MANUAL TRANSMISSION AND DIFFERENTIAL

3-1

SUBARU

1988

MECHANISM AND FUNCTION

Cross Sectional View

FWD

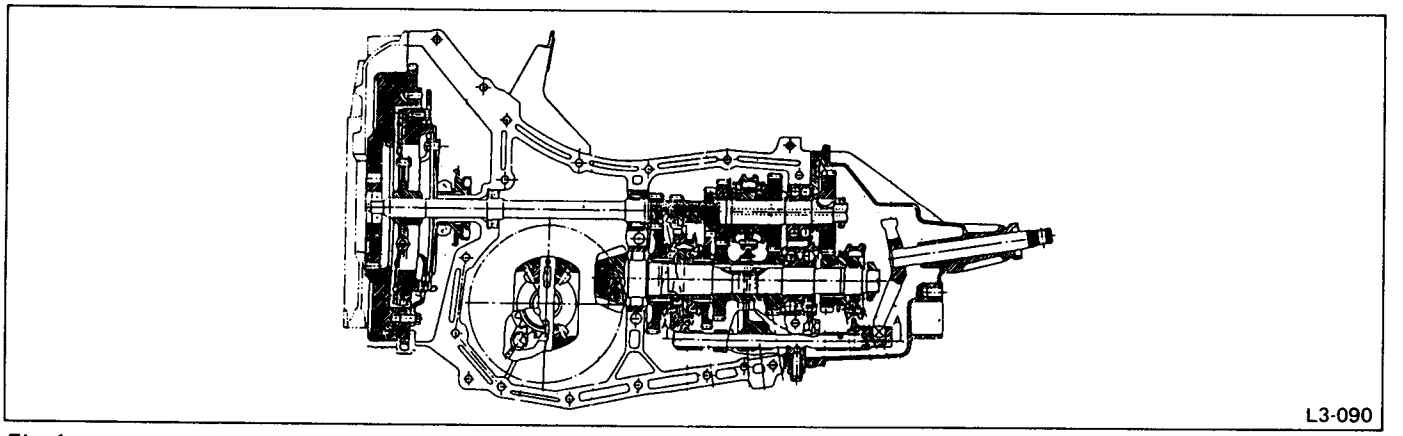


Fig. 1

4WD

- **Selective 4WD (Single-range)**

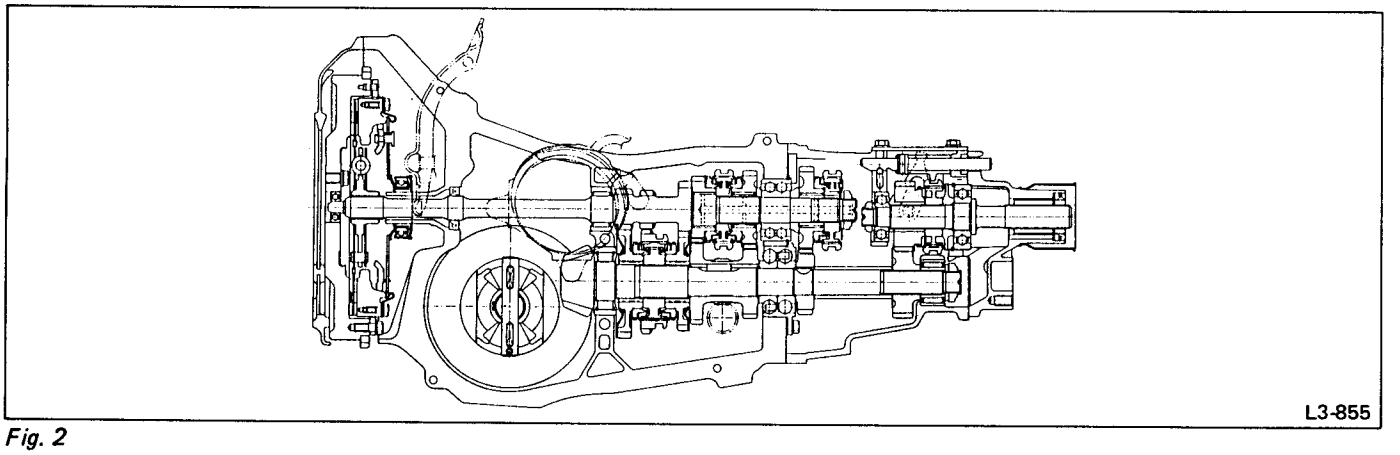


Fig. 2

- **Full-Time 4WD (Single-range)**

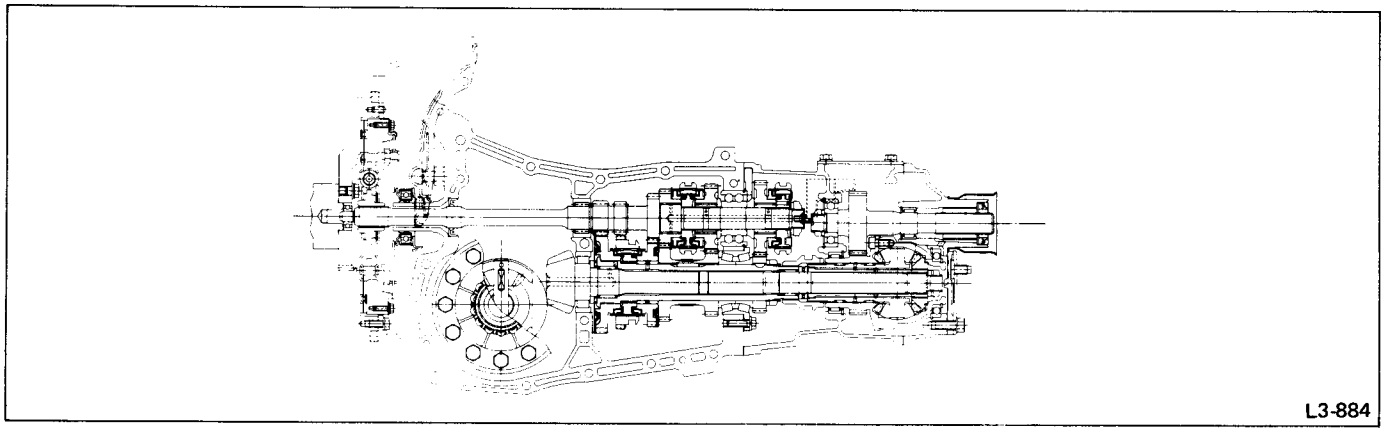


Fig. 3

Reverse Check Mechanism

COMPONENT PARTS

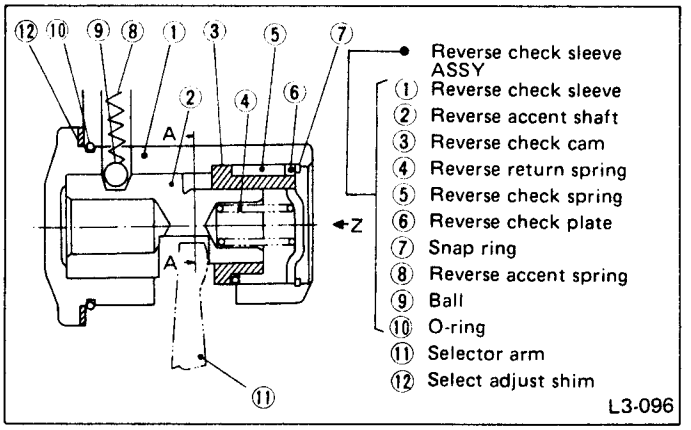


Fig. 4

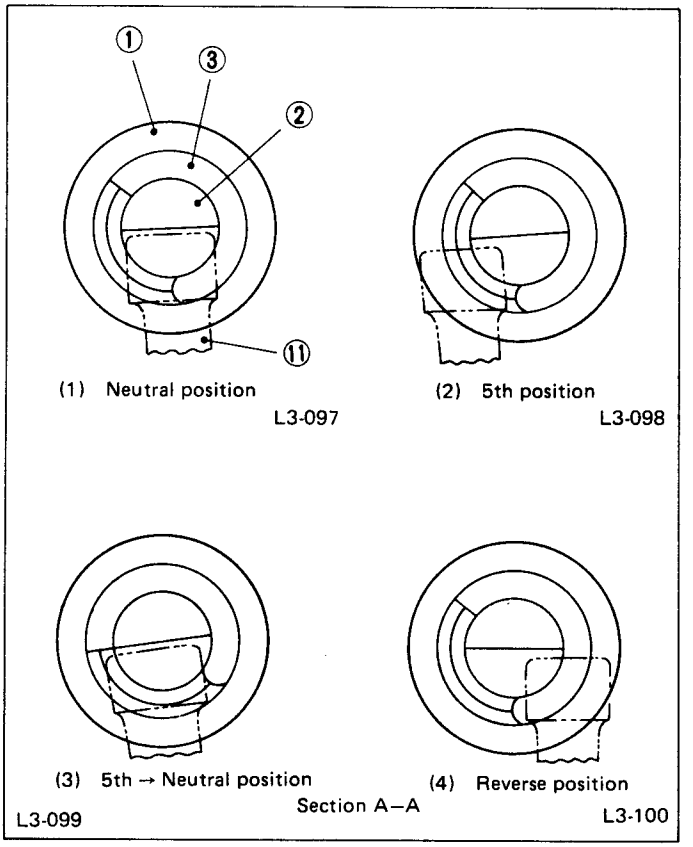


Fig. 5

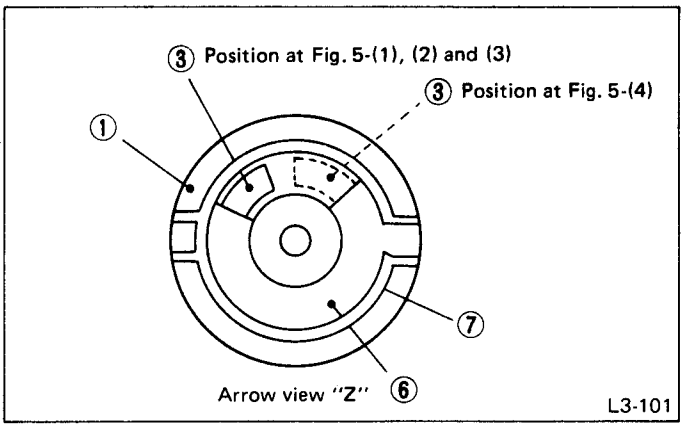


Fig. 6

CONSTRUCTION

- The sleeve ① is bolted to the transmission case. The shaft ② is inserted in the sleeve ①. On the smaller-diameter side (right side in Fig. 4) of this shaft ②, the cam ③ is loosely mounted so that it can rotate, and the sleeve ① holds the cam in place with its stepped part.
  The spring ④, which is inserted in the shaft ② presses the shaft to the left. Further, the spring ⑤ is placed in between the cam ③ and sleeve ①, which forces the cam ③ to the left and in the direction of rotation. Both springs are held down with the plate ⑥ that is attached to the sleeve ① with the snap ring ⑦. The shaft ② has a groove for reverse accent, in which the ball ⑨ and spring ⑧ are put through a hole drilled in the sleeve ①.

OPERATION

- As shown in Fig. 5, the sleeve ① and shaft ② have a notch, and the arm ⑪ is placed between the notches. The position of the arm ⑪ shown in Fig. 4 is the neutral position (hereafter referred to as Ⓝ position). The point where the arm stops when moved to the left is the 1st and 2nd position. Opposite this, the point where the arm stops when moved to the right is the 5th and reverse position.
  Fig. 5 shows the section A-A in Fig. 4, and Fig. 6 the view Z in Fig. 4.

1) When 5th and reverse side is selected

The arm ⑪ pushes the shaft ② and cam ③ simultaneously and moves to the 5th and reverse side, as shown in [Fig. 5-(1)].

2) When shift is made to 5th

As shown in [Fig. 5-(2)], the arm ⑪ moves to the 5th side pushing the shaft ②. When the arm ⑪ pulls out of the cam ③, the cam is returned to the original position by the spring ⑤.

3) When shift is made from 5th to reverse

As shown in [Fig. 5-(3)], the arm ⑪ moves to the reverse side pushing the shaft ② and runs against the cam ③ that has already returned. The cam ③ has, as shown in [Fig. 6], a stopper, which hits against the plate ⑥. Thus, the cam ③ cannot rotate further. Accordingly, the arm ⑪ comes to a

stop at a point where it has turned the cam ③ to a certain degree (i.e., Ⓝ position), and the cam ③ is pushed back to the Ⓝ position by the shaft ② (i.e., the spring (④).

4) When shift is made to reverse

From the position shown in [Fig. 5-(1)], the arm ⑪ again moves to the 5th and reverse side. When the shift is made to reverse, the arm ⑪ moves to the reverse position while pushing the shaft ② and cam ③ together.

Full-Time 4WD

CONSTRUCTION

1) The full-time 4WD transmission is designed on the basis of the selective 4WD model. A center differential unit and locking mechanism have been added to the rear end transfer section. The overall length of the transmission is unchanged.

2) The center differential features the reliable bevel gear design. It distributes the torque to both front and rear differentials and performs the differential action between the front and rear axle shafts.

3) In order to minimize the size of the transfer section, a triple-shaft structure with two hollow shafts is adopted. These are located at the center differential power input section and at the output section from which power is transmitted to the front and rear wheels. Major parts such as the transmission case, main shaft, front differential and others are interchangeable.

4) The center differential is equipped with a built-in mechanical locking mechanism. It is locked or unlocked by the vacuum actuator with engine vacuum when the differential lock switch on the console box inside the cabin is operated.

5) When the center differential is locked, the drive shaft is coupled directly to the front and rear wheels. This provides a maximum drive equivalent to that of the 4WD mode of the selective 4WD model.

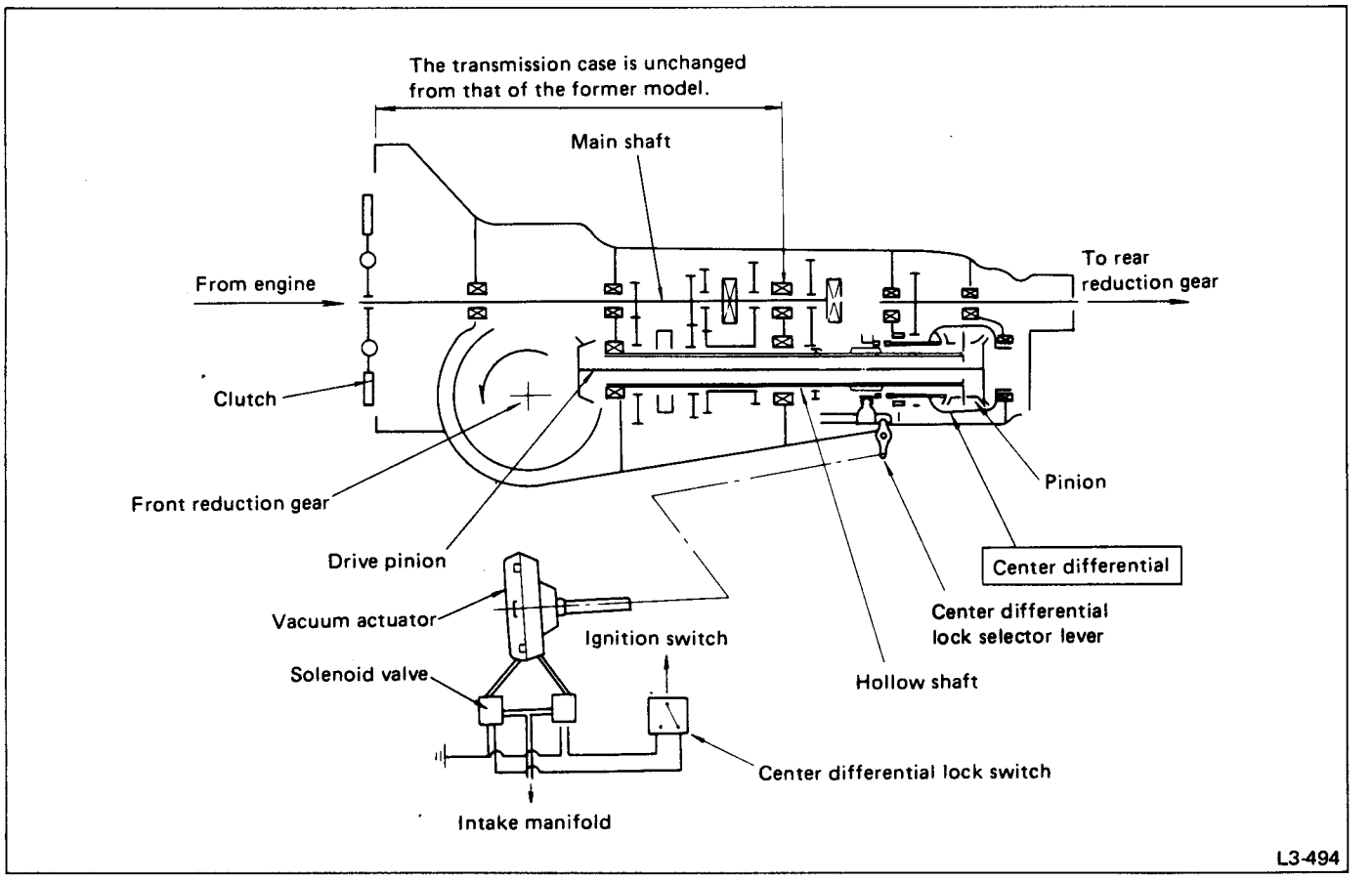


Fig. 7

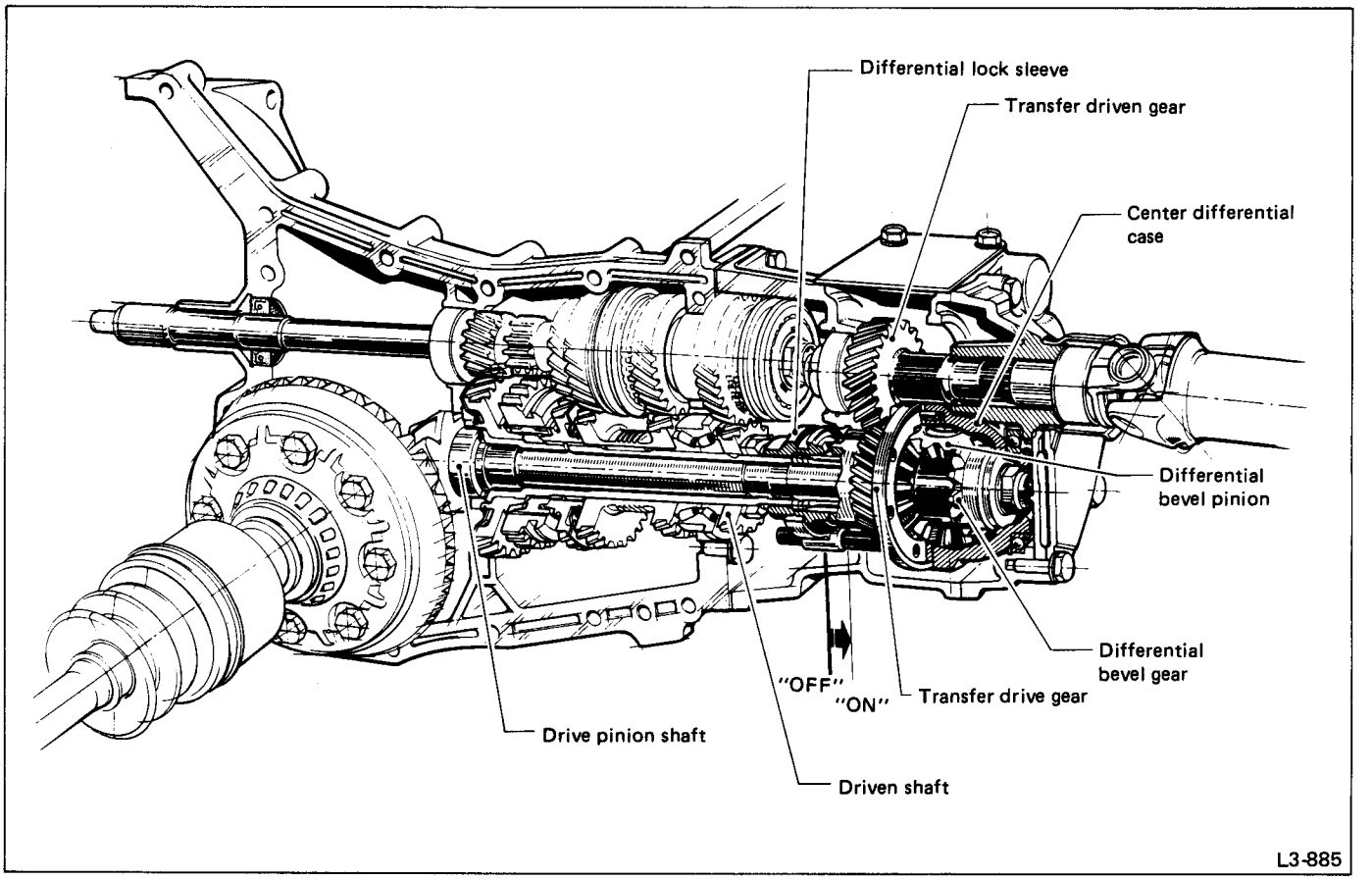

Differential lock sleeve
Transfer driven gear
Center differential case
Differential bevel pinion
Differential bevel gear
"OFF"
"ON"
Transfer drive gear
Drive pinion shaft
Driven shaft
L3-885

Fig. 8

OPERATION OF CENTER DIFFERENTIAL AND POWER TRANSMITTING MECHANISM

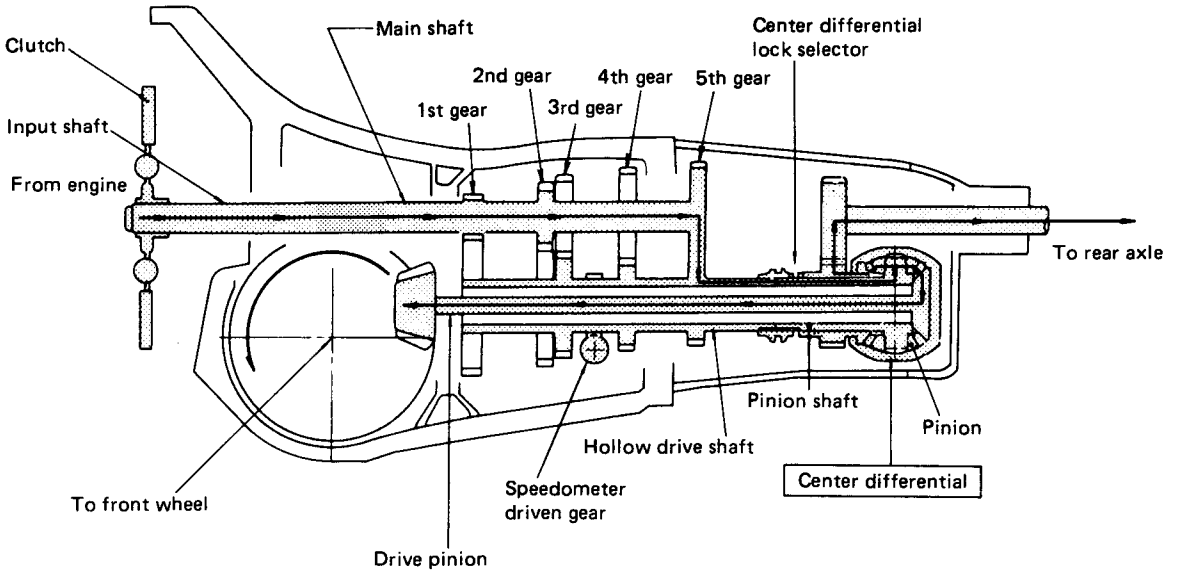
1) Engine torque is transmitted to the clutch and main shaft. It is then transmitted to the hollow driven shaft after being multiplied by the respective speed gears.

2) The rear end of the hollow driven shaft is coupled directly to the pinion of the center differential via the pinion shaft, and torque is transmitted equally to the front and rear final drives. Any difference in rotating speed between the front and rear wheels is absorbed through the action of this differential unit.

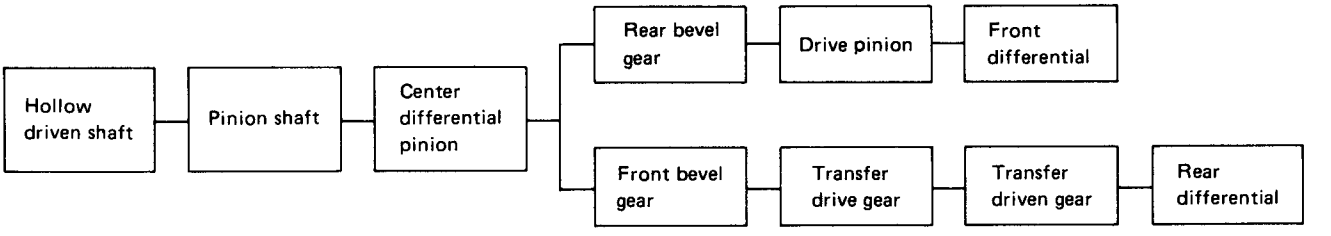
3) The torque or driving force thus transmitted and distributed is then transferred to the axle shafts and tires via the front and rear final drives.

4) When the car is going straight ahead, the drive pinion and transfer drive gear rotate as a unit. When making a turn, tight corner braking is avoided by the action of the center differential.

Power transmission when the car is going straight ahead (When driving in 5th gear)



Power from the engine is transmitted as follows:

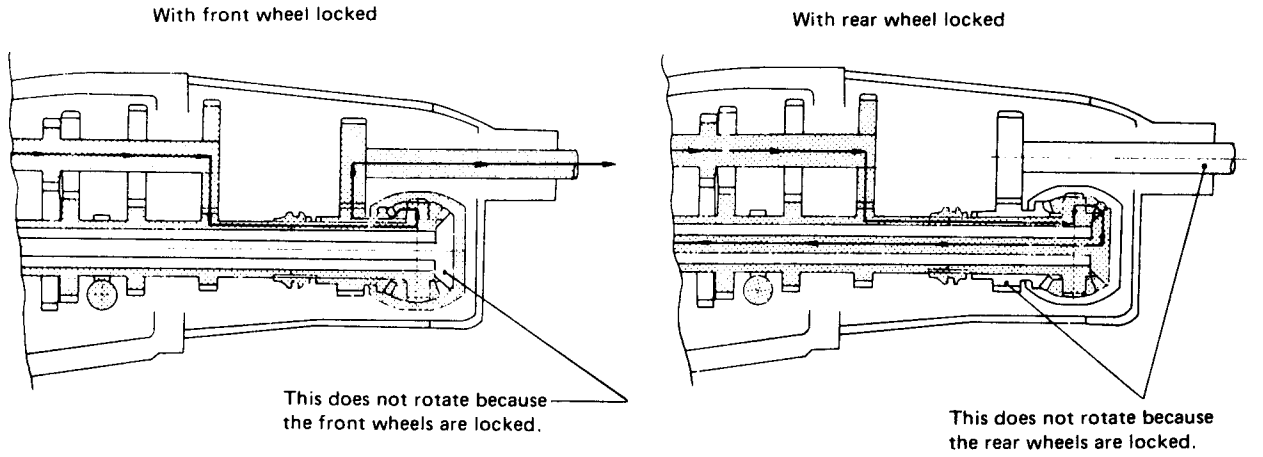


L3-496

Fig. 9

Power transmission when front wheel or rear wheel is locked (when driving in 5th gear)

Power is transmitted as follows:



In either case, the output shaft is driven at a speed twice that of the hollow input shaft.

L3-327

Fig. 10

5) When the center differential lock switch is operated and the center differential lock is activated, the differential gear coupled to the front and rear drive shafts does not function. If the front or the rear wheel slips, torque is transmitted to the remaining wheel by the center differential lock, so that the car can maneuver off the slippery surface, or get out of mud. The suction vacuum of the engine is utilized to activate the vacuum actuator to changeover the locking mechanism.

Operation of differential lock

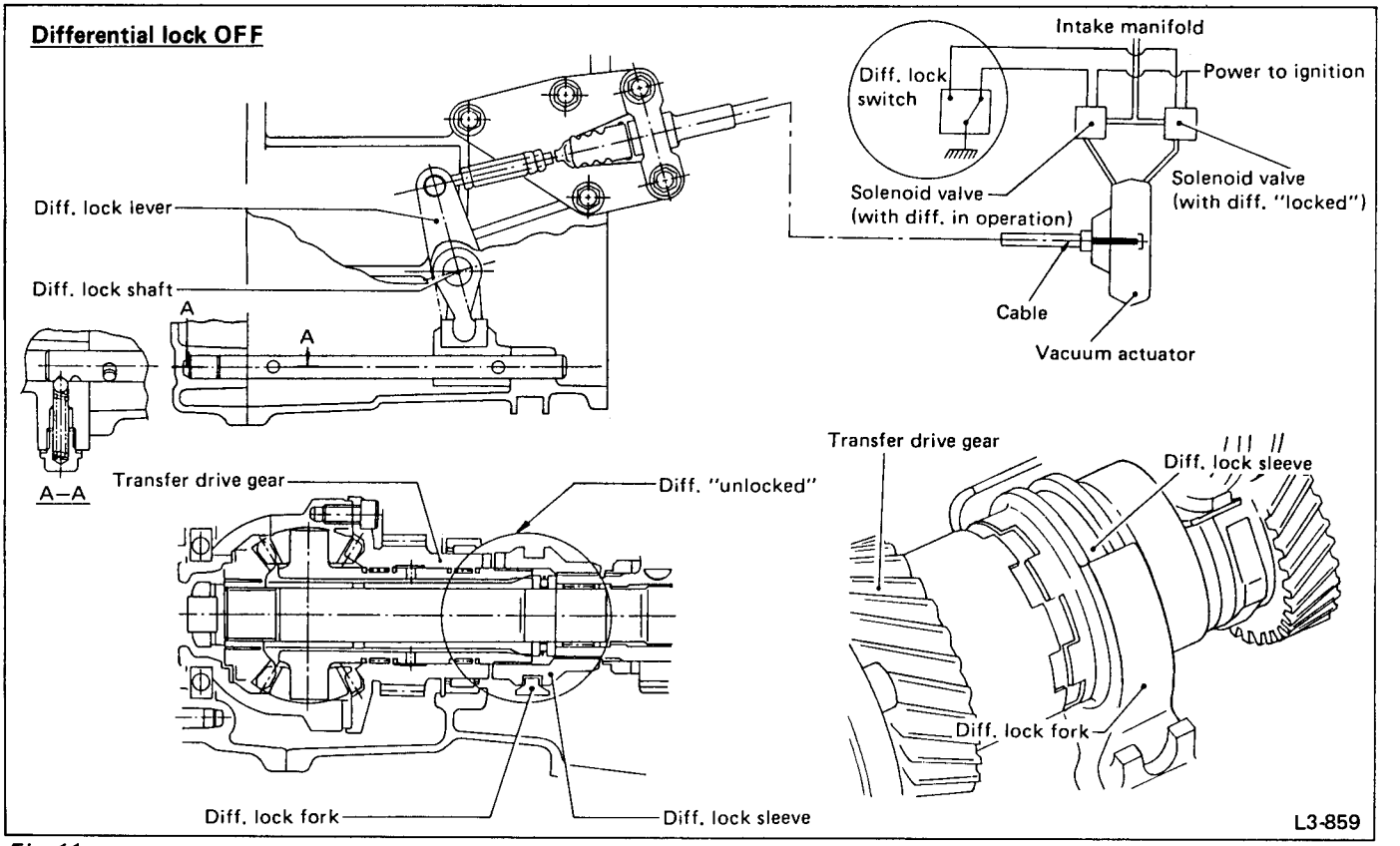


Fig. 11

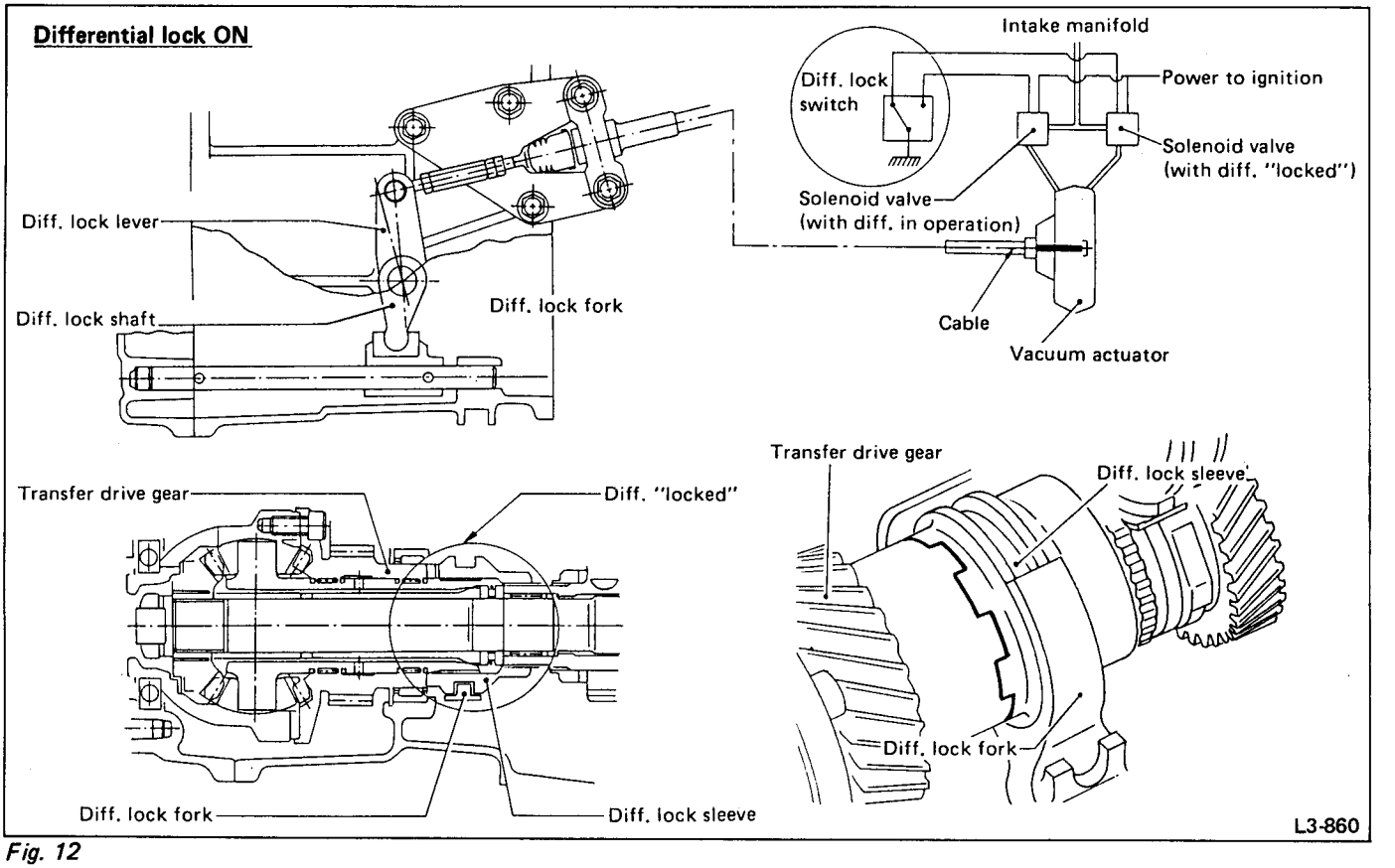


Fig. 12

SPECIFICATIONS AND SERVICE DATA

SPECIFICATIONS

			FWD	4WD	
				Selective 4WD, S/R	Full-time 4WD, S/R
Type			5-forward speeds with synchromesh and 1-reverse		
Transmission gear ratio (Tooth number of gear)		1st	3.636 (40/11)	3.545 (39/11)	3.545
		2nd	2.105 (40/19)	2.111 (38/11)	1.947
		3rd	1.428 (40/28)	1.448 (42/29)	1.366
		4th	1.093 (35/32)	1.088 (37/34)	0.972
		5th	0.885 (31/35)	0.871 (34/39)	0.780
		Reverse	3.583 (43/23/12)	3.416 (41/26/12)	3.416
Front reduction gear	Final	Type of gear	Hypoid		
		Gear ratio (Tooth number of gear)	3.700 (37/10)		3.900
Rear reduction gear	Transfer	Type of gear	–	Helical	
		Gear ratio (Tooth number of gear)	–	1.000 (34/34)	
	Final	Type of gear	–	Hypoid	
		Gear ratio (Tooth number of gear)	–	3.700 (37/10)	3.900 (39/10)
Front differential	Type and number of gear		Straight bevel gear (Bevel pinion: 2, Bevel gear: 2)		
	Tooth number	Bevel gear	14		
		Bevel pinion	10		
Center differential	Type and number of gear		–		Straight bevel gear (Bevel pinion: 2, Bevel gear : 2)
	Tooth number	Bevel gear	–		14
		Bevel pinion	–		10
Rear differential	Type and number of gear		–	Straight bevel gear (Bevel pinion: 2, Bevel gear: 2)	
	Tooth number	Bevel gear	–	14	
		Bevel pinion	–	10	
Transmission oil capacity			2.6ℓ (2.7 US qt, 2.3 Imp qt)	3.3ℓ (3.5 US qt, 2.9 Imp qt)	3.5ℓ (3.7 US qt, 3.1 Imp qt)
Rear differential gear oil capacity			–	0.8ℓ (1.7 US pt, 1.4 Imp pt)	

SERVICE DATA

4WD

DIFFERENTIAL ASSEMBLY

Bevel gear to pinion backlash
0.13 – 0.18 mm (0.0051 – 0.0071 in)

Washer (38.1 x 50 x t)			
Part No.	Thickness mm (in)	Part No.	Thickness mm (in)
803038021	0.925 – 0.950 (0.0364 – 0.0374)	803038023	1.025 – 1.050 (0.0404 – 0.0413)
803038022	0.975 – 1.000 (0.0384 – 0.0394)		

Pinion shaft to axle drive shaft clearance
0 – 0.2 mm (0 – 0.008 in)

Snap ring (Outer-28)			
Part No.	Thickness mm (in)	Part No.	Thickness mm (in)
805028011	1.05 (0.0413)	805028012	1.20 (0.0472)

Drive pinion adjustment

Drive pinion shim			
Part No.	Thickness mm (in)	Part No.	Thickness mm (in)
32295AA030	0.150 (0.0059)	32295AA070	0.250 (0.0098)
32295AA040	0.175 (0.0069)	32295AA080	0.275 (0.0108)
32295AA050	0.200 (0.0079)	32295AA090	0.300 (0.0118)
32295AA060	0.225 (0.0089)	32295AA100	0.500 (0.0197)

REVERSE IDLER GEAR SHAFT ASSEMBLY

Adjustment of reverse idler gear CP position
Reverse idler gear CP to transmission case (LH) wall clearance
6.0 – 7.5 mm (0.236 – 0.295 in)

Reverse shifter lever CP		
Part No.	Mark	Remarks
32820AA000	0	Further from case wall
32820AA010	No mark	Standard
32820AA020	2	Closer to the case wall

FWD

DIFFERENTIAL ASSEMBLY

Bevel gear to pinion backlash
0.13 – 0.18 mm (0.0051 – 0.0071 in)

Washer (35.1 x 45 x t)			
Part No.	Thickness mm (in)	Part No.	Thickness mm (in)
803135011	0.925 – 0.950 (0.0364 – 0.0374)	803135014	1.000 – 1.025 (0.0394 – 0.0404)
803135012	0.950 – 0.975 (0.0374 – 0.0384)	803135015	1.025 – 1.050 (0.0404 – 0.0413)
803135013	0.975 – 1.000 (0.0384 – 0.0394)		

Pinion shaft to axle drive shaft clearance
0 – 0.2 mm (0 – 0.008 in)

Snap ring (Outer-26)			
Part No.	Thickness mm (in)	Part No.	Thickness mm (in)
805026010	1.05(0.0413)	031526000	1.20 (0.0472)

Drive pinion adjustment

Drive pinion shim	
Part No.	Thickness mm (in)
441967111	0.15 (0.0059)
441967112	0.175 (0.0069)
441967113	0.20 (0.0079)
441967114	0.225 (0.0089)
441967115	0.25 (0.0098)
441967116	0.275 (0.0108)
441967117	0.30 (0.0118)
441967118	0.50 (0.0197)

REVERSE IDLER GEAR SHAFT ASSEMBLY

Adjustment of reverse idler gear CP position
Reverse idler gear CP to transmission case (LH) wall clearance
1.5 – 3.0 mm (0.059 – 0.118 in)

Reverse shifter lever CP		
Part No.	Mark	Remarks
440627101	1	Further from case wall
440627102	2 or No mark	Standard
440627103	3	Closer to the case wall

4WD

After installing a suitable reverse shifter lever, adjust reverse idler gear-to-transmission case wall clearance to within 0 to 0.5 mm (0 to 0.020 in) using washers.

Washer (20.5 x 26 x t)			
Part No.	Thickness mm (in)	Part No.	Thickness mm (in)
803020151	0.4 (0.016)	803020154	1.9 (0.075)
803020152	1.1 (0.043)	803020155	2.3 (0.091)
803020153	1.5 (0.059)		

DRIVE PINION SHAFT ASSEMBLY

Select suitable shifter forks so that both coupling sleeve and reverse driven gear are positioned in the center of their synchromesh mechanisms.

1st-2nd shifter fork CP		
Part No.	Mark	Remarks
32804AA031	1	Approach to 1st gear by 0.2 mm (0.008 in)
32804AA041	No mark	Standard
32804AA051	3	Approach to 2nd gear by 0.2 mm (0.008 in)

3rd-4th shifter fork CP		
Part No.	Mark	Remarks
32810AA031 *32810AA060	1	Approach to 4th gear by 0.2 mm (0.008 in)
32810AA041 *32810AA070	No mark	Standard
32810AA051 *32810AA100	3	Approach to 3rd gear by 0.2 mm (0.008 in)

* Full-time 4WD

5th shifter fork CP		
Part No.	Mark	Remarks
32812AA005 *32812AA060	1	Approach to 5th gear by 0.2 mm (0.008 in)
32812AA015 *32812AA070	No mark	Standard
32812AA025 *32812AA100	3	Become distant from 5th gear by 0.2 mm (0.008 in)

* Full-time 4WD

Rod end clearance
A: 3rd-4th – 5th
0.6 – 1.4 mm (0.024 – 0.055 in)
B: 1st-2nd – 3rd-4th
0.5 – 1.5 mm (0.020 – 0.059 in)

FWD

After installing a suitable reverse shifter lever, adjust reverse idler gear-to-transmission case wall clearance to within 0 to 0.5 mm (0 to 0.020 in.) using washers.

Washer (15.5 x 21 x t)			
Part No.	Thickness mm (in)	Part No.	Thickness mm (in)
803015081	0.6 – 0.8 (0.024 – 0.031)	803015084	1.8 – 2.0 (0.071 – 0.079)
803015082	1.0 – 1.2 (0.039 – 0.047)	803015085	2.2 – 2.4 (0.087 – 0.094)
803015083	1.4 – 1.6 (0.055 – 0.063)		

DRIVE PINION SHAFT ASSEMBLY

Select suitable shifter forks so that both coupling sleeve and reverse driven gear are positioned in the center of their synchromesh mechanisms.

1st-2nd shifter fork CP		
Part No.	Mark	Remarks
32804AA001	1	Approach to 2nd gear 0.2 mm (0.008 in)
32804AA011	No mark	Standard
32804AA021	3	Approach to 1st gear 0.2 mm (0.008 in)

3rd-4th shifter Fork CP		
Part No.	Mark	Remarks
32810AA110	1	Approach to 4th gear by 0.4 mm (0.016 in)
32810AA120	2	Approach to 4th gear by 0.2 mm (0.008 in)
32810AA130	No mark	Standard
32810AA140	4	Approach to 3rd gear by 0.2 mm (0.008 in)
32810AA150	5	Approach to 3rd gear by 0.4 mm (0.016 in)

5th shifter fork CP		
Part No.	Mark	Remarks
32812AA032	1	Approach to gear side by 0.2 mm (0.008 in)
32812AA042	No mark	Standard
32812AA052	3	Become distant from gear side by 0.2 mm (0.008 in)

Rod end clearance
A & B: 0.3 – 1.6 mm (0.012 – 0.063 in)

4WD

PRELOAD ADJUSTMENT OF THRUST BEARING

Drive pinion spacer	
Part No.	Length mm (in)
32288AA000	121.35 ± 0.02 (4.7775 ± 0.0008)
32288AA010	121.50 ± 0.02 (4.7835 ± 0.0008)
32288AA020	121.65 ± 0.02 (4.7894 ± 0.0008)

Differential bevel gear sleeve	
Part No.	Length mm (in)
38956AA000	18.925 ± 0.01 (0.7451 ± 0.0004)
38956AA010	18.950 ± 0.01 (0.7461 ± 0.0004)
38956AA020	18.975 ± 0.01 (0.7470 ± 0.0004)
38956AA030	19.000 ± 0.01 (0.7480 ± 0.0004)
38956AA040	19.025 ± 0.01 (0.7490 ± 0.0004)
38956AA050	19.050 ± 0.01 (0.7500 ± 0.0004)
38956AA060	19.075 ± 0.01 (0.7510 ± 0.0004)

FINAL GEAR ASSEMBLY

Hypoid gear backlash:
0.13 – 0.18 mm (0.0051 – 0.0071 in)

TRANSFER CASE ASSEMBLY

Main shaft rear plate		
Dimension "A" mm (in)	Part No.	Mark.
4.00 – 4.13 (0.1575 – 0.1626)	32294AA040	1
3.87 – 4.00 (0.1524 – 0.1575)	32294AA050	2

Neutral position adjustment

Reverse accent shaft		
Part No.	Mark	Remarks
32188AA020	A	Neutral position is closer to 1st.
32188AA002	B	Standard
32188AA030	C	Neutral position is closer to reverse.

Reverse check plate adjustment

Reverse check plate			
Part No.	Mark	Angle θ	Remarks
32189AA000	0	28°	Arm stops closer to 5th gear.
32189AA010	1	31°	Arm stops closer to 5th gear.
33189AA020	2	34°	Arm stops in the center.
32189AA030	3	37°	Arm stops closer to reverse gear.
32189AA040	4	40°	Arm stops closer to reverse gear.

