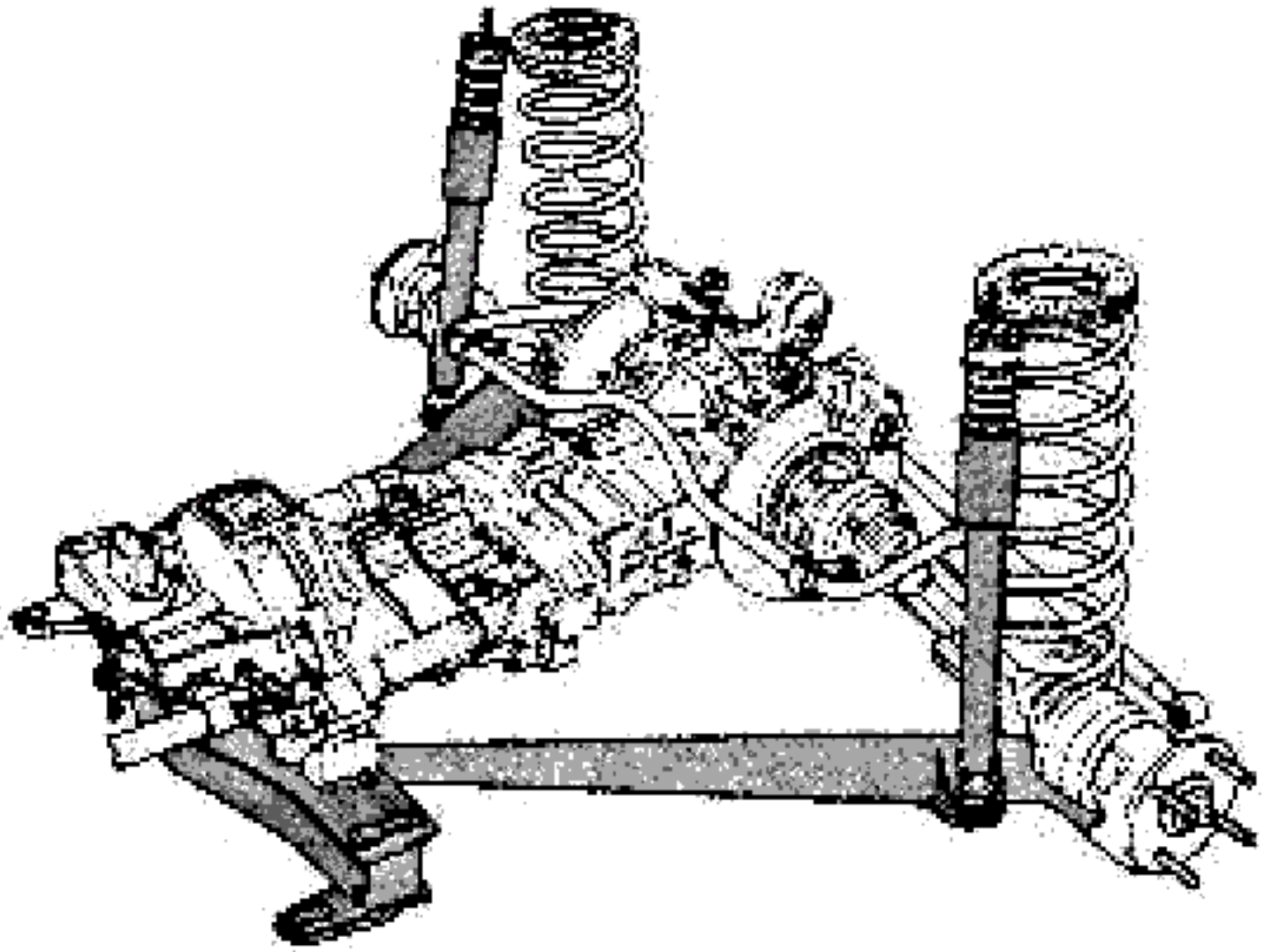
TRANSAXLE
SUPPLEMENT



GROUP 17

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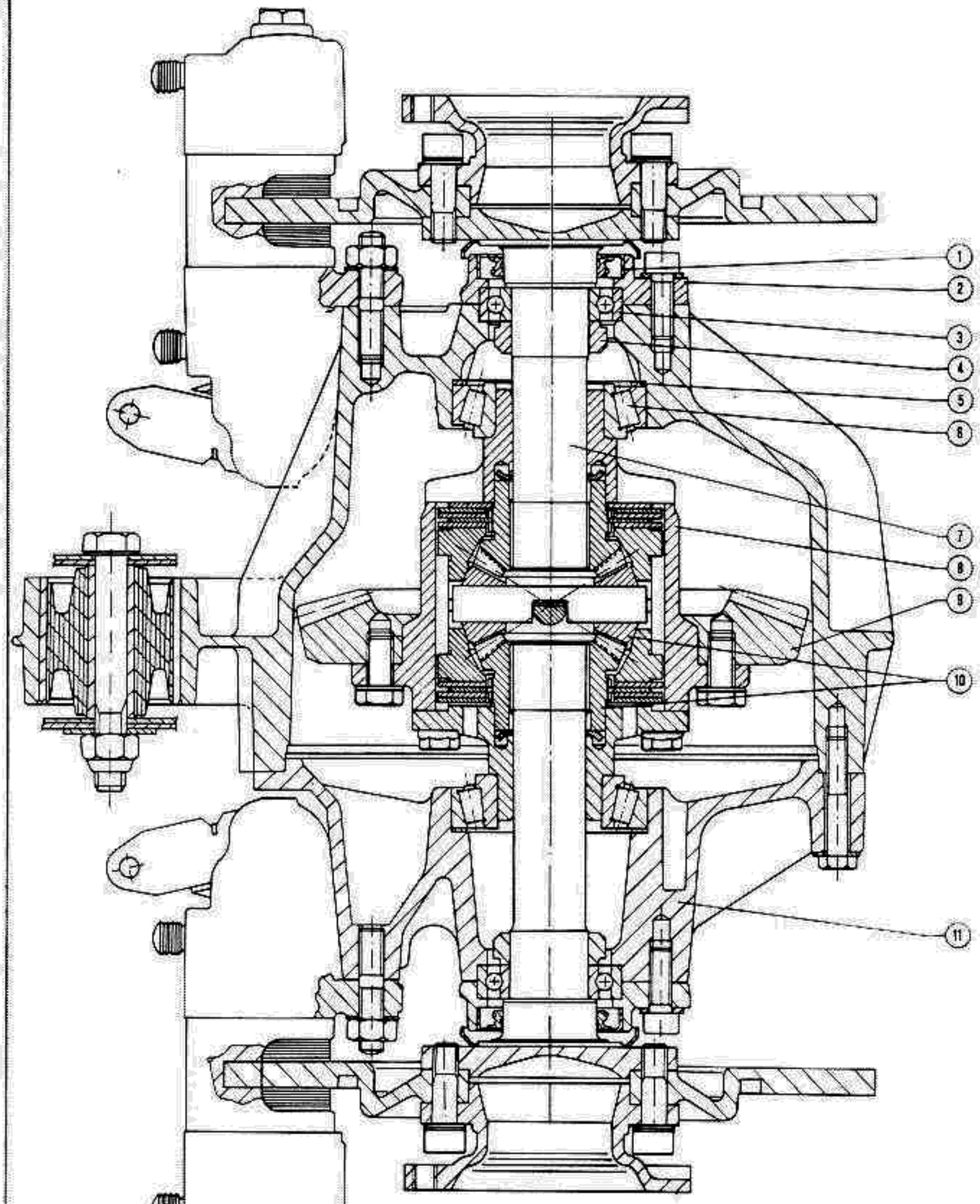
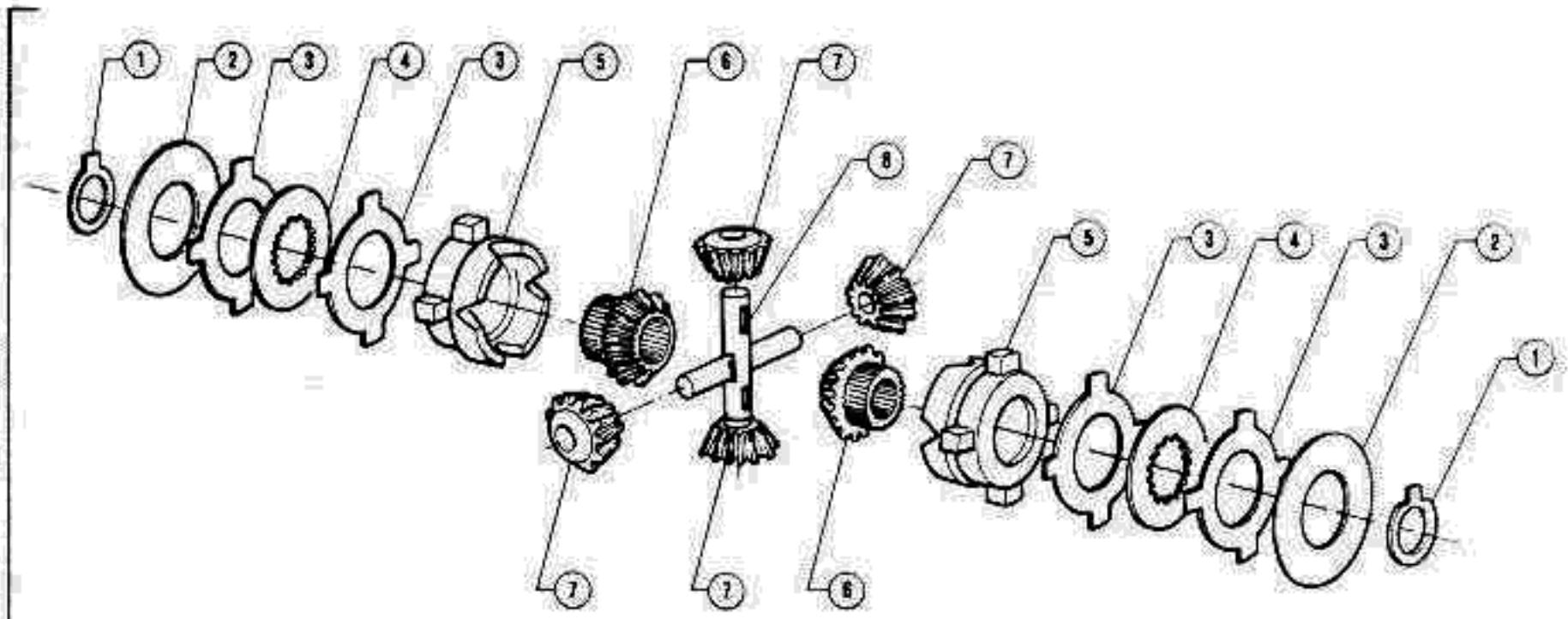
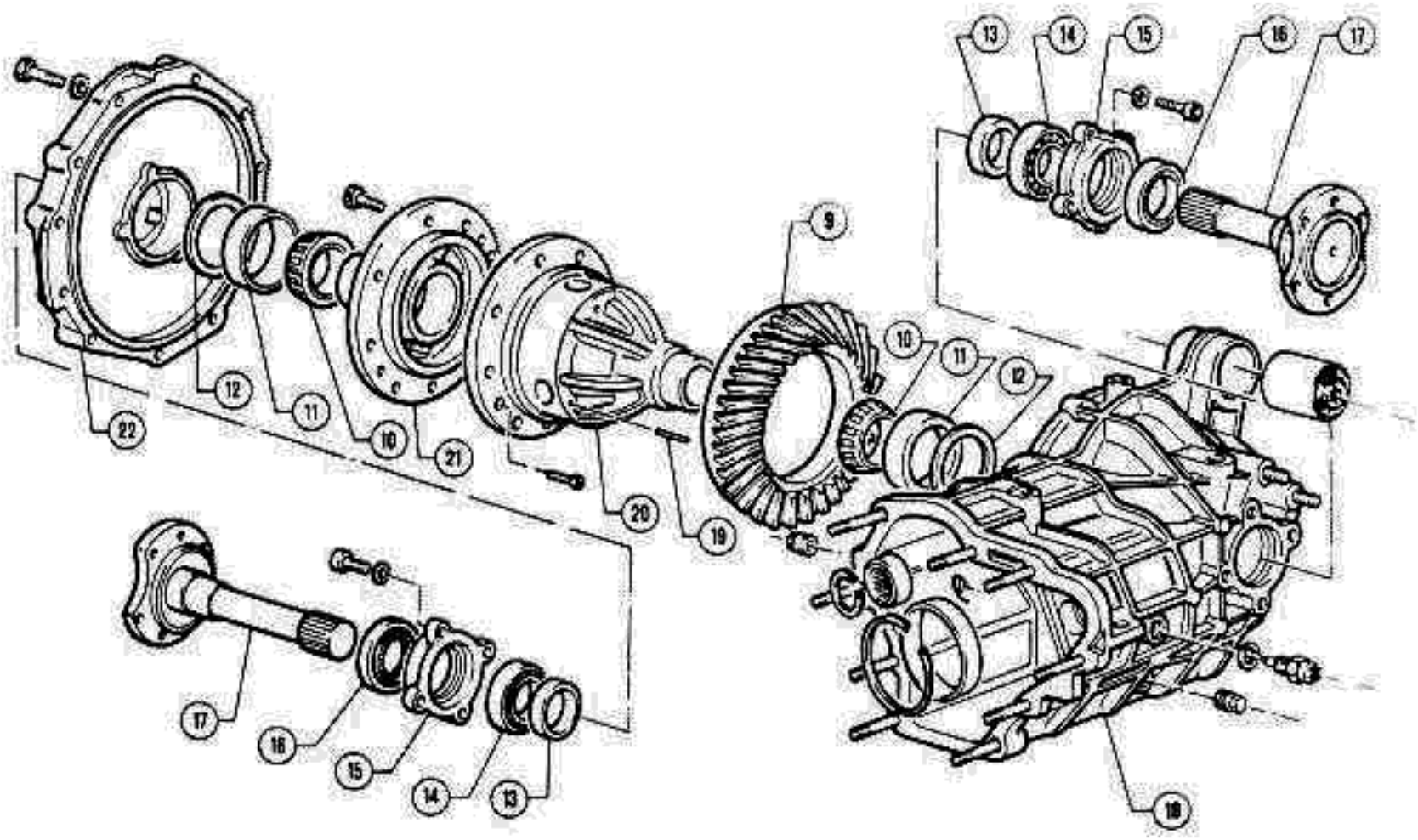
LIMITED SLIP DIFFERENTIAL



1 Oil seal ring
2 Cover
3 Differential internal drive shaft bearing
4 Bearing ring nut
5 Shim ring for differential carrier taper bearing
6 Differential carrier taper bearing
7 Differential internal drive shaft
8 Differential carrier
9 Ring bevel gear
10 Side pinions-crown wheels gears
11 Differential-speed gear casing





1 Stop ring
2 Spacer
3 External blade
4 Internal blade
5 Pressure ring
6 Side gear
7 Pinion gear
8 Pin
9 Ring bevel gear
10 Differential carrier taper bearing
11 Differential carrier taper bearing external race
12 Differential carrier taper bearing shim ring
13 Bearing ring nut
14 Bearing of differential internal drive shaft
15 Cover
16 Oil seal ring
17 Differential internal drive shaft
18 Differential-speed gear casing
19 Spring pin
20 Differential carrier
21 Differential casing cover
22 Differential-speed gear casing cover

DIFFERENTIAL-SERVICE DATA AND SPECIFICATIONS

TECHNICAL DATA

Refer to Group 13 - "Service Data and Specifications - Technical Data".

GENERAL SPECIFICATIONS

FLUIDS AND LUBRICANTS

Application	Type	Denomination	Q.ty
Differential roller bearing	GREASE	AGIP Grease 33 FD IP Autogrease FD SHELL Retinax AX ESSO Norva 275 (Std. No. 3671-69833)	—
Outer rings of differential taper bearing			—
Threading of screws securing axle shaft to differential shaft	GREASE	ISECO Molykote BR2 (Std.No. 3671-69841)	—
Spherical seat of propeller shaft rear joint			—
Internal lip of seal rings			5 cm³ (0.30 cuin)
Filling of differential-speed gear casing	OIL	AGIP Rotra MP SX SAE 75W/90 SHELL Spirax HD 80W/90 IP Pontiax HDS SAE 75W/90 (Std. No. 3631-69412)	4.56 lb (2.070 kg)
Outer surface of seal rings			—

SEALANTS AND SURFACE FIXING AGENTS

Application	Type	Denomination	Q.ty
Mating surface of axle shafts-covers	SEALING COMPOUND	LOWAC Perfect Seal (Std. No. 3522-00011)	—

CHECKS AND ADJUSTMENTS

Application \ Type of differential		Four side pinions
Installation clearance between side pinions and crown wheels teeth	G mm (in)	0.08 to 0.15 (0.003 to 0.006)

Shim washer correction shim "S" between 4th speed engagement bush and bearing internal ring.

$$S = \pm L \pm C$$

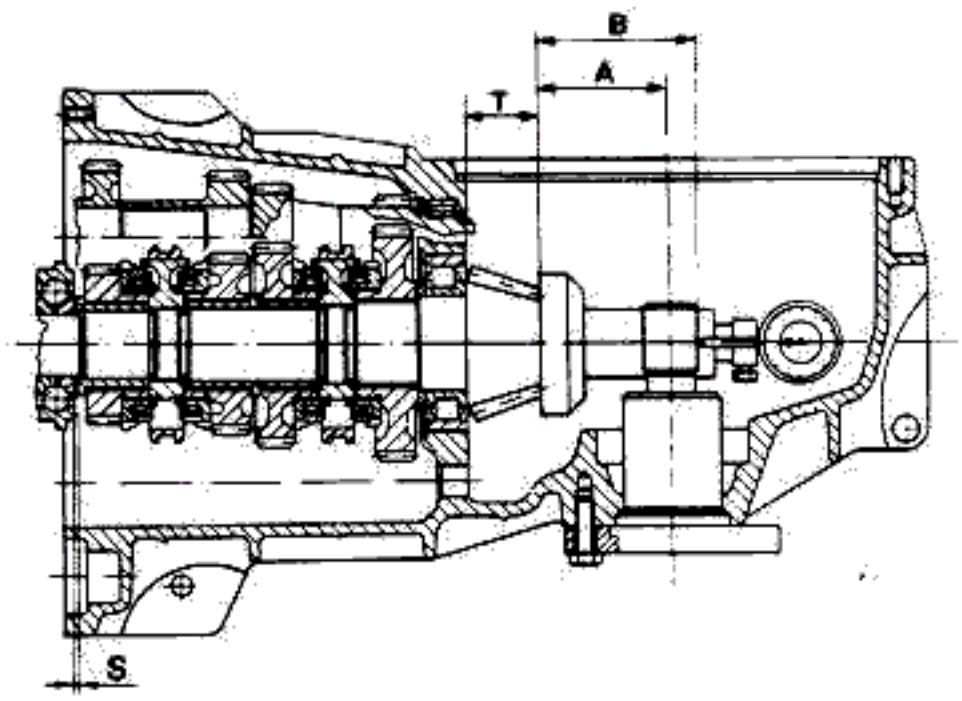
where:

L = Deviation value of ring bevel gear axis measured with centesimal gauge

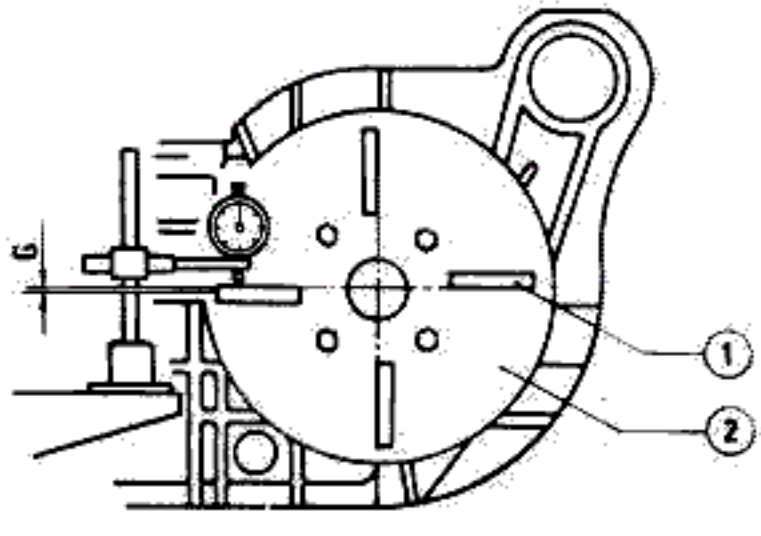
C = Value marked on pinion head

The real dimension must correspond to the nominal dimension of the algebric value marked on pinion head (in hundredths)

T = Pinion head height



Application \ Pinion type		Pinion head height T = 36 mm (1.42 in)
Nominal dimension between ring bevel gear axis and pinion head	A mm (in)	62.6 ± 0.03 (2.46 ± 0.001)
Dimension of tool C.6.0164 for gauge resetting	B mm (in)	72.6 (2.86)
Installation clearance between ring bevel gear and pinion	G mm (in)	0.10 to 0.20 (0.004 to 0.008)



1 Graded spoke
2 Tool sheave

Ring bevel gear average radius	R mm (in)	77 (3.03)

Clearance between splined section of axle shafts and differential crown wheels G mm (in)	0.07 to 0.13 (0.00275 to 0.0051)
Squareness deviation of brake disk support plane with respect to bearing and oil seal ring seats S mm (in)	0.05 (0.00197)
Installation interference fit for axle shaft bearing retaining ring nut I mm (in)	0.023 to 0.057 (0.0009 to 0.0022)

SHIM RINGS

Shims "S" for pinion - ring gear axis

Minimum shim

S_{min} = 0.08 mm

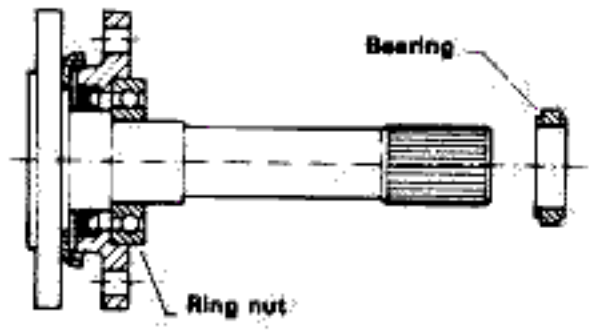
The remaining shims increase progressively by 0.05 mm each time, starting from 1.15 mm up to 2.50 mm.

Shims "S" for preload of the differential casing bearings.

The shims increase progressively by 0.25 each time, starting from 1.350 mm up to 2.600 mm

HEATING TEMPERATURES

Application / Measurement Unit	°C (°F)
Differential shaft bearing ring nut	190 (374)



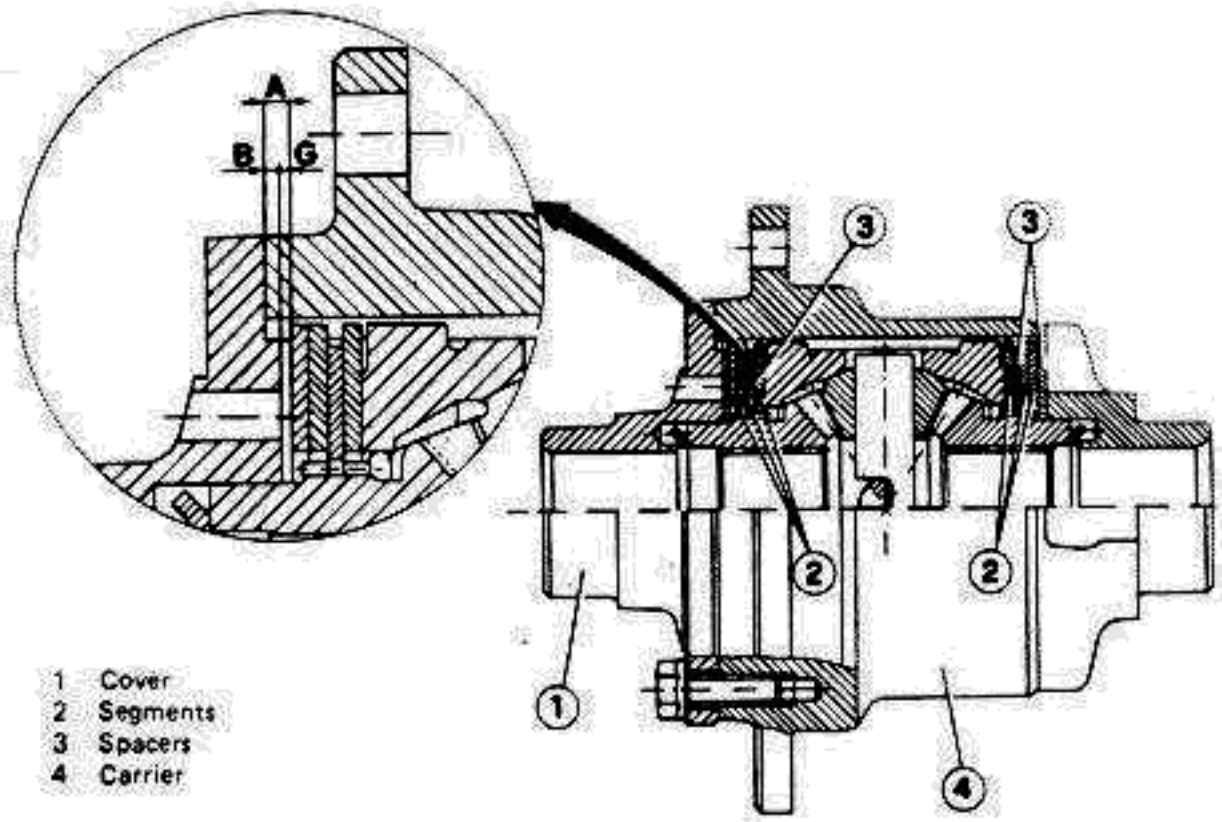
ROLLING TORQUES

Item / Measurement Unit	N·cm (ft·lb; kg·cm)
Differential carrier (to determine static preload of taper bearings)	
— Re-used bearings	49 to 68 (0.36 to 0.51; 5 to 7)
— New bearings	98 to 196 (0.72 to 1.45; 10 to 20)

LIMITED SLIP DIFFERENTIAL

Fitment clearance between cover and pack of segments

G = A-B = 0.1 thru 0.2 mm
(0.004 thru 0.006 in)



1 Cover
2 Segments
3 Spacers
4 Carrier

To check that clearance G is within the specified tolerances, proceed as follows:

1. Rest the supporting base of a suitably preloaded dial gauge on the contact surface (2) between cover (1) and segment pack, by operating on the cover of the limited slip differential carrier; zero set the dial gauge on the mating surface (3) between cover and carrier.

2. Position the gauge supporting base on the mating surface (1) between carrier (2) and cover by operating on the limited slip differential carrier; have the gauge feeler contacting segment pack (3).

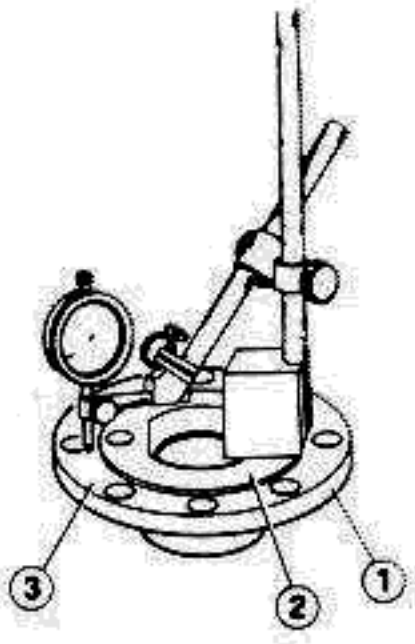
NOTE:
Apply a load of 10 Kg (22 lbs) to the segment pack.

3. Read the value, with negative sign, of clearance G: it must be within the specified values.

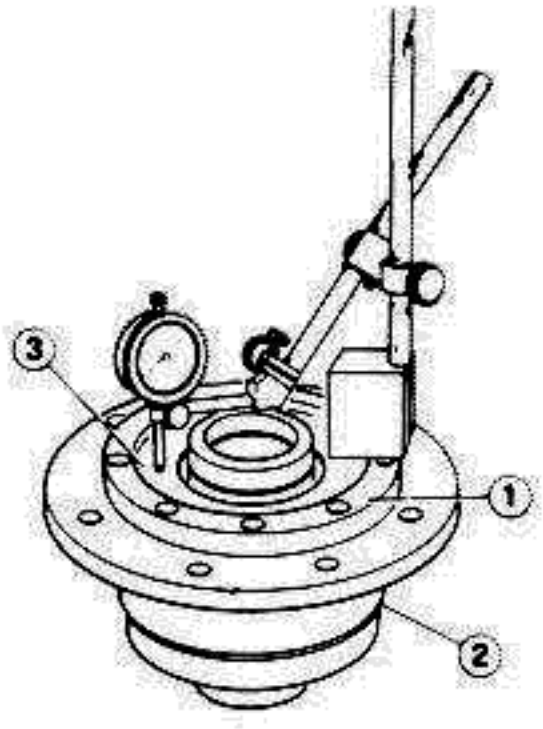
Fitment clearance between cover and segment pack:

G = 0.1 thru 0.2 mm
(0.004 thru 0.008 in)

4. Should clearance G be out of specified limits, replace the spacers with others of suitable thickness.



1 Cover
2 Cover-segment pack contact surface
3 Cover-carrier mating surface



1 Carrier-cover mating surface
2 Carrier
3 Segment pack

TIGHTENING TORQUES

Description \ Measurement unit	N·m (ft·lb; kg·m)
Screws securing spacers and brake discs to internal axle shafts	49 to 54 (36.1 to 39.8; 5 to 5.5)
Screws securing propeller shaft joint to clutch shaft fork	55 to 57 (40.5 to 41.9; 5.6 to 5.8)
Screws securing external axle shafts to internal axle shafts (1)	44 to 54 (32.5 to 39.8; 4.5 to 5.5)
Screws securing covers to differential speed gear casing	18 to 21 (13.0 to 15.9; 1.8 to 2.2)
Screws securing ring bevel gear to differential carrier (in oil)	67 to 74 (49.2 to 54.2; 6.8 to 7.5)
Pinion shaft securing nut	112 to 124 (82.4 to 91.1; 11.4 to 12.6)
Nut securing spacers and intermediate flange to differential-speed gear casing	112 to 124 (82.4 to 91.1; 11.4 to 12.6)
Securing screws of differential speed gear casing cover	19 to 23 (13.7 to 16.6; 1.9 to 2.3)
Nuts securing brakes calipers to differential-speed gear casing	45 to 52 (33.3 to 38.3; 4.6 to 5.3)
Unions of brakes and clutch control system piping: – Pipes – Hoses	 8 to 10 (5.8 to 7.2; 0.8 to 1) 10 to 15 (7.2 to 10.8; 1 to 1.5)
Reverse speed engagement indicator switch (on speed gear-differential casing)	23 to 26 (16.6 to 19.5; 2.3 to 2.7)
Nut securing plate for reverse speed engagement safety device	8.3 to 10.3 (6.5 to 7.6; 0.9 to 1.05)
Bolt securing rear support rubber bushing of clutch-speed gear-differential unit	71 to 89 (52.1 to 64.3; 7.2 to 8.9)
Screws securing speed gear-differential unit to lateral support small block	18.6 to 23.5 (13.7 to 17.4; 1.9 to 2.4)

(1) Use the grease prescribed: ISECO Molykote BR2

AXLE SHAFT-SERVICE DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

FLUIDS AND LUBRICANTS

Description	Type	Recommended product	Quantity
Axle shaft screw thread	GREASE	ISECO Molykote BR2 Part No. 3671-69841	–
Axle shaft constant velocity U-joint Apply an equal amount of grease on both sides of row of balls	GREASE	ISECO Molykote VN2461C OPTIMOL Olystamoly 2LN584 Part No. 3671-69843	120 g (4.23 oz.)

