TECHNICAL MANUAL
DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL AND REPAIR PARTS AND SPECIAL TOOLS LISTS (INCLUDING DEPOT MAINTENANCE ALLOWANCES)

FOR

TRANSMISSION W/ CONTAINER, ASSEMBLY

NSN 2520-00-909-2441
(DETROIT DIESEL ALLISON DIVISION, GM)
MODEL XTG 250-1A

HEADQUARTERS, DEPARTMENT OF THE ARMY

JANUARY 1978

WARNING

CARBON MONOXIDE POISONING CAN BE DEADLY

Carbon monoxide is a colorless, odorless, deadly poisonous gas, which, when breathed, deprives the body of oxygen and causes suffocation. Exposure to air contaminated with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, coma. Permanent brain damage or death can result from severe exposure.

Carbon monoxide occurs in exhaust fumes of fuel-burning heaters and internal-combustion engines and becomes dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to insure the safety of personnel whenever the personnel heater, main or auxiliary engine of any vehicle is operated for maintenance purposes or tactical use.

1. **Do not operate heater or engine of vehicle in an enclosed area unless it is adequately ventilated.**
2. **Do not idle engine for long periods without maintaining adequate ventilation in personnel compartments.**
3. **Do not drive any vehicle with inspection plates, cover plates, engine compartment doors removed unless necessary for maintenance purposes.**
4. **Be alert at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, immediately ventilate personnel compartments, if symptoms persist, remove affected personnel from vehicle and treat as follows: expose to fresh air; keep warm. Do not permit physical exercise; necessary, administer artificial respiration; obtain medical treatment.**

The best defense against carbon monoxide poisoning is adequate ventilation

.WARNING

THE M8A3 GAS-PARTICULATE FILTER UNIT WILL NOT PROTECT CREW AGAINST CARBON MONOXIDE POISONING.

TECHNICAL MANUAL
No. 2520-249-34&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *31 January 1978*

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL AND

REPAIR PARTS AND SPECIAL TOOLS LISTS

(INCLUDING DEPOT MAINTENANCE ALLOWANCES) FOR TRANSMISSION W/CONTAINER, ASSEMBLY (NSN 2520-00-909-2441) DETROIT DIESEL ALLISON DIVISION, GM) MODEL XTG 250-1A

REPORTING OF ERRORS

You can help improve this manual by recommending improvements using DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 (Test) located in the back of the manual and mail the form direct to Commander, US Army Tank Automotive Materiel Readiness Command, ATTN: DRSTA-M, Warren, MI 48090. A reply will be furnished direct to you.

*This manual supersedes TM 9-2520-249-34, 1 September 1971, including all changes.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope of Manual

a. Maintenance and Parts Information Combined. This manual contains instructions for direct support, general support maintenance, and listings of repair parts and special tools, for the Model XTG 250-1A Transmission Assembly NSN 2520-00-999-3904 (8356100). Included are descriptions of the transmission and components, procedures for troubleshooting, disassembly, cleaning, inspection, repair, assembly and test, and repair standards.

b. Transmission Illustrated

(1) Overall views of the transmission may be found in figures 1-1 and 1-2

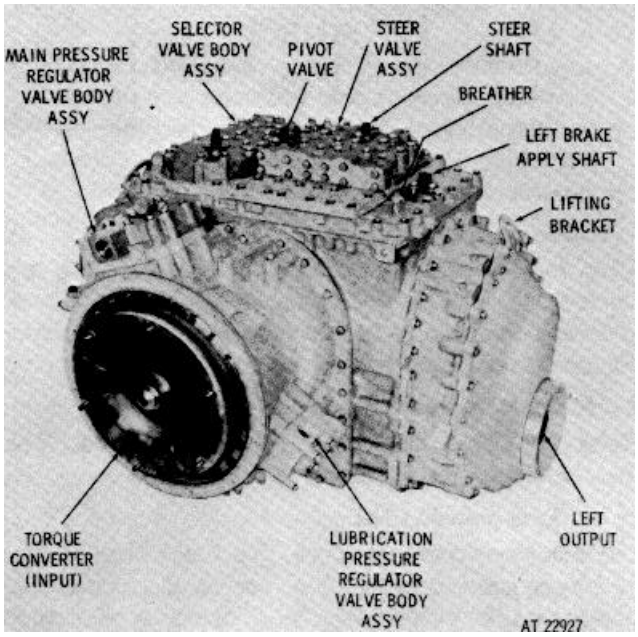


Figure 1-1. Model XTG 250-1A transmission-left-front view

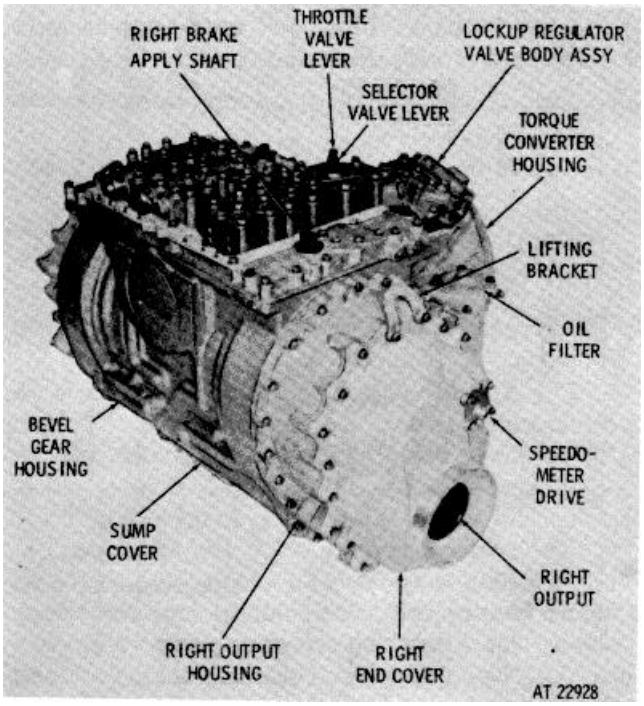


Figure 1-2. Model XTG 250-1A transmission-right-rear view

(2) Operational pictures (including disassembly and assembly pictorial step procedures), and drawings, near their pertinent text, appear throughout the manual.

(3) Foldouts (FO's) at the back of the book illustrate the transmission cross section (FO-1) a hydraulic schematic (FO-2), and exploded views (FO-3 through FO-13). Foldout 14 illustrates special tools and equipment. Foldout 15 illustrates the sequence which must be followed for tightening bolts retaining components at the top of the transmission.

1-2. Maintenance Forms and Records
Maintenance forms and records which you are required to use are listed and explained in TM 38-750

1-3. Calibration
Calibrations required are contained in this manual

1-4. Quality Assurance/Quality Control (QA/QC)
QA/QC will be in accordance with standards provided in this manual as well as those developed by authorized maintenance units

1-5. Reporting Equipment Improvement Recommendations (EIR).

EIR's will be prepared on DA Form 2407, Maintenance Request. Instructions for preparing EIR's are provided in TM 38-750, The Army Maintenance Management System (TAMMS) EIR's should be mailed directly to:

Commander
US Army Tank-Automotive
Materiel Readiness Command
ATTN: DRSTA-MCC
Warren, MI 48090

1-6. Repair Parts and Special Tools
Repair parts and special tools are listed in appendix B.

Section II. DESCRIPTION AND DATA

1-7. Description of Transmission Components

a. The Allison XTG 250-1A transmission is an X-drive model which delivers power to left and right sprocket drive shafts of a tracked vehicle The transmission, with principal exterior parts identified, is shown in figures 1-1 and 1-2.

b. The transmission (refer to the cross section, FO-1) consists primarily of a torque converter with a lockup clutch; low-, intermediate- and high-range clutches; low- and intermediate-range planetary gear sets; bevel gears and a cross shaft; left and right output, steer and reverse clutches; right and left steer and reverse planetary gear sets; and left and right brakes, output shafts and output reduction gearing

c. Full powershifting under load, through four forward and two reverse gear ratios, is a feature of the transmission. Either of two methods of steer may be selected, depending upon whether the vehicle is being operated on land or in the water The left and right brakes, linked to a foot pedal, provide service braking for the vehicle. A locking device in the brake linkage permits the brakes to be used also for parking

d. The transmission includes all hydraulic components required for operation and control, except for an oil cooler which must be remotely mounted. All operator's controls are mechanically linked to the transmission. Refer to chapter 2 for detailed descriptions and explanations of all components.

1-8. Definition of Locational and Directional Terms
The front of the transmission is the end which mounts on the vehicle engine; the rear is opposite Left and right are at the viewer's left and right when he is at the rear of the transmission, and facing toward the front. Clockwise and counterclockwise rotations will be defined at the time the terms are used in the text.

NOTE

Locational terms (front, rear, left, right) may not always agree with the same terms as established for the vehicle, due to variations of transmission installation positions.

1-9. Detailed Description of Components
The main components of the transmission are identified in the cross-section view (FO-1). Chapter 2 covers, in detail, the description and operation of all components and systems.

1-10. Driving Instructions
Refer to TM 9-2350-230-20-1 for vehicle driving instructions. (See appendix A.)

1-11. Transmission Oil
Oil may be considered as the life blood of the hydraulic transmission. The use of the proper oil, and attention to keeping the oil clean, is of utmost importance. The proper oil level must be maintained in the transmission to obtain maximum performance. Check the oil regularly. Change oil and filters in accordance with LO 9-2350-230-12 When changing or adding oil, use only that specified (see oil specifications, table 1-1, para 1-12, following).

1-12. Tabulated Data
Table 1-1, which follows, covers technical data, applicable to the XTG 250-1A transmission.

Table 1-1. Specifications and Data

Manufacturer	Detroit Diesel Allison Division, GM
Model	XTG 250-1A
Assembly number	8356100
Type	X drive
Weight, dry.	1310 lb
Overall dimensions:	
Length (engine mounting face to rear)	30.65 in
Width.	46.00 in
Height (excluding oil filler tube)	29.32 in
Nameplate location	Front-top of converter housing
Rating:	
Max input torque	542 lb/ft
Max input speed.	2800 rpm
Max input power	248 hp
Rotation:	
Input (viewing front of transmission)	Clockwise
Outputs (forward operation, viewing right side.	Clockwise
Drive ranges (manually selected)	R1, R2, N, 1, 2, 3, 4
Torque converter:	
Type	Single stage, multiphase, w/lockup clutch
Max torque multiplication ratio (at stall)	2.6:1
Lockup clutch	Single disk, automatic hydraulic apply
Range, output, steer clutches	Wet, multidisk, hydraulic apply
Brakes (service, parking)	Wet, multidisk, mechanical apply
Gearing:	
Range and steering (constant mesh).	Planetary
Cross shaft.	Spiral bevel
Output reduction.	Straight spur
Mounting:	
Input drive (engine to transmission)	Flex plate
Front support	Converter housing bolted to engine
Rear support.	Trunnions at left, right outputs
Oil system:	
Input-driven pump (main pressure).	2-gear type
Output-driven pump (main pressure)	3-gear type
Brake coolant pump	Dual-section, 2-gear type
Oil specification:	
MIL-L-21260, Grade 1, engine oil	Use during break-in and preservation
MIL-L-2104, Grade 10, engine oil	Use when ambient temp is above 0o F
MIL-L-10295, engine oil	Use when ambient temp is below 0o F
Oil capacity (less cooler circuit)	14 US gal
Oil filter	Full flow, screen type (80x80 mesh), cleanable
Oil temperature:	
Normal (in sump).	180 to 220° F
Maximum (to cooler).	3250 F
Gear ratios (mechanical):	
Low-range planetary	4.182:1
Intermediate-range planetary (compounded with low-range planetary).	2.246:1
High range (clutch)	1.00:1
Reverse-range planetary.	2.094:1
Steer planetary.	1.478:1
Bevel gear	1.444:1
Output reduction gears	2.222:1
Speedometer drive ratio	3.072 X transmission output
Torque multiplication ratios (overall):	
First gear, stall (2.6 X 4.182 X 1.478 X 1.444 X 2.222).	51.563:1
Fourth gear, lockup (1.00 X 1.444 X 2.222)	3.209:1
Reverse-i, stall (2.6 X 4.182 X 1.444 X 2.094 X 2.222)	73.055:1
Reverse-2, lockup (1.00 X 2.246 X 1.444 X 2.094 X 2.222)	15.090:1

Table 1-1. Specifications and Data Continued

Nominal pressures:

Main (1, 2, 3, 4, N, and R2)	200
Main (R1)	160
Converter-in	Not regulated
Converter-out	Not regulated
Lubrication	20
Clutch (range, steer. output)	Same as main
Lockup	165

Steer modes:

	Pivot valve position	
Range selection	*Land (normal)*	*Water (pivot)*
4	Geared steer	Geared steer
3	Geared steer	Pivot
2	Geared steer	Pivot
1	Pivot	Pivot
N	No steer	No steer
R1	Pivot	Pivot
R2	Pivot	Pivot

CHAPTER 2

DESCRIPTION AND OPERATION

Section I. DESCRIPTION AND OPERATION OF TRANSMISSION COMPONENTS

2-1. Torque Converter and Lockup Clutch

a. Description of Torque Converter Components (FO-3)

(1) The torque converter includes three main components-pump, turbine, and stator. The other parts in this group provide the support and housing for these three main components

(2) pump assembly (93, FO-3) is the driving element of the torque converter. The pump is bolted to converter cover assembly (5) which is driven by the engine flywheel. The pump rotates on a double row ball bearing (99) supported by converter ground sleeve (45) which is bolted to converter housing (60)]

(3) Converter turbine assembly (17) is the driven element. It is splined to converter output shaft (39) which transmits torque to the high-range clutch housing, and intermediate- and low-range sun gears. The turbine hub is splined to the lockup clutch disk

(4) Stator assembly (19) is the reaction element. It is mounted on an over-running clutch on a freewheel roller race assembly (24) which is splined to ground sleeve (45). The stator is free to rotate in the direction of engine rotation but locks up in the opposite direction.

b. Description of Lockup Clutch Components(FO-3)

(1) The lockup clutch includes three main components-piston assembly, clutch disk, and back plate. The lockup clutch, when engaged, provides direct drive from the engine to the converter output shaft

(2) Piston assembly (11, FO-3) is a spring steel diaphragm with a clutch apply disk attached at its circumference. The piston assembly is mounted within converter pump cover assembly (5) and retained by a snapring. The ends of the pump cover drive bolts nest in recesses in the lockup piston, causing the piston and pump cover to rotate as a unit

(3) Lockup clutch disk (13) is a nonmetallic, internal-splined disk. It is splined to the turbine hub and is located between piston assembly (11) and lockup clutch back plate (15)

(4) Lockup clutch back plate (15, FO-3) is a pressed steel ring, held between converter pump cover assembly (5) and pump (97), which are bolted together. Nonmetallic lockup clutch disk (13) reacts against the surface of the back plate when the lockup clutch is applied

c. Operation of Torque Converter and Lockup Clutch (FO-3)

(1) The torque converter and lockup clutch are inter-related and serve as the input member for the transmission. The action of these components, in combination, provides the functions of a torque multiplier, fluid coupling, and a direct drive coupling.

(2) Engine torque is transmitted to converter cover assembly (5, FO-3). Converter pump cover assembly (5), lockup clutch piston assembly (11), lockup clutch back plate (15), and converter pump assembly (93) rotate as a unit. Stator assembly (19) is located between pump assembly (93) and turbine assembly (17). The turbine assembly and lockup clutch disk (13) rotate as a unit with the converter turbine shaft.

(3) The cavity in which the torque converter components are inclosed is continually charged with oil which circulates to the oil cooler and returns through the transmission sump and oil pressure pumps. When the engine idles, there is little movement imparted to the oil. Thus, during idle, the converter acts as a disengaged clutch. The pressure of the oil in the converter cavity keeps the lockup clutch piston in the released position during idle and low speeds.

(4) When the engine is accelerated, the vanes of the converter pump force the oil radially outward and forward between the vanes of the turbine. The impact of the accelerated oil against the turbine vanes causes the turbine to rotate, driving the converter turbine shaft. Within the turbine, the oil flows toward the turbine hub and then rearward. As the oil exits from the turbine, it passes between the vanes of the stator and returns to the inner circumference of the converter pump However, when the pump is rotating faster than the turbine the returning oil strikes the front of the stator vanes and is deflected in the same direction as the pump is rotating. Thus, the returning oil assists the pump's rotation. This is the key to torque multiplication.

(5) When the oil strikes the front of the stator vanes (at low turbine speeds), it drives the stator in a direction opposite to converter rotation. This causes the over-running clutch to engage and lock the stator. However, when turbine speed approaches pump speed, the returning oil strikes the back of the stator vanes. This unlocks the stator and causes it to freewheel, allowing the converter to act as a fluid coupling.

(6) When the converter reaches a predetermined speed and there is no further need for either torque multiplication or a fluid coupling, automatic valves direct the oil to activate the lockup clutch piston. The piston compresses the lockup clutch disk against the back plate, locking the converter turbine to the converter pump cover assembly Therefore, during lockup operation, there is direct drive from the engine to the converter turbine. The stator freewheels to prevent any hydraulic drag and there is no hydraulic slippage which is inherent in fluid drives without the lockup feature The result is economy in operation and improved operating characteristics.

2-2. Input Pressure Pump

a. Description (FO-11). Input oil pump assembly (2) is located at the lower front of the transmission in an opening at the bottom of the converter housing. It is driven by a gear, concentric with the torque converter pump hub. The pump is a 2-gear positive displacement type. It consists mainly of an external drive spur gear shaft (22), internal-drive and idler gears (4 and 15), idler shaft (12), needle bearings (7, 14, 16 and 27), body (25), and cover (8)

b. Operation (FO-11). The pump supplies oil under pressure to charge the converter, activate valves, and lubricate the transmission. The input pump will be in operation any time the vehicle engine is running. Oil is drawn from the transmission sump through oil suction screen assembly (35), a passage in the converter housing, and into the pump through a passage in input pump base (18). Oil is pumped out through another passage in the pump base, a passage in the converter housing, and into the oil filter housing cavity.

2-3. Torque Converter Housing

a. Description. Torque converter housing (60, FO-3) is a magnesium casting which encloses the torque converter, input pressure pump, and all forward range gears. The front of the housing is flanged to bolt onto the engine flywheel housing The rear of the housing is bolted to bevel gear housing (9, FO-5).

b. Function. The torque converter housing acts as the front mounting for the transmission within the vehicle. It provides mounting pads for the main pressure and lubrication-pressure regulator valves, and oil filter housing. It encloses all of the transmission internal components forward of the bevel drive gears.

2-4. Converter Output Shaft

a. Description. Converter output shaft (39, FO-3) is a splined, steel shaft which connects the converter turbine to the range gearing. It extends from the converter turbine through high-range clutch housing (2, FO-4) and the intermediate and low-range components.

b. Operation. The converter output shaft transmits torque from the converter turbine to high-range clutch housing (2, FO-4) and intermediate- and low-range spur cluster sun gear (19). All these components are splined to the shaft A drilled passage within the converter output shaft provides for lubrication of the low- and intermediate-range pinion bearings and drive bevel gear bearing. Another drilled passage directs charging oil to the lockup piston.

2-5. High-Range Clutch

a. Description (FO-4)

(1) The high-range clutch consists mainly of clutch housing assembly (1), five external-tanged disks (9), five internal-splined disks (10), clutch piston (7), and clutch back plate (11). Several minor parts, including springs, pins, and spring retainer (14), complete the assembly

(2) Clutch housing (2, FO-4) is splined to the converter output shaft. Disks (9) engage pins (4) which cause the disks to rotate with the housing Internal-splined disks (10) are positioned alternately between external-tanged disks (9). The piston is fitted with oil seals and installed in a cavity in the clutch housing. Back plate (11) is the reaction member against which the clutch disks are compressed when the clutch is applied. The springs, compressed by retainer (14), return the piston to its seat in the cavity when the clutch is released.

b. Operation (FO-4)

(1) Torque is transmitted to clutch housing assembly (1) by the converter output shaft. When the clutch is in the released position, the housing assembly, piston, external-tanged disks, and back plate rotate but do not drive the internal-splined disks.

(2) When the clutch is applied, hydraulic pressure pushes the piston rearward and compresses all ten disks against the back plate. This grips internal-splined disks (10, FO-4) and causes them to rotate with the housing. The splines on disks (10) are engaged with the high-range clutch hub splines which are integral

within intermediate range planetary carrier (32). Thus, torque is transmitted from the converter output shaft, through the high-range clutch pack to the high range clutch hub. The result is a drive ratio of 1 to 1 from the converter output shaft to the drive bevel gear.

2-6. Fluid Velocity-Type Governor

a. Description. The governor consist mainly of two parts-a sheet metal annular ring, welded to the front of high-range clutch housing (2, FO-4) and a pilot tube assembly (47, FO-3) which is mounted stationarily to the rear side of the dividing wall in torque converter housing (60). The annular ring has a series of small vanes spaced around its inner circumference. The pitot tube assembly contains one oil passage. One end of this passage, the intake port, extends into the annular vaned ring and faces against the direction of rotation. The other end, exit port, connects to a passage in the converter housing.

b. Operation. The annular ring is kept filled with oil supplied from a port in the converter housing The oil is retained in the collector ring by centrifugal force induced by rotation of the high-range clutch housing. The series of vanes cause the oil to move at virtually the same speed as that of the collector ring. Thus, oil is thrown into the intake port of the pitot tube. The resulting pressure produced on the pitot tube varies with the speed of the rotating ring. This pressure is directed to the hydraulic system for control of the lockup clutch and the downshift inhibitor.

2-7. Intermediate- and Low-Range Clutches

a. Description (FO-4)

(1) The intermediate- and low-range clutches are closely similar in construction, and use identical disks and pistons. Return springs (39) and rivets (40) for these clutches are used in common for both the low- and intermediate-range clutch pistons. Both clutches react against a common clutch spacer assembly (36). The intermediate-range clutch is forward of the clutch spacer (37) and the low-range clutch is behind it.

(2) The intermediate-range clutch has four external-tanged disks (27 and 33, FO-4) which engage pins (38) in spacer (37). The spacer is held stationary by dowel pins (35). Positioned alternately between the external-tanged disks are three internal-splined disks (28 and 34) which engage intermediate-range gear assembly (29). Piston (22) travels in a bore, machined into the rear of the dividing wall in the torque converter.

(3) The low-range clutch has five external tanged disks (41, FO-4) which also engage pins (38)in stationary clutch spacer (37). Positioned alternately between these disks are four internal-splined disks (42) which engage the low-range spur gear (44). Piston (45) travels in a bore, machined into the front surface of bevel gear housing (9, FO-5).

b. Operation (FO-4)

(1) In both the intermediate- and low-range clutch, hydraulic pressure pushes either piston (22 or 45) against the clutch disks, compressing them against the stationary spacer assembly. When the disks are compressed, friction prevents movement, and either ring gear (29 or 44) is held stationary (2) When hydraulic pressure is released, the springs push piston (22 or 45, FO-4) back into its bore. This relieves the pressure on the clutch disks and permits the internal-splined clutch disks to rotate freely with ring gear (29 or 44).

2-8. Intermediate-Range Planetary Gearing

a. Description (FO-4)

(1) Planetary gearing for intermediate range includes three main elements--sun gear, ring gear, and carrier assembly. An 8-pitch, 26-tooth spur cluster sun gear (19, FO-4), (integral with the low range sun gear) is splined to the converter output shaft and is the driving element. A 70-tooth (internal teeth) ring gear (29), with external splines, is the reaction element. Planetary carrier (32) contains four, 22-tooth pinions (31.3) mounted on four spindles (31.8) which rotate on bearing rollers (31.6). The carrier is the driven element (2) Spacers (31.2 and 31.4, FO-4) position bearing rollers (31.6). Thrust washers (31.1 and 31.5) position the pinions and absorb the pinion end-thrust forces. The spindles are pressed into the carrier and locked in place by pins (31.7). The forward end of the intermediate-range carrier is splined to internal-splined disks (10) of the high range clutch and thus acts as a hub for the high range clutch. The rear end of the intermediate range carrier is splined and engages low-range spur gear (44).

b. Operation (FO-4)

(1) When the intermediate-range clutch is engaged, ring gear (29) is prevented from rotating Sun gear (19), being driven by the converter output shaft, rotates pinions (31.3) which mesh with ring gear (29). The rotating pinions then travel within the circumference of the stationary ring gear. Thus, the torque imparted by the sun gear to the pinions is transmitted to the carrier and causes it to rotate.

(2) Torque of the carrier is transferred to low range spur gear (44, FO-4). The low-range spur gear meshes with the pinions of low-range planetary carrier assembly (50), which, in turn, mesh with low-range sun gear (19) (integral with the intermediate-range sun gear). Thus, there are two rotational forces acting on the low-range planetary carrier sun gear (19) and spur gear (44).

However, these two elements are rotating at different speeds. As a result, the low-range carrier is driven at a third rate of speed. The drive ratio between the converter output shaft and bevel drive gear in this range is 2.246 to 1.

(3) Notice that, although the speed is reduced in the intermediate-range planetary, it is modified by the low-range planetary before it reaches the bevel drive gear. This interaction between two planetary gear sets is called compounding. The intermediate-range operation is the only instance in which compounding is used in the XTG 250-1A transmission.

2-9. Low-Range Planetary Gearing.

a. Description (FO-4).

(1) Planetary gearing for low range includes three main elements-sun gear, ring gear, and carrier assembly. An 8-pitch, 22-tooth sun gear (19), integral with the intermediate-range sun gear, is splined to the converter turbine shaft and is the driving element. An 8-pitch, 70-tooth (internal teeth) spur gear (44) with external splines is the reaction member. Planetary carrier (52) contains four, 8-pitch, 24-tooth pinions (51.5) mounted on four spindles (51.1) which rotate on bearing rollers (51.4). The carrier is the driven element (2) Spacers (51.3 and 51.6, FO-4) position bearing rollers. Thrust washers (51.2 and 51.7) position the pinions and absorb the pinion end thrust forces. The spindles are pressed into the carrier and locked in place by pins (51.8). A splined hub at the rear of the carrier (52) engages the internal splines in bevel drive gear (44,. FO-5).

b. Operation (FO-4).

(1) When the low-range clutch is engaged, spur gear (44) is prevented from rotating. Sun gear (19), being driven by the converter turbine shaft, rotates pinions (51.5) which mesh with spur gear (44). The rotating pinions then travel within the circumference of the stationary spur gear. Thus, the torque imparted by the sun gear to the pinions is transmitted to the carrier and causes it to rotate.

(2) Torque of the carrier is transferred to bevel drive gear (44, FO-5). In addition to the primary function of providing low-range speed reduction, the low-range planetary also functions during intermediate-range operation as described in paragraph 2-8b(2 and 3), above. Speed reduction in low-range operation provides a drive ratio of 4.182 to 1 from the converter shaft to the bevel drive gear.

2-10. Bevel Drive Gears and Cross Shaft

a. Description (FO-5)

(1) A 27-tooth, spiral bevel drive gear (44) is supported on roller bearing assembly (36), mounted on the hub of support (38), and roller bearing assembly (35), mounted on the hub of carrier (32). These parts are assembled as a unit and installed in the front of bevel gear housing (9) Shims (37) control the preload on the bearings, and shims (28) control the axial positioning of bevel drive gear (44).

(2) The bevel driven gear is press-fit to its cross shaft, positioned by a snap ring and held in place by spacer (45, FO-5) and spanner nut (47) Roller bearing assembly (40), mounted in right bearing retainer assembly (1), supports the bevel driven gear and right end of the cross shaft. Roller bearing assembly (46), mounted in left bearing retainer assembly (20), supports the left end of the cross shaft. Shims (7 and 19) control the preload of roller bearing assemblies (40 and 46) and position bevel driven gear and shaft assembly (43) in relation to bevel drive gear (44).

b. Operation (FO-5). The bevel drive gears transfer torque from the forward-range gearing, which is in line with the engine crankshaft, to the cross shaft and thus to the right and left output sections. The speed reduction ratio from bevel drive gear (44) to bevel driven gear and shaft assembly (43) is 1.444 to 1. The bevel driven gear also drives the brake coolant pump through the pump gear (42).

2-11. Reverse-Range Planetary Gearing, Left and Right

a. Description (FO-6 and FO-9).

NOTE

The right reverse-range planetary (FO-9) and the left reverse-range planetary (FO-6) are identical. Therefore, description of one planetary will serve to describe the other. The description below is keyed to foldout 6, the left reverse-range planetary.

(1) The reverse-range planetary gearing consists mainly of three elements-sun gear, ring gear, and carrier assembly. An 8-pitch, 32-tooth sun gear assembly (47, FO-6), (integral with the steer ring gear), is splined to the cross shaft and is the driving element. A 67-tooth ring gear (integral with brake hub 45) is the driven element.

(2) Planetary carrier (24, FO-6), the reaction element, contains six, 17-tooth pinions (26.3) which rotate on pinion rollers (26.4), placed between the pinions and spindles (26.7). Spacers (26.2 and 26.5) position pinion rollers (26.4).

Thrust washers (26 and 26.6) position the pinions and absorb end-thrust forces. The spindles are pressed into the carrier and locked in place with pins (26.8).

(3) Planetary carrier assembly (23, FO-6) is supported by ball bearing (28) which is mounted on the cross shaft. The outer circumference of the carrier is splined to the internal splines of left reverse-range clutch hub (19).

b. Operation. (FO-6 and FO-9)

(1) When the reverse-range clutch is engaged, carrier (24, FO-6) is prevented from turning. Thus, the torque imparted by sun gear assembly (47) to pinions (26.3) causes them to rotate on spindles (26.7) which are held stationary within the housing. The rotating pinions, therefore, drive the ring gear (brake hub 45) in the direction opposite to that of the sun gear.

(2) Driven brake hub (45, FO-6), (reverse ring gear) is splined to steer planetary carrier (58) which, in turn, is splined to output shaft (54) Thus, the output shaft rotates in reverse at a speed reduction ratio of 2 to 1. When the reverse-range clutch is released, reverse-range carrier (24) rotates freely.

2-12. Reverse-Range Clutches, Left and Right

a. Description (FO-6 and FO-9).

NOTE

The left reverse-range clutch (FO-6) and the right reverse-range clutch (FO-9) are identical. Therefore, description of one clutch will serve to describe the other. The description below is keyed to foldout 6, the left reverse-range clutch.

(1) The reverse-range clutch includes six internal-splined disks (33, FO-6), six external-tanged disks (34), reaction disk (32), piston (3), retainer assembly (9), hub (19), eight pins (8), and twelve springs (17).

(2) Pins (8, FO-6) are held stationary at one end by recesses in the bevel gear housing and at the other end by recesses in the brake stationary cam. These pins engage disks (34) and reaction disks (32) and prevent their rotation. Internal splined disks (33), positioned alternately between disks (34), engage hub (19). Piston (3) travels in a cavity, machined in the bevel gear housing.

b. Operation. When the reverse-range clutch is applied, hydraulic pressure behind piston (3, FO-6) pushes the piston against reaction disk (32). The reaction disk compresses all twelve clutch disks against brake apply stationary cam (35). This grips the internal-splined disks and holds them stationary. These disks engage the splines on hub (19) and thus prevent its rotation. This locks reverse-range planetary carrier (24) which causes the reversing action described in paragraph 2-11*b,* above. When the clutch is released, springs (17), acting against reaction disk (32), seat the piston in its cavity in the bevel gear housing.

2-13. Brakes and Brake Apply Components, Left and Right

a. Description

(1) Right and left brake assemblies are included in the transmission. Most components of one assembly are identical to those of the other assembly. The components which are not identical differ only in that they are specifically designed for right- or left-side installation. The brake assemblies are located in the right and left cavities of the bevel gear housing. The brake apply components, located in the top cover assembly, are just above their respective brake assemblies. The brakes are mechanically applied. The apply mechanism is connected, by external linkage, to a single, foot operated pedal. The pedal and external linkage are parts of the vehicle. The brakes are applied together, through the external linkage. Their only function is to slow, stop or hold the vehicle. Because of the close similarity of the right and left brake components, only the left brake will be described below. (The left brake components are illustrated in foldouts 6, 7 and 13).

(2) The brake includes stationary cam (35, FO-6), rotating apply cam (42), twelve steel balls (43), six external-tanged disks (4, FO-7), six internal-splined disks (3), and apply disk (2) Brake hub (45, FO-6)is integral with the reverse range ring gear. Reaction plate assembly (5, FO-7) is the reaction member for the brake clutch disks as well as the steer clutch disks. Springs (13) and pins (15) also serve both the brake and steer clutch.

(3) Brake apply components include shaft (74, FO-13), cam (88), bearing (87), rollers (90), body assembly (79), and adjusting screw (40, FO-6) Combined with the brake apply mechanism is brake signal valve (95, FO-13) and air valve assembly (76), both of which are activated by lever (86).

b. Operation

(1) When the brake is applied, the vehicle linkage causes brake apply shaft (74, FO-13) to rotate clockwise (right shaft rotates counterclockwise) Cam (88) is splined to shaft (74) and is eccentric to it. Bearing (87), being mounted on and concentric with the cam, applies pressure on the end of adjusting screw (40, FO-6), installed in rotating apply cam (42). Thus, when apply shaft 74, FO-13) rotates, brake rotating apply cam (42), FO-6) moves in a clockwise direction, as viewed from the left side.

(2) Rotating apply cam (42, FO-6) and

stationary cam (35) have matching, inclined pockets (cams). Twelve steel balls (43) are installed in these pockets and separate the stationary and rotating cams. Thus, when cam (42) rotates, the steel balls ride up the inclined pockets and force the rotating cam away from the stationary cam.

(3) The outward face of the rotating cam compresses apply disk (2, FO-7) and brake disks (3 and 4) against reaction plate assembly (5). The resulting friction between the plates causes internal-splined disks (3) to rotate slower or stop This action slows or stops brake hub (45, FO-6) which is splined to steer planetary carrier (58). The steer planetary carrier is splined to the output shaft. Thus, when the brakes are applied, the rotation of the output shaft is slowed or stopped.

(4) Simultaneously with application of the brake, lever (86, FO-13) is lifted off signal valve (95) and hydraulic pressure closes brake air valve assembly (76). When closed, no air is admitted to the intake for the brake coolant pump, and the pump supplies coolant to the applied brakes. When the brake is released, air is supplied to the pump intake and no coolant is pumped. Air valve assembly (76) is also actuated by a signal pressure during steer, causing coolant to flow to the clutches used for steer.

2-14. Steer Planetary Gearing, Left and Right

a. Description.

NOTE

The left steer planetary gearing (FO-6 and -7) and right steer planetary gearing (FO-8 and -9) are identical. Therefore, description of one planetary will serve to describe the other. The description below is keyed to foldouts 6 and 7, the left steer planetary.

(1) The steer planetary gearing includes three main elements: sun gear, ring gear, and planetary carrier assembly. An 8-pitch, 32-tooth sun gear (integral with output clutch housing assembly 19, FO-7) is the reaction element. A 67-tooth ring internal gear (49,. FO-6), which is splined to reverse range sun gear assembly (47, is the driving element. Planetary carrier (58), the driven element, contains six, 17-tooth pinions (60.3) which rotate on pinion rollers (60.4) placed between the pinions and spindles (60.8). Spacers (60.2 and 60.5) position rollers (60.4). Thrust washers (60.1 and 60.6) position pinions (60.3) and absorb end-thrust forces. Spindles (60.8) are pressed into the carrier and locked in place with pins (60.7).

(2) Planetary carrier (58, FO-6) is engaged by the splines on the output shaft and also by the splines on the outward end of brake hub (45). An oil baffle (59) and an oil collector (56), retained by six bolts (57), complete the carrier assembly.

b. Operation. When the steer clutch is applied, it prevents rotation of the output clutch housing assembly (19, FO-7). The steer planetary sun gear, being integral with the housing, is also stopped. Rotation of the ring gear (splined to the reverse range sun gear, which is driven by the cross shaft) causes pinions (60.3, FO-6) to rotate about the stationary sun gear. Thus, the torque imparted by the rotating ring gear is transferred through the pinions to the carrier which is splined to the output shaft. The speed reduction obtained through this gearing is a ratio of 1.478 to 1. In addition to its primary function, the steer planetary gearing also functions as a reduction gear during straight travel in first gear.

2-15. Steer Clutches, Left and Right

a. Description.

NOTE

The left steer clutch (FO-7) and the right steer clutch (FO-8) are identical. Therefore, description of one clutch will serve to describe the other. The description below is keyed to foldout 7, the left steer clutch.

(1) The steer clutch includes piston (35, FO-7), apply disk (16), four external-tanged disks (12), and four internal-splined disks (14). Anchor pins (6) engage the external-tanged disks. Guide pins (15) and springs (13) complete the assembly. (Anchor pins (6), guide pins (15) and springs (13) also serve the brake assembly).

(2) Piston (35, FO-7) travels in a bore, machined in output housing (55). Disks (12 and 14), apply disk (16), guide pins (15), and springs (13) are assembled to reaction plate assembly (5) which is bolted output housing (55). External tanged disks (12) are held stationary by anchor pins (6). Internal-splined disks (14) are assembled alternately between disks (12), and engage the splines on output clutch housing assembly (19).

b. Operation.

(1) When the steer clutch is applied, hydraulic pressure pushes piston (35, FO-7) toward steer clutch disks (12 and 14). The disks compress against reaction plate assembly (5) and friction prevents rotation of internal-splined disks (14). This, in turn, prevents rotation of output clutch housing assembly (19) and the attached steer planetary sun gear. Thus, when the steer planetary sun gear is stopped, a reduction in speed occurs, as described in paragraph 2-14b.

(2) Either of two steer systems may be selected-normal for land, or pivot for water. In normal steer (in any gear), one steer clutch is engaged, while a reverse or output clutch is engaged in the opposite side of the transmission. In pivot steer, a steer clutch is applied only in first, fourth, or reverse gear, while a

reverse clutch is engaged at the opposite side.

(3) The steer clutches also are used, in first gear only, as drive clutches during straight travel.

For this travel condition, both steer clutches are applied.

2-16. Output Drive Clutches, Left and Right

a. Description.

NOTE

The left output clutch (FO-7) and the right output clutch (FO-8) are identical. Therefore, the description of one clutch will serve to describe the other. The description below is keyed to foldout 7, the left output clutch.

(1) An output clutch includes housing assembly (19, FO-7), piston housing assembly (33), seven external-tanged disks (27), seven internal-splined disks (26), eight pins (22), sixteen springs (24) with sixteen guide pins (23) and clutch hub (25). Several minor parts complete the group.

(2) Disks (26 and 27, FO-7) are installed alternately in housing assembly (19). Pins (22) engage the tangs on disks (27) and holes in clutch housing assembly (19) and piston housing assembly (33). Piston (28) travels in the bore of piston housing assembly (33). The piston housing is installed in clutch housing assembly (19) and retained by retaining ring (34). Spring (24) holds piston (28) away from the clutch plates when the clutch is released. External splines on clutch hub (25) engage the internal-splined disks (26). Internal splines on the clutch hub engage the splines on the output shaft.

b. Operation.

(1) When the output clutch is applied, hydraulic pressure pushes piston (28, FO-7) toward clutch disks (26 and 27) and compresses them against inside of housing assembly (19). This locks the entire clutch assembly together and causes it to rotate as a unit when torque is applied from the cross shaft.

(2) Housing assembly (19, FO-7) includes the steer planetary sun gear. Hub (25) engages the output shaft which is splined to steer planetary carrier assembly (55, FO-6). Thus, when the output clutch is applied, two elements of the steer planetary are locked together. When any two elements of a planetary gear set are locked together the planetary will rotate as a unit. Further interconnection of the steer planetary and reverse planetary gear locks two elements of the reverse planetary, causing it also to rotate as a unit. Thus, any rotation of the cross shaft is transmitted by the reverse-range sun gear, through interconnected components, to the output shaft.

(3) During straight travel in second, third, and fourth gears, both output clutches are engaged. During normal or pivot steer in second, third, and fourth gears, only one output clutch is engaged to drive the faster or forward-moving track. Cross shaft rotation is transmitted to the output shaft at a 1 to 1 ratio.

2-17. Output Reduction Gears, left and Right

a. Description.

NOTE

The left set of output transfer gears (FO-7) and the right set of output transfer gears (FO-8) are identical. Therefore, the description of one set will serve to describe the other. The description below is keyed to foldout 7, left output reduction gears.

(1) A 4-pitch, 18-tooth drive spur gear (64, FO-7) is splined to output shaft assembly (51, FO-6) and retained by lock plate (66, FO-7), lock tab (67), and bolt (68). The gear hubs are supported on straight roller bearings (63 and 69). Inner bearing (63) is contained in a cage in output housing (55), the outer bearing is in a cage in end cover assembly (79).

(2) A 4-pitch, 40-tooth driven gear (90. FO-7) is supported on straight roller bearings (85 and 95). Inner bearing (95) is supported in a cage in the output housing. The outer bearing is supported in a cage in the end cover assembly. Splines inside the hub of driven gear (90) are designed to receive the track sprocket shaft.

b. Operation. The output transfer gears transmit torque drom the cross shaft to the vehicle drive sprockets at a speed reduction ratio of 2.222 to 1. Rotation of the track sprockets is opposite to that of the cross shaft.

2-18. Output Driven Oil Pump

a. Description.

(1) Output driven oil pump assembly (29, FO-8) is located on right output housing (63), inside of end cover assembly (44). The pump, a conventional gear-type unit, includes a pump body (31), cover (35), two 7-pitch, 8-tooth idler gears (34), and an internal drive gear shaft (33).

(2) A 4-pitch, 13-tooth drive spur gear (25, FO-8) is keyed to the drive shaft and retained by snap ring (24). The drive gear meshes with transfer drive spur gear (64, FO-7). The slotted end of the shaft on gear shaft (33, FO-8) protrudes through speedometer drive cover (4). The slotted end is machined to receive a 5/32-inch, heavy-duty speedometer drive cable. The speed of the pump (and speedometer drive) is 3.072 times the speed of the power train output (at vehicle drive coupling).

b. Operation.

(1) Directional rotation of the pump drive shaft matches the directional rotation of the output shaft. Therefore, the pump supplies oil under

pressure to the hydraulic system only when the vehicle is moving forward. In neutral, or during any reversing of the right track, no oil pressure is supplied.

(2) This pump is the sole source of hydraulic pressure at the beginning of tow- or push-starts. When the vehicle is moving forward, the pump assists the input driven pump in supplying oil to the hydraulic system.

2-19. Brake Coolant Pump Assembly

a. Description.

(1) A dual-section brake coolant pump assembly (40, FO-11) is located directly below the drive bevel gears and inside of sump cover (76). Two pairs of gears (48 and 51) are installed in body assembly (44). Cover assembly (55) has two intake ports each of which contains a check valve arrangement and a screen assembly (65). Cover assembly (55) is bolted to the open end of body assembly (44).

(2) Gears (42) are splined to the shaft ends of gears (48) and retained by nuts (41). Gears (42) engage the straight-cut teeth of pump drive gear (42, FO-5). The bevel teeth of pump drive gear (42) are engaged with bevel driven gear and shaft (43). The pump drive gear and shaft is supported by a needle bearing (47, FO-11) pressed in the center of pump body assembly (44). Two outlet ports in the body -assembly index with passages in the bevel gear housing.

b. Operation. The pump operates when the vehicle is moving. When the brakes are applied, the pump draws oil from the sump and directs it to the brake disks for coolant. When the brakes are released the pump draws air. During steer, the pump supplies coolant to the reverse or steer clutches. Refer to paragraph 2-13b(4), for air valve operation.

2-20. Oil Filter Assembly

a. Description (FO-10). Oil filter assembly (4) is located in oil filter housing assembly (6) which is mounted with four bolts (13) on the right side of the converter housing. Oil filter assembly (4) includes a replaceable, cleanable filter elements (5.1) having outside-in flow characteristics. The element is screen type, 80x80 mesh. A bypass valve is located within the cover housing above the filter element.

b. Function (FO-10).

(1) Oil pumped by the input pressure pump (and output driven pump when the vehicle is moving forward) enters through a passage in the bottom of filter housing (8) and surrounds filter element (5.1). Pressure differential causes the oil to flow through the screen to a passage in the cover housing. This passage indexes with the outlet port at the top of filter housing (8) where it enters the hydraulic system.

(2) Should the filter element become clogged, or if inlet oil pressure exceeds outlet oil pressure by 50 to 62 psi, the bypass valve will open. This will permit the oil to bypass the filter element and flow directly through a passage in the cover housing to the outlet port.

2-21. Main-Pressure and Lockup Regulator Valve Body Assemblies

a. Description (FO-10).

(1) The main-pressure regulator valve body assembly (34) includes three valve groups. These are as follows-(2), (3) and (4) below.

(2) The main-pressure regulator group consists of items (35) through (40).

(3) Flow valve (46) is alone in its bore.

(4) The lockup shift valve group consists of items (43) through (48).

(5) These three valve groups move lengthwise in bores of valve body (41).

(6) Lockup regulator valve body assembly (20) includes items (21) through (29).

b. Main-Pressure Regulator Valve Operation (FO-10). Main pressure is exerted against the right end of valve (40), pushing it against springs (38) and (39). When spring force balances hydraulic pressure, main pressure is regulated.

*c. Lockup Shift Valve Operation(*FO-10). Lockup shift valve (43) located in the right bore, is actuated by pitot pressure working against forces of spring (45) and throttle pressure. The lockup clutch circuit and the converter-in circuit are controlled by the lockup shift valve. When the spring is depressed, the lockup clutch is applied, and when the valve is seated, the lockup clutch is exhausted. The valve permits a greater flow of oil to the converter while the lockup clutch is released.

d. Flow Value Operation (FO-10). Flow valve (46) is located in the left bore and is actuated entirely by oil pressures. The flow valve is interconnected with the lockup shift valve and the manual-operated control valve body. When any manual shift is made (except to neutral), a pressure differential causes the flow valve to move rearward. This interrupts the lockup clutch circuit and causes it to exhaust. When the shift is completed, equalizing pressure (through the lockup regulator valve in later models) returns the valve to its forward position and the lockup circuit is restored. Thus, the flow valve causes release of the lockup clutch while shifts are being made.

e. Lockup Regulator Valve Operation (FO-10).

(1) The lockup regulator valve is connected between the lockup shift valve and the flow valve.

Valve (22)moves against spring (23) when lockup shift valve (43) is against stop (49). Valve (22) limits lockup pressure to approximately 165 psi.

(2) Included in body assembly (20) is the converter pressure relief valve group (items 26 through 29). These parts limit converter-in pressure to approximately 120 psi.

2-22. Main Control Valve Body Assembly

a. General Description (FO-12). Main control valve body assembly (7) works in conjunction with oil transfer plate assembly (15, FO-13), which is bolted to housing cover assembly (36). The control valve body contains throttle valve assembly (30, FO-12) and throttle valve regulator assembly (28) in a common bore, the downshift inhibitor (items 16 through 24), and selector valve (9). The control valve body also contains throttle valve lever assembly (34) to which the external throttle linkage is attached.

b. Throttle Valve Operation (FO-12).

(1) Throttle valve assembly (30) is actuated by lever assembly (34) which is linked to the vehicle throttle. The throttle valve acts against a spring (29) which acts against throttle regulator valve assembly (28) which, in turn, acts against another spring (27). Sufficient movement of the throttle overcomes both spring forces and allows main pressure to assist spring (27) to overcome pressure exerted by spring (29). Thus, movement of the throttle is proportional to the oil pressure assist given to spring (27), which results in regulated throttle pressure.

(2) At approximately three-quarter open throttle, throttle pressure comes from the regulator valve. Above this setting, pressure comes directly from the throttle valve. Pressure from the throttle valve is directed to the lockup shift valve (paragraph 2-21c). Thus, above, approximately three-quarter throttle opening, engagement of the lockup clutch is delayed; below this setting, pitot pressure alone controls engagement of the lockup clutch. Throttle pressure will also help to downshift the lockshift valve at heavy throttle.

c. Downshift Inhibitor Operation (FO-12). Governor plug (downshift inhibitor) valve (21) is actuated by pitot pressure. Pitot pressure pushes plunger (24) into the path of lugs formed on selector valve shaft and lever assembly (32). When the plunger is extended, it prevents rotation of the lever assembly toward a lower gear position. In fourth gear, high-range clutch pressure from selector valve (9) is directed between signal (compensator) valves (18 and 19), and causes signal valve (19) to compress spring (20). This action delays the movement of plunger (24) away from shaft and lever assembly (32). Turbine speed (and pitot pressure) must be lower to permit a 4-3 shift than it is for 3-2 and 2-1 shifts. This delay is necessary because the gear ratio step from fourth gear to third is much greater than from third to second gears.

d. Manual Selector Valve Operation (FO-12).

(1) Selector valve (9) is actuated by external linkage connected to the operator's manual shift control. The valve has two parallel internal passages--one passage is pressurized at all times and the other is open to exhaust at all times. Slots, milled into these passages, are spaced so that each valve movement will aline the slots with different ports in selector valve body (42) Thus, the proper pressure and exhaust ports are alined for each of the six driving ranges and neutral.

(2) Although reverse range, steer, and output clutches are not directly charged or exhausted by movements of the selector valve, the pressure (or absence of pressure) in signal lines connected to the valve does control the charging or exhausting of the clutches.

2-23. Steer Valve Body Assembly

a. General Description (FO-12). Steer valve assembly (54) is attached to separating plate (130) which is bolted to housing assembly (36, FO-13). The steer valve body assembly consists mainly of five valves-two identical steer valves (86 and 102, FO-12), drive relay valve (116), steer relay valve (75), and pivot valve (63). When the output, steer, or reverse clutches are used as driving clutches, interaction between the five valves selects and controls the proper clutch.

b. Steer Valves Operation (FO-12).

(1) When steer valves (86 and 102) are in the "no steer" position, main pressure is blocked at steer regulator valves (82 and 107). However, other passages within the valve body allow main pressure to charge the drive clutches during straight travel in any gear.

(2) When steering, one steer valve moves in the direction opposite the other steer valve. Thus, forward movement of one valve interrupts pressure to a driving clutch and allows it to exhaust, and the simultaneous rearward movement of the other valve retains the engagement of the driving clutch that it controls. The degree of steer is proportional to the degree the operator moves the steer control.

c. Pivot Valve Operation (FO-12).

(1) Pivot valve (63), connected to external linkage, is manually controlled by the vehicle operator. Rotation of the pivot valve permits selection of either of two systems of steering. When valve position indicator (65) is pointing rearward, normal (geared) steer is available. This steering system is known as "land" steering. When the pivot valve indicator is pointing 35

degrees off the centerline, pivot steer is available. This steering system is also known as "water" steer.

(2) In normal steer, the vehicle will "pivot" in first and reverse gears--one output will rotate opposite to the direction of travel while the other output rotates toward the direction of travel. During steering maneuvers (normal steer) in second, third, or fourth gear, rotation of only one output is slowed. Thus, the vehicle turns toward the side with the slowest rotating track.

(3) In pivot steer, the vehicle pivots in every gear except fourth. In fourth gear, the pivot system automatically reverts to normal steer. The sole function of pivot valve (63) is to control pressure to the bottom of steer relay valve (75).

d. Drive Relay Valve Operation (FO-12). Drive relay valve (116) determines whether the output clutches are used as driving clutches or whether the reverse or steer clutches will be the driving clutches. In neutral, first, and reverse gears, oil is directed to the steer relay valve, which, depending on the steer system being used, sends oil to either the reverse clutches or steer clutches. In second, third, and fourth gears, the valve directs oil to the output clutches- regardless of steer system used.

e. Steer Relay Valve Operation (FO-12).

(1) Steer relay valve (75) determines whether the reverse clutches or steer clutches will be used as the driving clutches during straight travel, and which one of them will be applied during steer. Using normal steer system for straight travel in first gear, the valve directs pressure to the steer clutches.

(2) During steer, in first or reverse, pressure is directed to a reverse clutch and exhausted from the steer clutch on the same side. In second, third or fourth gear, no pressure comes from the steer relay valve.

(3) During steer in first, second or third gear, with the pivot steer system in use, the valve directs pressure to a reverse clutch and exhausts the driving clutch on the same side. In fourth gear, the pivot steer system automatically reverts to normal steer-no oil pressure is sent to the reverse clutch.

2-24. Lubrication Regulator Valve Body Assembly.

a. General Description (FO-10). Lubrication regulator valve body assembly (73) is bolted to a mounting pad located on the lower right side of the converter housing. Two valves, lubrication regulator valve (80) and cooler bypass valve ball (77), are contained within valve body (84).

b. Cooler Bypass Valve Operation (FO-10).

(1) The cooler bypass valve is a spring-loaded ball (77), that is actuated by a 40 psi pressure differential between the cooler-in and cooler-out. flows. When the pressure differential is above 40 psi, the bypass valve opens, oil from the cooler-in circuit bypasses the cooler and flows directly to the lubrication regulator valve.

(2) When the pressure differential is below 40 psi, the bypass valve remains closed and all oil flow from the converter is directed to the oil cooler. (The oil cooler is considered as a vehicle component and is, therefore, described in TM 9-2350230 -35/1.)

c. Lubrication Regulator Valve Operation. (FO-10). Lubrication regulator valve (80) is a poppet-type, spring-loaded relief valve. All oil from the oil cooler, and that which flows through the cooler bypass valve, is delivered to the lubrication regulator valve. This valve maintains lubrication system pressure at 20 psi, supplies oil to the various points in the power train that require a positive and continuous flow of lubricant, and keeps the fluid velocity governor filled with oil. When these requirements are satisfied, the valve directs the excess to the power train sump.

2-25. Bevel Gear Housing.

a. Description (FO-5). Bevel gear housing (9) is an aluminum casting, and it is the largest structural member. The bevel gear housing is machined to receive the converter housing, output drive housings, bevel drive gear and cross shaft components, brake coolant pump and top cover assembly.

b. Function (FO-5). The bevel gear housing is the main structural member on which all other major assemblies are mounted. It also serves as the oil sump for the transmission.

2-26. Covers and Access Openings

a. Description.

(1) Sump cover (76, FO-11) is an aluminum casting or steel stamping, located at the bottom center of the bevel gear housing. Sixteen bolts (79) attach the cover to the bevel gear housing. Magnetic drain plug (81) is located in the center of the cover.

(2) Housing cover assembly (36, FO-13) is an aluminum casting that covers the top opening in the bevel gear housing. The cover assembly is attached to the bevel gear housing by 14 screws (31). Other bolts used to attach adjacent components also retain the cover assembly. Numerous passages are machined or drilled in this cover for distribution of oil.

(3) Right and left brake adjustment covers (24 and 40) are located on housing cover assembly (36). These small covers are each retained by five capscrews (27, 28, 43 and 44).

(4) Right and left end covers are located on the output drive housings.

These covers are machined, magnesium-alloy castings. The right end cover includes a mounting pad to accommodate the speedometer drive cover.

b. Function.

(1) Sump cover (76, FO-11) permits access to the brake coolant pump assembly.

(2) Housing cover assembly (36, FO-13) provides a mounting for oil transfer plates, brake and air valve controls, control valve body assembly, and steer valve body assembly. Removal of the housing cover permits access to components in the bevel gear housing.

(3) Brake adjustment covers (24 and 40) permit access to the right and left brake adjustment components.

(4) Left and right end covers (81, FO-7) and (46, FO-8) support and enclose the output reduction gears. They provide trunnion mounts which support the rear end of the transmission. The right end cover encloses the output driven oil pump.

2-27. Oil Transfer Plates

a. Description.

(1) Oil transfer plate (55, FO-10) is located under the main pressure regulator valve body assembly. It is a magnesium-alloy casting in which numerous oil channels have been machined or drilled.

(2) Oil transfer plate (18, FO-13) is located under steer valve (54, FO-12) and control valve body (7) assemblies. It is a magnesium-alloy casting having numerous oil channels. Separator plate (130) separates oil transfer plate (18, FO-13) and steer valve assembly (54, FO-12). Separator plate (53) separates oil transfer plate (18, FO-13) and control valve body assembly (7, FO-12).

b. Operation. The oil transfer plates, in conjunction with the spacer plates, direct oil from and to the proper passages in the valve bodies, converter housing and transmission top cover assembly.

Section II. OPERATION OF HYDRAULIC SYSTEM

2-28. Hydraulic Schematics

a. Full and Partial Schematics.

(1) A schematic diagram of the entire hydraulic system is illustrated in foldout 2 at the back of this manual. This illustration may be unfolded for reference during study in this section.

(2) Thirteen, color-coded partial schematics are presented in this section to illustrate the various valves and hydraulic circuits involved in vehicle operation. Although every possible condition is not illustrated, all operating conditions can be determined. This can be done by combining the desired characteristics of one operating condition with those of another. Separate colors or color combinations--contained in the legend within the figure-indicate the circuits involved for the condition stated in the caption. Areas not colored are inactive and contribute nothing to the hydraulic action. These areas indicate the circuits usually filled with oil which is neither flowing nor pressurized.

b. Valve Positions.

(1) In the partial schematics, the valves and other moving parts are shown in their proper positions for the operating condition illustrated. Some valves will be at either one extreme position or the other, while other valves will be shown at some intermediate position. Thus, those at intermediate position show only an approximate degree of movement under certain conditions.

NOTE

Variable conditions such as input speed, output speed, throttle opening, selector position, and viscosity of the working fluid will affect the degree of movement in certain valves.

(2) To link the hydraulic action with the corresponding mechanical action, references are made (when applicable) to Section III of this chapter which describes the mechanical functions in the power trains.

2-29. Torque Converter or Lockup Drive

Regardless of the gear range or steer condition selected by the vehicle operator, drive from the engine to the range gearing either is through the torque converter (hydraulic) or lockup clutch (mechanical). Because the application of the lockup clutch is a function of turbine speed, clutch engagement is illustrated for fourth-gear conditions. The torque converter drive is illustrated for neutral, first, second, third, and reverse gears.

2-30. System Pressure Pumps and Circuits.

(fig. 2-1)

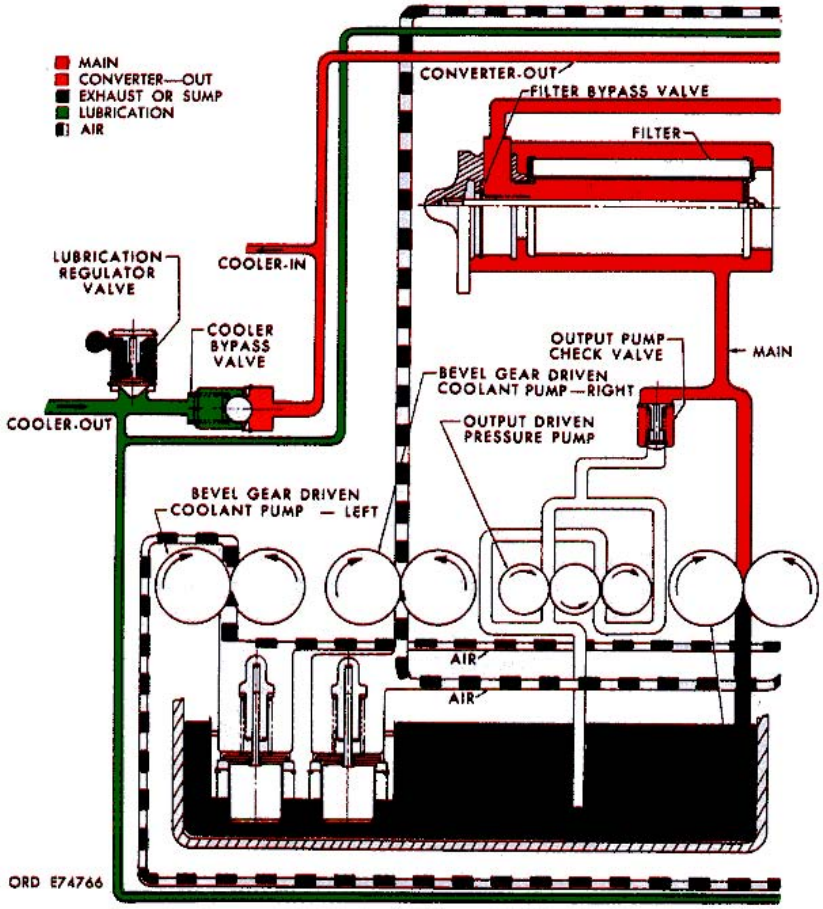


Figure 2-1. Hydraulic system oil supply components-schematic view.

a. Input-driven Pressure Pump. When the vehicle engine is operating, the input pressure pump draws oil from the transmission sump and delivers it to the cavity surrounding the filter element.

b. Output-driven Pressure Pump. When the vehicle is traveling forward, the output-driven pump also draws oil from the sump and assists the input-driven pump in satisfying system requirements. When the right track of the vehicle is driving in reverse, a spring-loaded check valve in the line on the pressure side of the pump prevents backpumping.

c. Brake Coolant Pump. The brake coolant pump operates any time a range clutch is engaged and the vehicle is moving, but pumps oil only when the vehicle is being steered or braked. During these operations, sump oil is drawn into the pump through a pair of large, mesh screens which cover the intake ports, and a pair of disk-type, spring-loaded check valves. The pump then forces the coolant to the areas of the steer clutches, reverse clutches, and brake disks. (fig. 2-13). When no coolant requirement exists. air is admitted to the inlet side of the pump. The pump then draws air into the circuit, and the coolant oil returns to the sump.

2-31. Oil Filter Assembly

Oil delivered by either the input-driven pump and/or the output-driven pump flows through the filter element and into the main-pressure line. If the filter element becomes clogged, system pressure is maintained by a bypass valve in the top of the filter assembly. The bypass valve opens at 56 psi pressure differential and allows the oil to flow from the pumps directly to the main-pressure line.

2-32. Cooler Bypass Valve and Converter-out Circuit

The converter-out circuit directs oil returning from the converter to the oil cooler and oil cooler bypass valve. (The oil cooler is not shown on the schematic because it is a vehicle-furnished component.) When the differential pressure at the bypass valve exceeds 40 psi, the valve opens and allows some of the returning oil in the converter-out line to flow into the lubrication circuit. When the valve is closed (below 40 psi), all oil in the converterout circuit is directed to the oil cooler.

2-33. Lubrication Regulator Valve

Oil from the oil cooler and cooler bypass valve is directed to the lubrication regulator valve. The regulator valve maintains the lubrication system pressure at 20 psi and also keeps the fluid-velocity governor cavity charged with oil. When these requirements are satisfied, the valve opens (20 psi) and allows the excess to return to the transmission sump. Refer to paragraph 2-34d,.
figure 2-2 and figure 2-13 for explanation of lubrication circuit.

2-34. Neutral Operation (fig. 2-2)

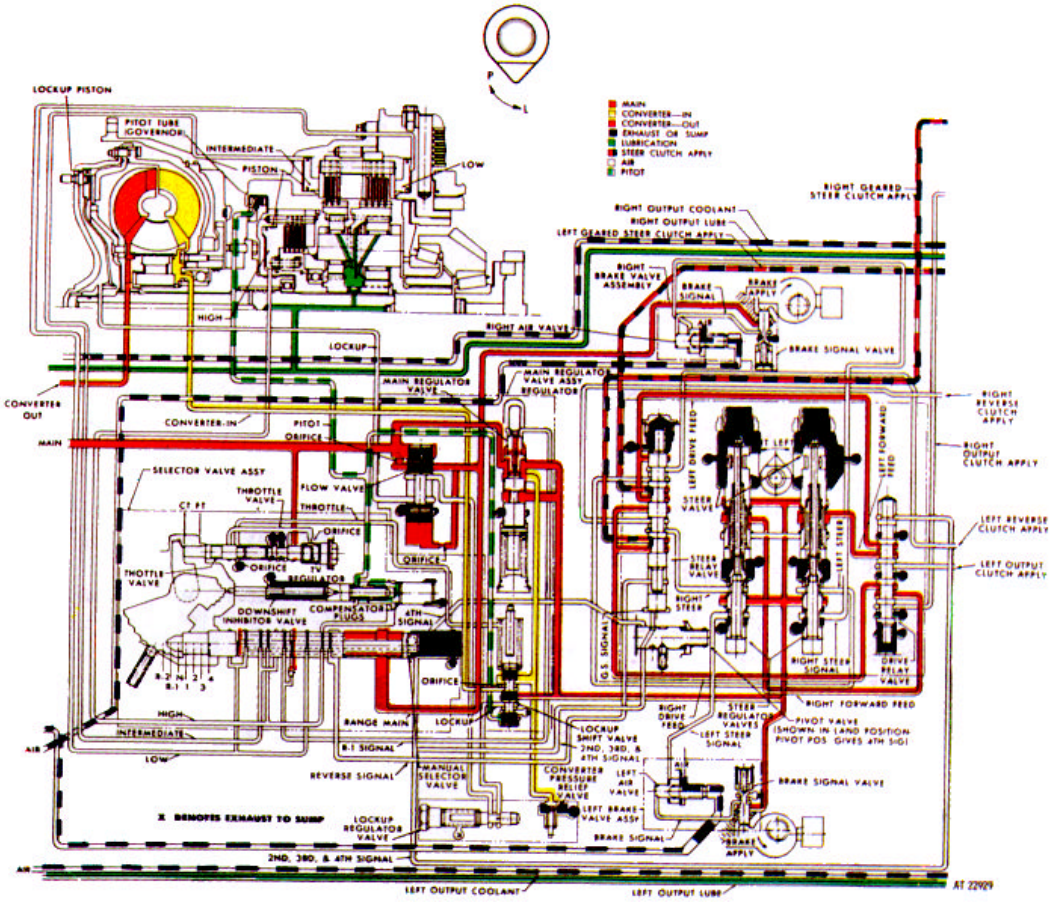


Figure 2-2. Hydraulic system, neutral operation--schematic view

a. Main-Pressure Circuit (red).

(1) Source and function. In neutral range, main pressure is supplied only by the input pressure pump (fig. 2-1). The oil is directed at all times to the following valves: throttle valve regulator, flow valve, manual selector valve, brake signal valves, main-pressure regulator valve, and lockup shift valve. Main pressure is also directed at all times to the steer regulator valves, drive relay valve, and steer valves.

(2) Throttle valve regulator. Main pressure is blocked at the valve bore by the throttle valve (TV) regulator. At closed throttle, the TV valve is held in place by spring compression against the throttle valve which in turn is positioned by the vehicle throttle.

(3) Flow value. Main-pressure oil enters the valve bore at the top of the valve, and also through an orifice which feeds another orifice at the bottom of the valve bore. In neutral operation, pressure is equal at both ends of the valve. The bottom portion of the valve has a larger area than the top portion and thus, the valve is held in the upward position. Movement of the flow valve is dependent on the pressure differential caused by a heavy oil flow across the upper orifice. (paragraph 2-38*d*).

(4) *Manual selector value*. Main-pressure oil enters the selector valve bore cavity and charges the upper passage in the selector valve. In neutral, main pressure is blocked at all valve ports except the reverse-i signal port which is blocked by a ball-type check valve. Thus, in neutral, no forward- or reverse-range clutches are charged.

(5) *Right brake signal valve*. Main-pressure oil is blocked at the valve body bore by the signal valve. When the brakes are in the release position, spring pressure holds the valve against the brake apply cam. When the brakes are applied, the cam allows the spring to move the valve upward. In this position, the exhaust port is covered and main-pressure oil is directed to the left end of the brake coolant air valve, forcing it closed. This stops the air supply to the brake coolant pump which causes the pump to draw cooled oil from the transmission sump and direct it to the right output section (fig. 2-13).

(6) Main-pressure regulator valve. Main pressure oil enters the valve bore, surrounds the stem and flows through a ball check valve in the stem to an area above the valve. This area is also connected with main-pressure oil through an oil-escape orifice. The pressure on the top of the valve pushes the valve downward. and compresses the spring proportionately to the amount of oil pressure applied at the top. When the hydraulic and spring pressures are in balance, main oil pressure is regulated. If the oil supply to the valve becomes too great, or if the oil is cold and does not flow easily, the valve will move down-ward far enough to uncover the exhaust port. This will allow the oil to return directly to the sump. The main-pressure regulator valve directs main pressure oil to the lockup shift valve, left brake signal valve, and steer valves.

(7) Lockup shift valve. Main-pressure oil is blocked at the valve body bore by the middle portion of the valve stem. Movement of the lockup shift valve is dependent on pitot pressure (c(2), following).

(8) Lockup regulator valve. Lockup oil pressure is regulated by movement of the valve. An increase in pressure into the valve bore goes through the valve orifice to the end land, forcing the valve against spring pressure and blocks off the intake port to prevent full main pressure from entering the valve bore (fig. 2-2).

(9) *Left brake signal valve*. Main-pressure oil is blocked at the valve body bore by the signal valve. When the valve is allowed to move downward by movement of the brake apply cam, coolant oil is directed to the left output section (fig. 2-13). The function and performance of this valve is the same as that of the right brake signal valve (a(5), preceding).

(10) *Steer valves*. Main-pressure oil is supplied to the right and left steer valve bodies. When the valves are in the no-steer position, main-pressure oil is blocked by the steer regulator valves. However, main pressure can enter through bores at the steer valve location and leave through the right- and left-forward feed passages. The oil enters the drive relay valve and leaves through the right and left drive feed passages and enters the steer relay valve. The main-pressure oil is then directed through the right and left geared steer clutch apply passages to charge the respective steer clutches. Figure 2-13 illustrates the engaged steer clutches.

b. Converter-in Circuit (yellow).

(1) All oil in excess of that required to maintain main pressure passes into the converter in line leading from the main-pressure regulator valve. When pressure in the converter-in line exceeds 100 psi, the converter pressure relief valve open and allows oil to escape to the power train sump.

(2) The converter-in circuit passes through the lockup shift valve. When the valve is upward (lockup engaged), converter-in oil must flow through an orifice. When the valve is downward (lockup released), converter-in oil flows unrestricted to the torque converter. The purpose of directing oil through the lockup shift valve is to decrease the oil flow to the converter during lockup operation (para 2-38c(2)).

c. Pitot Circuit (green and white). Pressure in the pitot circuit is produced by rotation of the fluid velocity governor and, therefore, varies proportionately with turbine speed. This varying pressure is directed to the downshift inhibitor valve and the lockup shift valve.

(1) Downshift inhibitor valve. Pitot pressure enters at the right end of the downshift inhibitor valve. During idle in neutral gear, pitot pressure (proportional to turbine speed) is not great enough to overcome the return spring at the left end of the valve plunger. Increased pitot pressure, greater than that produced at idle, is required to move the valve plunger. Movement of the plunger, however, will not prevent a shift from neutral.

Refer to figure 2-6 and paragraph 2-38c.

(2) *Lockup shift valve.* Pitot pressure enters near the bottom of the lockup shift valve body and acts against the bottom of the lockup shift valve. During idle, pitot pressure is not great enough to overcome the hydraulic and mechanical forces (converter- in circuit and spring) acting against it.

d. Lubrication Circuit (green). The lubrication circuit delivers oil to the various points in the transmission that require positive lubrication at all times. (Only the main passages and cavities are colored green.) Lubrication oil is directed to all planetary carriers and clutch packs. Some of the delivery points are orificed to prevent excessive oil flow and pressure drop.

(1) Range planetary carriers and clutch packs. Lubrication oil is directed into the passage in the center of the converter output shaft where it flows through passages in the intermediate-low sun gear and into the planetary spindles. The surrounding range clutches are also lubricated with this oil flow.

(2) Output planetary carriers and clutch packs (fig. 2-13). Lubrication oil is directed through passages in the bevel gear housing and the cross shaft bearing retainers where it flows into passages in the reverse-range planetary carriers. This oil flow also lubricates the reverse-range clutch components. Other passages deliver lubrication oil to the steer planetary carriers, steer clutches, and the output clutches.

NOTE

The related mechanical functions required for this operating condition are described in paragraph 2-49, and illustrated in figure 2-14.

2-35.First Gear, Straight Travel Operation (fig. 2-3)

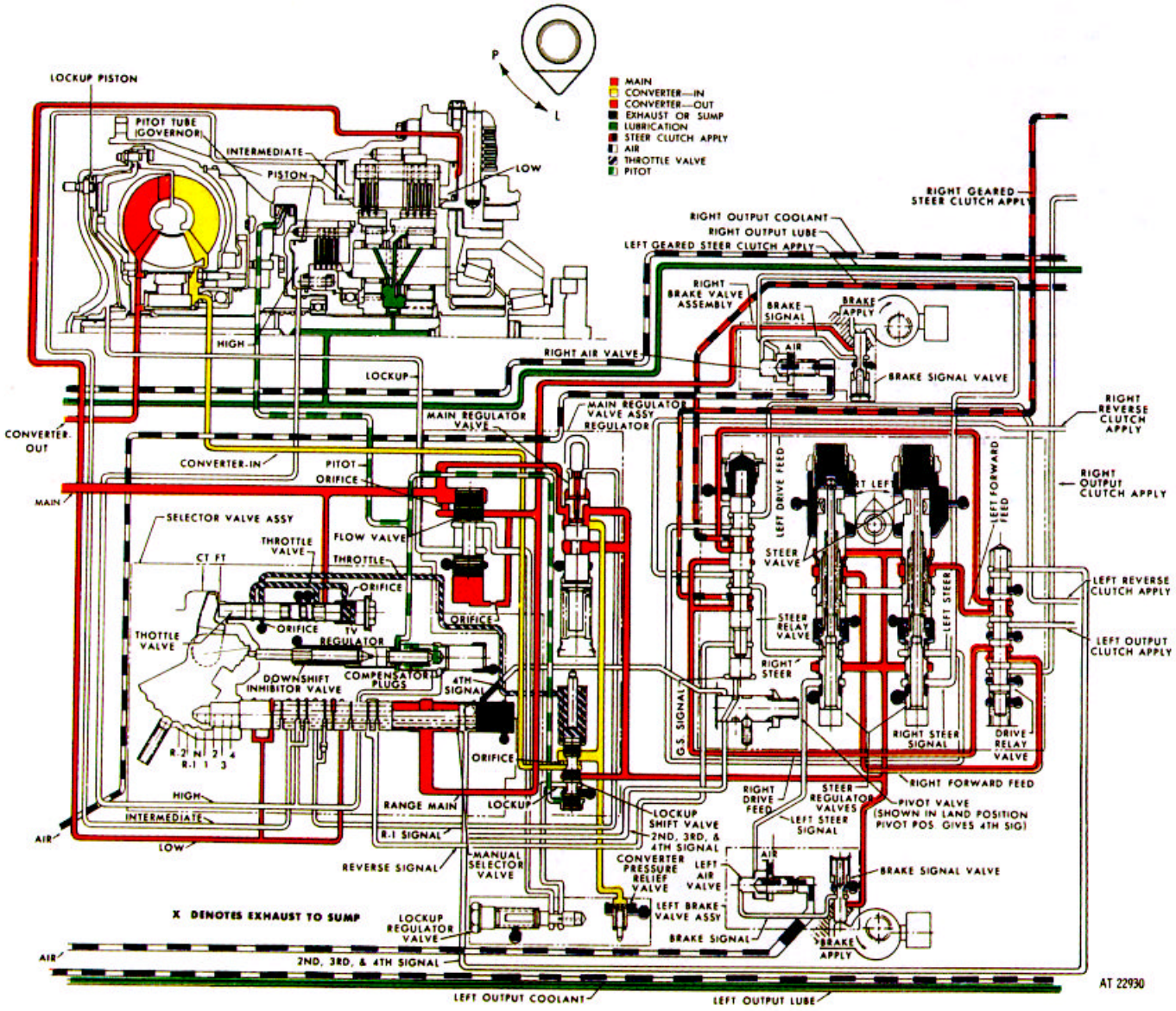


Figure 2-3. Hydraulic system, first gear, straight travel operation-schematic view.

a. Operational Circuits. This driving condition uses the same circuitry as neutral except that the low-range clutch is engaged, and the output pump is actuated.

b. Manual Selector Valve. The valve is moved toward the right until the retaining ball rests in the first-gear detent. This allows a main-pressure port (upper passage) to index with a low-range clutch apply port. The low-range circuit becomes charged, thus the low-range clutch is engaged.

c. Throttle Valve and Throttle Valve Regulator.

The throttle is advanced to the full-throttle position. At this setting, above three-quarter throttle, regulated pressure oil is allowed to surround the stem of the throttle valve and escape into the throttle circuit. This circuit directs the TV pressure oil to the area above the lockup shift valve where it assists the spring in opposing upward movement of the valve. Thus, at full throttle, engagement of the lockup clutch is delayed. (TV pressure will also help to downshift the lockup shift valve at higher turbine speeds at heavy throttle.)

d. Output-driven Pressure Pump. Forward vehicle travel causes the output-driven pump to rotate. This pump assists the input-driven pump in supplying main-pressure oil to the transmission (fig. 2-1).

NOTE

The related mechanical functions required for this travel condition are described in paragraph 2-50a, and illustrated in figure 2-15.

2-36. Second Gear, Straight Travel Operation. (fig. 2-4)

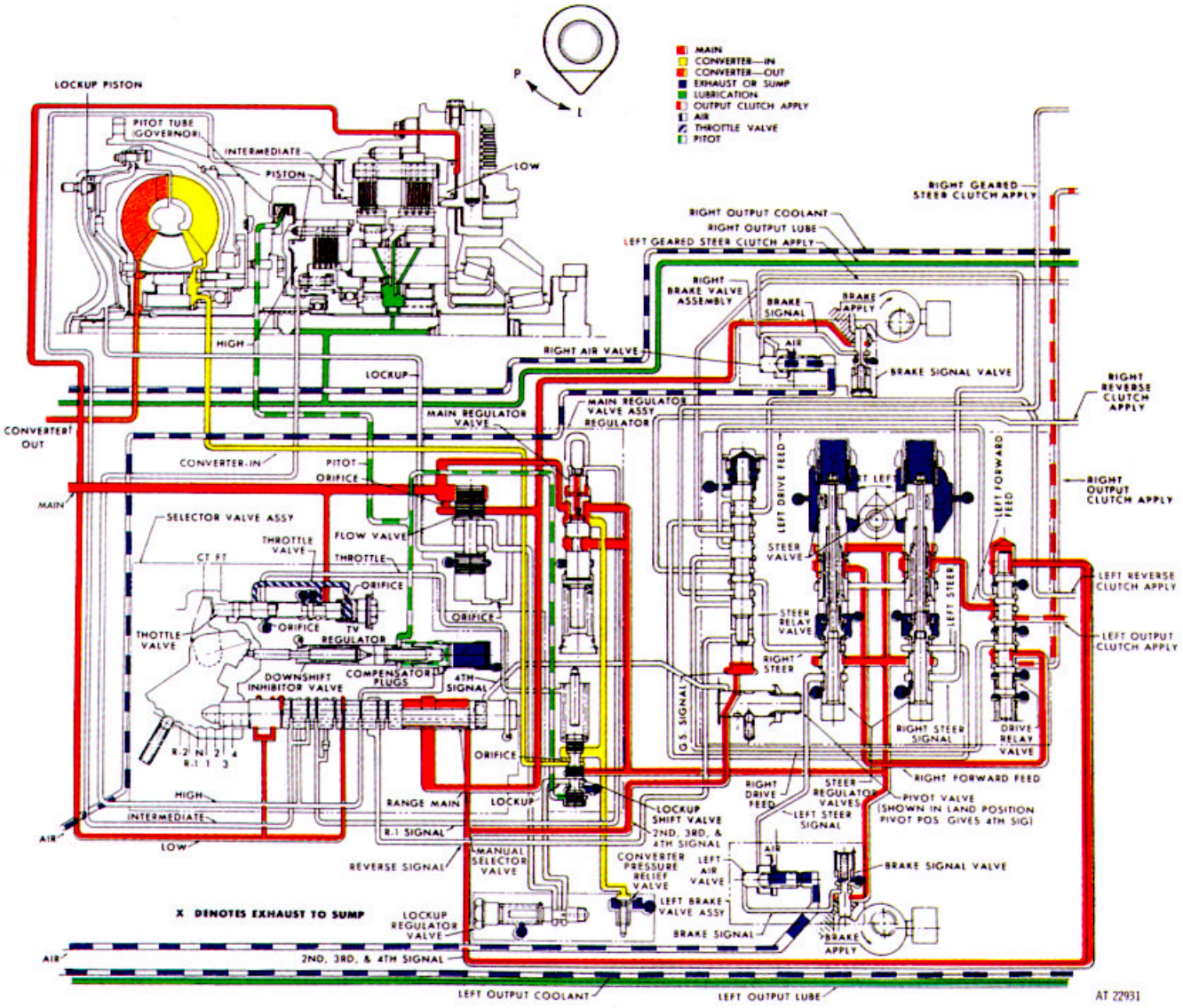


Figure 2-4. Hydraulic system. second gear straight travel operation--schematic view

a. Operational Circuits. This driving condition uses the same circuitry as first gear, straight travel, except the steer clutches are released and the output clutches are engaged.

b. Manual Selector Valve. The valve is moved toward the right until the ball rests in the second gear detent. In this position, the low-range clutch remains charged and a main-pressure port indexes with the second-, third-, and fourth-gear signal circuit. This circuit directs main-pressure oil to three valves-pivot, steer relay valve, and drive relay valve.

c. Pivot Valve (normal land-steer position).

(1) The pivot valve directs main-pressure oil in the second, third, and fourth signal circuit to the bottom of the steer relay valve.

(2) The pivot valve does not affect the circuits involved in any straight travel operation-forward or reverse. Refer to paragraph 2-4d, for description of valve effects during normal land-steer operation,

and paragraph 2-43b, for description of pivot water-steer operation.

d. Steer Relay Valve. Main-pressure oil enters at the bottom of the steer relay valve and forces it to the upward position. This allows the engaged steer clutches (in neutral and first gear) to exhaust through their respective steer circuits.

e. Drive Relay Valve. Main-pressure oil enters at the top of the drive relay valve and forces it to the downward position. This allows main-pressure oil from the steer valves to enter and be directed to the output clutch apply circuits. These charged circuits deliver oil to the pressure side of the output clutch pistons causing the output clutches to engage (fig. 2-13).

f. Throttle Valve and Throttle Valve Regulator. The throttle is shown at half-throttle position. At this position, below three-quarter throttle, TV pressure is blocked by the throttle valve, and upward movement of the lockup shift valve is dependent on only pitot pressure. Thus, the lockup clutch can be engaged at a predetermined turbine speed.

NOTE

The related mechanical functions required for this travel condition are described in paragraph 2-50b, and illustrated in. figure 2-16.

2-37. Third Gear, Straight Travel Operation. (fig. 2-5)

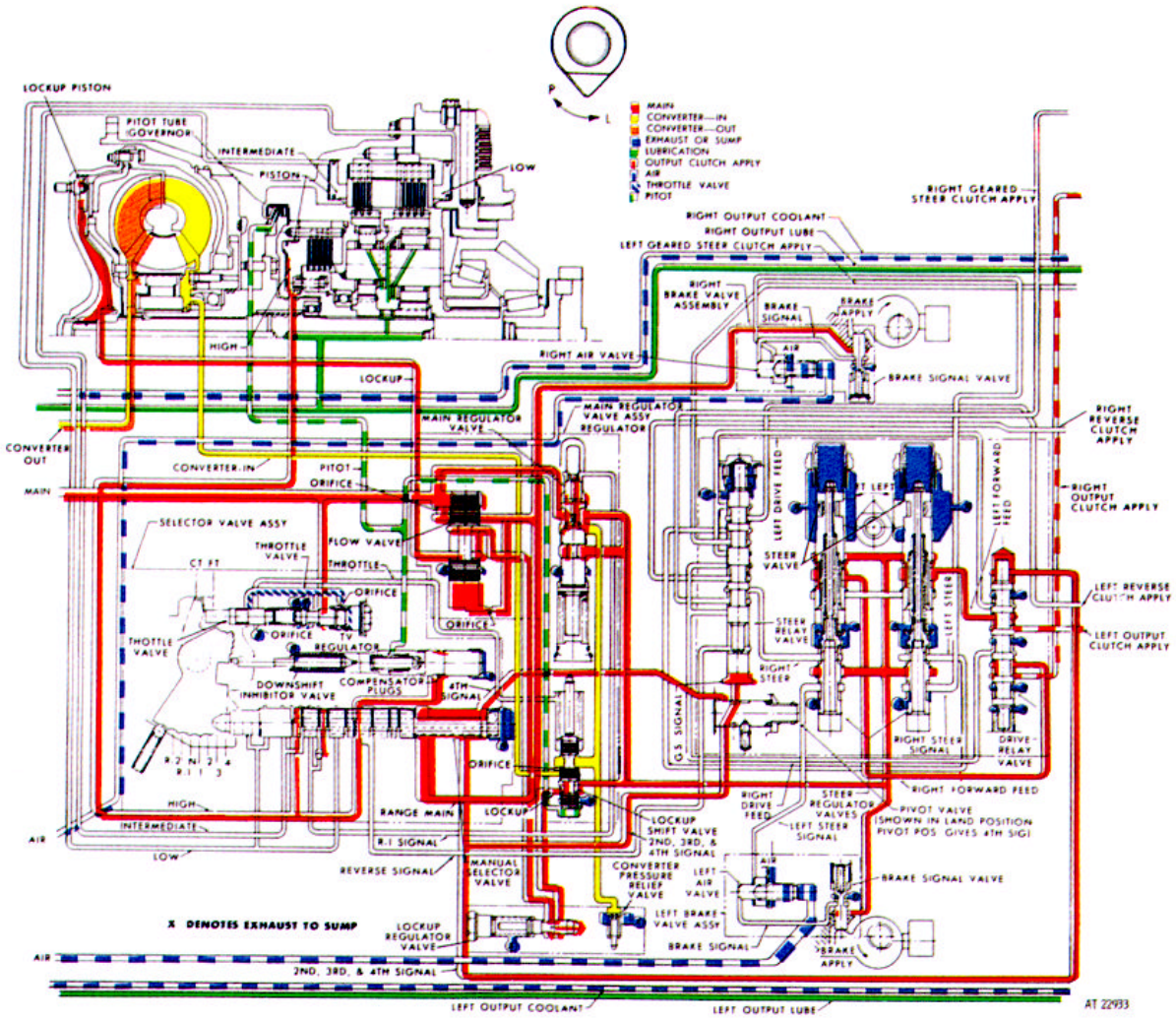


Figure 2-5. Hydraulic system, third gear, straight travel operation schematic view.

a. Operational Circuits. This driving condition uses the same circuitry as second gear, straight travel, except the intermediate-range clutch is engaged.

b. Manual Selector Valve. The valve is moved toward the right until the retaining ball rests in the third-gear detent. This allows a main-pressure port (upper passage) to index with an intermediate-range clutch apply port. The low-range clutch (or high-range clutch) is exhausted simultaneously through a selector valve port (lower passage).

NOTE

The related mechanical functions required for this travel condition are described in paragraph 2-50*c*, and illustrated in figure 2-17.

2-38. Fourth Gear, Straight Travel Operation (fig. 2-6)

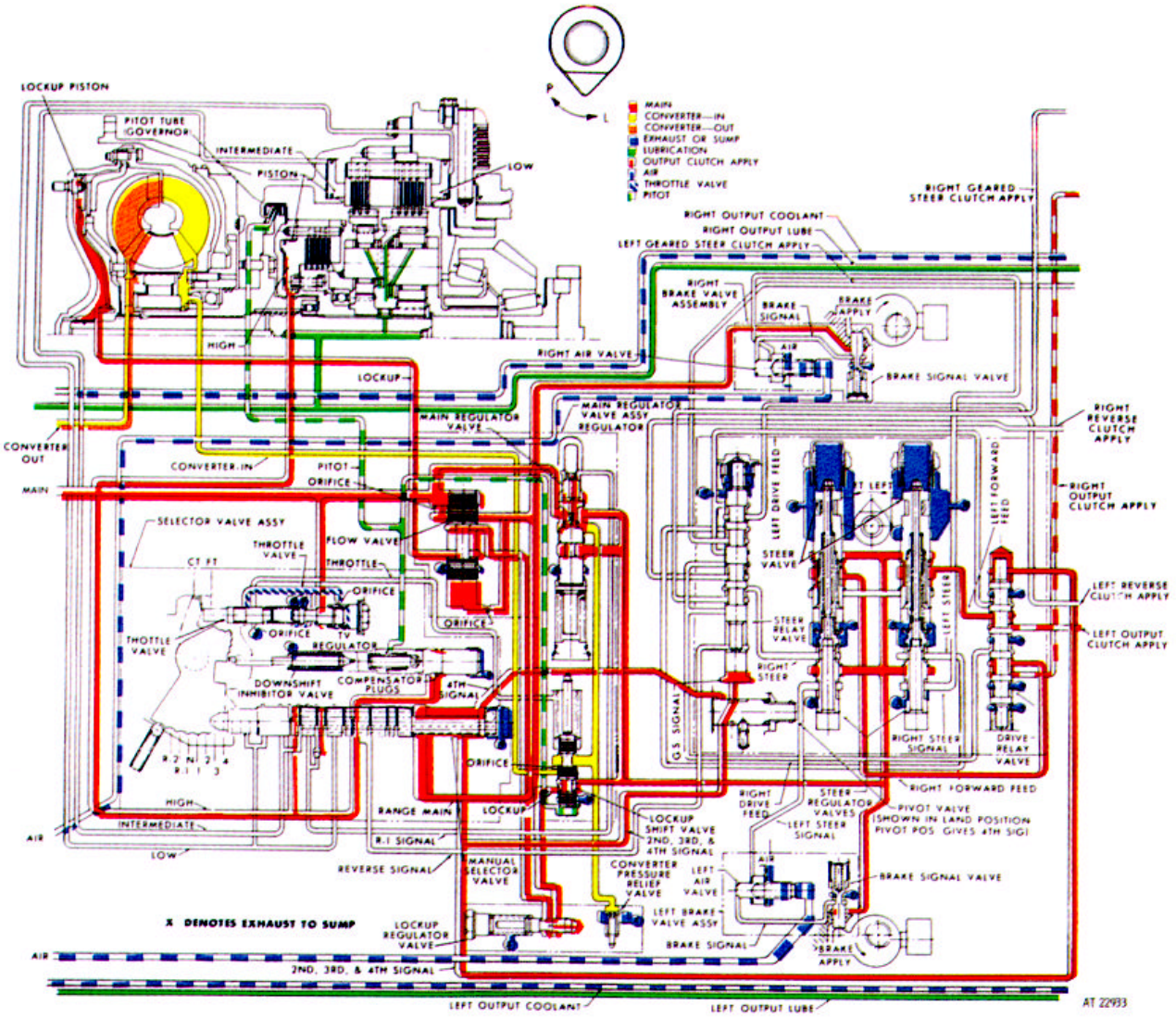


Figure 2-6. Hydraulic system. fourth gear straight travel operation -schematic view.

a. Operational Circuits. This driving condition uses the same circuitry as third gear, straight travel, except that the high-range clutch is engaged, and the transmission is in lockup operation.

b. Manual Selector Valve. The valve is moved toward the right until the retaining ball rests in the fourth-gear detent. This allows main-pressure oil (upper passage) to charge the high-range clutch and a signal circuit to the inhibitor valve group. The fourth-gear signal circuit is also charged. The intermediate-range clutch is exhausted simultaneously through a port (lower passage) in the manual selector valve.

c. Pitot Pressure Circuit. Figure 2-6 illustrates the effect greater pitot pressure has on the downshift inhibitor valve and lockup shift valve. The position in which these valves are shown can occur any time pitot pressure is great enough to overcome the opposing forces.

(1) Downshift inhibitor valve. Main-pressure from the high-range signal circuit is directed between the compensator plugs. Movement of the left plug toward the inhibitor valve compresses a spring between the plug and the valve. This action assists the pitot pressure in moving the valve plunger into the fourth-gear lug.

(2) Lockup shift value. Pitot pressure pushes the valve to the upward position. In this position, main pressure is allowed to flow through the flow valve to the lockup clutch. The volume of oil to the converter is reduced to that which can flow through the orifice at the left of the valve. This reduced flow provides adequate lubrication and cooling of the converter during lockup operation.

d. Valve.

(1) The function of the flow valve is to interrupt engagement of the lockup clutch while shifts are being made. During any shift, except to neutral, the oncoming clutch is charged with oil which must pass through the upper orifice. The pressure differential at the orifice decreases the pressure at the lower end of the valve. Pressure at the upper end forces the valve down, which rapidly expels oil below the valve through an orifice.

(2) In the valve's downward position, the lockup circuit is interrupted and the lockup clutch is exhausted through a port uncovered by the valve's movement. When the shift is completed and the oncoming clutch has been charged, pressure equalizes at each end of the valve. Due to the larger area at the lower end of the valve, the valve moves upward and resumes the position illustrated. Lockup operation is restored when the valve moves upward.

e. Fourth-Gear Signal Circuit. Signal pressure in this circuit is directed to the pivot valve. In the normal steer position, signal pressure in this circuit is blocked at the pivot valve. However, when the valve rotates (350) to the pivot steer position, signal pressure is admitted to the bottom of the steer relay valve. The steer relay valve is forced upward, and pivot steer is prevented during travel in fourth gear.

NOTE

The related mechanical functions required for this travel condition are described in paragraph 2-50*d*, and illustrated in figure 2-18.

2-39. Reverse-1 Gear, Straight Travel Operation (fig. 2-7)

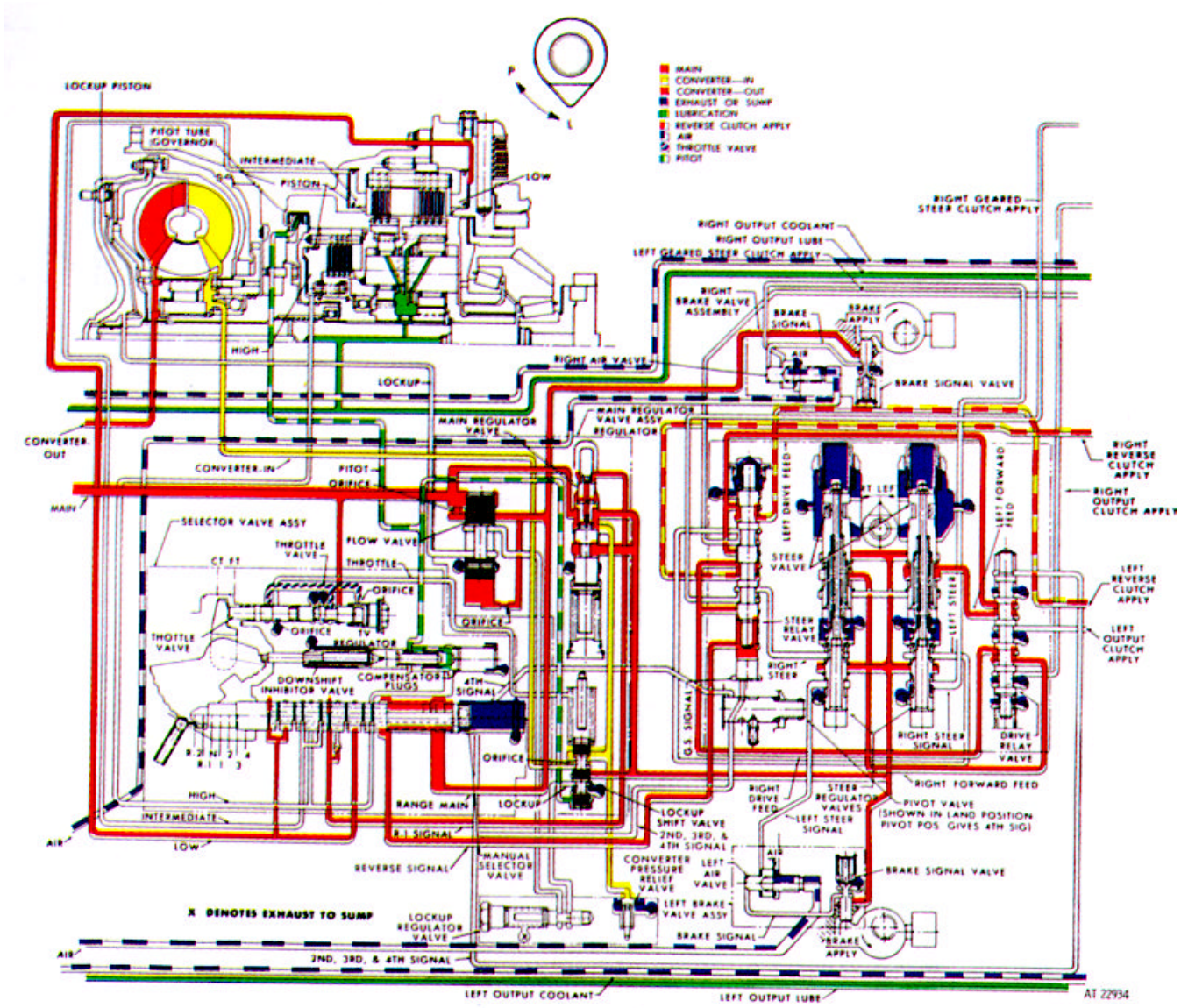


Figure 2- 7. Hydraulic system, reverse-1 gear ,straight travel operation-schematic view.

a. Operational Circuits. This driving condition uses the same circuitry as forward, second gear, straight travel, except that the reverse clutches are engaged, the reverse-signal circuits are charged, and the drive relay valve is upward.

b. Manual Selector Valve. The valve is moved toward the left until the retaining ball rests in the reverse-1 (R-1) detent. This allows main-pressure oil (upper passage to charge the low-range clutch and the reverse signal circuits. The intermediate and high-range clutches are simultaneously exhausted through ports in the manual selector valve (lower passage) which indexes with the clutch circuits.

c. Reverse-1 Signal Circuit.

(1) The manual selector valve directs main pressure oil through the R-1 signal circuit to the top of the main-pressure regulator valve. The oil enters the valve body above the regulator valve and causes the regulator valve to move downward. Thus, main pressure is regulated at a lower pressure because the return spring must balance a greater opposing force. (para 2-34*a* (6))

(2) Main pressure is lowered in this driving condition to limit the torque through the driving clutches. If full torque were to be directed through this gear combination it could be detrimental to the transmission components.

d. Reverse Signal Circuit. Main pressure is directed from the manual selector valve to the steer relay valve. The oil enters near the bottom of the steer relay valve but above the geared steer signal plug. This causes the steer relay valve to move to the upward position.

e. Drive Relay Valve. Main-pressure oil from the steer valves is directed to the drive relay valve. The drive relay valve, in the upward position, directs the oil through the left, and right, drive feed passages to the steer relay valve.

f. Steer Relay Valve. The steer relay valve directs main-pressure oil through the reverse clutch apply lines to the respective reverse clutches (fig. 2-13). Thus, the engaged clutches cause the vehicle to travel in reverse.

NOTE

The related mechanical functions required for this travel condition are described in paragraph 2-50e, and illustrated in figure 2-19.

2-40. Reverse-2 Gear, Straight Travel Operation (fig. 2-8).

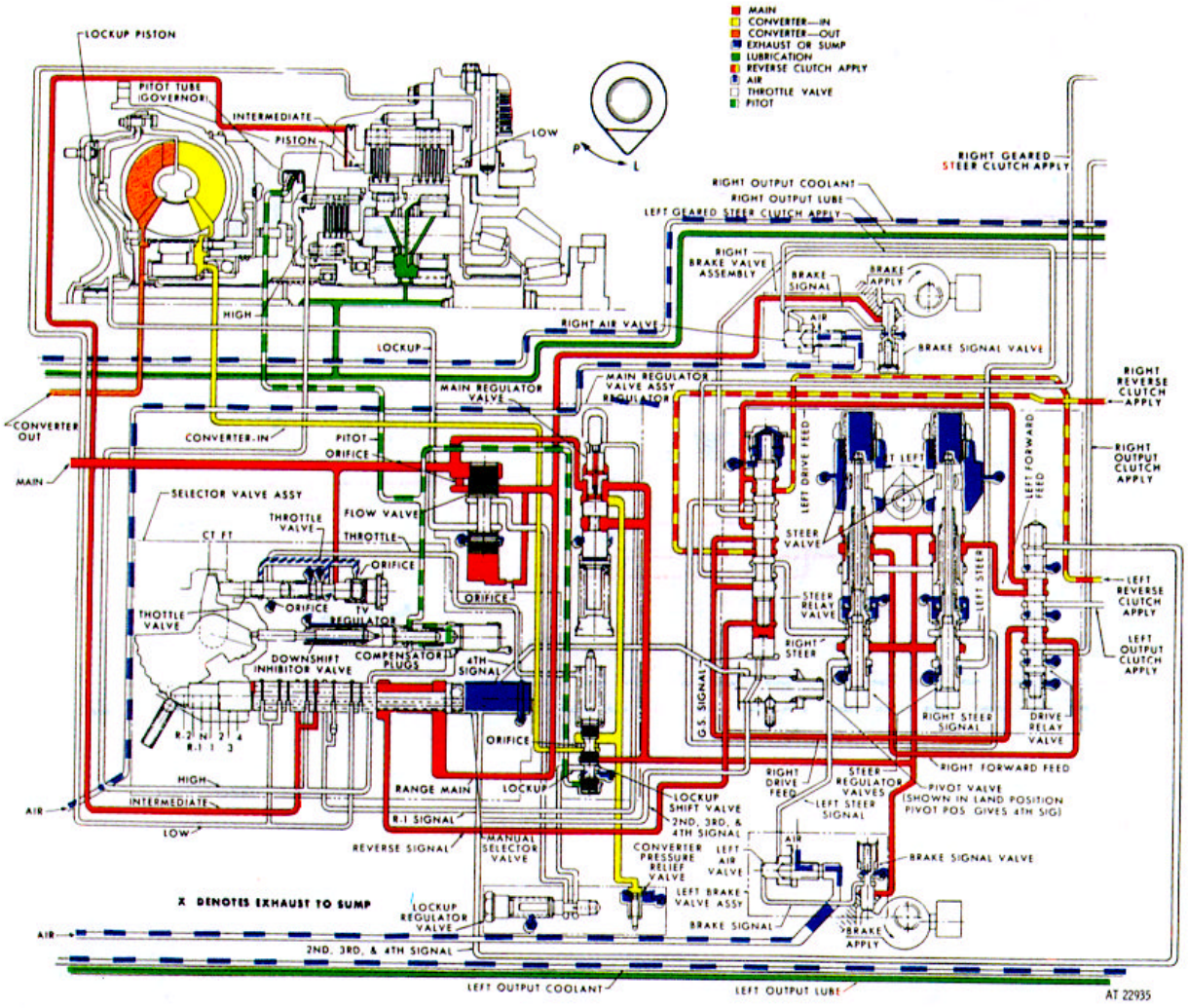


Figure 2-8. Hydraulic system, reverse 2 gear, straight travel operation-schematic view

a. Operational Circuits. This driving condition uses the same circuitry as reverse-1, straight travel. (para 2-39), except that the intermediate range clutch is engaged.

b. Manual Selector Valve. The valve is moved toward the left until the retaining ball rests in reverse-2 detent. This allows a main-pressure port (upper passage) to index with an intermediate range clutch apply port. The low-range clutch (or high-range clutch) is exhausted simultaneously

through a port in the selector valve which indexes with the clutch apply circuit.

NOTE

The related mechanical functions required for this travel condition are described in paragraph 2-50*f*, and illustrated in figure 2-20.

2-41. First Gear, Normal Left Steer Operation (fig. 2-9)

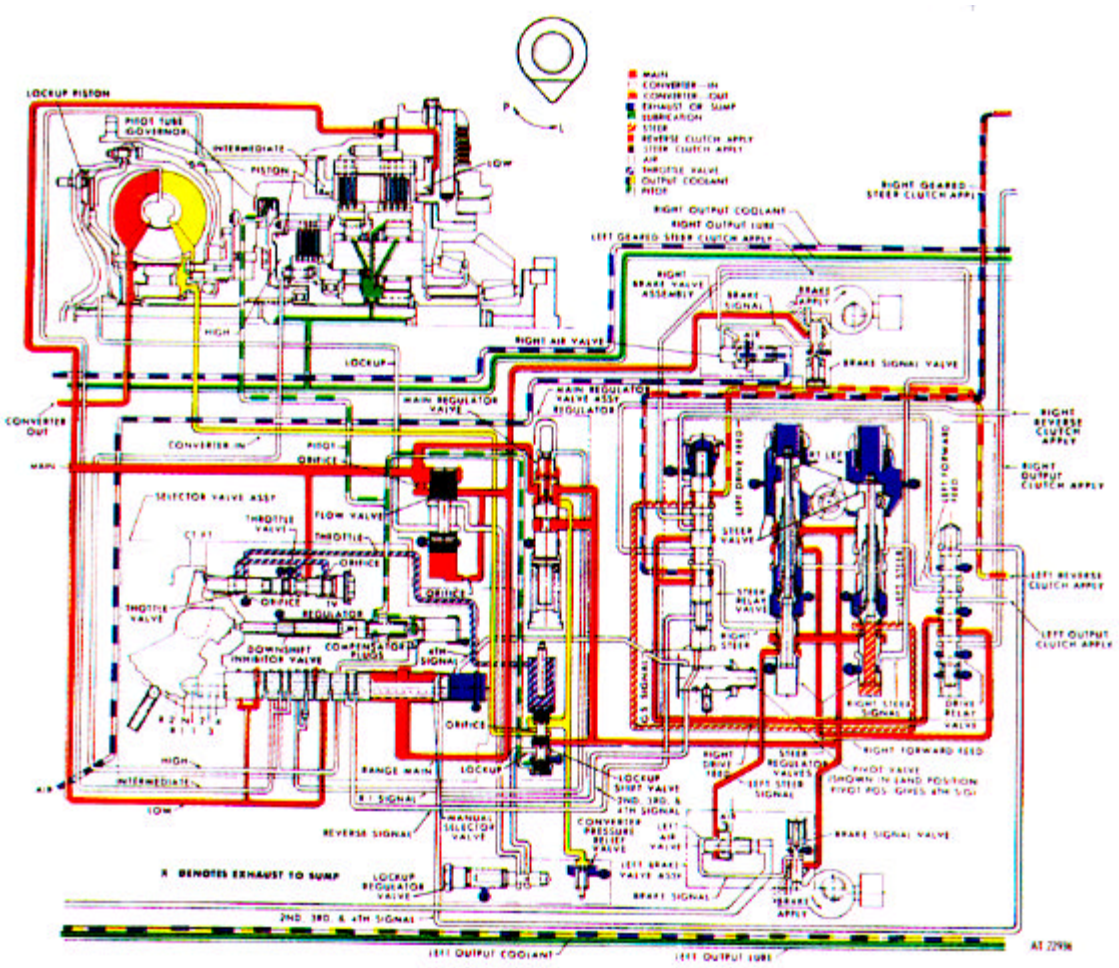


Figure 2-9. Hydraulic system, first gear, normal left steer operation-schematic view.

a. Operational Circuits. This driving condition uses the same circuitry as first gear, straight travel (para 2-35) except that the flow of oil through the steer valves charges the left reverse clutch (for steering) and the right steer clutch (for driving).

b. Left Steer Valve.

(1) In left steer operation, the steer control shaft is rotated clockwise. This rotation causes the left steer valve to move downward. The downward movement blocks main pressure at the upper portion of the valve and thus prevents the charging of the left geared steer clutch through the passage labeled left forward feed. The downward movement also allows the left geared steer clutch (driving clutch) to exhaust through a port in the right steer valve. Simultaneously, main pressure is admitted to the lower portion of the steer valve bore, regulated, and directed through the steer relay valve to the left reverse clutch (fig. 2-13).

(2) The lower portion of the steer valve is spring loaded and produces a regulated pressure. The degree of pressure directed to the steering clutch, thus the degree of clutch application, varies with movement of the steer control.

A slight movement produces a slight apply pressure-greater movement produces greater apply pressure.

c. Right Steer Valve.

(1) During left steer operation, the right steer valve is moved upward. (The steer valves move in opposite directions due to an interconnecting pivot arm.) The upward movement of the right steer valve does not interrupt the apply circuit to the right steer clutch. Thus, it remains engaged as the driving clutch (fig. 2-13).

(2) The lower portion of the valve also moves upward. This movement allows main-pressure oil to enter the left steer signal circuit. Pressure in this circuit seats the air valve which causes the brake coolant pump to direct coolant to the left J reverse clutch
(para 2-45*b*).

NOTE

The related mechanical functions required for this travel operation are described in paragraph 2-51*a*, and illustrated in figure 2-21.

2-42. Second Gear, Normal Right Steer Operation (fig. 2-10)

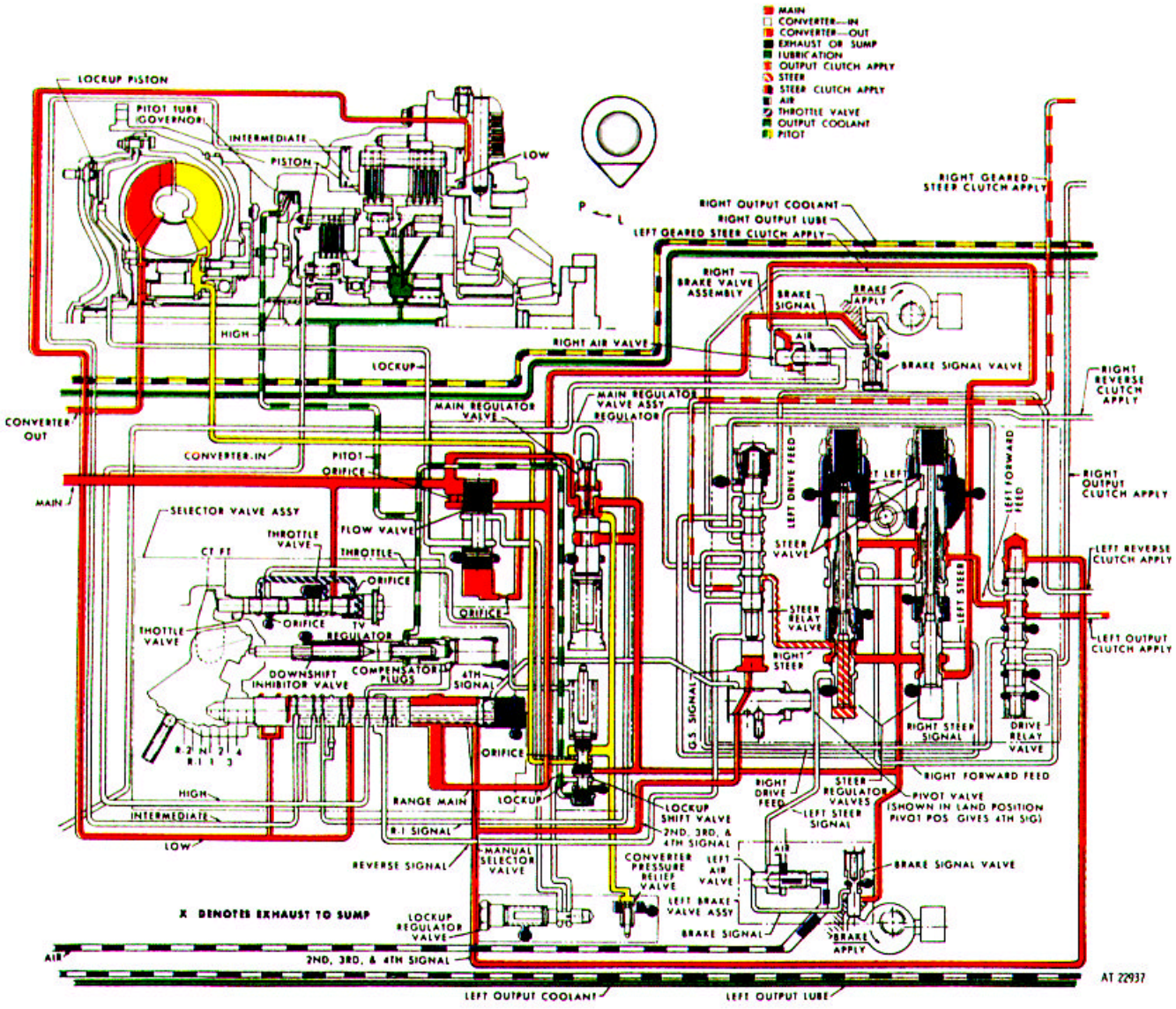


Figure 2-10. Hydraulic system, second gear normal right steer operation-schematic view.

a. Operational Circuits. This driving condition uses the same circuitry as second gear, straight travel (para 2-36), except that the flow of oil through the steer valves charges the right steer clutch and the left output clutch. In this steering mode, the geared steer clutch is used as the steering clutch and the output clutch is the driving clutch.

b. Right Steer Valve.

(1) In right steer operation, the steer control shaft is rotated counterclockwise. This rotation causes the right steer valve to move downward. The downward movement blocks main-pressure oil at the upper portion of the valve and thus prevents the charging of the right output clutch. The downward movement also allows the right output clutch to exhaust through a port in the left steer valve. Simultaneously, main pressure is admitted to the lower portion of the steer relay valve bore, regulated, and directed through the steer relay valve to the left geared steer (steering) clutch.

(2) The lower portion of the right steer valve directs steer-regulated pressure to the right geared steer (steering) clutch; refer to paragraph 2-41*b* (2) for description of regulating function.

c. Left Steer Value.

(1) During right steer operation, the left steer valve is moved upward. (The steer valves move in opposite directions due to an interconnecting pivot arm.) The upward movement does not interrupt the apply circuit to the left output. Thus, it remains engaged as the driving clutch.

(2) The lower portion of the valve also moves upward. This movement allows main-pressure oil to enter the right steer signal circuit. Pressure in this circuit seats the air valve which causes the brake coolant pump to direct coolant to the right geared steer clutch (para 2-45c).

d. Pivot Valve (normal land steer position).

(1) In normal steer position, the valve directs second-, third-, and fourth-signal pressure to the bottom of the steer relay valve. This pushes the valve upward where it indexes with ports to charge and exhaust the proper clutches for the desired steering condition.

(2) In normal steering, the vehicle will "pivot" in first and reverse gears-one output will rotate opposite to the direction of travel while the other output rotates with the direction of travel. During normal steer operation, in second gear (also third and fourth gears) geared steer is used. In geared steer, the vehicle turns toward the side with the slowest output. This is done by engaging the steer clutch on the side toward which the turn is made. Refer to paragraph 2-43b, following, for description of pivot valve in pivot "water steer" position.

NOTE

The related mechanical functions required for this travel operation are described in paragraph 2-51*b*, and illustrated in figure 2-22.

2-43. Second Gear, Pivot Right Steer Operation (fig. 2-11)

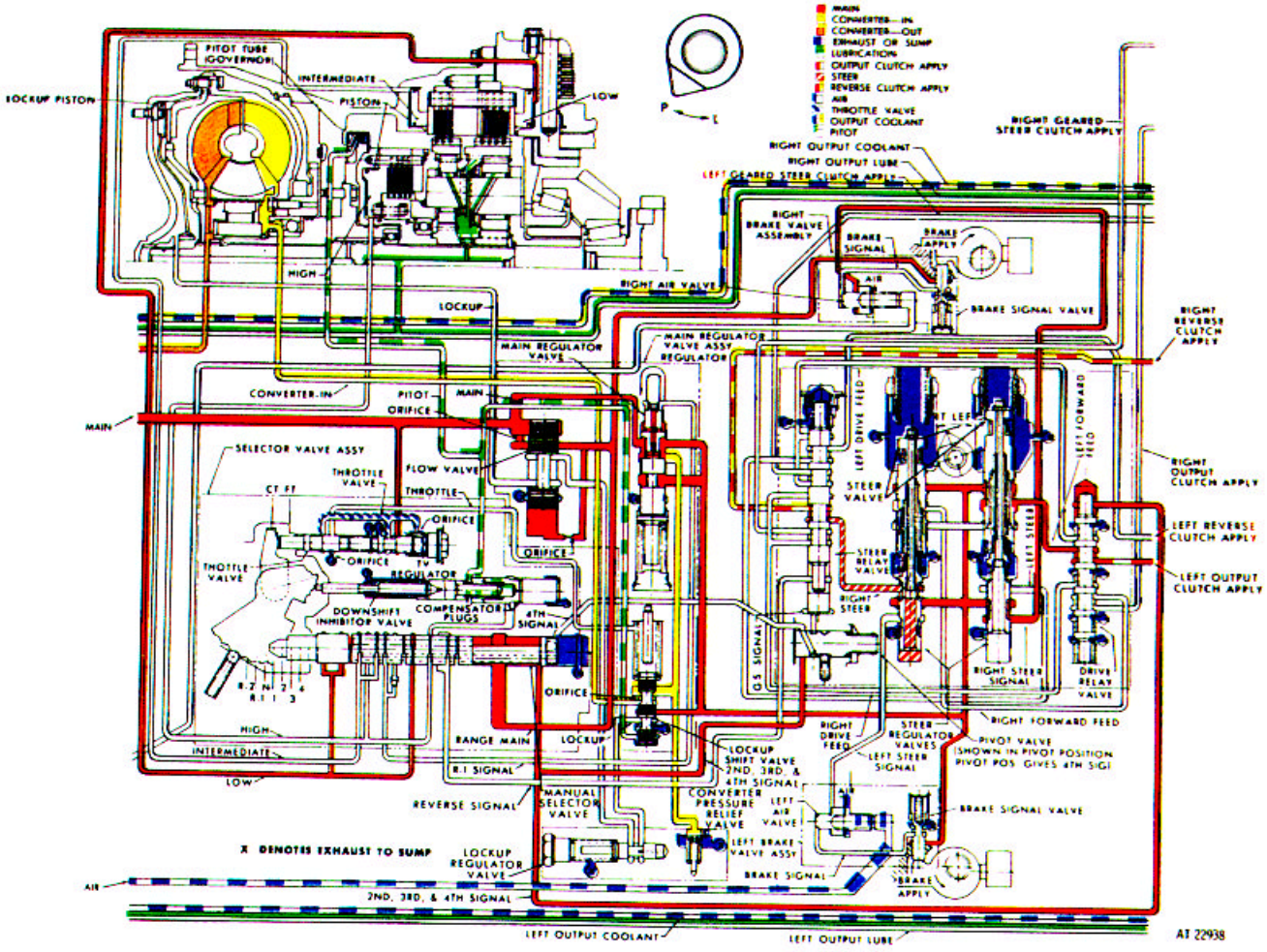


Figure 2-11. Hydraulic system, second gear pivot right steer operation-schematic view.

a. Operational Circuits. This driving condition uses the same hydraulic circuits as second gear, normal right steer (para 2-42, and fig. 2-10), except the vehicle operator has selected pivot steer operation. In pivot steering, the vehicle pivots in every gear except fourth.

b. Pivot Valve (pivot water steer position). In pivot position, the valve blocks the flow in the second-, third-, and fourth-signal circuit. Thus, during operation in second gear (also third) the steer relay valve is downward.

c. Steer Relay Valve.

(1) The valve, in the downward position, directs regulated steer pressure from the right steer valve to the right reverse clutch (fig. 2-13), causing it to function as the steering element.

(2) When the steer relay valve is in the upward position (fourth-gear signal), the reverse clutch is exhausted and regulated steer pressure is directed to the output clutch (fig. 2-13). Thus, pivot steer is prevented in fourth gear (para 2-38e).

2-44. Reverse- 1 Gear, Pivot Left Steer (fig. 2-12)

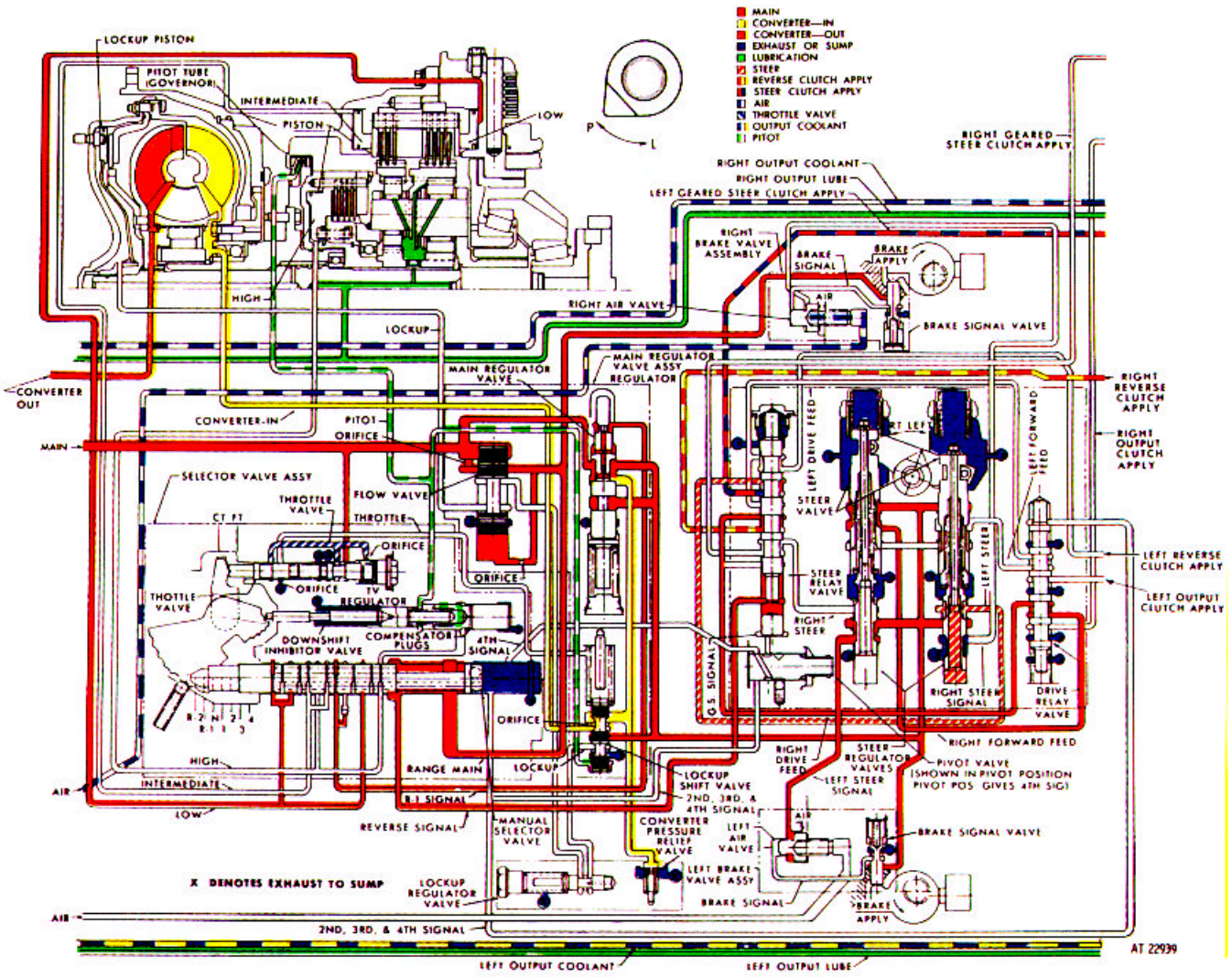


Figure 2-12. Hydraulic system, reverse-1 gear, pivot left steer operation-schematic view.

a. Operational Circuits. Thus driving condition uses the same circuitry as forward, first gear, normal left steer (para 2-41) except that the right reverse clutch is used as the driving component and left steer clutch is used as the steering member. The flow through the steer valve circuits is also the same as described for first gear, normal left steer (para 2-41).

b. Pivot Valve (pivot water steer position). The position of the pivot valve does not affect the circuits involved for this driving condition.

c. Steer Relay Valve. Signal pressure in the reverse signal circuit enters near the bottom of the steer relay valve and forces it upward. In this position, the steer relay valve directs regulated steer pressure to the left steer clutch (fig. 2-13) and allows the left reverse clutch to exhaust.

d. Reverse-1 Signal Circuit. Signal pressure in this circuit causes a reduction in main pressure. The pressure is reduced in this driving condition to limit the torque through the driving clutches (para 2-39*c*).

NOTE

The mechanical functions required for this travel operation are described in paragraph 2-52*e*, and illustrated in figure 2-31.

2-45. Output Components (fig. 2-13)

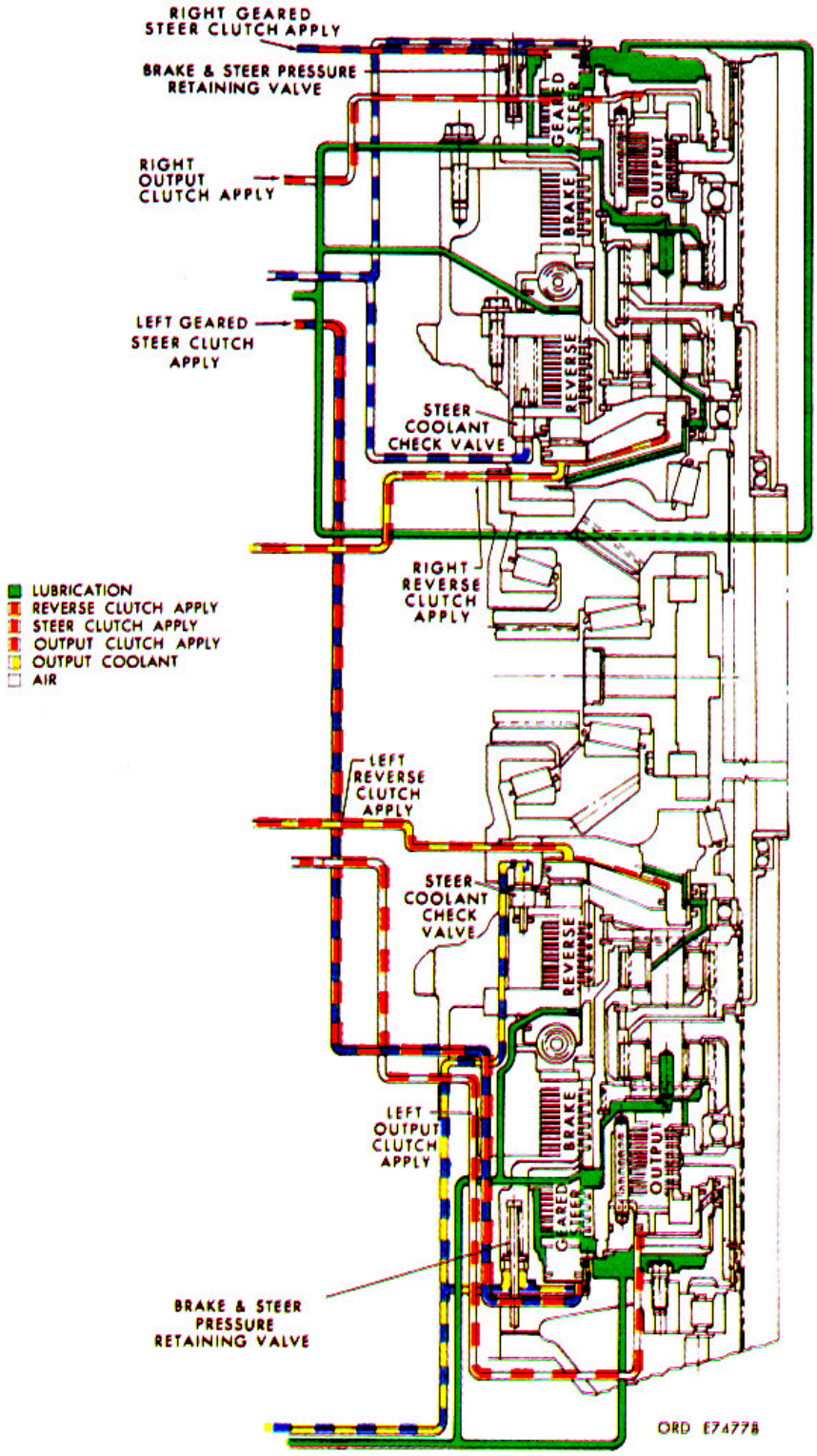


Figure 2-13. Hydraulic system, output components-Schematic view.

a. Composite Illustration. Figure 2-13 is a composite of all driving conditions which can occur in the output sections of the transmission. The conditions, as illustrated, can occur either independently or simultaneously. The clutch apply circuits are color coded to match the charging circuits shown in figures 2-2 through figure 2-12. The lubrication, brake coolant, and air circuit are color coded and match the circuits in figure 2-1 through figure 2-12.

b. Steer Coolant Check Value. The check valve opens when the reverse piston travels to engage the reverse clutch. This allows coolant (present during steer) to flood the clutch disks and prevents excessive heat buildup during partial application. When the apply piston returns to its seat, the check valve closes.

c. Brake and Steer Coolant Pressure Retaining Valve. The spring-loaded retaining valve opens when the pressure in the coolant circuit is not escaping through the steer coolant check valve. In the open position, the pressure-retaining valve allows coolant to flood the clutches and brake disks. The valve closes when pressure in the coolant circuit is reduced.

Section III. TORQUE PATHS THROUGH TRANSMISSION

2-46. Definition of Torque Path

a. A torque path is the route by which engine torque is directed through the transmission from transmission input to output. Each torque path is established by the application of a combination of clutches. Each travel condition (forward or reverse) and each steer condition (forward or reverse) requires the application of a different combination of clutches.

b. Changes in the torque paths as a result of torque converter or lockup operation is not important to the basic torque paths. Any given torque path can vary in this respect. Neutral condition is illustrated as a torque path, but is not considered as being a complete torque path.

2-47. Torque Path Illustrations

a. A series of cutaway illustrations (fig. 2-14 through fig. 2-32 are color coded to show the function of each component involved in the torque path. The torque paths for all possible situations are not shown because the explanation of steer toward one direction serves to explain the opposite steer, and because converter to lockup operation can be employed, as desired, in the power flows.

b. The principal paths shown in the illustrations are neutral, straight travel in each range, normal steer to either left or right in all ranges, and pivot steer to either left or right in all ranges. The steer illustrations (normal and pivot) are shown with the clutches in the full-apply condition. Lesser applications of the clutches will lengthen the radius in which the vehicle travels.

2-48. Torque Transmitted

a Torque Converter and Lockup Clutch.

(1) In every range, and in neutral, torque from the engine must be transmitted to the converter output shaft either hydraulically or mechanically. At lower speeds (until sufficient pitot pressure is produced), the drive is hydraulic.

(2) At higher speeds (lockup clutch engaged) the drive is mechanical. Although either type of operation is possible in neutral and all ranges, converter operation is illustrated in neutral, first gear, second gear, third gear and reverse. Lockup operation is illustrated only in fourth gear.

b. Output Reduction Gears. In every gear during straight travel or steer, torque is transmitted from the output shaft to the vehicle by two spur gears (transfer drive and transfer driven) at each side of the transmission. The speed reduction ratio is 2.222 to 1.

2-49. Neutral Torque path (fig. 2-14)

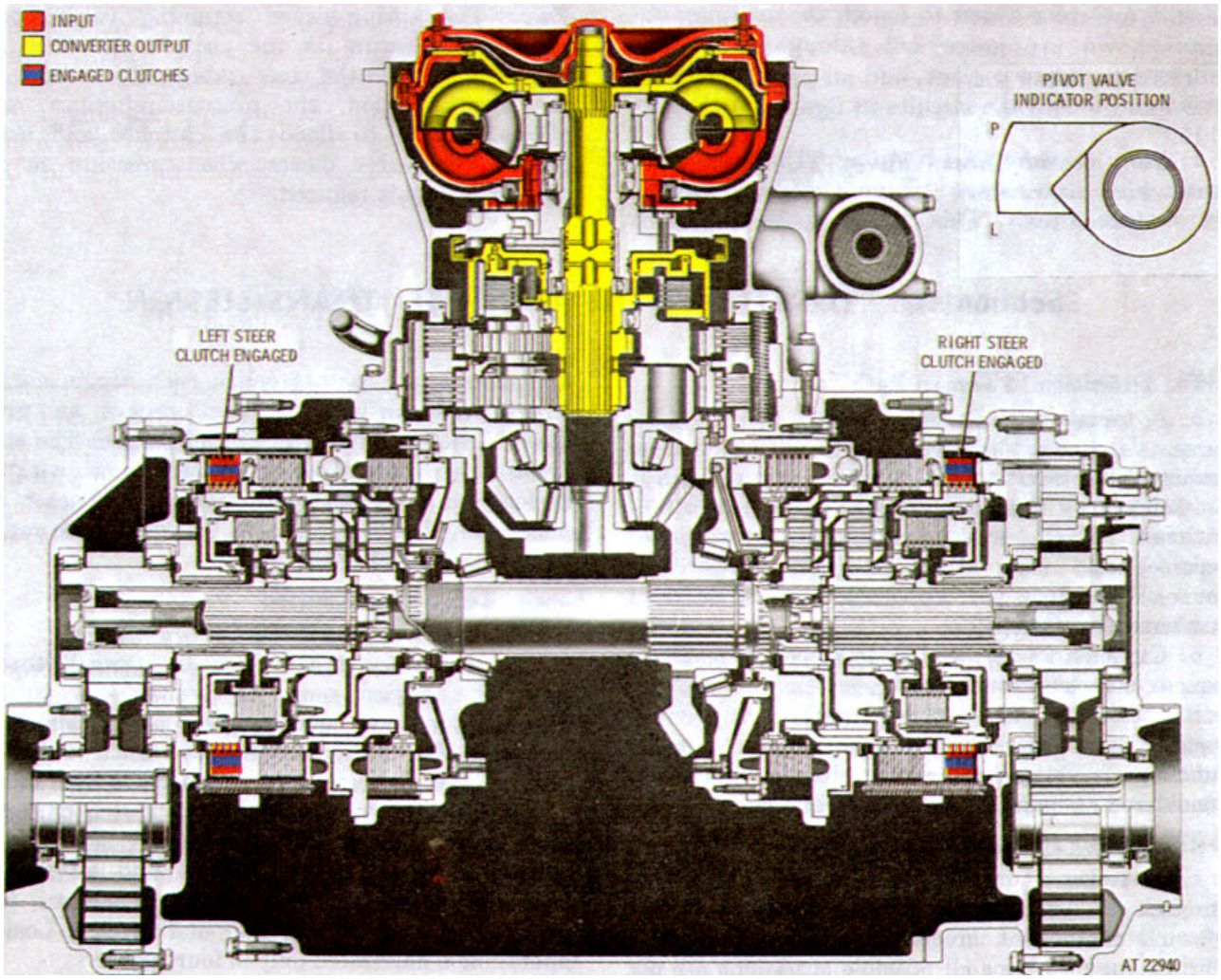


Figure 2-14. Neutral operation-torque path.

a. In neutral, torque is transmitted from the engine to the torque converter pump by the converter pump cover assembly. Torque is transmitted from the converter pump to the converter turbine hydraulically (converter action illustrated) or from the converter pump cover to the converter turbine mechanically by engaging the lockup clutch. The converter output shaft is splined to the converter turbine. The high-range clutch housing, and the low and intermediate-range sun gears are splined to the converter output shaft. Thus, all these components rotate with the shaft.

b. No range clutches are engaged when the power train is in neutral. As a result, no power is transmitted to the bevel drive gear. The left and right steer clutches are engaged, but, since no power is transmitted beyond the converter output shaft, there is no rotation in any of the gearing in the output sections.

2-50. Straight Travel Torque Paths

a. First Gear--Straight Travel (fig. 2-15).

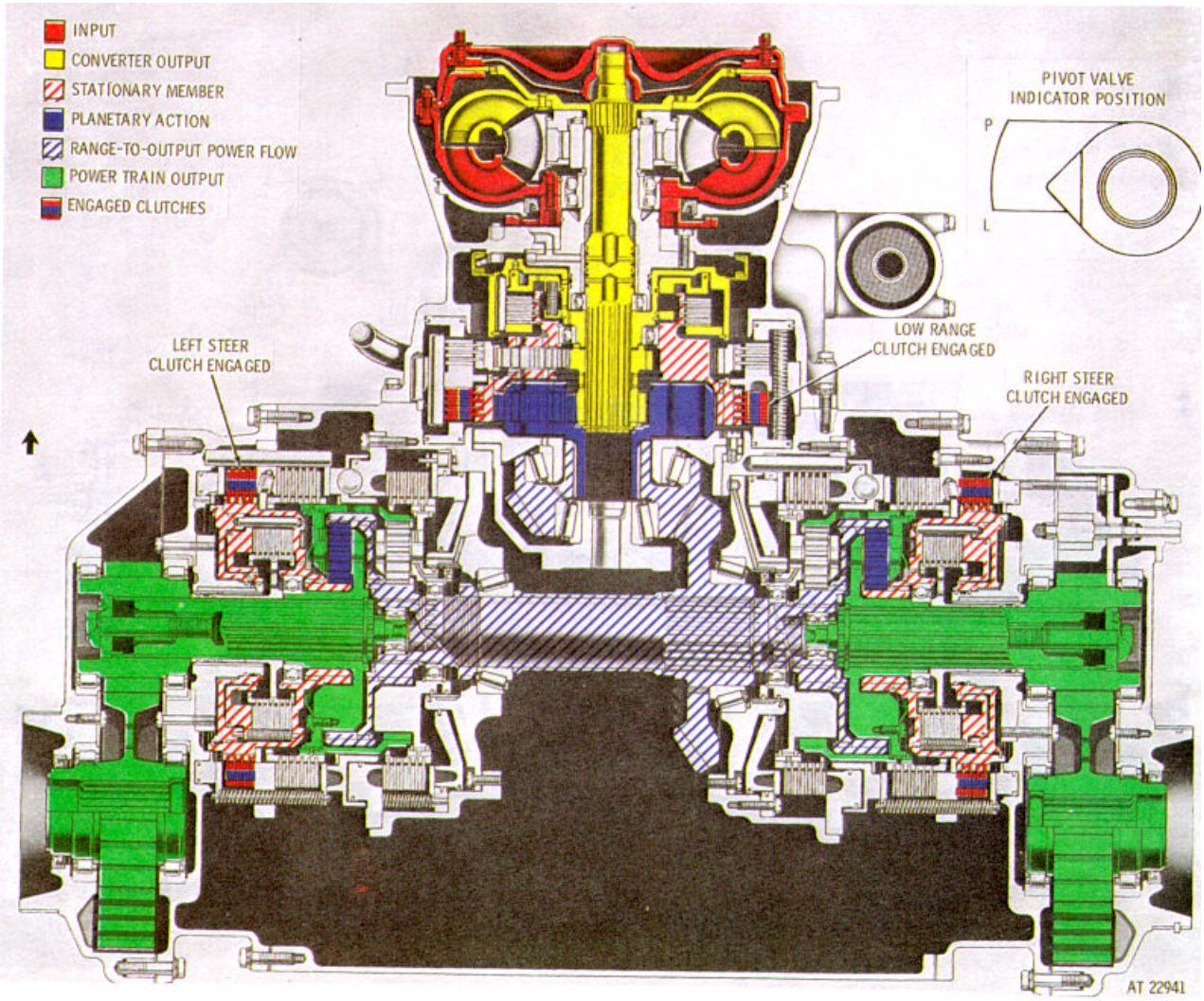


Figure 2-15. First gear, straight travel-operation-torque path.

(1) In first gear, torque is transmitted to the converter output shaft as described in paragraph 2-49*a*. The low-range clutch is engaged and holds the low-range ring gear stationary. The low-range sun gear rotates and drives the low-range pinions within the stationary ring gear. The pinions, being mounted to the low-range planetary carrier, cause the carrier to rotate. The low-range planetary carrier is splined to the bevel drive gear which transmits the rotation to the bevel driven gear and cross shaft.

(2) The cross shaft delivers torque to the left and right output sections. During straight travel, the functional operations that occur in one output section are identical to those that occur in the opposite section. In first gear, torque is transmitted from the cross shaft to the left-and right-output shafts by the steer planetary gears, used in this case as drive gears.

(3) The geared steer clutches are engaged and hold the steer sun gears stationary. The steer planetary ring gears are attached to the cross shaft and are the driving members. The rotating ring gears force the steer planetary pinions to rotate around the stationary sun gears which, in turn, drive the planetary carriers.

(4) The carriers are splined to the output shafts which, in turn, are splined to the output reduction transfer drive gears. The total mechanical speed reduction ratio from the engine through the transmission outputs is 19.832 to 1. At output stall, the total torque ratio available (output-to-engine) is (2.6 x 19.832) 51.563 to 1.

b. Second Gear-Straight Travel (fig. 2-16).