FWD

FINAL GEAR ASSEMBLY

Hypoid gear backlash:
0.13 – 0.18 mm (0.0051 – 0.0071 in)

REAR CASE ASSEMBLY

Main shaft rear plate		
Dimension "A" mm (in)	Part No.	Mark
4.50 – 4.63 (0.1772 – 0.1823)	441347001	T81-1
4.37 – 4.50 (0.1720 – 0.1772)	441347002	T81-2

Neutral position adjustment

Reverse accent shaft		
Part No.	Mark	Remarks
32188AA040	1	Neutral position is closer to 1st.
32188AA011	2	Standard
32188AA050	3	Neutral position is closer to reverse.

Reverse check plate adjustment

Reverse check plate			
Part No.	Mark	Angle θ	Remarks
32189AA000	0	28°	Arm stops closer to 5th gear.
32189AA010	1	31°	Arm stops closer to 5th gear.
33189AA012	2	34°	Arm stops in the center.
32189AA030	3	37°	Arm stops closer to reverse gear.
32189AA040	4	40°	Arm stops closer to reverse gear.

4WD	FWD

Snap ring to ball bearing side clearance:
0 – 0.1 mm (0 – 0.004 in)

Snap ring (Inner-56)	
Part No.	Thickness mm (in)
805156020	1.735 – 1.765 (0.0683 – 0.0695)
805156021	1.815 – 1.845 (0.0715 – 0.0726)
805156022	1.895 – 1.925 (0.0746 – 0.0758)

CENTER DIFFERENTIAL & EXTENSION ASSY

Snap ring to ball bearing side clearance:
0 – 0.2 mm (0 – 0.008 in)

Snap ring (Inner-80)	
Part No.	Thickness mm (in)
805180020	1.72 – 1.78 (0.0677 – 0.0701)
805180030	1.87 – 1.93 (0.0736 – 0.0760)
805180040	2.02 – 2.08 (0.0866 – 0.0819)

Backlash adjustment
axial movement: 0.4 – 0.6 mm (0.016 – 0.024 in)

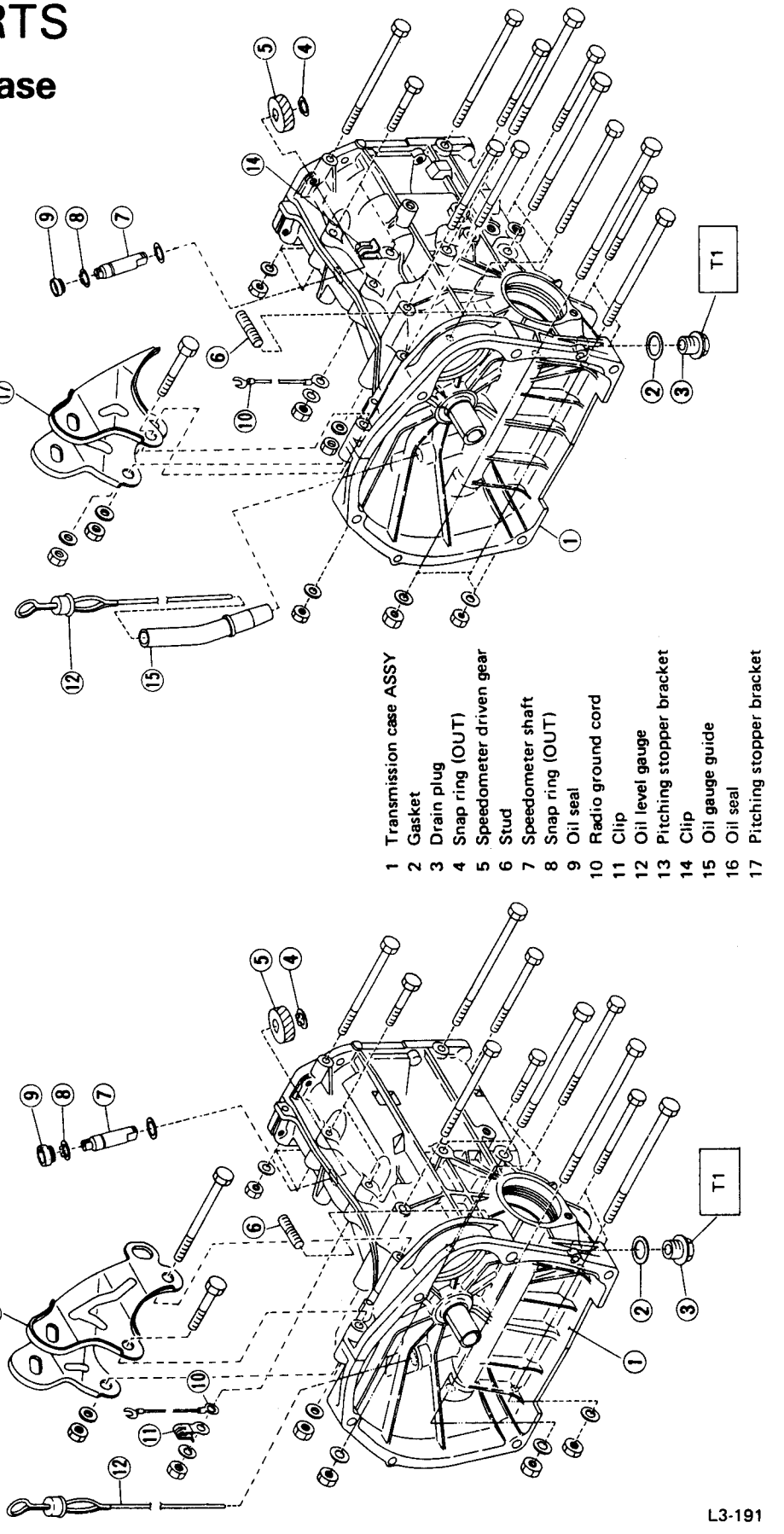
Differential bevel washer	
Part No.	Thickness mm (in)
38960AA001	0.95 – 1.05 (0.0374 – 0.0413)
38960AA011	1.15 – 1.25 (0.0453 – 0.0492)
38960AA021	1.35 – 1.45 (0.0531 – 0.0571)
38960AA031	1.55 – 1.65 (0.0610 – 0.0650)
38960AA041	1.75 – 1.85 (0.0689 – 0.0728)
38960AA051	1.95 – 2.05 (0.0768 – 0.0807)

Snap ring to ball bearing side clearance:
0 – 0.2 mm (0 – 0.008 in)

Snap ring (Outer-50)	
Part No.	Thickness mm (in)
805050030	1.97 – 2.03 (0.0776 – 0.0799)
805050040	2.12 – 2.18 (0.0835 – 0.0858)
805050050	2.27 – 2.33 (0.0894 – 0.0917)

COMPONENT PARTS

Transmission Main Case

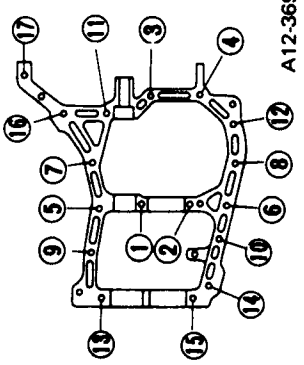


1 Transmission case ASSY
2 Gasket
3 Drain plug
4 Snap ring (OUT)
5 Speedometer driven gear
6 Stud
7 Speedometer shaft
8 Snap ring (OUT)
9 Oil seal
10 Radio ground cord
11 Clip
12 Oil level gauge
13 Pitching stopper bracket
14 Clip
15 Oil gauge guide
16 Oil seal
17 Pitching stopper bracket

Tightening torque: N·m (kg-m, ft-lb)
T1: 41 – 47 (4.2 – 4.8, 30 – 35)

Size	All models	Torque
8 mm bolt	⑤ – ⑮	23 – 26 N·m (2.3 – 2.7 kg-m, 17 – 20 ft-lb)
10 mm bolt	① – ④ ⑯ – ⑰	36 – 42 N·m (3.7 – 4.3 kg-m, 27 – 31 ft-lb)

Tightening sequence

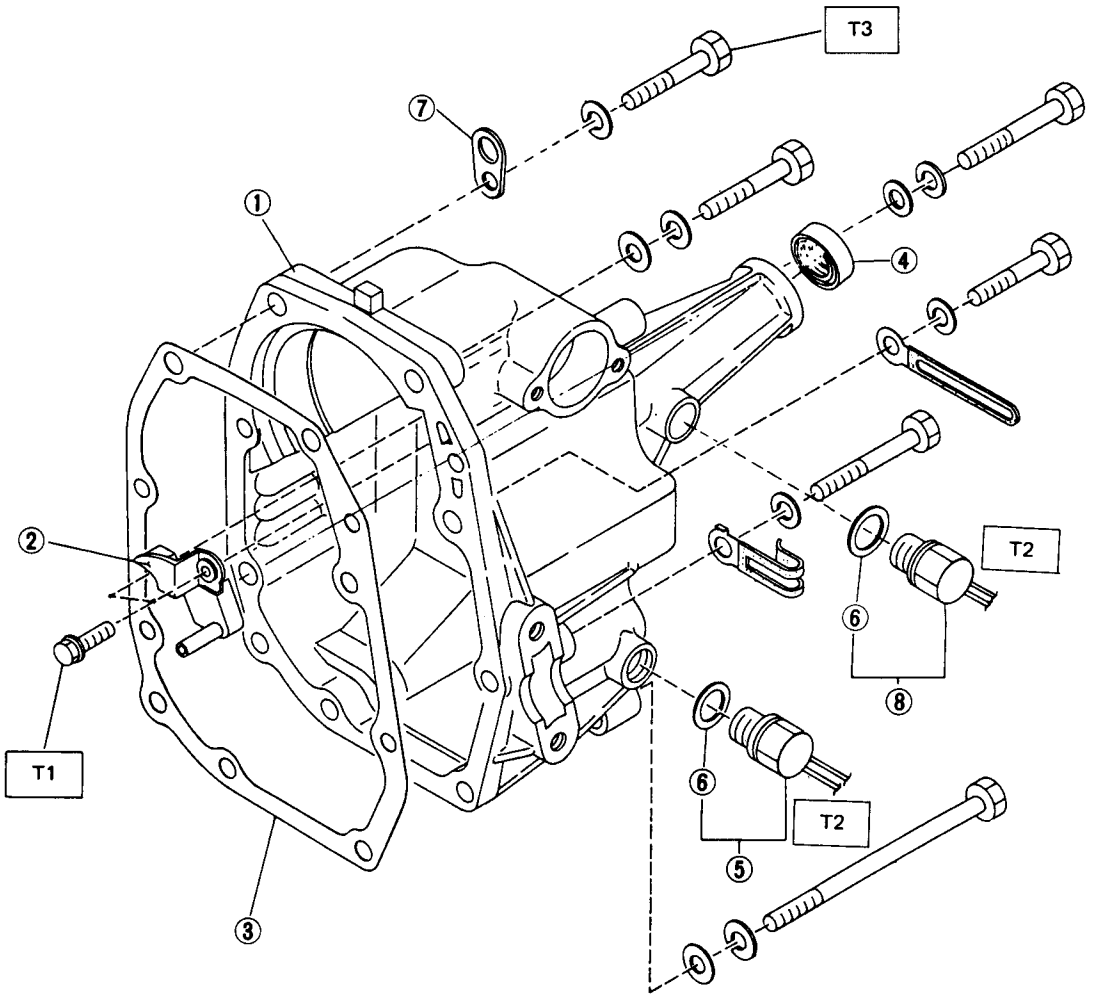


A12-369

L3-191

Fig. 13

Rear Case



Tightening torque: N·m (kg-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 18 (1.8 , 13)
T3: 23 – 26 (2.3 – 2.7, 17 – 20)

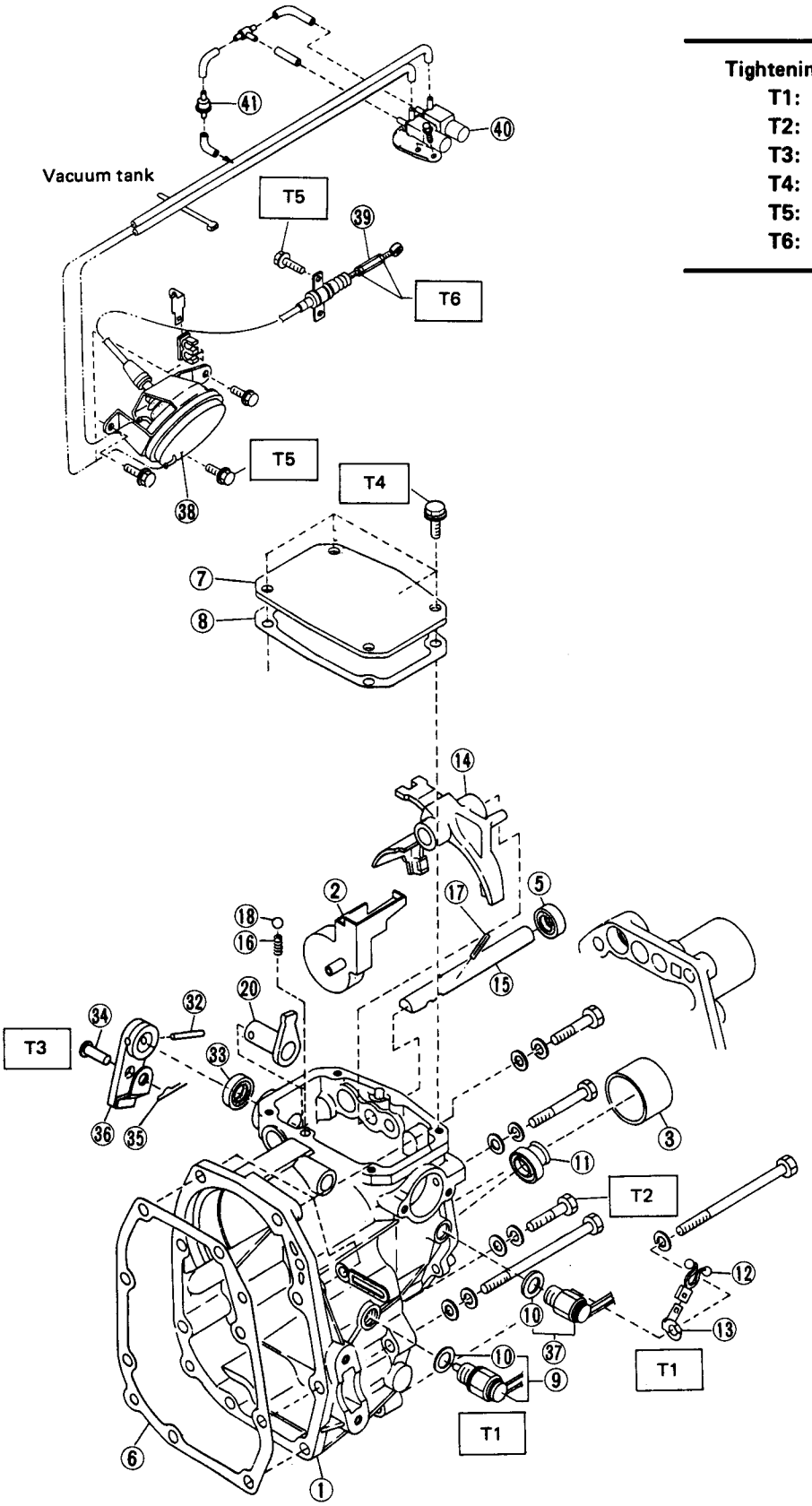
1 Rear case
2 Oil guide
3 Case gasket
4 Oil seal
5 Back-up light switch ASSY
6 Gasket
7 Transmission hanger
8 Neutral switch ASSY

Fig. 14

L3-886

Transfer Case and Transfer Control System

Selective 4WD



Tightening torque: N·m (kg-m, ft-lb)

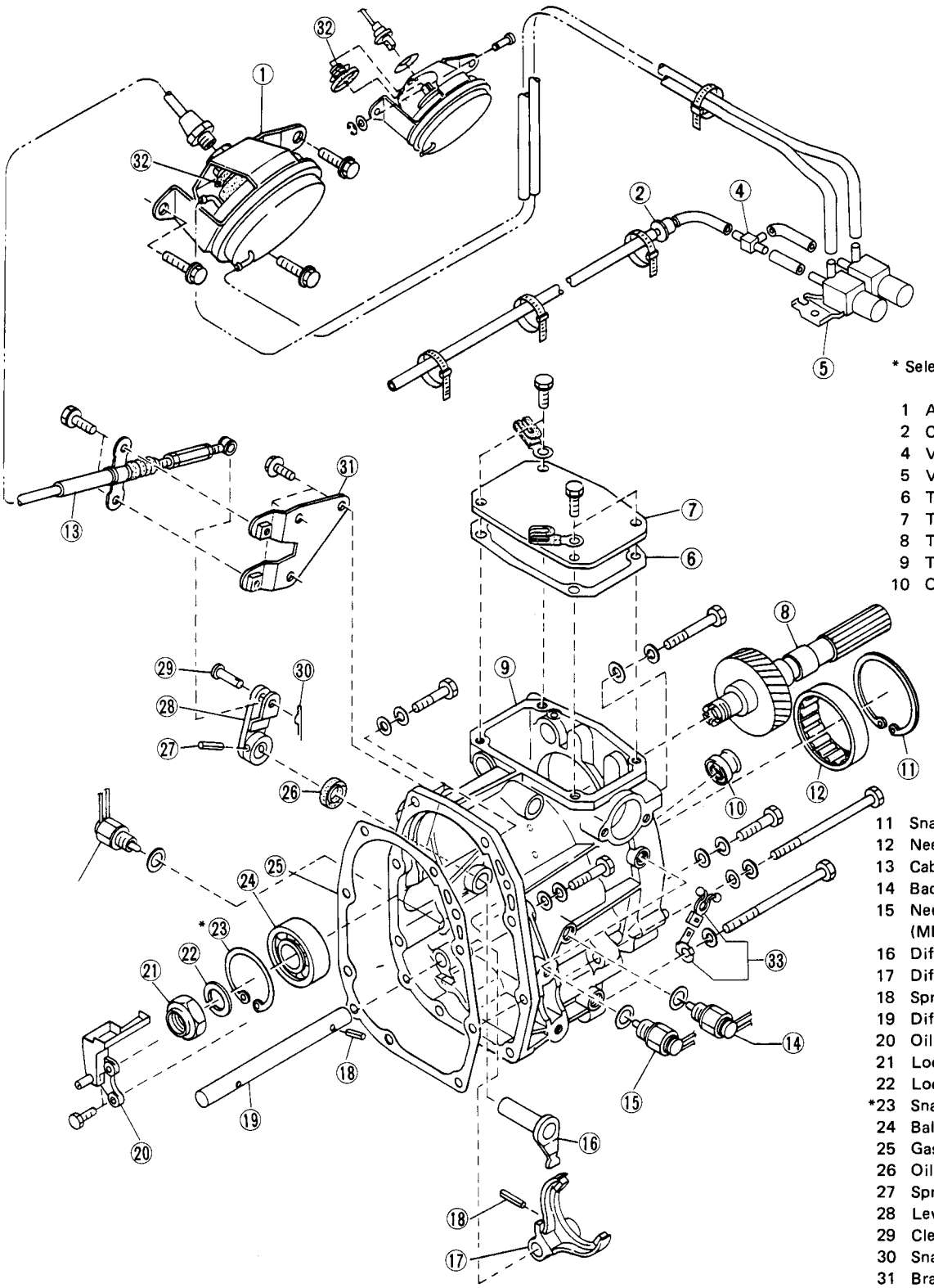
T1:	18 (1.8, 13)
T2:	25 (2.5, 18)
T3:	10 (1.0, 7)
T4:	20 (2.0, 14)
T5:	16 (1.6, 12)
T6:	5 (0.5, 3.6)

1 Transfer case CP
2 Oil guide
3 Needle bearing race
5 Oil seal
6 Gasket
7 Transfer cover
8 Cover gasket
9 Back-up light switch ASSY
10 Gasket
11 Oil seal
12 Support
13 Stay
14 Transfer shifter fork CP
15 Transfer shifter rod
16 Spring
17 Spring pin
18 Ball
20 Transfer shifter shaft
26 Ball
28 Clip
30 Spring
32 Spring pin
33 Oil seal
34 Clevis pin
35 Snap pin
36 Transfer shifter lever
37 Neutral switch ASSY
38 Actuator
39 Cable ASSY
40 4WD vacuum switch ASSY
41 Check valve

Fig. 15

L3-895

Full-Time 4WD



* Selective parts

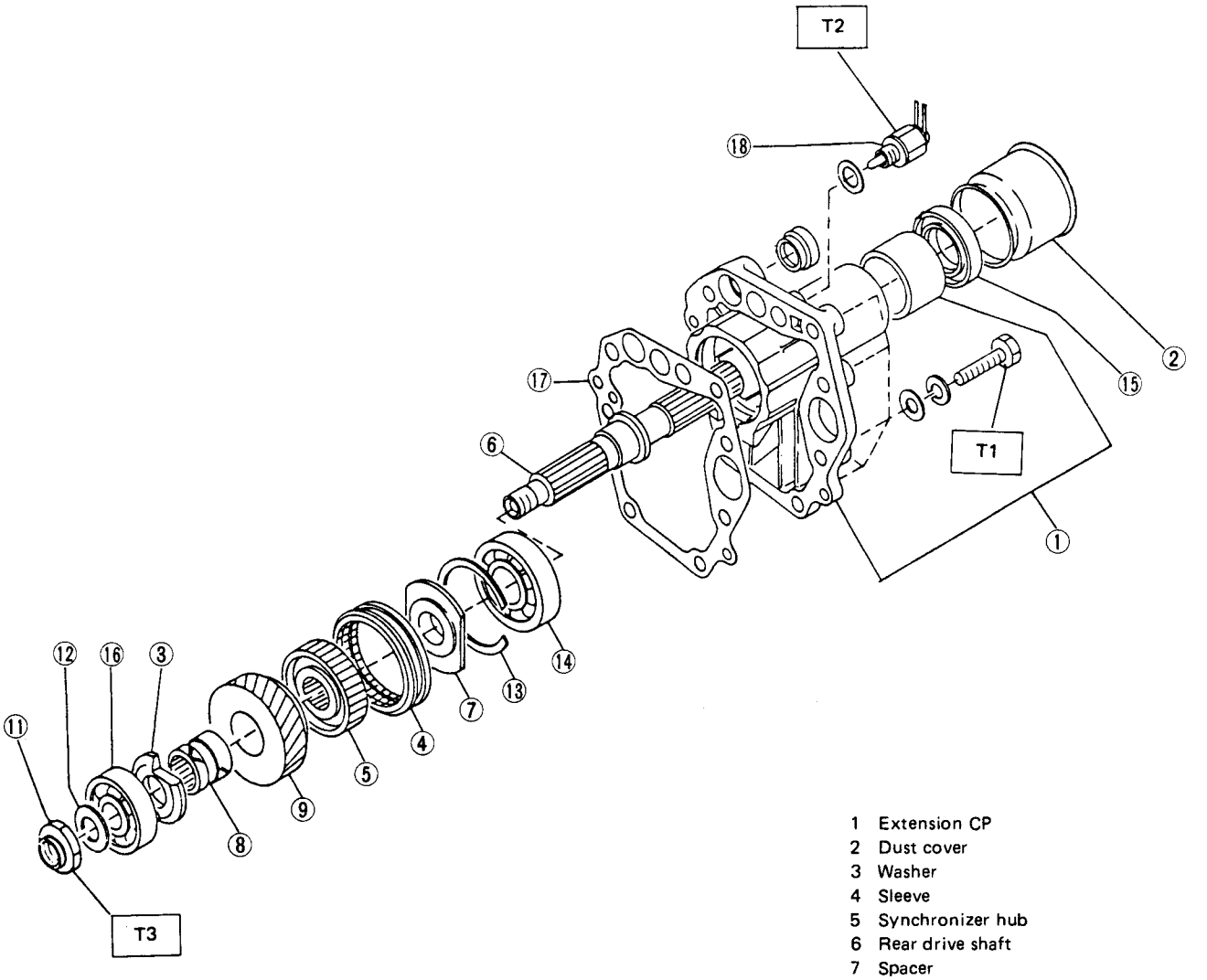
1 Actuator ASSY
2 Check valve
4 Vacuum hose connector
5 Vacuum switch ASSY
6 Transfer cover
7 Transfer cover gasket
8 Transfer gear set
9 Transfer case CP
10 Oil seal
11 Snap ring (Inner-72)
12 Needle bearing
13 Cable ASSY
14 Back-up light switch ASSY
15 Neutral switch ASSY (MPFI)
16 Differential lock shaft
17 Differential lock fork
18 Spring pin
19 Differential lock rod
20 Oil guide
21 Lock nut
22 Lock washer
*23 Snap ring (Inner-56)
24 Ball bearing
25 Gasket
26 Oil seal
27 Spring pin
28 Lever CP
29 Clevis pin
30 Snap pin
31 Bracket CP
32 Boot B
33 Harness stay CP (1800 cc)

Fig. 16

L3-887

Extension

Selective 4WD



1 Extension CP
2 Dust cover
3 Washer
4 Sleeve
5 Synchronizer hub
6 Rear drive shaft
7 Spacer
8 Bushing
9 Transfer driven gear
11 Lock nut
12 Lock washer
13 Snap ring (IN)
14 Ball bearing
15 Oil seal
16 Ball bearing
17 Gasket
18 4WD switch ASSY

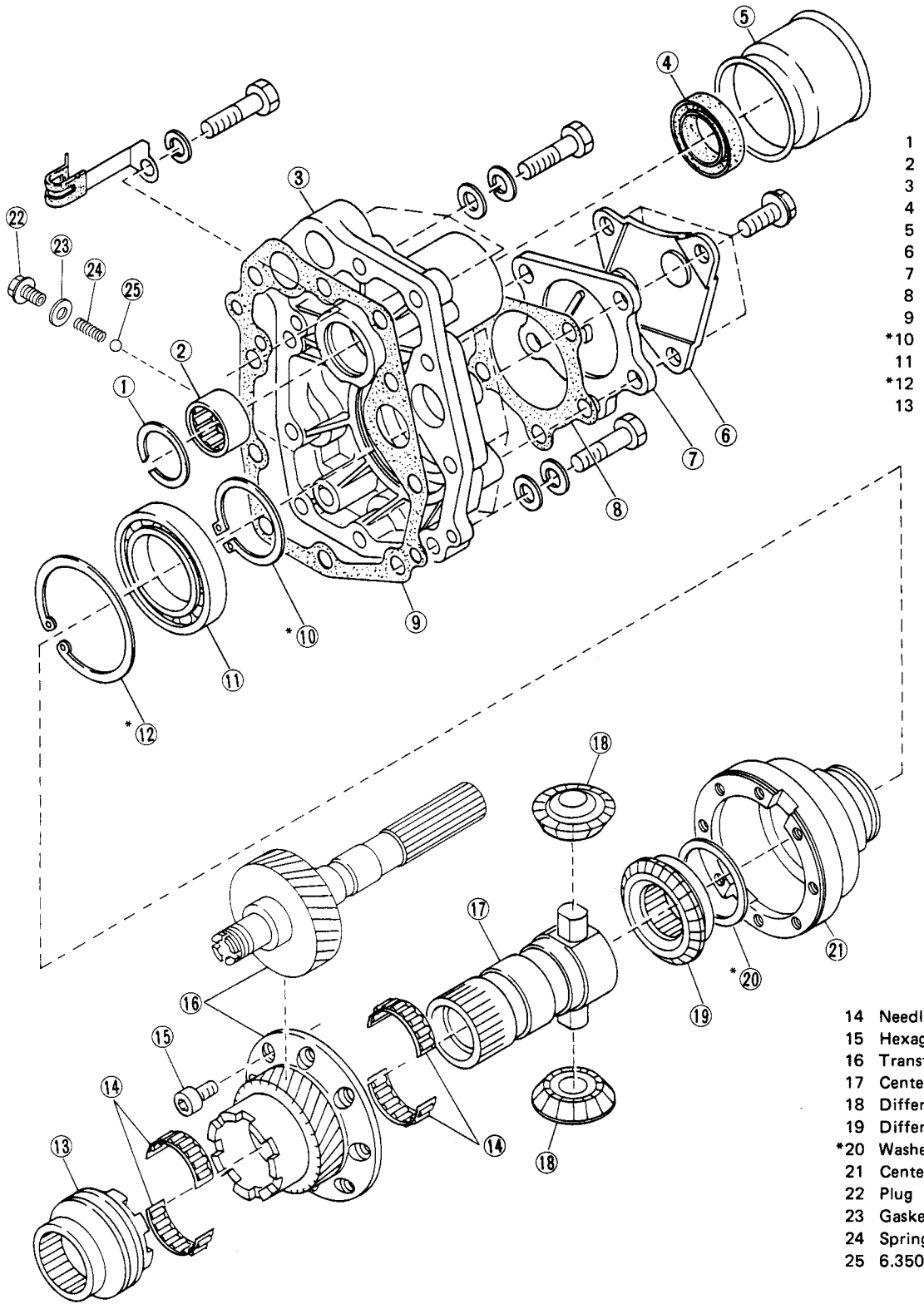
Tightening torque: N·m (kg-m, ft-lb)
T1: 37 (3.8, 27)
T2: 18 (1.8, 13)
T3: 78 (8.0, 58)

Fig. 17

L3-435

Extension and Center Differential

Full-Time 4WD



* Selective parts

1 Snap ring (Inner-37)
2 Needle bearing
3 Extension CP
4 Oil seal
5 Dust cover
6 Shifter bracket
7 Extension cover
8 Gasket
9 Transfer gasket
*10 Snap ring (Outer-50)
11 Ball bearing
*12 Snap ring (Inner-80)
13 Differential lock sleeve

14 Needle bearing
15 Hexagon socket head bolt
16 Transfer gear set
17 Center differential pinion shaft
18 Differential bevel pinion
19 Differential bevel gear
*20 Washer
21 Center differential case
22 Plug
23 Gasket
24 Spring
25 6.350 ball

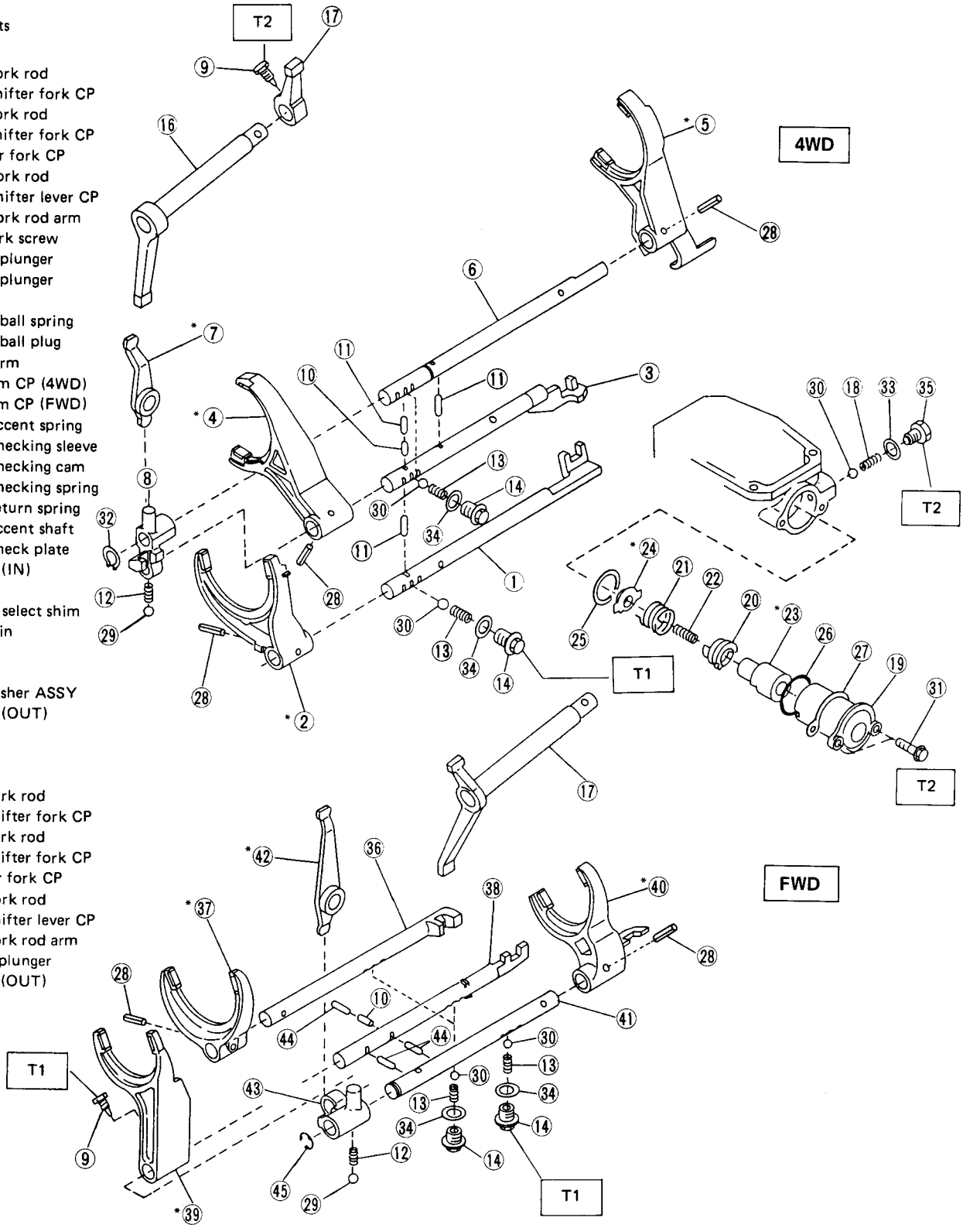
Fig. 18

L3-888

Shifter Fork and Shifter Rod

*Selective parts

1 1st-2nd fork rod
*2 1st-2nd shifter fork CP
3 3rd-4th fork rod
*4 3rd-4th shifter fork CP
*5 5th shifter fork CP
6 Reverse fork rod
*7 Reverse shifter lever CP
8 Reverse fork rod arm
9 Shifter fork screw
10 Interlock plunger
11 Interlock plunger
12 Spring
13 Checking ball spring
14 Checking ball plug
15 Selector arm
16 Shifter arm CP (4WD)
17 Shifter arm CP (FWD)
18 Reverse accent spring
19 Reverse checking sleeve
20 Reverse checking cam
21 Reverse checking spring
22 Reverse return spring
*23 Reverse accent shaft
*24 Reverse check plate
25 Snap ring (IN)
26 O-ring
27 Adjusting select shim
28 Straight pin
29 Ball
30 Ball
31 Bolt & washer ASSY
32 Snap ring (OUT)
33 Gasket
34 Gasket
35 Filler
36 1st-2nd fork rod
*37 1st-2nd shifter fork CP
38 3rd-4th fork rod
*39 3rd-4th shifter fork CP
*40 5th shifter fork CP
41 Reverse fork rod
*42 Reverse shifter lever CP
43 Reverse fork rod arm
44 Interlock plunger
45 Snap ring (OUT)



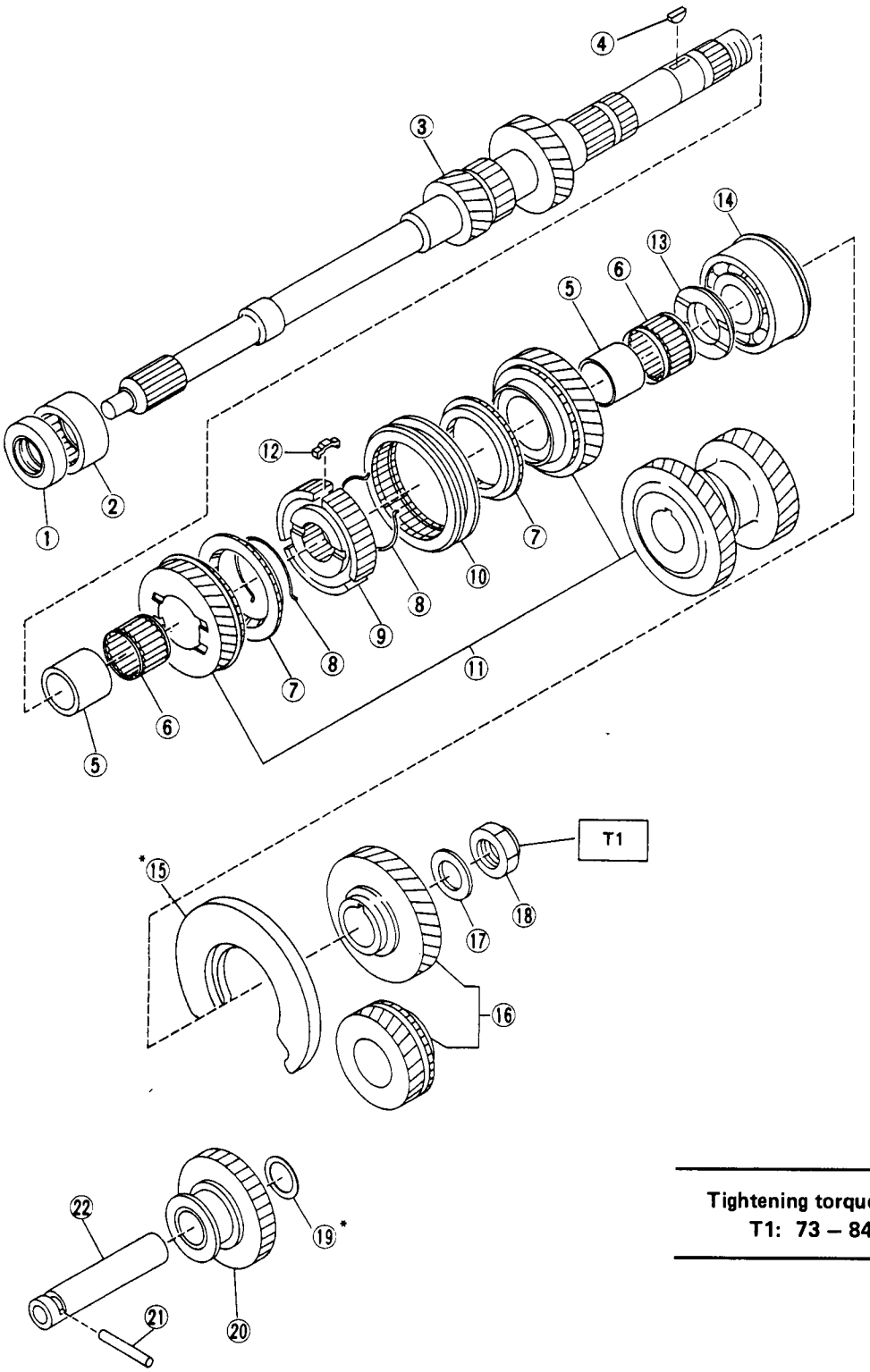
Tightening torque: N·m (kg-m, ft-lb)
T1: 20 (2, 14)
T2: 10 (1, 7)

Fig. 19

L3-334

Transmission Main Shaft

FWD



*Selective parts

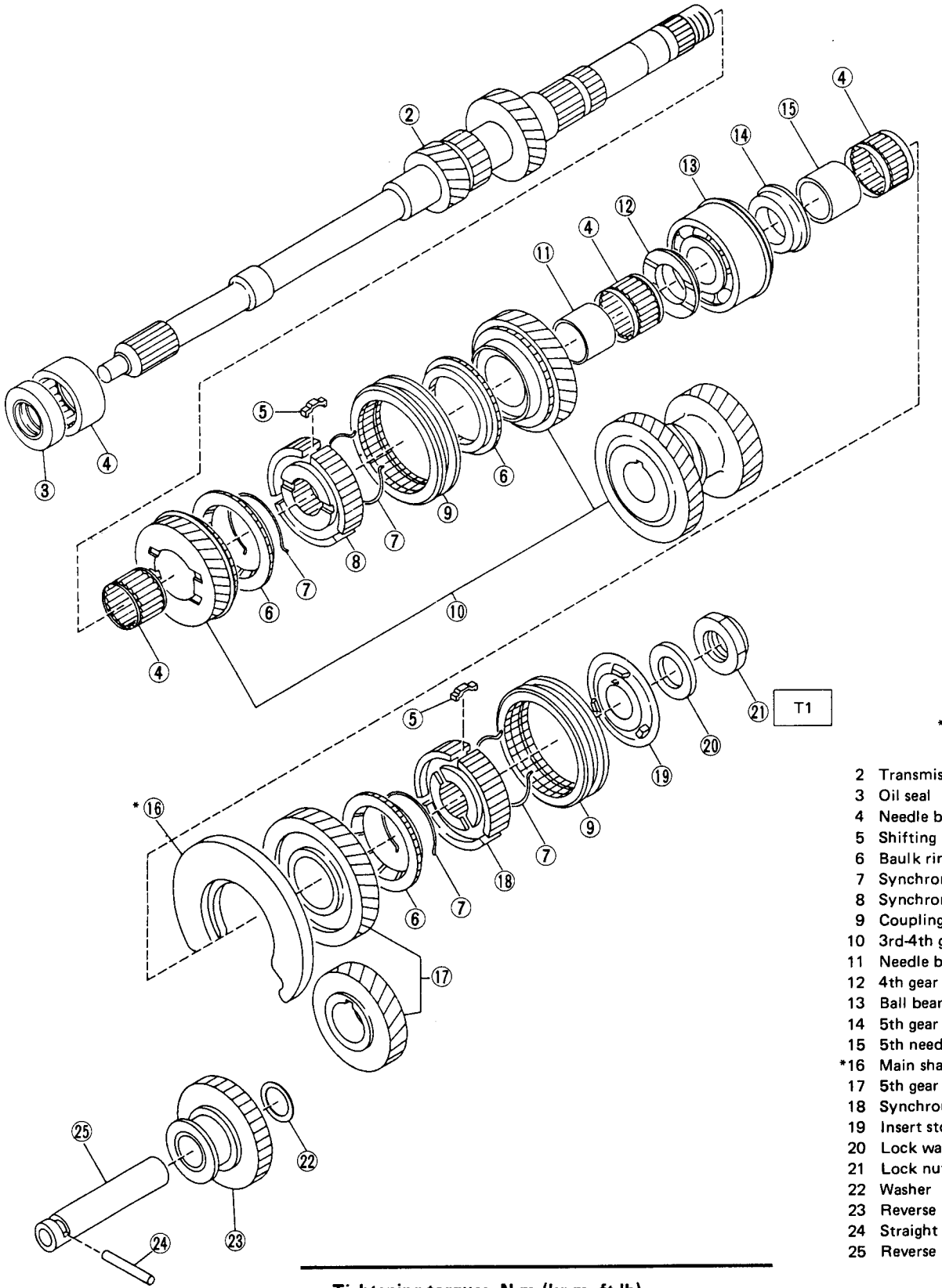
1 Oil seal
2 Needle bearing
3 Transmission main shaft
4 Woodruff key
5 5th needle bearing race
6 Needle bearing
7 Baulk ring
8 Synchronizer spring
9 Synchronizer hub
10 Coupling sleeve
11 3rd-4th gear set
12 Shifting insert
13 4th gear thrust washer
14 Ball bearing
*15 Main shaft rear plate
16 5th gear set
17 Lock washer
18 Lock nut
*19 Washer
20 Reverse idler gear CP
21 Straight pin
22 Reverse idler gear shaft

Tightening torque: N·m (kg-m, ft-lb)
T1: 73 – 84 (7.4 – 8.6, 54 – 62)

Fig. 20

L3-251

All 4WD



* Selective parts

2 Transmission main shaft
3 Oil seal
4 Needle bearing
5 Shifting insert
6 Baulk ring
7 Synchronizer spring
8 Synchronizer hub
9 Coupling sleeve
10 3rd-4th gear set
11 Needle bearing race
12 4th gear thrust washer
13 Ball bearing
14 5th gear thrust washer
15 5th needle bearing race
*16 Main shaft rear plate
17 5th gear set
18 Synchronizer hub
19 Insert stopper plate
20 Lock washer
21 Lock nut
22 Washer
23 Reverse idler gear CP
24 Straight pin
25 Reverse idler gear shaft

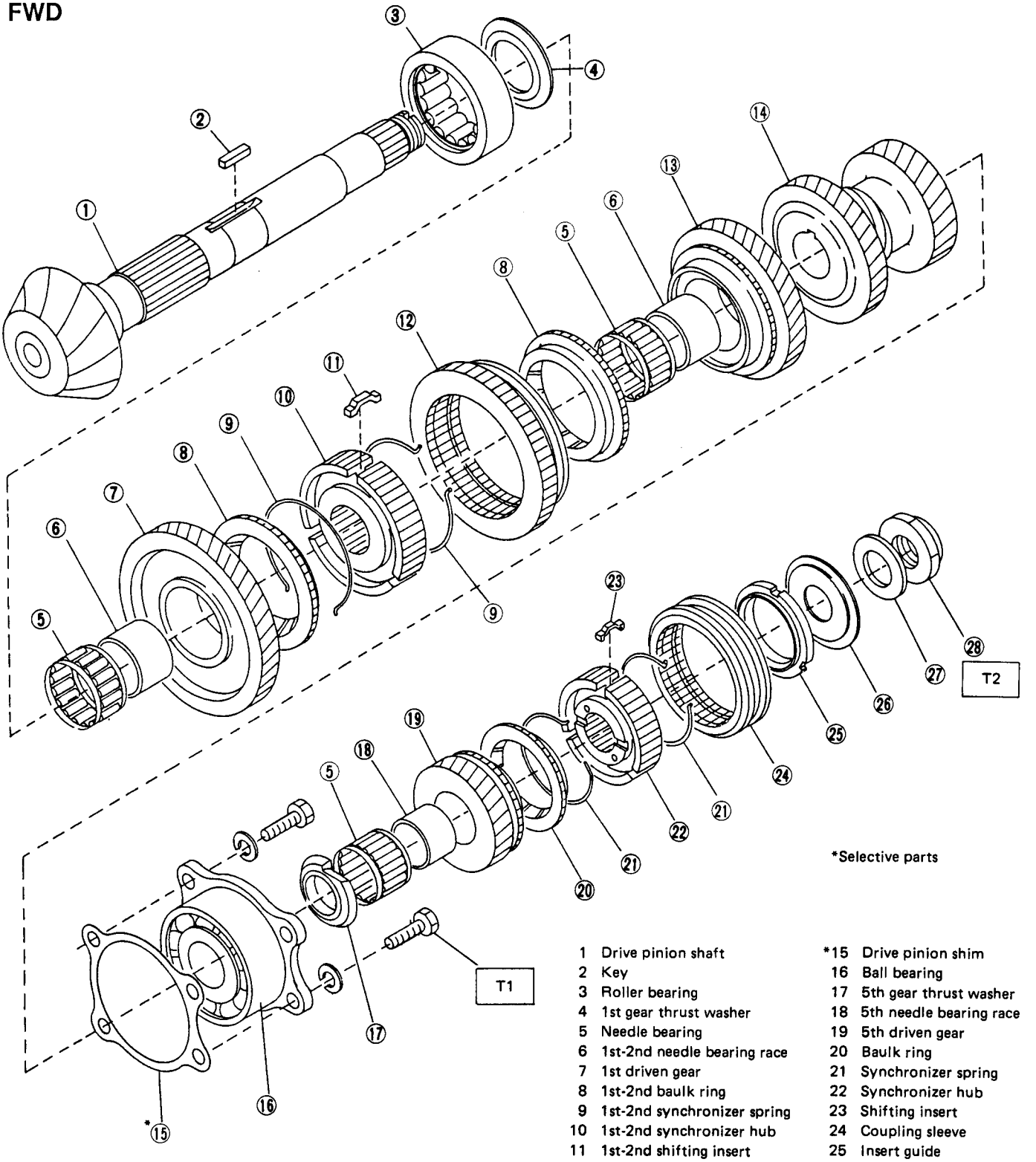
Tightening torque: N·m (kg-m, ft-lb)
T1: 118 (12.0, 87)