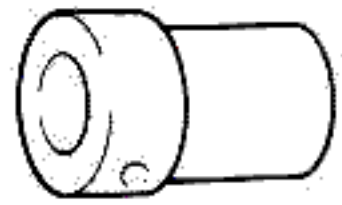
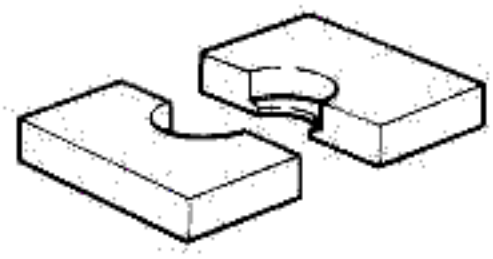
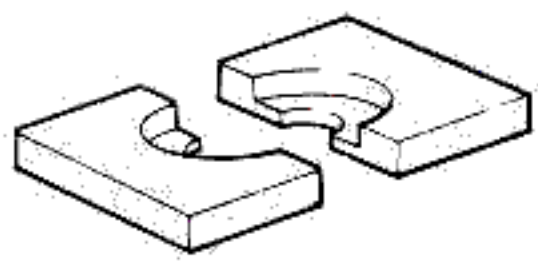
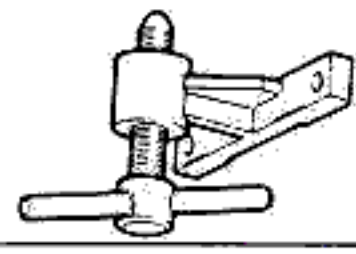
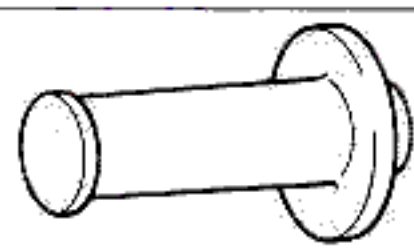
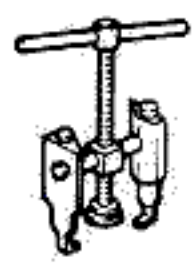
SEALANTS

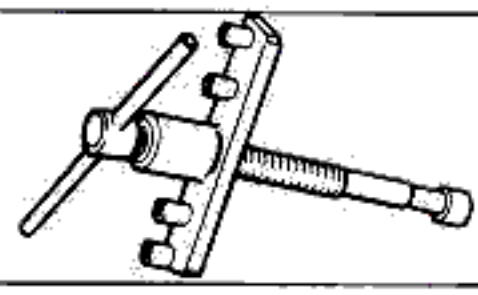
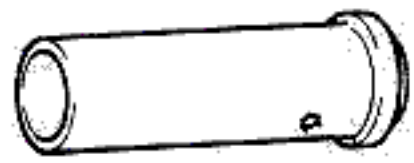
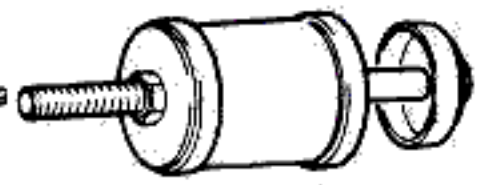
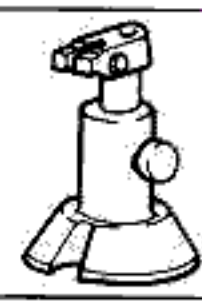
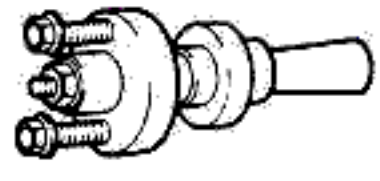
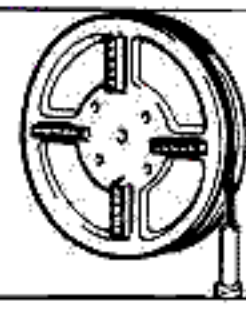
Description	Type	Recommended product
C. V. U-joint inner and outer cover surface	Jointing compound	DIRING Curil K2 Part No. 3522-00031
C.V. U-joint inner cover and bellows surface	Jointing compound	BOSTON Bostik 475 U.S.M. 475 Part No. 3521-00034

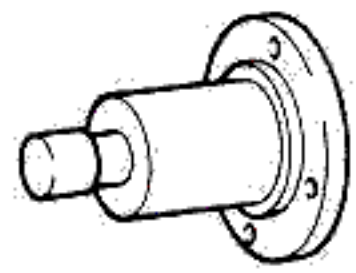
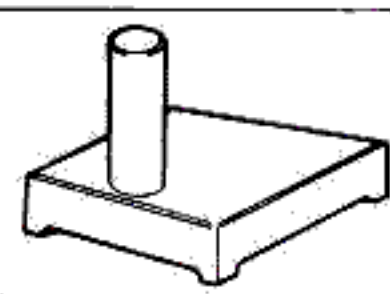
TIGHTENING TORQUES

Description \ Measurement unit	N·m (ft·lb; kg·m)
Capscrews, axle shaft to differential and wheel shaft Capscrews, axle shaft to spacer and wheel shaft	44 to 54 (32.5 to 39.8, 4.5 to 5.5)

SPECIAL SERVICE TOOLS

Tool Number	Tool name	Page Ref.
A.2.0175	Spacer for locking pinion shaft to intermediate flange (to be used with A.2.0250) 	–
A.2.0247	Plate for removing retaining ring nut of differential internal axle shaft bearing 	–
A.2.0248	Plate for removing differential internal axle shaft 	–
A.2.0250	Tool for locking pinion shaft (to be used with A.2.0175) 	–
A.2.0267	Dummy rods for striking rod balls and speed engagement detent balls. 	–
A.3.0272	Driver for internal and external rings of differential carrier taper bearings 	–
A.3.0287	Adjustable span puller for differential carrier taper bearing inner races. 	–

Tool Number	Tool name	Page Ref.
A.3.0348	Puller-driver for outer race of pinion shaft rear roller bearing (to be used with A.3.0593) 	–
A.3.0412	Driver for insertion of bearing and ring nut on differential internal axle shaft 	–
A.3.0413	Puller-driver of rear rubber bushing securing clutch-speed gear-differential unit to body 	–
A.3.0430	Driver for insertion of oil seal ring on differential internal axle shaft covers 	–
A.3.0593	Bushing for pulling and driving outer race of pinion shaft rear roller bearing (to be used with A.3.0348) 	–
A.4.0136	Support of dial gauge for pinion setting (to be used with C.6.0164 and C.6.0163) 	–
C.2.0037-100/2000	Weights for checking bearings preload n.7 items - (to be used with C.5.0124, C.5.0123 and C.5.0125) 	–
C.5.0123	Tool for checking preload of differential casing bearings (to be used with C.5.0124, C.2.0037 and C.5.0125) 	–
C.5.0124	Sheave for checking preload of differential casing bearings (to be used with C.5.0123, C.2.0037 and C.5.0125) 	–

Tool Number	Tool name	Page Ref.
C.5.0125	Spring bush for checking preload of differential casing bearings (to be used with C.5.0123, C.5.0124 and C.2.0037) 	
C.6.0164	Tool for checking pinion position 	
C.6.0193	Reference gauge for resetting of pinion position check centesimal gauge (to be used with A.4.0136) 	

GROUP 13

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This group is structurally similar to that of the vehicle GTV & 2.5 and consequently the disassembly and reassembly procedures remain the same.

SERVICE DATA AND SPECIFICATIONS

TECHNICAL DATA

Gear ratios		Model: VP milano / VP 2.9 milano			
		Variations: LH 161.14	LH 161.16	LH 161.36	161.24
Speed gear ratios	1st speed	1 : 2,875			
	2nd speed	1 : 1.720			
	3rd speed	1 : 1.226			
	4th speed	1 : 0.946			
	5th speed	1 : 0.780			
	R. speed	1 : 3.000			
Differential ratio		4.10 : 1			3.54 : 1
Differential speed gear overall ratios Nominal speed at 1000 r.p.m.	1st speed	1 : 11.787			1 : 10.193
	km/h (mi/h)	9.239 (5.74)			–
	2nd speed	1 : 7.052			1 : 6.098
	km/h (mi/h)	15.442 (9.60)			–
	3rd speed	1 : 5.027			1 : 4.347
	km/h (mi/h)	21.663 (13.46)			–
	4th speed	1 : 3.879			1 : 3.354
	km/h (mi/h)	28.074 (17.45)			–
	5th speed	1 : 3.198			1 : 2.765
	km/h (mi/h)	34.052 (21.16)			–
	R. speed	1 : 12.300			1 : 10.636
	km/h (mi/h)	8.854 (5.50)			–

GENERAL SPECIFICATIONS

FLUIDS AND LUBRICANTS

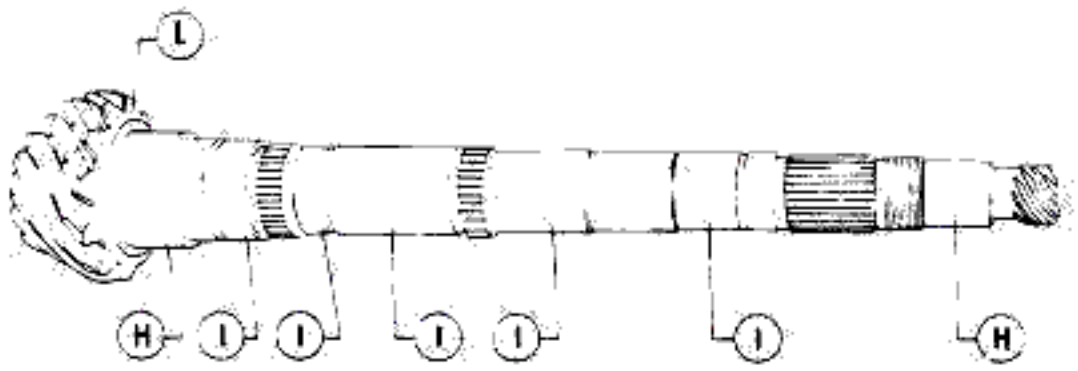
Applicat. No.	Application	Type	Name	Q.ty
1	Differential-speed gear roller bearings Detent devices Clutch fork spherical pin and thrust bearing seat	GREASE	– AGIP: Grease 33 FD – SHELL: Retinax AX – ESSO: Norva 275 – IP: Autogrease FD Std. No. 3671-69833	–
2	Propeller shaft rear joint seat Ball joint on speed control lever Reverse speed sliding gear inner bush Bush for bevel pinion on dutch-speed gear casing	GREASE	ISECO: Molykote BR2 Std. No. 3671-69841	5 cm^3 (0.3 cu in) –
3	Clutch-speed gear casing seal rings – Inner seal lip – Outer surface	GREASE OIL	ISECO: Molykote BR2 Std. No. 3671-69841 – AGIP: Rotra MP SX SAE 75W/90 – SHELL: Spirax HD 80W/90 – IP: Pontiax HDS SAE 75W/90 Std. No. 3631-69408	–
4	Differential-speed gear unit oil refilling	OIL	– AGIP: Rotra MP SX SAE 75W/90 – SHELL: Spirax HD 80W/90 – IP: Pontiax HDS SAE 75W/90 Std. No. 3631-69408	4.56 lb (2.070 kg)
5	Bushes for speed transmission and selection lever and speed transmission and engagement lever (isostatic control) Ball joint on speed transmission and engagement lever end	GREASE	Molykote Longterm No. 2 Std. No. 3671-69831	–

SEALANTS AND SURFACE FIXING AGENTS

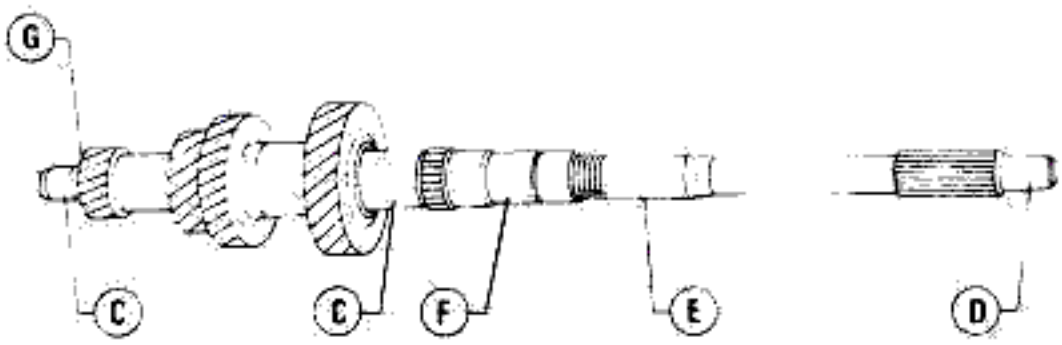
Application	Type	Name	Q.ty
Surfaces of differential-speed gear casing and clutch-speed gear casing mating with intermediate flange Mating surfaces between Reverse speed engagement safety devices and differential-speed gear casing NOTE: Use denatured ethyl alcohol to clean the surfaces	SEALING COMPOUND	LOWAC Perfect Seal Std. No. 3522-00011	–

CHECKS AND ADJUSTMENTS

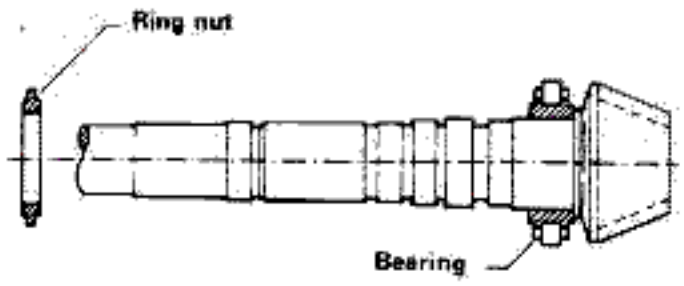
Axial clearance between fork and synchronizers sleeves	G	mm (in)	0.7 to 0.9 (0.0275 to 0.0354)
Spring test load	C	N (lb; kg)	90 to 97.6 (20.25 to 21.96; 9.18 to 9.95)
Spring length			
– Unloaded	L	mm (in)	30.6 (1.2)
– Loaded	L_C	mm (in)	18.8 (0.74)
Gears axial and radial clearance		mm (in)	0.1 to 0.15 (0.00394 to 0.00591)
Pinion, shaft and rear ring nut			
– Squareness deviation of ring nut support planes		mm (in)	0.02 (0.000787)
– Ring nut installation interference fit		mm (in)	0.019 to 0.060 (0.000748 to 0.00236)
– Eccentricity in seats H of front and rear bearings with respect to seats I of gear bushes and intermediate bearings		mm (in)	0.02 (0.000787)
– Squareness deviation for abutment plane L of rear bearing inner race with respect to seats H		mm (in)	0.02 (0.000787)



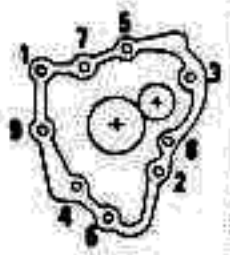
Main shaft			
– Eccentricity in seats C of differential-speed gear casing bearings and intermediate flange with respect to centering seat D on clutch shaft, to seat E of clutch-speed gear casing bearing and to seat F of 5th speed gear		mm (in)	0.03 (0.00118)
– Squareness deviation of abutment plane G for rear bearing inner race with respect to seats C of bearings		mm (in)	0.03 (0.00118)



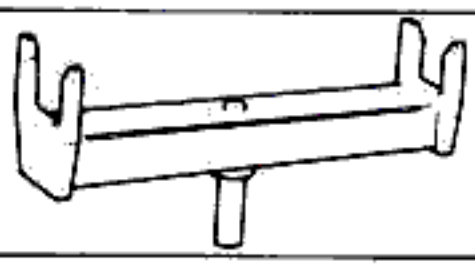
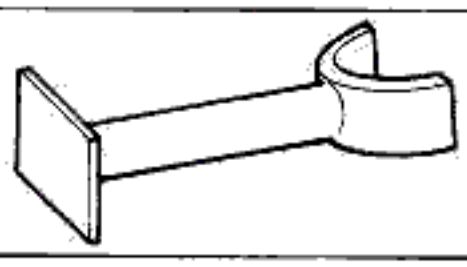
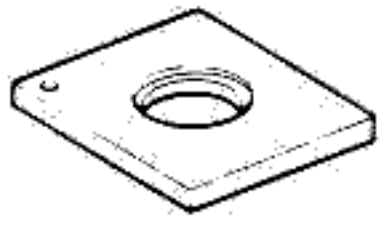
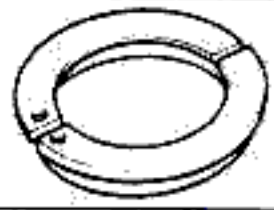
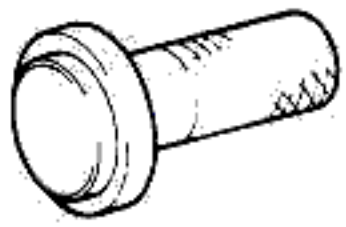
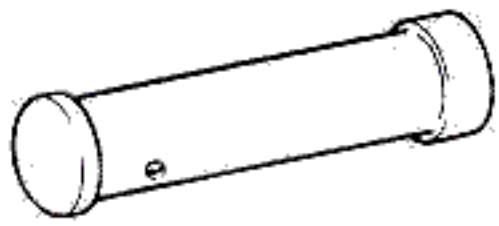
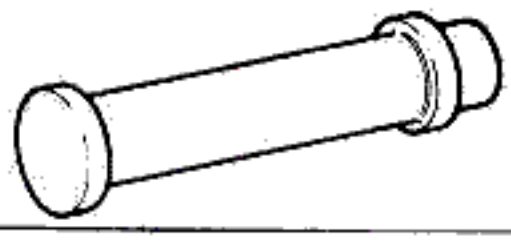
HEATING TEMPERATURES

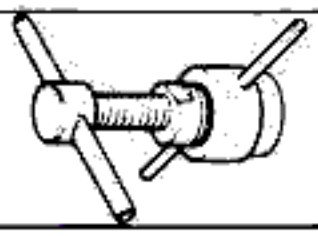
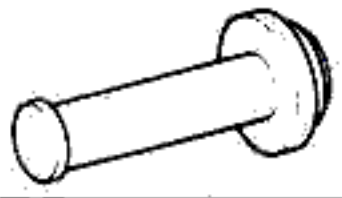
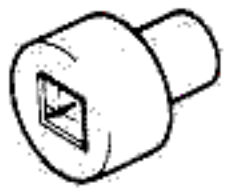
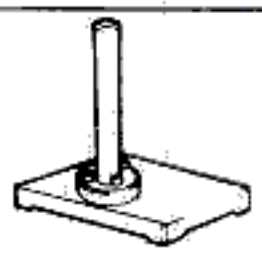
Application \ Measurement unit	°C (°F)
Heating temperature for roller bearing locking ring nut of bevel pinion shaft (head side)  	140 (284)
Heating temperature of clutch-speed gear casing for installation of Reverse speed gear pin, and bush of speed selection and engagement rod	140 to 160 (284 to 320)
Heating temperature of 3rd and 4th speed driving gears for installation on main shaft	195 to 210 (383 to 410)

TIGHTENING TORQUES

Application \ Measurement unit	N·m (ft·lb; kg·m)
Main shaft nut	93 to 103 (68.7 to 75.9; 9.5 to 10.5)
Bevel pinion shaft securing nut	112 to 124 (84.4 to 91.1; 11.4 to 12.6)
Nuts securing differential speed gear casing and clutch-speed gear casing to intermediate flange Tightening order 	12 to 14 (8.7 to 10.1; 1.2 to 1.4)
Screws securing shoulder plate to intermediate flange	14 to 15 (10.1 to 11.6; 1.4 to 1.6)
Containers for the laking of spring and balls securing rods	17 to 20 (12.3 to 15.2; 1.7 to 2.1)
Nut securing ball joint connecting rear lever to transmission lever	25.1 to 31 (18.1 to 23.1; 2.5 to 3.2)
Nut securing speed selection tie rod	11.3 to 14 (8 to 10.1; 1.1 to 1.4)
Bolt securing speed selection and transmission lever to speed transmission and engagement lever	8.1 to 10 (5.8 to 7.2; 0.8 to 1)
Bolt and screw securing bracket to speed gear rubber pad	8.1 to 10 (5.8 to 7.2; 0.8 to 1)
Bolts securing speed gear unit rubber pads to casing	18.6 to 23 (13.7 to 16.6; 1.9 to 2.3)
Fast idle switch (on intermediate flange)	40 to 48 (26.9 to 35.4; 4.1 to 4.9)
Screws securing clutch unit to differential speed gear unit	29 to 32 (21 to 23.1; 2.9 to 3.2)
Screws securing propeller shaft joint to clutch shaft fork	55 to 57 (40.5 to 41.9; 5.6 to 5.8)
Unions for clutch hydraulic system pipes	8 to 10 (5.8 to 7.2; 0.8 to 1)
Unions for clutch hydraulic system hoses	10 to 15 (7.2 to 10.8; 1 to 1.5)
Screws securing forks of 1st - 2nd - 3rd and 4th speed	21 to 23 (15.2 to 16.6; 2.1 to 2.3)
Screws securing speed gear - differential unit to lateral support small block	18.6 to 23 5 (13.7 to 17.3; 1.9 to 2.4)
Screws (lower) securing speed control lever support to body	20 to 32.5 (14.5 to 23.5; 2 to 3.25)
Screws (upper) securing speed control lever support to body	4.8 to 6 (3.6 to 4.3; 0.5 to 0.6)
Nut securing plate for Reverse speed engagement safety device	8.3 to 10.3 (6.5 to 7.2; 0.9 to 1.05)
Bolt securing lever to external speed control rod	13 to 16 (9.4 to 11.6; 1.3 to 1.6)

SPECIAL SERVICE TOOLS

Tool number	Tool name	Page ref.
A.2.0075	Support for jacking up car 	–
A.2.0267	Dummy rods for striking rod balls and speed engagement detent balls. 	–
A.2.0268	Spacer for removing De Dion axle 	–
A.2.0349-0100	Half-ring support plate for disassembling ring nut and inner race of pinion shaft bearing (to be used with A.2.0401 and A.2.0402) 	–
A.2.0401	Half-rings for removing inner race of pinion shaft rear bearing - (to be used with A.2.0349.0100) 	–
A.2.0402	Half-rings for removing ring nut of pinion shaft rear bearing - (to be used with A.2.0349.0100) 	–
A.3.0192	Puller-driver for outer race of pinion shaft bearing on intermediate flange (Solutions with intermediate roller ball bearings) 	–
A.3.0343	Driver for main shaft oil seal ring 	–
A.3.0346	Driver for pinion shaft bush 	–

Tool number	Tool name	Page ref.
A.3.0361	Puller for inner race of main shaft rear bearing 	–
A.3.0532	Driver for bush of speed selection and engagement rod 	–
A.3.0596	Puller-driver for outer race of main shaft bearing on intermediate flange 	–
A.4.0145	Support of gauge for determining pinion shim (to be used with C.6.0166) 	–
A.5.0181 A.50249	Wrench, ~~30~~ 32 mm. for main shaft nut Wrench, 30 mm. for Main shaft nut 	–
A.5.0216	Spanner for plug of speed control rod ball 	–
C.6.0166	Reference gauge for determining pinion shim (to be used with A.4.0145) 	–

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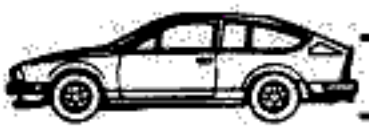
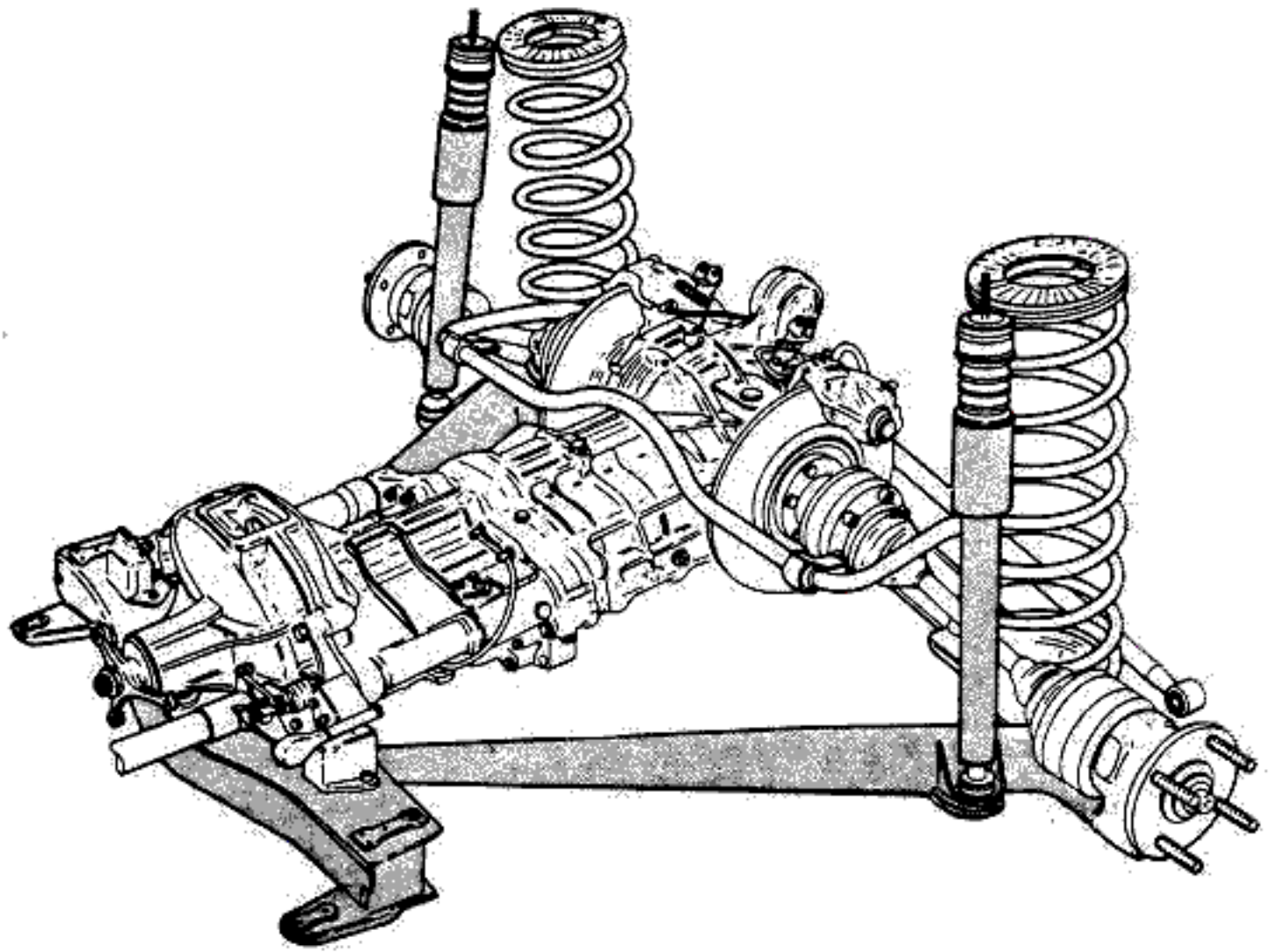


INTRODUCTION

This publication, intended for Alfa Romeo dealers and service technicians, explains the procedures used to remove, service, and install the clutch and gearbox used in the GTV-6 or 164 vehicle. Procedures are fully illustrated to help the service technician complete the servicing operations properly and safely.

Use only genuine Alfa Romeo replacement parts and be sure to consult service bulletins and this book when servicing the transaxle.

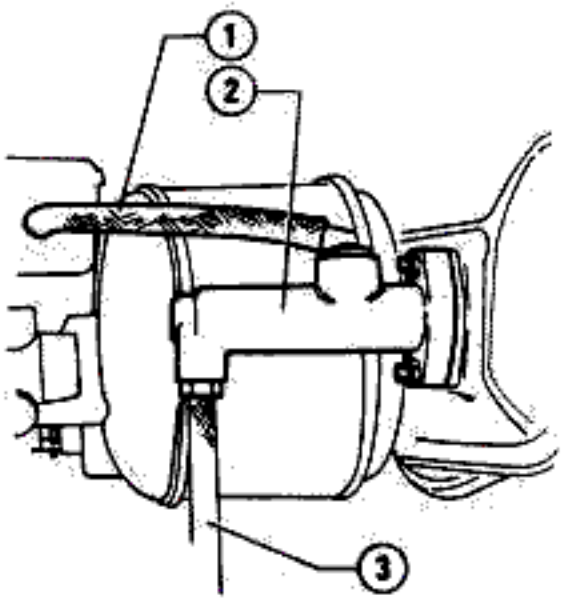


CLUTCH HYDRAULIC SYSTEM

Clutch Master Cylinder

To remove the clutch master cylinder, use a syringe to drain the fluid from the reservoir. Remove the supply hose from the clutch master cylinder (2). Remove the pipe (3) from the master cylinder.

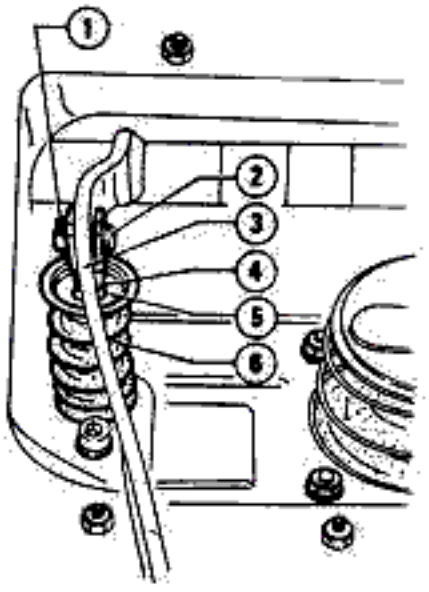
1. Master cylinder supply hose 2. Clutch master cylinder 3. Pipe



Clutch master cylinder.

From inside the vehicle, remove the cotter pin (1) and remove the pin (2). Move the pedal (3) away from the fork (4). Remove the cup (5) and withdraw the spring (6). Remove the two nuts that hold the master cylinder to the firewall and withdraw the master cylinder.

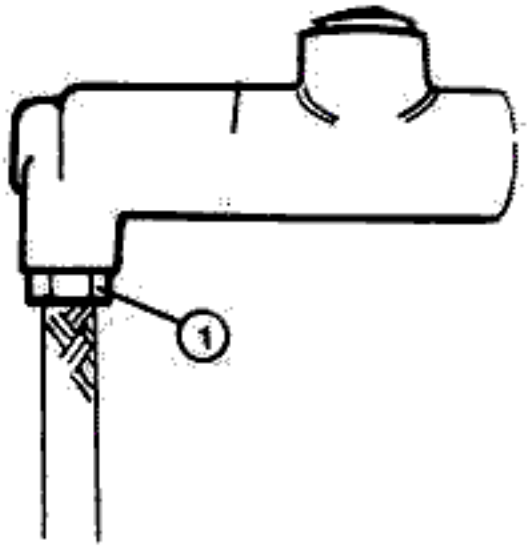
1. Cotter pin 2. Pin 3. Pedal 4. Fork 5. Cup 6. Spring



Clutch pedal assembly.

To install the master cylinder, reverse the order of the removal procedure. Tighten the hydraulic system pipe unions (1) to 6-7 ft-lb. Tighten the hose unions to 7-11 ft-lb. Fill the supply tank with the proper fluid and bleed the hydraulic system as described in the CLUTCH INSTALLATION section of this book.

1. Pipe union

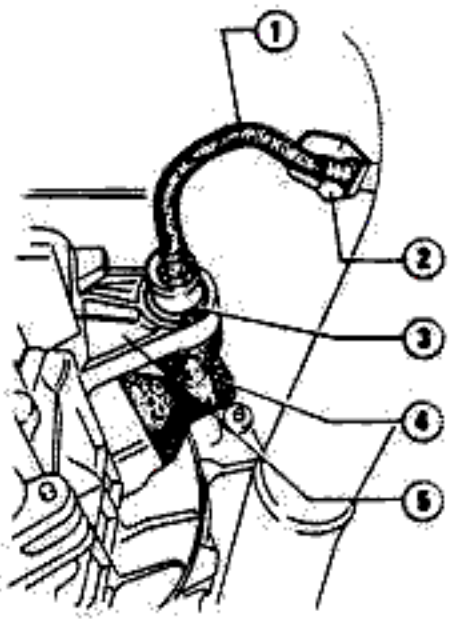


Master cylinder pipe union.

Removing Clutch Slave Cylinder (Double Plate Clutch)

Disconnect and plug the hydraulic hose (1). Remove the circlip (3) and the boot (4). Withdraw the clutch fork and remove the slave cylinder from the bracket (5).

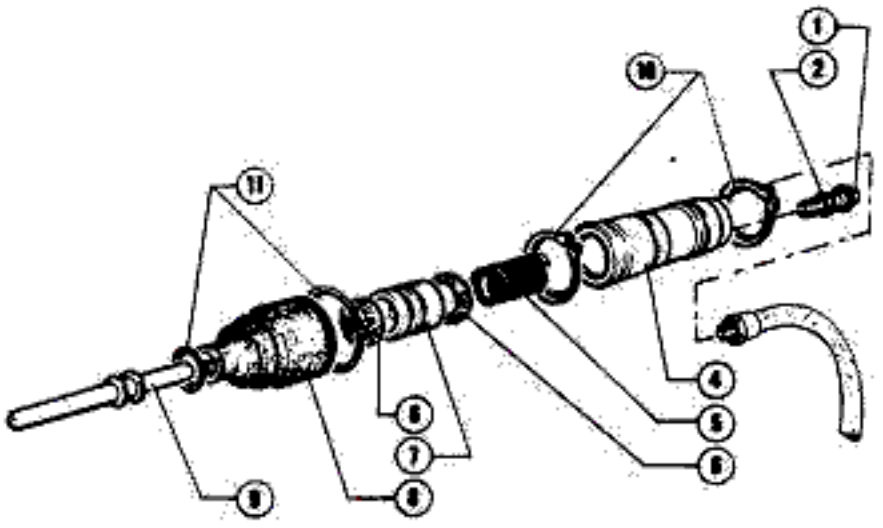
1. Hydraulic hose 2. Hose bracket 3. Circlip 4. Boot 5. Bracket



Removing clutch slave cylinder.

To disassemble the slave cylinder, remove the spring clips (11) and the boot (8). Withdraw the push rod (9), piston (7), seal rings (6), and spring (5) from the slave cylinder (4). Remove the bleeder (2) and cap (1).

1. Cap 2. Bleeder 4. Slave cylinder 5. Spring 6. Seal ring 7. Piston 8. Boot 9. Push rod 10. Circlips 11. Spring clips



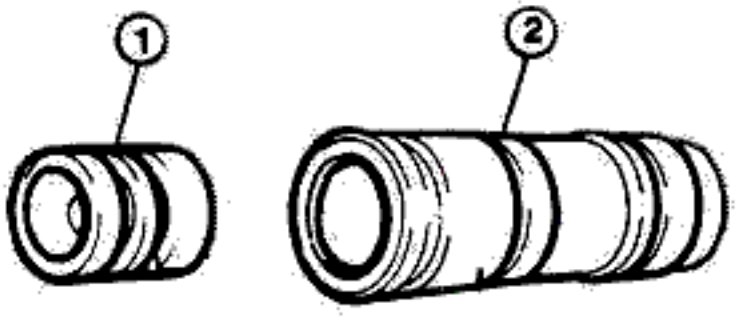
Clutch slave cylinder.

Slave Cylinder Inspection

Check for rust or scoring on the piston (1) and inside the slave cylinder (2). Check the condition of the seal rings and spring. Be sure the bleeder is free of any obstructions.

NOTE: Do not use gasoline, kerosene, or mineral oil to clean the components of the slave cylinder. These fluids can damage the rubber components of the slave cylinder.

1. Piston 2. Cylinder

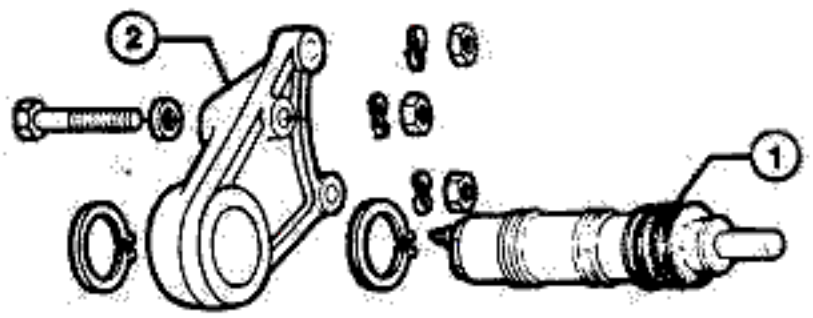


Slave cylinder inspection.

