# Transaxle/ Transmission

GENERAL	TR -2
AUTOMATIC TRANSAXLE SYSTEM	
MANUAL TRANSAXLE SYSTEM	TR -197
TRANSFER CASE ASSEMBLY	TR -224

## GENERAL

## SPECIFICATION EKUC0010

Engine		A-2.5 TCI	SIRIUS-II (2.4 MPI II)	4D56 TCI	T2-	-2.6	
M/T		M5SR1	M5ZR1	M5ZR1	KM135M-B	KM135M-8	
	A/T		30-40 LEi	03-11	30-40 LEi	03-72 LE	30-43 LE
	Trans	mission type		Forward 5th, Reverse	1st, Constant	synchromesh	
		1st	3.978	3.986, <sub>3.98</sub>	ar tiber	3.967	4.330
4.0 miles		2nd	2.188	2.155		2.136	2.355
	Gear	3rd	1.385	1.414	<b>←</b>	1.360	1.509
M/T	ratio	4th	1.000	1.000	<del>&lt;</del>	<b>←</b>	<b>←</b>
		5th	0.759	0.813	<b>←</b>	0.855	0.878
		Reverse	4.266	3.814	<b>←</b>	3.578	4.142
	Oil	Spec.		SAE 75W	/90 API GL-4		
	O11	Capacity (ℓ)	3.2	2.4	2.4	2.0	2.0
-		1st	2.804	2.826	2.804	2.826	2.804
		2nd	1.531	1.493	1.531	1.493	1.531
e e	Gear ratio	3rd	1.000	1.000	1.000	1.000	1.000
A/T		4th	0.705	0.730	0.753	0.730	0.753
		Reverse	2.393	2.703	2.393	2.703	2.393
	Oil	Spec.		ATF DE	EXRON II		
	Oil	Capacity (ℓ)	10.44	8.2	10.44	7.0	10.44
	Gear	HIGH	1.000				
Transfer	ratio	LOW	2.480				
case	O:I	Spec.		ATF DE	EXRON III		
	Oil Capacity (ℓ)		1.42				

EKUC001A

## TIGHTENING TORQUE (M/T) EMUB0020

Model	Item	N·m	Kg-cm	lb·ft
	Transmission engine bolt (10mm)	43 - 55	430 - 550	31 - 40
	Transmission engine bolt (8mm)	20 - 27	200 - 270	14 - 20
	Bracket, clutch cable bolt	20 - 27	200 - 270	14 - 20
	Bracket, exhaust pipe bolt	20 - 27	200 - 270	14 - 20
	Front cover bolt	10 - 12	100 - 120	8 - 9
	Extension housing-case bolt	15 - 22	150 - 220	11 - 16
	Clutch cover bolt	15 - 22	150 - 220	11 - 16
	Cylinder, clutch release bolt	30 - 42	300 - 420	22 - 30
	Fulcrum clutch release lever	30 - 42	300 - 420	22 - 30
	Retainer front nut	10 - 13	100 - 130	8 - 10
	Retainer rear bolt	15 - 22	150 - 220	11 - 16
	Retainer rear screw machine	15 - 22	150 - 220	11 - 16
M5ZR1	Main shaft lock nut	250 - 270	2500 - 2700	183 - 198
10102111	Counter shaft lock nut	160 - 190	1600 - 1900	117 - 139
	Idler shaft lock nut	20 - 60	200 - 600	14 - 44
	Idler shaft bolt	15 - 22	150 - 220	11 - 16
	Idler shaft screw machine	15 - 22	150 - 220	11 - 16
	Select adjuster nut	30 - 42	300 - 420	22 - 30
	Transmission drain plug	35 - 45	350 - 450	26 - 33
	Oil filler plug	30 - 35	300 - 350	22 - 26
	Under cover bolt	8.0 - 10	80 - 100	6 - 8
•	Speedometer sleeve bolt	3.0 - 5.0	30 - 50	2 - 4
	Backlight switch	30	300	22
	Oil chamber installing bolt	8 - 12	80 - 120	6 - 9
	Bell housing cover installing bolt	10 - 12	100 - 120	8 - 9
	Starter motor installing bolt	43 - 55	430 - 550	32 - 40
	Engine to transmission (12 X 40)	65 - 85	650 - 850	48 - 62
	Engine to transmission (12 X 55)	80 - 100	800 - 1000	59 - 74
	Poppet spring seal bolt	30 - 42	300 - 420	22 - 30
M5SR1	Front bearing retainer	20 - 25	200 - 250	14 - 18
14100111	Back-up lamp switch	30 - 35	300 - 350	22 - 25
	Main shaft lock nut	250 - 270	2500 - 2700	185 - 200
	Count shaft lock nut	250 - 270	2500 - 2700	185 - 200
	Clutch release cylinder	30 - 42	300 - 420	, 22 - 30

## TIGHTENING TORQUE (A/T) EKMB0020

Item	N·m	Kg⋅cm	lb-ft
Transmission housing to case (10mm)	35	350	25
Transmission housing to case (12mm)	58	580	42
Extension housing to T/M case	37	370	27
O/D case to T/M case	26	260	19
Oil pump to T/M case	22	220	16
Oil pump body to stator shaft	10	100	7
Valve body	10	100	7
Oil strainer	10	100	7
Oil pan	7.5	75	5
Speed sensor	7.5	75	5
Speedometer driven gear lock plate	16	160	11
Union	30	300	22
Transaxle range switch bolt	13	130	9
Transaxle range switch nut	7	70	5
Control shaft lever	16	160	11
Shift knob screw	2	20	1
Shift lever bracket	14 - 20	140 - 200	10 - 14

## TIGHTENING TORQUE (TRANSFER CASE) EMUCOO20

Item	N-m	Kg-cm	lb-ft
Speedometer driven gear sleeve	3 - 5	30 - 50	2.2 - 3.6
Drain plug	19 - 30	190 - 300	14 - 22
Fluid level plug	19 - 30	190 - 300	14 - 22
Transmission mounting bolt to transfer case	35 - 45	350 - 450	25 - 32
Adapter bolt	27 - 46	270 - 460	20 - 34
Air breather	8 - 19	80 - 190	6 - 14
Pump bolt	4 - 8.5	40 - 85	2.9 - 6.3
Clutch coil nut	8 - 11	80 - 110	6 - 8
Moter mounting bolt	8 - 11	80 - 110	6 - 8
Case bolt	27 - 46	270 - 460	20 - 34
Companion flange nut	203 - 244	2030 - 2440	150 - 180

## SPECIAL TOOLS (M/T) - M5ZR1,

KM135 EMUC0030

Tool (Number and name)	Illustration	Use
09414-11000 Lock pin extractor		Driving out the spring pin of the shift fork
	Н6МТООЗА	
09414-11100		Driving in the spring pin of the shift fork
Lock pin installer		
	0	
	немтоозв	
09431-32000 Front oil seal installer		Installation of the input shaft front oil seal and rear oil seal
0040044000	H6MT003C	
09432-11000 Main shaft bearing puller		Removal of the main drive gear bearing. (Use with 09432-11100)
	немтоозо	
09432-11100 Main shaft bearing puller adapter		Removal of the main drive gear bearing (Use with 09432-11000)
αυαρισι		
	. Н6МТ003Е	

Tool (Number and name)	Illustration	Use
09432-24000 Second gear puller plate		Removal of the 1st speed gear, 2nd speed gear and 1-2 synchronizer hub
	Н6МТ003Н	
09432-33300 Bearing installer		Installation of the countershaft bearing
	Н6МТ003F	
09455-33200 Bearing installer	H6MT003G	Installation of the 3-4 synchronizer hub
09457-22100 Transfer bearing outer race installer		Installation of the 1st speed gear, 2nd speed gear and 1-2 synchronizer hub
•	H6MT004J	

## TROUBLESHOOTING EMLA0040

Symptom	Probable cause	Remedy
Gear will not be shifted	Bent shift lever	Repair or replace
or is hard to be shifted	Faulty control cable	Replace parts
	Excessively worn return spring	Replace
	Clutch dose not release correctly	Adjust or replace
Jumps out of gear or	Shift rod malfunction	Replace
has too much play	Worn bush	Replace
	Bent lever	Replace
	Clutch dose not release correctly	Replace

Symptom	Probable cause	Remedy
Lever is hard to be	Insufficient grease of shift lever assembly	Replace
operated	Insufficient grease of control cable	Replace
Emits abnormal sound when operating	Worn bush	Replace

## SPECIAL TOOL (M/T) - M5SR1 EMMA0030

Tool (P/NO & P/Name)	Illustration	Use
09414-H1000 Lock pin remover		Removal of shift fork and inter lock body pin
44.5	D14H1000	
09414-H1100 Lock pin installer		Installation of shift fork and inter lock body pin
	D14H1100	
09455-21200 Counter shaft bearing installer (Front)		Installation of counter shaft bearing (Front)
	Y45-007G	
09455-H1000 Counter shaft bearing installer (Rear)		Installation of counter shaft bearing (Rear)
	Y45-007G	
09432-33800 Counter shaft bearing installer		Installation of counter shaft center bearing sleeve Installation of main shaft bearing sleeve

Tool (P/NO & P/Name)	Illustration	Use
09432-H1000 Main shaft bearing installer		Installation of main shaft bearing
	D32H1000	
09430-M2020 Bearing puller	DS2ATOOD	Removal of bearing
	D3211000	
09432-H1100 Lock nut wrench		Removal of main shaft lock nut
	D32H1100	

## SPECIAL TOOLS (A/T) EKMB0030

Tool (Number and name)	Illustration	Application
09452-21000 Oil pressure gauge adapter		Measurement of the oil pressure (use with 09452-21500, 09452-21600, 09452-32300)
	D522100	
09452-21500 Oil pressure gauge		Measurement of the oil pressure (use with 09452-21000, 09452-21600, 09452-32300)
	EKAA0060	

Tool (Number and name)	Illustration	Application
09452-21600 Oil pressure gauge adapter		Measurement of the oil pressure (use with 09452-21000, 09452-21500, 09452-32300)
	D5221600	
09452-32100 Oil seal installer		Installation of the oil pump oil seal
	D523210A	
09452-32300 Oil pressure gauge adapter		Measurement of the oil pressure (use with 09452-21000, 09452-21500, 09452-21600)
	D5232300	
09453-32100 Piston spring compressor		Removal of the clutch piston
	D5332100	
09414-11000 Lock pin extractor		Removal of the pin in the lock pawl rod
	D1411000	
09455-38000 Spring compressor		Removel of the overdrive return spring Removal of the forward clutch spring Removal of the direct clutch spring

Tool (Number and name)	Illustration	Application
09454-38000 Second brake spring compressor		Removal of second brake spring
09454-38100	D5438000	Domoval of first 9 reverse broke envis
First & reverse brake spring compressor		Removal of first & reverse brake spring
	D5438100	
09454-38200 Reverse brake piston remover		Removal of reverse brake piston
	D5438200	
09454-38300 Reaction sleeve remover		Removal of reaction sleeve
	D5438300	

## TROUBLESHOOTING (M/T) EMMB0040

Symptom	Probable cause	Remedy
Gear will not be shifted or is hard to be shifted	Bent shift lever Faulty control cable Excessively worn return spring Clutch dose not release correctly	Repair or replace Replace parts Replace Adjust or replace
Jumps out of gear or has too much play	Shift rod malfunction Worn bush Bent lever Clutch dose not release correctly	Replace Replace Replace Replace
Lever is hard to be operated	Insufficient grease of shift lever assembly Insufficient grease of control cable	Replace Replace
Emits abnormal sound when operating	Worn bush	Replace

## AUTOMATIC TRANSAXLE SYSTEM

## SELF-DIAGNOSIS DESCRIPTION EKUCOOA

- When malfunction is detected in the electronic control system, the concerned parts and wires should be inspected individually. It takes a lot of time resulting in automotive engineers and drivers to inconvenience. To cope with it, computer detects the malfunctions and generates them as code so that engineer can troubleshoot easily.
- Not all malfunctions of the vehicle are detected by Self-diagnosis. When the malfunction is completely presented like faulty parts of sensor or short/open wiring, detection will be easy. But when intermittent abnormality or short wiring occurs, self-diagnosis can't detect the errors even though the vehicle has problem.
- The above 2 is caused by timing difference between outputs of input signal for controlling by computer and self-diagnosis. So while using self-diagnosis, be careful not to make a mistake.

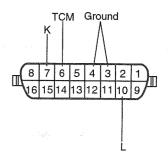
### SELF-DIAGNOSIS PROCEDURE

#### SELF-DIAGNOSIS USING HI-SCAN & OBD

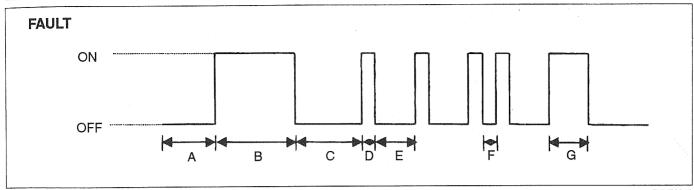
- 1. Using Hi-scan
  - Connect a Hi-scan to the self-diagnosis connector on the interior [in-car] fuse box (the lower inside of crash pad in driver's side).
  - Check and select the model of vehicle and system, when malfunction occurs, error code is output.
     (Self-diagnosis procedure is the same as passenger car)
  - Refer to self-diagnosis chart for self-diagnosis codes.
- Using OBD(ON BOARD DIAGNOSIS)
   OBD has a solf diagnosis function using term

OBD hsa a self-diagnosis function using terminal "L" of TCU and HOLD LAMP without a Hi-scan.

- a. Turn on the ignition key.
- Ground the terminal "L" of diagnosis connector on the upper side of interior fuse box to itself for min.2 seconds using a wire.
- c. After 2 seconds, HOLD LAMP on a cluster is illuminated for 3 seconds (This is starting signal. If an abnormality is not found, there is no more signal).
- d. Starting signal is ceased and 3 seconds after. If an abnormality is found, should read 1 or 0 which is illuminated for 0.5 or 1.5 seconds.

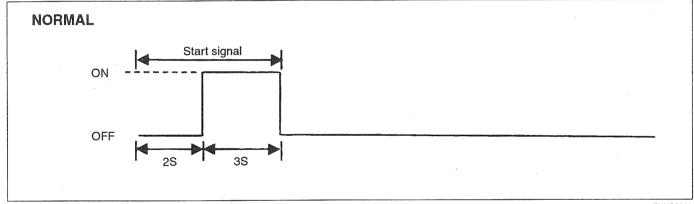


EKMB004A



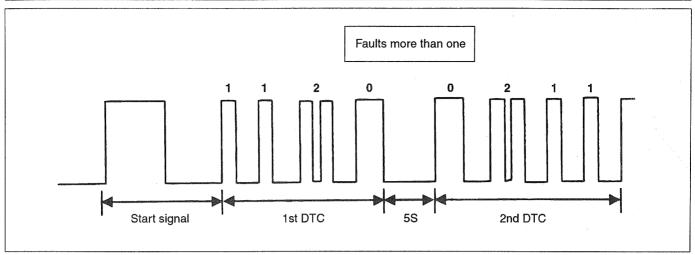
EKMB004B

Symbol	Description	Data
Α	Time from start of "L" low to start of warning lamp on	2.0 sec
В	Warning lamp on time prior to flashing of DTC	3.0 sec
C	Warning lamp off time prior to flashing of DTC	3.0 sec
D	Warning lamp on time or one digit except for "O"	0.5 sec
E	Time between digit and digit in one DTC	1.5 sec
F	Warning lamp off time in one digit display	0.5 sec
G	Warning lamp on time of "O" display	1.5 sec



EKUC004A

- HOLD LAMP plays an role in DTC warning (jump flickering).
- Be careful that if an error list is found one or more, signal will be detected continuously.
- In addition, the first error list is with starting signal, but from the next, starting signal is not indicated, only error list is output 5 seconds after from the first error code.
- When terminal "L" is grounded, error signal must be output continuously.



EKMB004D

## 3. Diagnostic Troubleshooting code chart

NO	DTC	Description	4D56 TCI	T2-2.6	A-2.5 TCI SIRIUS-II
1	P0705	Transaxle range s/w - Malfunction	С	-	С
2	P0710	Fluid temperature sensor circuit - Malfunction	С	-	С
3	P0715	Input speed sensor (PG-A) - Malfunction	В	-	В
4	P0722	Output speed sensor (PG-B) - Malfunction	В	-	В
5	P0720	Output speed sensor signal - Abnormal	-	В	and the
6	P1701	TPS - Malfunction		В	-
7	P0743	TCCSV - Open/Short	С		С
8	P0750	SCSV A(LR SOL) - Malfunction	.,	В	-
9	P0753	SCSV A(LR SOL) - Open/Short	Α	-	Α
10	P0755	SCSV B(LR SOL) - Malfunction		В	• - 1. 1. 3. 3. 3. 4. 4. 4. 4. 1.
11	P0758	SCSV B(LR SOL) - Open/Short	Α	-	Α
12	P1121	Throttle position input - Abnormal	В	<b>-</b> 1 -	В
13	P1780	Torque reduction request signal - Abnormal	В		В
14	P0748	PCSV circuit - Malfunction	Α	-	Α
15	P0740	Lock-up solenoid valve-open/short	-	В	-
16	P0500	Vehicle speed sensor	-	В	

## ( CAUTION

- Type A: Hold lamp blinking on the 1st driving cycle with a fail store DTC
- Type B: Hold lamp blinking on the 2nd consecutive driving cycle with a fail store DTC
- Type C: Hold lamp blinking store DTC on 2nd consecutive driving cycle with a fail

## **AUTOMATIC TRANSMISSION FLUID**

EKUC0050

### 1. Inspection

1) Apply the parking brake and position wheel chocks to prevent the car from rolling forward.

## **NOTE**

Place the car on a flat, level surface.

- 2) Run the engine to heat the automatic transmission fluid to 70-80°C (158-176°C) While the engine is idling, shift the selector lever from "P" to "L" and back again.
- 3) Let the engine idle.
- 4) Shift the selector lever to "P".
- 5) Check that the ATF level is in the hot range. Add ATF to specification if necessary.

### 2. Condition

- 1) Check the ATF for discoloration.
- 2) Check the ATF for any unusual small.

## M NOTE

Determine whether or not the automatic transmission should be disassembled, by carefully observing the condition of fluid.

If the fluid is muddy and varnished, it indicates burned drive plats.

## TRANSAXLE RANGE SWITCH EKMBOOGG

- 1. Operating inspection
  - Check that the starter turns with the ignition switch at START position and the selector in the "P" and "N" range only.
  - Check that the back-up (reverse) lights illuminate when shifted to the "R" range with the ignition switch in the ON position.
  - 3) Check the transaxle range switch if it is not working properly.

#### (GASOLINE)

Position				Con	necto	r pin			
Position	4	1	2	10	3	9	7	8	6
Р	0-	0	0-	-0					·
R			0-		-0				
N	0-	-0	0-			-0			
D			0-	-			0		
2	**		0-					0	
L			0					***************************************	0

○—○: Continuity

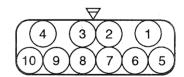
FKMB006A

### (DIESEL)

Position				Con	necto	r pin			
FUSITION	4	1	2	5	3	9	7	8	6
Р				0	0	0-		THE PARTY OF THE P	0
R	0-				0				
N		0-			0	0-		WATER AND DESCRIPTION OF THE PERSON OF THE P	0
D					0-			0	
2			0		9				
L			-		0-		<b>-</b> 0		

O-O: Continuity

EKMB006B

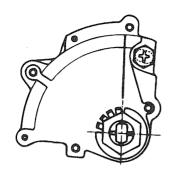


KKMB006B

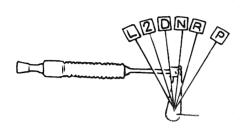
### 2. Adjustment

- 1) Shift the selector lever to the "N" range.
- 2) Loosen the transaxle range switch mounting bolts.
- 3) Disconnect the transaxle range switch connector.
- 4) Check the continuity of the terminals using ohmmeter.

5) Adjust the switch to the point where there is continuity between the terminals.



EKLA003G

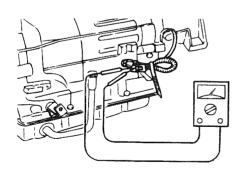


EKLA003H

## SPEED SENSOR (OUTPUT) EKMBOO9

- 1. Disconnect the speed sensor connector.
- 2. Measure the resistance between pin 1 and pin 2.

Resistance:  $430 \pm 40\Omega$ 



EKLA004B

## LINE PRESSURE EKMB0140

- Connect a tachometer to the engine and SST to line pressure inspection port of transmission case.
- 2. Shift the selector lever to "D" range.
- 3. Read the oil pressure at engine idle speed.
- 4. Depress the brake pedal firmly with the left and gradually depress the accelerator pedal with the right foot.

Read the oil pressure as soon as the engine speed becomes constant, then release the accelerator pedal.

## NOTE

Steps 4 to 5 must be accomplished within 5 seconds.

- 6. Shift the selector lever to "N" range and run the engine at idle speed for at least one minute.
- 7. Read the line pressures at engine idle and stall speed for "R" range in the procedure described above.

Shift position	Engine speed	Pressure (kg/cm²)
D	ldle	3.5 - 4.2
	Stall	12.7 - 14.5
R	Idle	5.1 - 5.2
	Stall	16.3 - 19.6

## **EVALUATION OF LINE PRESSURE TEST**

C	ondition	Possible cause
	In "D" and "R" ranges	Defective or stuck the throttle valve Defective or stuck the regulator valve Defective the oil pump OD clutch slipping
Below standard	In "D" range only	Fluid leakage in the "D" range line pressure hydraulic circuit Forward clutch slipping OD clutch slipping
	In "R" range only	Fluid leakage in the "R" range line pressure hydraulic circuit Direct clutch slipping Defective low & reverse brake
Excessive I	ine pressure at idle	Defective or stuck the throttle valve Defective or stuck the regulator valve

### STALL TEST EKUC0120

The object of this test is to check the overrall performance of the transmission and engine by measuring the stall speeds in the D and R ranges.

## / CAUTION

During this test, make sure that no one shand in front of or behind vehicle.

- Check transaxle fluid level. Fluid should be at normal operating temperature [70 - 80°C(158 - 176°F)]. Engine coolant should also be at normal operating temperature [80 - 90°C (176 - 194°F)].
- 2. Apply chocks to both rear wheels.
- 3. Attach an engine tachometer.
- 4. Apply the parking and service brakes fully.
- 5. Start the engine.
- 6. With the selector lever in the "D" position, depress the accelerator pedal fully to read maximum engine rpm. Do not hold the throttle wide open any longer than is necessary to obtain maximum engine rpm reading, and never longer than 5 seconds at a time. If more than one stall test is required, operate the engine at approximately 1,000 rpm in neutral for minutes to cool the transaxle fluid between tests.
- 7. Place the selector lever in the "R" position and perform the stall test by the same procedure as previously described.

Stall rpm: 2,390 ± 150

### **EVALUATION OF STALL TEST**

Co	ndition	Possible cause
	In "D" and "R" ranges	Line pressure too low OD clutch slipping OD one-way clutch not operating properly
Above standard	In "D" range only	Forward clutch slipping Rear one-way clutch not operating properly Line pressure too low OD clutch slipping OD one-way clutch not operating properly
	In "R" range only	Direct clutch slipping Low & reverse clutch slipping Line pressure too low OD clutch slipping OD one-way clutch not operating properly
Within standard		All shift control elements within transmission functioning normally
Below standard		Engine out of tune Slipping of one way clutch within torque converter

## TIME LAG TEST EKMB0130



If selector lever is shifted while the engine is idling, there will be a certain time lapse or time lag before shift shock can be felt. This is used for checking condition of the OD clutch, forward clutch, direct clutch and low & reverse brake.

#### **PRECAUTION**

Engage the parking brake and apply wheel chocks to the front and reart wheels.

- 1. Shift the selector lever from "N" to "D" range.
- 2. Using stop watch, measure the time it takes from the moment the lever is shifted untill shift shock is felt.
- 3. Measure the time lag for "N" to "R": in same manner.



Make thee measurements and take the average value. Be sure to permit at least one minute interval between measurements.

## STANDARD TIME LAG:

Shift range position	Time lag
N→D	1.2 second or less
N→R	1.5 second or less

### **EVALUATION OF TIME LAG TEST**

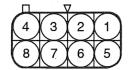
Shift range position	Time lag
Longer in "N" to "D"	Line pressure too low Forward clutch worn OD clutch worn
Longer in "N" to "R"	Direct clutch worn Low & reverse bake worn Line pressure too low OD clutch worn

## SOLENOID VALVE EKMB0100

- Disconnect the solenoid valve connector.
- 2. Measure the resistance between each terminal and ground.

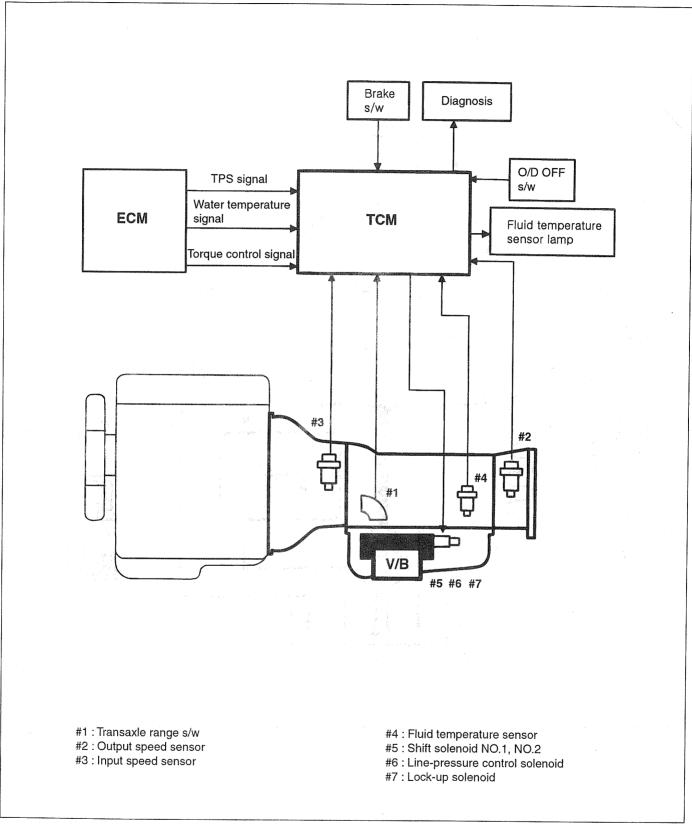
Resistance : 11 - 15 $\Omega$ 

- 3. If not corrected, replace the sloenoid valve.
  - 1) Solenoid valve NO.1
  - 2) Solenoid valve NO.2
  - 3) Line pressure sol.valve
  - 4) Lock-up solenoid valve



EKLA004C

## SYSTEM DIAGRAM EKUA0180



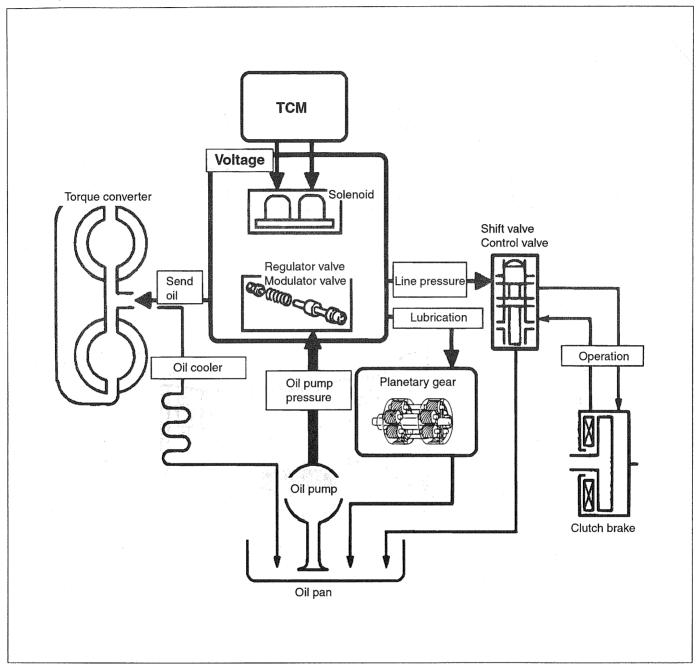
EKUA018A

## HYDRAULIC CONTROL SYSTEM

(03-II, 30-40LEI) EKUB0180

Based on the hydraulic created by the oil pump, TCM sends signals to solenoid and hydraulic control system

governs the hydraulic pressure acting on the torque converter, planetary gear, clutches and brakes in accordance with the vehicle driving conditions.



EKMA018A

## HYDRAULIC CONTROL SYSTEM

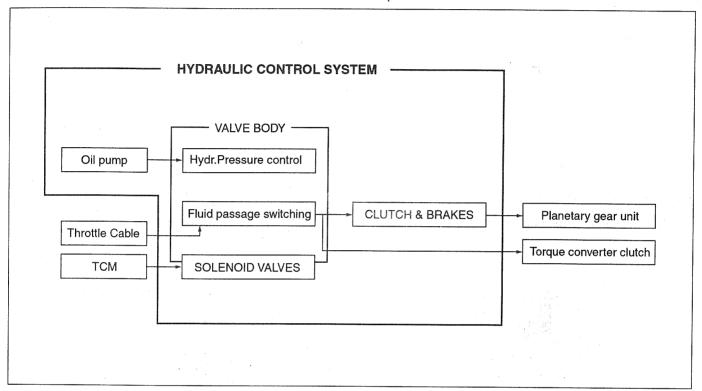
(03-72LE) EKUC0180

The hydraulic control system is composed of the oil pump, the valve body, the solenoid valves, the accumulators, the clutches and brakes, as well as the fluid passages which connect all of these components.

Based on the hydraulic pressure created by the oil pump, the hydraulic control system governs the hydraulic pressure acting on the torque converter clutch, clutches and brakes in accordance with the vehicle driving condition.

There are 3 solenoid valves are turned on and off by signals from the TCM to operate the shift valves, and change the gear shift position.

The No.3 solenoid valve is operated by signals from the TCM to engage or disengage the lock-up clutch of the torque converter clutch.

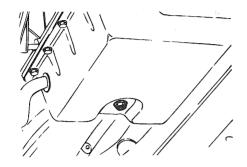


EKUC018A

## **AUTOMATIC TRANSAXLE**

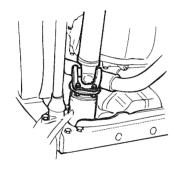
## REMOVAL EKUB0190

- Remove the battery (-) terminal.
- Drain the automatic transmission fluid.



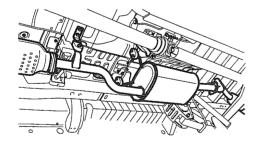
EKLA001B

- 3. Remove the control cable.
- Remove the under cover.
- Remove the front propeller shaft. (4WD) 5.



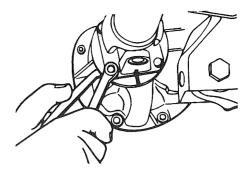
КММВ009Н

Remove the front muffler.



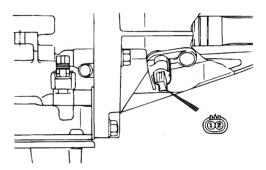
KDUB410C

- Remove the transfer case connector. (4WD)
- Remove the rear propeller shaft.



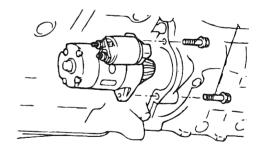
EKLA001E

- Remove the oil cooler pipe.
- 10. Remove the speed sensor connector.



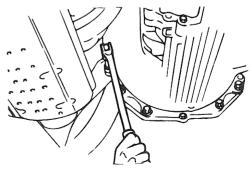
KKMB019A

- 11. Remove the back-up lamp switch connector.
- 12. Remove the starter motor.



EKLA001G

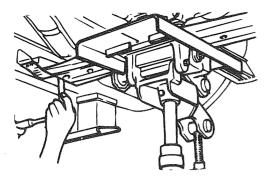
13. Remove the transmission mounting bolt.



EKLA001H

14. Support the transmission on the jack.

15. Remove the transmission assembly.



EKLA001I

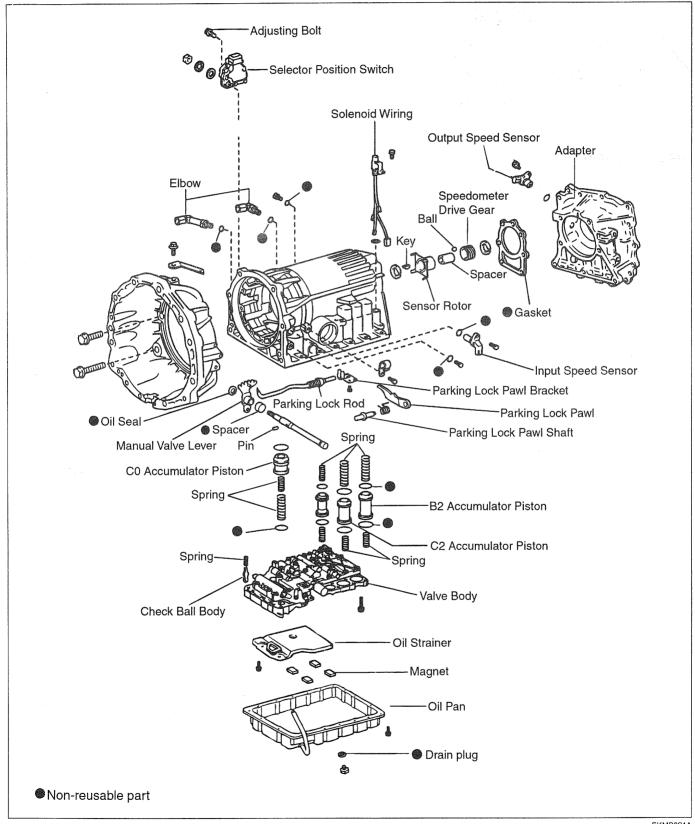
## INSTALLATION EKMB0200

1. Installation is the reverse of the removal.

## **AUTOMATIC TRANSMISSION**

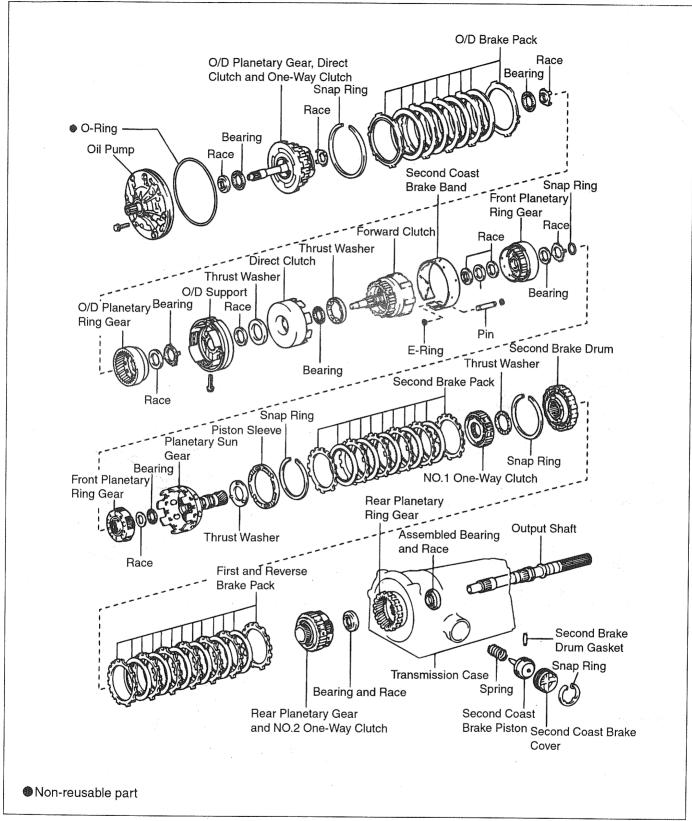
(30-40LE) EKMB0210

## **COMPONENTS (1)**



EKMB021A

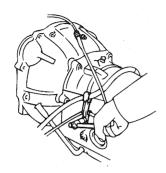
## **COMPONENTS (2)**



EKMB021B

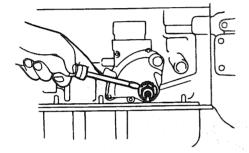
## DISASSEMBLY EKMB0220

- 1. Remove the torque converter.
- 2. Remove the oil filler gauge.
- 3. Remove the wire harness clamp.



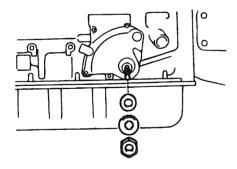
EKLA004A

4. Remove the control shaft lever.



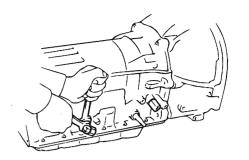
ККМВ003А

5. Remove the transaxle range switch.



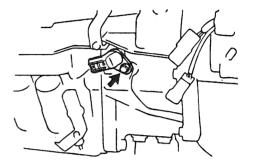
ккмвоозв

6. Remove the union.



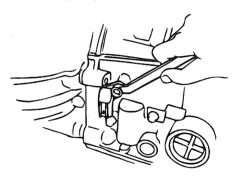
EKLA007A

7. Remove the output speed sensor.



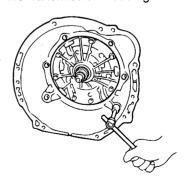
KKMB003C

8. Remove the input speed sensor.



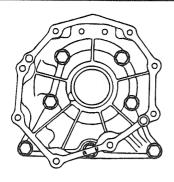
KKMB003D

9. Remove the transmission housing.



EKLA011A

10. Remove the extension housing.



KKMB003E

11. Using a dial indicator, measure the inside diameter of the extension housing bushing.

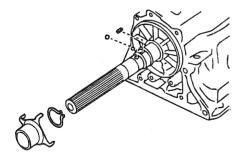
Max.: 40.09mm (1.5783in.)

If the inside diameter is greater than maximum, replace the extension housing.



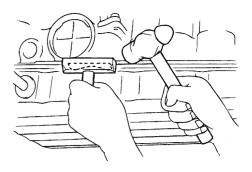
EKLA013A

- 12. Remove the speedometer drive gear.
- 13. Remove the sensor rotor and key.



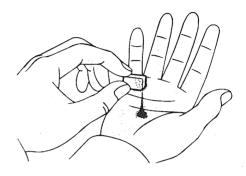
KKMB022B

14. Remove the oil pan.



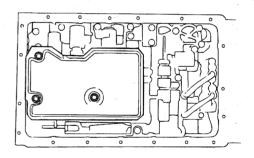
EKLA016A

15. Remove the magnets and use them to collect steel particles.



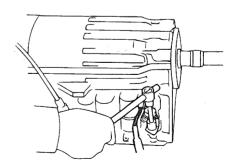
EKLA017A

16. Remove the oil strainer and gasket.



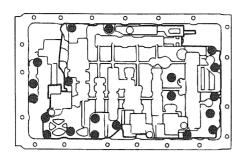
EKLA018A

17. Remove the stopper plate.



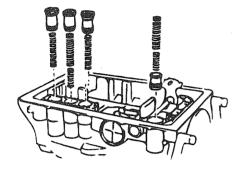
EKLA023A

18. Remove the valve body mounting bolts.



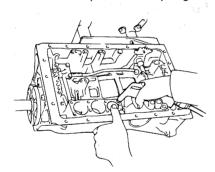
KKMB005C

19. Remove the check ball body, springs(4EA)and pins(2EA).



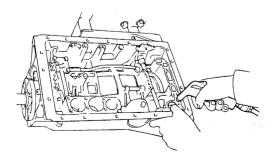
KKMB005A

- 20. REMOVE ACCUMULATOR SPRINGS AND PISTONS
  - 1) Applying compressed air to the ATF hole, remove Bo accumulator piston and spring.



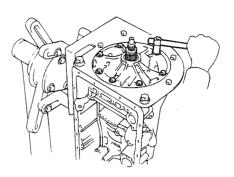
EKLA028A

2) Applying compressed air to the ATF hole, remove the Co accumulator piston and spring.



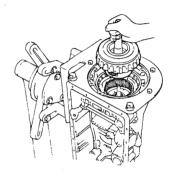
EKLA029A

21. Remove the oil pump.



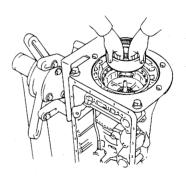
EKLA031A

22. Remove the overdrive planetary and the overdrive direct clutch.



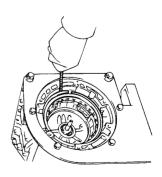
EKLA034A

23. Remove the overdrive ring gear.



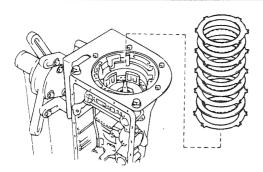
EKLA037A

24. Remove the snap ring.



EKLA040A

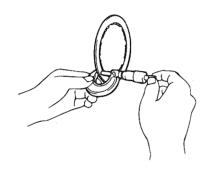
25. Remove the flanges, the plates and the discs.



EKLA041A

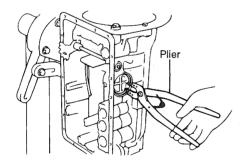
26. Using the micrometer, measure the thickness of the disc.

Minimum thickness: 1.84mm (0.0724in.)



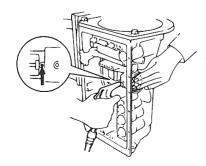
EKLA042A

27. Remove the snap ring.



EKMB022C

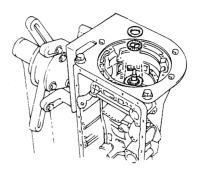
28. Applying compressed air to the ATF hole, remove the second coast brake piston.



EKLA046A

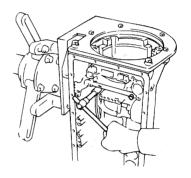
## 29. REMOVE OVERDRIVE SUPPORT

1) Remove the thrust bearing and race.



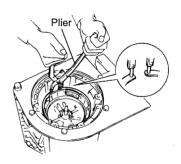
KKMB022A

2) Remove the overdrive support mounting bolts.



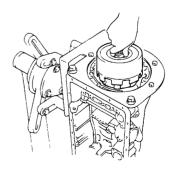
EKLA049A

3) After removing the snap ring, remove the overdrive support.



EKMB022A

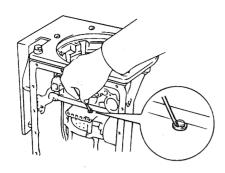
30. Remove the direct clutch and the forward clutch.



EKLA053A

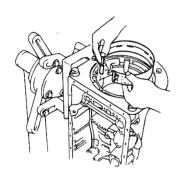
### 31. SECOND COAST BRAKE BAND

1) Remove the E-ring and pin.



EKLA055A

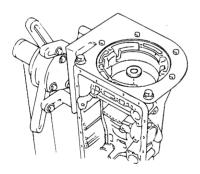
2) Remove the second coast brake band.



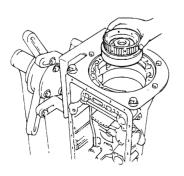
EKLA056A

## 32. FRONT PLANETARY RING GEAR

1) Remove the race.

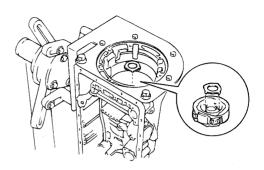


2) Remove the front plantary ring gear.



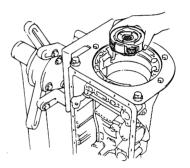
33. FRONT PLANETARY GEAR

1) Remove the race.



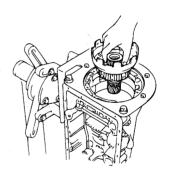
EKLA060A

2) Remove the front planetary gear.



EKLA063A

34. Remove the sun gear input drum and the oneway clutch.



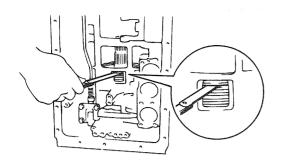
EKLA064A

35. Using the thickness gauge, measure the clearance between the second brake snap ring and the flange.

Standard value: 0.62 ~ 1.98 mm

EKLA058A

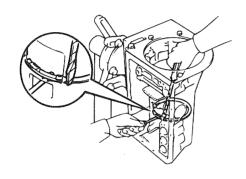
EKLA057A



EKLA065A

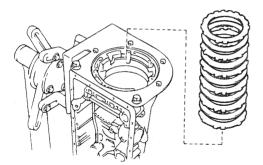


- 36. FLANGE, PLATE, DISC
  - 1) Remove the snap ring.



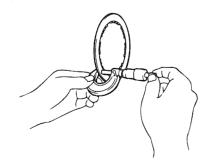
EKLA066A

2) Remove the flange(1), discs(4) and plates(4).



EKLA067A

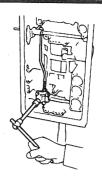
37. Using the micrometer, measure the thickness of disc.



EKLA068A

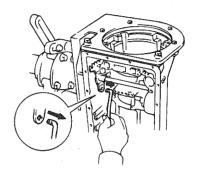
## 38. PARKING LOCK ROD

1) Remove the parking lock pawl bracket.



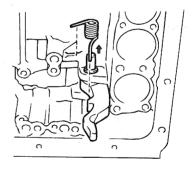
EKLA069A

Remove the parking lock rod from the manual valve lever.



EKLA070A

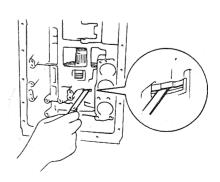
39. Remove the parking lock pawl and shaft.



EKLA071A

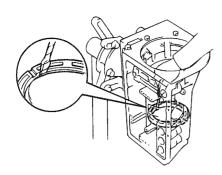
40. Measure the clearance between the plate and the second brake drum.

Standard value: 0.60 ~ 0.90 mm



EKLA072A

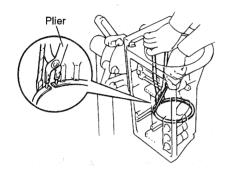
41. Remove the second brake piston sleeve.



EKLA073A

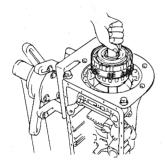
## 42. REAR PLANETARY, SECOND BRAKE DRUM

1) Remove the snap ring.



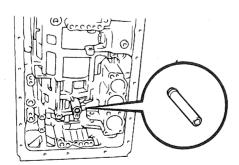
EKMB022B

2) Remove the rear planetary gear, the second brake drum and the output shaft.



EKLA075A

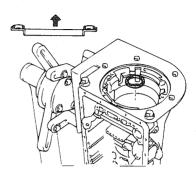
43. Using the screw driver, remove the gasket.



EKLA077A

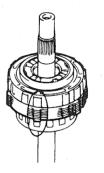
## REASSEMBLY EKMB069

- 1. Install the rear planetary gear, the second brake drum and the output shaft.
  - 1) Install the bearing and race.



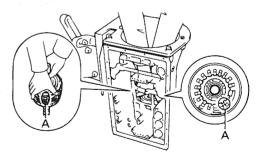
EKLA414A

2) Install the second brake drum, flange, disc and plate.



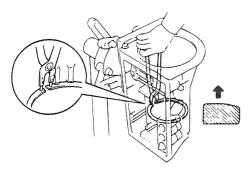
EKLA415A

3) Align the rear planetary gear, second brake drum and output shaft.



EKLA416A

4) Install the snap ring.

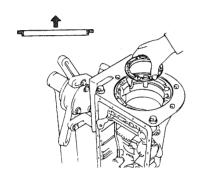


EKLA417A

2. Measure the clearance between the plate and the second brake drum.

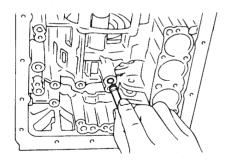
Clearance: 0.6 ~ 0.9 mm

3. Install the second brake piston sleeve.



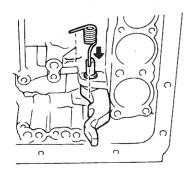
EKLA419A

4. Install the brake drum gasket.



EKLA420A

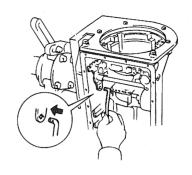
5. Install the parking lock pawl and shaft.



EKLA421A

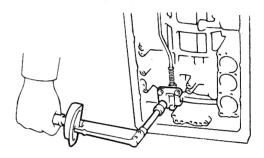
### INSTALL PARKING LOCK ROD

Connect the parking lock rod to the manual valve
lever



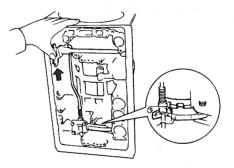
EKLA422A

2) Install the parking lock pawl bracket.



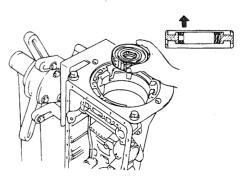
EKLA423A

 Confirm that the planetary ring gear is correctly fixed.



EKLA424A

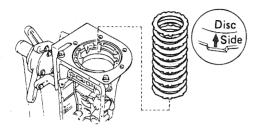
7. Install the one-way clutch.



EKLA425A

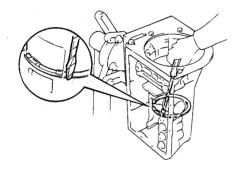
## 8. INSTALL FLANGE, DISC, PLATE

- Install the plate with the rounded edge side of the plate facing the disc.
- 2) Alternately install discs and plates (Disc first)



EKLA426A

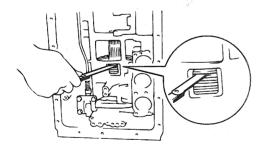
3) Install the flange and snap ring.



EKLA427A

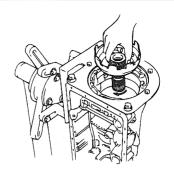
 Using the thickness gauge, measure the clearance between snap ring and flange.

Clearance: 0.62 ~ 1.98 mm



EKLA428A

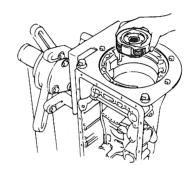
10. Install the sun gear input drum.



