaction area, is required to overcome the force of the regulator valve spring.

Torque Converter Control Valve

This valve maintains an oil pressure of approximately 30 psi within the torque converter. Oil is fed from the regulator valve through a restricting hole in the regulator valve body to the torque converter.

Oil is routed from the torque converter control valve through the transmission lubrication system to lubricate the gear train at approximately 10 to 30 psi pressure.

Governor Valve

The governor valve assembly transmits a hydraulic pressure to the transmission which is proportional to car speed. This governed pressure, in conjunction with throttle pressure, controls upshift and downshift speeds.

Throttle Valve

The throttle valve assembly transmits a hydraulic pressure to the transmission which is proportional to the amount of throttle opening.

The throttle valve allows oil to flow from the line pressure port to the throttle pressure port, which is connected by a passage to the reactions area of the throttle valve.

Throttle pressure will vary with the amount of carburetor throttle opening from a value of 0 (zero) pressure at closed throttle to a value of approximately 90 psi at wide open throttle.

Throttle Compensator Valve

The throttle compensator valve amplifies the variations in throttle pressure. Throttle compensator pressure will vary with the amount of carburetor throttle opening from a value of approximately 10 to 16 psi (with the 1 piece valve body) at closed throttle to a value of 90 psi at approximately ¾ throttle.

d. Flow Control Valves

Front and Rear Pump Check Valves

The front pump check valve prevents back flow from the rear pump into the pressure side of the pump when the pump is either stationary or merely circulating oil at a very low pressure. The check valve separates front and rear pump.

Manual Valve

The manual valve obtains the different transmission drive ranges as selected by the vehicle operator.

Reverse Blocker Valve

The reverse blocker valve mechanically blocks the manual valve from moving into reverse position to prevent accidental reverse engagement above approximately 10-15 mph.

1-2 Shift Valve

This valve determines whether the transmission is either in first gear ratio or second gear ratio, depending upon whether the valve is in the upshifted or down-shifted position.

2-3 Shift Valve

This shift valve automatically shifts the transmission from intermediate to direct gear.

1-2 Relay Valve

This valve provides for a quick application and release of the kickdown band and rear clutch at low speeds while smoothing out their apply and release at high speeds.

Kickdown Valve

The kickdown valve makes possible a forced downshift from direct to second — second to breakaway and direct to breakaway by depressing the accelerator pedal past the detent "feel" near wide open throttle.

Shuttle Valve, Shuttle Valve Plug, and Servo Pressure Bleed Valve

The shuttle valve has two separate functions and performs each independently of the other. The first is that of providing fast release of the kickdown band, and delayed smooth rear clutch engagement when the driver makes a "lift-foot" upshift from second to direct.

The second function of the shuttle valve is to regulate the application of the kickdown piston when making high speed (above approximately 30 mph) kickdowns.

e. Operational Summary

With the D (drive) button pushed in, the manual valve is positioned to govern the full range of operation of the transmission. With the manual valve in the drive position, the front clutch is engaged and the transmission will transmit drive torque in breakaway.

Pushing in the 2 (second) button of the control unit moves the manual valve so that line pressure is directed to the kickdown circuit of the 2-3 shift valve.

Pushing in the 1 (first) button of the control unit positions the manual valve so that line pressure is directed to the kickdown circuit of the 1-2 shift valve.

Pushing in the N (neutral) button moves the manual valve to a position which shuts off oil flow to the valve body. The torque converter and lubrication system remains pressurized.

Pushing in the R (reverse) button of the control unit positions the manual valve so that oil pressure is directed to apply the rear clutch and low-reverse band.

MAINTENANCE, ADJUSTMENTS AND TESTS

CAUTION

For safety reasons and to prevent possible damage to the transmission . . . wide open throttle stall test operations should not be attempted under any circumstances.

Good transmission operation depends directly upon good engine performance. Therefore, it is of utmost importance that the engine is operating at full efficiency and at proper idle speed before attempting to diagnose or correct any transmission operation. The engine and transmission should be warmed up to operating temperature. A short drive, approximately five to ten miles, with frequent stops and starts will produce normal operating temperatures to the transmission and engine. Check oil level.

All shifts and kickdowns should occur within the speed ranges given in the Shift Pattern Summary Chart.

NOTE: All shift speeds may vary somewhat due to production tolerances, type of engine, rear axle ratios and tire sizes. All shifts, however, should be smooth, responsive and with no noticeable engine runaway.

6. OIL LEAKS

Leaks Which may be Corrected with Transmission in Vehicle

Transmission output shaft rear bushing oil seal. Extension gasket, Speedometer drive pinion assembly. Oil pan to filler tube connector. Oil pan to transmission case. Regulator valve and torque converter control valve spring retainers. Regulator valve adjusting screw. Gearshift control cable seal ring and housing gasket. Governor, lin, lubrication, rear

clutch apply and throttle (compensated) pressure check plugs in transmission case or support (pressure test holes). Neutral starting switch. Oil cooler connections.

If oil is found inside the torque converter housing, determine whether it is Automatic Transmission Fluid or engine oil. Check the torque converter drain plug for tightness.

Leaks at these locations should be corrected, regardless of how light. Correct by tightening loose screws or plugs. Where this does not remedy the situation, replace the necessary gaskets, seals or plugs.

Leaks Requiring Removal of Transmission from Vehicle

Damaged transmission case. Damaged front oil pump housing. Front oil pump housing screws or damaged sealing washers. Front oil pump housing seal (located in the large front bore of the front oil pump housing). Torque converter. Leaks at these locations may be corrected by tightening loose bolts or replacing damaged or faulty parts.

7. GEARSHIFT CONTROL CABLE ADJUSTMENT

Gearshift Control Cable Adjustment (Fig. 11)

(1) Engage the R (reverse) push button and drain approximately two quarts of fluid from the transmission.

(2) Remove the control cable adjustment wheel lock screw.

(3) Remove the neutral starting switch, cupped washer and seal.

(4) Have an assistant firmly hold the R (reverse) button until the transmsision end of cable adjustment has been completed.

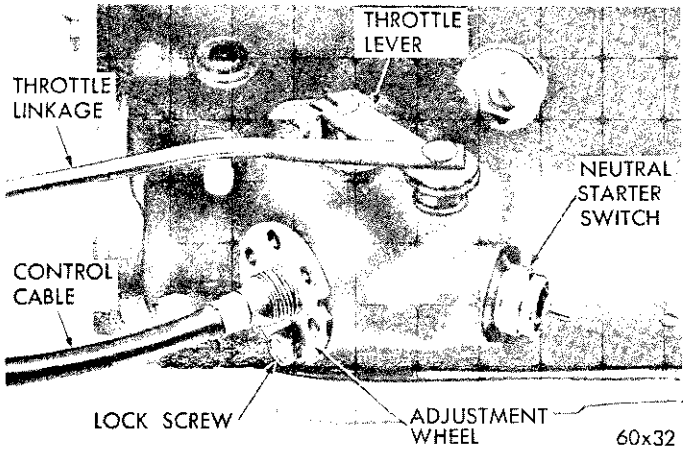


Fig. 11—Gearshift Control Cable Adjustment

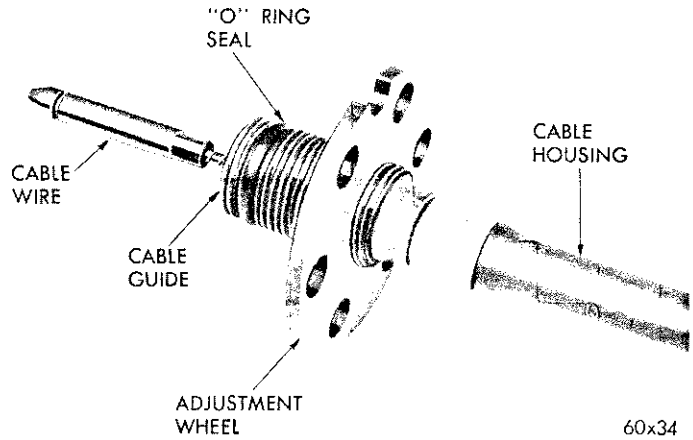


Fig. 12—Gearshift Control Cable and Adjustment Wheel

(5) Back the adjustment wheel off on cable housing (counter-clockwise) until only two or three threads are showing behind the wheel on the housing (Fig. 12).

NOTE: Check the wheel for free turning on the housing. Remove any dirt or burrs in the threads of the cable housing that may interfere. Lubricate the cable housing threads with a few drops of transmission fluid.

(6) Push the control cable housing into the case with just enough force to overcome the "O" ring friction and to bottom the assembly. Hold the cable assembly centered in the bore, and apply an inward pressure of 2 to 3 pounds against the reverse detent. Rotate the adjusting wheel to just contact the case.

(7) Turn the wheel clockwise just enough to make the next adjustment hole in the wheel line up with the screw hole in the case.

(8) Counting this hole as "number one," continue turning the wheel clockwise until the "fifth" hole lines up with the screw hole in the case.

(9) Install the lock screw, tighten 30 to 50 inch-pounds torque.

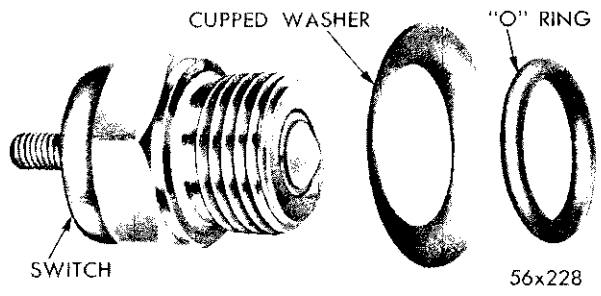


Fig. 13—Neutral Starting Switch and Seal

(10) Install the neutral starting switch as outlined in Paragraph 7. Refill the transmission with automatic transmission fluid (Type "A"—Suffix "A") to proper level.

8. NEUTRAL STARTING SWITCH — INSTALLING AND TESTING (Fig. 13)

a. Installation and Tests

Install the concave spring (cupped) washer over the threads of the neutral starting switch so that the concave (cupped) side of the washer is towards the transmission case. Install the "O" ring seal over the threads of the neutral starting switch and up against the washer.

b. Switch Lever Alignment

Check the location of the neutral starting switch lever inside the transmission, as illustrated in Figure 14.

The lever should be dead center of the neutral starter switch mounting hole (when the lever is in the neutral detent). Operation of the switch is accomplished through the contacting plunger of the switch and the manual lever. In instances where the lever is not aligned properly, it is recommended that the lever be bent with a screwdriver, or other suitable tool, to the proper location.

With the proper cable adjustment assured and the N (neutral) button depressed, make certain that the switch lever is properly aligned in the center of the neutral starting switch hole (Fig. 14). With the test leads connected to the battery current and terminal of the switch, screw the switch into the transmission case until test light lights, then turn the switch an additional ⅓ to ½ turn.

Should the test light still fail to light and the seating surfaces have been cleaned to obtain a good ground, it is recommended that the following modification be performed to the neutral starting switch.

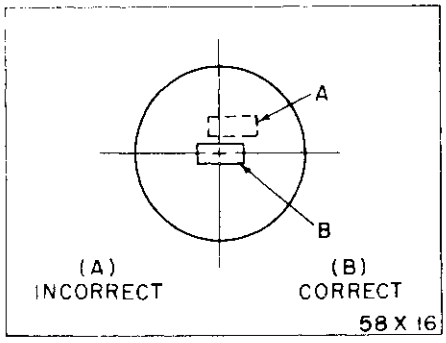


Fig. 14—Lever Alignment

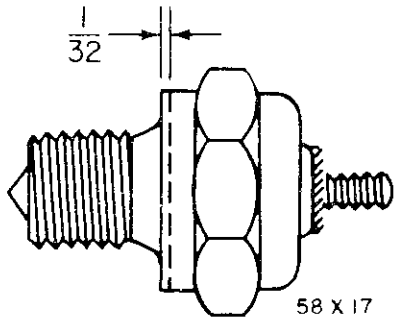


Fig. 15—Neutral Starting Switch

(1) Machine 1/32" from the seating surface of the switch, as illustrated in Figure 15.

(2) Clean the switch, replace the concave (cupped) washer and "O" ring seal, and install the switch.

(3) Tighten the switch until the test light just lights, then tighten another ⅓ to ½ turn.

NOTE: The switch must be tight enough to prevent oil leakage. If it is not, add a thin washer and retighten.

Refill the transmission to the proper level as outlined in the Lubrication Group O. Check starter operation by pushing the various push buttons and returning to neutral.

CAUTION

Neutral starting switch failure may occur due to very high amperage current flowing through the switch. This results when a jumper wire or remote control starting switch is improperly connected, when placed in the circuit when taking compression readings. It is important that the jumper leads be connected to the battery terminal and to the starter switch terminal (towards rear of car).

9. BAND ADJUSTMENTS

a. Kickdown Band

The kickdown band adjusting screw is located on the left side of the transmission case (Fig. 1).

(1) Loosen the locknut and back off 5 turns and **check the freeness of the adjusting screw in the transmission case.**

(2) Using an inch-pound torque wrench Tool C-3380 with adapter C-3583 or C-3705 (depending upon the accessibility due to type of engine and exhaust equipment) tighten the adjusting screw to a reading of 47 to 50 inch-pounds torque.

NOTE: This will be a true torque of 70 to 75 inch-pounds, which should be used if the torque wrench Tool C-3380 is used without the adapter Tool C-3583 or Tool C-3705 (as may be done if the adjustment is made with the transmission removed from the vehicle).

NOTE: All DeSoto models will take a 2 turn adjustment.

(3) Back off the adjusting screw according to the specifications applicable to the car model. (Refer to Chart on Specification page.)

(4) Holding the adjusting screw, tighten the lock nut 30 to 35 foot-pounds torque.

b. Low-Reverse Band

The low-reverse band adjusting screw is located on the right side of the transmission case (Fig. 2).

(1) Loosen the lock nut and back off 5 turns and check for freeness of the adjusting screw in the transmission case.

(2) Using wrench Tool C-3380 with adapter Tool C-3583 or Tool C-3705, tighten to a reading of 47 to 50 inch-pounds torque. **This will be a true torque of 70 to 75 inch-pounds, which should be used if the torque wrench Tool C-3380 is used without the adapter Tool C-3584 (as may be done if adjustment is made with the transmission removed from the vehicle).**

(3) Back off the adjusting screw exactly 2½ turns (all models).

(4) Holding the adjusting screw, tighten the lock nut to specifications 30 to 35 foot pounds torque.

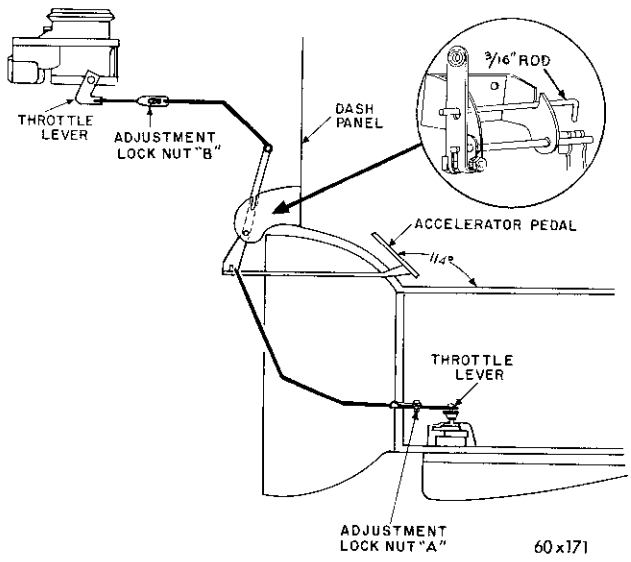


Fig. 16—Throttle Linkage Adjustments

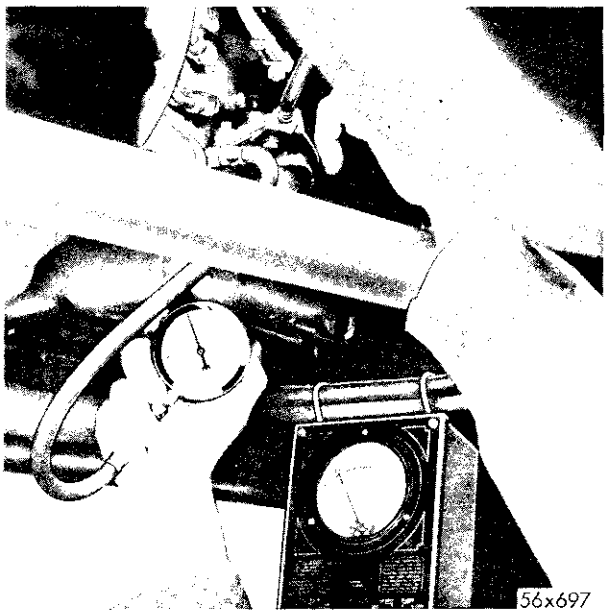


Fig. 17—Checking Line Pressure

10. THROTTLE LINKAGE ADJUSTMENTS

(Refer to Fig. 16)

(1) With the engine at operating temperature, carburetor off the fast idle cam and transmission in neutral, adjust idle speed 475 to 500 rpm (use tachometer), (ram manifold 725 to 750 rpm).

(2) Loosen the throttle linkage adjustment lock nuts on both the carburetor rod and the transmission throttle valve rod.

(3) Insert a 3/16" locating pin rod or drill bit in the hole and the accelerator shaft bracket and into the elongated hole of the throttle lever.

(4) With the rod in position, hold the transmission throttle valve lever all the way forward (closed position), and tighten transmission to accelerator lever assembly rod adjusting locknut "A".

(5) Remove the locating pin or the rod from the accelerator lever, shaft and bracket assembly.

(6) With the carburetor throttle lever off the fast idle cam and against the idle stop screw, move the rear half of the carburetor throttle rod rearward until the stop in the transmission is felt, and tighten locknut "B".

(7) The accelerator pedal should be at an angle of 114 degrees to the horizontal. If necessary to correct, adjust the pedal angle by removing the accelerator pedal end of the bellcrank to pedal rod, and shortening or lengthening the rod by loosening the locknut at the swivel end and rotating the swivel. Reinstall

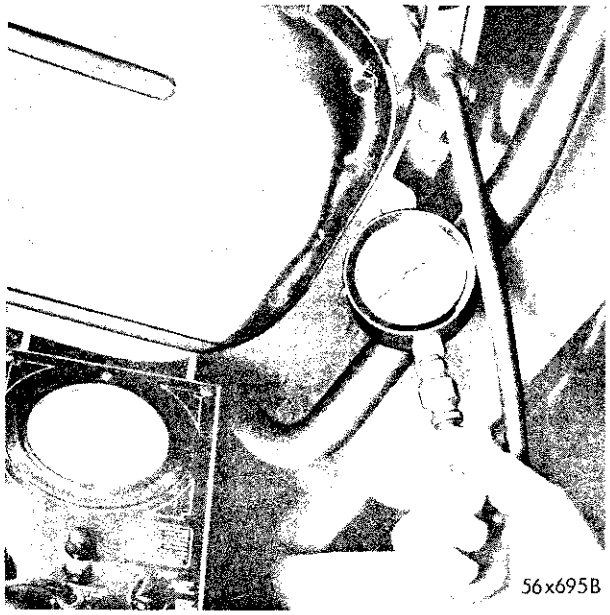


Fig. 18—Checking Governor Pressure

the rod and tighten the locknut. **Be sure the rod is properly aligned to prevent binding. Poor engine performance due to the carburetor throttle not opening fully or lack of kickdown may result if accelerator pedal angle is incorrect.**

*For cars equipped with "Ram Manifold" engines refer to Service Information at the end of this section.

11. HYDRAULIC CONTROL PRESSURE CHECKS AND ADJUSTMENTS

a. Line Pressure

Line Pressure adjustment must be made in D (drive) position with engine at 1200 rpm and wheels free to turn. Oil must be at normal operating temperature (150° F. to 200° F.).

(1) Remove the pipe plug from the line pressure take-off hole located on the left side of the transmission case (Fig. 1). Install the gauge, Tool C-2393 (300 psi), at this point (Fig. 17).

If the line pressure is not correct, adjust as follows:

(2) Loosen the lock nut on the regulator valve adjusting screw (Fig. 2).

(3) Turn the adjusting screw clockwise to increase or counter-clockwise to decrease line pressure. Line pressure adjustment must be made in D (drive) position with the engine at 1200 rpm, with wheel turning and transmission upshifted into direct speed.

All line pressure adjustments should fall within the limits specified in the table shown for all other push button positions.

If line pressure cannot be satisfactorily adjusted, check "Service Diagnosis Chart."

b. Governor Pressure (see Fig. 18)

(1) Remove the pipe plug from the governor pressure take-off hole located on the lower left side of the output shaft support (Fig. 1).

(2) Install gauge, Tool C-3292 (100 psi).

NOTE: For cars equipped with "Ram Manifold" engines, refer to Governor Pressure Chart under Service Information, Paragraph — .

If the governor pressure doesn't correspond to the car speed, check the line pressure and the "Service Diagnosis Chart."

c. Lubrication Pressure

(1) Remove the oil cooler line and fitting from the lubrication pressure hole located on the left side of the transmission case (Fig. 1).

*LINE PRESSURE CHART

Push Button Position	Rear Wheels	Engine Speed (rpm)	Line Pressure (psi)
R	Free to Turn	1600	200 - 240
N	—	1200	85 - 95
D (Shifted into Direct)	Free to Turn	1200	89 - 91
2	Free to Turn	1200	85 - 95
1	Free to Turn	1200	85 - 95
D	Free to Turn	3500	93 - 100

*NOTE: For cars equipped with "Ram Manifold" engines refer to Line Pressure Chart under Service Information at the end of this section.

GOVERNOR PRESSURE CHART

Push Button Position	Rear Wheels	Car Speed					Governor Pressure
Models		PS-1, PS-3	PC-1	PC-2	PC-3	PY-1	
2 (Second)	Free to Turn	15-20	18-22	18-22	18-23	19-24	15 psi
D (Drive)	Free to Turn	37-44	41-50	43-51	43-51	45-54	50 psi
D (Drive	Free to Turn	61-68	69-77	72-80	72-80	75-83	75 psi

(2) Install gauge, Tool C-3292 (100 psi). With engine running at 800 rpm in neutral, lubrication pressure should be approximately 10 to 30 psi.

If the pressure is extremely high (above 50 psi) remove the Torque Converter Control Valve (Fig. 2) and inspect for a dirty or sticking valve, or a distorted spring or regulator valve body.

d. Throttle Compensated Pressure

(1) Raise vehicle off the floor (wheels free to turn).

(2) Install gauge, Tool C-3292 (100 psi) at throttle compensated pressure take-off plug (refer to Fig. 2).

(3) Disconnect the bell crank to transmission throttle linkage at the transmission.

(4) Start engine and place the transmission in "2" (second) position.

(5) While holding the transmission throttle lever towards the closed throttle position (against the internal stop) increase engine speed slowly (using accelerator pedal or suitable throttle control fixture) to approximately 850 rpm to obtain an upshift into 2nd speed.

After the shift takes place, compensated throttle pressure should read 10 to 16 psi.

(6) Move throttle lever (at transmission) slowly towards full throttle. Compensated throttle pressure should begin to rise after approximately 5 degrees movement of the throttle lever. If compensated throttle pressure rises immediately when the lever is moved, or if the pressure is above 16 psi but fails to rise after approximately 5 degrees movement, the throttle pressure should be adjusted (refer to Paragraph E).

(7) Before stopping the engine, advance the throttle control lever (at transmission) slowly and then return it to closed throttle. Compensated throttle pressure should rise to approximately 80 to 90 psi and then fall smoothly without hesitation and should always return to a consistent reading at closed throttle. Failure to do this indicates faulty throttle compensated valve or throttle valve operation. The valve body assembly should then be thoroughly cleaned and these steps repeated before continuing with a throttle pressure adjustment.

e. Adjusting Compensated Throttle Pressure

NOTE: Check the "Throttle Compensated Pressure" as outlined in Paragraph 10-D before making this adjustment. Then proceed as follows:

(1) If the gauge reading is outside the 10 to 16 psi limits, adjust the throttle valve link (at the slotted lower end) Figure 19 to obtain this reading. Usually to obtain the smoothest 1-2 upshift, it is recommended that the pressure reading be at the high limit 16 psi. Tighten the slotted link clamp

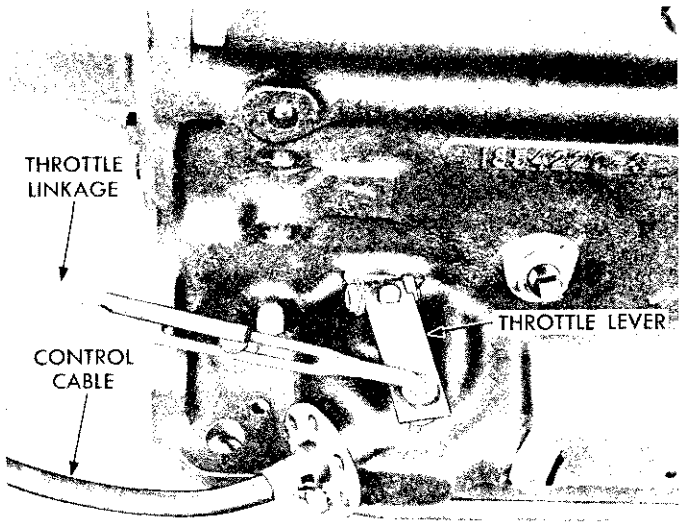


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Fig. 19—Throttle Compensated Pressure Adjustment

bolt. The transmission throttle linkage adjustment is now correct, however, for aiding in future adjustments, it is recommended that the throttle valve stop screw be correctly set.

(2) Push in the "N" Neutral button. Block the carburetor choke in the open position.

(3) Drain the transmission fluid. Remove the transmission oil pan.

(4) Adjust the transmission throttle valve stop screw so that the end of the stop screw just contacts the throttle lever with the accelerator pedal released. Tighten the stop screw lock nut.

(5) Install the transmission oil pan using a new gasket. Refill the transmission to proper fluid level.

SERVICING THE GEAR SHIFT CONTROL UNIT

12. REMOVAL AND INSTALLATION

a. Removal

(1) Disconnect one battery cable.

(2) Disconnect the back-up light switch wire connectors of push button control, and the illuminating lamp leads from the rear of the instrument panel.

NOTE: On Imperial Models, in order to get access to the control unit from the rear of the instrument panel, the speedometer should be removed. Refer to the Electrical Group 8 of this Manual under "Instruments" for removal procedures.

(3) Remove the screws of push button face plate and remove the push buttons by pulling it off push button slide. Remove the lamp bulb.

(4) Remove the control housing stud nuts that are now accessible and remove the control and the cable from the rear of the instrument panel.

(5) Remove the clip attaching control cable to the actuator and the screws holding the cable bracket to the control housing.

b. Installation

(1) Insert the end of cable on the actuator and reassemble the clip. Place the cable bracket on the control unit and install the screws securely.

(2) Carefully guide the unit into position from the rear of the instrument panel and install the attaching stud nuts from the front side of instrument panel.

(3) Install the lamp built in the push button control and reinstall the push buttons onto the control actuator slides. Replace the face plate.

(4) Connect the back-up light switch and the push button illuminating lamp wires.

c. Back-Up Light Switch Replacement (when so equipped)

Remove the gearshift control housing assembly. The back-up light switch is fastened to the control by four tabs. Straighten the tabs to remove switch. Install the replacement switch and secure to control housing by bending tabs. Install the gearshift control housing and reconnect the switch and lamp wires.

13. PUSH BUTTON UNIT LAMP BULB REPLACEMENT

The push button illuminating bulb can easily be replaced by removing the push button face plate and removing one or more of the center push buttons.

14. GEARSHIFT CONTROL CABLE (TRANSMISSION END)

a. Removal (Fig. 20)

(1) Raise the vehicle on a hoist and drain two quarts (approximately) of oil from the transmission.

CAUTION

Oil may be hot!

(2) Engage the 1 (first) push button.

(3) Remove the control cable adjustment wheel lock screw.

(4) Remove neutral starter switch, cupped washer and seal.

(5) With a screwdriver, inserted through the switch hole, push gently against upward projecting portion of the control cable adapter spring and pull outward on cable and remove the cable assembly from the transmission case.

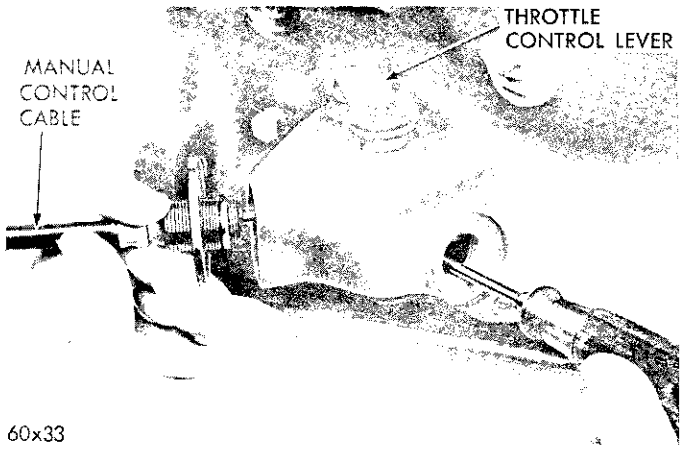


Fig. 20—Removal of the Gearshift Control Cable

b. Installation (Fig. 12)

(1) Have an assistant engage the R (reverse) button and hold it firmly engaged until the cable attachment operation is completed.

(2) Back the adjustment wheel off on the cable housing (counter-clockwise) until only two or three threads are showing behind the wheel on the guide.

(3) Lubricate the cable housing with transmission fluid, insert the cable wire in the adapter, and slide the cable housing into the case with just enough force to overcome "O" ring friction and the manual lever assembly bottoms against the reverse detent. Pull out on the cable to make sure that the adapter spring has engaged the cable end.

(4) Hold the control cable assembly centered in the bore of the hole in the transmission case and apply an inward pressure of approximately 2 to 3 pounds against the reverse detent. Rotate the adjusting wheel clockwise until it just contacts the transmission case.

(5) Turn the wheel clockwise just enough to make the next adjustment hole in the wheel line up with the screw hole in the case.

(6) Counting this hole as "number one," continue turning the wheel clockwise until the fifth hole lines up with the screw hole in the case.

(7) Install the lock screw, tighten 30 to 50 inch-pounds torque.

(8) Install the neutral starting switch as outlined in Paragraph 8. Refill the transmission with Automatic Transmission Fluid Type "A", Suffix "A" to proper level.

SERVICING OF COMPONENT PARTS WITH TRANSMISSION IN VEHICLE

15. SPEEDOMETER PINION

a. Removal

Disconnect the speedometer cable and the housing from the drive pinion and sleeve assembly. Remove the speedometer pinion and sleeve assembly from the transmission extension. Refer to chart.

b. Installation

Install the speedometer pinion and sleeve assembly

SPEEDOMETER PINION USAGE CHART

(TorqueFlite Transmission)

Tire Size	Axle Ratio—Speedometer Pinion Operation Indicating Number of Pinion Gear Teeth and Color			
Axle Ratios (All Models)	2.93:1	*3.31:1	**3.54:1	**3.73:1
8.00 x 14	17 - Red	20 - L. Blue	21 - Yellow	21 - Yellow
8.50 x 14	17 - Red	19 - L. Purple	20 - L. Blue	21 - Yellow
*9.00 x 14	19 - L. Purple	—	—	—

*Standard on C-300F only.
**DeSoto Cars only.

in the transmission extension and tighten 40 to 45 foot-pounds torque.

16. NEUTRAL STARTING SWITCH

a. Removal

Drain approximately three quarts of fluid from the transmission by disconnecting filler tube at oil pan connector (may be necessary to loosen the filler tube support bracket screw). Remove wire at switch the remove switch.

b. Installation

Refer to Paragraph 8.

17. REGULATOR VALVE ASSEMBLY

a. Removal

Remove the transmission regulator valve spring retainer, the gasket, cup, spring and sleeve. Using a mechanical retriever or a piece of welding rod (5/32″) inserted in end of valve, remove valve (Fig. 21).

b. Installation

With the assistance of the retrieving tool, place the valve in position and seat properly in regulator valve body. Install regulator valve spring, sleeve, cup, gasket and retainer and tighten to 50 foot-pounds torque. Check the line pressure and adjust if necessary.

18. TORQUE CONVERTER CONTROL VALVE ASSEMBLY

a. Removal

Remove the torque converter control valve spring retainer, gasket and spring. Using a mechanical retriever or a piece of welding rod (⅛″) inserted in end of valve, remove valve.

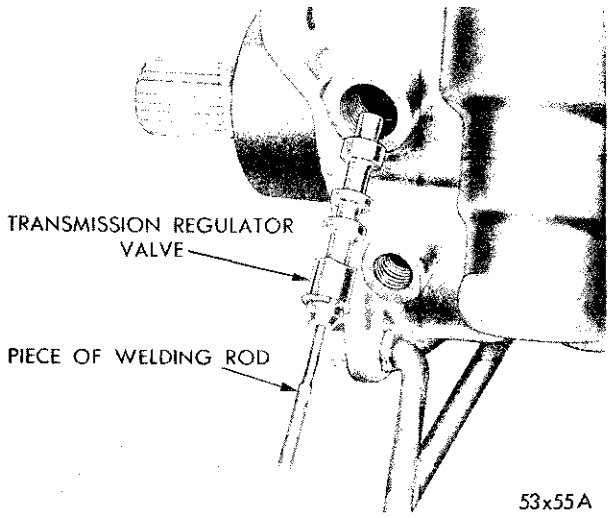


Fig. 21—Removing Regulator Valve

b. Installation

With the assistance of the retrieving tool, place valve in position and seat properly in regulator valve body. Install torque converter control valve spring, gasket and retainer and tighten to 40 foot-pounds torque.

19. OIL PAN

a. Removal

The oil pan may be removed after disconnecting the filler tube and draining the oil from the transmission. Remove screws and drop pan.

b. Installation

Using a new gasket, install the oil pan and tighten bolts 12 to 17 foot-pounds torque. Reconnect filler tube and refill transmission with Automatic Transmission Fluid (Type "A" — Suffix "A"). Refer to Lubrication Group D.

20. VALVE BODY AND TRANSFER PLATE ASSEMBLY OR ACCUMULATOR PISTON

a. Removal

(1) Engage R (reverse) push button and remove oil pan and clean off the dirt around the throttle shaft.

(2) Disconnect throttle linkage and remove throttle valve lever and washer.

(3) Remove the manual control lever to the cable adapter stud nut.

(4) Remove the oil strainer and transfer plate bolts and lower valve body and transfer plate assembly. Be careful not to lose the accumulator piston spring and cable adapter.

b. Installation

(1) Clean the mating surfaces and check for burrs on both the transmission case and the valve body transfer plate.

(2) Place manual lever in the reverse position (all the way in).

(3) Install the accumulator piston spring into recess in top of the transfer plate and carefully guide the spring up into the accumulator piston as the transfer plate and valve body are placed up against the transmission case. At the same time index the cable adapter stud into the manual control lever. Install the transfer plate bolts and washers (leaving four holes vacant to attach oil strainer) draw down evenly and tighten 14 to 16 foot-pounds torque. Install and tighten the stud nut securely. Install oil

strainer and tighten the remaining bolts 14 to 16 foot-pounds torque.

(4) Install the throttle valve lever and washer and reconnect the throttle linkage.

(5) Install oil pan and refill the transmission with Automatic Transmission Fluid (Type "A" — Suffix "A") to proper level.

(6) Adjust the throttle linkage.

21. KICKDOWN PISTON

a. Removal

(1) Remove oil pan and valve body assembly.

(2) Loosen the kickdown band adjusting screw lock nut and back out screw sufficiently to remove anchor and strut.

(3) Install compressing Tool C-3529 or C-3289 (modified), apply sufficient pressure on kickdown piston rod guide and remove snap ring.

(4) Remove tool, piston rod guide, piston spring and rod. Using C-484 pliers, remove the kickdown piston from transmission case (Fig. 22). Refer to Kickdown Piston Inspection, Paragraph 82.

b. Installation

(1) Lubricate the piston seal rings and place piston in position, compress outer ring and start assembly into case. With the piston properly centered so as not to damage rings, tap lightly until piston bottoms in case.

(2) Place the kickdown piston rod assembly in piston and slide piston spring over kickdown piston rod.

(3) Install Tool C-3529 or C-3289 (Modified) on case and place kickdown piston rod guide over spring, compress spring and install snap ring. Remove compressing tool.

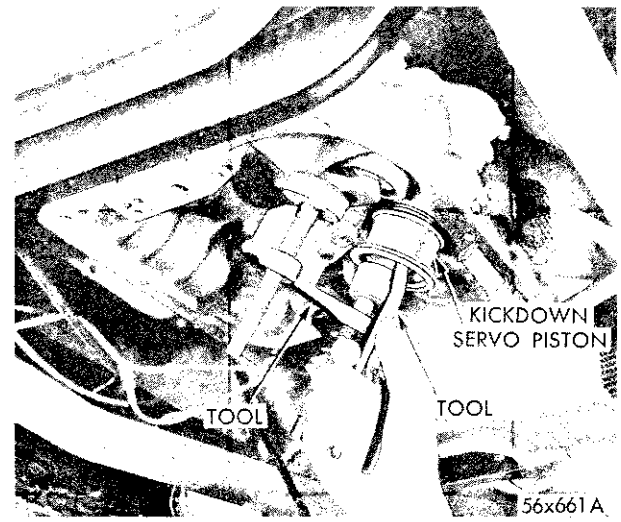


Fig. 22—Removal and Installation of Kickdown Piston

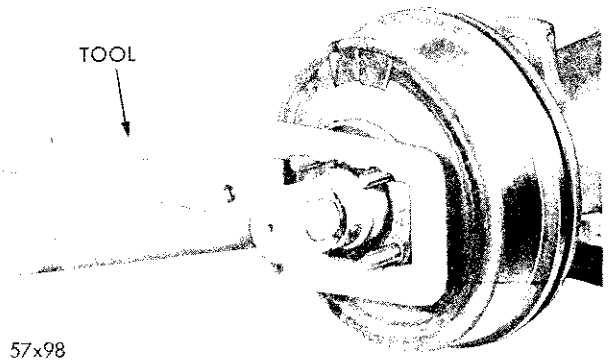


Fig. 23—Removing Handbrake Drum and Flange Assembly

(4) Place the kickdown band strut into position in the band and lever and compress band end sufficiently to install the anchor over the adjusting screw.

(5) Adjust kickdown band as outlined under "Maintenance, Adjustments and Tests," Paragraph 9A).

(6) Install valve body assembly and oil pan.

22. OUTPUT SHAFT REAR OIL SEAL

a. Removal

(1) Disconnect the front universal joint.

(2) Apply parking brake or use wrench Tool C-3281 (Fig. 23) and remove flange nut. Release the parking brake (if applied) and remove the parking brake flange and drum assembly. Use puller Tool C-452, if necessary.

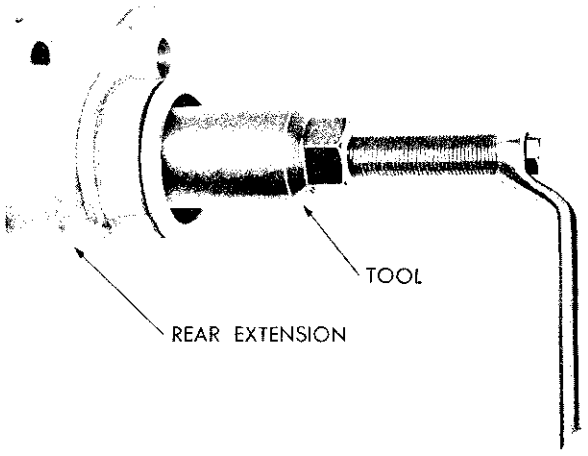


Fig. 24—Removing Output Shaft Rear Bearing Oil Seal

(3) Remove the brake support grease shield spring and grease shield.

(4) If screwdriver or sharp instrument is used in performing this operation, care must be exercised not to damage the neoprene sealing surface at bottom of the shield.

Install puller, Tool C-3690 and remove the transmission output shaft rear bushing oil seal (Fig. 24).

b. Installation

(1) Using driver, Tool C-3691, install the output shaft rear oil seal (with metal portion of seal facing down in housing bore) until tool bottoms on extension, as shown in Figure 25.

(2) Install brake support grease shield on extension housing. Indent on grease shield must match groove in extension for correct positioning. Also, shield must be located on extension far enough to permit installation of spring. Install grease shield spring with opening in spring toward adjusting sleeve.

(3) Reinstall parking brake flange and drum assembly, washer (convex side toward nut) and nut. Apply parking brake or use wrench, Tool C-3281, and tighten nut to 175 foot-pounds torque.

(4) Reconnect front universal joint and tighten bolts 33 to 37 foot-pounds torque. Check the transmission fluid level and refill if necessary.

23. EXTENSION HOUSING OR BUSHING

a. Removal

(1) Drain approximately two quarts of fluid from the transmission.

(2) Disconnect front universal joint.

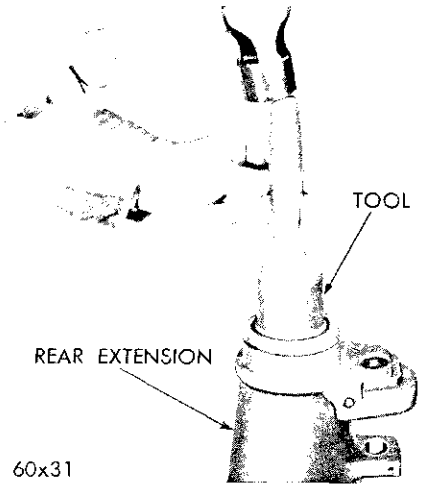


Fig. 25—Installing Output Shaft Rear Bearing Oil Seal

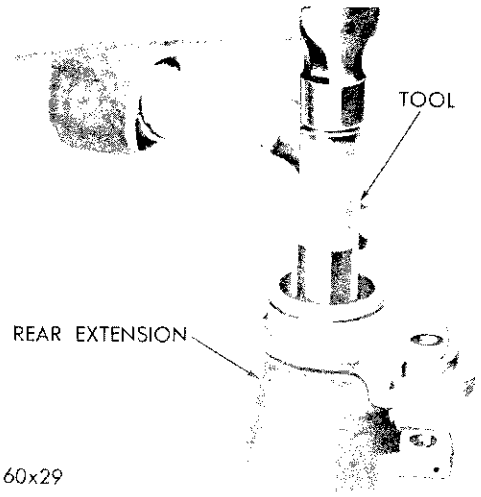


Fig. 26—Removing Output Shaft Rear Bushing

(3) Remove the propeller shaft flange and parking brake drum assembly, using puller Tool C-452, if necessary.

(4) Disconnect parking brake and speedometer cables. Remove the speedometer drive pinion sleeve assembly.

If the output shaft rear bushing is to be replaced, the oil seal must be removed at this point; otherwise, step No. 5 should not be performed.

(5) Install puller, Tool C-3690, and remove output shaft oil seal.

(6) Install the engine support fixture, Tool C-3487. Refer to Paragraph 26, Step No. 10. Adjust fixture to support the weight of the engine. Raise engine slightly, remove the crossmember to torsion bar bracket bolts. (Rear motor support and bracket may be left on transmission extension for transmission repairs or transferred to new parts after extension housing has been removed).

Remove the two screws holding the extension housing to support plate and install guide studs, Tool C-3283 and then remove the balance of the screws. Due to interference at the insulator, it will be necessary to back the lower screw out as the extension is removed. **Do not allow the output shaft support to slide away from transmission case while extension is being removed.**

Remove extension and parking brake as one assembly. If care is used, it is not necessary to remove the parking brake support and shoe assemblies from extension to replace the output shaft rear bushing.

(7) With the larger end of the extension housing on a flat surface, use bushing removing driver, Tool

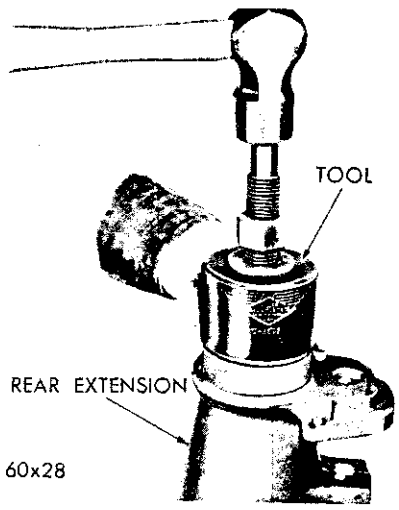


Fig. 27—Installing Output Shaft Rear Bushing

C-3689, and drive bushing out of housing. (Refer to Fig. 26).

b. Installation

(1) Place a new bushing on drive burnisher, Tool C-3692, with lubrication hole in bushing toward end of the tool. Align the hole in bushing with lubrication hole in the housing and drive the bushing into housing until the tool bottoms (refer to Fig. 27).

(2) While holding the screw of tool (Fig. 28) to prevent turning, turn nut on tool until burnisher is pulled back out of bushing to correctly size bushing. Recheck indexing of lubrication hole in bushing with housing.

(3) Use driver, Tool C-3691, install output shaft oil seal (with metal portion of seal facing down in housing bore) until tool bottoms on extension.

