TRANSMISSIONS

CONTENTS

TORQUEFLITE TRANSMISSION (A-727-B)

INDEX

GENERAL INFORMATION

The TorqueFlite Transmission model identification markings are cast in raised letters about 3/8 inch high on the lower left side of the transmission bell housing.

The A-727-B TorqueFlite Transmission servicing procedures are in general the same for all models. **CAUTION: Transmission operation requirements are different for each vehicle and engine combination and some internal parts will be different to provide for this. Therefore, when replacing parts, refer to the seven digit part number stamped on left side of the transmission oil pan flange.**

The A-727-B transmission (Fig. 1) combines a torque converter and a fully-automatic 3-speed gear system. The converter housing and transmission case are an integral aluminum casting. The transmission consists of two multiple disc clutches, an overrunning clutch, two servos and bands, and two planetary gear sets to provide three forward ratios and a reverse ratio. The common sun gear of the planetary gear sets is connected to the front clutch by a driving shell which is splined to the sun gear and to the front clutch retainer. The hydraulic system consists of an oil pump, and a single valve body which contains all of the valves except the governor valve.

Venting of the transmission is accomplished by a drilled passage through the upper part of the oil pump housing.

The torque converter is attached to the crankshaft through a flexible driving plate. Cooling of the converter is accomplished by circulating the transmission fluid through an oil-to-water type cooler, located in the radiator lower tank. The torque converter assembly is a sealed unit which cannot be disassembled.

The transmission fluid is filtered by an internal "Dacron Type" filter attached to the lower side of the valve body assembly.

Engine torque is transmitted to the torque converter then, through the input shaft to the multiple disc clutches in the transmission. The power flow depends on the application of the clutches and bands. Refer to "Clutch Engagement and Band Application Chart."

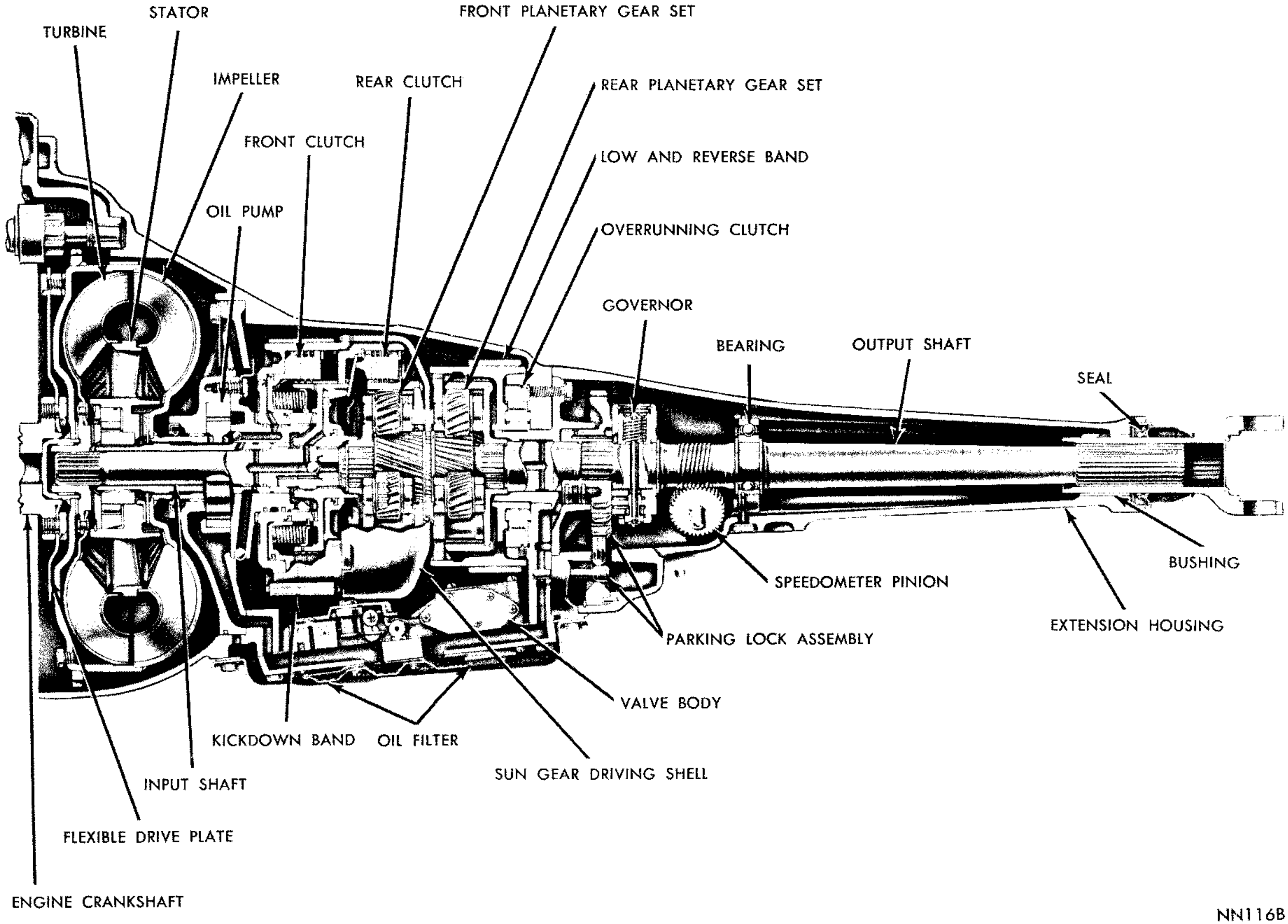
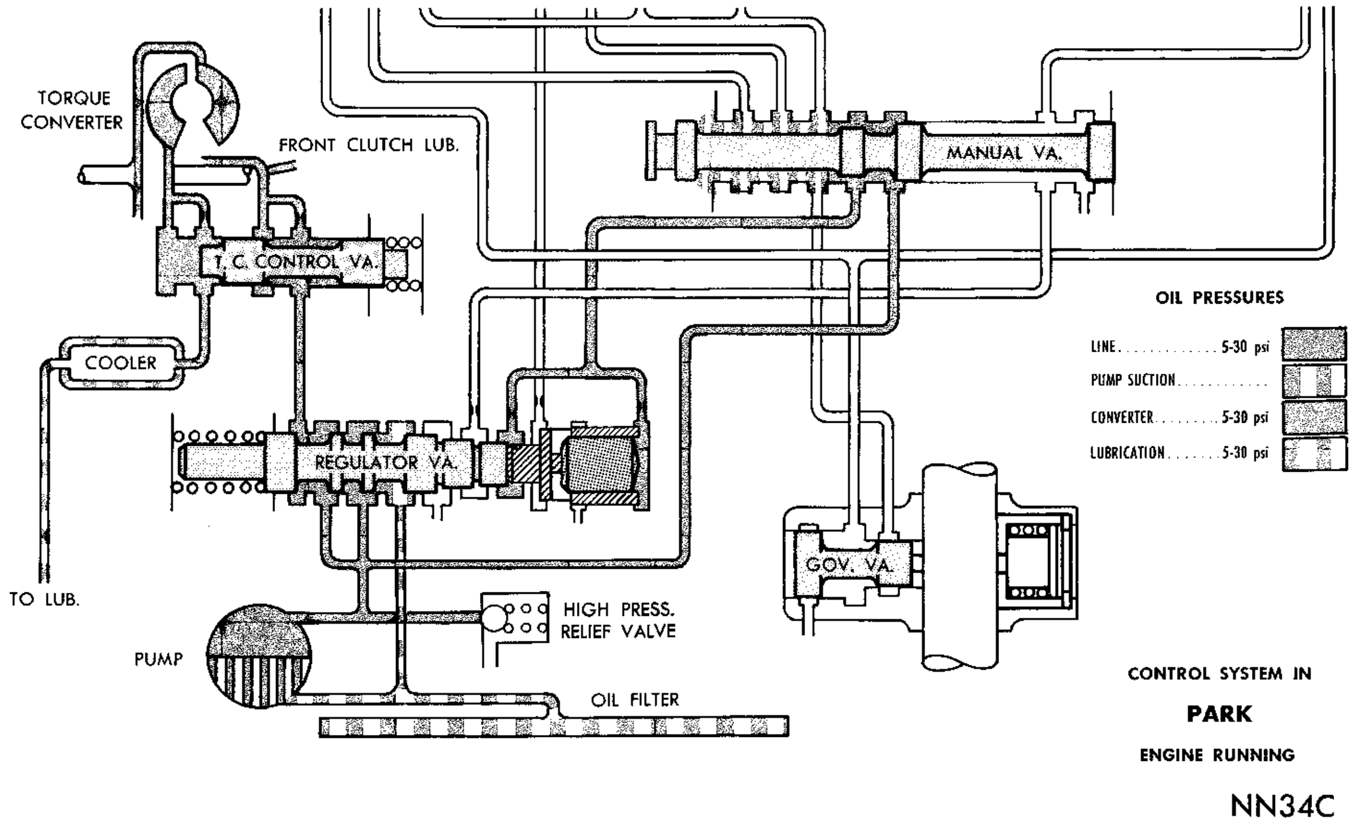
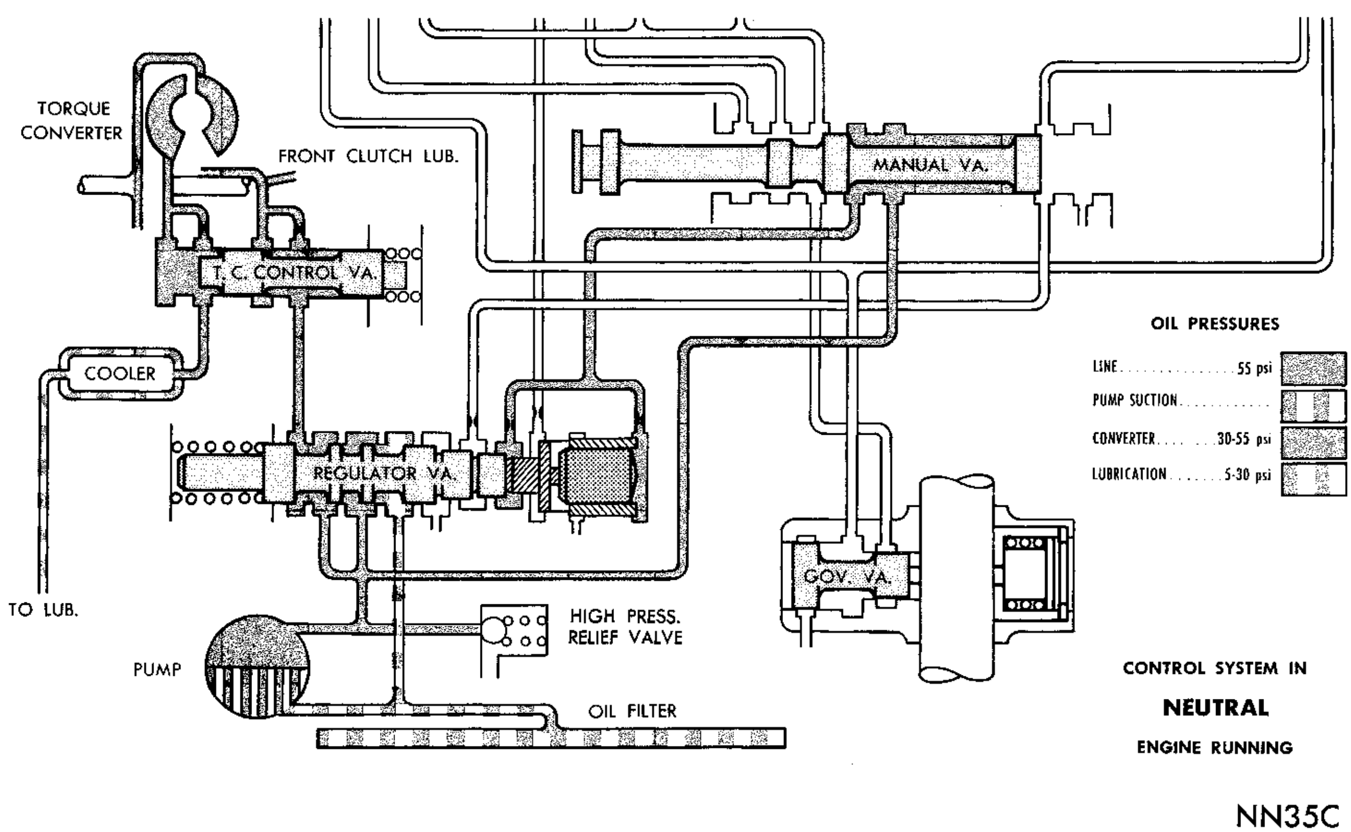


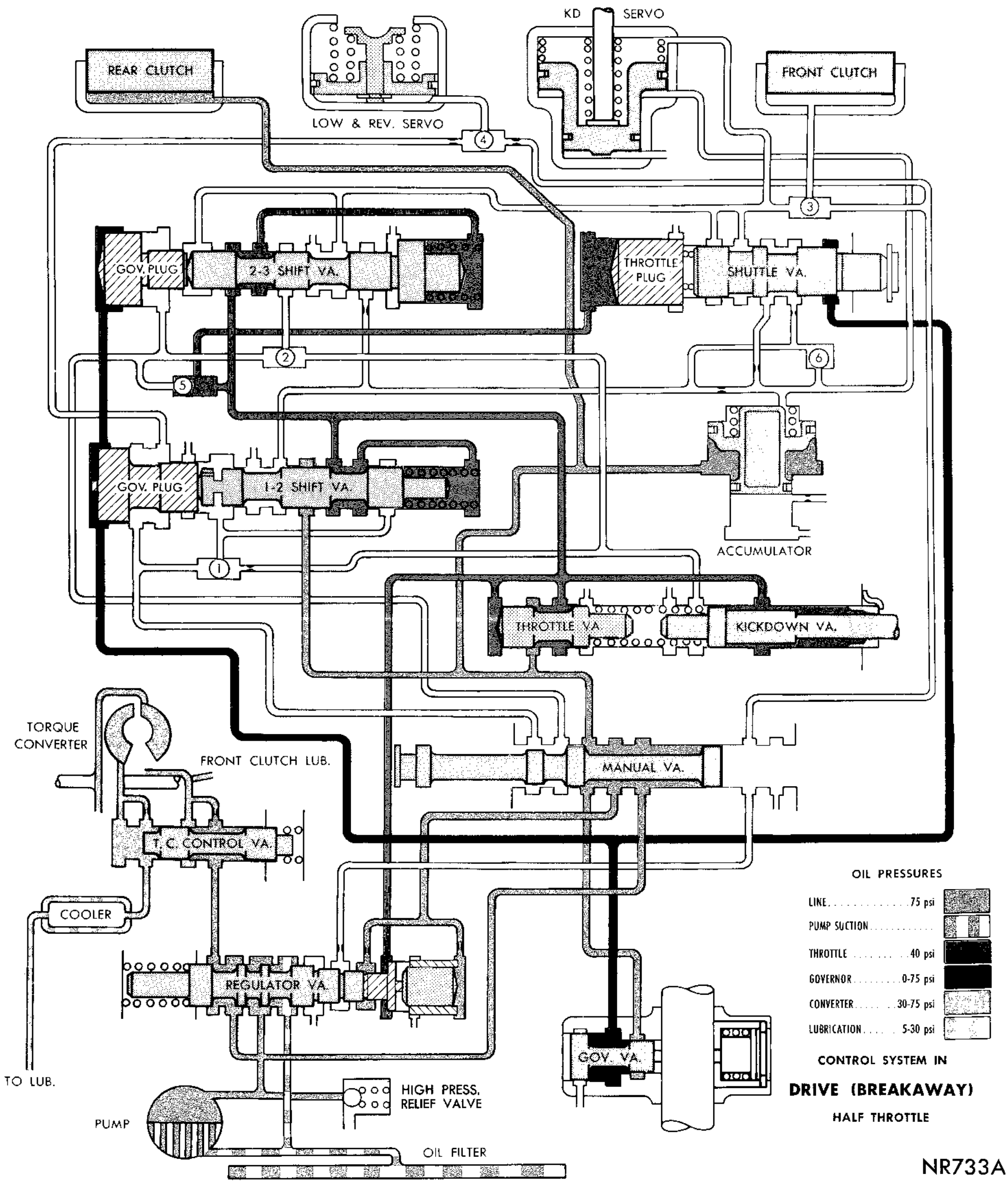
Fig. 1—TorqueFlite Transmission and Torque Converter (A-727)



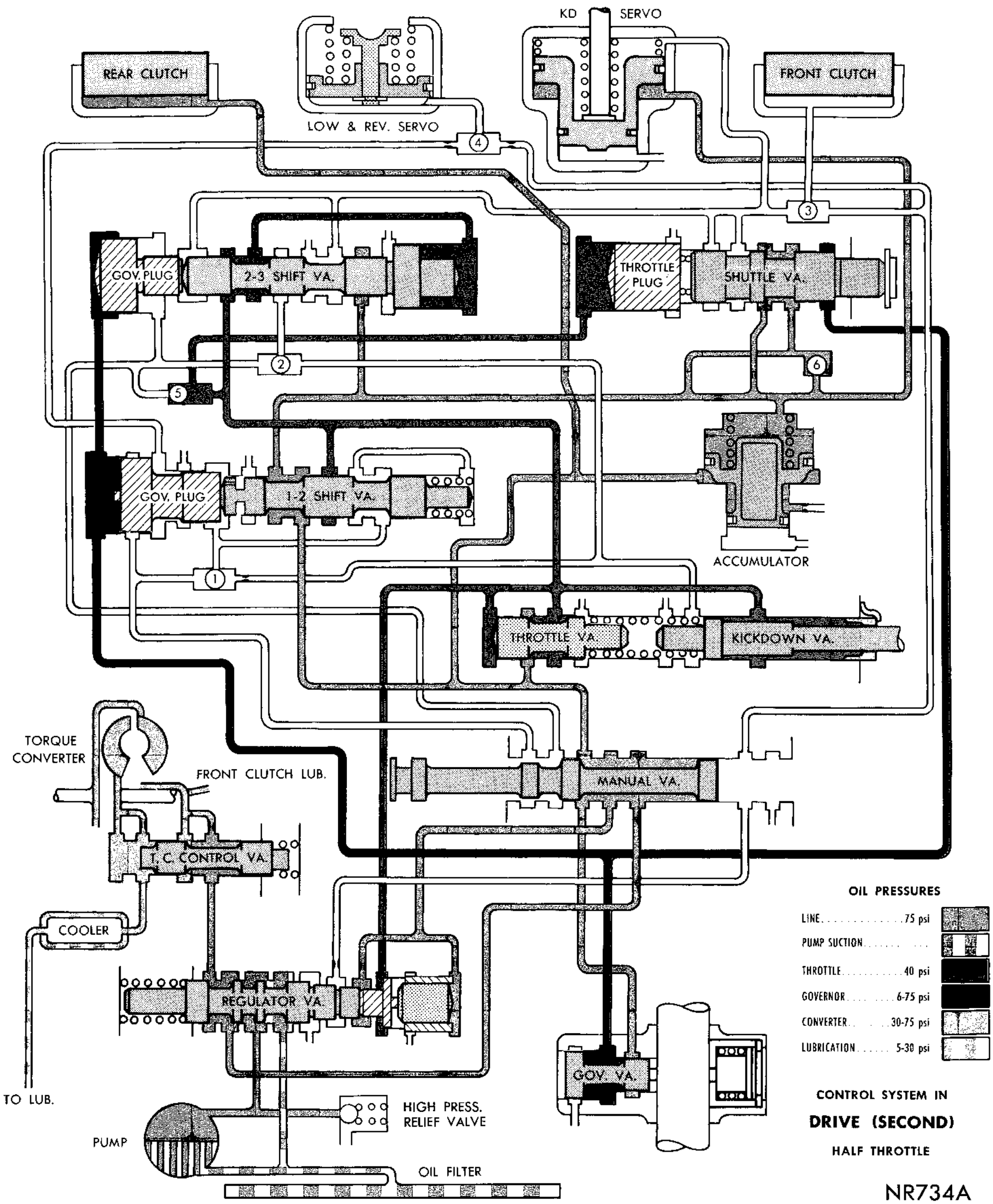
Park Hydraulic Circuits



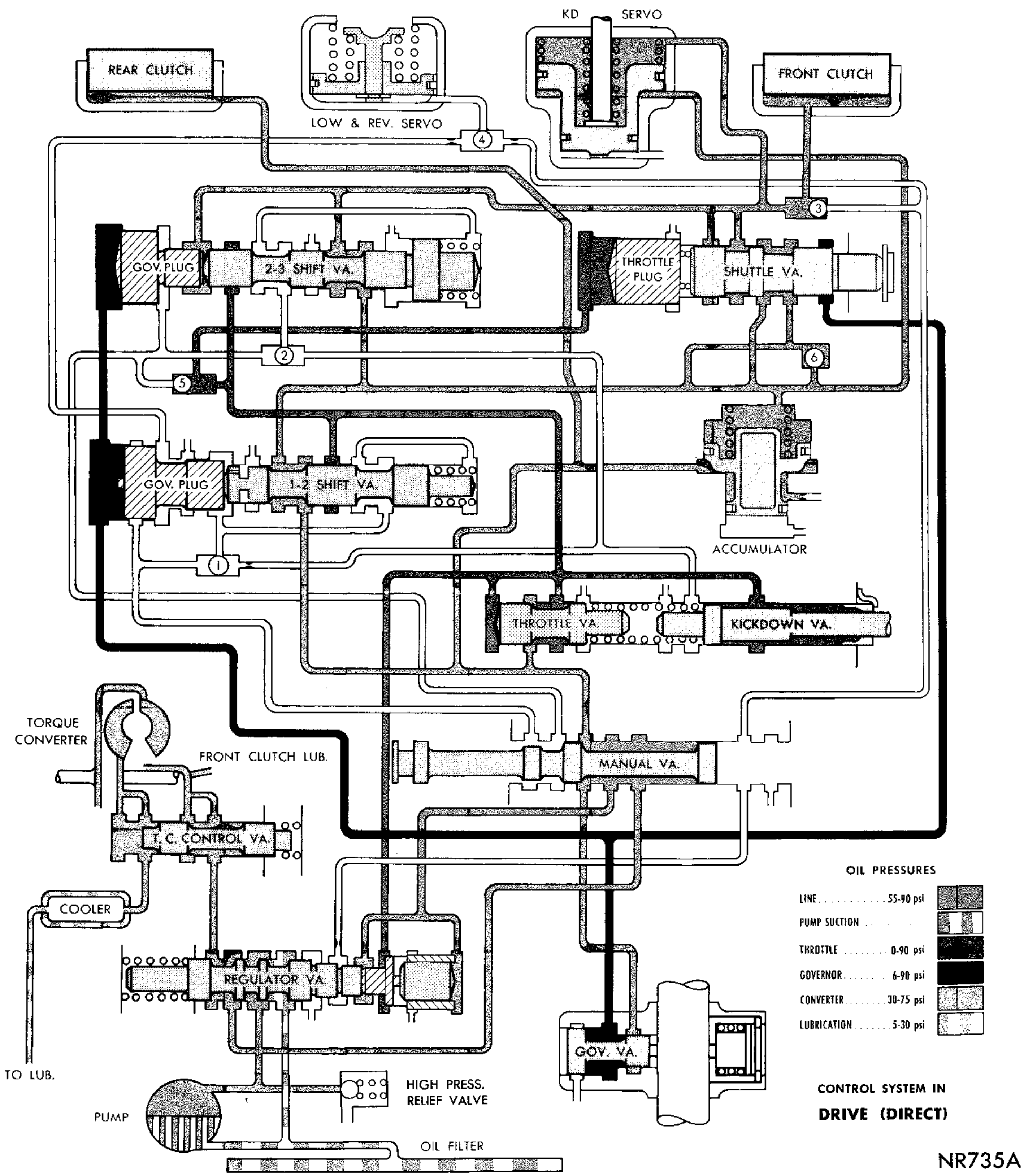
Neutral Hydraulic Circuits



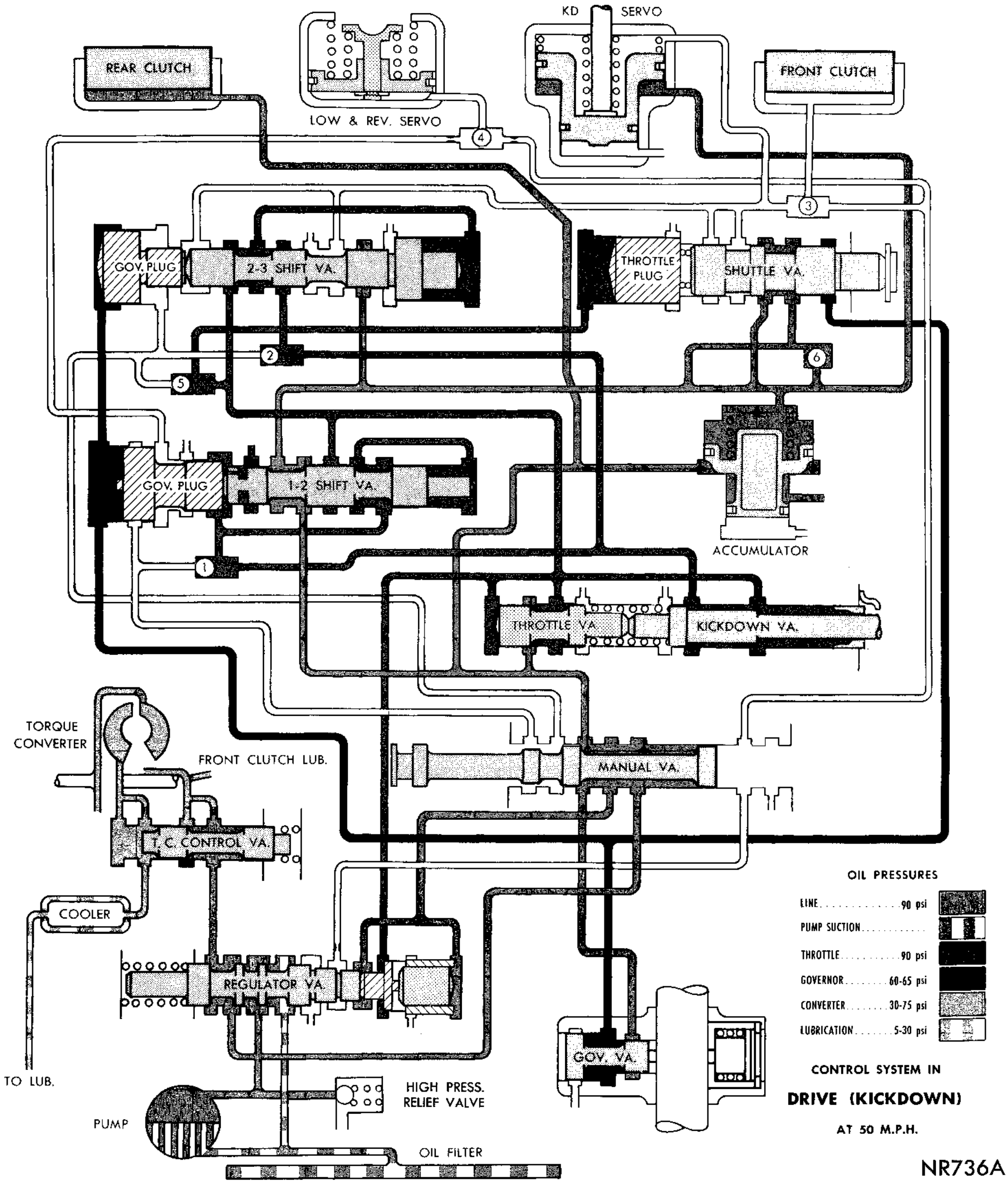
Drive-Breakaway Hydraulic Circuits



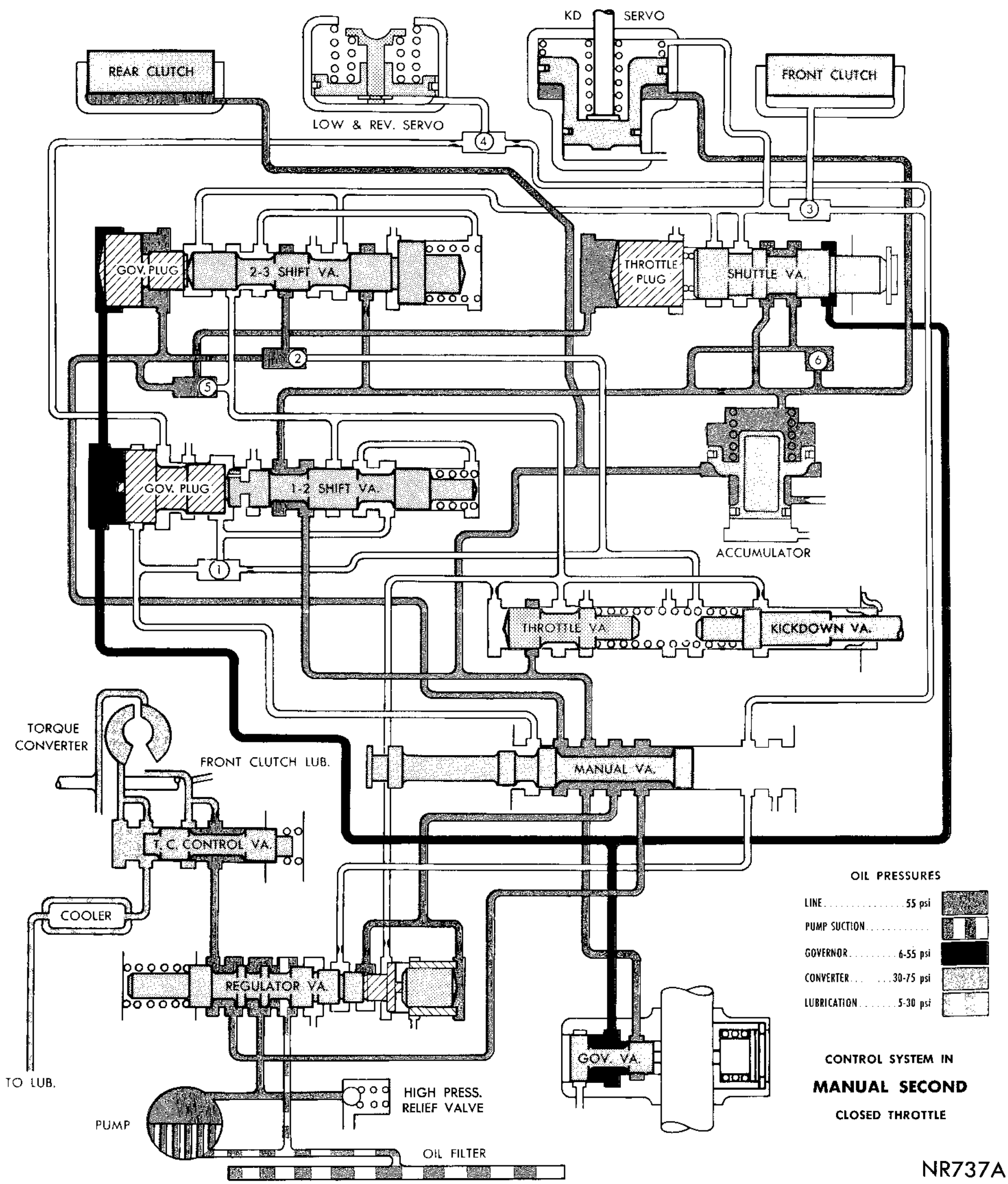
Drive-Second Hydraulic Circuits



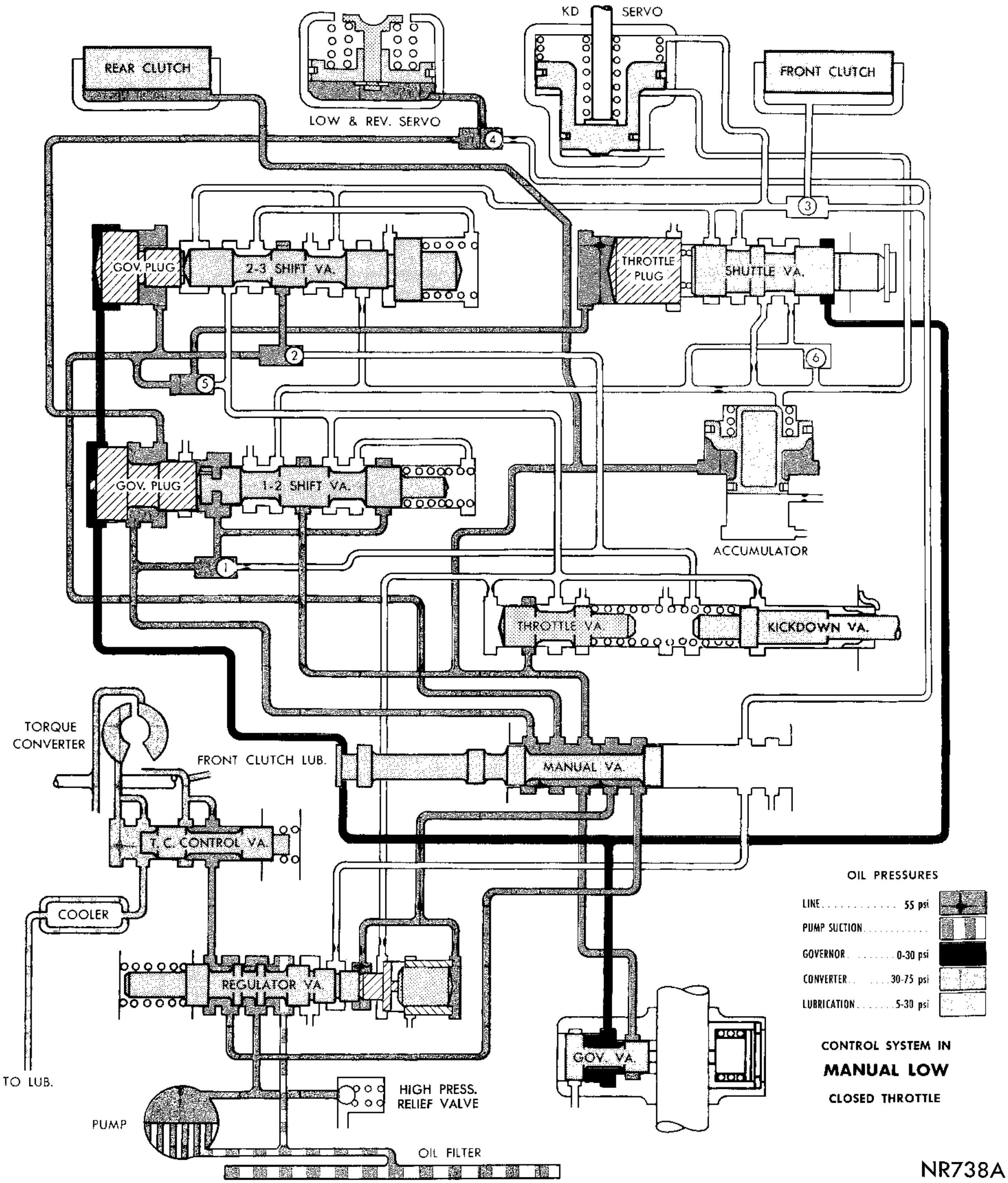
Drive-Direct Hydraulic Circuits



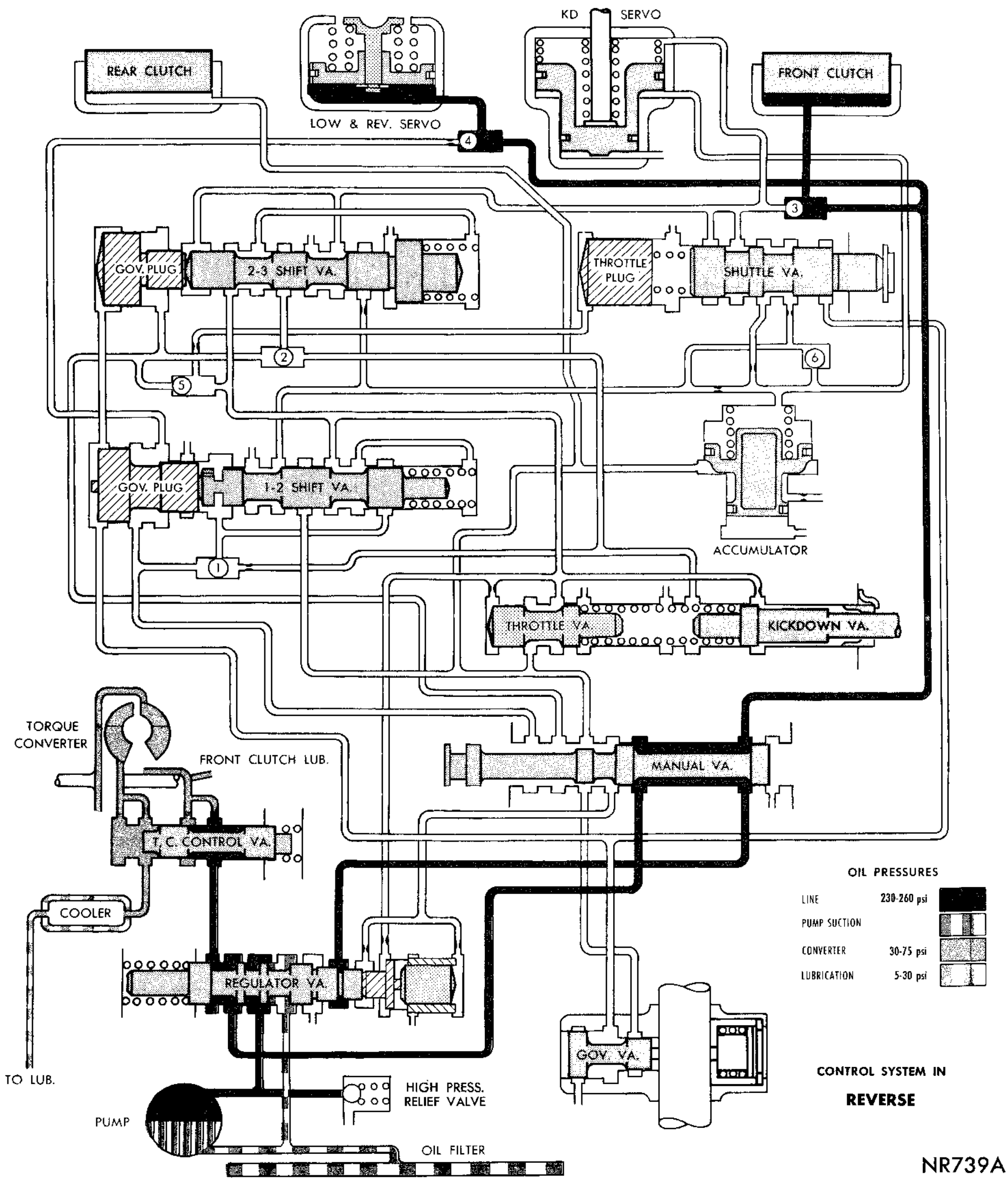
Drive-Kickdown Hydraulic Circuits



Selector Lever Second—Hydraulic Circuits



Selector Lever Low—Hydraulic Circuits



Reverse Hydraulic Circuits

HYDRAULIC CONTROL SYSTEM

The hydraulic control circuits on pages 3 through 10 show the position of the various valves with color coded passages to indicate those under hydraulic pressure for all operations of the transmission.

The hydraulic control system makes the transmission fully automatic, and has four important functions to perform. In a general way, the components of any automatic control system may be grouped into the following basic groups:

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

Taking each of these basic groups or systems in turn, the control system may be described as follows:

Pressure Supply System

The pressure supply system consists of an oil pump driven by the engine through the torque converter. The single front pump furnishes pressure for all the hydraulic and lubrication requirements.

Pressure Regulating Valves

The pressure regulating valves consist of a regulator valve which controls line pressure at a value dependent on throttle opening.

The torque converter control valve maintains torque converter operating pressure and transmission lubricating pressure.

The governor valve transmits regulated pressure to the transmission (in conjunction with throttle pressure) to control upshift and downshift speeds.

The throttle valve transmits regulated pressure to the transmission (in conjunction with governor pressure) to control upshift and downshift speeds.

Flow Control Valves

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

The 1-2 shift valve automatically shifts the transmission from low to second or from second to low depending on the vehicle operation.

The 2-3 shift valve automatically shifts the transmission from second to direct or from direct to second depending on the vehicle operation.

The kickdown valve makes possible a forced downshift from direct to second-second to breakaway or direct to breakaway (depending on vehicle speed) by depressing the accelerator pedal past the detent "feel" near wide open throttle.

The shuttle valve has two separate functions and performs each independently. The first is that of providing fast release of the kickdown band, and smooth front 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 servo and band when making direct to second kickdowns.

Clutches, Band Servos and Accumulator

The front and rear clutch pistons, and both servo

CLUTCH ENGAGEMENT AND BAND APPLICATION CHART

Lever Position Drive-Ratio	Front Clutch	Rear Clutch	Front (Kickdown) Band	Rear (Low-Rev) Band	Overrunning Clutch
N-NEUTRAL	DISENGAGED	DISENGAGED	RELEASED	RELEASED	NO MOVEMENT
D-DRIVE (Breakaway) 2.45 to 1	DISENGAGED	ENGAGED	RELEASED	RELEASED	HOLDS
(Second) 1.45 to 1	DISENGAGED	ENGAGED	APPLIED	RELEASED	OVER RUNS
(Direct) 1.00 to 1	ENGAGED	ENGAGED	RELEASED	RELEASED	OVER RUNS
KICKDOWN (To Second) 1.45 to 1	DISENGAGED	ENGAGED	APPLIED	RELEASED	OVER RUNS
(To Low) 2.45 to 1)	DISENGAGED	ENGAGED	RELEASED	RELEASED	HOLDS
2-Second 1.45 to 1	DISENGAGED	ENGAGED	APPLIED	RELEASED	OVER RUNS
1-LOW 2.45 to 1	DISENGAGED	ENGAGED	RELEASED	APPLIED	PARTIAL HOLD
R-REVERSE 2.20 to 1	ENGAGED	DISENGAGED	RELEASED	APPLIED	NO MOVEMENT

SHIFT PATTERN SUMMARY CHART

Condition	Car Speed To Axle Ratios Chrysler 2.76:1	Chrysler 3.23:1	Imperial 2.94:1
Closed Throttle 1-2 Upshift	8-14	7-13	7-12
Closed Throttle 2-3 Upshift	14-19	13-18	12-16
Wide Open Throttle 1-2 Upshift	33-52	31-49	28-44
Wide Open Throttle 2-3 Upshift	77-90	72-85	66-77
3-2 Kickdown Limit	66-31	62-76	56-69
3-1 Kickdown Limit	30-34	28-32	25-29
Closed Throttle Downshift	6-13	6-12	5-11

pistons are moved hydraulically to engage the clutches and apply the bands. The pistons are released by spring tension when hydraulic pressure is released. On the 2-3 upshift, the kickdown servo piston is released by spring tension and hydraulic pressure.

The accumulator controls the hydraulic pressure on the apply side of the kickdown servo during the 1-2 shift; thereby, cushioning the kickdown band application at any throttle position.

OPERATING INSTRUCTIONS

The transmission will automatically upshift and downshift at approximately the miles per hour given in the Shift Pattern Summary Chart. **All shift speeds given in the "Chart" may vary somewhat due to production tolerances and rear axle ratios. The quality of the shifts is very important. All shifts should be smooth, responsive, and with no noticeable engine runaway.**

Gearshift and Parking Lock Controls

The transmission is controlled by a "lever type" gearshift incorporated within the steering column. The control has six selector lever positions: P (park), R (reverse), N (neutral), D (drive), 2 (second) and 1 (low). Some vehicles are equipped with a "lever type" console gearshift which has the same selector lever positions. The parking lock is applied by moving the selector lever past a gate to the P position.