EKLA429A

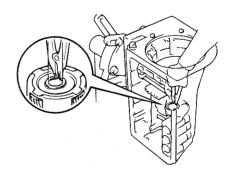
### 11. FRONT PLANETRAY GEAR

1) Install the front planetary gear on the sun gear.



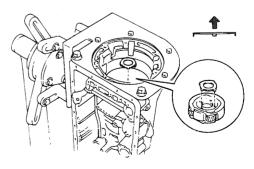
EKLA430A

Install the snap ring.



EKLA432A

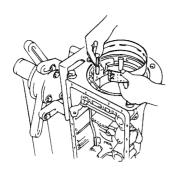
3) Install the bearing race on the front planetary gear.



EKLA433A

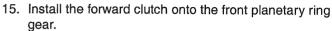
12. INSTALL SECOND COAST BRAKE BAND

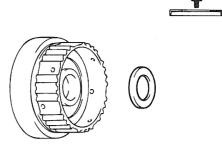
1) Insert the second coast brake band to the case.



EKLA434A

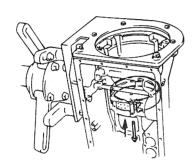
ENLA434A





EKLA438A

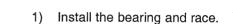
EKLA440A

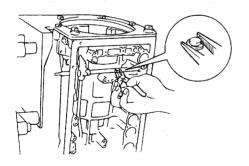


Install the pin through the brake band.

EKLA435A

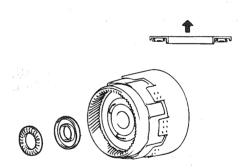
16. INSTALL DIRECT CLUTCH, FORWARD CLUTCH





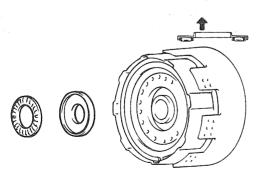
Install the E-ring to the pin

EKLA436A



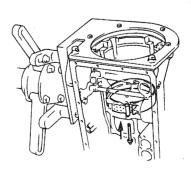
EKLA441A

13. Install the bearing and race onto the forward clutch.



EKLA437A

Install the direct clutch, the forward clutch and the front ring gear to the case.

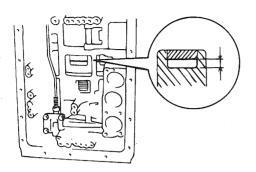


EKLA435A

14. Install the race onto the front planetary gear.

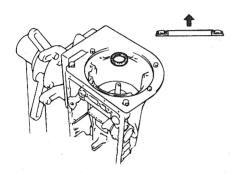
3) Using the vernier caliper, measure the distance between the sun gear.

Standard value: 5.3 ~ 7.3 mm



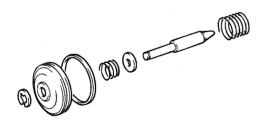
EKLA443A

4) Install the bearing and race onto the forward clutch.



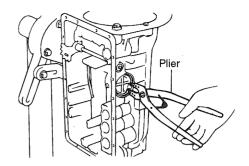
EKLA444A

17. Reassemble the second coast brake piston.



EKLA445A

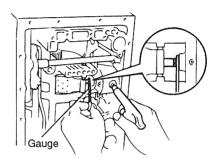
18. After installing the piston cover, install the snap ring.



EKMB069A

19. Measure the stroke applying the compressed air.

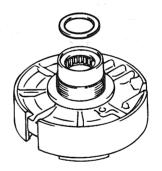
Stroke: 2.0 ~ 3.0 mm



EKMB069B

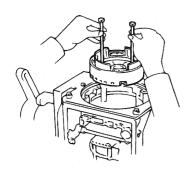
## 20. OVERDRIVE SUPPORT

1) Install the race onto the overdrive support.



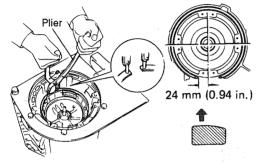
EKLA449A

2) Aim the bolt and oil holes of the overdrive support toward the valve hole side, and align then with the bolt hole of the transmission case and insert.



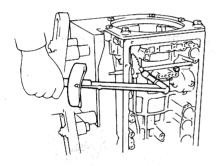
EKLA450A

3) Install the snap ring.



EKMB069C

4) Install the bolts(2EA).

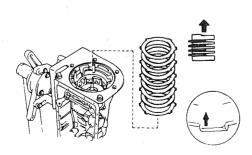


EKLA452A

21. Measure the end-play of the output shaft.

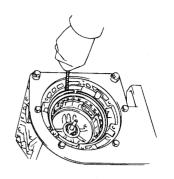
Standard value: 0.27 ~ 0.86 mm

22. Install the flange with the rounded edge side of the flange facing the disc.



EKLA454A

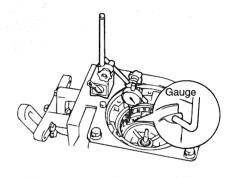
23. Install the snap ring.



EKLA455A

#### 24. PISTON STROKE OF OVERDRIVE BRAKE

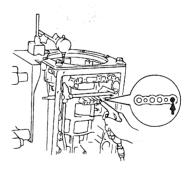
 Place the dial indicator onto the overdrive brake piston.



EKMB069D

2) Measure the stroke applying and releasing the compressed air.

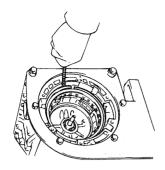
Piston stroke: 1.40 ~ 1.70 mm



EKLA457A

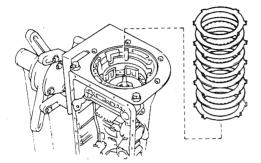
#### 25. REMOVE FLANGE, PLATE, DISC

Remove the snap ring.



EKLA458A

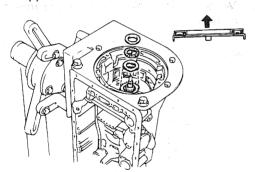
2) Remove the flanges(2EA), plates(3EA) and discs(4EA).



EKLA459A

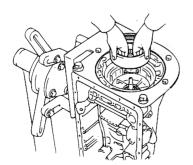
#### 26. OVERDRIVE RING GEAR

 Install the bearing and the race onto the overdrive support.



EKLA460A

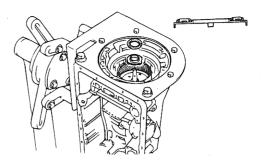
2) Install the overdrive planetary ring gear.



EKLA461A

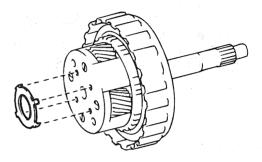
#### 27. INSTALL OVERDRIVE PLANETARY GEAR

1) Install the bearing and the race onto the planetary ring gear.



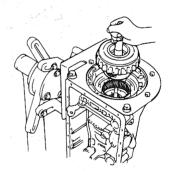
EKLA462A

2) Install the race onto the planetary gear.



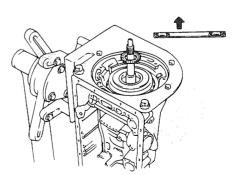
EKLA463A

3) Install the overdrive planetary gear and the direct clutch.



EKLA464A

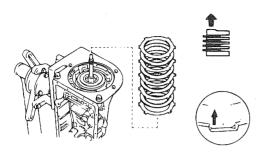
4) Install the bearing and the race onto the direct clutch.



EKLA465A

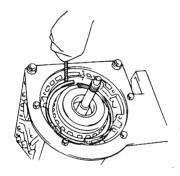
#### 28. INSTALL FLANGE, DISC, PLATE

- 1) Install the flange with the rounded edge side of the flange facing the disc.
- 2) Alternately install discs and plates.



EKLA466A

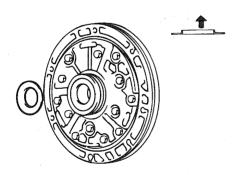
3) Install the flange and the snap ring.



EKLA467A

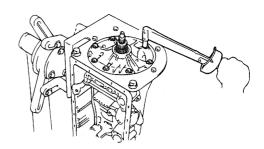
#### 29. INSTALL OIL PUMP

1) Install the race onto the oil pump.



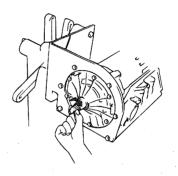
EKLA468A

2) Install the oil pump onto the transmission case.



EKLA469A

30. Make sure the input shaft rotates smoothly.



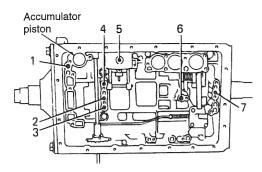
EKLA470A

- 31. Check for the sound of operation while injecting compressed air into the oil hole indicated in the figure.
  - 1) Overdrive direct clutch
  - 2) Direct clutch
  - 3) Forward clutch
  - 4) Overdrive brake
  - 5) Second coast brake
  - 6) Second brake
  - 7) First and reverse brake

# **NOTE**

When inspecting the OD direct clutch, check with the Co accumulator piston hole closed.

If there is no noise, disassemble and check the condition of the parts.



EKMB069F

# C° OIM OLD GITHING OIMING OIMI

KKMB005B

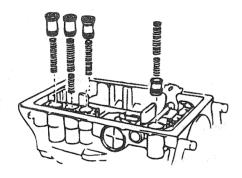
#### 32. INSTALL ACCUMULATOR PISTON

1) Install the accumulator piston.

/ CAUTION

C0: Overdrive direct clutch

C2: Direct clutch B0: Overdrive brake B2: Second brake



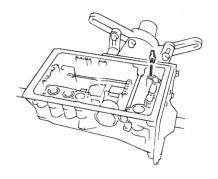
KKMB005A

#### 2) Install the spring

Spring		Free length	Outer diameter	Color
(1)B2	Upper	70.50	19.70	Yellow
(2)B2	Lower	22.0	14.00	Pink
(3)C2	Upper inner	42.06	14.70	Pink
(4)C2	Upper outer	64.00	20.20	Green
(5)C2	Lower	26.00	11.96	Green
(6)B0	Upper	62.00	16.00	Green
(7)B0	Upper	17.50	14.00	Green
(8)C0	Inner	46.00	14.02	Yellow
(9)C0	Outer	74.60	20.90	Orange

Unit: mm

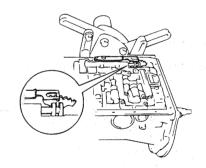
33. Install the check ball body and the spring.



EKLA476A

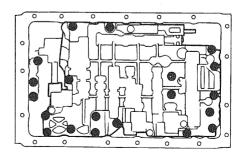
#### 34. INSTALL VALVE BODY

1) Align the groove of the manual valve to the pin of the lever.



EKLA477A

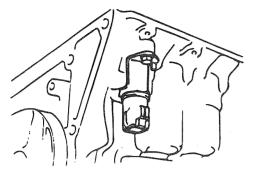
- 2) Confirm the spring into the accumulator piston are installed correctly.
- 3) Install the valve body.



KKMB005C

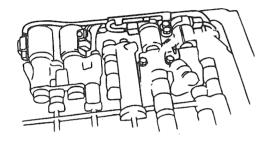
#### 35. INSTALL SOLENOID CONNECTOR

1) Install the stopper plate.



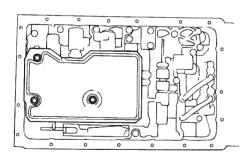
KKMB005D

- 2) Connect the solenoid connect.
- 3) Install the clamp bolt.



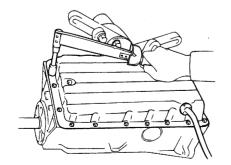
KKMB005E

36. Install the oil strainer.



EKLA484A

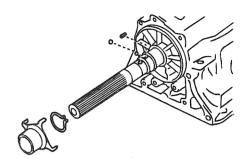
37. Install the oil pan.



EKLA489A

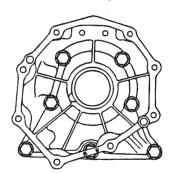
#### 38. INSTALL ROTOR SENSOR

- 1) Install the key.
- 2) Install the snap ring.
- 3) Install the spacer and the sensor rotor.
- 4) Install the snap ring.



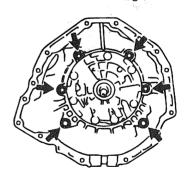
KKMB022B

39. Install the extension housing.



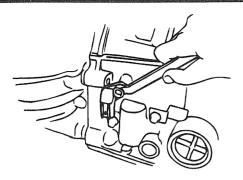
KKMB003E

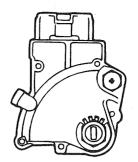
40. Install the transmission housing.



KKMB005F

41. Install the input speed sensor.

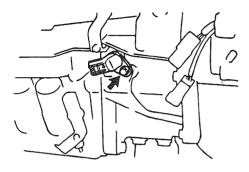




KKMB003D

KKMB005G

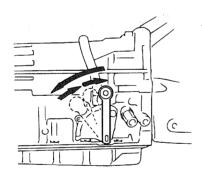
#### 42. Install the output speed sensor.



ккмвоозс

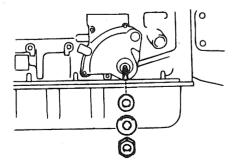
#### 43. INSTALL TRANSAXLE RANGE SWITCH

 Install the transaxle range switch onto the manual valve shaft and temporarily tighten the adjusting nut.



EKLA501A

#### 2) Install the washer and the nut.

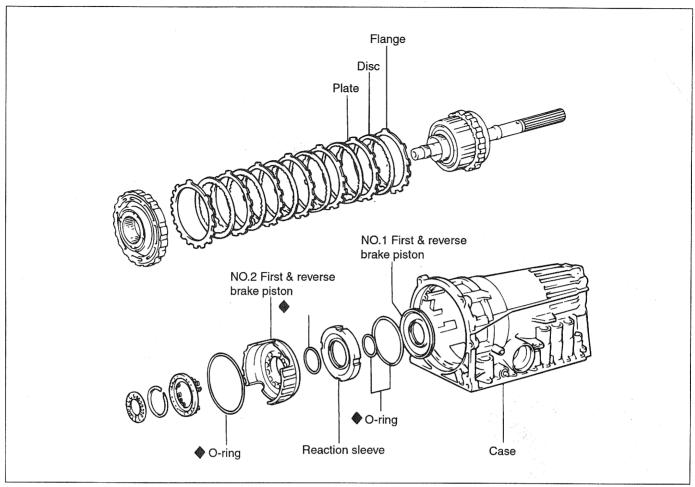


KKMB003B

#### 44. Tighten the adjusting bolt.

# LOW REVERSE BRAKE

# FIRST(OR LOW) REVERSE BRAKE EKMB0560

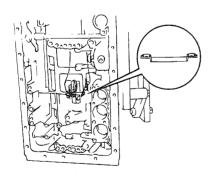


EKMB056A

#### DISASSEMBLY

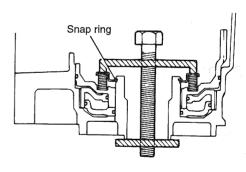
EKMB0570

1. Remove the bearing and the race.



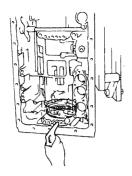
EKLA282A

2. Remove the snap ring and the piston return spring.



EKMB057A

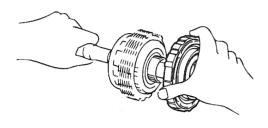
3. Apply the compressed air to the transmission case to remove the NO.2 first reverse brake piston.



EKLA285A

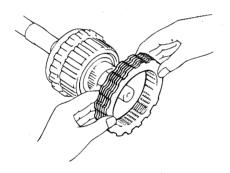
12 420071

4. Remove the second brake from the output shaft.



EKLA288A

5. Remove the discs(6EA), plates(6EA) and flange.



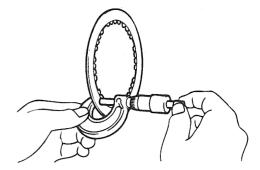
EKLA289A

#### INSPECTION EKMB0580

1. Using a micrometer, measure the thickness of the discs.

If the thickness is less than the minimun, replace the disc.

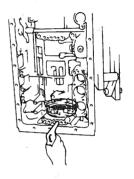
Minimun thickness: 1.51 mm



EKLA290A

#### REASSEMBLY EKMB0590

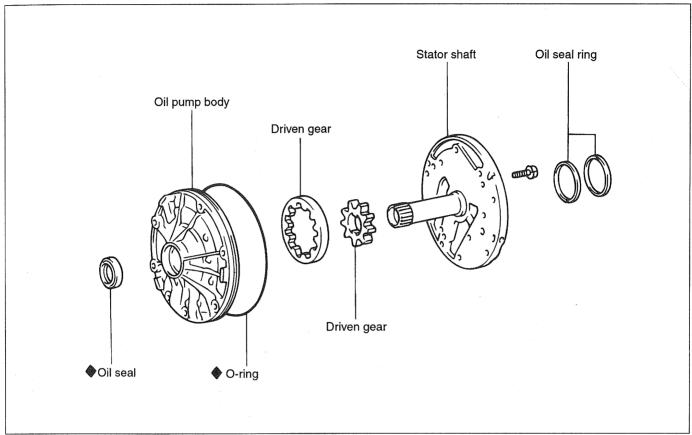
1. Make sure the first and reverse brake piston moves smoothly when applying and releasing the compressed air into the transmission case.



EKLA299A

# OIL PUMP (A/T)

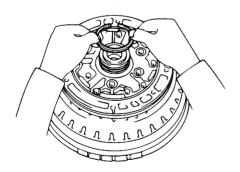
#### OIL PUMP EKMB0230



EKMB023A

#### DISASSEMBLY EKMB0240

1. Remove the oil seal ring.

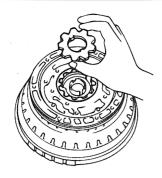


EKLA090A

3. Remove the driven and the drive gear.

EKLA089A

2. Remove the stator shaft.



EKLA091A



EKLA094A

#### INSPECTION EKMB0250

1. Measure the inner diameter of the oil pump bushing.

Standard value: 38.19 mm



EKLA092A

Measure the inner diameter of the stator shaft bushing.

Front: 21.58 mm Rear: 27.08 mm



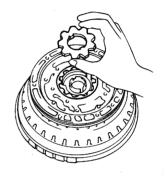
EKLA093A

3. Using a filler gauge, measure the clearance of the driven gear.

Standard value: 0.07 - 0.15 mm

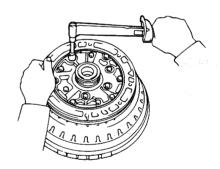
#### REASSEMBLY EKMB0260

 Install the driven gear and the drive gear after coating them with ATF.



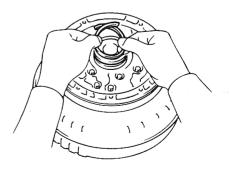
EKLA099A

2. Install the stator shaft to the oil pump.



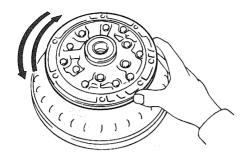
EKLA100A

3. Install the oil seal ring.



EKLA101A

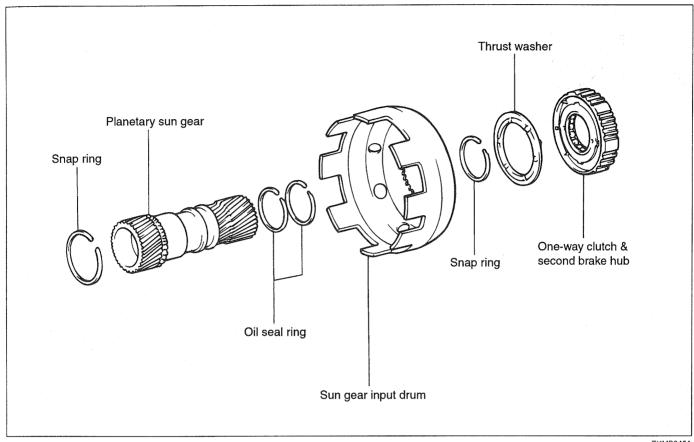
 Make sure the drive gear rotates smoothly when installed to the torque converter.



EKLA103A

# ONE WAY CLUTCH

EKMB0450



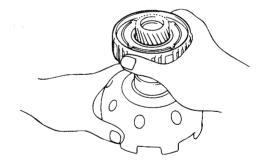
EKMB045A

#### DISASSEMBLY EKMB0460

1. Hold the planetary sun gear and turn the brake hub. The brake hub should turn freely clockwise and should lock counterclockwise.



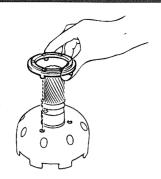
EKLA227A



EKLA228A

3. Remove the thrust washer.

Separate the one-way clutch from the brake hub.

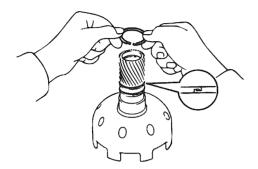


EKLA229A



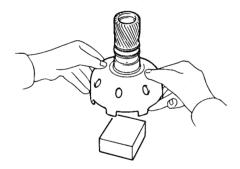
EKLA233A

4. Remove the oil seal ring.



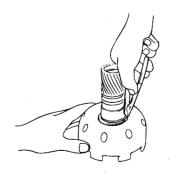
EKLA230A

5. Remove the snap ring.



EKLA231A

6. Remove the sun gear input drum.



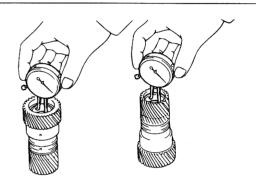
EKLA232A

7. Remove the snap ring of the planetary sun gear.

#### INSPECTION EKMB0470

1. Using a dial indicator, measure the inner diameter of the planetary sun gear.

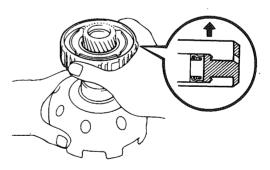
Maximum diameter: 27.08 mm



EKLA234A

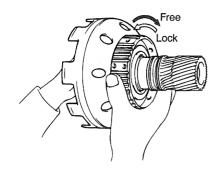
#### REASSEMBLY EKMB0480

1. Install the one-way clutch and the brake hub.



EKLA240A

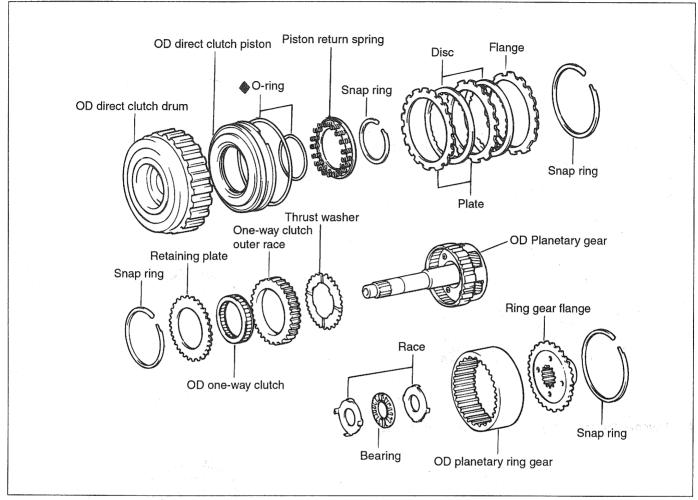
 Hold the planetary sun gear and turn the hub. The brake hub should turn freely clockwise and should lock counterclockwise.



EKLA241A

#### **REVERSE & OVERDRIVE CLUTCH**

EKMB0270



EKMB027A

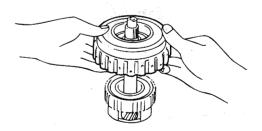
#### DISASSEMBLY EKMB0280

1. Hold the OD direct clutch drum and turn the input shaft. The input shaft should turn freely clockwise and should lock counterclockwise.



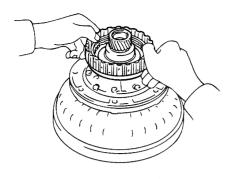
EKLA105A

Remove the overdrive direct clutch from the overdrive planetary gear.



EKLA106A

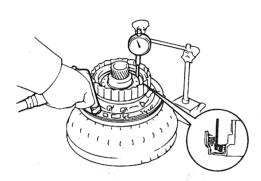
- 3. CHECK PISTON STROKE OF OVERDRIVE DIRECT CLUTCH (Co)
  - Place the oil pump onto the torque converter, and then place the OD direct clutch assembly onto the oil pump.



EKLA108A

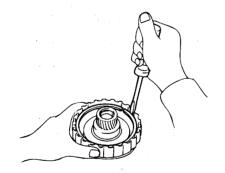
 Using a dial indicator, measure the overdrive direct clutch piston stroke applying and releasing the compressed air.

Standard value: 1.40 - 1.70 mm



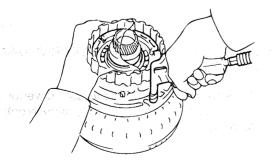
EKLA109A

4. Remove the snap ring and the piston return spring.



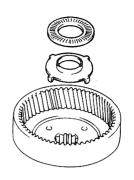
EKLA110A

5. Remove the overdrive direct clutch piston.



EKLA112A

6. Remove the bearing and the race from the planetary ring gear.



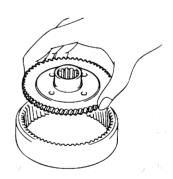
EKLA113A

7. Remove the snap ring.



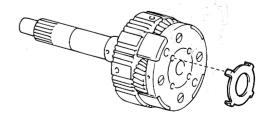
EKLA114A

8. Remove the ring gear flange.



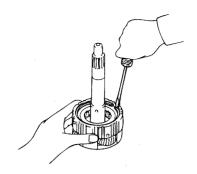
EKLA115A

9. Remove the race from the overdrive planetary gear.

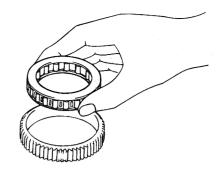


EKLA116A

10. Remove the snap ring.

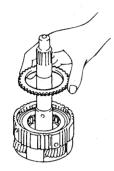


EKLA117A



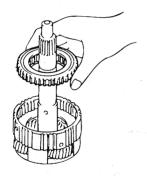
EKLA121A

11. Remove the retaining plate.



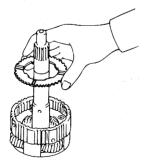
EKLA118A

12. Remove the overdrive one-way clutch with the outer race.



EKLA119A

13. Remove the thrust washer.



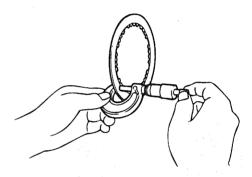
EKLA120A

14. Remove the one-way clutch.

#### INSPECTION EKMB0290

 Using a micrometer, measure the thickness of the disc.

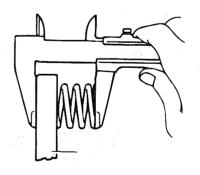
Standard value: 1.84 mm



EKLA122A

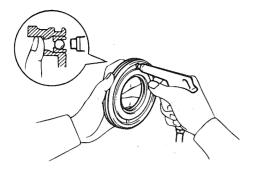
CHECK PISTON RETURN SPRING
 Using calipers, measure the free length of the return spring.

Standard length: 15.8 mm



EKLA123A

- 3. CHECK OVERDRIVE DIRECT CLUTCH PISTON
  - a. Check that check ball is free by shaking the piston.
  - b. Check that the valve does not leak by applying low pressure compressed air.



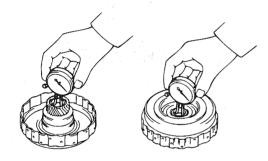
EKLA124A

4. CHECK OVERDRIVE DIRECT CLUTCH DRUM BUSHINGS

Using a dial indicator, measure the inside diameter of the clutch drum bushings.

Maximum inside diameter: 27.11 mm

If the inside diameter is greater then the maximum, replace the clutch drum.

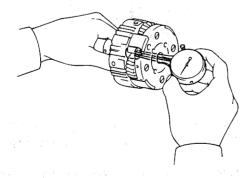


EKLA125A

 CHECK OVERDRIVE PLANETARY GEAR BUSHING Using a dial indicator, measure the inside diameter of the planetary gear bushing.

Maximum inside diameter: 11.27 mm

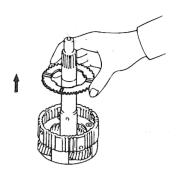
If the inside diameter is greater than the maximum, replace the planetary gear.



EKLA126A

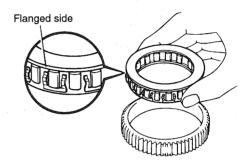
#### REASSEMBLY EKMB0300

1. Install the thrust washer to the overdrive planetary gear, facing the grooved side upward.



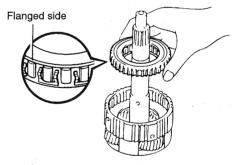
EKLA127A

2. Install the one-way clutch into the outer race, facing the flanged side of the one-way clutch upward.



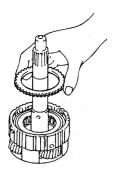
EKMB030B

Install overdrive one-way clutch with outer race to overdrive planetary gear.

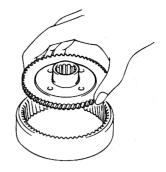


EKMB030A

4. Install retaining plate.

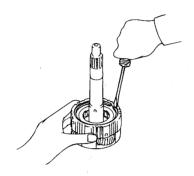


EKLA130A



EKLA133A

5. Install snap ring.



EKLA131A

8. Install snap ring.



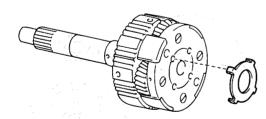
EKLA134A

Coat the race with petroleum jelly and install it to the planetary gear.



#### Race diameter

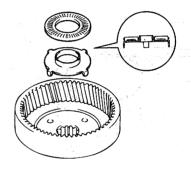
Inside diameter : 27.1mm (1.067in.) Outside diameter : 41.8mm (1.646in.)



EKLA132A

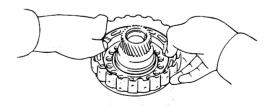
7. Install ring gear flange to overdrive planetary ring gear.

Install race and bearing.



EKLA135A

10. Install the race on the planetary gear.



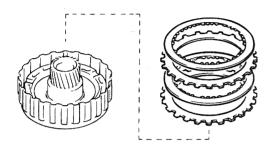
EKLA136A

11. Install the piston return spring.



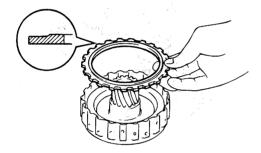
EKLA137A

12. Install the plate and the disc.



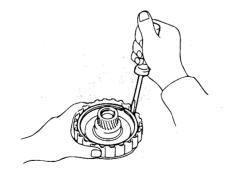
EKLA139A

13. Install the flange.



EKLA140A

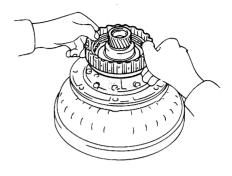
14. Install the snap ring.



EKLA141A

15. CHECK PISTON STROKE OF THE DIRECT CLUTCH PISTON

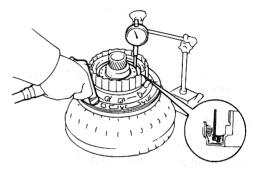
 Place the oil pump onto the torque converter, and then place the OD direct clutch assembly onto the oil pump.



EKLA142A

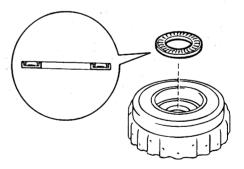
 Using a dial indicator, measure the overdrive direct clutch piston stroke applying and releasing the compressed air.

Piston stroke: 1.4 - 1.7 mm



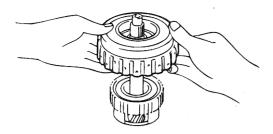
EKLA143A

16. Install the bearing and the race.



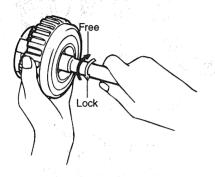
EKLA144A

17. Install the direct clutch assembly onto the OD planetary gear.



EKLA145A

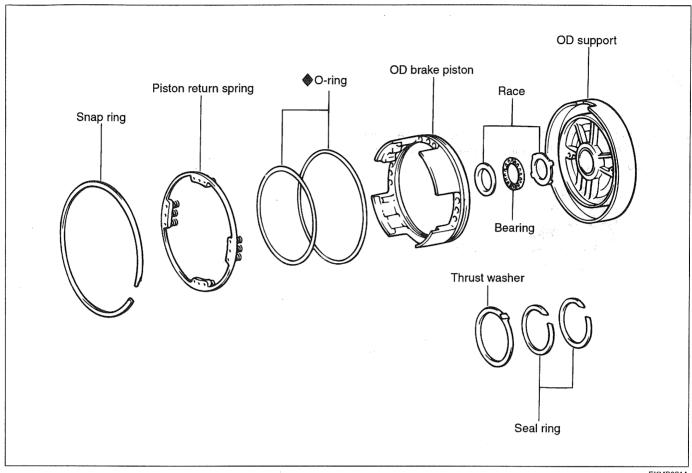
18. Hold the OD direct clutch drum and turn the input shaft. The input shaft should turn freely clockwise and should lock counterclockwise.



EKLA146A

# **OVERDRIVE BRAKE**

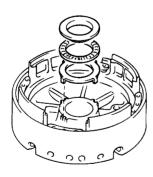
EKMB0310



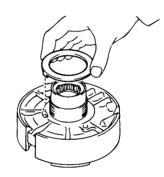
EKMB031A

#### DISASSEMBLY EKMB0320

1. Remove the bearing and the race.



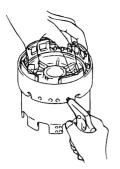
EKLA150A



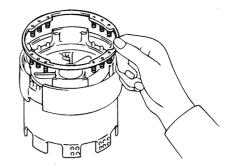
EKLA152A

- 3. Hold the OD brake piston so it is not slanted and apply compressed air into the passage to remove the OD brake piston.
- Remove the OD brake piston.

2. Remove the clutch drum washer.

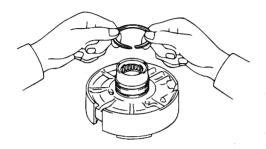


EKLA155A



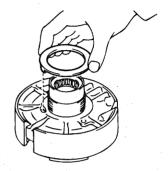
EKLA160A

5. Remove the oil seal ring.



EKLA156A

4. Install the clutch drum washer onto the OD support.



EKLA162A

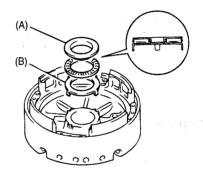
### REASSEMBLY EKMB0340

1. Install the oil seal ring.



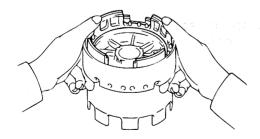
EKLA158A

5. Install the race.



EKLA164A

2. Install the overdrive brake piston.

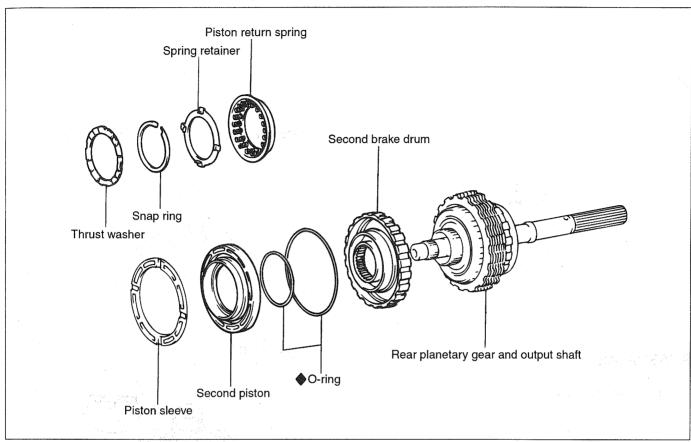


EKLA159A

3. Install the return spring.

# SECOND BRAKE

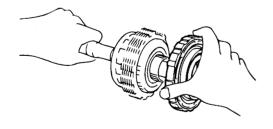
EKMB0490

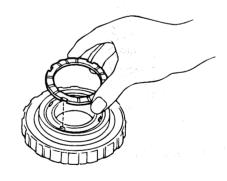


EKMB049A

#### DISASSEMBLY EKMB0500

Remove the second brake assembly from the output shaft.



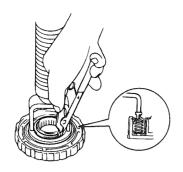


EKLA244A

Remove the snap ring, the spring and the piston return spring.

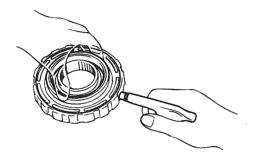
EKLA243A

2. Remove the thrust washer.



EKLA245A

4. Remove the second brake piston.



EKLA247A

#### INSPECTION EKMB0510

1. Check the free length of the return spring.

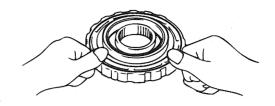
Standard length: 19.64 mm



EKLA248A

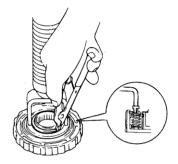
#### REASSEMBLY EKMB052

1. Being careful not to damage the O-ring, press in the second brake piston into the second brake drum.



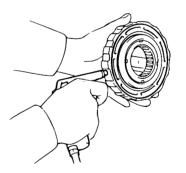
EKLA249A

Install the return spring, the spring retainer and the snap ring.



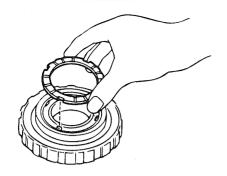
EKLA251A

3. Make sure the second brake piston moves smoothly when applying and releasing the low compressed air to the second brake drum.



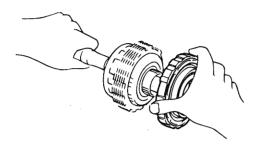
EKLA252A

4. Install the thrust washer.



EKLA253A

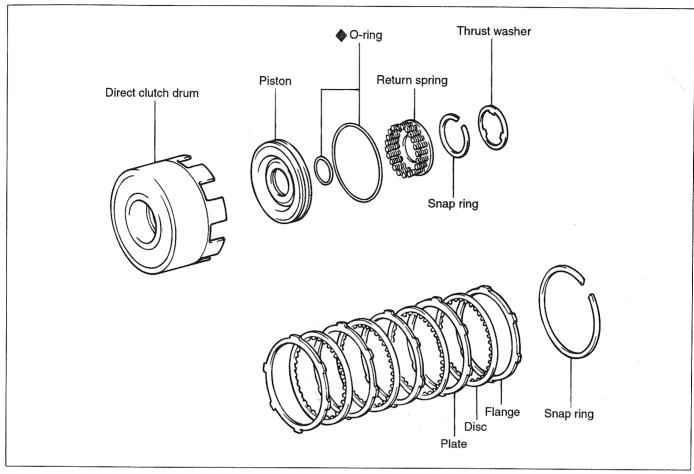
5. Install the second brake assembly to the output shaft.



EKLA254A

# DIRECT CLUTCH

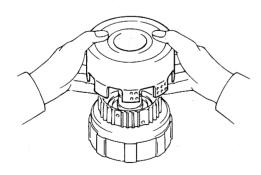
EKMB0350

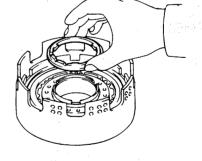


EKMB035A

#### DISASSEMBLY EKMB0360

1. Remove the direct clutch drum from the forward clutch.



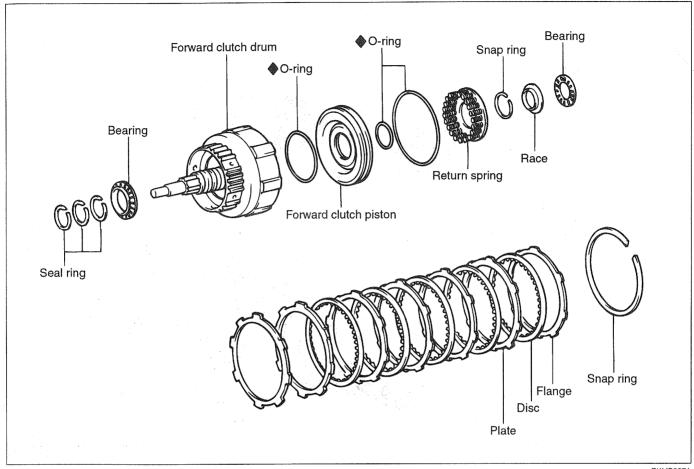


EKLA169A

Remove the thrust washer from the direct clutch.

# FORWARD CLUTCH & FRONT CLUTCH

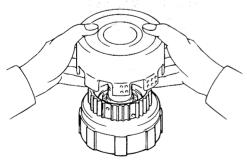
EKMB0370

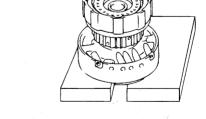


EKMB037A

#### DISASSEMBLY EKMB0380

1. Remove the direct clutch and the forward clutch.



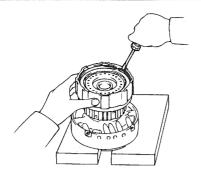


EKLA191A

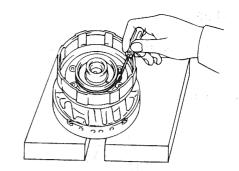
EKLA190A

2. Remove the bearing and the race.

3. Remove the snap ring, the flange, the disc and the plate.

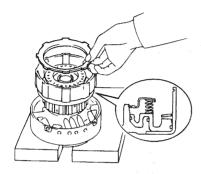


EKLA193A



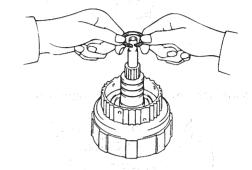
EKLA197A

4. Remove the cushion plate.



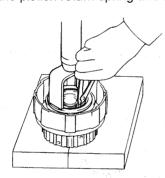
EKLA194A

8. Remove the oil seal ring.



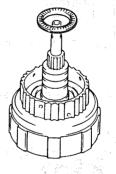
EKLA198A

5. Remove the pistion return spring and the snap ring.



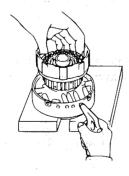
EKLA195A

9. Remove the bearing and the race.



EKLA199A

6. Remove the forward clutch piston.



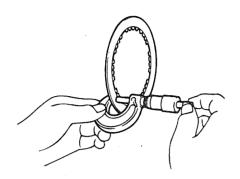
EKLA196A

7. Remove the O-ring from the forward clutch.

#### INSPECTION EKMBO39

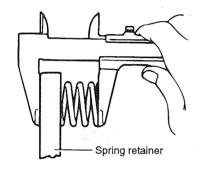
 Using a micrometer, measure the thickness of the disc.

Minimum: 1.84 mm



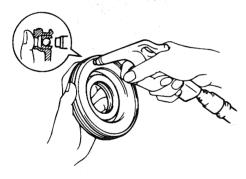
EKLA200A

Measure the free length of the return spring.



EKMB039A

3. Check that check ball is free by shaking the piston.



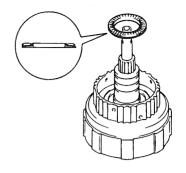
EKLA202A

 Measure the inner diameter of the forward clutch drum bushing.

Maximum I.D: 24.08 mm

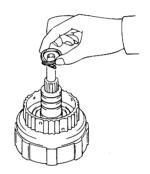
#### REASSEMBLY EKMB0400

1. Reassemble the bearing and the race.



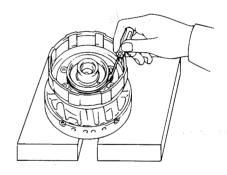
EKLA204A

Install the oil seal onto the forward clutch.



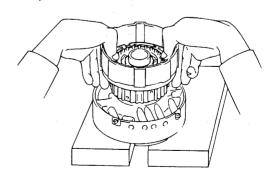
EKLA205A

3. Install the O-ring on the forward clutch drum and the piston.



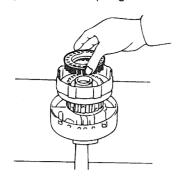
EKLA206A

4. Being careful not to damage the O-rings, press the clutch piston into the forward clutch drum.



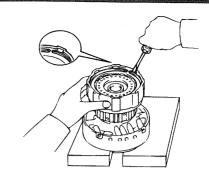
EKLA207A

5. Install the piston return spring and the snap ring.



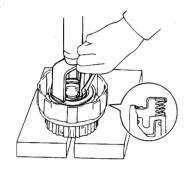
EKLA208A

10. Install the race and the bearing.



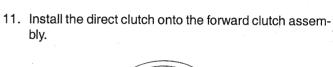
EKLA212A

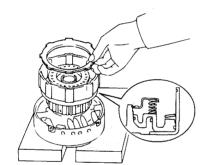
6. Install the piston return spring and the snap ring.



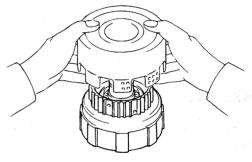
EKLA209A

EKLA214A





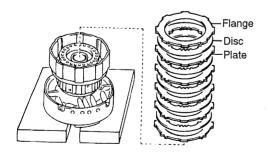
EKLA210A



EKLA215A

8. Install the disc, the flange and the plate.

Install the cushion plate.

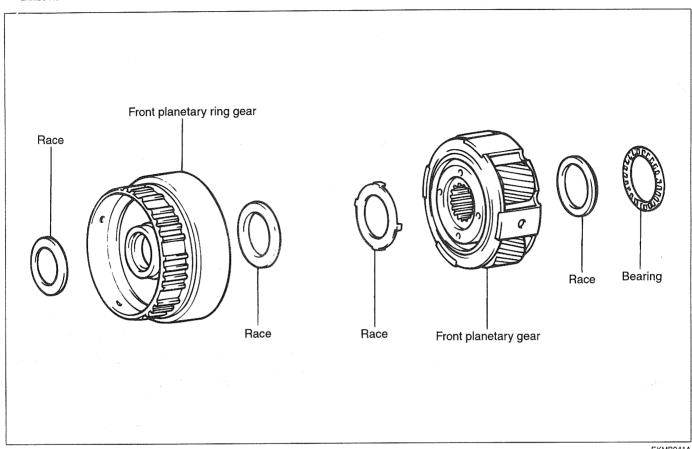


EKMB040A

Install the snap ring.

# FRONT PLANETARY GEAR

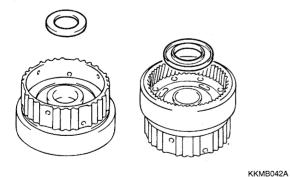
EKMB0410



EKMB041A

#### DISASSEMBLY EKMB0420

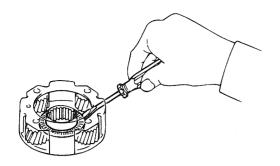
1. Remove the bearing and the race from the front planetary ring gear.



EKLA219A

Turn over the planetary gear and remove the bearing and the race.

Remove the race from the front planetary gear.



EKLA220A

#### INSPECTION EKMB0430

 Measure the inner diameter of the front planetary ring gear bushing.

Maximum I.D: 24.08 mm

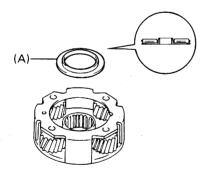


EKLA221A

#### REASSEMBLY E

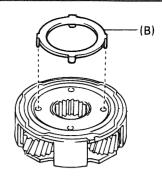
EKMB0440

1. Install the race onto the planetary gear.



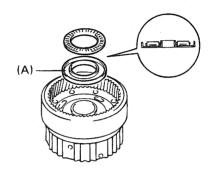
KKMB044A

2. Turn over the planetary gear and install the race.



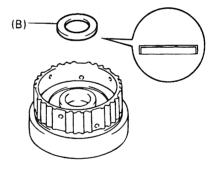
EKLA223A

3. Install the race and the bearing onto the front planetary ring gear.



EKLA224A

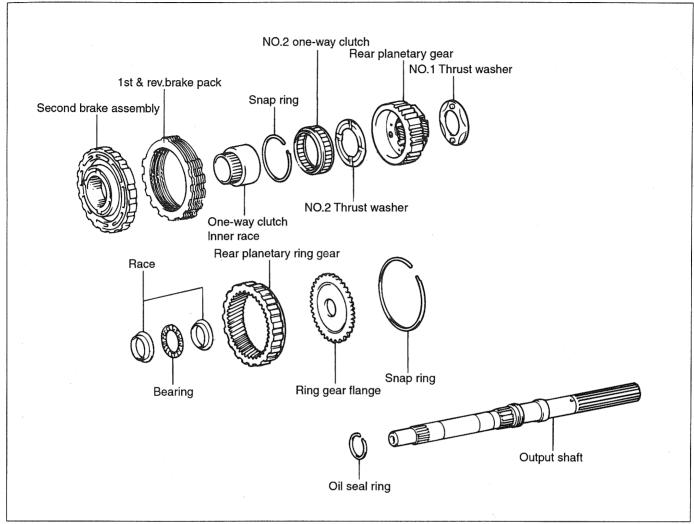
4. Turn over the planetary ring gear and install the race.



EKLA225A

# **OUTPUT SHAFT**

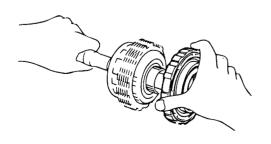
EKMB0530

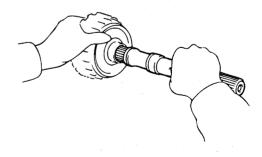


EKMB053A

#### DISASSEMBLY EKMB0540

1. Remove the second brake assembly from the output shaft.



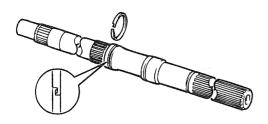


EKLA257A

3. Remove the oil seal from the output shaft.

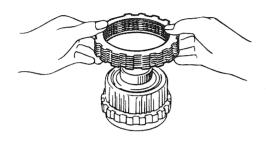
EKLA256A

2. Remove the output shaft from the rear planetary gear.



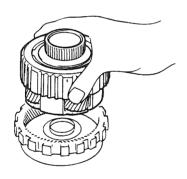
EKLA258A

4. Remove first and reverse brake discs, plates and flange.



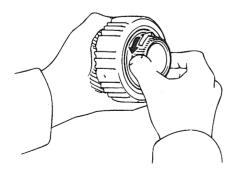
EKLA259A

5. Remove rear planetary gear from rear planetary ring gear.



EKLA260A

6. Hold the planetary gear and turn the one-way clutch inner race. The one-way clutch inner race should turn freely counterclockwise and should lock clockwise.