Fig. 21

L3-500

Drive Pinion Shaft

FWD



*Selective parts

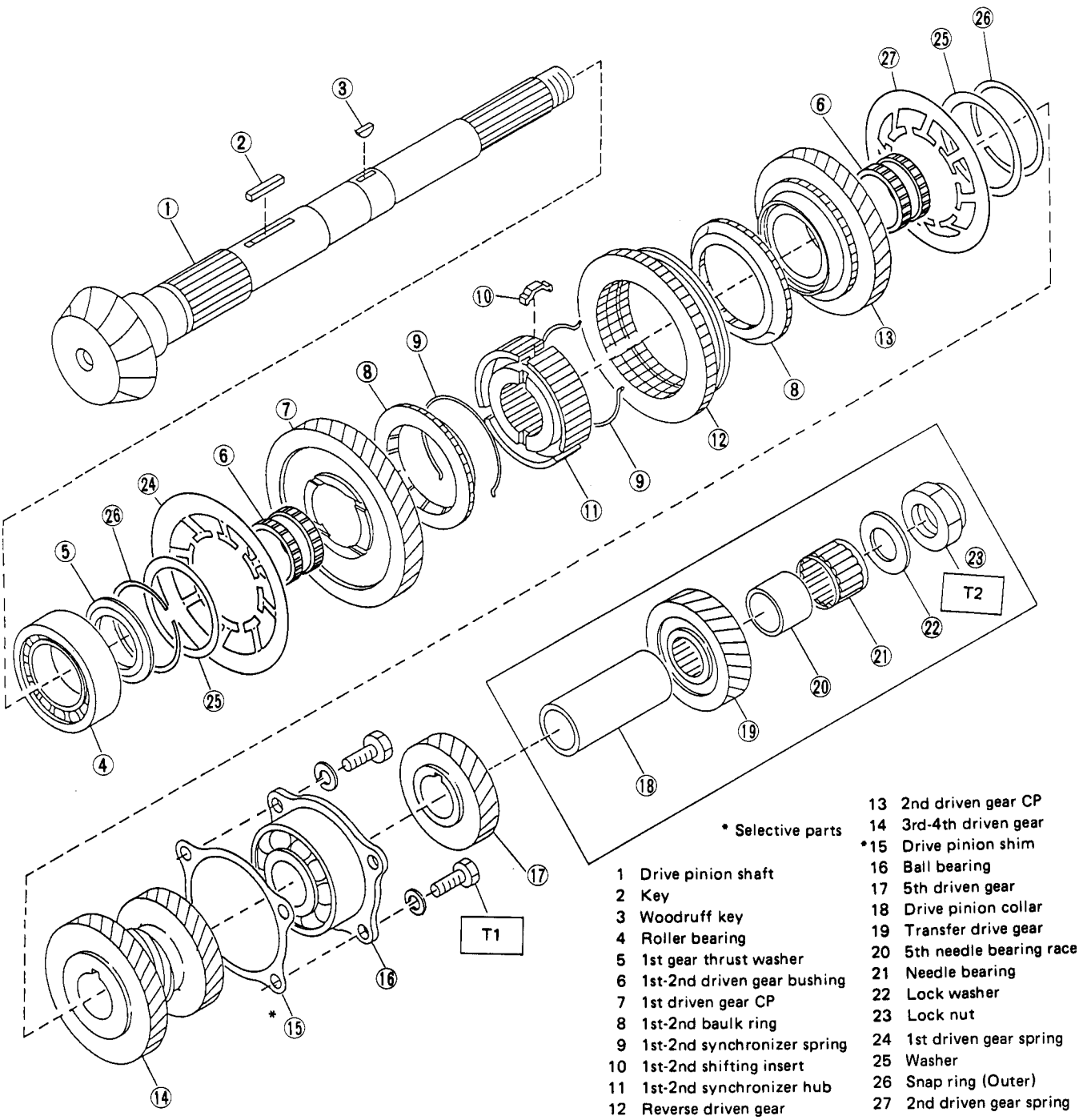
1	Drive pinion shaft	*15	Drive pinion shim
2	Key	16	Ball bearing
3	Roller bearing	17	5th gear thrust washer
4	1st gear thrust washer	18	5th needle bearing race
5	Needle bearing	19	5th driven gear
6	1st-2nd needle bearing race	20	Baulk ring
7	1st driven gear	21	Synchronizer spring
8	1st-2nd baulk ring	22	Synchronizer hub
9	1st-2nd synchronizer spring	23	Shifting insert
10	1st-2nd synchronizer hub	24	Coupling sleeve
11	1st-2nd shifting insert	25	Insert guide
12	Reverse driven gear	26	Insert stopper plate
13	2nd driven gear	27	Lock washer
14	3rd-4th driven gear	28	Lock nut

Tightening torque: N·m (kg-m, ft-lb)
T1: 26 – 32 (2.7 – 3.3, 20 – 24)
T2: 78 (8.0, 58)

Fig. 22

L3-177

Selective 4WD



* Selective parts

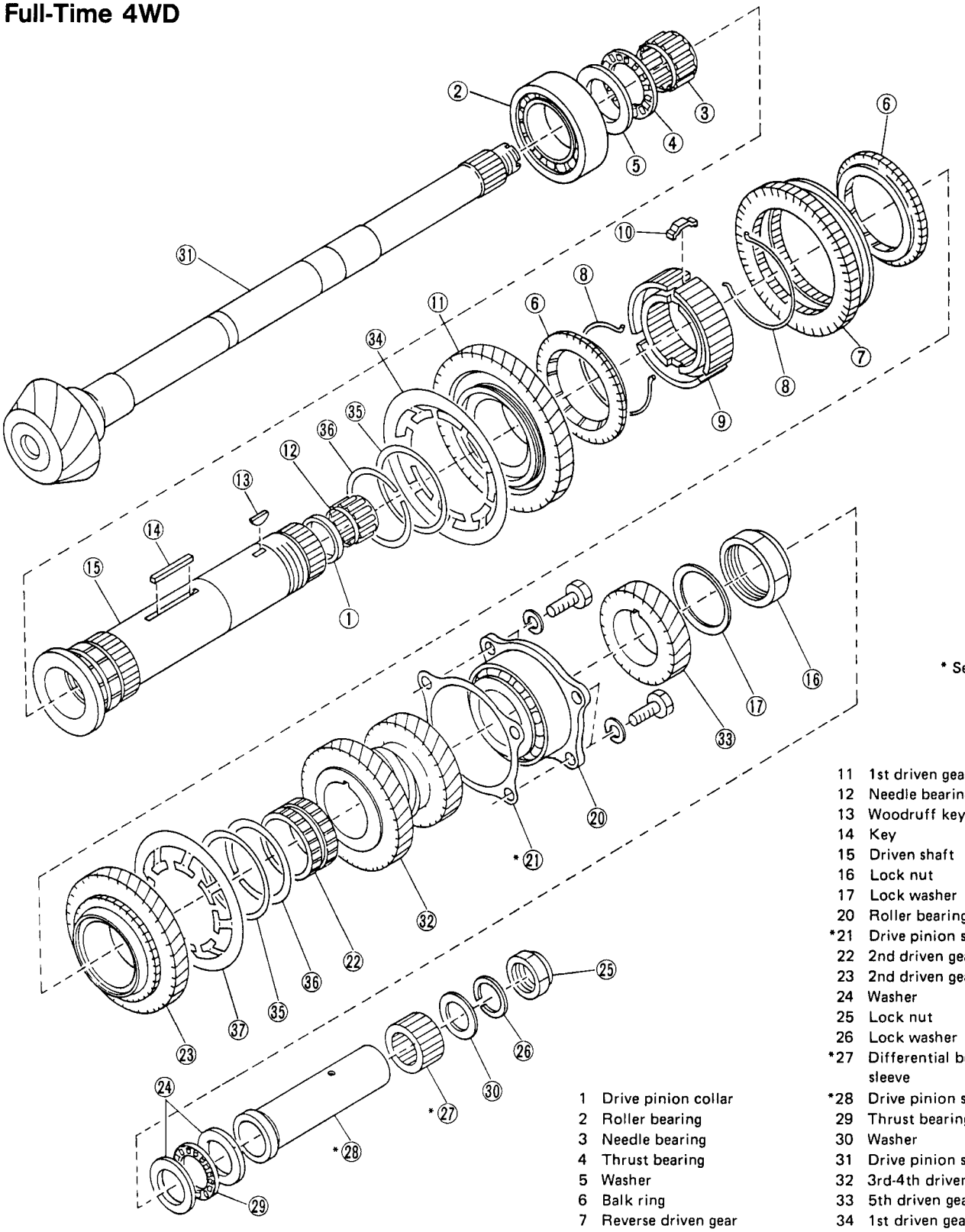
1 Drive pinion shaft
2 Key
3 Woodruff key
4 Roller bearing
5 1st gear thrust washer
6 1st-2nd driven gear bushing
7 1st driven gear CP
8 1st-2nd baulk ring
9 1st-2nd synchronizer spring
10 1st-2nd shifting insert
11 1st-2nd synchronizer hub
12 Reverse driven gear
13 2nd driven gear CP
14 3rd-4th driven gear
*15 Drive pinion shim
16 Ball bearing
17 5th driven gear
18 Drive pinion collar
19 Transfer drive gear
20 5th needle bearing race
21 Needle bearing
22 Lock washer
23 Lock nut
24 1st driven gear spring
25 Washer
26 Snap ring (Outer)
27 2nd driven gear spring

Tightening torque: N·m (kg-m, ft-lb)
T1: 26 – 32 (2.7 – 3.3, 20 – 24)
T2: 112 – 124 (11.4 – 12.6, 82 – 91)

Fig. 23

L3-889

Full-Time 4WD

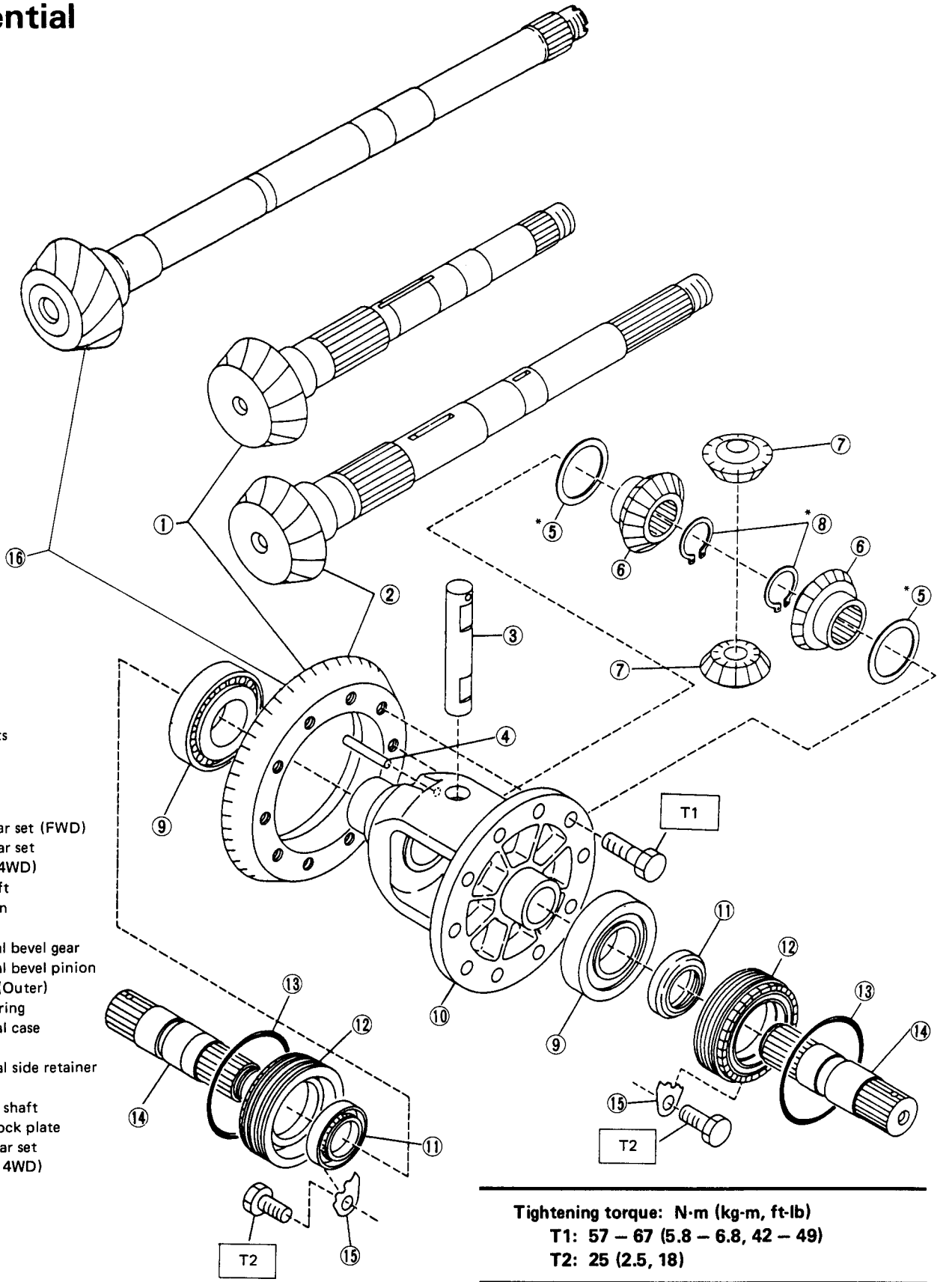


* Selective parts

1 Drive pinion collar
2 Roller bearing
3 Needle bearing
4 Thrust bearing
5 Washer
6 Balk ring
7 Reverse driven gear
8 Spring
9 1st-2nd synchronizer hub
10 Insert
11 1st driven gear
12 Needle bearing
13 Woodruff key
14 Key
15 Driven shaft
16 Lock nut
17 Lock washer
20 Roller bearing
*21 Drive pinion shim
22 2nd driven gear bush
23 2nd driven gear
24 Washer
25 Lock nut
26 Lock washer
*27 Differential bevel gear sleeve
*28 Drive pinion spacer
29 Thrust bearing
30 Washer
31 Drive pinion shaft
32 3rd-4th driven gear
33 5th driven gear
34 1st driven gear spring
35 Washer
36 Snap ring (Outer)
37 2nd driven gear spring

Fig. 24 L3-868

Differential



* Selective parts

1 Hypoid gear set (FWD)
2 Hypoid gear set (Selective 4WD)
3 Pinion shaft
4 Straight pin
*5 Washer
6 Differential bevel gear
7 Differential bevel pinion
*8 Snap ring (Outer)
9 Roller bearing
10 Differential case
11 Oil seal
12 Differential side retainer
13 O-ring
14 Axle drive shaft
15 Retainer lock plate
16 Hypoid gear set (Full time 4WD)

Tightening torque: N·m (kg-m, ft-lb)
T1: 57 – 67 (5.8 – 6.8, 42 – 49)
T2: 25 (2.5, 18)

Fig. 25

L3-890

SERVICE PROCEDURE

The vehicle models listed after the description of each service procedure indicate the vehicle models to which that procedure applies. If an item does not list any vehicle model, it applies to all models.

A Selective 4WD

[1] Overall Transmission

DISASSEMBLY

The following job should be followed before disassembly;
- Clean oil, grease, dirt and dust from transmission.
- Remove drain plug to drain oil. After draining, retighten it as before.
- Replace gasket with a new one.

Tightening torque:
41 – 47 N·m (4.2 – 4.8 kg-m, 30 – 35 ft-lb)

1) Attach transmission to TRANSMISSION STAND SET (399295120).
2) Remove release lever and clutch release bearing.
   (1) Remove two clutch sleeve clips from transmission front, and then clutch release bearing.
   (2) Remove release dust cover. Next, remove release lever retainer spring from release lever by pushing release lever from outside main case, and take out lever.

Be careful not to deform clutch sleeve clips and release lever retainer spring.

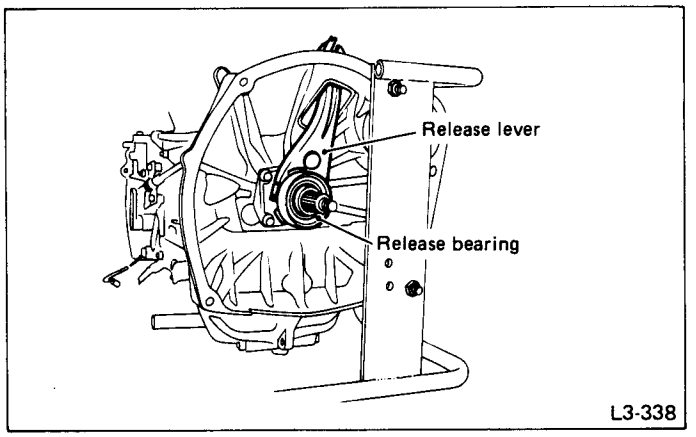


Fig. 26

3) Removing actuator & cable ASSY
Using REMOVER II (398791600), drive out spring pin (5.2 x 28) connecting transfer shifter shaft and transfer shifter lever on the right side of transfer case. Remove transfer shifter lever from transfer shifter shaft. Remove snap pin and extract 8-mm clevis pin. Then, remove cable from transfer shifter lever. Remove five 8-mm bolts & washers (three on actuator and two on cable) and remove actuator & cable ASSY.

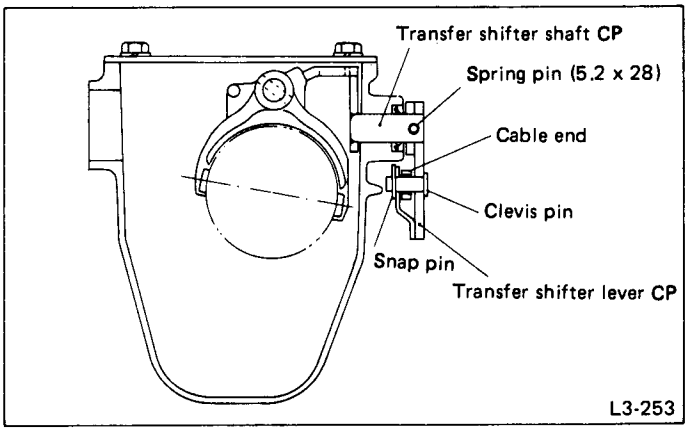


Fig. 27

4) Removing transfer cover
Remove transfer cover by loosening four bolts.

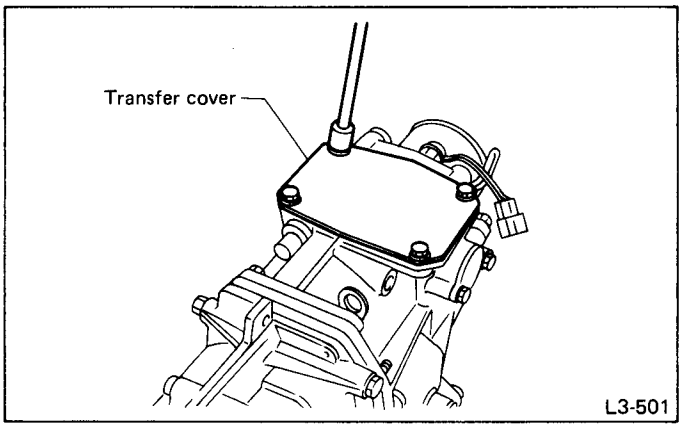


Fig. 28

5) Removing straight pin in transfer shifter fork CP
Using REMOVER II (398791600), drive out straight pin (5 x 25).
6) Removing transfer shifter rod and transfer shifter fork
Extract transfer shifter rod by turning it 180°. Remove transfer shifter fork. Also remove ball (6.35) and checking ball spring from transfer case.

a. When taking out fork, move reverse checking sleeve 2 to 3 mm (0.08 to 0.12 in) toward outside by loosening it.
b. Be careful not to drop ball when removing transfer shifter rod.

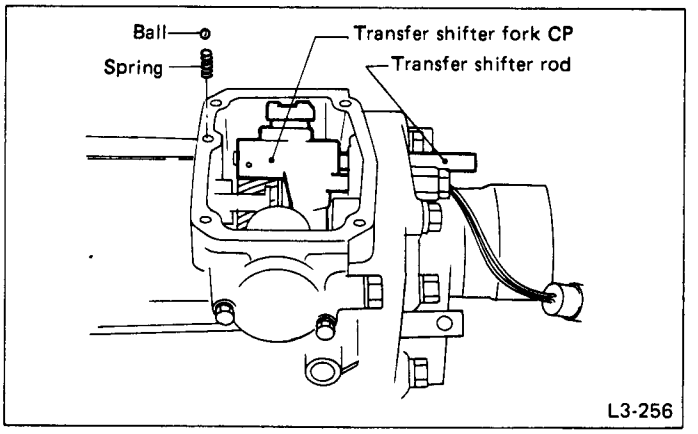


Fig. 29

7) Removing bolts from extension
Remove seven bolts from extension.

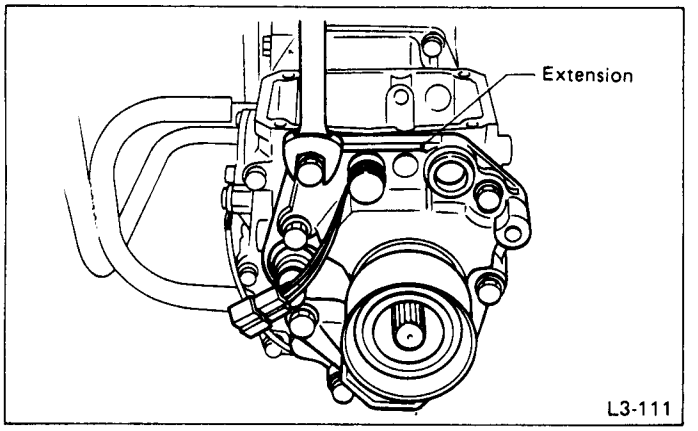


Fig. 30

8) Removing extension and transfer gear ASSY
Remove extension & transfer gear ASSY.
9) Removing transfer shifter shaft
Extract transfer shifter shaft from the right side of transfer case.

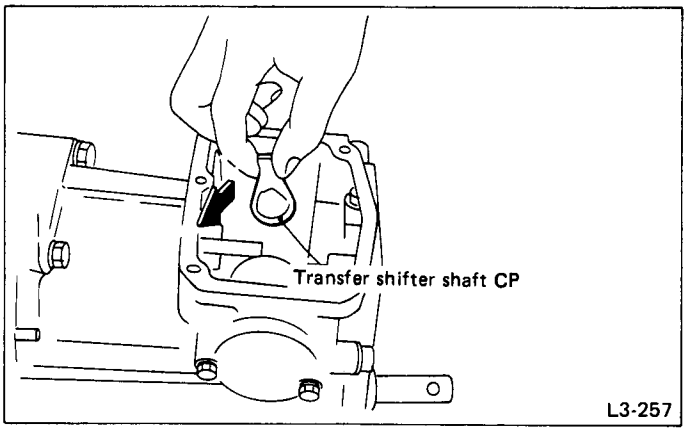


Fig. 31

10) Remove transfer case plug with gasket and then remove reverse accent spring and ball (7.1438).

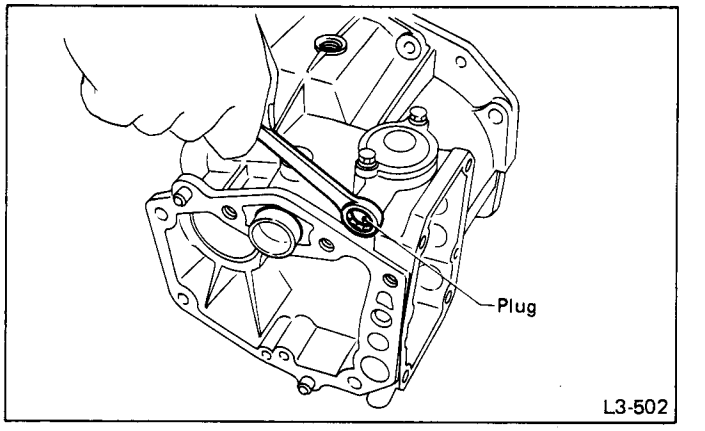


Fig. 32

11) Remove the two bolts from reverse check sleeve ASSY and move the sleeve ASSY until it rotates freely.

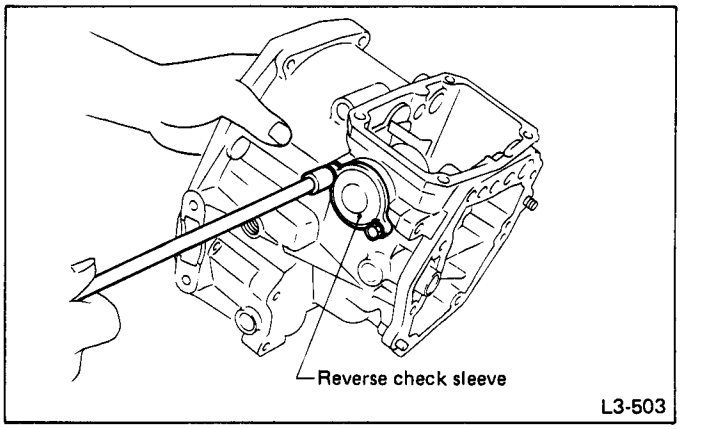


Fig. 33

12) Removing shifter fork screw from selector arm
Remove shifter fork screw securing selector arm to shifter arm CP.

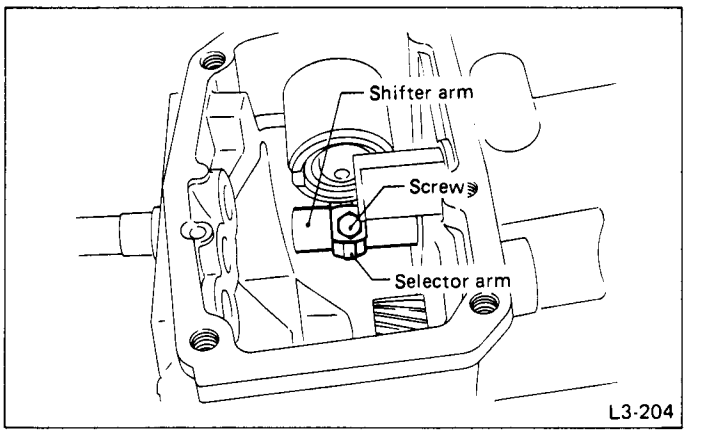


Fig. 34

13) Removing transfer case and shifter ASSY
Loosen eight bolts, and remove transfer case and shifter ASSY from transmission case by tapping with a plastic hammer.
14) Removing bearing mounting bolts
Remove four bolts mounting ball bearing behind drive pinion shaft ASSY.

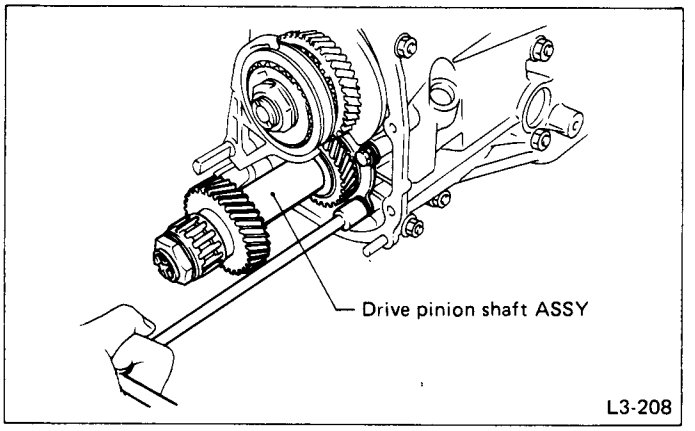


Fig. 35

15) Remove main shaft rear plate.
16) Putting vinyl tape around axle drive shafts
Put vinyl tape around splines of right and left axle drive shafts to prevent damage to oil seals.

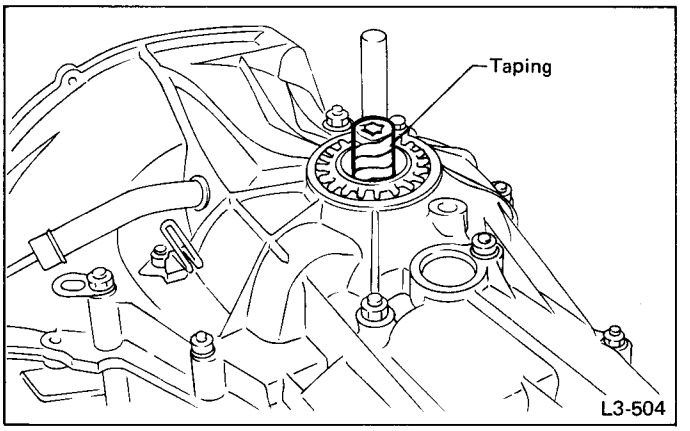


Fig. 36

17) Separating transmission case
Separate transmission case into right and left cases by loosening seventeen coupling bolts.

Work with nuts facing upward.

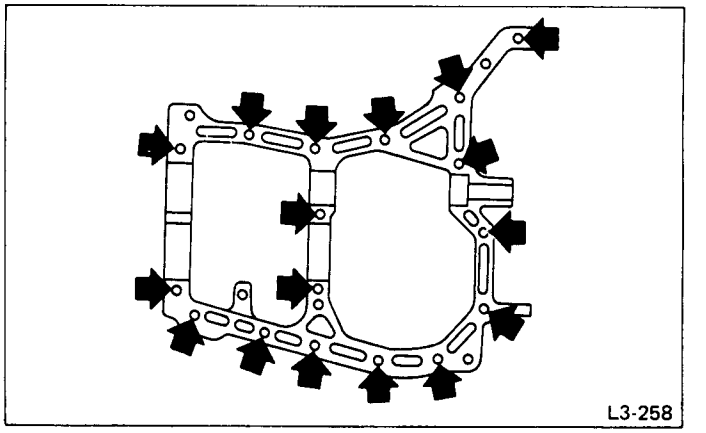


Fig. 37

18) Removing drive pinion shaft
Remove drive pinion shaft ASSY from LH transmission.

Use a hammer handle, etc. to remove if too tight.

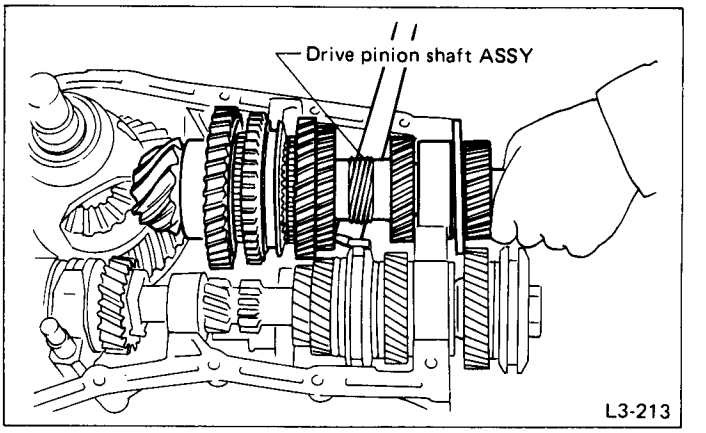


Fig. 38

19) Removing transmission main shaft ASSY
Remove main shaft ASSY from LH transmission case.
20) Removing differential ASSY
Remove differential assembly from transmission case.

a. Be careful not to confuse right and left roller bearing outer races.
b. Be careful not to damage retainer oil seal.

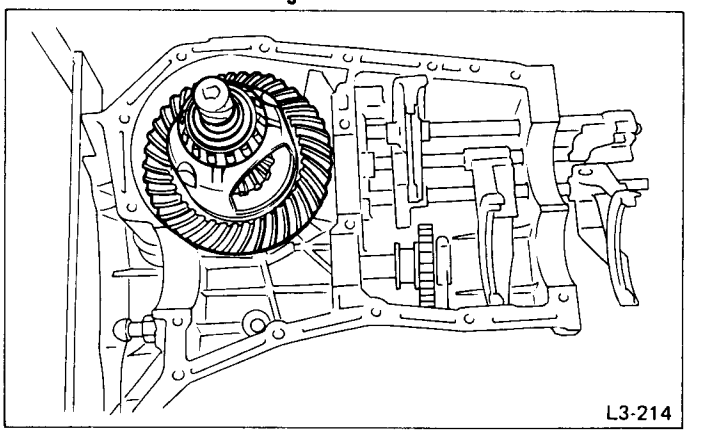


Fig. 39

21) Removing 5th shifter fork
Remove spring pin from 5th shifter fork by driving with STRAIGHT PIN REMOVER 2 (398791700).

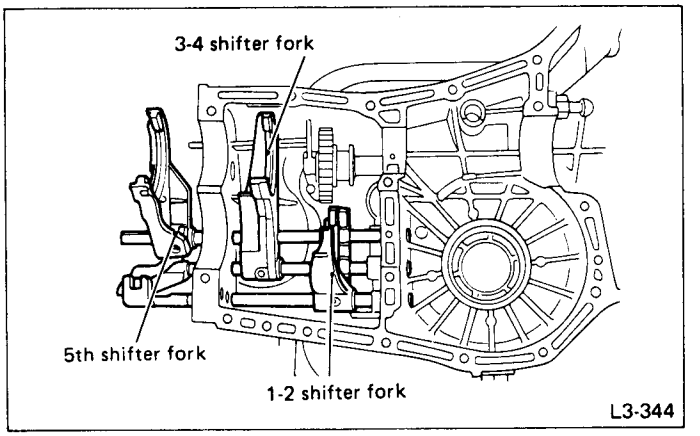


Fig. 40

22) Removing checking ball plugs
Remove three checking ball plugs from main case.

There are spring and ball inside. Replace gasket with a new one.

23) Removing fork and rod
Using STRAIGHT PIN REMOVER 2 (398791700), drive out spring pins from 1-2 shifter fork CP and 3-4 shifter fork CP, and remove 3-4 fork rod and 3-4 shifter fork CP. Then, pull out 1-2 fork rod and remove 1-2 shifter fork CP.

When removing rod, keep other rods in neutral. Also, when pulling out spring pin, remove it toward inside of case so that it may not hit against case.

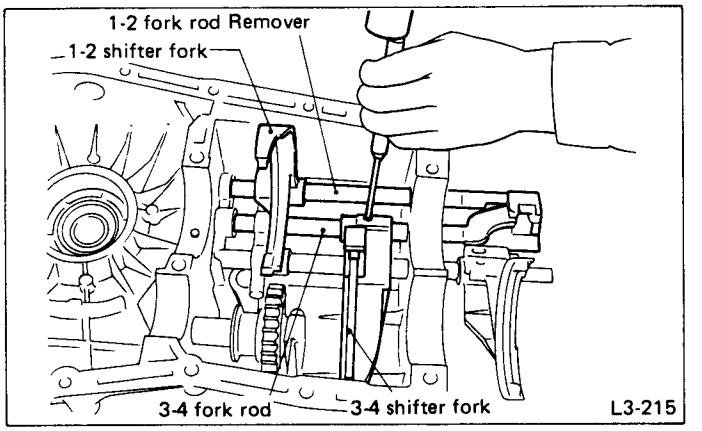


Fig. 41

24) Removing reverse idler gear
Pull out straight pin and reverse idler gear shaft. Then, remove reverse idler gear CP and washer (15.5 x 21 x T).

When pulling out straight pin, wash off oil and blow air on it for easy removal.

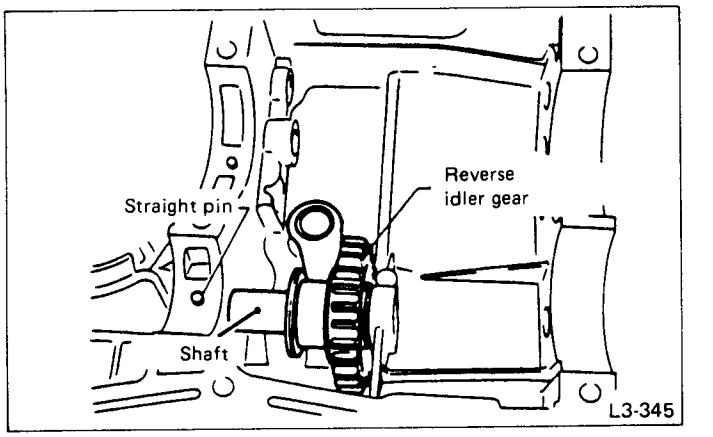


Fig. 42

25) Removing arm and rod
Remove outer snap ring, and pull out reverse shifter rod arm from reverse fork rod. Then take out ball, spring and interlock plunger from rod.
And then remove rod.

When pulling out reverse shifter rod arm, be careful not to let ball pop out of arm.

26) Remove reverse shifter lever.
27) Removing differential side retainer ASSY
Using WRENCH ASSY (499787000), remove differential side retainer ASSY from transmission case.

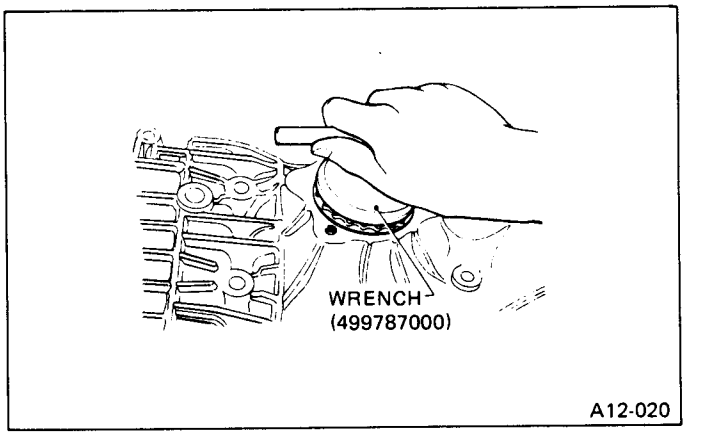


Fig. 43

28) Removing speedometer driven gear
Remove outer snap ring and pull out speedometer driven gear. Next, remove speedometer shaft CP and washer (12.5 x 15.5 x 1) from main case.

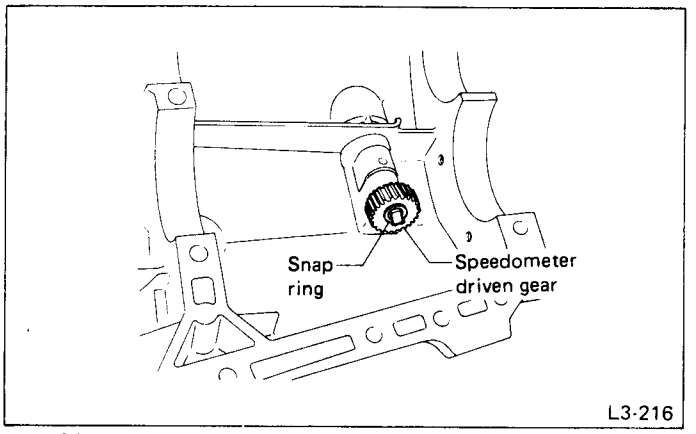


Fig. 44

INSPECTION

Disassembled parts should be washed clean first and then inspected carefully.

1) Bearings
Replace bearings in the following cases:
- Bearings whose balls, outer races and inner races are broken or rusty.
- Worn bearings.
- Bearings that fail to turn smoothly or make abnormal noise when turned after gear oil lubrication.
  The ball bearing on the rear side of the drive pinion should be checked for smooth rotation before the drive pinion ASSY is disassembled. In this case, because a preload is working on the bearing, its rotation feels slightly dragging unlike the other bearings.
- Bearings having other defects.

2) Bushing (each gear)
Replace the bushing in the following cases:
(1) When the sliding surface is damaged or abnormally worn.
(2) When the inner wall is abnormally worn.

3) Gears
(1) Replace gears with new ones if their tooth surfaces are broken, damaged, or excessively worn.
(2) Correct or replace if the cone that contacts the balk ring is rough or damaged.
(3) Correct or replace if the inner surface or end face is damaged.

4) Balk ring
Replace the ring in the following cases:
- When the inner surface and end face are damaged.
- When the ring inner surface is abnormally or partially worn down.
- If the gap between the end faces of the ring and the gear splined part is excessively small when the ring is pressed against the cone.
- When the contact surface of the synchronizer insert is scored or abnormally worn down.

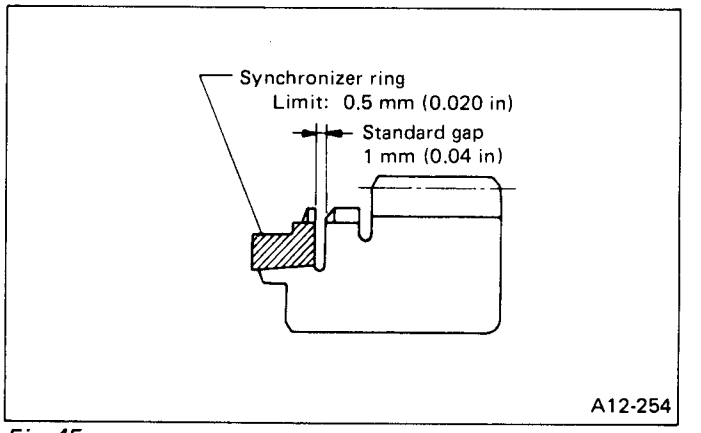


Fig. 45

5) Insert (shifting)
Replace the insert if deformed, excessively worn, or defective in any way.

6) Oil seal
Replace the oil seal if the lip is deformed, hardened, damaged, worn, or defective in any way.

7) O-ring
Replace the O-ring if the sealing face is deformed, hardened, damaged, worn, or defective in any way.

8) Gearshift mechanism
Repair or replace the gearshift mechanism if excessively worn, bent, or defective in any way.

9) Differential gear
Repair or replace the differential gear in the following cases.
(1) The hypoid drive gear and drive pinion shaft tooth surfaces are damaged, excessively worn, or seized.
(2) The roller bearing on the drive pinion shaft has a worn or damaged roller path.
(3) There is damage, wear, or seizure of the differential bevel pinion, differential bevel gear, washer, pinion shaft, and straight pin.
(4) The differential case has worn or damaged sliding surfaces.

ASSEMBLY

Replace gaskets with new ones.

1) Assembling parts in transmission case (LH).

① Interlock plunger (5.56 x 19.6)

Position two interlock plungers (5.56 x 19.6) in holes on the inner wall of left transmission case, one interlock plunger in hole between 1-2 and 3-4 fork rod holes, and one interlock plunger in hole between 3-4 and reverse fork rod holes.

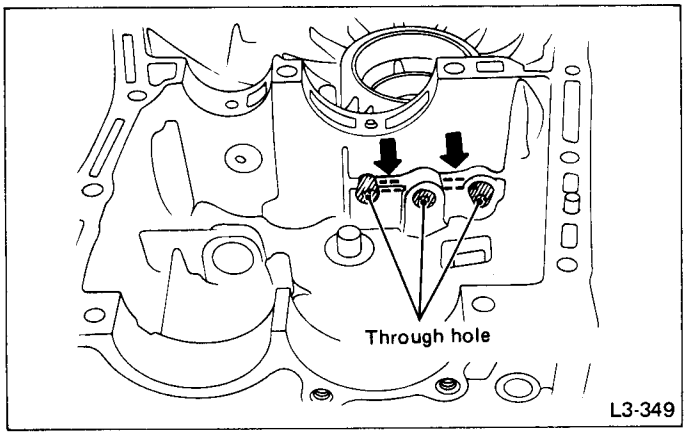


Fig. 46

② Reverse idler gear CP

Position reverse shifter lever CP in L.H. transmission case. Install reverse idler CP and reverse idler gear shaft, and secure with straight pin (6 x 411).

Be sure to install reverse idler shaft from the rear side.

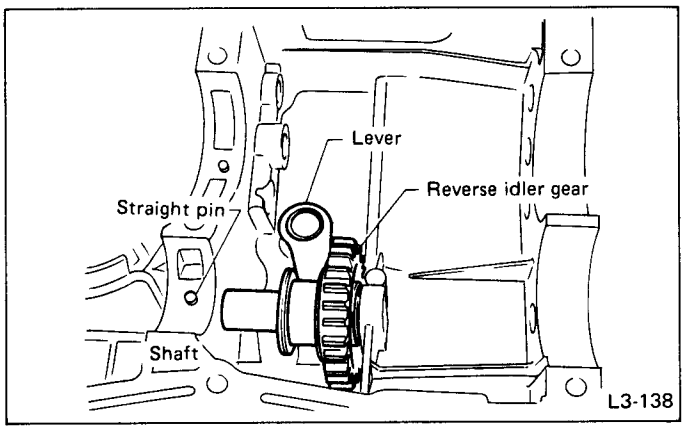


Fig. 47

③ Reverse fork rod and reverse fork rod arm.

Install reverse arm fork spring, ball (5.5563) and interlock plunger (5.56 x 19.6) to reverse fork rod arm. Insert reverse fork rod into hole in reverse fork rod arm, and hold it with outer snap ring using ACCENT BALL INSTALLER (39941 1700).

Apply grease to plunger to prevent it from falling.

④ Plug

Position ball (7.1438), spring and gasket in reverse shifter rod hole on L.H. transmission case, and tighten checking ball plug.