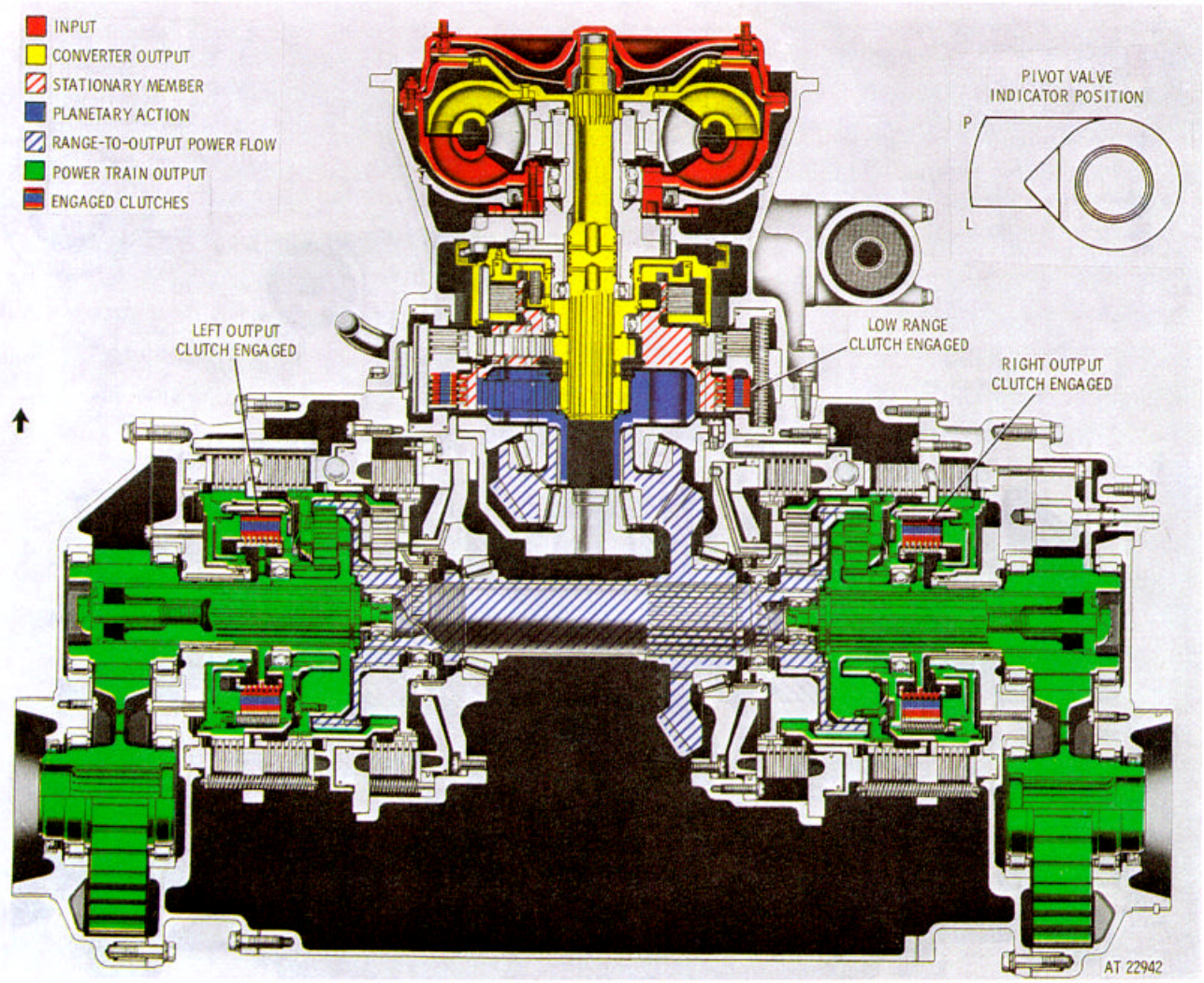


Figure 2-16. Second gear, straight travel operation-torque path

(1) In second gear, the torque path from the engine to the cross shaft is the same as that described for first gear (*a* (1), above). In the left and right-output sections, the output clutches are engaged which lock the clutch hubs to the steer sun gears. The output clutch hubs and steer planetary carriers are attached to the output shafts. Thus, two members of the steer planetary are locked together, causing the entire steer planetary to rotate as a unit when torque is applied. The cross shaft, which is attached to the steer planetary ring gears, drives the locked planetaries and output shafts at a 1 to 1 ratio.

(2) The output shafts are splined to the transfer drive gears. The total mechanical speed reduction ratio from the engine through the transmission outputs is 13.418 to 1. At output stall, the total torque ratio available (output-to-engine) is (2.6 x 13.418) 34.887 to 1.

c. Third Gear--Straight Travel (fig. 2-17).

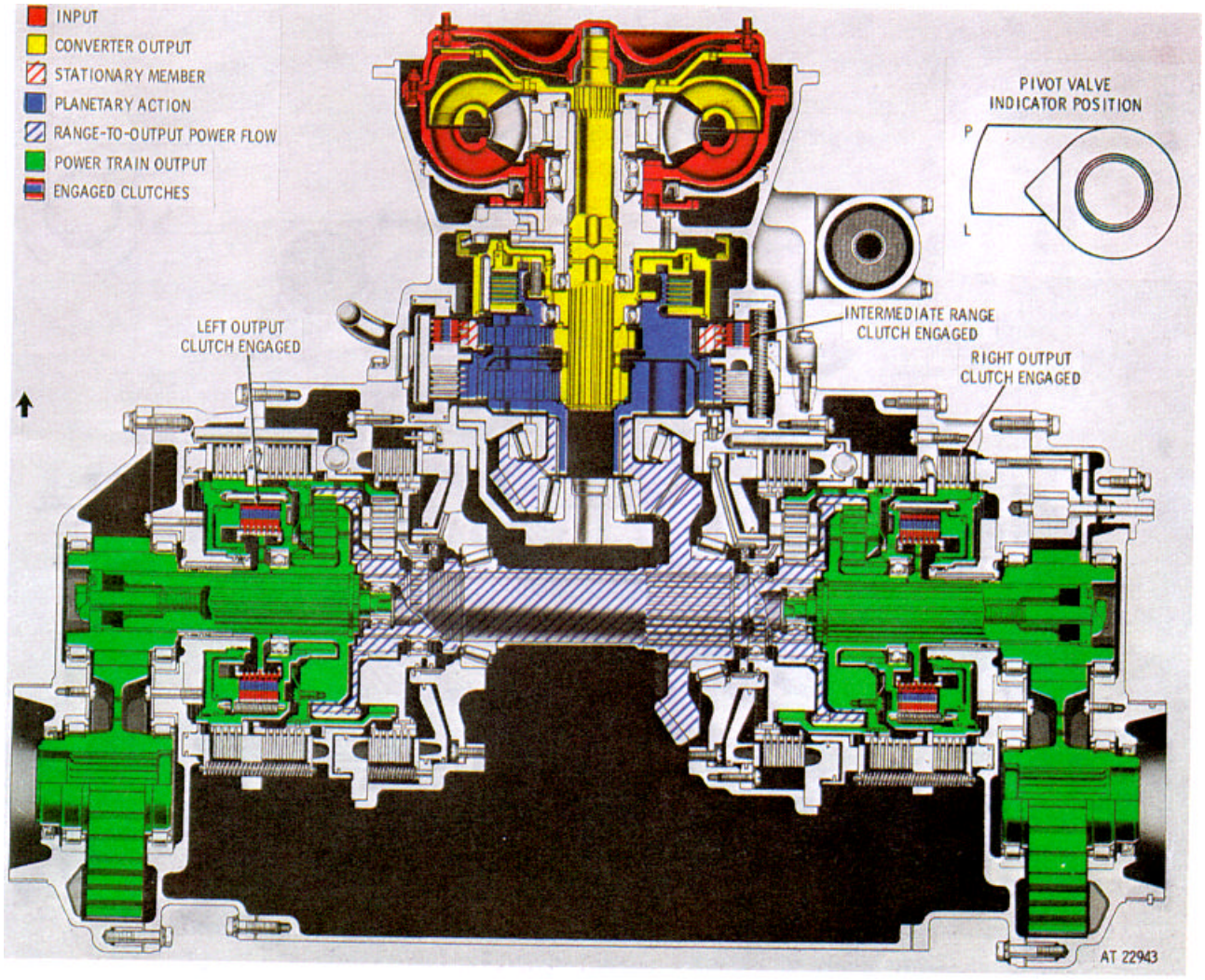


Figure 2-17. Third gear, straight travel operation-torque path.

(1) In third gear, the torque path from the engine to the power train output shafts is the same as that described for second gear *(b* (1), above), except that the intermediate-range clutch is engaged instead of the low-range clutch. When the intermediate-range clutch is engaged, the intermediate, and low-range planetary gears operate in "compound." The compound action is explained in paragraph 2-8*b* (3).

(2) The total mechanical speed reduction ratio from the engine through the transmission outputs is 7.206 to 1. At output stall, the total torque ratio available (output-to-engine) is (2.6 x 7.206) 18.736 to 1.

d. Fourth Gear--Straight Travel (fig. 2-18).

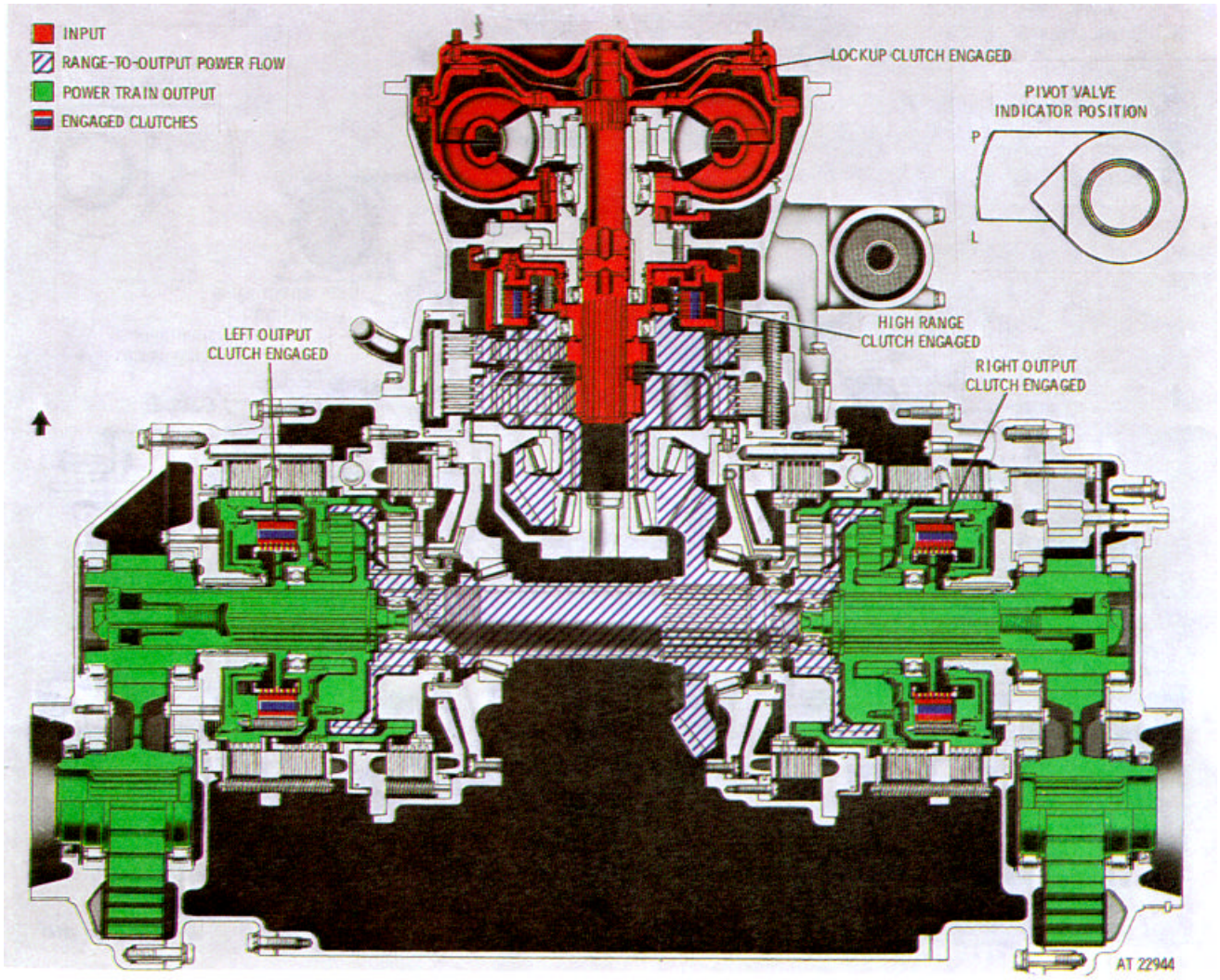


Figure 2-18. Fourth gear, straight travel operation-torque path.

(1) In fourth gear, the torque path to the transmission outputs is the same as that described for second gear (*b*, above), except that the high range clutch is engaged instead of the low-range clutch. Engagement of the high-range clutch locks the turbine shaft to the intermediate-range planetary carrier. The intermediate-range sun gear is splined to the turbine shaft. Thus, two elements of the intermediate-range planetary are locked together and must rotate as a unit. The inter connection of the intermediate-range planetary with the low-range planetary causes the low-range planetary to rotate as a unit. The low-range planetary is splined to the bevel drive gear which transmits the torque through the bevel-driven gear to the cross shaft at a speed reduction of 1.444 to 1.

(2) In the output sections, the output clutches are engaged and operate as explained in *b* (1), above. Thus, there is direct drive from the turbine shaft to the bevel drive gear, a 1.444 to 1 speed reduction in the bevel gears, direct from the bevel-driven gear to the output shafts, and a 2.222 to 1 speed reduction in the output reduction gears. The total mechanical speed reduction from the converter output shaft to the transmission outputs is 3.209 to 1. At output stall, the total torque ratio available (output-to-engine) is 2.6 x 3.209) 8.343 to 1.

e. Reverse-1 Gear-Straight Travel (fig. 2-19).

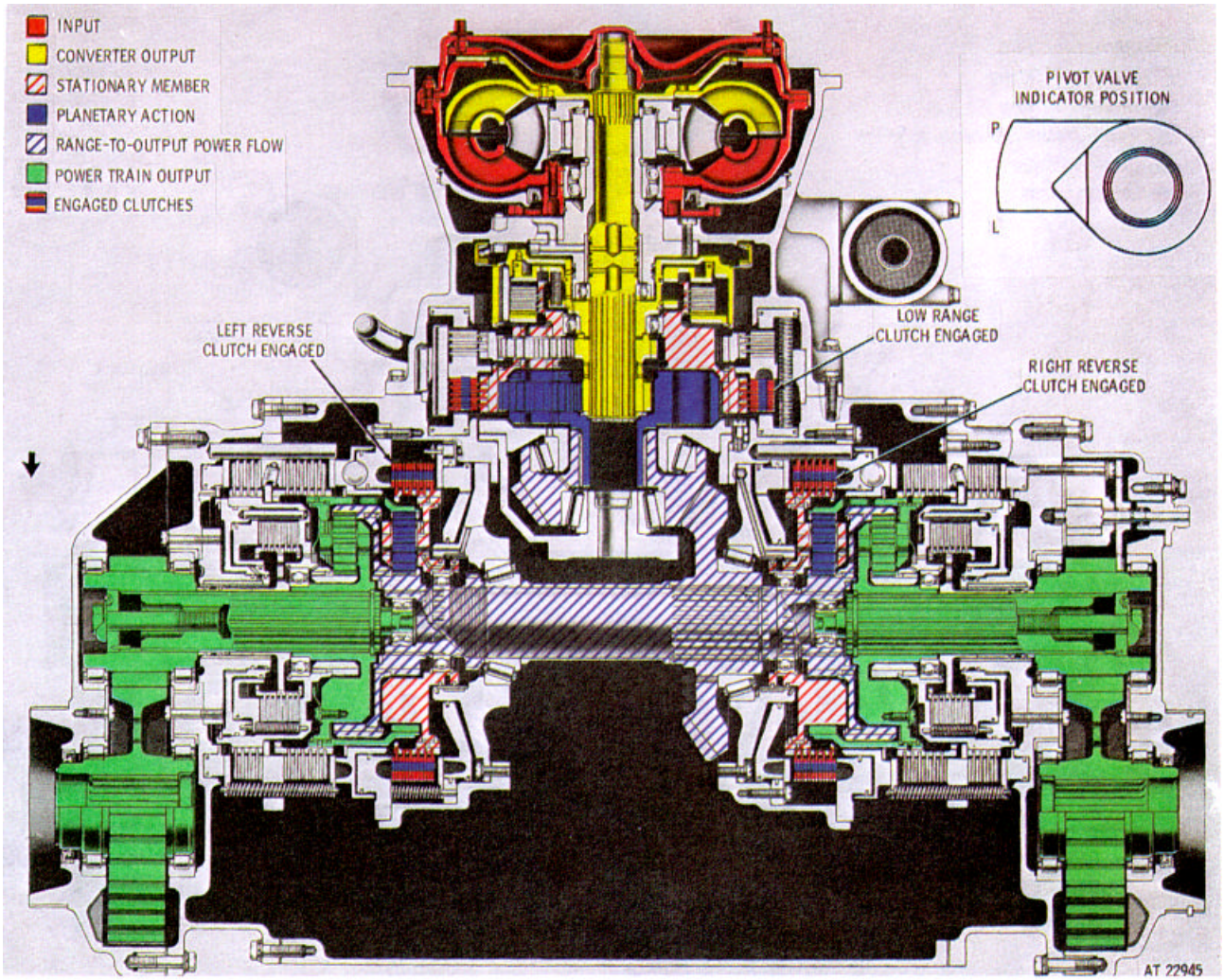


Figure 2-19. Reverse-1 gear, straight travel operation-torque path.

(1) In reverse-1 gear, the low-range clutch is engaged. This transmits torque to the cross shaft as explained in *a*(1), above. In the output sections, the reverse-range clutches are engaged. This holds the reverse-range planetary carriers stationary. The reverse-range sun gears are splined to the cross shaft. Their rotation drives the pinions in the stationary carriers. The pinions, in turn, drive the reverse-range ring gears in the reverse direction. The ring gears are connected, through the steer planetary carriers, to the output shafts.

(2) The output shafts transmit torque to the transmission outputs by means of the output transfer reduction gears. The total mechanical speed reduction from the engine through the transmission outputs is 28.098 to 1. At output stall, the total torque ratio available (output-to engine) is (2.6x28.098) 73.055 to 1.

f. Reverse-2 Gear--Straight Travel (fig. 2-20).

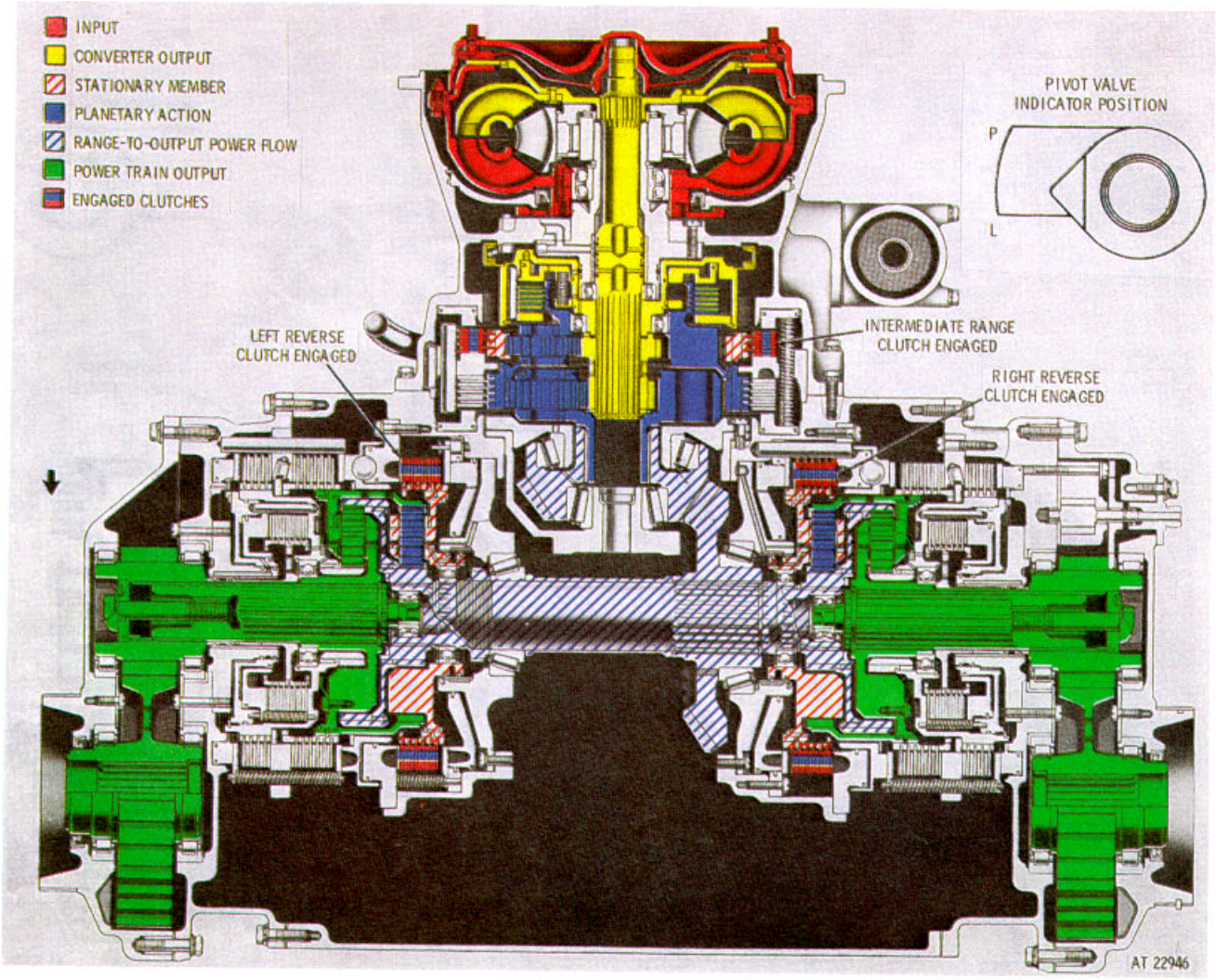


Figure 2-20. Reverse-2 gear, straight travel operation-torque path.

(1) In reverse-2 gear the intermediate clutch is engaged. This transmits torque to the cross shaft as explained in *c* (1), above.

(2) The output shafts transmit torque to the transmission by means of the output reduction gears. The total mechanical speed reduction from the engine through the transmission outputs is 15.090 to 1. At output stall, the total torque ratio available is (2.6x15.09) 39.234 to 1.

2-51. Normal (land) Steer Operation

a. First Gear, Normal Left Steer (fig. 2-21).

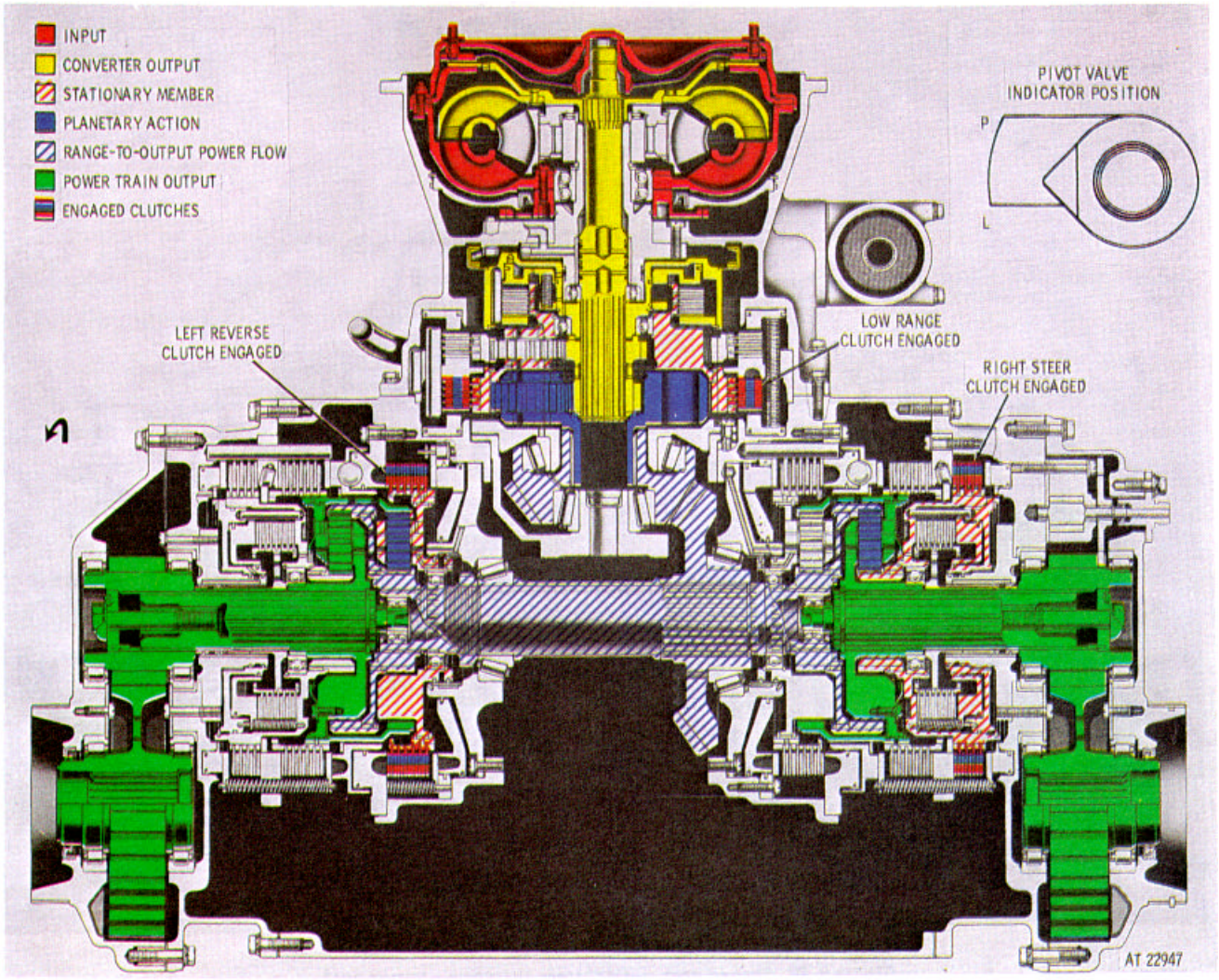


Figure 2-21. First gear, normal left steer operation-torque path.

(1) The power flow through the range section and right output section is the same as that described in paragraph 2-50*a*. However, in the left output section, the reverse-range clutch is engaged. The power flow in the left output section is, therefore, the same as that described in paragraph 2-50*a*.

(2) In first gear, one transmission output rotates as in straight travel operation while the opposite output rotates as in reverse gear. Thus, one vehicle track drives forward while the other drives in reverse, causing the vehicle to pivot about a point approximately at its center (during full steer). Lesser application of steer will lengthen the radius in which the vehicle travels.

(3) In first gear, normal right steer operates in the same manner as left steer except the actions described in (1) and (2), above, take place in opposite sides of the transmission. (The right reverse-range clutch is engaged and the left transmission drives as in first gear straight travel.)

b. Second Gear, Normal Right Steer (fig. 2-22).

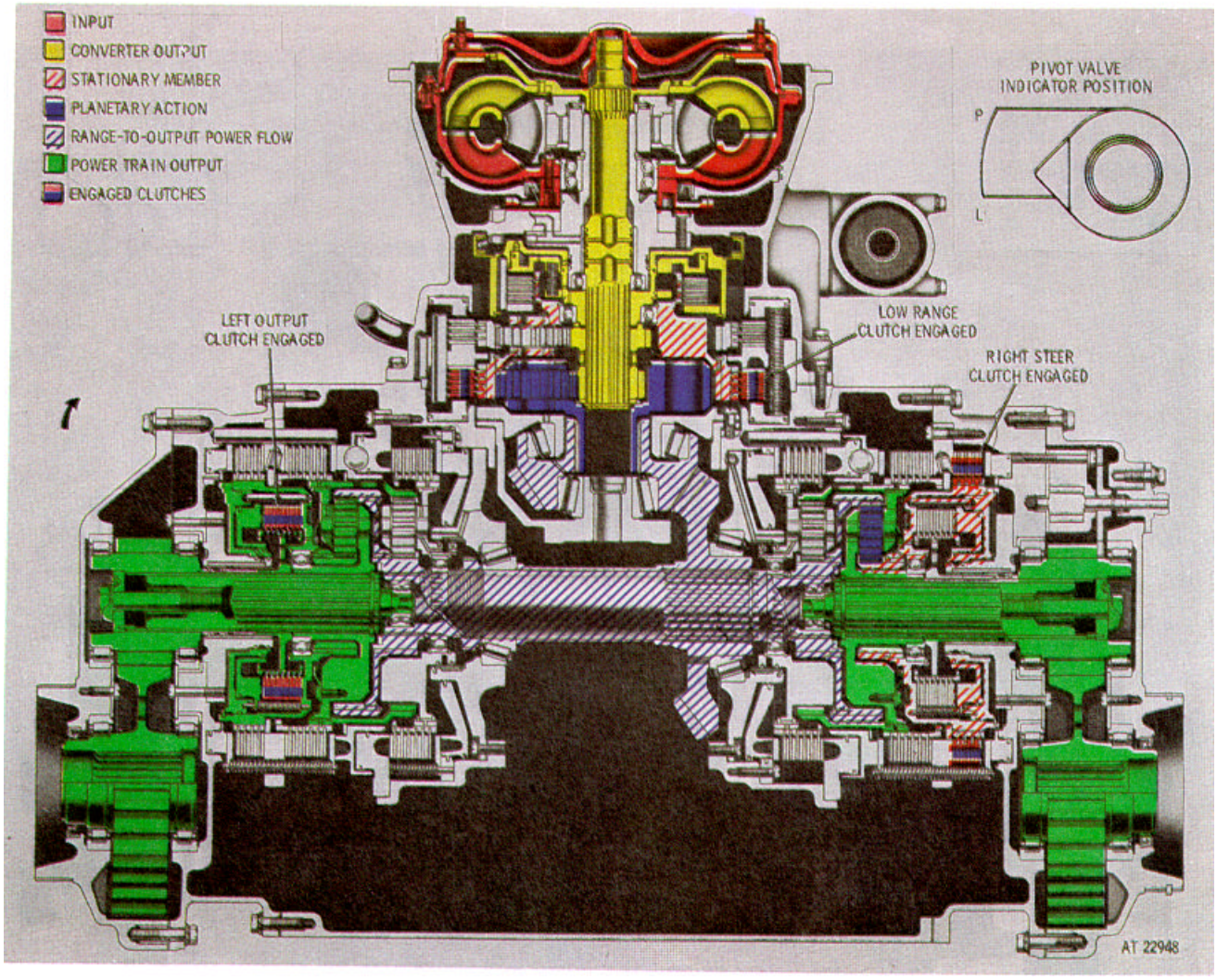


Figure 2-22. Second gear. Normal steer operation-torque path.

(1) The power flow through the range section and left output section is the same as described in paragraph 2-50b, above. However, in the right output section, the steer clutch is engaged. The power flow in the right output section is, therefore, the same as that described in paragraph 2-50*a* (3).

(2) In second gear (normal steer), one transmission output rotates as in straight travel operation for second gear, while the opposite output operates at a slower rotation (in this case, the same speed as first gear). Thus, one track drives ahead of the other track, causing the vehicle to steer toward the slower side. Lesser application of steer will lengthen the radius in which the vehicle travels.

(3) In second gear, normal left steer operates in the same manner as right steer except that the actions described in (1) and (2), above, take place in opposite sides of the power train. (The left steer clutch is engaged, while the right transmission output drives as in second-gear straight travel.)

c. Third Gear, Normal Left Steer (fig. 2-23).

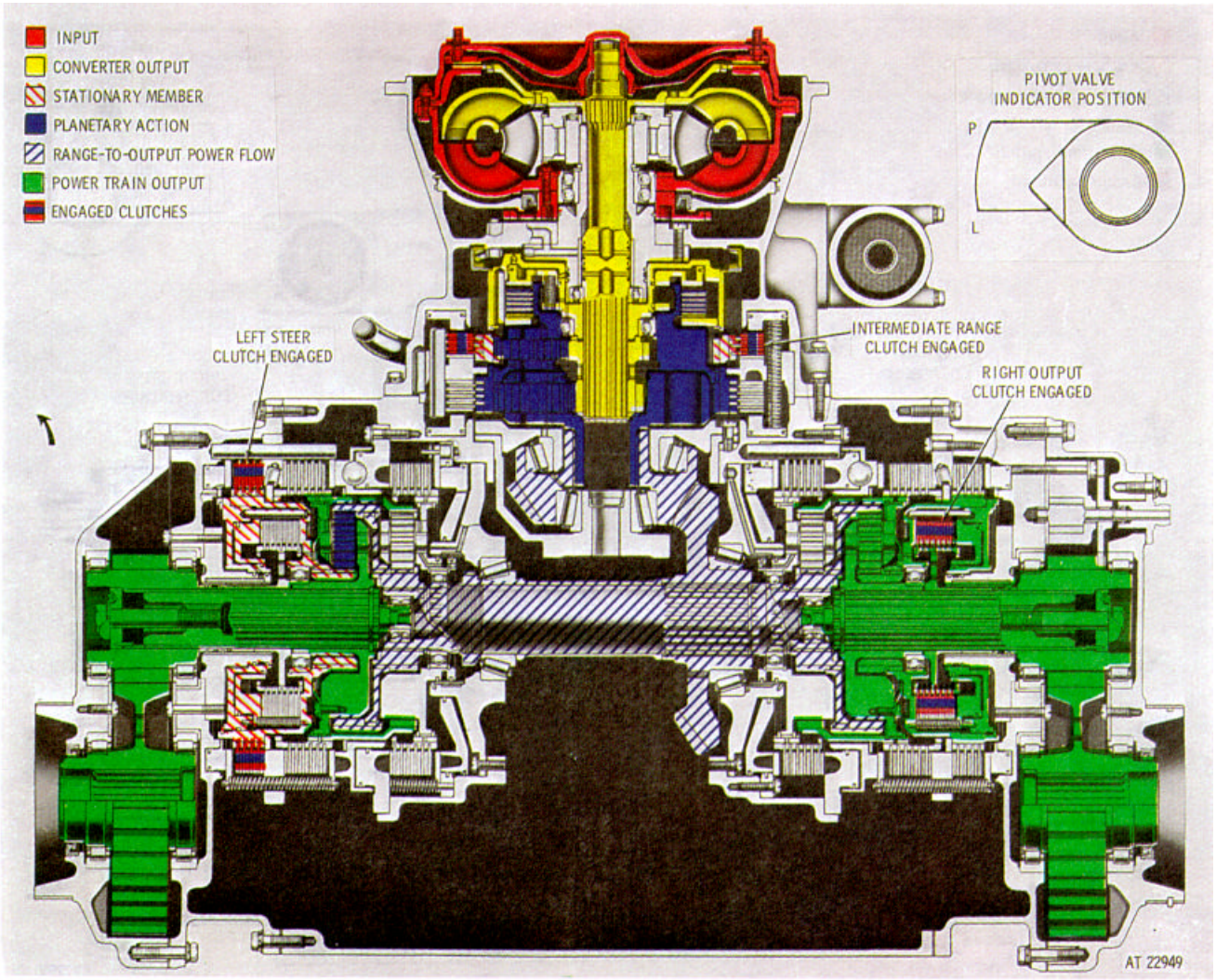


Figure 2-23. Third Gear, normal left steer operation-torque path.

(1) The power flow through the range section and right output section is the same as that described in paragraph 2-50c. However, in the left output section, the steer clutch is engaged. The power flow in the left output section is, therefore, the same as that described in paragraph 2-50a (3)

(2) In third gear (normal steer), one transmission output rotates as in straight travel operation for third gear, while the opposite output operates at a slower rotation. Thus, one vehicle track drives ahead of the other track, causing the vehicle to steer toward the slower side. Lesser application of steer will lengthen the radius in which the vehicle travels.

(3) In third gear, normal right steer operates in the same manner as left steer except that the actions described in (1) and (2), above, take place in opposite sides of the transmission. (The right steer clutch is engaged, while the left output clutch drives as in third-gear straight travel.)

d. Fourth Gear, Normal Right Steer (fig. 2-24).

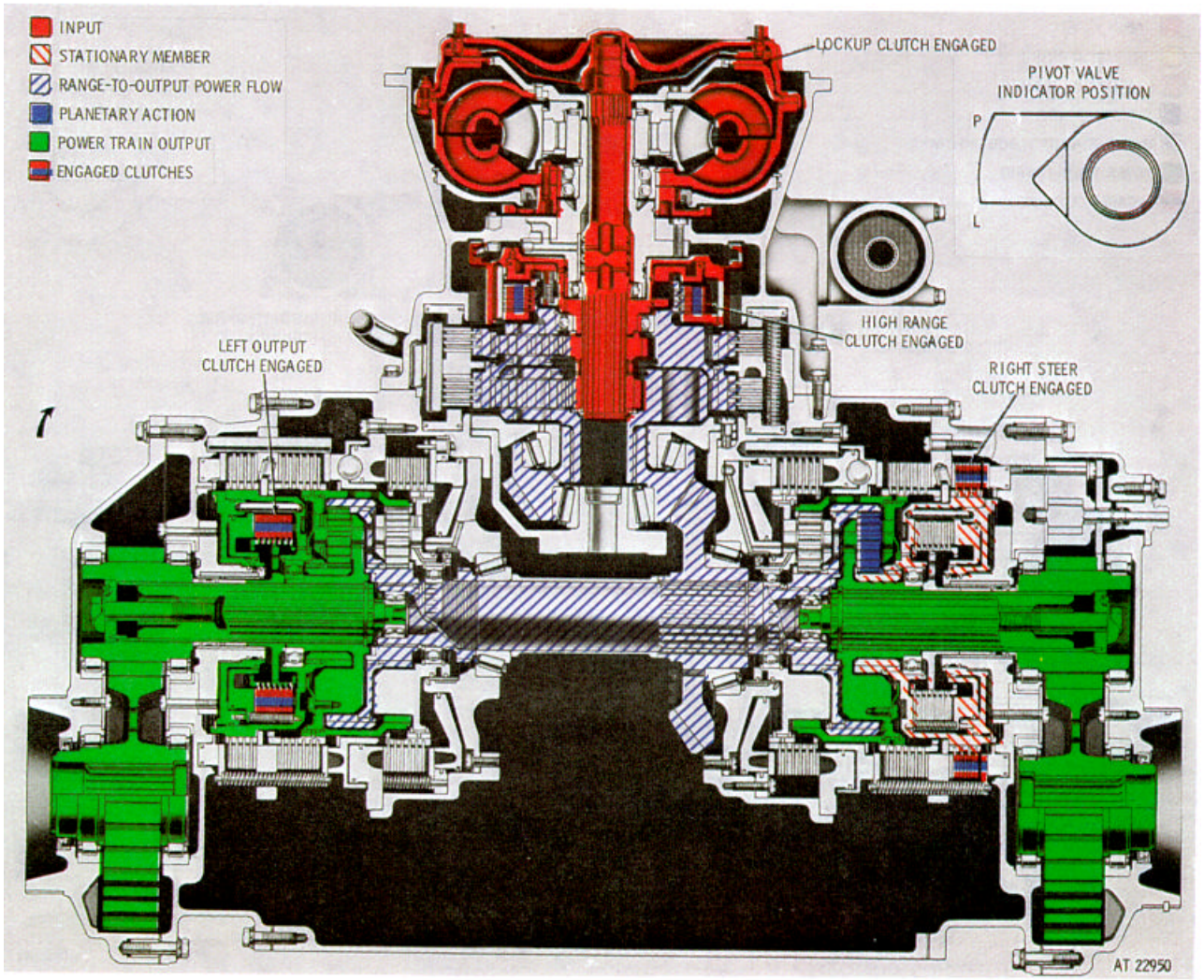


Figure 2-24. Fourth gear, normal right steer operation-torque path.

(1) The power flow through the range section and left output section is the same as that described in paragraph 2-50d. However, in the right output section, the steer clutch is engaged. The power flow in the right output section is, therefore, the same as that described in paragraph 2-50*b*.

(2) In the fourth gear (normal steer) one transmission output rotates as in straight travel operation for fourth gear, while the opposite output operates at a slower rotation. Thus, one vehicle track drives ahead of the other track, causing the vehicle to steer toward the slower side. Lesser application of steer will lengthen the radius in which the vehicle travels.

(3) In fourth gear, normal left steer operates in the same manner as right steer except that the actions described in (1) and (2), above, take place in the opposite side of the transmission. (The left steer clutch is engaged, while the right output clutch drives as in fourth-gear straight travel.)

e. Reverse 1 Gear, Normal Right Steer (fig. 2-25).

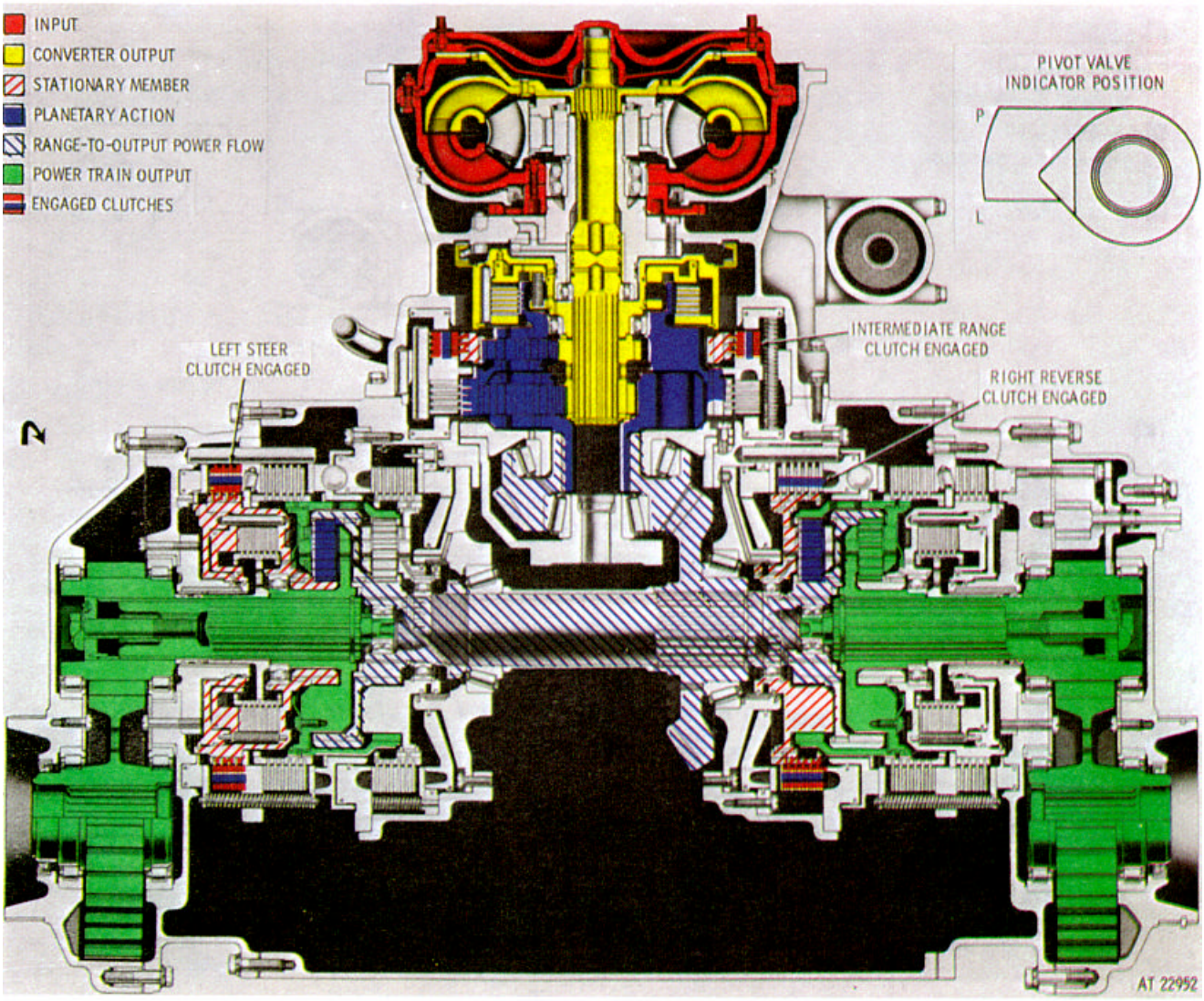


Figure 2-25. Reverse-1 gear, normal right steer operation-torque path.

(1) The power flow through the range and left output sections is the same as that described in paragraph 2-50*e*. Torque is transmitted through the right output section as described in paragraph 2-50*a.* The right output on the right steer clutch is engaged, causing the torque to be transmitted as described in paragraph 2-50*a* (3).

(2) In reverse-1 gear (normal steer), one transmission output rotates as in straight travel operation for reverse gear, while the opposite output operates as in forward travel. Thus, one track drives the vehicle in reverse while the other rack drives forward, causing the vehicle to pivot about a point approximately at its center (during full steer). Lesser application of steer will lengthen the radius in which the vehicle travels.

(3) In reverse-1 gear, normal left steer operates in the same manner as right steer except that the actions described in (1) and (2), above, take place in opposite sides of the transmission. (The left steer clutch is engaged, and the right transmission output drives the vehicle in reverse as in reverse-gear straight travel.)

f. Reverse 2 Gear, Normal Left Steer (fig. 2-26).

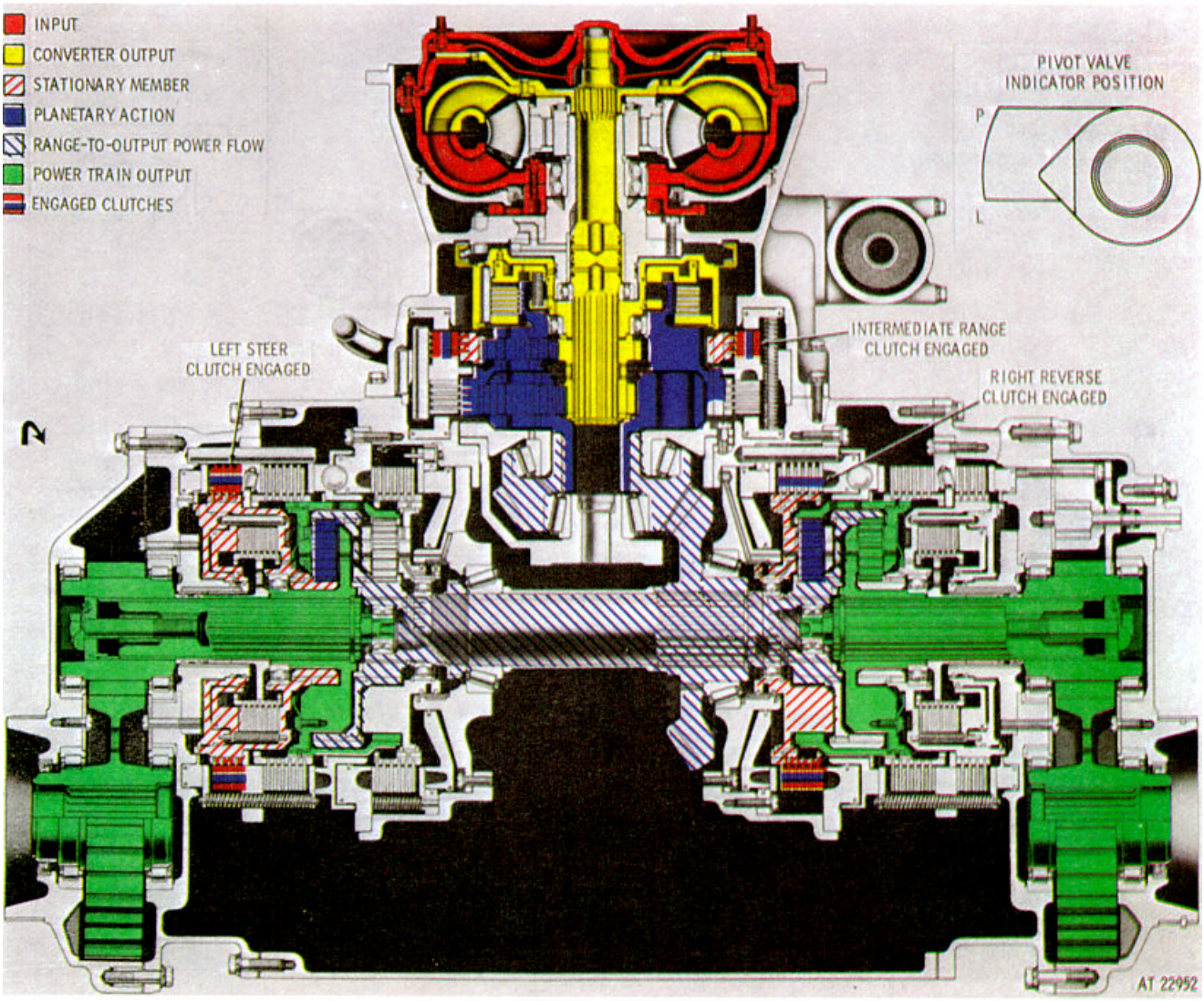


Figure 2-26. Reverse-2 gear, normal left steer operation-torque path.

(1) The power flow through the range section and right output section is the same as that described in paragraph 2-50*f.* However, in the left output section, the steer clutch is engaged. The power flow in the left output section is, therefore, the same as described in paragraph 2-50*a* (3).

(2) In reverse-2 gear steer, the resulting power flow is the same as that described in e (2), above.

(3) In reverse-2 gear, normal right steer operates in the same manner as left steer except that the actions described in (1) and (2), above, take place in opposite sides of the transmission. (The right steer clutch is engaged, while the left transmission output drives the vehicle in reverse as in reverse gear, straight travel.

2-52. Pivot (water) Steer Operation

a. First Gear, Pivot Right Steer (fig. 2-27).

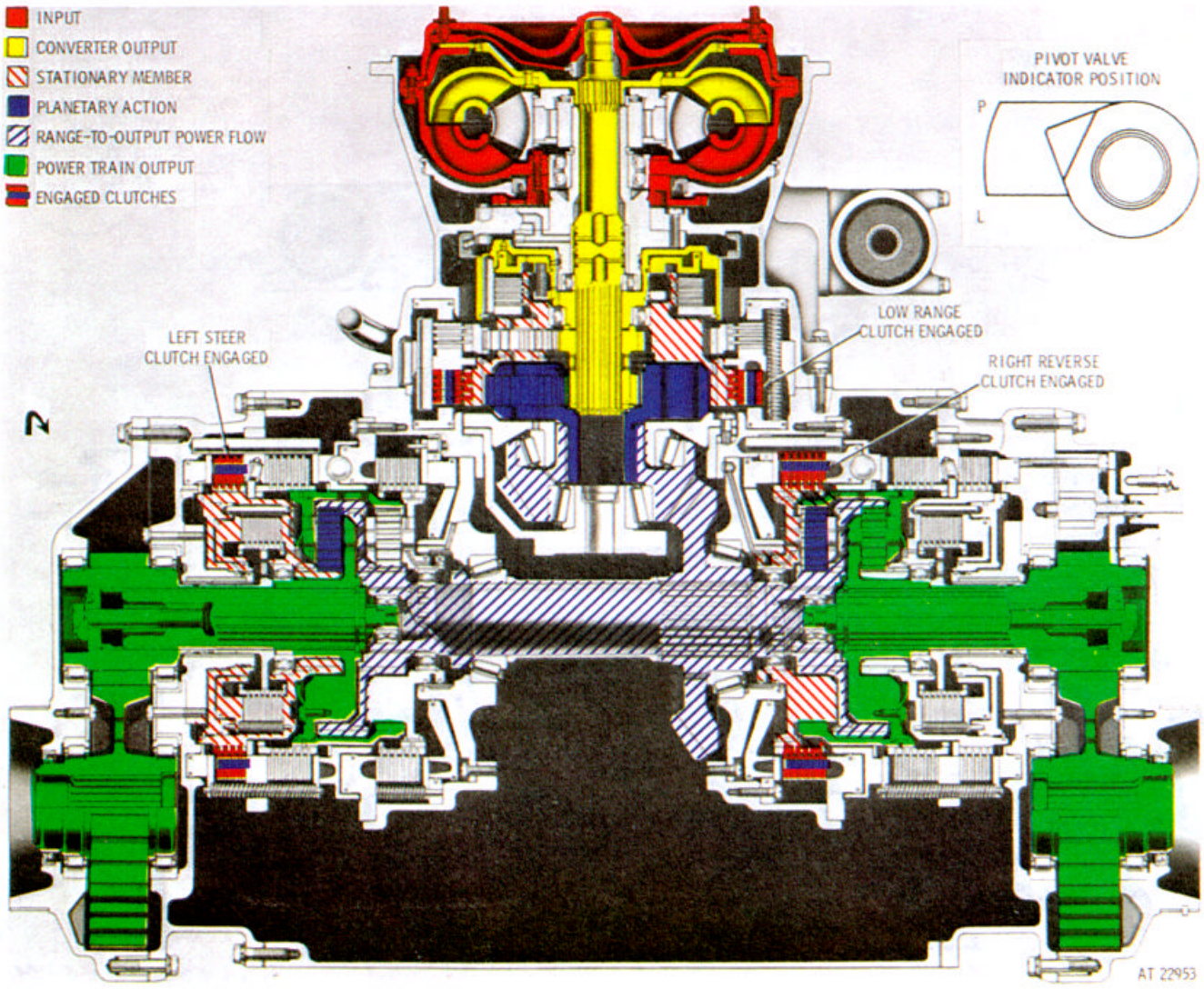


Figure 2-27. First gear. pivot right steer operation-torque path.

(1) The power flow through the transmission in first-gear pivot steer is identical to that described for first gear, normal steer (para 2 -51*a*). However, paragraphs 2-51*a* (1) and (2) describes left steer. For right steer, the right reverse range clutch is engaged, while the left transmission output drives forward (as in first gear, straight travel.)

(2) First gear, pivot left steer is identical to that described in paragraphs 2-51*a* (1) and (2), and illustrated in figure 2-21.

b. Second Gear, Pilot Left Steer (fig. 2-28).

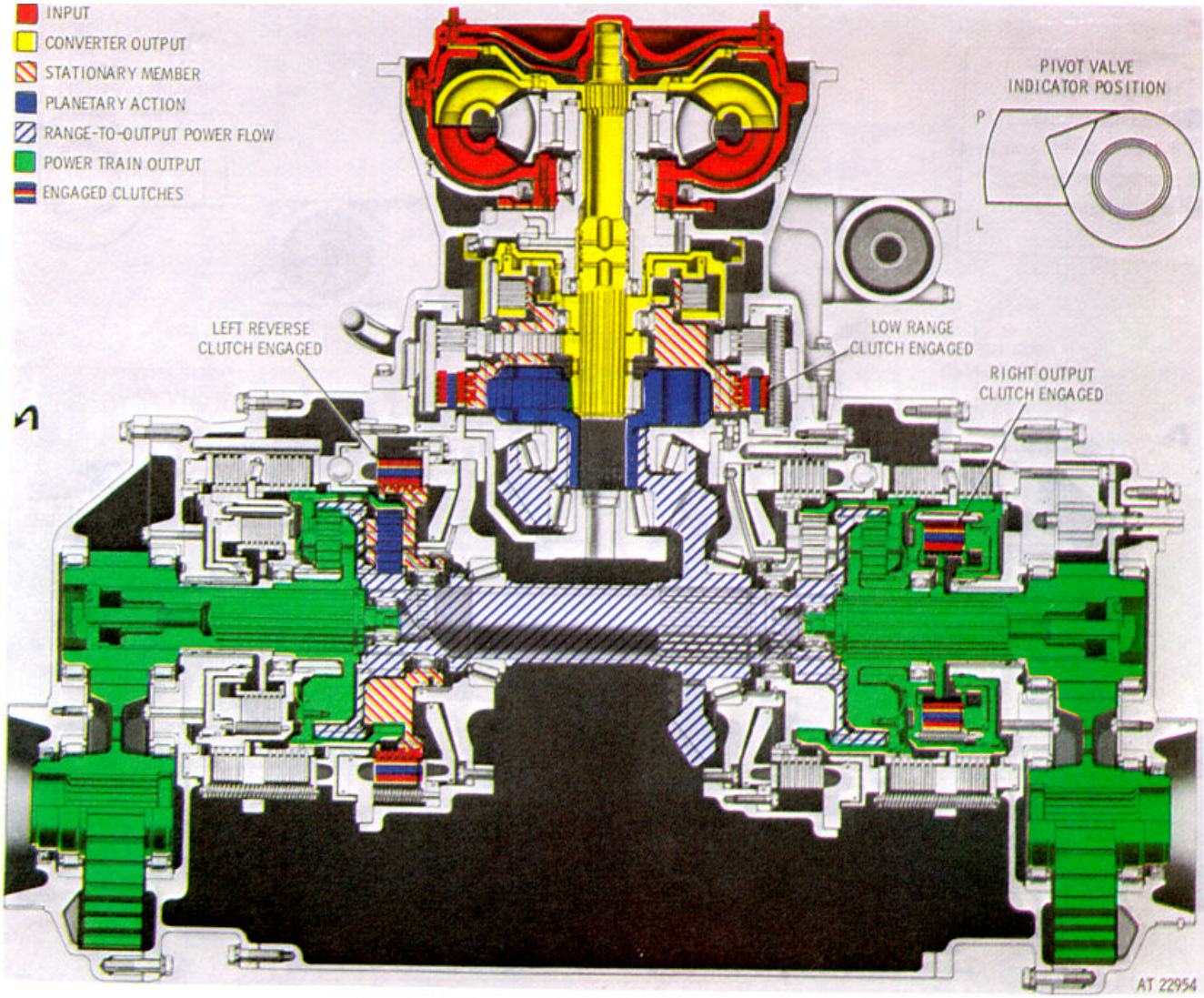


Figure 2-28. Second gear, pivot left steer operation-torque path.

(1) The power flow through the range section and right output section is the same as that described in paragraph 2-50b. However, in the left output section, the reverse clutch is engaged. The power flow in the left output section is, therefore, as described in paragraph 2-50e.

(2) In second gear, pivot steer, one transmission output rotates as in straight travel operation for second gear, while the opposite output operates as in reverse gear. Thus, one vehicle track drives forward while the other drives in reverse, causing the vehicle to pivot about a point approximately at its center (during full steer). Lesser application of steer will lengthen the radius in which the vehicle travels.

(3) Second gear, pivot right steer, operates in the same manner as pivot left steer except that the actions described in (1) and (2), above, take place in opposite sides of the transmission. (The reverse range right clutch is engaged, while the left transmission output drives forward as in second gear, straight travel.)

c. Third Gear, Pivot Right Steer (fig. 2-29).

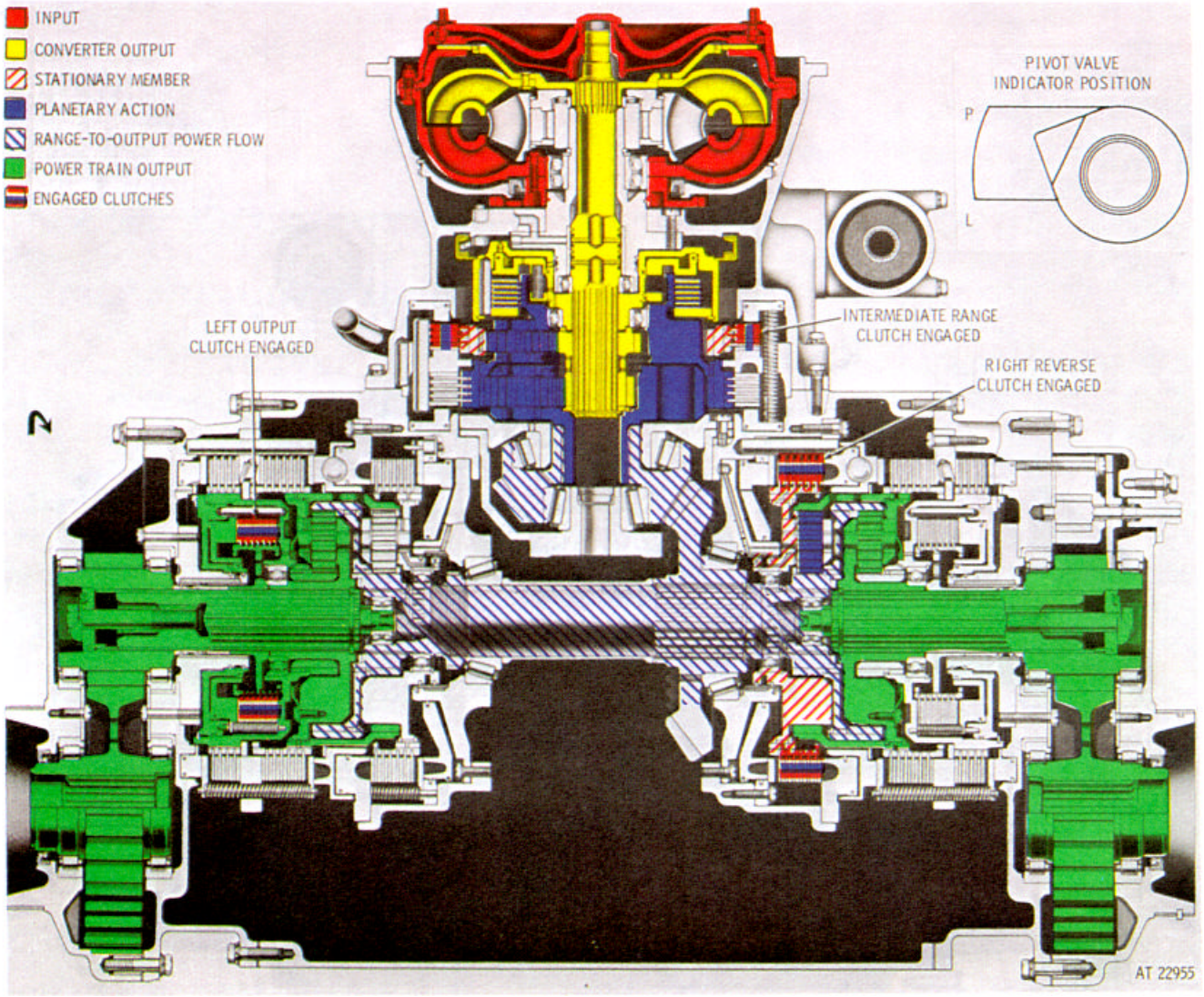


Figure 2-29. Third gear, pivot right steer operation-torque path.

(1) In third gear, pivot right steer, the range section operates the same as that described in paragraph 2-50*c.* In the output sections, the left output clutch and the right reverse-range clutch are engaged, causing the vehicle to pivot right about a point approximately at its center (during full steer). Lesser application of steer will lengthen the radius in which the vehicle travels.

(2) In third gear, pivot left steer, the transmission operates in the same manner except that the action described in (1), above, takes place in opposite sides of the transmission. The right output clutch and left reverse-range clutch are engaged causing the vehicle to pivot left (during full steer).

d. Fourth Gear, Pivot Left Steer (fig. 2-30).

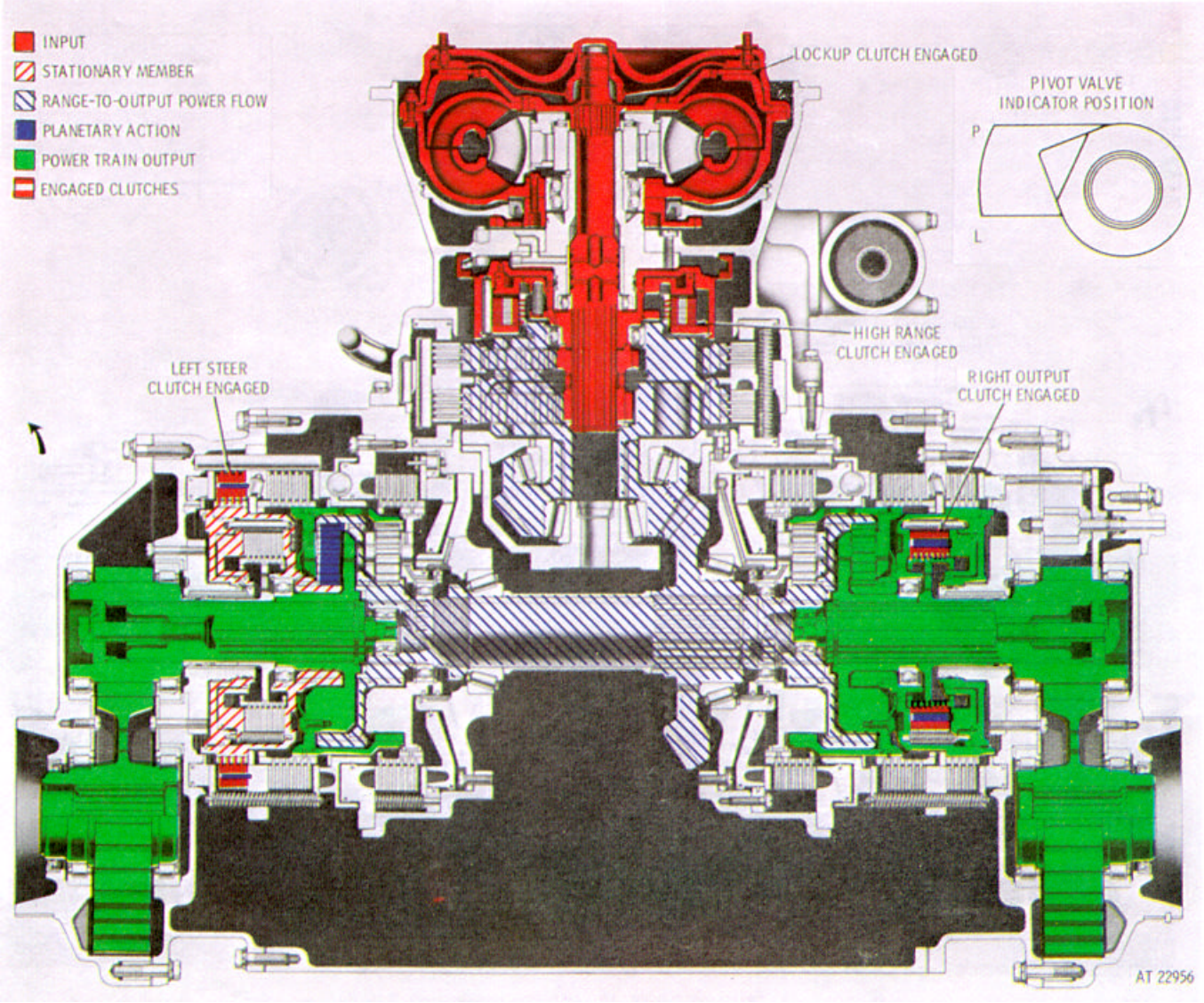


Figure 2-30. Fourth gear, pivot left steer operation-torque path.

(1) In fourth gear, even though the steer valve is set for pivot steer, the steer system automatically reverts to normal geared-steer operation. Thus, fourth gear, pivot steer is identical with fourth gear, normal steer. The power flow in the range and right output sections is the same as that described in paragraph 2-50*d.* However, in the left output section, the steer clutch is engaged. The power flow in the left output section is therefore, the same as that described in paragraph 2-50*a* (3).

(2) In fourth gear, pivot left steer, the left output rotates slower than the right output, causing the vehicle to steer toward the left. Lesser application of steer will lengthen the radius in which the vehicle travels.

(3) In fourth gear, pivot right steer, the transmission operates in the same manner as left steer except that the actions described in (1) and (2), above, take place in opposite sides of the transmission. (The output clutch drives the left output, while the steer clutch drives the right output. Thus, the right output is slower, and the vehicle steers toward the right.)

e. Reverse-1 Gear, Pivot Left Steer (fig. 2-31).

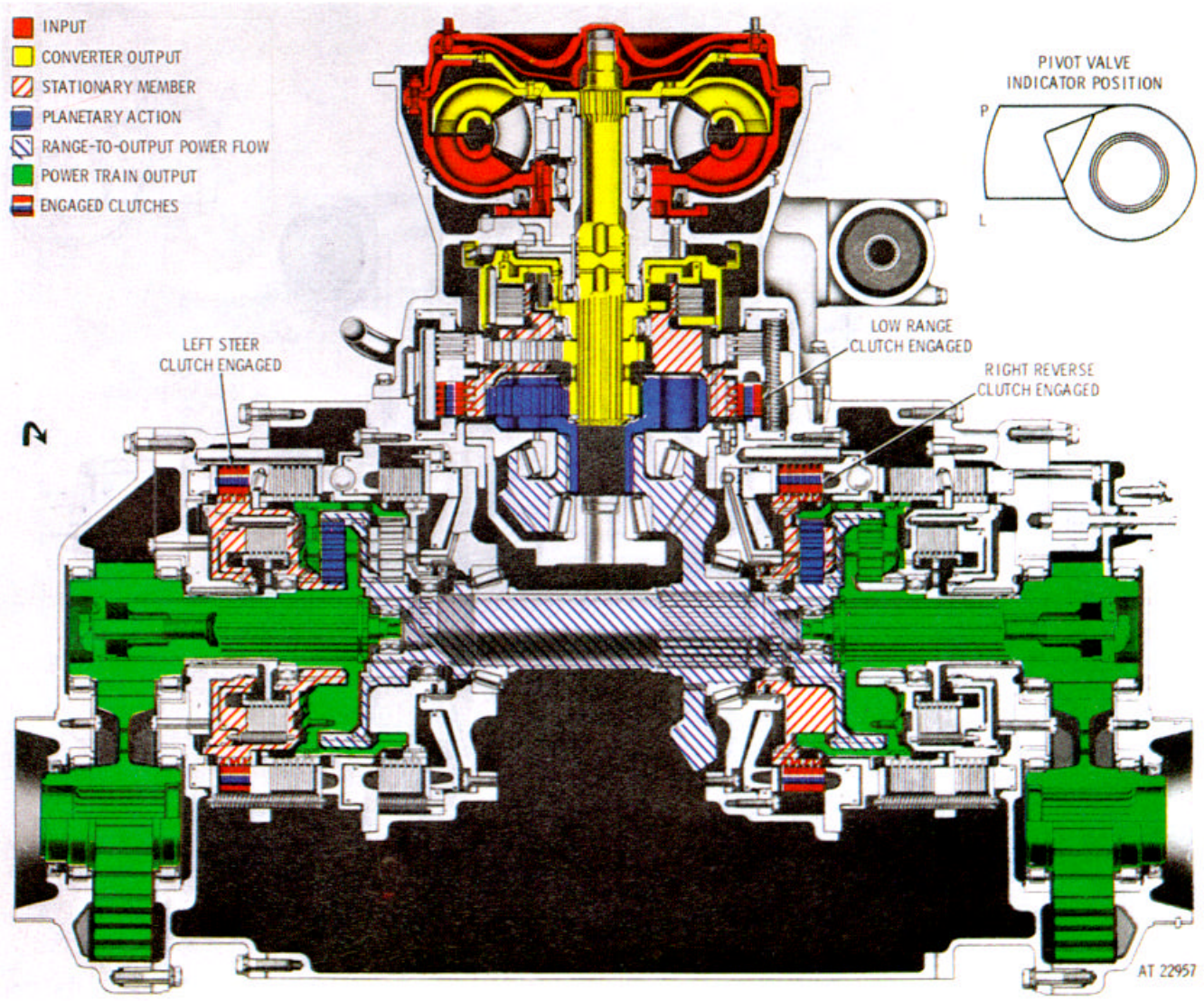


Figure 2-31. Reverse-1 gear, pivot left steer operation-torque path

(1) The power flow through the range and output sections in reverse-i gear, pivot left steer is the same as reverse-1, normal right steer except that the action in the output section described in paragraph 2-51*e* takes place in opposite sides of the transmission. Torque is transmitted through the range and left output section as described in paragraph 2-50*a*. However, in the right output section the right reverse range clutch is engaged, causing the torque to be transmitted as described in paragraph 2-50*e*.

(2) In reverse gear, pivot steer, one transmission output rotates as in straight travel operation for reverse gear, while the opposite output rotates as in straight forward travel. Thus one track drives the vehicle in reverse while the other track drives forward. These counteracting drives cause the vehicle to pivot about a point approximately at its center (during full steer). Lesser application of the steer will lengthen the radius in which the vehicle travels.

(3) Reverse-1 gear, right pivot steer is identical with reverse-1 gear, normal right steer as described in paragraphs 2-51*e* (1) and (2), and illustrated in figure 2-25.

f. Reverse-2 Gear, Pivot Right Steer (fig. 2-32).

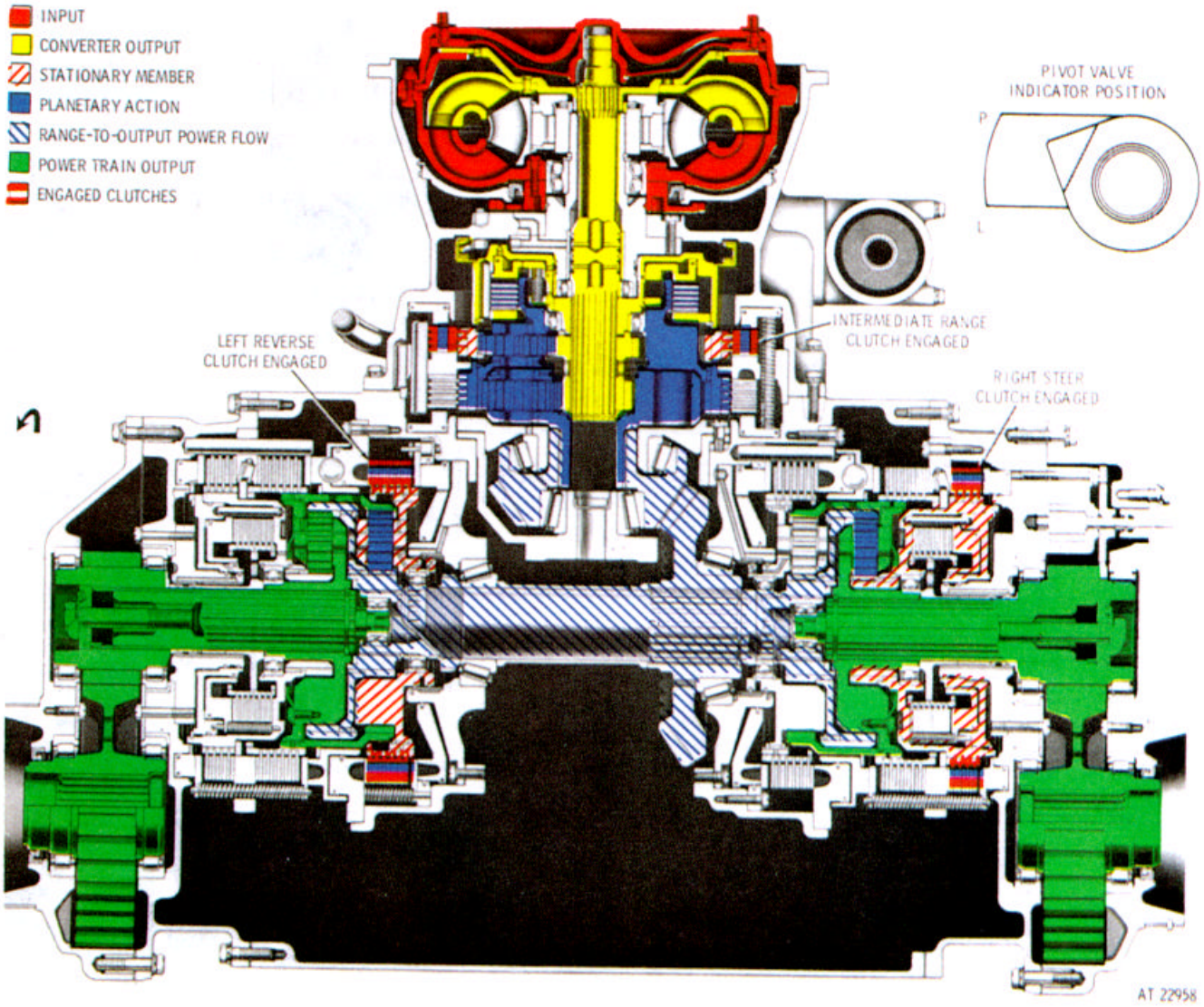


Figure 2 32. Reverse 2 gear, pivot right steer operation-torque path.

(1) Pivot steer in reverse-2 range is the same as reverse-2 normal steer except that the actions described in paragraphs 2-51*f* (1) and (2) take place in opposite sides of the transmission. (Power flow through the range section and left output sections is identical to that described in paragraph 2-50*f.* In the right output section, however, the right steer operation-torque path. right steer clutch is engaged causing the power flow to be the same as that described in paragraph 2-51*a*)

(2) Reverse-2 gear, pivot left steer is identical with reverse-2, normal left steer as described in paragraphs 2-51*f* (1) and (2), and illustrated in figure 2-26.

CHAPTER 3

PARTS, SPECIAL TOOLS AND EQUIPMENT FOR DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE

3-1. Tool Availability Tools, equipment and maintenance parts, over and above those available to the using organization, are supplied to supporting maintenance shops for maintaining, repairing, and rebuilding the transmission.

3-2. Repair Parts

Repair parts are issued to supporting maintenance personnel for the replacement of parts which have been worn, broken, or are otherwise unserviceable. Repair parts are listed in Appendix B which is the authority for requisitioning replacements.

3-3. Common Tools and Equipment

Standard and commonly used tools and equipment, having general application to the transmission, are authorized for issue by tables of allowances (TA) and tables of organization and equipment (TOE).

3-4. Special Tools and Equipment

Special tools and equipment-illustrated in foldout 14 (back of manual) and table 3-1 are necessary to perform the operations described in this manual. Refer to appendix B which is the authority for requisitioning replacements.

3-5. Improvised Tools and Equipment

The improvised tools and equipment illustrated in figures 3-1 and 3-2 (table 3-2) apply only to direct support, general support, and depot maintenance shops. Principal dimensions are shown to enable maintenance personnel to fabricate tools locally, if desired. These tools are of chief value to maintenance of identical components; however, they are not essential for rebuild and are not available for issue A transmission disassembly and assembly table similar to that shown in figure 3-2 may be constructed if other suitable facilities are not available.

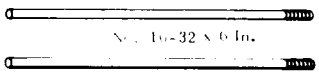
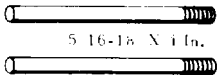
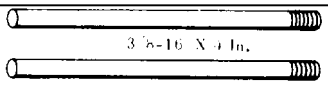
ITEM	REFERENCE ILLUS	REFERENCE PARA	USE
 1. GUIDE BOLT	Step 65 Step 66 Step 67	8-11 8-11 8-11	Install pitot tube and screws.
 2. GUIDE BOLT	Step 102	8-11	Install lubrication regulator valve body.
 3. GUIDE BOLT	Step 2 Step 5 Step 7 Step 27	8-11 8-11 8-11 8-11	Aline components and subassemblies for installation.

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Figure 3-1. Improvised tools.

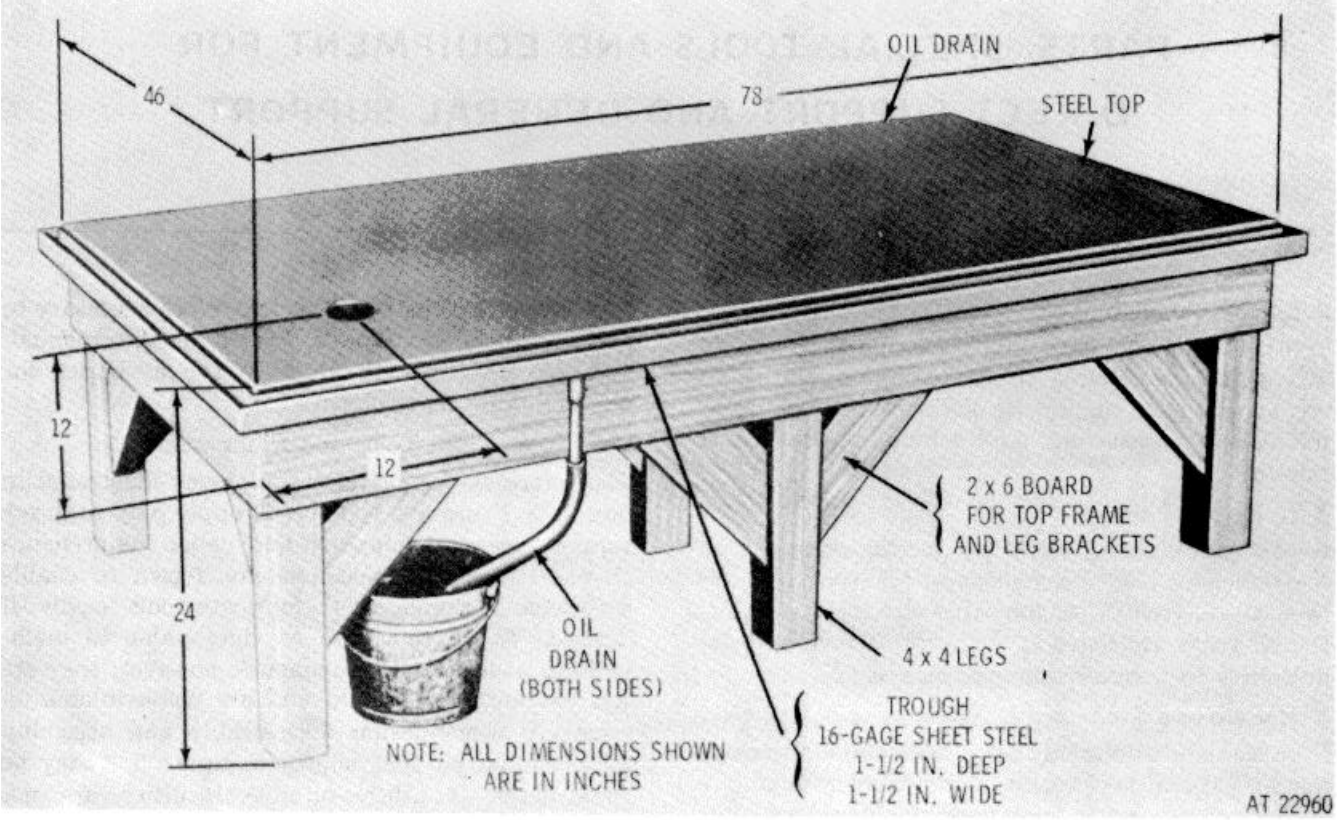


Figure 3-2. Transmission disassembly and assembly table.

Table 3-1. Special Tools and Equipment for Direct Support and General Support Maintenance

Item	Identifying number	Reference		Use
		Illus	Para	
1. ADAPTER (FO-14, Key No. 1)	5120-00-906-1051 (8355955)	Step 121 Fig. 9-6	8-11 9-5*a*(1)	Apply torque when adjusting brakes
2. ADAPTER, LIFTING (FO-14, Key No. 2)	5120-00-902-2053 (8355956)	Step 55 Step 22	6-3 8-11	Lifting output carrier subassembly (used with handle 5120-00-906-1043)
3. ADAPTER, PULLER (FO-14, Key No. 16)	4910-00-907-8998 (8356694)	Fig. 7-45 Fig. 7-48	7-117*a*(10) 7-123*d*	Remove final drive bearing (used with puller kit 5120-00-423-1596)
4. ADAPTER, PULLER (2)(FO-14, Key No. 3)	5120-00-901-4292 (8355996)	Step 32	6-3	Remove converter ground sleeve bearing (used with puller kit 5120-00-902-0186)
5. ADAPTER, PULLER LEG CAP (2) (FO-14, Key No. 28)	5120-00-902-0187 Spec GGG-P-781, Type XIII, Class 5, Size 1	Fig. 7-22	7-81*j*	Used with puller kit 5120-00-902-0186
6. ADAPTER, PULLER, STEP PLATE (FO-14, Key No. 4)	Spec GG-P-781 Type XIII, Class 4, Size 13	Fig 7-21	7-81*g*	Used with puller attachment 5120-00-572-8712 and forcing screw 5120-00-302-5857

Table 3-1. Special Tools and Equipment for Direct Support and General Support Maintenance- Continued

Item	Identify number	Reference		Use
		Illus	Para	
7. COMPRESSOR (FO-14, Key No. 5)	4910-00-906-1045 (8355967)	Fig. 7-6	7-32*d*	Compress high-range clutch piston return springs
8. DRIVER KIT (FO-14, Key No. 29)	5120-00-106-7688	Step 83	8-11	Install turbine hub retaining ring
9. DRIVER, PLUG (FO-14, Key No. 9)	5120-00-572-8656 (8356202)	Fig. 7-2	7-6*a*	Install converter drive cover bushing (used with handle 5120-00-316-9182)
10. EYEBOLT (FO-14, Key No. 6)	5306-00-576-2094 (8708107)	Step 52	6-3	Lift output shaft and clutch assembly
11. GAGE, PRESSURE, KIT (FO-14, Key No. 25)	4910-00-572-8656 (8356107)	Fig. 9-4	9-4*c*(2)	Check oil pressures
12. HANDLE (FO-14, Key 7)	5120-00-316-9182 (7950864)	Fig 7-2	7-6*a*	Used with driver 5120-00-572-8656
13. HANDLE (FO-14, Key No. 30)	5120-00-906-1984 (5411894)	Fig. 7-49	7-127*a*	Use with replacer 5120-00-906-1046
14. HANDLE (FO-14, Key No. 8)	5120-00-906-1043 (8355959)	Step 55	6-3	Used with adapter 5120-00-902-2053
15. HOLDER ASSEMBLY (FO-14, Key No. 18)	4910-00-906-1047 (8355962)	Fig. 8-5	8-8*b*	Lock input bevel gear to check backlash
16. HOLDER ASSEMBLY (FO-14, Key No. 17)	4910-00-906-1049 (83355959)	Step 48	6-3	Lock output gear while removing or tightening output shaft retaining bolt
17. PULLER, ATTACH-MENT, MECHANICAL (FO-14, Key No. 20)	5120-00-572-08712 Spec GGG-P-781, Type XI, Size 1	Fig. 7-21	7-81*g*	Remove input bevel gear bearing cup (used with forcing screw 5120-00-302-5857 and adapter or remove output gear bearings (used with puller kit 5120-00-902-0186
18. PULLER, KIT, MECHANICAL (FO-14, Key No. 19)	5120-00-902-0186 Spec GGG-P-781, Type VII, Size 1 w/two 11 3/4 in. legs	Step 32	6-3	Remove input drive bevel gear bearing cup (used with forcing screw 5120-00-572-8712 and adapter or adapters 5120-00-902-0187); or remove ground sleeve bearing (used with adapter 5120-00-901-4292 and shield 5120-00-901-4290)
19. REPLACER (FO-14, Key No. 11)	5120-00-901-4285 (8355987)	Fig. 7-17	7-79*a*	Install driven bevel gear bearings, or cross shaft bearing
20. REPLACER (FO-14, Key No. 10)	5120-00-901-4289 (8355986)	Fig. 7-5 Fig 7-23	7-30*b* 7-85*a*	Install PTO bearings and seal; converter pump bearing; driving bevel gear bearing; or input ground sleeve bearing

Table 3-1. Special Tools and Equipment for Direct Support and General Support Maintenance-Continued

Item	Identify number	Reference		Use
		Illus	Para	
21. REPLACEER (FO-14, Key No. 12)	5120-00-906-1046 (8355988)	Fig. 7-25 Fig. 7-32	7-85*d* 7-103*a*	Install output seal (used with handle 5120-00-541-1984; output shaft double-row bearings; or bevel pinion support bearing
22. REPLACER (FO-14, Key No. 21)	4910-00-906-1048 (8355971)	Fig 7-10 Fig 7-14	7-42*f* 7-61*f*	Aline and replace all carrier spindles
23. SCREW, FORCING (FO-14, Key No. 13)	5120-00-302-5857 Spec GGG-P-781, Type VIII	Fig. 7-21	7-81*g*	Used with puller attachment 5120-00-572-8712 and adapter
24. SHIELD (FO-14, Key No. 14)	5120-00-901-4290 (8355970)	Step 32	6-3	Protect turbine shaft while removing ground sleeve bearing (used with puller kit 5120-00-902-0186
25. SLING (FO-14, Key No. 26)	4910-00-708-3778 (7083778)	Step 24	6-3	Lift brake and steer package; intermediate- and low-range clutch assembly; converter drive cover; or converter pump
26. SLING (FO-14, Key No. 24)	4910-00-901-4291 (8356006)	Step 19 Step 124	6-3 8-11	Lift converter subassembly; or lift transmission (used with sling 4910-00-907-8990)
27. SLING (FO-14, Key No. 27)	4910-00-907-8990 (10954024)	Step 1	6-3	Lift transmission (used with sling 4910-00-901-4291)
28. SOCKET, WRENCH, FACE SPANNER (FO-14, Key No. 22)	5120-00-902-6522 (8356658)	Fig. 7-16	7-75*b*	Remove or tighten cross shaft spanner nut
29. TOOL, STALL CHECK (FO-14, Key No. 23)	4910-00-907-0703 (8355989)	Fig. 9-5	9-4*f*	Stall check powerplant and transmission
30. WRENCH ASSEMBLY (FO-14, Key No. 15)	5120-00-906-1052 (836022)	Step 8	8-11	Check input bevel gear bearing preload

Table 3-2. Improvised Tools and Equipment for Direct Support and General Support Maintenance

Item	Reference		Use
	Illus	Para Use	
1. GUIDE BOLT	3-1 Step 65 Step 66 Step 67	3-5 8-11 8-11 8-11	Install pitot tube and screws
2. GUIDE BOLT	3-1 Step 102	3-5 8-11	Install lubrication regulator valve body

Table 3-2. Improvised Tools and Equipment for Direct Support and General Support Maintenance- Continued

Item	Reference		Use
	Illus	**Para Use**	
3. GUIDE BOLT	3-1 Step 2 Step 5 Step 7 Step 27	3-5 8-11 8-11 8-11 8-11	Aline component sand subassemblies for in-stallation
4. DISASSEMBLY, ASSEMBLY TABLE	3-2	3-5	For disassembly and assembly

CHAPTER 4

TROUBLESHOOTING

4-1. Introduction

a. This chapter contains the troubleshooting information for locating and correcting most of the operating troubles which may develop in the XTG 250-1A transmission. Each malfunction for an individual component, unit, or system is followed by a list of tests or inspections which will help you to determine the corrective actions for you to take. You should perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all possible malfunctions that may occur nor all tests or inspections and corrective actions. If a malfunction is not listed (except when malfunction and cause are obvious), or is not corrected by listed corrective actions, notify your supervisor.

4-2. Purpose of Troubleshooting

NOTE

Information in this chapter is for use of Direct Support and General Support maintenance personnel, in conjunction with and as a supplement to the troubleshooting section of TM 9-2350-230-20-1. (Refer to appendix A.) It provides continuation of instructions where a remedy in the organizational maintenance manual refers to supporting maintenance personnel for corrective action.

a. Damage Prevented.

(1) This chapter contains inspection and trouble-shooting procedures to be performed while a disabled transmission is still mounted in the vehicle as well as after it has been removed.

(2) Operation of a deadlined vehicle without a preliminary examination can cause further damage to the transmission and possible injury to personnel. By careful inspection and troubleshooting, such damage and injury can be avoided. In addition, the cause of faulty operation can often be determined without extensive disassembly.

b. Precautions by Inspection. Most of the inspections are visual inspections and are to be performed before attempting to operate the vehicle. These inspections are mainly to determine the condition

and to take precautions to prevent further damage.

c. Troubleshooting while Mounted. The troubleshooting performed while the transmission is mounted in the vehicle is that which is beyond the normal scope of the using organization. Check the troubleshooting section of TM 9-2350-230-20-1, then proceed as outlined in this chapter.

d. Troubleshooting, Transmission Alone. If the transmission alone is received, inspection should be performed to verify the diagnosis made when the transmission was in the vehicle. This inspection, to uncover further defects or to determine malfunctions, is important. Often this is the only means of determining the malfunction without complete disassembly.

4-3. Study of Construction, Function Required

To perform effective troubleshooting, the mechanic must have a thorough knowledge of:

a. Construction Features. Refer to paragraphs 2-1 through 2-27 for description and function of the transmission components.

b. Functions of Components. Refer to paragraphs 2-28 through 2-50 for explanations of hydraulic operations and power flow.

c. Operating Instructions. Refer to TM 9-2350-230-20-1 for instructions on operating the transmission.

d. Oil Supply. Refer to paragraph 1-11 for oil supply information.

e. Adjustments. Refer to chapter 9 for adjustment procedures.

f. Oil Pressures. Refer to table 1-1, paragraph 1-12 and to paragraph 9-4c for oil pressures.

4-4. Troubleshooting-Before Removal or Operation

a. Preliminary Check. Do not operate the vehicle prior to completing the procedures described in this paragraph. Refer to paragraph 4-2 for the purpose of these inspections.

b. Inspect for Oil Leakage. Visually inspect all splitlines, connections, covers, output shafts and plugs for oil leaks. Oil leakage at splitlines may be caused by loose bolts or defective gaskets. Tighten bolts (do not exceed torque specifications) where leakage is found. If leaks continue, install new gaskets.

c. Re-inspect for Leakage. Inspect the transmission again for oil leakage after starting the vehicle engine. Refer to paragraph 4-5.

d. Check Linkage. Inspect for loose components and loose, disconnected or damaged linkage. Check linkage and operator's controls for damage, wear,

binding or improper adjustment. Proper adjustment and operation of brake, shift and throttle control linkage are essential to efficient performance.

4-5. Troubleshooting-Before Removal and During Operation

a. Preliminary Check. If the inspections in paragraph 4-3 do not reveal the cause of failure, and the vehicle can be operated, further troubleshooting is necessary. Do not remove the transmission from the vehicle until the causes of trouble listed in table 4-1, following, are checked. Refer to paragraph 4-2 for the purposes and scope of these troubleshooting procedures.

b. Check Engine and Oil. To make a thorough performance check, be sure the vehicle engine is properly tuned and that the transmission oil level is correct (refer to paragraph 1-11 and 9-4). Inspect again for oil leaks after starting the engine.

4-6. Troubleshooting-XTG 250-1A Transmission Removed from Vehicle

When the malfunction has not been determined before removal from the vehicle, the transmission should be mounted on a test stand and checked. Refer to chapter 9. Particular attention should be given to the correct adjustments and proper oil level in every test.

4-7. Troubleshooting Tests After Assembly

All tests prescribed after assembly (para 8-11) may be applied to the transmission in which a malfunction is suspected.

4-8. Troubleshooting Table

a. Condensed Information.

(1) The condensed troubleshooting information (table 4-1, which follows) will assist mechanics in diagnosing and correcting malfunctions.

(2) Use table 4-1 in conjunction with tests (para 9-4) and adjustments (para 9-5).

b. Arrangement. In table 4-1, the steps listed following the malfunction indicate probable causes of trouble followed by the corrective action to the probable cause.

Table 4-1. TROUBLESHOOTING

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
TRANSMISSION
1. VEHICLE WILL NOT TRAVEL IN ANY RANGE.
Step 1. Check shift linkage for disconnection, bent, broken, sticking or out-of-adjustment. Connect, repair, and/or adjust shift linkage (para 9- 5b.); refer to TM 9-2350-230-35/1.
Step 2. Check for low main oil pressure. Normal main oil pressures are listed in table 1-1. Procedures for checking oil pressures are listed in paragraph 9-3.
Step 3. Check for low oil level. Add oil as required to bring oil level to proper level. (Refer to TM 9-2350-230-20-1.)
Step 4. Check for brakes holding. Refer to paragraph 9-5a, for brake adjustment.
2. VEHICLE WILL NOT TRAVEL IN FIRST GEAR.
Check for low-range clutch or both steer clutches slipping. Refer to repair of transmission (paras 6-3 and 8-11.
3. VEHICLE WILL NOT TRAVEL IN SECOND GEAR.
Check low-range clutch or both output clutches slipping. Refer to repair of transmission (paras 6-3 and 8-11).
4. VEHICLE WILL NOT TRAVEL IN THIRD GEAR.
Check for slipping intermediate-range clutch or both output clutches slipping. Refer to repair of transmission (paras 6-3 and 8-11).
5. VEHICLE WILL NOT TRAVEL IN FOURTH GEAR.
Check for slipping high-range clutch or both output clutches slipping. Refer to repair of transmission (paras 6- 3 and 8-11).

Table 4-1. TROUBLESHOOTING-- continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

6. VEHICLE WILL NOT TRAVEL IN REVERSE-1.
   Step 1. Check shift linkage for out-of-adjustment or bent.
   Repair and/or adjust linkage (refer to para 9-5*b* and TM 9-2350-230-35/1).
   Step 2. Check for low-range or both reverse-range clutches slipping.
   Repair clutch and piston seal rings (Refer to paras 6-3 and 8-11).
   Step 3. Check excessive internal oil leakage.
   Repair power train (Refer to chs. 5 through 8).
7. VEHICLE WILL NOT TRAVEL IN REVERSE-2.
   Step 1. Check shift linkage for out-of-adjustment or bent.
   Repair and/or adjust linkage (Refer to para 9-5*b* and TM 9-2350-230-35/1).
   Step 2. Check for slipping intermediate-range clutch or both reverse clutches slipping.
   Replace clutch and piston seal rings (Refer to paras 6-3 and 8-11).
   Step 3. Excessive internal oil leakage.
   Repair transmission (Refer to chs. 5 through 8).
8. VEHICLE WILL TRAVEL IN ONLY ONE RANGE REGARDLESS OF RANGE SELECTED.
   Check shift linkage for disconnection, bent, broken, sticking or out-of-adjustment.
   Connect, repair, and/or adjust linkage (Refer to para 9-5*b*).
9. OIL TEMPERATURE WARNING LIGHT COMES ON.

NOTE

Shift to neutral and run engine at 1500 rpm for three minutes. Light should go off. If trouble persists, continue with troubleshooting check.

   Step 1. Check for low or high oil level.
   Refer to TM 9-2350-230-20-1 for proper oil level.
   Step 2. Check for clogged oil cooler lines.
   Refer to TM 9-2350-230-35/1.
   Step 3. Check for high oil temperature warning light malfunction.
   Check electrical circuit and oil temperature at K, figure 9-2. Normal temperature 180°F. to 200°F.
   Step 4. Converter stator locked (will not freewheel).
   Repair torque converter (Refer to paras 7-7 through 7-12).
   Step 5. Check for blocked air flow to cooler.
   Unblock air flow.
   Step 6. Check for improperly adjusted brakes.
   Adjust brakes (paras 9-5*a*).
10. LOW LUBRICATION PRESSURE WARNING LIGHT COMES ON.
   Step 1. Check warning light for malfunction.
   Check electrical circuit and oil pressure at L, figure 9-2; replace warning light or electrical wiring.
   Step 2. Check for lubrication regulator valve sticking open; spring weak or failed.
   Replace weak or failed spring. Repair lubrication regulator (paras 7-152 through 7-157).
   Step 3. Check for excessive internal oil leakage.
   Repair transmission (Refer to chs. 5 through 8)
11. VEHICLE WILL TRAVEL IN ALL RANGES EXCEPT FOURTH GEAR.
   Step 1. Check shift linkage for out-of-adjustment or bent.
   Repair and/or adjust linkage (Refer to para 9-5b and TM 9-2350-230-35/1).
   Step 2. Check for slipping high-range clutch.
   Repair clutch and piston seal rings (Refer to paras 7-31 through 7-36).
   Step 3. Check for excessive internal oil leaks. Repair transmission (Refer to chs. 5 through 8).

Table 4-1. TROUBLESHOOTING-Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

12. RANGE SELECTOR CONTROL WILL NOT MOVE.
    Step 1. Check shift linkage for disconnection, bends, breaks, out-of-adjustment or sticking.
    Connect, repair, and/or adjust linkage (Refer to para 9-5*b* and TM 9-2350-23-35/1).
    Step 2. Check for sticking downshift inhibitor.
    Repair valve body (paras 7-170 through 7-175).
    Step 3. Check for sticking selector valve.
    Repair valve body (paras 7-170 through 7-175).
13. STEER CONTROL WILL NOT MOVE.
    Step 1. Check steer linkage for disconnection, bent, broken, out-of-adjustment or sticking.
    Connect, repair, and/or adjust linkage (Refer to para 9-5**c** and TM 9-2350-230-35/1).
    Step 2. Check for sticking steer valves.
    Repair valve body (Refer to paras 7-176 through 7-181).
14. CONVERTER LOCKUP CLUTCH WILL NOT RELEASE.
    Step 1. Check lockup clutch for improper assembly or failed (not releasing).
    Repair input drive (paras 6-3 and 8-11).
    Step 2. Check for sticking lockup valve.
    Repair valve body (Refer to paras 7-146 through 7-151).
15. CONVERTER LOCKUP CLUTCH WILL NOT ENGAGE.
    Step 1. Check for low governor pressure.
    Check oil pressure at P, figure 9-2.
    Step 2. Check lockup clutch failed (slipping).
    Repair input drive (paras 6-3 and 8-11).
    Step 3. Check lockup clutch piston seal ring leakage.
    Repair input drive (paras 6-3 and 8-6).
    Step 4. Check for excessive internal oil leakage.
    Repair transmission (Refer to chs. 5 through 8).
    Step 5. Check for sticking lockup valve.
    Repair valve body (Refer to paras 7-146 through 7-151).
16. CONVERTER LOCKUP CLUTCH DOES NOT ENGAGE AND RELEASE AT PROPER SPEEDS.
    Step 1. Check throttle valve linkage for disconnection, bent, broken, out-of-adjustment or lever sticking.
    Connect, repair, and/or adjust linkage (Refer to para 9-5*d* and TM 9-2350-230-35/1).
    Step 2. Check for low governor pressure.
    Check pressure at P, figure 9-2.
    Step 3. Check for lockup valve sticking.
    Repair valve body (Refer to paras 7-146 through 7-151).
    Step 4. Check for excessive internal oil leakage.
    Repair transmission (Refer to chs. 5 through 8).
17. BRAKES DO NOT HAVE "FREE PLAY" AT PEDAL.
    Step 1. Check for improperly adjusted brakes.
    Adjust brakes (Refer to para 9-5*a*).
    Step 2. Check brake linkage for disconnection, bent, broken, out-of-adjustment or sticking.
    Connect, repair, and/or adjust linkage (Refer to para 9-5*a*).
18. BRAKES DO NOT STOP VEHICLE.
    Step 1. Check for improperly adjusted brakes.
    Adjust brakes (Refer to para 9-5*a*).
    Step 2. Check brake linkage for disconnection, bent, broken, out-of-adjustment or sticking.
    Connect, repair, and/or adjust linkage (Refer to para 9-5*a*).

Table 4-1. TROUBLESHOOTING-Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Step 3. Check for failure of brakes.
Repair transmission (Refer to paras 6-3 through 8-11).

19. VEHICLE TRAVELS IN FIRST AND SECOND GEARS AND REVERSE-1, BUT STALLS IN ANY OTHER EXCEPT NEUTRAL (IN WHICH VEHICLE MOVES).
Check for failed low-range clutch (will not release).
Repair low-range clutch (Refer to paras 6-3 and 8-11).

20. VEHICLE TRAVELS IN THIRD GEAR AND REVERSE-2, BUT STALLS IN ANY OTHER GEAR EXCEPT NEUTRAL (IN WHICH VEHICLE MOVES FORWARD).
Check for failed intermediate-range clutch (will not release).
Repair intermediate-range clutch (Refer to paras 6-3 and 8-11).

21. VEHICLE TRAVELS IN FOURTH GEAR, BUT STALLS IN ANY OTHER GEAR EXCEPT NEUTRAL (IN WHICH VEHICLE MOVES).
Check for failed high-range clutch (will not release).
Repair high-range clutch (Refer to paras 6-3, 7-31 through 7-36, and 8-11).

22. VEHICLE TRAVELS IN FIRST GEAR, BUT STALLS IN ALL OTHER GEARS, AND IS FREE IN NEUTRAL.
Step 1. Check for failure of left steer clutch (will not release).
Repair clutch (Refer to paras 6-3 and 8-11).
Step 2. Check for failure of right steer clutch (will not release).
Repair clutch (Refer to paras 6-3 and 8-11).

23. VEHICLE TRAVELS IN SECOND, THIRD, AND FOURTH GEARS, BUT STALLS IN FIRST AND REVERSE GEARS, AND IS FREE IN NEUTRAL.
Step 1. Check for left output clutch failure (will not release).
Repair clutch (Refer to paras 6-3 and 8-11).
Step 2. Check for right output clutch failure (will not release).
Repair clutch (Refer to paras 6-3 and 8-11).

24. VEHICLE TRAVELS IN REVERSE GEAR, BUT STALLS IN FORWARD GEARS AND IS FREE IN NEUTRAL.
Step 1. Check for failure of left reverse-range clutch (will not release).
Repair clutch (Refer to paras 6-3 and 8-11).
Step 2. Check for failure of right reverse-range clutch (will not release).
Repair clutch (Refer to paras 6-3 and 8-11).

25. VEHICLE HAS ONLY NORMAL STEER CONDITION REGARDLESS OF POSITION OF STEER SELECTOR.
Step 1. Check linkage for disconnection, bent, broken, out-of-adjustment or sticking.
Connect, repair, and/or adjust linkage (Refer to para 9-5*c*).
Step 2. Check for sticking steer relay valve.
Repair valve body (Refer to paras 7-176 through 7-181).

26. VEHICLE HAS ONLY PIVOT STEER REGARDLESS OF POSITION OF STEER SELECTOR.
Step 1. Check for broken, bent, or disconnected linkage or linkage sticking or out-of-adjustment.
Adjust or repair linkage (Refer to para 9-5c).
Step 2. Check for sticking steer relay valve.
Repair valve body (Refer to paras 7-176 through 7-181).

27. VEHICLE PULLS TO LEFT IN FIRST GEAR WHILE NOT STEERING.
Step 1. Check left steer clutch for slipping.
Repair clutch (Refer to paras 6-3 and 8-11).
Step 2. Check for excessive internal oil leakage.
Repair transmission (Refer to chs. 5 through 8).

Table 4-1. TROUBLESHOOTING--Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

28. VEHICLE PULLS TO LEFT IN SECOND, THIRD, AND FOURTH GEARS WHILE NOT STEERING.
    Step 1. Check for slipping left output clutch.
    Repair clutch (Refer to paras 6-3 and 8-11).
    Step 2. Check for excessive internal oil leakage.
    Repair transmission (Refer to chs. 5 through 8).
29. VEHICLE PULLS TO LEFT IN REVERSE GEAR WHILE NOT STEERING.
    Step 1. Check for slipping left reverse-range clutch.
    Repair clutch (Refer to paras 6-3 and 8-11).
    Step 2. Check for excessive internal oil leakage.
    Repair transmission (Refer to chs. 5 through 8).
30. VEHICLE PULLS TO RIGHT IN FIRST GEAR WHILE NOT STEERING.
    Step 1. Check for slipping right steer clutch.
    Repair clutch (Refer to paras 6-3 and 8-11).
    Step 2. Check for excessive internal oil leakage.
    Repair transmission (Refer to chs. 5 through 8).
31. VEHICLE PULLS TO RIGHT IN SECOND, THIRD, AND FOURTH GEARS WHILE NOT STEERING.
    Step 1. Check for slipping right output clutch.
    Repair clutch (Refer to paras 6-3 and 8-11).
    Step 2. Check for excessive internal oil leakage.
    Repair transmission (Refer to chs. 5 through 8).
32. VEHICLE PULLS TO RIGHT IN REVERSE GEAR WHILE NOT STEERING.
    Step 1. Check for slipping right reverse-range clutch.
    Repair clutch (Refer to paras 6-3 and 8-11).
    Step 2. Check for excessive internal oil leakage.
    Repair transmission (Refer to chs. 5 through 8).
33. VEHICLE PULLS TO LEFT OR RIGHT IN EVERY GEAR WHILE NOT STEERING.
    Step 1. Check steer linkage for disconnection, bent, broken, out-of-adjustment or sticking.
    Connect, repair, replace, and/or adjust linkage (Refer to para 9-5l).
    Step 2. Check for improperly adjusted steer valve.
    Adjust steer valve (Refer to paras 7-176 through 7-181).
34. ENGINE RACES WHILE VEHICLE MOVES SLOWLY.
    Step 1. Check for low main oil pressure (Refer to para 9-3).
    Repair or replace main pressure regulator and pump (Refer to step 18, p. 6-6; step 22; p. 6-7; paras 7-146 through 7-151; and paras 7-158 through 7-162).
    Step 2. Check for slipping low-range clutch (in first, second, and reverse-1).
    Repair clutch (Refer to paras 6-3 and 8-11).
    Step 3. Check for intermediate-range clutch slipping (in third and reverse-2).
    Repair clutch (Refer to paras 6-3 and 8-11).
    Step 4. Check for high-range clutch slipping (in fourth gear).
    Repair clutch (Refer to paras 6-3 and 8-11).
35. ENGINE LABORS EXCESSIVELY.
    Step 1. Check for improperly adjusted brakes.
    Adjust brakes (Refer to para 9-5*a*).
    Step 2. Check for high oil level.
    Refer to LO 9-2350-230-12.
    Step 3. Check for locked converter stator (will not freewheel).
    Repair converter components (Refer to paras '7-7 through 7-12).

Table 4-1 TROUBLESHOOTING - Continued

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Step 4. Check track components failed or binding.
Repair (Refer to TM 9-2350-230-35/1).

36. VEHICLE MOVES IN NEUTRAL (ENGINE SPEED 1000 RPM OR ABOVE).
Check for missing 3/8" nylon ball in oil transfer plate.
Repair (Refer to para 8-11, step 115).

37. ENGINE STALLS WHEN SHIFTED FROM NEUTRAL TO ANY RANGE.
Check for stuck lockup valve in applied position.
Retighten valve body bolts (Refer to para 8-11, steps 104 through 107).

CHAPTER 5

PRELIMINARY INSTRUCTIONS FOR TRANSMISSION REPAIR

5-1. Preparing for Repair

a. Get Proper Equipment.

(1) Proper equipment must be available before disassembly is started. This equipment includes a suitable hoist of at least 2-ton capacity, proper hand tools and special tools, improvised tools, receptacles for small parts, work table, wood blocks, oil-soluble grease, wiping cloths, and a press.

(2) Refer to paragraphs 3-4 and 3-5 for lists of special and improvised tools and equipment.

b. What to Discard. Lockwires, lockstrips, and gaskets should be discarded at transmission disassembly. New parts should always be supplied in such cases.

c. Penalty for Careless Handling. Care must be used to avoid damage to transmission components during disassembly, cleaning, inspection, repair, and reassembly. Nicks, scratches, and dents caused by careless handling may cause oil leakage or improper functioning and could result in transmission failure. All defective parts must be replaced.

5-2. Cleaning Recommendations

a. Importance of Cleanliness. Cleanliness is of utmost importance in servicing the power train. All components must be thoroughly cleaned and kept clean throughout the repair process. The presence of foreign matter can cause malfunction, and possible failure, of the power train.

WARNING

Forewarn personnel in the immediate area when using compressed air for cleaning. Compressed air, coming into contact with the human skin, or causing flying metal chips, can cause serious injury.

b. Clean Every Component. Every component should be thoroughly cleaned after the transmission is disassembled. Cleaning is necessary to insure effective inspection for wear, damage and serviceability of components. Oil lines and the oil cooler must be thoroughly flushed to remove sludge, or debris resulting from mechanical failure.

c. Handle With Care. The utmost care should be used in handling of parts during cleaning and overhaul operation. Nicks, scratches, dents, or burs can prevent proper assembly or cause malfunction after assembly. This is especially true of valves and valve body parts.

d. Avoid Abrasives. Abrasives, files, scrapers, wire brushes and sharp tools should never be used on surfaces where finish is important to the operation or sealing of parts, except where specifically recommended.

e. Removal Agents. Gum or varnish may be removed by soaking in dry cleaning solvent or mineral spirits paint thinner and by use of a soft bristle brush. Crocus cloth may be used to remove minor surface irregularities. Lapping compound may be used, if required, in valve body bores to prevent valves from sticking. Clean thoroughly to remove compound after use.

f. Cleaning Oil Passages. A soft wire (brass or copper) may be used to clean oil passages. Always flush such passages thoroughly after cleaning.

g. Steam Cleaning. If steam cleaning is used, dry the cleaned parts immediately with compressed air and apply a film of clean oil to prevent rusting. Cover or wrap parts to protect them from dust of dirt after cleaning. Never use lye or caustics which will corrode or etch metal surfaces.

h. Lubricant in New Bearings.

(1) Do not clean the lubricant from new bearings. Keep new bearings wrapped until they are to be installed. Soak bearings, which have been in service, in dry-cleaning colvent or mineral spirits paint thinner to loosen deposit of dirt. Do not spin the bearings during cleaning or drying.

(2) After cleaning, turn the bearings by hand and note any evidence of grit. Reclean them if grit is present. Refer to TM 9-214 for further information on cleaning bearings.

5-3. Inspection and Repair Recommendations

a. Castings, Forgings, Machined Surfaces.

(1) Inspect all castings and forgings for breaks, cracks, and wear or scoring that would impair serviceability. Remove nicks and small surface irregularities with crocus cloth or a soft stone.

(2) Inspect all oil passages for obstructions and dirt. Reclean the passage if necessary.

(3) Inspect mounting faces for nicks, scratches and scores. Remove minor defects with crocus cloth or a soft honing stone. Replace any parts in which defects which cannot be corrected will impair the operation of the transmission.

(4) Inspect threaded openings for damaged threads. Chase damaged threads with the correct size tap.

NOTE

If threads are stripped, discard the part unless it can be satisfactorily repaired by installing an insert.

(5) Replace housings or other cast parts that are cracked or broken.

b. Roller or Ball Bearings. Refer to TM 9-214 for proper cleaning and inspection procedures.

c. Needle-type Roller Bearings. Inspect the bearings for free and smooth rotation, broken or missing rollers, and tightness of fit in the bore. If defects are found, replace the bearing.

d. Bushings, Bushing-type Bearings, and Thrust Washers.

(1) Inspect bushings and bushing-type bearings for size, scoring and out-of-roundness, burs, sharp edges and evidence of seizing. Minor scores, sharp edges and scratches may be removed with crocus cloth. Out-of-round, deeply scored or worn parts should be discarded.

(2) Do not remove bushings and bushing-type bearings unless replacement is necessary. Removal usually damages these parts.

(3) Remove bushings and bushing-type bearings by using a puller or press when possible. Bushings in blind holes may require removal by sawing or the use of a narrow cape chisel.

CAUTION

If necessary to cut a bushing, do not damage the bore into which it fits.

(4) Inspect thrust washers for wear, distortion, scores and burs. Correct minor defects but replace parts that are worn, scored or deformed.

e. Oil Seals, Preformed Packings and Gaskets.

(1) Inspect hook-type searings for wear, distortion and broken hooks. Replace defective sealrings.

(2) Inspect composition-type sealrings or packing for wear, brittleness, cracks, cuts, deformation, and deterioration. Replace defective seals.

(3) Inspect lip-type seals for cracks, wear, cuts, and brittleness. Inspect springs and seal shells. Replace any seal found defective.

CAUTION

Removal of a seal will usually damage it. Inspect it rigidly before reusing it.

(4) Replace all flat-type gaskets.

f. Gears.

(1) Inspect gears for burs, wear, broken teeth and pitting at tooth contact areas.

(2) Remove burs, using a soft honing stone. Replace gears that are excessively worn or pitted.

g. Splined Parts.

(1) Inspect splined parts for twisted or broken splines, burs and excessive wear.

(2) Remove burs, using a soft honing stone. Replace parts which have twisted or broken splines and excessive wear.

h. Clutch Disks.

(1) Inspect nonmetallic disks for excessive wear, cracks, breaks, and deep scoring. Replace disks if such defects are found.

(2) Inspect bronze-faced steel disks for burs, imbedded metal particles, severely pitted faces, excessive wear, cracks, distortion, and damaged spline teeth. Remove burs, using a soft honing stone. Replace disks which have other defects.

(3) Inspect steel disks for burs, scoring, excessive wear, distortion, imbedded metal, galling, cracks, breaks, and damaged spline teeth. Remove burs and minor surface irregularities, using a soft honing stone. Replace disks which have other defects.

i. Threaded Parts.

(1) Inspect all threaded parts for stripped or damaged threads and burs.

(2) Replace all parts which have stripped threads or damage which cannot be repaired by chasing the threads with a tap or die of the proper size or by installing an insert.

j. Snaprings. Inspect snaprings for nicks, burs, distortion, and wear. Discard snaprings which are defective.

k. Springs. Inspect springs for wear, distortion, breaks, evidence of overheating, and loss of tension or compression. Discard defective springs. Refer to spring information in Repair standards tables in chapter 7.

l. Shafts and Spindles.

(1) Inspect shafts and spindles for excessive wear, bending, scores, cracks, burs, and obstructed oil passages.

(2) Remove burs and minor surface irregularities with crocus cloth or a soft honing stone. Remove obstructions by probing with soft wire or with compressed air. Discard parts with other defects.

m. Ball-type Valves.

(1) Inspect steel balls for rust, pitting, or grooving. Inspect nylon balls for nicks, scratches, grooving or chipping. Inspect nonmetallic balls for nicks, scratches, grooving, chipping or cracking. Discard balls which will not seat properly.

(2) Inspect ball seats for wear and pitting. Reseat by lapping with the proper size ball. On seats where a nonmetallic ball is used, a steel ball of the same size may be used for lapping. Discard parts in which the seats cannot be restored.

n. Spool-type Valves.

(1) Inspect valves for wear, burs, scoring, and evidence of sticking. Try valves in their bores. All

valves should move freely in their bores by their weight alone. Do not force valves.

(2) Inspect the edges of all valve lands. All edges should be square and sharp. Do not destroy these sharp edges in cleaning or repair operations. These sharp edges help prevent the accumulation of substances which might cause the valve to stick in its bore.

(3) Remove burs with a soft honing stone. If necessary, reclean valves to remove gum and dirt. Discard all valves which have other defects.

o. Sheet Metal Parts.

(1) Inspect sheet metal parts for bends, cracks, distortion, interference with adjacent parts, and loose-welded joints.

(2) Straighten bent parts. Weld cracks or loose welds.

(3) Discard governor oil collector rings if any damage is evident.

p. Installation of Teflon Seals and Expanders.

(1) Install the expander into the sealring groove so that its ends bend toward the bottom of the grooves.

NOTE

Some expanders may require additional bending to cause them to point toward the bottom of the groove.

(2) While holding the expander in the groove, start the seal into the groove at a point diametrically opposite the expander ends. No lubrication is necessary for installation.

(3) Install the seal by hand. Tools or instruments might damage the seal. Do not stretch the seal any more than is necessary for installation.

(4) Center the piston in the piston bore when installing it, to prevent seal damage. Be extremely careful to avoid scratching, nicking, or distorting a Teflon seal. Refer to chapter 7, section IX.

WARNING

Do not dispose of Teflon seal rings by burning. Toxic gases are produced when Teflon is burned.

5-4. Repair Standards

a. Clearance and Wear Limits. Data covering the size and fits of new parts and wear limit information are given in the repair standards tables in Chapter 7.

b. Torque Specifications. Special torque specifications are given in the text where applicable.

c. Spring Specifications. Refer to repair standards tables in chapter 7, for spring specifications.

CHAPTER 6

DISASSEMBLY OF TRANSMISSION INTO SUBASSEMBLIES

6-1. Arrangement of Chapter 6

a. Pictorial Steps. This chapter is arranged in consecutive pictorial steps (1 through 97), completely illustrating the disassembly of the transmission. Directly beneath each picture are simple disassembly instructions, keyed to pictures by numerical callouts.

b. Foldout Views. Refer to the transmission cross section (FO-1, back of book) and to component group exploded views (FO-3 through FO-13) for assembly sequences and parts identification. Special tools and equipment are shown on foldout 14.

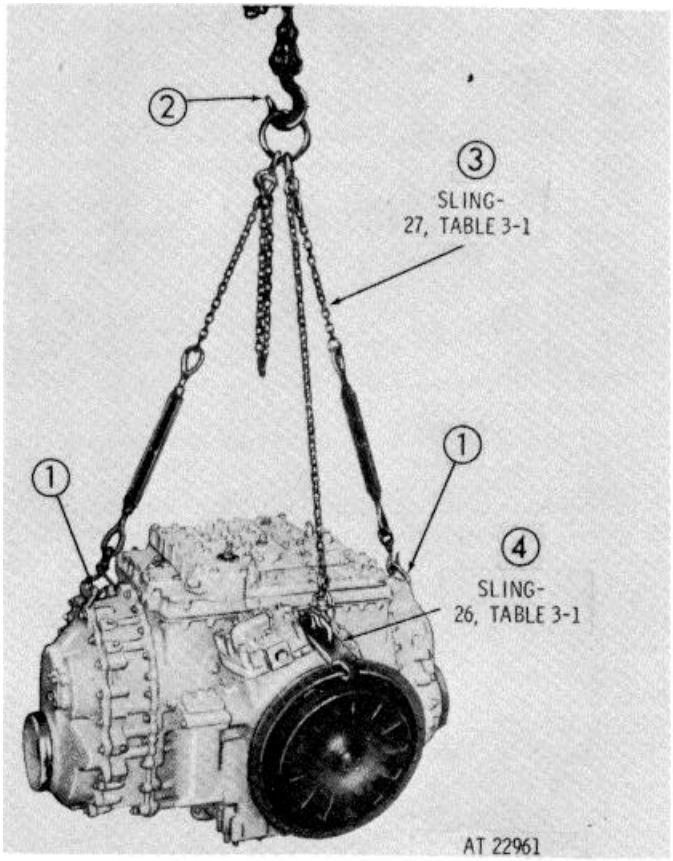
6-2. Preliminary Disassembly

a. Drain Oil. Drain the oil from the transmission, if it was not drained before the transmission was removed from the vehicle. (Refer to LO 9-2350-230-12 for draining procedures.) Remove the oil filler tube assembly from the transmission, if it was not removed before the transmission was removed from the vehicle. (Refer to FO-10, items 62 through 72.)

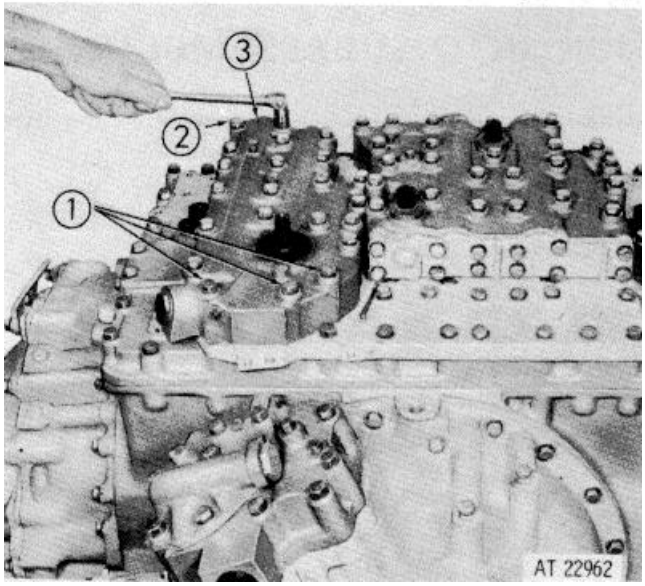
b. Removing from Vehicle. Refer to TM 9-2350-230-20-1 for instructions on removing the transmission from the vehicle.

6-3. Disassembly Pictorial Steps

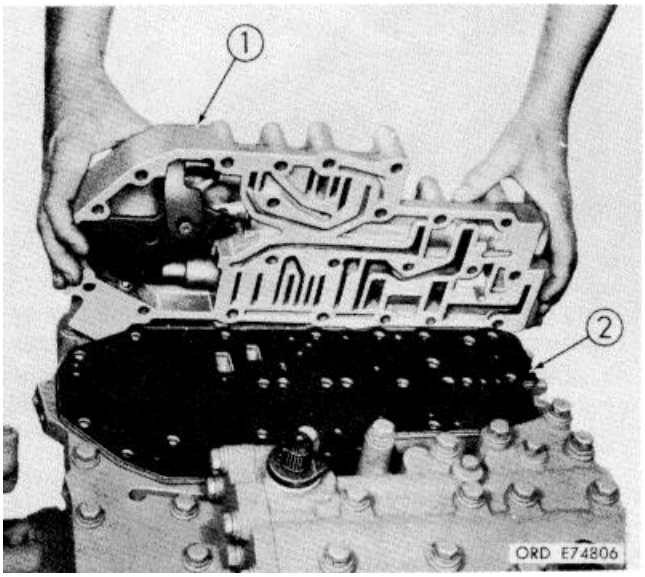
The disassembly of the transmission into subassemblies is outlined in the following steps.



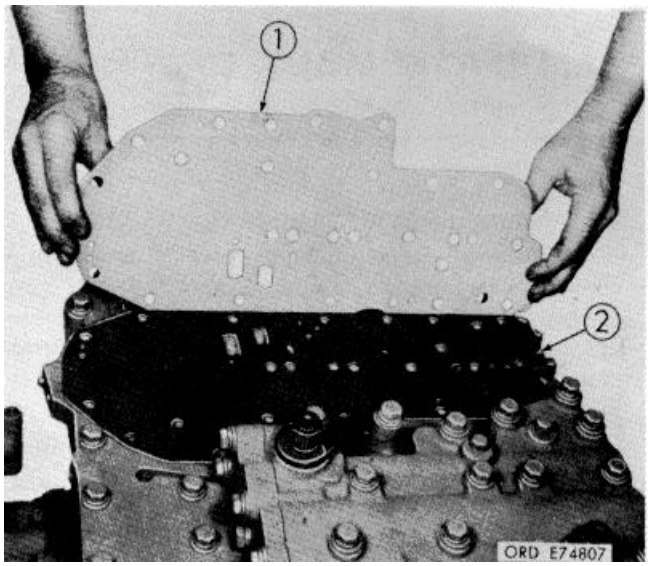
1 Using lifting slings (3) and (4), install the two adjustable leg hooks into end brackets (1) and a chain leg into sling (4). Attach hoist (2) to sling (3) and position the power train on a disassembly table. Remove slings and (4)



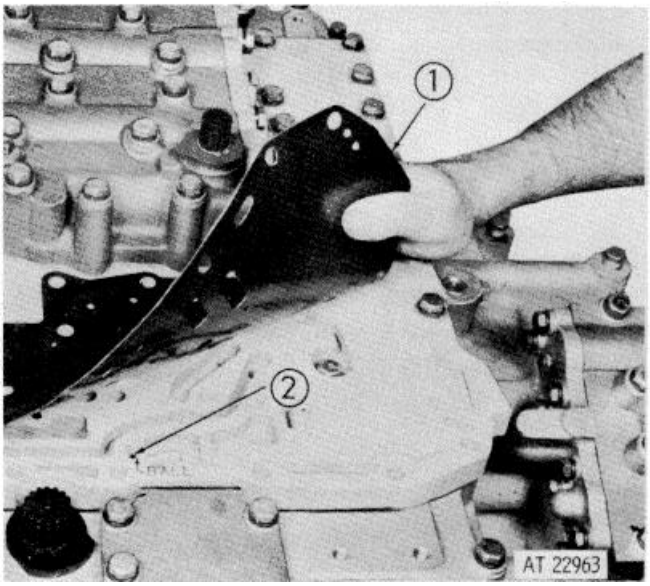
2 Using a 9/16-inch socket wrench, remove 19 short bolts (2). three long bolts (1), 22 lockwashers and 22 flat washers which retain control valve body assembly (3).



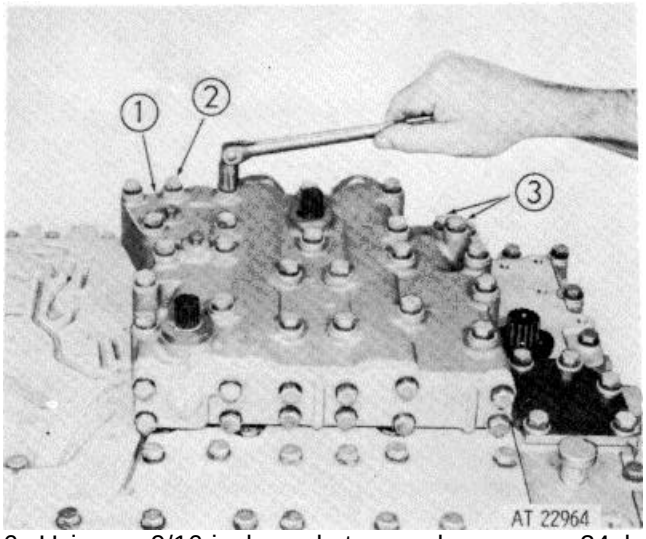
3 Remove control valve body assembly (1) and gasket (2).



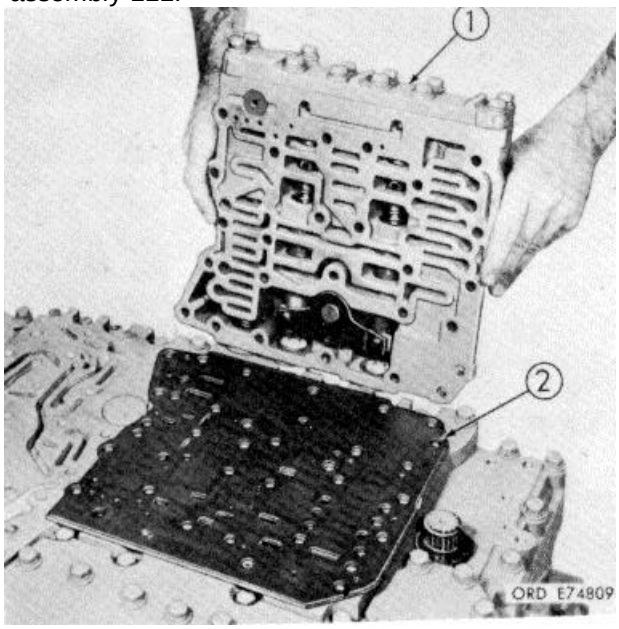
4. Remove control valve body assembly separator plate (1).



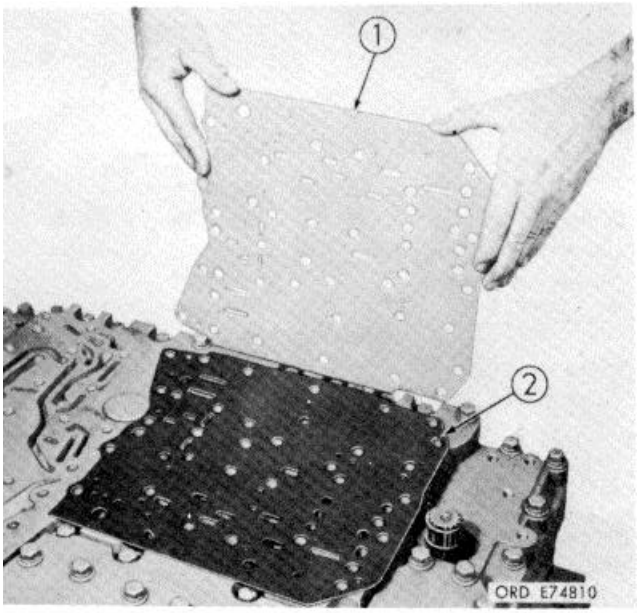
5 Remove separator plate gasket (1) and ball (2)



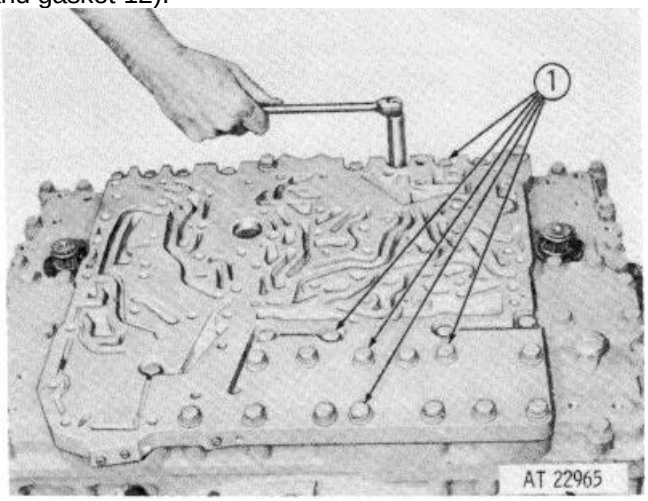
6 Using a 9/16-inch socket wrench, remove 24 long bolts 121, two short bolts (31, 26 lockwashers and 26 plain washers which retain steer valve body assembly 111.



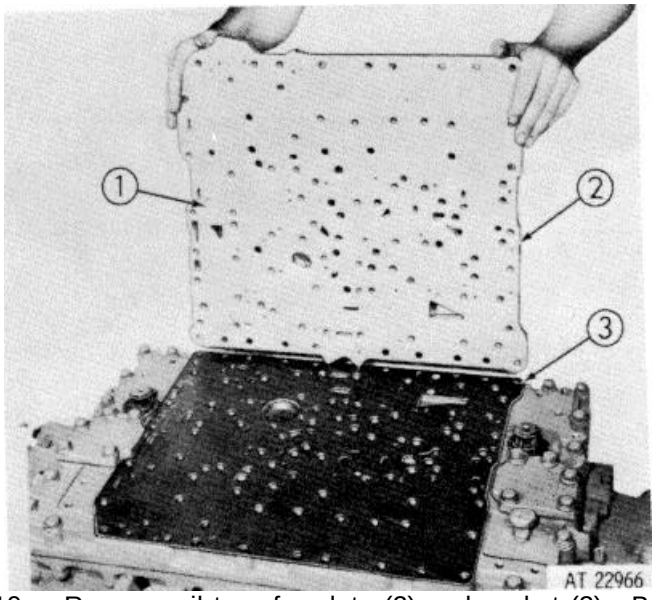
7 Remove steer valve body assembly (11 and gasket 12)1.



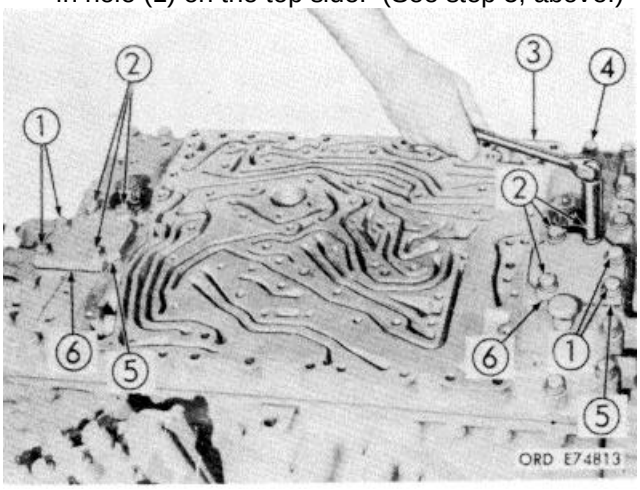
8 Remove steer valve body assembly separator plate (1
and gasket 12).



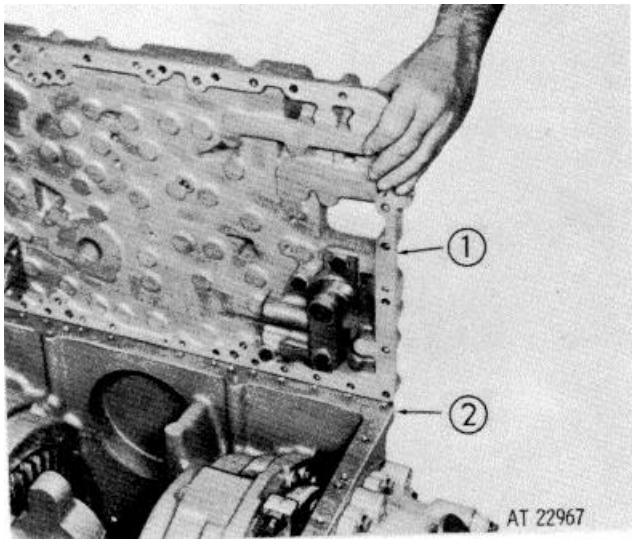
9 Using a 9/I6-inch socket wrench remove 28 bolts (lengths indicated) by 1), 28 lockwvashers and 28 plain washers.



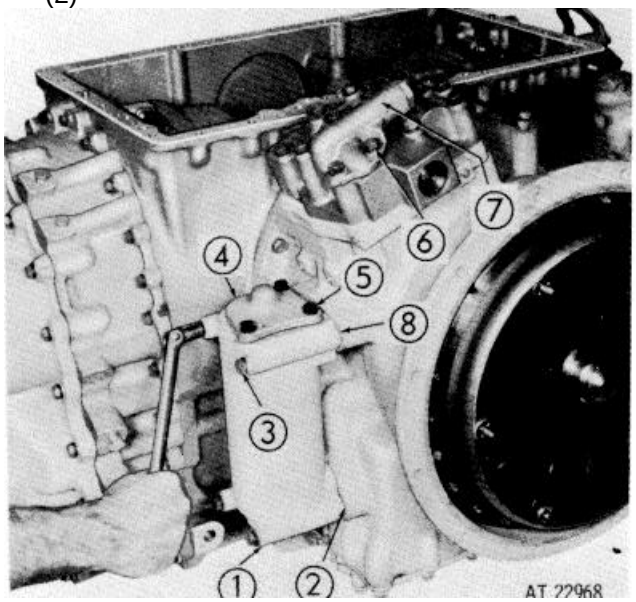
10. Remove oil transfer plate (2) and gasket (3). Be careful not to lose white nylon ball that may still be in hole (1) on the top side. (See step 5, above.)



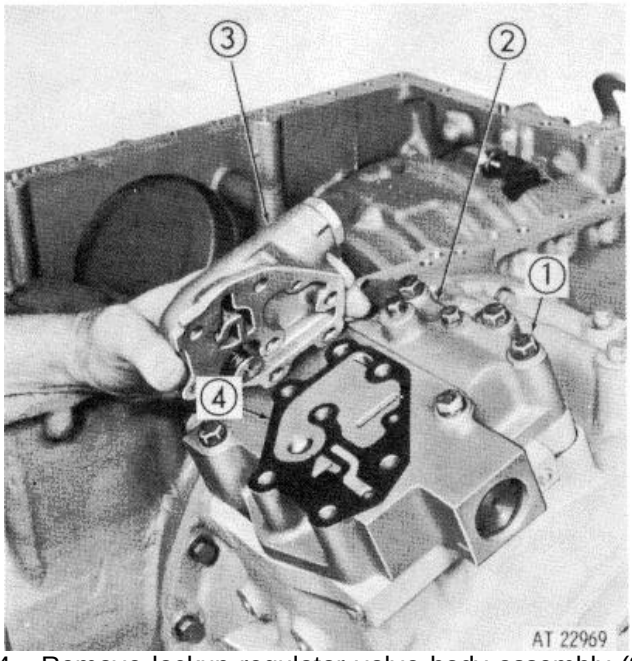
11 Using a 9/16-inch socket wrench, remove six short bolts (2), four long bolts (1), two brake adjustment covers (5) and two gaskets (6). Remove the remaining 14 bolts (4), lockwashers and plain washers that retain bevel gear housing cover (3).



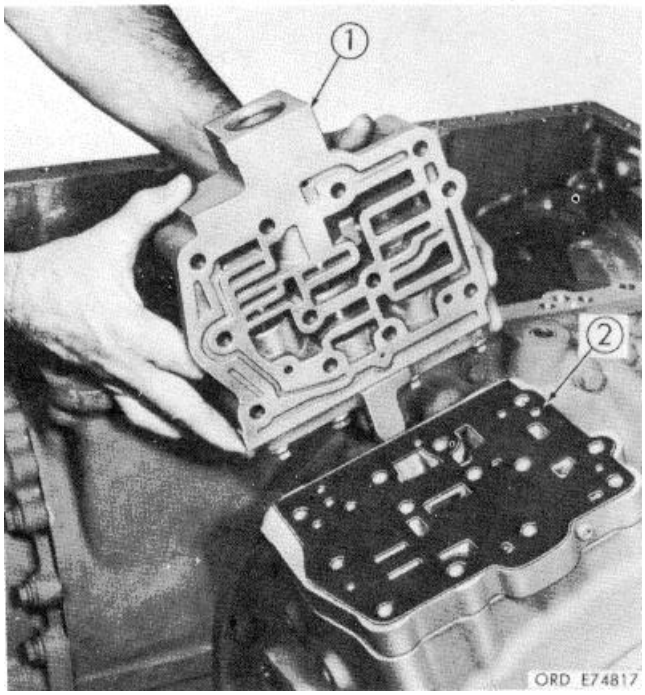
12 Remove bevel gear housing cover (1)and gasket (2)



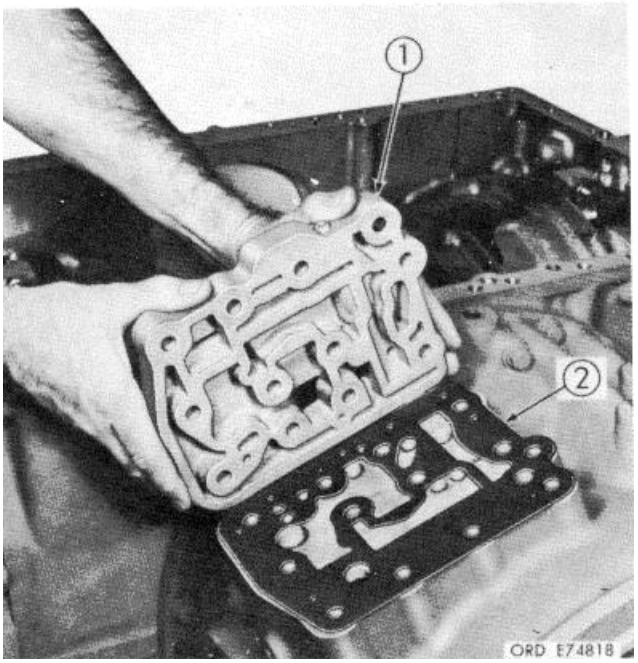
13 Using a 9 / 16-inch wrench, remove three bolts (5) and lockwashers. Remove oil filter screen element (4). Remove four bolts 13), lockwashers and plain washers. Remove oil filter screen housing (1) and two gaskets (2 and 8). Support the housing while removing the last two bolts. Remove several bolts (6), lockwashers and plain washers from lockup regulator valve body assembly (7).