EKLA261A

7. Remove the one-way clutch inner race from the rear planetary gear.



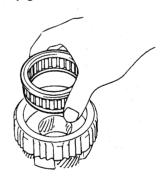
EKLA262A

8. Remove the snap ring with a screwdriver.



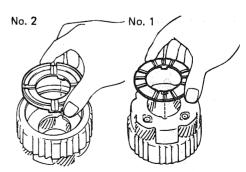
EKLA263A

9. Remove the NO.2 one-way clutch with retainers from the planetary gear.



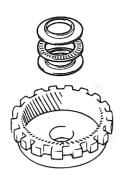
EKLA264A

10. Remove NO.2 and NO.1 thrust washers.



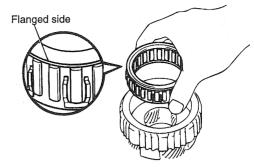
EKLA265A

11. Remove races and bearing from rear planetary ring gear.



EKLA266A

2. Install the NO.2 one-way clutch.



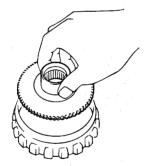
EKMB055A

12. Remove the snap ring.



EKLA267A

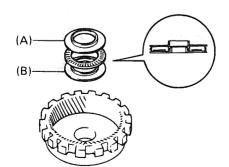
13. Remove the ring gear flange.



EKLA268A

#### REASSEMBLY KKMB0550

1. Install the race and the bearing.

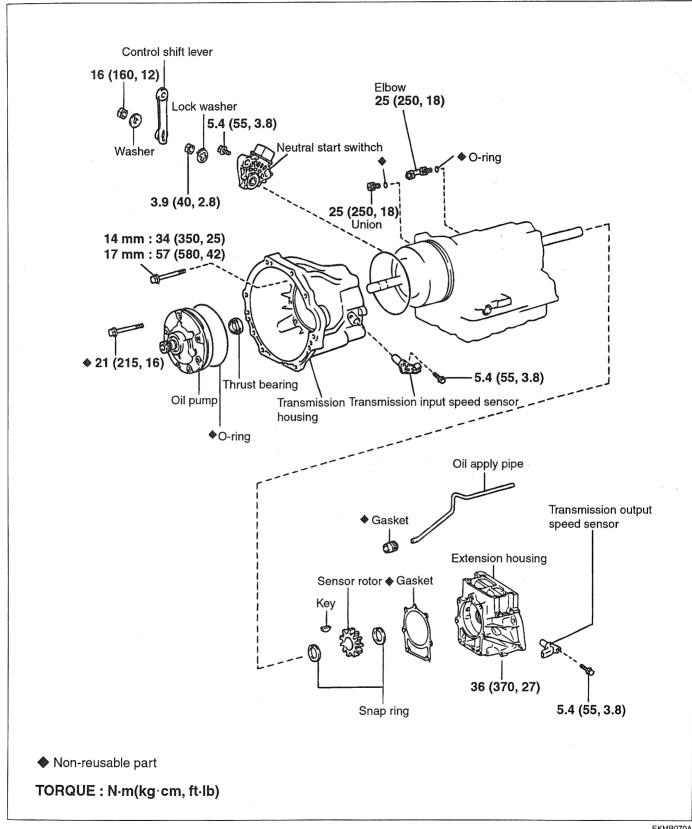


EKLA270A

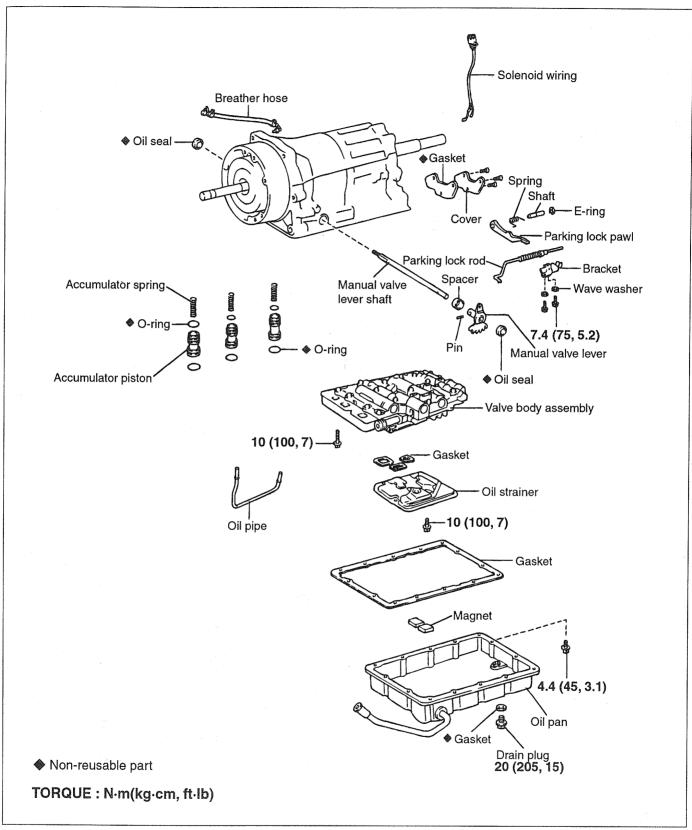
#### **AUTOMATIC TRANSMISSION**

(03-II MODEL) EKMB0700

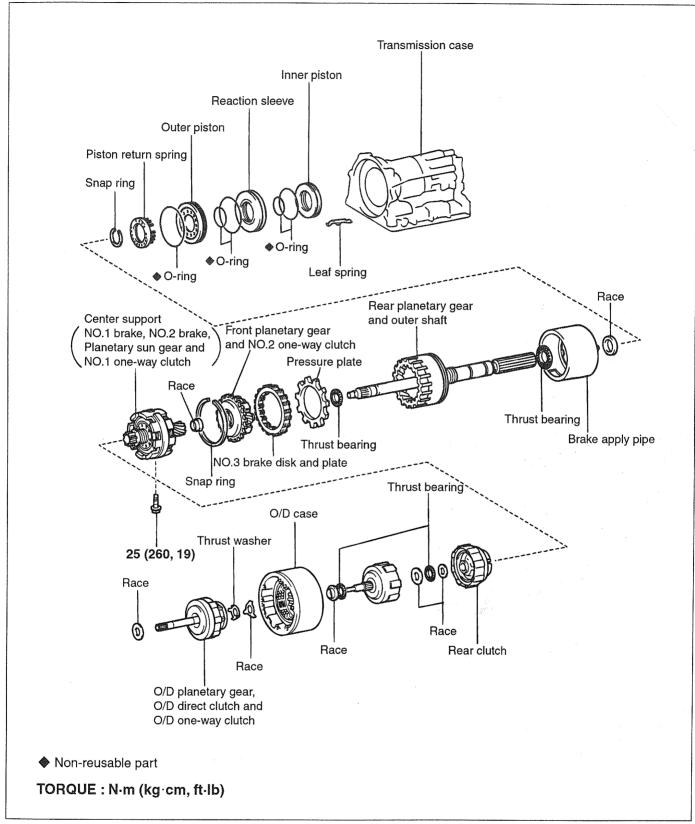
**COMPONENTS (1)** 



### **COMPONENTS (2)**



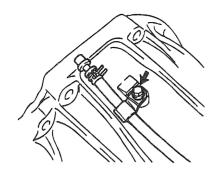
### **COMPONENTS (3)**



EKMB070C

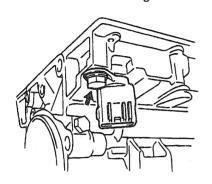
#### DISASSEMBLY EKMB0710

Remove breather hose.



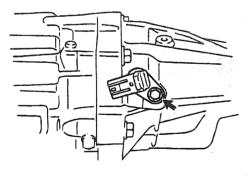
KKMB011A

2. Remove solenoid wire retaining bolt.



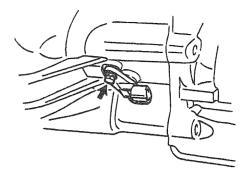
KKMB011B

- 3. Remove transmission output speed sensor.
  - a. Remove the bolt and transmission output speed sensor.
  - b. Remove the O-ring from the sensor.



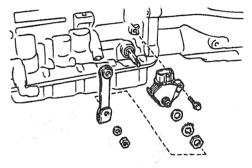
KKMB011C

- 4. Remove transmission input speed sensor.
  - a. Remove the bolt and transmission input speed sensor.
  - b. Remove the O-ring from the sensor.



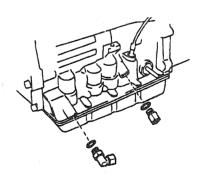
KKMB011D

- 5. Remove transmission control shift lever.
- 6. Remove neutral start switch.
  - a. Unstake the lock washer.
  - b. Remove the lock washer.
  - Remove the nut and bolt, and then remove the neutral start switch.



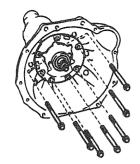
KKMB011E

- 7. Remove union and elbow.
  - a. Remove the union and elbow.
  - b. Remove the 2 O-rings from the union and elbow.

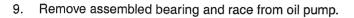


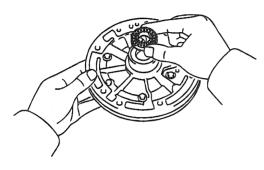
KKMB011F

Remove the 7 bolts holding the oil pump to the transmission case.



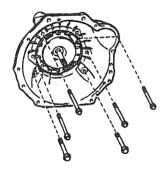
KKMB011G





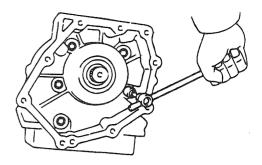
KKMB012A

- 10. Remove transmission housing.
  - a. Remove the 6 bolts.
  - b. While holding the input shaft, remove the transmission housing.
  - c. Remove the O-ring from the O/D case.



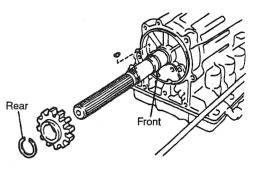
KKMB012B

- 11. Remove extension housing and gasket.
  - a. Remove the 6 bolts and extension housing.
  - b. Remove the gasket.



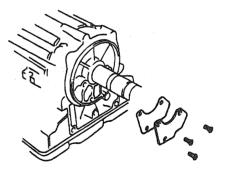
KKMB012C

- 12. Remove sensor rotor and key.
  - a. Using a snap ring expander, remove the rear side snap ring.
  - b. Remove the sensor rotor and key.
  - c. Using a snap ring expander, remove the front side snap ring.



EKMB071A

- 13. Remove governor oil strainer.
  - a. Remove the 3 screws, cover and gasket.
  - b. Remove the governor oil strainer from the transmission case.



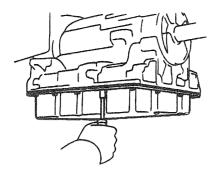
KKMB012E

14. Remove oil pan.



Do not turn the transmission over as this will contaminate the valve body with any foreign matter at the bottom on the pan.

- a. Remove the 14 bolts.
- b. Remove the pan by lifting the transmission case.
- Remove the oil pan gasket.



KKMB012F

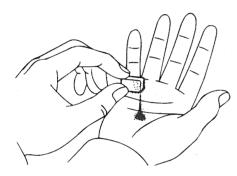
15. Examine particles in pan.

Remove the magnets and use then to collect any steel chips.

Look carefully at the chips and particles in the pan and the magnet to anticipate what type of wear you will fine in the transmission.

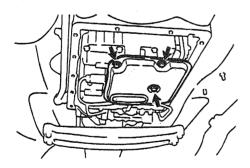
Steel(magnetic): bearing, gear and plate wear

Brass(non-magnetic): bushing wear



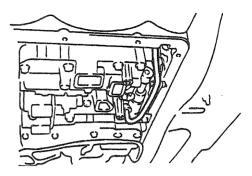
EKLA017A

- 16. Remove oil strainer.
  - a. Remove the 3 bolts and oil strainer.
  - b. Remove the 3 gaskets.



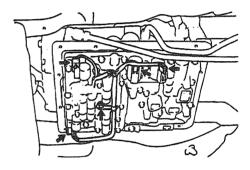
KKMB012H

17. Pry up both oil pipe ends with a large screwdriver and remove the oil pipe.



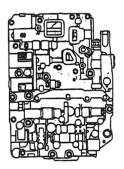
KKMB012I

- 18. Remove solenoid wiring.
  - a. Remove the bolt.
  - b. Remove the bolt and clamp.
  - c. Disconnect the 4 connectors from the solenoid.



KKMB013A

19. Remove valve body.



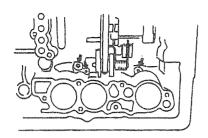
KKMB013B

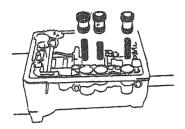
20. Remove accumulator piston and spring.



Keep face away to avoid injury. Do not use regular high-pressure air.

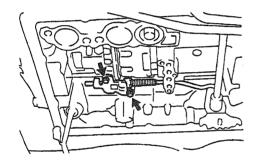
- a. Position a rag to catch each piston.
- b. Applying compressed air to the oil holes shown, and remove the 3 pistons and springs.
- c. Remove the 2 O-rings from each piston.





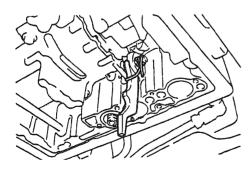
KKMB013C

21. Remove parking lock pawl bracket.



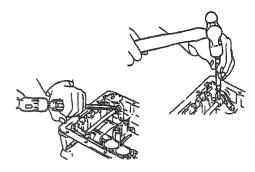
KKMB013D

22. Remove spring, parking lock pawl pin and parking lock pawl.



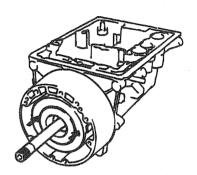
KKMB013E

- 23. Remove manual valve lever shaft.
  - a. Using a hammer and screwdriver, pry and shift the spacer.
  - b. Using a hammer and pin punch, drive out the pin.
  - c. Slide the manual valve lever shaft out case and remove the manual valve lever and spacer.



KKMB013F

- 24. Measure installation distance of O/D direct clutch
  - a. Push the input shaft and drum toward the rear to make sure the O/D direct clutch is installed correctly.

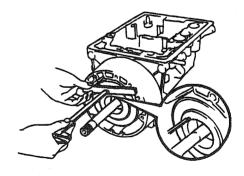


KKMB013G

 Using calipers, measure distance between the tops of tool and clutch drum.

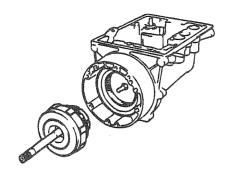
### **NOTE**

Make a note of the measurement for the reference at assembly.



KKMB014A

25. Remove O/D planetary gear unit with O/D direct clutch and one-way clutch.

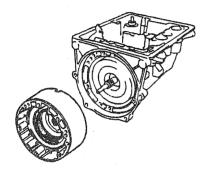


KKMB014B

26. Remove O/D case.

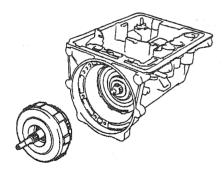


When the O/D case is removed, the front clutch sometimes adheres to it.



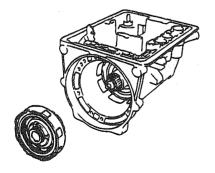
KKMB014C

27. Remove front clutch.



KKMB014D

28. Remove rear clutch.



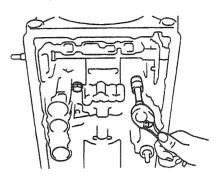
KKMB014E

29. Remove center support.

a. Remove the 2 center support bolts and wave washers.

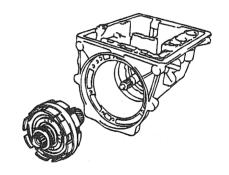


After removing 1 bolt, the other 1 will be loose.



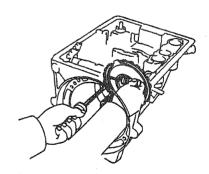
KKMB014F

b. Remove the center support from the transmission case.



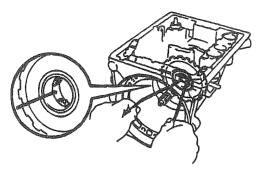
KKMB014G

- 30. Remove front planetary gear unit.
  - a. Using 2 screwdrivers, remove the snap ring.



KKMB014H

Insert the 2 wires into the planetary gear and remove it.

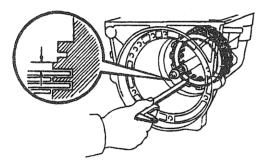


KKMB015A

31. Check pack clearance of NO.3 brake.
Using calipers, measure th clearance between the disc and transmission case, as shown.

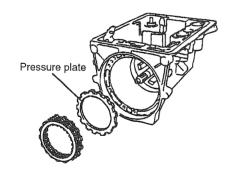
Clearance: 0.52 - 1.27mm

If the values are non-standard, inspect the discs.



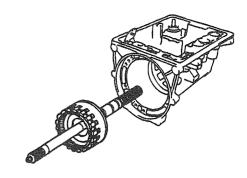
KKMB015B

- 32. Remove NO.3 brake pack and pressure plate.
  - a. Remove the 5 discs and 4 plates.
  - b. Remove the pressure plate.



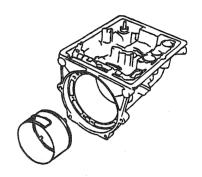
EKMB071B

33. Remove rear planetary gear unit and output shaft.



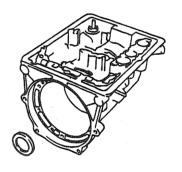
KKMB015D

34. Remove brake apply pipe.



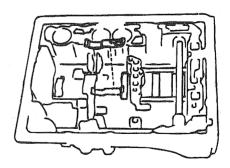
KKMB015E

35. Remove race.



KKMB015F

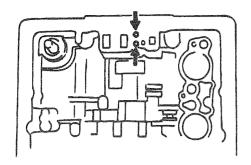
36. Remove leaf spring.



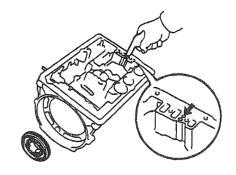
KKMB015G

37. Check NO.3 brake piston moving.

Make sure the NO.3 brake pistons move smoothly when applying and releasing the compressed air into the transmission case.

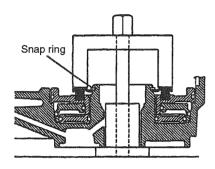






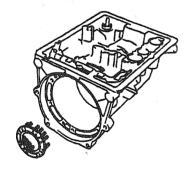
KKMB015K

- 38. Remove components of NO.3 brake piston.
  - a. Set SST on the spring retainer, and compress the return springs
  - b. Using a snap ring expander, remove the snap ring.



EKMB071C

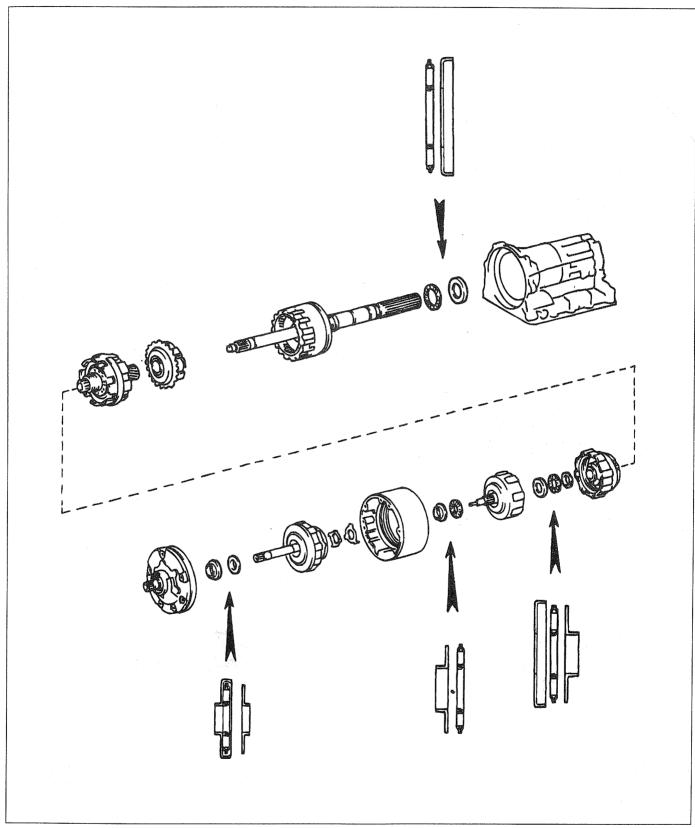
c. Remove the piston return spring.



KKMB015J

- d. Hold outer piston with hand, apply compressed air to the transmission case to remove the outer piston. If the piston does not pop out with compressed air, lift the piston out with needle-nose pliers.
- e. Remove the O-ring from the outer piston.

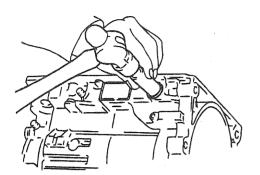
BEARING AND RACES INSTALLATION POSITION AND DIRECTION



KKMB016A

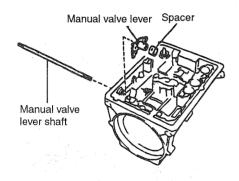
### INSTALLATION EKME

- 1. Install manual valve lever, shaft and oil seal.
  - a. Drive in 2 new oil seals as far as they will go.
  - b. Coat the oil seal lips with grease.



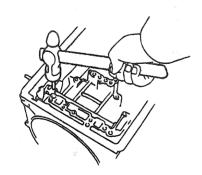
KKMB017A

- Assembled a new spacer to the manual valve lever.
- d. Install the manual valve lever shaft to the transmission case through the manual valve lever.



EKMB072A

e. Drive in the pin to the shaft.



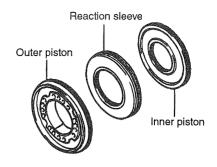
KKMB017C

- 2. Install components of NO.3 brake piston.
  - a. Coat 5 new O-ring goes on the inner piston, reaction sleeve and outer piston.



The thinner O-ring goes on the outside of the reaction sleeve.

b. Assemble the inner piston, reaction sleeve and outer piston.



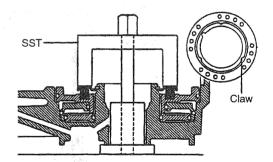
EKMB072B

- c. Stand up the transmission case.
- d. Being careful not to damage the O-rings, press in the assembled pistons into the transmission case with hand.



KKMB017E

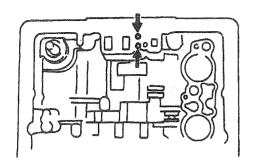
- e. Set SST as shown, and compress the return springs with SST.
- f. Install the snap ring with a snap ring expander. Be sure that the end gap of the snap ring is not aligned with the spring seat claw



EKMB072C

3. Check NO.3 brake pistons moving.

Make sure that the NO.3 brake pistons move smoothly when applying and releasing the compressed air into the transmission case.

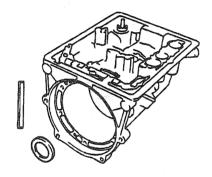


KKMB017G

Install race.
 Coat the race with petroleum jelly and install it onto the transmission case.

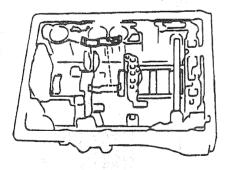
#### **RACE DIAMETER:**

	Inside mm (in.)	Outside mm (in.)
Race	39.2 (1.543)	57.5 (2.264)



ККМВ017Н

5. Install leaf spring.

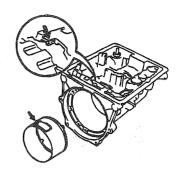


KKMB018A

6. Install break apply pipe.

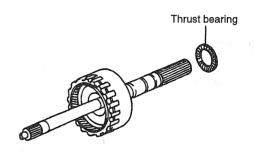


Make sure that the lips of the pipe end are completely inserted into the outer piston.



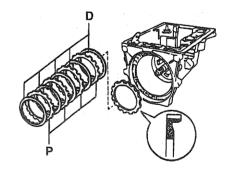
KKMB018B

7. Install rear planetary gear unit and output shaft.



EKMB072D

- 8. Install pressure plate, disc and plate.
  - a. Install the pressure plate, the flat surface facing forward.
  - b. Install the 5 discs and 4 plates.
    Install in order: P=Plate D=Disc
    D-P-D-P-D-P-D

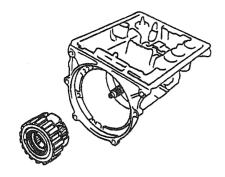


KKMB018D

- 9. Install front planetary gear unit.
  - a. Remove the one-way clutch inner race from the planetary gear unit.
  - b. Install the front planetary gear unit.



Mesh the splines of the planetary gear with the flukes of the discs by rotating and pushing the planetary gear.

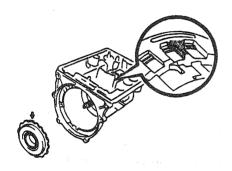


KKMB018E

 Position the notched tooth of the inner race toward the valve body side of the case. Push it into place.



The inner race is correctly installed if the snap rings groove is fully visible.



KKMB018F

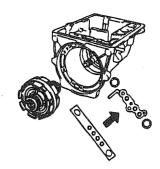
d. Using a screwdriver, install the snap ring.



KKMB018G

10. Install center support.

Aim the bolt and oil holes of the center support toward the valve body side, and align them with the bolt and oil holes of the transmission case and insert.



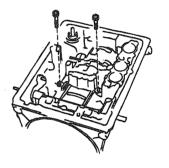
KKMB018H

11. Install the 2 wave washers and bolts.



First tighten the accumulator piston side.

Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)

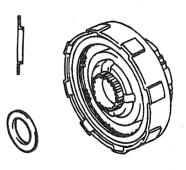


KKMB019I

- 12. Install rear clutch.
  - Coat the race with petroleum jelly and install it onto the rear clutch.

#### RACE DIAMETER:

	Inside mm (in.)	Outside mm (in.)
Race	27.6 (1.087)	44.5 (1.752)

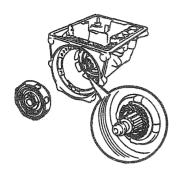


KKMB019B

b. Install the rear clutch.



 Mesh the splines of the rear clutch with the flukes of the disc by rotating and pushing the rear clutch.  If the rear clutch is fully meshed with the center support, the splined center of the clutch will be flush with the end of the sun gear shaft.

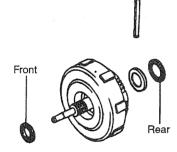


KKMB019C

- 13. Install front clutch.
  - a. Coat the bearings and race with petroleum jelly and install them onto the front clutch.

#### **BEARING AND RACE DIAMETER:**

	Inside mm (in.)	Outside mm (in.)
Bearing (Front)	23.4 (0.921)	37.5 (1.476)
Race	30.1 (1.185)	48.5 (1.909)
Bearing (Gear)	28.4 (1.118)	46.4 (1.827)

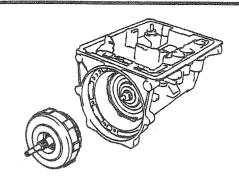


EKMB072E

b. Install the front clutch.



Mesh the splines of the front clutch with the flukes of the discs by rotating and pushing the front clutch.

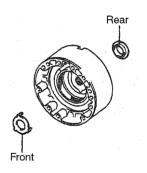


KKMB019E

 Cost the races with petroleum jelly and install them onto the O/D case.

### RACES DIAMETER:

	Inside mm (in.)	Outside mm (in.)
Bearing (Front)	23.0 (0.906)	48.0 (1.890)
Bearing (Gear)	24.1 (0.946)	37.3 (1.469)



EKMB072F

- 15. Install O/D planetary gear unit with O/D direct clutch and one-way clutch.
  - a. Coat the thrust washer with petroleum jelly and install it onto the O/D planetary gear.
  - Coat the race with petroleum jelly and install it onto the O/D planetary gear.

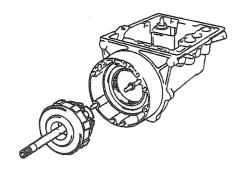
#### **RACE DIAMETER:**

	Inside mm (in.)	Outside mm (in.)
Race	24.3 (0.957)	39.1 (1.539)

c. Install the O/D planetary gear with the O/D direct clutch and one-way clutch.



Mesh the splines of the O/D planetary gear with the flukes of the discs by rotating and pushing the O/D planetary gear.

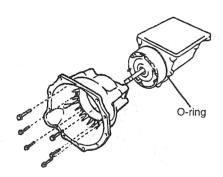


KKMB019H

- 16. Install transmission housing.
  - a. Coat a new O-ring with ATF and install it around the O/D case.
  - b. Install the transmission housing and 6 bolts.
  - c. Tighten the bolts.

Torque:

10 mm bolt : 34 N·m (345 kgf·cm, 25 ft·lbf) 12 mm bolt : 57 N·m (580 kgf·cm, 42 ft·lbf)

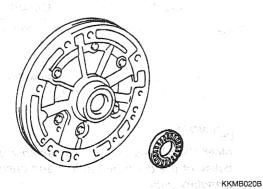


EKMB072H

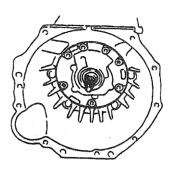
- 17. Install oil pump.
  - a. Coat the assembled bearing and race with petroleum jelly and install it onto the oil pump.

#### ASSEMBLED BEARING AND RACE DIAMETER:

6.	Inside mm (in.)	Outside mm (in.)
Bearing and race	24.3 (0.957)	43.2 (1.701)



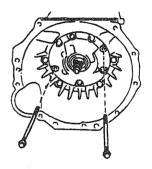
b. Coat a new O-ring with ATF and install it around the pump body.



KKMB020C

- c. Temporarily install the 2 bolts.
- d. Tighten the all bolts.

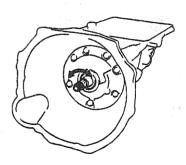
Torque: 21 N·m (215 kgf·cm, 16 ft·lbf)



KKMB020D

18. Check input shaft rotation.

Make sure the input shaft rotates smoothly.



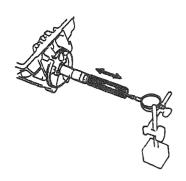
KKMB020E

- 19. Check output shaft.
  - a. Using a dial indicator, measure the end play of the output shaft with hand.

End play: 0.3 - 0.9 mm (0.012 - 0.035 in.)

If the values are non-standard, check for an improper installation.

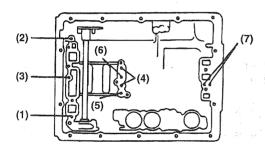
b. Check to see that output shaft rotates smoothly.



KKMB020F

- 20. Check for the sound of operation while applying compressed air into the oil holes indicated in the illustration.
  - a. O/D direct clutch
  - b. O/D brake
  - c. Rear clutch
  - d. Front clutch
  - e. NO.1 brake
  - f. NO.2 brake
  - g. NO.3 brake

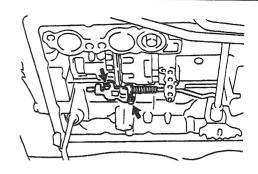
If there is no noise, disassembled and check the installation condition of the parts.



KKMB020G

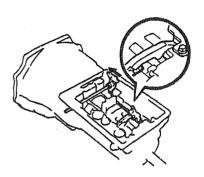
- 21. Install parking lock pawl and rod.
  - a. Install the E-ring to the shaft.
  - b. Install the parking lock pawl, shaft and spring.
  - Connect the parking lock rod to the manual valve lever.
  - d. Install the parking lock pawl bracket.
  - e. Install the 2 bolts with the wave washer.

Torque: 7.4 N·m (75 kgf·cm, 5.2 lb·ft)



KKMB021C

22. Shift the manual valve lever to the P range, and confirm the planetary ring gear is correctly locked up by the lock pawl.



KKMB021D

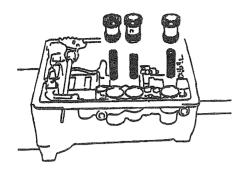
- 23. Install accumulator spring and piston.
  - a. Coat new O-rings with ATF and install them to the pistons.
  - b. Install the 3 springs and 3 accumulator pistons to the bore, as shown.

#### **PISTON**

Piston	Outer diameter mm (in.)
C1	31.8 (1.252)
C2	31.8 (1.252)
B2	34.8 (1.370)

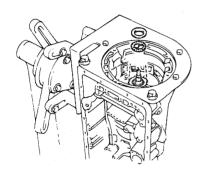
#### **SPRING**

Spr	ing (Color)	Free length (mm)	Outer diameter (mm)
(Wh	C1 nite & Blue)	75.03	17
C2	2 (Green)	55.18	15.22
B2	Outer (Orange)	55.18	19.49
DΖ	Inner (Red)	35.13	16.16



KKMB021E

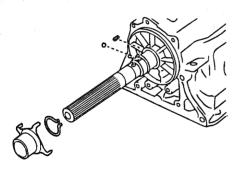
- 24. Install valve body.
  - Align the groove of the manual valve to the pin of the lever.



KKMB022A

b. Install the 17 bolts.

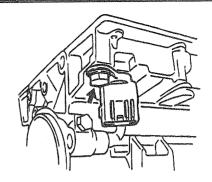
Torque: 10 N·m (100 kgf·cm, 7 lb·ft)



KKMB022B

25. Install solenoid wire.
Install the solenoid wire retaining bolt with the bolt.

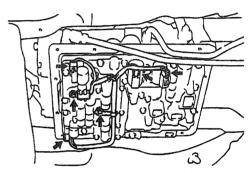
Torque: 5.4 N·m (55 kgf·cm, 3.8 lb·ft)



KKMB022C

- 26. Install solenoid wiring.
  - a. Install the clamp.
  - b. Connect the 4 connectors to the solenoid.
  - c. Install the clamp and bolt.

Torque: 10 N·m (100 kgf·cm, 7 lb·ft)

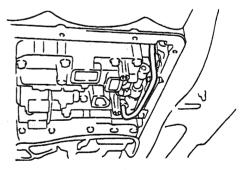


KKMB022D

27. Using a plastic hammer, install the oil pipe into position.

# M NOTE

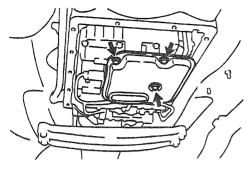
Be careful not to bend or damage the pipe.



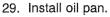
KKMB022E

- 28. Install oil strainer.
  - a. Install a new gasket to the oil strainer.
  - b. Install the oil strainer, oil stainer cover and 6 bolts.

Torque: 5.5 N·m (55 kgf·cm, 7 lb·ft)



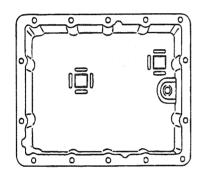
KKMB022F



a. Install the 2 magnets in the oil pan.



Make sure that the magnets do not interfere with the oil pipes.

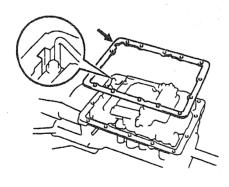


KKMB022G

b. Install a new gasket to the transmission case.

# **NOTE**

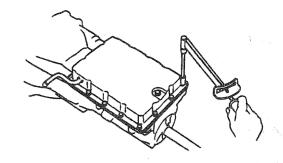
Align the cut part of the gasket and case.



KKMB022H

c. Install the 14 bolts.

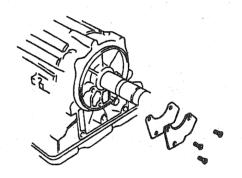
Torque: 4.4 N·m (45 kgf·cm, 3.1 lb·ft)



KKMB023A

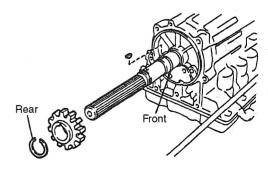
- 30. Install governor oil strainer.
  - a. Install the governor oil strainer into the transmission case.
  - b. Install a new gasket and cover.
  - c. Install the 3 screws.

Torque: 7.5 N·m (75 kgf·cm, 5.2 lb·ft)



KKMB023B

- 31. Install key and sensor rotor.
  - a. Using a snap ring expander, install the front side snap ring.
  - b. Install the key and sensor rotor.
  - Using a snap ring expander, install the rear side snap ring.



EKMB072I

- 32. Install extension housing.
  - a. Install the extension housing with a new gasket to the case.
  - b. Apply sealant to the bolt A.

c. Install the 6 bolts.

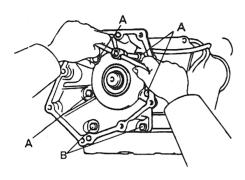


The 2 lower bolts are shorter.

Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)

Bolt length:

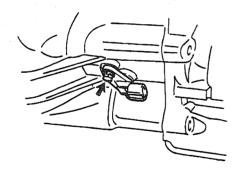
Bolt A 40 mm (1.77 in.) Bolt B 76 mm (1.38 in.)



EKMB072J

- 33. Install transmission input speed sensor.
  - a. Coat a new O-ring with ATF and install it to the transmission input speed sensor.
  - Install the transmission input speed sensor and bolt.

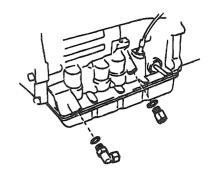
Torque: 5.4 N·m (55 kgf·cm, 3.8 lb·ft)



KKMB023E

- 34. Install union and elbow.
  - Coat new 2 O-rings with ATF and install them to union and elbow.
  - b. Install the union and elbow.

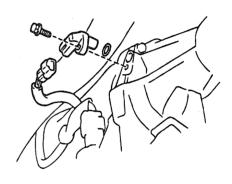
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



KKMB023E

- 35. Install transmission output speed sensor.
  - Coat a new O-ring with ATF and install it to the transmission output speed sensor.
  - b. Install the transmission output speed sensor and bolt.

Torque: 5.4 N·m (55 kgf·cm, 3.8 lb·ft)

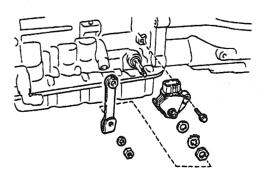


KKMB023G

- 36. Install neutral start switch.
  - Insert the neutral start switch onto the manual valve lever shaft and temporarily install the adjusting bolt.
  - b. Install a new lock washer.
  - c. Install and tighten the nut.

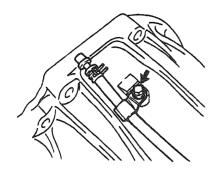
Torque: 5.4 N·m (55 kgf·cm, 3.8 lb·ft)

d. Using the control shaft leer, fully turn the manual valve lever shaft back and return 2 notches. It is now in neutral.



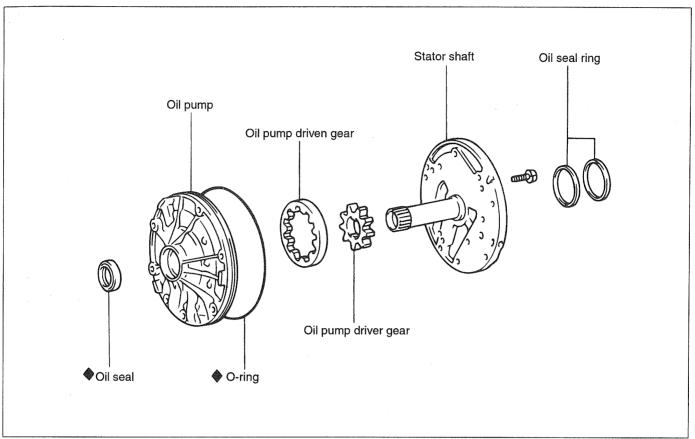
KKMB024A

37. Install the breather hose with the bolt.



KKMB024B

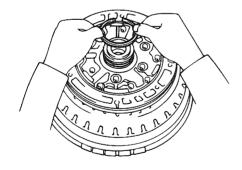
### OIL PUMP EKMB0730



EKMB073A

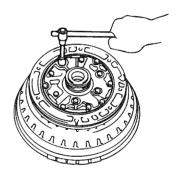
### DISASSEMBLY EKMB0740

1. Remove the oil seal ring.



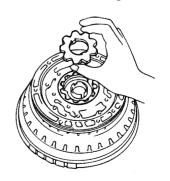
EKLA089A

2. Remove the stator shaft.



EKLA090A

3. Remove the drive and driven gear.



EKLA091A

#### INSPECTION

EKMB0750

1. Measure the inside diameter of the oil pump bushing.

Max. ID: 38.19 mm



EKLA092A

2. Measure the inside diameter of the stator shaft bushing.

Front: 23.11 mm Rear: 23.11 mm



EKLA093A

3. Using a feeler gauge, measure the clearance of the driven gear.

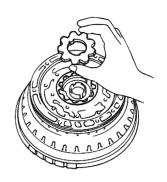
Standard value: 0.07 - 0.15 mm



EKLA094A

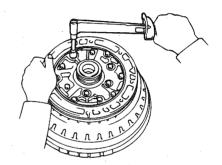
### REASSEMBLY EKMB0760

1. Install the driven gear and the drive gear to the oil pump body.



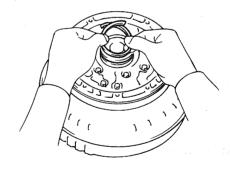
EKLA099A

2. Install the stator shaft to the oil pump.



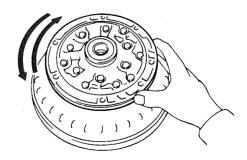
EKLA100A

3. Install the oil seal ring.



EKLA101A

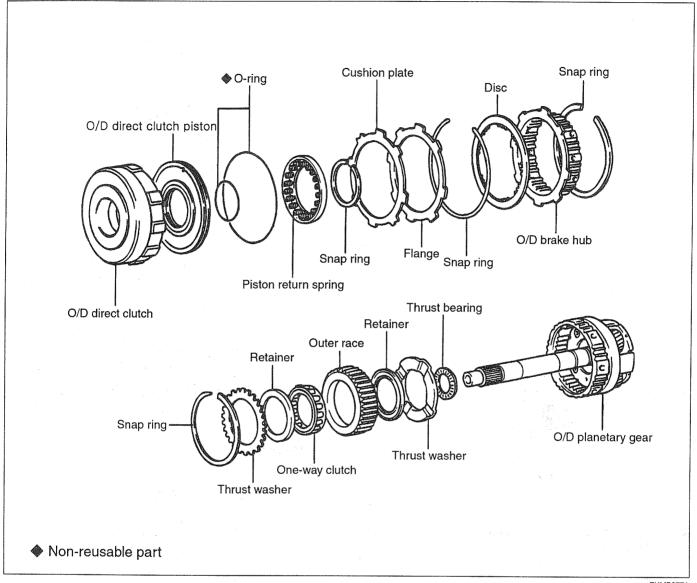
4. Make sure the drive gear rotates smoothly.



EKLA103A

#### DIRECT CLUTCH EKMB0770

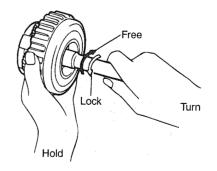
#### **COMPONENTS**



EKMB077A

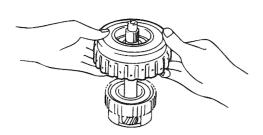
# DISASSEMBLY EKMB0780

1. Hold the O/D direct clutch drum and turn the input shaft. The input shaft turns freely clockwise and locks counterclockwise.



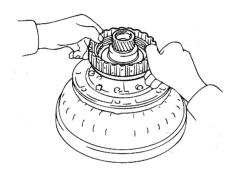
EKMB078A

Remove O/D direct clutch assembly from O/D planetary gear.



EKLA106A

- 3. Check piston stroke of O/D direct clutch.
  - a. Place the O/D direct clutch assembly onto the oil pump.



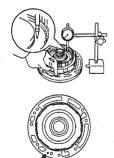
EKLA108A

Using a dial indicator, measure the O/D direct clutch piston stroke applying and releasing the compressed air (392 - 785 kPa, 4 - 8 kgf/cm², 57 - 114 psi), as shown.

Piston stroke: 1.74 - 2.44 mm

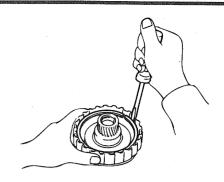
If the values are non-standard, inspect the discs.

 Remove the O/D direct clutch assembly from the oil pump.



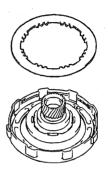
KKMB024D

- 4. Remove O/D brake hub.
  - a. Using a screwdriver, remove the snap ring.
  - b. Remove the O/D brake hub.



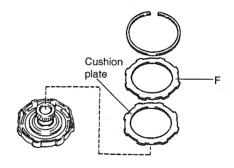
EKLA110A

. Remove disc.



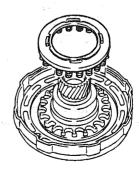
EKMB024F

- 6. Remove flange and cushion plate.
  - a. Using a screwdriver, remove the snap ring.
  - b. Remove the flange and cushion plate.



EKMB024G

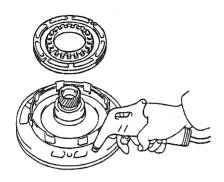
7. Remove the piston return spring.



EKMB024H

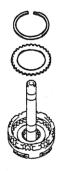
8. Remove O/D direct clutch piston.

- a. Place the O/D direct clutch onto the oil pump.
- Hold the O/D direct clutch piston and apply compressed air to the oil pump to remove the O/D direct clutch piston.
- c. Remove the 2 O-rings from the piston.



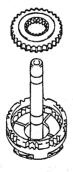
EKMB024

- 9. Remove thrust washer.
  - a. Using a screwdriver, remove the snap ring.
  - b. Remove the thrust washer.



EKMB024J

10. Remove one-way clutch assembly.



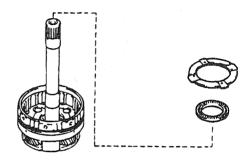
EKMB024K

- 11. Disassemble one-way clutch.
  - a. Remove the 2 retainers from the both sides.
  - b. Remove the one-way clutch from the outer race.



EKMB024L

- 12. Remove thrust washer.
- 13. Remove assembled bearing and race.



EKMB024M

#### INSPECTION

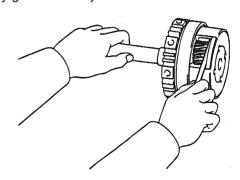
Measure planetary pinion gear thrust clearance.
 Using a feeler gauge, measure the planetary pinion gear thrust clearance.

#### Standard clearance:

0.20 - 0.50 mm (0.0079 - 0.0197 in.)

EKMB0790

If the clearance is non-standard, inspect the planetary gear thrust washer. If necessary, replace the planetary gear assembly.



KKMB024E

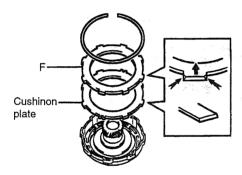
#### REASSEMBLY EKMB0800

- 1. Install thrust washer.
  - a. Install the thrust washer.
  - b. Using a screwdriver, install the snap ring.



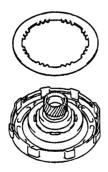
KKMB025A

- 2. Install cushion plate and flange.
  - a. Install the cushion plate.
  - b. Install flange, the rounded edge facing upward.
  - c. Using a screwdriver, install the snap ring. Be sure the end gap of the snap ring is not aligned with the cutout portion of the drum.



EKMB078B

3. Install disc.



KKMB025C

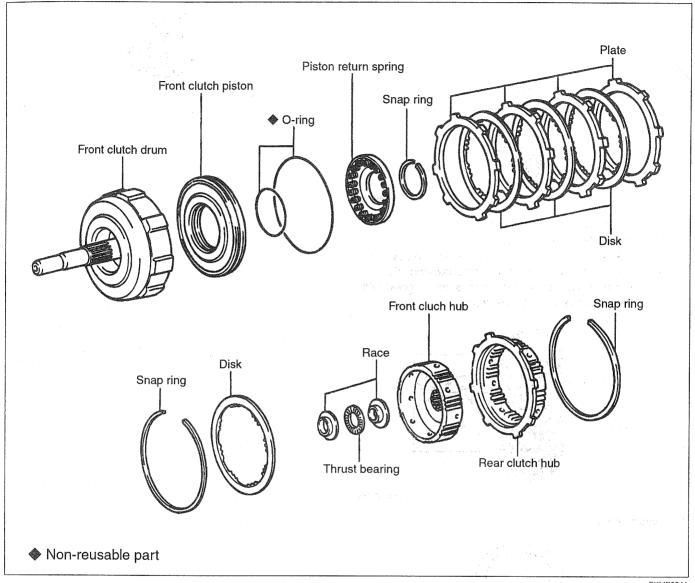
- 4. Install O/D brake hub.
  - a. Install the O/D brake hub.
  - b. Using a screwdriver, install the snap ring, Be sure the end gap of the snap ring is not aligned with the cutout portion of the drum.



KKMB025D

## FRONT CLUTCH

#### COMPONENTS EKMB0840



#### EKMB084A

#### DISASSEMBLY EKMBO850

1. Install front clutch assembly to O/D case.



KKMB028B

- 2. Remove rear clutch hub and front clutch hub.
  - a. Using a screwdriver, remove the snap ring.
  - b. Remove the rear clutch hub and front clutch hub.



KKMB028C

Remove the bearing and 2 races.



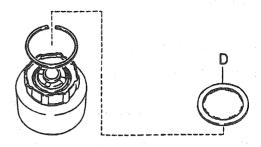
KKMB028D

- 3. Check piston stroke of front clutch.
  - a. For check of piston stroke, install the rear clutch hub.
  - b. Install the snap ring.



