AUTOMATIC TRANSMISSION

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OUTLINE

FEATURES

1. The new model L4N71B Automatic Transmission features the employment of a torque converter with impeller and turbine lock-up (henceforth abbreviated as LU), and a modified version of the conventional model 3N71B transmission mechanism with the addition of Overdrive (henceforth abbreviated as OD).
2. The hydraulic system is electrically selected to OD by the OD control switch and OD cancel solenoid. Furthermore, the OD range may also be manually selected with the OD switch, located beside the selector lever.
3. The transmission shifts from 1st to 2nd to 3rd, and from 3rd to OD (4th) in the drive (D) range. (However, the gear remains in 3rd, and does not shift to OD, when the aforementioned OD switch is in the OFF position).
   Furthermore, the torque converter impeller and the turbine lock-up when the vehicle speed exceeds 70 km/h.

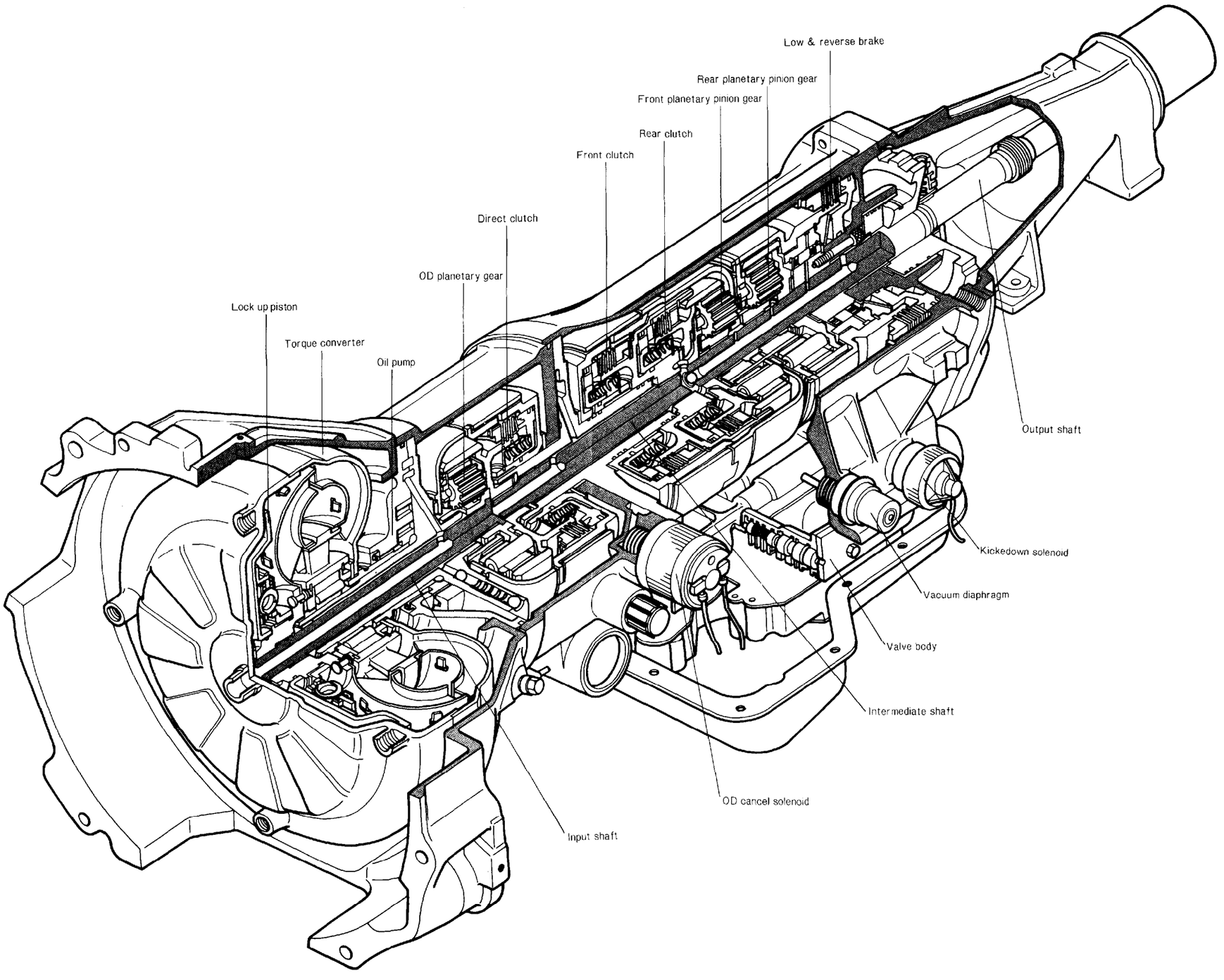
47U07B-001

SPECIFICATIONS

Model		L4N71B
Torque converter stall torque ratio		1.950
Gear ratio	1st	2.458
	2nd	1.458
	3rd	1.000
	OD (4th)	0.720
	Reverse	2.181
Number of plates	Direct clutch	2
	Front clutch	3
	Rear clutch	4
	Low reverse brake	4
Servo diameter (Piston outer diameter/ retainer inner diameter)	OD band servo	60/40 mm (2.36/1.57 in)
	2nd band servo	64/36 mm (2.52/1.42 in)
Speedometer gear ratio		17/5
Final gear ratio		3.933
Oil used	Type	A.T.F. type F (M2C33-F)
	Capacity	7.5 liters (7.9 U.S. quarts, 6.6 Imp. quarts)

47U07B-002

STRUCTURAL VIEW

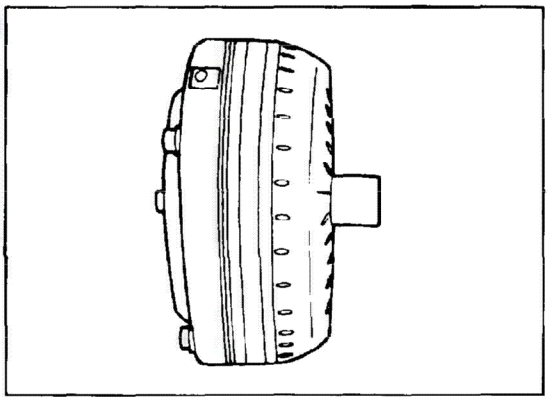


MAJOR MODIFICATIONS

The following modifications have been made from the conventional model 3N71B Automatic Transmission.

Modified part	Details	Modified part	Details
Torque converter	Performance/ configuration	Transmission case	Configuration
Oil pump	Performance/ configuration	Control valve	Function
OD case	Newly installed	OD switch & OD cancel solenoid	Newly installed
OD geartrain	Newly installed	OD indicator switch & lamp	Newly installed
Drum support	Newly installed	4-3 switch & kickdown switch	Newly installed
Input shaft/intermediate shaft	Newly installed/ configuration		

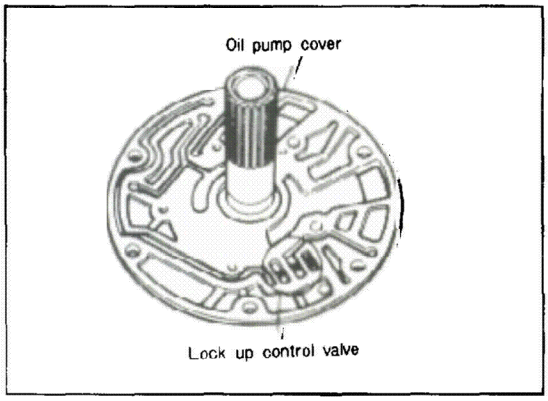
47U07B-003



47U07B-004

Torque Converter

A symmetrical 3-element, 1-step, 2-phase torque converter with lock-up mechanism is employed to attain ultimate fuel economy.



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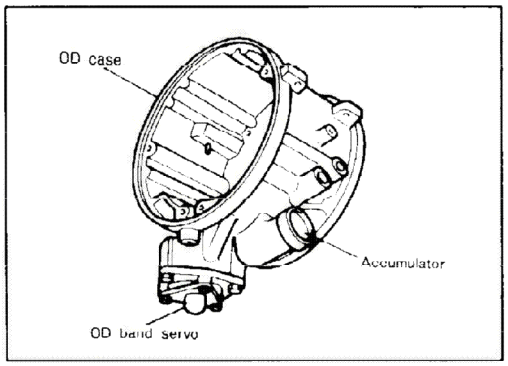
Oil Pump

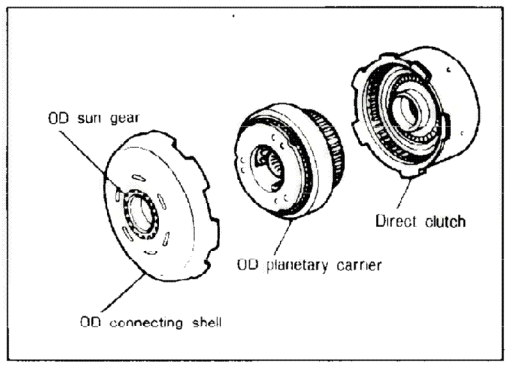
The configuration of the oil pump cover side as well as the internal hydraulic circuitry has been partially modified, and a lock-up control valve has been newly added.



47U07B-006

OD Case

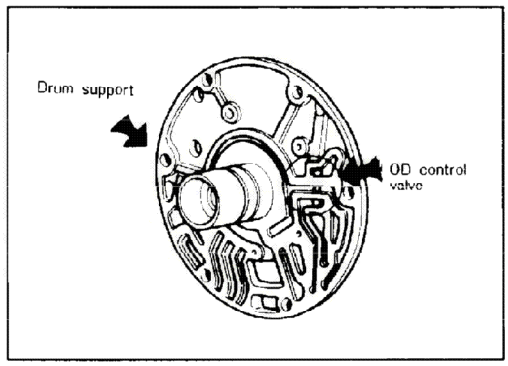
This case encloses the newly added planetary gear set, direct clutch, etc. for the OD mechanism, and is installed between the converter housing and the transmission case. Furthermore, the OD cancel solenoid, OD band servo, accumulator, etc. are installed on the perimeter of this casing.



47U07B-007

OD Geartrain

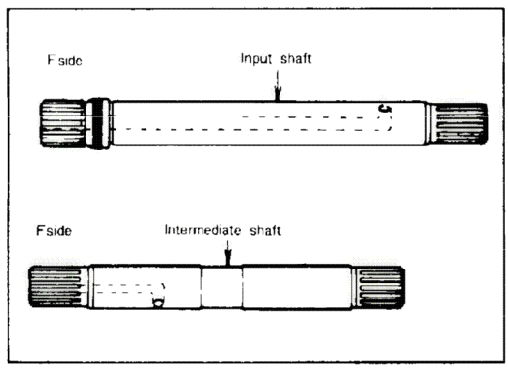
The OD geartrain is comprised of an OD planetary gear, direct clutch, OD sun gear, and OD connecting shell.



47U07B-008

Drum Support

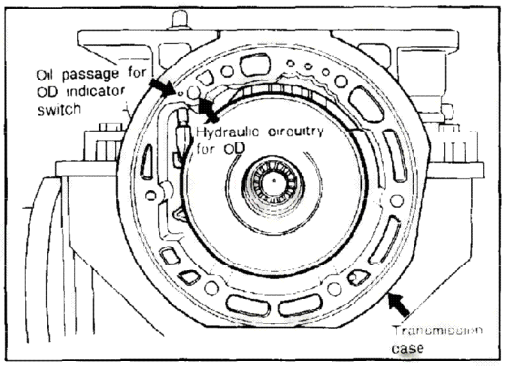
The drum support is installed between the OD case and the transmission case in order to support the front, rear and direct clutch drums. Furthermore, hydraulic circuitry is located on the front side for the installation of the OD control valve.



47U07B-009

Input Shaft & Intermediate Shaft

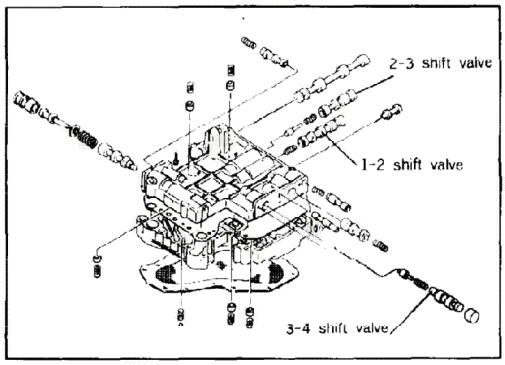
- An oil passage for the lock-up circuitry has been added.
- Added for the connection between the direct clutch hub and the rear clutch drum.



47U07B-010

Transmission Case

The transmission case has been modified with the addition of hydraulic circuitry for the OD and an oil passage for the transmission oil pressure switch.

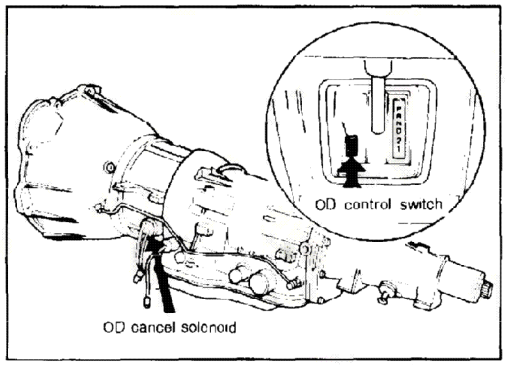


47U07B-011

Control Valve

The hydraulic circuits for the upper and lower bodies as well as for the separation plate have been modified in accordance with the addition of the 3-4 shift valve.

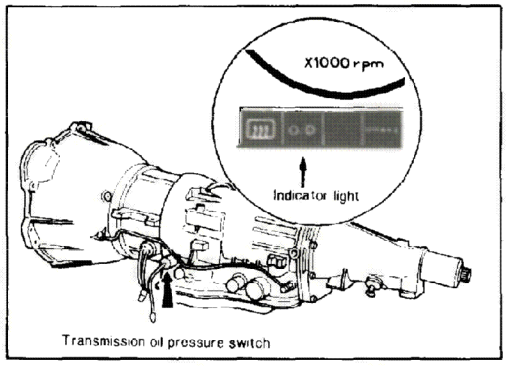
Furthermore, the 1-2 shift valve and the 2-3 shift valve positions have been reversed for the same reason.



47U07B-012

OD Control Switch & OD Cancel Solenoid

This mechanism is provided to activate and deactivate the OD. The OD control switch is installed on the left side of the transmission selector lever, and the OD cancel solenoid is located on the left of the OD casing.



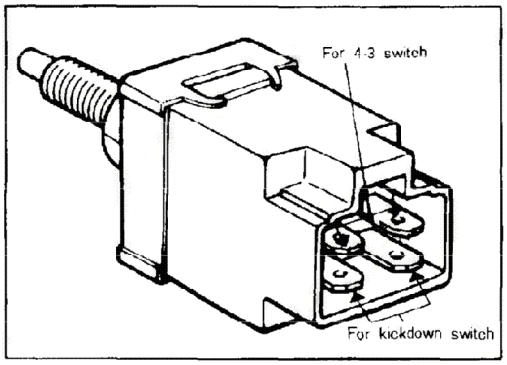
47U07B-012

Transmission Oil Pressure Switch & OD Indicator Light

This mechanism is provided to indicate the OD activation to the driver.

The switch is located on the left side of the transmission casing and is actuated by the deactivation of the OD band servo's open side pressure.

The OD indicator light are installed within the combination meter for illumination during OD operation.



47U07B-013

4-3 Switch & Kickdown Switch

The 4-3 switch is provided to shift the gear from OD to 3rd gears.

The kickdown switch is provided to rapidly shift the gears down from 3rd to 2nd, and from 2nd to 1st gears.

OPERATION TABLE

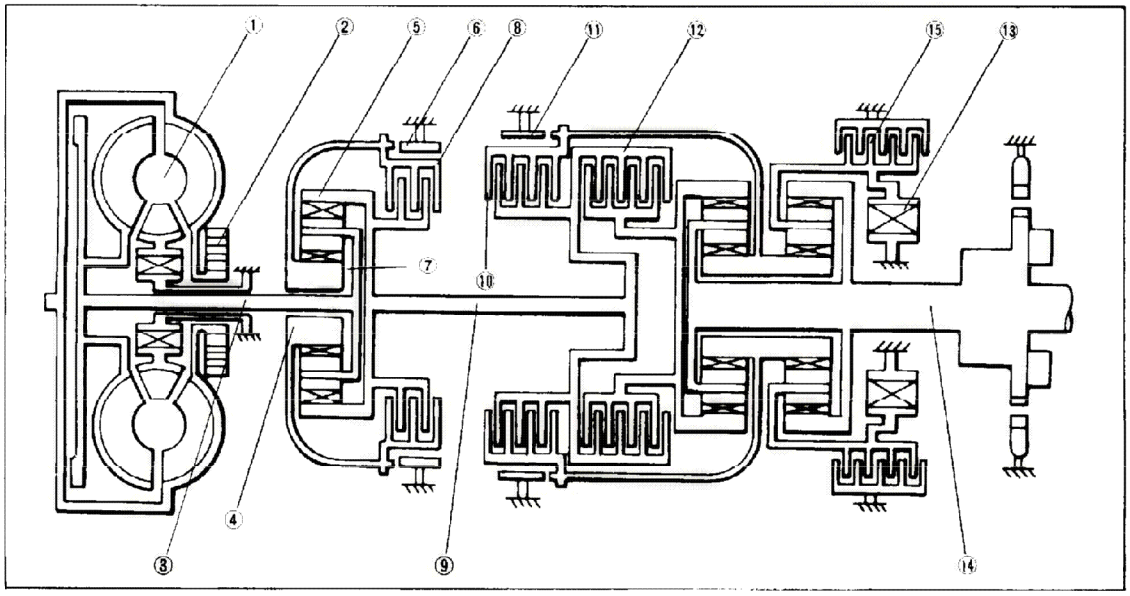
The individual transmission components operate as indicated in the table below for the respective gear positions.

Selector position		Direct clutch	OD band servo		Front clutch	Rear clutch	2nd band servo		Low & reverse brake	One-way clutch
			Operation	Release			Operation	Release		
P		O	◎	O					O	
R		O	◎	O	O			O	O	
N		O	◎	O						
D	1st gear	O	◎	O		O				O
	2nd gear	O	◎	O		O	O			
	3rd gear	O	◎	O	O	O	◎	O		
	OD (4th gear)		O		O	O	◎	O		
2		O	◎	O		O	O			
1	2nd gear	O	◎	O		O	O			
	1st gear	O	◎	O		O			O	

The ◎ indications indicate operation although the band servos remain deactivated due to the large release pressure side area.

47U07B-014

POWER TRANSMISSION MECHANISM DIAGRAM



47U07B-015

1. Torque converter
2. Oil pump
3. Input shaft
4. OD sun gear
5. OD clutch hub
6. OD brake band
7. OD planetary pinion carrier
8. Direct clutch
9. Intermediate shaft
10. Front clutch
11. 2nd brake band
12. Rear clutch
13. One-way clutch
14. Output shaft
15. Low & reverse brake

HYDRAULIC CIRCUITRY (HYDRAULIC CONTROL SYSTEM)

Outline

The transmission case and the oil pump body comprise a part of the hydraulic circuitry's oil passage route along with the control valves. The hydraulic circuitry diagram (schematic) illustrates the entire hydraulic system. The hydraulic pressures of the individual circuits are categorized as listed below in accordance with their respective functions:

(Numbers indicate individual circuits)

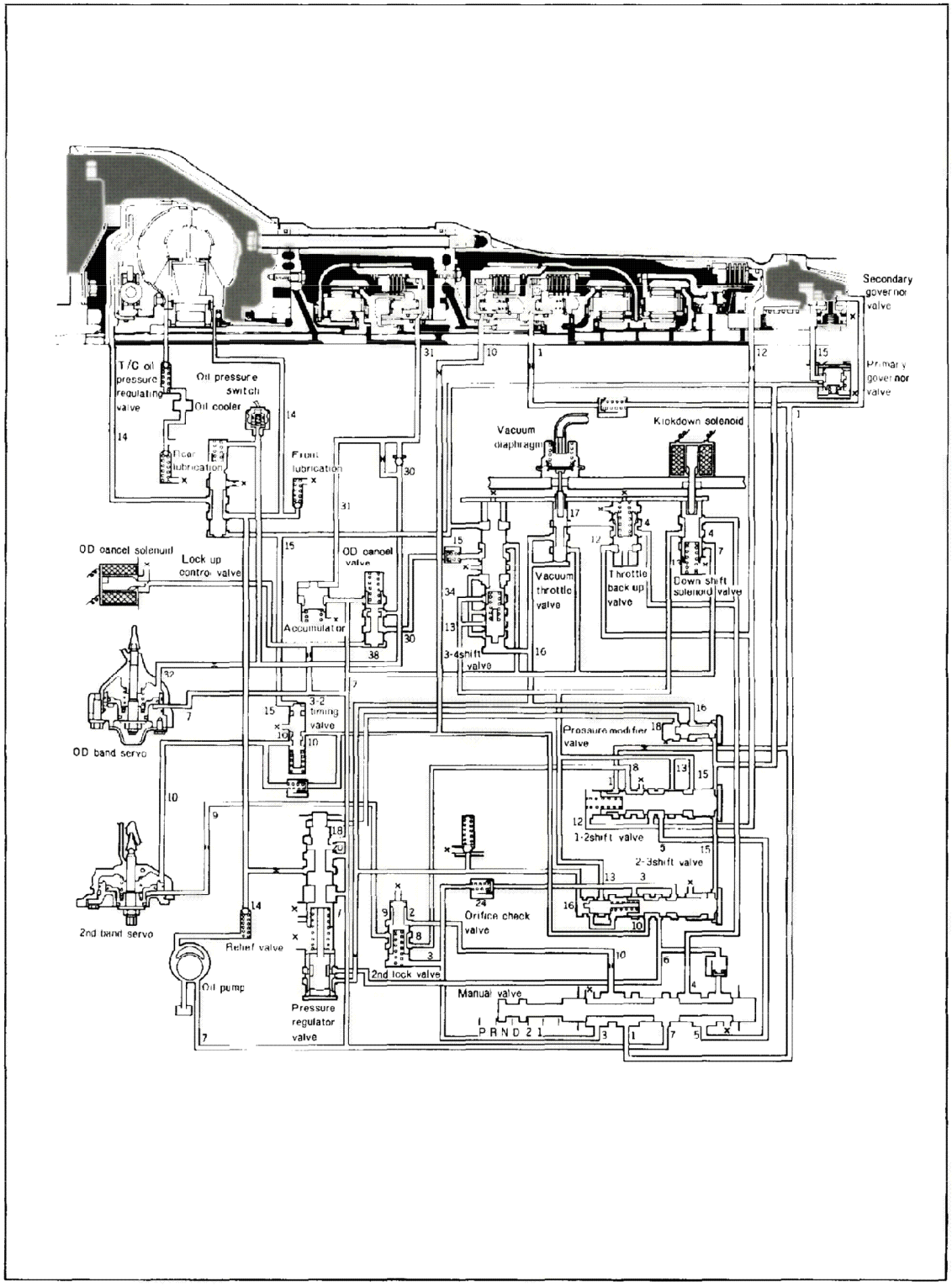
Line pressure source	7
Control element operation system line pressure	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 30, 31, 32, 33
Auxiliary line pressure	13
Throttle system pressure	16, 17, 18, 19, 34
Governor system pressure	15
Torque converter system pressure	14

1. Line pressure
   The line pressure is the hydraulic pressure of the oil emitted from the oil pump after adjustment by the pressure regulator valve.
2. Throttle pressure
   Derived from the line pressure, the throttle pressure is the hydraulic pressure generated by the throttle valve which operates with the variation in the negative pressure of the intake manifold.
3. Governor pressure
   Also derived from the line pressure, the governor pressure is the hydraulic pressure which varies with the vehicle's speed by the governor rotating together with the output shaft.

Note
Hydraulic circuitry diagram (schematic) symbols
X : Drain
⧗ : Orifice

47U07B-503

N (NEUTRAL) RANGE



47U07B 504

TROUBLESHOOTING GUIDE

It is highly important to follow proper troubleshooting procedures when attempting to determine an automatic transmission malfunction. The majority of such malufnctions often can be solved by simple inspections and adjustments. On the contrary to those which can be solved relatively simply, it is highly essential to perform repair work in accordance with the following troubleshooting chart for malfunctions requiring discrete tests.
Always perform removal and disassembly work when deemed necessary in accordance with the reference indicated in the troubleshooting chart.

How to use the troubleshooting chart
1) The numbers indicate the order of inspection for detecting malfunctions.
2) The letters A ~ P and mnq ~ x in the "Possible cause" column indicate individual inspection items and/or parts to be inspected.

57U07B-016

TROUBLESHOOTING GUIDES

Problem	Possible cause						
	A B C D	E F G H	I J K L	M N O P	m n q r	s t u v	w x
Engine does not start in "N" and/or "P" ranges.	● 2 3 ●	● ● ● ●	● ● ● ●	● ● 1 ●	● ● ● ●	● ● ● ●	● ●
Engine starts in ranges other than "N" and "P"	● 1 2 ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ●
Excessive "N" to "D" range shifting shock	● ● ● 2	● 1 3 ●	● 4 ● ●	● ● ● ●	⑤ ● ● ●	● ● ● ●	● ●
Vehicle does not move in "D" range (but moves in "1", "2" & "R" ranges).	● 1 ● ●	● ● 2 ●	● 3 ● ●	● ● ● ●	● ● ● ●	● ● ● ④	● ●
Vehicles does not move in "D", "2" & "1" ranges (but moves in "R" range). Extremely poor acceleration.	1 2 ● ●	● ● 4 ●	● 5 ● ●	6 3 ● 7	⑧⑩ ● ●	● ⑨ ● ●	● ●
Vehicle does not move in "R" range (but moves in "D", "2" & "1" ranges). Extremely poor acceleration.	1 2 ● ●	● ● 3 ●	● 5 ● ●	6 4 ● ●	⑨⑧ ● ⑦	● ⑪ ● ●	● ●
Vehicle does not move in any range.	1 2 ● ●	● ● 3 ●	● 5 ● ●	6 4 ● ●	● ● ● ●	⑦⑧ ● ●	⑨ ●
Power transmission slippage felt when starting.	1 2 ● 6	● ● 3 ●	● 5 ● ●	7 4 ● ●	● ● ● ●	⑧⑨ ● ●	● ●
Vehicle moves in "N" range.	● 1 ● ●	● ● ● ●	● 3 ● ●	● 2 ● ●	④ ● ● ●	● ● ● ●	
Low maximum speed & poor acceleration	1 2 ● ●	● ● 4 5	● 7 ● 6	● 3 ● 8	⑪⑫⑨⑩	⑬ ● ● ●	● ●
Vehicle braked when "R" range selected	● ● ● ●	● ● ● ●	● ● ● 3	2 1 ● ●	④ ● ⑤ ●	● ● ● ●	⑥ ●
Excessive creep	● ● ● ●	● 1 ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ●
No creep at all.	1 2 ● ●	● 3 ● ●	● 5 ● ●	● 4 ● ●	⑧⑨ ● ●	⑥⑦ ● ●	● ●
Does not shift from 1st to 2nd gear.	● 1 ● 2	3 ● ● ●	● 5 6 8	7 4 ● ●	● ● ⑨ ●	● ⑪ ● ●	● ●
Does not shift from 2nd to 3rd gear.	● 1 ● 2	3 ● ● ●	● 5 6 8	7 4 ● ●	● ⑩ ● ●	● ⑩ ● ●	● ●

Note: Creep is the term applied to the natural forward movement of a stationary vehicle in "D", "2" or "1" range.