(4) Using a new gasket, slide extension assembly

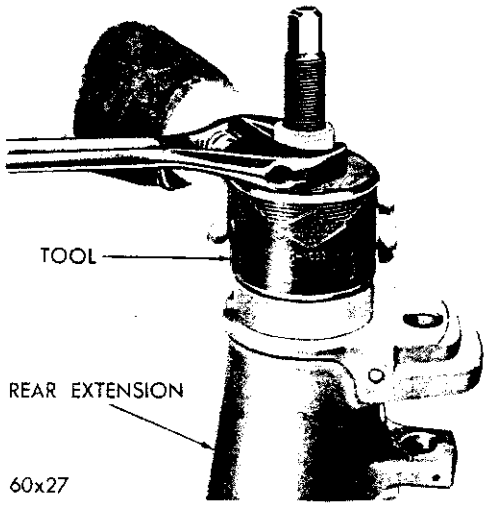


Fig. 28—Burnishing Output Shaft Bushing

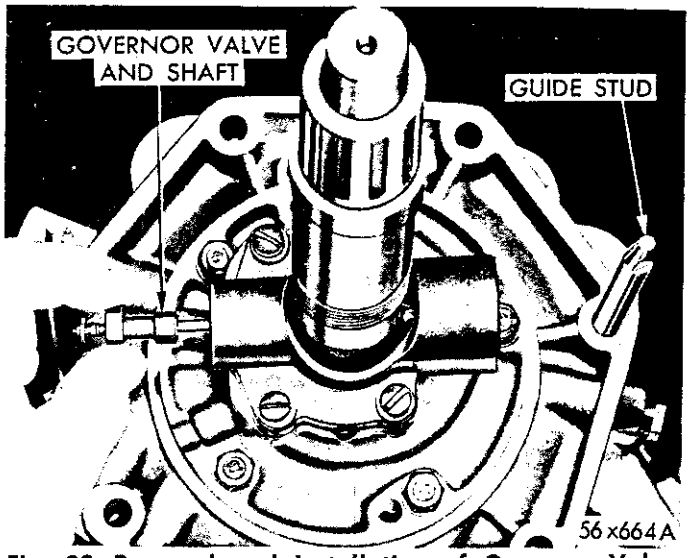


Fig. 29—Removal and Installation of Governor Valve Shaft and Valve

over guide studs in transmission case up against output shaft support. **Do not use sealing material on gasket.**

(5) Start extension to case screws. **Due to interference of the mounting insulator, it will be necessary to start the bottom extension housing to case screw as the extension is pushed into position against the support.** Remove the guide studs and install the remaining screws and tighten 25 to 30 foot-pounds torque. Turn output shaft to make sure it turns freely.

(6) Lower the transmission and install crossmember bolts. Remove engine support fixture.

(7) Reconnect parking brake cable. Install speedometer pinion sleeve and tighten 40 to 45 foot-pounds torque and connect cable.

(8) Install the propeller shaft flange and drum assembly, washer and nut and tighten to 175 foot-pounds torque. Connect front universal joint and tighten nuts 33 to 37 foot-pounds torque.

(9) Refill the transmission to proper fluid level.

24. GOVERNOR

a. Removal

(1) Remove extension assembly as described in previous section.

(2) Remove governor valve shaft snap ring from the weight end of the shaft and remove the shaft and valve (Fig. 29).

(3) Using Tool C-3229, remove the governor weight assembly snap ring (large) and remove governor weight. The primary cause of governor operating failures is due to improper operation of the

governor valve which may be sticking in housing or travel restricted by chips or other foreign matter. If inspection reveals necessity for further governor servicing, then remove the governor support locating screw and remove governor and support assembly from rear oil pump housing (Fig. 30). Normal servicing does not require removal of the governor body from the governor support. **If condition warrants removal of governor body from governor support, do not tighten governor body screws when reassembling until governor body support is located on output shaft.**

b. Installation

(1) Slide the governor body and support assembly into oil pump housing. It will be necessary to compress seal rings on governor support. **Do not force.**

(2) Align the locating hole in output shaft with hole in governor support, install set screw and tighten to 60-80 inch-pounds. If the governor body had been removed from support, the four governor body screws should now be tightened.

(3) Place the governor weight assembly (secondary weight snap ring facing out) into governor body, use pliers, Tool C-3229, and install snap ring, convex side facing out.

(4) Slide the governor valve over governor valve shaft, insert the shaft and weight into governor weight and install snap ring securely (Fig. 31). Check operation of governor weight assembly and valve by turning output shaft. Both should fall freely in body.

(5) Install the transmission extension.

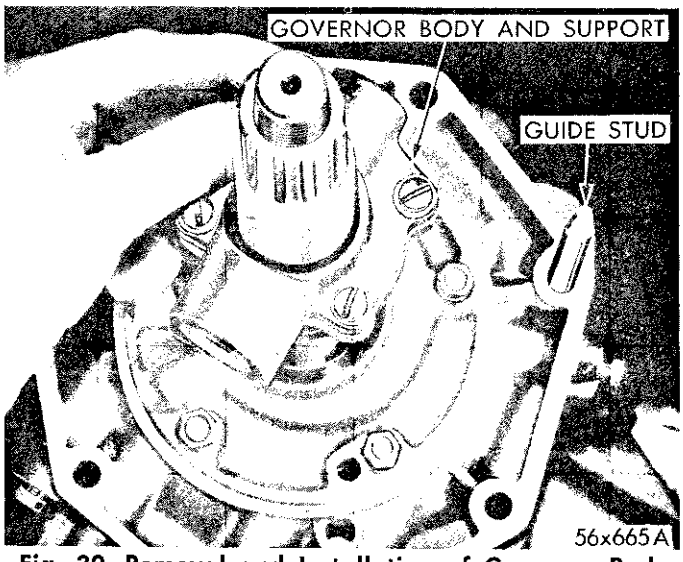


Fig. 30—Removal and Installation of Governor Body and Support Assembly

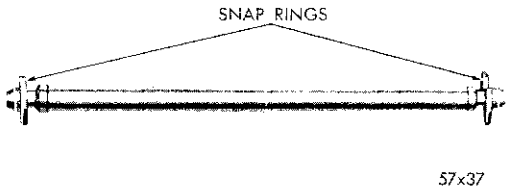


Fig. 31—Positioning Governor Valve Shaft Snap Rings in Grooves

25. REAR OIL PUMP

a. Removal

(1) Remove the transmission extension and governor assembly as outlined in Paragraph 24.

(2) Remove oil pump housing to output shaft support screws and install guide studs, Tool C-3288. Remove pump housing and gear from output shaft. Use dye (or other suitable material) to mark pump gears in relation to the pump housing face.

NOTE: Do not use scribe. Oil pump pinion is keyed to output shaft pinion by a small ball. Use care when removing pinion so as not to lose ball.

b. Installation

(1) Slide the governor support and body assembly into position in rear oil pump housing. **Compress the seal rings as support enters oil pump housing. Do not force.**

(2) Place the oil pump pinion ball in ball pocket in output shaft. Place the rear oil pump pinion (as marked when removed) over output shaft and into position aligning keyway in the pinion with the ball in shaft.

(3) With the rear oil pump gear properly positioned in pump housing (check marking), slide the rear oil pump and governor assemblies over output shaft and guide studs into position against support. **There are two extra holes in housing which are used for vents. Make definitely sure you do not attempt to install screw in these holes.**

(4) Remove the guide studs, install oil pump housing to output shaft support screws and tighten 10 to 12 foot-pounds torque. Turn output shaft to make sure pump gears are free to rotate. If not, remove pump to determine cause of binding.

(5) Align locating hole in output shaft to locating screw hole in governor support; install locating screw and tighten.

Check operation of the governor weight assembly and valve by turning output shaft. Both weights should fall freely in body.

(6) Install the transmission extension.

DISASSEMBLY, INSPECTION AND ASSEMBLY OF COMPONENT PARTS

26. REMOVAL OF TRANSMISSION FROM VEHICLE

(1) Disconnect battery.

(2) Engage the R (reverse) push button. **It will be necessary for the control cable adapter to be in this position (for accessibility) when removing cable from transmission.**

(3) Drain transmission and torque converter. When the fluid has drained, replace torque converter drain plug and tighten.

(4) Disconnect the front universal joint and fasten the propeller shaft out of the way.

(5) Remove the brake adjusting screw cover plate and loosen cable clamp bolt on parking brake support. Disengage the ball end of the cable from the operating lever and remove cable from brake support.

(6) Disconnect the speedometer cable and housing at transmission extension, neutral starter switch wire and throttle control linkage from throttle lever at transmission.

(7) Remove the push button control cable adjustment wheel locking screw and the neutral starter switch.

(8) Insert a screwdriver through the neutral switch hole, contact the top end of the cable-to-adapter locking spring and while releasing the lock, pull out the cable (Fig. 20).

(9) Disconnect the oil cooling lines from the transmission.

(10) Install the engine support fixture, Tool C-3487. (On some models it may be necessary to remove the starter to provide clearance for fixture support ends.) Insert hooks of fixture firmly into holes in side of frame member with support ends up against the underside of oil pan flange.

(11) Adjust the fixture to support the weight of the engine. Raise engine slightly, remove crossmember to torsion bar bracket bolts.

CAUTION

When using fixture, Tool C-3487, do not lower engine more than three inches from floor pan to avoid disrupting the set position of the water hose and other engine attachments.

Rear motor support and bracket may be left on transmission extension during transmission repairs. When it is necessary to replace the extension housing, it can be transferred on the bench.

(12) Remove the two transmission case to torque converter housing screws and lockwashers from the right side and install guide studs, Tool C-3276. With the transmission supported, remove the two transmission case to torque converter housing screws and lockwashers from left side. Slide the transmission straight back to avoid damage to the front oil pump driving sleeve, then lower to the floor.

27. FLUSHING TORQUE CONVERTER

In the event that any part of the transmission has failed, it will be necessary to flush the torque converter to insure that fine metallic particles are not later transferred into the transmission controls.

(1) Using a long spouted can, slowly pour 2 quarts of new, clean kerosene into the torque converter hub. Before this can be done, it will be necessary to reach into the torque converter with a screwdriver and turn the torque converter stator hub counterclockwise (large splined hub) by lifting on the right side of the spline so that one of the $\frac{1}{8}$″x$\frac{3}{8}$″ rectangular slots on this assembly is visible at the top. Since there is a second slot directly below, an adequate opening is provided for the kerosene (if poured slowly). After the kerosene is in the torque converter, close the hub opening with masking tape.

(2) Disconnect the coil wire to prevent the engine from starting and rotate the converter approximately 10 seconds by cranking the engine with the starter.

(3) Drain the converter by removing the drain plug and masking tape. Realign the stator hub and repeat the above procedure at least once (or if there is excessive contamination, until the kerosene drained out is clear). To complete the flushing procedure, rotate the converter with the drain plug removed. This will remove any residual solvent and trapped dirt. Reinstall the drain plug or plugs.

28. PRECAUTIONS TO OBSERVE DURING DISASSEMBLY

The following precautions should be observed during

disassembly of the transmission: Cleanliness through the entire disassembly and assembly cannot be overemphasized. Unit should be thoroughly cleaned when removed from the vehicle, preferably by steam. When disassembling, each part should be placed in a suitable solvent, washed, then dried by compressed air. **Do not wipe parts with shop towels.** All of the mating surfaces in the transmission are accurately machined; therefore, careful handling of parts must be exercised to avoid nicks or burrs.

The use of crocus cloth is permissible where necessary, providing it is used carefully. When used on valves, use extreme care so not to round off the sharp edges. The sharp edge portion is vitally important to this type valve. Sharp edges prevent dirt and foreign matter from getting between the valve and body, thus reducing the possibilities of sticking. When a vehicle has accumulated considerable mileage and it becomes necessary to recondition the transmission, install new seal rings on parts requiring their usage. **The following procedures are based on the assumption that the unit has been removed from vehicle and prepared for disassembly.**

29. OIL PAN REMOVAL

Attach stand, Tool C-3280, to the transmission and invert, as shown in Figure 32. Remove the oil pan.

30. VALVE BODY AND TRANSFER PLATE—REMOVAL

(1) Remove the throttle valve lever and flat washer.

(2) Remove the cable adapter stud nut.

(3) Remove the oil strainer.

(4) Remove attachment nut from cable adapter stud at manual lever and remove the adapter.

(5) Remove the transfer plate bolts and remove the valve body assembly from the transmission (Fig. 33). Mating surfaces are machined: Use extreme care so as not to damage these surfaces. Place valve body in stand, Tool C-3528.

(6) Remove the accumulator piston spring.

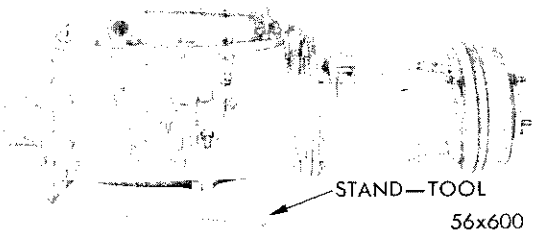


Fig. 32—Transmission Assembly Inverted in Stand

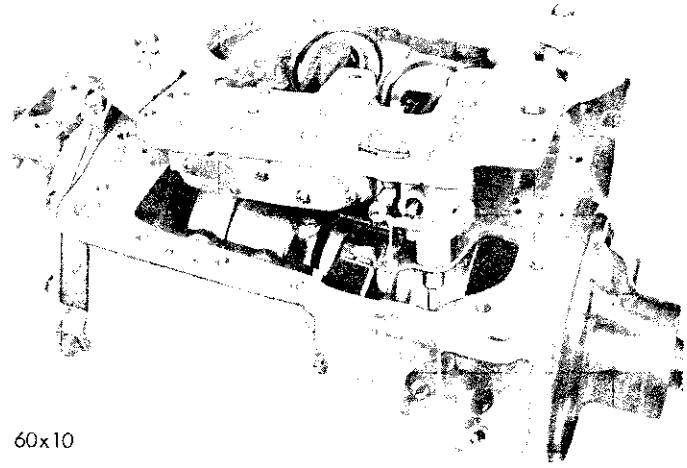


Fig. 33—Removal of the Valve Body Assembly

31. CHECKING FRONT CLUTCH END CLEARANCE

Prior to removal of propeller shaft flange and drum assembly, measure the end clearance of front clutch piston retainer assembly.

(1) Install dial indicator, Tool C-3339, as shown in Figure 34.

(2) To make this measurement, pry front clutch forward by carefully inserting screwdriver between the front and rear clutch piston retainers.

(3) Remove screwdriver and with the dial indicator point contacting edge of front clutch retainer, set dial indicator to zero.

(4) Pry the front clutch piston retainer assembly rearward against rear clutch, remove screwdriver and take indicator reading. This clearance should be from .020″ to .050″. If the clearance exceeds the specified limit, particular attention should be paid

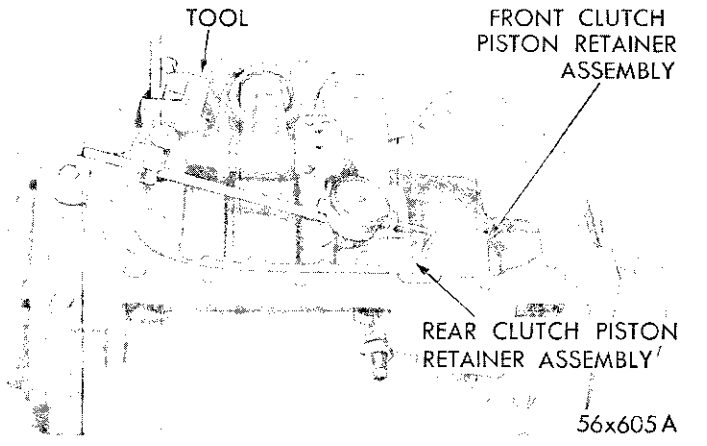


Fig. 34—Checking Front Clutch Piston Retainer Assembly End Clearance

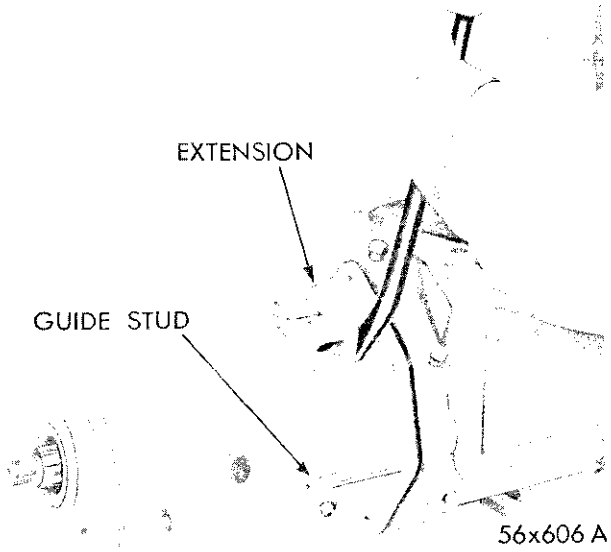


Fig. 35—Removal of Extension

to the condition of the input shaft thrust washer when disassembling transmission and a thrust washer of the correct thickness selected during assembly.

32. PARKING BRAKE ASSEMBLY — REMOVAL

(1) Remove the transmission flange nut and washer. Use wrench, Tool C-3281, to hold the brake drum and flange assembly, see Figure 23.

(2) Attach puller, Tool C-452, if necessary, and remove the propeller shaft flange and the drum assembly. Inspect lining contact surfaces on brake drum assembly for scoring and inspect the brake lining for wear.

(3) Remove the transmission brake support grease shield spring.

(4) Remove C type retainer.

(5) Remove the brake support grease shield from

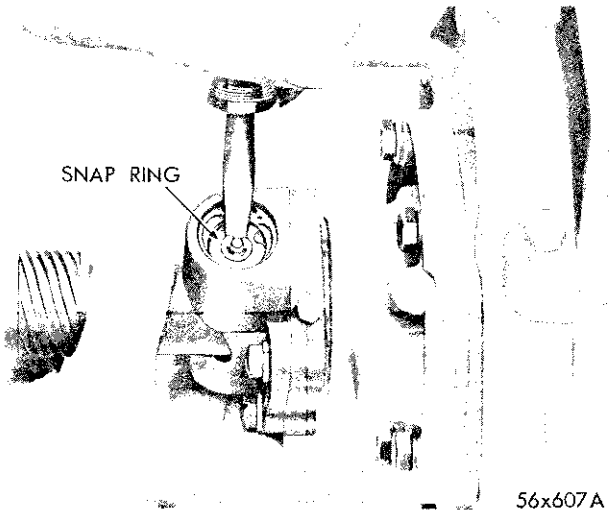


Fig. 36—Removal and Installation of Governor Valve Shaft Snap Ring

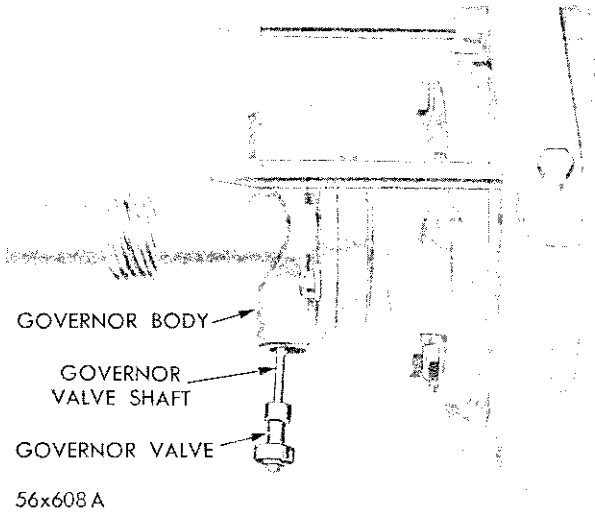


Fig. 37—Removal and Installation of Governor Valve and Shaft

extension. If a screwdriver or sharp instrument is used in removal of this shield, care must be exercised not to damage the neoprene sealing surface at bottom of shield. Note the indent on the grease shield for correct positioning on the extension.

(6) Using a suitable drift, remove pin which attaches the brake shoe anchor in the extension housing. Slide the balance of parking brake assembly intact from extension housing. Inspect the spacer (neoprene) on back of support plate for deterioration and note the steel sleeve used between neoprene space and extension.

33. EXTENSION HOUSING — REMOVAL

(1) Remove the speedometer drive pinion and sleeve assembly. **Nylon gear can be easily damaged**

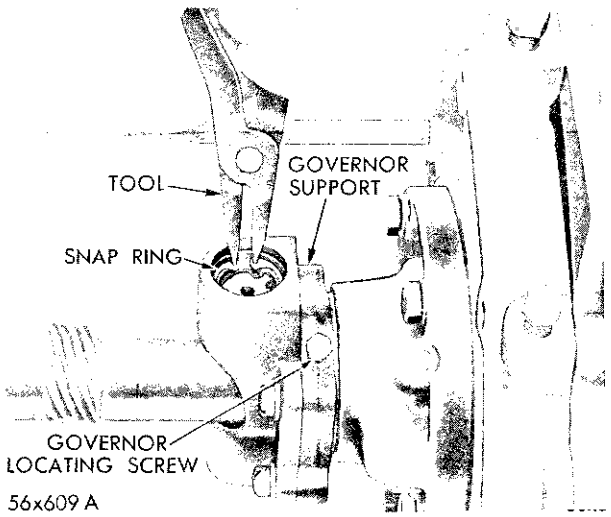


Fig. 38—Removal and Installation of Governor Weight Assembly

if extension is removed without first removing the speedometer drive pinion and sleeve assembly.

(2) Inspect the output shaft rear oil seal and remove (if necessary) using puller Tool C-3690. **If the transmission extension housing oil seal or bushing are to be replaced, the seal must be removed at this time before extension housing is removed from transmission case.**

(3) Remove the transmission extension to case bolts and lockwashers. Install guide studs, Tool C-3283 and remove extension from output shaft support assembly by tapping housing lightly with a soft hammer. **Housing may be separated by using a pry bar against support screw, as shown in Figure 35.** Remove the extension gasket.

34. GOVERNOR AND REAR OIL PUMP HOUSING— REMOVAL

(1) Using a small screwdriver, remove the governor valve shaft snap ring from the weight assembly end, as shown in Figure 36.

(2) Remove governor valve shaft and valve (Fig. 37).

(3) Using pliers, Tool C-3229, remove governor snap ring (large) as shown in Figure 38 and remove governor weight assembly.

(4) Remove the governor locating screw from the governor support.

(5) Remove the oil pump housing, gear, pinion and governor assembly from output shaft. **Use dye and mark the face of the pump gear in relation to pump housing, for reassembly purposes. DO NOT SCRIBE. Remove oil pump pinion ball.**

35. OUTPUT SHAFT SUPPORT — REMOVAL

(1) Slide the output shaft rear support assembly and gasket from transmission case, as shown in Figure 39. If the rear support is stuck to the transmission case, it can be loosened by tapping lightly with a soft hammer.

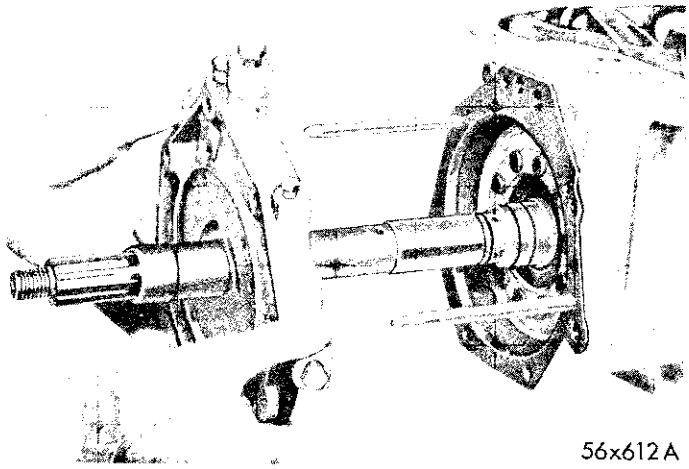


Fig. 39—Removal and Installation of Output Shaft Support

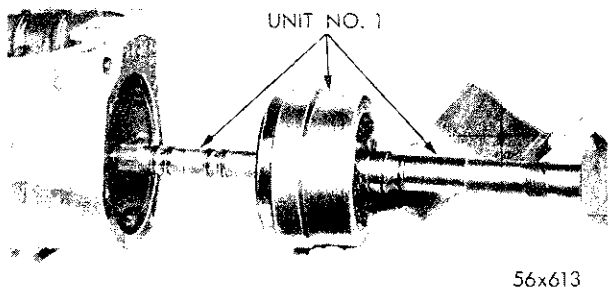


Fig. 40—Removal and Installation of Unit No. 1

(2) Remove the thrust washer from front end of support plate or output shaft.

(3) Remove the guide studs, Tool C-3283, from transmission case.

36. REMOVING POWER TRAIN UNIT NO. 1 (OUTPUT SHAFT, KICKDOWN PLANET PINION CARRIER AND INTERMEDIATE SHAFT ASSEMBLIES) — REMOVAL

Remove by sliding the unit out rear of the transmission case, Figure 40. Support unit as much as possible, when removing, to prevent damage to seal rings on intermediate shaft.

37. REMOVING POWER UNIT NO. 2 (SUN GEAR, REVERSE PLANET PINION CARRIER, OVERRUNNING CLUTCH AND REAR CLUTCH ASSEMBLIES) — REMOVAL

(1) Loosen the lock nuts on low-reverse and kickdown band adjusting screws and back adjusting screws out 2 to 3 turns.

(2) Remove the three intermediate support locating bolts and lockwashers (two outside of case and one inside). When removing the unit, identify

Fig. 41—Removal and Installation of Intermediate Support Locating Screw

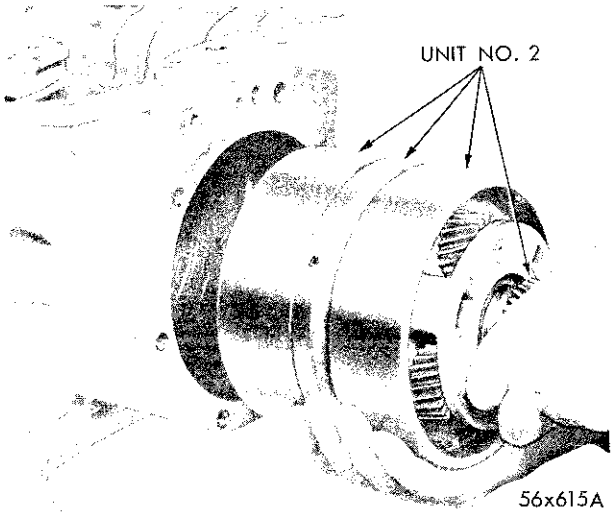


Fig. 42—Removal of Unit No. 2

the locating hole in the intermediate support to correspond with the threaded locating hole inside of case for installation purposes, Figure 41.

(3) Keep unit centered as much as possible to prevent binding of intermediate support and remove assembly from transmisison case, as shown in Figure 42. Remove front clutch and sun gear thrust washer.

38. REMOVING UNIT NO. 3 (FRONT CLUTCH PISTON RETAINER AND INPUT SHAFT ASSEMBLIES) — REMOVAL

Keep unit centered as much as possible and remove from transmission case, as shown in Figure 43. Use extreme care when removing to prevent damage to the seal rings on input shaft and sealing surfaces in the reaction shaft.

39. LOW-REVERSE BAND — REMOVAL

(1) Mark the low-reverse band assembly for installation purposes; then compress ends of band

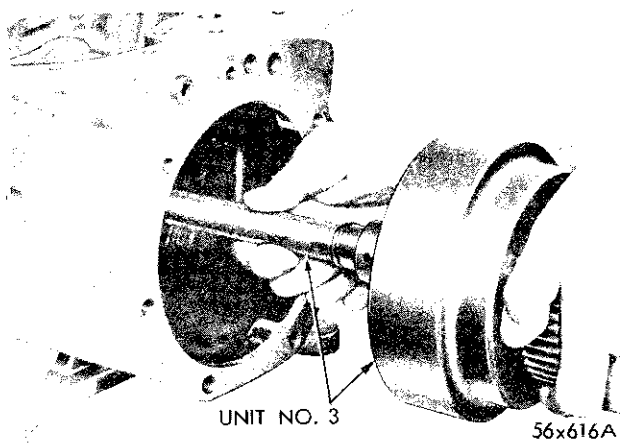


Fig. 43—Removal and Installation of Unit No. 3

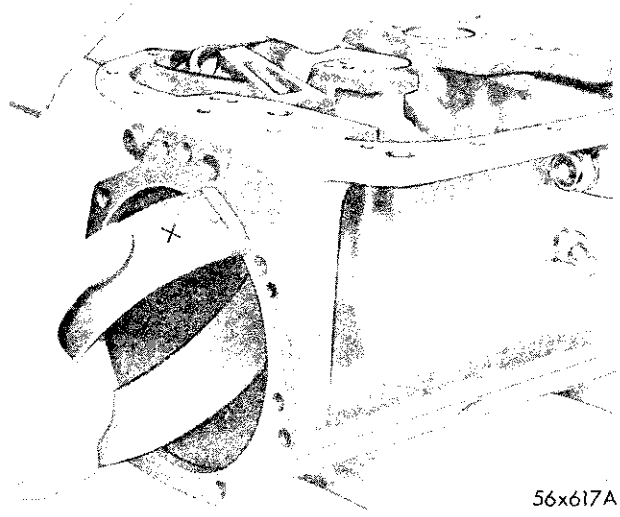


Fig. 44—Removal and Installation of Low-Reverse Band

sufficiently to remove the low-reverse band strut.

(2) Remove the low-reverse band assembly by rotating band ends through rear opening in transmission case, as shown in Figure 44, and remove low-reverse band anchor from adjusting screw.

40. KICKDOWN BAND — REMOVAL

(1) Mark the band for reassembly purposes. Compress kickdown band ends sufficiently to remove the kickdown band strut, see Figure 45, and remove the kickdown band anchor from adjusting screw.

(2) Remove the kickdown band assembly by rotating band ends over center support in transmission case, as shown in Figure 46. Both bands have bonded lining and no attempt should be made to reline them. The kickdown band is wider and has different lining material than the low-reverse band.

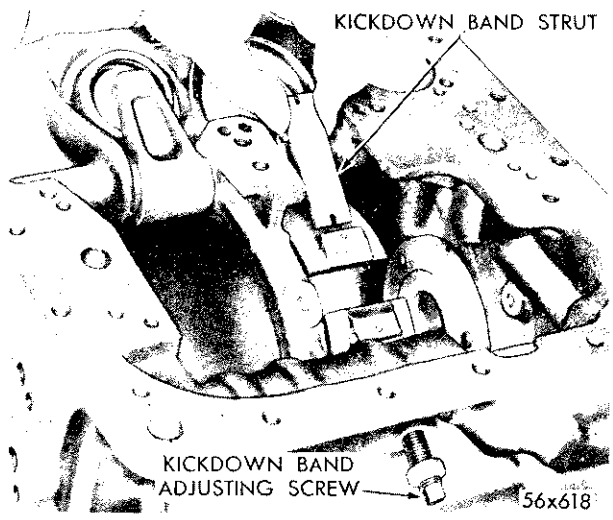


Fig. 45—Removal and Installation of Kickdown Band Strut

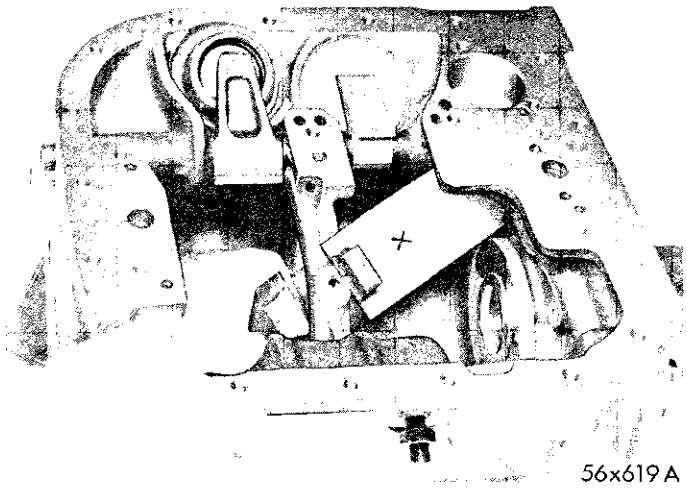


Fig. 46—Removal and Installation of Kickdown Band

NOTE: Use extreme care when removing band so as not to damage lining against edges of transmission case.

41. LOW-REVERSE AND KICKDOWN BAND LEVER ASSEMBLIES — REMOVAL

(1) Remove the kickdown and reverse lever shaft stop plug at rear of transmission case.

(2) Using pliers, remove kickdown and low-reverse shaft lever spacer (flat).

(3) Thread a guide stud, Tool C-3288, into shaft and remove shaft from case, as shown in Figure 47, and remove the kickdown and low-reverse servo levers.

42. LOW-REVERSE SERVO — REMOVAL

(1) Install Tool C-3529 or C-3289 (modified) and depress the reverse servo piston retainer to permit the removal of the snap ring with a screwdriver (Fig. 48).

(2) Remove the tool from the case.

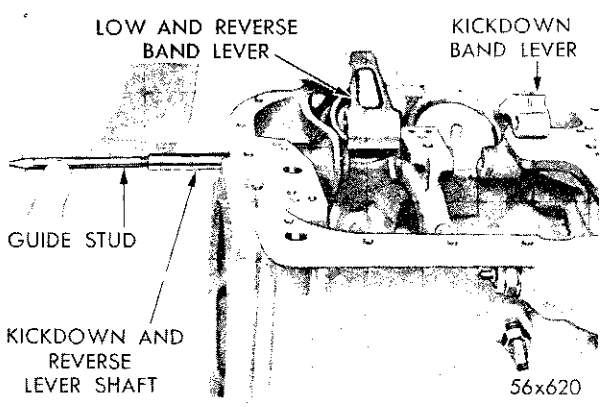


Fig. 47—Removal and Installation of Kickdown and Reverse Lever Shaft

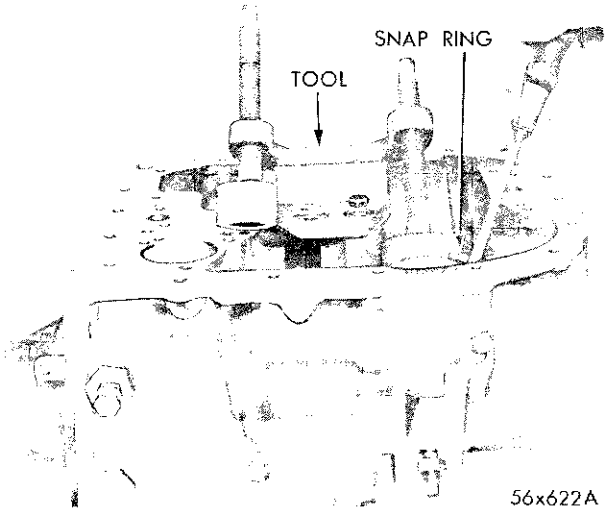


Fig. 48—Removal and Installation of Low-Reverse Servo Piston Spring Retainer Snap Ring

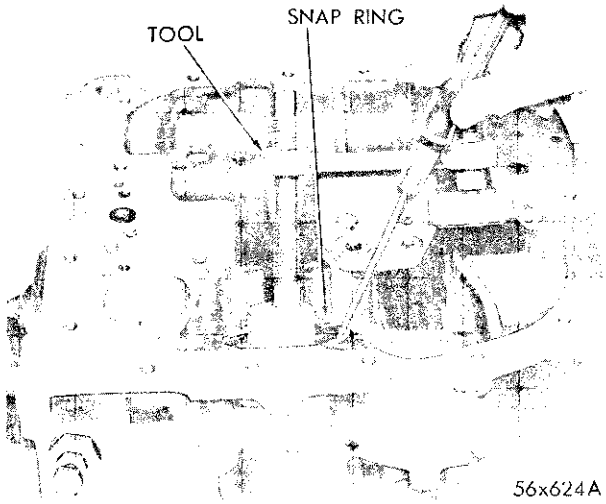


Fig. 49—Removal and Installation of Kickdown Piston Rod Guide Snap Ring

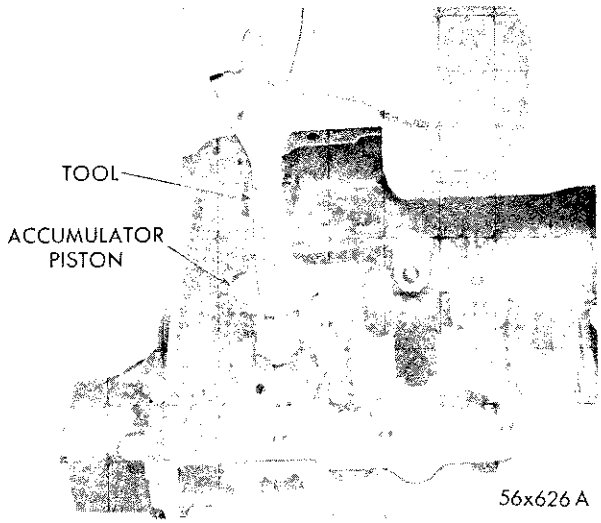


Fig. 50—Removal and Installation of Accumulator Piston

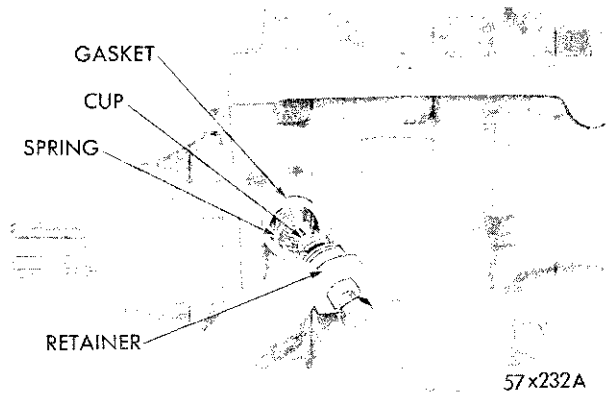


Fig. 51—Removal and Installation of Regulator Valve Retainer

(3) Remove piston rod guide, piston spring and piston assembly.

43. KICKDOWN SERVO — REMOVAL

(1) Install Tool C-3529 or C-3289 (modified) and apply sufficient pressure on the kickdown piston rod guide to permit the removal of the snap ring (Fig. 49).

(2) Remove the tool from the case.

(3) Remove the piston rod guide, piston spring and piston rod.

(4) Using pliers, Tool C-484, remove the kickdown piston from the transmission case.

44. ACCUMULATOR PISTON — REMOVAL

Using the same pliers, remove the accumulator piston from transmission case, Figure 50.

45. FRONT OIL PUMP — REMOVAL

(1) Remove the front oil pump drive sleeve.

(2) Remove the front oil pump screws and washers (sealing washers, used under bolts, are made from aluminum; discard if damaged) and replace with a new washer.

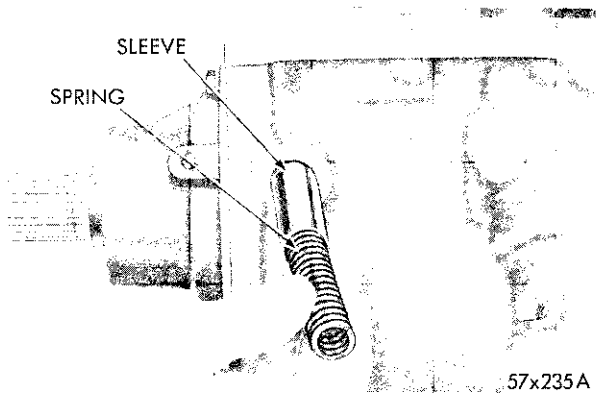


Fig. 52—Removal and Installation of Regulator Valve Spring

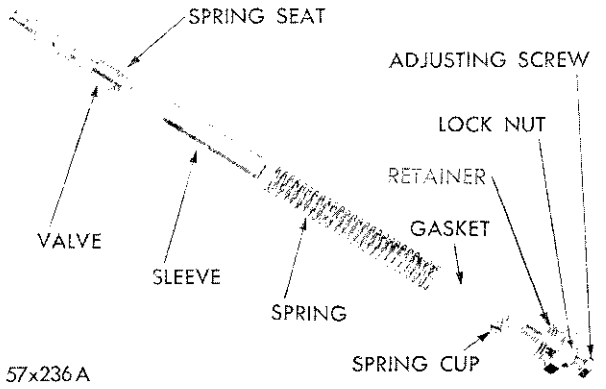


Fig. 53—Regulator Valve Assembly (Disassembled View)

(3) Remove oil pump housing from transmission case by tapping the housing lightly with a soft hammer (Fig. 54). **Using dye, mark the pump gears in relation to face of oil pump housing for reassembly purposes. DO NOT SCRIBE.**

46. REGULATOR VALVE BODY — REMOVAL

(1) Remove the transmission regulator valve spring retainer, gasket, cup, spring, sleeve and valve (Figs. 51, 52 and 53).

(2) Remove the torque converter valve retainer, gasket, spring and valve. A mechanical retriever, such as a piece of welding rod, will aid in removing these valves by inserting it in the end of the valve.

(3) Install guide studs, Tool C-3288, and using the two threaded holes provided in the regulator valve body, install the guide studs, Tool C-3283, as shown in Figure 55.

(4) Pull regulator valve body off of torque converter reaction shaft and remove gasket. **Regulator valve body (Fig. 56) is made of aluminum and requires care in handling to avoid damage.**

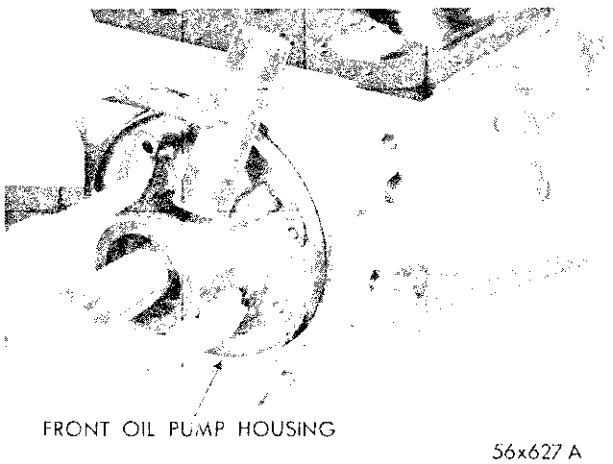


Fig. 54—Removal of Front Oil Pump Housing Assembly

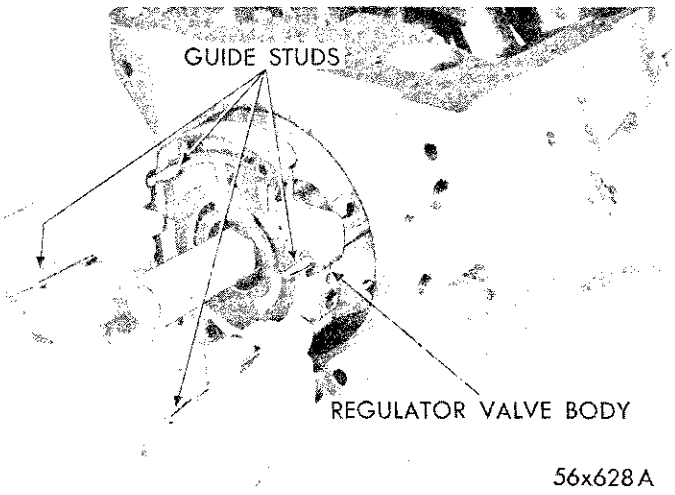


Fig. 55—Removing Regulator Valve Body

47. TORQUE CONVERTER REACTION SHAFT — REMOVAL

Refer to "Inspection of Torque Converter Reaction Shaft," Paragraph 49.

(1) If inspection reveals it is necessary to remove the torque converter reaction shaft, remove the torque converter reaction shaft seal ring (neoprene).

(2) Remove transmission case to reaction shaft bolts and washers.

(3) Using Tool C-3531 press the reaction shaft out of the transmission case (Fig. 57).

48. PRECAUTIONS TO OBSERVE DURING DISASSEMBLY, INSPECTION AND ASSEMBLY OF COMPONENT PARTS

The following precautions should be observed during assembly of component parts. Where lubrication is

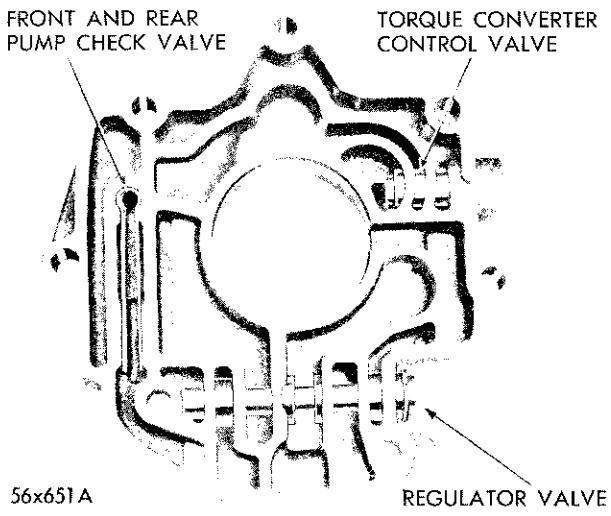


Fig. 56—Regulator Valve Body and Valves

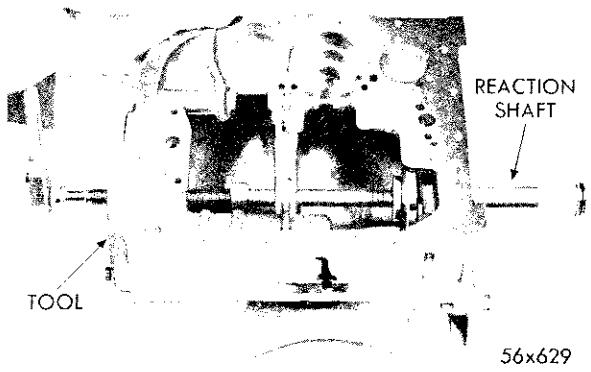


Fig. 57—Removal and Installation of Torque Converter Reaction Shaft

required, use Automatic Transmission Fluid (Type "A" — Suffix "A"). **Do not use sealing materials on any gasket or mating surface, always use new gaskets.** Tighten all bolts and nuts to correct specifications. Where snap rings are used, always make sure they are seated properly. If mating parts do not go together properly, always check reason. Do not force parts unnecessarily.