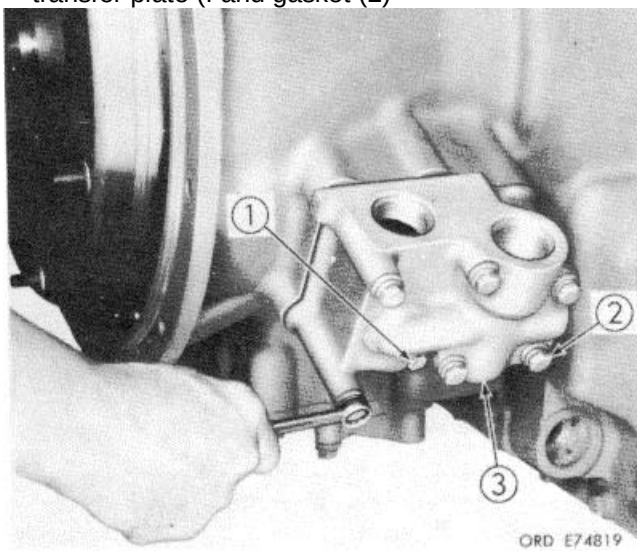
14 Remove lockup regulator valve body assembly (3) and gasket 141. Using a 9/ 16-inch wrench, remove the remaining five bolts (1), lockwashers and plain washers which retain main pressure regulator valve body assembly (2).



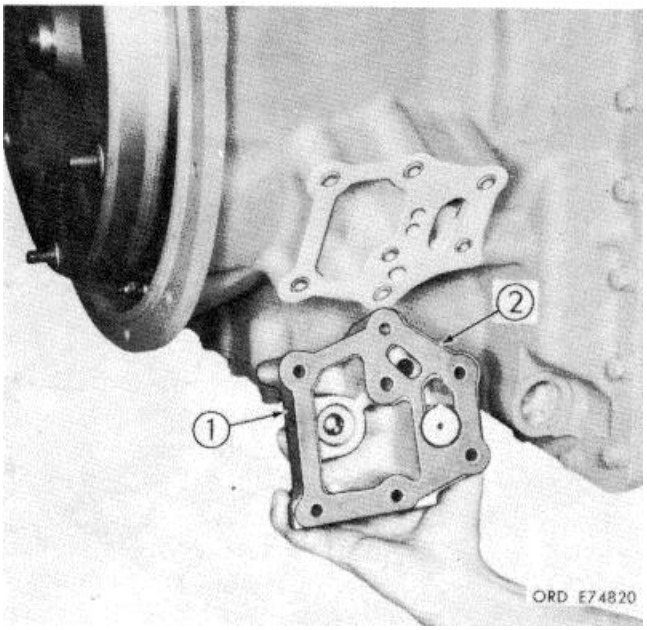
15 Remove main-pressure regulator valve body assembly (1) and gasket (2).



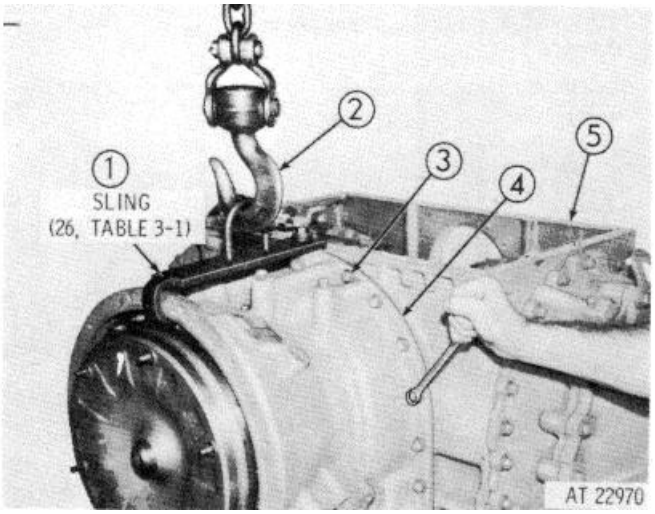
16 Remove main-pressure regulator valve body oil transfer plate (I and gasket (2)



17 Using a 1/2-inch wrench. remove one short bolt (1), six long bolts (1). lockwashers and plain washers which retain lubrication regulator valve body assembly (3). Support the valve body assembly while removing the last two bolts.



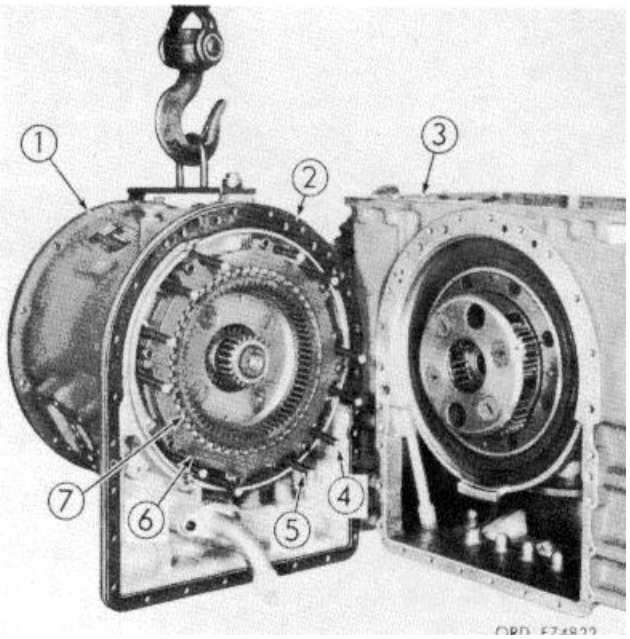
18. Remove lubrication regulator valve body assembly (1) and gasket (2).



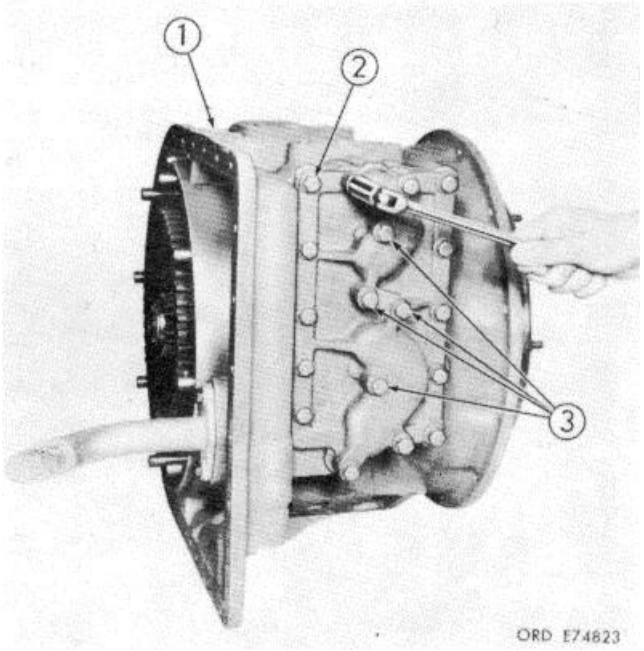
19. Attach sling (1) to converter housing (4) as shown. Position hoist hook (2) in sling and take up slack in hoist. Using a 9/16-inch wrench,, remove 25 bolts (3), lockwashers and plain washers which attach converter housing (4) to bevel gear housing (5).

NOTE

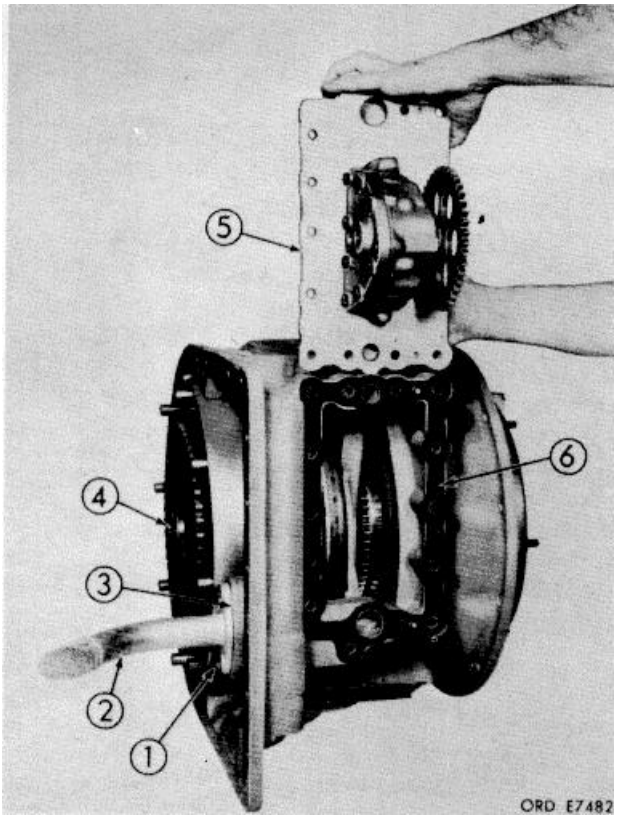
The converter housing is under spring pressure and will separate approximately 2 inches from bevel gear housing.



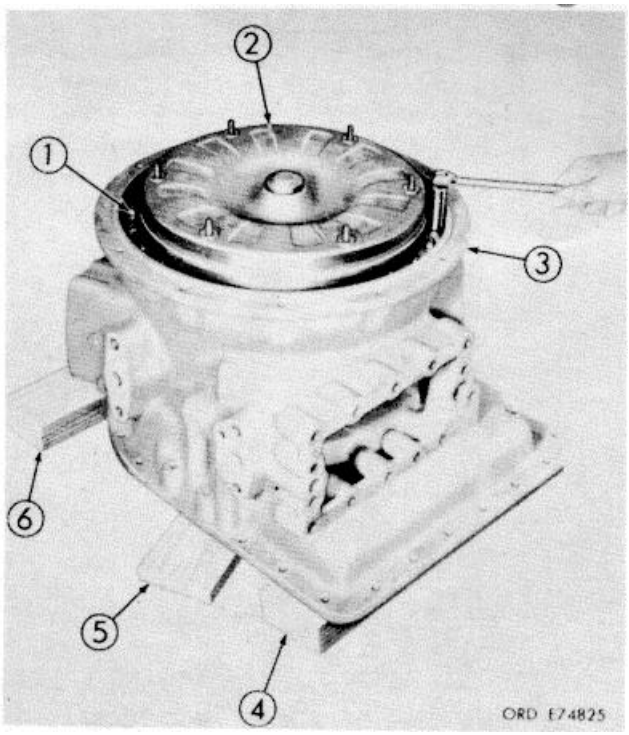
20. Remove torque converter housing assembly (1) and gasket (2) from bevel gear housing (3). Remove 12 spring pins (4) and 12 springs (5). Remove five steel low range clutch disks (6) and four bronze-faced disks (7).



21. Position torque converter housing assembly (1). as shown. Remove the sling. Using a 9/16-inch socket wrench, remove 14 bolts (2), lockwashers and plain washers which retain the input oil pump assembly. Do not remove four bolts (3).



22. Remove input oil pump assembly (5) and gasket (6). Using a 9/16-inch wrench, remove two self-locking bolts (1) and plain washers that retain screen assembly (2). Remove screen assembly (2) and gasket (3).

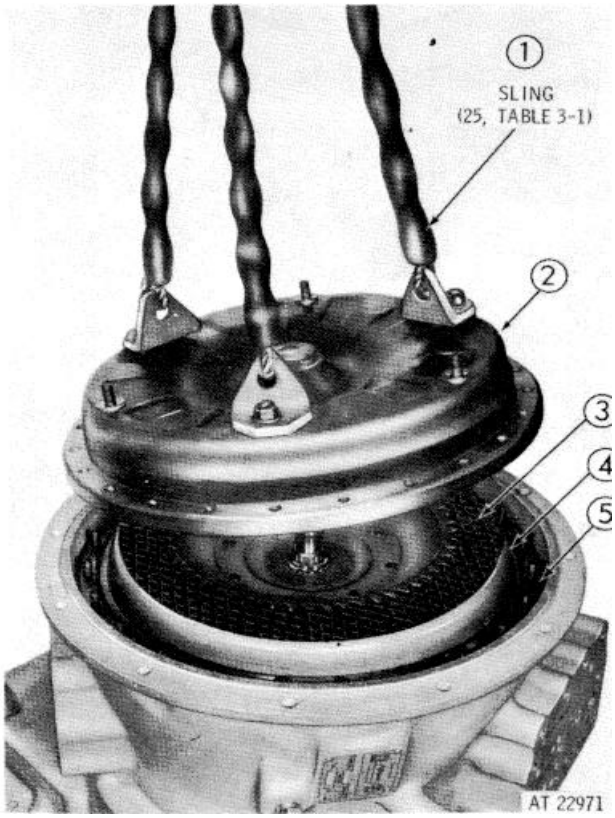


23. Position torque converter housing assembly (3) on wood blocks (4 and 6), on the rear mounting face. Support the turbine shaft on wood block (5) so that the turbine shaft is prevented from moving axially (rearward) in the housing. (Refer to step 22, turbine shaft (4), above).

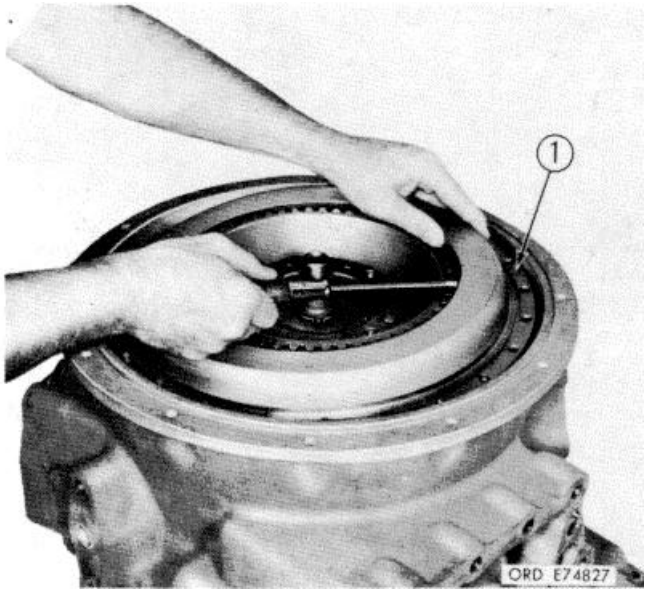
CAUTION

Turbine shaft movement will damage the pilot tube and. Or the vanes in the pitot oil collector.

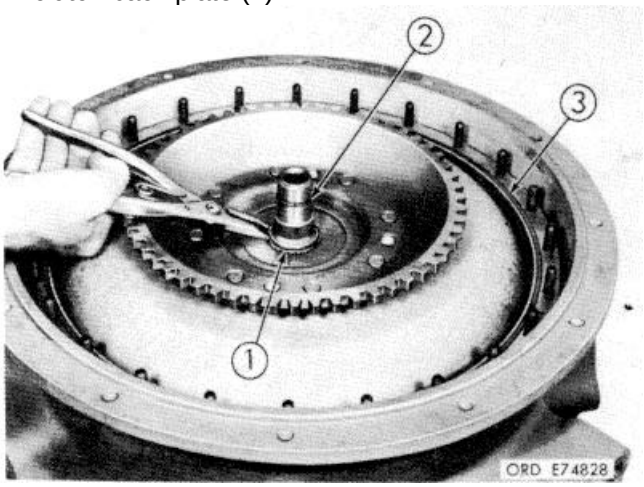
Using a 1/2-inch socket wrench, remove 24 self-locking nuts (1) which retain converter pump cover assembly (2).



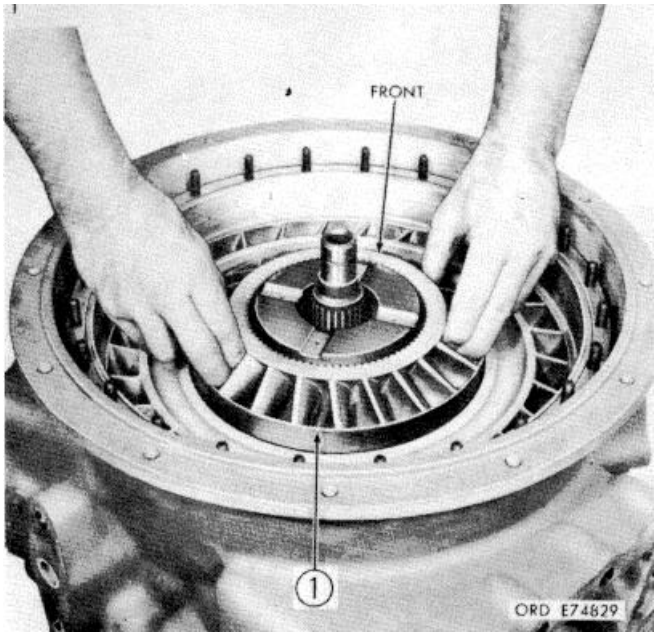
24. Attach lifting sling (1) to converter pump cover assembly (2) and remove the cover assembly. Remove the sling from the cover. Remove the sling from the cover. Remove lockup clutch disk (3) and seal ring (4) from lockup clutch back plate (5).



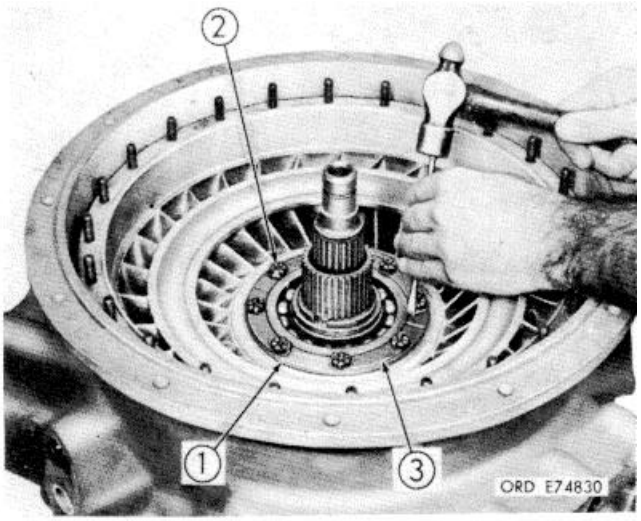
25. Using a screwdriver as shown, remove lock-up clutch back plate (1).



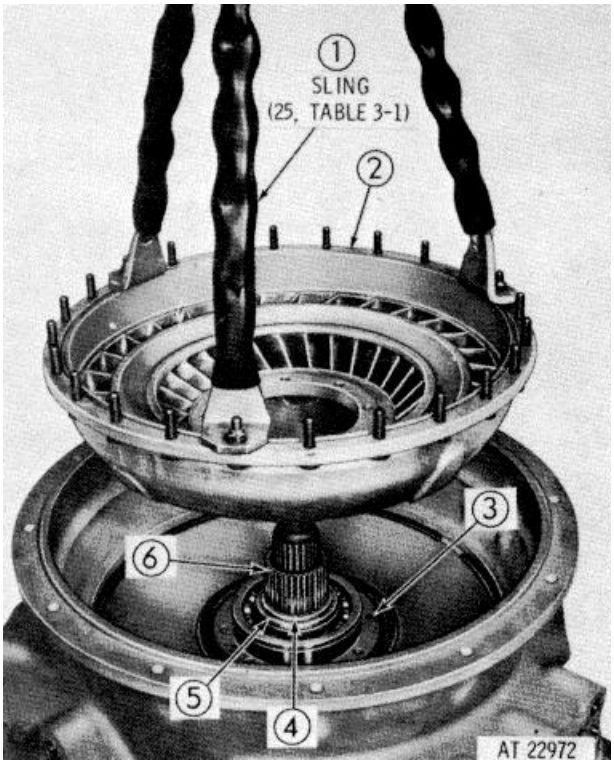
26. Remove snapring (1). Remove hook-type seal ring (2) from the turbine shaft. Remove seal ring (3) from the turbine shaft. Remove seal ring (3) from the converter pump.



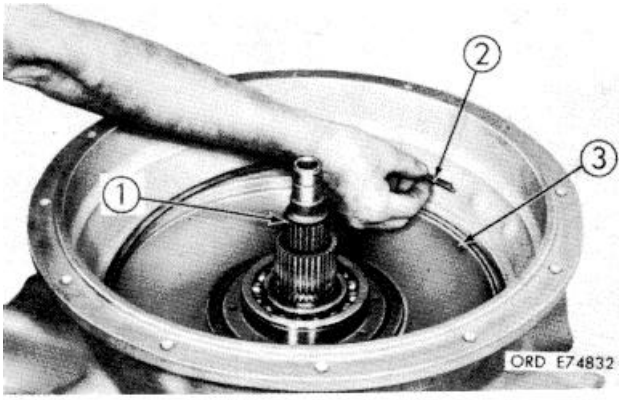
27. Apply pressure to stator assembly (1) in a counterclockwise direction to lock the stator to the freewheel roller race. Remove the stator assembly carefully and lay it, front downward, on a table to prevent the race, rollers and springs from falling out.



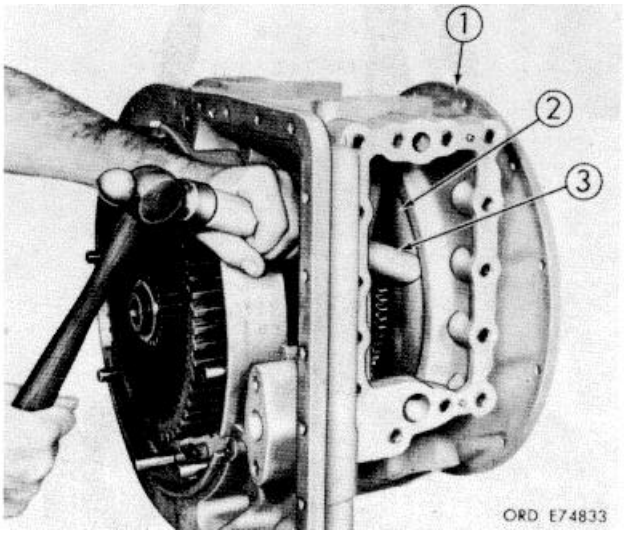
28. Flatten the corners of four lock strips 131 which retain converter pump bolts (21. Remove eight self-locking bolts and four lock strips. Remove two bearing retainers (1).



29. Attach lifting sling (1) to converter pump (2) and remove the converter pump and gasket (3). Remove the sling from the pump. Remove snapring (41 and splined spacer (5) from ground sleeve (6).



30. Remove large snapring (2) that retains diaphragm (3) in the housing.



31. Position torque converter housing (1) on its side as shown.

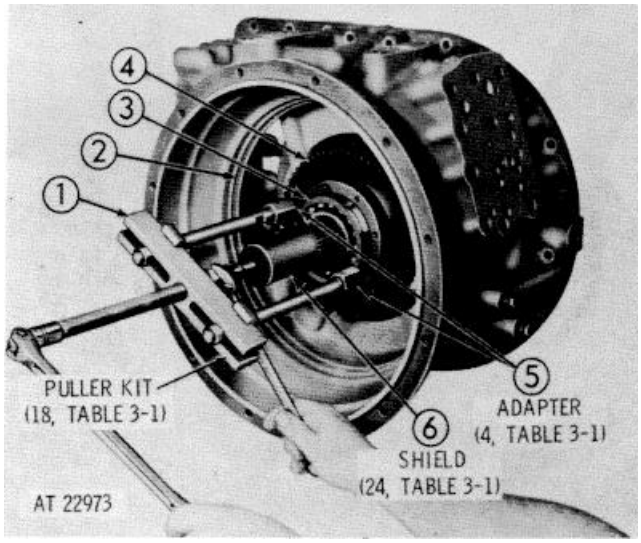
CAUTION

Before moving housing, grasp the turbine shaft refer to step 30, callout (1) above) to prevent an downward movement housing. An downward movement might damage the pitot and / or vanes in the pitot oil collector.

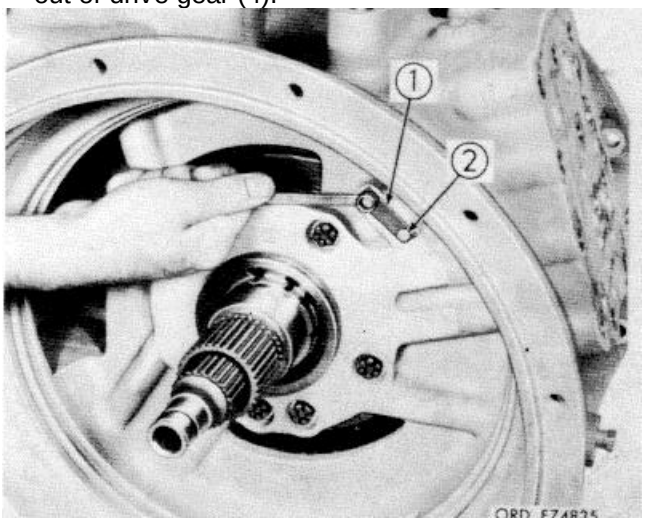
Remove diaphragm (2) by inserting driver (3) through the rear of the housing. Tap the driver sharply with a hammer to unseat the diaphragm.

NOTE

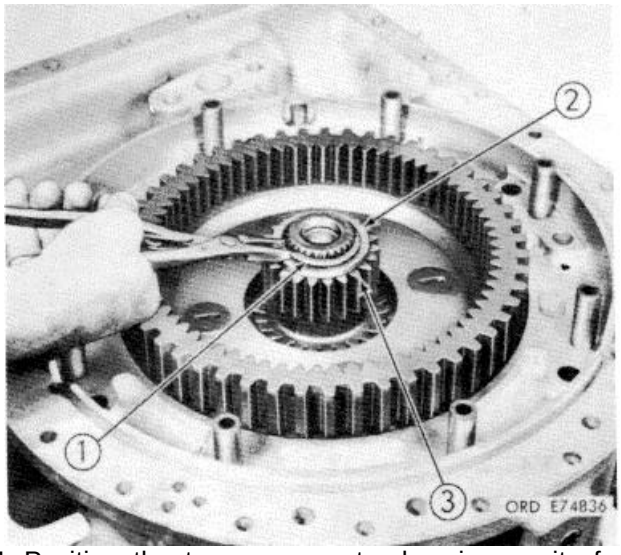
Do not remove the diaphragm center oil seal unless replacement is necessary.



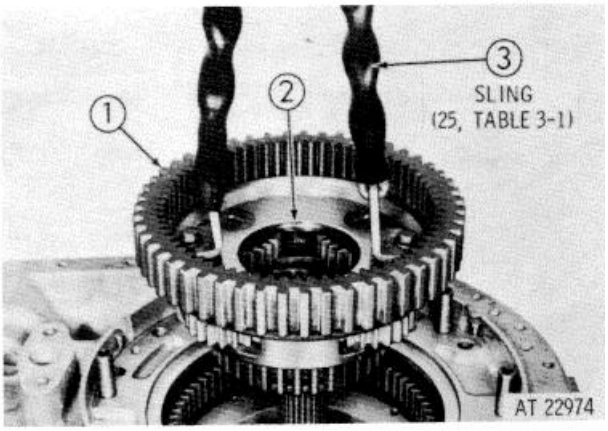
32. Using puller kit (1) shield (6), and adapters (5). remove pump drive gear (4) and bearing (3). Remove diaphragm seal ring (2). Tap bearing (3) out of drive gear (4).



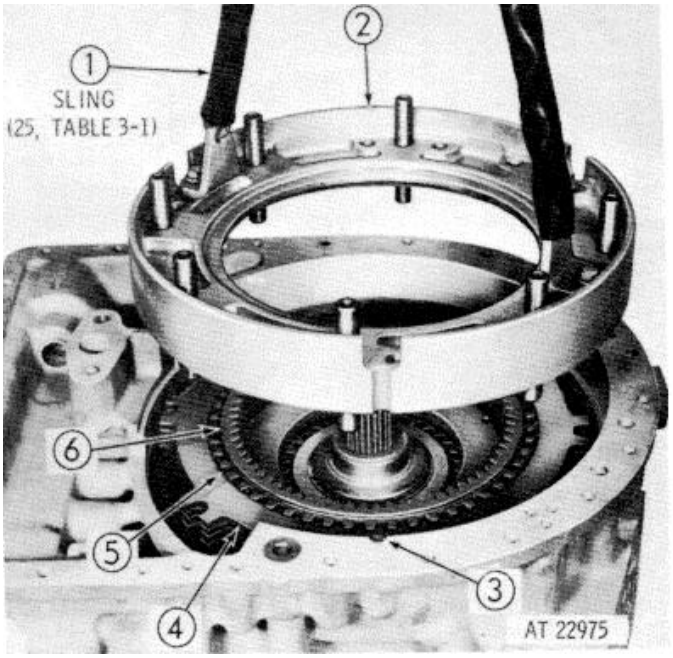
33. Flatten corners of lockstrip (1). Using a 5 / 16 inch wrench, remove two bolts 121 from the pitot tube. The pitot tube will fall free within the collector ring. Remove the lockstrip



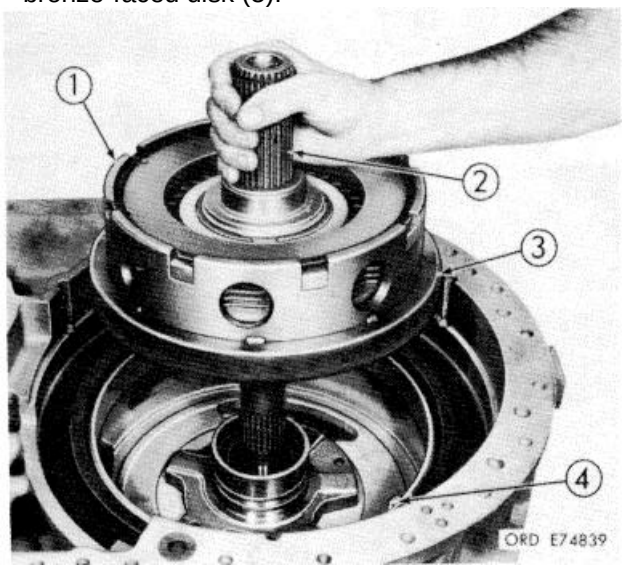
34. Position the torque converter housing on its front face as shown. Remove snapring (1) and bronze thrust washer (2). Remove low intermediate sun gear (3).



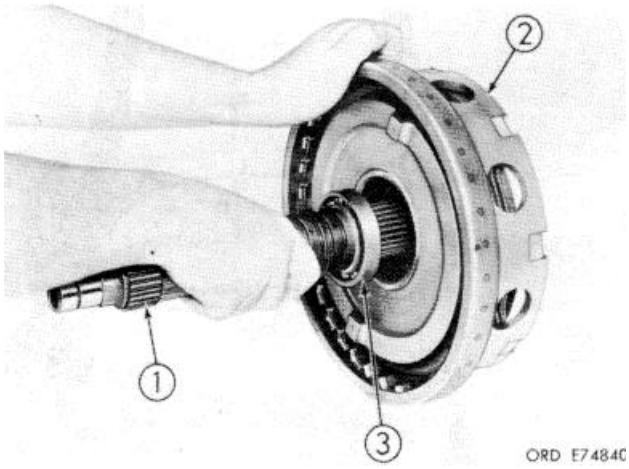
35. Using two 3/ 8-16 bolts, attach two legs of sling (3) to intermediate-range planetary carrier (2). Remove planetary carrier (2) and low-range ring gear (1) as an assembly, Remove the sling.



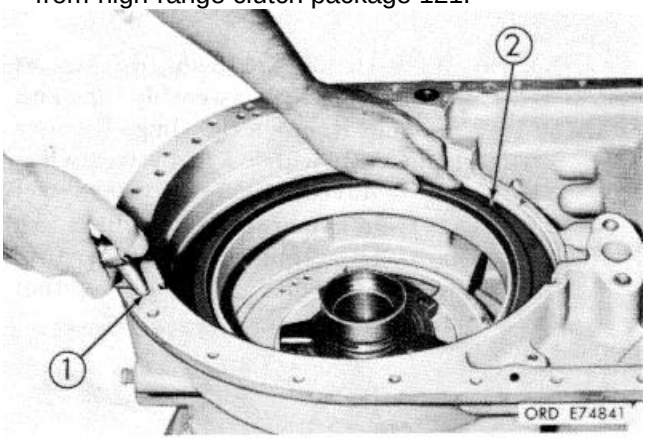
36. Using two 3/ 8-16 bolts, attach two legs of sling (1) to clutch spacer assembly (2) and carefully remove it. Remove the sling. Remove three dowel pins (3), which will be free ,when spacer (2) is removed. Remove three steel clutch disks (4) and two bronze-faced disks (5). Remove intermediate ring gear (61. Remove another steel clutch disk (4) and another bronze-faced disk (5).



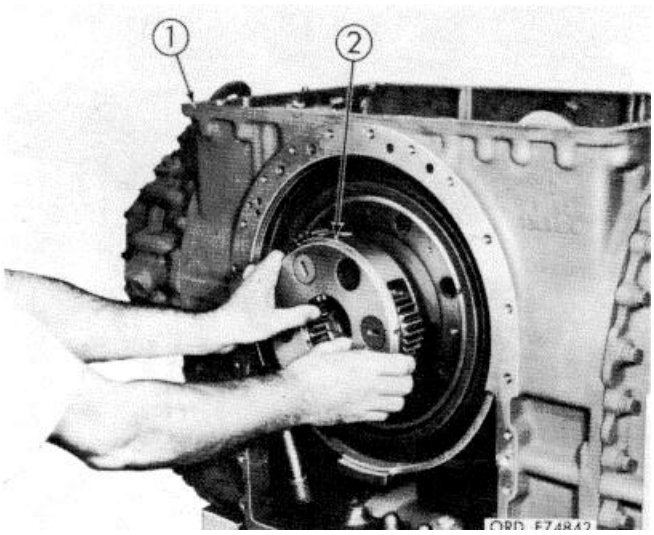
37. Remove high-range clutch package (1) and turbine output shaft (2) as a unit. The pitot tube may or may not remain in pitot collector (3) or could be any place in the housing. Remove pitot tube (4).



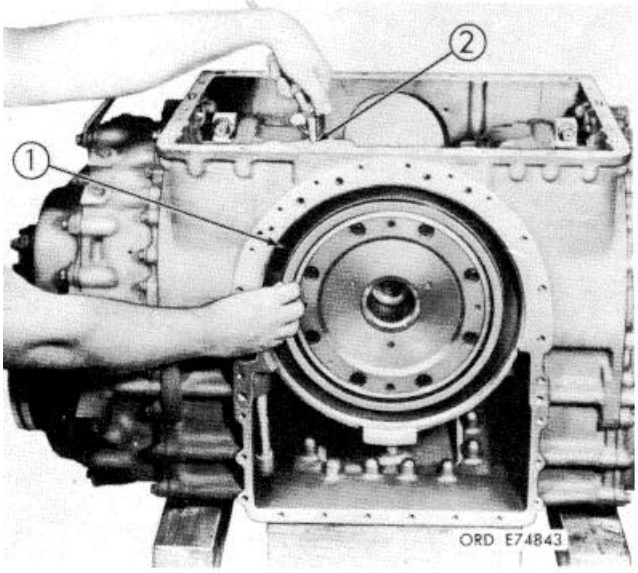
38. Remove turbine output shaft 1I and bearing 131 from high-range clutch package 121.



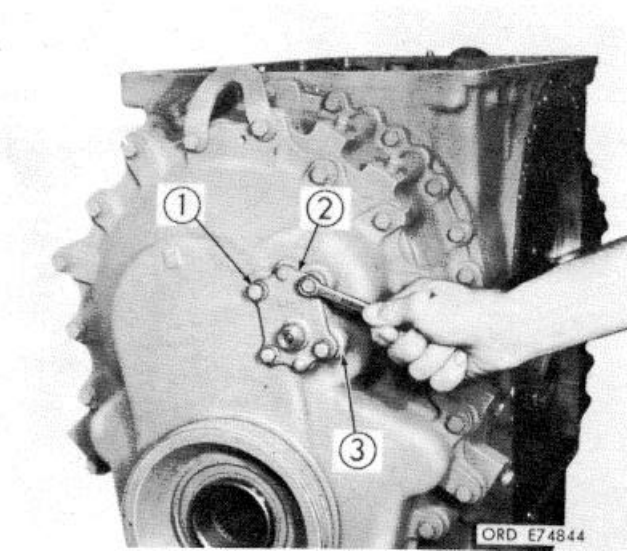
39. Remove inter mediate-range clutch piston (2). using air pressure directed through clutch apply passage (1).



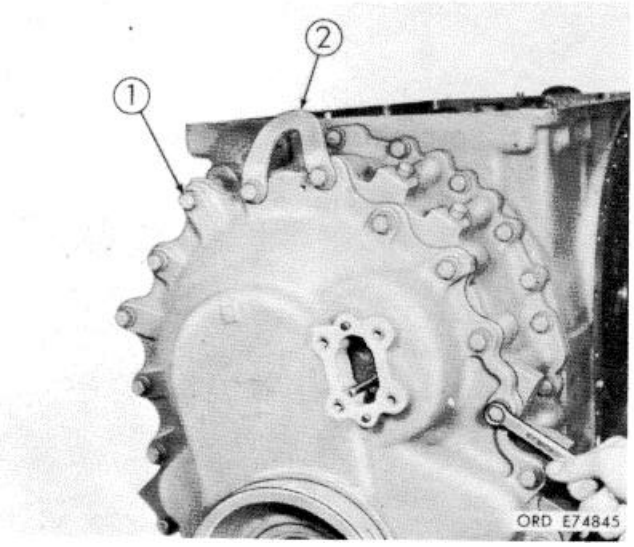
40. Position bevel gear housing and output components (1) on wood blocks on a table as shown. Remove low-range planetary carrier assembly (2)



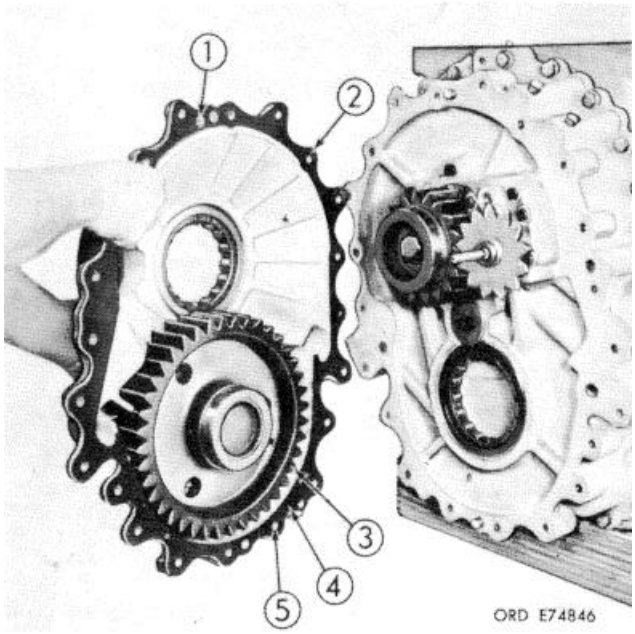
41. Remove low-range clutch piston (1), using air pressure directed through clutch apply passage (2).



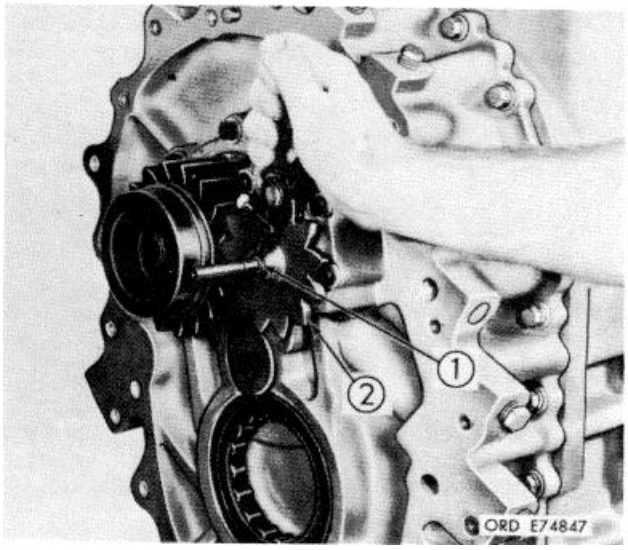
42 Working on the right side of the bevel gear housing, use a l/2-inch wrench and remove four bolts (I) lockwashers and plain washers. Remove speedometer drive cover assembly (21 and gasket (3).



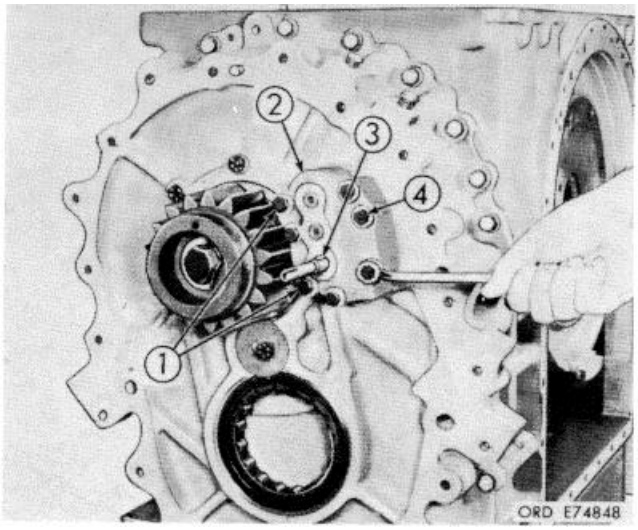
43 Using a 9/16-inch wrench, remove 21 bolts (1) two at bottom on inside of flange), lockwashers and plain washers. Remove lifting bracket (2).



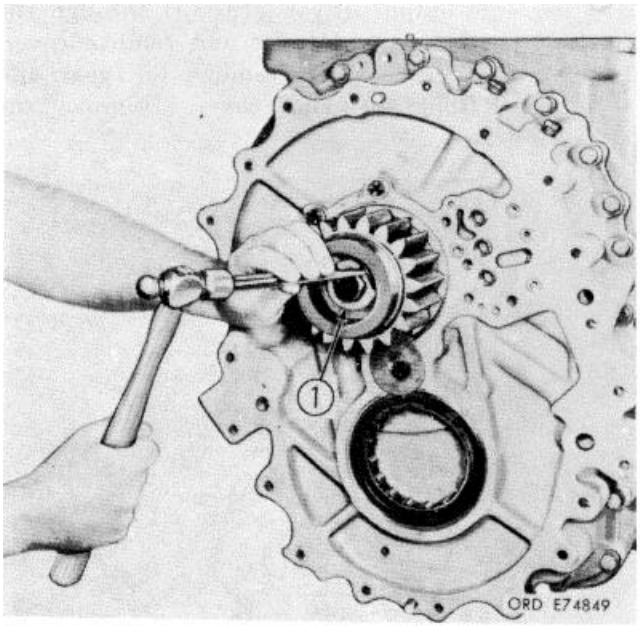
44 Using two of the bolts removed as jackscrews at locations (1 and 5), loosen end cover (2). Hold the output driven gear 13) through the opening in the end cover and remove cover, gear and gasket (4). Remove the gear and gasket from the end cover. Remove the jackscrews.



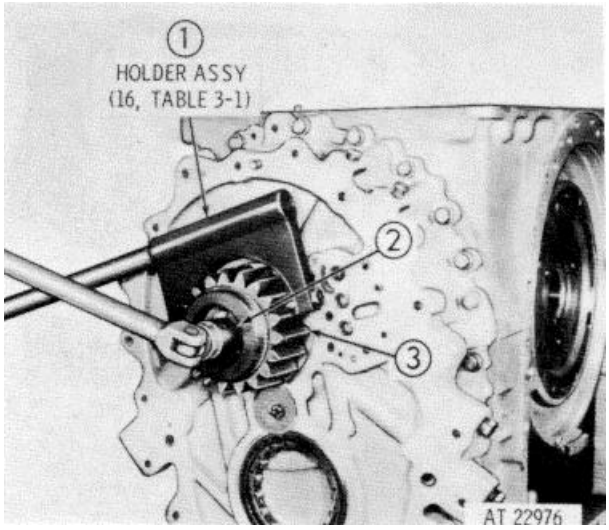
45 Remove snapring (1) from output oil pump drive gear (2). Remove the drive gear.



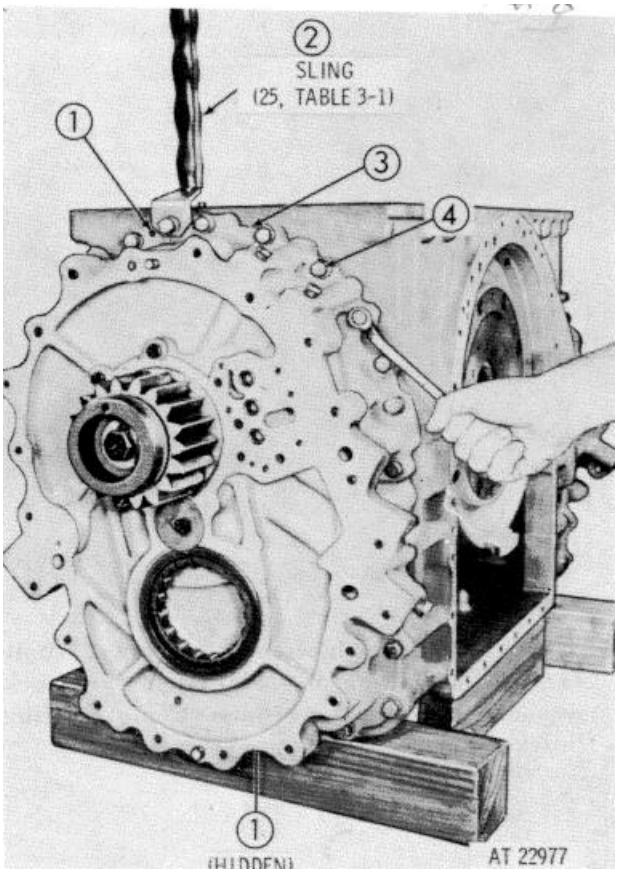
46 Remove pump gear key (3). Using a 1/2-inch wrench, remove five bolts (4) and washers. Using a 9/16-inch wrench, remove two bolts (1) and washers. Remove pump assembly (2).



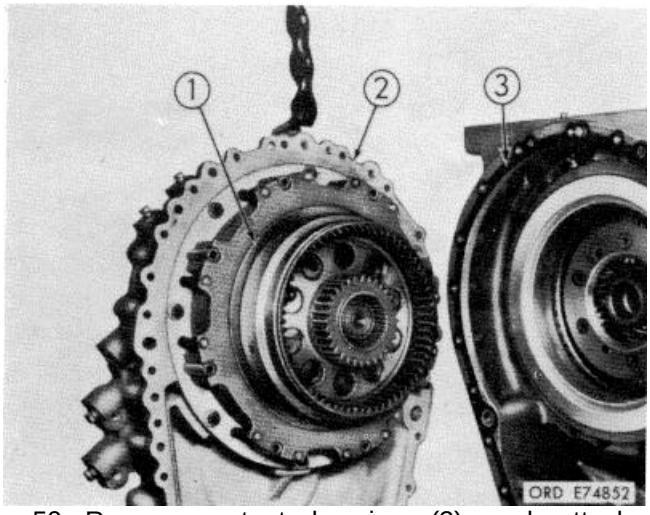
47 Using a chisel, flatten the tab on lockwasher (1).



48 Using holder assembly (1), loosen, but do not remove, bolt (2) that retains output drive gear (3). Use a 1 1/8-inch socket wrench on bolt.



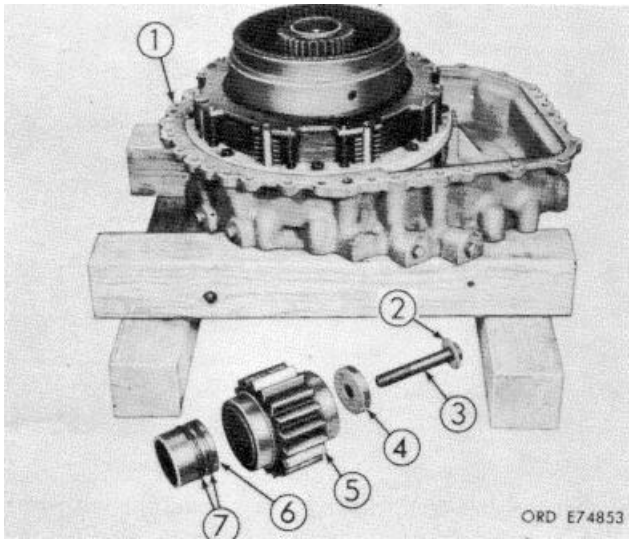
49 Attach one leg of sling (1) to output housing (3). Using a 9/16-inch wrench, remove 24 bolts (4), lockwashers and plain washers. Using two of the bolts removed as jackscrews in holes (1), loosen the output housing at the splitline.



50 Remove output housing (2) and attached components. Remove gasket (3). Remove oil baffle plate (1).

NOTE

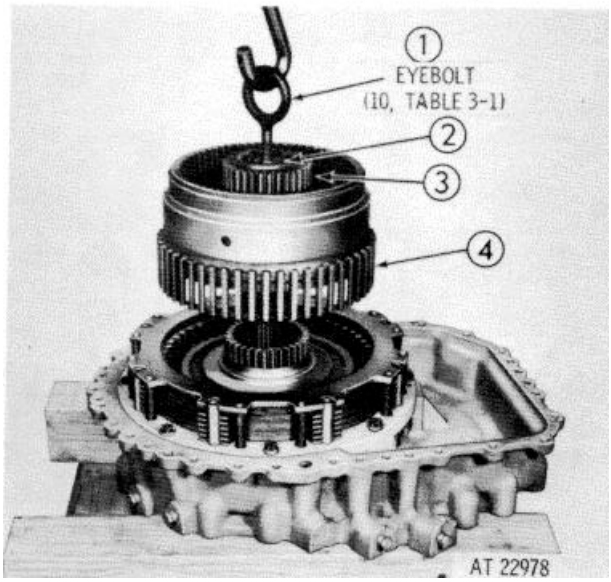
The oil baffle plate may remain in the brake apply cam ring or on the brake hub).



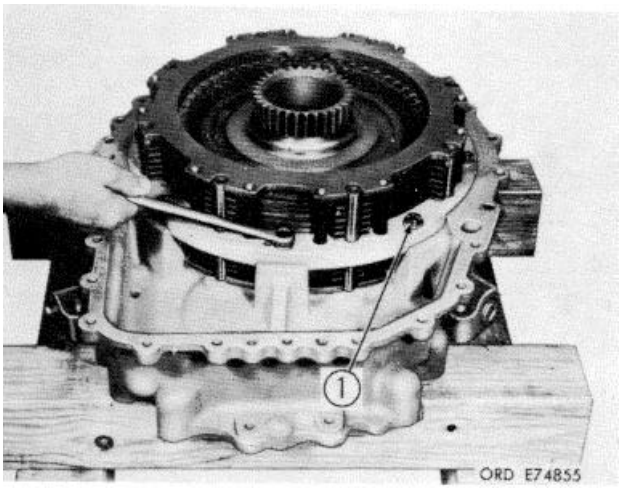
51 Position output housing assembly (1) on wood blocks. Remove the sling and jackscrews. Working beneath the assembly, remove bolt (3), washer (2), lock plate (4), output drive gear (5) and splined spacer assembly (6). Remove two sealrings (7) from spacer (6).

NOTE

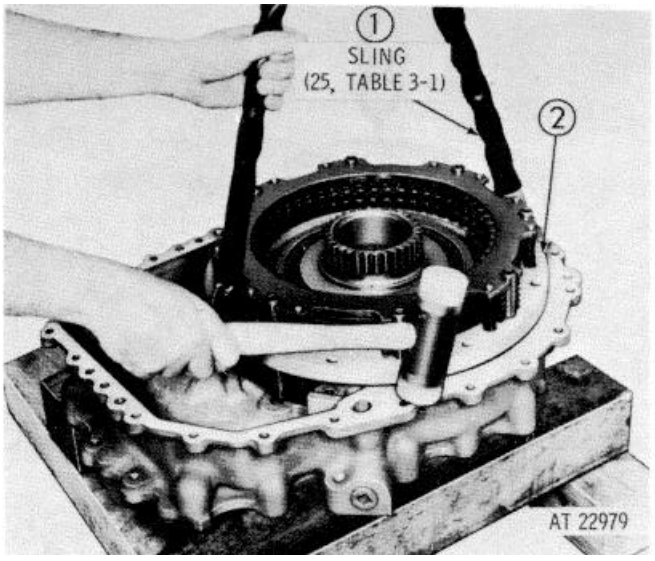
When bolt (3) is removed. all items will fall freely. Support gear (5) during removal of bolt (3).



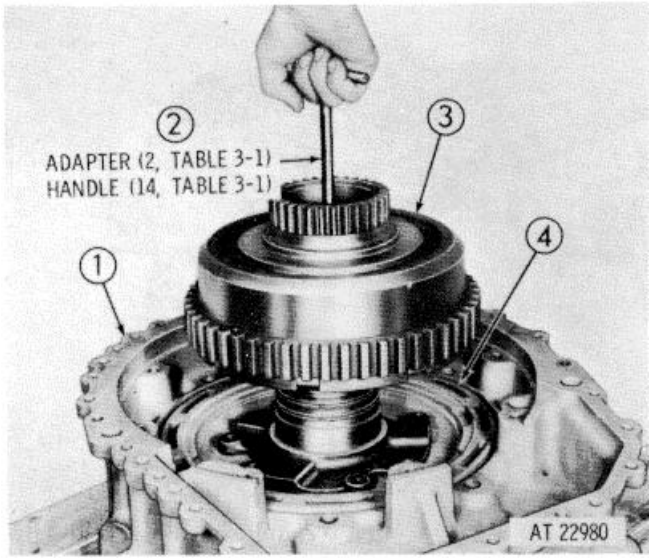
52 Install eyebolt (1) into the end of output shaft (2). Using a hoist, remove the output shaft, gear assembly (3), brake hub (4) and associated parts. Remove the eyebolt.



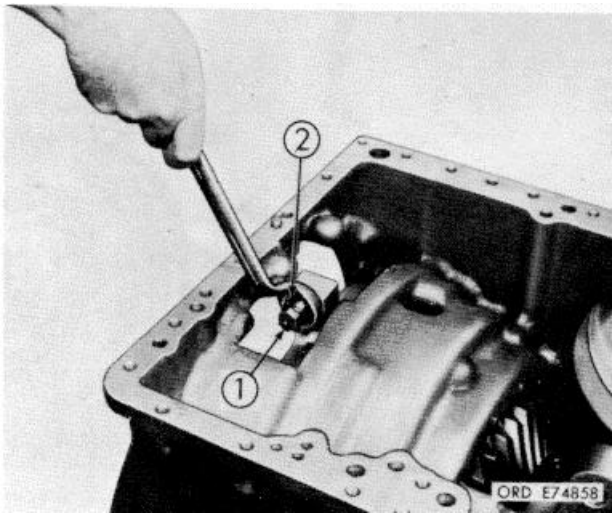
53 Using a 9/16-inch wrench, remove eight self-locking bolts (1) and plain washers.



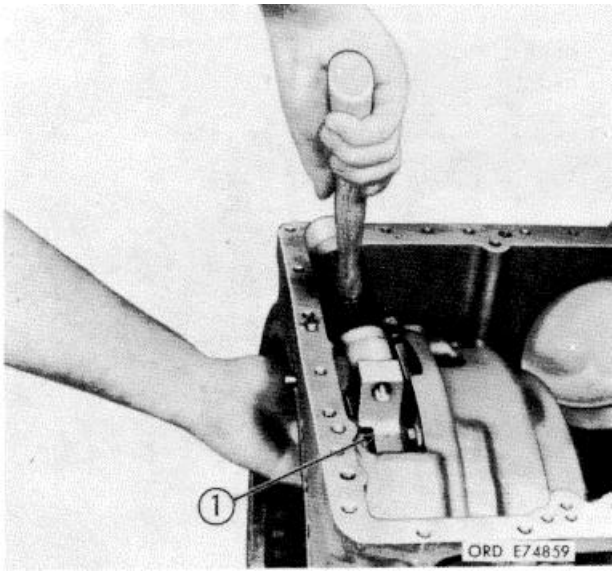
54 Attach two legs of sling (1) using two of the bolts removed, to the brake and steer clutch assembly (2). Remove the assembly by tapping the housing lightly with a soft hammer while lifting with the hoist. Remove the sling.



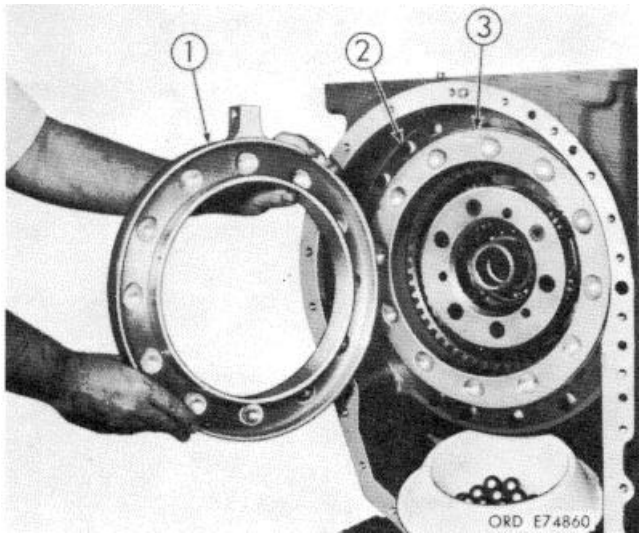
55 Install handle and adapter (2) into output clutch assembly (3). Remove the clutch assembly by lifting the handle. Remove steer clutch piston (4) by applying air pressure in passage (1). Remove the handle and adapter.



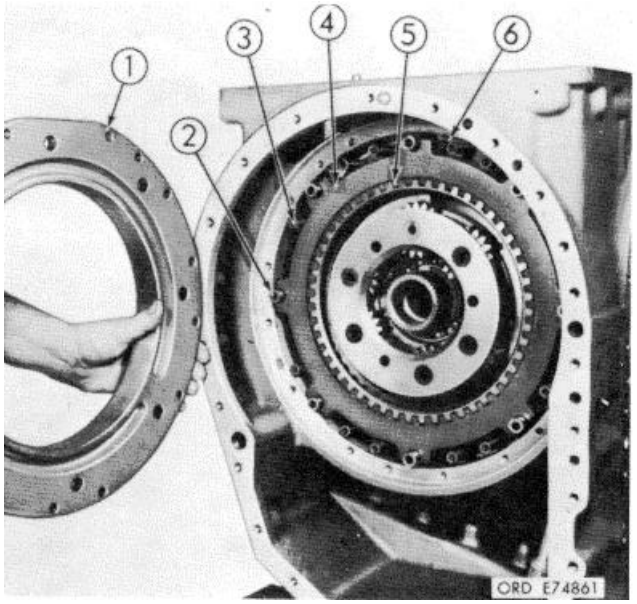
56. Using a 15/16-inch wrench, loosen lock nut (2) on brake adjusting screw (1). Use a 5/8-inch wrench, if necessary, and remove the adjusting screw and locknut.



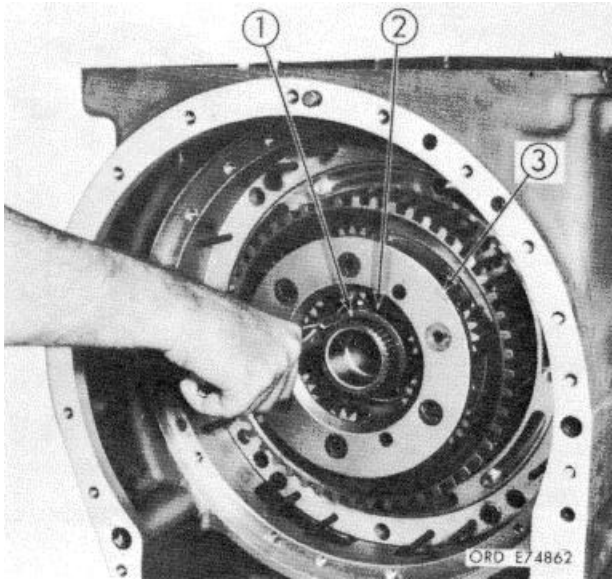
57 Grasp brake apply rotating cam (1) with one hand. Using a soft hammer, drive the cam lug toward the front of the bevel gear housing to loosen the cam. Place a container beneath the brake cam to catch the 12 steel balls that will fall during removal of the cam.



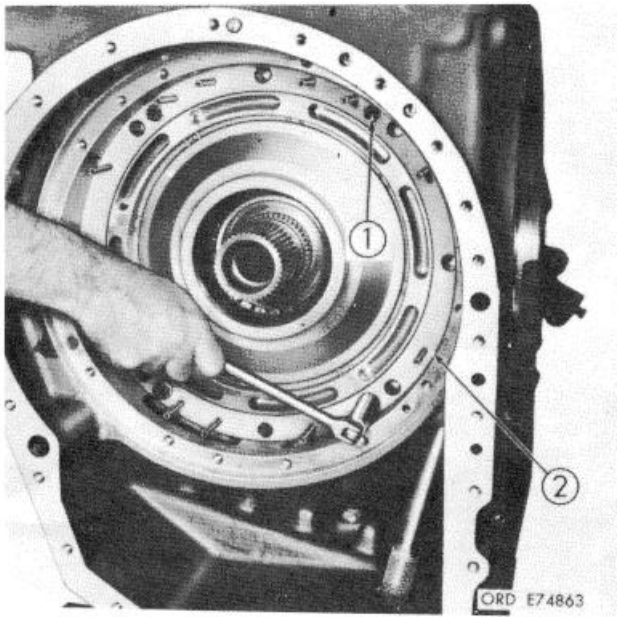
58 Remove brake apply rotating cam (1) and let the 12 steel balls fall into the container. Using a 9/ 16-inch wrench, remove 16 self-locking bolts (2) and plain washers from brake stationary cam 13).



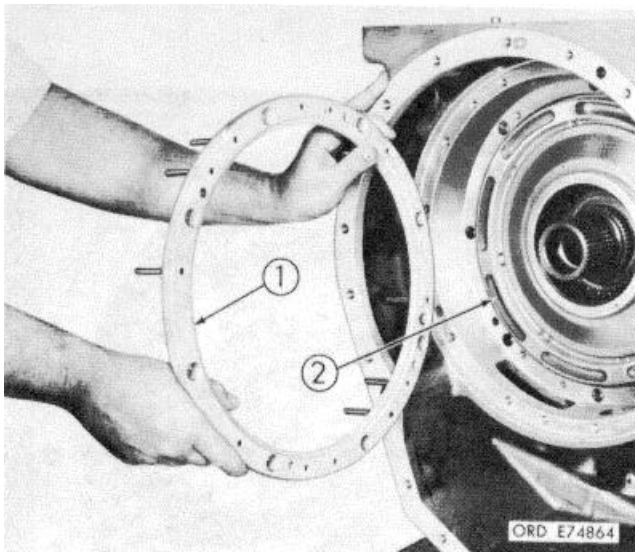
59 Remove brake stationary cam (1). Eight anchor pins (2) will be loose when the cam is removed and some may come out with the cam. Remove these pins from the cam. Remove the remaining anchor pins. Remove 12 springs (3). Remove six steel clutch disks (4) and six bronze-faced clutch disks (5). Remove reverse range clutch apply disk (6) with the coolant valve attached.



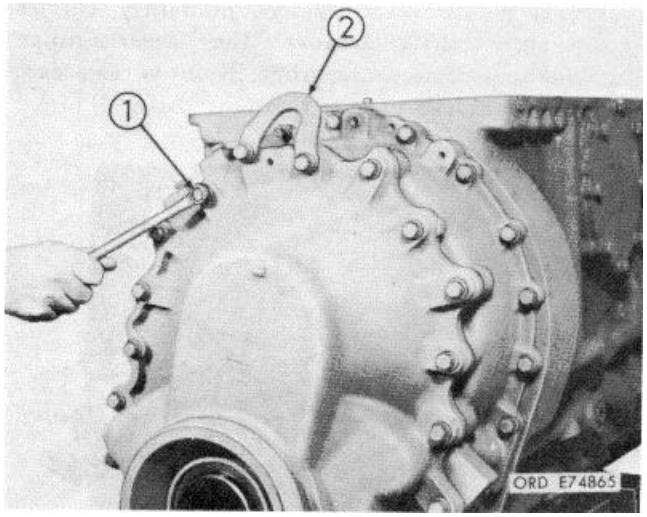
60 Remove snapring (1) and splined spacer (2) which retain reverse-range planetary carrier assembly (3). Remove the reverse-range planetary carrier assembly. Remove two seal rings from the carrier hub.



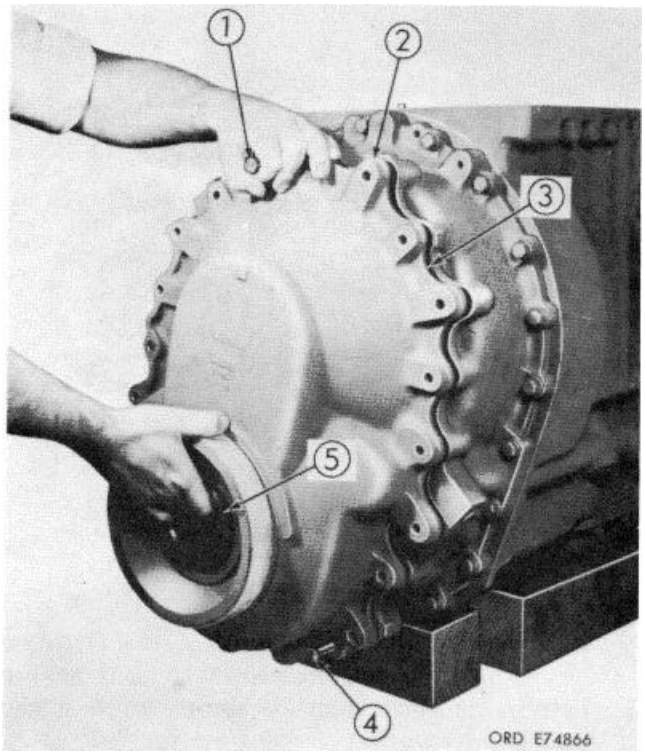
61 Using a 1/2-inch socket wrench, remove four self-locking bolts (1) and plain washers from retainer assembly (2).



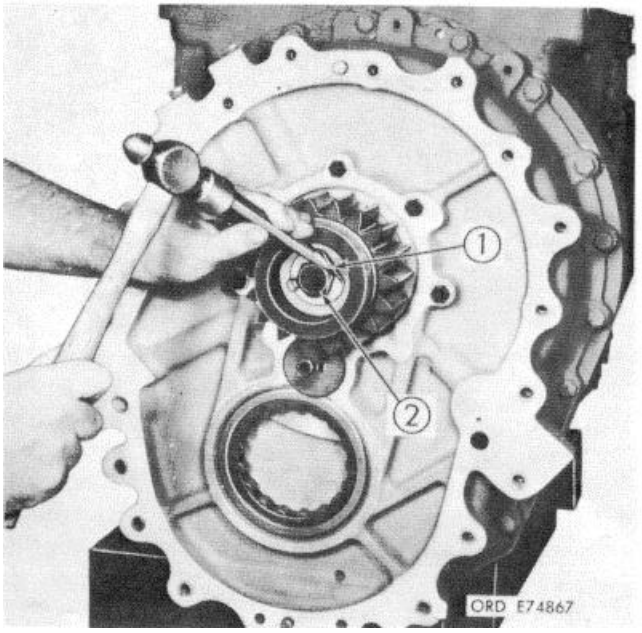
62 Remove retainer assembly (1) Remove reverse-range clutch piston (2).



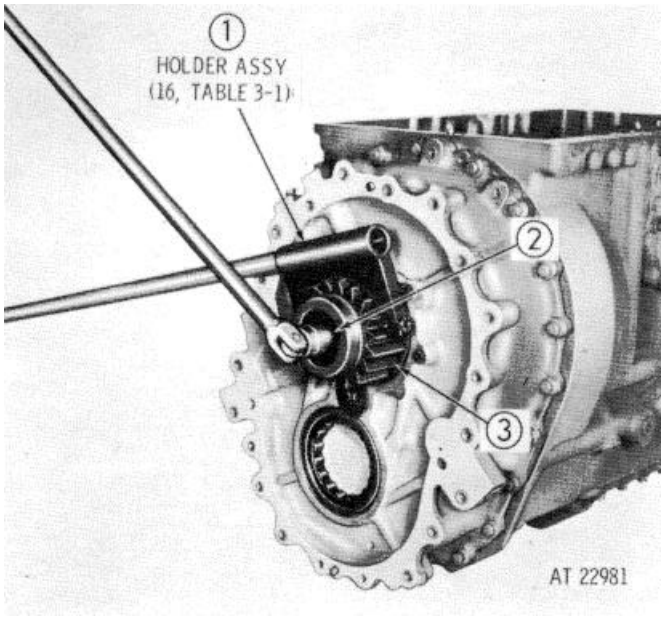
63 On the left side, using a 9/16-inch wrench, remove 21 bolts (1) two at bottom on inside of flange) lockwashers and plain washers. Remove lifting bracket (2).



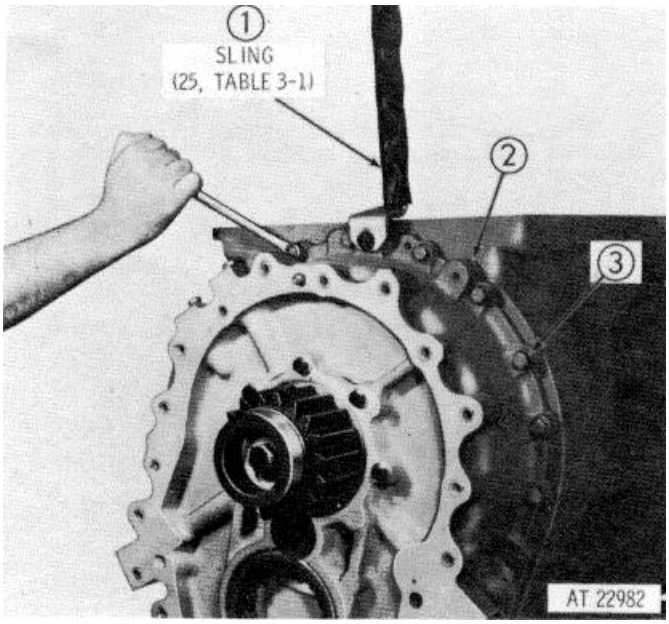
64 Using two of the bolts removed as jackscrews (1 and 4) loosen end cover assembly (2). Grasp output driven gear (5) through the opening in the gear. and then remove cover assembly, driven gear, and gasket (3). Remove the driven gear from the cover assembly. Remove the jackscrews.



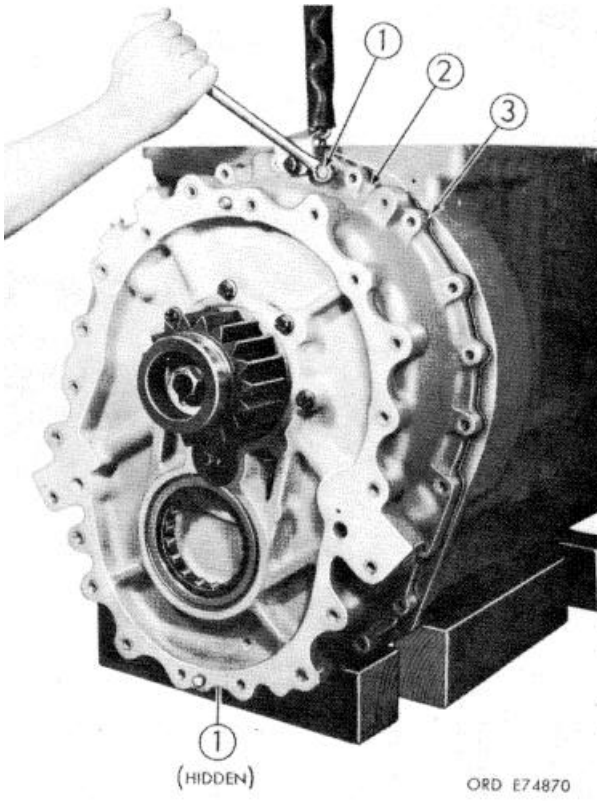
65 Flatten lockwvasher (1) that retains (drive gear bolt (2).



66 Using holder assembly (1) loosen. but do not remove, bolt (2) that retains output drive gear (3). Use a 1 1/8-inch socket wrench on the bolt.



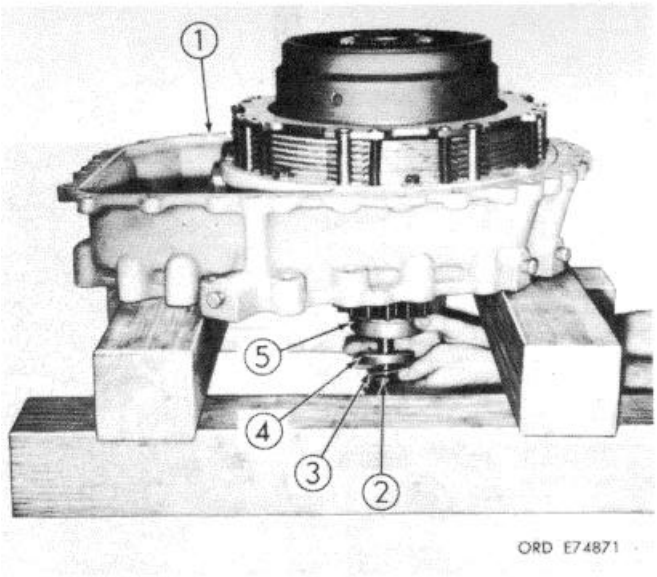
67 Attach sling (1) to output housing (2). Using a 9/16-inch wrench remove 24 bolts (3), locking washers and plain washers.



68 Using two of the bolts removed as jackscrews (1) loosen output housing (2), from the bevel gear housing. Remove the output housing, components and gasket (3). Remove the jackscrews.

NOTE

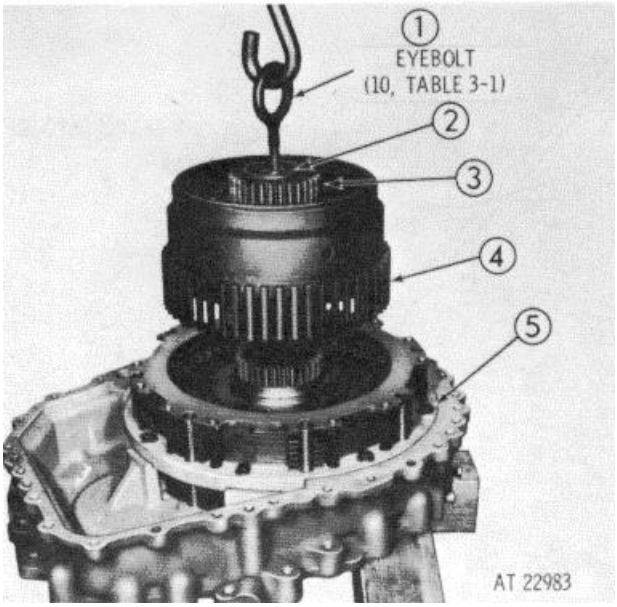
The oil baffle plate may remain in the brake apply cam ring or on the brake hub. If on the brake hub, remove it.



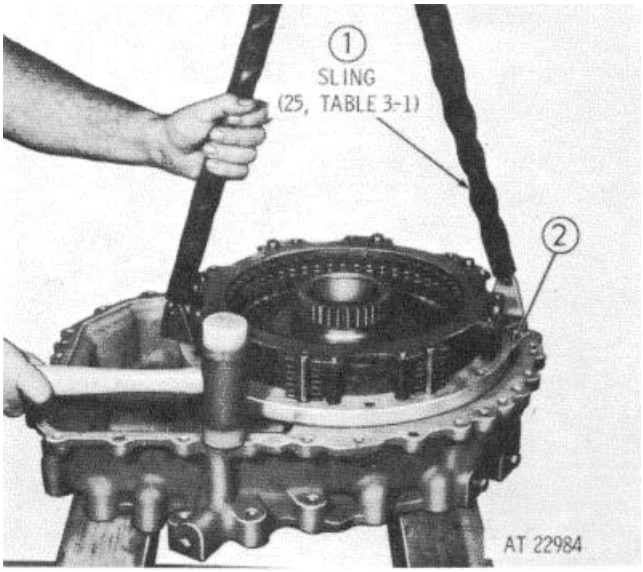
69 Position output housing assembly (1) on wood blocks as shown. Remove the sling (step 67). Working beneath the assembly. remove bolt (2), lockwasher (3), lock plate (4), gear (5) and a splined spacer with two seal rings. Remove the two seal rings from the spacer.

NOTE

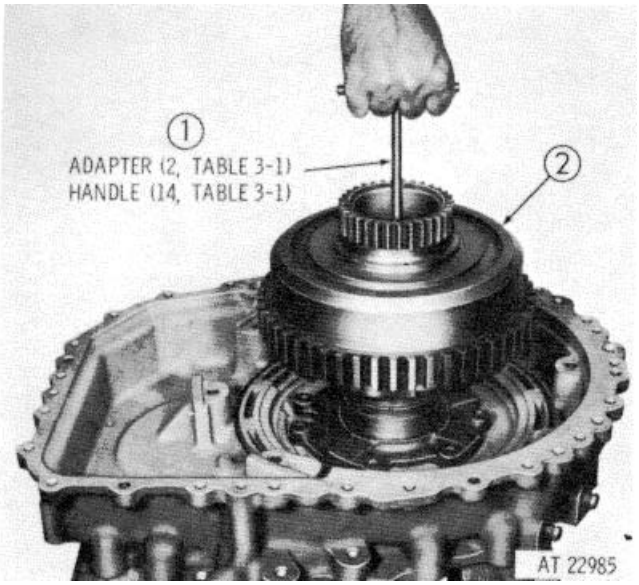
When bolt (2) is removed. all items will fall freely. Support gear (5) during removal of the bolt.



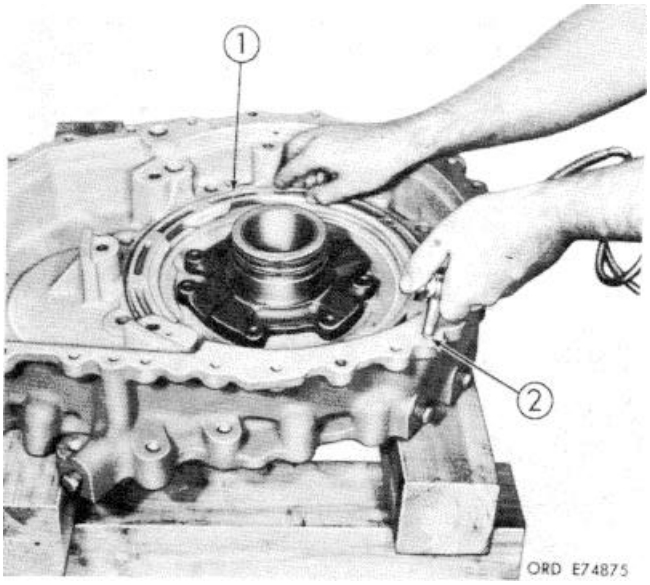
70 Install eyebolt (1) into the end of output shaft (2). Using a hoist, remove the output shaft. gear assembly (3). brake hub (4) and attached parts. Remove the eyebolt. Using a 9/16-inch wrench. remove eight self-locking bolts (5) and plain washers.



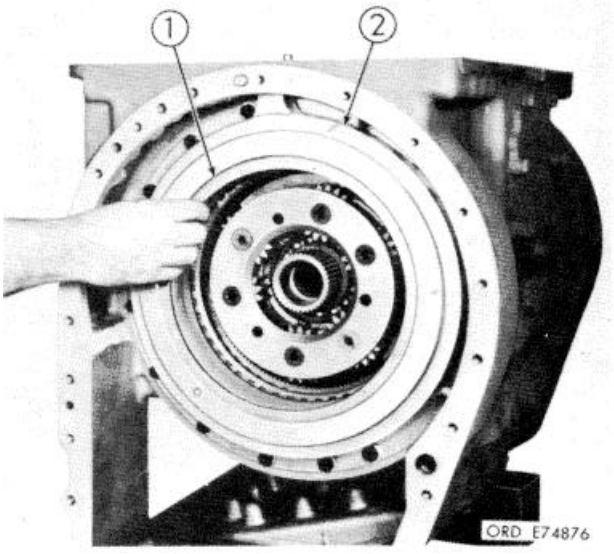
71 Attach two legs of sling (1) using two of the bolts removed. to brake and steer clutch assembly (2). Remove the assembly by tapping the housing lightly with a soft hammer while lifting with the hoist. Remove the sling.



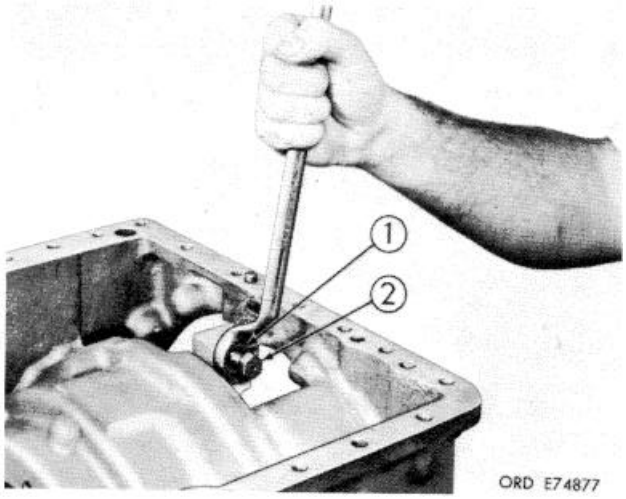
72 Install handle and adapter (1) into output clutch assembly (2). Remove the clutch assembly by lifting the handle. Remove the handle and adapter.



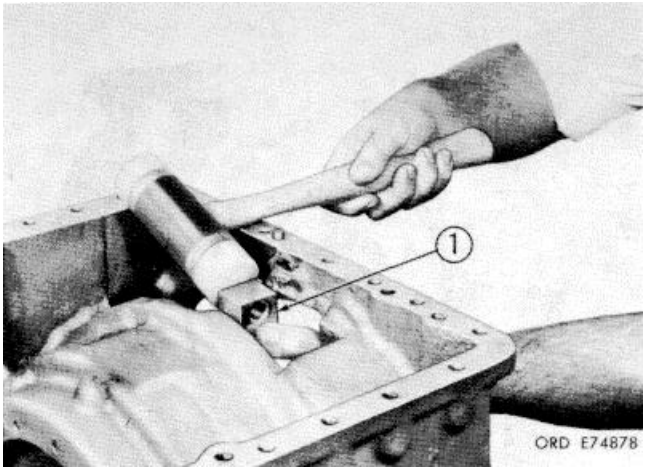
73 Remove steer clutch piston (1) by applying air pressure into clutch apply passage (2).



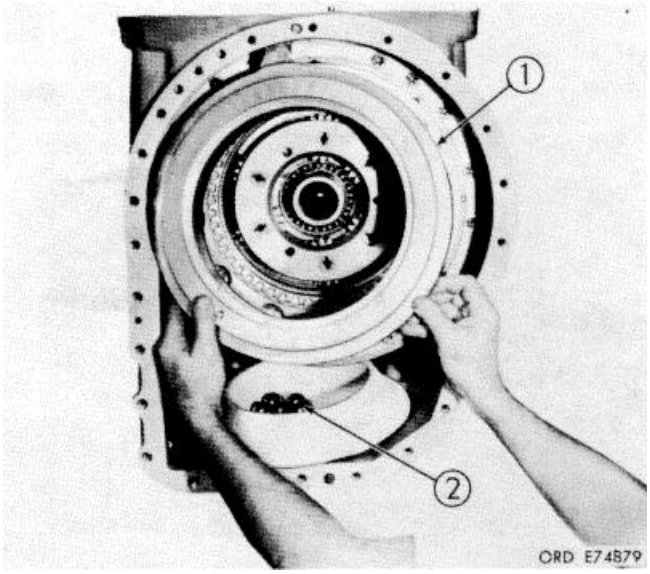
74 Remove oil baffle plate(1) from brake rotating cam (2). The baffle plate may have remained in the output housing assembly.



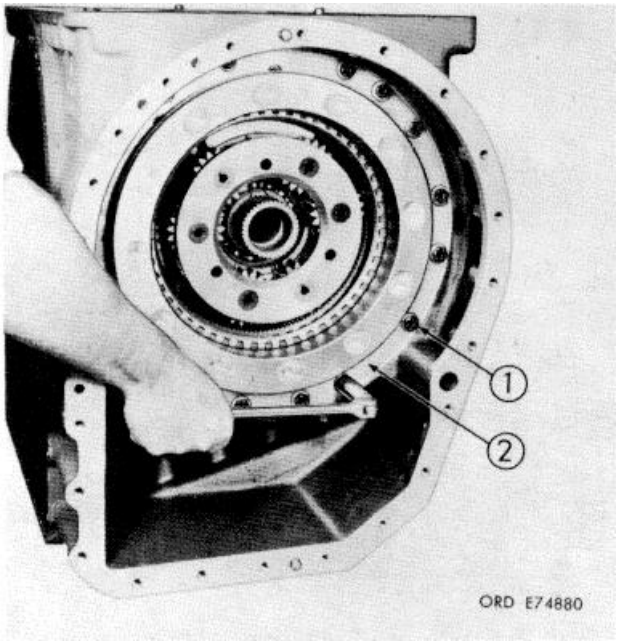
75 Using a 15/16-inch wrench, loosen locknut (1) on brake adjusting screw (2) Use a 5/8-inch wrench, if necessary, to remove the adjusting screw and locknut.



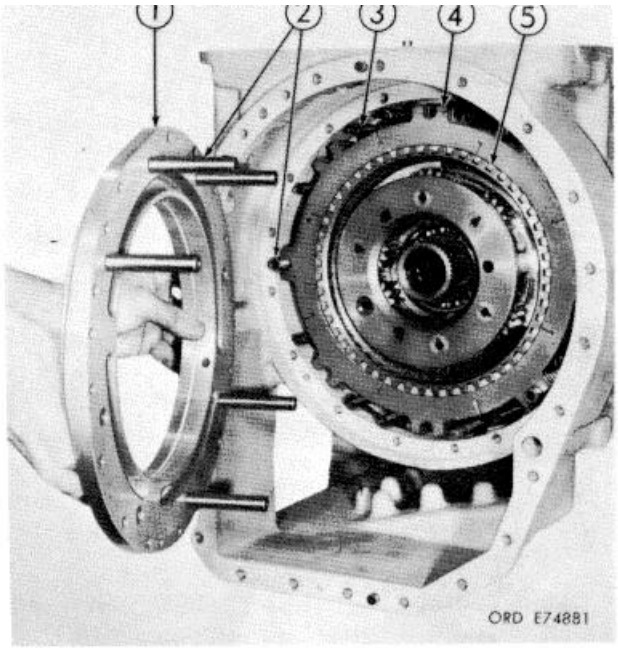
76 Grasp brake rotating cam (1) with one hand. Using a soft hammer, drive the cam lug toward the front (of the bevel gear housing to loosen the cam. Place a container beneath the brake cam to catch the 12 steel balls that will fall during removal of the cam.



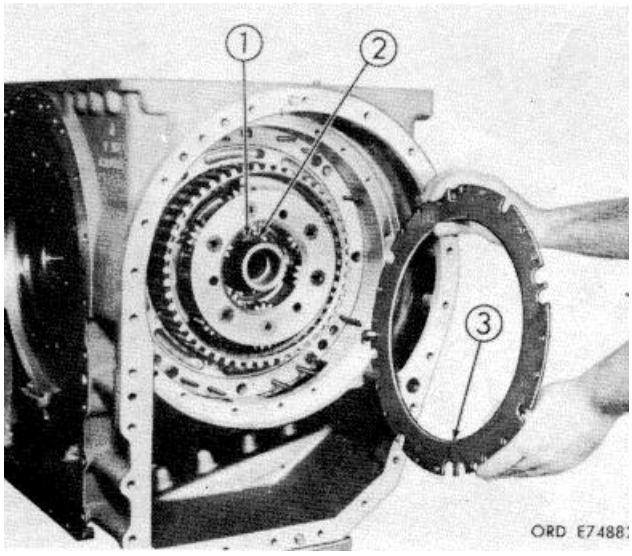
77 Remove rotating cam (1) and let the 12 steel balls (2) fall into the container.



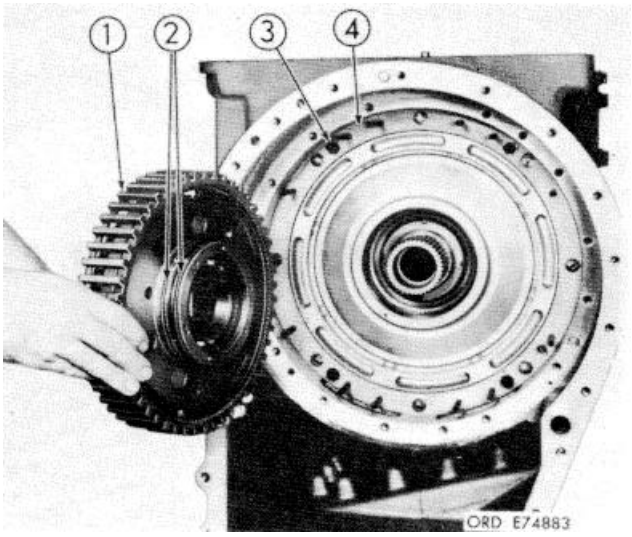
78 Using a 9/16 inch socket wrench remove 16 self-locking bolts (1) and plain washers from stationary cam (2).



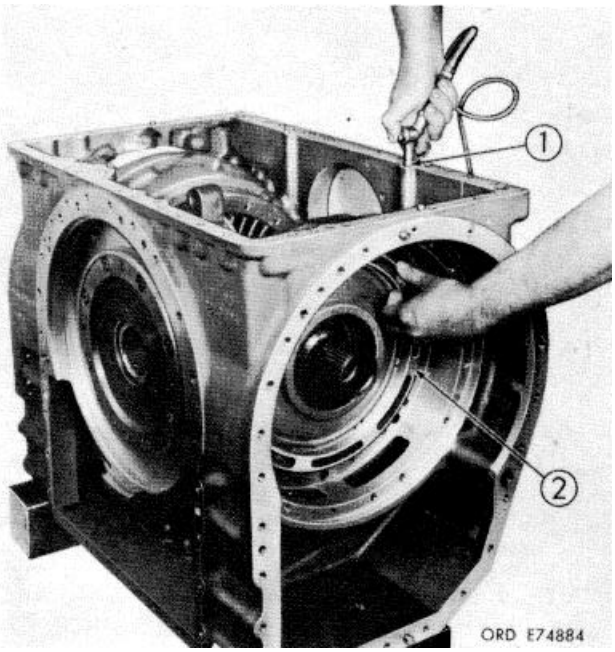
79 Remove stationary cam (1) some of the eight anchor pins (2) may come out with the cam. Remove them from the cam. Remove the remainder of the anchor pins. Remove 12 springs (3). Remove six steel clutch disks (4) and six bronze-faced clutch disks (5).



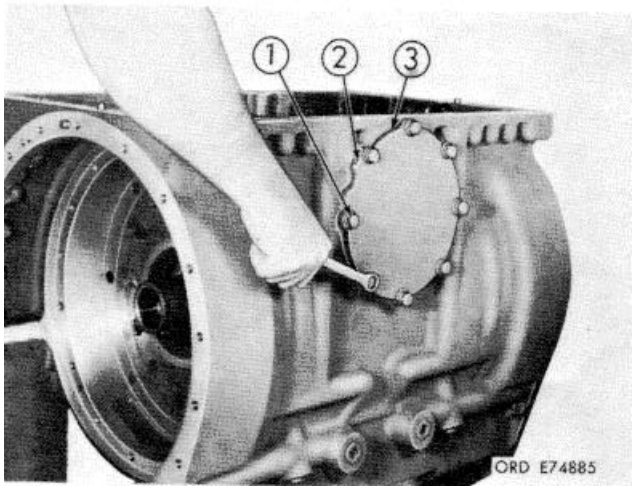
80 Remove reverse-range clutch apply disk (3) with coolant valve attached. Remove snapring (2) and splined spacer (1).



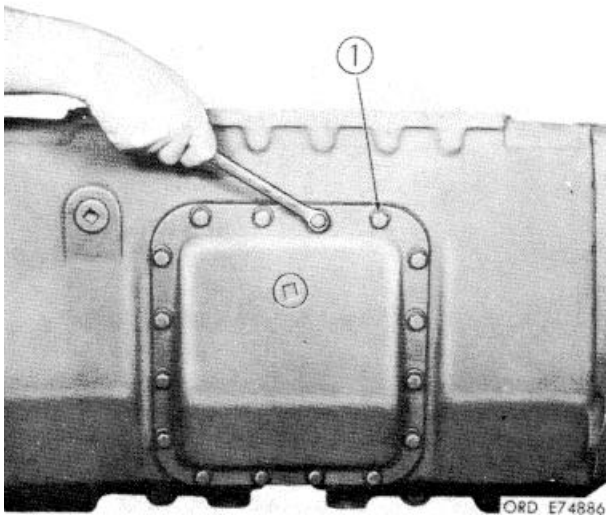
81 Remove reverse-range planetary carrier assembly (1) Remove two seal rings (2) from the carrier assembly. Using a 1/2-inch socket wrench remove four self-locking bolts (3) and plain -washers. Remove retainer assembly (4).



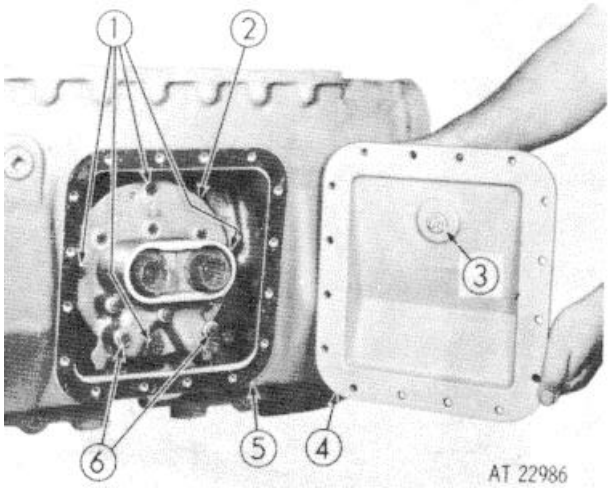
82 Remove reverse-range clutch piston (2) by applying air pressure in clutch apply passage (1).



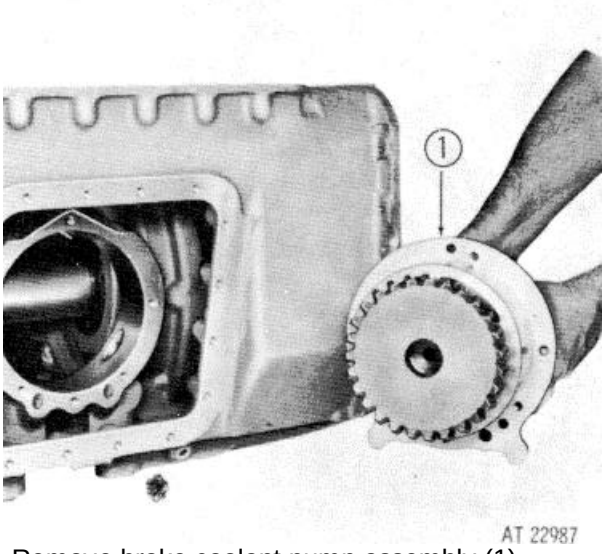
83 Using a 9/16-inch wrench, remove eight bolts (1), lockwashers and plain washers. Remove power takeoff cover (2) and gasket (3). (Later models do not include cove (2).



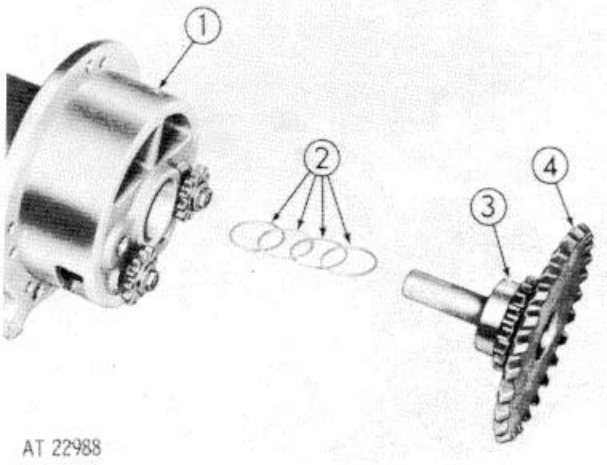
84 Position the bevel gear housing so that it rests on its back, blocking it so that the top side is level. Using a 9/16-inch wrench, remove 16 bolts (1), lockwashers and plain



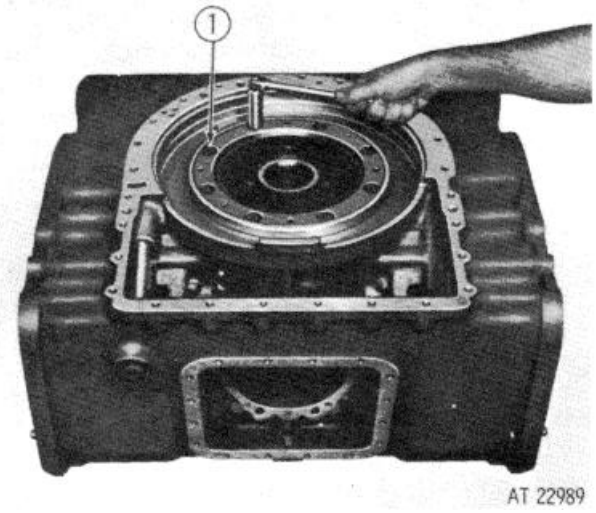
85 Remove sump cover (4) and gasket (5). Remove magnetic drain plug (3) and its gasket from cover (4). Using a 9/16-inch socket wrench, remove two long self-locking bolts (6) and four short self-locking bolts (1) and plain washers. Use three of these bolts, if necessary, to loosen oil pump assembly (2) for removal.



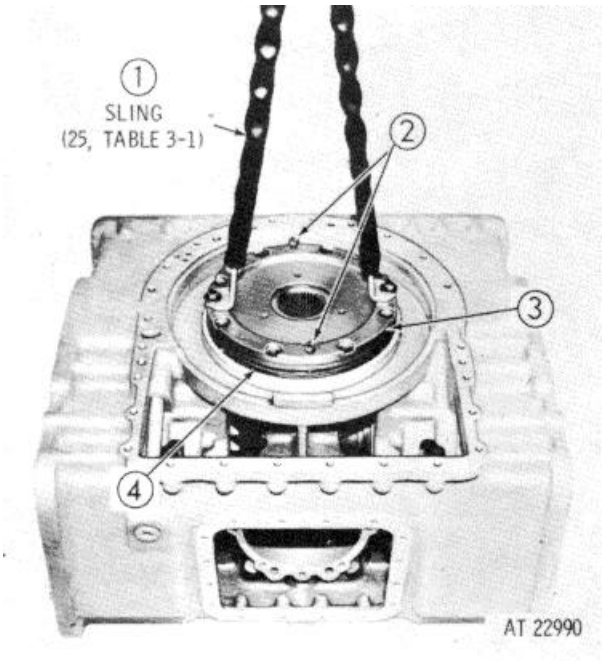
86 Remove brake coolant pump assembly (1).



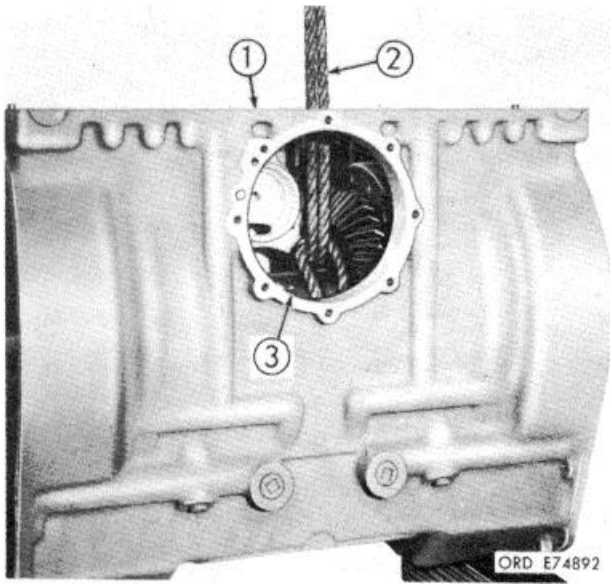
87 Bevel drive gear (4), bearing (3) and shims (2) will come out with pump assembly (1). Do not remove bearing (3) from gear (4) unless necessary. Tie shims (2) together and identify them as to location, to prevent loss or confusion with other shims. Record the thickness of the shim pack.



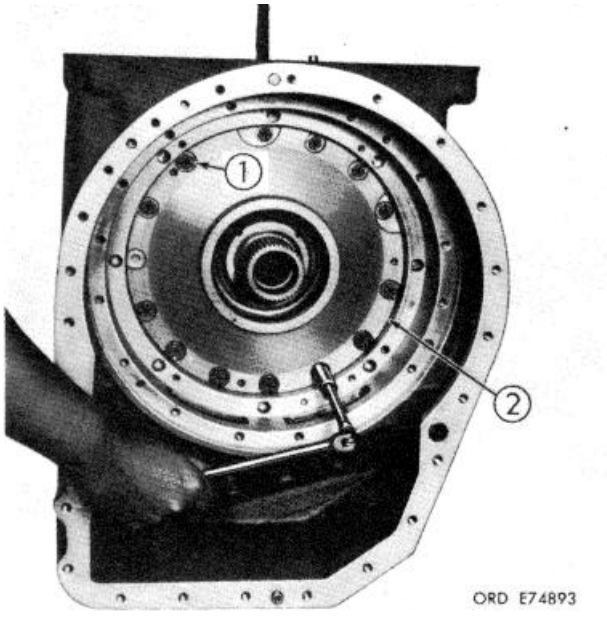
88 Using a 9/ 16-inch socket wrench, remove eight self-locking bolts (1).



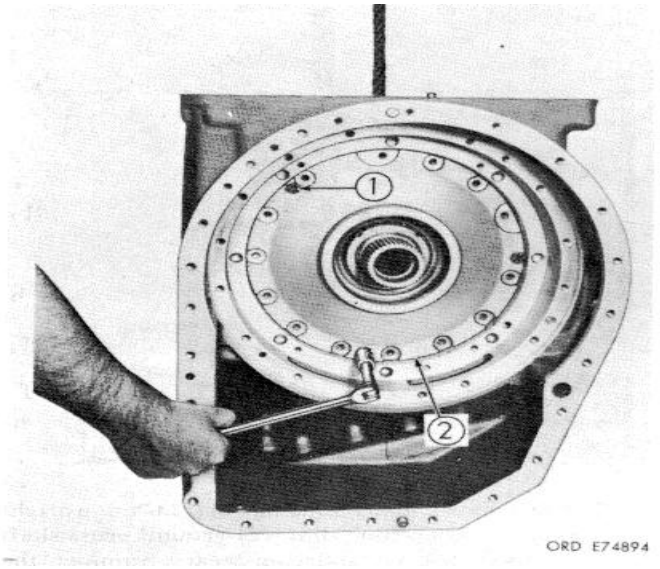
89 Use two of the removed bolts as jackscrews (2) to loosen bearing support (3). Attach two legs of sling (1) and remove the bearing support and bevel drive gear as an assembly. Remove the jackscrews and slings. Remove shims (4). Tie the shims together and identify them as to location, to prevent loss or confusion with other shims. Record the thickness of the shim pack.



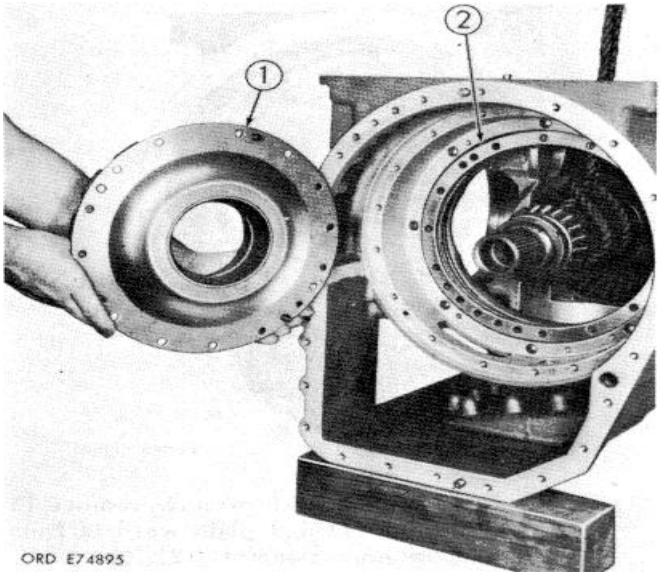
90 Place bevel gear housing (I in an upright position. Loop rope sling (12 around cross shaft (3) near the bevel-driven gear. Support the sling and cross shaft with a slight pull on a hoist.



91 Using a 9/16-inch socket wrench, remove 13 self-locking bolts (1) and plain washers from left bearing retainer assembly (2).



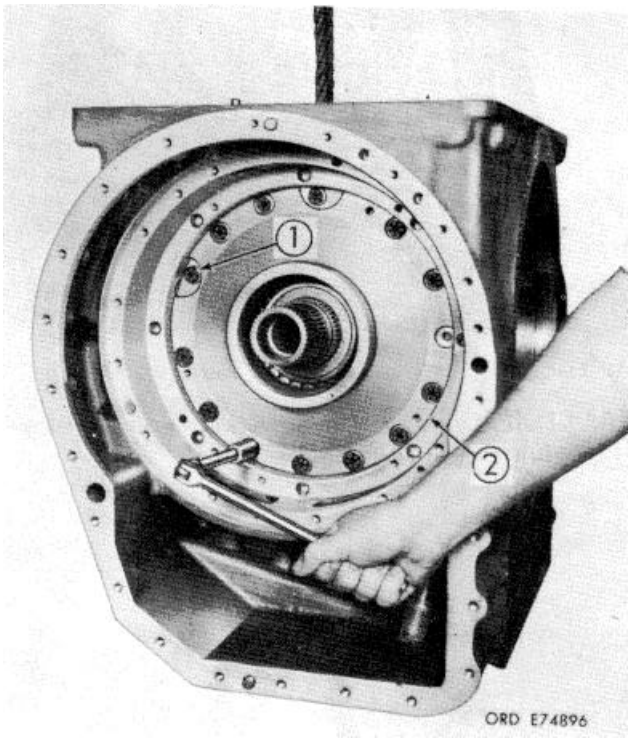
92 Using three of t he bolts removed as jackscrews (1), loosen left bearing retainer assembly (2)



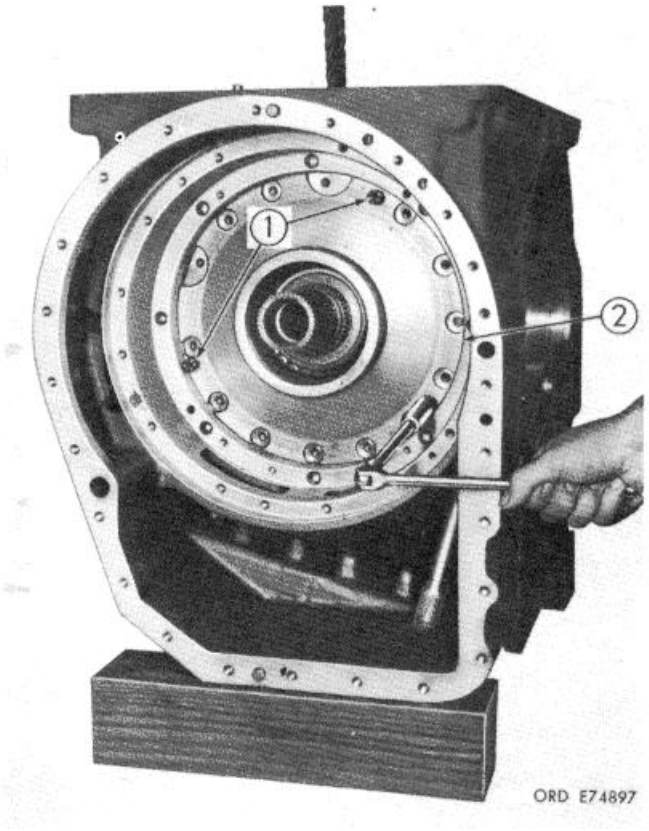
93 Remove left cross shaft bearing retainer (1). Remove shims (2); tie them together and identify them as to location, to prevent loss or confusion with other shims. Record the thickness of the shim pack. Remove the jackscrews.

NOTE

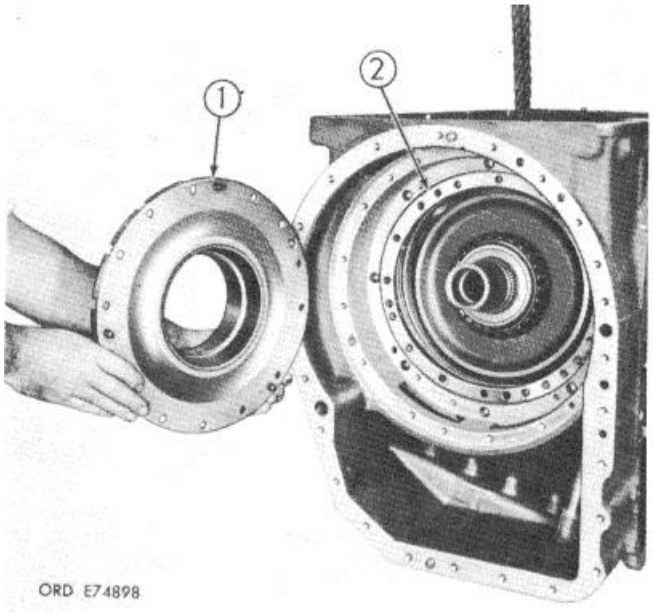
Before removing the shims, identify any one bolt hole in the housing with a corresponding hole in the shims for proper indexing during assembly.



94 Using a 9/16-inch socket wrench, remove 13 self-locking bolts (1) and plain washers from right bearing retainer assembly (2).



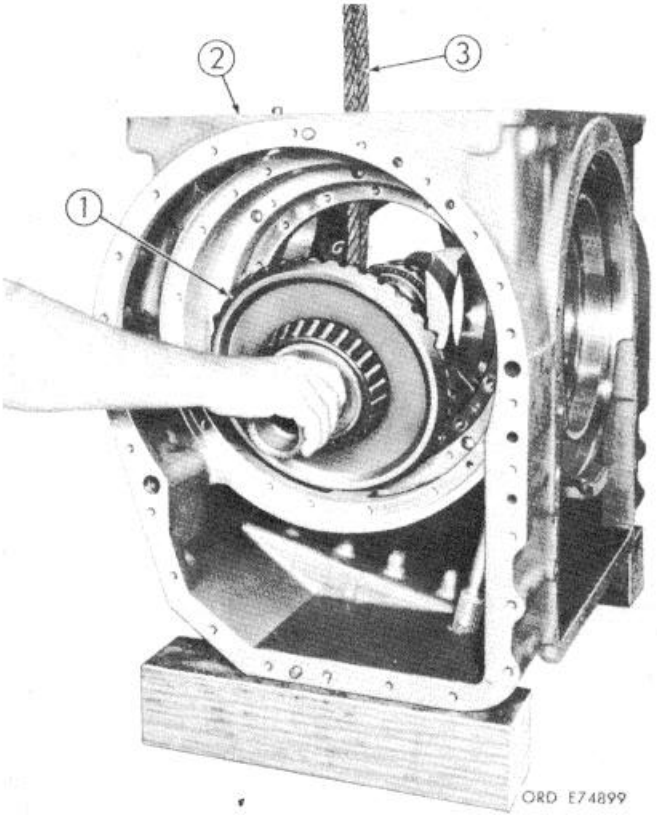
95 Using three of the bolts removed as jackscrews (1), loosen right bearing retainer assembly (2).



96. Remove right cross shaft bearing retainer assembly (1). Remove the jackscrews. Remove shims (2). Tie them together and identify them as to location, to prevent loss or confusion with other shims. Record the thickness of the shim pack.

NOTE

Before removing the shims, identify any one bolt hole in the housing with a corresponding hole in the shims for proper indexing during assembly.



97 Remove cross shaft and bevel driven gear assembly, working it out through the right side of bevel gear housing (2). Remove rope sling (3).

CHAPTER 7

REPAIR OF SUBASSEMBLIES

Section I. CONVERTER PUMP COVER AND LOCKUP CLUTCH ASSEMBLY-REPAIR

7-1. Description (FO-3)

Converter pump cover assembly (5) is a pressed steel assembly with six drive studs at the front to attach it to the engine flex-drive plates. The rear ends of these six studs enter blind holes in lockup clutch piston assembly (11), causing the cover and piston to rotate as a unit. A center hub enters the end of the engine crankshaft for alinement. Lockup clutch oil pressure, applied between piston and cover, moves the piston against lockup clutch disk (13) for clutch application. Refer to paragraph 2-1.

7-2. Disassembly (FO-3)

a. Compress the center part of lockup clutch piston assembly (11) by hand and remove retaining ring (12) with snapring pliers.

b. Remove lockup clutch piston assembly (11) from converter pump cover assembly (5). Refer to figure 7-1.

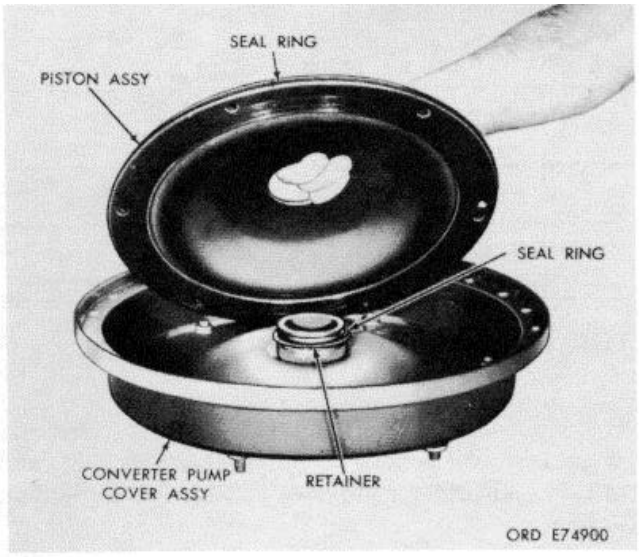


Figure 7-1. Removing (or installing lockup clutch piston assembly.

c. Remove seal ring (10, FO-3) from lockup clutch piston assembly (11). Lay the sealring flat after removal so it will not stretch.

d. Remove preformed packing (9) from the hub of pump cover assembly (5). Also remove seal retainer (8), if loose, or for replacement. Refer to figure 7-1.

e. Do not remove bearing (7, FO-3) except for replacement. For removal collapse the bushing and lift it out.

7-3. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-4. Inspection and Repair

Refer to paragraph 5-3 for inspection and repair recommendations.

7-5. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-1).

7-6. Assembly (FO -3)

a. If bearing (7) was removed from converter pump cover assembly (5), press in a new bearing. Using handle (12, table 3-1)and driver (9, table 3-1), install the bearing 1.00 to 1.04 inches below the outer bolt ring surface inside of the cover assembly (fig. 7-2).

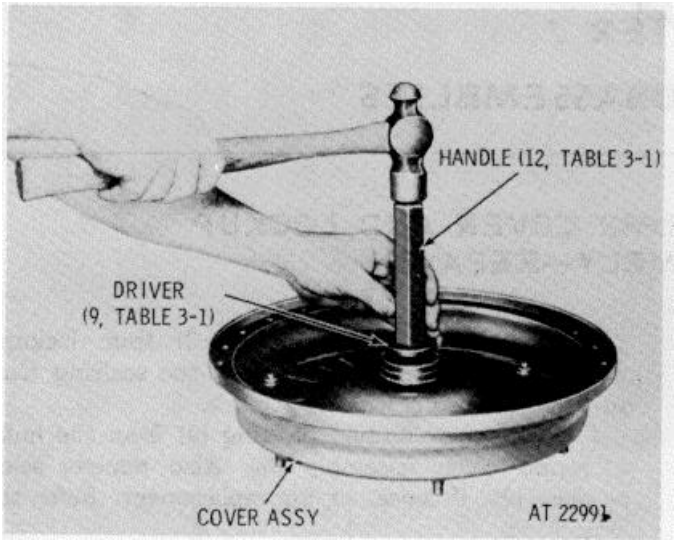


Figure 7-2. Installing bearing into hub of converter assembly

b. If seal retainer (8, FO-3) was removed, install the retainer, small diameter end first, onto the hub of converter pump cover assembly (5). Refer to figure 7-1.

c. Install preformed packing (9, FO-3) over the hub of pump cover assembly (5) into seal retainer (8). Refer to figure 7-1.

d. Install sealring (10, FO-3) into the outer diameter groove in lockup clutch piston (11). Refer to figure 7-1.

e. Install lockup clutch piston assembly (11, FO-3), with sealring (9) in place, into converter pump cover assembly (5). Refer to figure 7-1.

CAUTION

Triangular balance marks (if present) on piston and cover must be alined to the nearest stud and hole engagement of cover and piston. Piston must engage cover studs. Failure to engage the studs will prevent lockup clutch release. Recheck to see that 0.094 hole in one of the six piston recesses is open.

f. Carefully compress the center of lockup clutch piston (11), FO-3) and install retaining ring (12) into the groove in the hub of converter pump cover assembly (5).

Table 7 -1 Repair Standards (Converter Pump Cover, Lockup Clutch

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
3	6a	Inside diameter of cover at sealring.....	12.996 to 13.006	13.010
3	7a	Inside diameter of bearing.....	0.999 to 1.002	1.004
3	39a	Outside diameter at bearing surface of shaft		0.9975 to 0.9985
0.9965				
3	7a, 39a	Fit of shaft in cover bearing.....		0.0005L to 0.0045L
3	11a	Thickness of piston.....	0.301 to 0.305	0.300
				No scoring permissible
3	13a	Thickness of disk	0.180 to 0.190	0.170
3	15a	Thickness of plate	1.235 to 1.245	1.225
		.....		No scoring permissible

Section II. TORQUE CONVERTER ELEMENTS-REPAIR

7-7. Description

(FO-3)

The torque converter consists mainly of pump assembly (93), stator assembly (19) and turbine assembly (17). Pump assembly (93) is driven by the engine. Stator assembly (19) is mounted on a freewheel clutch arrangement which holds the stator stationary when torque multiplication is required. Turbine assembly (17) is the output member of the converter. It is connected to output shaft (39). Converter pump cover assembly (5) is the input member of the converter. It transmits drive from the engine to pump assembly (93), and encloses all other components. Refer to paragraph 2-1.

7-8. Disassembly

a. Pump Assembly (FO-3). No further disassembly of the torque converter pump is necessary. Since the pump was balanced during manufacture, do not remove any screws (94) or balance weights (96) from the pump. Remove

screws (95), for replacement only, by pressing them out.

b. Stator and Components (FO-3).

(1) Remove freewheel roller race assembly (24) from stator assembly (19). Refer to figure 7-.3

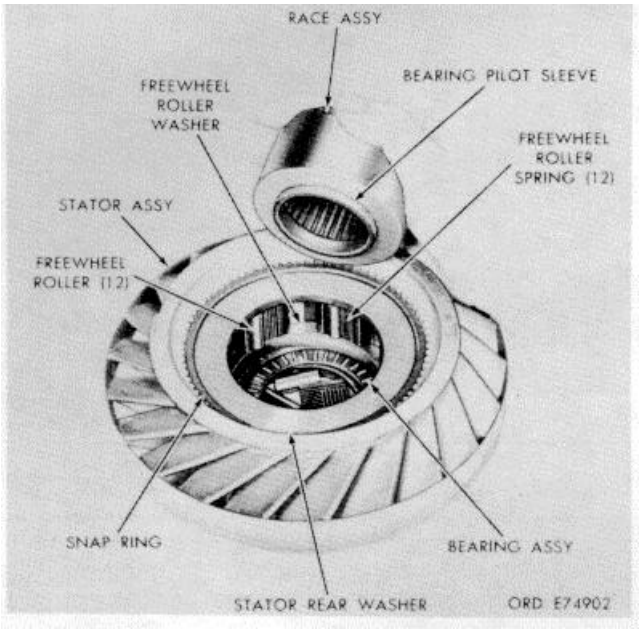


Figure 7-3. Removing freewheel race .assembly.

(2) Remove 12 rollers (26, FO-3) and 12 springs (25).

(3) Remove retaining ring (30), washer (29) and washer (28) from stator assembly (19).

(4) Remove bearing assembly (23) and bearing race thrust washer (22) from stator assembly (19).

(5) Remove retaining ring (18), stator thrust washer (20), and freewheel roller thrust washer (21).

(6) Do not remove the sleeve from freewheel roller race assembly (24).

(7) Do not remove cam (27) except for parts replacement. If the cam is to be removed, first note the relations of the cam to stator assembly (19) to insure correct installation of cam to stator.

c. Turbine Assembly. The turbine assembly is of riveted construction and is assembled and balanced at the factory. If replacement is necessary, it is replaced as an assembly.

7-9. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-10. Inspection and Repair

Refer to paragraph 5-3 for inspection and repair recommendations.

7-11. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-2).

7-12. Assembly

a. Pump Assembly (FO-3). If screws (95) were removed for replacement; install new screws with the flat sides of the head toward the center of pump (97). Press each screw in until it bottoms on the pump (or balance weight when used).

b. Stator and Components (FO-3)

(1) If freewheel cam (27) was removed from stator assembly (19) for replacement of either part, install the cam into the stator assembly as marked when disassembled. As an aid, refer to figure 7-3, a rear view of the stator assembly, and note that the freewheel roller and spring pockets and deeper at the clockwise end (spring end) of the pocket. Also note that the rear of the stator has a counterbore new its internal splines.

(2) Place stator assembly (19, FO-3), front end up, and install freewheel roller washer (21), stator thrust washer (20), larger inside diameter end first, and retain it with retaining ring (18).

(3) Turn stator assembly (19) over, rear (counterbored) end up, and install bearing race thrust washer (22).

(4) Install the bearing assembly, roller side up, into the stator assembly (fig. 7-3).

(5) Install the freewheel race assembly, sleeve end first, into the stator assembly (fig. 7-3). Be sure that the sleeve extends through the bearing assembly and its race.

(6) Install 12 freewheel rollers and 12 freewheel roller springs. Springs go in the clockwise (deeper) end of each pocket.

(7) Install freewheel roller thrust washer (28 FO-3), stator cam roller washer (29), smaller outside diameter first, and retain it with retaining ring (30). Refer to figure 7-4.

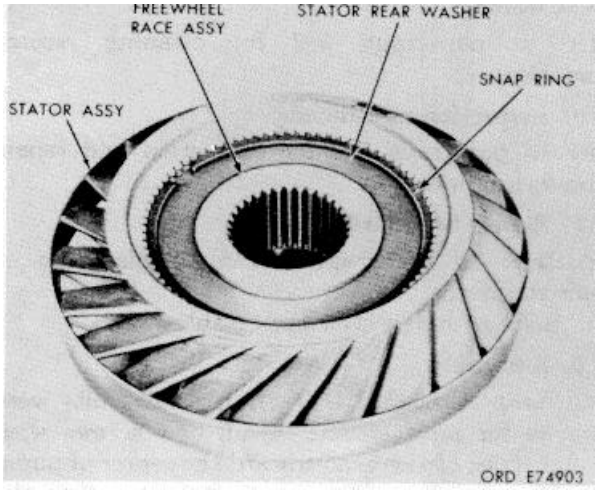


Figure 7-4. Torque converter stator components, assembled

c. Turbine Assembly (FO-3). Turbine assembly (17) is assembled as balanced at the factory. When replacement of any part is necessary, the entire assembly is replaced.

Table 7-2. Repair Standards (Torque converter elements)

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	**Item**			
3	20a	Thickness of washer.....	0.740 to 0.7520	0.7550
3	24a	Outside diameter of race	3.2907 to :1.2917	3.2897
3	24b	Length of race	1.7778 to 1-782	1.777
3	25a	Free length of spring.....	0.640	*
3	26a	Outside diameter of roller (if one is replaced, replace all rollers.....	0.3748 to 0.3750 0.3746	
3	27 a	Inside diameters of cam (under 0.3:750 dia rollers.....	3.242 to .3.250	*
3	28a	Thickness of washer..... ..	0.020 to 0.024	0.0 1 80
3	87a, 97a	Inside diameters of pump and drive gear	43300 to 4.3.310	4.332
3	99a	Outside diameter of bearing	4.3301 to 4.3307	*
3	87a 97a 99a	Fit of bearing in gear and pump.....	0.0012T to 0.0013L	
3	87b	Inside diameter of gear at sealring	3.9375 to 3.9395	3.9415
3	87c	Outside diameter of gear at lip seal	5.500 to 5.505	5.498

*Replace when worn beyond new dimensions

Section III. CONVERTER DIAPHRAGM ASSEMBLY-REPAIR

7-13. Description

(FO-3)

Converter seal diaphragm (90) is mainly a sealing component separating the converter section from the part of the transmission behind it. Its outside diameter seals at converter housing (60) and the inside diameter seals around the hub of spur gear (87).

7-14. Disassembly

(FO-3)

Remove oil seal (92) from center of diaphragm (90) for replacement only.

7-15. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-16. Inspection and Repair

Refer to paragraph 5-3 for inspection and repair recommendations.

7-17. Repair Standards

There are no wearing points on the diaphragm, thus no repair standards.

7-18. Assembly

(FO-3)

If oil seal (92) was removed for replacement, install a new seal, spring side first, into diaphragm (90). Press or tap the seal lightly until it is firmly seated in the diaphragm.

Section IV. CONVERTER HOUSING ASSEMBLY AND CONVERTER GROUND SLEEVE ASSEMBLY-REPAIR

7-19. Description

(FO-3)

Refer to paragraph 2-3 for description and function of converter housing assembly (51). Converter ground sleeve assembly (43) has passages for oil flow to and from the converter. In addition to being a reaction member for the stator when it is multiplying torque, the ground sleeve provides a mounting surface for ball bearing (99).

7-20. Disassembly

(FO-3)

a. Do not remove converter ground sleeve assembly (43) from converter housing (60) except for replacement.

b. Do not remove pins (46) from ground sleeve (45) except for replacement.

c. Do not remove insert (44) from ground sleeve (45) except for replacement.

d. Do not remove plugs (52, 63 and 67) except for replacement or to aid in cleaning housing (60).

e. Do not remove two dowel pins (59) except for replacement.

f. Do not remove threaded inserts (53, 56, 58, 61 and 65), or their retainer pins (54, 53, 57, 62, and 64), or plug (66) except for replacement. To remove, carefully drill the pin out and screw the insert out.

g. Do not remove output pump check valve assembly from the housing, except for replacement. For replacement, remove valve seat (72), valve (71), spring (70) and guide (69) from housing (60).

7-21. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-22. Inspection and Repair

Refer to paragraph 5-3 for inspection and repair recommendations.

7-23. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-3).

7-24. Assembly

(FO -3)

a. If converter ground sleeve assembly (43) was removed for replacement, chill a new ground sleeve assembly in dry ice for at least 4 hours. Press the sleeve in from the rear of housing (60), in position to line up all holes, until it bottoms. Install five bolts (83) and five plain washers (82). Tighten the bolts to 41 to 49 pound fett torque.

b. If pins (46) were removed, drive new pins into sleeve (45) and stake sleeve metal over them.

c. If ground sleeve insert (44) was removed from sleeve (45), press a new insert in until it bottoms in sleeve (45).

CAUTION

The hole in insert must aline with the hole in the sleeve.

d. If the output pump check valve assembly was removed from housing (60), install valve guide (69), large diameter end first, into the housing.

e. Install valve spring (70).

f. Install valve (71), stem end first, into guide (69).

g. Install valve seat (72), chamfered outside diameter side first, into housing (60). Press the seat flush with, to 0.010 inch below, its bore surface.

h. If any threaded inserts (53, 56, 58, 61, or 65) were removed, select new inserts for 0.002-inch loose to 0.002-inch tight fit and install them slotted end first, 0.010 to 0.030 inch below the housing surface. Drill a 0.0902 to 0.0922-inch diameter hole, 0.209 to 0.229 inch deep. Install pins (54, 55, 57, 62, or 64) and stake metal over it to retain the pin.

i. If dowel pins (59) were removed, install new ones. Press dowel pins to 0.240 inch above the housing surface.

j. If threaded plugs (52, 63, and 67) were removed for replacement, install new plugs. If removed for cleaning and the plugs are serviceable, install the same plugs.

Table 7-3. Repair Standards (converter Housings, Ground Sleeve)

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
3	44a	Inside diameter of insert at seal diameter .	2.000 to 2.002	2.004
3	45a	Diameter at bearing surface of sleeve...	2.3609 to 2.3619	2.3606
3	99b	Inside diameter of bearing.....	2.3616 to 2.3622	*
3	45a, 99b	Fit of bearing on sleeve..... ..	0.0003T to 0.0013L	
3	60a	Inside diameter of housing at sealring.....14.500 to 14.506		14.510
3	60b	Outside diameter of housing at sealring.....11.246 to 11.250		11.242

*Replace when worn beyond new dimensions.

Section V. TORQUE CONVERTER OUTPUT SHAFT ASSEMBLY-REPAIR

7-25. Description

Refer to paragraph 2-4 for description and operation of the converter output shaft.

7-26. Disassembly

(FO-3)

a. Remove two Teflon step-joint sealrings (40) from output shaft (39).

b. Remove bearing (36) from output shaft (39) for replacement only.

c. Do not remove plug (38) from output shaft (39) except for replacement.

7-27. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-28. Inspection and Repair

Refer to paragraph 5-3 for inspection and repair recommendations.

7-29. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-4).

7-30. Assembly

(FO-3)

a. If plug (38) was removed from output shaft (39), install a new plug. Press the plug into the shaft until it is firmly seated.

b. Using replacer 20, table 3-1, install bearing (36) onto output shaft (39). Press the bearing until it is firmly seated against the shoulder of the shaft. Refer to figure 7-5.

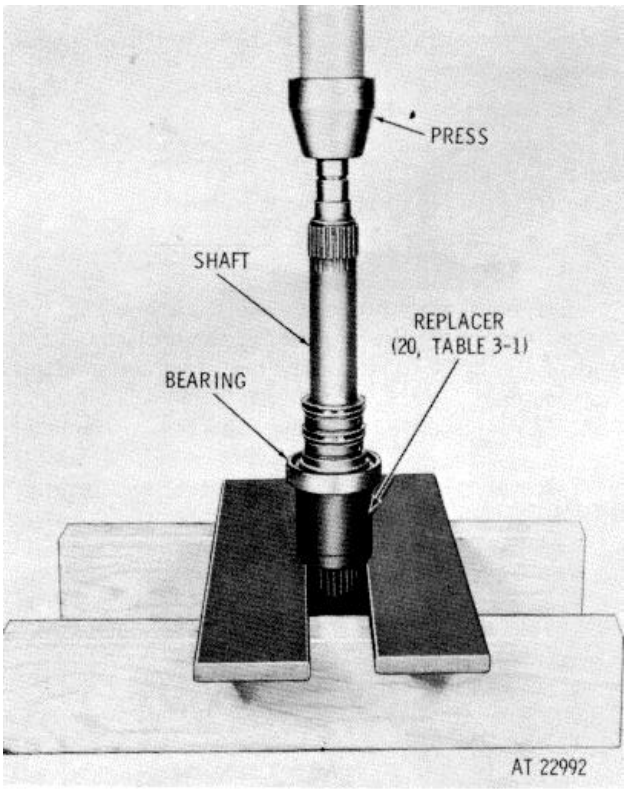


Figure 7-5. Installing bearing onto torque converter output shaft.

c. Install two step-joint sealrings (40, FO-3) onto output shaft (39) Use oil-soluble grease to retain them.

Table 7-4. Repair Standards (Converter Output Shaft)

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
3	36a	Outside diameter of bearing.....	2.9523 to 2.9528	*
3	45b	Inside diameter at bearing surface of sleeve	2.9527 to 2.9537	2.9547
3	36a 45b	Fit of bearing in sleeve..... .	0.0010T to 0.0014L	
3	36b	Inside diameter of bearing.....	1.7712 to 1.7717	
3	39b	Diameter at bearing surface of shaft	1.7714 to 1.7724	1.7709
3	36b, 39b	Fit of bearing on shaft	0.0012T to 0.0003L	

*Replace when worn beyond new dimensions.

Section VI. HIGH-RANGE CLUTCH ASSEMBLY-REPAIR

7-31. Description (FO-4)

The high-range clutch has five external-tanged clutch disks (9) which engage pins (4), and five internal-splined disks (10) that spline onto intermediate range planetary carrier (32), small end. Refer to paragraph 2-5.

7-32. Disassembly (FO-4)

a. Remove retaining ring (16) from high-range

clutch housing (2).

b. Remove high-range clutch back plate (11).

c. Remove five internal-splined (10) and five external-tanged (9) high-range clutch disks.

d. Using compressor 7, table 3-1, against spring retainer (14, (FO-4), compress the spring retainer and remove retaining ring (15). Refer to figure 7-6.

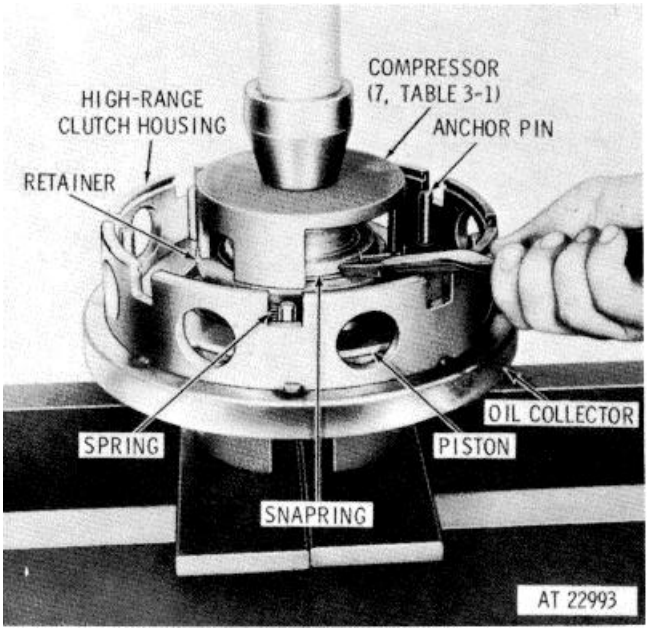


Figure 7-6. Removing (or installing) high-range clutch piston return spring retainer retaining ring.

e. Remove retainer (14, FO-4) and sixteen springs (12).

f. Remove spring retainer locating ball (13).

g. Remove eight anchor pins (4).

h. Remove high-range clutch piston (7).

i. Remove sealring (5) and expander spring (6) from piston (7), as outlined in paragraph 7-51.

WARNING

Do not dispose of Teflon sealrings by burning. Toxic gases are produced when Teflon is burned.

i. Remove sealring (8, FO-4) from hub of housing (2).

k. Do not remove two balls (3) from housing (2) except for replacement.

l. Do not remove the oil collector from the housing (fig. 7-6). If the ring is damaged, the collector and housing (2, FO-4) will have to be replaced as an assembly.

7-33. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-34. Inspection and Repair

Refer to paragraph 5-3 for inspection and repair recommendations.

7-35. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-5).

7-36. Assembly (FO-4)

a. If balls (3) were removed from housing (2), install new balls. Stake metal in three places at the end of the hole, to retain the ball, but not to affect its movement in the hole.

b. Install sealring (8) onto the hub of housing (2).

c. Install eight high-range clutch anchor pins (fig. 7-7).

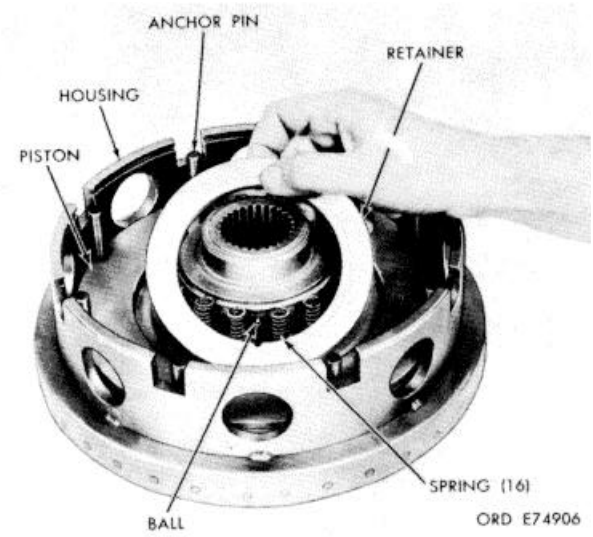


Figure 7-7. Installing high-range clutch piston return spring retainer.

d. Install expander spring (6, FO-4) and sealring (5) onto piston (7), as outlined in paragraph 7-55, following.

e. Lubricate sealring bores and sealrings with the same oil as used in the power train and carefully install piston (7) with expander spring (6) and sealring (5) into housing (2). Refer to figure 7-7.

f. Install ball (13, FO-4) into the recess of the housing hub, retaining it with oil-soluble grease (fig. 7-7).

g. Install 16 piston return springs (12, FO-4). Indexing the retainer (14) with ball (13), install the spring retainer. Refer to figure 7-7.

h. Using a press and compressor (7, table 3-1), compress the retainer and secure it with retainer ring (15, FO-4). Refer to figure 7-6.

i. After soaking internal-splined clutch disks (10, FO-4) in the same oil as used in the transmission, alternately install five external-tanged (9) and five internal-splined (10), high-range clutch disks, beginning with an external-tanged disk (9).

j. Install high-range clutch back plate (11) and secure it with retaining ring (16).

Table 7-5. Repair Standards (High-range Clutch)

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
4	2a	Outside diameter at bearing surface of housing	2.5576 to 2.5586	2.5571
4	18a	Inside diameter of bearing	2.5585 to 2.5591	*
4	2a 18a	Fit of bearing on housing	0.0001T to 0.0015L	
4	2b	Inside diameter of housing at sealrings.	3.250 to 3.252	3.254
4	2c	Inside diameter of housing at sealrings.	7.875 to 7.881	7.885
4	7a	Inside diameter of piston at sealring	.3.875 to 3.877	8.879
4	9a	Thickness of disk	0.095 to 0.098	*
4	10a	Thickness of disk	0.11 80 to 0.1240	0.1080
4	11a	Thickness of disk	0.70 to 0.365	0.364
4	12a	Free length of spring	1.691	*
4	12a	length under load	3 12 at 9.81 to 10.01lb	1.312 at 9.76 lb)

*Replace when worn beyond new dimensions.

Section VII. INTERMEDIATE-RANGE CARRIER AND LOW-RANGE SPUR GEAR ASSEMBLY-REPAIR

7-37. Description (FO-4)

Intermediate-range planetary carrier assembly (30) is a 4-pinion carrier assembly with roller bearings for each pinion. This carrier is splined to the low-range spur gear. Refer to paragraph 2-8.

7-38. Disassembly (FO-4)

a. Remove snapring (43) from low-range spur gear (44) Refer to figure 7-8.