57U07B-017

Problem	Possible cause						
	A B C D	E F G H	I J K L	M N O P	m n q r	s t u v	w x
Excessively high 1 to 2, and 2 to 3 shifting points	● ● ● 1	2 ● 3 ●	● 5 6 ●	● 4 ● ●	● ● ● ●	● ⑦ ● ●	● ●
Shifts directly to 3 from 1.	● ● ● ●	● ● ● ●	● 2 4 ●	3 1 ● ●	● ● ⑤ ●	● ⑥ ● ●	● ●
Excessively large 1 to 2 shift shock.	● ● ● 1	● ● ● 2	● 4 ● 5	● 3 ● ●	● ● ⑥ ●	● ● ● ●	● ●
Excessively large 2 to 3 shift shock.	● ● ● 1	● ● 2 ●	● 3 ● 5	4 ● ● ●	● ⑥ ● ●	● ● ● ●	● ●
Practically no 1 to 2 shift shock, or slippage while shifting	1 2 ● 3	● ● 4 ●	● 6 ● 8	7 5 ● ●	● ● ⑨ ●	● ⑩ ● ●	● ●
Practically no 2 to 3 shift shock, or slippage while shifting Engine runaway	1 2 ● 3	● ● 4 ●	● 6 ● 8	7 5 ● ●	● ⑨ ● ●	● ⑩ ● ●	● ●
Vehicle braked when shifted from 1 to 2.	● ● ● ●	● ● ● ●	● 2 ● ●	● 1 ● ●	● ④ ● ③	● ● ● ⑤	● ●
Vehicle braked when shifted from 2 to 3.	● ● ● ●	● ● ● ●	● 3 ● 2	● 1 ● ●	● ● ④ ●	● ● ● ●	● ●
Does not shift from 3 to 2.	● ● ● 1	● ● ● ●	● 3 4 6	5 2 ● ●	● ⑦ ⑧ ●	● ⑨ ● ●	● ●
Does not shift from 2 to 1 or from 3 to 1.	● ● ● 1	● ● ● ●	● 3 4 6	5 2 ● ●	● ● ⑦ ●	● ● ● ⑧	● ●
Shift shock felt when accelerator is released and deceleration occurs.	● 1 ● 2	3 ● 4 ●	● 5 6 ●	● ● ● ●	● ● ● ●	● ⑦ ● ●	● ●
Excessively high 3 to 2, and 2 to 1 shifting points	● 1 ● 2	3 ● 4 ●	● 5 6 ●	● ● ● ●	● ● ● ●	● ⑦ ● ●	● ●
Does not kickdown when accelerator is depressed in 3 within the kickdown speed limit.	● ● ● 2	1 ● ● ●	● 4 5 ●	● 3 ● ●	● ● ⑥ ●	● ⑦ ● ●	● ●
Abnormal rise of engine speed and/or kickdown when accelerator is depressed in 3 beyond the kickdown speed limit.	● 1 ● 2	● ● 3 ●	● 5 6 ●	7 4 ● ●	● ⑧ ● ●	● ⑨ ● ●	● ●
Engine runaway or slip when shifting from 3 to 2	● ● ● 1	● ● 2 ●	● 4 ● 6	5 3 ● ●	● ⑦ ⑧ ●	● ⑨ ● ●	● ●
Does not shift from 3 to 2 on "D" to "2" range shift.	● 1 ● ●	● ● 2 ●	● 4 ● 5	● 3 ● ●	● ● ⑥ ●	● ⑦ ● ●	● ●
Shifts from 2 to 1, or 2 to 3 in "2" range.	● 1 ● ●	● ● 2 ●	● 3 ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ●
No shift shock, or engine runaway in "1" to "2" range shift	1 2 ● 3	● 4 ● 8	● 6 ● ●	7 5 ● ●	● ● ⑨ ●	⑩ ● ● ●	● ●
No 3 to 2 shift in "D" to "1" range shift	● 1 ● ●	● ● 2 ●	● 4 5 7	6 3 ● ●	● ⑧ ⑨ ●	● ⑩ ● ●	● ●
No engine braking in "1" range	● 1 ● ●	● ● 2 ●	● 4 ● ●	5 3 ● ●	● ● ● ⑥	● ⑦ ● ●	● ●
Shifts from 1 to 2 and/or 2 to 3 in "1" range.	● 1 ● ●	● ● ● ●	● 2 ● ●	● ● ● ●	● ● ● ●	● ③ ● ●	● ●
Does not shift from 2 to 1 in "1" range.	1 2 ● ●	● ● ● ●	● 4 5 6	7 3 ● ●	● ● ● ⑧	● ⑨ ● ●	● ●
Excessively large 2 to 1 shift shock in "1" range	● ● ● 1	● ● ● 2	● 4 ● ●	● 3 ● ●	● ● ● ⑤	● ● ● ●	● ●

57007B-505

Problem	Possible cause						
	A B C D	E F G H	I J K L	M N O P	m n q r	s t u v	w x
Vehicle moves in "P" range and/or parking gear not disengaged when "P" range is disengaged.	● 1 ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	② ●
Transmission overheats.	1 ● ● ●	● ● 3 4	2 6 ● 8	7 5 ● ●	● ⑨ ⑩ ⑪	⑫ ⑬ ⑭ ●	● ● ⑮
Oil emission and/or white smoke discharge while running	1 ● ● 3	● ● 5 6	2 7 ● ●	8 4 ● ●	● ⑨ ⑩ ⑪	⑫ ⑬ ⑭ ●	● ● ⑮
Abnormal odor from oil charging pipe	1 ● ● ●	● ● ● ●	● ● ● ●	● 2 ● ●	③ ④ ⑤ ⑥	⑦ ⑧ ⑨ ●	● ● ⑩
Transmission noisy in "P" and "N" ranges	1 ● ● ●	● ● 2 ●	● ● ● ●	● ● ● ●	● ● ● ●	⑧ ● ● ●	● ●
Transmission noisy in "D", "2" "1" and "R" ranges	1 ● ● ●	● ● 2 ●	● ● ● ●	● ● ● ●	③ ● ● ●	④ ● ● ⑤	● ● ⑥

57U07B-018

INSPECTION ITEMS

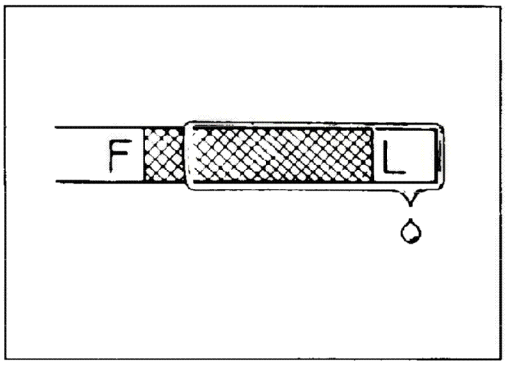
Inspection without disassembly		Inspection after disassembly	
A.	ATF quantity	m.	Rear clutch
B.	Range selector linkage	n.	Front clutch
C.	Inhibitor switch & wiring	q.	Brake band
D.	Vacuum diaphragm & piping	r.	Low & reverse brake
E.	Kickdown solenoid, kickdown switch & wiring	s.	Oil pump
F.	Engine idling speed	t.	Hydraulic circuitry (hydraulic control system)
G.	Oil pressure (throttle pressure)	u.	Torque converter one-way clutch
H.	Engine stall speed	v.	Power train one-way clutch
I.	Rear lubrication	w.	Parking gear mechanism
J.	Control valve	x.	Planetary gear
K.	Governor valve		
L.	Band servo		
M.	Transmission air check		
N.	Fluid inspection		
O.	Ignition switch and/or starter motor		
P.	Engine adjustment & brake inspection		

47U07B 019

LOCK-UP & OD MECHANISM TROUBLESHOOTING

Problem	Possible cause
Does not shift to OD.	• OD control switch malfunction • OD cancel solenoid malfunction • Insufficient governor pressure • Stuck OD cancel solenoid valve • Stuck 3-4 shift valve
Does not lock-up.	• Insufficient governor pressure • Stuck lock-up valve • Exfoliated lock-up clutch facing
Does not shift down to 3 from OD.	• OD cancel solenoid malfunction • Improper adjustment, or malfunction of 4-3 switch • Stuck 3-4 shift valve
Does not kickdown to 3 and 2 from OD.	• Improper adjustment or malfunction of kickdown switch
Slips when shifting to OD from 3.	• Improper OD band servo adjustment
Excessive OD to 3 and 2 downshift shock	• Stuck accumulator
OD indicator light does not illuminate.	• Disconnected wiring or failed bulb • Transmission oil pressure switch malfunction

57U07B-506



57U07B 020

ON-VEHICLE INSPECTIONS AND ADJUSTMENTS

FLUID LEVEL

Inspection

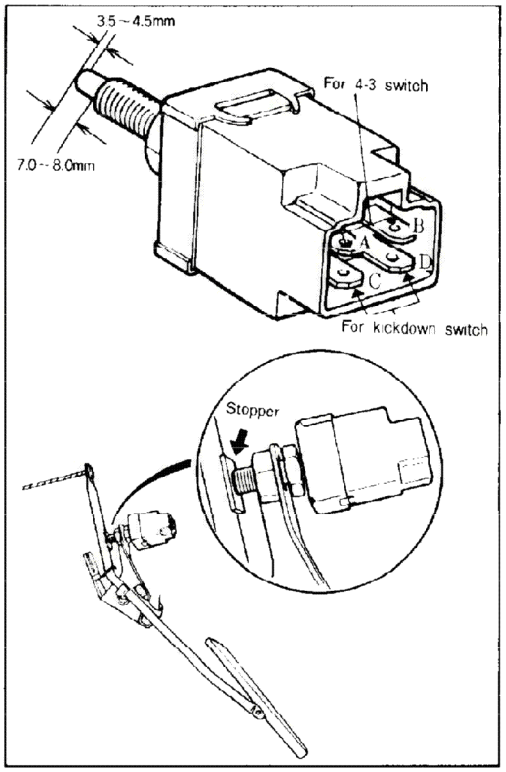
The automatic transmission fluid level is checked by the fluid level appearing on the level gauge with the selector lever in "P" range and the warmed engine at idling speed after shifting the selector through all shift ranges. Sufficient level is when the fluid level is between the F and L marks, as illustrated in the diagram. Add sufficient fluid when the fluid level is lower than the L mark.

Notes

a) Always park the vehicle on level ground when inspecting the automatic transmission fluid level.

b) Never add fluid beyond the F mark on the level gauge.

c) Always inspect the automatic transmission fluid level at normal running engine temperature (50 ~ 80°C).



57U07B-021

4-3 SWITCH AND KICKDOWN SWITCH

Inspection

4-3 switch

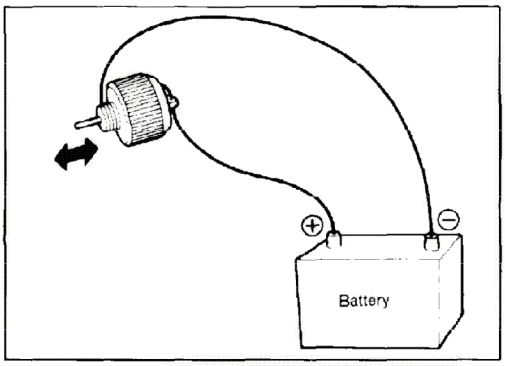
The 4-3 switch function is normal when conduction between the A and B terminals is attained with the tip of the switch depressed approximately 3.5 ~ 4.5 mm (0.137 ~ 0.177 in).

Kickdown switch:

The kickdown switch function is normal when conduction between the C and D terminals is attained with the tip of the switch depressed approximately 7.0 ~ 8.0 mm (0.276 ~ 0.315 in).

Adjustment procedures

1. Depress the accelerator fully down.
2. Adjust the 4-3 and kickdown switch stopper to where it contacts the accelerator pedal.
3. Secure the switch with the lock nut.

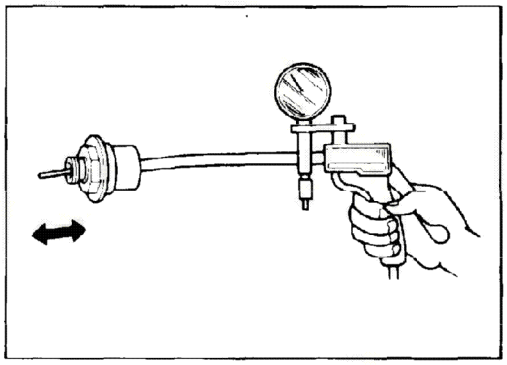


47U07B-022

KICKDOWN SOLENOID

Inspection

The kickdown solenoid function is normal when a "click" sound is heard with 12 volt electrical current applied to the kickdown solenoid.



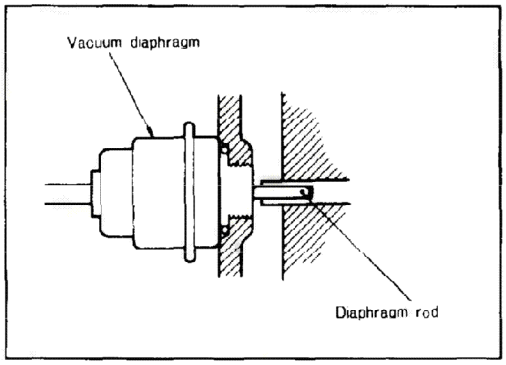
47U07B-023

VACUUM DIAPHRAGM

Inspection and Adjustment

Excessive shift shocks and gears not properly shifting often indicate a vacuum diaphragm malfunction. If this occurs, inspect the vacuum diaphragm as follows:

1. Remove the vacuum pipe to check for any automatic transmission fluid.
2. Check that the diaphragm rod moves when negative pressure is applied to the vacuum diaphragm.
3. Replace the rod when the diaphragm function is normal.

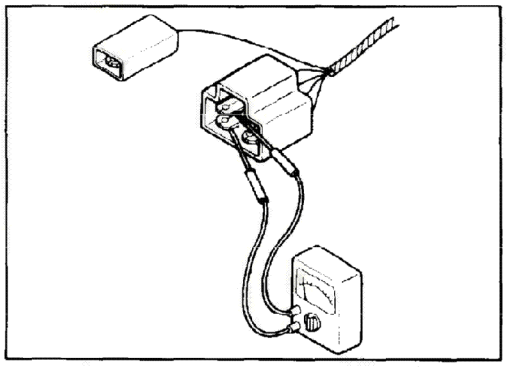


Diaphragm rod variations

29.0 mm (1.1418 in)	29.5 mm (1.1614 in)
30.0 mm (1.1811 in)	30.5 mm (1.2008 in)
31.0 mm (1.2205 in)	

Note

Extract approximately 1.0 liter (1.0567 U.S. quart) of automatic transmission fluid prior to removing the vacuum diaphragm.



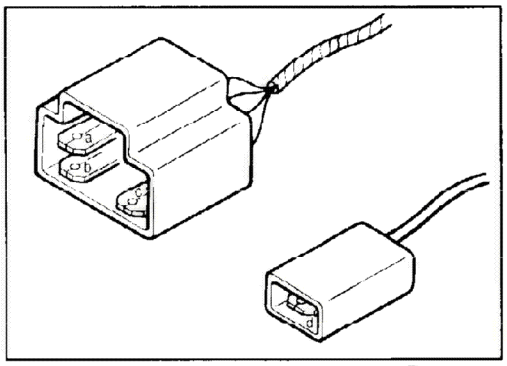
47U07B-024

INHIBITOR SWITCH

Inspection and Adjustment

The inhibitor switch is inspected and adjusted as follows:

1. Check that the starter turns with the ignition switch at START position in "P" and "N" ranges.
2. Check that the back-up (reverse) light illuminates when shifted to "R" range with the ignition switch in the ON position.
3. Check that all indicator lamps illuminate for the respective ranges.



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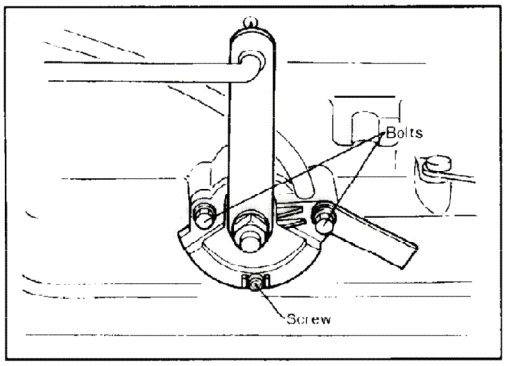

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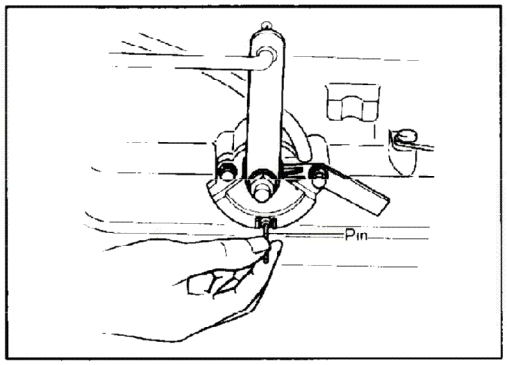


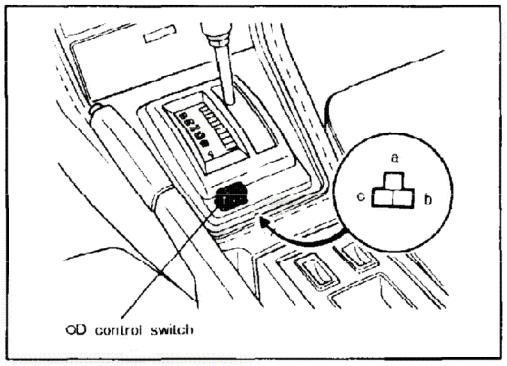
4. Jack up the vehicle and support it with stands. Then disconnect the inhibitor switch coupler to check the conduction between individual terminals with a circuit tester if there is a malfunction.

Connection guide

Position	Coupler terminal			
	a	b	c	d
P			○—○	
R	○—○			
N			○—○	
D				

○—○ : indicates conduction

5. Perform adjustments as follows when it is determined that there is a malfunction:
   1) Shift the selector lever to the "N" range.
   2) Jack up the vehicle and support it with stands.
   3) Loosen the inhibitor switch mounting bolts.
   4) Remove the screw on the switch body and slightly move the inhibitor switch so that the screw hole on the switch body will be aligned with the small hole inside the switch. Check their alignment by inserting a **2.0 mm (0.0079 in)** diameter pin into the holes.
   5) Temporarily tighten the switch attaching bolts, remove the pin, and tighten the screw into the hole.
   6) Tighten the switch attaching bolts.
   7) Check the conduction between individual terminals with a circuit tester in the respective ranges.



57U07B-027

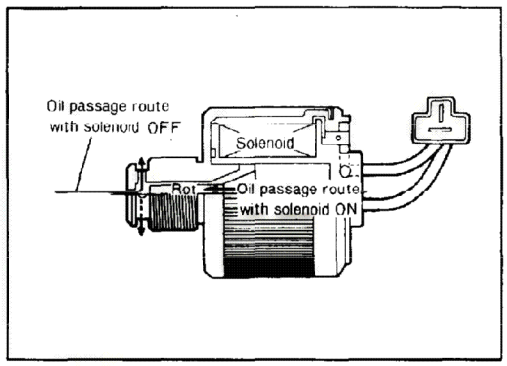
OD CONTROL SWITCH

Inspection

The OD control switch inspection is performed as follows:

1. Remove the indicator panel and disconnect the OD control switch coupler.
2. Check the conduction between a and b terminals with a circuit tester.

SWITCH	ON	No Conduction
	OFF	Conduction

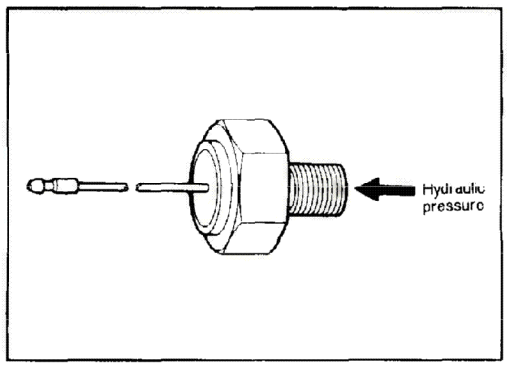


47U07B-028

OD CANCEL SOLENOID

Inspection

Inspect the opening and closing of the oil passage by applying 12V current to the OD cancel solenoid. The oil passage should close with the current conduction to the OD cancel solenoid and open when the current is cut off.



47U07B-029

TRANSMISSION OIL PRESSURE SWITCH

Inspection

The transmission oil pressure switch function is normal when the following conditions are satisfied:

Illuminating pressure	Under 50 kPa (7.1 psi) ON Conduction
Shut-off pressure	Over 300 kPa (42.7 psi) OFF Conduction

(The inspection is performed under air pressurization.)

PERFORMANCE (FUNCTION) TESTS

OUTLINE

The following items are tested to check the individual transmission component functions:

1. Stall test
2. Line pressure test
3. Governor pressure test
4. Road test

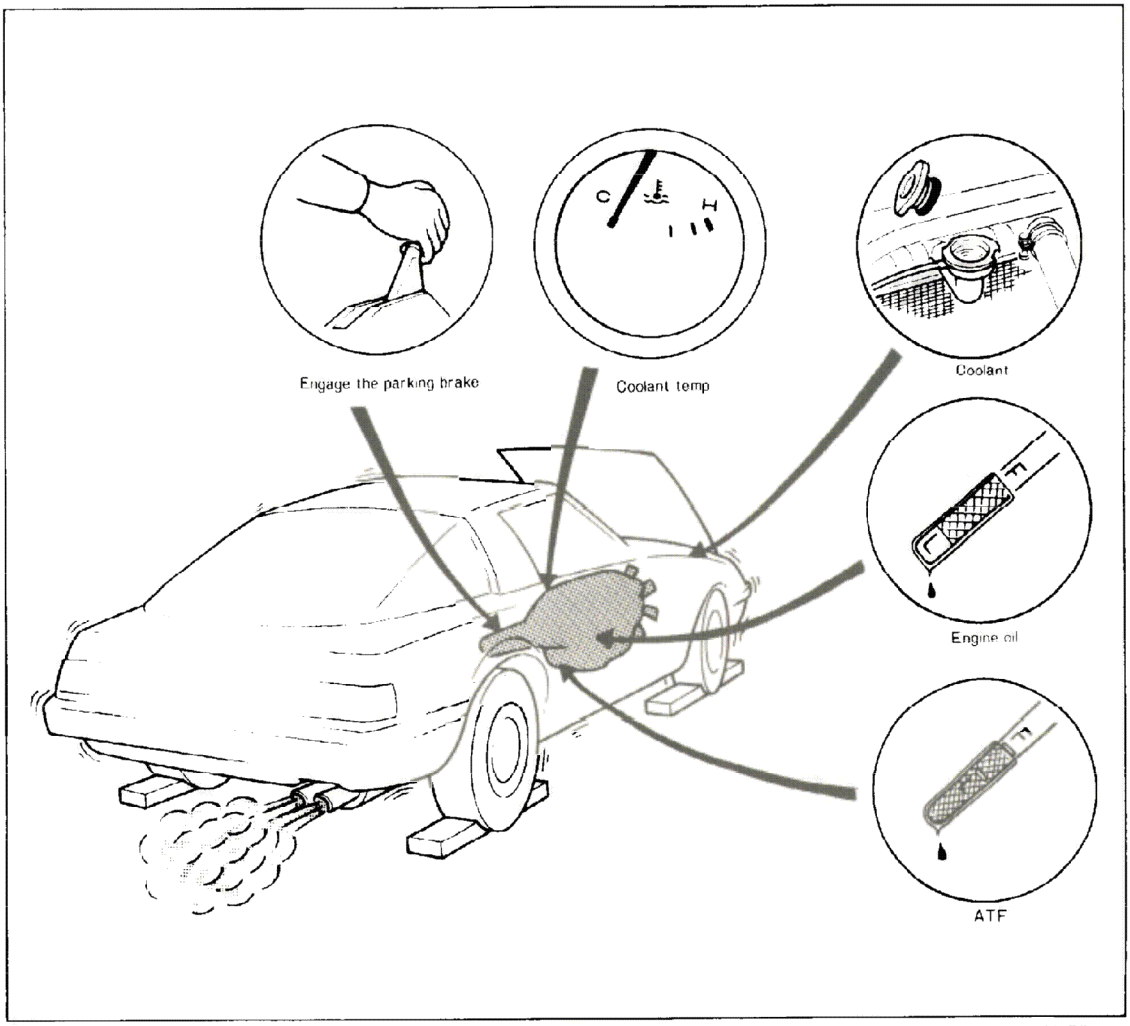
Notes

Always check the following items prior to testing the aforementioned items:

a) Engine coolant, engine oil and automatic transmission fluid levels.

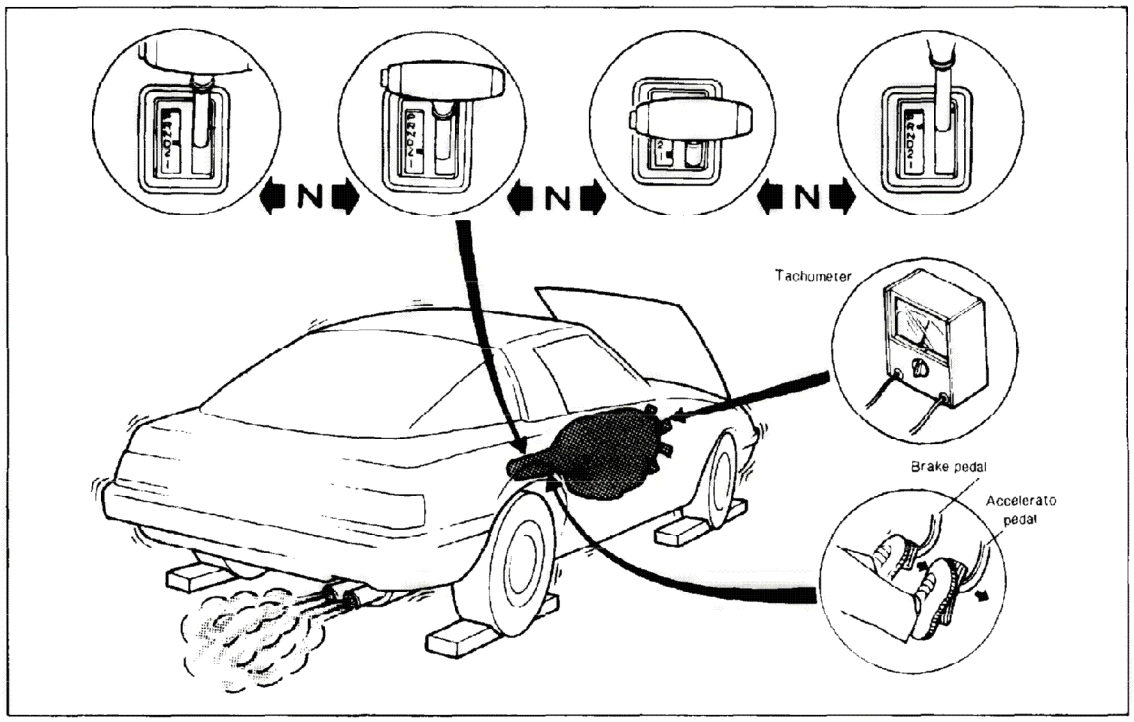
b) Warm the engine thoroughly to raise the automatic transmission fluid temperature to working level (50 ~ 80°C).

c) Engage the parking brake and apply wheel stoppers to front and rear wheels when performing stall and line pressure tests.
Drive the vehicle in traffic to perform inspection of line pressure cutback point as well as governor pressure and road tests.



47U07B-507

STALL TEST



47U07B-030

Stall Test Procedures

The stall test is performed as follows.

1. Mount the tachometer (engine revolution speed meter) to the engine.
2. Shift the selector to "D" range.
3. Depress the brake pedal firmly with the left foot and gradually depress the accelerator pedal with the right foot.
4. Read the engine revolution speed as soon as the engine revolution becomes constant, and release the accelerator pedal.

Note
Steps 3 to 4 must be accomplished within 5 seconds.

5. Shift the selector to "N" range and run the engine at idling speed for over one minute.

Note
This over one minute idling is performed to cool the automatic transmission fluid as well as to prevent oil degeneration.

6. Perform stall tests for "2", "1" and "R" ranges in the identical manner.

Note
Always provide adequate cooling time between individual range stall tests.

Stall revolutions: 2,400 ~ 2,650 rpm

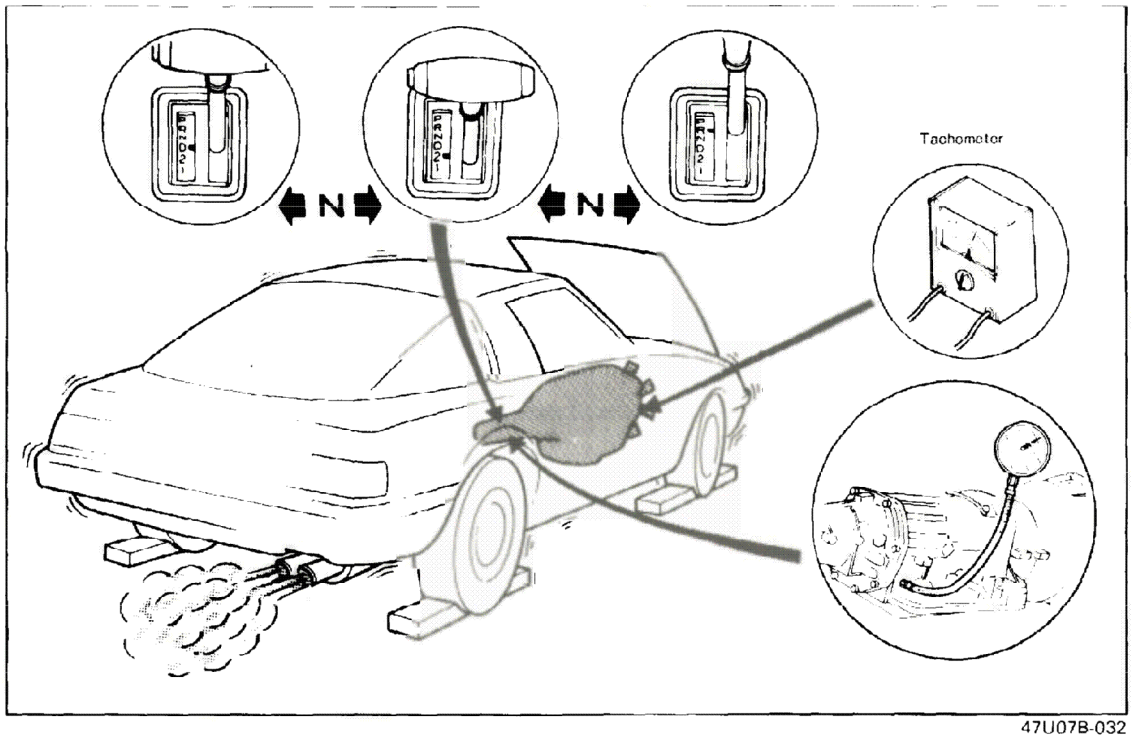
47U07B-031

Function performance is determined in accordance with the chart below.

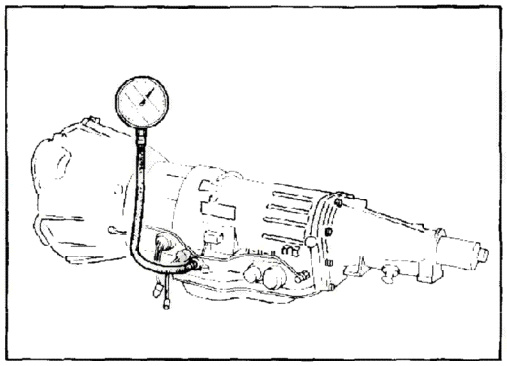
Stall revolution		Possible cause	
Above standard	Above standard in all ranges	Insufficient line pressure	Degenerated oil pump Oil leakage from oil pump, control valve, and/or transmission case Stuck pressure regulator valve
	Above standard in "D", "2" & "1" ranges	Direct clutch slipping Rear clutch slipping	
	Above standard in "D" range only	Direct clutch slipping One-way clutch slipping	
	Above standard in "2" range only	Brake band slipping	
	Above standard in "R" range only	Direct clutch slipping Low & reverse brake slipping Front clutch slipping Perform the road test, to determine whether it is due to the low & reverse brake or the front clutch, as follows a) Effective engine braking in "1" range . . . . Front clutch b) No engine braking in "1" range . . . . . Low & reverse brake	
Within standard		All gearshift control elements within the transmission are functioning normally.	
Below standard		Engine out of tune Slipping of one-way clutch within the torque converter	

57U07B-508

LINE PRESSURE TEST



47U07B-032



47U07B-033

The line pressure test is performed as follows.

1. Mount the tachometer to the engine and the **oil pressure gauge** (49 0378 400A) to the line pressure inspection hole of the transmission case as illustrated in the figure.
2. Shift the selector to the "D" range.
3. Read the oil pressure at engine idling speed.
4. Depress the brake pedal firmly with the left foot and gradually depress the accelerator pedal with the right foot.
5. Read the oil pressure as soon as the engine revolution speed becomes constant, and release the accelerator pedal.

Note
Steps 4 to 5 must be accomplished within 5 seconds.

6. Shift the selector to "N" range and run the engine at idling speed for over one minute.
7. Read the line pressures at engine idling and stall speeds for each range in the identical manner.

Note
The line pressure in the "R" range is tested by removing the detection plug of the line pressure inspection hole.

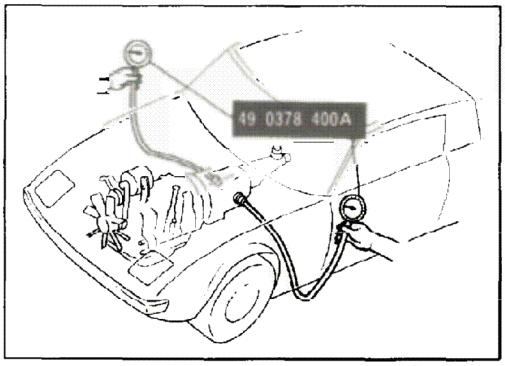
Standard line pressure table

	Line pressure	
Range	Idling condition	Stall condition
D, 1	300 ~ 400 kPa (43 ~ 75 psi)	900 ~ 1100 kPa (128 ~ 156 psi)
2	800 ~ 1200 kPa (114 ~ 171 psi)	800 ~ 1200 kPa (114 ~ 171 psi)
R	400 ~ 700 kPa (57 ~ 110 psi)	1600 ~ 1900 kPa (228 ~ 270 psi)

Function performance is determined as follows:

Line pressure	Possible cause
Below standard in "D", "1", "2" & "R" ranges	Worn out oil pump Fluid leakage from the oil pump, control valve, and/or transmission case Stuck pressure regulator valve Fluid leakage from the direct clutch and/or OD band servo release side
Below standard in "D", "1", & "2" ranges only	Fluid leakage from the direct clutch and/or OD band servo release side Fluid leakage from the "D" and/or "2" range hydraulic circuitry (rear clutch/governor)
Below standard in "R" range only	Fluid leakage from the direct clutch and/or OD band servo release side Fluid leakage from the "R" range hydraulic circuitry (low & reverse brake)
Excessive line pressure at idling	Degenerated or disconnected vacuum tube Degenerated vacuum diaphragm

57U07B-034



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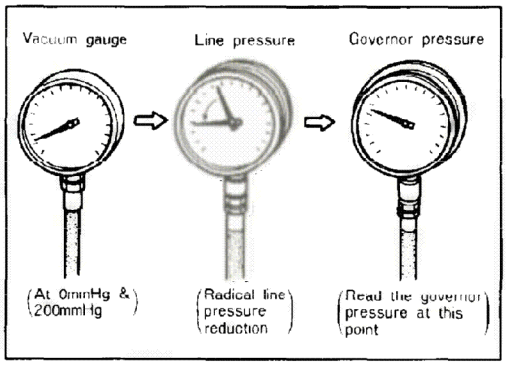


LINE PRESSURE CUTBACK POINT INSPECTION

The line pressure cutback point is inspected as follows.