49. TORQUE CONVERTER REACTION SHAFT — INSPECTION

Inspect inside of torque converter reaction shaft for burrs. Inspect splines on shaft for burrs and wear. Inspect the reaction shaft seal ring (neoprene) for deterioration and hardness. Inspect thrust surface for wear and heavy scoring. Check the inner bronze bushing for excessive scoring. Bushing is serviced with reaction shaft assembly. **Do not remove the torque converter reaction shaft unless inspection reveals it is necessary to do so.**

50. TRANSMISSION CASE — INSPECTION

Inspect the transmission case for cracks, sand holes and stripped threads. Check for burrs on mating surfaces. Blow compressed air through all passages to make sure they are open. Check pressure take-off plugs for tightness.

Using a straight edge, Tool C-3335, inspect valve body mating surface on transmission case for any burrs or irregularity in surface. Surfaces should be smooth and flat.

Inspect the servo and accumulator bores for any scores or scratches. Light scratches may be removed with crocus cloth. Check regulator valve body mating surface in front on case for any irregularities. **Disregard any scratches which may have been caused by torque converter reaction shaft bolt lockwashers.**

It is vitally important that the band adjusting screws fit freely into the transmission case. **When the lock nuts are loose, the adjusting screws must be finger free. If not, inspect the screws and nuts for pulled threads or foreign material in the threads. This is very important in obtaining proper band adjustments.**

51. TRANSMISSION EXTENSION HOUSING — INSPECTION

Inspect the extension for cracks in the casting and remove burrs from the gasket surface. Inspect vent (drive type) in top of extension and make sure it is open and free from dirt, undercoating, etc. The purpose of this vent is to facilitate draining and filling. The vent also releases fumes and air pressure build-up caused by expansion of oil due to heat. Clean output shaft rear bushing and dry with compressed air. Inspect bushing for rough spots. Do not remove the bushing from the extension unless inspection reveals it is necessary to do so.

52. OUTPUT SHAFT REAR BUSHING — REMOVAL

If it is necessary to remove rear bushing, the output shaft rear oil seal should be removed during disassembly. Refer to Paragraph 33.

(1) With the larger end of the extension housing on a flat surface, use bushing removing driver, Tool C-3689, and drive bushing out of housing, as shown in Figure 26.

53. OUTPUT SHAFT REAR BUSHING AND OIL SEAL INSTALLATION

(1) Place new bushing on driver-burnisher, Tool C-3692, with the lubrication hole in bushing toward the end of the tool.

(2) Align the hole in bushing with the lubrication hole in the top side of the extension housing and drive bushing until tool bottoms, Figure 27.

(3) While holding screw of tool with a wrench to prevent turning, use another wrench and turn nut on tool until burnisher of tool is pulled back out of bushing. This operation correctly sizes the bushing. Recheck the indexing of the lubrication hole in bushing with the housing (Fig. 28).

(4) Using driver, Tool C-3691, install output shaft rear oil seal (with metal portion of seal facing down in housing bore) until tool bottoms on extension, as shown in Figure 25.

54. GOVERNOR DISASSEMBLY AND INSPECTION

(1) Remove snap ring with Tool C-3229. Remove

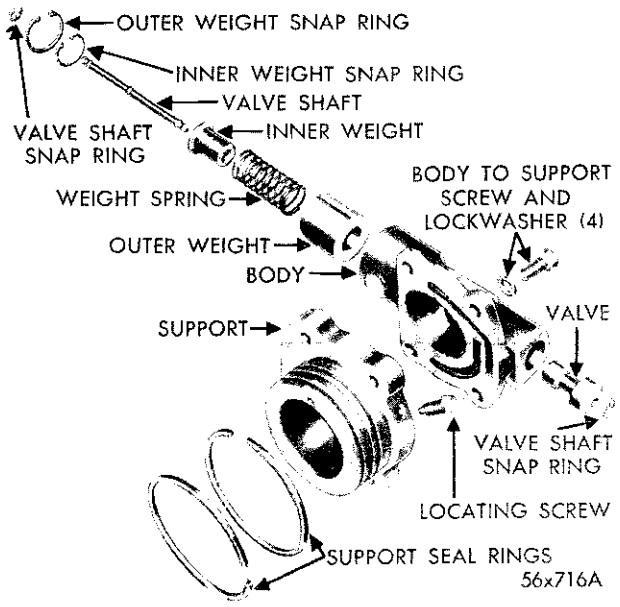


Fig. 58—Governor Assembly (Disassembled View)

governor secondary weight and spring. Inspect all parts for burrs and wear. Check secondary weight for free movement in primary weight by placing weight in primary weight without the spring. Primary weight should fall freely when both parts are clean and dry. Inspect governor weight spring for distortion (Fig. 58).

(2) Place secondary weight and spring in primary weight, compress the spring and install snap ring (flat side facing downward against weight). Make sure the snap ring is seated properly.

(3) Remove and inspect the two governor support seal rings.

(4) Remove the governor body to support bolts

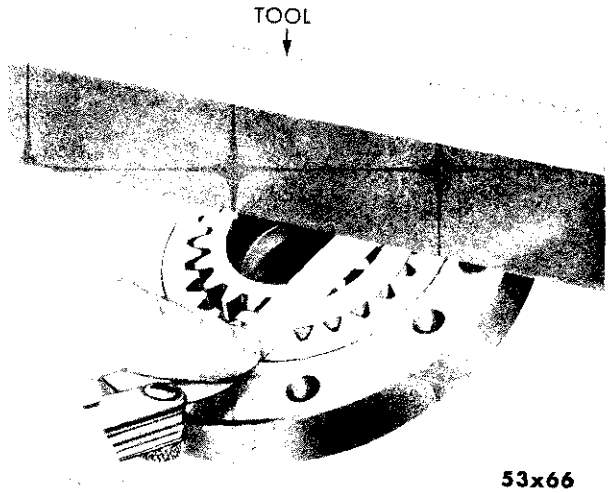


Fig. 59—Checking Clearance Between Rear Pump Body and Gears

and separate body from support. (Washers are part of the bolt and serviced as an assembly.)

Mating surfaces are machined and can be easily damaged. Inspect oil passages and make sure they are free from dirt or foreign matter. Clean passages with compressed air. Inspect governor valve and body for slight scores. **Valve should travel freely in governor body.**

55. REAR OIL PUMP — INSPECTION

Inspect oil pump housing machined surfaces for nicks and burrs and housing plug for leaks. Inspect oil pump gears for scoring or pitting. With gears cleaned and installed in pump housing (as marked) and using straight edge, Tool C-3335 (and feeler gauge), check clearance between pump housing face and face of the gears, as shown in Figure 59. Clearance limits are from .001″ to .0025″. The clearance between the outer gear and the pump housing should be from .004″ to .006″. Replace if clearance exceeds .008″.

56. GOVERNOR ASSEMBLY — REASSEMBLY

(1) Lubricate the two governor support seal rings with Automatic Tranmission Fluid (Type "A" — Suffix "A"), and install them on the governor support. Make sure rings are free to rotate in grooves.

(2) Position governor body and support and install the four bolts with attached lockwashers. **Do not tighten the bolts at this time.**

(3) Slide the governor support and body assembly into position in rear oil pump housing. **Compress the governor support seal rings with fingers as support enters oil pump housing. Do not force.**

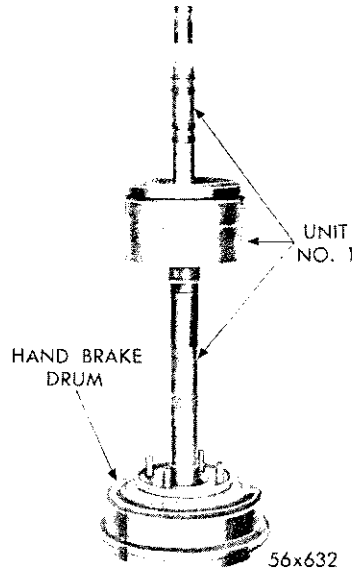


Fig. 60—Using Propeller Shaft Flange and Brake Drum Assembly (as a Holding Fixture for Unit No. 1)

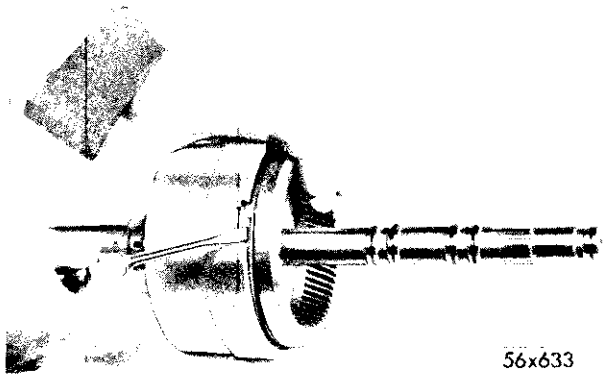


Fig. 61—Removal and Installation of Output Shaft Drive Housing Snap Ring

57. OUTPUT SHAFT SUPPORT — INSPECTION

Inspect all oil passages in output shaft support for any obstructions. Remove pressure take-off plugs and clean passages with compressed air. Check the rear oil pump mating surface for burrs and score marks. Check for stripped threads in the support. Inspect gasket surfaces for burrs and dirt. Inspect the inside bearing surface for wear and scoring. Inspect output shaft to support plate thrust washer for tangs being bent or broken. Replace the washer when bronze is worn to the extent that grooves in face of the washer are worn off.

58. DISASSEMBLY, INSPECTION AND ASSEMBLY OF POWER TRAIN UNITS, UNIT NO. 1 (OUTPUT SHAFT, KICKDOWN PLANET PINION CARRIER AND INTERMEDIATE SHAFT ASSEMBLIES)

a. Disassembly

The unit can be placed in the propeller flange and brake drum assembly to aid in disassembly, as shown in Figure 60.

(1) Using a screwdriver, remove the ouput shaft drive housing snap ring (Fig. 61). Refer to Figure 62 and complete disassembly of unit as follows:

(2) Remove the reverse annulus gear (B) from the output shaft assembly (K).

(3) Remove the thrust plate (C) from the kickdown planet pinion carrier (F).

(4) Remove the intermediate shaft (D) and kickdown planet pinion carrier assembly (F) from output shaft assembly (K).

(5) Remove the output shaft thrust washer (E) located inside housing.

(6) Remove the kickdown planet pinion carrier assembly (F) from intermediate shaft assembly (D). **The kickdown planet pinion carrier assembly used in**

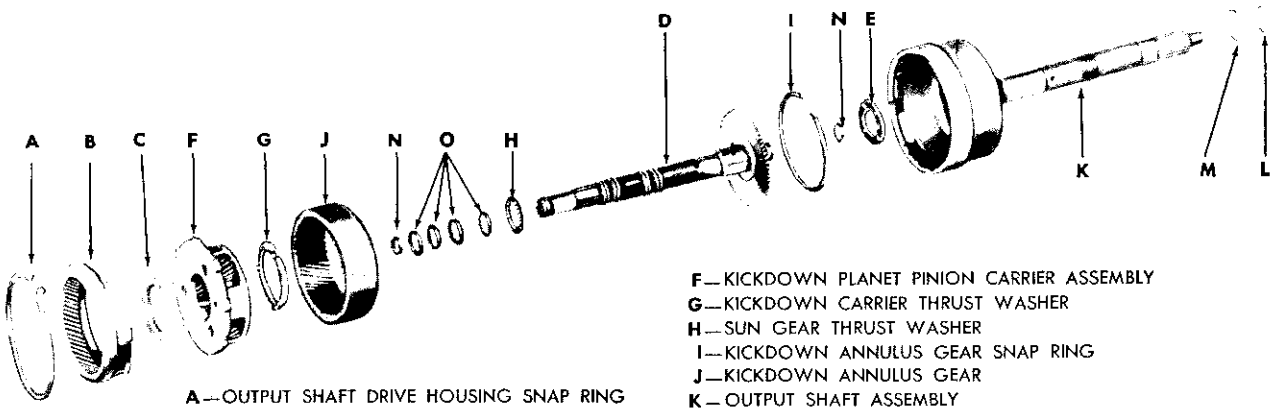


Fig. 62—Unit No. 1 (Disassembled View)

this unit is identical to the low-reverse planet pinion carrier assembly used in Unit No. 2, but should not be interchanged due to wear patterns.

(7) Remove bronze kickdown carrier thrust washer (G).

(8) Remove the sun gear roller type thrust washer (H) from the intermediate shaft assembly (D).

(9) With a screwdriver, remove kickdown annulus gear snap ring (1) and separate gear (J) from intermediate shaft assembly (D).

59. OUTPUT SHAFT — INSPECTION

Inspect the speedometer drive gear for any nicks or burrs. Nicks or burrs on gear surface can be removed with the use of a sharp edged stone. Inspect thrust surfaces, journals and inner bushing for scores or excessive wear. Inspect the riveting and housing for any cracks and internal driving splines for excessive wear or brinnelling. The housing and output shaft are serviced as an assembly.

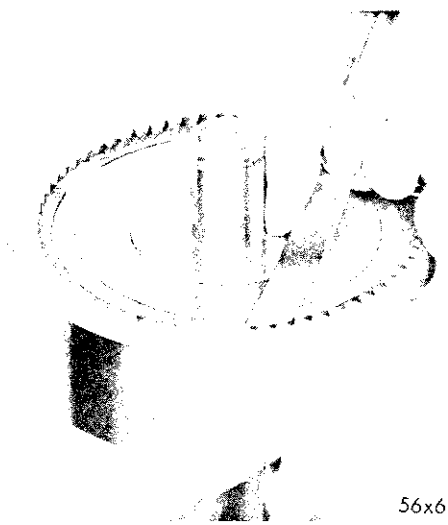


Fig. 63—Checking Clearance Between Kickdown Annulus Gear Snap Ring and Intermediate Shaft Assembly

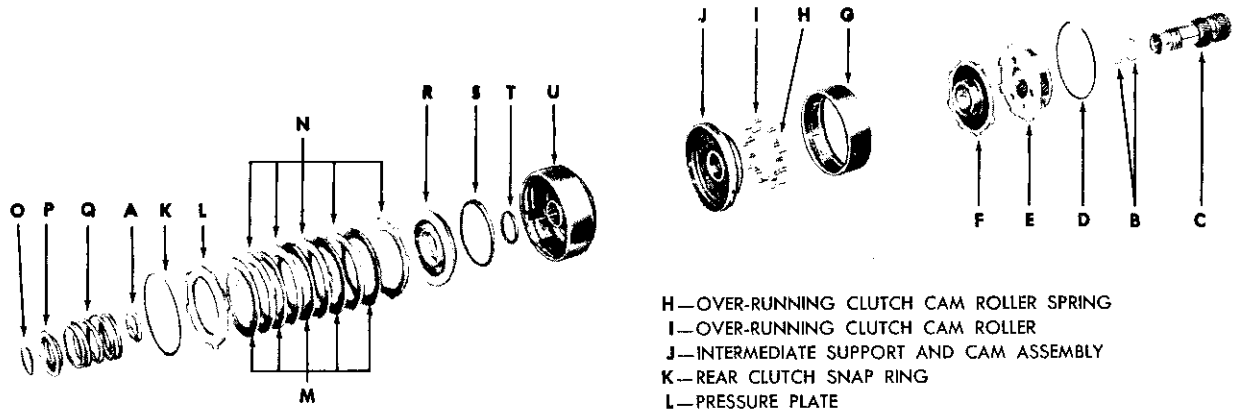
Inspect the interlocking seal rings (L-M) on output shaft (K) for wear or broken locks and make sure they turn freely in the grooves. Do not remove rings unless condition warrants. When replacing rings, use extreme care so as not to damage interlocking portion of ring. Make sure all oil passages are open by blowing out with compressed air. Inspect output shaft and kickdown carrier thrust washers (E-G) for scratches or excessive wear. Inspect the sun gear (roller type) thrust washer (H) for pitted or cracked rollers.

60. INTERMEDIATE SHAFT ASSEMBLY — INSPECTION

Inspect all bearing and thrust surfaces for scoring or scratches. Blow compressed air through all oil passages; make sure they are open and free of foreign matter. Inspect the four large (O) and two small (N) interlocking seal rings for excessive wear, broken ends and make sure they rotate freely in the grooves. The intermediate shaft and clutch feed tubes are serviced as an assembly.

61. KICKDOWN PLANET PINION CARRIER ASSEMBLY — INSPECTION

Inspect planet pinion carrier for cracks and pinions for broken or worn gear teeth. Using a feeler gauge, measure the end clearance on the individual planet pinion gears. Clearance should be .006″ to .017″. Inspect the pinion shafts for fit in the carrier and make sure the pinions are free to rotate on the shafts (.001 inch max. looseness in hole). Make sure the pinion shaft lock pins are installed and tight. **Do not**



A—SUN GEAR THRUST WASHER (same as output shaft thrust washer)
B—SUN GEAR REAR CLUTCH SEAL RING
C—SUN GEAR ASSEMBLY
D—REVERSE BAND SNAP RING
E—REVERSE PLANET PINION CARRIER ASSEMBLY
F—OVER-RUNNING CLUTCH HUB ASSEMBLY
G—LOW AND REVERSE BAND DRUM
H—OVER-RUNNING CLUTCH CAM ROLLER SPRING
I—OVER-RUNNING CLUTCH CAM ROLLER
J—INTERMEDIATE SUPPORT AND CAM ASSEMBLY
K—REAR CLUTCH SNAP RING
L—PRESSURE PLATE
M—DRIVING DISC
N—CLUTCH PLATE
O—PISTON RETURN SPRING SNAP RING
P—RETURN SPRING RETAINER
Q—RETURN SPRING
R—PISTON
S—PISTON SEAL RING—OUTER
T—PISTON SEAL RING—INNER
U—PISTON RETAINER ASSEMBLY

56 x 710

Fig. 64—Unit No. 2 (Disassembled View)
Note: Number of Clutch Plates and Discs Dependent Upon Vehicle Model

replace the carrier assembly unless inspection reveals it is necessary. The planet pinion carrier and pinions are serviced only as a complete assembly. Scuffing of the carrier does not affect its operation and the carrier should not be replaced for this reason alone. Inspect the kickdown carrier thrust washer (G) for scratches or excessive wear.

62. REVERSE AND KICKDOWN ANNULUS GEAR—INSPECTION

Inspect the annulus gears for worn, cracked or broken gear teeth.

63. UNIT NO. 1 (OUTPUT SHAFT, KICKDOWN PLANET PINION CARRIER AND INTERMEDIATE SHAFT ASSEMBLIES)—ASSEMBLY

To aid in the assembly of Unit No. 1, use the propeller shaft flange and brake drum assembly as a stand.

(1) With the output shaft assembly (K) in the upright position, lubricate output shaft thrust washer (E) with Automatic Transmission Fluid (Type "A" — Suffix "A") and place into position in the housing.

(2) Place the kickdown annulus gear (J) in position on intermediate shaft assembly (D) and install snap ring (I) (select fit). Using a feeler gauge, check the clearance under the kickdown annulus gear snap ring (Fig. 63). Clearance limits are as close to zero as possible. Snap rings are available in the following thicknesses:—.060" to .062" and .064" to .066". **When checking clearance, support annulus gear on the edge of the bench so intermediate shaft will seat properly in the gear. Make sure snap ring seats properly.**

(3) Place the intermediate shaft assembly (D) in the output shaft housing (K).

(4) Place the carrier assembly (F) in position in kickdown annulus gear (J). Make sure the thrust washer (G) remains in position.

(5) Place the thrust plate (C) on the carrier. Be sure the thrust plate pilot enters bore in the pinion carrier.

(6) Place reverse annulus gear (B) in position in housing (K) and install output shaft drive housing snap ring. Make sure the snap ring seats properly in the housing.

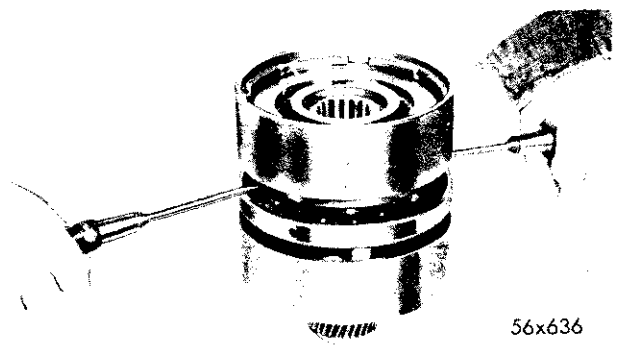


Fig. 65—Removing Rear Clutch Piston Retainer Assembly From Sun Gear

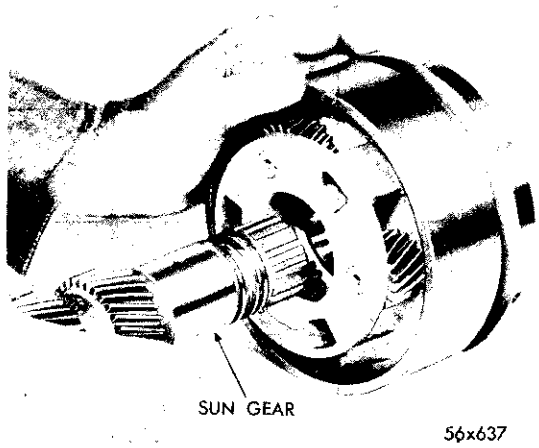


Fig. 66—Removal and Installation of Sun Gear (Reverse Planet Pinion Carrier and Overrunning Clutch Assembly)

(7) Lubricate and install the sun gear (roller type), thrust washer (H) over intermediate shaft and into position at the base of the shaft.

64. UNIT NO. 2 — SUN GEAR, REVERSE PLANET PINION CARRIER, OVERRUNNING CLUTCH, AND REAR CLUTCH PISTON RETAINER ASSEMBLIES — DISASSEMBLY

The letters referred to in the Disassembly, Inspection and Assembly of the unit pertain to Figure 64.

(1) With the unit setting in the upright position, remove the sun gear and the front clutch thrust washer (A).

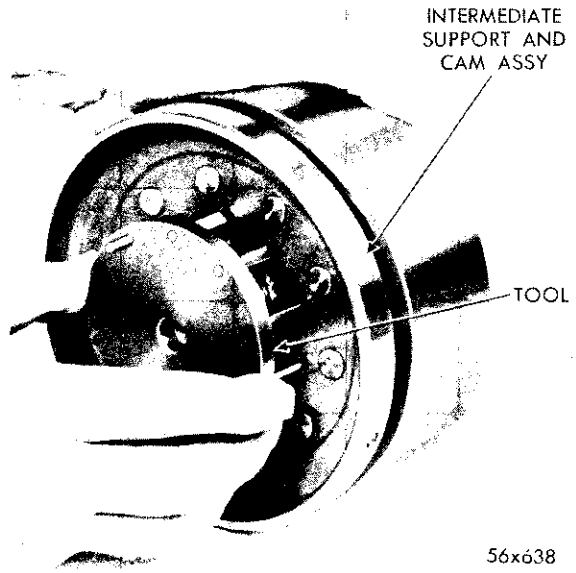


Fig. 67—Installation of Tool C-3527 in Intermediate Support and Cam Assembly

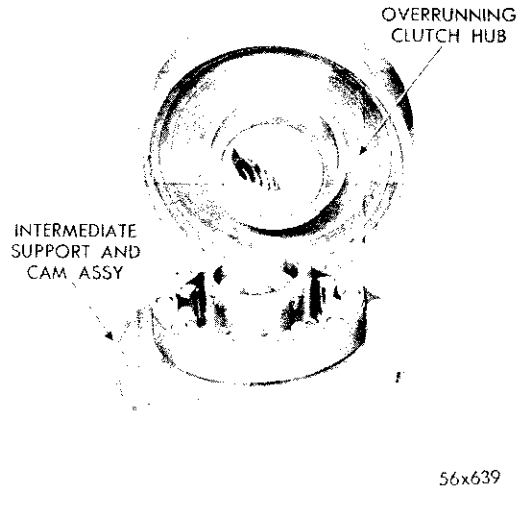


Fig. 68—Removal and Installation of Intermediate Support and Cam Assembly from Overrunning Clutch

(2) Using two screwdrivers, inserted between clutch and intermediate support, remove the rear clutch retainer assembly from the sun gear, as shown in Figure 65.

(3) Remove the two rear clutch seal rings (neoprene) from sun gear and remove the reverse sun gear from the overrunning clutch and reverse planet pinion carrier assembly, Figure 66.

(4) Install gauge, Tool C-3527, in intermediate support and cam assembly, as shown in Figure 67. Remove intermediate support and cam assembly from the overrunning clutch hub, Figure 68.

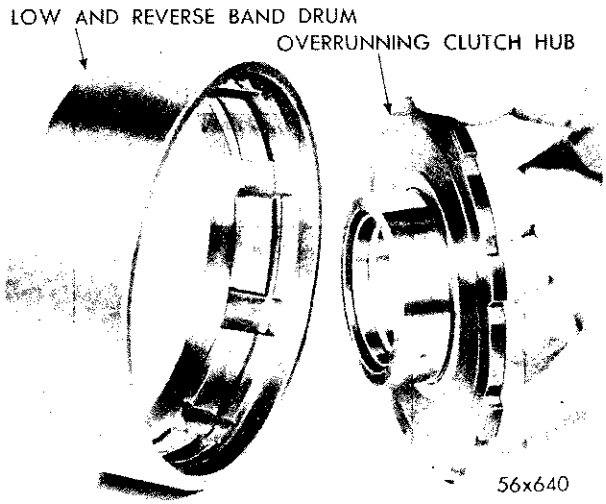


Fig. 69—Removal and Installation of Overrunning Clutch Hub in Low and Reverse Band Drum

(5) Using a screwdriver, remove the snap ring (D) from the low and reverse band drum assembly (G).

(6) Remove the low and reverse planet pinion carrier assembly (E) from reverse band drum.

(7) Remove the overunning clutch hub assembly from reverse band drum, Figure 69.

(8) Remove the overrunning clutch cam roller springs (H) and rollers (I) (ten each) by removing gauge, Tool C-3527, from the intermediate support and cam assembly. **Have the assembly over bench when removing the tool.**

65. REAR CLUTCH PISTON RETAINER ASSEMBLY — DISASSEMBLY

(1) Using a screwdriver, remove the snap ring (large) from rear clutch piston retainer assembly (Fig. 70).

(2) Remove the rear clutch pressure plate (L) from retainer assembly.

(3) Invert the clutch piston retainer assembly and remove the clutch plates (H) and driving discs (M) from assembly.

(4) Using the compressor, Tool C-3575, slightly compress the rear clutch piston return spring retainer, as shown in Figure 71. **Use extreme care not to damage piston return spring retainer by compressing the spring too far.**

(5) Remove piston return spring retainer snap ring with parallel jawed snap ring pliers, Tool C-3301.

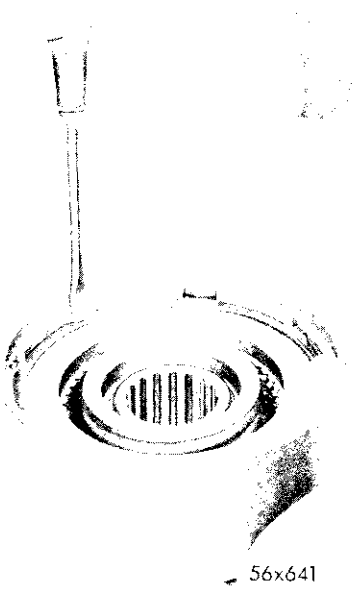


Fig. 70—Removal and Installation of Rear Clutch Piston Retainer Snap Ring

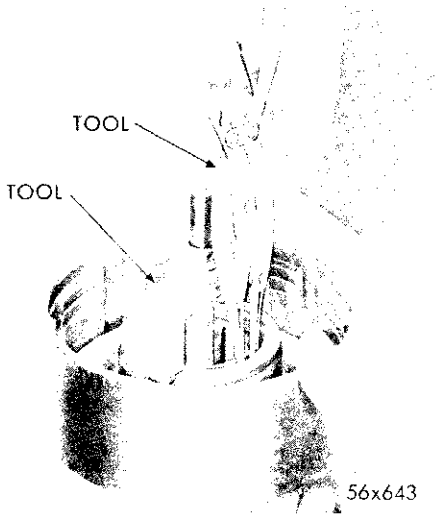


Fig. 71—Removal and Installation of Rear Clutch Spring Retainer Snap Ring

(6) Release the compressor carefully, Tool C-3575, and remove clutch return spring retainer (P) and spring (Q) from clutch piston retainer assembly. **The spring retainer may require guiding past snap ring groove as tool is released.**

(7) Using a twisting motion, remove the clutch piston assembly (R) from retainer. Remove the inner and outer (S and T) seal rings from piston.

66. CLUTCH DRIVING DISC AND PLATE — INSPECTION

Inspect driving disc for evidence of burning, glazing and flaking off of facing material. Check the discs by scratching facings with finger nail; if material collects under nail, replace all of the driving discs. Replace the driving discs if the splines have become damaged. Inspect the steel clutch plates and pressure plate surfaces for evidence of burning, scoring or damaged driving lugs; replace if necessary.

67. PISTON AND SEAL RINGS — INSPECTION

Inspect the seal ring surfaces in the piston retainer for nicks or deep scratches. Light scratches will not interfere with sealing of neoprene rings. Inspect the inner and outer piston seal rings (neoprene) for deterioration, wear and hardness. Inspect the seal ring groove in the piston for nicks or burrs.

Inspect the inside bore of the piston for score marks; if light, remove with crocus cloth; if heavy, replace the piston. Inspect the piston spring, retainer and snap ring for distortion.

68. REAR CLUTCH PISTON RETAINER ASSEMBLY — INSPECTION

Note the ball check in the clutch retainer. The purpose of the ball check is to relieve centrifugal oil

pressure and to prevent partial clutch engagement when the transmission is in neutral or operating in drive (breakaway) when the engine speeds are increased; otherwise, clutch may engage. Make sure the ball operates freely.

Inspect the band contacting surface for deep scores and burns, especially if the band lining is worn to the point where the steel band has been contacting the rear clutch piston retainer. **Do not machine the piston retainer in a lathe to remove score marks.**

Inspect the steel clutch plate contacting surfaces for burrs or brinelling. Make sure the clutch driving lugs on steel plates travel freely into retainer. Remove any metal pickup on the hub of retainer.

69. REAR CLUTCH PISTON RETAINER — ASSEMBLY

(1) Lubricate and install inner piston seal ring (T) on hub of clutch retainer. **Make sure that the lip of the seal is facing down and the seal is properly seated in groove.**

(2) Lubricate and install the outer seal ring (S) on clutch piston (lip of seal toward piston head).

(3) Place the piston assembly (R) in the clutch retainer (U) and with a twisting motion, seat the piston in bottom of the retainer.

(4) Install the piston return spring on hub and position spring retainer and snap ring on spring.

(5) Using a compressor, Tool C-3575, compress the clutch spring sufficiently to permit the snap ring to enter the groove in the hub and snap the ring in place as shown in Figure 71. The piston spring retainer may require guiding past the clutch hub. **Make very sure the snap ring is properly seated.**

(6) Remove the compressor, Tool C-3575.

(7) Lubricate all clutch plates and drive discs with Automatic Fluid (Type "A" — Suffix "A"). Assemble by placing one of the rear clutch steel plates in the clutch retainer followed by a driving disc. Alternately repeat this procedure until all discs and plates have been installed.

The number of discs and plates vary according to the engine and transmission equipment. The rear clutch pistons are of various thicknesses. Therefore, the correct piston must always be used with the number of discs and plates. As an example, if a five plate piston is used with a four pack disc and plate combination excessive slippage of the clutch will result.

(8) Install the pressure plate (L) and snap ring (K). Make sure the ring is properly seated.

70. REVERSE SUN GEAR ASSEMBLY — INSPECTION

Inspect the gears for cracked or broken teeth. Inspect the steel back bronze type bushing for scoring or excessive wear. Bushing and reverse sun gear are serviced as an assembly. Inspect intermediate support bearing surface of gear for wear and slight scores. Inspect the rear clutch seal ring groove on the gear for nicks or burrs. Inspect the inner ring sealing area in bore of sun gear for grooves or scratches.

Inspect the thrust area of sun gear for nicks, scratches or burrs. Inspect seal rings (neoprene) for deterioration, wear, nicks or hardness. Inspect the front clutch and sun gear thrust washer for scratches or excessive wear.

71. INTERMEDIATE SUPPORT AND CAM ASSEMBLY — INSPECTION

Inspect the riveting of cam to intermediate support. Inspect the cam roller surface for brinelling. Inspect the roller spring retaining tabs for being bent or distorted. Inspect the bearing surface on hub for scoring.

Inspect the steel back bronze type bushing in hub for scratches, scoring or excessive wear. The bushing and intermediate support are serviced as an assembly. Inspect the overrunning clutch cam rollers for being pitted or scored. Inspect the overrunning cam roller springs for distortion. Replace if necessary.

72. LOW AND REVERSE PLANET PINION CARRIER ASSEMBLY — INSPECTION

Inspect the planet pinion carrier for cracks and the pinions for broken or worn gear teeth. Using a feeler gauge, check the end clearance on individual planet pinion gears. Clearance should be .006″ to .017″.

Inspect the pinion shafts for fit in carrier and make sure pinions are free to rotate on the shafts. Make sure shaft lock pins are installed and tight. **Do not replace carrier assembly unless inspection reveals it is necessary. The planet pinion carrier and pinions are serviced only as a complete assembly. Scuffing of the carrier does not affect its operation and the carrier should not be replaced for this reason alone.**

73. LOW AND REVERSE BAND DRUM—INSPECTION

Inspect the band contacting surface for deep scratches and burns, especially if band lining is worn to the point where steel band has been contacting the drum. **Do not attempt to machine the drum in lathe to remove score marks.** Inspect the driving splines inside the drum for excessive wear.

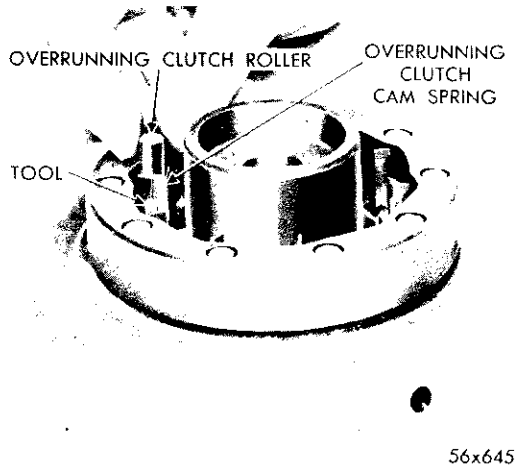


Fig. 72—Installation of Overrunning Clutch Rollers and Springs in Intermediate Support and Cam Assembly

74. OVERRUNNING CLUTCH HUB ASSEMBLY—INSPECTION

Inspect the cam roller contacting surface for brinelling. Inspect the steel back bronze type bushing in hub for scratching or scoring and excessive wear. The bushing and hub are serviced as an assembly.

Inspect the lubricating hole and make sure it is free from foreign matter by cleaning with compressed air. Inspect the reverse band drum snap ring (select fit) for being distorted.

75. UNIT NO. 2 — (SUN GEAR, REVERSE PLANET PINION CARRIER, OVERRUNNING CLUTCH AND REAR CLUTCH RETAINER)—ASSEMBLY (Fig. 64)

(1) Install overrunning clutch hub assembly (hub first) into the snap ring side of the low and the reverse band drum (Fig. 69).

(2) Place low and reverse planet pinion carrier assembly (E) in position in low and reverse band drum (G).

(3) With the drum supported, select snap ring to give minimum clearance. Snap rings are available in three thisknesses: .060-.062, .064-.066 and .068-.070 inch.

(4) Place Tool C-3527 in position in the intermediate support and cam assembly and install cam spring and rollers, as shown in Figure 72. **Make definitely sure that cam springs and rollers are properly seated against cam; otherwise, damage to springs will result when overrunning clutch hub is installed.**

(5) With the intermediate support and cam assembly resting on bench, lubricate bushing and install the low and reverse band drum assembly over hub.

(6) While holding the two assemblies together, remove Tool C-3527. Lubricate the bearing surface on the reverse sun gear and install intermediate support and planet pinion carrier assembly.

(7) Lubricate the two sun gear rear clutch seal rings (neoprene) and install them on the reverse sun gear.

(8) Install the rear clutch piston retainer assembly on the reverse sun gear. To prevent personal injury, do not place fingers under the clutch retainer assembly when installing.

(9) Install the front clutch and sun gear thrust washer (A). Lubriplate may be used to hold the thrust washer in position.

76. UNIT NO. 3 — (INPUT SHAFT AND FRONT CLUTCH PISTON RETAINER ASSEMBLIES)—DISASSEMBLY

The letters referred to in disassembly, inspection and reassembly of this unit, pertain to Figure 73.

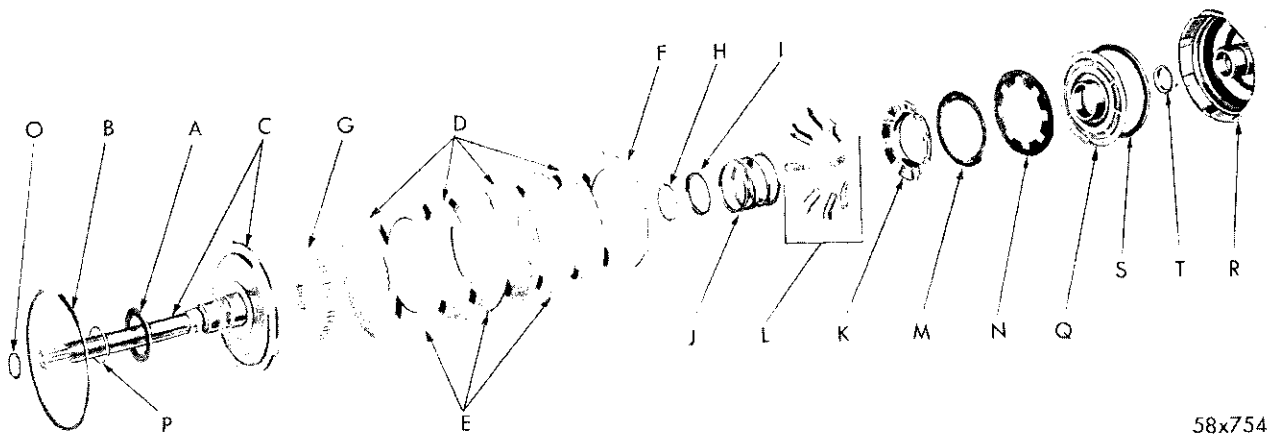


Fig. 73—Front Clutch (Disassembled View)

(1) Remove the input shaft fiber thrust washer (A)

(2) Remove the snap ring (B) and lift the input shaft (C) from the retainer (R).

(3) Invert the retainer (R), remove driving discs (D), plates (E), pressure plate (F) and hub (G).

(4) Install the compressor, Tool C-3575, and compress spring retainer (I).

(5) Use pliers, Tool C-3301, to remove spring retainer snap ring (H).

(6) Slowly release the spring pressure and remove the compressor.

(7) Remove the spring retainer (I), spring (J), levers (L), lever retainer (K), and cushion spring washer (M) and cushion spring (N) from the retainer (R).

(8) With a twisting motion, remove the piston (Q) from retainer (R).

77. INPUT SHAFT REACTION SHAFT AND FRONT CLUTCH — INSPECTION

Cleaning and Inspection

Clean clutch discs with clean, damp wiping cloths. Clean the metal parts in kerosene, mineral spirits or similar solvents. Blow the solvent through oil passages with compressed air until clean.

(1) Inspect the input shaft thrust washer (A) for cracks or excessive wear. Inspect the shaft (C) lugs for nicks and burrs. Splines should be smooth, without scratches, nicks or burrs. The bushing

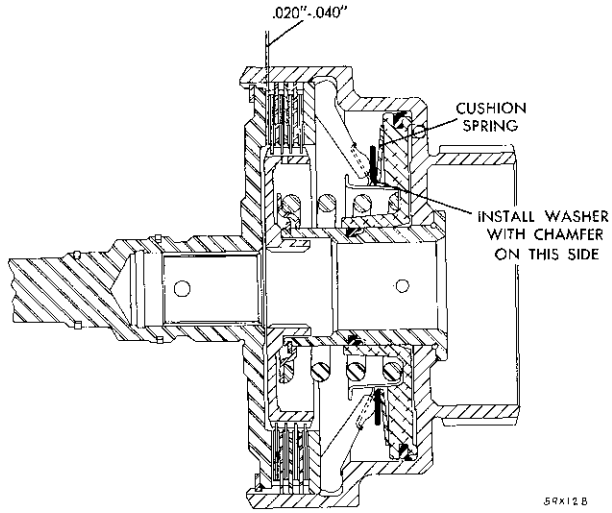


Fig. 74—Cushion Spring Washer Position

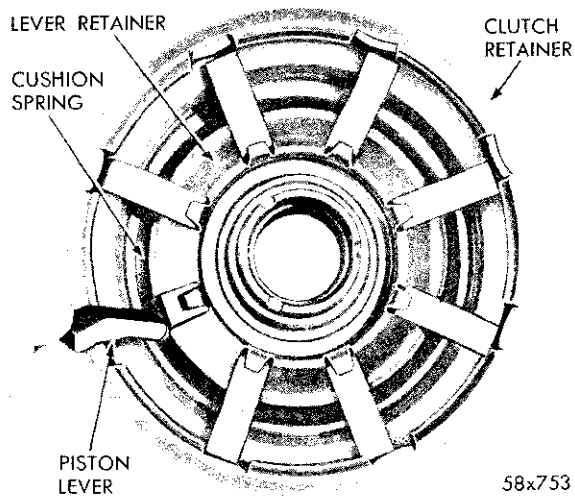


Fig. 75—Installing Piston Levers

should be smooth, free from scratches and excessive wear. **Do not unlock or remove rings except for replacement unless the condition warrants.** Seal rings should have sharp, unbroken edges and unbroken lock ends. The side clearance should not exceed .005 inch. The outer surface should show no evidence of wear.

(2) Do not remove the reaction shaft for inspection. Inspect splines for nicks, burrs and uneven excessive wear. Inspect inner bore. The input shaft seal ring contact area should not be worn. The thrust washer contact area on end of shaft should be smooth and unmarked.

(3) Inspect the driving discs (D) for flaking, glazing, burning and excessive wear (grooves not evident). Spline teeth should slide freely on driving disc hub splines (G).

(4) The steel clutch plates (E) and pressure plate (F) should be smooth and lugs should slide freely in piston retainer (R).

(5) Inspect the snap ring (H), spring retainer (I) and return spring (J) and lever retainer (K) for distortion, breakage and cracks.

(6) Inspect the levers (L), cushion spring (N) and cushion spring washer (M) for wear, distortion or evidence of scoring.

(7) Inspect the piston (Q) and piston retainer (R). Remove any nicks, burrs or light score marks with crocus cloth. Check ball in retainer must operate freely. Inspect the piston seal rings (S and T) for deterioration, nicks, distortion or excessive wear.

78. INPUT SHAFT AND FRONT CLUTCH (UNIT NO. 3) —ASSEMBLY (Fig. 73)

(1) Lubricate and install the new rubber seal ring (T) in hub groove of retainer (R) with lip of seal toward rear of retainer.

(2) Lubricate and install the new outer seal ring (S) on piston (Q) with lip of seal toward rear of piston.

(3) Using a twisting motion, seat the piston in the bottom of the retainer.

(4) Place the cushion spring (N) on the piston with cupped (concave) side toward piston.

(5) Place cushion spring washer (M) on cushion spring with chamfer up, toward front on assembly (Fig. 74).

(6) Place lever retainer (K) on piston hub and install levers (Fig. 75).

(7) Position the return spring (J), retainer (I) and snap ring (H) on retainer hub. Use Tool C-3575 to compress spring sufficiently to seat snap ring in the groove with pliers C-3301 and then remove compressor. **Be very sure snap ring is properly seated.**

(8) Install the plate (F) (smooth side up) in retainer and then install discs (D) and plates (E) alternately.

(9) Check the clutch travel (free play for complete disengagement). Using the truck transmission front clutch spacer plate, Part Number 1824319, as a special tool, place the spacer against shoulder in retainer above the top clutch disc. The clearance between tool and top disc should be .020" to .040".

Clutch discs are available in three thicknesses: .060-.063, .073-.076 and .087-.090 inch. Usually, it will only be necessary to repla e the top plate to provide clearance within this range. When proper clearance is obtained, remove tool.

(10) Install the clutch hub (G) and input shaft (C) in retainer and install snap ring (B).

(11) Install the thrust washer (A) over the input shaft, against the flange of the shaft.

SERVOS, BANDS AND MISCELLANEOUS— INSPECTION

79. BAND — INSPECTION

All letters referred to in the inspection of these parts pertain to Figure 76. Make visual inspection of bands and lining for wear and bond to metal. If the lining is worn to the point that the grooves are no longer visible, band assemblies must be replaced. The lining is bonded to the band and no attempt should be made to reline them. Inspect bands for distortion or cracked ends. The reverse band is **narrower** than the kickdown band and the lining is of a different composition. Therefore, it should be identified to prevent improper installation.

80. LEVER ASSEMBLIES — INSPECTION (Fig. 76)

Inspect the levers (J and K) for being cracked or worn and make sure they are free to turn on the shaft and have side clearance when installed. Inspect the lever shaft (I) for excessive wear.

81. REVERSE SERVO PISTON ASSEMBLY— INSPECTION (Fig. 76)

Inspect the lever contacting surface on plug (L) for excessive wear. Remove and inspect reverse servo piston seal ring (Z) (neoprene) for deterioration and hardness. Inspect seal ring groove for nicks or burrs. Inspect servo piston return spring (O), retainer (N) and snap ring (Q) for being distorted.