Tightening torque:
20 N·m (2 kg-m, 14 ft-lb)

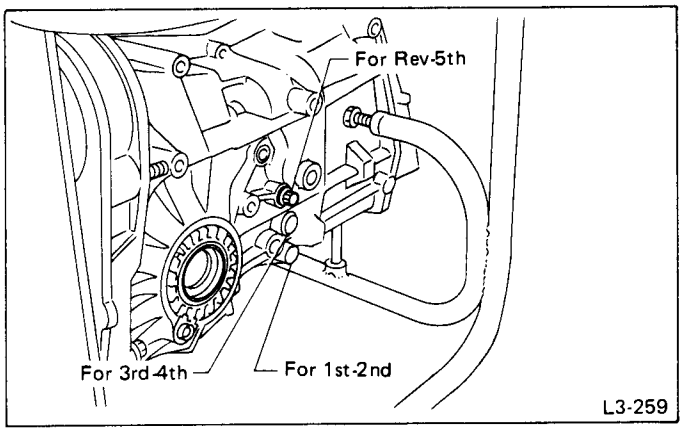


Fig. 48

⑤ Adjustment of reverse idler gear CP position

Move reverse shifter rod toward REV side. Adjust so clearance between reverse idler gear CP and L.H. transmission case wall is 6.0 to 7.5 mm (0.236 to 0.295 in), using reverse shifter lever CP.

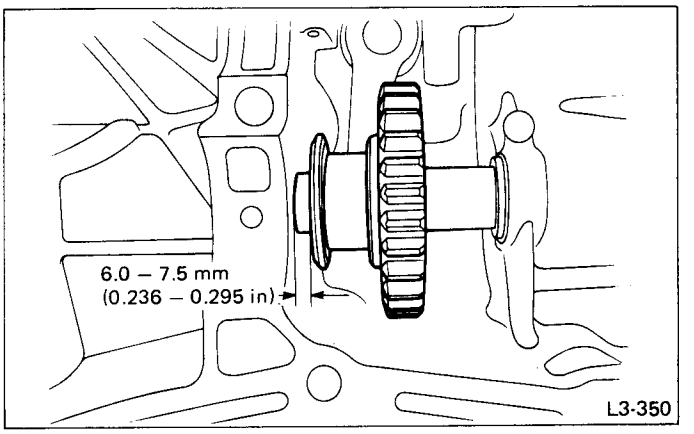


Fig. 49

Reverse shifter lever CP		
Part No.	No.	Remarks
32820AA000	0	Further from case wall.
32820AA010	–	Standard.
32820AA020	2	Closer to case wall.

⑥ Clearance adjustment
After installing a suitable reverse shifter lever CP, shift into Neutral. Adjust so clearance between reverse idler gear CP and L.H. transmission case wall is 0 to 0.5 mm (0 to 0.020 in), using washer(s).

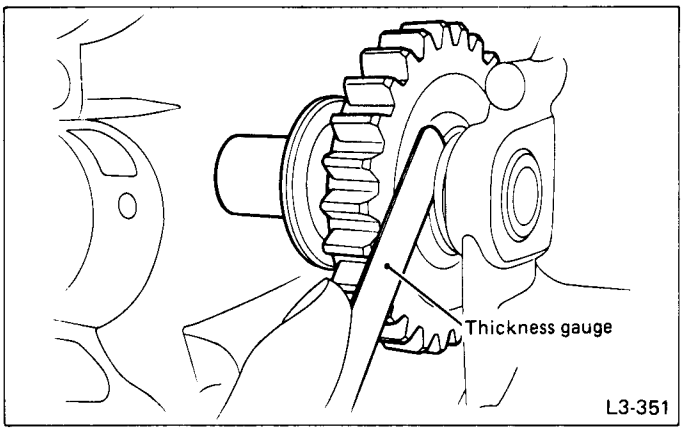


Fig. 50

Washer (20.5 x 26 x t)	
Part No.	Thickness mm (in)
803020151	0.4 (0.016)
803020152	1.1 (0.043)
803020153	1.5 (0.059)
803020154	1.9 (0.075)
803020155	2.3 (0.091)

⑦ Rod and fork
(1) Install interlock plunger (3 x 11.9) onto 3-4 fork rod.

Apply a coat of grease to plunger to prevent it from falling.

(2) Install 3-4 fork rod into 3-4 shifter fork CP via the hole on the rear of L.H. transmission case. Align the holes in rod and fork, and drive straight pin (6 x 22) into these holes using STRAIGHT PIN REMOVER (398791600).

a. Set reverse fork rod to Neutral.
b. Make sure interlock plunger (installed before) is on the reverse fork rod side.

(3) Install 1-2 fork rod into 1-2 shifter fork CP via the hole on the rear of L.H. transmission case. Align the holes in rod and fork, and drive straight pin (6 x 22) into these holes using STRAIGHT PIN REMOVER (398791600).

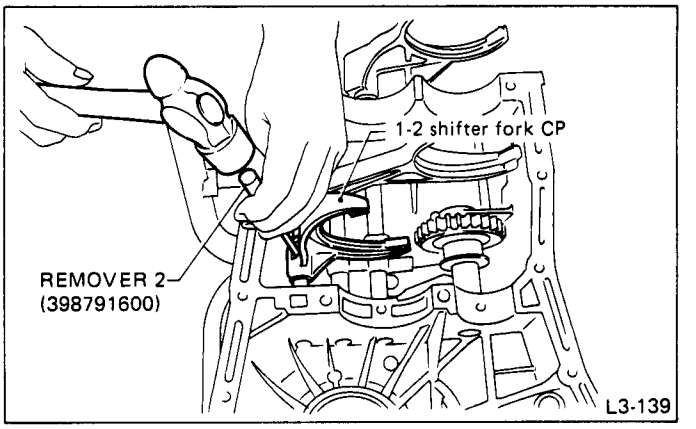


Fig. 51

a. Set other rods to Neutral.
b. Make sure interlock plunger (5.56 x 19.6) is on the 3-4 fork rod side.

(4) Install 5th shifter fork CP onto the rear of reverse fork rod. Align holes in the two parts and drive straight pin into place.

⑧ Plug
Position balls (7.1438 mm dia.), checking ball springs and gaskets into 3-4 and 1-2 rod holes, and install plugs.

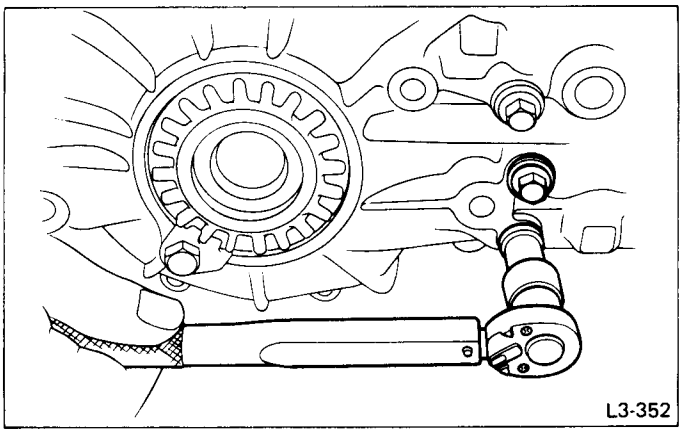


Fig. 52

Tightening torque:
20 N·m (2 kg-m, 14 ft-lb)

2) Alignment marks/figures on hypoid gear set.

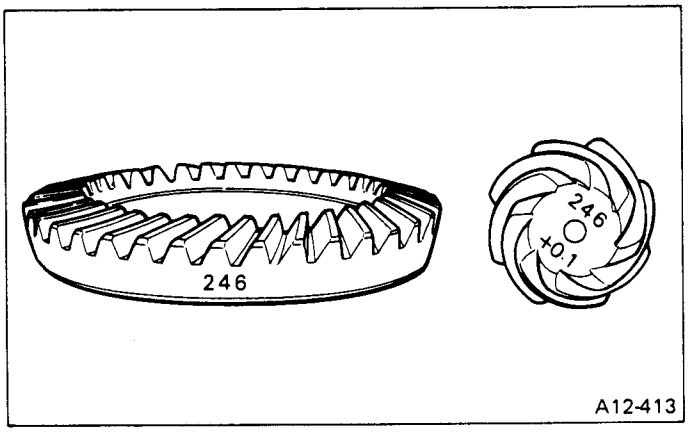


Fig. 53

The upper figure on drive pinion is the match number for combining it with crown gear. The lower figure is for shim adjustment. If no lower figure is shown, the value is zero. The figure on crown gear indicates a number for combination with drive pinion.

3) Adjustment of drive pinion shim

(1) Place drive pinion shaft on transmission main case (R.H.) without shim and tighten drive pinion.

Tightening torque:
26 – 32 N·m (2.7 – 3.3 kg-m, 20 – 24 ft-lb)

(2) Inspection and adjustment of GAUGE ASSY (499917500).

a. Loosen the two bolts and adjust so that the scale indicates 0.5 correctly when the plate end and the scale end are on the same level.

b. Tighten two bolts.

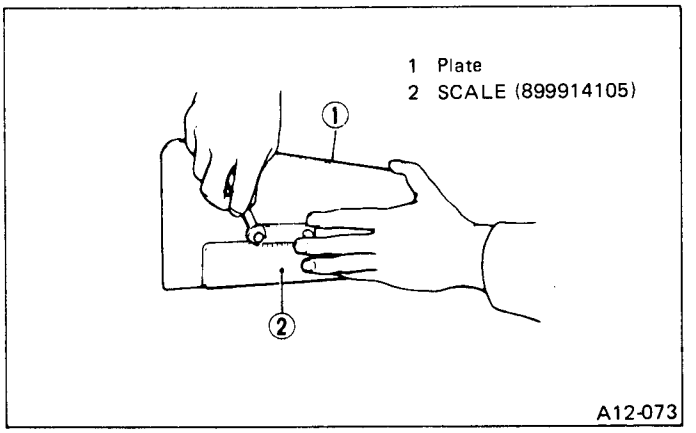


Fig. 54

(3) Position the gauge by inserting the knock pin of gauge into the knock hole in the transmission case.

(4) Slide the drive pinion gauge scale with finger tip and read the value at the point where it matches with the end face of drive pinion.

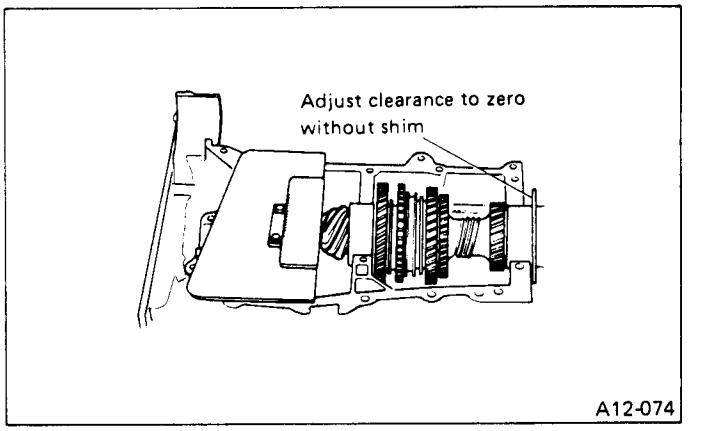


Fig. 55

(5) The thickness of shim shall be determined by adding the value indicated on drive pinion to the value indicated on the gauge. (Add if the figure on drive pinion is prefixed by + and subtract if the figure is prefixed by –.)

Select one to three shims from the next table for the value determined as described above and take a shim thickness which is closest to the said value.

Drive pinion shim	
Part No.	Thickness mm (in)
32295AA030	0.150 (0.0059)
32295AA040	0.175 (0.0069)
32295AA050	0.200 (0.0079)
32295AA060	0.225 (0.0089)
32295AA070	0.250 (0.0098)
32295AA080	0.275 (0.0108)
32295AA090	0.300 (0.0118)
32295AA100	0.500 (0.0197)

4) Differential ASSY

Install differential ASSY onto L.H. transmission case.

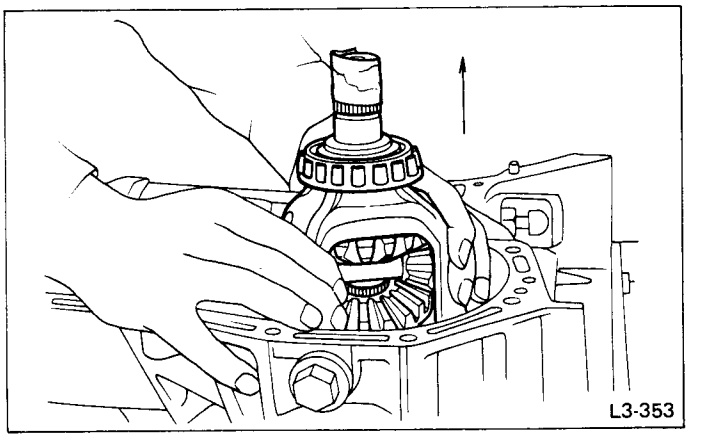


Fig. 56

a. Wrap the left and right splined sections of axle shaft with vinyl tape to prevent scratches.
b. Be careful not to fold the sealing lip of oil seal.

5) Transmission main shaft ASSY
Install needle bearing and oil seal onto the front of transmission main shaft ASSY, and position in LH transmission case.

a. Wrap clutch splined section with vinyl tape to prevent damage to oil seal.
b. Apply grease (Unilube #2 or equivalent) to the sealing lip of oil seal.
c. Align the end face of seal with surface A of LH transmission main case when installing oil seal.

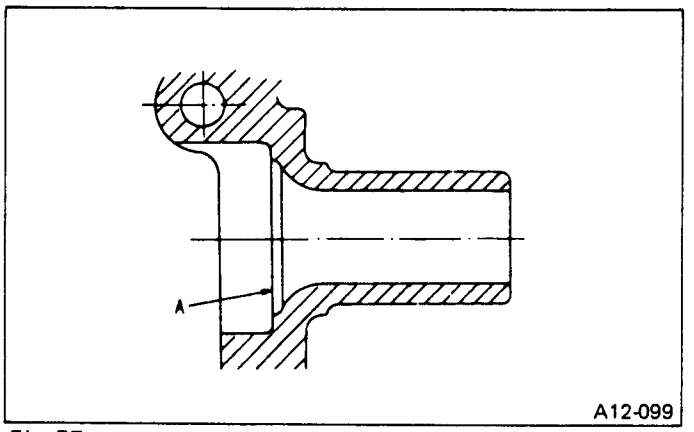


Fig. 57

d. Be careful not to drop oil seal when installing RH transmission main case.
e. Make sure straight pin is positioned in hole in needle bearing's outer race.

6) Install drive pinion with shims selected before into transmission case.

Ensure that the knock pin of the case is fitted into the hole in the bearing outer race.

7) Selection of suitable 1st-2nd, 3rd-4th and 5th shifter fork CPs.
Set transmission main shaft ASSY and drive pinion shaft ASSY in position (so there is no clearance between the two when moved all the way to the front). Select suitable 1st-2nd, 3rd-4th and 5th shifter fork CP's so that coupling sleeve and reverse driven gear are positioned in the center of their synchronizing mechanisms.

1st-2nd shifter fork CP			3rd-4th shifter fork CP			5th shifter fork CP		
Part No.	No.	Remarks	Part No.	No.	Remarks	Part No.	No.	Remarks
32804AA031	1	Moves 0.2 mm (0.008 in) closer to 1st gear	32810AA031 *32810AA060	1	Moves 0.2 mm (0.008 in) closer to 4th gear	32812AA004 *32812AA060	1	Moves 0.2 mm (0.008 in) closer to 5th gear
32804AA041	–	Positions in the center	32810AA041 *32810AA070	–	Positions in the center	32812AA014 *32812AA070	–	Positions in the center
32804AA051	3	Moves 0.2 mm (0.008 in) closer to 2nd gear	32810AA051 *32810AA100	3	Moves 0.2 mm (0.008 in) closer to 3rd gear	32812AA024 *32812AA100	3	Moves 0.2 mm (0.008 in) closer to 5th gear

* Full-time 4WD

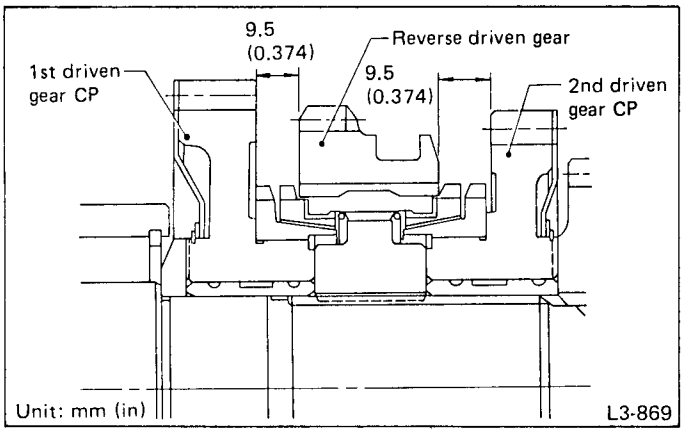


Fig. 58 1st-2nd shifter fork

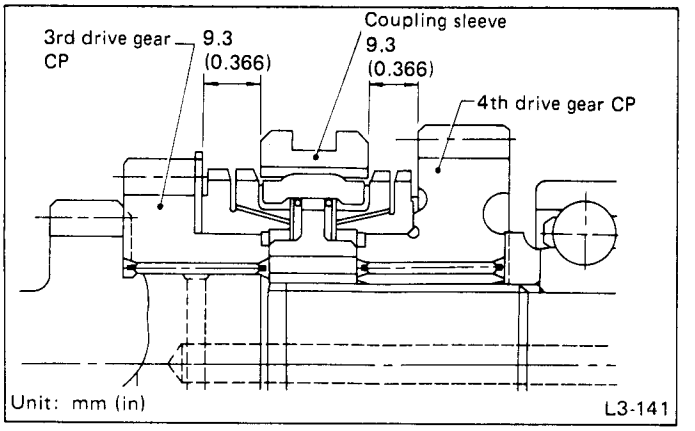


Fig. 59 3rd-4th shifter fork

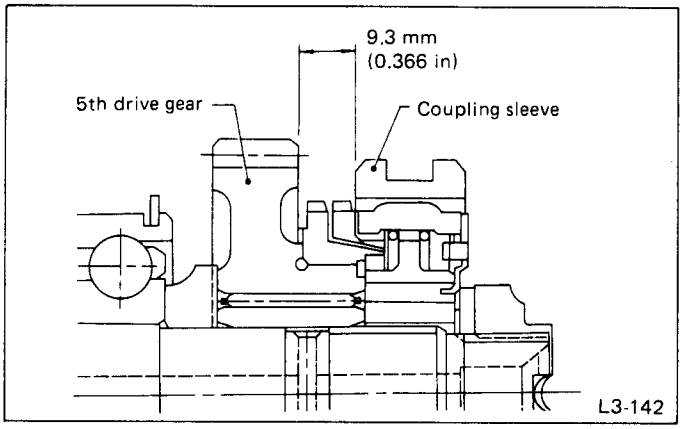


Fig. 60 5th shifter fork

8) Inspection of rod end clearance

Measure rod end clearances A and B. If any clearance is not within specifications, replace rod of fork as required.

A: 3-4 – 5	0.6 – 1.4 mm (0.024 – 0.055 in)
B: 1-2 – 3-4	0.5 – 1.5 mm (0.020 – 0.059 in)

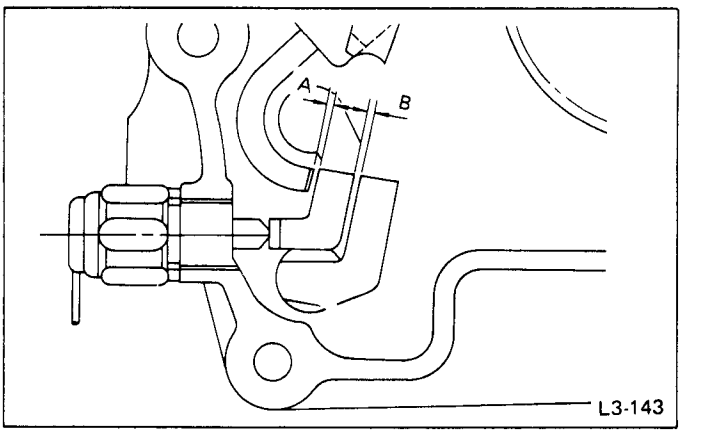


Fig. 61

9) Wipe off grease, oil and dust on the mating surfaces of transmission cases with white gasoline, and apply liquid gasket (Fuji Bond "C" or equivalent), and then put case (RH) and (LH) together.

10) Tighten 17 bolts with bracket, clip, etc. in the following sequence.

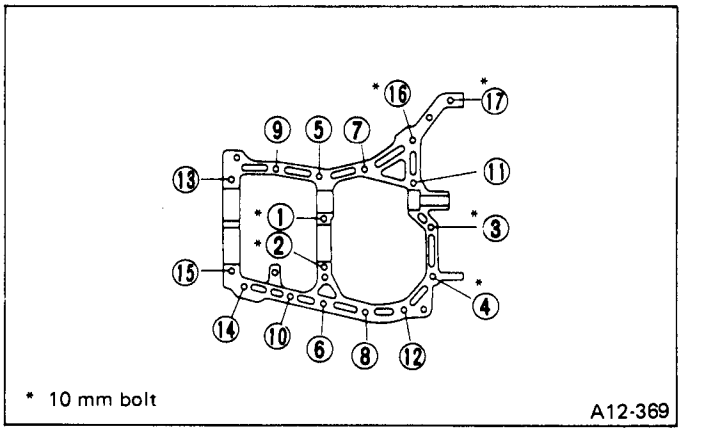


Fig. 62

Tightening torque:
8 mm bolt
23 – 26 N·m (2.3 – 2.7 kg-m, 17 – 20 ft-lb)
10 mm bolt
36 – 42 N·m (3.7 – 4.3 kg-m, 27 – 31 ft-lb)

a. Insert bolts from the bottom and tighten nuts at the top.
b. Put cases together so that drive pinion shim and input shaft holder shim are not caught up in between.
c. Confirm that counter gear and speedometer gear are meshed, and high-low shifter shaft is inserted perfectly.

11) Tighten ball bearing attaching bolts at the drive pinion rear.

Tightening torque:
26 – 32 N·m
(2.7 – 3.3 kg-m, 20 – 24 ft-lb)

12) Backlash adjustment of hypoid gear and preload adjustment of roller bearing.

a. Place the transmission with case (LH) facing downward and put WEIGHT (399780104) on bearing cup.

b. Screw retainer ASSY into case (LH) from the bottom with WRENCH (499787000). Fit HANDLE (499927100) on the transmission main shaft. Shift gear into 5th and turn the shaft several times. Screw in the retainer while turning HANDLE until a slight resistance is felt on WRENCH.

This is the contact point of hypoid gear and drive pinion shaft. Repeat the above sequence several times to ensure the contact point.

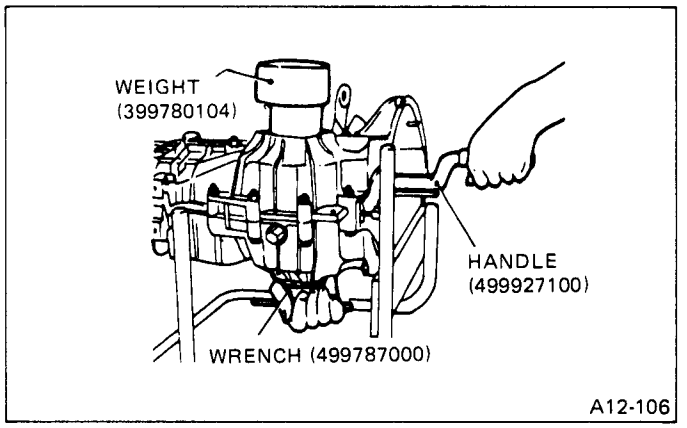


Fig. 63

c. Remove weight and screw in retainer without O-ring on the upper side and stop at the point where slight resistance is felt.

At this point, the backlash between the hypoid gear and drive pinion shaft is zero.

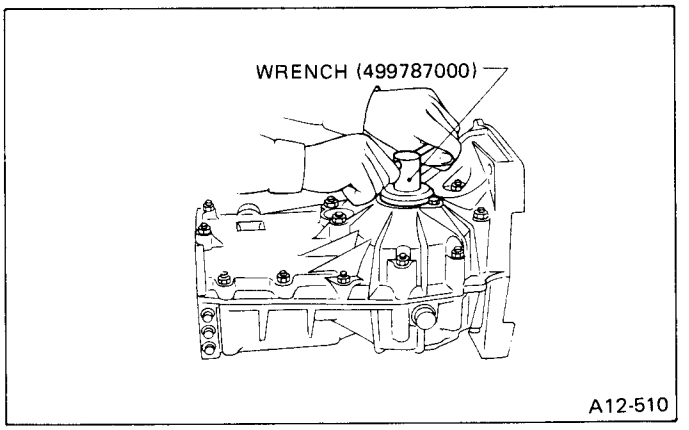


Fig. 64

d. Fit lock plate. Loosen the retainer on the lower side by 1½ notches of lock plate and turn in the retainer on the upper side by the same amount in order to obtain the backlash.

The notch on the lock plate moves by ½ notch if the plate is turned upside down.

e. Turn in the retainer on the upper side additionally by ½ to 1 notch in order to apply preload on taper roller bearing.

f. Tighten temporarily both the upper and lower lock plates and mark both holder and lock plate for later readjustment.

g. Turn transmission main shaft dozens of turns while tapping around retainer lightly with plastic hammer.

h. Set DIAL GAUGE (498247100) and MAGNET BASE (498247001). Insert the needle through transmission oil drain plug hole so that the needle comes in contact with the tooth surface at a right angle and check the backlash.

Backlash:
0.13 – 0.18 mm (0.0051 – 0.0071 in)

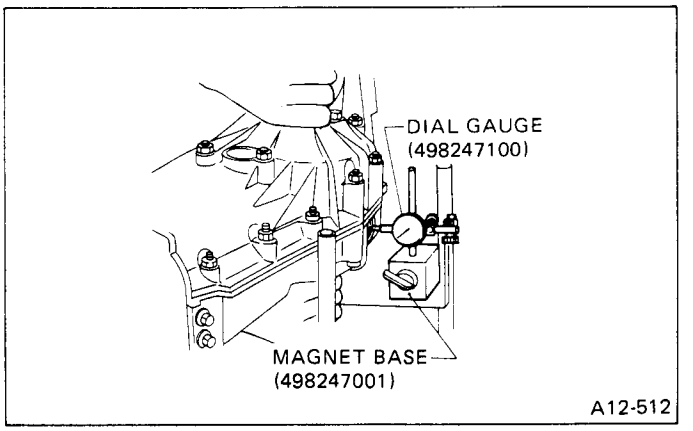


Fig. 65

13) Checking tooth contact of hypoid gear.

Apply a uniform thin coat of red lead on both tooth surfaces of 3 or 4 teeth of the hypoid gear. Move the hypoid gear back and forth by turning the transmission main shaft until a definite contact pattern is developed on hypoid gear, and judge whether face contact is correct. If it is incorrect, make the following correction.

a. Tooth contact is correct.

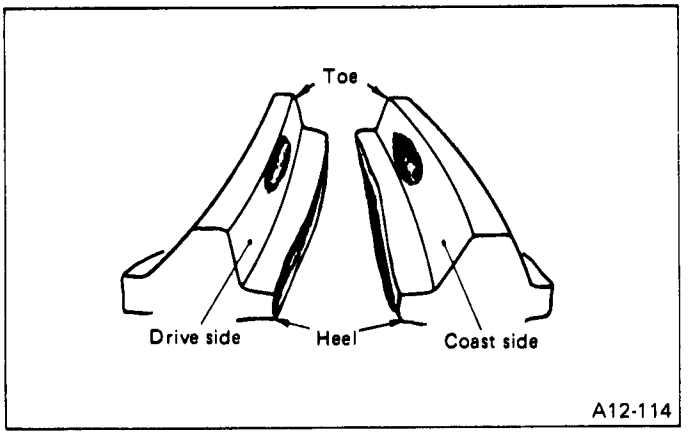


Fig. 66

b. Backlash is excessive.
To reduce backlash, loosen holder on the upper side (case R.H. side) and turn in the holder on the lower side (case L.H. side) by the same amount.

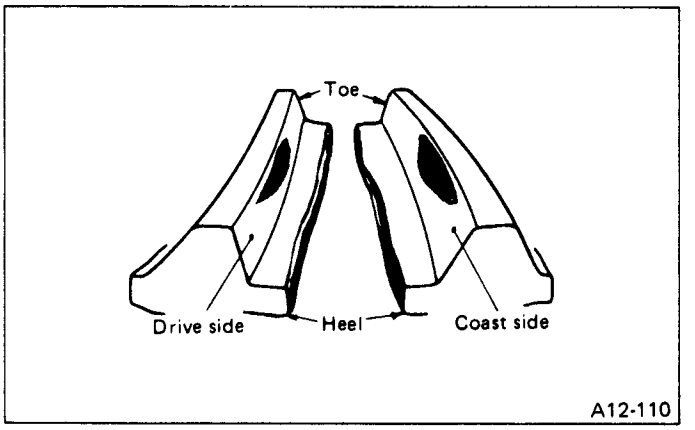


Fig. 67

c. Backlash is insufficient.
To increase backlash, loosen holder on the lower side (case L.H. side) and turn in the holder on the upper side (case R.H. side) by the same amount.

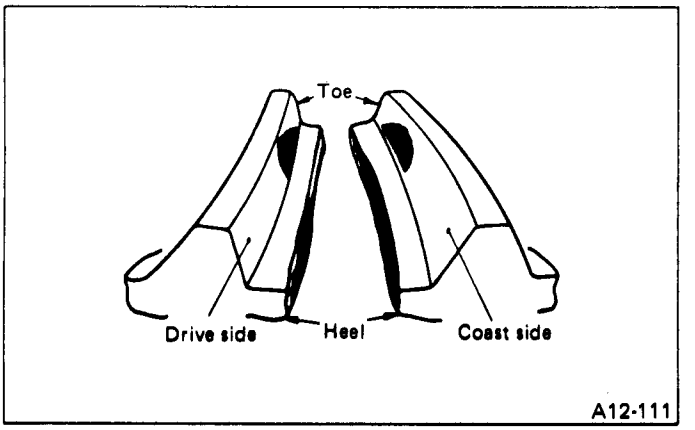


Fig. 68

d. The drive pinion shim selected before is too thick.
Reduce its thickness.

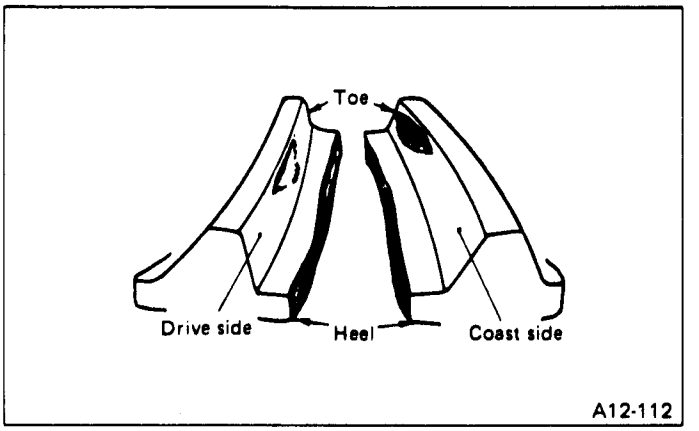


Fig. 69

e. The drive pinion shim selected before is too thin.
Increase its thickness.

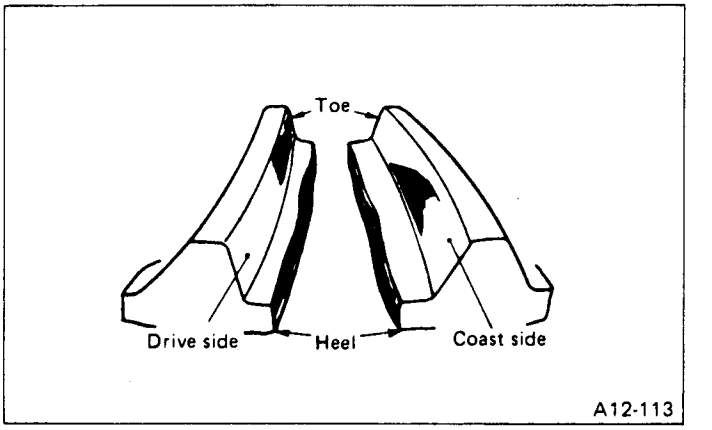


Fig. 70

14) After checking the tooth contact of hypoid gears, remove the lock plate. Then loosen retainer until the O-ring groove appears. Fit O-ring into the groove and tighten retainer into the position where retainer has been tightened in.
Tighten lock plate.

Tightening torque:
22 – 27 N·m
(2.2 – 2.8 kg-m, 16 – 20 ft-lb)

Carry out this job on both upper and lower retainers.

15) Selecting of main shaft rear plate.
Using DEPTH GAUGE (498147000), measure the amount (A) of ball bearing protrusion from transmission main case surface and select the proper plate in the following table.

Dimension A mm (in)	Part No.	Identification
4.0 – 4.13 (0.1575 – 0.1626)	32294AA040	1
3.87 – 4.0 (0.1524 – 0.1575)	32294AA050	2

Before measuring, tap the end of main shaft by the plastic hammer lightly in order to make the clearance zero between the main case surface and the moving flange of bearing.

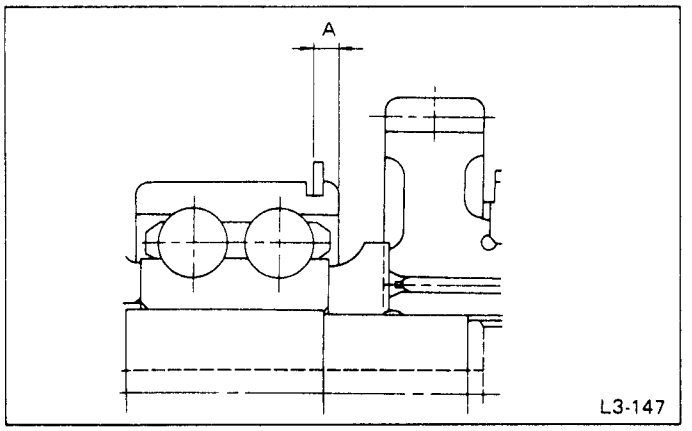


Fig. 71

16) Transfer case & shifter ASSY
Secure transfer case & shifter ASSY to transmission case with eight bolts.

Tightening torque:
25 N·m (25 kg-m, 18 ft-lb)

Be sure gasket is positioned on the rear of the case.

17) Tighten selector arm.
Secure selector arm to shifter arm CP with shifter fork screw. Shifter arm CP should be caught by pawl of rod.

Tightening torque:
10 N·m (1.0 kg-m, 7 ft-lb)

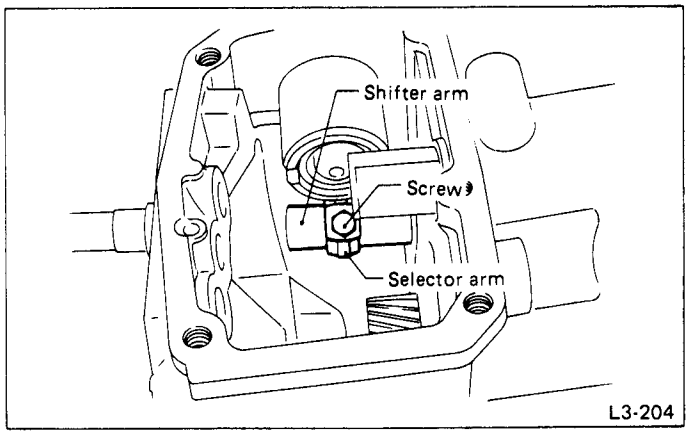


Fig. 72

18) Install ball (7.1438), reverse accent spring, aluminum gasket and plug in that order.

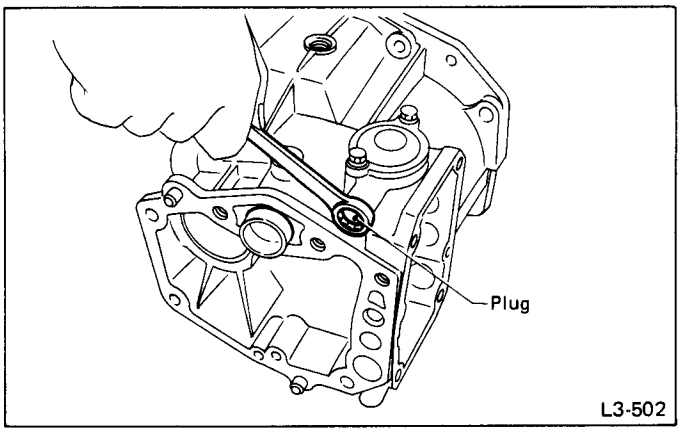


Fig. 73

Tightening torque:
10 N·m (1.0 kg-m, 7 ft-lb)

19) Neutral position adjustment
(1) Shift gear into 3rd gear position.
(2) Shifter arm turns lightly toward the 1st/2nd gear side but heavily toward the reverse gear side because of the function of the return spring, until arm contacts the stopper.
(3) Make adjustment so that the heavy stroke (reverse side) is a little more than the light stroke (1st/2nd side).
(4) To adjust, remove bolts holding reverse check sleeve ASSY to the case, move sleeve ASSY outward, and place adjustment shim (0 to 1 ea.) between sleeve ASSY and case to adjust the clearance.

Be careful not to break O-ring when placing shim(s).

One shim's thickness: 0.15 mm (0.0059 in)
0.30 mm (0.0118 in)

- When shim is removed, the neutral position will move closer to reverse; when shim is added, the neutral position will move closer to 1st gear.
- If shims alone cannot adjust the clearance, replace reverse accent shaft and re-adjust.

Reverse accent shaft		
Part No.	Mark	Remarks
32188AA020	A	Neutral position is closer to 1st gear.
32188AA002	No mark	Standard
32188AA030	C	Neutral position is closer to reverse gear.

20) Reverse check plate adjustment.
Shift shifter arm CP to "5th" and then to reverse to see if reverse check mechanism operates properly. Also check to see if arm returns to Neutral when released from the reverse position. If arm does not return properly, replace reverse check plate.

Reverse check plate			
Part No.	No.	Angle θ	Remarks
32189AA000	0	28°	Arm stops closer to "5th".
32189AA010	1	31°	Arm stops closer to "5th".
32189AA020	2	34°	Standard
32189AA030	3	37°	Arm stops closer to reverse.
32189AA040	4	40°	Arm stops closer to reverse.

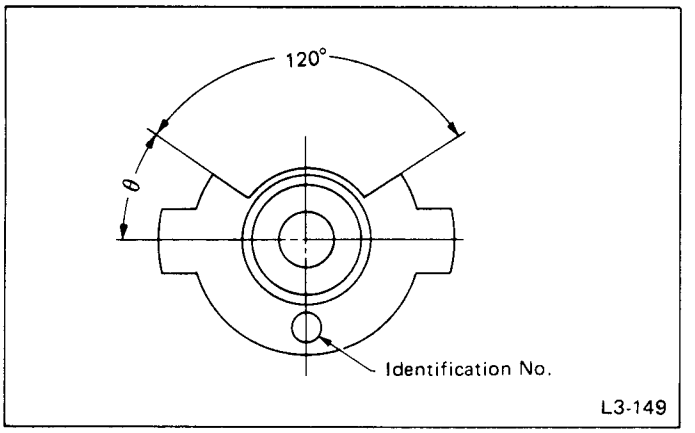


Fig. 74

21) Install extension with transfer gasket and tighten bolts.

Tightening torque:
34 – 40 N·m
(3.5 – 4.1 kg-m, 25 – 30 ft-lb)

While installing, the gears (transfer drive and driven) should engage each other.

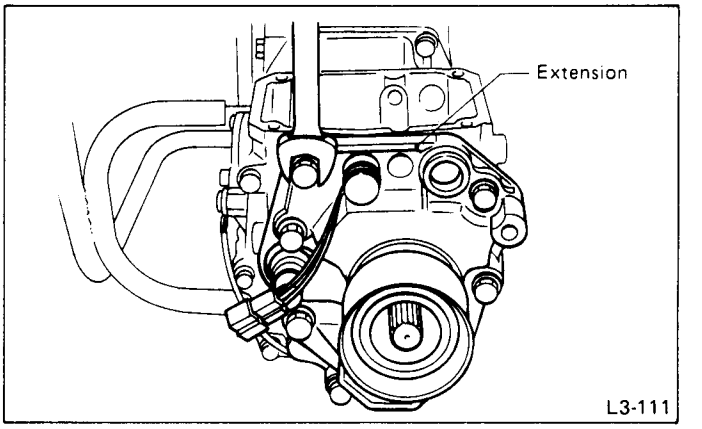


Fig. 75

22) Installing transfer shifter fork
Install transfer shifter fork to coupling sleeve and align the cutout section of fork with arm of transfer shifter shaft.

Apply a coat of oil to nylon pawl of fork.

23) Installing spring and ball
Install checking ball spring and ball (6.35) in transfer case.

Be careful not to drop ball and spring into transfer case.

24) Installing transfer shifted rod
Insert transfer shifter rod into bore in the upper center of extension with the cutout section facing the front. Pass it through transfer shifter fork while positioning ball and spring in the hole at the center of transfer case.
Align the hole in transfer shifter fork with that in shifter rod and drive spring pin (5 x 25) into the holes.

a. Be sure each end of spring pin protrudes slightly beyond the holes when installing.
b. Position ball with the cutout section of shifter rod facing down. Be careful not to drop the ball.
c. To avoid scratching oil seal, apply a coat of oil to shifter rod before installing.

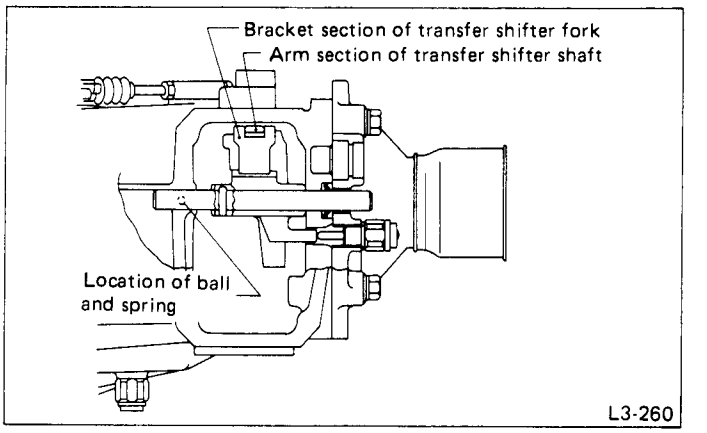


Fig. 76

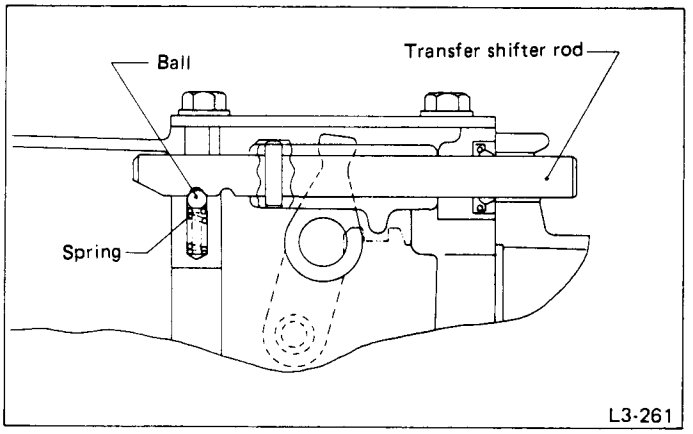


Fig. 77

25) Installing actuator & cable ASSY

Connect the end of cable and shifter lever with an 8-mm clevis pin and secure with a snap pin. Secure actuator to the left side of transmission case with three 8-mm bolts & washers. Secure cable plate to transfer case with two 8-mm bolts & washers. All bolts should be tightened to the specified torque.

Tightening torque:
16 N·m (1.6 kg-m, 12 ft-lb)

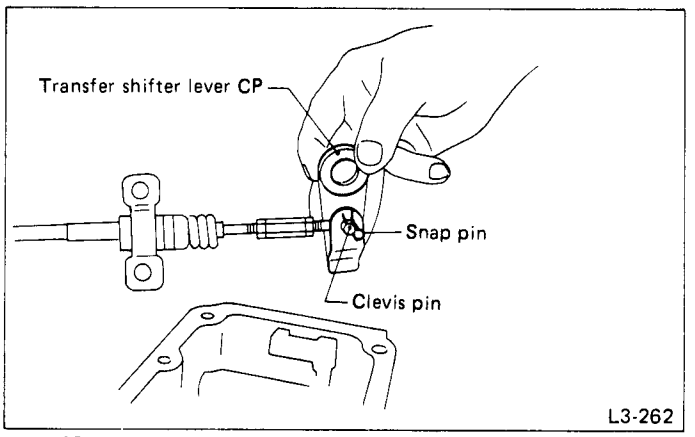


Fig. 78

26) Adjustment of cable

(1) Connect transfer shifter lever to transfer shifter shaft. Align the hole in transfer shifter lever with that in shifter shaft and drive spring pin into the holes.

(2) Connect a hose to pipe on the outside of actuator and apply vacuum pressure until cable is shortened as much as possible.

Use a vacuum pump or intake manifold to create vacuum.

(3) While applying vacuum pressure, turn turnbuckle in the direction that shortens cable until it no longer turns. Then, back off turnbuckle 180° and tighten two lock nuts to the specified torque.

Tightening torque:
5 N·m (0.5 kg-m, 3.6 ft-lb)

(4) Operate actuator to ensure that shifting from front-wheel drive to 4-wheel drive is smooth.

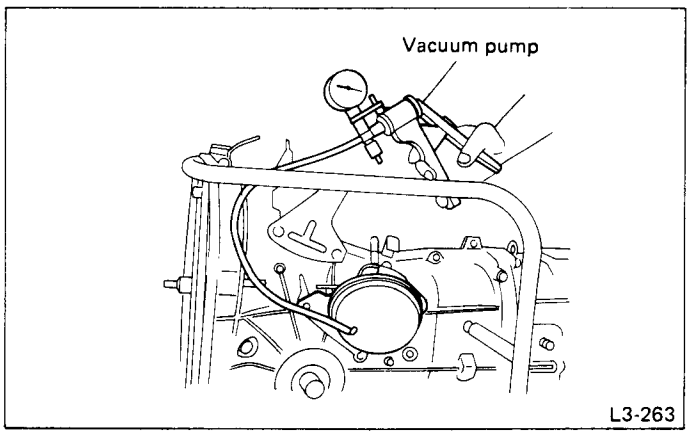


Fig. 79

27) Install transfer cover with gasket and tighten bolts.