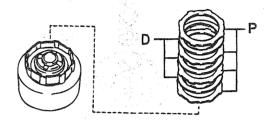
KKMB028E

- 4. Remove plate and disc.
  - a. Remove the disc.
  - b. Using a screwdriver, remove the snap ring.



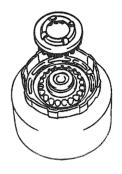
KKMB028F

c. Remove the 5 plates and 5 discs.



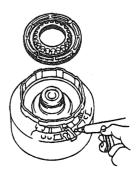
KKMB028G

5. Remove the piston return spring.



KKMB028H

- 6. Remove front clutch piston.
  - a. Place the front clutch drum onto the O/D case.
  - b. Hold the front clutch piston with hand and, apply compressed air to the O/D case to remove the front clutch piston.
  - c. Remove the 2 O-rings from the piston.



KKMB028I

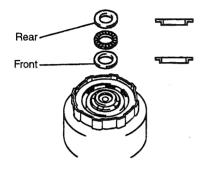
# REASSEMBLY

EKMB0860

1. Coat the bearing and races with petroleum jelly and install them onto the front clutch drum.

### **BEARING AND RACES DIAMETER:**

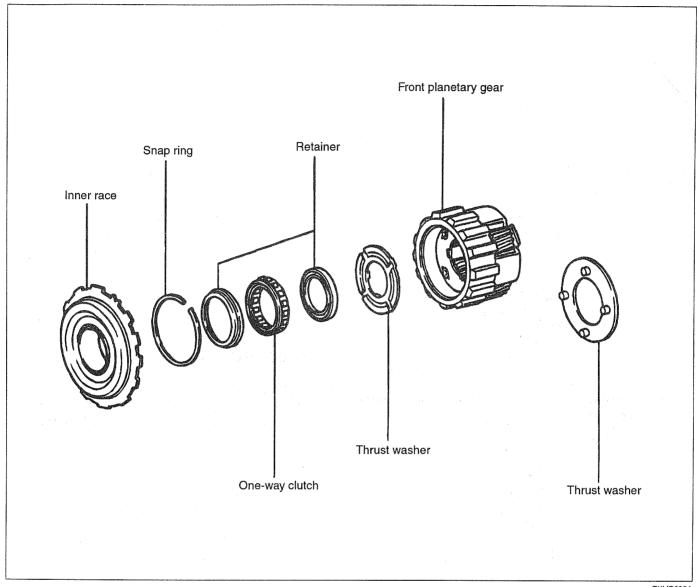
	Inside mm (in)	Outside mm (in.)
Race (Rear)	21.4 (0.843)	37.3 (1.469)
Bearing	23.4 (0.921)	37.5 (1.476)
Race (Front)	24.1 (0.949)	37.3 (1.469)



EKMB086A

### FRONT PLANETARY GEAR EKMB0980

#### COMPONENTS

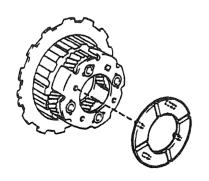


KKMB032C

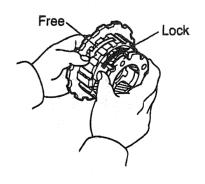
EKMB098A

### DISASSEMBLY EKMB0990

1. Remove thrust washer from front planetary carrier.

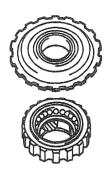


2. Hold the one-way clutch inner race and turn the planetary gear. The planetary gear turns freely counterclockwise and locks clockwise.



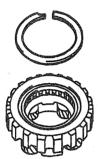
KKMB032D

3. Remove one-way clutch inner race.



KKMB032E

- 4. Remove NO.2 one-way clutch.
  - a. Using a screwdriver, remove the snap ring.



KKMB032F

b. Remove the one-way clutch and 2 retainers from the planetary gear.



KKMB032G

5. Remove thrust washer.



KKMB032H

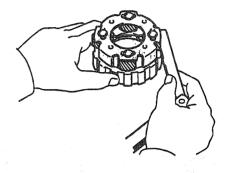
#### INSPECTION EKMB1000

Measure planetary pinion gear thrust clearance.
 Using a feeler gauge, measure the planetary pinion gear thrust clearance.

#### Standard clearance:

0.20 - 0.50 mm (0.0079 - 0.0197 in.)

If the clearance is non-standard, inspect the planetary gear thrust washer. If necessary, replace the planetary gear assembly.



KKMB032I

#### REASSEMBLY

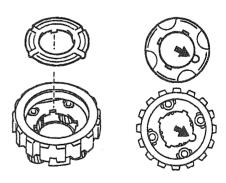
- I. Install thrust washer.
  - a. Coat the thrust washer with petroleum jelly.

EKMB1010

b. Install the thrust washer into the front planetary gear.

### M NOTE

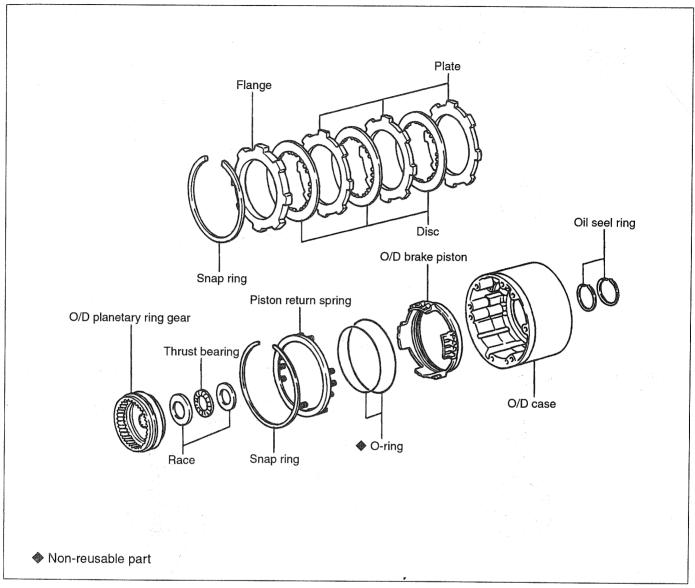
Make sure that the lug shapes match the cutout portions on the front planetary gear.



KKMB032J

### OVERDRIVE BRAKE EKMBO810

#### COMPONENTS



#### EKMB081A

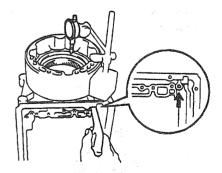
#### DISASSEMBLY

1. Using a dial indicator, measure the O/D brake pack clearance applying and releasing the compressed air (.392 - 785 kPa, 4 - 8 kgf/cm<sup>2</sup>, 57 - 114 psi), as shown.

Pack clearance: 0.75 - 1.25 mm

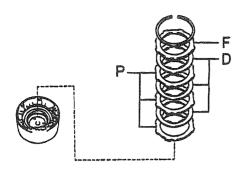
If the values are nonstandard, inspect the discs.

Remove the O/D case from the transmission case.



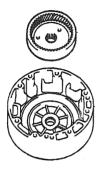
KKMB026A

- Remove flange, disc and plate.
  - Using a screwdriver, remove the snap ring.
  - Remove the flange, 3 discs and 3 plates.



KKMB026B

4. Remove the O/D planetary rign gear.



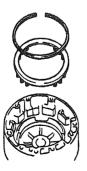
KKMB026C

5. Remvoe the bearing and 2 races.



KKMB026D

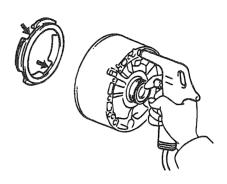
- 6. Remove piston return spring.
  - Using a screwcdriver, remove the snap ring.
  - b. Remove the piston return spring.



KKMB026E

7. Remove O/D brake piston.

- a. Hold the O/D brake piston with hand, apply compressed air into the passage to remove the O/D brake piston.
- b. Remove the 2 O-rings from the piston.



KKMB026F

#### REASSEMBLY EKMB0830

- 1. Install oil seal ring.
  - a. Coat the 2 oil seal rings with ATF.
  - b. Contact the oil seal rings and install them onto the O/D case.

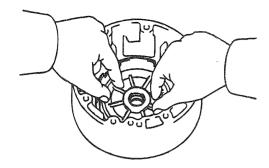
### **MOTE**

- Do not spread the ring ends more than necessary.
- After installing the oil seal rings, check that they rotate smoothly.



KKMB027G

- 2. Install O/D brake piston.
  - Coat 2 new O-rings with ATF and install them on the O/D brake piston.
  - Being careful not to damage the O-rings, press in the brake piston into the O/D case with both hands.



KKMB027B

3. Pushing the piston return spring and using a screwdriver, install the snap ring. Be sure the end gap of the snap ring is not aligned with the cutout portion of the O/D case.

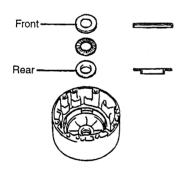
### MOTE

Make sure that the snap ring is inserted into its groove.



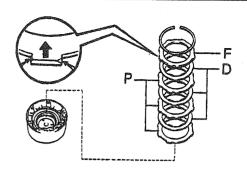
KKMB027C

4. Install the O/D planetary ring gear.



EKMB083A

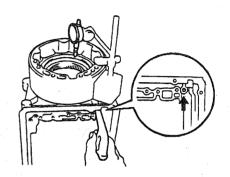
5. Install the flange, the disc and the plate.



KKMB027E

6. Measure the clearance of the O/D brake.

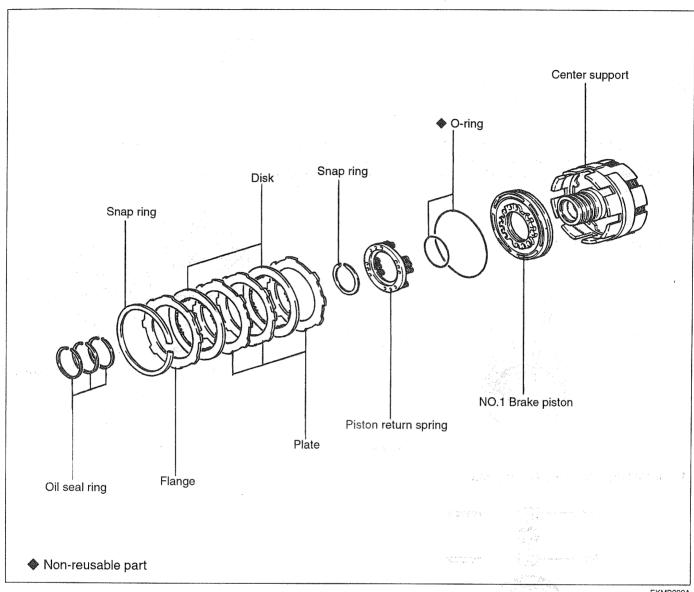
Clearance: 0.75 - 1.25 mm



KKMB027F

## NO.1 BRAKE

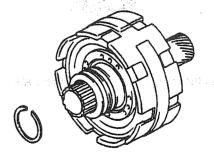
#### COMPONENTS EKMB0900



#### EKMB090A

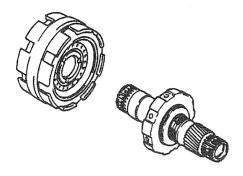
### DISASSEMBLY EKMB0910

1. Remove planetary sun gear and NO.1 one-way clutch.



KKMB030B

2. Remove the planetary sun gear with the NO.1 one-way clutch.

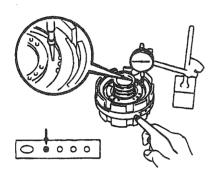


KKMB030C

Check piston stroke of NO.1 brake.
 Using a dial indicator, measure the NO.1 brake piston stroke applying and releasing the compressed air (392 - 785 kPa, 4 - 8 kgf/cm², 57 - 114 psi), as shown.

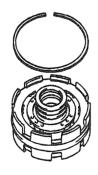
Piston stroke: 0.97 - 1.64 mm

If the values are non-standard, inspect the disc.



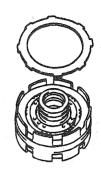
KKMB030D

- 4. Remove flange.
  - a. Using a screwdriver, remove the snap ring.



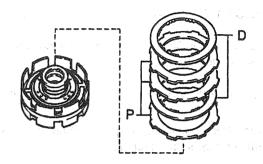
KKMB030E

b. Remove the flange.



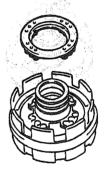
KKMB030F

5. Remove the 2 discs and 3 plates.



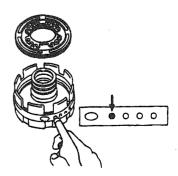
KKMB030G

Remove the piston return spring.



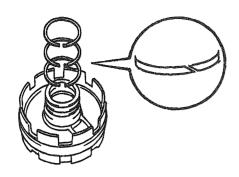
ккмвозон

- 7. Remove NO.1 brake piston.
  - a. Hold the NO.1 brake piston with hand and apply compressed air to the center support to remove the NO.1 brake piston.
  - b. Remove the 2 O-rings from the piston.



KKMB030I

8. Remove the 3 oil seal rings.



ккмв030Ј

### INSPECTION EKMB0920

1. Using a dial indicator, measure the inside diameter of the center support bushing.

Maximum inside diameter: 36.46 mm (1.4354 in.)

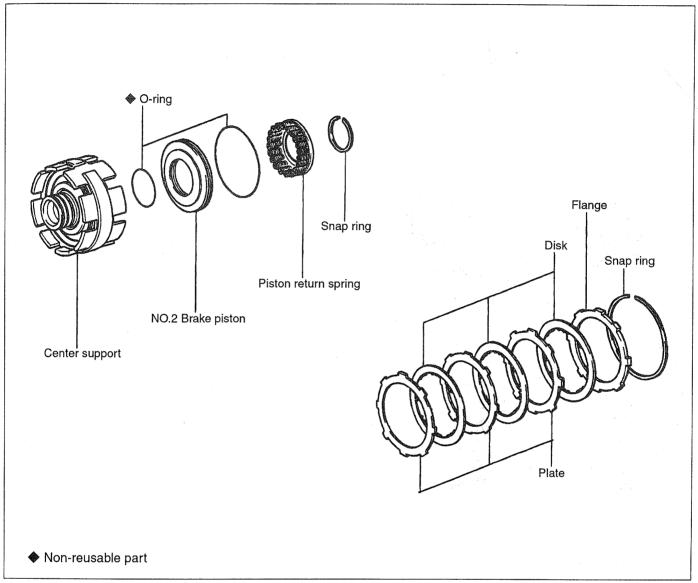
If the inside diameter is greater than the maximum, replace the center support.



KKMB030K

### NO.2 BRAKE

### COMPONENTS EKMB0940



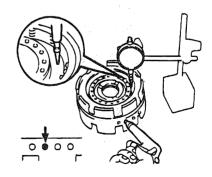
#### EKMB094A

### DISASSEMBLY EKMB0950

Check piston stroke of NO.2 brake.
 Using dial indicator, measure the NO.2 brake piston stroke applying and releasing the compressed air (392 - 782 kPa, 4 - 8 kgf/cm², 57 - 114 psi), as shown.

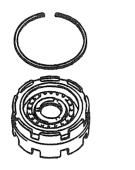
Piston stroke: 0.97 - 1.64 mm

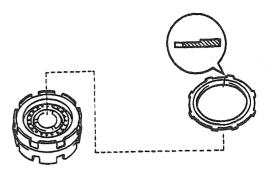
If the values are non-standard, inspect the discs.



KKMB031B

- 2. Remove flange.
  - a. Using a screwdriver, remove the snap ring.





KKMB031C

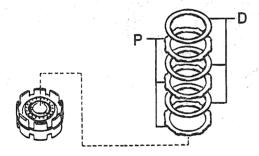
KKMB031G

b. Remove the flange.



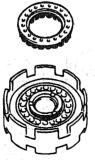
KKMB031D

3. Remove the 3 discs and 3 plates.



KKMB031E

4. Remove the piston return spring.



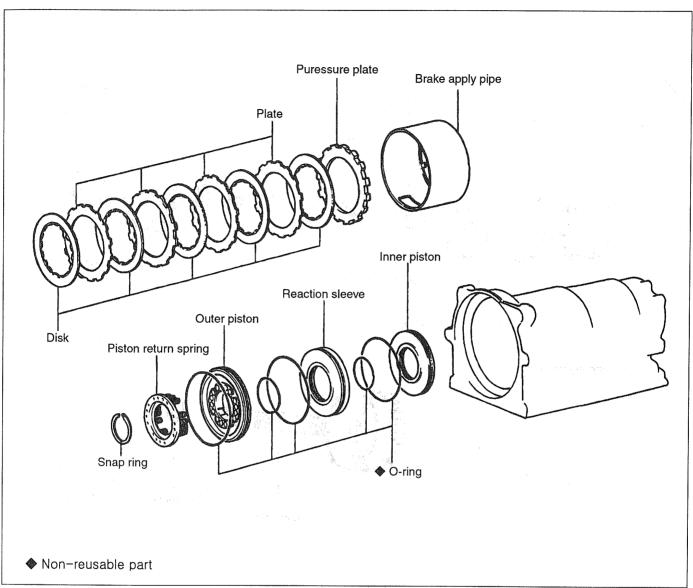
KKMB031F

### REASSEMBLY EKMB0960

1. Install the flange, the flat end facing downward.

### NO.3 BRAKE

### COMPONENTS EKMB0970

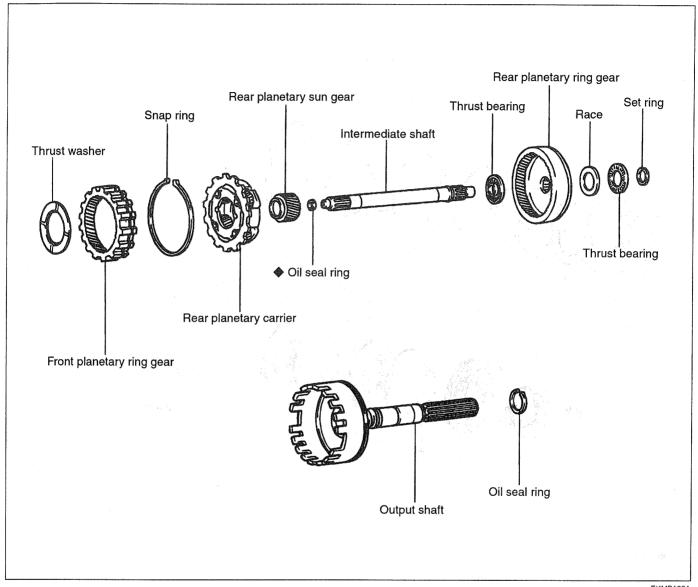


EKMB097A

### **REAR PLANETARY GEAR**

### COMPONENTS

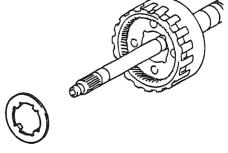
EKMB1020



EKMB102A

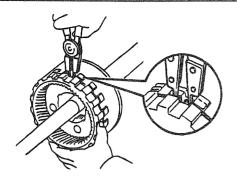
#### DISASSEMBLY EKMB1030

1. Remove thrust washer from front planetary ring gear.



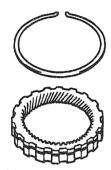
ккмвоззв

- 2. Remove front planetary ring gear.
  - Using a snap ring expander, pull out the ring gear while compressing the snap ring.



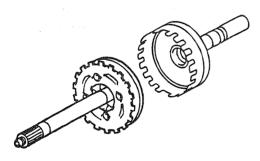
KKMB033C

 Using a screwdriver, remove the snap ring from the ring gear.



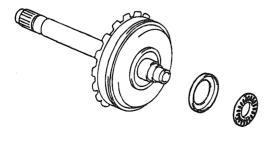
KKMB033D

- 3. Remove rear planetary gear assembly from output shaft.
  - a. Pull out the rear planetary gear assembly.



KKMB033E

b. Remove the bearing and race.



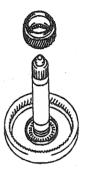
KKMB033F

4. Remove rear planetary carrier from planetary ring gear.



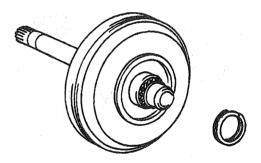
KKMB033G

5. Remove planetary sun gear from planetary ring gear.



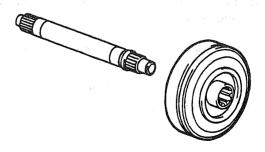
ккмвоззн

- 6. Remove planetary ring gear.
  - a. Using a screwdriver, remove the set ring.



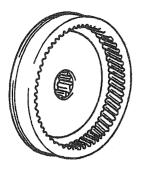
KKMB0331

b. Remvoe the planetary ring gear.



KKMB033J

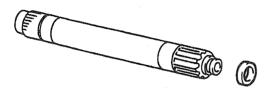
c. Remove the assembled bearing from the ring gear.





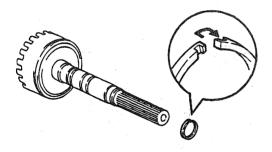
ккмвоззк

 Remove oil seal ring from intermediate shaft. Using a screwdriver, remove the oil seal ring.



KKMB033L

8. Remove oil seal ring from output shaft.



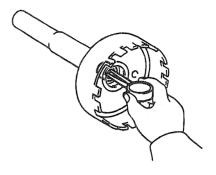
ККМВ033М

### INSPECTION EKMB1040

Check output shaft bushing.
 Using a dial indicator, measure the inside diameter of the output shaft bushing.

Maximum inside diameter: 18.08 mm (0.7118 in.)

If the inside diameter is greater than the maximum, replace the output shaft.



KKMB033N

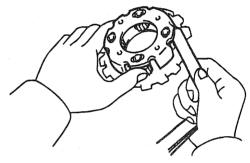
Measure planetary pinion gear thrust clearance.
 Using a feeler gauge, measure the planetary pinion gear thrust clearance.

#### Standard clearance:

0.20 - 0.50 mm (0.0079 - 0.0197 in.)

If the clearance is non-standard, inspect the planetary gear thrust washer.

If necessary, replace the planetary gear assembly.



KKMB033O

### REASSEMBLY EKMA1050

Coat the assembled bearing and race with petroleum

# jelly and install it onto the ring gear. ASSEMBLED BEARING AND RACE DIAMETER:

	Inside mm (in.)	Outside mm (in.)
Assembled bearing and race	21.4 (0.843)	47.3 (1.862)

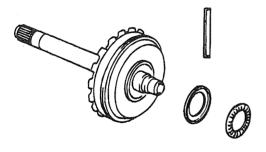


KKMB033P

2. Coat the bearing and race with petroleum jelly and install them onto the ring gear

### **BEARING AND RACE DIAMETER:**

	Inside mm (in.)	Outside mm (in.)		
Race	30.1 (1.185)	48.5 (1.909)		
Bearing	28.4 (1.118)	46.3 (1.823)		

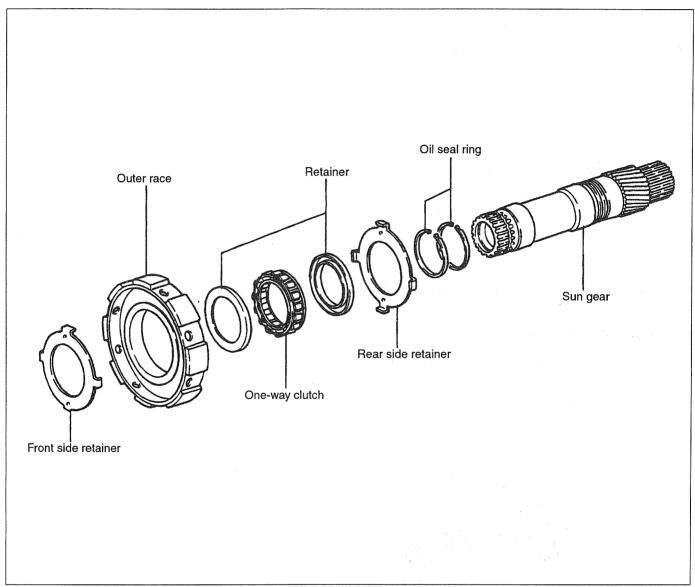


KKMB033Q

### PLANETARY GEAR SET

### PLANETARY SUN GEAR EKMB1050

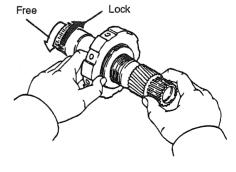
### COMPONENTS



#### EKMB105A

### DISASSEMBLY EKMB1060

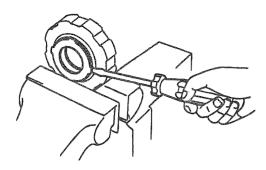
1. Hold NO.1 one-way clutch and turn the planetary sun gear. The planetary sun gear turns freely counterclockwise and locks clockwise.



KKMB034B

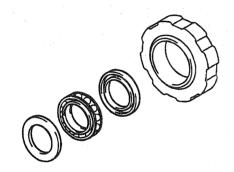
2. Disassemble NO.1 one-way clutch.

- a. Using a screwdriver, loosen the staked parts of the rear side retainer.
- b. Remove the retainer.



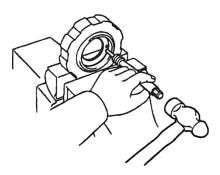
KKMB034C

Remove the one-way clutch and 2 retainers from the outer race.



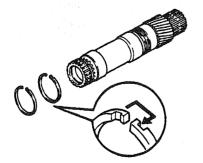
KKMB034D

4. Using a pin punch and hammer, remove the front side retainer.



KKMB034E

5. Remove the 2 oil seal rings.



KKMB034F

### INSPECTION EKMB1070

Check planetary sun gear bushing.
 Using a dial indicator, measure the inside diameter of the planetary sun gear bushings.

Maximum inside diameter: 21.58 mm (0.896 in.)

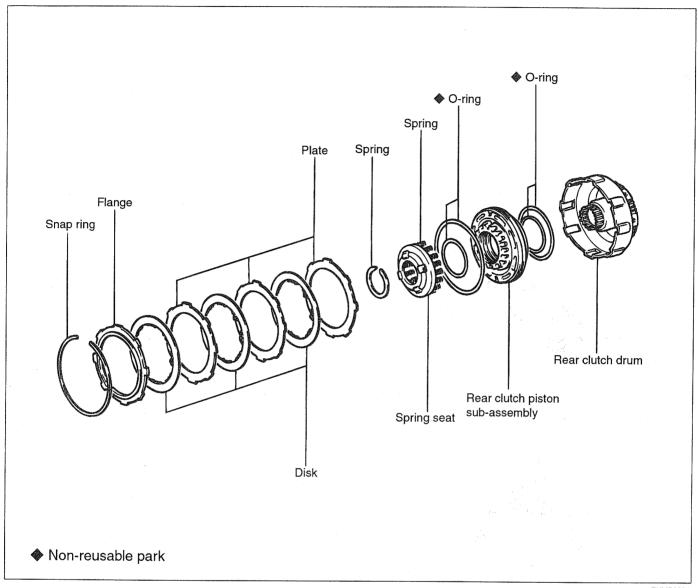
If the inside diameter is greater than the maximum, replace the planetary sun gear.



KKMB034G

### REAR CLUTCH

### COMPONENTS EKMB0870



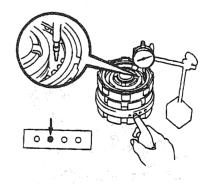
#### EKMB087A

### DISASSEMBLY EKMBO880

 Using a dial indicator, measure the rear clutch piston stroke applying and releasing the compressed air (392 - 785 kPa, 4 - 8 kgf/cm², 57 - 114 psi), as shown.

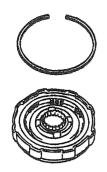
Piston stroke: 0.90 - 1.30 mm

If the values are non-standard, inspect the discs.



KKMB029C

- 2. Remove flange.
  - 1) Using a screwdriver, remove the snap ring.



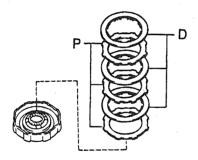
KKMB029D

2) Remove the flange.



KKMB029E

3. Remove disc and plate.



KKMB029F

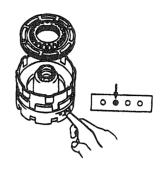
4. Remove the piston return spring.



KKMB029G

- 5. Remove rear clutch piston.
  - Place the rear clutch drum onto the center support.

- Hold the rear clutch piston with hand, apply compressed air to the center support to remove the rear clutch piston.
- c. Remove the 4 O-rings from the piston.



KKMB029H

#### 03-72LE MODEL EKUC2000

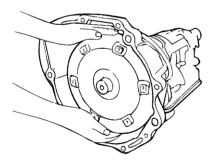
#### DISASSEMBLY

- 1. Before starting disassembly, thoroughly clean the transmission to prevent entry of foreign matter.
- Each port should be carefully inspected for deformation, damage, wear, etc. when removed.
- 3. All disassembled parts should be carefully arranged for ease of reassembly. Be sure to separate or otherwise identify parts to be replaced from those that will be reused. Parts should be disassembled in away that will not affect their performance or external appearance. Fragile and easily damaged parts should be arranged on a suitable surface to prevent damage.
- 4. Drain the ATF from the transmission.
- 5. Pull the torque converter out of the converter housing.

### **NOTE**

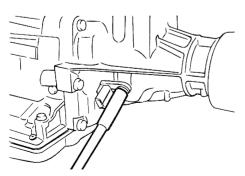
Do not allow ATF to spill when removing the torque converter.

Remove the throttle cable clamp attaching bolt and the wiring clamp attaching bolt.



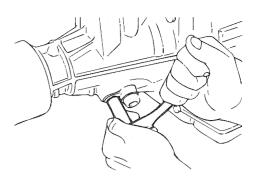
EKUC200A

Remove the speed sensor.



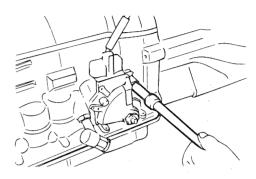
EKUC200B

8. Remove the speedometer driven gear.



EKUC200C

9. Remove the transaxle range switch.



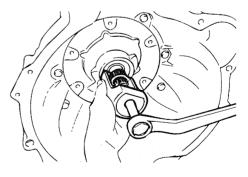
EKUC200D

- 10. Remove the oil pump.
  - a. Remove the oil pump mounting bolts.
  - b. Set SST on the shaft in back of the spline and pull the oil pump out.

### **NOTE**

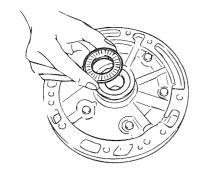
Do not damage the shaft bushing surface.

 Grasp the front pump stator shaft and pull the pump from the case.



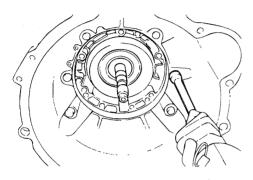
EKUC200E

11. Watch for bearing behind oil pump.



EKUC200F

12. Remove the converter housing mounting bolts, then while holding the input shaft, remove the converter housing.

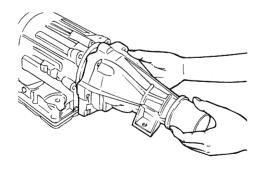


EKUC200G

13. Remove the extension housing and gasket.

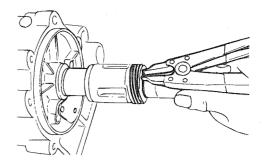
### M NOTE

- Note the length and location of the extension housing mounting bolts.
- b. When pulling of the extension housing, be careful not to damage the oil seal at the rear of the housing.



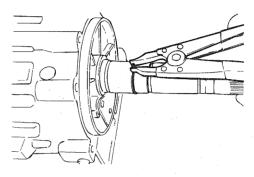
EKUC200H

14. Remove the snap ring, then remove the speedometer drive gear.



EKUC200I

15. Remove sensor rotor and snap ring from output shaft.

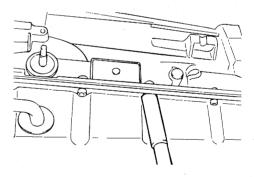


EKUC200J

16. Remove the oil pan and gasket.

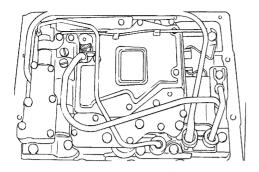


Do not turn the transmission over as this will contaminate the valve body with foreign materials in the bottom of the pan.



EKUC200K

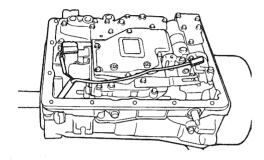
17. Pry up both tube ends with a large screwdriver, then remove the tubes.



EKUC200L

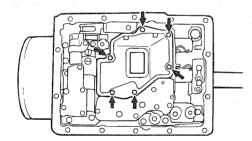
18. Remove the solenoid connectors.

Then after removing keep plate, pull the wiring out of the transmission case.



EKUC200M

19. Remove the oil strainer and gasket by removing the 6 mounting bolts.

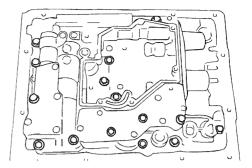


EKUC200N

20. Remove the valve body by removing the 15 mounting bolts.

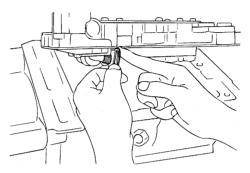


Note the length of the mounting bolts.



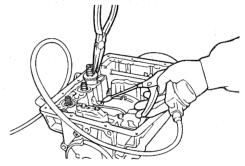
EKUC200O

21. Lift up valve body carefully and remove throttle cable from throttle cam, and body.



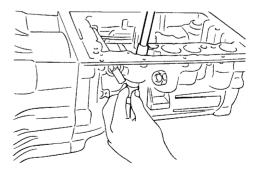
EKUC200P

22. Remove the accumulator piston springs (3EA).



EKUC200Q

23. Remove the throttle cable and retainer by using 10 mm socket. Push the plastic throttle cable retainer out of the transmission case.



EKUC200R

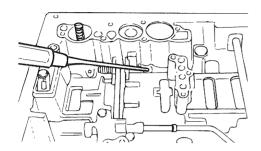
24. Remove the accumulator pistons by blowing compressed air through the holes indicated by the arrows.



Accumulators are for B2, C2, and C1 as seen from the front of the transmission.

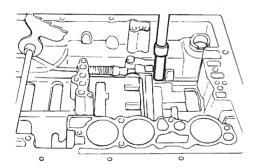
### **CAUTION**

Use care in removing, as the piston and fluid will come out with considerable force. Cover and hold the piston with a rag.



EKUC201A

25. If necessary, remove the parking pawl bracket and torsion spring, with using the SST (lock pin extractor) pull out the lock pawl shaft, then remove the lock pawl. Remove the lock pawl rod.

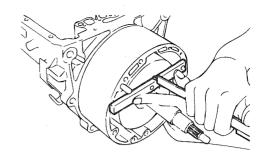


EKUC201B

26. Check the distance between the top of the case and the clutch drum using a suitable straight bar.

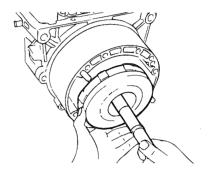


Note the distance for reassembly.



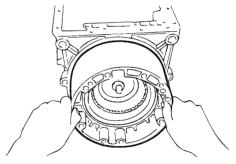
EKUC201C

27. Pull the OD clutch assembly from the OD case.



EKUC201D

28. Hold both sides of the overdrive case and pull it out from the transmission case.

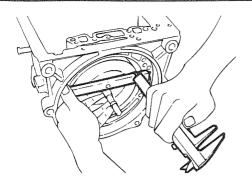


EKUC201E

29. Measure distance between top of case flange and clutch drum. Set special tool in the case at shown in the figure.

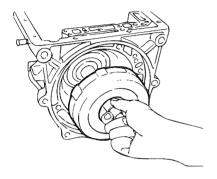


Note the distance for reassembly.



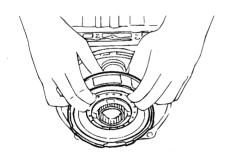
EKUC201F

30. Pull the forward clutch assembly from the case.



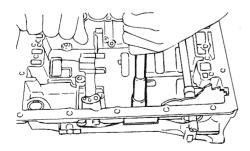
EKUC201G

31. Pull the direct clutch assembly out the case.



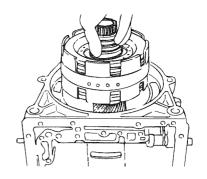
EKUC201H

32. Remove the two center support mounting bolts.



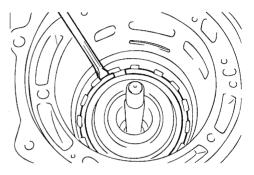
EKUC2011

33. Pull the center support and sun gear assembly out of the case as a unit.



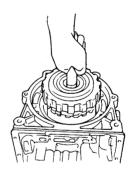
EKUC201J

34. Using a screwdriver, remove the snap ring holding the front planetary carrier.



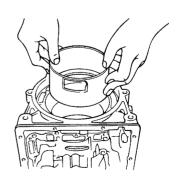
EKUC201K

35. Hold the intermediate shaft and pull the carrier assembly out of the case.



EKUC201L

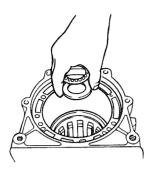
36. Remove the brake tube from inside the case.



EKUC201M

37. Remove the thrust bearing and race for the output shaft from inside the case.

38. Remove the rear cover and gasket.



EKUC201N

#### **ASSEMBLY** EKUC2020

#### **PRECAUTION**

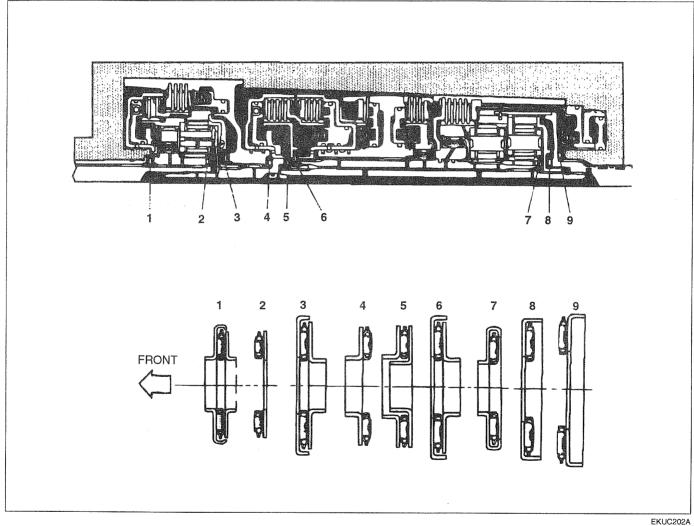
The automatic transmission is composed of high-precision-finished parts, necessitating careful inspection before assembly because even a small nick could cause fluid leakage or affect performance. Clean out oil holes and oil passages with compressed air, and check that there are no obstructions.

Before assembly, apply ATF to each "O" ring, seal ring, rotating part and friction part.

If brake bands or drive plates are replaced with new ones, first soak them in ATF for at least 2 hours. All seal gaskets and "O" rings must be replaced with new ones. Be sure to install thrust bearings and races in the correct direction and position.

#### THRUST BEARING DIRECTION

#### COMPONENTS



#### SIZES OF BEARING AND RACE

lten	n	d	2	3	4	5	6	7	8	9
Front race	O.D.		50	48.54	37.59	37.59	48.54		48.54	-
FIORETACE	I.D.	-		30.00	24.05	24.05	30.00	-	30.00	_
Bearing	O.D.	43.20	52.52	46.36	37.47	27.34	46.36	47.50	46.36	55.17
Dearing	I.D.	24.32	37.30	28.37	23.41	23.41	28.37	21.41	28.37	38.22
Rear race	O.D.	39.20	-	44.70	-	37.59	44.70	-		57.53
riear race	I.D.	24.32	-	27.58	-	21.41	27.58	809		39.12

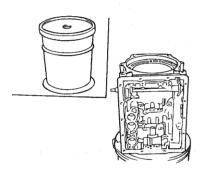
Unit: mm

O.D.: Outer dia. I.D.: Inner dia.

 Place the transmission case on a cylindrical stand for more efficient work.

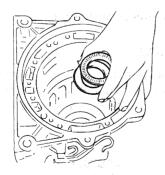


Place stop rags between the case and stand to avoid damaging the case.



EKUC202B

2. Install the thrust bearing and race, facing the cup side downward.

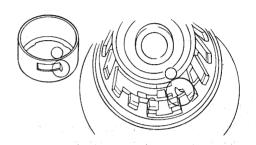


EKUC202C

 Place the transmission case on a cylindrical stand for more efficient work.

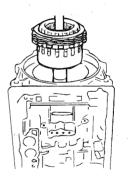


Make sure that the lips of the tube end are fully seated in the case.



EKUC202D

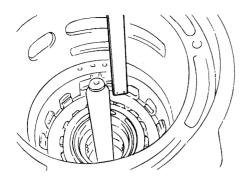
 Install the output shaft assembly in the transmission case without using the inner race asembly.
 Using a large screwdriver, install the snap ring.



EKUC202E

- 5. Check clutch pack clearance.
  - With the case in upright position, make sure that the clutch pack is lower than the ledge below the snap ring groove.
  - If the clutch pack is not lower than the ledge, components may be misassembled or there may be excess ATF on the discs.

Standard clearance: 0.61-2.64 mm (0.0240-0.1039 in.)

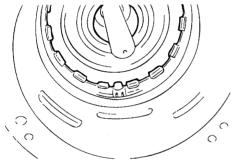


EKUC202F

- Remove the snap ring and output shaft assembly from the transmission case to install the inner race assembly.
- Position the notched tooth of the inner race assembly toward the valve body side of the case, then install in the case.



The snap ring groove is fully visible when the inner race assembly is correctly installed.

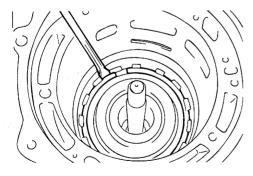


EKUC202G

8. Using a large screwdriver, install the snap ring.

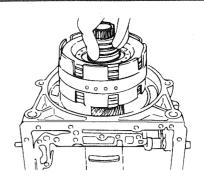
## ( CAUTION

Visually check that snap ring is fully seated.



EKUC202H

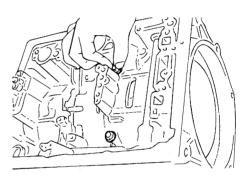
 Align the oil hole and bolt hole of the center support with those of the valve body side, then insert the center support assembly.



EKUC201J

 Align the center support with the holes in the case, then install two bolts with wave washers finger tight.
 Tighten the center support bolts alternately in 6.8 Nm (0.7kg·m, 6.0ft·lb) increments.

# Tightening torque: 24-28 Nm (2.4-2.8kg·cm, 17-20ft·lb)



EKUC202I

11. Install the direct clutch into the case.

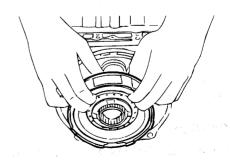
### **NOTE**

Rotate the clutch to mesh the hub with the center support.

12. Check for correct installation of the direct clutch.

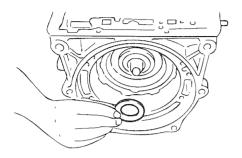


If the direct clutch is fully meshed with the center support the splined center of clutch will be flush with the end of the sun gear shaft.



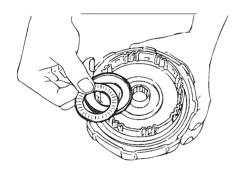
EKUC202J

- 13. Coat parts with petroleum jelly to keep them in place.
- 14. Position the lip of the race toward the direct clutch.
- 15. Install thrust bearing race over splined end of direct clutch in case.



EKUC202K

- 16. Coat the bearing races and bearing with petroleum jelly.
- 17. Install the bearing race, bearing and bearing race in the forward clutch.



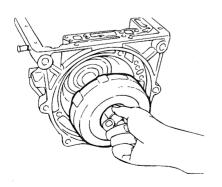
EKUC202L

- 18. Align the tabs of the drive plates to mesh them with the direct cluth hub.
- 19. Install the forward clutch assembly in the case.



### / CAUTION

Be careful that the thrust bearing does not fail out.



EKUC201G

20. Check that the forward clutch in installed all way in using suitable straight bar.

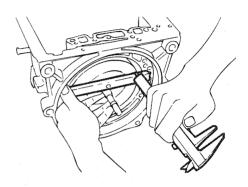
Set the bar on the transmission case as shown in the figure.

Measure the transmission case as shown in the figure. Measure the distance between the top surface of the bar and forward clutch assembly. If the distance corresponds to specification, the forward clutch is installed correctly.



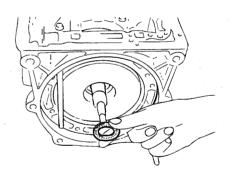
Measure at the raised surface of the forward clutch. not the lower surface.

Standard height: 1.0 - 3.0 mm (0.039-0.118 in.)



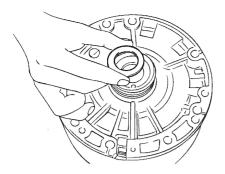
EKUC202M

- 21. Coat the thrust bearing and race with petroleum jelly.
- 22. Install the thrust bearing and race to the foward clutch.



EKUC202N

23. Coat the thrust washer with petroleum jelly. Install the thrust washer on the OD, case end.

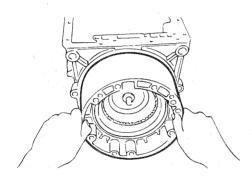


EKUC2020

- 24. Insert the OD case into the transmission case.
- Insert the overdrive case gently through the two guide pins.



Align the OD case notch with the oil passage in the transmission case when installing.

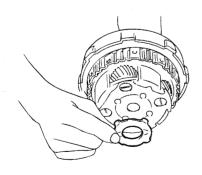


EKUC201E

26. Coat the thrust washers with petroleum jelly. Install the thrust washer on the overdrive planetary carrier.

## **NOTE**

The washer lugs should be inserted in the holes.

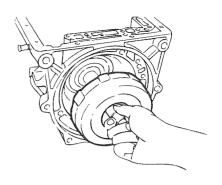


EKUC202P

- 27. Align the discs flukes in the overdrive case.
- 28. Align the flukes with the slots of the overdrive clutch and press the overdrive clutch into the overdrive case.
- 29. Install the OD clutch assembly into the OD case.

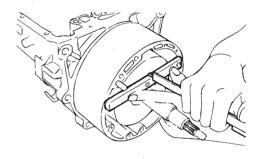
### **M** NOTE

Be carefull that the thrust washer does not fall out.



EKUC202Q

30. Check correct installation of overdrive clutch. Set SST on the overdrive case as shown in the figure. Measure the distance between the top surface of SST and overdrive clutch. If the distance corresponds to that during disassembly, the overdrive clutch is installed correctly.

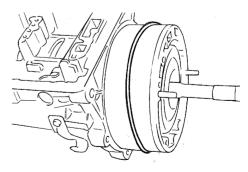


EKUC201C

- 31. Install the "O" ring on the OD case.
- 32. Install the converter housing 2 short bolts and 4 long bolts.

#### Tightening torque

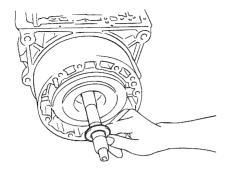
Long bolts: 26 - 41 Nm (2.7-4.3kg·cm, 20-30ft·lb) Short bolts: 47 - 67 Nm (4.8-6.8kg·cm, 35-49ft·lb)



EKUC202R

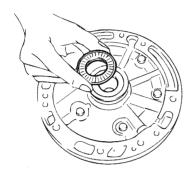
33. Coat the thrust bearing and race with petroleum jelly.

34. Install the thrust bearing and race on the OD clutch.



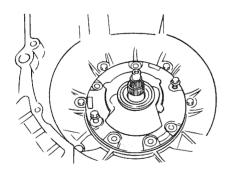
EKUC202S

35. Coat the thrust washer with petroleum jelly and install the lip side toward the pump body.



EKUC202T

36. Install the oil pump gently through the two guide bolts, being careful that the thrust washer does not fall out.

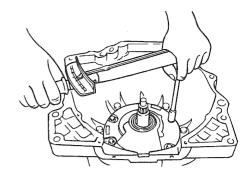


EKUC202U

37. Tighten the oil pump assembly uniformly a little at a time. While tightening, check that the input shaft has play in the axial direction, and that it turns easily.

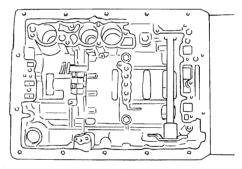


Coat the oil pump mounting bolts with sealant below the heads.



EKUC202V

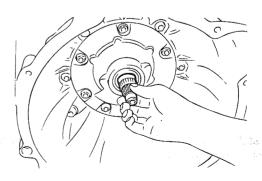
- 38. Blow low pressure air into the indicated passages and check for operation by listening for operational sounds.
  - a. OD clutch
  - b. OD brake
  - c. Forward clutch
  - d. Direct clutch
  - e. Front brake
  - f. Rear brake
  - g. Low & reverse brake



EKUC203A

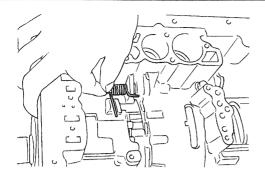
- 39. Check input shaft and output shaft.
  - a. Make sure that the input shaft has play in axial direction and that it turns.
  - b. Make sure that the output shaft has thrust play in axial direction.

Thrust play: 0.3-0.9 mm (0.912-0.035 in.)



EKUC203B

40. Insert the parking pawl into the case, then install parking pawl shaft and spring and parking pawl rod.



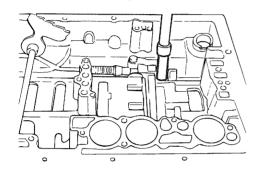
EKUC203C



41. Install the parking pawl bracket.

# Tightening torque:

5.9-8.8 Nm (60-90kg·cm, 52-78in·lb)

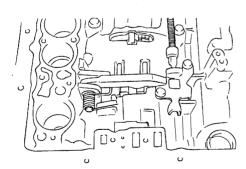


EKUC203D

42. Check that the planetary gear output shaft is locked when the manal valve lever is in "P" range.

### **NOTE**

"P" position is when the deepest detent of the manual valve lever is at the highest point of arc. Do not push the lever too far forward.