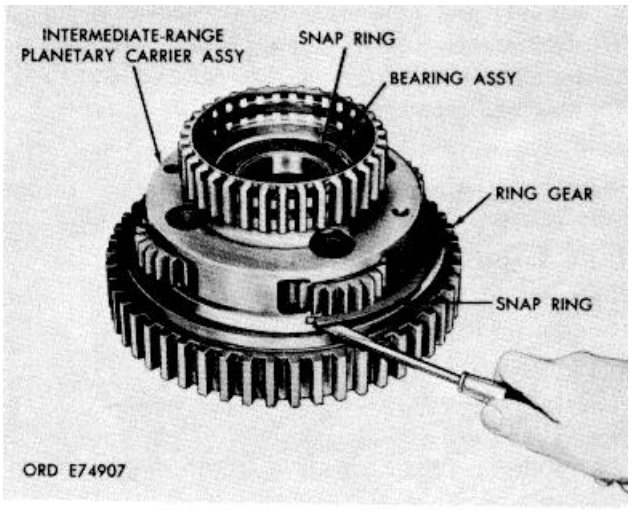


Figure 7-8. Removing snapring which retains low-range spur gear

b. Remove low-range spur gear (44, FO-4) from intermediate-range carrier assembly (30).

c. Remove the snapring and bearing assembly from the planetary carrier (fig. 7-8).

d. Remove four pins (31.7, FO-4) from carrier (32), driving them toward the inside of the carrier. Refer to figure 7-9.

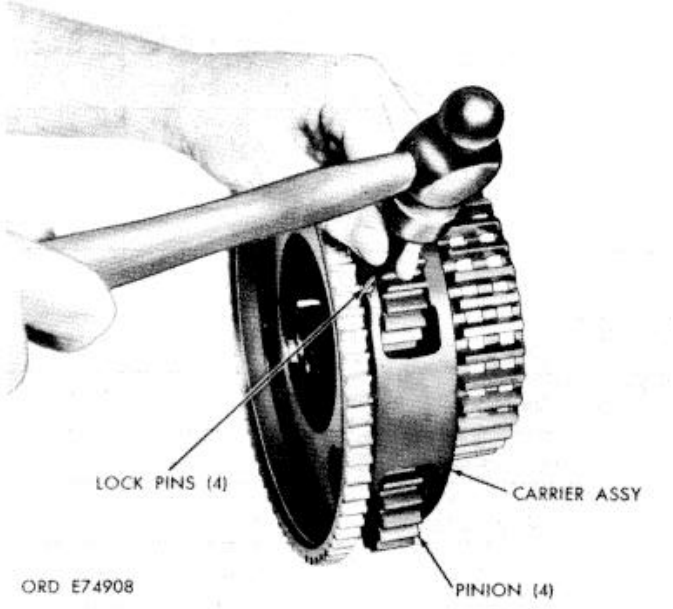


Figure 7-9. Removing spindle lock pins from intermediate range planetary carrier assembly.

e. Using a spindle of replacer assembly (22, table 3-1) and a press, remove four pinion spindles (31.8, FO-4) from carrier (32).

f. Remove eight thrust washers (31.1 and 31.5), eight spacers (31.2 and 31.4), 96 rollers (31.6) and four pinions (31.3), keeping each set of components with its pinion.

NOTE

The pinions are a matched set. Keep each pinion and its component parts in a separate container. If one pinion must be replaced, all four must be replaced with a matched set of four pinions.

7-39. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-40. Inspection and Repair

Refer to paragraph 5-3 for inspection and repair recommendations.

7-41. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-6).

7-42. Assembly (FO-4)

a. Chill spindles (31.8) for approximately 1 hour in dry ice prior to installing in planetary carrier (32).

b. Grease the bore of a pinion (31.3) with a liberal amount of oil-soluble grease.

c. Install a spacer (31.2) and thrust washer (31.1) on one end of planetary pinion (31.3).

d. Install 24 rollers (31.6) around the pinion bore wall.

e. Install another spacer (31.4) and thrust washer (31.5) on the second end of pinion (31.3).

f. Insert the pinion with spacers, rollers and washers into its location in carrier (32). Using alinement tool of replacer (22, table 3-1), aline the pinion and its components with the carrier spindle bore (fig. 7-10).

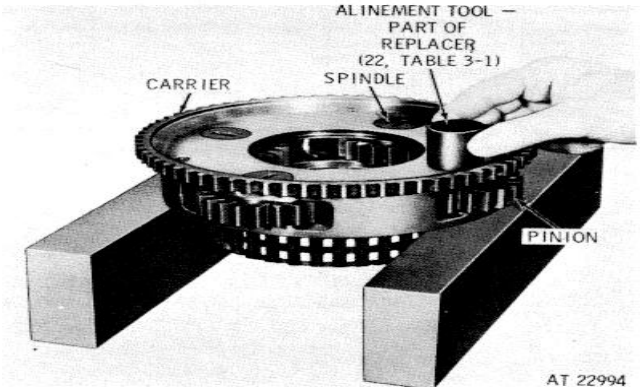


Figure 7-10. Alining pinion assembly in intermediate-range planetary carrier.

g. Using replacer (22, table 3-1). install planetary carrier pinion spindle (31.8, FO-4). Press the spindle flush with, to 0.010 inch below, the spindle bore surface of the carrier. Refer to figure 7-11.

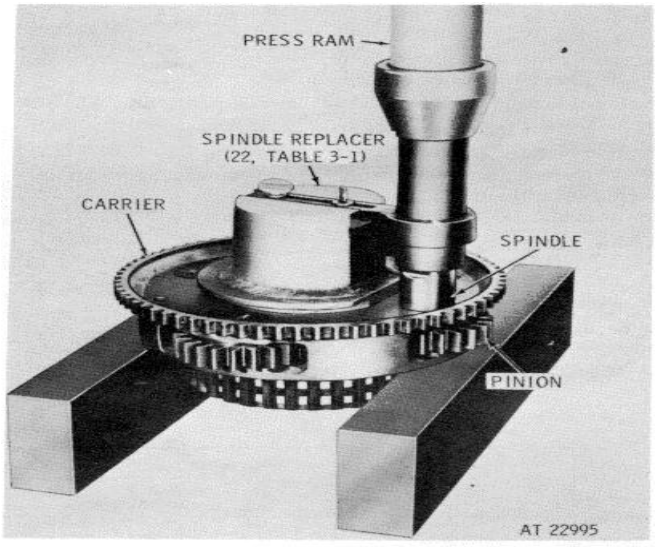


Figure 7-11. Installing spindle into intermediate-range planetary carrier.

h. Install remaining pinions (31.3, FO-4), with component parts, into carrier (32) in the same manner as described in a through g, above.

i. Install four spindle lock pins (31.7), smooth ends first, into carrier (32). Press them to 0.03 to 0.09 inch below the outer circumference of carrier (32), and stake carrier metal over the pins.

j. Install bearing (18) into carrier (32), and retain it with retaining ring (17). Refer to figure 7-8.

k. Install low-range spur gear (44, FO-4) onto intermediate-range carrier assembly (30) and then install snapring (43) to retain it. Refer to figure 7-8.

Table 7-6. Repair Standards (Intermediate-range Carrier, Low-range Spur Gear)

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	**Item**			
4	18b	Outside diameter of bearing	3.9364 to 3.9370	*
4	30a	Inside diameter at bearing surface of ... carrier	3.9362 to 3.9372	3.9382
4	18b, 30a	Fit of bearing in carrier	0.0008T to 0.00081,	
4	31.1a	Thickness of washer.....	0.0615 to 0.0635	0.0575
4	31.2a	Thickness of spacer.....	0.0600 to 0.0650	0.0550
4	31.3a	Inside diameter of pinion	1.6316 to 1.6321	1.6331
4	31.4a	Thickness of spacer.....	0.0600 to 0.0650	0.0550
4	31.5a	Thickness of washer.....	0.0615 to 0.0635	0.0575
4	31.6a	Outside diameter of roller	0.1873 to 0.1875	0.1870
4	31.8a	Outside diameter of spindle.....	1.2557 to 1.2562	1.2547

*Replace when worn beyond new dimensions.

Section VIII. LOW- AND INTERMEDIATE-RANGE CLUTCH SPACER ASSEMBLY-REPAIR

7-43. Description (FO-4)
Low- and intermediate-range clutch spacer assembly (36) separates the low-range (41 and 42) and the intermediate-range (27, 28, 33, and 34) clutch disks. Eight pins (38) are pressed through spacer (37) to anchor the external-tanged clutch disks (27, 33 and 41). Refer to paragraph 2-7.

7-44. Disassembly (FO-4)
Do not remove pins (38) from spacer (37) except for replacement.

7-45. Cleaning
Refer to paragraph 5-2 for cleaning recommendations.

7-46. Inspection and Repair
Refer to paragraph 5-3 for inspection and repair recommendations.

7-47. Repair Standards
a. Refer to paragraph 5-4 for explanation of repair standards.
b. Refer to repair standards (table 7-7).

7-48. Assembly (FO-4)
a. If pins (38) were removed from spacer (37), install new ones.
b. Install new pins (38) into shallow side of spacer (37). Press each pin in until it projects 0.900 inch above the highest surface of the spacer.

Table 7-7. Repair Standards (Low-, Intermediate-range Clutch Spacer)

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
4	27a, 33a	Thickness of disk.....	0.1166 to 0.1226	*
4	28a. 34a	Thickness of disk.....	0.1580 to 0.1630	0.1480
4	41a	Thickness of disk.....	0.1166 to 0.1226	*
4	42a	Thickness of disk..... .	0.1580 to 0.1630	0.1480

*Replace when worn beyond new dimensions.

Section IX. TEFLON SEALRINGS AND EXPANDERS-REPAIR

7-49. Description
Teflon sealrings have better wear characteristics, but are less elastic than rubber-type rings. They require an expander in most cases where the endless sealring is used. The expander is a thin wavy strip of metal with open ends and goes into the bottom of the groove between the sealring and the piston.

7-50. Instructions Apply to All Clutches
a. These instructions apply to the installation of Teflon sealrings and their expanders into all pistons or other components, regardless of the clutch applied by the piston using these rings.
b. All overhaul sections in this chapter which involve sealrings and expanders are referenced to this section for removal and installation.

7-51. Removal
a. Insert a thin bladed tool (such as shim stock) into the sealring groove, and work one edge of the sealring out where it can be grasped by the fingers.

WARNING
Do not dispose of Teflon sealrings by burning. Toxic gases are produced.

b. Remove the sealring expander. Clean the groove thoroughly, and make sure there are no burs or rough spots in the groove sides or bottom.

7-52. Cleaning
Refer to paragraph 5-2 for cleaning recommendations.

7-53. Inspection and Repair

Refer to paragraph 5-3 for inspection and repair recommendations.

7-54. Repair Standards

There no repair standards for the items involved in this section.

7-55. Installation

a. Coil the expanders as shown in figure 7-12. Inspect the ends for curvature toward the bottom of the groove (inward for external grooves (view A) outward for internal grooves (view B)).

b. Install the expander into the groove.

c. Starting at a point opposite the open ends of the expander, install the Teflon sealring. Do not stretch or deform the sealring more than absolutely necessary for installation. Work both directions from the starting point until the sealring is completely installed. Do not use tools to force the sealring-use fingers only.

d. Lubricate the sealring and center it radially in respect to the piston, or the part on which it is installed. This will aid installation of the piston into its bore.

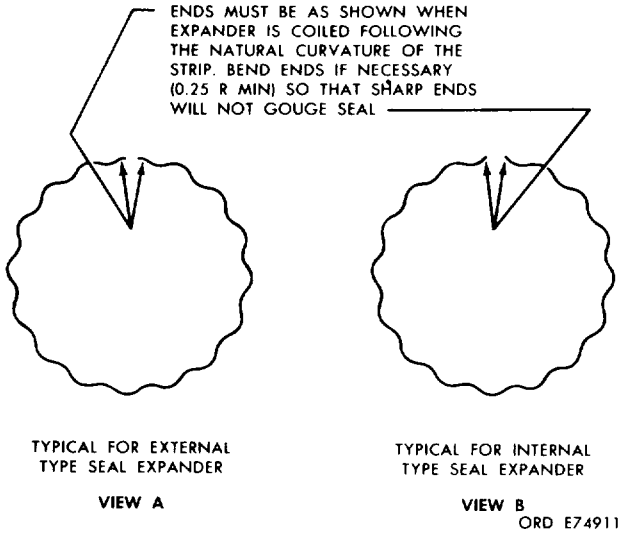


Figure 7-12. Typical expanders for Teflon Sealrings.

Section X. LOW-RANGE PLANTARY CARRIER ASSEMBLY-REPAIR

7-56. Description (FO-4)

Low-range planetary carrier assembly (50) is a 4pinion type carrier assembly with bearing rollers (51.4) for each pinion. Refer to paragraph 2-9.

7-57. Disassembly (FO-4)

a. Remove four pins (51.8) from low-range planetary carrier (52), pressing or driving the pins toward the inside of the carrier.

b. Using an alinement tool of replacer (22, table 3-1), (fig. 7-13), remove four pinion spindles (51.1, FO-4).

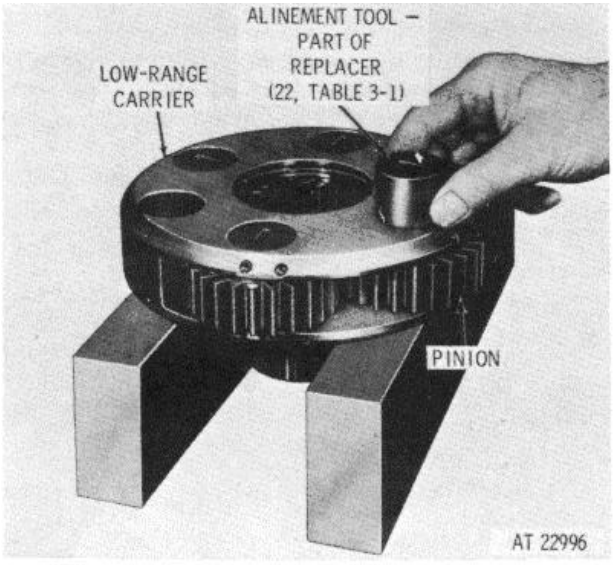


Figure 7-13. Alining pinion assembly in low-range planetary carrier.

c. Remove eight thrust washers (51.2 and 51.7), eight spacers (51.3 and 51.6), 112 rollers (51.4), and four pinions (51.5).

NOTE

Because the four pinions are a matched set, place each pinion and its component parts in a separate container. If any one of the pinions must be replaced, the whole set is to be replaced with a matched set of four pinions.

7-58. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-59. Inspection and Repair

Refer to paragraph 5-3, for inspection and repair recommendations.

7-60. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-8).

7-61. Assembly (FO-4)

NOTE

Chill spindles (51.1) in dry ice for approximately 1 hour prior to installing them in the carrier.

a. Grease the bore of a pinion (51.5) with a liberal amount of oil-soluble grease.

b. Install a spacer (51.3) and thrust washer (51.2) on one end of pinion (51.5).

c. Install 28 rollers (51.4) around the bore wall of pinion (51.5).

d. Install another spacer (51.6) and another thrust washer (51.7) on the other end of pinion (51.5).

e. Install the pinion with rollers, spacers and thrust washers into the carrier. Using an alinement tool of replacer (22, table 3-1), aline the pinion and its component parts with the spindle bore in carrier (52, FO-4). Refer to figure 7-13.

f. Using replacer (22, table 3-1), install a pinion spindle (fig. 7-14). Press the spindle flush with, to 0.010 inch below, the spindle bore surface of the carrier.

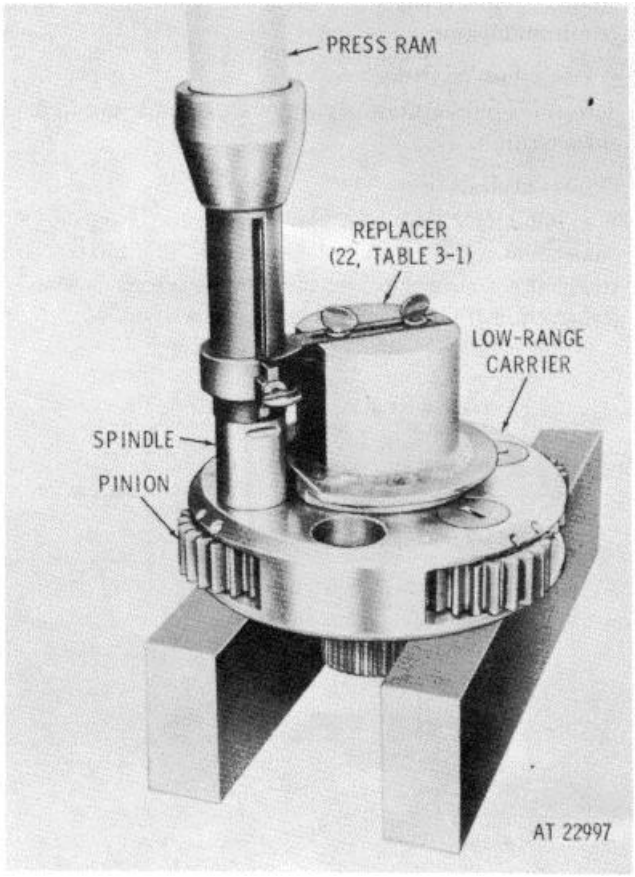


Figure 7-14. Installing spindle into low-range planetary: carrier.

g. Install a pin (51.8, FO-4), pressing it 0.030 to 0.090 inch below the pin bore surface of the carrier, and stake carrier metal over the end of the pin to retain it.

h. Install the remaining three pinions (51.5), each with its associated parts, into carrier (52), and pins (51.8), as described in *a* through *g*, above.

Table 7-8. Repair Standards (Low-range Planetary Carrier)

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
4	51.1a	Outside diameter of spindle	1.4940 to 1.4945	1.4930
4	51.2a	Thickness of washer.....	0.0615 to 0.0635	0.0575
4	51.3a	Thickness of spacer.....	0.0600 to 0.0650	0.0550
4	51.4a	Outside diameter of roller	0.1873 to 0.1875	0.1870
4	51.5a	Inside diameter of pinion	1.8702 to 1.8707	1.8717
4	51.6a	Thickness of spacer.....	0.0600 to 0.0650	0.0550
4	51.7a	Thickness of washer.....	0.0615 to 0.0635	0.0575

Section XI. RIGHT AND LEFT CROSS-SHAFT BEARING RETAINERS-REPAIR

7-62. Description

Refer to paragraph 2-10 for a description of the bearing retainers and components.

NOTE

The right and left bearing retainers require identical overhaul procedures; therefore, the right assembly only is described in the following disassembly and assembly procedures.

7-63. Disassembly (FO-5)

a. Do not remove the outer race of right bearing assembly (40) from right bearing retainer (2) unless replacement is necessary. If necessary, remove the race.

b. Do not remove right sleeve bearing (4) from right bearing retainer (2).

7-64. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-65. Inspection and Repair

Refer to paragraph 5-3 for inspection and repair recommendations.

7-66. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-9).

7-67. Assembly (FO-5)

a. If outer race of right bearing assembly (40) was removed from right bearing retainer (2), install a new replacement.

b. Press the outer race of bearing assembly (40) until it is firmly seated in retainer (2). The thicker side of the race must enter retainer first.

Table 7-9. Repair Standards (Right, Left Cross-Shaft Bearing Retainers)

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
5	2a	Inside diameter at bearing surface of ... retainer	6.1790 to 6.1800	6.1805
5	40a	Outside diameter of bearing outer race.	6.1875 to 6.1885	*
5	2a, 40a	Fit of bearing outer race in retainer.....	0.0075T to 0.0095T	
5	4a	Inside diameter of sleeve bearing at..... sealrings	5.000 to 5.002	5.040

Table 7-9. Repair Standards (Right, Left Cross-Shaft Bearing Retainers) - Continued

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
5	21a	Inside diameter at bearing surface of ... retainer	4.9930 to 4.9940	4.9945
5	46a	Outside diameter of bearing outer race.	5.000 to 5.0010	*
5	21a 46a	Fit of bearing outer race in retainer.....	0.0060T to 0.0080T	
5	21b	Outside diameter of bearing retainer at sealrings	6.246 to 6.250	6.242
5	22a	Inside diameter of sleeve bearing at..... sealring	5.000 to 5.002	5.0040

*Replace when worn beyond new dimensions.

Section XII. BEVEL GEAR HOUSING ASSEMBLY-REPAIR

7-68. Description

Refer to paragraph 2-25 for a description of the bevel gear housing components.

7-69. Disassembly (FO-5)

a. Remove plug and output pump screen from the bevel gear housing (fig. 7-15).

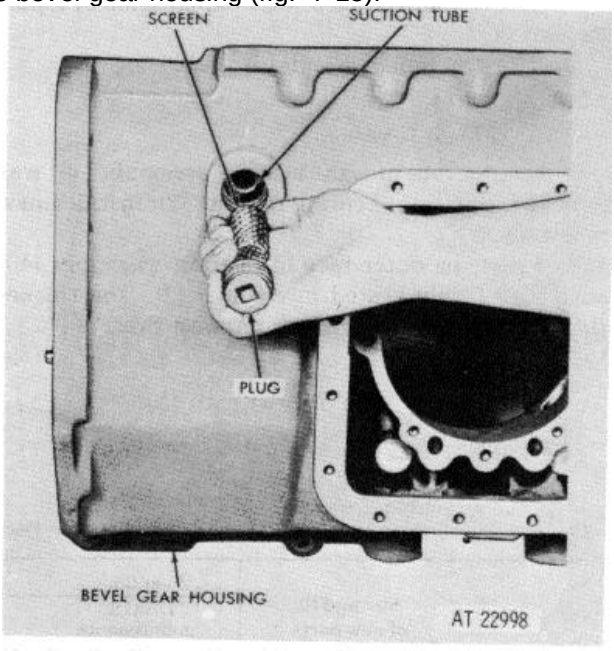


Figure 7-15. Removing (or installing) plug and output pump screen.

b. Do not remove output pump suction tube (16. FO-5) unless replacement is necessary.

c. Do not remove plugs (10, 11 and 12) from bevel gear housing 19) unless replacement is necessary, or to aid in cleaning the housing.

d. Do not remove dowel pins (13, 14, 15, and 17) unless replacement is necessary.

7-70. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-71. Inspection and Repair

Refer to paragraph 5-3 for general inspection and repair recommendations.

7-72. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards table 7-10).

7-73. Assembly (FO-5)

a. If dowel pins (13) were removed, press replacements into housing (9), so that they extend 0.30 inch above the housing surface.

b. If dowel pins (14, 15 and 17) were removed, press replacements into housing (9), flush with, to 0.03 inch below, the housing surface and stake metal over the pins.

c. If dowel pins (18) were removed, press replacements into housing (9), so that they extend 0.20 inch above the housing surface.

d. If plugs (11 and 12) were removed, install the plugs.

e. If output pump suction tube (16) was removed from housing (9), install a new replacement. Press the tube until the shoulder of the tube is firmly seated in the housing.

f. Install output pump screen (26) and plug (27) into housing (9). Refer to figure 7-15.

Table 7-10. Repair Standards (Bevel Gear Housing)

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
5	9a	Inside diameter of housing at seal	14.500 to 14.506	14.510
5	9b	Outside diameter of housing at seal.....	11.246 to 11.250	11.242
5	9c, 9d	Inside diameter of housing at sealrings.	12.625 to 12.631	12.635

Section XIII. BEVEL DRIVEN GEAR AND CROSS-SHAFT ASSEMBLY-REPAIR

7-74. Description

Refer to paragraph 2-10 for a description of the bevel driven gear and cross-shaft components.

7-75. Disassembly

(FO-5)

a. Unstake the lip of cross-shaft nut (47) from the slot in the shaft of gear and shaft assembly (43).

b. Using socket wrench (28, table 3-1), remove the nut from the shaft (fig. 7-16).

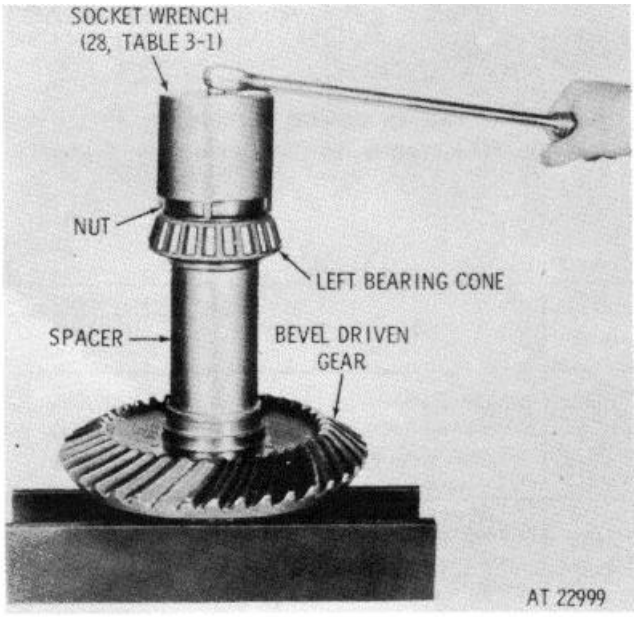


Figure 7-16. Removing (or installing) cross-shaft nut.

c. If the inner race of right bearing assembly (40, FO-5) must be removed from gear and shaft assembly (43), press the race off, using drill rods in the removal holes provided in the gear.

d. Do not attempt to separate the driven gear from the shaft.

7-76. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-77. Inspection and Repair

Refer to paragraph 5-3 for general inspection and repair recommendations.

7-78. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standard (table 7-11).

7-79. Assembly

(FO-5)

a. If the right bearing race was removed from the bevel driven gear, heat the race to approximately 2500 F. Using replacer (19, table 3-1), press the race onto the gear (fig. 7-17).

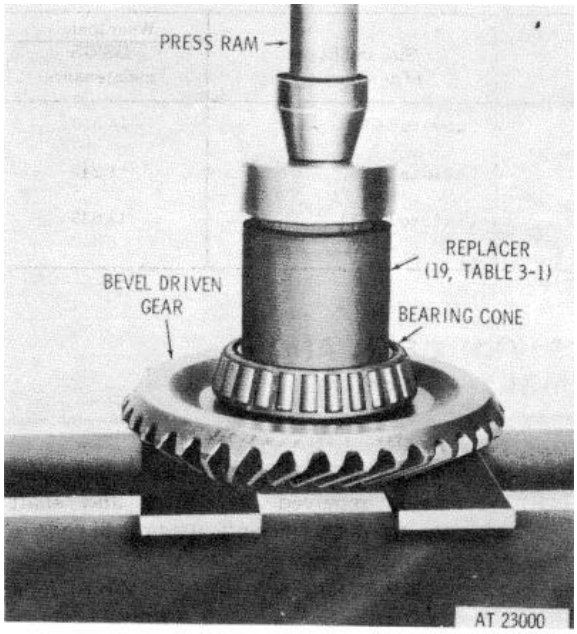


Figure 7-17. Installing bearing inner race onto bevel driven gear

b. Install spacer (45, FO-5) onto gear and shaft assembly 143).

c. Heat the inner race of bearing assembly (46) to 250° F. Using replacer (19, table 3-1) install the bearing race onto gear and shaft assembly (43). Press the bearing until it is firmly seated against spacer (45)

d. Using socket wrench (28, table 3-1), install nut (47, FO-5) with beveled side toward the bearing race. Refer to figure 7-16. Tighten the nut to 150 pound feet torque.

e. Using a center punch, stake the nut into the slots in the cross shaft (fig. 7-18).

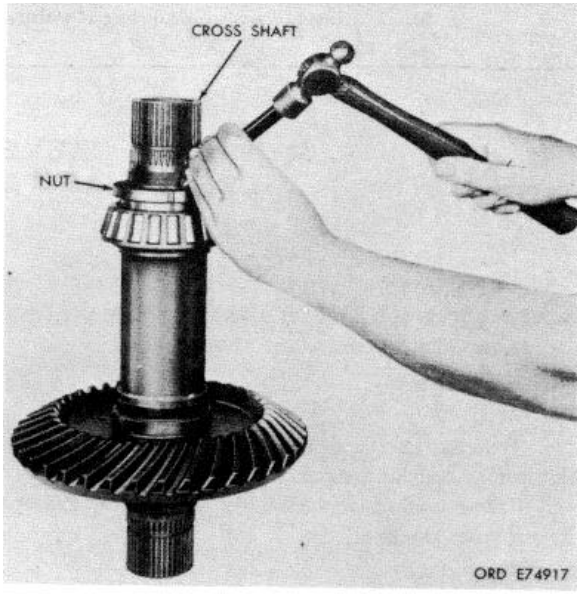


Figure 7-18. Staking nut into cross shaft.

f. Record the mounting dimension (MD) and backlash (BL) etched on the bevel driven gear.

Table 7-11. Repair Standards (Bevel Driven Gear, Cross Shaft)

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
9	12b	Outside diameter of bearing	1.8499 to 1.8504	*
5	43d	Inside diameter at bearing surface of shaft	1.8502 to 1.8510	1.8520
5,9	43d, 12b	Fit of bearing shaft	0.0002T to 0.0011L	
6	50a	Outside diameter of bearing	1.8499 to 1.8504	*
5	43c	Inside diameter at bearing surface of shaft	1.8502 to 1.8510	1.8520
5.6	43c, 50a	Fit of bearing in shaft.....	0.0002T to 0.0011L	
5	40a	Inside diameter of bearing inner race ...	4.0000 to 4.0010	*
5	43a	Outside diameter at bearing surface of gear	4.0015 to 4.0025	4.0012
5	40a, 43a	Fit of bearing inner race on gear.....	0.0005T to 0.0025T	
5	42b	Outside diameter at roller bearing surface of gear	0.8120 to 0.8125	0.8117
5	43a	Outside diameter at bearing surface of shaft	2.7510 to 2.7515	2.7507
5	46a	Inside diameter of bearing inner race....	2.7500 to 2.7505	*

*See footnote at the end of table.

Table 7-11. Repair Standards (Bevel Driven Gear, Cross Shaft) - Continued

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
5	43a, 46a	Fit of bearing inner race on shaft	0.0005T to 0.0015T	
5	43b	Outside diameter at bearing surface of . shaft	2.5576 to 2.5586	2.5571
6	28a	Inside diameter of bearing	2.5585 to 2.5591	*
5,6	43b, 28a	Fit of bearing on shaft.....	0.0001T to 0.0015L	
5	43e	Outside diameter at bearing surface of shaft	2.5576 to 2.5586	2.5571
9	34b	Inside diameter of bearing	2.5585 to 2.5591	*
5,9	43e 34b	Fit of bearing on shaft.....	0.0001T to 0.0015L	

*Replace when worn beyond new dimensions

Section XIV. BEVEL DRIVE GEAR ASSEMBLY-REPAIR

7-80. Description

Refer to paragraph 2-10 for a description of the bevel drive gear components.

7-81. Disassembly

(FO-5)

a. Remove two flat-head screws from the bevel pinion carrier (fig. 7-19).

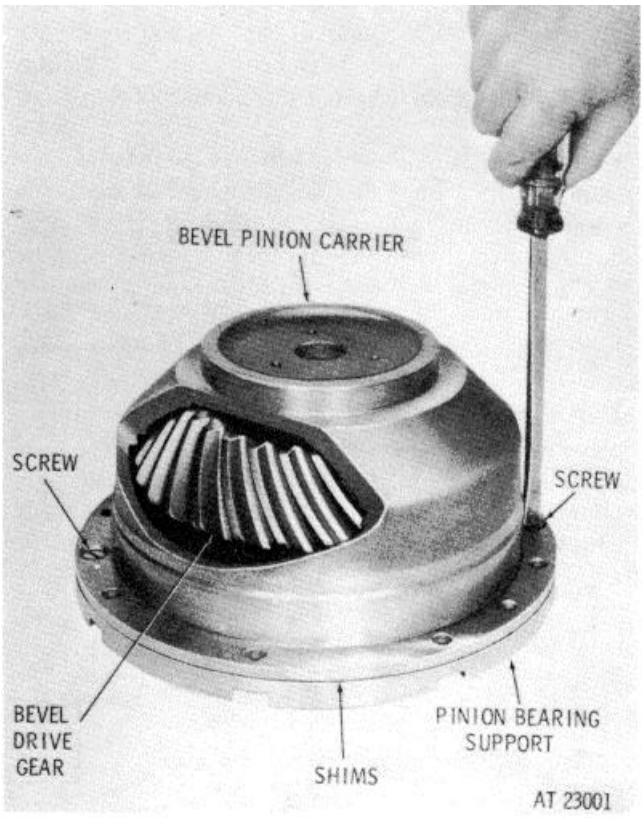


Figure 7-19. Removing(or installing) bevel drive gear assembly screws.

b. Using two 3/8 16 bolts as jackscrews. loosen the bevel pinion bearing support from the bevel pinion carrier (fig. 7-20).

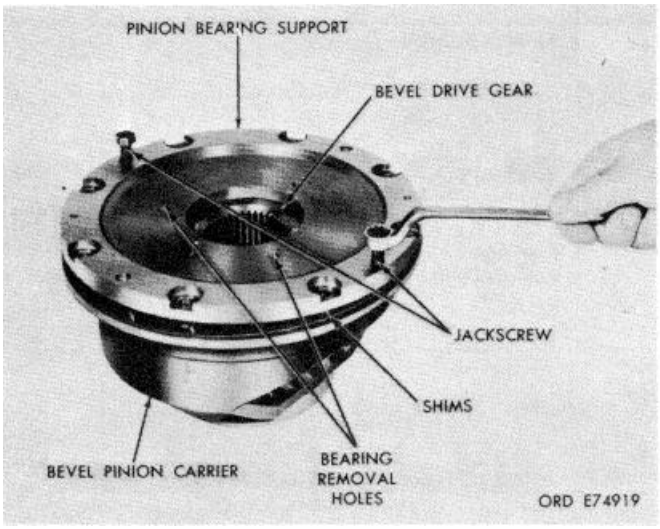


Figure 7-20. Loosening pinion bearing support.

c. Remove the bevel pinion bearing support and shims (fig. 7-20). Remove the shims from the bearing support and record the thickness of the shim pack. Tie the shims together and identify them as to location.

d. Do not remove the inner race of bearing assembly (36, FO-5) unless replacement is necessary. If the race must be removed, insert drill rod into the removal holes in pinion bearing support (38). Tap on the drill rod with a hammer to remove the race.

e. Remove bevel drive gear (44) and outer race of bearing assembly (36) from bevel pinion carrier (32).

f. Do not remove the bearing outer race unless replacement is necessary.

g. If replacement is necessary, use puller attachment (17, table 3-1), forcing screw (23, table 3-1) and puller adapter (6, table 3-1) to remove the bearing race (fig. 7-21).

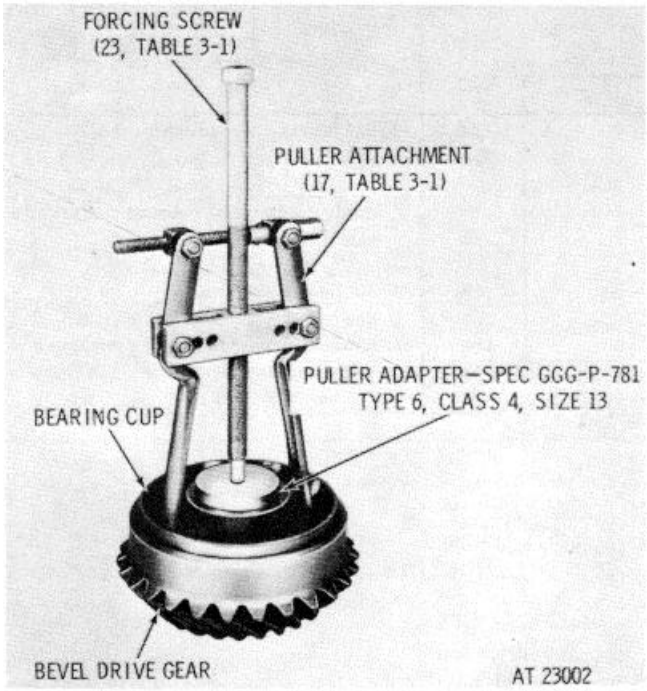


Figure 7-21. Removing bevel drive gear front hearing outer race.

h. Do not remove inner race of bearing assembly (35, FO-5) from bevel pinion carrier (32) unless replacement is necessary. If replacement is necessary, use a drill rod in the removal holes provided in the bevel pinion carrier and press or drive out the bearing inner race.

i. Do not remove outer race of bearing assembly (35) from bevel drive gear (44) unless replacement is necessary.

j. If replacement is necessary, use puller kit (18, table 3-1) and puller attachment (17, table 3-1) to remove the bearing race from the bevel drive gear (fig. 7-22).

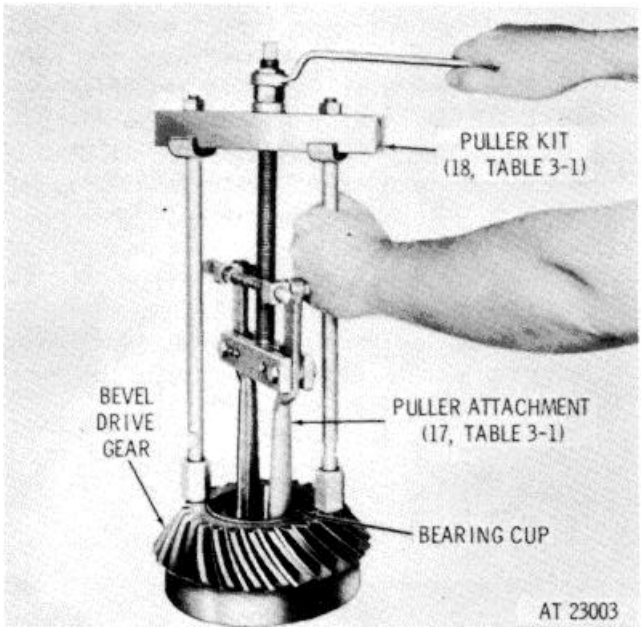


Figure 7-22. Removing bevel drive gear rear bearing outer race.

7-82. Cleaning
Refer to paragraph 5-2 for cleaning recommendations.

7-83. Inspection and Repair
Refer to paragraph 5-3 for general inspection and repair recommendations.

7-84. Repair Standards
a. Refer to paragraph 5-4 for explanation of repair standards.
b. Refer to repair standards (table 7-12).

7-85. Assembly (FO-5)
a. If inner race of bearing assembly (35) was removed from bevel pinion carrier (32), install a new replacement. Using replacer (20, table 3-1), press the bearing inner race onto the hub of the carrier until it is firmly seated (fig. 7-23).

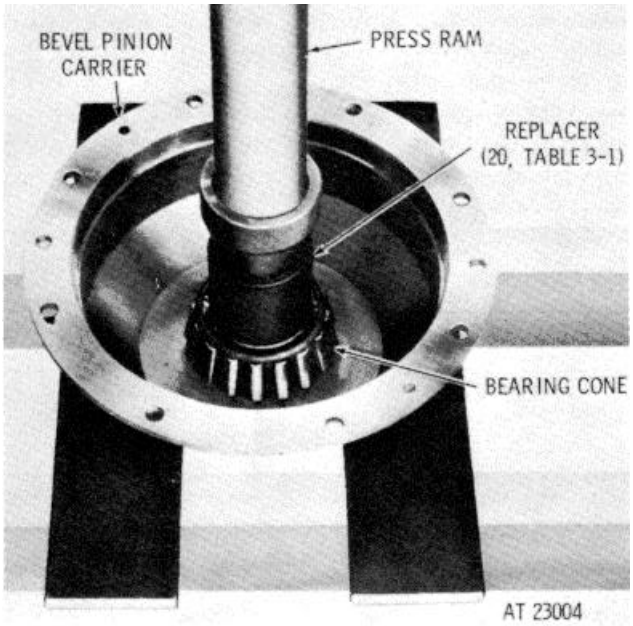


Figure 7-23. Installing bearing inner race onto hub of bevel pinion carrier

b. Install the rear bearing outer race into the bevel drive gear, using replacer (19. table 3-1). Press the race until it is firmly seated in the gear (fig. 7-24).

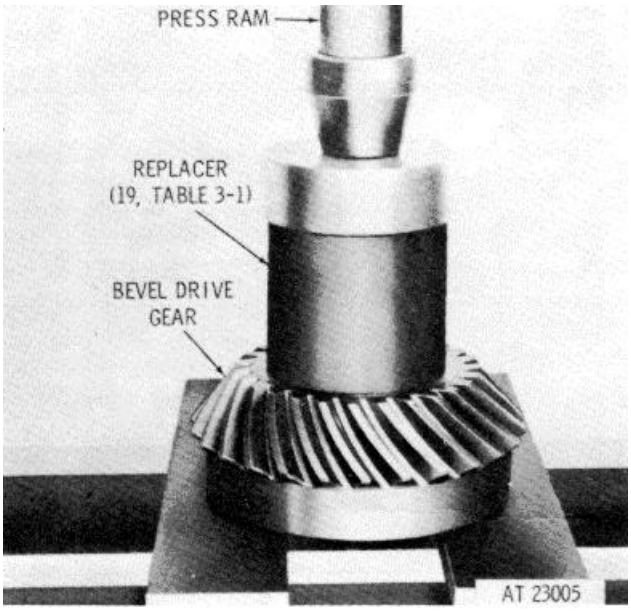


Figure 7-24. Installing rear bearing outer race into bevel drive gear

c. If inner race of bearing assembly (36, FO-5) was removed, install a new race into the opposite side of bevel drive gear (44). Press the race until it is firmly seated in the gear.

d. Using replacer (21, table 3-1), install the bearing inner race into the bevel pinion bearing support. Press the race until firmly seated on the support (fig. 7-25).

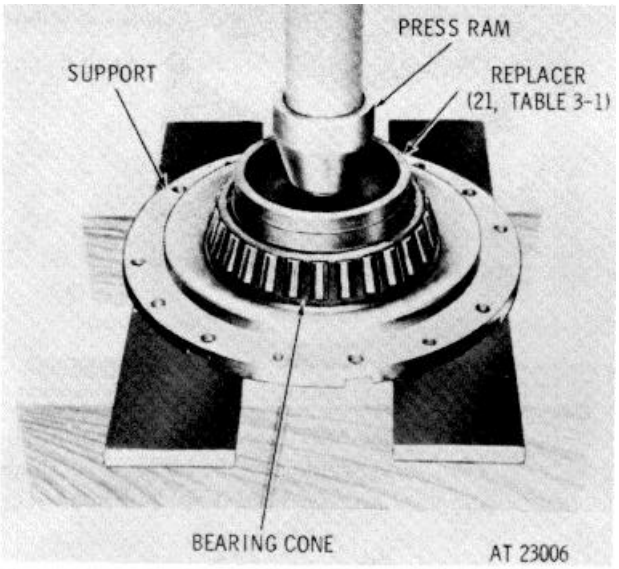


Figure 7-25. Installing bearing inner race onto pinion bearing support

e. Before proceeding further with the assembly, refer to paragraph 8-3 for the procedure to determine the nominal shim dimension between pinion bearing support (38, FO-5) and bevel pinion carrier (32).

f. Record the mounting distance (MD) and backlash (BL) as etched on bevel drive gear (44).

g. Install shims to obtain proper nominal spacing. If no new parts were installed in the bevel drive gear assembly, install the original shim pack used on the carrier.

h. Install the bearing support and shims onto the bevel pinion carrier, alining the bolt holes (fig. 7-19).

i. Secure the bearing support to the bevel pinion carrier with two flat-head screws (fig. 7-19).

Table 7-12. Repair Standards (Bevel Drive Gear)

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
5	32a	Outside diameter at bearing surface of carrier	1.9385 to 1.9390	1.9382
5	35a	Inside diameter of bearing inner race	1.9375 to 1.9380	*
5	32a, 35a	Fit of bearing inner race on carrier	0.0005T to 0.0015T	
5	35a	Outside diameter of bearing outer race	4.0625 to 4.0635	
5	44b	Inside diameter at bearing surface of gear	4.0605 to 4.0615 4.0620	
5	35a 44b	Fit of bearing outer race in gear	0.00 I10T to 0.0030T	
5	42a	Outside diameter at ball bearing surface of gear	0.9839 to 0.9849	0.9836
11	38a	Inside diameter of bearing assembly	0.9839 to 0.9843	*
5.11	42a. 38a	Fit of bearing on gear	0.00 0T to 0.0004L	
5	36a	Outside diameter of bearing outer race	6.5000 to 6.5010	*
5	44a	Inside diameter at bearing surface of gear	6.4970 to 6.4990	6.4995
5	36a, 44a	Fit of bearing outer race in gear	0.00 01T to 0.0040T	

*See foot not at the end of table.

Table 7-12. Repair Standards (Bevel Drive Gear)--Continued

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
5	36a	Inside diameter of bearing inner race ...	4.2500 to 4.2510	*
5	38a	Outside diameter at bearing surface of . support	4.2515 to 4.2525	4.2512
5	36a, 38a	Fit of bearing inner race on support	0.0005T to 0.0025T	

*Replace when worn beyond new dimensions.

Section XV. STEER COOLANT CHECK VALVE RETAINER ASSEMBLY-REPAIR

NOTE

Right and left assemblies use identical parts and require identical repair procedures; however, the assembly relation of parts differs for left and right. They must be kept separate so that each will be assembled properly in the transmission. Only the right side parts are referenced in the following procedures.

7-86. Description

(FO-9)

The steer coolant check valve (53) is a two-diameter, step-type, spool-shape valve. Its larger diameter end enters a bore in steer coolant check valve retainer assembly (48). The smaller diameter end passes through a hole in reverse-range reaction clutch disk (30), where it is retained by a spring-type pin (52).

7-87- Disassembly

(FO-9)

a. Remove Teflon sealring (56) and expander (55) from retainer assembly (48) as outlined in paragraph 7-51.

b. Do not remove alinement pin (51) or guide pins (49) from retainer (50) except for replacement. If alinement pin (51) is removed, mark the hole from which it is removed for proper replacement.

c. Remove steer coolant check valve (53) only if it needs replacement by pulling out pin (52). To insure proper assembly, mark the hole and the side of disk (30) from which the valve was removed.

7-88. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-89. Inspection and Repair

Refer to paragraph 5-3 for general inspection and repair recommendations.

7-90. Repair Standards

These components do not involve repair standards.

7-91. Assembly

(FO-9)

a. If any of the 11 guide pins (49) were removed from retainer (50) for replacement, install new pins. Press each pin until it projects 1.to 1.80 inch above the flat side of the retainer.

b. If alinement pin (51) was removed from retainer (50) for replacement, install a new pin into the same hole from the flat side of the retainer. Press the pin in unit it projects 1.76 to 1.80 inch above the flat side of the retainer.

c. If valve (53) was removed from reaction disk (30) for replacement, install a new valve into the same hole, from the same side of the plate as removed (marked at disassembly). Install retaining pin (52) through valve (53), letting it protrude equal lengths at each side of the valve stem.

d. Install expander (55) and sealring (56), as outlined in paragraph 7-55, preceding.

Section XVI. REVERSE-RANGE PLANETARY CARRIER ASSEMBLY-REPAIR

NOTE

The right and left carrier assemblies are identical, therefore, the right assembly only is described in the following procedures.

7-92. Description

(FO-9)

Reverse-range planetary carrier assembly (36) is 6 pinion type carrier assembly with rollers (39.5) for each pinion (39.4). Refer to paragraph 2-11.

7-93. Disassembly
(FO-9)

a. Remove two sealrings (41 and 42) from the hub of reverse-range carrier assembly (36).

b. Remove retaining snap ring (35), retaining reverse-range clutch hub (43). Refer to figure 7 26.

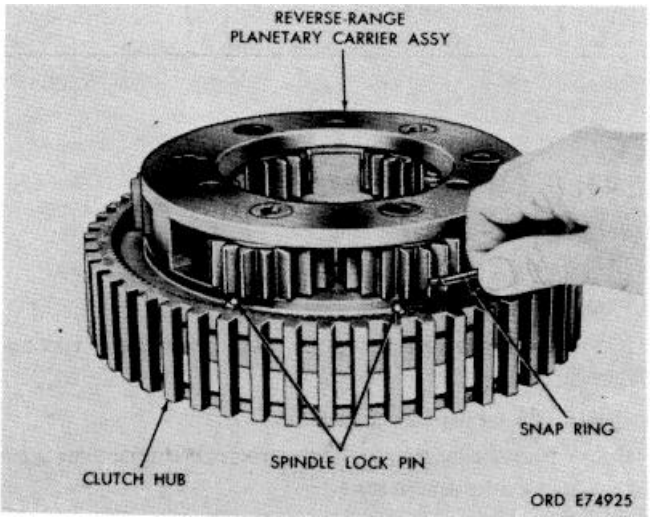


Figure 7-26. Removing (or installing) retaining snap ring which retains reverse-range clutch hub.

c. Remove hub (43, FO-9) and retaining ring (44) from the hub.

d. Remove retaining rings (33 and 40) from carrier assembly (36).

e. Remove bearing assembly (34) from carrier assembly (36).

f. Remove six pins (39.8) from carrier (38), driving them toward the inside of the carrier.

g. Do not remove pins (37) from carrier (38) unless replacement is necessary.

h. Using an alinement tool of replacer assembly (22, table 3-1), remove six spindles (39.1. FO-9), six pinions (39.4) 12 thrust washers (39.2 and 39.7), 12 spacers (39.3 and 39.6) and 150 pinion rollers (39.5) from carrier (38) Refer to figure 7-27.

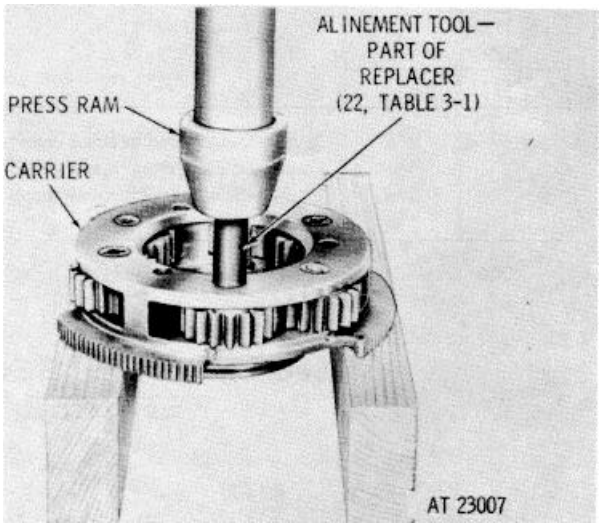


Figure 7-27 Pressing spindle from reverse-range planetary carrier.

NOTE

The pinions are a matched set. Therefore, each pinion and its component parts should be placed in a separate container. If one of the pinions must be replaced, the entire set of six must be replaced.

7-94. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-95. Inspection and Repair

Refer to paragraph 5-3 for inspection and repair recommendations.

7-96. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standard (table 7-13).

7-97. Assembly (FO 9)

NOTE

Chill spindles (39.1) in dry ice for approximately 1 hour prior to installing in the carrier.

a. If the six pins (37) were removed, install new ones. Press the pins into the carrier, to 0.010 inch below the plug bore surface of carrier (38). Stake metal over each plug at two places.

b. Grease the bore of a pinion (39.4) with a liberal amount of oil-soluble grease.

c. Install a spacer (39.3) and a thrust washer (39.2) on one side of pinion (39.4).

d. Install 25 pinion rollers (39.5) inside pinion (39.4) around the bore wall.

e. Install another spacer (39.6) and another thrust washer (39.7) on the other end of pinion (39.4).

f. Install the pinion with rollers, washers and spacers into the carrier, using alining tool of replacer (22, table 3 1) to aline the pinion components with the spindle bore in the carrier.

g. Using spindle replacer (22, table 3-1), and indexing the spindle and replacer, install the spindle into the carrier. Press the spindle flush with, to 0.010 inch below, the spindle bore of the carrier. Refer to figure 7-28.

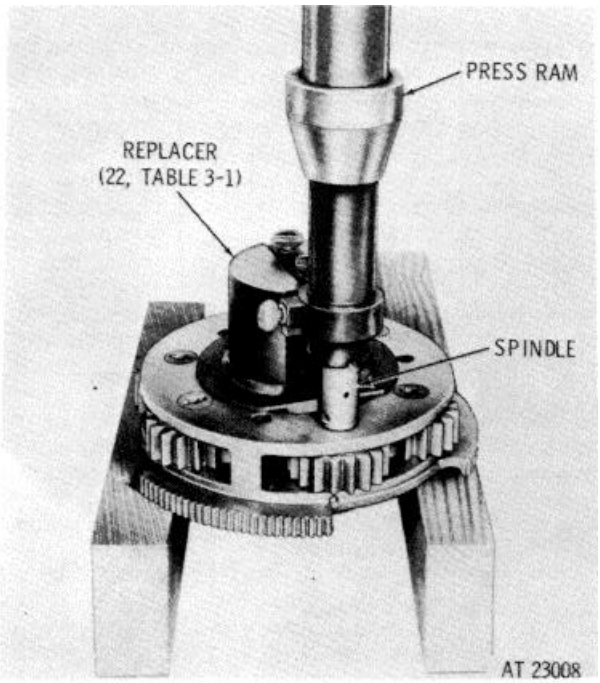


Figure 7-28. Installing spindle into reverse-range planetary carrier.

h. Install a pin (39.8, FO-9), pressing it 0.030 to 0.090 inch below the pin bore surface of carrier (38). Stake carrier metal over the pin at two places.

i. Install the remaining five pinions, each with its associated parts, and pins (39.8) into the carrier as described in b through h, above.

j. Install retaining ring (40) into the hub of planetary carrier assembly (36).

k. Install bearing (34) into the hub of carrier assembly (36). Press the bearing until it is firmly seated against retaining ring (40).

l. Install retaining ring (33) into the hub of carrier assembly (36).

m. Install retaining ring (44) into reverse-range clutch hub (43).

n. Install hub (43) with retaining snap ring (44) onto reverse-range carrier assembly (36), Refer to figure 7-29.

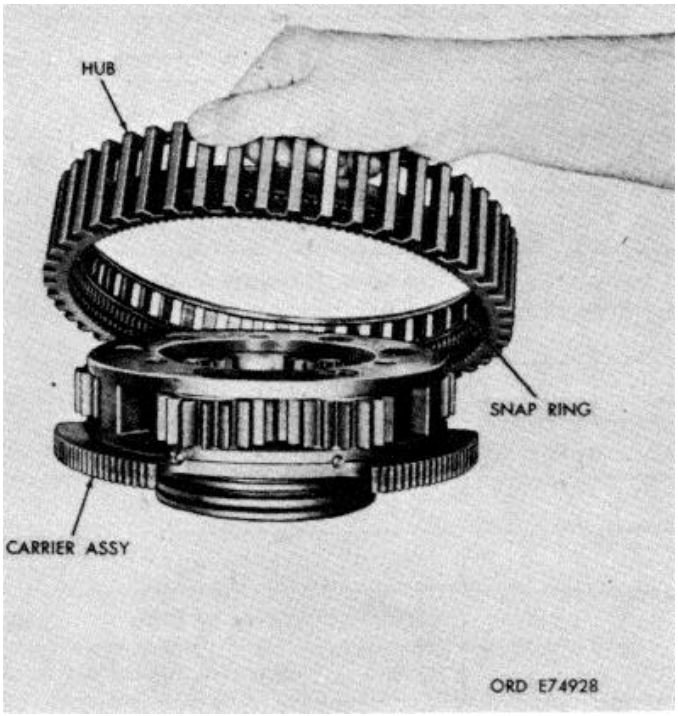


Figure 7-29. Installing reverse-range clutch hub onto carrier assembly.

o. Install retaining ring (35, FO-9) into reverse-range clutch hub (43).

p. Install two sealrings (41 and 42) onto the hub of reverse-range carrier assembly (36). Retain them with soluble grease.

Table 7-13. Repair Standards (Reverse-range Planetary Carrier)

Reference			Size and fit	Wear limit DS/GS
Foldout	Item	Point of measurement ..... of new parts		maintenance
6	3a	Outside diameter of piston at sealring...	12.321 to 12.325	12.317
6	17a	Free length of spring.....	2.0480	
6	17a	Length of spring under load	1.79 at 24.62 to 30.02 lb	1.79 at 23.12 lb
6	58a	Outside diameter at bearing surface of . carrier	2.7549 to 2.7559	2.7546
7	20a	Inside diameter of bearing	2.7553 to 2.7559	*
6, 7	58a, 20a	Fit of bearing on carrier	0.0006T to 0.0010L	
6	24a	Inside diameter at bearing surface of .... carrier	3.9369 to 3.9377	3.9387
6	28b	Outside diameter of bearing	3.9364 to 3.9370	*
6	24a, 28b	Fit of bearing in carrier	0.000 T to 0.0013L	
6	26.1a	Thickness of washer.....	0.0615 to 0.0635	0.0575
6	26.2a	Thickness of spacer.....	0.0600 to 0.0650	0.0550
6	26.3a	Inside diameter of pinion	1.1303 to 1.1308	1.1318
6	26.4a	Outside diameter of roller	0.1248 to 0.1250	0.1245
6	26.5a	Thickness of spacer.....	0.0600 to 0.0650	0.0550
6	26.6a	Thickness of washer.....	0.0615 to 0.0635	0.0575
6	26.7a	Outside diameter of spindle	0.8793 to 0.8798	0.8733
6	32a	Thickness of disk.....	0.1166 to 0.1226	0.1156
6	33a	Thickness of disk.....	0.1580 to 0.1630	0.1480
6	34a	Thickness of disk.....	0.1166 to 0.1226	*
9	28a	Thickness of disk.....	0.1 166 to 0.1226	0.1156
9	29a	Thickness of disk.....	0.1580 to 0.1630	0.1480
9	30a	Thickness of disk.....	0.1 166 to 0.1226	0.1156
9	34a	Outside diameter of bearing	3.9364 to 3.9370	*
9	38a	Inside diameter at bearing surface of ... carrier	3.9369 to 3.9377	3.9387
9	34a, 38a	Fit of bearing in carrier	0.0001T to 0.00131.	
9	39.1a	Outside diameter of spindle	0.8793 to 0.8798	0.8783
9	39.2a	Thickness of washer.....	0.0615 to 0.0635	0.0575
9	39.3a	Thickness of spacer.....	00.600 to 0.0650	0.0555
9	39.4a	Inside diameter of pinion	1.1303 to 1.1308	1.1318
9	39.5a	Outside diameter of roller	1248 to 0.1250	0.1245
9	39.6a	Thickness of spacer.....	0.0600 to 0.0650	0.0550

*See footnote at the end of table.

Table 7-13. Repair Standards (Reverse-range Planetary Carrier)-Continued

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
9	39.7a	Thickness of washer.....	0.0615 to 0.0635	0.0575
9	45a	Free length of spring.....	2.0480	*
9	45a 30.02 lb	Length under load	1.79 at 24.62 to	1.79 at 23.12 lb
9	59a	Outside diameter of piston at sealring...	12.321 to 12.325	12.317

*Replace when worn beyond new dimensions.

Section XVII. STEER PLANETARY CARRIER AND OUTPUT SHAFT ASSEMBLY-REPAIR

7-98. Description (FO-9)

Steer planetary carrier assembly (2) and output shaft assembly (8) are identical for left and right locations. The carrier is a 6-pinion type planetary with pinions (7.3) turning on needle-type rollers (7.4). Output shaft (9) is splined to and connects carrier assembly (2), output clutch hub (107, FO-8) and transfer drive gear (20). Refer to paragraph 2-14.

NOTE

The right and left steer planetary carrier and output shaft assemblies are identical, therefore, only the right assemblies are described in the following procedures.

7-99. Disassembly (FO-9)

a. Remove the snapring which retains the steer planetary carrier assembly in the brake hub (fig. 7-30).

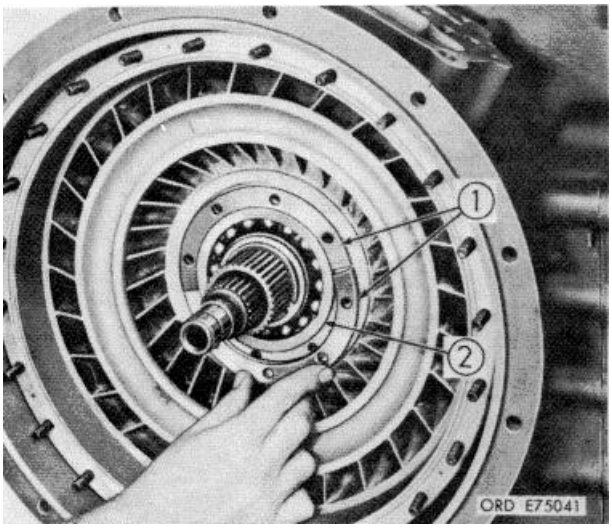


Figure 7-30. Removing (or installing) snapring which retains brake hub.

b. Remove output shaft assembly (8, FO-9) and steer plantar' carrier assembly (2) from brake hub (17) as an assembly (fig. 7-31).

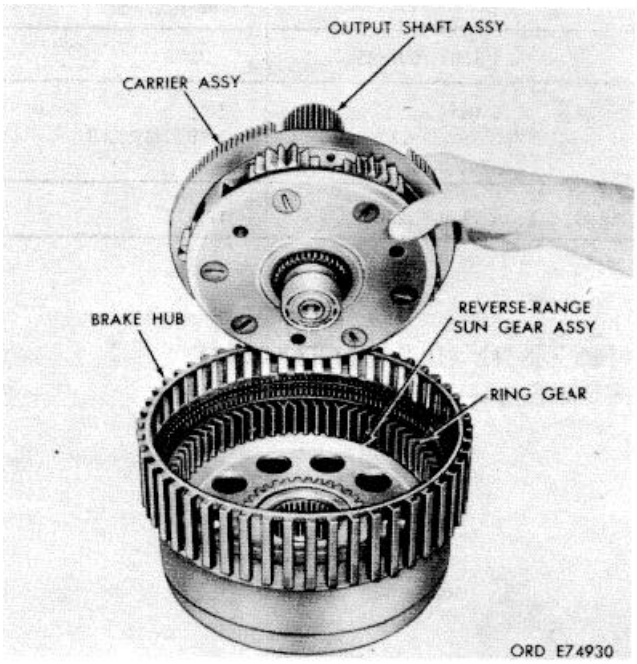


Figure 7-31. Removing for installing) steer planetary carrier assembly.

c. Remove the steer planetary ring gear and the reverse-range sun gear assembly from the brake hub (fig. 7-31).

d. Remove retaining ring (16, FO-9) from steer planetary ring gear (13).

e. Remove reverse-range sun gear assembly (15) from steer planetary ring gear (13).

f. Do not disassemble reverse-range sun gear assembly (15) If the gear or hub of assembly (15) is damaged, replace the entire assembly.

g. the lock tabs on oil collector (5) and remove six bolts (6) the baffle on steer planetary carrier (4).

h. Remove collector (5) from carrier (4).

i. Remove six spindle lock pins (7.7) from steer planetary carrier (4) by driving them toward the inner diameter of the carrier and bending the pins if necessary.

j. Using an alinement tool of replacer (22, table 3-1). press six spindles (7.8) from carrier (4) and remove six pinions (7.3), 12 washers (7.1 and 7.6), 12 spacers (7.2 and 7.5) and 150 pinion rollers (7.4) from the carrier.

NOTE

Pinions are a matched set and each pinion and its component parts should be placed in a separate container. If one pinion must be replaced, it is necessary to replace the entire set of six pinions.

k. Remove baffle (3) from carrier (4) only for replacement.

l. Remove ball bearing (12) from output shaft assembly (8) only for replacement. Do not remove retaining ring (10) except for replacement, as it is not reusable.

7-100. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-101. Inspection and Repair

Refer to paragraph 5-3 for inspection and repair recommendations.

7-102. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-14).

7-103. Assembly (FO-9)

a. If double-row ball bearing (12) was removed from output shaft assembly (8), install a new bearing. Using replacer (21, table 3-1), (fig. 7-32), install the bearing onto the shaft. Press the bearing until it is firmly seated against the shoulder on the shaft.

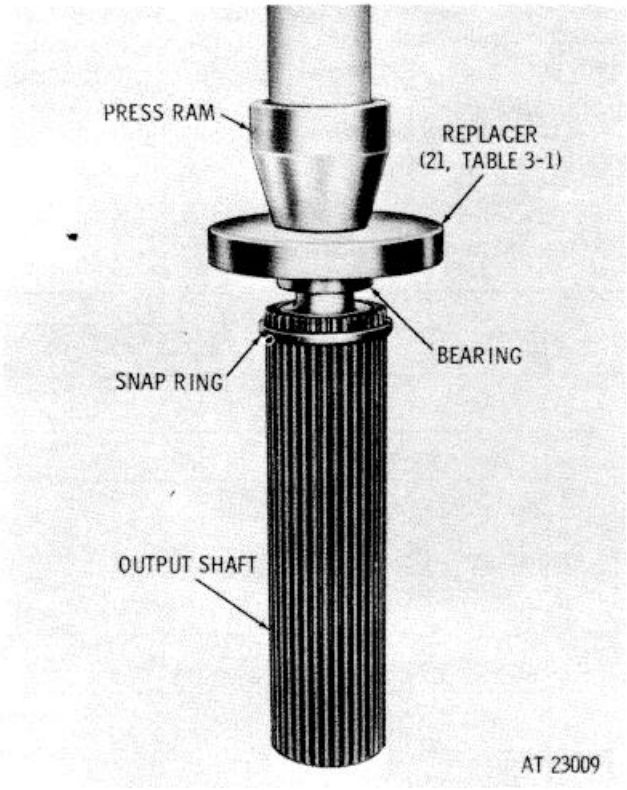


Figure 7-32. Installing double-row ball bearing onto output shaft.

b. If baffle (3, FO-9) was removed from carrier (4), install a new one. Stake the baffle plate two places at each of three locations around the inside diameter of the baffle to secure it to the carrier.

c. Grease the bore of a pinion (7.3) with a liberal amount of oil-soluble grease.

d. Install a spacer (7.2) and a thrust washer (7.1) onto one side of pinion (7.3) with oil-soluble grease.

e. Insert 25 pinion rollers (7.4) inside pinion (7.3) around the bore wall.

f. Install another spacer (7.5) and another thrust washer (7.6) on the other end of pinion (7.3).

g. Install the pinion with rollers, washers and spacers into the carrier using an alinement tool of replacer (22, table 3) to aline the pinion components with the spindle bore in the carrier. Refer to figure 7-33.

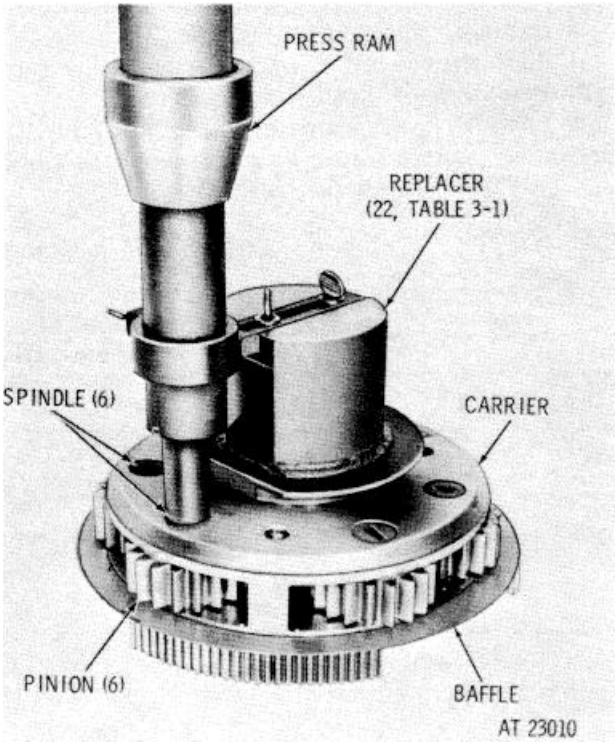


Figure 7-33. Installing spindle into steer planetary carrier.

h. Using spindle replacer (22, table 3-1), and indexing the spindle and replacer, install the spindle into the carrier. Press the spindle flush with, to 0.010 inch below, the spindle bore surface of the carrier (fig. 7-33).

i. Install pin (7.7, FO-9) into carrier (4). Press the pin 0.030 to 0.090 inch below the pin bore surface of the carrier outside diameter. Stake carrier metal over the pin at two places.

j. Install the remaining five pinions (7.3) with their components, and pins (7.7), into the carrier in the same manner as described in c through i, above.

k. Install oil collector (5) on carrier (4) and secure it with six 5/16-24 x 5/8 bolts (6). Bend a lock tab on the oil collector against the head of each bolt (6).

l. Install shaft assembly (8) into steer planetary carrier assembly (2) Insert the shaft through the side of the carrier opposite oil collector (5).

m. Install reverse-range sun gear assembly (15) into steel planetary ring gear (13) and secure it with retaining ring (16).

n. Place brake hub (17) on the assembly table, with its external-splined end up.

o. Install reverse-range sun gear assembly (15) and steer planetary ring gear (13) as an assembly, sun gear first, into brake hub (17).

p. Install the steer planetary carrier assembly and output shaft as an assembly, carrier end first, into the brake hub (fig. 7-31). Rotate the output shaft to mesh the carrier pinions with the ring gear.

q. Install the snapring into the brake hub to retain the hub (fig. 7-30).

Table 7-14. Repair Standards (Steer Planetary Carrier, Output Shaft)

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
6	42a	Inside diameter of cam at sealring	13.625 to 13.631	13.635
6	48a	Thickness of thrust washer	0.246 to 0.248	0.2420
6	50b	Inside diameter of bearing	0.7870 to 0.7874	*
6	52a	Outside diameter at bearing surface of shaft extension	0.7880 to 0.7883	0.7877
6	50b, 52a	Fit of bearing on shaft.....	0.0013T to 0.0006T	
6	60.1a	Thickness of washer	0.0615 to 0.0635	0.0575
6	60.2a	Thickness of spacer.....	0.0600 to 0.0650	0.0550
6	60.3a	Inside diameter of pinion	1.1303 to 1.1308	1.1318
6	60.4a	Outside diameter of roller	0.1248 to 0.1250	0.1245
6	60.5a	Thickness of spacer.....	0.0600 to 0.0650	0.0550
6	60.6a	Thickness of washer	0.0615 to 0.0635	0.0575
6	60.8a	Outside diameter of spindle	0.8793 to 0.8798	0.8783
9	7.1a	Thickness of washer	0.0615 to 0.0635	0.0575
9	7.2a	Thickness of spacer.....	0.0600 to 0.0650	0.0550
9	7.3a	Inside diameter of pinion	1.1303 to 1.1308	1.1318
9	7.4a	Outside diameter of roller	0.1248 to 0.1250	0.1245
9	7.5a	Thickness of spacer.....	0.0600 to 0.0650	0.0550
9	7.6a	Thickness of washer	0.0615 to 0.0635	0.0575
9	7.8a	Outside diameter of spindle	0.8793 to 0.8798	0.8783
9	11a	Outside diameter at bearing surface of shaft extension	0.7880 to 0.7883 0.7877	
9	12a	Inside diameter of bearing	0.7870 to 0.7874	
9	11a, 12a	Fit of bearing on shaft extension.....	0.0013T to 0.0006L	
9	11a	Thickness of thrust washer	0.246 to 0.248	0.242
9	19a	Inside diameter of cam at sealring	13.625 to 13.631	13.635

*Replace when worn beyond new dimensions.

Section XVIII. RIGHT AND LEFT BRAKE AND STEER CLUTCH-REPAIR

7-104. Description.

Refer to paragraphs 2-13 and 2-15 for description of the right and left brakes and steer clutches.

7-105. Disassembly (FO-7)

NOTE

The right and left assemblies are identical; therefore, only the left assembly is described in the following procedures.

a. Position the assembly in a press with the steer clutch (side with fewer plates) down (fig. 7-34).

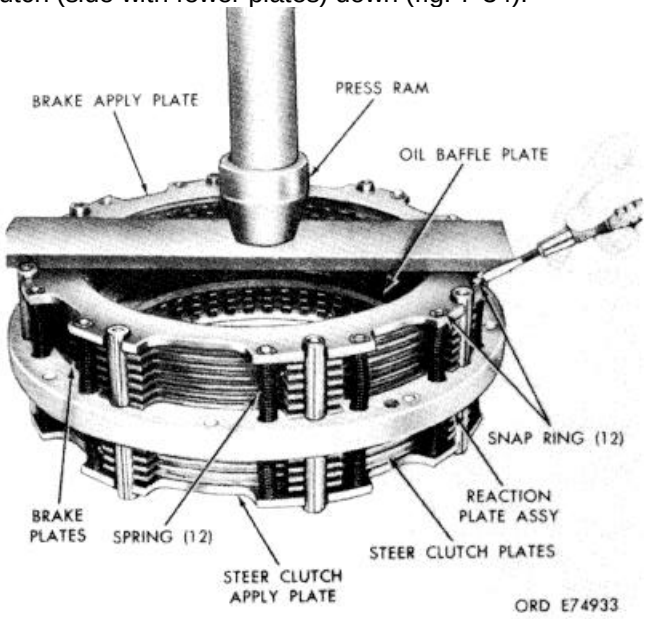


Figure 7-34. Removing o r installing) snaprings which retain brake and steer clutch release guide pins.

b. Depress the brake apply plate (fig. 7-34) until pressure is relieved from the snaprings. Remove the 12 snaprings.

c. Remove the brake apply plate and 12 springs, Remove six internal-splined brake plates and six external-tanged brake plates (fig. 7-34).

d. Lift the brake and steer clutch reaction plate assembly off the oil baffle plate and steer clutch plates (fig. 7-34).

e. Remove the oil baffle plate. Remove four external-tanged steer clutch plates and four internal-splined steer clutch plates (fig. 7-34).

f. Remove 12 spring guide pins (15, FO-7) from steer clutch apply disk (16). Do not remove the remaining 12 retaining rings (17) from pins (15) unless replacement of retaining rings or pins is necessary.

g. If inspection shows that anchor pins (6) require replacement, press them out of reaction plate (7).

h. If pins (8) require replacement, remove them from plate (7).

7-106. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-107. Inspection and Repair

Refer to paragraph 5-3 for general inspection and repair recommendations.

7-108. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair and overhaul standards (table 7-15).

7-109. Assembly (FO-7)

a. If pins (8) were removed from plate (7), install new replacement parts. The pins must be pressed in, flat sides of the ends out, and flat sides parallel to the centerline of the plate, to a radius of 5.350 inches (center of plate to inner end of pin).

b. If pins (6) were removed from plate (7), install new pins. Pins (6) must be pressed into plate (7) so that the pins project 2.000 inches from the plate surface on the side that has the largest inner diameter.

c. Install 12 spring guide pins (15), assembled to 12 retaining rings (17), into the small holes in apply disk (16). The retaining rings must seat against the flat side of the disks (opposite the counterbores at the pin holes).

d. Position disk (16), flat side down, on a flat surface. The ends of the pins (15), which do not have retaining rings, will project upward.

e. Install four internal-splined disks 114) and four external-tanged disks (12) onto apply disk (16). Begin with an internal-splined disk (14) and alternate with external-tanged disks (12) in the clutch. The external tang of disks (12) must be positioned between the closest adjoining pins. The smaller cutouts (in the tangs) must aline with identical cutouts in apply disk (16).

f. Install oil baffle plate (11) on external-tanged clutch disks (12), centering it with the clutch disks.

g. Position reaction plate assembly (5), largest

inside diameter downward, over oil baffle plate (7) and clutch disks (12 and 14). Rotate plate assembly (5) until the through-holes in plate (7) aline with the 12 pins (15).

h. Lower plate assembly (5), and guide spring guide pins (15) through the holes in plate (7). At the same time, engage pins (6) with the cutouts in disks (12 and 16). Also, two pins (8) in plate (7) must engage the two slots in oil baffle plate (11). The ends of pins (6) in plate (7) should now rest on the flat surface on which the entire assembly is sitting.

i. Install six external-tanged disks (4) and six internal-splined disks (3) alternately upon plate assembly (5). Begin with an external-tanged disk (14). The smaller cutouts in the tangs of disks (4) must engage pins (6).

j. Install 12 springs (13) onto pins (15). Push them through the holes in plate (7) and against disk (16).

k. Install apply disk (2). flat side upward (counterbores of smaller holes downward), onto the assembly. Aline the smaller holes to engage all 12 pins (15).

l. Using a press or C clamps, depress the brake apply disk until the pins project through the smaller holes in the disk. Install 12 snaprings (fig. 7-34). Release the pressure and remove the assembly from the press.

Table 7-15. Repair Standards (Right, Left Brake, Steer Clutch)

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
7	2a	Thickness of disk.....	0.2420 to 0.2540	0.2410
7	3a	Thickness of disk.....	0.1580 to 0.1630	0.1480
7	4a	Thickness of disk.....	0.1166 to 0.1226	
7	1a	Thickness of baffle plate.....	0.2400 to 0.2600	0.2200
7	12a	Thickness of disk.....	0.1166 to 0.1226	*
7	13a	Free length of spring.....	5.238	
7	13a	Length under load	3.99 at 27.13 to 33.17 lb	3.99 at 25.63 lb
7	14a	Thickness of disk.....	0.1580 to 0.1630	0.1480
7	16a	Thickness of disk.....	0.2420 to 0.2540	0.2410
8	113a	Thickness of disk.....	0.242 to 0.254	0.241
8	117a	Thickness of disk.....	0.5180 to 0.1630	0.1430
8	118a	Free length of spring.....	5.238	*
8	118a	Length under load	3.99 at 27.13 to 33.17 lb	3.99 at 25.63 lb
8	1119a	Thickness of disk.....	0.1166 to 0.1226	
8	120a	Thickness of baffle plate.....	0.2400 to 0.2600	0.2200
8	127a	Thickness of disk.....	0.1166 t o0.1226	*
8	128a	Thickness of disk.....	0.1580 to 0.1630	0.1480
8	129a	Thickness of disk.....	0.242 to 0.254	0.241

*Replace when worn beyond new dimensions.

Section XIX. RIGHT AND LEFT OUTPUT CLUTCH ASSEMBLIES-REPAIR

7-110. Description

Refer to paragraph 2-16 for description of the right and left output clutch assemblies.

7-111. Disassembly (FO-7)

NOTE

The right and left output clutch assemblies are identical, therefore, only the left clutch is described in the following procedures.

a. Position the output clutch assembly in a press and apply sufficient force against the piston housing to relieve pressure on the snapring. Remove the snapring (fig. 7-35).

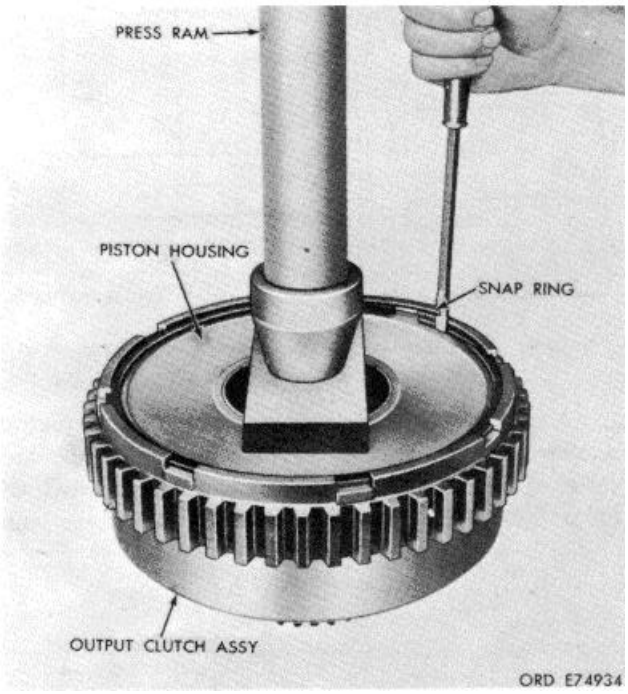


Figure 7-35. Removing (or installing).output clutch piston housing snapring.

b. Release the press and remove the output clutch piston housing and piston as a unit (fig. 7-36).

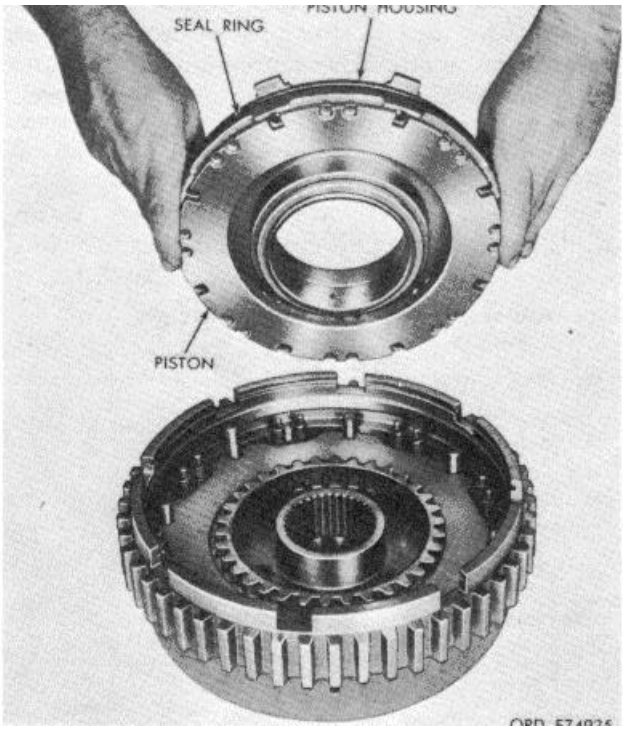


Figure 7-36. Removing output clutch piston and piston housing

c. Remove the piston, with its outer sealring, from the piston housing (fig. 7-37).

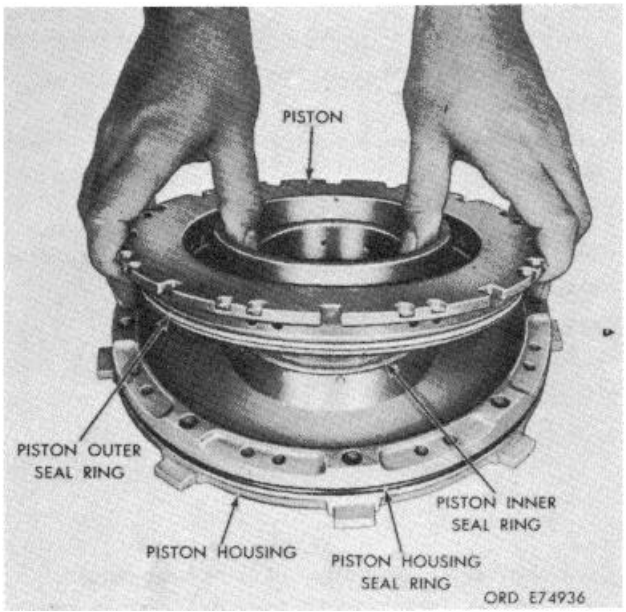


Figure 7-37. Removing output clutch piston from piston housing.

d. Remove the piston outer sealring and expander as outlined in paragraph 7-51.

e. Remove the piston housing sealring (fig. 7-37).

f. Remove the piston inner sealring from the piston housing (fig. 7-37).

g. Do not attempt further disassembly of the piston. If the bushing or sleeve requires replacement. replace the piston assembly.

h. Remove the output clutch hub (fig. 7-38).

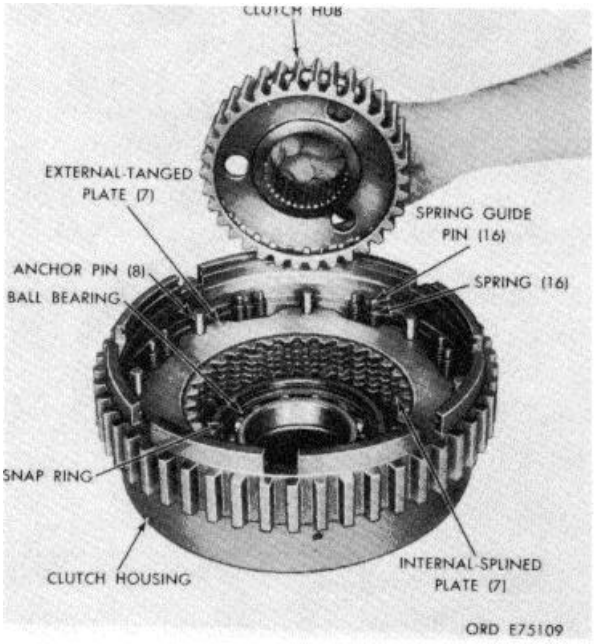


Figure 7-38. Removing output clutch hub.

i. Remove 14 clutch plates, 16 springs, 16 springs guide pins and eight clutch anchor pins from the clutch housing (fig. 7-38).

j. Remove the snapring and ball bearing from the clutch housing (fig. 7-38).

7-112. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-113. Inspection and Repair

Refer to paragraph 5-3 for general inspection and repair recommendations.

7-114. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-16).

7-115. Assembly (FO-7)

NOTE

Before final assembly of the output clutch, a clearance (with clutch released) of 0.070 to 0.090 inch must be established in the clutch disk pack.

a. dimension A (fig. 7-39) which is etched on the rim of the output clutch housing during manufacture. Record this dimension. Some early production units may not have this dimension etched on the housing. If not, measure the dimension accurately at the location indicated by A in figure 7-39.

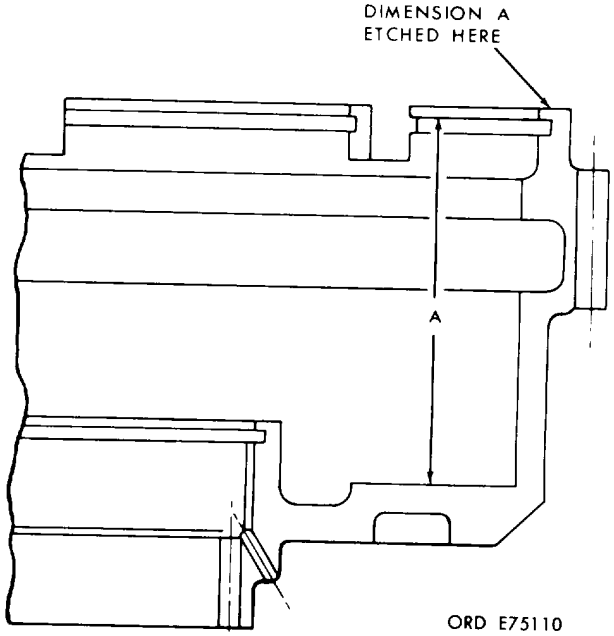


Figure 7-39. Dimension from clutch reaction surface of housing to snapring grove

b. Next, install the clutch piston into the piston housing and stack the 14 clutch disks onto the piston. Position this group, housing downward, on the press table or a smooth, flat steel plate (fig. 7-40)

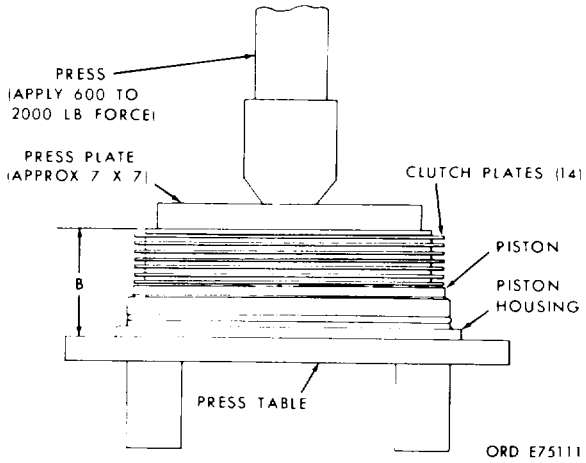


Figure 7-40. Clutch pack dimension over plates, piston and piston housing.

c. Place a flat, smooth plate (approximately 7 x 7 inches) on the clutch plates as shown in figure 7-40.

d. Apply a press force of 600 to 2,000 pounds on the clutch group as shown in figure 7-40, and measure and record dimension B.

e. With a micrometer. measure the thickness of the snapring which retains the output clutch piston housing. Record this as dimension C.

f. Substitute the three dimensions recorded for the letters in the formula A (B + C)=clutch clearance. If the clearance is between 0.070 and 0.090 inch, the clutch may be assembled from the parts at hand. If the clearance is greater than 0.090 inch, select a thicker piston (28, FO-7 or 104, FO-8). If the clearance is less than 0.070 inch, select a thinner piston.

NOTE

The exact thickness of the piston is etched on the piston.

g. With the proper clutch clearance established, assemble the clutch as outlined below.

h. Install the ball bearing into the clutch housing and retain it with the snapring (fig. 7-41).

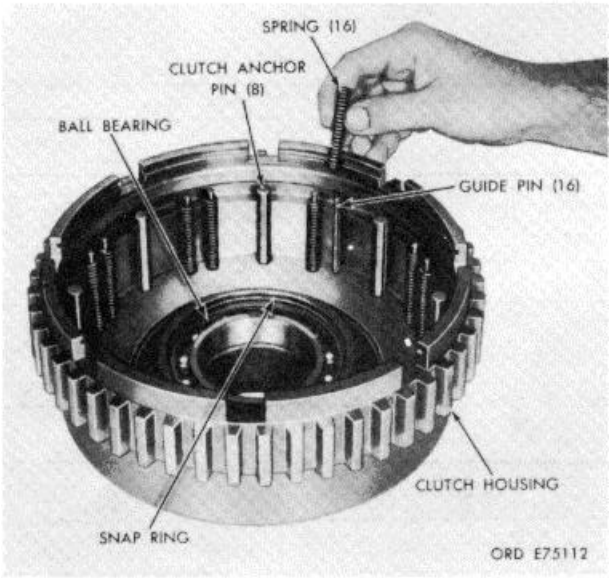


Figure 7-41. Installing output clutch piston return spring.

i. Install eight clutch anchor pins, 16 spring guide pins and 16 springs (fig. 7-41).

j. Install the clutch hub, shorter side of hub downward (fig. 7-42).

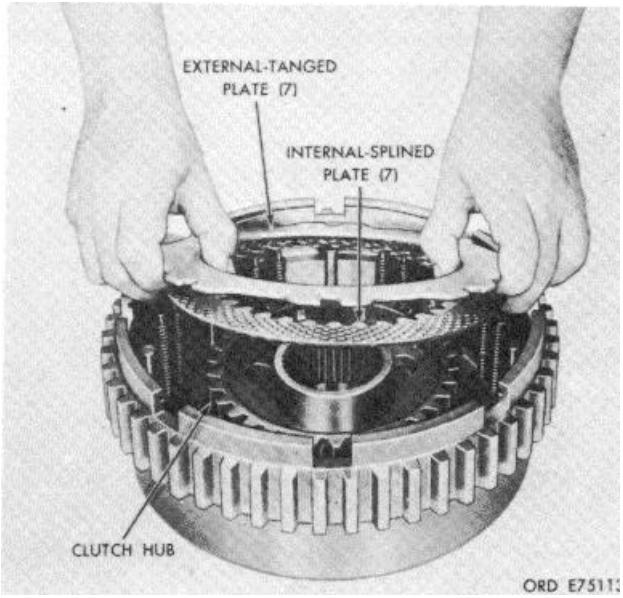


Figure 7-42. Installing output clutch plates.

k. Install, alternately, seven internal-splined and seven external-tanged clutch plates. beginning with an internal-splined plate (fig. 7-42).

l. Install the expander and piston outer sealring onto the piston as outlined in paragraph 7-55.

m. Install the piston, larger diameter first, into the clutch housing. Make certain that all of the springs seat in the counterbored spring pockets in the clutch piston (fig. 7-43). Shaking the piston will help seat the springs.

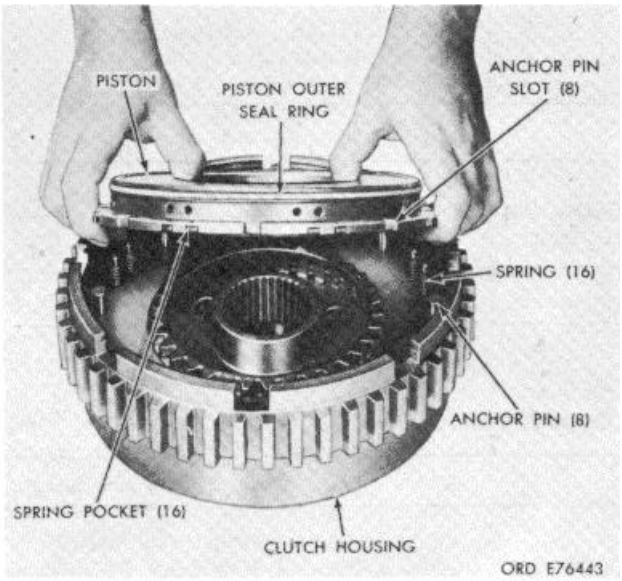


Figure 7-43. Installing output clutch piston.

n. Install the hook-type sealring onto the hub of the piston housing. Using a liberal amount of oilsoluble grease, install the sealring at the outer circumference of the piston housing (fig. 7-44).

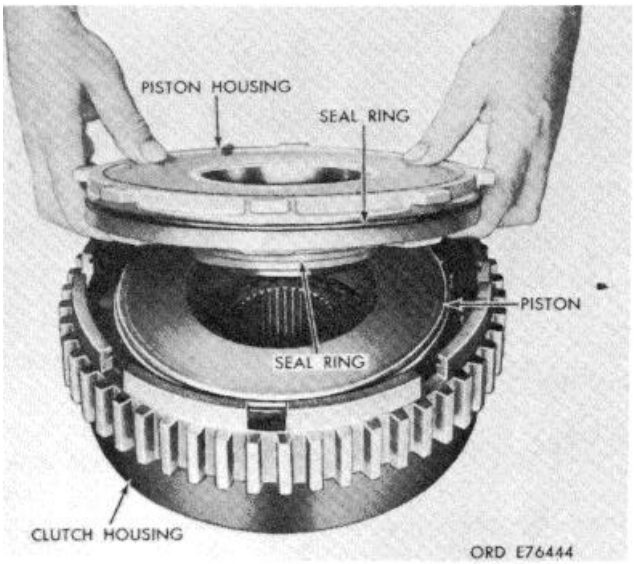


Figure 7-44. Installing output clutch piston housing

o. Aline the tangs on the piston housing with the slots in the clutch housing and install the piston housing (fig. 7-44).

p. Position the clutch assembly in a press. Apply sufficient pressure to push the piston housing into the clutch housing so that the snapring can be installed. Install the snapring (fig. 7-35).

Table 7-16. Repair Standards (Right, Left Output Clutch Assemblies)

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
7	19a	Inside of diameter at hearing surface of housing	4.3306 to 4.3316	4.3326
7	20b	(Outside diameter of bearing....	4.3301 to 4.3307	*
7	19a, 20b	Fit of hearing in housing.	0.0001T to 0.0015L	
7	24a	Free length of spring	1.982	*
7	24a	Length under load	1.806 at 10.9 to 12.33 lb	1.806 at 10.55 lb
7	26a	Thickness of disk	0.118 to 0.124	0.108
7	27a	Thickness of disk	0.095 to 0.098	*
7	28a	Inside diameter of piston at sealring	4.500 to 4.502	4.504
7	33a	Inside diameter of housing sleeve at sealrings	3.750 to 3.752	3.754
7	33a	Inside diameter of housing	3.8784 to 3.8814	3.8834
7	43a.	Out side diameter at surface of sleeve	3.8745 to 3.8755	3.8735
7	33a 43a	Fit of sleeve in housing	0.0029L to 0.0069L	
7	33b	Inside diameter of piston housing at sealring	7.875 to 7.881	7.885
8	99a	Outside diameter at hushing surface of sleeve	3.8748 to 3.8755	3.8735
8	89a.	Inside diameter of housing	3.8784 to 3.8814	3.8834
	99a 99a	Fit of sleeve in housing	0.0029L. to 0.0069L	

*See footnote at the end of table.

Table 7-16. Repair Standards (Right, Left Output Clutch Assemblies)-Continued

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
8	99b	Inside diameter of piston housing at seal-rings	7.875 to 7.881	7.885
8	99a	Inside diameter of housing sleeve at seal-rings	3.750 to 3.752	3.7540
8	104a	Inside diameter of piston at sealring	4.500 to 4.502	4.5040
8	105a	Thickness of disk	0.095 to 0.098	
8	106a	Thickness of disk	0.1 18 to 0.124	0.108
8	109a	Free length of spring	1.9820	*
8	109a	Length under load	1.806 at 10.9 to 12.33 lb	1.806 at 10.55 lb
8	111a	Outside diameter of bearing	4.3301 to 4.3307	*
8	113a	Inside diameter at bearing surface of housing	4.3306 to 4.3316	4.3326
8	111a, 113a	Fit of bearing in housing	0.0001T to 0.0015L	
8	111b	Inside diameter of bearing	2.773 to 2.7559	*
9	4a	Outside diameter at bearing surface of carrier	2.7549 to 2.7559	2.7546
8, 9	111b, 4a	Fit of bearing on carrier	0.0006T to 0.0010L	

*Replace when worn beyond new dimensions.

Section XX. RIGHT AND LEFT OUTPUT HOUSING ASSEMBLY-REPAIR

7-116. Description

Refer to paragraph 2-26 for description of the right and left output housing assemblies.

7-117. Disassembly

a. Right Output Housing Assembly FO-8).

(1) Do not remove plugs (64, 65, and 66) unless replacement is necessary or to aid in the cleaning of the output housing. If necessary, remove the plugs.

(2) Do not remove dowel pins (67 and 73) unless replacement is necessary. If necessary, remove the pins.

(3) Do not remove insert staking pins (68, 72, and 75) and screw thread inserts (69, 71, and 74) unless replacement is necessary. If necessary, remove the pins and inserts.

(4) Do not remove three output pump needle bearings (70) unless replacement is necessary. If necessary, remove the bearings.

(5) Do not remove brake and steer coolant pressure retaining valve assembly, items (76 through 79) unless replacement of parts is necessary. If necessary, remove spring guide (79) spring (78), valve (77), and valve seat (76).

(6) Do not remove plug (80) unless replacement is necessary or to aid in the cleaning of the output Housing. If necessary, remove the plug.

(7) Do not remove roll pin (81) unless replacement is necessary. If necessary, remove the pin.

(8) Flatten tab lockwasher (55) and remove retaining bolt (54), washer (55) and roller bearing retaining plate (56). Remove three output clutch sleeve bolts (57) and three flat washers (58).

(9) Remove output clutch sleeve assembly (88) with two sealrings (91). Remove sealrings (91) from sleeve assembly (88).

(10) Do not remove reduction gear roller bearings (21 and 36) from housing (63) unless replacement is necessary. If necessary, use puller adapter (3, table 3-1), puller attachment (17, table 3-1), and puller kit (18, table 3-1) to remove the roller bearings. Refer to figure 7-45.

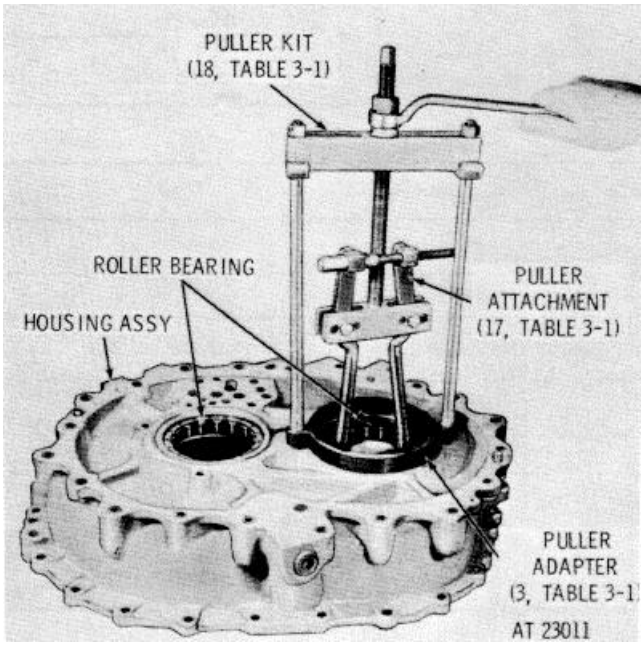


Figure 7-45. Removing roller bearing from right output housing assembly.

b. Left Output Housing Assembly (FO-7).

(1) Do not remove brake and steer coolant pressure retaining valve assembly, items (48 through 51), unless replacement of parts is necessary. If necessary, remove spring guide (48), spring (49), valve (50) and valve seat (51).

(2) Do not remove roll pin (54) unless replacement is necessary. If necessary, remove the pin.

(3) Do not remove insert staking pins (52 and 57) and screw thread inserts (53 and 56) unless replacement is necessary. If necessary, remove the pins and inserts.

(4) Do not remove plugs (59) unless replacement is necessary. If necessary, remove the plugs.

(5) Do not remove two dowel pins (58) unless replacement is necessary. If necessary, remove the pills.

(6) Do not remove three plugs (60) unless replacement is necessary. If necessary, remove the plugs.

(7) Remove five output clutch sleeve bolts (62) and five flat washers (61). Flatten tab lockwasher (93) and remove retaining bolt (92), tab lockwasher (931) and roller bearing retaining plate (94).

(8) Remove output clutch sleeve assembly (41) with two sealrings 4(0). Remove sealrings (40) from sleeve assembly (41).

(9) Do not remove reduction drive gear roller bearings (63 and 95) unless replacement is necessary. If necessary, use adapter (3, table 3-1), puller attachment (17, table 3-1), and puller kit (18, table 3-1), to remove the roller bearings (fig. 7-46).

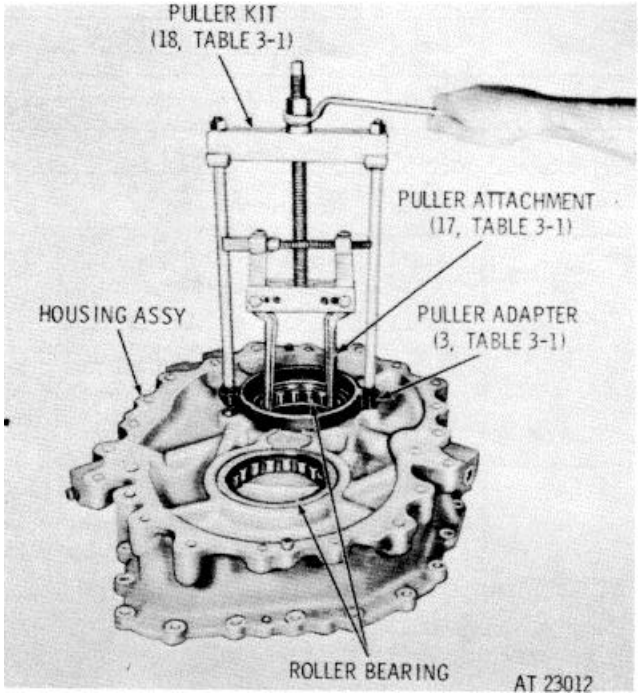


Figure 7-46. Removing roller bearing from left output housing Assembly.

7-118. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-119. Inspection and Repair

Refer to paragraph 5-3 for general inspection and repair recommendations.

7-120. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-17).

7-121. Assembly

a. Right Output Housing Assembly (FO-8).

(1) If plugs (64, 65, and 66) were removed, install them.

(2) If dowel pins (67 and 73) were removed, install new replacements. Press the pins to 0.300 inch above the surface of housing (63).

(3) If screw thread inserts (69, 71 and 74) and staking pins (68, 72 and 75) were removed, install new replacement parts. Install to the dimensions given in figure 7-47. Use a bolt with the same thread size as the inner thread of the insert, and a sleeve with an

outside diameter smaller than the outside diameter of the insert. to install the inserts. The bolt should project through the sleeve one inch for the 5/16-18 thread bolts and one and one-quarter inch for the 3/8-16 thread bolts.

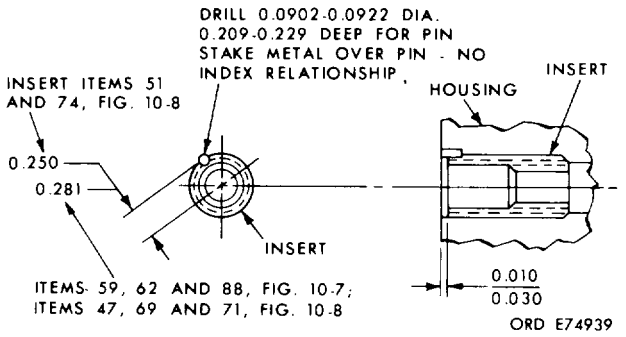


Figure 7-47. Dimensions for installing screw thread inserts and insert staking pins.

(4) If three output pump needle bearings (70, FO-8) were removed, install three new replacements. Press them flush with to 0. inch below, the surface of housing (63).

(5) If the brake and steer coolant pressure retaining valve assembly, items (76 through 79), were removed, install new replacement parts. Install valve seat (76) first, flat side down, into housing (63), pressing the seat until it is firmly seated in the housing. Install pressure retaining valve (77), convex side first, in housing (63). Install pressure retaining spring (78). Install spring guide (79) through spring (78), valve (77), and seat (76) into the housing. Press the spring guide into the housing until the top of the head is 0.450 inch below the surface adjacent to the valve bore in housing (63).

(6) If plug (80) was removed, install it.

(7) If roll pin (81) was removed, install a new replacement. Press the pin to bottom in the hole.

(8) If the reduction drive and driven gear roller bearings (21 and 36) were removed, install new replacements. Chill the bearings in dry ice for 4 hours and heat the housing to 3500 F before installation. Make certain the bearings are fully seated when installed.

NOTE

The cutout on the bearing race should be indexed with the retaining plate location in the housing.

(9) Install output clutch sleeve assembly (88, FO-8) with two sealrings (91). Retain the sealrings with oil-soluble grease.

(10) Install retaining plate (56) with tab lockwasher (55) and bolt (54). Make certain the tab of the lockwasher that is bent at a right angle is inserted into the hole of the retaining plate. Bend the remaining two tabs against the flat sides of the bolt head.

(11) Install three output clutch sleeve bolts (57) and three flat washers (58).

b. Left Output Housing Assembly (FO-7).

(1) If the brake and steer coolant pressure retaining valve assembly, items (48 through 51), were removed, install new replacement parts. Install valve seat (51) first, flat side down, into housing (55), pressing the seat until it is firmly seated in the housing. Install pressure retaining valve (50), convex side first, into housing (55). Install pressure retaining spring (49). Install spring guide (48) through spring (49), valve (50) and seat (51) into the housing. Press the spring guide into the housing until the top of the head is 0.450 inch below the surface adjacent to the valve bore in housing (55).

(2) If roll pin (54) was removed, install a new replacement. Press the pin to bottom in the hole.

(3) If screw thread inserts (53 and 56) and staking pins (52 and 57) were removed, install new replacement parts. Install to the dimensions given in figure 7-47. Use a bolt with same thread size as the inner thread of the insert, and a sleeve with an outside diameter smaller than the outside diameter of the insert, to install the inserts. The bolt should project through the sleeve 1 inch for the 5/16 18 inch thread bolts and 1 1/4-inch for the 3/816 thread bolts.

(4) If plugs (59, FO-7) were removed, install them.

(5) If two dowel pins (58) were removed, install new replacement parts. Press the pins to 0.300 inch above the surface of housing (55).

(6) If three plugs (60) were removed, install them.

(7) If reduction drive and driven gear roller bearings (63 and 95) were removed, install new replacements. Chill the bearings in dry ice for 4 hours and heat the housing to 3500 F before installation. Make certain the bearings are fully seated when installed.

NOTE

The cutout on the bearing race must be indexed with the retaining plate location in the housing.

(8) Install output clutch sleeve assembly (41, FO-7) with two sealrings (40). Retain the sealrings with oil-soluble grease.

(9) Install retaining plate (94) with tab lockwasher (93) and bolt (92). Make certain the tab of the washer that is bent at a right angle is inserted in the hole in the retaining plate. Bend the remaining two tabs against the flat sides of the bolt head.

(10) Install five output clutch sleeve bolts (62) and five flat washers (61).

Table 7-17. Repair Standards (Right, Left Output Housing)

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
7	42a	Inside diameter of sleeve insert at seals	2.875 to 2.877	2.879
7	55a	Inside diameter at bearing surface of ... housing	5.5106 to 5.5118	5.5123
7	63a	Outside diameter of bearing	5.5133 to 5.5141	*
7	55a 63a	Fit of bearing in housing	0.0015T to 0.0035T	
7	55b	Inside diameter at bearing surface of ... housing	5.5106 to 5.5118	5.5123
7	95a	Outside diameter of bearing	5.5133 to 5.5141	*
7	55b. 95a	Fit of bearing in housing	0.001IT to 0.0035T	*
7	55c	Inside diameter of housing at sealrings .	12.500 to 12.506	12.510
7	55d	Outside diameter of housing at sealrings	10.496 to 10.500	10.492
8	21a	Outside diameter of bearing	5.5133 to 5.5141	*
8	63a	Inside diameter at bearing surface of .... housing	5.5106 to 5.5118	5.5123
8	21a, 63a	Fit of bearing in housing	0.0015T to 0.0035T	
8	36a	Outside diameter of bearing	5.5133 to 5.5141	*
8	63b	Inside diameter at bearing surface of .... housing	5.5106 to 5.5118	5.5123
8	36a, 63b	Fit of bearing in housing	0.0015T to 0.0035T	
8	63c	Inside diameter of housing at sealrings .	12.500 to 12.506	12.510
8	63d	Outside diameter of housing at sealrings	10.496 to 10.500	10.492
8	63e	Inside diameter at bearing bore of outer housing	0.686 to 0.687	0.6875
8	70a	Outside diameter of needle bearing	0.6875 basic	
8	63e, 70a	Fit of bearings in outer housing.....	Press fit	
8	90a	Inside diameter of sleeve insert at seals	2.875 to 2.877 2.879	

*Replace when worn beyond new dimensions.

Section XXI. LEFT OUTPUT END COVER ASSEMBLY-REPAIR

7-122. Description

Refer to paragraph 2-26 for description of the left output end cover assembly.

7-123. Disassembly (FO-7)

a. Do not remove oil seal (78) from output end cover (81), unless replacement is necessary. If necessary, remove the seal.

b. Do not remove sleeve (80) from output end cover (81). unless replacement is necessary. If necessary, remove the sleeve.

c. Do not remove reduction drive and driven gear roller bearings (69 and 85) from output end cover (81), unless replacement is necessary. If necessary, flatten tab lockwasher (87) and remove bolt (88), tab lockwasher (87) and retaining plate (86).

d. Using adapter (3, table 3-1), puller attachment (17, table 3-1), and puller kit (18, table 3-1), remove the reduction drive and driven gear roller bearings (fig. 7-48).

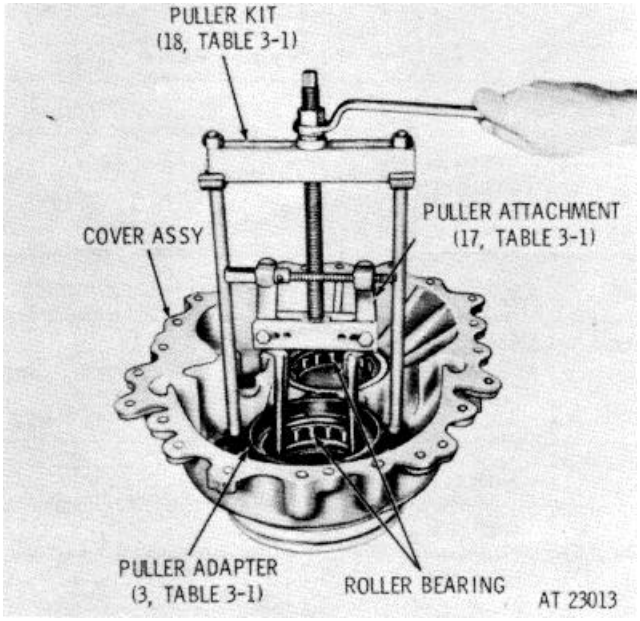


Figure 7-48. Removing roller bearing from end cover assembly.

e. Do not remove two screw thread inserts (83, FO-7) and two staking pins (84), unless replacement of parts is necessary. If necessary, remove the inserts and pins.

7-124. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-125. Inspection and Repair

Refer to paragraph 5 3 for general inspection and repair recommendations.

7-126. Repair Standards

a. Refer to paragraph 5 4 for explanation of repair standards.

b. Refer to repair standards (table 7-18).

7-127. Assembly

(FO -7)

a. If oil seal (78) was removed, install a new replacement part. Using replacer (21, table 3-1) and handle (13, table 3-1), press or drive the oil seal, spring side first, into the end cover (figure 7-49).

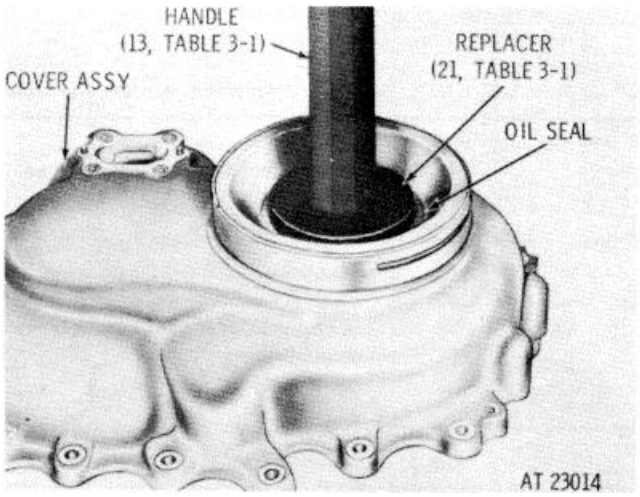


Figure 7-49. Installing output oil seal into end cover assembly.

b. If sleeve (80, FO-7) was removed, install a new replacement part. Press the sleeve onto the cover, beveled edge side first, until it is firmly seated against the cover.

c. If reduction drive and driven gear roller bearings (69 and 85) were removed, install new replacement parts. Chill the bearings in dry ice for 4 hours and heat the housing to 3500 F before installation. Make certain the bearings are fully seated when installed.

NOTE

The cutout on the bearing race must be indexed with the retaining plate location in the cover.

d. Install retaining plate (86, FO-7) with tab lockwasher (87) and bolt (88). Make certain the tab of the lockwasher that is bent at right angle is inserted in the hole of the retaining plate. Bend the remaining two tabs against the flat sides of the bolt head.

e. If two screw thread inserts (83) and staking pins (84) were removed, install new replacement parts as follows: Select inserts for 0.002-inch tight to 0.002-inch loose fit. Install to the dimension given in figure 7-47. Use a bolt with the same thread size as the inner thread of the insert, and a sleeve with an outside diameter smaller than the outside diameter of the insert, to install the inserts. The bolt should project through the sleeve 1 1/4-inch for the 3/8-16 volts.

Table 7-18. Repair Standards Left Output End Cover)

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
7	64a	Outside diameter at bearing surface of gear	3.7518 to 3.7528	
7	69a	Outside diameter of bearing	5.5133 to 5.5141	*
7	81a	Inside diameter at bearing surface of cover	5.5106 to 5.5118	5.5123
7	69a, 81a	Fit of bearing in cover.....	0.0015T to 0.0035T	
7	80a	Outside diameter of sleeve (installed)...	7.999 to 8.003	7.990
7	81b	Inside diameter at bearing surface of cover	5.5106 to 5.5118	5.5123
7	85a,	Outside diameter of bearing	5.5133 to 5.5141	*
7	81 b. 85a	Fit of bearing in cover	0.0015T to 0.0035T	
7	90a	Outside diameter at bearing surface of gear	3.7518 to 3.7528	*
7	90b	Outside diameter at lip seal surface of gear	3.5000 to 3.5005	3.4980

*Replace when worn beyond new dimensions.

Section XXII. RIGHT OUTPUT END COVER ASSEMBLY AND SPEEDOMETER DRIVE COVER-REPAIR

7-128. Description

Refer to paragraph 2-26 for description of the right output end cover assembly.

7-129. Disassembly

(FO-8)

a. Do not remove oil seal (53) from output end cover (46) unless replacement is necessary. If necessary, remove the seal.

b. Do not remove sleeve (49) from output end cover (46) unless replacement is necessary. If necessary, remove the sleeve.

c. Do not remove two speedometer drive cover mounting pad dowel pins (50) unless replacement is necessary. If necessary, remove the dowel pins.

d. Do not remove four screw thread inserts (51) and four staking pins 152) unless replacement is necessary. Do not remove two screw thread inserts (47) and two staking pins (48) unless replacement is necessary. If necessary, remove the inserts and pins.

e. Do not remove reduction drive and driven gear roller bearing (15 and 40) from output end cover (46), unless replacement is necessary. If necessary, flatten tab lockwasher (42) and remove bolt (41), tab lockwasher (42) and retaining plate (43).

f. Using adapter (3, table 3-1), puller attachment (17, table 3-1), and puller kit (18, table 3-1), remove the reduction drive and driven gear roller bearings (fig. 7-48).

g. Do not remove oil seal (6, FO-8) from speedometer drive cover (4), unless replacement is necessary. If necessary, remove the oil seal.

7-130. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-131. Inspection and Repair

Refer to paragraph 5 3 for general inspection and repair recommendations.

7-132. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-19).

7-133. Assembly (FO-8)

a. If oil seal (53) was removed, install a new replacement part. Using replacer (21, table 3-1) and handle (13, table 3 1), press or drive the oil seal, spring side first, into the end cover fig. 7-49).

b. If sleeve (49, FO-8) was removed, install a new replacement part. Press the sleeve onto the cover, beveled edge first. until firmly seated against the cover.

c. If two speedometer drive cover mounting pad dowel pins (50) were removed, install new replacement parts. Press them into the mounting pad so that they project 0.220 from the face of the pad.

d. If four screw thread inserts (51) and four

staking pins (52) were removed, install new replacement parts. If two screw thread inserts (47) and staking pins (48) were removed, install new replacement parts as follows: Select inserts for 0.002-inch tight to 0.002-inch loose fit. Install to the dimension given in figure 7-47. Use a bolt with same thread size as the inner thread of the insert, and a sleeve with an outside diameter smaller than the outside diameter of the insert, to install the inserts. The bolt should project through the sleeve 1 inch for the 5/16-18 bolts and 1 1/4 inch for the 3/8-16 bolts.

e. If reduction drive and driven gear roller bearings (15 and 40, FO-8) were removed, install new replacement parts. Chill the bearings in dry ice for 4 hours and heat the cover to 3500 F before installation. Make certain the bearings are fully seated when installed.

NOTE

The cutout on the bearing race must be indexed with the retaining plate location in the cover.

f. Install retaining plate (43) with tab lockwasher (42) and bolt (41). Make certain the tab of the lockwasher that is bent at a right angle is inserted in the hole of the retaining plate. Bend the remaining two tabs against the flat sides of the bolt head.

g. If oil seal (6) was removed from speedometer drive cover (4), install a new replacement part. Press the seal, spring side last, until it bottoms.

Table 7-19. Repair Standards Right Output End Cover, Speedometer Drive Cover)

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
8	15a	Outside diameter of bearing	5.5133 to 5.5141	*
8	46b	Inside diameter at bearing surface of cover	5.5106 at 5.5118	5.5123
8	15a 46b	Fit of bearing in cover.....	0.0015T to 0.0035T	
8	20a	Outside diameter at bearing surface of gear	3.7518 to 3.7528	*
8	40a	Outside diameter of bearing	5.5133 to 5.5141	*
8	46a	Inside diameter at bearing surface of cover	5.5106 to 5.5118	5.5123
8	40a 46a	Fit of bearing in cover.....	0.0015T to 0.0035T	
8	49a	Outside diameter of sleeve installed	7.999 to 8.003 7.990	

*****Replace when worn beyond new dimensions.

Section XXIII. OUTPUT OIL PUMP ASSEMBLY-REPAIR

7-134. Description

Refer to paragraph 2-18 for description of the output oil pump assembly.

7-135. Disassembly

(FO-8)

a. Remove the output oil pump cover (fig. 7-50) from the output oil pump body assembly.

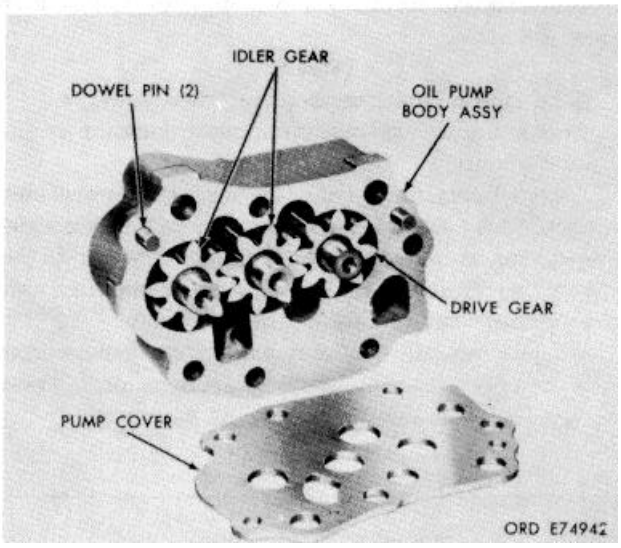


Figure 7-50. Output oil pump components

b. Remove the pump drive gear from the pump body.

c. Remove the two idler gears from the pump body.

d. Do not remove the two dowel pins from the pump body, unless necessary. If necessary, remove the dowel pins.

e. Do not remove three sleeve bearings (30, FO-8) from pump body (31) unless necessary. If necessary, remove the sleeve bearings.

7-136. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-1.37. Inspection and Repair

Refer to paragraph 5-3 for general inspection and repair recommendations.

7-1-38. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards table 7-20).

7-139. Assembly

(FO-8)

a. If three sleeve bearings (30) were removed from pump body (31), install new replacement parts. Install the bearings into the body from the outside face. Press them in until they are flush with, to 0.010 inch below. the outside face of the body.

b. If two dowel pins (32) were removed, install new replacement parts. Press them into the body so that they project 0.375 inch from the mounting face of the body.

c. Install two idler gears (34) into the pump body.

d. Install drive gear shaft (33) into the pump body, long shaft end first.

e. Install pump cover (35) onto pump body (31).

Table 7-20. Repair Standards (Output Oil Pump)

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
8	30a	inside diameter of hearings.....	05 to 0.5015	0.5020
8	33a. 34a	Out side diameter of shafts at hearings.	0.4995 to 0.5000	0.4992
8	30a, 33a, 34a	Fit shafts in hearings	0.0005L. to 0.0020L	
8	30b	Outside diameter of hearing	0.6270 to 0.6280	*
8	31a	Inside diameter at hearing bore of body	0.6245 to 0.6255	
8	30b	Fit of bearing in body.....	0.0015T to 0.0035T	
8	31a			
8	33	Outside diameter of gear shafts at needle hearings	0.4995 to 0.5000	0.4992
8	39a	Outside diameter at hearing surface of gear	3.751; to 3.7528	*
8	39b	Outside diameter of gear hub at lip seal surface	3.5000 to 3.5005	3.4980

*Replace when worn beyond newt dimensions.

Section XXIV. OIL FILTER ASSEMBLY-REPAIR

7-140. Description
Refer to paragraph 2-20 for description of the oil filter assembly.

7 -141. Disassembly
(FO-10)

a. Remove the nut from the filter assembly and separate the filter head assembly from the oil filter element (fig. 7-51).

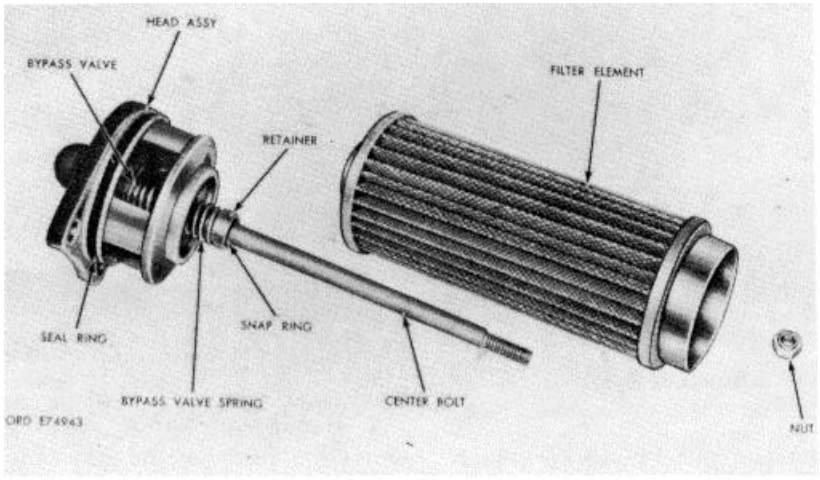


Figure 7-51. Oil filter assembly components.

b. Remove the filter sealring from the filter head assembly (fig. 7-51).

c. Do not remove screw thread inserts (7, FO-10) from filter housing (8), unless replacement of parts is necessary. If necessary, remove screw thread inserts.

7-142. Cleaning
Refer to paragraph 5-2 for cleaning recommendations.

7-143. Inspection and Repair
Refer to paragraph 5-3 for general inspection and repair recommendations.

7-144. Repair Standards
No repair standards are involved in this assembly.

7-145. Assembly
(FO-10)

a. If screw thread inserts (7) were removed from housing (8), install new replacement parts. Install the inserts 0.005 inch, to one turn, below the surface of housing (8).

b. Install the filter sealring onto the filter head assembly (fig. 7-51).

c. Install the filter head assembly onto the filter element and retain it with the self-locking nut (fig. 7-51). Tighten the nut to 25 to 50 pound inches torque.

Section XXV. MAIN-PRESSURE REGULATOR VALVE BODY, LOCKUP REGULATOR VALVE BODY ASSEMBLY, AND OIL TRANSFER PLATE ASSEMBLY-REPAIR

7-146. Description
Refer to paragraphs 2-21 and 2-27 for description of the main-pressure regulator valve body assembly, lockup regulator valve body assembly, and oil transfer plate assembly.

7 -147. Disassembly
(FO 10)

a. Remove eight bolts, eight lockwashers and eight flat washers from the valve body assembly (fig. 7-52). Remove the end cover assembly and gasket from the valve body.

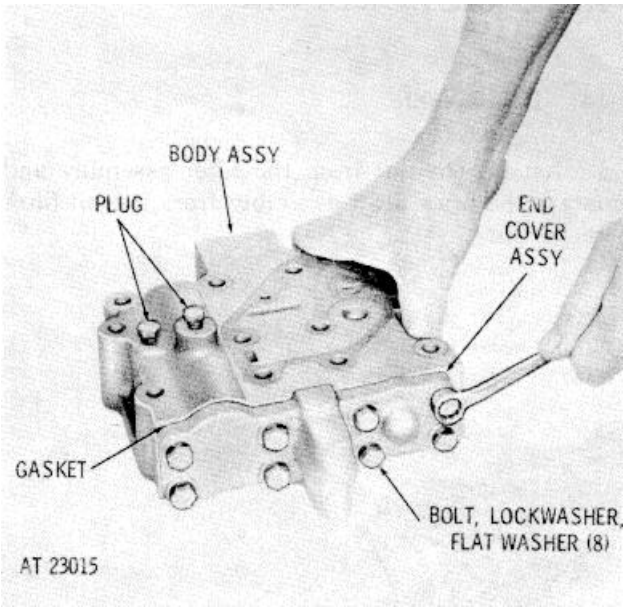


Figure 7-52. Removing for installing) main-pressure regulator end cover bolt.

b. Do not remove valve stop (49, FO 10) from end cover (50) unless replacement of parts is necessary. If necessary. remove the stop.

c. Remove lockup shift valve spring (45), washer (44) and shift valve (43) from valve body (41).

d. Remove flow valve (46) from valve body (41).

e. Remove retaining ring (35), retaining plug (36), and preformed packing (37) from valve body (41).

f. Remove primary spring (38), secondary spring (39) and main-pressure regulator valve assembly (40) from valve body (41).

g. Remove two pipe plugs (42) from valve body (41).

h. Remove plug (60) from oil transfer plate (59).

i. Remove the lockup regulator valve and spring from the lockup regulator valve body (fig. 7-53).

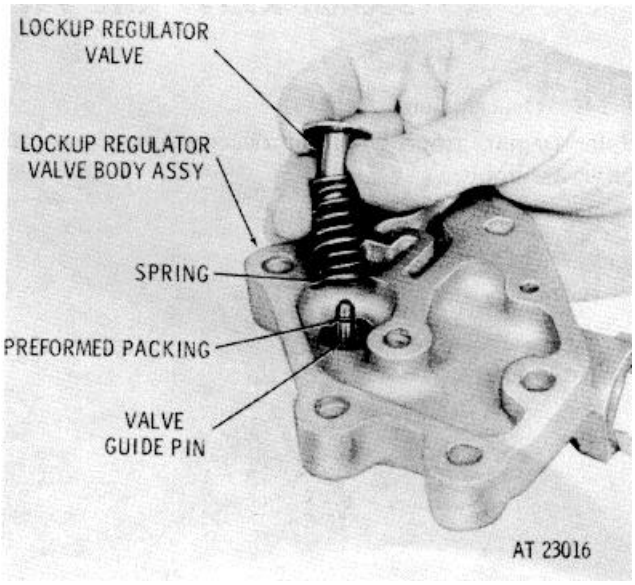


Figure 7-53. Components of lockup regulator valve body assembly.

j. Remove preformed packing (27, FO-10) from pin (26). Remove the pin only if replacement is necessary.

k. Remove valve plug (25) and gasket (24). Remove spring (23) and valve (22) from regulator body (21).

7-148. Cleaning Refer

Refer to paragraph 5-2 for cleaning recommendations.

7-149. Inspection and Repair

Refer to paragraph 5 3 for general inspection and repair recommendations.

7-150. Repair Standards.

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-21).

7-151. Assembly

(FO-10)

a. Install valve (22) into valve body (21); the valve must move freely by its own weight within the bore. Install valve springs (23) gasket (24) and valve plug (25). Tighten the plug sufficiently to prevent leakage.

b. If pin (26) was removed, install a new pin. Press the pin into the bore until the conical end is flush with, to 0.010 below, the mounting surface of the valve body.

c. Install preformed packing (27 into the groove on pin (26).

d. Install the lockup regulator valve and spring onto the valve guide pin, as shown in figure 7-53.

e. Install plug (60) into oil transfer plate (59).

f. Install two pipe plugs (42) into valve body (41).

g. Install main-pressure regulator valve assembly (40) into valve body (41), smaller end first.

h. Install primary spring (38) and secondary spring (39) into valve body (41).

i. Install preformed packing (37), retaining plug (36) and retaining ring (35) into valve body (41), in that order.

j. Install flow valve (46) into valve body (41).

k. Install lockup shift valve (43), washer (44) and shift valve spring (45) into valve body (41), in that order.

l. If valve stop (49) was removed from end cover (40), install it. Press it in until the larger diameter shoulder seats firmly.

m. Install gasket (fig. 7-52) and end cover assembly. Install eight 5/16-18 x 1 1/4-inch bolts, eight plain washers and eight lockwashers. Tighten them to 10 to 12 pound feet torque.

Table 7-21. Repair Standards (Main-pressure Regulator value, Lockup regulator value, Oil Transfer Plate)

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
10	21a	Inside diameter of valve bore in body....	0.5620 to 0.5630	
10	22a	Outside diameter of valve.....	0.5605 to 0.5610	
10	21a, 22a	Fit of valve in body	0.0010L to 0.0750L	**0.0045L
10	23a	Free length of spring.....	2.80	*
10	23a	Length under load	1.46 at 39.0 to 43.0 lb	1.46 at 38.5 lb
10	28a	Free length of spring.....	1.296	
10	28a	Length under load	1.00 at 38.0 to 40.0 lb	1.00 at 37.5 lb
10	38a	Free length of spring	4.190	*
10	38a	Length under load	2.36 at 73.50 to 76.50 lb	2.36 at 72.75 lb
10	39a	Free length of spring.....	3.46	*
10	39a	Length under load	2.36 at 45.5 to 47.5 lb	2.36 at 44.9 lb
10	40a	Outside diameter of valve.....	0.5065 to 0.5070	
10	41c	Inside diameter of valve bore in body....	0.508 to 0.509	
10	40a, 41c	Fit of valve in body	0.0010L to 0.0025L	**0.0045L
10	40b	Outside diameter of valve.....	1.0150 to 1.0155	
10	41d	Inside diameter of valve bore in body....	1.0165 to 1.0175	
10	40b, 41d	Fit of valve in body	0.0010L to 0.0025L	**0.0045L
10	41a	Inside diameter of valve bore in body....	1.2495 to 1.2505	
10	46a	Outside diameter of valve.....	1.2480 to 1.2485	
10	41a, 46a	Fit of valve in body	0.0010L to 0.0025L	**0.0045L

*See footnote at end of table.

Table 7-21. Repair Standards (Main-pressure Regulator Valve, Lockup Regulator Valve, Oil Transfer Plate)

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
10	41b	Inside diameter of valve bore in body....	1.1865 to 1.1875	
10	46b	Outside diameter of valve	1.1850 to 1.1855	
10	41b. 46b	Fit of valve in body	0.0010L to 0.0025L	**0.0045L
10	41e	Inside diameter of valve bore in body ...	0.7015 to 0.7025	
10	43a	Outside diameter of valve	0.7000 to 0.7005	
10	41e, 43a	Fit of valve in body	0.00100L to 0.0025L	**0.0045L
10	41 f	Inside diameter of valve bore in body ...	0.6870 to 0.6880	
10	43b	Outside diameter of valve	0.6855 to 0.6860	
10	41f, 43b	Fit of valve in body	0.0010L to 0.0025L	**0.0045L
10	45a	Free length of spring	3.90	*
10	45a	Length under load	1.98 at 7.42 to 8.02 lb	1.98 at 7.27 lb

*Replace when worn beyond new dimensions.
**Wear is allowed on either or both mating parts so long as fit is within the specified limit.

Section XXVI. LUBRICATION REGULATOR VALVE BODY ASSEMBLY-REPAIR

7-152. Description

Refer to paragraph 2-24 for description of the lubrication regulator valve body assembly.

7-153. Disassembly

(FO-10)

a. Remove retaining ring (74), guide (76), spring (78) and valve (80) from lubrication regulator valve body (84).

b. Remove retaining ring (82) and regulator valve seat (83) from valve body (84).

c. Remove the snapring (fig. 7-54), the ball check valve seat and the cooler bypass valve ball.

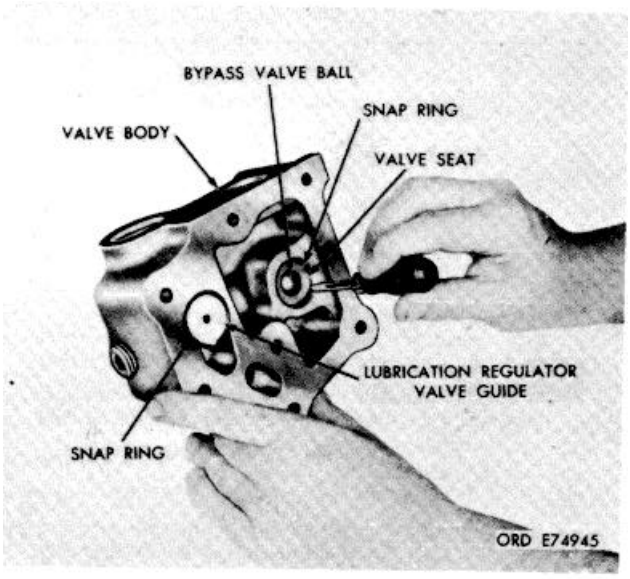


Figure 7-54. Removing for installed cooler bypass valve snapring.

d. Remove valve spring seat (79, FO-10) and spring (81) from valve body (84).

e. Do not remove plug (85) unless replacement of parts is necessary. If necessary, remove the plug.

7-154. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-155. Inspection and Repair

Refer to paragraph 5-3 for general inspection and repair recommendations.

7-156. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-22).

7-157. Assembly (FO 10)

a. If plug (85) was removed from valve body (84), install a new replacement part.

b. Install cooler bypass valve spring (81) onto seat (79). Install the spring and seat, spring end first, into the valve body.

c. Install bypass valve ball (77).

d. Install bypass valve seat (75), chamfered inside diameter side first, into valve body (84).

e. Install retaining ring (74).

f. Install lubrication regulator valve seat (83), flat side first, into valve body (84).

g. Install retaining ring (82).

h. Install lubrication regulator valve (80), large end first, and spring (78).

i. Install valve guide (76), small diameter first, onto valve (80) and against valve spring (78) in valve body (84). Secure guide (76) with retaining ring (74). Refer to figure 7-54.

Table 7-22. Repair Standards (Lubrication Regulator Valve

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
10	78a, 81a	Free length of spring.....	2.16	*
10	78a, 81a	Length under load	1.16 at 10.50 to 11.50 lb	1.16 at 10.25 lb

*Replace when worn beyond new dimensions.

Section XXVII. INPUT OIL PUMP ASSEMBLY-REPAIR

7 -158. Description

Refer to paragraph 2-2 for description of the input oil pump components.

7-159. Disassembly

(FO-11)

a. Remove four bolts, lockwashers, flat washers, and input pump base with gasket from the input pump body. Refer to figure 7 55.

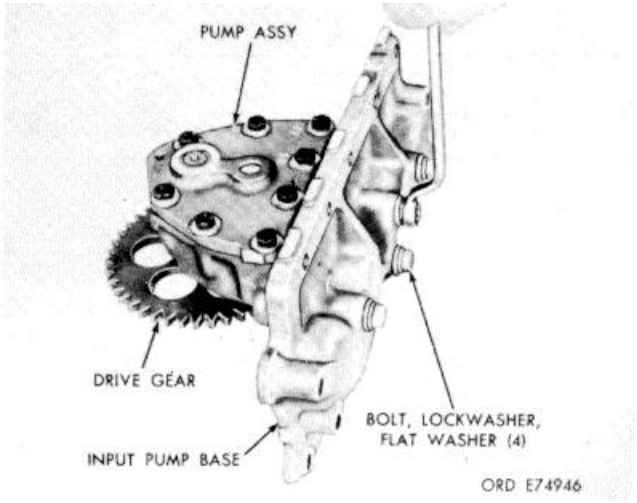


Figure 7-55 Removing for installing) input pump base bolt.)

b. Remove eight self-locking bolts (9, FO-11), flat washers (10), and input pump cover assembly (6) from input pump body (25).

c. Do not remove bearing (7) from input pump cover (8) unless replacement is necessary.

d. Remove ball (11) from idler shaft (12).

e. Remove idler shaft (12) and idler gear assembly (13) from input pump body (25).

f. Do not remove bearings (14) and (16) from idler gear (15) unless replacement is necessary.

g. Remove retaining ring (5) from input pump drive gear shaft (22).

h. Remove driven gear (4, FO-11) and driven gear roller (3) from input pump drive gear shaft (22).

i. Remove input pump drive gear shaft (22) from input pump body (25).

j. Do not remove bearing (27) from input pump body (25) unless replacement is necessary.

k. Do not remove dowel pins (24 and 26) unless replacement is necessary.

7-160. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-161. Inspection and Repair

Refer to paragraph 5 3 for general inspection and repair recommendations.

7-162. Repair Standards

a. Refer to paragraph 5 4 for explanation of repair standards.

b. Refer to repair standard (table 7-23).

7-163. Assembly

(FO-11)

a. If dowel pins (24 and 26) were removed, install new replacements. Press the pins to 0.22 inch above the surface of input pump body (25).

b. If bearing (27) was removed from input pump body (25), install a new replacement from the pump gear cavity side of the pump body. Press the bearing 0.005 to 0.010 inch below the surface adjacent to the bearing bore of the pump body.

c. Install input pump drive gear shaft (22) into input pump body (25).

d. Install driven gear roller (3) and driven gear (4) onto input pump drive gear shaft (22).

e. Install retaining ring (5, FO-11) onto input pump drive gear shaft (22).

f. Install idler gear shaft (12) into input pump cover (8).

g. If bearings (14 and 16) were removed from idler gear (15), install replacements. Install each bearing, pressing against the numbered side of the cage, 0.005 to 0.010 inch below the surface on each side of the gear.

h. Install idler gear assembly (13) onto idler shaft (12).

i. If bearing (7) was removed from input pump cover (8), install a new replacement. Install the bearing from the flat side of the cover, pressing against the numbered side of the cage, 0.005 to 0.010 inch below the surface of the cover.

j. Install ball (11, FO-11) into idler shaft (12), using oil-soluble grease to retain it.

k. Install input pump cover assembly (6) onto input pump body (25) and secure it with eight selflocking bolts (9) and flat washers (10). Tighten the bolts to 17 to 20 pound feet torque.

l. Install gasket (17) and input pump base (18) onto input pump body (25).

m. Secure the base with four 3/8-16 x 2 1/2-inch bolts, lockwashers, and flat washers. Refer to figure 7-55.