CAUTION: Never apply the parking lock until the vehicle has stopped; otherwise, a severe ratcheting noise will occur.

Starting Engine

The engine will start with the selector lever in either the P (park) or N (neutral) positions.

(1) As a safety precaution when starting in the N (neutral) position, apply the parking or foot brake.

(2) Depress the accelerator pedal one-third of travel to insure proper choke operation.

(3) Turn the ignition key all the way to the right to START position. When the engine starts, release the key and it will return to the ON position.

The TorqueFlite transmission will not permit starting the engine by pushing or towing.

Mountain Driving

When driving in the mountains with either heavy loads or when pulling trailers, the 2 (second) or 1 (low) position should be selected on upgrades which requires heavy throttle for 1/2 mile or more. This reduces the possibility of overheating the transmission and converter under these conditions.

Towing Vehicle

Transmission Inoperative: Tow the vehicle with a rear end pickup or remove the propeller shaft.

Transmission Operating Properly: The vehicle may be towed safely in N (neutral) with rear wheels on the ground at a speed not to exceed 30 mph. **If the vehicle is to be towed for extended distances, it should be done with a rear end pickup or the propeller shaft removed.** Because the transmission receives lubrication only when the engine is running, **it is good practice to always tow a disabled vehicle with a rear end pickup** or remove the propeller shaft.

SERVICE DIAGNOSIS

The transmission should not be removed nor disassembled until a careful diagnosis is made, the definite cause determined and all possible external corrections performed. In diagnosing any abnormal shift condition, always make the hydraulic pressure tests before disassembly or replacement of parts.

Condition	Possible Cause	Correction
HARSH ENGAGEMENT IN D, 1, 2 AND R	(a) Engine idle speed too high.	(a) Adjust engine idle speed to specifications. Re-adjust throttle linkage.
	(b) Hydraulic pressures too high or low.	(b) Inspect fluid level, then perform hydraulic pressure tests and adjust to specifications.

Condition	Possible Cause	Correction
	(c) Low-reverse band out of adjustment.	(c) Adjust low-reverse band.
	(d) Valve body malfunction or leakage.	(d) Perform pressure tests to determine cause and correct as required.
	(e) Accumulator sticking, broken rings or spring.	(e) Inspect accumulator for sticking, broken rings or spring. Repair as required.
	(f) Low-reverse servo, band or linkage malfunction.	(f) Inspect servo for damaged seals, binding linkage of faulty band lining. Repair as required.
	(g) Worn or faulty front and/or rear clutch.	(g) Disassemble and inspect clutch. Repair or replace as required.
DELAYED ENGAGEMENT IN D, 1, 2, AND R	(a) Low fluid level.	(a) Refill to correct level with Automatic Transmission Fluid, AQ-ATF, Suffix A. or (Dexron).
	(b) Incorrect gearshift control linkage adjustment.	(b) Adjust control linkage.
	(c) Hydraulic pressures too high or low.	(c) Perform hydraulic pressure tests and adjust to specifications.
	(d) Oil filter clogged.	(d) Replace oil filter.
	(e) Valve body malfunction or leakage.	(e) Perform pressure tests to determine cause and correct as required.
	(f) Accumulator sticking, broken rings or spring.	(f) Inspect accumulator for sticking, broken rings or spring. Repair as required.
	(g) Clutches or servos sticking or not operating.	(g) Remove valve body assembly and perform air pressure tests. Repair as required.
	(h) Faulty oil pump.	(h) Perform hydraulic pressure tests. Adjust and repair as required.
	(i) Worn or faulty front and/or rear clutch.	(i) Disassemble and inspect clutch. Repair or replace as required.
	(j) Worn or broken input shaft and/or reaction shaft support seal rings.	(j) Inspect and replace seal rings as required, also inspect respective bores for wear. Replace parts as required.
	(k) Aerated fluid.	(k) Inspect for air leakage into pump suction passages.
RUNAWAY OR HARSH UPSHIFT AND 3-2 KICKDOWN	(a) Low fluid level.	(a) Refill to correct level with Automatic Transmission Fluid, AQ-ATF, Suffix A. or (Dexron).
	(b) Incorrect throttle linkage adjustment.	(b) Adjust throttle linkage.
	(c) Hydraulic pressures too high or low.	(c) Perform hydraulic pressure tests and adjust to specifications.
	(d) Kickdown band out of adjustment.	(d) Adjust kickdown band.
	(e) Valve body malfunction or leakage.	(e) Perform pressure tests to determine cause and correct as required.
	(f) Governor malfunction.	(f) Inspect governor and repair as required.
	(g) Accumulator sticking, broken rings or spring.	(g) Inspect accumulator for sticking, broken rings or spring. Repair as required.
	(h) Clutches or servos sticking or not operating.	(h) Remove valve body assembly and perform air pressure tests. Repair as required.
	(i) Kickdown servo, band or linkage malfunction.	(i) Inspect servo for sticking, broken seal rings, binding linkage or faulty band lining. Repair as required.
	(j) Worn or faulty front clutch.	(j) Disassemble and inspect clutch. Repair or replace as required.
	(k) Worn or broken input shaft and/or reaction shaft support seal rings.	(k) Inspect and replace seal rings as required, also inspect respective bores for wear. Replace parts as required.

Condition	Possible Cause	Correction
NO UPSHIFT	(a) Low fluid level.	(a) Refill to correct level with Automatic Transmission Fluid, AQ-ATF, Suffix A. or (Dexron).
	(b) Incorrect throttle linkage adjustment.	(b) Adjust throttle linkage.
	(c) Kickdown band out of adjustment.	(c) Adjust kickdown band.
	(d) Hydraulic pressures too high or low.	(d) Perform hydraulic pressure tests and adjust to specifications.
	(e) Governor sticking or leaking.	(e) Remove and clean governor. Replace parts if necessary.
	(f) Valve body malfunction or leakage.	(f) Perform pressure tests to determine cause and correct as required.
	(g) Clutches or servos sticking or not operating.	(g) Remove valve body assembly and perform air pressure tests. Repair as required.
	(h) Faulty oil pump.	(h) Perform hydraulic pressure tests, adjust or repair as required.
	(i) Kickdown servo, band or linkage malfunction.	(i) Inspect servo for sticking, broken seal rings, binding linkage or faulty band lining. Repair as required.
	(j) Worn or faulty front clutch.	(j) Disassemble and inspect clutch. Repair or replace as required.
	(k) Worn or broken input shaft and/or reaction shaft support seal rings.	(k) Inspect and replace seal rings as required, also inspect respective bores for wear. Replace parts as required.
NO KICKDOWN OR NORMAL DOWNSHIFT	(a) Incorrect throttle linkage adjustment.	(a) Adjust throttle linkage.
	(b) Incorrect gearshift control linkage adjustment.	(b) Adjust control linkage.
	(c) Kickdown band out of adjustment.	(c) Adjust kickdown band.
	(d) Hydraulic pressures too high or low.	(d) Perform hydraulic pressure tests and adjust to specifications.
	(e) Governor sticking or leaking.	(e) Remove and clean governor. Replace parts if necessary.
	(f) Valve body malfunction or leakage.	(f) Perform pressure tests to determine cause and correct as required.
	(g) Clutches or servos sticking or not operating.	(g) Remove valve body assembly and perform air pressure tests. Repair as required.
	(h) Kickdown servo, band or linkage malfunction.	(h) Inspect servo for sticking, broken seal rings, binding linkage or faulty band lining. Repair as required.
	(i) Overrunning clutch not holding.	(i) Disassemble transmission and repair overrunning clutch as required.
SHIFTS ERRATIC	(a) Low fluid level.	(a) Refill to correct level with Automatic Transmission Fluid, AQ-ATF, Suffix A. or (Dexron).
	(b) Aerated fluid.	(b) Inspect for air leakage into pump suction passages.
	(c) Incorrect throttle linkage adjustment.	(c) Adjust throttle linkage.
	(d) Incorrect gearshift control linkage adjustment.	(d) Adjust control linkage.
	(e) Hydraulic pressures too high or low.	(e) Perform hydraulic pressure tests and adjust to specifications.
	(f) Governor sticking or leaking.	(f) Remove and clean governor. Replace parts if necessary.
	(g) Oil filter clogged.	(g) Replace oil filter.
	(h) Valve body malfunction or leakage.	(h) Perform pressure tests to determine cause and correct as required.
	(i) Clutches or servos sticking or not operating.	(i) Remove valve body assembly and perform air pressure tests. Repair as required.
	(j) Faulty oil pump.	(j) Perform hydraulic pressure tests, adjust or repair as required.

Condition	Possible Cause	Correction
	(k) Worn or broken input shaft and/or reaction shaft support seal rings.	(k) Inspect and replace seal rings as required, also inspect respective bores for wear. Replace parts as required.
SLIPS IN FORWARD DRIVE POSITIONS	(a) Low fluid level.	(a) Refill to correct level with Automatic Transmission Fluid, AQ-ATF, Suffix A. or (Dexron).
	(b) Aerated fluid.	(b) Inspect for air leakage into pump suction passages.
	(c) Incorrect throttle linkage adjustment.	(c) Adjust throttle linkage.
	(d) Incorrect gearshift control linkage adjustment.	(d) Adjust control linkage.
	(e) Hydraulic pressures too low.	(e) Perform hydraulic pressure tests and adjust to specifications.
	(f) Valve body malfunction or leakage.	(f) Perform pressure tests to determine cause and correct as required.
	(g) Accumulator sticking, broken rings or spring.	(g) Inspect accumulator for sticking, broken rings or spring. Repair as required.
	(h) Clutches or servos sticking or not operating.	(h) Remove valve body assembly and perform air pressure tests. Repair as required.
	(i) Worn or faulty front and/or rear clutch.	(i) Disassemble and inspect clutch. Repair or replace as required.
	(j) Overrunning clutch not holding.	(j) Disassemble transmission and repair overrunning clutch as required.
	(k) Worn or broken input shaft and/or reaction shaft support seal rings.	(k) Inspect and replace seal rings as required, also inspect respective bores for wear. Replace parts as required.
SLIPS IN REVERSE ONLY	(a) Low fluid level.	(a) Refill to correct level with Automatic Transmission Fluid, AQ-ATF, Suffix A. or (Dexron).
	(b) Aerated fluid.	(b) Inspect for air leakage into pump suction passages.
	(c) Incorrect gearshift control linkage adjustment.	(c) Adjust control linkage.
	(d) Hydraulic pressures too high or low.	(d) Perform hydraulic pressure tests and adjust to specifications.
	(e) Low-reverse band out of adjustment.	(e) Adjust low-reverse band.
	(f) Valve body malfunction or leakage.	(f) Perform pressure tests to determine cause and correct as required.
	(g) Front clutch or rear servo, sticking or not operating.	(g) Remove valve body assembly and perform air pressure tests. Repair as required.
	(h) Low-reverse servo, band or linkage malfunction.	(h) Inspect servo for damaged seals, binding linkage or faulty band lining. Repair as required.
	(i) Faulty oil pump.	(i) Perform hydraulic pressure tests, adjust or repair as required.
SLIPS IN ALL POSITIONS	(a) Low fluid level.	(a) Refill to correct level with Automatic Transmission Fluid, AQ-ATF, Suffix A. or (Dexron).
	(b) Hydraulic pressures too low.	(b) Perform hydraulic pressure tests and adjust to specifications.
	(c) Valve body malfunction or leakage.	(c) Perform pressure tests to determine cause and correct as required.
	(d) Faulty oil pump.	(d) Perform hydraulic pressure tests, adjust or replace as required.
	(e) Clutches or servos sticking or not operating.	(e) Remove valve body assembly and perform air pressure tests. Repair as required.
	(f) Worn or broken input shaft and/or reaction shaft support seal rings.	(f) Inspect and replace seal rings as required, also inspect respective bores for wear. Replace parts as required.

Condition	Possible Cause	Correction
NO DRIVE IN ANY POSITION	(a) Low fluid level.	(a) Refill to correct level with Automatic Transmission Fluid, AQ-ATF, Suffix A. or (Dexron).
	(b) Hydraulic pressures too low.	(b) Perform hydraulic pressure tests and adjust to specifications.
	(c) Oil filter clogged.	(c) Replace oil filter.
	(d) Valve body malfunction or leakage.	(d) Perform pressure tests to determine cause and correct as required.
	(e) Faulty oil pump.	(e) Perform hydraulic pressure tests, adjust or repair as required.
	(f) Clutches or servos sticking or not operating.	(f) Remove valve body assembly and perform air pressure tests. Repair as required.
NO DRIVE IN FORWARD DRIVE POSITIONS	(a) Hydraulic pressures too low.	(a) Perform hydraulic pressure tests and adjust to specifications.
	(b) Valve body malfunction or leakage.	(b) Perform pressure tests to determine cause and correct as required.
	(c) Clutches or servos, sticking or not operating.	(c) Remove valve body assembly and perform air pressure tests. Repair as required.
	(d) Worn or faulty rear clutch.	(d) Disassemble and inspect clutch. Repair or replace as required.
	(e) Overrunning clutch not holding.	(e) Disassemble transmission and repair overrunning clutch as required.
	(f) Worn or broken input shaft and/or reaction shaft support seal rings.	(f) Inspect and replace seal rings as required, also inspect respective bores for wear. Replace parts as required.
NO DRIVE IN REVERSE	(a) Incorrect gearshift control linkage adjustment.	(a) Adjust control linkage.
	(b) Hydraulic pressures too low.	(b) Perform hydraulic pressure tests and adjust to specifications.
	(c) Low-reverse band out of adjustment.	(c) Adjust low-reverse band.
	(d) Valve body malfunction or leakage.	(d) Perform pressure tests to determine cause and correct as required.
	(e) Front clutch or rear servo, sticking or not operating.	(e) Remove valve body assembly and perform air pressure tests. Repair as required.
	(f) Low-reverse servo, band or linkage malfunction.	(f) Inspect servo for damaged seals, binding linkage or faulty band lining. Repair as required.
	(g) Worn or faulty front clutch.	(g) Disassemble and inspect clutch. Repair or replace as required.
DRIVES IN NEUTRAL	(a) Incorrect gearshift control linkage adjustment.	(a) Adjust control linkage.
	(b) Valve body malfunction or leakage.	(b) Perform pressure tests to determine cause and correct as required.
	(c) Rear clutch dragging.	(c) Inspect clutch and repair as required.
DRAGS OR LOCKS	(a) Kickdown band out of adjustment.	(a) Adjust kickdown band.
	(b) Low-reverse band out of adjustment.	(b) Adjust low-reverse band.
	(c) Kickdown and/or low-reverse servo, band, linkage malfunction.	(c) Inspect servo for sticking, broken seal rings, binding linkage or faulty band lining. Repair as required.
	(d) Front and/or rear clutch faulty.	(d) Disassemble and inspect clutch. Repair or replace as required.
	(e) Planetary gear sets broken or seized.	(e) Inspect condition of planetary gear sets and replace as required.
	(f) Overrunning clutch worn, broken or seized.	(f) Inspect condition of overrunning clutch and replace parts as required.
GRATING, SCRAPING GROWLING NOISE	(a) Kickdown band out of adjustment.	(a) Adjust kickdown band.
	(b) Low-reverse band out of adjustment.	(b) Adjust low-reverse band.
	(c) Output shaft bearing and/or bushing damaged.	(c) Remove extension housing and replace bearing and/or bushing.

Condition	Possible Cause	Correction
	(d) Governor support binding or broken seal rings.	(d) Inspect condition of governor support and repair as required.
	(e) Oil pump scored or binding.	(e) Inspect condition of pump and repair as required.
	(f) Front and/or rear clutch faulty.	(f) Disassemble and inspect clutch. Repair or replace as required.
	(g) Planetary gear sets broken or seized.	(g) Inspect condition of planetary gear sets and replace as required.
	(h) Overrunning clutch worn, broken or seized.	(h) Inspect condition of overrunning clutch and replace parts as required.
BUZZING NOISE	(a) Low fluid level.	(a) Refill to correct level with Automatic Transmission Fluid, AQ-ATF, Suffix A. or (Dexron).
	(b) Pump sucking air.	(b) Inspect pump for nicks or burrs on mating surfaces, porous casting, and/or excessive rotor clearance. Replace parts as required.
	(c) Valve body malfunction.	(c) Remove and recondition valve body assembly.
	(d) Overrunning clutch inner race damaged.	(d) Inspect and repair clutch as required.
HARD TO FILL, OIL FLOWS OUT FILLER TUBE	(a) High fluid level.	(a) Drain fluid to correct level.
	(b) Breather clogged.	(b) Inspect and clean breather vent opening in oil pump housing.
	(c) Oil filter clogged.	(c) Replace oil filter.
	(d) Aerated fluid.	(d) Inspect for air leakage into pump suction passage.
OIL LEAKAGE	(a) Speedometer Adaptor	(a) Replace rubber "O" ring seal. Inspect for bore porosity
	(b) Speedometer Drive Pinion Seal	(b) Replace rubber seal
	(c) Oil Pan Gasket	(c) Can often be stopped by tightening the attaching bolts to proper torque (150 in-lbs.). If necessary, replace gasket. Inspect oil pan gasket mounting face for flatness. **Caution:** Do not overtorque pan bolts.
	(d) Fluid Filler Tube	(d) Replace "O" ring seal. Inspect for tube damage, and bore porosity.
	(e) Fluid Lines and Fittings	(e) If leakage cannot be stopped by tightening a fitting, replace the defective part.
	(f) Manual Control Lever	(f) Replace either or both the manual lever or throttle lever shaft seal.
	(g) Pipe Plugs	(g) Torque to specified torque. If leak persists, replace plug.
	(h) Rear Extension Seal	(h) Check for O.D. Bore damage and replace seal.
	(i) Rear Bearing Access Plate	(i) Replace gasket
	(j) Extension Bolts	(j) Replace bolt
	(k) Extension Gasket	(k) Replace gasket and check for sealing surface damage on case and extension
	(l) Kickdown Band Adjusting Screw	(l) Apply sealer
	(m) Neutral Switch	(m) Replace switch and/or gasket
	(n) Fluid Leakage in Converter Housing Area	(n) See section on Fluid Leakage
TRANSMISSION OVERHEATS	(a) Low fluid level.	(a) Refill to correct level with Automatic Transmission Fluid, AQ-ATF, Suffix A. or (Dexron).
	(b) Kickdown band adjustment too tight.	(b) Adjust kickdown band.
	(c) Low-reverse band adjustment too tight.	(c) Adjust low-reverse band.
	(d) Faulty cooling system.	(d) Inspect transmission cooling system, clean and repair as required.

Condition	Possible Cause	Correction
	(e) Cracked or restricted oil cooler line or fitting.	(e) Inspect, repair or replace as required.
	(f) Faulty oil pump.	(f) Inspect pump for incorrect clearance, repair as required.
	(g) Insufficient clutch plate clearance in front and/or rear clutches.	(g) Measure clutch plate clearance and correct with proper size snap ring.
STARTER WILL NOT ENERGIZE IN NEUTRAL OR PARK	(a) Incorrect gearshift control linkage adjustment.	(a) Adjust control linkage.
	(b) Faulty or incorrectly adjusted neutral starting switch.	(b) Test operation of switch with a test lamp. Adjust or replace as required.
	(c) Broken lead to neutral switch.	(c) Inspect lead and test with a test lamp. Repair broken lead.

STALL TEST

WARNING: DURING TEST LET NO ONE STAND IN FRONT OF VEHICLE.

The stall test consists of determining the engine speed obtained at full throttle in D position. This test checks the torque converter stator clutch operation, and the holding ability of the transmission clutches. The transmission oil level should be checked and the engine brought to normal operating temperature before stall operation. **Both the parking and service brakes must be fully applied and front wheels blocked while making this test.**

Do not hold the throttle open any longer than is necessary to obtain a maximum engine speed reading, **and never longer than five seconds at a time.** If more than one stall check is required, operate the engine at approximately 1,000 rpm in neutral for 20 seconds to cool the transmission fluid between runs. If engine speed exceeds the maximum limits shown, release the accelerator immediately since transmission clutch slippage is indicated.

STALL SPEED ABOVE SPECIFICATION

If stall speed exceeds the maximum specified in chart by more than 200 rpm, transmission clutch slippage is indicated. Follow the transmission oil pressure and air pressure checks outlined in the Service on Vehicle section to determine the cause of slippage.

STALL SPEED BELOW SPECIFICATION

Low stall speeds **with a properly tuned engine** indicate torque converter stator clutch problems. A road test will be necessary to identify the exact problem.

If stall speeds are 250-350 rpm below specification, and the vehicle operates properly at highway speeds, but has poor through-gear acceleration, the stator overrunning clutch is slipping.

If stall speed and acceleration are normal, but abnormally high throttle opening is required to maintain highway speeds, the stator clutch has seized.

Both of these stator defects require replacement of the torque converter.

NOISE

A whining or siren-like noise due to fluid flow is normal during stall operation with some converters; however, loud metallic noises from loose parts or interference within the assembly indicate a defective torque converter. To confirm that the noise originates within the converter, operate the vehicle at light throttle in D and N on a hoist and listen under the transmission bell housing.

STALL SPEED SPECIFICATION CHART

Engine Model (C.I.D.)	Transmission Type	Engine Speed (RPM)
383-2 BBL.	A727	1850-2100
383-4 BBL.	A727	2350-2650
440-4 BBL.	A727	2000-2300

SERVICE PROCEDURES

SERVICE IN VEHICLE

Various transmission components can be removed for repairs without removing the transmission from vehicle. The removal, reconditioning and installation procedures for these components are covered here, except valve body reconditioning, which is described on Page 34.

ALUMINUM THREAD REPAIR

Damaged or worn threads in the aluminum transmission case and valve body can be repaired by the use of Heli-Coils. Essentially, this repair consists of drilling out the worn or damaged threads, tapping the hole with a special Heli-Coil Tap, and installing a Heli-Coil Insert into the tapped hole. This brings the

Heli-Coil Insert			Drill	Tap	Inserting Tool	Extracting Tool
Thread Size	Part No.	Insert Length	Size	Part No.	Part No.	Part No.
10-24	1185-3	.285″	13/64″ (.203″)	3 CPB	528-3N	1227-6
1/4-20	1185-4	3/8″	17/64″ (.265″)	4 CPB	528-4N	1227-6
5/16-18	1185-5	15/32″	Q (.332″)	5 CPB	528-5N	1227-6
3/8-16	1185-6	9/16″	X (.397″)	6 CPB	528-6N	1227-6
7/16-14	1185-7	21/32″	29/32″ (.453″)	7 CPB	528-7N	1227-16

hole back to its original thread size.

The chart lists the threaded hole sizes which are used in the aluminum case and valve body, and the necessary tools and inserts for the repair of damaged or worn threads. Heli-Coil tools and inserts are readily available from most automotive parts jobbers. **Some thread drag may occur in screwing a bolt into the installed Heli-Coil insert. Therefore, a torque reading should be taken of the thread drag with an inch-pound torque wrench and added to the specified bolt torque, so that all bolts securing a particular part will be tightened to the same torque.**

LUBRICATION

The transmission fluid and filter should provide satisfactory lubrication and protection to the automatic transmission and no change is recommended in vehicles used in normal service. Regularly scheduled fluid and filter changes, therefore will not be required, except when the operation of the vehicle is classified as severe.

If, for any reason, the factory fill fluid is replaced with another fluid, the fluid must be changed every three years or 36,000 miles in normal service.

Fluid Level

Inspect fluid level every six months with engine and transmission at normal operating temperature. Refer to "Lubrication and Maintenance", Group 0. The transmission should not be idled in gear for long periods.

Trailer Towing Service and Hard Usage

If vehicle is used for trailer towing or is used in hard or severe service, more frequent servicing is required as outlined.

Drain and refill transmission and replace filter initially at 36,000 miles or 3 years and every 12,000 miles or 12 months thereafter.

Drain and Refill

(1) Raise vehicle on a hoist. Place a drain container with a large opening, under the transmission oil pan.

(2) Loosen pan bolts, tap pan to break it loose allowing fluid to drain, then remove the oil pan.

(3) Remove access plate from in front of converter, remove drain plug allowing the fluid to drain (Fig. 2). Install and tighten converter drain plug to 110 inch-pounds, and install the access plate.

(4) If necessary, adjust the reverse band.

(5) Install a new filter on bottom of the valve body, and tighten retaining screws to 35 inch-pounds.

(6) Clean the oil pan, and reinstall using a new gasket. Tighten pan bolts to 150 inch-pounds.

(7) Pour six quarts of Automatic Transmission Fluid, AQ-ATF Suffix "A" (Dexron) into the transmission.

(8) Start engine and allow to idle for at least two minutes. With parking brake on, move selector lever momentarily to each position ending in the neutral position.

(9) Add sufficient fluid to bring fluid level to the "ADD ONE PINT" mark.

(10) Recheck fluid level after transmission is at normal operating temperature. The level should be between the "FULL" mark and "ADD ONE PINT" mark (Fig. 3).

CAUTION: To prevent dirt from entering transmission, make certain that dip stick cap is fully seated onto the filler tube.

GEARSHIFT LINKAGE ADJUSTMENT (Column Shift) (Fig. 4)

(1) Assemble all linkage parts leaving adjustable rod end free.

(2) Place gearshift selector lever in PARK position and lock steering column with ignition key.

(3) Move shift control lever on transmission all the way to rear (in PARK detent) (Fig. 5).

(4) Set adjustable rod to proper length and install with no load in either direction on linkage.

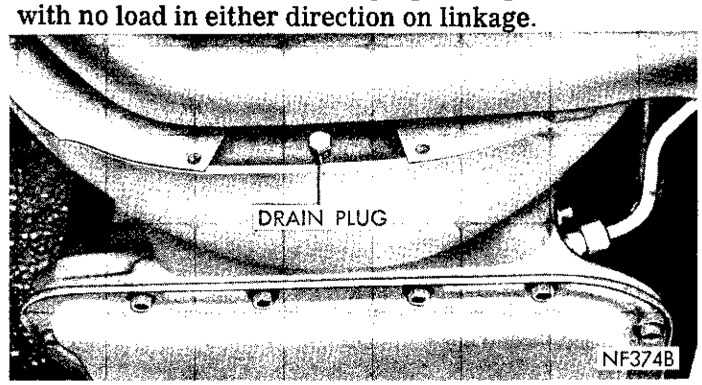


Fig. 2—Converter Drain Plug

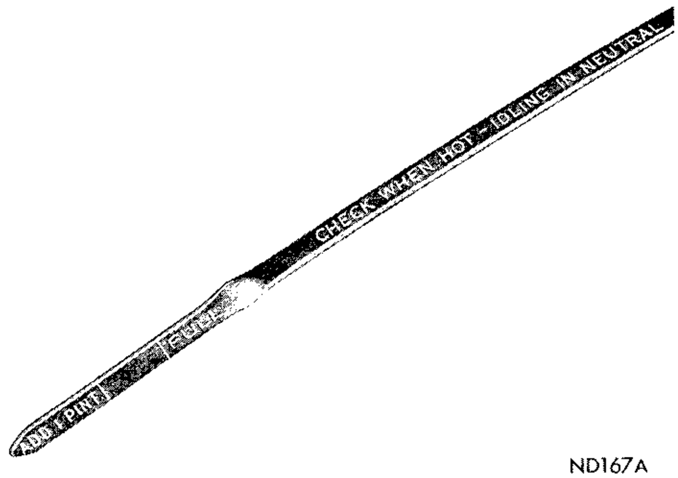


Fig. 3—Dip Stick Markings

(5) Check Adjustment as follows:

(a) Shift effort must be free and detents feel crisp. All gate stops must be positive.

(b) Detent position must be close enough to gate stops in neutral and drive to assure that hand lever will not remain out of detent position when placed against gate and then released.

(c) Key start must occur with shift lever held down against the park gate.

LINKAGE ADJUSTMENT (Console Shift) (Fig. 8)

(1) Assemble all linkage parts leaving adjustable rod ends free.

(2) At steering column upper end, line up locating slots in bottom of shift housing and bearing housing. Install suitable tool to hold this alignment and lock column with ignition key.

(3) Place console lever in PARK and move shift control lever on transmission all the way to the rear (in PARK detent).

(4) Set adjustable rods to proper length with no load applied in either direction on linkage.

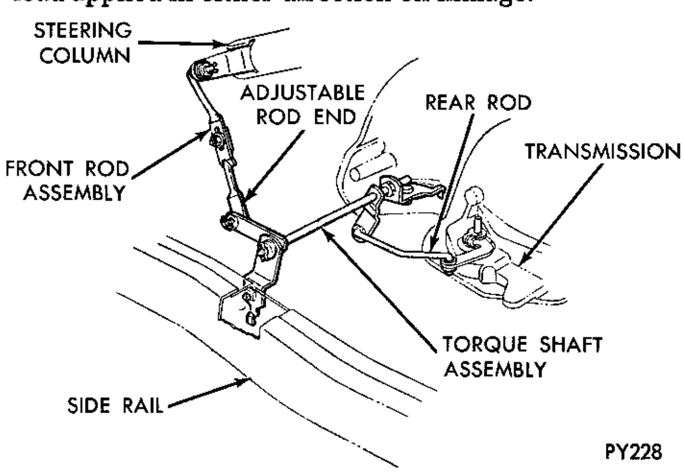


Fig. 4—Gearshift Linkage

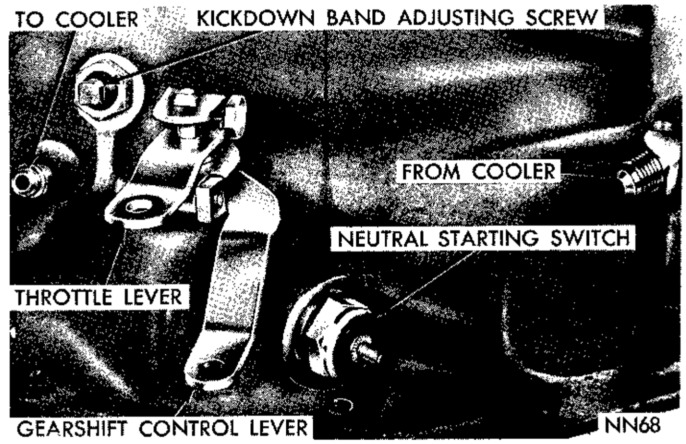


Fig. 5—External Controls and Adjustments

(5) Check adjustment as follows:

(a) Shift effort should be free enough so detents feel crisp.

(b) Detent position must be close enough to gate stops in neutral and drive to assure that hand lever will not remain out of detent position when placed against gate and then released.

(c) Key start and locking must occur with shift lever held back against the park gate.

(6) If console removal is required, disconnect battery ground cable. Remove set screw and shift knob or handle. Proceed as outlined in Body Section 23.

(7) After console is in place, install shift knob as follows: with gearship lever in NEUTRAL, thread button, spring and knob assembly on the cable end until dimension from top of button to top of knob is 13/32" (Fig. 6). Secure knob with set screw.

(8) Connect battery ground cable.

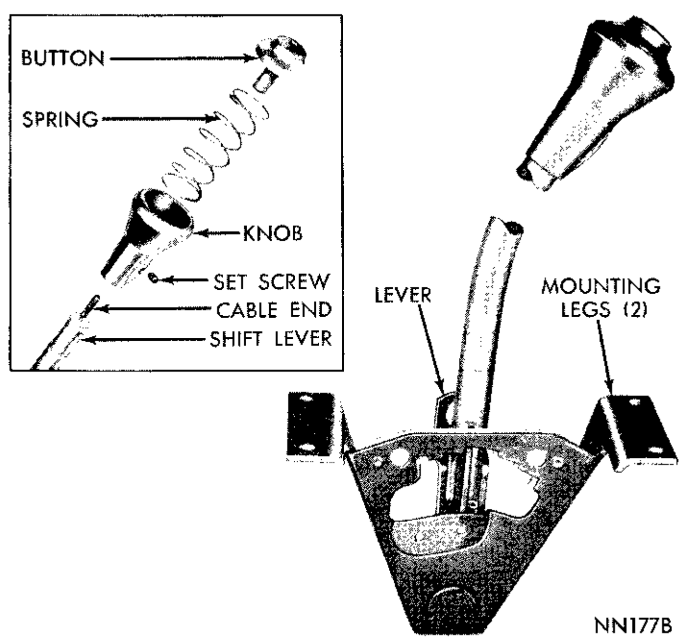


Fig. 6—Console Gearshift Unit

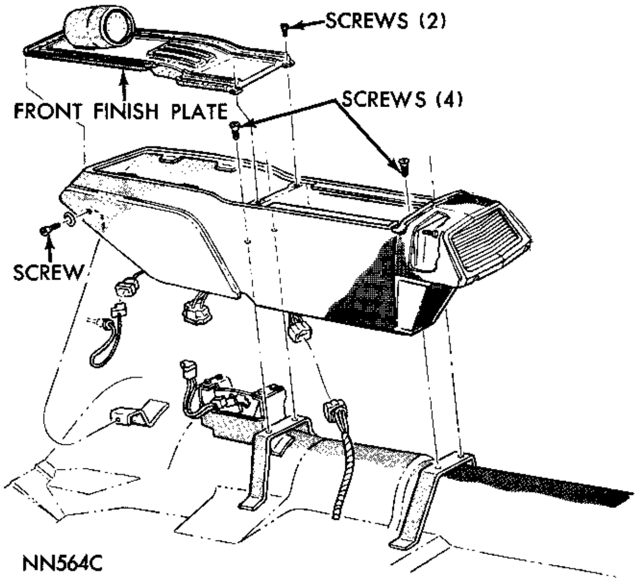


Fig. 7—Removing or Installing Console

BACK-UP LIGHT AND NEUTRAL STARTING SWITCH (Fig. 9 and 10)

Replacement and Test

The **Neutral Starting Switch** is the center terminal of the 3 terminal switch. It provides ground for the starter solenoid circuit through the selector lever cam in only **Park** and **Neutral** positions.

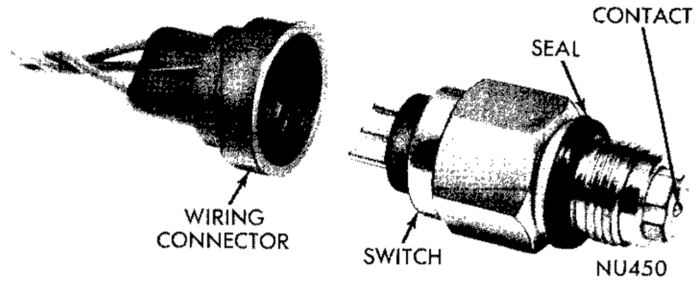


Fig. 9—Neutral-Park Starting Switch and Back-Up Light Switch

(1) To test switch, remove wiring connector from switch and test for continuity between center pin of switch and transmission case. Continuity should exist only when transmission is in **Park** or **Neutral.**

(2) Check gearshift linkage adjustment before replacing a switch which tests bad.

(3) Unscrew switch from transmission case allowing fluid to drain into a container. Move selector lever to **Park** and then to **Neutral** positions, and inspect to see that the switch operating lever fingers are centered in switch opening in the case.

(4) Screw switch and new seal into transmission case and tighten to 24 foot-pounds. Retest switch with the test lamp.

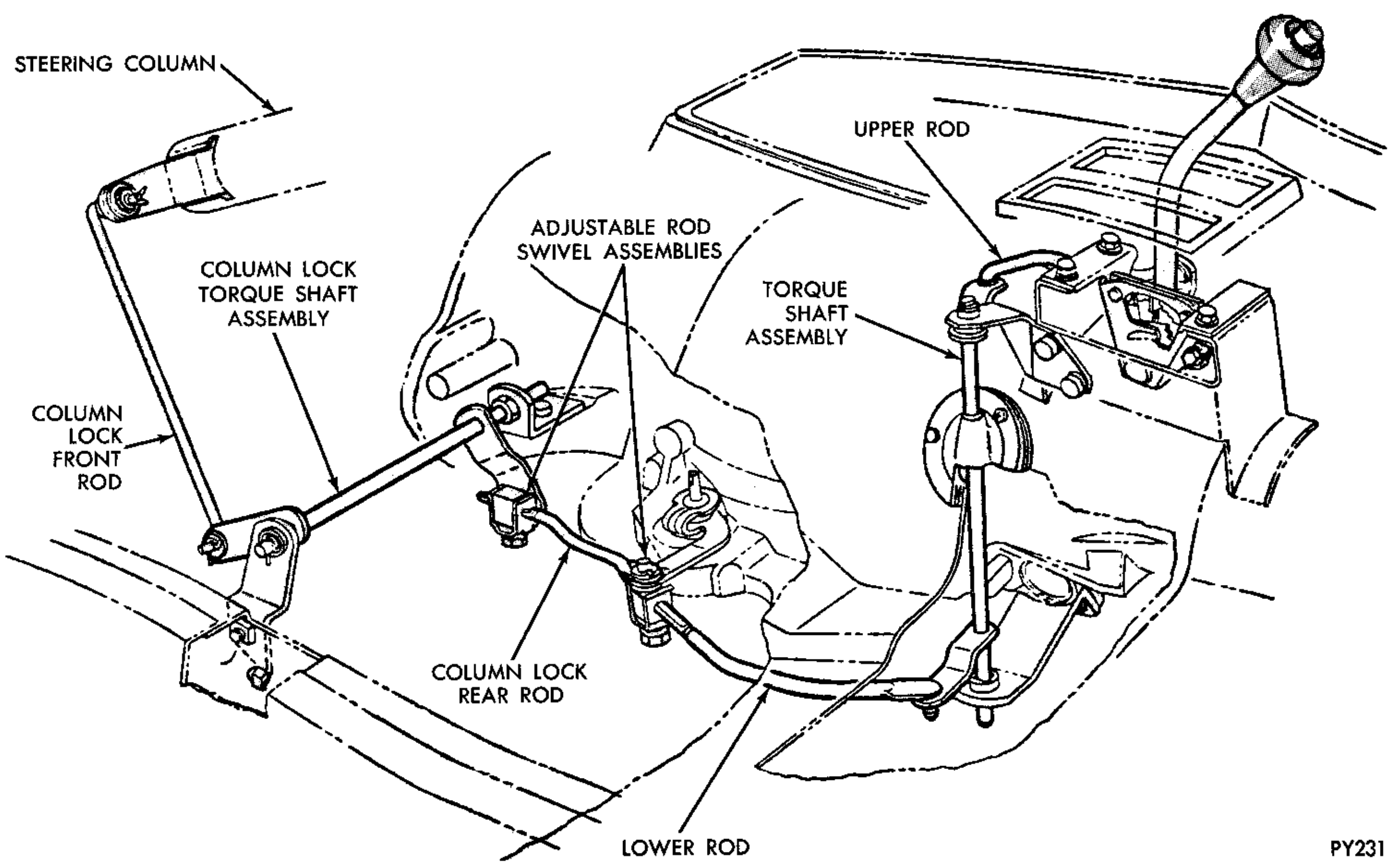


Fig. 8—Console Gearshift Linkage

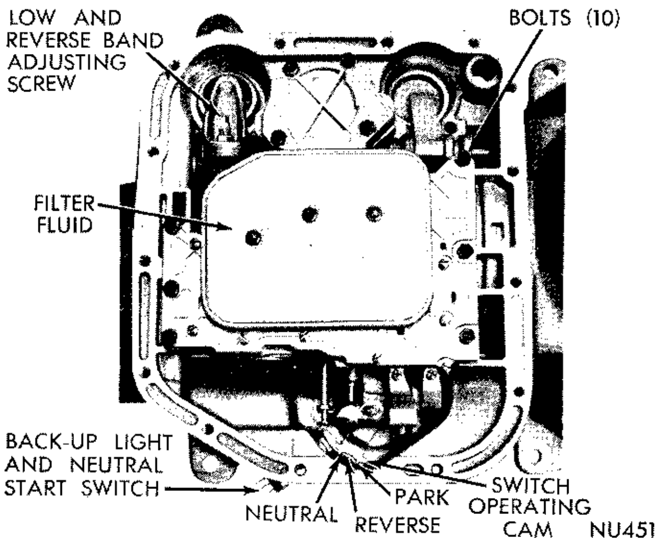


Fig. 10—Bottom View of Transmission (Pan Removed)

(5) Add fluid to transmission to bring up to proper level.

(6) The **Back-Up Light Switch Circuit** is through the two outside terminals of the 3 terminal switch.

(7) To test switch, remove wiring connector from switch and test for continuity between the two outside pins.

(8) Continuity should exist only with transmission in **Reverse** position.

(9) No continuity should exist from either pin to the case.

BAND ADJUSTMENTS

Kickdown Band

The kickdown band adjusting screw is located on left side of transmission case near the throttle lever shaft (Fig. 5).

(1) Loosen lock nut and back off approximately five turns. Inspect adjusting screw for free turning in the transmission case.

(2) Using wrench, Tool C-3380 with adapter C-3705, tighten band adjusting screw 47 to 50 inch-pounds. If adapter C-3705 is not used, tighten adjusting screw to 72 inch-pounds which is the true torque.

(3) Back off adjusting screw 2 turns. Hold adjusting screw in this position and tighten lock nut to 29 foot-pounds.

Low and Reverse Band

(1) Raise vehicle, drain transmission fluid and remove oil pan.

(2) Loosen adjusting screw lock nut and back off nut approximately five turns (Fig. 10). Inspect adjusting screw for free turning in the lever.

(3) Using wrench, Tool C-3380 with adapter C-3705, tighten band adjusting screw to 47 to 50 inch-pounds. If adapter C-3705 is not used, tighten adjusting screw to 72 inch-pounds.

(4) Back off adjusting screw 2 turns. Hold adjusting screw in this position and tighten lock nut to 35 foot-pounds.

(5) Reinstall oil pan using a new gasket. Tighten oil pan bolts to 150 inch-pounds.

(6) Fill transmission with "Automatic Transmission Fluid AQ-ATF Suffix A, (Dexron).

THOTTLE ROD ADJUSTMENT (Fig. 11)

With engine at operating temperature and carburetor off fast idle cam, adjust idle speed of engine using a tachometer. Refer to "Fuel System" Group 14, for idle speed Specifications and carburetor linkage adjustment.

(1) Follow detailed instructions in Lubrication Section for linkage lubrication of all models.

(2) Disconnect choke at carburetor or block choke valve in full open position. Open throttle slightly to release fast idle cam, then return carburetor to curb idle.

(3) Loosen the transmission throttle rod adjustment lock screw.

(4) Hold the transmission lever forward against its stop while adjusting the transmission linkage. (On engines with solenoid idle stops, the solenoid plunger must also be in its fully extended position).

(5) Adjust the transmission rod by pulling forward on the slotted link with a slight effort so that the rear edge of the slot is against the carburetor lever pin. Tighten transmission rod adjustment locking screw.

Note: The slotted link and transmission lever must be held forward while the locking screw is being tightened.

(6) To check transmission linkage freedom of operation, move slotted link to the full rearward position, then allow it to return slowly, making sure it returns to the full forward position.

(7) Loosen carburetor cable clamp nut. Adjust position of cable housing ferrule in the clamp so that all slack is removed from cable with carburetor at curb idle. To remove slack from cable, move ferrule in the clamp in direction away from carburetor lever.

(8) Back off ferrule 1/4". This provides 1/4" free play. Tighten cable clamp nut to 45 inch-pounds.

(9) Connect choke rod or remove blocking fixture.

HYDRAULIC CONTROL PRESSURE TESTS

Line Pressure and Front Servo Release Pressure

Line pressure and front servo release pressure tests must be made in D (drive) position with rear wheels free to turn. The transmission fluid must be at operating temperature (150°F to 200°F).