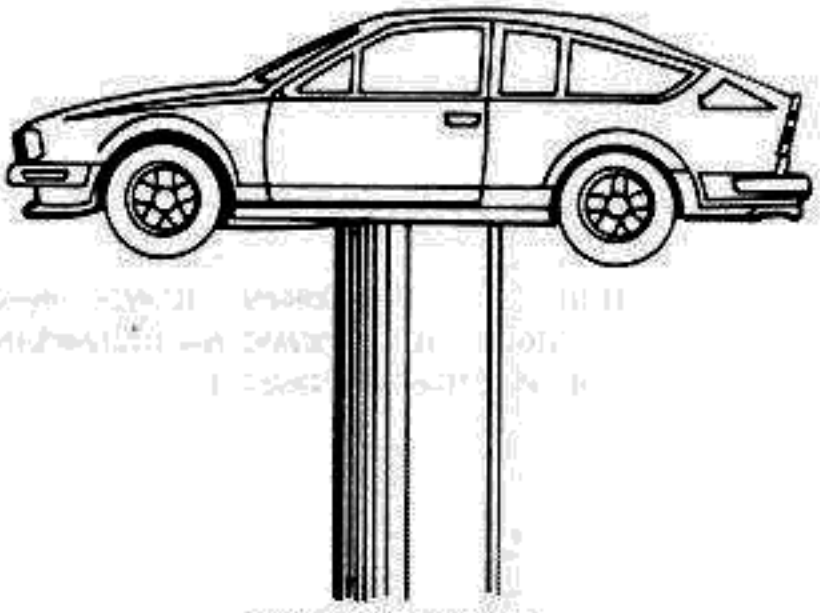
Assembly and Installation

To assemble and install the slave cylinder (1), reverse the order of the removal procedure. Bleed the clutch hydraulic system as described in the CLUTCH INSTALLATION section of this book.

1. Clutch slave cylinder 2. Bracket



Assembling clutch slave cylinder.

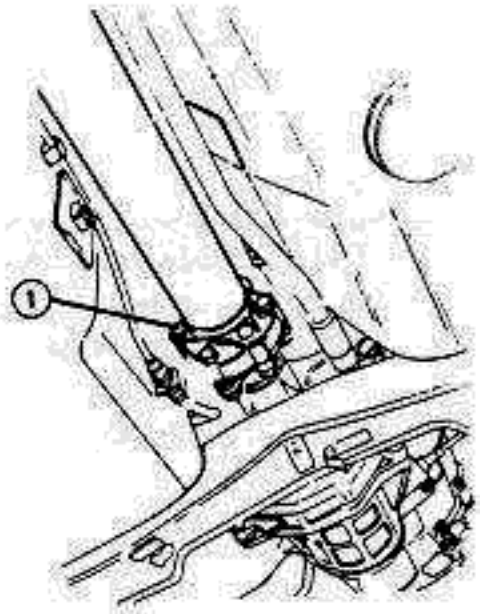


Preparing vehicle.

Preparation

To remove the clutch unit from the vehicle, place the transmission in neutral, disconnect the battery negative cable, and raise the vehicle on a hoist.

With the vehicle securely supported, remove the intermediate exhaust section and disconnect the drive shaft from the transaxle yoke.

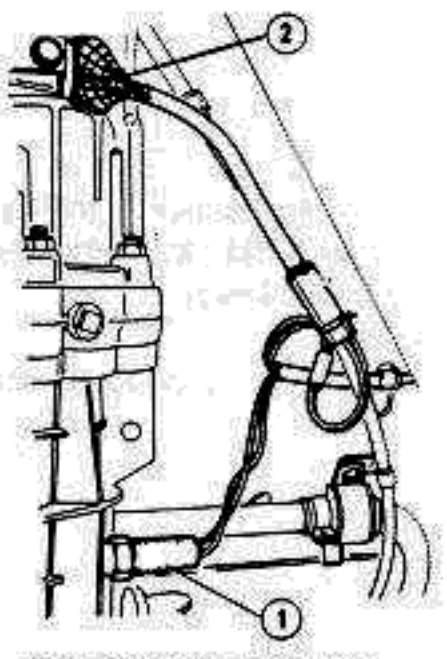


Drive shaft retaining bolts.

1. Drive shaft retaining bolts

Note! All drive shaft Nuts, Bolts and washers Must be marked, so that they can be reassembled in the same Locations. Nuts + Washers of different weight are used at the factory to finish balance the drive Shaft. Very important!!!

Disconnect the electrical connectors from the speedometer sending unit (2) and from the backup lights switch (1).



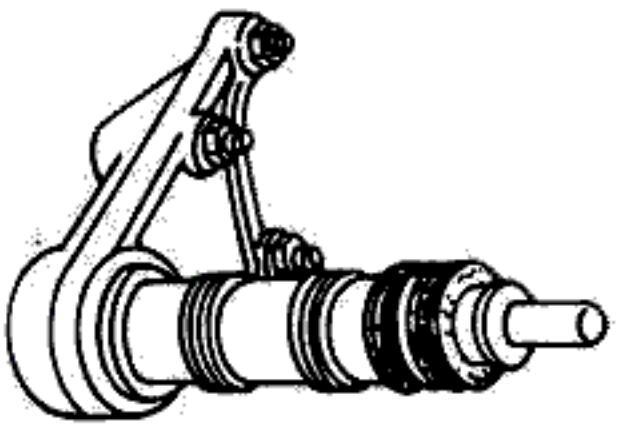
Electrical connectors.

1. Backup lights connector 2. Speedometer sending unit connector

REMOVING CLUTCH UNIT

Remove the clutch slave cylinder.

NOTE: Relieve the clutch hydraulic pressure slowly so that the slave cylinder seals are not damaged when the cylinder is removed from the vehicle.

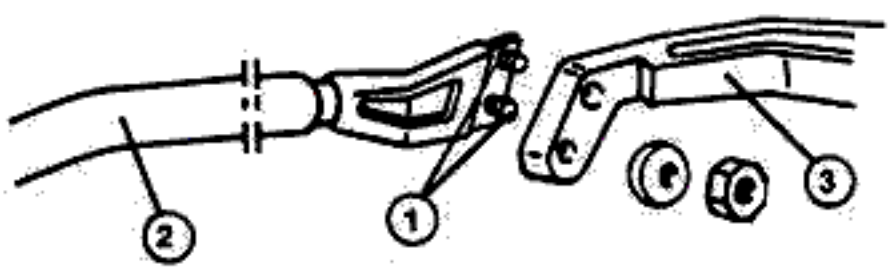


Clutch slave cylinder.

Shift Linkage

The GTV-6 uses two types of shift linkages. To remove the linkage on 1981 to 1984 vehicles, remove the two bolts (1) that hold the control rod (2) to the selector arm (3) and remove the control rod.

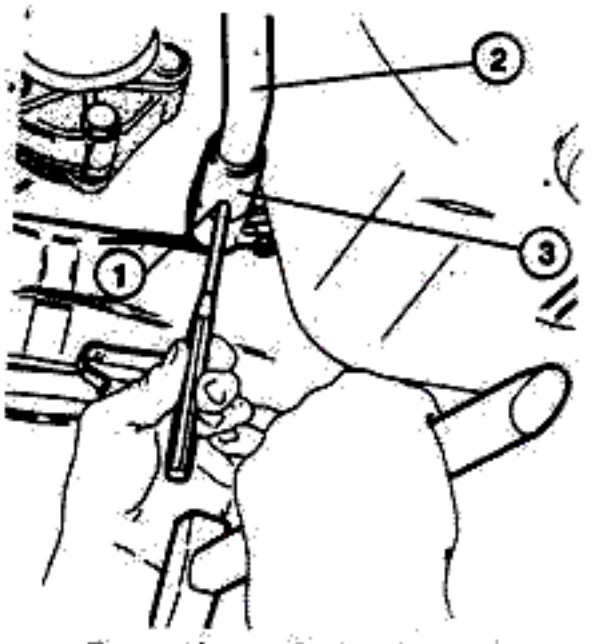
1. Linkage bolts 2. Control rod 3. Selector arm



1981 to 1984 shift linkage.

On 1985 to present vehicles, withdraw the pin (1) that holds the control rod (2) to the selector arm (3) and remove the control rod.

1. Pin 2. Control rod 3. Selector arm

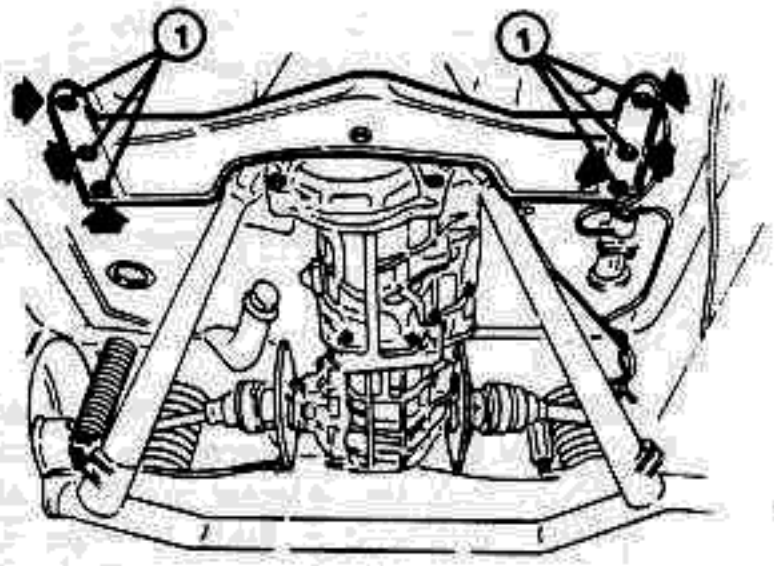


Removing selector arm pin.

Clutch Removal

Remove the six deDion tube front support bolts (1).

1. deDion support bolts

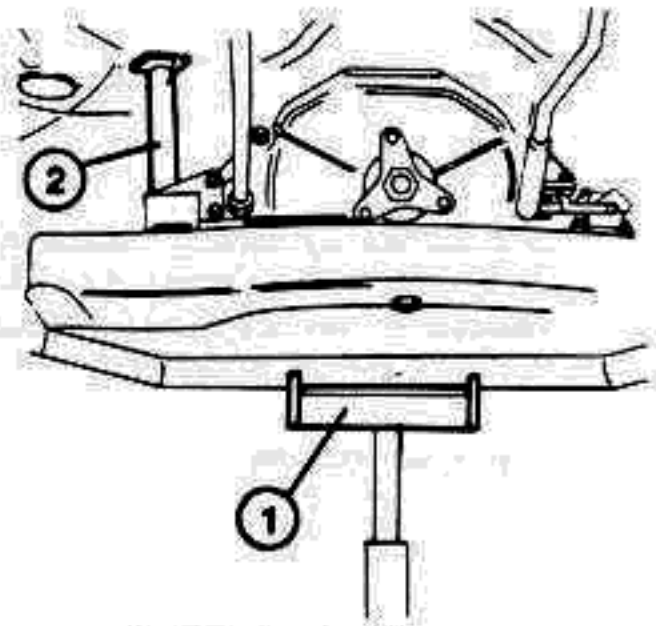


Removing support bolts.

Place the support (1) (special tool A.2.0075) on a transmission jack under the center of the rear deDion tube and raise the deDion tube slowly. The front transaxle subassembly will drop away from the vehicle. Place the deDion spacer (2) (special tool A.2.0268) between the deDion side tubes and the vehicle body and remove the transmission jack.

NOTE: Be careful of brake line and electrical wiring when installing the deDion spacer.

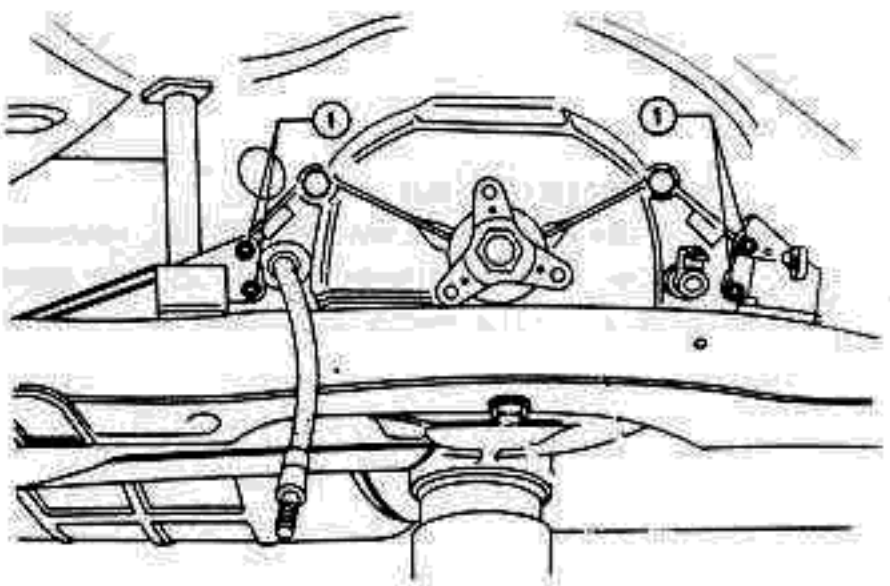
1. Support 2. deDion spacer



Positioning deDion spacer.

Disconnect the front transaxle mounting bolts (1). Using tool R.4.0150 on a transmission jack, secure the tool to the differential housing side flanges. Raise the transaxle off the deDion support.

1. Front transaxle mounting bolts



Disconnecting transaxle bolts.

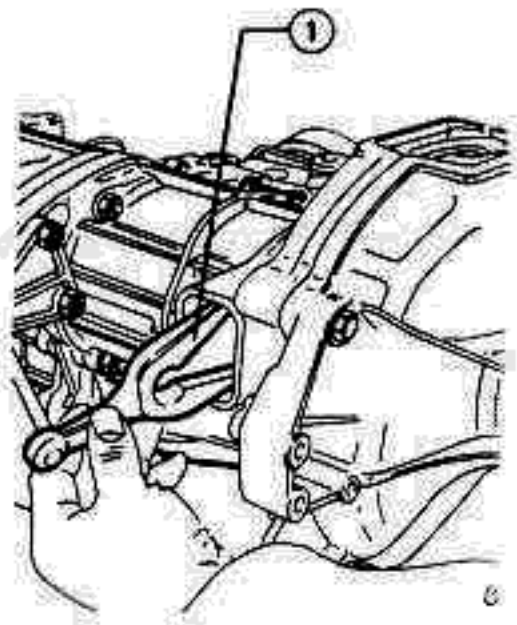
REMOVING CLUTCH UNIT

Withdraw the clutch fork (1) from the front housing. Remove the shift selector arm retaining nut, and remove arm from shaft.

NOTE: On 1981-1984 vehicles, mark the position of the arm on the shaft to ensure proper reassembly.

1. Clutch fork

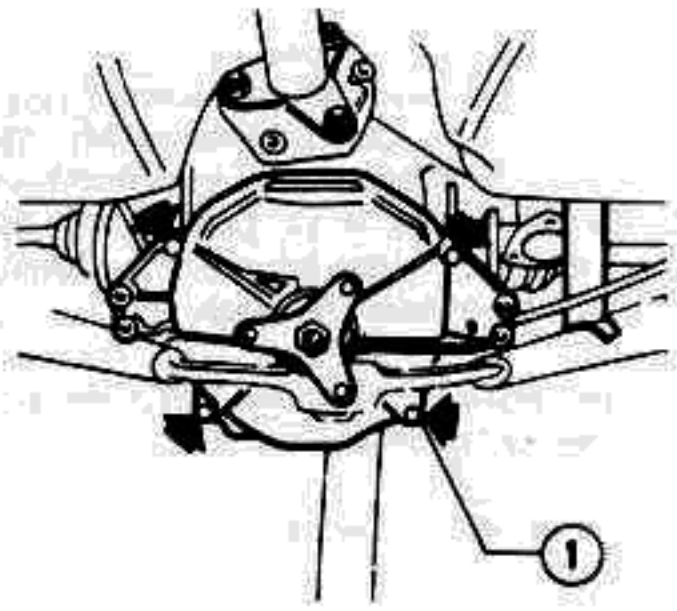
CAUTION: On 1981-1984 vehicles, care must be taken that torque on shift selector arm retaining nut is not absorbed by primary selector shaft, or shift gate misalignment will occur. Brace selector arm with adjustable spanner while removing or installing retaining nut. ***Do not*** *use impact tools.*



Clutch fork.

Remove the four bolts (1) that hold the clutch unit to the transaxle. Pull the clutch unit forward and withdraw it from the vehicle. To service the clutch unit, see the CLUTCH SERVICE section of this book.

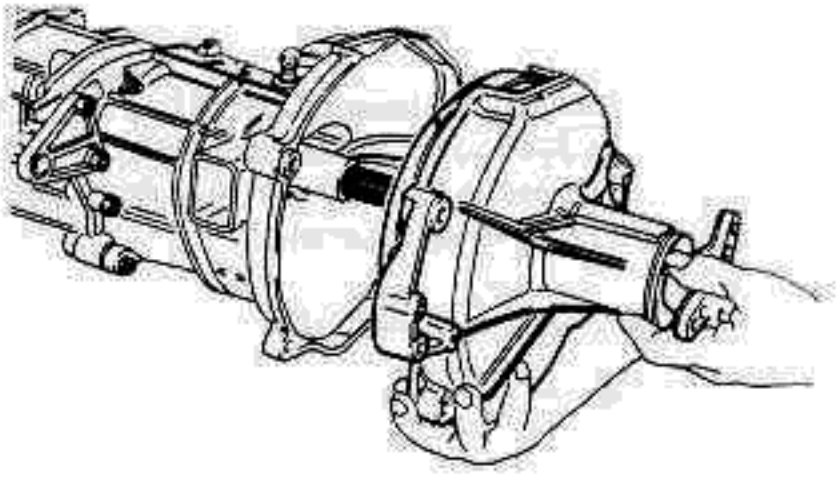
1. Clutch unit retaining bolts



Removing clutch unit bolts.

Clutch Installation

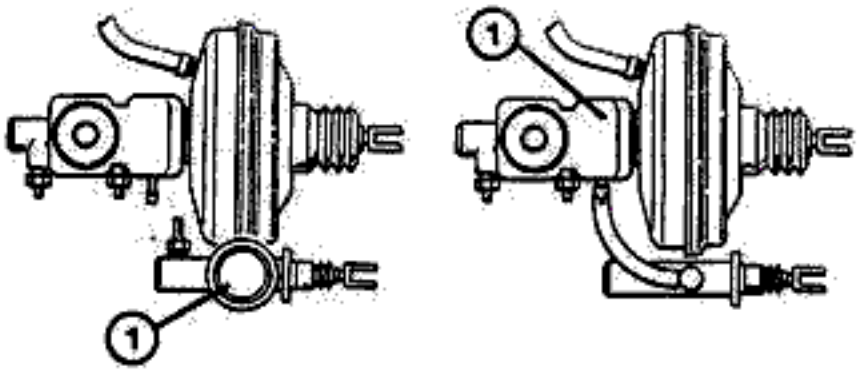
To install the clutch unit on the vehicle, reverse the order of the removal procedure. Be sure to note the position of the shift selector arm on the selector shaft.



Installing clutch unit.

When the clutch slave cylinder is installed, the hydraulic system must be bled to remove any air from the system. To bleed the system, first check that the hydraulic system supply tank (1) is full.

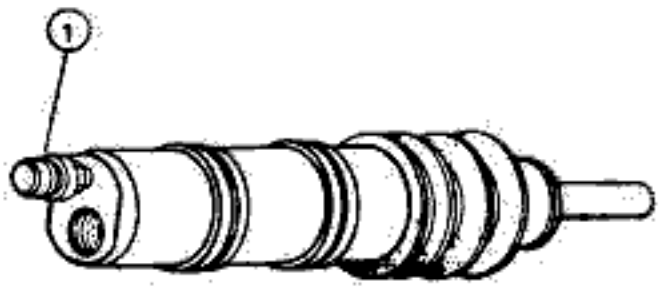
1. Hydraulic fluid supply tanks



1981 to 1984 *1985 to Present*
Hydraulic fluid supply tanks.

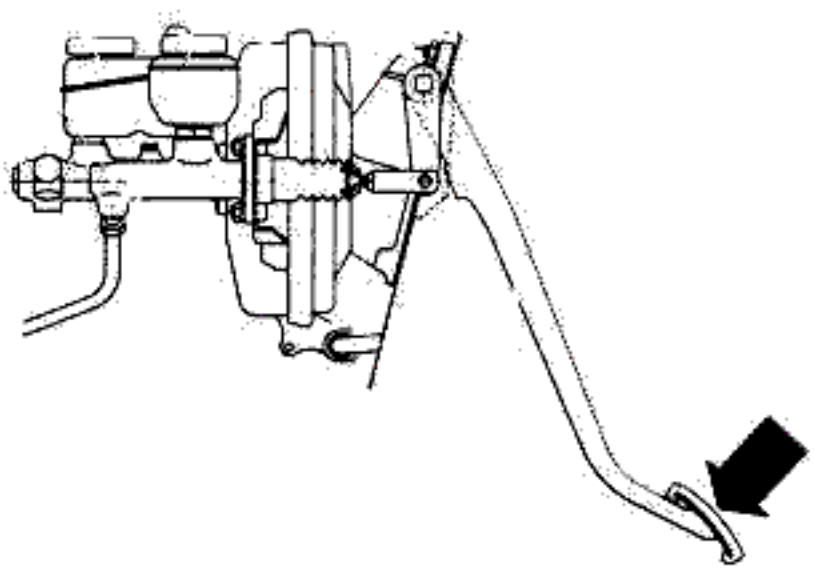
Remove the dust cap from the clutch slave cylinder bleeder (1). Be sure the bleeder is positioned "up," as shown in the illustration. Fit one end of a rubber hose over the bleeder. Put the other end of the hose in a glass jar of hydraulic fluid.

1. Bleeder



Slave cylinder bleeder.

Loosen the bleeder and have someone pump the clutch pedal slowly and smoothly until no more air bubbles are released into the jar of fluid.



Bleeding clutch hydraulic system.

REMOVING CLUTCH UNIT

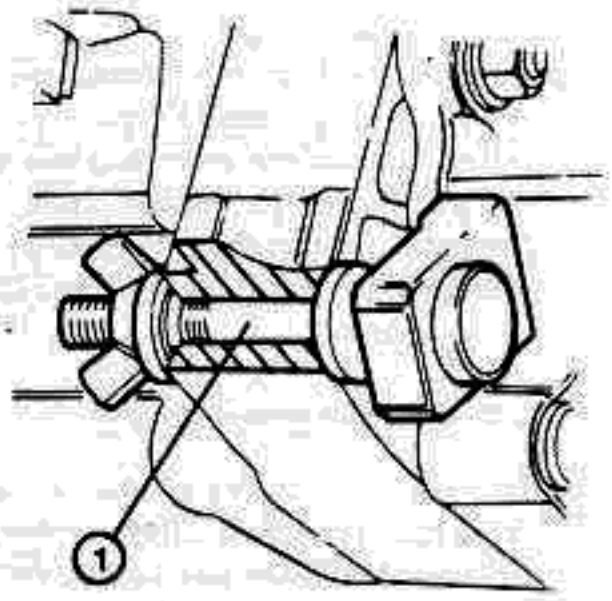
When no more bubbles are released, hold the clutch pedal down and tighten the bleeder. Remove the rubber hose, and place the dust cap back on the bleeder. Fill the supply tank with the proper fluid and discard the fluid in the jar.

Bleeding jar.

Gearbox Removal

To remove the gearbox from the vehicle, remove the clutch as described above. Then, secure the intermediate flange to the gearbox-differential housing with the flange retainer (1) (special tool A.2.0322). Note that both sides of the flange are coated with sealant during assembly. Remove the nuts that hold the front housing and intermediate flange to the differential housing.

1. Flange retainer

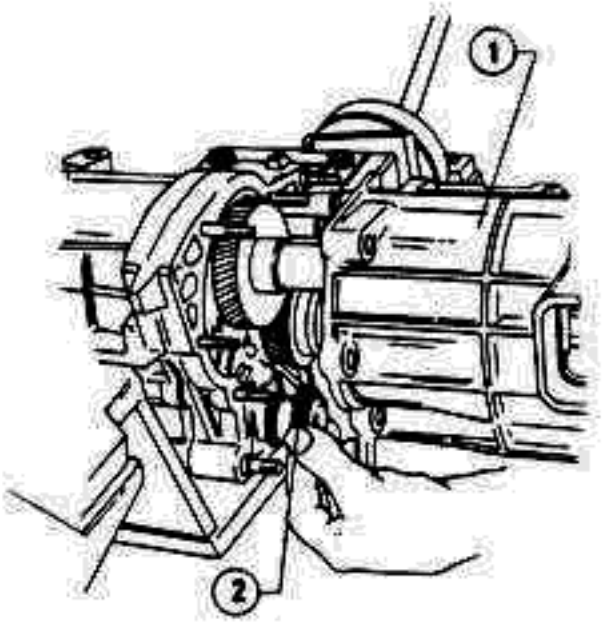


Flange retainer position.

Pull the front housing (1) forward and withdraw it from the vehicle.

NOTE: Be careful not to drop the reverse idler gear (2) when removing the front cover.

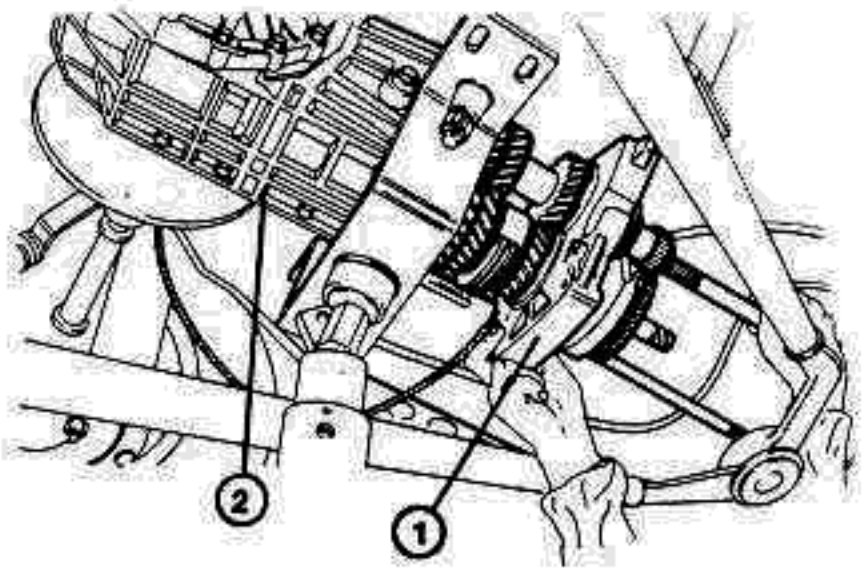
1. Front housing 2. Reverse idler gear



Removing front housing.

Hold the intermediate flange securely, and remove the flange retainer. Pull the intermediate flange (1) and gearbox assembly forward and withdraw them from the vehicle. To service the gearbox, see the GEARBOX SERVICE section of this book.

1. Intermediate flange 2. Housing



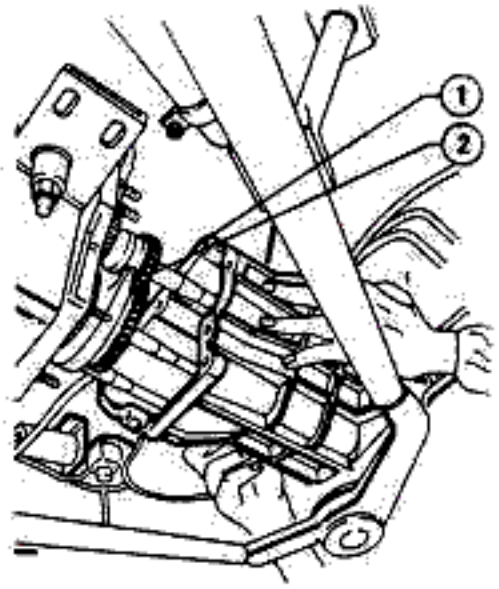
Removing intermediate flange.

Gearbox Installation

To install the gearbox on the vehicle, reverse the order of the removal procedure. Be sure to position the reverse idler gear when installing the gearbox. Remove any traces of old sealant from intermediate flange. Then coat both sides of the flange with sealant. If the clutch is to be installed, see the INSTALLATION section of this book.

1. Front cover 2. Reverse idler gear

*NOTE: Do **not** use silicone sealant or other sealants which are difficult to remove. They threaten the integrity of future transaxle reseals. Use Lowac Perfect Seal Std. No. 3522-00011 or Permatex Sealants, which may be removed with conventional solvents.*

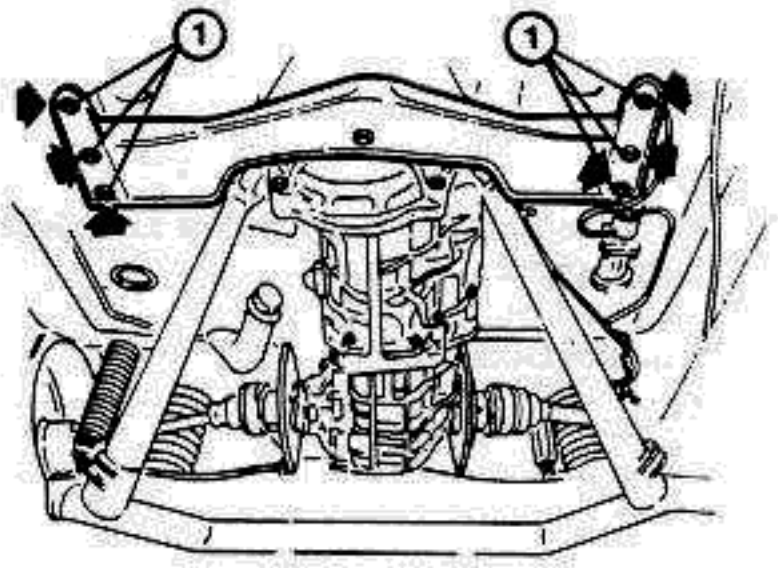


Installing gearbox.

Transaxle Removal

To remove the transaxle from the vehicle, first remove the drive shaft, clutch slave cylinder, and shift linkage as described in the REMOVING CLUTCH UNIT FROM VEHICLE section of this book. Then, remove the six deDion tube front support bolts (1).

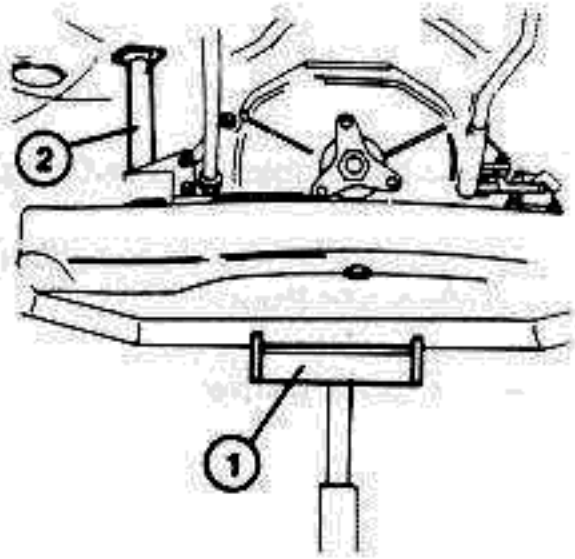
1. deDion support bolts



Removing support bolts.

Place the support (1) (special tool A.2.0075) on a transmission jack under the center of the rear deDion tube and raise the deDion tube slowly. The front transaxle subassembly will drop away from the vehicle. Place the deDion spacer (2) (special tool A.2.0268) between the deDion side tubes and the vehicle body and remove the transmission jack.

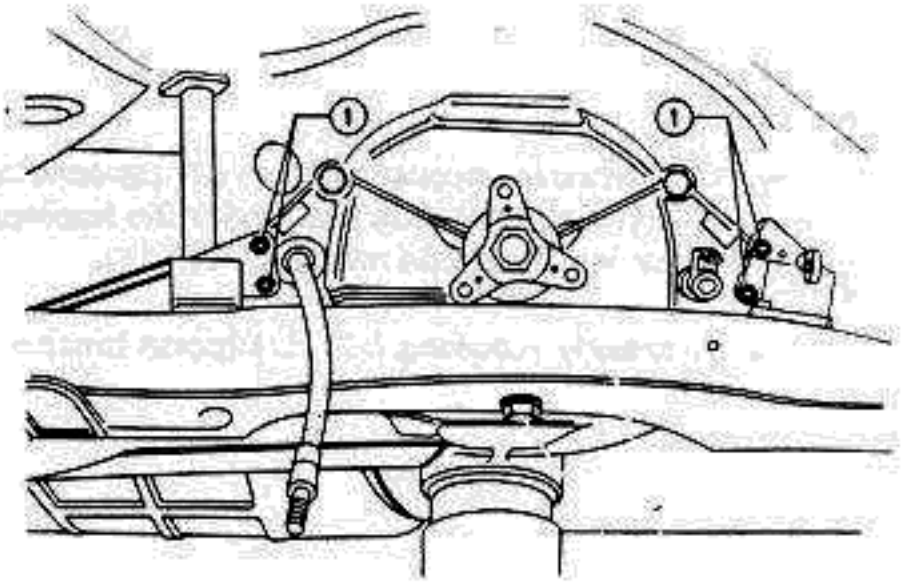
1. Support 2. deDion spacer



Positioning deDion spacer.

Disconnect the front transaxle mounting bolts (1).

1. Front transaxle mounting bolts

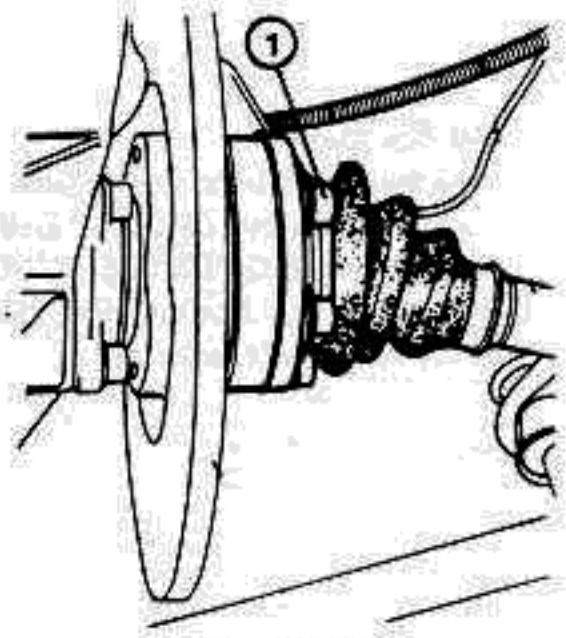


Front transaxle mounting bolts.

REMOVING TRANSAXLE

Remove the bolts (1) that hold the axle shafts to the stub axle shafts.

1. Stub axle bolts

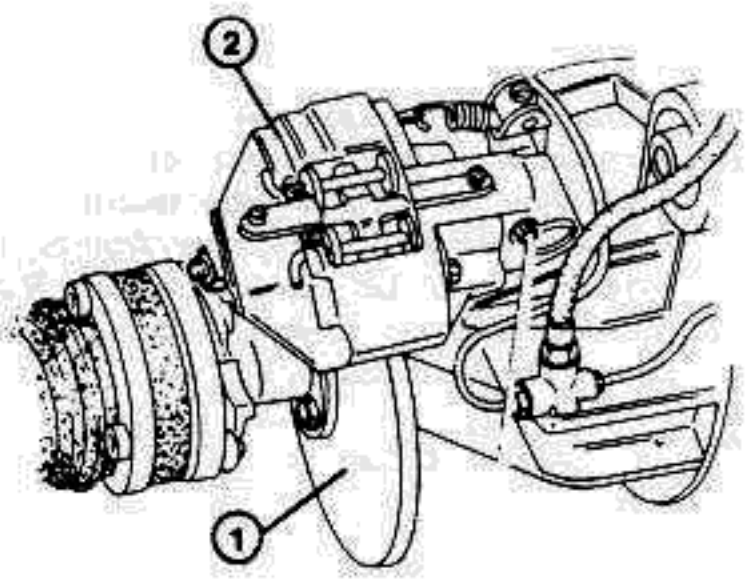


Stub axle bolts.