82. KICKDOWN PISTON ASSEMBLY — INSPECTION (Fig. 76)

Inspect the riveting of kickdown piston rod (T). Inspect the guide (R) contacting surface for nicks or burrs. Inspect seal ring (CC) on the guide for wear and make sure it turns freely in the groove. Check the fit of the guide (R) on the piston rod. Inspect the three rings (FF, EE, DD) (two interlocking) on piston for wear or broken locks. Make

sure they turn freely in the groove. It is not necessary to remove the rings unless the condition warrants. When replacing new rings, use extreme care so as not to damage the interlocking portion of the ring. Inspect kickdown piston (U) for light scores and wear. Inspect the kickdown piston spring (S) and the rod guide snap ring (M) for being distorted.

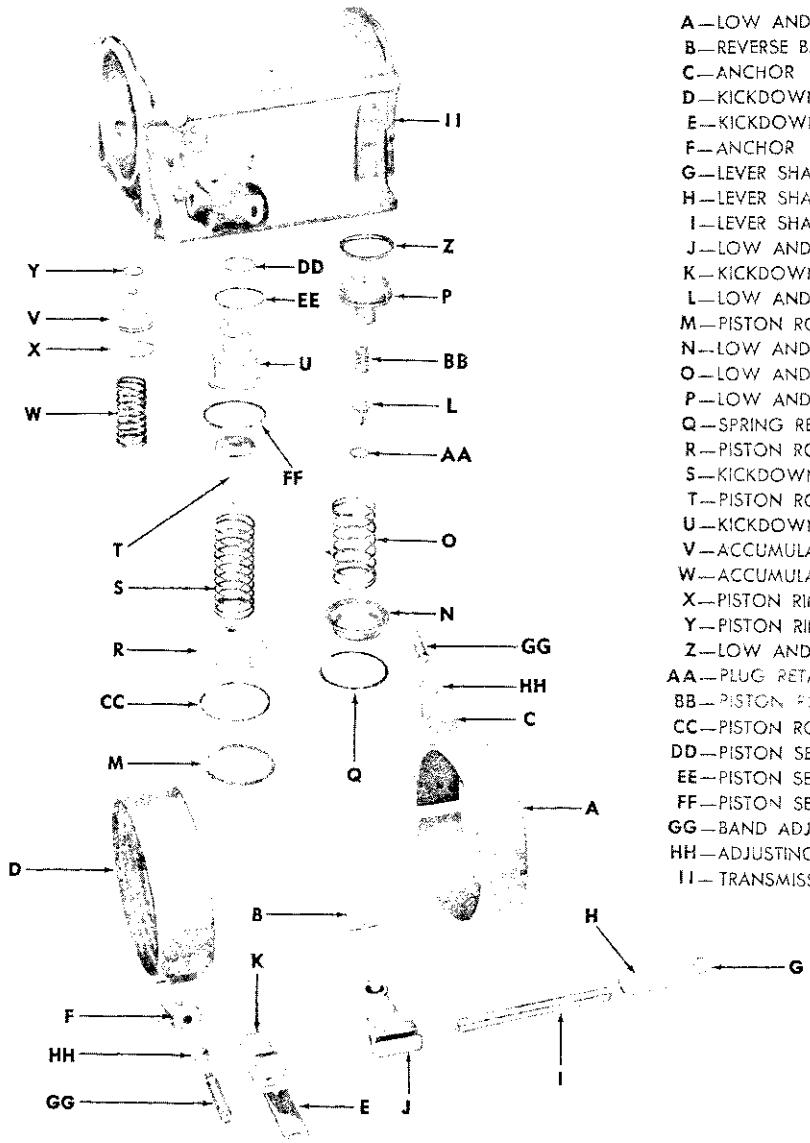
83. ACCUMULATOR PISTON AND SPRING — INSPECTION (Fig. 76)

Inspect the two seal rings (X and Y) (one interlocking) for wear or broken locks and make sure they turn freely in the grooves. It is not necessary to remove rings unless condition warrants. When replacing the new interlocking seal rings, use extreme care so as not to damage the interlocking portion of the ring.

Inspect the accumulator piston (V) for nicks, burrs and excessive wear. Inspect the accumulator spring (W) for being distorted.

84. DRIVE SLEEVE — INSPECTION

Inspect the front seal ring (neoprene) for nicks, deterioration and hardness. Inspect the interlocking seal ring for wear or broken locks and make sure it



A—LOW AND REVERSE BAND
B—REVERSE BAND STRUT
C—ANCHOR
D—KICKDOWN BAND
E—KICKDOWN BAND STRUT
F—ANCHOR
G—LEVER SHAFT PLUG
H—LEVER SHAFT SPACER
I—LEVER SHAFT
J—LOW AND REVERSE BAND LEVER
K—KICKDOWN BAND LEVER
L—LOW AND REVERSE SERVO PISTON PLUG
M—PISTON ROD GUIDE SNAP RING
N—LOW AND REVERSE SERVO PISTON SPRING RETAINER
O—LOW AND REVERSE SERVO PISTON SPRING
P—LOW AND REVERSE SERVO PISTON
Q—SPRING RETAINER SNAP RING
R—PISTON ROD GUIDE
S—KICKDOWN SERVO PISTON SPRING
T—PISTON ROD
U—KICKDOWN SERVO PISTON
V—ACCUMULATOR PISTON
W—ACCUMULATOR SPRING
X—PISTON RING—LARGE
Y—PISTON RING—SMALL
Z—LOW AND REVERSE SERVO PISTON RING
AA—PLUG RETAINING RING
BB—PISTON PLUG SPRING
CC—PISTON ROD GUIDE SEAL RING
DD—PISTON SEAL RING—SMALL
EE—PISTON SEAL RING—MEDIUM
FF—PISTON SEAL RING—LARGE
GG—BAND ADJUSTING SCREW
HH—ADJUSTING SCREW LOCK NUT
II—TRANSMISSION CASE

56 x 708 B

Fig. 76—Servos and Bands (Disassembled View)

turns freely in groove. It is not necessary to remove the rings unless the conditions warrant their replacement. Inspect the driving lugs for excessive wear and the bearing surface on outer diameter for nicks, burrs or deep scratches.

85. FRONT OIL PUMP — INSPECTION AND OIL SEAL REPLACEMENT

Inspect front oil pump housing outer "O" ring seal (on circumference of the housing) and the front oil seal for deterioration and hardness. Do not remove the front oil seal from the housing unless inspection reveals that it is necessary. To remove oil seal, use a brass drift and drive the seal out of housing. With new seal lip towards rotor bore (metal portion of the seal down), use driver, Tool C-3278, and drive the seal until tool bottoms on the face of housing, as shown in Figure 77. Inspect the drive sleeve seal ring contacting surface in housing for wear and scratches. Inspect the steel back bronze type bushing in bore for deep scratches or scoring and excessive wear. (Bushing and housing are serviced as an assembly). Remove the oil pump rotors and inspect the rotor contacting surfaces for scratches, burrs or grooving.

Inspect the regulator valve body contacting surface on pump housing face for nicks or burrs. Inspect housing passages and make sure they are free from dirt and foreign matter. Clean and install oil pump gears in housing. Replace gears, as identified when removed, with counterbore in the pinion gear facing down. Using straight edge, Tool C-3335, and feeler gauge, measure the clearance between the pump housing face and the face of the rotors, as

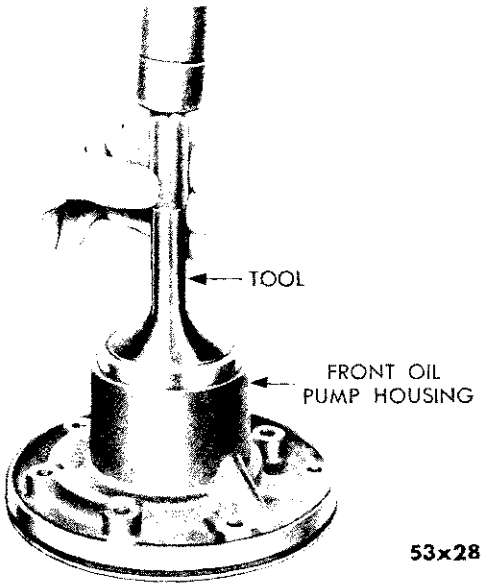


Fig. 77—Installing Front Pump Housing Oil Seal

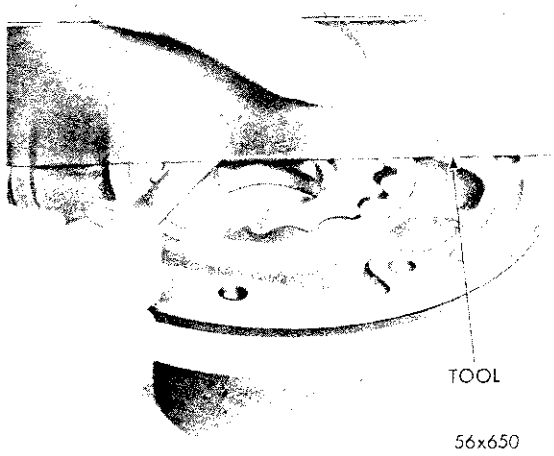


Fig. 78—Checking Clearance between Front Pump Body and Gears

shown in Figure 78. Clearance limits are from .001" to .0025". After measuring pump gear clearance, lubricate the pump rotors with Automatic Transmission Fluid (Type "A" — Suffix "A").

Measure the tip clearance between the rotor lobes. The manufacturing limits are .005 to .010 inch. Replace the rotors if this clearance exceeds .012 inch. Measure the clearance between the outer rotor and pump housing bore. The manufacturing limits are .008 inch (maximum). Replace the rotors or pump housing if this clearance exceeds .010 inch.

86. REGULATOR VALVE BODY AND VALVES — INSPECTION

Place the body and valves in pan containing a clean solvent, wash thoroughly and dry with compressed air. Inspect the reaction seal ring surface in bore for scratches, nicks or burrs. Inspect both valves for free movement in this valve body; they should fall in and out of bores when both the valves and body are dry. Crocus cloth may be used to polish valves providing care is exercised not to round the sharp edge portion of the valves. The sharp edge portion is vitally important to this type of valve, it helps to prevent dirt and foreign matter from getting between the valve and body, thus reducing the possibilities of sticking.

Check all fluid passages for obstructions and inspect all mating surfaces for burrs and distortion. If the regulator valve body should have a slight nick or raised portion on mating surfaces, it may be removed by using a surface plate and No. 400 or finer, grit wet or dry, sandpaper. Inspect the front and rear pump check valve for proper seating on both surfaces. If necessary to remove valve use a pair of long nose pliers.

Inspect the regulator valve spring seat (snap ring). After the valves and regulator body have been thoroughly cleaned and inspected, the valves should be reinstalled in body (Fig. 56). Place assembly on a clean surface and cover with a paper towel (line free) until ready for installation. Inspect regulator valve and torque converter control valve springs for distortion. Inspect the regulator valve spring sleeve and cup for burrs. Inspect the adjusting screw and locknut in retainer for freeness and pulled threads.

ASSEMBLY OF UNITS IN TRANSMISSION CASE

87. TORQUE CONVERTER REACTION SHAFT — INSTALLATION

If the torque converter reaction shaft was removed, reinstall it as follows:

(1) Using heat lamps, steam or hot water, heat the front of the transmission case to approximately 170 to 190 degrees F. (very hot when touched by fingers). If steam or hot water are used, be sure case and passage ways are all thoroughly dried out with compressed air.

(2) Install guide studs, Tool C-3283, in the front face of reaction shaft flange. Lubricate portion of reaction shaft that presses into case and then position into front of transmission case so that guide studs in shaft align with threaded holes in case.

(3) Using Tool C-3531, press reaction shaft into place, as shown in Figure 57. Remove the guide studs and install the bolts and washers. Tighten the bolts down evenly to prevent any possible misalignment of the shaft in the case and tighten 30 to 35 foot-pounds torque.

(4) Lubricate the torque converter reaction shaft seal (neoprene) and install on shaft.

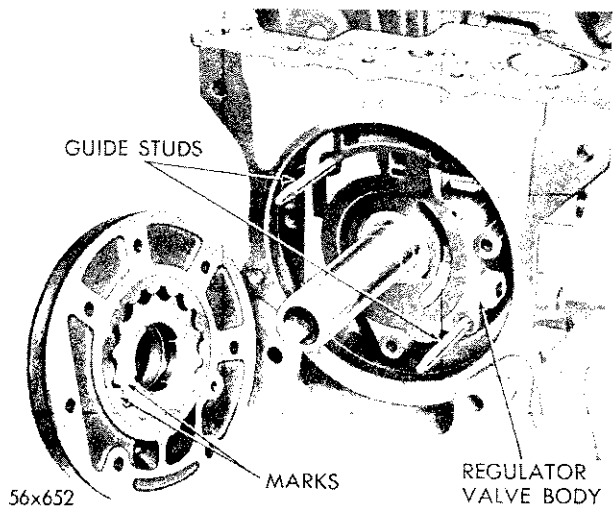


Fig. 79—Installing Front Oil Pump Assembly

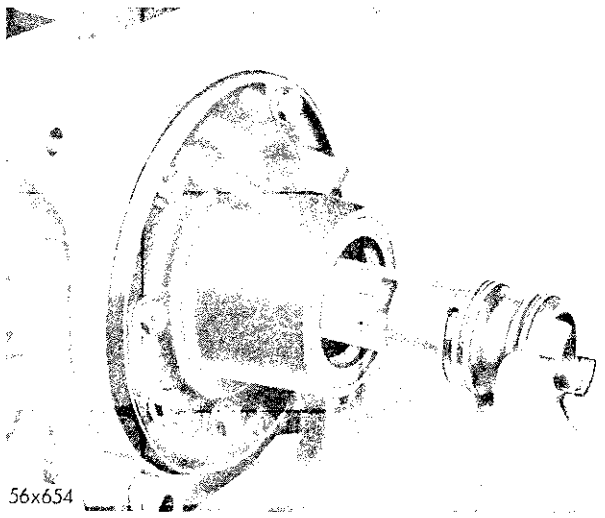


Fig. 80—Installing Front Oil Pump Drive Sleeve

88. REGULATOR VALVE BODY — INSTALLATION

(1) Install the guide studs, Tool C-3288, as shown in Figure 55.

(2) Install the regulator valve body gasket over guide studs into position on transmission case and with a rotating motion install torque converter and regulator valves into the regulator valve body (centering tool hole in ends of valves goes towards outside). Be sure the front and rear pump check valve is in proper position in regulator valve body (Fig. 56).

(3) With (neoprene) seal ring in position on the reaction shaft, slide the regulator valve body over the shaft and guide studs into position against the case.

89. FRONT OIL PUMP ASSEMBLY — INSTALLATION

(1) With the inner and outer seals lubricated and the pump rotors in position in housing (Fig. 79) (counterbore in pinion gear facing down as identified when removed) place the oil pump housing over studs and slide into position.

(2) Start the bolts and aluminum sealing washers and tighten evenly until the housing is seated into the transmission case. Remove the guide studs and

install the remaining bolts and washers and tighten 14 to 16 foot-pounds torque. **Improper tightening of these bolts may cause pump gears to bind.**

(3) Lubricate the front pump drive sleeve. With a slight rotating back and forth motion install sleeve (smooth bearing surface first) being sure the drive lugs engage in the oil pump inner rotor and can be rotated freely, Figure 80. **The main body of the driving sleeve should be flush with oil pump housing when properly installed and the neoprene seal ring will not be visible. If the rotors do not turn freely, remove the pump and check for foreign matter between the pump rotors and housing (Fig. 81).**

(4) Install the torque converter control valve spring, retainer and gasket and tighten 35 to 40 foot-pounds torque.

(5) Install the regulator valve spring, sleeve, cup, gasket and retainer (with adjusting screw and lock nut installed) and tighten 45 to 50 foot-pounds torque.

90. KICKDOWN PISTON — INSTALLATION

(1) Lubricate piston seal rings and install them on the kickdown piston.

(2) Compress outer ring and start assembly into case. With the piston properly centered so as not to damage the rings, tap lightly until piston bottoms in the case.

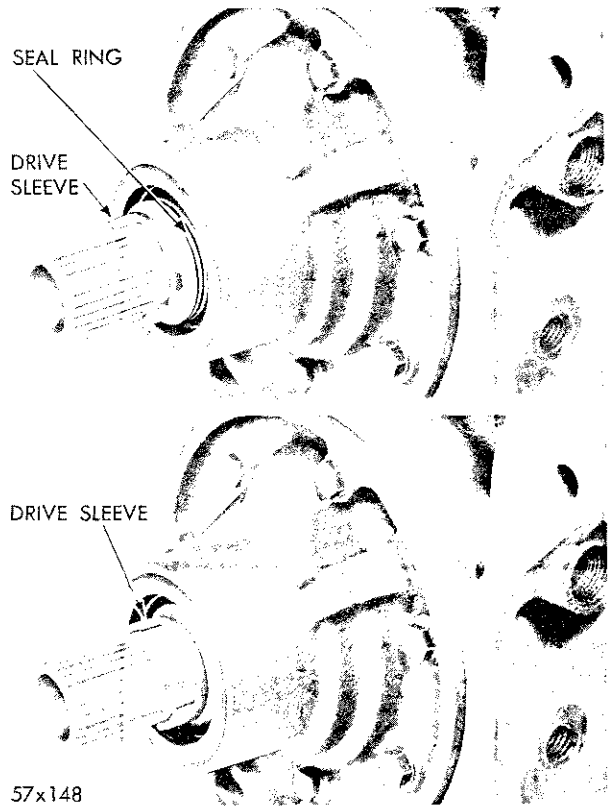


Fig. 81—Front Pump Drive Sleeve Installation — Incorrect Installation (Top View) — Correct Installation (Bottom View)

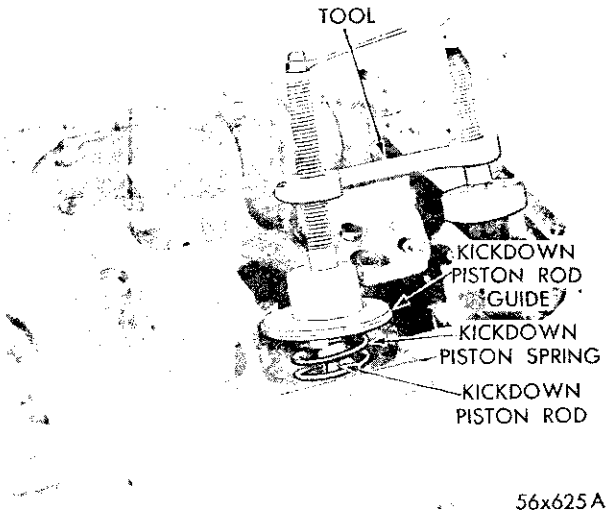


Fig. 82—Removal and Installation of Kickdown Piston Rod Guide and Spring

(3) Place the kickdown piston rod assembly in the piston and slide the piston spring over kickdown piston rod.

(4) Install Tool C-3529 or C-3289 (modified) on case and place kickdown piston rod guide over the spring while guiding piston rod guide, as shown in Figure 82.

(5) Using extreme care, compress the kickdown piston spring to the point that the piston rod guide seal ring slightly binds on the case and then work the seal ring into position by gradually compressing the spring, install the snap ring and loosen the compression portion of the tool.

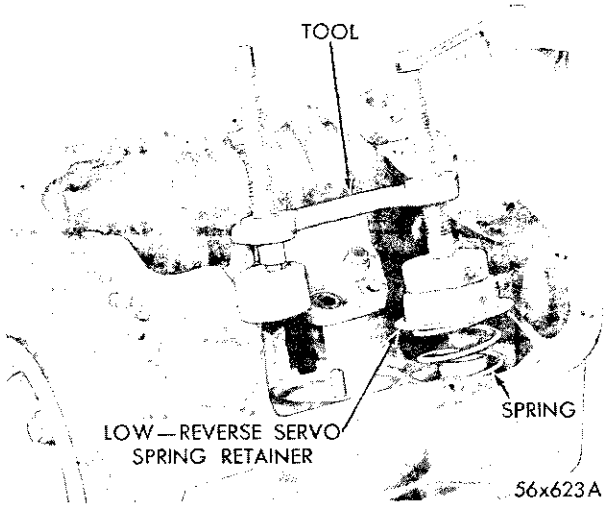


Fig. 83—Compressing Low and Reverse Servo Spring and Retainer

91. LOW-REVERSE SERVO PISTON — INSTALLATION

(1) Lubricate the low-reverse servo piston seal ring and install on the piston (lip of seal facing top end of piston). Install the cushion spring and plug into piston and fasten with the snap ring.

(2) Install the piston assembly into the transmission case then place reverse servo piston spring over piston and position spring retainer over spring. Using compressing tool for reverse servo piston installation, compress spring sufficiently to install snap ring. Spring retainer may require guiding into case (Fig. 83).

(3) Remove compressing tool.

92. KICKDOWN BAND — INSTALLATION

(1) Install the kickdown band assembly in same position as marked upon disassembly, by rotating the band ends over center support in transmission case, as shown in Figure 46. **Use extreme care when installing bands to prevent damage to the lining on edges of transmission case.**

(2) Install the anchor on the kickdown band adjusting screw.

93. LOW-REVERSE BAND — INSTALLATION

(1) Install the anchor on reverse band adjusting screw.

(2) Install the band by rotating ends through rear opening in case, in the same position as marked upon disassembly, as shown in Figure 44.

94. LOW-REVERSE AND KICKDOWN BAND LEVER ASSEMBLIES AND STRUTS — INSTALLATION

(1) Place the levers in position in the case, as shown in Figure 47.

(2) Remove the guide stud, Tool C-3288, from the threaded end of shaft and install in case to hold levers, followed by spacer (flat) and plug. Tighten plug securely.

(3) Position the kickdown band anchor over the adjusting screw, compress band and install kickdown band strut.

(4) Position the low-reverse band anchor over adjusting screw, compress band and with the aid of a screwdriver, install the strut.

95. UNIT NO. 3 — FRONT CLUTCH AND INPUT SHAFT ASSEMBLIES — INSTALLATION

If when transmission was disassembled, the end clearance was found to be incorrect, correction can be made at this time by selection of proper input shaft thrust washer. To accomplish this, use a micrometer and measure the thickness of the thrust washer which was removed. Then, select a thicker or thinner washer to give proper clearance. Thrust washers are available in the following thicknesses:

Thicknesses	Color
.115″ to .117″	Natural
.097″ to .099″	Red
.078″ to .080″	Black
.059″ to .061″	Orange

(1) Select the proper thickness thrust washer and position it on the input shaft.

(2) With the input shaft seal rings lubricated, start the unit through the rear of the transmission case, as shown in Figure 43. By supporting and keeping the unit centered as much as possible, guide through bands and reaction shaft into position.

96. UNIT NO. 2 — (SUN GEAR, REVERSE PLANET PINION CARRIER, OVERRUNNING CLUTCH AND REAR CLUTCH ASSEMBLIES)—INSTALLATION

(1) Start the unit through rear of transmission case.

(2) Align the identified locating hole in intermediate support with threaded locating hole inside of transmission case (Fig. 84).

(3) By supporting and keeping unit centered as much as possible, guide it through the bands until it contacts the hub of the front clutch. While pushing in on assembly, rotate the sun gear to engage clutch plates at the rear clutch on hub of front clutch.

While rotating the sun gear, make sure the unit

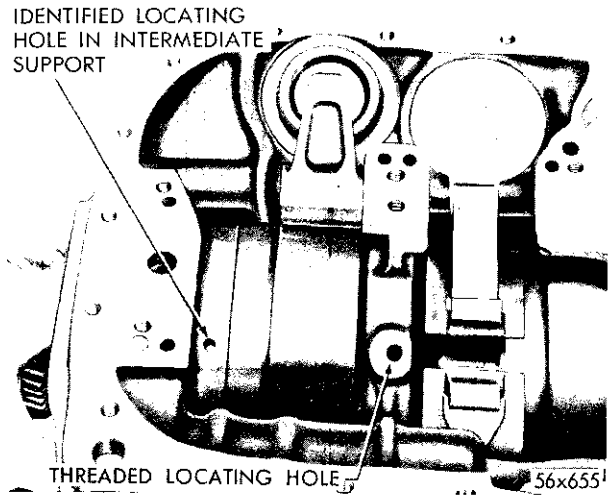


Fig. 84—Installing Unit No. 2

does not bind on bands or in intermediate support. Do not use excessive force when installing this unit so as to prevent damage to clutch discs in rear clutch. A drift may be used to assist in alignment of intermediate locating holes.

(4) Install the intermediate support locating bolts and lockwashers and tighten 25 to 30 foot-pounds torque. Test the input shaft and sun gear for free rotation.

97. UNIT NO. 1 — (OUTPUT SHAFT, KICKDOWN PLANET PINION CARRIER AND INTERMEDIATE SHAFT ASSEMBLIES)—INSTALLATION

Be sure reverse sun gear thrust washer (roller type) is in position on the intermediate shaft.

(1) Install the planet pinion carrier anti-scuff plate into position (pilot flange goes into the inside bore of the kickdown planet pinion carrier) against planet pinion housing. Lubricate plate, seal rings and bearing surface on intermediate shaft with Automatic Transmission Fluid Type "A", Suffix "A".

(2) Place the intermediate shaft in sun gear, as shown in Figure 40. Keeping unit centered as much as possible and while slowly turning output shaft, slide into position (large seal ring on output shaft must be flush with rear of transmission case).

NOTE: Use extreme care when installing to prevent damage to seal rings on intermediate shaft.

98. OUTPUT SHAFT SUPPORT — INSTALLATION

(1) Position the output shaft support thrust washer with the four tabs spaced between the webs on the front side of the output shaft support. Rotate the washer to find the location that will provide a minimum amount of rotation (Fig. 85). Lubriplate should be used to hold the washer in place.

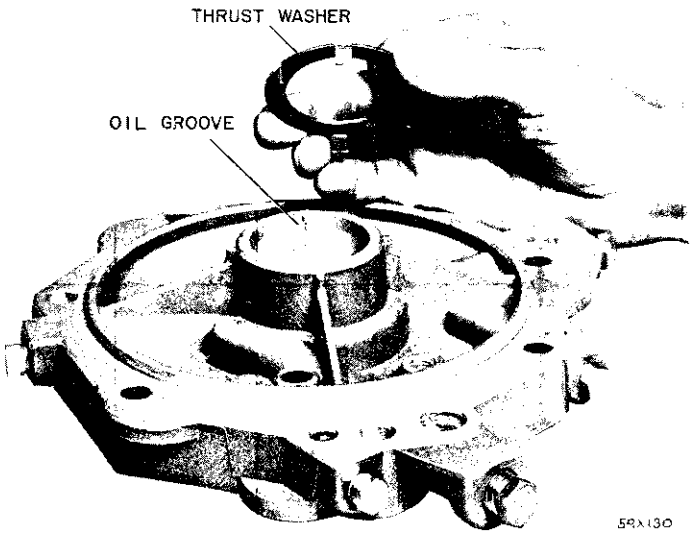


Fig 85—Installing Thrust Washer on Output Shaft Support

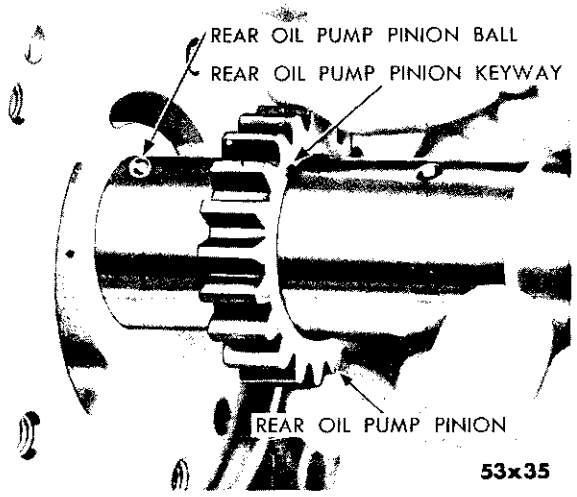


Fig. 86—Removal and Installation of Rear Oil Pump Pinion

(2) With the guide studs, Tool C-3283, installed in rear of transmission case, place output shaft support gasket over guide studs and into position on rear of case.

(3) Lubricate the output shaft seal rings. Install the support over the shaft and guide studs and position against transmission case (Fig. 39).

NOTE: Use care when installing support so as not to damage ring sealing surfaces.

(4) Install the one (short) output shaft support to transmission case bolt and lockwasher and tighten finger tight.

99. REAR OIL PUMP AND GOVERNOR ASSEMBLIES — INSTALLATION

NOTE: The oil pump gears were marked upon disassembly for ease of identification and should be reassembled in the same manner.

(1) Place the rear oil pump pinion ball in ball pocket in output shaft.

(2) Lubricate the rear oil pump drive pinion. Place over the output shaft and slide into position aligning the keyway in pinion with ball in shaft, as shown in Figure 86.

(3) Lubricate the rear oil pump gear and position it in the pump housing, rounded edge down.

(4) Slide the rear oil pump and governor assemblies over the output shaft and position it against the support, as shown in Figure 87. **There are two extra holes in the housing which are used for vents.**

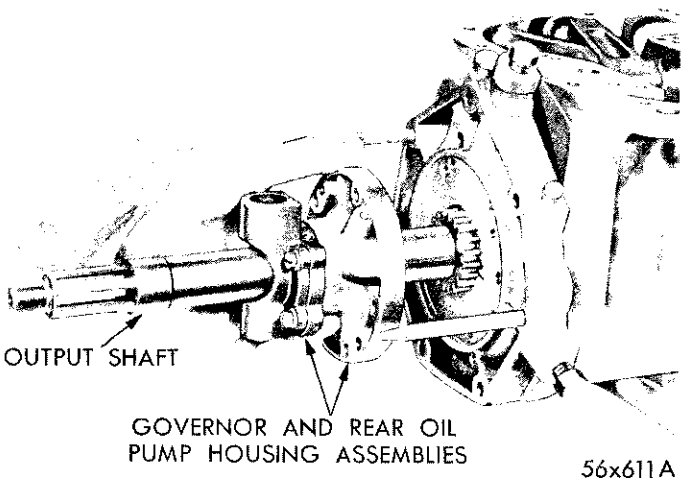


Fig. 87—Removal and Installation of Governor and Rear Oil Pump Housing Assemblies

Make definitely sure that no attempt is made to install bolts in these holes. Check each threaded hole before installing bolts.

(5) Install the rear oil pump housing to output shaft support bolts. These special bolts do not require washers. Tighten the bolts down evenly and torque 10 to 12 foot-pounds torque. After the bolts have been properly torqued, turn the output shaft to make sure the pump gears are free to rotate. If not, disassemble the pump to determine cause.

100. GOVERNOR WEIGHTS AND VALVE ASSEMBLY — INSTALLATION

(1) Align the locating hole in output shaft to locating bolt hole in governor support and install locating bolt, tighten 60 to 80 inch pounds torque. If the governor body has been removed, tighten the four governor body screws.

(2) Dry the governor weight assembly and valve with compressed air, but do not lubricate when assembling. Place the governor weight assembly (secondary weight snap ring facing out), into governor body (Fig. 88), and using pliers, Tool C-3229, install the snap ring (Fig. 38), beveled side outward.

(3) Place the governor valve (small end up) on governor shaft, slide assembly into governor body through the output shaft and governor weight assembly (Fig. 37); at the same time positioning valve in body and then install the governor valve shaft snap ring (weight assembly end), (Fig. 36). Make very sure snap rings on both ends of the governor valve shaft fit securely. After snap ring installation, apply sufficient pressure to both ends of the valve shaft to force snap rings to outer portion of snap ring grooves. Check operation of governor weight assembly and valve by turning the output shaft. **Both shall fall freely in governor body.**

101. TRANSMISSION EXTENSION — INSTALLATION

(1) Install the new transmission extension gasket over guide studs and into position against output shaft support. **Do not use any sealing material on gaskets.**

(2) Place the extension housing over output shaft and guide studs and slide into position against support being careful not to damage rear oil seal or bushing. Install the extension to case bolts and lockwashers and tighten 25 to 30 foot-pounds torque. **After these bolts have been properly torqued, turn the output shaft to make sure it turns freely.**

(3) Install the speedometer drive pinion and sleeve assembly in the transmission extension and tighten 40 to 45 foot-pounds torque.

102. PARKING BRAKE — INSTALLATION

(1) Install brake shoe anchor and anchor pin in the extension housing.

(2) Install the brake support spacer (neoprene) in position on back of brake support and spacer sleeve in center of support. Slide parking brake assembly (intact) over rear of extension and anchor pin. Make sure spacer sleeve remains in center of support.

(3) Install brake support grease shield on extension housing.

Indent in the shield is for correct positioning on the extension. The shield must be located on the extension far enough to permit installation of the spring.

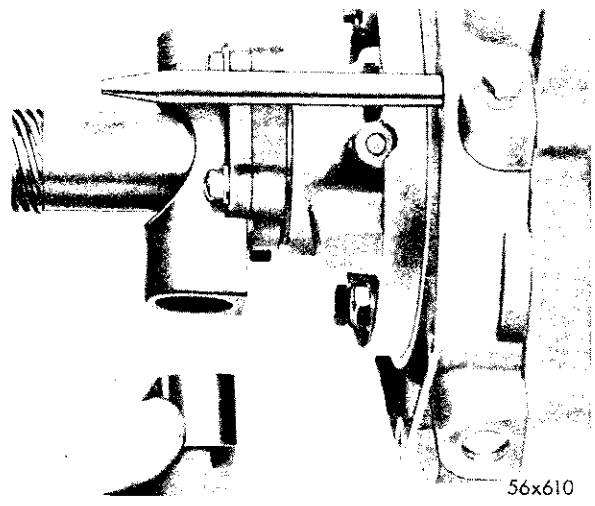


Fig. 88—Removal and Installation of Governor Weight Assembly

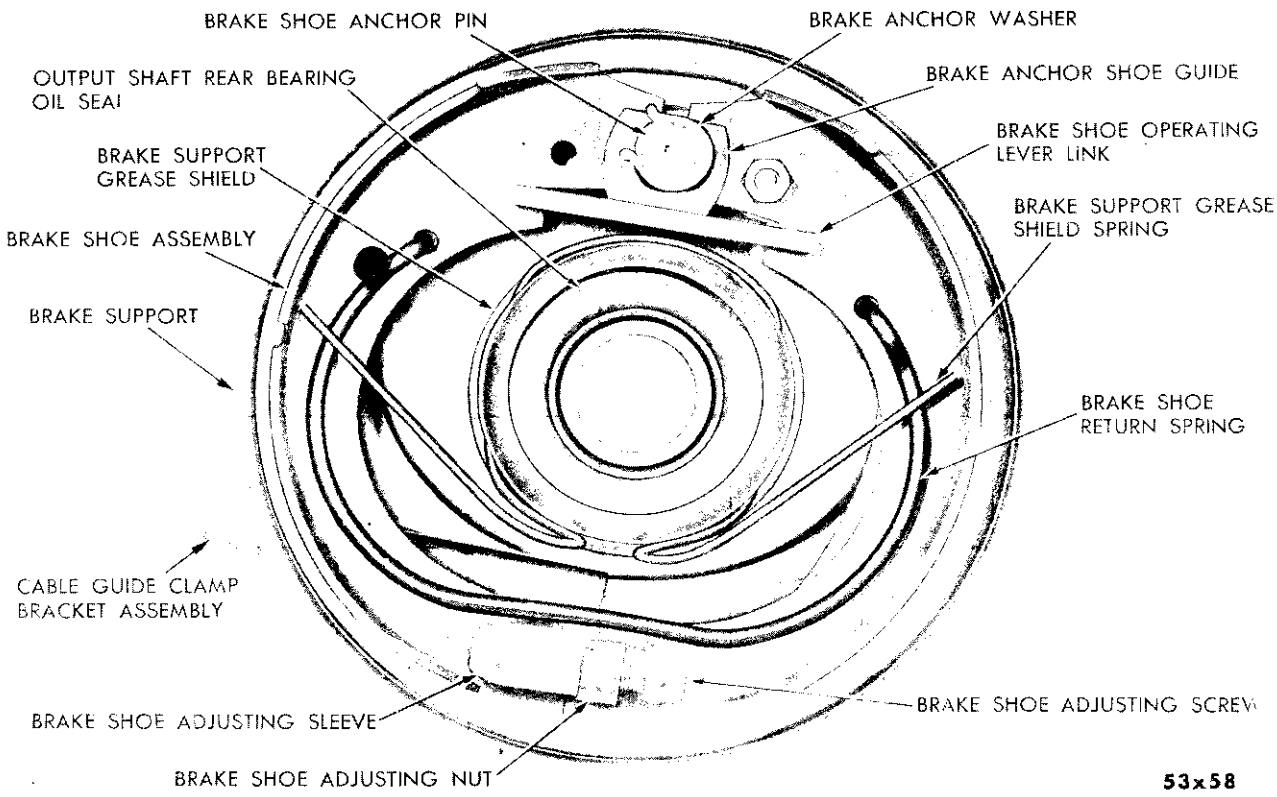


Fig. 89—Internal Expanding Hand Brake (Drum Removed)

(4) Install the brake support grease shield spring (opening in the spring toward adjusting sleeve). Make sure the spring is properly seated in groove.

(5) Slide the brake shoe return spring behind the grease shield spring and hook into position, as shown in Figure 89.

(6) Install "C" type brake anchor washer.

(7) Install propeller shaft flange and drum assembly, washer and nut. While holding flange with Tool C-3281, tighten to 175 foot-pounds torque.

103. RECHECKING FRONT CLUTCH END CLEARANCE

Prior to installing the valve bodies and transfer plate assembly, recheck front clutch end clearance using dial indicator, Tool C-3339, as shown in Figure 34.

(1) Install the dial indicator and pry the clutch forward by carefully inserting screwdriver between the front and rear clutch.

(2) Remove the screwdriver and with point of dial indicator contacting edge of front clutch retainer, set the indicator to zero.

(3) Pry the front clutch assembly rearward against rear clutch and take indicator reading. This clearance should be from .020" to .050".

If the clearance is not within these limits, the transmission will have to be partially disassembled to allow an input shaft thrust washer of proper thickness to be installed by the following additional steps:

(4) Remove the bolts from transmission extension and install guide studs, Tool C-3283.

(5) As a complete assembly, remove the parking brake, extension, output shaft support and Unit No.

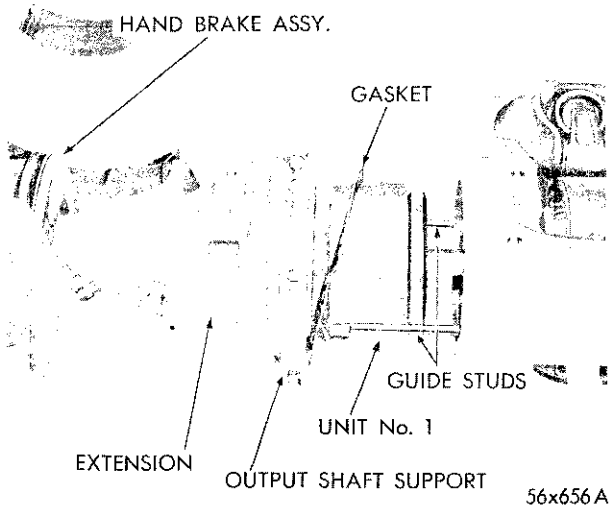


Fig. 90—Removal of Output Shaft Support, Extension, Handbrake Assembly and Unit No. 1 as an Assembly

1, as shown in Figure 90. **Support assemblies as much as possible when removing to prevent damaging the seal rings on the intermediate shaft. Refer to "Power Train Units — Removal," Unit No. 2 and Unit No. 3.**

(6) Using a micrometer, measure the thickness of the input shaft thrust washer and select a washer that will provide correct clearance. Thrust washers are available in the following thicknesses:

Thickness	Color
.115" to .117"	Natural
.097" to .099"	Red
.078" to .080"	Black
.059" to .061"	Orange

(7) Reinstall the power train units. Refer to "Power Train Units — Installation;" Unit No. 3 and Unit No. 2.

(8) Install the parking brake assembly, extension, output shaft support and Unit No. 1 in one assembly as removed, following the procedure as described in the installation of Unit No. 1.

(9) Install the extension housing bolts and lockwashers (remove the guide studs and replace with the remaining bolts and lockwashers) and then tighten all extension housing bolts 25 to 30 foot-pounds torque.

(10) Rotate the output shaft to make sure it turns freely and then recheck the front clutch end clearance.

104. BAND ADJUSTMENTS

Since both band assemblies have been removed, it is very important that the parking brake drum is turned in a clockwise and counter-clockwise direction to center the bands on the drums prior to making band adjustments.

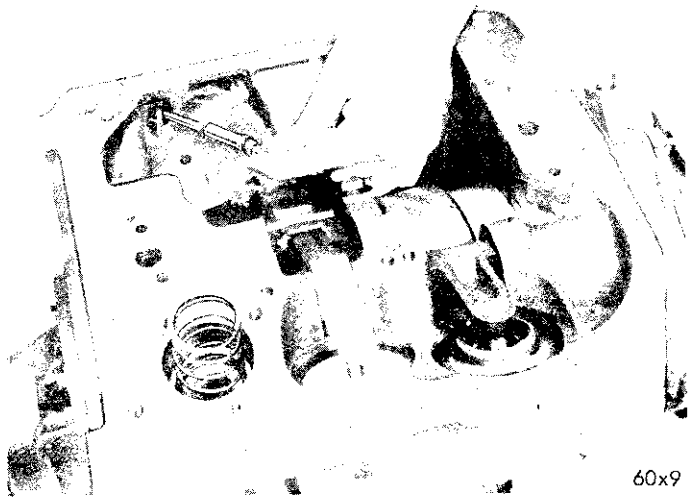


Fig. 91—Installing Cable Adapter

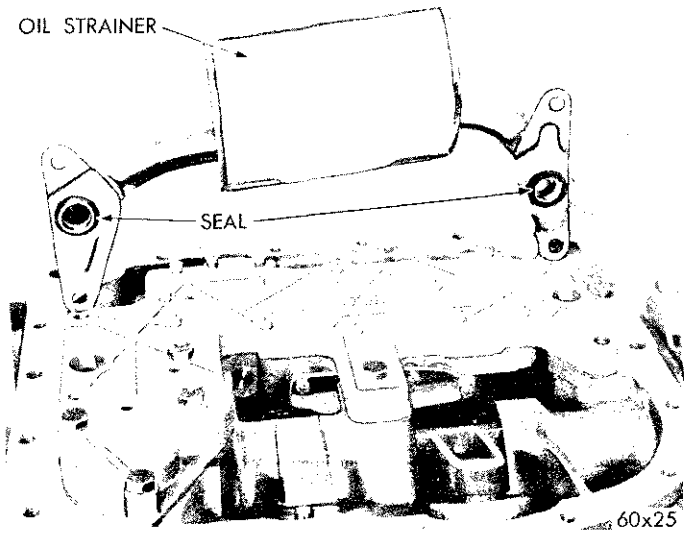


Fig. 92—Installing Oil Strainer on Valve Body and Transfer Plate Assembly

Low-Reverse (Rear) Band

Refer to "Maintenance Adjustments Test," Paragraph 8 (b).

Kickdown (Front) Band

Refer to "Maintenance, Adjustments and Tests," Paragraph 8 (a).

105. ACCUMULATOR PISTON — INSTALLATION

(1) Lubricate the piston seal rings and place the accumulator into position in the transmission case. Compress the outer seal ring and tap lightly into the transmission case and then place the accumulator piston spring down into the accumulator piston.

106. VALVE BODY AND TRANSFER PLATE ASSEMBLY — INSTALLATION

(1) Inspect the mating surfaces of the valve body assembly for cleanliness. Place the manual lever in the reverse position (all the way in).

(2) Using a suitable guide, such as a piece of welding rod, inserted through the push button cable opening in the transmission case, slide the cable adapter over the end of the guide, as shown in Figure 91, with the adapter attaching stud facing toward the bottom of the transmission case.

(3) Place the valve body and transfer plate assembly into position on the transmission case, and at the same time guiding the cable adapter stud into the hole in the manual control lever (Fig. 33).

(4) Install the cable adapter stud nut and tighten securely.

(5) Install the transfer plate bolts (leaving four holes vacant to attach the oil strainer), tighten evenly and torque 14 to 16 foot-pounds.

(6) With the sealing washers on the ends of the strainer tubes, place strainer in position on the transfer plate. Install remaining bolts and torque 14 to 16 foot-pounds (Fig. 92).

(7) Install the neutral starter switch and sealing washer and tighten 15 to 20 foot-pounds torque. Make sure manual lever contacts the switch plunger when in neutral position.

107. OIL PAN — INSTALLATION

Use a new gasket, install the oil pan and tighten bolts 12 to 17 foot-pounds torque. Do not overtighten, as a leak at the gasket may result due to possible distortion of the flange of the pan.

108. INSTALLING TRANSMISSION IN VEHICLE

(1) Install guide studs, Tool C-3276, in the two transmission mounting holes in the right side of torque converter housing.

(2) With front oil pump drive sleeve lubricated, install it, making sure the driving lugs are properly engaged with the oil pump pinion. **The main portion of drive sleeve will be flush with the front of the pump housing when properly installed (Fig. 81).**

(3) Note the position of the driving lugs inside the torque converter hub, then position front oil pump drive sleeve on the transmission accordingly, to aid in proper engagement when transmission is installed.

(4) Slide the transmission over the guide studs and into position against the converter housing. Make sure driving lugs on front oil pump drive sleeve properly engage the torque converter. **To avoid damage to the front oil pump, do not use transmission to torque converter housing screws to force transmission and housing together. If the oil pump drive sleeve and input shaft have been properly aligned, the transmission should slide into position relatively easy. Do not force.**

(5) Install two transmission case to torque converter housing screws and lockwashers in the left side, do not tighten. Remove the guide studs and install the two transmission case to housing screws and lockwashers in the right side. Tighten the four down evenly to specifications.