1. Mount the **oil pressure gauge** (49 0378 400A) to the line pressure and governor pressure inspection holes in the transmission case and place the meters in the driver's seat.
2. Remove the piping to the vacuum diaphragm and seal the piping off with a plug.
3. Mount the vacuum pump to the vacuum diaphragm and place the pump in the driver's seat.
4. Read the governor pressure at the point where the line pressure drops radically while gradually accelerating the vehicle in "D" range. Readings are to be taken when the vacuum pump gauges are indicating 0 mmHg and 200 mmHg respectively.

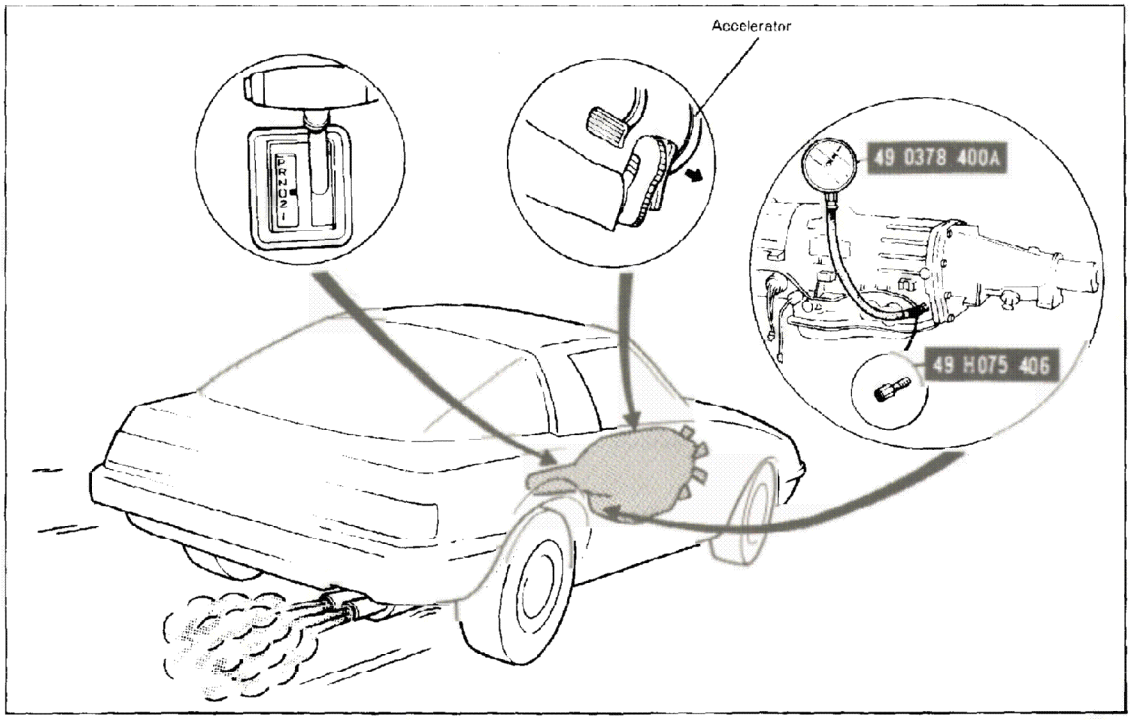
Standards

Vacuum pump negative pressure	Governor pressure
0 mmHg (0 inHg)	100 ~ 160 kPa (14 ~ 23 psi)
200 mmHg (7.87 inHg)	40 ~ 100 kPa (6 ~ 14 psi)

The following malfunctions are conceivable when readings are off standard.

1. Unassembled diaphragm rod and/or rod length radically off standards.
2. Stuck valve in the control valve.

GOVERNOR PRESSURE TEST



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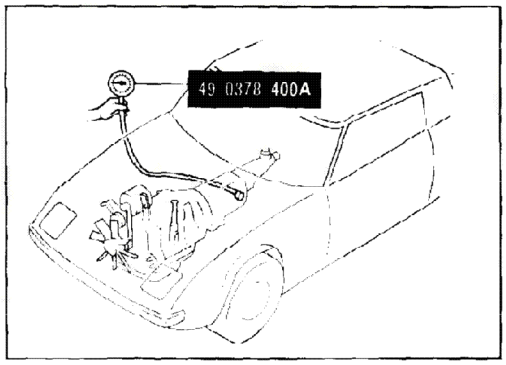


57U07B-037

The governor pressure test is performed as follows.

1. Mount the **oil pressure gauge** (49 0378 400A) by using the **adaptor** (49 H075 406) to the governor pressure inspection hole in the transmission case and place the meter in the driver's seat.
2. Drive the vehicle in "D" range.
3. Read the governor pressures at the speeds listed in the table below.

Standard governor pressures

Vehicle speed	Governor pressure
20 mile/h (30 km/h)	80 ~ 140 kPa (11.4 ~ 20.0 psi)
35 mile/h (55 km/h)	150 ~ 230 kPa (21.3 ~ 32.7 psi)
55 mile/h (85 km/h)	320 ~ 410 kPa (45.5 ~ 58.3 psi)

The following malfunctions are conceivable when readings are off standard.

1. Fluid leakage from the line pressure hydraulic circuitry
2. Fluid leakage from the governor pressure hydraulic circuitry
3. Defective or stuck governor valve

ROAD TEST

Road tests are performed to inspect the following items. Adjust/repair malfunctions identified during road tests in accordance with the Troubleshooting Chart.

Gearshift Function Check Items

1. Shift shock must be minimal and shifting must be smooth.
2. Engine revolution must not run away and the shifting must not be delayed.
3. The gears must shift through $D_1 \rightarrow D_2 \rightarrow D_3 \rightarrow$ OD in "D" range.
4. Must shift from 3rd in "D" range to 2nd gear when the "2" range is selected.
5. Must shift from 2nd to 1st when the "1" range is selected from 3rd gear in "D" range.
6. Gears must not shift up in "1" range.
7. Must remain in 2nd gear in "2" range.
8. Must positively lock in "P" range.

The vehicle must positively lock when selected to "P" range while moving at a speed below 4 km/h (slow walking speed) on level ground. The vehicle must positively lock when selected to "P" range with the brakes disengaged on a gentle slope.

47U07B-038

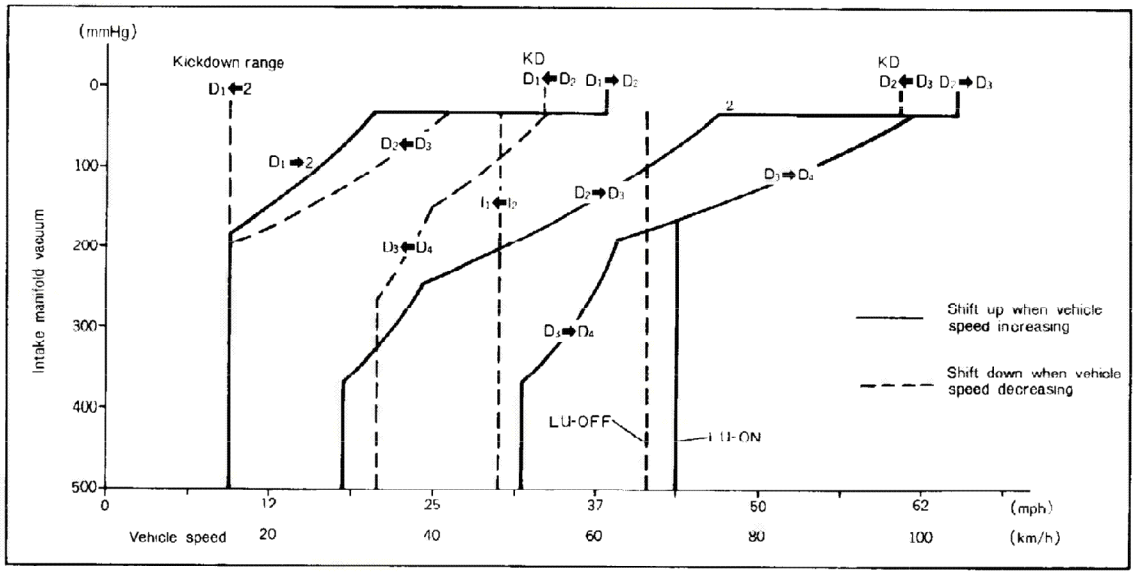
Vehicle Speed At Gearshift Table

Throttle condition	Gearshift	Vehicle speed at gearshift	Throttle condition	Gearshift	Vehicle speed at gearshift
Full throttle (kick-down)	$D_1 \rightarrow D_2$	34 ~ 41 mile/h (55 ~ 66 km/h)	Half throttle	$D_1 \rightarrow D_2$	7 ~ 11 mile/h (12 ~ 18 km/h)
	$D_2 \rightarrow D_3$	63 ~ 70 mile/h (102 ~ 113 km/h)		$D_2 \rightarrow D_3$	19 ~ 22 mile/h (30 ~ 36 km/h)
	$D_3 \rightarrow D_2$	58 ~ 65 mile/h (94 ~ 105 km/h)		$D_3 \rightarrow D_4$	59 ~ 70 mile/h (37 ~ 43 km/h)
	$D_2 \rightarrow D_1$	29 ~ 36 mile/h (47 ~ 58 km/h)	Fully closed	$D_3 \rightarrow D_1$	7 ~ 11 mile/h (12 ~ 18 km/h)
Entire throttle Opening range	$I_2 \rightarrow I_1$	27 ~ 34 mile/h (44 ~ 55 km/h)	Lock-up on	D_4	42 ~ 48 mile/h (67 ~ 78 km/h)

1. Full throttle: The throttle opening range during kickdown where the manifold negative pressure is between **0 ~ 100 mmHg.**
2. Half throttle: The throttle opening at manifold negative pressure of **200 mmHg.**

47U07B-039

Basic Gearshift Pattern



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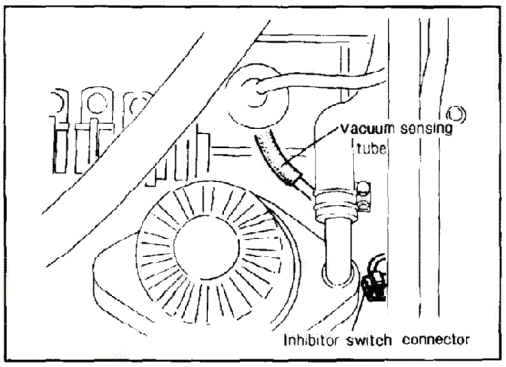


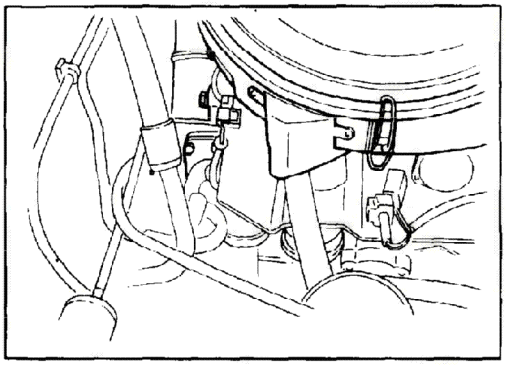
47U07B-040

REMOVAL OF TRANSMISSION

The procedures for removing the transmission from the vehicle are as follows:

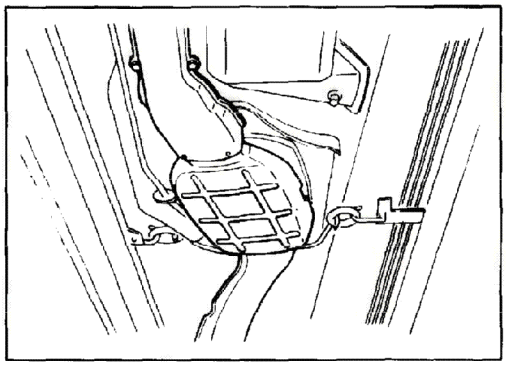
Apply the parking brake and block the wheels.

1. Open the hood and disconnect the battery negative cable.
2. Disconnect the inhibitor switch connector.
3. Remove the converter housing upper cover.
4. Disconnect the vacuum sensing tube of the vacuum diaphragm.



47U07B-041

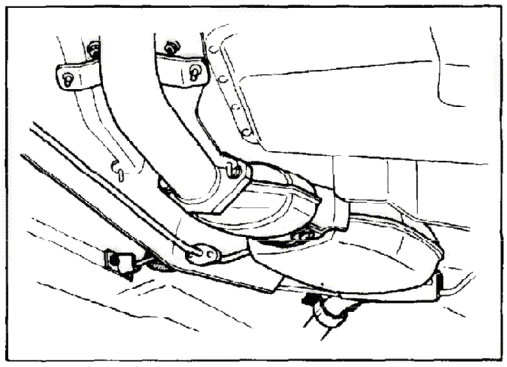
5. Remove the air cleaner assembly.
6. Remove the converter housing side cover.
7. Remove the bolts attaching the transmission to the rear end of the engine.



47U07B-042

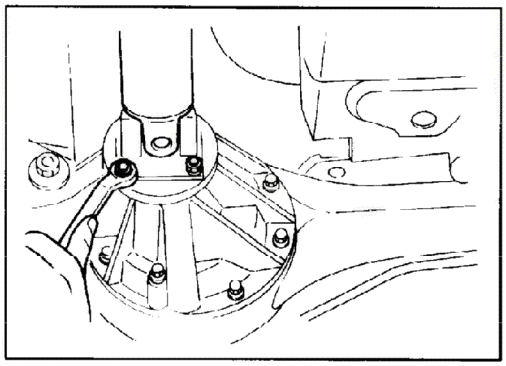
Jack up the vehicle and support it with stands.

8. Remove the under cover front.
9. Remove the under cover rear.
10. Remove the converter under cover.



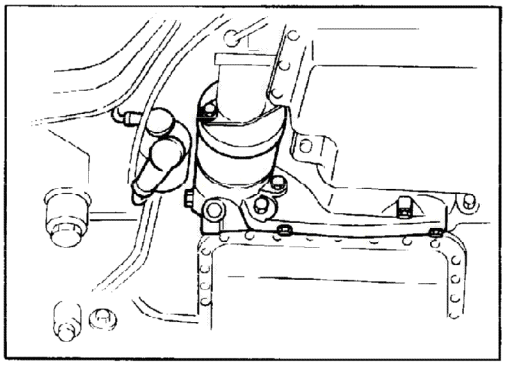
47U07B-043

11. Remove the nuts and disconnect the air pipe.
12. Remove the converter brackets.
13. Loosen the nuts and carefully remove the exhaust pipe rear and pellet converter assembly.
14. Loosen the nuts and remove the exhaust pipe front and monolith converter assembly.
15. Remove the floor under covers.



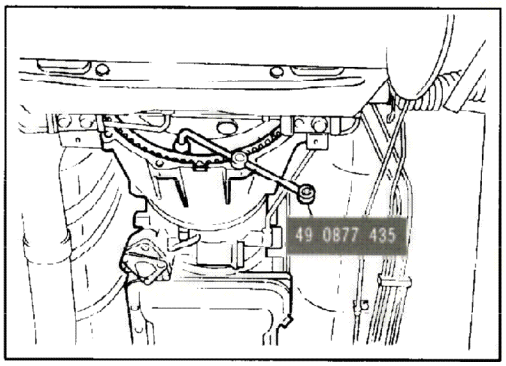
47U07B-044

16. Remove the propeller shaft. Install the **turning holder** (49 0259 440) into the extension housing to prevent lubricant from leaking out of the housing.



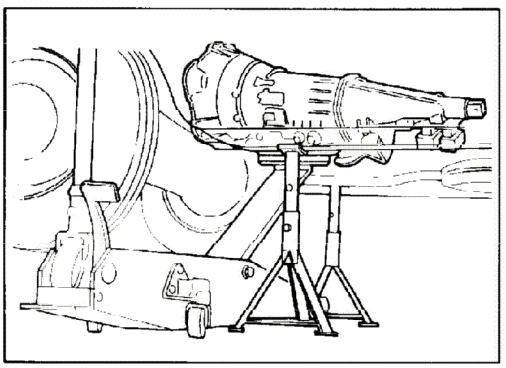
47U07B-045

17. Disconnect the starting motor wiring.
18. Remove the starting motor.
19. Remove the converter housing lower cover.



47U07B-046

20. Mark the drive plate and torque converter for correct realignment during re-installation. Using the **wrench** (49 0877 435), remove the bolts attaching the torque converter to the drive plate.
21. Remove the bolts attaching the transmission to the rear end of the engine.

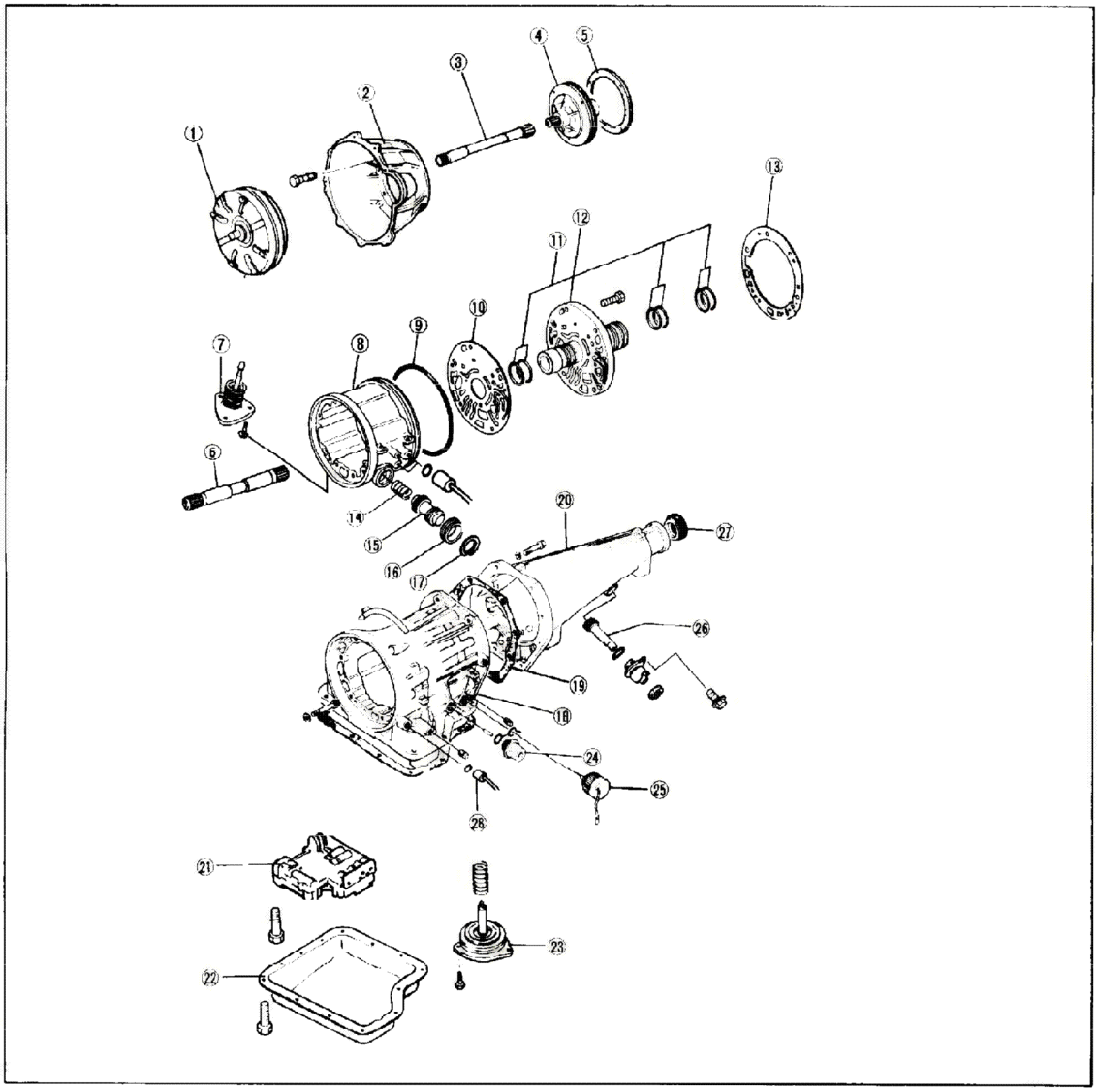


47U07B-047

22. Place a jack under the transmission and the engine, and support them securely.
23. Disconnect the speedometer cable.
24. Disconnect the selector rod at the selector lever.
25. Remove the nuts attaching the transmission support to the body.
26. Lower the transmission enough to disconnect the fluid pipes, and disconnect the fluid pipes from the transmission housing.
27. Slide the transmission rearward until the input shaft clears the rear end of the eccentric shaft, and carefully remove the transmission and torque converter assembly from under the vehicle.

DISASSEMBLY OF TRANSMISSION

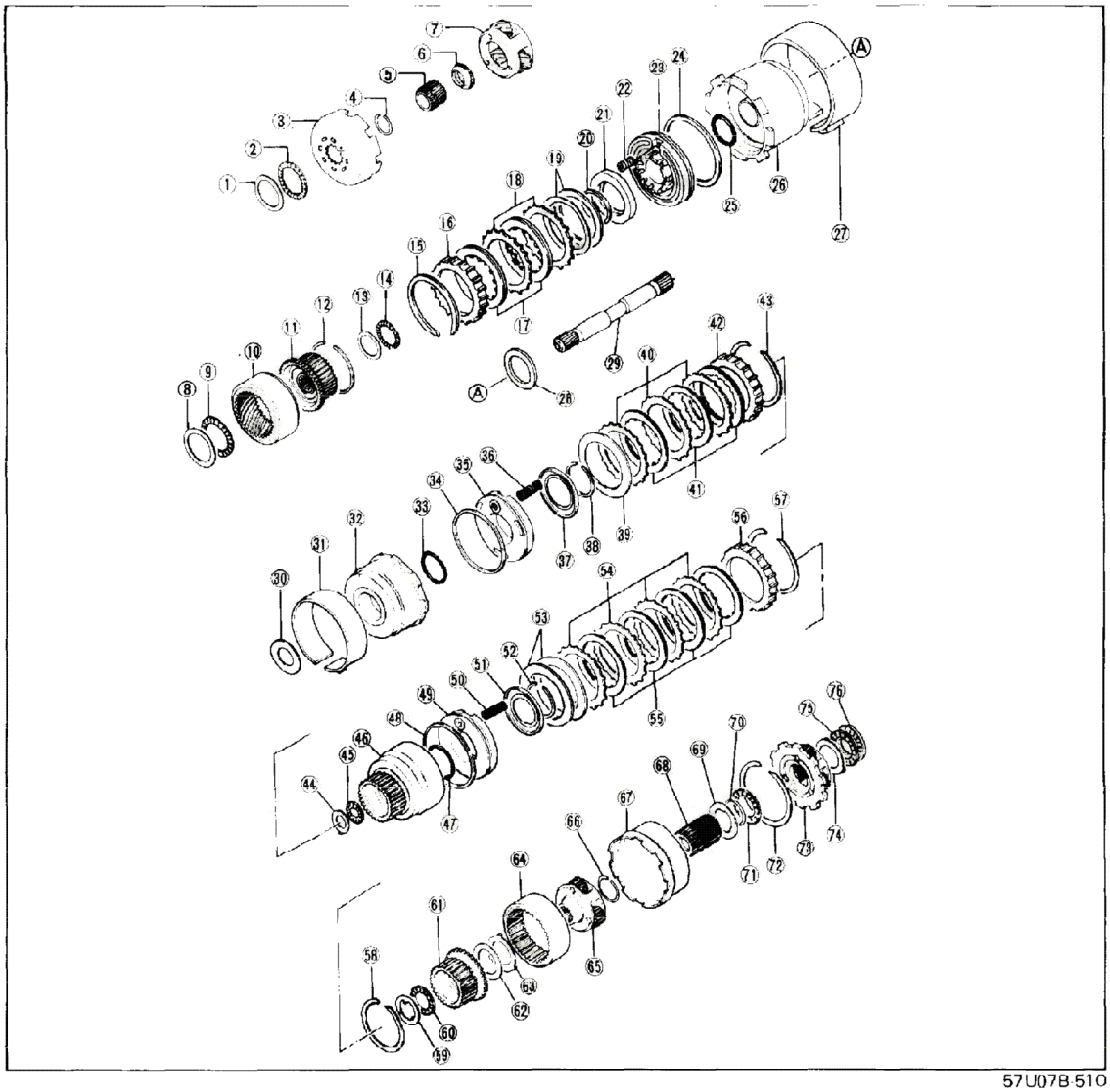
CONSTRUCTION VIEW



57U07B-509

1. Torque converter
2. Converter housing
3. Input shaft
4. Oil pump
5. Gasket
6. Intermediate shaft
7. OD band servo
8. OD case
9. Seal ring
10. Gasket
11. Seal ring
12. Drum support
13. Gasket
14. Spring
15. Accumulator piston
16. Accumulator plug
17. Snap ring
18. Transmission case
19. Gasket
20. Extension housing
21. Control valve assembly
22. Oil pan
23. 2nd band servo
24. Vacuum diaphragm
25. Kickdown solenoid
26. Speedometer driven gear
27. Oil seal

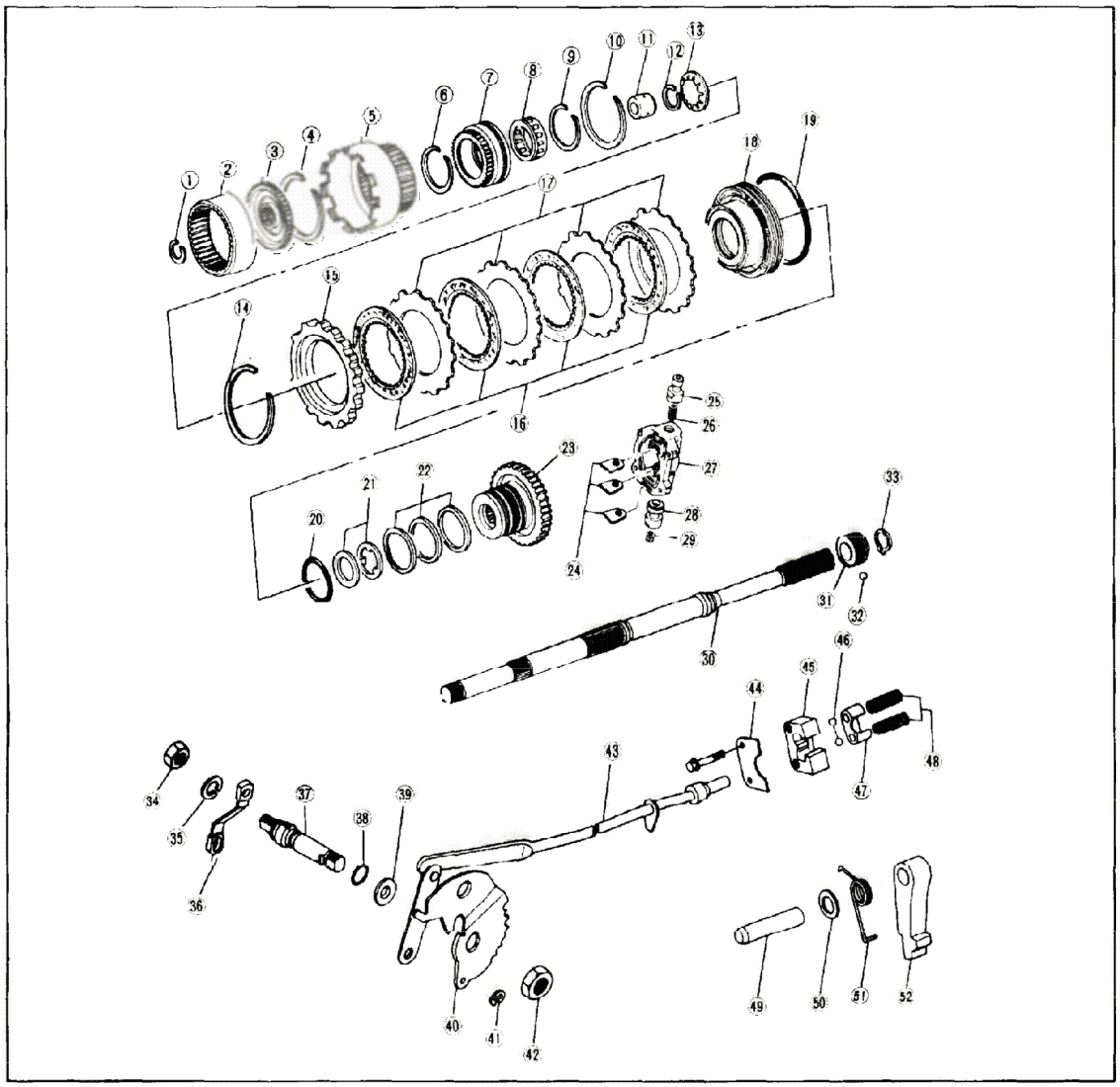
CONSTRUCTION VIEW



57U07B-510

1. Bearing race
2. Needle bearing
3. OD connecting shell
4. Snap ring
5. OD sun gear
6. Bearing
7. OD carrier
8. Bearing race
9. Needle bearing
10. OD internal gear
11. OD clutch hub
12. Snap ring
13. Bearing race
14. Needle bearing
15. Snap ring
16. Retaining plate
17. Drive plates
18. Driven plates
19. Dished plates
20. Snap ring
21. Spring retainer
22. Return spring
23. Clutch piston
24. Piston seal
25. O ring
26. Direct clutch drum
27. Brake band
28. Thrust washer
29. Intermediate shaft
30. Front clutch washer
31. Brake band
32. Front clutch drum
33. O ring
34. Piston seal
35. Clutch piston
36. Return spring
37. Spring retainer
38. Snap ring
39. Dished plates
40. Driven plates
41. Drive plate
42. Retaining plate
43. Snap ring
44. Bearing race
45. Needle bearing
46. Rear clutch drum
47. O ring
48. Piston seal
49. Clutch piston
50. Return spring
51. Spring retainer
52. Snap ring
53. Dished plates
54. Driven plates
55. Drive plates
56. Retaining plate
57. Snap ring
58. Snap ring
59. Bearing race
60. Needle bearing
61. Rear clutch hub
62. Needle bearing
63. Bearing race
64. Internal gear
65. Front carrier assembly
66. Snap ring
67. Connecting shell
68. Sun gear
69. Bearing race
70. Snap ring
71. Needle bearing
72. Snap ring
73. Rear carrier assembly
74. Bearing race
75. Needle bearing
76. Needle bearing

CONSTRUCTION VIEW

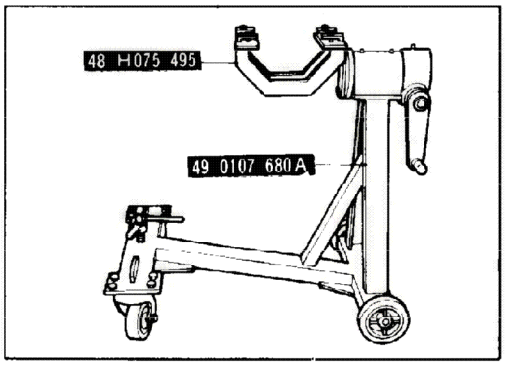


57U07B-511

1. Snap ring
2. Internal gear
3. Internal drive flange
4. Snap ring
5. Connecting drum
6. Snap ring
7. Outer race
8. One-way clutch
9. Snap ring
10. Snap ring
11. Inner race
12. Thrust ring
13. Piston return spring
14. Snap ring
15. Retaining plate
16. Drive plates
17. Driven plates
18. Low & reverse brake piston
19. Piston seal
20. O ring
21. Needle bearing & bearing race
22. Seal rings
23. Oil distributor
24. Retainer plate
25. Governor secondary valve
26. Governor spring
27. Governor valve body
28. Governor primary valve
29. Governor spring
30. Output shaft
31. Speedometer drive gear
32. Steel ball
33. Snap ring
34. Nut
35. Spring washer
36. Selector lever
37. Manual shaft
38. O ring
39. Spacer
40. Manual plate
41. Snap ring
42. Nut
43. Parking rod
44. Retaining plate
45. Actuator support
46. Steel ball
47. Retainer
48. Spring
49. Pole shaft
50. Dowel spacer
51. Return spring
52. Parking pole

Cautions
a) Always disassemble transmissions in a dustproof environment (dustproof workspace) to prevent dust entry into the mechanisms.
b) Always clean the transmission exterior thoroughly with steam and/or cleaning solvents prior to commencing disassembly.
c) Always inspect the individual disassembled transmission components in accordance with the troubleshooting chart during disassembly.
d) Always use plastic hammers when applying force to split the light alloy case joint.
e) Never use rags during disassembly.