Tightening torque:
18 – 22 N·m (1.8 – 2.2 kg-m, 13 – 16 ft-lb)

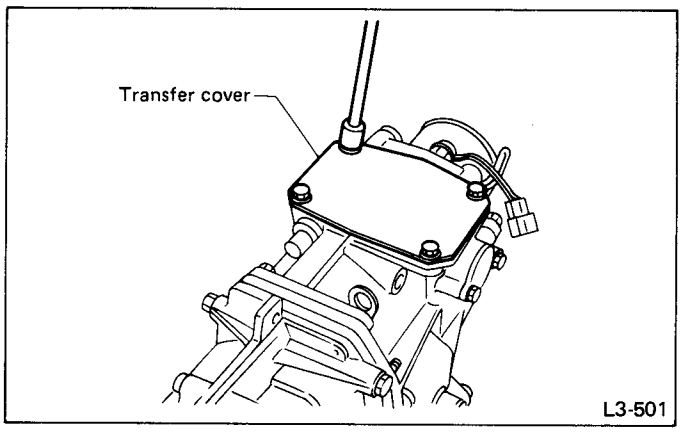


Fig. 80

28) Release lever

(1) Install retaining spring on release lever.

(2) Secure release lever pivot to LH transmission case.

Tightening torque:
16 N·m (1.6 kg-m, 12 ft-lb)

(3) Push release lever against pivot. With the lever held in that position, twist it to the left and right so that retaining spring moves onto the stepped surface on the rear of pivot. (Proper positioning of retaining spring can be checked through access window on the case.)
(4) Install release bearing sleeve ASSY, and hold with two clutch sleeve clips.
(5) Install dust release cover onto the case.

[2] Extension & Transfer Gear ASSY

DISASSEMBLY

1) Remove 4WD switch ASSY with a spanner, etc.

Replace aluminum gasket with a new one.

2) Using a snap-ring pliers, remove snap ring (Inner-68) from extension.
3) Remove rear drive shaft by tapping from the rear with an aluminum bar.
4) Put sleeve coupling in drive position, and remove locknut (18 x 10.5) with the TOP-THIRD DRIVEN GEAR HOLDER (899884100).

Remove caulking before taking off locknut.

5) Using the REMOVER (899864110) and REPLACER (398517700), remove ball bearing (20 x 52 x 15).
6) Remove 4th gear thrust washer, transfer driven gear and coupling sleeve from rear drive shaft.
7) Using the REMOVER (899714110) and TRANSMISSION MAIN SHAFT REMOVER (899864100), remove following parts from rear drive shaft.

- Rear shaft driven bushing
- Transfer synchronizer hub
- Rear drive spacer
- Ball bearing (28 x 68 x 18)

ASSEMBLY

1) Install oil seal (35 x 50 x 11) onto the rear of extension CP using INSTALLER (399513600).
2) Install transfer rear oil seal onto extension CP using OIL SEAL INSTALLER (498057200).
3) Install 4WD switch ASSY on extension CP.

Tightening torque:
18 N·m (1.8 kg-m, 13 ft-lb)

Do not forget to install aluminum washer.

4) Install ball bearing onto rear drive shaft with INSTALLER (899580100) and RETAINER (899714100).

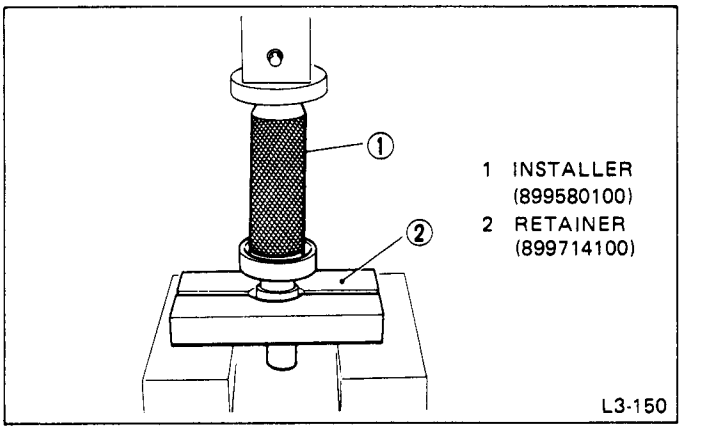


Fig. 81

5) Install rear drive spacer, synchronizer hub and sleeve onto rear drive shaft.

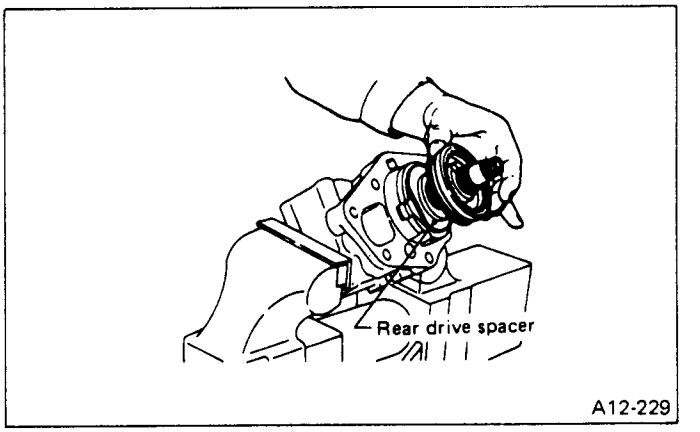


Fig. 82

6) Install transfer driven gear bushing onto rear drive shaft with INSTALLER (899874100) and RETAINER (899714100).
7) Install coupling sleeve, transfer driven gear and thrust washer onto rear drive shaft.
8) Install ball bearing onto rear drive shaft with PRESS ASSY (899754112) and RETAINER (899714100).
9) Shift sleeve to the drive position and tighten lock nut with HOLDER (899884100) and SOCKET WRENCH (899988608).

Tightening torque:
73 – 84 N·m
(7.4 – 8.6 kg-m, 54 – 62 ft-lb)

Stake the lock nut at four positions after tightening.

10) Hammer rear drive shaft into extension with a plastic hammer. And fit snap ring to the groove inside of extension.

[3] Transfer Case & Shifter ASSY

DISASSEMBLY

1) Pull out shifter arm CP and selector arm from transfer case.
2) Remove oil guide from transfer case.
3) Remove back-up light switch ASSY and neutral switch ASSY.

a. Some models are not equipped with neutral switch ASSY.
b. Replace aluminum gasket with a new one.

4) Remove reverse check sleeve ASSY by loosening 6-mm bolt and washer ASSY in two places.

a. Be careful not to damage O-ring fitted in reverse check sleeve.
b. 0 to 3 shim(s) are inserted between reverse check sleeve and transfer case. Be careful not to break them.

5) Disassembling reverse check sleeve ASSY.

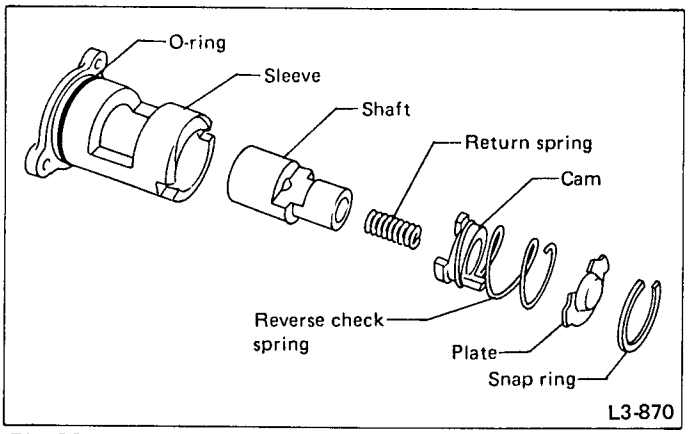


Fig. 83

① Using a standard screwdriver, remove snap ring (inner 28).

Replace snap ring with a new one if deformed or weakened.

② Remove reverse check plate.
③ Take out return reverse spring and reverse check spring.
④ Take out reverse check cam.
⑤ Take out reverse accent shaft.
⑥ Remove O-ring (35.4 x 1.5).

ASSEMBLY

1) Install needle bearing race into bore in transfer case.

Be careful not to damage stopper on transfer case.

2) Install back lamp switch ASSY and neutral switch ASSY on transfer case.

Tightening torque:
18 N·m (1.8 kg-m, 13 ft-lb)

a. Some models are not equipped with neutral switch ASSY.
b. Do not forget to install aluminum washer.

3) Install oil seal (18 x 28 x 7) into bore in transfer case using OIL SEAL INSTALLER (498057000).
4) Install oil guide.

Make sure oil guide is secure and tight.

5) Assembling reverse check sleeve ASSY.
① Install reverse accent shaft, check cam, return spring and check spring onto reverse check sleeve.

Be sure the bent section of reverse check spring is positioned in the groove in check cam.

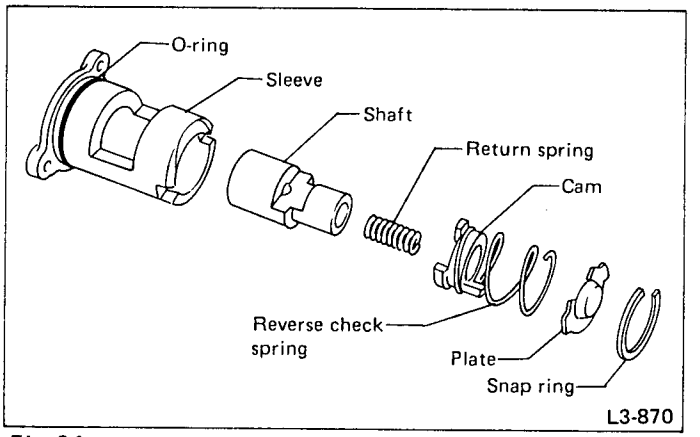


Fig. 84

② a. Hook the bent section of reverse check spring over reverse check plate.
b. Rotate cam so that the protrusion of reverse check cam is at the opening in plate.
c. With cam held in that position, install plate onto reverse check sleeve and hold with snap ring (Inner-28).
d. Position O-ring (35.4 x 1.5) in groove in sleeve.

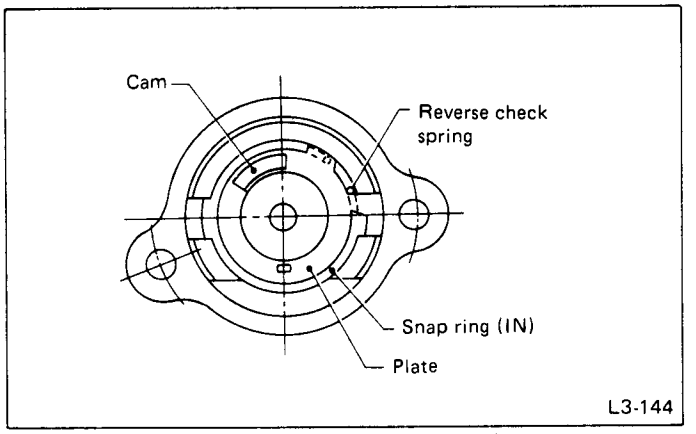


Fig. 85

a. Make sure the cutout section of reverse accent shaft is aligned with the opening in reverse check sleeve.
b. Spin cam by hand for smooth rotation.
If it does not return properly, replace reverse check spring.
c. Move cam and shaft all the way toward plate and release.
If cam does not return properly, replace reverse check spring; if shaft does not, check for scratches on the inner surface of sleeve. If sleeve is in good order, replace spring.
d. Select a suitable reverse check plate by referring to "Neutral Position Adjustment."

6) a. Install reverse check sleeve ASSY onto transfer case and tighten with two bolt & washers.

Tightening torque:
10 N·m (1.0 kg-m, 7 ft-lb)

b. Install shifter arm CP into the partition from the front while inserting selector arm into the opening in sleeve ASSY. Pass shaft through hole in selector arm until its end comes out of the rear of transfer case.

Apply a coat of gear oil to shifter arm CP. Also make sure oil seal (18 x 28 x 7) is positioned properly.

7) Press oil seal (15 x 25 x 2) completely into the right boss section of transfer case.
8) Press oil seal (13 x 22 x 6) completely into bore for transfer shifter rod at rear of transfer case.
9) Insert transfer shifter shaft into the right side of transfer case from inside.

[4] Drive Pinion Shaft ASSY

DISASSEMBLY

Remove caulking before taking off locknut.

1) Loosen locknut (22 x 13) using SOCKET WRENCH (35) (499987003) and HOLDER (899884100).

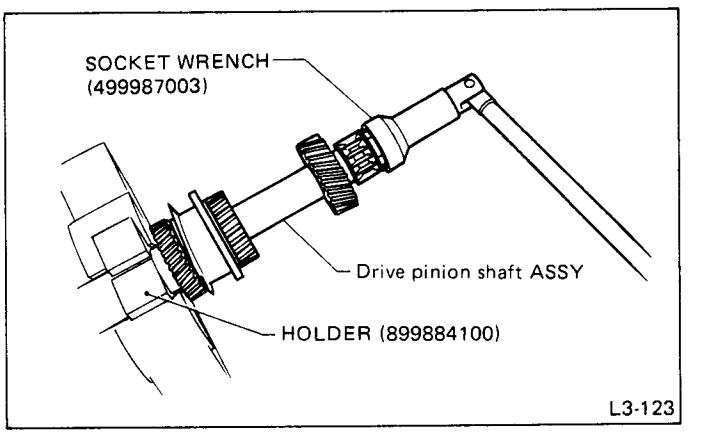


Fig. 86

2) Using TRANSMISSION SHAFT REMOVER (899864100) and REMOVER (899714110), remove 5th needle bearing race, needle bearing (32 x 42 x 25.8), and transfer drive gear.
3) Remove drive pinion collar.
4) Remove 5th driven gear using 5TH DRIVEN GEAR REMOVER (498077000) and a press.
5) Remove woodruff key (5 x 6.5 x 1.6).
6) Using REMOVER (899714110) and a press, remove ball bearing (28 x 74 x 28) and 3rd and 4th driven gear.

Tool No.	Tool name
899714110	REMOVER

7) Remove 2nd driven gear CP.
8) Using REMOVER (899714110) and a press, remove 1st driven gear CP, 2nd gear bushing, and gear & hub ASSY.

Remove key before removing 2nd gear bushing.

9) Using 5th driven gear remover and a press, remove 1st gear bushing, 1st driven gear thrust plate, and roller bearing (41 x 71 x 23).

Replace roller bearing (41 x 71 x 23) with a new one if this disassembly is performed.

ASSEMBLY

1) Assemble gear & hub ASSY.

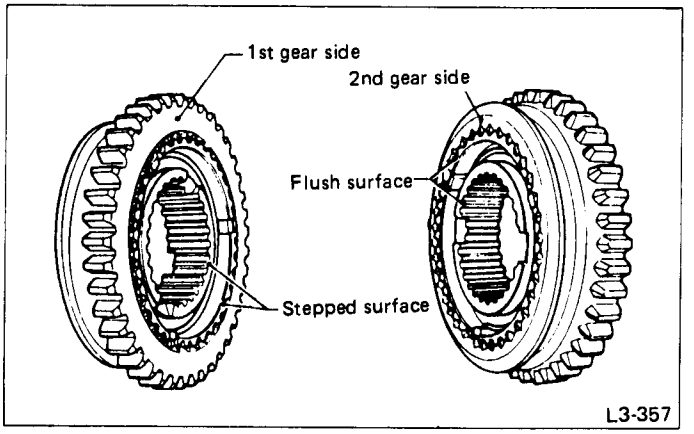


Fig. 87

Position open ends of springs 120° apart.

2) Drive roller bearing onto drive pinion shaft and 1st driven gear thrust washer using 1ST-2ND BUSHING INSTALLER (499277100) and 4TH-5TH RACE INSTALLER (499877000).

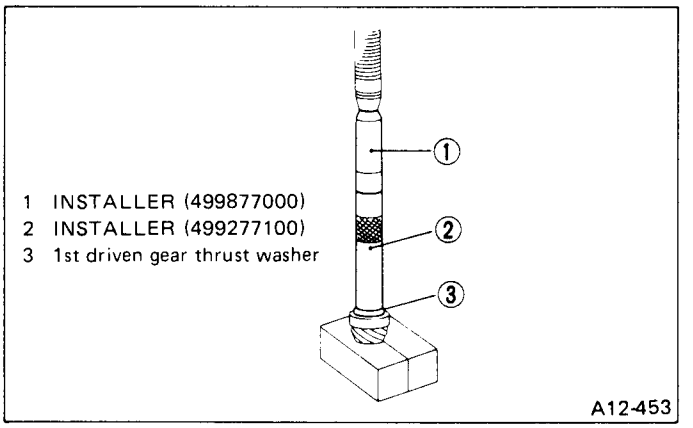


Fig. 88

3) Install driven gear bushing (42) onto drive pinion shaft using the same tools as in step (2) above.

Bushing may be installed with either side up.

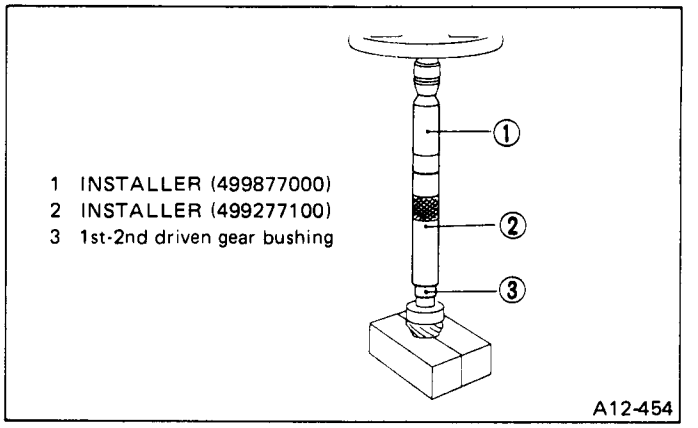


Fig. 89

4) Install 1st driven gear, 1st-2nd balk ring and gear & hub ASSY (already assembled in previous step) to drive pinion shaft.

Align ring groove with insert.

5) Install 1st-2nd driven gear bushing to drive pinion shaft.

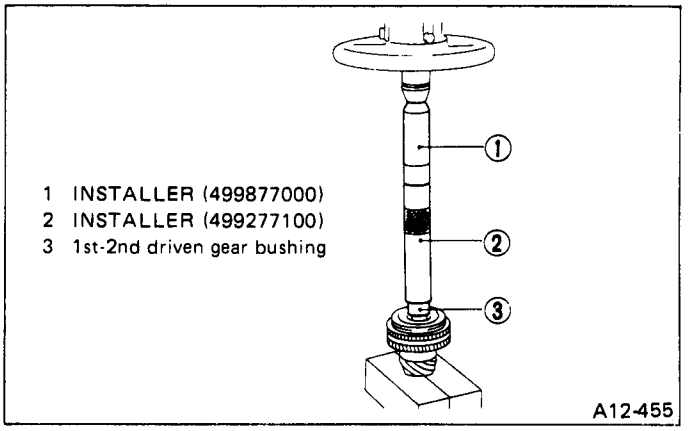


Fig. 90

6) Install 2nd driven gear, 1st-2nd balk ring and key to drive pinion shaft. Then, install 4th-3rd driven gear using the same tools as above.

Tool No.	Tool name
499277100	INSTALLER (1st-2nd bushing)
499877000	INSTALLER (4th-5th race)

7) Install ball bearing (29 x 74 x 38) to drive pinion shaft using 1ST-2ND BUSHING INSTALLER (499277100).

Ball bearing may be installed without using the tool. There should be no problem.

8) Install woodruff key (5 x 6.5 x 1.5) to the rear section of drive pinion shaft. Using 1ST-2ND BUSHING INSTALLER (499277100) and press, install 5th driven gear.

a. Face 5th driven gear in the correct direction.

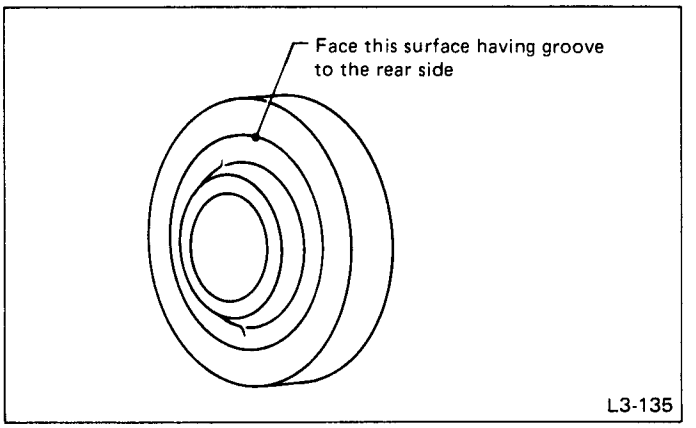


Fig. 91

b. Be careful not to dislocate woodruff key while installing 5th gear.

9) Install drive pinion collar and transfer drive gear. Then, install 5th needle bearing race using 4TH-5TH RACE INSTALLER (499877000) and a press.
10) Install needle bearing and lock washer, then tighten lock nut to the specified torque.

Tool No.	Tool name
499987003	SOCKET WRENCH (35)
899884100	HOLDER

Tightening torque:
112 – 124 N·m (11.4 – 12.6 kg-m, 82 – 91 ft-lb)

Secure lock nut in two places.

[5] Transmission Main Shaft ASSY

DISASSEMBLY

1) Put vinyl tape around main shaft splines to protect oil seal from damage. Then pull out oil seal and needle bearing by hand.

Remove caulking before taking off locknut.

2) Remove locknut.

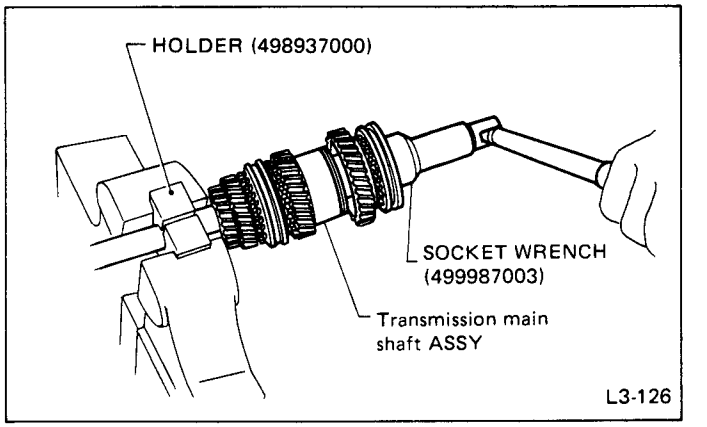


Fig. 92

3) Remove insert stopper plate, sleeve and hub ASSY No. 2, balk ring, 5th drive gear CP, and needle bearing (32 x 36 x 25.7).
4) Using TRANSMISSION MAIN SHAFT REMOVER (899864100), REMOVER (899714110), and a press, remove:

- 5th needle bearing race
- 5th gear thrust washer
- Ball bearing (25.5 x 65 x 31)
- 4th gear thrust washer
- 4th drive gear CP
- Sleeve and hub assembly
- Balk ring
- 4th needle bearing race
- 3rd drive gear CP

ASSEMBLY

1) Assemble sleeve & hub ASSY for 3rd-4th and 5th.

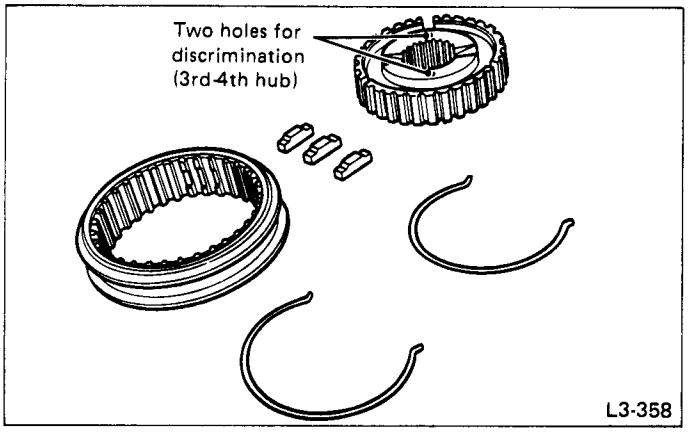


Fig. 93

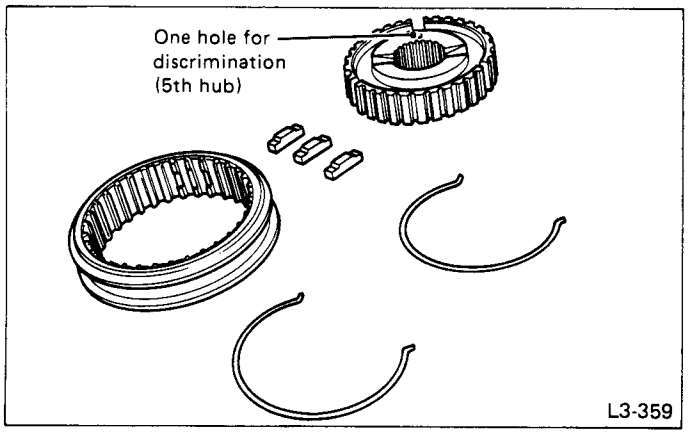


Fig. 94

2) Install 3rd drive gear CP, balk ring, and sleeve & hub ASSY for 3rd-4th needle bearing (32 x 36 x 25.7) on transmission main shaft.

Align groove in balk ring with shifting insert.

3) Install 4th needle bearing race onto transmission main shaft using REMOVER (899714110), INSTALLER (499877000) and a press.

4) Install balk ring, needle bearing (32 x 30 x 25.7), 4th drive gear CP and 4th gear thrust washer to transmission main shaft.

Face thrust washer in the correct direction.

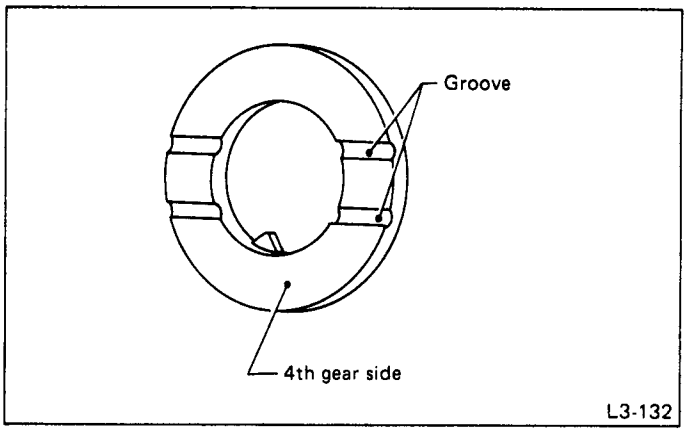


Fig. 95

5) Drive ball bearing onto the rear section of transmission main shaft using REMOVER (899714110), 4TH-5TH RACE INSTALLER (499877000) and a press.

6) Using REMOVER (899714110), 4TH-5TH RACE INSTALLER (499877000) and a press, install the following parts onto the rear section of transmission main shaft.

- 5th gear thrust washer

Face thrust washer in the correct direction.

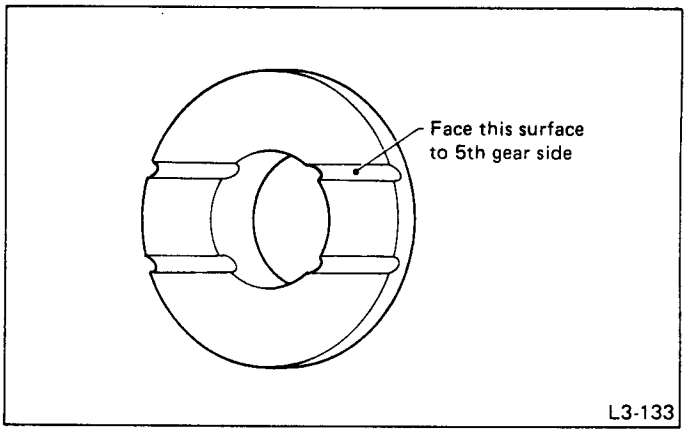


Fig. 96

- 5th needle bearing race

7) Install the following parts to the rear section of transmission main shaft.

- Needle bearing (32 x 36 x 25.7)
- 5th drive gear
- Balk ring
- Sleeve & hub ASSY
- Insert stopper plate
- Lock washer (22 x 38 x 2)
- Tighten lock nuts (22 x 13) to the specified torque using SOCKET WRENCH (499987003) and TRANSMISSION MAIN SHAFT HOLDER (498937000).

Tightening torque:
112 – 124 N·m (11.4 – 12.6 kg-m, 82 – 91 ft-lb)

a. Align groove in balk ring with shifting insert.
b. Be sure to fit pawl of insert stopper plate into 4-mm dia hole in the boss section of synchronizer hub.

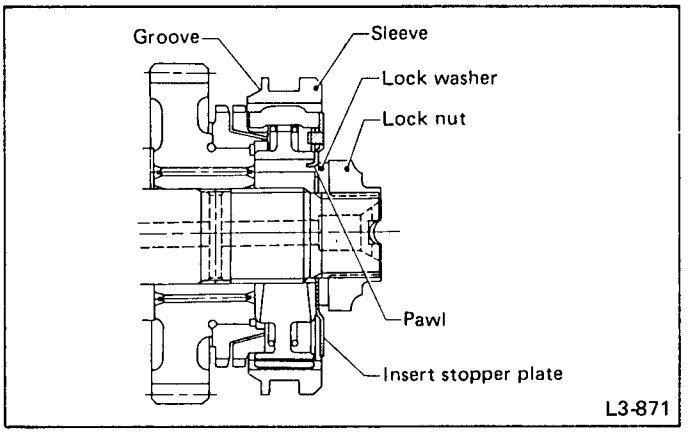


Fig. 97

c. Secure lock nuts in two places after tightening.

[6] Differential ASSY

DISASSEMBLY

1) Remove right and left snap rings from differential, and then remove two axle drive shafts.

During reassembly, reinstall each axle drive shaft in the same place from which it was removed.

2) Loosen twelve bolts and remove hypoid drive gear.
3) Drive out straight pin from differential ASSY toward crown gear.

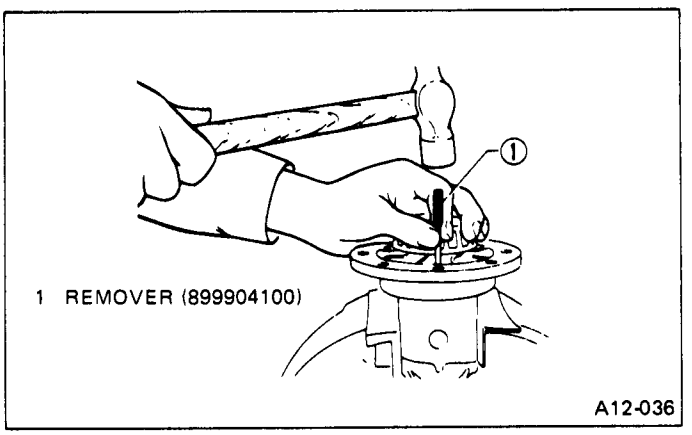


Fig. 98

4) Pull out pinion shaft, and remove differential bevel pinion and gear and washer (38.1 x 50 x t).
5) Remove roller bearing.

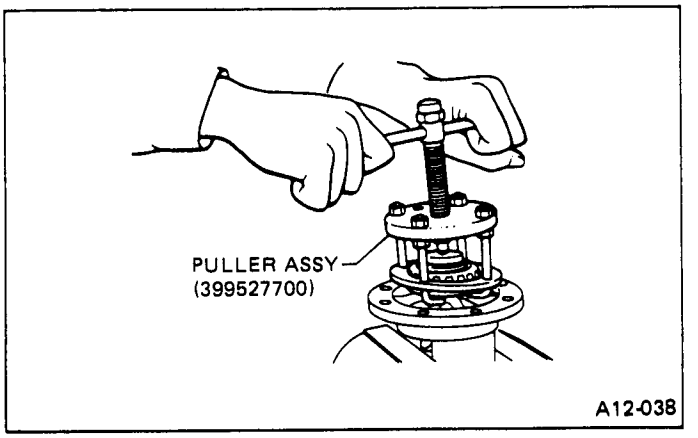


Fig. 99

ASSEMBLY

1) Install bevel gear and bevel pinion together with washers, and insert pinion shaft.

Face the chamfered side of washer toward gear.

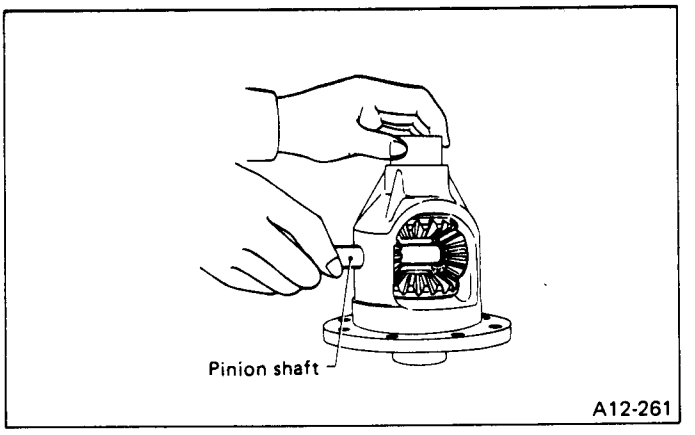


Fig. 100

2) Measure backlash between bevel gear and pinion. If it is not within specifications, install a suitable washer to adjust it.

Standard backlash:
0.13 – 0.18 mm (0.005 – 0.0071 in)

Be sure the pinion gear tooth contacts adjacent gear teeth during measurement.

Washer (38.1 x 50 x t)	
Part No.	Thickness mm (in)
803038021	0.925 – 0.950 (0.0364 – 0.0374)
803038022	0.975 – 1.000 (0.0384 – 0.0394)
803038023	1.025 – 1.050 (0.0404 – 0.0413)

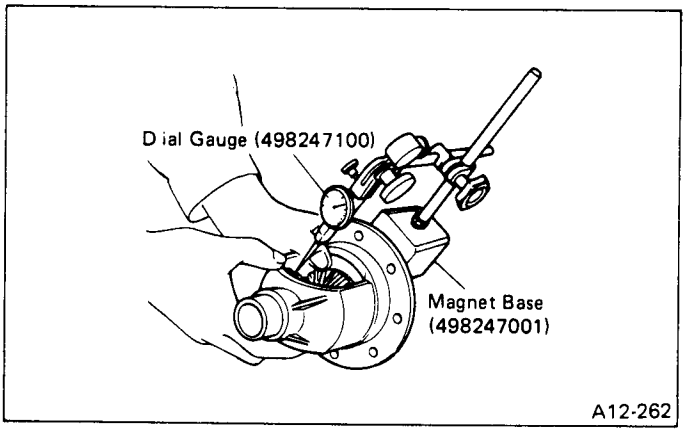


Fig. 101

3) Align pinion shaft and differential case at their holes, and drive straight pin into holes from the crown gear side, using STRAIGHT PIN REMOVER (899904100).

Lock straight pin after installing.

4) Install roller bearing (40 x 80 x 19.75) to differential case.

Be careful because roller bearing outer races are used as a set.

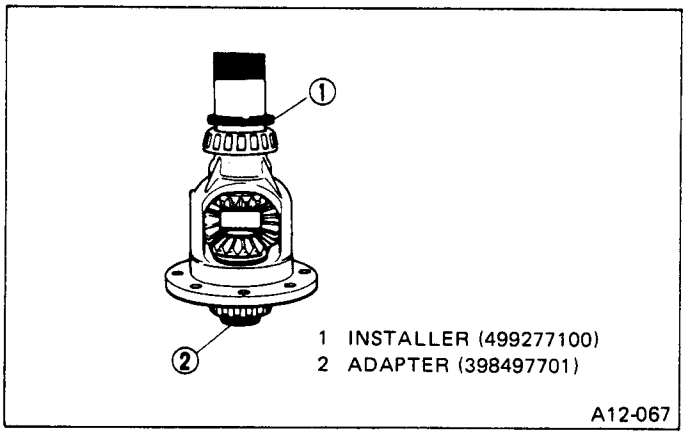


Fig. 102

5) Install crown gear to differential case using twelve bolts.

Tightening torque:
57 – 67 N·m (5.8 – 6.8 kg-m, 42 – 49 ft-lb)

6) Position drive axle shaft in differential case and hold it with outer snap ring (28). Make sure clearance between the shaft and case is within specifications.

Clearance:
0 – 0.2 mm (0 – 0.008 in)

If it is not within specifications, replace snap ring with a suitable one.

Snap Ring (Outer-28)	
Part No.	Thickness mm (in)
805028011	1.05 (0.0413)
805028012	1.20 (0.0472)

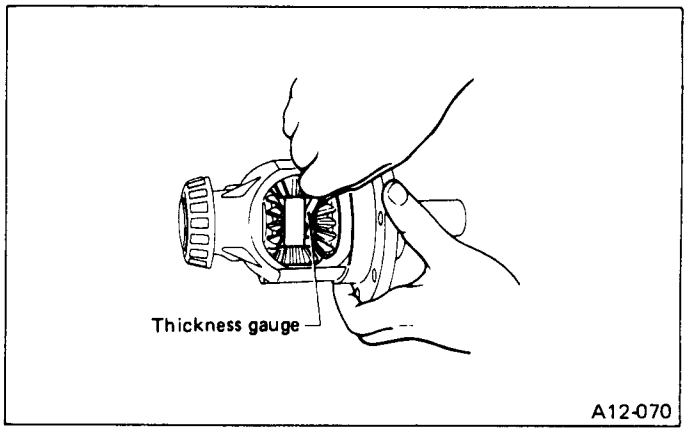


Fig. 103

B Full-Time 4WD

[1] Overall Transmission

DISASSEMBLY

The following job should be followed before disassembly;
- Clean oil, grease, dirt and dust from transmission.
- Remove drain plug to drain oil. After draining, retighten it as before.
- **Replace gasket with a new one.**

Tightening torque:
41 – 47 N·m (4.2 – 4.8 kg-m, 30 – 35 ft-lb)

1) Attach transmission to TRANSMISSION STAND SET (399295120).

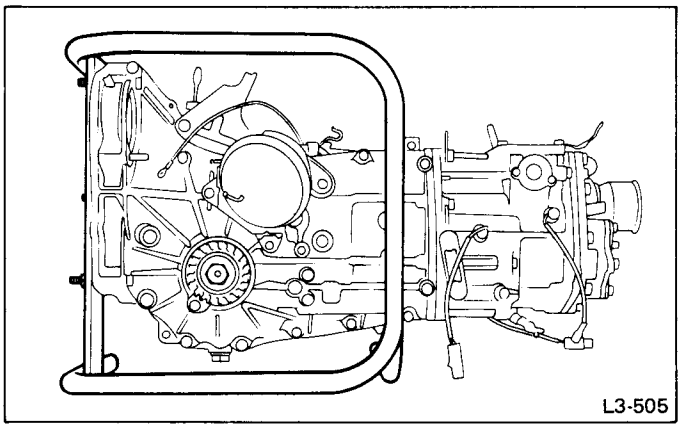


Fig. 104

2) Remove release lever and clutch release bearing.
3) Removing actuator & cable ASSY
   ① Remove snap pin from the transfer shifter rod side and remove clevis pin.

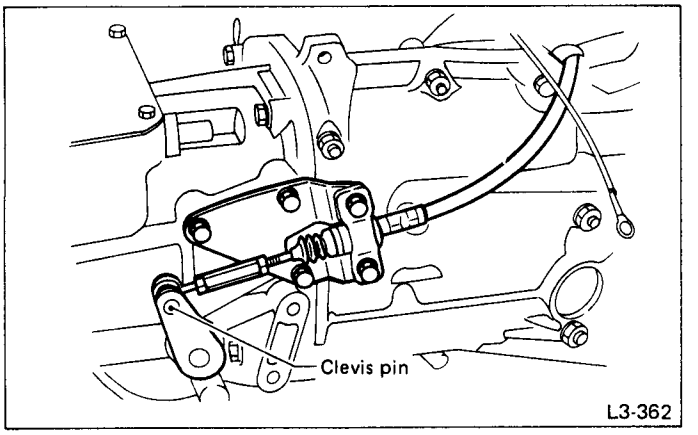


Fig. 105 Cable ASSY

② Remove the three 8 mm bolts and detach the differential lock cable bracket.
③ Remove the three 8 mm bolts from the actuator side and remove actuator & cable ASSY.

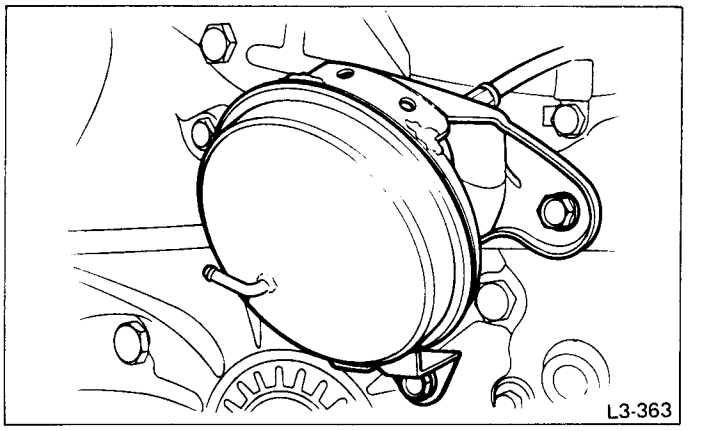


Fig. 106 Actuator ASSY

4) Remove transfer cover.
5) Remove plug from extension and take out spring and ball.
6) Removing rear cover and bracket CP
Remove the five 10-mm bolts from the rear cover.

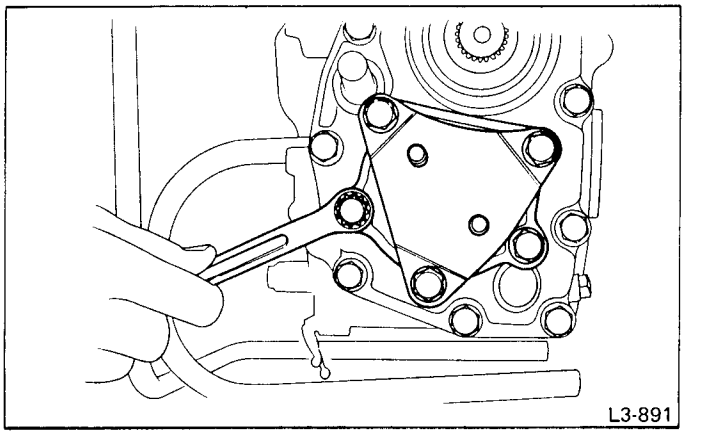


Fig. 107 Removing rear cover

7) Removing extension ASSY
   ① Remove the ten bolts which secure extension ASSY.

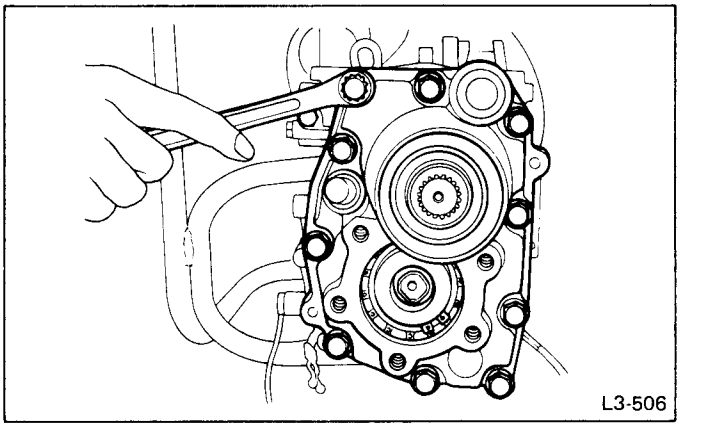


Fig. 108

② Remove center differential & extension ASSY.

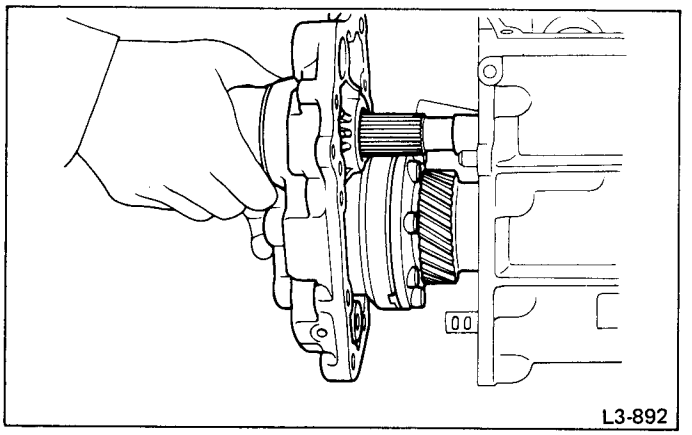


Fig. 109

8) Remove plug with gasket, reverse accent spring and ball.
9) Remove two bolts and loosen reverse check sleeve ASSY.

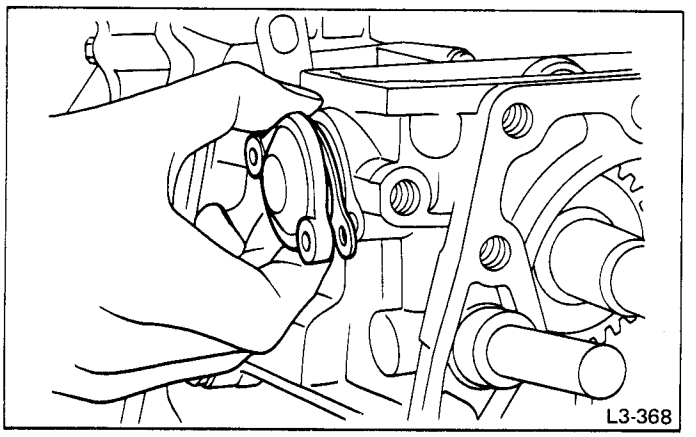


Fig. 110

10) Remove shifter fork screw securing selector arm to shifter arm CP.
11) Remove transfer case and shifter ASSY.
12) Remove bearing mounting bolts.