(6) Place crossmember into position and install the crossmember to torsion bar bracket bolts. Tighten to specifications. Lower the engine and at the same time align mounting bolts in insulator bracket with holes in rear spring mount plate. Install the nuts and lockwashers, tighten to specifications.

(7) Remove the support fixture, Tool C-3487, from the side of the frame member.

(8) Install the oil cooling lines. Connect neutral starting switch wire to switch. Install oil pan filler tube nut and tighten the nut to specifications. Connect speedometer cable. Engage ball end of the parking brake cable in operating lever and tighten cable clamp bolt. Install adjusting brake screw cover plate on parking brake support. Connect the front universal joint and tighten nuts to 37 foot-pounds torque. Install the starter (if removed).

(9) Connect throttle control linkage to throttle lever on the transmission. Install push button control cable in the adapter making sure spring lock engages the cable. Adjust the manual control cable. Refer to Paragraph 7. Tighten the cable adjustable mounting bracket nut securely. Lower the vehicle and connect the battery. Refill transmission with Automatic Transmission Fluid (Type "A", Suffix "A"). Adjust the throttle linkage (Paragraph 10).

RECONDITION VALVE BODY AND TRANSFER PLATE ASSEMBLIES

109. VALVE BODY — REMOVAL FROM TRANSFER PLATE AND DISASSEMBLY

To facilitate the reassembly of the valve body it is suggested that the valves, springs, and plugs removed from one side of the valve body be kept in separate containers, apart from the parts removed from the other portion of the valve body. The parts used in this new one piece valve body are not interchangeable with those of earlier production models.

(1) Place the valve body and transfer plate assembly in stand, Tool C-3528, with the operating lever shafts in the downward position, as shown in Figure

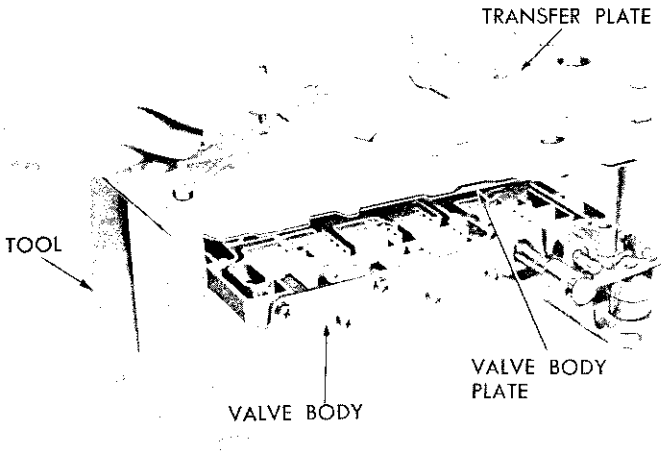


Fig. 93—Valve Body and Transfer Plate Assembly in Stand

93. **Never clamp any portion of any valve body assembly in a vise or use force when removing or installing the valves and plugs.**

(2) Remove the blocker valve retainer plate, blocker valve and spring, Figure 94.

(3) Remove the cross recess screws that hold the transfer plate, valve body and valve body cover together. All screws are of equal length. **When the last screw is removed, the valve body should be held and lowered cautiously to prevent loss of any of the six ball check valves.** Observe the location of these balls and then remove the balls. All check valve balls are of the same size (Fig. 95).

(4) Remove the shuttle valve and governor plug cover plate (A) (larger of the two covers). (Refer to Fig. 96.)

(5) Remove the shuttle valve plug (B) and shuttle valve spring (C). Remove the snap ring (J) and slide out shuttle valve (I).

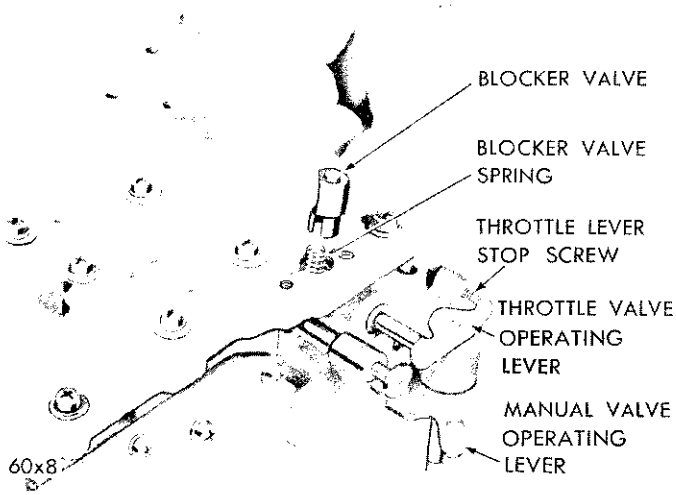


Fig. 94—Removal and Installation of Blocker Valve

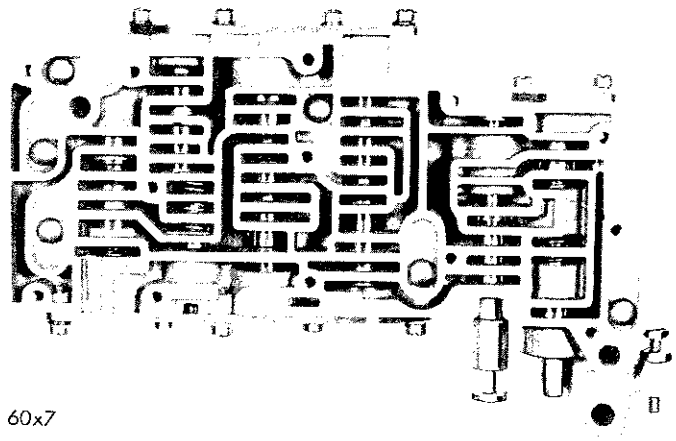


Fig. 95—Location of Check Valve Balls in Valve Body

(6) Remove the 1-2 relay valve spring (D) and 1-2 relay valve (E).

(7) Remove the 1-2 (F) and 2-3 (G) shift valve governor plugs.

(8) Remove the shift valve cover plate (L). **Hold the cover plate while releasing the spring tension to prevent possible loss of springs while the cover is removed.** (Refer to Fig. 97.)

(9) Remove the 1-2 (M) and 2-3 (N) shift valve springs and valves (O-P).

(10) Remove the throttle compensating spring (Q) and valve (R).

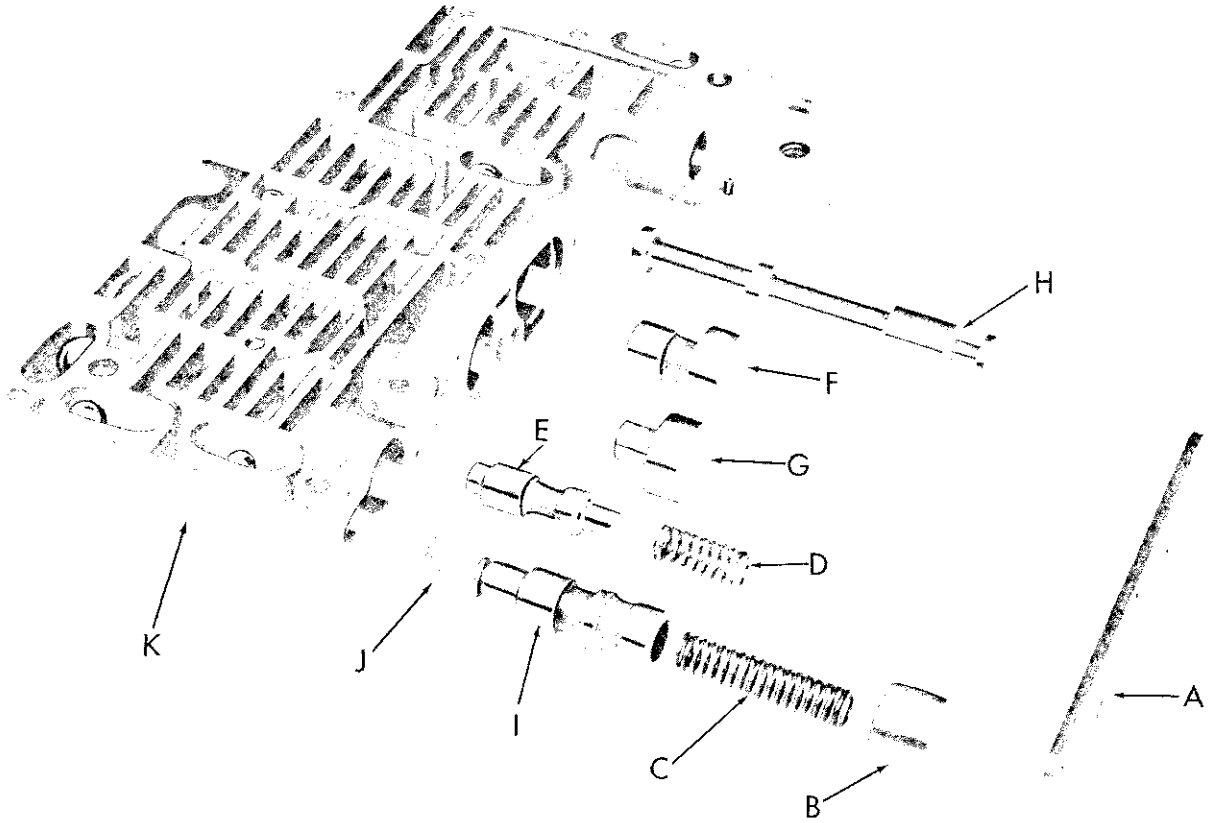
(11) Remove the throttle valve cover plate (S), throttle valve (T), throttle valve spring (U), kickdown valve (V) and detent (W).

For general cleaning purposes it is not usually necessary to disassemble and remove the manual valve, manual valve lever, throttle operating lever, or the manual valve lever detent ball and spring. However, if it is deemed advisable to remove these parts, perform the following additional steps:

(12) Remove the throttle control lever shaft snap ring and while holding the manual valve operating lever detent ball against the spring to prevent loss of the ball and spring, slide out throttle and manual valve levers. Remove the detent ball and spring (Fig. 94).

(13) Carefully slide the manual valve out of the valve body.

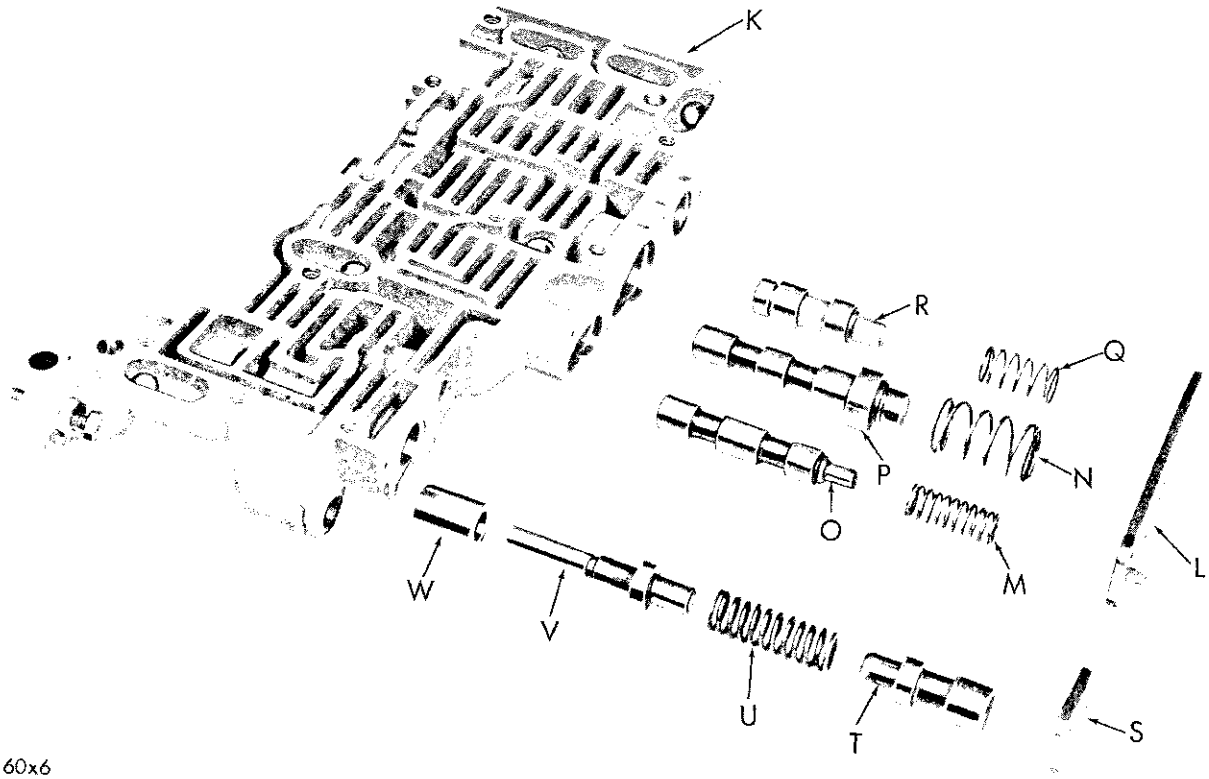
(14) Remove blocked valve plate, spring and valve (Fig. 94).



60x5

Fig. 96—Shuttle and Relay Valve Side of Valve Body

A. Shuttle Valve and Governor Plug Cover
B. Shuttle Valve Plug
C. Shuttle Valve Spring
D. 1-2 Relay Valve Spring
E. 1-2 Relay Valve
F. 1-2 Shift Valve Governor Plug
G. 2-3 Shift Valve Governor Plug
H. Manual Valve
I. Shuttle Valve
J. Shuttle Valve Snap Ring
K. Valve Body



60x6

Fig. 97—Shift and Throttle Valve Side of Valve Body

L. Shift Valve Cover Plate
M. 1-2 Shift Valve Spring
N. 2-3 Shift Valve Spring
O. 1-2 Shift Valve
P. 2-3 Shift Valve
Q. Throttle Compensating Valve Spring
R. Throttle Compensating Valve
S. Throttle Valve Cover
T. Throttle Valve
U. Throttle Valve Spring
V. Kickdown Valve
W. Kickdown Valve Detent

110. VALVE BODY, VALVE BODY PLATE AND TRANSFER PLATE — CLEANING AND INSPECTION

Place all parts in clean solvent, wash thoroughly and dry with compressed air. Make definitely sure all passages are free from obstructions. When inspecting, also check for porous castings. Inspect all mating surfaces for burrs, nicks and grooves. The small ones may be removed with very fine wet or dry sand paper (400 grit); otherwise, the damaged parts must be replaced with new parts. Using straightedge, Tool C-3335, check all mating surfaces for distortion.

Using a pen light, inspect the bores in the valve body for score marks, pits, and irregularities. Inspect all springs for distortion and collapsed coils. Inspect all valves and plugs for burrs, nicks and scores. The small scratches may be removed with crocus cloth providing extreme care is used **not to round off the sharp edge portion of valve.** The sharp edge portion is vitally important to this type valve as it helps to prevent dirt and foreign matter from getting between valves and body, thus reducing possibilities of sticking. Check the valves and plugs for free operation in bores; they must fall freely in bores when clean and dry.

Inspect the valve body plate for nicks, scratches, or burrs; and make sure metering holes are open. Inspect the transfer plate for porosity. Inspect the machined surfaces for nicks and burrs.

The throttle operating lever stop screw should be inspected for being loose or worn. Be sure the lock nut is tight. **This screw should never be removed or its position changed. It is pre-set and controls the base throttle pressure setting. Should it become loose it will require careful readjustment with a special service tool. Refer to Paragraph 10 (e) for adjustment procedure.**

Inspect the manual and throttle valve operating levers and shafts for being bent, worn, or the levers loose on their shafts. If bent or worn they should be replaced. If the levers are loose on shafts, they may be silver soldered **only,** otherwise they must be replaced with new parts.

All valves should be installed dry and with a rotating motion.

111. VALVE BODY, VALVE BODY PLATE AND TRANSFER PLATE — ASSEMBLY

(1) While holding the valve body, with the oil passage ways facing downward, insert the manual valve operating lever detent spring into the valve body recess followed by the detent ball. Hold the ball against the spring with the fingers to prevent loss.

(2) Slide the throttle lever shaft up through the valve body with the smallest cam contacting the end of throttle lever stop screw, as shown in Figure 94.

(3) While continuing to hold the detent ball against spring, slide the manual operating lever down over the throttle valve shaft and at the same time index the arm on the lever into the end groove of the manual valve. The detent notches in the lever should slide down against the detent ball.

(4) Install the snap ring over the throttle lever shaft. Rotate the manual lever to see that detent and valve operate freely.

(5) (Refer to Fig. 97,) Slide the kickdown detent (W) (counterbored end first) over the machined end of the kickdown valve (V), and then slide the assembly (W-V), detent end first, into the valve body. Install the throttle valve spring (U) into the valve body followed by the throttle valve (T), spring pilot end first. Install the throttle valve cover plate (S) and tighten the screw 25 to 30 inch-pounds torque.

(6) Install the 1-2 and 2-3 shift valves (O-P) with the spring pilot ends pointed outward followed by springs (M-N).

(7) Install the throttle compensating valve (R) with spring pilot end outward followed by the throttle compensating pressure spring (Q).

(8) Install the shift valve cover plate (L) and tighten the screws 25 to 30 inch-pounds torque.

(9) Turn the valve body over and refer to Figure 96. Install the shuttle valve (I), small end first into valve body and install the snap ring (J). The snap ring should be replaced if it does not fit securely.

(10) Install shuttle valve spring (C) followed by the shuttle valve plug (B).

(11) Insert the 1-2 relay valve (E), spring pilot end outward, followed by relay valve spring (D) into valve body.

(12) Install the 1-2 and 2-3 shift valve governor plugs (F-G).

(13) Place the shuttle valve and governor plug plate cover (A) on valve body and tighten screws 25 to 30 inch-pounds torque.

(14) Place the six ball checks in their respective positions in the valve body, as shown in Figure 95.

(15) Set the transfer plate cover (thin steel plate) over the stand pilots, Tool C-3528, as shown in Figure

LINE PRESSURE CHART

(Ram Manifold Cars Only)

Push Button Position	Rear Wheels	Engine Speed (rpm)	Line Pressure (psi)
R	Free to Turn	1600	235-275
N	—	1200	100-110
D (Shifted into Direct)	Free to Turn	1200	104-106
2	Free to Turn	1200	100-110
1	Free to Turn	1200	100-110
D	Free to Turn	3500	108-115

93, followed by the transfer plate so that all screw holes line up.

(16) With all ball check valves in place, position the valve body up against the transfer plate and cover, aligning the screw holes and install the attaching screws and washers. Tighten all screws evenly 25 to 30 inch-pounds torque.

(17) Insert the reverse blocker valve spring into top of transfer plate, as shown in Figure 94, followed by the blocker valve. The slot in the lower portion of the blocker valve must index with the bar of transfer plate cover so that the valve can be depressed flush with the top of transfer plate.

(18) Position the blocker valve cover plate over the blocker valve so that all openings in the transfer plate are completely covered and tighten screws 25 to 30 inch-pounds torque.

NOTE: If this plate is incorrectly positioned, governor pressure leakage will result. When correctly installed, the edge of the plate will align up flush with the edge of the valve body transfer plate, completely covering the blocker valve bore and governor pressure passage in the transfer plate.

112. SERVICE INFORMATION

a. TorqueFlite Transmission — Ram Manifold Engines

The following information will acquaint the service technician with the procedures that differ from the standard TorqueFlite transmission and the one used on cars equipped with the ram manifold.

Disassembly, inspection, and assembly procedures are the same. There is a difference, however, in line pressure, governor pressure, planet pinion carrier, and throttle linkage adjustment; they are as follows:

(1) The line pressure is increased from 90 to 105 psi, (refer to ram manifold line pressure chart). In order to achieve this change, a heavier regulator valve spring is used.

(2) Governor pressure is also changed. (Refer to ram manifold governor pressure chart.) In this case, the governor weight assembly incorporates a heavier spring along with a lighter outer weight.

(3) Due to the increased torque provided by ram induction, the kickdown and reverse planet pinion carrier assemblies differ, they embody a planet pinion carrier that is made of a different aluminum alloy.

(4) The throttle linkage is designed to conform with the ram manifold equipped engine. (Refer to Fig. 98).

It is very important that the throttle linkage be set in the following order:

GOVERNOR PRESSURE CHART

(Ram Manifold Cars Only)

Push Button Position	Rear Wheels	PS-1, PS-3 Car Speed	PC-3, C300F Car Speed	Governor Pressure
D	Free to Turn	20-24	21-24	15 psi
D	Free to Turn	35-41	36-43	50 psi
D	Free to Turn	53-60	55-62	75 psi

b. Positioning the Accelerator Shaft

(1) Loosen the adjusting nuts "A" and "B" (accelerator shaft to transmission rod and accelerator shaft to throttle shaft lever rod).

(2) Insert a piece of 3/16 inch drill rod, 10 inches long into the accelerator shaft bracket and through the hole in the lever.

(3) Move the transmission throttle control lever forward until it stops. Tighten the locknut "A" securely. This positions the accelerator shaft.

c. Positioning the Accelerator Pedal

(1) Unsnap the accelerator pedal to shaft rod.

(2) Turn the threaded end of rod either in or out until an angle measurement of 114 degrees is ob-

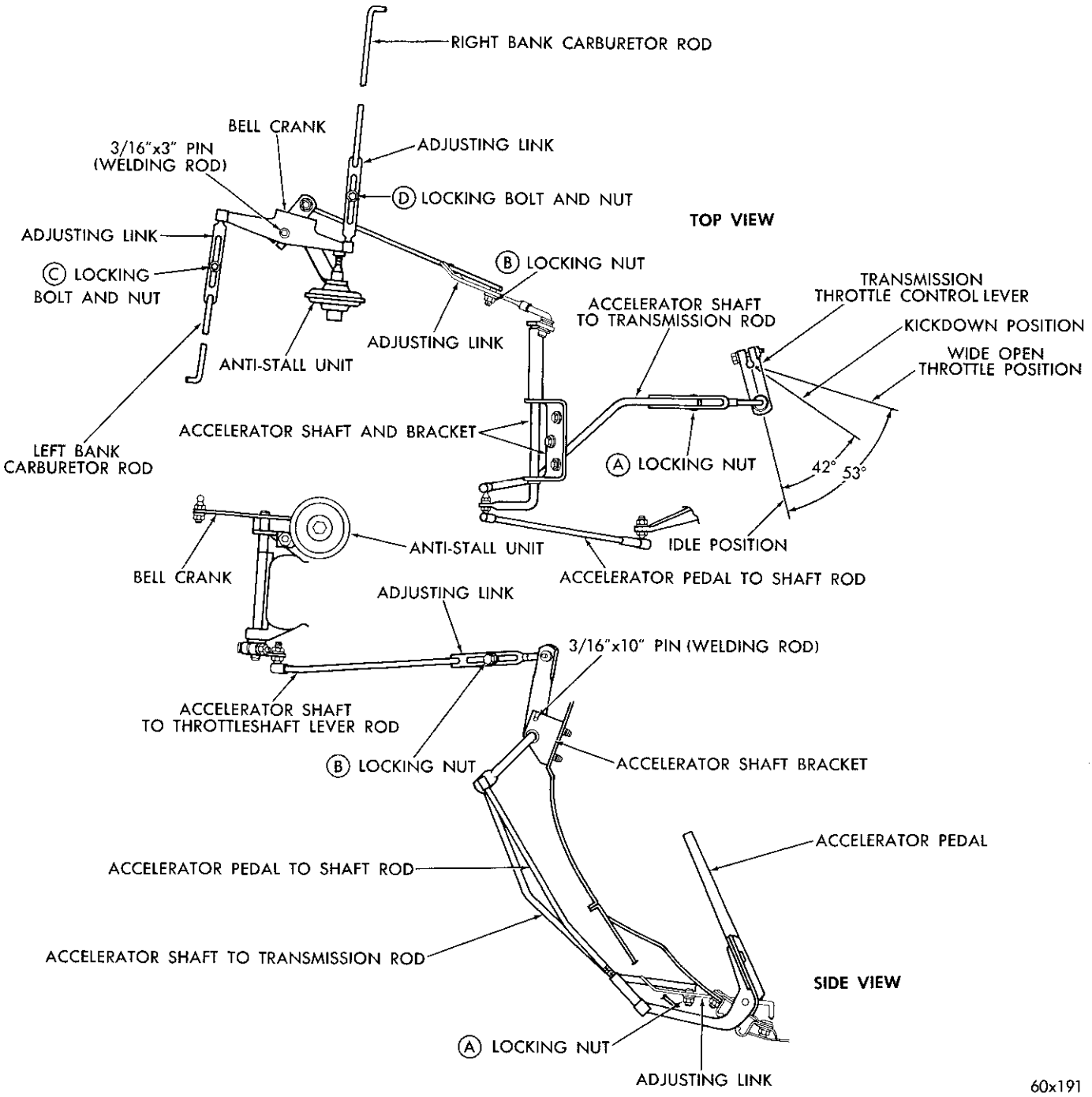


Fig. 98—Throttle Linkage—Ram Manifold (Schematic View)

tained between the floor of car and the flat face of the accelerator pedal.

(3) This angle can be obtained with a protractor.

(4) After correct measurement has been obtained, connect the rod. Remove the locating pin from accelerator shaft bracket.

d. Setting the Bellcrank

(1) Inspect each carburetor to be sure the choke valves are open; that the fast idle cams are released and the throttle valves are closed.

(2) Loosen the locking nuts "C" and "D" (left and right bank carburetor rods).

(3) Back off the anti-stall adjusting plunger far enough to allow the bellcrank to be pivoted.

(4) Pivot the bellcrank until a 3/16 inch piece of drill rod 3 inches long can be inserted through the bellcrank hole and down into the intake manifold.

(5) Tighten locking nuts "C" and "D" securely. Remove the $^{3}/_{16}$ inch drill rod from the bellcrank.

(6) Push rearward on the accelerator shaft to throttle shaft lever rod adjusting link, until the stop is reached. Tighten locking nut securely.

TORQUE CONVERTER SERVICE PROCEDURES

113. REMOVAL AND INSTALLATION OF TORQUE CONVERTER AND HOUSING

a. Removal

(1) Remove the transmission as outlined in Paragraph 26.

(2) Remove the converter housing dust shield and starting motor. Remove the torque converter housing-to-engine block (or adapter plate) bolts and washers. As the housing is doweled to the engine block (or adapter plate), care must be exercised during removal. **Do not hammer or pry between the mating surfaces to loosen, as the metal may be distorted which can result in misalignment.**

(3) After removing the housing, inspect the mating surfaces of the housing and engine block (or adapter plate). Remove all burrs or rough spots with emery cloth. Remove all obstructions, dirt, etc. from vent hole screens (when so equipped).

(4) Using wrench, Tool C-589, remove the stud nuts and lock washers which hold the converter unit to the crankshaft. The torque converter assembly is a welded unit and cannot be serviced, except as an assembly.

b. Installation

(1) If a new torque converter is being installed, make sure all visible foreign matter, such as raised metal around studs, burrs, chips, etc. have been removed from the converter and crankshaft drive flanges.

(2) Measure the crankshaft flange runout (maximum is .002 inch total indicator reading) by using dial indicator set, Tool C-3339, at one of the engine block to housing bolt holes. Checking the crankshaft flange runout will determine whether or not the crankshaft flange may be contributing to torque converter hub runout.

If the crankshaft flange runout is within tolerance, proceed to install the torque converter and housing as follows:

(3) Position the torque converter unit on the crankshaft flange. Using wrench, Tool C-589, tighten the stud nuts to specifications.

Before installing the torque converter housing, it is recommended that the torque converter hub runout be checked (and corrected if necessary) as outlined in Paragraph 115. If the torque converter hub runout is within specifications, continue to install the housing in the following manner:

(4) Position the housing over the dowels and against mating face of the engine block (or adapter plate). Tighten the mounting bolts just snug enough to retain the housing in position.

(5) Check (and correct if necessary) the torque converter housing bore and face runout as outlined in Paragraph 4. If the bore and face runout are

within specifications, tighten housing bolts to specifications. Install the metal dust shield and starting motor. Install the transmission as outlined in the transmission Group, Paragraph 108.

114. REPLACING STARTER RING GEAR

a. Removing Ring Gear

(1) Remove the torque converter and housing as outlined in Paragraph —.

(2) Place the converter on the bench and carefully remove the staking lugs. This can be done by filing or by carefully knocking the head off the lug with a hammer and chisel.

(3) Place the torque converter on blocks of wood (for support) while removing the gear. Using a blunt chisel, or drift, tap around the ring gear until it comes off the torque converter as shown in Figure 99.

NOTE: A small amount of heat, directed on gear, will aid in its removal if ring gear is to be discarded.

b. Installing Ring Gear

Remove the burrs or raised spots (left on the gear contact surface of the torque converter) with a file. Do not remove more metal from the torque converter than is required to remove the burrs and rough surfaces.

Any of the following methods may be used to heat the starter ring gear for installation on converter.

Oven

Use Oven, C-794, and set temperature at 150 degrees F. Allow ring gear to remain in the oven for approximately 15 to 20 minutes.

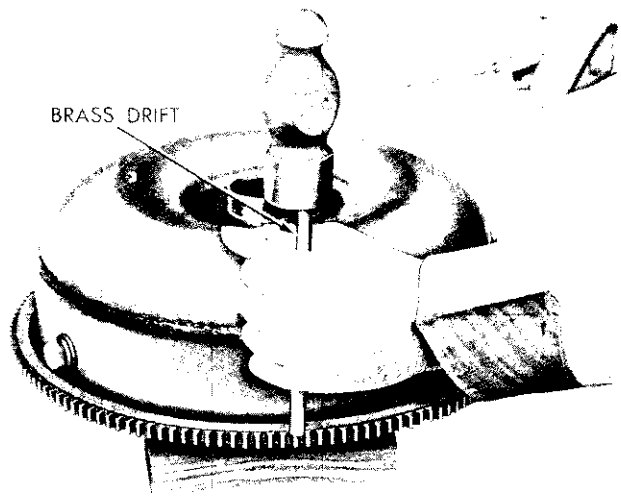


Fig. 99—Removing Starter Ring Gear

Boiling Water

Place the ring gear in a shallow container, add water, and heat for approximately eight minutes after the water has come to a boil.

Steam

Place the ring gear on a flat surface and direct the steam flow around the gear for approximately two minutes.

Flame

Place the ring gear squarely on a flat surface. Using a medium-size tip, direct a slow flame around the inner rim of the gear, being careful not to direct the flame onto the teeth of the ring gear. Place a few drops of water on the face of the gear at intervals during the heating process. When the gear is hot enough to boil the drops of water, installation of the gear to the torque converter can be made.

Place the starter gear over flange surface of the torque converter, making sure that the rear face of gear contacts flange on the torque converter evenly around the entire diameter.

Reweld the ring gear to the torque converter, using extreme care to place, as nearly as possible, the same amount of metal in exactly the same location as on the original assembly. This is necessary in order to maintain proper balance of the unit. Place the welds alternately on opposite sides of the converter to minimize distortion.

The following suggestions are offered as an aid in making the weld:

(a) Use a welding current of 200 amps.

(b) Use a D.C. welder that is set straight polarity or an A.C. welder.

(c) Use 5/32 inch diameter, No. 47 or 5/32 inch diameter No. W2B welding rods (or their equivalent). To prevent burning through the torque converter, the arc should be directed at the intersection of the gear and the housing from an angle of approximately 45 degrees from the face of the gear. DO NOT GAS WELD.

Before installing the torque converter, inspect all gear teeth and remove all nicks where metal is raised, welding splatter, etc., as these will cause noisy starter operation.

Install torque converter and housing. Refer to Paragraph 113.

115. TORQUE CONVERTER HUB RUNOUT

a. Checking Hub Runout

It is not necessary to remove the torque converter housing to make this check.

(1) Install attachment, Tool C-3613, to dial indicator set, Tool C-3339, as shown in Figure 100.

(2) Install dial indicator support rod in one of the transmission to torque converter housing mounting bolt holes, as shown in Figure 100. Disconnect at coil to distributor secondary cable.

(3) With the remote control starter switch, Tool C-763, properly installed at a convenient "hot" terminal, crank the engine while noting indicator needle deflection. Torque converter hub runout must not exceed .004 inch.

b. Correcting Hub Runout

If the hub runout exceeds .004 inch total indicator reading, correct by using heat. **Before using heat, make definitely sure that the torque converter has been drained.**

(1) It is not necessary to remove the housing to correct runout with heat application, as shown in Figure 101.

(2) Mark the position of the hub low spot as accurately as possible on the impeller shell. Rotate the converter so that this mark is directly down.

(3) Using a piece of chalk, mark the front cover radius directly opposite the hub low spot previously marked on the impeller shell. The subsequent heating operation can now be done at this location, as shown in Figure 101.

The size of the spot to be heated is governed by the magnitude of hub runout and is usually about

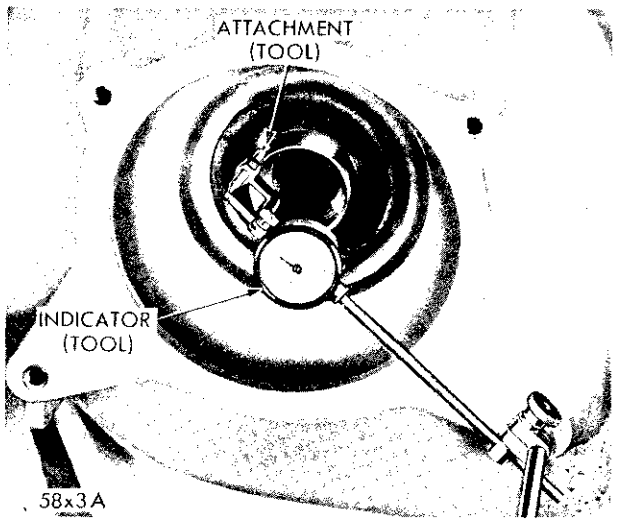


Fig. 100—Checking Torque Converter Hub Runout (Typical)

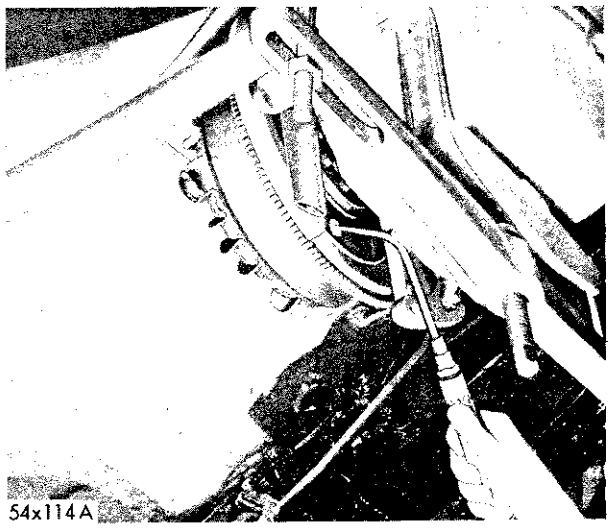


Fig. 101—Heating Torque Converter Showing Heating Operation

½ inch diameter for .008 inch total indicator reading. Using an acetylene torch containing a No. 3 tip, and set to minimum heat, apply it to the selected spot until it becomes a dull red. Rapid heating of a local area is essential and if the torch is adjusted properly, the spot will become red within a few seconds. If sparks are noted, it is an indication that the torch is too close and the metal is starting to burn; move back slightly.

CAUTION

Care should be taken to remove the torch the instant the selected spot becomes a dull red, to avoid over correction or damage to the unit.

The area is then quenched (as rapidly as possible) with cold water (hose or wet rags). It is suggested this be done by starting around the heated area and working in toward the spot. This prevents the heat from spreading.

The hub runout should not be rechecked until the converter has returned to a uniform room temperature.

If the converter hub runout exceeds .016 inch total indicator reading, remove the converter and recheck the drive flanges for raised metal chips. Check crankshaft flange runout (maximum .002 inch). If the hub runout remains in excess of .016 inch total indicator reading, install a new converter.

116. CHECKING AND CORRECTING HOUSING FACE AND BORE RUNOUT

a. Bore Runout

The torque converter housing bore and face alignment, as well as converter hub runout, should be checked anytime that a PowerFlite or TorqueFlite transmission is removed to correct leakage at the

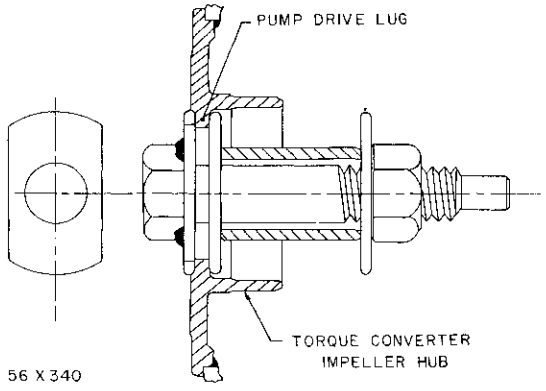


Fig. 102—Torque Converter Hub Showing Tool C-3461 Installed

front pump oil seal or front pump failure — also whenever an engine replacement is made.

(1) Mount Tool C-3461, shown in Figure 102, inside the converter with the ears of the washer behind the converter pump drive lugs. The square end of the bolt can be held with a wrench as the nut is tightened. The dial indicator set, Tool C-3339, can now be attached, as shown in Figure 103.

(2) Locate the indicator so that it is bearing on the transmission pilot bore of the converter housing and rotate the converter.

(3) The runout must not exceed .010 inch total indicator reading.

To illustrate the recommended correction procedure, assume that the total indicator reading is .016 inch, in a direction which approximates 2 o'clock

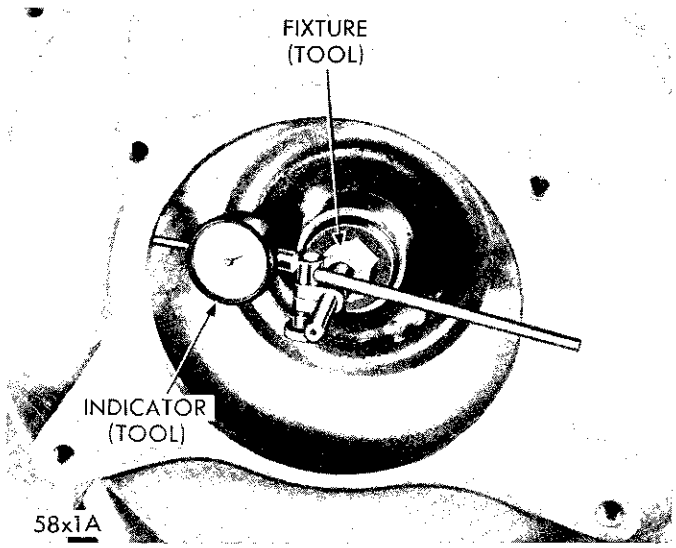


Fig. 103—Checking Housing Bore Runout (Typical)

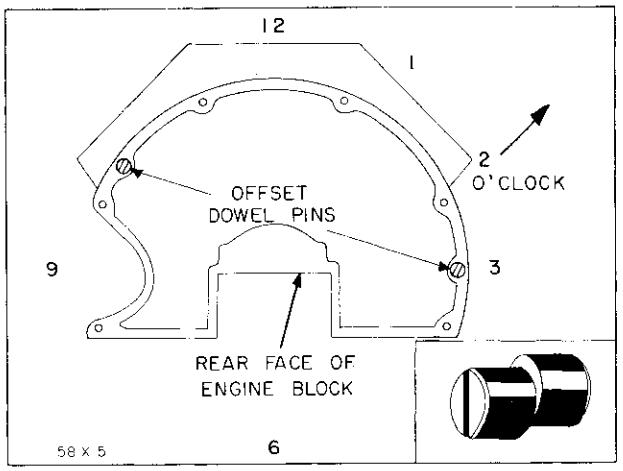


Fig. 104—Eccentric Dowel (Schematic Diagram)

on engine block. (Refer to Fig. 104.) In this case, the housing is off crankshaft centerline .008 inch (one-half total indicator reading) which is .003 inch greater than the allowable limit of .005 (one-half total indicator reading).

To correct an off-center condition, three off-set dowels are available.

When selecting dowels to be used for a particular job, take the dowel closest to one-half the total indicator reading. Refer to chart.

In the case, under consideration, use of the .007 inch offset dowels (pair) will bring the runout well within the allowable limit of .005 inch, or .008 inch minus .007 inch (offset dowels) equals .001 inch runout. **The dowels must be used in pairs (same part number).**

To install the dowell pins (pair), remove the torque converter housing as outlined in Paragraph 1 (a).

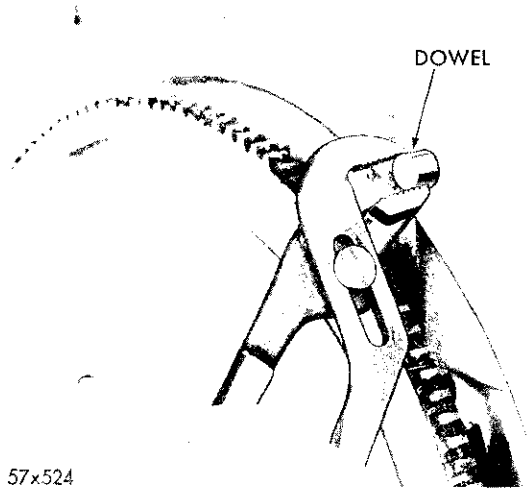


Fig. 105—Removing Dowel Pin

ECCENTRIC DOWEL CHART

Total Indicator Reading	One-Half Total Indicator Reading	Size Dowel To Be Used	Dowel Part Number
.012″ to .020″	.006″ to .010″	.007″	1736347
.022″ to .034″	.011″ to .017″	.014″	1736348
.036″ to .052″	.018″ to .026″	.021″	1736353

Remove the dowel pins from engine block (or adapter plate) as shown in Figure 105.

Select the eccentric dowels (pair) as indicated in the Eccentric Dowel Chart.

Install both dowels with the slots parallel and aligned in the direction to correct the bore runout. (Slot indicates the direction of maximum dowel eccentricity.) Majority of corrections will be for one direction only; but it is possible that the housing bore may be out in two directions. In the latter case, it may be necessary to use the next higher step dowels, adjusting these dowels with the housing installed to bring the housing bore within tolerance. **Both dowels should be inserted into the engine block (or adapter plate) up to offset shoulder.**

Install and tighten the converter housing bolts to specifications. Remount the dial indicator and recheck the bore runout. Small corrections can be made by loosening the housing mounting bolts and turning dowels with a screwdriver to shift the housing and bring the bore within limits.

SHIM THICKNESS–LOCATION TABLE

Location of Housing Face Low Point	Location of Shim	Total Indicator Reading Observed on Housing Face	Total Shim Thickness
(a) Near one of the lower trans. to hsg. bolt holes.	(a) Place shim on bolt which will enter this hole.	(a) 1) .005 to .010″ 2) .010 to .015″ 3) .015 to .020″	(a) 1) .013″ 2) .020″ 3) .026″
(b) Near one of the upper trans. to hsg. bolt holes.	(b) Place shim on bolt which will enter this hole.	(b) 1) .005 to .010″ 2) .010 to .015″ 3) .015 to .020″	(b) 1) .014 2) .021″ 3) .029″
(c) Between the two lower trans. to hsg. bolt holes	(c) Place shims on both bolts that will enter these holes.	(c) 1) .005 to .010″ 2) .010 to .015″ 3) .015 to .020″	(c) 1) .010″ 2) .015″ 3) .020″
(d) Between the two upper trans. to hsg. bolt holes.	(d) Place shims on both bolts which will enter these holes.	(d) 1) .005 to .010″ 2) .010 to .015″ 3) .015 to .020″	(d) 1) .003″ 2) .012″ 3) .016″
(e) Between the upper and lower trans. to hsg. bolt holes.	(e) Place shims on both bolts which will enter these holes.	(e) 1) .005 to .010″ 2) .010 to .015″ 3) .015 to .020″	(e) 1) upper—.010″ lower—.014″ 2) upper—.015″ lower—.020″ 3) upper—.020″ lower—.027″

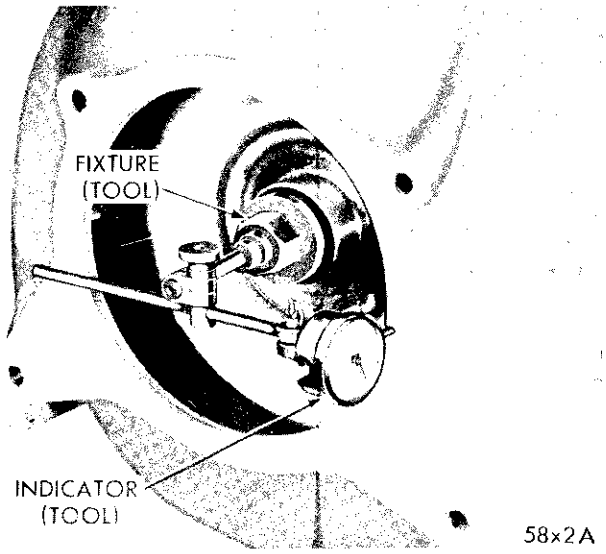


Fig. 106—Checking Face Runout (Typical)

b. Face Runout

(1) Relocate the dial indicator set, Tool C-3339, as shown in Figure 106.

(2) Rotate the converter.

(3) If the total indicator reading is greater than .008", note the amount of the total indicator reading and the location of the lowest indicator reading (i.e., the point where the indicator arm or follower is extended the furthest).

(4) Place the shim or shims on one or more of the transmission housing bolts in position between transmission and housing.

CONSULT THE "SHIM THICKNESS — LOCATION TABLE" FOR SELECTION OF CORRECT SHIM OR SHIMS TO BE USED IN CORRECTION PROCEDURES.

(5) Tighten the housing bolts to specifications.

(6) Install the transmission as outlined in Paragraph 108, Transmission Group.