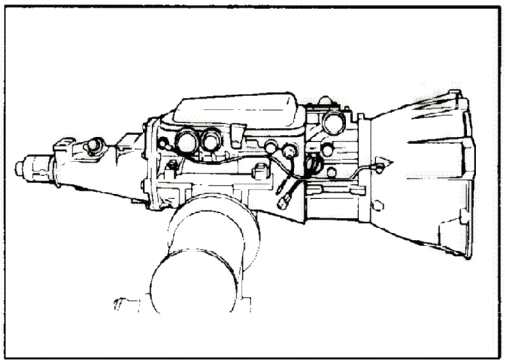
47U07B-048



57U07B-049

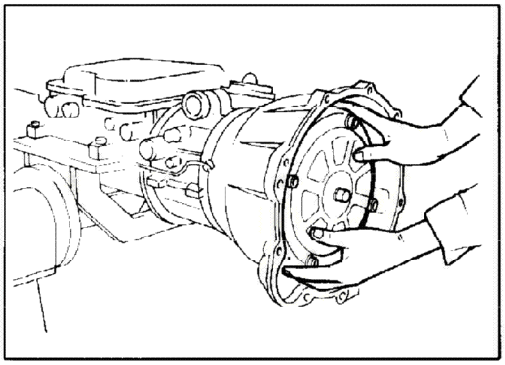
DISASSEMBLY PROCEDURES

1. Mount the **transmission hanger** (49 H075 495) to the **engine stand** (49 0107 680A).
2. Extract automatic transmission fluids out of the transmission.



57U07B-050

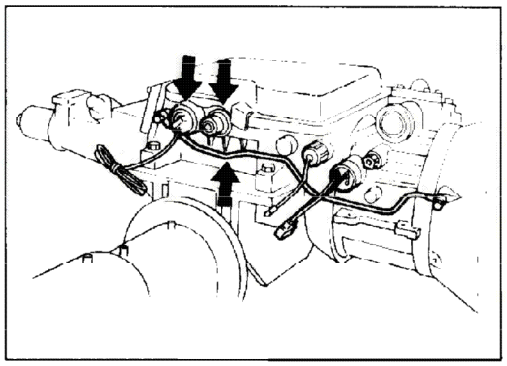
3. Mount the transmission assembly on the engine stand.



47U07B-051

4. Remove the torque converter out of the converter housing.

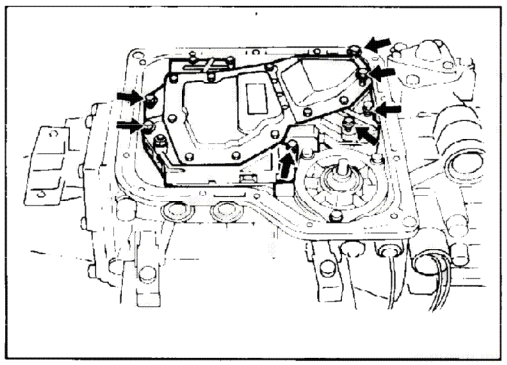
Note
Pay close attention to prevent automatic transmission fluid from spilling when removing the torque converter.



47U07B 052

5. Remove the governor pressure pipe, downshift solenoid and vacuum diaphragm.

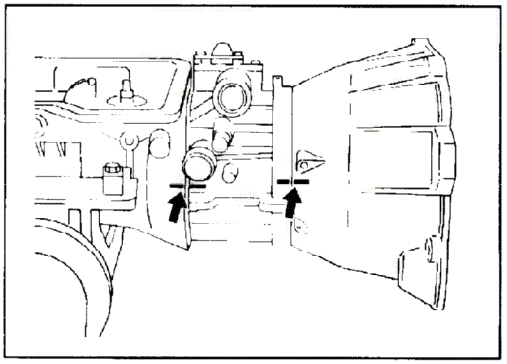
Caution
Be careful not to leave the vacuum rod in the tip of the vacuum diaphragm after removal.



57U07B-053

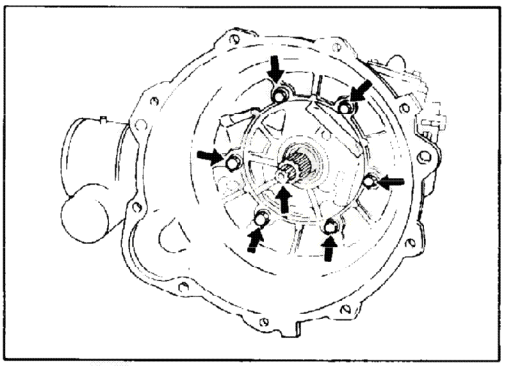
6. Remove the oil pan and inspect its contents. An analysis of any foreign matter can indicate the types of problems to look for. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches and/or band) may need replacement. A tacky film that will not wipe clean indicates varnish build-up which can cause valves, servo and clutches to stick and may inhibit pump pressure.
7. Remove the valve body assembly.

Note
Neatly arrange the different length bolts to facilitate reassembly.



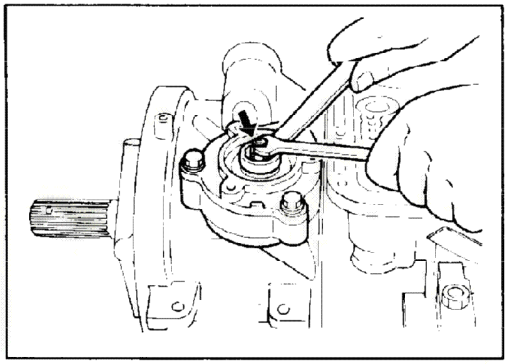
47U07B-054

8. Place match-joint marks on the converter housing, overdrive case and transmission case.



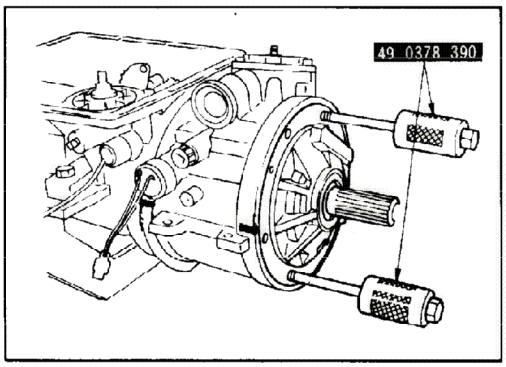
47U07B-055

9. Remove the converter housing.
10. Remove the input shaft.



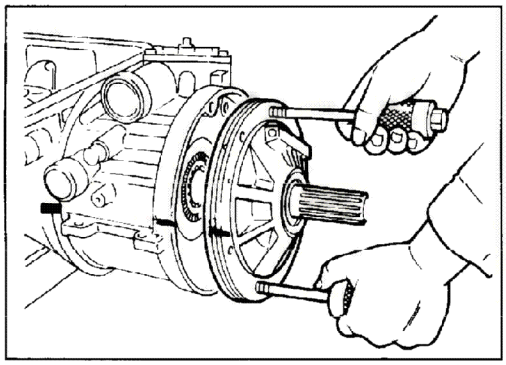
47U07B 056

11. Remove the OD band servo cover.
12. Loosen the OD band servo lock nut and tighten the piston stem.



57U07B-057

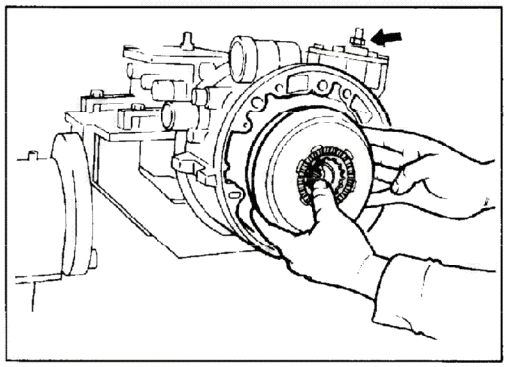
13. Mount the **oil pump pullers** (49 0378 390) on the oil pump.



47U07B-058

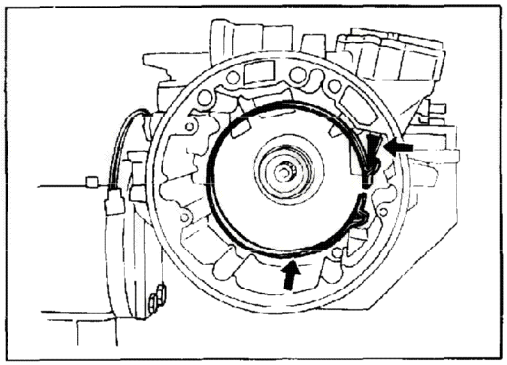
14. Slide the weights of the oil pump pullers and remove the oil pump.

Caution
Refrain from forcibly pulling the oil pump pullers during removal to prevent the OD connecting shell, sun gear and planetary pinion carrier from falling off.



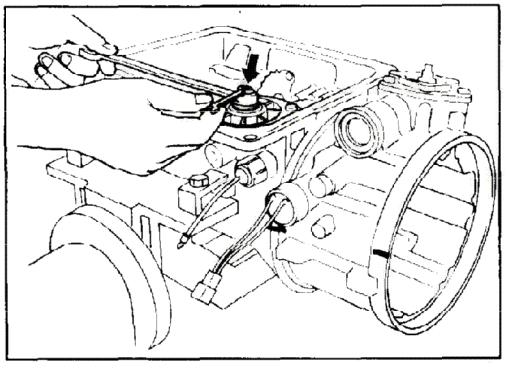
47U07B-059

15. Loosen the piston stem of the OD band servo.
16. Remove the direct clutch assembly.



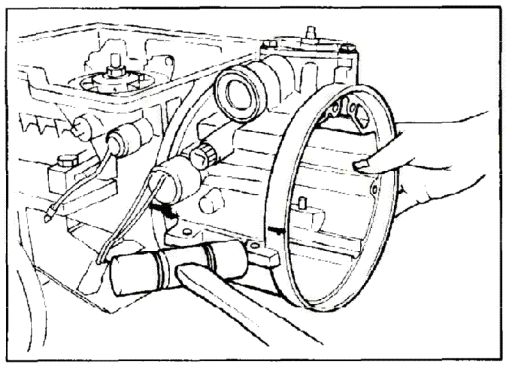
47U07B-060

17. Remove the OD brake band and band strut.



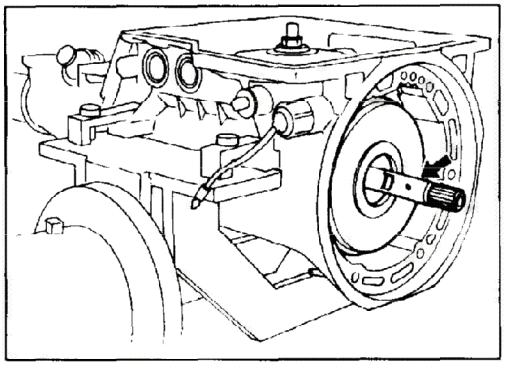
47U07B-061

18. Loosen the 2nd band servo lock nut and tighten the piston stem.



47U07B-062

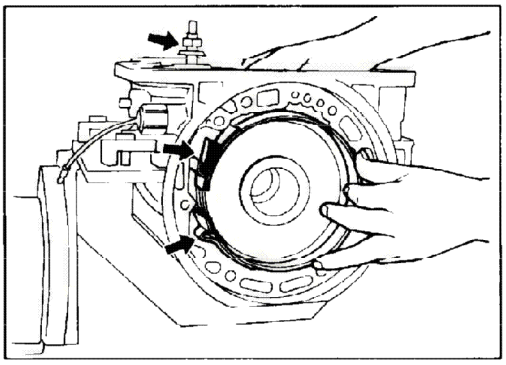
19. Separate the OD case from the transmission case by tapping lightly with a plastic hammer.



47U07B-063

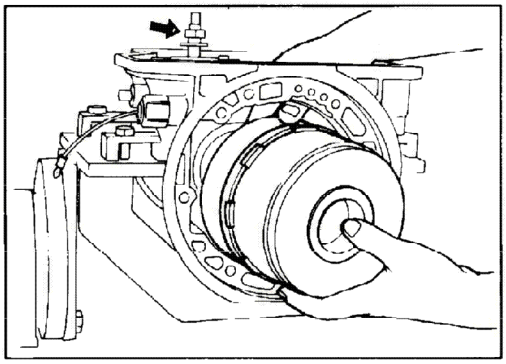
20. Remove the intermediate shaft.

Caution
The side with the oil hole is the front.



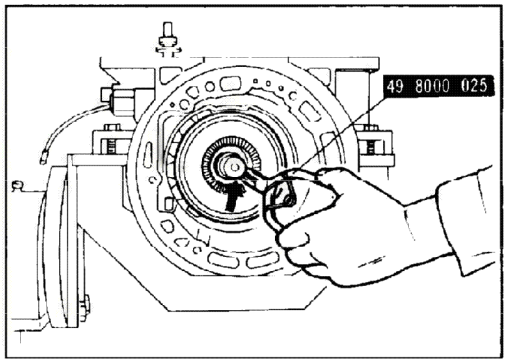
47U07B-064

21. Loosen the piston stem of the 2nd band servo and remove the brake band and band strut.



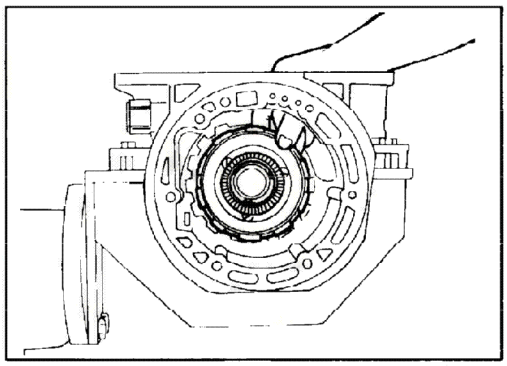
47U07B-065

22. Remove the front clutch, rear clutch, rear clutch hub, front planetary pinion carrier, connecting shell and sun gear in one piece.



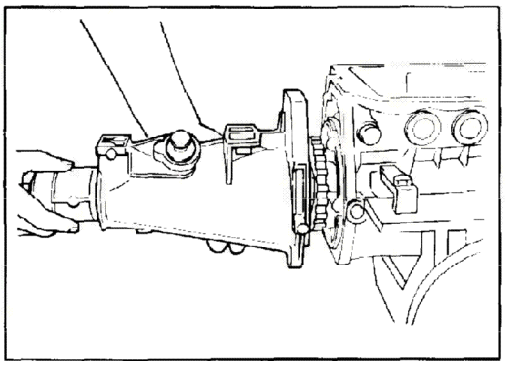
57U07B-066

23. Remove the snap ring on the output shaft with **snap-ring remover** (49 8000 025).



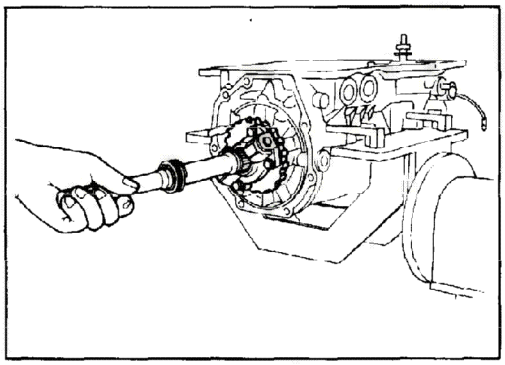
47U07B 067

24. Remove the connecting drum, rear planetary carrier and internal gear in one piece.



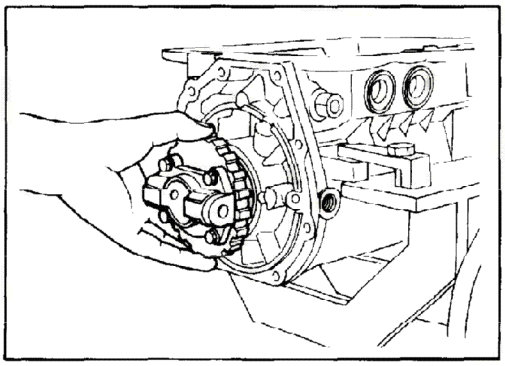
47U07B-068

25. Remove the rear extension housing.



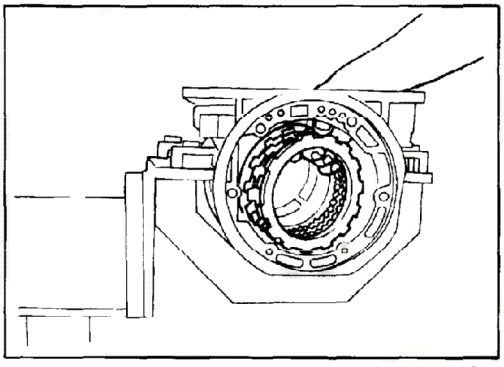
47U07B-069

26. Pull out the output shaft.



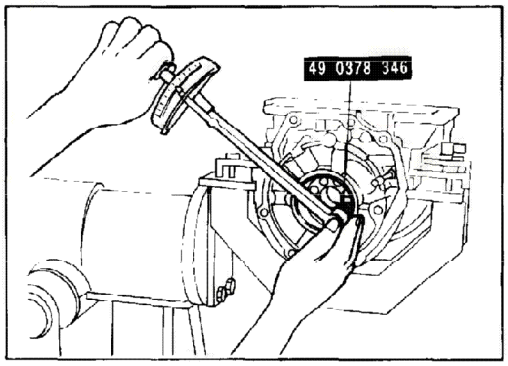
47U07B-070

27. Remove the governor valve and oil distributor in one piece.



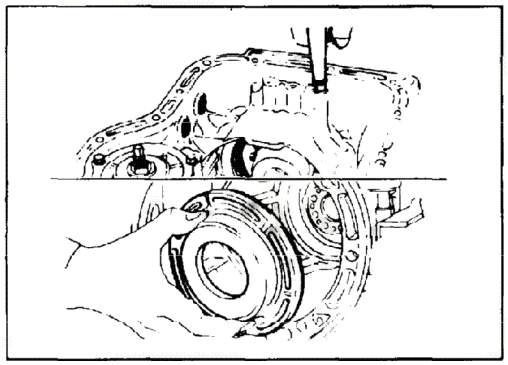
47U07B-071

28. Remove the snap ring on the low and reverse brake with a flat-tip screwdriver.
29. Remove the retaining plate, drive plate, driven plate and dished plate.



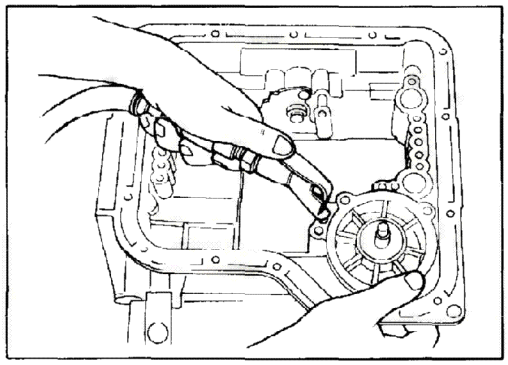
57U07B-072

30. Remove the hexagonal head bolt with the **hex-head wrench** (49 0378 346) from behind the transmission case.
31. Remove the one-way clutch inner race, thrust washer, piston return spring and thrust spring ring.



47U07B-073

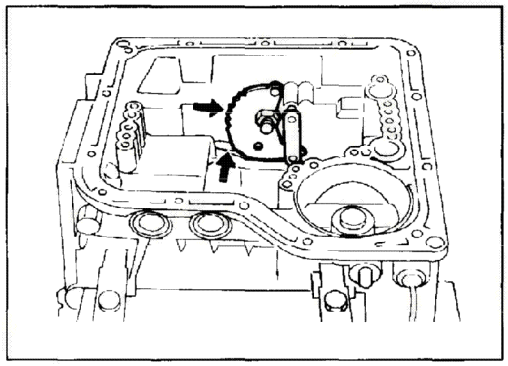
32. Apply compressed air pressure to the oil passage as illustrated in the figure, and remove the low and reverse brake piston.



47U07B-074

33. Remove the 2nd band servo.

Note
Apply compressed air pressure to the release side as illustrated in the figure when retainer removal is difficult.



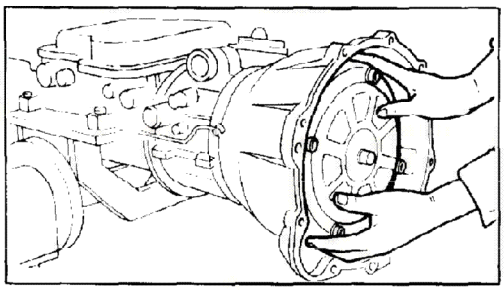
47U07B-075

34. Remove the manual plate and parking rod.

DISASSEMBLY, INSPECTION AND REASSEMBLY OF TRANSMISSION COMPONENTS

Cautions

a) Always neatly arrange the disassembled transmission component parts to prevent similar configuration parts from intermixing.
b) Always clean individual parts with cleaning solvent and blow out oil holes and oil channels with compressed air to prevent clogging.
c) Always take precautionary measures to prevent cleaning solvents from entering the eyes.
d) Always soak the new drive plate and/or brake band for more than two hours in automatic transmission fluid prior to replacement.
e) Always apply automatic transmission fluid to individual seal rings and to the rotating as well as other moving parts of each component during reassembly.
f) Basically, replace seal rings and gaskets at each disassembly.
g) Always use vaseline instead of grease.
h) Always replace the entire sub-assembly when bushing replacement is necessary. 47U07B-052

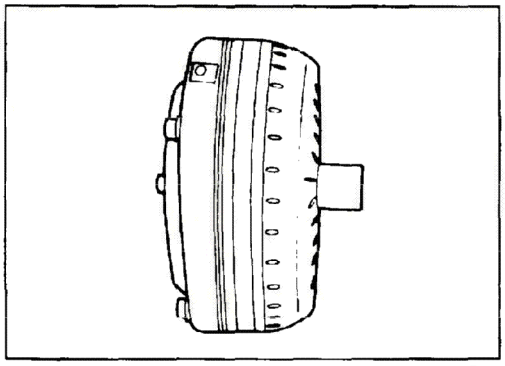


47U07B-053

TORQUE CONVERTER

Remove the torque converter from the converter housing.

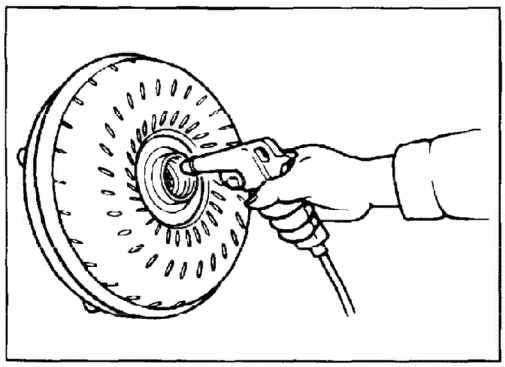
Caution
Pay close attention to prevent automatic transmission fluid from spilling when removing the torque converter.



47U07B 054

Checking

1. Check the outer part of the converter for damage or cracks, and replace it if there is any problem.
2. Check whether there is any rust on the pilot part of the converter or on the base. If there is any, remove it completely.

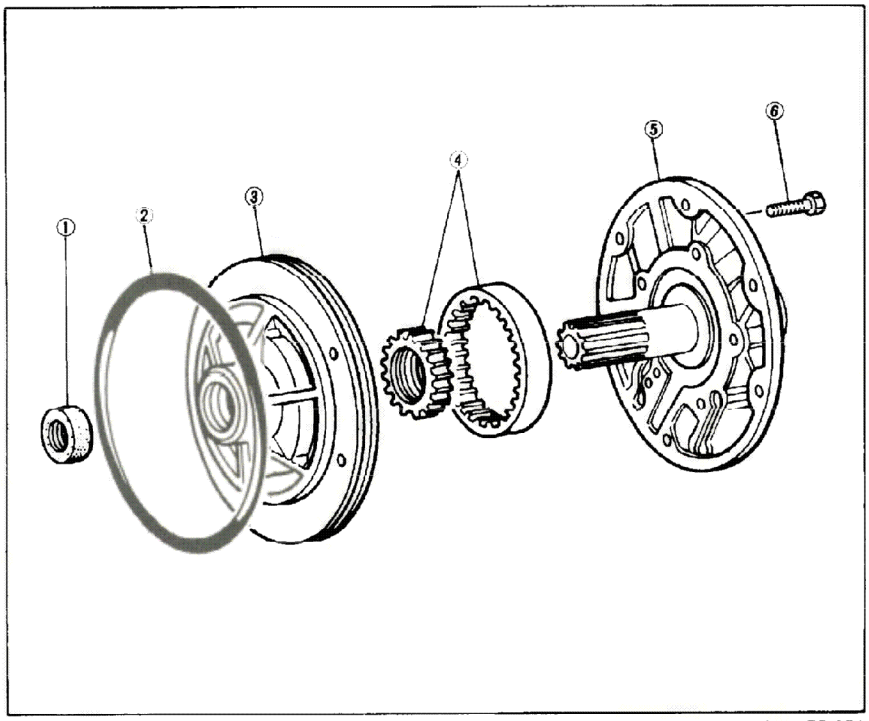


47U07B-055

Washing the inside of the converter

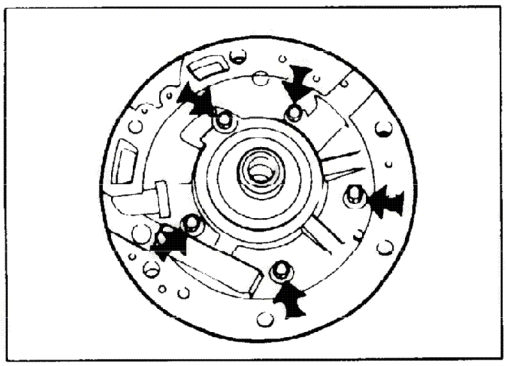
1. Drain any fluid remaining in the converter.
2. Pour in white gasoline or kerosene (approximately 0.5 liter).
3. Shake the converter to clean the inside. Pour out the white gasoline or kerosene.
4. Clean the inside of the converter with compressed air so that the inside is perfectly empty.
5. Pour in A.T.F.
6. Shake the converter to clean the inside. Pour out the A.T.F.

OIL PUMP



47U07B-056

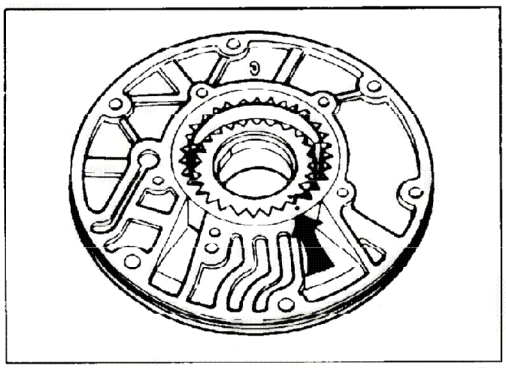
1. Oil seal
2. O ring
3. Pump housing
4. Inner & outer gear
5. Pump cover
6. Bolts (5)



47U07B-057

Disassembly

1. Remove the mounting bolts and disassemble the pump cover from the housing.



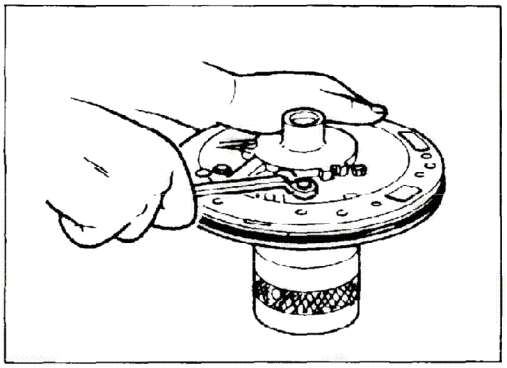
47U07B-058

2. Mark the inner and outer gear positions and remove the gears from the housing.

Cautions

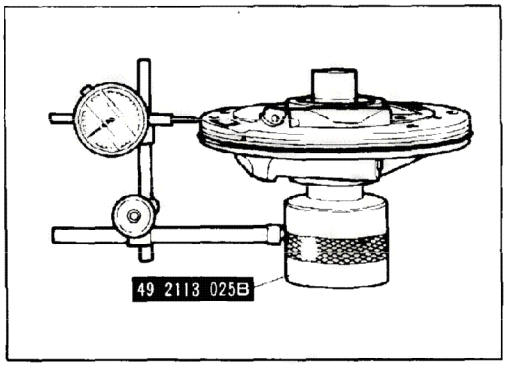
a) It is essential to restore the inner and outer gears to their originally installed positions when reassembling since the gear teeth engagement may be affected otherwise.
Always mark both gears with match marks and pay careful attention to the front and rear directions when removing the gears.

b) Never use a punch for marking the gears.