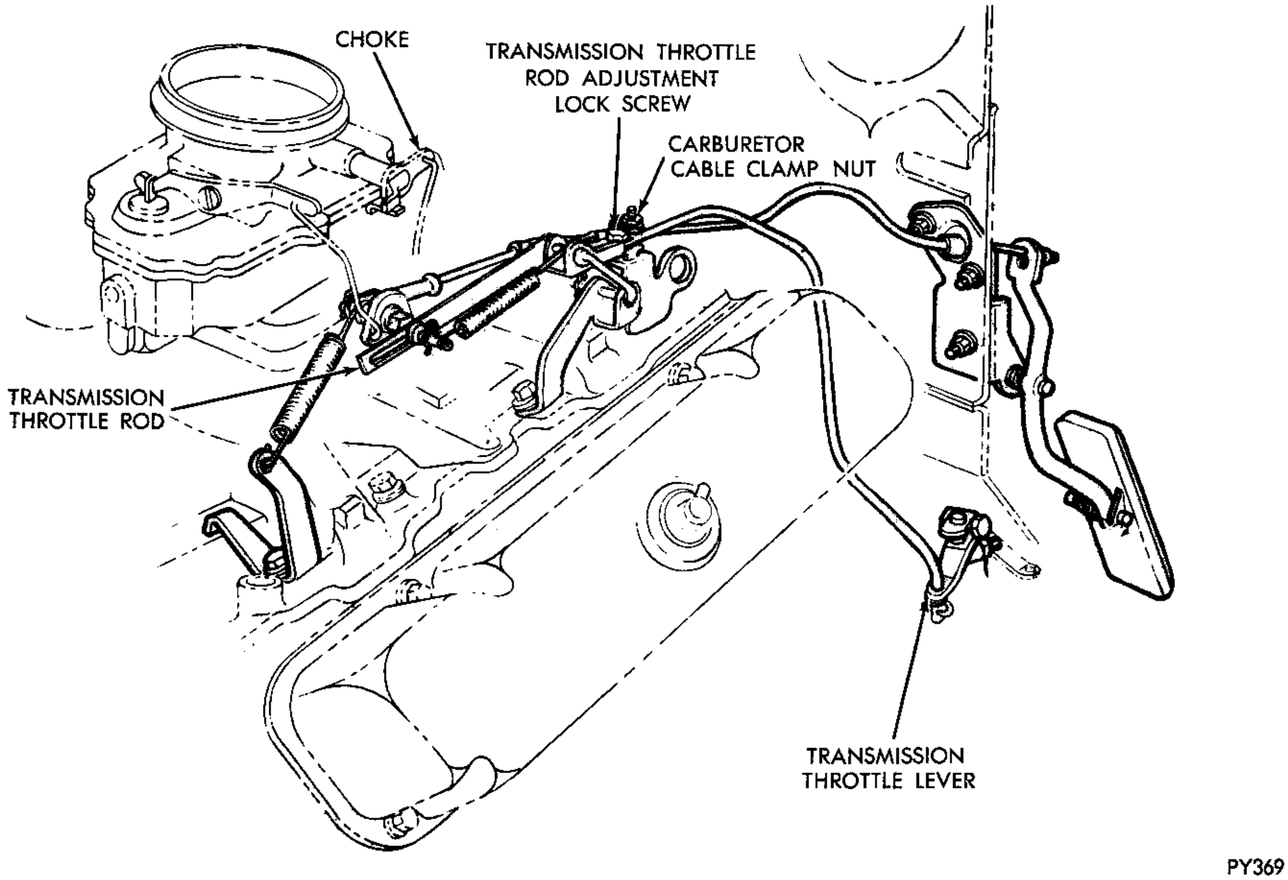


Fig. 11—Throttle Rod Adjustment

(1) Install an engine tachometer, raise vehicle on a hoist and position tachometer so it can be read under the vehicle.

(2) Connect two 0-100 psi pressure gauges, Tool C-3292 to pressure take-off points at side of accumulator and at front servo release (Fig. 12).

(3) With control in D (drive) position, speed up engine slightly until transmission shifts into direct. (Front servo release will be pressurized in direct.) Reduce engine speed slowly to 1,000 rpm. Line pressure at this time (1,000 rpm) must be 54-60 psi, and front servo release pressure must not be more than 3 psi below line pressure.

(4) Disconnect throttle linkage from transmission throttle lever and move throttle lever gradually to full throttle position. Line pressure must rise to a maximum of 90-96 psi just before or at kickdown into low gear. Front servo release pressure must follow line pressure up to the kickdown point and should not be more than 3 psi below line pressure.

If line pressure is not 54-60 psi at 1,000 rpm, see "Hydraulic Control Pressure Adjustments".

If front servo release pressures are less than pressure specified and line pressures are within limits, there is excessive leakage in front clutch and/or front servo circuits. **Always inspect the external transmission throttle lever for looseness on the valve body shaft when making pressure tests.**

Lubrication Pressures

The lubrication pressure test should be made at same time that line pressure and front servo release pressures are tested.

(1) Install a "tee" fitting between cooler return line fitting and fitting hole in transmission case at rear left side of the transmission case (Fig. 13). Connect a

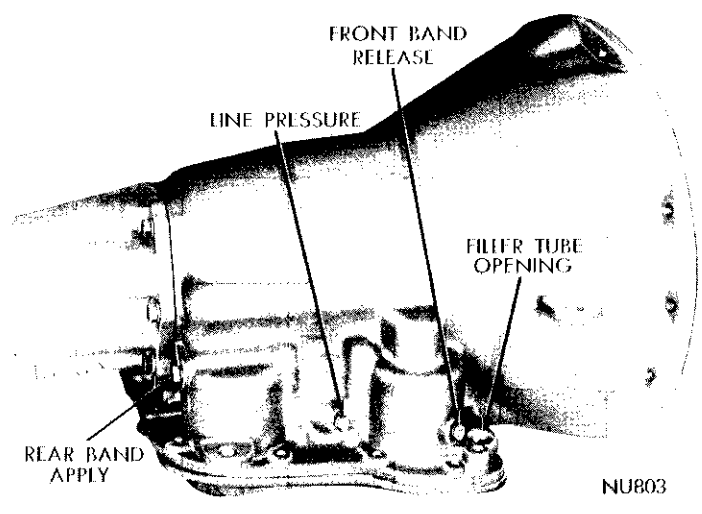


Fig. 12—Pressure Test Locations (Right Side of Case)

0-100 psi pressure gauge, Tool C-3292 to the "tee" fitting.

(2) At 1,000 engine rpm, with throttle closed and transmission in direct, the lubrication pressure should be 5-15 psi. Lubrication pressure will be approximately doubled as throttle is opened to the maximum line pressure.

Rear Servo Apply Pressure

(1) Connect a 0-300 psi pressure gauge, Tool C-3293 to apply pressure take-off point at rear servo (Fig. 13).

(2) With transmission control in R (reverse) position and engine speed set at 1600 rpm, the reverse servo apply pressure should be 230 to 300 psi.

Governor Pressure

(1) Connect a 0-100 psi pressure gauge, Tool C-3292 to governor pressure take-off point, located at lower left side of extension near the mounting flange (Fig. 13).

(2) Governor pressures should fall within the limits given in the "Governor Pressure Chart."

If governor pressures are incorrect at the given vehicle speeds, the governor valve and/or weights are probably sticking.

GOVERNOR PRESSURE CHART

Vehicle Speed To Axle Ratios Chrysler 2.76:1	3.23:1	Imperial 2.94:1	Pressure Limits* psi
20-22	17-19	19-22	15
48-57	41-49	48-57	50
77-85	66-73	77-85	75

*The governor pressure should respond smoothly to changes in m.p.h. and should return to 0 to 1-1/2 psi when the vehicle is stopped. High pressure at standstill (above 2 psi) will prevent the transmission from downshifting.

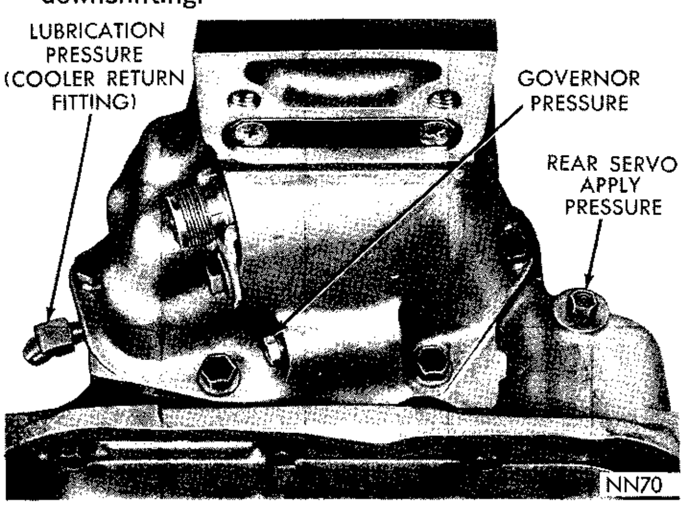


Fig. 13—Pressure Test Locations (Rear End of Case)

Throttle Pressure

No provisions are made to test the throttle pressure. Incorrect throttle pressure should only be suspected if part throttle shift speeds are either very delayed or occur too early in relation to vehicle speeds. In which case, the throttle linkage should be adjusted before throttle pressure setting is adjusted.

HYDRAULIC CONTROL PRESSURE ADJUSTMENTS

Line Pressure

An incorrect throttle pressure setting will cause incorrect line pressure readings even though line pressure adjustment is correct. Always inspect and correct throttle pressure adjustment before adjusting the line pressure. **Before adjusting line pressure, measure distance between the manual valve (valve in 1-low position) and line pressure adjusting screw (Fig. 14). This measurement must be 1-7/8 inches; correct by loosening spring retainer screws and repositioning the spring retainer. The regulator valve may cock and hang up in its bore if spring retainer is out of position.**

If line pressure is not correct, it will be necessary to remove valve body assembly to perform the adjustment.

The approximate adjustment is 1-5/16 inches, measured from valve body to inner edge of the adjusting nut (Fig. 15). However, due to manufacturing tolerances, the adjustment can be varied to obtain specified line pressure.

The adjusting screw may be turned with an Allen wrench. One complete turn of adjusting screw changes closed throttle line pressure approximately 1-2/3 psi. Turning adjusting screw counterclockwise increases pressure, and clockwise decreases pressure.

Throttle Pressure

Throttle pressure cannot be tested accurately:

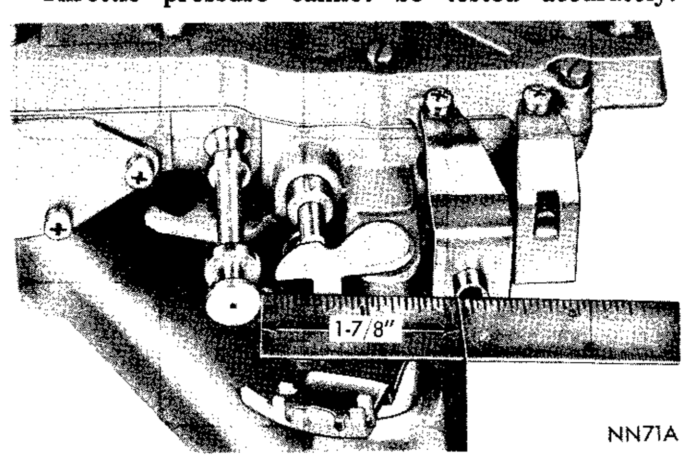


Fig. 14—Measuring Spring Retainer Location

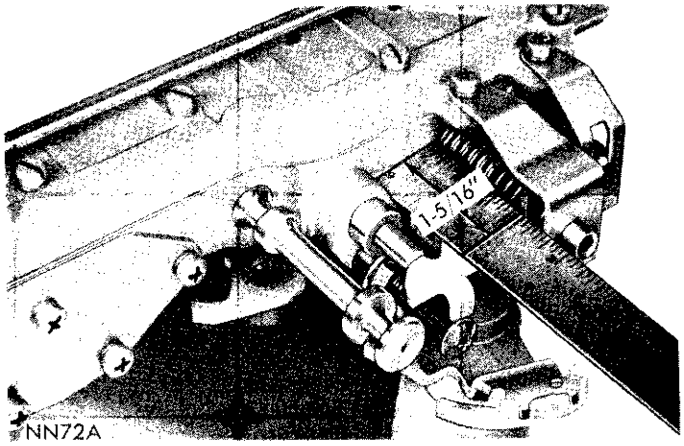


Fig. 15—Line Pressure Adjustment

therefore, the adjustment should be measured if a malfunction is evident.

(1) Remove valve body assembly from transmission to perform adjustment.

(2) Loosen throttle lever stop screw lock nut and back off approximately five turns (Fig. 16).

(3) Insert gauge pin of Tool C-3763 between the throttle lever cam and kickdown valve.

(4) By pushing in on the tool, compress kickdown valve against its spring so throttle valve is completely bottomed inside the valve body.

(5) As force is being exerted to compress spring, tighten throttle lever stop screw finger tight against throttle lever tang with throttle lever cam touching the tool and the throttle valve bottomed. **Be sure adjustment is made with spring fully compressed and valve bottomed in the valve body.**

(6) Remove tool and tighten stop screw lock nut securely.

AIR PRESSURE TESTS

A "NO DRIVE" condition might exist even with correct fluid pressure, because of inoperative clutches or bands. The inoperative units, clutches, bands and servos can be located through a series of tests by substituting air pressure for fluid pressure (Fig. 17). The front and rear clutches, kickdown servo, and low-reverse servo may be tested by applying air pressure to their respective passage after valve body assembly has been removed. To make air pressure tests, proceed as follows:

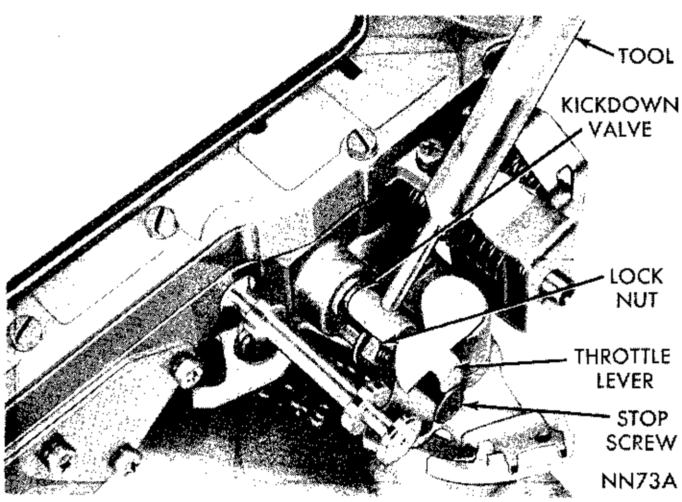


Fig. 16—Throttle Pressure Adjustment

CAUTION: Compressed air supply must be free of all dirt or moisture. Use a pressure of 30 to 100 psi.

Front Clutch

Apply air pressure to front clutch "apply" passage and listen for a dull "thud" which indicates that rear clutch is operating. Hold air pressure on for a few seconds and inspect system for excessive oil leaks.

Rear Clutch

Apply air pressure to rear clutch "apply" passage and listen for a dull "thud" which indicates that rear clutch is operating. Also check for excessive oil leaks.

If a dull "thud" cannot be heard in clutches, place finger tips on clutch housing and again apply air pressure. Movement of piston can be felt as clutch is applied.

Kickdown Servo

Direct air pressure into front servo "apply" passage. Operation of servo is indicated by a tightening of the front band. Spring tension on servo piston should release the band.

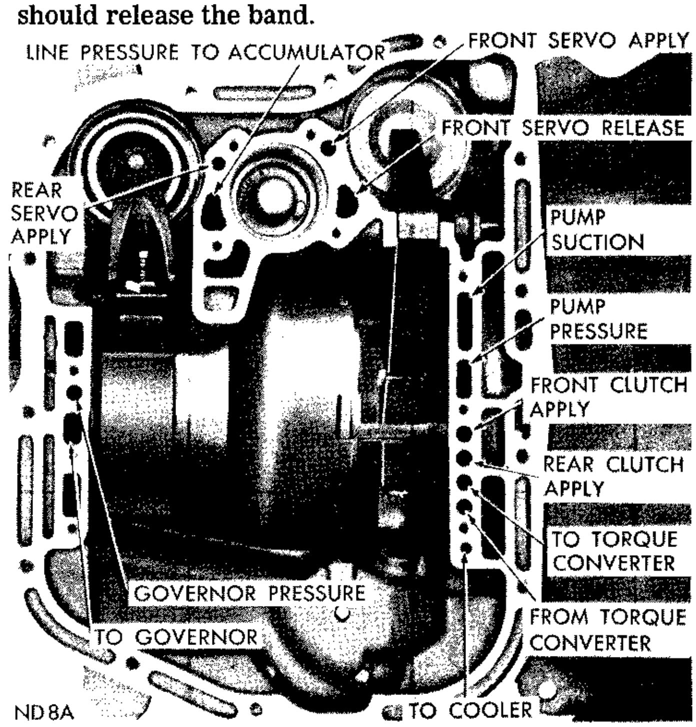


Fig. 17—Air Pressure Tests

Low and Reverse Servo

Direct air pressure into servo "apply" passage. Operation of servo is indicated by a tightening of the rear band. Spring tension on servo piston should release the band.

If clutches and servos operate properly; no upshift or erratic shift conditions indicate that malfunction exists in the valve body.

SPEEDOMETER PINION

Removal and Installation

Rear axle gear ratio and tire size determines pinion gear size requirements. Refer to 'Speedometer Pinion Chart' in Specifications for pinion usage.

(1) Remove bolt and retainer securing speedometer pinion adapter in the extension housing (Fig. 18).

(2) With cable housing connected, carefully work adapter and pinion out of the extension housing.

(3) If transmission fluid is found in cable housing, replace seal in the adapter (Fig. 19). Start seal and retainer ring in the adapter, then push them into adapter with Tool C-4004 until tool bottoms (Fig. 20).

CAUTION: Before installing pinion and adapter assembly make sure adapter flange and its mating area on extension housing are perfectly clean. Dirt or sand will cause mis-alignment resulting in speedometer pinion gear noise.

(4) Note number of gear teeth and install speedometer pinion gear into adapter (Fig. 19).

(5) Rotate the speedometer pinion gear and adapter assembly so that the number on the adapter, corresponding to the number of teeth on the gear, is in the 6 o'clock position as the assembly is installed (Fig. 18).

(6) Install retainer and bolt, with retainer tangs in adapter positioning slots. Tap adapter firmly into the extension housing and tighten retainer bolt to 100 inch-pounds.

EXTENSION HOUSING YOKE SEAL

Replacement

(1) Mark parts for reassembly then disconnect propeller shaft at rear universal joint. Carefully pull shaft

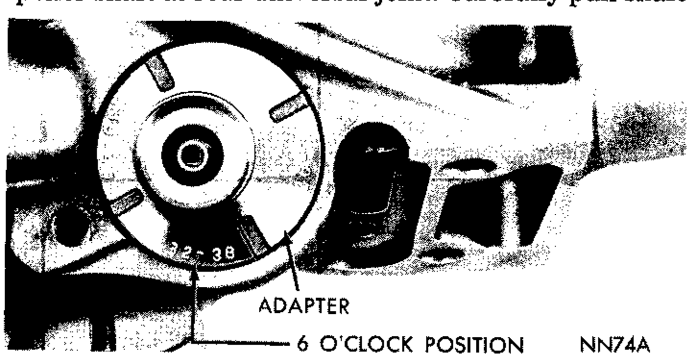


Fig. 18—Speedometer Pinion and Adapter—Installed (Retainer Removed for View)

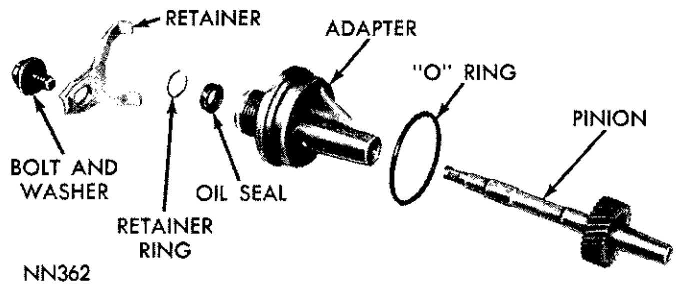


Fig. 19—Speedometer Drive

yoke out of transmission extension housing.

CAUTION: Be careful not to scratch or nick ground surface on sliding spline yoke during removal and installation of the shaft assembly.

(2) Remove the extension housing yoke seal (Fig. 21) with Tool C-3985.

(3) To install a new seal, position seal in opening of extension housing and drive it into housing with Tool C-3972 (Fig. 22).

(4) Carefully guide front universal joint yoke into extension housing and on the output shaft splines. Align marks made at removal and connect propeller shaft to rear axle pinion shaft yoke.

EXTENSION HOUSING AND OUTPUT SHAFT BEARING

Removal

(1) Mark parts for reassembly then disconnect propeller shaft at rear universal joint. Carefully pull shaft assembly out of the extension housing.

(2) Remove speedometer pinion and adapter as-

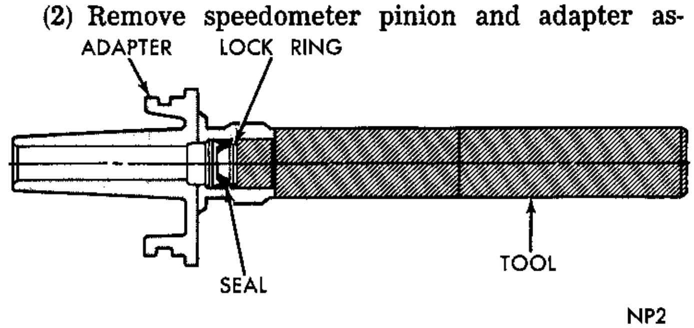


Fig. 20—Installing Speedometer Pinion Seal

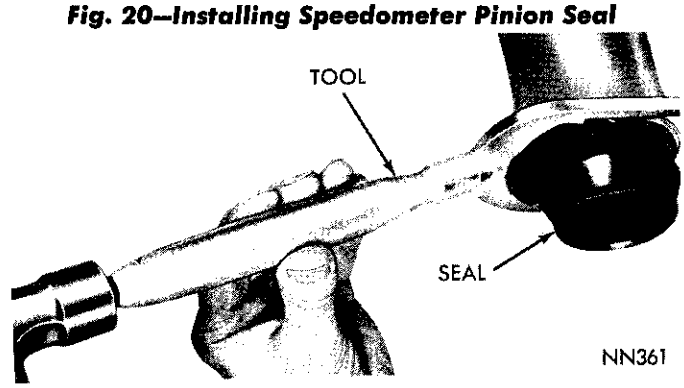


Fig. 21—Removing Extension Housing Yoke Seal

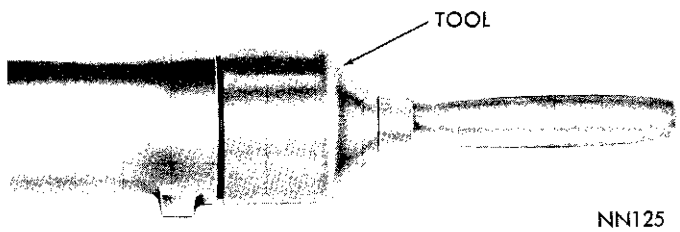


Fig. 22—Installing Extension Housing Yoke Seal

sembly (Fig. 18). Drain approximately two quarts of fluid from the transmission.

(3) Remove bolts securing extension housing to the crossmember. Raise transmission slightly with service jack Tool C-3203A, then remove center crossmember and support assembly.

(4) Remove the extension housing to transmission bolts.

Console Shift: Remove two bolts securing gearshift torque shaft lower bracket to the extension housing. Swing bracket out of way for extension housing removal.

IMPORTANT: In removing or installing the extension housing (step 5), the gearshift lever must in in "1" (low) position. This positions the parking lock control rod rearward so it can be disengaged or engaged with the parking lock sprag.

(5) Remove two screws, plate and gasket from bottom of extension housing mounting pad. Spread large snap ring from output shaft bearing with Tool C-3301A (Fig. 23). With snap ring spread as far as possible, carefully tap extension housing off output shaft bearing. Carefully pull extension housing rearward, to remove parking lock control rod knob past the parking sprag, then remove the housing.

Bearing Replacement

(1) Using heavy duty snap ring pliers C-4020, remove output shaft bearing rear snap ring and remove bearing from the shaft (Fig. 24).

(2) If removed, install snap ring in front groove on output shaft. Install a new bearing on shaft with outer race ring groove toward front (Fig. 24), then install rear snap ring.

NOTE: To replace the extension housing bushing, refer to INDEX.

Installation

(1) Place a new extension housing gasket on the transmission case. Position output shaft bearing retaining snap ring in the extension housing. Slide extension housing on output shaft guiding parking lock control rod knob past the parking sprag. While spreading large snap ring in housing with Tool C-3301A (Fig. 23), carefully tap housing into place, then release snap ring. Make sure snap ring is fully seated in bearing outer race ring groove.

(2) Install and tighten extension housing bolts to 24 foot-pounds.

(3) Install gasket, plate and two screws on bottom of extension housing mounting pad.

(4) Install center crossmember and rear mount assembly, tighten retaining bolts to 75 foot-pounds. Lower transmission, install extension housing to support bolts and tighten to 40 foot-pounds.

Console Shift: Align gearshift torque shaft lower bracket with the extension housing. Install the two retaining bolts and tighten securely.

(5) Install the speedometer pinion and adapter.

(6) Carefully guide front universal joint yoke into extension housing and on the output shaft splines. Align marks made at removal and connect propeller shaft to the rear axle pinion shaft yoke.

(7) Add fluid to transmission to bring up to proper level.

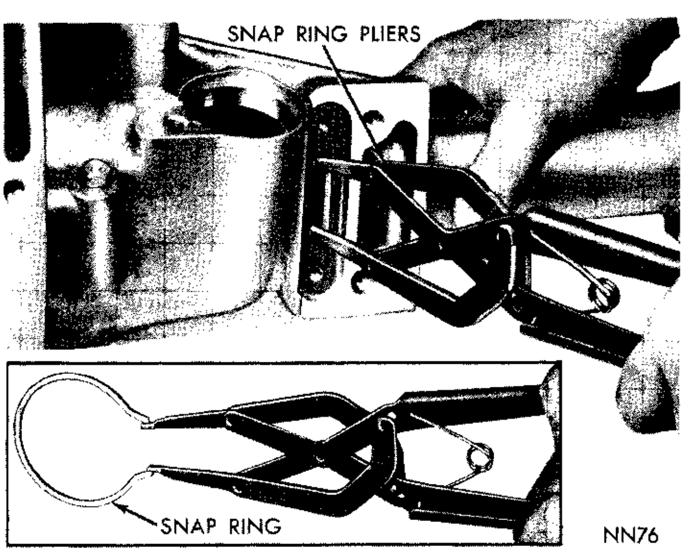


Fig. 23—Removing or Installing Extension Housing

GOVERNOR

Removal

(1) Remove extension housing and output shaft bearing.

(2) Carefully pry snap ring from weight end of governor valve shaft (Fig. 25). Slide valve and shaft

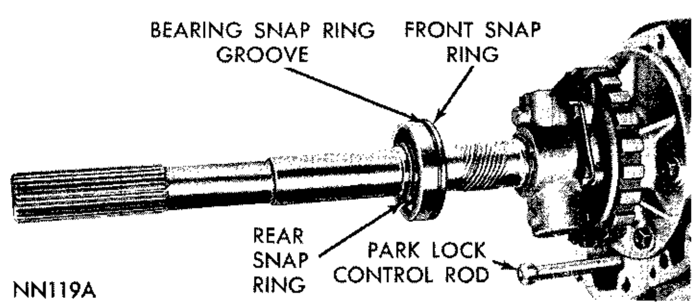


Fig. 24—Output Shaft Bearing

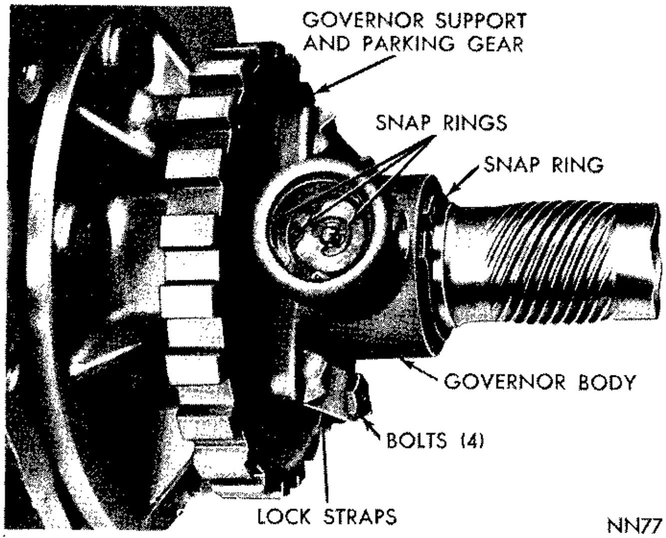


Fig. 25—Governor Shaft and Weight Snap Rings

assembly out of the governor body.

(3) Remove large snap ring from weight end of governor body, lift out governor weight assembly.

(4) Remove snap ring from inside governor weight, remove inner weight and spring from outer weight. Figure 26 shows a disassembled view of the governor assembly.

(5) Remove snap ring from behind governor body, then slide body and support assembly off the output shaft. If necessary, remove four bolts and separate governor from the support.

Cleaning and Inspection

The primary cause of governor operating failure is due to a sticking governor valve or weights. Rough surfaces may be removed with crocus cloth. Thoroughly clean all parts in clean solvent and inspect for free movement before assembly.

Installation

(1) Assemble governor body to the support (if disassembled) and tighten the bolts finger tight. Make sure oil passage of governor body aligns with passage in the support.

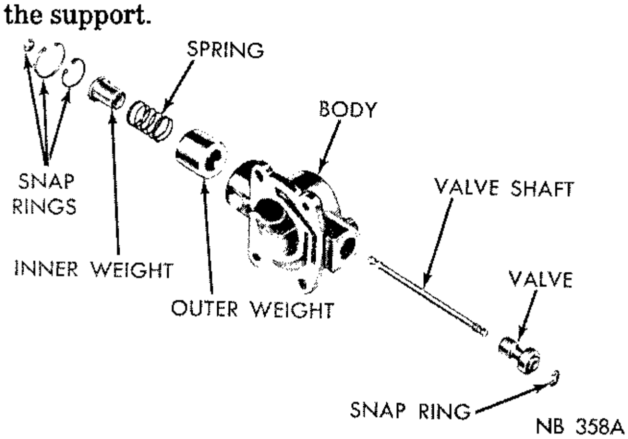


Fig. 26—Governor Assembly

(2) Position support and governor assembly on output shaft. Align assembly so governor valve shaft hole in governor body aligns with hole in the output shaft, then slide assembly into place. Install snap ring behind governor body (Fig. 25). Tighten body to support bolts to 100 inch-pounds. Bend ends of lock straps over the bolt heads.

(3) Assemble governor weights and spring, and secure with snap ring inside large governor weight. Place weight assembly in governor body and install snap ring.

(4) Place governor valve on valve shaft, insert the assembly into body and through governor weights. Install valve shaft retaining snap ring. Inspect valve and weight assembly for free movement after installation.

(5) Install output shaft bearing and extension housing.

PARKING LOCK COMPONENTS

Removal

(1) Remove the extension housing.

(2) To replace the governor support and parking gear, refer to "governor and support".

(3) Slide shaft out of extension housing to remove the parking sprag and spring (Fig. 27). Remove snap ring and slide reaction plug and pin assembly out of the housing.

(4) To replace the parking lock control rod, refer to "Valve Body—Removal and Installation."

Installation

(1) Position sprag and spring in housing and insert the shaft (Fig. 27). Make sure square lug on sprag is toward the parking gear, and spring is positioned so it moves sprag away from the gear.

(2) Install reaction plug and pin assembly in the housing and secure with snap ring.

(3) Install extension housing.

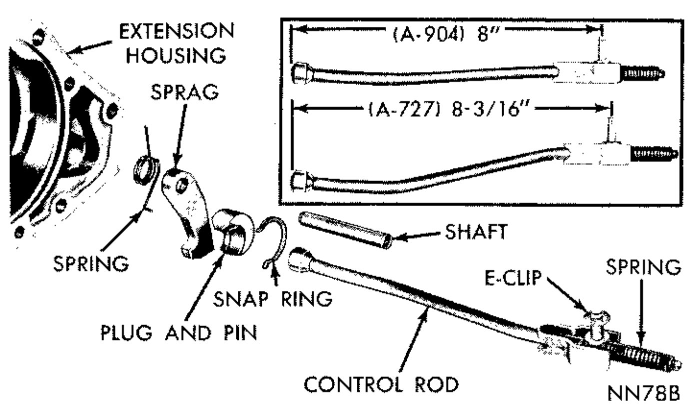


Fig. 27—Parking Lock Components

VALVE BODY ASSEMBLY AND ACCUMULATOR PISTON

Removal

(1) Raise the vehicle on a hoist.

(2) Loosen oil pan bolts, tap pan to break it loose allowing fluid to drain, then remove the oil pan.

(3) Disconnect throttle and gearshift linkage from levers on the transmission. Loosen clamp bolts and remove the levers (Fig. 5).

(4) Remove E-clip (Fig. 28), securing parking lock rod to the valve body manual lever.

(5) Remove Back-Up Light and Neutral Start Switch.

(6) Place a drain pan under transmission, then remove the ten hex-head valve body to transmission case bolts. Hold valve body in position while removing the bolts.

(7) While lowering valve body out of transmission case, disconnect parking lock rod from the lever.

To remove parking lock rod, pull it forward out of the case. If necessary, rotate propeller shaft to align parking gear and sprag to permit knob on end of control rod to pass the sprag.

(8) Withdraw accumulator piston from transmission case. Inspect piston for scoring, and rings for wear or breakage. Replace as required.

(9) If valve body manual lever shaft seal requires replacement, drive it out of the case with a punch.

(10) Drive a new seal into the case with a 15/16 inch socket and hammer (Fig. 29). **Servicing the valve body assembly is outlined under "Recondition—Sub-Assemblies."**

Installation

(1) Make sure Back-Up Light and Neutral Start Switch has been removed. If parking lock rod was removed, insert it through the opening in rear of case with knob positioned against the reaction plug and sprag. Move front end of rod toward center of transmission while exerting rearward pressure on the rod to force it past the sprag. (Rotate propeller shaft if necessary.)

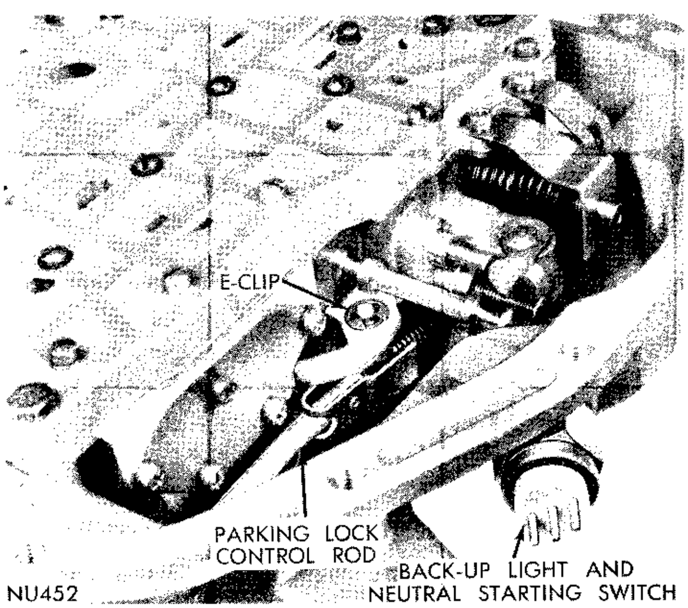


Fig. 28—Parking Lock Control Rod Retainer E-Clip

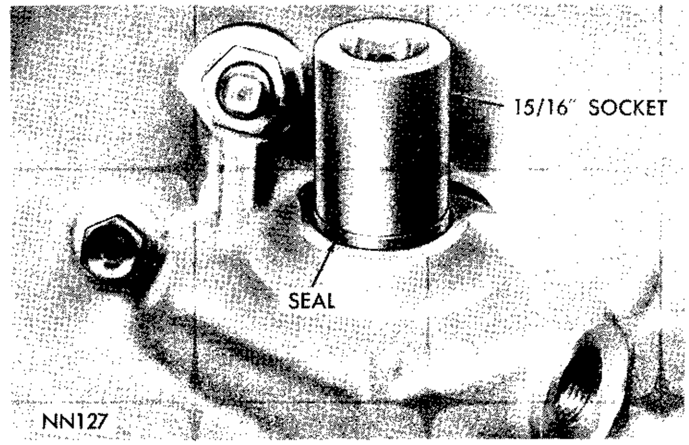


Fig. 29—Installing Valve Body Manual Lever Shaft Oil Seal

(2) Install accumulator piston in the transmission case.

(3) Position accumulator spring on the valve body.

(4) Place the valve body manual lever in **LOW** position. Lift valve body into its approximate position, connect parking lock rod to manual lever and secure with the E-clip. Position valve body in the case, install retaining bolts finger tight.

(5) With neutral starting switch installed, place manual valve in the neutral position. Shift valve body if necessary to center neutral finger over the neutral switch plunger. Snug bolts down evenly, then tighten to 100 inch-pounds.

(6) Install gearshift lever and tighten clamp bolt. Check lever shaft for binding in the case by moving lever through all detent positions. If binding exists, loosen valve body bolts and re-align.

(7) Make sure throttle shaft seal is in place, then install flat washer, lever and tighten the clamp bolt. Connect throttle and gearshift linkage and adjust as required.

(8) Install oil pan, using a new gasket. Add transmission fluid to bring it up to proper level.

SERVICE OUT OF VEHICLE

TRANSMISSION AND CONVERTER REMOVAL

The transmission and converter must be removed as an assembly; otherwise, the converter drive plate, pump bushing, and oil seal will be damaged. The drive plate will not support a load; therefore, none of the weight of the transmission should be allowed to rest on the plate during removal.

(1) Connect a Remote Control Starter Switch, Tool C-763 to starter solenoid and position switch so engine can be rotated from under the vehicle.

(2) Disconnect secondary (high tension) cable, from the ignition coil.

(3) Remove cover plate in front of converter to provide access to converter drain plug and mounting bolts.

(4) Rotate engine with Remote Control Switch to bring drain plug to "6 o'clock " position. Drain torque converter and transmission.

(5) Mark converter and drive plate to aid in reassembly. The crankshaft flange bolt circle, inner and outer circle of holes in drive plate, and four tapped holes in front face of converter all have one hole offset so these parts will be installed in original position. This maintains balance of the engine and converter.

(6) Rotate engine with Remote Control Switch to locate two converter to drive plate bolts at "5 and 7 o'clock" positions. Remove the two bolts, rotate engine with switch and remove the other two bolts. **Do not rotate converter or drive plate by prying with a screw driver or similar tool as the drive plate might become distorted. Also, starter should never be engaged if drive plate is not attached to converter with at least one bolt or if transmission case to engine block bolts have been loosened.**

(7) Disconnect negative (ground) cable from battery.

(8) Remove the starting motor assembly.

(9) Disconnect wire from the neutral starting switch.

(10) Disconnect gearshift rod from the transmission lever. Remove gearshift torque shaft from transmission housing and left side rail.

Console Shift: Remove two bolts securing gearshift torque shaft lower bracket to the extension housing. Swing bracket out of the way for transmission removal. Disconnect gearshift rod from the transmission lever.

(11) Disconnect throttle rod from bellcrank at left side of transmission bell housing.

(12) Disconnect oil cooler lines at transmission and remove oil filler tube. Disconnect the speedometer cable.

(13) Mark parts for reassembly then disconnect propeller shaft at rear universal joint. Carefully pull shaft assembly out of the extension housing.

(14) Remove rear mount to extension housing bolts.

(15) Install engine support fixture, Tool C-3487A and raise engine slightly (Fig. 30).

(16) Remove crossmember attaching bolts and remove the crossmember.

(17) Place a transmission service jack under transmission to support the assembly.

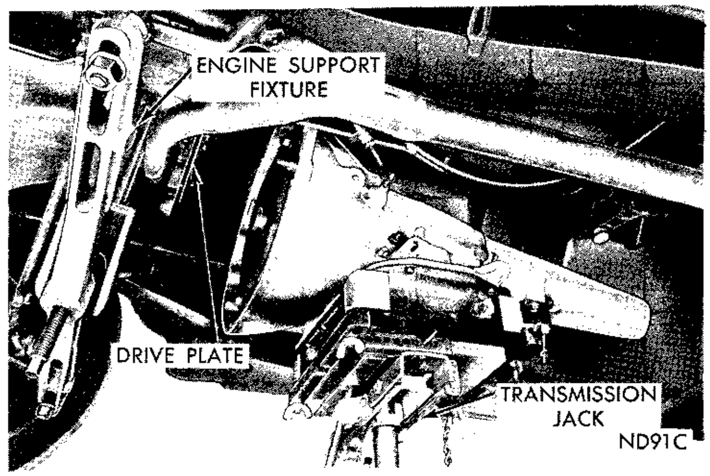


Fig. 30—Engine Lifting Fixture

Imperial Models: Through openings on rear side of torsion bar rear anchor crossmember, remove four large bolts securing rubber isolators to the center crossmember. Remove six additional bolts securing center crossmember, then remove crossmember from the stub frame. **Do not remove rear anchor crossmember from the torsion bars.**

(18) Attach a small "C" clamp to edge of converter housing to hold converter in place during removal of the transmission.

(19) Remove converter housing retaining bolts. Carefully work transmission rearward off engine block dowels and disengage converter hub from end of the crankshaft (Fig. 30).

(20) Lower transmission jack and remove transmission and converter assembly.

(21) To remove converter assembly, remove "C" clamp from edge of the housing, then carefully slide assembly out of the transmission.

STARTER RING GEAR REPLACEMENT

The starter ring gear is mounted directly on outer diameter of the torque converter front cover. With torque converter removed from vehicle, replacement of the gear is as follows:

Removal

(1) Cut through weld material at rear side of ring gear with a hack saw or grinding wheel (Fig. 31). Be careful not to cut or grind into the front cover stamping.

(2) Scribe a heavy line on front cover next to front face of ring gear to aid in locating the new gear.

(3) Support converter with the four lug faces resting on blocks of wood. **The converter must not rest on the front cover hub during this operation.** Using a blunt chisel or drift and hammer, tap downward on ring gear near welded areas to break any remaining weld material (Fig. 31). Tap around ring gear until it comes off the converter.

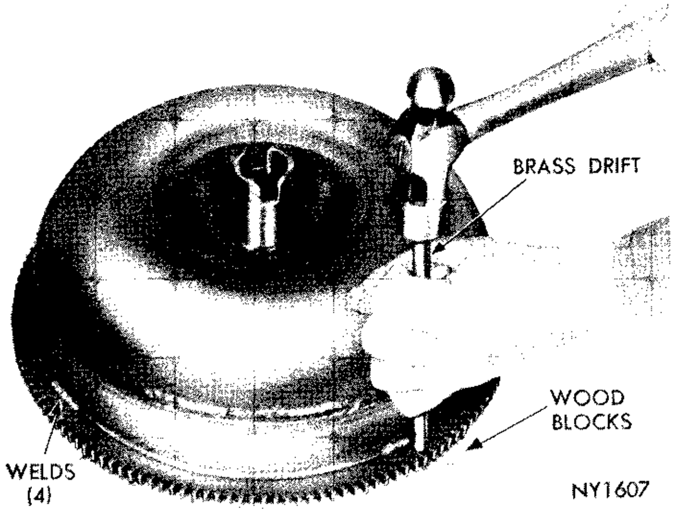


Fig. 31—Removing Starter Ring Gear

(4) Smooth off weld areas on the cover with a file.