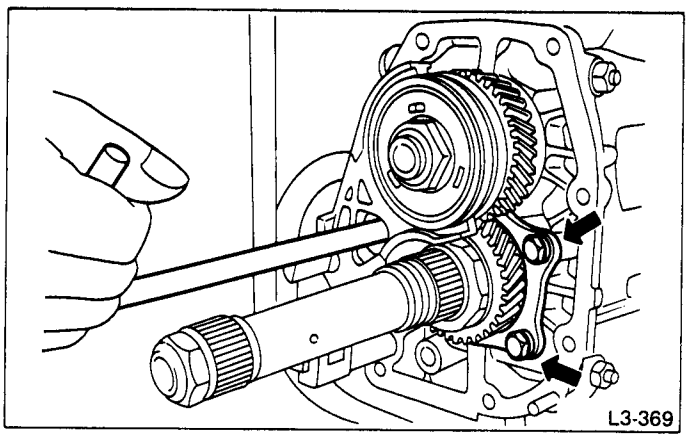


Fig. 111

13) Remove main shaft rear plate.

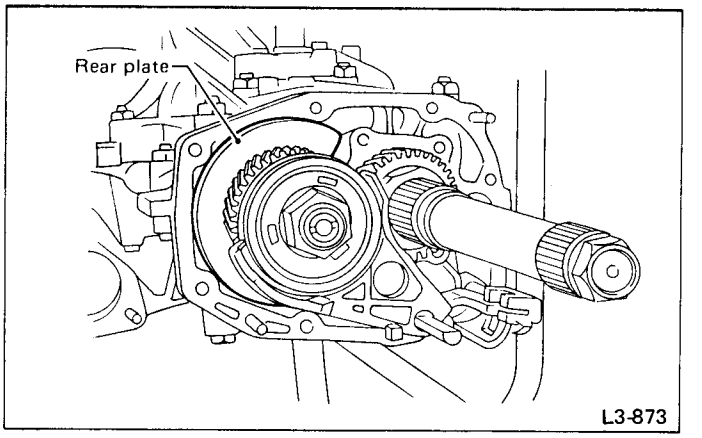


Fig. 112

14) Put vinyl tape around axle drive shafts.
15) Separate transmission case.

Work with nuts facing upward.

16) Remove drive pinion shaft ASSY.

Use a hammer handle, or similar item, remove if too tight.

17) Remove transmission main shaft ASSY.
18) Remove differential ASSY.

a. Be careful not to confuse right and left roller bearing outer races.
b. Be careful not to damage retainer oil seal.

19) Remove 5th shifter fork.
20) Remove three checking ball plugs from main case.

There is a spring and ball inside. Replace gasket with a new one.

21) Remove fork and rod.

When removing rod, keep other rods in neutral. Also, when pulling out spring pin, remove it toward inside of case so that it may not hit against case.

22) Remove reverse idler gear.
23) Remove reverse shifter rod arm and rod.

When pulling arm, be careful not to let ball pop out of arm.

24) Remove reverse shifter lever.
25) Remove differential side retainer.
26) Remove speedometer driven gear.

INSPECTION

See p. 31

ASSEMBLY

Replace gaskets with new ones.

1) Assembling parts in transmission case (LH).
   ① Interlock plunger
   ② Reverse idler gear CP.
   ③ Reverse fork rod and reverse fork rod arm.
   ④ Plug for Rev-5th
   ⑤ Adjustment of reverse idler gear CP. position.

See p. 32

   ⑥ Clearance adjustment

See p. 33

   ⑦ Rod and fork
   ⑧ Plugs for 3-4 and 1-2.

2) Alignment marks/figures on hypoid gear set.

See p. 34

3) Adjustment of drive pinion shim.

See p. 34

4) Install differential ASSY.

a. Wrap the left and right splined sections of axle shaft with vinyl tape to prevent scratches.
b. Be careful not to fold the sealing lip of oil seal.

5) Install transmission main shaft ASSY.

See p. 35

6) Install drive pinion shaft ASSY with selected shims.

Ensure that the knock pin of the case is fitted into the hole in the bearing outer race.

7) Selection of suitable 1st-2nd, 3rd-4th and 5th shifter fork CPs.

1st-2nd shifter fork CP			3rd-4th shifter fork CP			5th shifter fork CP		
Part No.	No.	Remarks	Part No.	No.	Remarks	Part No.	No.	Remarks
32804AA031	1	Moves 0.2 mm (0.008 in) closer to 1st gear	32810AA080	1	Moves 0.2 mm (0.008 in) closer to 4th gear	32812AA060	1	Moves 0.2 mm (0.008 in) closer to 5th gear
32804AA041	–	Positions in the center	32810AA070	–	Positions in the center	32812AA070	–	Positions in the center
32804AA051	3	Moves 0.2 mm (0.008 in) closer to 2nd gear	32810AA100	3	Moves 0.2 mm (0.008 in) closer to 3rd gear	32812AA100	3	Moves 0.2 mm (0.008 in) closer to 5th gear

8) Inspect rod end clearance.

See p. 36

9) Apply liquid gasket and put cases (RH/LH) together.
10) Tighten 17 bolts to the tightening torque in the following sequence.

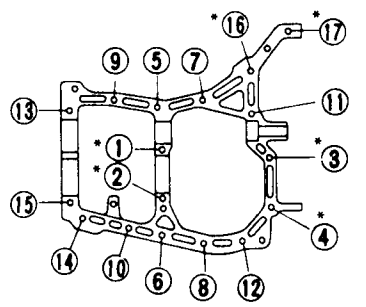


Fig. 113

Tightening torque:
8 mm bolt
23 – 26 N·m (2.3 – 2.7 kg-m, 17 – 20 ft-lb)
10 mm bolt
36 – 42 N·m (3.7 – 4.3 kg-m, 27 – 31 ft-lb)

a. Insert bolts from the bottom and tighten nuts at the top.
b. Put cases together so that drive pinion shim and input shaft holder shim are not caught up in between.
c. Confirm that counter gear and speedometer gear are meshed, and high-low shifter shaft is inserted perfectly.

11) Tighten ball bearing attaching bolts at the drive pinion rear.
12) Backlash adjustment of hypoid gear and preload adjustment of roller bearing.

a. Use new special tool "STOPPER (498427000)".

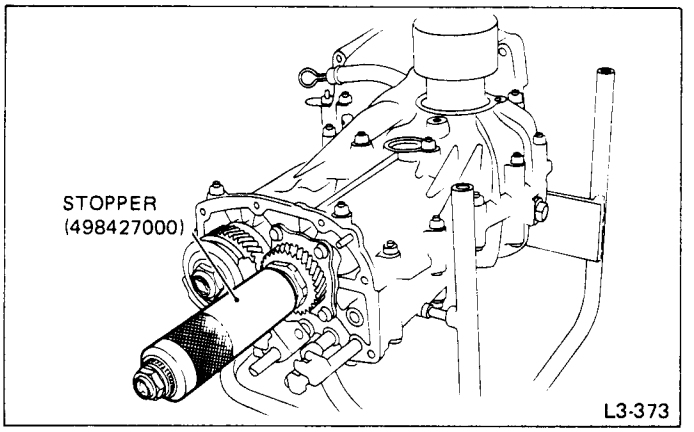


Fig. 114

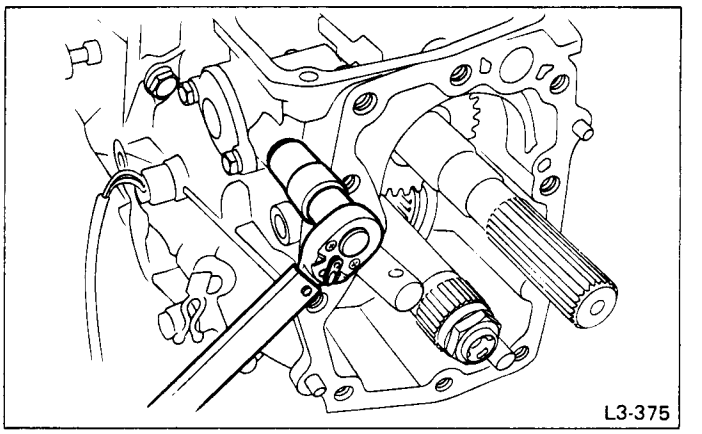


Fig. 116

b. See p. 37

13) Checking tooth contact of hypoid gear.

See p. 37

14) Fit O-ring into the groove of retainer and tighten it into the position where retainer has been tightened.

Carry out this job on both upper and lower retainers.

15) Selection of main shaft rear plate.

See p. 38

16) Install transfer case & shifter ASSY to transmission case.

While aligning differential lock sleeve, install transfer case.

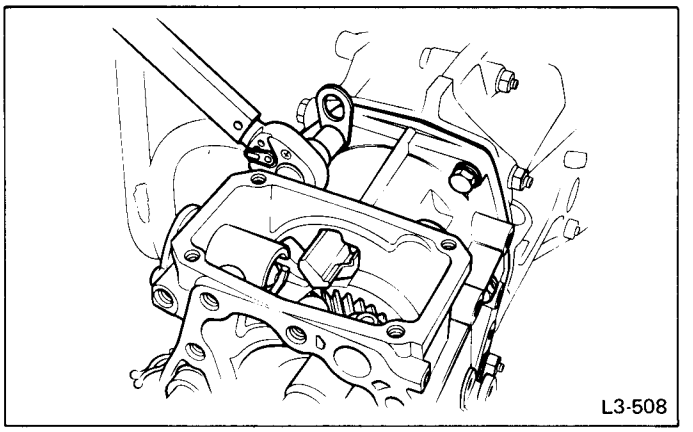


Fig. 115

17) Tighten selector arm.
18) Install in following order ball, reverse accent spring, aluminum gasket and plug.

19) Neutral position adjustment.

See p. 39

20) Reverse check plate adjustment.

See p. 40

21) Installing center differential & extension ASSY.
① Install transfer shifter rod on extension with a clip.
② Install center differential & extension on transfer case.

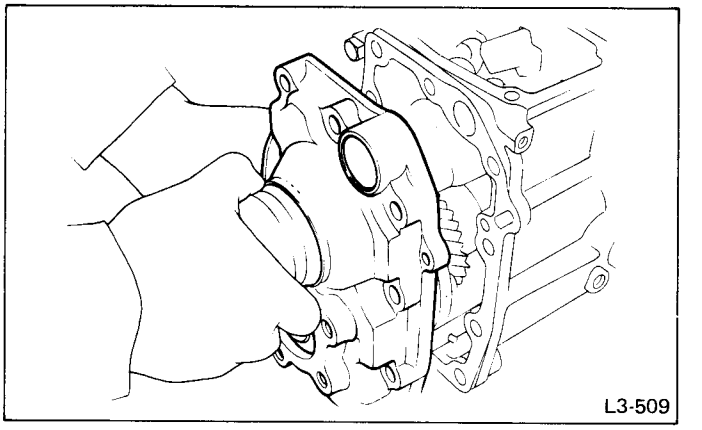


Fig. 117

③ Tightening the extension
Tighten the ten 10-mm bolts to secure extension.

Tightening torque:
37 ± 3 N·m (3.8 ± 0.3 kg-m, 27.5 ± 2.2 ft-lb)

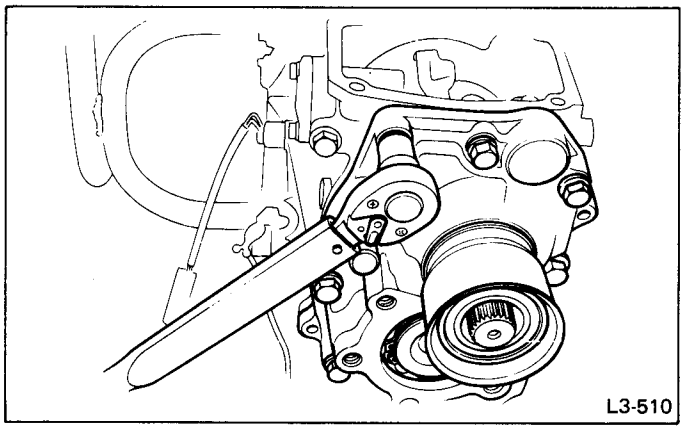


Fig. 118

④ Install ball, spring and gasket in extension and tighten plug.

Tightening torque:
19.6 ± 1.5 N·m (2.0 ± 0.15 kg-m, 14.5 ± 1.1 ft-lb)

22) Installing extension cover and shifter bracket
Secure cover and shifter bracket to extension with the five bolts.

Tightening torque:
33 ± 3 N·m (3.4 ± 0.3 kg-m, 24.6 ± 2.2 ft-lb)

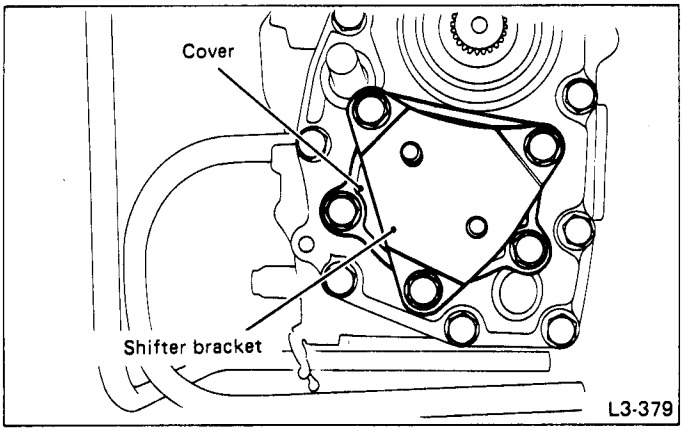


Fig. 119

23) Install transfer cover with gasket and tighten bolts.
24) Installing differential lock bracket
Tighten with the three bolts.

Tightening torque:
15.7 ± 1.5 N·m (1.6 ± 0.15 kg-m, 11.6 ± 1.1 ft-lb)

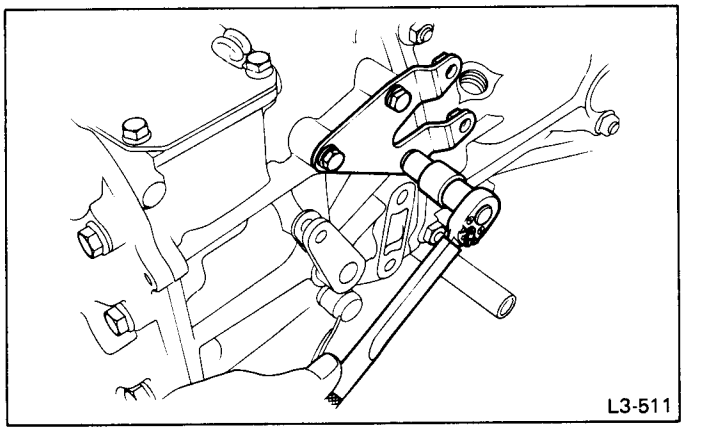


Fig. 120

25) Installing actuator & cable ASSY
Install on the case (left) with the three bolts. Also install cable plate with the two bolts.

Tightening torque:
15.7 ± 1.5 N·m (1.6 ± 0.15 kg-m, 11.6 ± 1.1 ft-lb)

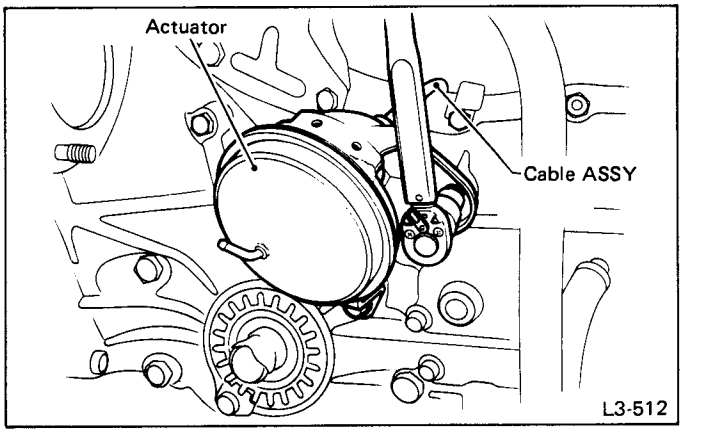


Fig. 121

26) Adjusting cable length
① Move differential lock lever to the center differential lock side while turning main shaft.

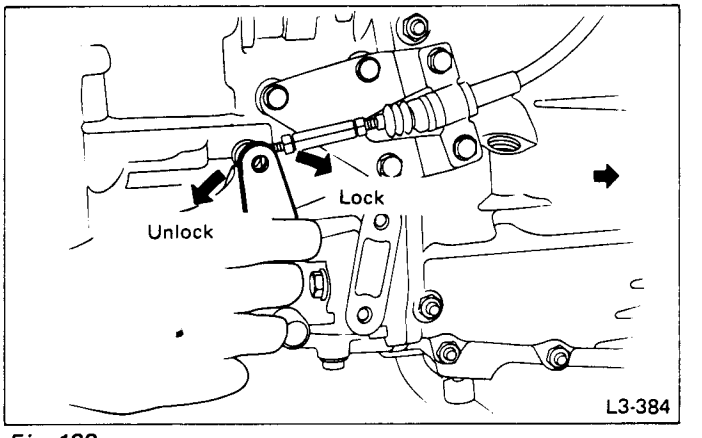


Fig. 122

② Connect a hose to the pipe outside the actuator. Apply vacuum (using Mighty Bag, etc.) through the hose to pull the cable forward.

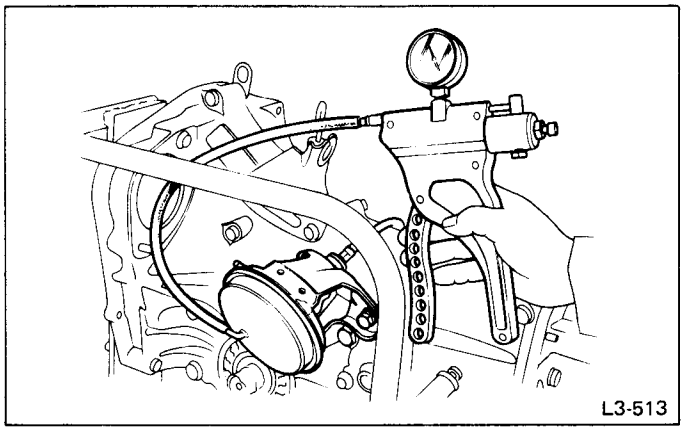


Fig. 123

③ Align the bore in differential lock lever with the hole at the end of cable using a turnbuckle, and secure with an 8-mm clevis pin and snap pin.
④ Turn the turnbuckle 180° in the compression direction and tighten the two lock nuts to the specified torque.

Tightening torque:
5 N·m (0.5 kg-m, 3.6 ft-lb)

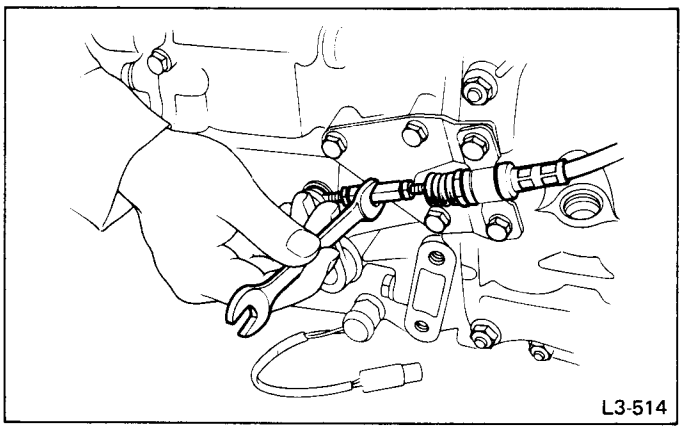


Fig. 124

27) Checking operation of transfer shifter rod
Apply vacuum –26.7 to –33.3 kPa (–200 to –250 mmHg, –7.87 to –9.84 inHg) through pipes located on the inside and outside of the actuator to check that transfer shifter rod moves smoothly from the differential lock position to the differential unlock position, and vice versa.

If transfer shifter rod does not move properly, check condition of rod, lever, bracket, transfer sleeve and gears. Repair or replace faulty parts.

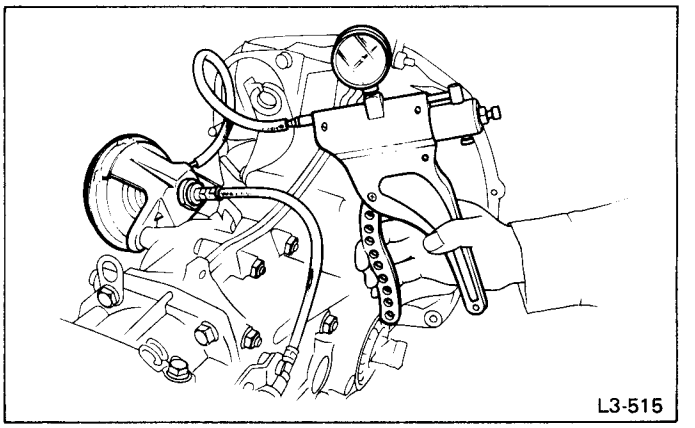


Fig. 125

28) Install release lever.

[2] Center Differential & Extension ASSY

DISASSEMBLY

1) Remove snap ring (Outer-50) from center differential bearing.
2) Press out center differential ASSY.

Do not reuse ball bearing.

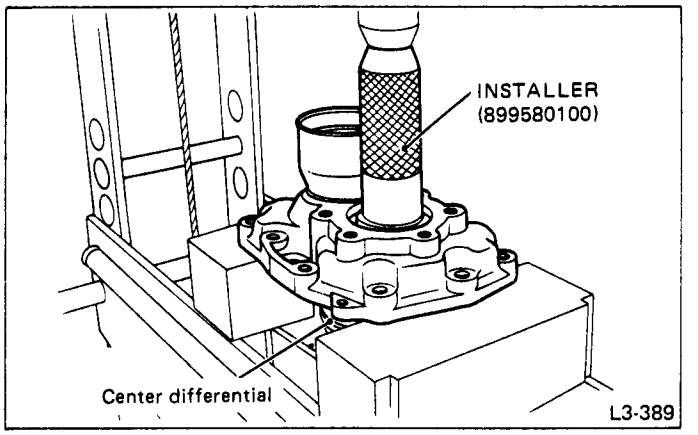


Fig. 126

3) Remove snap ring (Inner-80) and remove ball bearing (50 x 80 x 10).

Do not reuse ball bearing.

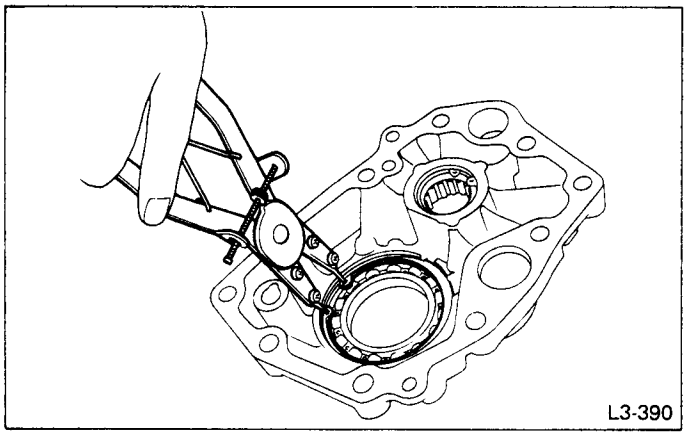


Fig. 127

4) Disassembling center differential
   ① Remove the eight socket bolts (8 x 16 x 12).
   ② Separate transfer drive gear and differential case. Remove the shaft, two pinions, bevel gear, washer, and needle bearings (41 x 46 x 13; 2 sets of two halves).

Note the locations of both sets of needle bearings so that they can be reassembled in their original positions.

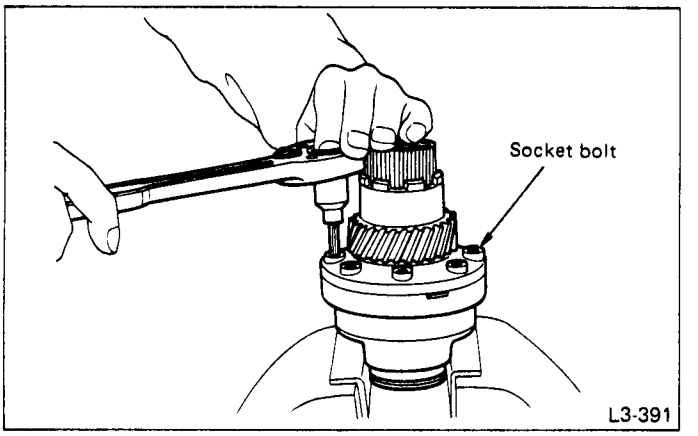


Fig. 128

ASSEMBLY

1) Attach ball bearing (50 x 80 x 10) to extension and install snap ring (Inner-80).
Select a suitable snap ring so that side clearance between snap ring and ball bearing is 0 to 0.2 mm (0 to 0.008 in).

Snap Ring (Inner-80)	
Part No.	Thickness mm (in)
805180020	1.75 ± 0.03 (0.0689 ± 0.0012)
805180030	1.90 ± 0.03 (0.0748 ± 0.0012)
805180040	2.05 ± 0.03 (0.0807 ± 0.0012)

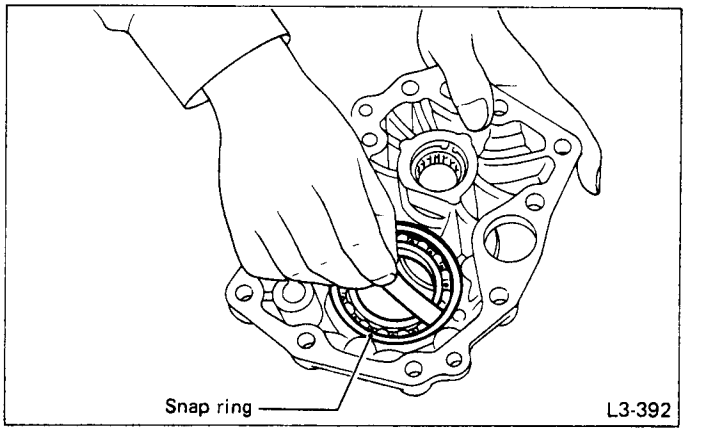


Fig. 129

2) Installing center differential ASSY
   ① Position differential bevel washer and bevel gear in center differential case.
   ② Attach differential bevel pinion to center differential pinion shaft and insert the assembled unit into the case.

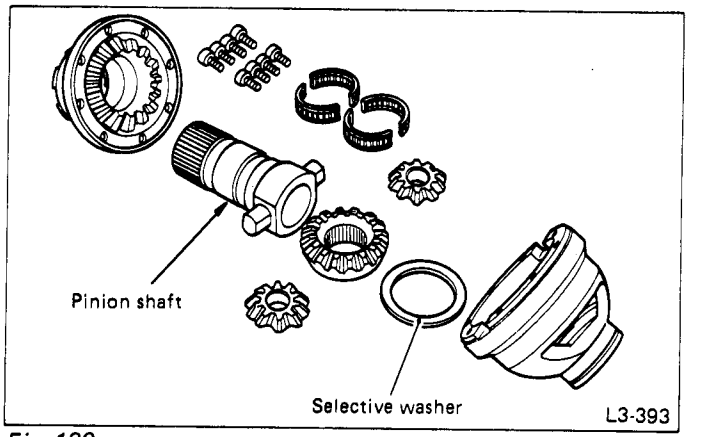


Fig. 130

   ③ Attach the two needle bearing halves (41 x 46 x 13) to the groove in pinion shaft. Install transfer drive gear and tighten with the eight socket bolts (8 x 16 x 12).

Tightening torque:
25 ± 2 N·m (2.5 ± 0.2 kg-m, 18.1 ± 1.4 ft-lb)

Always replace needle bearing halves in their original positions.

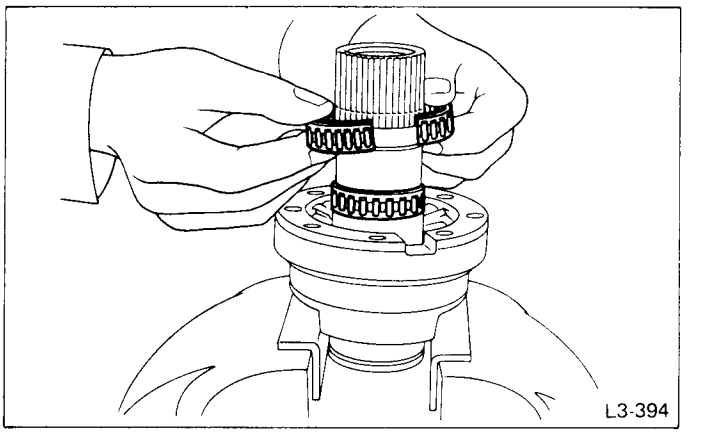


Fig. 131

④ Backlash adjustment
Set up a dial gauge as shown in Figure below. Select a differential bevel washer so that pinion shaft can move 0.40 to 0.60 mm (0.0157 to 0.0236 in) in the axial direction.

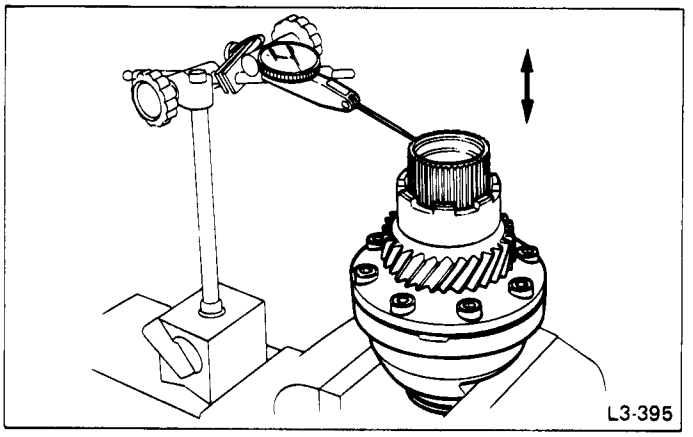


Fig. 132

Differential Bevel Washer	
Part No.	Thickness mm (in)
38960AA000	1.0 ± 0.05 (0.0394 ± 0.0020)
38960AA100	1.2 ± 0.05 (0.0472 ± 0.0020)
38960AA200	1.4 ± 0.05 (0.0551 ± 0.0020)
38960AA300	1.6 ± 0.05 (0.0630 ± 0.0020)
38960AA400	1.8 ± 0.05 (0.0709 ± 0.0020)
38960AA500	2.0 ± 0.05 (0.0787 ± 0.0020)

3) Using INSTALLER, press center differential into place.

Tool No.	Tool name
922340000	INSTALLER

Support socket bolt location with a press.

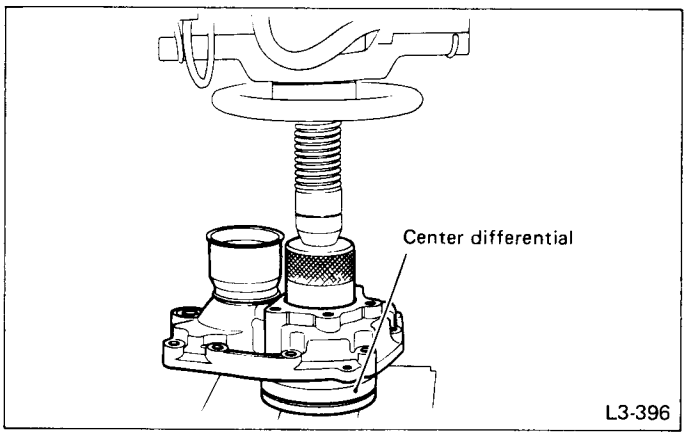


Fig. 133

4) Installing snap ring (Outer-50)
Select a snap ring so that side clearance between snap ring and ball bearing is 0 to 0.2 mm (00 to 0.008 in).

Snap Ring (Outer-50)	
Part No.	Thickness mm (in)
805050030	2.00 ± 0.03 (0.0787 ± 0.0012)
805050040	2.15 ± 0.03 (0.0846 ± 0.0012)
805050050	2.30 ± 0.03 (0.0906 ± 0.0012)

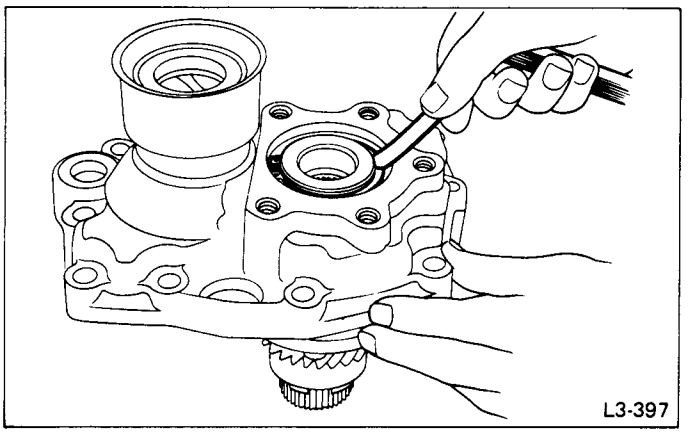


Fig. 134

[3] Transfer Case & Shifter ASSY

DISASSEMBLY

1) Pull out shifter arm CP., selector arm, and reverse check sleeve ASSY from transfer case.
2) Remove oil guide from transfer case.

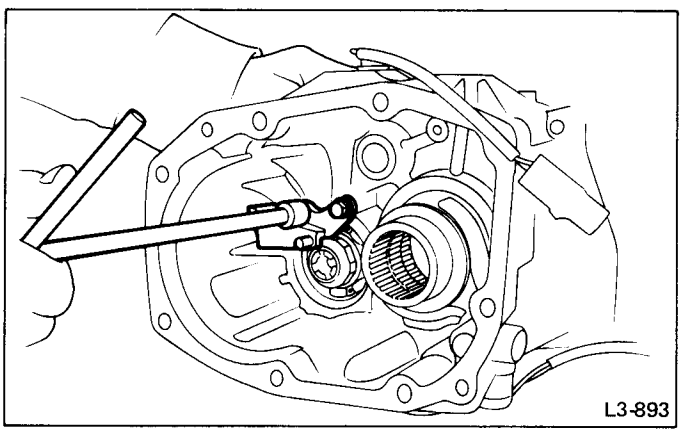


Fig. 135

3) Remove ① back-up light switch, ② neutral switch and ③ differential lock pilot switch.

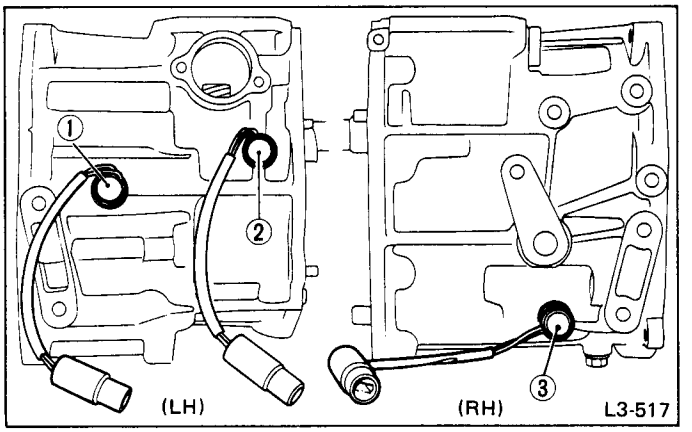


Fig. 136

4) Using REMOVER 2, drive out straight pin (5 mm dia. x 25). Remove differential lock lever ASSY.

Tool No.	Tool name
398791600	REMOVER 2

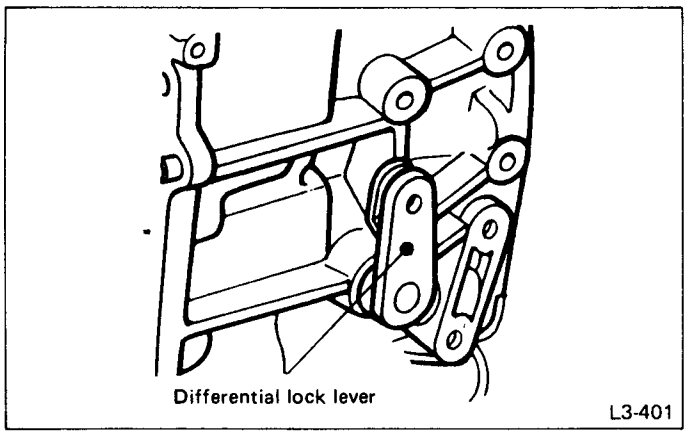


Fig. 137

5) Using REMOVER 2, drive out straight pin (5 mm dia. x 25) through the hole for differential lock switch. Remove fork, differential lock shaft and lock sleeve.

Tool No.	Tool name
398791600	REMOVER 2

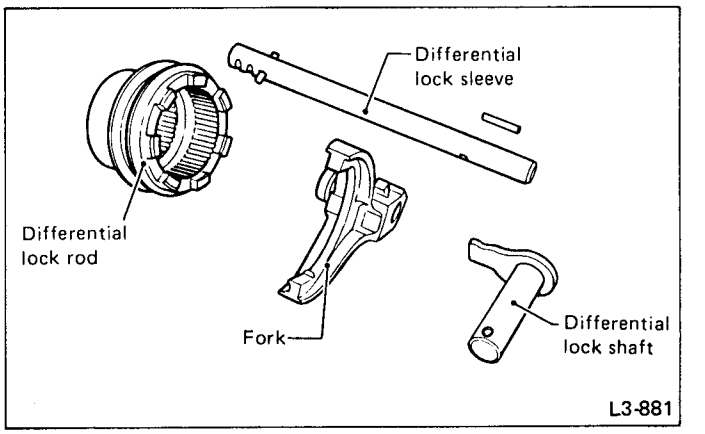


Fig. 138

6) Place splined end of transfer driven gear in a vise. Unlock lock plates and remove lock nuts (30 x 12).

a. Use soft vise jaws (such as aluminum plates, etc.) when placing driven gear in vise.
b. Use a hex. socket wrench whose width across flats is 30 mm.

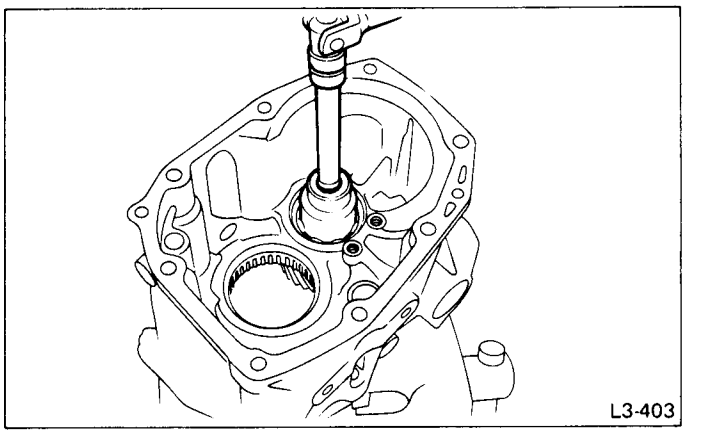


Fig. 139

7) Press out transfer driven gear.

Tool No.	Tool name
899580100	REMOVER

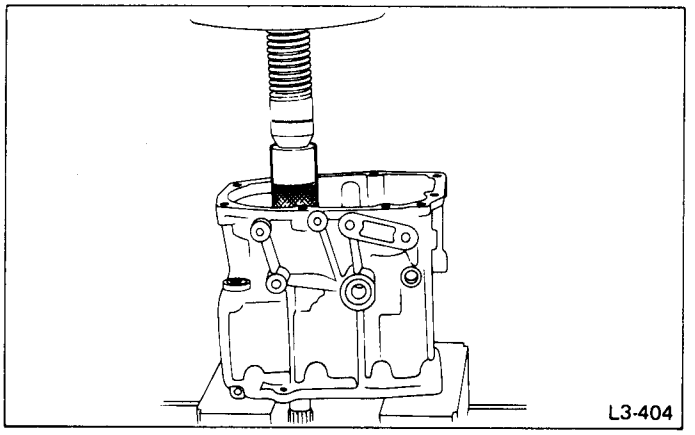


Fig. 140

8) Remove snap ring (Inner-56) and press out ball bearing (22 x 56 x 16).

Tool No.	Tool name
899754112	PRESS

Do not reuse ball bearing.

9) Remove snap ring (Inner-72). Remove needle bearing (58 x 72 x 16) using INSTALLER and a press.

Tool No.	Tool name
398663600	SNAP RING PLIERS
499755502	INSTALLER

ASSEMBLY

1) Press needle bearing (58 x 72 x 16) into the bore in transfer case and secure with snap ring (Inner-72).

Tool No.	Tool name
498175400	INSTALLER
499755502	INSTALLER

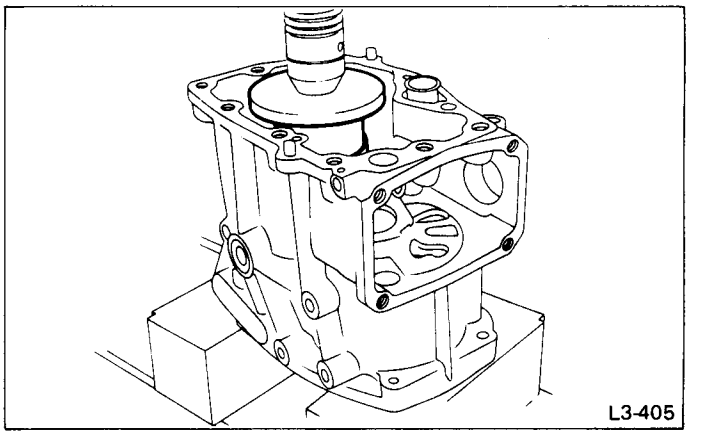


Fig. 141

2) Install ball bearing (22 x 56 x 16) using a press and INSTALLER and install snap ring (Inner-56).

Tool No.	Tool name
899874100	INSTALLER

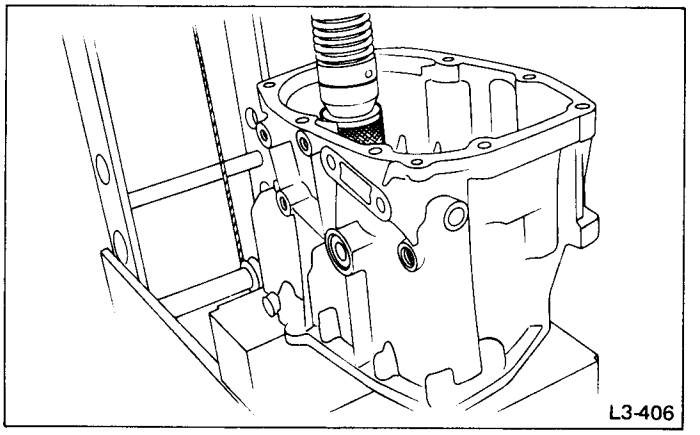


Fig. 142

3) Select a snap ring so that side clearance between snap ring (Inner-56) and ball bearing is 0 to 0.1 mm (0 to 0.004 in).

Snap Ring (Inner-56)	
Part No.	Thickness mm (in)
805156020	1.75 ± 0.015 (0.0689 ± 0.0006)
805156021	1.83 ± 0.015 (0.0720 ± 0.0006)
805156022	1.91 ± 0.015 (0.0752 ± 0.0006)

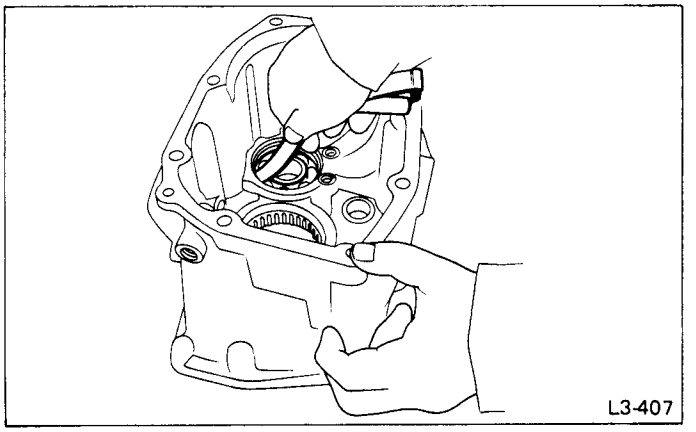


Fig. 143

4) Install transfer driven gear using PRESS and INSTALLER.

Tool No.	Tool name
899580100	INSTALLER
899754112	PRESS

Be careful because press support is unstable.

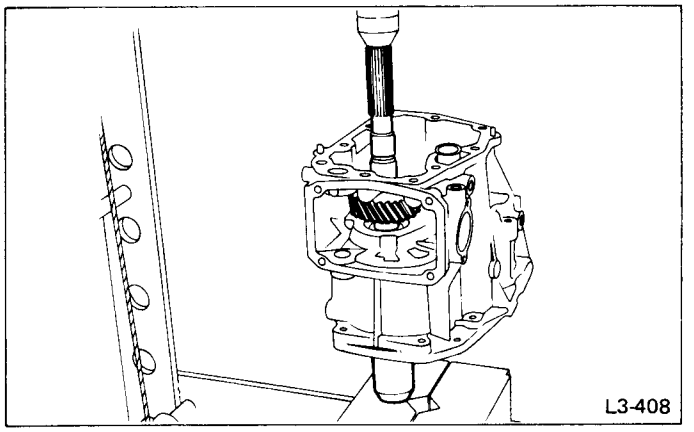


Fig. 144

5) Install lock washer (20 x 30 x 3). Place splined end of transfer driven gear in a vise and tighten lock nut (30 x 12) to the specified torque. Lock lock nut at four points.

Tightening torque:
78 ± 6 N·m (8 ± 0.6 kg-m, 57.9 ± 4.3 ft-lb)

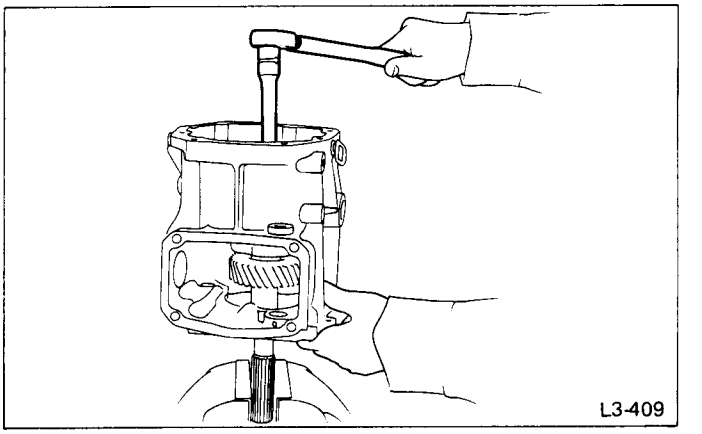


Fig. 145

6) Install differential lock shaft, lock sleeve, fork and rod in that order. Drive straight pin (5 mm dia. x 25) into place through the hole for differential lock switch using REMOVER 2.

Tool No.	Tool name
398791600	REMOVER 2

a. Note the direction of the check ball groove in the rod.
b. Face dog clutch of differential lock sleeve toward the rear.