47U07B-059

3. Attach the pump cover and fix it temporarily with the mounting bolts.

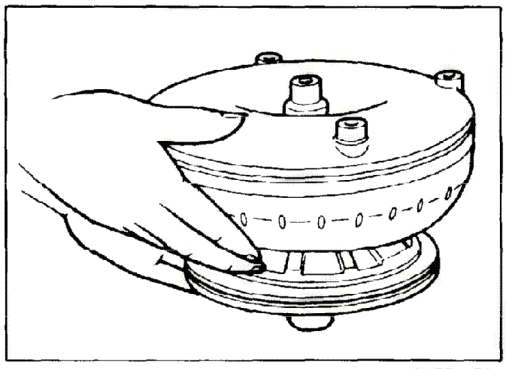


57U07B-060

4. Attach the magnet base bar and dial gauge to the **oil pump assembling tool** (49 2113 025B).
5. Turn the oil pump assembly to measure the deflection in the pump cover perimeter.

Cover deflection limit: 0.07 mm (0.0028 in)

6. Tap the pump cover lightly with a plastic hammer to adjust the cover perimeter deflection to under 0.07 mm (0.0028 in) if found to be excessive.



47U07B-061

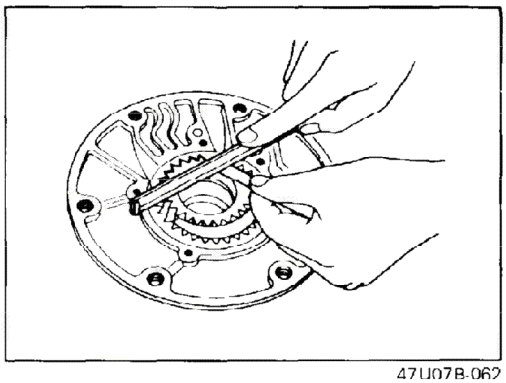
7. Tighten the pump cover mounting bolts by the specified torque.

Tightening torque: 7 ~ 9 N-m (5.1 ~ 6.5 ft-lb)

Cautions

a) Pay close attention to prevent the pump mounting bolt holes from becoming diverged when tightening the pump cover mounting bolts.

b) Check that the inner and outer gears turn smoothly after mounting the pump cover.



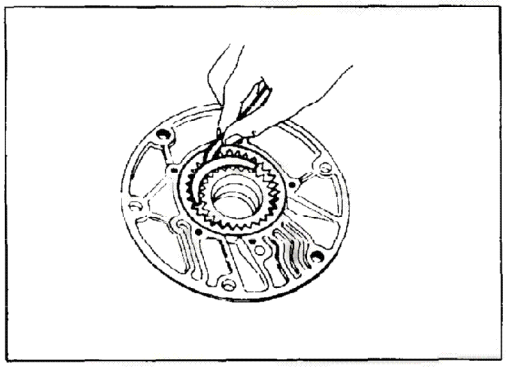
47U07B-062

Inspection

Check the following items and replace any parts found to be defective.

1. Measure the clearance between the gears and pump cover by using a feeler gauge and straight edge.

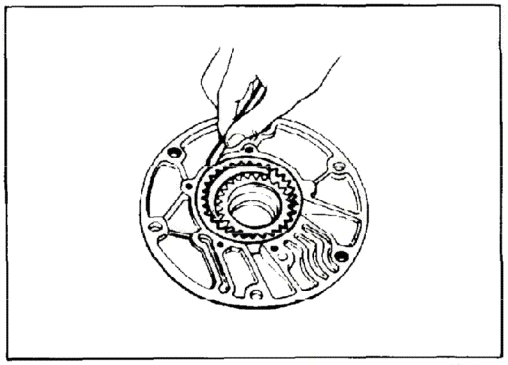
Standard clearance:
0.02 ~ 0.04 mm (0.0008 ~ 0.0016 in)
Limit: 0.08 mm (0.0031 in)



47U07B-003

2. Measure the clearance between the outer gear teeth tip and crescent.

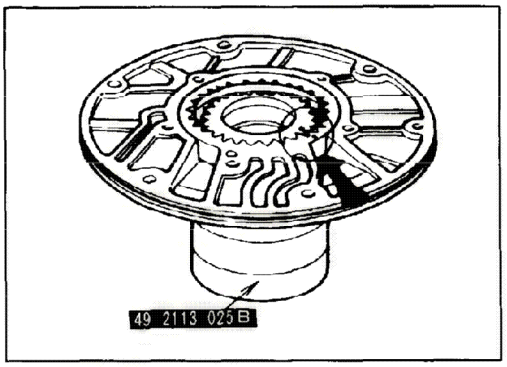
Standard clearance:
0.14 ~ 0.21 mm (0.0055 ~ 0.0083 in)
Limit: 0.25 mm (0.0098 in)



47U07B-064

3. Measure the clearance between the outer gear and housing.

Standard clearance:
0.05 ~ 0.20 mm (0.0020 ~ 0.0079 in)
Limit: 0.25 mm (0.0098 in)

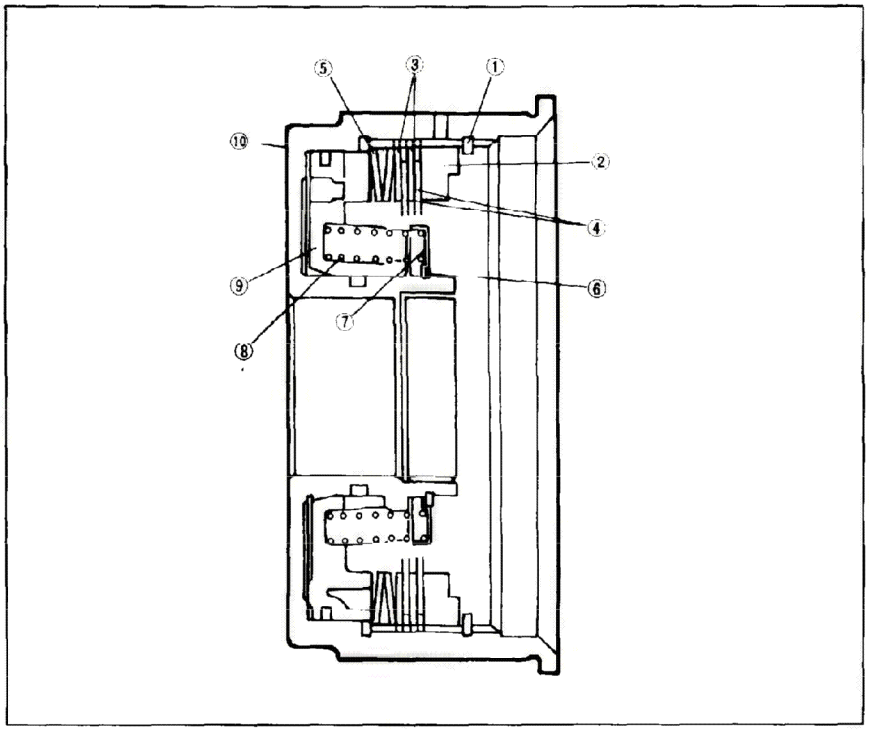


57U07B-065

Reassembly

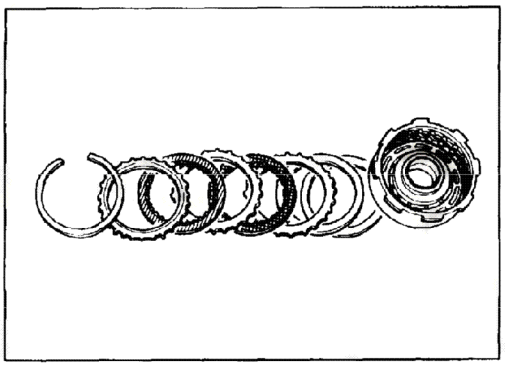
1. Place the oil pump housing in the **oil pump assembling tool** (49 2113 025B).
2. Insert the inner and outer gears with their match marks to the pump cover side.

DIRECT CLUTCH



47U07B-066

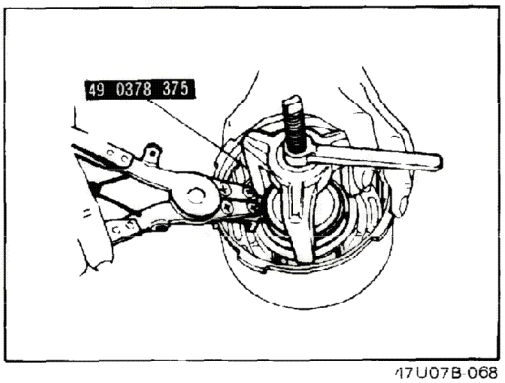
1. Snap ring
2. Retaining plate
3. Drive plates (2)
4. Driven plates (2)
5. Dished plates
6. Snap ring
7. Spring retainer
8. Springs
9. Piston
10. Direct clutch drum



47U07B-067

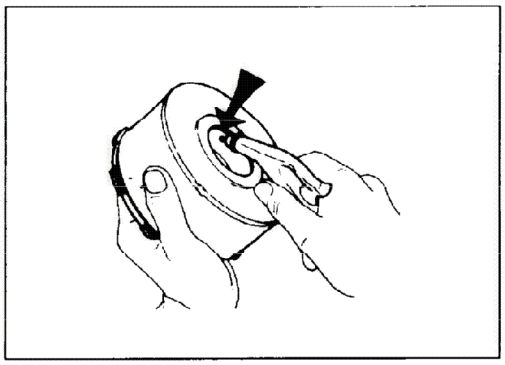
Disassembly

1. Remove the snap ring with a screwdriver and remove the retaining plates, drive plates, driven plates and dished plates.



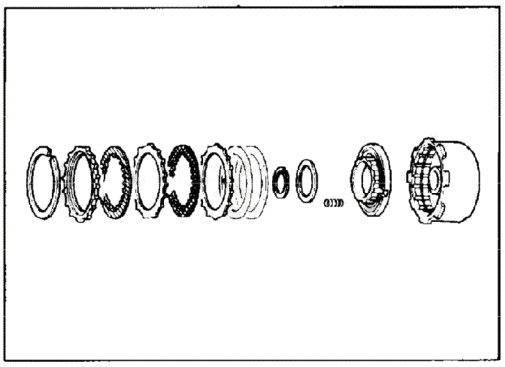
47U07B-068

2. Remove the snap ring with snap-ring pliers after compressing the clutch spring with the **clutch spring compressor** (49 0378 375).
3. Remove the spring retainer and spring.



47U07B-069

4. Remove the piston by applying compressed air pressure to the oil passage.



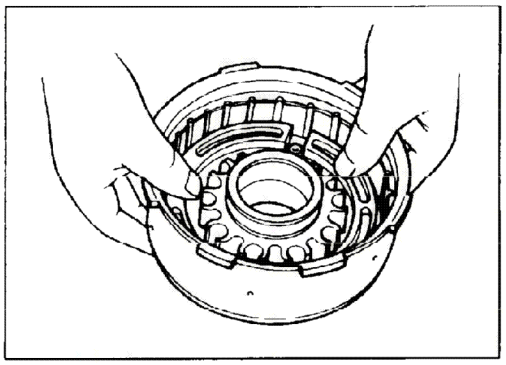
47U07B-070

Inspection

Inspect the direct clutch and replace any parts found to be defective.

1. Damage or wear of the drive plate facing
2. Fracture or wear of the snap ring
3. Spring retainer deformation
4. Spring fracture
5. Degeneration of the spring tension

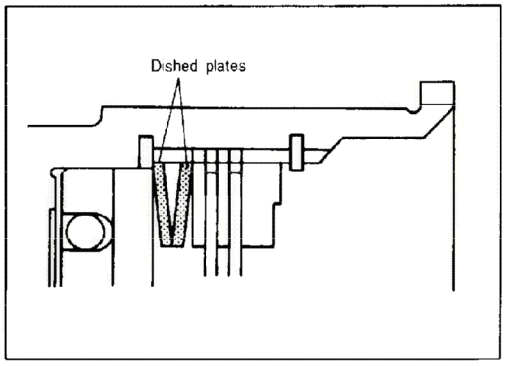
Free spring length: 30.5 mm (1.2008 in)



47U07B-071

Reassembly

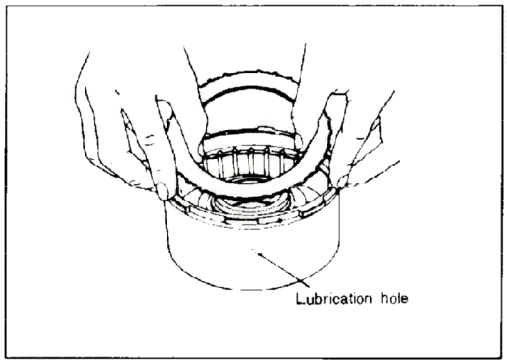
1. Install the piston to the direct clutch drum.
2. Install the spring, spring retainer and snap ring by using the **clutch spring compressor** (49 0378 378).



47U07B-072

Cautions

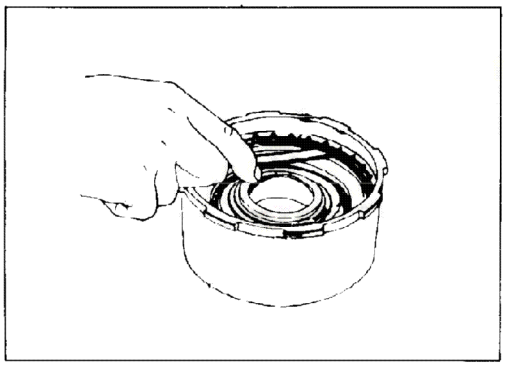
a) Apply a coating of automatic transmission fluid to the individual parts.
b) Apply even pressure to the perimeter of the piston to avoid damaging the seal rings when assembling the piston.
c) Install the dished plate as shown in the figure.



47U07B-073

3. Install the dished plates, driven plates, drive plates and retaining plates

Caution
Align the toothless parts of the driven plate with the lubrication hole of the clutch drum, and insert the plates into the drum.



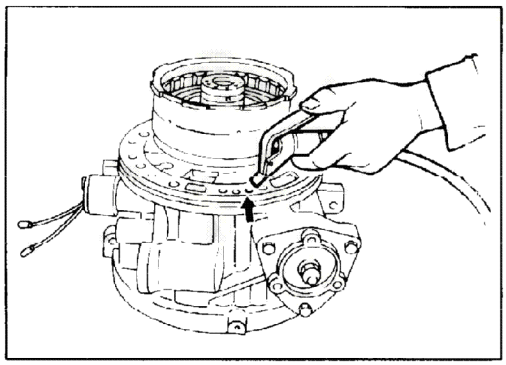
47U07B-074

4. Measure the clearance between the retaining plate and snap ring with a thickness gauge. Adjust the clearance by retainer plate selection if found to be off standard.

Standard clearance:
1.6 ~ 1.8 mm (0.0630 ~ 0.0709 in)

Retaining plate variations

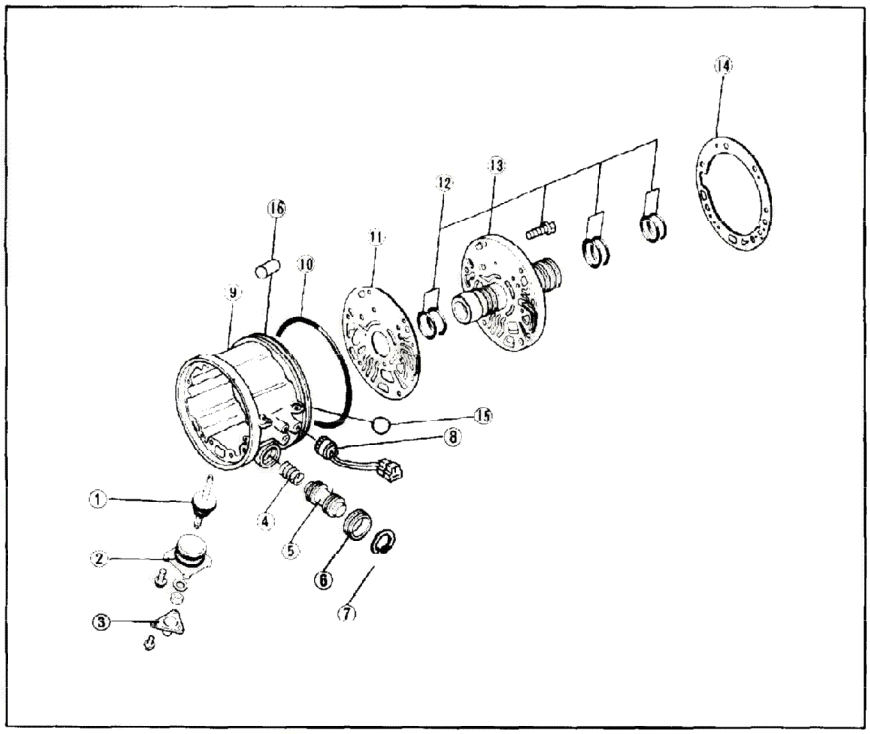
5.6 mm (0.2205 in)	5.8 mm (0.2284 in)
6.0 mm (0.2362 in)	6.2 mm (0.2441 in)
6.4 mm (0.2520 in)	6.6 mm (0.2598 in)
6.8 mm (0.2677 in)	7.0 mm (0.2756 in)



47U07B-075

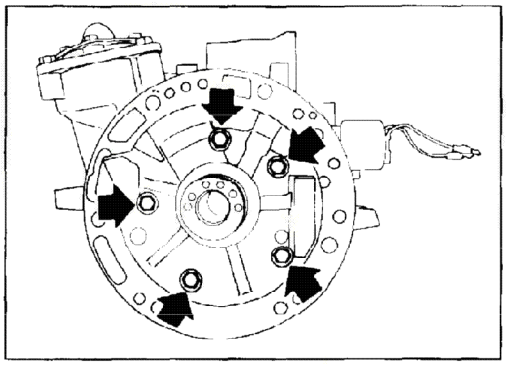
5. Operation inspection
Check the direct clutch operation, temporarily place the direct clutch on the OD drum support, and then apply compressed air pressure to the oil passage.

DRUM SUPPORT, OD BAND SERVO, ACCUMULATOR AND OD CASE



47U07B-076

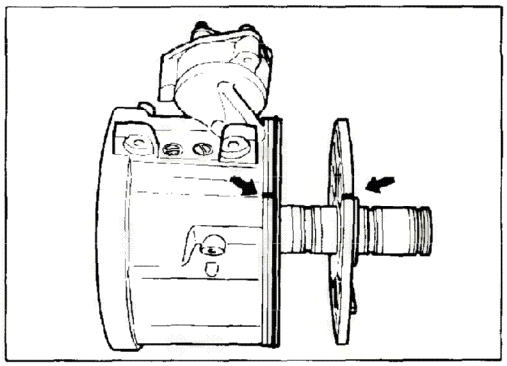
1. Piston
2. Body
3. Cover
4. Spring
5. Accumulator piston
6. Accumulator plug
7. Snap ring
8. OD cancel solenoid
9. OD case
10. Seal ring
11. Gasket
12. Seal ring
13. Drum support
14. Gasket
15. Steel ball
16. One-way valve



47U07B-077

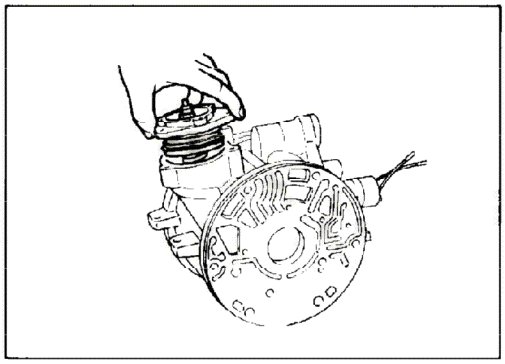
Disassembly

1. Remove the five mounting bolts.



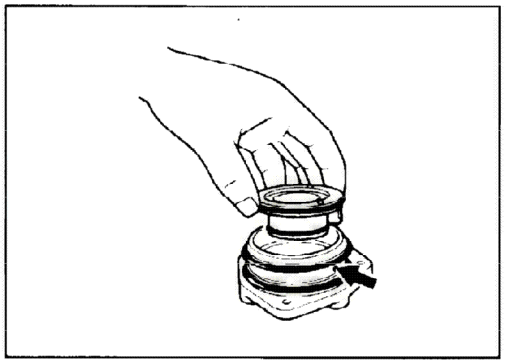
47U07B-078

2. Make match-joint marks on the OD case and drum support, and remove the drum support.



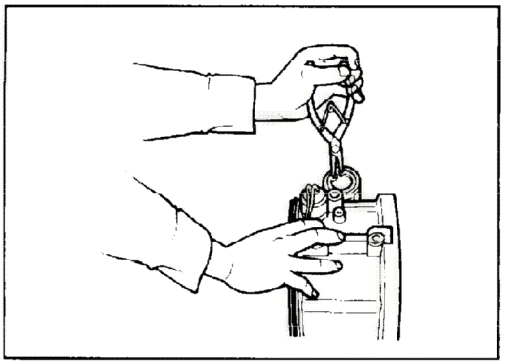
47U07B-079

3. Remove the OD band servo cover.
4. Remove the OD band servo piston retainer mounting bolt and take out the retainer assembly.



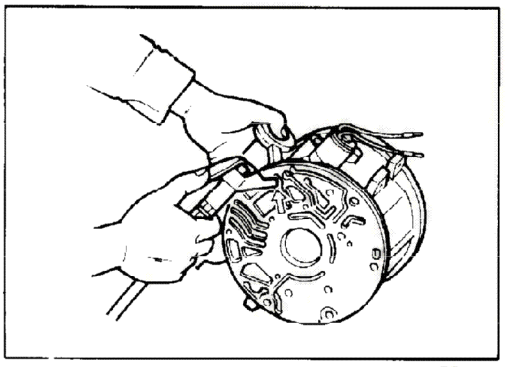
47U07B-080

5. Apply compressed air from the hole and remove the band servo piston.



47U07B-081

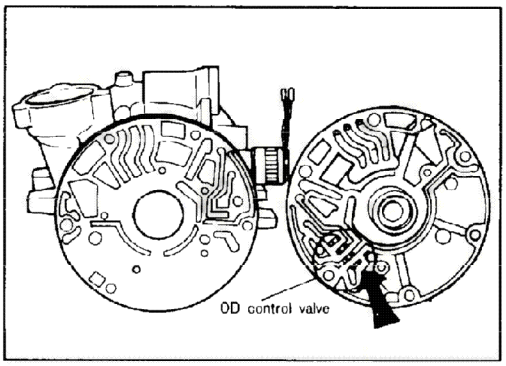
6. Remove the snap ring with snap-ring pliers.



47U07B-082

7. Blow out the oil passage with compressed air.
8. Extract the accumulator piston and spring.

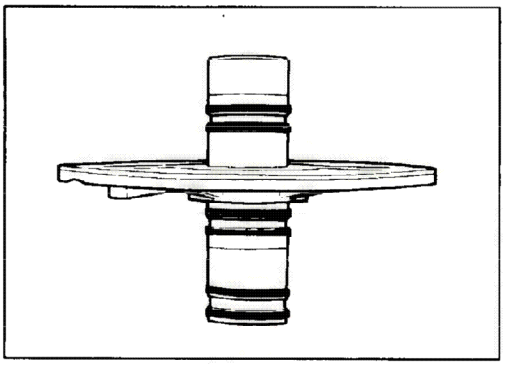
Warning
Apply compressed air gradually to prevent residual oil from flying out.



47U07B-083

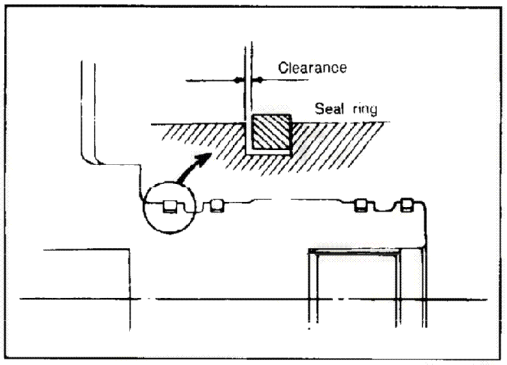
Inspection of drum support

1. Inspect the drum support and replace any parts found to be defective.
   1) Cracks in the case
   2) Damage of the oil passage
   3) Damage of the gasket
   4) Damage of the O ring
   5) OD control valve functions



47U07B-084

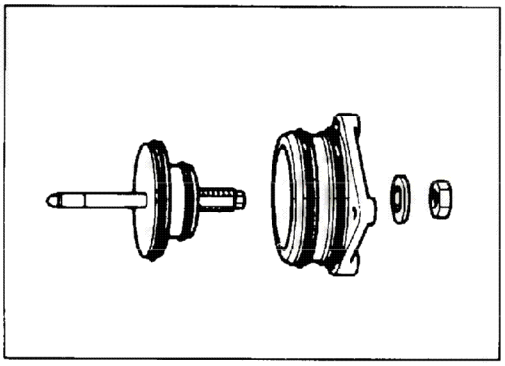
2. Fracture and wear of the drum support seal ring.



47U07B-085

3. Measure the clearance between the seal ring and seal ring channel.

Standard clearance:
0.04 ~ 0.16 mm (0.0016 ~ 0.0063 in)
Limit: 0.40 mm (0.0157 in)

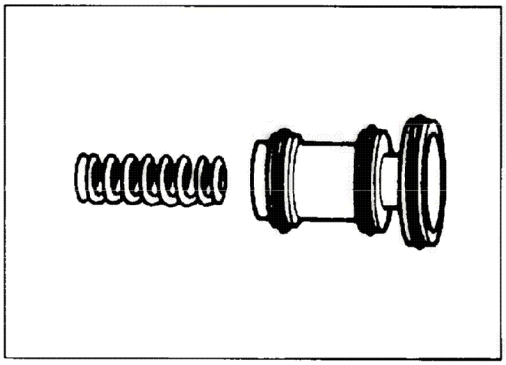


57U07B-086

Inspection of OD Band Servo

Inspect the OD band servo and replace any parts found to be defective.

1. Damage or wear of the piston
2. Damage to the individual seal rings



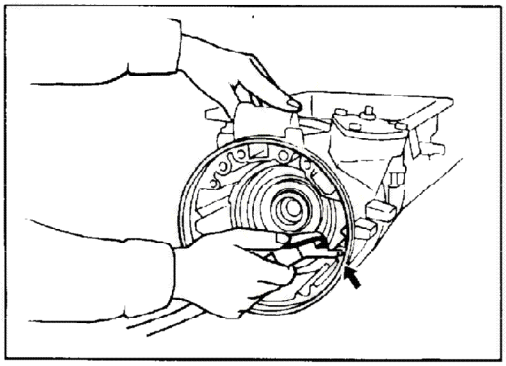
47U07B-087

Inspection of accumulator

Inspect the following items and replace any parts found to be defective.

1. Damage or wear of the piston
2. Fracture or wear of the snap ring
3. Damage to the seal rings
4. Degeneration of the return spring tension

Free spring length: 39.7 mm (1.5630 in)



47U07B-088

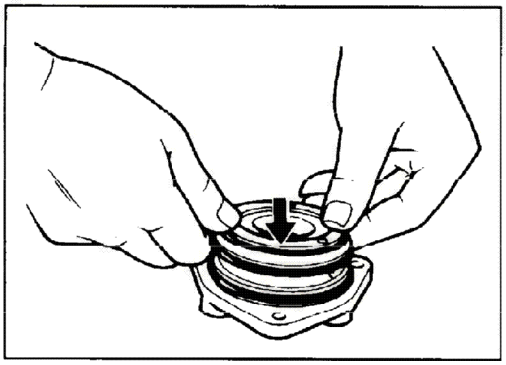
Reassembly

1. Install the spring, accumulator piston, accumulator plug and spring.

Note

a) Apply even pressure to the perimeter of the piston to avoid damaging the seal rings when assembling the piston.

b) Check the accumulator operation by applying compressed air pressure to the oil passage.



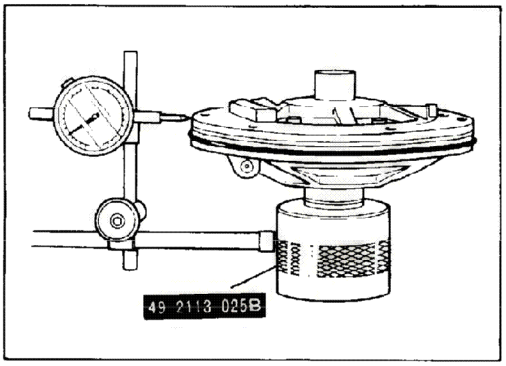
47U07B-089

2. Install the OD servo piston to the OD servo cover.

Note

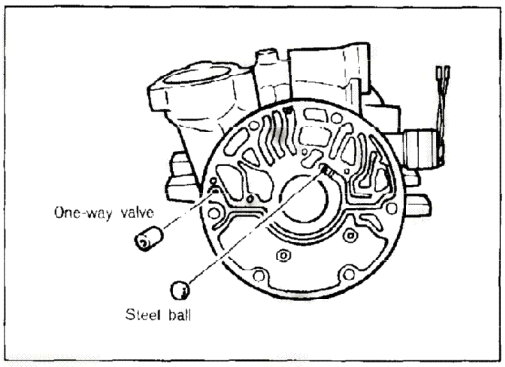
Apply even pressure to the perimeter of the piston to avoid damaging the seal ring when assembling the piston.

3. Install the OD servo cover to the OD case.



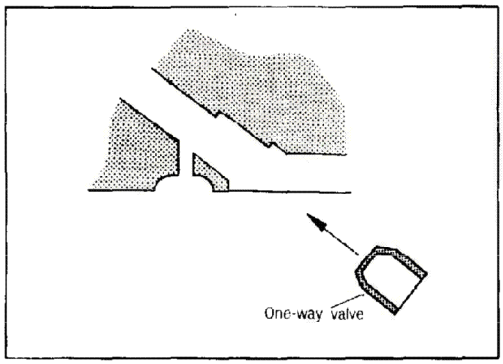
57U07B-090

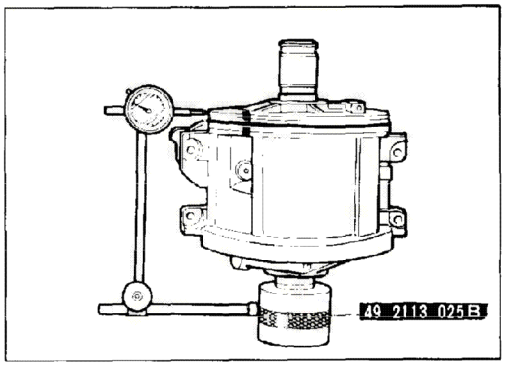
4. Place the oil pump assembly on the **oil pump assembling tool** (49 2113 025B).
5. Mount the OD case on the oil pump assembly.



47U07B-187

Caution
Be sure to insert the one-way valve as well as the steel ball in the OD case.