Installation

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

Oven: Place ring gear in Oven C-794 and set temperature at 200 degrees F. Allow ring gear to remain in oven for 15 to 20 minutes.

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

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

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

(1) After ring gear is expanded by heating, place the gear in position on converter front cover. Tap gear on cover evenly with a plastic or rawhide mallet until front face of gear is even with scribed line (made during removal) on the front cover. Make sure gear is even with scribed line around full circumference of the front cover.

(2) Reweld ring gear to torque converter front cover, being careful to place, as nearly as possible, same amount of weld material in exactly same location as was used in the original weld. This is necessary in order to maintain proper balance of the unit. Place welds alternately on opposite sides of converter to minimize distortion.

(3) The following suggestions are offered as an aid in making the weld.

a. **Do not gas weld.**

b. Use a D.C welder that is set at straight polarity or an A.C. welder if proper electrode is available.

c. Use a 1/8 inch diameter welding rod, and a welding current of 80 to 125 amps.

d. Direct the arc at intersection of gear and front cover from an angle of 45 degrees from rear face of the gear.

(4) Inspect gear teeth and remove all nicks where metal is raised, weld metal splatter, etc., in order to ensure quiet starter operation.

TORQUE CONVERTER FLUSHING

When a transmission failure has contaminated the fluid, the torque converter should be flushed to insure that metal particles or sludged oil are not later transferred back into the reconditioned transmission.

HAND FLUSHING

(1) Place converter in horizontal position and pour two quarts of new clean solvent or kerosene into converter through the impeller hub.

(2) Turn and shake converter so as to swirl solvent through the internal parts. **Turn the turbine and stator with transmission input and reaction shafts to dislodge foreign material.**

(3) Position converter in its normal operating position with drain plug at the lowest point. Remove drain plug and drain solvent. Rotate turbine and stator, and shake converter while draining to prevent dirt particles from settling. Tool C-3963-A is available to do this job faster and more effectively.

This tool adapts a drill motor to an input shaft to spin the turbine and includes a drawing for a simple wooden fixture to hold the converter. This fixture will hold the converter upright for the spinning and draining operations.

(4) Repeat flushing operation at least once, or as many times as required until solvent or kerosene drained out is clear.

(5) After flushing, shake and rotate converter several times with drain plug out to remove any residual solvent and dirt. **Flush any remaining solvent from converter with two quarts of new transmission fluid.** This will prevent any adverse effect the solvent may have on the transmission seals. Reinstall drain plug and tighten to 110 inch-pounds.

(6) Flush and blow out the oil cooler and its lines.

MACHINE FLUSHING

Machine cleaning is recommended; using the type which rotates the converter while pumping cleaning fluid through it. The machine automatically adds timed blasts of compressed air to the cleaning fluid as it enters the converter, providing more thorough cleaning than the hand flushing operation.

PUMP OIL SEAL

Replacement

The pump oil seal can be replaced without removing pump and reaction shaft support assembly from the transmission case.

(1) Screw seal remover, Tool C-3861 into the seal (Fig. 32). Tighten screw portion of tool to withdraw the seal.

(2) To install a new seal, place the seal in opening of the pump housing (lip side facing inward). Using Tool C-3860, drive the seal into housing until tool bottoms (Fig. 33).

DISASSEMBLY—SUB-ASSEMBLY REMOVAL

Prior to removing transmission sub-assemblies, plug all openings and thoroughly clean exterior of the unit, preferably by steam. Cleanliness through entire disassembly and assembly cannot be over-emphasized. When disassembling, each part should be washed in a suitable solvent, then dried by compressed air. **Do not wipe parts with shop towels.** All mating surfaces in the transmission are accurately machined; therefore, careful handling of parts must be exercised to avoid nicks or burrs.

Drive Train End Play

Measuring drive train end play before disassembly, will usually indicate when a thrust washer change between the reaction shaft support and front clutch retainer is required, to properly adjust end play during assembly (except when major parts are replaced).

(1) Attach a dial indicator to transmission bell housing with its plunger seated against end of input shaft (Fig. 34).

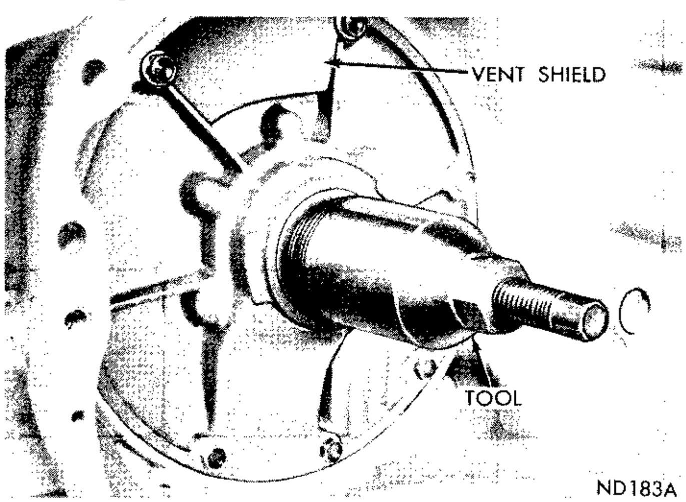


Fig. 32—Removing Pump Oil Seal

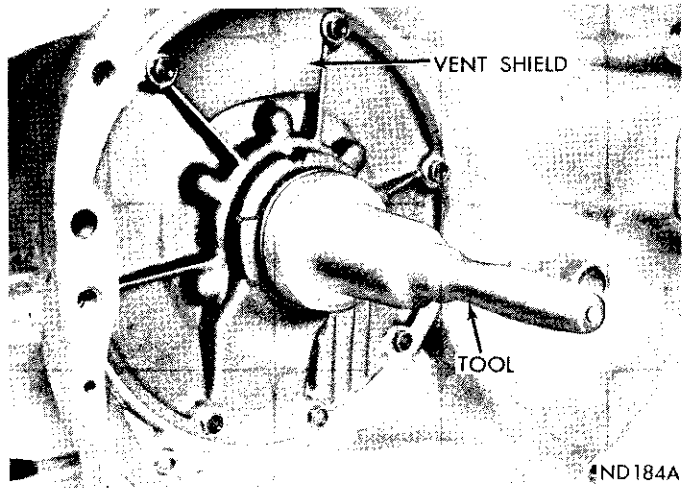


Fig. 33—Installing Pump Oil Seal

(2) Move input shaft in and out to obtain end play reading.

(3) Record the indicator reading for reference when reassembling the transmission. The end play specifications are .037 to .084 inch.

Oil Pan

(1) Place transmission assembly in repair stand, Tool C-3750 with adapter C-3882 (Fig. 35).

If repair stand DD-1014 is available, fabricate two attaching brackets (Fig. 36) and install transmission in the stand (Fig. 37), file out the 7/16 inch holes if necessary to obtain bracket alignment. This stand provides easier disassembly and assembly as transmission can be rotated as desired.

(2) Unscrew oil pan bolts and remove the pan and gasket.

Valve Body Assembly

(1) Loosen clamp bolts and remove throttle and gearshift levers from the transmission.

(2) Remove Back-Up Light and Neutral Start Switch.

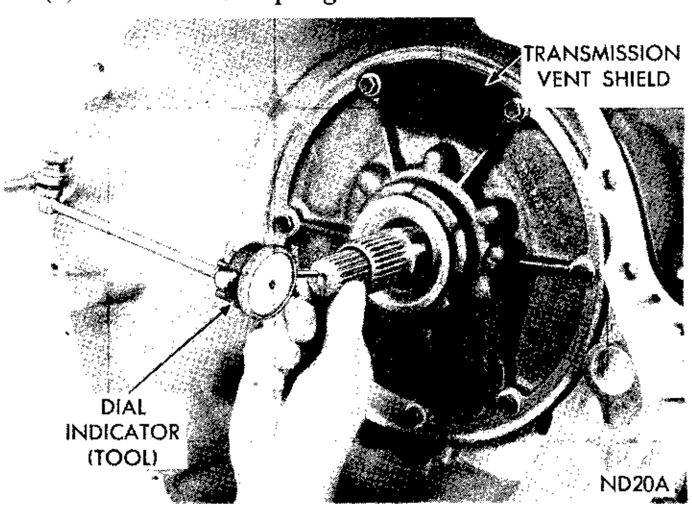


Fig. 34—Measuring Drive Train End Play

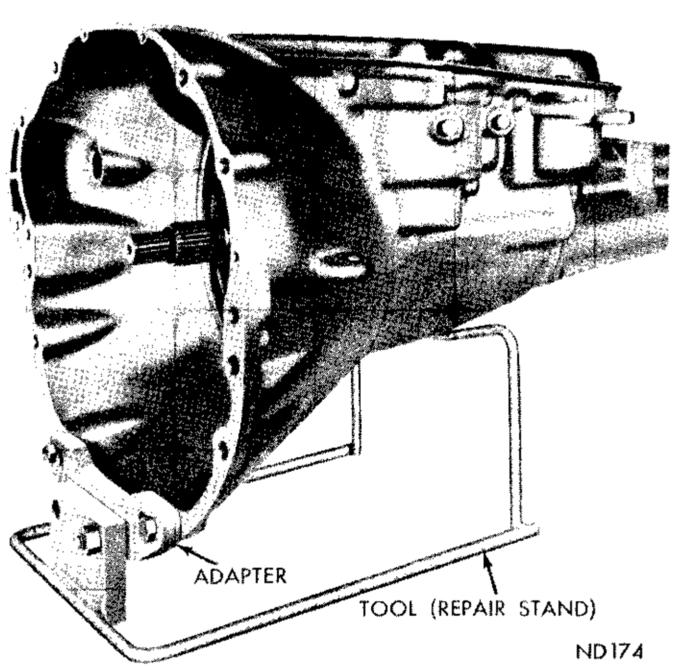


Fig. 35—Transmission Installed in Repair Stand

(3) Remove the ten hex-head valve body to transmission bolts. Remove E-clip securing parking lock rod to valve body manual lever (Fig. 28).

(4) While lifting valve body out of transmission case, disconnect parking lock rod from the lever.

Accumulator Piston and Spring

(1) Lift spring off accumulator piston and withdraw piston from the case.

Extension Housing and Output Shaft Bearing

Before removing extension housing, pull parking lock rod forward out of the case. Rotate output shaft if necessary to align parking gear and sprag to permit knob on end of control rod to pass the sprag.

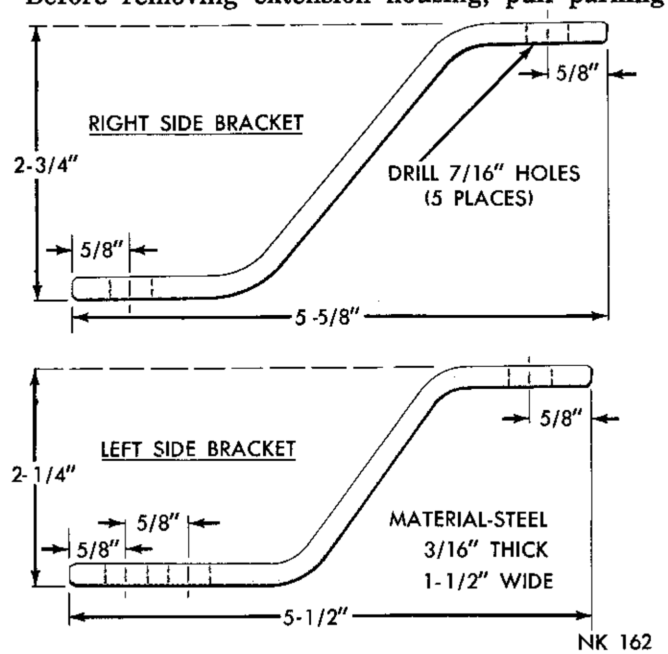


Fig. 36—Repair Stand Bracket Dimensions

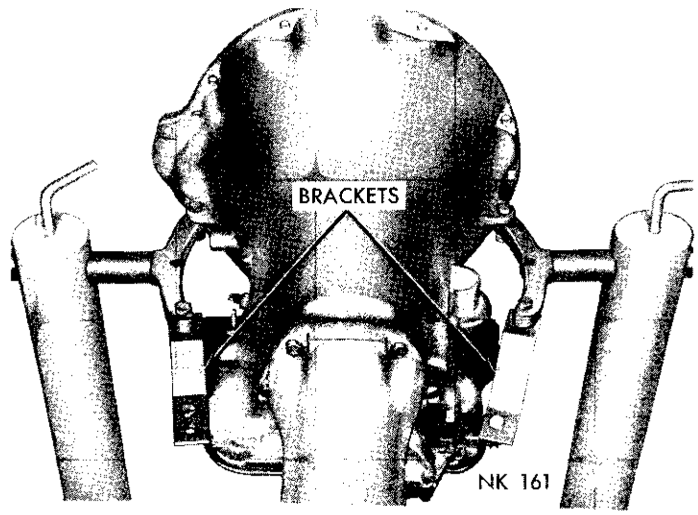


Fig. 37—Transmission Installed in Repair Stand

(1) Remove speedometer pinion and adapter assembly.

(2) Remove extension housing to transmission bolts.

(3) Remove two screws, plate and gasket from bottom of extension housing mounting pad. Spread large snap ring from output shaft bearing with Tool C-3301A (Fig. 23). With snap ring spread as far as possible, carefully tap extension housing off the output shaft and bearing.

(4) Using heavy duty snap ring pliers C-4020, remove output shaft bearing rear snap ring. Remove bearing from shaft, then remove front snap ring.

Governor and Support

(1) Carefully pry snap ring from weight end of governor valve shaft (Fig. 27). Slide valve and shaft assembly out of the governor body.

(2) Remove snap ring from behind governor body, then slide governor body and support assembly off the output shaft.

Oil Pump and Reaction Shaft Support

(1) Tighten front band adjusting screw until band is tight on the front clutch retainer. This prevents clutch retainer from coming out with pump which might cause unnecessary damage to the clutches.

(2) Remove oil pump housing retaining bolts.

(3) Attach Tool C-3752 to the pump housing flange (Fig. 38), thread screws of tool into the flange holes at 9 and 3 o'clock locations.

(4) Bump outward evenly on the two "knocker weights" to withdraw pump and reaction shaft support assembly from the case.

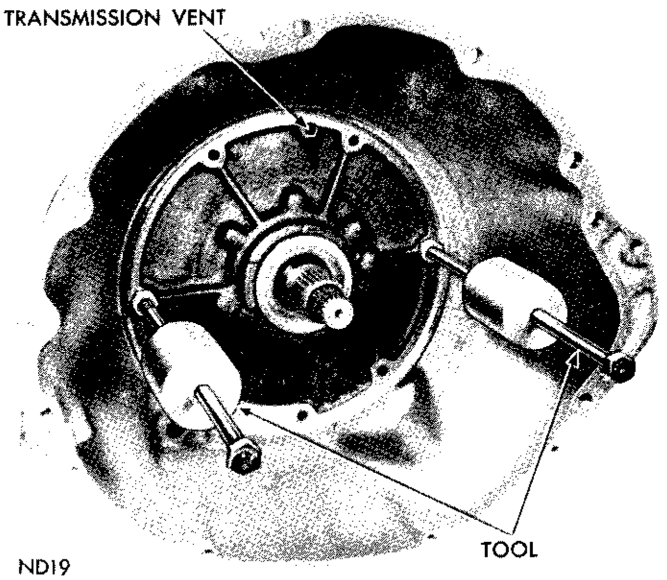


Fig. 38—Removing Pump and Reaction Shaft Support Assembly

Front Band and Front Clutch

(1) Loosen front band adjuster, remove band strut and slide band out of the case.

(2) Slide front clutch assembly out of the case.

Input Shaft and Rear Clutch

(1) Grasp input shaft, and slide input shaft and rear clutch assembly out of the case.

CAUTION: Be careful not to lose thrust washer located between rear end of input shaft and forward end of output shaft.

Planetary Gear Assemblies, Sun Gear, and Driving Shell

(1) While supporting output shaft and driving shell, carefully slide assembly forward and out through the case.

CAUTION: Be very careful not to damage ground surfaces on output shaft during removal.

Rear Band and Low-Reverse Drum

(1) Remove low-reverse drum, then loosen rear band adjuster, remove band strut and then remove band from the case.

Overrunning Clutch

(1) Note position of overrunning clutch rollers and springs before disassembly to assist in reassembly.

(2) Carefully slide out clutch hub and remove the rollers and springs. **If overrunning clutch cam and/or roller spring retainer are found damaged or worn, refer to index for replacement procedures.**

Kickdown Servo

(1) Compress kickdown servo spring by using engine valve spring compressor Tool C-3422, then remove snap ring (Fig. 39).

(2) Remove rod guide, springs and piston rod from the case. Be careful not to damage piston rod or guide during removal.

(3) Withdraw piston from the transmission case.

Low and Reverse Servo

(1) Compress low and reverse servo piston spring by using engine valve spring compressor Tool C-3422, then remove snap ring.

(2) Remove spring retainer, spring, and servo piston and plug assembly from the case.

RECONDITION SUB-ASSEMBLIES

The following procedures cover disassembly, inspection, repair, and assembly of each sub-assembly as removed from transmission.

Heli-Coil inserts are recommended for repairing damaged, stripped or worn threads in aluminum parts. Refer to "Aluminum Thread Repair".

Pre-sized service bushings are available for replacement for most all bushings in the TorqueFlite transmission. The two bushings in sun gear are not serviced because of the low cost of the sun gear assembly. If bushings are found worn or scored, they should be replaced as outlined in the following reconditioning procedures.

The bushing replacement tools listed by "SP" numbers are part of Tool Kit C-3887-A.

The use of crocus cloth is permissible where necessary, providing it is used carefully. When used on

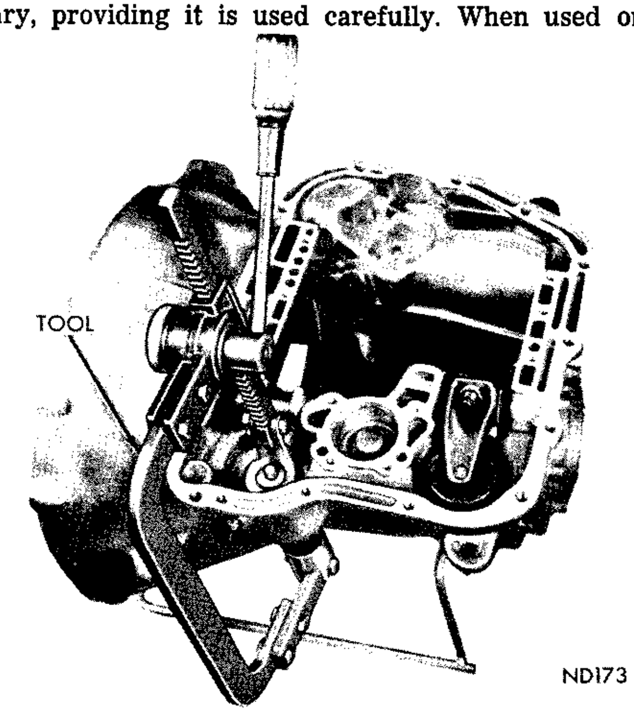


Fig. 39—Compressing Kickdown Servo Spring

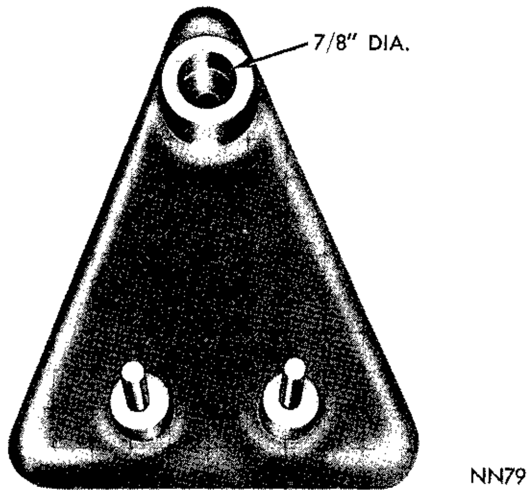


Fig. 40—Rework Valve Body Repair Stand

valves, use extreme care to avoid rounding off the sharp edges. The sharp edge is vitally important to this type valve. Sharp edges prevent dirt and foreign matter from getting between the valve and body, thus reducing possibility of sticking. When it becomes necessary to recondition the transmission, and vehicle has accumulated considerable mileage, install new seal rings on parts requiring their usage. **Coat each part with Automatic Transmission Fluid—AQ-ATF Suffix "A" (Dexron) during assembly.**

VALVE BODY ASSEMBLY

CAUTION: Never clamp any portion of valve body or transfer plate in a vise. Any slight distortion of the aluminum body or transfer plate will result in sticking valves, excessive leakage or both. When removing or installing valve or plugs, slide them in or out carefully. Do not use force.

Rework valve body repair stand, Tool C-3749 by drilling the 5/16 inch diameter hole to 7/8, and 3/4 inch deep (Fig. 40). The stand can then be used with either the old or new type valve bodies.

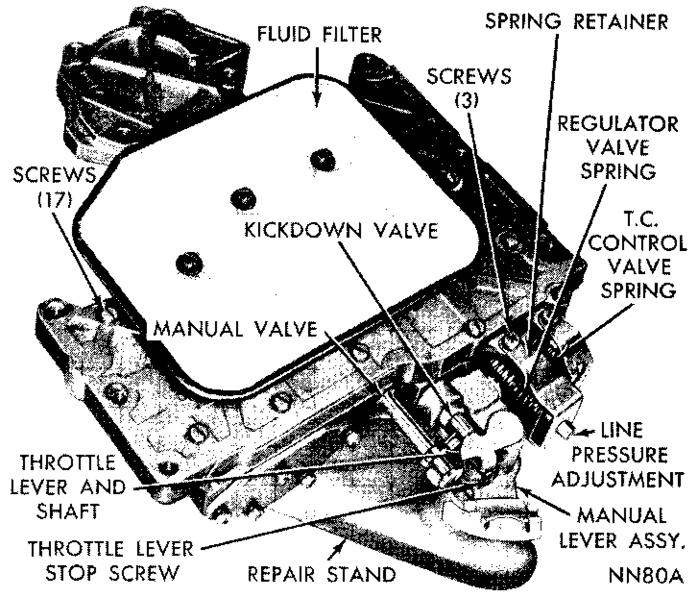


Fig. 41—Valve Body and Control Assembly

Disassembly

(1) Place valve body assembly on repair stand, Tool C-3749, (Fig. 41). Remove three screws from fluid filter and lift off the filter.

(2) While holding spring retainer firmly against the spring force, remove the three bracket retaining screws (Fig. 41).

(3) Remove the spring retainer, torque converter control valve spring, and regulator valve spring with line pressure adjusting screw assembly. **Do not alter setting of line pressure adjusting screw and nut. The nut has an interference thread and does not turn easily on the screw.**

(4) Slide regulator valve out of valve body. Slide torque converter control valve out of valve body.

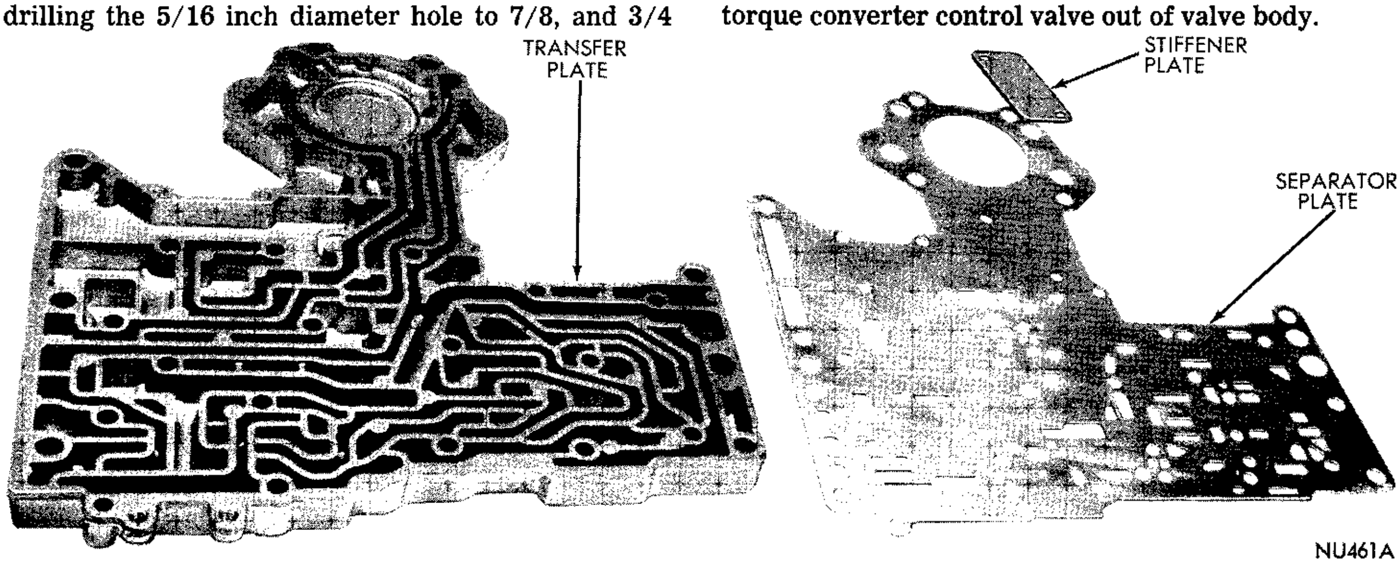


Fig. 42—Transfer and Separator Plate

(5) Remove 17 transfer plate retaining screws. Carefully lift transfer plate and steel separator plate assembly off the valve body.

(6) Invert transfer plate assembly and remove the stiffener plate. Remove remaining screws securing separator plate to the transfer plate, and carefully lift off the separator plate (Fig. 42).

(7) Remove and note location of 7 steel balls and 1 spring in valve body (Fig. 43). **CAUTION: Do Not mix up the two larger balls.** The 3/8 inch diameter ball goes on the spring in the corner and is the high pressure relief valve. The 5/16 diameter ball in the large chamber is the front clutch ball check.

(8) Invert valve body and lay it on a clean cloth or paper. Remove E-clip and washer from throttle lever shaft (Fig. 44). Remove any burrs from shaft, then while holding manual lever detent ball and spring in their bore with Tool C-3765 or similar tool, slide manual lever off the throttle shaft. Remove the detent ball and spring.

(9) Remove manual valve, carefully slide it out of valve body with a rotating motion.

(10) Remove throttle lever and shaft from the valve body.

(11) Remove shuttle valve cover plate (Fig. 44). Remove E-clip from exposed end of the shuttle valve.

(12) Remove throttle lever stop screw assembly (Fig. 45), being careful not to disturb the setting any more than is necessary.

(13) Remove kickdown detent, kickdown valve, throttle valve spring and the throttle valve.

(14) Remove the governor plug end plate (Fig. 45). Tip up valve body to allow shuttle valve throttle plug, spring, shuttle valve, and shift valve governor plugs to slide out into your hand.

Note longer stem on the 1-2 shift valve plug as a

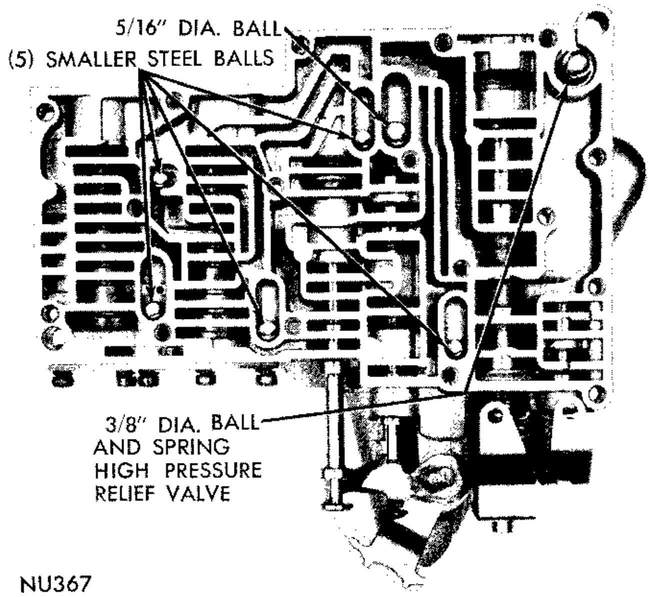


Fig. 43—Steel Ball Locations

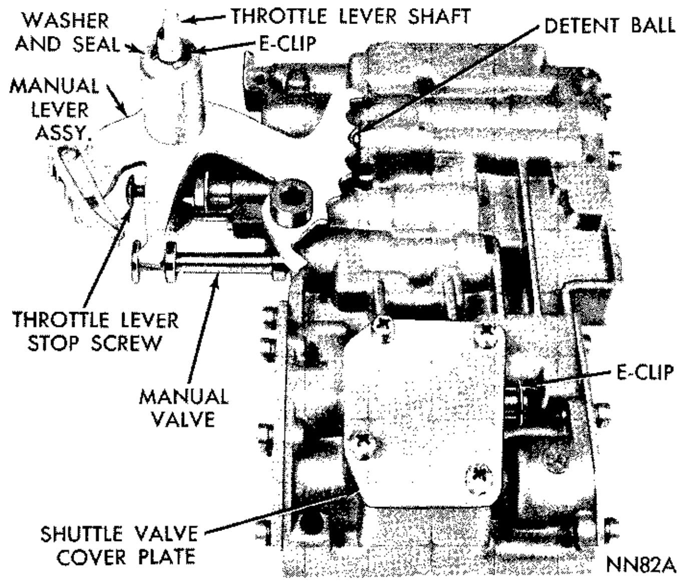


Fig. 44—Valve Body Controls (Assembled View)

means for identification.

(15) Remove shift valve end plate (Fig. 46) and slide out the two springs and valves.

(16) Remove regulator valve end plate. Slide regulator valve line pressure plug, sleeve, and regulator valve throttle pressure plug out of valve body.

Cleaning and Inspection

Allow all parts to soak a few minutes in a suitable clean solvent. Wash thoroughly and blow dry with compressed air. Make sure all passages are clean and free from obstructions.

Inspect manual and throttle valve operating levers and shafts for being bent, worn or loose. If a lever is loose on its shaft, it may be **silver soldered** only, or the lever and shaft assembly should be replaced.

CAUTION: Do not attempt to straighten bent levers.

Inspect all mating surfaces for burrs, nicks and scratches. Minor blemishes may be removed with crocus cloth, using only a very light pressure. Using a straightedge, inspect all mating surfaces for warpage or distortion. Slight distortion may be corrected, using a surface plate. Make sure all metering holes in the steel plate are open. Using a pen light, inspect bores in the valve body for scores, scratches, pits and irregularities.

Inspect all valve springs for distortion and collapsed coils. Inspect all valves and plugs for burrs, nicks and scores. Small nicks and scores may be removed with crocus cloth, providing extreme care is taken not to round off sharp edges. The sharpness of these edges is vitally important because it prevents foreign matter from lodging between the valve and valve body, thus reducing possibility of sticking. Inspect all valves and plugs for freedom of operation in valve body bores. When bores, valves and plugs are clean and dry, the

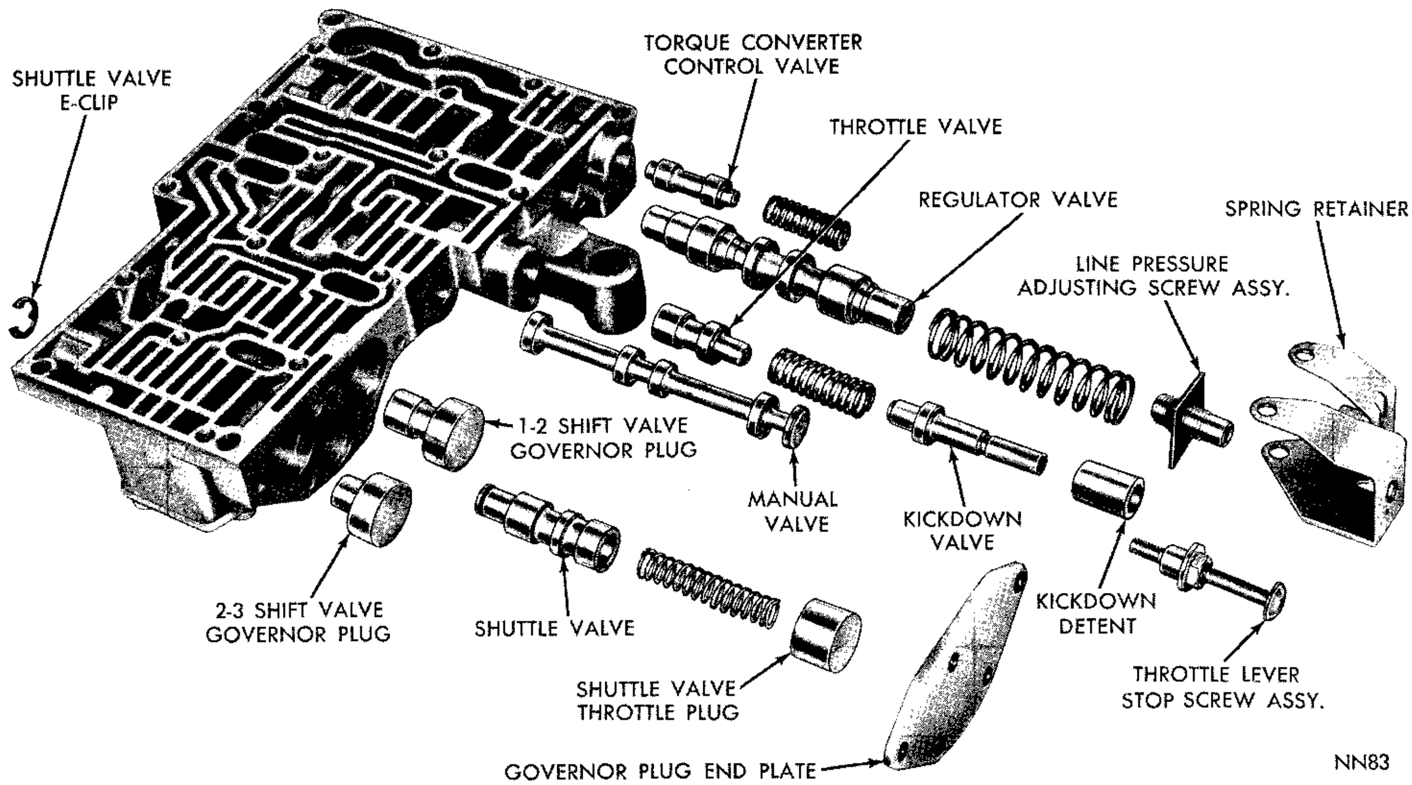


Fig. 45—Valve Body—Lever Side—Disassembled

valve and plugs should fall freely in the bores. **The valve body bores do not change dimensionally with use. Therefore, a valve body that was functioning properly when vehicle was new, will operate correctly if it is properly and thoroughly cleaned. There is no need to replace the valve body unless it is damaged in handling.**

Assembly

(1) Place separator plate on the transfer plate (Fig. 42). **Install stiffener plate and retaining screws exactly as shown.** Make sure all bolt holes are aligned; then tighten stiffener plate screws to 28 inch-pounds.

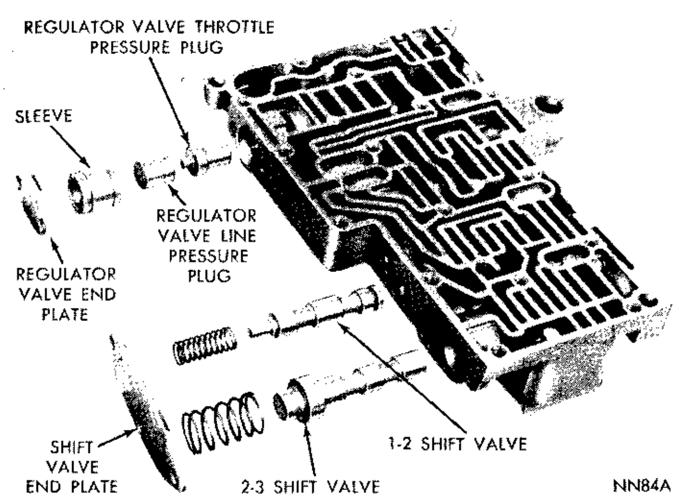


Fig. 46—Valve Body—Shift Valve Side—Disassembled

(2) Place 1-2 and 2-3 shift valve governor plugs in their respective bores (Fig. 45). Install shuttle valve, spring and shuttle valve throttle plug. Install governor plug end plate and tighten the five retaining screws to 28 inch-pounds.

(3) Install E-clip on end of the shuttle valve (Fig. 44). Install shuttle valve cover plate and tighten the four retaining screws to 28 inch-pounds.

(4) Install 1-2 and 2-3 shift valves and springs (Fig. 46). Install shift valve end plate and tighten the three retaining screws to 28 inch-pounds.

(5) Install regulator valve throttle pressure plug, sleeve, and the line pressure plug (Fig. 46). Install regulator valve end plate and tighten the two retaining screws to 28 inch-pounds.

(6) Install throttle valve and spring (Fig. 45). Slide kickdown detent on the kickdown valve (counterbore side of detent toward valve), then install assembly in the valve body.

(7) Install throttle lever stop screw (Fig. 45), and tighten lock nut finger tight.

(8) Install manual valve in the valve body (Fig. 45).

(9) Install throttle lever and shaft on the valve body (Fig. 47). Insert detent spring and ball in its bore in the valve body. Depress ball and spring with Tool C-3765 or similar tool and slide manual lever over throttle shaft so that it engages manual valve and detent ball. Install seal, retaining washer and E-clip on the throttle shaft. (Fig. 44).

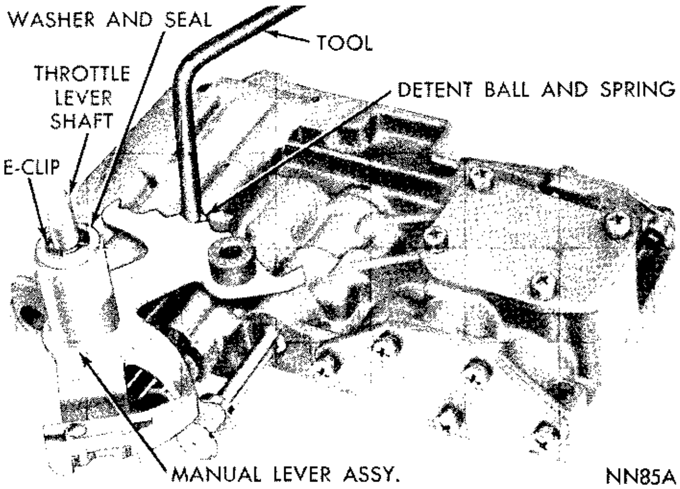


Fig. 47—Installing Detent Ball, Spring and Control Levers

(10) Position valve body assembly on the repair stand.

(11) Place the six steel balls in valve body chambers with large ball in the large chamber (Fig. 43). Install spring and high pressure relief valve ball (3/8" dia.)

(12) Position transfer plate assembly on the valve body. Install the retaining screws, starting at center and working outward, tighten screws to 35 inch-pounds.

(13) Install the torque converter valve and regulator valve (Fig. 45).

(14) Position the torque converter valve spring and regulator valve spring over ends of their respective valves. Place line pressure adjusting screw assembly on end of regulator valve spring with long dimension of nut at right angles to the valve body (Fig. 45).

(15) Install spring retainer, making sure converter valve spring is engaged on the tang and position squarely in the retainer. Tighten the three retaining screws to 28 inch-pounds. **Measure and if necessary, align spring retainer (Fig. 14).**

(16) Install the oil filter and tighten the three retaining screws to 35 inch-pounds.

After valve body has been serviced and completely assembled, adjust the throttle and line pressures. See "Hydraulic Control Pressure Adjustments". However, if pressures were satisfactory prior to disassembly, use original settings.

ACCUMULATOR PISTON AND SPRING

Inspection

Inspect the two seal rings for wear and make sure they turn freely in piston grooves. It is not necessary to remove rings unless condition warrants. Inspect piston for nicks, burrs, scores and wear. Inspect piston bore in the case for scores or other damage and piston spring for distortion. Replace parts as required.

EXTENSION HOUSING BUSHING REPLACEMENT

(1) Remove the extension housing yoke seal (Fig. 21) with Tool C-3985.

(2) Press or drive out bushing with Tool C-3974 (Fig. 48).

(3) Slide a new bushing on installing end of Tool C-3974. Align oil hole in bushing with oil slot in the housing, then press or drive bushing into place (Fig. 48).

(4) Position a new seal in opening of extension housing and drive it into the housing with Tool C-3972 (Fig. 22).

PARKING LOCK SPRAG

Disassembly

(1) Slide shaft out of extension housing to remove parking sprag and spring (Fig. 27). Remove snap ring and slide reaction plug and pin assembly out of the housing.

Inspection

Inspect sprag shaft for scores and free movement in the housing and sprag. Inspect sprag and control rod springs for distortion and tension. Inspect square lug on the sprag for broken edges, also lugs on the parking gear for damage. Inspect knob on end of control rod for nicks, burrs and free turning.

To replace the parking gear, refer to "Governor and Support-Disassembly and Assembly."

Assembly

(1) Install reaction plug and pin assembly in the housing and secure with snap ring (Fig. 27).

(2) Position sprag and spring in the housing and insert the shaft. Make sure square lug on sprag is toward parking gear and spring is positioned so it moves sprag away from the gear.

GOVERNOR AND SUPPORT

Disassembly

(1) Remove large snap ring from weight end of

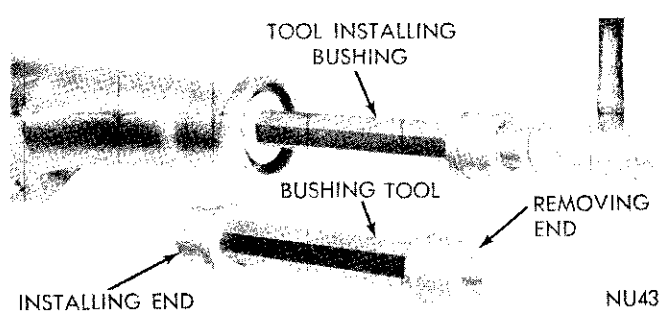


Fig. 48—Replacing Extension Housing Bushing

governor body and lift out the weight assembly.

(2) Remove snap ring from inside governor weight, remove inner weight, and spring from the outer weight.

(3) If the lugs on parking gear are damaged, removed the four bolts and separate support from the governor body.

Cleaning and Inspection

Figure 26 shows a disassembled view of the governor assembly.

Inspect all parts for burrs and wear. Inspect inner weight for free movement in the outer weight, and outer weight for free movement in the governor body. Inspect valve for free movement in the governor body. The weights and valve should fall freely in the bores when clean and dry. Rough surfaces may be removed with crocus cloth.

Inspect the governor weight spring for distortion. Inspect the lugs on parking gear for broken edges or other damage. Thoroughly clean all governor parts in clean solvent and inspect for free movement before assembly.

Assembly

(1) If the support was separated from governor body, assemble and tighten the bolts finger tight.

(2) Assemble governor weights and spring, and secure with snap ring inside of large governor weight. Place weight assembly in governor body and install snap ring.

OIL PUMP AND REACTION SHAFT SUPPORT

Disassembly

Figure 49 shows the oil pump and reaction shaft support disassembled.

(1) Remove bolts from rear side of reaction shaft support, remove vent baffle and lift the support off the pump.

(2) Remove rubber seal ring from pump body flange.

(3) Drive out the oil seal with a blunt punch.