Remove the rear brake rotors (1) and calipers (2).

NOTE: Be sure to support the brake calipers to relieve any strain on the brake lines.

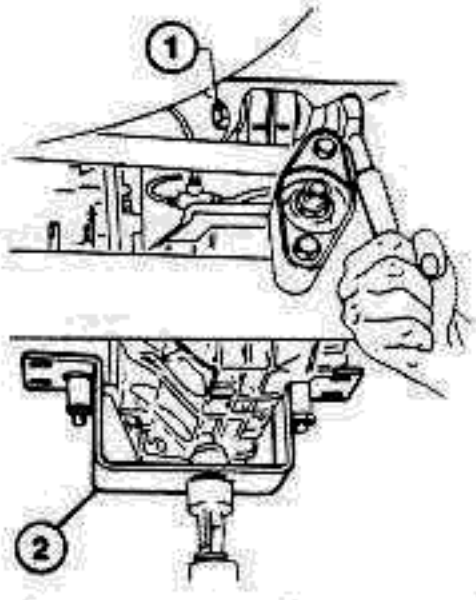
1. Brake rotor 2. Brake caliper



Rear brake assembly.

Place the transaxle support bracket (2) (special tool R.4.0150) on a transmission jack under the transaxle. Remove the rear transaxle mounting bolt (1).

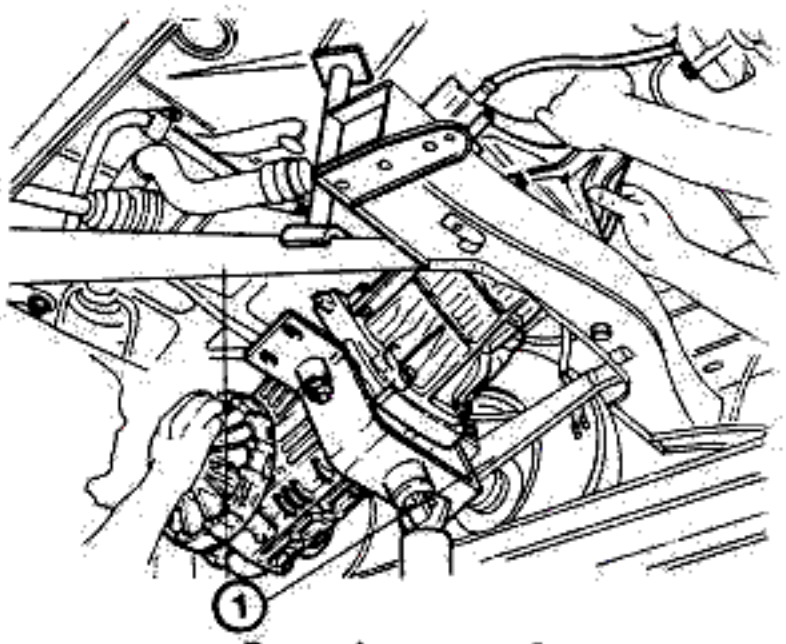
1. Rear transaxle mounting bolt 2. Support bracket



Removing rear transaxle mounting bolt.

Lower the transaxle and withdraw it from the vehicle. To service the clutch unit, see the CLUTCH SERVICE section of this book; to service the gearbox, see the GEARBOX SERVICE section of this book.

1. deDion tube



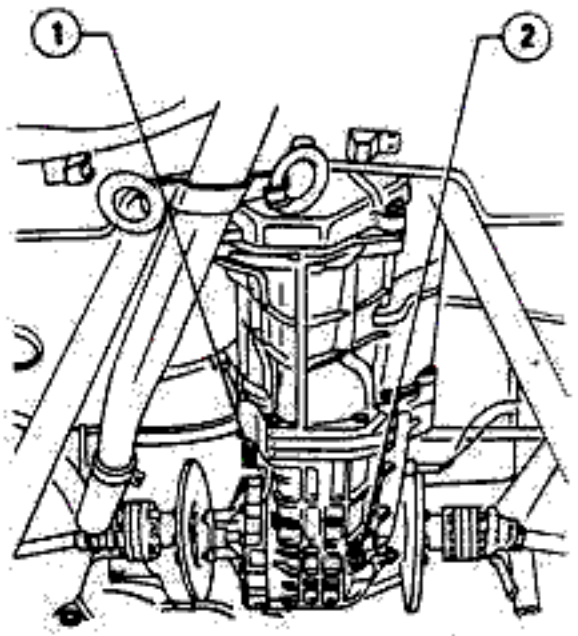
Removing transaxle.

Transaxle Installation

To install the transaxle on the vehicle, reverse the order of the removal procedure. If the gearbox and clutch unit are to be installed, see the CLUTCH INSTALLATION and GEARBOX INSTALLATION sections of this book.

1. Oil fill plug 2. Oil drain plug

NOTE: Fill transaxle with proper gear oil, SAE 75W/90, AGIP Rotra MP SX.

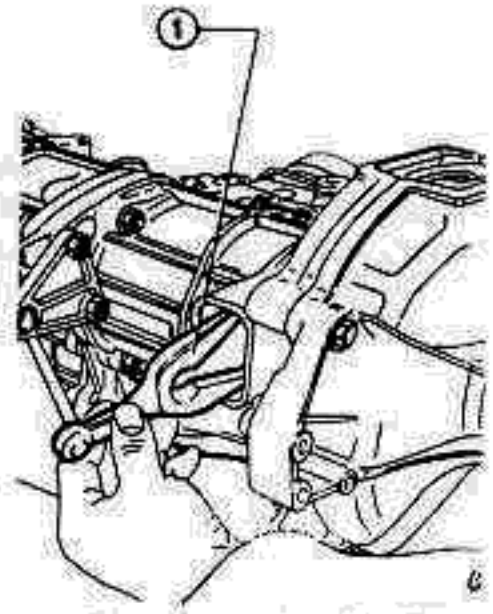


Installing transaxle.

Removing Clutch from Transaxle (Double Plate Clutch)

Remove the clutch fork (1) from the front housing.

1. Clutch fork

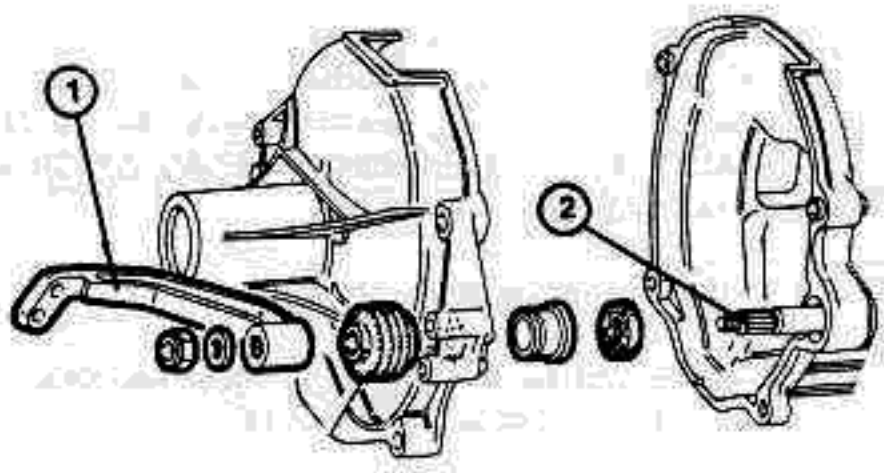


Removing clutch fork.

On 1981 to 1984 vehicles, mark the position of the shift selector arm on the selector shaft to ensure proper reassembly. Remove the nut that holds the arm to the shaft.

1. Selector arm 2. Selector shaft

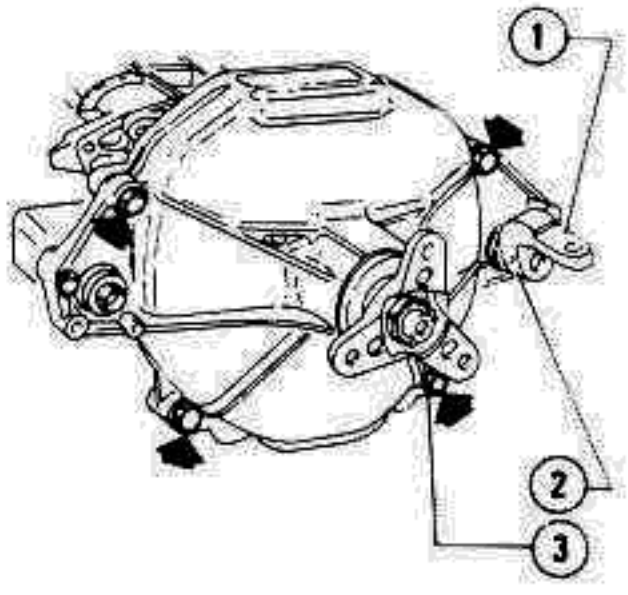
CAUTION: On 1981-1984 vehicles, care must be taken that torque on shift selector arm retaining nut is not absorbed by primary selector shaft, or shift gate misalignment ***will*** *occur. Brace selector arm with adjustable spanner while removing or installing retaining nut.* ***Do not*** *use impact tools.*



Removing shift selector arm.

On 1985 to present vehicles, withdraw the pin (2) that holds the control rod to the selector arm (1) and remove the arm. Remove the bolts (3) that hold the clutch unit to the clutch-gearbox assembly.

1. Selector arm 2. Pin 3. Bolts

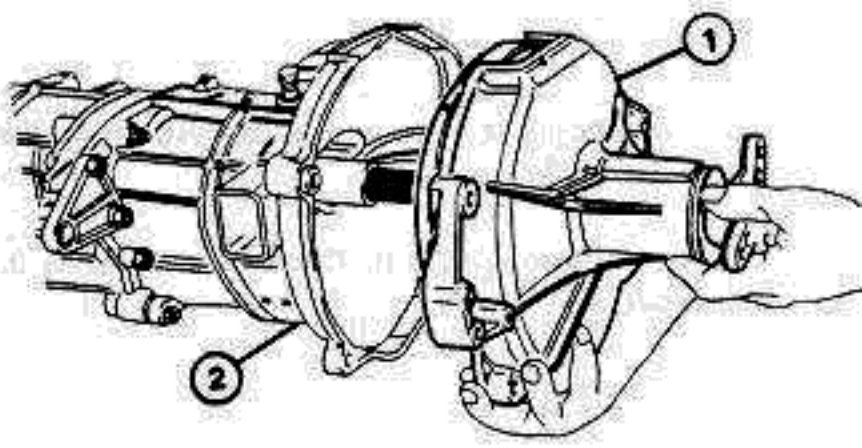


Clutch unit.

Pull the clutch unit (1) away from the gearbox assembly and place it carefully on a bench.

NOTE: Place the clutch unit on a bench so that it does not rest on the throw-out bearing.

1. Clutch unit 2. Front housing

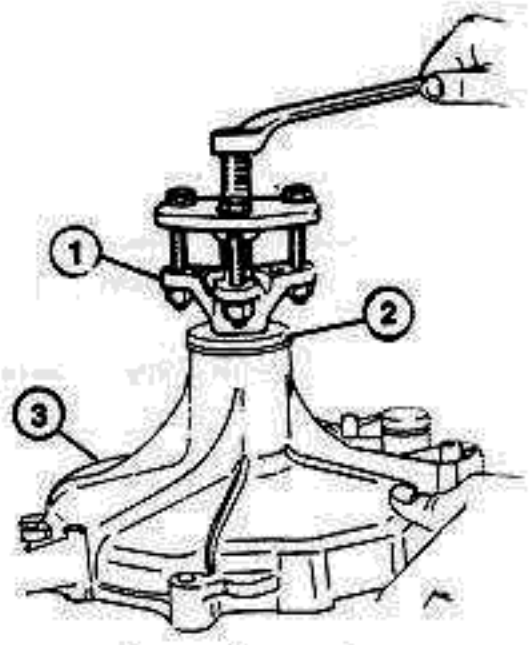


Removing clutch unit.

Dismantling Clutch Unit (Double Plate Clutch)

With the clutch unit on the bench, remove the nut that holds the yoke to the clutch assembly and use the puller (special tool A.3.0600) to remove the yoke (1). Remove the dust guard (2) and lift the front cover (3) from the clutch unit.

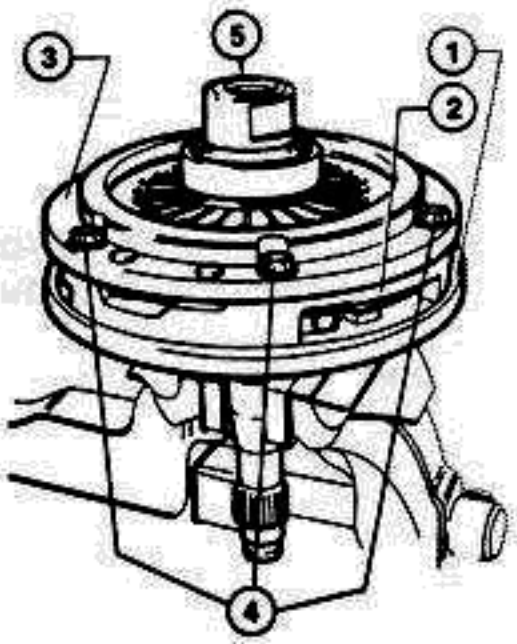
1. Yoke 2. Dust guard 3. Front cover



Removing yoke.

Place the clutch unit in a vise with protective jaws. Mark the position of the flywheel (1), intermediate pressure plate (2), and rear pressure plate (3) to ensure proper reassembly. Remove the bolts (4) and washers that hold the rear pressure plate to the flywheel.

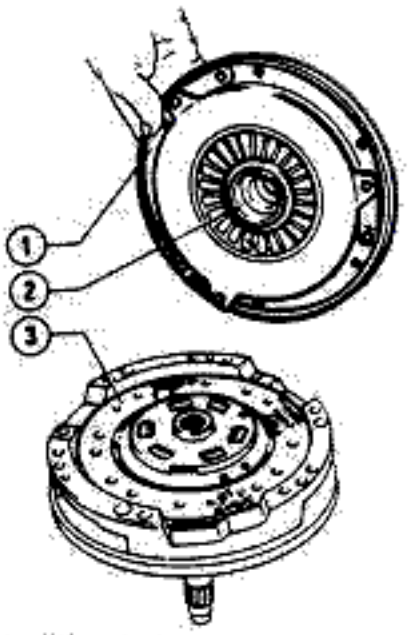
1. Flywheel 2. Intermediate pressure plate 3. Rear pressure plate 4. Bolts 5. Throw-out bearing



Clutch assembly.

Separate the rear pressure plate (1) from the rear clutch plate (3).

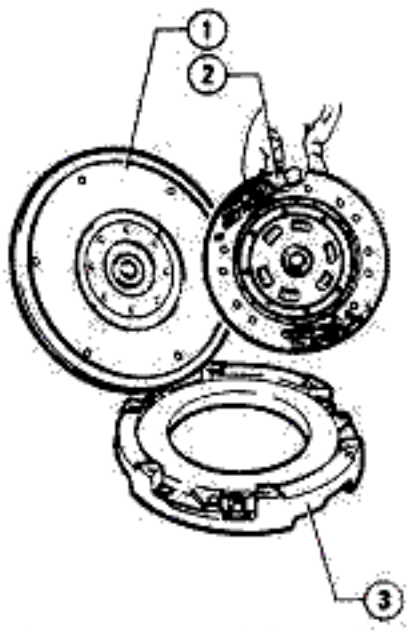
1. Rear pressure plate 2. Throw-out bearing 3. Rear clutch plate



Separating rear pressure plate.

Separate the intermediate pressure plate (3) and front clutch plate (2) from the flywheel (1).

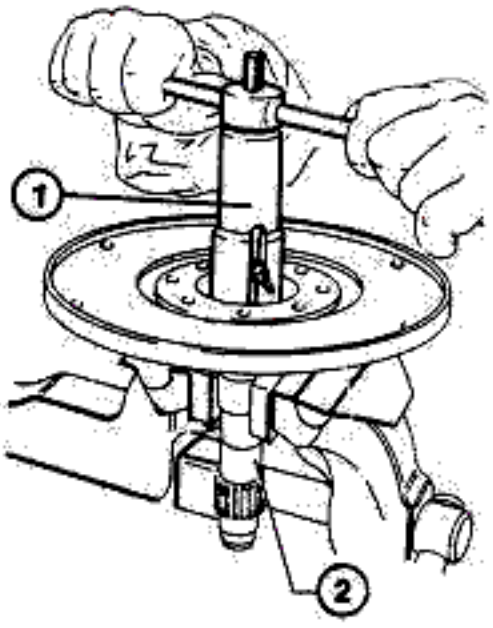
1. Flywheel 2. Front clutch plate 3. Intermediate pressure plate



Separating clutch assembly.

Use the puller (1) (special tool A.3.0402) to withdraw the pilot bearing from the flywheel shaft (2).

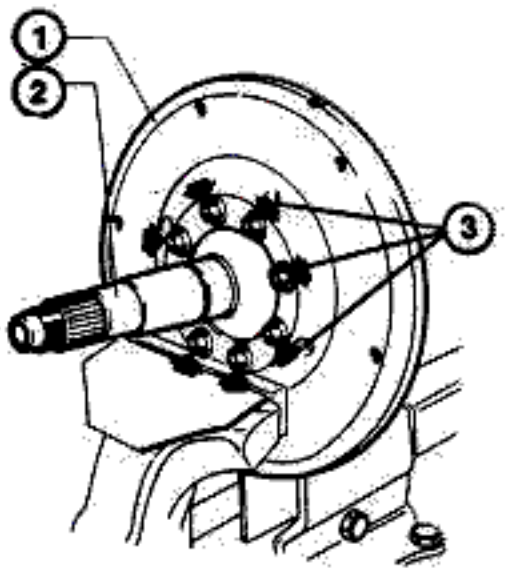
1. Puller 2. Shaft



Removing pilot bearing.

If the shaft must be removed from the flywheel, remove the bolts (3) and washers that hold the shaft (2) to the flywheel (1) and remove the shaft.

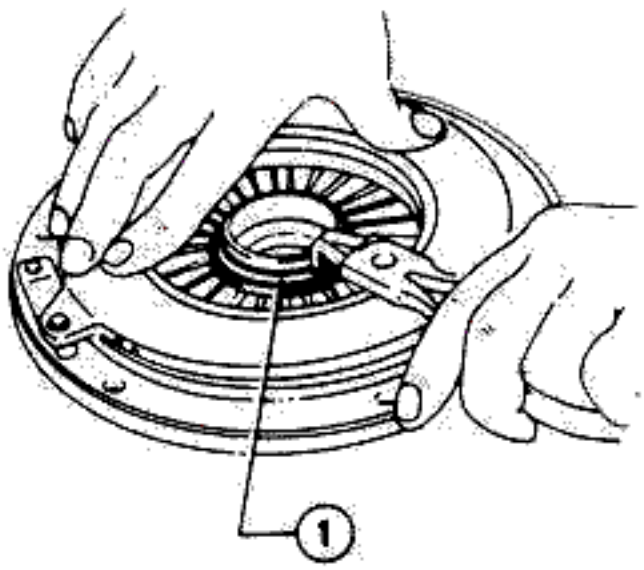
1. Flywheel 2. Shaft 3. Bolts



Flywheel and shaft.

With the rear pressure plate on the bench, press down on the diaphragm spring and release the circlip (1).

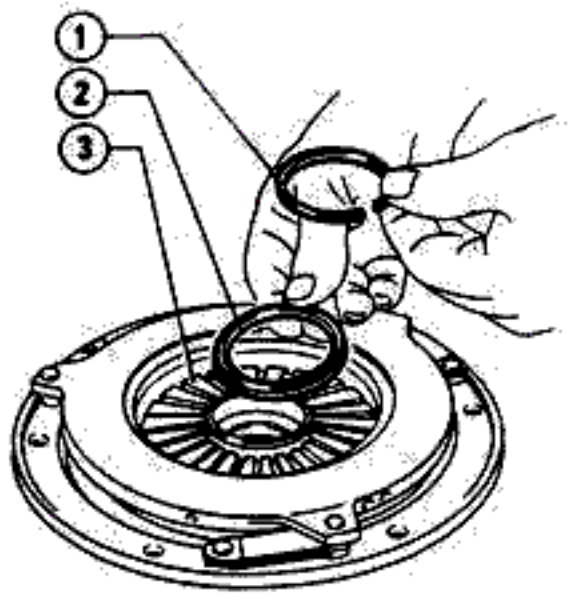
1. Circlip



Removing circlip.

Remove the circlip (1) and throw-out bearing fastening ring (2). Withdraw the throw-out bearing from the rear pressure plate (3).

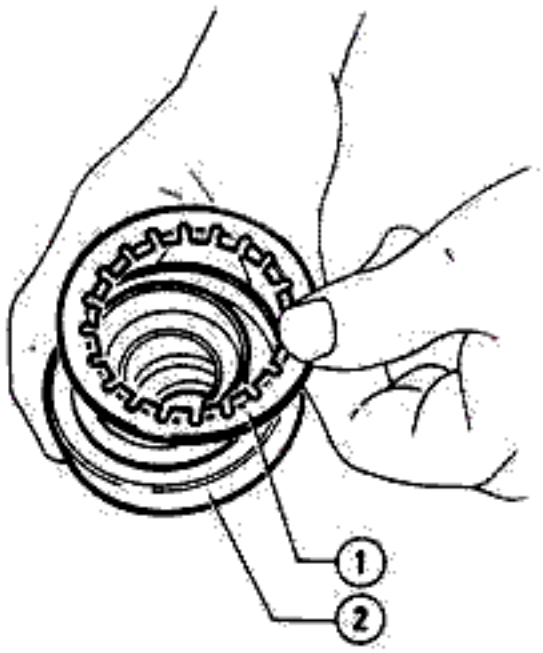
1. Circlip 2. Fastening ring 3. Rear pressure plate



Removing fastening ring.

Remove the Belleville washer (1) from the throw-out bearing (2).

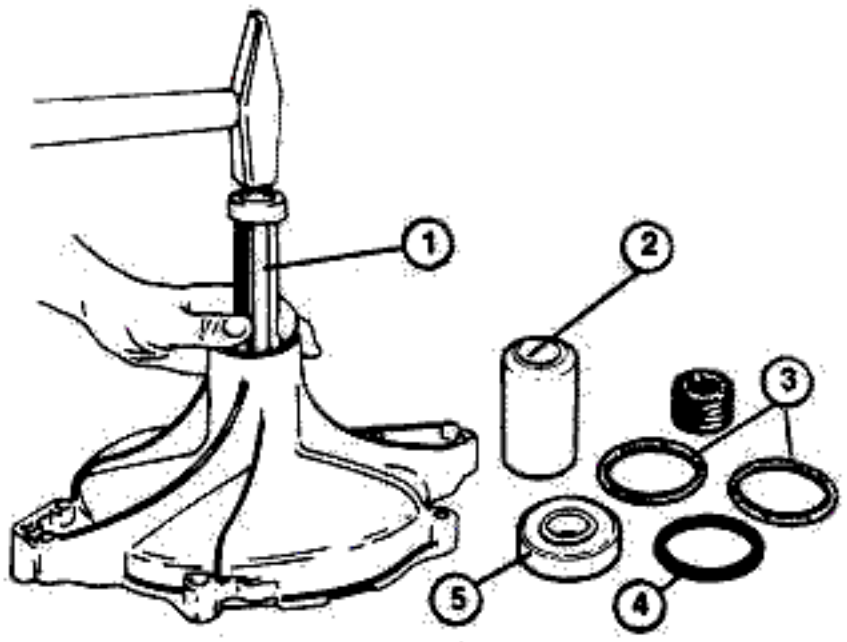
1. Belleville washer 2. Throw-out bearing



Removing washer from bearing.

Remove the gear selector dust boot from the front cover. Remove the rear bearing retaining locknuts (3), remove the front ball bearing (5), spacer (2), and O-ring (4). Use the extractor (1) (special tool A.3.0401) to drive the rear ball bearing from the cover.

1. Extractor 2. Spacer 3. Locknuts 4. O-ring 5. Front bearing

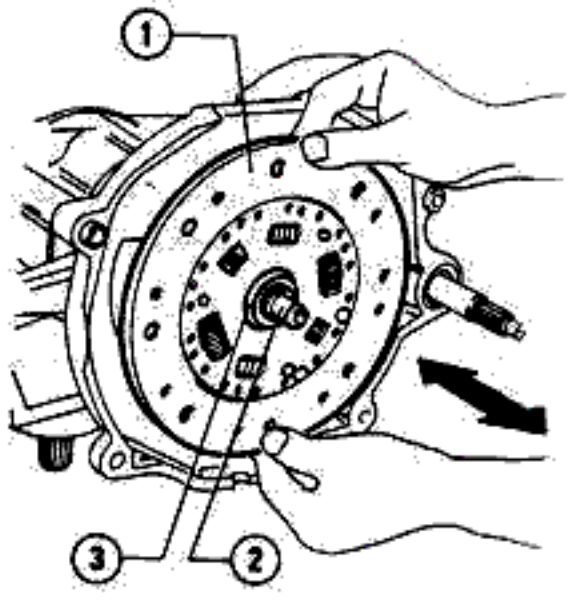


Front cover.

Clutch Inspection

Check that the pressure plate surfaces (1) are not burned, oily, or brittle. Check also that any wear on the clutch plate is uniform and that the plate hub (3) is securely fastened to the plate. The clutch plates of the double plate clutch should be replaced in pairs only. Never replace only one plate.

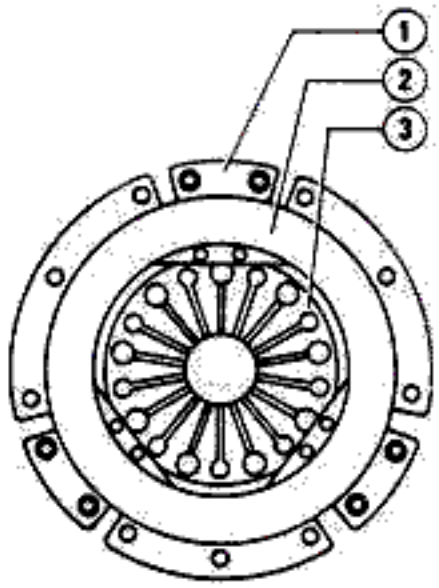
1. Clutch plate surfaces 2. Shaft 3. Hub



Inspecting clutch plate.

Check that the pressure plate surfaces (2) are not scored and that any wear is even. The pressure plates cannot be repaired or resurfaced. If a pressure plate is badly worn or damaged, it must be replaced.

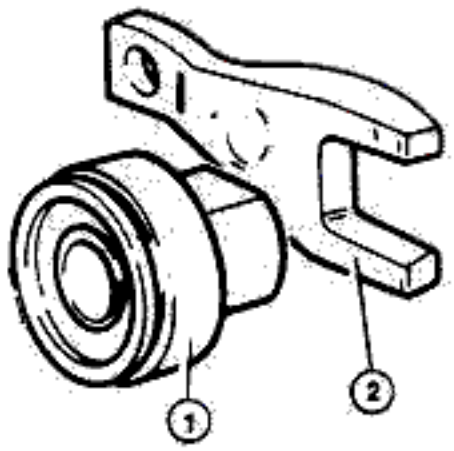
1. Pressure plate 2. Pressure plate surfaces
3. Diaphragm spring



Inspecting pressure plate.

Check that the clutch throw-out bearing (1) slides freely on its guide sleeve and that there is no roughness or excessive play in the bearing. Check also that the fork (2) is not bent and is free of cracks. Replace the bearing or fork if necessary.

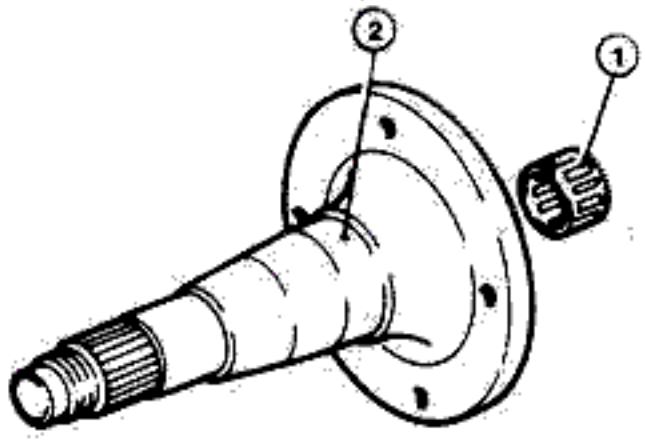
1. Throw-out bearing 2. Fork



Throw-out bearing and fork.

The pilot bearing (1) should not show any seizing marks or excessive wear. Replace the bearing if necessary. Check the flywheel shaft working surfaces (2) for abnormal wear.

1. Pilot bearing 2. Shaft

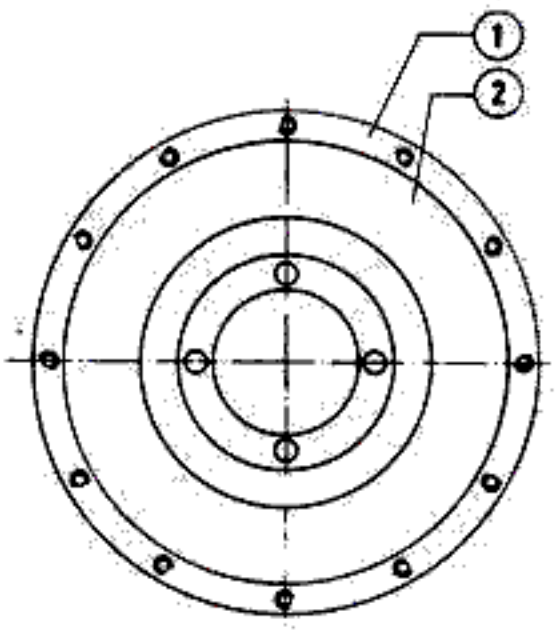


Pilot bearing and shaft.

CLUTCH SERVICE

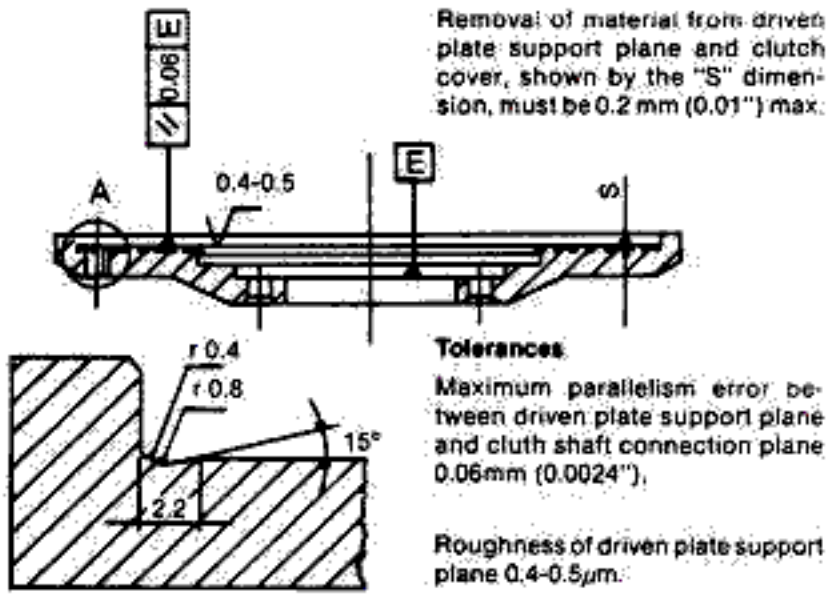
Check the flywheel friction surfaces (2) carefully for wear. Do not attempt to resurface a flywheel that has previously been resurfaced.

1. Flywheel 2. Friction surfaces



Inspecting flywheel.

When resurfacing a flywheel, always observe the resurfacing limits shown in the illustrations to maintain flywheel rigidity and strength.



Removal of material from driven plate support plane and clutch cover, shown by the "S" dimension, must be 0.2 mm (0.01") max.

Tolerances

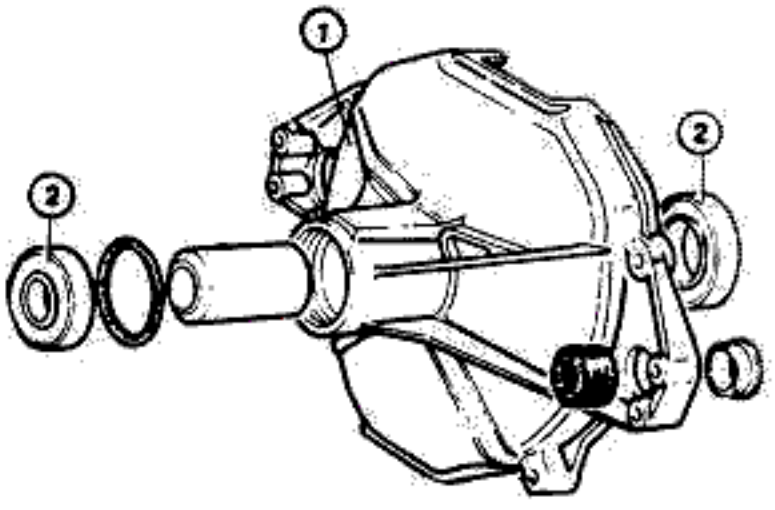
Maximum parallelism error between driven plate support plane and cluth shaft connection plane 0.06mm (0.0024").

Roughness of driven plate support plane 0.4-0.5μm.

Double plate clutch.

Check the clutch cover (1) condition. Inspect the flywheel shaft ball bearings (2) carefully for binding or abnormal wear.

1. Clutch cover 2. Bearings

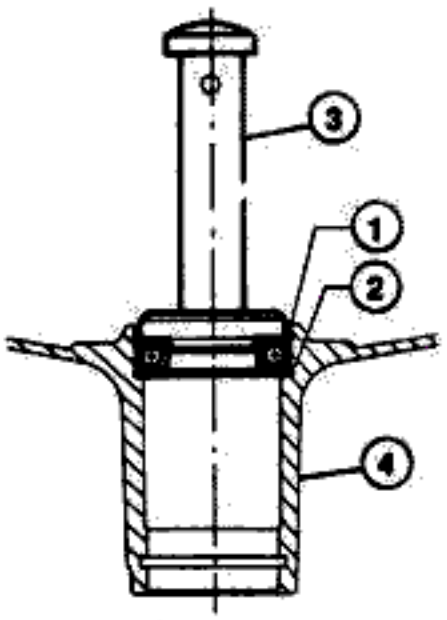


Inspecting clutch cover.