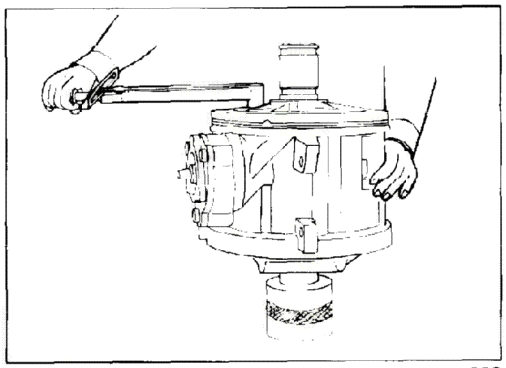




57U07B-091

6. Mount the drum support on the OD case and align the match-joint marks. Temporarily tighten the bolts after proper alignment is attained.
7. Attach the bar and dial gauge on the oil pump tool.
8. Rotate the OD case to adjust the drum support deflection to under 0.05 mm (0.0020 in) by tapping lightly with a plastic hammer.

Deflection limit: 0.05 mm (0.0020 in)

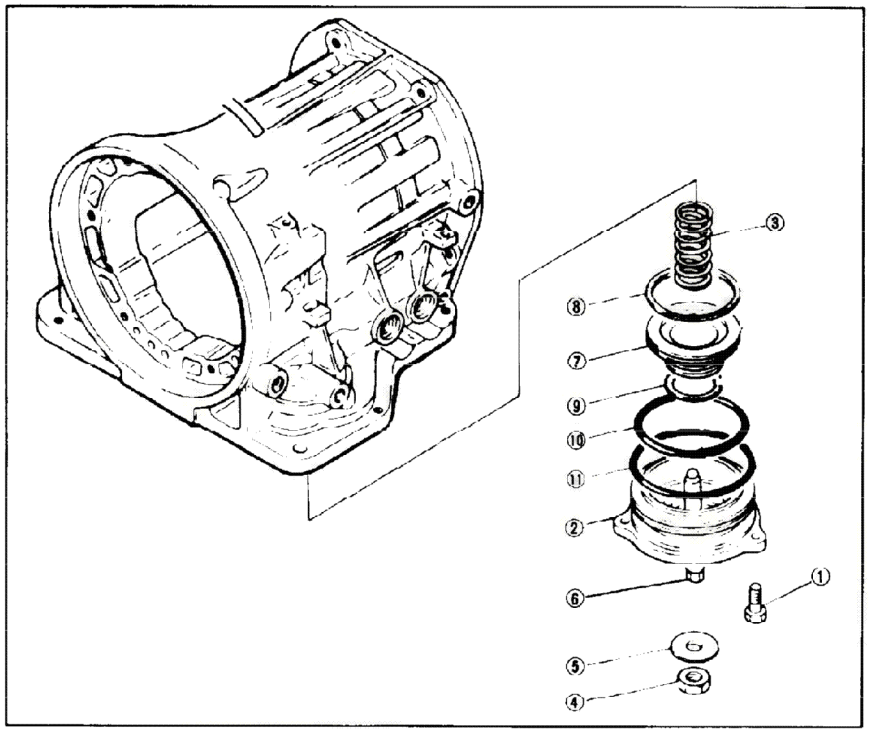


47U07B-092

9. Tighten the drum support mounting bolts by the specified torque.

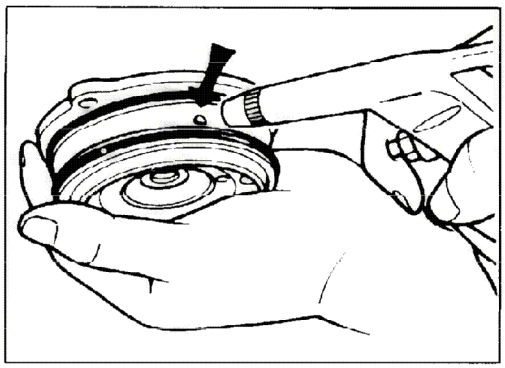
Tightening torque: 7 ~ 9 N-m (5.1 ~ 6.5 ft-lb)

2ND BAND SERVO



1. Bolt
2. Body
3. Return spring
4. Nut
5. Plain washer
6. Piston stem
7. Piston ass'y
8. Piston seal
9. Piston seal
10. Leather cut seal
11. O ring

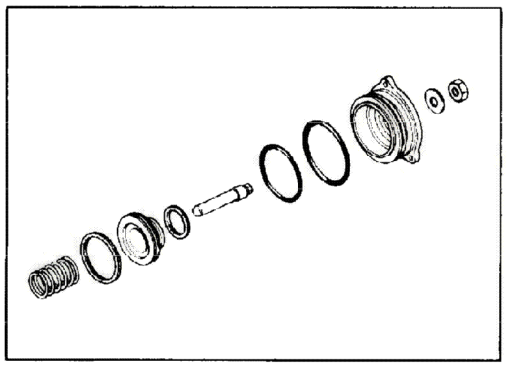
47U07B-093



47U07B-094

Disassembly

1. Remove the 2nd band servo body from the transmission case.
2. Remove the piston assembly from the 2nd servo body by applying compressed air pressure to the oil passage hole.



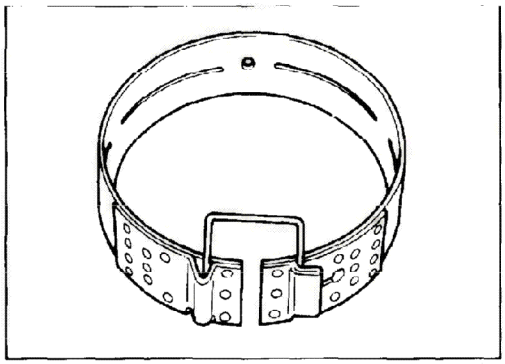
47U07B-095

Inspection

Inspect the 2nd band servo and replace any parts found to be defective.

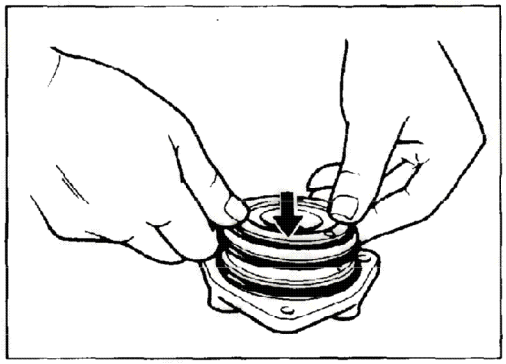
1. Damage or wear of the pinion
2. Damage to the individual seal rings
3. Degeneration of the return spring tension

Free spring length: 36.0 mm (1.4173 in)



47U07B-096

4. Inspect the brake band friction material for wear. If cracked, chipped or burnt spots are apparent, replace the brake band.



47U07B-097

Reassembly

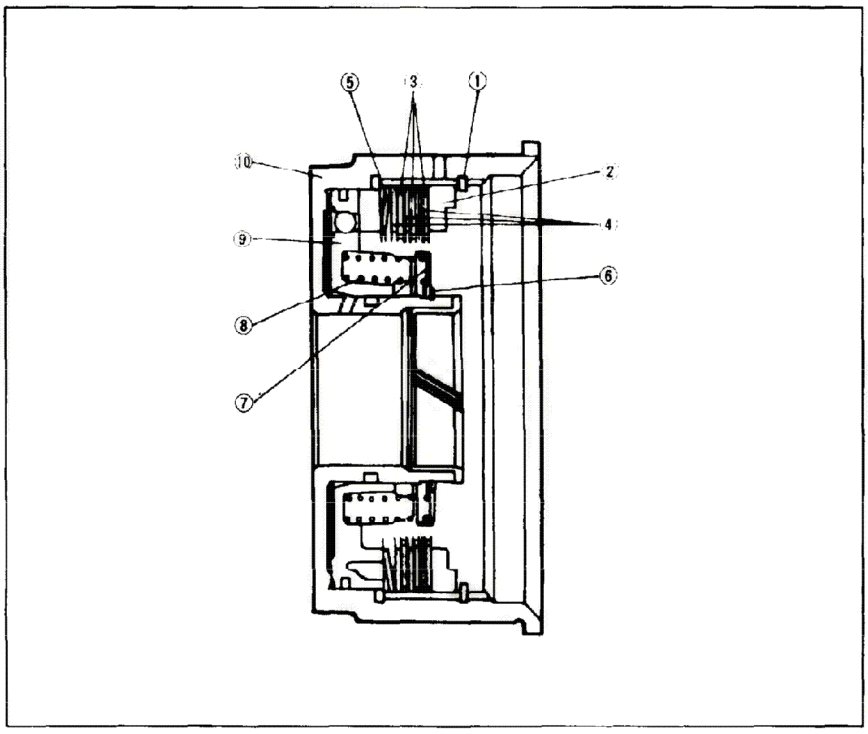
1. Install the piston assembly into the 2nd band servo.
2. Install the 2nd band servo body to the transmission case.

Notes

a) Apply even pressure to the perimeter of the piston to avoid damaging the seal rings when assembling the piston.

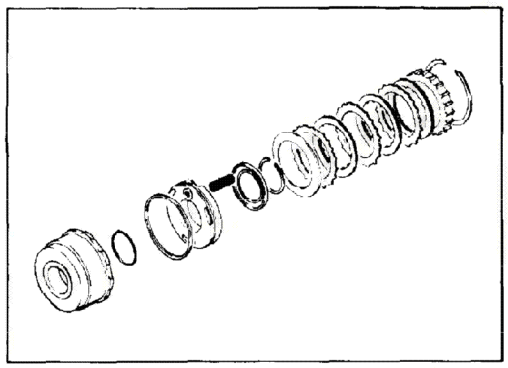
b) For brake band adjustment information, refer to page 7B–77.

FRONT CLUTCH



47U07B-098

1. Snap ring
2. Retaining plate
3. Drive plate
4. Driven plate
5. Dished plate
6. Snap ring
7. Spring retainer
8. Spring
9. Piston
10. Front clutch drum



47U07B-098

Disassembly

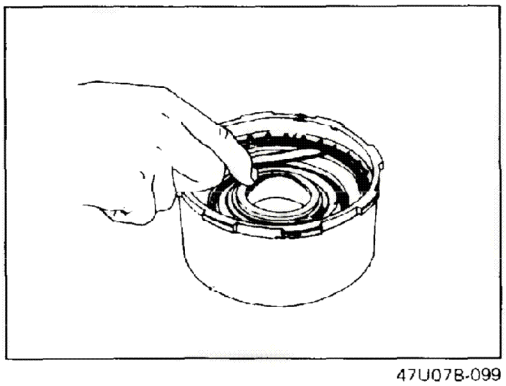
The front clutch is disassembled by the identical procedures as for the direct clutch.
Refer to page 7B–42.

Inspection

Inspect the front clutch and replace any parts found to be defective.

1. Damage or wear of the drive plate facing
2. Fracture or wear of the snap ring
3. Spring retainer deformation
4. Degeneration of the return spring tension

Free spring length: 30.5 mm (1.2008 in)

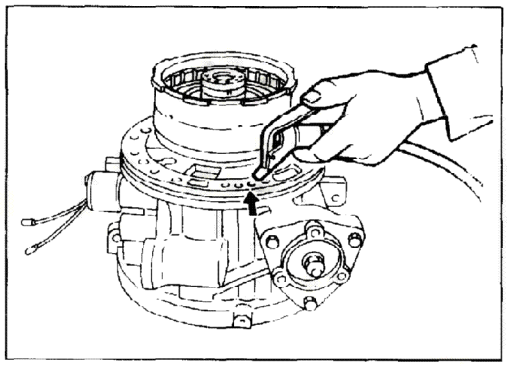


47U07B-099

Reassembly

1. The front clutch is reassembled and inspected by the identical procedures as for the direct clutch.
Refer to page 7B–43.

Front clutch clearance:
1.6 ~ 1.8 mm (0.0630 ~ 0.0709 in)



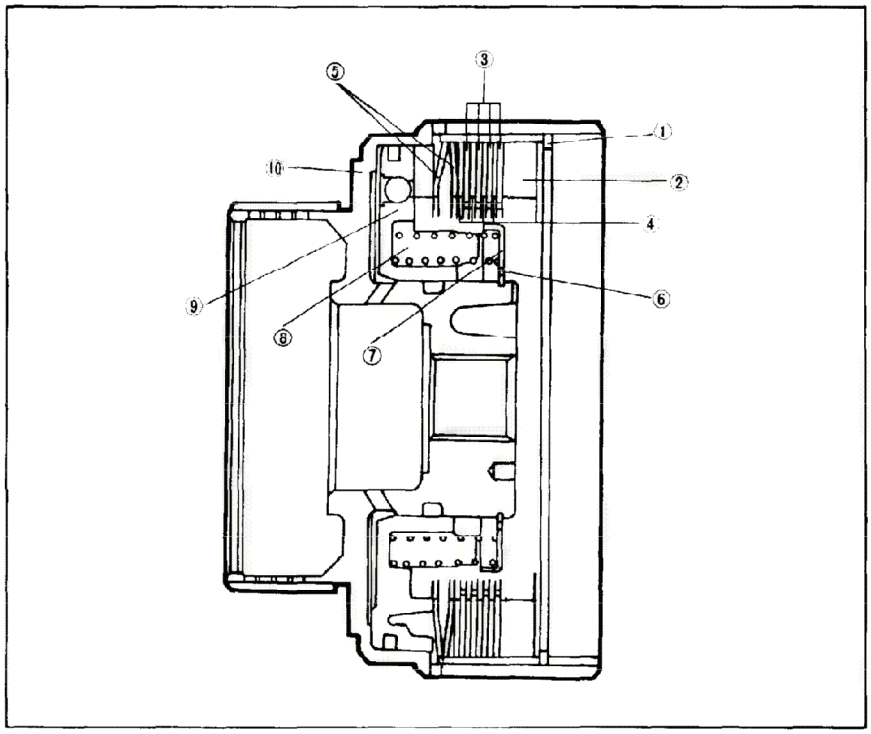
47U07B-100

2. Available retaining plates

5.0 mm (0.1969 in)	5.2 mm (0.2047 in)
5.4 mm (0.2126 in)	5.6 mm (0.2205 in)
5.8 mm (0.2284 in)	6.0 mm (0.2362 in)
6.2 mm (0.2441 in)	

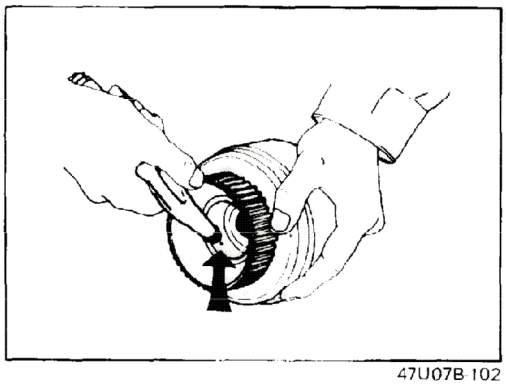
3. Operation inspection
   Inspect the front clutch operation by applying compressed air pressure to the oil passage.

REAR CLUTCH



47U07B-101

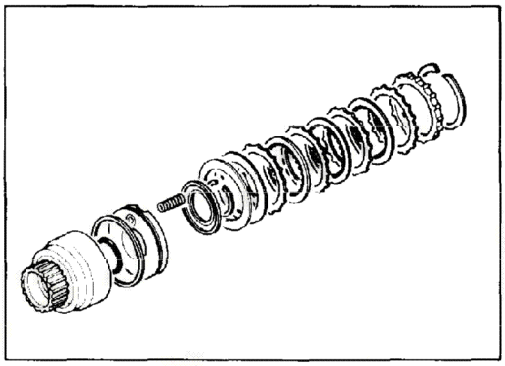
1. Snap ring
2. Retainer plate
3. Drive plates (4)
4. Driven plates (4)
5. Dished plate
6. Snap ring
7. Spring retainer
8. Spring
9. Piston
10. Rear clutch drum



47U07B-102

Disassembly

1. Remove the snap ring, retaining plate, drive plate, driven plate and dished plate by the identical procedures as for the direct clutch.
   Refer to page 7B–42.
2. Remove the snap ring on the spring retainer by using the **clutch spring compressor** (49 0378 375).
3. Extract the piston by applying compressed air pressure to the oil passage.



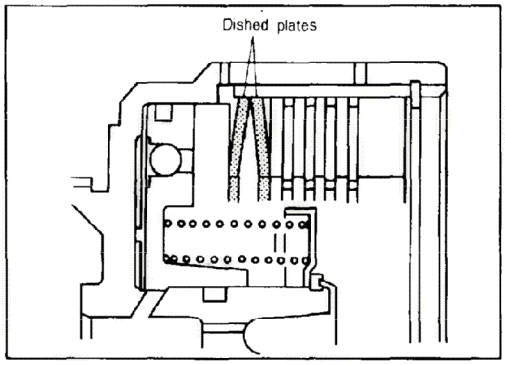
47U07B-103

Inspection

Inspect the following items and replace any parts found to be defective.

1. Damage or wear of the drive plate facing
2. Fracture or wear of the snap rings
3. Spring retainer deformation
4. Degeneration of the return spring tension

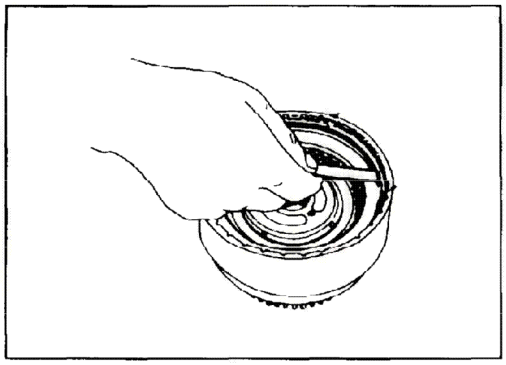
Free spring length: 30.5 mm (1.2008 in)



47U07B-104

Reassembly

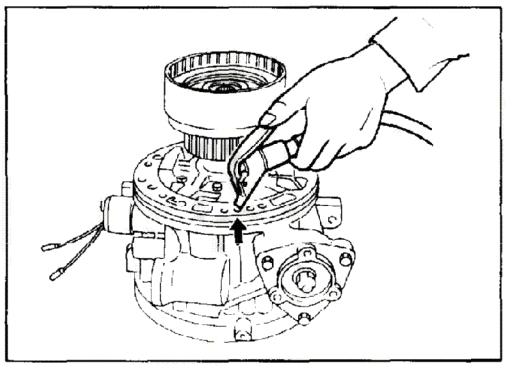
1. The rear clutch is reassembled by the identical procedures as for the direct clutch.
   Refer to page 7B–42.
2. Install the dished plate as shown in the figure.



47U07B-105

3. Measure the clearance between the snap ring and retaining plate with a thickness gauge after assembling.
   Replace all drive and driven plates if the clearance is off standard.

Rear clutch clearance:
0.8 ~ 1.5 mm (0.0315 ~ 0.0591 in)



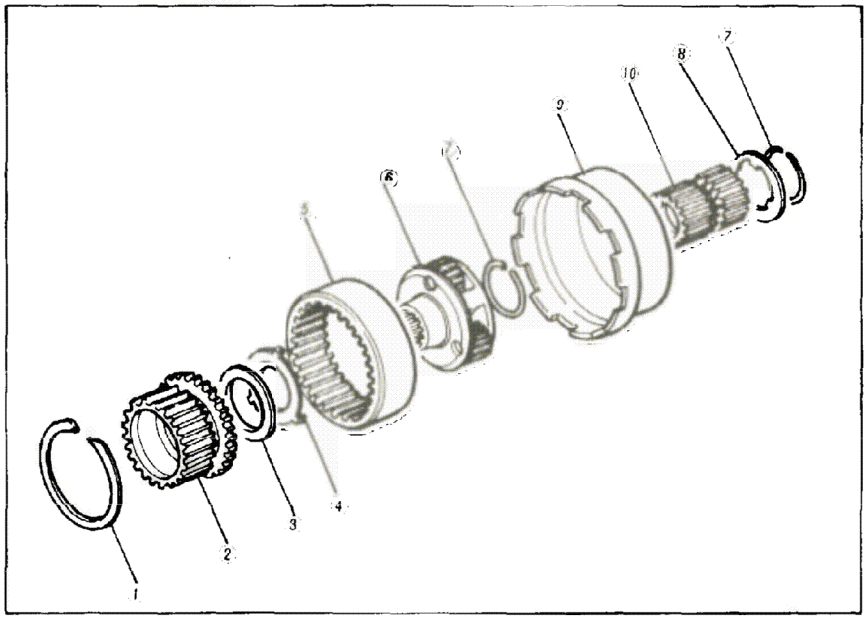
47U07B-106

4. Operation inspection
   Check the rear clutch operation, temporarily place the rear clutch on the OD drum support, and then apply compressed air pressure to the oil passage.

CONNECTING SHELL, REAR CLUTCH HUB AND FRONT PLANETARY PINION CARRIER

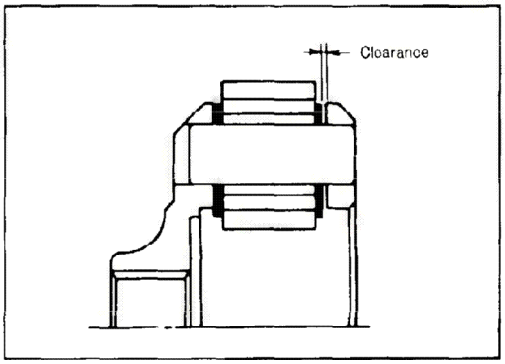
Disassembly and Reassembly

Remove the parts in the order shown in the figure.
Installation is the reverse order of removal.



47U07B-107

1. Snap ring
2. Rear clutch hub
3. Needle bearing
4. Bearing race
5. Internal gear
6. Front planetary pinion carrier
7. Snap ring
8. Bearing race
9. Connecting shell
10. Sun gear



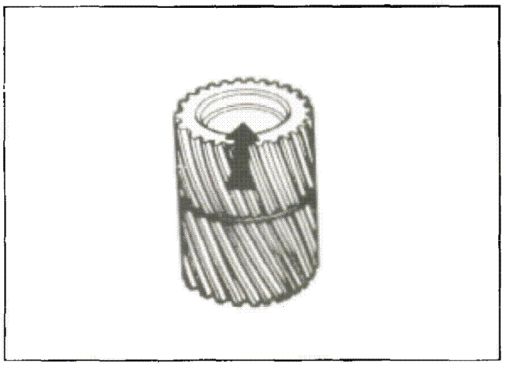
47U07B-108

Inspection

Check the following items and replace any parts found to be defective.

1. Fracture and wear of the snap ring
2. Wear of the individual gears
3. Rotation of the front carrier pinion gear
4. Measure the clearance between the pinion washer and planetary pinion carrier

Standard clearance:
0.2 ~ 0.7 mm (0.0079 ~ 0.0276 in)
Limit: 0.8 mm (0.0315 in)



47U07B-109

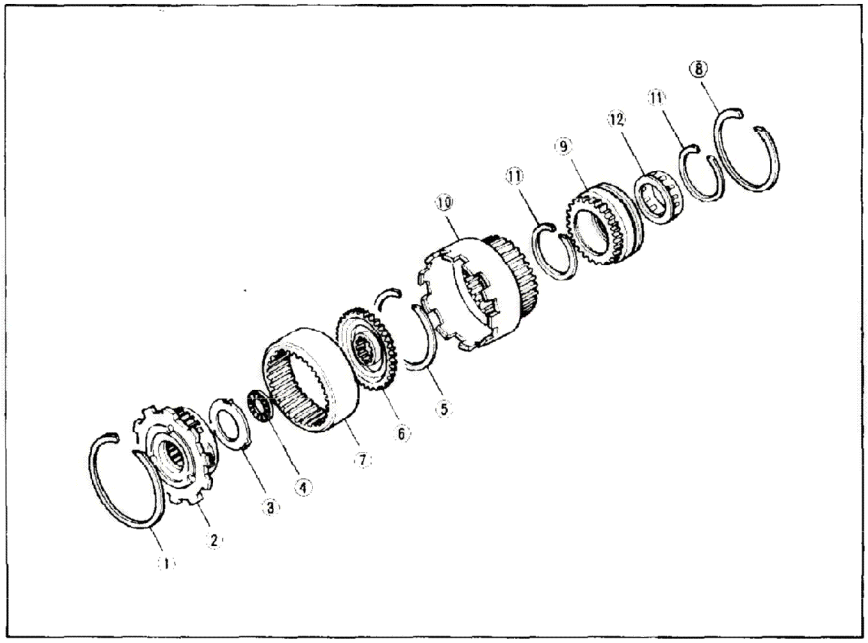
Note

Pay close attention to the front and rear direction of the sun gear when inserting. The grooved side indicated in the figure by an arrow is the front side.
This groove is provided since the front side of the sun gear is restricted by the planetary pinion carrier washer. The rear side of the gear does not contact anything directly and is not grooved.

CONNECTING DRUM, REAR PLANETARY PINION CARRIER AND ONE-WAY CLUTCH

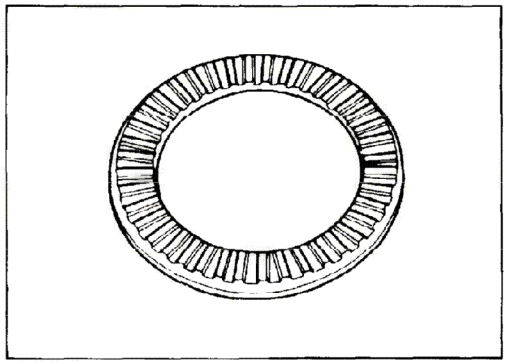
Disassembly and Reassembly

Remove the parts in the order shown in the figure. Installation is the reverse order of removal.



57U07B-110

1. Snap ring
2. Rear planetary pinion carrier
3. Bearing race
4. Needle bearing
5. Snap ring
6. Drive flange
7. Flange
8. Snap ring
9. Outer race
10. Connecting drum
11. Snap ring
12. One-way clutch

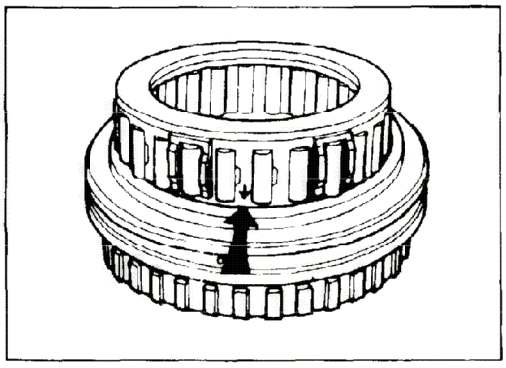


57U07B-111

Inspection

Check the following items and replace any parts found to be defective.

1. Fracture or wear of the snap ring
2. Damage or wear of the individual gears
3. Rotation, and damage or wear of the needle bearing.



47U07B-112

4. Rotation, and wear of the one-way clutch

Notes

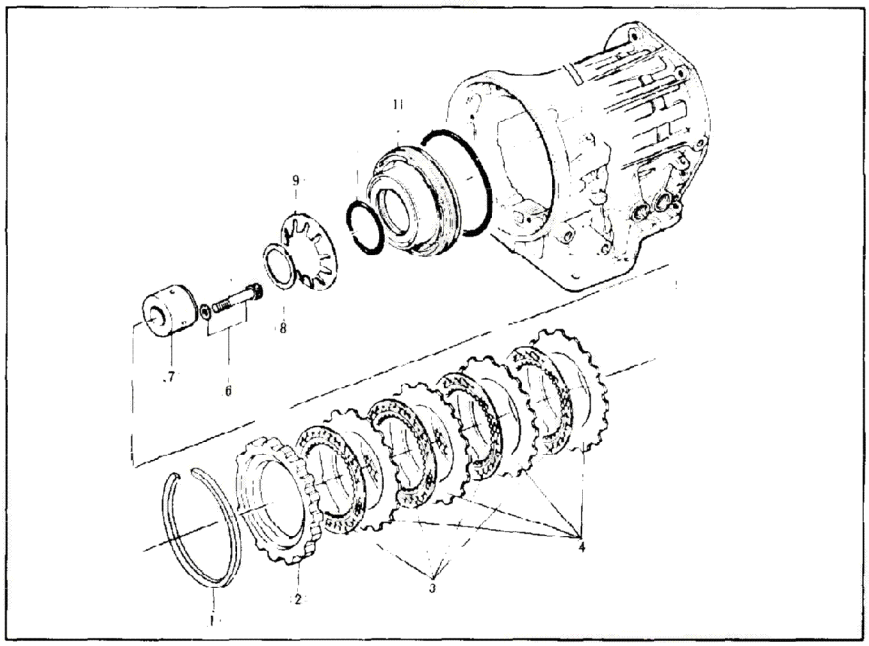
a) Install the side indicated by an arrow in the figure toward the front when inserting the one-way clutch into the one-way clutch outer race.

b) Check that the rotation is restricted to one direction and that it rotates smoothly.

LOW AND REVERSE BRAKE

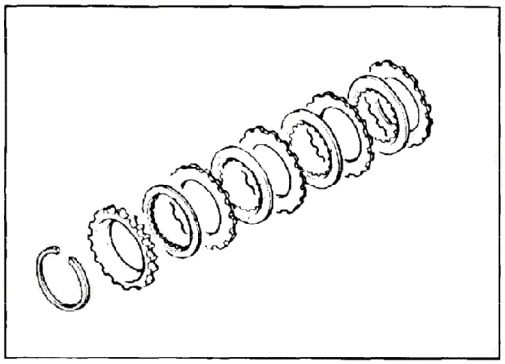
Disassembly and Reassembly

Remove the parts in the order shown in the figure. Installation is the reverse order of removal.



57U07B-113

1. Snap ring
2. Retaining plate
3. Drive plate
4. Driven plate
5. Bolt
6. One-way clutch inner race
7. Thrust washer
8. Return spring
9. Low & reverse brake piston, seal ring

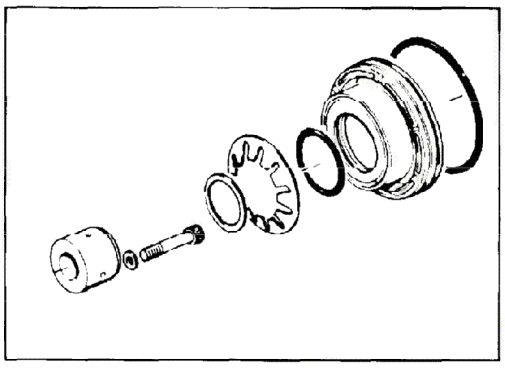


57U07B-114

Inspection

Check the following items and replace any parts found to be defective.