Inspection

Inspect interlocking seal rings (Fig. 49) on reaction shaft support for wear or broken locks, make sure they turn freely in the grooves. Do not remove rings unless conditions warrant. Inspect pump body and reaction shaft support bushings for wear or scores. Inspect machined surfaces on pump body and reaction shaft support for nicks and burrs. Inspect pump rotors for scoring or pitting. With rotors cleaned and installed in the pump body, place a straightedge across face of rotors and pump body. Using a feeler gauge, measure clearance between straight edge and face of the rotors. Clearance limits are from .0015 to .003 inch. Also, with a feeler gauge, measure rotor tip clearance between inner and outer rotor teeth. Clearance limits are from .005 to .010 inch.

Clearance between outer rotor and its bore in oil pump body should be .004 to .008 inch.

Pump Bushing Replacement

(1) Place pump housing on a clean smooth surface

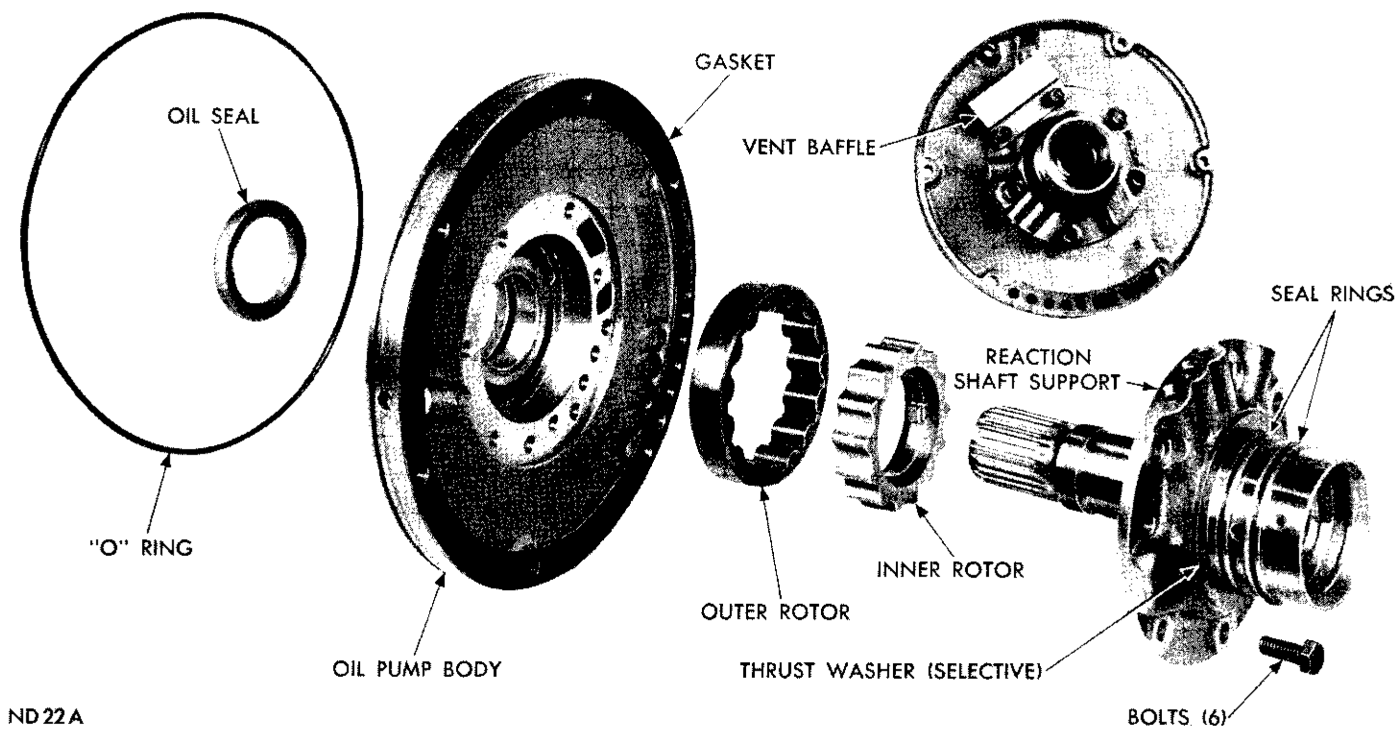


Fig. 49—Oil Pump and Reaction Shaft Support (A-727)

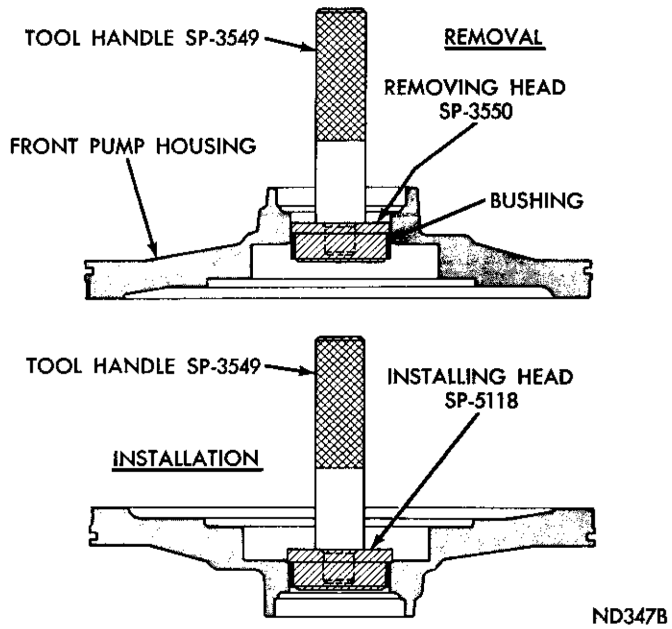


Fig. 50—Replacing Pump Bushing (A-727)

with the rotor cavity down.

(2) Place removing head Tool SP-3550 in the bushing, and install handle Tool SP-3549 in the removing head (Fig. 50).

(3) Drive bushing straight down and out of the bore. Be careful not to cock tool in the bore.

(4) Position a new bushing on the installing head Tool SP-5118.

(5) With pump housing on a smooth clean surface (hub end down), start bushing and installing head in the bushing bore. Install handle Tool SP-3549 in the installing head (Fig. 50).

(6) Drive bushing into housing until tool bottoms in the pump cavity. Be careful not to cock tool during installation.

(7) Stake bushing in place by using a blunt punch or similar tool (Fig. 51). A gentle tap at each stake slot location will suffice.

(8) Using a narrow-bladed knife or similar tool, remove high points or burrs around the staked area (Fig. 51). Do not use a file or similar tool that will remove more metal than is necessary.

(9) Thoroughly clean pump housing before installation.

Reaction Shaft Bushing Replacement

(1) Assemble remover Tool SP-5301, cup Tool SP-3633, and hex nut Tool SP-1191.

CAUTION: Do not clamp any part of reaction shaft or support in a vise.

(2) With cup held firmly against the reaction shaft, thread remover into bushing as far as possible by hand (Fig. 52).

(3) Using a wrench, screw remover into bushing 3 to 4 additional turns to firmly engage threads in the

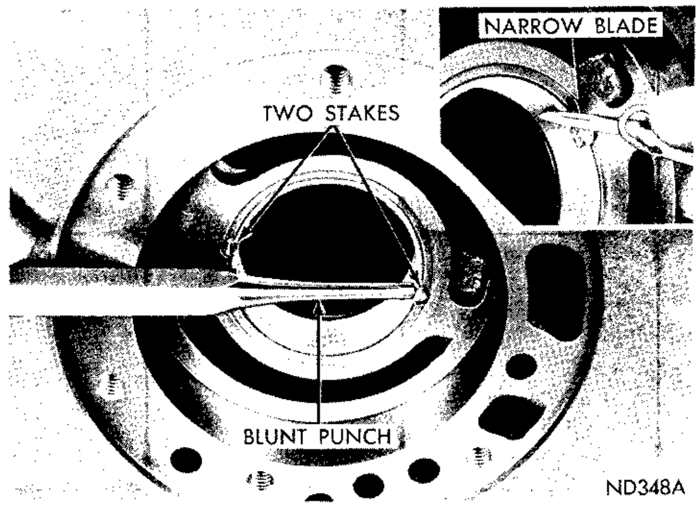


Fig. 51—Staking Pump Bushing (A-727)

bushing.

(4) Turn hex nut down against the cup to pull bushing from the reaction shaft. Thoroughly clean reaction shaft to remove chips made by the remover threads.

(5) Lightly grip bushing in a vise or with pliers and back tool out of the bushing. Be careful not to damage threads on the bushing remover.

(6) Slide a new bushing (chamfered end first) on installing head Tool SP-5302, and start them in bore of the reaction shaft.

(7) Support reaction shaft upright on a clean smooth surface and install handle Tool SP-3549 in the installing head (Fig. 52). Drive bushing into the shaft until tool bottoms.

(8) Thoroughly clean reaction shaft support assembly before installation.

Assembly

(1) Assemble pump rotors in the pump housing (Fig. 49).

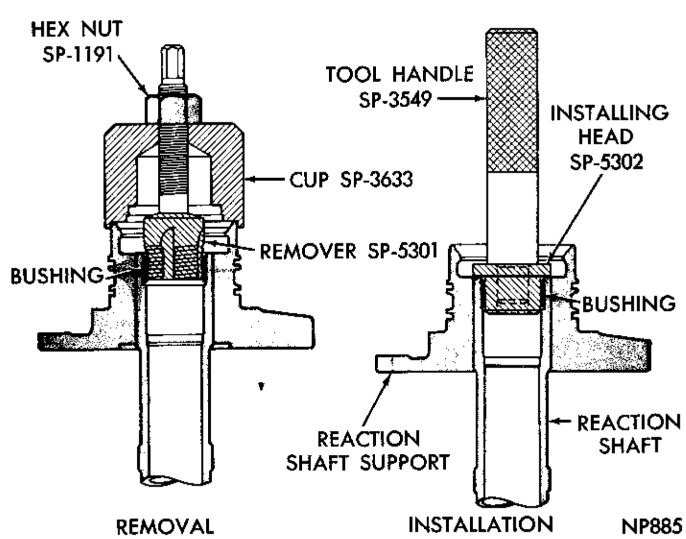


Fig. 52—Replacing Reaction Shaft Bushing (A-727)

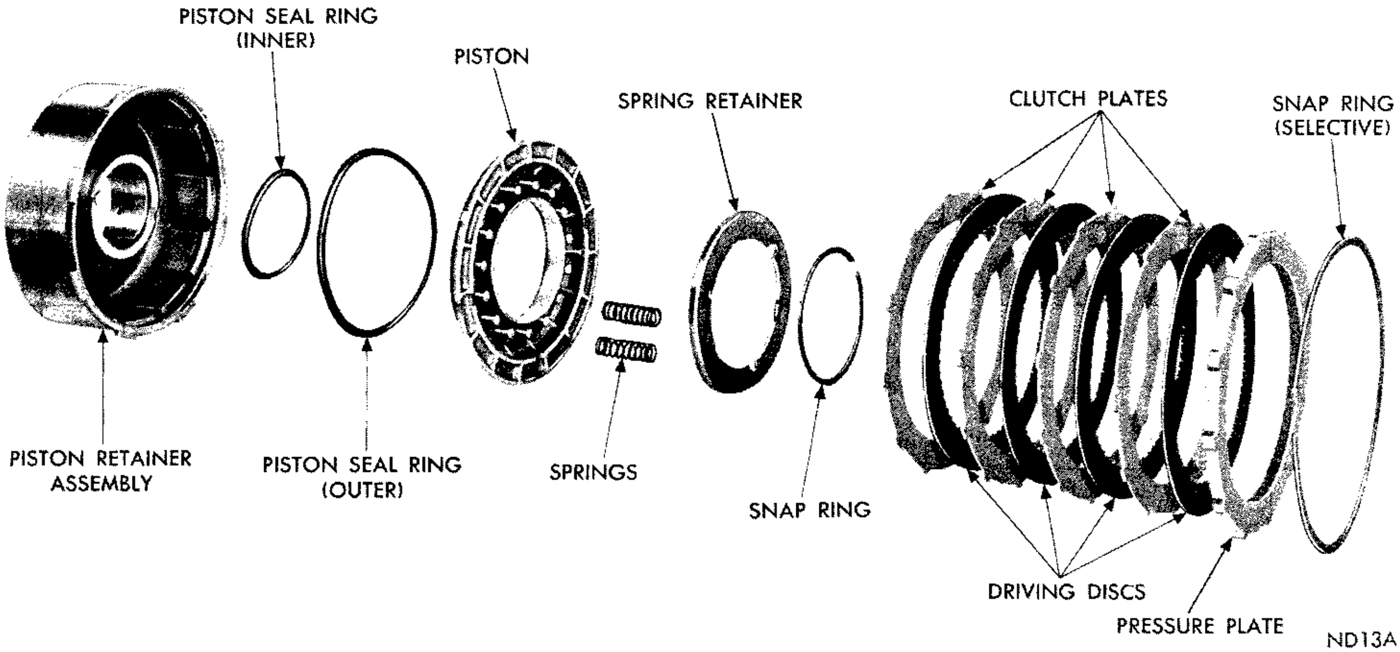


Fig. 53—Front Clutch Disassembled (A-727)

(2) Install reaction shaft support and position vent baffle over the vent opening. Install retaining bolts and tighten to 150 inch-pounds.

(3) Place a new oil seal in opening of pump housing (lip of seal facing inward) using Tool C-3860 drive seal into housing until tool bottoms.

FRONT CLUTCH

Disassembly

Figure 53 shows a disassembled view of the front clutch assembly.

(1) Remove large selective snap ring that secures pressure plate in the clutch piston retainer. Lift pressure plate and clutch plates out of the retainer.

(2) Install compressor, Tool C-3863 over the piston spring retainer (Fig. 54). Compress springs and remove snap ring, then slowly release tool until spring retainer is free of the hub. Remove tool, retainer and springs.

(3) Invert clutch retainer assembly and bump on a wood block to remove piston. Remove seals from piston and clutch retainer hub.

Inspection

Inspect facing material on all driving discs. Replace discs that are charred, glazed or heavily pitted. Discs should also be replaced if they show evidence of material flaking off or if the facing material can be scraped off easily. Inspect driving disc splines for wear or other damage. Inspect steel plate and pressure plate surfaces for burning, scoring or damaged driving lugs. Replace if necessary.

Inspect steel plate lug grooves in clutch retainer for smooth surfaces, plates must travel freely in the grooves. Inspect band contacting surface on clutch retainer for scores. Note ball check in clutch retainer, make sure ball moves freely. Inspect seal surfaces in clutch retainer for nicks or deep scratches, light scratches will not interfere with sealing of neoprene rings. Inspect clutch retainer bushing for wear or scores.

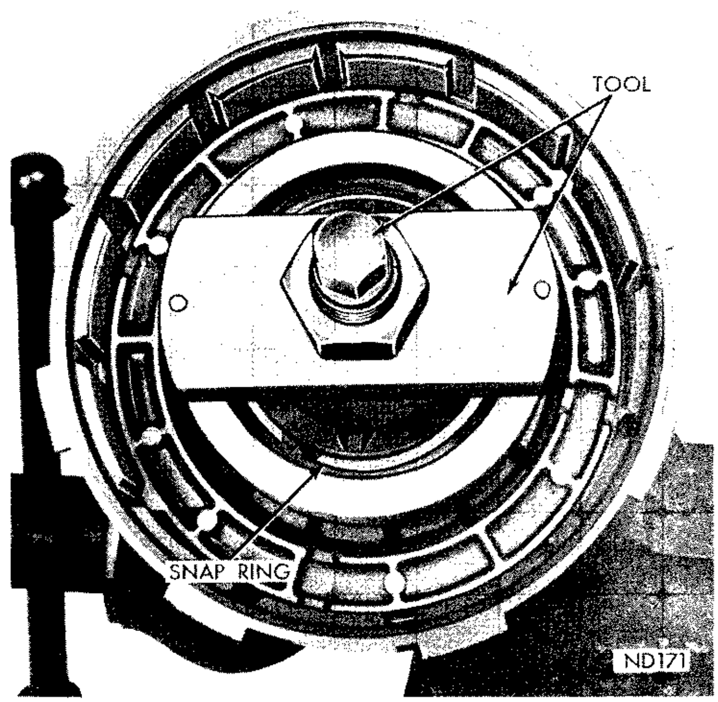


Fig. 54—Removing or Installing Front Clutch Retainer Snap Ring (A-727)

Inspect inside bore of piston for score marks, if light, remove with crocus cloth. Inspect seal grooves for nicks and burrs. Inspect neoprene seals for deterioration, wear, and hardness, and the piston springs, retainer and snap ring for distortion.

Front Clutch Retainer Bushing Replacement

(1) Lay clutch retainer (open end down) on a clean smooth surface and place removing head Tool SP-3629 in the bushing. Install handle Tool SP-3549 in removing head (Fig. 55).

(2) Drive bushing straight down and out of clutch retainer bore. Be careful not to cock tool in the bore.

(3) Lay clutch retainer (open end up) on a clean smooth surface. Slide a new bushing on installing head Tool SP-3628, and start them in clutch retainer bore.

(4) Install handle Tool SP-3549 in the installer (Fig. 55. Drive bushing into clutch retainer until tool bottoms.

(5) Thoroughly clean clutch retainer before assembly and installation.

Assembly

(1) Lubricate and install inner seal on hub of the clutch retainer. Make sure lip of seal faces down and is properly seated in the groove (Fig. 53).

(2) Install outer seal on the clutch piston, with lip of seal toward bottom of the clutch retainer. Apply a coating of wax type lubricant or Door Ease to outer edge of seal for easier installation of the piston assembly. Place piston assembly in retainer and carefully seat piston in bottom of the retainer.

(3) Install springs as shown in Figures 56, 57 or 58.

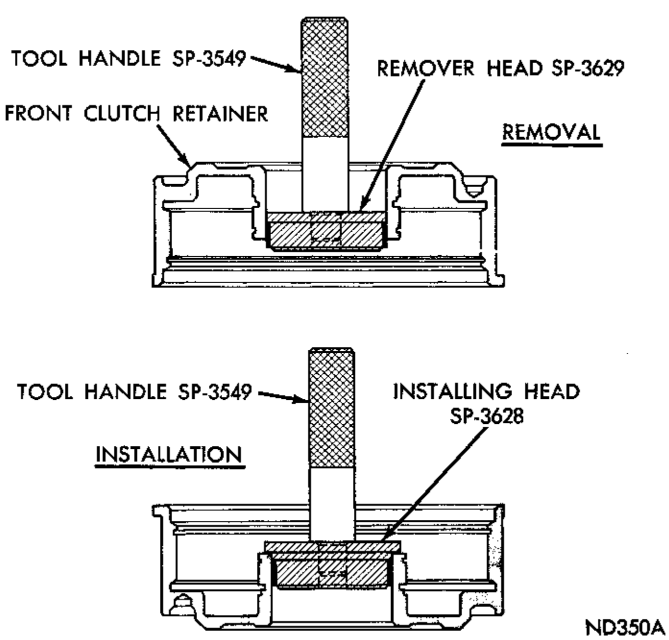


Fig. 55—Replacing Front Clutch Retainer Bushing (A-727)

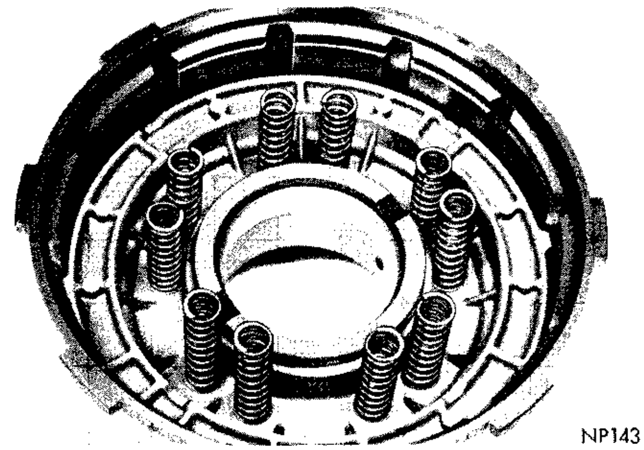


Fig. 56—Front Clutch Piston Return Spring Location (10 Springs)

Position spring retainer and snap ring over springs. Compress springs with Tool C-3863 (Fig. 54), and seat snap ring in the hub groove.

(4) Lubricate all clutch plates, install one steel plate followed by a lined plate until all plates are installed. Install pressure plate and selective snap ring. Make sure snap ring is properly seated.

(5) With front clutch completely assembled, insert a feeler gauge between pressure plate and snap ring (Fig. 59). The clearance should be .024 to .125 inch for 383 and 440 Cu. In. Eng. or .066 to .123 inch for 440 High Performance Engine. Install a snap ring of proper thickness to obtain specified clearance. **Snap**

FRONT CLUTCH CHART
(A-727)

Engine Type	Clutch Discs	Plate Clearance	Piston Springs
383 Cu. In.	4	.024 to .125″	8
(High. Perf.)	4	.024 to .125″	6
440 Cu. In.	4	.024 to .125″	6
(High Perf.)	4	.066 to .123″	10

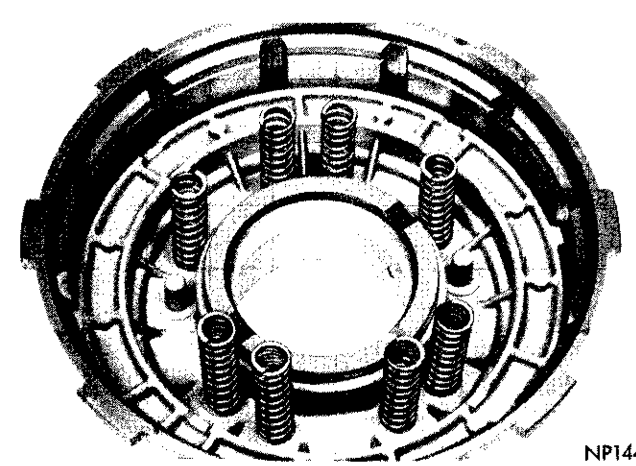


Fig. 57—Front Clutch Piston Return Spring Location (8 Springs)

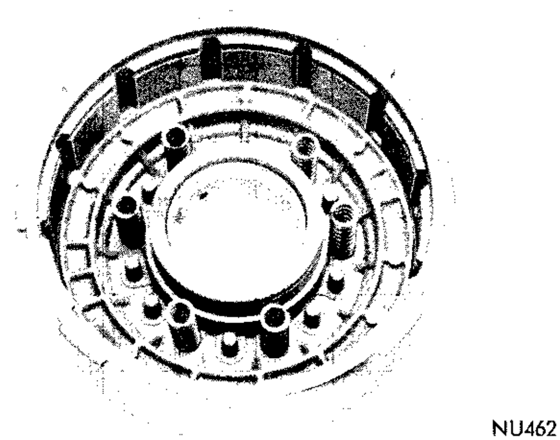


Fig. 58—Front Clutch Piston Return Spring Location (6 Springs)

rings are the same as that used in rear clutch and are available in .060-.062, .074-.076 and .088-.090 inch thickness.

REAR CLUTCH

Disassembly

Figure 60 shows a disassembled view of the rear clutch assembly.

(1) Remove large selective snap ring that secures pressure plate in the clutch retainer. Lift pressure plate, clutch plates, and inner pressure plate out of the retainer.

(2) Carefully pry one end of wave spring out of its groove in the clutch retainer, then remove wave spring, spacer ring and clutch piston spring.

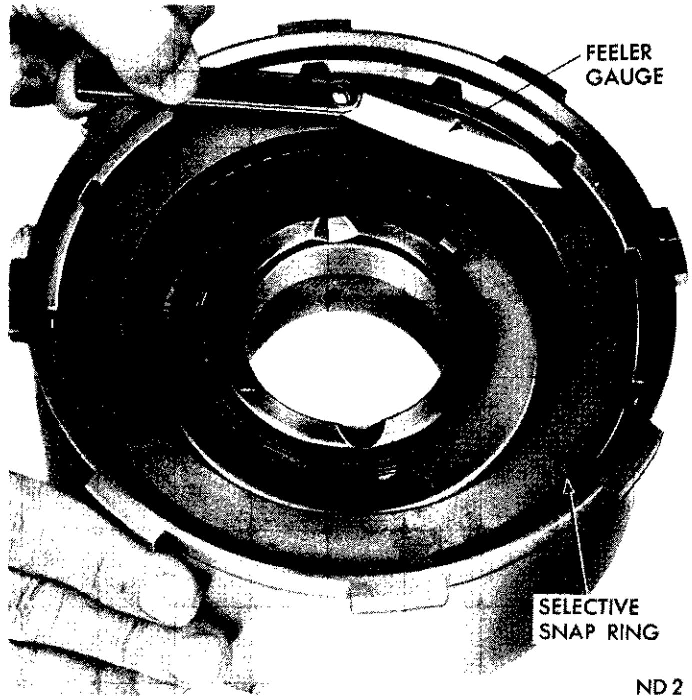


Fig. 59—Measuring Front Clutch Plate Clearance

(3) Invert clutch piston retainer assembly and bump on a wood block to remove the piston. Remove seals from the piston.

(4) If necessary, remove snap ring and press input shaft from the clutch piston retainer.

Inspection

Inspect facing material on all driving discs. Replace discs that are charred, glazed or heavily pitted. Discs

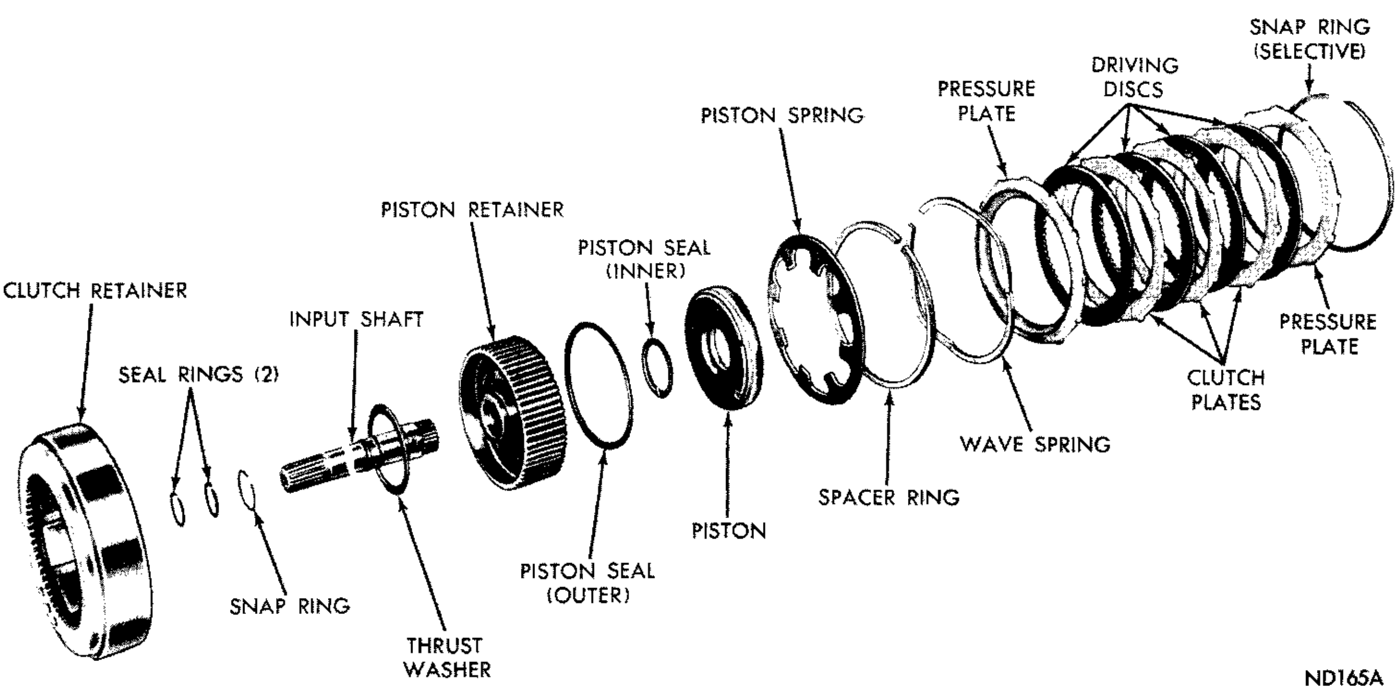


Fig. 60—Rear Clutch Disassembled (A-727)

should also be replaced if they show evidence of material flaking off or if facing material can be scraped off easily. Inspect driving disc splines for wear or other damage. Inspect steel plate and pressure plate surfaces for burning, scoring or damaged driving lugs. Replace if necessary.

Inspect steel plate lug grooves in clutch retainer for smooth surfaces, plates must travel freely in grooves. Note ball check in the piston, make sure ball moves freely. Inspect seal surfaces in clutch retainer for nicks or deep scratches, light scratches will not interfere with sealing of neoprene seals. Inspect neoprene seals for deterioration, wear, and hardness. Inspect piston spring, wave spring, and spacer for distortion or breakage.

Inspect interlocking seal rings (Fig. 60) on input shaft for wear or broken locks, make sure they turn freely in the grooves. Do not remove rings unless conditions warrant. Inspect bushing in the input shaft for wear or scores. Inspect rear clutch to front clutch thrust washer for wear. Washer thickness should be .061 to .063 inch, replace if necessary.

Input Shaft Bushing Replacement

(1) Clamp input shaft in a vise with soft jaws, being careful not to clamp on seal ring lands or journals.

(2) Assemble remover Tool SP-3630, cup Tool SP-3633, and hex nut Tool SP-1191.

(3) With cup held firmly against clutch piston retainer, thread remover into bushing as far as possible by hand (Fig. 61).

(4) Using a wrench, screw remover into bushing 3 to 4 additional turns to firmly engage threads in the bushing.

(5) Turn hex nut down against cup to pull bushing from the input shaft.

(6) Thoroughly clean input shaft to remove chips made by remover threads. Make certain small lubrication hole next to ball in end of shaft is not plugged with chips. Be sure no chips are lodged next to the steel ball.

(7) Slide a new bushing on installing head Tool SP-3636, and start them in bore of the input shaft.

(8) Stand input shaft upright on a clean smooth surface and install handle Tool SP-3549 in the installing head (Fig. 61). Drive bushing into shaft until tool bottoms.

(9) Thoroughly clean input shaft and clutch piston retainer before assembly and installation.

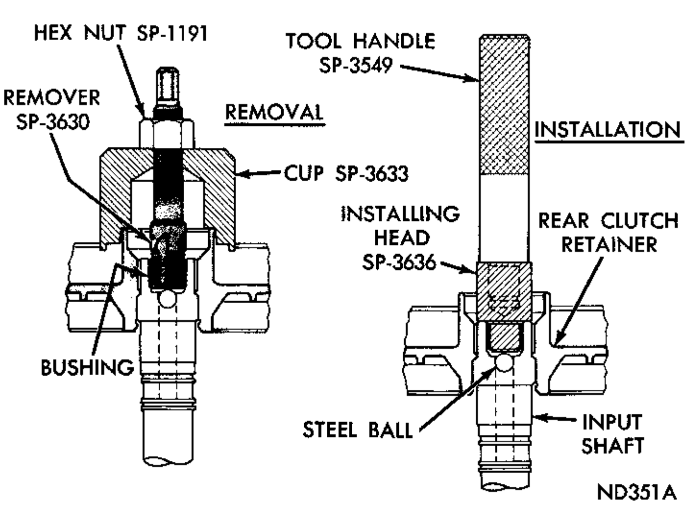


Fig. 61—Replacing Input Shaft Bushing (A-727)

Assembly

(1) If removed, press input shaft into clutch piston retainer and install snap ring.

(2) Lubricate and install inner and outer seal rings on the clutch piston. Make sure lip of seals face toward head of clutch retainer, and are properly seated in the piston grooves (Fig. 60).

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

(4) Position clutch retainer over piston retainer splines and support the assembly so clutch retainer remains in place.

(5) Place clutch piston spring and spacer ring on top of piston in clutch retainer, make sure spring and spacer ring are positioned in retainer recess. Start one end of wave spring in the retainer groove (Fig. 62), then progressively push or tap spring into place making sure it is fully seated in the groove.

(6) Install inner pressure plate in clutch retainer with raised portion of plate resting on the spring.

(7) Lubricate all clutch plates, install one lined plate followed by a steel plate until all plates are installed. Install outer pressure plate and selective snap ring.

(8) Measure rear clutch plate clearance by having an assistant press downward firmly on the outer pressure plate, then insert a feeler gauge between

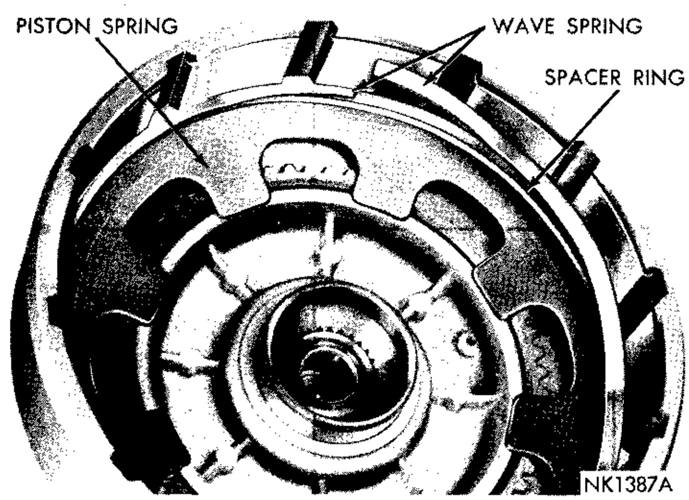


Fig. 62—Installing Rear Clutch Spring, Spacer Ring and Wave Spring

plate and snap ring (Fig. 63). The clearance should be between .025 to .045 inch. If not, install a snap ring of proper thickness to obtain specified clearance. Low limit clearance is desirable. **Rear clutch plate clearance is very important in obtaining proper clutch operation. The clearance can be adjusted by the use of various thickness outer snap rings. Snap rings are available in .060-.062, .074-.076, .088-.090 and .106-.108 inch thickness.**

PLANETARY GEAR TRAIN

Measure end play of planetary gear assemblies, sun gear and driving shell before removing these parts from the output shaft. With the assembly in an upright position, push rear annulus gear support downward on the output shaft. Insert a feeler gauge between rear annulus gear support hub and shoulder on the output shaft (Fig. 64). The clearance should be .010 to .037 inch. If clearance exceeds specifications, replace thrust washers and/or necessary parts.

Disassembly

(1) Remove thrust washer from forward end of the output shaft (Fig. 65).

(2) Remove selective snap ring from forward end of output shaft, then slide front planetary assembly off the shaft.

(3) Slide front annulus gear off the planetary gear set (Fig. 65). Remove thrust washer from rear side of the planetary gear set.

(4) Slide sun gear, driving shell and rear planetary assembly off the output shaft.

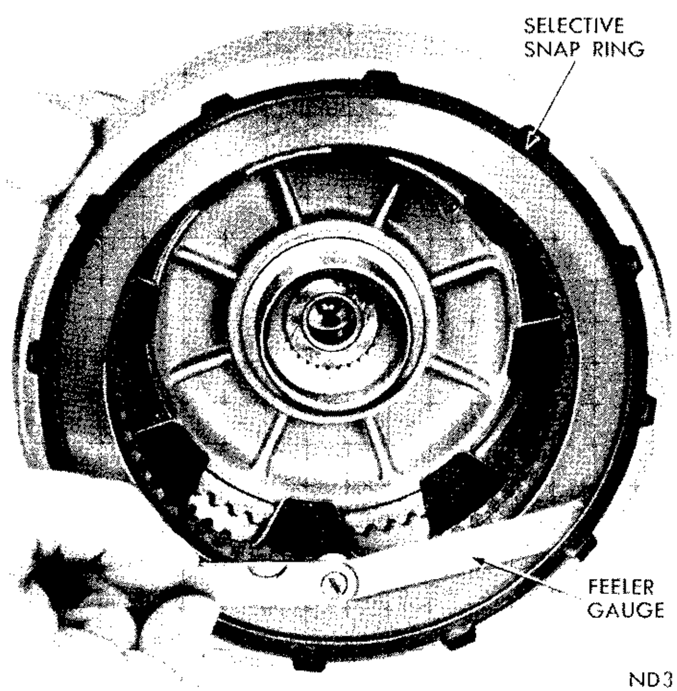


Fig. 63—Measuring Rear Clutch Plate Clearance

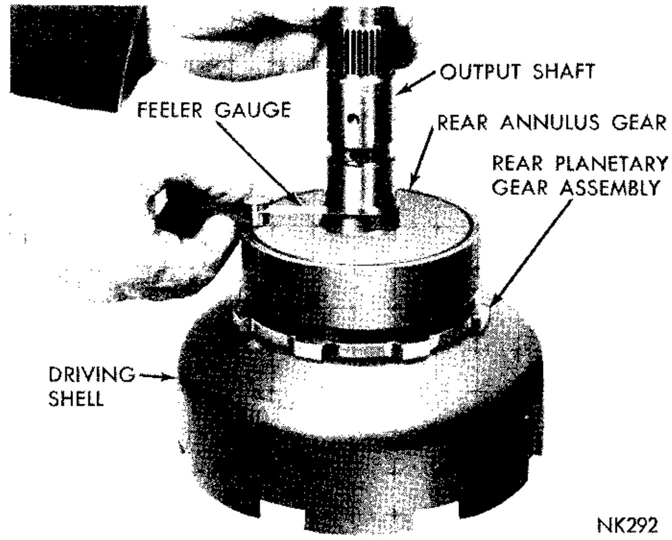


Fig. 64—Measuring End Play of Planetary Gear Assemblies

(5) Lift sun gear and driving shell off rear planetary gear assembly. Remove thrust washer from inside the driving shell. Remove snap ring and steel washer from sun gear (rear side of driving shell) and slide sun gear out of the shell. Remove front snap ring from the sun gear if necessary. Note that front end of sun gear is longer than the rear.

(6) Remove thrust washer from forward side of rear planetary gear assembly, remove planetary gear set and thrust plate from the rear annulus gear.

Inspection

Inspect bearing surfaces on output shaft for nicks, burrs, scores or other damage. Light scratches, small nicks or burrs can be removed with crocus cloth or a fine stone. Inspect speedometer drive gear for any nicks or burrs, and remove with a sharp edge stone. Make sure all oil passages in the shaft are open and clean.

Inspect bushings in sun gear for wear or scores, replace sun gear assembly if bushings are damaged. Inspect all thrust washers for wear and scores, replace if damaged or worn below specifications. Inspect thrust faces of planetary gear carriers for wear, scores or other damage, replace as required. Inspect planetary gear carrier for cracks and pinions for broken or worn gear teeth and for broken pinion shaft lock pins. Inspect annulus gear and driving gear teeth for damage. Replace distorted lock rings.

Assembly

Refer to Figure 65 for parts references.

(1) Install rear annulus gear on the output shaft. Apply a thin coat of grease on thrust plate, place it on the shaft and in the annulus gear making sure teeth are over the shaft splines.

(2) Position rear planetary gear assembly in rear

annulus gear. Place thrust washer on front side of the planetary gear assembly.

(3) Install snap ring in front groove of sun gear (long end of gear). Insert sun gear through front side of driving shell, install rear steel washer and snap ring.

(4) Carefully slide driving shell and sun gear assembly on the output shaft, engaging sun gear teeth with rear planetary pinion teeth. Place thrust washer inside front of the driving shell.

(5) Place thrust washer on rear hub of front planetary gear set, then slide assembly into front annulus gear.

(6) Carefully work front planetary and annulus gear assembly on the output shaft, meshing planetary pinions with the sun gear teeth.

(7) With all components properly positioned, install selective snap ring on front end of the output shaft. Re-measure end play of the assembly. **The clearance can be adjusted by the use of various thickness snap rings. Snap rings are available in .048-.052, .055-.059 and .062-.066 inch thickness.**

OVERRUNNING CLUTCH

Inspection

Inspect clutch rollers for smooth round surfaces, they must be free of flat spots and chipped edges. Inspect roller contacting surfaces in the cam and race for brinelling. Inspect roller springs for distortion, wear or other damage. Inspect cam set screw for tightness. If loose, tighten and restake case around the screw.

Overrunning Clutch Cam Replacement

If overrunning clutch cam and/or roller spring retainer are found damaged, replace cam and spring retainer in the following manner:

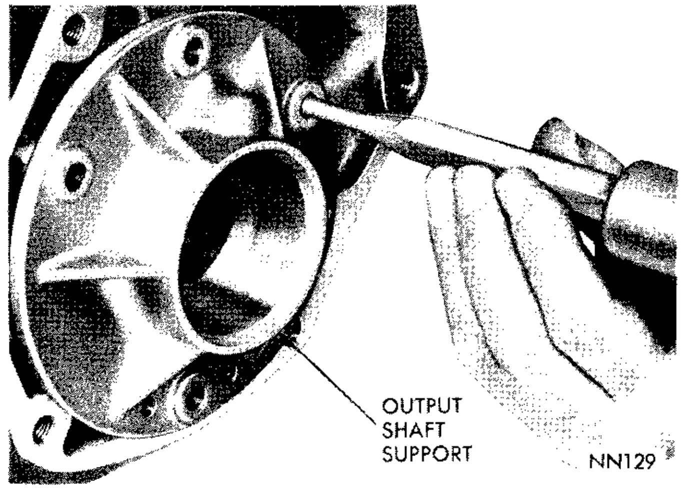


Fig. 66—Removing Overrunning Clutch Cam (A-727)

(1) Remove set screw from case below the clutch cam.

(2) Remove four bolts securing output shaft support to rear of the transmission case. Insert a punch through the bolt holes and drive cam from the case (Fig. 66). Alternate the punch from one bolt hole to another so cam will be driven evenly from the case.

IMPORTANT: The output shaft support must be in the case to install the overrunning clutch cam.

If the support requires replacement, drive it rearward out of the case with a wood block and hammer. To install, screw two C-3288 pilot studs into the case (Fig. 67). Chill the support with ice (preferably dry ice). Quickly position support over the pilot studs, and drive it firmly into the case with a wood block and hammer.

(3) Clean all burrs and chips from cam area in the case.