Table 7-23. Repair Standards (Input Oil Pump)

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
11	7a	Outside diameter of bearing	To press fit 0.8075 to 0.8078 bore	*
11	8a	Inside diameter at bearing	0.8070 to 0.8075 0.8080	
11	7a, 8a	Fit of bearing in cover	0.0000 to 0.0008T	
11	12a	Outside diameter of shaft	0.6245 to 0.6250	0.6242
11	14a, 16a	Outside diameter of bearing To press fit	0.8075 to 0.8078 bore	*
11	15a	Inside diameter of gear	0.8075 to 0.8080	0.8085
11	14a, 15a, 16a	Fit of bearings in gear	0.0005L to 0.0003T	

Table 7-23. Repair Standards (Input Oil Pump)-Continued

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
11	22a	Outside diameter at bearing surface of gear shaft	0.6245 to 0.6250	0.6242
11	25a	Inside diameter at bearing surface of body	0.8068 to 0.8075	0.8080
11	27a	Outside diameter of bearing	To press fit 0.8075 to 0.8078 bore	*
11	25a, 27a	Fit of bearing in body.....	0.0000 to 0.0010T	

*Replace when worn beyond new dimensions.

Section XXVIII. BRAKE COOLANT PUMP ASSEMBLY-REPAIR

7-164. Description

Refer to paragraph 2-19 for description of the brake coolant pump components.

7-165. Disassembly

(FO-11)

a. Remove three bolts (68), three bolts (70) and six flat washers (67 and 69). Remove coolant pump cover assembly (55) from pump body assembly (44). Refer to figure 7-56.

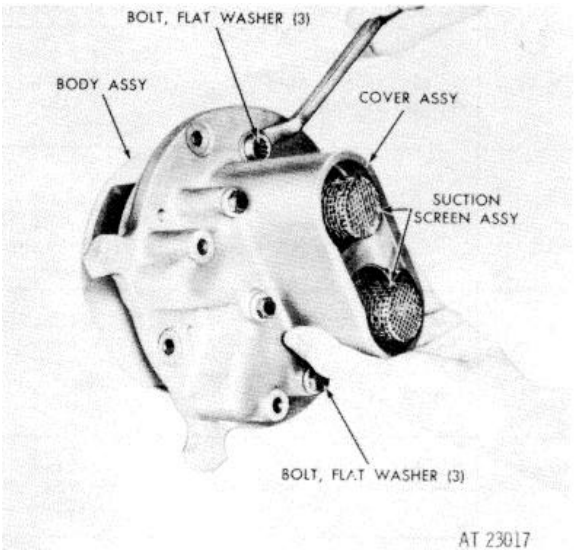


Figure 7-56. Removing (or installing) brake coolant pump cover assembly bolt.

b. Remove two retaining rings (66, FO-11) and two coolant suction screen assemblies (65).

c. Remove six washers (60, 62, 64), two check valve guide pins (59), and two springs (61) from pump cover (58).

d. Do not remove two grommets (63) from washers (62 and 64) unless replacement is necessary.

e. Do not remove needle bearing (57) from pump cover (58) unless replacement is necessary.

f. Do not remove two dowel pins (56) from pump cover (58) unless replacement is necessary.

g. Remove two driven gear assemblies (51, FO-11) from pump body (46).

h. Remove two driven gear shafts (49) and two antirotation balls (50) from pump body (46).

i. Remove two retaining nuts (41) from internal drive gears (48) and remove two external-driven gears (42).

j. Remove four thrust washers (43) from internal drive gears (48).

k. Remove two internal drive gears (48) from pump body (46).

l. Do not remove needle bearing (45 and 47) unless replacement is necessary.

7-166. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-167. Inspection and Repair

Refer to paragraph 5-3 for general inspection and repair recommendations.

7-168. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-24).

7-169. Assembly

(FO-11)

a. If needle bearing (45) were removed from pump body (46), press new replacements flush with, to 0.005 inch below, the outer surface of the pump body. Press against the numbered side of the bearing cage.

b. If needle bearing (47) was removed from pump body (46), press a new replacement 0.18 inch below the surface adjacent to the bearing bore.

c. Install two internal drive gears (48) into pump body (46).

d. Install four thrust washers (43) onto two internal drive gears (48).

e. Install two external-driven gears (42) onto two internal drive gears. Secure the external driven gears with two nuts (41). Tighten the nuts to 30 to 32 pound feet torque.

f. Place antirotation balls (50, FO-11) on driven gear shafts (49) and retain them with oil-soluble grease. Install the shafts, with the balls, into pump body (46).

g. If bearings (52 and 54) were removed from driven gears (53), install new replacements. Install each bearing, pressing against the numbered side of the bearing cage, 0.006 inch below the end surface of each gear.

h. Install two driven gear assemblies (51) onto driven gear shafts (49).

i. If needle bearings (57) were removed from pump cover (58), install new replacements. Install the bearings, pressing against the numbered side of the cage, 0.050 inch below the surface of the cover.

j. If dowel pins (56) were removed from pump cover (58), install new replacements. Install pins to 0.300 inch above the surface of the cover.

k. Install two pins 159, FO-11), large diameter first, into pump cover 158).

I. Install a spring (61) onto each pin (59).

m. Install a washer (60) onto each pin.

n. Install a grommet (63) on each pair of washers (62 and 64).

o. Install each pair of washers (62 and 64) with grommet (63) onto each pin (59). The steel washers (62) must be upward, against spring 161).

p. Install two screen assemblies (65) into pump cover (58) and secure each screen with a retaining ring (66).

q. Install the pump cover assembly and attached parts onto pump body assembly (44). Secure the two assemblies with three 5/16-18 x 1 1/8-inch bolts (68) and flat washers (67). Tighten the bolts to 13 to 16 pound feet torque. Install three 5/16-18 x 2 3/4-inch bolts (70) and flat washers (69). Tighten the bolts to 17 to 20 pound feet torque (fig. 7-56)

Table 7-24. Repair Standards (Brake Coolant Pump)

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
11	38b	Outside diameter of bearing	2.0467 to 2.0472	*
11	46a	Inside diameter at bearing surface of body	2.0471 to 2.0481	2.0486
11	38b, 46a	Fit of bearing in body	0.00011T to 0.0014L	
11	45a	Outside diameter of bearing	To press fit 0.8075 to 0.8078 bore	*
11	46b	Inside diameter at bearing surface of body	0.8075 to 0.8080	0.8085
11	45a, 46b	Fit of bearing in body.....	0.0005L to 0.0003T	
11	46c	Inside diameter at bearing surface of body	1.0615 to 1.0625	1.0630
11	47a	Outside diameter of bearing To press fi	1.0620 to 1.0630 bore	*
11	46c, 47a	Fit of bearing in body.....	0.0005L to 0.0015T	
11	48a	Outside diameter at bearing surface of gear	0.6245 to 0.6250	0.6242
11	49a	Outside diameter of shaft	0.6245 to 0.6250	0.6242
11	52a. 54a	Outside diameter of bearings To press fit	0.8075 to 0.8078 bore	*
11	53a	Inside diameter of gear	0.8075 to 0.8080	0.8085
11	52a, 53a, 54a	Fit of bearing in gear	0.0005L to 0.0003T	

Table 7-24. Repair Standards (Brake Coolant Pump)-Continued

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
11	57a	Outside diameter of bearing	To press fit 0.8075 to 0.8088 cover bore	*
11	58a	Inside diameter at bearing surface of cover	0.8075 to 0.8078	0.8083
11	57a, 58a	Fit of bearing in cover.....	0.0003L to 0.0013T	
11	61a	Free length of spring.....	3.500	
11	61a	Length under load	1.900 at 2.7 to 3.3 lb	1.900 at 2.55 lb

*Replace when worn beyond new dimensions.

Section XXIX. MAIN CONTROL SELECTOR VALVE BODY ASSEMBLY-REPAIR

7-170. Description

Refer to paragraph 2-22 for a description of the selector valve body components.

7-171. Disassembly

(FO-12)

a. Remove detent retaining plug (36), gasket (37), detent spring (38) and detent ball (39) from selector valve body (42).

b. Remove self-locking bolt (51), flat washer (50), and throttle lever retaining ring (49) from throttle valve lever assembly (34). Remove the lever assembly.

c. Remove preformed packing (33) from throttle valve lever assembly (34).

d. Remove indicator retaining ring (48), selector indicator (47) and washer (46) from selector control shaft and lever (32).

e. Remove selector control shaft and lever (32, FO-12) from selector valve body (42). Remove selector lever pin (31) from shaft and lever (32).

f. Remove selector lever gasket (45) and selector lever preformed packing (44) from selector valve body (42).

g. Remove four bolts (15), lockwashers (14), flat washers (13), selector valve body cover (12) and gasket (11) from selector valve body (42).

h. Remove selector valve assembly (8) from selector valve body (42).

i. Do not remove plug (10) from selector valve (9).

j. Remove shift inhibitor retaining plug (16) and retaining plug gasket (17) from selector valve body (42).

k. Remove third- and fourth-signal plug valve (18), fourth-signal valve (19, FO-12) and inhibitor compensator spring (20).

l. Remove governor plug valve (21), shift inhibitor plunger (24) and shift inhibitor spring (23).

m. Remove plunger retaining ring (22) from shift inhibitor plunger (24).

n. Remove throttle regulator valve plug (25) and regulator plug gasket (26) from selector valve body (42).

o. Remove throttle regulator spring (27) and throttle regulator valve assembly (28).

p. Remove throttle valve spring (29, FO-12) and throttle valve assembly (30) from selector valve body (42).

q. Remove two plugs (43) from selector valve body (42).

r. Do not remove selector lever bearings (41) unless replacement is necessary.

7-172. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-173. Inspection and Repair

Refer to paragraph 5-3 for general inspection and repair recommendations.

7-174. Repair Standards

a. Refer to paragraph 5 4 for explanation of repair standards.

b. Refer to repair standards (table 7-25).

7-175. Assembly

(FO-12)

a. If selector lever bearings (41) were removed from selector valve body (42), install new replacements. Install one bearing (41) from the outer side of selector valve body (42), pressing against the numbered end of the bearing cage. 0.200 inch below

the surface of the valve body. Install the other bearing (41) from the inside of selector valve body (42), pressing against the numbered end of the bearing cage, 0.050 inch below the inner surface of the valve body.

b. Install two plugs (43) into selector valve body (42).

c. Install throttle valve assembly (30), long stem first, into selector valve body (42).

d. Install throttle valve spring (29).

e. Install throttle regulator valve assembly (28, FO 12) into selector valve body (42), small diameter end first.

f. Install throttle regulator spring (27).

g. Install regulator plug gasket (26) and plug (25).

h. Install shift inhibitor spring (23) into selector valve body (42).

i. Install plunger retaining ring (22) onto shift inhibitor plunger (24).

j. Install shift inhibitor plunger (24), smaller diameter end first, into selector valve body (42).

k. Install governor plug valve (21), large diameter end first, into selector valve body (42).

l. Install inhibitor compensator spring (20, FO-12) onto governor plug valve (21).

m. Install fourth signal plug valve (19), larger diameter first, into selector valve body (42).

n. Install third- and fourth-signal plug valve (18) in selector valve body (42).

o. Install retaining plug gasket (17) and shift inhibitor retaining plug (16).

p. Install selector valve assembly (8), small end first, into selector valve body (42).

q. Install selector valve body cover gasket (11) and cover (12). Secure the cover with four bolts (15), lockwashers (14) and flat washers (13). Tighten the bolts to 13 to 16 pound feet torque.

r. Install selector lever preformed packing (44, FO-12) and gasket (45) into selector valve body (42).

s. Install throttle lever preformed packing (33) onto throttle valve lever assembly (34).

t. Install valve lever assembly (34) up through selector control shaft and lever (32).

u. Install throttle lever retaining ring (49) onto throttle valve lever assembly (34).

v. Install selector lever pin (31) into the top of selector control shaft and lever (32).

w. Install the throttle valve lever assembly and selector valve lever up through selector valve body (42), alining selector lever pin (31) with the slot in selector valve (9). Use a screwdriver to position throttle valve assembly (30), at the same time indexing the selector lever pin (31) with the selector valve.

x. Install washer (46, FO-12), selector indicator (47) and then retaining ring (48) onto selector control shaft and lever (32).

y. Install detent ball (39), detent spring (38), retaining plug gasket (37) and detent retaining plug (36).

z. Install flat washer (50) and self-locking bolt (51) loosely (these items retain the control linkage).

Table 7-25. Repair Standards (Main control Selector Valve body)

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
12	9a	Outside diameter of valve.....	1.0605 to 1.0610	
12	42d	Inside diameter of valve body bore	1.0620 to 1.0630	
12	9a, 42d	Fit of valve in bore.....	0.0010L to 0.0025L	0.0045L
12	19a	Outside diameter of valve.....	0.9980 to 0.9985	
12	42c	Inside diameter of valve body bore	0.9995 to 1.0005	
12	19a, 42c	Fit of valve in bore.....	0.0010L to 0.0025L	0.0045L
12	20a	Free length of spring	1.907	*
12	20a	Length under load	1.500 at 4.84 to 5.84 lb	1.50 at 4.59 lb
12	21a	Outside diameter of valve.....	0.7480 to 0.7485	
12	42b	Inside diameter of smaller valve body bore	0.7495 to 0.7505	
12	21a, 42b	Fit of valve in valve body bore	0.0010L to 0.0025L	0.0045L

*See footnote at the end of table.

Table 7-25. Repair Standards (Main Control Selector Valve Body)-Continued

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
12	23a	Free length of spring.....	3.383	*
12	23a	Length under load	2.586 to 9.83 to 10.83 lb	2.586 at 8.58 lb
12	24a	Outside diameter of inhibitor plunger	0.368 to 0.370	
12	42f	Inside diameter of valve body.....	0.373 to 0.374	
12	24a, 42f	Fit of inhibitor plunger in valve bore.....	0.003L to 0.006L 0.010L	
12	27a	Free length of spring.....	1.81	*
12	27a	Length under load	0.54 at 4.9 to 5.1 lb	0.54 at 4.85 lb
12	28a	Outside diameter of valve.....	0.6225 to 0.6230	
12	42a	Inside diameter of valve body bore.....	0.6245 to 0.6255	
12	28a, 42a	Fit of valve in body	0.0015L to 0.00300	0.0045L
12	29a	Free length of spring.....	2.117	*
12	29a	Length under load	1.680 at 4.7 to 5.3 lb	1.680 at 4.55 lb
12	30a	Outside diameter of valve.....	0.6230 to 0.6235	
12	42a	Inside diameter of valve body bore.....	0.6245 to 0.6255	
12	30a, 42a	Fit of valve in body	0010L to 0.0025L	0.0045L
12	32a	Outside diameter of shaft	0.8750 to 0.8755	0.8748
12	32b	Inside diameter of shaft	0.6195 to 0.6205	0.6210
12	34a	Outside diameter of shaft	0.6165 to 0.6175	0.6160
12	32b, 34a	Fit of shaft into shaft	0.0020L to 0.0040L	
12	38a	Free length of spring	2.140	*
12	38a	Length under load	1.690 at 8.0 to 9.0 lb	1.690 at 7.75 lb
12	41a	Outside diameter of bearing	Press fit in to 1.1255 dia bore	1.1245*
12	42e	Inside diameter of valve body bore	1.1245 to 1.1255	1.1260
12	41a, 42e	Fit of bearings in bore	0.0010L to 0.0010T	

*Replace when worn beyond new dimensions.

Section XXX. STEER VALVE BODY ASSEMBLY-REPAIR

7-176. Description

Refer to paragraph 2-23 for description of the steer valve body components.

7-177. Disassembly (FO-12)

a. Remove steer valve retainer nuts together with their steer valve plungers, plunger spring retainers, and gaskets from the steer valve body. Refer to figure 7-57.

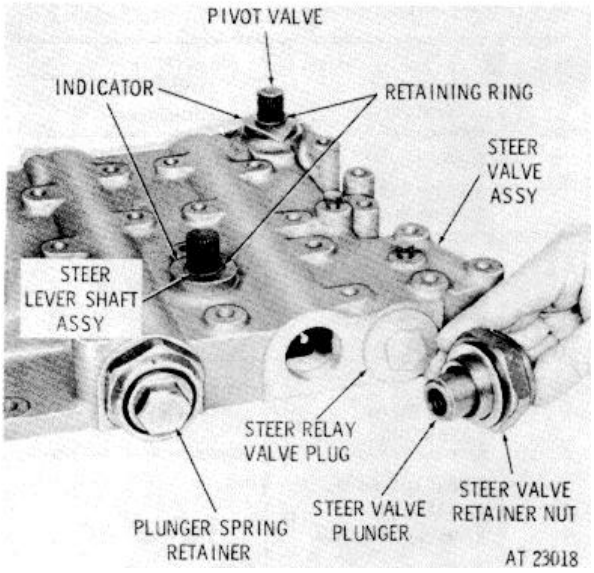


Figure 7-57. Removing (or installing) steer valve plunger and related parts.

b. Remove retaining rings and indicators from pivot valve and steer lever shaft assembly (fig. 7-57)

c. Remove steer shaft assembly, blocks, detent hall and spring from steer valve body (fig. 7-58)

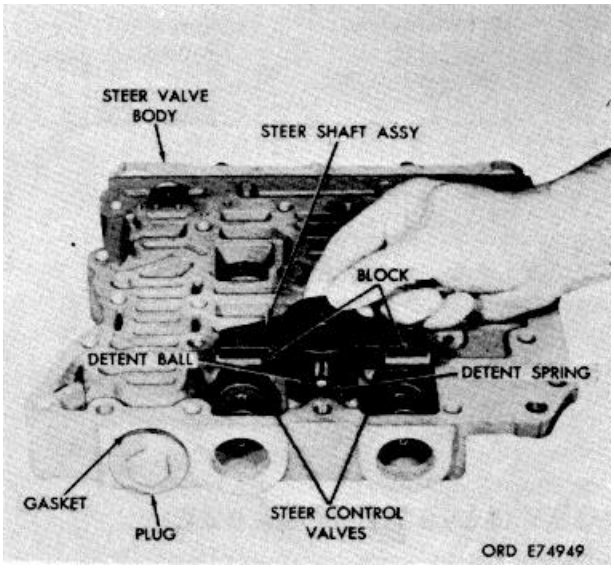


Figure 7-58. Removing for installing) steer shaft assembly.

d. Remove steer control shaft preformed packing (72, FO-12) from steer valve body (109).

e. Remove steer valve assemblies (79 and 100). Do not disassemble these parts unless replacement is necessary. If necessary, remove nuts 187 and 101), steer valves (86 and 102) and steer regulator valve springs (103 and 104), and (84 and 85) from steer regulator valve assemblies (80 and 106). Remove stops (83 and 105). Remove steer regulator valve stems (81 and 108) from steer regulator valves (82 and 107).

f. Remove the steer relay valve plug and gasket from steer valve body (fig. 7-57).

g. Remove spring (76, FO-12), valve (75) and plug valve (74).

h. Remove 12 bolts (55 and 122), flat washers (57 and 120) and lockwashers (56 and 121) which retain cover (119). Remove valve body cover (119) and gasket (118) from valve body (109).

i. Remove detent spring (59), detent ball (60) and drive relay valve spring (117) and stop pin (58).

j. Remove drive relay valve (116).

k. Remove retaining rings (66 and 67) and pivot valve indicator (65) from pivot valve (63).

l. Remove pivot valve (63, FO-12) from steer valve body (109).

m. Remove preformed packing (64) from steer valve body (109).

n. Remove plugs (68) from steer valve body (109).

o. Do not remove dowel pin (62) unless replacement is necessary.

p. Do not remove detent sleeve (111) unless replacement is necessary.

q. Do not remove steer shaft needle bearings (73) unless replacement is necessary.

7-178. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-179. Inspection and Repair

Refer to paragraph 5-3 for general inspection and repair recommendations.

7-180. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-26).

7-181. Assembly (FO-12)

a. If needle bearings (73) were removed from steer valve body (109), install new replacements. Install one needle bearing into top of the valve body, pressing against the numbered side of the bearing cage, 0.200 inch below the surface adjacent to the bearing bore of the valve body. Install the remaining bearing (73), pressing against the numbered side of bearing cage, from the bottom side of the valve body, 0.150 inch below the surface adjacent to the bearing bore of the valve body.

b. If detent sleeve (111) was removed, install it from the lower side of steer valve body (109). Press the sleeve to 0.241 to 0.251 inch below the valve body mounting surface.

c. If dowel pin (62) was removed, install a new replacement. Press the pin flush with, to below, the end surface of the valve body.

d. Install plugs (68) into steer valve body (109).

e. Install pivot valve (63) into steer valve body (109, FO-12).

f. Install preformed packing (64) into steer valve body (109).

g. Install drive relay valve (116), small diameter end first, into steel valve body (109).

h. Install drive relay valve spring (117) into steer valve body (109).

i. Install stop pin (58) into steer valve body (109).

j. Install detent ball (60) into steer valve body (109).

k. Install detent spring (59) into steer valve cover (119).

l. With springs (117 and 59, FO-12), and ball (60) in position, install gasket (118) and steer valve cover (119) onto steer valve body (109) and secure it with nine 3/8-16 x 1 1/2 inch bolts (122), three 3/8 16 x 1 3/4 -inch bolts (55), lockwashers (56 and 121), and flat washers (57 and 120). Tighten the bolts to 26 to 32 pound feet torque.

m. Install pivot valve indicator (65) so that the pointer travels between L and P marks on the valve body.

n. Install retaining rings (66 and 67) onto pivot valve (63).

o. Install relay plug valve (74, FO-12) into steer valve body (109).

p. Install steer relay valve (75) into steer valve body (109).

q. Install steer relay valve spring (76) into steer valve body (109).

r. Install steer relay valve retaining plug (78) and retainer plug gasket (77).

s. If steer regulator valve stems (81 and 108) were removed from steer regulator valves (82 and 107), assemble the replacement parts. Insert small diameter ends of the stems into the larger ends of the valves. Press the stems into the valves until they are firmly seated against the shoulders of the valves.

t. Install stop (83), steer regulator valve outer (85) and inner (84) springs onto steer regulator valve assembly (80).

u. Install steer valve (86, FO-12), large end first, onto steer regulator valve stem (81) against springs (84 and 85).

v. Install nut (87), flat side first, onto steer regulator valve stem (81) but do not tighten at this time.

w. Assemble the left steer valve in the same manner as described in s through v, above (items 100 through 108).

x. Install right and left steer valve assemblies (79 and 100) head of stems (81 and 108) first, into steer valve body (109).

y. Tighten nuts (87 and 101) at the steer valves until the dimension of 3.335 inches is obtained between the land of the steer regulator valve and the land of the steer valve, as shown in figure 7-59. The steer regulator valve assemblies may be prevented from rotating while adjusting the nuts by inserting a 5/16 -inch diameter rod or punch through the drilled holes in the valve. After adjusting the nuts, crimp each nut in two places.

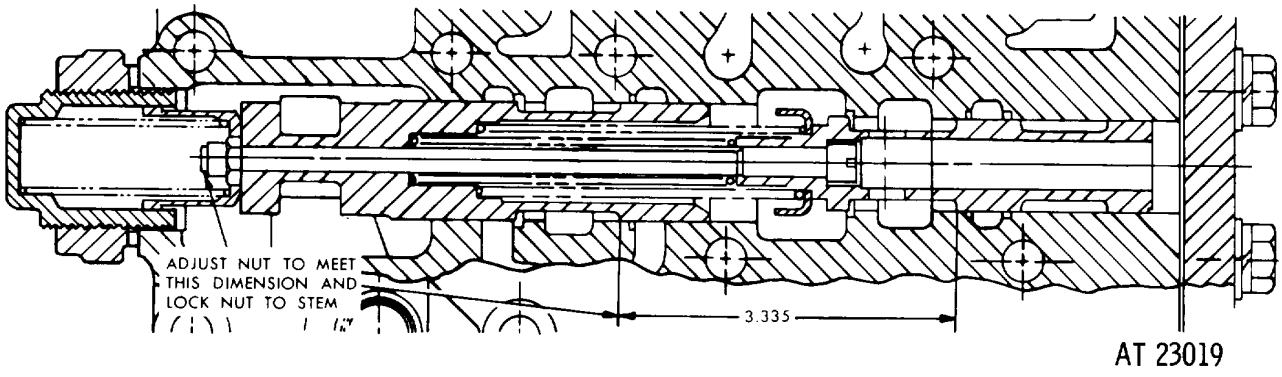


Figure 7-59. Steer valve adjustment

z. Install spring (110, FO-12) and detent ball (112) into steer valve body (109).

aa. Install steer lever blocks (113 and 115) onto steer lever shaft assembly (114), using a coating of oil soluble grease to retain the blocks. Install shaft assembly (114), indexing blocks (113 and 115) with the outer grooves near the ends of steer regulator valves (82 and 107).

ab. While holding the shaft assembly in position, install preformed packing (72) into the top of

steer valve body (109), being careful not to damage the packing on the splines of the shaft assembly

ac. Install steer indicator (71) on shaft assembly (114) in the position shown in figure 7-57 (toward front of valve body).

ad. Install two retaining rings (69 and 70, FO-12) onto steer lever shaft assembly (114).

ae. Install retaining nut gaskets (92 and 95), and steer valve plunger, and spring retainer as an assembly. Refer to figure 7-57. Tighten the retainer nuts.

Table 7-26. Repair Standards (Steer Valve Body)

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
	59a	Free length of spring	1.808	*12
12	59a	Length under load	1.130 at 33.15 to 36.75 lb	1.130 at 32.25 lb
12	63a	Outside diameter at three narrow lands of valve	0.9980 to 0.9985	
12	109e	Inside diameter of valve bore in body....	0.9995 to 1.0005	
12	63a, 109e	Fit of valve in body	0.0010L to 0.0025L	0.0045L
12	73a	Outside diameter of bearing	0.9995 to 1.0005	*
12	109f	Diameter of bore in housing.....	0.9995 to 1.0005	1.0010
12	73a, 109f	Fit of bearing in housing	0.0010L to 0.0010T	
12	74a	Outside diameter of valve.....	0.8730 to 0.8735	
12	75a	Outside diameter of valve.....	0.8730 to 0.8735	
12	109d	Inside diameter of bore in body.....	0.8745 to 0.8755	
12	74a, 75, 109d	Fit of valves in body	0.0010L to 0.0025L	0.0045L
12	76a	Free length of spring.....	2.075	*
12	76a	Length under load	1.22 at 28.5 to 31.5 lb	1.22 at 27.5 lb
12	86a	Outside diameter of valve.....	1.1850 to 1.1855	
12	109b	Inside diameter of bore in body.....	1.1870 to 1.1880	
12	86a. 109b	Fit of valve in body.....	0.001L to 0.0025L	0.0045L
12	103a	Free length of spring.....	3.430	*
12	103a	Length under load	3.25 at 9 to 11 lb	3.25 at 8.5 lb
12	104a	Free length of sprint, ...	3.027	
12	104a	Length under load	2.69 at 57 to 73 lb	2.69 at 55.5 lb
12	107a	Outside diameter of valve.....	0.9350 to 0.9355	
12	109c	Inside diameter of bore in body.....	0.9370 to 0.9380	
12	107a, 109c	Fit of valve in body.....	0.0015L to 0.0030L	0.0045L
12	109a	Inside diameter of bore in body.....	0.8745 to 0.8755	
12	116a	Outside diameter of valve.....	0.8730 to 0.8735	
12	109 a, 116a	Fit of valve in body.....	0.0010L to 0.0025L	0.0045L
12	110a	Free length of spring.....	1.1610	*
12	110a	Length under load	0.758 at 18 to 22 lb	0.758 at 17 lb
12	114a	Outside diameter of shaft	0.7495 to 0.7500	0.7493

*See footnote at the end of table.

Table 7-26. Repair Standards (Steer Valve Body)-Continued

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
12	117a	Free length of spring	2.075	*
12	117a	Length under load	1.22 at 28.5 to 31.5 lb	1.22 at 27.5 lb

*Replace when worn beyond new dimensions.

Section XXXI. OIL TRANSFER PLATE ASSEMBLY-REPAIR

7-182. Description
The oil transfer plate has numerous oil passages and channels to connect passages of control valve bodies and transmission housings. Refer to paragraph 2-27.

7-183. Disassembly (FO-13)
Do not remove threaded plugs (16, 17 and 20) except for replacement or cleaning.

7-184. Cleaning
Refer to paragraph 5-2 for cleaning recommendations.

7-185. Inspection and Repair
Refer to paragraph 5-3 for inspection and repair recommendations.

7-186. Repair Standards
No repair standards apply to these components.

7-187. Assembly (FO-13)
If threaded plugs (16, 17 and 20) were removed, install them, if serviceable, or install new plugs.

Section XXXII. RIGHT AND LEFT BRAKE APPLY BODY AND BEVEL GEAR HOUSING COVER ASSEMBLIES-REPAIR

7-188. Description
The manually operated right and left brake apply bodies and associated parts mechanically apply the brakes. Applying the brakes causes the brake coolant pump to provide oil to cool the brakes. The bevel gear housing cover provides a mounting for the brake apply components and control valve bodies. Refer to paragraph 2-26.

7-189. Disassembly (FO-13)
a. Remove breather assembly (35) from cover assembly (36).
b. Remove right and left brake adjustment access covers (24 and 40) with gaskets (23 and 39).
c. Remove four retaining rings (21 and 29) and indicator keyed washers (22 and 30) from both right and left brake apply shafts (47 and 74).
d. Remove eight bolts (62, 65, 85, 93) and washers (61, 66, 84, 94). Remove the right and left brake apply body assemblies (52 and 79) from housing Removing (or installing) brake apply body bolt. cover (37). Refer to figure 7-60.

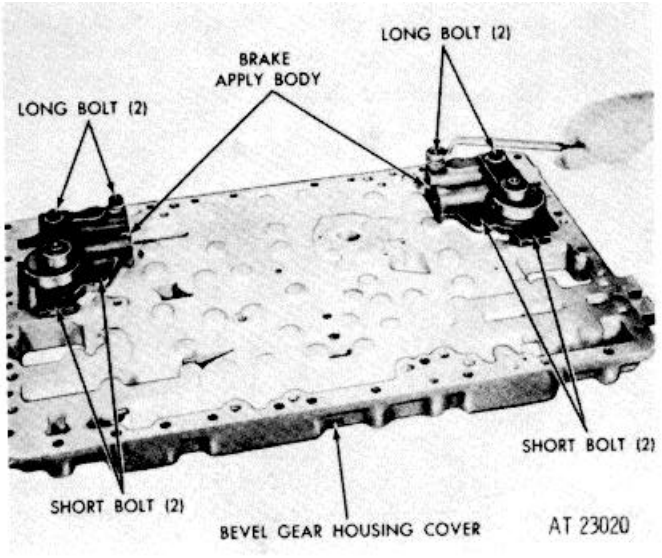


Figure 7-60. Removing (or installing) brake apply body bolt

NOTE

The right and left brake apply valve body assemblies are identical except that they are designed for opposite sides, therefore, e through o, below, will apply to either one. The instructions are keyed to the left brake apply body (FO-13, items 72 through 98).

e. Remove preformed packing (72) from brake apply shaft (74).

f. Remove springs (73 and 75) from cover assembly (36).

g. Remove air valve assembly (76) from brake apply body (82). Do not remove seal (77) from air valve (78). except for replacement.

h. Remove retaining ring (91) and washer (92) from brake apply shaft (74).

i. Remove brake apply shaft (74, FO-13) from brake apply body (82). Refer to figure 7-62.

j. Remove lever (86. FO-13), cam (88), rollers (90), bearing race (87), and plate (89) from brake apply body (82).

k. Remove retaining ring (98) from brake apply body (82).

l. Remove flat washer (97, FO-13), spring (96) and valve (95) from brake apply body (82).

m. Do not remove bearing (80 or 83) from brake apply body (82) except for replacement.

n. Do not remove pins (81) from the brake apply body (82) except for replacement.

o. Do not remove hexagon-head plugs 138) from cover (37) except for replacement.

7-190. Cleaning

Refer to paragraph 5-2 for cleaning recommendations.

7-191. Inspection and Repair

Refer to paragraph 5-3 for inspection and repair recommendations.

7-192. Repair Standards

a. Refer to paragraph 5-4 for explanation of repair standards.

b. Refer to repair standards (table 7-27).

7-193. Assembly (FO-13)

a. If hexagon-head plugs (38) were removed from housing cover (37), install plugs.

b. Assemble and install the right and left brake apply body assemblies as outlined in c through v, below.

c. If pins (80) were removed from brake apply body (82), install new ones. Press pins (81) into body (82), 0.060 inch below the surface of the body and stake securely.

d. If bearing (83) was removed from brake apply body (82), install a new bearing. Install the bearing, pressing against the numbered side, 0.060 to 0.070 inch above the oil port relief surface of the body.

e. If bearing (80) was removed from brake apply body (82), install a new bearing. Install the bearing, pressing against the numbered side of the bearing, flush with, to 0.010 inch below, the surface of the body .

f. Install signal valve (95), small end first, into brake apply body (82).

g. Install signal valve spring (96) and washer (97) into brake apply body (82) and secure washer (97) with retaining ring (98).

h. Apply a coating of oil-soluble grease to needle bearing race (87), cam (88,) and rollers (90).

i. Place the brake apply cam side plate (89) on the assembly table and position brake cam (88) on the plate. Refer to figure 7-61.

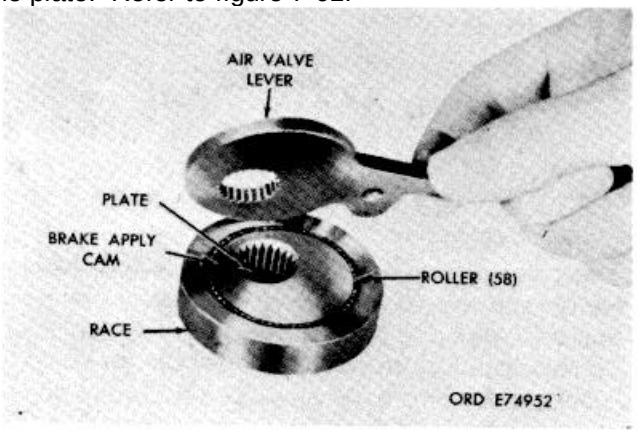


Figure 7-61. Components of left brake assembly, showing relation of parts.

j. Place bearing race (87, FO-13) over cam (88) and install 58 rollers (90) between the cam and race. Refer to figure 7-61.

k. Place the brake air valve lever onto the components (fig. 7-61), as shown.

l. Install the brake components into the brake apply body (82, FO-13). Refer to figure 7-62

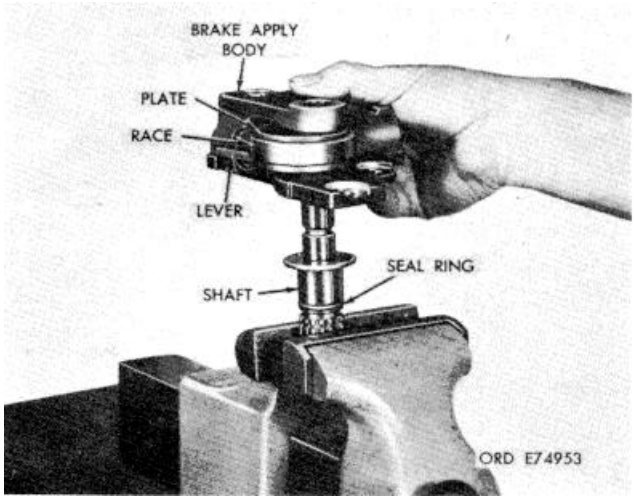


Figure 7-62. Removing (or installing) brake apply shaft.

m. Install the sealring onto the brake apply shaft. Refer to figure 7-62.

n. With the brake apply shaft held in a soft jaw vise, install the brake apply body with components onto the brake apply shaft (fig. 7-62). Rotate the splined brake lever, cam and plate to index with the blind spline on the brake shaft.

o. Install washer (92, FO-13), onto brake apply shaft (74) and secure it with retaining ring (91).

p. If seal (77) was removed from air valve (78), install a new seal.

q. Install air valve assembly (76), smaller diameter first, into brake apply valve body (82).

r. Install spring (75) into housing cover (37).

s. Install spring (73) into housing cover (37), making sure that the end of the spring is engaged with the hole in the cover.

t. Using a smooth thin steel strip to compress the air valve spring and hold the air valve assembly in the brake apply body, install the brake apply body and its component parts on the housing cover assembly (fig. 7-63). Rotate the brake apply body, keeping the steel strip positioned, in a counterclockwise direction so that the ends of spring (73, FO-13) are indexed with the holes provided in cover (37) and brake apply shaft (74). Remove the steel strip.

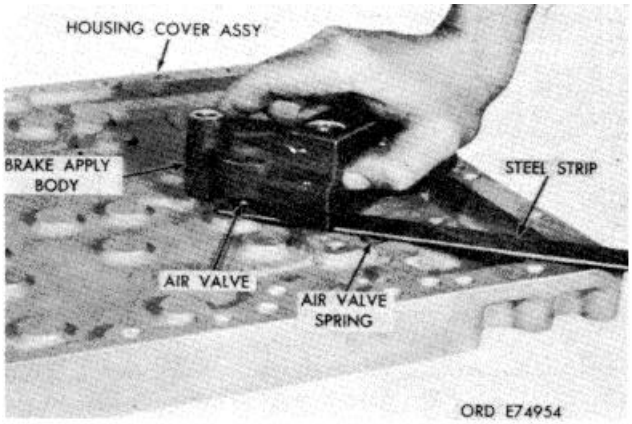


Figure 7-63. Installing brake apply assembly.

u. Secure brake apply body assembly (79) to housing cover (37) with two bolts (93), two bolts (85) and their washers (94 and 84). Refer to figure 7-60.

v. Install indicator washer (30, FO-13) and two retaining rings (29) on brake apply shaft (74).

NOTE

Repeat procedures outlined in *c* through *v,* above, to assemble and install corresponding components making up the right brake apply mechanism. However, rotation to index spring (46) will be clockwise instead of counterclockwise as for spring (73) in *t,* above.

w. Install the right and left brake adjustment access covers (40 and 24, FO-13) with gaskets (39 and 23) temporarily onto housing cover (37) and secure with six capscrews (44 and 28), lockwashers (42 and 26) and flat washers (41 and 25).

x. Install breather assembly (35) into housing cover (37).

Table 7-27. Repair Standards (Right, Left Brake Apply body Bevel Gear Housing Cover)

Reference		Point of measurement	Size and fit of new parts	Wear limit DS/GS maintenance
Foldout	Item			
13	46a	Free position of spring ends.....	123 apart	*
13	46a	Position under torque load	45 at 12.9 to 15.7 in. lb	45° at 12.2 lb
13	47a	Diameter at smaller end of shaft.....	0.6245 to 0.6250	0.6243
13	47a	Diameter at center bearing surface of shaft	0.7495 to 0.7500	0.7493

*See footnote at the end of table.

Table 7-27. Repair Standards (Right, Left Brake Apply body Bevel Gear Housing Cover)-Continued

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
13	48a	Free length of spring.....	2.42	*
13	48a	Length under load	1.04 at 11.68 to 12.92 lb	1.04 at 11.37 lb
13	51a	Larger outside diameter of valve.....	1.1225 to 1.230	
13	51b	Smaller outside diameter of valve.....	0.6850 to 0.6855	
13	54a	Inside diameter at large bore in body	1.1245 to 1.1255	
13	54b	Inside diameter at small bore in body ...	0.6870 to 0.6880	
13	51a, 51b, 54a, 54b	Fit of valves in bores	0.0015L to 0.003L 0.0045L	
13	53a	Outside diameter of bearing	0.9995 to 1.0005	*
13	54d	Inside diameter of bearing surface of body	0.9985 to 0.9995	1.000
13	53a, 54d	Fit of bearing in body.....	0.0000 to 0.0020T	
13	54c	Inside diameter of smaller bore in body	0.4995 to 0.5005	
13	57a	Outside diameter of valve.....	0.4980 to 0.4985	
13	54c, 57a	Fit of valve in body.....	0.0010L to 0.0025L	0.0045L
13	54e	Inside diameter at bearing surface of body	0.811 to 0.812	0.8125 0.812
13	56a	Outside diameter of bearing	Press fit in 0.811 to 0.812	*
13	54e, 56a	Fit of bearing in body.....	0.0000 to 0.0020T	
13	58a	Free length of spring.....	1.930	*
13	58a	Length under load	0.800 at 4.05 to 4.95 lb	0.80 at 3.825 lb
13	68a	Outside diameter of cam	1.6563 to 1.6568	1.6561
13	69a	Outside diameter of bearing	0.0936 to 0.0938	0.0933
13	70a	Inside diameter of race.....	1.8449 to 1.8454	1.8456
13	68a, 69a, 70a	Fit of cam and bearings in race	0.0005L to 0.0019L	
13	73a	Free position of spring ends.....	123° apart	*
13	73a	Position under torque load	45° at 12.9 to 15.7 in. lb	450 at 12.2 lb
13	74a	Outside diameter at bearing surface of shaft	0.6245 to 0.6250	0.6243
13	74b	Outside diameter at bearing surface of shaft	.0.7495 to 0.7500	0.7493
13	75a	Free length of spring.....	2.420	*
13	75a	Length under load	1.04 at 11.68 to	1.04 at 11.37 lb 12.92 lb
13	78a	Larger outside diameter of valve.....	1.1225 to 1.1230	
13	78b	Smaller outside diameter of valve.....	0.6850 to 0.6855	
13	82a	Diameter of larger bore in body	1.1245 to 1.1255	
13	82b	Diameter of small bore in body	0.6870 to 0.6880	
13	78a, 78b, 82a, 82b	Fit of valve in body.....	0.0015L to 0.003L	0.0045L

*See footnote at the end of table.

Table 7-27. Repair Standards (Right, Left Brake Apply Body Bevel Gear Housing Cover)-Continued

Reference				Wear limit
Foldout	Item	Point of measurement	Size and fit of new parts	DS/GS maintenance
13	80a	Outside diameter of bearing	0.9995 to 1.0005	*
13	82d	Inside diameter of bore in body.....	0.9985 to 0.9995	1.000
13	80a, 82d	Fit of bearing in body.....	0.0000 to 0.0020T	
13	82c	Inside diameter of bore in body.....	0.4995 to 0.5005	
13	95a	Outside diameter of valve.....	0.4980 to 0.4985	
13	82c, 95a	Fit of valve in body.....	0.0010L to 0.0025L 0.0045L	
13	82e	Inside diameter of bore in body.....	0.811 to 0.812	0.8125
13	83a	Outside diameter of bearing	Press fit in 0.811 to 0.812 bore	*
13	82e, 83a	Fit of bearing in body.....	0.0010L to 0.0010T	
13	87a	Inside diameter of race.....	1.8449 to 1.8454	1.8456
13	88a	Outside diameter of cam	1.6563 to 1.6568	1.6561
13	90a	Outside diameter of bearing	0.0936 to 0.0938	0.0933
13	87a, 88a, 90a	Fit of cam and bearings in race	0.0005L to 0.0019L	
13	96a	Free length of spring.....	1.930	*
13	96a	Length under load	0.800 at 4.05 to 4.95 lb	0.80 at 3.825 lb

*Replace when worn beyond new dimensions.

CHAPTER 8

ASSEMBLY OF TRANSMISSION FROM SUBASSEMBLIES

8-1. Arrangement of Chapter 8

Assembly procedures for the transmission, arranged in consecutive, pictorial steps, commence with paragraph 8-11, following. Instructions for shimming and adjusting the bevel gears are given in the paragraphs immediately following. Also, references will be made to exploded view foldouts (FO-3 through FO-13, back of book), and to special tool information (chapter 3), as needed.

8-2. Shimming and Adjusting Bevel Gears

a. Matched Components.

(1) The bevel drive gear, bevel driven gear, and brake coolant pump bevel drive gear are matched components in a set and must be properly positioned and adjusted in relation to each other. Correct backlash, gear tooth contact and bearing preload must be established during assembly of the transmission.

(2) Steel shims of various thickness are used to position the gears and to produce the proper preload on the tapered roller bearings on which the bevel drive gears and cross shaft are mounted.

b. Shimming Outlined. The instructions which follow outline the procedures required to do the complete job of shimming and gear setting. However, when a transmission is rebuilt, the extent of the job will be determined by the extent of factors which prevent using the original shim packs.

c. When to Use New Shims. Some of the factors which prevent using the original shims are:

(1) Evidence of incorrect setting of gears in previous assembly. This can be recognized by abnormal gear contact wear pattern.

(2) Loss or mixing of shims removed during disassembly. Always tie each shim pack together at the time of removal and identify its location. As added precaution, record the thickness of each shim pack and its location.

(3) Replacement of any components which, because of manufacturing tolerances, will not be dimensionally identical to original components.

d. Stamped and Etched Dimensions.

(1) Each gear set is matched during manufacture and etched with a gear set number, prescribed backlash (BL), and mounting dimension (MD). Lettered dimensions AA, BB, CC and DD are tamped on a web in the bevel gear housing. These are called "case" dimensions and are specific for each bevel gear housing. Figure 8-1 shows the location of case dimensions.

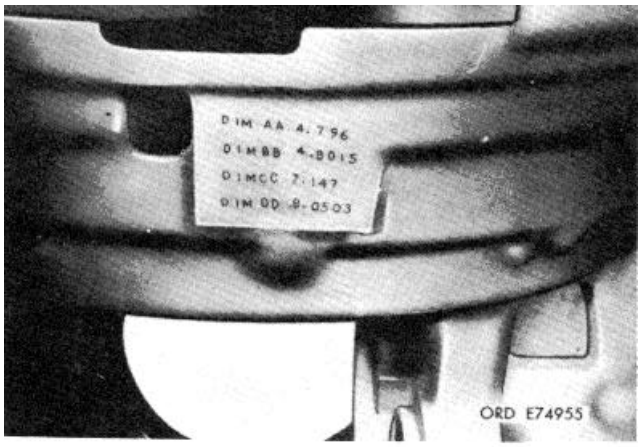


Figure 8-1. Case dimensions stamped on bevel gear housing.

(2) Other dimensions must be accurately measured during adjustment procedures. The mounting dimensions (MD) etched on the gears, the case dimensions and the dimensions measured during adjustment are all used in the formulas for determining the nominal (approximate) shim pack thicknesses.

e. Shimming Illustrated. Line drawings illustrate each major step in determining the nominal shim pack thicknesses.

f. Record Prior to Adjustments. Record all backlash, mounting distance and case dimensions before beginning the gear-setting procedures.

g. Final Adjustments. After the nominal shim packs are determined, the gear setting and bearing preload must be further adjusted to obtain the proper backlash, gear tooth pattern and drag torque characteristics.

8-3. Determining Nominal Shim Between Bevel Drive Gear Support and Carrier

a. Nominal shim W (fig. 8-2) establishes approximately zero end play of the bevel drive gear within its carrier and support.

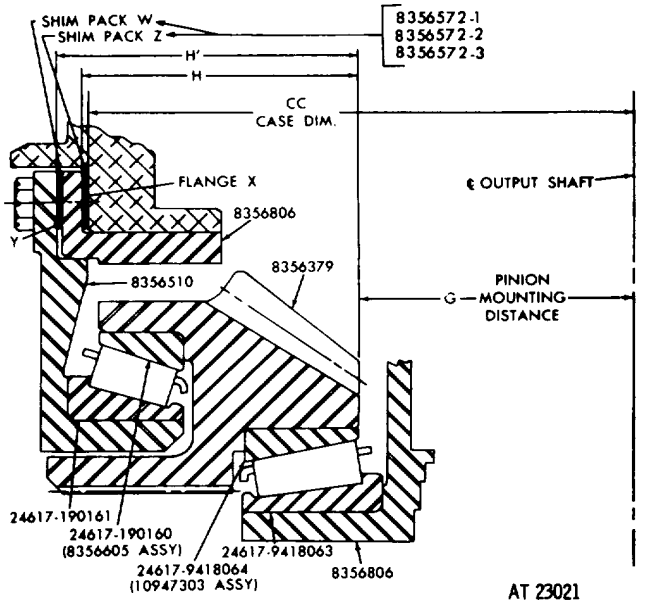


Figure 8-2. Nominal shims for bevel drive gear support and carrier.

b. Position gear 8356379, teeth upward, on a level surface. Position the assembled carrier 8356806, larger diameter down, over gear 8356379. Rotate the carrier to seat bearing assembly 10947303 firmly.

c. Measure and record the vertical distance H, from the flange surface of carrier 8356806 to the end surface of gear 8356379.

d. Measure and record the thickness of flange X.

e. Position the support 8356510, bearing upward, on a level surface.

f. Remove carrier 8356806 from gear 8356379. Install the gear, teeth upward, on support 8356510. Rotate it to seat bearing 8356605 firmly.

g. Measure and record the vertical distance H' (fig. 8 -2) from the outer flange of support 8356510 to the end surface of gear 8356379.

h. Substituting the dimensions obtained in c, d and g, above, in the formula W = H'-(H + X), calculate the thickness of nominal shim pack W. Select the proper combination of shims 8356572 1, 8356572 2 and 8356572 3 which most nearly equals the dimension obtained for W.

i. Assemble the bevel drive gear assembly as outlined in chapter 7, section XIV.

8-4. Determining Actual Shim Between Bevel Drive Gear Support and Carrier

a. When assembly of the bevel drive gear assembly is completed, check the end play of the gear. It should not exceed 0.0015 inch. If end play exceeds this amount, remove shims to reduce it. Reassemble the gear, carrier and support.

b. Using wrench assembly (30, table 3-1) (fig. 8-3) check the torque required to slowly rotate the bevel drive gear within the carrier. At zero end play, torque should not exceed 2 pound inches. If greater than this figure, add shims to increase the end play - but do not let the end play exceed 0.0015 inch.

NOTE

If trouble is encountered in arriving at an adjustment that is within both the torque and end play limits, disassemble the parts and inspect the bearings for dirt. Clean them and lubricate with recommended transmission fluid.

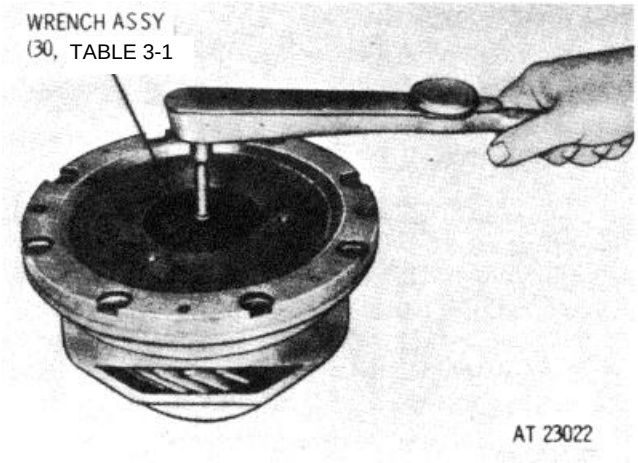


Figure 8-3. Checking preload torque of bevel drive gear bearings.

8-5. Determining Nominal Shim B etween Bevel Drive Gear Carrier and Transmission Housing

a. Nominal shim Z (fig. 8-2), positions the bevel drive gear in approximately the correct relation to the bevel driven gear's installed position.

b. Calculate shim Z by substituting dimensions previously recorded for H, G and CC, in the formula Z = H + G - CC.

NOTE

Dimension H was measured and recorded in paragraph 8 3c, above; dimensions CC and G were recorded, per instructions in paragraph 8 -2d, above.

c. Select the proper combination of shims 8356572 1, 8356572 2 and 8356572 3 which will most nearly equal dimension Z.

d. Do not install the bevel drive gear assembly until procedures in paragraphs 8 6 and 8-7, following, are completed.

8-6. Determining Nominal Shim Between Cross Shaft Left Bearing Retainer and Transmission Housing

a. Install outer race of bearing assembly 10947307 into retainer assembly 2520-915-6534 (para 7-67).

b. Assemble the driven gear and cross shaft assembly (para 7-79).

c. Position the left bearing retainer assembly, bearing race upward, on a level surface.

d. Position the cross shaft, nut downward, into the retainer assembly. Rotate the shaft and gear assembly to firmly seat the components of bearing assembly 10947307.

e. Measure and record the vertical distance B (fig. 8-4) from the outer flange surface of the retainer to the lower surface of the teeth on the driven gear.

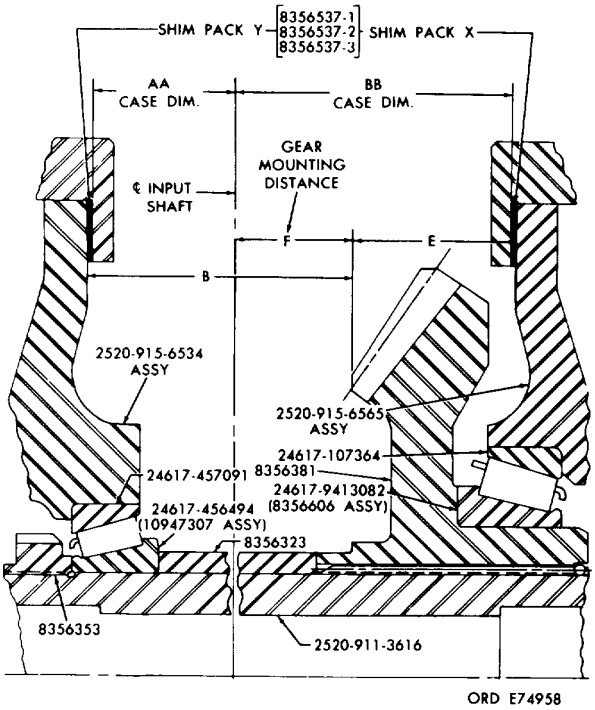


Figure 8-4. Nominal shims for bearing retainers.

f. Calculate shim pack Y (fig. 8-4) by substituting dimensions for B, F and AA in the formula Y = B - F - AA.

NOTE

Dimension B was obtained in e, above; dimension F is the gear mounting distance (MD) etched on the driven gear; dimension AA is stamped on a web in the bevel gear housing.

g. Select the combination of shims 8356537 1, 8356537 2 and 8356537 3 which will most nearly equal Y (fig. 8-4). Install the shims and left bearing retainer into the bevel gear housing left side (para 8-11, step 4, below).

8-7. Determining Nominal Shim Between Driven Bevel Gear (Right Bearing Retainer and Transmission Housing

a. Install outer race of bearing assembly 3110-100-5480 into right bearing retainer assembly 2520-915-6565 (para 7-67). Position the retainer assembly, bearing race upward, on a level surface.

b. Position the cross shaft, nut upward, into the retainer assembly. Rotate the shaft and gear assembly to firmly seat the bearing (8356606) components.

c. Measure and record the vertical distance E (fig. 8-4) from the outer flange surface of the retainer, to the upper end surface of the teeth on the driven gear.

d. Calculate shim pack X (fig. 8-4) by substituting dimensions for E, F and BB in the formula X = E + F - BB.

NOTE

E was obtained in *c*, above; F is the moutning dimension (MD) etched on the driven gear; BB is stamped on a web of the bevel gear housing.

e. Select the combination of shims 8356537-1, 8356537 2 and 8356537-3 which will most nearly equal X.

f. Install the shaft and gear assembly into the bevel gear housing. Install shims X (fig. 8-4) and the right bearing retainer (refer to para 8-11, step 2, below). Rotate the driven gear while tightening the retainer bolts. Check for torque required to slowly rotate the cross shaft while tightening the bolts (use a pound inch torque wrench and socket wrench 28, table 3-1, para 8-11, step 6, below).

g. If torque exceeds 2 pound inches when the right retainer is tight, remove the left retainer and add shims to shim pack Y (fig. 8-4) until torque does not exceed the limit.

h. End play of the cross shaft should not exceed 0.0015 inch when both bearing retainers are tight but may be zero is the torque does not exceed 2 pound inches. Shims are removed from shim pack Y (fig. 8-4) (at left bearing retainer) to reduce end play.

NOTE

If trouble is encountered in arriving at an adjustment that is within both the torque and end play limits, disassemble the parts and inspect the bearings for dirt. Clean them and lubricate with recommended transmission fluid.

8-8. Establishing Proper Backlash and Gear Tooth Contact Between Drive and Driven Bevel Gears

a. After cross shaft end play and bearing

preload are properly adjusted, install shim pack Z (fig. 8-2) (determined in para 8-5, above) and the bevel drive gear assembly into the bevel gear housing. Tighten the bolts which retain the assembly, Check the free rotation of the bevel gears (para 8-11, step 8, below).

b. Check the backlash between the drive and driven gear teeth by locking the drive gear with holder assembly (15, table 3-1) (fig. 8-5). Install a dial indicator against a tooth of the driven gear. Rock the driven gear in both directions and note the backlash. It should be as indicated by the etched dimension (BL) on the gear set.

NOTE

Backlash may be adjusted by changing shim pack Z, or by moving shims from shim pack X to shim pack Y or vice versa. However, any change in shimming will affect the gear tooth contact pattern and must be coordinated with adjustments outlined in c, below.

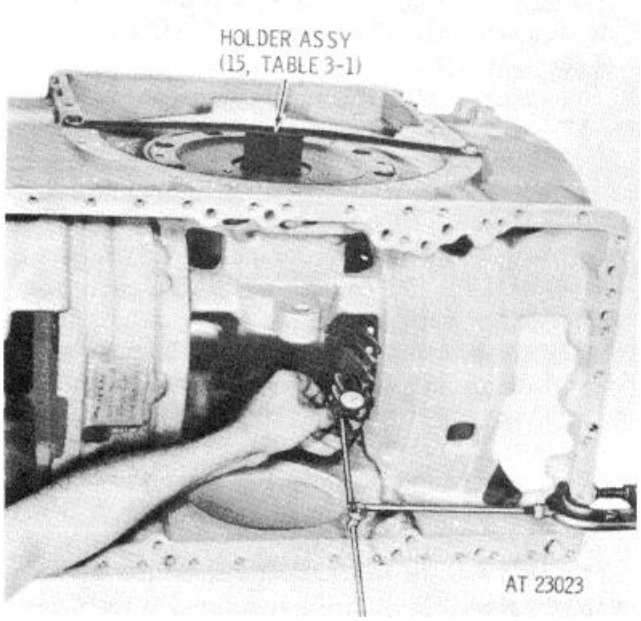


Figure 8-5. Checking backlash of bevel gears.

c. Remove holder assembly (15, table 3-1) (fig. 8-5). Coat several teeth of the bevel drive gear with a fairly dry mixture of red lead and oil. Using wrench assembly (30, table 3-1) (para 8-11, step 8, below), and a socket wrench drive, rotate the drive gear in a clockwise direction through several revolutions while holding a light load against turning of the cross shaft (para 8-11, step 8, below). Note the gear tooth contact pattern and compare it with the patterns shown in figures 8-6 and 8-7. Readjust shims X and Y (fig. 8-4), and Z (fig. 8-2), as required, to establish the proper pattern. Recheck the backlash. Figure 8-7 illustrates the proper gear tooth contact pattern under full load.

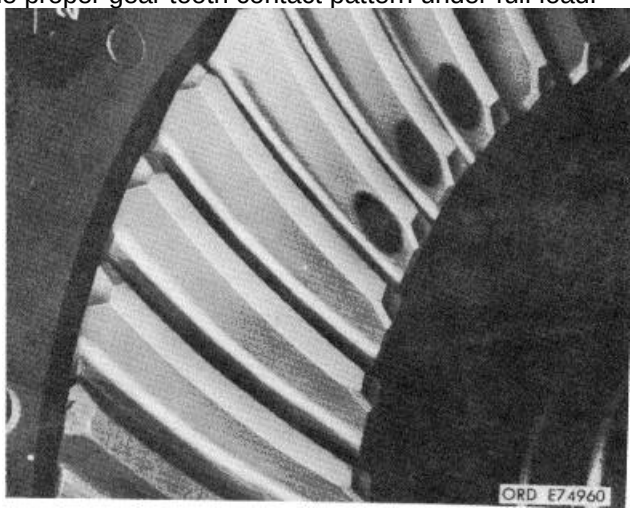


Figure 8-6. Gear tooth contact pattern-no load.

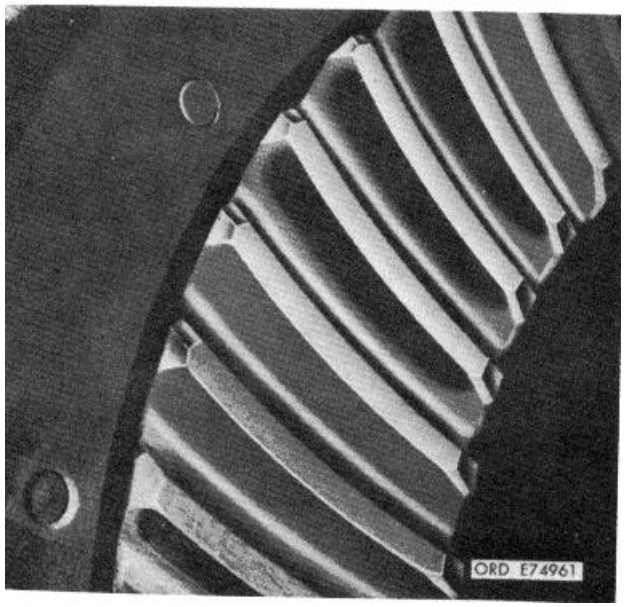


Figure 8-7. Gear tooth contact pattern-full load.

8-9. Determining Nominal Shim Between Brake Coolant Pump Body and Drive Gear Bearing

a. Measure and record width J (fig. 8-8), of the pump drive gear bearing.

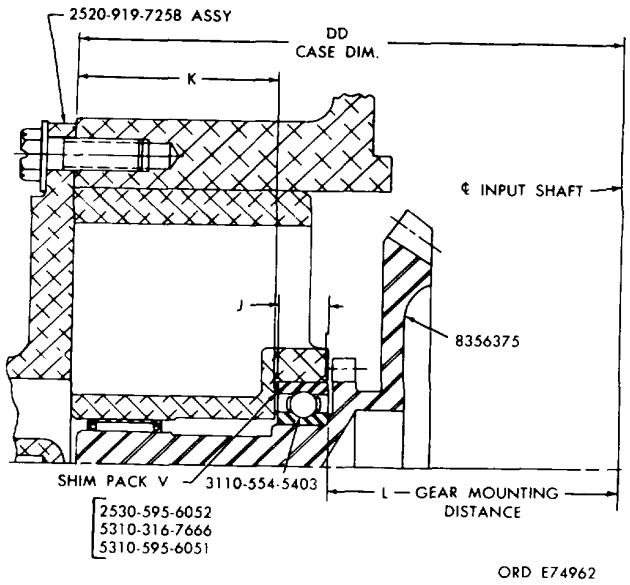


Figure 8-8. Nominal shims for brake coolant pump gear

b. Measure and record distance K (fig. 8-8), From the bottom of the bearing bore in the pump cody, to upper surface of the pump cover (pump assembled).

c. Calculate shim pack V (fig. 8-8) by substituting dimensions for DD, J, K and L in the formula V = DD - K - J - L.

NOTE

DD is stamped on a web of the bevel gear housing; J was obtained in a, above; K was obtained in b, above; L is the gear mounting distance (MD) etched on the pump drive gear.

d. Select the combination of shims 2530-595-6052, 5310-316-7666 and 5310-595-6051 which most nearly equal V. Install the shims and gear (fig. 8-8).

e. Install the pump assembly (refer to para 8-11, step 9).

f. Check the gear tooth contact pattern and backlash (fig. 8-9). The backlash (BL) should be that etched on the gear. Backlash may be adjusted by adding or removing shims from shim pack V fig. 8-8).

NOTE

The cross shaft must be held stationary to obtain correct backlash reading.

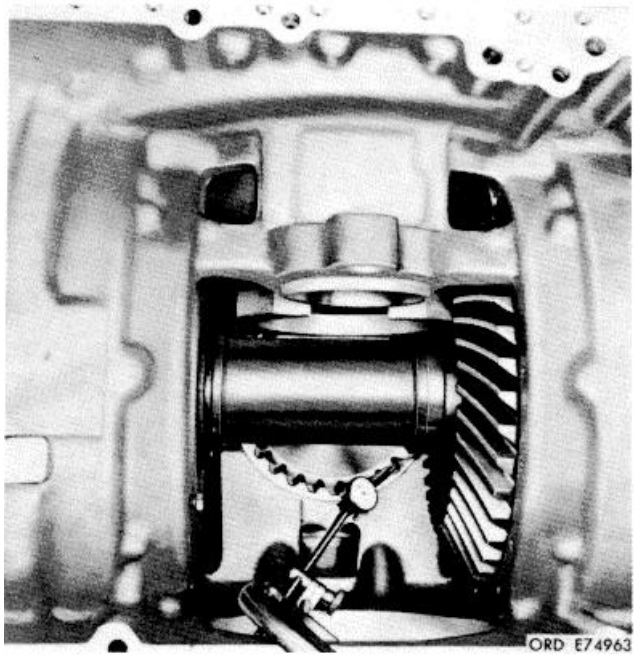


Figure 8-9. Checking coolant pump drive gear tooth contact pattern and backlash

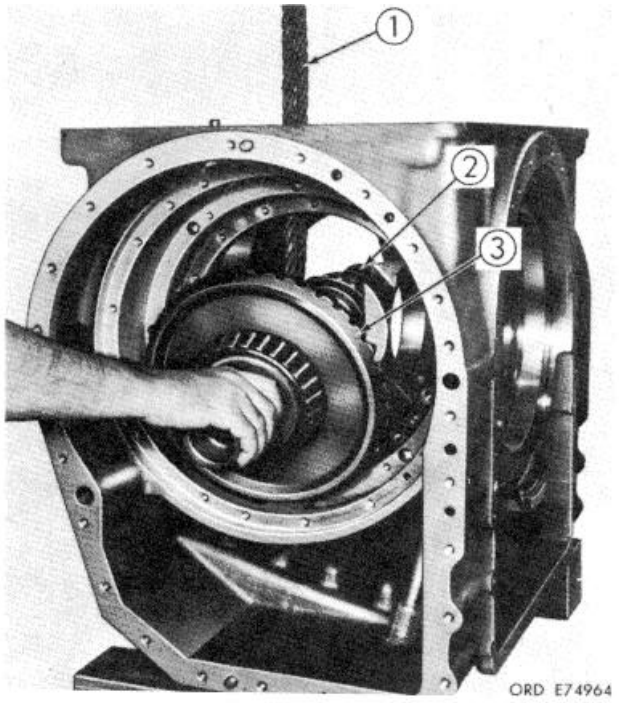
g. When gear pattern, backlash, and bearing preload are properly established for all the gears, recheck all bolts for tightness.

8-10. Preliminary Assembly

All thrust surfaces, gears, sealrings, splines, bushings and bearings must be oiled as they are installed.

8-11. Assembly Pictorial Steps

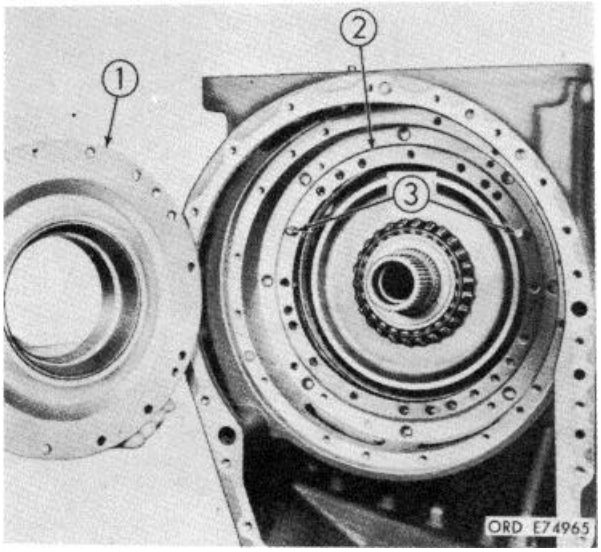
The assembly of the transmission from subassemblies (as discussed in chapter 7) is outlined in the following consecutive pictorial steps (1 through 125).



1 Position the bevel gear housing on blocks in an upright position. Loop rope sling (1) around cross shaft (2) of the assembled cross shaft and bevel driven gear assembly, near bevel gear (3). Install the assembly, shaft first, into the right side of the bevel gear housing. Support the assembly with a hoist.

NOTE

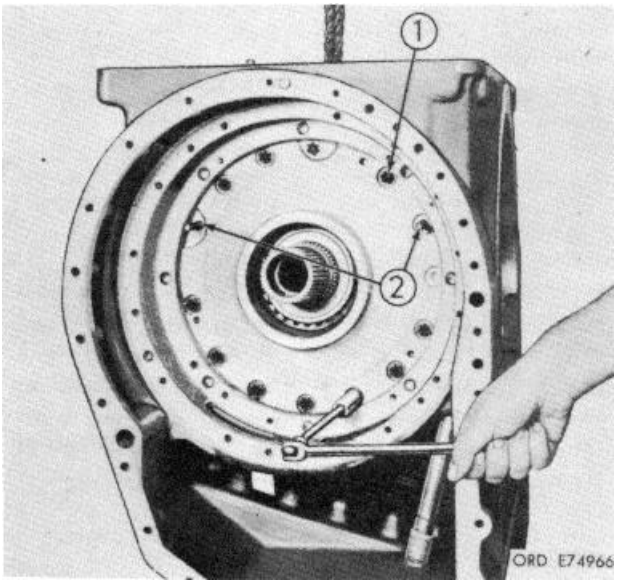
Bevel driven gear must be at right side of transmission.



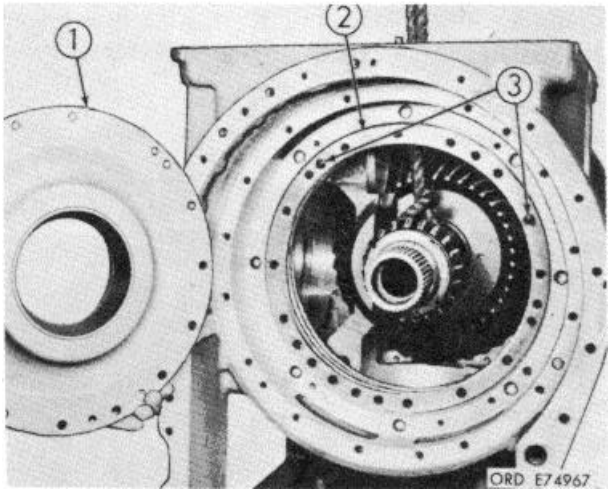
2 Install proper shims (2) at the right side of the bevel gear housing. Use headless guide bolts (3) to hold the shims in place. Aline the shims to index "with the oil passages and the bolt holes. Install right bearing retainer assembly (1).

NOTE

Refer to paragraph 8-7, above, for shimming instructions.



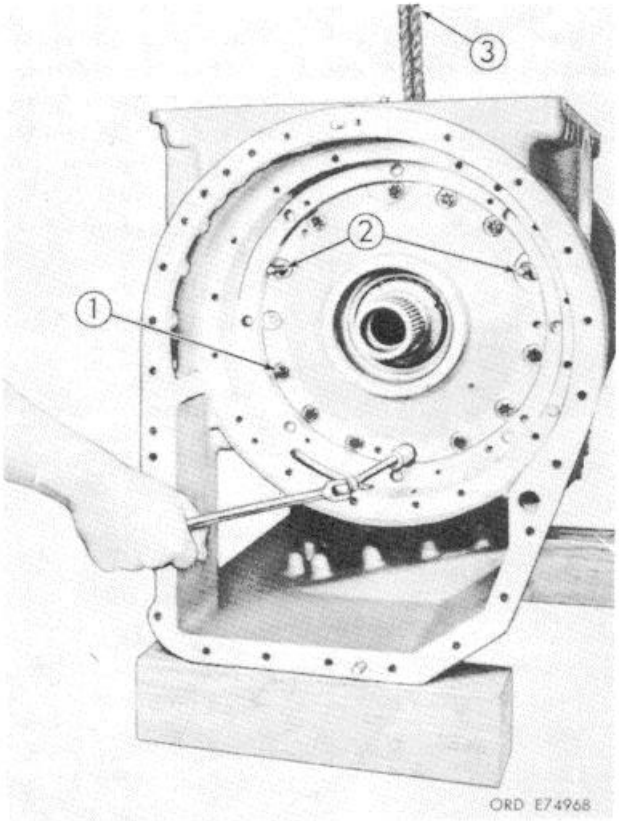
3 Install eleven 3/8-16 x 1 1/4-inch, selflocking bolts (1) Remove two headless guide bolts (2) and install the remaining two bolts. Tighten the bolts evenly to 36 to 43 pound feet torque.



4 Install proper shims (2) at the left side of the bevel gear housing. Use headless guide bolts (3) to hold the shims in place. Aline the shims to index with the oil passages and the bolt holes. Install left bearing retainer assembly (1).

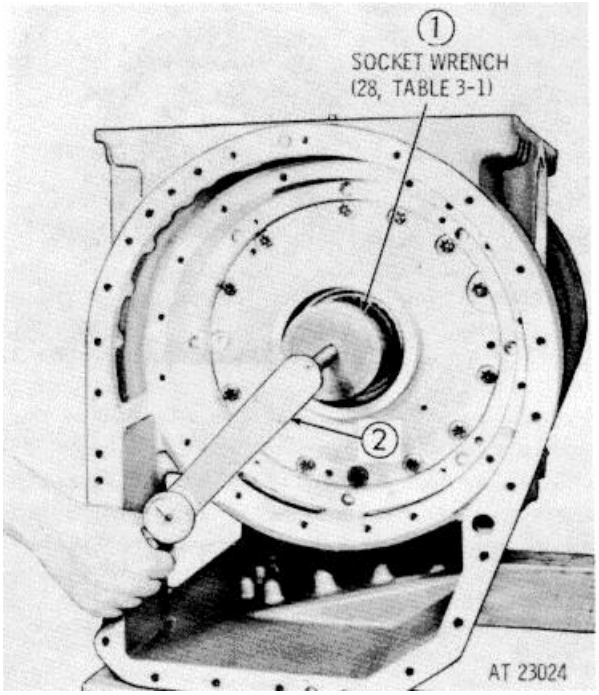
NOTE

Refer to paragraph 8-6, above, for shimming instructions.

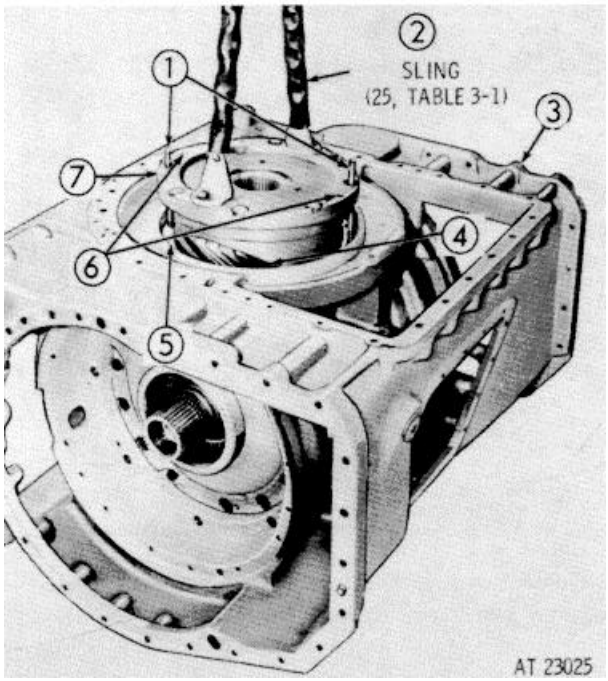


5 Install eleven 3/8-16 x 1/4-inch, selflocking bolts (1). Remove two headless guide

bolts (2) and install remaining two bolts. Tighten bolts evenly to 36 to 43 pound feet torque (refer to step 6, below). Remove rope sling (3).



6. Check the torque required to rotate the cross shaft while tightening the left bearing retainer bolts. Use socket wrench (1), (28, table 3-1) and a pound inch torque wrench (2) to rotate the shafts. If torque exceeds 2 pound inches, or if shaft end play exceeds 0.0015 inch when retainer bolts are tight, refer to paragraphs 8-6 and 8-7, above.

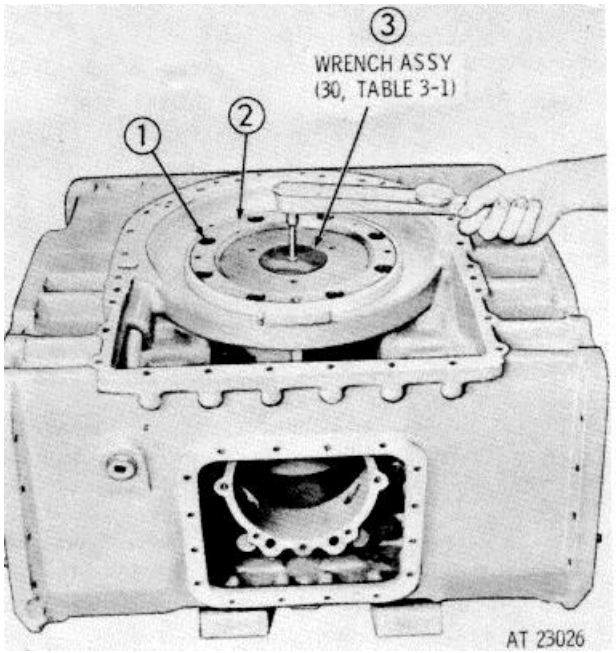


7 Position bevel gear housing (3), rear downward, on blocks. Install two 3/8-16 x 4-inch headless guide bolts (1) in opposite holes of gear assembly mounting face. Install the proper shims (5) into the recess at the front of the housing, alining the shims to index with bolt holes. Two holes in the shims must aline with largest threaded holes (6) in bevel drive gear assembly (7).

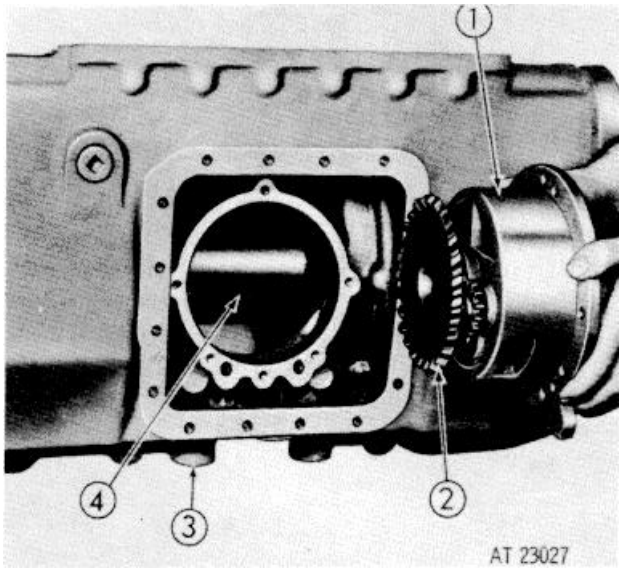
NOTE

Refer to paragraph 8-5, above, for shimming instructions

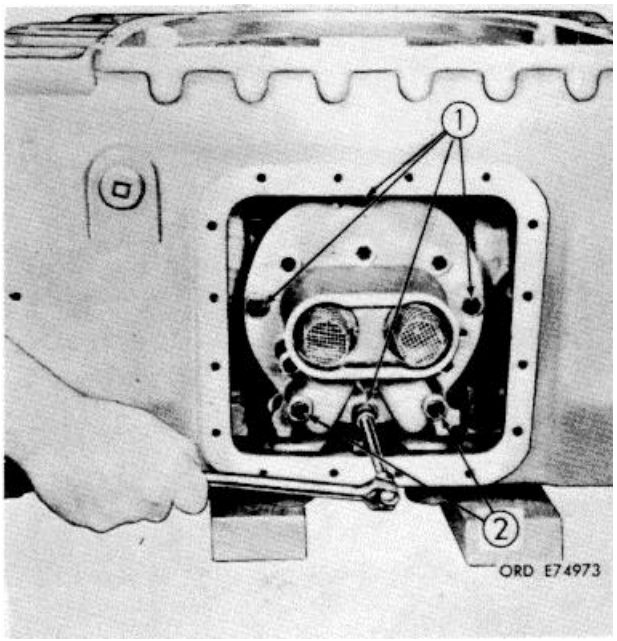
Using two 3/8-16 bolts, attach sling (2), (25, table 3-1) to bevel drive gear assembly. Install the bevel drive gear assembly into the bevel gear housing. The open side of the bevel gear carrier (4) must face the right side of the bevel gear housing. Mesh the drive gear teeth with those of the driven gear while installing. Remove the guide bolts and lifting sling.



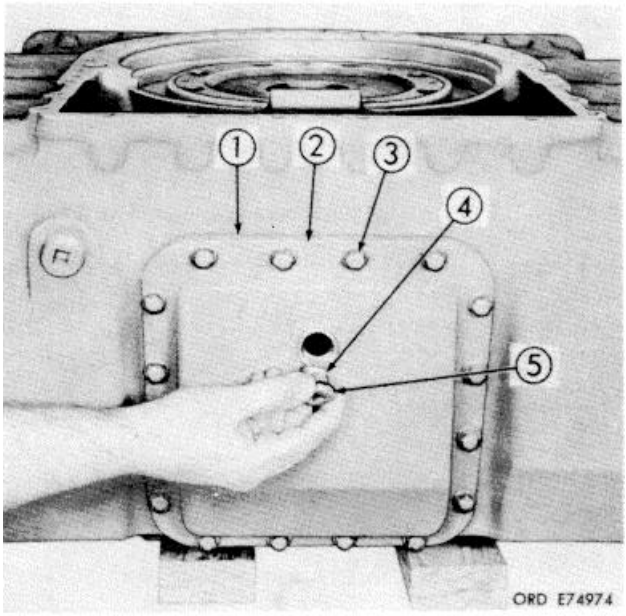
8. Install eight 3/8-16x1 3/4-inch, selflocking bolts (1) gear assembly flange (2). Tighten the bolts to 36 to 43 pound feet torque. Check the free rotation of the bevel gears, using wrench assembly (3), (30, table 3-1). Check the backlash and gear tooth contact as outlined in paragraph 8-8, above.



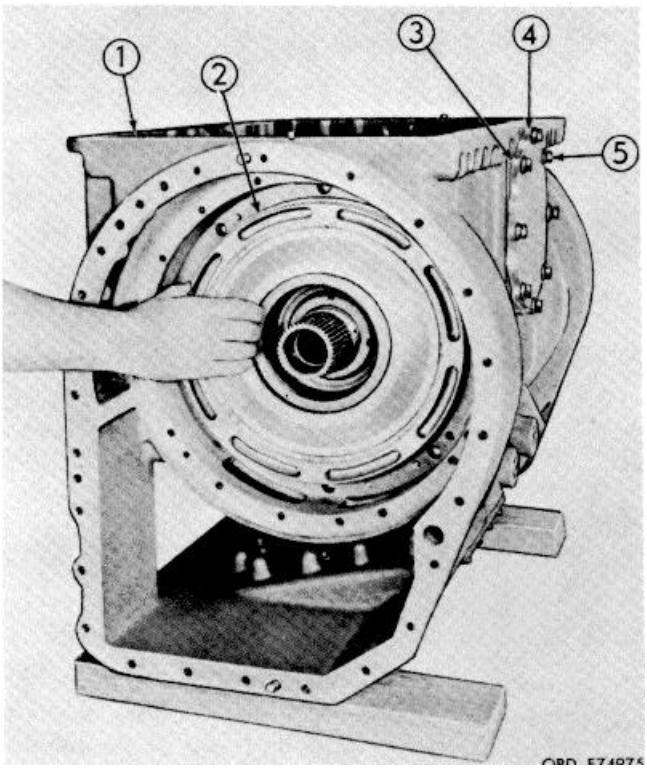
9. Install brake coolant pump assembly (1) (refer to para 8-9, above) into bevel gear housing assembly (3). Be sure gear (2) is meshed with the bevel drive gear on cross shaft (4) before the pump seats.



10. Install four 3/8-16 x 1 1/2-inch bolts (1), two 3/8-16 x 3-inch bolts (2) and six flat washers. Tighten the bolts to 20 to 24 pound feet torque. Refer to paragraph 8-9, above, for determining proper backlash and gear tooth contact pattern.



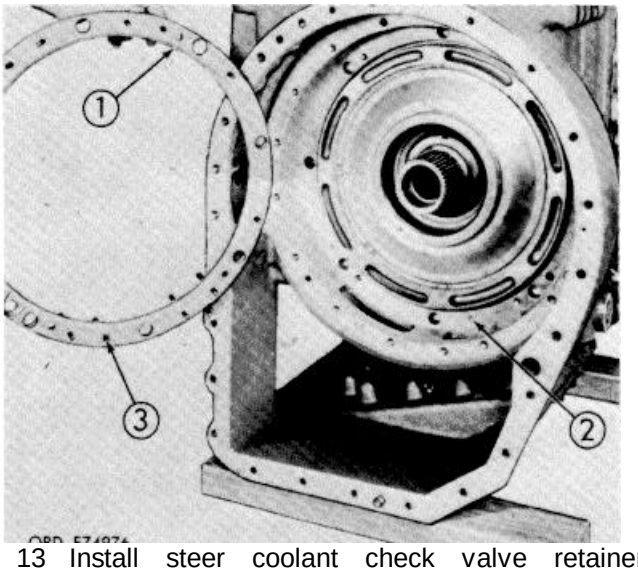
11. Install sump cover gasket (1) and cover (2) Install sixteen 3/8-16 x 1 1/2-inch bolts (3). 16 lockwashers and 16 plain washers. Tighten the bolts to 20 to 24 pound feet torque. Install magnetic drain plug (4) and gasket (5).



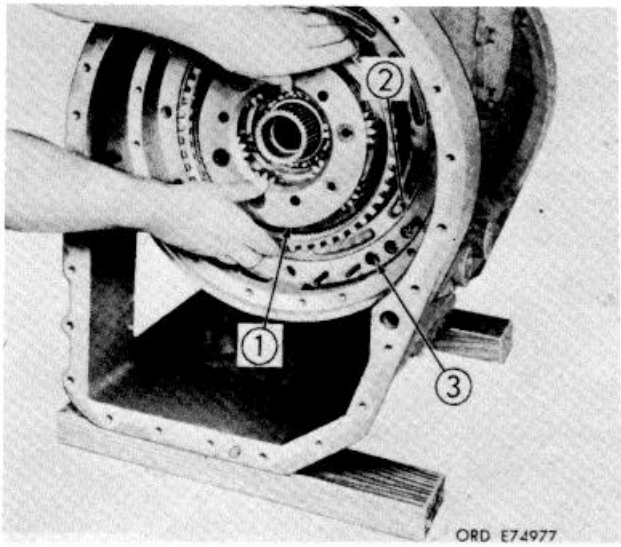
12. Place bevel gear housing (1) on wood blocks in an upright position. Install reverse-range clutch piston assembly includes inner and outer seal rings. Install gasket (3), cover (4), eight 3/8-16 x 1 3/8-inch bolts (5), eight lock washers. Tighten the bolts to 36 to 43 pound feet torque.

NOTE

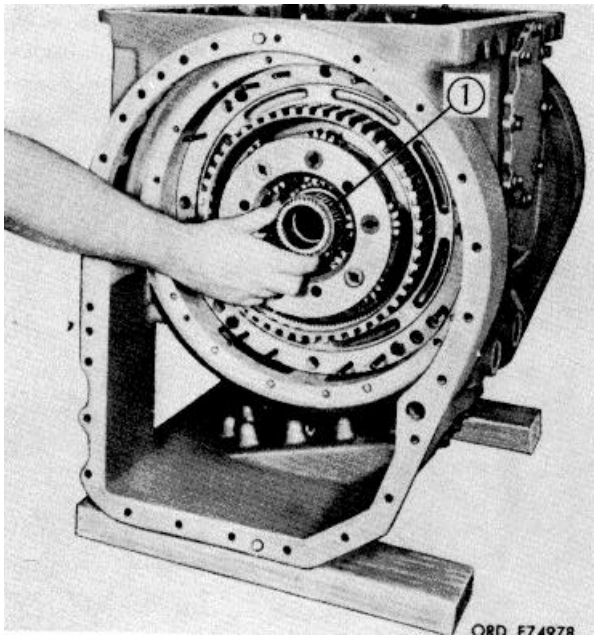
Items (3, 4 and 5), above, used only on earlier models.



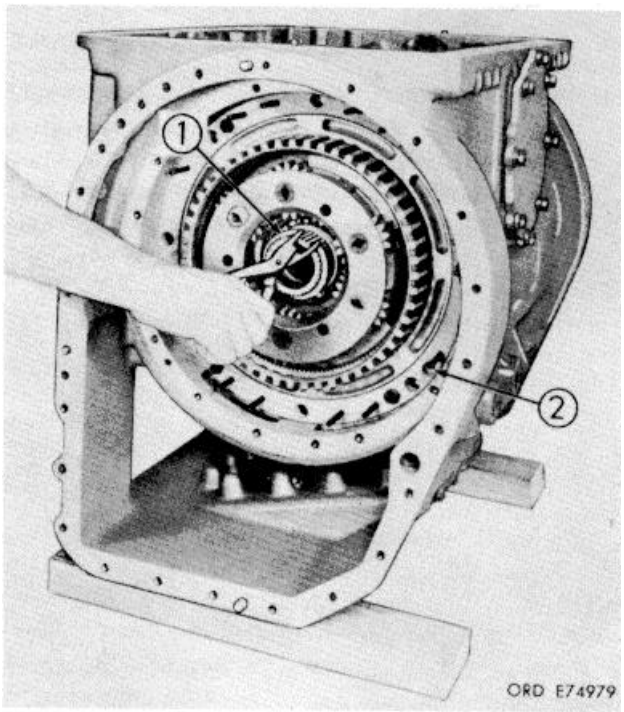
13 Install steer coolant check valve retainer assembly (1), with its seal ring. Pin (3) extends through the retainer approximately 3/ 16 inch and must be indexed with hole (2).



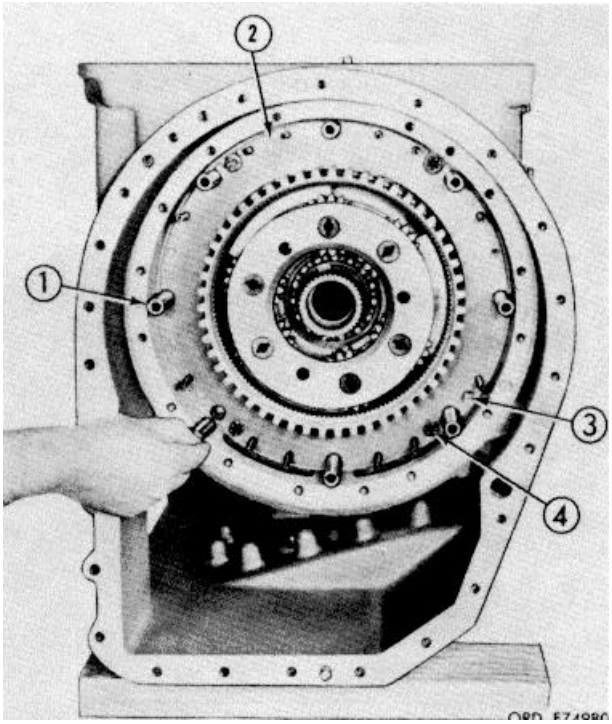
14. Install four 5/16-18 x 1 1/2-inch, self-locking bolts (3) and four flat washers to secure retainer assembly (2). but do not tighten. Install reverse-range planetary carrier assembly (1). Make certain two seal rings are installed on it.



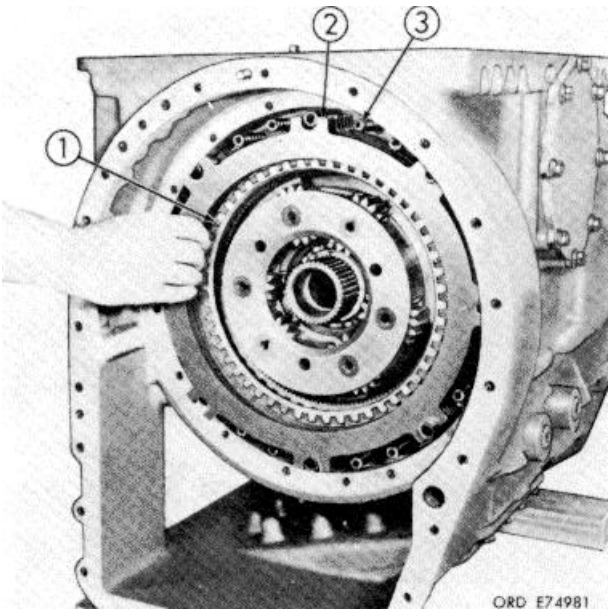
15. Install splined spacer (1).



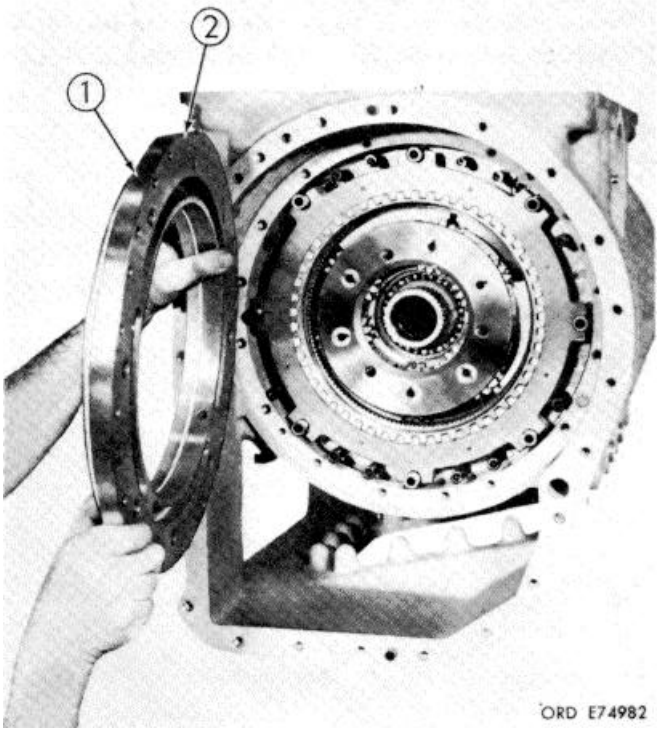
16. Install snapring (1). Note hole (2). (Refer to step 17 below.)



17. Install reverse-range clutch apply disk (2) and check valve (3) as an assembly. Check valve (3) must be inserted in hole (2) (step 16, above). The heads of four bolts (4) must be exposed. Install eight anchor pins (1) into the retainer holes and make certain they are seated. Tighten four bolts (4) to 17 to 20 pound feet torque.



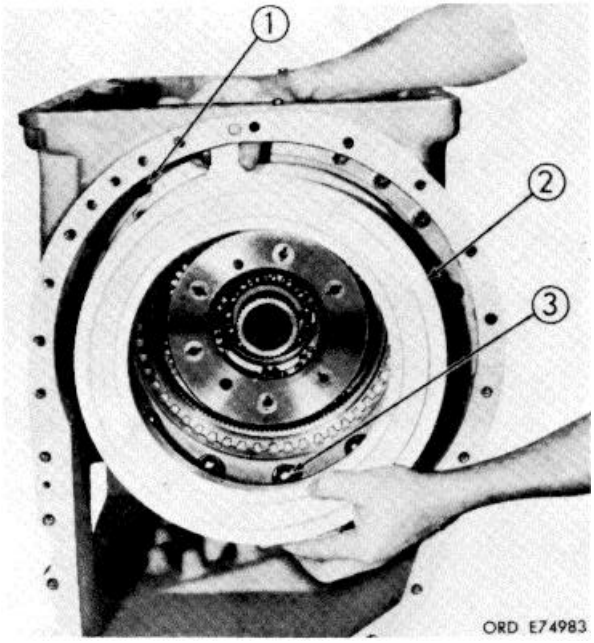
18. Install six internal-splined disks (1) and six external-tanged disks (2) beginning with an internal splined and alternately installing external-tanged and internal-splined disks. Install 12 clutch release springs (3) on the spring pins.



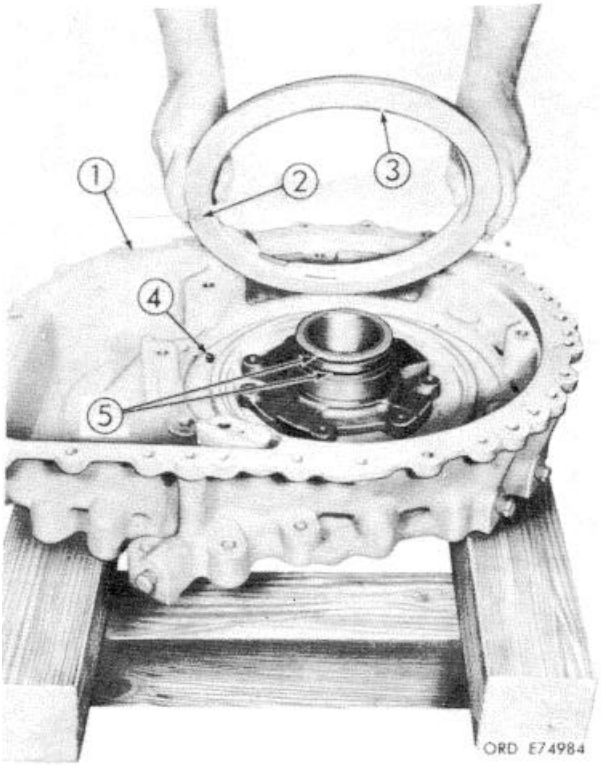
19. Install left brake stationary cam ring (1), with its seal ring, and seat it against the piston return springs.

NOTE

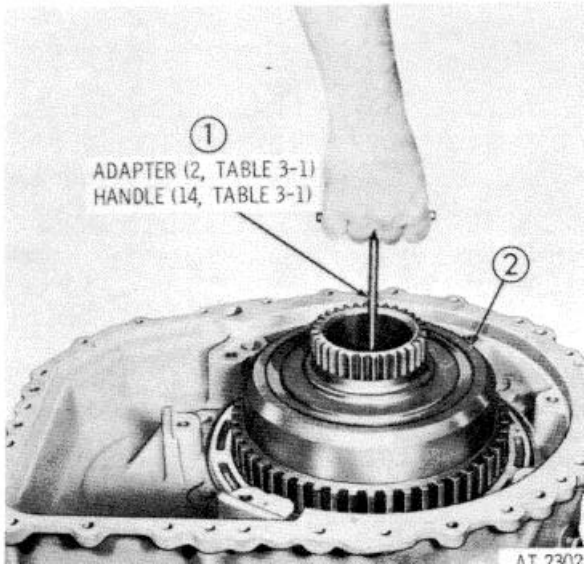
When installing the cam, the flat area (2) on the largest circumference must be at the top and inclined slightly toward the rear of J the bevel gear housing.



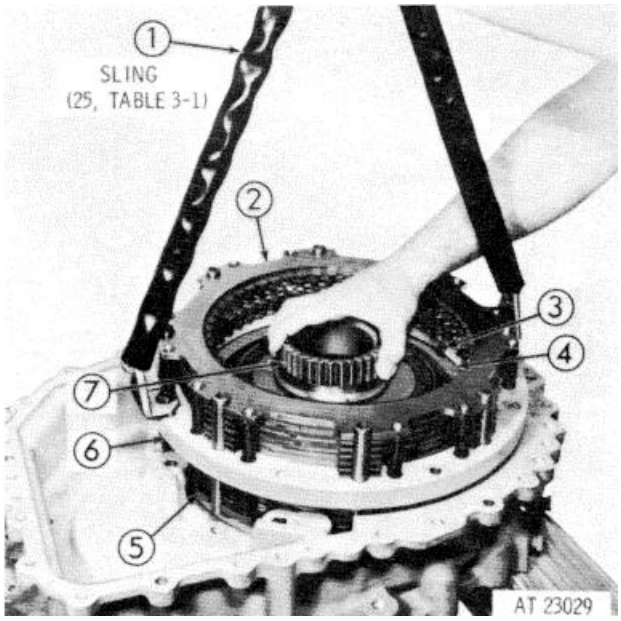
20. Install sixteen 3/8-16 x 1-1/2 inch, self-locking bolts (1) and sixteen flat washers. Tighten the J bolts to 36 to 43 pound feet torque. Install 12 steel balls (3) into the pockets in the stationary cam, using oil-soluble grease to retain them. Install left brake rotating cam (2), seating it against the steel balls. Rotate the cam clockwise to maximum release position.



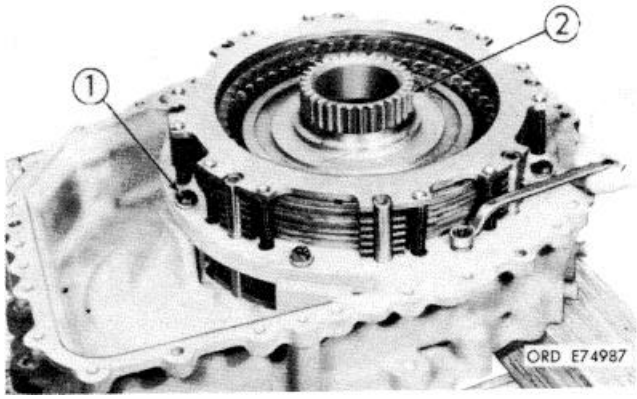
21. Position left output housing assembly (1) on wood blocks. Aline hole (2) in piston (3) with anti-rotation pin (4) in housing (1) and install piston assembly 131 with its seal rings. Make certain two seal rings (5) are in place on the output sleeve.



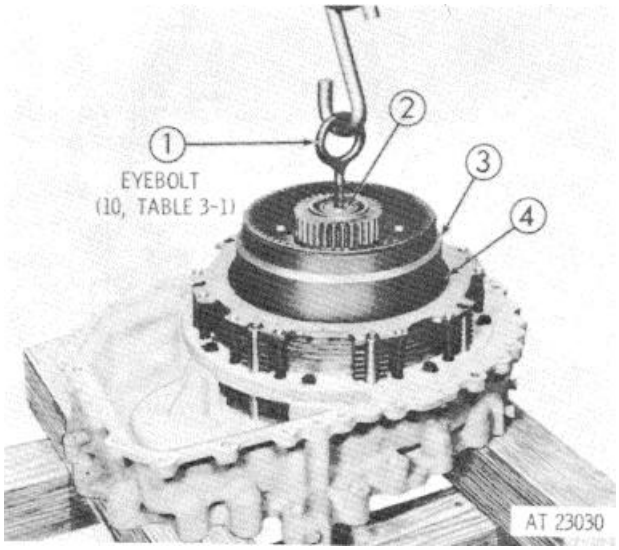
22. Using handle and adapter (1), (14 and 2. table (3-1) install left output clutch assembly (2) into the output housing. Remove the handle and adapter.



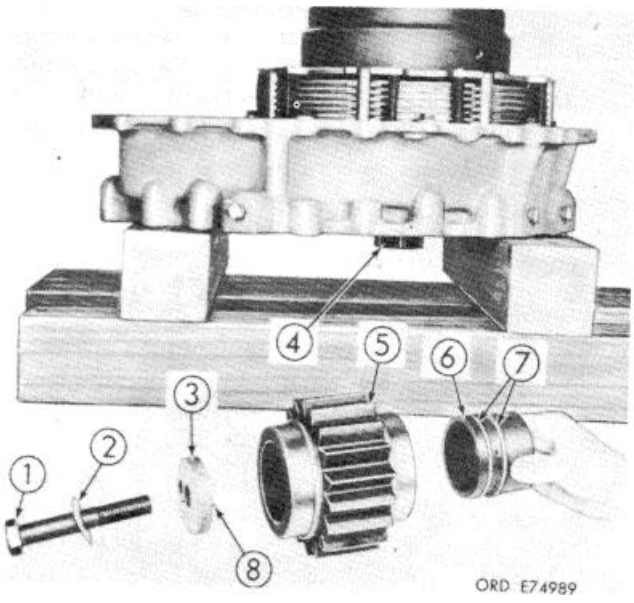
23. Using lifting sling (1)(25, table 3-1) install brake assembly (2) steer clutch assembly (5), and spacer assembly (6) as a unit. Aline the bolt holes in the spacer with those in the housing. Grasp the sling with one hand and, while rotating sun gear (7) back and forth, move the assembly up and down by squeezing the sling strands together. This movement allows the internal splines of the steer clutch disks to engage the splines on the output clutch hub and thus seat properly. Two slots in oil baffle (4) must be engaged with two keys (3) positioned 180 degrees apart. Remove lifting sling (1).



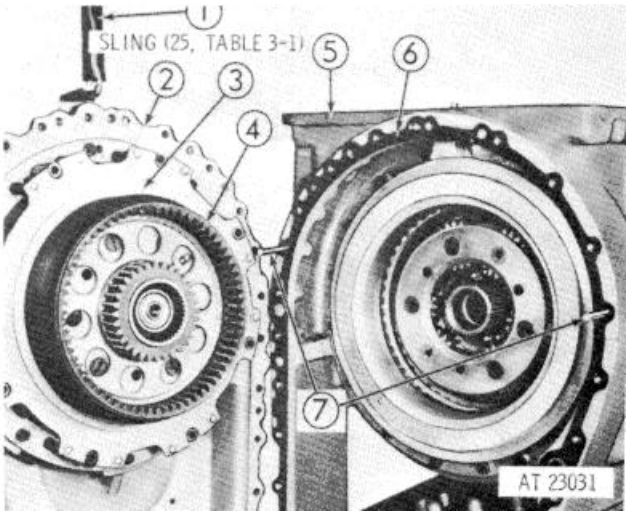
24. Install eight 3/8-16 x 21/4-inch, self-locking bolts (1) and eight plain washers. Tighten the bolts to 36 to 43 pound feet torque.



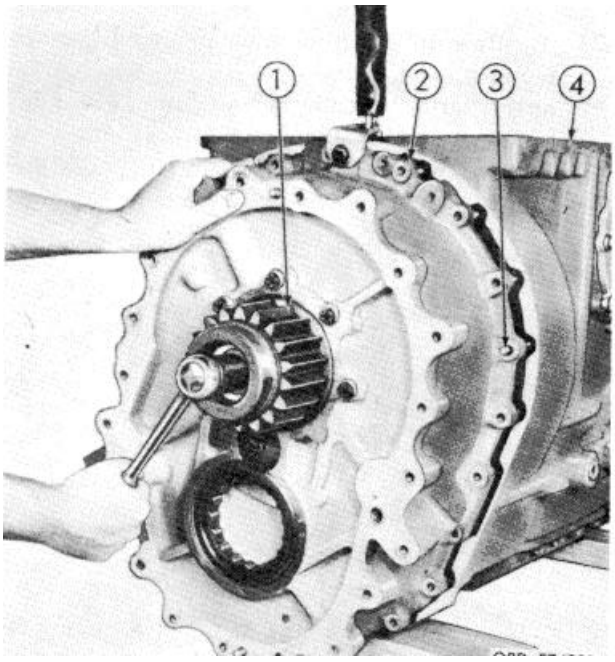
25. Insert eyebolt (1), 10, table 3-1) into the end of output shaft (2) and install the output shaft, steer planetary carrier and brake hub as a unit. The splines of brake hub (3) must engage the intern al-splined brake disks at (4). Also sun gear (2, step 24, above) must engage the steer planetary pinions in the unit. Remove eyebolt (1).



26. Install two sealrings (7) onto splined sleeve 10 Install, in succession. splined sleeve (6) plain end first, output drive gear (5). lock plate assembly (3) with pin (8) toward gear (5), lockwasher (2) and bolt (1). holding each part in place with one hand until bolt (1) is engaged in threads in output shaft (4). Tighten the bolt finger tight at this time.



27. Attach lifting sling (1) (25, table 3-1) at top of output housing (2). Install oil baffle (3) on brake hub (4). Install two 3/ 8-16 x 4-inch, headless guide bolts (7), 180 degrees apart, into bevel gear housing (5). Install gasket (6) on bevel gear housing.

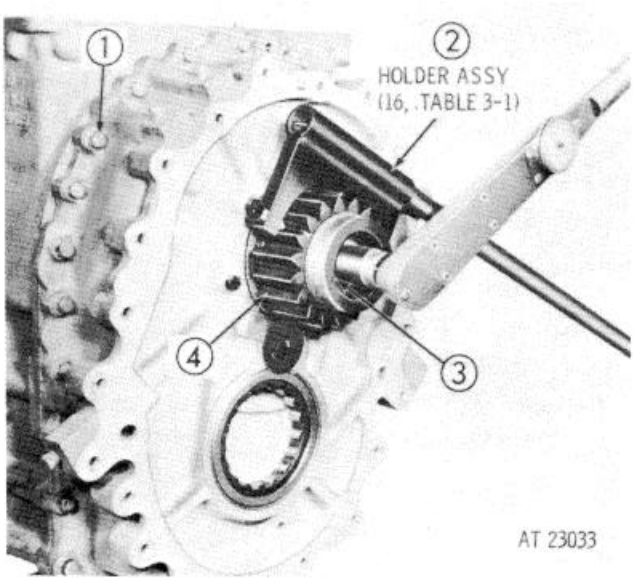


28. Slide output housing assembly (2) onto guide bolts (3) and into position against bevel gear housing (4).

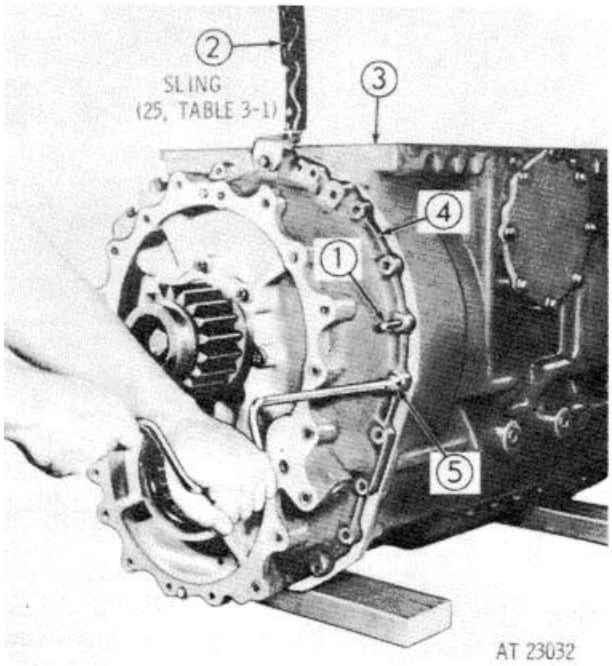
NOTE

Adjust the. hoist carefully and keep the output housing assembly parallel with the bevel gear housing. Rotate output drive gear (1) while pushing the output housing assembly into place. The reverse-range sun

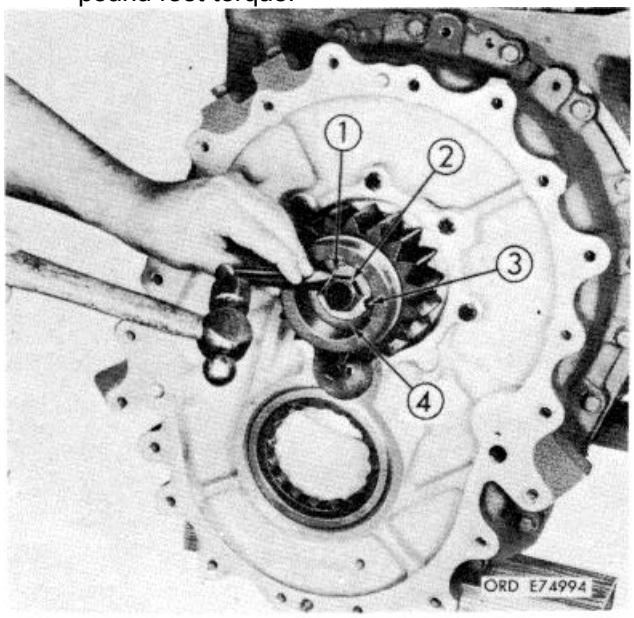
gear must spline onto the cross shaft, the sun gear must mesh with the carrier pinions, and the reverse-range ring gear brake hub internal teeth must mesh with the pinions.



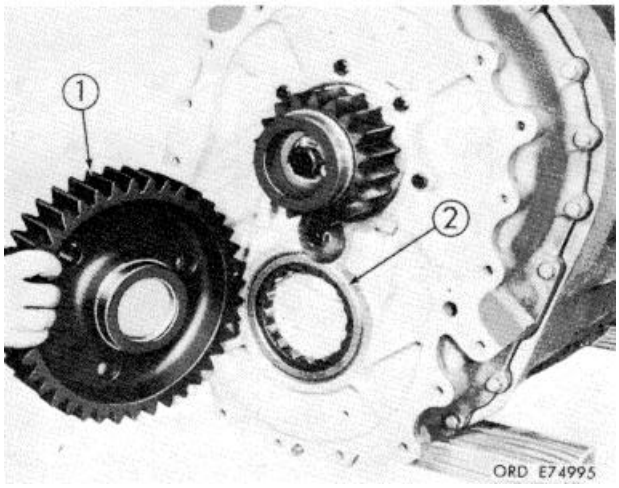
29. Install two 3/8-16 x 1 3/4-inch bolts (5) 180 degrees apart, and carefully draw output housing assembly (4) against bevel gear housing (3). When the output housing assembly is seated against the bevel gear housing, remove two bolts (5) and guide bolts ill. Remove lifting sling (2), (25, table 3-1).



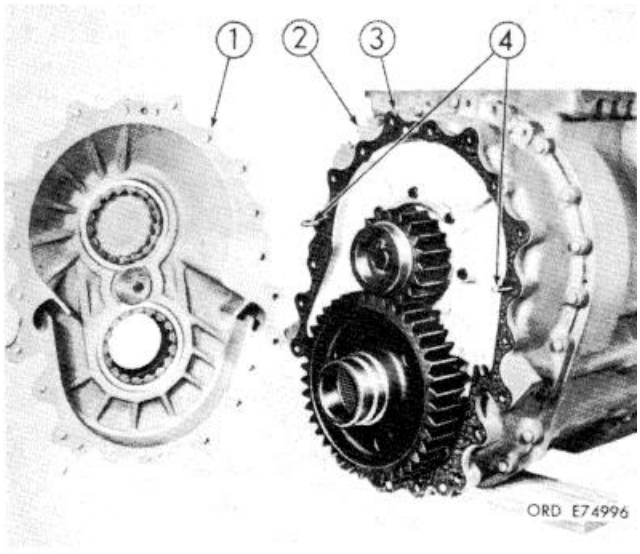
30. Install twenty-four 3/8-16 x 1 3/4-inch bolts (1) 24 plain washers and 24 lockwashers. Tighten the bolts to 27 to 32 pound feet torque. Using holder assembly (2), (16, table 31) lock output drive gear (4). Tighten bolt (3) to 200 to 225 pound feet torque.



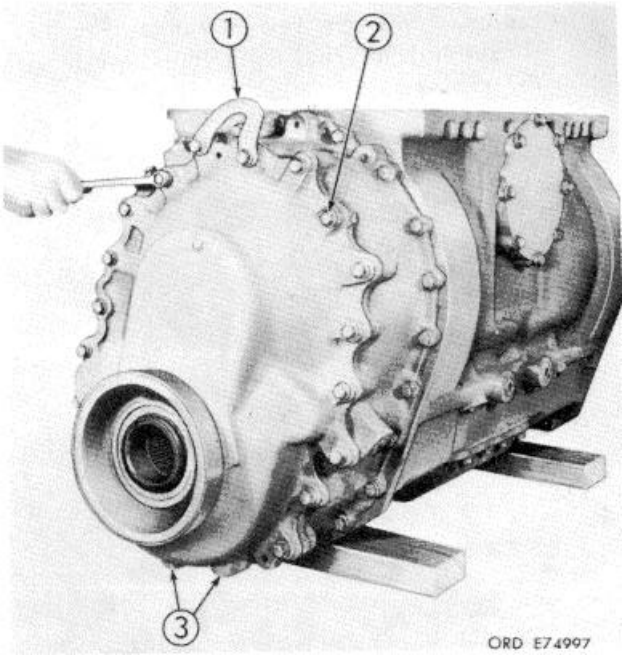
31. Using a blunt rounded-tip chisel, bend lockwasher (1) against a flat side of bolt head (2), opposite hole (3). Using a punch, bend washer (1) down into hole (3) of lock plate (4).



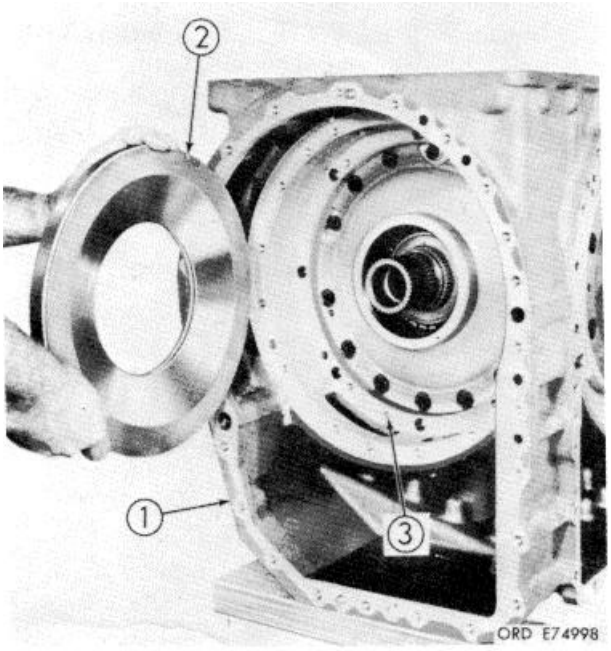
32. Install left output driven gear (1) into bearing (2). The short hub (plugged end) of the gear faces the output housing.



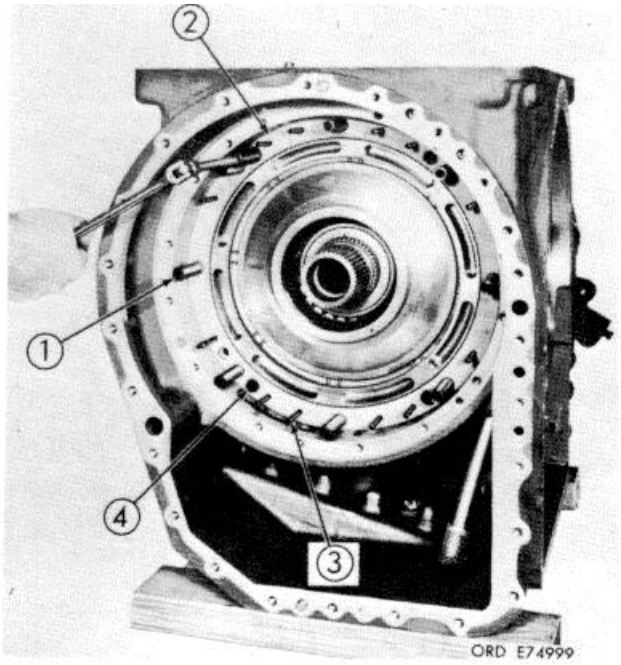
33. Install two 3 / 8-16 x 4-inch, headless guide bolts (41 into output housing (2), 180 degrees apart. Install gasket (3). Install end cover assembly (1). Remove guide bolts (4).



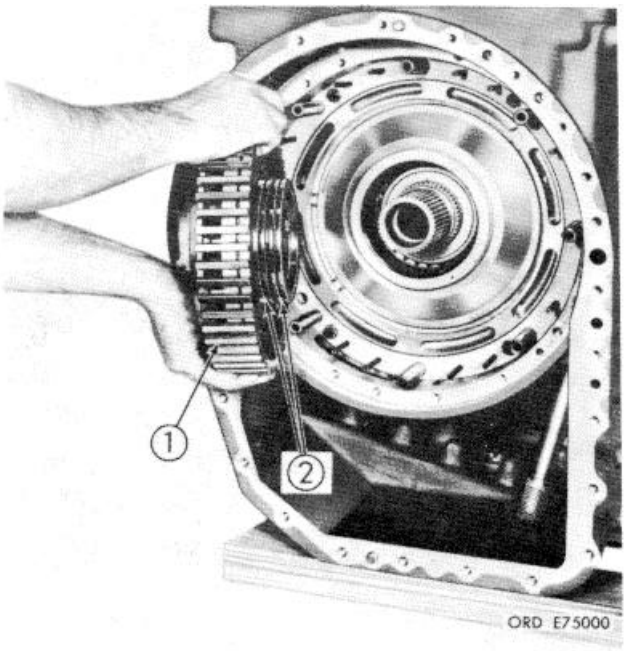
34. Install lifting bracket I1I, nineteen /8-16 x 2 1/4-inch bolts (2), tow 3/8-16 x 21/2-inch bolts (3)1, 21 plain washers and 21 lockwashers. The two bolts (3) at bottom install from the output housing into the end cover. Tighten to 27 to 32 pound feet torque.



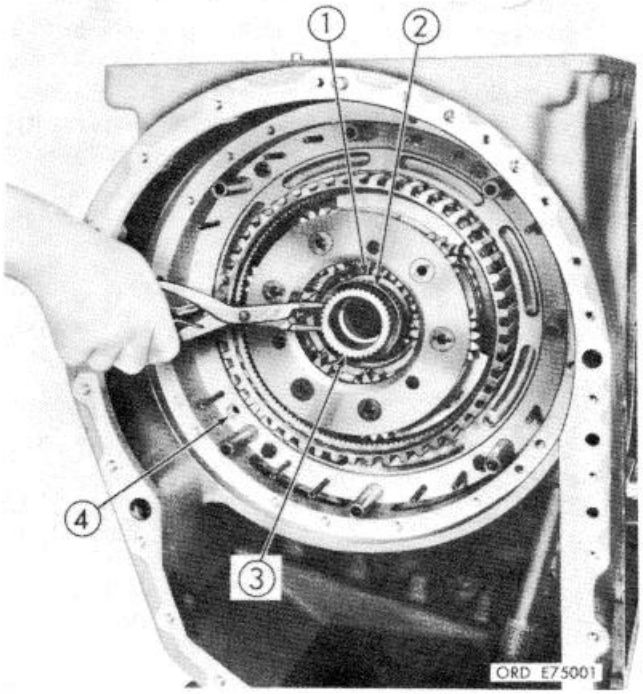
35. On the right side of bevel gear housing (1), install reverse-range clutch piston (2), with its seal rings. Note hole (3): refer to step 36, below.



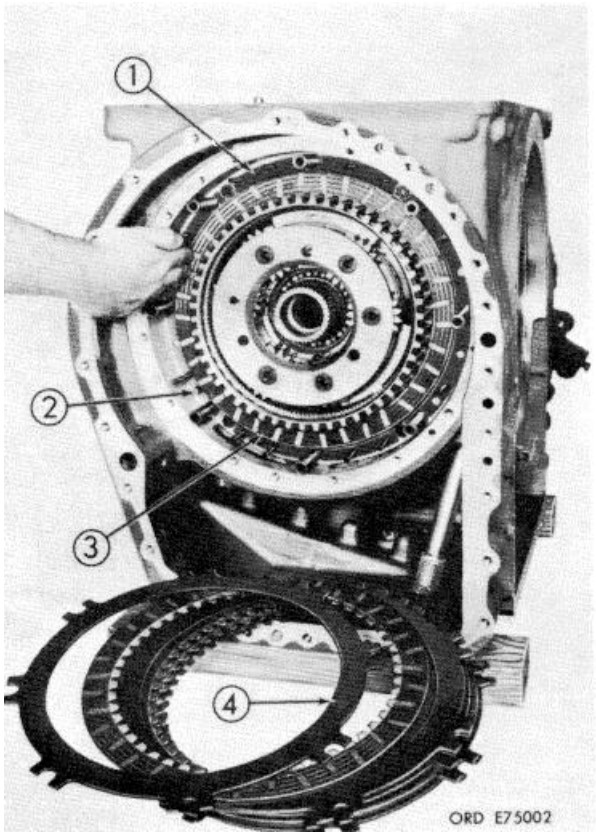
36. Install steer coolant check valve retainer assembly (2) with its seal ring. Pin (31 extends through the retainer approximately 3/16 inch and must be indexed with hole (3, step 35, above). Install four 5/ 16-18 x 1 1/2-inch, selflocking bolts (4) and four plain washers in the retainer assembly and tighten them only finger tight. Install eight anchor pins (1) through the retainer and seat them into the output housing. Tighten four bolts (4) to 17 to 20 pound feet torque.



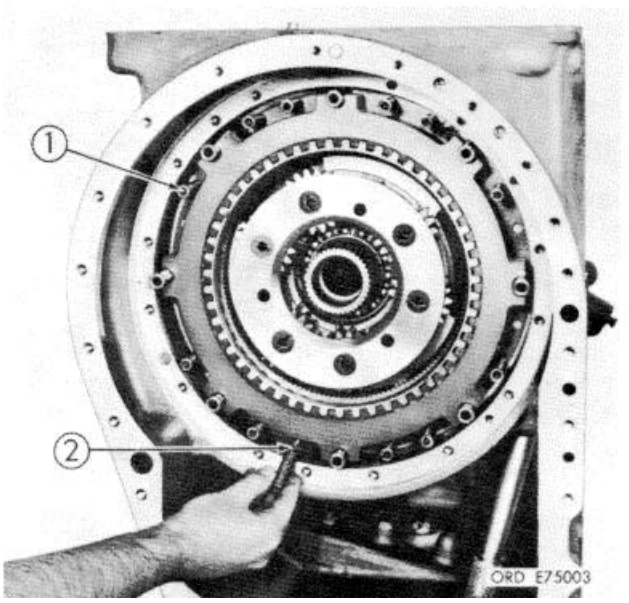
37. Install reverse-range planetary carrier assembly (1), with its two seal rings (2).



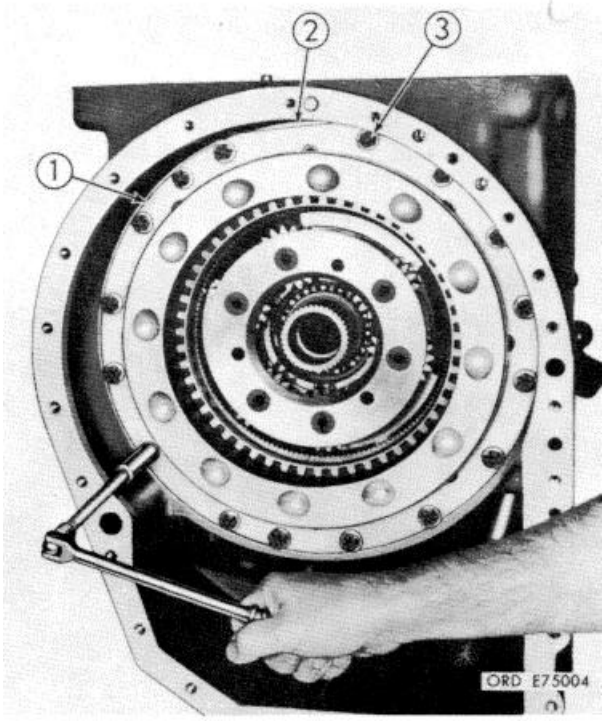
38. Install splined spacer (1) and snapring (2) onto cross shaft (3). Note hole (4). (Refer to



39. Install reverse-range clutch apply disk (1) and check valve (2) as an assembly. Check valve (2) must be inserted in hole (4, step 38, above). Install six internal-splined and six internal-tanged. reverse-range clutch disks starting with internal-splined disk (3). Then install internal-tanged disk (4) and alternately install the remainder of the disks.



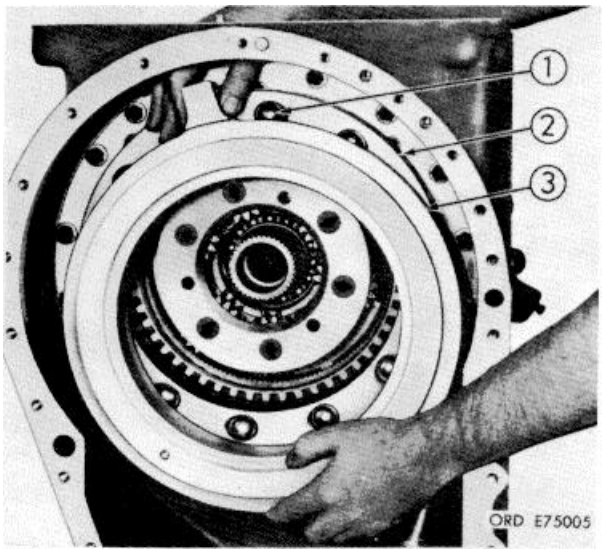
40. Install 12 piston return springs (1) onto pins (2) extending from the check valve retainer assembly.



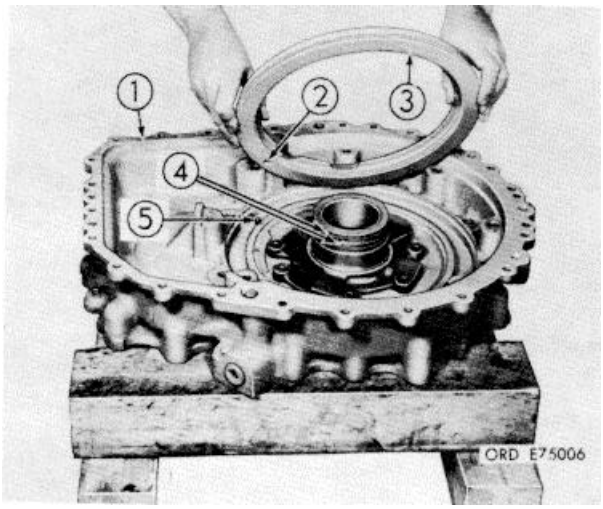
41. Install right brake stationary cam (1) with its seal ring and seat it against the piston return springs. Install sixteen 3/8-16 x 1 1/2-inch, self-locking bolts (3) and 16 flat washers. Tighten the bolts to 36 to 43 pound feet torque.

NOTE

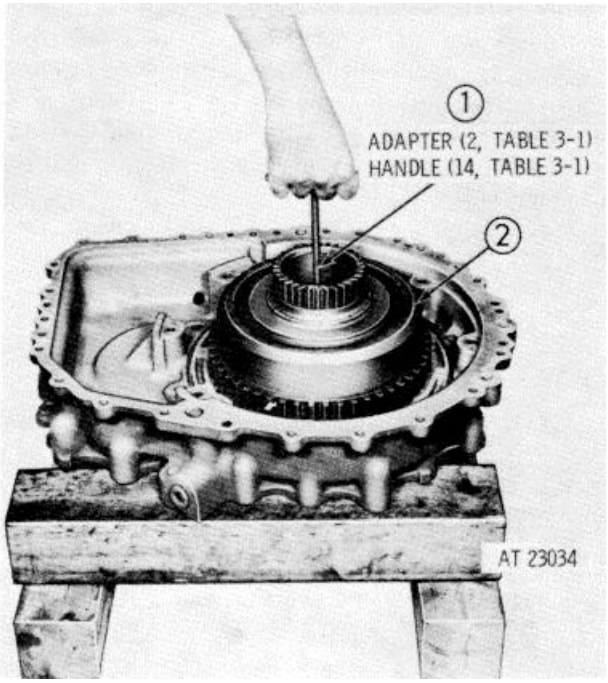
When installing the cam. the flat area (2) on the largest circumference must be at the top and inclined slightly toward the rear of the bevel gear housing.



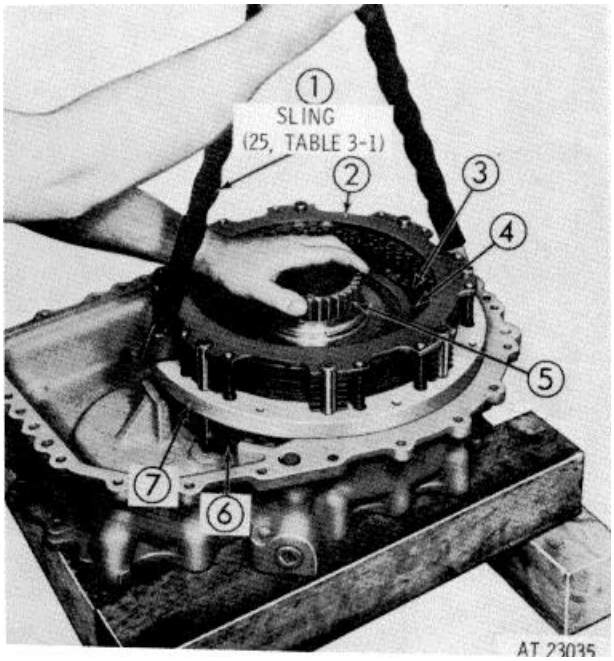
42 Install 12 steel balls (1) into the pockets in stationary cam (2), retaining them with oil soluble grease. Install right brake rotating cam (3) and seat it against the steel balls. Rotate the cam counterclockwise to the maximum released position.



43 Position right output housing assembly (1) on wood blocks. Aline hole (2) in piston (3) with anti rotation pin (5) in the housing and install piston assembly (3) with its seal rings. Make certain two seal rings (4) are in place on output ground sleeve.

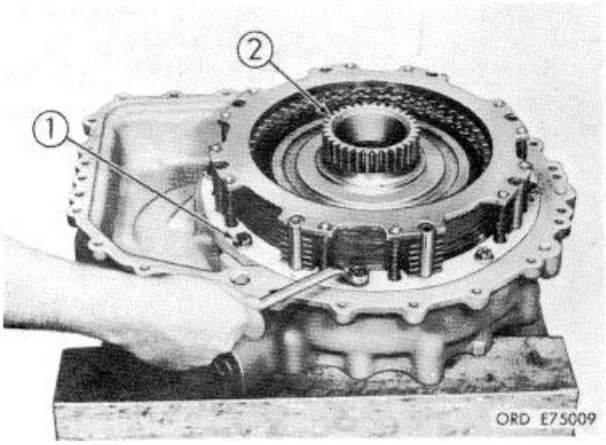


44 Using handle and adapter (1), (14 and 2, table 3-1) install right output clutch assembly (2) in housing. Remove the handle and adapter.

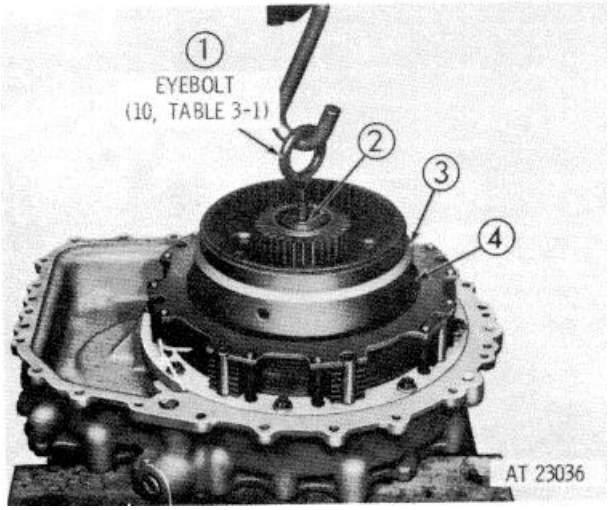


45 Using lifting sling (1), (25, table 3-1) install brake assembly (2), steer clutch assembly (6), and spacer assembly (7) as a unit. Aline the bolt holes in the spacer with those in the housing. Grasp the sling with one hand and while rotating sun gear (5) back and forth, move the assembly

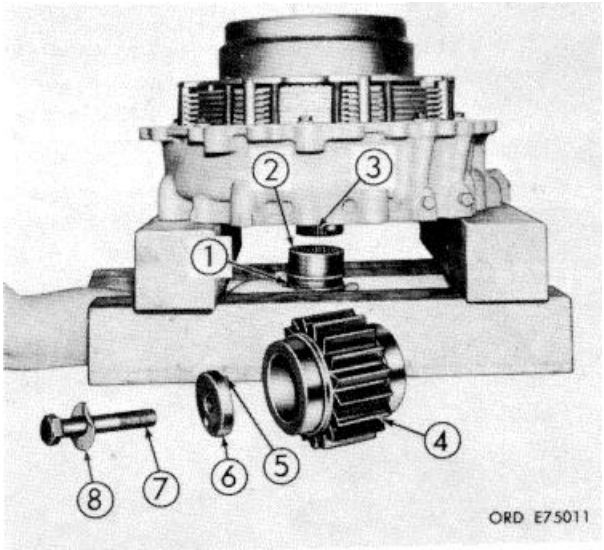
up and down by squeezing the sling strands together. This movement allows the internal splines of the steer clutch disks to engage the splines on the output clutch hub and thus seat properly. Two slots in oil baffle 31 must be engaged with two keys (41, positioned 180 degrees apart. Remove lifting sling (1).



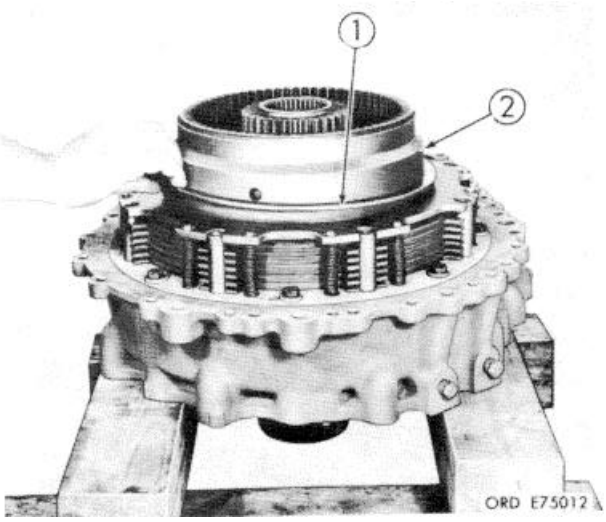
46 Install eight 3/8-16 x 2 1/4-inch, self-locking bolts (1) and eight plain washers. Tighten the bolts to 36 to 43 pound feet torque. Note sun gear (2). Refer to step 47, below.)



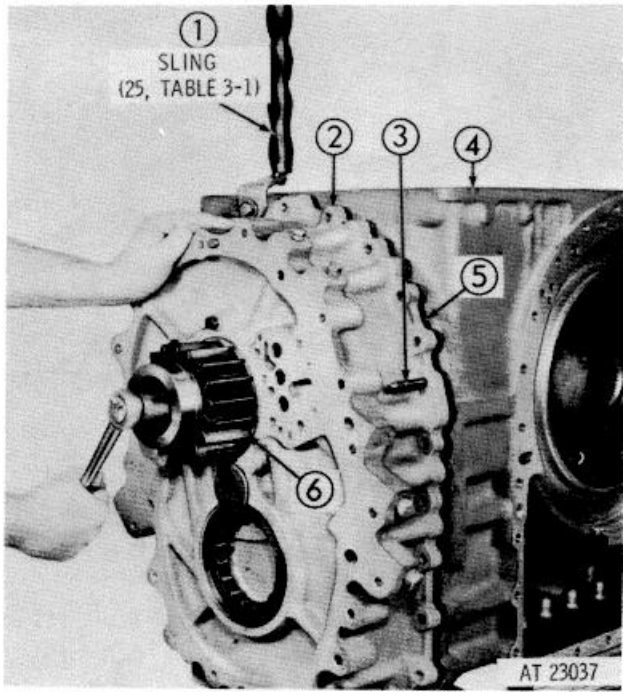
47 Insert eyebolt (1) (10, table 3-1) into the end of output shaft (2) and install the output shaft. steer planetary carrier and brake hub as a unit. The splines of brake hub (3) must engage the internal-splined brake disks at (4). Also sun gear 12, step 40, above must engage the steer planetary pinions in the unit. Remove eyebolt (1).



48 Install two sealrings (1) onto splined sleeve (2). Install, in succession, splined sleeve (2), plain end first, output drive gear (4), lock plate assembly (6) with pin (5) toward the gear, lockwasher (8) and bolt (7), holding each part in place with one hand until bolt (7) is engaged in threads in output shaft (3). Tighten the bolt only finger tight at this time.



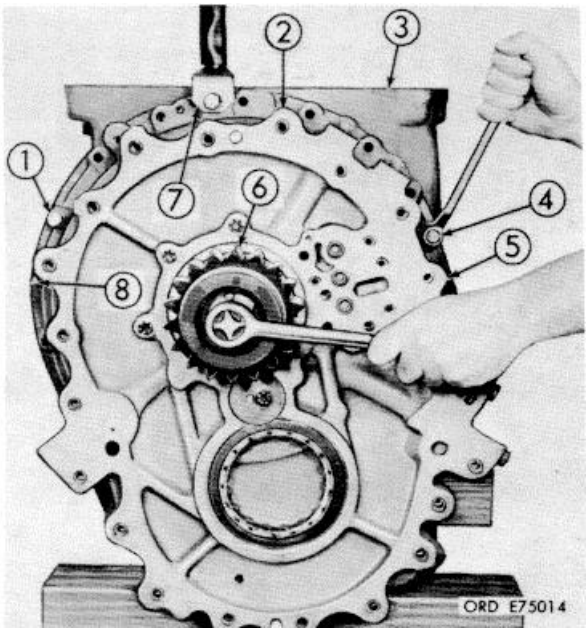
49 Install oil baffle (1) on brake hub (2).