POWERFLITE TRANSMISSION CONTENTS

POWERFLITE TRANSMISSION DATA AND SPECIFICATIONS

Type	Automatic Two Speed with Torque Converter
Torque Converter Diameter (inches)	11¾
Oil Capacity of Transmission and Torque Converter	20 pt. (Automatic Transmission Fluid—Type "A" Suffix "A")
Method of Cooling	Water
Lubrication	Pumps (Rotor Type)
Number of Clutch Plates	6
GEAR RATIOS	
Low	1.72 to 1
Drive — Breakaway	1.72 to 1
Drive — Direct	1 to 1
Reverse	2.39 to 1
FRONT-REAR PUMPS	
Type	Gear (Rotary)
End Clearance (Front Pump)	.0012 to .0022"
End Clearance (Rear Pump)	.001 to .003"
GOVERNOR (3-STAGE)	
Type	Centrifugal
Clearance Between Governor Valve and Body	.002 to .005"

DATA AND SPECIFICATIONS (Continued)

THRUST WASHERS	
Direct Clutch Piston Retainer (Fibre)	.078 to .080″
	.095 to .097″
	.112 to .114″
Kickdown Planet Pinion Carrier	.062 to .064″
Kickdown Annulus Gear	.062 to .064″
Planet Pinion Carrier Housing	.078 to .080″
SNAP RINGS	
Planet Pinion Carrier Housing	.062 to .064″*
	.072 to .074″*
	.082 to .084″*
Kickdown Sun Gear	.058 to .060″
	.062 to .064″
Reverse Annulus Gear	.078 to .080″
	.082 to .084″
	.086 to .088″

*If this selection of snap rings fails to provide minimum clearance, use kickdown sun gear snap ring (.058 - .060″).

SPECIAL TOOLS

C-452	Puller	C-3288	Pilots
C-484	Pliers	C-3292	Gauge
C-589	Wrench	C-3293	Gauge
C-748	Puller	C-3294	Stand
C-760	Pliers	C-3295	Pilots
C-811	Wrench	C-3297	Remover-Installer
C-3201A	Jack	C-3301	Pliers
C-3202A	Jack	C-3335	Straightedge
C-3204	Driver	C-3339	Set-Dial Indicator
C-3205	Driver	C-3380	Wrench
C-3275	Driver	C-3461	Fixture
C-3276	Pilots	C-3487	Support
C-3278	Driver	C-3529	Compressor-Servo Spring
C-3279A	Wrench		
C-3280	Stand	C-3575	Compressor
C-3281	Wrench	C-3583	Adapter-For C-3380 Torque Wrench
C-3283	Pilots		
C-3287	Puller	DD-1150	Tachometer

TIGHTENING REFERENCE

	Foot-Pounds	Inch-Pounds
Case to Converter Housing Bolt	45	
Case Oil Line Plug		120
Case to Reaction Shaft Bolt	15	
Direct Clutch Shift Valve Plug Bolt		30
Extension to Case Bolt	25	
Front Oil Pump Housing Bolt		180
Governor Body Bolt		90
Governor Locating Bolt		45
Governor Oil Pressure Take Off Plug		120
Kickdown Band Adjusting Bolt Nut	40	
Kickdown Band Lever Shaft Plug	25	
Kickdown Strainer Support Bolt		180
Manual Control Lever Nut	7	
Neutral Starter Switch — Initial Electrical Contact Plus ⅓ to ½ Turn	75 Max.	
Oil Pan Bolt and Lockwasher		180
Oil Pan Filler Tube Bracket Bolt Nut	20	
Oil Pan Filler Tube Nut	40	
Output Shaft Support Bolt	25	
Output Shaft Support Pipe Plug		120
Rear Oil Pump Housing Bolt		180
Regulator Valve Spring Retainer	50	
Reverse Band Lever Adjusting Bolt Nut	35	
Shaft Flange Nut	175	
Speedometer Pinion Sleeve	45	
Throttle Control Lever Nut	7	
Throttle Oil Pressure Take Off Plug		120
Throttle Valve Adjusting Bolt Plug	25	
Torque Converter Control Valve Spring Retainer	40	
Transfer Plate Cover Bolt—Long		45
Transfer Plate Cover Bolt—Short		45
Transfer Plate Bolt—Long		180
Transfer Plate Bolt—Short		180
Valve Body End Cover Long Bolt		25
Valve Body End Cover Bolt		25
Valve Body End Cover Short Bolt		25
Cable Control		
Cable Clip to Column Jacket Bolt		70
Push Button Box to Instrument Panel, Plate or Bracket Assembly Nut		20
Transmission Cable Bracket Bolt		15

SERVICE DIAGNOSIS CHART

(PowerFlite Transmission)

ITEMS TO CHECK See Explanation of Index Items INDEX ↓ ITEM ↓ NOTE: Always Check Items A, B, C, and G First	OPERATING DIFFICULTY																					
	Shift Abnormalities							Response							Miscellaneous							
	Harsh N to R or N to D	Delayed N to D	Runaway on Upshift and K.D.	Harsh Upshift and K.D.	No Upshift	No K.D. or Normal Downshift	Shifts Erratically	Slips in Drive Position	Slips in All Ranges	No Drive in D-L	Reverse Band Slips	Moves Forward in Neutral	No Drive in Any Range	Moves Backward in Neutral	Drags or Locks	Grating, Scraping, Growling Noises	Buzzing Noise	Trans. Hard to Fill—Oil Blows Out Fill Tube	Trans. Overheats	Impossible to Push Start Engine	Starter Won't Energize
A. Oil Level		●	●		●	●	●	●	●				●				●	●	●	●	
B. Throttle Link Adj.			●	●	●	●	●														
C. Gearshift Control Cable Adj.						●	●					●		●							●
D. Pressure Checks—Line Lube, etc.	●	●	●	●	●	●	●	●	●	●			●							●	
E. K.D. Band Adj.	●		●	●		●			●	●					●				●	●	
F. Reverse Band Adj.	●								●		●				●				●		
G. Engine Idle	●						●														
H. Neutral Start SW.																					●
I. Handbrake Adj.															●	●			●		
J. Regulator Valves—Springs							●		●				●				●	●	●		
K. Converter Control Valve																	●	●	●		
L. Breather																		●			
M. Output Shaft Rear Bushing							●									●					
N. T. C.																			●		
O. K.D. Servo-Band Linkage	●		●	●		●			●	●					●					●	
P. R. Servo Band Linkage	●			●					●		●			●	●						
Q. Oil Strainer							●							●			●	●			
R. Valve Body-Bolts—Mating Surfaces		●	●	●	●	●	●	●	●	●	●	●	●	●						●	
S. Speedometer Pinion																					
T. Governor					●	●	●									●				●	
U. Rear Pump																●			●		
a. Front Pump—Drive Sleeve		●					●	●	●				●			●		●	●		
b. Reg. Valve Body, Gasket, Surfaces	●			●					●		●		●				●	●	●		
c. Converter-Housing																			●		
d. Direct Clutch			●	●	●			●		●		●			●				●		
e. Planetary Gear Set															●	●					
f. Seal Rings		●	●		●		●			●	●										

POWERFLITE TRANSMISSION

1. EXPLANATION OF INDEX ITEMS ON TROUBLE DIAGNOSIS CHART

The Trouble Diagnosis Chart has the operating difficulties listed in three groups. After road testing, match the trouble found to its particular group and to the specific difficulty under that group. The Index and Item in the "Items to Check" column are next checked against the "Explanation of Index Items". Capital letter items refer to those operations which may be performed without removing the transmission. The small letter items refer to those operations done after the transmission is removed from the vehicle.

Never remove a transmission from a vehicle until all the possible "in car" causes have been checked for the operating difficulty and the oil pan has been removed to check for dirt, metal chips, band material, broken band ends and burned or scored band contacting surfaces. Inspect the manual control cable and throttle linkage for adjustment and wear.

A. Oil level – Refer to Lubrication Group of this Manual.

B. Throttle linkage — Refer to Paragraph 6, "Transmission and Control Adjustments."

C. Gearshift control cable—Refer to Paragraph 6.

D. Pressure tap check — Hydraulic pressure taps have been provided to check the following pressures:

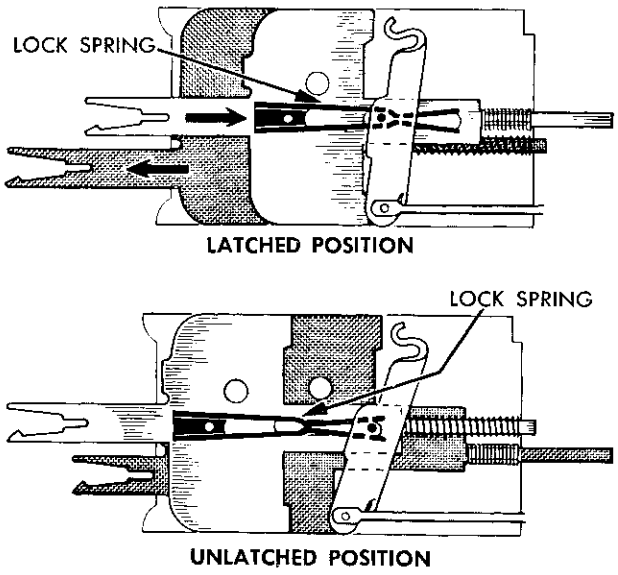
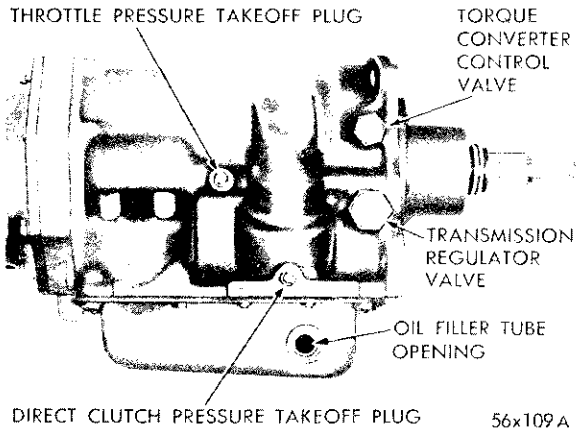


Fig. 1—Gearshift Control Unit (Operational Sketch)



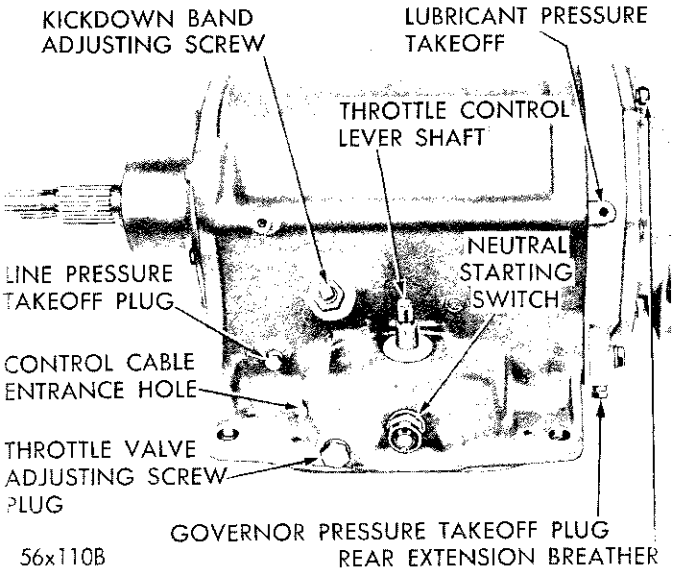


Fig. 2—Exterior Views of Transmission

line, lubrication, direct clutch, governor and throttle (Refer to Fig. 2). These pressures should fall within specified limits stated in Hydraulic Control Pressure Check Charts.

E. Kickdown band adjustment — The kickdown band adjustment screw is found on the left side of transmission case (Fig. 2). Refer to Paragraph 6, "Transmission and Control Adjustments."

F. Reverse band adjustment — The oil pan must be removed to make this adjustment. The adjustment is made by backing off adjusting screw lock nut. Torque the adjusting screw 20 to 25 inch-pounds torque then back adjusting set screw out 12 turns. While holding the adjusting screw at this position, tighten lock nut 30 to 35 foot-pounds torque.

G. Engine idle — Adjust to 475 to 500 r.p.m.

H. Neutral starting switch — Check wire connections and switch.

NOTE: If jumper wire is used for cranking engine (when taking compression readings, etc.) it is important that jumper leads be connected to battery terminals and to starter switch terminal (located toward rear of car) of the solenoid.

I. Handbrake—Check for excessive drag. Adjust as outlined in Brakes Group of this manual.

J. Regulator valve spring — The regulator valve may be removed by removing the regulator valve spring retainer which is on the right side of transmission case (Fig. 2). Check for a stuck or scratched valve and/or buckled spring.

K. Converter control valve, spring — The converter control valve may be removed by removing the converter control valve spring retainer which is on right side of transmission case (Fig. 2). Check for a stuck or scratched valve and/or buckled spring.

L. Breather — Check to determine whether breather is free of dirt, undercoating, etc.

M. Output shaft rear bearing, snap ring—Check for rough bearing and/or unseated snap ring. Snap rings are available in two sizes.

N. Torque converter housing cooling air passages — Check for dirt, mud or other foreign material on screens or torque converter cooling fins.

O. Kickdown servo, band and linkage — Check for broken seal rings, stuck servo piston or broken linkage.

P. Reverse servo, band and linkage — Check for torn seal, stuck or broken band and/or linkage.

Q. Oil strainer and suction tubes — Check for possible air leakage at front pump suction tube, or rear pump suction tube.

R. Valve body attaching bolts and mating surface — Check for loose bolts, burrs or scratches on mating surfaces. Clean valve body assembly. Check for stuck valves, dirt, scratched valves or body and burrs on valves. Torque valve body bolts to specifications.

S. Speedometer pinion — Check nylon teeth for wear, shredding.

T. Governor — Clean assembly and check weight assembly and valve for burrs, scratches or sticky operation. Examine the governor valve shaft, shaft snap rings and seal rings.

U. Rear pump — Clean and inspect assembly for side and diametral clearance. Note whether rear oil pump pinion ball is in place. Examine output shaft support face for scoring.

a. Front pump and drive sleeve — Clean and inspect assembly for side and diametral clearance. Examine oil pump inner and outer rotor for scoring. Check front pump drive sleeve seal ring.

b. Regulator valve body, mating surfaces, gasket — Clean and inspect valve body for scratches and scoring on valve bores and face which bears against the front pump housing. Examine valve body to determine if secondary reaction orifice is free of dirt. Check gasket for uniformness of compression by valve body.

c. Converter — Flush out converter and check converter hub runout. (Refer to Torque Converter Page.)

d. Direct clutch — Clean and inspect discs, plates, drive hub, return spring and piston.

e. Planetary gear set — Clean and inspect gear set for worn thrust washers, nicked or rough gear teeth and excessive pinion and clearance.

f. Seal rings — Check for burrs, broken ends.

NOTE: Refer to Figure 35 for illustration showing location of the various drilled passages in transmission case.

SERVICE PROCEDURES

2. OPERATION

PowerFlite combines a highly efficient torque converter and a simple automatic two-speed transmission which provides exceptionally smooth performance throughout the entire speed range. The transmission is equipped with a neutral starting safety switch which prevents starting the car in gear. All normal driving can be done in the drive (D) range, which accelerates the car in low range then automatically upshifts the transmission into direct drive at the proper time, depending upon the degree of acceleration desired by the driver. The shift is

fully automatic, allowing the driver to keep constant pressure on the accelerator at all times. Instantaneous acceleration, with the D (Drive) push button engaged, is accomplished by pressing the accelerator pedal to the floor. This action downshifts the transmission to low gear.

The L (low) range is provided to keep the transmission in low gear regardless of speeds for unusual driving conditions such as climbing or descending mountains or driving through sand.

"Rocking" the car, when mired in mud or snow, is easily accomplished by alternately engaging the R (reverse) and L (low) push buttons.

a. Torque Converter

The torque converter receives its oil supply at a constant pressure from the front oil pump in the transmission.

The unit is bolted to and supported by the crankshaft flange. It consists of three basic parts: an impeller, a turbine and a stator. The impeller, which forms the outer shell of the converter unit, is driven by the engine. The turbine is driven by the force of oil from the impeller vanes. The turbine is splined to the input shaft of the transmission. The stator, located between the impeller and turbine, serves to redirect the flow of oil in the unit, thus multiplying engine torque. The stator is mounted on an overrunning clutch which permits it to rotate only in the direction of impeller and turbine rotation.

The torque converter is serviced only as a complete assembly.

b. Gearshift Control Push Button

PowerFlite Transmission equipped cars have four gearshift control buttons located to the left of the steering column on the instrument panel, as shown in Figure 1. The buttons, which control the transmission are identified by the letters R (reverse), N (neutral), D (drive) and L (low). The buttons are illuminated for night driving.

When operating the gearshift control, the button selected must be pushed to the full extent of its travel. This will automatically release a previously selected button for return to its normal position.

A hydraulic interlock prevents the driver from inadvertently pushing the R (reverse) button to the reverse position when the vehicle is traveling in the D (drive) position above 15 mph.

Should the reverse button be pushed "in" at a speed in excess of 15 mph., the manual valve lever will move to the neutral position. The driver is then required to again select the proper gear range.

c. Gearshift Control Housing (Refer to Fig. 1)

Mechanical connection between the gearshift control housing and the transmission manual control valve is obtained through the use of a single push-pull cable. One end of the wire cable is secured to the cable actuator in the gearshift housing, while the other end enters the transmission case to engage the manual control valve lever assembly.

A back-up light switch (when so equipped) is incorporated in the gearshift control housing and is operated by the R (reverse) push button slide.

d. Neutral Starting Switch

The starting motor is wired in such a way that the engine cannot be started unless the N (neutral) button is engaged. Engaging the N (neutral) button closes the starting motor circuit at the neutral starting switch, located on the transmission case (Fig. 2).

e. Starting the Engine

(1) As a safety precaution, apply handbrake or foot brake.

(2) Push the N (neutral) button.

(3) Depress accelerator pedal slightly.

(4) Turn ignition key to extreme clockwise position.

(5) When engine starts, release pressure on ignition key.

f. Push Starting

If the engine fails to start in the normal manner, because of a discharged battery, it may be started by pushing the car. Towing the car to start is not recommended due to the sudden surge of power when the engine starts.

Turn the ignition switch on, then push "in" on the N (neutral) button. After the car has been pushed to a speed of 25 m.p.h. (approximately), push in on the L (low) button. This will allow the transmission to drive the engine by power transmitted from the rear wheels.

g. How to Drive the Vehicle

(1) After the engine is started, better fuel economy and quicker engine warm up can be obtained by starting to drive immediately. If the engine is cold apply the foot brake to prevent a creep tendency when pushing the buttons in D (drive) or R (re-

LINE PRESSURE CHART

Gearshift Position	Rear Wheels	Engine Speed	Line Pressure
R*	Free to Turn	1400 R.P.M.	225 to 275 P.S.I.
N	.....	800 R.P.M.	85 to 95 P.S.I.
D*	Brakes Applied	800 R.P.M.	85 to 95 P.S.I.

*Engine must be at operating temperature.

verse) positions and avoid fast acceleration when driving (regardless of the mileage).

(2) All normal driving will be done in D (drive) range. The vehicle will have a slight tendency to creep after pushing the button from N (neutral) to D (drive) at idle due to slight torque output from the torque converter. This can be prevented by applying the foot brake. As soon as the accelerator is depressed, the vehicle will move forward in the drive (breakaway) range.

At speed of between approximately 15 and 61 mph and the amount the accelerator is depressed, the transmission will upshift to direct. When slowing the car down at throttle openings short of wide open, the transmission will automatically downshift from approximately 9 to 11 mph.

(3) L (low) provides driving characteristics similar to D (drive) except the transmission will not upshift (into direct) at any car speed. This position provides excellent handling ease in mountain driving and superior pulling qualities in sand and snow. It is possible to push the buttons from L (low) to D (drive) and D (drive) to L (low) at any speed below 65 mph. Damage may result if a shift from D (drive) to L (low) is made above 65 mph.

(4) Reverse — Stop the vehicle and with the foot brake applied, push the R (reverse) button to full limit of travel. Upon depressing the accelerator, the vehicle will move in reverse. Do not depress the R (reverse) button when the car is moving forward at a speed above 5 mph.

(5) Kickdown or forced downshift — At speeds between 15 to approximately 55 mph in D (drive), after the transmission has upshifted to direct, maximum acceleration can be obtained for passing or climbing a steep grade by pressing the accelerator wide open. This will cause the transmission to downshift. It will automatically upshift to direct if the accelerator is released or a speed of about 61 mph is reached. Any variation in downshift speed limits may be due to permissible operating fluid leakage within the transmission.

h. Towing

(1) Transmission inoperative — Tow the car with a rear end pickup or remove the propeller shaft.

(2) Transmission Operating Properly — The car may be towed safely in N (neutral) at moderate speeds. However, for long distance towing (over 100 miles), the propeller shaft should be removed.

i. Checking Fluid Level

Refer to Lubrication Group O of this manual.

3. HYDRAULIC CONTROL PRESSURE CHECKS

a. Line Pressure

Remove the pipe plug from the line pressure take-off hole located on the front left side of the transmission case (Fig. 2). Install pressure gauge, Tool C-3293 (300 psi), at this point.

b. Throttle Pressure

Remove the plug from the throttle pressure take-off hole located on the right-hand side of the transmis-

THROTTLE PRESSURE CHART

Gearshift Position	Brakes Throttle	Engine Speed	Throttle Pressure
D	Applied Closed	Idle	13 to 15 P.S.I.
D	Applied Wide Open*	1400 to 1500 R.P.M.	80 to 90 P.S.I.

*Do not hold throttle wide open for longer than a few seconds.

GOVERNOR PRESSURE CHART

Gearshift Position	Wheels	Car Speed	Governor Pressure
D	Free to Turn	13 to 15 M.P.H.	15 P.S.I.
D	Free to Turn	24 to 32 M.P.H.	45 P.S.I.
D	Free to Turn	51 to 60 M.P.H.	60 P.S.I.

sion case (Fig. 2). Install pressure gauge, Tool C-3292 (100 psi), at this point.

When checking throttle pressure, always follow up by checking throttle linkage adjustment (Paragraph 6). If throttle pressure does not conform to specifications, refer to Paragraph 6.

c. Governor Pressure

Remove the pipe plug from the governor pressure take-off hole located on the lower left side of the output shaft support (Fig. 2). Install pressure gauge, Tool C-3292 (100 psi), at this point.

d. Direct Clutch Pressure

Remove the pipe plug fitting from the pressure take-off hole tapped in the kickdown servo (Fig. 2) and install pressure gauge, Tool C-3292 (100 psi). With the rear wheels free to turn, accelerate the engine slowly until an upshift occurs. During the upshift, the pressure gauge attached to the kickdown servo should show a very rapid pressure rise from 0 to final clutch or line pressure. This rise should not take more than 1½ to 2 seconds.

With an engine speed of not less than 650 rpm (transmission upshifted) the direct clutch pressure should read not lower than 10 psi below line pressure.

Should a slow rise in clutch pressure be observed, or a clutch pressure of more than 10 psi lower than line pressure be obtained, it is an indication of abnormal leakage.

e. Lubrication Pressure

Remove the oil cooler fitting from the lubrication pressure take-off hole located on the left side of the transmission case (Fig. 2). Install gauge, Tool C-3292 (100 psi). With engine running at 800 rpm in neutral, lubrication pressure should read not below 10 psi minimum. If the pressure is incorrect, check line pressure and Trouble Diagnosis Chart.

4. CHECKING FOR OIL LEAKS

If the transmission is leaking oil, check the following points:

a. Leaks Not Requiring Removal of Transmission from Vehicle

(1) Transmission output shaft rear oil seal.

(2) Speedometer pinion assembly.

(3) Oil filler tube to oil pan connector.

(4) Oil pan to transmission case.

(5) Regulator valve and torque converter control valve retainers.

(6) Test pressure hole plugs.

(7) If oil is found inside converter housing, check torque converter drain plug.

Leaks at these locations should be corrected regardless of how slight.

b. Leaks Requiring Removal of Transmission from Vehicle

(1) Sand hole in transmission case.

(2) Sand hole in front oil pump housing.

(3) Front oil pump housing bolts loose or sealing washers damaged.

(4) Torque converter impeller hub seal (located on forward end of front oil pump housing). When correcting, make sure torque converter hub runout is within limits. (Refer to Torque Converter, Page —).

(5) Front oil pump housing oil seal (located on outside diameter of front oil pump housing).

When replacement of the front oil pump housing is made or whenever it is necessary to correct a leak due to this "O" seal ring, the following precautions should be taken:

(a) Install a new "O" ring seal in its groove in the front oil pump housing.

(b) Make sure that the seal has not been twisted during this installation, as this alone will cause a leak.

(c) Measure the amount the seal protrudes above

the front oil pump housing completely around the O.D. If, at any point, the seal protrudes less than .010 inch, or if considerable variation exists in the amount the seal protrudes, a new front pump housing should be selected.

Leaks at these points may be remedied by tightening loose bolts or replacing damaged or faulty parts.

5. SERVICING GEARSHIFT CONTROL UNIT

a. Removing Gearshift Control Unit

(1) Disconnect one battery cable.

(2) Disconnect back-up light switch (if so equipped) and illuminating lamp lead wires, at the rear of the instrument panel.

(3) Remove the push button face plate screws, then remove the push buttons by pulling them off the push button slide. Remove lamp bolt.

(4) Remove the control housing stud nuts that are now accessible and remove control and cable from rear of instrument panel.

(5) Remove hairpin securing control cable to actuator and the screws holding the cable bracket to the control housing.

b. Installing Gearshift Control Unit

(1) Insert end of cable on actuator and reassemble hairpin clip. Place cable bracket on control unit and install screws securely (Fig. 3).

(2) Carefully guide the unit into position from the rear of the instrument panel and install the attaching stud nuts from the front side of the instrument panel.

(3) Install lamp bulb in push button control and reinstall push buttons onto control actuator slides. Replace face plate.

(4) Connect back-up switch and push button illuminating lamp wires.

c. Removing Gearshift Control Cable

(1) Remove gearshift control cable from transmission assembly, as outlined under "Removal and Inspection of Cable Assembly—Transmission End," Paragraph 5 "G", steps 1 and 2.

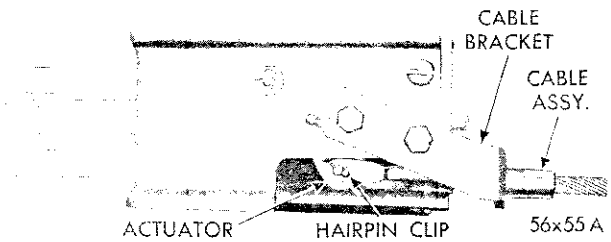


Fig. 3—Exterior View of Gearshift Control Housing (Typical)

(2) Remove gearshift control housing and cable as outlined under "Servicing Gearshift Control Unit," Removal, Paragraph 5.

(3) From inside of vehicle, pull cable assembly through rubber grommet (or remove grommet) in dash panel.

d. Installing Gearshift Control Cable

(1) From inside of vehicle, install transmission end of cable through rubber grommet in dash panel.

(2) Install cable at gearshift control housing as outlined in "Servicing Gearshift Control Unit," Installation, Paragraph 5.

(3) Install cable assembly into transmission case. (Refer to Paragraph 5, "Adjusting the Gearshift Control Cable.)

e. Replacing the Back-Up Light Switch (when so equipped)

(1) Remove gearshift control housing and plate assembly as outlined under "Servicing Gearshift Control Unit," Removal, Paragraph 5.

(2) Back-up light switch is fastened to the control unit by four tabs. Straighten tabs to remove switch.

(3) Install repaired or replacement switch and bend tabs to secure switch to gearshift control housing.

(4) Install gearshift control housing assembly.

f. Replacing Push Button Unit Lamp Bulb

(1) Remove the face plate retaining screws.

(2) Remove one or more push buttons for clearance.

(3) Replace defective or burned out bulb, using Tool C-3399.

(4) Replace face plate. Test operation of unit.

g. Removal and Inspection of Cable Assembly (Transmission End)

(1) Push in the R (reverse) push button to position cable adapter for removal of cable lock spring, and placing cable adapter in close proximity to cable entrance hole in transmission case (for reinstallation of cable). Raise car on hoist and remove neutral starting switch from transmission case. Some fluid will drain out. **Transmission fluid may be hot!!**

(2) Loosen cable to transmission adjustable mounting bracket screw. Place screwdriver blade through neutral starting switch hole, and push against cable lock spring. With the other hand, withdraw cable assembly from transmission case.

(3) Examine "O" ring seal on cable ferrule. Replace seal if it shows signs of roughness, shredding or deterioration. Inspect fit of bracket slot and cable ferrule groove. The bracket should fit just freely into ferrule groove to full depth of bracket slot. If cable bracket slotted section does not meet this requirement, remove excess metal with a file.

6. TRANSMISSION AND CONTROLS — ADJUSTMENTS

a. Throttle Pressure and Throttle Linkage Adjustment

Accurate adjustment of the transmission throttle linkage and setting of the throttle oil pressure is very important for proper operation of the PowerFlite transmission. Therefore, the following procedures should be very carefully performed:

b. Throttle Linkage Adjustments (Refer to Fig. 4)

(1) With the engine at operating temperature, carburetor off the fast idle cam and transmission in neutral, adjust idle speed to 475-500 r.p.m. (use tachometer).

(2) Loosen the throttle linkage adjustment lock nuts on both the carburetor rod and the transmission throttle rod.

(3) Insert a 3/16″ rod or drill bit in the hole and open slot of the accelerator shaft bracket and into the elongated hole of the throttle lever.

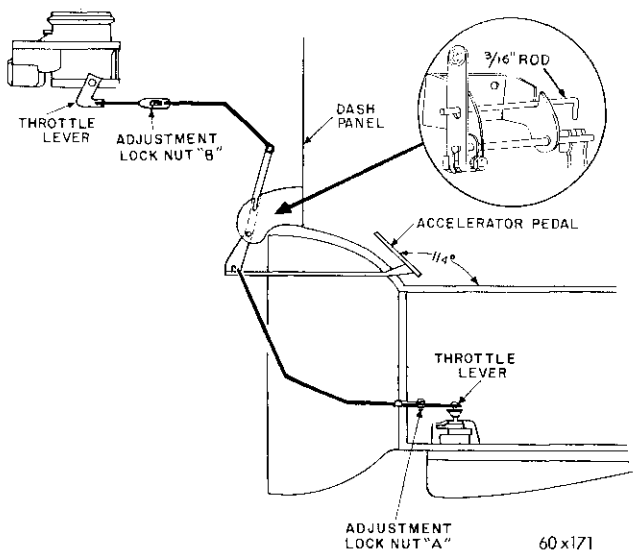


Fig. 4—Throttle Linkage Adjustment

(4) With the rod in position, hold the transmission throttle valve lever all the way forward (closed position), and tighten transmission to accelerator lever assembly rod adjusting lock nut "A", Figure 4.

(5) Remove rod from accelerator lever, shaft and bracket assembly.

(6) With the carburetor throttle lever off the fast idle cam and against the idle stop screw, move the rear half of the carburetor rod rearward until the stop in the transmission is felt, tighten lock nut "B", Figure 4.

(7) The accelerator pedal should be at an angle of 113 to 114 degrees to the horizontal. If necessary to correct, adjust pedal angle by removing the accelerator pedal end of the bellcrank to pedal rod, and shortening or lengthening the rod by loosening the lock nut at the swivel end and rotating the swivel. Reinstall the rod and tighten the lock nut. **Be sure the rod is properly aligned to prevent binding. Poor engine performance due to carburetor throttle not opening fully or lack of kickdown may result if accelerator pedal angle is incorrect.**

c. Throttle Pressure Adjustment

(1) With throttle linkage properly adjusted and tachometer attached, start engine and recheck idle setting (475-500 rpm) with transmission in neutral and hand brake set. Raise vehicle on hoist.

(2) Remove the throttle oil pressure take off plug located between reverse and kickdown servos on right side of transmission. (Refer to Fig. 2.) Connect 100 psi pressure gauge, Tool C-3292.

(3) Push in the D (Drive) push button. (When the manual control lever is moved into drive range, engine speed will drop approximately 50 rpm). Check throttle pressure.

Oil pressure should read 13 to 15 psi. If the pressure is not within specifications, adjust as follows:

(4) Remove the throttle valve adjusting screw plug (Fig. 2). About 1 quart of transmission fluid will drain out.

(5) Insert adjusting screw wrench, Tool C-3279A, and adjust throttle pressure to 13-15 psi, as shown in Figure 5. Turn screw OUT to increase pressure and IN to decrease pressure.

(6) Replace the throttle valve adjusting screw plug and torque from 20 to 25 foot-pounds.

(7) With the accelerator pedal fully released, and engine at 475 to 500 rpm, the pressure should read 13 to 15 psi.

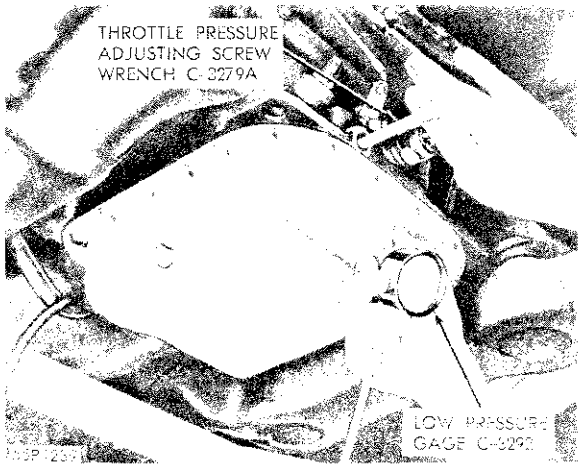


Fig. 5—Adjusting Throttle Pressure (Typical)

(8) Move the accelerator pedal or lever from underneath, very slowly.

With throttle pressure and linkage properly adjusted, the throttle pressure will rise (approximately 6-8 psi) the instant engine rpm is increased. Do not use throttle rod. When making this check, use accelerator pedal lever located on underside of floor pan.

(9) Remove oil pressure gauge and install plug. Torque from 10 to 12 foot-pounds.

(10) If the throttle pressure was adjusted, replace the fluid that drained out, with Automatic Transmission Fluid (Type "A", Suffix "A").

(11) Check accelerator pedal height at wide open throttle. There should be sufficient clearance between the tip of the pedal and the floor mat. Adjust pedal to accelerator shaft rod assembly.

d. Adjustment of Kickdown (Front) Band

(1) Using a ¾ inch open-end wrench loosen the

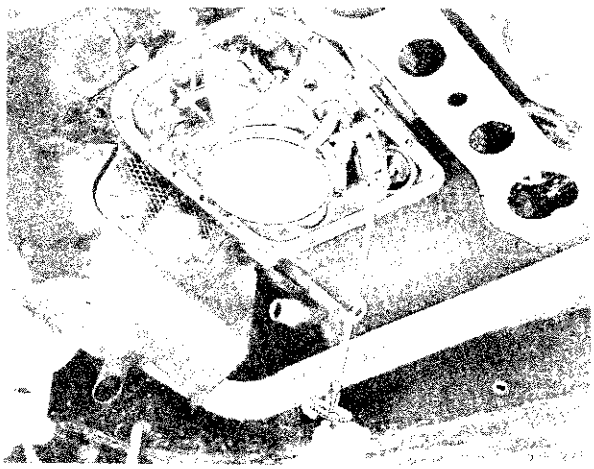


Fig. 6—Adjusting the Reverse Band (Typical)

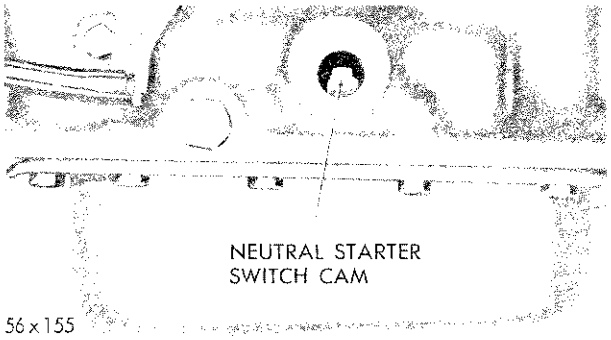


Fig. 7—Neutral Starting Switch Cam Centered in Switch Mounting Hole

locknut (Fig. 2). Check the freeness of the adjusting screw in the transmission case. If free, use inch-pound torque wrench, Tool C-3380 (with extension C-3583), and tighten the adjusting screw from 40-43 inch-pounds* torque. Disregard multiplication factor on Extension, C-3583. Use a reference mark of chalk or colored pencil on the corner of the adjusting screw square and the transmission case. Using extreme care, back the adjusting screw out exactly 2¾ turns. Now, hold the adjusting screw stationary with wrench and tighten the locknut securely. Extreme care must be exercised in performing this operation to insure correct adjustment otherwise serious damage will occur when transmission is operated.

*If Tool C-3380 (with extension C-3583) is not used, then, use wrench, Tool C-3380, and tighten adjusting screw to 72 inch-pounds torque.

e. Reverse (Rear) Band Adjustment

(1) Drain transmission and remove transmission oil pan.

(2) Loosen reverse band adjusting screw locknut and tighten adjusting screw from 20 to 25 inch-pounds, as shown in Figure 6. Back out adjusting screw 12 turns. Holding adjusting screw in this location, tighten locknut securely (30-35 foot-pounds torque).

(3) Replace the transmission oil pan, using a new gasket and refill transmission with Automatic Transmission Fluid, Type "A", Suffix "A".

f. Adjusting the Gearshift Control Cable

Push in L (low) push button. Place transmission manual valve lever in reverse detent by moving neutral switch contact part of lever full travel towards rear of car manually, by using screwdriver (or other suitable tool) in neutral starting switch hole. With L (low) push button held tightly in (full

travel), insert cable assembly into transmission case engaging cable ferrule groove with lock spring in cable adapter. Push and pull the cable, using light pressure, to be sure groove in cable ferrule has engaged lock spring. Replace adjustable mounting bracket and tighten cap screw finger tight.

g. Cable and Neutral Starting Switch Adjustment

Move the cable and bracket assembly (manually) at the transmission, as required, to position the manual valve lever into neutral detent. Hold the N (neutral) button tightly "in" at full travel. The neutral starting switch cam should then be centered in the neutral starting switch hole, as shown in Figure 7.

Use a free-fitting flat-faced shaft, inserted through the neutral switch mounting hole (Fig. 8), and apply light pressure against the manual valve lever to maintain the neutral detent position of the manual lever. If tool is not available, lever may be held by finger pressure.

Carefully move cable assembly "in" and "out" without moving the manual lever, to determine total free play travel of cable. Locate the cable in mid-position of the free play, release the pressure against the manual lever and tighten the mounting bracket securely. **Do not allow the cable to move when tightening the bracket.**

Replace the neutral starting switch. Install the concave (cupped) spring washer over the threads of the neutral starting switch so that the concave (cupped) side of the washer is toward the transmission case. Install the "O" ring seal over the threads of the neutral starting switch and up against the washer.

With proper cable adjustment assured and N (neutral) button depressed, make certain that switch is properly aligned in center of neutral starting switch hole. With test leads connected to battery current and terminal of the switch, screw switch into transmission case until test light lights, then turn switch an additional ⅓ to ½ turn. Do not exceed 75 foot-pounds torque.

NOTE: Excessive tightening may damage case and interfere with push button control.

Check transmission fluid level as outlined in Lubrication Group of this Manual.

h. Road Testing

When faulty operation of the transmission is reported, transmission fluid level and engine idle should be checked before anything else. Good transmission operation also depends on good engine operation. Therefore, before blaming any rough shifting on the transmission, it is necessary to make sure the engine is operating at full efficiency.

If, when tuning the engine, the throttle linkage between the carburetor and the transmission is disturbed, it will be necessary to readjust the linkage. Refer to "Throttle Pressure and Throttle Linkage Adjustment," Paragraph 6.

After all the adjustments and pressure checks are completed, road test the car under varying road conditions. The transmission should respond according to the following shift patterns:

All shift speeds may vary somewhat due to production tolerances, however, the quality of the shifts should be smooth, responsive, and without noticeable engine runaway.

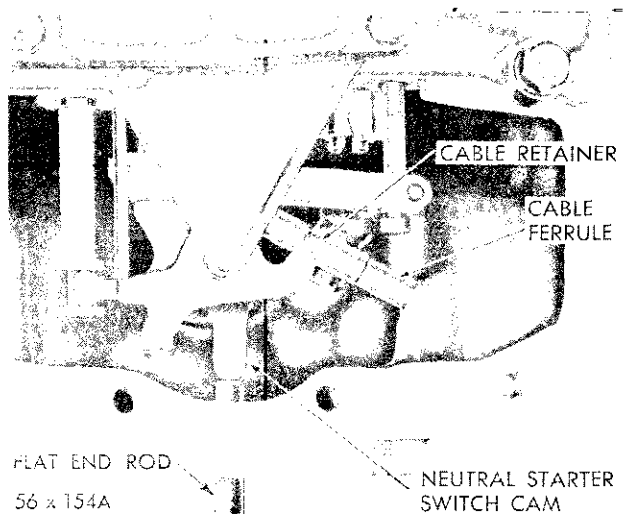


Fig. 8—"Locking" Manual Valve Lever in Neutral Position (Oil Pan Removed to Show Operation)

SHIFT PATTERN SUMMARY (M.P.H.)

Upshift		Downshift		
Light Throttle	Wide Open Throttle	Light Throttle	Wide Open Throttle	Kickdown Limit
14 to 19	51 to 61	9 to 11	9 to 17	41 to 57

7. REMOVING TRANSMISSION FROM VEHICLE

(1) Drain transmission by disconnecting oil filler tube connector at oil pan. Remove torque converter housing cover. Then, remove the torque converter drain plug. After draining, replace plug and tighten securely. Replace torque converter housing cover. Remove oil cooler lines from the transmission.

(2) Disconnect front propeller shaft universal joint and secure shaft to frame.

(3) Remove brake adjusting screw cover plate and loosen cable clamp bolt on hand brake cable support. Disengage ball end of handbrake cable from operating lever and remove cable from handbrake cable support.

(4) Disconnect speedometer cable and housing. **To avoid damage to neutral starting switch, remove switch from transmission case before removing transmission from vehicle.**

(5) Disconnect throttle linkage from lever at transmission. Remove gearshift control cable.

(6) Remove engine rear support insulator bolts from crossmember.

(7) Install engine support fixture, Tool C-3487. Adjust fixture to support weight of engine and raise engine slightly.

(8) Remove crossmember to torsion bar support bracket bolts. Remove the rear motor support insulator bolts to support bracket, then remove the complete support assembly from the crossmember. When using Fixture, Tool C-3487, do not lower engine more than three inches from floor pan to avoid disturbing the set position of water hoses and other engine attachments.

(9) Support transmission with a suitable jack. Remove the two upper transmission case to converter housing screws and lockwasher. Install guide studs, Tool C-3276.

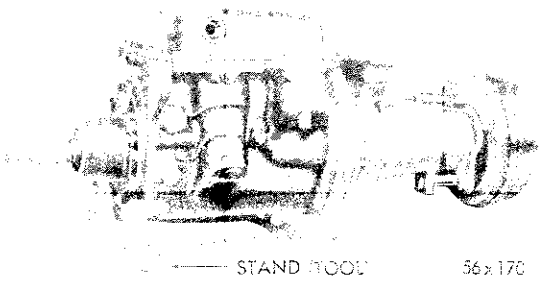


Fig. 9—Transmission Inverted in Repair Stand

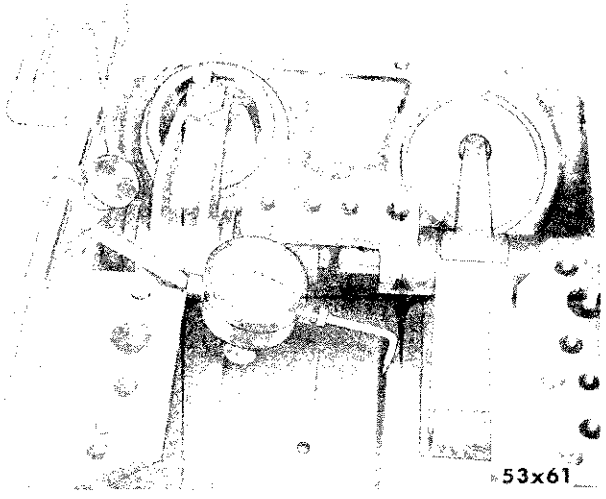


Fig. 10—Checking Transmission End Clearance

(10) Remove the two lower transmission case to converter housing screws and lockwashers. Slide jack and transmission straight back to avoid damaging the front pump drive sleeve. After removing transmission from the vehicle, attach fixture, Tool C-3280, and invert transmission assembly, as shown in Figure 9.

8. DISASSEMBLY AND INSPECTION

(1) Remove the front oil pump drive sleeve and inspect. Check the drive lugs and machined surfaces for burrs and wear. Inspect seal ring for brittleness and shredding.

(2) Remove the bolts and lockwashers which hold the engine rear support adapter to extension housing.

(3) Loosen the throttle control lever assembly locking screw. Slide the throttle control lever assembly off the shaft and remove the felt retainer and felt. Inspect throttle control lever for wear.

(4) Remove the oil pan bolts, oil pan, and gasket.

(5) Remove the oil strainer support bolts and washers. Inspect seal rings located at both outlets of strainer.

(6) Remove the five transfer plate bolts and lockwashers. Remove the valve body and transfer plate assembly from transmission case. Remove throttle valve camshaft sleeve "O" ring seal. Discard seal if torn or shredded. The valve body mating surfaces are machined. Work carefully to avoid damaging these surfaces. Place valve body in stand, Tool C-3294.

a. Checking Transmission End Play

Prior to removal of propeller shaft flange and drum

assembly, check end clearance of front clutch piston retainer assembly using dial indicator, Tool C-3339, as shown in Figure 10.