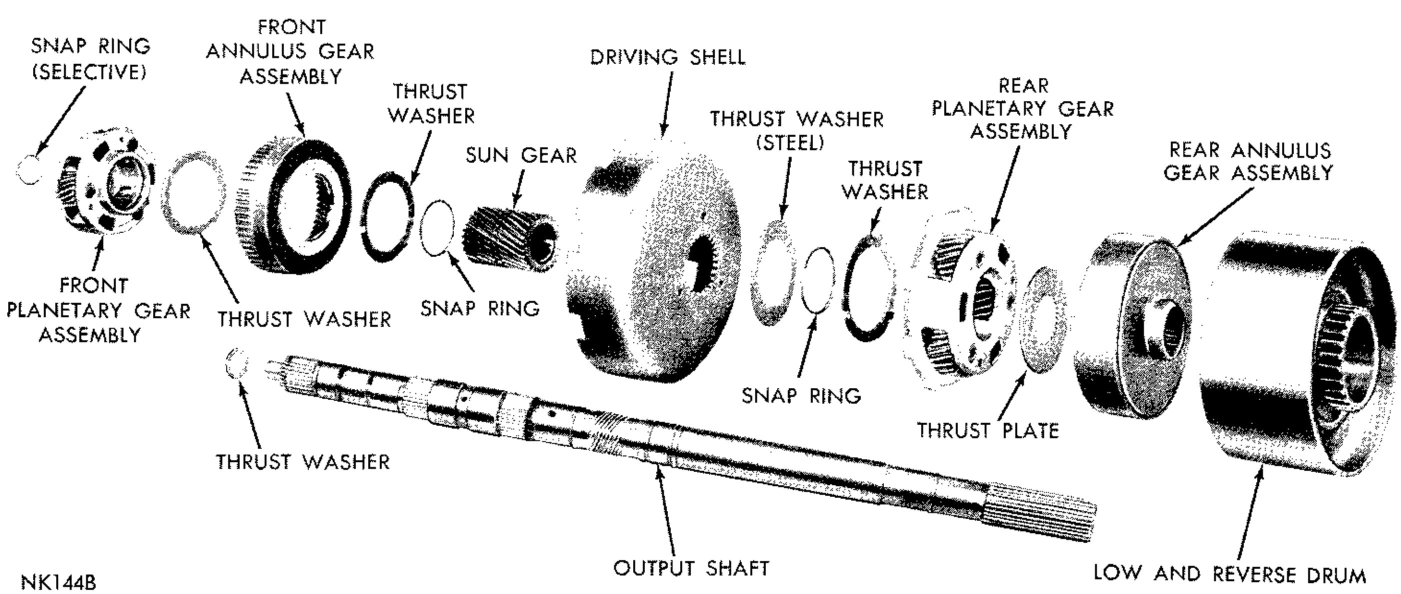


Fig. 65—Planetary Gear Train and Output Shaft Disassembled (A-727)

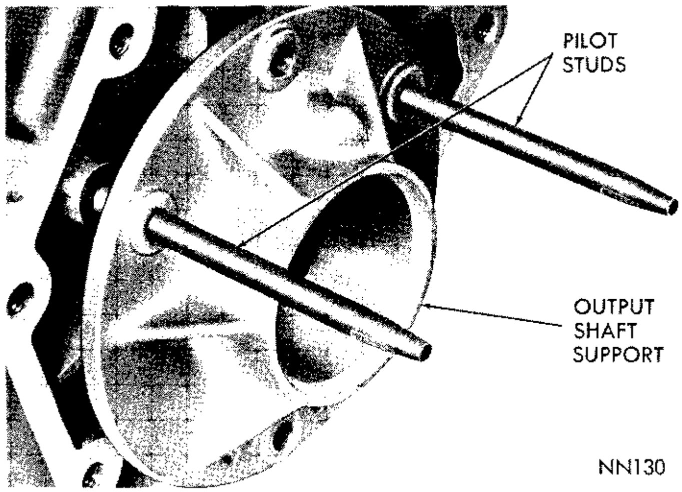


Fig. 67—Installing Output Shaft Support (A-727)

(4) Place spring retainer on the cam, making sure retainer lugs snap firmly into notches on the cam.

(5) Position cam in the case with cam serrations aligned with those in the case. Tap cam **evenly** into the case as far as possible with a soft mallet.

(6) Install Tool C-3863 and Adapter SP-5124 as shown in Figure 68, tighten nut on tool to seat cam into the case. Make sure cam is firmly bottomed, then install cam retaining set screw. Stake case around set screw to prevent it coming loose.

(7) Remove cam installing tool. Install and tighten support retaining screws to 150 inch-pounds. Stake case around the cam in twelve places with a blunt chisel (Fig. 69).

KICKDOWN SERVO AND BAND

Inspection

Figure 70 shows a disassembled view of the kickdown servo assembly. **The large outer spring shown in Figure 70 is not used in transmissions with "Hi-Performance" engines.**

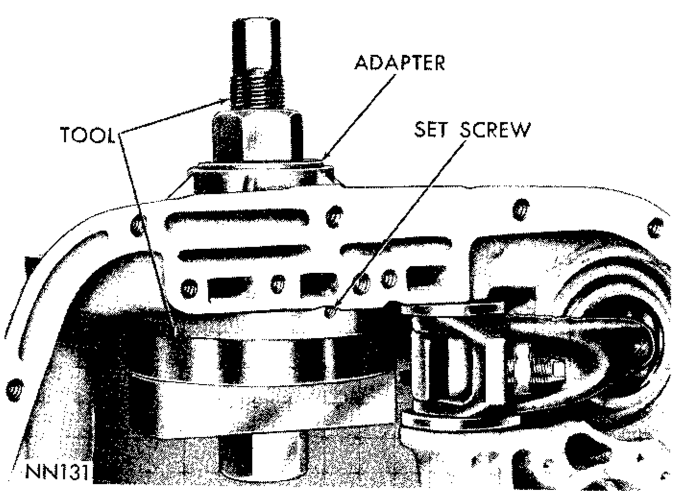


Fig. 68—Installing Overrunning Clutch Cam (A-727)

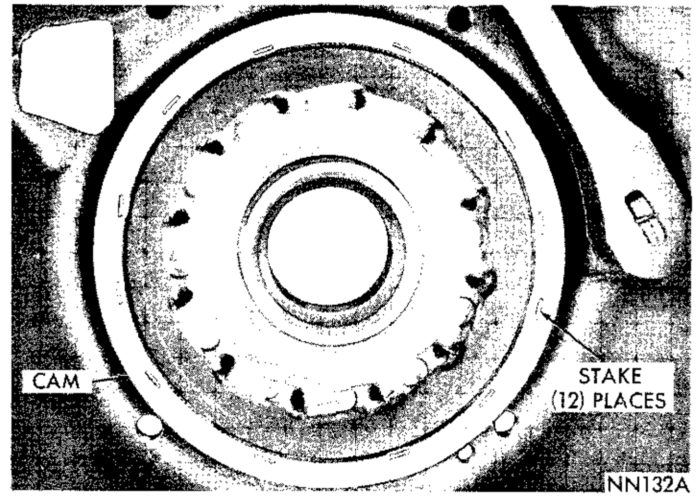


Fig. 69—Overrunning Clutch Cam Staked (A-727)

Inspect piston and guide seal rings for wear, and make sure they turn freely in the grooves. It is not necessary to remove seal rings unless conditions warrant. Inspect piston for nicks, burrs, scores and wear and piston bore in the case for scores or other damage. Inspect fit of guide on piston rod and piston spring for distortion.

Inspect band lining for wear and bond of lining to band and lining for black burn marks, glazing, non-uniform wear pattern and flaking. If lining is worn so grooves are not visible at ends or any portion of band, replace the band. Inspect band for distortion or cracked ends.

LOW—REVERSE SERVO AND BAND

Disassembly

(1) Remove snap ring from piston plug and remove plug and spring from the piston (Fig. 71).

Inspection

Inspect seal for deterioration, wear and hardness. Inspect piston and piston plug for nicks, burrs, scores and wear; piston plug must operate freely in the piston. Inspect piston bore in the case for scores or other damage and springs for distortion. Inspect band lining for wear and bond of lining to the band. If

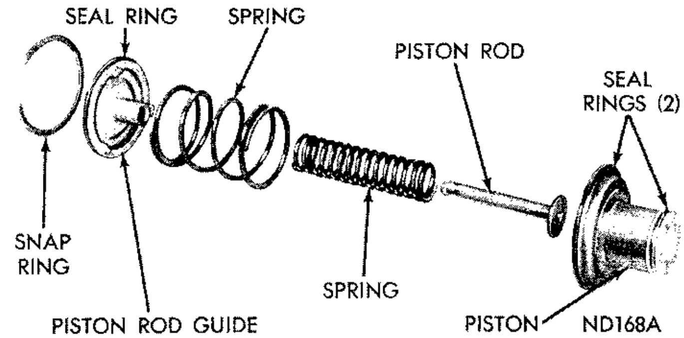


Fig. 70—Kickdown Servo

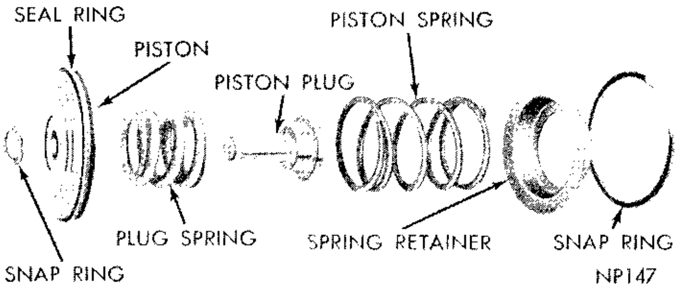


Fig. 71—Low and Reverse Servo

lining is worn so grooves are not visible at ends or any portion of band, replace the band. Inspect band for distortion or cracked ends.

Assembly

(1) Install piston plug and spring in the piston and secure with snap ring.

ASSEMBLY—SUB-ASSEMBLY INSTALLATION

The assembly procedures given here include installation of sub-assemblies in the transmission case and adjusting drive train end play. Do not use force to assemble mating parts. If parts do not assemble freely, investigate cause, and correct the trouble before proceeding with assembly procedures. Always use new gaskets during assembly operations.

IMPORTANT: Use only Automatic Transmission Fluid AQ-ATF Suffix "A" (Dexron) to lubricate transmission parts during assembly.

Overrunning Clutch

(1) With transmission case in an upright position, insert clutch hub inside the cam. Install overrunning clutch rollers and springs exactly as shown in Figure 72.

Low—Reverse Servo and Band

(1) Carefully work servo piston assembly into the case with a twisting motion. Place spring, retainer and snap ring over the piston (Fig. 71).

(2) Compress low and reverse servo piston spring by using engine valve spring compressor Tool C-3422, then install snap ring.

(3) Position rear band in the case, install short strut, then connect long link and anchor to the band (Fig. 73). Screw in band adjuster just enough to hold strut in place. Be sure long link and anchor assembly is installed, as shown in Figure 72 to provide a running clearance for the low and reverse drum. Install the low-reverse drum.

Kickdown Servo

(1) Carefully push servo piston into the case bore. Install piston rod, two springs and the guide (Fig. 70). **The transmission used with "HI-Performance" engines, use only one small inner spring in the kickdown servo.**

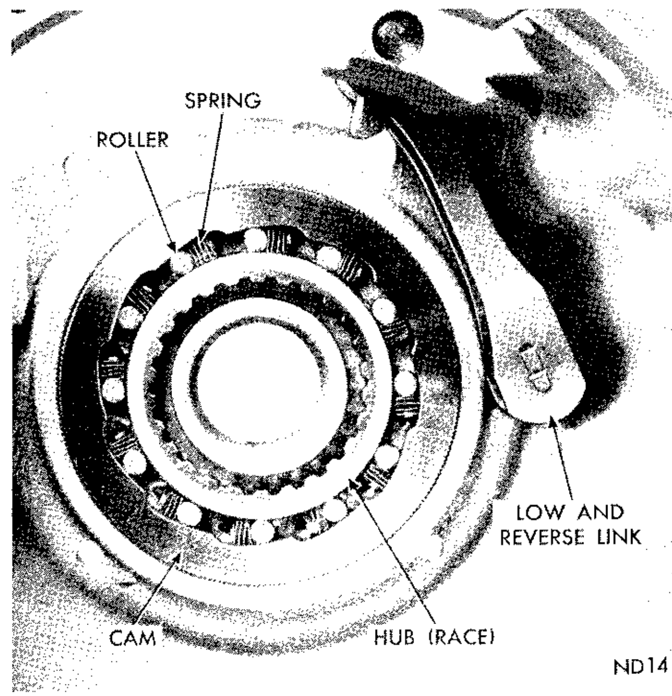


Fig. 72—Overrunning Clutch, Low and Reverse Band Link

(2) Compress kickdown servo springs by using engine valve spring compressor Tool 3422, then install snap ring.

Planetary Gear Assemblies, Sun Gear and Driving Shell

(1) While supporting assembly in the case, insert output shaft through the rear support. Carefully work assembly rearward engaging rear planetary carrier

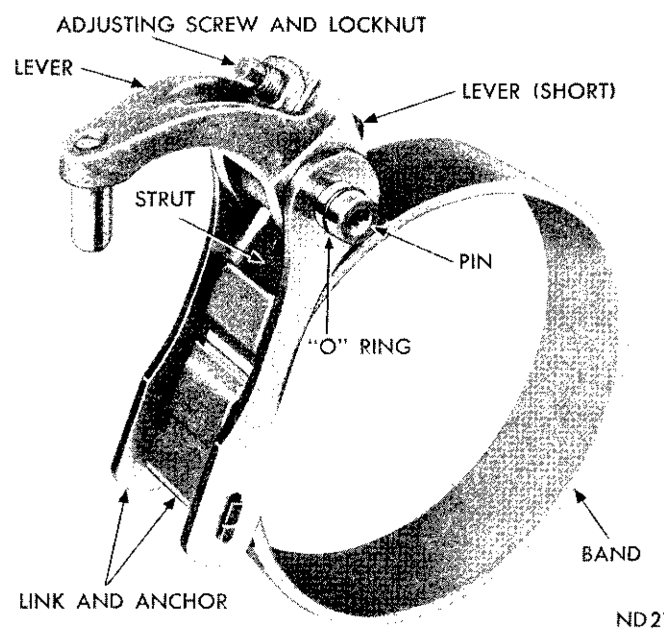


Fig. 73—Low-Reverse Band and Linkage

lugs into the low-reverse drum slots.

CAUTION: Be very careful not to damage ground surfaces on output shaft during installation.

Front and Rear Clutch Assemblies

The front and rear clutches, front band, pump and reaction shaft support are more easily installed with transmission in an upright position.

If transmission repair stand DD-1014 was not available to support transmission, an alternate method is outlined in Steps 1 and 2.

(1) Cut a 3-1/2 inch diameter hole in a bench, in the end of a small oil drum or a large wooden box strong enough to support transmission. Cut or file notches at the edge of the 3-1/2 inch hole so output shaft support will fit and lay flat in the hole.

(2) Carefully insert output shaft into the hole to support the transmission upright, with its weight resting on flange of the output shaft support.

(3) Apply a coat of grease on the input to output shaft thrust washer (Fig. 65), and install the washer on front end of the output shaft.

(4) Align front clutch plate inner splines, and place assembly in position on the rear clutch. Make sure front clutch plate splines are fully engaged on the rear clutch splines.

(5) Align rear clutch plate inner splines, grasp input shaft and lower the two clutch assemblies into the transmission case.

(6) Carefully work clutch assemblies in a circular motion to engage rear clutch splines over splines of the front annulus gear. Make sure front clutch drive lugs are fully engaged in slots in the driving shell.

Front Band

Figure 74 shows disassembled view of the kickdown band assembly.

(1) Slide the band over front clutch assembly.

(2) Install the band strut, screw in adjuster just enough to hold strut and anchor in place.

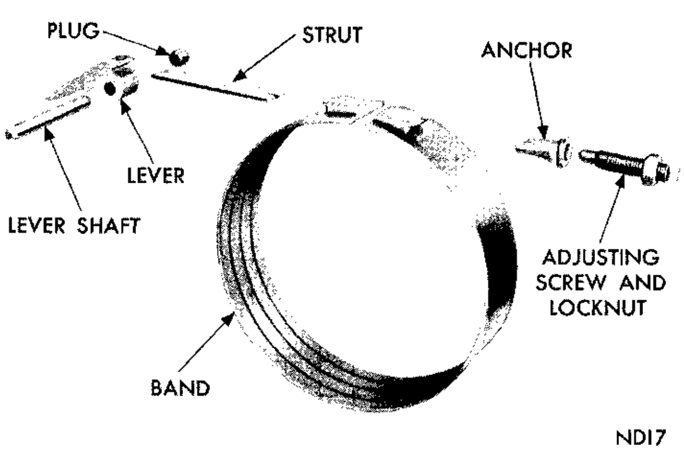


Fig. 74—Kickdown Band and Linkage

Oil Pump and Reaction Shaft Support

If difficulty was encountered in removing the oil pump assembly due to an exceptionally tight fit in the case, it may be necessary to expand the case with heat during pump installation. Using a suitable heat lamp, heat the case in area of the pump for a few minutes prior to installing pump and reaction shaft support assembly.

If drive train end play was not within specifications .037-.084 inch) when measured, replace the thrust washer on reaction shaft support hub with one of proper thickness (Fig. 49).

The following selective thrust washers are available:

Thickness	Color
.061-.063 inch	Green
.084-.086 inch	Red
.102-.104 inch	Yellow

(1) Screw two pilot studs, Tool C-3288 in oil pump opening in the case (Fig. 75). Install a new gasket over the pilot studs.

(2) Place a new rubber seal ring in the groove on outer flange of pump housing. Make sure seal ring is not twisted. Coat seal ring with grease for easy installation.

(3) Install pump assembly in the case, tap it lightly with a soft mallet if necessary. Place the deflector over vent opening and install four pump body bolts. Remove pilot studs, install remaining bolts and snug all bolts down evenly.

Rotate input and output shafts to see if any binding exists, then tighten bolts to 175 inch-pounds. Check shafts again for free rotation.

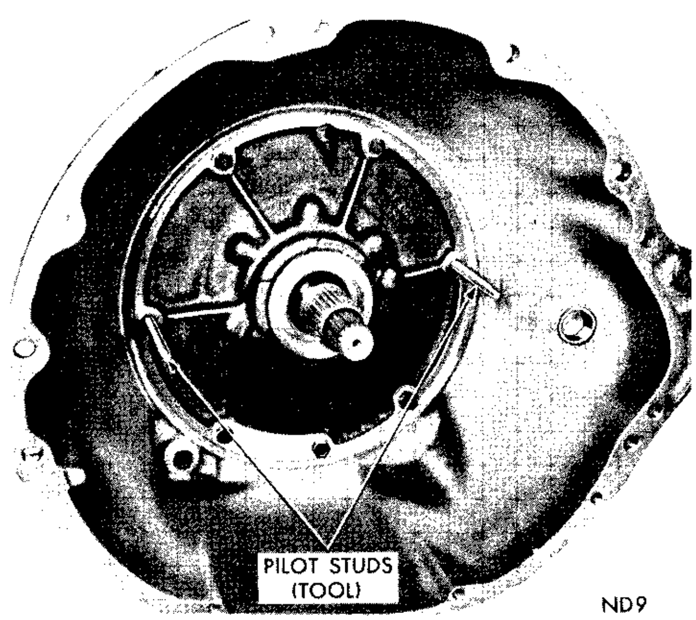


Fig. 75—Installing Pump and Reaction Shaft Support Assembly

Governor and Support

(1) Position support and governor body assembly on the output shaft. Align assembly so governor valve shaft hole in governor body aligns with hole in the output shaft, then slide assembly into place. Install snap ring behind the governor body. Tighten housing to support bolts to 100 inch-pounds. Bend ends of lock straps against the bolt heads.

(2) Place governor valve on valve shaft, insert the assembly into the body and through governor weights. Install valve shaft retaining snap ring.

Output Shaft Bearing and Extension Housing

(1) Install a snap ring in the innermost groove on the output shaft. Install bearing on the shaft with its outer race ring groove toward the front (Fig. 24). Press or tap bearing tight against front snap ring, then install rear snap ring.

(2) Place a new extension housing gasket on the transmission case. Position output shaft bearing retaining snap ring in the extension housing. Spread snap ring as far as possible (Fig. 23), then carefully tap extension housing into place. **Make sure snap ring is fully seated in the bearing groove.**

(3) Install and tighten extension housing bolts to 24 foot-pounds.

(4) Install gasket, plate and two screws on bottom of extension housing mounting pad.

(5) Install speedometer pinion and adapter assembly. **IMPORTANT: Measure drive train end play as described under "Disassembly—Sub-Assembly Removal". Correct if necessary.**

Valve Body Assembly and Accumulator Piston

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

(2) Install accumulator piston in transmission case and place piston spring on the accumulator piston (Fig. 76). Make sure Back-Up Light and Neutral Start Switch has been removed.

(3) Insert parking lock rod through opening in rear of case with knob positioned against the reaction plug and sprag. Move front end of rod toward center of transmission while exerting rearward pressure on rod to force it past the sprag (rotate output shaft if necessary).

(4) Place valve body manual lever in **LOW** position. Place valve body in its approximate position in the case, connect parking lock rod to the manual lever and secure with the E-clip. Align valve body in the case, install retaining bolts finger tight.

(5) With neutral starting switch installed, place manual valve in the neutral position. Shift valve body if necessary to center the neutral finger over the neutral switch plunger. Snug bolts down evenly, then tighten to 100 inch-pounds.

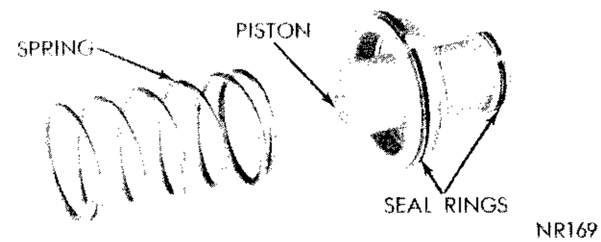


Fig. 76—Accumulator Piston and Spring

(6) Install gearshift lever and tighten clamp bolt. Check lever shaft for binding in the case by moving lever through all detent positions. If binding exists, loosen valve body bolts and re-align.

(7) Install flat washer and throttle lever, then tighten lever clamp bolt.

(8) Adjust the kickdown, and low-reverse bands.

(9) Install oil pan, using a new gasket. Tighten pan bolts to 150 inch-pounds.

TRANSMISSION—CONVERTER AND DRIVE PLATE INSTALLATION

The transmission and converter must be installed as an assembly; otherwise, the converter drive plate, pump bushing, and oil seal will be damaged. The drive plate will not support a load; therefore, none of the weight of the transmission should be allowed to rest on the plate during installation.

(1) Rotate pump rotors with Tool C-3881 until the two small holes in handle of Tool are vertical (Fig. 77).

(2) Carefully slide converter assembly over the input shaft and reaction shaft. Make sure converter impeller shaft slots are also vertical and fully engage the pump inner rotor lugs.

Inspect for full engagement by placing a straightedge on face of the case (Fig. 78). The surface of

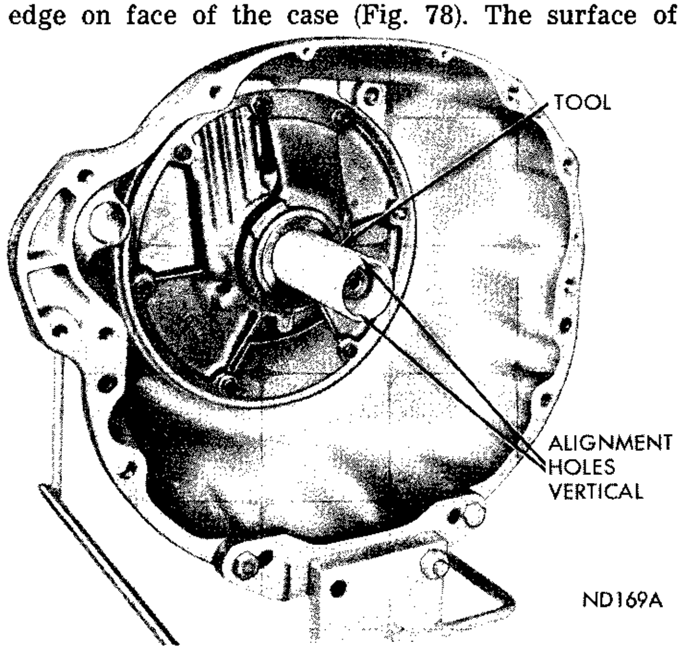


Fig. 77—Aligning Pump Rotors

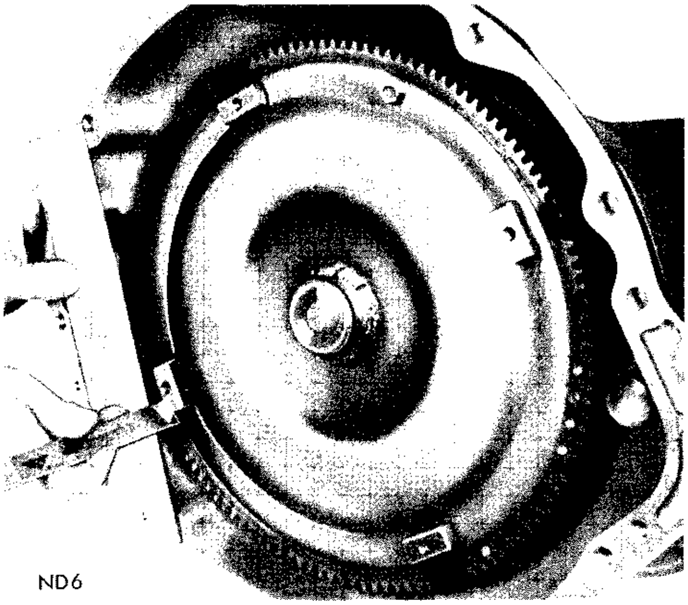


Fig. 78—Measuring Converter for Full Engagement in Transmission

converter front cover lug should be at least 1/2 inch rear of straightedge when converter is pushed all way into the transmission.

(3) Attach a small "C" clamp to edge of converter housing to hold converter in place during transmission installation.

(4) Inspect converter drive plate for distortion or cracks and replace if necessary. Torque Drive Plate to Crankshaft bolts to 55 foot pounds. **When Drive Plate replacement has been necessary, make sure transmission dowel pins are in engine block and pro-**

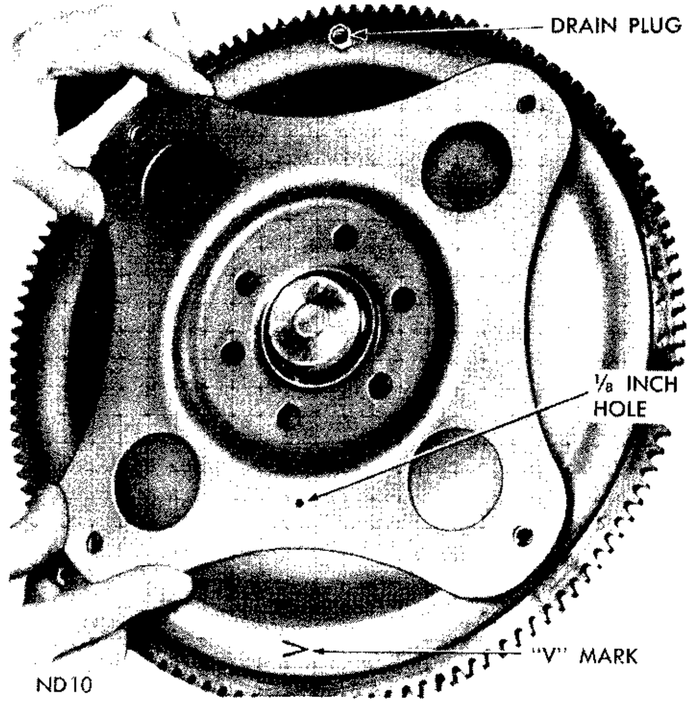


Fig. 79—Converter and Drive Plate Markings

truding far enough to hold transmission in alignment.

(5) Coat converter hub hole in crankshaft with wheel bearing lubricant. Place transmission and converter assembly on a service jack and position assembly under vehicle for installation. Raise or tilt as necessary until transmission is aligned with the engine.

(6) Rotate converter so mark on converter (made during removal) will align with mark on drive plate.

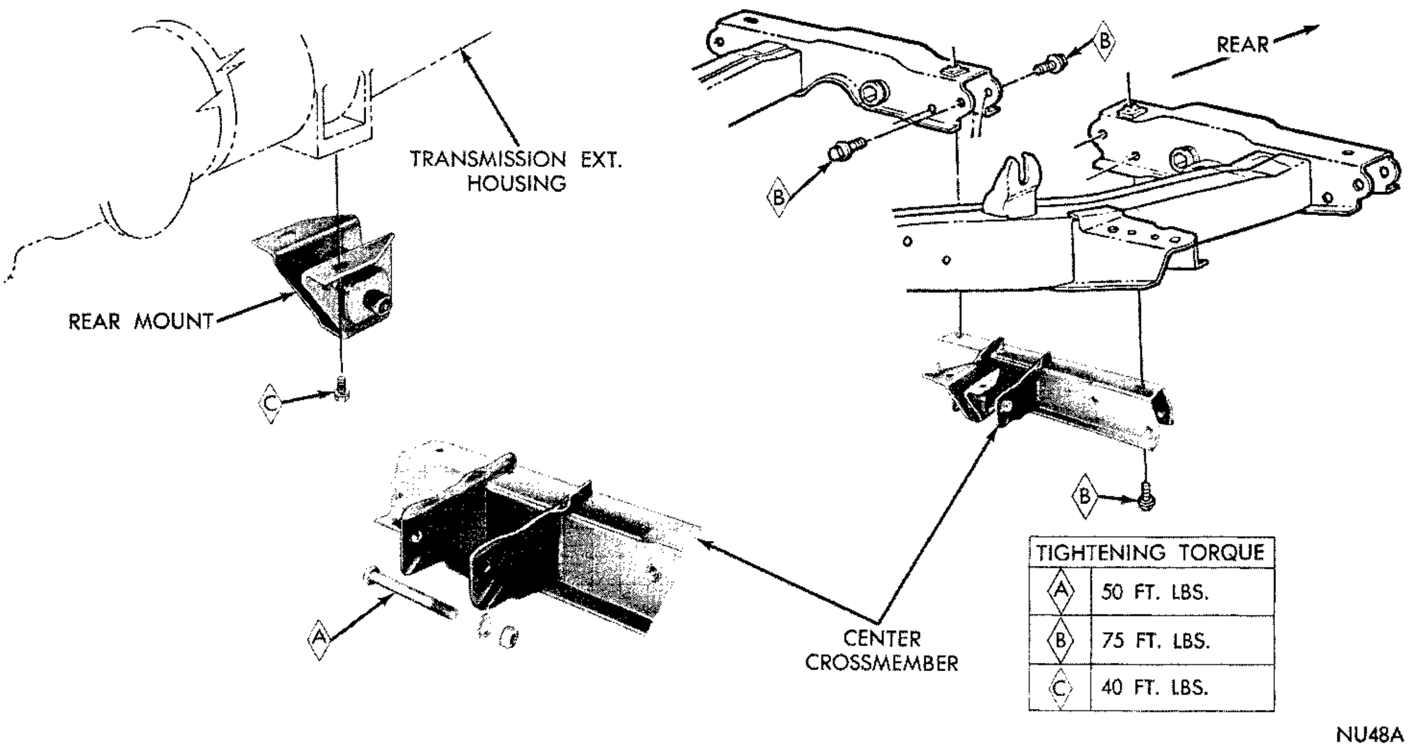


Fig. 80—Center Crossmember and Rear Engine Mount

The offset holes in plate are located next to the 1/8 inch hole in the inner circle of the plate. A stamped V mark identifies offset hole in the converter front cover (Fig. 79). Carefully work transmission forward over engine block dowels with converter hub entering the crankshaft opening.

(7) After transmission is in position, install converter housing bolts and tighten to 28 foot-pounds.

(8) Install two lower drive plate to converter bolts and tighten to 270 inch-pounds.

(9) Install starting mtotor and connect battery ground cable.

(10) Rotate engine with Remote Control Switch and install the other two drive plate to converter bolts. Tighten bolts to 270 inch-pounds.

(11) Install crossmember and tighten attaching bolts to 75 foot-pounds.

Imperial Models: Position center crossmember in the stub frame. Start all retaining bolts including the four rubber isolator bolts, then tighten all bolts to 75 foot-pounds.

(12) Lower transmission so extension housing is aligned and rests on rear mount. Install bolts and tighten to 40 foot-pounds (Fig. 80). Engine mount to center crossmember bolt and nut, loose assembled to this point, should now be torqued to 50 foot-pounds.

(13) Install gearshift torque shaft and connect gearshift rod to the transmission lever.

Console Shift: Align gearshift torque shaft lower bracket with the extension housing. Install the two retaining bolts and tighten securely. Connect gearshift rod to the transmission lever.

(14) Carefully guide sliding yoke into extension housing and on the output shaft splines. Align marks made at removal then connect propeller shaft to the rear axle pinion shaft yoke.

(15) Connect oil cooler lines to the transmission. Install the oil filler tube. Connect the speedometer cable.

(16) Connect throttle rod to bellcrank at left side of transmission bell housing.

(17) Connect wire to the back-up light and neutral starting switch.

(18) Install cover plate in front of the converter assembly.

(19) Refill transmission with Automatic Transmission Fluid, AQ-ATF Suffix "A" (Dexron).

(20) Adjust throttle and gearshift linkage.

FLUID LEAKAGE—TRANSMISSION CONVERTER HOUSING AREA

(1) **Check for Source of Leakage**

Since fluid leakage at or around the converter area may originate from an engine oil leak, the area should be examined closely. Factory fill fluid is dyed red and, therefore, can be distinguished from engine oil.

(2) Prior to removing the transmission, perform the following checks:

When leakage is determined to originate from the transmission, check fluid level and torque converter drain plug torque prior to removel of the transmission and torque converter.

High oil level can result in oil leakage out the vent located at the top of the front pump housing. If the fluid level is high, adjust to proper level.

Oil leakage can also occur at the torque converter drain plug. Torque the drain plug to 110 inch-pounds.

After performing these two operations, re-check for leakage. If a leak persists, perform the following operation on the car to determine whether it is the **converter** or **transmission** that is leaking.

LEAKAGE TEST PROBE

(1) Remove converter housing dust shield.

(2) Position vehicle with front lower than back so that accumulated fluid in converter housing will drain out. Wipe bottom inside of converter housing as dry as possible. A solvent spray followed by compressed air drying is preferable.

(3) Fasten test probe (Fig. 1) securely to convenient dust shield bolt hole. Make certain converter is cleared by test probe. Tool must be clean and dry.

(4) Run engine at approximately 2,500 rpm with transmission in neutral, for about 2 minutes. Transmission must be at operating temperature.

(5) Stop engine and carefully remove tool.

(6) If upper surface of test probe is dry, there is no converter leak. A path of fluid across probe indicates a converter leak. Oil leaking under the probe is coming from the transmission converter area (Fig. 2).

(7) Remove transmission and torque converter assembly from vehicle for further investigation. The fluid should be drained from the transmission and converter. Re-install converter drain plug and oil pan (with new gasket) at specified torque.

Possible sources of transmission converter area fluid leakage shown in (Fig. 2) are:

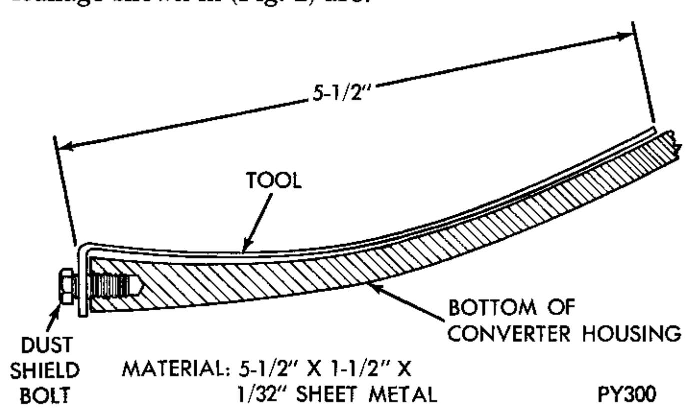


Fig. 1—Leak Locating Test Probe Tool

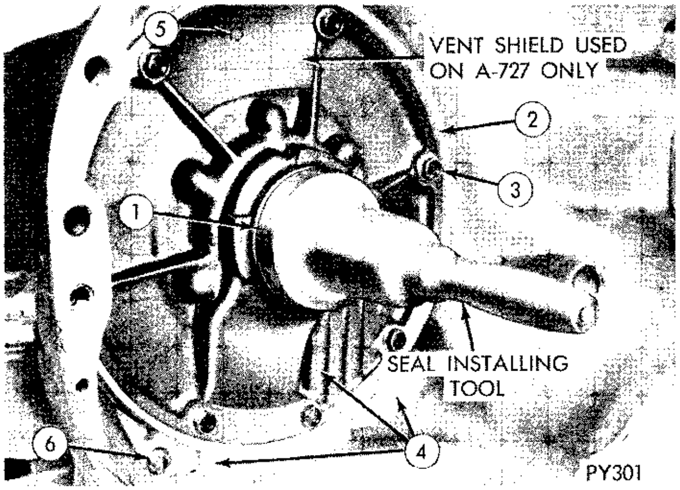


Fig. 2—Transmission Converter Area

(1) **Converter Hub Seal**

(a) Seal lip cut, check converter hub finish.

(b) Bushing moved and/or worn.

(c) Oil return hole in front pump housing plugged or omitted.

(d) Seal worn out (high mileage cars).

(2) Fluid leakage at the outside diameter from pump housing "O" ring seal.

(3) Fluid leakage at the front pump to case bolts.

(4) Fluid leakage due to case or front pump housing porosity.

(5) Oil leakage out the vent.

(6) Kickdown lever shaft access plug.

Possible sources of converter leakage shown in (Fig. 3) are:

(1) Torque converter weld leaks at the outside diameter (peripheral) weld.

(2) Front pump hub weld.

(3) Crankshaft pilot weld.

(4) Fluid leakage from the converter drain plug. These leaks appear at the outside diameter of the converter on the engine side.

AIR PRESSURE TEST OF TRANSMISSION

The transmission should be prepared for pressure

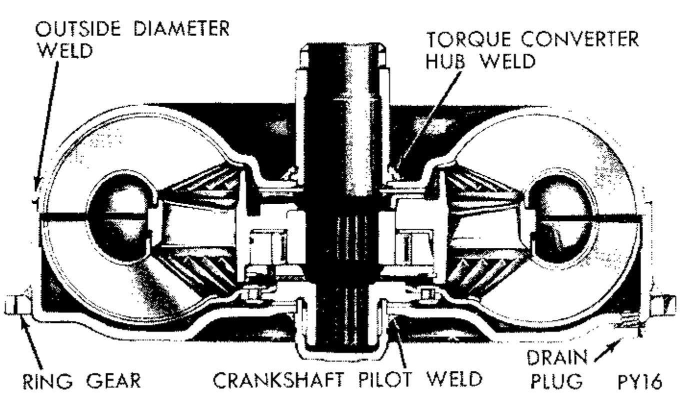


Fig. 3—Torque Converter Cross Section

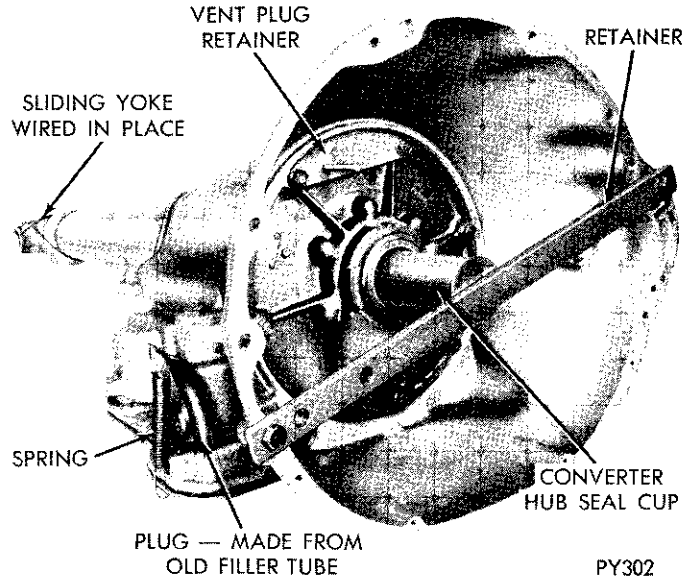


Fig. 4—Transmission Prepared for Test

test as follows after removal of the torque converter:

(1) Install filler tube bore plug, propeller shaft yoke (tie in with cord or wire), flared tube fitting cap (on

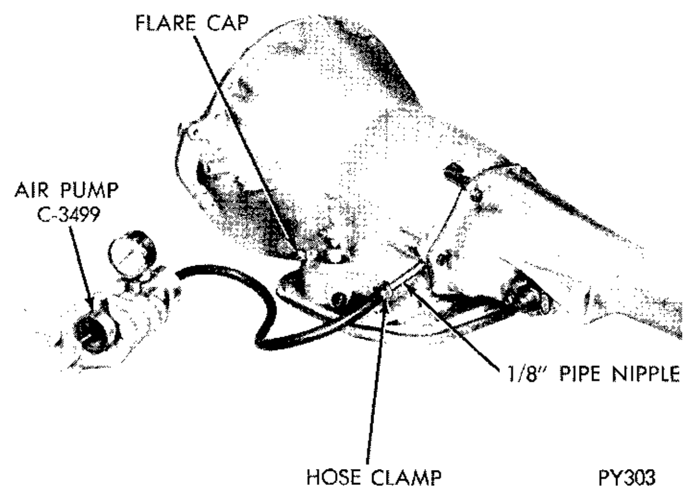


Fig. 5—Pressurizing Transmission

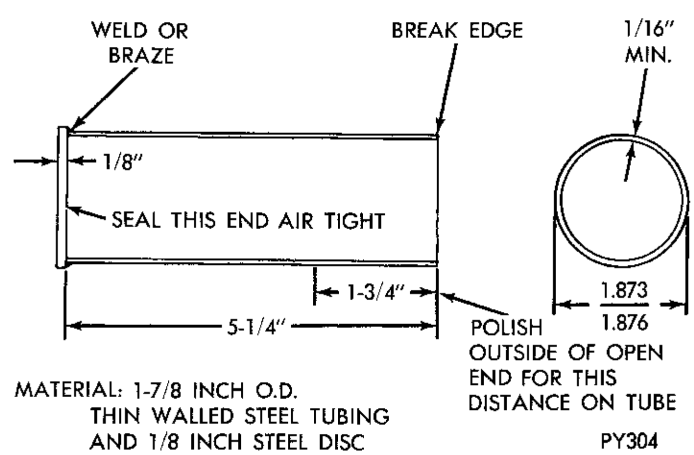


Fig. 6—A-727—Converter Hub Seal Cup

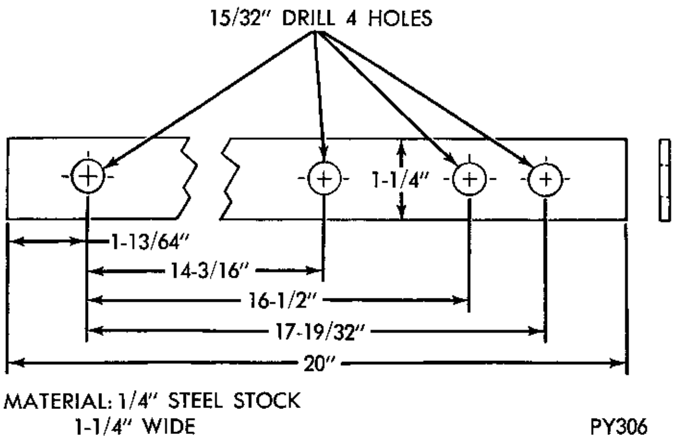


Fig. 7—Hub Seal Cup Retaining Strap

front cooler line fitting), and pipe nipple (in case at rear cooler line fitting) (Fig. 4 and 5).

(2) Remove necessary front pump housing bolts, and vent shield (in A-727 transmission). Install vent plug (rubber stopper), and vent plug retainer (Fig. 4) preferably using longer bolts than those removed.

(3) With rotary motion, install converter hub seal cup (Fig. 4), over input shaft, and through the converter hub seal until the cup bottoms against the pump rotor lugs. Secure with cup retainer strap (Fig. 4), using converter housing to engine block retaining bolts.

(4) Attach and clamp hose from nozzle of Tool C-3499 to pipe nipple, which is in rear cooler line fitting position in case (Fig. 5).

(5) Pressurize the transmission using Tool C-3499, until the pressure gage reads 8 psi. Position transmission so that pump housing and case front may be covered with soapy solution or water. Leaks are sometimes caused by porosity in the case or pump housing. **CAUTION:** Do not, under any circumstances, pressurize a transmission to more than 10 psi.

If a leak source is located, that part and all associated seals and gaskets should be replaced with new parts.