Clutch Assembly (Double Plate Clutch)

Use the rear bearing driver (3) (special tool A.3.0282) to install the clutch cover rear bearing (1) and shoulder washer (2). Install the retaining ring, making sure that it seats correctly.

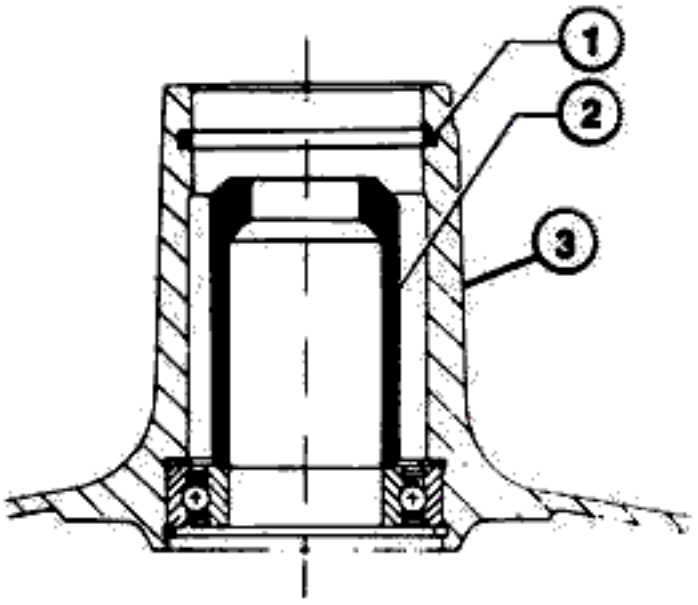
1. Clutch cover rear bearing 2. Shoulder washer 3. Driver 4. Cover



Assembling clutch cover.

Turn the cover over and install the spacer (2). Be sure to position the spacer so that the chamfered surface is toward the front of the cover (3). Install the O-ring (1).

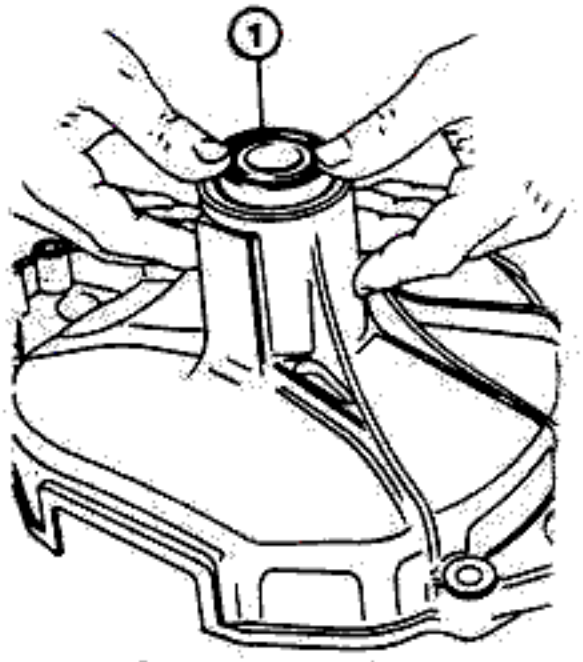
1. O-ring 2. Spacer 3. Cover



O-ring and spacer.

Install the clutch cover front bearing (1).

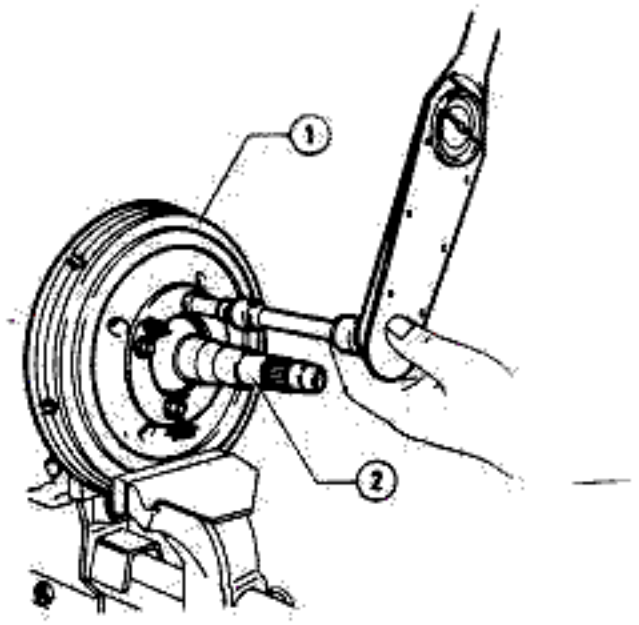
1. Cover front bearing



Installing front bearing.

If previously disassembled, assemble the flywheel (1) and shaft (2). Treat the bolts with thread sealing compound and tighten them to 20 to 23 ft-lb.

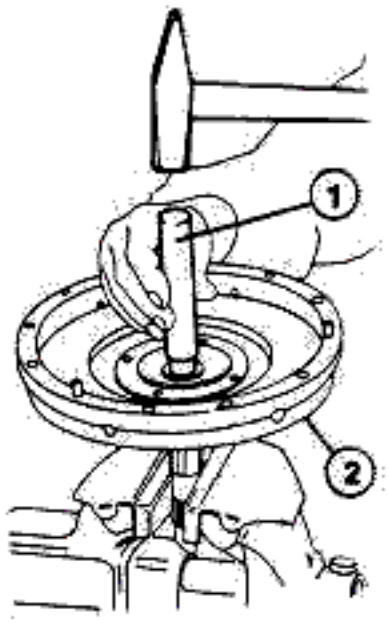
1. Flywheel 2. Shaft



Assembling flywheel and shaft.

Install the pilot bearing in the shaft with the bearing driver (1) (special tool A.3.0405).

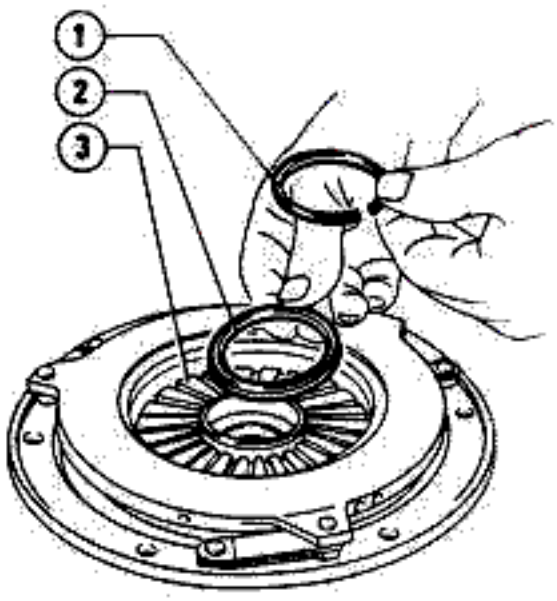
1. Bearing driver 2. Flywheel



Installing pilot bearing.

Install the throw-out bearing on the rear pressure plate by reversing the order of the removal procedure.

1. Circlip 2. Fastening ring 3. Rear pressure plate

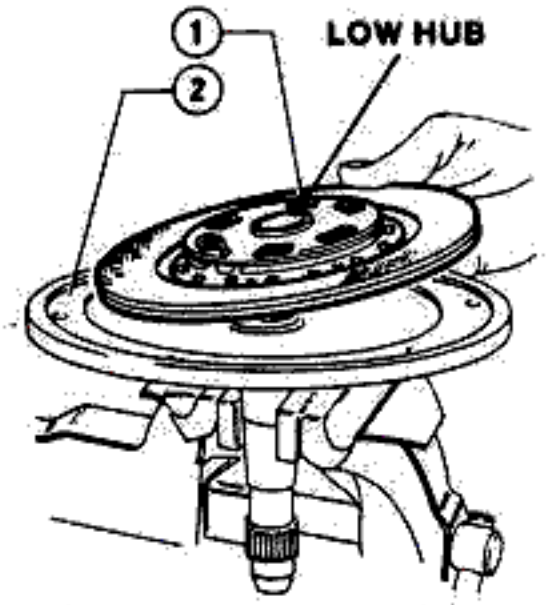


Assembling throw-out bearing.

With the flywheel (2) in a vise with protective jaws, place the front clutch plate (1) on the flywheel. Be sure to position the clutch plate as shown in the illustration.

NOTE: Front clutch plate has low center hub.

1. Front clutch plate 2. Flywheel

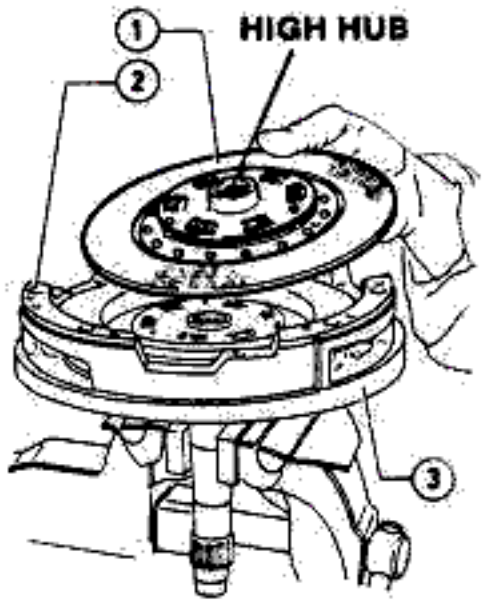


Assembling front clutch plate.

Place the intermediate pressure plate (2) on the flywheel (3). Be sure to line up the marks made during disassembly. Place the rear clutch plate (1) on the intermediate pressure plate.

NOTE: Rear clutch plate has high center hub.

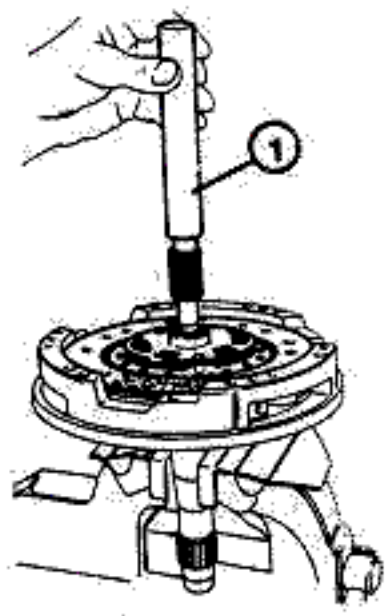
1. Rear clutch plate 2. Intermediate pressure plate 3. Flywheel



Assembling intermediate pressure plate.

Use the clutch alignment tool (1) (special tool A.4.0205) to center the clutch plates.

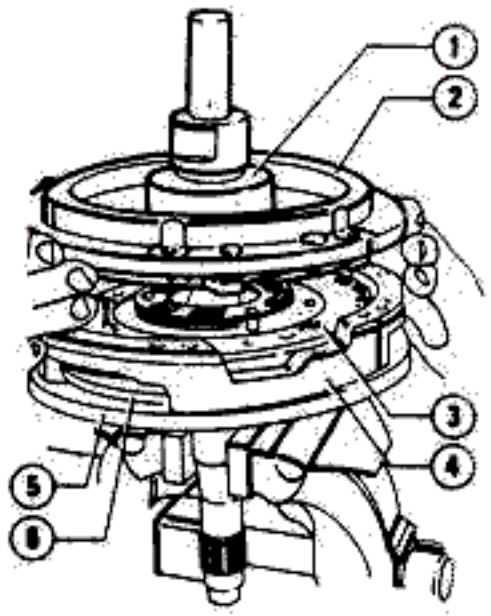
1. Clutch alignment tool



Aligning clutch plates.

With the plates centered, position the rear pressure plate (2), complete with the throw-out bearing (1), on the intermediate pressure plate (4). Check again that the marks made during disassembly line up.

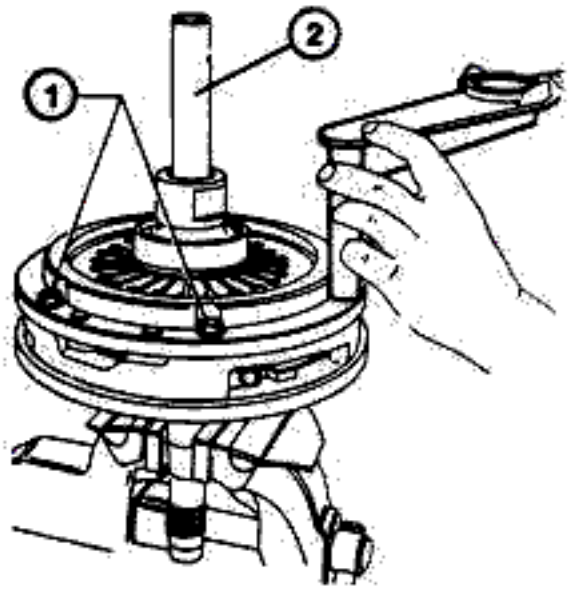
1. Throw-out bearing 2. Rear pressure plate 3. Rear clutch plate 4. Intermediate pressure plate 5. Flywheel 6. Front clutch plate



Assembling rear pressure plate.

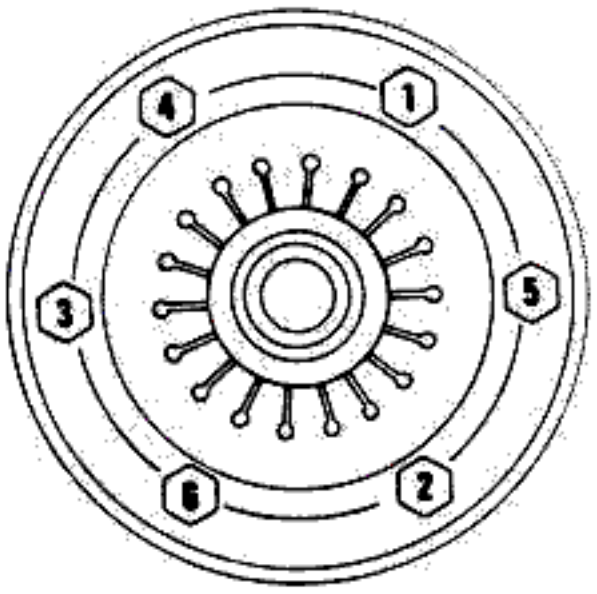
With the clutch alignment tool (2) (special tool A.4.0205) keeping the clutch plates centered, install the pressure plate bolts (1).

1. Bolts 2. Alignment tool



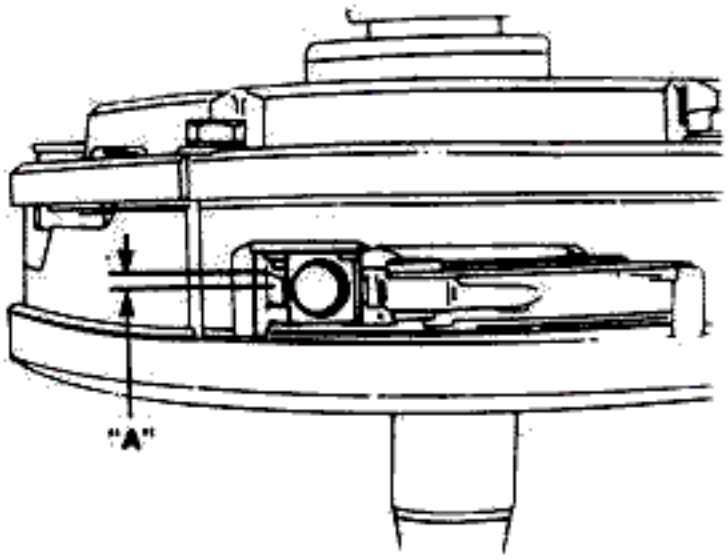
Installing pressure plate bolts.

In the sequence shown in the illustration, tighten the pressure plate bolts to 13 to 16 ft-lb.



Pressure plate torque sequence.

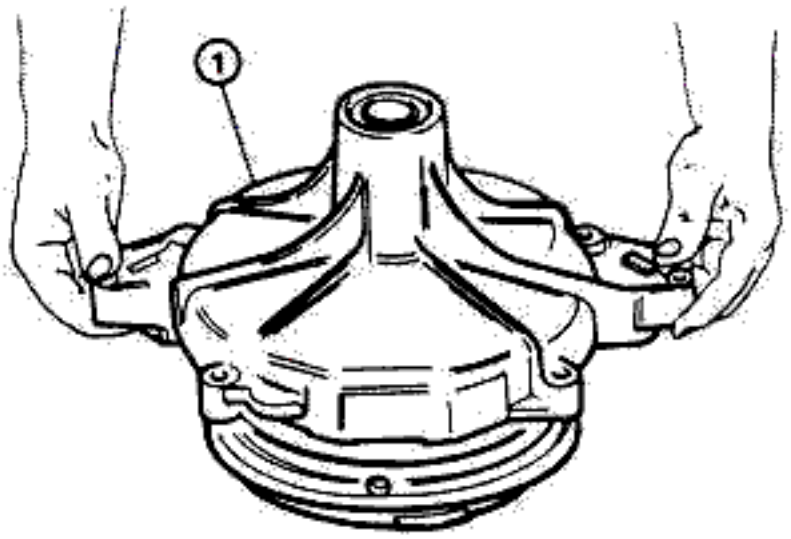
After tightening the rear pressure plate bolts, check that the clutch plates and pressure plates are tight against each other and that they are true to the flywheel. They are true to the flywheel if the diaphragm spring produces the gap "A" shown in the illustration.



Checking clutch assembly.

Remove the clutch alignment tool and place the clutch cover (1) over the flywheel.

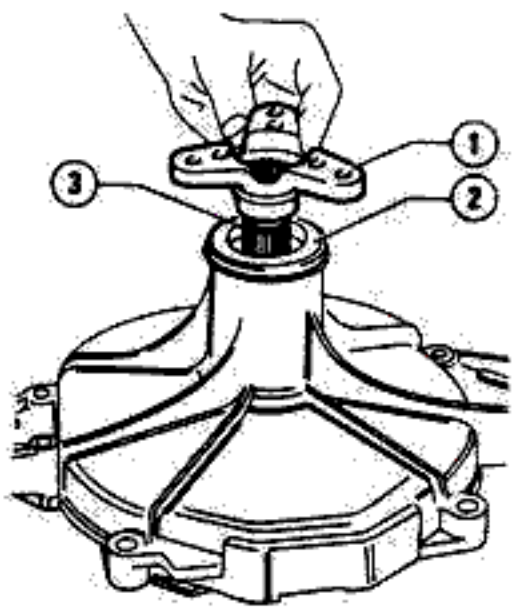
1. Clutch cover



Installing clutch cover.

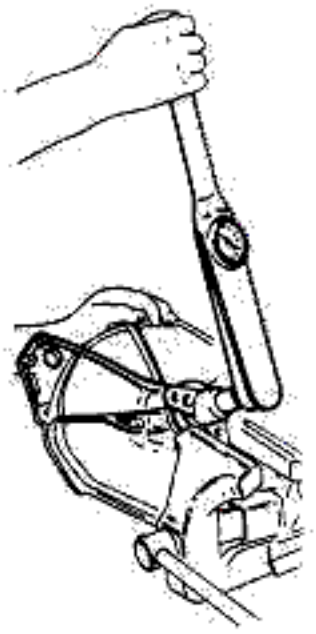
Install the dust cover (2). Remove any old sealant from the shaft splines (3), and apply a new coating of sealant on the splines. Place the yoke (1) on the shaft.

1. Yoke 2. Dust cover 3. Shaft splines



Installing yoke.

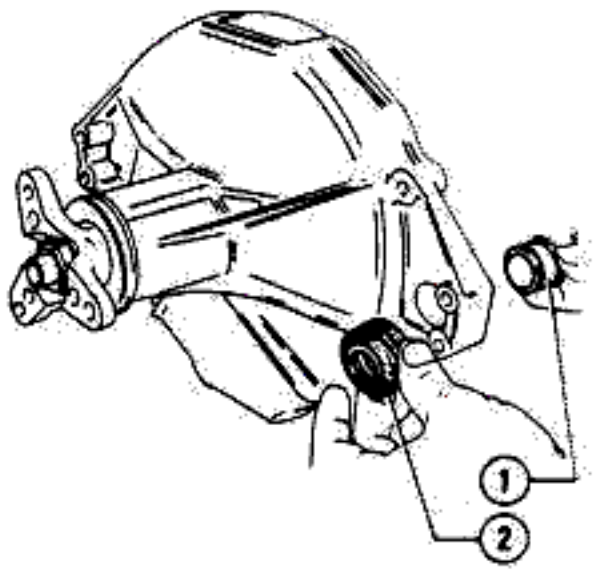
With the yoke held in a vise with protective jaws as shown, tighten the yoke locknut to 69 to 76 ft-lb.



Tightening yoke locknut.

Install the shift lever shaft bearing (1) and protective boot (2).

1. Shaft bearing 2. Boot



Installing bearing and boot.

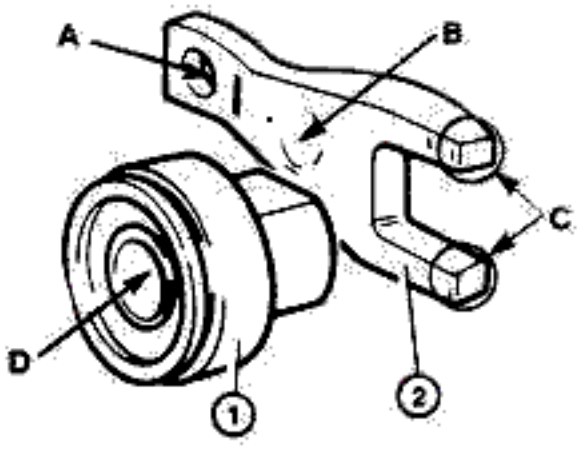
Clutch Unit Installation

Lubricate the throw-out bearing and clutch fork working surfaces. The points of lubrication are as follows:

Points of Lubrication
- A. Push rod socket
- B. Fork pivot
- C. Machined surfaces
- D. Recessed area inside bearing

CAUTION: Lubricate throw-out bearing and fork only with disc brake high temperature wheel bearing grease.

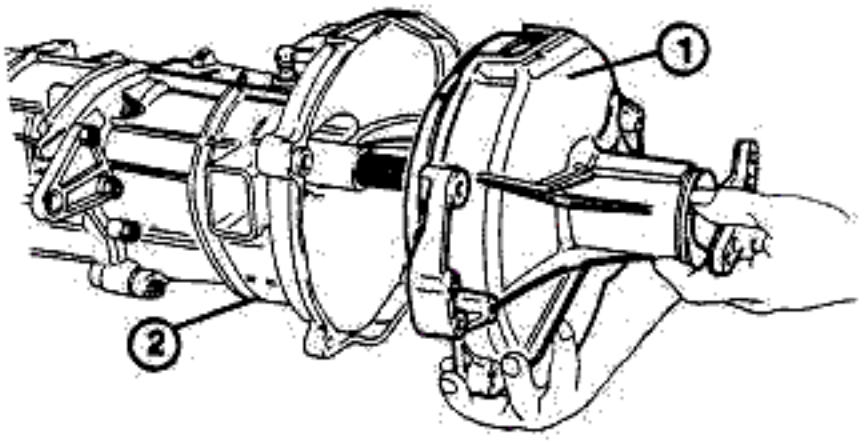
1. Throw-out bearing 2. Fork



Throw-out bearing and fork.

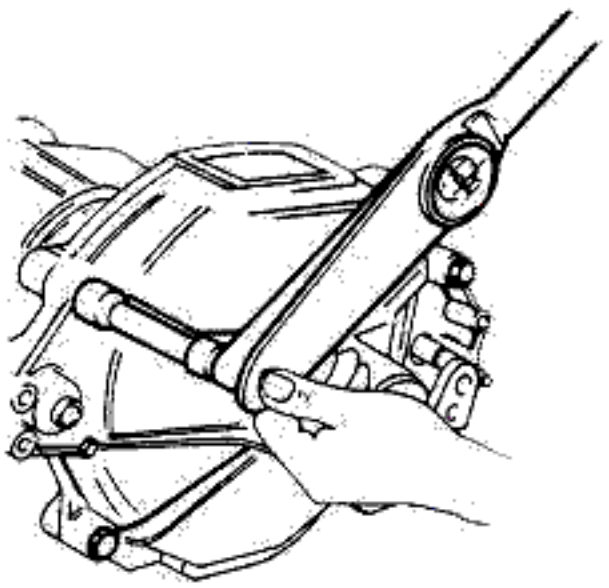
Install the assembled clutch unit (1) onto the front housing (2).

1. Clutch unit 2. Front housing



Installing clutch unit.

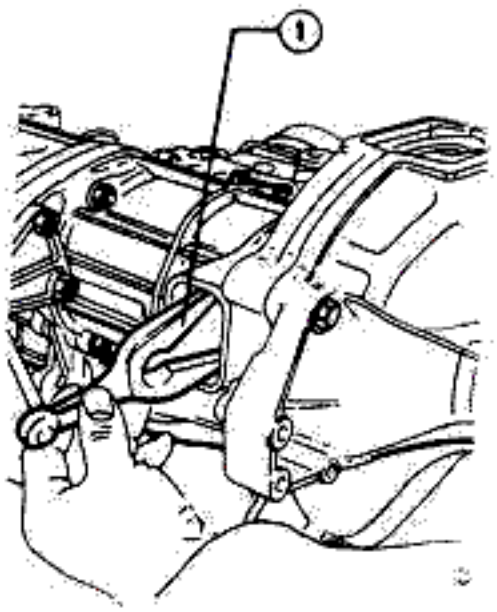
Tighten the clutch cover bolts (1) to 21 to 24 ft-lb.



Tightening clutch cover bolts.

Install the clutch fork (1). Be sure the fork seats properly on the pivot and throw-out bearing seat.

1. Clutch fork

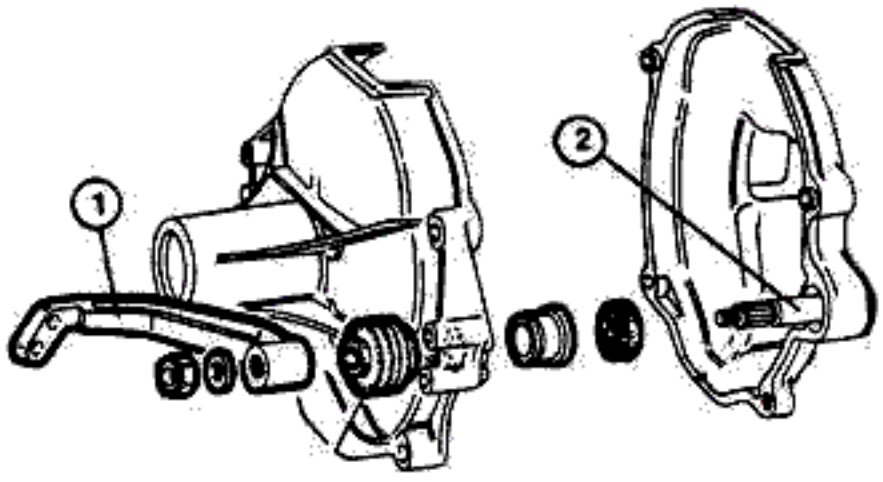


Installing clutch fork.

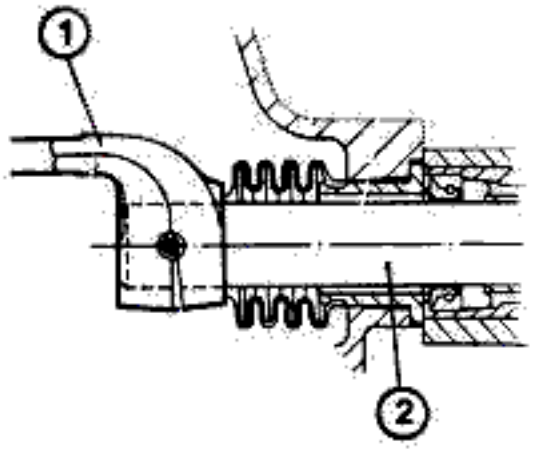
To install the shift lever assemblies, reverse the order of the removal procedure.

1. Selector arm 2. Selector shaft

CAUTION: On 1981-1984 vehicles, care must be taken that torque on shift selector arm retaining nut is not absorbed by primary selector shaft, or shift gate misalignment ***will*** *occur. Brace selector arm with adjustable spanner while removing* ***or*** *installing retaining nut.* ***Do not*** *use impact tools.*



1981-1984

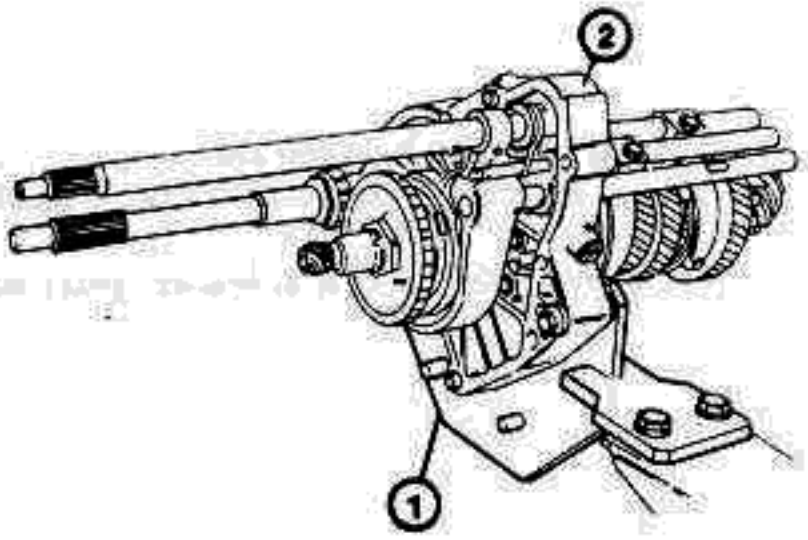


1985 to Present
Shift lever assemblies.

Dismantling Gearbox

Remove gearbox from the transaxle as described in the GEARBOX REMOVAL section of this book. Attach the flange bracket (1) (special tool R.4.0148) to the flange (2). Place the complete assembly in a vise.

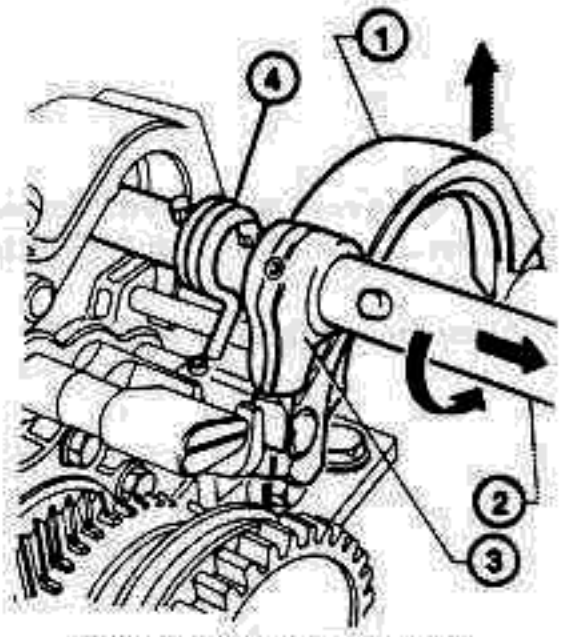
1. Flange bracket 2. Flange



Securing flange.

To remove the gear selector shaft, place the selector arm on the selector shaft (2) and turn the selector shaft counterclockwise. While turning the shaft, turn the 5th-reverse gear selector fork (1) counterclockwise also. The retaining spring (4) and selector lever (3) will become free. Pull the selector shaft away from the intermediate flange.

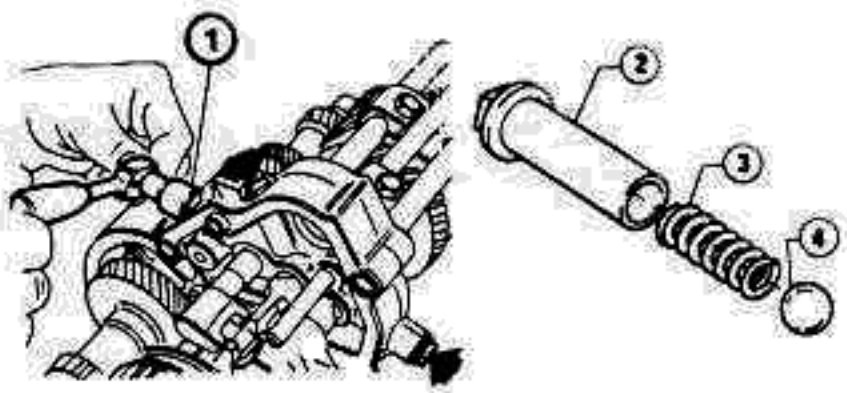
1. Selector fork 2. Selector shaft 3. Selector lever 4. Retaining spring



Removing selector shaft.

Use three dummy shafts (special tool A.2.0267) to retain detent balls, springs, and interlock plungers if inspection of these parts is unnecessary. Otherwise, use the spanner (1) (special tool A.5.0216) to loosen and remove the detent spring guides (2). Carefully remove the guides, springs (3), and shaft detent balls (4).

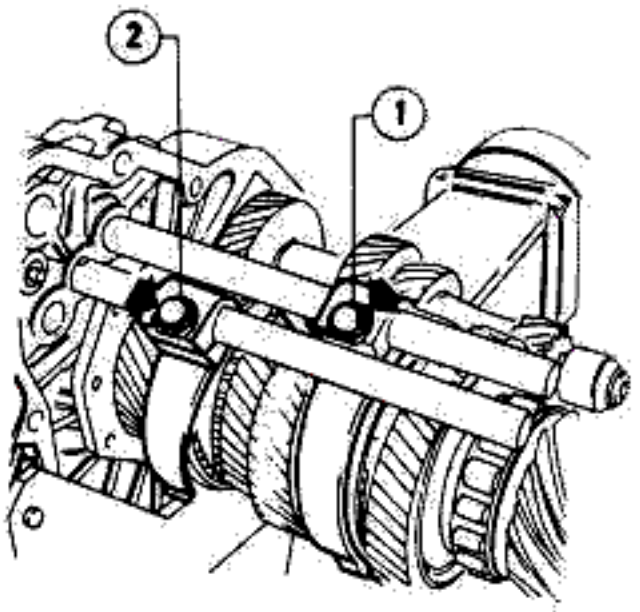
1. Spanner 2. Spring guides 3. Springs 4. Detent balls



Removing spring guides.

Remove the bolts that hold the 1st-2nd gear selector fork (1) and 3rd-4th gear selector fork (2) to the shafts.