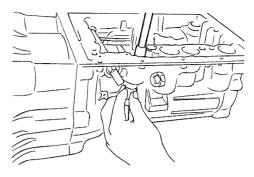


EKUC203E

43. Install the throttle cable through the case being careful not to damage the "O" ring.

### M NOTE

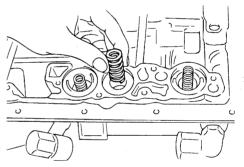
In subsequent work, do not roll the case over the cable and break the cable fitting.



EKUC203F

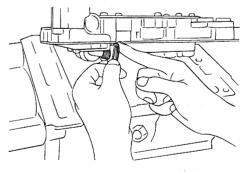
44. Install the accumulator pistons and springs.

	Free length (mm)	Outer diameter (mm)
B2 LOWER	17.50	12.50
B2 UPPER	55.90	19.60
C2 LOWER	30.00	15.50
C2 UPPER	43.56	14.30
C1 LOWER	29.56	12.70
C1 UPPER	57.18	17.50



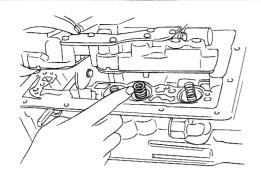
EKUC203G

45. Attach the throttle cable to the throttle cam.



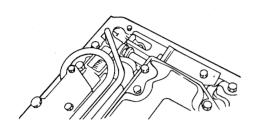
EKUC203H

46. Check that the lower springs are installed correctly on the accumulator pistons.



EKUC203I

47. Align the postion of the valve body manual valve with that of the manual valve lever pin.



EKUC203J

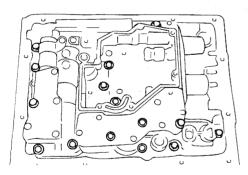
48. Install valve body mounting bolts.



Each bolt length (mm) is indicated in the figure.

### Tightening torque:

80-12 Nm (80-120kg·cm, 69-104in·lb)

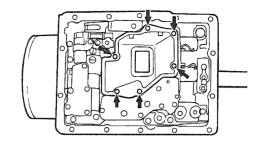


EKUC203K

49. Install the oil strainer.

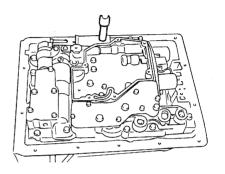
### Tightening torque:

4.9-5.9 Nm (50-60kg·cm, 43-52in·lb)



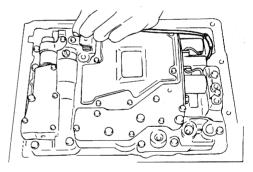
EKUC203L

50. Install detent spring.



EKUC203M

- 51. Push the solenoid wire through in the transmission case and connect the terminals to each solenoid.
- 52. Clamp the wiring to the oil screen.
- 53. Install the gromet for the wiring with the plate.

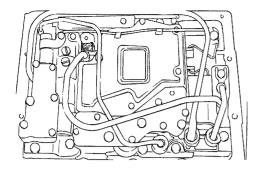


EKUC203N

54. Using a plastic hammer, install the tubes into the position indicated in the figure.



Be careful not to bend or damage the tubes.



EKUC200L

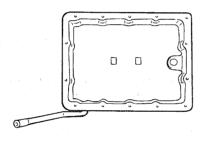
55. Install the magnet in the oil pan and install the oil pan with a new gasket.



The magnet should be located under the strainer.

#### Tightening torque:

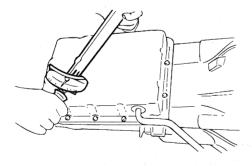
3.9-4.9 Nm (40-50kg·cm, 35-43in·lb)



EKUC203O

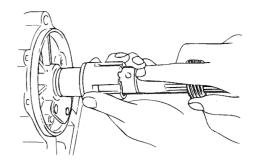
56. Install drain plug with new gasket.

Tightening torque: 175kg·cm (13ft·lb, 17Nm)



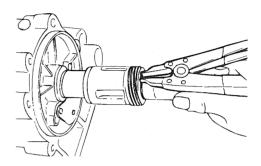
EKUC203P

- 57. Install sensor rotor and speedometer drive gear.
  - Install the snap ring and woodruff key onto the shaft.
  - b. Install the sensor rotor.



EKUC203Q

- c. Slide the speedometer gear on the shaft.
- d. Using screwdriveer, install the retainer.



EKUC200I

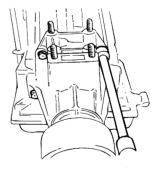
58. Install the extension housing with a new gasket.



The two lower bolts are short bolts. Bolt must be coated with sealant.

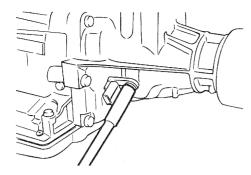
#### Tightening torque:

26-41 Nm (2.7-4.2kg·cm, 20-30in·lb)



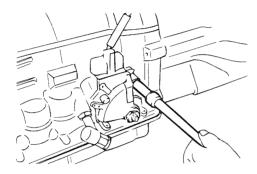
EKUC203R

- Install O-rings, bushing and speedometer driven gear to shaft sleeve.
- 60. Install speed sensor in extension housing.



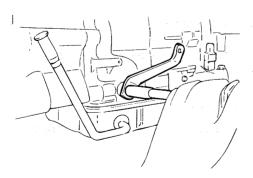
EKUC200B

- 61. Install inhibitor switch.
  - a. Slide the switch onto the control shaft.
  - b. Install the grommet facing the groove toward the switch body and then install the washer and nut.
- 62. Install control lever.



EKUC200D

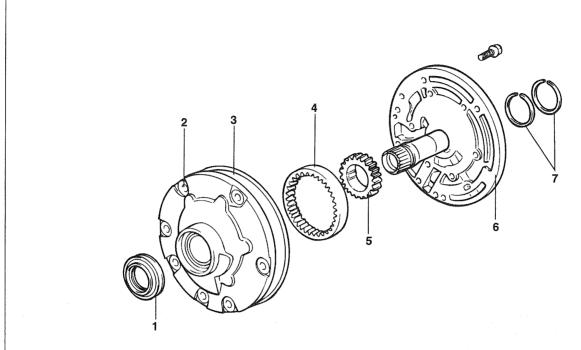
- 63. Adjust inhibitor switch.
  - a. Connect an ohmmeter between the terminals.
  - b. Turn the shift handle fully rearward, then return it two notches to the "N" position.
  - c. Adjust the switch to the point where there is continuity between the terminals.
  - d. Lock the switch with the bolt.



EKUC203S

### OIL PUMP EKUC2040

#### **COMPONENTS**

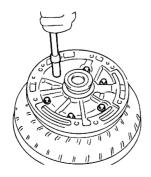


- 1. Oil seal
- 2. Oil pump body
- 3. "O" ring
- 4. Outer gear
- 5. Inner gear
- 6. Oil pump cover
- 7. Seal ring

TORQUE: Nm (kg-cm, lb-ft)

### DISASSEMBLY EKUC2050

- 1. Use the torque converter as a work stand.
- 2. Remove the seal rings from the oil pump cover.
- 3. Remove the oil pump cover.



4. Remove the "O" ring from the oil pump cover.

5. Mark the inner and outer gear positions, then remove them from the body.

EKUC204A

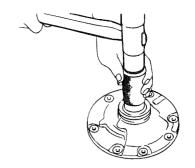


Do not use a punch to mark the gears.

EKUC205A







EKUC205E

### INSPECTION EKUC2060

Inspection the following parts and replace if necessary.

- 1. Drain or wear of inner or outer gear tooth surfaces.
- 2. Broken or worn seal rings.
- 3. Worn seal ring grooves.
- 4. Worn oil pump bushing.
- 5. Worn front and rear stator shaft bushings.
- 6. Damaged oil seals.

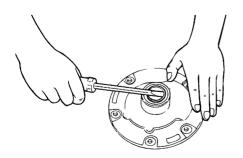


EKUC205C

### . Oil seal.

If necessary, replace the oil seal as follows:

a. Remove the oil seal using a screwdriver.



EKUC205D

b. Install the oil seal using a suitable pipe.

#### 3. Clearance

Ме	asuring point	Standard	Max.	
1	Side clearance	0.02-0.05 mm (0.008-0.0020 in.)	0.1 mm (0.0039 in.)	
2	Tip clearance	0.11-0.14 mm 0.0043-0.0050 in.)	0.3 mm (0.018 in.)	
3	Body clearance	0.07-0.15 mm (0.0028-0.0059 in.)	0.3 mm (0.0018 in.)	



EKUC205F

### ASSEMBLY EKUC2070

- 1. Use the torque converter as a work stand.
- 2. Apply ATF to the oil pump inner and outer gear, then install on the pump body. Next, set the pump body on the torque converter.



EKUC205G

- Align the bolt holes and set the pump cover into place. Install the bolts finger tight.
- Mount and tighten SST to align the pump and cover.
- Tighten the pump cover bolts.

Tightening torque:

5.9-8.8 Nm (60-90kg·cm, 52-78in·lb)



EKUC205H

Install the 2 seal rings on the oil pump cover.

### /!\ CAUTION

Make sure that the seal rings are properly seated.

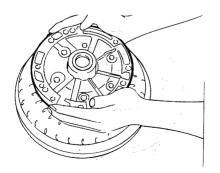
7. Install the new "O" ring on the oil pump.



EKUC205A



Make sure the "O" ring on the oil pump.

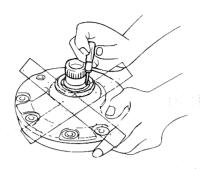


Turn the inner gear with the torque converter and 8. check that it rotates smoothly.



### !\ CAUTION

Do not use a screwdriver to rotate the inner gear. If used, the oil seal may be damaged.



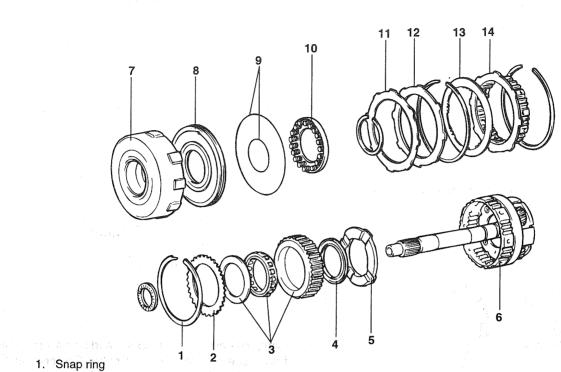
EKUC205J

EKUC205I

### **OVERDRIVE CARRIER AND**

CLUTCH EKUC2080

### COMPONENTS



- 2. Thrust washer
- 3. One-way clutch
- 4. Outer race
- 5. Thrust washer
- 6. OD carrier
- 7. OD clutch drum
- 8. Clutch piston
- 9. "O" ring
- 10. Return spring
- 11. Cushion plate
- 12. Plate
- 13. Disc
- 14. OD brake hub

TORQUE: Nm (kg-cm, lb-ft)

EKUC208A

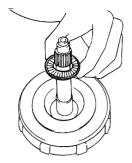
### DISASSEMBLY EKUC2090

1. Remove the thrust bearing and races from the OD clutch side.



Note the position of the bearing.

2. Remove the thrust washer from the OD planetary gear side.

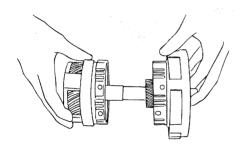


EKUC209A

Pull the OD clutch assembly from the OD planetary gear.



Be careful that the thrust bearing and race do not fall out.

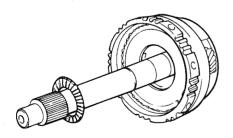


EKUC209B

Remove the thrust bearing and race.

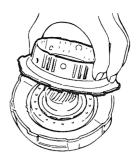


Note their positions.



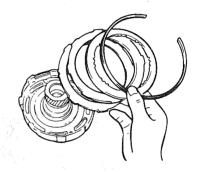
EKUC209C

Remove the outer snap ring and OD brake hub from the OD clutch assembly.



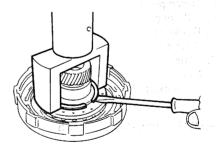
EKUC209D

Remove the thin snap ring, and drive plate(s), driven plate(s) and dished plate.



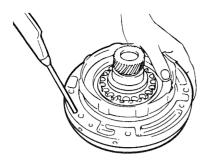
EKUC209E

- Compress piston return spring and remove snap ring. Place special tool Psiton Spring Compressor Set (09453-32100), on the spring retainer and compress springs with a shop press. Using a screwdriver, remove the snap ring.
- Remove return spring.



EKUC209E

- Remove the OD clutch piston.
  - Set the OD clutch drum on the oil pump.
  - Apply compressed air to the oil pump to remove b. the piston.
- 10. Remove the "O" rings from the OD clutch piston.



EKUC209G



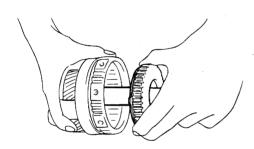
EKUC209J

- 11. Remove the snap ring from the OD planetary gear assembly.
- 12. Remove the thrust washers and one-way clutch assembly from the planetary gear assembly.
  - **NOTE**

Note the positions.

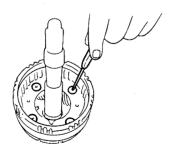
A CAUTION

Be careful not to lose the four plugs.



EKUC209H

13. Remove four plugs by magnet finger.



EKUC209I

14. Remove the one-way clutch from the outer race.



Note the direction of the one-way clutch.

### **INSPECTION**

Inspect the following parts and replace if necessary.

EKUC2100

- 1. Damaged drive plate face.
- 2. Braken snap ring.
- 3. Burnt input shaft journal.
- 4. Damaged "O" rings.

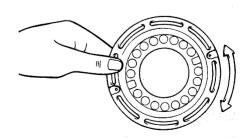


EKUC209K

5. Stuck check ball in clutch piston.

### **NOTE**

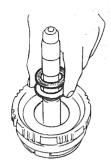
- · Check that check ball is free by shaking piston.
- Do not allow the discs to dry out.
- Prepare new discs by soaking them at least two hours in ATF.



EKUC209L

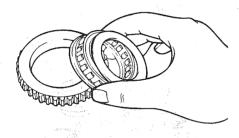
#### ASSEMBLY EKUC2110

- 1. Install four plugs.
- 2. Install thrust washer and bearing.



EKUC209M

- Install the one-way clutch and the retainer into the outer race.
- 4. Install the retainer on both sides of the one-way clutch.



EKUC209N

### **NOTE**

Check that the spring cage of the one-way clutch faces toward the front of the transmission.



EKUC209O

Install the thrust washers and one-way clutch assembly in the planetary gear assembly.

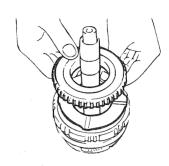
## **NOTE**

Check that the one-way clutch is installed in the correct direction.

6. Install the snap ring.

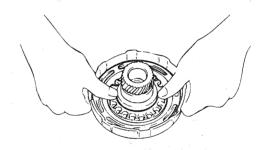


Check that the spring cage of the one-way clutch faces toward the front of the transmission.



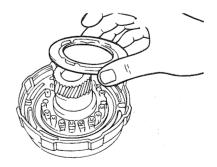
EKUC209P

- 7. Install the new "O" rings on the piston.
- 8. Apply ATF to "O" rings.
- 9. Press the piston into the OD clutch drum.



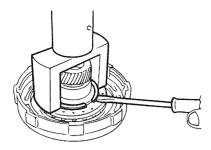
EKUC209Q

10. Install springs with the retainer and the snap ring in place.



EKUC209R

- 11. Install the snap ring in the groove.
  - Place SST on the spring retainer, then compress the spring retainer only enough to install the snap ring.
  - b. Install the snap ring in the groove.

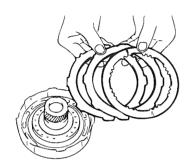


EKUC209F

12. Install the cushion plate, plate and disc without using the thin snap ring.



Installation order: Cushion plate -Plate-Disc-Plate-Disc t=1.4 t=1.8

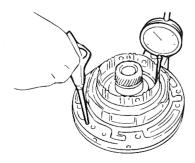


EKUC209S

- 13. Check the OD clutch piston stroke.
  - Install the OD brake hub and outer snap ring.
  - Set the OD clutch drum into the oil pump body.
  - Using a dial indicator, measure the piston stroke while applying and releasing compressed air (392-784 KPa, 4-8 kg/cm<sup>2</sup>, 57-114 psi)

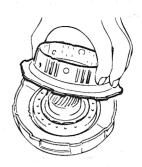
### **₩** NOTE

- · If the piston stroke is excessive, the drive plate is
- · If the piston stroke is less than specified, parts are misassembled.



EKUC209T

14. Remove the outer snap ring and OD brake hub to allow installation of the thin snap ring.



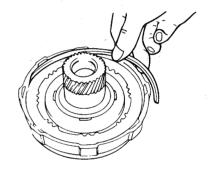
EKUC209D

15. Install the thin snap ring the OD clutch drum groove.



### / CAUTION

Make sure the thin snap ring is in the lowest groove and that the snap ring ends are not between lugs.



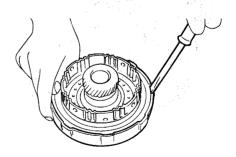
EKUC209U

16. Install OD brake hub and outer snap ring.



### CAUTION

Make sure the ends of the snap ring are not between lugs.

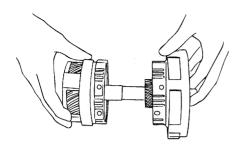


EKUC209V

17. Assemble overdrive clutch drum and overdrive carrier.

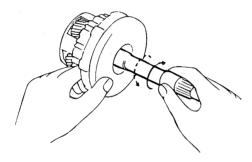
## M NOTE

Mesh the hub with the disc, twisting and jiggling the hub as required.



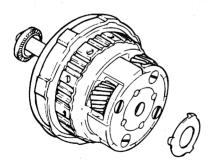
EKUC209B

18. Hold the OD clutch drum and turn the input shaft to check operation of the one-way clutch. The input shaft should rotate smoothly when turned clockwise and lock when turned counterclockwise.



EKUC209W

- 19. Install the thrust washer on the OD planetary gear side.
- 20. Coat the thrust bearing races, then install them on the OD clutch side.

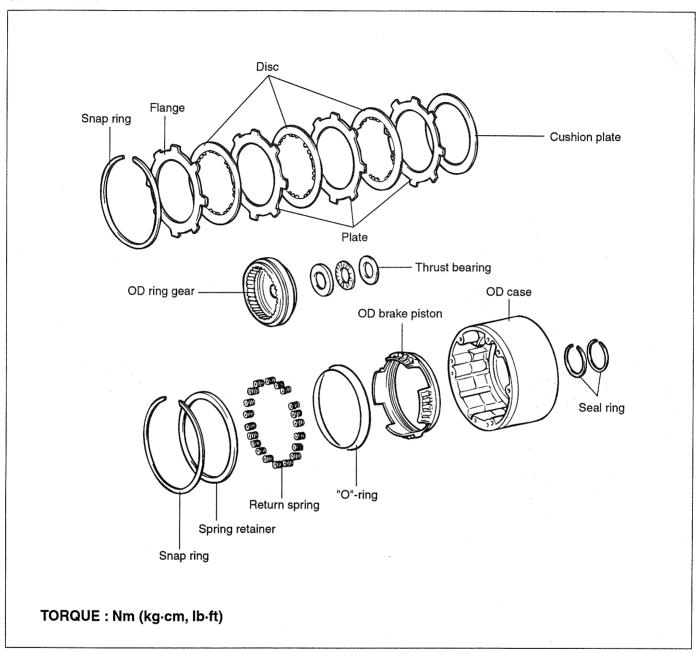


EKUC209X

## **OVERDRIVE SUPPORT**

### OVERDRIVE CASE AND BRAKE EKUC2120

### COMPONENTS



EKUC212A

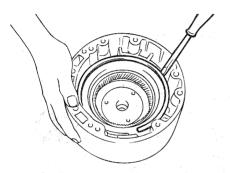
### DISASSEMBLY EKUC2130

1. Remove the thrust washer from the internal gear.



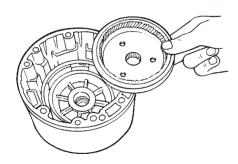
EKUC213A

- 2. Remove the snap ring the OD case.
- 3. Remove the clutch flange, discs, plates and cushion plate from the OD case.



EKUC213B

4. Remove the internal gear from the OD case.

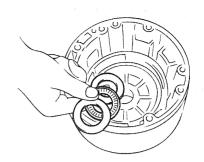


EKUC213C

5. Remove the bearing and races from the OD case.

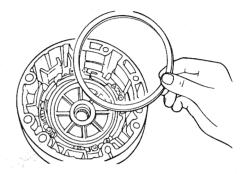


Note the position of the races.



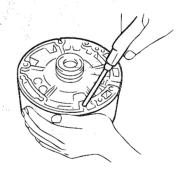
EKUC213D

- 6. Remove the snap ring from the OD case.
- 7. Remove the spring retainer and return springs.



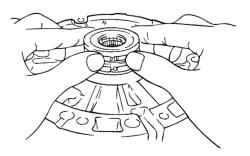
EKUC213E

- 8. Blow compressed air through the OD case oil hole to remove the OD brake piston.
- 9. Remove the OD brake pistion "O" rings.



EKUC213F

10. Remove the seal rings from OD case.



EKUC213G

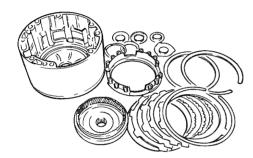
### INSPECTION EKUC2140

Inspect the following parts and replace if necessary.

- 1. Damaged drive plate faces.
- 2. Broken snap rings.
- 3. Damaged OD case seal ring grooves.
- 4. Damaged or worn weal rings.

### **NOTE**

- Do not allow the discs to dry out.
- Prepare new discs by soaking them at least two hours in ATF.



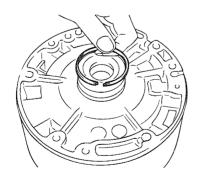
EKUC213H

#### ASSEMBLY EKUC2150

1. Install the seal rings on the OD case.



Make sure the seal rings are properly seated.

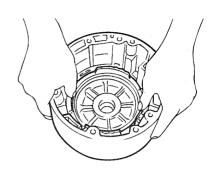


EKUC213I

- 2. Install the new "O" rings on the OD piston.
- 3. Apply ATF to the "O" rings.
- 4. Press the OD brake piston into the OD case by hand.



Be careful not to damage the "O" rings, do not force in.

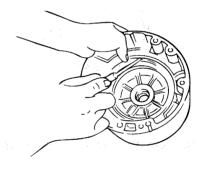


EKUC213J

- 5. Install the spring and set the spring retainer and the snap ring in place.
- 6. Install the snap ring in the OD case groove.

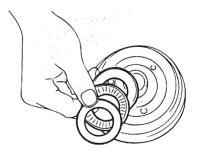


Make sure the ends of the snap ring are not between lugs.



EKUC213K

7. Install the bearing and races on the OD case then install the ring gear.



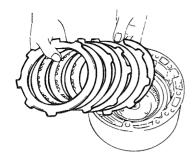
EKUC213L

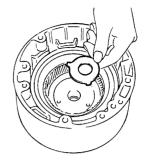
8. Install the cushion plate, discs, plates and flange.



Installation order

Cushion plate (rounded end down) - plate - Disc -Plate - Disc - Plate-Disc-Plate-Disc-Flange (Flat end down)





EKUC213A

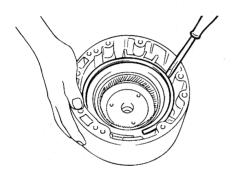
EKUC213M

Install the snap ring in the OD case groove.



### ( CAUTION

Make sure the ends of the snap ring are not between lugs.



EKUC213B

10. Check the clearance between the snap ring and flange.

Clearance: 0.40-1.38 mm (0.0157-0.0543 in.)

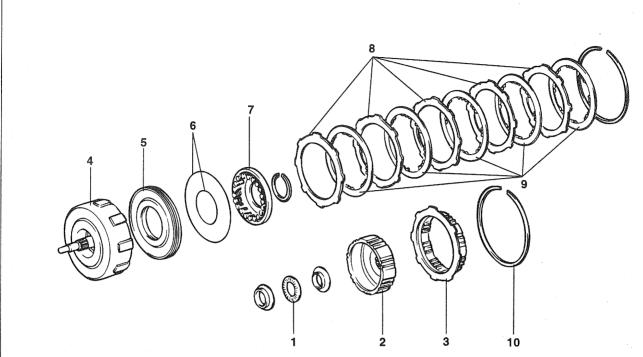


EKUC213N

11. Install the thrust washer on the ring gear.

### FORWARD CLUTCH EKUC2160

#### COMPONENTS



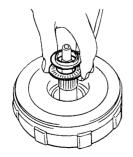
- 1. Thrust bearing
- 2. Forward clutch hub
- 3. Direct clutch hut
- 4. Forward clutch drum
- 5. Forward clutch piston
- 6. "O"-ring
- 7. Return spring
- 8. Plate
- 9. Disc
- 10. Snap ring

TORQUE: Nm (kg·cm, lb·ft)

EKUC216A

### DISASSEMBLY EKUC2170

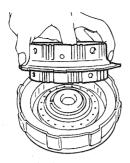
1. Remove the thrust bearings and races form the front and rear of the forward clutch.



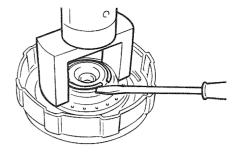
- 2. Use the extension housing as a work stand.
- 3. Remove the snap ring from the forward clutch drum.
- 4. Remove the forward and direct clutch hubs.



Lift out the two clutch hubs together.

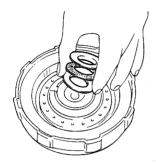


EKUC217B



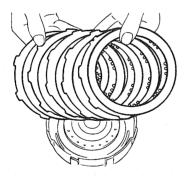
EKUC217E

- 5. Remove the thrust bearing and races.
- Remove the disc.



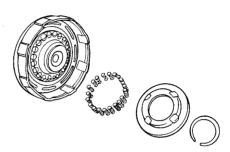
EKUC217C

- 7. Remove the thin snap ring.
- 8. Remove the retaining clutch plates and discs.



EKUC217D

 Compress piston return spring and remove snap ring. Place special tool, Piston Spring Compressor Set (09453-32100), with a shop press. Using a screwdriver, remove the snap ring.



10. Remove the spring retainer and the 20 return springs.

EKUC217F

- 11. Assemble forward clutch on overdrive case and blow out piston.
  - a. Slide the forward clutch onto the overdrive case.
  - Apply compressed air to the overdrive case to remove the piston.
     (If the piston does not come out completely, use needle nose pliers to remove it.)
  - c. Remove the forward clutch from the overdrive case.
- 12. Remove O-rings from piston.

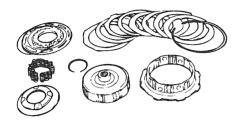


EKUC217G

### INSPECTION EKUC2180

Inspect the following parts and replace if necessary.

- 1. Damaged or worn drive plate faces.
- 2. Broken snap ring.
- 3. Worn seal ring friction surfaces.
- 4. Burned input shaft journal.
- 5. Damaged "O" ring.

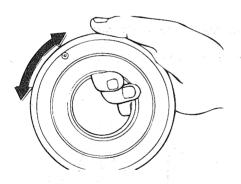


EKUC217H

6. Stuck check ball in clutch piston.



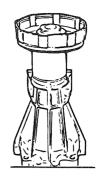
Check that the check ball is free by shaking piston.



EKUC217I

### ASSEMBLY EKUC2190

1. Use the extension housing as a work stand.

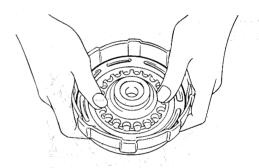


EKUC217J

- 2. Install new "O" rings on the piston (inner and outer).
- 3. Apply ATF to the "O" rings.
- 4. Press the forward clutch piston into the housing by hand.

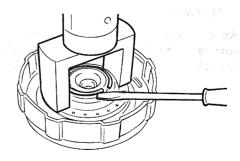


Be careful not to damage the "O" rings, do not force in.



EKUC217K

- 5. Install the piston return springs, spring retainer and snap ring into the clutch drum.
- 6. Install the snap ring in the groove.
  - a. Place SST(09453-32100) on the spring retainer and compress only enough to install the snap ring.
  - b. Install the snap ring in the groove.



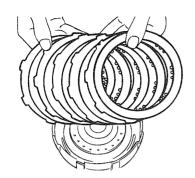
EKUC217E

 Install the discs and plates without using the thin snap ring.

### **NOTE**

Installation order:

Plate - Disc - Plate - Disc - Plate - Disc - Plate - Disc - Plate - Disc

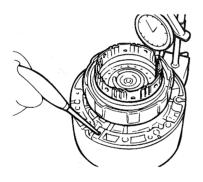


FKUC217D

Check the forward clutch piston stroke.
 Install the direct clutch hub and outer snap ring.
 Set the forward clutch drum into the oil pump body and releasing compressed air (392-784 KPa, 4-5 kg/cm²,57-114psi)

#### Standard piston stroke:

1.43-2.93 mm (1.0563-0.1154 in.)

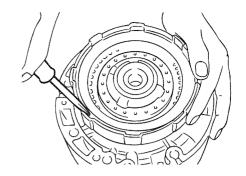


EKUC217L

- 9. Remove the outer snap ring, direct clutch hub and drive plate.
- 10. Install the thin snap ring in the clutch drum groove.



Make sure that the snap ring is tin the lowest groove and that the snap ring ends are not between lugs.

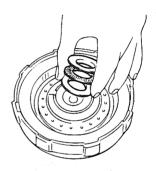


EKUC217M

11. Coat the thrust bearing and races with petroleum jelly.



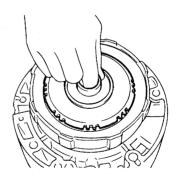
This is to prevent the bearing races from falling out when installing the forward clutch.



EKUC217C

12. Install the forward clutch hub.

Make sure the forward clutch hub meshes and is fully inserted.

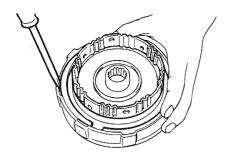


EKUC217N

13. Install the drive plate, direct clutch hub and outer snap ring.

Make sure the ends of the snap ring are not between lugs.

14. Install the thrust bearings and races on the front and rear of the forward clutch.



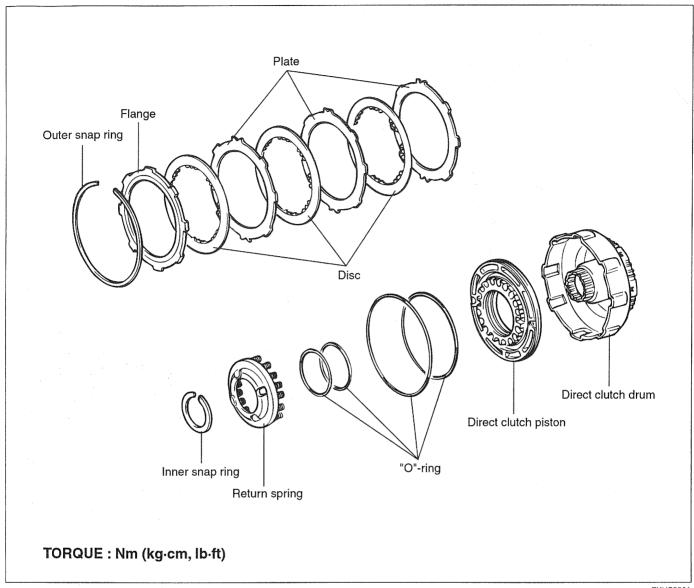
EKUC2170



EKUC217P

### DIRECT CLUTCT EKUC2200

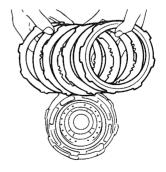
#### **COMPONENTS**



EKUC220A

## DISASSEMBLY EKUC2210

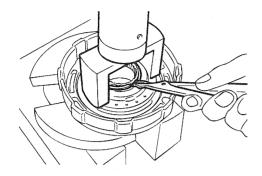
- 1. Remove the following parts from the direct clutch and brake hub assembly.
  - a. Snap ring
  - b. Flange
  - c. Discs
  - d. Plates



EKUC221A

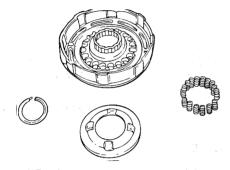
2. Compress piston return springs and remove snap ring.

Place special tool, Piston Spring compressor Set (09453-32100), on the spring retainer and compress the springs with shop press. Using snap ring pliers, remove the snap ring.



EKUC221B

3. Remove the spring retainer and the 18 return springs.



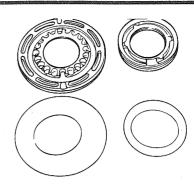
EKUC221C

- 4. Remove the outer and inner pistons.
  - a. Set the direct clutch hub on the center support.
  - b. Apply compressed air to the center support to remove the pistons.



EKUC221D

5. Remove the "O" rings from the pistons.

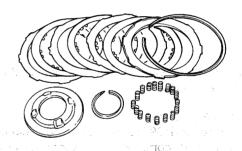


EKUC221E

### INSPECTION EKUC2220

Inspect the following parts and replace if necessary.

- 1. Damaged or worn drive plate faces.
- 2. Broken snap ring.
- 3. Worn or damaged seal ring contraction surfaces.
- 4. Damaged "O" rings.

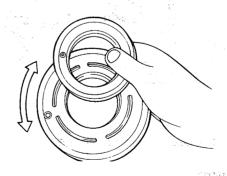


EKUC221F

5. Stuck check ball in clutch piston.

### **NOTE**

Check that the check ball is free by shaking piston.



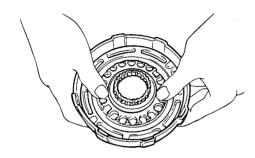
EKUC221G

#### **ASSEMBLY** EKUC2230

- Install new "O" rings on the pistons.
- 2. Apply ATF to the rings.
- Install the direct clutch inner and outer pistons.
  - Press the inner piston into the housing first by hand.
    - Install with the flat side down.
  - b. Press the outer piston into the housing by hand.

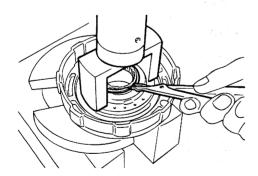
### CAUTION

Be careful not to damage "O" rings, do not force in.



EKUC221H

- Install the return springs, spring retainer and snap ring onto to direct clutch hub.
- Install the snap ring in the groove.
  - Place SST(09453-32100) on the direct clutch hub and compress the spring retainer only enough to install the snap ring.
  - Install the snap ring in the groove.



EKUC221B

Install the discs, plates and flange.



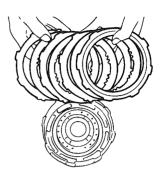
Installation order:

Plate - Disc - Plate - Disc - Plate - Disc - Flange

7. Install the snap ring.



Make sure the ends of the snap ring are not between lugs.



EKUC221A

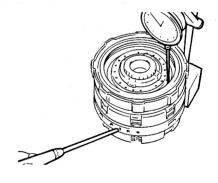
- Check the rear clutch piston stroke.
  - Set the clutch on the center support.
  - Using a dial indicator, measure the piston stroke by applying and releasing compressed air (392-784KPa, 4-8kg/cm<sup>2</sup>, 57-114psi).

Standard piston stoke: 0.90-1.75mm(0.0345-0.0689)



### **NOTE**

- If the piston is excessive, the drive plates are
- If the piston stroke is less than specified, parts are misassembled.

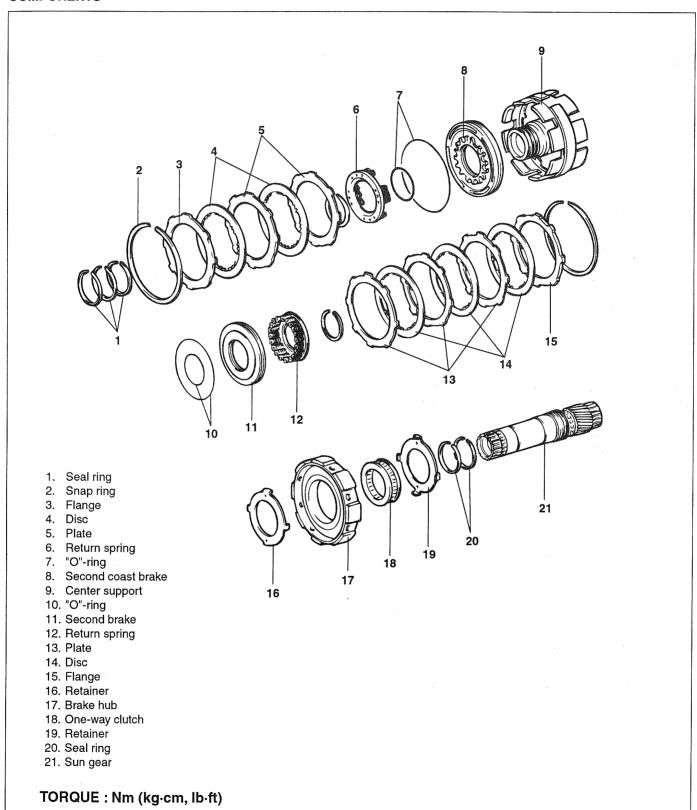


EKUC221I

### **CENTER SUPPORT**

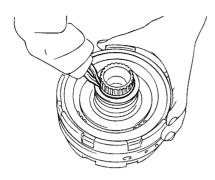
### CENTER SUPPORT EKUC2240

#### **COMPONENTS**



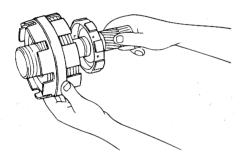
#### DISASSEMBLY EKUC2250

 Remove the snap ring from the end of the sun gear shaft.



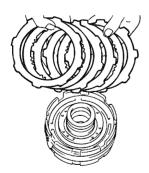
EKUC225A

2. Remove the center support assembly from the sun gear shaft.



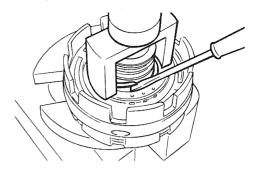
EKUC225B

- 3. Remove the following parts from the front of the center support. (Second coast brake)
  - a. Snap ring
  - b. Flange
  - c. Discs
  - d. Plates



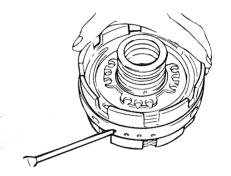
EKUC225C

- 4. Remove the snap ring.
  - a. Place SST onto the center support and compress the spring retainer.
  - b. Remove the snap ring using snap ring pliers.
- 5. Remove the spring retainer and the return springs.



EKUC225D

- Blow compressed air through the center support oil hole to remove the second coast brake piston.
- 7. Remove the second coast brake piston "O" rings.
- 8. Turn the center support assembly over.



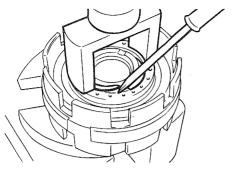
EKUC225E

- 9. Remove the following parts from the rear of the center support. (Second coast brake)
  - a. Snap ring
  - b. Flange
  - c. Discs
  - d. Plates



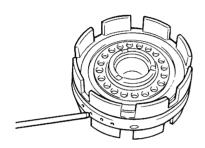
EKUC225F

- 10. Remove the snap ring.
  - Place SST onto the center support and compress the spring retainer.
  - b. Remove the snap ring using snap ring pliers.
- 11. Remove the spring retainer and the return springs.



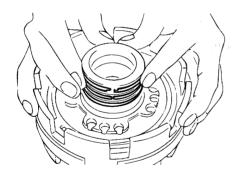
EKUC225G

- 12. Blow compressed air through the center support oil hole to remove the second brake piston.
- 13. Remove the second brake piston "O" rings.



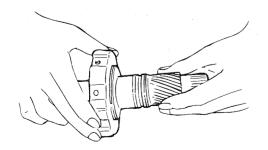
EKUC225H

14. Remove the seal rings from the front of the center support.



EKUC225I

15. Remove the one-way clutch and seal rings from the sun gear shaft.

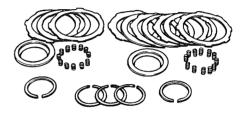


EKUC225J

### INSPECTION EKUC2260

Inspect the following parts and replace if necessary.

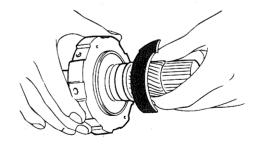
- 1. Damaged discs.
- 2. Broken snap rings.
- 3. Damaged center support seal ring grooves.
- 4. Center support pin hole (Especially direct clutch oil passage).
- 5. Damaged or worn seal rings.



EKUC225K

- 6. Worn one-way clutch inner race on sun gear shaft.
- 7. Worn one-way clutch spring.
- 8. Worn sun gear bushing.
- Check operation by holding the second brake hub and turning the sun gear shaft.

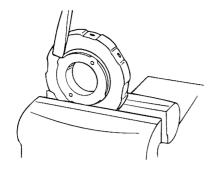
The sun gear shaft should rotate smoothly when turned clock- wise and lock when turned counter-clockwise.



EKUC225L

### REPLACEMENT OF ONE WAY CLUTCH

- Hold the one-way clutch assembly in a vise.
- Pry up the tabs of the retainer plate.
- 3. Remove the retaining plate and retainer, then pry out the one-way clutch.



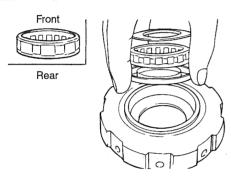
EKUC225M

Install the one way clutch retainer into the rear brake hub.



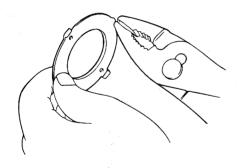
### / CAUTION

Check that the spring cage of the one-way clutch faces inward toward the flat side of the rear brake hub.



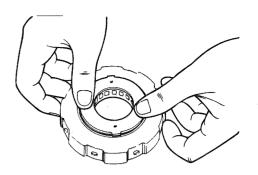
EKUC225N

Bend the tabs of the new retaining plate.

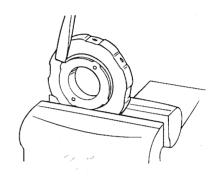


EKUC225O

Push the retaining plate into the rear brake hub.



Hold the brake hub in a vise and lock the retaining plate tabs using a chisel.



EKUC225M

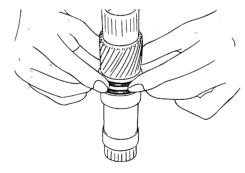
#### **ASSEMBLY** EKUC2270

Install the seal rings on the sun gear shaft.



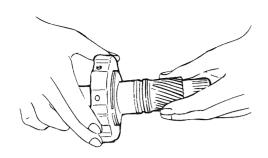
### /!\ CAUTION

Hook the ends together.



EKUC225Q

Install the one-way clutch assembly in the sun gear shaft.

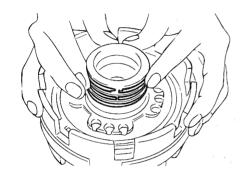


EKUC225J

3. Install the seal rings on the front of the center support.



Hook the ends together.

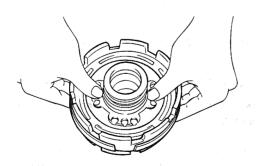


EKUC225I

- 4. Install new "O" rings on the second coast brake piston.
- 5. Apply ATF to the "O" rings.
- Press the second coast brake piston into the housing by hand.



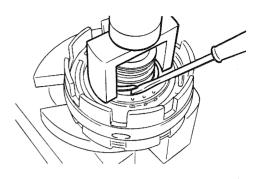
Be careful not damage the "O" rings, do not force in.



EKUC225R

- 7. Install the springs, spring retainer and snap ring in the center support.
- 8. Install the snap ring in the groove.

- a. Place SST on the center support and compress the spring retainer only enough to install the snap ring.
- b. Install the snap ring in the groove.

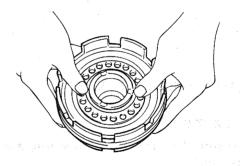


EKUC225D

- 9. Install new "O" rings on the second brake piston.
- 10. Apply ATF to the "O" rings.
- 11. Turn the center support assembly over.
- 12. Press the second brake piston into the rear of the center support by hand.

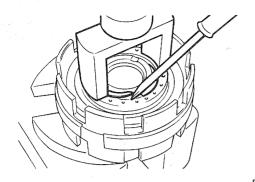


Be careful not to damage the "O" rings, do not force in.



EKUC225S

- 13. Install the spring, spring retainer and snap ring in the center support.
- 14. Install the snap ring in the groove.
  - Place SST on the center support and compress the spring retainer only enough to install the snap ring.
  - b. Install the snap ring in the groove.

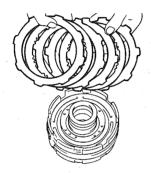


EKUC225G

- 15. Turn the center support assembly over again.
- 16. Install the second coast brake plates, discs and flange.



Installation order: Plate - Disc - Plate - Disc - Flange

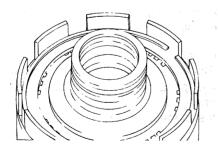


EKUC225C

17. Install the snap ring in the groove.

## /! CAUTION

Makesure the ends of the snap ring are not between lugs.



EKUC225T

18. Check the second coast brake piston stroke. Using dial indicator, measure the piston stroke by applying and releasing compressed air. (392-784 KPa, 4-8kg/cm<sup>2</sup>, 57-114psi).

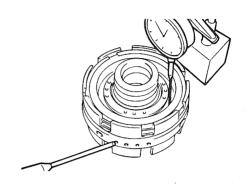


### **NOTE**

- If the piston stroke is excessive, the drive plates
- If the piston stroke is less than specified, parts are misassembled.

### Standard piston stroke:

0.80 - 1.73 mm (0.0315-0.681 in)



EKUC225U

- 19. Turn the center support over again.
- 20. Install the second brake plates, discs and flange.



Installation order: Plate - Disc - Plate - Disc - Plate - Disc - Flange



EKUC225F

21. Install the snap ring in the groove.



Make sure the ends of the snap ring are not between lugs.

22. Check the second brake piston stroke. Using a dial indicator, measure the piston stroke by applying and releasing compressed air(392-784KPa, 4-8kg/cm<sup>2</sup>, 57-114 lb/in<sup>2</sup>).

#### Standard piston stroke:

1.01-2.25mm(0.0398-0.0886 in)

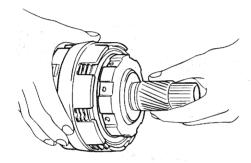
### **NOTE**

- If the piston stroke is excessive, the drive plates are worn.
- If the piston stroke is less than specified, parts are misassembled.



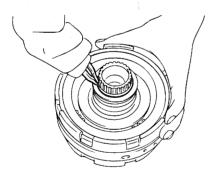
EKUC225V

23. Assemble the center support and sun gear shaft.



EKUC225W

24. Install the snap ring on the sun gear shaft.

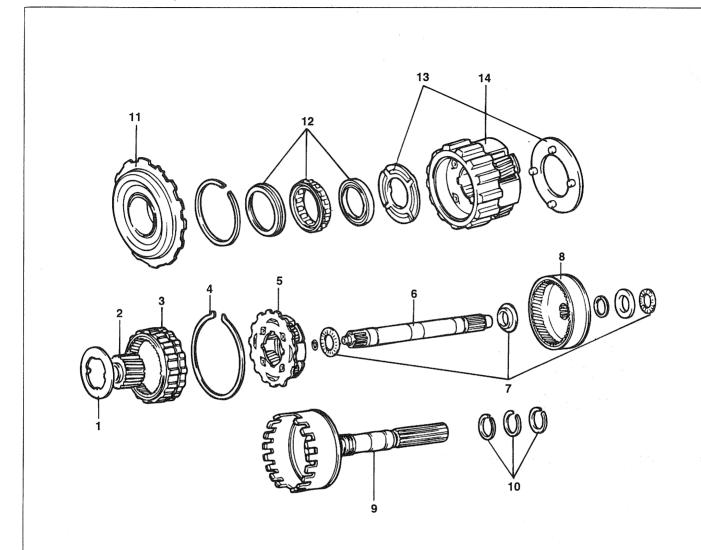


EKUC225A

### PLANETARY GEAR OUTPUT

SHAFT EKUC2280

### COMPONENTS

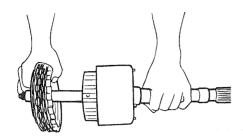


- 1. Thrust washer
- 2. Sun gear
- 3. Front ring gear
- 4. Snap ring
- 5. Rear carrier
- 6. Intermediate shaft
- 7. Thrust bearing
- 8. Rear ring gear9. Output shaft
- 10. Seal ring
- 11. Reaction plate
- 12. One-way clutch
- 13. Thrust washer
- 14. Front ring gear

TORQUE: Nm (kg·cm, lb·ft)

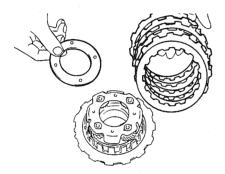
### DISASSEMBLY EKUC2290

Remove the reaction plate assembly, discs plates and front carrier assembly.



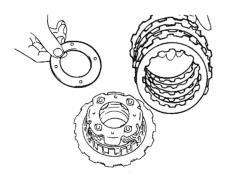
EKUC229A

- Remove the thrust washer. 2.
- 3. Remove the disc and plates.
- Remove the reaction plate assembly.



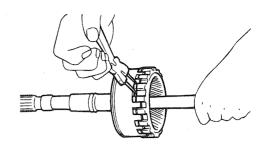
EKUC229B

Remove the snap ring, one-way clutch and thrust washer from the front carrier assembly.