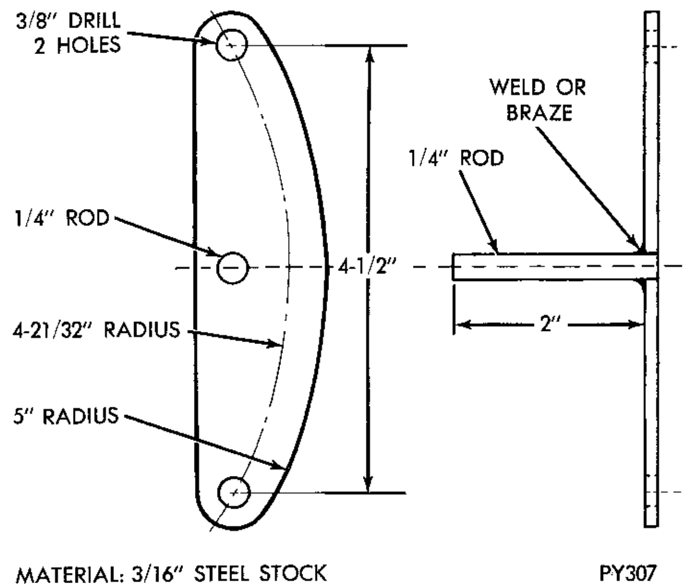


Fig. 8—A-727—Vent Plug Retainer

Fabricate equipment needed for test as shown in (Figs. 1, 6, 7, & 8).

TORQUE CONVERTER PRESSURE TEST

If fluid leakage has occurred in the bell housing area, the torque converter can be leak checked as follows after removal from the transmission:

(1) Drain all oil from the converter. If flushing is required, flush before checking for leakage.

(2) Install tool C-4102 and tighten.

(3) Apply a maximum of 100 psi air pressure to the converter.

(4) Submerge the converter in a tank of water and observe the hub, cup, ring gear, and seam welds for bubbles. Five to ten minutes may be required for bubbles to develop from small leaks.

If no bubbles are observed, it can be assumed that the welds are not leaking. If leakage occurs, the converter should be replaced.

MANUAL TRANSMISSION—(A-230)

THREE SPEED

INDEX

GENERAL INFORMATION

The A-230 three speed transmission (Fig. 1) has two synchronizer units, providing clash free shifting in all forward gears.

A pad has been provided on the right side of the transmission (Fig. 2) for identification numbers.

Sample Number: PP 230 3262 2220

The first two letters identify the manufacturing plant. The next three numbers are the transmission model number. The following four numbers are a date of manufacture code. The last four numbers are a sequence number.

The main drive pinion (input shaft) is supported by a ball bearing in the transmission case and an olite bushing pressed in the end of the crankshaft.

The mainshaft (output shaft) front end is supported by roller bearings in the end of the main drive pinion and a ball bearing retainer in the front of the extension housing. The output end of the mainshaft is splined to the sliding universal joint yoke, which is supported by a bushing in the extension housing.

The countershaft gear is supported by a double row of needle type roller bearings at each end and the thrust is taken on thrustwashers between the ends of the gear and the transmission case. The alignment of the needle type roller bearings within the gear is maintained by six thrust washers (one being used between the rows of roller bearings and one at each end).

The reverse idler gear is also supported on needle type roller bearings.

The gearshifting is manually operated through shift control rods to the transmission. Any forward gear may be engaged while the vehicle is in motion through the use of synchronizing clutches.

The transmission may be used as an aid to deceleration by downshifting in sequence without double clutching or gear clashing, due to the fact that all forward speeds are synchronized. The service procedures covering the A-230 transmission used on all vehicles so equipped is identical to the following service procedures except where noted.

IMPORTANT: Some internal transmission parts are different from standard on vehicles with high performance engines. These "special" parts are listed in applicable Parts Catalog; therefore, be sure they are used when replacement is necessary.

SERVICE DIAGNOSIS

Condition	Possible Cause	Correction
HARD SHIFTING	(a) Incorrect clutch adjustment.	(a) Refer to Clutch Group for corrections.
	(b) Improper linkage adjustment.	(b) Perform linkage adjustment as outlined in "Gearshift Linkage Adjustments."
	(c) Synchronizer clutch sleeve damaged. (d) Synchronizer spring improperly installed. (e) Broken or worn synchronizer stop rings.	(c-d-e) Causes noted can only be corrected by disassembling transmission and replacing damaged or worn parts.

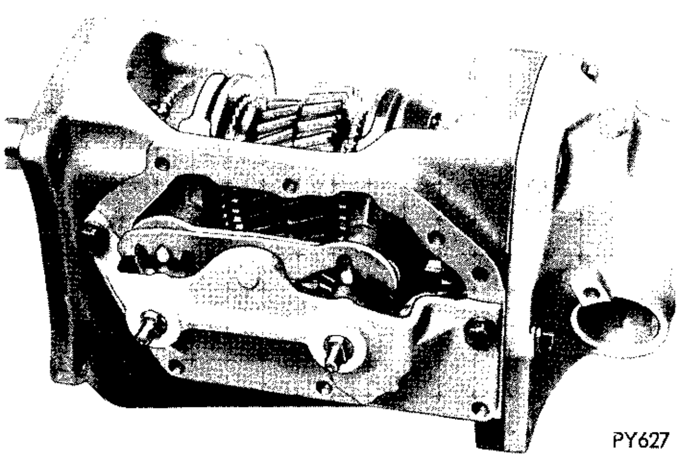


Fig. 1—A-230 Transmission Cutaway

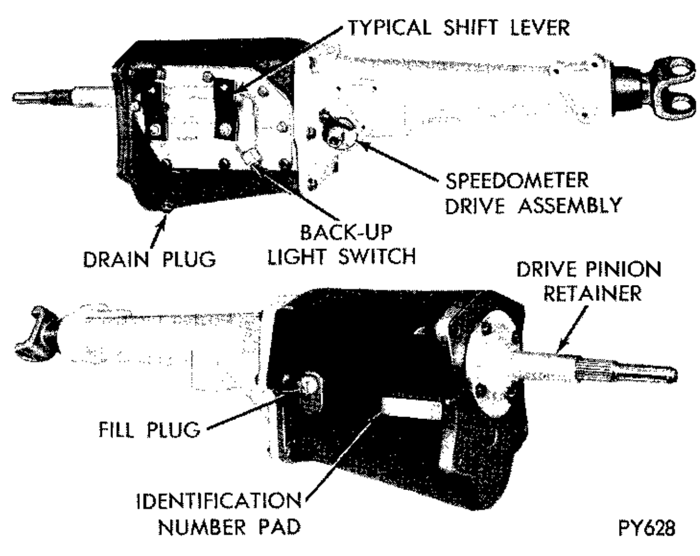


Fig. 2—A-230 Transmission—Left and Right Sides

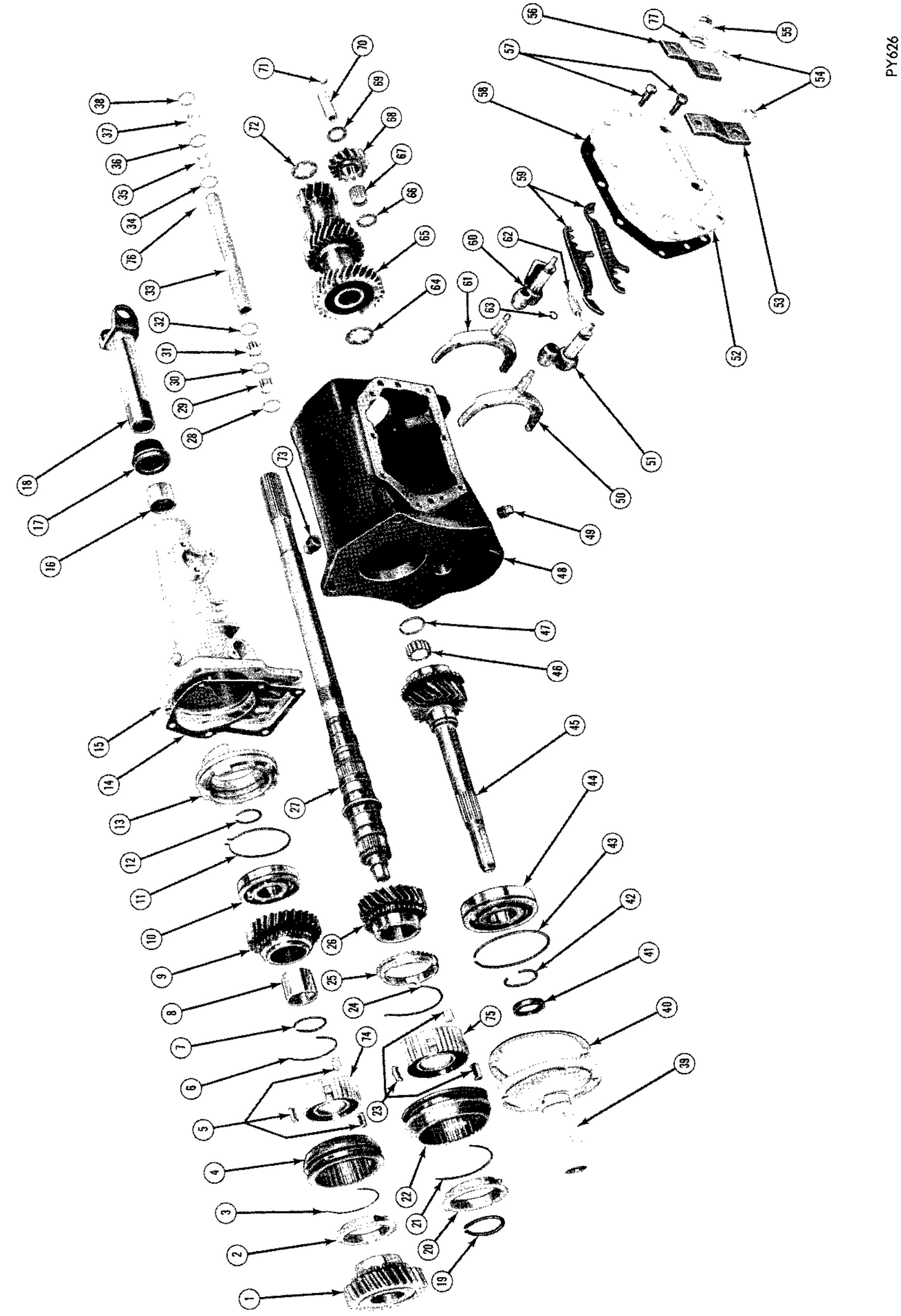


Fig. 3—A-230 Transmission—Disassembled

Ref. No. Name	Ref. No. Name	Ref. No. Name	Ref. No. Name	Ref. No. Name	Ref. No. Name
1. Gear, First	14. Gasket	27. Shaft, Output	40. Gasket	53. Lever	66. Washer
2. Ring	15. Extension	28. Washer	41. Seal	54. Nut Locking	67. Roller
3. Spring	16. Bushing	29. Roller	42. Snap Ring	55. Switch	68. Gear, Idler
4. Sleeve	17. Seal	30. Washer	43. Snap Ring	56. Lever	69. Washer
5. Struts (3)	18. Yoke	31. Roller	44. Bearing	57. Bolt	70. Shaft
6. Spring	19. Snap Ring	32. Washer	45. Pinion, Drive	58. Gasket	71. Key
7. Snap Ring	20. Ring	33. Countershaft	46. Roller	59. Lever, Interlock	72. Washer
8. Bushing	21. Spring	34. Washer	47. Snap Ring	60. Lever	73. Plug, Filler
9. Gear, Reverse	22. Sleeve	35. Roller	48. Case	61. Fork	74. Gear, Clutch
10. Bearing	23. Struts (3)	36. Washer	49. Plug, Drain	62. Spring	75. Gear, Clutch
11. Snap Ring	24. Spring	37. Roller	50. Fork	63. Snap Ring	76. Key
12. Snap Ring	25. Ring	38. Washer	51. Lever	64. Washer	77. Gasket
13. Retainer	26. Gear, Second	39. Retainer	52. Housing	65. Gear, Countershaft	

LEGEND FOR FIGURE 3

Condition	Possible Cause	Correction
TRANSMISSION SLIPS OUT OF GEAR	(a) Linkage interference.	(a) Inspect and remove all linkage interferences.
	(b) Gearshift rods out of adjustment.	(b) Adjust gearshift rods as outlined in "Gearshift Linkage Adjustments."
	(c) Synchronizer clutch teeth worn.	(c) Disassemble transmission and replace parts as necessary.
	(d) Clutch housing bore or face out of alignment.	(d) Refer to Clutch Group for correction procedure.
TRANSMISSION NOISES	(a) Excessive end play in countershaft gear.	(a) Replace thrust washers.
	(b) Loose synchronizer hub spline fit on mainshaft.	(b) Inspect mainshaft and synchronizer hub and replace parts as necessary.
	(c) Damaged, broken or excessively worn gear teeth.	(c) Replace worn gears.
	(d) Rough or pitted bearing races or balls.	(d) Replace worn bearing.

SERVICE PROCEDURES

TRANSMISSION REMOVAL

(1) Remove shift rods from transmission levers.

(2) Drain fluid from transmission.

(3) Disconnect propeller shaft at rear universal joint. Mark both parts to reassemble in same position. Carefully pull shaft yoke out of transmission extension housing.

CAUTION: Be careful not to scratch or nick ground surface on sliding spline yoke during removal and installation of the shaft assembly.

(4) Disconnect speedometer cable and back-up light switch leads.

(5) Some models have exhaust systems which will have to be partially removed for clearance. See Exhaust Systems, Section 11.

(6) Install engine support fixture C-3487A, engaging the hooks in holes in frame side member. Be sure support ends are up against underside of oil pan flange.

(7) Raise engine slightly with support fixture. Disconnect extension housing from removable center crossmember.

(8) Support transmission with a suitable jack and remove center crossmember.

(9) Remove transmission to clutch housing bolts. Slide transmission toward rear until drive pinion shaft clears clutch disc, before lowering transmission.

(10) Lower transmission and remove from under vehicle. Thoroughly clean exterior of unit.

DISASSEMBLING TRANSMISSION (Fig. 3)

Gearshift Housing and Mechanism

(1) Shift transmission to second gear for shift fork clearance.

(2) Remove housing retaining bolts and lift shift mechanism from case (Fig. 4).

(3) If shaft "O" ring seals need replacement, proceed as follows: Pull shift forks out of shafts.

(4) Remove nuts attaching operating levers to the shafts. Disengage levers from flats on shafts and remove.

(5) Remove burrs from shafts before removal from housing to avoid scoring the bores which would cause leakage after reassembly.

(6) Push gearshift lever shafts through housing bores and remove.

Drive Pinion Retainer and Extension Housing

(1) Remove bolts holding drive pinion bearing retainer to front of transmission case.

(2) Slide retainer and gasket forward off the drive pinion. Pry pinion oil seal from bearing retainer. To avoid leakage around the new seal, do not nick or scratch the bore in which the seal is pressed, or the surface on which seal bottoms.

(3) Tap drive pinion forward carefully with a brass

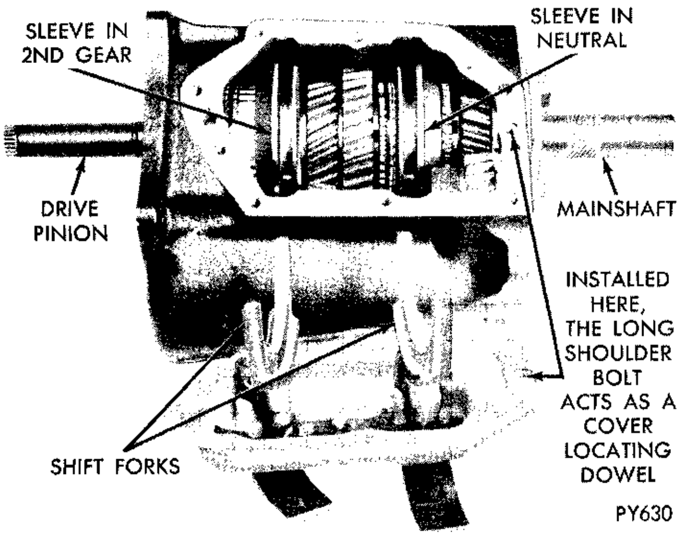


Fig. 4—A-230 With Shift Mechanism Assy., Pinion Bearing Retainer, and Extension Housing—Removed

drift, as far as possible to provide maximum disassembly clearance for mainshaft removal (Fig. 5).

(4) Rotate cut away part of second gear next to countershaft gear for mainshaft removal clearance (Fig. 6).

(5) Also shift 2nd-3rd synchronizer sleeve forward for the same reason.

(6) Remove bolt and retainer securing speedometer pinion adapter in extension housing (Fig. 2). Carefully work adapter and pinion out of extension housing.

(7) Remove bolts that attach extension housing to rear of transmission case.

(8) Tap with plastic hammer to break gasket seal and carefully guide housing off rear of mainshaft.

Idler Gear and Mainshaft (Fig. 7)

(1) Insert arbor tool C-464 in case to push reverse idler shaft and key out of case (Fig. 7).

(2) Remove idler gear with arbor in place to retain rollers.

(3) Remove both thrust washers (Fig. 8).

(4) Grasp mainshaft assembly and remove through rear of case (Fig. 8).

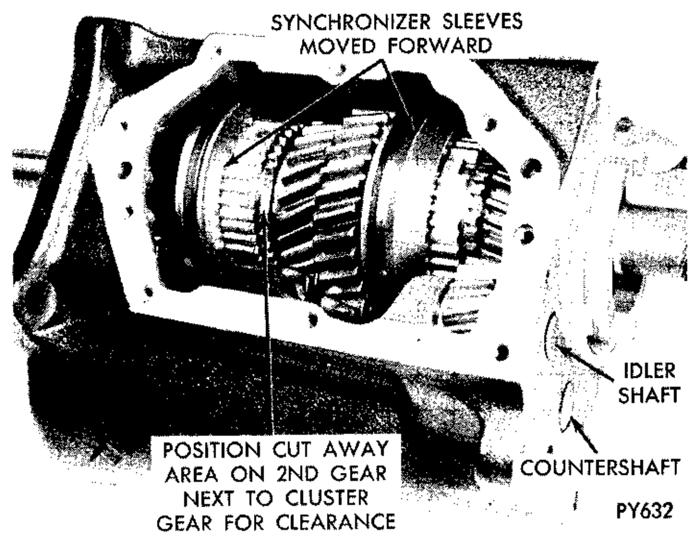


Fig. 6—Position 2nd Gear and Shift Sleeves for Clearance

Countershaft Gear and Drive Pinion

(1) Using a mallet and arbor Tool C-4112 tap countershaft rearward and remove key. Continue to drive countershaft out of case, maintaining contact between shaft and arbor so that washers will not drop between them (Fig. 9).

(2) Lower countershaft gear to bottom of case to permit removal of main drive pinion.

(3) Remove snap ring from pinion bearing outer race (Fig. 10).

(4) Using a plastic hammer, drive the pinion into

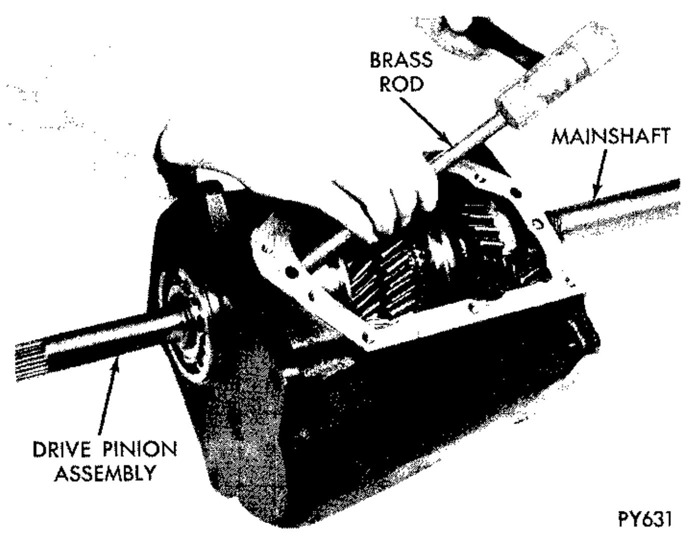


Fig. 5—Tap Drive Pinion Forward for Mainshaft Pilot Clearance

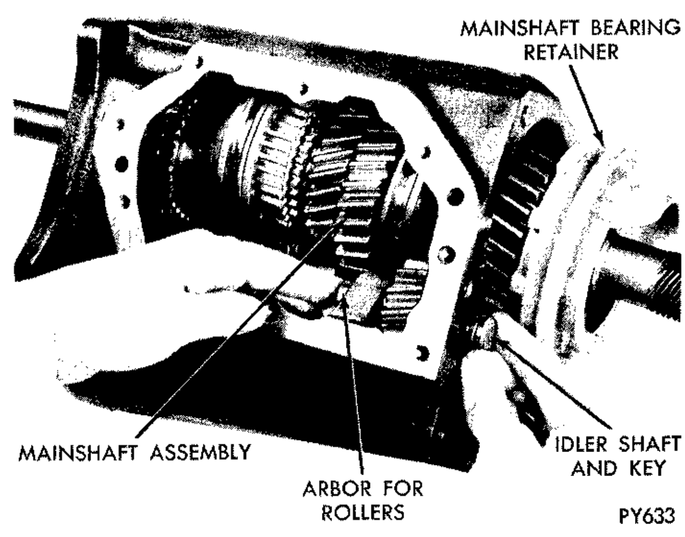


Fig. 7—Reverse Idler Gear—Removal or Installation

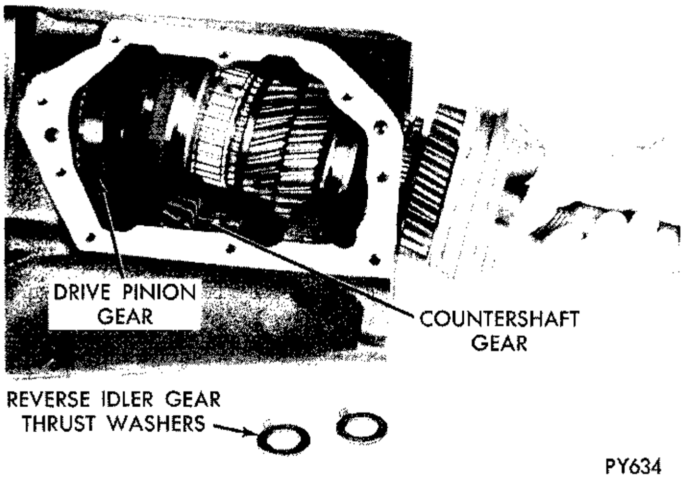


Fig. 8—Mainshaft Assembly—Removal or Installation

case and remove through rear (Fig. 11).

(5) If bearing is to be replaced, remove snap ring and press bearing off the pinion gear shaft (Fig. 12).

(6) Lift countershaft gear and arbor assembly out through rear of case (Fig. 13).

Mainshaft Disassembly

(1) Remove the snap ring from front end of mainshaft which retains the 2nd-3rd synchronizer clutch gear (Fig. 14).

(2) Slide the 2nd-3rd synchronizer assembly off end of mainshaft along with the 2nd gear stop ring (Fig. 15).

(3) Remove 2nd gear from mainshaft (Fig. 16).

(4) Spread snap ring in mainshaft bearing retainer to disengage it from bearing groove and slide retainer off the bearing race (Fig. 17).

(5) Remove snap ring securing bearing to mainshaft (Fig. 18).

(6) Set up parts in arbor press to force bearing off

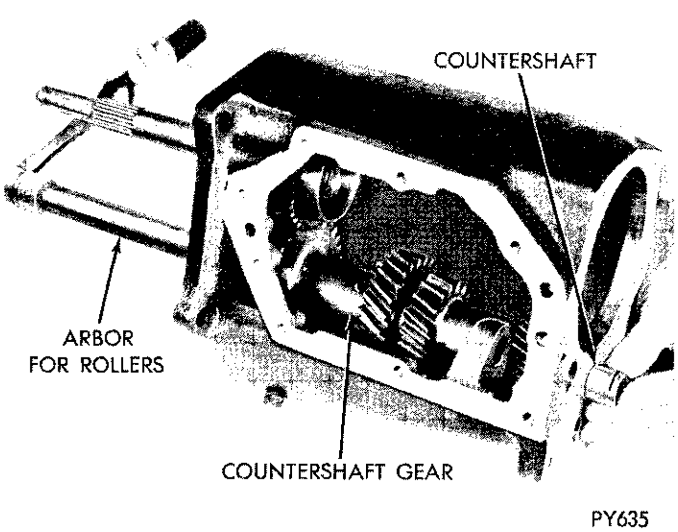


Fig. 9—Countershaft Removal

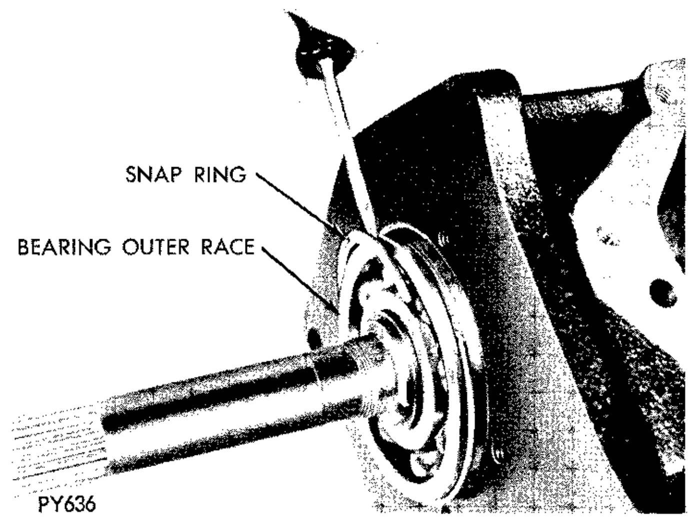


Fig. 10—Snap Ring on Pinion Gear Bearing—Removal

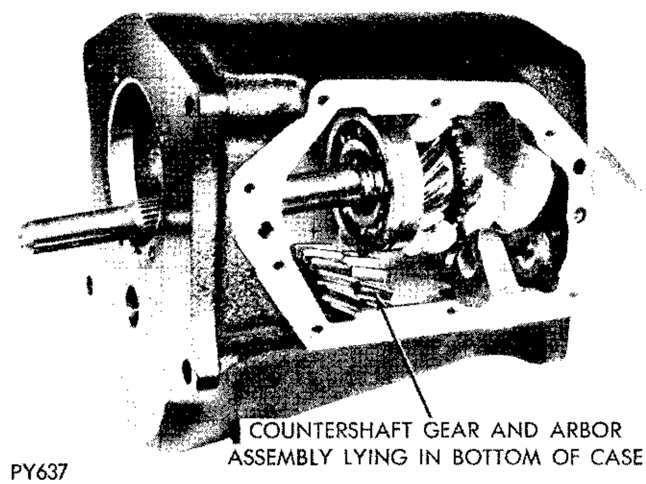


Fig. 11—Drive Pinion and Bearing Assembly—Removal or Installation

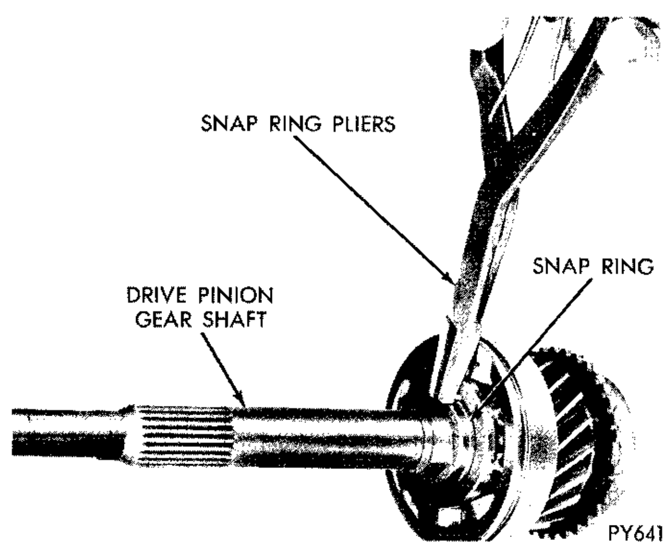


Fig. 12—Snap Ring, Pinion Shaft to Bearing—Removal or Installation

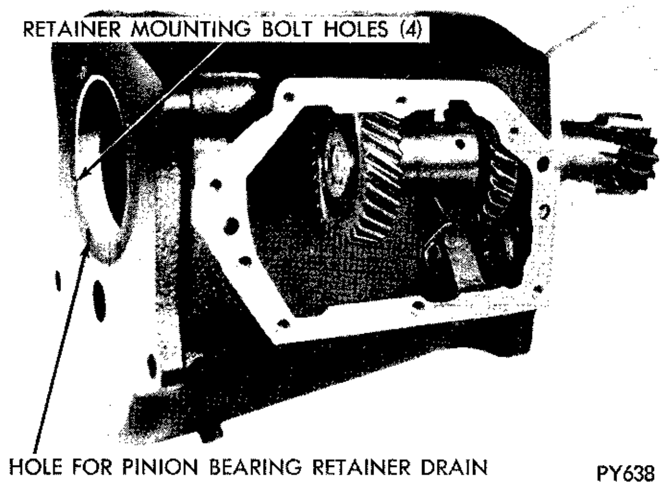


Fig. 13—Countershaft Gear and Arbor Assembly—Removal or Installation

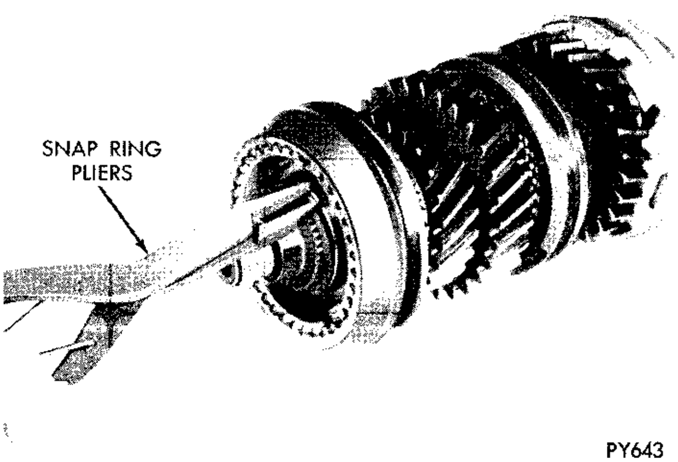


Fig. 14—Snap Ring—2nd-3rd Synchronizer Clutch Gear to Mainshaft—Removal or Installation

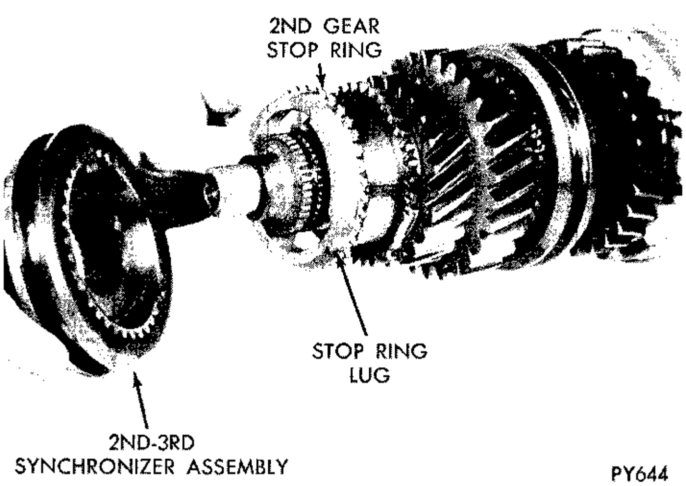


Fig. 15—2nd-3rd Synchronizer Assembly and Stop Ring—Removal or Installation

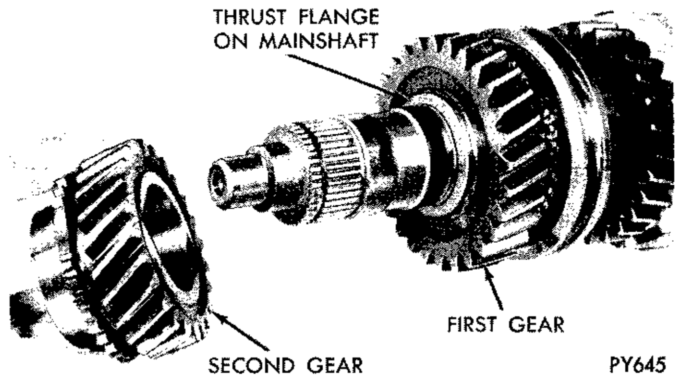


Fig. 16—2nd Gear—Removal or Installation

mainshaft. By supporting front side of reverse gear it can push the bearing off shaft as pressure is applied to shaft (Fig. 19). When bearing clears shaft, don't let parts drop through.

(7) Remove from press and slip off the end of shaft, the mainshaft bearing and reverse gear (Fig. 20).

(8) Remove from mainshaft the snap ring which retains the 1st-Reverse synchronizer clutch gear (Fig. 21).

(9) Slide 1st-Reverse synchronizer assembly off

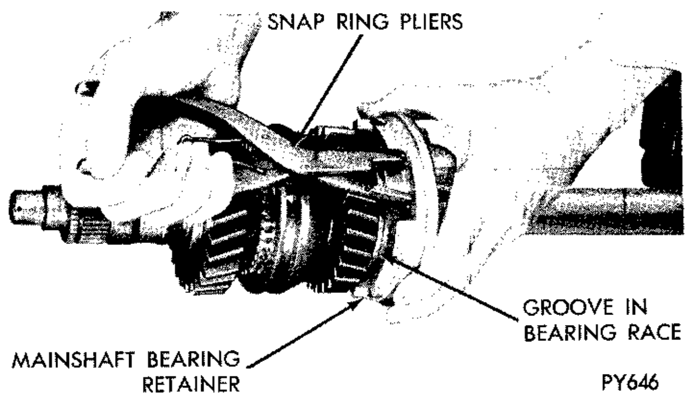


Fig 17—Snap Ring Spread, to Remove or Install Retainer on Mainshaft Bearing

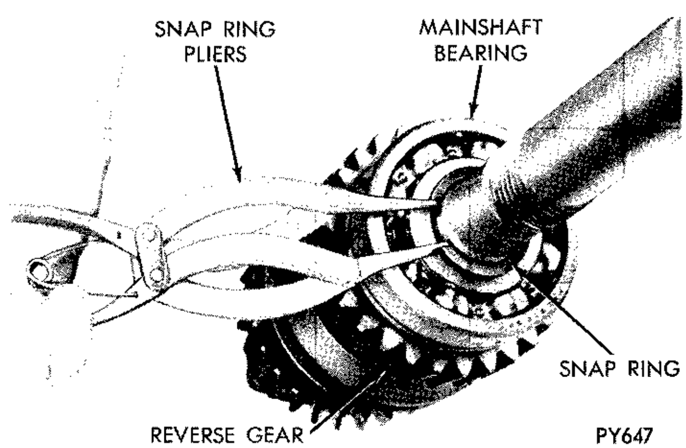


Fig. 18—Snap Ring—Mainshaft Bearing to Shaft—Removal or Installation

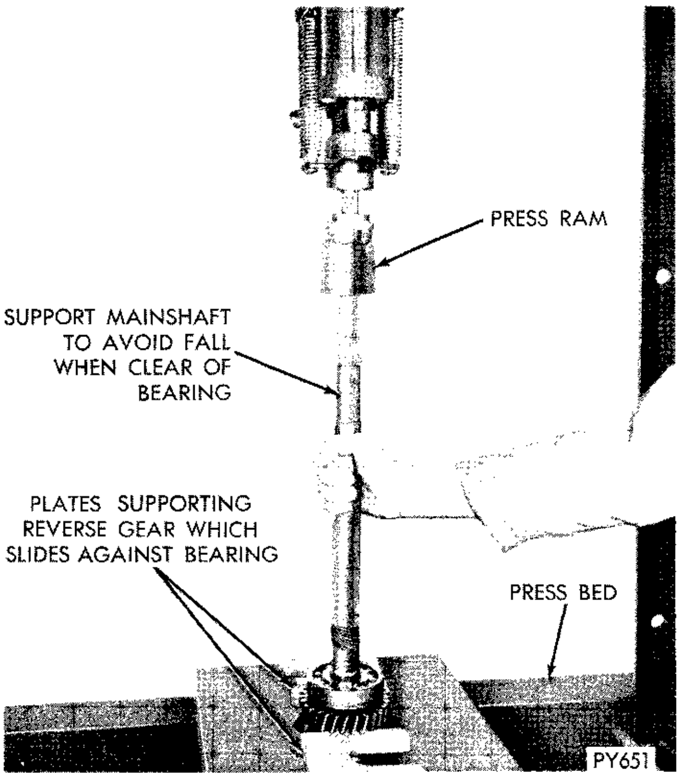


Fig. 19—Using Press to Remove Mainshaft Bearing

splines and remove from mainshaft (Fig. 22).

(10) Remove 1st gear and its stop ring from mainshaft (Fig. 23).

CLEANING AND INSPECTION

Clean transmission case thoroughly, using a suitable solvent, dry with compresesd air. Inspect case for cracks, stripped threads in various bolt holes and machined mating surfaces for burrs, nicks or any condition that would render the case unfit for further service. The front mating surface should be smooth; if any burrs are present, dress them off with a fine mill file. If threads are stripped, install Helicoil inserts.

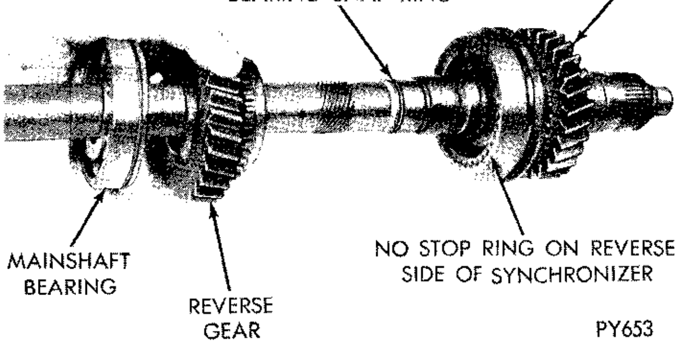


Fig. 20—Reverse Gear and Mainshaft Bearing—Removal or Installation

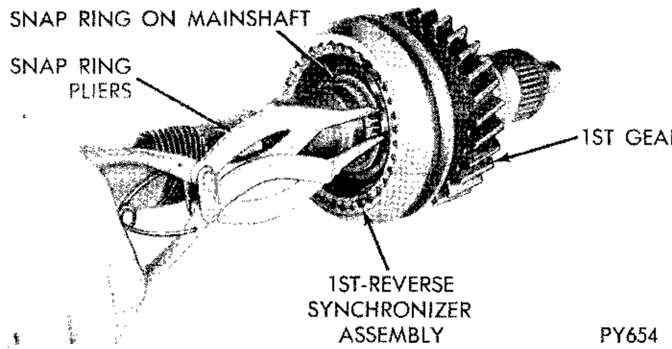


Fig. 21—Snap Ring—1st-Reverse Synchronizer Clutch Gear—Removal or Installation

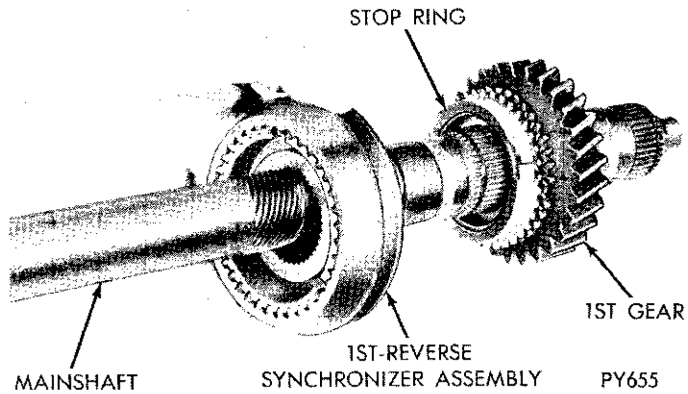


Fig. 22—1st-Reverse Synchronizer Assembly—Removal or Installation

Ball Bearings

Wash ball bearings, using a clean solvent and blow dry with compressed air.

CAUTION: Do not spin bearings with air pressure; turn slowly by hand. Spinning unlubricated bearings may cause damage to races and balls.

Be sure ball bearings are clean, then lubricate them with light grade engine oil. Inspect bearings for pitting. This can best be determined by slowly turning outer race by hand. Measure fit of bearings on their respective shafts.

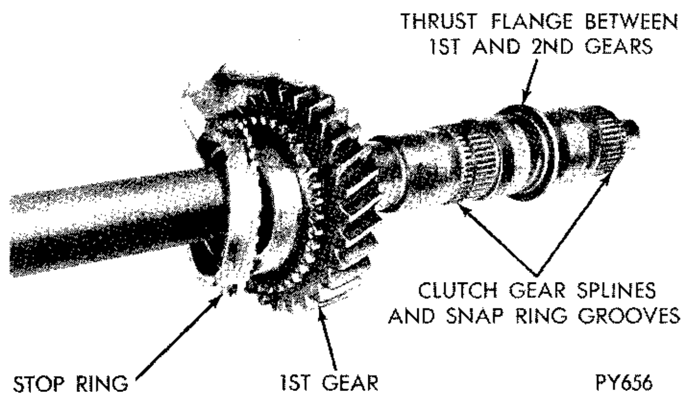


Fig. 23—1st Gear and Stop Ring—Removal or Installation

Needle Type Bearing Rollers and Spacers

Inspect all bearing rollers for flat spots or brinelling. Inspect all bearing roller spacers for signs of wear or galling. Install new parts as required.

Gears

Inspect gear splines on synchronizer clutch gears and stop rings. If there is evidence of chipping or excessively worn teeth, install new parts at reassembly. Be sure clutch sleeve slides easily on the clutch gear. Inspect countershaft gear and all gear teeth for chipped or broken teeth, or showing signs of excessive wear. Small nicks or burrs must be stoned off.

Inspect teeth on main drive pinion. If excessively worn, broken or chipped, a new pinion should be installed. If the oil seal contact area on drive pinion shaft is pitted, rusted or scratched, a new pinion is recommended for best seal life.

Synchronizer Stop Rings

Inspect stop rings for cracks and wear. If rings are cracked or show signs of extreme wear on threaded bore, install new rings at reassembly. Test new rings for good fit on gear cones with minimum wobble.

Mainshaft

Inspect mainshaft gear and bearing mating surfaces. If gear contact surfaces show signs of galling or are excessively worn, a new mainshaft should be installed.

Inspect snap ring grooves for burred edges. If rough or burred, remove condition using a fine file or crocus cloth. Inspect synchronizer clutch gear splines on shaft for burrs.

ASSEMBLING TRANSMISSION

Countershaft Gear

(1) Slide assembly arbor, Tool C-4112, into countershaft gear.

(2) Slide one roller thrust washer over arbor and into gear, followed by 22 Greased Rollers (Fig. 24).

(3) Repeat Step 2, adding one roller thrust washer on end.

(4) Repeat Steps 2 and 3 at other end of countershaft gear. (Total of 88 Rollers and 6 thrust washers).

(5) Place greased front thrust washer on arbor against gear with tangs forward.

(6) Coat rear thrust washer with heavy grease and stick it in place in the transmission case, with tangs rearward.

(7) Carefully place countershaft gear assembly in position in bottom of transmission case (Fig. 13). **Do not finish installation with countershaft and key until drive pinion is installed.**

Pinion Gear

(8) Press new bearing on pinion with snap ring groove forward. Install snap ring on shaft (Fig. 12).

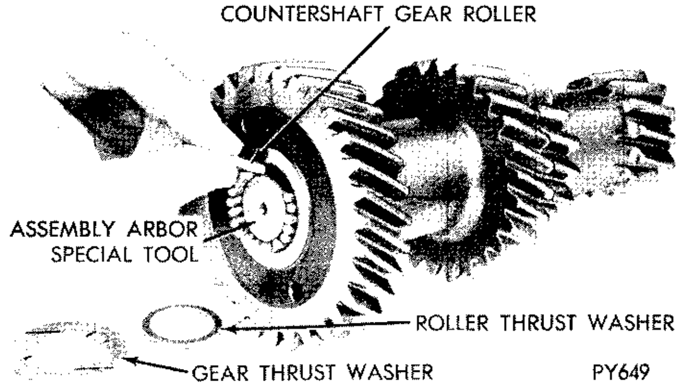


Fig. 24—Countershaft Gear—Roller Bearing Assembly

(9) Install 15 rollers and retaining ring in gear (Fig. 25).