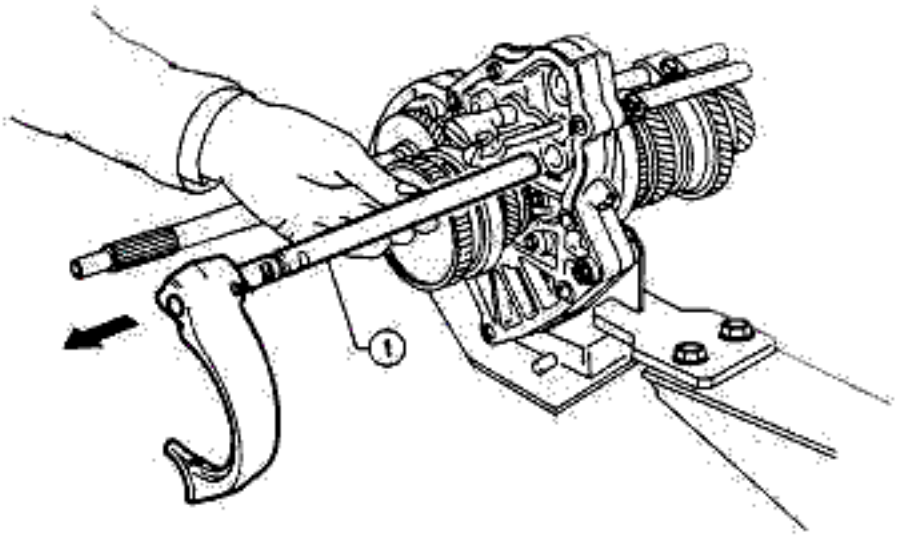
1. 1st-2nd gear selector fork 2. 3rd-4th gear selector fork



Gear selector bolts.

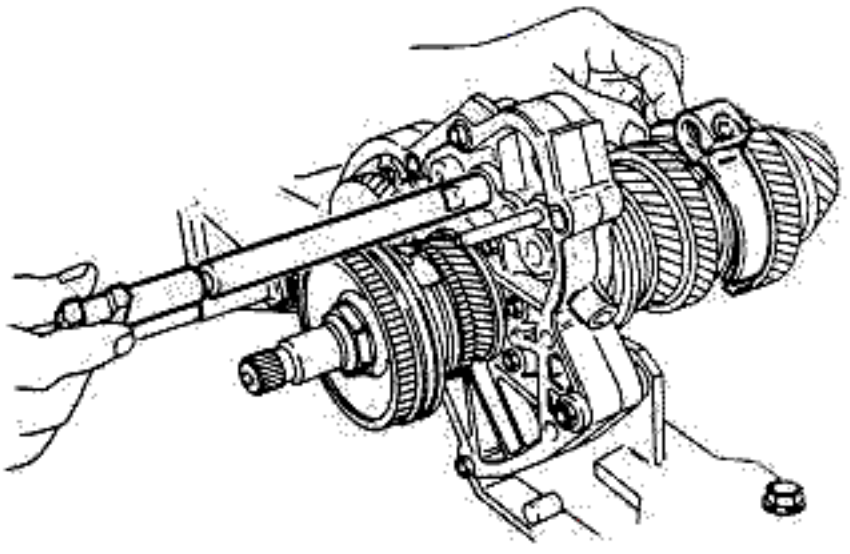
While holding the selector forks in one hand, withdraw the 5th-reverse gear selector shaft and fork (1).

1. 5th-reverse gear shaft and fork



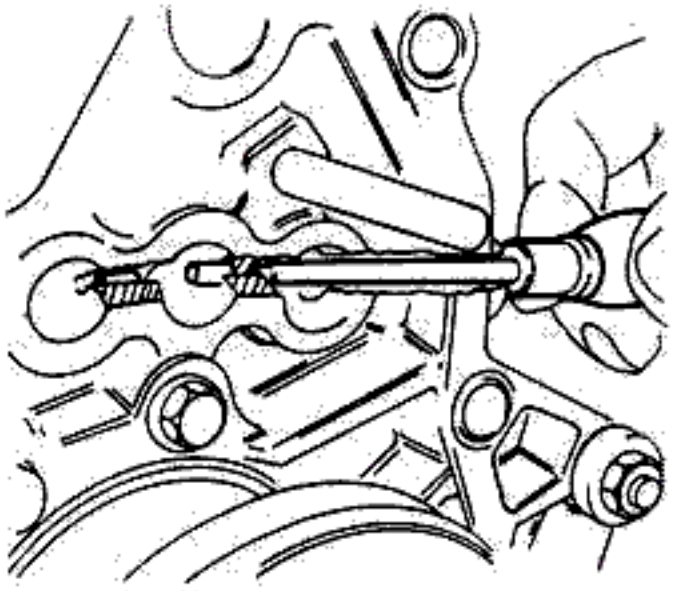
Removing 5th-reverse gear shaft and fork.

Then withdraw the 1st-2nd gear and 3rd-4th gear shafts and forks also.



Removing gear shafts and forks.

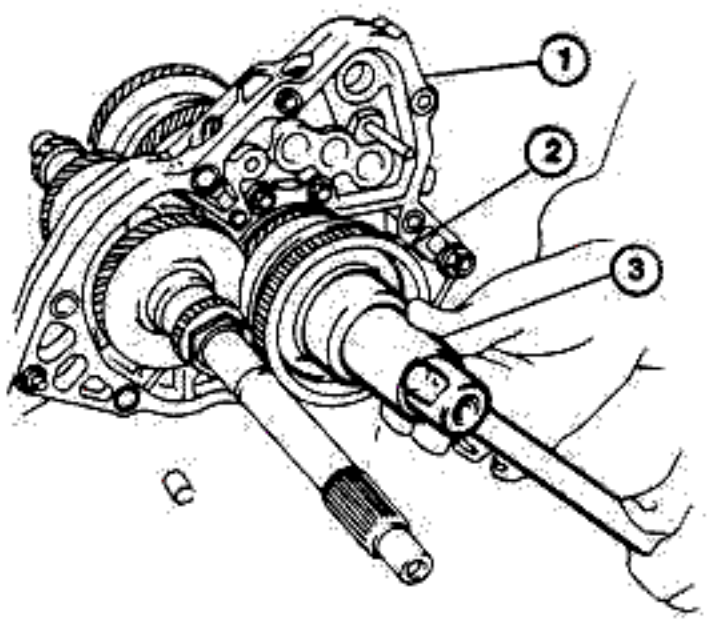
Remove the gear interlock plungers from the intermediate flange. This step is unnecessary if dummy shaft (special tool A.2.0267) is used.



Removing gear interlock plungers.

With the gear selectors removed, record pinion shaft dimensions as follows: First, engage two gears. Unstake the pinion shaft locknut. With the gears locked, use the socket (special tool A.5.0126) to verify pinion shaft locking nut torque at 82 to 92 ft. lb.

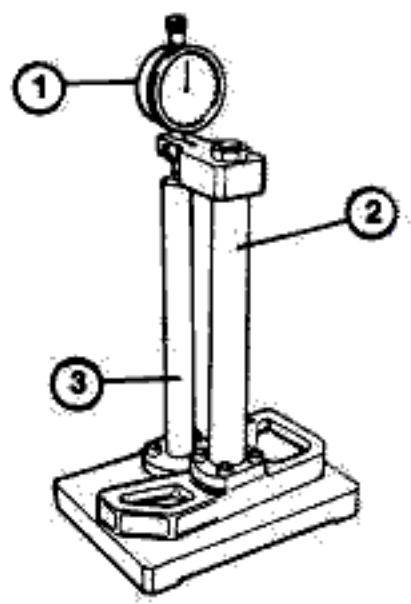
1. Intermediate flange 2. Pinion shaft assembly 3. Socket A.5.0126



Tightening pinion shaft nut.

Mount a dial gauge (1) on the pillar (2) (special tool A.4.0145). Place the master gauge (3) (special tool C.6.0166) as shown and adjust the dial gauge to zero.

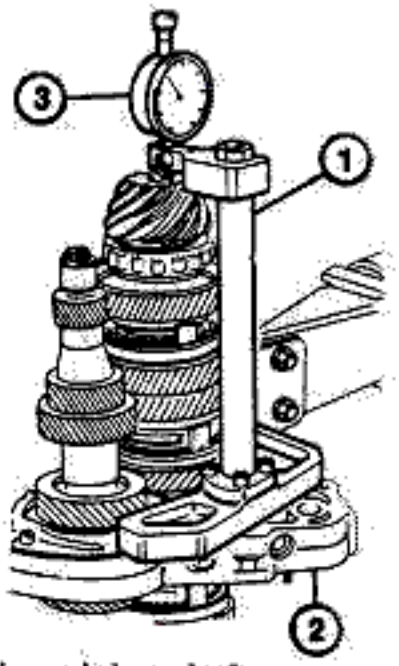
1. Dial gauge 2. Pillar 3. Master gauge



Assembling master gauge and pillar.

With the dial gauge zeroed, place the dial gauge pillar (1) on the intermediate flange (2) as shown. Record and retain the dial indicator (3) reading.

1. Pillar 2. Intermediate flange 3. Dial gauge



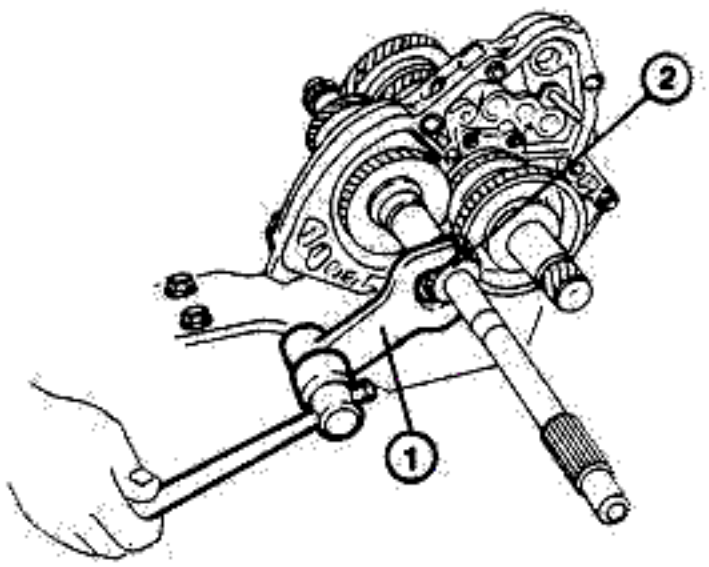
Recording pinion shaft measurement.

Use the socket wrench (special tool A.5.0126) to remove the pinion shaft locknut. Then, unstake the mainshaft locknut (2) and use the wrench (1) (special tool A.5.0181) to loosen the mainshaft nut.

for 32mm nut.

1. Wrench 2. Locknut

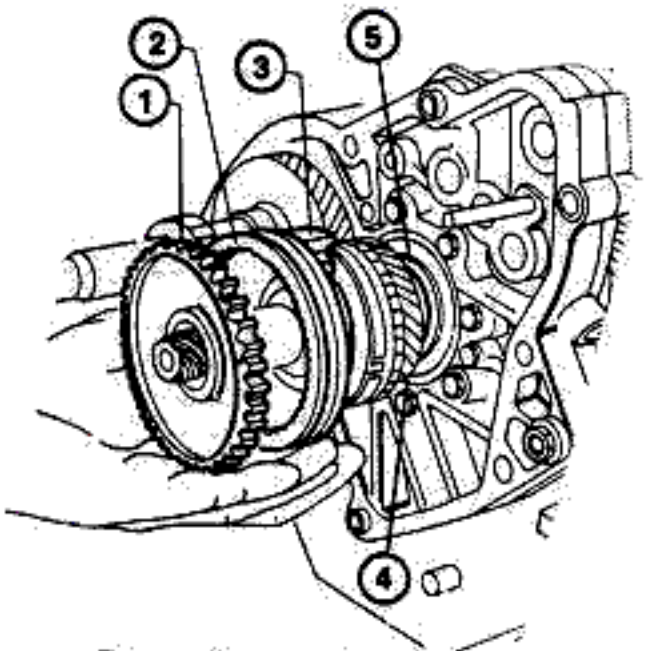
USE A50249 for 30mm Nut.



Loosening mainshaft nut.

Carefully withdraw the reverse gear (1), the synchromesh hub (3), and its sleeve (2) from the pinion shaft.

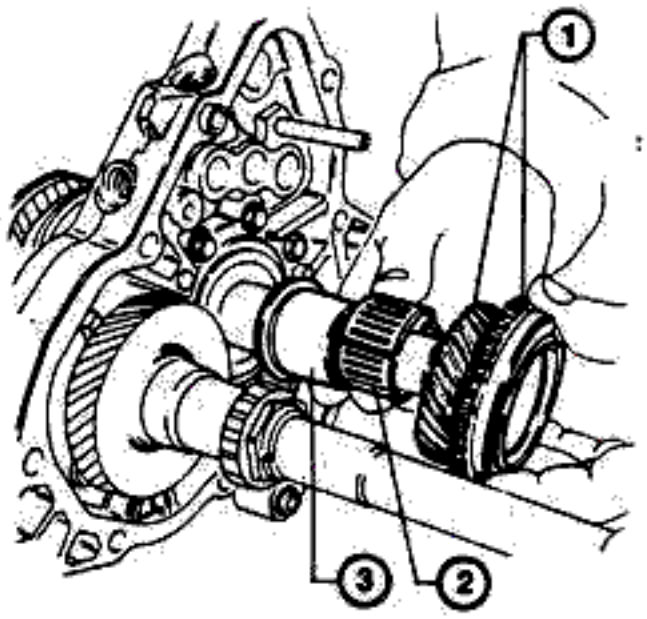
1. Reverse gear 2. Sleeve 3. Hub 4. 5th gear 5. Bearing



Removing reverse gear.

Then remove 5th gear and its synchro (1), the roller bearing (2), and the race (3) from the pinion shaft.

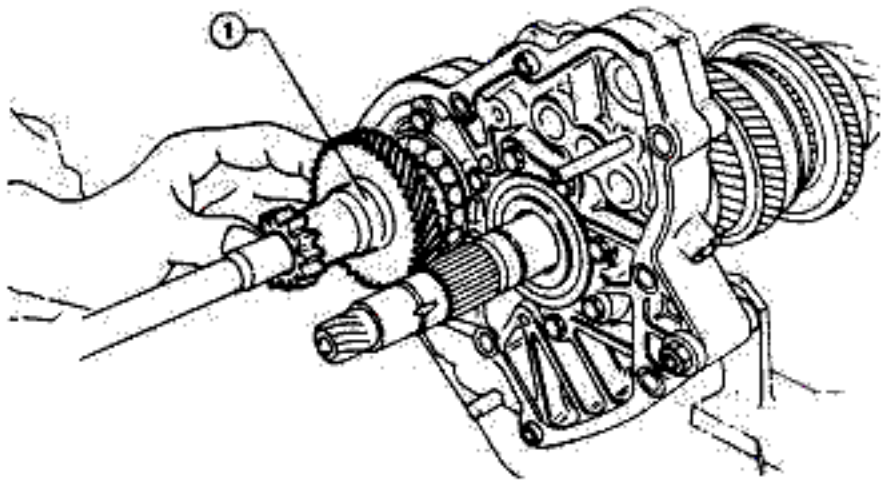
1. 5th gear 2. Roller bearing 3. Race



Removing 5th gear.

Next, remove the previously loosened mainshaft nut and withdraw the 5th-reverse gear (1) from the mainshaft.

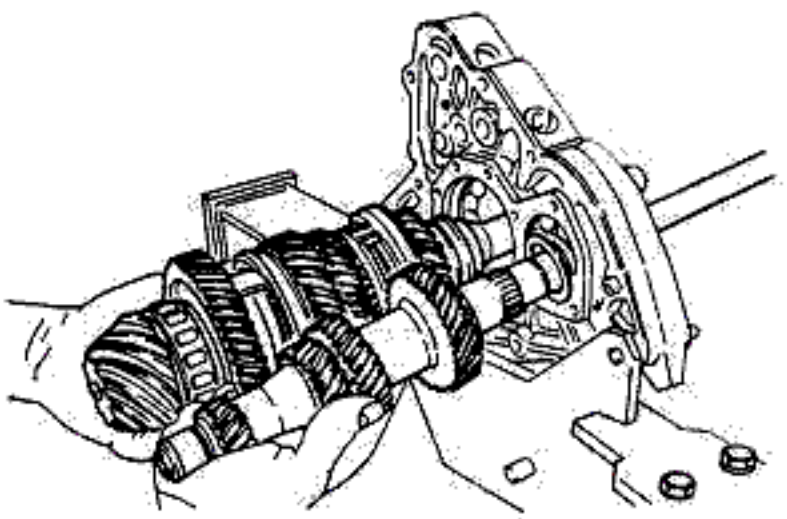
1. 5th-reverse gear



Removing 5th-reverse gear.

With a plastic mallet, tap the ends of the main and pinion shafts. Withdraw them together from the intermediate flange. Then remove the rear inner half-races of the shaft bearings.

NOTE: Be careful that the half-races do not fall out as the shafts are removed.

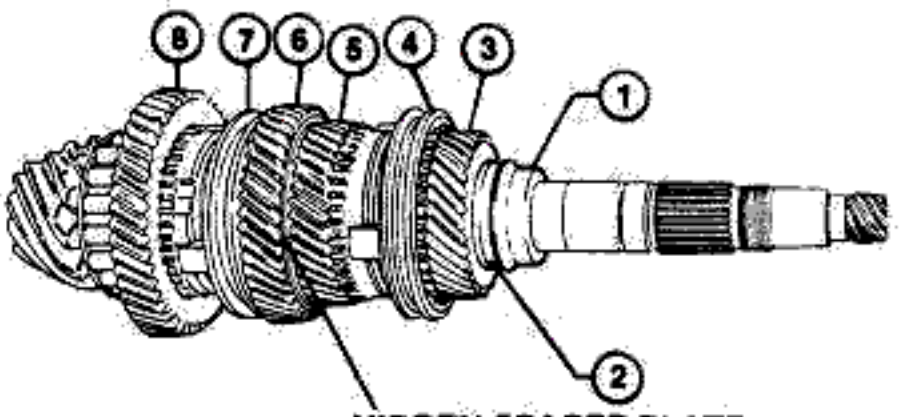


Removing main and pinion shafts.

Dismantle the pinion shaft by removing the bearing half-race (1), spacer (2), 4th gear and its bushing (3), the 3rd-4th gear synchro hub and sleeve (4), 3rd gear and its bushing (5), 2nd gear and its bushing (6), the 1st-2nd gear synchro hub and sleeve (7), and 1st gear (8).

NOTE: Do not misplace the spacer plate that separates the 2nd and 3rd gears on the pinion shaft.

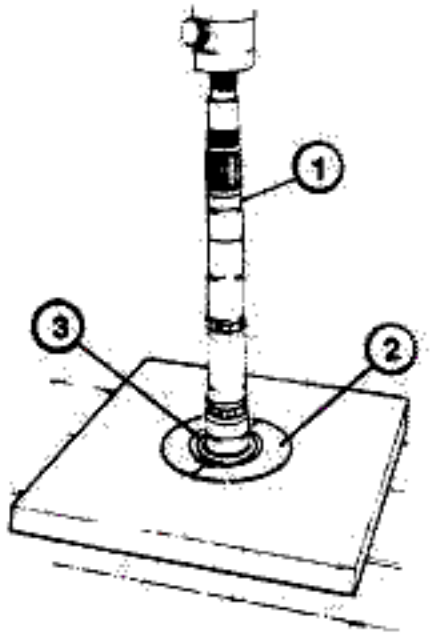
1. Bearing half-race 2. Spacer 3. 4th gear 4. 3rd-4th gear synchro 5. 3rd gear 6. 2nd gear 7. 1st-2nd gear synchro 8. 1st gear



Pinion shaft.

If it is necessary to remove the pinion bearing, place the plate (special tool A.2.0349-0100) and pinion shaft (1) in a press as shown. Vary the half-rings (2) (special tool A.2.0402) to fit the rear pinion shaft bearing distance piece (3). Press the shaft away from the distance piece. Remove the distance piece from the shaft.

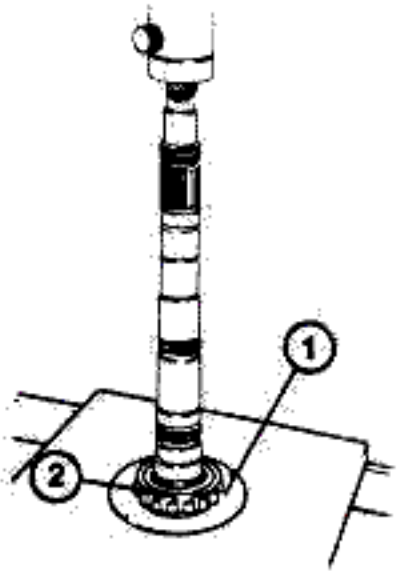
1. Pinion shaft 2. Half-rings 3. Rear bearing distance piece



Removing pinion shaft distance piece.

Then, vary the half-rings (1) (special tool A.2.0401) to fit the pinion shaft bearing (2). Press the shaft away from the bearing. Remove the bearing from the shaft.

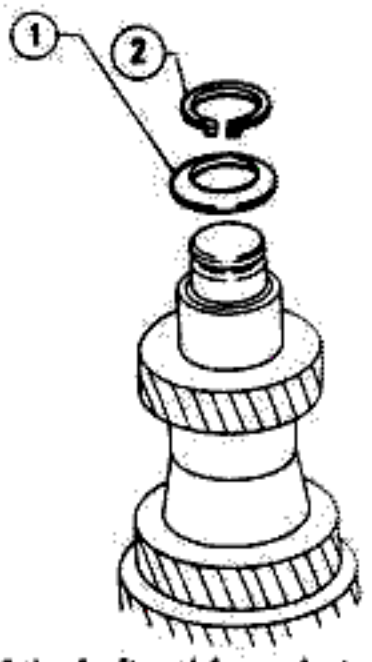
1. Half-rings 2. Shaft bearing



Removing pinion shaft bearing.

To dismantle the mainshaft, remove the circlip (2) and the plastic tapered guide (1).

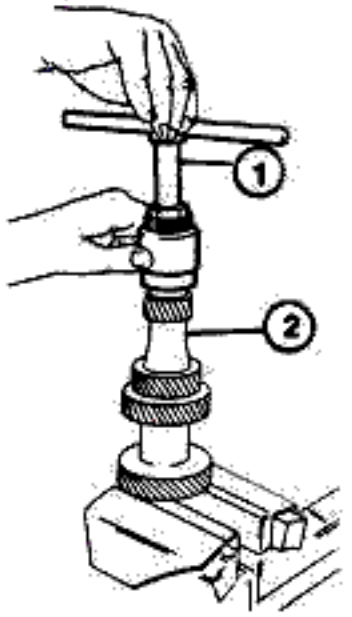
1. Tapered guide 2. Circlip



Mainshaft guide and circlip.

Then, use the extractor (1) (special tool A.3.0361) to remove the gearbox-differential housing rear bearing inner race from the mainshaft (2).

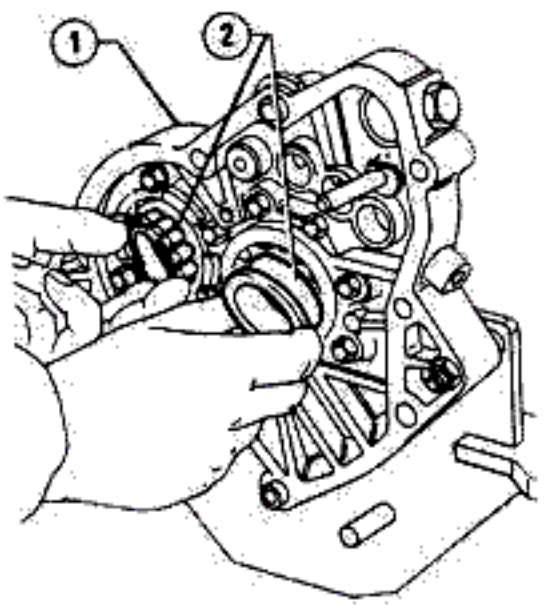
1. Extractor 2. Mainshaft



Removing rear bearing inner-race.

To dismantle the intermediate flange (1), first remove the mainshaft and pinion shaft inner races (2) from the flange.

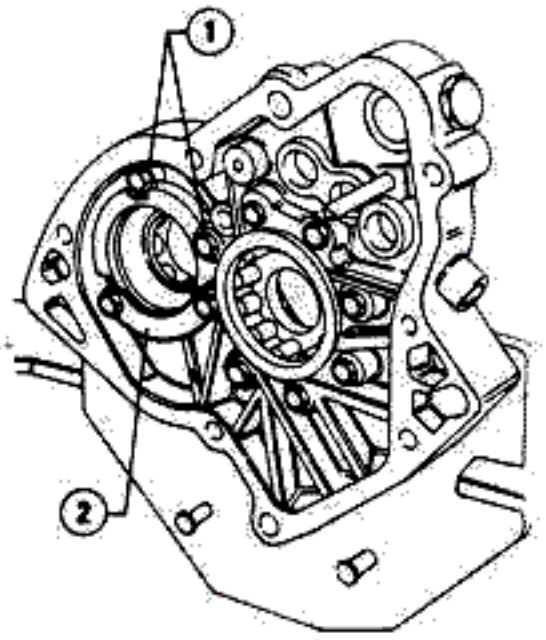
1. Intermediate flange 2. Inner races



Removing inner races.

Remove the bolts and washers (1) that hold the intermediate bearing back plate and stop plate (2) to the flange.

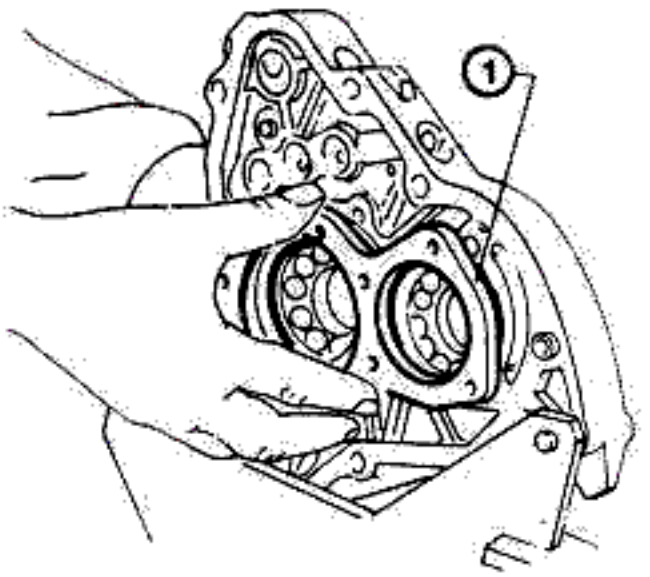
1. Bolts 2. Stop plate



Stop plate and back plate bolts.

With the bolts removed, withdraw the stop plate (2, previous illustration) and the back plate (1).

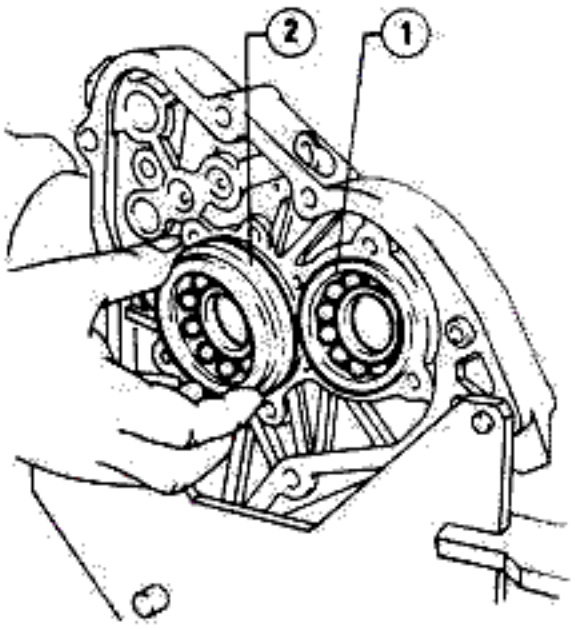
1. Back plate



Removing back plate.

Remove the mainshaft bearing (1) and the pinion shaft bearing (2) from the flange.

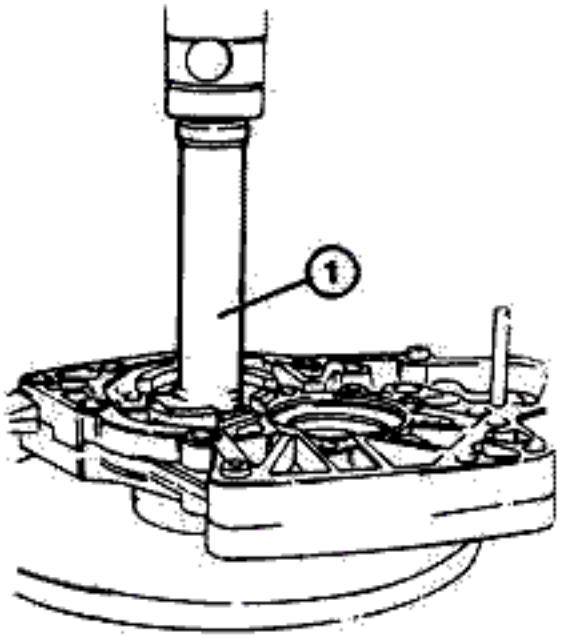
1. Mainshaft bearing 2. Pinion shaft bearing



Removing shaft bearings.

With the flange in a press as shown, use the extractor (1) (special tool A.3.0696) to press the mainshaft bearing from the flange.

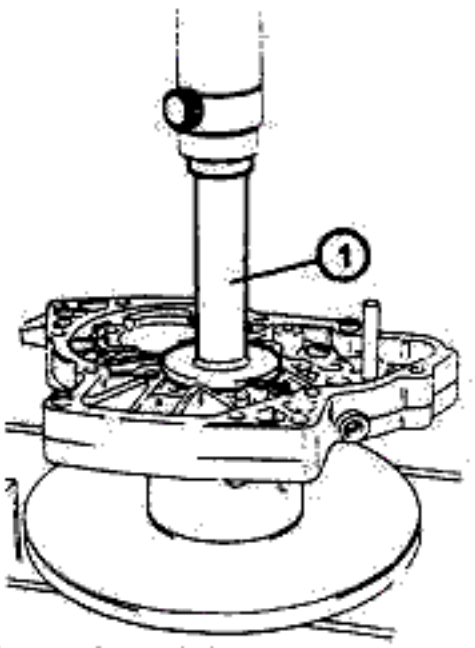
1. Extractor



Removing mainshaft bearing.

Finally, use a press and extractor (1) (special tool A.3.0192) to remove the pinion shaft bearing.

1. Extractor

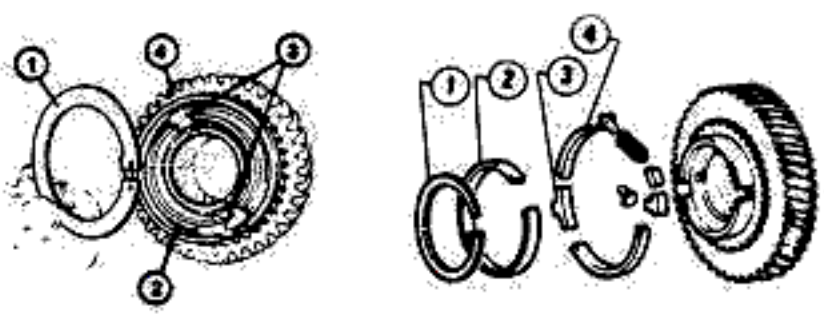


Removing pinion shaft bearing.

Gearbox Inspection

Dismantle the synchromesh assemblies by first placing them in a vise with protective jaws. To dismantle the 1st gear synchro, remove the circlip (1) and the synchro ring (2). Then withdraw the stop straps (4) and locking segments (3).

1. Circlip 2. Synchro ring 3. Locking segments 4. Stop straps

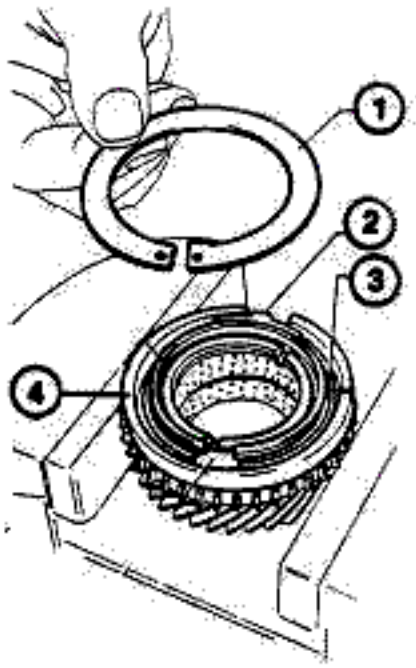


1981 to 1984 1985 to Present

Dismantling 1st gear synchro.

Dismantle the 2nd, 3rd, 4th, and 5th gear synchros by removing the circlip (1) and the synchro ring (5). Then withdraw the stop straps (3) and locking segments (2).

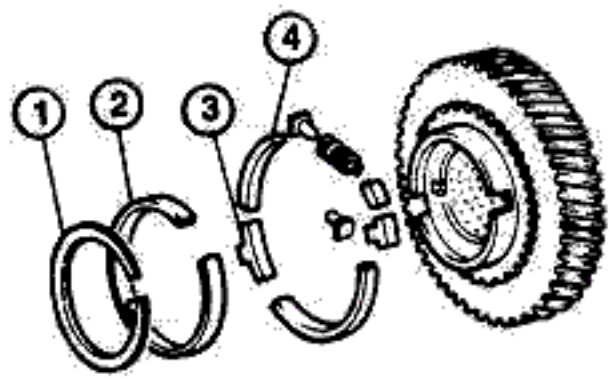
1. Circlip 2. Locking segments 3. Stop straps 4. Synchro ring



Dismantling 2nd, 3rd, 4th, 5th gear synchros.

Check that the synchromesh components are generally in good condition and that the synchro rings (2) are not excessively worn, that the stop straps (4) do not show signs of overheating, and that the locking segments (3) are not excessively marked at the points of engagement.

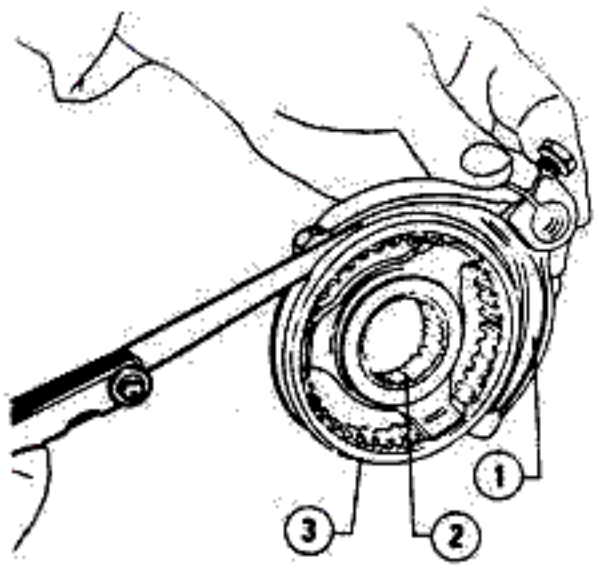
1. Circlip 2. Synchro rings 3. Locking segments 4. Stop straps



Inspecting synchros.