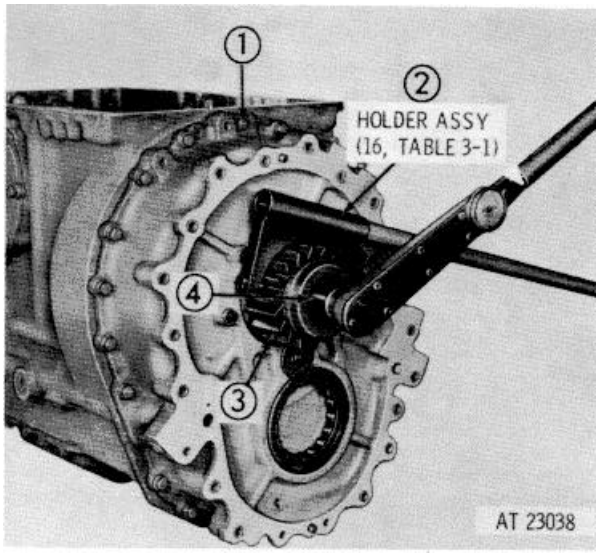
50 Attach lifting sling (1) (25, table 3-1) at top of output housing (2). Install two 3/8-16 x 4-inch, headless guide bolts (3), 180 degrees apart, into bevel gear housing (4). Install gasket (5) on bevel gear housing. Slide output housing (2) onto guide bolts (3) and into position against bevel gear housing (4).

NOTE

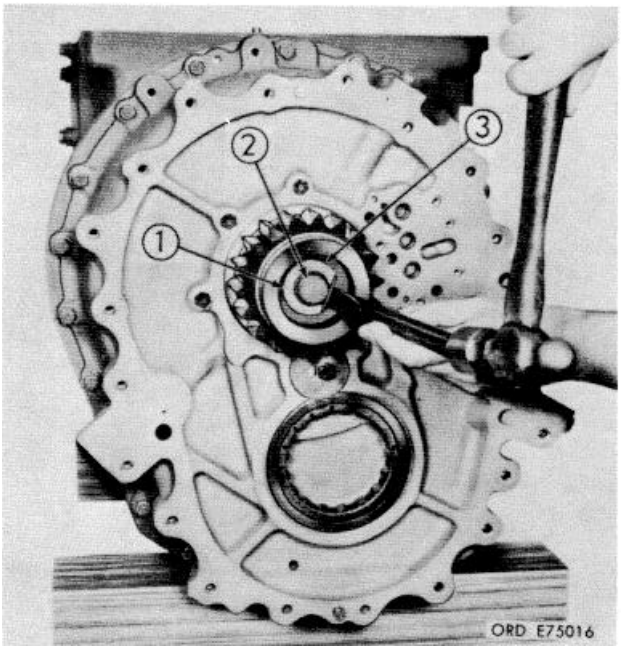
Adjust the hoist carefully and keep the output housing assembly parallel with the bevel gear housing. Rotate output drive gear (6) while pressing the output housing assembly into place. The reverse-range ring gear must spline onto the cross shaft, the sun gear must mesh with the carrier pinions. and the reverse-range ring gear (brake hub internal teeth) must mesh with the pinions.



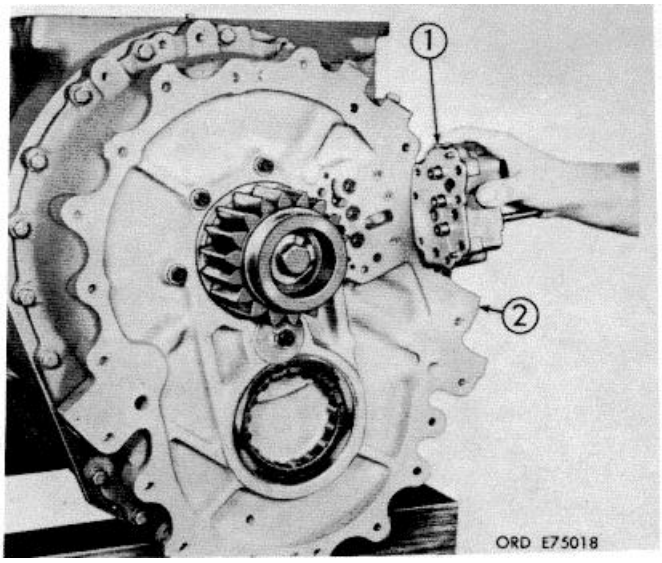
51 Install two 3/8-16 x 1 3/4-inch bolts (1 and 4), and carefully draw output housing assembly (2) against bevel gear housing (3) while rotating output drive gear (16 back and forth. When the output housing assembly is seated against the bevel gear housing, remove two bolts (1 and 4) and two guide bolts (5 and 8). Remove lifting sling (7).



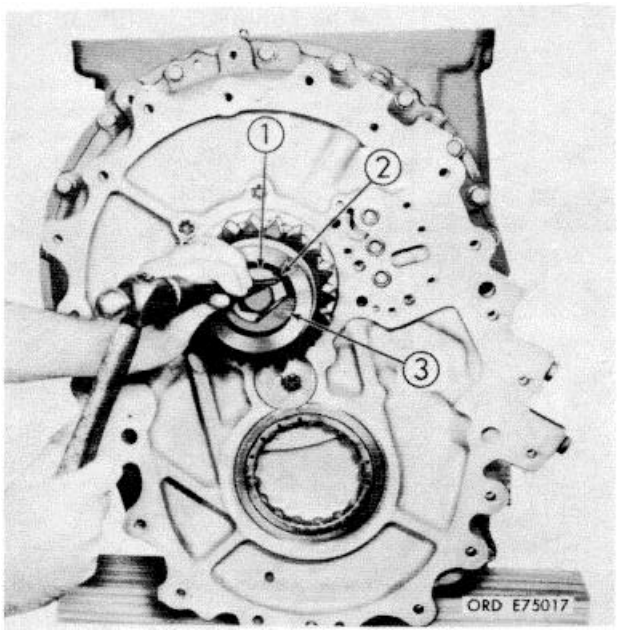
52 Install twenty-four 3/8-16 x 1 3/4-inch bolts (1). 24 plain washers and 24 lock-washers. Tighten the bolts to 27 to 32 pound feet torque. Using holder assembly) (2), (16, table 3-1 lock output drive gear (3). Tighten bolt (4) to 200 to 225 pound feet torque.



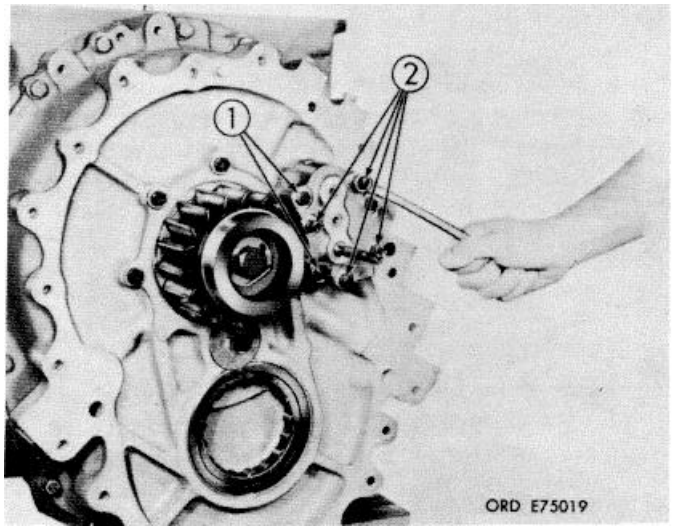
53 Using a blunt rounded tip chisel, bend lockwasher (1) against a flat side of bolt head (2) opposite hole in plate (3).



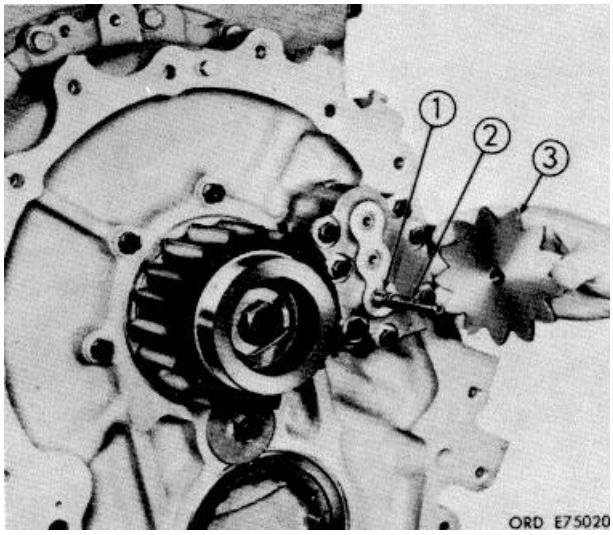
54 Using a punch, bend washer (1) down into hole (2) of lock plate (3).



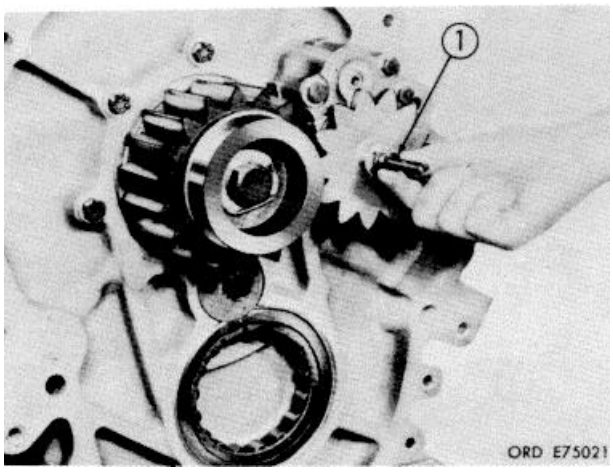
55 Install output driven oil pump assembly (1) on output housing (2).



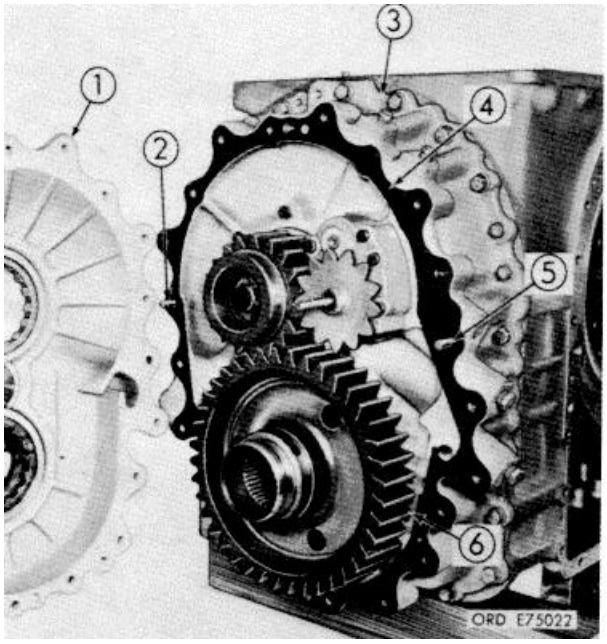
56 Install five 5/16-18 x 3-inch bolts (2) and five plain washers. Tighten the bolts to 10 to 12 pound feet torque. Install two 3/8-24 x 3 3/4-inch bolts (1) and two plain washers. Tighten the bolts to 33 to 40 pound feet torque.



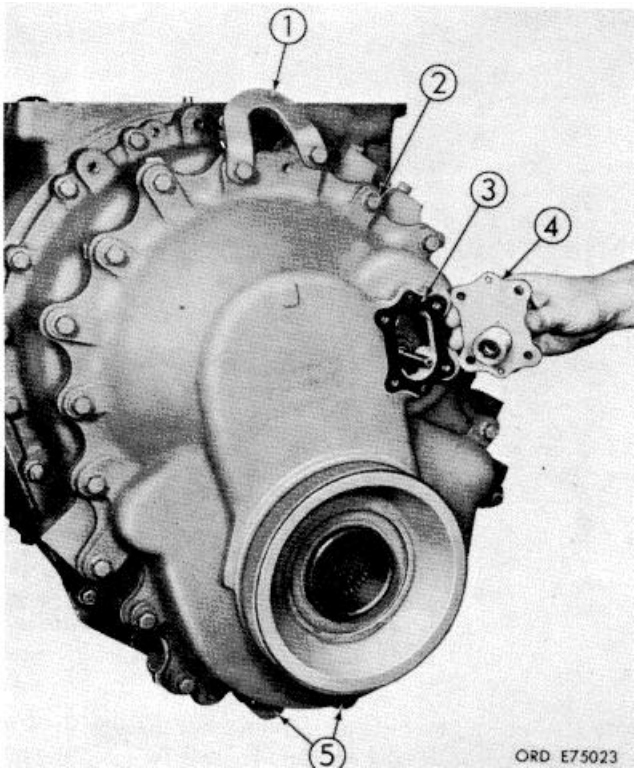
57 Install Woodruff key (1) in transmissions prior to S/N 1699 (or roller (1) in S/N 1699 and later models) in keyway in pump shaft (2) Install pump drive gear (3), flat side toward pump.



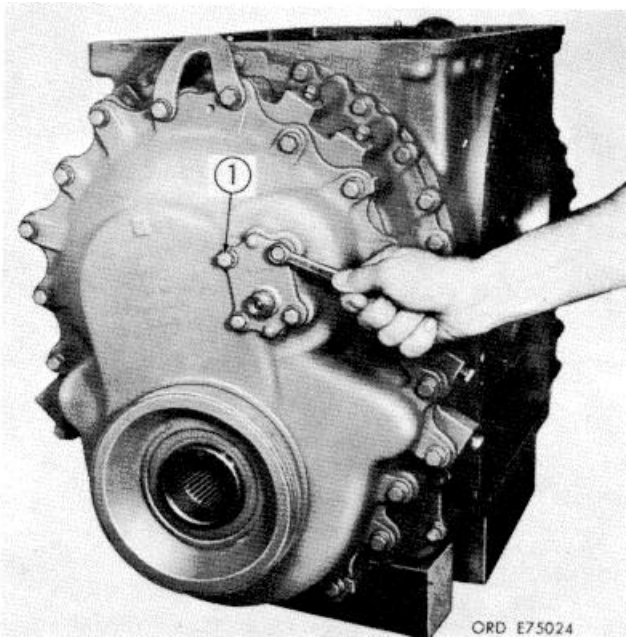
58 Install snapring (1) to retain the gear on the shaft.



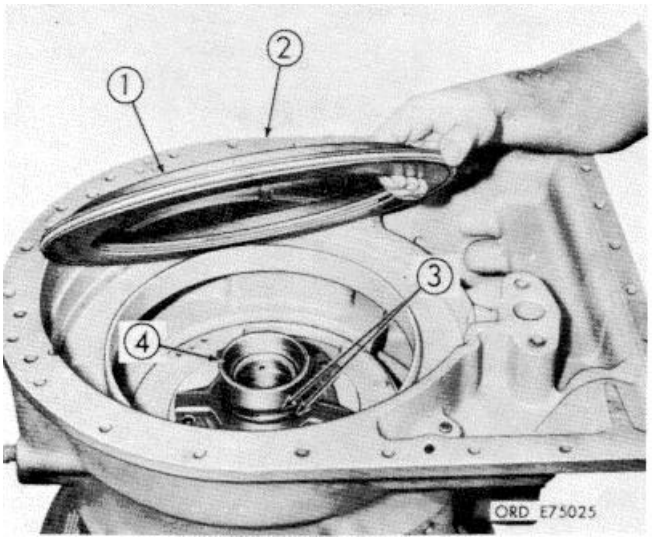
59 Install right output driven gear assembly (6), internal-splined hub out. Install two 3/8-16 x 4-inch, headless guide bolts (2 and 5) into input housing (3), 180 degrees apart. Install gasket (4). Install end cover assembly (1). Remove two guide bolts (2 and 5).



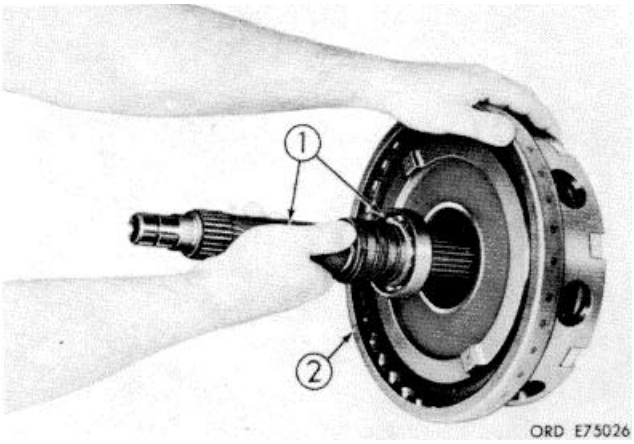
60 Install lifting bracket(1) nineteen 3/8-16 x 2 1/4-inch bolts (2), two 3/8-16 x 2 1/2-inch bolts (5), 21 plain washers and 21 lockwashers. The two bolts (5) at the bottom are installed from the output housing into the end cover. Tighten the bolts to 29 to 32 pound feet torque. Install speedometer cover gasket (3) and cover (4).



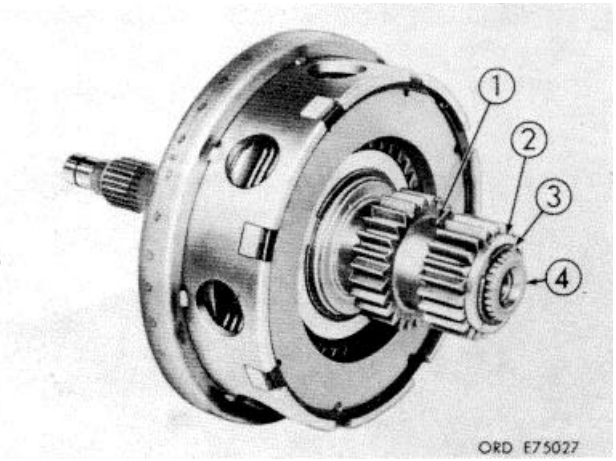
61 Install four 5/16-18 x 1 1/2-inch bolts (1), four plain washers and four lockwashers. Tighten the bolts to 10 to 12 pound feet torque.



62 Position the torque converter housing, front downward, on wood blocks. Install intermediate-range clutch piston assembly (1), with seal rings, flat side first, into converter housing (2). Make certain that two seal rings (3) are installed on sleeve (4).



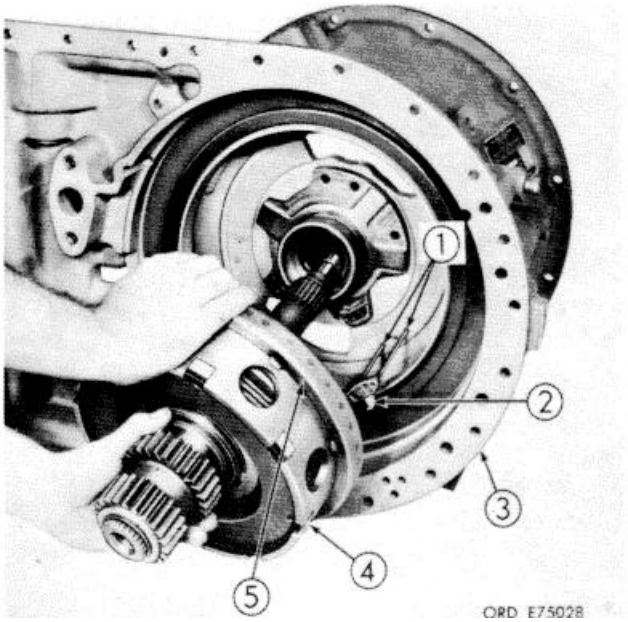
63 Install converter output shaft and bearing (1) into high-range clutch pack (2).



64 Temporarily install intermediate-low sun gear (1), splined washer (2). and snapring (3) onto converter output shaft (4).

NOTE

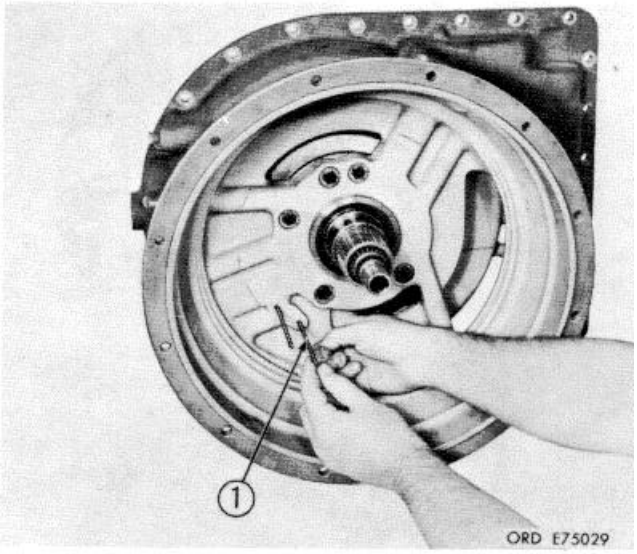
These parts will maintain proper positioning of the output shaft and clutch pack within the converter housing during subsequent assembly.



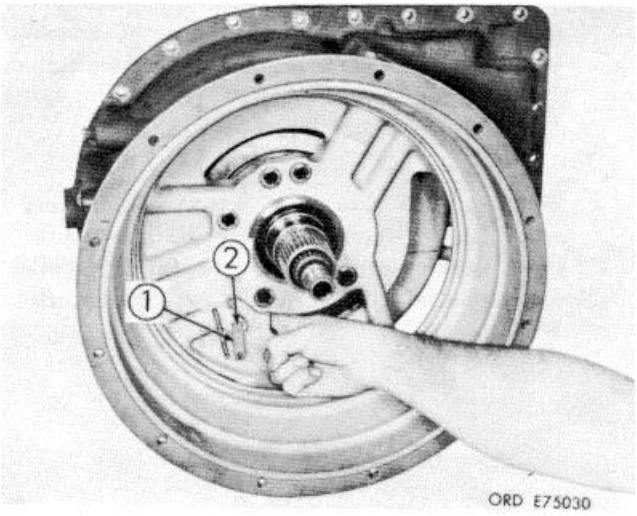
65 Lay the converter housing on its side. Install two 10-32 x 6-inch headless guide bolts (1) onto pitot tube (2) and insert the guide bolts into housing (3) as shown. At rear of housing, install converter output shaft and clutch pack (4), engaging the pitot tube within the lip of collector ring (5).

NOTE

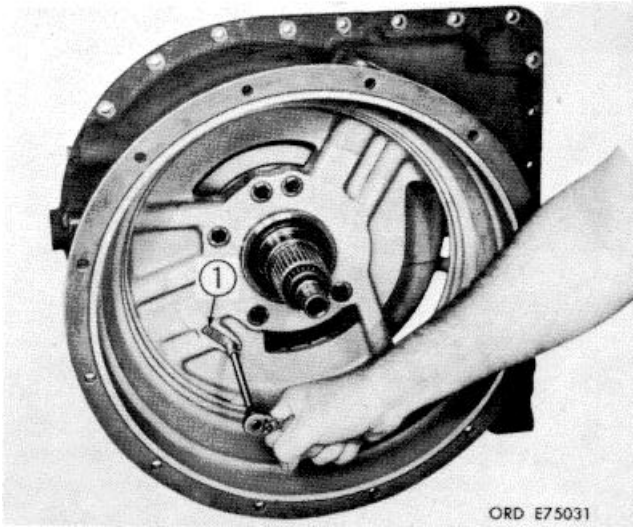
Inlet part of pitot tube must be outward and facing clockwise. Carefully seat the shaft and clutch pack assembly while pushing the pitot guide bolts through the housing.



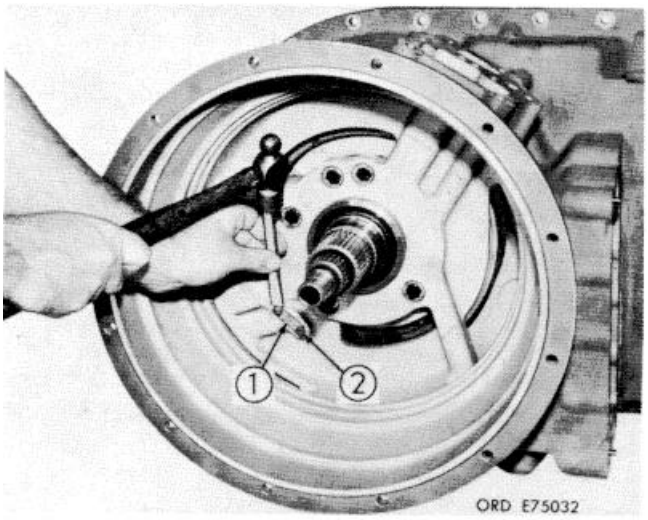
66 Hold the pitot tube in place by reaching through the hole in the housing front wall. And remove one guide bolt (1).



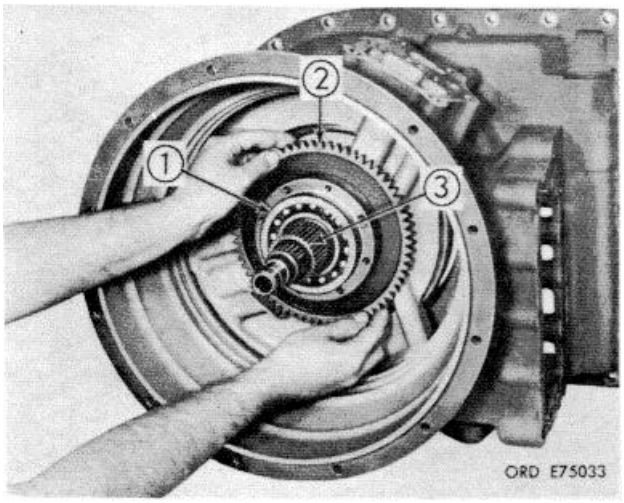
67 Maintain finger pressure on the pitot tube and install lockstrip (1) and one 10-32 x 1 1/2-inch bolt (2) into the pitot tube. Tighten bolt (2) finger tight.



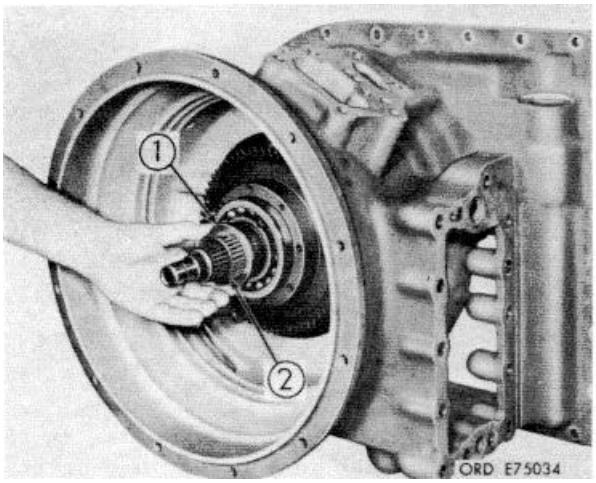
68 Maintain finger pressure on the pitot tube, remove the second guide bolt and install remaining 10-32 x 1 1/2-inch bolt (1) Tighten both bolts to 2.5 to 4 pound feet torque.



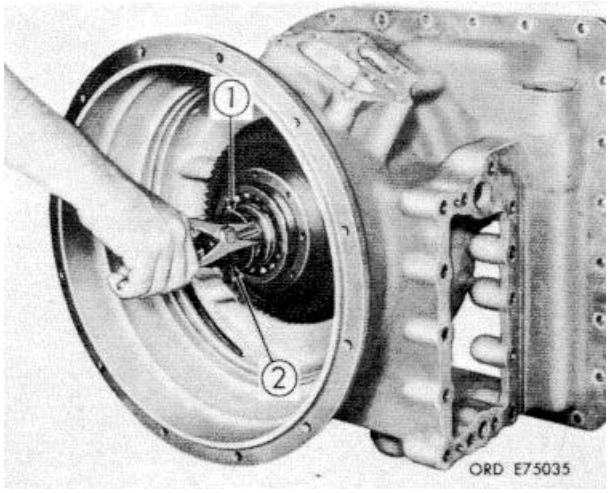
69 Using a chisel, a corner of lockstrip (1) against (1) a flat side on each (of bolts (2).



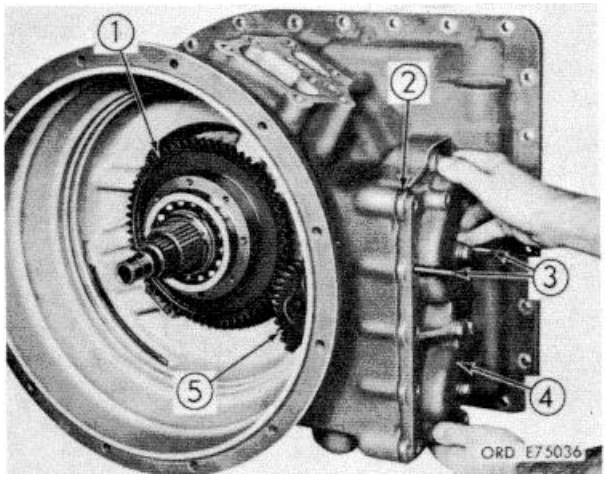
70 Install bearing (1) ungrooved end first, into pump drive gear 12). Install pump drive gear (2) and bearing (1) on converter ground sleeve (3). Bearing (1) may require tapping with a soft hammer to seat it.



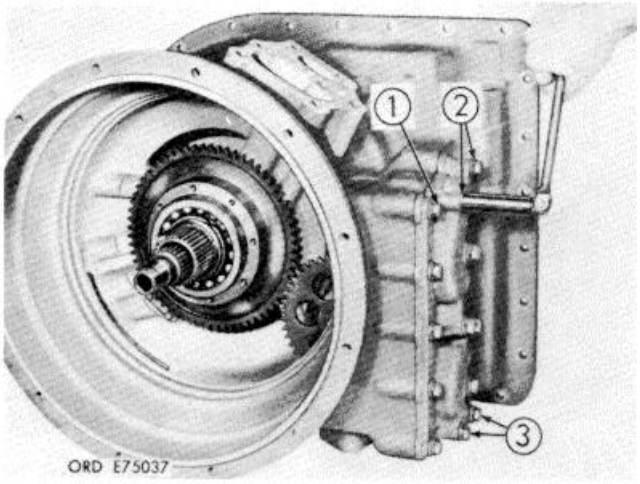
71 Install splined spacer (1) onto ground sleeve (2).



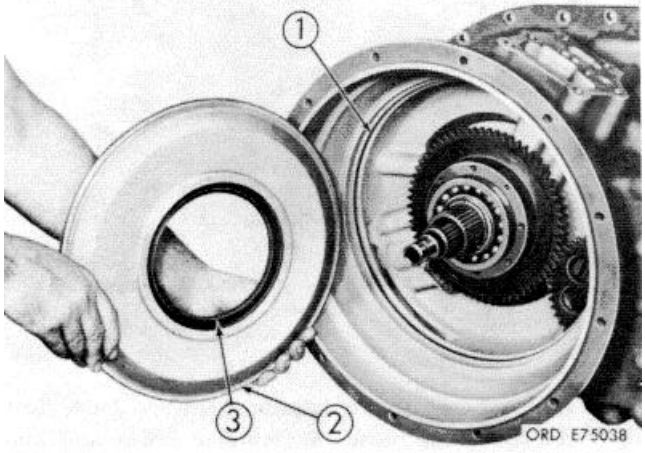
72 Install retaining ring (1) on ground sleeve (2).



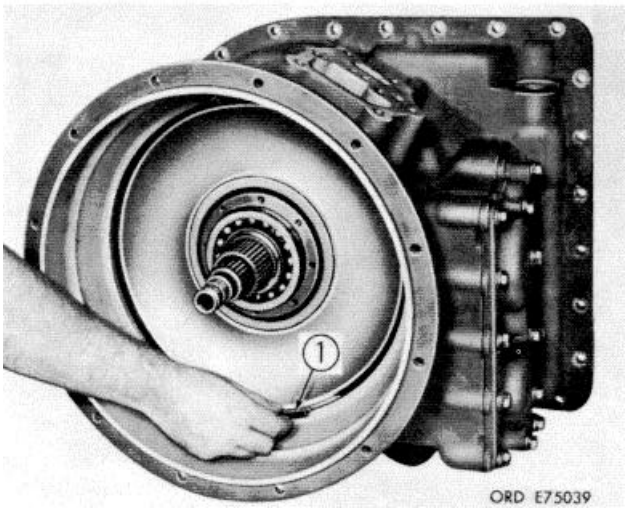
73 Install two 3/8-16 x 4-inch, headless guide bolts (3) into the input oil pump mounting pad. Install gasket (2). Install input oil pump assembly (4). Mesh teeth of gears (1 and 5).



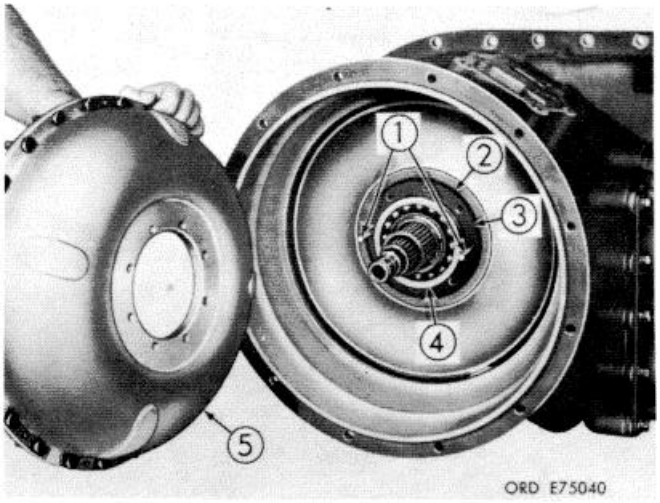
74 Install ten 3/8-16 x 2 1/4-inch bolts (1) and four 3/8 -16 x 3-inch bolts (2 and 3), 14 plain washers and 14 lockwashers. (Remove guide bolts.) Tighten bolts to 20 to 24 pound feet torque.



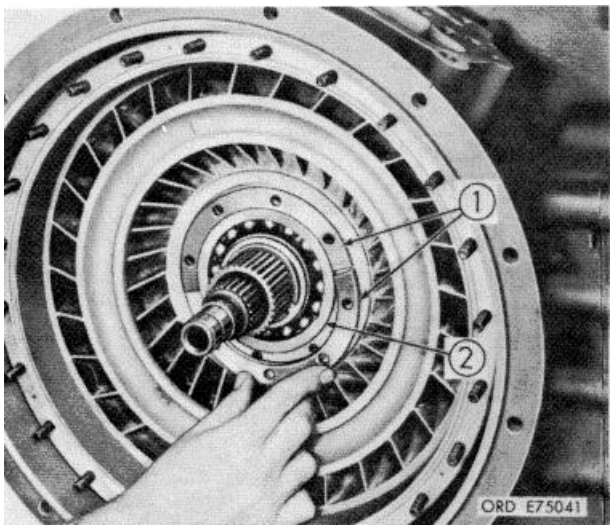
75 Install large, O-type sealring (1) into the converter housing. Retain the seal ring with oil soluble grease. Install diaphragm assembly. (2), convex side first, with seal (3) installed, into the housing. Seat the diaphragm by tapping around its circumference.



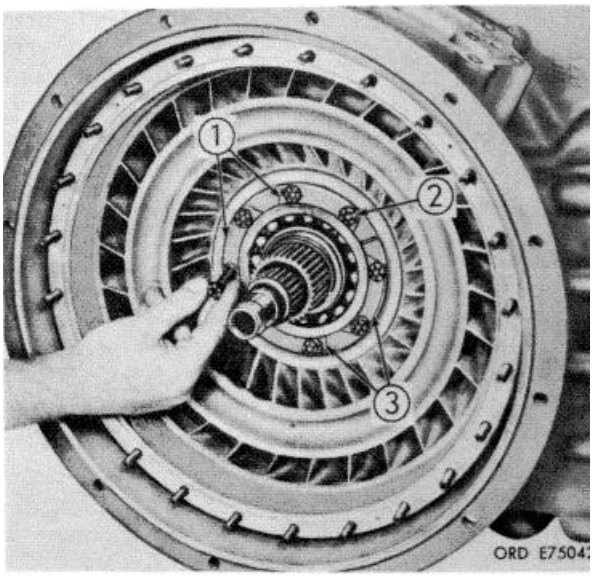
76 Install retaining ring (1) to retain the diaphragm assembly.



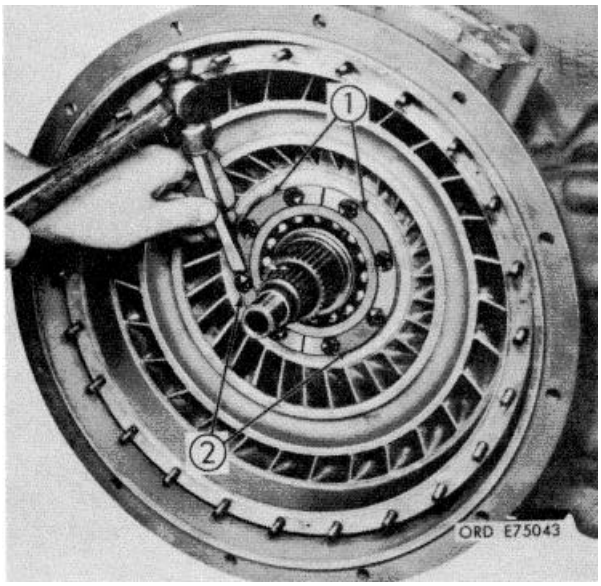
77 Install two 5/16-24 x 3-inch, headless guide bolts (1) into the hub of pump drive gear (2). Install gasket (3). Install torque converter pump assembly (5) onto bearing (4). Remove the two guide bolts.



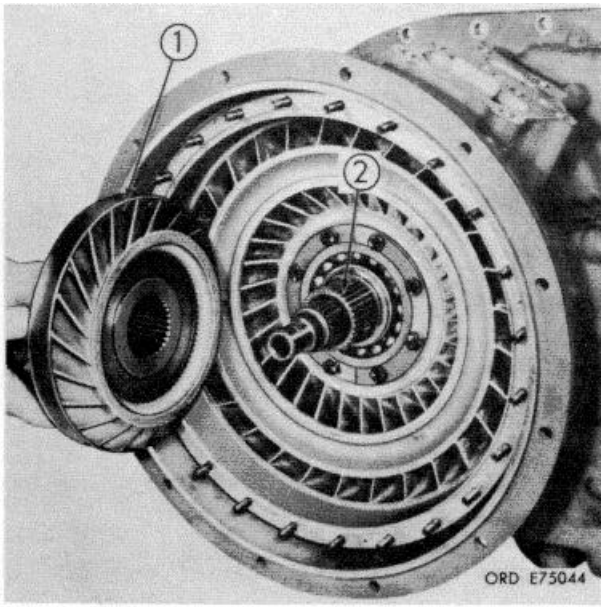
78 Install bearing retainers (1), flat side first, with the lip fitting into the groove in bearing (2).



79 Install four lockstrips (1 and 3) and eight 5/16-24 x 1 1/4-inch bolts (2). Tighten bolts (2) to 14 to 18 pound feet torque.



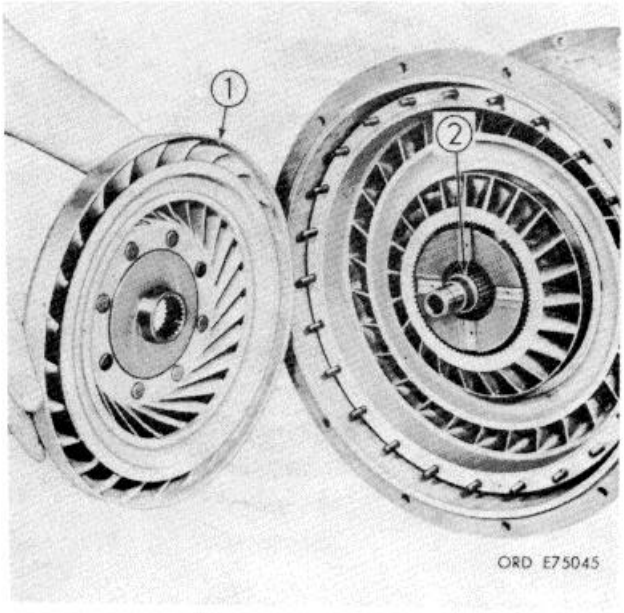
80 Using a chisel, bend each end of the lockstrips (1 and 2) against a flat side of the bolt heads.



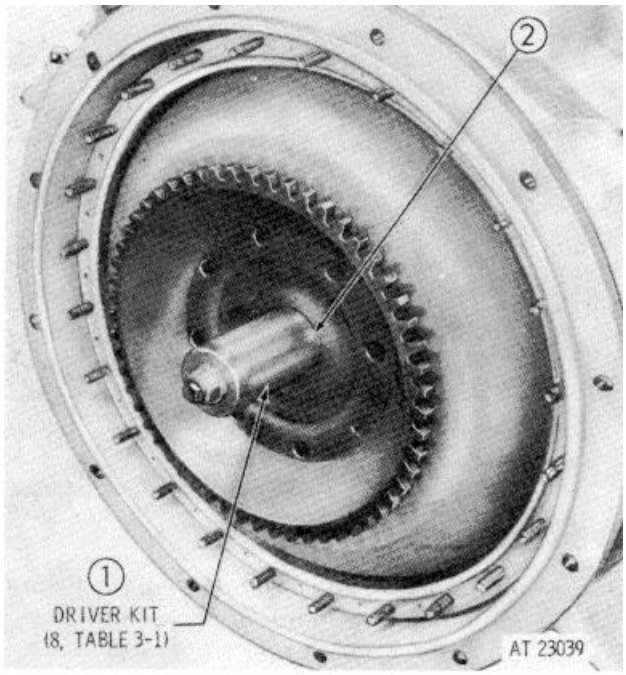
81 Install stator assembly (1). thin edges of stator vanes first. onto ground sleeve spline (2).

NOTE

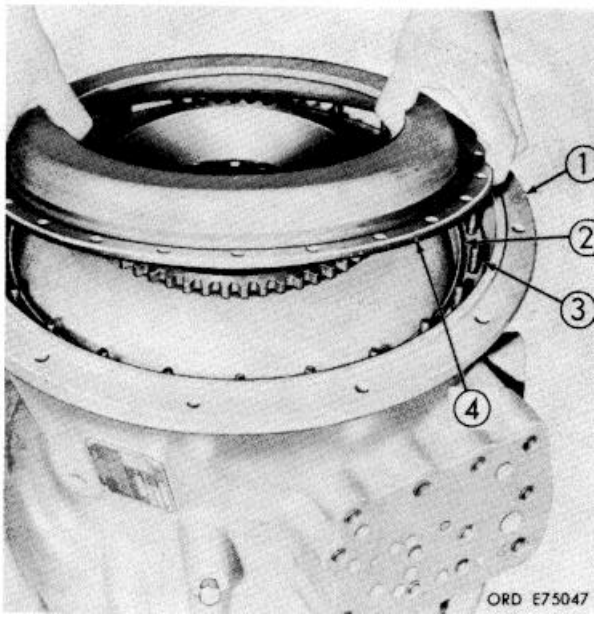
Check for freedom of clockwise rotation. Stator should lock if counterclockwise rotation is attempted.



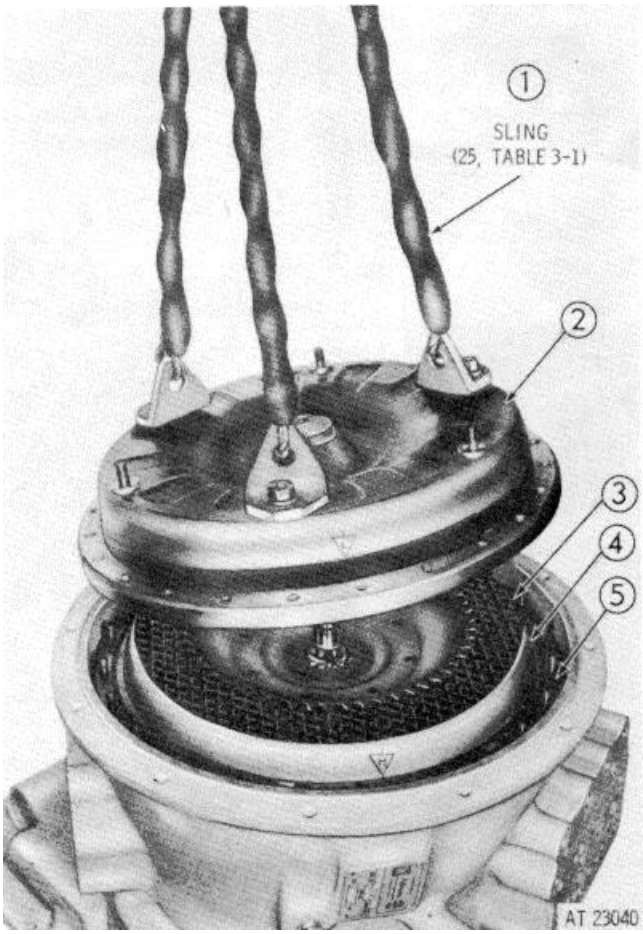
82 Install turbine assembly (1) onto converter output shaft splines (2).



83 Using driver kit (1), (8, table 3-11, install snapring (2) onto the converter output shaft, to retain the turbine assembly.



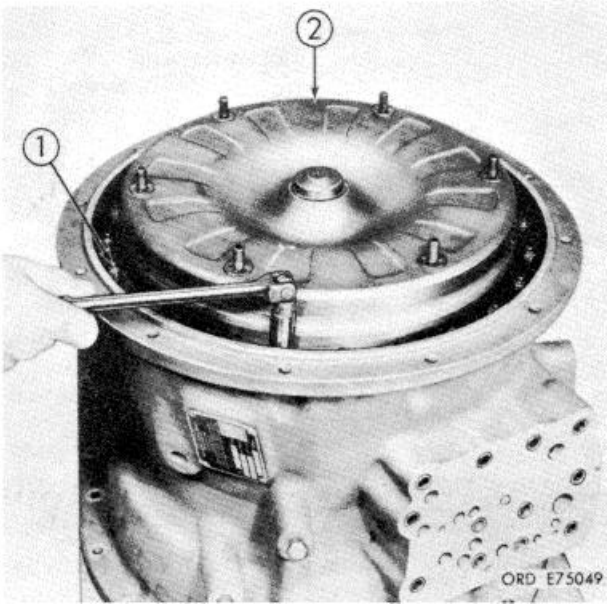
84 Using a hoist, position converter housing assembly (1) on wood blocks, so that it rests on the rear flange (converter up) Install square seal ring (2) into the groove in converter pump (3). Install lockup clutch back plate (4) onto the converter pump.



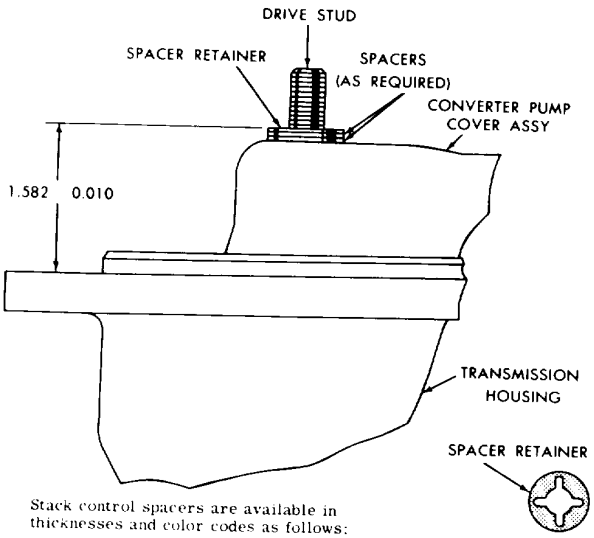
85 Install square sealring (4) into the groove on back plate (5). Install lockup clutch disk (6) on back plate (5). Install hook-type sealring (7) onto the turbine shaft. Using sling (1), (25, table 3-1) install torque converter pump cover assembly (2). Remove the sling.

NOTE

If balance marks (3) are present, aline the mark on converter pump cover assembly with the one on the back plate.



86 Install four 5/16-24 slotted lock nuts (1) (spaced 90 degrees apart) to retain pump cover assembly (2). Tighten these four nuts alternately and evenly to 10 pound feet torque. Install the remaining twenty 5/16-24 nuts and tighten 24 nuts to 19 to 23 pound feet torque.

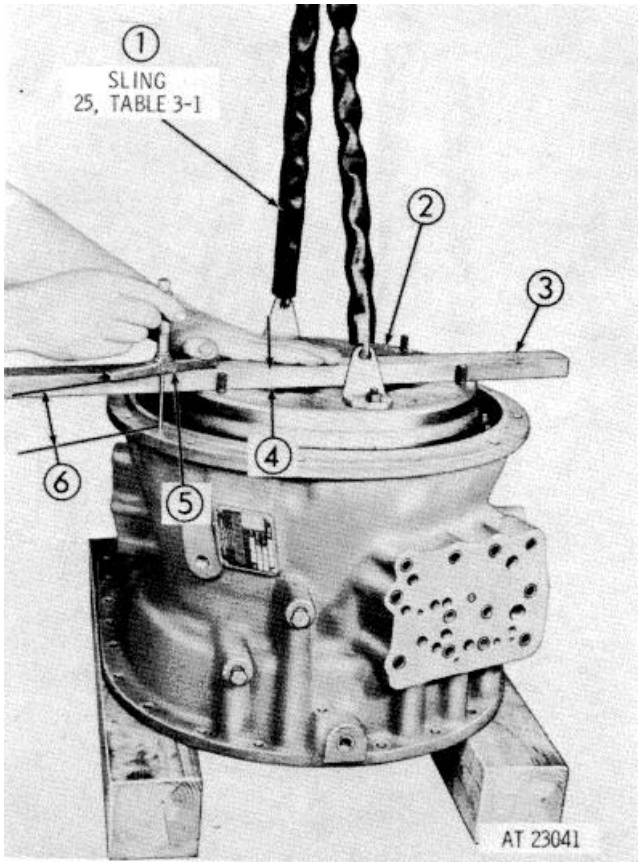


Stack control spacers are available in thicknesses and color codes as follows:

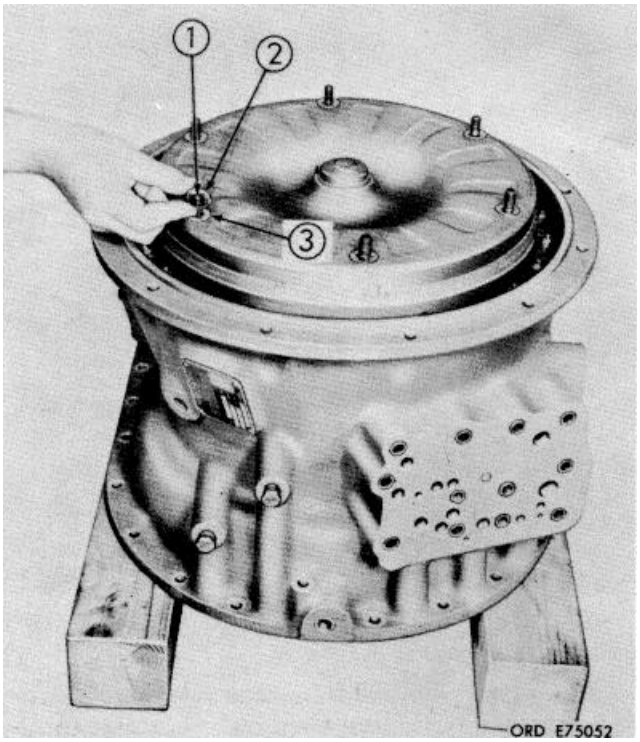
Thickness	Color Code
0.027 - 0.029	Gold
0.045 - 0.047	Silver
0.063 - 0.065	Copper
0.081 - 0.083	Black
0.099 - 0.101	Plain

ORD E75050

87 The procedures outlined in step 88, following. are necessary to space the transmission properly in relation to the transmission driving disk (on engine). If correct spacing is not established, the driving disk will be subject to strains which will cause its failure and possible transmission damage. The above figure shows the correct spacing. stack control spacers, and spacer retainers.



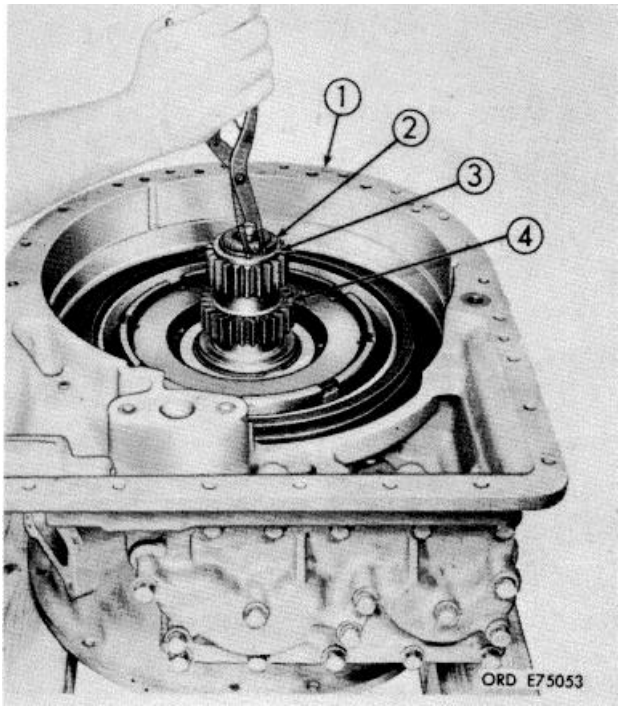
88 Attach sling(1), (25, table 3-11 to torque converter pump cover (2) and use a hoist to apply sufficient lifting force 150 to 100 Ib to eliminate all end play. Position straight-edge (3) on the converter pump cover, as shown. Using a micrometer depth gage (5), measure and record dimension (6). Subtract height of straight-edge (dimension (4), from dimension (6)), and record the difference. Subtract this difference from 1.566 inches. Select spacers which will equal (within 0.010 inch, plus or minus the resulting dimension. This is the proper spacer thickness to be used at each drive stud. Remove sling (1).



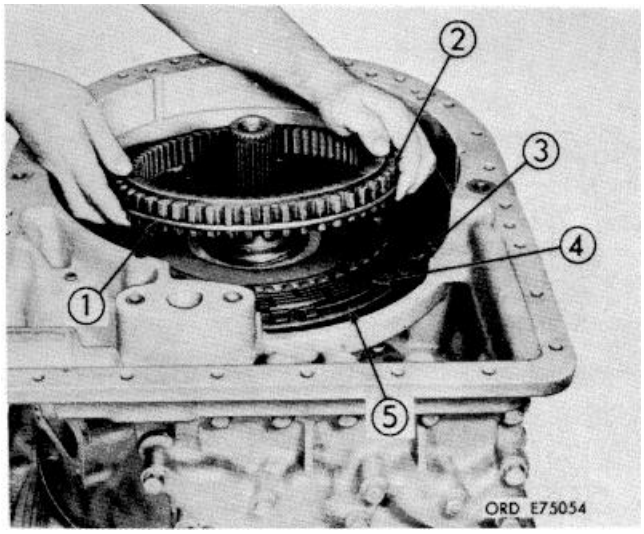
89 Install the proper spacer or spacers (3) and retainer (21 on each of six drive studs (1).

NOTE

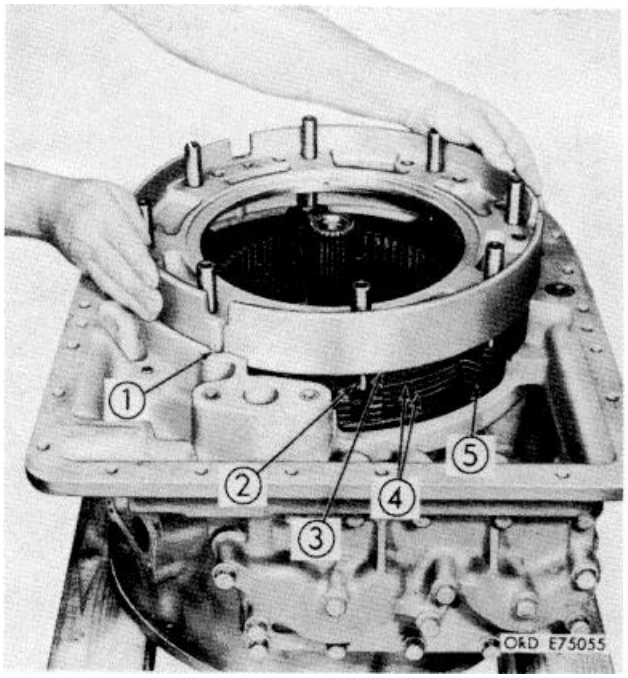
The spacers selected to meet the 1.566 dimension, plus the retainer thickness of approximately 0.016 inch, will meet the 1.582 dimensions in step 87, above.



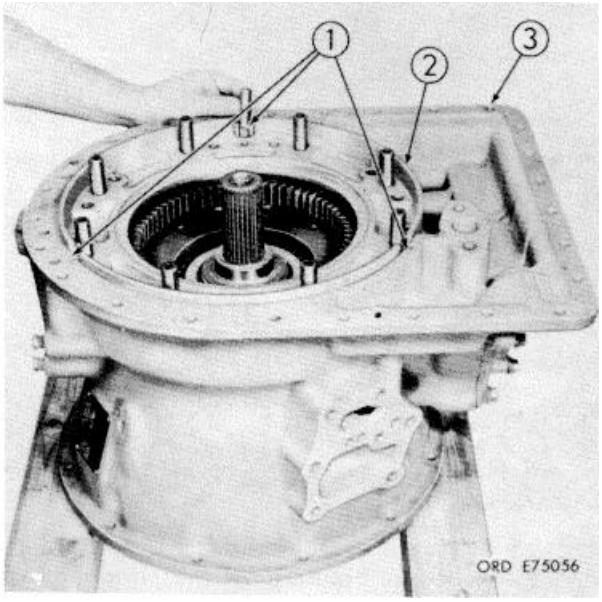
90 Position torque converter housing (1) so that it rests on the engine (front) mounting flange. Remove temporarily installed snapring (2), splined washer (3), and intermediate-low sun gear (4) from the turbine shaft.



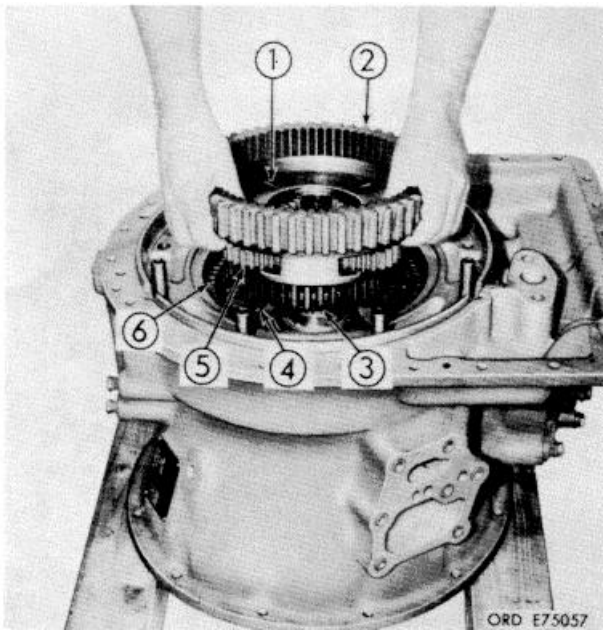
91 Position one external-tanged clutch disk (3) and one internal-splined clutch disk (4) on intermediate-range clutch piston (5). Install ring gear (2), counterbored side down, on the clutch disks so that ring (1) rests on clutch disk (4) with the splines engaged.



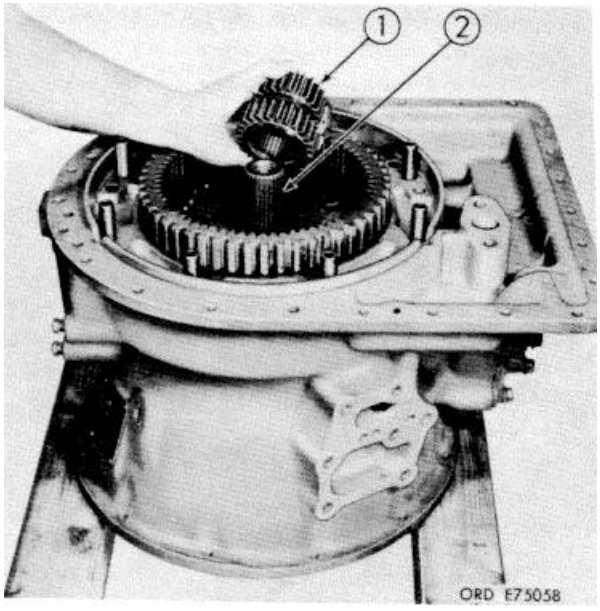
92 Install alternately, starting with an external tanged disk (5), three external-tanged and two internal-splined disks (4). Aline the slots in the external-tanged disks so that the anchor pins will engage the disks properly. Install clutch spacer assembly (3) with the short end of anchor pins(2) down. Aline three pin grooves (1) with mating grooves in the housing.



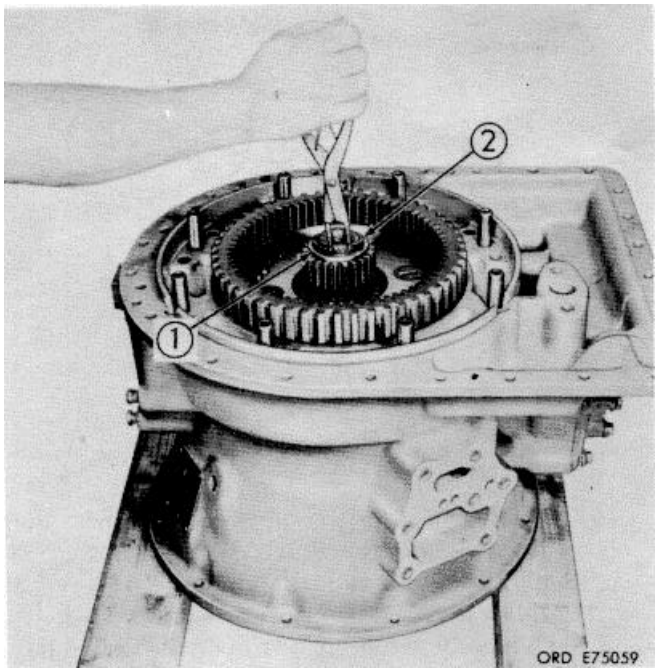
93 Install three antirotational pins (1) between spacer assembly (2) and converter housing (3).



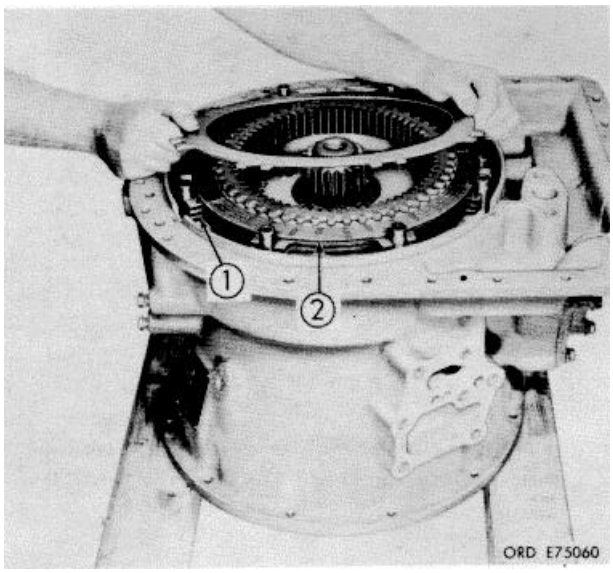
94 Install intermediate-range planetary carrier assembly (1) and low-range ring gear (2) as an assembly. High-range clutch hub splines (3) must mesh with high-range clutch disks (4). Intermediate-range planetary carrier pinions (5) must mesh with ring gear (6).



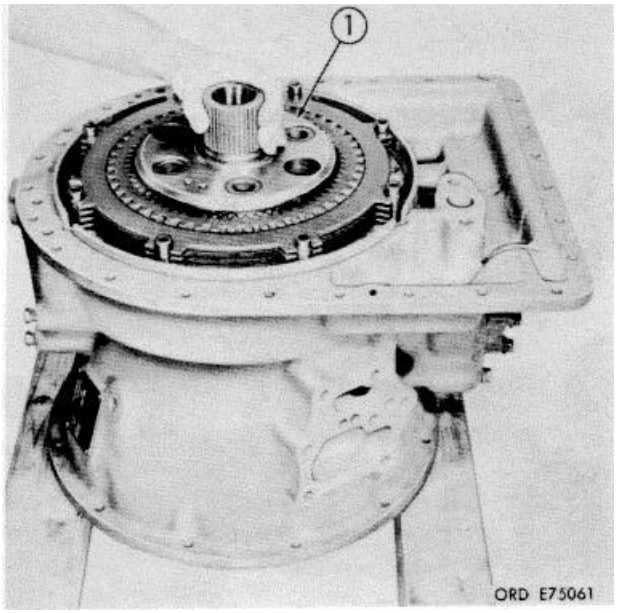
95 Install low-intermediate sun gear (1) on converter output shaft (2).



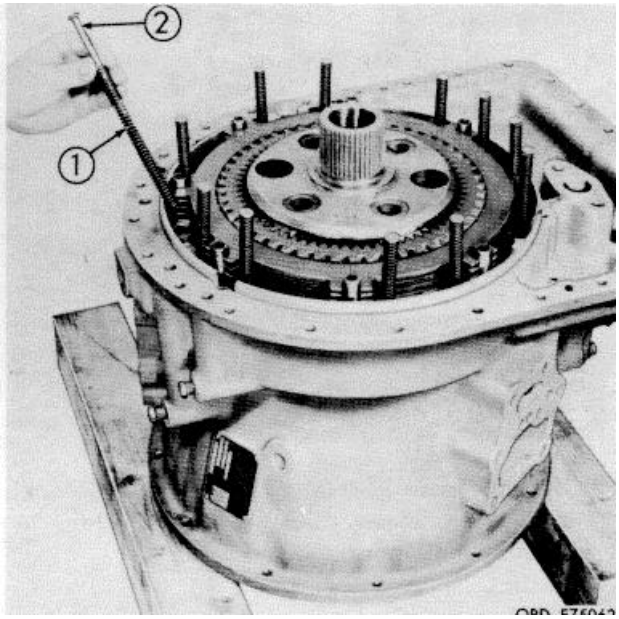
96 Install splined washer (1) onto the converter output shaft. Install retaining ring (2) to retain the splined washer.



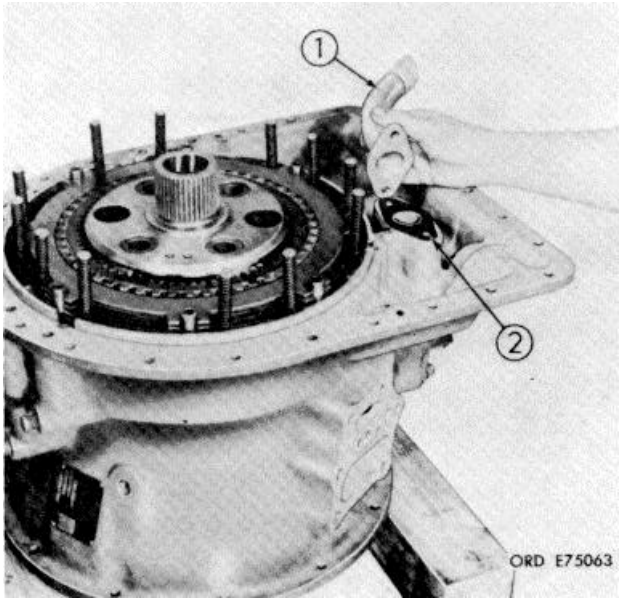
97 Beginning with an external-tanged clutch disk (1), install alternately five external-tanged clutch disks and four internal-splined clutch disks (2).



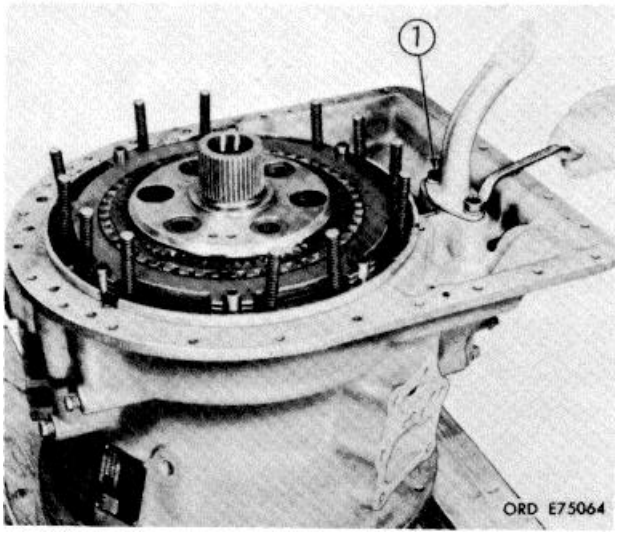
98 Install low-range planetary carrier assembly (1), meshing the pinions with the low-range sun and ring gear.



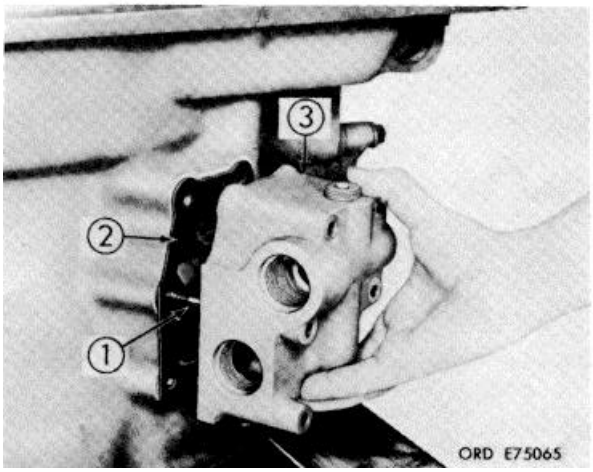
99 Install 12 springs (1) and 12 spring guides (2) into the holes in the clutch spacer assembly.



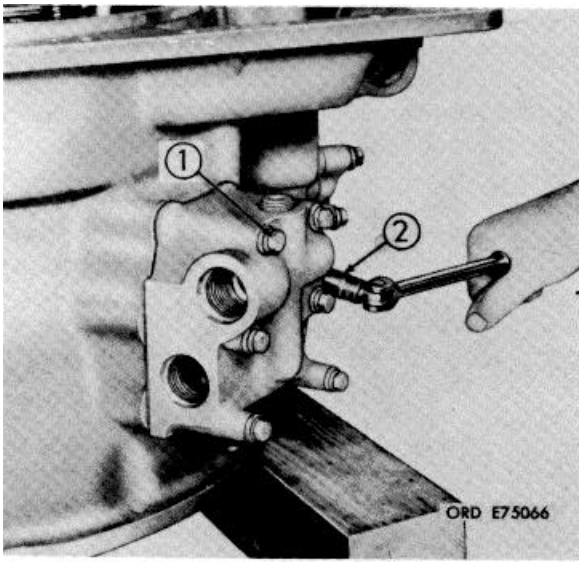
100 Install gasket (2) and oil suction tube assembly (1).



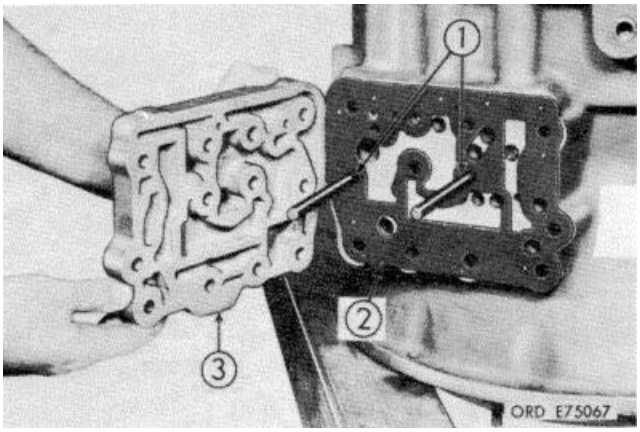
101 Install two 3/8-16 x 1 3/4-inch, self-locking bolts (1) and two plain washers. Tighten bolts to 36 to 43 pound feet torque.



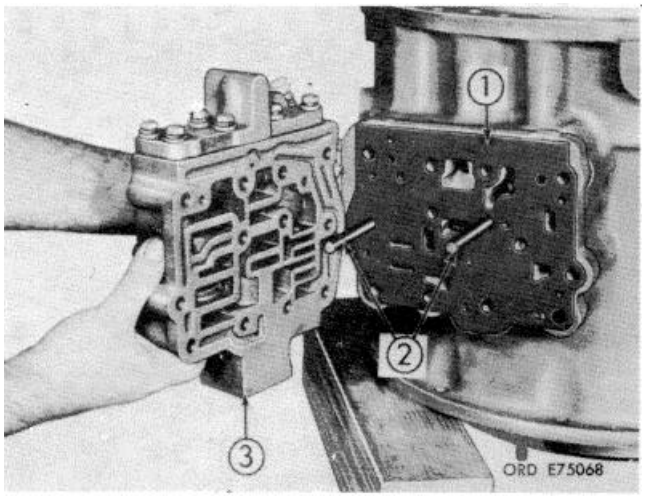
102 Install two 5/16-18 x 4-inch, headless guide bolts (1) into the lubrication regulator valve body mounting pad. Install gasket (2) over the guide bolts. Install lubrication regulator valve body assembly (3) over the guide bolts.



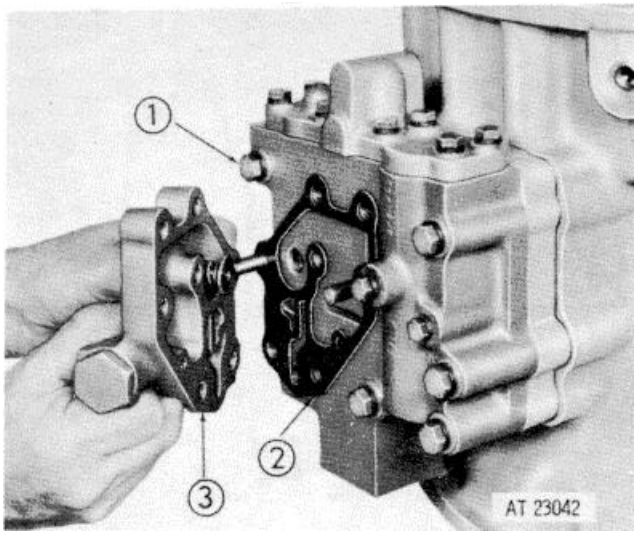
103 Install six 5/ 16-18 x 4-inch bolts (1), one 5/16-18 x 2 1/4-inch bolt (2), seven plain washers and seven lockwashers. Remove the guide bolts. Tighten bolts (1 and 2) to 10 to 12 pound feet torque.



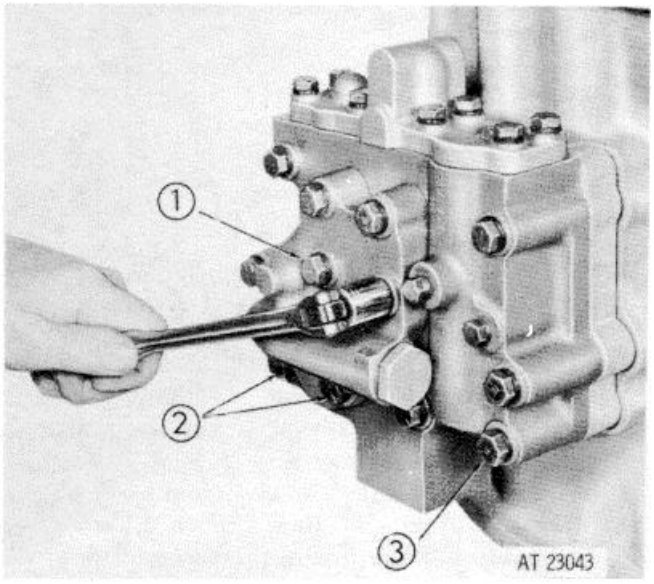
104 Install two 3/ 8-1 6 x 4-inch guide bolts (1) into the main-pressure regulator valve body mounting pad. Install gasket (2) over the guide bolts. Install oil transfer plate (3) over the guide bolts.



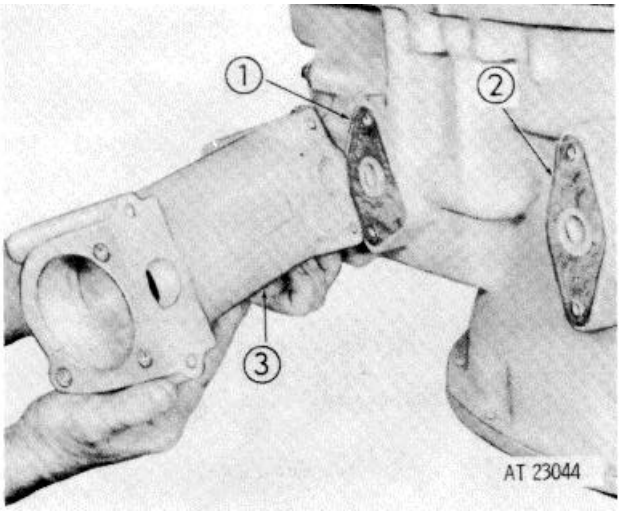
105 Install gasket (1) over guide bolts (2). Install main-pressure regulator valve body assembly (3) over the guide bolts.



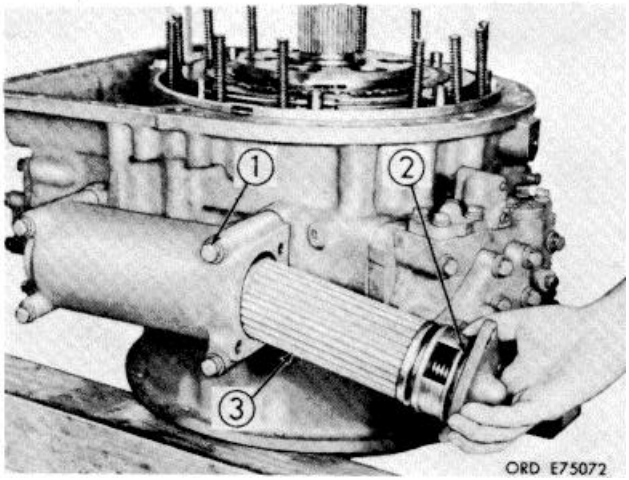
106 Install five 3/8-16 x 4 1/2-inch bolts (1), five plain washers and five lockwashers. Tighten bolts finger tight. Install gasket (2) and lockup regulator valve body assembly (3) over the guide bolts.



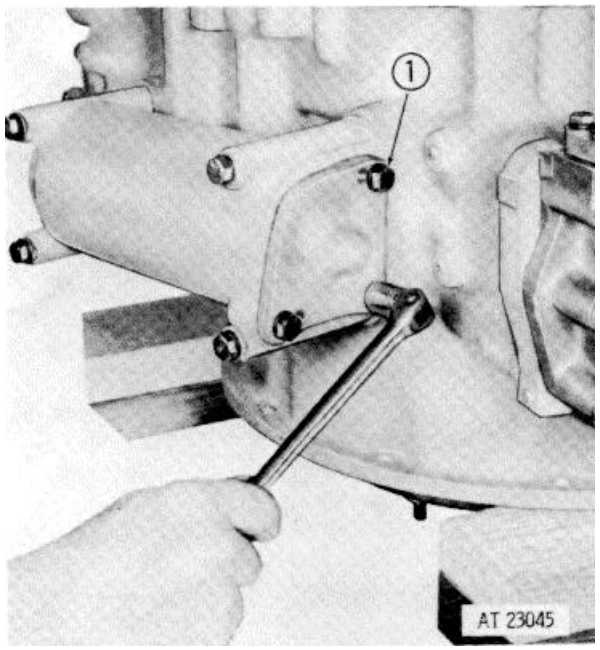
107 Remove the guide bolts and install five 3/8-16 x 5 1/4-inch bolts (1) two 3/8-16 x 4 1/2inch bolts (2), and seven plain washers and seven lock washers to retain the lockup regulator valve body assembly. Tighten bolts to 20 to 24 pound feet torque.



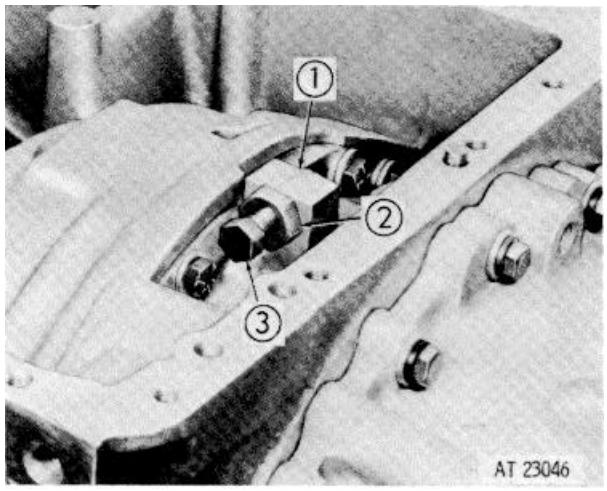
108 Install two gaskets (1 and 2) on the oil filter housing mounting pads, using oil-soluble grease to retain them. Install oil filter housing 13).



109 Install four 3/8-16 x 5 3/4-inch bolts (1), four plain washers, and four lockwashers. Tighten the bolts to 20 to 24 pound feet torque. Install O-type seal ring (2) on filter screen assembly (3) and install the assembly into the filter housing.



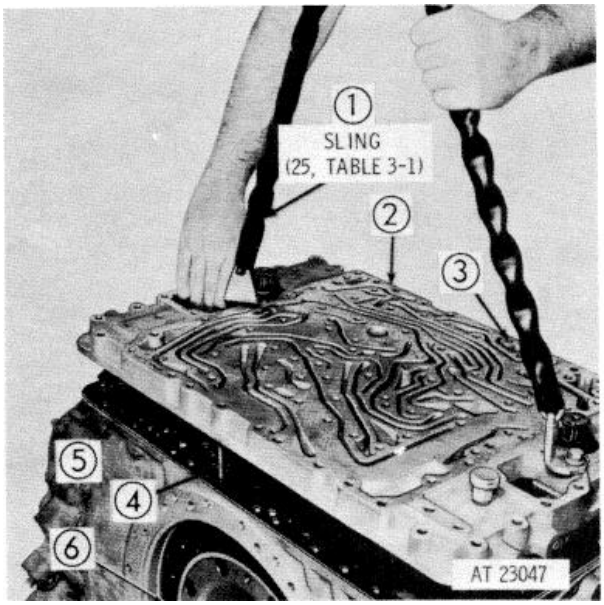
110 Install three 3/8-24 x 1 1/8 bolts (1) and three lockwashers. Tighten the bolts to 33 to 40 pound feet torque. Set the torque converter housing assembly to one side until ready to attach it to the bevel gear housing assembly.



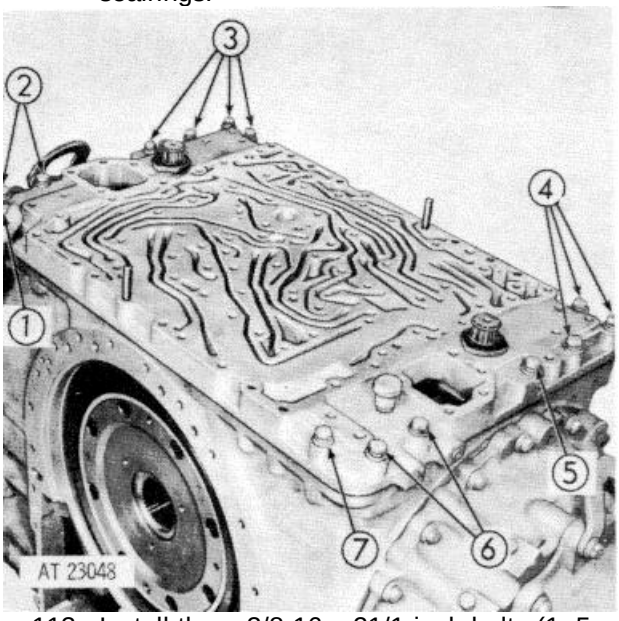
111 Install locknut (2) onto brake adjusting screw (3) on left side. Install the bolt and nut into the lug on brake rotating cam (1)

NOTE

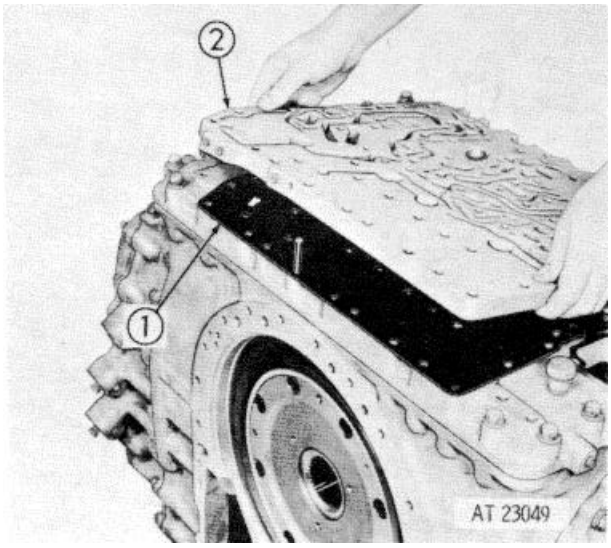
Install the brake adjusting screw so that the threaded end does not project through the rear of the lug. Leave the locknut loose. Repeat the installation procedure on the right side



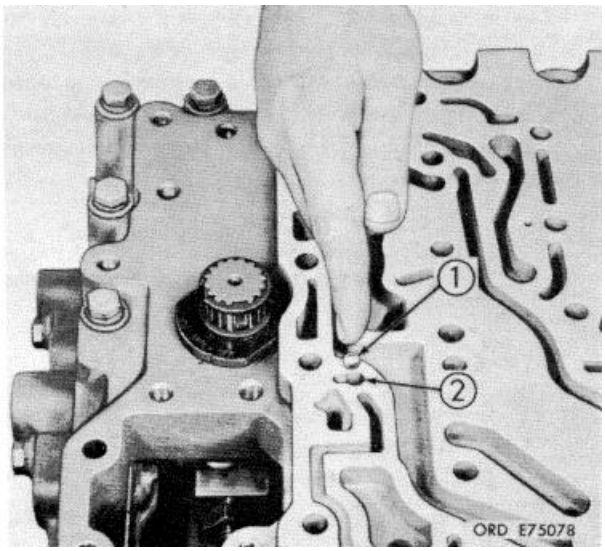
112 Install two 3/8-16 x 4-inch, headless guide bolts (3 and 4) in bevel gear housing and position gasket (5) over the guide bolts. Attach lifting sling (1), (25, table 3-1) to bevel gear housing cover assembly (2). Install the top cover assembly on the guide bolts. Remove the sling. Install low-range clutch piston (6) with its sealrings.



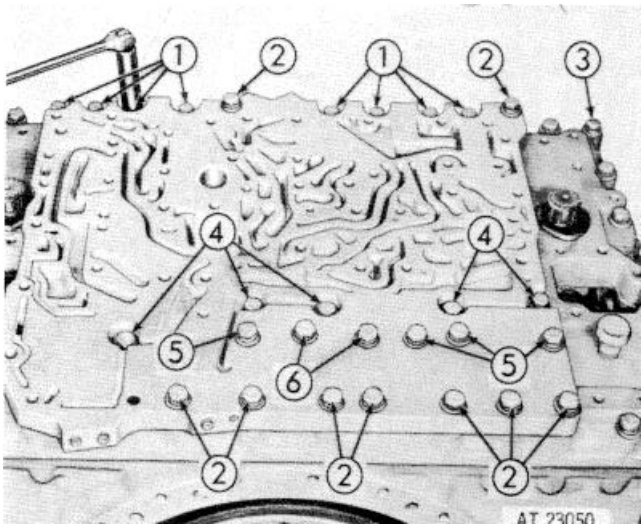
113 Install three 3/8-16 x 21/1-inch bolts (1, 5 and 7) and eleven 3/8-16 x 21/-inch bolts (2, 3, 4 and 6), 14 plain washers and 14 lockwashers. Tighten the 14 bolts finger tight.



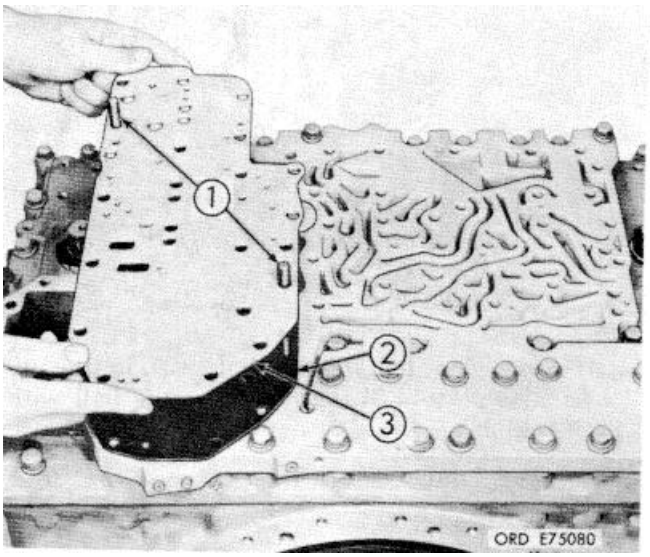
114 Install gasket (1) over the guide bolts. Install oil transfer plate (2) over the guide bolts.



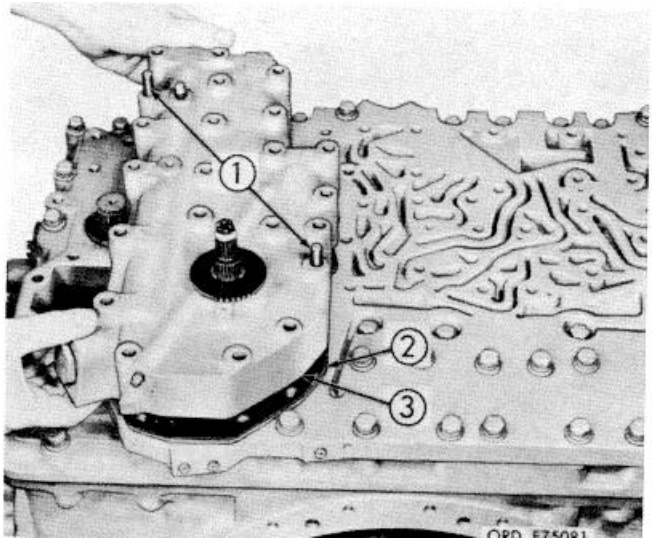
115 Place nylon ball (1) in hole (2) in the oil transfer plate. Fill the hole over the ball with oil-soluble grease.



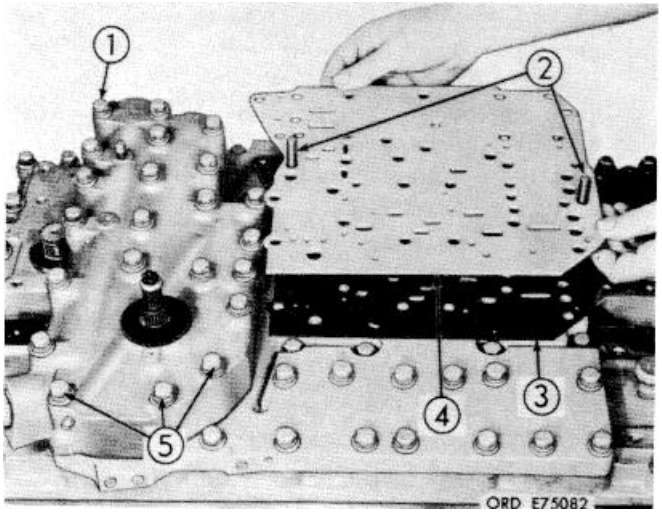
116 Remove the guide bolts and install nine 3/8-16 x 3 1/4-inch bolts (2), four 3/8-16 x 1 3/4-inch bolts (5), two 3/816 x 2-inch bolts (6), five 3/8-16 x 1 1/4-inch bolts (4), eight 3/8-16 x 2 5/8-inch bolts (1), 28 plain washers and 28 lockwashers. Tighten the bolts to 20 to 24 pound feet torque. Tighten 14 bolts (3) to 20 to 24 pound feet torque. Refer to FO-15 for correct sequence of tightening these bolts.



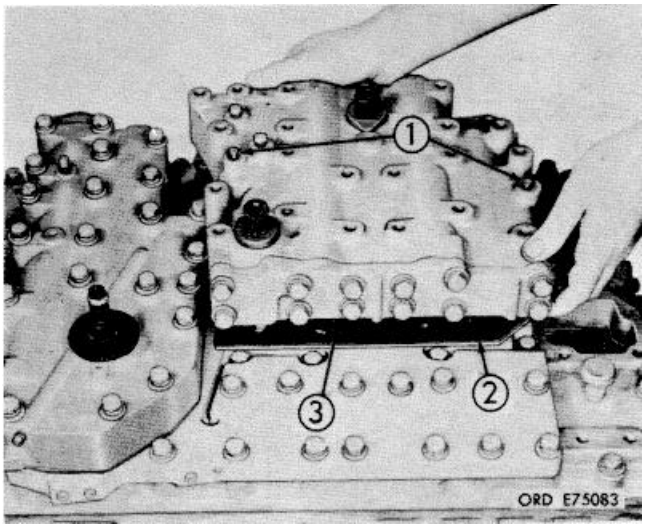
117 Install two 3/8-16 x 4-inch, headless guide bolts (1) in the control valve body mounting pad. Install control valve body gasket (2) and separator plate (3) over the guide bolts.



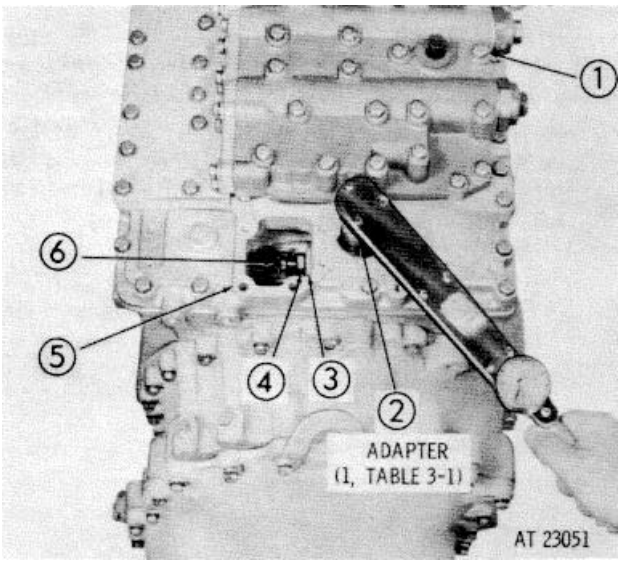
118 Install gasket (2) and control valve body assembly (3) over guide bolts (1). Remove guide bolts.



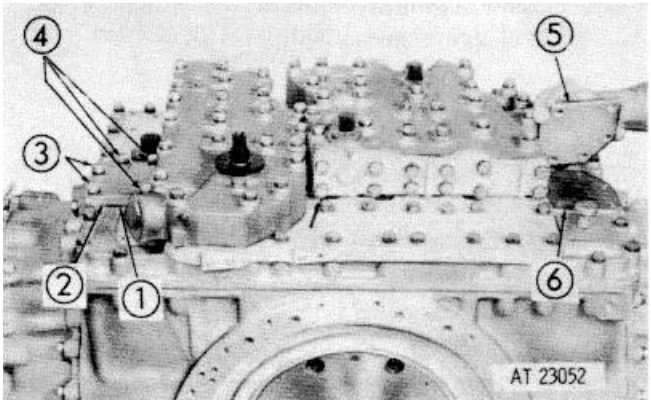
119 Install three 3/8-16 x 51/4-inch bolts (5), nineteen 3/8-16 x 3 3/4-inch bolts (1) 22 plain washers and 22 lockwashers in the control valve body assembly. Refer to FO-15 for proper method and sequence of tightening the bolts. In stall two 3/8-16 x 4-inch guide bolts (2) in the steer valve mounting pad. Install gasket (3) and separator plate (4) over the guide bolts.



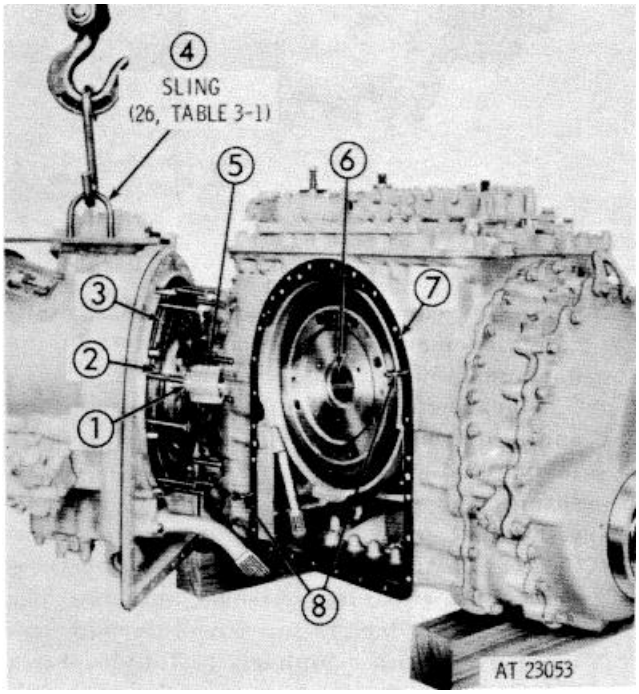
120 Install gasket (2) and steer valve body assembly (3) over guide bolts (1). Remove the guide bolts.



121 Install twenty-six 3/8-16 x 4-inch bolts (1), 24 plain washers and 24 lockwashers. Refer to FO-15 for torque and proper sequence of tightening these bolts. With all the left brake components in the fully-released position, screw adjustment bolt (6) in until it lightly contacts the brake apply cam (on underside of the top cover (5). Tighten locknut (4) against lug (3) so that the bolt and nut will remain in place if the power train is run before brakes are given the final adjustment. Using adapter (2), (1, table 3-1) on the brake apply shaft, apply torque to check for freedom of movement of the brake apply rotating cam. Repeat the adjustment bolt procedure and torque check on the right side.



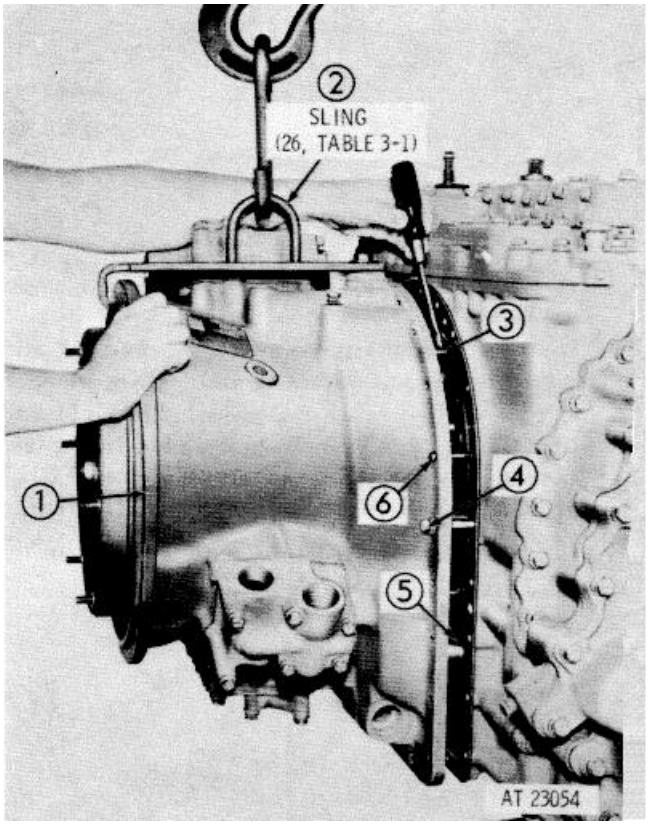
122 Install left and right gaskets (1 and 6) and brake adjustment covers (2 and 5). Secure each cover with two 3/8-16 x 23 3/4-inch bolts (3) and three 3/8-l6 x 1 3/8-inch bolts (4), five plain washers and five lock-washers. Refer to FO-15 for torque and proper sequence of tightening these bolts.



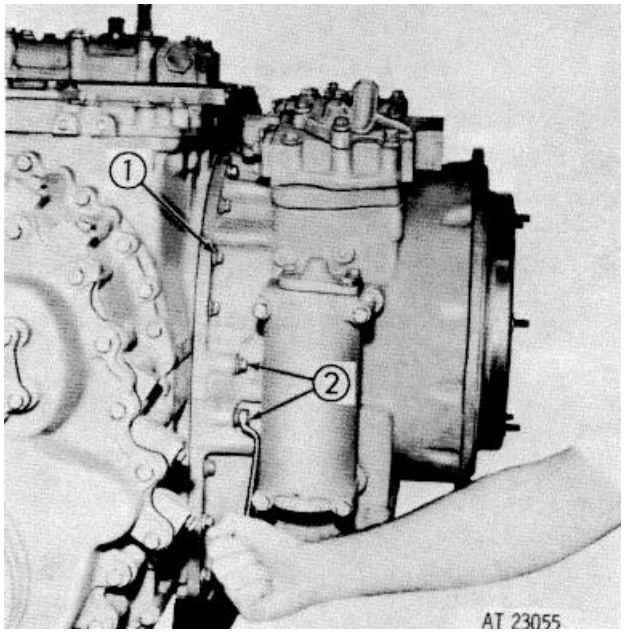
123 Install two 3/8-16 x 4-inch, headless guide bolts (8) in the converter housing mounting pad on the bevel gear housing. Install gasket (7) over the guide bolts and retain it with oil-soluble grease. Attach sling (4) (26, table 3-1) to the converter housing assembly and position the converter housing for installation on the bevel gear housing.

NOTE

Be careful that low-range clutch disks (3), springs (2) and spring pins (1) do not fall out of the housing. The low-range planetary carrier assembly splines (5) must engage bevel gear carrier splines (6).



124 Position converter housing assembly (1)carefully on guide bolts (6), being careful not to damage oil suction tube (5). Install two 3/8-16 x 2 3/4-inch bolts (4), 180 degrees to each other, and, while making repeated checks to ensure that the clutch plates are in position and the springs and pins (3) are perpendicular to the piston face, draw the converter housing toward the bevel gear housing. Install two 3/8-16 x 1 5/8-inch bolts, two plain washers and two lockwashers, 180 degrees to each other and draw the converter up completely to the bevel gear housing. Remove the two guide bolts and the two draw bolts. Remove sling (2), (26, table 3-1)



125 Install twenty-one /8- 16 x 1 5/8-inch bolts (1). two 3/8-16 x 2 3/4-inch bolts (2), 23 plain washers and 23 lockwashers. Install one 3/8-16 x 3 1/4-inch bolt at the top of the converter housing, and install one plain washer and one lockwasher. Tighten 24 bolts to 27 to 32 pound feet torque. Install oil filler and level indicator kit (62, foldout 101.)

NOTE

To establish the oil level in the power train following overhaul. refer to paragraph 9-4b (6)

CHAPTER 9

TESTS AND ADJUSTMENTS

9-1. Scope of Chapter 9

a. The tests described in this section will determine if the functional operation of the transmission is satisfactory. These tests may be made after rebuild or at any time to determine the condition of the transmission. The tests may be made with the transmission installed in the vehicle or on a properly equipped test stand.

b. These tests will determine whether or not the clutches, torque converter, gearing and hydraulic system are functioning properly.

c. Adjustment of transmission components and control linkage must be correct when tests are performed (or corrected during tests). When tests are made in the vehicle, the vehicle, engine must be properly adjusted and performing efficiently. Refer to TM 9-2815-205-34 for engine test and adjustment procedures. Refer to paragraphs 9-4 and 9 5, below, for transmission test and adjustment procedures.

9-2. Test Equipment

a. Transmission Installed in Vehicle. The following equipment is required when testing the transmission in a vehicle:

(1) Tachometer to indicate engine speed (transmission input and output speed) in revolutions per minute.

(2) Two oil pressure gages with ranges of 0 to 400 and 0 to 100psi, and fittings to adapt the gages to 1/8- and 1/4-inch NPT female threads. Additional fittings may be required to adapt the gage to cooler-and cooler-out connections. The gages are provided in the special tool set in a kit (11, table 3-1).

b. Transmission Installed on Test Stand. In addition to a properly equipped test stand with a means of driving a transmission, and the equipment tested in *a,* above, the following equipment is required.

(1) Manual control for shifting transmission through all range selector positions.

(2) Manual control for operating steer controls.

(3) Manual control for operating pivot valve.

(4) Manual control for operating throttle valve (on transmission).

(5) Manual control for operating left and right brakes simultaneoulsy.

NOTE

Brake control must be self-equalizing.

(6) Speed control for regulating transmission input speed.

c. Test Data Log Sheet. A sample test data log sheet for recording transmission performance is illustrated in figure 9-1.

PRESSURE (psi)	Input rpm	Range selector positions (No steer—pivot valve in normal position)						
		Neutral	1st gear	2nd gear	3rd gear	4th gear	Rev-1	Rev-2
Main	1500	190-215	190-210	190-210	190-210	190-210	140-175	190-210
Low-range clutch	1500		180 min	180 min			130 min	
Int-range clutch	1500				180 min			180 min
High-range clutch	1500					177 min		
Left rev range clutch	1500						130 min	180 min
Right rev range clutch	1500						130 min	180 min
Left output clutch	1500			165 min	165 min	165 min		
Right output clutch	1500			165 min	165 min	165 min		
Left steer clutch	1500	180 min	180 min					
Right steer clutch	1500	180 min	180 min					
Lockup clutch	2400	150-180	150-180	150-180	150-180	150-180	150-180	150-180
Lubrication	1800					20-40		

OUTPUT SPEED (no load)				(rpm)	
Lockup engages — Full TV				250-295	(770 - 910 at speedometer drive)
Lockup releases — No TV				105-160	(325 - 490 at speedometer drive)

Steer method and range	Engaged steer clutches	
	Left steer	Left rev
LEFT NORMAL	(psi)	(psi)
1st gear		150 min
2nd, 3rd, 4th gear	150 min	
reverse-2 gear	150 min	
reverse-1 gear	130 min	

Steer method and range	Engaged steer clutches	
	Right steer	Right rev
RIGHT NORMAL	(psi)	(psi)
1st gear		150 min
2nd, 3rd, 4th gear	150 min	
reverse-2 gear	150 min	
reverse-1 gear	130 min	

AT 23056

Figure 9-1. Test data log sheet

9-3. Oil Pressure Readings

Use the oil pressures listed in the test data log sheet as normal values in testing the transmission. Record actual values directly below the normal values shown on the log. Slight variations from normal pressures are permissible.

9-4. Tests

a. Preliminary Instructions. When testing the transmission in a vehicle, the left- and right-track drive couplings must be disconnected.

b. Oil Level Check and Warmup.

(1) Check the transmission oil level before starting the engine. The oil level must be within the Operating Range marks on the oil level indicator.

(2) Add or drain oil as required to bring the oil level within the Operating Range.

CAUTION

To avoid overfilling, check the oil level either following operation with hot oil (over 200°F operating temperature) or while the oil is cold and the vehicle engine has not been started for a period of at least 8 hours. Always consider oil temperature when adding oil.

NOTE

Oil return to the reservoir, following operation, will vary within a given time depending upon oil temperature at shutdown. This will result in variation of oil level.

(3) When previous operating temperature is not known, warm up the transmission and stabilize the oil temperature, observing the oil temperature warning system. To warm the transmission, operate the engine at 1800 to 2000 rpm for 3 to 8 minutes while the vehicle brakes are applied and the transmission is in fourth gear. To stabilize the oil temperature, operate the engine at 1000 to 1500 rpm while the vehicle brakes are applied and the transmission is in neutral.

(4) Stop the engine and, after 3 to 5 minutes, check the oil level. Add or drain oil as' required to bring the oil level to the mid point of the Operating Range on the oil level indicator.

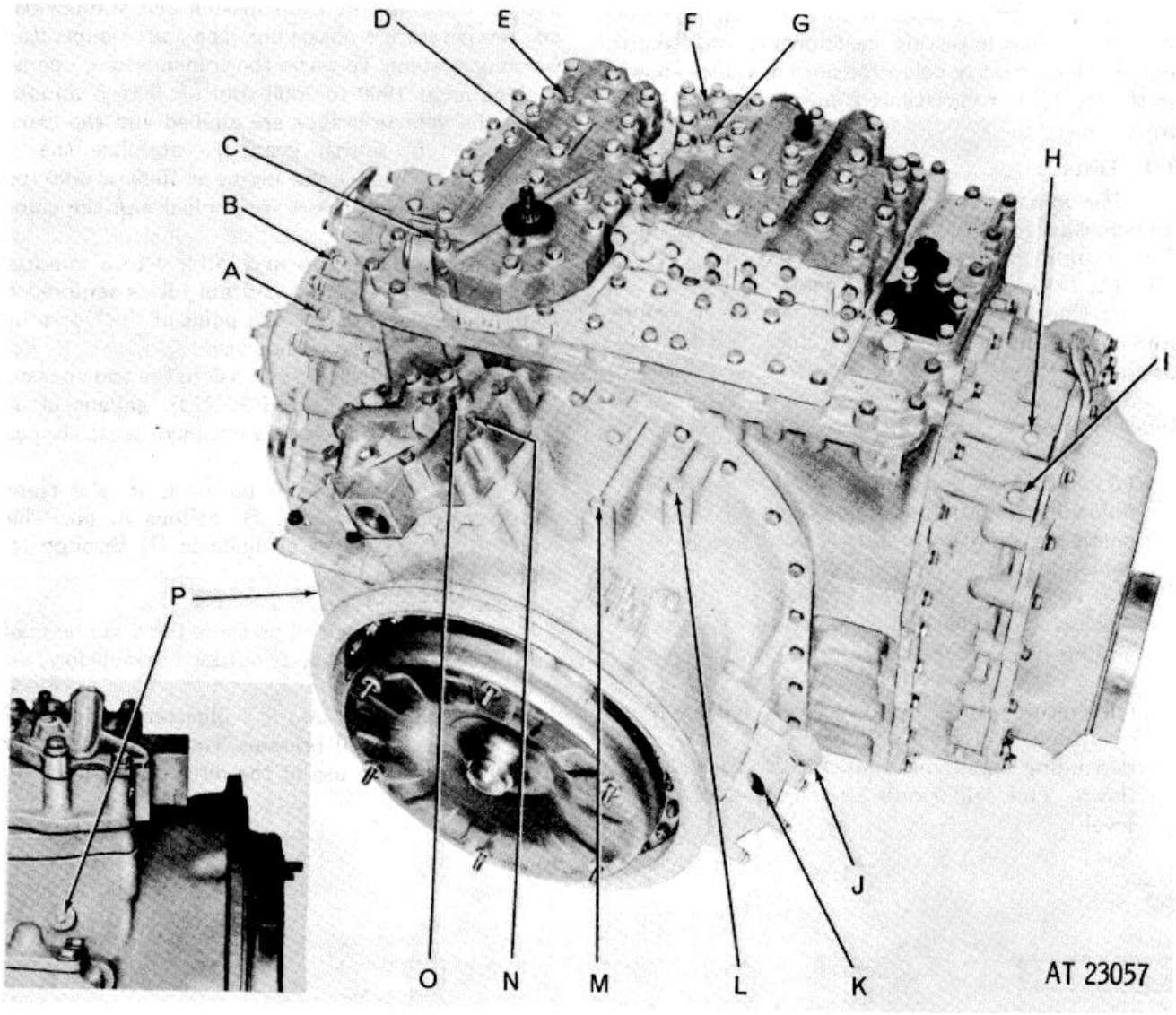
(5) To establish the oil level in the transmission after draining the oil, add 10 U.S. gallons of oil. Then adjust the oil level as outlined in (1) through
(4), above.

(6) To establish the oil level in the transmission sump, add 14 U.S. gallons of oil. Then adjust the oil level as outlined in (1) through (4), above.

c. Oil Pressure Tests.

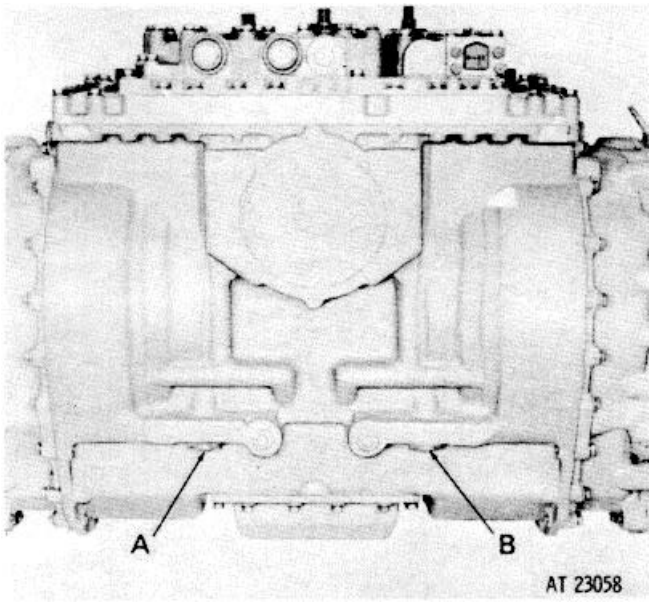
(1) All necessary oil pressure tests can be made during the functional tests outlined in d, below, and in figure 9-1.

(2) Figures 9-2 and 9-3 illustrate and identify the transmission oil pressure check points. Figure 9-4 illustrates the use of the oil pressure gage kit.



A-Right steer clutch
B-Right output clutch
C-TV
D-Low-range clutch
E-Main
F-Left reverse clutch
G-Right reverse clutch
H-Left output clutch
I- Left steer clutch
J-From oil cooler
K-To oil cooler
I- Intermediate-range clutch
M-High-range clutch
N-Converter-in
O-Lockup clutch
P-Pitot (governor)

Figure.9 2. Transmission oil pressure check points front view.



A-Left brake coolant
B-Right brake coolant

Figure 9-3. Transmission oil pressure check points-rear view.

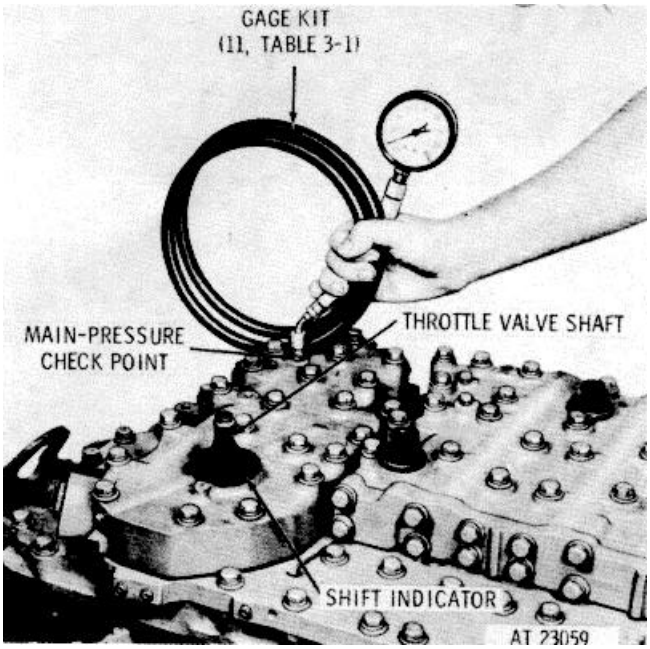


Figure 9-4. Checking transmission main pressure.

d. Functional Tests.

(1) The test data log sheet (fig. 9-1) can be used as a guide for making functional tests, as well as providing spaces to record actual test results. In addition, the normal pressures are included for comparison with test results.

(2) In all tests, the transmision sump temperature should be normal (180° to 2200F). Connect the pressure gage(s) to the check point(s) indicated for the test being made.

(3) Reduce the speed of the transmission input to engine idle speed before engaging the desired range. Then slowly increase speed to the rpm desired. Record the pressure reading for each test.

(4) Do not attempt to remove or install the pressure gage(s) while the transmission is operating. Tightly reinstall the plugs immediately upon removing the gage(s)

(5) When making the tests for steer clutch pressure, move the steer control from center to full steer slowly while observing the pressure rise. Pressure should be maximum at full-steer position.

(6) In test for lockup engagement with unit in third gear, increase speed slowly until lockup apply pressure registers. Record output speed which registers at that time.

(7) In tests for lockup release with unit in third gear, first increase the input speed to above the point where lockup occurs. Observe lockup clutch apply pressure while slowly reducing the speed until lockup pressure drops quickly. When pressure drops quickly, record the output speed.

(8) During all tests observe the left and right transmission output rotation. Rotation should be as outlined in e, below.

e. Rotation of Transmission Outputs.

(1) In all forward and reverse gears the transmission outputs will tend to rotate even at engine idle speeds. A light application of the brake will stop such rotation when the transmission is functioning properly.

(2) In all forward gears, the transmission output should rotate clockwise as viewed from the right side of the transmission when no steer is applied.

(3) In reverse gears, the transmission output should rotate counterclockwise as viewed from the right side of the transmission when no steer is applied.

(4) In first gear, during normal or pivot steer, and in second and third gears during pivot steer, the output at the side toward which the turn is made rotates counterclockwise. The output at the opposite side rotates clockwise. Both rotations are as viewed from the right side of the transmission.

(5) In second, third and fourth gears during normal steer, and in fourth gear during pivot steer, both outputs rotate clockwise (as viewed from the right side of the transmission). The output at the side toward which the turn is made rotates slower than the output on the opposite side.

(6) In reverse gears during normal or pivot steer, the output at the side toward which the turn is made rotates clockwise. The opposite side rotates counterclockwise. Both rotations are as viewed from the right side of the transmission.

f. Converter Stall Test

CAUTION

While conducting a stall tests, do not let oil temperature in the converter-to-cooler circuit exceed 325°F. The high-temperature warning light comes on at this temperature. With the transmission in neutral, run the engine at 1000 to 1500 rpm between tests to cool the oil to normal (1800 to 2200F).

(1) A converter stall test is performed by stalling the transmission output, putting the transmission in fourth gear accelerating the engine to full throttle, and noting the maximum rpm the engine will attain. The speed attained is then compared to normal stall speed 2100 to 2400 rpm). Number 2 diesel fuel should be used in the 6V 53T engine during a stall test.

(2) To conduct converter stall tests in the vehicle, fully apply vehicle brakes. To conduct converter stall tests in the test stand, install the brake stall check tool (29, table 3-1) after removing the brake linkage and brake inspection cover at the right side of the transmission (fig. 9-5). Tighten the stall check tool until Apply on the brake indicator alines with the stationary mark on the transmission top cover.

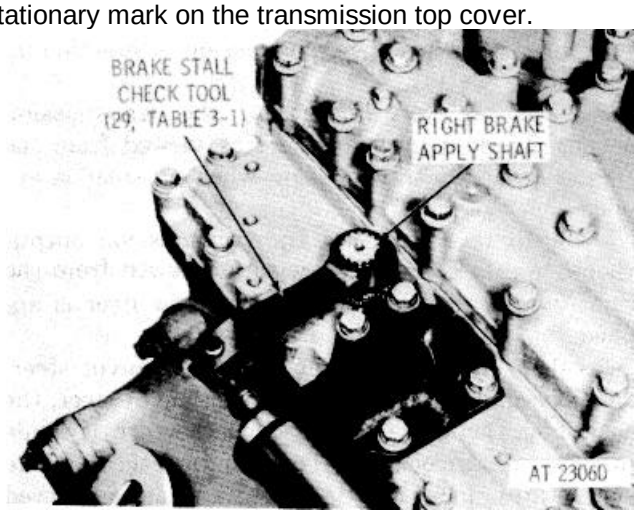


Figure 9-5. Brake stall check tool installed on transmission.

NOTE

The transmission brakes must be properly adjusted when using stall check tool (29, table 3-1). Refer to paragraph 9-5a, below.

(3) A low engine speed (under 2100 rpm) may indicate that that the engine is not delivering full power. Refer to TM 9-2815-205-34 for engine instructions. If high (above 2400 rpm) or low (below 2100 rpm) engine speed is noted, refer to troubleshooting, chapter 4.

9-5. Adjustments

a. Brakes

(2) Remove the linkage from the left and right brake apply shafts, leaving the shaft splines exposed at the top of the transmission. Remove the left and right brake inspection covers immediately forward of the brake separately. Install adapter (1, table 3-1) on a short 1/2-inch drive socket wrench extension. Use a torque wrench and apply 100 pound feet rotating force (clockwise on left side, counterclockwise on right side of transmissions to the brake apply shaft (fig. 9-6).

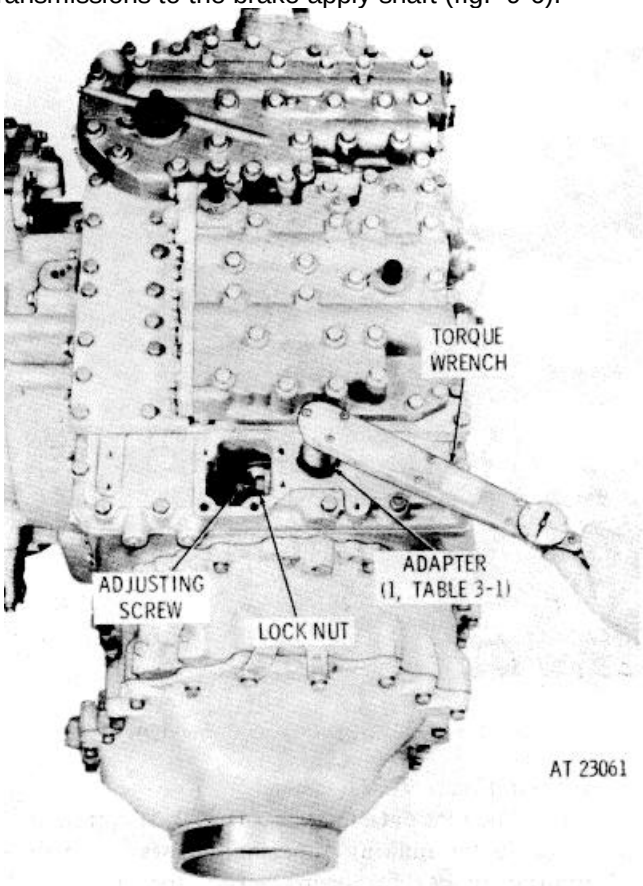


Figure 9-6. Checking rotation of brake apply shaft during adjustment of brake.

(2) With torque applied, note the position of the brake indicator. If the stationary mark on the power train is between Off and Apply, on the brake indicator, the brake adjustment must be loosened. If it is at Apply, or between Apply and Adjust, the adjustment is satisfactory. If the mark is at Adjust or beyond, the brakes must be tightened.

(3) To adjust the brakes, loosen the brake adjusting screw lock nut and rotate the adjusting screw (fig. 9-6). Clockwise rotation (viewed from the front of the transmission) of either the left or right adjusting screw will shorten the brake apply shaft travel. This tightens the brake adjustment. Counterclockwise rotation will lengthen the brake apply shaft travel (loosen the brakes). The brakes are properly adjusted when 100 pound feet of torque on the brake apply shaft will cause the stationary mark on the transmission to aline with the Apply mark on the indicator.

(4) When both brakes are adjusted, tighten the lock nuts and replace the gaskets, inspection covers, washers and bolts. Replace the linkage if the transmission is in a vehicle. Refer to TM 9-2350-230-35/1 for linkage information.

b. Shift Control Linkage.

(1) The linkage connecting the selector shaft with the operator's control should be adjusted carefully. When the detent in the selector valve body assembly is seated, the transmission is in the gear to which the shift indicator points (fig. 9-4). The operator's control must be in a corresponding position.

(2) To adjust the linkage, disconnect it at one point. Place the selector valve in neutral (N). Place the operator's control in neutral. Adjust the linkage so that it can be connected without moving either the selector valve or operator's control, and connect linkage. Shift the operator's control through all gears. noting that the selector detent in the valve body seats in each position. Readjust if required, until the detent seats at each gear position. Secure the linkage.

c. Steer Control Linkage.

(1) Proper adjustment of the steer control linkage will insure that the operator's steer control will have full and equal travel left and right.

(2) The steer valve body has an internal detent which seats only in the central (no steer) position. The operator's control wheel (or T bar) must be in the central, or no steer, position. Adjust the linkage so that it can be connected with the control and valve in the no steer position. Check to see that full and equal travel for left and right steer can be obtained.

d. Throttle Valve Linkage.

(1) To obtain maximum performance and fuel economy, the throttle valve linkage must be properly adjusted. The throttle valve lever on the transmission rotates 17°20' from closed-throttle position to full-throttle position. A positive stop, located inside the selector valve body assembly, indicates full-throttle position. Rotating the throttle valve shaft (fig. 9-4) counterclockwise will seat the valve lever against the full-throttle stop.

(2) Disconnect the throttle valve linkage, and rotate the throttle valve shaft (at the transmission) to full-throttle position. Hold it in this position and move the vehicle throttle to full-throttle position. Adjust the linkage so that it will connect while both shaft and control are at full-throttle position.

(3) Check the throttle to be sure:

(a) That engine full throttle is available.

(b) That the control will return to closed throttle position.

APPENDIX A

REFERENCES

A-1. Publication Indexes

The following indexes should be consulted frequently for latest changes or revisions of references given in this appendix and for new publications relating to material covered in this manual.

DA Pam 310-4 ..... Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders
DA Pam 310-7 ..... Index of Modification Work Orders

A-2. Publication References

TM 9-214 ..... Inspection, Care, and Maintenance of Antifriction Bearings
TM 9-237 ..... Operator's Manual: Welding Theory and Application
TM 9-247 ..... Materials Used for Cleaning
TM 38-750 ..... The Army Maintenance Management System (TAMMS)
TM 38-750-1 ..... The Army Maintenance Management System (TAMMS) Field Command Procedures
TM 9-2350-230-20-1 ..... Organizational Maintenance Manual, Hull, Suspension, and Miscellaneous Components of Hull for AR/AAV M551 and M551A1
TM 9-2815-205-34..... Direct, General Support Maintenance Manual: Engine Diesel, 6V53 and 6V53T
TB 9-289..... Depot Reconditioning of Engine and Transmission Reusable Metal Containers
TB 9-2300-386-50 ..... General Paint Standards for Overhaul of Military Vehicles

APPENDIX B

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

1. Scope

This manual lists spares and repair parts; special tools; special test, measurement; and diagnostic equipment (TMDE); and other special support equipment required for performance of organizational, direct support, and general support maintenance of the XTG 250-1A transmission. It authorizes the requisitioning and issue of spares and repair parts as indicated by the source and maintenance codes.

2. General

This Repair Parts and Special Tools List is divided into the following sections:

a. Section II. Repair Parts List. A list of spares and repair parts authorized for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in numeric sequence, with the parts in each group listed in foldout and item number sequence.

b. Section III. Special Tools List. A list of special tools, special TMDE, and other special support equipment authorized for the performance of maintenance.

c Section IV. National Stock Number and Part Number Index. A list, in National item identification number (NIIN) sequence, of all National stock numbers (NSN) appearing in the listings, followed by a list in alphameric sequence of all part numbers appearing in the listings. National stock numbers and part numbers are cross-referenced to each illustration foldout and item number appearance. This index is followed by a cross-reference list of reference designators to foldout and item numbers.

3. Explanation of Columns

a. Illustration. This column is divided as follows:

(1) Foldout number. Indicates the foldout number of the illustration on which the item is shown.

(2) Item number. The number used to identify item called out in the illustration.

b. Source, Maintenance, and Recoverability (SMR) Codes.

(1) *Source code*. Source codes indicate the manner of acquiring support items for maintenance, repair, or overhaul of end items. Source codes are entered in the first and second positions of the Uniform SMR Code format as follows:

Code *Definition*

PA--Item procured and stocked for anticipated or known usage.

PB-Item procured and stocked for insurance purpose because essentiality dictates that a minimum quantity be available in the supply system.

PC-Item procured and stocked and which otherwise would be coded PA except that it is deteriorative in nature.

PD-Support item, excluding support equipment, procured for initial issue or outfitting and stocked only for subsequent or additional initial issues or outfittings. Not subject to automatic replenishment.

PE-Support equipment procured and stocked for initial issue or outfitting to specified maintenance repair activities.

PF-Support equipment which will not be stocked but which will be centrally procured on demand.

PG-Item procured and stocked to provide for sustained support for the life of the equipment. It is applied to an item peculiar to the equipment which, because of probable discontinuance or shutdown of production facilities, would prove uneconomical to reproduce at a later time.

KD-An item of a depot overhaul repair kit and not purchased separately. Depot kit defined as a kit that provides items required at the time of overhaul or repair.

KF-An item of a maintenance kit and not purchased separately. Maintenance kit defined as a kit that provides an item that can be replaced at organizational or intermediate levels of maintenance.

KB--Item included in both a depot overhaul/repair kit and maintenance kit.

Code *Definition*

MO-Item to be manufactured or fabricated at organizational level.

MF--Item to be manufactured or fabricated at the direct support maintenance level.

MH-Item to be manufactured or fabricated at the general support maintenance level.

N1D--Item to be manufactured or fabricated at the depot maintenance level.

AO- Item to be assembled at organizational level.

AF--Item to be assembled at direct support maintenance level.

AH-Item to be assembled at general support maintenance level.

AD--Item to be assembled at depot maintenance level.

XA-Item is not procured or stocked because the requirements for the item will result in the replacment of the next higher assembly.

XB-Item is not procured or stocked. If not available through salvage, requisition.

XC-Installation drawing, diagram instruction sheet, field service drawing, that is identified by manufacturer's part number.

XD-A support item that is not stocked. When required. item will be procured through normal supply channels.

NOTE

Cannibalization or salvage may be used as a source of supply for any items coded above except those coded XA and aircraft support items as restricted by AR 700-42

(2) *Maintenance code.* Maintenance codes are assigned to indicate the levels of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the Uniform SMR Code format as follows:

(a) The maintenance code entered in the third position will indicate the lowest maintenance level authorized to remove, replace, and use the support item. The maintenance code entered in the third position will indicate one of the following levels of maintenance:

Code *Application/Explanation*

C-Crew or operator maintenance performed within organizational maintenance.

O-Support item is removed, replaced, used at the organizational level.

F-Support item is removed, replaced, used at the direct support level.

H-Support item is removed, replaced, used at the general support level.

D-Support items that are removed, replaced, used at depot, mobile depot, or specialized repair activity only.

(b) The maintenance code entered in the fourth position indicates whether the item is to be repaired and identifies the lowest maintenance level with the capability to perform complete repair (i.e., all authorized maintenance functions). This position will contain one of the following maintenance codes:

Code *Application/Explanation*

O-The lowest maintenance level capable of complete repair of the support item is the organizational level.

F-The lowest maintenance level capable of complete repair of the support item is the direct support level.

H-The lowest maintenance level capable of complete repair of the support item is the general support level.

D-The lowest maintenance level capable of complete repair of the support item is the depot level.

L-Repair restricted to (enter applicable designated specialized repair activity) Specialized Repair Activity.

Z-Nonreparable. No repair is authorized.

B-No repair is authorized. The item may be reconditioned by adjusting, lubricating, etc., at the user level. No parts or special tools are procured for the maintenance of this item.

(3) Recoverability code. Recoverability codes are assigned to support items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the Uniform SMR Code format as follows:

Recoverability

Codes *Definition*

Z-Nonreparable item. When unserviceable, condemn and dispose at the level indicated in position 3.

O-Reparable item. When uneconomically reparable, condemn and dispose at organizational level.

F-Reparable item. When uneconomically reparable, condemn and dispose at the direct support level.

H-Reparable item. When uneconomically reparable, condemn and dispose at the general support level.

D-Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal not authorized below depot level.

L-Reparable item. Repair, condemnation. and disposal not authorized below depot specialized repair activity level.

A-Item requires special handling or condemnation procedures because of specific reasons (i.e, precious metal content, high dollar value, critical material or hazardous material). Refer to appropriate manuals, directives for special instructions.

c. National Stock Number. Indicates the National stock number assigned to the item and which will be used for requisitioning.

d. Part Number. Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity) which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

NOTE

When a stock numbered item is requisitioned, the item received may have a different part number than the part being replaced.

e. Federal Supply Code for Manufacturer (FSCM). The FSCM is a 5-digit numeric code listed in SB 708-42 which is used to identify the manufacturer, distributor, or Government agency, etc.

f. Description. Indicates the Federal item name and, if required, a minimum description to identify the item. Items that are included in kits and sets are listed below the name of the kit or set with the quantity of each item in the kit or set indicated in the quantity incorporated in unit column. When the part to be used differs between serial numbers of the same model, the effective serial numbers are shown as the last line of the description.

g. Unit of Measure (U/M). Indicates the standard of the basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr, etc). When the unit of measure differs from the unit of issue, the lowest unit issue that will satisfy the required units of measure will be requisitioned.

h. Quantity Incorporated in Unit. Indicates the quantity of the item used in the breakout shown on the illustration foldout, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that no specific quantity is applicable (e.g., shims, spacerss, etc).

4. Special Information

a. Usable on codes are shown in the description column. Uncoded items are applicable to all models.

b. Repair parts kits and gasket sets (enter) either "appear as the last entries in the repair parts listing for the foldout in which its parts are listed as repair parts" or "are listed at the end of the repair parts listing for the last foldout containing parts of the kit").

5. How to Locate Repair Parts

a. When National Stock Number or Part Number is Unknown:

(1*) First.* Using the table of contents, determine the functional group or subgroup within which the item belongs. This is necessary since illustrations are prepared for functional groups or subgroups, and listings are divided into the same groups.

(2) *Second*. Find the illustration covering the functional group or subgroup to which the item belongs.

(3) *Third*. Identify the item on the illustration and note the illustration foldout and item number of the item.

(4) *Fourth.* Using the repair parts listing, find the foldout and item number noted on the illustration.

b. When National Stock Number or Part Number is Known:

(1) *First*. Using the index of National stock numbers and part numbers, find the pertinent National stock number or part number. This index is in NIIN sequence followed by a list of part numbers in alphameric sequence, cross-referenced to the illustration foldout number and item number.

(2) *Second.* After finding the foldout and item number, locate the foldout and item number in the repair parts list.