(1) Pry front clutch forward by inserting screwdriver between the direct clutch assembly and pinion carrier housing.

(2) Remove screwdriver; and with dial indicator point contacting edge of direct clutch retainer, set dial indicator to zero. Pry direct clutch assembly rearward against pinion carrier housing, remove screwdriver, and take indicator reading. Clearance should be from .026 to .052 inch. If this clearance exceeds the specified limit, particular attention should be shown to the condition of the direct clutch retainer thrust washer when disassembling transmission. Record the amount of end clearance so that the proper thickness fiber thrust washer can be installed at assembly.

If clearance exceeds .052 inch, install a thicker direct clutch piston retainer thrust washer (fiber). If clearance is less than .026 inch, install a thinner washer. The thrust washer is selectively fit and is available in the following thicknesses: .078-.080, .095-.097, .112-.114 inch.

b. Removal of Hand Brake Assembly

(1) Using wrench, Tool C-3281, to hold the mainshaft, as shown in Figure 11, remove the transmission flange nut and washer.

(2) Install puller, Tool C-452, to remove brake drum and flange assembly.

(3) Using a suitable drift, remove pin which secures the brake shoe anchor in extension. Remove the brake support grease shield spring and remove shield. If a screwdriver or sharp instrument is used in removing shield, care must be exercised to avoid damaging the neoprene sealing surface at the bottom of the shield.

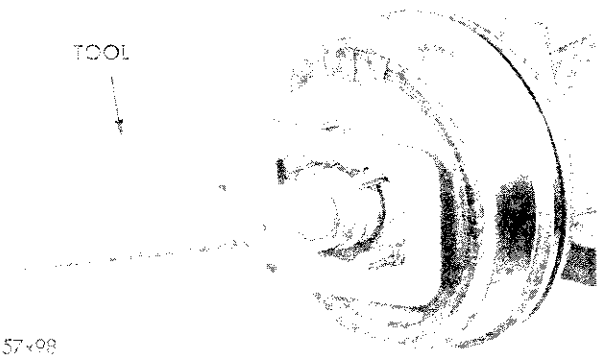


Fig. 11—Holding Output Shaft While Removing Nut

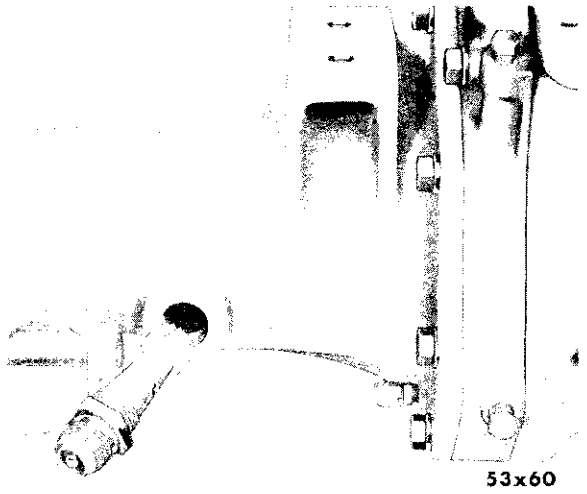


Fig. 12—Removal and Installation of Speedometer Drive Pinion

(4) Slide the hand brake assembly intact from extension housing.

c. Removal, Disassembly and Inspection of Transmission Extension

(1) Remove the speedometer drive pinion and sleeve assembly, as shown in Figure 12. **The nylon gear can be easily damaged if extension housing is removed without first removing the speedometer drive pinion.**

(2) Inspect the output shaft rear bearing oil seal and remove, if necessary, by using puller, Tool C-748. Remove any burrs from counter-bore of extension housing.

(3) Remove the seven transmission extension to case screws and lockwashers.

(4) Install guide studs, Tool C-3283, and remove

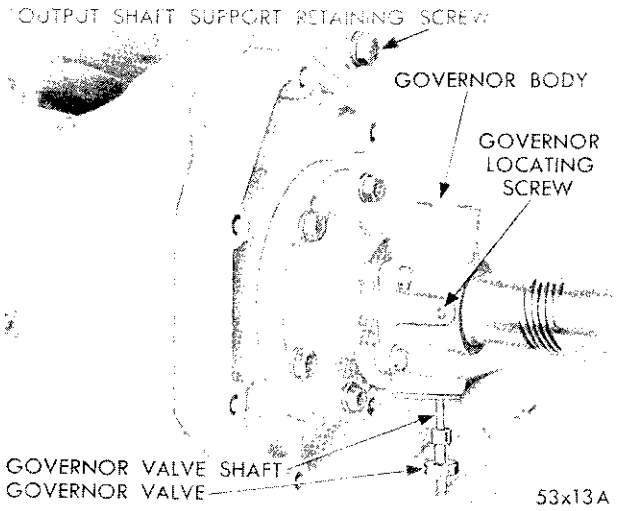


Fig. 13—Removal and Installation of Governor Valve and Shaft

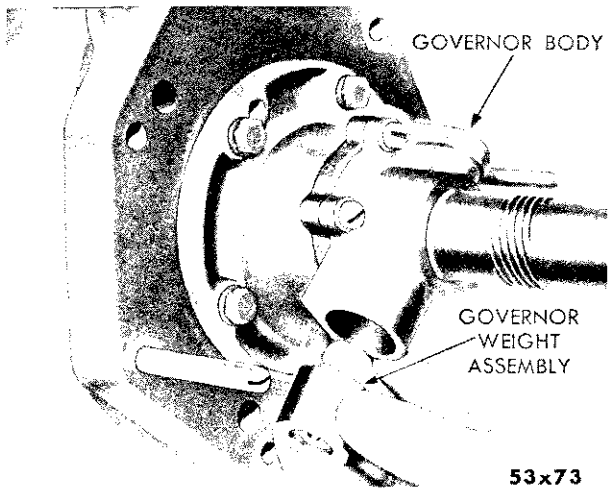


Fig. 14—Removal and Installation of Governor Weight Assembly

extension assembly by carefully tapping assembly rearward, using a soft hammer. Remove transmission extension gasket and discard.

(5) Do not remove extension bearing unless inspection reveals it is necessary. Never reuse a bearing which has been removed. If necessary to remove bearing, remove the output shaft rear bearing snap ring. Inspect ring for distortion. Use driver, Tool C-3275, and drive bearing out of extension housing.

d. Removal, Disassembly and Inspection of Governor

(1) Loosen governor body to support screws to aid in removal of governor assembly.

(2) Using a sharp instrument, such as an ice pick, remove the governor valve shaft snap ring (weight end) and remove the governor valve shaft and valve from governor valve body assembly (Fig. 13).

(3) Using pliers, Tool C-760, remove the governor weight assembly snap ring (large one), and remove the governor weight assembly from the governor body (Fig. 14). Remove governor secondary weight snap ring (Fig. 15) using pliers, Tool C-3229.

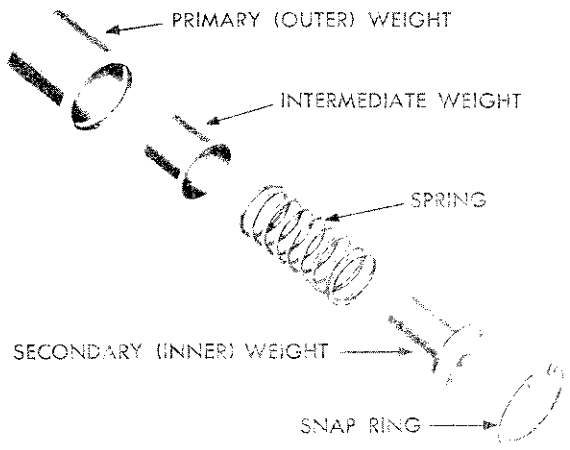


Fig. 15—Governor Weight Assembly (Exploded View)

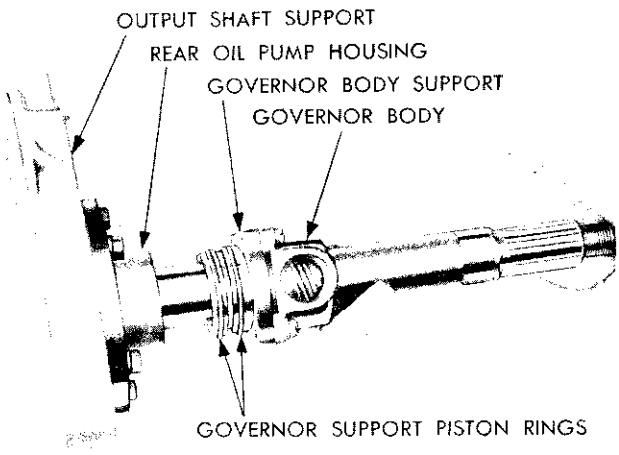


Fig. 16—Removal and Installation of Governor Body and Support

(4) Remove governor secondary weight and spring and the intermediate weight. Inspect all parts (Fig. 15) for burrs and wear. Check intermediate weight for free movement in primary weight by placing intermediate weight in primary weight. Intermediate weight should fall freely when both parts are clean and dry. Inspect spring for distortion and inspect secondary weight.

(5) Remove governor locating screw from the governor body and output shaft.

(6) Slide governor body and support from output shaft (Fig. 16). Remove and inspect the two governor support piston rings.

(7) Remove the four governor body to support

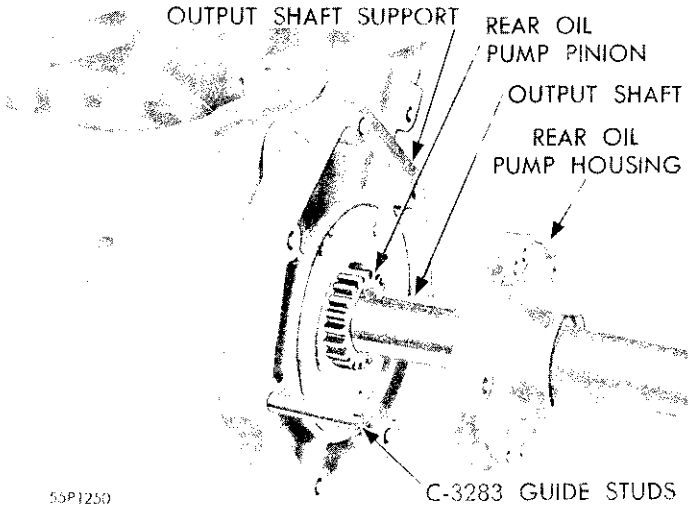


Fig. 17—Removal and Installation of Rear Oil Pump Housing

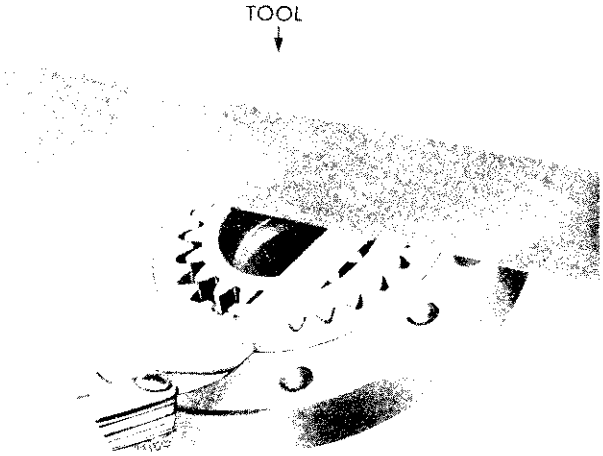


Fig. 18—Checking Clearance Between Pump Body and Gears

screws and lockwashers and separate body from support. Mating surfaces are machined and can be easily damaged. Inspect oil passages. Clean passages thoroughly with compressed air. Inspect valve and governor body for scores. Check ball plug in face of governor.

e. Removal, Disassembly and Inspection of Rear Oil Pump

(1) Remove the five rear oil pump housing to output shaft support screws and lockwashers. Remove rear oil pump housing, as shown in Figure 17. Use dye to mark front side of gear in housing. **Do not use scribe.** Inspect machined surfaces for nicks and burrs, the oil pump gear and housing for scoring or pitting and pump housing plugs for leaks.

(2) Remove rear oil pump pinion from output shaft and mark front side with dye.

The oil pump pinion is keyed to output shaft by a small ball. When removing pinion, do not lose the ball. Inspect keyway in pinion and ball pocket in output shaft for wear, and also the gear for pitting

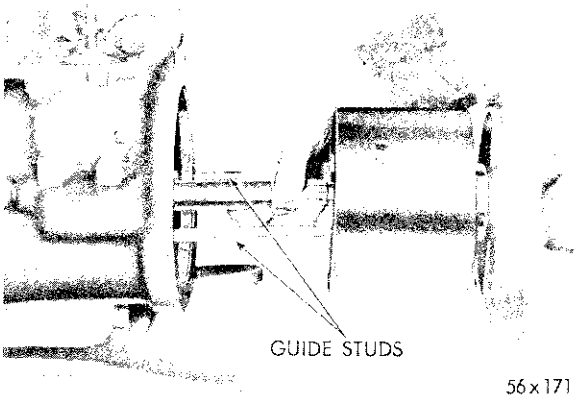


Fig. 19—Removing Output Shaft, Carrier Housing and Input Shaft Assemblies

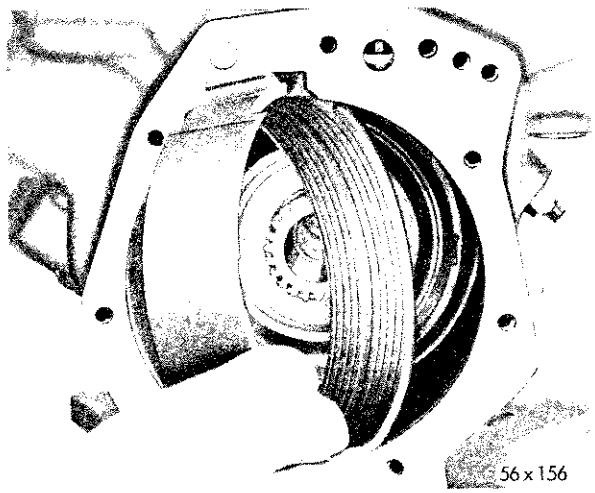


Fig. 20—Removing or Installing Reverse Band

or scoring.

(3) Using straightedge, Tool C-3335, and feeler gauge, check clearance between pump housing face and face of gears as shown in Figure 18. Clearance limits are from .001 to .003 inch.

f. Removal of Output Shaft Support, Planet Pinion Carriers, and Direct Clutch Assemblies

(1) Remove output shaft support to transmission case screw and washer (Fig. 13). Loosen reverse band adjusting screw and locknut to release any tension of reverse band on carrier housing. Grasping output shaft in both hands, carefully work shaft, planet pinion carrier assemblies, housing and support, out of transmission case, as shown in Figure 19. If support is stuck to transmission case and cannot be removed as described, lightly tap support with a soft hammer.

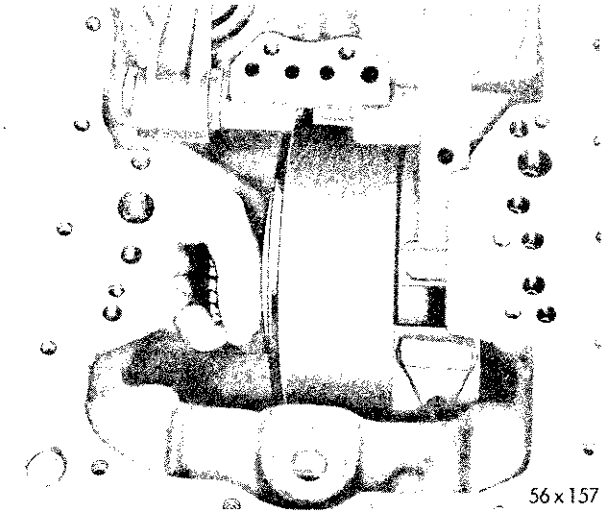


Fig. 21—Removing or Installing Direct Clutch Assembly

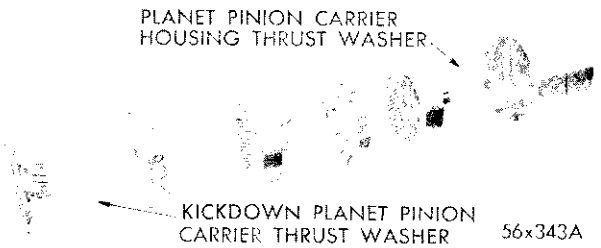


Fig. 22—Transmission Gear Train (Exploded View)

(2) Remove the large (tabbed) kickdown planet pinion carrier thrust washer from direct clutch piston retainer assembly (if not removed with gear train). Inspect for cracks, burrs and wear.

(3) Because the diameter of the direct clutch retainer is greater than the diameter of the reverse band, it is necessary to first remove the reverse band before the direct clutch assembly can be withdrawn from the transmission case.

To remove the reverse band, loosen the band adjusting screw and locknut and compress band sufficiently to remove band strut. Unhook reverse band from link assembly. Remove band by rotating it through the relieved area in transmission case, as shown in Figure 20.

(4) To remove the direct clutch assembly, loosen kickdown band adjusting screw locknut and back off adjusting screw sufficiently to provide clearance for removal of clutch retainer. Remove the direct clutch assembly from the reaction shaft, as shown in Figure 21. Wrap towel around sun gear to protect hands. Be sure to remove direct clutch retainer thrust washer (fiber) from reaction shaft.

g. Removal and Inspection of Planet Carriers (Refer to Fig. 22)

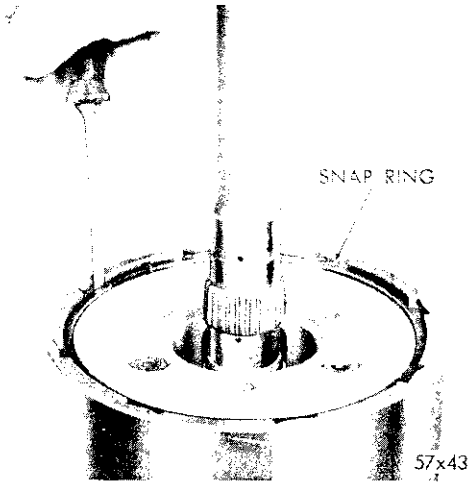


Fig. 23—Removing Kickdown Planet Pinion Carrier Housing Snap Ring

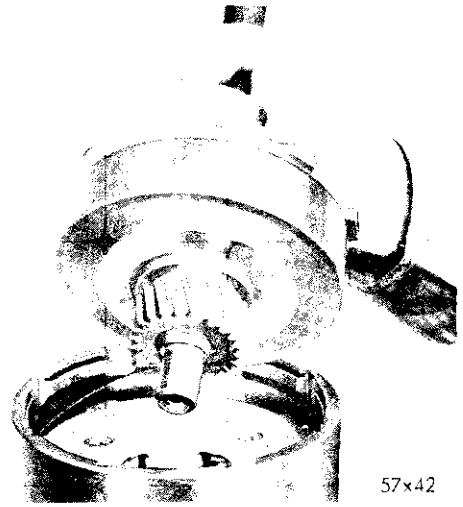


Fig. 24—Removing or Installing Input Shaft and Kickdown Planet Pinion Carrier Assembly

(1) Using a feeler gauge, check clearance between the planet pinion carrier housing snap ring and kickdown planet carrier assembly. This clearance should be from .010 to .021 inch. Snap rings are available in the following thicknesses: .062-.064, .072-.074, and .082-.084 inch. If this selection of snap rings fails to provide the necessary clearance, use one of the kickdown sun gear snap rings (part number 1327729) which will permit a minimum of .058-.060 inch.

(2) Using a screwdriver, remove the planet pinion carrier housing snap ring (Fig. 23). Identify snap ring to aid in reassembly.

(3) Remove the input shaft, kickdown planet pinion carrier assembly and kickdown annulus gear from carrier housing, as shown in Figure 24.

(4) Remove the kickdown annulus gear after removing snap ring (Fig. 25) from input shaft. Inspect gear for worn, cracked, and broken teeth. Remove

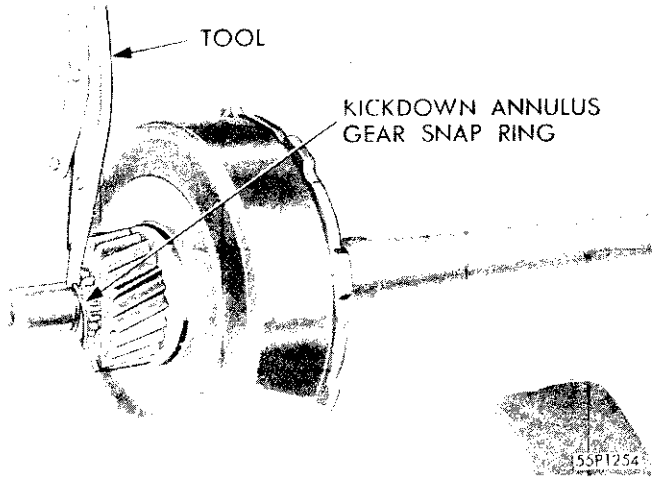


Fig. 25—Removing or Installing Kickdown Annulus Gear Snap Ring

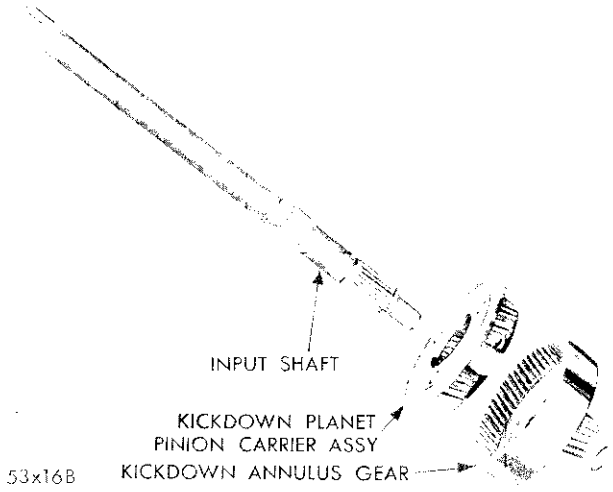


Fig. 26—Input Shaft, Kickdown Planet Pinion Carrier and Annulus Gear (Disassembled View)

the small (tabbed) thrust washer and inspect for cracks, burrs and wear.

(5) Remove kickdown planet pinion carrier assembly from input shaft. Check all oil passages in both the gear and shaft for obstructions. Inspect splines and bearing surface on input shaft for burrs and wear. Inspect snap ring groove (Fig. 26).

Inspect kickdown planet pinion carrier for scores on thrust surfaces and broken and worn gear teeth. Using a feeler gauge, check end clearance on individual planet pinion gears. Clearance should be .006 to .017 inch. Inspect pinion shafts for fit in the carrier and make sure pinions are free to rotate. Inspect retaining pins in pinion shaft. Inspect planet pinion washers for scoring. Do not replace carrier unless inspection reveals it is necessary. The kickdown planet pinion carrier assembly is serviced only as a complete assembly.

Fig. 27—Removal and Installation of Reverse Planet Pinion Carrier Assembly

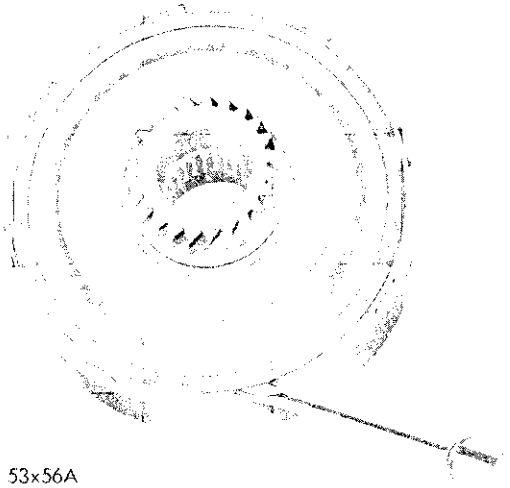


Fig. 28—Removing Kickdown Sun Gear Snap Ring

(6) Remove the reverse planet pinion carrier from the carrier housing, as shown in Figure 27. Remove the output shaft and reverse annulus gear assembly and fiber thrust washer from the carrier housing. Using pliers, Tool C-3301, remove the reverse annulus gear snap ring and remove annulus gear from output shaft. Inspect annulus gear for worn or broken teeth. Inspect output shaft ring grooves (seal and snap) for burrs and inspect rings for broken ends. Inspect splines on both shaft and annulus gear for burrs and wear. Check speedometer gear for burrs. Check output shaft bronze pilot bushing for wear, scoring. The output shaft is serviced only as an assembly.

NOTE: Output shaft bushing I.D. (after machining) should be .752 to .753" with maximum service limit of .0065" greater.

Inspect reverse planet pinion carrier housing fiber thrust washer for cracks and wear. Inspect planet

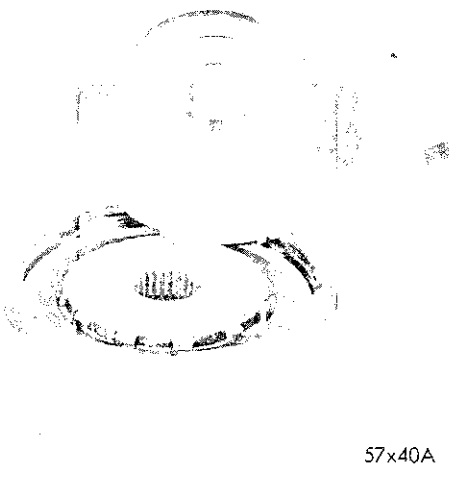


Fig. 29—Removal and Installation of Kickdown Sun Gear

pinion carrier housing and driving lug slots inside housing for wear. Closely inspect band contacting surface for burned spots and scoring, especially if reverse band lining has become excessively worn. Inspect reverse planet pinion carrier assembly in same manner as kickdown planet pinion carrier assembly.

Inspect all oil passages in output shaft support for obstructions. Check rear oil pump mating surface for burrs and score marks. Check for stripped threads in support. Inspect gasket surfaces for burrs and dirt. Inspect both inside and outside bearing surfaces for wear and scoring.

h. Disassembly and Inspection of the Direct Clutch Piston Retainer

(1) Using a screwdriver, remove the kickdown sun gear snap ring, as shown in Figure 28. The ring is a select fit. Identify to aid in reassembly.

(2) Lift out kickdown sun gear assembly (Fig. 29). Oil passages in front are to lubricate the kickdown planet pinion carrier thrust washer. Inspect for clutch material obstructing oil passages. Remove foreign material which may have accumulated on front side. Inspect driving disc contact surface for evidence of burning or scoring.

Inspect sun gear for cracked or broken teeth. Lift out direct clutch hub from center of direct clutch piston retainer. Oil passages in hub are to lubricate the clutch plates and driving discs when clutch is in released position. Inspect clutch hub driving lugs for wear and remove metal pickup which may have accumulated on either side of the hub. Inspect hub splines for burrs and wear.

(3) Invert the direct clutch piston retainer and remove the clutch plates (steel) and driving disc assemblies. Inspect driving discs for evidence of burning, glazing, and flaking off of facing material. Check discs by scratching facings with finger nail; if material collects under nail, replace all driving discs. Replace driving discs if splines have become damaged. Inspect the steel clutch plates for evidence of burning, scoring, and damaged splines.

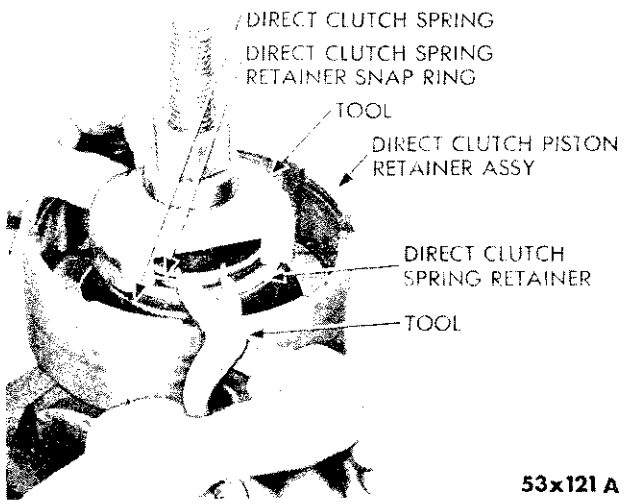


Fig. 30—Removal and Installation of Direct Clutch Spring Retainer Snap Ring

(4) Using compressor, Tool C-3575 (or C-3533), compress the direct clutch spring sufficiently to unseat the direct clutch spring retainer snap ring with pliers, Tool C-3301, as shown in Figure 30. Release compressor, Tool C-3575 (or C-3533), and remove the direct clutch spring retainer snap ring, spring retainer and spring from the clutch retainer. Check spring, retainer and snap ring for distortion.

(5) Using a twisting motion, remove the direct clutch piston from retainer. Note the ball check in clutch retainer housing. The ball check relieves centrifugal oil pressure when transmission is in neutral and prevents clutch engagement when engine speeds are increased. Make sure ball operates freely and seals properly. The bronze bushing used in the direct clutch piston retainer is not replaceable.

NOTE: Particular attention should be paid to the inside diameter of the direct clutch retainer bushing. Excessive clearance between the direct clutch retainer bushing and the reaction shaft, can permit the retainer to wobble and reduce the effectiveness of the reaction shaft seal. Accordingly, if this seal is ineffective, clutch slippage may result due to loss of clutch application pressure. Normal direct clutch bushing inside diameter dimensions (after machining) are 1.8125 inches to 1.8135 inches. Maximum useable service limit is .004 greater.

Inspect reaction shaft seal ring contacting areas, on retainer, for grooving. Inspect the band contacting surface for deep scores and burns, especially if the kickdown band lining is worn to the point where the steel band has been contacting the direct clutch piston retainer. **Do not turn the direct clutch piston retainer in a lathe to remove score marks.**

(6) Inspect steel clutch plate contacting surfaces for deep scores and burrs. Make sure clutch driving lugs will slide freely into retainer. Remove any metal pickup on hub of retainer. Inspect bore of the piston for score marks. If score marks are light, remove with crocus cloth. If they are heavy, replace the piston. Remove the direct clutch piston retainer seal ring (lip type neoprene) from retainer hub, using a suitable piece of wire. Remove the direct clutch piston seal ring (neoprene) from outer circumference of piston.

i. Removal and Inspection of Kickdown Band

(1) Compress kickdown band ends sufficiently to remove the kickdown band strut. Note that strut is grooved to act as a guide to the kickdown band strut pin on band end. Remove adjusting screw blade.

(2) Remove the kickdown band assembly by rotating band ends through rear opening in transmission case. Both reverse and kickdown bands have bonded lining and no attempt should be made to reline them. The kickdown band is narrower, larger in diameter, and has a different lining material. Make visual inspection of lining for wear and bond. If lining is worn so that grooves are no longer visible, the band assembly must be replaced. Inspect band for distortion and cracked ends.

j. Removal of the Reverse and Kickdown Band Levers

Inspect reverse band link assembly for wear and riveting of assembly. Inspect levers for cracks and wear. Make sure they have side clearance and are free to turn on shafts. Do not remove these assemblies unless inspection reveals it is necessary to do so.

(1) Insert fingers in back of reverse band and link assembly lever shaft. Holding the reverse band lever and link assembly with the other hand, push shaft out of rear opening in case.

(2) Remove kickdown band lever shaft plug in front of transmission case. Remove kickdown lever by inserting finger in back of kickdown lever shaft and, holding the band lever with the other hand, push shaft out front of transmission case.

k. Removal of the Front Oil Pump

(1) Remove the transmission regulator valve spring retainer, gasket and spring.

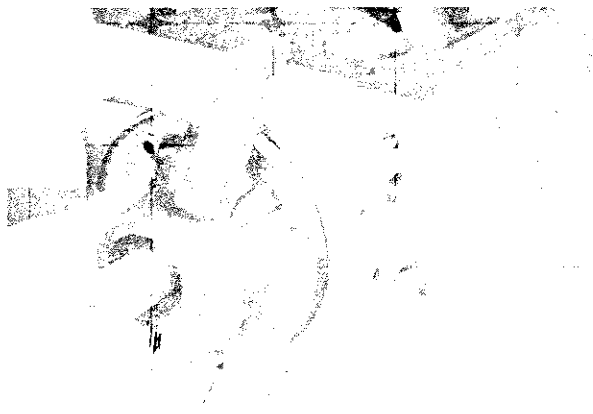


Fig. 31—Removal of Front Oil Pump Housing (Typical View)

(2) Remove the torque converter control valve spring retainer, gasket and spring. Do not remove valves. To remove these valves when transmission is installed in vehicle, use a mechanical retriever or a piece of welding rod inserted in end of valve. Valves are so constructed that they will not drop into front housing when removing.

(3) Remove the front oil pump housing to transmission case bolts and washers.

(4) Using a soft hammer, tap on the circumference of the housing to loosen. Pull oil pump housing assembly and gears from the transmission case (Fig. 31). Using dye, mark front side of gears. **Do not use scribe marks.**

(5) Remove oil pump gear from front oil pump housing. Remove the front oil pump housing seal (large neoprene) from circumference of housing.

(6) Using a brass drift, drive the front oil pump housing oil seal from front of housing. Inspect front oil pump housing bushing for scores (bushing is not replaceable). Bushing I.D. (after machining) should be 1.878 to 1.879 inches with maximum service limit of .002 inch greater. This bushing supports the front oil pump drive sleeve. Slight scores may be removed with crocus cloth. Inspect pump housing and gears for scores and wear.

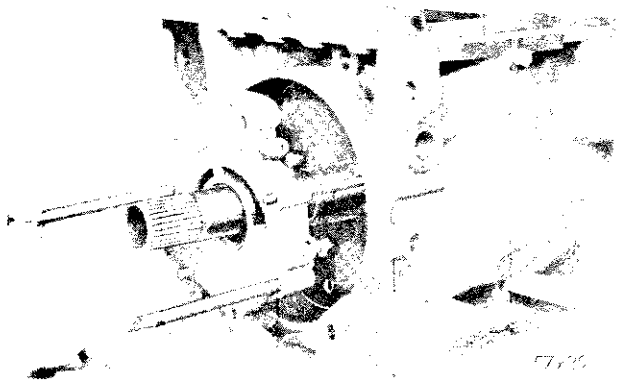
(7) Using straightedge, Tool C-3335, and feeler gauge, check clearance between pump housing face and face of gears. Clearance limits are .0012 to .0022 inch. Make sure all oil passages are open by blowing them out with compressed air.

l. Removal of the Regulator Valve Body

(1) If regulator valve body cannot be removed by installing guide studs, Tool C-3283, in tapped holes in body (and pulling outward with the hands, as shown in Figure 32) use the two threaded holes provided in the regulator valve body to attach puller, Tool C-3287, and install (if removed) guide studs, Tool C-3288 (Fig. 32).

(2) Pull regulator valve body from torque converter reaction shaft and discard the gasket. Handle the regulator valve body carefully.

(3) Place body and both valves in pan containing a clean solvent, wash thoroughly, and dry with compressed air. Inspect both valves for free movement in valve body. They should fall in and out of bores when both the valves and body are dry. Crocus cloth may be used to polish valves, providing care is exercised not to round the sharp edge portion of the



Using Guide Studs (Top View)

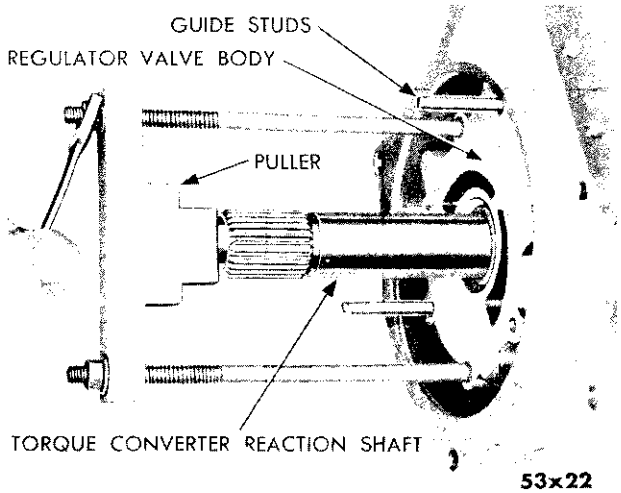


Fig. 32—Removing Regulator Valve Body—Using Puller Tool (Bottom View)

valves. The sharp edge portion prevents dirt and foreign matter from getting between the valve and body, reducing the possibility of sticking. Check all fluid passages for obstructions and inspect all mating surfaces for burrs and distortion. If regulator valve body should have a slight nick or raised portion on mating surfaces, it may be removed by using a surface plate and crocus cloth.

(4) Check regulator valve spring seat (snap ring). After both valves and regulator valve body have been thoroughly cleaned and inspected, place them on clean paper and cover with clean paper until ready for installation. Leave valves in regulator body bores.

m. Removal of Reverse Servo Piston

(1) Install compressor, Tool C-3289 or C-3529, on transmission case (use oil pan screws) and compress reverse servo piston spring retainer.

(2) Using a screwdriver, remove the reverse servo piston spring retainer snap ring, as shown in Figure 33. Loosen compressing portion of tool. Spring retainer may require guiding out of transmission case.

(3) Remove the spring retainer, spring and servo piston and plug assembly.

(4) Remove the servo piston seal (lip type neoprene) from piston.

(5) Remove reverse servo piston plug snap ring.

(6) Remove plug and cushion spring from piston. Inspect servo bore for scoring. Light scores may be removed with crocus cloth. Check plug for scoring and wear at lever contact point. Check plug snap ring and groove for burrs, wear.

n. Removal of Kickdown Piston

(1) Using compressor, Tool C-3289 or C-3529, apply sufficient pressure on the kickdown piston rod guide to remove the piston rod guide retaining snap ring.

(2) Loosen compressing portion of tool and remove tool from transmission case. Remove piston rod guide, piston spring, and kickdown piston rod assembly. Inspect riveting of the kickdown piston rod to kickdown spring retainer.

(3) Remove seal ring from guide. Inspect for light scores and wear on piston rod and guide.

(4) Using lock ring pliers, Tool C-484, remove the kickdown piston from the transmission case.

(5) Remove the three cast iron seal rings from the kickdown piston. Inspect piston for light scores and wear. Inspect rings for broken ends.

o. Removal of Torque Converter Reaction Shaft

Inspect torque converter reaction shaft steel seal rings (interlocking type) for broken ends. Make sure

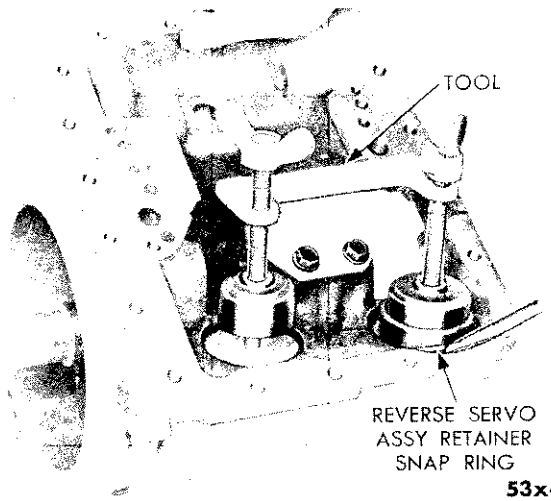


Fig. 33—Removal and Installation of Reverse Servo Assembly Retainer Snap Ring

they are free to rotate in the lands. Inspect neoprene seal ring for brittleness. Inspect splines on shaft for burrs and wear. Inspect thrust surfaces for wear and slight scores. Remove the reaction shaft seal (neoprene). Do not remove the torque converter reaction shaft unless inspection reveals it is necessary to do so.

If necessary to remove reaction shaft, follow these steps:

(1) Remove neoprene seal ring.

(2) Remove the three transmission case to reaction shaft screws and washers.

(3) Using Tool C-3297 or C-3521 press reaction shaft out of transmission case, as shown in Figure 34.

(4) Remove the two torque converter reaction shaft seal rings (interlocking).

NOTE: Reaction shaft bushing I.D. (after machining) should be 1.063 to 1.064 inches with a maximum of .0035 greater.

p. Removal of Kickdown Band Adjusting Screw

Loosen locking nut and remove kickdown band adjustment screw and locknut. When locknut is loosened, the adjusting screw must be finger free. If it is not, inspect screw and nut for pulled threads or foreign material in threads.

The transmission and its components have been disasembled for inspection, cleaning and the replacement of worn or damaged parts.

Inspect transmission case for cracks, sand holes, and stripped threads. Check for burrs on mating surfaces. Blow compressed air through all passages

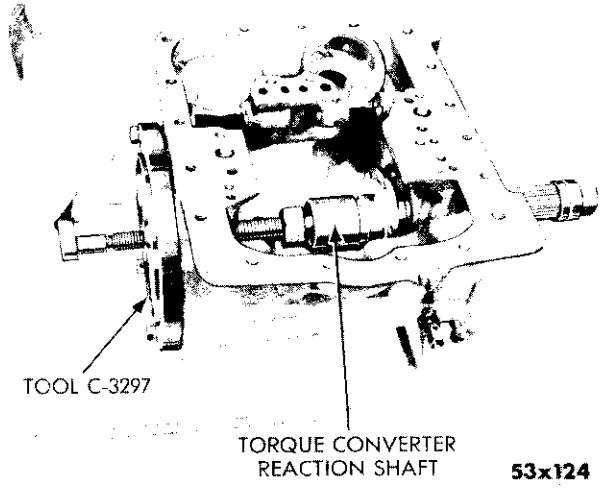


Fig. 34—Removal of Torque Converter Reaction Shaft

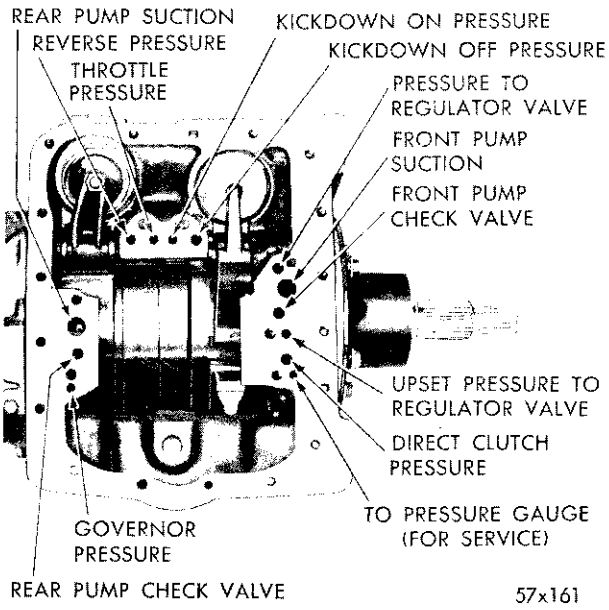


Fig. 35—Transmission Oil Passages

(refer to Fig. 35) to make sure they are open. Check oil pressure take-off plugs for tightness. Check drive type breather in extension housing for being plugged (under coating) and looseness.

9. ASSEMBLING THE TRANSMISSION

Before assembling the transmission, lubricate each part with **clean** Automatic Transmission Fluid, Type "A", Suffix "A".

a. Installing Kickdown Band Adjusting Screw

It is vitally important that the adjusting screw fit freely into the transmission case. Install adjusting screw, with locking nut attached, into transmission case until there is approximately 1 inch of screw left on outside of case. Do not lock screw into position at this time.

b. Installing the Torque Converter Reaction Shaft

(1) Coat the two steel torque converter reaction shaft seal rings with transmission fluid.

(2) Install rings on shaft. Make sure they are interlocked and rotate freely in the ring lands.

(3) Coat portion of reaction shaft (that presses into case) with transmission fluid. Position torque converter reaction shaft into transmission case so that holes in shaft align with bolt holes in case. Install Tool C-3297 (or Tool C-3531).

(4) Place two front oil pump to transmission case screws (coarse thread) through reaction shaft screw holes in transmission case until threads contact the machine threads of reaction shaft flange screw holes

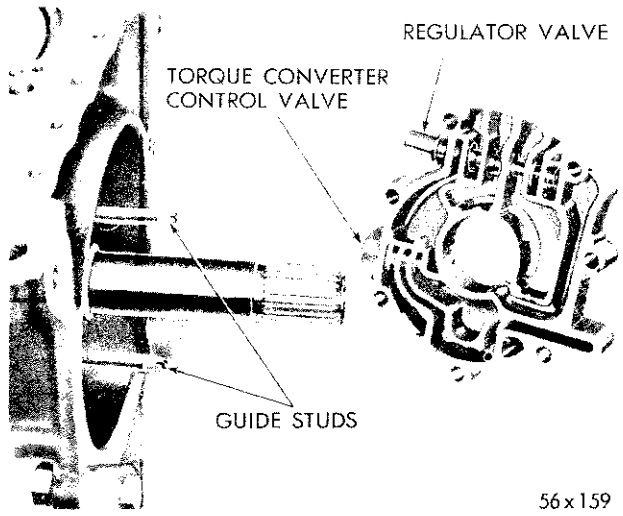


Fig. 36—Installing Regulator Valve Body

(fine thread). Use very light finger pressure to tighten (approximately one turn).

In this position, the bolts will serve as guides in aligning the reaction shaft flange dowel hole with the dowel in the transmission case.

(5) Press reaction shaft into transmission case. Remove Tool C-3297 (or Tool C-3531).

(6) Remove the two front pump screws (guide). Start the three transmission case to reaction shaft bolts and washers and tighten from 10 to 15 foot-pounds torque. Coat new torque converter reaction shaft seal ring (neoprene) with transmission fluid and install on shaft.

c. Installing the Kickdown Piston

(1) Coat the three kickdown piston rings with transmission fluid (two locking and one open type) and install on piston. Interlock the rings and make sure they are free to rotate in lands.

(2) Place kickdown piston assembly into transmission case. Compress bottom ring (large) with a piece of brass rod. After bottom ring has entered, piston will seem to hang at two different locations while being pushed into case. This is due to rings entering cylinder. **DO NOT HAMMER.**

(3) Place kickdown piston rod in piston and slide spring over kickdown piston rod.