(10) Install drive pinion and bearing assembly into case (Fig. 11).

(11) Now finish installation of countershaft gear assembly by positioning it and the thrust washers so that the countershaft can be tapped into position (Fig. 26). **Be careful to keep the arbor in contact with the countershaft to avoid parts dropping out of position and blocking the installation.** Install key in countershaft as installation is finished.

(12) Carefully tap drive pinion forward to provide maximum clearance for mainshaft installation (Fig. 5).

Mainshaft (Fig. 27)

(13) Sub assemble the synchronizer parts in the order shown in (Figs. 28, 29 and 30) as follows: Place a stop ring flat on the bench followed by the clutch gear and sleeve. Drop the struts in their slots and snap in a strut spring placing the tang inside one strut. Turn the assembly over on the stop ring and install second strut spring with tang in a different strut.

(14) Slide 1st gear and stop ring over rear end of mainshaft and against flange which separates 1st and 2nd gears (Fig. 23).

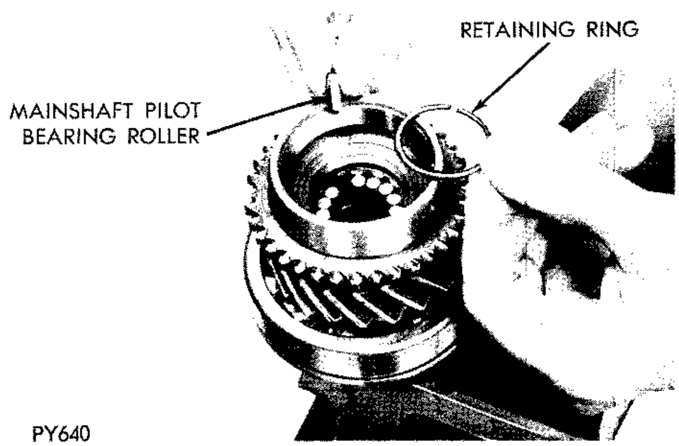


Fig. 25—Installing Rollers in Drive Pinion Gear

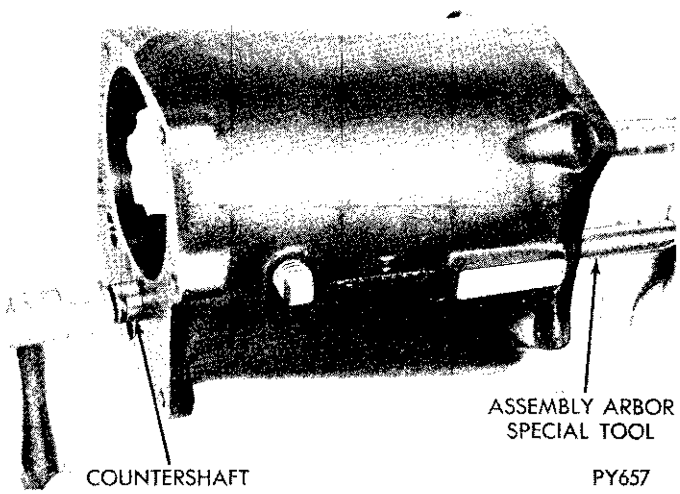


Fig. 26—Countershaft—Installation

(15) Slide 1st-Reverse synchronizer assembly over mainshaft, indexing the hub slots to 1st gear stop ring lugs (Fig. 22).

(16) Install clutch gear snap ring on mainshaft (Fig. 21).

(17) Slide reverse gear and mainshaft bearing in place and take to press, to force bearing on shaft (Fig. 20).

(18) Support inner race of bearing and press shaft through to shoulder (Fig. 31).

Be sure snap ring groove on outer race is forward.

(19) Install bearing retaining snap ring on mainshaft (Fig. 18).

(20) Spread snap ring in mainshaft bearing retainer groove and slide it over the bearing. Be sure snap ring seats in bearing groove (Fig. 17).

(21) Place second gear over front of mainshaft with thrust surface against flange (Fig. 16).

(22) Install properly indexed stop ring and 2nd-3rd synchronizer assembly against second gear (Fig. 15).

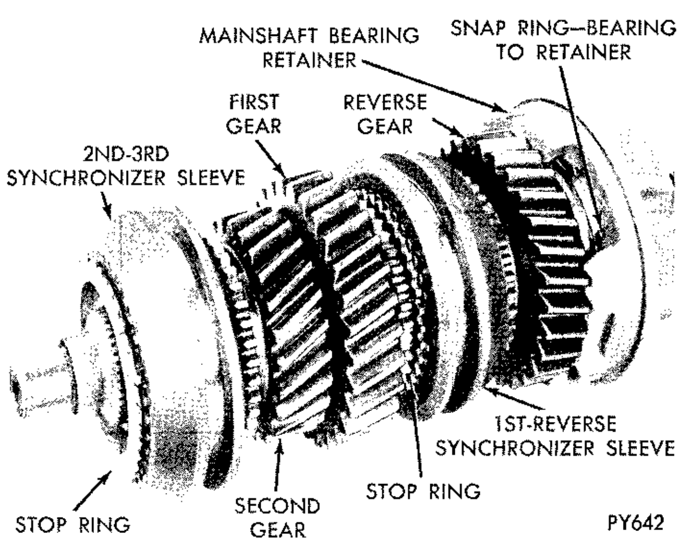


Fig. 27—Mainshaft Assembled

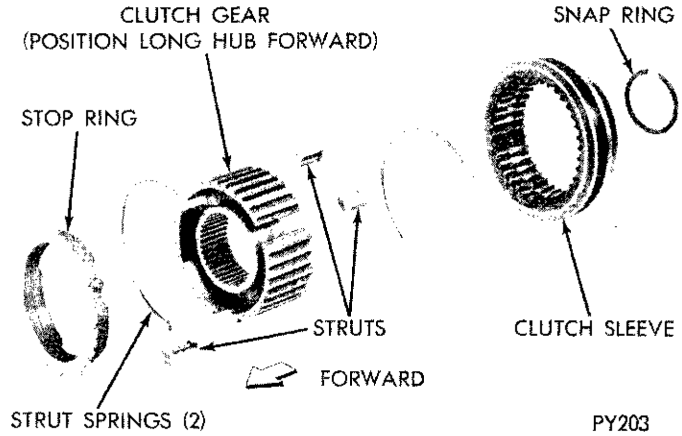


Fig. 28—1st-Reverse Synchronizer—Disassembled

(23) Install 2nd-3rd clutch gear snap ring on shaft (Fig. 14).

(24) Move 2nd-3rd synchronizer sleeve forward as far as practical (limited by need to retain struts in place) and install front stop ring (coated with grease to hold it in position) inside sleeve with lugs indexed to struts.

(25) Rotate cut out on second gear so it is toward countershaft gear for clearance (Fig. 6).

(26) Now slowly insert mainshaft assembly into case (Fig. 8) tilting it as required to clear cluster gears and finally entering the pilot rollers in the drive pinion gear.

If everything is in proper position the bearing retainer will bottom to the case without force. If not, check to see if a strut, pinion roller, or stop ring is out of position.

Reverse Idler Gear

(27) Place assembly arbor, Tool C-464 into idler gear along with 22 greased rollers (Fig. 32).

(28) Position reverse idler thrust washers in case with grease to retain them.

(29) Now position reverse idler gear with arbor and

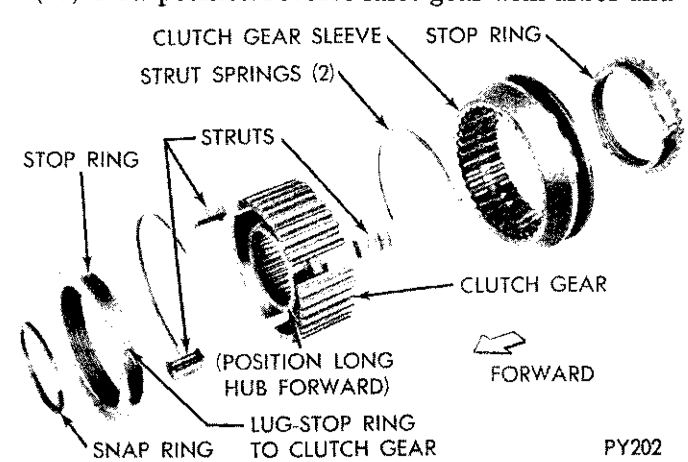


Fig. 29—2nd-3rd Synchronizer—Disassembled

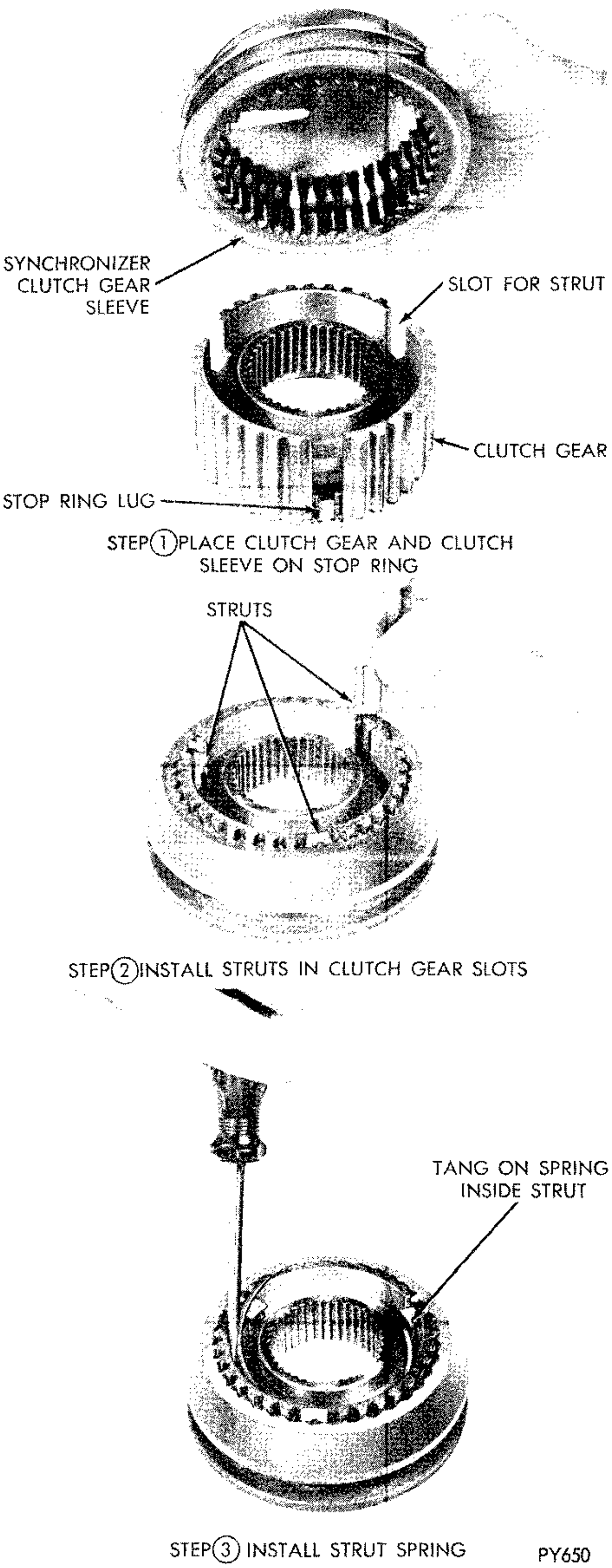


Fig. 30—Assembling Synchronizer Parts

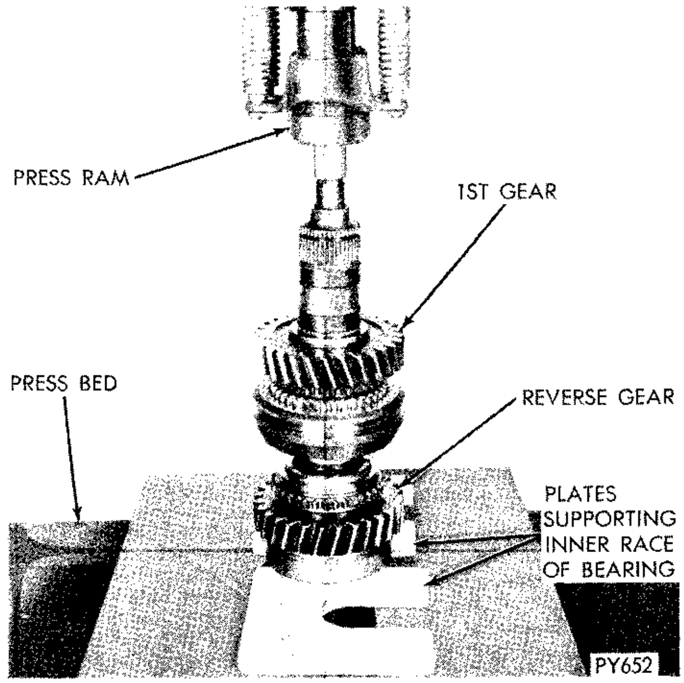


Fig. 31—Using Press to Install Mainshaft Bearing

rollers in the case (Fig. 7) while installing idler shaft and key.

(30) Install extension housing and gasket now, to hold mainshaft and bearing retainer in place (Fig. 33). First, replace bushing and seal, if necessary.

Extension Housing Bushing Replacement

(a) Remove extension housing yoke seal (Fig. 34) with Tool C-3985.

(b) Drive the bushing out of housing (Fig. 35) with Tool C-3974.

(c) Slide a new bushing on installing end of Tool C-3974. Align oil hole in bushing with oil slot in housing, then drive bushing into place (Fig. 35).

(d) To install a new seal, position seal in opening of

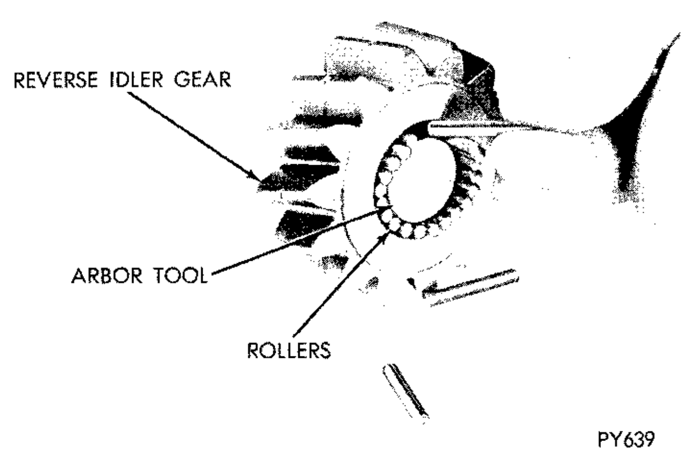


Fig. 32—Reverse Idler Gear—Roller and Arbor Assembly

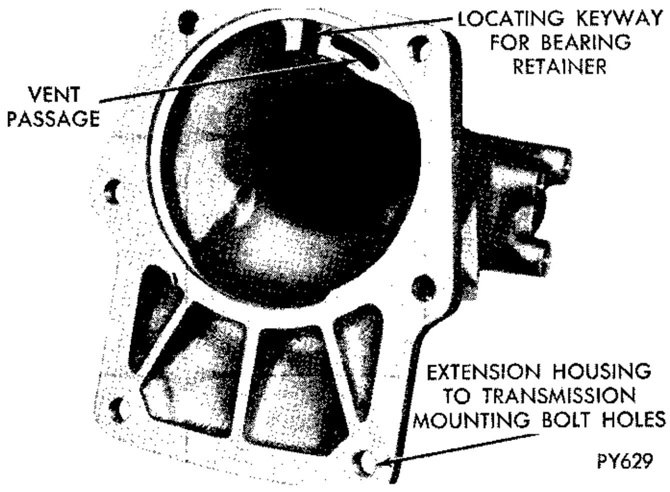


Fig. 33—Extension Housing—Front View

extension housing and drive it into housing with Tool C-3972 (Fig. 36).

Drive Pinion Bearing Retainer

(31) Install the outer snap ring on the drive pinion bearing and tap the assembly back until the snap ring contacts case.

(32) Using Tool C-3789 (Fig. 37), install a new oil seal in retainer bore. Position main drive pinion bearing retainer and gasket on front of case. Coat threads with sealing compound, then install attaching bolts and tighten to 30 foot-pounds (Fig. 2).

Gearshift Mechanism and Housing (Fig. 38)

(33) If removed, place the two interlock levers on

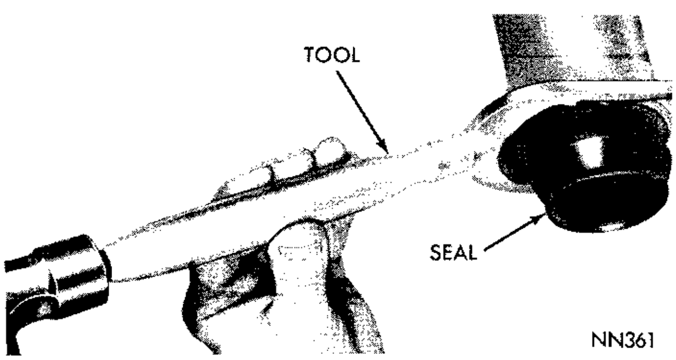


Fig. 34—Removing Extension Housing Seal

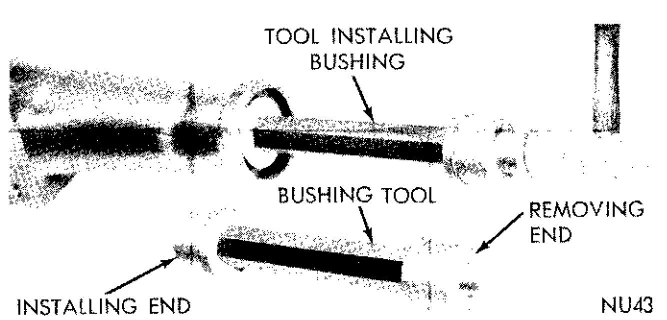


Fig. 35—Replacing Bushing in Extension Housing

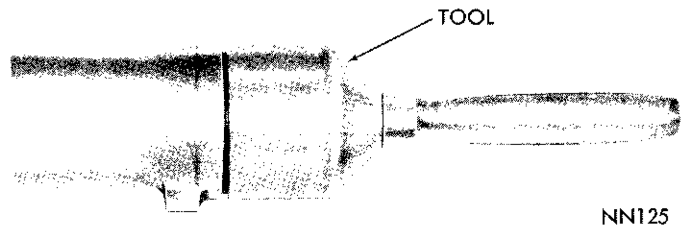


Fig. 36—Installing Extension Housing Seal

the pivot pin with the spring hangers offset toward each other so the spring will install in a straight line, and secure with "E" clip on Pivot pin.

(34) Grease and install new "O" ring oil seals on both shift shafts. Grease housing bores and push each shaft into its proper bore.

(35) With pliers install the spring on interlock lever hangers.

(36) Rotate each shift shaft fork bore, to neutral position (straight up) and install shift forks through bores and under both interlock levers.

Install Gearshift Mechanism

(37) Position the 2nd-3rd Synchronizer sleeve in transmission to rear (in 2nd gear). Position the 1st-reverse synchronizer sleeve to middle of travel (in neutral) (Fig. 4). Place the shift forks in the gearshift mechanism in the same positions.

(38) Install gasket and gearshift mechanism on transmission using special shoulder bolts. One bolt has an extra long shoulder which enters the transmission case acting as a locating dowel pin. This hole is at center rear of case (Fig. 4). Tighten bolts evenly to 15 foot-pounds.

(39) Install speedometer drive pinion gear and adapter being sure range number, stamped on outside of adapter, representing number of teeth on gear, is in 6 "O" clock position (Fig. 40).

TRANSMISSION INSTALLATION

Place a small amount of Multi-Purpose lubricant around inner end of pinion shaft pilot bushing in flywheel and on pinion bearing retainer pilot, for clutch

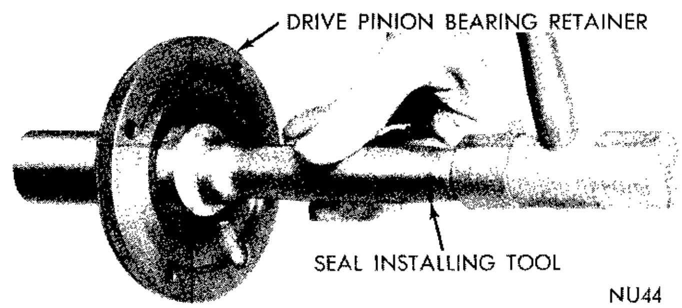


Fig. 37—Installing Seal in Drive Pinion Bearing Retainer

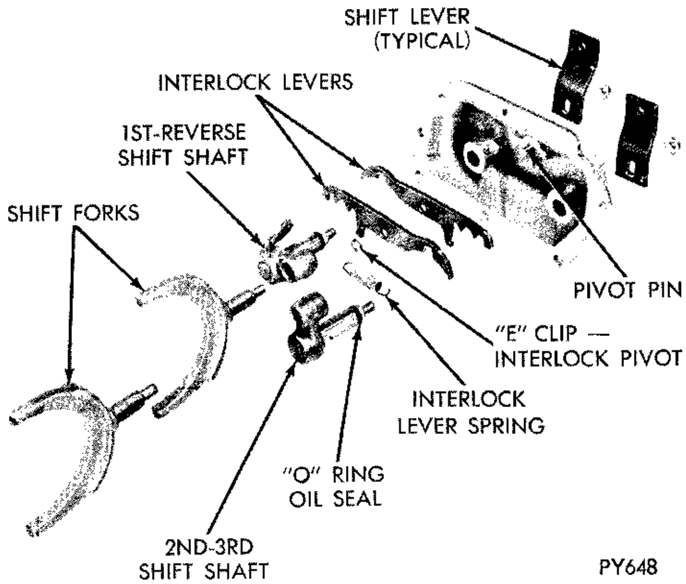


Fig. 38—Gearshift Mechanism and Housing—Disassembled

release sleeve. **Do not lubricate end of pinion shaft, clutch disc splines or clutch release levers.**

(1) With transmission on a suitable jack, slide assembly under vehicle.

(2) Raise transmission until drive pinion is centered in clutch housing bore.

(3) Roll transmission slowly forward until pinion shaft enters clutch disc. Turn pinion shaft until splines are aligned, then work transmission forward until seated against clutch housing. **Do not allow transmission to "hang" after pinion shaft has entered the clutch disc.**

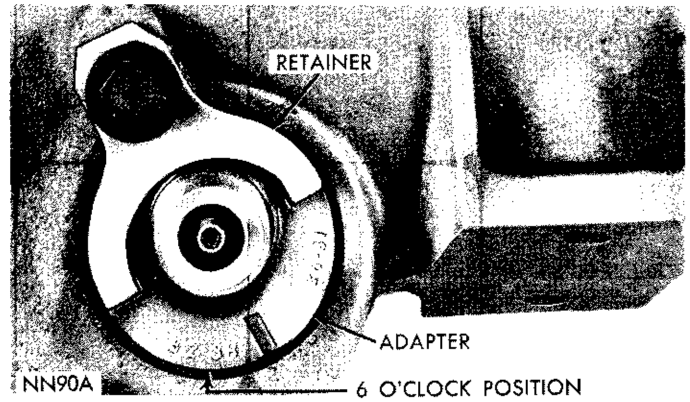


Fig. 40—Speedometer Pinion and Adapter—Installed in Extension Housing

(4) Install transmission to clutch housing bolts and tighten to 50 foot-pounds.

(5) Using a pointed drift, align crossmember bolt holes, then install attaching bolts. Tighten to 75 foot-pounds (Fig. 39).

(6) Remove engine support fixture and disengage hooks from holes in the frame side rails. Install extension housing to rear engine mount bolts and tighten to 40 foot-pounds. Engine mount to center crossmember bolt and nut, loose assembled to this point, should now be torqued to 50 foot-pounds.

(7) Referring to "Gearshift Linkage Adjustment", conenct shift control rods to transmission levers and connect speedometer cable.

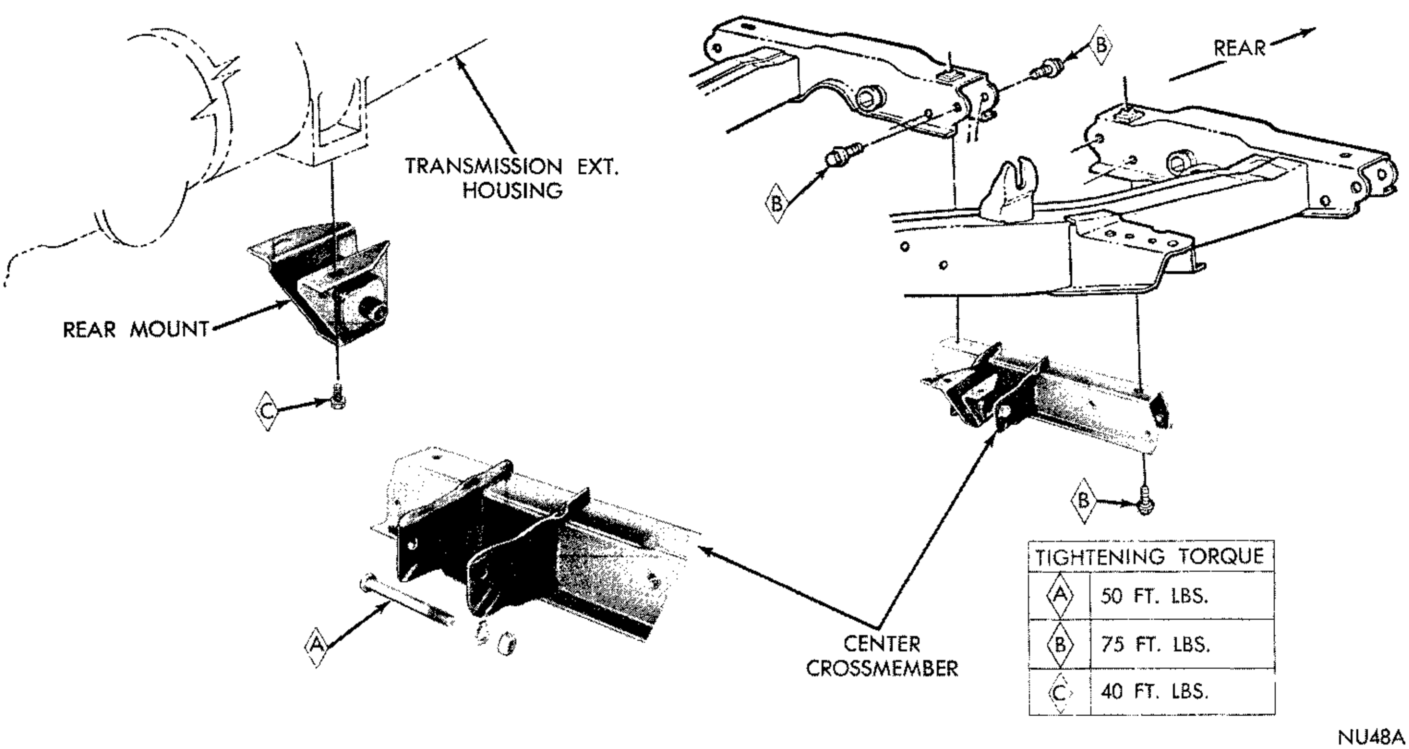


Fig. 39—Center Crossmember and Rear Engine Mount

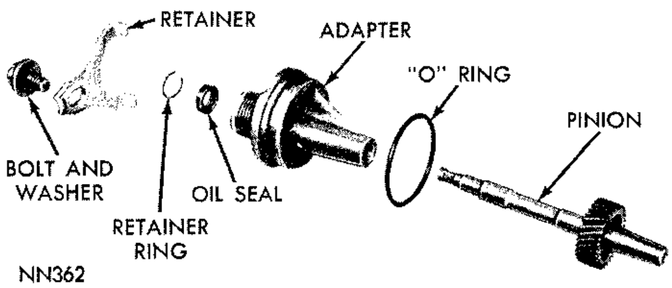


Fig. 41—Speedometer Pinion and Adapter—Disassembled

(8) Carefully guide front universal joint yoke into extension housing and onto mainshaft splines. Connect propeller shaft to rear axle pinion yoke aligning the marks made at removal.

(9) Reconnect exhaust pipes (if removed). Tighten bolts securely.

(10) Fill transmission. See Lubrication Section for detailed recommendations.

(11) Road test vehicle to make sure transmission shifts smoothly and operates quietly.

SPEEDOMETER PINION GEAR

Removal and Installation

Rear axle gear ratio and tire size determines pinion gear size requirements. Refer to "Speedometer Pinion Gear Chart" in Specifications for pinion usage.

(1) Place drain pan under adapter or drain transmission.

(2) Remove bolt and retainer securing speedometer pinion adapter to extension housing (Fig. 40).

(3) With cable housing connected, carefully work adapter and pinion out of extension housing.

(4) If transmission fluid is found in cable housing, replace seal in the adapter (Fig. 41). Start seal and retainer ring in adapter, then push them into adapter with Tool C-4004 until tool bottoms (Fig. 42).

(5) Note number of gear teeth and install speedometer pinion gear into adapter (Fig. 41).

CAUTION: Before installing pinion and adapter assembly, make sure adapter flange and its mating area on extension housing are perfectly clean and lubricated. Dirt or sand will cause mis-alignment resulting in speedometer pinion gear damage.

(6) Rotate the speedometer pinion gear and adapter assembly so that the number on the adapter, corresponding to the number of teeth on the gear, is in the 6 o'clock position as the assembly is installed (Fig. 40).

(7) Install retainer and bolt, with retainer tangs in adapter positioning slots. Tap adapter firmly into extension housing and tighten retainer bolt to 100 inch-pounds.

(8) Fill transmission to level of fill plug (Refer to Lubrication Section).

EXTENSION HOUSING YOKE SEAL

Replacement

(1) Place drain pan under yoke seal.

(2) Disconnect propeller shaft at rear universal joint. Mark both parts to reassemble in same position. Carefully pull shaft yoke out of transmission extension housing.

CAUTION: Be careful not to scratch or nick ground surface on sliding spline yoke during removal and installation of the shaft assembly.

(3) Remove extension housing yoke seal (Fig. 34) with Tool C-3985.

(4) To install a new seal, position seal in opening of extension housing and drive it into housing with Tool C-3972 (Fig. 36).

(5) Carefully guide front universal joint yoke into extension housing and on mainshaft splines. Connect propeller shaft to rear axle pinion shaft yoke aligning the marks made at removal.

(6) Fill transmission to level of fill plug (Refer to Lubrication Section).

GEARSHIFT LINKAGE ADJUSTMENT

A-230 Column Shift

(1) Remove both shift rod swivels from transmission shift levers (Fig. 43).

(2) Make sure transmission shift levers are in neutral (middle detent) position.

(3) Move shift lever to line up locating slots in bottom of steering column shift housing and bearing housing. Install suitable tool in slot and lock ignition switch.

(4) Place screwdriver or suitable tool between cross-over blade and 2nd-3rd lever at steering column so that both lever pins are engaged by cross-over blade (Fig. 44).

(5) Set 1st-Reverse lever on transmission to reverse position (rotate clockwise).

(6) Adjust 1st-reverse rod swivel by loosening clamp bolt and sliding swivel along rod so it will enter 1st-reverse lever at transmission. Install washers and

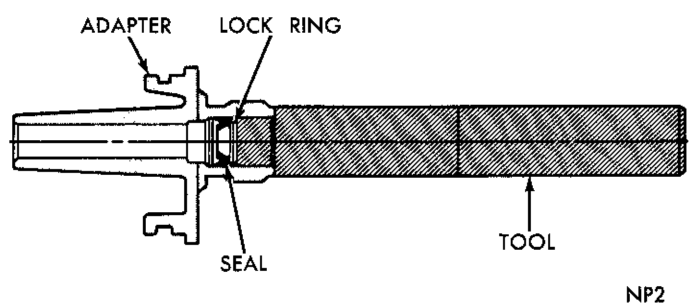


Fig. 42—Installing Speedometer Pinion Seal in Adapter

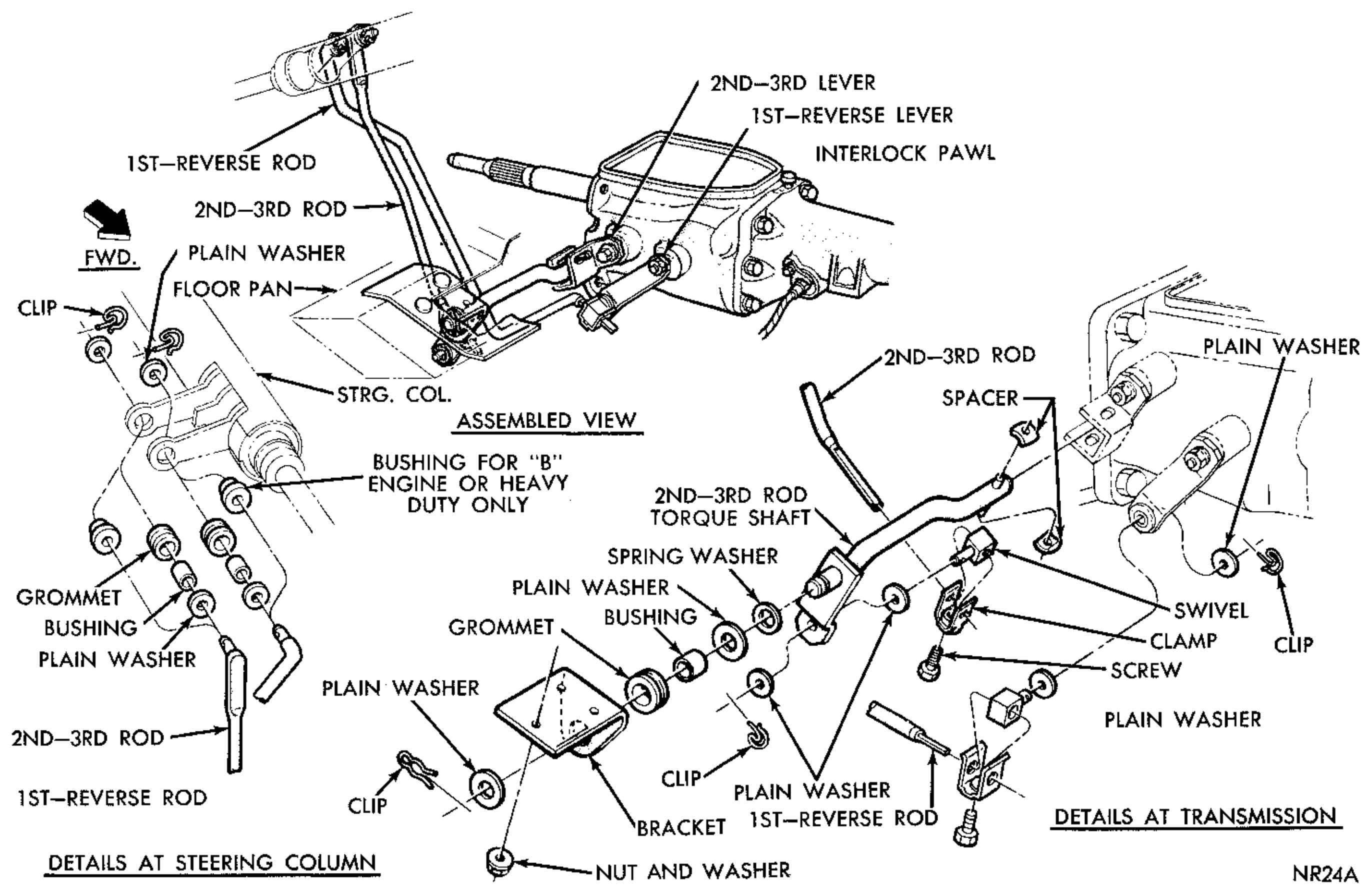


Fig. 43—Column Gearshift Linkage

clip. Tighten swivel bolt to 100 inch-pounds.

(7) Remove gearshift housing locating tool, unlock ignition switch and shift column lever to neutral position.

(8) Adjust 2nd-3rd rod swivel by loosening clamp bolt and sliding swivel along rod so it will enter 2nd-3rd lever at transmission. Install washers and clip. Tighten swivel bolt to 100 inch-pounds.

(9) Remove tool from cross-over blade at steering column and shift through all gears to check adjustment and cross-over smoothness.

(10) Check for proper operation of steering column lock in reverse and second gear positions. With proper linkage adjustment, column should lock in reverse position and should not lock in second position.

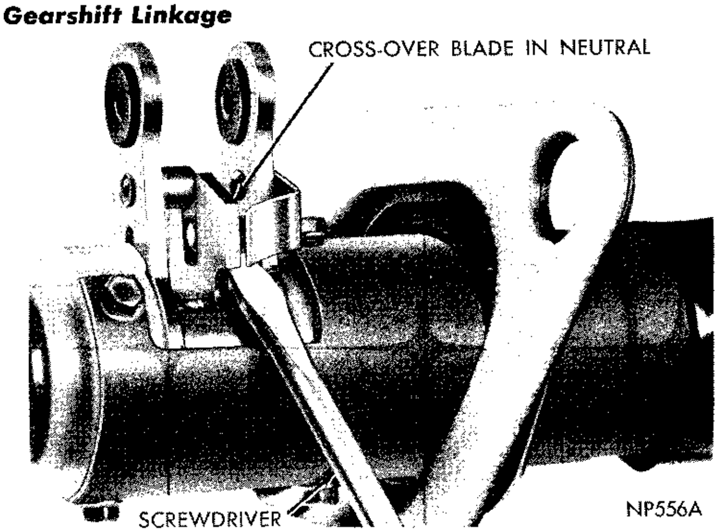


Fig. 44—Holding Crossover Blade in Neutral Position

SPECIFICATIONS

3-SPEED TRANSMISSION

(A-230 ALL SYNCHRONIZED)

Engine Displacement (Cu. In.)	383	
Gear Ratio		
First	2.55	
Second	1.49	
Third	1.00	
Reverse	3.34	
Downshift Speed Limits		
3rd to 2nd	45 to 15 M.P.H.	
2nd to 1st	25 to 0 M.P.H.	
Lubricant		
Capacity	U.S. Pints	IMP. Pints
	5	4-1/4
Type	Auto Trans. Fluid AQ-ATF Suffix "A" or "Dexron"	
Gear Type	Helical	
Tolerances		
Clutch Housing Face Squareness	.006 Max.	
Clutch Housing Bore Run-Out	.008 Max.	

SPEEDOMETER PINION GEAR CHART

ALL TRANSMISSIONS

NUMBER OF TEETH ON PINION GEAR LISTED UNDER EACH AXLE RATIO

Tire Size	Tire Size	2.45:1	2.71:1	2.76:1	2.93:1	2.94:1	3.23:1	3.54:1	3.55:1	3.91:1	4.10:1
	F78 x 15					29	31		35		
7.75 x 15		24	27	27	29	29	32		35	38	
8.25 x 15		24	26	27	28	28	31		34	38	
	G78 x 15		26	26		28	31		34		
8.55 x 15			26	26		28	31		34		
8.85 x 15			25	26		27	30		33		
9.15 x 15			25	26		27	30		33		
	H78 x 15		25	26		27	30		33		
	J78 x 15		25	26		27	30		33		
G70 x 15			26	27		29	31		35		
E60 x 15				29			34	37	37	41	43
F60 x 15		25	28	28		30	33		36	40	42

TORQUEFLITE TRANSMISSION

TRANSMISSION MODEL	A-727-B
TYPE	Automatic Three Speed with Torque Converter
TORQUE CONVERTER	
Diameter (Std.)	11-3/4"
(High Perf.)	10-3/4"
OIL CAPACITY—TRANSMISSION AND TORQUE CONVERTER ... Use Automatic Transmission Fluid labeled Type AQ-ATF, Suffix "A" or "Dexron". (Std.)	U.S. Measure 19 pts. Imp. Meas. 16 pts.
(High Perf.)	U.S. 16-1/2 pts. Imp. Meas. 13-1/2 pts.
COOLING METHOD	Water-Heat Exchanger
LUBRICATION	Pump (Rotor Type)
CLUTCHES	
Number of Front Clutch Plates	4

Number of Front Discs	4
Number of Rear Clutch Plates	3
Number of Rear Discs	4
GEAR RATIOS	
1—First	2.45 to 1
2—Second	1.45 to 1
D—Third	1 to 1
R—Reverse	2.20 to 1
PUMP CLEARANCES	
Outer Rotor to Case Bore	.004 to .008 inch
Outer to Inner Tip	.005 to .010 inch
End Clearance—Rotors	.0015 to .003 inch
Planetary Assy. End Play	.010 to .037 inch
Drive Train End Play	.037 to .084 inch
CLUTCH PLATE CLEARANCE	
Front Clutch	
383 & 440 Cu. In. Engine	.024 to .125 inch
440 High. Perf. Engine	.066 to .123 inch
Rear Clutch	.025 to .045 inch
SNAP RINGS	
Front and Rear Clutches	
Rear Snap Ring (Selective)	.060 to .062 inch .074 to .076 inch .088 to .090 inch
Output Shaft (Forward End)	.048 to .052 inch .055 to .059 inch .062 to .066 inch
BAND ADJUSTMENTS	
Kickdown Band (Front)	2 Turns*
Low-Reverse Band (Internal)	2 Turns*
THRUST WASHERS	
Reaction Shaft Support to Front Clutch Retainer (Selective)	.061 to .063 inch (Green) .084 to .086 inch (Red) .102 to .104 inch (Yellow)
Output Shaft to Input Shaft	.062 to .064 inch
Driving Shell Thrust Plate—Steel (1)	.034 to .036 inch
Rear Planetary Gear to Driving Shell	.062 to .064 inch
Front Planetary Gear to Annulus Gear Support	.062 to .064 inch
Front Annulus Gear to Driving Shell	.062 to .064 inch
Front Clutch to Rear Clutch	.061 to .063 inch
Rear Planetary Gear to Annulus Gear	.034 to .036 inch

* Backed off from 72 inch-pounds.

TIGHTENING REFERENCE

	Foot Pounds
Manual A-230 3-Speed	
Back Up Light Switch	15
Extension Housing Bolts	50
Drive Pinion Bearing Retainer Bolts	30
Gearshift Operating Lever Nuts	18
Transmission to Clutch Housing Bolts	50
Transmission Cover Retaining Bolts	12
Transmission Drain Plug	25

	Pounds Foot	Pounds Inch
Torqueflite A-727-B		
Cooler Line Fitting	—	110
Cooler Line Nut	—	85
Converter Drain Plug	—	110
Converter Drive Plate to Crankshaft Bolt	55	—
Converter Drive Plate to Torque Converter Bolt	—	270
Extension Housing to Transmission Case Bolt	24	—
Extension Housing to Insulator Mounting Bolt	40	—
Extension Housing—Crossmember to Frame Bolt	75	—
Governor Body to Support Bolt	—	100
Kickdown Band Adjusting Screw Lock Nut	29	—
Kickdown Lever Shaft Plug	—	150
Neutral Starter Switch	24	—
Oil Pan Bolt	—	150
Oil Pump Housing to Transmission Case Bolt	—	175
Output Shaft Support Bolt	—	150
Overrunning Clutch Cam Set Screw	—	40
Pressure Test Take-off Plug	—	75
Reaction Shaft Support to Oil Pump Bolt	—	160
Reverse Band Adjusting Screw Lock Nut	35	—
Speedometer Drive Clamp Screw	—	100
Transmission to Engine Bolt	28	—
Valve Body Screw	—	35
Valve Body to Transmission Case Bolt	—	100