6. Abbreviations

Abbreviations	Explanation
Qty	Quantity
Std	Standard
Ask	Assembly
Thk	Thick
Hd	Head
Hex	Hexagon
Inc	Included

(1) ILLUSTRATION (a) FIG NO.	(b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 07-TRANSMISSIONS		
						NOTE		
						Refer to TM		
						9-2350-230-24P/1 for		
						listing of transmission		
						assembly, attaching, and		
						associated parts and their		
						issue allowances.		
						END ITEMS		
		PAFDL	2520-00-909-2441	5703120		TRANSMISSION, W/CONTAINER, shipping and storage, composed of:	EA	1
Fig. 1-1		TFFDL	8145-00-999-3897	8356450	19207	1 CONTAINER, shipping and storage	EA	1
		XAFDL	2520-00-999-3904	8356100	19207	1 TRANSMISSION, hydraulic, Allison Model XTG 250-1A	EA	1
						GROUP 0708-TORQUE CONVERTER		
3	1	PAHZZ	2520-00-045-3216	5703126	19207	KIT, spacers, converter stack control, composed of:	EA	1
3	2	KBHZZ		6758201	73342	6 SPACER, 0.027 to 0.029 thk	EA	1
3	2	KBHZZ		6758202	73342	6 SPACER, 0.045 to 0.047 thk		
3	2	KHBZZ		6758203	73342	6 SPACER, 0.063 to 0.065 thk		
3	2	KBHZZ		6758204	73342	6 SPACER, 0.081 to 0.083 thk		
2		KBHZZ		6758205	73342	6 SPACER, 0.099 to 0.101 thk		
3	3	KBHZZ		6770019	73342	6 RETAINER		
3	4	PAHZZ	5310-00-088-0553	MS21044N5	96906	NUT, SELF-LOCKING HEXAGON, torque converter pump cover	EA	24
3	5	PAHZZ	2520-00-758-7214	6777077	73342	COVER ASSEMBLY, CONVERTER PUMP	EA	1
3	6	XAHZZ		6777080	73342	COVER		
3	7	PAHZZ	3120-00-679-7068	7710319	19207	BEARING SLEEVE, torque converter cover hub	EA	1
3	8	PAHZZ	2520-00-015-6596	6770822	73342	RETAINER, CONVERTER, lockup clutch piston seal	EA	1
3	9	PAHZZ	5330-00-821-4490	10885411	19207	PACKING, PREFORMED, converter lockup clutch piston	EA	1
3	10	PAHZZ	2520-00-679-6974	8348300	19207	SEAL RING, lockup clutch piston outer	EA	1
3	11	PAHZZ	2520-00-945-8416	8356940	19207	PISTON ASSEMBLY, lockup clutch	EA	1
3	12	PAHZZ	5365-00-679-7070	10863066	19207	RING, RETAINING, lockup clutch piston	EA	1
3	13	PAHZZ	2520-00-890-7491	6833906	73342	DISK, lockup clutch	EA	1
3	14	PAHZZ	5330-00-631-8125	7710023	19207	WASHER, NONMETALLIC, converter lockup clutch back plate	EA	1
3	15	PAHZZ	2520-00-679-6972	10863056	19207	PLATE, lockup clutch back	EA	1
3	16	PAHZZ	5365-00-905-4445	8356270	19207	RING, RETAINING, torque converter turbine	EA	1
3	17	PAHZZ	2520-00-910-3713	8356571	19207	TURBINE ASSEMBLY, torque converter	EA	1
3	18	PAHZZ	5365-00-282-7017	7709185	19207	RING, RETAINING, stator thrust washer	EA	1
3	19	PAHZZ	2520-00-910-3710	8356441	19207	STATOR ASSY, TORQUE CONVERTER	EA	1
3	20	PAHZZ	2520-00-974-7396	8355841	19207	WASHER, STATOR THRUST	EA	1
3	21	PAHZZ	3120-00-841-0271	8351718	19207	WASHER, THRUST, stator freewheel roller cam	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0708-TORQUE CONVERTER-Continued		
3	22	PAHZZ	2520-00-974-7397	8355840	19207	WASHER, THRUST, stator, bearing race	EA	1
3	23	PAHZZ	2520-00-736-0280	8351473	19207	BEARING ASSY, stator thrust	EA	1
3	24	PAHZZ	2520-00-910-3712	8356541	19207	RACE ASSY, freewheel roller torque converter stator	EA	1
3	25	PAHZZ	2520-00-736-0271	8351366	19207	SPRING, torque converter stator freewheel roller	EA	12
3	26	PAHZZ	3110-00-770-7842	7707842	19207	ROLLER, BEARING, torque converter stator freewheel	EA	12
3	27	PAHZZ	2520-00-736-0268	8351725	19207	CAM, torque converter stator freewheel roller	EA	1
3	28	PAHZZ	3120-00-841-0271	8351718	19207	WASHER, THRUST, stator freewheel roller cam	EA	1
3	29	PAHZZ	2520-00-733-4742	8351717	19207	WASHER, torque converter stator cam roller	EA	1
3	30	PAHZZ	5365-00-282-7017	7709185	19207	RING, RETAINING, internal stator cam washer	EA	1
3	31	PAHZZ	5306-00-905-4461	9409021	24617	BOLT, SELF-LOCKING, torque converter pump bearing retainer	EA	8
3	32	PAHZZ	5340-00-905-4443	8356553	19207	LOCKING PLATE, NUT AND BOLT, torque converter pump bearing retainer	EA	4
3	33	PAHZZ	2520-00-842-6645	8356386	19207	RETAINER	EA	2
3	34	PAHZZ	5365-00-905-4448	8356312	19207	RING, RETAINING, stator freewheel roller race	EA	1
3	35	PAHZZ	2520-00-842-5642	8356387	19207	SPACER	EA	1
3	41	PAHZZ	5330-00-787-8724	10875301	19207	RING, SEAL, torque converter output shaft	EA	1
3	43	PAHZZ	2520-00-910-3714	8356583	19207	SLEEVE ASSY, TORQUE CONVERTER	EA	1
3	44	PAHZZ	2520-00-842-5638	8356359	19207	INSERT	EA	1
3	45	XAHZZ		8356415	19207	SLEEVE		
3	46	PAHZZ	5315-00-014-1234	141234	24617	PIN	EA	3
3	47	PAHZZ	2520-00-340-3334	10910271	19207	PITOT ASSEMBLY, TRANSMISSION	EA	1
3	51	PAHZZ	2520-00-157-1813	8356718	19207	HOUSING ASSY, TORQUE CONVERTER	EA	1
3	52	PAHZZ	4730-00-018-9566	444687	24617	PLUG	EA	1
3	53	PAHZZ	2520-00-842-5556	8356702-1	19207	INSERT	EA	1
3	54	PAHZZ	5315-00-828-5486	MS35671-16	96906	PIN	EA	2
3	55	PAHZZ	5315-00-828-5486	MS35671-16	96906	PIN	EA	7
3	56	PAHZZ	2520-00-842-5591	8356704-1	19207	INSERT, std size	EA	V
3	57	PAHZZ	5315-00-828-5486	MS35671-16	96906	PIN	EA	14
3	58	PAHZZ	2520-00-842-5556	8356702-1	19207	INSERT	EA	V
3	59	PAHZZ	5315-00-044-3769	443769	24617	PIN, DOWEL	EA	2
3	60	XAHZZ		8356725	19207	HOUSING		
3	61	PAHZZ	2520-00-842-5556	8356702-1	19207	INSERT, std size	EA	V
3	62	PAHZZ	5315-00-828-5486	MS35671-16	96906	PIN	EA	4
3	63	PAHZZ	4730-00-044-4688	444688	24617	PLUG, PIPE	EA	2
3	64	PAHZZ	6315-00-828-5486	MS35671-16	96906	PIN	EA	12
3	65	PAHZZ	2520-00-842-5556	8356702-1	19207	INSERT, std size	EA	*
3	66	PAHZZ	2520-00-891-7863	8356101	19207	PLUG	EA	1
3	67	PAHZZ	4730-00-913-9770	9423065	24617	PLUG	EA	2
3	68	PAHZZ	5340-00-937-7828	MS35914-117	96906	INSERT	EA	1
3	69	PAHZZ	2520-00-167-9183	8357244	19207	GUIDE	EA	1
3	70	PAHZZ	5360-00-316-7564	8348018	19207	SPRING	EA	1
3	71	PBHZZ	2520-00-893-3403	8347958	19207	VALVE	EA	1
3	72	PAHZZ	2520-00-849-3465	8356536	19207	SEAT	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0708-TORQUE CONVERTER-Continued		
3	73	PAHZZ	5340-00-912-5629	8356271	19207	LOCKING PLATE, NUT, AND BOLT, pitot tube	EA	1
3	74	PAHZZ	2520-00-944-6753	9415677	24617	SCREW, MACHINE, pitot tube	EA	2
3	75	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, torque converter housing	EA	1
3	76	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, torque converter housing	EA	1
3	77	PAHZZ	5305-00-269-3221	MS90725-71	96906	SCREW, CAP, HEXAGON HEAD torque converter housing	EA	1
3	78	PAHZZ	5305-00-269-3219	MS90725-69	96906	SCREW, CAP, HEXAGON HEAD torque converter housing	EA	2
3	79	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, torque converter housing	EA	2
3	80	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, torque converter housing	EA	2
3	81	PAHZZ	2520-00-910-3711	8356521	19207	SEAL RING, NONMETALLIC, Teflon converter ground sleeve	EA	1
3	82	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, torque converter ground sleeve	EA	5
3	83	PAHZZ	5306-00-292-4595	940937	24617	BOLT, SELF-LOCKING, torque converter ground sleeve	EA	5
3	84	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, torque converter housing	EA	23
3	86	PAFZZ	5310-00-637-9541	MS35338-46	906906	WASHER, LOCK, torque converter housing	EA	23
3	86	PAHZZ	2520-00-944-6759	9423632	24617	SCREW, CAP, HEXAGON HEAD torque converter housing	EA	23
t								
3	88	PAHZZ	5330-00-904-8109	8356419	19207	GASKET, torque converter pump	EA	1
3	89	PAHZZ	5330-00-939-7120	8356810	19207	PACKING, PREFORMED, converter housing diaphragm	EA	1
3	90	PAHZZ	2520-00-840-4652	8356377	19207	DIAPHRAGM	EA	1
3	91	PAHZZ	5365-00-905-4444	8356336	19207	RING, RETAINING, converter housing diaphragm	EA	1
3	92	PAHZZ	5330-00-0904-8110	8356599	19207	SEAL, PLAIN, ENCASED, input oil pump drive gear	EA	1
3	93	PAHZZ	2520-00-910-3715	8356589	19207	PUMP ASSEMBLY, TORQUE CONVERTER	EA	1
3	94	PAHZZ	5305-00-937-7918	9422880	24617	SCREW	EA	V
3	95	PAHZZ	5306-00-679-8109	7710675	19207	BOLT, MACHINE, torque converter pump	EA	24
3	96	PAHZZ	2520-00-839-6629	6777201	73342	WEIGHT	EA	V
3	96	PAHZZ	2590-00-839-6628	6777202	73342	WEIGHT	EA	V
3	96	PAHZZ	2520-00-839-6627	6777203	73342	WEIGHT	EA	V
3	96	PAHZZ	2520-00-839-6626	6777205	73342	WEIGHT ASSY	EA	V
3	97	XAHZZ		8356602	19207	TORQUE CONVERTER PUMP		
3	98	PAHZZ	5330-00-631-8125	7710032	19207	WASHER, NONMETALLIC, converter pump cover	EA	1
3	99	PAHZZ	3110-00-951-2424	10947301	19207	BEARING, BALL, torque converter pump	EA	1
						GROUP 0710-TRANSMISSION ASSEMBLY		
3	36	PAHZZ	3110-00-541-9785	10947300	19207	BEARING, BALL, ANNULAR, torque converter output shaft	EA	1
3	37	PAHZZ	2520-00-915-6513	8356792	19207	SHAFT ASSEMBLY CONVERTER, STEEL		
3	38	PAHZZ	4340-00-898-6445	8356794	19207	PLUG	EA	1
3	39	XAHZZ		8356793	19207	SHAFT	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0710-TRANSMISSION ASSEMBLY-Continued		
3	40	PAHZZ	2520-00-911-3623	8356523	19207	SEAL RING, NONMETALLIC, Teflon torque converter output shaft	EA	2
3	48	PAOZZ	5305-00-253-5615	MS21318-21	96906	SCREW	EA	4
3	49	PAOZZ	9905-00-801-7800	7767270	19207	PLATE, NAME	EA	1
3	50	PAHZZ	5330-00-902-7571	8356403	19207	GASKET, torque converter housing	EA	1
3	87	PAHZZ	3020-00-905-7551	8356397	19207	GEAR, SPUR, input oil pump drive	EA	1
4	15	PAHZZ	5365-00-913-7991	8356307	19207	RING, RETAINING, high-range clutch piston return spring retainer	EA	1
4	16	PAHZZ	5365-00-913-7992	8356308	19207	RING, RETAINING, high-range clutch back plate	EA	1
4	17	PAHZZ	5365-00-913-7993	8356313	19207	RING, RETAINING, intermediate-range planetary carrier bearing	EA	1
4	18	PAHZZ	3110-00-592-9967	3L13L1A	43334	BEARING, BALL, ANNULAR, intermediate-range clutch planetary carrier	EA	1
4	19	PAHZZ	3020-00-914-6037	8356343	19207	GEAR, CLUSTER, SPUR, intermediate- and low-range sun	EA	1
4	20	PAHZZ	3120-00-913-8711	8356337	19207	WASHER. THRUST, intermediate- and low-range sun gear	EA	1
4	21	PAHZZ	5365-00-913-7990	8356266	19207	RING, RETAINING, intermediate-and low-range sun gear thrust washer	EA	1
4	29	PAHZZ	2520-00-915-6515	8356781	19207	GEAR ASSY, CLUTCH, intermediate-range (ring)	EA	1
4	30	PAHZZ	2520-00-911-7626	8356143	19207	CARRIER ASSEMBLY, TRANSMISSION, intermediate-range clutch planetary	EA	1
4	31	PAHZZ	2520-00-911-3580	5703115	19207	PARTS KIT, TRANSMISSION PLANETARY CARRIER ASSEMBLY, pinion, intermediate-range (field service item to service carrier assy Ord No. 8356143, NSN 2520-00-911-7626) composed of:	EA	V
4	31.1	KFHZZ		8356427	19207	4 WASHER, TRUST		
4	31.2	KFHZZ		8356155	19207	4 SPACER		
4	31.3	KFHZZ		8356423	19207	1 PINION SET, matched w/four pinions		
4	31.4	KFHZZ		8356155	19207	4 SPACER		
4	31.5	KFHZZ		8356427	19207	4 WASHER, THRUST		
4	31.6	KFHZZ		8356268	19207	96 ROLLER		
4	31.7	KFHZZ		442935	24617	4 PIN, GROOVED, HEADLESS		
4	31.8	KFHZZ		8356144	19207	4 SPINDLE		
4	32	XAHZZ		8356147	19207	CARRIER		
4	43	PAHZZ	5365-00-913-7992	8356308	19207	RING, RETAINING, low-range clutch ring gear	EA	1
4	44	PAHZZ	3020-00-905-7550	8356347	19207	GEAR, SPUR, low-range clutch	EA	1
4	50	PAHZZ	2520-00-911-7644	8356135	19207	CARRIER ASSEMBLY, TRANSMISSION, low-range clutch planetary	EA	1
4	51	PAHZZ	2520-00-911-3581	5703116	19207	PARTS KIT, TRANSMISSION, PLANETARY CARRIER ASSEMBLY, pinion, low-range (field service item to service carrier assy Ord No. 8356135, NSN 2520-00-911-7644) composed of:	EA	1
4	51.1	KFHZZ		8356136	19207	4 SPINDLE		
4	51.2	KFHZZ		8356311	19207	4 WASHER, THRUST		
4	51.3	KFHZZ		8356156	19207	4 SPACER		
4	51.4	KFHZZ		7376454	19207	112 ROLLER		

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0710-TRANSMISSION ASSEMBLY-Continued		
4	51.5	KFHZZ		8356424	19207	1 PINION SET, matched w/four pinions		
4	51.6	KFHZZ		8356156	19207	4 SPACER		
4	51.7	KFHZZ		8356311	19207	4 WASHER, THRUST		
4	51.8	KFHZZ		442935	24617	4 PIN, GROOVED, HEADLESS		
4	52	XAHZZ				CARRIER		
5	1	PAHZZ	2520-00-915-6565	8356804	19207	RETAINER ASSY, BEARING, cross EA 1 shaft, right		
5	2	XAHZZ		8356801	19207	RETAINER		
5	3	PAHZZ	5315-00-914-0981	110409	24617	PIN, straight, headless	EA	2
5	4	PAHZZ	3120-00-939-7121	8356800	19207	BEARING SLEEVE, cross-shaft bearing retainer, right	EA	2
5	5	PAHZZ	5306-00-512-2048	9409029	24617	BOLT, SELF-LOCKING, cross-shaft bearing retainer, right	EA	13
5	6	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, cross-shaft bearing retainer, right	EA	13
5	7	PAHZZ	5365-00-911-3583	5703122	19207	SHIM SET, cross-shaft bearing retainer, composed of:	EA	V
5	7	KFHZZ		8356537-1	19207	1 SHIM		
5	7	KFHZZ		8356537-2	19207	1 SHIM 0.0105 to 0.0135 thk		
5	7	KFHZZ		8356537-3	19207	1 SHIM 0.014 to 0.0170 thk		
5	8	PAHZZ	2520-00-839-6635	8356713	19207	HOUSING ASSY, without PTO	EA	1
5	8	PAHZZ		8356058	19207	HOUSING, with PTO	EA	1
5	9	XAHZZ		8356720	19207	HOUSING		
5	10	PAHZZ	2520-00-891-7863	8356101	19207	PLUG	EA	1
5	11	PAHZZ	4730-00-288-8555	MS490059	90906	PLUG	EA	2
5	12	PAHZZ	4130-00-959-2329	MS49005-7	96906	PLUG	EA	2
5	13	PAHZZ	5315-00-014-1260	141260	24617	PIN	EA	4
5	14	XAHZZ		8356963	19207	PIN	EA	2
5	15	PAHZZ	5315-00-014-2134	141234	21450	PIN	EA	1
5	16	PAHZZ	2520-00-839-6634	8356547	19207	TUBE	EA	1
5	17	PAHZZ	5315-00-014-1234	141234	21450	PIN	EA	1
5	18	PAHZZ	5315-00-014-1238	141238	24617	PIN	EA	2
5	19	PAHZZ	5365-00-911-3583	5703122	19207	SHIM SET, cross-shaft bearing retainer, composed of:	EA	V
5	19	KFHZZ		8356537-1	19207	1 SHIM 0.008 to 0.0100 thk		
5	19	KFHZZ		8356537-2	19207	1 SHIM 0.0105 to 0.0135 thk		
5	19	KFHZZ		8356537-3	19207	1 SHIM 0.014 to 0.0170 thk		
5	20	PAHZZ	2520-00-915-6534	8356803	19207	RETAINER ASSY, BEARING, cross-shaft, left	EA	1
5	21	XAHZZ		8356802	19207	RETAINER		
5	22	PAHZZ	3120-00-939-7121	8356800	19207	BEARING, SLEEVE, cross-shaft bearing retainer, left	EA	1
5	23	PAHZZ	5315-00-914-0981	110409	24617	PIN, straight, headless, cross-shaft bearing retainer sleeve, left	EA	1
5	24	PAHZZ	5306-00-512-2048	9409029	19207	BOLT, SELF-LOCKING, cross-shaft bearing retainer, left	EA	13
5	25	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, cross-shaft bearing retainer, left	EA	13
5	26	PAHZZ	2520-00-839-6630	8356531	19207	SCREEN	EA	1
5	27	PAHZZ	4730-00-964-1781	MS49005-11	96906	PLUG	EA	1
5	28	PAHZZ	5365-00-911-3642	5703121	19207	SHIM SET, bevel pinion carrier composed of:	EA	V
5	28	PAHZZ	5365-00-782-1311	8356572-1	19207	1 SHIM 0.008 to 0.010 thk		
5	28	KFHZZ		8356572-2	19207	1 SHIM 0.0105 to 0.0135 thk		
5	28	KFHZZ		8356572-3	19207	1 SHIM 0.013 to 0.017 thk		
5	29	PAHZZ	2520-00-937-7832	8356795	19207	PILOT	EA	1
5	30	PAHZZ	5305-00-988-3784	MS35191-289	96906	SCREW, MACHINE, bevel gear pinion carrier shim	EA	2

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0710-TRANSMISSION ASSEMBLY-Continued		
5	31	PAHZZ	2520-00-782-1309	8356806	19207	CARRIER ASSY	EA	1
5	32	XAHZZ		8356402	19207	CARRIER		
5	33	PAHZZ	5340-00-898-6448	8351769	19207	PLUG	EA	1
5	34	PAHZZ	5306-00-940-9012	8350586	19207	BOLT, SELF-LOCKING, bevel gear carrier pilot	EA	4
5	5	PAHZZ	3110-00-100-5963	10947303	19207	BEARING ASSY, ROLLER, bevel pinion carrier	EA	1
5	36	PAHZZ	3110-00-100-5483	8356605	19207	BEARING ASSY, ROLLER, bevel drive gear	EA	1
5	37	PAHZZ	5365-00-911-3642	5703121	19207	SHIM SET, bevel pinion carrier EA V composed of:		
5	37	PAHZZ	5365-00-782-1311	8356572-1	19207	1 SHIM 0.008 to 0.010 thk		
5	37	KFHZZ		8356572-2	19207	1 SHIM 0.0105 to 0.0135 thk		
5	37	KFHZZ		8356572-3	19207	1 SHIM 0.013 to 0.017 thk		
5	38	PAHZZ	2520-00-842-5653	8356510	19207	SUPPORT	EA	1
5	39	PAHZZ	5306-00-616-2015	7748616	19207	BOLT, SELF-LOCKING, pinion bearing support	EA	8
5	40	PAHZZ	3110-00-100-5480	8356606	19207	BEARING ASSY, ROLLER, cross-shaft, right	EA	1
5	41	PAHZZ	2520-00-122-4711	11649907	19207	GEAR AND SHAFT ASSY, MATCHED SET	EA	1
5	42	XAHZZ		8356375	19207	GEAR		
5	43	XAHZZ		8356381	19207	GEAR AND SHAFT ASSY		
5	44	XAHZZ		8356379	19207	GEAR		
5	45	PAHZZ	2520-00-842-5527	8356323	19207	SPACER	EA	1
5	46	PAHZZ	3110-00-947-7080	10947307	19207	BEARING ASSY, ROLLER, cross-shaft, left	EA	1
5	47	PAHZZ	5310-00-999-0590	8356353	19207	NUT, cross-shaft	EA	1
6	9	PAHZZ	2520-00-842-5629	8356426	19207	RETAINER ASSY	EA	1
6	10	XAHZZ		8356414	19207	RETAINER		
6	11	PAHZZ	5315-00-088-5260	MS16562-163	96906	PIN	EA	1
6	12	PAHZZ	5315-00-058-6152	536152	21450	PIN	EA	11
6	13	PAHZZ	2520-00-849-3460	8356388	19207	VALVE	EA	1
6	14	PAHZZ	5315-00-937-7684	454736	24617	PIN	EA	1
6	15	PAHZZ	5310-00-905-5025	8356700	19207	WASHER, FLAT, steer coolant check valve retainer bolt. left	EA	4
6	16	PAHZZ	2520-00-944-6812	9409014	24617	BOLT, SELF-LOCKING, steer coolant check valve retainer, left	EA	4
6	18	PAHZZ	5365-00-914-0978	8356352	19207	RING, RETAINING, reverse-range clutch hub, left	EA	1
6	20	PAHZZ	2520-00-911-3622	8356529	19207	SEAL RING, NONMETALLIC, Teflon reverse-range carrier, left	EA	1
6	21	PAHZZ	2520-00-911-3622	8356529	19207	SEAL RING, NONMETALLIC, Teflon revere-range carrier, left	EA	1
6	22	PAHZZ	5365-00-913-7993	8356313	19207	RING, RETAINING, reverse-range carrier bearing, left	EA	1
6	23	PAHZZ	2520-00-911-7645	8356142	19207	CARRIER ASSEMBLY TRANS MISSION, reverse-range clutch planetary, left	EA	1
6	24	XAHZZ		8356149	19207	CARRIER		
6	25	PAHZZ	5315-00-014-1147	141147	24617	PIN	EA	6
6	26	PAHZZ	2520-00-911-3579	5703117	19207	PARTS KIT, TRANSMISSION, PLANETARY CARRIER ASSEMBLY, pinion, reverse-range (field service item to service carrier assy Ord No. 8356142, NSN 2520-911-7645), composed of:	EA	V
6	26 1	KFHZZ		6758828	73342	6 WASHER, THRUST		
6	26.2	KFHZZ		8357330	19207	6 SPACER		

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0710-TRANSMISSION ASSEMBLY-Continued		
6	26.3	KFHZZ		8356425	19207	1 PINION SET		
6	26.4	KFHZZ		8356350	19207	150 ROLLER		
6	26.5	KFHZZ		8357330	19207	6 SPACER		
6	26.6	KFHZZ		6758828	73342	6 WASHER, THRUST		
6	26.7	KFHZZ		8356141	19207	6 SPINDLE		
6	26.8	KFHZZ		442934	24617	HEADLESS, grooved pin	EA	1
6	27	PAHZZ	5365-00-914-0978	8356352	19207	RING, RETAINING, reverse-range clutch hub, left	EA	1
6	28	PAHZZ	3110-00-592-9677	3L13L1A	43334	BEARING, BALL, ANNULAR reverse-range planetary carrier, left	EA	1
6	29	PAHZZ	5365-00-913-7993	8356313	19207	RING, RETAINING, reverse-range carrier bearing, left	EA	1
6	30	PAHZZ	2520-00-840-4640	8356360	19207	SPACER	EA	1
6	31	PAHZZ	5365-00-281-6452	7708225	19207	RING, RETAINING, reverse-range sun gear, left	EA	1
6	36	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, left brake apply stationary cam	EA	16
6	37	PAHZZ	5306-00-616-2015	7748616	19207	BOLT, SELF-LOCKING, left brake apply stationary cam	EA	16
6	40	PAHZZ	2520-00-919-6404	8356588	19207	SCREW, BRAKE ADJUSTING, left	EA	1
6	41	PAHZZ	5310-00-851-2677	MS35691-49	96906	NUT, HEXAGON, brake adjusting left	EA	1
6	42	PAHZZ	2520-00-939-7086	8356785	19207	CAM, ROTATING, TRANS-MISSION, brake apply, left	EA	1
6	43	PAHZZ	3110-00-841-1505	147499	21450	BALL, BEARING, brake apply rotating cam, left	EA	1
6	44	PAHZZ	2520-00-839-6616	8356579	19207	PLATE	EA	1
6	45	PAHZZ	2520-00-910-9650	8356385	19207	HUB, BRAKE, left	EA	1
6	46	PAHZZ	5365-00-914-0977	8356341	19207	RING, RETAINING, steer planetary ring gear, left	EA	1
6	47	PAHZZ	2520-00-911-3618	8356272	19207	GEAR ASSY, SUN, TRANS-MISSION, reverse-range clutch, left	EA	1
6	48	PAHZZ	3120-00-913-9777	8356354	19207	WASHER, THRUST, reverse-range clutch sun gear, left	EA	1
6	49	PAHZZ	3020-00-914-4702	8356322	19207	GEAR, INTERNAL, steer planetary ring, left	EA	1
6	50	PAHZZ	3110-00-554-5826	10947304	19207	BEARING, BALL, output shaft, left	EA	1
6	51	PAHZZ	2520-00-945-8586	8356954	19207	SHAFT ASSEMBLY, OUTPUT, TRANSMISSION, left	EA	1
6	52	PAHZZ	2520-00-839-6619	8356956	19207	EXTENSION	EA	1
6	53	PAHZZ	5365-00-914-0980	8356265	19207	RING, RETAINING, output shaft, left	EA	1
6	54	XHAZZ		8356955	19207	SHAFT		
6	55	PAHZZ	2520-00-939-7083	8356796	19207	CARRIER ASSEMBLY, TRANS- MISSION, steer planetary, left	EA	1
6	56	PAHZZ	2520-00-840-4655	8356339	19207	COLLECTOR	EA	1
6	57	PAHZZ	5306-00-225-9086	MS90726-31	96906	BOLT	EA	6
6	58	XAHZZ		8356797	19207	CARRIER		
6	59	PAHZZ	2520-00-840-4676	8356562	19207	BAFFLE	EA	1
6	60	PAHZZ	2520-00-911-3582	5703118	19207	PARTS KIT, TRANSMISSION, PLANETARY CARRIER ASSY, pinion steer (field service item to service carrier). composed of'	EA	V
6	60.1	KFHZZ		6758828	73342	6 WASHER, THRUST		
6	60.2	KFHZZ		8357330	19207	6 SPACER		
6	60.3	KFHZZ		8356425	19207	1 PINION SET. matched w/six pinions		

(1) ILLUSTRATION (a) FIG NO.	(b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0710-TRANSMISSION ASSEMBLY-Continued		
6	60.4	KFHZZ		8356350	19207	150 ROLLER		
6	60.5	KFHZZ		8357330	19207	6 SPACER		
6	60.6	KFHZZ		6758828	73342	6 WASHER, THRUST		
6	60.7	KFHZZ		442934	24617	6 PIN, GROOVED, HEADLESS		
6	60.8	KFHZZ		8356145	19207	6 SPINDLE		
6	61	KFHZZ	5365-00-914-0978	8356352	19207	RING, RETAINING, steer planetary carrier, left	EA	1
7	9	PAHZZ	5306-00-839-9088	8675777	19207	BOLT, SELF-LOCKING, brake and steer clutch reaction plate, left	EA	8
7	10	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, brake and steer clutch reaction plate. left	EA	8
7	11	PAHZZ	2520-00-840-9598	8356220	19207	PLATE	EA	1
7	15	PAHZZ	5315-00-914-0982	8356263	19207	PIN, GROOVED, HEADLESS, brake and steer clutch return spring, left	EA	12
7	18	XAHZZ		8356971	19207	CLUTCH ASSY, OUTPUT		
7	19	PAHZZ	2520-00-911-3613	8356527	19207	HOUSING ASSY, CLUTCH, output left	EA	1
7	20	PAHZZ	3110-00-144-8571	10910987	19207	BEARING, BALL, ANNULAR output clutch housing, left	EA	1
7	21	PAHZZ	5365-00-737-4496	7374496	19207	RING, RETAINING, output clutch housing bearing, left	EA	1
7	22	PAHZZ	5315-00-905-4457	8356295	19207	PIN, STRAIGHT, HEADLESS, output clutch anchor, left	EA	8
7	23	PAHZZ	5315-00-930-4132	8356965	19207	PIN, STRAIGHT, HEADLESS output clutch piston return spring guide, left	EA	16
7	24	PAHZZ	5360-00-904-9591	8356281	19207	SPRING, HELICAL, COMPRES-SION output clutch piston return, left	EA	8
7	25	PAHZZ	2520-00-910-3734	8356363	19207	HUB, OUTPUT CLUTCH, left	EA	1
7	26	PAHZZ	2520-00-930-4082	8356969	19207	DISK, CLUTCH, output, left	EA	7
7	27	PAHZZ	2520-00-930-4081	8356970	19207	DISK, CLUTCH, output, left	EA	7
7	28	PAHZZ	2520-00-930-4079	8356511-	19207	PISTON, OUTPUT CLUTCH, left	EA	1
7	29	PAHZZ	2805-00-910-3728	8351893-7	19207	SPRING EXPANDER, PISTON RING, output clutch, left, outer	EA	1
7	31	PAHZZ	2520-00-911-3620	8356535	19207	SEAL RING METAL, output clutch piston, left, inner	EA	1
7	32	PAHZZ	5330-00-905-9823	8356526	19207	PACKING, PREFORMED, output clutch piston housing, left	EA	1
7	33	PAHZZ	2520-00-911-3617	8356287	19207	HOUSING ASSEMBLY, PISTON, TRANSMISSION, output clutch, left	EA	1
7	34	PAHZZ	5365-00-913-7992	8356308	19207	RING, RETAINING, output clutch piston housing, left	EA	1
7	40	XAHZZ		11649947	19207	SEAL RING, METALLIC, output clutch sleeve, left	EA	2
7	41	PAHZZ	2520-00-842-5597	8356924	19207	SLEEVE ASSY	EA	1
7	42	PAHZZ	2520-00-840-4710	8356501	19207	INSERT	EA	1
7	43	XAHZZ		8356925	19207	SLEEVE		
7	44	PAHZZ	2520-00-911-3621	8356532	19207	SEAL RING, NONMETALLIC, Teflon output clutch spacer, left	EA	2
7	45	PAHZZ	2520-00-840-4656	8356325	19207	SPACER	EA	1
7	46	PAHZZ	5330-00-920-7565	8356732	19207	GASKET, output housing, left	EA	1
7	47	PAHZZ	2520-00-839-6622	8356719	19207	HOUSING ASSY	EA	1
7	48	PAHZZ	2520-00-840-4675	8356561	19207	GUIDE	EA	1
7	49	PAHZZ	5360-00-891-7841	8356558	19207	SPRING	EA	1
7	50	PAHZZ	4820-00-849-3462	8356292	19207	VALVE	EA	1
7	51	PAHZZ	2520-00-840-4664	8356291	19207	SEAT	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0710-TRANSMISSION ASSEMBLY-Continued		
7	52	PAHZZ	5315-00-828-5486	MS35671-16	96906	PIN	EA	8
7	53	PAHZZ	2520-00-842-5556	8356702-1	19207	INSERT, std size	EA	V
7	54	PAHZZ	5315-00-894-4237	MS16562-165	96906	PIN	EA	1
7	55	XAHZZ		8356722	19207	HOUSING		
7	56	PAHZZ	2520-00-839-0618	8356703-1	19207	INSERT, std size	EA	V
7	57	PAHZZ	5315-00-828-5486	MS35671-16	96906	PIN	EA	21
7	58	PAHZZ	5315-00-014-1260	141260	24617	PIN	EA	1
7	59	PAHZZ	4730-00-288-8555	MS49005-	96906	PLUG	EA	2
7	60	PAFZZ	4730-00-913-9770	9423065	24617	PLUG, PIPE, output housing, left	EA	3
7	61	PAOZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, output clutch sleeve, left	EA	5
7	62	PAHZZ	5306-00-655-6847	9409040	18876	BOLT, SELF-LOCKING, output clutch sleeve, left	EA	5
7	63	PAHZZ	3110-00-915-5612	10947302	19207	BEARING ASSY, ROLLER, output transfer drive gear, left	EA	1
7	64	PAHZZ	2520-00-944-6813	8356812	19207	GEAR, SPUR, output transfer drive, left	EA	1
7	65	PAHZZ	5315-00-786-6197	45532	24617	PIN	EA	1
7	66	PAHZZ	2520-00-915-6527	8356808	19207	PLATE, LOCKING, SHAFT, output transfer drive gear, left	EA	1
7	67	PAHZZ	2520-00-915-6581	8356811	19207	TAB, LOCK, SHAFT BOLT, output transfer drive gear, left	EA	1
7	68	PAHZZ	5305-00-940-8069	MS90727-197	96906	BOLT, LOCKING, SHAFT, output transfer drive gear, left	EA	1
7	69	PAHZZ	3110-00-915-5612	10947302	19207	BEARING ASSY, ROLLER, output transfer drive gear, left	EA	1
7	70	PAHZZ	5330-00-920-7566	8356734	19207	GASKET, end cover, left	EA	1
7	71	PAHZZ	2520-00-911-7629	8356714	19207	BRACKET, LIFTING TRANS-MISSION, left	EA	1
7	72	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, lifting bracket, left	EA	2
7	73	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, lifting bracket left	EA	2
7	74	PAHZZ	5305-00-269-6218	MS90725-8	96906	SCREW, CAP, HEXAGON HEAD, lifting bracket, left	EA	2
7	75	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, end cover, left	EA	17
7	76	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, end cover	EA	17
7	77	PAHZZ	5305-00-269-3217	MS90725-67	96906	SCREW, CAP, HEXAGON HEAD, end cover, left	EA	17
	78	PAHZZ	5330-00-913-9771	8356365	19207	SEAL, PLAIN, ENCASED, end cover, left	EA	1
7	79	PAHZZ	2520-00-839-6624	8356739	19207	COVER ASSY	EA	1
7	80	PAHZZ	2520-00-840-4696	8356578	19207	SLEEVE		
7	81	XAHZZ		8356724	19207	COVER		
7	82	XAHZZ		8357268	19207	INSERT, end cover	EA	1
7	83	PAHZZ	2520-00-842-5556	8356702-1	19207	INSERT, std size	EA	V
7	84	PAHZZ	5315-00-828-5486	MS35671-16	96906	PIN	EA	2
7	85	PAHZZ	3110-00-915-5612	10947302	19207	BEARING ASSY, ROLLER, output transfer drive gear, left	EA	1
7	86	PAHZZ	2520-00-919-6459	8356124	19207	PLATE, SPACER, GEAR, output transfer gear roller bearing retaining, left	EA	1
7	87	PAHZZ	5310-00-919-6470	8356707	19207	WASHER, TAB LOCK, output transfer gear roller bearing retainer bolt, left	EA	1
7	88	PAHZZ	5305-00-577-5462	MS35295-60	96906	BOLT, machine output transfer gear roller bearing retaining washer, left	EA	1
7	89	PAHZZ	2520-00-910-9648	8356533	19207	GEAR ASSEMBLY, TRANSFER, driven output, left	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0710-TRANSMISSION ASSEMBLY-Continued		
7	90	XAHZZ		8356507	19207	GEAR		
7	91	PAHZZ	2520-00-840-9454	6756403	73342	PLUG	EA	1
7	92	PAHZZ	5305-00-269-3211	MS90725-60	96906	BOLT, MACHINE, output transfer gear roller bearing retaining washer, left		
7	93	PAHZZ	5310-00-919-6470	8356707	19207	WASHER, TAB LOCK, output transfer gear roller bearing retainer bolt, left	EA	1
7	94	PAHZZ	2520-00-919-6459	8356124	19207	PLATE, SPACER, GEAR, output transfer gear roller bearing retaining, left	EA	1
7	95	PAHZZ	3110-00-915-5612	10947302	19207	BEARING ASSY, ROLLER,. Output transfer drive gear, left	EA	1
7	96	PAHZZ	5310-00-906-4462	8356699	19207	WASHER, FLAT, end cover, left	EA	2
7	97	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, end cover, left	EA	2
7	98	PAHZZ	5305-00-269-3217	MS90725-67	96906	SCREW, CAP, HEXAGON HEAD, end cover, left	EA	2
7	99	PAHZZ	5305-00-269-3215	MS90725-65	96906	SCREW, CAP, HEXAGON HEAD output housing, left	EA	24
7	100	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, output housing, left	EA	24
7	101	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, output housing left	EA	24
8	1	PAHZZ	5306-00-225-8502	MS90725-38	19207	BOLT, MACHINE, speedometer drive cover	EA	4
8	2	PAFZZ	5310-00-407-9566	MS35338-45	96906	WASHER, LOCK, speedometer drive cover	EA	4
8	3	PAHZZ	5310-00-905-5025	8356700	19207	WASHER FLAT, speedometer drive cover	EA	4
8	4	PAHZZ	2520-00-842-5651	8356508	19207	COVER	EA	1
8	5	PAHZZ	5330-00-920-7584	8356556	19207	GASKET, speedometer drive cover	EA	1
8	7	PAHZZ	5305-00-269-3218	MS90725-68	96906	SCREW, CAP, HEXAGON HEAD, transmission lifting bracket, right	EA	2
8	8	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, transmission lifting bracket, right	EA	2
8	9	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, transmission lifting bracket. right	EA	2
8	10	PAHZZ	2520-00-911-7629	8356714	19207	BRACKET, LIFTING, TRANS-MISSION, right	EA	1
8	11	PAHZZ	5305-00-269-3217	MS90725-67	96906	SCREW, CAP, HEXAGON HEAD, end cover, right	EA	17
8	12	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, end cover, right	EA	17
8	13	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, end cover	EA	17
8	14	PAHZZ	5330-00-920-7566	8356734	19207	GASKET, end cover, right	EA	1
8	15	PAHZZ	3110-00-915-5612	10947302	19207	BEARING ASSY, ROLLER, output transfer drive gear, right	EA	1
8	16	PAHZZ	5305-00-940-8069	MS90727-197	96906	BOLT, LOCKING, SHAFT, output transfer drive gear, right	EA	1
8	17	PAHZZ	2520-00-915-6581	8356811	19207	TAB, LOCK, SHAFT BOLT, output transfer drive gear, right	EA	1
8	18	PAHZZ	2520-00-915-6527	8356808	19207	PLATE, LOCKING, SHAFT, output transfer drive gear, right	EA	1
8	19	PAHZZ	5315-00-786-6197	455532	24617	PIN	EA	1
8	20	PAHZZ	2520-00-944-6813	8356812	19207	GEAR, SPUR, output transfer drive, right	EA	1
8	21	PAHZZ	3110-00-915-5612	10947302	19207	BEARING ASSY, ROLLER, output transfer drive gear, right	EA	1
8	36	PAHZZ	3110-00-915-5612	10947302	19207	BEARING ASSY, ROLLER, output transfer drive gear, right	EA	1
8	37	PAHZZ	2520-00-910-9648	8356533	19207	GEAR ASSEMBLY, TRANSFER, driven output, right	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0710-TRANSMISSION ASSEMBLY-Continued		
8	38	PAHZZ	2520-00-840-9454	6756403	73342	PLUG	EA	1
8	39	XAHZZ		8356507	19207	GEAR		
8	40	PAHZZ	3110-00-915-5612	10947302	19207	BEARING ASSY, ROLLER, output transfer drive gear, right	EA	1
8	41	PAHZZ	5305-00-269-3211	MS90725-60	96906	BOLT, MACHINE, output transfer gear roller bearing retaining washer, right	EA	1
8	42	PAHZZ	5310-00-919-6470	8356707	19207	WASHER, TAB LOCK, output transfer gear roller bearing retaining bolt, right	EA	1
8	43	PAHZZ	2520-00-019-6459	8356124	19207	PLATE, SPACER, GEAR, output transfer gear roller bearing retaining, right	EA	1
8	44	PAHZZ	2520-00-842-5594	8356738	19207	COVER ASSY	EA	1
8	45	KFHZZ		8357268	19207	INSERT, end cover	EA	1
8	46	XAHZZ		8356723	19207	COVER		
8	47	PAHZZ	2520-00-842-5556	8356702-1	19207	INSERT, std size	EA	V
8	48	PAHZZ	5315-00-828-5486	MS35671-16	96906	PIN	EA	2
8	49	PAHZZ	2520-00-842-5639	8356378	19207	SLEEVE	EA	1
8	50	PAHZZ	5315-00-044-3767	443767	24617	PIN	EA	2
8	51	PAHZZ	2520-00-842-5591	8356704-1	19207	INSERT, std size	EA	V
8	52	PAHZZ	5315-00-828-5486	MS35671-16	96906	PIN	EA	4
8	53	PAHZZ	5330-00-913-9771	8356365	19207	SEAL, PLAIN, ENCASED, end cover, right	EA	1
8	54	PAHZZ	5305-00-269-3211	MS90725-60	96906	BOLT, MACHINE, output transfer gear roller bearing retaining washer, right	EA	1
8	56	PAHZZ	5310-00-919-6470	8356707	19207	WASHER, TAB LOCK, output transfer gear roller bearing retaining bolt, right	EA	1
8	56	PAHZZ	2520-00-919-6459	8356124	19207	PLATE, SPACER, GEAR, output transfer gear roller bearing retaining, right	EA	1
8	57	PAHZZ	5306-00-655-6847	9409040	18876	BOLT, SELF-LOCKING, output clutch sleeve, right	EA	3
8	58	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, output clutch sleeve, right	EA	3
8	59	PAHZZ	5305-00-269-3215	MS90725-65	96906	SCREW, CAP, HEXAGON HEAD, output housing, right	EA	24
8	60	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, output housing, right	EA	24
8	61	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, output housing, right	EA	24
8	62	PAHZZ	2520-00-842-5599	8356922	19207	HOUSING ASSY	EA	1
8	63	XAHZZ				HOUSING		
8	64	PAFZZ	4730-00-913-9770	9423065	24617	PLUG, PIPE, output housing, right	EA	3
8	65	PAHZZ	2520-00-944-6378	8356931	19207	PLUG, HEX, HD output housing, right	EA	3
8	66	PAHZZ	2520-00-840-9453	7709211	19207	PLUG	EA	1
8	67	PAHZZ	5315-00-014-1260	141260	24617	PIN		
8	68	PAHZZ	5315-00-828-5486	MS35671-16	96906	PIN	EA	5
8	69	PAHZZ	2520-00-842-5591	8356704-1	19207	INSERT, std size	EA	V
8	71	PAHZZ	2520-00-842-5556	8356702-1	19207	INSERT, std size	EA	V
8	72	PAHZZ	5315-00-828-5486	MS35671-16	96906	PIN	EA	21
8	73	PAHZZ	5315-00-014-1260	141260	24617	PIN	EA	1
8	74	PAHZZ	2520-00-039-6618	8356703-1	19207	INSERT, std size	EA	V
8	75	PAHZZ	5315-00-828-5486	MS35671-16	96906	PIN	EA	8
8	76	PAHZZ	2520-00-840-4664	8356291	19207	SEAT	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0710-TRANSMISSION ASSEMBLY-Continued		
8	77	PAHZZ	4820-00-849-3462	8356292	19207	VALVE	EA	1
8	78	PAHZZ	5360-00-891-7841	8356558	19207	SPRING	EA	1
8	79	PAHZZ	2520-00-840-4675	8356561	19207	GUIDE	EA	1
8	80	PAHZZ	4730-00-278-3380	MS49005-10	96906	PLUG	EA	1
8	81	PAHZZ	5315-00-894-4237	MS16562-165	96906	PIN	EA	1
8	82	PAHZZ	5310-00-905-4462	8355599	19207	WASHER, FLAT, end cover, right	EA	2
8	83	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, end cover, right	EA	2
8	84	PAHZZ	5305-00-269-3217	MS90725-67	96906	SCREW, CAP, HEXAGON HEAD, end cover, right	EA	2
8	85	PAHZZ	5330-00-920-7565	8356732	19207	GASKET, output housing, right	EA	1
8	86	PAHZZ	2520-00-840-4656	8356325	19207	SPACER	EA	1
8	87	PAHZZ	2520-00-911-3621	8356532	19207	SEAL RING, NONMETALLIC, Teflon output clutch spacer, right	EA	2
8	88	PAHZZ	2520-00-842-5597	8356924	19207	SLEEVE ASSY	EA	1
8	89	XAHZZ		8356925	19207	SLEEVE		
8	90	PAHZZ	2520-00-840-4710	8356501	19207	INSERT	EA	1
8	91	XAHZZ		11649987	19207	SEAL RING, METALLIC, output clutch sleeve, right	EA	2
8	97	XAHZZ		8356971	19207	CLUTCH ASSY, OUTPUT		
8	98	PAHZZ	5365-00-913-7992	8356308	19207	RING, RETAINING, output clutch piston housing, right	EA	1
8	99	PAHZZ	2520-00-911-3617	8356287	19207	HOUSING ASSEMBLY, PISTON TRANSMISSION, output clutch, right	EA	1
8	100	PAHZZ	5330-00-905-9823	8356526	19207	PACKING, PREFORMED, output clutch piston housing, right	EA	1
8	101	PAHZZ	2520-00-911-3620	8356535	19207	SEAL RING, METAL, output clutch piston, right, inner	EA	1
8	102	PAHZZ	2520-00-9010-3708	8356062	19207	SEAL RING, NONMETALLIC, Teflon, output clutch piston, right, outer	EA	1
8	103	PAHZZ	2805-00-910-3728	8351893-7	19207	SPRING EXPANDER, PISTON RING, output clutch, right outer	EA	1
8	104	PAHZZ	2520-00-930-4079	8356511-5	19207	PISTON, OUTPUT CLUTCH, right	EA	1
8	105	PAHZZ	2520-00-930-4081	8356970	19207	DISK, CLUTCH, output, right	EA	7
8	106	PAHZZ	2520-00-930-4082	8356969	19207	DISK, CLUTCH, output, right	EA	7
8	107	PAHZZ	2520-00-910-3734	8356363	19207	HUB, OUTPUT CLUTCH, right	EA	1
8	108	PAHZZ	5365-00-737-4496	7374496	19207	RING, RETAINING, output clutch housing bearing, right	EA	1
8	109	PAHZZ	5360-00-904-9591	8356281	19207	SPRING, HELICAL, COMPRESSION, output clutch piston return, right	EA	17
8	110	PAHZZ	5315-00-930-4132	8356965	19207	PIN, STRAIGHT, HEADLESS output clutch piston return spring guide, right	EA	16
8	111	PAHZZ	2530-00-086-6965	10910987	19207	BEARING, BALL, ANNULAR output clutch housing, right	EA	1
8	112	PAHZZ	5315-00-905-4457	8356295	19207	PIN, STRAIGHT, HEADLESS, output clutch anchor, right	EA	8
8	113	PAHZZ	2520-00-911-3613	8356527	19207	HOUSING ASSY, CLUTCH, output, right	EA	1
8	116	PAHZZ	5315-00-914-0982	8356263	19207	PIN, GROOVED, HEADLESS, brake and steer clutch return spring, right	EA	12
8	120	PAHZZ	2520-00-840-9598	8356220	19207	PLATE	EA	1
8	121	PAHZZ	2520-00-840-9623	8356221	19207	PLATE ASSY	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0710-TRANSMISSION ASSEMBLY--Continued		
8	122	XAHZZ		8356288	19207	PLATE		
8	123	PAHZZ	2520-00-840-9614	8356219	19207	PIN	EA	2
8	124	PAHZZ	5315-00-895-3703	8356560	19207	PIN	EA	8
8	125	PAHZZ	5306-00-839-9088	8675777	19207	BOLT, SELF-LOCKING, brake and steer clutch reaction plate right	EA	8
8	126	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, brake and steer clutch reaction plate, right	EA	8
9	1	PAHZZ	5365-00-914-0978	8356352	19207	RING, RETAINING, steer planetary carrier, right	EA	1
9	2	PAHZZ	2520-00-939-7083	8356796	19207	CARRIER ASSEMBLY, TRANS-MISSION steer planetary, right	EA	1
9	3	PAHZZ	2520-00-840-4676	8356562	19207	BAFFLE	EA	1
9	4	XAHZZ		8356797	19207	CARRIER		
9	5	PAHZZ	2520-00-840-4655	8356339	19207	COLLECTOR	EA	1
9	6	PAHZZ	5306-00-225-9086	MS90726-31	96906	BOLT	EA	6
9	7	PAHZZ	2520-00-911-3582	5703118	19207	PARTS KITS, TRANSMISSION, PLANETARY CARRIER ASSEMBLY, pinion steer (field service item to service carrier assy ORD No. 8356796, NSN 2520-00-939-7083), 5703118, composed of:	EA	V
9	7.1	KFHZZ		6758828	73342	6 WASHER, THRUST		
9	7.2	KFHZZ		8357330	19207	6 SPACER		
9	7.3	KFHZZ		8356425	19207	1 PINION SET, matched w/six pinions		
9	7.4	KFHZZ		8356350	19207	150 ROLLER		
9	7.5	KFHZZ		8357330	19207	6 SPACER		
9	7.6	KFHZZ		6758828	73342	6 WASHER, THRUST		
9	7.7	KFHZZ		442934	24617	6 PIN, GROOVED, HEADLESS		
9	7.8	KFHZZ		8356145	19207	6 SPINDLE		
9	8	PAHZZ	2520-00-945-8586	8356954	19207	SHAFT ASSEMBLY, OUTPUT, TRANSMISSION, right	EA	1
9	9	XAHZZ		8356955	19207	SHAFT		
9	10	PAHZZ	5365-00-914-0980	8356265	19207	RING, RETAINING, OUTPUT shaft, right	EA	1
9	11	PAHZZ	2520-00-839-6619	8356956	19207	EXTENSION	EA	1
9	12	PAHZZ	3110-00-0554-5826	10947304	19207	BEARING, BALL, ANNULAR, output shaft, right	EA	1
9	13	PAHZZ	3020-00-914-4702	8356322	19207	GEAR, INTERNAL, steer planetary ring, right	EA	1
9	14	PAHZZ	3120-00-913-9777	8356354	19207	WASHER, THRUST, reverse-angle clutch sun gear, right	EA	1
9	15	PAHZZ	2520-00-911-3618	8356272	19207	GEAR ASSY, SUN, TRANS-MISSION, reverse-range clutch, right	EA	1
9	16	PAHZZ	5365-00-914-0977	8356341	19207	RING, RETAINING, steer planetary ring gear, right	EA	1
9	17	PAHZZ	2520-00-910-9650	8356385	19207	HUB, BRAKE, right	EA	1
9	18	PAHZZ	2520-00-839-6616	8356579	19207	PLATE	EA	1
9	19	PAHZZ	2520-00-939-7085	8356786	19207	CAM, ROTATING TRANSMISSION, brake apply, right	EA	1
9	20	PAHZZ	5310-00-851-2677	MS35691-49	96906	NUT, HEXAGON, brake adjusting right	EA	1
9	21	PAHZZ	2520-00-919-6404	8356588	19207	SCREW, BRAKE ADJUSTING, right	EA	1
9	22	PAHZZ	3110-00-841-1505	147499	73342	BALL, BEARING, brake apply rotating cam, right	EA	12
9	25	PAHZZ	5306-00-616-2015	7748616	19207	BOLT, SELF-LOCKING, right brake apply stationary cam	EA	16

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0710-TRANSMISSION ASSEMBLY-Continued		
9	26	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, right brake apply stationary cam	EA	16
9	27	PAHZZ	2520-00-939-7087	8356784	19207	CAM	EA	1
9	31	PAHZZ	5365-00-281-6452	7708225	19207	RING, RETAINING, reverse-range sun gear, right	EA	1
9	32	PAHZZ	2520-00-840-4640	8356360	19207	SPACER	EA	1
9	33	PAHZZ	5365-00-913-7993	8356313	19207	RING, RETAINING, reverse-range	EA	1
9	34	PAHZZ	3110-00-592-9967	3L13L1A	43334	BEARING, BALL, ANNULAR, reverse-range planetary carrier, right	EA	1
9	35	PAHZZ	5365-00-914-0978	8356352	19207	RING, RETAINING, reverse-range clutch hub, right	EA	1
9	36	PAHZZ	2520-00-911-7645	8356142	19207	CARRIER ASSEMBLY, TRANS-MISSION reverse-range clutch planetary, right	EA	1
9	37	PAHZZ	5315-00-014-1147	141147	24617	PIN	EA	6
9	38	XAHZZ		8356149	19207	CARRIER		
9	39	PAHZZ	2520-(-911-3579	5703117	19207	PARTS KIT, TRANSMISSION, PLANETARY CARRIER ASSEMBLY, pinion, reverse-range (field service item to service carrier assy Ord No. 8356142, NSN 2520-00-911-7645), 5703117,) composed of:	EA	V
9	39.1	KFHZZ		8356141	19207	6 SPINDLE		
9	39.2	KFHZZ		6758828	73342	6 WASHER, THRUST		
9	39.3	KFHZZ		8357330	19207	6 SPACER		
9	39.4	KFHZZ		8356425	19207	1 PINION SET, matched w/six pinions		
9	39.5	KFHZZ		8356350	19207	150 ROLLER		
9	39.6	KFHZZ		8357330	19207	6 SPACER		
9	39.7	KFHZZ		6758828	73342	6 WASHER, THRUST		
9	39.8	KFHZZ		442934	24617	6 PIN, GROOVED, HEADLESS		
9	40	PAHZZ	5365-00-913-7993	8356313	19207	RING, RETAINING, reverse-range carrier bearing, right	EA	1
9	41	PAHZZ	2520-00-911-3622	8356529	19207	SEAL, RING, NONMETALLIC, Teflon, reverse-range carrier right	EA	1
9	42	PAHZZ	2520 00-911-3622	8356529	19207	SEAL, RING, NONMETALLIC, Teflon, reverse-range, carrier, right	EA	1
9	44	PAHZZ	5365-00-914-0978	8356352	19207	RING. RETAINING, reverse-range clutch hub, right	EA	1
9	46	PAHZZ	2520-00-944-6812	9409014	24617	BOLT, SELF-LOCKING, steer coolant check valve retainer, right	EA	4
9	47	PAHZZ	5310-00-905-5025	8356700	19207	WASHER, FLAT, steer coolant check valve retainer bolt, right	EA	4
9	48	PAHZZ	2520-00-842-5595	8356758	19207	RETAINER ASSY	EA	1
9	49	PAHZZ	5315-00-058-6152	586152	21450	PIN	EA	11
9	50	XAHZZ		8356759	19207	RETAINER		
9	51	PAHZZ	5315-00-988-5260	MS16562-163	96906	PIN	EA	1
9	52	PAHZZ	5315-00-937-7684	454736	24617	PIN	EA	1
9	53	PAHZZ	2520-00-849-3460	8356388	19207	VALVE	EA	1
11	38	PAHZZ	3110-00-554-5403	10947298	19207	BEARING, BALL, ANNULAR, brake coolant oil pump bevel gear	EA	1
11	39	PAHZZ	5310-00-595-6051	8347950	19207	SHIM, 0.015 thk, brake coolant oil pump bevel, gear bearing	EA	V
11	39	PAHZZ	5365-00-595-6052	8347948	19207	SHIM, 0.009 thk, brake coolant oil pump bevel gear bearing	EA	V
11	39	PAHZZ	5310-00-316-7666	8347949	19207	SHIM, 0.012 thk, brake coolant oil pump bevel gear bearing	EA	V

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0710-TRANSMISSION ASSEMBLY-Continued		
11	75	PAHZZ	5330-00-920-7572	8356405	19207	GASKET, oil sump cover	EA	1
11	76	PAHZZ	2520-00-842-5665	8356413	19207	COVER	EA	1
11	77	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, oil sump cover	EA	16
11	78	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, oil sump cover	EA	16
11	79	PAHZZ	5305-00-269-3214	MS90725--4	96906	SCREW, CAP, HEXAGON HEAD, oil sump cover	EA	16
11	80	KBHZZ	5330-00-904-0152	8356330	19207	GASKET, oil drain plug	EA	1
11	81	PAOZZ	5365-00-737-6357	7376357	19207	PLUG, MACHINE THREAD, MAGNETIC, oil drain	EA	1
11	82	PAHZZ	5330-00-920-7563	8356630	19207	GASKET, power takeoff cover (use with transmission prior to serial No. 631)	EA	1
11	83	PAHZZ	2520-00-842-5666	8356629	19207	COVER, (use with transmission prior to serial No. 631)	EA	1
11	84	PAOZZ	5305-00-269-4511	MS90725-63	96906	SCREW, CAP, HEXAGON HEAD power takeoff cover (use with transmission prior to serial No. 631)	EA	8
11	85	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, power takeoff cover (use with transmission prior to serial No. 631	EA	8
11	86	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, power takeoff cover (use with transmission prior to serial No. 631)	EA	8
13	1	PAHZZ	5330-00-920-7581	8356513	19207	GASKET, oil transfer plate	EA	1
13	2	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, oil transfer plate	EA	5
13	3	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, oil transfer plate	EA	5
13	4	PAHZZ	5305-00-269-3213	MS90725-62	96906	BOLT, MACHINE, oil transfer plate	EA	5
13	5	PAHZZ	3110-00-679-6979	7710550	19207	BALL, BEARING, nylon	EA	1
13	6	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, oil transfer plate	EA	8
13	7	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, oil transfer plate	EA	8
13	8	PAHZZ	2520-00-944-6809	9422023	24617	BOLT, MACHINE, oil transfer plate	EA	8
13	9	PAHZZ	5305-00-269-3215	MS90725-5	96906	SCREW, CAP, HEXAGON HEAD, oil transfer plate	EA	6
13	10	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, oil transfer plate	EA	6
13	11	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, oil transfer plate	EA	6
13	12	PAHZZ	5305-00-269-3221	MS90725-71	96906	SCREW, CAP, HEXAGON HEAD, oil transfer plate	EA	9
13	13	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, oil transfer plate	EA	9
13	14	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, oil transfer plate	EA	9
13	15	PAHZZ	2520-00-842-5583	8356711	19207	PLATE ASSEMBLY	EA	1
13	16	PAHZZ	4730-00-044-4688	444688	24617	PLUG	EA	1
13	17	PAHZZ	4730-00-933-0652	9423064	24617	PLUG	EA	3
13	18	XAHZZ		8356709	19207	PLATE		
13	20	PAHZZ	4730-00-933-0652	9423064	24617	PLUG	EA	2
13	21	PAHZZ	5365-00-770-7326	7707326	19207	RING, RETAINING, brake apply shaft	EA	2
13	22	PAHZZ	5310-00-919-2900	8356545	19207	WASHER, KEYED, brake apply indicator	EA	1
13	23	PAOZZ	5330-00-909-2442	8356335	19207	GASKET, brake adjustment cover	EA	1
13	24	PAOZZ	2520-00-145-0970	11649951	19207	COVER	EA	1
13	25	PAOZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, brake adjustment cover	EA	5
13	26	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, brake adjustment cover	EA	5
13	27	PAOZZ	5305-00-269-3219	MS90725-69	96906	SCREW, CAP, HEXAGON HEAD, brake adjustment cover	EA	2
13	28	PAOZZ	5305-00-269-4511	MS90725-3	96906	SCREW, CAP, HEXAGON HEAD brake adjustment cover	EA	3

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0710-TRANSMISSION ASSEMBLY-Continued		
13	29	PAHZZ	5365-00-770-7326	7707326	19207	RING, RETAINING, brake apply: shaft	EA	2
13	30	PAHZZ	5310-00-919-2900	8356545	19207	WASHER KEYED, brake apply indicator	EA	1
13	31	PAHZZ	5305-00-269-3217	MS90725-67	96906	SCREW, CAP, HEXAGON HEAD transmission top cover	EA	14
13	32	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, top cover	EA	14
13	33	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, top cover	EA	14
13	34	PAHZZ	5330-00-920-7582	8356514	19207	GASKET, bevel gear housing cover	EA	1
13	36	PAHZZ	2520-00-839-6621	8356598	19207	COVER ASSEMBLY	EA	1
13	37	XAHZZ		8356517	19207	COVER		
13	38	PAHZZ	4730-00-044-4688	444688	24617	PLUG, PIPE	EA	4
13	39	PAOZZ	5330-00-909-2442	8356335	19207	GASKET, brake adjustment cover	EA	1
13	40	PAOZZ	2520-00-145-0970	11649951	19207	COVER	EA	1
13	41	APOZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, brake adjustment cover	EA	5
13	42	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, brake adjustment cover	EA	5
13	43	PAOZZ	5305-00-269-3219	MS90725-69	96906	SCREW, CAP, HEXAGON HEAD, brake adjustment cover	EA	2
13	44	PAOZZ	5305-00-269-4511	MS90725-63	96906	SCREW, CAP, HEXAGON HEAD, brake adjustment cover	EA	1
						GROUP 0713-RANGE CLUTCHES		
3	42	PAHZZ	2520-00-910-3751	8356524	19207	SEAL RING, NONMETALLIC, Teflon torque converter ground sleeve	EA	2
4	1	PAHZZ	2520-00-910-3732	8356438	19207	HOUSING ASSEMBLY, HIGH CLUTCH	EA	1
4	2	XAHZZ		8356401	19207	HOUSING		
4	3	PAHZZ	3110-00-151-9137	145639	24617	BALL	EA	2
4	4	PAHZZ	5315-00-905-4458	8356267	19207	PIN, STRAIGHT, HEADLESS, high. range clutch housing anchor	EA	8
4	5	PAHZZ	2520-00-910-3708	8356062	19207	SEAL RING, NONMETALLIC, Teflon high-range clutch piston, outer	EA	1
4	6	PAHZZ	2805-00-910-3728	8351893-7	19207	SPRING, EXPANDER, PISTON RING high-range clutch, outer	EA	1
4	7	PAHZZ	2520-00-910-3735	8356396	19207	PISTON, CLUTCH, high-range	EA	1
4	8	PAHZZ	2520-00-910-3744	8356534	19207	SEAL RING, METAL, high-range clutch piston, inner	EA	1
4	9	PAHZZ	2520-00-930-4081	8356970	19207	DISK, CLUTCH, high-range	EA	5
4	10	PAHZZ	2520-00-930-4082	8356969	19207	DISK, CLUTCH, high-range	EA	5
4	11	PAHZZ	2520-00-945-8569	8356951	19207	PLATE, BACKING, high-range clutch	EA	1
4	12	PAHZZ	5360-00-904-9589	8356279	19207	SPRING, HELICAL, COMPRESSION, clutch piston return, high-range	EA	16
4	13	PAHZZ	3110-00-067-3849	MS19059-85	96906	BALL BEARING	EA	1
4	14	PAHZZ	2520-00-945-8529	8356950	19207	RETAINER, SPRING, high-range clutch piston	EA	1
4	22	PAHZZ	2520-00-910-3733	8356338	19207	PISTON, CLUTCH, intermediate-range	EA	1
4	23	PAHZZ	2520-00-910-3726	8351893-5	19207	SPRING, expander, piston ring	EA	1
4	24	PAHZZ	2520-00-945-8432	8356943-2	19207	RING, SEAL, Teflon, intermediate-range clutch piston, inner	EA	1
4	25	PAHZZ	2520-00-910-3723	8351893-2	19207	SPRING, EXPANDER, PISTON RING, intermediate-range clutch, outer	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0713-RANGE CLUTCHES-Continued		
4	26	PAHZZ	2520-00-945-8464	8356943-3	19207	RING, SEAL, Teflon, intermediate-range clutch piston, outer	EA	1
4	27	PAHZZ	2520-00-905-4413	8356383	19207	DISK, CLUTCH, intermediate-range	EA	1
4	28	PAHZZ	2520-00-446-2484	8351184	19207	DISK, CLUTCH, intermediate-range	EA	1
4	33	PAHZZ	2520-00-905-4413	8356383	19207	DISK, CLUTCH, intermediate-range	EA	3
4	34	PAHZZ	2520-00-446-2484	8351184	19207	DISK, CLUTCH, intermediate-range	EA	2
4	35	PAHZZ	5315-00-014-1289	141289	24617	PIN	EA	3
4	36	PAHZZ	2520-00-839-6636	8356764	19207	SPACER ASSEMBLY	EA	1
4	37	XAHZZ		8356763	19207	SPACER	EA	1
4	38	PAHZZ	5315-00-910-9636	8356543	19207	PIN	EA	8
4	39	PAHZZ	5360-00-904-9592	8356127	19207	SPRING, HELICAL, COM-PRESSION low- and intermediate-range clutch piston return	EA	12
4	40	PAHZZ	5320-00-939-5681	8356791	19207	RIVET, SOLID, low- and in-termediate-range clutch piston return spring guide	EA	12
4	41	PAHZZ	2520-00-905-4413	8356383	19207	DISK, CLUTCH, low-range	EA	5
4	42	PAHZZ	2520-00-446-2484	8351184	19207	DISK, CLUTCH, low-range	EA	4
4	45	PAHZZ	2520-00-910-3733	8356338	19207	PISTON, CLUTCH, low-range	EA	1
4	46	PAHZZ	2520-00-910-3723	8351893-2	19207	SPRING, EXPANDER, PISTON RING, low-range clutch, outer	EA	1
4	47	PAHZZ	2520 00-945-8464	8356943-3	19207	RING, SEAL, Teflon, low-range clutch piston, outer	EA	1
4	48	PAHZZ	2520-00-910-3726	8351893-6	19007	SPRING, EXPANDER, PISTON RING, low-range clutch, inner	EA	1
4	49	PAHZZ	2520-00-945-8432	8356943-2	19207	RING, SEAL, Teflon, low-range clutch piston, inner	EA	1
6	1	PAHZZ	2520-00-910-3746	8356065	19207	SEAL RING, NONMETALLIC, Teflon reverse-range clutch piston, left, outer	EA	1
6	2	PAHZZ	2520-00-910-3722	8351893-1	19207	SPRING, EXPANDER, PISTON RING, reverse-range clutch, left outer	EA	1
6	3	PAHZZ	2520-00-910-3731	8356410	19207	PISTON, CLUTCH, reverse-range left	EA	1
6	4	PAHZZ	2520-00-910-3724	8351893-3	19207	SPRING, EXPANDER, PISTON RING, reverse-range clutch, left inner	EA	1
6	5	PAHZZ	2520-00-910-3709	8356061	19207	SEAL RING, NONMETALLIC, Teflon, reverse-range clutch piston, left, inner	EA	1
6	6	PAHZZ	2520-00-910-3746	8356065	19207	SEAL RING, NONMETALLIC Teflon, steer coolant check valve retained, left	EA	1
6	7	PAHZZ	2520-00-910-3727	8351893-6	19207	SPRING, EXPANDER, PISTON RING, steer coolant check valve retainer, left	EA	1
6	8	PAHZZ	5315-00-910-9636	8356543	19207	PIN, ANCHOR, reverse-range clutch, left	EA	8
6	17	PAHZZ	5360-00-904-9588	8356128	19207	SPRING, HELICAL, COM-PRESSION, reverse-range clutch piston return, left	EA	12
6	19	PAHZZ	2520-00-910-3730	8356503	19207	HUB, CLUTCH, REVERSE-RANGE, left	EA	1
6	32	PAHZZ	2520-00-939-7084	8356787	19207	DISK, CLUTCH, reaction, reverse-range, left	EA	1
6	33	PAHZZ	2520-00-446-2484	8351184	19207	DISK, CLUTCH, reverse-range left	EA	6
6	34	PAHZZ	2520-00-905-4413	8356383	19207	DISK, CLUTCH, reverse-range, left	EA	6
6	35	PAHZZ	2520-00-923-4235	8356783	19207	CAM, brake apply stationary, left	EA	1
6	38	PAHZZ	2520-00-923-4236	8356893-8	19207	SPRING, expander piston ring	EA	1
6	39	PAHZZ	2520-00-939-7082	8351892-1	19207	SEAL RING, NONMETALLIC, Teflon brake apply stationary, cam, left	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0713-RANGE CLUTCHES-Continued		
7	1	PAHZZ	5365-00-263-3831	MS16633-25	96906	RING, RETAINING, brake and steer clutch return spring pin, left	EA	12
7	2	PAHZZ	2520-00-905-4416	8356126	19207	DISK, CLUTCH, brake apply, left	EA	1
7	3	PAHZZ	2520-00-446-2484	8351184	19207	DISK, left brake	EA	6
7	4	PAHZZ	2520-00-905-4413	8356383	19207	DISK, CLUTCH, left steer	EA	6
7	5	PAHZZ	2520-00-840-9623	8356221	19207	PLATE ASSEMBLY	EA	1
7	6	PAHZZ	5315-00-895-3703	8356560	19207	PIN	EA	8
7	7	XAHZZ		8356288	19207	PLATE		
7	8	PAHZZ	2520-00-840-9614	8356219	19207	PIN	EA	2
7	12	PAHZZ	2520-00-905-4413	8356383	19207	DISK, CLUTCH, left steer	EA	4
7	13	PAHZZ	5360-00-904-9592	8356127	19207	SPRING, HELICAL, COM-PRESSION, brake and steer clutch return, left	EA	12
7	14	PAHZZ	2520-00-446-2484	8351184	19207	DISK, steer clutch, left	EA	4
7	16	PAHZZ	2520-00-905-4416	8356126	19207	DISK, CLUTCH, apply, steer, left	EA	1
7	17	PAHZZ	5365-00-263-3831	MS16633-25	96906	RING, RETAINING, brake and steer clutch return spring pin, left	EA	12
7	30	PAHZZ	2520-00-910-3708	8356062	19207	SEAL RING, NONMETALLIC, Teflon, output clutch piston, left, outer	EA	1
7	35	PAHZZ	2520-00-930-4080	8356964	19207	PISTON, CLUTCH, steer, left	EA	1
7	36	PAHZZ	2520-00-910-3725	8351893-4	19207	SPRING, EXPANDER, PISTON RING, steer clutch, left, inner	EA	1
7	37	PAHZZ	2520-00-945-8427	8356943-1	19207	SEAL RING, NONMETALLIC, Teflon, steer clutch piston, left, inner	EA	1
7	38	PAHZZ	2520-00-861-1435	8351909	19207	SPRING, EXPANDER, PISTON RING, steer clutch, left, outer	EA	1
7	39	PAHZZ	2520-00-945-8360	8356943-4	19207	SEAL RING, NONMETALLIC, Teflon, steer clutch piston, left, outer	EA	1
8	92	PAHZZ	2520-00-945-8360	8356943-4	19207	SEAL RING, NONMETALLIC, Teflon, steer clutch, piston, right, outer	EA	1
8	93	PAHZZ	2520-00-861-1435	8351909	19207	SPRING, EXPANDER, PISTON RING, steer clutch, right, outer	EA	1
8	94	PAHZZ	2520-00-945-8427	8356943-1	19207	SEAL RING, NONMETALLIC, Teflon, steer clutch piston, right, inner	EA	1
8	95	PAHZZ	2520-00-910-3725	8351893-4	19207	SPRING, EXPANDER, PISTON RING, steer clutch, right, inner	EA	1
8	96	PAHZZ	2520-00-930-4080	8356964	19207	PISTON, CLUTCH, steer, right	EA	1
8	114	PAHZZ	5360-00-263-3831	MS16633-25	96906	RING, RETAINING, brake and steer clutch return spring pin, right	EA	12
8	115	PAHZZ	2520-00-905-4416	8356126	19207	DISK, CLUTCH, apply, steer, right	EA	1
8	117	PAHZZ	2520-00-446-2484	8351184	19207	DISK, steer clutch, right	EA	4
8	118	PAHZZ	5360-00-904-9592	8356127	19207	SPRING, HELICAL, COM-PRESSION, brake and steer clutch return, right	EA	12
8	119	PAHZZ	2520-00-905-4413	8356383	19207	DISK, CLUTCH, right steer	EA	4
8	127	PAHZZ	2520-00-905-4413	8356383	19207	DISK, CLUTCH, right steer	EA	6
8	128	PAHZZ	2520-00-446-2484	8351184	19207	DISK, CLUTCH, right brake	EA	6
8	129	PAHZZ	2520-00-905-4416	8356126	19207	DISK, CLUTCH, brake apply right	EA	1
8	130	PAHZZ	5365-00-263-3831	MS16633-25	96906	RING, RETAINING, brake and steer clutch return spring pin, right	EA	12
9	23	PAHZZ	2520-00-939-7082	8351892-1	19207	SEAL RING, NONMETALLIC, Teflon brake apply stationary cam, right (In Kit, NSN 2520808-6791)	EA	1
9	24	PAHZZ	2520-00-923-4236	8351893-8	19207	SPRING. expander,. piston ring	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0713-RANGE CLUTCHES--Continued		
9	28	PAHZZ	2520-00-905-4413	8356383	19207	DISK, CLUTCH, external-tanged reverse-range, right	EA	6
9	29	PAHZZ	2520-00-446-2484	8351184	19207	DISK, CLUTCH, reverse-range, right	EA	6
9	30	PAHZZ	2520-00-939-7084	8356787	19207	DISK, CLUTCH, reaction, reverse-range, right	EA	1
9	43	PAHZZ	2520-00-910-3730	8356503	19207	HUB, CLUTCH, REVERSE-RANGE, right	EA	1
9	45	PAHZZ	5360-00-904-9588	8356128	19207	SPRING, HELICAL, COM-PRESSION, reverse-range clutch piston return, right	EA	12
9	54	PAHZZ	5135-00-910-9636	8356543	19207	PIN, ANCHOR, reverse-range clutch, right	EA	8
9	55	PAHZZ	2520-00-910-3727	8351893-6	19207	SPRING, EXPANDER, PISTON RING, steer coolant check valve retainer, right	EA	1
9	56	PAHZZ	2520-00-910-3746	8356065	19207	SEAL RING, NONMETALLIC, Teflon, steer coolant check valve retainer, right	EA	1
9	57	PAHZZ	2520-00-910-3709	8356061	19207	SEAL RING, NONMETALLIC, Teflon, reverse-range clutch piston, right, inner	EA	1
9	58	PAHZZ	2520-00-910-3724	8351893-3	19207	SPRING, EXPANDER, PISTON RING, reverse-range clutch, right, inner	EA	1
9	59	PAHZZ	2520-00-910-3731	8356410	19207	PISTON, CLUTCH, reverse-range right	EA	1
9	60	PAHZZ	2520-00-910-3722	8351893-1	19207	SPRING, EXPANDER, PISTON RING, reverse-range, clutch, right, outer	EA	1
9	61	PAHZZ	2520-00-910-3746	8356065	19207	SEAL RING, NONMETALLIC, Teflon, reverse-range clutch piston, right outer	EA	1
						GROUP 0714-CONTROL VALVE		
10	14	PAFZZ	5306-00-913-3373	9422029	24617	BOLT, MACHINE, main regulator valve cover	EA	5
10	15	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, main regulator valve cover	EA	5
10	16	PAOZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, main regulator valve cover	EA	5
10	17	PAHZZ	5305-00-269-3226	MS90725-76	96906	SCREW, CAP, HEXAGON HEAD, main regulator valve cover	EA	1
10	18	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, main regulator valve	EA	1
10	19	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT	EA	1
10	20	PAHZZ	4820-01-010-5048	8357219	19207	BODY ASSEMBLY, VALVE, lockup regulator	EA	1
10	21	PAHZZ	2520-00-134-0168	8357220	19207	BODY		
10	22	XAHZZ	2520-00-122-7537	8357019	19207	VALVE		
10	23	PAHZZ	5360-00-933-5257	8357026	19207	SPRING, HELICAL, COMPRESSION lockup regulator valve body	EA	1
10	24	PAHZZ	5310-00-737-5608	7375608	19207	GASKET, lockup regulator plug	EA	1
10	25	PAHZZ	2520-00-933-5236	8357024	19207	PLUG, lockup regulator valve	EA	1
10	26	PAHZZ	5315-00-165-8350	8357222	19207	PIN	EA	1
10	27	PAHZZ	5330-00-893-5452	8357224	19207	PACKING, PREFORMED, lockup regulator valve body	EA	1
10	28	PAHZZ	5360-00-901-1451	8357223	19207	SPRING, HELICAL, COMPRESSION lockup regulator regulator valve body	EA	1
10	29	XAHZZ		8357721	19207	VALVE, lockup regulator	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0714-CONTROL VALVE-Continued		
10	30	PAHZZ	5330-00-933-6238	8357017	19207	GASKET, lockup regulator valve body	EA	1
10	31	PAFZZ	6305-00-269-3226	MS90725-76	96906	BOLT, MACHINE, main-pressure regulator valve body	EA	6
10	32	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, main-pressure regulator valve body	EA	6
10	33	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, main-pressure regulator valve body	EA	6
10	34	PAFZZ	2620-00-933-6239	8357023	19207	BODY ASSEMBLY, VALVE, main-pressure regulator	EA	1
10	35	PAHZZ	5365-00-282-2423	MS16625-3150	96906	RING, RETAINING, main-pressure regulator valve plug	EA	1
10	36	PAHZZ	2520-00-839-6632	8356761	19207	PLUG	EA	1
10	37	PAHZZ	5330-00-933-5136	8357183	19207	PACKING, PREFORMED, main-pressure regulator valve plug	EA	1
10	38	PAHZZ	2520-00-918-6173	8356780	19207	SPRING, HELICAL, COMPRESSION main-pressure regulator valve, primary	EA	1
10	39	PAHZZ	2520-00-918-6172	8356760	19207	SPRING, HELICAL, COMPRESSION main-pressure regulator valve, secondary	EA	1
10	40	XAHZZ		8356751	19207	VALVE ASSY		
10	41	XAHZZ		8357025	19207	BODY		
10	42	PAFZZ	4730-00-349-3672	444612	24617	PLUG, PIPE	EA	2
10	43	XAHZZ		6771169	73342	VALVE		
10	44	PAHZZ	5310-00-579-1979	6768629	73342	WASHER	EA	1
10	45	PAHZZ	5360-00-905-4435	8356277	19207	SPRING, HELICAL, COMPRESSION lockup shift valve	EA	1
10	46	XAHZZ		8351524	19207	VALVE		
10	47	PAHZZ	2520-00-944-6354	8356733	19207	GASKET, main-pressure regulator valve body end cover	EA	1
10	48	PAHZZ	2520-00-839-6631	8356754	19207	COVER ASSY	EA	1
10	49	PAHZZ	2520-00-842-5592	8356306	19207	STOP	EA	1
10	50	XAHZZ		8356755	19207	COVER		
10	51	PAHZZ	5310-00-905-5025	8356700	19207	WASHER, FLAT, main-pressure regulator valve body end cover	EA	8
10	52	PAHZZ	5310-00-407-9566	MS35338-45	96906	WASHER, LOCK, main-pressure regulator valve body end cover	EA	8
10	53	PAHZZ	5305-00-225-9081	MS90725-36	96906	BOLT, MACHINE, main-pressure regulator valve body end cover	EA	8
10	54	PAFZZ	5330-00-933-5237	8357020	19207	GASKET, main pressure regulator valve body	EA	1
10	55	PAFZZ	2520-00-167-9181	8357021	19207	PLATE ASSEMBLY	EA	1
10	56	PAFZZ	2520-00-842-5609	8356952	19207	SEAT	EA	1
10	57	PAFZZ	2520-00-679-6976	6756904	73342	BALL	EA	1
10	58	PAFZZ	5365-00-898-6444	8356953	19207	RING, RETAINING	EA	1
10	59	XAFZZ		8356731	19207	PLATE		
10	60	PAFZZ	4730-00-044-4688	444688	24617	PLUG, PIPE	EA	2
10	61	PAFZZ	5330-00-920-7564	8356730	19207	GASKET, oil transfer plate	EA	1
10	73	PAFZZ	2520-00-919-7257	8356564	19207	BODY ASSEMBLY, VALVE lubrication regulator	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0714-CONTROL VALVE-Continued		
10	74	PAFZZ	5365-00-913-1208	8349689	19207	RING, RETAINING, lubrication regulator valve seat and guide	EA	2
10	75	PAFZZ	2520-00-842-5605	8356305	19207	SEAT	EA	1
10	76	PAFZZ	2520-00-840-9446	8347311	19207	GUIDE	EA	1
10	77	PAFZZ	3110-00-151-9113	147497	24617	BALL, BEARING, cooler bypass valve	EA	1
10	78	PAFZZ	5360-00-316-7508	8347411	19207	SPRING, HELICAL, COMPRESSION lubrication regulator valve	EA	1
10	79	PAFZZ	5340-00-961-2404	8347312	19207	SEAT	EA	1
10	80	PAFZZ	2520-00-840-9434	8348050	19207	VALVE	EA	1
10	81	PAFZZ	5360-00-316-7508	8347411	19207	SPRING, HELICAL, COMPRESSION lubrication regulator valve	EA	1
10	82	PAFZZ	5365-00-913-1208	8349689	19207	RING, RETAINING, lubrication regulator valve seat and guide	EA	1
10	83	PAFZZ	2520-00-849-3469	8349690	19207	SEAT	EA	1
10	84	XAFZZ		8356400	19207	BODY		
10	85	PAFZZ	4730-00-937-9787	9418210	24617	PLUG	EA	1
10	86	PAFZZ	5310-00-905-5025	8356700	19207	WASHER, FLAT, lubrication, regulator valve body	EA	6
10	87	PAFZZ	5310-00-407-9566	MS35338-45	96906	WASHER, LOCK, lubrication regulator valve body	EA	6
10	88	PAFZZ	5306-00-225-8512	MS90725-48	96906	BOLT, MACHINE, lubrication regulator valve body	EA	6
10	89	PAFZZ	5306-00-225-8505	MS90725-41	96906	BOLT. MACHINE, lubrication regulator valve body	EA	1
10	90	PAFZZ	5310-00-407-9566	MS35338-45	96906	WASHER, LOCK, lubrication regulator valve body	EA	1
10	91	PAFZZ	5310-00-905-5025	8356700	19207	WASHER, FLAT, lubrication regulator valve body	EA	1
10	92	PAFZZ	5330-00-919-7251	8356736	19207	GASKET, lubrication regulator valve body	EA	1
12	1	PAFZZ	5306-00-913-3373	9422029	24617	BOLT, MACHINE, main control valve	EA	3
12	2	PAFZZ	5310-00-637-6541	MS35338-46	96906	WASHER, LOCK, main control valve	EA	3
12	3	PAFZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, main control valve	EA	3
12	4	PAFZZ	5305-00-269-3223	MS90725-73	96906	SCREW, CAP, HEXAGON HEAD, main control valve	EA	10
12	5	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, main control valve	EA	19
12	6	PAFZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, main control valve	EA	19
12	7	PAHZZ	2520-00-051-9929	8357238	19207	VALVE ASSEMBLY, CONTROL, main	EA	1
12	8	PAHZZ	2520-00-476-6540	8357241	19207	VALVE ASSY	EA	1
12	9	XAHZZ		8357242	19207	VALVE	EA	1
12	10	XAHZZ		8357243	19207	PLUG	EA	1
12	11	PAHZZ	5330-00-911-3611	8356315	19207	GASKET, main control valve body cover	EA	1
12	12	PAHZZ	2520-00-842-5624	8356372	19207	COVER	EA	1
12	13	PAFZZ	5310-00-905-5025	8356700	19207	WASHER, FLAT, main control valve body cover	EA	4
12	14	PAHZZ	5310-00-407-9566	MS35338-45	96906	WASHER, LOCK, main control valve body cover	EA	4
12	15	PAHZZ	5306-00-225-8500	MS90725-35	96906	BOLT, MACHINE, main control valve body cover	EA	4
12	16	PAHZZ	5365-00-905-5023	6756622	73342	PLUG, MACHINE THREAD, shift inhibitor retaining	EA	1
12	17	PAHZZ	5330-285-3442	142756	73342	GASKET, shift inhibitor retaining plug	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0714-CONTROL VALVE-Continued		
12	18	PAHZZ	2520-00-842-5532	8356316	19207	VALVE	EA	1
12	19	PAHZZ	2520-00-842-5519	8356327	19207	VALVE	EA	1
12	20	PAHZZ	5360-00-905-4436	8356276	19207	SPRING, inhibitor compensator	EA	1
12	21	PAHZZ	2520-00-842-5513	8356328	19207	VALVE	EA	1
12	22	PAHZZ	5340-00-616-5235	MS16633-43	96906	RING, RETAINING	EA	1
12	23	PAHZZ	5360-00-905-4437	8356275	19207	SPRING, HELICAL, COM-PRESSION shift inhibitor	EA	1
12	24	PAHZZ	2520-00-842-5504	8356329	19207	PLUNGER	EA	1
12	25	PAFZZ	4730-00-090-9166	7709239	19207	PLUG, throttle regulator valve	EA	1
12	26	PAFZZ	5330-00-904-0152	8356330	19207	GASKET, throttle regulator valve plug	EA	1
12	27	PAHZZ	5360-00-841-4020	8351527	19207	SPRING, HELICAL, COM-PRESSION throttle regulator valve	EA	1
12	28	PAHZZ	2520-00-735-4220	8351514	19207	VALVE ASSEMBLY, throttle regulator	EA	1
12	29	PAHZZ	5360-00-913-1979	8356297	19207	SPRING, HELICAL, COM-PRESSION, throttle valve	EA	1
12	30	PAHZZ	2520-00-910-9657	8356436	19207	VALVE ASSY, throttle	EA	1
12	31	PAHZZ	2520-00-842-5552	8356939	19207	PIN	EA	1
12	32	PAHZZ	2520-00-911-3610	8356439	19207	SHAFT AND LEVER, SELECTOR CONTROL, range	EA	1
12	33	PAHZZ	5330-00-905-8314	8356948	19207	PACKING, PREFORMED, throttle valve lever	EA	1
12	34	PAHZZ	2520-00-910-9658	8356565	19207	LEVER ASSY, throttle valve	EA	1
12	35	PAHZZ	4730-00-595-1884	444606	24617	PLUG, PIPE, main control valve body	EA	1
12	36	PAHZZ	5365-00-905-5024	6772643	73342	PLUG, MACHINE THREAD, main control valve detent retaining	EA	1
12	37	PAHZZ	5330-00-105-4166	6772740	73342	GASKET, main control valve detent retaining plug	EA	1
12	38	PAHZZ	5360-00-905-4473	8356332	19207	SPRING, HELICAL, COM-PRESSION main control valve detent ball	EA	1
12	39	PAHZZ	3110-00-887-5524	MS19061-15	96906	BALL, BEARING. main control valve detent	EA	1
12	40	XAHZZ		8357239	19207	BODY ASSY.		
12	41	PAHZZ	3110-00-112-5779	709467	73342	BEARING, ROLLER, needle, control valve body	EA	1
12	42	XAHZZ		8357240	19207	BODY		
12	43	PAHZZ	4730-00-349-3672	444612	24617	PLUG, PIPE, main control valve body	EA	1
12	44	PAHZZ	5330-00-945-7842	8356946	19207	PACKING, PREFORMED, range selector lever	EA	1
12	45	PAHZZ	5330-00-105-4166	6772740	73342	GASKET, range selector lever	EA	1
12	46	PAHZZ	5310-00-737-6763	7376763	19207	WASHER, FLAT, range selector shaft	EA	1
12	47	PAHZZ	2520-00-145-1162	11649953	19207	INDICATOR	EA	1
12	48	PAHZZ	5365-00-845-1092	MS16632-87	96906	RING, RETAINING, range selector indicator	EA	1
12	49	PAHZZ	5365-00-776-7532	7767532	19207	RING, RETAINING, throttle valve lever	EA	1
12	50	PAHZZ	5310-00-906-6025	8356700	19207	WASHER, FLAT, selector lever	EA	1
12	51	PAHZZ	5306-00-846-3245	7748677	19207	BOLT, SELF-LOCKING, selector lever	EA	1
12	52	PAFZZ	5330-00-176-7868	5703133	19207	KIT, PARTS, gasket selector valve and separator plate, composed of:	EA	1
12	52.1	PAHZZ	5330-00-915-6604	8356790	19207	1 GASKET		
12	52.2	KFFZZ		8357256	19207	1" GASKET		
12		KFFZZ		8357257	19207	1 INSTRUCTION SHEET		

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0714-CONTROL VALVE-Continued		
12	53	PAFZZ	2520-00-842-5600	8356789	19207	PLATE	EA	1
12	54	PAFHH		11649913	19207	VALVE ASSEMBLY, STEER GEAR	EA	1
12	55	PAFZZ	5305-00-269-3215	MS90725-65	96906	BOLT	EA	3
12	56	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, steer valve cover	EA	3
12	57	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, steer valve cover	EA	3
12	58	PAHZZ	5315-00-062-2338	MS16555-52	96906	PIN	EA	1
12	59	PAHZZ	5360-00-930-3231	8356961	19207	SPRING, HELICAL, COM-PRESSION steer valve detent	EA	1
12	60	PAHZZ	3110-00-151-9121	453612	24617	BALL BEARING, steer valve detent	EA	1
12	61	PAHZZ	2520-00-930-3232	8356958	19207	GUIDE, steer valve detent	EA	1
12	62	PAHZZ	5315-00-014-1189	141189	21450	PIN	EA	1
12	63	PAHZZ	2520-00-134-0169	8356957	19207	VALVE	EA	1
12	64	PAHZZ	5330-00-945-8068	8356z47	19207	PACKING, PREFORMED, pivot valve	EA	1
12	65	PAHZZ	2520-00-145-0983	11649952	19207	INDICATOR	EA	1
12	66	PAHZZ	5365-00-282-0081	MS16624-75	96906	RING, RETAINING, pivot valve	EA	1
12	67	PAHZZ	5365-00-282-0081	MS16624-75	96906	RING, RETAINING, pivot valve	EA	1
12	68	PAFZZ	4730-00-349-3672	444612	24617	PLUG	EA	2
12	69	PAHZZ	5365-00-282-0081	MS16624-75	96906	RING, RETAINING, steer control shaft	EA	1
12	70	PAHZZ	5365-00-282-0081	MS16624-75	96906	RING, RETAINING, steer control shaft	EA	1
12	71	'PAHZZ	2520-00-145-0983	11649952	19207	INDICATOR	EA	1
12	72	PAHZZ	5330-00-945-8068	8356947	19207	PACKING, PREFORMED, steer control shaft	EA	1
12	73	PAHZZ	3110-00-120-3086	709514	73342	BEARING, ROLLER, needle, steer valve shaft	EA	2
12	74	PAHZZ	2520-00-842-5658	8356544	19207	VALVE	EA	1
12	75	PAHZZ	2520-00-842-5663	8356505	19207	VALVE	EA	1
12	76	PAHZZ	5360-00-933-5256	8357181	19207	SPRING, HELICAL, COM-PRESSION steer relay valve	EA	1
12	77	PAHZZ	5330-00-913-3371	8350449	19207	GASKET. steer valve body retaining plug	EA	1
12	78	PAHZZ	5365-00-178-1559	8357327	19207	PLUG	EA	1
12	79	XAHZZ		11649911	19207	VALVE ASSY, steer	EA	1
12	80	AHHZZ		8356430	19207	VALVE ASSY, steer regulator		
12	81	PAHZZ	2520-00-842-5546	8356318	19207	STEM	EA	1
12	82	XAHZZ		11649909	19207	VALVE, steer regulator	EA	1
12	83	XAHZZ		11649912	19207	STOP, outer spring	EA	1
12	84	PAHZZ	5360-00-919-6464	8356747	19207	SPRING, HELICAL, COM-PRESSION, steer regulator valve, inner	EA	1
12	85	PAHZZ	5360-00-846-5981	8349424	19207	SPRING, HELICAL, COM-PRESSION, steer regulator valve, outer	EA	1
12	86	XAHZZ		11649908	19207	VALVE, steer	EA	1
12	87	PAHZZ	5310-00-770-8035	7708035	19207	NUT, SLEEVE, steer regulator valve stem	EA	1
12	88	XAHZZ		8357235	19207	RING, RETAINING, steer valve plunger	EA	1
12	89	XAHZZ		8357232	19207	PLUNGER, steer valve	EA	1
12	90	PAHZZ	5360-00-307-8403	8357234	19207	SPRING, HELICAL, COM-PRESSION steer valve plunger	EA	1
12	91	XAHZZ		8357231	19207	RETAINER, plunger spring	EA	1
12	92	PAHZZ	5330-00-913-3371	8350499	19207	GASKET, steer valve retainer nut	EA	1
12	93	XAHZZ		8357233	19207	NUT, HEXAGON HEAD, steer valve retainer	EA	1
12	94	XAHZZ		8357233	19207	NUT. HEXAGON, steer valve retainer	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0714-CONTROL VALVE-Continued		
12	95	PAHZZ	5330-00-913-3371	8350499	19207	GASKET, steer valve retainer nut	EA	1
12	96	XAHZZ		8357231	19207	RETAINER, plunger spring	EA	1
12	97	PAHZZ	5360-00-307-403	8357234	19207	SPRING, HELICAL, COM-PRESSION steer valve plunger	EA	1
12	98	XAHZZ		8357232	19207	PLUNGER, steer valve	EA	1
12	99	XAHZZ		8357235	19207	RING, RETAINING, steer valve plunger	EA	1
12	100	XAHZZ		11649911	19207	VALVE, ASSY, steer	EA	1
12	101	PAHZZ	5310-00-770-8035	7708035	19207	NUT, SLEEVE, steer regulator valve stem	EA	1
12	102	XAHZZ		11649908	19207	VALVE, steer	EA	1
12	103	PAHZZ	5360-00-846-5981	8349424	19207	SPRING, HELICAL, COM-PRESSION steer regulator valve. outer	EA	1
12	104	PAHZZ	5360-00-919-6464	8356747	19207	SPRING, HELICAL, COM-PRESSION, steer regulator valve. inner	EA	1
12	105	XAHZZ		11649912	19207	STOP, outer spring	EA	1
12	106	KFHZZ		8356430	19207	VALVE ASSY, steer regulator	EA	1
12	107	XAHZZ		11649909	19207	VALVE, steer regulator	EA	1
12	108	PAHZZ	2520-00-842-5546	8356318	19207	STEM	EA	1
12	109	XAHZZ		8356515	19207	BODY		
12	110	PAHZZ	5360-00-844-0613	6756907	73342	SPRING, HELICAL, COM-PRESSION	EA	1
12	111	PAHZZ	2520-00-840-9615	8349550	19207	SLEEVE	EA	1
12	112	PAHZZ	3110-00-151-9121	453612	24617	BALL BEARING, steer valve	EA	1
12	113	PAHZZ	2520-00-849-3463	8356296	19207	BLOCK	EA	1
12	114	PAHZZ	2520-00-910-9661	8356597	19207	SHAFT ASSY, steer lever	EA	1
12	115	PAHZZ	2520-00-849-3463	8356296	19207	BLOCK	EA	1
12	116	PAHZZ	2520-00-840-4709	8356506	19207	VALVE	EA	1
12	117	PAHZZ	5360-00-933-5256	8357181	19207	SPRING, HELICAL, COM-PRESSION, drive relay valve	EA	1
12	118	PAHZZ	5330-00-930-3230	8356960	19207	GASKET, steer valve cover	EA	1
12	119	PAHZZ	2520-00-839-6617	8356959	19207	COVER	EA	1
12	120	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, steer valve cover	EA	9
12	121	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, steer valve cover	EA	9
12	122	PAHZZ	5305-00-269-3214	MS90725-64	96906	BOLT	EA	9
12	123	PAFZZ	5310-00-905-4462	8356699	96906	WASHER, FLAT, steer valve body	EA	24
12	124	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, steer valve body	EA	24
12	125	PAFZZ	5305-00-269-3224	MS90725-4	96906	SCREW, CAP, HEXAGON HEAD, steer valve body	EA	24
12	126	PAFZZ	5305-00-269-3218	MS90725-68	96906	SCREW, CAP, HEXAGON HEAD, steer valve body	EA	2
12	127	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, steer valve body	EA	2
12	128	PAFZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, steer valve body	EA	2
12	129	PAFZZ	5330-00-911-3607	8356576	19207	GASKET, steer valve body	EA	1
12	130	PAFZZ	2520-00-840-4720	8356409	19207	PLATE	EA	1
12	131	PAFZZ	5330-00-911-3607	8356576	19207	GASKET, steer valve body	EA	1
13	45	PAHZZ	5330-00-945-7841	8356945	19207	PACKING, PREFORMED, brake apply	EA	1
13	46	PAHZZ	5360-00-913-3969	8356551	19207	SPRING, HELICAL, TORSION, brake apply shaft, right	EA	1
13	47	PAHZZ	2520-00-840-4644	8356373	19207	SHAFT	EA	1
13	48	PAHZZ	5360-00-905-7548	8356260	19207	SPRING, HELICAL, COM-PRESSION air valve	EA	1
13	49	PAHZZ	2520-00-910-9659	8356587	19207	VALVE ASSY, air	EA	1
13	50	XAOZZ		8356586	19207	SEAL, air valve	EA	1
13	51	XAHZZ		8356319	19207	VALVE	EA	1
12	52	PAHZZ	2520-00-840-4667	8356285	19207	BODY ASSY	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0714-CONTROL VALVE-Continued		
13	53	PAHZZ	3110-00-120-3086	709514	73342	BEARING, ROLLER, NEEDLE, brake apply body, right	EA	2
13	54	XAHZZ		8356394	19207	BODY		
13	55	PAHZZ	5315-00-614-1147	141147	24617	PIN	EA	2
13	56	PAHZZ	3110-00-120-3085	709414	73342	BEARING, ROLLER, NEEDLE, brake apply body, right	EA	2
13	57	PAHZZ	2520-00-840-4663	8356321	19207	VALVE	EA	1
13	58	PAHZZ	5360-00-905-1142	8356264	19207	SPRING, HELICAL, COM-PRESSION brag signal valve	EA	1
13	59	PAHZZ	5310-00-592-2438	8349394	19207	WASHER, FLAT, brake signal valve	EA	1
13	60	PAHZZ	5365-00-804-7681	MS16625-75	96906	RING, RETAINING, brake signal valve	EA	1
13	61	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, brake apply body	EA	2
13	62	PAHZZ	5306-00-940-9071	9409071	24617	BOLT, SELF-LOCKING, brake apply body	EA	2
13	63	PAHZZ	5310-00-898-6447	8356278	19207	WASHER, FLAT	EA	1
13	64	PAHZZ	5365-00-776-7532	7767532	19207	RING, RETAINING, brake apply shaft	EA	1
13	65	PAHZZ	5306-00-512-2048	9409029	24617	BOLT, SELF-LOCKING, brake apply body	EA	2
13	66	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, brake apply shaft	EA	2
13	67	PAHZZ	2520-00-910-9660	8356595	19207	PLATE, apply cam side	EA	1
13	68	PAHZZ	2520-00-911-3606	8356594	19207	CAM, BRAKES APPLY, TRANS-MISSION	EA	1
13	69	PAHZZ	3110-00-198-0464	Q8292	60380	ROLLER, BEARING, brake apply cam	EA	58
13	70	PAHZZ	3120-00-905-7537	8356593	19207	BEARING, SLEEVE, race, brake apply cam roller	EA	1
13	71	PAHZZ	2520-00-839-6620	8356596	19207	LEVER	EA	1
13	72	PAHZZ	5330-00-945-841	8356945	19207	PACKING, PREFORMED, brake apply shaft	EA	1
13	73	PAHZZ	5360-00-913-3969	8356551	19207	SPRING, HELICAL, TORSION, brake apply shaft, left	EA	1
13	74	PAHZZ	2520-00-840-4644	8356373	19207	SHAFT	EA	1
13	75	PAHZZ	5360-00-905-7548	8356260	19207	SPRING, HELICAL, COM-PRESSION air valve	EA	1
13	76	PAHZZ	2520-00-910-9659	8356587	19207	VALVE ASSY, air	EA	1
13	77	XAHZZ		8356586	19207	SEAL, air valve	EA	1
13	78	XAHZZ		8356319	19207	VALVE		
13	79	PAHZZ	2520-00-040-4669	8356284	19207	BODY ASSY	EA	1
13	80	PAHZZ	3110-00-120-3086	709514	19207	BEARING, ROLLER, NEEDLE, brake apply body, left		
13	81	PAHZZ	5315-00-014-1147	141147	24617	PIN	EA	2
13	82	XAHZZ		8356406	19207	BODY		
13	83	PAHZZ	3110-00-120-3085	709414	19207	BEARING, ROLLER, NEEDLE, brake apply body, left		
13	84	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, brake apply shaft	EA	2
13	85	PAHZZ	5306-00-940-9071	9409071	19207	BOLT, SELF-LOCKING, brake apply body	EA	2
13	86	PAHZZ	2520-00-839-6620	8356596	19207	LEVER	EA	1
13	87	PAHZZ	3120-00-905-7537	8356593	19207	BEARING, SLEEVE, race, brake apply cam roller	EA	1
13	88	PAHZZ	2520-00-911-3606	8356594	19207	CAM, BRAKES APPLY, TRANS-MISSION	EA	1
13	89	PAHZZ	2520-00-910-9660	8356595	19207	PLATE, apply cam side	EA	1
13	90	PAHZZ	3110-00-198-0464	Q8292	60380	ROLLER, BEARING, brake apply cam	EA	58
13	91	PAHZZ	5365-00-776-7532	7767532	19207	RING, RETAINING, brake apply shaft	EA	1

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0714-CONTROL VALVE-Continued		
13	92	PAHZZ	5310-00-898-6447	8356278	19207	WASHER, FLAT	EA	1
13	93	PAHZZ	5306-00-612-2048	9409029	24617	BOLT, SELF-LOCKING, brake apply shaft	EA	2
13	94	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, brake apply shaft	EA	2
13	95	PAHZZ	2520-00-040-4663	8356321	19207	VALVE	EA	1
13	96	PAHZZ	5360-00-905-7142	8356264	19207	SPRING, HELICAL, COM-PRESSION, brake signal valve	EA	1
13	97	PAHZZ	5310-00-592-2438	8349394	19207	WASHER, FLAT, brake signal valve	EA	1
13	98	PAHZZ	5365-00-840-4681	MS16625-75	96906	RING, RETAINING, brake signal valve	EA	1
						GROUP 0721-OIL PUMPS		
8	6	PAHZZ	5330-00-905-7140	8356366	19207	SEAL, PLAIN ENCASED, output oil pump gear shaft oil	EA	1
8	22	PAHZZ	5305-00-269-2817	MS90726-73	96906	BOLT, MACHINE, output oil pump	EA	2
8	23	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, output oil pump	EA	2
8	24	PAHZZ	5365-00-789-0449	10875162	19207	RING, RETAINING, output oil pump drive gear	EA	1
8	25	PAHZZ	3020-00-462-2893	8357276	19207	GEAR, SPUR, output oil pump drive	EA	1
8	26	PAHZZ	3110-00-294-3650	8348540	19207	ROLLER, output oil pump drive gear	EA	1
8	26					KEY, WOODRUFF, output oil pump drive gear	EA	1
8	27	PAHZZ	5306-00-225-8508	MS90725-44	96906	BOLT, MACHINE, output oil pump	EA	5
8	28	PAHZZ	5310-00-905-5025	8356700	19207	WASHER, FLAT, output oil pump	EA	5
8	29	PAHZZ	2520-00-462-2306	8357275	19207	PUMP ASSEMBLY, OUTPUT OIL	EA	1
8	29					PUMP ASSY, output oil	EA	1
8	30	PAHZZ	3120-00-905-7141	8356549	19207	BEARING, SLEEVE, output oil pump	EA	3
8	31	XAHZZ		8356928	19207	BODY		
8	32	PAHZZ	5315-00-014-1195	141195	24617	PIN	EA	2
8	33	XAHZZ		8357274	19207	GEAR SHAFT, SPUR, output oil pump drive	EA	2
8	33					GEAR SHAFT, SPUR, output oil pump drive	EA	1
8	34	PAHZZ	3020-00-850-4001	3356393	19207	GEAR		
8	35	XAHZZ		5356929	19207	COVER		
8	70	PAHZZ	3110-00-108-7944	709420	21450	BEARING, NEEDLE, output oil pump	EA	3
10	1	PAOZZ	5330-00-269-2804	MS90726-61	36906	SCREW, CAP, HEXAGON HEAD, main oil filter	EA	3
10	2	PAFZZ	5310-00-637-9541	MS35338-46	36906	WASHER, LOCK, main oil filter	EA	3
10	3	PAOZZ	5330-00-599-2180	7374386	19207	PACKING, PREFORMED, main oil filter	EA	1
10	4	PAFZZ	2520-00-919-7253	3356044	19207	FILTER ASSEMBLY, OIL, main	EA	1
10	5	PAOZZ	2520-00-911-3638	5703119	19207	PARTS KIT, FLUID PRESSURE FILTER, composed of:	EA	*
10	5.1	KFOZZ		3656421	19207	1 ELEMENT, oil filter		
10	5.2	PAOZZ	5310-00-262-6376	MS20365-524A	96906	1 NUT		
10	6	PAFZZ	2520-00-840-4711	8356440	19207	HOUSING ASSY	EA	1
10	7	XAHZZ		MS35914-14	96906	INSERT	EA	3
10	8	XAFZZ		83356411	19207	HOUSING		
10	9	PAFZZ	5330-00-914-5168	8356528	19207	GASKET, ASBESTOS, main oil filter housing, upper	EA	1
10	10	PAFZZ	5330-00-920-7683	3366518	19207	GASKET, ASBESTOS. main oil filter housing, lower	EA	1
10	11	PAFZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, main oil filter housing	EA	4
10	12	PAFZZ	5310-00-637-9541	MS25338-46	96906	WASHER, LOCK, main oil filter housing	EA	4

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0721-OIL PUMPS-Continued		
10	13	PAFZZ	5306-00-913-7215	9423633	24617	BOLT, MACHINE, main oil filter housing	EA	4
10	62	AOFZZ				OIL FILTER and oil level indicator		
10	63	PAOZZ	6680-00-919-6466	8356624	19207	INDICATOR, OIL LEVEL, ASSY	EA	1
10	64	PAFZZ	5330-00-770-8078	7708078	19207	GASKET	EA	1
10	65	PAOZZ	5330-00-770-8123	7708123	19207	SEAL, RUBBER ANGLE, oil filler tube	EA	1
10	66	PAFZZ	2520-00-911-3635	8356621	19207	TUBE ASSY, OIL FILTER	EA	1
10	67	PAOZZ	4730-00-908-3194	MS35842-11	96906	CLAMP, HOSE. oil filter tube	EA	1
10	68	PAFZZ	4720-00-919-6455	8356139	19207	VENT HOSE, oil filler	EA	1
10	69	PAFZZ	4730-00-776-7619	10900456	19207	CLAMP, HOSE, oil filler tube	EA	1
10	70	PAFZZ	4730-00-508-0481	8349049	19207	CONNECTOR	EA	1
10	71	PAFZZ	2520-00-919-6478	10947194	19207	ADAPTER, INDICATOR, OIL FILLER	EA	1
10	72	PAFZZ	2520-00-911-3628	10947193	19207	RING ASSEMBLY, SEAL, oil filler tube	EA	1
11	1	PAHZZ	5330-00-920-7567	8356735	19207	GASKET, input oil pump	EA	1
11	2	PAHZZ	2520-00-893-5454	8357211	19207	PUMP ASSY, INPUT OIL	EA	1
11	3	PAHZZ	2520-00-944-6963	8351462	19207	ROLLER, input oil pump driven gear	EA	1
11	4	PAHZZ	3020-00-134-0166	8357215	19207	GEAR	EA	1
11	5	PAHZZ	5365-00-770-8032	7708032	19207	RING, RETAINING. input oil pump driven gear	EA	1
11	6	XAHZZ		8356539	19207	COVER ASSY		
11	7	PAHZZ	3110-00-027-3430	GB1012XOH	60380	BEARING, ROLLER, NEEDLE, input oil pump cover	EA	1
11	8	XAHZZ		8356398	19207	COVER		
11	9	PAHZZ	5306-00-840-9013	9409013	19207	BOLT, SELF-LOCKING, input oil pump cover	EA	8
11	10	PAHZZ	5310-00-906-5025	8356700	19207	WASHER, FLAT, input oil pump cover	EA	8
11	11	PAHZZ	3110-00-950-4236	MS19061-5	96906	BALL, BEARING, input oil pump idler gear shaft. locking	EA	1
11	12	PAHZZ	3040-00-134-0167	8357218	19207	SHAFT	EA	1
11	13	XAHZZ		8357216	19207	GEAR ASSY		
11	14	PAHZZ	3110-00-227-3430	GB1012XOH	60380	BEARING, ROLLER, NEEDLE, input oil pump idler gear	EA	1
11	15	PAHZZ	3020-00-782-1310	8357217	19207	GEAR	EA	1
11	16	PAHZZ	3110-00-227-3430	GB1012XOH	60380	BEARING, ROLLER, NEEDLE, input oil pump idler gear	EA	1
11	17	PAHZZ	5330-00-911-3636	8356368	19207	GASKET, input oil pump base	EA	1
11	18	PAHZZ	2520-00-840-4705	8356509	19207	BASE	EA	1
11	19	PAHZZ	5305-00-269-3218	MS90725-68	96906	SCREW, CAP, HEXAGON HEAD, input oil pump base	EA	4
11	20	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, input oil pump base	EA	4
11	21	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT. input oil pump base	EA	4
11	22	PAHZZ	3020-00-893-5455	8357214	19207	GEAR SHAFT, SPUR, input oil pump drive	EA	1
11	23	XAHZZ		8357212	19207	BODY ASSY		
11	24	PAHZZ	5315-00-014-1192	141192	24617	PIN	EA	2
11	25	XAHZZ		8357213	19207	BODY		
11	26	PAHZZ	5315-00-014-1192	141192	24617	PIN	EA	2
11	27	PAHZZ	3110-00-227-3430	GB1012XOH	60380	BEARING, ROLLER, NEEDLE, input oil pump body	EA	1
11	28	PAFZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT. input oil pump	EA	4
11	29	PAHZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, input oil pump	EA	4

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0721-OIL PUMPS-Continued		
11	30	PAFZZ	5306-00-269-3220	MS90725-0	96906	BOLT	EA	4
11	31	PAHZZ	5310-00-904-4462	8356699	19207	WASHER, FLAT, input oil pump	EA	10
11	32	PAFZZ	5310-00-637-9541	MS35338-46	96906	WASHER, LOCK, input oil pump	EA	10
11	33	PAHZZ	5305-00269-3217	MS90725-67	96906	SCREW, CAP, HEXAGON HEAD, input oil pump	EA	10
11	34	PAHZZ	5330-00-905-7139	8356333	19207	GASKET, oil suction tube	EA	1
11	35	PAHZZ	2520-00-840-4712	8356407	19207	SCREEN ASSY	EA	1
11	36	PAHZZ	5310-00-906-4462	8356699	19207	WASHER, FLAT, oil suction screen	EA	2
11	37	PAHZZ	2520-00-944-6819	1097464	19207	BOLT, SELF-LOCKING, oil suction screen	EA	2
11	40	PAFZZ	2520-00-167-9023	5703160	19207	KIT, PARTS, brake coolant pump, composed of:	EA	1
11	40.1	KFFZZ		8357267	19207	2 PLUG		
11		KFFZZ		8357266	19207	1 INSTRUCTION SHEET		
11	4.2	XAHZZ		8357265	19207	1 PUMP ASSEMBLY, OIL COOLANT		
11	41	PAHZZ	5310-00-752-1461	7521461	19207	NUT, EXTENDED WASHER, HEXAGON, brake coolant oil pump external driven gear	EA	2
11	42	PAHZZ	3020-00-914-1004	8350398	19207	GEAR. SPUR, brake coolant oil pump external driven	EA	2
11	43	PAHZZ	2530-00-692-2418	8350114	19207	WASHER, thrust	EA	4
11	44	XAHZZ		8356569	19207	BODY ASSY		
11	45	PAHZZ	3110-00-902-2714	GB108XOH	60380	BEARING, ROLLER, NEEDLE, brake coolant oil pump body	EA	2
11	46	XAHZZ		8356449	19207	BODY		
11	47	PAHZZ	3110-00-120-3098	8347919	19207	BEARING, ROLLER, NEEDLE, brake coolant oil pump body	EA	1
11	48	PAHZZ	2520-00-891-1128	8350116	19207	GEAR	EA	2
11	49	PAHZZ	2520-00-840 9456	8347863	19207	SHAFT	EA	2
11	50	PAHZZ	3110-00-950-4236	MS19061-5	96906	BALL, BEARING, brake coolant oil pump driven gear shaft	EA	
11	51	XAHZZ		8347899	19207	GEAR ASSY		
11	52	PAHZZ	3110-00-902-2714	GB108XOH	60380	BEARING, ROLLER, NEEDLE, brake coolant oil pump driven gear assy	EA	2
11	53	PAHZZ	2520-00-839-6625	8347896	19207	GEAR	EA	2
11	54	PAHZZ	3110-00-902-2714	GB108XOH	60380	BEARING, ROLLER, NEEDLE, coolant oil pump driven gear assy	EA	2
11	55	XAHZZ		8357264	19207	COVER ASSY		
11	56	PAHZZ	5315-00-044-3769	443769	24617	PIN	EA	2
11	57	PAHZZ	3110-00-902-2714	GB108XOH	60380	BEARING, ROLLER. NEEDLE, brake coolant oil pump cover	EA	2
11	58	XAHZZ		8356566	19207	COVER		
11	59	PAHZZ	5315-00-840-9458	8356269	19207	PIN, GUIDE	EA	2
11	60	PAHZZ	5310-00-937-7846	446151	24617	WASHER,	EA	2
11	61	PAHZZ	5360-00-905-7138	8356557	19207	SPRING, HELICAL, COM-PRESSION brake coolant oil pump suction check valve	EA	2
11	62	PAHZZ	2520-00-145-1004	11649943	19207	WASHER, VALVE	EA	2
11	63	PAHZZ	5320-00-187-0017	8347930	19207	GROMMET, RUBBER	EA	2
11	64	PAHZZ	5330-00-226-5488	8350245	19207	WASHER	EA	2
11	65	PAHZZ	2520-00-840-4703	8356525	19207	SCREEN ASSY	EA	2
11	66	PAHZZ	5365-00-804-9744	MS16625-212	96906	RING, RETAINING, brake coolant oil pump suction screen	EA	2

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 0721-OIL PUMPS-Continued		
11	67	PAHZZ	5310-00-905-5025	8356700	19207	WASHER, FLAT, brake coolant oil pump cover	EA	3
11	68	PAHZZ	5306-00-940-9013	9409013	19207	BOLT, SELF-LOCKING, brake coolant oil pump cover	EA	3
11	69	PAHZZ	5310-00-905-5025	8356700	19207	WASHER, FLAT, brake coolant oil pump cover	EA	3
11	70	PAHZZ	5306-00-225-8507	MS90725-43	96906	BOLT, MACHINE, brake coolant oil pump cover	EA	3
11	71	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, brake coolant oil pump	EA	2
11	72	PAHZZ	5305-00-269-3220	MS90725-70	96906	SCREW, CAP, HEXAGON HEAD, brake coolant oil pump	EA	2
11	73	PAHZZ	5306-00-940-9030	9409030	19207	BOLT, SELF-LOCKING, brake coolant oil pump	EA	4
11	74	PAHZZ	5310-00-905-4462	8356699	19207	WASHER, FLAT, brake coolant oil pump	EA	4
13	36	PAHZZ	2520-00-191-254	8356303	19207	BREATHER ASSEMBLY, TRANS-MISSION	EA	1

Section III. SPECIAL TOOLS LIST

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 2604-SPECIAL TOOLS		
14	1	PEOFF	5120-00-906-1051	8355955	19207	ADAPTER, apply, torque when adjusting brakes	EA	1
14	2	PEHHH	5120-00-902-2053	8355956	19207	ADAPTER, LIFTING, lift output carrier subassembly	EA	1
14	3	PEHHH	5120 00-901-4292	8355966	19207	ADAPTER, PULLER, remove converter ground sleeve bearing	EA	2
14	4	PEHHH			81348	ADAPTER, PULLER, STEP PLATE GGG-P-781, TYPE Xlll, CLASS 4, SIZE 13	EA	1
14	5	PEHHH	4910-00-906-1045	8355967	19207	COMPRESSOR, high-range clutch piston return spring	EA	1
14	6	PEFFF	5306-00-576-2094	8708107	19207	EYEBOLT, lift output shaft and clutch assembly	EA	1
14	7	PEHHH	5120-00-316-9182	79508r4	19207	HANDLE, driver	EA	1
14	8	PEHHH	5120-00-906-1043	8355958	19207	HANDLE, lifting	EA	1
14	9	PEHHH	5120-00-572-8656	8356202	19207	DRIVER, PLUG, install converter driver cover bushing	EA	1
14	10	PEFFF	5120-00-901-4289	8355986	19207	REPLACER, PTO bearings and seal converter pump bearing; driving bevel gear bearing; ground sleeve bearing	EA	1
14	11	PEHHH	5120-00-901-4285	8355987	19207	REPLACER, driven bevel gear bearings; cross-shaft bearings	EA	1
14	12	PEFFF	5120-00-906-1046	8355988	19207	REPLACER, output seal; output shaft double-row bearings; bevel pinion support bearing	EA	1
14	13	PEHHH	5120-00-302-5857	5F7345		SCREW, FORCING, puller	EA	1
14	14	PEHHH	5120-00-901-4290	8355970	19207	SHIELD, turbine shaft protector	EA	1
14	15	PEHHH	5120-00-906-1052	8356022	19207	WRENCH ASSEMBLY, input bevel gear preload	EA	1
14	16	PEHHH	4910-00-907-8998	8356694	19207	ADAPTER, PULLER, remove final drive bearing	EA	1
14	17	PEHHH	4910 00-906-1049	8356959	19207	HOLDER ASSEMBLY, output gear	EA	1
14	18	PEHHH	4910-00-906-1047	8355962	19207	HOLDER ASSEMBLY, input bevel gear	EA	1
14	19	PEHHH	5120-00-902-0186		81348	PULLER KIT, MECHANICAL, GGG-P181, Type VII, size 1	EA	1
14	20	PEHHH	5120-00-572-8712	8356201	19207	PULLER, ATTACHMENT, MECHANICAL	EA	1
14	21	PEHHH	4910-00-906-1048	8355971	19207	REPLACER, carrier spindle	EA	1
14	22	PEHHH	5120-00-902-6522	8356668	19207	SOCKET, WRENCH, FACE SPANNER	EA	1
14	23	PEOFF	4910-00-907-0703	8355989	19207	TOOL, STALL CHECK	EA	1
14	24	PEHHH	4910-00-901-4291	8366006	19207	SLING, lifting	EA	1
14	25	PEOFF	4910-00-572-8612	8356176	19207	GAGE, PRESSURE, KIT	EA	1
14	26	PEHHH	4910-00-708-3778	7083778	19207	SLING, lifting	EA	1
14	27	PEHHH	4910-00-907-8990	10954024	19207	SLING, lifting	EA	1
14	28	PEHHH	5120-00-902-0187		81348	ADAPTER, PULLER, LEG CAP, GGG-P-781, Type XIII, Class 5, size 1	EA	2
14	29	PEHHH	5120-00-106-7688	11649988	19207	DRIVER KIT, turbine hub retaining ring	EA	1
14	30	PEOFF	5120-00-541-1984	5411984	19207	HANDLE, driver	EA	1

Section IV. NATIONAL STOCK NUMBER AND PART NUMBER INDEX

National Stock Number Cross-Reference to Figure and Item Numbers - Continued

National Stock number	Fold out No.	Item No.
4820-01-010-5048	10	20
5315-00-014-1147	6	25
5315-00-014-1147	9	37
5315-00-014-1147	13	81
5315-00-014-1189	12	62
5315-00-014-1192	11	24
5315-00-014-1192	11	26
5315-00-014-1195	8	32
5315-00-014-1234	3	46
5315-00-014-1234	5	15
5315-00-014-1234	5	17
5315-00-014-1238	5	18
5315-00-014-1260	5	13
5315-00-014-1260	7	58
5315-00-014-1260	8	67
5315-00-014-1260	8	73
5315-00-014-1289	4	35
2520-00-017-6596	3	8
4730-00-018-9566	3	52
5315-00-044-3767	8	50
5315-00-044-3769	3	59
5315-00-044-3769	11	56
4730-00-044-4688	3	63
4730-00-044-4688	10	60
4730-00-044-4688	13	16
4730-00-044-4688	13	38
2520-00-045-3216	3	1
2520-00-051-9929	12	7
5315-00-058-6152	6	12
5315-00-058-6152	9	49
5315-00-062-2338	12	58
3110-00-067-3849	4	13
2530-00-086-6965	8	11
5310-00-088-0553	3	4
4730-00-090-9166	12	25
3110-00-100-5480	5	40
3110-00-100-5483	5	36
3110-00-100-5963	5	35
5330-00-105-4166	12	37
5330-00-105-4166	12	45
5120-00-106-7648	14	20
5120-00-106-7688	14	29
3110-00-112-5779	12	41
5315-00-120-3085	13	56
3110-00-120-3085	13	83
3110-00-120-3086	12	73
3110-00-120-3086	13	53
3110-00-120-3086	13	80
3110-00-120-3098	11	47
2520-00-122-4711	5	41
2520-00-122-7537	10	22
3020-00-134-0166	11	4
3040-00-134-0167	11	12
2520-00-134-0168	10	21
2520-00-134-0169	12	63
3110-00-144-8571	7	20
2520-00-145-0970	13	24
3110-00-108-7944	8	70
2520-00-145-0970	13	40
5305-00-260-3218	12	126

Stock number	Fold out. No.	Item No.
2520-00-145-0983	12	65
2520-00-145-0983	12	71
2520-00-145-1004	11	62
2520-00-145-1162	12	47
3110-00-151-9113	10	77
3110-00-151-9121	12	60
3110-00-151-9121	12	112
3110-00-151-9137	4	3
2520-00-157-1813	3	51
5315-00-165-8350	10	26
2520-00-167-9023	11	40
2520-00-167-1813	3	69
2520-00-167-9181	10	55
5330-00-176-7868	12	52
5365-00-178-1559	12	78
5320-00-187-0017	11	63
3110-00-198-0464	13	69
3110-00-198-0464	13	90
5306-00-225-8500	12	15
5306-00-225-8502	8	1
5306-00-225-8505	10	89
5306-00-225-8507	11	70
5306-00-225-8508	8	27
5306-00-225-8512	10	88
5305-00-225-9081	10	53
5306-00-225-9086	6	57
5306-00-225-9086	9	6
5330-00-226-5488	11	64
3110-00-227-3430	11	7
3110-00-227-3430	11	14
3110-00-227-3430	11	16
3110-00-227-3430	11	27
5305-00-253-5615	3	48
5310-00-262-6375	10	5.2
5365-00-263-3831	7	1
5365-00-263-3831	7	17
5365-00-263-3831	8	114
5365-00-263-3831	8	130
5305-00-269-2804	10	1
5305-00-269-2817	8	22
5305-00-269-3211	7	92
5305-00-269-3211	8	41
5305-00-269-3211	8	54
5305-00-269-3213	13	4
5305-00-269-3214	11	79
5305-00-269-3214	12	122
5305-00-269-3215	12	55
5305-00-269-3215	7	99
5305-00-269-3215	8	59
5305-00-269-3215	13	9
5305-00-269-3217	7	77
5305-00-269-3217	7	98
5305-00-269-3217	8	11
5305-00-269-3217	8	84
5305-00-269-3217	11	33
5305-00-269-3217	13	31
5305-00-269-3218	7	74
5305-00-269-3218	8	7
5305-00-269-3218	11	19

National Stock Number Cross-Reference to Figure and Item Numbers-Continued

National Stock number	Fold out No.	Item No.	Stock number	Fold out. No.	Item No.
5305-00-269-3219	3	78	5120-00-541-1984	14	30
5305-00-269-3219	13	27	3110-00-541-9785	3	36
5305-00-269-3219	13	43	3110-00-554-5403	11	38
5305-00-269-3220	11	30	3110-00-554-5826	6	50
5305-00-269-3220	11	72	3110-00-554-5826	9	12
5305-00-269-3221	3	77	4910-00-572-8612	14	25
5305-00-269-3221	13	12	5120-00-572-8656	14	9
5305-00-269-3223	12	4	5306-00-576-2094	14	6
5305-00-269-3224	12	125	5305-00-577-5462	7	88
5305-00-269-3226	10	17	5310-00-579-1979	10	44
5305-00-269-3226	10	31	2530-00-592-2418	11	43
5305-00-269-4511	11	84	5310-00-592-2438	13	59
5305-00-269-4511	13	28	5310-00-592-2438	13	97
5305-00-269-4511	13	44	3110-00-592-9967	4	18
4730-00-278-3380	8	80	3110-00-592-9967	6	28
5365-00-281-6452	6	31	3110-00-592-9967	9	34
5365-00-281-6452	9	31	4730-00-595-1884	12	36
5365-00-282-0081	12	66	5310-00-595-6051	11	39
5365-00-282-0081	12	67	5365-00-595-6052	11	39
5365-00-282-0081	12	69	5330-00-599-2180	10	3
5365-00-282-0081	12	70	5315-00-614-1147	13	55
5365-00-282-2423	10	36	5306-00-616-2015	5	39
5365-00-282-7017	3	18	5306-00-616-2015	6	37
5365-00-282-7017	3	30	5306-00-616-2015	9	25
5330-00-285-3442	12	17	5340-00-616-5235	12	22
4730-00-288-8555	5	11	5315-00-616-5514	8	26
4730-00-288-8555	7	59	5330-00-631-8125	3	14
5306-00-292-4595	3	83	5330-00-631-8125	3	98
3110-00-294-3650	8	26	5330-00-632-9541	11	29
5120-00-302-5857	14	13	5310-00-637-9541	3	85
5360-00-307-8403	12	90	5310-00-637-9541	3	76
5360-00-307-8403	12	97	5310-00-637-9541	3	79
5360-00-316-7508	10	78	5310-00-637-9541	7	73
5360-00-316-7508	10	81	5310-00-637-9541	7	76
5360-00-316-7564	3	70	5310-00-637-9541	7	97
5310-00-316-7666	11	39	5310-00-637-9541	7	100
5120-00-316-9182	14	7	5310-00-637-9541	8	8
4730-00-349-3672	10	42	5310-00-637-9541	8	12
4730-00-349-3672	12	43	5310-00-637-9541	8	60
4730-00-349-3672	12	68	5310-00-637-9541	8	83
5310-00-407-9566	8	2	5310-00-637-9541	10	2
5310-00-407-9566	10	52	5310-00-637-9541	10	12
5310-00-407-9566	10	87	5310-00-637-9541	10	15
5310-00-407-9666	10	90	5310-00-637-9541	10	18
5310-00-407-9566	12	14	5310-00-637-9541	10	32
2520-00-440-3334	3	47	5310-00-637-9541	11	20
2520-00-446-2484	4	28	5310-00-637-9541	11	32
2520-00-446-2484	4	34	5310-00-637-9541	11	78
2520-00-446-2484	4	42	5310-00-637-9541	11	85
2520-00-446-2484	6	33	5310-00-637-9541	12	2
2520-00-446-2484	7	3	5310-00-637-9541	12	5
2520-00-446-2484	7	14	5310-00-637-9541	12	56
2520-00-446-2484	8	117	5310-00-637-9541	12	121
2520-00-446-2484	8	128	5310-00-637-9541	12	124
2520-00-446-2484	9	29	5310-00-637-9541	12	127
2520-00-446-2306	8	29	5310-00-637-9541	13	3
3020-00-462-2893	8	25	5310-00-637-9541	13	7
2520-00-476-6540	12	8	5310-00-637-9541	13	10
4730-00-508-0481	10	70	5310-00-637-9541	13	13
5306-00-512-2048	5	5	5310-00-637-9541	13	26
5306-00-512-2048	5	24	5310-00-637-9541	13	32
5306-00-512-2048	13	65	5310-00-637-9541	13	42
5306-00-512-2048	13	93	5306-00-655-6847	7	62

National Stock Number Cross-Reference to Figure and Item Numbers-Continued

National Stock number	Fold out No.	Item No.	Stock number	Fold out. No.	Item No.
5306-00-655-6847	8	57	2520-00-839-6620	13	86
2520-00-679-6972	3	15	2520-00-839-6621	13	36
2520-00-679-6974	3	10	2520-00-839-6622	7	47
2520-00-679-6976	10	57	2520-00-839-6624	7	79
3110-00 679-6979	13	5	2520-00-839-6625	11	53
3120-00-679-7068	3	7	2520-00-839-6626	3	96
5365-00-679-7070	3	12	2520-00-839-6627	3	96
5306-00-679-8109	3	95	2520-00-839-6628	3	96
4910-00-708-3778	14	26	2520-00-839-6629	3	96
2520-00-733-4742	3	29	2520-00-839-6630	5	26
2520-00-735-4220	12	28	2520-00-839-6631	10	48
2520-00-736-0268	3	27	2520-00-839-6632	10	36
2520-00-736-0271	3	25	2520-00-839-6345	5	16
2520-00-736-0280	7	21	2520-00-839-6635	5	8
5365-00-737-4496	7	21	2520-00-839-6636	4	36
5365-00-737-4496	8	108	2520-00-839-9088	7	9
5310-00-737-5608	10	24	2520-00-839-9088	8	125
5365-00-737-6357	11	81	2520-00-840-4640	6	30
5310-00-737-6763	12	46	2520-00-840-4640	9	32
5310-00-752-1461	11	41	2520-00-840-4644	13	47
2520-00-758-7214	3	5	2520-00-840-4644	13	74
5365-00-770-7326	13	21	2520-00-840-4652	3	90
5365-00-770-7326	13	29	2520-00-840-4655	6	56
3110-00-770-7842	3	26	2520-00-840-4655	9	55
3656-00-708-8032	11	5	2520-00-840-4656	7	45
5310-00-770-8035	12	87	2520-00-840-4656	8	86
5310-00-770-8035	12	101	2520-00-840-4663	13	57
5330-00-770-8078	10	64	2520-00-840-4663	13	95
5330-00-770-8123	10	65	2520-00-840-4664	7	51
5365-00-776-7532	12	49	2520-00-840-4664	8	76
5365-00-776-7532	13	64	2520-00-840-4667	13	52
5365-00-776-7532	13	91	2520-00-840-4669	13	79
4730-00-776-7619	10	69	2520-00-840-4675	7	48
2520-00-782-1309	5	31	2520-00-840-4675	8	79
3020-00-782-1310	11	15	2520-00-840-4676	6	59
5365-00-782-1311	5	28	2520-00-840-4676	9	3
5315-00-786-6197	7	64	2520-00-840-4696	7	80
5315-00-786-6197	8	19	2520-00-840-4703	11	65
5330-00-787-8724	3	41	2520-00-840-4705	11	18
5365-00-789-0449	8	24	2520-00-840-4709	12	116
5365-00-804-7681	13	60	2520-00-840-4710	7	42
5365-00-804-7681	13	98	2520-00-840-4710	8	90
5365-00-804-9744	11	66	2520-00-840-4711	10	6
5330-00-821-4490	3	9	2520-00-840-4712	11	35
5315-00-828-5486	3	54	2520-00-840-4720	12	130
5315-00-828-5486	3	62	2520-00-840-9434	10	80
5315-00-828-5486	7	52	2520-00-840-9446	10	76
5315-00-828-5486	7	57	2520-00-840-9453	8	66
5315-00-828-5486	8	48	2520-00-840-9454	7	91
5315-00-828-5486	8	52	2520-00-840-9454	8	38
5315-00-628-5486	8	68	2520-00-840-9456	11	49
5315-00-828-5486	8	72	5315-00-840-9458	11	59
5315-00-828-5486	8	75	2520-00-840-9598	7	11
5315-00-828-5486	3	55	2520-00-840-9598	8	120
2520-00-839-6616	6	44	2520-00-840-9614	7	8
2520-00-839-6616	9	18	2520-00-840-9614	8	123
2520-00-839-6617	12	119	2520-00-840-9615	12	111
2520-00-839-6618	7	56	2520-00-840-9623	7	5
2520-00-839-6618	8	74	2520-00-840-9623	8	121
2520-00-839-6619	6	52	3120-00-841-0271	3	21
2520-00-839-6619	9	11	3120-00-841-0271	3	28
2520-00-839-6620	13	71	3110-00-841-1505	6	43

National Stock Number Cross-Reference to Figure and Item Numbers-Continued

National Stock number	Fold out No.	Item No.	Stock number	Fold out. No.	Item No.
3110-00-841-1505	9	22	2520-00-890-7491	3	13
5360-00-841-4020	12	27	2520-00-891-1128	11	48
2520 00-842-5504	12	24	9905-00-891-7800	3	49
2520-00-842-5513	12	21	5360-00-891-7841	7	49
2520-00-842-5519	12	19	5360-00-891-7841	8	78
2520 00-842-6527	5	45	2520-00-891-7863	3	66
2520-00-842-5532	12	18	2520-00-891-7863	5	10
2520-00-842-6546	12	81	2520-00-893-3403	3	71
2520-00-842-5546	12	108	5330-00-893-5452	10	27
2520-00-842-5552	12	31	2520-00-893-5454	11	2
2520-00-08426556	3	53	3020-00-893-5455	11	22
2520-00-842-6556	3	58	5315-00-804-4237	7	54
2520-00-842-5556	3	61	5315-00-894-4237	8	81
2520-00-842-5556	3	65	5315-00-895-3703	7	6
2520-00-842-5556	7	53	5315-00-895-3703	8	124
2520-00-842-6556	7	83	5365-00-898-4444	10	58
2520 00-842-5556	8	71	5348-00-898-6445	3	38
2520-00-842-6583	13	15	5340-00-898-6446	13	19
2520-00-842-5591	3	56	5310-00-898-6447	13	63
2520-00-842-5591	8	51	5310-00-898-6447	13	92
2520-00-842-5591	8	69	5340-00-898-6448	5	33
2520-00-842-5592	10	49	5360-00-901-1451	10	28
2520-00-842-5594	8	44	5120-00-901-4285	14	11
2520-00-842-6595	9	48	5120-00-901-4289	14	10
2520-00-842-5597	7	41	5120-00-901-4290	14	14
2520-00-842-5597	8	88	4910-00-901-4291	14	24
2520-00-842-5599	8	62	5120-00-901-4292	14	3
2520-00-842-5600	12	53	5120-00-902-0186	14	19
2520-00-842-5605	10	75	5120-00-902-0187	14	28
2520-00-842-5608	10	55	5120-00-902-2063	14	2
2520-00-842-5609	10	56	3110-00-902-2714	11	45
2520-00-842-5624	12	12	3110-00-902-2714	11	52
2520-00-842-5629	6	9	3110-00-902-2714	11	54
2520-00-842-5638	3	44	3110-00-902-2714	11	57
2520-00-842-5639	8	49	5120-00-902-6522	14	22
2520-00-842-5642	3	35	5330-00-904-0152	11	80
2520-00-842-5645	3	33	5330-00-904-0152	12	26
2520-00-842-5651	8	4	5330-00-904-8109	3	88
2520-00-842-5653	5	38	5330-00-904-8110	3	92
2520-00-842-5658	12	74	5360-00-904-9588	6	17
2520-00-842-5663	12	75	5360-00-904-9588	9	45
2620-00-842-6665	11	76	5360-00-904-9589	4	12
2520-00-842-5666	11	83	5360-00-904-9591	7	24
5360-00-844-0613	12	110	5360-00-904-9591	8	109
5365-00-845-1092	12	48	5360-00-904-9592	4	39
5306-00-846-3245	12	51	5360-00-904-9592	7	13
5360-00-846-5981	12	85	5360-00-904-9592	8	118
5360-00-836-5981	12	103	2520-00-905-4413	4	27
2520-00-849-3460	6	13	2520-00-905-4413	4	33
2520-00-849-3460	9	53	2520-00-905-4413	4	41
4820-00-849-3462	7	50	2520-00-905-4413	6	34
4820-00-849-3462	8	77	2520-00-905-4413	7	4
2520-00-849-3463	12	113	2520-00-905-4413	7	12
2520-00-849-3463	12	115	2520-00-905-4413	8	119
2520-00-849-3465	3	72	2520-00-905-4413	8	127
2520-00-849-3469	10	83	2520-00-905-4413	9	28
2320-00-850-4001	8	34	2520-00-905-4416	7	2
5310-00-851-2677	6	41	2520-00-905-4416	7	16
5310-00-851-2677	9	20	2520-00-905-4416	8	116
5315-00-658-6486	3	64	2520-00-905-4416	8	129
2520-00-861-1435	7	38	5360-00-905-4435	10	46
2520-00-861-1435	8	93	5360-00-905-4436	12	20
3110-00-887-5524	12	39	5360-00-905-4437	12	23

National Stock Number Cross-Reference to Figure and Item Numbers-Continued

National Stock number	Fold out No.	Item No.	Stock number	Fold out. No.	Item No.
5340-00-905-4443	3	32	5310-00-905-5025	8	28
5365-00-905-4444	3	91	5310-00-905-5025	9	47
5365-00-905-4445	3	16	5310-00-905-5025	10	51
5365-00-905-4448	3	34	5310-00-905-5025	10	86
5315-00-905-4457	7	22	5310-00-905-5025	10	91
5315-00-905-4457	8	112	5310-00-905-5025	11	10
5315-00-905-4458	4	4	5310-00-905-5025	11	67
5306-00-905-4461	3	31	5310-00-905-5025	11	69
5310-00-905-4462	3	75	5310-00-905-5025	12	13
5310-00-905-4462	3	80	5310-00-905-5025	12	50
5310-00-905-4462	3	82	5360-00-905-7138	11	61
5310-00-905-4462	3	84	5330-00-905-7139	11	34
5310-00-905-4462	5	6	5330-00-905-7140	8	6
5310-00-905-4462	5	25	3120-00-905-7141	8	30
5310-00-905-4462	6	36	5360-00-905-7142	13	58
5310-00-905-4462	7	10	5360-00-905-7142	13	96
5310-00-905-4462	7	61	3120-00-905-7537	13	70
5310-00-905-4462	7	72	3120-00-905-7537	13	87
5310-00-906-4462	7	75	5360-00-905-7548	13	48
5310-00-905-4462	7	96	5360-00-905-7548	13	75
5310-00-905-4462	7	101	3020-00-905-7550	4	44
5310-00-905-4462	8	9	3020-00-905-7551	3	87
5310-00-905-4462	8	13	5335-00-905-9823	7	32
5310-00-905-4462	8	23	5330-00-905-9823	8	100
5310-00-905-4462	8	58	5120-00-906-1043	14	8
5310-00-905-4462	8	61	4910-00-906-1045	14	5
5310-00-905-4462	8	82	5120-00-906-1046	14	12
5310-00-905-4462	8	126	4910-00-906-1047	14	18
5310-00-905-4462	9	26	4910-00-906-1048	14	21
5310-00-905-4462	10	11	4910-00-906-1049	14	17
5310-00-905-4462	10	16	5120-00-906-1051	14	1
5310-00-905-4462	10	19	5120-00-906-1052	14	15
5310-00-905-4462	10	33	4910-00-907-0703	14	23
5310-00-905-4462	11	21	4910-00-907-8990	14	27
5310-00-905-4462	11	28	4910-00-907-8998	14	16
5310-00-905-4462	11	31	4730-00-908-3194	10	67
5310-00-905-4462	11	36	2520-00-909-2441	NI	
5310-00-905-4462	11	71	5330-00-909-2442	13	23
5310-00-905-4462	11	74	5330-00-909-2442	13	39
5310-00-905-4462	11	77	2520-00-910-3708	4	5
5310-00-905-4462	11	86	2520-00-910-3708	7	30
5310-00-905-4462	12	3	2520-00-910-3708	8	102
5310-00-905-4462	12	6	2520-00-910-3709	6	5
5310-00-905-4462	12	57	2520-00-910-3709	9	57
5310-00-905-4462	12	120	2520-00-910-3710	3	19
5310-00-905-4462	12	123	2520-00-910-3711	3	81
5310-00-905-4462	12	128	2520-00-910-3712	3	24
5310-00-905-4462	13	2	2520-00-910-3713	3	17
5310-00-905-4462	13	6	2520-00-910-3714	3	43
5310-00-905-4462	13	11	2520-00-910-3715	3	93
5310-00-905-4462	13	14	2520-00-910-3722	6	2
5310-00-905-4462	13	25	2520-00-910-3722	9	60
5310-00-905-4462	13	33	2520-00-910-3723	4	25
5310-00-905-4462	13	41	2520-00-910-3723	4	46
5310-00-905-4462	13	61	2520-00-910-3724	6	4
5310-00-906-4462	13	66	2520-00-910-3724	9	58
5310-00-905-4462	13	84	2520-00-910-3725	7	36
5310-00-905-4462	13	94	2520-00-910-3725	8	95
5360-00-905-4473	12	38	2520-00-910-3726	4	23
5365-00-905-5023	12	16	2520-00-910-3726	4	48
5365-00-905-5024	12	36	2520-00-910-3727	6	7
5310-00-905-5025	6	15	2520-00-910-3727	9	55
5310-00-905-5025	8	3	2805-00-910-3728	4	6

National Stock Number Cross-Reference to Figure and Item Numbers-Continued

National Stock number	Fold out No.	Item No.	Stock number	Fold out. No.	Item No.
2805-00-910-3728	7	29	2520-00-911-3635	10	66
2805-00-910-3728	8	103	5330-00-911-3636	11	17
2520-00-910-3730	6	19	2520-00-911-3638	10	5
2520-00-910-3730	9	43	5365-00-911-3642	5	28
2520-00-910-3731	6	3	5365-00-911-3642	5	37
2520-00-910-3731	9	59	2520-00-911-7626	4	30
2520-00-910-3732	4	1	2520-00-911-7629	7	71
2520-00-910-3733	4	22	2520-00-911-7629	8	10
2520-00-910-3733	4	45	2520-00-911-7644	4	50
2520-00-910-3734	7	25	2520-00-911-7645	6	23
2520-00-910-3734	8	107	2520-00-911-7645	9	36
2520-00-910-3735	4	7	5340-00-912-5629	3	73
2520-00-910-3744	4	8	5365-00-913-1208	10	74
2520-00-910-3746	6	1	5365-00-913-1208	10	82
2520-00-910-3746	6	6	5360-00-913-1979	12	29
2520-00-910-3746	9	56	5330-00-913-3371	12	77
2520-00-910-3746	9	61	5330-00-913-3371	12	92
2520-00-910-3751	3	42	5330-00-913-3371	12	95
5315-00-910-9636	4	38	5306-00-913-3373	10	14
5315-00-910-9636	6	8	5306-00-913-3373	12	1
5315-00-910-9636	9	54	5360-00-913-3969	13	46
2520-00-910-9648	7	89	5360-00-913-3969	13	73
2520-00-910-9648	8	37	5310-00-913-7215	10	13
2520-00-910-9650	6	45	5365-00-913-7990	4	21
2520-00-910-9650	9	17	5365-00-913-7991	4	15
2520-00-910-9657	12	30	5365-00-913-7992	4	16
2520-00-910-9658	12	34	5365-00-913-7992	4	43
2520-00-910-9659	13	49	5365-00-913-7992	7	34
2520-00-910-9659	13	76	5365-00-913-7992	8	98
2520-00-910-9660	13	67	5365-00-913-7993	4	17
2520-00-910-9660	13	89	5365-00-913-7993	6	22
2520-00-910-9661	12	114	5365-00-913-7993	6	29
2520-00-911-3579	6	26	5365-00-913-7993	9	33
2520-00-911-3579	9	39	5365-00-913-7993	9	40
2520-00-911-3580	4	31	3120-00-913-8711	4	20
2520-00-911-3581	4	51	4730-00-913-9770	3	67
2520-00-911-3582	6	60	4730-00-913-9770	7	60
2520-00-911-3582	9	7	4730-00-913-9770	8	64
5365-00-911-3583	5	7	5330-00-913-9771	7	78
5365-00-911-3583	5	19	5330-00-913-9771	8	53
2520-00-911-3606	13	68	3120-00-913-9777	6	48
2520-00-911-3606	13	88	3120-00-913-9777	9	14
5330-00-911-3607	12	129	5365-00-914-0977	6	46
5330-00-911-3607	12	131	5365-00-914-0977	9	16
2520-00-911-3610	12	32	5365-00-914-0978	6	18
5330-00-911-3611	12	11	5365-00-914-0978	6	27
2520-00-911-3613	7	19	5365-00-914-0978	6	61
2520-00-911-3613	8	113	5365-00-914-0978	9	1
2520-00-911-3617	7	33	5365-00-914-0978	9	35
2520-00-911-3617	8	99	5365-00-914-0978	9	44
2520-00-911-3618	6	47	5365-00-914-0980	6	53
2520-00-911-3618	9	15	5365-00-914-0980	9	10
2520-00-911-3620	7	31	5315-00-914-0981	5	3
2520-00-911-3620	8	101	5315-00 914-0981	5	23
2520-00-911-3621	7	44	5315-00-914-0982	7	15
2520-00-911-3621	8	87	5315-00-914-0982	8	116
2520-00-911-3622	6	20	3020-00-914-1004	11	42
2520-00-911-3622	6	21	2520-00-914-4702	9	13
2520-00-911-3622	9	41	3020-00-914-4702	6	49
2520-00-911-3622	9	42	5330-00-914-5168	10	9
2520-00-911-3623	3	40	3020-00-914-6037	4	19
2520-00-911-3624	8	91	3110-00-915-5612	7	63
2520-00-911-3628	10	72	3110-00-915-5612	7	69