(4) Coat a new kickdown piston rod guide seal ring with transmission fluid and install on kickdown piston rod guide. Make sure ring rotates freely in land.

(5) Install compressor, Tool C-3289 (or Tool C-3529), on transmission case. Using extreme care, compress the kickdown piston spring to the point that piston guide seal ring slightly binds on case. Using a piece of brass rod flattened on end, work seal ring into position, gradually compressing spring until seal ring enters case.

(6) Install the kickdown piston rod guide retaining snap ring. Make sure snap ring is properly seated.

d. Installing the Reverse Servo Piston

(1) Install cushion spring and plug in servo piston.

(2) Install the reverse servo piston plug snap ring. Make sure snap ring is properly seated.

(3) Coat a new reverse servo piston ring (neoprene) with transmission fluid and install (lip facing down) on piston. Insert reverse servo piston and plug assembly into transmission case in a cocked position. Then, by rotating piston, the piston ring will enter case without being damaged.

(4) Place reverse servo piston spring over piston and position spring retainer over spring. Compress spring with compressor, Tool C-3289 (or Tool C-3529), sufficiently to install snap ring. The spring retainer may require guiding into case. Make sure snap ring seats properly. Remove installing tool from transmission case.

e. Installing the Regulator Valve Body

Inspect regulator valve body and valves to make sure that no damage has occurred since first inspection and cleaning. Blow out passages with compressed air.

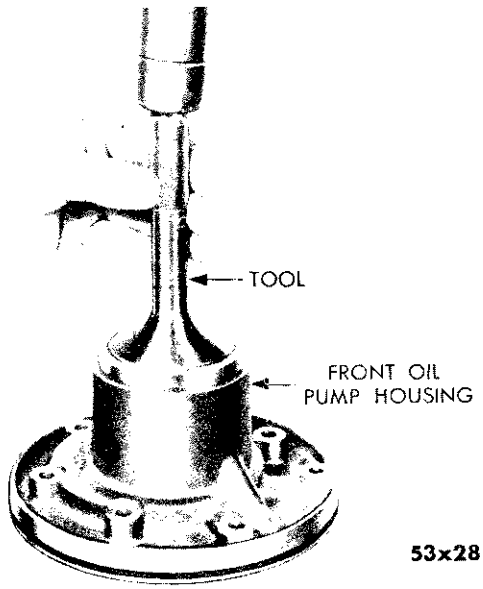


Fig. 37—Installing Front Pump Oil Seal

Make sure torque converter reaction shaft seal (neoprene) is coated with transmission fluid.

(1) Place the transmission regulator valve and torque converter control valve in the regulator valve body. (Refer to Fig. 36.)

(2) Install guide studs, Tool C-3288 (if removed), in front of transmission case, position new regulator valve body gasket and valve body assembly (with oil passages to rear) over torque converter reaction shaft. Seat firmly against gasket on front of transmission case. Use extreme care when placing regulator body in position to prevent reaction shaft screws from damaging passages in regulator body.

f. Installing the Front Oil Pump

(1) Position front oil pump housing oil seal in front of oil pump housing (metal portion of seal down). Using driver, Tool C-3278, bottom seal into housing, as shown in Figure 37.

(2) Coat new front oil pump housing seal (neoprene) with transmission fluid and install on housing. Make sure seal is properly seated in groove (lip facing down) and that it protrudes .010 inch above circumference of housing.

(3) Place transmission front oil pump gear and pinion (driving lugs of pinion facing up) in oil pump housing and check the marking. Unless oil pump pinion is installed correctly, considerable damage will result when transmission is installed in vehicle. Lubricate oil pump gears wth Automatic Transmission Fluid, Type "A", Suffix "A".

(4) Place front oil pump housing assembly (with oil drain facing up) over torque converter reaction shaft and slide into position over guide studs and up against regulator valve body. Start five of the bolts and draw housing down evenly until it is seated into transmission case.

(5) Remove guide studs and install the two remaining bolts and washers. Tighten to 17 foot-pounds torque. After all bolts have been installed and properly torqued, engage the driving lugs of the oil pump pinion to determine if oil pump pinion turns freely. Use the oil pump drive sleeve for this check. If pinion does not turn freely, remove pump and check for foreign matter between pump gears and housing. Lugs of drive sleeve should extend not more than from ½ to ⅝ inch beyond face of oil pump housing.

(6) Using a new gasket, install the torque converter control valve spring and retainer. Tighten 35 to 40 foot-pounds torque.

(7) Using a new gasket, install the transmission regulator valve spring and retainer. Tighten from 45 to 50 foot-pounds torque.

g. Installing the Kickdown Band and Levers

(1) Place kickdown band lever assembly into transmission case and slide the kickdown band lever shaft into position from front of transmission case. The lever should operate freely on shaft.

(2) Install kickdown band lever shaft plug in front of transmission case and tighten 30 to 35 foot-pounds torque.

(3) Place kickdown band assembly into transmission case by rotating ends of band through rear opening in case. Fit either end of the kickdown band over adjusting screw blade and compress the band lever. **Make sure the kickdown band strut slot engages with kickdown strut pin in the band end.**

h. Assembling the Direct Clutch Piston Retainer

(1) Coat a new direct clutch piston seal ring with transmission fluid and install on piston, with lip of seal facing away from the flange.

(2) Coat a new direct clutch piston retainer seal ring with transmission fluid and install (lip of seal down) on retainer hub.

(3) Place piston assembly in the direct clutch retainer and, with a twisting motion, seat piston in bottom of retainer. Work carefully to avoid damaging lip of seals.

(4) Seat the direct clutch spring into the direct clutch piston retainer. Place spring retainer on spring and snap ring on spring retainer.

(5) Using compressor, Tool C-3575 (or Tool C-3533), compress the direct clutch spring sufficiently to seat the snap ring in its groove. Make sure snap ring is properly seated.

(6) Remove compressor, Tool C-3575 (or Tool C-3533). Place the direct clutch hub in the center of the direct clutch piston retainer.

(7) Lubricate the clutch plates and driving discs with Automatic Transmission Fluid (Type "A", Suffix "A"). Place one of the clutch plates (steel) in the direct clutch piston retainer, followed by a driving disc.

(8) Place the kickdown sun gear assembly in the direct clutch piston retainer.

(9) Using a feeler gauge, check the clearance under the kickdown sun gear snap ring. Select a

snap ring to give minimum clearance (close to zero as possible). Make sure snap ring seats properly. Snap rings are available in the following two thicknesses: .058 to .060 inch and .062 to .064 inch.

(10) Place fiber thrust washer (select fit, see "Checking Transmission End Play," Paragraph 9) on reaction shaft and install direct clutch assembly in transmission case, as shown in Figure 21.

i. Installing Reverse Band and Levers Assembly

(1) Place the reverse band lever assembly in the reverse band link assembly and place in transmission case.

(2) Align the holes in the lever and link assemblies to shaft hole in the transmission case. Slide the reverse band lever shaft into position from rear of transmission case.

(3) Place reverse band assembly into transmission case by rotating ends of band through relieved area in transmission case (Fig. 20). Hook end of band in link assembly. Compress band sufficiently to install the strut in the slots of the band and lever assembly. (Figure 38 illustrates assembly of reverse band linkage after installation in transmission case.)

j. Installing the Panet Pinion Carriers in Housing (Refer to Fig. 22)

(1) Lubricate bearing surface of planet pinion carrier housing, and place bearing surface of housing over output shaft support bearing surface.

(2) Place the reverse annulus gear on the output shaft and install snap ring. Output shaft may be placed in a vise, providing it is clean and equipped with soft jaws. **Reverse annulus gear must fit reasonably tight on output shaft. End clearance is controlled by various snap rings which are available in the following thicknesses: .078 to .080 inch; .082 to .084 inch, and .086 to .088 inch.** Make sure snap ring seats properly.

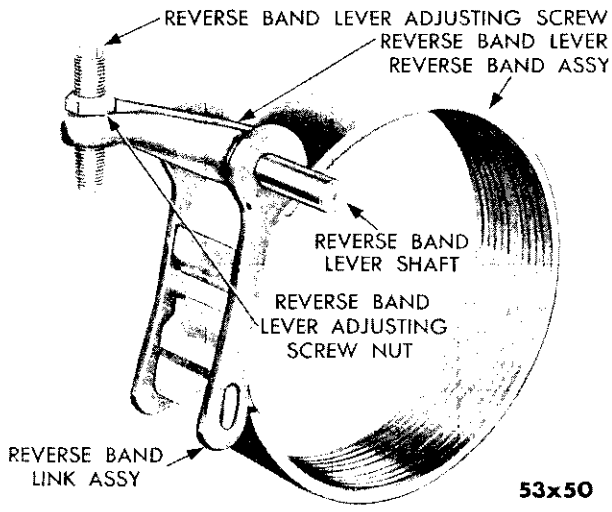


Fig. 38—Reverse Band Linkage

(3) Coat output shaft seal ring with transmission fluid and install on shaft. Interlock the seal ring into position and make sure ring rotates freely in land.

(4) Coat the planet pinion carrier housing fiber thrust washer with lubriplate, slide washer over output shaft and against thrust surface on reverse annulus gear.

(5) Place output shaft and reverse annulus gear into position in the planet carrier housing.

Be careful not to damage the output shaft seal ring as it enters the output shaft support. Make sure the fiber thrust washer seats properly between the reverse annulus gear and the planet pinion carrier housing.

(6) Coat reverse annulus gear teeth with transmission fluid.

(7) Lubricate thrust surfaces and gear teeth of the reverse planet pinion gears and carrier assembly. Place carrier assembly (Fig. 27) in the reverse annulus gear. Make sure driving lugs on carrier assembly properly engage the slots in the planet pinion carrier housing.

(8) Coat input shaft bearing surfaces and gear teeth on the kickdown planet pinion gears and carrier assembly with transmission fluid. Slide kickdown planet pinion carrier assembly carefully down on rear end of input shaft.

(9) Lubricate teeth and thrust surfaces, then slide kickdown annulus gear over input shaft. Install kickdown annulus gear snap ring and make sure it is seated properly (Fig. 25). Input shaft may be placed in a vise, providing vise is clean and equipped with soft jaws.

(10) Lubricate the large kickdown planet pinion carrier thrust washer (tabbed) with lubriplate and install on kickdown planet pinion carrier assembly.

(11) Place the kickdown planet pinion carrier assembly, kickdown annulus gear and input shaft into position in planet pinion carrier housing. Make sure lugs on kickdown carrier assembly properly engage the slots in the planet pinion carrier housing.

(12) Install planet pinion carrier housing snap ring (raise housing slightly to aid in installing snap

ring). Make sure snap ring is positioned and seated properly.

(13) Using feeler gauge, check the clearance between the kickdown planet carrier housing snap ring and the kickdown planet pinion carrier assembly. Limits are .010 to .021 inch. If the clearance is not within these limits, select a new snap ring. Snap rings are available in the following thicknesses: .062 to .064 inch; .072 to .074 inch, and .082 to .084 inch. If this selection of snap rings fails to provide sufficient clearance, use a kickdown sun gear snap ring (part number 1327729) which will permit a minimum of .058-.060 inch.

k. Installing the Output Shaft Support, Planet Pinion Carriers and Housing Assembly

(1) Install guide studs, Tool C-3283, in rear of transmission case. Position new output shaft support gasket over guide studs and against case.

(2) Insert input shaft, planet pinion carrier housing, output shaft support and output shaft through the rear of transmission case. Make sure large kickdown planet pinion carrier thrust washer (tabbed) is positioned correctly against thrust surface of direct clutch retainer assembly.

(3) Install the one output shaft support to transmission case screw and lockwasher and tighten **finger tight.**

l. Installing the Rear Oil Pump

(1) Coat transmission rear oil pump pinion ball with transmission fluid and insert in ball pocket in output shaft.

(2) Lubricate rear oil pump drive pinion with transmission fluid, place over output shaft and slide into position. Align keyway in pinion with ball shaft. Pinion was marked when removed in disassembly, so make sure it is installed correctly. Check the marking.

(3) Slide rear oil pump housing assembly over output shaft support bolts and lockwashers. Draw down evenly and tighten from 10 to 12 foot-pounds torque. **After bolts have been properly tightened, turn output shaft to make sure pump gears are free to rotate. If they are not, remove pump to determine cause.**

m. Installing the Governor on the Output Shaft

(1) Coat the two governor support piston rings with transmission fluid and install on the governor support. Stagger ring gaps and make sure they are free to rotate in lands. Position governor on support and install the four screws and lockwashers. **Do not tighten screws at this time.**

(2) Slide governor support and body assembly over output shaft, as shown in Figure 16, and into position in rear oil pump housing. Compress governor support piston rings with fingers as support enters oil pump housing.

(3) Align locating hole in output shaft to locating screw hole in governor body and install governor locating screw. Tighten 3½ to 4 foot-pounds torque. Holes can be easily aligned by turning output shaft and holding governor body.

(4) Tighten the four governor body screws from 5 to 10 foot-pounds torque.

(5) Dry governor parts with compressed air, but do not lubricate when assembling. Place governor intermediate weight in primary weight.

(6) Install the secondary weight spring and weight. Compress spring sufficiently to install snap ring. Make sure the spring seats properly and that snap ring is seated properly.

(7) Place the governor weight assembly (secondary weight snap ring up) into governor body (Fig. 14) and install snap ring. Make sure the snap ring seats properly.

(8) Slide the governor valve shaft into the governor body (Fig. 13) through the output shaft and governor weight assembly. At the same time, position valve into body.

(9) Install the governor valve shaft snap ring. Make sure snap ring is positioned at outer end of groove. (Refer to Fig. 39.) If positioned at inner end of groove it may limit travel of governor valve. Make sure ring is properly locked to shaft.

(10) Check operation of governor weight assembly and valve by turning output shaft. Both should fall freely in body.

n. Installing the Transmission Extension, Oil Seal and Bearing

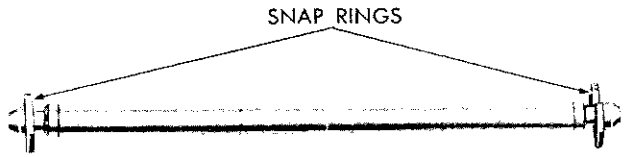


Fig. 39—Positioning Governor Valve Snap Ring

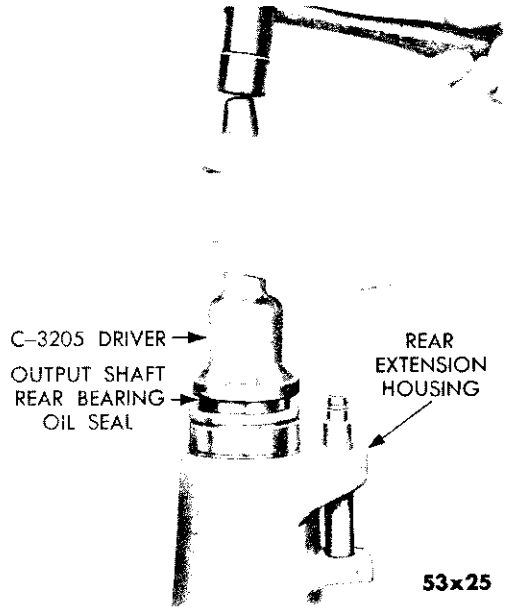


Fig. 40—Installation of Output Shaft Rear Bearing Oil Seal

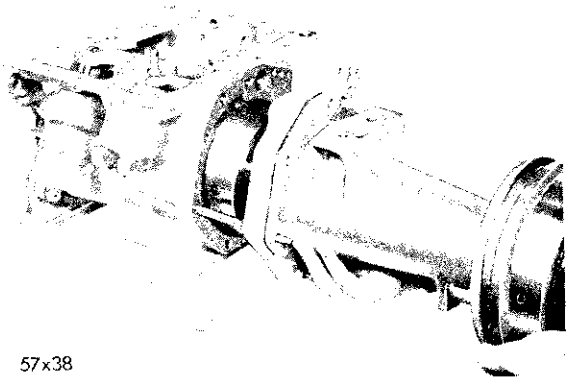


Fig. 41—Removal of Output Shaft Support, Extension, Handbrake Assembly and Pinion Carrier Housing as an Assembly

(1) Install the new output shaft rear bearing in extension housing with driver, Tool C-3204. Make sure bearing is properly seated and then lubricate with Automatic Transmission Fluid, Type "A", Suffix "A".

(2) Install output shaft rear bearing snap ring. Snap rings are available in two sizes. Select one to eliminate all end play at bearing.

(3) Install extension oil seal with driver, Tool C-3205, as shown in Figure 40.

(4) Place new transmission extension gasket over

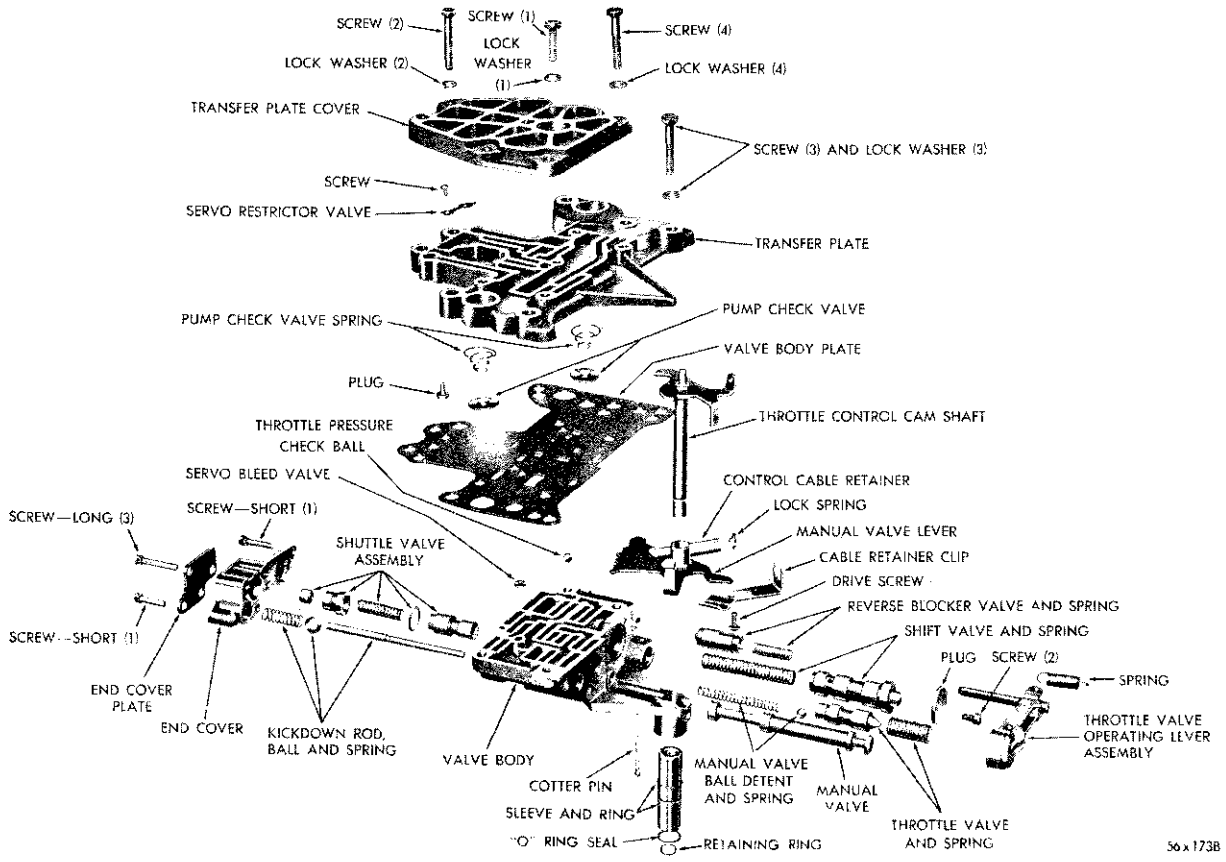


Fig. 42—Valve Body and Transfer Plate Assembly (Exploded View)

guide studs, Tool C-3283, and into position against output shaft support. Do not use sealing material on gasket. Avoid damaging the governor housing when placing the rear extension housing over the output shaft and onto the guide studs.

(5) Position housing by tapping with soft hammer. Remove guide studs and install the seven transmission extension to case bolts and lockwashers. Draw down evenly and tighten 25 to 30 foot-pounds torque.

(6) Lighten the output shaft support to case bolt 25 to 30 foot-pounds torque. Turn output shaft to make sure it turns freely.

(7) Coat nylon gear and threads on speedometer drive pinion with transmission fluid and install in transmission extension, as shown in Figure 12. Tighten 40 to 45 foot-pounds torque.

o. Checking Transmission End Play

Before transmission end play is checked, it is necessary that the hand brake drum be installed and tightened to required torque specifications (175 foot-pounds). This operation is necessary to aid in proper seating on the extension rear bearing.

If end play does not fall within specifications, the transmission will have to be partially disassembled to allow a direct clutch retainer thrust washer (fiber) of proper thickness to be installed. Thrust washers are available in the following three thicknesses: .078-.080 inch; .095-.097 inch, and .112-.114 inch.

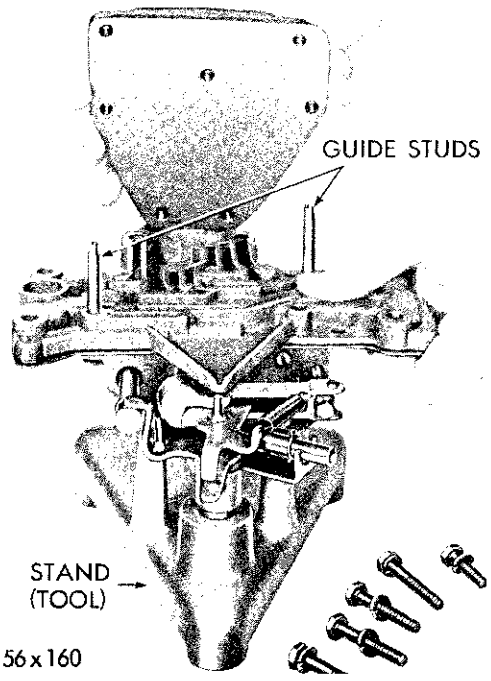


Fig. 43—Valve Body and Transfer Plate Assembly in Stand

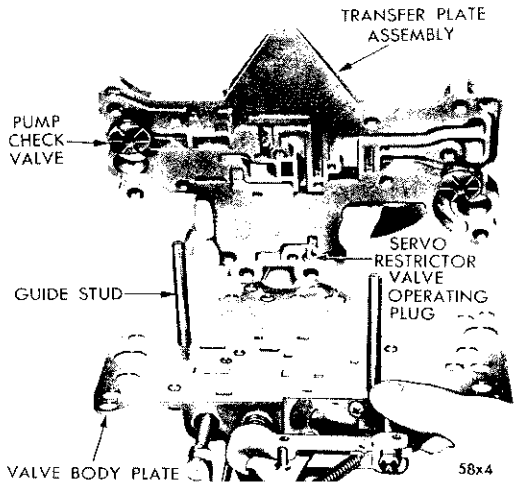


Fig. 44—Removing Transfer Plate Assembly

(1) Remove the screws and lockwashers from the transmission extension and install guide studs, Tool C-3283.

(2) Remove the output shaft support to case screw and washer and remove the extension housing (with brake assembly), output shaft support and planet pinion carrier housing as one assembly as shown in Figure 41.

(3) Slide the direct clutch piston retainer from torque converter reaction shaft (it is unnecessary to remove it from transmission case) and remove the direct clutch retainer thrust washer.

(4) Using a micrometer, measure the thickness of the washer and select washer to give correct clearance. Assemble as previously instructed.

p. Adjustment of Bands (Bench)

Kickdown (Front Band)

(1) Using a ¾ inch open end wrench, loosen the locknut.

(2) Check the freeness of the adjusting screw in the transmission. Refer to "Transmission and Controls — Adjustments," Paragraph 6.

Reverse (Rear Band)

(1) Loosen reverse band adjusting screw locknut and tighten adjusting screw from 20 to 25 inch-pounds torque.

(2) Back out adjusting screw 12 turns.

(3) Holding the adjusting screw in this location, tighten the adjusting screw locknut 30 to 35 foot-pounds torque.

10. SERVICING THE VALVE BODY AND TRANSFER PLATE

a. Disassembling the Valve Body and Transfer Plate

To disassemble the valve body and transfer plate for

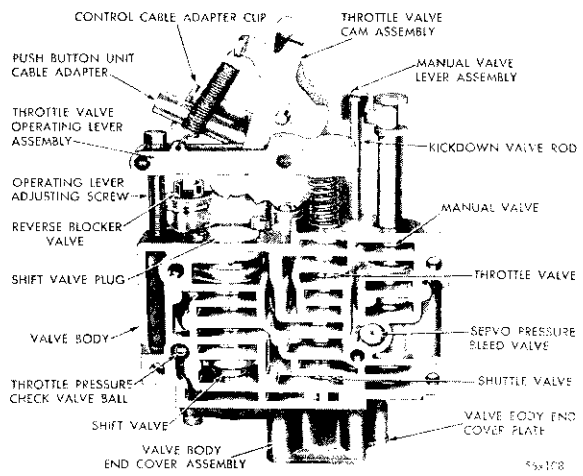


Fig. 45—Valve Body Assembly (Valve Body Plate Removed)

cleaning, inspection, and overhaul, refer to Figure 42, and proceed as follows:

(1) Place valve body and transfer plate assembly in stand, Tool C-3294 (if not previously done so) (Fig. 43). **Do not use vise to hold valve body and transfer plate.**

(2) Remove two of the long transfer plate cover bolts and lockwashers and install guide studs, Tool C-3295.

(3) Keeping finger pressure against transfer plate, remove the remaining three (2 long and 1 short) transfer plate cover bolts, and remove transfer plate cover, as shown in Figure 43.

Do not lose the servo restrictor valve operating plug from transfer plate when removing transfer plate from valve body plate (Fig. 44).

(4) Remove valve body plate from valve body. The servo pressure bleed valve may stick to valve body plate when it is removed. Note position of servo pressure bleed valve and pressure check valve ball. (Refer to Fig. 45.)

(5) Remove valve body from stand, Tool C-3294, and remove guide studs. Remove servo pressure bleed valve and pressure check valve ball, and place in clean container.

(6) Remove the throttle valve cam return spring from cam and throttle operating lever.

(7) Compressing the throttle valve operating lever assembly against throttle valve spring, as shown in Figure 46, rotate the throttle valve operating assembly outward from the throttle valve cam. Swing throttle valve operating lever out of the way and remove the throttle valve spring from throttle valve. Remove the throttle valve from the valve bore.

(8) Check the distance from valve body to end of throttle valve operating adjusting screw. Using wrench, Tool C-3279B, remove the throttle valve adjusting screw lever assembly. Normally, it is not necessary to remove this assembly unless damaged parts are to be replaced.

(9) Holding the manual valve lever detent plate and sleeve securely, remove small retainer ring which locks throttle camshaft in sleeve (Fig. 47). While maintaining constant thumb pressure on detent plate, carefully withdraw sleeve from valve body. Remove throttle valve cam assembly and manual valve lever assembly. Detent plate ball is spring loaded. **Do not lose the detent ball.**

(10) Remove detent ball and spring from valve body. Remove the manual valve by slowly rotating it out of its bore.

(11) Remove reverse blocker valve cotter pin, spring and valve. Remove valve by rotating it out of the bore. Do not remove push button unit control cable adapter, lock spring or cable adapter clip, unless inspection reveals it is necessary to do so (Fig. 45).

(12) Remove the four (three long and one short) valve body and cover plate bolts and lockwashers and remove valve body and cover plate.

(13) Remove valve body end cover screw and lockwasher (oval fillister). Keep pressure against valve body and cover when removing screws as there are three springs behind cover. **Do not disturb the setting.**

b. Cleaning and Inspecting the Valve Body and Transfer Plate

After each part has been thoroughly cleaned and in-

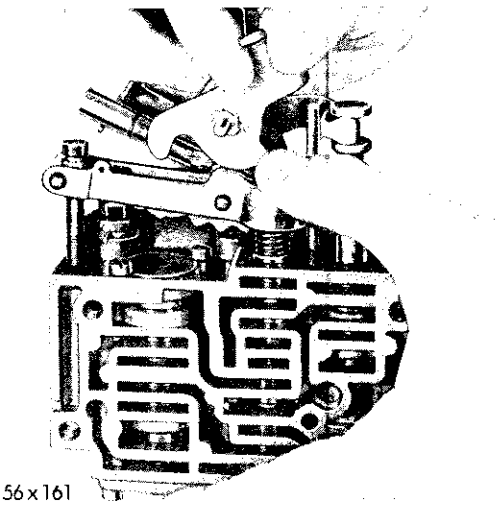


Fig. 46—Compressing Throttle Valve Operating Lever

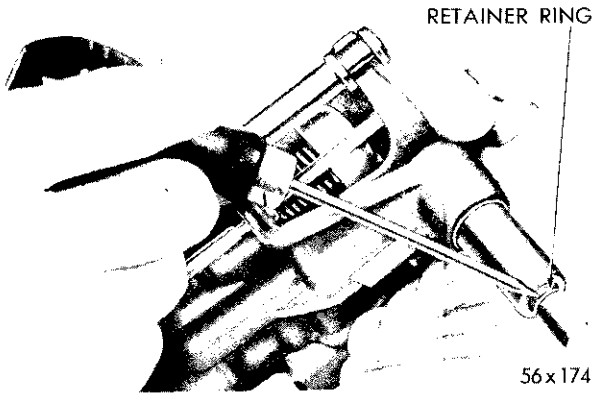


Fig. 47—Removing Throttle Camshaft Retaining Ring

spected, place on clean paper until ready for assembly. Make sure all parts are free from obstructions, and inspect all mating surfaces for burrs, nicks and grooves. Small nicks, etc. may be removed with crocus cloth; otherwise, damaged parts must be replaced. Using straightedge, Tool C-3335, check all mating surfaces for distortion. Inspect bores in valve body for score marks, pits and irregularities. Inspect all springs for distortion and collapsed coils.

Inspect all valves and plugs for burrs, nicks and scores. Small burrs, nicks, etc., may be removed with crocus cloth, providing extreme care is taken to avoid rounding off the sharp edge portion of the valve which helps to prevent dirt and foreign matter from getting between valves and body, reducing the possibility of sticking. Check valves and plugs (dry) for free operation in bores. All must fall freely in the bores when the valves, plugs and bores are clean and dry. Inspect detent portions on manual valve lever assembly for wear. Inspect detent ball for wear and make sure it slides freely into valve body.

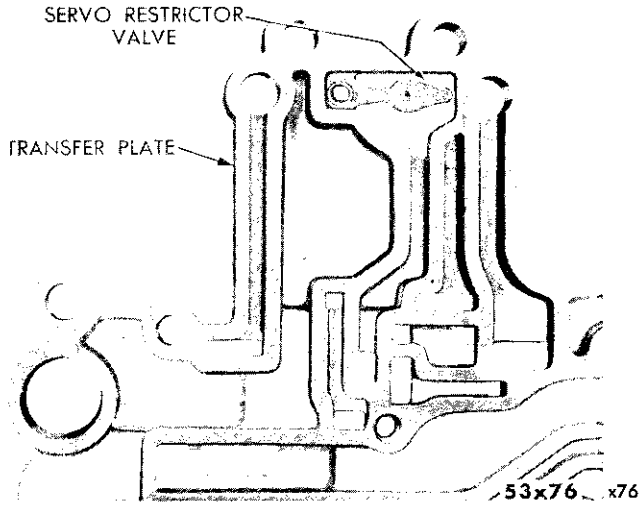


Fig. 48—Servo Restrictor Valve

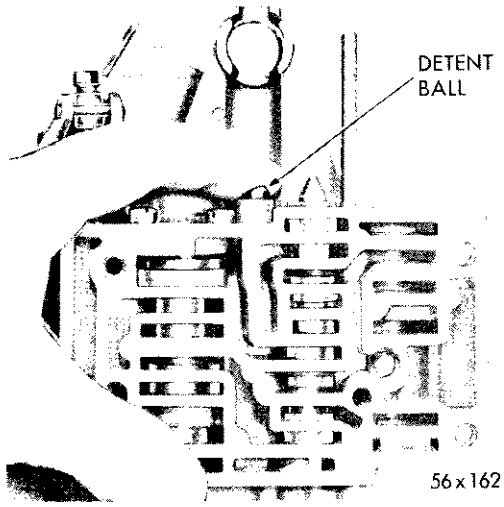


Fig. 49—Holding Manual Valve Lever Detent Ball

Inspect staking of control cable adapter to detent plate and cable adapter clip to valve body. Inspect the staking of valve lever and throttle valve cam to their respective shafts. Inspect the throttle valve operating lever roller to make sure it rolls freely. Inspect throttle valve operating lever adjusting screw and pin for wear. Make sure adjusting screw rotates freely in the throttle valve operating lever. Inspect kickdown valve rod for wear and scoring and also inspect for wear at entering point in valve body. Inspect servo restrictor valve (Fig. 48) in the transfer plate to make sure valve is seating properly. If valve is distorted, carefully remove the drive screw. Install new valve and new drive screw. Make sure the drive screw is tight. Avoid distorting transfer plate when performing this operation. Inspect valve body plate for burrs and make sure the five small metering holes are open. Visually inspect pump check valve springs in the transfer plate. Make sure radial grooves in check valves are free of obstructions.

c. Assembling the Valve Body and Transfer Plate

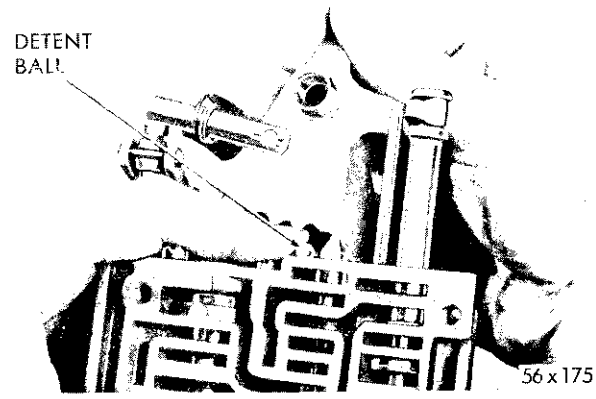


Fig. 50—Aligning Manual Valve Lever Assembly

NOTE: Three steel balls are used in the valve body and each must be installed in its correct position. Each is identified by its size as follows:

Kickdown rod ball—large

Manual valve lever detent ball—medium

Throttle pressure check ball—small

(1) Install reverse blocker valve and spring. Use new cotter pin.

(2) Place manual valve in its bore.

(3) Install shift valve. Install shift valve plug and tighten screws securely.

(4) Place manual valve lever detent spring and ball in valve body and hold in position, as shown in Figure 49. While holding the detent ball, position the manual valve lever assembly so that the lever arm engages the manual valve (manual valve may be positioned to assist in this alignment) and the push button control cable adapter in direct alignment with the control cable adapter clip. (Refer to Fig. 50.) At the same time, align the shoulder on the manual valve lever with the sleeve bore in the valve body so that the detent ball will engage the detent plate when finger pressure on detent ball is released.

(5) With finger pressure holding manual valve shoulder in bore, insert sleeve (short end) in bore (up to stop ring).

(6) Position throttle valve cam in sleeve, as shown in Figure 51, and lock in place with retainer. If retainer is not placed in position at this time, the

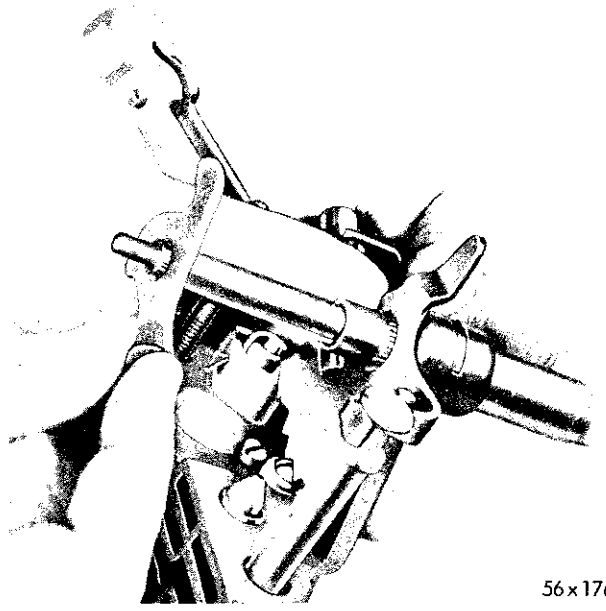


Fig. 51—Placing Throttle Valve Cam Shaft in Sleeve

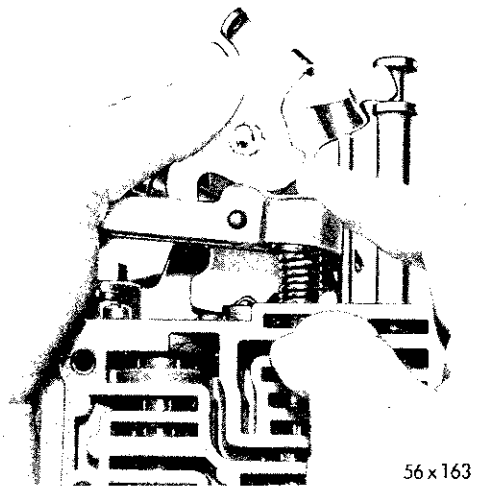


Fig. 52—Indexing Throttle Valve Cam Shaft with Throttle Valve Operating Lever

detent plate may move out of position, allowing the detent ball to escape from its bore.

(7) Place valve body in stand, Tool C-3294.

(8) Place kickdown rod into position in valve body.

(9) Install the shift valve spring in valve body.

(10) Install the shuttle valve in valve body. Coat stop ring lightly with transmission fluid and place into recess in valve body.

(11) Place shuttle valve spring in valve body.

(12) Place kickdown valve ball into valve body.

(13) Place valve body and cover plate on end cover. Install the one short screw and lockwasher and tighten snugly.

(14) Place adjustable shuttle valve plug into posi-

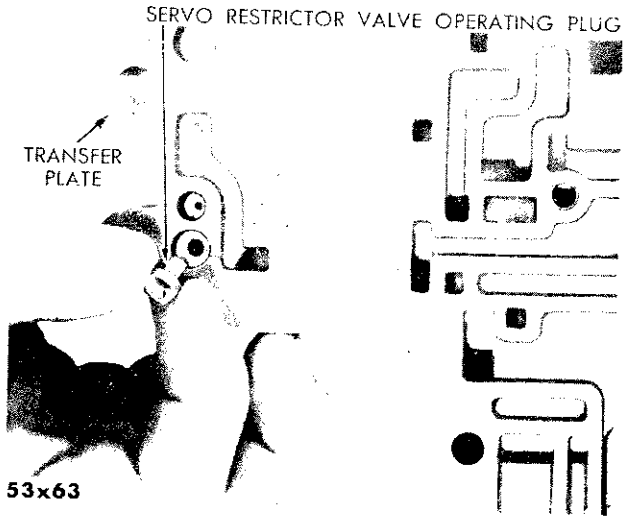


Fig. 53—Installing Servo Restrictor Plug

tion in valve body end cover. Plug must fit to full depth of bore.

(15) Install the kickdown valve spring in place in end cover.

(16) Install valve body end cover to valve body. Make sure the shift valve, shuttle valve and kickdown valve springs are properly seated in position when cover is being installed.

(17) Install the valve body end cover screw and lockwasher but do not torque.

(18) Install the three (long) valve body end cover plate screws and lockwashers. Draw down evenly and tighten to 24 to 30 inch-pounds torque.

(19) Remove valve body from repair stand. Using wrench, Tool C-32798, install throttle valve adjusting screw and throttle valve operating lever assembly. Adjust to approximately 1-11/16" distance between the valve body and end of throttle valve adjusting screw.

(20) Install throttle valve (point outward) in valve body. Place throttle valve spring over throttle valve. Swing throttle valve operating lever over spring. Compressing the throttle operating lever assembly against the throttle valve spring, slide the throttle valve cam assembly into throttle valve operating lever, indexing the cam portion in slot of operating lever, as shown in Figure 52. Replace throttle valve cam assembly return spring and replace valve body in stand.

(21) Install servo bleed valve and throttle pressure check valve ball into position in valve body and install guide studs, Tool C-3295.

(22) Install the servo restrictor valve operating plug (long end first) into transfer plate (Fig. 53). Make sure the pump check valves and springs are properly positioned in transfer plate. The pump check valve with the metering hole should be positioned in end of transfer plate that lies next to the manual valve.

(23) Place the valve body plate flush into position on valve plate by compressing pump check valve springs. Make sure pump check valves enter transfer plate; otherwise, the valve body plate will be damaged when assembly is drawn down onto valve body.

(24) Keep sufficient pressure on transfer plate and valve body plate to hold them together. Place them over the guide studs and into position on valve body.

(25) Place transfer plate cover into position and install two of the transfer plate cover screws and lockwashers (one each side) finger tight. Make sure pump check valves remain in position in body plate.

(26) Remove guide studs and install the remaining transfer plate cover bolts and lockwashers. Tighten the bolts 45 to 50 inch-pounds torque. Avoid overtightening as this will distort valve body, resulting in sticky valves. Operate pump check valves to make sure they can be unseated before final tightening.

d. Installing the Valve Body and Transfer Plate

(1) Place "O" ring seal on throttle camshaft sleeve, then place valve body and transfer plate into position on transmission case. Install the five transfer plate bolts and lockwashers. Two bolts are 1⅝ inches long and go through the transfer plate cover on valve body. The other three are 1⅛ inches long. Draw bolts down evenly and tighten 12 to 17 foot-pounds torque.

(2) Make sure the two oil strainer tube seals are in position on oil strainer and place oil strainer assembly into position on valve body. Install the two oil strainer support bolts (1¼ inches long) and lockwashers. Tighten 12 to 17 foot-pounds torque.

(3) Replace oil pan and gasket (new). Tighten oil pan bolts 12 to 17 foot-pounds torque.

(4) Replace felt and felt retainer on throttle camshaft, then install throttle control lever assembly. Tighten lock screw securely.

(5) Place engine rear support adapter into position on extension housing and install bolts and lockwashers. Tighten to 50 foot-pounds torque.

(6) Remove transmission assembly from stand, Tool C-3280.

11. INSTALLING THE TRANSMISSION IN VEHICLE

NOTE: Before installing transmission in vehicle, check torque converter hub runout and housing alignment as outlined in the Torque Converter Group 21.

(1) Install guide studs, Tool C-3276, in the two upper transmission case to converter housing bolt holes.

(2) Lubricate front oil pump drive sleeve seal ring and bearing surface with transmission fluid.

(3) Install drive sleeve in front oil pump housing (if not previously installed) **making sure driving lugs are properly engaged in front oil pump pinion gear.** Note position of driving lugs on front oil pump drive sleeve and position accordingly, to aid in proper

engagement with torque converter hub when transmission is installed.

(4) Mount transmission in suitable jack. Raise and align transmission with pilot bore in torque converter housing. Slide transmission over guide studs and into position against torque converter housing. To avoid damage to front oil pump, the transmission must be properly aligned. Do not attempt to use transmission to converter housing bolts to bring transmission and converter housing together. If oil pump drive sleeve and input shaft have been properly aligned, transmission should slide into position relatively easy. **Do not force** it into position.

(5) Install the two lower transmission case to converter housing bolts and lockwashers, but do not tighten. Remove guide studs and install the two upper transmission case to converter housing bolts and lockwashers. Draw all bolts down evenly and tighten 45 to 50 foot-pounds torque.

(6) Place crossmember into position and install crossmember to torsion bar spring bracket bolts. Tighten bolts securely.

(7) Install the rear engine mount to the transmission and tighten bolts to 35 foot-pounds torque. Install rear engine crossmember to frame and tighten bolts to 75 foot-pounds torque. Remove the transmission jack. Install the rear engine mount to crossmember bolts and tighten to 35 foot-pounds torque. Lower the car and remove holding fixture Tool C-3487.

(8) Connect throttle linkage to throttle lever, insert gearshift control cable into transmission and adjust as outlined in "Transmission and Controls — Adjustments," Paragraph 6. Install neutral starting switch. Connect speedometer cable housing to drive pinion.

Engage ball end of brake cable with brake operating lever, secure to support and tighten support screw securely (refer to Brakes, Group 4) of this manual for method of adjusting parking brake). Connect propeller shaft and tighten nuts 33 to 37 foot-pounds torque.

Connect oil pan filler tube and refill transmission to proper level (refer to Lubrication, Group 0 of this manual). Connect battery and make all necessary adjustments and tests, as outlined in "Transmission and Controls — Adjustments," Paragraph 6.

Group 22
WHEELS, BEARINGS AND TIRES
CONTENTS

DATA AND SPECIFICATIONS

MODELS	DE SOTO (PS-1, PS-3)	WINDSOR (PC-1)
WHEELS		
Type	Steel Disc	
Rim	Drop Center–Safety Wheel	
Size	14 x 5½K	14 x 5½K 14 x 6K (Town and Country)
Number of Wheel Nuts	5	
Stud Hole Circle	4½"	
Stud Size	½"-20	
TIRES		
Type	Super Cushion Tubeless	
Size	8 x 14 8.50 x 14 Optional	8.00 x 14 8.50 x 14 (Town and Country)
Ply	4 Standard	
Tread	Twin Grip	
TIRE PRESSURES–COLD		
Pounds–Rear		24–Town and Country*
Rear	22	24
Front	22	

*With Town & Country fully loaded, increase rear tire **cold** pressure to 28 pounds.
Captive-Air tires are optional equipment on Town & Country Wagons 3-seat Models only.

(8.50 x 14 on Model PC-1 and 9.00 x 14 on Model PC-3.)