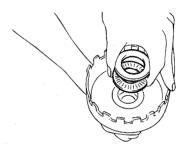
EKUC229B

- Remove the front ring gear.
  - While pulling on the ring gear, compress the snap ring sing needle nose pliers.
  - Slide out the ring gear and rear carrier assembly.



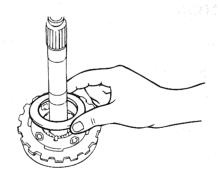
EKUC229D

- Remove the following parts from the output shaft assembly.
  - Intermediate shaft assembly. a.
  - Thrust bearing and race. b.
  - 3 seal rings on the output shaft.



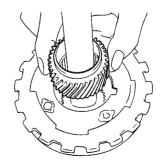
EKUC229E

Remove the thrust washer.



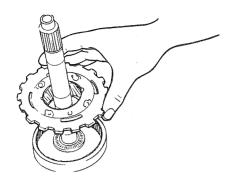
EKUC229F

Remove the rear sun gear.



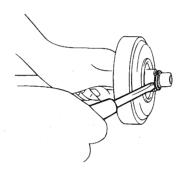
EKUC229G

10. Remove the rear carrier assembly from the intermediate shaft assembly.



EKUC229H

- 11. Remove the snap ring from the end of the intermediate shaft.
- 12. Remove the rear internal gear and thrust bearing.

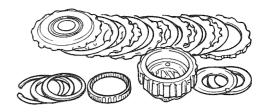


EKUC229I

### INSPECTION EKUC2300

Inspect the following parts and replace if necessary.

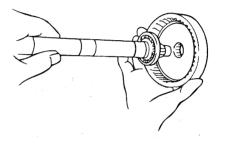
- 1. Damaged or worn disc faces.
- 2. Worn one-way clutch inner and outer race.
- 3. Worn one-way clutch springs.
- 4. Worn and damaged pinion gears.
- 5. Damaged intermediate shaft splines.
- 6. Worn seal ring.



EKUC229J

### ASSEMBLY EKUC231

1. Install the thrust bearing and rear ring gear on the intermediate shaft.



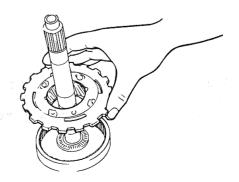
EKUC229K

2. Install the snap ring in the groove.



EKUC229L

 Install the rear carrier assembly on the intermediate shaft assembly.



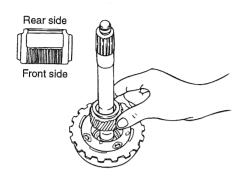
EKUC229H

Install the sun gear in the rear carrier assembly.



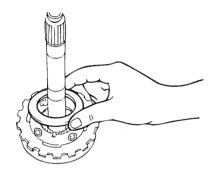
### ( CAUTION

Install the sun gear with the splines facing rearward as shown in the figure.



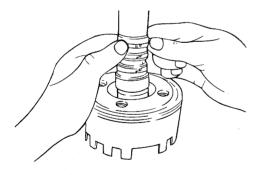
EKUC229M

Install thrust washer on the rear carrier assembly.



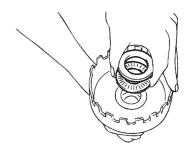
EKUC229F

Install the seal rings in the output shaft grooves.



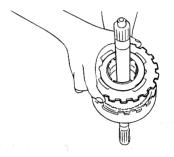
EKUC229N

- Use the extension housing as a work stand.
- Install the thrust bearing and race.



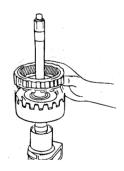
EKUC229E

Insert the intermediate shaft assembly in the output shaft flange.



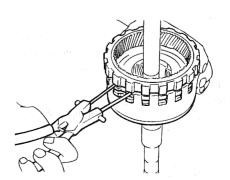
EKUC229O

- 10. Install the snap ring to the front ring gear.
- 11. Attach the front ring gear.



EKUC229P

12. Compress the snap ring, then connect the ring gear to the output shaft flange.



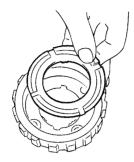
EKUC229Q

13. Install the thrust washer in the front carrier assembly.



### / CAUTION

Note sizes of the alignment tabs and assemble accordingly.



EKUC229R

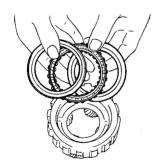
14. Install the retainer and rear one-way clutch in the front carrier assembly.



### / CAUTION

Check that the spring cage of the one-way clutch faces toward the bottom.

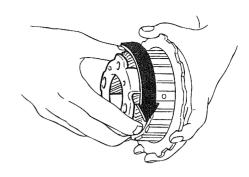
- 15. Install the snap ring.
- 16. Assemble the reaction plate assembly to the front carrier assembly.



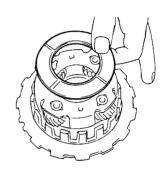
EKUC229C

#### CHECKING OF REAR ONE-WAY CLUTCH OPERATION

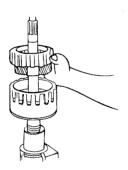
- Install the reaction plate assembly in the front carrier assembly.
- Check operation by holding the reaction plate assembly and turning the front carrier assembly. The front carrier assembly should rotate smoothly when turned counter clockwise and lock when turned
- clockwise. c. Remove the reaction plate assembly from the front carrier assembly.
- 17. Apply petroleum jelly to the rear thrust washer of the front carrier, then install it.



18. Install the front carrier gear assembly on the front ring



EKUC229T



EKUC229U

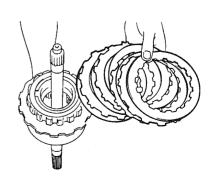
19. Install the pressure plate, discs clutchs.



### **M** NOTE

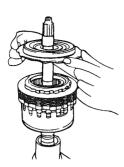
Installation order:

Disc - plate - Disc - plate - Disc - Plate - Disc - Plate - Disc



EKUC229V

20. Install reaction plate assembly on the rear one-way clutch.



EKI ICSSOM

21. Align the tabs of the plates with the reaction plate and pressure plate.

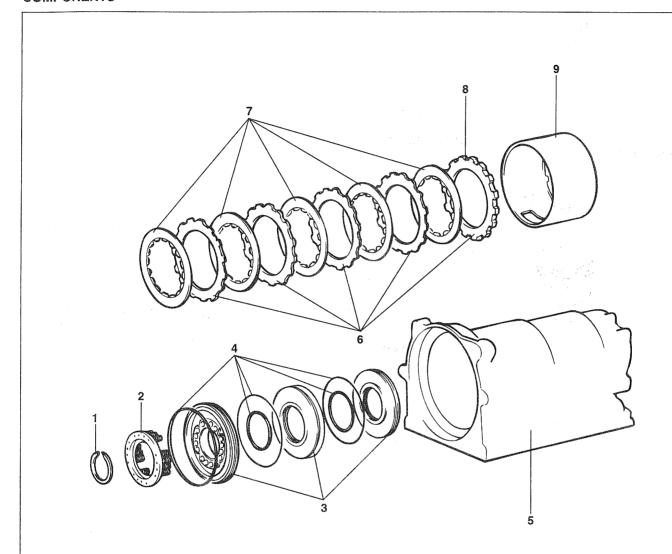


EKUC229X

### **AUTOMATIC TRANSAXLE CASE**

# TRANSMISSION CASE AND REVERSE BRAKE PISTONS EKUC2320

### COMPONENTS

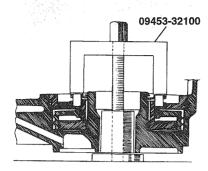


- 1. Snap ring
- 2. Return spring
- 3. Low & Reverse brake piston
- 4. "O"-ring
- 5. Transmission case
- 6. Plate
- 7. Disc
- 8. Pressure plate
- 9. Apply tube

TORQUE: Nm (kg·cm, lb·ft)

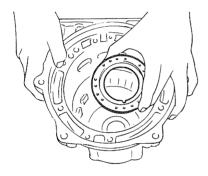
### DISASSEMBLY EKUC2330

- 1. Remove the snap ring.
  - a. Place SST as shown.
  - b. Gradually tighten the handle to compress the spring retainer.
  - c. Remove the snap ring using the snap ring pliers.



EKUC233A

2. Remove the spring retainer and the 16 return springs



EKUC233B

Turn the case over with the front of the case down on the work bench.

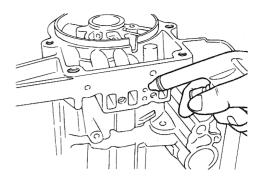


Place shop rags under the transmission case to catch the piston.

 Apply strong compressed air to force out the pistons and sleeve.



Apply air to the oil hole for the inner piston. If air is applied to the oil hole for the outer piston, the inner piston will not move.



EKUC233C

- 5. Separate the outer piston and inner piston from the sleeve.
- 6. Remove the "O" rings from the pistons and sleeve.

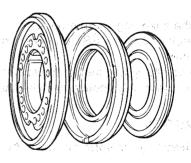
#### INSPECTION EKUC2340

Inspect the following parts and replace if necessary.

- Worn output shaft seal ring contact surface on the transmission case.
- 2. Worn bushing in the transmission case.

#### ASSEMBLY EKUC2350

- 1. Install new "O" rings on the pistons and sleeve.
- 2. Install the inner and outer pistons on the sleeve.
  - a. Push the inner piston into the cupped side of the sleeve.
  - Push the outer piston onto the other side of the sleeve.



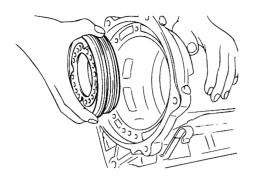
EKUC233D

- 3. Apply ATF to the new "O" ring.
- 4. Push the pistons and sleeve into the bottom of the case by hand.



a. Be careful not to damage the "O" rings : do not force in.

b. Push the pistons in until they are just flush with the case.

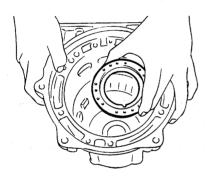


EKUC233E

- 5. Install SST under the transmission case.
- 6. Apply petroleum jelly to the piston return springs for easier installation.
- 7. Install the piston return springs, spring retainer and snap ring.



Align the snap ring so that the ends are visible.



EKUC233B

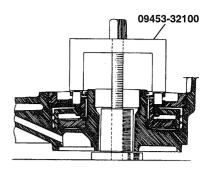
- 8. Install the snap ring in the groove.
  - a. Carefully position SST on the spring retainer as shown.
  - b. Gradually tighten the handle to compress.

    Compress only enough to install the snap ring.

### **CAUTION**

Avoid bending the spring retainer by overtightening.

c. Install the snap ring.

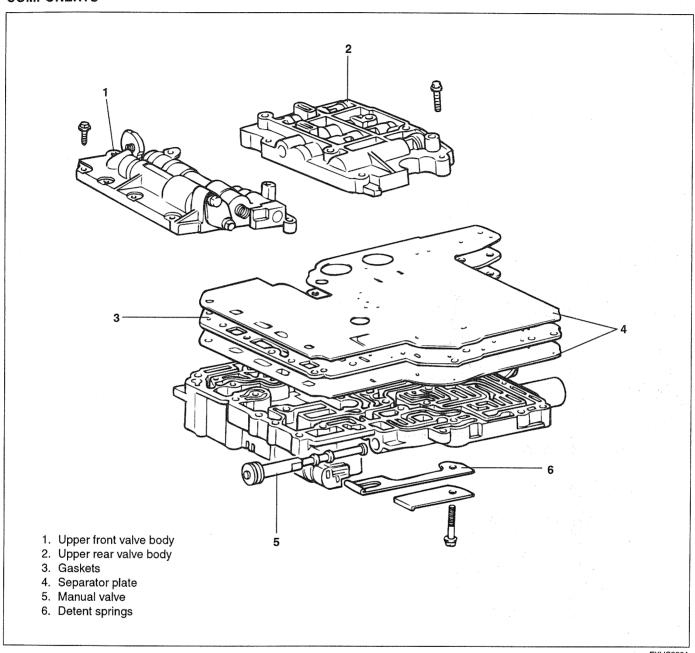


EKUC233A

## **VALVE BODY**

## VALVE BODY EKUC2360

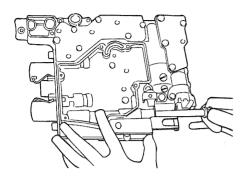
### COMPONENTS



EKUC236A

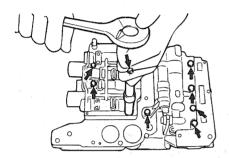
### REMOVAL EKUC2370

- 1. Remove the detent springs.
- 2. Remove the manual valve.



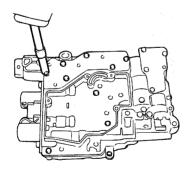
EKUC237A

3. Turn the valve body over and remove the 9 bolts shown in the figure.



EKUC237B

4. Turn the valve body over again and remove the 10 bolts shown in the figure.

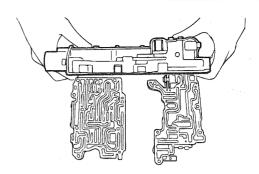


EKUC237C

5. Lift off the lower valve body and separator plate at the same time.

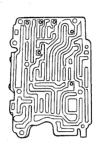


Remove the lower valve body and separator plate as a unit to prevent loosing the rubber balls from the lower valve body.



EKUC237D

6. Watch, for steel balls, retainers and pins in valve body.

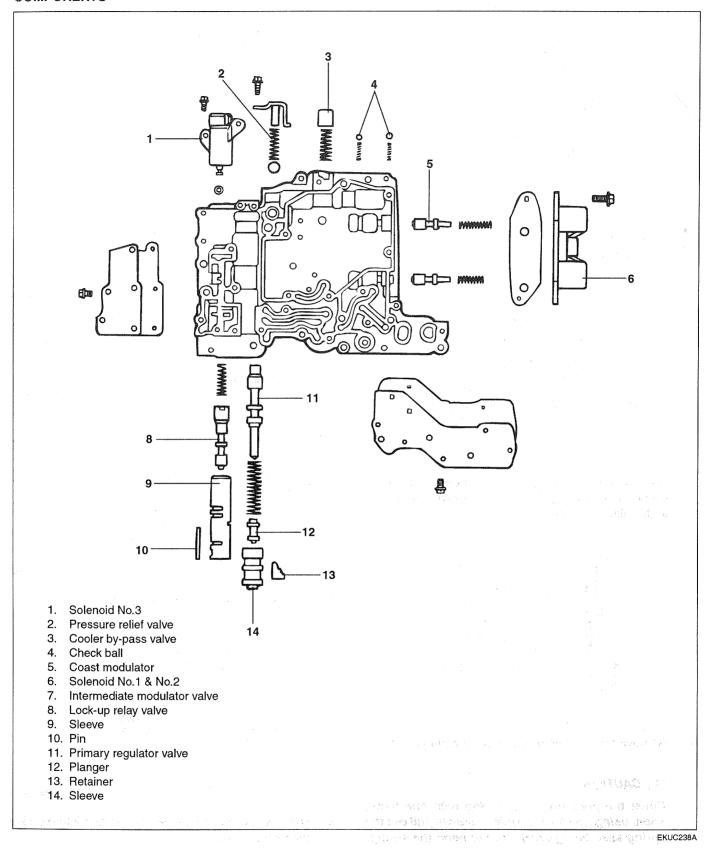




EKUC237E

### LOWER VALVE BODY EKUC2380

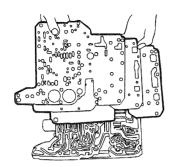
### COMPONENTS



### DISASSEMBLY

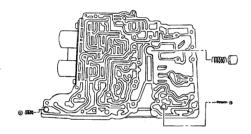
EKUC2390

1. Remove the separator plate and gaskets.



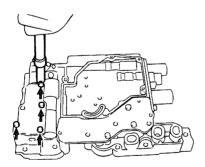
EKUC239A

Remove two check balls, cooler by-pass check and three springs as shown in the figure.



EKUC239B

3. Turn the lower valve body over, remove set bolts as shown in the figure, then remove the lower cover separator plate and gasket.

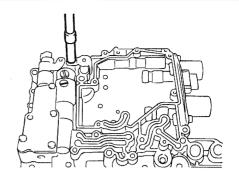


EKUC239C

4. Remove the retainer, pressure relief spring and ball.

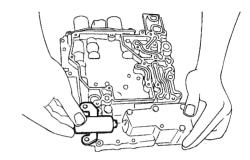


Cover the pressure relief spring with one hand. Then, using needle nose pliers, slowly pull out the spring seat, being careful not to bend the spring.



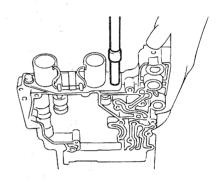
EKUC239D

5. Remove solenoid No.3 from the bore.



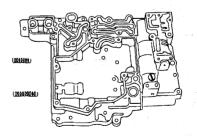
EKUC239E

6. Remove solenoid No.1 and No.2.



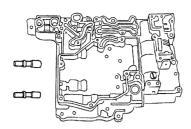
EKUC239F

7. Remove the two springs from the bore.



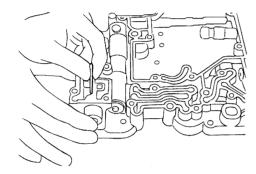
EKUC239G

8. Remove low coast modulator valve and intermediate modulator valve.



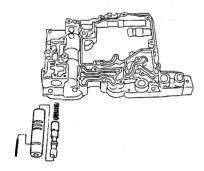
EKUC239H

- Remove lock-up relay valve
  - Remove the pin by pushing the sleeve.



EKUC239I

Remove the sleeve with lock-up relay valve, and spring.



EKUC239J

10. Remove return spring retainer from primary regulator valve.



### **CAUTION**

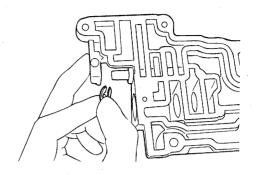
Highly compressed spring inside-keep away from face.

a. Place a mark on the bevel when the retainer is positioned.



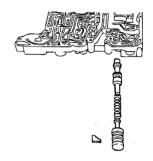
When reassembling, position the retainer in the same position.

To remove the retainer, hold the valve body face down, and press in on the valve sleeve. The retainer will drop out. Slowly relieve spring compression.



EKUC239K

Remove the sleeve, plunger, spring and primary regulator valve.



EKUC239L

#### INSPECTION EKUC2400

Inspect the following parts, replace as necessary.

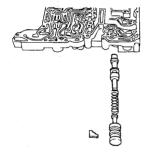
- 1. Valve (Valves must move smoothly in the valve body.)
- 1. Valve (valves must move smooting in the valve bod
- Spring.
   Measure spring free length, and replace spring if necessary.
- 4. Check ball bores.

<ol><li>Valve body.</li></ol>
-------------------------------

	Free length (mm)	Outer diameter (mm)
Primary regulator valve spring	50.28	17.02
Low coast modulator valve spring	42.35	9.24
Intermediate modulator valve spring	27.26	9.04
Lock-up control valve spring	32.60	11.40
Oil cooler by-pass valve spring	28.90	13.80
Pressure relief valve spring	32.14	13.14
Damping check ball spring	20.00	4.97

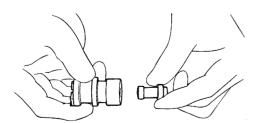
#### ASSEMBLY EKUC2410

- 1. Insert primary regulator valve and spring.
  - Set the valve body on the edge and drop in the valve, large end first, and the spring.
  - b. Make sure that the primary regulator valve fits flush with the valve body.



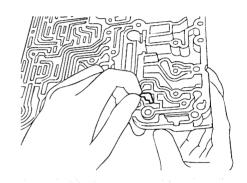
EKUC239L

- Install with the rounded end first. Make sure that it is fully inserted: the plunger should be recessed inside the sleeve.
- d. Install the sleeve with the plunger.
- e. Install the regulator valve sleeve.



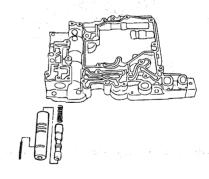
EKUC239M

f. Install the retainer on the bevel by pushing the regulator valve sleeve.



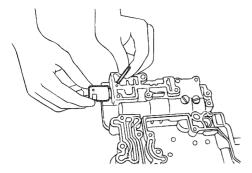
EKUC239N

- 2. Install lock-up relay valve.
  - a. Install the lock-up relay valve, into the sleeve.
  - b. Install the lock-up relay valve assembly into the bore.



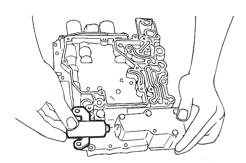
EKUC239J

c. Install the pin as shown in the figure.



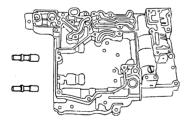
EKUC239O

- 3. Install No.3 solenoid
  - Install the No.3 solenoid onto the lower valve body.
  - b. Temporarily tighten the bolt.



EKUC239E

- 4. Install two valves
  - Install the low coast modulator valve into the bore.
  - Install the intermediate modulator valve into the bore.

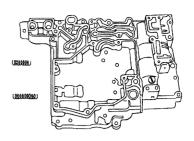


EKUC239H

5. Install two valve springs



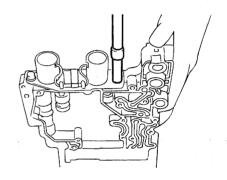
Install short spring in the right bore.



EKUC239G

- 6. Install No.1 and No.2 solenoids
  - a. Install the solenoid over the gasket.
  - b. Tighten the three bolts.

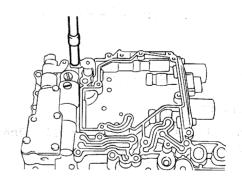
Torque: 100kg·cm (7ft·lb, 10Nm)



EKUC239F

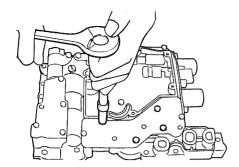
- 7. Install pressure relief ball.
  - a. Place the steel ball and spring not the body.
  - b. Install the retainer.

Torque: 55kg·cm (48in·lb, 5.4Nm)



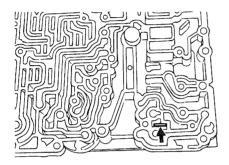
EKUC239D

8. Install two valve body covers.



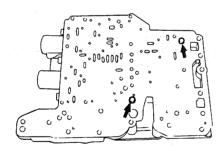
EKUC239P

Turn the body over and check the retainer.
 Make sure that the retainer is installed correctly.



EKUC239Q

10. Install two check balls, spring, and cooler by pass check valve.

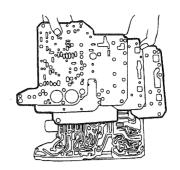


EKUC239R

11. Install lower valve body gasket.



Two gaskets are not interchangeable. The gasket must lay flat on the valve body.

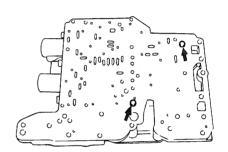


EKUC239S

12. Set the lower valve body plate into place. Temporarily install the two short bolts finger tight to compress the plate against the spring-loaded check valve.

## **NOTE**

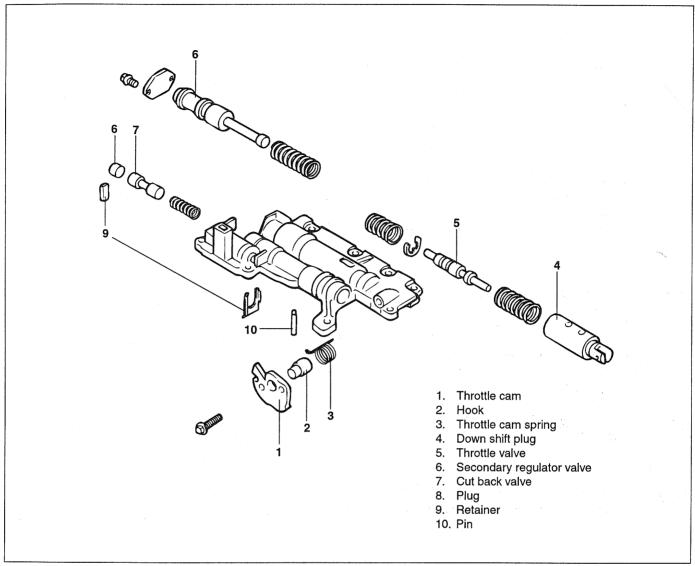
Use the oil strainer bolts.



EKUC239T

## UPPER FRONT VALVE BODY EKUC2420

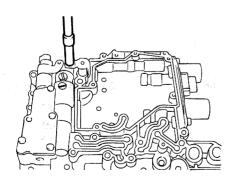
#### **COMPONENTS**



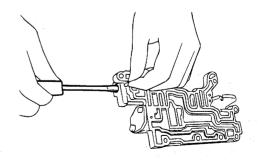
EKUC242A

#### DISASSEMBLY EKUC2430

1. Remove throttle valve retainer



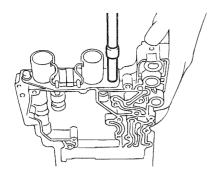
Remove cut back plug retainer.



EKUC243B

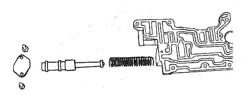
EKUC243A

Remove plug, cut back valve and spring.



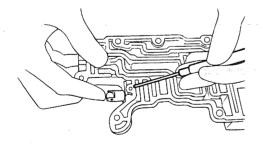
EKUC243C

- 4. Remove the secondary regulator valve.
  - Remove one bolt from the front valve end cover and loosen the other one. Slowly rotate the cover to uncover the valve.
  - b. Remove the valve and spring.
  - Remove the remaining bolt, then remove the cover.



EKUC243D

- 5. Remove throttle cam.
- 6. Remove down-shift plug and spring
  - a. Remove the pin by pushing the down-shift plug.



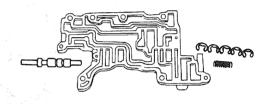
EKUC243E

b. Remove the down-shift plug with the sleeve and spring.



EKUC243F

- Remove throttle valve and spring.
- 8. Remove adjusting rings.



EKUC243G

#### INSPECTION EKUC2440

Inspect the following parts and replace if necessary.

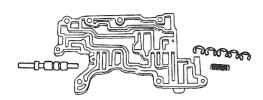
- 1. Valve (Valve must move smoothly in the valve body.)
- 2. Valve body
- 3. Spring

  Measure the spring free length and replace if necessary.

A wy C Miles			
	Free length (mm)	Outer diameter (mm)	
Cut-back valve spring	23.00	6.85	
Throttle valve spring	39.55	10.90	
Down-shift plug spring	21.94	8.58	
Secondary regulator valve spring	71.27	17.43	

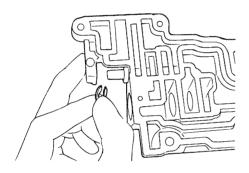
#### ASSEMBLY EKUC2450

- 1. Insert throttle valve.
- 2. Install throttle valve retainer.



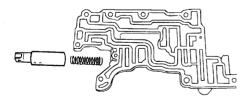
EKUC243G

- Install adjusting rings and small spring on throttle valve shift.
  - a. Install the same number of adjusting rings as were removed during disassembly.
  - Slip the spring over the end of the valve shift.
     Compress the spring and slide it into place.



EKUC243H

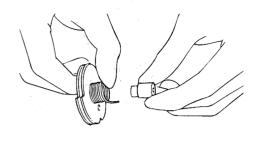
- 4. Insert spring and down-shift plug.
  - a. Push the down-shift plug into the bore.
  - Coat the pin with petroleum jelly and install it to hold the sleeve.



EKUC243F

- 5. Assemble the throttle cam.
  - Install the throttle retaining spring with the hook through the hole in the cam.

b. Insert the sleeve through one side of the cam.



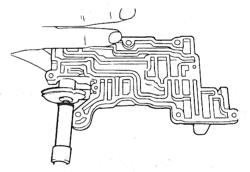
EKUC243I

6. Install cam assembly on upper front valve body.

Tightening torque: 75kg·cm (65in·lb, 7.4Nm)

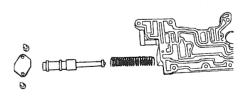


Be careful not to drop the pin and the retainer in the body.



EKUC243J

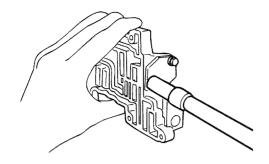
- 7. Install secondary regulator valve
  - a. Partially install the cover plate and insert the spring and secondary regulator valve.



EKUC243D

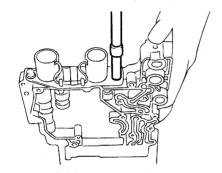
- b. Compress the spring and swing the cover plate into place.
- Install the 2nd bolt in the cover plate and tighten both bolts.

Tightening torque: 55kg·cm (48in·lb, 5.4Nm)



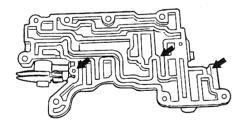
EKUC243K

- 8. Insert spring and cut back valve.
- 9. Install plug and plug retainer.



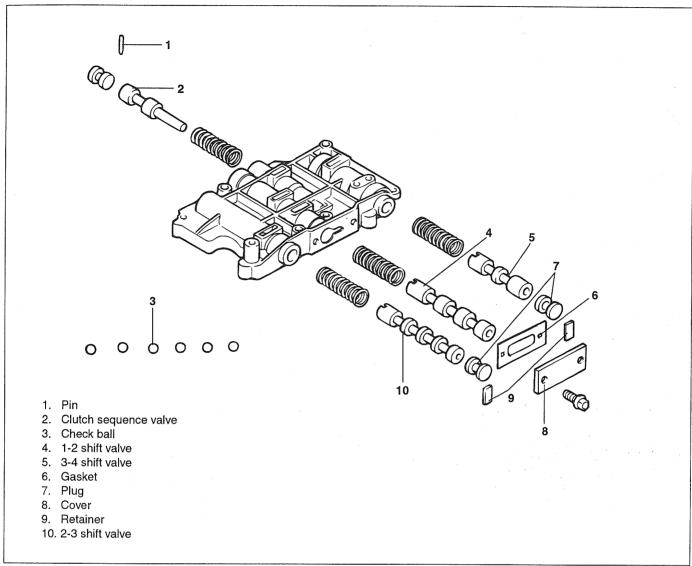
EKUC243C

10. Make sure that sleeve is held by the pins and the retainer.



EKUC243L

## UPPER REAR VALVE BODY EKUC2460

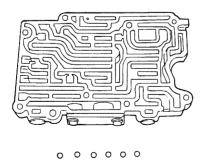


EKUC247A

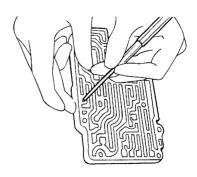
EKUC246A

## DISASSEMBLY EKUC2470

1. Remove six check balls.



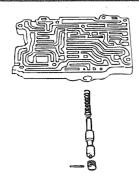
a. Remove the pin with a magnetic finger by pushing the plug, and then remove the plug.

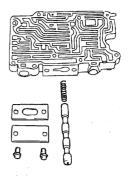


EKUC247B

2. Remove clutch sequence valve.

b. Remove the clutch sequence valve and spring.

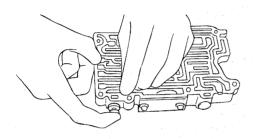




EKUC247C

EKUC247G

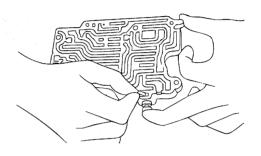
- 3. Remove 3-4 shift valve
  - a. Remove the retainer by pushing the plug.



EKUC247D

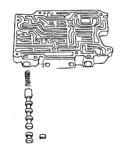
6. Remove 2-3 shift valve

a. Remove the retainer by pushing the plug.

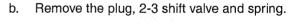


EKUC247H

b. Remove the plug, valve and spring.



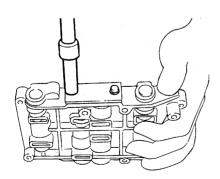
EKUC247E





EKUC247E

4. Remove cover and gasket



EKUC247F

5. Remove 1-2 shift valve.

#### INSPECTION EKUC2480

Inspect the following parts and replace if necessary.

- 1. Valve (Valve must move smoothly in the valve body.)
- 2. Valve body

- Spring
   Measure spring free length and replace if necessary.
- 4. Check ball bores.

	Free length (mm)	Outer diameter (mm)
Clutch sequence valve spring	37.55	9.10
1-2 shift valve spring	29.15	8.90
2-3 shift valve spring	29.15	8.90
3-4 shift valve spring	29.15	8.90

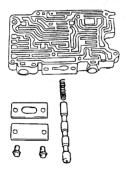
#### ASSEMBLY EKUC2490

- 1. Install 3-4 shift valve
  - a. Install the 2-3 shift valve and spring.
  - Install the plug into the bore. Coat the retainer with petroleum jelly and install it.



EKUC247E

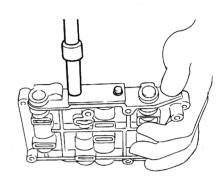
- 2. Install 1-2 shift valve
  - a. Install the 1-2 shift valve and spring.



EKUC247G

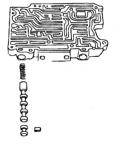
b. Install the plate over the gasket.

Tightening torque: 55kg·cm (48in·lb, 5.4Nm)



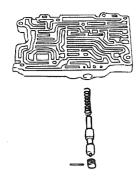
EKUC247F

- 3. Install 2-3 shift valve
  - a. Install the 2-3 shift valve and spring.
  - b. Install the plug into the bore.
  - c. Coat the retainer with petroleum jelly and install it.



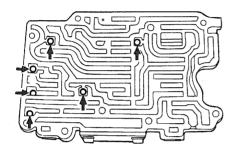
EKUC247E

- 4. Install clutch sequence valve
  - a. Install the valve spring, and the valve.
  - b. Install the plug into the bore.
  - c. Coat the pin with petroleum jelly and install it.



EKUC247C

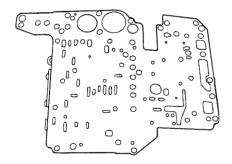
5. Install check balls as shown.



EKUC247I

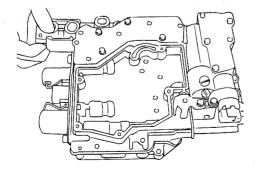
#### INSTALLATION EKUC2500

1. Position new gasket on upper rear valve body.



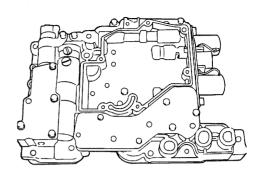
EKUC247J

2. Place lower valve body with plate on top of upper rear valve body.



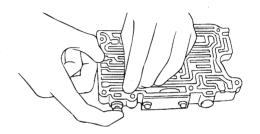
EKUC247K

3. Install and finger tighten three bolts in lower valve body to secure upper rear valve body.



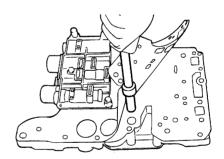
EKUC247L

 Turn assembly over, check gasket alignment and finger tighten four bolts in upper rear valve body.



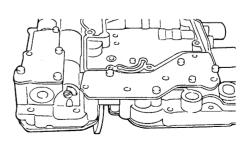
EKUC247M

5. Remove temporary bolts from plate.



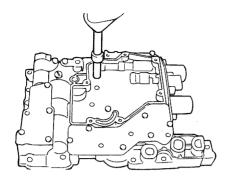
EKUC247N

6. Place lower and upper rear valve body assembly on top of upper front valve body.



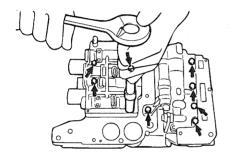
EKUC2470

7. Install and finger tighten set bolts in lower valve body to secure upper front valve body.



EKUC247P

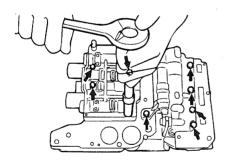
Turn assembly over and finger tighten five bolts in upper front valve body.



EKUC247Q

Tighten bolts in upper front and rear valve bodies

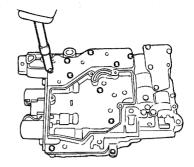
Tightening torque: 55kg·cm (48in·lb, 5.4Nm)



EKUC247R

10. Turn assembly over and tighten bolts in lower valve body.

Tightening torque: 55kg·cm (48in·lb, 5.4Nm)



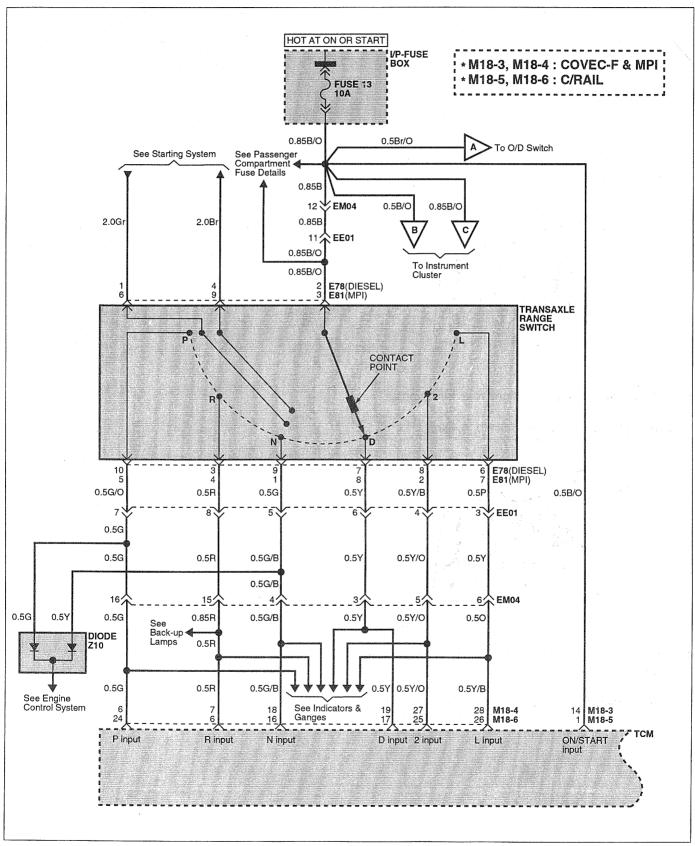
EKUC247S

11. Install manual valve into lower valve body.

## TRANSAXLE CONTROL MODULE

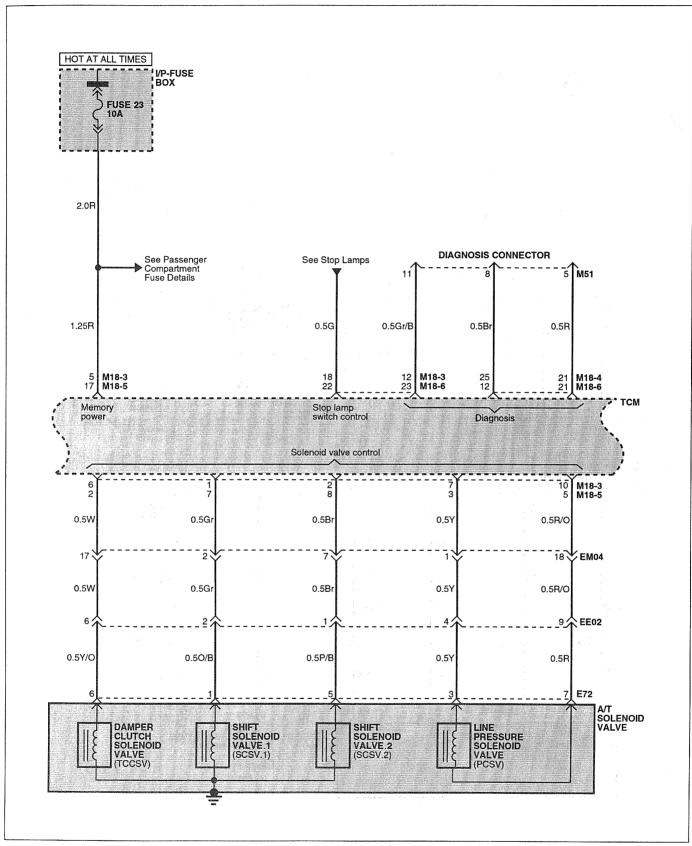
EKUB1080

#### TCM CIRCUIT DIAGRAM (1)



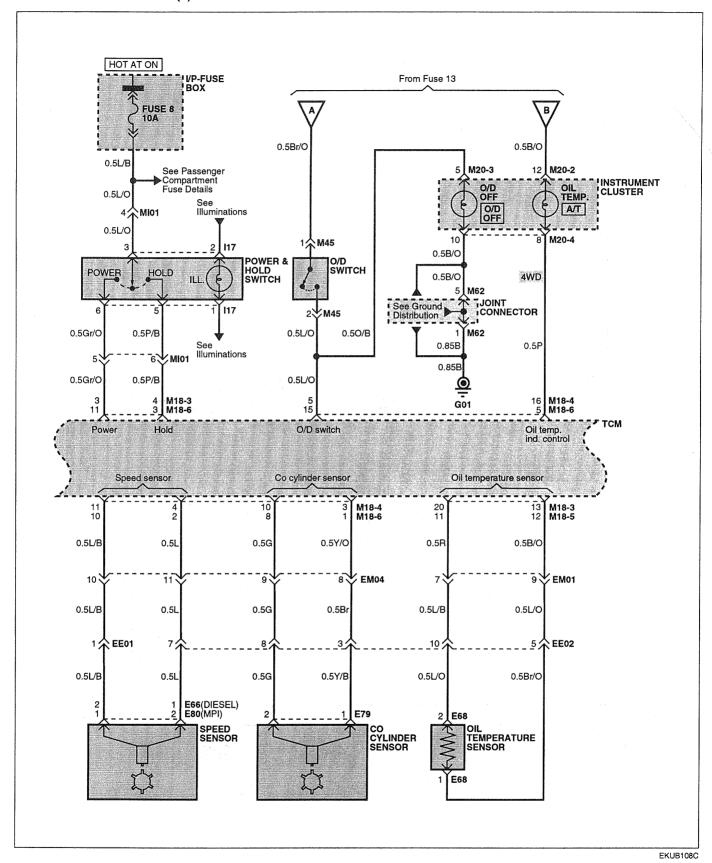
EKUB108A

#### TCM CIRCUIT DIAGRAM (2)

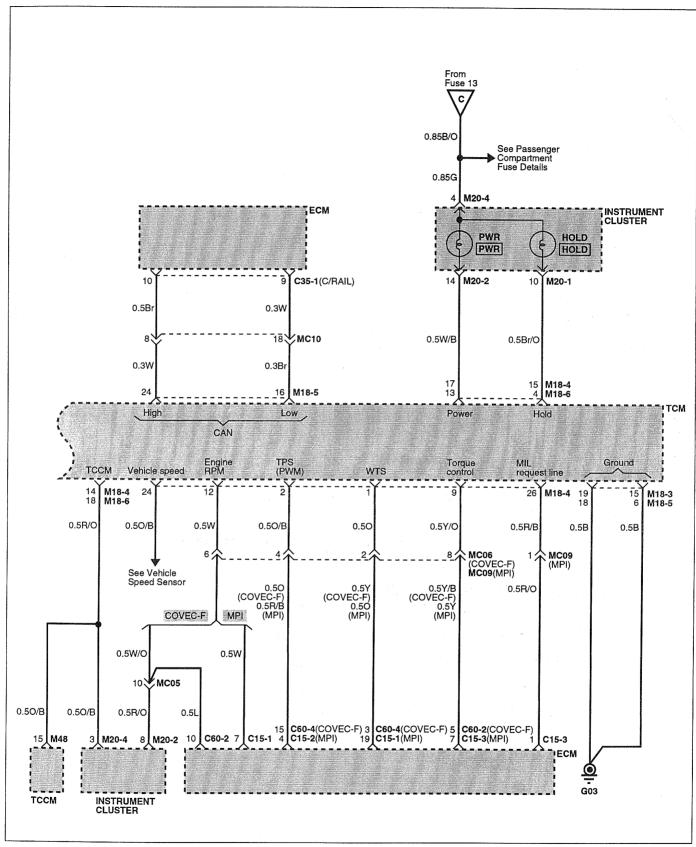


EKUB108B

#### TCM CIRCUIT DIAGRAM (3)



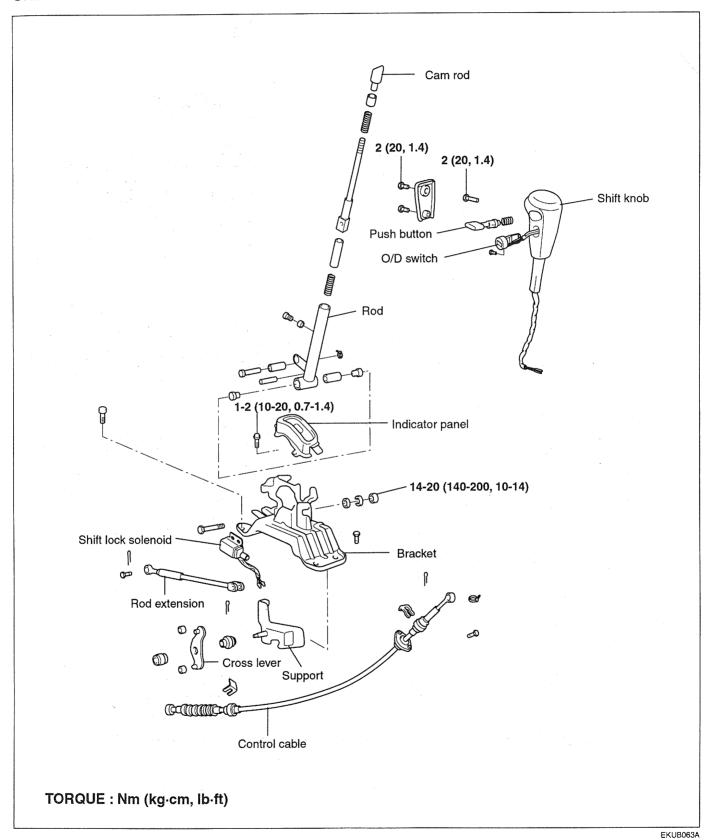
#### TCM CIRCUIT DIAGRAM (4)



EKUB108D

## AUTOMATIC TRANSAXLE SHIFT CONTROL

SHIFT LEVER EKUB0630

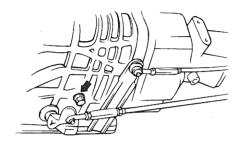


# MANUAL TRANSAXLE SYSTEM

## SERVICE ADJUSTMENT PROCEDURES EMUCO050

#### OIL LEVEL CHECK

1. Remove filler plug and check oil level.

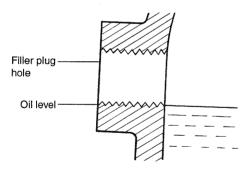


H7MT0100

- Oil level should be at the lower portion of the filler plug hole.
- 3. Tighten filler plug to specified torque.

#### Tightening torque:

30-35 Nm (300-350 kg·cm, 22-25 lb·ft)



H6MT005B

#### **CHANGING OIL**

- 1. Remove transmission drain plug.
- 2. Drain oil.
- 3. Tighten drain plug to specified torque.

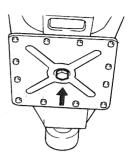
### Tightening torque:

35-45 Nm (350-450 kg·cm, 25-33 lb·ft)

4. Remove filler plug and fill with specified oil till the level comes to the lower portion of filler plug hole.

Specified transmission oil : Hypoid gear oil SAE 80W or 75W-90W conforming to API GL-4 or higher

Quantity: 2.4 lit. (2.5 U.S.qts., 2.16 lmp.qts.)

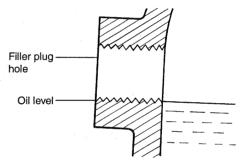


H6MT005C

5. Tighten filler plug to specified torque.

#### Tightening torque:

30-35 Nm (300-350 kg·cm, 22-25 lb·ft)

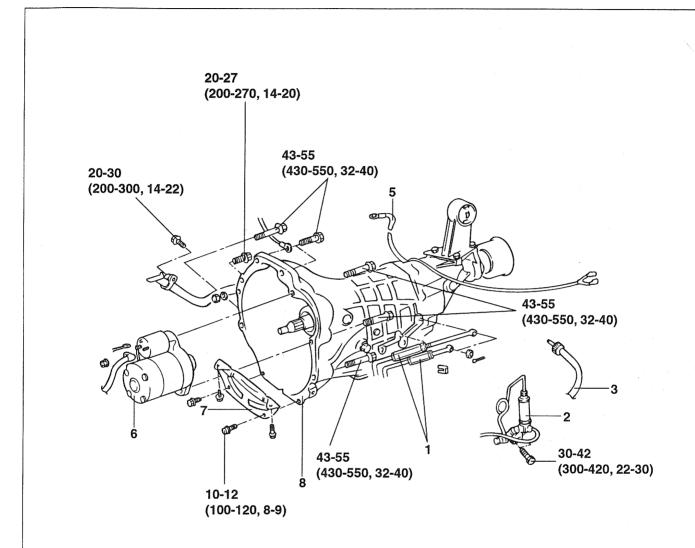


H6MT005B

## MANUAL TRANSAXLE

### M5ZR1 MODEL EMUC0070

#### **COMPONENTS**



#### \*Removal steps

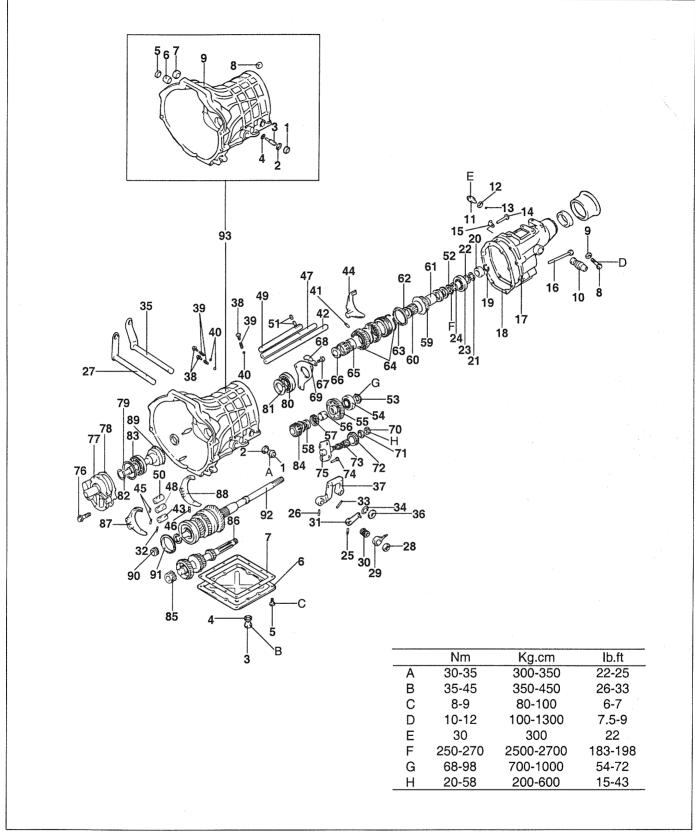
- 1. Shift control cable connection.
- 2. Release cylinder and oil chamber installing bolts
- 3. Speedometer cable connection.
- 4. Back-up lamp harness connection.
- 5. Earth cable.
- 6. Starter motor.
- 7. Bell housing cover.
- 8. Manual transmission assembly

#### NOTE

Reverse the removal procedures to install.