Check also that the synchromesh sleeves (3) slide freely on their hubs (2). Finally, check the clearance between the sides of the selector forks (1) and the sleeves as shown. The clearance should be 0.7 to 0.9 mm.

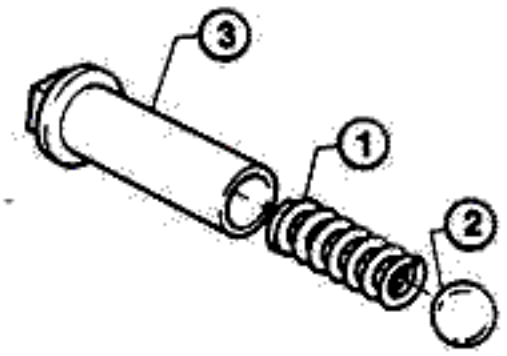
1. Selector fork 2. Hub 3. Sleeve



Inspecting sleeve clearance.

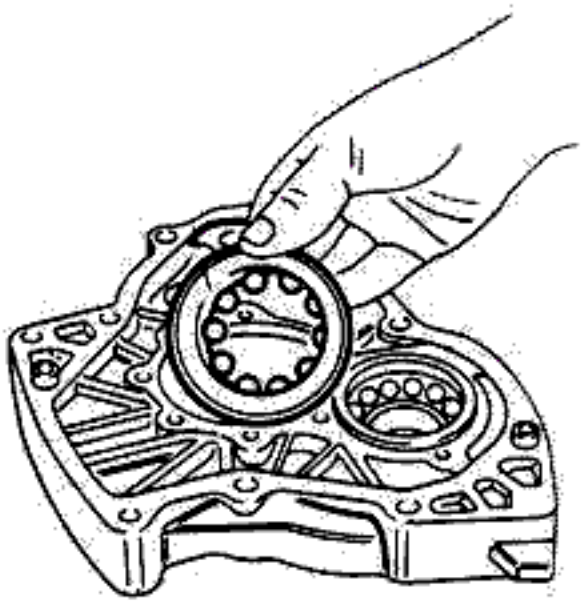
Next, check the length of the detent spring guides. The free length of the spring (1) should be 30.6 mm. Check that the balls (2) are in good condition and that they slide freely in the spring cylinder (3). This inspection cannot be performed if dummy shafts (special tool A.2.0267) were used.

1. Spring 2. Detent ball 3. Cylinder



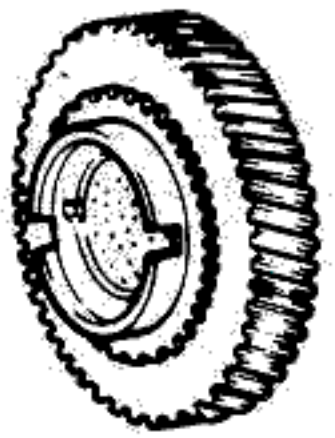
Detent spring guides.

Check that the bearings show no signs of overheating or excessive wear and that there is no indication of roughness.



Inspecting bearings.

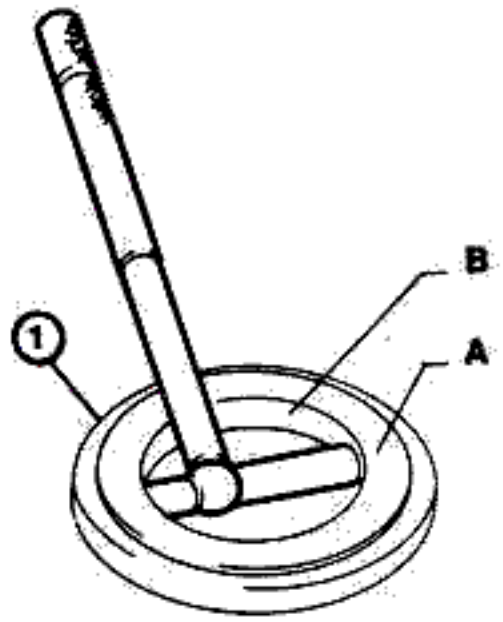
Check the general condition of all the gears. Check for signs of binding or excessive wear on the gear bushings and on the pinion shaft.



Inspecting gears and bushings.

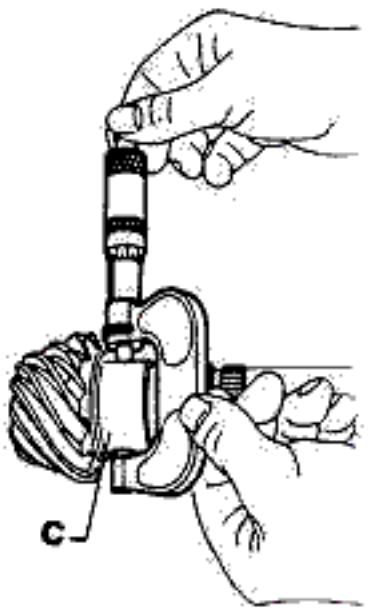
Check that the thrust face (A) of the rear pinion shaft bearing distance piece (1) is no more than 0.02 mm out of true.

1. Distance piece



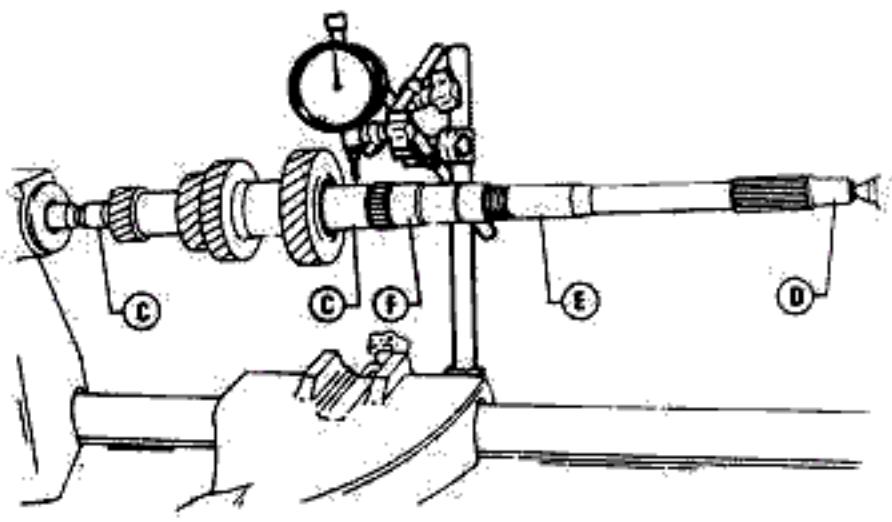
Inspecting distance piece.

With the proper instruments, check also that the interference fit between the inside surface of the distance piece (B, previous illustration) and the pinion shaft (C) is 0.019 to 0.060 mm.



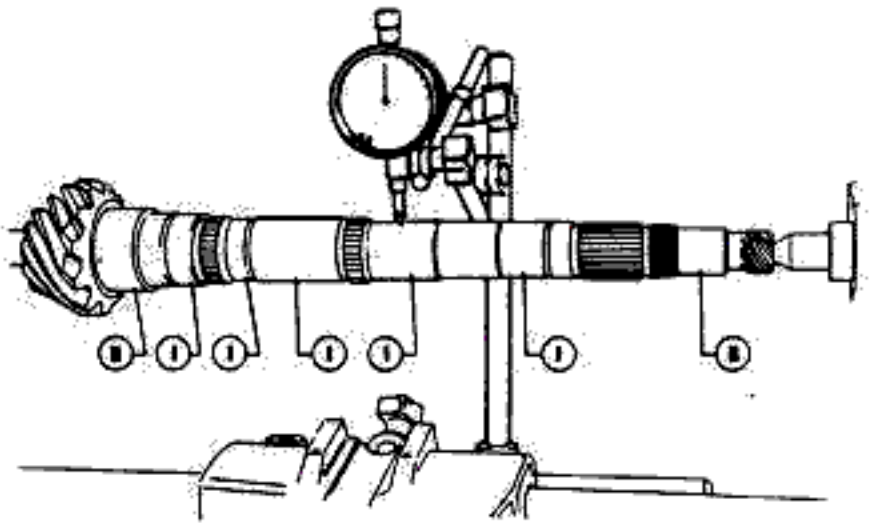
Inspecting interference fit.

With a dial gauge, check that the runout of the mainshaft at the seats (C), the pilot bearing seat (D), the seat (E), and the seat (F) does not exceed 0.03 mm.



Inspecting mainshaft.

Use a dial gauge to check that the runout of the pinion shaft at the seats (H), the seats (I), and the intermediate bearing does not exceed 0.02 mm.



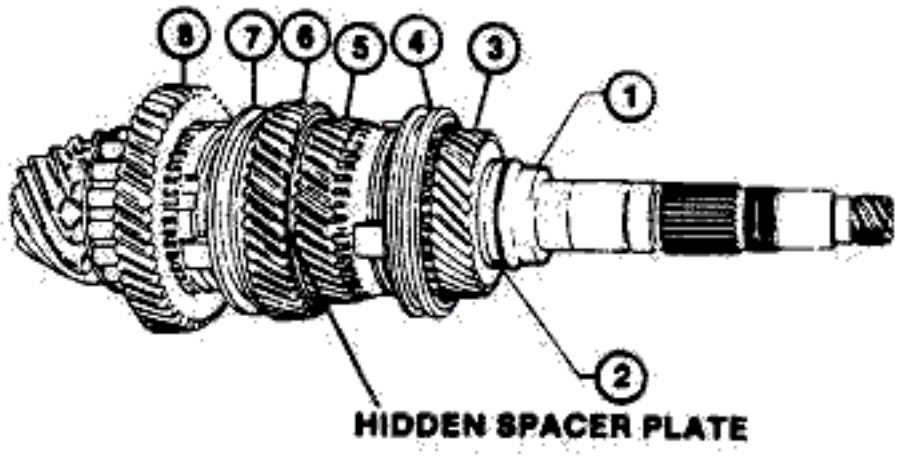
Inspecting pinion shaft.

Gearbox Assembly

Assemble 1st through 4th gear on the pinion shaft by reversing the order of the removal procedure.

NOTE: Heat the rear pinion shaft bearing distance piece to 285 degrees F for five minutes before pressing distance piece onto pinion shaft.

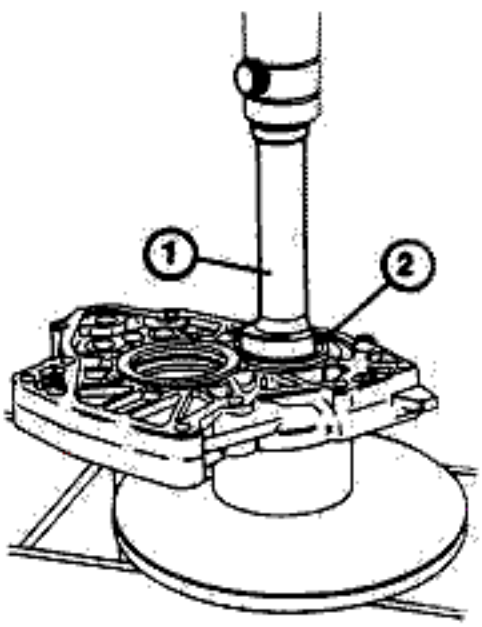
1. Bearing half-race 2. Spacer 3. 4th gear 4. 3rd-4th gear synchro 5. 3rd gear 6. 2nd gear 7. 1st-2nd gear synchro 8. 1st gear



Pinion shaft.

Use a press and the driver (1) (special tool A.3.0407) to press the mainshaft bearing outer race (2) against the lip on the intermediate flange.

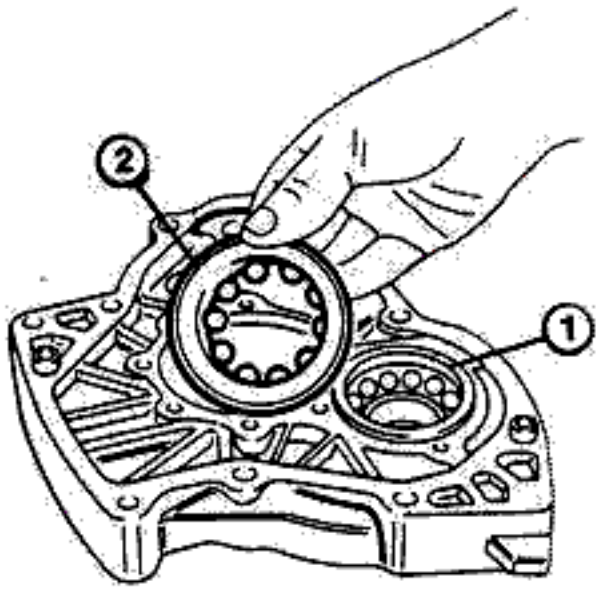
1. Driver 2. Mainshaft bearing outer race



Installing mainshaft bearing outer race.

With the flange on a bench, install the mainshaft bearing (1) with its inner half-race. Then, install the pinion shaft bearing (2). Be sure the pinion bearing is positioned as shown, with its thinner lip up.

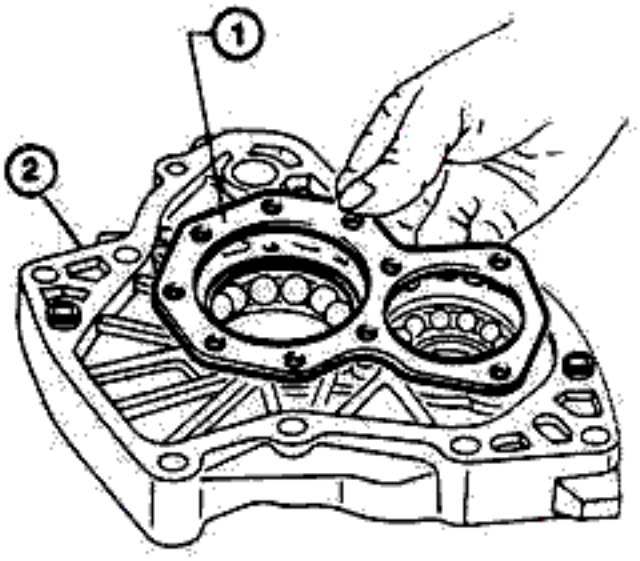
1. Mainshaft bearing 2. Pinion shaft bearing



Installing bearings.

Position the intermediate bearing back plate (1) on the intermediate flange (2).

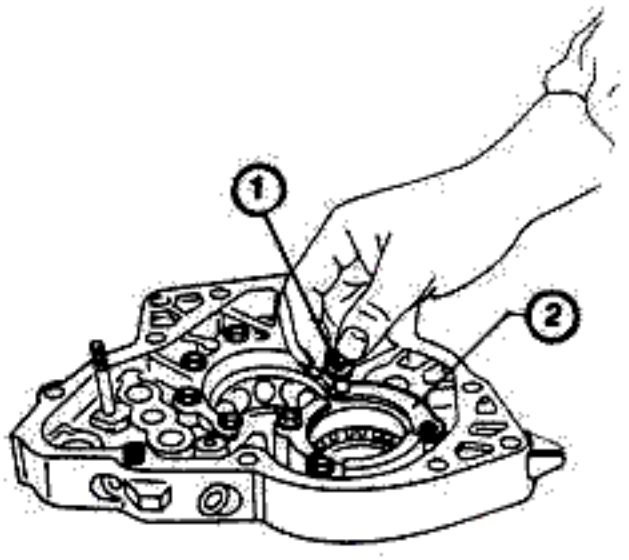
1. Back plate 2. Intermediate flange



Installing back plate.

Install the stop plate (2) and bolts (1), but do not tighten the bolts.

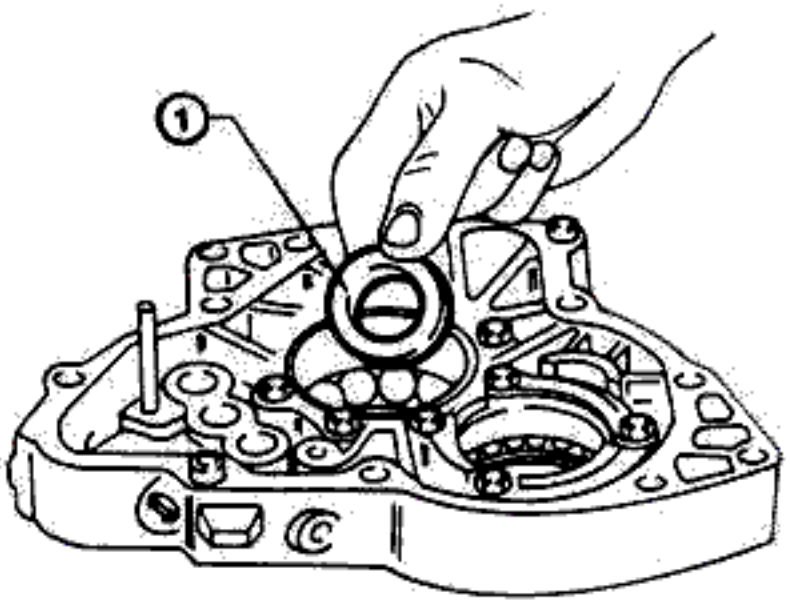
1. Bolts 2. Stop plate



Installing stop plate.

Install the inner half-race (1) of the pinion shaft bearing.

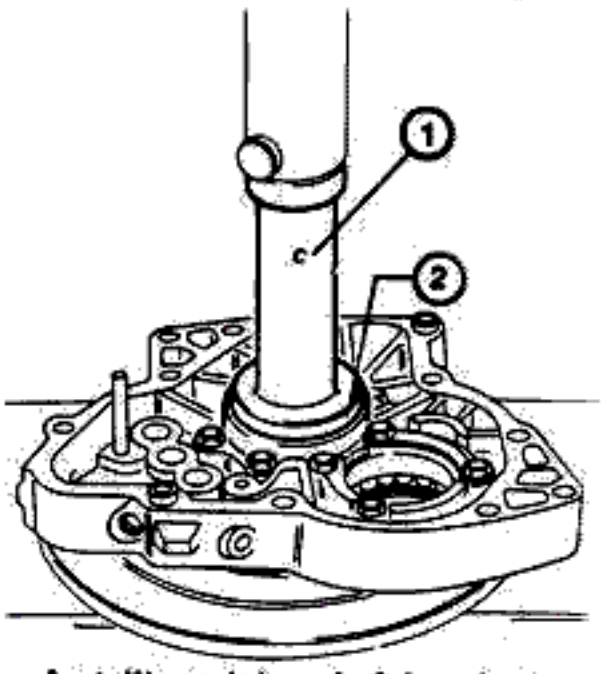
1. Pinion shaft inner half-race



Installing inner half-race.

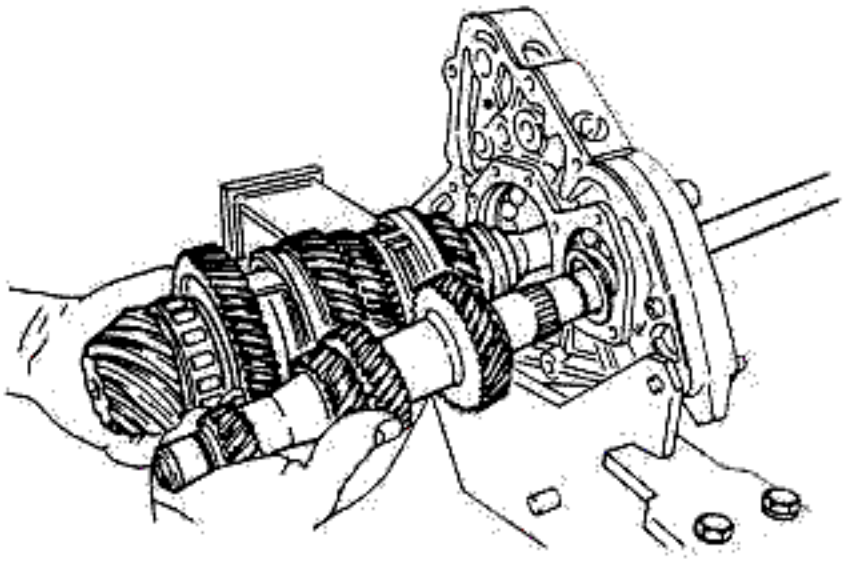
With a press and driver (1) (special tool A.3.0192), press the pinion shaft bearing (2) into the flange. Be sure to press the bearing evenly; do not jam it.

1. Driver 2. Pinion shaft bearing



Installing pinion shaft bearing.

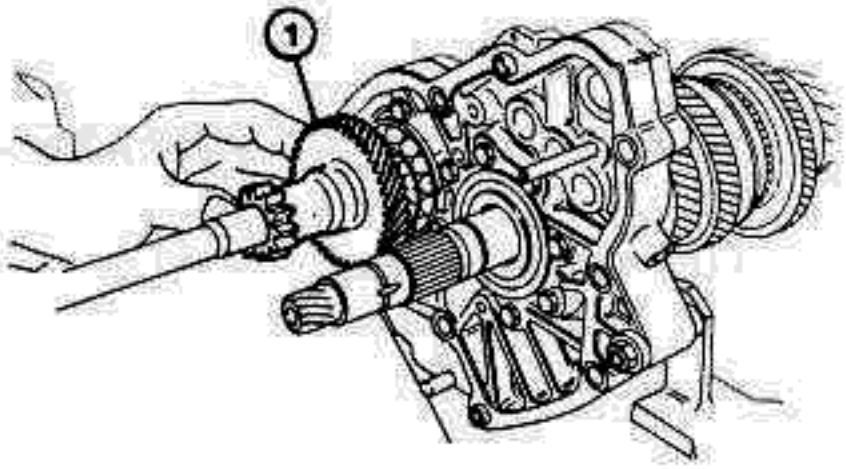
With the flange in the bracket as shown, install the inner races of the mainshaft and pinion shaft bearings in the flange. Then install the mainshaft and pinion shaft. Place the intermediate flange against the gearbox-differential housing and turn both shafts so the bearings settle. Carefully tighten the bolts that hold the back plate and stop plate to 10 to 12 ft-lb.



Settling shaft bearings.

With the flange back in the bracket, install the 5th gear and reverse gear (1) on the mainshaft as shown. Install the shaft nut but do not tighten it at this time.

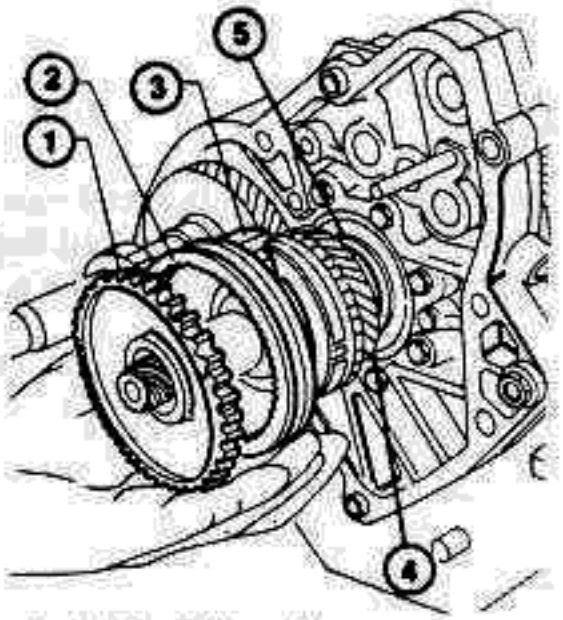
1. 5th and reverse gear



Installing 5th and reverse gear.

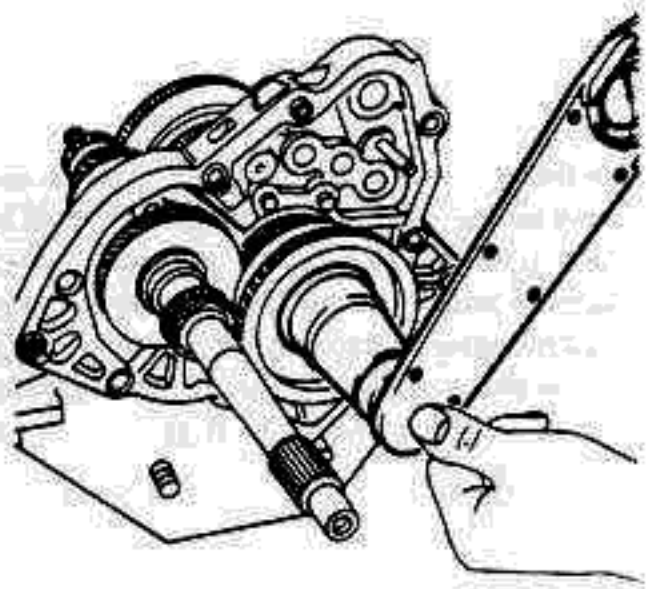
Lubricate the bearing (5) and its roller cage and install them on the pinion shaft. Then install, in order, 5th gear (4), the 5th-reverse gear hub (3) and sleeve (2), and the reverse gear (1). Install the shaft nut but do not tighten it at this time.

1. Reverse gear 2. Sleeve 3. Hub 4. 5th gear 5. Bearing



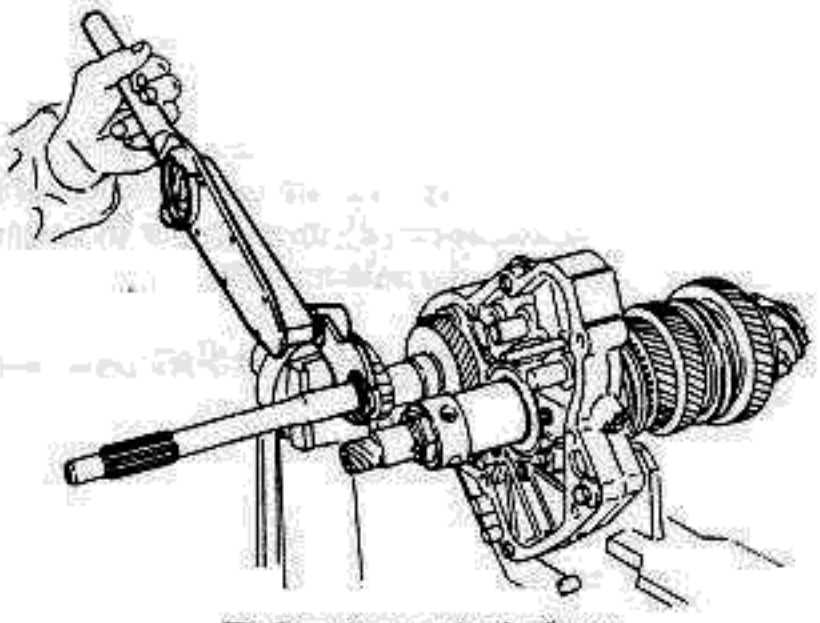
Installing 5th and reverse gear.

Shift the synchro sleeves to engage two gears, and now tighten the pinion shaft nut to 82 to 91 ft-lb. with the spanner (special tool A.5.0126).



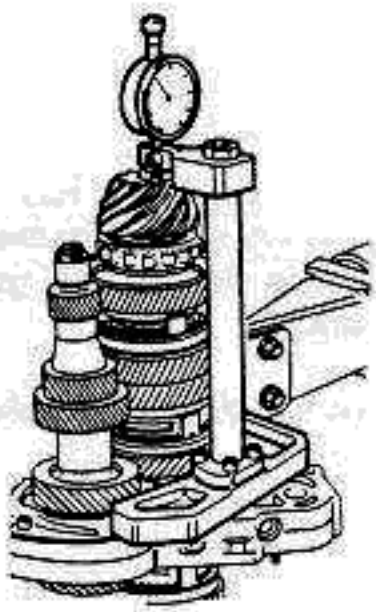
Tightening pinion shaft nut.

Then, with the spanner (special tool A.5.0181), tighten the mainshaft nut to 59 to 65 ft-lb. Disengage the two engaged gears.



Tightening mainshaft nut.

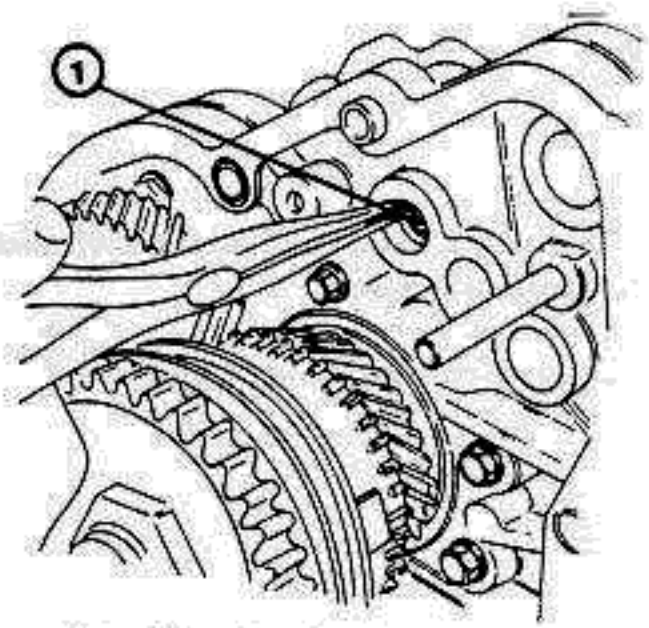
Place the dial gauge pillar (special tool A.4.0145) on the intermediate flange as shown. The reading should be the same as recorded when the shaft was disassembled. If not, use shims between the 4th gear bushing and the inner half-race of the intermediate bearing to adjust the pinion height. With the distance correct, stake one side only of both shaft nuts.



Measuring reassembled pinion shaft.

Lubricate the interlock plungers (1) and install them into their locations in the intermediate flange. This procedure is unnecessary if dummy shafts (special tool A.2.0267) were used.

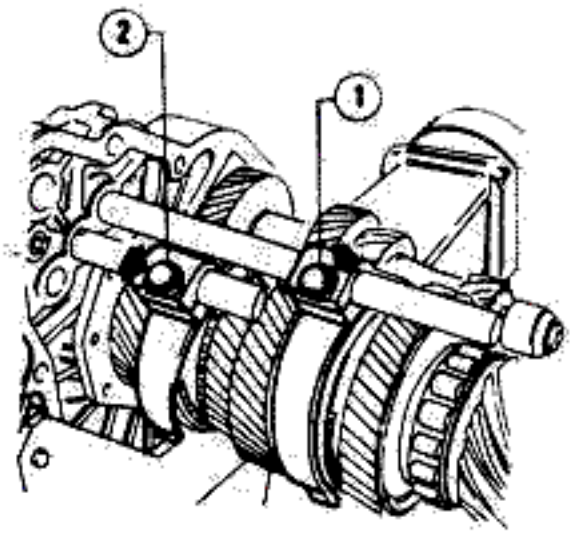
1. Interlock plungers



Installing interlock plungers.

Oil the working surfaces of the 3rd-4th gear selector fork (1) and fit it to the 3rd-4th gear synchro sleeve. Slide the selector shaft (2) through the intermediate flange and through the selector fork.

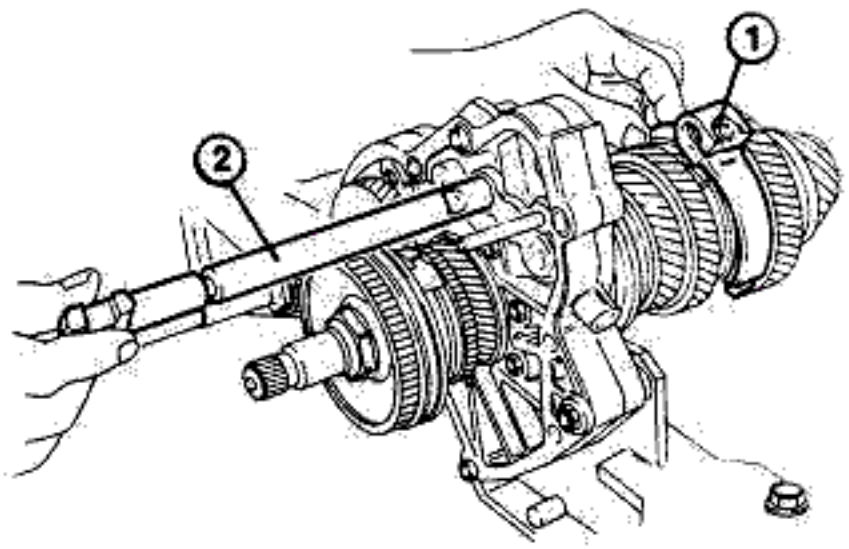
1. 1st-2nd gear selector fork 2. 3rd-4th gear selector fork



Installing 3rd-4th selector shaft.

Fit the 1st-2nd gear selector fork (1) to the 1st-2nd gear synchro sleeve after oiling the working surfaces of the fork. Slide the 1st-2nd gear selector shaft through the fork.

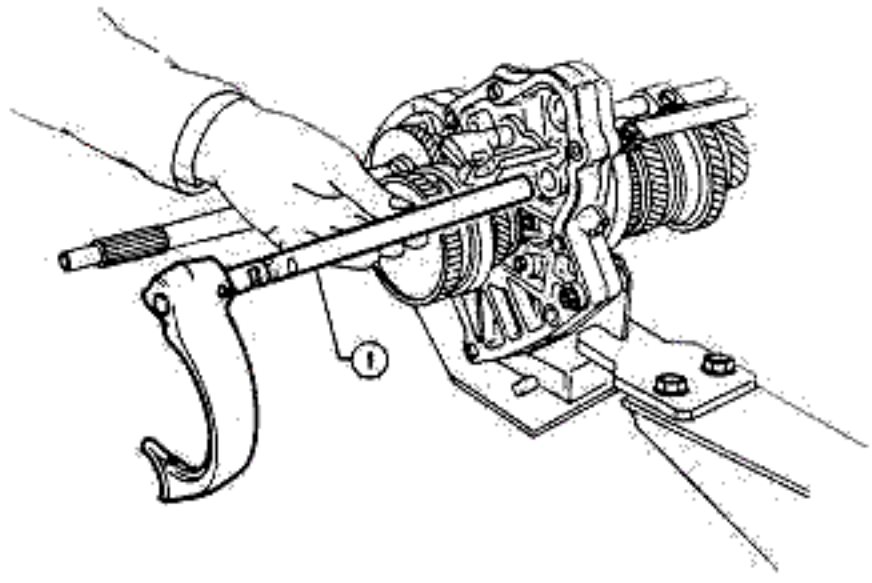
1. 1st-2nd gear selector fork 2. Selector shaft



Installing 1st-2nd selector shaft.