1. Damage or wear of the drive plate facing
2. Damage of the driven plate



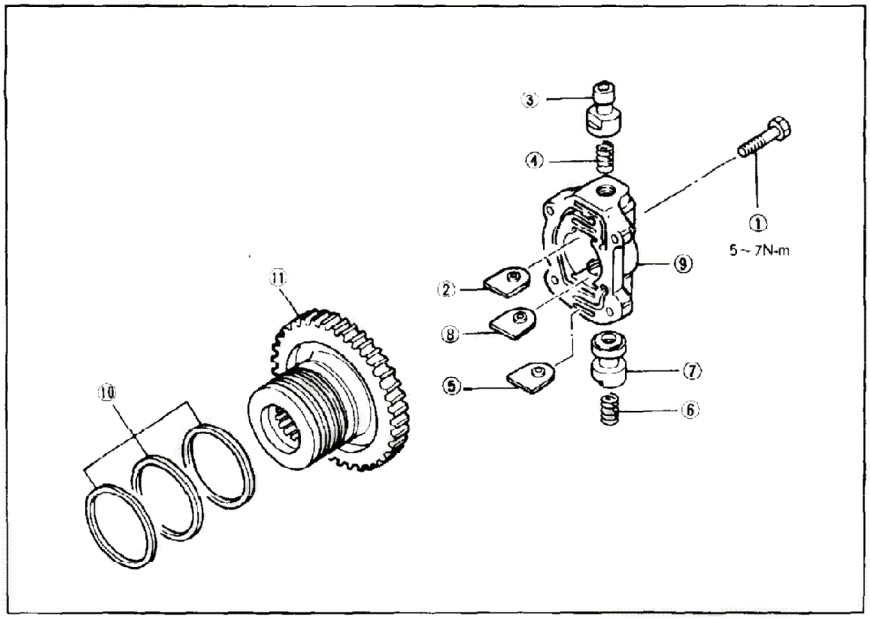
57U07B-115

3. Wear of the one-way clutch inner race
4. Damage to the return spring and thrust washer
5. Damage or wear of the low & reverse brake piston and seal ring

OIL DISTRIBUTOR AND GOVERNOR

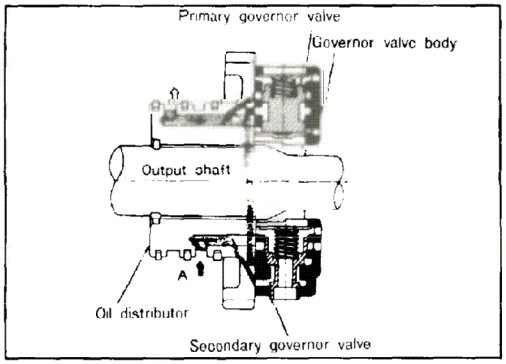
Disassembly and Reassembly

Remove the parts in the order shown in the figure.
Installation is the reverse order of removal.

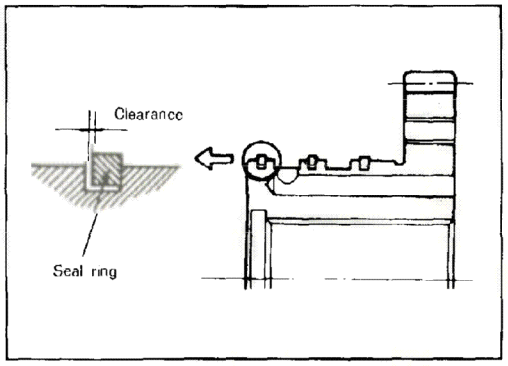


57U07B-116

1. Bolts (4)
2. Retainer plate
3. Secondary governor valve
4. Spring
5. Retainer plate
6. Spring
7. Primary governor valve
8. Retainer plate
9. Valve body
10. Seal ring
11. Oil distributor



47U07B-117



47U07B-118

Inspection

Check the following items and replace any parts found to be defective.

1. Damage or wear of the valve
2. Sliding condition of the valve
   Check that valve moves fractionally, and a sound is heard, when compressed air is applied from A in the figure.

Note
The compressed air pressure must be under 500 kPa (71 lb/m^2) and should not be applied over 5 seconds.

3. Weak return spring

Type	Outer dia.	Free length
Primary governor	8.75 mm (0.3445 in)	21.8 mm (0.8583 in)
Secondary governor	9.2 mm (0.3622 in)	25.1 mm (0.9882 in)

4. Measure the clearance between the seal ring and seal ring groove.

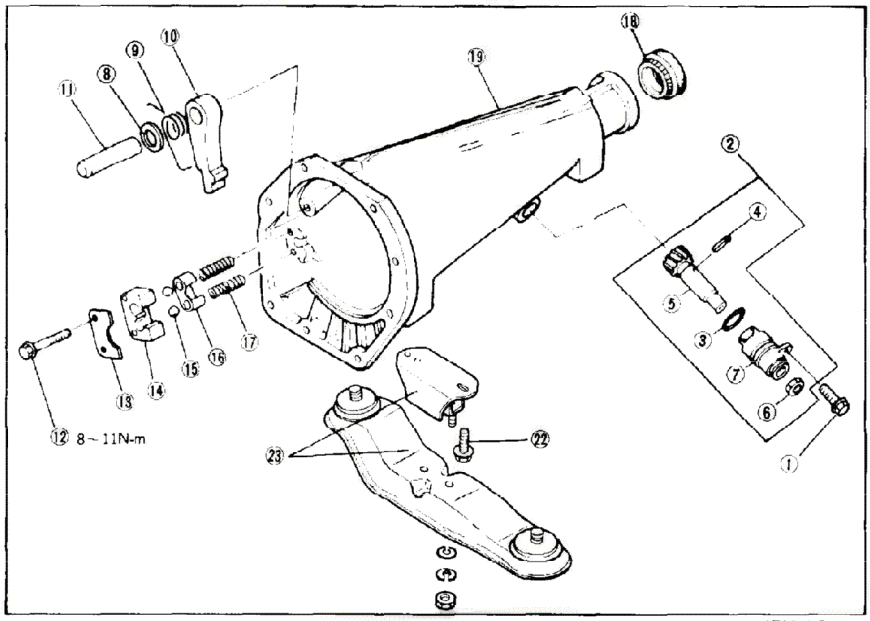
Standard clearance:
0.04 ~ 0.16 mm (0.0016 ~ 0.0063 in)
Limit: 0.40 mm (0.0157 in)

5. Damage of the seal ring

EXTENSION HOUSING

Disassembly and Reassembly

Remove the parts in the order shown in the figure.
Installation is the reverse order of removal.



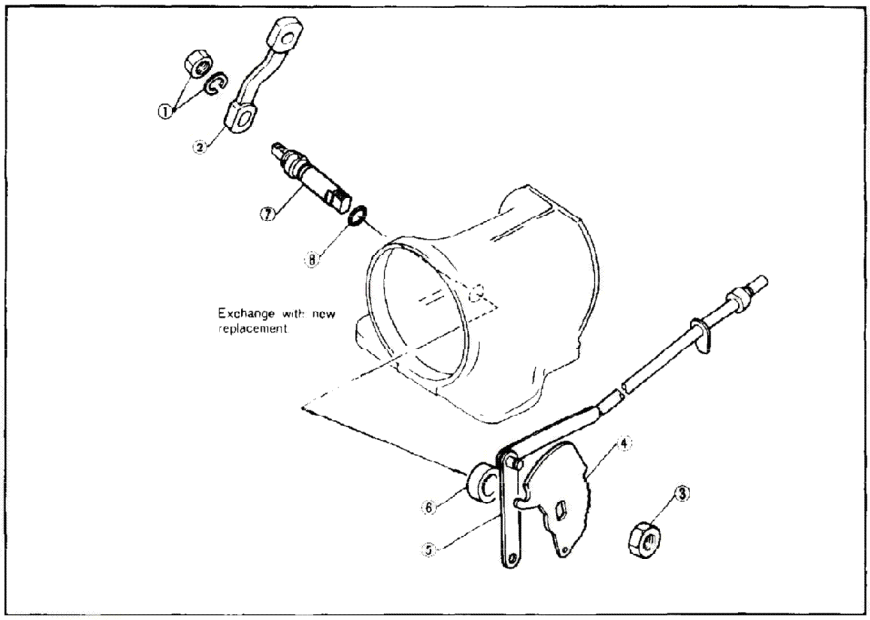
47U07B-119

1. Bolt
2. Speedometer drive gear ass'y
3. O ring
4. Spring pin
5. Drive gear
6. Oil seal
7. Gear case
8. Dowel spacer
9. Return spring
10. Parking pole
11. Pole shaft
12. Bolts (2)
13. Retaining plate
14. Actuator support
15. Steel ball
16. Retainer
17. Spring
18. Oil seal
19. Housing
20. Bolt
21. Weight
22. Bolt
23. Bracket

TRANSMISSION CASE

Disassembly and Reassembly

Remove the parts in the order shown in the figure.
Installation is the reverse order of removal.



47U07B-120

1. Nut & spring washer
2. Selector lever
3. Nut
4. Manual plate
5. Parking rod
6. Nut
7. Manual shaft
8. O ring

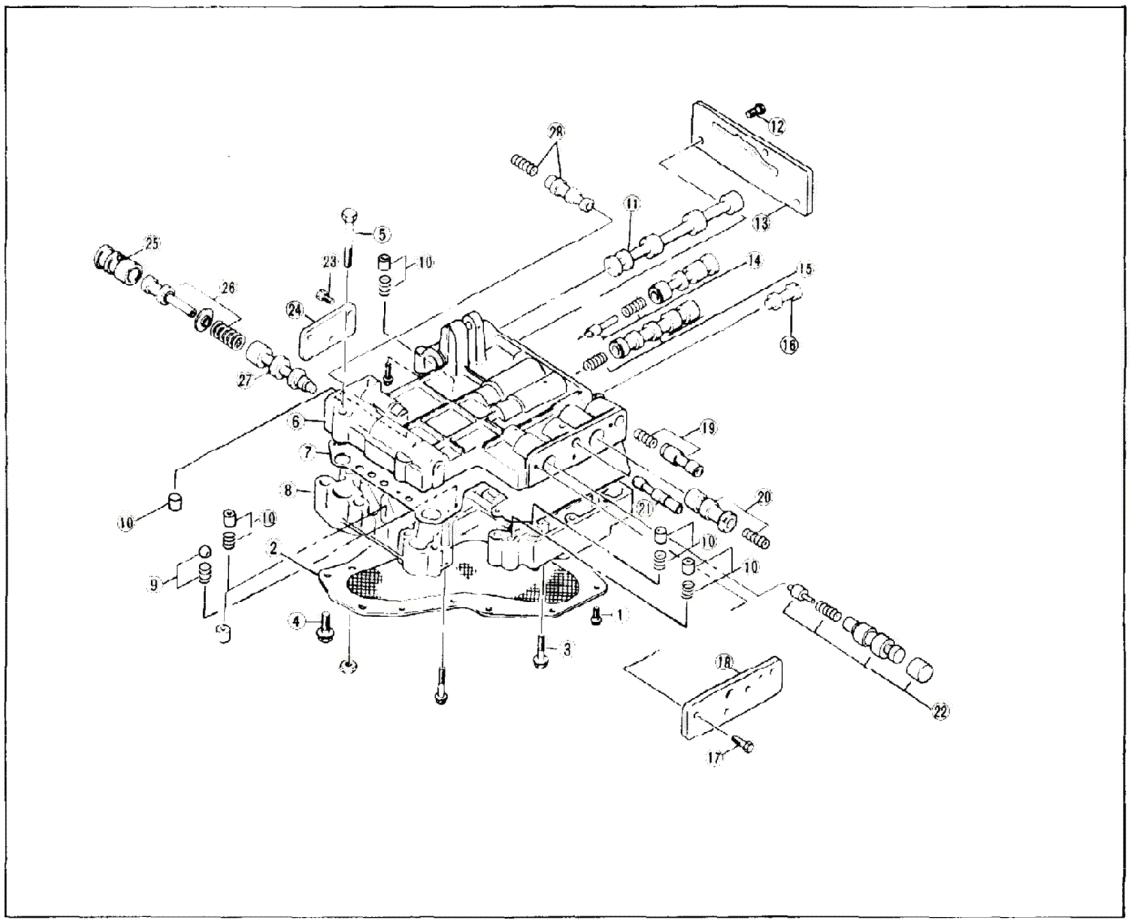
CONTROL VALVE

Notes

a) Always pay close attention when handling the control valve, because it is composed of the most precise and delicate parts of all transmission components.

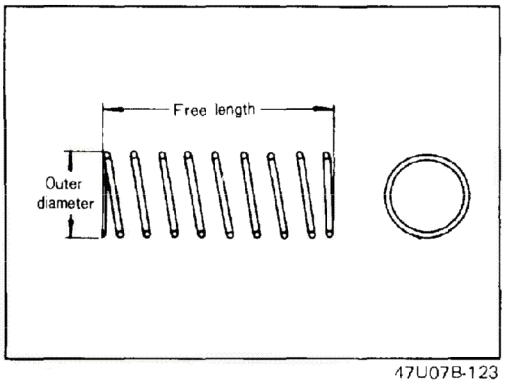
b) Always neatly arrange the removed parts in order to avoid similar parts from intermixing.

c) Always disassemble the control valve assembly to perform repairs when the clutch and/or brake band is burnt out and/or when the automatic transmission fluid is degenerated. 47U07B-121



47U07B 122

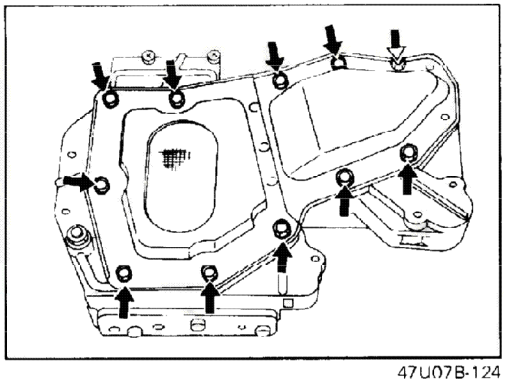
1. Bolt
2. Oil strainer
3. Bolt
4. Bolt
5. Bolt
6. Upper valve body
7. Separation plate
8. Lower valve body
9. Throttle relief ball & spring
10. Orifice check valve & spring
11. Manual valve
12. Bolt
13. Side plate
14. 2–3 shift valve, spring
15. 1–2 shift valve & spring
16. Pressure modifier valve
17. Bolt
18. Side plate
19. Downshift valve & spring
20. Throttle back-up valve & spring
21. Throttle valve
22. 3–4 shift valve sleeve, spring & plug
23. Bolt
24. Side plate
25. Pressure regulator sleeve
26. Pressure regulator plug, seat & spring
27. Pressure regulator valve
28. 2nd lock valve & spring



47U07B-123

Valve body spring chart

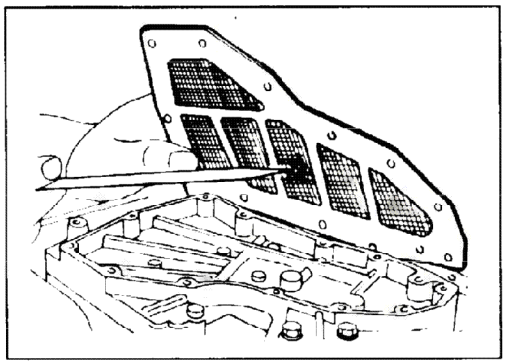
Name of spring	Outer diameter	Free length
Throttle backup	7.3 mm (0.2874 in)	31.8 mm (1.2520 in)
Downshift	5.55 mm (0.2185 in)	22.0 mm (0.8662 in)
3-4 shift	7.3 mm (0.2874 in)	25.8 mm (1.0158 in)
2-3 shift	6.9 mm (0.2717 in)	41.0 mm (1.6142 in)
1-2 shift	6.6 mm (0.2579 in)	32.0 mm (1.2599 in)
Second lock	5.55 mm (0.2185 in)	33.5 mm (1.3189 in)
Pressure regulator	11.7 mm (0.4606 in)	43.0 mm (1.6929 in)
Throttle relief	6.5 mm (0.2559 in)	26.8 mm (1.0551 in)
Orifice check	5.0 mm (0.1969 in)	15.5 mm (0.6102 in)



47U07B-124

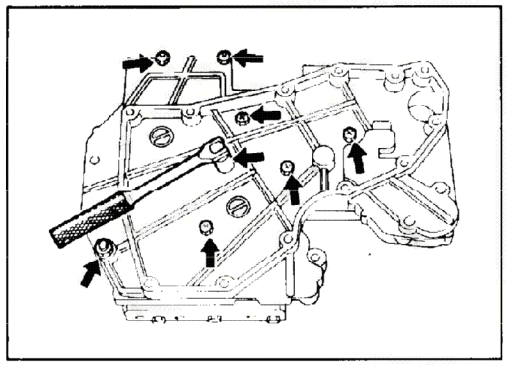
Disassembly

1. Remove the oil strainer mounting bolts and nuts indicated by arrows in the figure, and remove the oil strainer.



47U07B-125

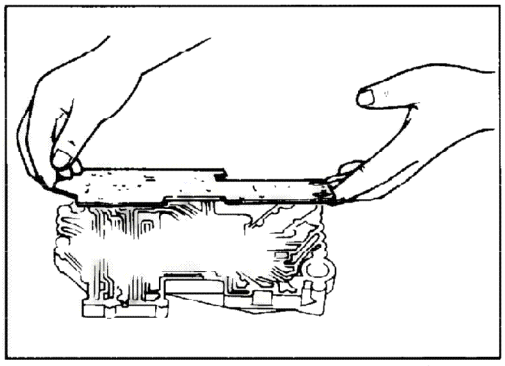
Note
Check the oil strainer for scratches or damage. Replace if necessary. Scratches or score marks can cause oil to bypass correct oil passages and result in system malfunction.



47U07B-126

2. Remove the lower valve body mounting bolts and nuts indicated by arrows in the figure, and remove the lower valve body.

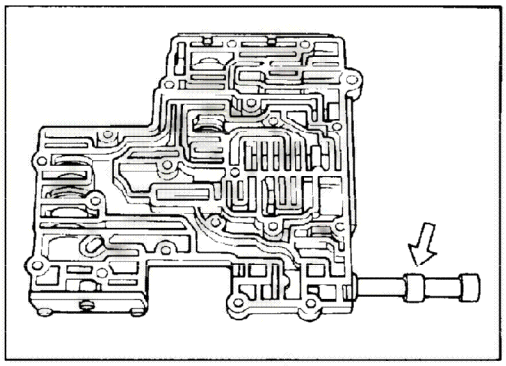
Note
Always use a socket wrench for removal; do not use a screwdriver.



47U07B-127

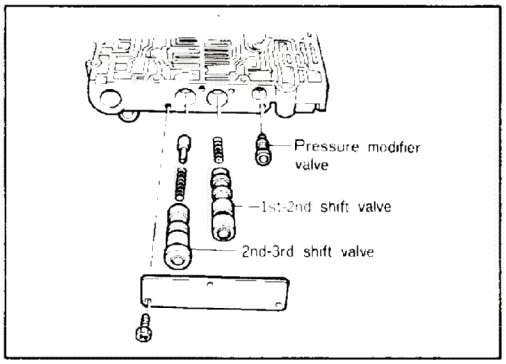
3. Remove the separation plate.

Note
Gently remove the separation plate to avoid losing the orifice check valve and spring as well as the throttle relief ball and spring in the lower valve body.



47U07B-128

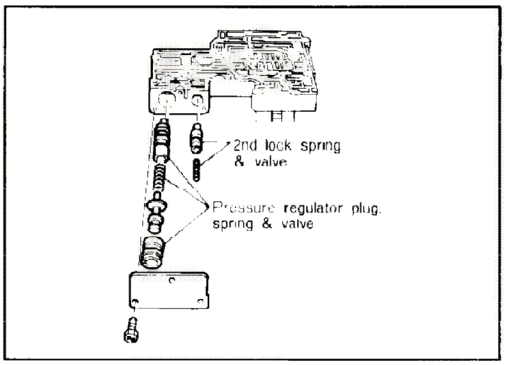
4. Remove the manual valve.



47U07B-129

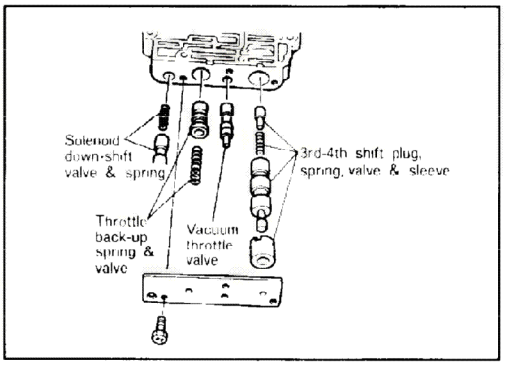
5. Remove the side plate and extract the pressure modifier valve, 1st-2nd shift valve and spring, and the 2nd 3rd shift valve and spring.

Note
Remove the side plate slowly because the valves may pop out.



47U07B-130

6. Remove the side plate and extract the pressure regulator plug, spring and valve as well as the 2nd lock spring and valve.



47U07B-131

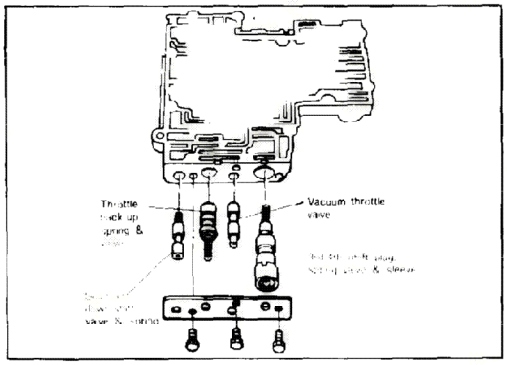
7. Remove the side plate, and extract the 3rd-4th shift valve, spring and plug, vacuum throttle valve, throttle back-up spring and valve as well as the solenoid downshift valve and spring.

Inspection

Check the following items and replace any parts found to be defective.

1. Damage or wear of the individual gears
2. Damage in the oil passage
3. Cracks or damage in the valve body
4. Operational conditions of the individual valves
5. Degeneration of the return spring tension

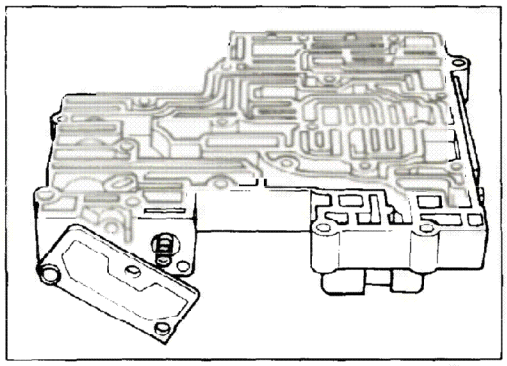
47U07B-132



47U07B-133

Assembly

1. Insert the 3rd-4th shift plug, spring, valve and sleeve.
2. Insert the vacuum throttle valve.
3. Insert the throttle back-up valve and spring.
4. Insert the solenoid downshift spring and valve.
5. Tighten and secure the side plate by the specified torque.

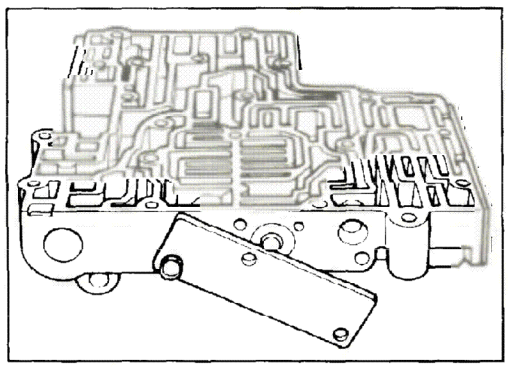


47U07B-134

Note

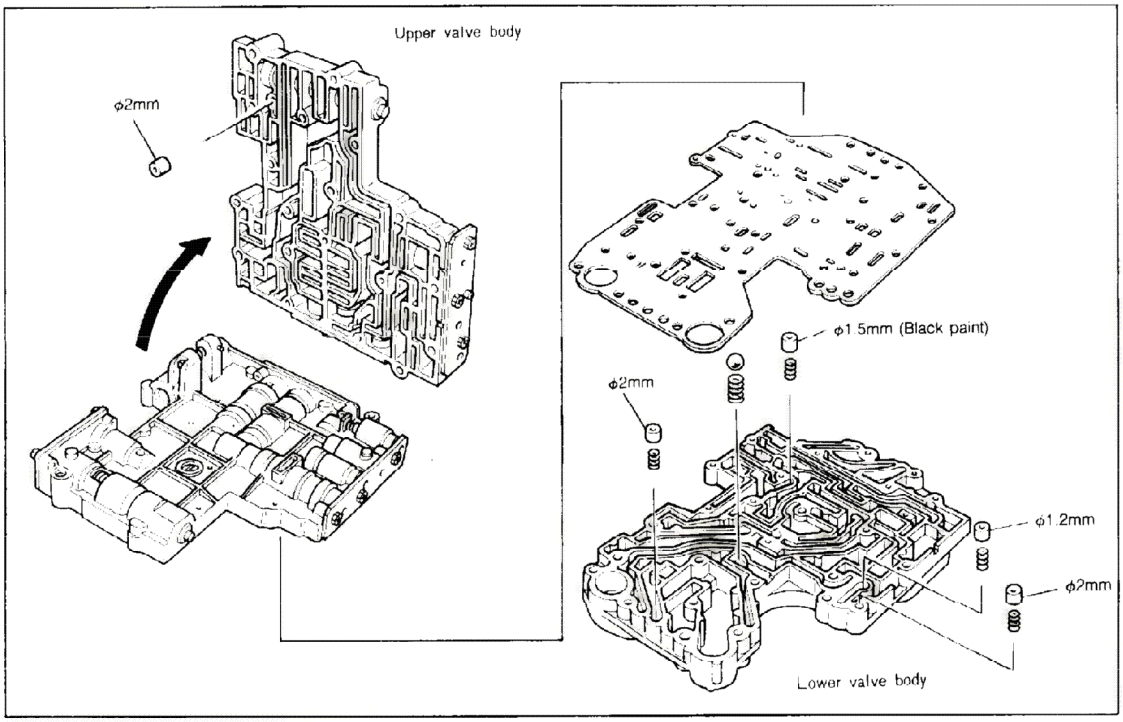
The insertion (reassembly) is to be performed consecutively by blocking the valves with the side plate stopped with a bolt at the edge, as illustrated in the figure.

6. Insert the pressure regulator valve, spring, plug and sleeve.
7. Insert the 2nd lock valve and spring.
8. Set the side plate in a position where it does not interfere with the set plate, and secure by the specified torque.



47U07B-135

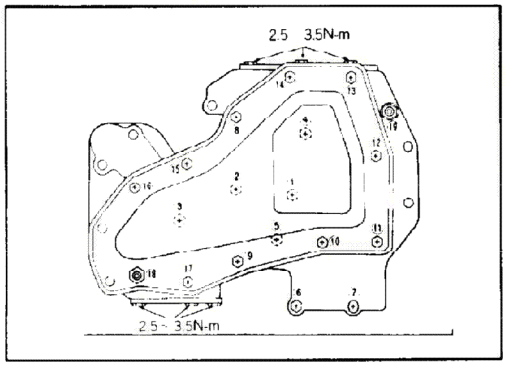
9. Insert the 2nd-3rd shift plug, spring and valve.
10. Insert the 1st-2nd shift spring and valve.
11. Insert the pressure modifier valve.
12. Secure the side plate by the specified torque.
13. Insert the manual valve.



57U07B-136

14. Insert the orifice check valve and spring as well as the throttle relief ball and spring in the lower valve body.
15. Position the separation plate on the lower valve body, and then align the separation plate and lower valve body and hold them together with large clips.
16. Insert the orifice check valve in the upper valve body.

Note
Check that the orifice check valve and throttle relief ball are properly inserted.



57U07B-137

17. Insert the upper valve body and secure by the specified torque.
18. Mount the oil strainer and secure by the specified torque.

Tightening torque:
1 ~ 7 : 2.5 ~ 3.5 N-m (1.8 ~ 2.5 ft-lb)
8 ~ 17: 3.0 ~ 4.0 N-m (2.2 ~ 2.9 ft-lb)
18, 19: 5.0 ~ 7.0 N-m (3.6 ~ 5.1 ft-lb)
Side plate: 2.5 ~ 3.5 N-m (1.8 ~ 2.5 ft-lb)

REASSEMBLY OF TRANSMISSION

Notes

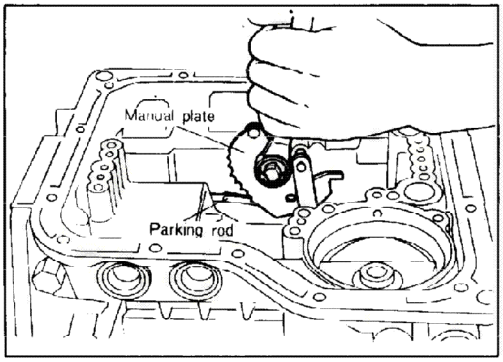
a) Always pay close attention to find dents and scars on the individual parts prior to reassembly since such defects may affect the functions of the precision constructed components.

b) Always apply automatic transmission fluid on individual seal rings as well as the rotating and sliding parts of each component prior to reassembly.

c) Basically, replace all removed gaskets and seal rings.

d) Always use vaseline and refrain from using grease.

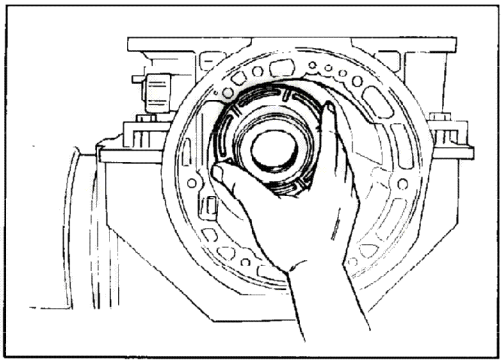
47U07B-140



47U07B-141

REASSEMBLY PROCEDURES

1. Mount the transmission case on the engine stand.
2. Install the manual plate and parking rod in the transmission case.

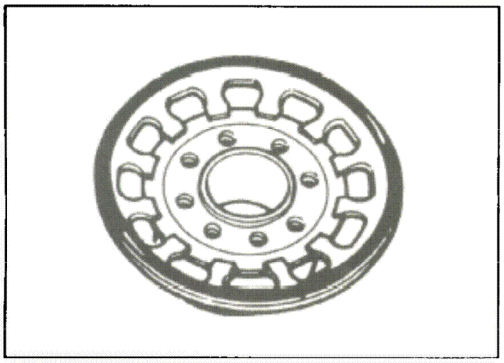


47U07B-142

3. Install the low and reverse brake piston.

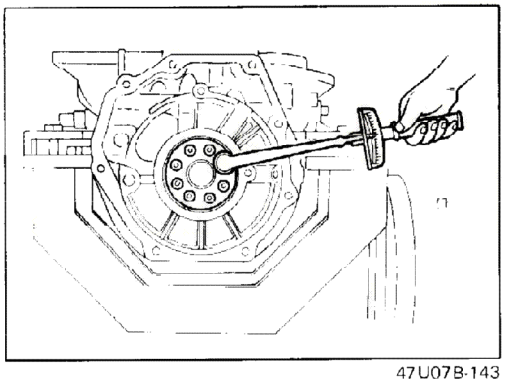
Note

Apply automatic transmission fluid on the seal rings, and press the perimeter of the piston evenly when installing the piston.



57U07B-142

4. Set and install the one-way clutch inner race, thrust washer and piston return spring.

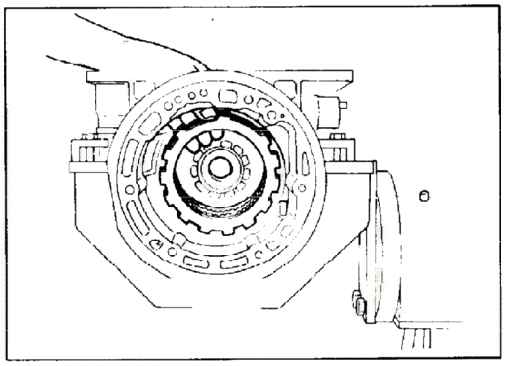


47U07B-143

5. Tighten and secure the inner race mounting bolts by the specified torque by using the **hexagonal socket wrench** (49 0378 346) and torque wrench from the transmission case side.