TORQUE: Nm (kg·cm, lb·ft)

#### DISASSEMBLY AND REASSEMBLY EMLA0080



H6MT009A

- 1. Oil filler plug
- 2. Gasket
- 3. Oil drain plug
- 4. Gasket
- 5. Bolt (12)
- 6. Under cover
- 7. Gasket
- 8. Bolt
- 9. Locking plate
- 10. Speedometer gear sleeve assembly
- 11. Backup lamp switch
- 12. Gasket
- 13. Steel ball
- 14. Bolt (8x55)(6)
- 15. Cord fastener
- 16. Bolt (8x110)(2)
- 17. Extension housing
- 18. Liquid gasket
- 19. Snap ring
- 20. Speedometer drive gear
- 21. Snap ring
- 22. Snap ring
- 23. Ball bearing
- 24. Snap ring
- 25. Spring pin
- 26. Spring pin
- 27. Select shaft
- 28. Spacer
- 29. Return spring
- 30. Distance spring
- 31. Adjust arm
- 32. Spring pin for overdrive-reverse shift lug
- 33. Lock pin
- 34. Snap ring-select
- 35. Shift shaft
- 36. Spacer
- 37. Control
- 38. Seal bolt (3)
- 39. Poppet spring (3)
- 40. Steel ball (3)
- 41. Spring pin
- 42. Shift rail for overdrive-reverse
- 43. Shift lug for overdrive-reverse
- 44. Shift fork for overdrive-reverse
- 45. Spring pin for shift lugs (2)
- 46. Spring pin for shift fork (2)
- 47. Shift rail for 3-4 speed
- 48. Shift lug for 3-4 speed
- 49. Shift rail for 1-2 speed
- 50. Shift lug for 1-2 speed
- 51. Interlock plunger (2)
- 52. Mainshaft lock nut

- 53. Counter lock nut
- 54. Ball bearing
- 55. Counter overdrive gear
- 56. Spacer
- 57. Counter reverse gear
- 58. Spacer
- 59. Overdrive gear
- 60. Needle bearing
- 61. Overdrive gear sleeve
- 62. Bearing spacer
- 63. Synchronizer ring
- 64. Overdrive synchronizer assembly
- 65. Stop plate
- 66. Spacer
- 67. Bolt washer (8x20)(3)
- 68. Baffle plate
- 69. Split pin
- 70. Nut
- 71. Thrust washer
- 72. Reverse idler gear
- 73. Needle bearing
- 74. Bolt (8x20)(4)
- 75. Reverse idler shaft
- 76. Seal bolt
- 77. Front bearing retainer
- 78. Liquid gasket
- 79. Spacer-select
- 80. Ball bearing
- 81. Spacer
- 82. Snap ring-select
- 83. Ball bearing
- 84. Counter rear bearing
- 85. Counter front bearing
- 86. Counter gear
- 87. Shift fork for 3-4 speed
- 88. Shift fork for 1-2 speed
- 89. Main drive pinion
- 90. Needle bearing
- 91. Synchronizer ring
- 92. Mainshaft assembly
- 93. Transmission case assembly
- -1 Nut
- -2 Gasket
- -3 Select adjuster
- -4 O-ring
- -5 Cap
- -6 Clutch shaft bushing
- -7 Oil seal (2)
- -8 Knock (2)
- -9 Transmission case

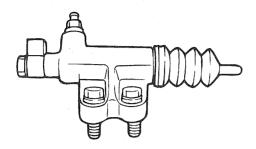
#### NOTE

Numbers show order of disassembly For reassembly, reverse order of disassembly

#### DISASSEMBLY

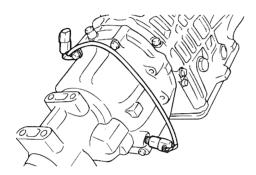
 After removing the bolt of the engine and the manual transmission, remove the release cylinder and the oil chamber.

EMLA0090



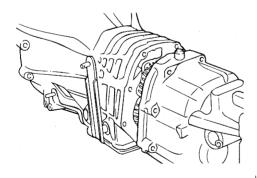
H7CL0140

2. Remove the backlamp switch.



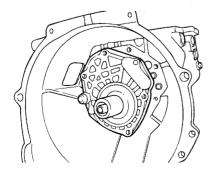
H7MT0170

3. Remove the extention housing



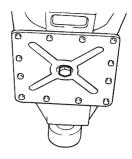
H7MT0180

4. Remove the front bearing retainer.



H7MT0190

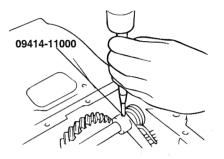
5. Remove the under cover.



EMLA009A

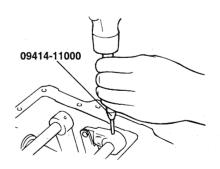
To remove select and shift shafts, proceed as follows:

6. Using the Special Tool, Lock Pin Extractor (09414-11000), remove the spring pin from the adjust arm.



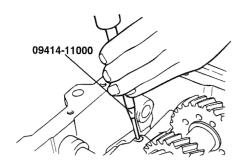
H6MT011A

- Using the Special Tool, Lock Pin Extractor, remove the spring pin from the control link assembly (select side).
- 8. Extract the select shaft from case and remove the adjust arm, the return spring and the spacer.



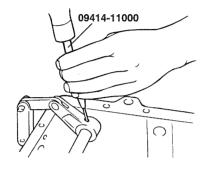
H6MT011B

- 9. Remove spring pin from overdrive and reverse shift lug, using Special Tool, Lock Pin Extractor.
- 10. Slide overdrive and reverse shift lug to either side, lift control link out groove in shift lug, and turn shift shaft half a turn. This will make it easier to extract lock pin.



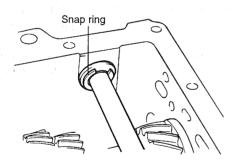
H6MT011C

11. Using Special Tool, Lock Pin Extractor, remove the lock pin from the control link (shift side).



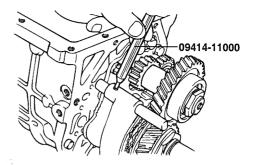
H6MT011D

- 12. Remove snap ring.
- 13. Remove shift shaft from case and remove spacer and control link assembly.



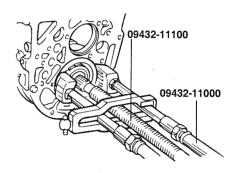
H6MT011E

- Using Special Tool, Lock Pin Extractor, pull off overdrive and reverse shift fork spring pin, then remove shift rail and fork.
- 15. Using Special Tool, Lock Pin Extractor, pull off 3-4 and 1-2 shift fork and shift lug spring pins.
- 16. Pull off each shift rail toward rear of transmission case, then remove shift fork and lugs.



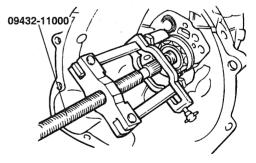
H7MT0200

- 17. Remove mainshaft bearing snap ring.
- 18. Using Special Tools, Bearing Puller (09432-11000) and Adapter (09432-11100), remove mainshaft rear bearing.



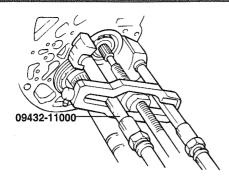
H7MT0210

19. Remove snap rings, big and small, from main drive gear bearing. Subsequently, using Special Tool, Bearing Puller, pull off bearing.



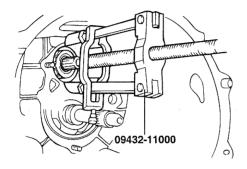
H6MT012C

20. Remove snap rign from countershaft gear rear bearing, using Special Tool.



H6MT012D

21. Remove snap ring from countershaft gear front bearing using Special Tool.



H6MT012E

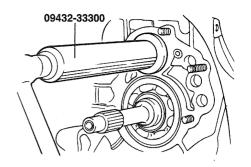
22. Remove main drive gear and mainshaft assembly from transmission case.



Н6МТ013А

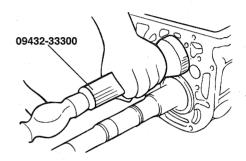
#### REASSEMBLY EMLA0100

1. Insert countershaft gear into transmission case. Subsequently, with snap ring fitted to countershaft front bearing, install bearing into case by using special tool, bearing Installer (09432-33300).



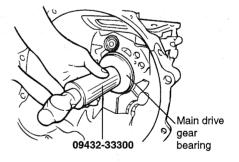
H6MT013B

 Install snap ring to countershaft rear bearing, then install it into place with special tool, bearing Installer (09432-33300).



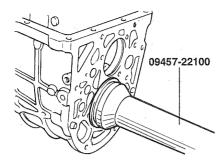
H6MT013C

 To install main drive gear bearing, first install snap ring to bearing, and then using Special Tool, Bearing Installer (09432-33300), drive bearing into position. Subsequently, install snap ring (small) on main drive gear.



H6MT013D

 Insert assembled mainshaft assembly into transmission case and drive in mainshaft rear bearing by using Special Tool, Bearing Installer (09457-22100). In this case, hold forward end of mainshaft by hand at front of case.

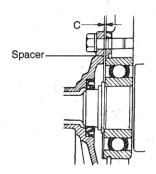


H6MT013E

5. Install front bearing retainer. When installing retainer, select and install spacer of proper size so that clearance "C" will be of standard value. Apply sealant to both sides of front bearing retainer apply gear oil to oil seal lip, then install packing and oil seal.

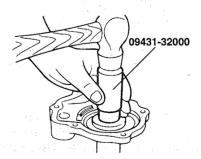
#### Retainer to bearing clearance:

0 - 0.1 mm (0 - 0.004 in.)



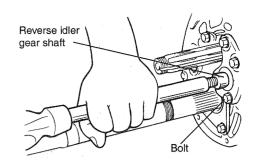
H6MT014A

Install oil seal to front bearing retainer. When installing oil seal, apply grease to oil seal lip and drive in oil seal, using Special Tool, Oil Seal Installer (09431-32000).



H6MT014B

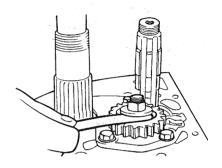
- 7. Install reverse idler gear shaft. When installing shaft, install bolts to be used as guide as illustrated.
- 8. Install needle bearing, reverse idler gear and thrust washer. Lock them with a nut. Then install split pin to locking nut to prevent it from turning. Install thrust washer with ground side toward you.



H6MT014C

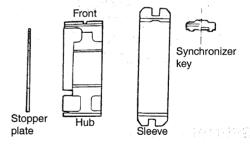
Check reverse idler gear end play.

Standard value: 0.12-0.28mm (0.005-0.011in.)



H6MT014D

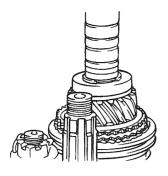
- 10. When overdrive-reverse synchronizer is reassembled, pay attention to respective directions.
- Synchronizer spring installation method is the same as 3-4 speed and 1-2 speed.



H6MT014E

12. Install spacer, stopper plate, overdrive synchronizer assembly, overdrive gear bearing sleeve, needle bearing, synchronizer ring and overdrive gear in consideration of order from rear end of main shaft. Tighten locking nut, then lock it at notch of mainshaft. Subsequently, make sure of overdrive gear end play.

Standard value: 0.04-0.20mm (0.002-0.008in.)



H6MT015A

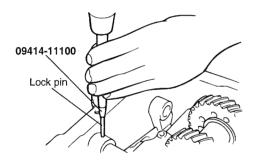
- 13. Install select and shift shafts as follows:
  - a. Insert shift shaft into transmission case and put it through control link assembly and spacer.
  - Align the lock pin hole of shift shaft with that of control link and install a lock pin.



#### Do not reuse lock pin.

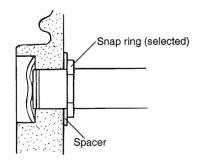
 Select and install the proper snap ring to adjust end play of shift shaft to specification.

Standard value: 0.10-0.45mm (0.004-0.018 in.)



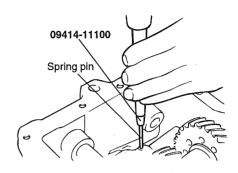
H6MT015B

- d. Slide reverse shaft lug to either side and then fit shift pin of control link in grooves of the 1-2 and 3-4 speed shift lugs.
- e. Align pin holes of reverse shift lug and shift rail and install a spring pin.



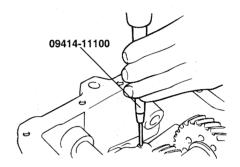
H6MT015C

- f. Insert select shaft into transmission case and put it through control link. Then install adjust arm, distance spring, return spring and spacer to select shaft.
- g. Align the spring pin hole of select arm with that of select shaft and install a spring pin.



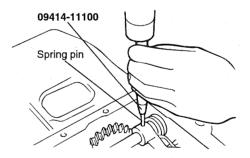
H6MT015D

h. Install spring pin to adjust arm.



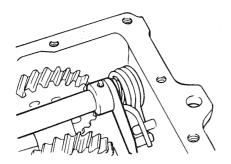
H6MT015E

i. Install select adjuster. Install the end of adjuster to ends of return spring.

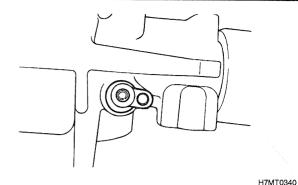


H6MT016A

j. Turn down select adjuster all the way.



H6MT016B

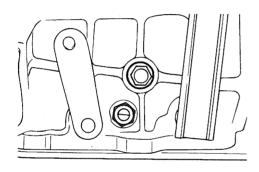


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 Loosen select adjuster (counterclockwise) until smooth shift can be made by operating shift and secure select adjuster with nut.

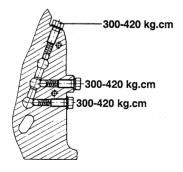
## **CAUTION**

Do not back off select adjuster more than two turns. If it is backed off more than two turns, O-ring or return spring will come off.



H7MT0330

- 14. Insert ball and poppet spring into each shift rail.
- 15. Tighten seal bolts to specified position.
- 16. Install poppet spring with small end on ball side.
- 17. After installation, seal bolts head with sealer.

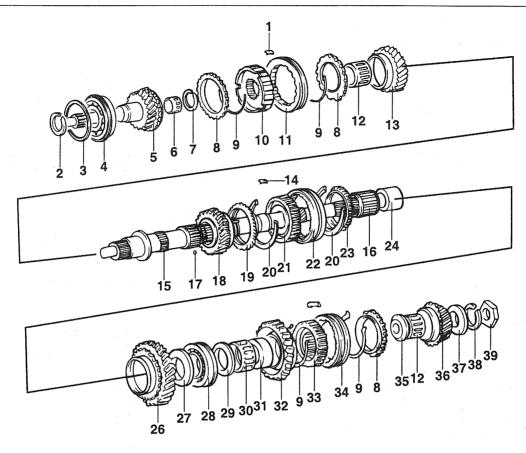


H6MT016D

18. Install the speedometer driven gear.

#### **MAINSHAFT**

#### **COMPONENTS**



- 1. Synchronizer key
- 2. Snap ring
- 3. Snap ring
- 4. Ball bearing
- 5. Main drive pinion assembly
- 6. Needle bearing
- 7. Snap ring
- 8. Synchronizer ring
- 9. Synchronizer spring
- 10.Synchronizer hub
- 11. Synchronizer sleeve (3&4)
- 12. Needle bearing
- 13. Third speed gear assembly
- 14.Synchronizer key
- 15.Main shaft
- 16.Needle bearing
- 17.Steel ball
- 18. Second speed gear assembly
- 19. Synchronizer ring

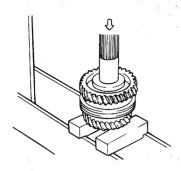
#### NOTE

Numbers show order of disassembly. For reassembly, reverse order fo disassembly.

- 20.Synchronizer spring
- 21.Synchronizer hub
- 22.Synchronizer sleeve (1&2)
- 23. Synchronizer ring
- 24. First gear bearing sleeve
- 25.Synchronizer key
- 26. First speed gear
- 27.Bearing spacer
- 28.Ball bearing
- 29.Bearing spacer
- 30.Needle bearing
- 31.Sleeve
- 32. Reverse gear assembly
- 33. Synchronizer hub
- 34. Synchronizer sleeve (5&R)
- 35.Spacer
- 36. Fifth gear assembly
- 37.Spacer
- 38. Snap ring
- 39.Lock nut

#### DISASSEMBLY

Holding second speed gear on press base, push rear end of mainshaft to remove bearing inner race (double bearing only), gear bearing sleeve, first speed gear, 1-2 speed synchronizer and second speed gear.

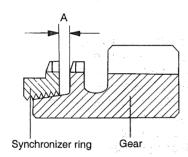


H6MT018A

#### INSPECTION

#### SYNCHRONIZER RING

- Check synchronizer ring for worn and damaged internal threads.
- 2. With synchronizer assembled to cone of each gear, check dimension "A". If "A" is 0 (zero) or very small, replace synchronizer ring and/or gear.

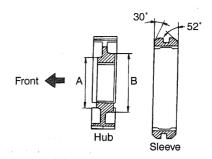


H6MT018B

#### REASSEMBLY

#### SYNCHRONIZER

- When synchronizer sleeve is assembled to hub, pay attention to their directions.
- Install 3-4 speed hub with smaller diameter side "A" of center boss directed toward front.
- 3. Install 3-4 speed sleeve with smaller bevel angle side directed toward front.



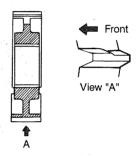
H6MT018C

4. Identify 1-2 speed hub front and rear by shoulder machined in tooth surface. Direct smaller tooth width side toward rear.

## **NOTE**

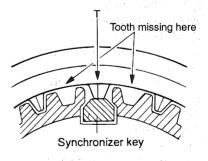
Tooth of 3-4 speed hub also has been provided with shoulder in same way.

5. 1-2 speed sleeve is the same as 3-4 speed sleeve.



H6MT018D

Synchronizer sleeve has tooth missing at six portions.
 Assemble hub to sleeve in such as way that center tooth "T" between two missing teeth will touch synchronizer key.



H6MT018E

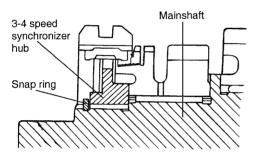
 When synchronizer springs are installed, make sure that front and rear ones are not faced in same direction.



H6MT019A

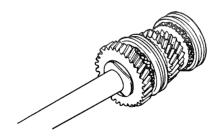
#### **MAINSHAFT**

- 1. As for mainshaft front end snap ring, select and install one of such thickness that will minimize clearance between snap ring and hub. In other words, install the thickest snap ring that fits in snap ring groove.
- 2. Make sure that 3rd speed gear turns smoothly.



H6MT019E

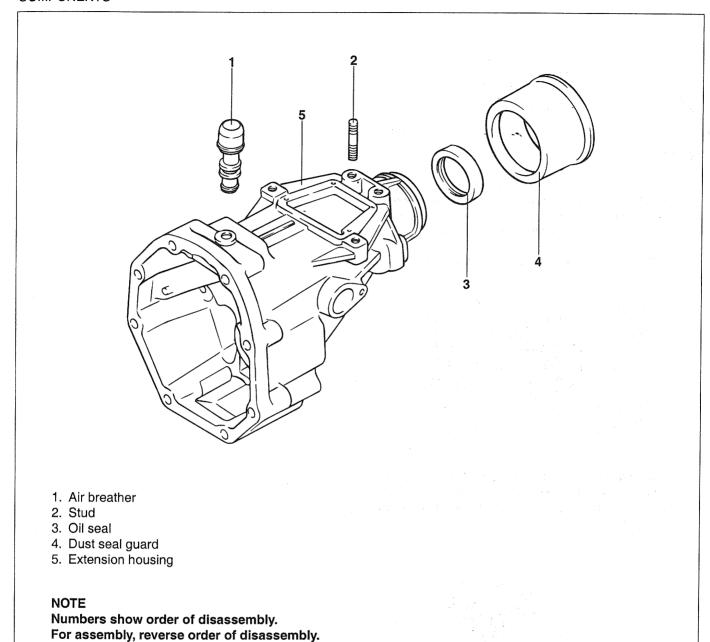
3. After installation of 2nd speed gear, 1st-2nd synchronizer and 1st speed gear, push bearing spacer firmly toward 1st speed gear and make sure that 1st and 2nd speed gears turn smoothly.



H6MT019C

#### **EXTENSION HOUSING**

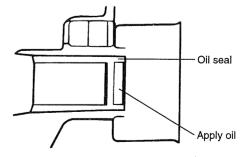
#### **COMPONENTS**



#### H6MT020A

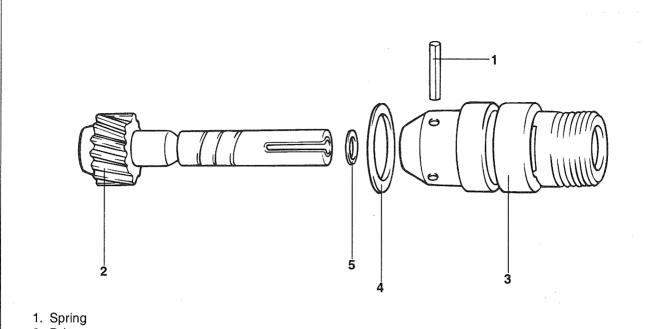
#### REASSEMBLY

- 1. Do not reuse oil seal.
- 2. Pay attention to direction and insert all the way.
- 3. Apply oil to the oil seal edge.



H6MT020B

#### SPEEDOMETER SLEEVE ASSEMBLY



- 2. Driven gear
- 3. Sleeve
- 4. O-ring
- 5. O-ring

#### NOTE

Numbers show order of disassembly. For reassembly, reverse order of disassembly.

H6MT021A

#### **DISASSEMBLY**

Drive spring pin out, and gear and sleeve can be disassembled.

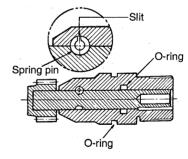


## ( CAUTION

Do not reuse O-rings and spring pin.

#### REASSEMBLY

- 1. Install new O-rings.
- Drive spring pin in, while making sure that slit does not face gear shaft.

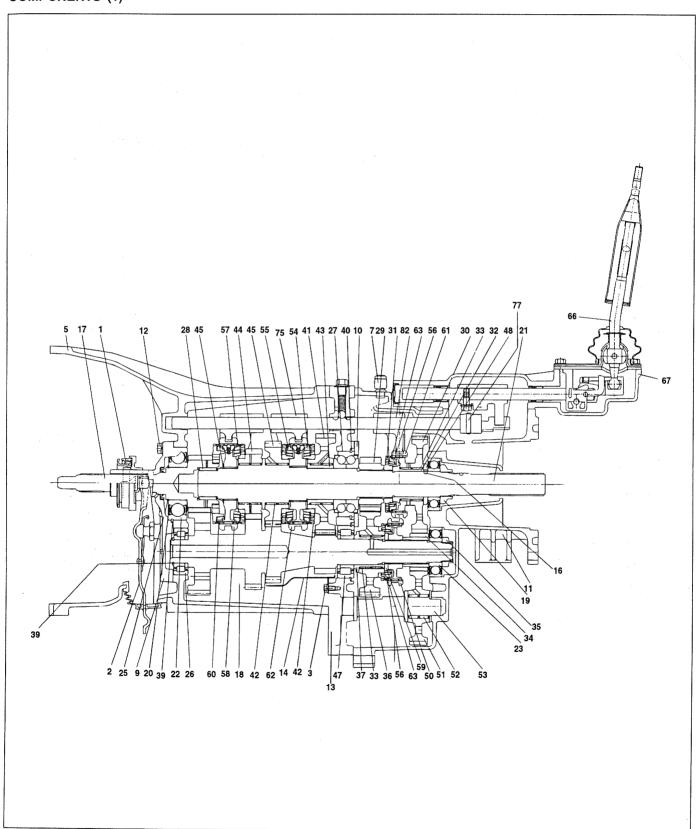


H6MT021B

## SPEEDOMETER CABLE

M5SR1 MODEL EMUBO180

COMPONENTS (1)



#### COMPONENTS (2)

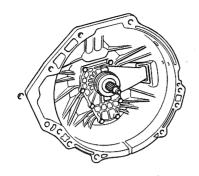
- 1. Clutch release bearing
- 2. Release fork assembly
- 3. Bolt
- 4. Bolt
- 5. Bolt
- 6. Transmission case
- 7. Air breather
- 8. Magnet
- 9. Front bearing retainer
- 10. Rear bearing retainer
- 11. Adapter
- 12. Seal bolt
- 13. Intermediate plate
- 14. Oil quide
- 15. Seal bolt
- 16. Steel ball
- 17. Main drive pinion
- 18. Counter shaft cluster
- 19. Locking nut
- 20. Spacer
- 21. Main shaft
- 22. Ball bearing
- 23. Rear ball bearing
- 24. Ball bearing
- 25. Snap ring
- 26. Roller bearing
- 27. Double angular ball bearing
- 28. Needle roller bearing
- 29. Overtop gear
- 30. Reverse gear
- 31. Clutch gear
- 32. Reverse gear sleeve
- 33. Needle roller bearing
- 34. Counter shaft reverse gear
- 35. Locking nut
- 36. Overtop gear
- 37. Overtop gear sleeve
- 38. Snap ring
- 39. Snap ring
- 40. Snap ring
- 41. 1st speed gear

- 42. Needle roller bearing
- 43. 1st speed gear sleeve
- 44. 3rd speed gear
- 45. 3rd & 4th speed gear snap ring
- 46. 2nd speed gear
- 47. Roller bearing
- 48. Thrust washer
- 49. Spacer
- 50. Reverse idler gear
- 51. Needle roller bearing
- 52. Reverse spacer
- 53. Reverse idler gear shaft
- 54. Triple cone (1st)
- 55. Triple cone (2nd)
- 56. Double cone
- 57. Double cone (3rd)
- 58. Synchronizer hub & sleeve (3&4)
- 59. Synchronizer hub & sleeve (5th)
- 60. Synchronizer ring (4th)
- 61. Synchronizer sleeve (5th & Rev.)
- 62. Synchronizer hub & sleeve (1st & 2nd)
- 63. Synchronizer spring
- 64. Bolt washer
- 65. Linear ball bearing
- 66. Control lever
- 67. Transmission control housing
- 68. Shift rail sub (1&2)
- 69. Shift rail sub (3&4)
- 70. Shift rail
- 71. Shift rail sub (5&R)
- 72. Steel ball
- 73. Poppet spring
- 74. Seal bolt
- 75. Shift fork (1&2)
- 76. Spring pin
- 77. Spring pin
- 78. Inter lock plunger
- 79. Shift lever (5th)
- 80. Shift fork (3&4)
- 81. Shift fork (5&R)

#### DISASSEMBLY

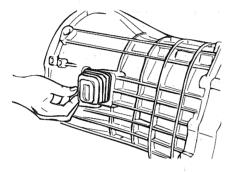
EMMB0190

1. Remove the clutch release fork and bearing.



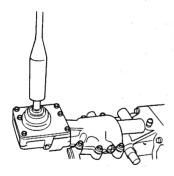
KMMB040A

2. Remove the clutch release fork boot.

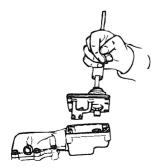


KMMB041B

3. Remove the shift lever mounting bolt.



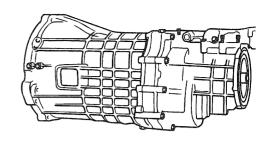
4. Remove the shift lever.



KMMB043A

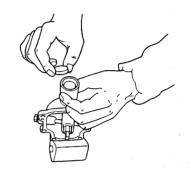
KMMB042A

5. Remove the transmission control housing.



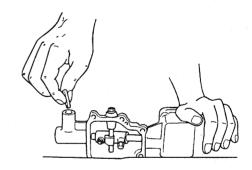
KMMB044A

6. Remove the rail rod.



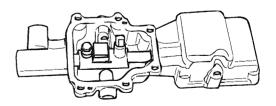
KMMB045A

7. Remove the spring pin.



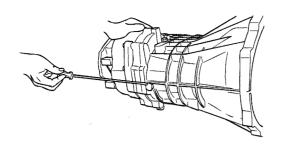
KMMB046A

8. Remove the rail fork bolt.

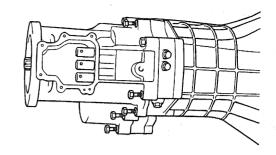


KMMB048A

9. Remove the oil drain plug.

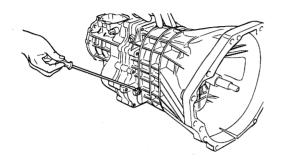


KMMB049A



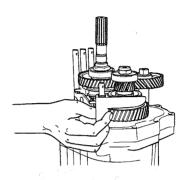
KMMB050A

10. Remove the oil filler plug.



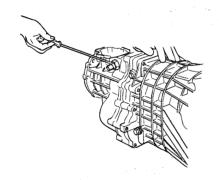
KMMB049B

14. Remove the shift fork.



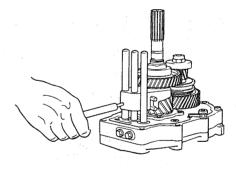
KMMB050B

11. Remove the back-up lamp.



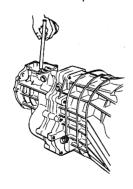
KMMB049C

15. Remove the spring pin.



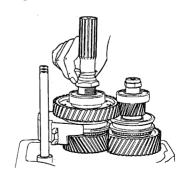
KMMB051B

12. Remove the shaft rail sub pin.



KMMB049D

16. Remove the main shaft locking nut and the counter shaft locking nut.

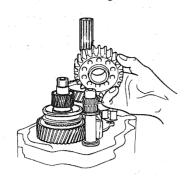


KMMB051C

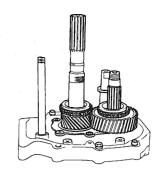
13. Remove the extension housing mounting bolt and the housing.

17. Remove the ball bearing and the spacer.

18. Remove the reverse idler gear.

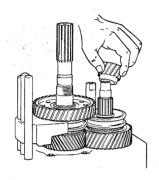


KMMB052A



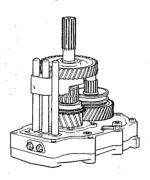
KMMB054A

19. Remove the counter shaft reverse gear.



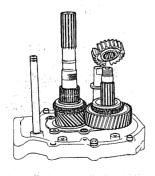
KMMB052B

20. Remove the reverse gear and the shift fork.



KMMB053A

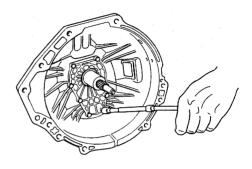
21. Remove the hub and the sleeve (5&R).



KMMB053B

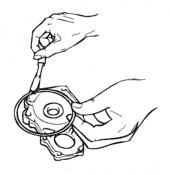
- 22. Remove the main shaft sleeve.
- 23. Remove the synchronizer and the 5th speed gear.

24. Remove the front retainer.



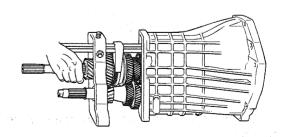
KMMB055A

25. Make sure the damage of the front retainer snap ring and the oil seal.



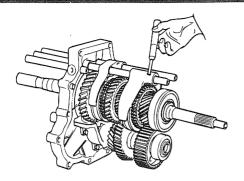
KMMB056A

26. Seperate the main shaft, the shift rail, the counter shaft and the intermediate housing from the transmission case.

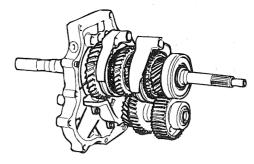


KMMB057A

27. Remove the shift fork pin (3&4).

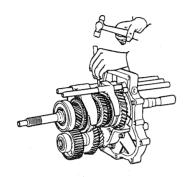


KMMB058A



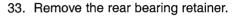
KMMB060B

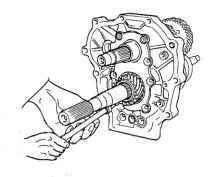
28. Remove the shift fork pin (1&2).



KMMB058B

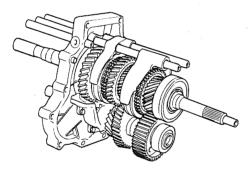
32. Remove the oil guide.





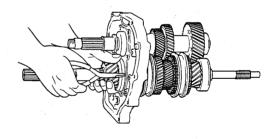
KMMB061B

29. Remove the poppet ball.



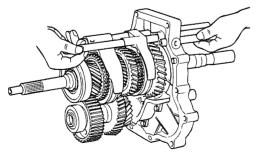
KMMB059A

34. Remove the main shaft side snap ring.



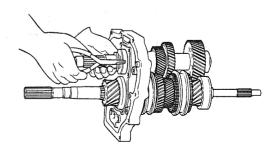
KMMB061C

30. Remove the shift rail.



KMMB060A

35. Remove the counter shaft side snap ring.



KMMB061D

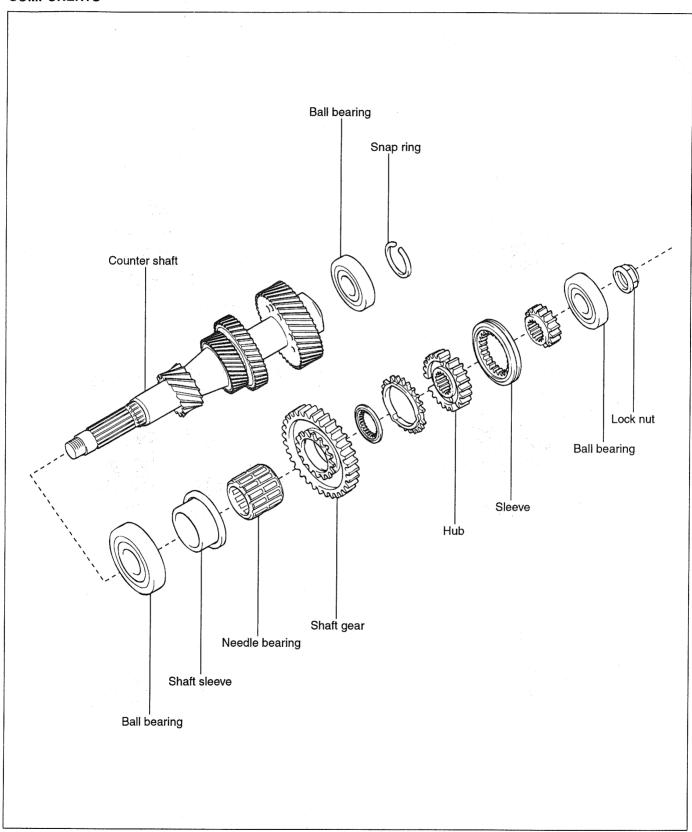
31. Remove the shift fork.

36. Seperate the main shaft assembly and the counter shaft assembly from the intermediate housing.

## **COUNT SHAFT**

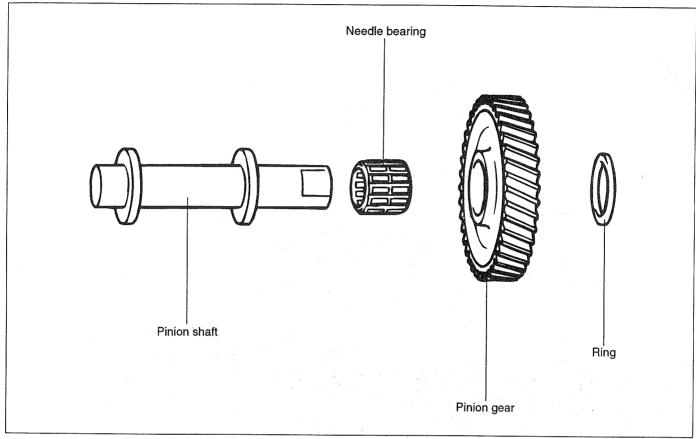
## COUNTER SHAFT EMMB0210

#### **COMPONENTS**



## MAIN DRIVE PINION GEAR

## COMPONENTS EMMB0260



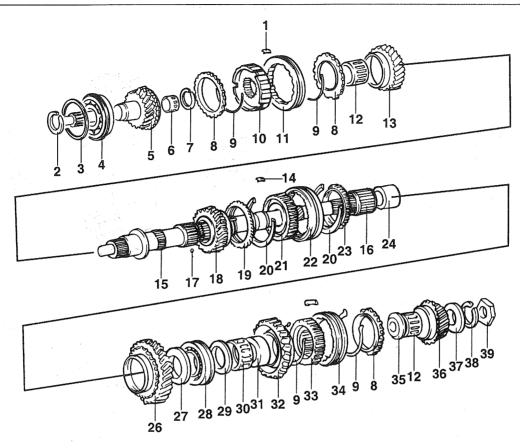
EMMB026A

#### **OUTPUT SHAFT**

#### **MAINSHAFT**

EMUC0170

#### COMPONENTS



- 1. Synchronizer key
- 2. Snap ring
- 3. Snap ring
- 4. Ball bearing
- 5. Main drive pinion assembly
- 6. Needle bearing
- 7. Snap ring
- 8. Synchronizer ring
- 9. Synchronizer spring
- 10.Synchronizer hub
- 11. Synchronizer sleeve (3&4)
- 12. Needle bearing
- 13. Third speed gear assembly
- 14. Synchronizer key
- 15.Main shaft
- 16. Needle bearing
- 17.Steel ball
- 18. Second speed gear assembly
- 19. Synchronizer ring

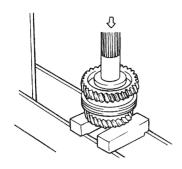
Numbers show order of disassembly.

For reassembly, reverse order fo disassembly.

- 20. Synchronizer spring
- 21. Synchronizer hub
- 22. Synchronizer sleeve (1&2)
- 23. Synchronizer ring
- 24. First gear bearing sleeve
- 25. Synchronizer key
- 26.First speed gear
- 27.Bearing spacer
- 28.Ball bearing
- 29.Bearing spacer
- 30.Needle bearing
- 31.Sleeve
- 32. Reverse gear assembly
- 33. Synchronizer hub
- 34. Synchronizer sleeve (5&R)
- 35.Spacer
- 36. Fifth gear assembly
- 37.Spacer
- 38. Snap ring
- 39.Lock nut

#### DISASSEMBLY EMI

Holding second speed gear on press base, push rear end of mainshaft to remove bearing inner race (double bearing only), gear bearing sleeve, first speed gear, 1-2 speed synchronizer and second speed gear.

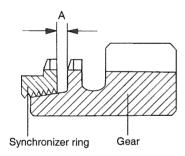


H6MT018A

#### INSPECTION EMUC0190

#### SYNCHRONIZER RING

- Check synchronizer ring for worn and damaged internal threads.
- With synchronizer assembled to cone of each gear, check dimension "A". If "A" is 0 (zero) or very small, replace synchronizer ring and/or gear.

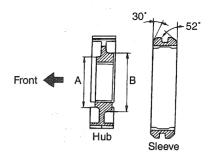


H6MT018B

#### REASSEMBLY EMUCO200

#### **SYNCHRONIZER**

- When synchronizer sleeve is assembled to hub, pay attention to their directions.
- Install 3-4 speed hub with smaller diameter side "A" of center boss directed toward front.
- 3. Install 3-4 speed sleeve with smaller bevel angle side directed toward front.



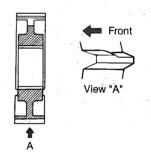
H6MT018C

4. Identify 1-2 speed hub front and rear by shoulder machined in tooth surface. Direct smaller tooth width side toward rear.

### **NOTE**

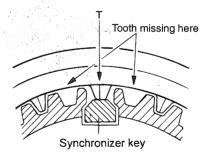
Tooth of 3-4 speed hub also has been provided with shoulder in same way.

5. 1-2 speed sleeve is the same as 3-4 speed sleeve.



H6MT018D

Synchronizer sleeve has tooth missing at six portions.
 Assemble hub to sleeve in such as way that center tooth "T" between two missing teeth will touch synchronizer key.



H6MT018E

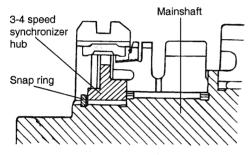
 When synchronizer springs are installed, make sure that front and rear ones are not faced in same direction.



H6MT019A

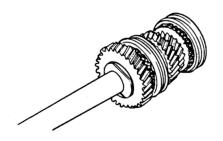
#### **MAINSHAFT**

- 1. As for mainshaft front end snap ring, select and install one of such thickness that will minimize clearance between snap ring and hub. In other words, install the thickest snap ring that fits in snap ring groove.
- 2. Make sure that 3rd speed gear turns smoothly.



H6MT019B

 After installation of 2nd speed gear, 1st-2nd synchronizer and 1st speed gear, push bearing spacer firmly toward 1st speed gear and make sure that 1st and 2nd speed gears turn smoothly.

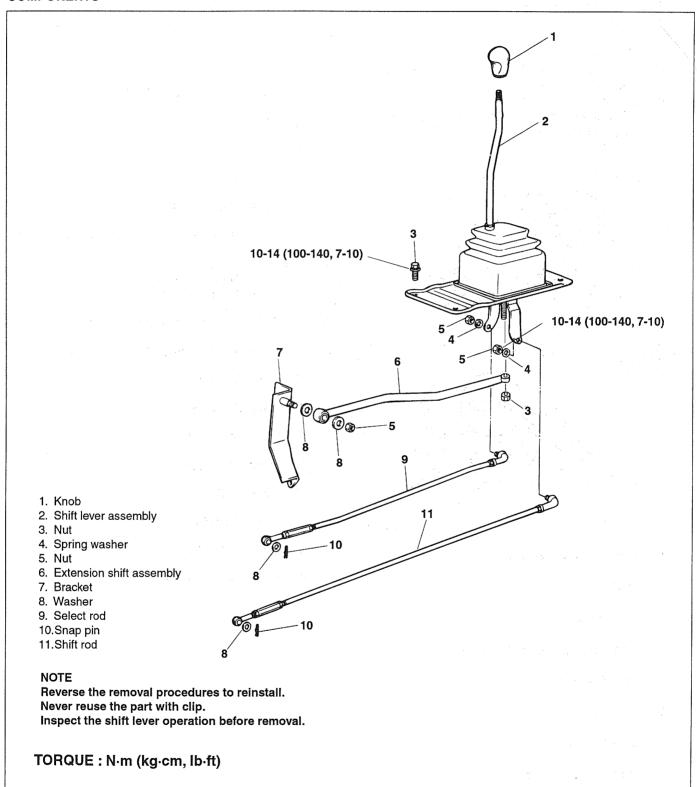


H6MT019C

## MANUAL TRANSAXLE SHIFT CONTROL

#### CHANGE LEVER, CONTROL ROD EMLBOO60

#### COMPONENTS

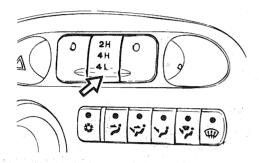


# TRANSFER CASE ASSEMBLY

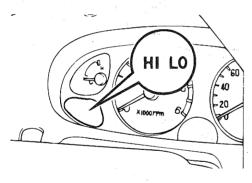
#### **ELECTRONIC CONTROL SYSTEM**

EMUC033

- 1. TCCM (Transfer case control module) is installed in the lower part of the driver side seat.
- 2. 4H→4L mode
  - a. When vehicle speed is 0-3km/h, it is operated.
  - b. Press clutch pedal.
  - c. Select 4L mode switch.
  - d. When the 4L mode switch is set to 4L, the "LO" lamp will come on.



H7MT1400



H7MT1410

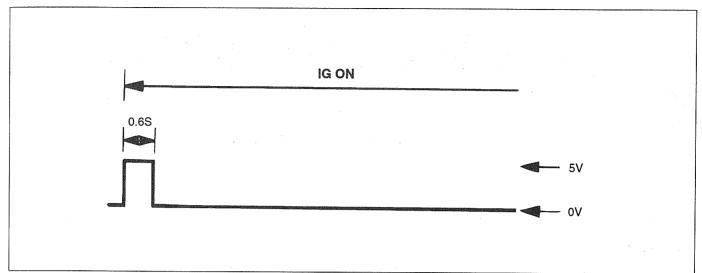
- 3. Following items will be indicated
  - 1) TCCM
  - 2) Shift motor
  - 3) Magnetic synchronizer clutch
  - 4) Speed sensor
  - 5) Hub solenoid
  - 6) Selector switch
  - 7) Motor position sensor
- 4. DTC Table

Code	Item
001	TCCM
010	Shift motor
011	Synchronizer clutch
100	Speed sensor
101	Hub solenoid
110	Selector switch
111	Motor position sensor

- 5. DTC Indication
  - 1) Indicator lamp check (0.6S)
  - 2) Lamp OFF (3S)
  - 3) DTC Indication
  - 4) OFF (3S)
  - 5) Repeat steps 3), 4)
  - 6) Repeat steps 3), 4), 5) for additional faults.
- 6. Meaning of code
  - 0: Lamp ON for 0.5 second
  - 1: Lamp ON for 1 second
- 7. EX) TCCM Fault (DTC: 001)
  - 1) Indicator lamp check (0.6S)
  - 2) Lamp OFF (3S)
  - 3) Lamp ON (0.5S)
  - 4) Lamp OFF (0.5S)
  - 5) Lamp ON (0.5S)
  - 6) Lamp OFF (0.5S)
  - 7) Lamp ON (1S)
  - 8) Lamp OFF (3S)
  - 9) Repeat steps 3) ~ 8).