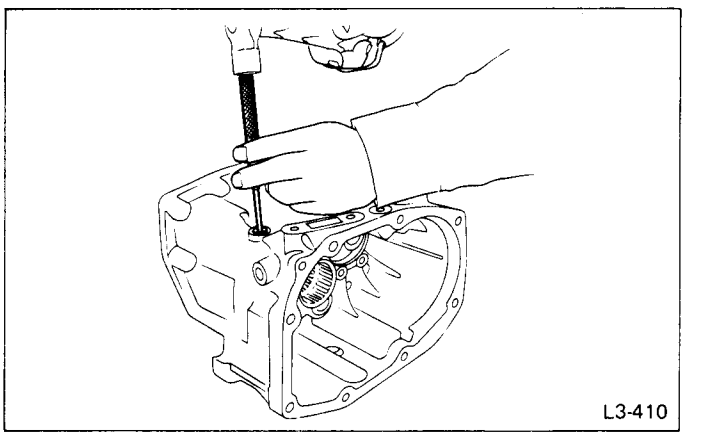


Fig. 146

7) Install differential lock lever. Drive straight pin (5 mm dia. x 28) into place using REMOVER 2.

Tool No.	Tool name
398791600	REMOVER 2

8) Install ③ differential lock pilot switch, ② neutral switch and ① back-up light switch.

Tightening torque:
25 ± 2 N·m (2.5 ± 0.2 kg-m, 18.1 ± 1.4 ft-lb)

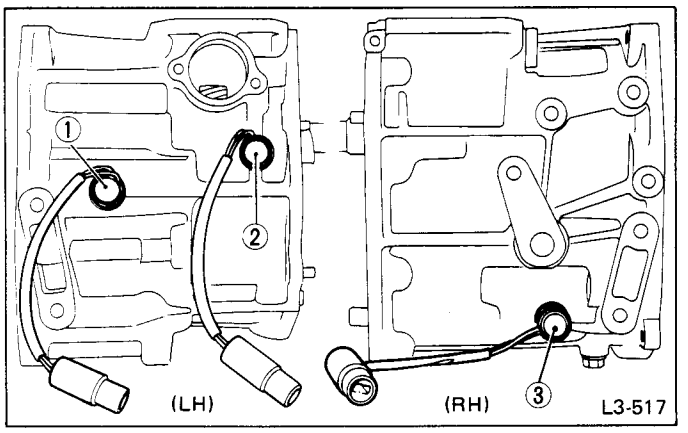


Fig. 147

Harness color ① RY (two harnesses)
② LgY and B
③ RY (two harnesses)

9) Position reverse check sleeve ASSY in the case.
10) Position shifter arm in the case and install selector arm.

Apply gear oil to shifter arm. Check that oil seal (18 x 28 x 7) engages properly.

11) Install transfer oil guide.

Tightening torque:
10 N·m (1 kg-m, 7 ft-lb)

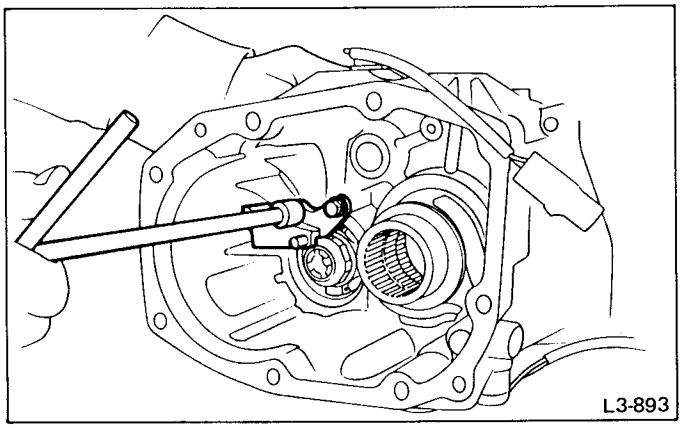


Fig. 148

[4] Drive Pinion Shaft ASSY

DISASSEMBLY

1) Drive pinion ASSY
(1) Straighten lock nut at staked portion. Remove the lock nut using HOLDER and STOPPER.

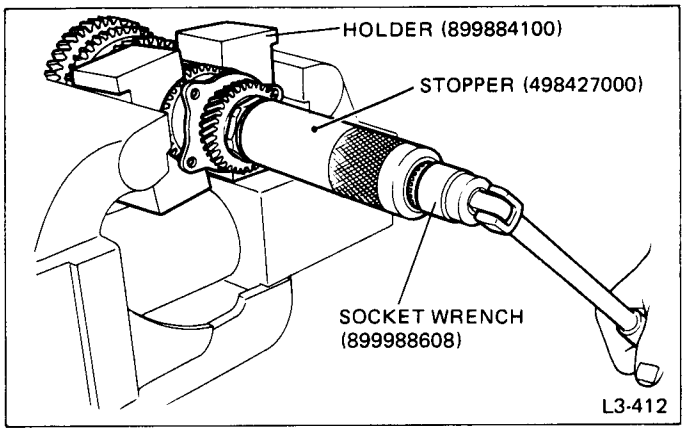


Fig. 149

(2) Withdraw drive pinion from driven shaft ASSY. Remove differential bevel gear sleeve ①, drive pinion spacer ②, two washers ③ (25 x 37.5 x 4), thrust bearing ④ (25 x 37.5 x 3), needle bearing ⑤ (25 x 30 x 20), drive pinion collar ⑥, needle bearing ⑦ (30 x 37 x 23) and thrust bearing ⑧ (33 x 50 x 3).

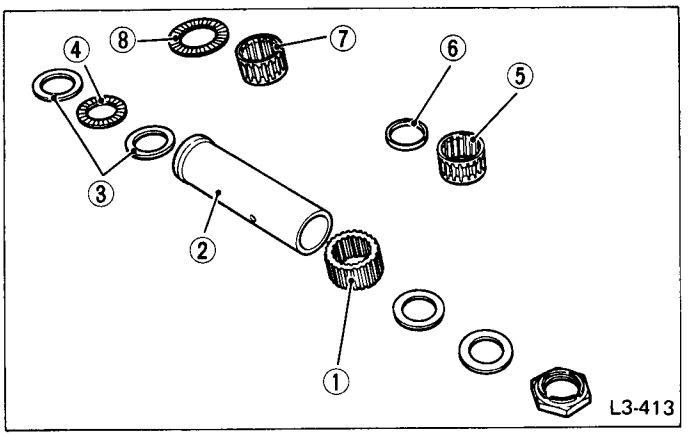


Fig. 150

(3) Remove roller bearing and washer (33 x 50 x 5) using REMOVER and PRESS.

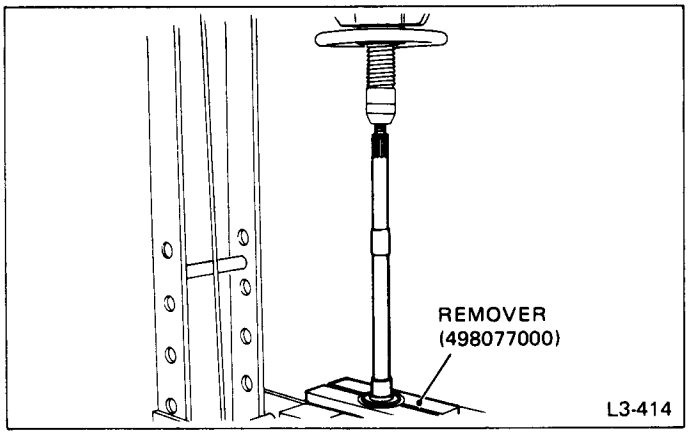


Fig. 151

2) Driven gear ASSY

Attach a cloth to the end of driven shaft (on the frictional side of thrust needle bearing) during disassembly or reassembly to prevent damage.

(1) Straighten lock nut at staked portion. Remove the lock nut using SOCKET WRENCH 50 and HOLDER.

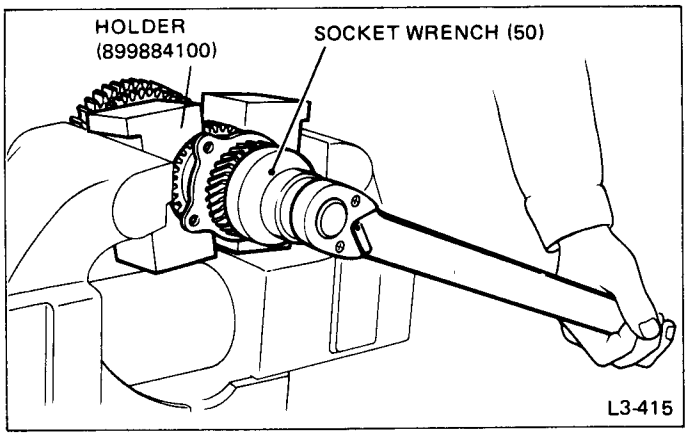


Fig. 152

(2) Remove 5th driven gear using REMOVER.

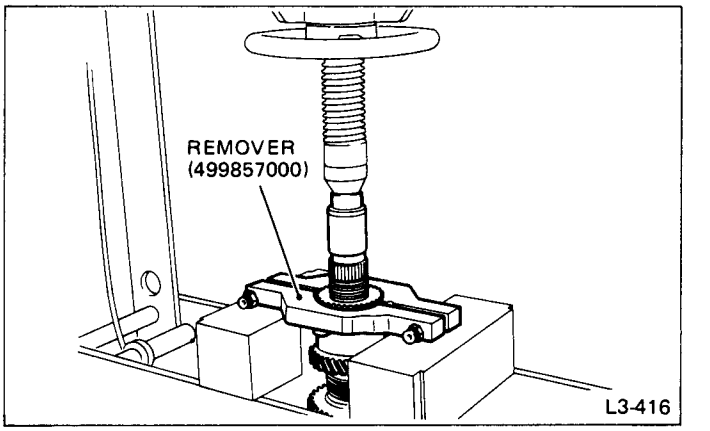


Fig. 153

(3) Remove woodruff key.
(4) Remove roller bearing (42 x 74 x 40) and 3rd & 4th driven gear using REMOVER.

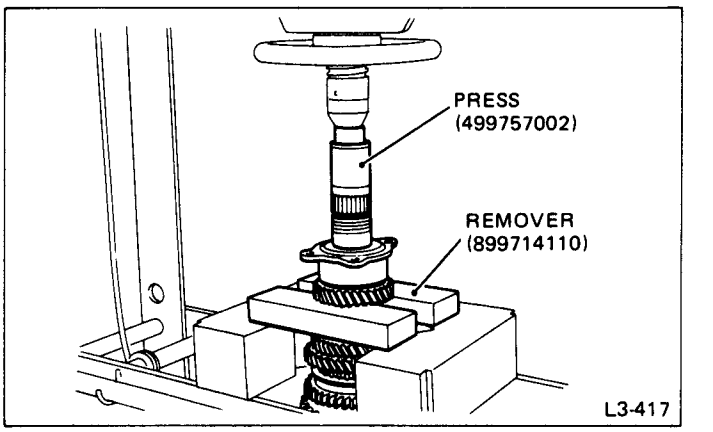


Fig. 154

(5) Remove the key.
(6) Remove 2nd driven gear ASSY.
(7) Remove 1st driven gear, 2nd gear bushing, gear and hub using REMOVER and PRESS.

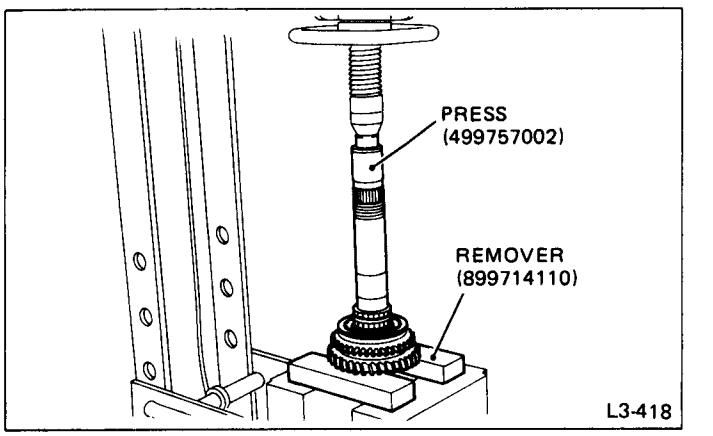


Fig. 155

ASSEMBLY

1) Assemble gear & hub ASSY.

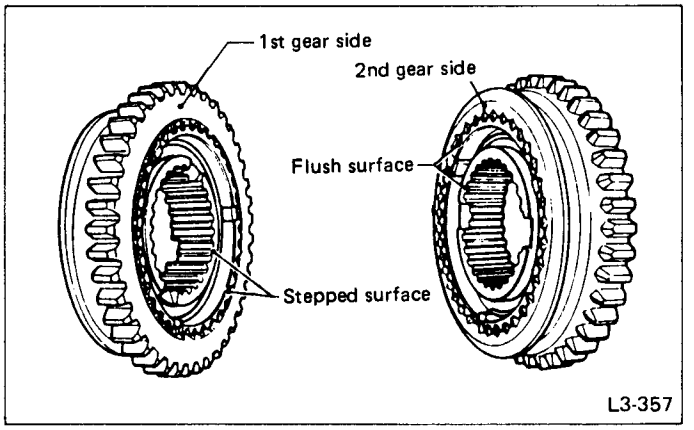


Fig. 156

Position open ends of springs 120° apart.

2) Driven shaft ASSY
(1) Install 1st driven gear, 1st-2nd baulk ring and gear & hub ASSY onto driven shaft.
(2) Install 2nd driven gear bushing onto driven shaft using INSTALLER and PRESS.

Attach a cloth to the end of driven shaft to prevent damage.

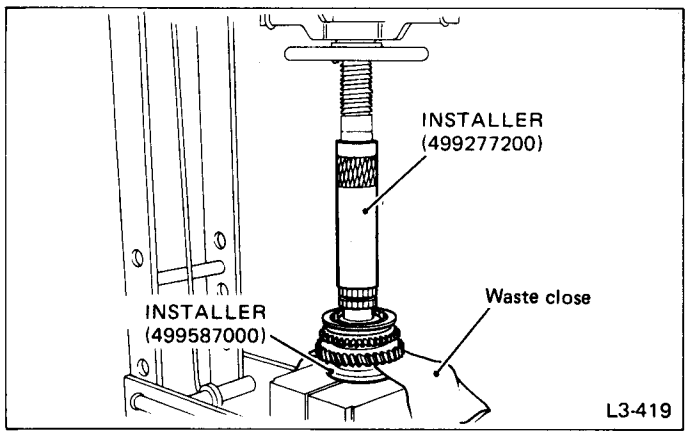


Fig. 157

(3) Install 2nd driven gear, 1st-2nd baulk ring and insert onto driven shaft. After installing key on driven shaft, install 3rd-4th driven gear using INSTALLER and PRESS.

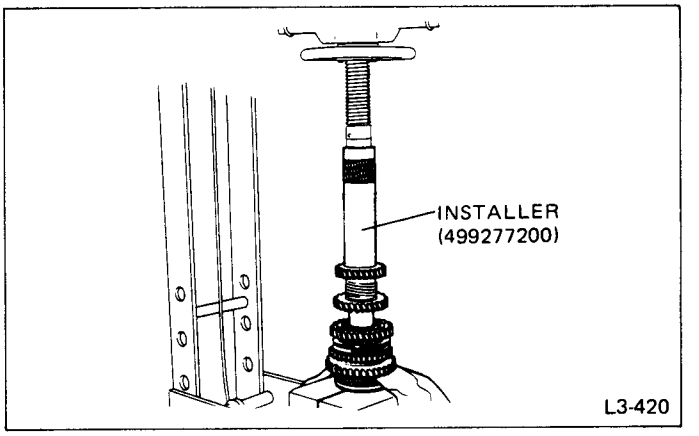


Fig. 158

(4) Install a set of roller bearing (42 x 74 x 40) onto the driven shaft using INSTALLER and PRESS.

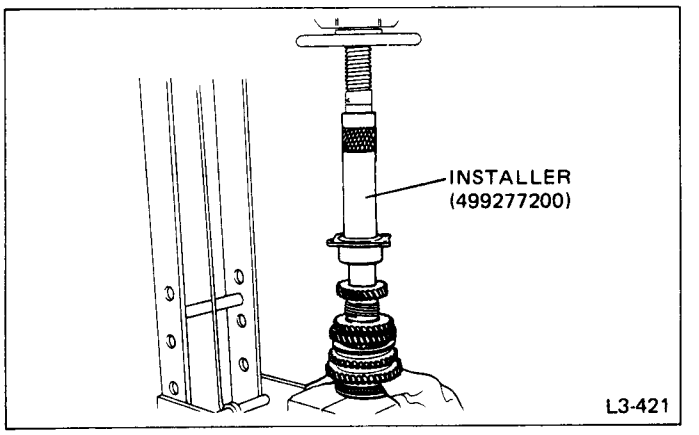


Fig. 159

(5) Position woodruff key in groove on the rear of driven shaft. Install 5th driven gear onto drive shaft using INSTALLER and PRESS.

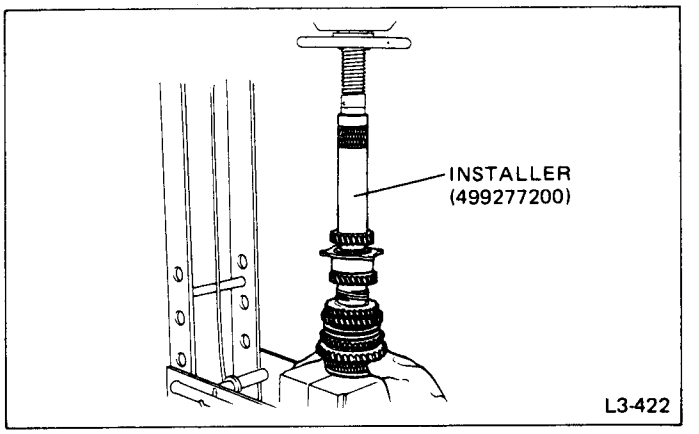


Fig. 160

(6) Install lock washer (42 x 53 x 2). Install lock nut (42 x 13) and tighten to the specified torque using SOCKET WRENCH (50).

Tightening torque:
245 ± 10 N·m (25 ± 1 kg-m, 181 ± 7 ft-lb)

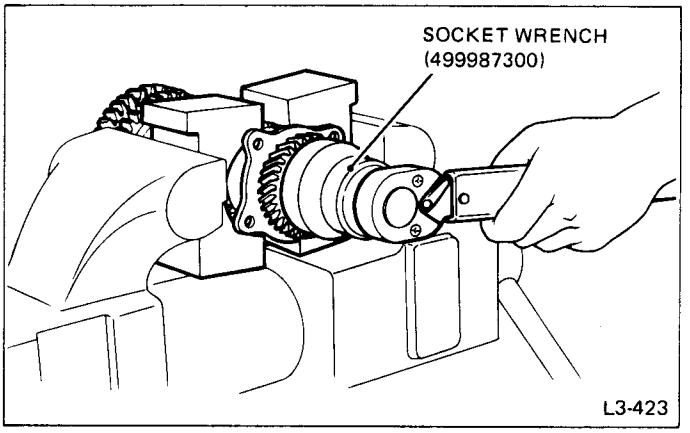


Fig. 161

a. Stake lock nut at two points.
b. Check that starting torque of roller bearing is 0.1 to 1.5 N·m (1 to 15 kg-cm, 0.9 to 13.0 in-lb).

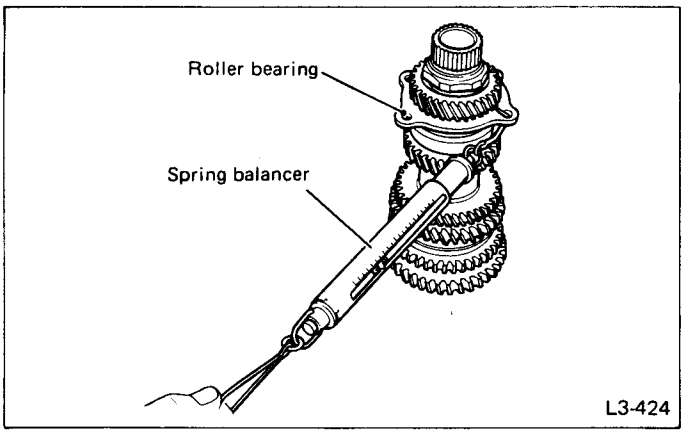


Fig. 162

3) Drive pinion shaft ASSY
(1) Install roller bearing onto drive pinion. Install washer (33 x 50 x 5) using INSTALLER and PRESS.

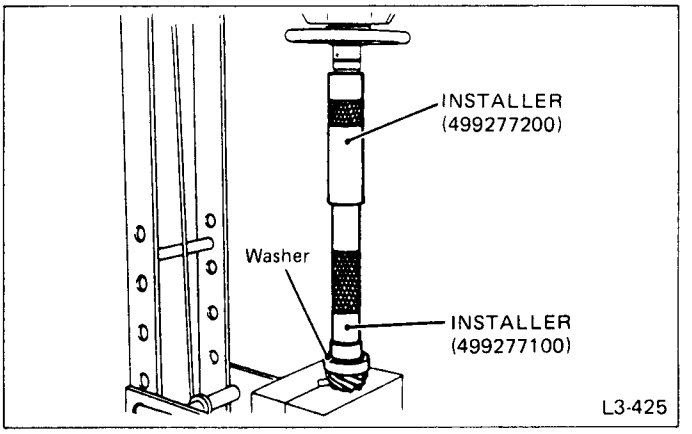


Fig. 163

When installing roller bearing, note its directions (front and rear) because knock pin hole in outer race is offset.

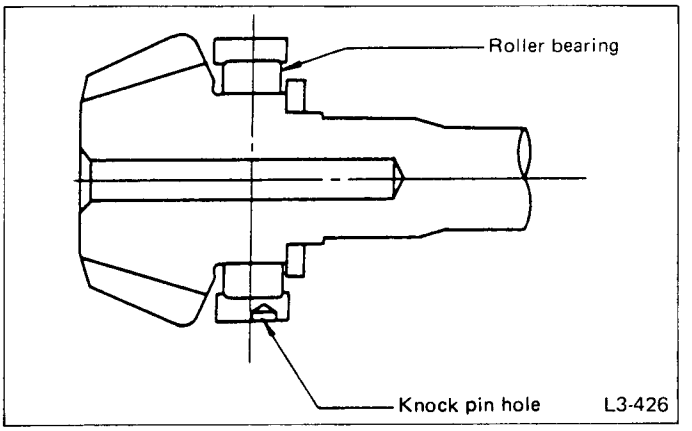


Fig. 164

(2) Install thrust bearing (33 x 50 x 3) and needle bearing (30 x 37 x 23). Install driven shaft ASSY.

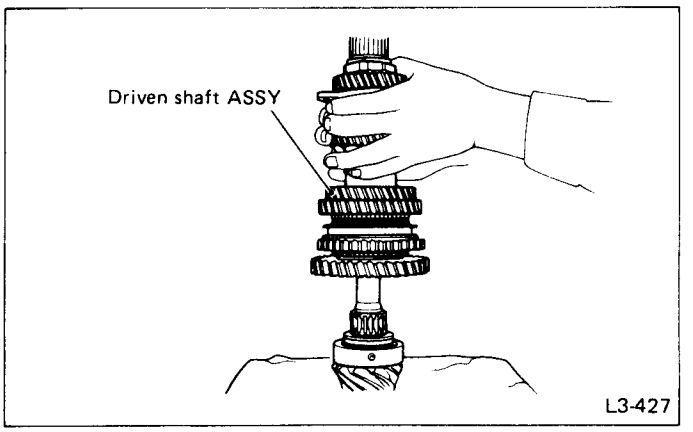


Fig. 165

(3) Install drive pinion collar ①, needle bearing ② (25 x 30 x 20), washer ③ (215 x 37.5 x 4), thrust bearing ④ (25 x 37.5 x 3), washer ⑤ (25 x 37.5 x 4), drive pinion spacer ⑥ and differential bevel gear sleeve ⑦ in that order.

Be careful because spacer must be installed in proper direction.

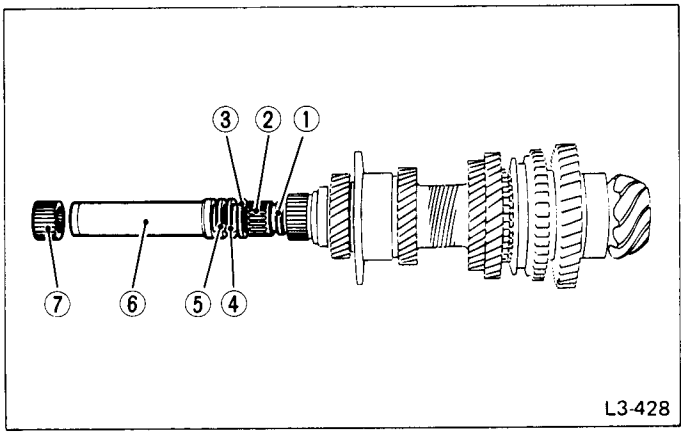


Fig. 166

4) Adjust thrust bearing preload.
(1) After completing steps 1) through 4) above, select a spacer and sleeve so that dimension H is zero through visual check. Position washer (18.3 x 30 x 4) and lock washer (18 x 30 x 2) and install lock nut (18 x 13.5).

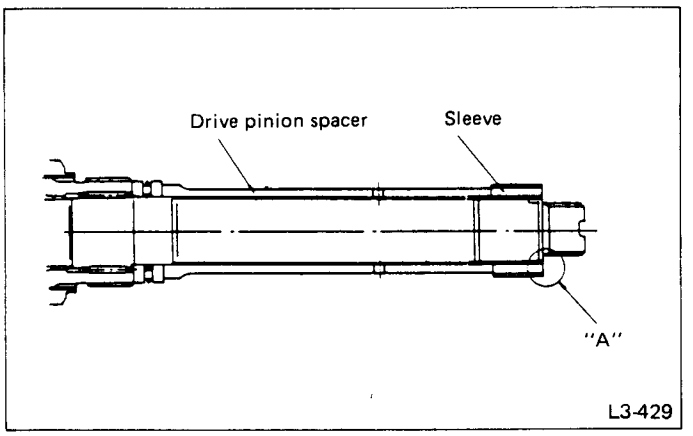


Fig. 167

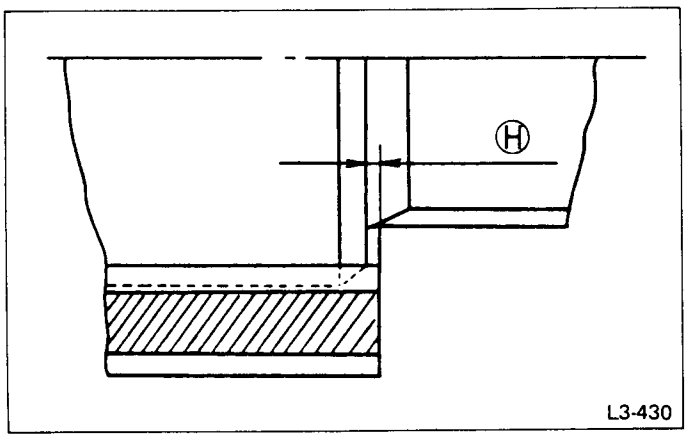


Fig. 168 Detail "A"

(2) Using HOLDER, measure starting torque while tightening lock nut to the specified torque.

Tightening torque:
118 ± 8 N·m (12 ± 0.8 kg-m, 86.8 ± 5.8 ft-lb)

Starting torque:
0.3 – 0.8 N·m (3 – 8 kg-cm, 2.6 – 6.9 in-lb)

Stake the lock nut at four points.

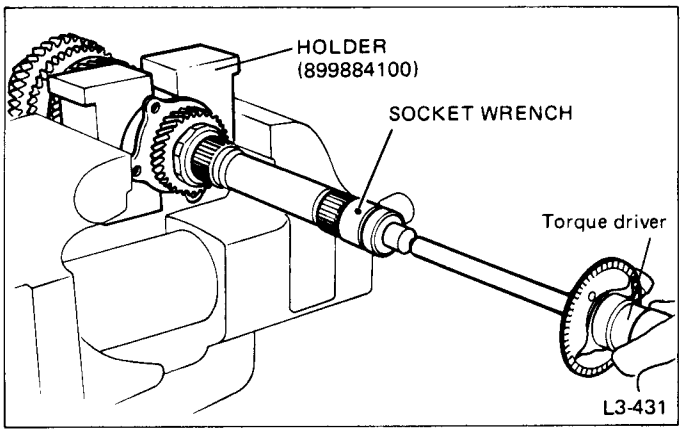


Fig. 169

(3) If starting torque is not within specified limit, select new spacer or sleeve and recheck starting torque.

Starting torque	Dimension H	Spacer/sleeve
Low	Small	Select thicker one.
High	Large	Select thinner one.

Drive Pinion Spacer	
Part No.	Length mm (in)
32288AA000	121.35 ± 0.02 (4.7775 ± 0.0008)
32288AA010	121.50 ± 0.02 (4.7835 ± 0.0008)
32288AA020	121.65 ± 0.02 (4.7894 ± 0.0008)

Differential Bevel Gear Sleeve	
Part No.	Length mm (in)
38956AA000	18.925 ± 0.01 (0.7451 ± 0.0004)
38956AA010	18.950 ± 0.01 (0.7461 ± 0.0004)
38956AA020	18.975 ± 0.01 (0.7470 ± 0.0004)
38956AA030	19.000 ± 0.01 (0.7480 ± 0.0004)
38956AA040	19.025 ± 0.01 (0.7490 ± 0.0004)
38956AA050	19.050 ± 0.01 (0.7500 ± 0.0004)
38956AA060	19.075 ± 0.01 (0.7510 ± 0.0004)

[5] Transmission Main Shaft ASSY

See p. 46

[6] Differential ASSY

See p. 48

C FWD

[1] Overall Transmission (FWD)

DISASSEMBLY

The following job should be followed before disassembly;
- Clean oil, grease, dirt and dust from transmission.
- Remove drain plug to drain oil. After draining, retighten it as before.
- Replace gasket with a new one.

Tightening torque:
41 – 47 N·m (4.2 – 4.8 kg-m, 30 – 35 ft-lb)

1) Attach transmission to TRANSMISSION STAND SET (399295120).
2) Remove release lever and clutch release bearing.
   (1) Remove two clips and release bearing holder.
   (2) Remove dust cover, release lever retainer spring and clutch release lever.

Be careful not to deform clips and retainer spring.

3) Remove rear case and shifter ASSY.
4) Remove four bolts holding ball bearing behind drive pinion shaft ASSY.
5) Putting vinyl tape around axle drive shafts.
6) Separate transmission case into right and left cases by loosening seventeen coupling bolts.

Work with nuts facing upward.

7) Remove drive pinion shaft ASSY from LH transmission.

Use a hammer claw, etc. to remove if too tight.

8) Remove transmission main shaft ASSY from LH transmission case.
9) Removing differential ASSY
Remove differential ASSY from transmission case.

a. Be careful not to confuse right and left roller bearing outer races.
b. Be careful not to damage retainer oil seal.

10) Removing 5th shifter fork
Remove spring pin from 5th shifter fork.

Tool No.	Tool name
398791700	STRAIGHT PIN REMOVER

11) Removing checking ball plugs
Remove three checking ball plugs from main case.

There is a spring and ball inside. Replace gasket with a new one.

12) Removing fork and rod
Remove 3-4 shifter fork and 3-4 fork rod by loosening shifter fork screw. Drive out spring pin from 1-2 shifter fork CP with STRAIGHT PIN REMOVER "2" (398791700), and remove fork CP and 1-2 fork rod.

When pulling out rod, keep other rod in neutral. Also, turn 3rd-4th rail 90° and remove it in order not to drop plunger.

13) Removing reverse idler gear
Pull out straight pin and reverse idler gear shaft. Then remove reverse idler gear CP and washer.

When pulling out straight pin, wash off oil and blow air on it for easy removal.

14) Removing arm and rod
Remove outer snap ring and pull out reverse shifter rod arm with ball, spring and interlock plunger from rod. Then take out rod.

When pulling out reverse shifter rod arm, be careful not to let ball pop out of arm.

15) Removing differential side retainer ASSY
Using WRENCH ASSY (499787000), remove differential side retainer ASSY from transmission case.

In FWD, this work can be done with WRENCH CP (399780111).

16) Removing speedometer driven gear
Remove outer snap ring and pull out speedometer driven gear. Next, remove speedometer shaft CP and washer from main case.

INSPECTION

See p. 31

ASSEMBLY

Replace gaskets with new ones.

1) Assembling parts in transmission case (LH).
① Install two plungers into case.

Be sure to insert the correct plunger.

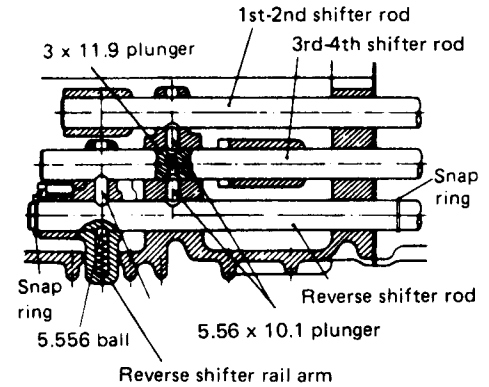


Fig. 170

② Install reverse idler gear and reverse idler gear shaft and retain with knock pin.

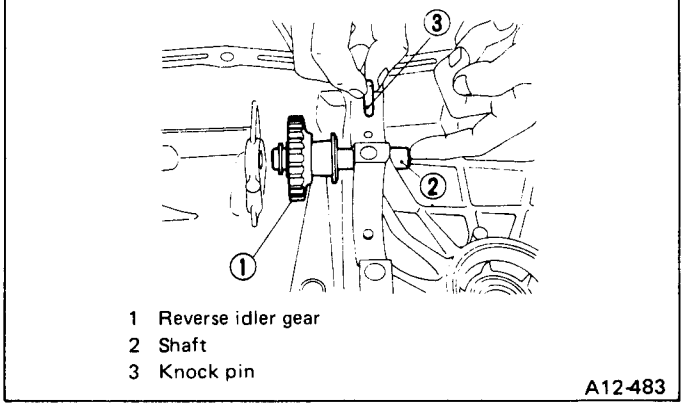


Fig. 171

③ Install reverse fork rod and reverse fork rod arm.

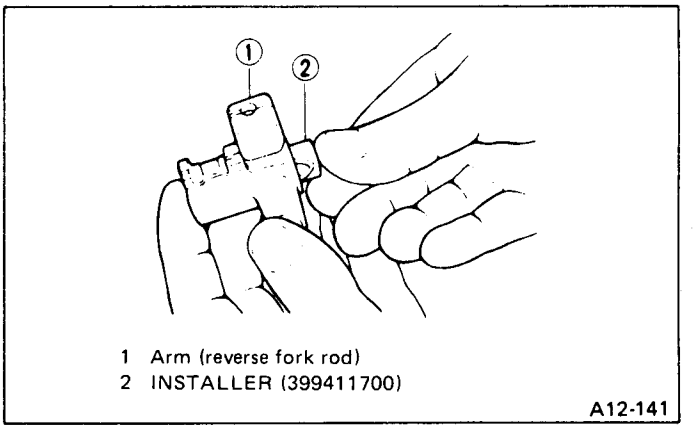


Fig. 172

Apply grease to plunger to prevent it from falling.

④ For reverse shifter rail, install ball, spring and gasket into case and tighten plug.

Tightening torque:
18.1 – 21.1 N·m
(1.85 – 2.15 kg-m, 13.4 – 15.6 ft-lb)

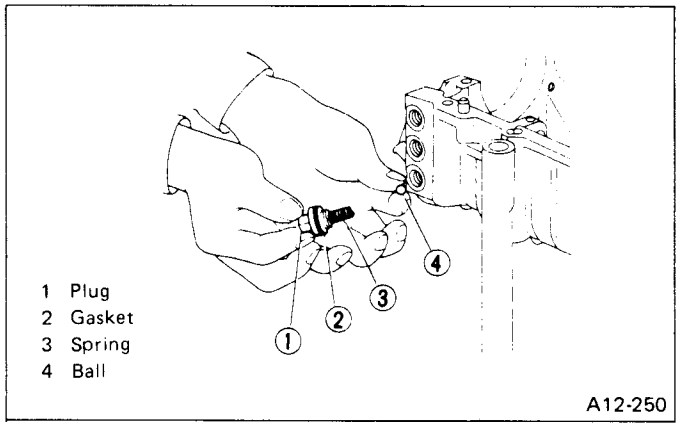


Fig. 173

⑤ Adjustment of reverse idler gear CP position.

Clearance:
1.5 – 3.0 mm (0.059 – 0.118 in)

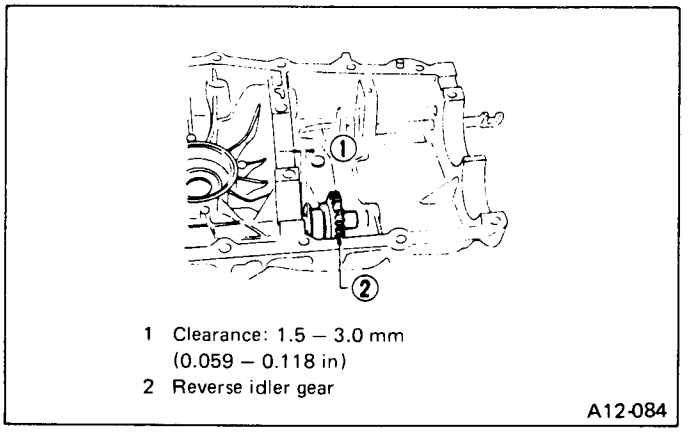


Fig. 174

Reverse shifter lever		
Part No.	Mark	Remarks
440627101	1	Recedes from the case wall
440627102	No mark	Standard
440627103	3	Moves to the case wall

⑥ Clearance adjustment

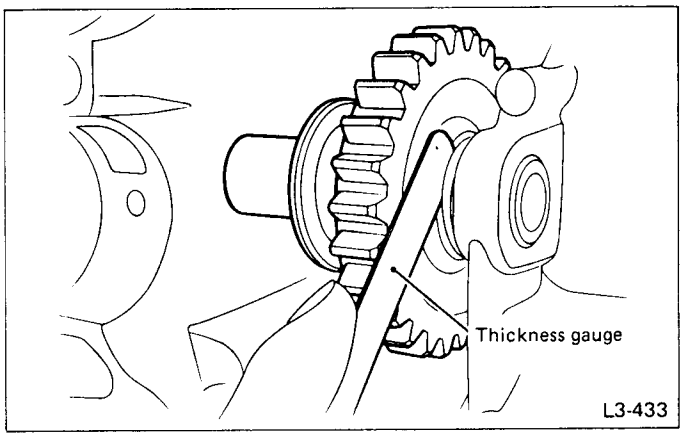


Fig. 175

Washer (15.5 x 21 x t mm)	
Part No.	Thickness mm (in)
803015081	0.6 – 0.8 (0.024 – 0.031)
803015082	1.0 – 1.2 (0.039 – 0.047)
803015083	1.4 – 1.6 (0.055 – 0.063)
803015084	1.8 – 2.0 (0.071 – 0.079)
803015085	2.2 – 2.4 (0.087 – 0.094)

⑦ Install rod and fork
- Interlock plunger (3 x 11.9)
- Fork rod for 3-4, 1-2 and 5th
- Shifter fork for 3-4, 1-2 and 5th

⑧ Install ball, checking ball spring, gasket and plug for 3-4 and 1-2.

2) Alignment marks/figures on hypoid gear set

See p. 34

3) Adjustment of drive pinion shim

See p. 34

Drive pinion shim	
Part No.	Thickness mm (in)
441967111	0.15 (0.0059)
441967112	0.175 (0.0069)
441967113	0.20 (0.0079)
441967114	0.225 (0.0089)
441967115	0.25 (0.0098)
441967116	0.275 (0.0108)
441967117	0.30 (0.0118)
441967118	0.50 (0.0197)

Use GAUGE ASSY (499917101)

4) Install differential ASSY onto LH transmission case.

a. Wrap the left and right splined sections of axle shaft with vinyl tape to prevent scratches.
b. Be careful not to fold the sealing lip of oil seal.

5) Install transmission main shaft ASSY.

See p. 35

6) Install drive pinion shaft with shims selected before into transmission case.

Ensure that the knock pin of the case is fitted into the hole in the bearing outer race.

7) Selection of suitable 1st-2nd, 3rd-4th and 5th shifter fork CPs.

1st-2nd shifter fork CP		
Part No.	Identification Mark	Remarks
32804AA001	1	Moves 0.2 mm (0.008 in) toward 2nd gear
32804AA011	No mark	Standard
32804AA021	3	Moves 0.2 mm (0.008 in) toward 1st gear

3rd-4th shifter fork		
Part No.	Identification Mark	Remarks
32810AA110	1	Moves 0.4 mm (0.016 in) toward 4th gear
32810AA120	2	Moves 0.2 mm (0.008 in) toward 4th gear
32810AA130	No mark	Standard
32810AA140	4	Moves 0.2 mm (0.008 in) toward 3rd gear
32810AA150	5	Moves 0.4 mm (0.016 in) toward 3rd gear

5th shifter fork CP		
Part No.	Identification Mark	Remarks
32812AA032	1	Moves 0.2 mm (0.008 in) toward gear side
32812AA042	No mark	Standard
32812AA052	3	Recedes 0.2 mm (0.008 in) from gear side

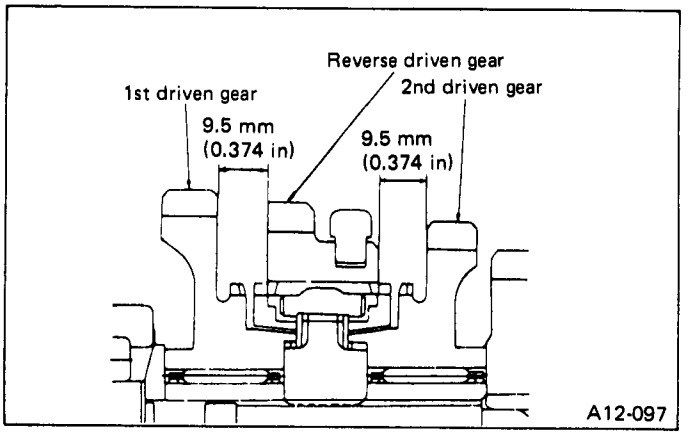


Fig. 176 1st-2nd shifter fork

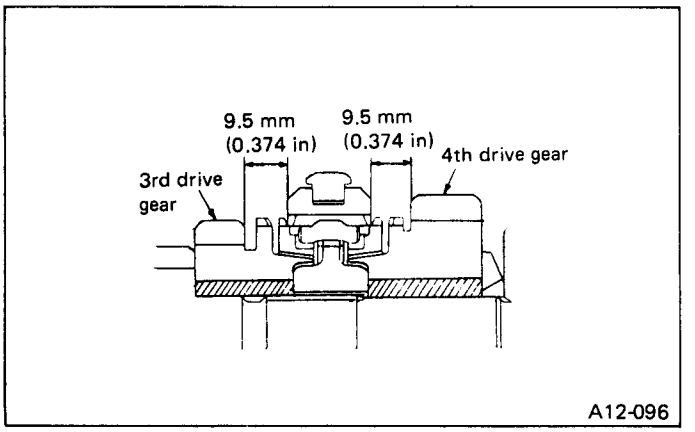


Fig. 177 3rd-4th shifter fork

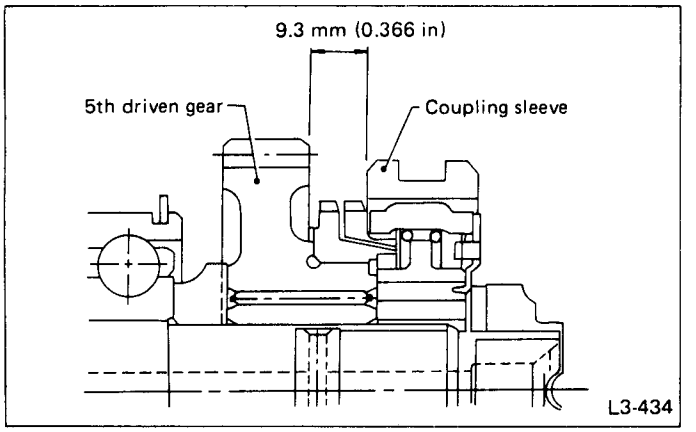


Fig. 178 5th shifter fork

8) Inspection of rod end clearance

Unit: mm (in)

	A	B
Clearance	0.3 – 1.6 (0.012 – 0.063)	0.3 – 1.6 (0.012 – 0.063)

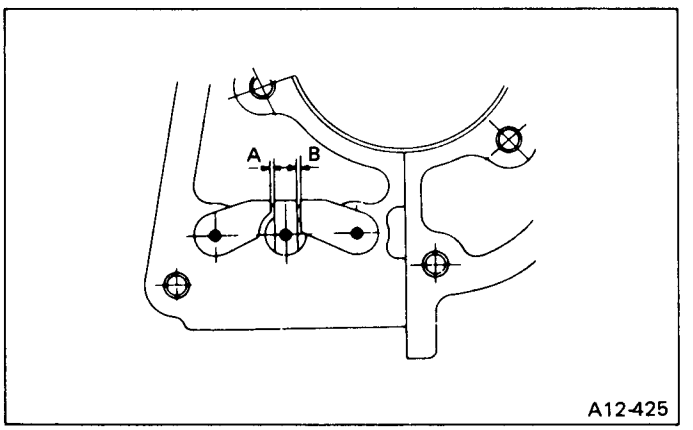


Fig. 179

9) Wipe off grease, oil and dust on the mating surfaces of transmission cases with white gasoline, and apply liquid gasket (Fuji Bond "C" or equivalent), and then put case (RH) and (LH) together.

10) Tighten 17 bolts with bracket, clip, etc. in the following sequence.