National Stock Number Cross-Reference to Figure and Item Numbers-Continued

National Stock number	Fold out No.	Item No.	Stock number	Fold out. No.	Item No.
3110-00-915-5612	7	85	2520-00-930-4081	7	27
3110-00-915-5612	7	95	2520-00-930-4081	8	105
3110-00-915-5612	8	15	2520-00-930-4082	4	10
3110-00-915-5612	8	21	2520-00-930-4082	7	26
3110-00-915-5612	8	36	2520-00-930-4082	8	106
3110-00-915-5612	8	40	5315-00-930-4132	7	23
2520-00-915-6513	3	37	5315-00-930-4132	8	110
2520-00-915-6515	4	29	4730-00-933-0652	13	17
2520-00-915-6527	7	66	5330-00-933-5136	10	37
2520-00-915-6527	8	18	2520-00-933-5236	10	25
2520-00-915-6534	5	20	5330-00-933-5237	10	54
2520-00-915-6565	5	1	5330-00-933-6238	10	30
2520-00-915-6581	7	67	2520-00-933-5239	10	34
2520-00-915-6581	8	17	5360-00-933-5256	12	76
5330-00-915-6604	12	52.1	5360-00-933-5256	12	117
2520-00-918-6172	10	39	5360-00-933-5257	10	23
2520-00-918-6173	10	38	5315-00-937-7684	6	14
5310-00-919-2900	13	22	5315-00-937-7684	9	52
5310-00-919-2900	13	30	5340-00-937-7828	3	68
2520-00-919-6404	6	40	2520-00-937-7832	5	29
2520-00-919-6404	9	21	5310-00-937-7846	11	60
4720-00-919-6455	10	68	5305-00-937-7918	3	94
2520-00-919-6459	7	86	4730-00-937-9787	10	85
2520-00-919-6459	7	94	5320-00-939-5681	4	40
2520-00-919-6459	8	43	2520-00-939-7082	6	39
2520-00-919-6459	8	56	2520-00-939-7082	9	23
5360-00-919-6464	12	84	2520-00-939-7083	6	55
5360-00-919-6464	12	104	2520-00-939-7083	9	2
6680-00-919-6466	10	63	2520-00-939-7084	6	32
5310-00-919-6470	7	87	2520-00-939-7084	9	30
5310-00-919-6470	7	93	2520-00-939-7085	9	19
5310-00-919-6470	8	42	2520-00-939-7086	6	42
5310-00-919-6470	8	55	2520-00-939-7087	9	27
2520-00-919-6478	10	71	5330-00-939-7120	3	89
5330-00-919-7251	10	92	3120-00-939-7121	5	4
2520-00-919-7253	10	4	3120-00-939-7121	5	22
2520-00-919-7254	13	35	5305-00-940-8069	7	68
3040-00-919-7256	8	33	5305-00-940-8069	8	16
2520-00-919-7257	10	73	5306-00-940-9012	5	34
5330-00-920-7563	11	82	5306-00-940-9013	11	9
5330-00-920-7564	10	61	5306-00-940-9013	11	68
5330-00-920-7565	7	46	5306-00-940-9030	11	73
5330-00-920-7565	8	85	5306-00-940-9071	13	62
5330-00-920-7566	7	70	5306-00-940-9071	13	85
5330-00-920-7566	8	14	2520-00-944-6345	8	29
5330-00-920-7567	11	1	2520-00-944-6354	10	47
5330-00-920-7571	3	50	2520-00-944-6378	8	65
5330-00-920-7572	11	75	2520-00-944-6753	3	74
5330-00-920-7581	13	1	2520-00-944-6759	3	86
5330-00-920-7582	13	34	2520-00-944-6809	13	8
5330-00-920-7583	10	10	2520-00-944-6812	6	16
5330-00-920-7584	8	5	2520-00-944-6812	9	46
2520-00-923-4235	6	35	2520-00-944-6813	7	64
2520-00-923-4236	6	38	2520-00-944-6813	8	20
2520-00-923-4236	9	24	2520-00-944-6819	11	37
5330-00-930-3230	12	118	2520-00-944-6963	11	3
5360-00-930-3231	12	59	5330-00-945-7841	13	45
2520-00-930-3232	12	61	5330-00-945-7841	13	72
2520-00-930-4079	8	104	5330-00-945-7842	12	44
2520-00-930-4079	7	28	5330-00-945-8068	12	64
2520-00-930-4080	7	35	5330-00-945-8068	12	72
2520-00-930-4080	8	96	5330-00-945-8314	12	33
2520-00-930-4081	4	9	2520-00-945-8360	7	39

National Stock Number Cross-Reference to Figure and Item Numbers-Continued

National Stock number	Fold out No.	Item No.	Stock number	Fold out. No.	Item No.
2520-00-945-8360	8	92	3110-00-950-4236	11	50
2520-00-945-8416	3	11	3110-00-951-2424	3	99
2520-00-945-8427	7	37	4130-00-959-2329	5	12
2520-00-945-8427	8	94	5340-00-961-2404	10	79
2520-00-945-8432	4	24	4730-00-964-1781	5	27
2520-00-945-8432	4	49	2520-00-974-7396	3	20
2520-00-945-8464	4	26	2520-00-974-7397	3	22
2520-00-945-8464	4	47	5305-00-988-3784	5	30
2520-00-945-8529	4	14	5315-00-988-5360	6	11
2520-00-945-8569	4	11	5315-00-988-5260	9	51
2520-00-945-8586	6	51	5310-00-999-0590	5	47
2520-00-945-8586	9	8	8145-00-999-3897	NI	
3110-00-947-7080	5	46	2520-00-999-3904		
3110-00-950-4236	11	11			

Part Numbers Cross-Referenced to Figure and Item Numbers

Part Number	FSCM	Foldout No.	Item. No.	Part Number	FSCM	Foldout No.	Item No.
GB1012XOH	60380	11	7	MS35338-46	96906	11	32
GB1012XOH	60380	11	14	MS35338-46	96906	11	79
GB1012XOH	60380	11	16	MS35338-46	96906	11	85
GB1012XOH	60380	11	27	MS35338-46	96906	12	5
GB108XOH	60380	11	45	MS35338-46	96906	12	56
GB108XOH	60380	11	52	MS35338-46	96906	12	121
GB108XOH	60380	11	54	MS35338-46	96906	12	124
GB108XOH	60380	11	57	MS35338-46	96906	12	127
MS16555-52	96906	12	58	MS35338-46	96906	13	3
MS16562-163	96906	6	11	MS35338-46	96906	13	7
MS16562-163	96906	9	51	MS35338-46	96906	13	10
MS16562-165	96906	7	54	MS35338-46	96906	13	13
MS16562-165	96906	8	81	MS35338-46	96906	13	26
MS16624-75	96906	12	66	MS35338-46	96906	13	32
MS16624-75	96906	12	67	MS35338-46	96906	13	42
MS16624-75	96906	12	69	MS35671-16	96906	3	54
MS16624-75	96906	12	70	MS35671-16	96906	3	55
MS16625-212	96906	11	66	MS35671-16	96906	3	57
MS16625-3150	96906	10	35	MS35671-16	96906	3	62
MS16625-75	96906	13	60	MS35671-16	96906	3	64
MS16625-75	96906	13	98	MS35671-16	96906	7	52
MS16632-87	96906	12	48	MS35671-16	96906	7	57
MS16633-25	96906	7	1	MS35671-16	96906	7	84
MS16633-25	96906	7	17	MS35671-16	96906	8	48
MS16633-25	96906	8	114	MS35671-16	96906	8	52
MS16633-25	96906	8	130	MS35671-16	96906	8	68
MS16633-43	96906	12	22	MS35671-16	96906	8	72
MS19059-85	96906	4	13	MS35671-16	96906	8	75
MA19061-15	96906	12	39	MS35691-1001	96906	6	41
MA19061-5	96906	11	11	MS35691-45	96906	6	41
MS19061-5	96906	11	50	MS35691-49	96906	9	20
MS20365-524A	96906	10	5.2	MS35842-11	96906	10	67
MS21044N5	96906	3	4	MS35914-14	96906	10	7
MS21318-21	96906	3	48	MS35914-117	96906	3	68
MS35191-289	96906	5	30	MS49005-10	96906	8	80
MS35295-43	96906	11	70	MS49005-11	96906	5	27
MS35295-60	96906	7	88	MS49005-7	96906	5	12
MS35296-61	96906	10	1	MS49005-9	96906	5	11
MS35296-73	96906	8	22	MS49005-9	96906	7	59
MS35338-45	96906	8	2	MS90725-35	96906	12	15
MS35338-45	96906	10	52	MS90725-36	96906	10	53
MS35338-45	96906	10	87	MS90725-38	19207	8	1
MS35338-45	96906	10	90	MS90725-41	96906	10	89
MS35338-45	96906	12	1	MS90725-44	96906	8	27
MS35338-45	96906	12	14	MS90725-48	96906	10	88
MS35338-46	96906	3	76	MS90725-60	96906	7	92
MS35338-46	96906	3	79	MS90725-60	96906	8	41
MS35338-46	96906	7	73	MS90725-60	96906	8	54
MS35338-46	96906	7	76	MS90725-62	96906	13	4
MS35338-46	96906	3	85	MS90725-63	96906	11	84
MS35338-46	96906	7	97	MS90725-63	96906	13	28
MS35338-46	96906	7	100	MS90725-63	96906	13	44
MS35338-46	96906	8	8	MS90725-64	96906	11	79
MS35338-46	96906	8	12	MS90725-64	96906	12	122
MS35338-46	96906	8	60	MS90725-65	96906	7	99
MS35338-46	96906	8	83	MS90725-65	96906	8	59
MS35338-46	96906	10	1	MS90725-65	96906	12	55
MS35338-46	96906	10	12	MS90725-65	96906	13	9
MS35338-46	96906	10	15	MS90725-67	96906	7	77
MS35338-46	96906	10	18	MS90725-67	96906	7	98
MS35338-46	96906	10	31	MS90725-67	96906	8	11
MS35338-46	96906	11	20	MS90725-67	96906	8	84
MS35338-46	96906	11	28	MS90725-67	96906	11	33

Part Numbers Cross-Referenced to Figure and Item Numbers

Part Number	FSCM	Foldout No.	Item. No.	Part Number	FSCM	Foldout No.	Item No.
MS90725-67	96906	13	31	11649951	19207	13	40
MS90725-68	96906	7	74	11649952	19207	12	65
MS90725-68	96906	8	7	11649952	19207	12	71
MS90725-68	96906	11	19	11649953	19207	12	47
MS90725-68	96906	12	126	11649987	19207	8	91
MS90725-69	96906	3	78	11649988	19207	14	29
MS90725-69	96906	13	27	141147	24617	6	25
MS90725-69	96906	13	43	141147	24617	9	37
MS90725-70	96906	11	30	141147	24617	13	55
MS90725-70	96906	11	72	141147	24617	13	81
MS90725-71	96906	3	77	141189	24617	12	62
MS90725-71	96906	13	12	141192	24617	11	24
MS90725-73	96906	12	4	141192	24617	11	26
MS90725-74	96906	12	125	141195	24617	8	32
MS90725-16	96906	10	17	141234	24617	3	46
MS90725-76	96906	10	31	141234	21450	5	15
MS90726-31	96906	6	57	141234	21450	5	17
MS90726-31	96906	9	6	141238	24617	5	18
MS90727-197	96906	7	68	141260	24617	5	13
MS90727-197	96906	8	16	141260	24617	7	58
Q8292	19207	13	69	141260	24617	8	67
100409	24617	5	23	141260	24617	8	73
10863056	19207	3	15	141289	24617	4	35
10863066	19207	3	12	142756	73342	12	17
10875162	19207	8	24	145639	24617	4	3
10875301	19207	3	41	147497	24617	10	77
10885411	19207	3	9	147499	21450	6	43
10900456	19207	10	69	147499	73342	9	22
10910271	19207	3	47	19420	21450	8	71
10910987	19207	7	20	3L13L1A	43334	4	18
10910987	19207	8	111	3L13L1A	43334	6	28
10947193	19207	10	72	3L13L1A	43334	9	34
10947194	19207	10	71	442934	24617	6	26.8
10947298	19207	11	38	442934	24617	6	60.7
10947300	19207	3	36	442934	24617	9	7.7
10947301	19207	3	99	442934	24617	9	39.8
10947302	19207	7	63	442935	24617	4	31.7
10947302	19207	7	69	442935	24617	4	51.8
10947302	19207	7	85	443767	24617	8	50
10947302	19207	7	95	443769	24617	3	59
10947302	19207	8	15	443769	24617	11	56
10947302	19207	8	21	444606	24617	12	35
10947302	19207	8	36	444612	24617	10	42
10947302	19207	8	40	444612	24617	12	43
10947303	19207	5	35	444612	24617	12	68
10947304	19207	6	50	444687	24617	3	52
10947304	19207	9	12	444688	24617	3	63
10947307	19207	5	46	444688	24617	10	60
10947464	19207	11	37	444688	24617	13	16
10954024	19207	14	27	444688	24617	13	38
110409	24617	5	3	446151	24617	11	60
11649907	19207	5	41	453612	24617	12	60
11649908	19207	12	86	453612	24617	12	112
11649908	19207	12	102	454736	24617	6	14
11649909	19207	12	82	454736	24617	9	52
11649909	19207	12	107	455532	24617	7	65
11649911	19207	12	79	455532	24617	8	19
11649911	19207	12	100	5F7345	11083	14	13
11649912	19207	12	83	536152	21450	6	12
11649912	19207	12	105	5411984	19207	14	30
11649913	19207	12	54	5703115	19207	4	31
11649943	19207	11	62	5703116	19207	4	51
11649947	19207	7	40	5703117	19207	6	26
11649951	19207	13	24	5703117	19207	9	39

Part Numbers Cross-Referenced to Figure and Item Numbers

Part Number	FSCM	Foldout No.	Item. No.	Part Number	FSCM	Foldout No.	Item No.
5703118	19207	6	60	7708035	19207	12	101
5703118	19207	9	7	7708078	19207	10	64
5703119	19207	10	5	7708123	19207	10	65
5703120				7708225	19207	6	31
5703121	19207	5	28	7708225	19207	9	31
5703121	19207	5	37	7709185	19207	3	18
5703122	19207	5	7	7709185	19207	3	30
5703122	19207	5	19	7709211	19207	8	66
5703126	19207	3	1	7709239	19207	12	25
5703133	19207	12	52	7710032	19207	3	14
5703160	19207	11	40	7710032	19207	3	98
586152	21450	9	49	7710319	19207	3	7
6756403	73342	7	91	7710550	19207	13	5
6756403	73342	8	38	7710675	19207	3	95
6756622	73342	12	16	7748616	19207	5	39
6756904	73342	10	57	7748616	19207	6	37
6756907	73342	12	110	7748616	19207	9	25
6758201	73342	3	2	7748677	19207	12	51
6758202	73342	3	2	7767270	19207	3	49
6758203	73342	3	2	7767532	19207	12	49
6758204	73342	3	2	7767532	19207	13	64
6758205	73342	3	2	7767532	19207	13	91
6758828	73342	6	26.1	79420	21450	8	71
6758828	73342	6	26.6	7950864	19207	14	7
6758828	73342	6	60.1	8347311	19207	10	76
6758828	73342	6	60.6	8347312	19207	10	79
6758828	73342	9	7.1	8347411	19207	10	78
6758828	73342	9	7.6	8347411	19207	10	81
6758828	73342	9	39.2	8347863	19207	11	49
6758828	73342	9	39.7	8347896	19207	11	53
6768629	73342	10	44	8347899	19207	11	51
6770019	73342	3	3	8347919	19207	11	47
6770822	73342	3	8	8347930	19207	11	63
6771169	73342	10	43	8347948	19207	11	39
6772643	73342	12	36	8347949	19207	11	39
6772740	73342	12	37	8347958	19207	3	71
6772740	73342	12	45	8348018	19207	3	70
6777080	73342	3	6	8348050	19207	10	80
6777201	73342	3	96	8348300	19207	3	10
6777202	73342	3	96	8348540	19207	8	26
6777203	73342	3	96	8349049	19207	10	70
6777205	73342	3	96	8349394	19207	13	59
6833906	73342	3	13	8349394	19207	13	97
7083778	19207	14	26	8349324	19207	12	85
709414	73342	13	56	8349424	19207	12	103
709414	19207	13	83	8349550	19207	12	111
709467	73342	12	41	8349689	19207	10	74
709514	73342	12	73	8349689	19207	10	82
709514	73342	13	53	8349690	19207	10	83
709514	19207	13	80	8350114	19207	11	43
7374386	19207	10	3	8350116	19207	11	48
7374496	19207	7	21	8350245	19207	11	64
7374496	19207	8	108	8350398	19207	11	42
7375608	19207	10	24	8350449	19207	12	77
7376357	19207	11	81	8350499	19207	12	62
7376454	19207	4	51.4	8350499	19027	12	95
7376763	19207	12	46	8350586	19207	5	34
7521461	19207	11	41	8351184	19207	4	28
7707326	19207	13	21	8351184	19207	4	34
7707326	19207	13	29	8351184	19207	4	42
7707842	19207	3	26	8351184	19207	6	33
7708032	19207	11	5	8351184	19207	7	3
7708035	19207	12	87	8351184	19207	7	14

Part Numbers Cross-Referenced to Figure and Item Numbers

Part Number	FSCM	Foldout No.	Item. No.	Part Number	FSCM	Foldout No.	Item No.
8351184	19207	8	117	8356100	19207	N1	N1
8351184	19207	8	128	8356100	19207	1-1	
8351184	19207	9	29	8356101	19207	3	66
8351366	19207	3	25	8356101	19207	5	10
8351462	19207	11	3	8356124	19207	7	86
8351473	19207	3	23	8356124	19207	7	94
8351514	19207	12	28	8356124	19207	8	43
8351524	19207	10	46	8356124	19207	8	56
8351527	19207	12	27	8356126	19207	7	2
8351717	19207	3	29	8356126	19207	7	16
8351718	19207	3	21	8356126	19207	8	115
8351718	19207	3	28	8356126	19207	8	129
8351725	19207	3	27	8356127	19207	4	39
8351769	19207	5	33	8356127	19207	7	13
8351892-1	19207	6	39	8356127	19207	8	118
8351892-1	19207	9	23	8356128	19207	6	17
8351893-1	19207	6	2	8356128	19207	9	45
8351893-1	19207	9	60	8356135	19207	4	50
8351893-2	19207	4	25	8356136	19207	4	51.1
8351893-2	19207	4	46	8356139	19207	10	68
8351893-3	19207	6	4	8356141	19207	6	26.7
8351893-3	19207	9	58	8356141	19207	9	39.1
8351893-4	19207	7	36	8356142	19207	6	23
8351893-4	19207	8	95	8356142	19207	9	36
8351893-5	19207	4	23	8356143	19207	4	30
8351893-5	19207	4	48	8356144	19207	4	31.8
8351893-6	19207	6	7	8356145	19207	6	60.8
8351893-6	19207	9	55	8356145	19207	9	7.8
8351893-7	19207	4	6	8356147	19207	4	32
8351893-7	19207	7	29	8356149	19207	6	24
8351893-7	19207	8	103	8356149	19207	9	38
8351893-8	19207	6	38	8356155	19207	4	31.2
8351893-8	19207	9	24	8356155	19207	4	31.4
8351909	19207	7	38	8356156	19207	4	51.3
8351909	19207	8	93	8356156	19207	4	51.6
8355840	19207	3	22	8356176	19207	14	25
8355841	19207	3	20	8356201	19207	14	20
8355955	19207	14	1	8356202	19207	14	9
8355956	19207	14	2	8356219	19207	7	8
8355958	19207	14	8	8356219	19207	8	123
8355959	19207	14	17	8356220	19207	7	11
8355962	19207	14	18	8356220	19207	8	120
8355966	19207	14	3	8356221	19207	7	5
8355967	19207	14	5	8356221	19207	8	121
8355970	19207	14	14	8356260	19207	13	48
8355971	19207	14	21	8356260	19207	13	75
8355986	19207	14	10	8356263	19207	7	15
8355987	19207	14	11	8356263	19207	8	116
8355988	19207	14	12	8356264	19207	13	58
8355989	19207	14	23	8356264	19207	13	96
8356006	19207	14	24	8356265	19207	6	53
8356022	19207	14	15	8356265	19207	9	10
8356044	19207	10	4	8356266	19207	4	21
8356058	19207	5	8	8356267	19207	4	4
8356061	19207	6	5	8356268	19207	4	31.6
8356061	19207	9	57	8356269	19207	11	59
8356062	19207	4	5	8356270	19207	3	16
8356062	19207	7	30	8356271	19207	3	73
8356062	19207	8	102	8356272	19207	6	47
8356065	19207	6	1	8356272	19207	9	15
8356065	19207	6	6	8356275	19207	12	23
8356065	19207	9	56	8356276	19207	12	20
8356065	19207	9	61	8356277	19207	10	45

Part Numbers Cross-Referenced to Figure and Item Numbers

Part Number	FSCM	Foldout No.	Item. No.	Part Number	FSCM	Foldout No.	Item No.
8356278	19207	13	63	8356339	19207	9	5
8356278	19207	13	92	8356341	19207	6	46
8356279	19207	4	12	8356341	19207	9	16
8356281	19207	7	24	8356343	19207	4	19
8356281	19207	8	109	8356347	19207	4	44
8356284	19207	13	79	8356350	19207	6	26.4
8356285	19207	13	52	8356350	19207	9	7.4
8356287	19207	7	33	8356350	19207	9	39.5
8356287	19207	8	99	8356352	19207	6	18
8356288	19207	7	7	8356352	19207	6	27
8356288	19207	8	122	8356352	19207	6	61
8356291	19207	7	51	8356352	19207	9	1
8356291	19207	8	76	8356352	19207	9	35
8356292	19207	7	50	8356352	19207	9	44
8356292	19207	8	77	8356353	19207	5	47
8356295	19207	7	22	8356354	19207	6	48
8356295	19207	8	112	8356354	19207	9	14
8356296	19207	12	113	8356359	19207	3	44
8356296	19207	12	115	8356360	19207	6	30
8356297	19207	12	29	8356360	19207	9	32
8356303	19207	13	35	8356363	19207	7	25
8356305	19207	10	75	8356363	19207	8	107
8356306	19207	10	49	8356365	19207	7	78
8356307	19207	4	15	8356365	19207	8	53
8356308	19207	4	16	8356366	19207	8	6
8356308	19207	4	43	8356368	19207	11	17
8356308	19207	7	34	8356372	19207	12	12
8356308	19207	8	98	8356373	19207	13	47
8356311	19207	4	51.2	8356373	19207	13	74
8356311	19207	4	51.7	8356375	19207	5	42
8356312	19207	3	34	8356377	19207	3	90
8356313	19207	4	17	8356378	19207	8	49
8356313	19207	6	22	8356379	19207	5	44
8356313	19207	6	29	8356381	19207	5	43
8356313	19207	9	33	8356383	19207	4	27
8356313	19207	9	40	8356383	19207	4	33
8356315	19207	12	11	8356383	19207	4	41
8356316	19207	12	18	8356383	19207	6	34
8356318	19207	12	81	8356383	19207	7	4
8356318	19207	12	108	8356383	19207	7	12
8356319	19207	13	51	8356383	19207	8	119
8356319	19207	13	78	8356383	19207	8	127
8356321	19207	13	57	8356383	19207	9	28
8356321	19207	13	95	8356385	19207	6	45
8356322	19207	6	49	8356385	19207	9	17
8356322	19207	9	13	8356386	19207	3	33
8356323	19207	5	45	8356387	19207	3	35
8356325	19207	7	45	8356388	19207	6	13
8356325	19207	8	86	8356388	19207	9	53
8356327	19207	12	19	8356393	19207	8	34
8356328	19207	12	21	8356394	19207	13	54
8356329	19207	12	24	8356396	19207	4	7
8356330	19207	11	80	8356397	19207	3	87
8356330	19207	12	26	8356398	19207	11	8
8356332	19207	12	38	8356400	19207	10	84
8356333	19207	11	34	8356401	19207	4	2
P356335	19207	13	23	8356402	19207	5	32
8356335	19207	13	39	8356403	19207	3	50
8356336	19207	3	91	8356405	19207	11	75
8356337	19207	4	20	8356406	19207	13	82
8356338	19207	4	22	8356407	19207	11	35
8356338	19207	4	45	8356409	19207	12	130
8356339	19207	6	56	8356410	19207	6	3

Part Numbers Cross-Referenced to Figure and Item Numbers

Part Number	FSCM	Foldout No.	Item. No.	Part Number	FSCM	Foldout No.	Item No.
8356410	19207	9	59	8356535	19207	7	31
8356411	19207	10	9	8356535	19207	8	101
8356413	19207	11	76	8356536	19207	3	72
8356414	19207	6	10	8356537-1	19207	5	7
8356415	19207	3	45	8356537-1	19207	5	19
8356419	19207	3	88	8356537-2	19207	5	7
8356421	19207	10	5.1	8356537-2	19207	5	19
8356423	19207	4	31.3	8356537-3	19207	5	7
8356424	19207	4	51.5	8356537-3	19207	5	19
8356425	19207	6	26.3	8356539	19207	11	6
8356425	19207	6	60.3	8356541	19207	3	24
8356425	19207	9	7.3	8356543	19207	4	38
8356425	19207	9	39.4	8356543	19207	6	8
8356426	19207	6	9	8356543	19207	9	54
8356427	19207	4	31.1	8356544	19207	12	74
8356427	19207	4	31.5	8356545	19207	13	22
8356430	19207	12	80	8356545	19207	13	30
8356430	19207	12	106	8356547	19207	5	16
8356436	19207	12	30	8356549	19207	8	30
8356438	19207	4	1	8356551	19207	13	46
8356439	19207	12	32	8356551	19207	13	73
8356440	19207	10	6	8356553	19207	3	32
8356441	19207	3	19	8356556	19207	8	5
8356449	19207	11	46	8356557	19207	11	61
8356450	19207			8356558	19207	7	49
8356450	19207	6	60.4	8356558	19207	8	78
8356501	19207	7	42	8356560	19207	7	6
8356501	19207	8	90	8356560	19207	8	124
8356503	19207	6	19	8356561	19207	7	48
8356503	19207	9	43	8356561	19207	8	79
8356505	19207	12	75	8356562	19207	6	59
8356506	19207	12	116	8356562	19207	9	3
8356507	19207	7	90	8356564	19207	10	73
8356507	19207	8	39	8356565	19207	12	34
8356508	19207	8	4	8356566	19207	11	58
8356509	19207	11	18	8356569	19207	11	44
8356510	19207	5	38	8356571	19207	3	17
8356511-5	19207	7	28	8356572-1	19207	5	28
8356511-5	19207	8	104	8356572-1	19207	5	37
8356513	19207	13	1	8356572-2	19207	5	28
8356514	19207	13	34	8356572-2	19207	5	37
8356515	19207	12	109	8356572-3	19207	5	28
8356517	19207	13	37	8356572-3	19207	5	37
8356518	19207	10	10	8356576	19207	12	129
8356521	19207	3	81	8356576	19207	12	131
8356523	19207	3	40	8356578	19207	7	80
8356524	19207	3	42	8356579	19207	6	44
8356525	19207	11	65	8356579	19207	9	18
8356526	19207	7	32	8356583	19207	3	43
8356526	19207	8	100	8356586	19207	13	50
8356527	19207	7	19	8356586	19207	13	77
8356527	19207	8	113	8356587	19207	13	49
8356528	19207	10	9	8356587	19207	13	76
8356529	19207	6	20	8356588	19207	6	40
8356529	19207	6	21	8356588	19207	9	21
8356529	19207	9	41	8356589	19207	3	93
8356529	19207	9	42	8356593	60380	13	70
8356531	19207	5	26	8356593	19207	13	87
8356532	12907	7	44	8356594	19207	13	68
8356532	19207	8	87	8356594	19207	13	88
8356533	19207	7	89	8356595	19207	13	67
8356533	19207	8	37	8356595	19207	13	89
8356534	19207	4	8	8356596	19207	13	71

Part Numbers Cross-Referenced to Figure and Item Numbers

Part Number	FSCM	Foldout No.	Item. No.	Part Number	FSCM	Foldout No.	Item No.
8356596	19207	13	86	8356699	19207	13	94
8356597	19207	12	114	8356700	19207	6	15
8356598	19207	13	36	8356700	19207	8	3
8356599	19207	3	92	8356700	19207	8	28
8356602	19207	3	97	8356700	19207	9	47
8356605	19207	5	36	8356700	19207	10	51
8356606	19207	5	40	8356700	19207	10	86
8356621	19207	10	66	8356700	19207	10	91
8356624	19207	10	63	8356700	19207	11	10
8356629	19207	11	83	8356700	19207	11	67
8356630	19207	11	82	8356700	19207	11	69
8356658	19207	14	22	8356700	19207	12	13
8356694	19207	14	16	8356700	19207	12	50
8356699	19207	3	75	8356702-1	19207	3	53
8356699	19207	3	80	8356702-1	19207	3	58
8356699	19207	3	82	8356702-1	19207	3	61
8356699	19207	3	84	8356702-1	19207	3	65
8356699	19207	5	6	8356702-1	19207	7	53
8356699	19207	5	25	7356702-1	19207	7	83
8356699	19207	6	36	8356702-1	19207	8	47
8356699	19207	7	10	8356702-1	19207	8	71
8356699	19207	7	61	8356703-1	19207	7	56
8356699	19207	7	72	8356704-1	19207	3	56
8356699	19207	7	75	8356704-1	19207	8	51
8356699	19207	7	96	8356704-1	19207	8	69
8356699	19207	7	101	8356707	19207	7	87
8356699	19207	8	9	8356707	19207	7	93
8356699	19207	8	13	8356707	19207	8	42
8356699	19207	8	23	8356707	19207	8	55
8356699	19207	8	58	8356709	19207	13	18
8356699	19207	8	61	8356711	19207	13	15
8356699	19207	8	82	8356713	19207	5	8
8356699	19207	8	126	8356714	19207	7	71
8356699	19207	9	26	8356714	19207	8	10
8356699	19207	10	11	8356718	19207	3	51
8356699	19207	10	16	8356719	19207	7	47
8356699	19207	10	19	8356720	19207	5	9
8356699	19207	10	33	8356722	19207	7	55
8356699	19207	11	21	8356723	19207	8	46
8356699	19207	11	28	8356724	19207	7	81
8356699	19207	11	31	8356725	19207	3	60
8356699	19207	11	36	8356730	19207	10	61
8356699	19207	11	71	8356732	19207	7	46
8356699	19207	11	74	8356732	19207	8	85
8356699	19207	11	77	8356733	19207	10	47
8356699	19207	11	86	8356734	19207	7	70
8356699	19207	12	3	8356734	19207	8	14
8356699	19207	12	6	8356735	19207	11	1
8356699	19207	12	57	8356736	19207	10	92
8356699	19207	12	120	8356738	19207	8	44
8356699	19207	12	123	8356739	19207	7	79
8356699	19207	12	128	8356747	19207	12	84
8356699	19207	13	2	8356747	19207	12	104
8356699	19207	13	6	8356751	19207	10	40
8356699	19207	13	11	8356754	19207	10	48
8356699	19207	13	14	8356755	19207	10	50
8356699	19207	13	25	8356758	19207	9	48
8356699	19207	13	33	8356759	19207	9	50
8356699	19207	13	41	8356760	19207	10	39
8356699	19207	13	61	8356761	19207	10	36
8356699	19207	13	66	8356763	19207	4	37
8356699	19207	13	84	8356764	19207	4	36

Part Numbers Cross-Referenced to Figure and Item Numbers

Part Number	FSCM	Foldout No.	Item. No.	Part Number	FSCM	Foldout No.	Item No.
8356780	19207	10	38	8356954	19207	9	8
8356781	19207	4	29	8356955	19207	6	54
8356783	19207	6	35	8356955	19207	9	9
8356784	19207	9	27	8356956	19207	6	52
8356785	19207	6	42	8356956	19207	9	11
8356786	19207	9	19	8356957	19207	12	63
8356787	19207	6	32	8356958	19207	12	61
8356787	19207	9	30	8356959	19207	12	119
8356789	19207	12	53	8356960	19207	12	118
8356790	19207	12	52	8356961	19207	12	59
8356791	19207	4	40	8356963	19207	5	14
8356792	19207	3	37	8356964	19207	7	35
8356793	19207	3	39	8356964	19207	8	96
8356794	19207	3	38	8356965	19207	7	23
8356795	19207	5	29	8356965	19207	8	110
8356796	19207	6	55	8356969	19207	4	10
8356796	19207	9	2	8356969	19207	7	26
8356797	19207	6	58	8356969	19207	8	106
8356797	19207	9	4	8356970	19207	4	9
8356800	19207	5	4	8356970	19207	7	27
8356800	19207	5	22	8356970	19207	8	105
8356801	19207	5	2	8356971	19207	8	97
8356802	19207	5	21	8356971	19207	7	18
8356803	19207	5	20	8357017	19207	10	30
8356804	19207	5	1	8357019	19207	10	22
8356806	19207	5	31	8357020	19207	10	54
8356808	19207	7	66	8357021	19207	10	55
8356808	19207	8	18	8357022	19207	10	59
8356810	19207	3	89	8357023	19207	10	34
8356811	19207	7	67	8357024	19207	10	25
8356811	19207	8	17	8357025	19207	10	41
8356812	19207	7	64	8357026	19207	10	23
8356812	19207	8	20	8357181	19207	12	76
8356922	19207	8	62	8357181	19207	12	117
8356924	19207	7	41	8357183	19207	10	37
8356924	19207	8	88	8357211	19207	11	2
8356925	19207	7	43	8357212	19207	11	23
8356925	19207	8	89	8357213	19207	11	25
8356928	19207	8	31	8357214	19207	11	22
8356929	19207	8	35	8357215	19207	11	4
8356931	19207	8	65	8357216	19207	11	13
8356939	19207	12	31	8357217	19207	11	15
8356940	19207	3	11	8357218	19207	11	12
8356943-1	19207	7	37	8357219	19207	10	20
8356943-1	19207	8	94	8357220	19207	10	21
8356943-2	19207	4	24	8357222	19207	10	26
8356943-2	19207	4	49	8357223	19207	10	28
8356943-3	19207	4	26	8357224	19207	10	27
8356943-3	19207	4	47	8357231	19207	12	91
8356943-4	19207	7	39	8357231	19207	12	96
8356943-4	19207	8	92	8357232	19207	12	89
8356944	19207	10	55	8357232	19207	12	98
8356945	19207	13	45	8357233	19207	12	93
8356945	19207	13	72	8357233	19207	12	94
8356946	19207	12	44	8357234	19207	12	90
8356947	19207	12	64	8357234	19207	12	97
8356947	19207	12	72	8357235	19207	12	88
8356948	19207	12	33	8357235	19207	12	99
8356950	19207	4	14	8357238	19207	12	7
8356951	19207	4	11	8357239	19207	12	40
8356952	19207	10	56	8357240	19207	12	42
8356953	19207	10	58	8357241	19207	12	8
8356954	19207	6	51	8357242	19207	12	9

Part Numbers Cross-Referenced to Figure and Item Numbers

Part Number	FSCM	Foldout No.	Item. No.	Part Number	FSCM	Foldout No.	Item No.
8357243	19207	12	10	9409014	24617	6	16
8357244	19207	3	69	9409014	24617	9	46
8357256	19207	12	52	9409021	24617	3	31
8357257	19207	NI	NI	9409029	24617	5	5
8357264	19207	11	55	9409029	19207	5	24
8357265	19207	11	40.2	9409029	24617	13	66
8357267	19207	11	40.1	9409029	24617	13	93
8357268	19207	7	82	9409030	19207	11	73
8357268	19207	8	45	9409037	24617	3	83
8357274	19207	8	33	9409040	18876	7	62
8357275	19207	8	29	9409040	18876	8	57
8357276	19207	8	25	9409071	24617	13	62
8357327	19207	12	78	9409071	19207	13	85
8357330	19207	6	26.2	9415677	24617	3	74
8357330	19207	6	26.5	9418210	24617	10	85
8357330	19207	6	60.2	9422023	24617	13	8
8357330	19207	6	60.5	9422029	24617	10	14
8357330	19207	9	7.2	9422029	24617	12	1
8357330	19207	9	7.5	9422880	24617	3	94
8357330	19207	9	39.3	9423064	24617	13	17
8357330	19207	9	39.6	9423064	24617	13	20
8357721	19207	10	29	9423065	24617	3	67
8647950	19207	11	39	0423065	24617	7	60
865703-1	19207	8	74	9423065	24617	8	64
8675777	19207	7	9	9423632	24617	3	86
8675777	19207	8	125	9423633	24617	10	13
8708107	19207	14	6	949013	19207	11	9
9409013	19207	11	68				

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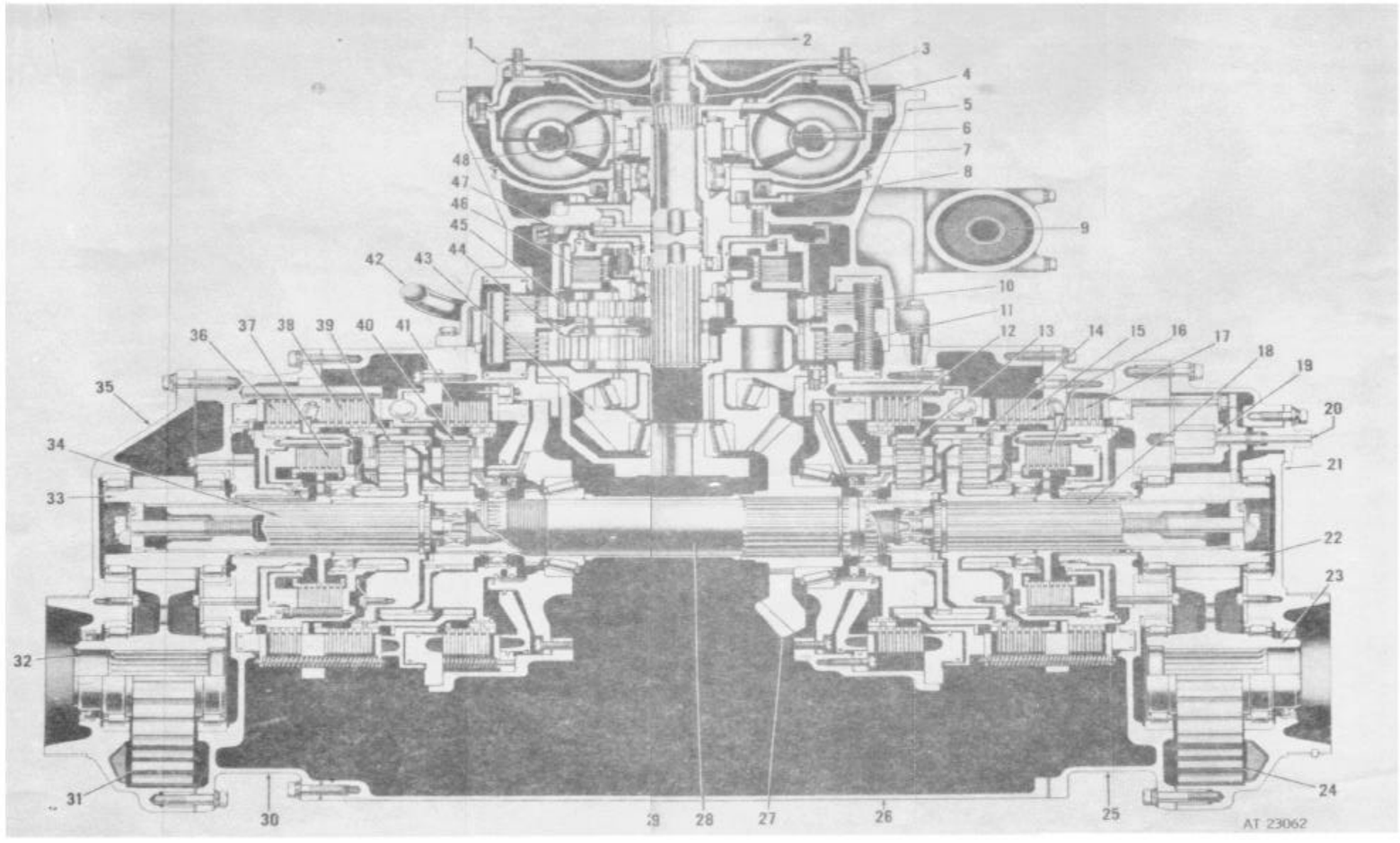
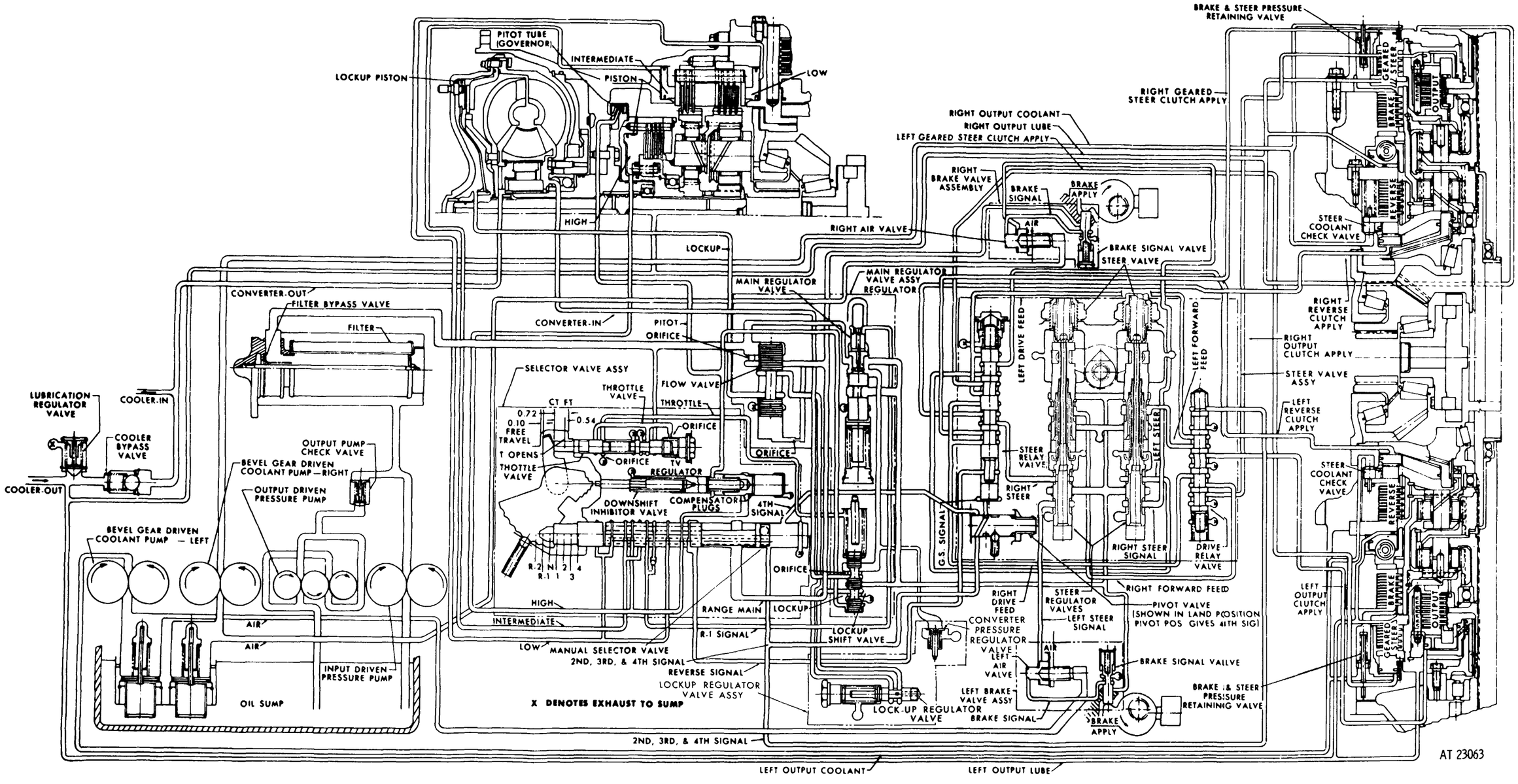
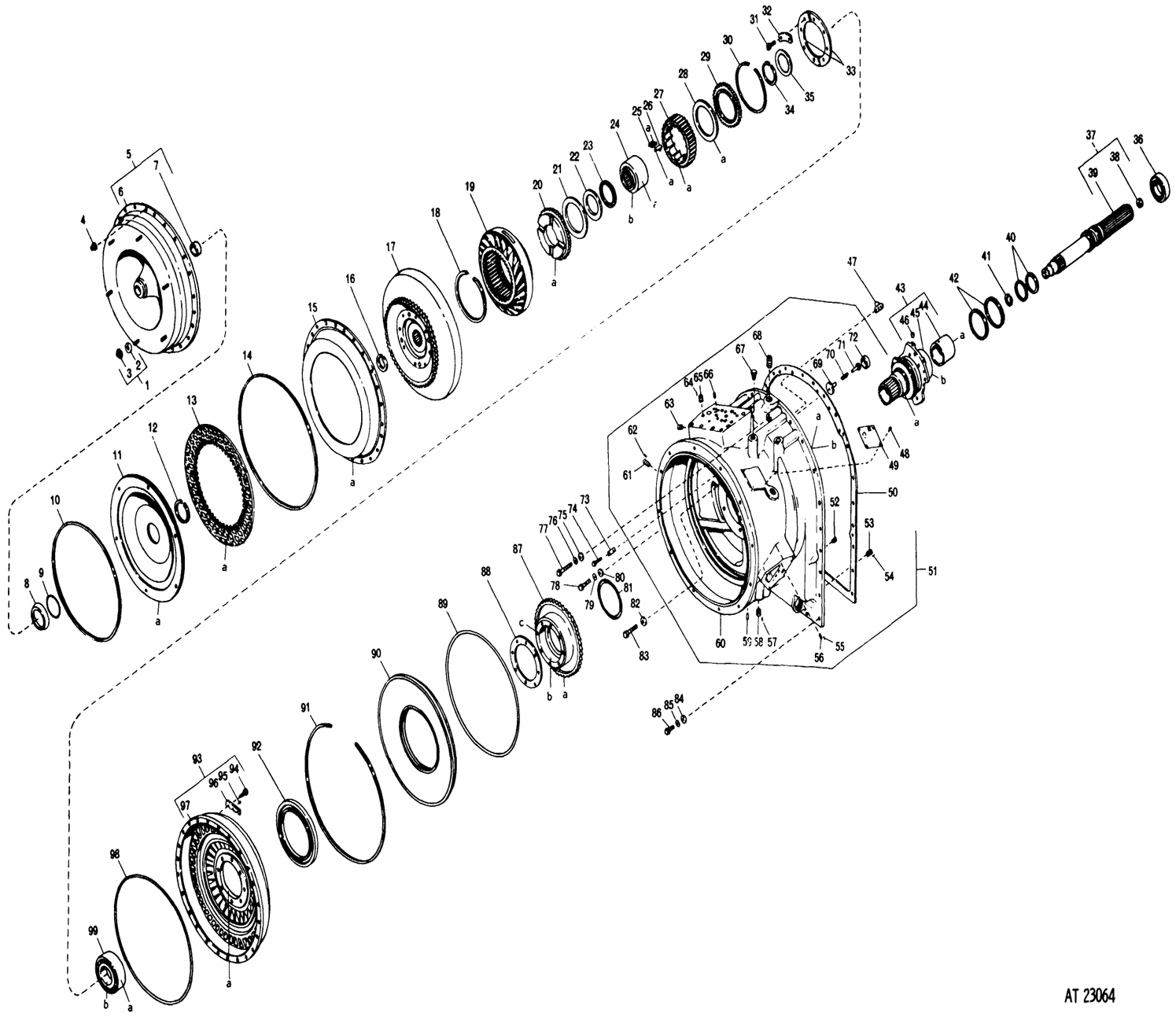
1—Torque converter cover
2—Converter turbine shaft
3—Lockup clutch
4—Torque converter turbine
5—Torque converter housing
6—Torque converter stator
7—Torque converter pump
8—Input drive gear
9—Oil filter element
10—Intermediate-range clutch
11—Low-range clutch
12—Right reverse-range clutch
13—Right reverse-range planetary carrier assembly
14—Right steer planetary carrier assembly
15—Right brake
16—Right output clutch
17—Right steer clutch
18—Right output shaft
19—Output pump assembly
20—Speedometer drive
21—Right end cover
22—Right output drive gear
23—Right output
24—Right output driven gear
25—Right output housing
26—Bevel gear housing
27—Bevel driven gear
28—Cross shaft
29—Bevel drive gear carrier
30—Left output housing
31—Left output driven gear
32—Left output
33—Left output drive gear
34—Left output shaft
35—Left end cover
36—Left steer clutch
37—Left output clutch
38—Left brake
39—Left steer planetary carrier assembly
40—Left reverse-range planetary carrier assembly
41—Left reverse-range clutch
42—Oil filler tube
43—Bevel drive gear
44—Low-range planetary carrier assembly
45—Intermediate-range planetary carrier assembly
46—High-range clutch
47—Fluid velocity governor
48—Stator freewheel roller



Foldout 1. Model XTG 250-1a transmission-cross-section view.



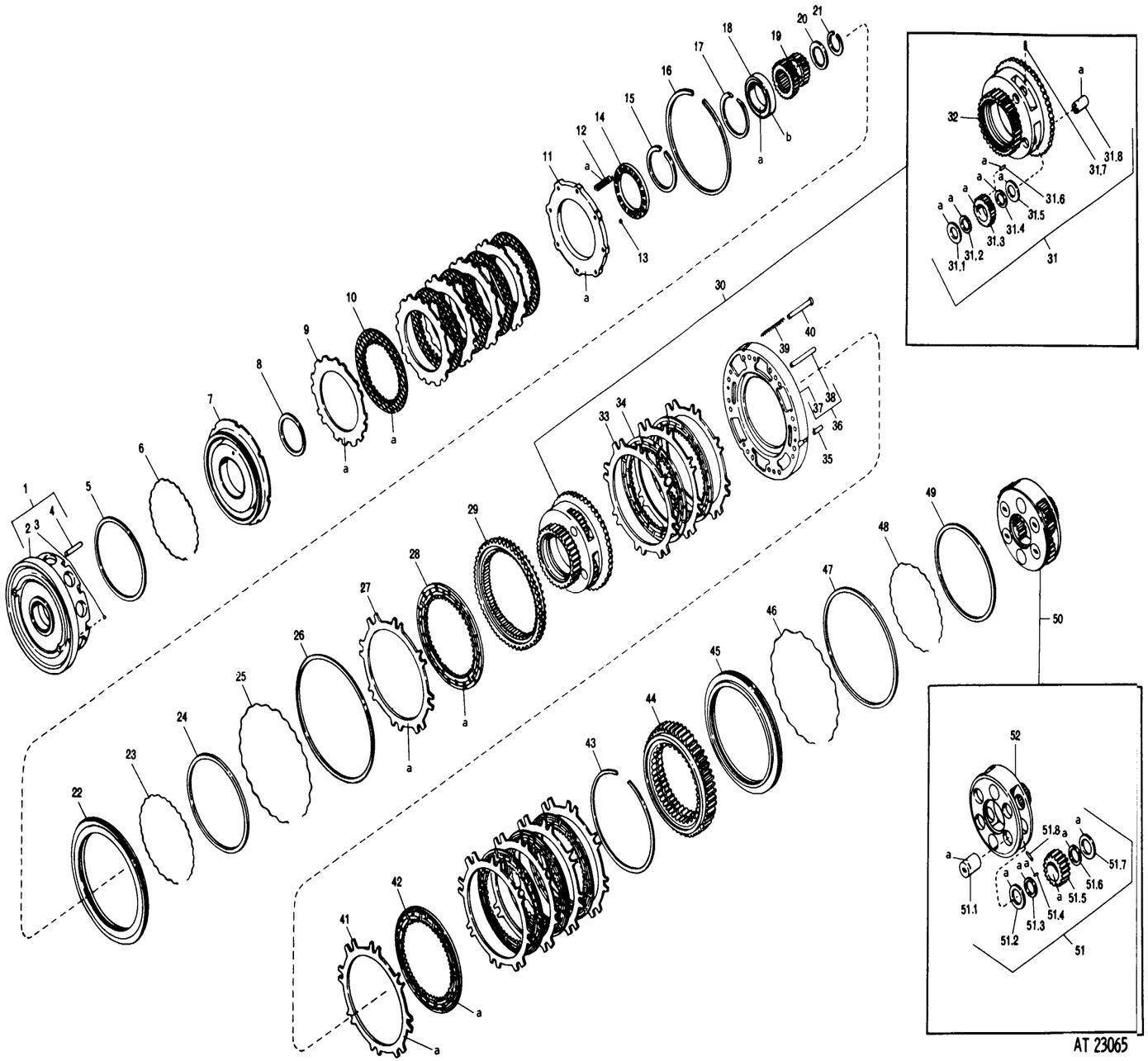
Foldout 2. Model XTG 250-1A transmission hydraulic system-schematic view.



(All parts listed below are found in Functional Group 0708, except as otherwise indicated)

1—Converter stack control spacer kit
2—Spacer:
0.027 to 0.029 (ar)
0.045 to 0.047 (ar)
0.063 to 0.065 (ar)
0.081 to 0.083 (ar)
0.099 to 0.101 (ar)
3—Retainer
4—Self-locking, hexagon nut, 5/16-24 (24)
5—Converter pump cover assembly
6—Cover
7—Torque converter cover hub inner Teflon sealring
8—Converter lockup clutch piston seal retainer
9—Converter lockup clutch piston preformed packing
10—Lockup clutch piston outer sealring
11—Lockup clutch piston assembly
12—Lockup clutch piston retaining ring
13—Lockup clutch disk
14—Converter lockup clutch back plate nonmetallic washer
15—Lockup clutch back plate
16—Torque converter turbine retaining plate
17—Torque converter turbine assembly
18—Stator thrust washer retaining ring
19—Torque converter stator assembly
20—Stator thrust washer
21—Stator freewheel roller cam thrust washer
22—Stator bearing race thrust washer
23—Stator thrust bearing assembly
24—Torque converter stator freewheel roller race assembly
25—Torque converter stator freewheel roller spring (12)
26—Torque converter stator freewheel bearing roller (12)
27—Torque converter stator freewheel roller cam
28—Stator freewheel roller cam thrust washer
29—Torque converter stator cam roller washer
30—Stator cam washer internal retaining ring
31—Torque converter pump bearing retainer self-locking bolt 5/16-24 x 1 1/4 (8)
32—Torque converter pump bearing retainer nut and bolt lock plate (4)
33—Retainer (2)
34—Stator freewheel roller race retaining ring
35—Spacer
36—Torque converter output shaft annular ball bearing (0710)
37—Converter output shaft assembly (0710)
38—Plug (0710)
39—Shaft (0710)
40—Torque converter output shaft nonmetallic Teflon sealring (0710)
41—Torque converter output shaft sealring
42—Torque converter ground sleeve nonmetallic Teflon sealring (0713)
43—Torque converter sleeve assembly
44—Insert
45—Sleeve
46—Pin, ⅛ x ⅜ (3)
47—Transmission pitot assembly
48—Screw (4) (0710)
49—Nameplate (0710)
50—Torque converter housing gasket (0710)
51—Torque converter housing assembly
52—Plug, ⅛
53—Insert
54—Pin (2)
55—Pin (7)
56—Insert
57—Pin (14)
58—Insert
59—Dowel pin, 1/4 x 9/16 (2)
60—Housing
61—Insert
62—Pin (4)
63—Pipe plug (2)
64—Pin (12)
65—Insert (1)
66—Plug
67—Plug (2)
68—Insert
69—Guide
70—Spring
71—Valve
72—Seat
73—Nut and bolt lock plate
74—Pitot tube machine screw, no. 10-32 x 1½ (2)
75—Torque converter housing flat washer
76—Torque converter housing lockwasher
77—Torque converter housing hexagon-head capscrew, ⅜-16 x 3¼
78—Torque converter housing hexagon-head capscrew, ⅜-16 x 2¼ (2)
79—Torque converter housing lockwasher (2)
80—Torque converter housing flat washer (2)
81—Converter ground sleeve nonmetallic Teflon sealring
82—Torque converter ground sleeve flat washer (5)
83—Torque converter ground sleeve self-locking bolt, ⅜-24 x 1¼ (5)
84—Torque converter housing flat washer (23)
85—Torque converter housing lockwasher (23)
86—Torque converter housing hexagon-head capscrew, ⅜-16 x 1⅝ (23)
87—Input oil pump drive spur gear (0710)
88—Torque converter pump gasket
89—Converter housing diaphragm preformed packing
90—Diaphragm
91—Converter housing diaphragm retaining ring
92—Input oil pump drive gear plain encased seal
93—Torque converter pump assembly
94—Screw, no. 6 x ⅜ (2)
95—Torque converter pump machine screw, 5/16-24 x 1.30 (24)
96—Weight:
0.009
0.018
0.060
—Weight Assembly
97—Torque converter pump
98—Converter pump cover nonmetallic washer
99—Torque converter pump ball bearing

Foldout 3. Lockup clutch, torque converter, converter housing, and related parts-exploded view.

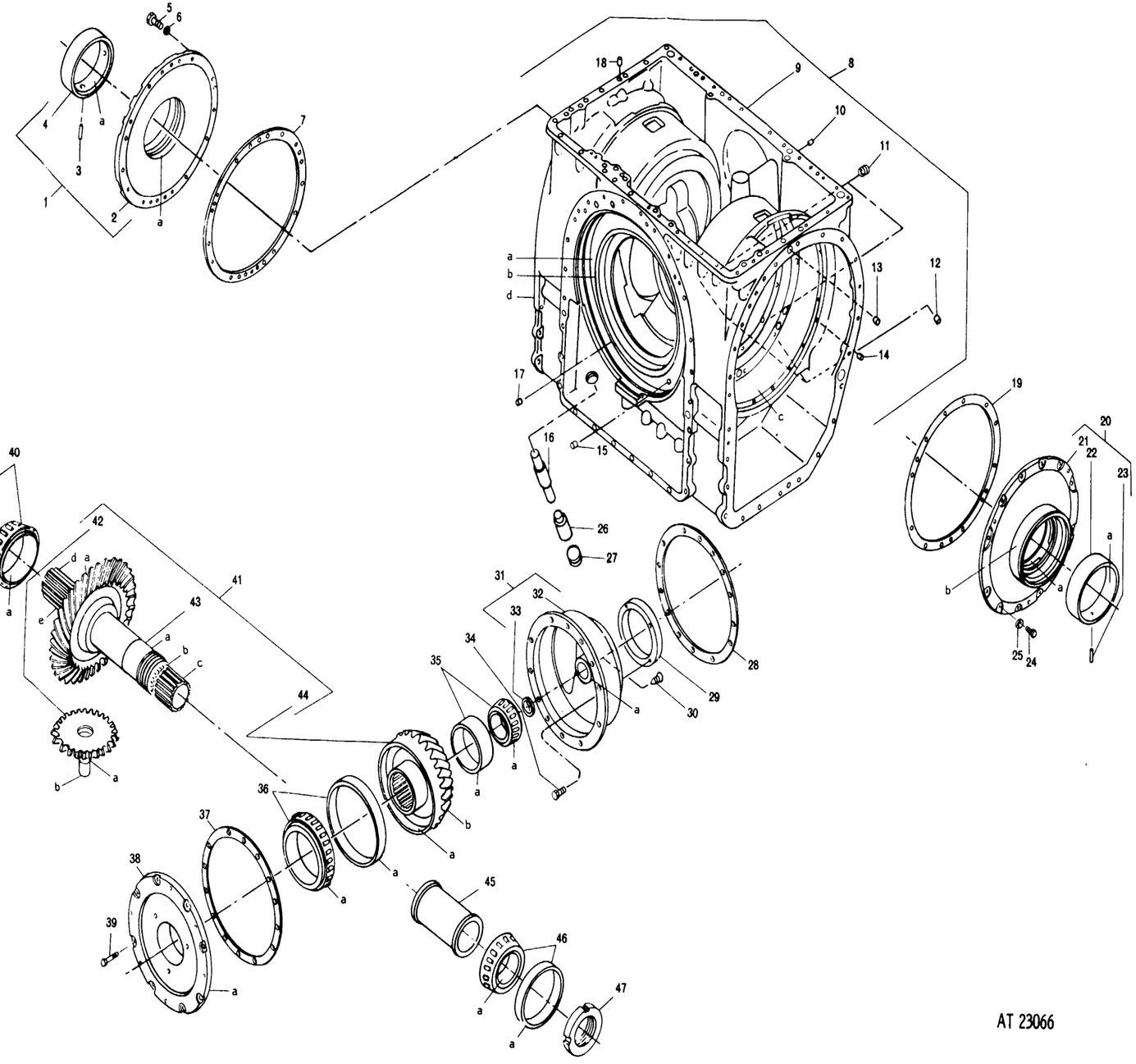


(All parts listed below are found in Functional Group 0713, except as otherwise indicated)

1—High-range clutch housing assembly
2—Housing
3—Ball (2)
4—High-range clutch housing anchor headless straight pin (8)
5—High-range clutch piston outer nonmetallic Teflon sealring
6—High-range clutch outer expander piston ring spring
7—High-range clutch piston
8—High-range clutch piston inner metal sealring
9—High-range clutch disk (5)
10—High-range clutch disk (5)
11—High-range clutch back plate
12—High-range clutch piston return helical compression spring (16)
13—High-range clutch spring retainer locating bearing ball
14—High-range clutch piston spring retainer
15—High-range clutch piston return spring retainer retaining ring (0710)
16—High-range clutch back plate retaining ring (0710)
17—Intermediate-range planetary carrier bearing retaining ring (0710)
18—Intermediate-range clutch planetary carrier annular ball bearing (0710)
19—Intermediate- and low-range spur cluster sun gear (0710)
20—Intermediate- and low-range sun gear thrust washer (0710)
21—Intermediate- and low-range sun gear thrust washer retaining ring (0710)
22—Intermediate-range clutch piston
23—Intermediate-range clutch inner expander piston ring spring
24—Intermediate-range clutch piston inner Teflon sealring
25—Intermediate-range clutch outer expander piston ring spring
26—Intermediate-range clutch piston outer Teflon sealring
27—Intermediate-range clutch disk
28—Intermediate-range clutch disk
29—Intermediate-range clutch ring gear assembly (0710)
30—Intermediate-range clutch planetary transmission carrier assembly (0710)
31—Intermediate-range pinion transmission planetary carrier assembly parts kit (0710)
31.1—Thrust washer (0710)
31.2—Spacer (0710)
31.3—Pinion set (0710)
31.4—Spacer (0710)
31.5—Thrust washer (0710)
31.6—Roller (0710)
31.7—Headless groove pin (0710)
31.8—Spindle (0710)
32—Carrier (0710)
33—Intermediate-range clutch disk (3)
34—Intermediate-range clutch disk (2)
35—Pin (3)
36—Spacer assembly
37—Spacer
38—Pin (8)
39—Low- and intermediate-range clutch piston return helical compression spring
40—Low- and intermediate-range clutch piston return spring guide solid rivet
41—Low-range clutch disk
42—Low-range clutch disk
43—Low-range clutch ring gear snapring (0710)
44—Low-range clutch spur gear (0710)
45—Low-range clutch piston
46—Low-range clutch outer expander piston ring spring
47—Low-range clutch piston outer Teflon sealring
48—Low-range clutch inner expander piston ring spring
49—Low-range clutch piston inner Teflon sealring
50—Low-range clutch planetary transmission carrier assembly (0710)
51—Low-range pinion transmission planetary carrier assembly parts kit (0710):
51.1—Spindle (0710)
51.2—Thrust washer (0710)
51.3—Spacer (0710)
51.4—Roller (0710)
51.5—Pinion set (0710)
51.6—Spacer (0710)
51.7—Thrust washer (0710)
51.8—Headless grooved pin (0710)
52—Carrier (0710)

Foldout 4. High-range clutch, intermediate- and low-range clutches and planetaries, and related parts-exploded view.

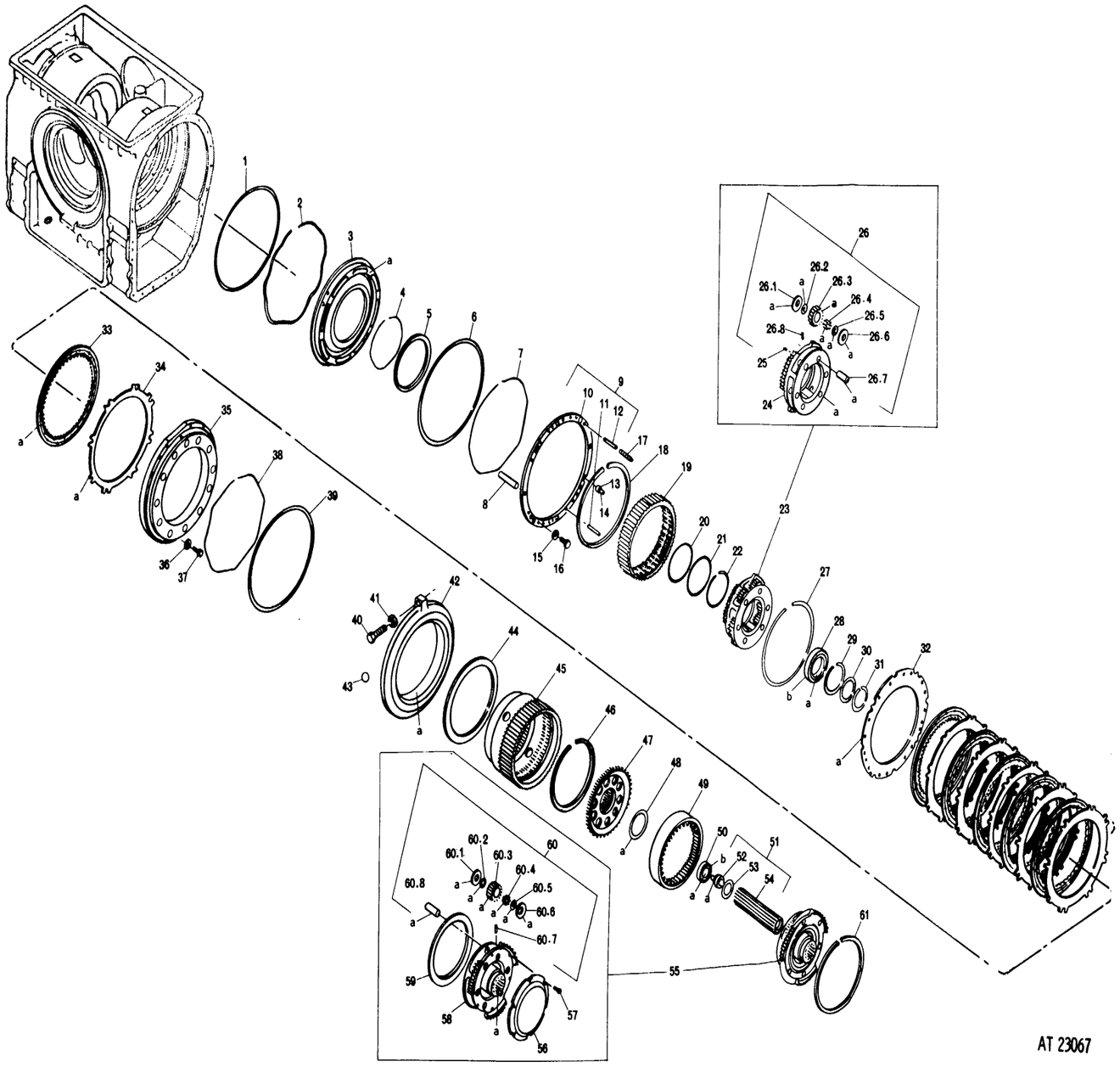
All parts listed below are found in Functional Group 0710)



1—Cross-shaft right bearing retainer assembly
2—Retainer
3—Right cross-shaft bearing retainer sleeve, headless straight pin
4—Right cross-shaft bearing retainer sleeve bearing
5—Right cross-shaft bearing retainer self-locking bolt, 3/8-16 x 1 1/8 (13)
6—Right cross-shaft bearing retainer flat washer (13)
7—Cross-shaft bearing retainer shim set:
Shim, 0.008 to 0.0100 (ar)
Shim, 0.0105 to 0.0135 (ar)
Shim, 0.014 to 0.0170 (ar)
8—Housing assembly
9—Housing
10—Plug prior to serial no. 365
11—Plug (2)
12—Plug (2)
13—Pin (4)
14—Pin (2)
15—Pin
16—Tube
17—Pin
18—Pin
19—Shim set:
Shim, 0.008 to 0.0100 (ar)
Shim, 0.0105 to 0.0135 (ar)
Shim, 0.014 to 0.170 (ar)
20—Left cross-shaft bearing retainer assembly
21—Retainer
22—Left cross-shaft bearing retainer sleeve bearing
23—Left cross-shaft bearing retainer sleeve headless straight pin
24—Left cross-shaft bearing retainer self-locking bolt, 3/8-16 x 1 1/8 (13)
25—Left cross-shaft bearing retainer flat washer
26—Screen
27—Plug
28—Shim set:
Shim, 0.008 to 0.010 (ar)
Shim, 0.0105 to 0.0135 (ar)
Shim, 0.013 to 0.017 (ar)
29—Pilot (prior to serial no. 953)
30—Machine screw 1/4-28 x 1/2 (2)
31—Carrier assembly
32—Carrier
33—Plug
34—Bevel gear carrier pilot self-locking bolt, 5/16-18 x 1 (4) (prior to serial no. 953)
35—Bevel pinion carrier roller bearing assembly
36—Bevel drive gear roller bearing assembly
37—Bevel pinion carrier shim set:
Shim, 0.008 to 0.010 (ar)
Shim, 0.0105 to 0.0135 (ar)
Shim, 0.013 to 0.017 (ar)
38—Support
39—Pinion bearing support self-locking bolt, 3/8-16 x 1 1/2
40—Right cross-shaft roller bearing assembly
41—Matched gear and shaft assembly
42—Pump gear
43—Driven gear and shaft assembly
44—Drive gear
45—Spacer
46—Left cross-shaft roller bearing assembly
47—Cross-shaft nut

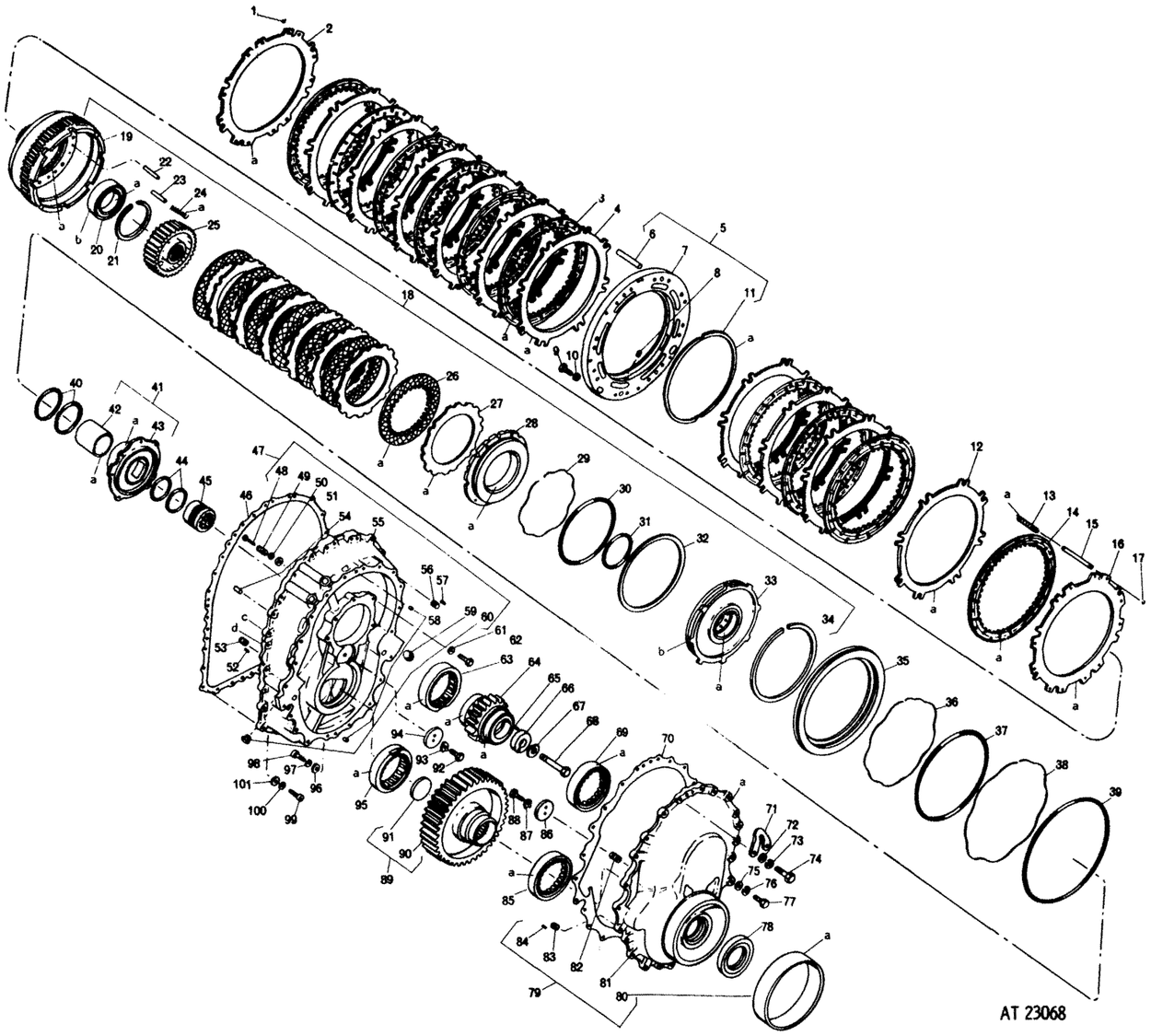
Foldout 5. Cross shaft, bevel gears, bevel gear housing, and related parts-exploded view.

(All parts listed below are found in Functional Group 0710, except as otherwise indicated)



1—Left reverse-range clutch piston outer Teflon nonmetallic sealring (0713)
2—Left reverse-range clutch outer piston ring spring expander (0713)
3—Left reverse-range clutch piston (0713)
4—Left reverse-range clutch inner piston ring spring expander (0713)
5—Left reverse-range clutch piston inner Teflon nonmetallic sealring (0713)
6—Left steer coolant check valve retainer Teflon nonmetallic sealring (0713)
7—Left steer coolant check valve retainer piston ring spring expander (0713)
8—Left reverse-range clutch anchor pin (8) (0713)
9—Retainer assembly
10—Retainer
11—Pin
12—Pin (11)
13—Valve
14—Pin
15—Left steer coolant check valve retainer bolt flat washer (4)
16—Left steer coolant check valve retainer self-locking bolt, 5/16-18 x 1½ (4)
17—Left reverse-range clutch piston return helical compression spring (12) (0713)
18—Left reverse-range clutch hub retaining ring
19—Left reverse-range clutch hub (0713)
20—Left reverse-range carrier Teflon nonmetallic sealring
21—Left reverse-range carrier Teflon nonmetallic sealring
22—Left reverse-range carrier bearing retaining ring
23—Left reverse-range clutch planetary, transmission carrier assembly
24—Carrier
25—Pin (6)
26—Reverse-range pinion transmission planetary carrier assembly parts kit:
26.1—Thrust washer
26.2—Spacer
26.3—Pinion set
26.4—Roller
26.5—Spacer
26.6—Thrust washer
26.7—Spindle
26.8—Headless grooved pin
27—Left reverse-range clutch hub retaining ring
28—Left reverse-range planetary carrier annular ball bearing
29—Left reverse-range carrier bearing retaining ring
30—Spacer
31—Left reverse-range sun gear retaining ring
32—Left reverse-range reaction clutch disk (0713)
33—Left reverse-range clutch disk (6) (0713)
34—Left reverse-range, clutch disk (6) (0713)
35—Left brake apply stationary cam
36—Left brake apply stationary cam flat washer (16)
37—Left brake apply stationary cam self-locking bolt, 3/8-16 x 1 1/2
38—Left brake stationary cam expander piston ring spring
39—Left brake apply stationary cam Teflon nonmetallic sealring (0713)
40—Left brake adjusting screw
41—Left brake adjusting hexagon nut
42—Transmission left brake rotating apply cam
43—Left brake apply rotating cam bearing ball (12)
44—Plate
45—Left brake hub
46—Left steer planetary ring gear retaining ring
47—Left reverse-range clutch transmission sun gear assembly
48—Left reverse-range clutch sun gear thrust washer
49—Left steer planetary ring internal gear
50—Ball bearing
51—Transmission output shaft assembly
52—Extension
53—Left output shaft retaining ring
54—Shaft
55—Left steer planetary transmission carrier assembly
56—Collector
57—Bolt (6)
58—Carrier
59—Baffle
60—Steer pinion transmission planetary carrier assembly parts kit:
60.1—Thrust washer
60.2—Spacer
60.3—Pinion set
60.4—Roller
60.5—Spacer
60.6—Thrust washer
60.7—Headless grooved pin
60.8—Spindle
61—Left steer planetary carrier retaining ring

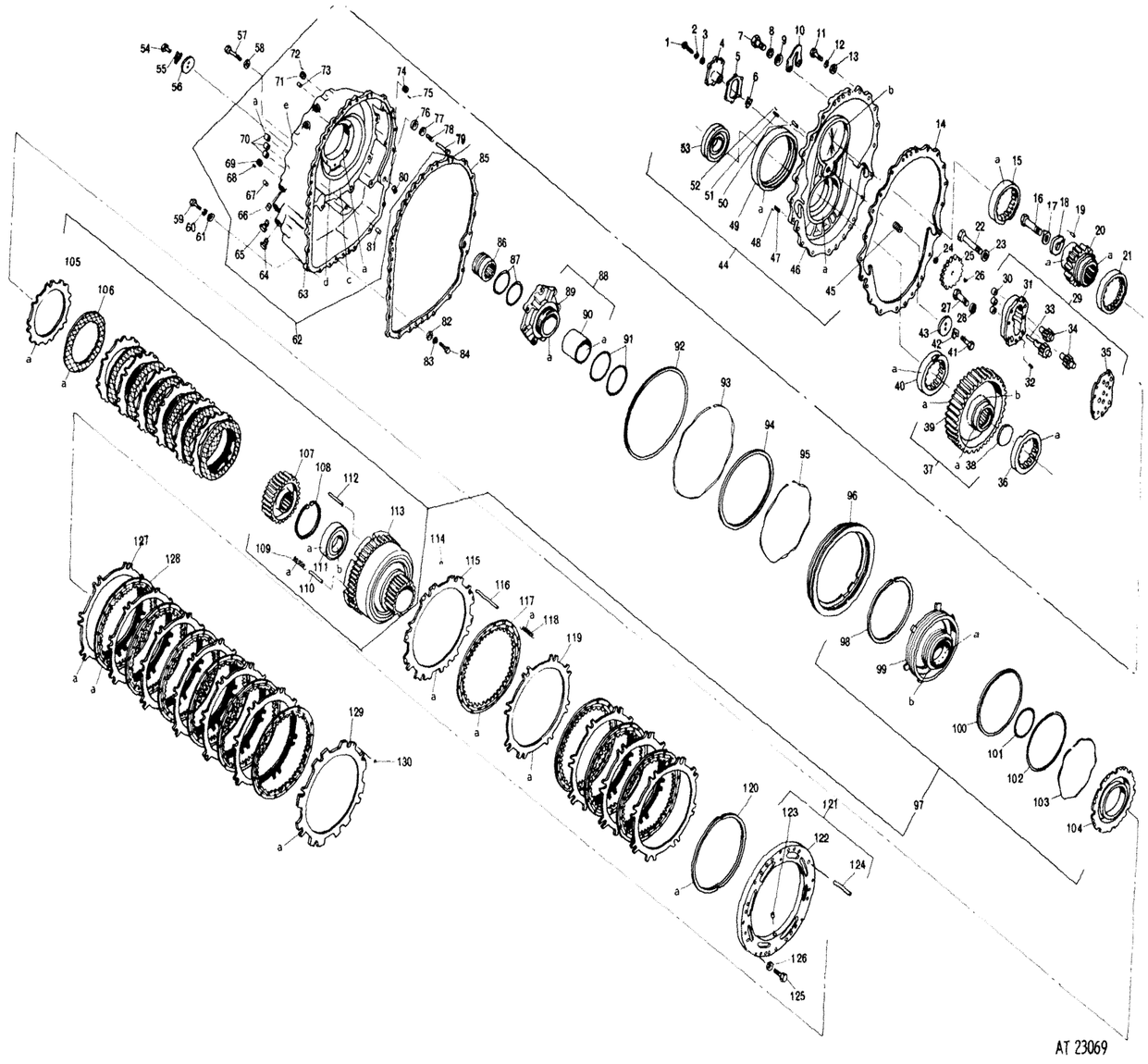
Foldout 6. Left reverse-range clutch and planetary, brake cams, and steer planetary-exploded view.



(All parts listed below are found in Functional Group 0710, except as otherwise indicated)

1—Left brake and steer clutch return spring pin retaining ring (12) (0713)
2—Left brake apply clutch disk (0713)
3—Left brake disk (6) (0713)
4—Left steer clutch disk (6) (0713)
5—Plate assembly (0713)
6—Pin (8) (0713)
7—Plate
8—Pin (2)
9—Left brake and steer clutch reaction plate self-locking bolt, 3/8-16 x 2 1/4 (8)
10—Left brake and steer clutch reaction plate flat washer (8)
11—Plate
12—Left steer clutch disk (4) (0713)
13—Left brake and steer clutch return helical compression spring (12) (0713)
14—Left steer clutch disk (4) (0713)
15—Left brake and steer clutch return spring headless grooved pin
16—Left steer apply clutch disk (0713)
17—Left brake and steer clutch return spring pin retaining ring (12) (0713)
18—Output clutch assembly
19—Left output clutch housing assembly
20—Left output clutch housing annular ball bearing
21—Left output clutch housing bearing retaining ring
22—Left output clutch anchor headless straight pin (8)
23—Left output clutch piston return spring guide headless straight pin (16)
24—Left output clutch piston return helical compression spring (8)
25—Left output clutch hub
26—Left output clutch disk (7)
27—Left output clutch disk (7)
28—Left output clutch piston
29—Left output clutch piston ring spring expander
30—Left output clutch piston Teflon nonmetallic sealring (0713)
31—Left output clutch piston metal sealring
32—Left output clutch piston housing preformed packing
33—Left output clutch transmission piston housing assembly
34—Left output clutch piston housing retaining ring
35—Left steer clutch piston (0713)
36—Left steer clutch piston ring spring expander (0713)
37—Left steer clutch piston Teflon nonmetallic sealring (0713)
38—Left steer clutch piston ring spring expander (0713)
39—Left steer clutch piston Teflon nonmetallic sealring (0713)
40—Left output clutch sleeve metallic sealring
41—Sleeve assembly
42—Insert
43—Sleeve
44—Left output clutch spacer Teflon nonmetallic sealring
45—Spacer
46—Left output housing gasket
47—Housing assembly
48—Guide
49—Spring
50—Valve
51—Seat
52—Pin (8)
53—Insert
54—Pin
55—Housing
56—Insert
57—Pin (5)
58—Pin
59—Plug (2)
60—Left output housing pipe plug, 1/4-18 (3)
61—Left output clutch sleeve flat washer (5)
62—Left output clutch sleeve self-locking bolt, 3/8-24 x 2 (5)
63—Left output transfer drive gear roller bearing assembly
64—Left output transfer drive spur gear
65—Pin
66—Left output transfer drive gear lock plate
67—Left output transfer drive gear shaft bolt lock tab
68—Left output transfer drive gear shaft locking bolt, 3/4-16 x 4 1/2
69—Left output transfer drive gear roller bearing assembly
70—Left end cover gasket
71—Left lifting transmission bracket
72—Left transmission lifting bracket flat washer (2)
73—Left lifting bracket lockwasher (2)
74—Left lifting bracket hexagon-head capscrew, 3/8-16 x 2 1/2 (2)
75—Left end cover flat washer (17)
76—Left end cover lockwasher (17)
77—Left end cover hexagon-head capscrew, 3/8-16 x 2 1/4 (17)
78—Left end cover encased plain seal
79—Cover assembly
80—Sleeve
81—Cover
82—Left end cover insert
83—Insert
84—Pin (2)
85—Left output transfer drive gear roller bearing assembly
86—Left output transfer gear roller bearing retaining plate
87—Left output transfer gear roller bearing retainer bolt tab lockwasher
88—Left output transfer gear roller bearing retainer washer machine bolt, 3/8-16 x 1
89—Left output driven transfer gear assembly
90—*Gear*
91—Plug
92—Left output transfer gear roller bearing retaining washer machine bolt, 3/8-24 x 2
93—Left output transfer gear roller bearing retainer bolt tab lockwasher (5)
94—Left output transfer gear roller bearing retaining plate
95—Left output transfer drive gear roller bearing assembly
96—Left end cover flat washer (2)
97—Left end cover lockwasher (2)
98—Left end cover hexagon-head capscrew, 3 8-16 x 2 1/4 (2)
99—Left output housing hexagon-head capscrew, 3/8-16 x 1 3/4 (24)
100—Left output housing lockwasher (24)
101—Left output housing flat washer (24)

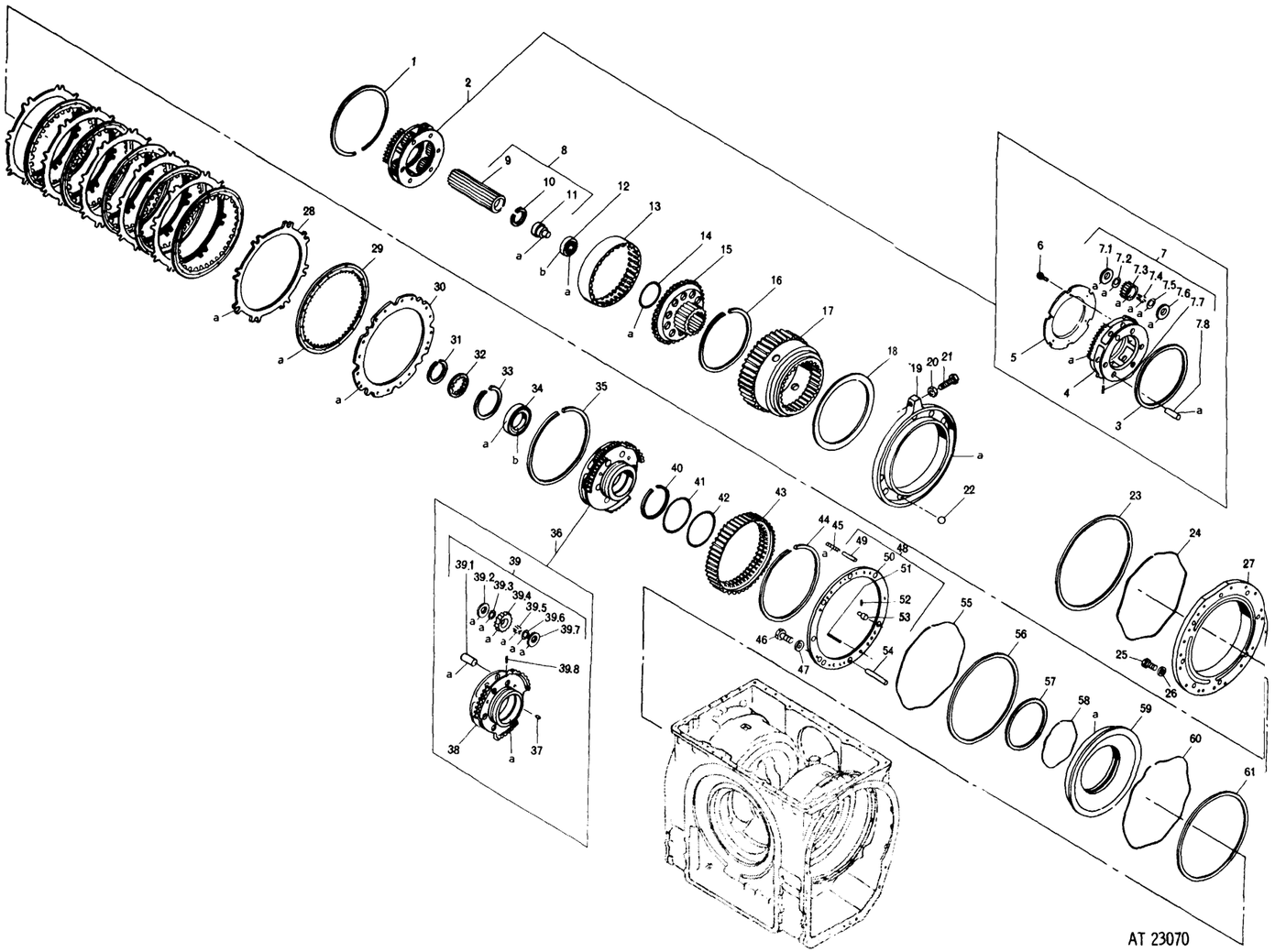
Foldout 7. Left brake disks, steer clutch, output clutch, output housing. Transfer gears, and end cover exploded view.



(All parts listed below are found in Functional Group 0710, except as otherwise indicated)

1—Speedometer drive cover machine bolt, 5/16-18 x 1 1/2 (4)
2—Speedometer drive cover lockwasher (4)
3—Speedometer drive cover flat washer (4)
4—Cover
5—Speedometer drive cover gasket
6—Output oil pump gear shaft plain encased oil seal (0721)
7—Right transmission lifting bracket hexagon-head capscrew, 3/8-16 x 2 1/2 (2)
8—Right transmission lifting bracket lockwasher (2)
9—Right transmission lifting bracket flat washer (2)
10—Right transmission lifting bracket
11—Right end cover hexagon-head capscrew, 3/8-16 x 2 1/4 (17)
12—Right end cover lockwasher (17)
13—Right end cover flat washer (17)
14—Right end cover gasket
15—Right output transfer drive gear roller bearing assembly
16—Right output transfer drive gear shaft locking bolt, 3/4-16 x 4 1/2
17—Right output transfer drive gear shaft bolt lock tab
18—Right output transfer drive gear shaft lock plate
19—Pin
20—Right output transfer drive spur gear
21—Right output transfer drive gear roller bearing assembly
22—Output oil pump machine bolt, 3/8-24 x 3 3/4 (2) (0721)
23—Output oil pump flat washer (2) (0721)
24—Output oil pump drive gear retaining ring (0721)
25—Output oil pump drive spur gear (0721)
25—Output oil pump drive spur gear (prior to serial no. 1699)
26—Output oil pump drive gear roller
26—Output oil pump drive gear Woodruff key (0721) (prior to serial no. 1699)
27—Output oil pump machine bolt, 5/16-18 x 3 (5) (0721)
28—Output oil pump flat washer (5) (0721)
29—Output oil pump assembly (0721) (prior to serial no. 1699)
29—Output oil pump assembly (0721) (beginning with serial no. 1699)
30—Output oil pump sleeve bearing (3) (0721)
31—Body (0721)
32—Pin (2) (0721)
33—Output oil pump drive gear shaft (0721) (prior to serial no. 1699)
33—Output oil pump drive gear shaft (0721) (beginning with serial no. 1699)
34—Gear (2)
35—Cover (0721)
36—Right output transfer drive gear roller bearing assembly
37—Right output driven transfer gear assembly
38—Plug
39—Gear
40—Right output transfer drive gear roller bearing assembly
41—Right output transfer gear roller bearing retainer washer machine bolt, 3/8-16 x 1
42—Right output transfer gear roller bearing retainer bolt tab lockwasher
43—Right output transfer gear roller bearing retaining plate
44—Cover assembly
45—End cover insert
46—Cover
47—Insert
48—Pin (2)
49—Sleeve
50—Pin (2)
51—Insert
52—Pin (4)
53—Right end cover plain encased seal
54—Right output transfer gear roller bearing retaining washer
machine bolt, 3/8-24 x 2
55—Right output transfer gear roller bearing retaining bolt tab lockwasher
56—Right output transfer gear roller bearing retaining plate
57—Right output clutch sleeve self-locking bolt, 3/8-24 x 1 (3)
58—Right output clutch sleeve flat washer (3)
59—Right output housing hexagon head capscrew, 3/8-16 x 1 3/4 (24)
60—Right output housing lockwasher (24)
61—Right output housing flat washer (24)
62—Housing assembly
63—Housing
64—Right output housing pipe plug (3)
65—Right output housing hexagon-head plug
66—Plug
67—Pin
68—Pin (5)
69—Insert
70—Output oil pump needle bearing (3)
71—Insert
72—Pin (21)
73—Pin
74—Insert
75—Pin (8)
76—Seat
77—Valve
78—Spring
79—Guide
80—Plug
81—Pin
82—Right end cover flat washer (2)
83—Right end cover lockwasher (2)
84—Right end cover hexagon-head capscrew, 3/8-16 x 2 1/4 (2)
85—Right output housing gasket
86—Spacer
87—Right output clutch spacer Teflon nometallic sealring (2)
88—Sleeve assembly
89—Sleeve
90—Insert
91—Right output clutch sleeve metallic sealring (2)
92—Right steer clutch piston Teflon nonmetallic sealring (0713)
93—Right steer clutch piston ring spring expander (0713)
94—Right steer clutch piston Teflon nonmetallic sealring (0713)
95—Right steer clutch piston ring spring expander (0713)
96—Right steer clutch piston (0713)
97—Output clutch assembly
98—Right output clutch piston housing retaining ring
99—Right output clutch transmission piston housing assembly
100—Right output clutch piston housing preformed packing
101—Right output clutch piston metal sealring
102—Right output clutch piston Teflon nonmetallic sealring
103—Right output clutch piston ring spring expander
104—Right output clutch piston
105—Right output clutch disk (7)
106—Right output clutch disk (7)
107—Right output clutch hub
108—Right output clutch housing bearing retaining ring
109—Right output clutch piston return helical compression spring (16)
110—Right output clutch piston return spring guide headless straight pin
111—Right output clutch housing annular ball bearing
112—Right output clutch anchor headless straight pin (8)
113—Right output clutch housing assembly
114—Right brake and steer clutch return spring pin retaining ring (12) (0713)
115—Right steer apply clutch disk (0713)
116—Right brake and steer clutch return spring headless grooved pin (12)
117—Right steer clutch disk (4) (0713)
118—Right brake and steer clutch return helical compression spring (12) (0713)
119—Right steer clutch disk (0713)
120—Plate
121—Plate assembly
122—Plate
123—Pin (2)
124—Pin (8)
125—Right brake and steer clutch reaction plate self-locking bolt, 3/8-16 x 2 1/4 (8)
126—Right brake and steer clutch reaction plate flat washer (8)
127—Right steer clutch disk (6) (0713)
128—Right brake clutch disk (6) (0713)
129—Right brake apply clutch disk (0713)
130—Right brake and steer clutch return spring pin retaining ring (0713)

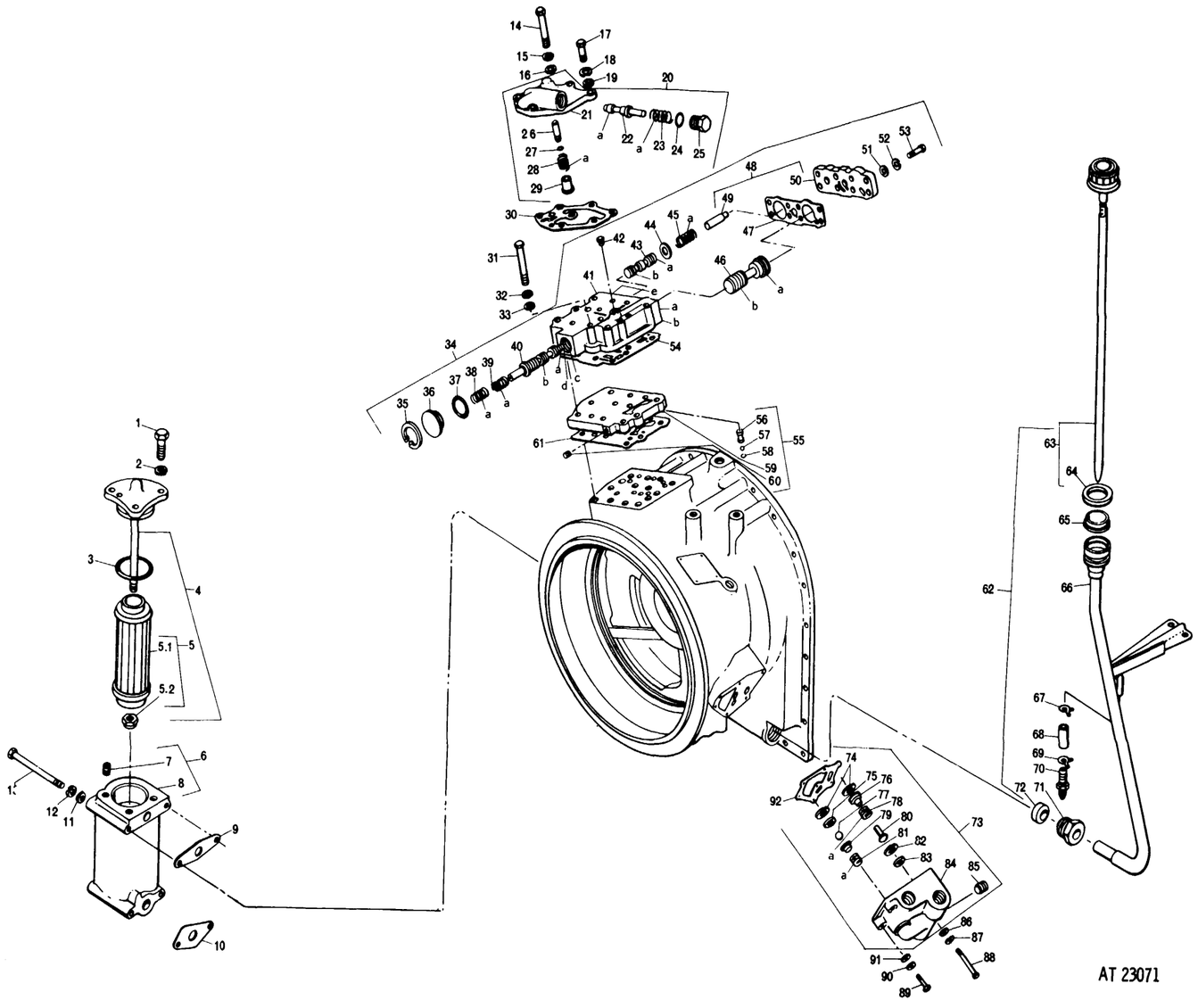
Foldout 8. Right brake disks, steer clutch. Output housing, transfer gears, and end cover-exploded view.



(All parts listed below are found in Functional Group 0710, except as otherwise indicated)

1—Right steer planetary carrier retaining ring
2—Right steer planetary transmission carrier assembly
3—Baffle
4—Carrier
5—Collector
6—Bolt (6)
7—Steer pinion transmission planetary carrier assembly parts kit:
7.1—Thrust washer
7.2—Spacer
7.3—Pinion set
7.4—Roller
7.5—Spacer
7.6—Thrust washer
7.7—Headless grooved pin
7.8—Spindle
8—Right output transmission shaft assembly
9—Shaft
10—Right output shaft retaining ring
11—Extension
12—Right output shaft annular ball bearing
13—Right steer planetary ring internal gear
14—Right reverse-range clutch sun gear thrust washer
15—Right reverse-range clutch transmission sun gear assembly
16—Right steer planetary ring gear retaining ring
17—Right brake hub
18—Plate
19—Right brake apply transmission rotating cam
20—Right brake adjusting hexagon nut
21—Right brake adjusting screw
22—Right rotating cam bearing ball (12)
23—Right brake apply stationary cam Teflon nonmetallic sealring (0713)
24—Right brake stationary cam piston ring spring expander (0713)
25—Right brake apply stationary cam self-locking bolt, 3/8-16 x 1 1/2 (16)
26—Right brake apply stationary cam flat washer (16)
27—Cam
28—Right reverse-range, external-tanged clutch disk (6) (0713)
29—Right reverse-range clutch disk (6) (0713)
30—Right reverse-range reaction clutch disk (0713)
31—Right reverse-range sun gear retaining ring
32—Spacer
33—Right reverse-range carrier bearing retaining ring
34—Right reverse-range planetary carrier annular ball bearing
35—Right reverse-range clutch hub retaining ring
36—Right reverse-range clutch planetary transmission carrier assembly
37—Pin
38—Carrier
39—Pinion transmission planetary carrier assembly parts kit:
39.1—Spindle
39.2—Thrust washer
39.3—Spacer
39.4—Pinion set
39.5—Roller
39.6—Spacer
39.7—Thrust washer
39.8—Headless grooved pin
40—Right reverse-range carrier bearing retaining ring
41—Right reverse-range carrier Teflon nonmetallic sealring
42—Right reverse-range carrier Teflon nonmetallic sealring
43—Right reverse-range clutch hub (0713)
44—Right reverse-range clutch hub retaining ring
45—Right reverse-range clutch piston return helical compression spring (0713)
46—Right steer coolant check valve retainer self-locking bolt, 5/16-18 x 1 1/2
47—Right steer coolant check valve retainer bolt flat washer
48—Retainer assembly
49—Pin
50—Retainer
51—Pin
52—Pin
53—Valve
54—Right reverse-range clutch anchor pin (8) (0713)
55—Right steer coolant check valve retainer piston ring expander (0713)
56—Right steer coolant check valve retainer Teflon nonmetallic sealring (0713)
57—Right reverse-range clutch piston Teflon nonmetallic sealring (0713)
58—Right reverse-range clutch piston ring spring expander (0713)
59—Right reverse-range clutch piston (0713)
60—Right reverse-range clutch piston ring spring expander (0713)
61—Right reverse-range clutch piston Teflon nonmetallic sealring (0713)

Foldout 9. Reverse-range clutch and planetary, brake cams, and steer planetary-exploded view.

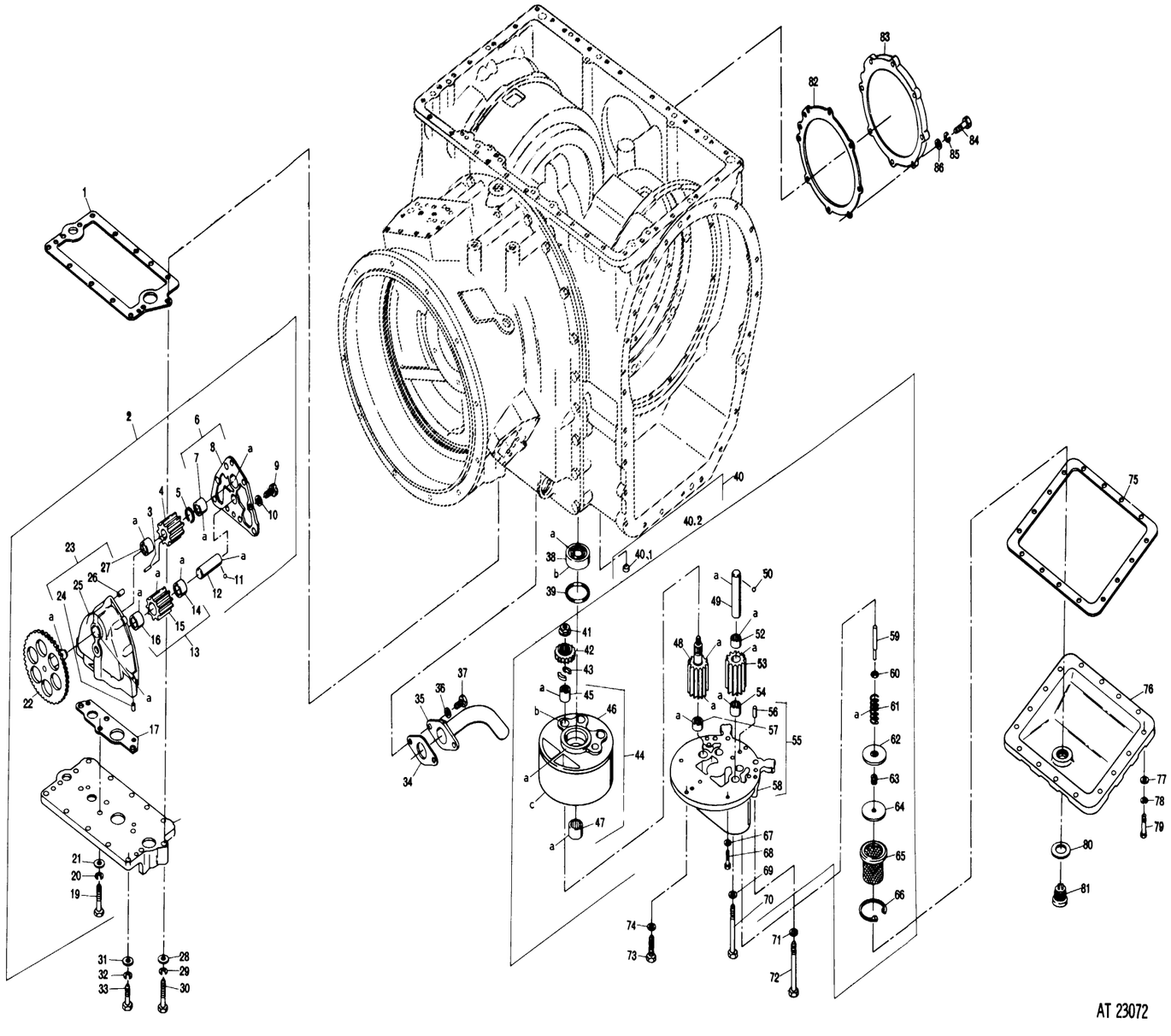


(All parts listed below are found in Functional Group 0714, except as otherwise indicated)

1—Main oil filter hexagon-head capscrew, ⅛-24 x 1⅛ (3) (0721)
2—Main oil filter lockwasher (3) (0721)
3—Main oil filter preformed packing (0721)
4—Main oil filter assembly (0721)
5—Fluid pressure filter parts kit: (0721)
5.1—Oil filter element (0721)
5.2—Nut (0721)
6—Housing assembly (0721)
7—Insert (0721)
8—Housing (0721)
9—Main oil filter housing upper asbestos gasket (0721)
10—Main oil filter housing, lower asbestos gasket (0721)
11—Main oil filter housing flatwasher (4) (0721)
12—Main oil filter housing lockwasher (0721)
13—Main oil filter housing machine bolt, ⅛-16 x 5¾ (4) (0721)
14—Main regulator valve cover machine bolt, ⅜-16 x 5¼ (5)
15—Main regulator valve cover lockwasher (5)
16—Main regulator valve cover flat washer (5)
17—Main regulator valve cover hexagon-head capscrew, ⅜-16 x 1¾
18—Main regulator valve cover lockwasher
19—Main regulator valve cover flat washer
20—Lockup regulator valve body assembly
21—Lockup regulator body
22—Valve
23—Lockup regulator helical compression spring
24—Lockup regulator plug gasket
25—Lockup regulator valve plug
26—Pin
27—Lockup regulator valve body preformed packing
28—Lockup regulator valve body helical compression spring
29—Lockup regulator valve
30—Lockup regulator valve body gasket
31—Main-pressure regulator valve body machine bolt, ⅜-16 x 4½ (6)
32—Main-pressure regulator valve body lockwasher (6)
33—Main-pressure regulator valve body flat washer (6)
34—Main-pressure regulator valve body assembly
35—Main-pressure regulator valve plug retaining ring
36—Plug
37—Main-pressure regulator valve plug preformed packing
38—Main-pressure regulator valve, primary helical compression spring
39—Main-pressure regulator valve, secondary helical compression spring
40—Valve assembly
41—Body
42—Pipe plug (2)
43—Valve
44—Washer
45—Lockup shift valve helical compression spring
46—Valve
47—Main-pressure regulator valve body end cover gasket
48—Cover assembly
49—Stop
50—Cover
51—Main-pressure regulator valve body end cover flat washer (8)
52—Main-pressure regulator valve body end cover lockwasher (8)
53—Main-pressure regulator valve body end cover machine bolt, 5/16-18 x 1¼ (8)
54—Main-pressure valve body gasket
55—Plate assembly (prior to serial no. 1210)
55—Plate assembly (after serial no. 1337)
56—Seat (prior to serial no. 1210 and after serial no. 1209)
57—Ball (prior to serial no. 1210)
58—Retaining ring (prior to serial no. 1210)
59—Plate
60—Pipe plug (2)
61—Oil transfer plate gasket
62—Oil filler and oil level indicator assembly (0721)
63—Oil level indicator assembly (0721)
64—Gasket
65—Oil filler tube rubber angle seal (0721)
66—Oil filler tube assembly (0721)
67—Oil filler tube hose clamp (0721)
68—Oil filler vent hose (0721)
69—Oil filler tube hose clamp (0721)
70—Connector
71—Oil filler indicator adapter (0721)
72—Oil filler tube sealring assembly (0721)
73—Lubrication regulator valve body assembly
74—Lubrication regulator valve seat and guide retaining ring
75—Seat
76—Guide
77—Cooler bypass valve bearing ball
78—Lubrication regulator valve helical compression spring
79—Seat
80—Lubrication regulator valve
81—Lubrication regulator valve helical compression spring
82—Lubrication regulator valve seat and guide retaining ring
83—Seat
84—Valve body
85—Plug
86—Lubrication regulator valve body flat washer (6)
87—Lubrication regulator valve body lockwasher (6)
88—Lubrication regulator valve body machine bolt, 5/16-18 x 4 (6)
89—Lubrication regulator valve body machine bolt, 5/16-18 x 2¼
90—Lubrication regulator valve body lockwasher
91—Lubrication regulator valve body flat washer
92—Lubrication regulator valve body gasket

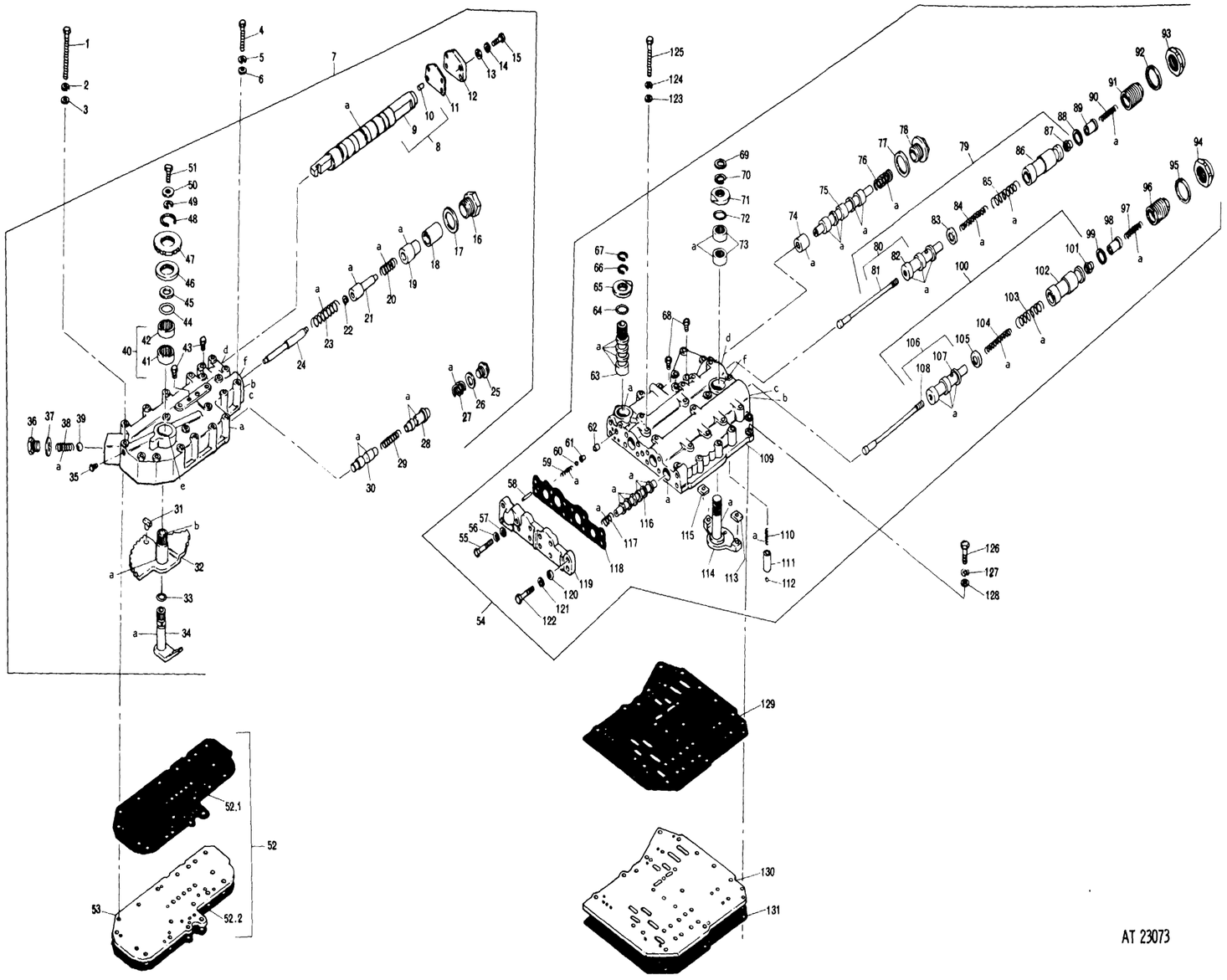
Foldout 10. Oil filter screen. Main-pressure regulator, lubrication regulator, and oil, and oil filler tube exploded view.

(All parts listed below are found in Functional Group 0721, except as otherwise indicated)



1—Input oil pump gasket
2—Input oil pump assembly
3—Input oil pump driven gear roller
4—Gear
5—Input oil pump driven gear retaining ring
6—Cover assembly
7—Input oil pump cover needle roller bearing
8—Cover
9—Input oil pump cover self-locking bolt, 5/16-18 x 1 1/8 (8)
10—Input oil pump cover flat washer (8)
11—Input oil pump idler gear shaft locking bearing ball
12—Shaft
13—Gear assembly
14—Input oil pump idler gear needle roller bearing
15—Gear
16—Input oil pump idler gear needle roller bearing
17—Input oil pump base gasket
18—Base
19—Input oil pump base hexagon-head capscrew, 3/8-16 x 2 1/2 (4)
20—Input oil pump base lockwasher (4)
21—Input oil pump base flat washer (4)
22—Input oil pump drive spur gear shaft
23—Body assembly
24—Pin (2)
25—Body
26—Pin (2)
27—Input oil pump body needle roller bearing
28—Input oil pump flat washer (4)
29—Input oil pump lockwasher (4)
30—Bolt (4)
31—Input oil pump flat washer (10)
32—Input oil pump lock-washer (10)
33—Input oil pump hexagon-head capscrew, 3/8-16 x 2 1/4 (10)
34—Oil suction tube gasket
35—Screen assembly
36—Oil suction screen flat washer (2)
37—Oil suction screen self-locking bolt, 3/8-16 x 1 3/4 (2)
38—Brake coolant oil pump bevel gear annular ball bearing (0710)
39—Brake coolant oil pump bevel gear bearing shim:
0.009 (ar) (0710)
0.012 (ar) (0710)
0.015 (ar) (0710)
40—Brake coolant pump parts kit:
40.1—Plug (2)
40.2—Pump assembly
41—Brake coolant oil pump external-driven gear extender washer hexagon nut (2)
42—Brake coolant oil pump external driven spur gear (2)
43—Brake coolant oil pump external-driven gear thrust washer (4)
44—Body assembly
45—Brake coolant oil pump body needle roller bearing (2)
46—Body
47—Pump body needle roller bearing
48—Gear (2)
49—Shaft (2)
50—Brake coolant oil pump driven gear shaft bearing ball (2)
51—Gear assembly
52—Brake coolant oil pump-driven gear assembly needle roller bearing (2)
53—Gear (2)
54—Brake coolant oil pump-driven gear assembly needle roller bearing (2)
55—Cover assembly
56—Pin (2)
57—Brake coolant oil pump cover needle roller bearing (2)
58—Cover
59—Guide pin (2)
60—Washer (2)
61—Brake coolant oil pump suction check valve helical compression spring (2)
62—Washer (2)
63—Brake coolant oil pump suction check valve rubber grommet (2)
64—Washer
65—Screen assembly (2)
66—Brake coolant oil pump suction screen retaining ring (2)
67—Brake coolant oil pump cover flat washer (3)
68—Brake coolant oil pump cover self-locking bolt, 5/16-18 x 1 1/8 (3)
69—Brake coolant oil pump cover flat washer (3)
70—Brake coolant oil pump cover machine bolt, 5/16-18 x 2 3/4 (3)
71—Brake coolant oil pump flat washer (2)
72—Brake coolant oil pump hexagon-head capscrew, 3/8-16 x 3 (2)
73—Brake coolant oil pump self-locking bolt, 3/8-16 x 1 1/4 (4)
74—Brake coolant oil pump flat washer (4)
75—Oil sump cover gasket (0710)
76—Sump cover (0710)
77—Oil sump cover flat washer (16) (0710)
78—Oil sump cover lockwasher (16) (0710)
79—Oil sump cover hexagon-head capscrew, 3/8-16 x 1 1/2 (16) (0710
80—Oil drain plug gasket (0710)
81—Oil drain machine thread magnetic plug (0710)
82—Power takeoff cover gasket (0710)
83—P TO cover (0710)
84—Power takeoff cover hexagon-head capscrew, 3/8-16 x 1 3/8 (8) (0710)
85—Power takeoff cover lock-washer (8) (0710)
86—Power takeoff cover flat washer (8) (0710)

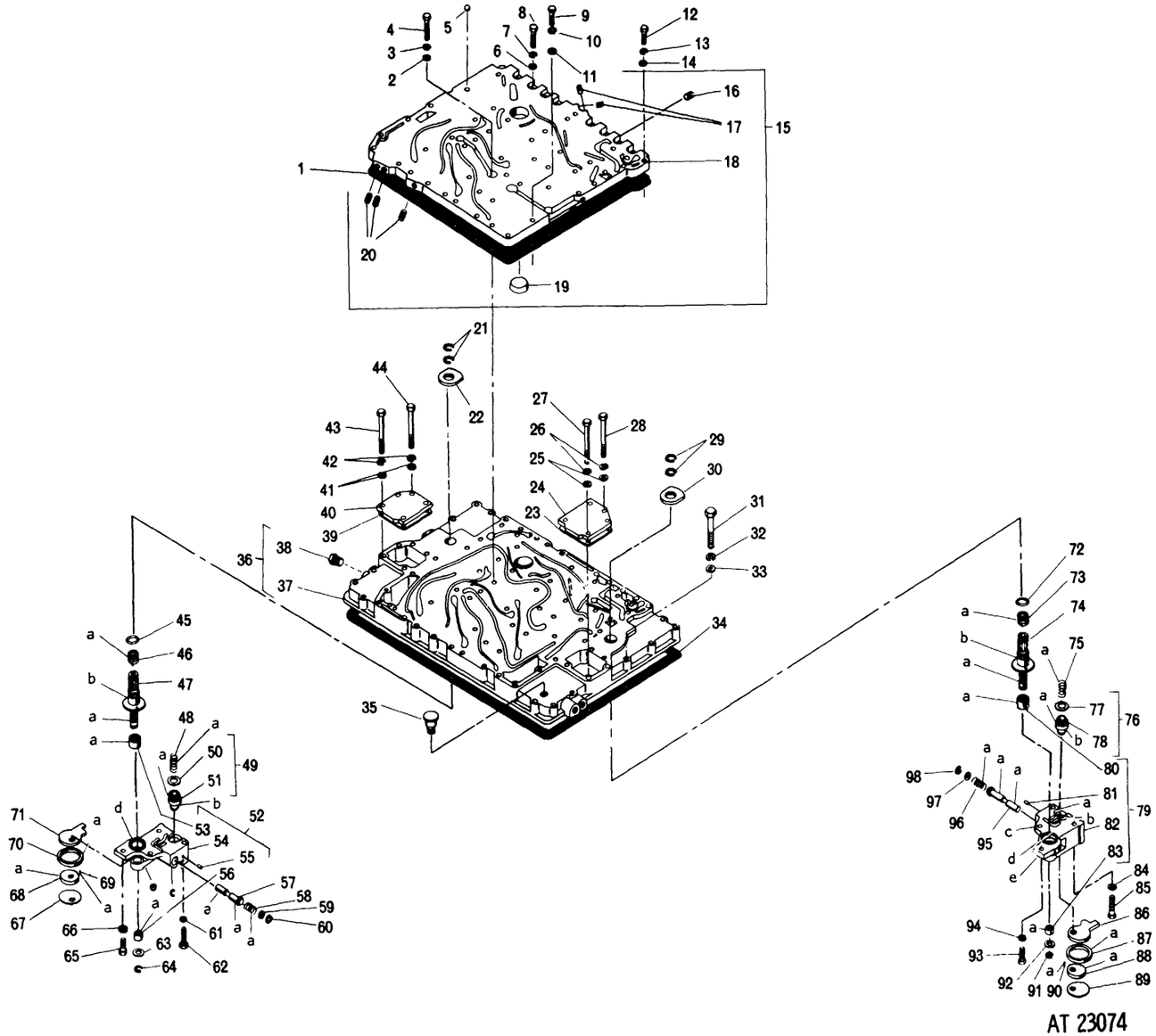
Foldout 11. Input oil pump, brake coolant pump, and related parts-exploded view.



(All parts listed below are found in Functional Group 0714)

1—Main control valve machine bolt, ⅜-16 x 5¼ (3)
2—Main control valve lockwasher (3)
3—Main control valve flat washer (3)
4—Main control valve hexagon-head capscrew, ⅜-16 x 3¾ (19)
5—Main control valve lockwasher (19)
6—Main control valve flat washer (19)
7—Main control valve assembly
8—Valve assembly
9—Valve
10—Plug
11—Main control valve body cover gasket
12—Cover
13—Main control valve body cover flat washer (4)
14—Main control valve body cover lockwasher (4)
15—Main control valve body cover machine bolt, 5/16-18 x 1⅛ (4)
16—Shift inhibitor retaining machine thread plug
17—Shift inhibitor retaining plug gasket
18—Valve
19—Valve
20—Inhibitor compensator spring
21—Valve
22—Shift inhibitor plunger retaining ring
23—Shift inhibitor helical compression spring
24—Plunger
25—Throttle regulator valve plug
26—Throttle regulator valve plug gasket
27—Throttle regulator valve helical compression spring
28—Throttle regulator valve assembly
29—Throttle valve helical compression spring
30—Throttle valve assembly
31—Pin
32—Range selector control shaft and lever
33—Throttle valve lever preformed packing
34—Throttle valve lever assembly
35—Main control valve body pipe plug
36—Main control valve detent retaining machine thread plug
37—Main control valve detent retaining plug gasket
38—Main control valve detent ball helical compression spring
39—Main control valve detent bearing ball
40—Body assembly
41—Control valve body needle roller bearing
42—Valve body
43—Main control valve body pipe plug (2)
44—Range selector lever preformed packing
45—Range selector lever gasket
46—Range selector shaft flat washer (5)
47—Indicator
48—Range selector indicator retaining ring
49—Throttle valve lever retaining ring
50—Selector lever flat washer
51—Selector lever self-locking bolt, 5/16-24 x ⅜
52—Selector valve and separator plate gasket parts kit:
52.1—Gasket
52.2—Gasket
53—Plate
54—Steer gear valve assembly
55—Bolt (3)
56—Steer valve cover lockwasher (3)
57—Steer valve cover flat washer (3)
58—Pin
59—Steer valve detent helical compression spring
60—Steer valve detent bearing ball
61—Steer valve detent guide
62—Pin
63—Pivot valve
64—Pivot valve preformed packing
65—Indicator
66—Pivot valve retaining ring
67—Pivot valve retaining ring
68—Plug (2)
69—Steer control shaft retaining ring
70—Steer control shaft retaining ring
71—Indicator
72—Steer control shaft preformed packing
73—Steer valve shaft needle roller bearing (2)
74—Valve
75—Steer relay valve
76—Steer relay valve helical compression spring
77—Steer valve body retaining plug gasket
78—Plug
79—Steer valve assembly
80—Steer regulator valve assembly
81—Stem
82—Steer regulator valve
83—Outer spring stop
84—Steer regulator valve inner helical compression spring
85—Steer regulator valve outer helical compression spring
86—Steer valve
87—Steer regulator valve stem sleeve nut
88—Steer valve plunger retaining ring
89—Steer valve plunger
90—Steer valve plunger helical compression spring
91—Plunger spring retainer
92—Steer valve retainer nut gasket
93—Steer valve retainer hexagon nut
94—Steer valve retainer hexagon nut
95—Steer valve retainer nut gasket
96—Plunger spring retainer
97—Steer valve plunger helical compression spring
98—Steer valve plunger
99—Steer valve plunger retaining ring
100—Steer valve assembly
101—Steer regulator valve stem sleeve nut
102—Steer valve
103—Steer regulator valve outer helical compression spring
104—Steer regulator valve inner helical compression spring
105—Outer spring stop
106—Steer regulator valve assembly
107—Steer regulator valve
108—Stem
109—Body
110—Steer valve helical compression spring
111—Sleeve
112—Steer valve bearing ball
113—Block
114—Steer lever shaft assembly
115—Block
116—Drive relay valve
117—Drive relay valve helical compression spring
118—Steer valve cover gasket
119—Cover
120—Steer valve cover flat washer (9)
121—Steer valve cover lockwasher (9)
122—Bolt (9)
123—Steer valve body flat washer (24)
124—Steer valve body lockwasher (24)
125—Steer valve body hexagon-head capscrew, ⅜-16 x 4 (24)
126—Steer valve body hexagon-head capscrew, ⅜-16 x 2½ (2)
127—Steer valve body lockwasher
128—Steer valve body flat washer (2)
129—Steer valve body gasket
130—Plate
131—Steer valve body gasket

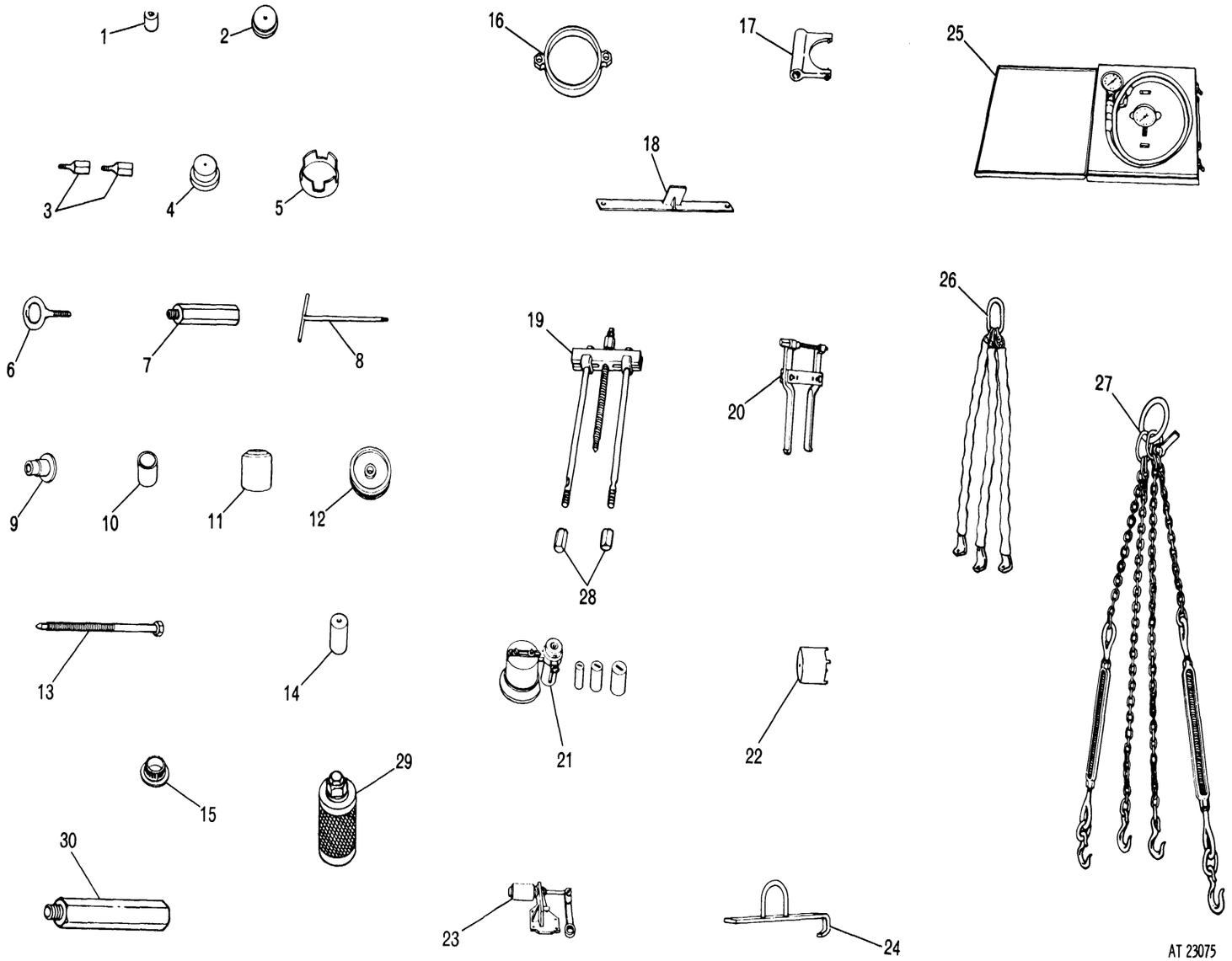
Foldout 12. Control, steer valve assemblies, and separating plates-exploded view.



(All parts listed below are found in Functional Group 0710, except as otherwise indicated)

1—Oil transfer plate gasket
2—Oil transfer plate flat washer (5)
3—Oil transfer plate lockwasher (5)
4—Oil transfer plate machine bolt, ⅜-16 x 1¼ (5)
5—Nylon bearing ball
6—Oil transfer plate flat washer (8)
7—Oil transfer plate lockwasher (8)
8—Oil transfer plate machine bolt, ⅜-16 x 2½ (8)
9—Oil transfer plate hexagon-head capscrew, ⅜-16 x 1¾ (6)
10—Oil transfer plate lockwasher (6)
11—Oil transfer plate flat washer (6)
12—Oil transfer plate hexagon-head capscrew, ⅜-16 x 3¼ (9)
13—Oil transfer plate lockwasher (9)
14—Oil transfer plate flat washer (9)
15—Plate assembly
16—Plug
17—Plug (2)
18—Plate
19—Plug
20—Plug (3)
21—Brake apply shaft retaining ring (2)
22—Brake apply indicator keyed washer
23—Brake adjustment cover gasket
24—Cover
25—Brake adjustment cover flat washer (5)
26—Brake adjustment cover lockwasher (5)
27—Brake adjustment cover hexagon-head capscrew, ⅜-16 x 2¾ (2)
28—Brake adjustment cover hexagon-head capscrew, ⅜-16 x 1⅜ (3)
29—Brake apply shaft retaining ring (2)
30—Brake apply indicator keyed washer
31—Transmission top cover hexagon-head capscrew, ⅜-16 x 2⅛ (14)
32—Transmission top cover lockwasher (14)
33—Transmission top cover flat washer (14)
34—Bevel gear housing cover gasket
35—Transmission breather assembly (0721)
36—Bevel gear housing cover assembly
37—Cover
38—Pipe plug (4)
39—Brake adjustment cover gasket
40—Cover
41—Brake adjustment cover flat washer (5)
42—Brake adjustment cover lockwasher (5)
43—Brake adjustment cover hexagon-head capscrew, ⅜-16 x 2¼ (2)
44—Brake adjustment cover hexagon-head capscrew, ⅜-16 x 1⅜ (3)
45—Brake apply shaft preformed packing (0714)
46—Right brake apply shaft torsion helical spring (0714)
47—Shaft
48—Air valve helical compression spring (0714)
49—Air valve assembly (0714)
50—Air valve seal (0714)
51—Valve (0714)
52—Body assembly
53—Right brake apply body needle roller bearing (0714)
54—Body (0714)
55—Pin (2) (0714)
56—Right brake apply body needle roller bearing (0714)
57—Valve (0714)
58—Brake signal valve helical compression spring (0714)
59—Brake signal valve flat washer (0714)
60—Brake signal valve retaining ring (0714)
61—Brake apply body flat washer (2) (0714)
62—Brake apply body self-locking bolt, ⅜-16 x 2¾ (2) (0721)
63—Flat washer (0714)
64—Brake apply shaft retaining ring (0714)
65—Brake apply body self-locking bolt, ⅜-16 x 1⅛ (2) (0714)
66—Brake apply shaft flat washer (2) (0714)
67—Apply cam side plate (0714)
68—Transmission brake apply cam (0714)
69—Brake apply cam bearing roller (58) (0714)
70—Brake apply cam roller sleeve bearing race (0714)
71—Lever (0714)
72—Brake apply shaft preformed packing (0714)
73—Left brake apply shaft helical torsion spring (0714)
74—Shaft (0714)
75—Air valve helical compression spring (0714)
76—Air valve assembly (0714)
77—Air valve seal (0714)
78—Valve (0714)
79—Body assembly (0714)
80—Left brake apply body needle roller bearing (0714)
81—Pin (0714)
82—Body (0714)
83—Left brake apply body needle roller bearing (0714)
84—Brake apply shaft flat washer (2) (0714)
85—Brake apply body self-locking bolt, ⅜-16 x 2¾ (2) (0714)
86—Lever (0714)
87—Brake apply cam roller race sleeve bearing race (0714)
88—Transmission brake apply cam (0714)
89—Apply cam side plate (0714)
90—Brake apply cam bearing roller (58) (0714)
91—Brake apply shaft retaining ring (0714)
92—Flat washer (0714)
93—Brake apply shaft self-locking bolt, ⅜-16 x 1⅛ (2) (0714)
94—Brake apply shaft flat washer (2) (0714)
95—Valve (0714)
96—Brake signal valve helical compression spring (0714)
97—Brake signal valve flat washer (0714)
98—Brake signal valve retaining ring (0714)

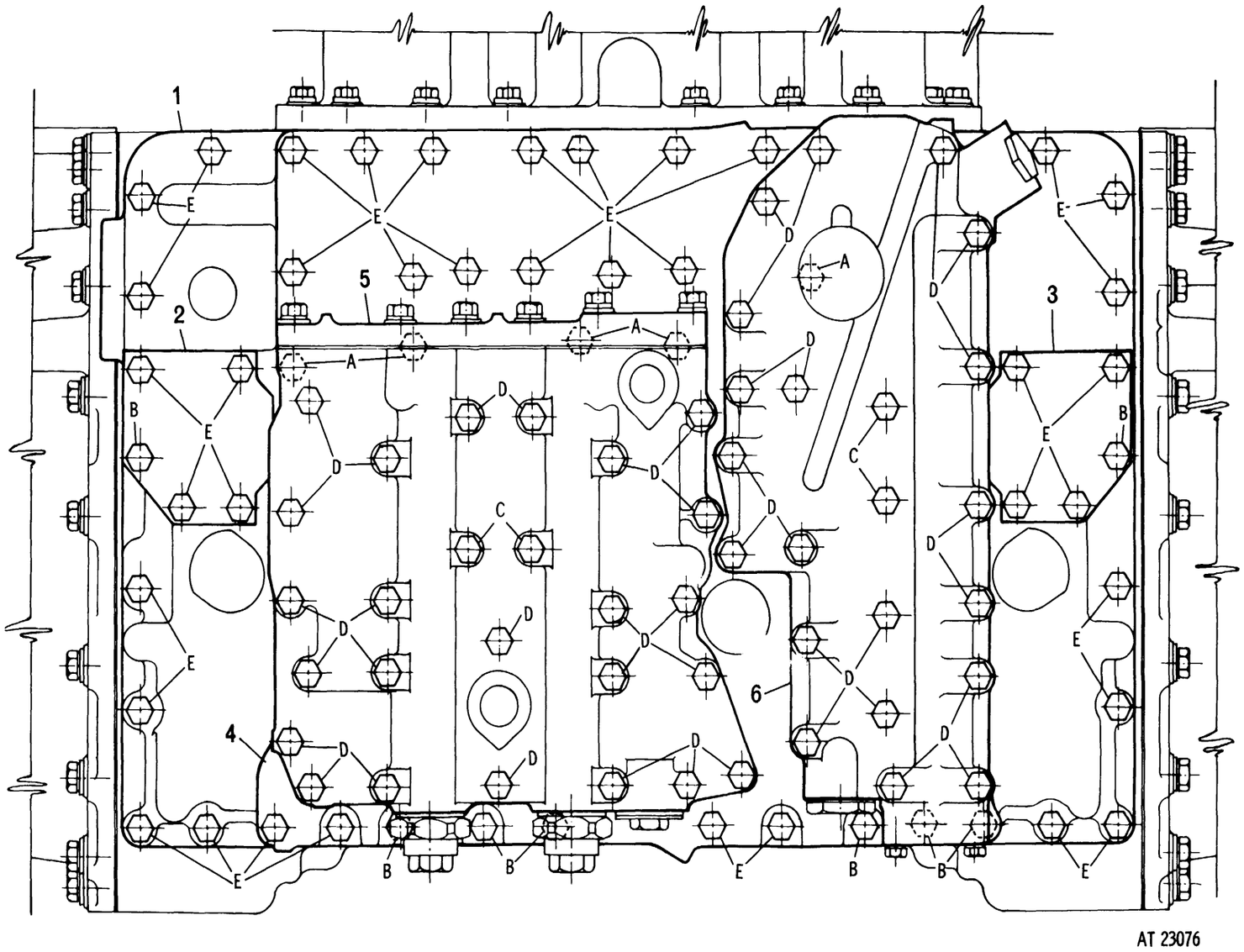
Foldout 13. Oil transfer plate, bevel gear housing cover, and brake apply components-exploded view.



(All tools listed below are found in Functional Group 2604)

1—Brake torque adapter
2—Lifting adapter
3—Puller adapter (2)
4—Puller step plate adapter
5—Clutch spring compressor
6—Eyebolt
7—Handle
8—Handle
9—Plug driver
10—Bearing replacer
11—Bearing replacer
12—Bearing and seal replacer
13—Forcing screw
14—Shield
15—Wrench assembly
16—Puller adapter
17—Holder assembly
18—Holder assembly
19—Puller assembly
20—Puller attachment
21—Spindle replacer
22—Socket wrench
23—Stall check tool
24—Lifting sling
25—Pressure gage kit
26—Lifting sling
27—Lifting sling
28—Leg cap puller adapter (2)
29—Retaining ring driver kit
30—Handle

Foldout 14. Special tools and equipment.



Foldout 15. Sequence for tightening transmission top bolts.

BOLT TIGHTENING SEQUENCE

1. After installing covers 1, 2 and 3 and oil transfer plate 4, and their related gaskets and separator plates, install bolts A and B.
2. Tighten bolts A to 20 to 24 pound feet torque.
3. Tighten bolts B to 20 to 24 pound feet torque.
4. Install valve bodies 5 and 6. Install bolts C, D and E.
5. Tighten bolts C to 20 to 24 pound feet torque.
6. Tighten bolts D, working progressively outward from bolts C, to 20 to 24 pound feet torque.
7. Tighten bolts E, working progressively outward from the cover center, to 20 to 24 pound feet torque.

NOTE

If only valve body 5, or valve body 6 is removed and reinstalled, it is only necessary to tighten its two bolts C, and then work progressively outward to tighten its bolts D.

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.0386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

TEMPERATURE

5/9 (F - 32) = C
212 Fahrenheit is equivalent to 100 Celsius
90 Fahrenheit is equivalent to 32.2 Celsius
32 Fahrenheit is equivalent to 0 Celsius
9/5 (C + 32) = F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

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