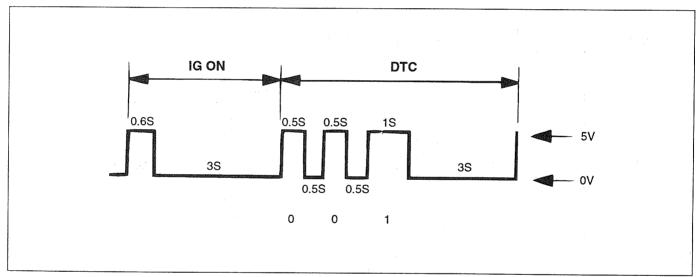
#### **READING METHOD**

#### NORMAL

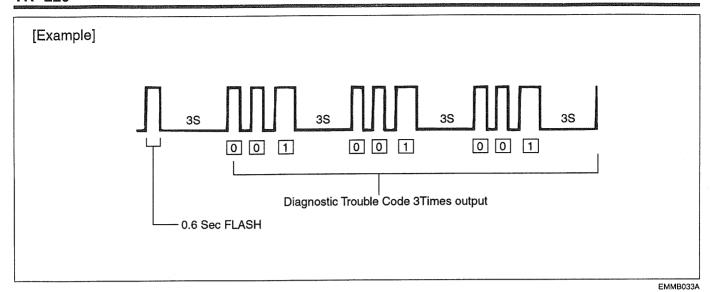


КММВ033В

#### **FAULT**



КММВ033С

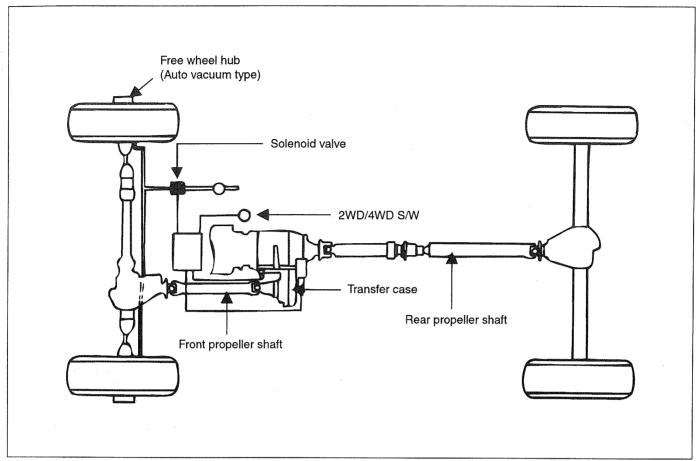


#### DTC PATTERN

Code	Output pattern	item
001	KMMB033E	TCCM
010	KMMB033F	Shift motor
011	KMMB033G	Magnetic synchronizer clutch
100	кммвоззн	Speed sensor

Code	Output pattern	Item
101		Hub solenoid valve
	KMMB033I	
110	КММВОЗЗЈ	Select switch
. <b>111</b>	кммвоззк	Motor position sensor

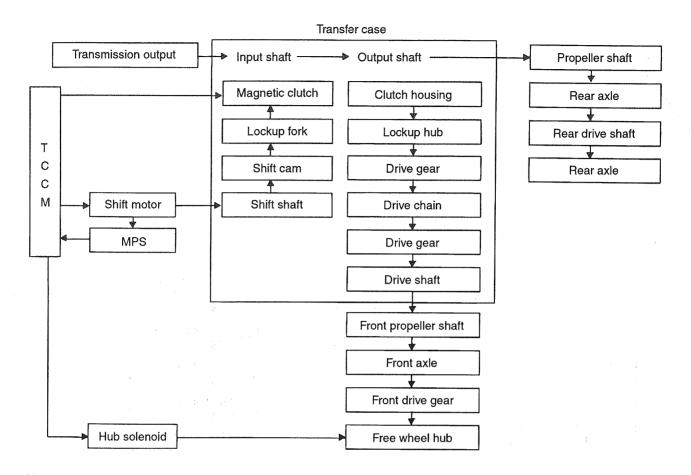
### SYSTEM DIAGRAM EMUC0340



EMUC034A

#### SYSTEM BLOCK DIAGRAM

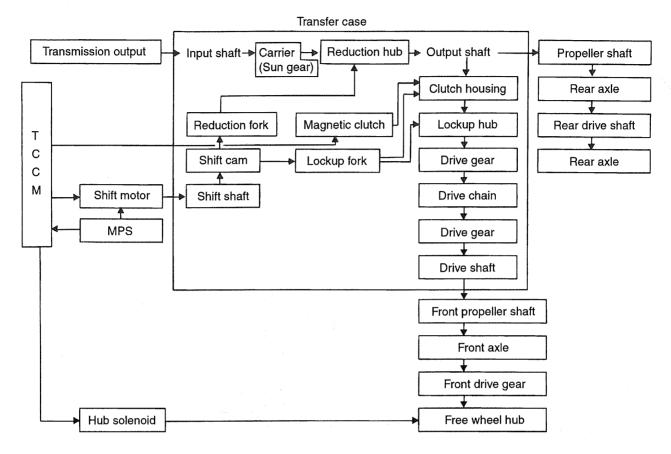
(4WD HIGH) EMUC0350



EMUC035A

#### SYSTEM BLOCK DIAGRAM

(4WD LOW) EMUC0360



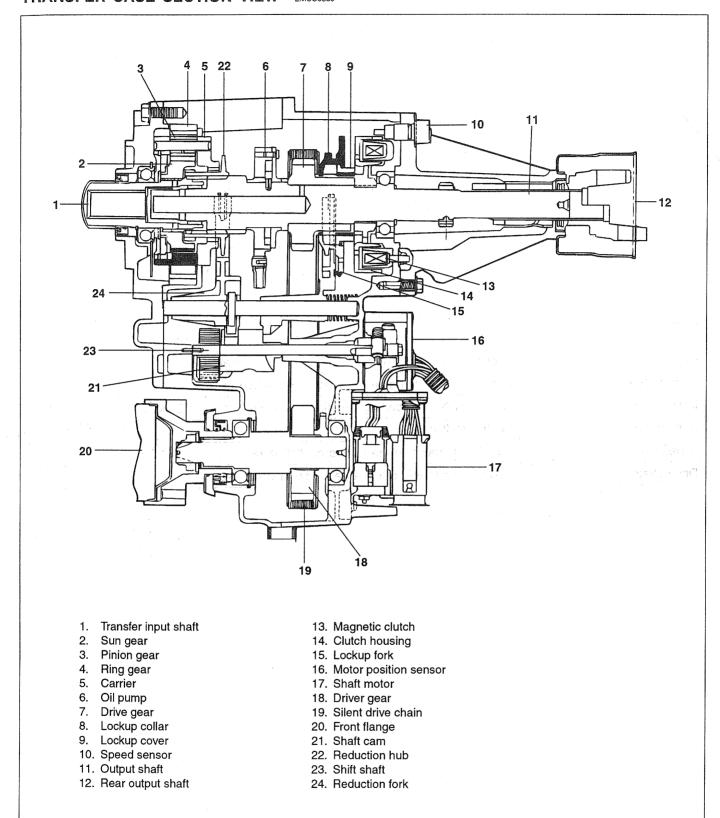
EMUC036A

## TRANSFER CASE

## FUNCTION OF COMPONENT EMUC0390

Component	Function
Transfer input shaft	Connect power from transmission output shaft and transfer sun gear.
Sun gear	Connect transfer input shaft and pinion gear.
Pinion gear	Rotate and move around ring gear by sun gear.
Ring gear	Connect pinion gear with fixing by transfer housing.
Carrier	Connect pinion gear (six) with arm. And move around ring gear.
Oil pump	When operating by transfer output shaft, supply oil to the planet gear and the drive silent chain.
Lock-up collar	Move to rear side by the lockup fork and magnetic clutch in 4WD.
Lock-up cover	Connect clutch housing and spline gear of drive gear.
Speed sensor	Detect vehicle speed by using four groove of clutch housing.
Output shaft	Connect input shaft and spline gear in 2WD, 4WD HIGH.
Rear output shaft	Supply the power to rear axle through rear propeller shaft.
Clutch housing	Supply the power of output shaft to the drive gear,
Lock-up fork	Is operated by shift cam and control lockup collar.
MPS	Supply angle and rotating direction of the motor to the TCCM.
Shift motor	Control shift cam.
Driver gear	Supply the power to the front propeller shaft.
Drive chain	Connect the power of drive gear with driven gear.

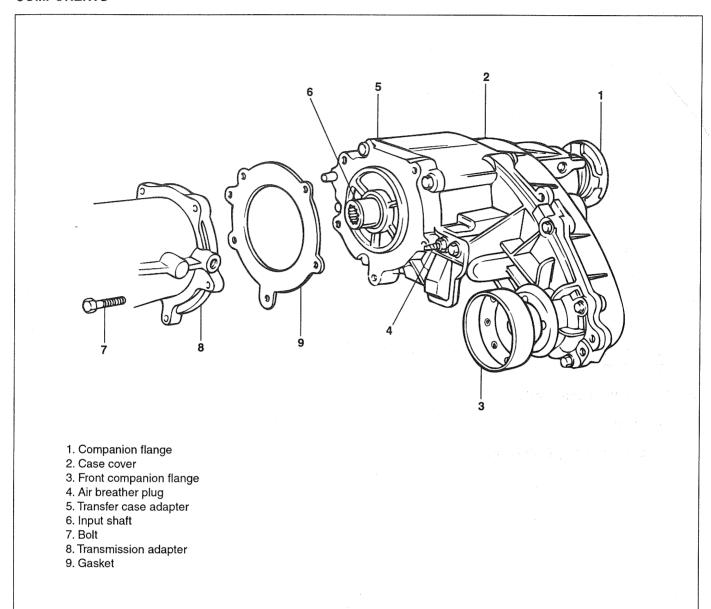
#### TRANSFER CASE SECTION VIEW EMUC0380



EMUC038A

#### TRANSFER CASE EMUC0400

#### COMPONENTS



EMUC040A

#### REMOVAL EMUCO410

- With the transmission selector lever in "N" (Neutral) position and the transfer case selector switch in "2H" position, and the parking brakes applied.
- 2. Disconnect the battery (-) terminal.
- 3. Lift up the vehicle.
- 4. Drain the oil after removing the transfer case oil level plug and the drain plug.
- 5. Disconnect the electric wire from the transfer case.

- 6. Disconnect the speed meter cable.
- 7. Remove the breather hose from the transfer case.
- 8. Remove the front drive shaft from the front companion flange from the transfer case.
- 9. Remove the rear drive shaft from the rear output companion flange.
- 10. Support the transfer case by the jack.
- 11. Remove the mounting bolt and the transfer case.

12. Remove cleanly the gasket of the transmission and the transfer case.

#### INSTALLATION EMUC0420

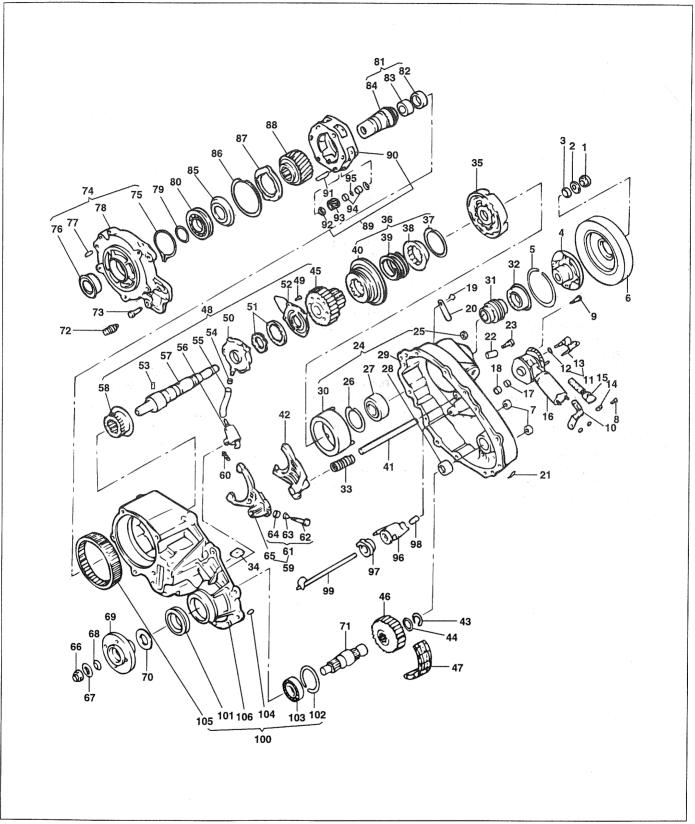
- 1. Before installing the transfer case, apply the grease on the transmission output spline.
- Install the new gasket on the joining surface of the transmission and the transfer case.
- 3. Install the transfer case on the transmission.
- 4. Tighten the mounting bolt.

Tightening torque: 3.5 - 6 kg cm

- 5. Install the rear drive shaft in the rear output companion flange.
- 6. Install the front drive shaft in the front output companion flange.
- 7. Connect the breather hose.
- 8. Connect the rear cover of the transfer case with the speed meter cable.
- 9. Connect the electric wiring.
- 10. Add the oil.
- 11. Connect the battery (-) terminal.

## TRANSFER CASE ASSEMBLY EMUCO430

#### COMPONENTS



1	Nut
	IVUL

2. Spring washer

3. Oil seal

Companion flange 4.

5. Snap ring

Torsional dump 6.

7. Pipe plug

8. Bolt

9. Bolt

10. Harness bracket.

11. Speed sensor assembly

12. Speed sensor

13. O-ring

14. Locking clip

15. Connector

16. Motor

17. Oil seal

18. Bearing

19. Bolt

20. Tag

21. Decal

22. Wiring harness clip

23. Bolt

24. Cover assembly

25. Nut

26. Snap ring

27. Bearing

28. Needle bearing

29. Transfer case cover

30. Clutch coil assembly

31. Speed gear

32. Oil seal

33. Return spring

34. Magnet

35. Clutch housing

36. Lockup assembly

37. Snap ring

38. Lock-up hub

39. Sleeve return spring

40. Lock-up collar

41. Rail shaft

42. Lock-up fork

43. Snap ring

44. Spacer

45. Drive sprocket

46. Driven sprocket

47. Drive chain

48. Shaft and pump

49. Screw

50. Pump housing

51. Pump gear set

52. Pump cover

53. Spring pin

54. Hose clamp

55. Hose coupling

56. Oil strainer

57. Output shaft

58. Reduction hub

59. Shift fork assembly

60. Shift fork facing

61. Pin, roller, retainer

62. Pin

63. Cam roller

64. Retainer

65. Reduction shift fork

66. Nut

67. Plain washer

68. Oil seal

69. Companion flange

70. Spacer

71. Front output assembly

72. Breather hose

73. Bolt

74. Front adapter assembly

75. Snap ring

76. Oil seal

77. Spiral pin

78. Front adapter

79. Retaining ring

80. Bearing

Input shaft assembly 81.

82. Sleeve bearing

Needle bearing 83.

Input shaft 84.

85. Thrust washer

86. Retaining ring

87. Thrust plate

88. Sun gear 89. Gear carrier assembly

90. Planet carrier

91. Pinion shaft

92. Thrust washer

93. Pinion gear

94. Needle roller bearing

95. Pinion needle spacer

96. Electric shift cam

97. Torsion spring

98. Spacer

99. Shift shaft

100. Case assembly

101. Oil seal

102. Snap ring

103. Bearing

104. Dowel gear 105. Ring gear

106. Transfer case

#### DISASSEMBLY EMMB0370

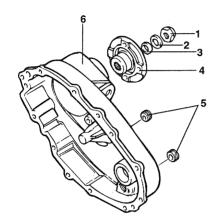
#### **COMPANION FLANGE**

### NOTE

Position transfer case on work bench with rear or cover side up.

Use wooden blocks under front to keep assembly level.

- Remove nut and washer.
- Pull companion flange.
- 3. Remove oil seal.
- If installed, remove two plugs from cover.



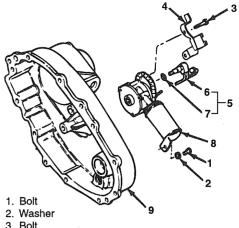
- 1. Nut
- 2. Washer
- 3. Oil seal
- 4. Companion flange
- 5. Plug
- 6. Cover

H7MT1100

#### **EXTERNAL ELECTRIC SHIFT**

On electric shift units, remove components as follows.

- Remove bolt (1).
- 2. Remove three bolts (3).
- Remove sensor and harness bracket.
- Remove speed sensor assembly.
- Remove motor assembly.

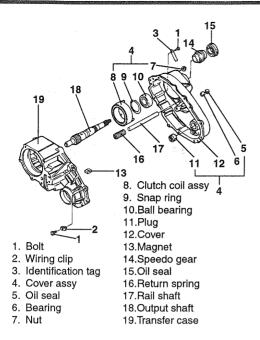


- 3. Bolt
- 4. Harness bracket & sensor
- 5. Sensor assembly
- Speed sensor
- 7. O-ring
- 8. Motor assembly
- 9. Cover

EMMB037A

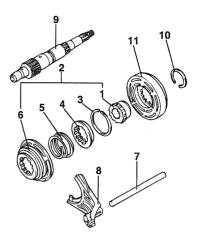
#### **COVER ASSEMBLY**

- Remove nine bolts (1). This will free wiring harness clip and identification tag. Use care not to lose identification tag.
  - It contains information required for ordering replacement parts.
- Pry at the bosses provided on the cover and transfer case to break the sealant bond loose. Then, lift cover assembly straight up to remove.
- On electric shift units, remove oil seal (5), bearing, three nuts and clutch coil assembly.
- Remove snap ring and pull ball bearing from cover. This will free speedo gear.
- Pull needle bearing from cover.
- 6. Pull oil seal (15) from cover.
- Remove magnet from slot in case. 7.
- Remove return spring from rail shaft. 8.
- Scrap and clean sealant from mating faces of cover and transfer case. Use care not to damage metal faces or allow scrapings to fall into transfer case.



#### LOCK SHIFT

- 1. From electric shift only, remove retaining ring and slide clutch housing from shift collar hub.
- 2. Remove shift collar hub from output shaft.
- 3. Together, slide 2W-4W lockup assembly and lockup fork from output shaft and rail shaft. Separate assemblies and remove rail shaft.
- To disassemble 2W-4W lockup assembly, remove snap ring, lockup hub and return spring from lockup collar.
- 5. One-piece, plastic lockup fork replaces earlier fork assembly with metal fork and separate roller parts.

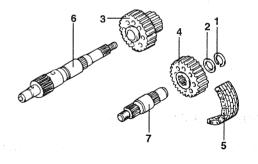


- 1. Shift collar hub
- 2. 2W-4W Lockup assy
- 3. Snap ring
- 4. Lockup hub
- 5. Return spring
- 6. Lockup collar
- 7. Rail shaft
- 8. Lockup fork
- 9. Output shaft
- 10. Retaining ring
- 11. Clutch housing

H7MT1130

#### CHAIN DRIVE

- Remove snap ring and spacer from output shaft (front).
- Together, slide drive sprocket, driver sprocket and drive chain from output shafts (rear and front). Separate sprockets and chain when out of assembly.

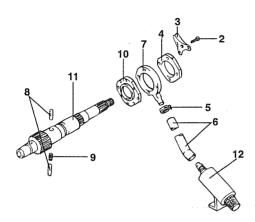


- 1. Snap ring
- 2. Spacer
- 3. Drive sprocket
- 4. Driven sprocket
- 5. Drive chain
- 6. Output shaft (rear)
- 7. Lockup collar

H7MT1150

#### OIL PUMP

- 1. Remove four bolts (2) and retainer. Slide rear pump cover off output shaft.
- Loosen hose clamp and separate hose coupling from pump housing.
   Slide pump housing off output shaft.
- 3. Remove hose clamp, hose coupling and strainer.
- 4. Remove two pump pins and spring from output shaft.
- Slide front pump cover off output shaft and remove output shaft.

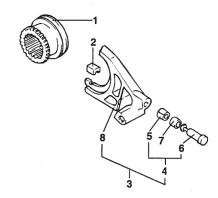


- 1. Shaft & pump assy
- 2. Bolt
- 3. Pump retainer
- 4. Rear pump cover
- 5. Hose clamp
- 6. Hose coupling
- 7. Pump housing
- 8. Pump pin
- 9. Spring
- 10. Front pump cover
- 11.Output shaft
- 12.Strainer

H7MT1160

#### **REDUCTION SHIFT**

- 1. Remove reduction hub and reduction shift fork assembly from transfer case.
- 2. Remove two facings from shift fork assembly.
- Disassemble fork assembly only if parts replacement is required.
   Cut plastic retainer to remove, freeing pin and cam roller.

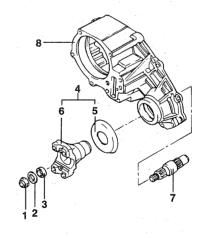


- 1. Reduction hub
- 2. Shift fork facing
- 3. Reduction shift fork assy
- 4. Pin, roller and retainer assy
- 5. Retainer
- 6. Pin
- 7. Cam roller
- 8. Reduction shift fork

H7MT1170

#### FRONT OUTPUT SHAFT

- 1. Hold yoke and remove nut and washer. Pull yoke assembly and oil seal.
- 2. Press deflector from yoke only if replacement is required.
- 3. Remove output shaft.

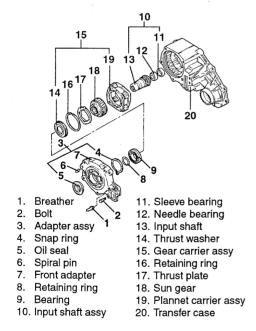


- 1. Nut
- 2. Washer
- 3. Oil seal
- 4. Yoke assy
- 5. Deflector
- 6. Yoke
- 7. Output shaft(front)
- 8. Transfer case

H7MT1180

#### ADAPTER, INPUT SHAFT AND GEAR CARRIER

- Remove breather.
- Remove six bolts (2).
   Carefully pry front adapter up to break sealant band with transfer case. Use care not to damage adapter or case.
- Remove adapter assembly, input shaft assembly and gear carrier assembly as an assembled group.
- 4. Holding end of input shaft on workbench, press down on adapter while expanding long ends of snap ring.
- 5. Remove snap ring and pump oil seal from front adapter.
  - Remove pin only if replacement is required.
- 6. Remove retaining ring (8). Pull bearing and thrust washer from end of input shaft assembly. Remove input shaft assembly from gear carrier assembly.
- 7. To disassemble input shaft assembly, pull sleeve bearing and needle bearing from input shaft.
- 8. Remove retaining ring (16), thrust plate end sun gear from planet carrier assembly.



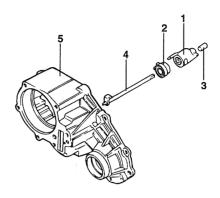
H7MT1190

#### SHIFT CAM (ELECTRIC PARTS)

- Remove electric shift cam group (1 through 4) from transfer case as an assembly.
- 2. Slide electric shift cam off shift shaft.
- 3. Clamp retainer end of shift shaft.

Keeping fingers away from spring ends, pry torsion spring out of engagement with shaft drive tang using a screwdriver.

4. Remove torsion spring and spacer from shift shaft.

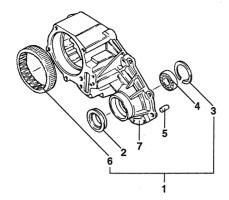


- 1. Electric shift cam
- 2. Torsion spring
- 3. Spacer
- 4. Shift shaft
- 5. Transfer case

H7MT1210

#### CASE ASSEMBLY

- 1. Pull oil seal.
- 2. Remove retaining ring and pull ball bearing.
- 3. Remove dowel pins from transfer case only if they are loose or damaged.
- 4. Press ring gear out of transfer case only if ring gear must be replaced.

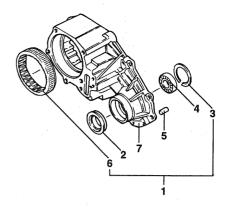


- 1. Transfer case assembly
- 2. Oil seal
- 3. Retaining ring
- 4. Ball bearing
- 5. Dowel pin
- 6. Ring gear
- 7. Transfer case



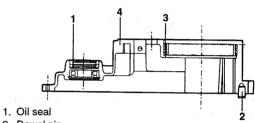
#### CASE ASSEMBLY

- If ring gear was removed for replacement, align serrations on OD of new ring gear with those in transfer case. Press in ring gear, chamfered end first. Make sure gear is not cocked and is firmly seated in case.
- 2. If removed, press two new dowel pins into case.
- Press in ball bearing to bottom in transfer case and install retaining ring.
- Position new oil seal and press in to seat seal flange against transfer case.



- 1. Transfer case assembly
- 2. Oil seal
- 3. Retaining ring
- 4. Ball bearing
- 5. Dowel pin
- 6. Ring gear
- 7. Transfer case

H7MT1220

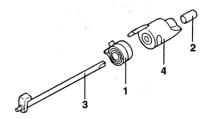


- 2. Dowel pin
- 3. Ring gear
- 4. Transfer case

H7MT1230

#### SHIFT CAM (ELECTRIC PARTS)

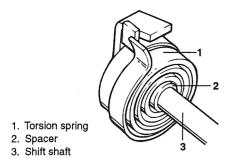
Insert spacer in torsion spring and install over free end of shift shaft.



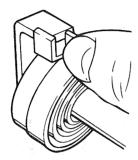
- 1. Torsion spring
- 2. Spacer
- 3. Shift shaft
- 4. Electric shift cam

H7MT1240

Slide torsion spring and spacer on shift shaft up to drive tang and position first spring end to left (Viewed from free end of shaft) of drive tang.

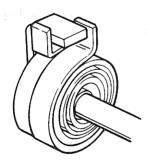


- H7MT1250
- Twist second spring end to right of drive tang on shift shaft.



- Push torsion spring and spacer together back as far as they will go.
- Slide electric shift cam onto shift shaft, drive tang on

Position drive tang on cam so that it will go under drive tang on shift shaft and between spring ends and slide cam as far as it will go.

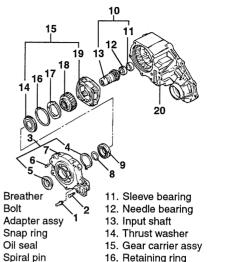


H7MT1270

#### ADAPTER, INPUT SHAFT AND CARRIER

- 1. Lay planet carrier assembly on work bench with end having groove for retaining ring up.
- Install sun gear with hub end up. Rotate gear of planet carrier assembly as required until sun gear is fully meshed.
- Align tabs and install thrust plate into planet carrier assembly.

Install retaining ring (16) to complete gear carrier assembly.



16. Retaining ring 17. Thrust plate Front adapter

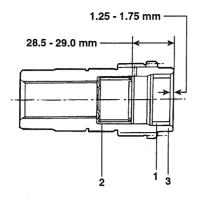
2.

3.

- Retaining ring 18. Sun gear Bearing 19. Plannet carrier assy
- 10. Input shaft assy 20. Transfer case

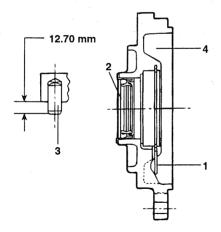
H7MT1190

- If removed, position needle bearing and press into input shaft to dimension shown. Press in new sleeve bearing to complete input shaft assembly.
- Lift up gear carrier assembly and install input shaft assembly up through gear carrier assembly. Install thrust washer and press bearing over end of input shaft assembly. Retain bearing on input shaft with retaining ring in shaft groove.
- If removed, press new pin into front adapter.
- Position oil seal and press into front adapter to dimension shown.
- Install snap ring in groove in front adapter with long ends of snap ring in adapter groove to complete front adapter assembly.
- 10. Position front adapter assembly with face that mates with transfer case up. Support on wood blocks to provide clearance for input shaft assembly. Position assembled input shaft and carrier group over front adapter with input shaft down. Lower shaft and carrier group while expanding long ends of snap ring until snap ring engages groove in outside diameter of bearing.



- 1. Sleeve bearing
- 2. Needle bearing
- 3. Input shaft

- Apply continuous 1/16 in.(1.6 mm) bead of sealant (Neutral Cure RTV, Loctite 598) all around transfer case mounting face for front, adapter. Center sealant bead between edges of face. Circle bolt holes.
- 12. Install assembled adapter, input shaft and carrier group on transfer case and attach with six bolts. Torque bolts to 20 34 lb.ft (27 46 Nm)
- 13. Install breather bard and torque to 6 14 lb.ft (8 19 Nm).



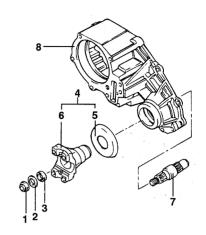
- 1. Snap ring
- 2. Oil seal
- 3. Spiral pin
- 4. Front adapter

H7MT1290

#### FRONT OUTPUT SHAFT

If removed, press deflector onto yoke.

- 2. Position output shaft in transfer case and install yoke assembly, oil seal, washer and nut.
- 3. Hold yoke and torque nut to 150 180 lb·ft (203 244 Nm).



- 1. Nut
- 2. Washer
- 3. Oil seal
- 4. Yoke assy
- 5. Deflector
- 6. Yoke
- 7. Output shaft(front)
- 8. Transfer case

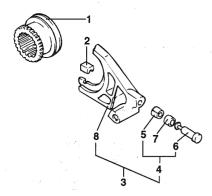
H7MT1180

#### **REDUCTION SHIFT**

 If disassembled for parts replacement, assemble reduction shift fork assembly using new pin, roller and retainer assembly.

Press pin, roller and retainer assembly into bore in reduction shift fork until retainer passes completely through and snaps in place. Make sure that cam roller turns freely.

- 2. Install two fork facings on reduction shift fork assembly.
- 3. Engage reduction shift fork assembly with reduction hub and position in transfer case, reduction hub in gear carrier assembly previously installed.
- 4. Install output shaft, engaging output shaft end with input shaft bearings and output shaft spline with reduction hub.



- 1. Reduction hub
- 2. Shift fork facing
- 3. Reduction shift fork assy
- 4. Pin, roller and retainer assy
- 5. Retainer
- 6. Pin
- 7. Cam roller
- 8. Reduction shift fork

#### OIL PUMP

Locate pump front cover. Front pump cover has tapped holes.

Position front cover so that word TOP faces down and turned so that it will be at top of transfer case when installed in vehicle.

Install front pump cover over output shaft in this position.

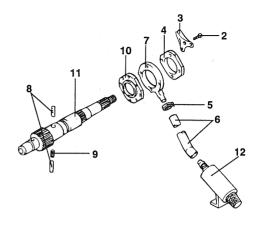
Install two pump pins with spring between them in output shaft.

Flat surface on both pins must point out and face up. Center pins and spring in output shaft.

- Push hose coupling onto barb on strainer and install L shaped foot on filter in slot in transfer case. Hose coupling must point in direction of pump assembly.
- 4. Install pump housing so that word REAR marked on it is up and hose bard points toward hose coupling and strainer. Lower pump housing over upper output shaft, moving pump pins inward and compressing spring so that both pins are contained inside pump housing.
- 5. Slip hose clamp over free end of hose coupling and push onto hose bard on pump housing. Secure hose clamp over hose coupling on hose barb.
- Position pump rear cover over assembly with words TOP REAR facing up and located to be at top of transfer case when installed.

Position pump retainer on cover so that tab on retainer is in notch in transfer case. Clean threads on four bolts and apply Loctite 222. Align pump holes and install bolts. Torque bolts to 2.9 - 6.3 lb·ft (4.0 - 8.5

Nm) while turning output shaft by hand to insure that pump pins move freely.

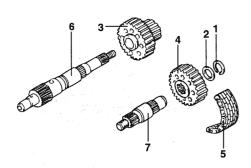


- 1. Shaft & pump assy
- 2. Bolt
- 3. Pump retainer
- 4. Rear pump cover
- Hose clamp
   Hose coupling
- 7. Pump housing
- 8. Pump pin
- 9. Spring
- 10.Front pump cover
- 11.Output shaft
- 12.Strainer

H7MT1160

#### **CHAIN DRIVE**

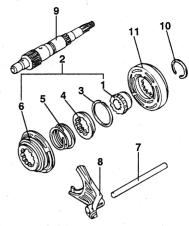
- On work bench, next to transfer case assembly, position driven sprocket (with internal spline) at front output shaft end of case and drive sprocket (with smooth bore) at output shaft end.
- 2. Assemble drive chain around sprockets.
- Grasp each sprocket, hold drive chain tight and parallel with transfer case, and install chain drive assembly over output shaft. It may be necessary to rotate driven sprocket slightly to engage splines on front output shaft.
- Install spacer on front output shaft. Install snap ring in shaft groove over spacer.



- 1. Snap ring
- 2. Spacer
- 3. Drive sprocket
- 4. Driven sprocket
- 5. Drive chain
- 6. Output shaft (rear)
- 7. Lockup collar

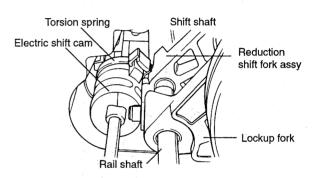
#### LOCKUP SHIFT

- 1. Assemble return spring and lockup hub in lockup coller and retain with snap ring, completing 2W-4W lockup assembly.
- Install rail shaft in transfer case, through reduction shift fork assembly previously installed and into blind hole in case.
- Engage lockup fork in groove in 2W-4W lockup assembly and slide this group down over output shaft and rail shaft.
- Install shift collar hub, engaging splines on output shaft and in 2W-4W lockup assembly.
- On electric shift units only, install electric shift cam group previously assembled and clutch housing as follow:
  - 1) Position electric shift cam group rotated so that end of torsion spring will contact side of reduction shift fork assembly that faces up, toward top of case.
  - Holding rail shaft down, raise up fork assemblies slightly. Rotate electric shift cam group into position so that roller on reduction shift fork assembly is in groove in shift cam and button on lockup fork is on cam end. Then lower this group of parts into the transfer case engaging shift shaft on pin in transfer case.
  - 3) Position clutch housing in transfer case over shift collar hub. Attach with retaining ring in clutch collar hub groove.



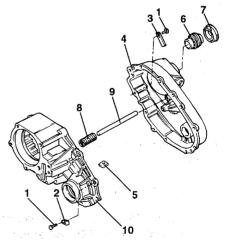
- 1. Shift collar hub
- 2. 2W-4W Lockup assy
- 3. Snap ring
- 4. Lockup hub
- 5. Return spring
- 6. Lockup collar
- Rail shaft
- 8. Lockup fork
- Output shaft 9
- 10. Retaining ring
- 11. Clutch housing

H7MT1130



H7MT1300

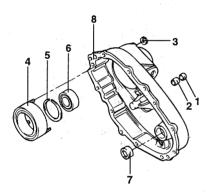
#### **CASE COVER**



- 1. Bolt
- 2. Wiring clip
- 3. Identification tag
- 4. Cover assy
- 5. Magnet
- 6. Speedo gear
- 7. Oil seal
- 8. Return spring
- 9. Rail shaft
- 10.Transfer case

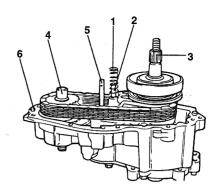
H7MT1310

- Position cover on bed of suitable press so that open face of cover is up and parallel with press bed.
- 2. Position end of needle bearing with identification marking up and press into cover until upper end of bearing is 1.593 1.603 in. (40.47 40.97 mm) below face of cover that mates with transfer case.
- 3. Press in ball bearing to bottom in cover and install snap ring.
- 4. On electric shift units only, install parts as follow:
  - Verify that four O-rings (one on wire and one each on three studs) are in place on clutch coil assembly. Install clutch coil assembly in inside of cover, with electrical wire and studs extending through cover, with electrical wire and studs extending through cover. Use care not to kink or trap electrical wire under clutch coil assembly. Attach with three nuts and torque to 6 - 8 lb-ft (8 - 11 Nm).
  - 2) Install motor bearing and oil seal in cover.



- 1. Oil seal
- 2. Bearing
- 3. Nut
- 4. Clutch coil assy
- 5. Snap ring
- 6. Ball bearing
- 7. Needle bearing
- 8. Case cover

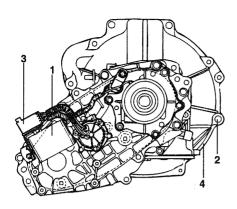
- Install return spring over rail shaft in transfer case to rest on shift fork.
- 6. Install magnet in slot in transfer case.
- Apply continuous 1/16 in. (1.6 mm) bead of sealant (Neutral Cure RTV, Loctite 598) all around transfer case mounting face for cover assembly. Center sealant bead between edges of face. Circle bolt holes. Remove excess if sealant bead is larger than 1/16 in. (1.6 mm).



- 1. Return spring
- 2. Rail shaft
- 3. Output shaft
- 4. Front output shaft
- 5. Shift shaft
- 6. Dowel pin

H7MT1330

- 8. Install cover assembly on transfer case. All of the following alignment conditions must be met for the cover assembly to seat on transfer case properly.
  - 1) Cover holes with transfer case dowel pins.
  - 2) Cover bearings with output shafts.
  - Blind hole in cover with rail shaft. Make sure spring in not cocked. On electric shift, check with pen light through cover hole for speed sensor.
  - On electric shift units, cover bearing with shift shaft.
- 9. Install nine bolts positioning identification tag and wiring clip under bolt heads at locations. Torque bolts to 20 34 lb-ft (27 46 Nm).
- 10. Install speedo gear over spline of output shaft into cover assembly.
- 11. Press new oil seal into cover assembly.

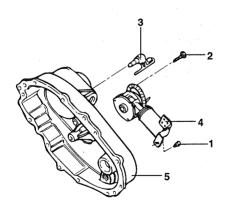


- 1. Motor assembly
- 2. Bolt
- 3. Wiring clip
- 4. Identification tag



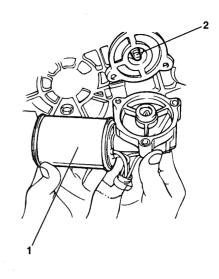
#### **EXTERNAL ELECTRIC SHIFT**

- Position motor assembly so that triangular slot in motor will align with shift shaft. Move motor in to engage shift shaft and contact cover. Then rotate motor in clockwise direction until motor is in correct position and mounting holes are aligned.
- 2. Fit O-ring on speed sensor and install speed sensor assembly in cover. Install bracket so that it is over speed sensor and install three bolts. Torque bolts to 6 8 lb·ft (8 11 Nm).
- Install bolt and washer at bracket end of motor assembly and torque to 6 8 lb-ft (8 11 Nm).



- 1. Bolt
- 2. Bolt
- 3. Speed sensor
- 4. Motor assembly
- 5. Cover



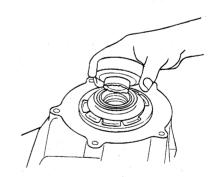


- 1. Motor assy
- 2. Shift shaft

H7MT1340

#### REASSEMBLY EMMB0430

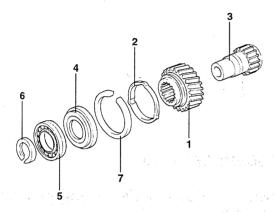
- Before assembly, lubricate all parts with the specified grease oil.
- 2. If removed, drive the bearing into the front output case bore.
- 3. Install the internal snap ring that retains the bearing to the front case.
- 4. If removed, install the front yoke to flange seal in the front case bore.
- 5. If removed, install the yoke to flange seal into the mounting adapter bore.



KMMB043Q

- 6. If the input shaft needle bearing and bushing were removed, install a new bearing and bushing.
- 7. The recessed face of the sun gear and the snap ring groove on the bearing outer race should be Toward the rear of the transfer case.

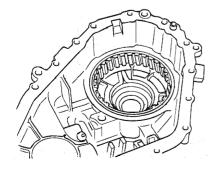
- 8. The stepped face of the thrust washer should face toward the bearing.
- 9. Slide the sun gear, thrust plate and thrust washer into position on the input shaft.
- 10. Press the bearing over the input shaft.
- 11. Install the external snap ring to the input shaft.
- 12. Install the front planet to the sun gear and input shaft.
- 13. Install the internal snap ring to the planetary carrier.



- 1. Sun gear
- 2. Thrust plate
- 3. Input shaft
- 4. Thrust washer
- 5. Bearing
- 6. Outer snap ring
- 7. Inner snap ring

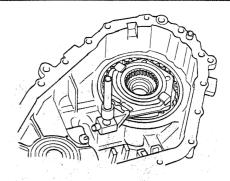
EMMB043A

- 14. Place the tanged snap ring in the case. Expand the snap ring with the snap ring pliers and install the planetary carrier assembly. Check the installation by holding the case and carefully tapping the face of the input shaft against a wooden block to make sure the snap ring is installed.
- 15. Remove all traces of gasket sealant from the front case and mounting adapter mating surfaces.



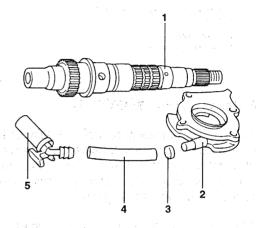
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16. Install the high-low shift fork and high-low collar as an assembly into the front planet.



KMMB043D

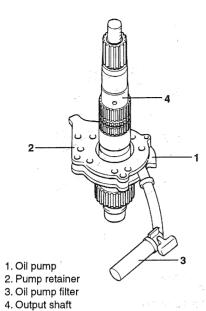
- 17. Check the pump to make sure the pump rotates freely.
- 18. Inspect the outside surfaces and bore of the oil pump.



- 1. Rear output shaft
- 2. Pump body
- 3. Clamp
- 4. Hose
- 5. Filter

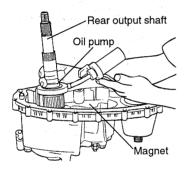
EMMB043B

19. Install the output shaft and oil pump in the input shaft. Make sure that the internal splines of the output shaft engage the internal splines of the high-low shift collar. Make sure that the oil pump retainer arm and oil filter leg are in the groove and slot of the front case.



EMMB043C

- 20. Install the oil pan magnet in the slot in the front case just above the oil filter leg.
- 21. Install the front output shaft in the front case.

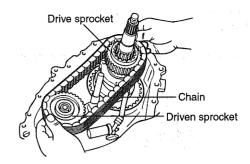


EMMB042F

- 22. Install the thrust washer on the rear output shaft.
- 23. Install the chain, drive sprocket and driven sprocket as an assembly over the output shaft.



The driven sprocket (on the front output shaft) must be installed with the marking REAR facing toward the rear case, if so marked.

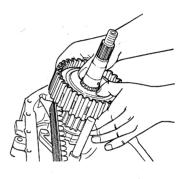


FMMB042F

- 24. Install tone wheel onto the front output shaft. Make sure the spline on the tone wheel engages the spline on the front output shaft.
- 25. Install clutch pack assembly onto the rear output shaft.

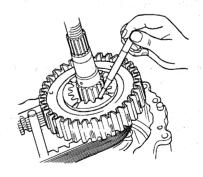
  Make sure that the spline on the clutch pack engages

Make sure that the spline on the clutch pack engages to the spline of the sprocket.



KMMB043G

26. Install snap ring onto the rear output shaft. Start the snap ring over the spline and use the wave spring to seat the snap ring in the snap ring groove. If the snap ring will not install, the thrust washer inside the clutch pack may not be seated properly.



KMMB043H

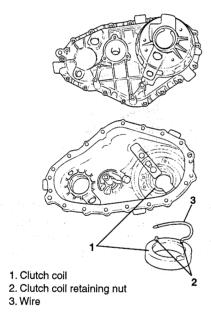
- 27. Three slots on the thrust washer must be aligned with the three tabs on the clutch pack housing.
- 28. Install the apply cam onto the rear output shaft.
- 29. Install three balls into the apply cam.

- 30. Install cam and coil housing assembly onto rear output shaft.
- 31. Install thrust bearing assembly onto output shaft.



KAMAROAS

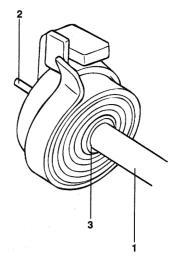
- 32. Install the clutch coil from inside the rear case until the wire and studs extend through the cover.
- 33. Install the washers and nuts and tighten to 8 11Nm



EMMB042B

- 34. Slide the spring spacer on the cam shaft and position it beneath the drive tang.
- 35. Place the torsion spring on the cam shaft.

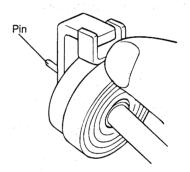
  Position the first spring tang to the left of the cam shaft drive tang.



- 1. Cam shaft
- 2. Pin
- 3. Spring spacer

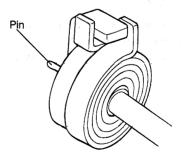
EMMB043D

36. Wind the second spring tang clockwise past the drive tang.



EMMB043E

- 37. Push the torsion spring and sleeve in as far as it will do.
- 38. Install the helical cam and slide the drive tang between the torsion spring tangs as far as it will go.



EKKB043F

39. Install the pin on the tang end of the helical cam into the hole in the front case.

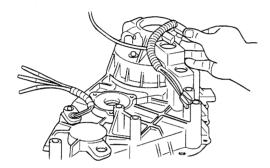
Position the torsion spring tangs so that they are pointing toward the top side of the transfer case and just touching the high-low shift fork.



#### CAUTION

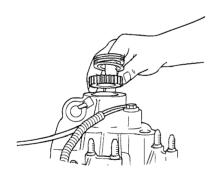
Do not bend the helical cam during installation to the front case because of possible damage to the pin at the tang end of the motor shaft.

- 40. Install the shift rail through the high-low shift fork and make sure that the reverse gear shift rail is seated in the front case bore.
- 41. Install upper and lower speed sensors into the cover. Feed the coil wire through the upper speed sensor wire shield.



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42. Install uppor tone wheel, speedometer gear and rear output seal.

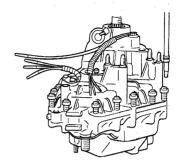


KMMB043N

- 43. Coat the mating surface of the front case with sealant.
- 44. The follwing precdure must be followed prior to installing the rear case onto the front case half:
  - Align the output shaft with the rear case output shaft bore.
  - Align the helical cam with the rear case motor bore.
    - If difficulty is encountered with seating the rear case, tap the rear output shaft with a sharp blow using a rubber mallet in a direction away from the

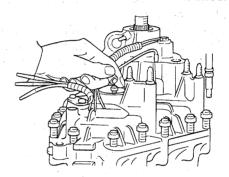
triangular shaft while pushing down on the rear

45. Install the bolts retaining the case halves and tighten to 25 - 37 N·m (250 - 370 kg·cm, 19 - 25 lb·ft).



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46. Install shift shaft oil seal if it is not installed.



KMMB043P

- 47. Using pliers equipped with soft jaws, rotate the triangular shaft so it is aligned with the triangular slot in the trassfer case shift motor. If triangular shaft will not rotate, rotate the rear output shaft.
- 48. Slightly loosen the two nuts that attach the slotted support bracket to the end of the motor house.
- 49. Apply the sealant to motor housing base and install on transfer case.
- 50. Install the transfer case shift motor.
- 51. Holding the slotted support bracket tight against the motor housing end secure the bracket to the transfer case, tightening the bolt with lockwasher to 8 11 N·m (80 110 kg·cm, 6 8 lb·ft)
- 52. Retighten the two nuts that attach the slotted support bracket to the end of the motor to 3 -4 N·m (30 40 kg·m, 2 3 lb·ft)

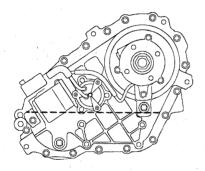
## SERVICE ADJUSTMENT PROCEDURES EMMB0450

#### **FLUID LEVEL INSPECTION**

- 1. Wipe fluid level plug and surrounding area clean.
- 2. Remove fluid level plug.
- 3. When transfer case is full, lubricant will just drip out fluid level plug opening.
- 4. Add approved lubricant if required.
- Install fluid level plug and torque to 20 30 N·m (14 22 lb·ft).

#### **NOTE**

- To check or drain the lubricant, the transfer case should be warm.
  - This is best done shortly after shutdown.
- Do not use an impact wrench to remove or install the fill or drain plugs since this will damage female threads in transfer case cover.

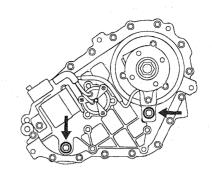


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#### FLUID REPLACEMENT

- 1. Wipe fluid level and drain plug and surrounding areas clean.
- 2. Place suitable container under transfer case.
- 3. Remove drain plug.
- 4. Remove fluid level plug.
- 5. Allow all lubricant to drain.
- 6. Install drain plug and torque to 20 30 N·m (14 22 lb·ft).
- Add approved lubricant through fluid level plug opening until lubricant just begins to drip back out of opening.

Install fluid level plug and torque to 20 - 30 N·m (14 - 22 lb·ft).

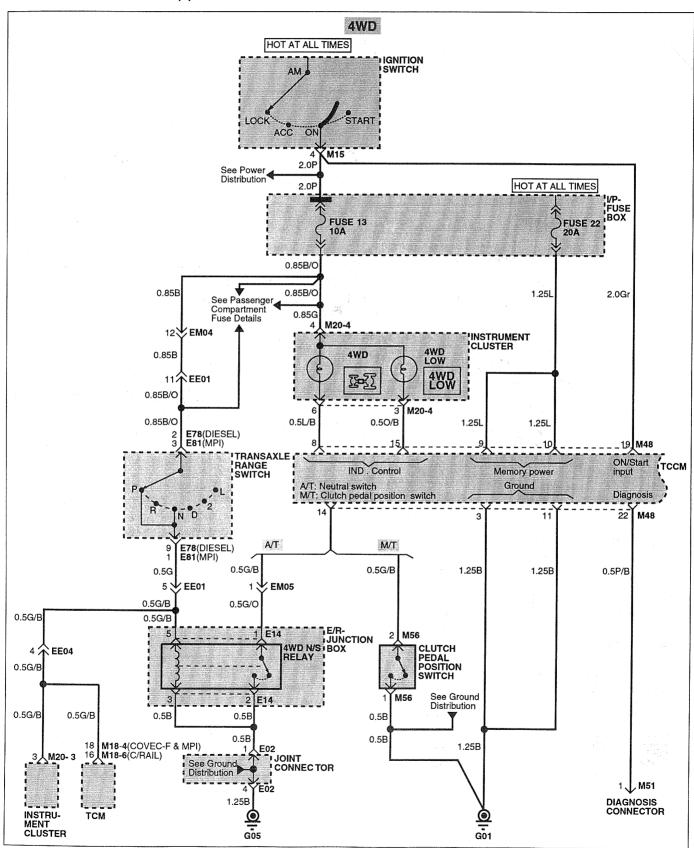


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#### TCCM

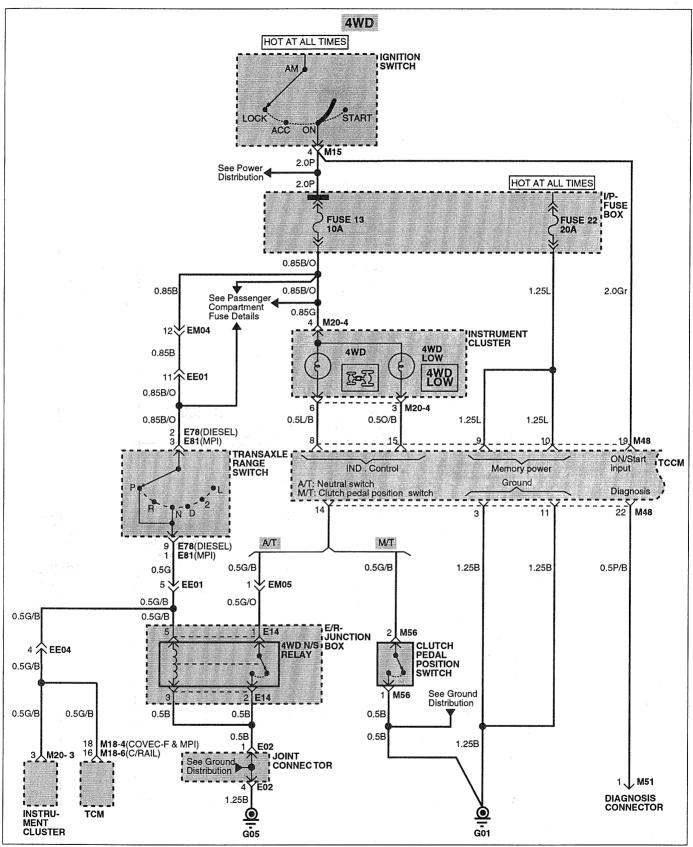
EMUC0500

#### TCCM CIRCUIT DIAGRAM (1)



EMUC050A

#### TCCM CIRCUIT DIAGRAM (2)



EMUC050A

#### TCCM CIRCUIT DIAGRAM (3)