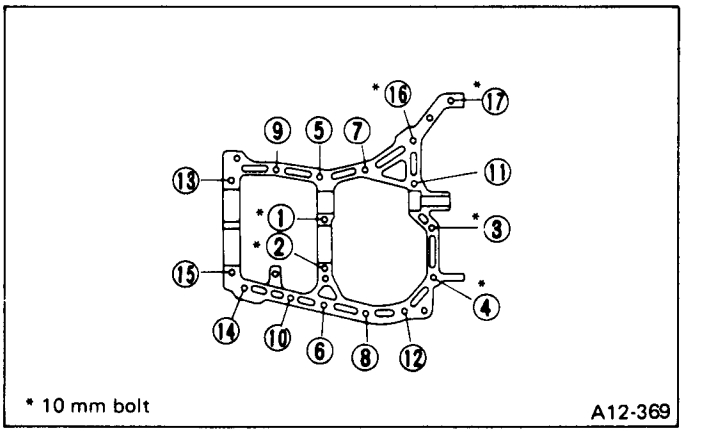


Fig. 180

Tightening torque:
8 mm bolt
23 – 26 N·m (2.3 – 2.7 kg-m, 17 – 20 ft-lb)
10 mm bolt
36 – 42 N·m (3.7 – 4.3 kg-m, 27 – 31 ft-lb)

a. Insert bolts from the bottom and tighten nuts at the top.
b. Put cases together so that drive pinion shim and input shaft holder shim are not caught up in between.
c. Confirm that counter gear and speedometer gear are meshed, and high-low shifter shaft is inserted perfectly.

11) Tighten ball bearing attaching bolts at the drive pinion shaft rear.

12) Backlash adjustment of hypoid gear and preload adjustment of roller bearing.

a. WRENCH CP (399780111) can be used instead of WRENCH ASSY (499787000).
b. Use HANDLE CP (499927000) instead of HANDLE (499927100).
c. See p. 37

13) Checking tooth contact of hypoid gear.

See p. 37

14) Fit O-ring into the groove of retainer and tighten it into the position where retainer has been tightened.

Carry out this job on both upper and lower retainers.

15) Selection of main shaft rear plate.

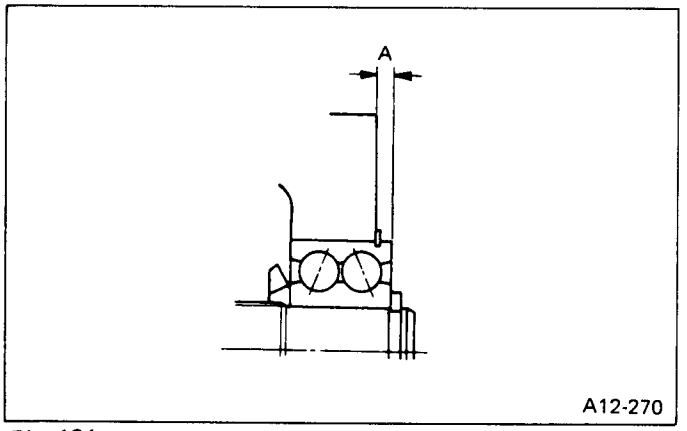


Fig. 181

Dimension A mm (in)	Part Number	Discrimination stamp
4.50 – 4.63 (0.1772 – 0.1823)	441347001	T81-1
4.37 – 4.50 (0.1720 – 0.1772)	441347002	T81-2

16) Install rear case & shifter ASSY.

Tightening torque:
23 – 26 N·m (2.3 – 2.7 kg-m, 17 – 20 ft-lb)

17) Neutral position adjustment

Reverse accent shaft		
Part No.	Identification Mark	Remarks
32188AA040	1	Neutral position is closer to 1st gear.
32188AA011	No mark	Standard
32188AA050	3	Neutral position is closer to reverse gear.

See p. 39

18) Reverse check plate adjustment.

See p. 40

19) Install clutch release lever and clutch release bearing.

[2] Rear Case & Shifter ASSY

DISASSEMBLY

1) Pull out shifter arm CP.
2) Loosen two 6-mm bolts and remove rear case oil guide.
3) Remove back lamp switch ASSY and neutral switch ASSY.

Replace aluminum gasket with a new one.

4) Remove filler with gasket from transmission rear case. Then remove reverse accent spring and ball (7.1438).
5) Remove reverse check sleeve ASSY.
6) Disassembling reverse check sleeve ASSY.

ASSEMBLY

1) Install oil seal (18 x 30 x 6) into bore on the back of rear case using a plastic hammer.

Apply a coat of gear oil to the mating surface and sealing lip of oil seal beforehand.

2) Install oil guide on rear case, and tighten with two 6-mm bolts.

Tightening torque:
6.4 N·m (0.65 kg-m, 4.7 ft-lb)

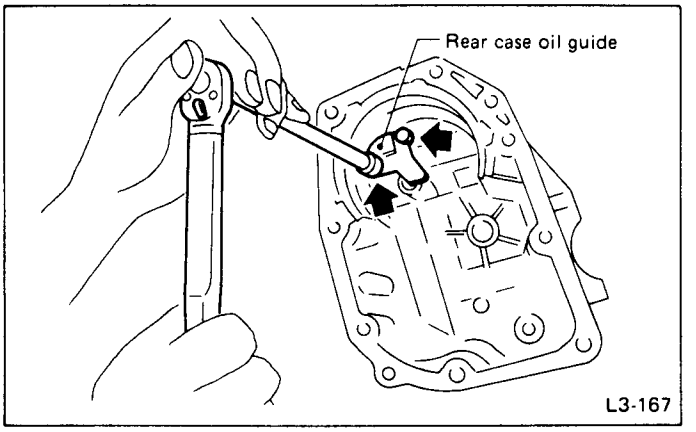


Fig. 182

3) Assembling reverse check sleeve ASSY.
① Install reverse accent shaft, check cam, return spring and check spring onto reverse check sleeve.

Be sure the bent section of reverse check spring is positioned in the groove in check cam.

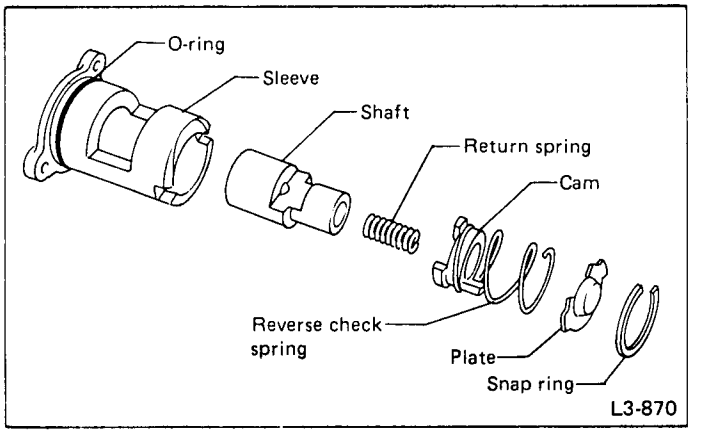


Fig. 183

② a. Hook the bent section of reverse check spring over reverse check plate.
b. Rotate cam so that the protrusion of reverse check cam is at the opening in plate.
c. With cam held in that position, install plate onto reverse check sleeve and hold with snap ring (Inner-28).
d. Position O-ring (35.4 x 1.5) in groove in sleeve.

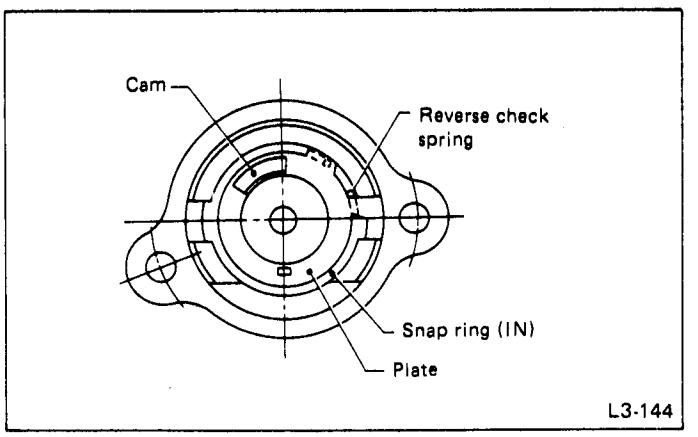


Fig. 184

a. Make sure the cutout section of reverse accent shaft is aligned with the opening in reverse check sleeve.
b. Spin cam by hand for smooth rotation.
If it does not return properly, replace reverse check spring.
c. Move cam and shaft all the way toward plate and release. If cam does not return properly, replace reverse check spring; if shaft does not, check for scratches on the inner surface of sleeve. If sleeve is in good order, replace spring.
d. Select a suitable reverse check plate by referring to "Neutral Position Adjustment."

4) Install reverse check sleeve ASSY to rear case, and tighten with bolts and washers.

Tightening torque:
10 N·m (1.0 kg-m, 7 ft-lb)

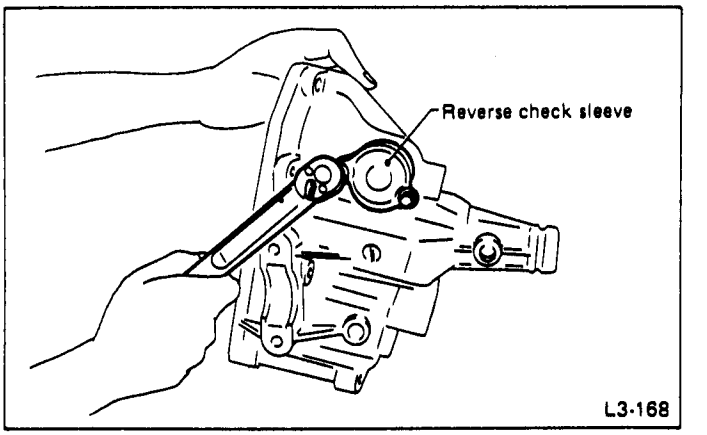


Fig. 185

5) Install ball (7.1438), reverse accent spring aluminum gasket, and plug in that order.

Tightening torque:
10 N·m (1.0 kg-m, 7 ft-lb)

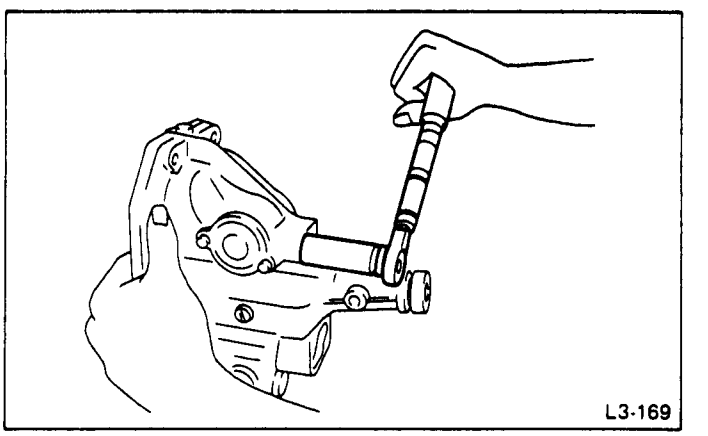


Fig. 186

6) Install back lamp and neutral switch ASSY on rear case.

Tightening torque:
18 N·m (1.8 kg-m, 13 ft-lb)

a. Do not forget to install aluminum washer.
b. Some models are not equipped with neutral switch ASSY.

7) Install shifter arm CP onto rear case.

Apply a coat of gear oil to arm CP. Also make sure oil seal is positioned in place.

Tool No.	Tool name
899714110	REMOVER

5) Remove 1st needle bearing inner race and gear and hub ASSY.

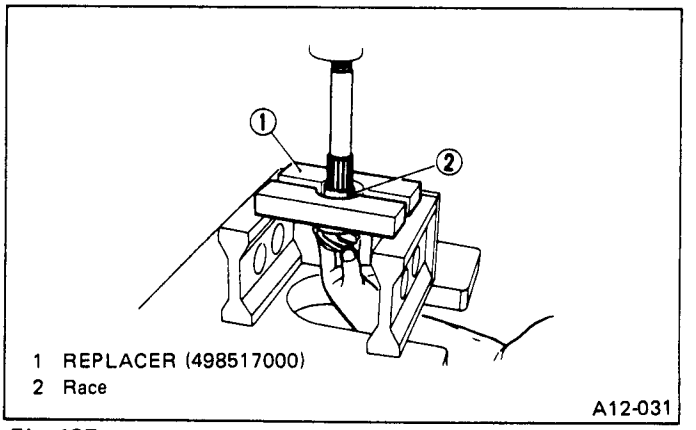


Fig. 187

[3] Drive Pinion Shaft ASSY

DISASSEMBLY

1) Remove locknut (22) from drive pinion with SOCKET WRENCH (35) (499987003), HOLDER (899884100), and a vice.

Remove caulking before taking off locknut.

2) Remove following parts:
- Insert stopper plate
- Insert guide
- Sleeve and hub ASSY
- Balk ring
- 5th driven gear
- Needle bearing (29 x 33 x 25.8)

3) Using REMOVER (899714110), TRANSMISSION MAIN SHAFT REMOVER (899864100), and a press, remove:
- Ball bearing (27 x 70 x 35)
- 4th and 3rd driven gear
- 5th needle bearing race
- 5th gear thrust washer

4) First remove 2nd driven gear and needle bearing (39 x 44 x 23.8) using REMOVER (899714110). Then, using a press, remove 1st driven gear, 2nd needle bearing inner race, and gear and hub ASSY.

Remove key before removing 2nd needle bearing inner race.

ASSEMBLY

1) Assemble gear & hub ASSY.

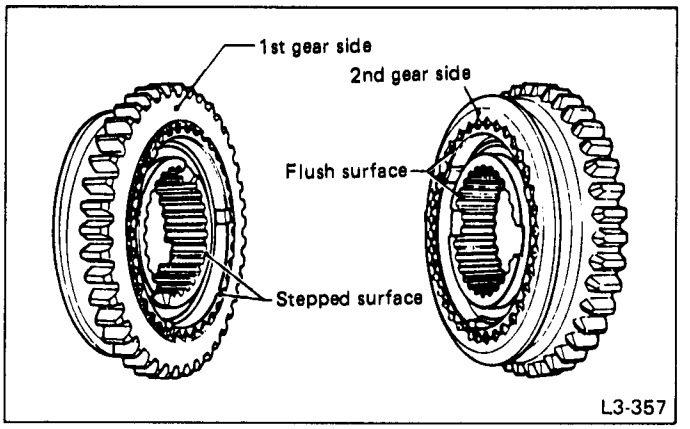


Fig. 188

Position open ends of springs 120° apart.

2) Assemble sleeve & hub ASSY.

Make sure bent sections of springs on both sides are kept 180° apart and hooked at hub's holes.

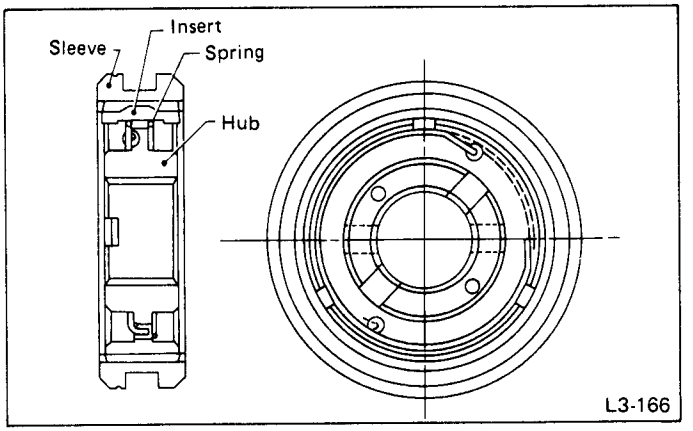


Fig. 189

3) Fit roller bearing in drive pinion shaft. Install 1st driven gear thrust plate.

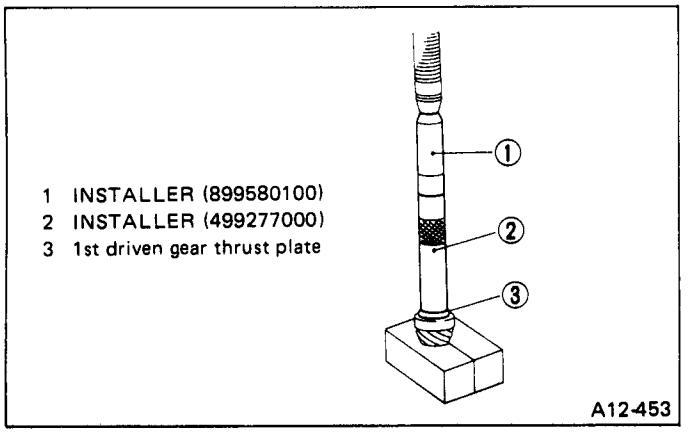


Fig. 190

4) Install needle bearing race.

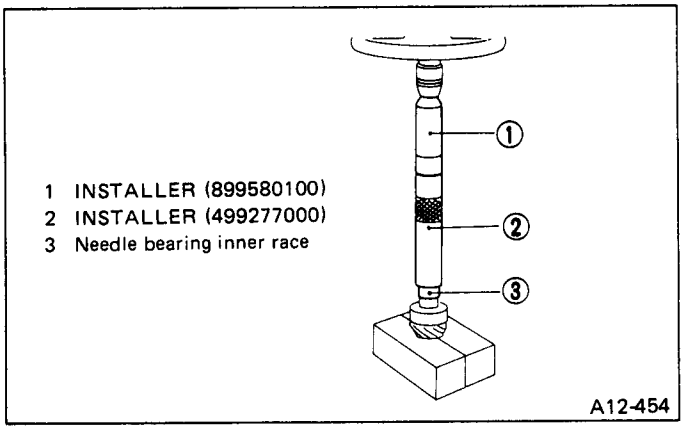


Fig. 191

5) Install needle bearing, 1st driven gear, 1st-2nd ring and gear & hub ASSY subassembled before.

Take care so that 1st-2nd synchronizer ring groove is in line with the insert.

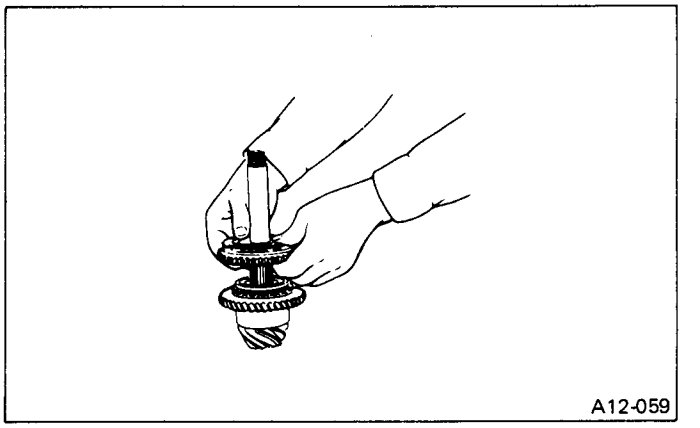


Fig. 192

6) Install needle bearing inner race.

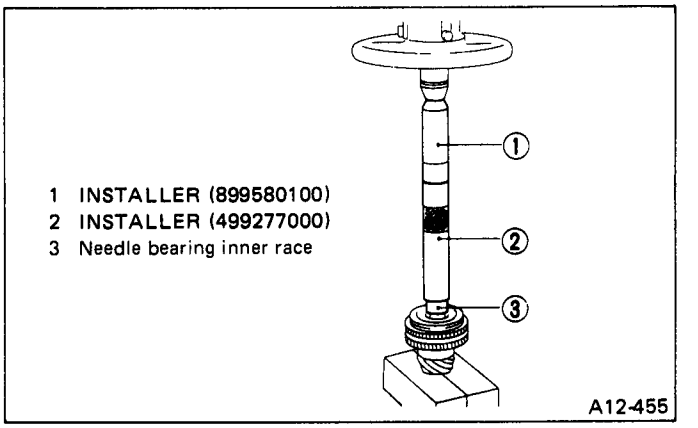


Fig. 193

7) Install needle bearing, 2nd driven gear.

8) Install key into the groove on drive pinion shaft and install 3rd-4th driven gear.

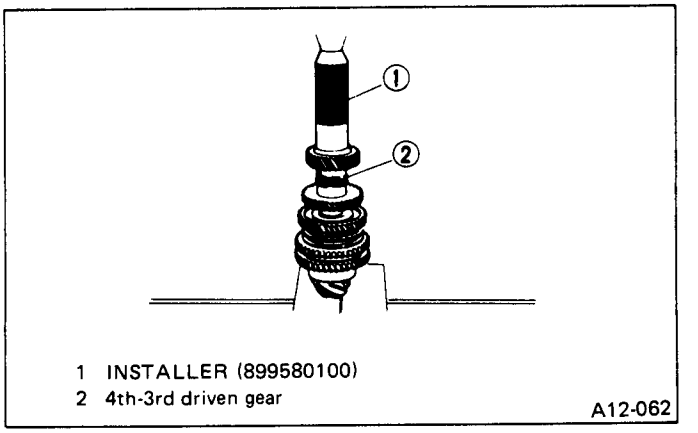


Fig. 194

9) Install ball bearing with the following special tool(s): INSTALLER (899874100) and/or INSTALLER (899580100).

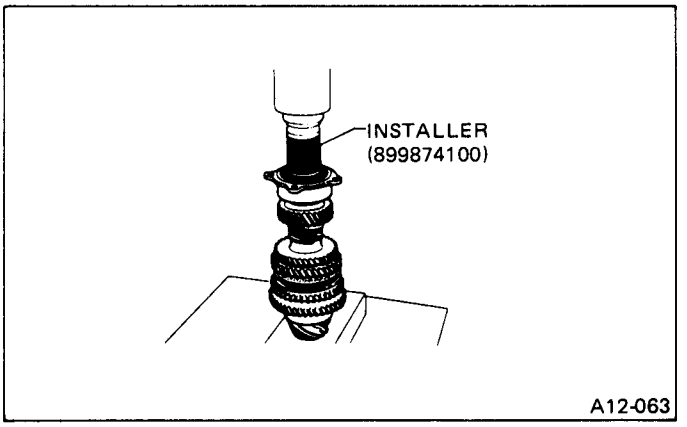


Fig. 195

Some ball bearings may be installed in the drive pinion shaft without press tightness, but it causes no problem in practical operation.

10) Install 5th driven gear thrust washer and then, install 5th needle bearing inner race.

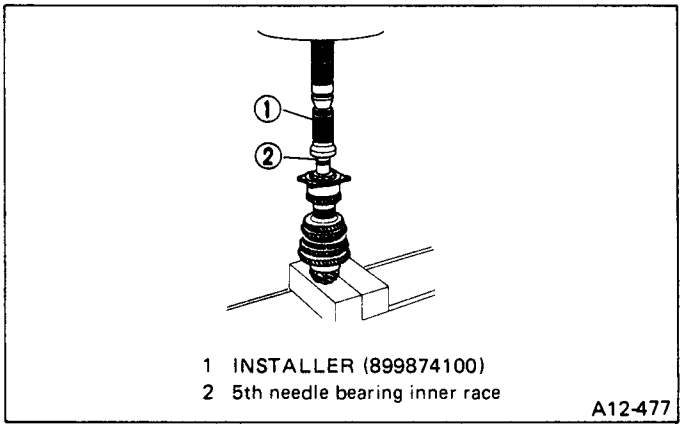


Fig. 196

11) Install needle bearing, 5th driven gear, rings, sleeve & hub ASSY, insert guide, insert stopper plate, lock washer and lock nut.

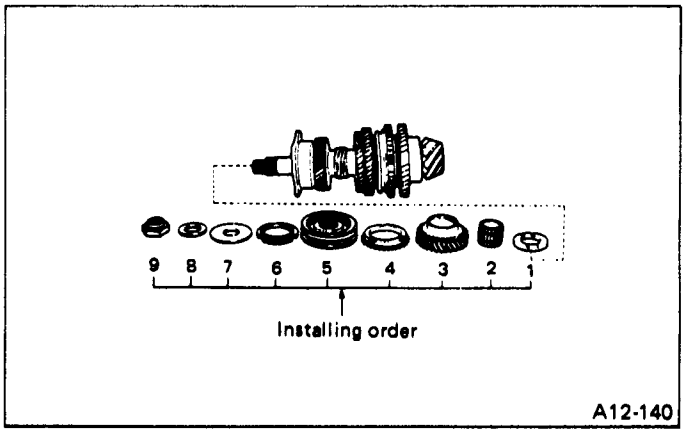


Fig. 197

12) Tighten lock nut-22 with SOCKET WRENCH (499987003) and HOLDER (899884100).

Tightening torque:
73 – 84 N·m (7.4 – 8.6 kg-m, 54 – 62 ft-lb)

Stake the lock nut at 2 points.

[4] Transmission Main Shaft ASSY

DISASSEMBLY

1) Put vinyl tape around main shaft splines to protect oil seal from damage. Then pull out oil seal and needle bearing by hand.
2) Removing locknut
Remove locknut (18 x 10).

Remove caulking before taking off locknut.

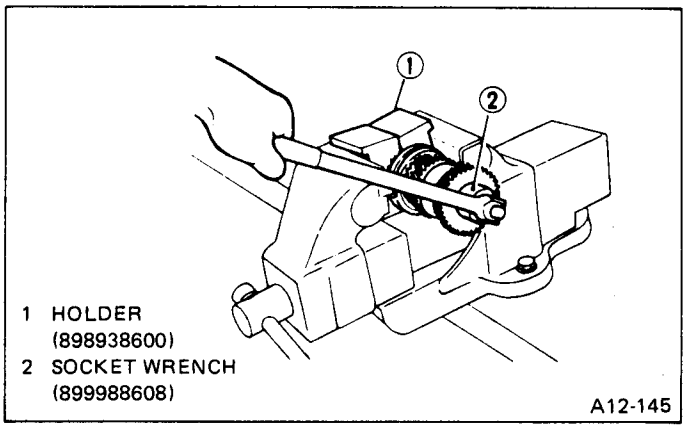
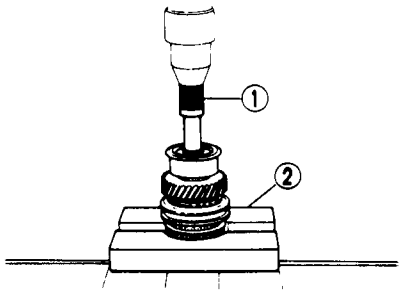


Fig. 198

3) Removing 5th drive gear
Remove 5th drive gear using REMOVER (899714110) and TRANSMISSION MAIN SHAFT REMOVER (899864100).
4) Remove woodruff key.
5) Remove the following parts;
- Ball bearing (23 x 58 x 27)
- 4th drive gear
- Sleeve and hub assembly
- 3rd drive gear CP
- 4th needle bearing race



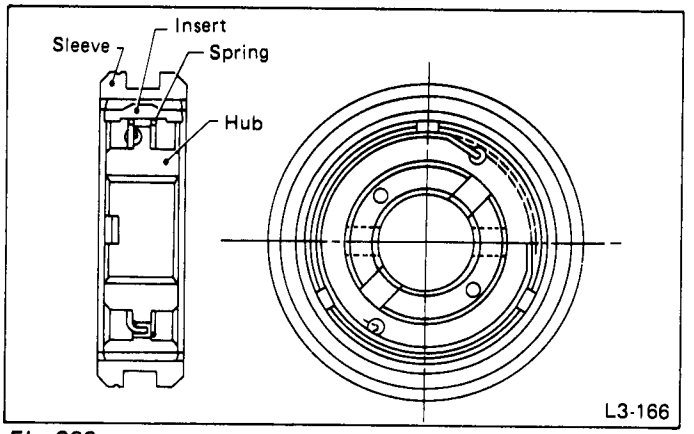
1 REMOVER (899864100)
2 RETAINER (899714110)
A12-027

Fig. 199

ASSEMBLY

1) Assemble sleeve & hub ASSY.

Make sure bent sections of springs on both sides are kept 180° apart and hooked at hub's holes.



L3-166

Fig. 200

Before assembling main shaft, apply transmission oil to needle bearing, ball bearing and bushings sufficiently.

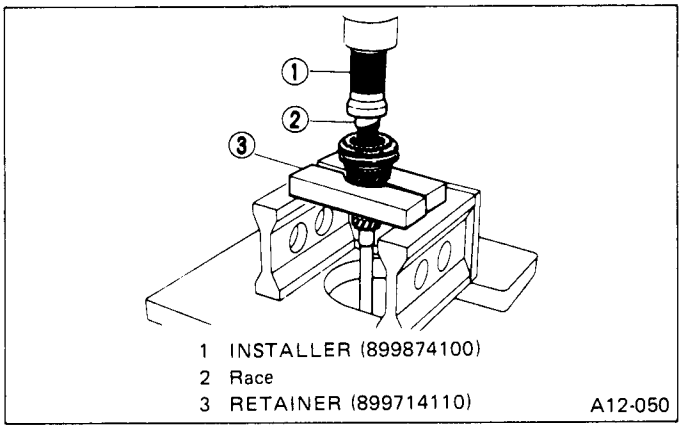
2) Install 5th needle bearing race with the following special tools.

INSTALLER (899874100)
RETAINER (899714110)

3) Install 3rd drive gear, ring and sleeve & hub ASSY sub-assembled before.

Take care so that the insert is in line with the ring groove.

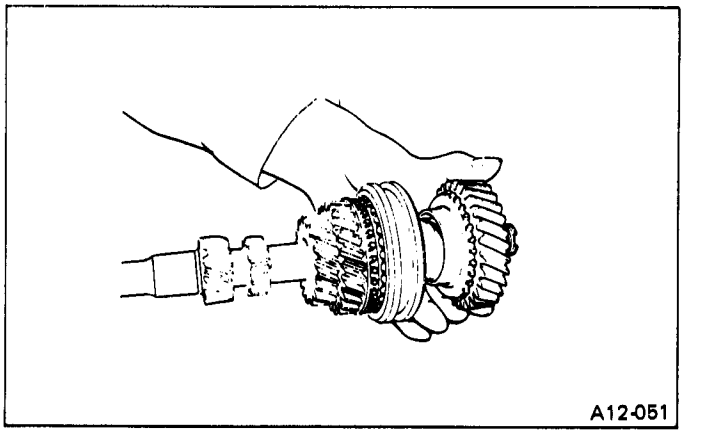
4) Install 5th needle bearing race.



1 INSTALLER (899874100)
2 Race
3 RETAINER (899714110)
A12-050

Fig. 201

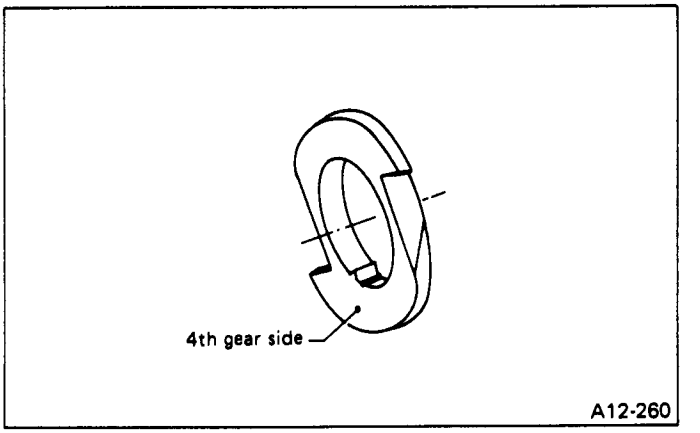
5) Install ring, 4th drive gear and 4th drive gear thrust washer.



A12-051

Fig. 202

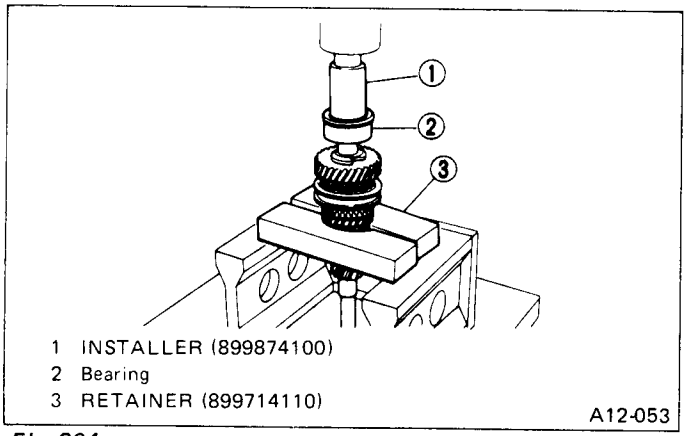
Pay attention to the assembling direction.



A12-260

Fig. 203

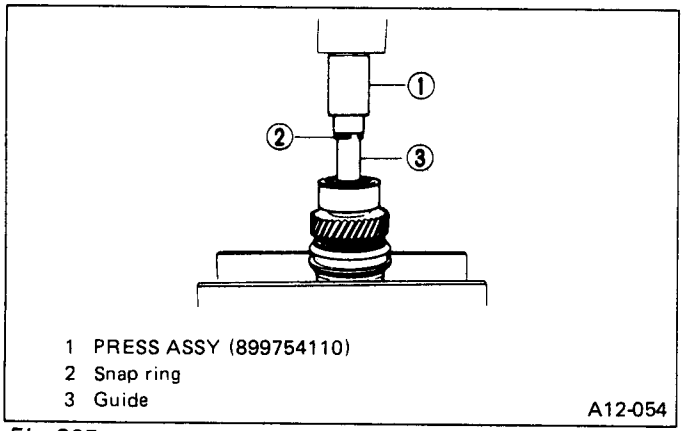
6) Install ball bearing.



1 INSTALLER (899874100)
2 Bearing
3 RETAINER (899714110)
A12-053

Fig. 204

7) Assemble snap ring with PRESS ASSY (899754110).



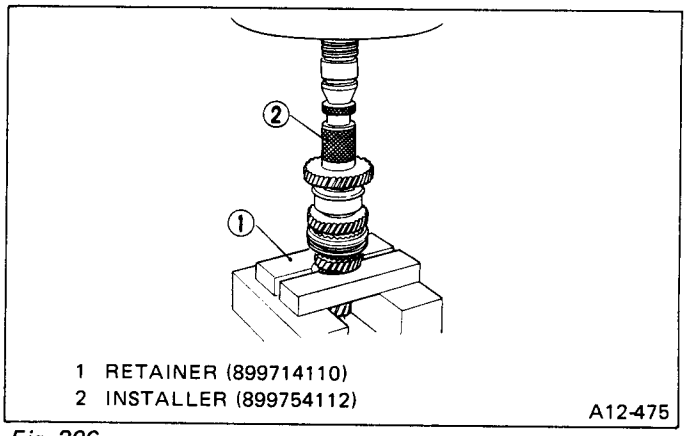
1 PRESS ASSY (899754110)
2 Snap ring
3 Guide
A12-054

Fig. 205

Part No.	Thickness mm (in)
805022010	2.45 (0.0965)
805022011	2.48 (0.0976)
805022012	2.51 (0.0988)
805022013	2.54 (0.1000)
805022014	2.57 (0.1012)
805022015	2.60 (0.1024)
805022016	2.63 (0.1035)
805022017	2.66 (0.1047)
805022018	2.69 (0.1059)
805022019	2.85 (0.1122)
805022030	2.42 (0.0953)
805022031	2.39 (0.0941)

a. When reassembling a snap ring, always replace it with a new one.
b. Select a suitable snap ring from the following table so that the play in the axial direction is 0 to 0.05 mm (0 to 0.0020 in).

8) Assemble woodruff key and then 5th drive gear.



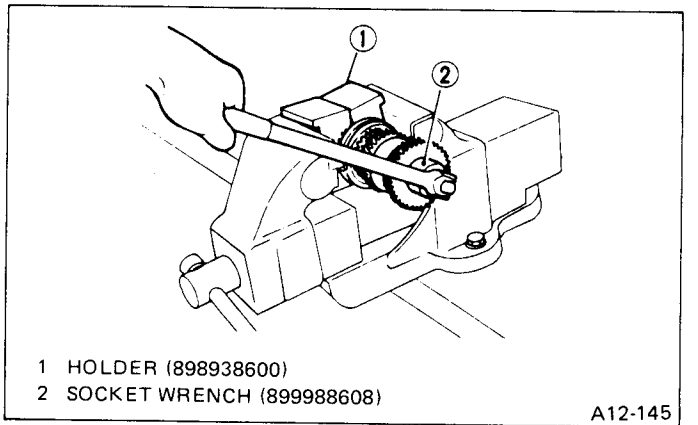
1 RETAINER (899714110)
2 INSTALLER (899754112)
A12-475

Fig. 206

When assembling key, pay attention to the groove.

9) Tighten lock nut.

Tightening torque:
73 – 84 N·m
(7.4 – 8.6 kg-m, 54 – 62 ft-lb)



1 HOLDER (898938600)
2 SOCKET WRENCH (899988608)
A12-145

Fig. 207

After tightening the lock nut, stake it.

[5] Differential ASSY

DISASSEMBLY

1) Remove right and left snap rings from differential, and then remove two axle drive shafts.

During reassembly, reinstall each axle drive shaft in the same place from which it was removed.

2) Loosen ten bolts and remove hypoid drive gear.
3) Using STRAIGHT PIN REMOVER (899904100), drive out straight pin from differential ASSY toward crown gear.
4) Pull out pinion shaft, and remove differential bevel pinion and gear and washer (35.1 x 45 x t).
5) Remove roller bearing with puller ASSY (899524100).

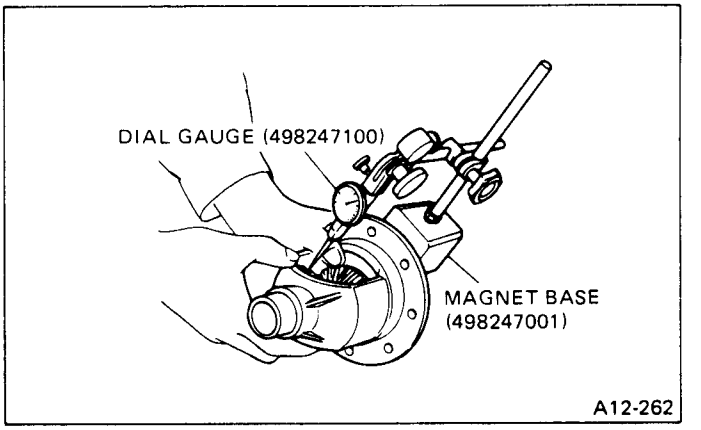


Fig. 209

Washers (35.1 x 45 x t mm)	
Part No.	Thickness mm (in)
803135011	0.925 – 0.950 (0.0364 – 0.0374)
803135012	0.950 – 0.975 (0.0374 – 0.0384)
803135013	0.975 – 1.000 (0.0384 – 0.0394)
803135014	1.000 – 1.025 (0.0394 – 0.0404)
803135015	1.025 – 1.050 (0.0404 – 0.0413)

ASSEMBLY

1) Install differential bevel gears and differential pinions together with washers on differential case, and then insert pinion shaft.

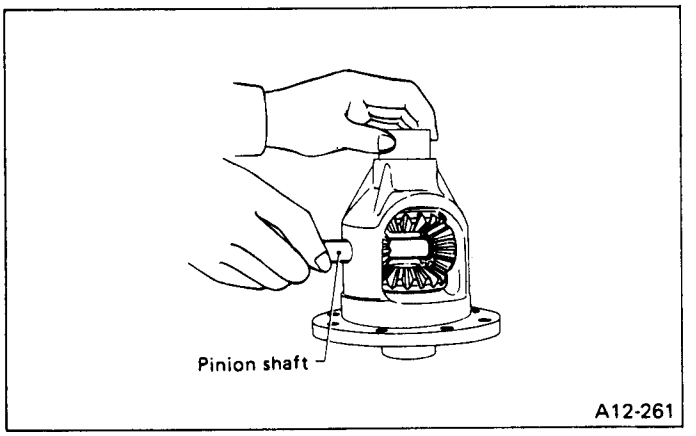


Fig. 208

2) Measure backlash between gear and pinion.
If the backlash is inappropriate, make adjustment by using proper washers.

Standard backlash:
0.13 – 0.18 mm (0.0051 – 0.0071 in)

3) Align the pinion shaft hole with the holes on differential case and drive straight pin by tapping lightly with hammer from the hypoid gear side. Finally drive pin until it falls in about 1 mm (0.04 in) with REMOVER (899904100).

Stake the hole portion after driving it into the differential case.

4) Install bearing cone on differential case with INSTALLER (399790110) and SEAT (399520105).

Notice that the cups of roller bearings are provided as a set.

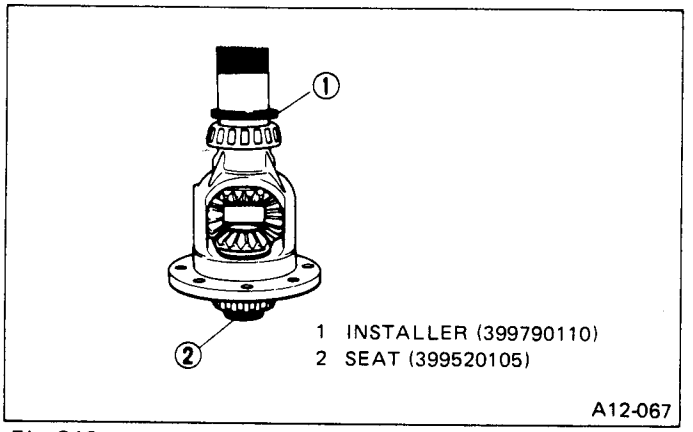


Fig. 210

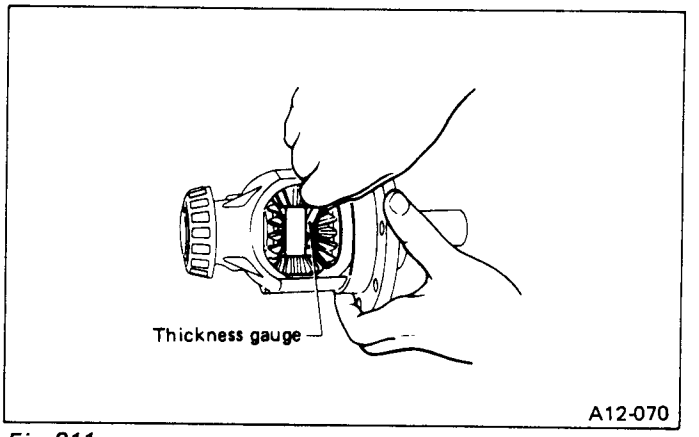


Fig. 211

5) Install hypoid gear on case.

Tightening torque:
57 – 67 N·m (5.8 – 6.8 kg-m, 42 – 49 ft-lb)

6) Install axle drive shafts and lock it with snap rings. Select proper snap ring so that the clearance between pinion shaft and tip of axle drive shaft is within the specified range.

Standard clearance:
0 – 0.20 mm (0 – 0.0079 in)

Outer snap ring	
Part No.	Thickness mm (in)
805026010	1.00 – 1.10 (0.0394 – 0.0433)
031526000	1.15 – 1.25 (0.0453 – 0.0492)

TROUBLESHOOTING

Condition and possible cause	Corrective action
1. Gears are difficult to intermesh. The cause for difficulty in shifting gears can be classified into two kinds: one is malfunction of the gear shift system and the other is malfunction of the transmission. However, if the operation is heavy and engagement of the gears is difficult, defective clutch disengagement may also be responsible. Check whether the clutch is correctly functioning, before checking the gear shift system and transmission.	
(a) Worn, damaged or burred chamfer of internal spline of sleeve and reverse driven gear.	Replace.
(b) Worn, damaged or burred chamfer of spline of gears.	Replace.
(c) Worn or scratched bushings.	Replace.
(d) Incorrect contact between synchronizer ring and gear cone or wear.	Correct or replace.
2. Gear slips out. (1) Gear slips out when coating on rough road. (2) Gear slips out during acceleration.	
(a) Defective pitching stopper adjustment.	Adjust.
(b) Loose engine mounting bolts.	Tighten or replace.
(c) Work fork shifter, broken shifter fork rail spring.	Replace.
(d) Worn or damaged ball bearing.	Replace.
(e) Excessive clearance between splines of synchronizer hub and synchronizer sleeve.	Replace.
(f) Worn tooth step of synchronizer hub (responsible for slip-out of 3rd gear).	Replace.
(g) Worn 1st driven gear, needle bearing and race.	Replace.
(h) Worn 2nd driven gear, needle bearing and race.	Replace.
(i) Worn 3rd drive gear and bushing.	Replace.
(j) Worn 4th drive gear and bushing.	Replace.
(k) Worn reverse idler gear and bushing.	Replace.
3. Unusual noise from transmission. If an unusual noise is heard when the car is parked with its engine idling and if the noise ceases when the clutch is disengaged, it may be considered that the noise comes from the transmission.	
(a) Insufficient or improper lubrication.	Lubricate or replace with specified oil.
(b) Worn or damaged gears and bearings. **If the trouble is only wear of the tooth surfaces, merely a high roaring noise will occur at high speeds, but if any part is broken, rhythmical knocking sound will be heard even at low speeds.**	Replace.

Condition and possible cause	Corrective action
4. Broken differential (case, gear, bearing, etc.) Abnormal noise will develop and finally it will become impossible to continue to run due to broken pieces obstructing the gear revolution.	
(a) Insufficient or improper oil. (b) Use of vehicle under severe conditions such as excessive load and improper use of clutch. (c) Improper adjustment of taper roller bearing. (d) Improper adjustment of drive pinion and crown gear. (e) Excessive backlash due to worn differential side gear, washer or differential pinion. (f) Loose crown gear clamping bolts.	Disassemble differential and replace broken components and at the same time check other components for any trouble, and replace if necessary. Readjust bearing preload and backlash and face contact of gears. Add recommended oil to specified level. Do not use vehicle under severe operating conditions.
5. Differential and hypoid gear noises. Troubles of the differential and hypoid gear always appear as noise problems. Therefore noise is the first indication of the trouble. However noises from the engine, muffler, tire, exhaust gas, bearing, body, etc. are easily mistaken for the differential noise. Pay special attention to the hypoid gear noise because it is easily confused with other gear noises. There are following four kinds of noises. (1) Gear noise when driving: If noise increase as vehicle speed increases it may be due to insufficient gear oil, incorrect gear engagement, damaged gears, etc. (2) Gear noise when coasting: Damaged gears due to maladjusted bearings and incorrect shim adjustment. (3) Bearing noise when driving or when coasting: Cracked, broken or damaged bearings. (4) Noise which mainly occurs when turning: Unusual noise from differential side gear, differential pinion, differential pinion shaft, etc.	
(a) Insufficient oil	Lubricate.
(b) Improper adjustment of crown gear and drive pinion.	Check tooth contact.
(c) Worn teeth of crown gear and drive pinion.	Replace in a set.
(d) Loose roller bearing.	Readjust bearing preload. Readjust crown gear to drive pinion backlash and check tooth contact.
(e) Distorted crown gear or differential case.	Replace.
(f) Worn washer and differential pinion shaft.	Replace.