Install the 5th-reverse gear selector shaft (1) in the intermediate flange.

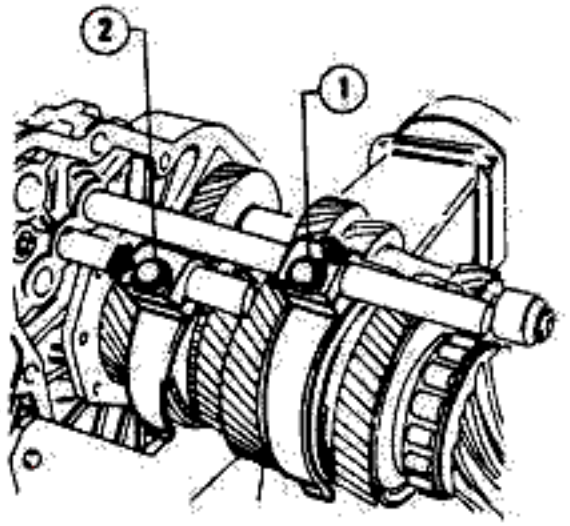
1. 5th-reverse selector shaft and fork



Installing 5th-reverse gear shaft.

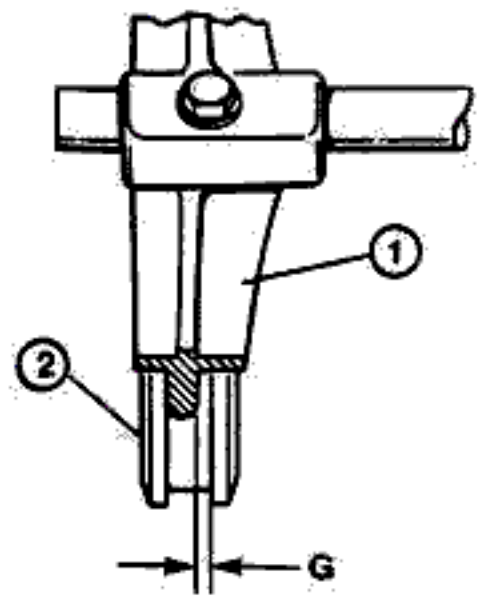
Install detent cap, spring, and ball if previously removed. With shift rods in neutral, adjust shift forks to position shift sleeves midway between gears. Tighten lockbolts (1) and (2).

1. 1st-2nd gear selector fork lock bolts 2. 3rd-4th gear selector fork lockbolts



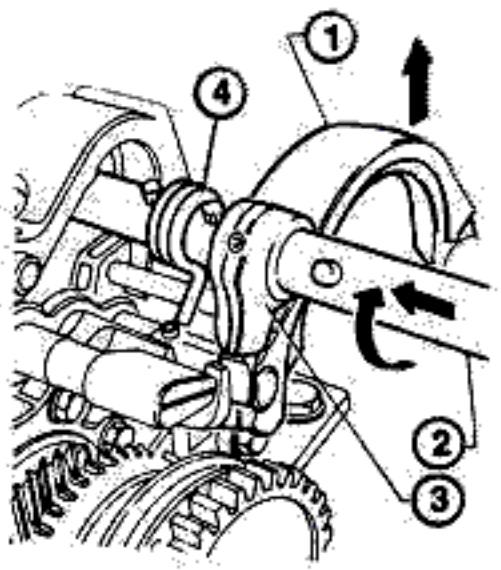
Shift into all gears and check end play (G) of sleeves. End play should be 0.7 to 0.9 mm. Adjust if necessary.

1. Shift fork 2. Shift sleeve G. End play



Once the selector shafts are installed, install the gear selector shaft (2). To install the shaft, turn the 5th-reverse selector shaft by carefully positioning the selector lever (3) at the center of the slots of the selector shafts.

1. Selector fork 2. Selector shaft 3. Selector lever 4. Retaining spring



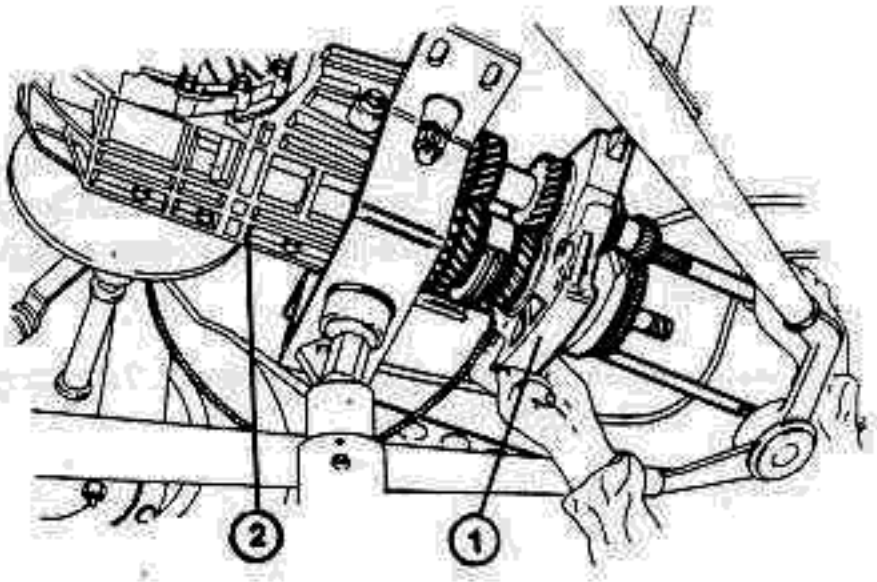
Installing gear selector shaft.

Gearbox Installation

To install the gearbox on the transaxle, first remove any traces of old sealant from the intermediate flange. Then coat both sides of the flange with sealant. Position the intermediate flange, complete with the gear assembly (1), on the gearbox-differential housing (2).

1. Intermediate flange 2. Housing

*NOTE: Do **not** use silicone sealant or other sealants which are difficult to remove. They threaten the integrity of future transaxle reseals. Use Lowac Perfect Seal Std. No. 3522-00011 or Permatex Sealants, which may be removed with conventional solvents.*

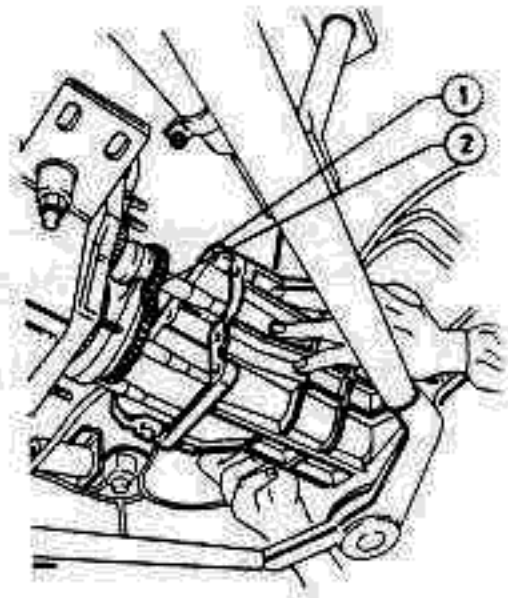


Installing intermediate flange.

Lubricate the reverse idler gear (2) and place it on the 5th-reverse gear fork. Hold the fork and position the front housing (1) on the intermediate flange.

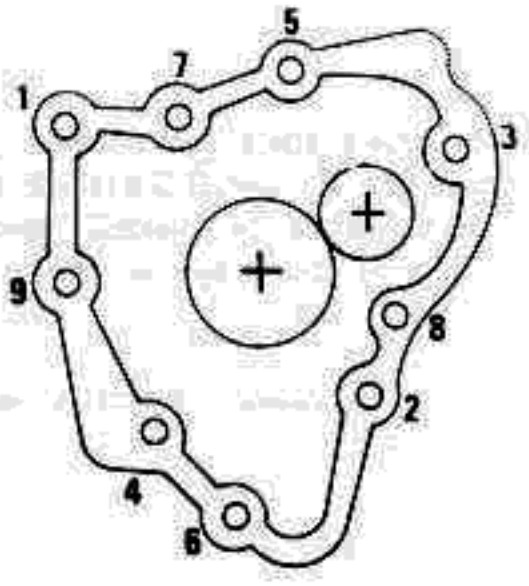
NOTE: Be sure reverse idler gear aligns with front housing shaft.

1. Front housing 2. Reverse idler gear



Installing front housing.

Assemble the nuts that hold the front housing to the intermediate flange and tighten them in the order shown to 9 to 10 ft-lb. To install the clutch unit, see the CLUTCH UNIT INSTALLATION section of this book.

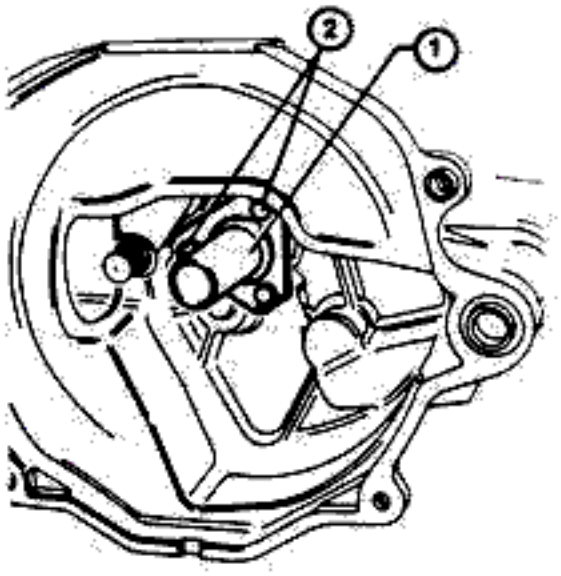


Front housing torque sequence.

Dismantling Front Housing

To service the front housing, remove the bolts and washers (2) that hold the throw-out bearing sleeve (1) to the housing. Remove the sleeve.

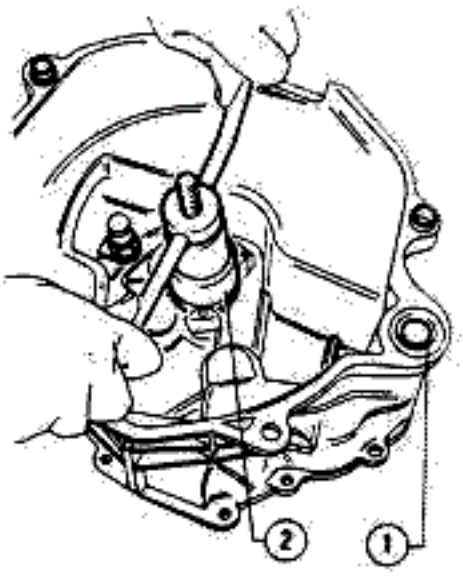
1. Throw-out bearing sleeve 2. Bolts



Throw-out bearing sleeve bolts.

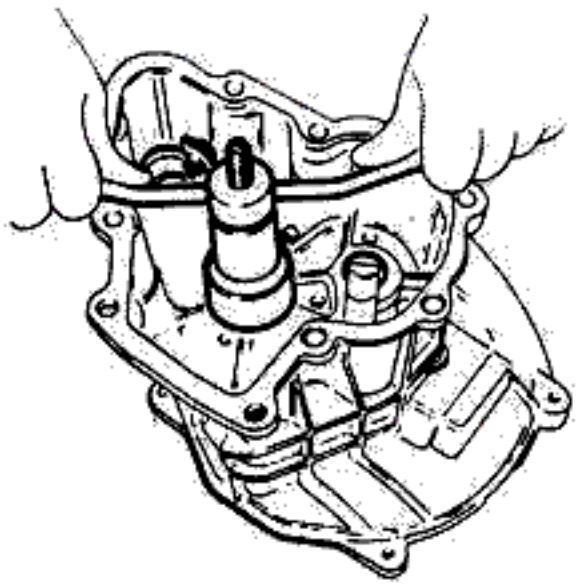
Use the puller (special tool A.3.0291) to remove the mainshaft oil seal (2). Also, remove the gear selector shaft oil seal (1).

1. Selector shaft seal 2. Mainshaft oil seal



Removing oil seals.

Turn the housing over and use the puller (special tool A.3.0291) to remove the pinion shaft support bushing from the housing.

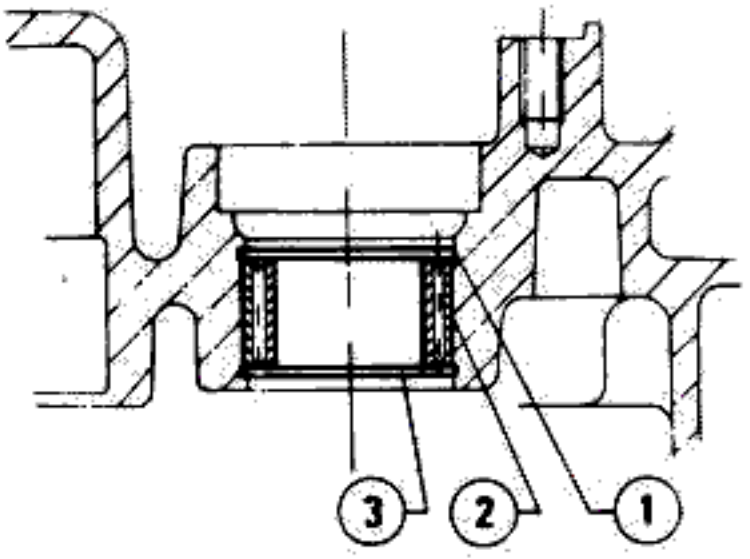


Removing support bushing.

FRONT HOUSING SERVICE

Remove the mainshaft roller bearing by removing the front circlip (1) and the bearing (2) from the housing. If necessary, also remove the rear circlip (3).

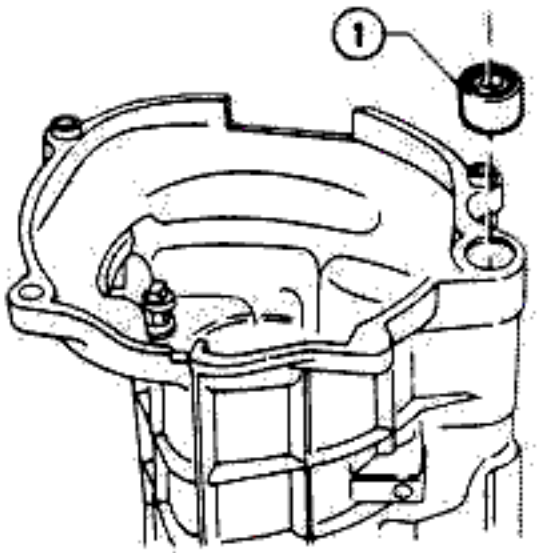
1. Front circlip 2. Bearing 3. Rear circlip



Mainshaft roller bearing.

If necessary, remove the gear selector shaft bearing (1) from the housing.

1. Selector shaft bearing

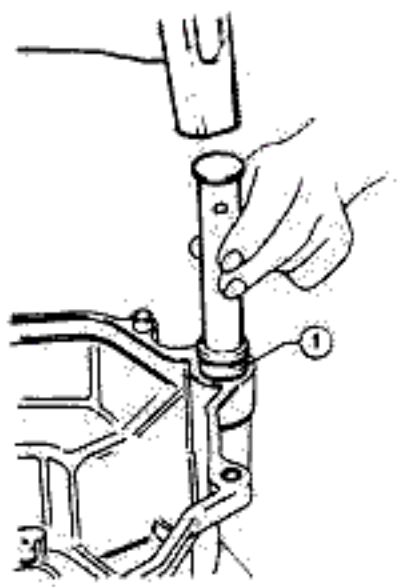


Selector shaft bearing.

Front Housing Assembly

To install the gear selector shaft bearing (1), carefully heat the front housing to 285 to 320 degrees F. Then, use the driver (special tool A.3.0532) to drive the bearing into the housing.

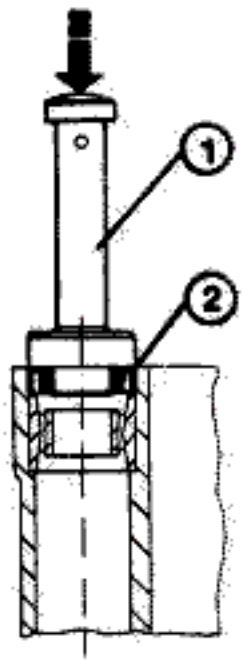
1. Shaft bearing



Installing selector shaft bearing.

When the housing has cooled, lubricate the outer surfaces and inner lip of the selector shaft oil seal (2). Drive the seal into the cover with the driver (1) (special tool A.3.0406).

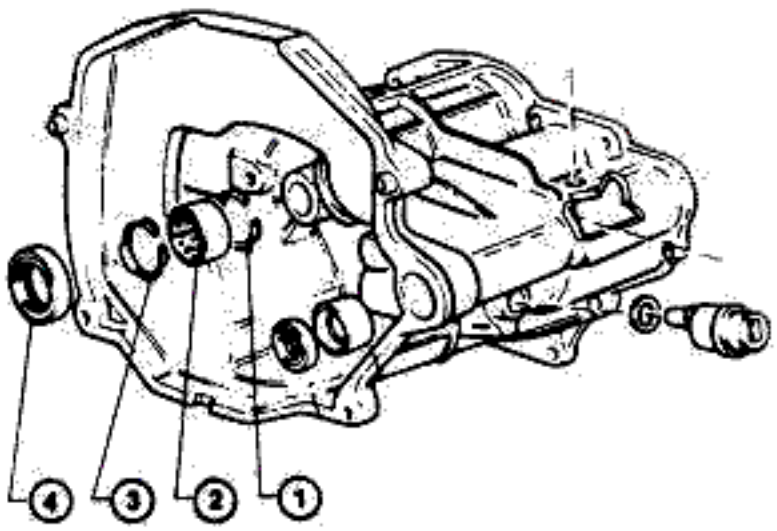
1. Driver 2. Oil seal



Installing selector shaft oil seal.

If removed previously, install the rear circlip (1) for the mainshaft roller bearing (2). Slide the roller bearing into the housing (no tool is required) and install the front circlip (3).

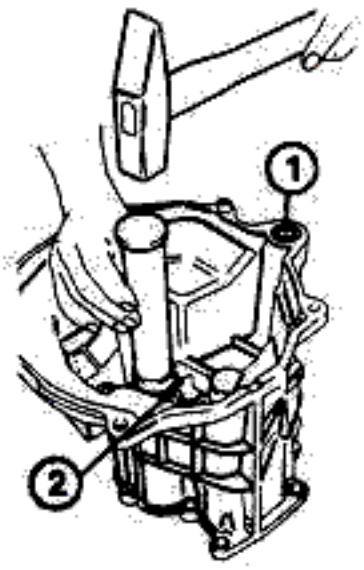
1. Rear circlip 2. Roller bearing 3. Front circlip 4. Mainshaft seal



Roller bearing and circlips.

Then install the mainshaft oil seal (2) with the driver (special tool A.3.0343).

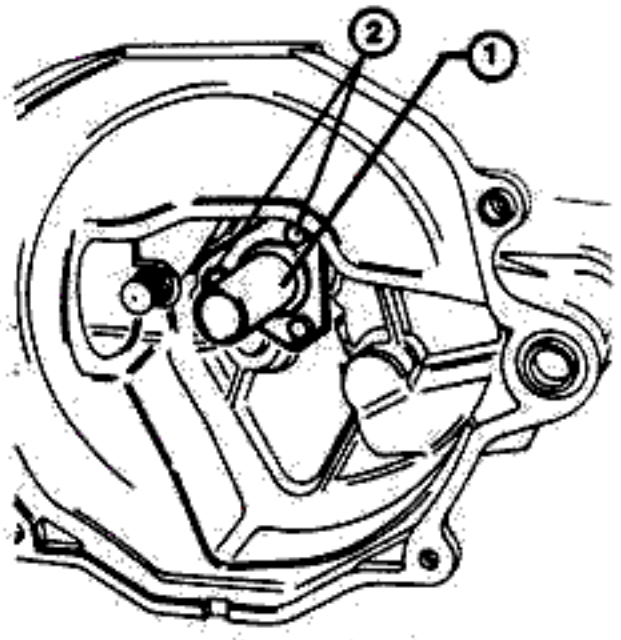
1. Selector shaft seal 2. Mainshaft seal



Installing mainshaft oil seal.

Install the throw-out bearing sleeve (1) and tighten the bolts that hold it to the housing to 7 to 10 ft-lb.

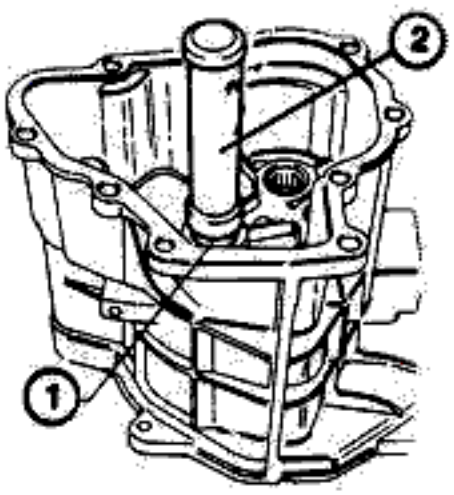
1. Throw-out bearing sleeve 2. Bolts



Throw-out bearing sleeve.

Place the housing in a press. Use the press and driver (special tool A.3.0346) to install the pinion shaft support bushing (1) in the housing.

1. Bushing 2. Driver

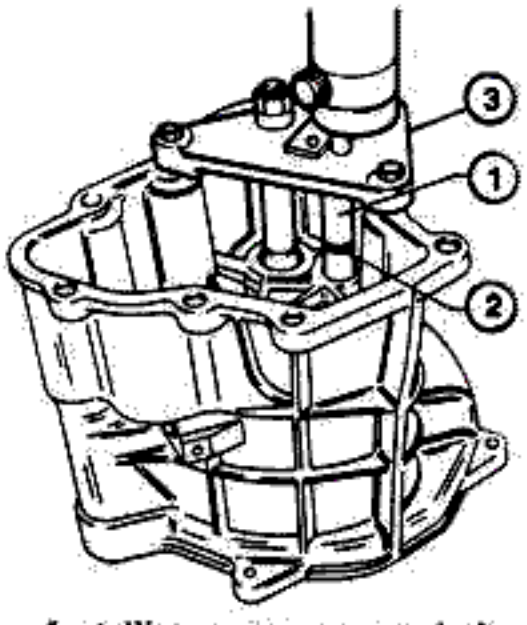


Installing pinion shaft support bushing.

Replacing Reverse Gear Shaft

To replace the reverse gear shaft (1), heat the housing to 285 to 320 degrees F and press out the old shaft. Install the circlip (2) on the new shaft and place the housing in a press. Press the new shaft into the housing until the circlip seats. Then use the plate (3) (special tool A.3.0497) to set the shaft correctly.

1. Reverse gear shaft 2. Circlip 3. Plate



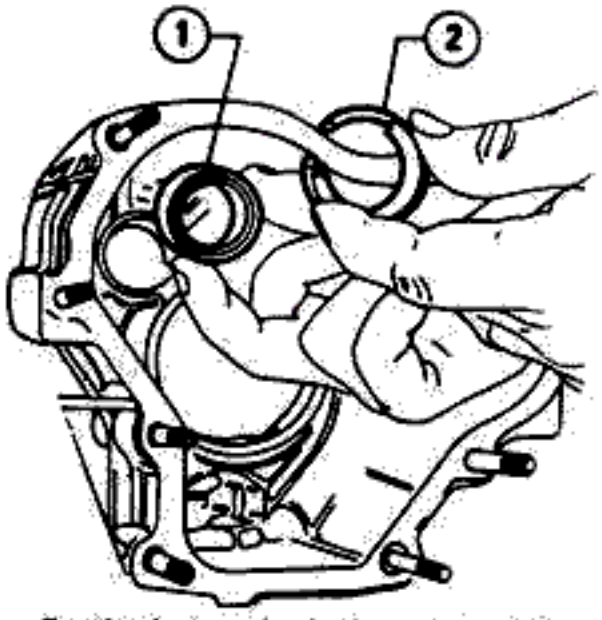
Installing reverse gear shaft.

Replacing Mainshaft Rear Bearing

To replace the rear bearing, remove the circlip (2) and withdraw the bearing (1) from the gearbox-differential housing. No special tools are required for this procedure. Install the new bearings and replace the circlip.

NOTE: The pinion shaft rear bearing cannot be replaced without dismantling the differential.

1. Bearing 2. Circlip



Replacing mainshaft rear bearing.

TORQUES AND LUBRICANTS

TORQUES

Clutch Service

Flywheel shaft mounting bolts:	20 to 23 ft-lb
Pressure plate bolts:	13 to 16 ft-lb
Yoke locknuts:	69 to 76 ft-lb
Clutch cover bolts:	21 to 24 ft-lb

Gearbox Service

Pinion shaft locking nut:	82 to 92 ft-lb
Main shaft locking nut:	59 to 65 ft-lb

LUBRICANTS

Clutch hydraulic fluid:	DOT 4 Brake fluid ATE "Blau S"
Gearbox oil:	SAE 75W/90, AGIP ROTRA MP SX

CLUTCH SERVICE

- **Be sure the vehicle is securely supported when working underneath it.**
- **Always use eye protection when using striking tools.**
- Lubricate pilot bearing with high temperature disc brake wheel bearing grease.
- Lubricate clutch fork pivot area with high temperature disc brake wheel bearing grease.
- Lubricate throw-out bearing working surfaces with high temperature disc brake wheel bearing grease.
- Always use new hydraulic fluid when filling reservoir.
- Keep hydraulic fluid container tightly closed to prevent it from absorbing moisture.
- Relieve the clutch hydraulic pressure slowly so that the slave cylinder seals are not damaged when the cylinder is removed from the vehicle.
- Be careful of brake line and electrical wiring when installing the deDion spacer.
- On 1981-1984 vehicles, mark the position of the selector arm on the selector shaft to ensure proper reassembly.
- Be careful not to drop the reverse idler gear when removing the front cover.
- Be sure to support the brake calipers to relieve any strain on the brake lines.
- Fill transaxle with proper gear oil, SAE 75W/90, AGIP ROTRA MP SX.
- Place the clutch unit on a bench so that it does not rest on the throw-out bearing.
- Front clutch plate has low center hub.
- Rear clutch plate has high center hub.

NOTES AND CAUTIONS

- Keep clutch plate surfaces free of grease or other fluids.

- Always use a calibrated torque wrench when tightening values are specified.

- On 1981-1984 vehicles, care must be taken that torque on shift selector arm retaining nut is not absorbed by primary selector shaft, or shift gate misalignment **will** occur. Brace selector arm with adjustable spanner while removing **or** installing retaining nut. **Do not** use impact tools.

- Lubricate throw-out bearing and fork only with disc brake high temperature wheel bearing grease.

GEARBOX SERVICE

- Be careful that the half-races do not fall out as the shafts are removed.

- Do not misplace the spacer plate that separates the 2nd and 3rd gears on the pinion shaft.

- Heat the rear pinion shaft bearing distance piece to 285 degrees F for five minutes before pressing distance piece onto pinion shaft.

- Be sure reverse idler gear aligns with front housing shaft.

- The pinion shaft rear bearing cannot be replaced without dismantling the differential.

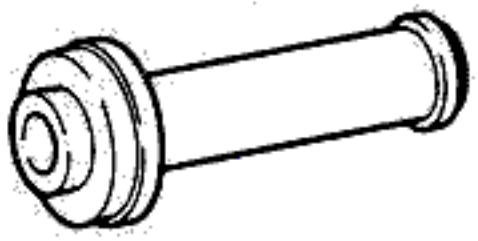
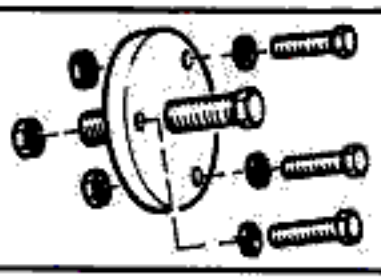
- Use extreme caution when heating bearings and housings.

- Do not allow gears to drop on hard surfaces.

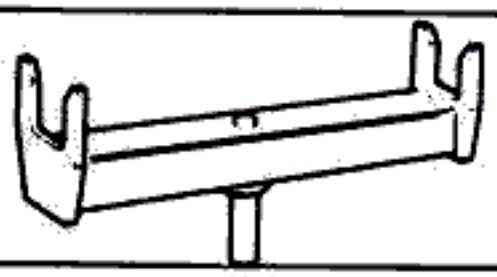
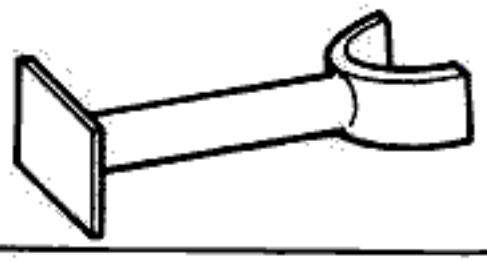
- Always use a calibrated torque wrench when tightening values are specified.

- Do **not** use silicone sealant or other sealants which are difficult to remove. They threaten the integrity of future transaxle reseals. Use Lowac Perfect Seal Std. No. 3522-00011 or Permatex sealants, which may be removed with conventional solvents.

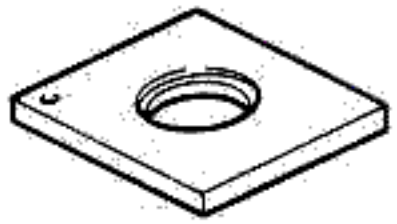
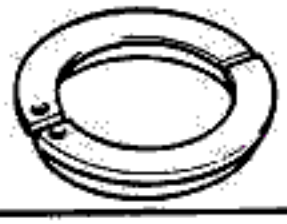
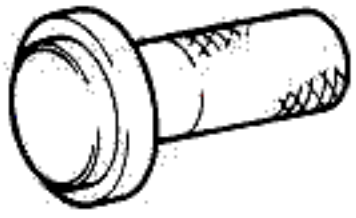
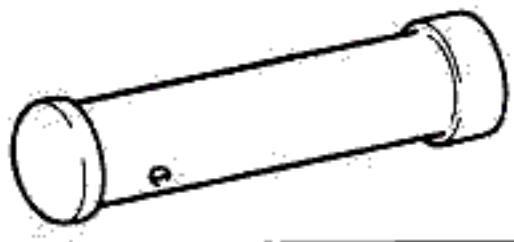
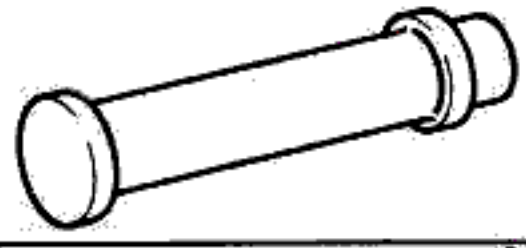
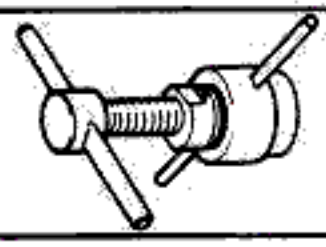
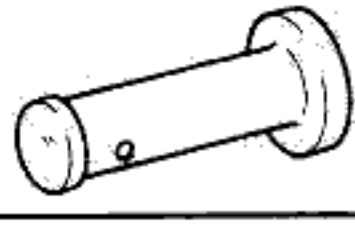
CLUTCH TOOLS

Tool Number	Tool Description
A.3.0282	Driver for rear bearing 
A.3.0405	Driver for centering bush on flywheel-clutch shaft 
A.3.0600	Puller for propeller shaft connecting fork (for double plate clutch) 
A.4.0205	Tool for clutch plate centering 

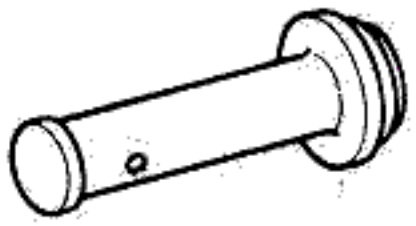
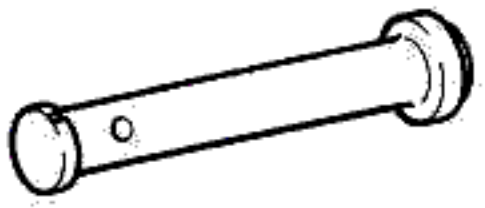
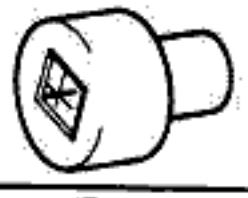
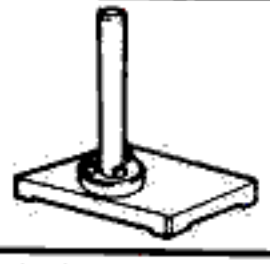
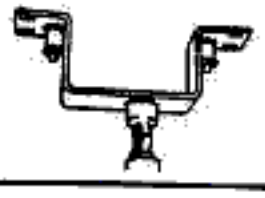
GEARBOX TOOLS

Tool Number	Tool Description
A.2.0075	Support for jacking up car 
A.2.0267	Dummy rods for striking rod balls and speed engagement detent balls 
A.2.0268	Spacer for removing deDion axle 

GEARBOX TOOLS (Continued)

Tool Number	Tool Description
A.2.0349-0100	Half-ring support plate for disassembling ring nut and inner race of pinion shaft bearing (to be used with A.2.0401 and A.2.0402) 
A.2.0401	Half-rings for removing inner race of pinion shaft rear bearing—(to be used with A.2.0349-0100) 
A.2.0402	Half-rings for removing ring nut of pinion shaft rear bearing—(to be used with A.2.0349-0100) 
A.3.0192	Puller-driver for outer race of pinion shaft bearing on intermediate flange 
A.3.0343	Driver for main shaft oil seal ring 
A.3.0346	Driver for pinion shaft bush 
A.3.0361	Puller for inner race of main shaft rear bearing 
A.3.0407	Puller-driver for outer race of pinion shaft intermediate bearing 

GEARBOX TOOLS (Continued)

Tool Number	Tool Description
A.3.0408	Puller-driver for outer race of pinion shaft intermediate bearing 
A.3.0532	Driver for bush of speed selection and engagement rod 
A.3.0596	Puller-driver for outer race of main shaft bearing on intermediate flange 
A.4.0145	Support of gauge for determining pinion shim (to be used with C.6.0166) 
A.5.0181	Wrench, 30 mm for main shaft nut 
A.5.0216	Spanner, 10mm for detent retaining caps 
C.6.0166	Reference gauge for determining pinion shim (to be used with A.4.0145) 
R.4.0150	Transaxle support bracket 
A.5.0126	Socket wrench for pinion shaft nut, 36mm size