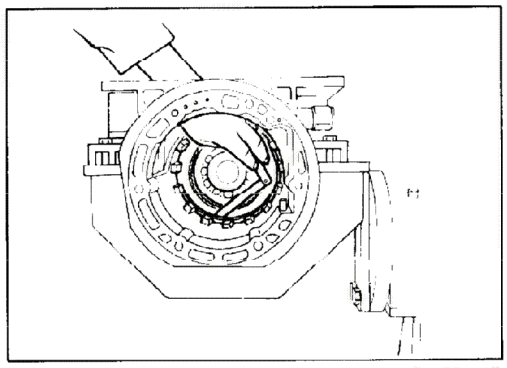
Tightening torque: 13 ~ 18 N-m (9.4 ~ 13.0 ft-lb)

Caution
Check that the return spring, thrust washer and rings are properly positioned before securing the bolts.



57U07B-144

6. Install the driven plate, drive plate and retaining plate consecuitively, and install the snap ring.



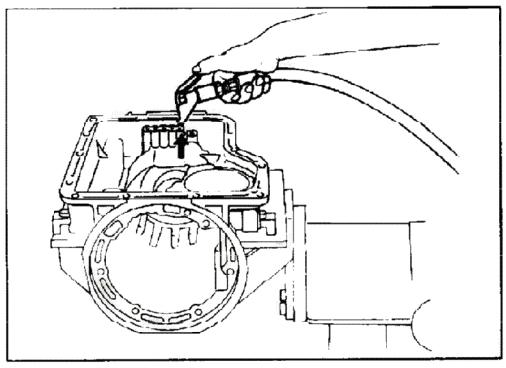
47U07B-145

7. Measure the clearance between the snap ring and retaining plate with a thickness gauge or dial gauge. Adjust the clearance by the selection of a retaining plate if off standard.

Standard clearance:
0.8 ~ 1.05 mm (0.0315 ~ 0.0413 in)

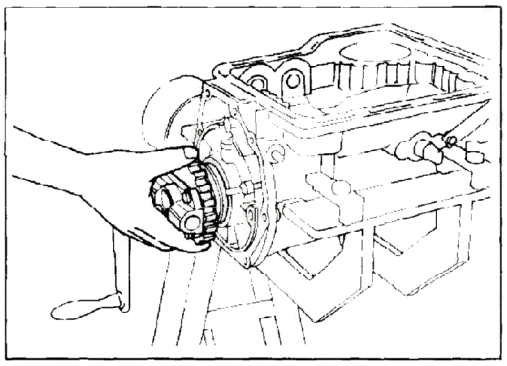
Retaining plate variations

7.8 mm (0.3071 in)	8.0 mm (0.3150 in)
8.2 mm (0.3228 in)	8.4 mm (0.3307 in)
8.6 mm (0.3386 in)	8.8 mm (0.3465 in)



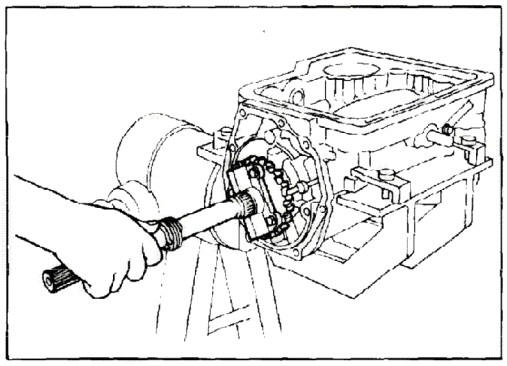
47U07B-146

8. Check the piston operation by applying compressed air to the oil passage of the low and reverse brake.



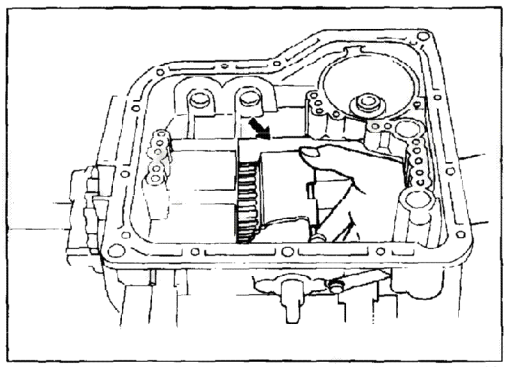
47U07B-147

9. Install the bearing and bearing race.
10. Install the oil distributor.



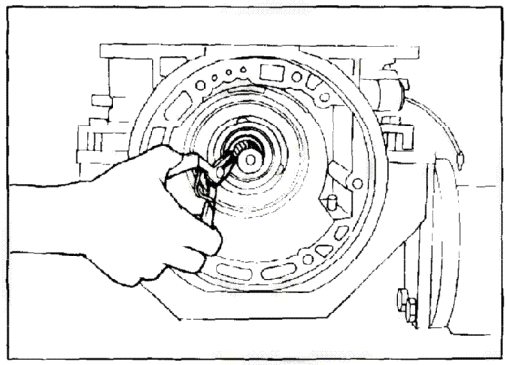
47U07B-148

11. Insert the output shaft.



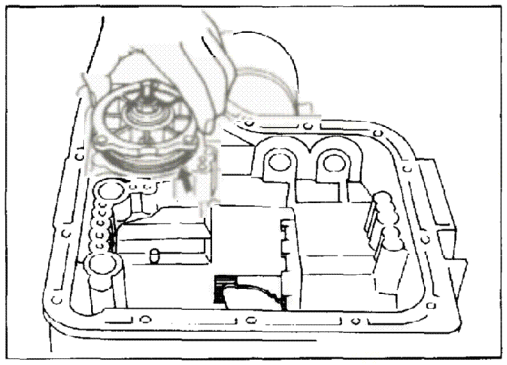
47U07B-149

12. Install the connecting drum, internal gear and rear planetary pinion carrier in one piece to the low and reverse brake side.



47U07B-150

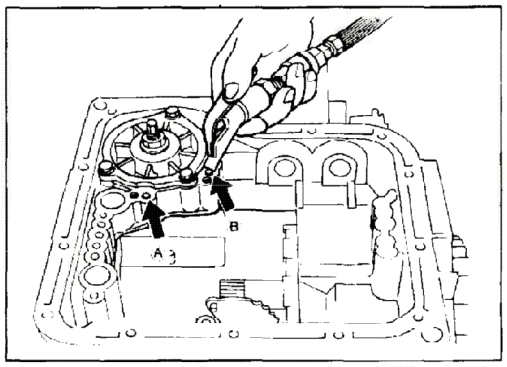
13. Install the snap ring from the front side of the output shaft.



47U07B-151

14. Install the 2nd band servo retainer.

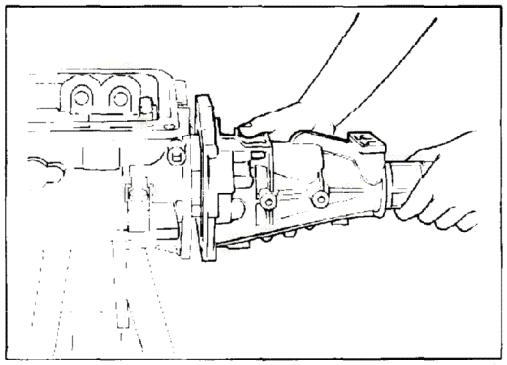
Caution
Apply even pressure to the perimeter to avoid damaging the seal ring when installing.



57U07B-152

15. Check the servo piston operation by applying compressed air to the oil passage of the 2nd band servo.

"A" oil passage — Engagement side
"B" oil passage — Release side

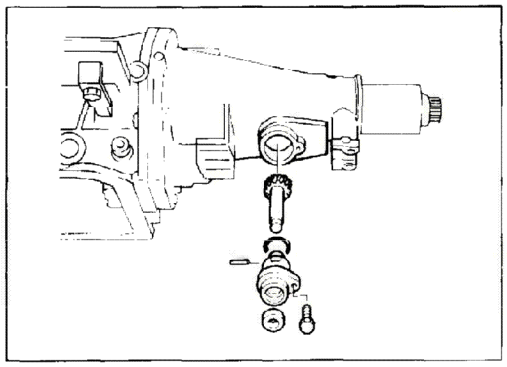


47U07B-153

16. Install the rear extension housing and secure by the specified torque.

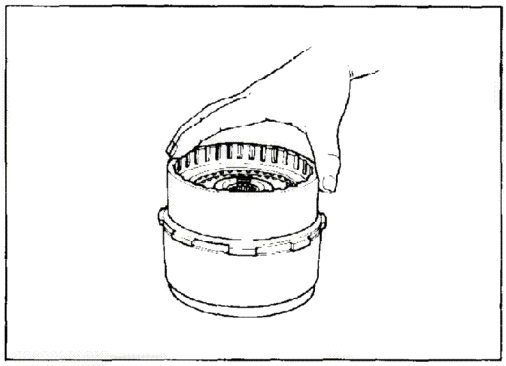
Tightening torque:
20 ~ 25 N-m (14.5 ~ 18.1 ft-lb)

Note
Check that the output shaft locks by shifting the manual lever to "P" range after installing the rear extension housing.



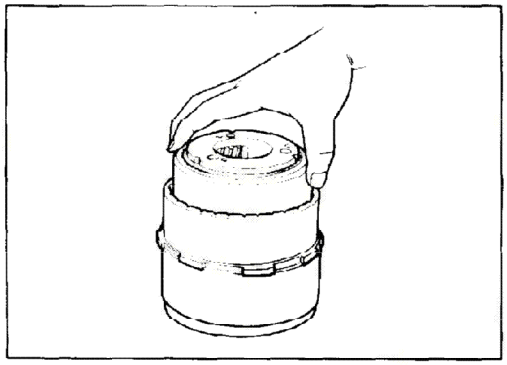
47U07B-154

17. Install the speedometer gear.



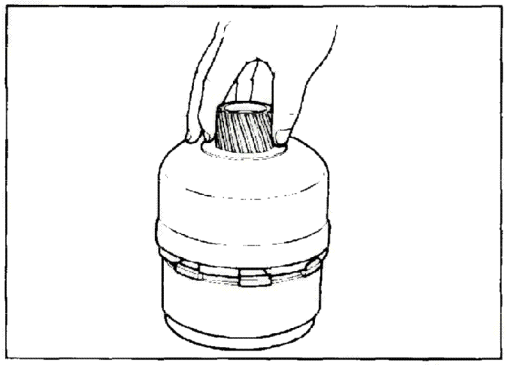
47U07B-155

18. Insert the rear clutch assembly from the top of the front clutch assembly.



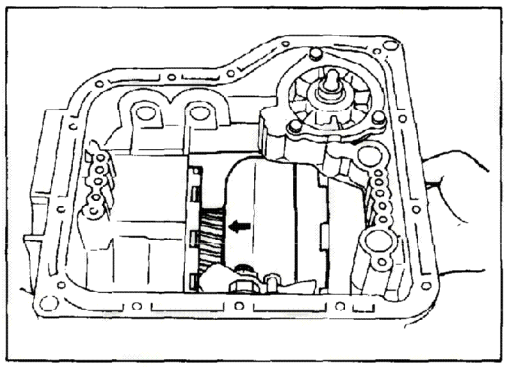
47U07B 156

19. Install the rear clutch hub and front planetary pinion carrier on the rear clutch assembly.



47U07B-157

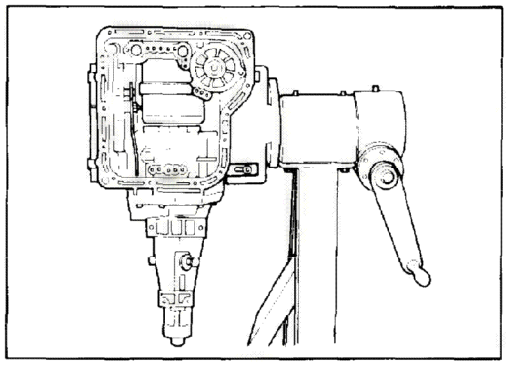
20. Install the connecting shell and sun gear from the top of the front planetary pinion carrier.



47U07B 158

21. Install the front clutch assembly to the connecting shell in one piece into the transmission case.

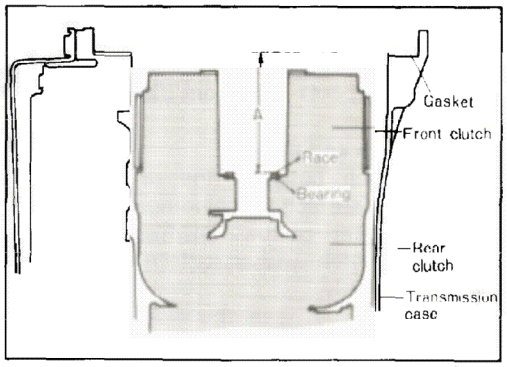
Caution
Pay close attention to prevent incorrect assembly of the many similar needle bearings and bearing races.



47U07B-159

TOTAL END PLAY MEASUREMENT

1. Position the front of the transmission case upward.
2. Insert the drum support bearing and race in the rear clutch.
3. Install the drum support gasket in the transmission case.



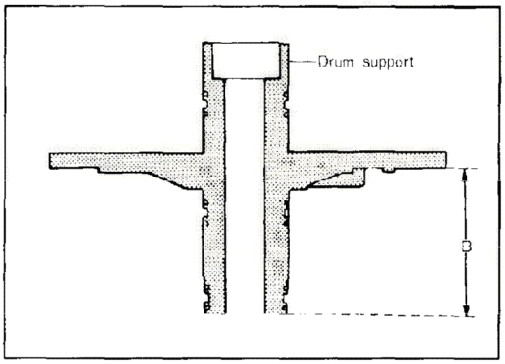
57U07B-160

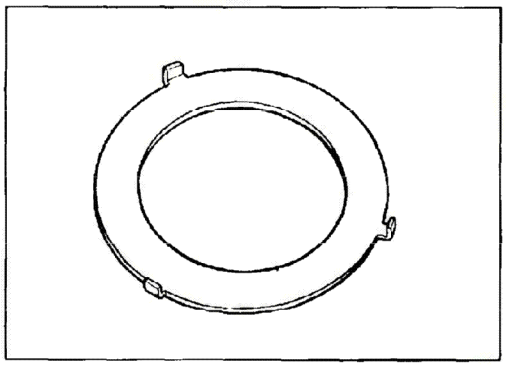
4. Measure the A and B distances with a measurement bar and depth gauge or vernier calipers.

   Formula: T = A − B − 0.1 mm (0.0039 in)

   T: Total end play
   A: The distance between the drum support mounting surface (including the drum support gasket) and the drum support bearing race surface on the rear clutch assembly.
   B: The distance between the drum support bearing race contact surface and the drum support gasket contact surface.
   0.1: The sinking (contraction) volume of a new gasket.

   Standard total end play:
   0.25 ~ 0.50 mm (0.0098 ~ 0.0197 in)



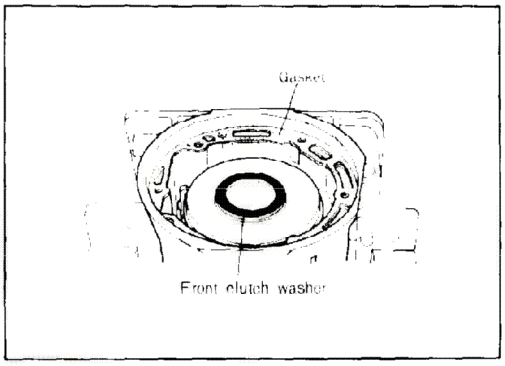


47U07B-161

5. Adjust the total end play to the standard by selection of a drum support bearing race.

Bearing race variations

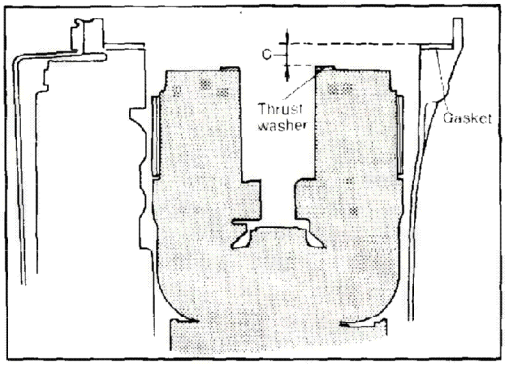
1.2 mm (0.0472 in)	1.4 mm (0.0551 in)
1.6 mm (0.0630 in)	1.8 mm (0.0709 in)
2.0 mm (0.0787 in)	2.2 mm (0.0866 in)



57U07B-162

FRONT CLUTCH END PLAY MEASUREMENT

1. Install the gasket in the transmission case.
2. Install the front clutch washer in the transmission case.



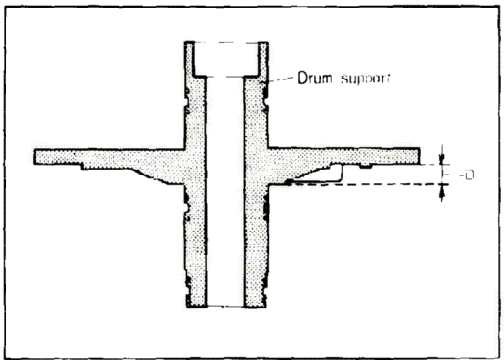
57U07B-163

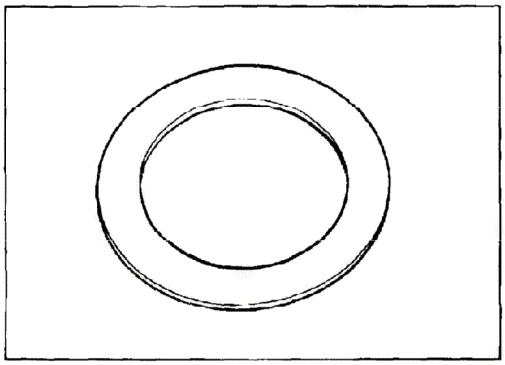
3. Measure the C and D distances with a measurement bar and depth gauge or vernier calipers.

   Formula: T = C − D − 0.1 mm (0.0039 in)

   T: Front clutch end play
   C: The distance between the drum support mounting surface (including the drum support gasket) of the transmission case and the front clutch washer surface on the front clutch assembly.
   D: The distance between the sliding surface of the drum support thrust washer and the drum support gasket contact surface.
   0.1: The sinking (contraction) volume of a new gasket.

   Standard front clutch end play:
   0.5 ~ 0.8 mm (0.0197 in)



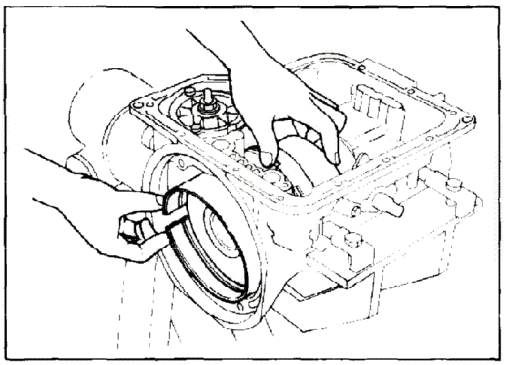


57U07B-164

4. Adjust the front clutch end play to the standard by selection of the front clutch washer.

Front clutch washer variations

1.3 mm (0.0512 in)	1.5 mm (0.0591 in)
1.7 mm (0.0669 in)	1.9 mm (0.0748 in)
2.1 mm (0.0827 in)	2.3 mm (0.0906 in)
2.5 mm (0.0984 in)	2.7 mm (0.1063 in)

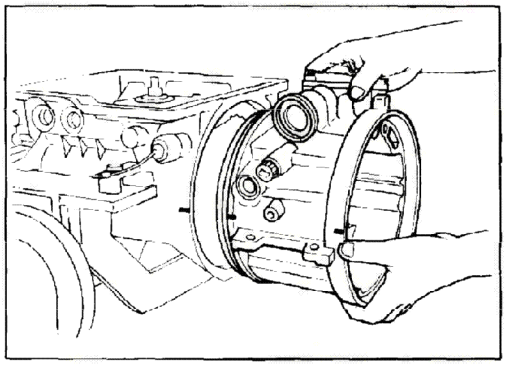


57U07B-165

REASSEMBLY (cont'd.)

22. Install the 2nd brake band and band strut.

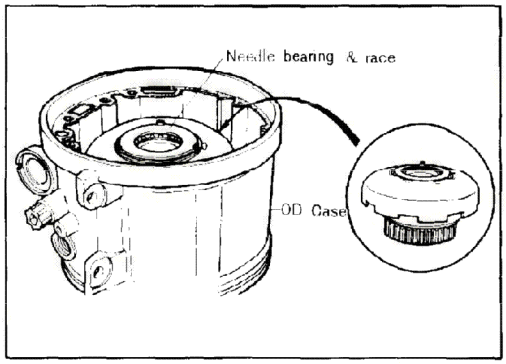
Note
Check that the brake band and band strut are positioned correctly.



57U07B-166

23. Install the gasket in the transmission case side and mount the OD case.

Notes
a) Align the match-joint marks of the transmission case and OD case, and tap lightly with a plastic hammer to avoid damaging the seal rings when installing.
b) Position with the two bolts and install by tapping lightly with a plastic hammer.

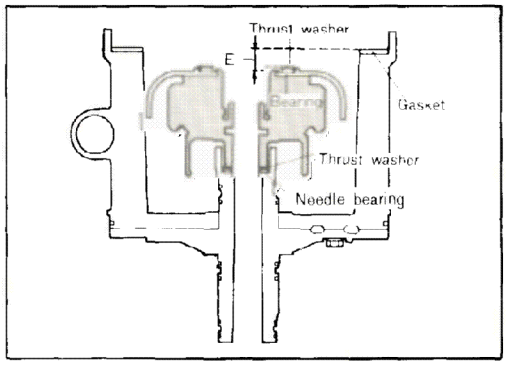


57U07B-167

OD GEARTRAIN TOTAL END PLAY MEASUREMENT

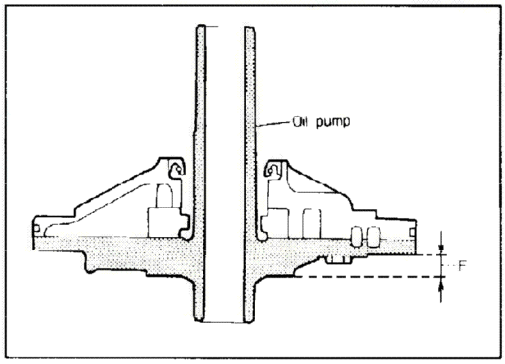
1. Position the OD case upright.
2. Install the needle bearing and race in the OD case.
3. Install the planetary carrier, sun gear and connecting shell in one piece into the OD case.

Caution
Do not insert the direct clutch drum.



57U07B-168

4. Install the needle bearing and race in the connecting shell.
5. Measure the E and F distance with a measurement bar and depth gauge or vernier calipers.

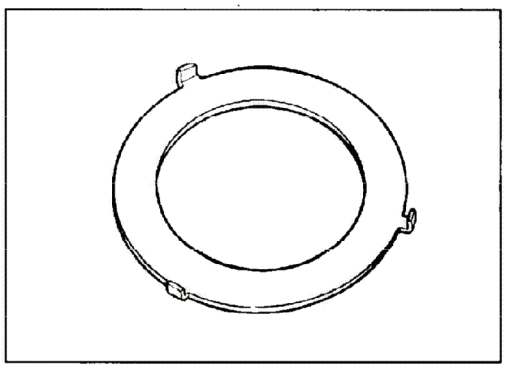


57U07B-169

Formula: T = E − F − 0.1 mm (0.0039 in)

T: Total end play
E: The distance between the oil pump mounting surface (including the oil pump gasket) and the OD connecting bearing race surface.
F: The distance between the oil pump side connecting shell bearing race contact surface and the oil pump gasket contact surface.
0.1: The sinking (contraction) volume of a new gasket

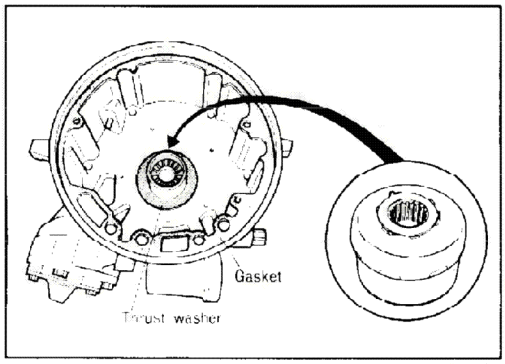
Standard total end play:
0.25 ~ 0.50 mm (0.0098 ~ 0.0197 in)



6. Adjust the total end play to the standard by selection of a bearing race.

Bearing race variations

1.2 mm (0.0472 in)	1.4 mm (0.0551 in)
1.6 mm (0.0630 in)	1.8 mm (0.0709 in)
2.0 mm (0.0787 in)	2.2 mm (0.0866 in)



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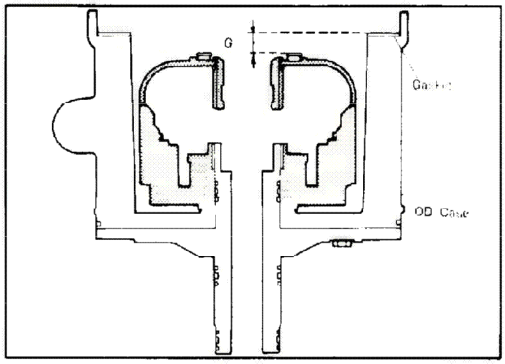
DIRECT CLUTCH END PLAY MEASUREMENT

1. Position the OD case upright.
2. Install the gasket and direct clutch thrust washer in the OD case.
3. Install the direct clutch, sun gear, connecting shell as well as the bearing and race in the OD case.

Caution
Do not insert the planetary pinion carrier.



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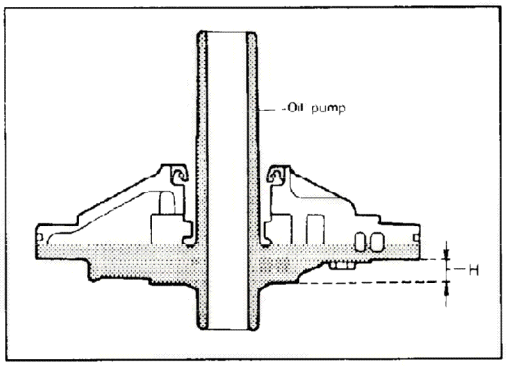
4. Measure the G and H distances with a measurement bar and depth gauge or vernier calipers.



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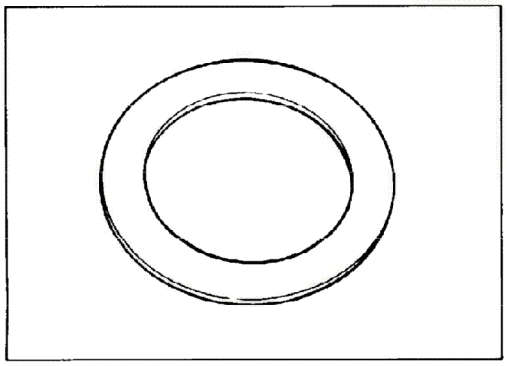
Formula: T = G – H – 0.1 mm (0.0039 in)

T: Direct clutch end play
G: The distance between the oil pump mounting surface (including the oil pump gasket) and the OD connecting bearing race surface.
H: The distance between the oil pump side connecting shell bearing race contact surface and the oil pump gasket contact surface.
0.1: The sinking (contraction) volume of a new gasket.

Standard direct clutch end play: 0.5 ~ 0.8 mm



5. Adjust the direct clutch end play to the standard by selection of a thrust washer.

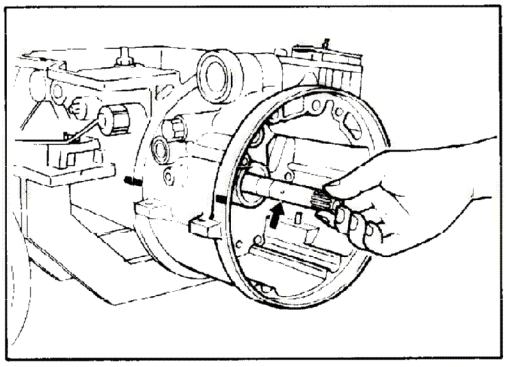
Direct clutch thrust washer variations

1.3 mm (0.0512 in)	1.5 mm (0.0591 in)
1.7 mm (0.0669 in)	1.9 mm (0.0748 in)
2.1 mm (0.0827 in)	2.3 mm (0.0906 in)
2.5 mm (0.0984 in)	2.7 mm (0.1063 in)

REASSEMBLY (cont'd.)

24. Insert the intermediate shaft.

Caution
Install the side with the oil hole toward the front.



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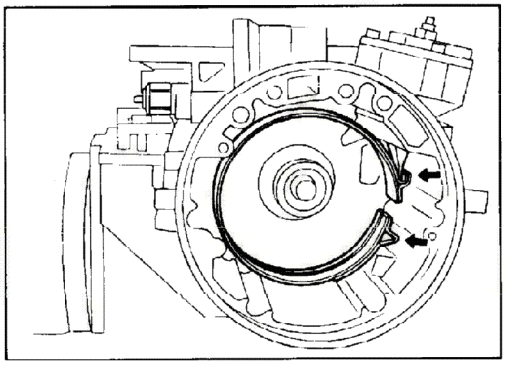
25. Install the OD brake band and band strut.



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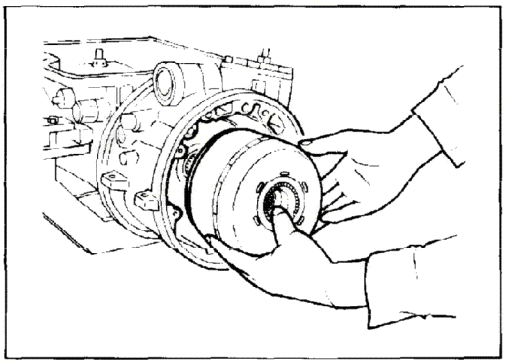

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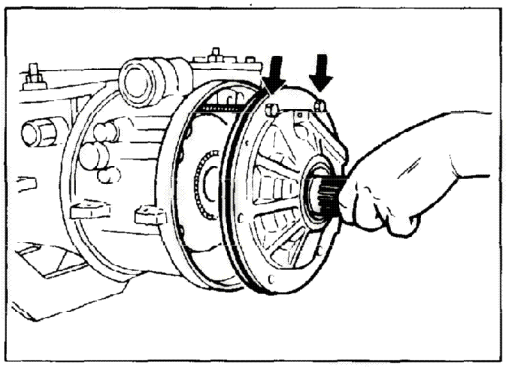
26. Install the direct clutch assembly.



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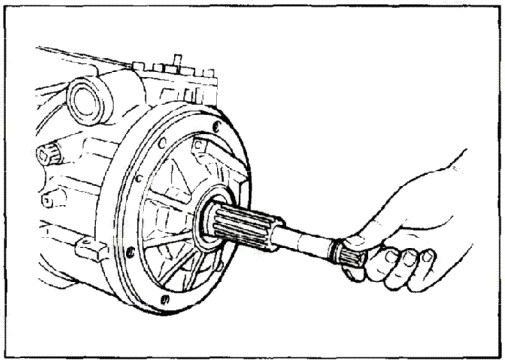
27. Install the gasket on the oil pump side, and mount the oil pump.

Notes

a) Attach the thrust washer and bearing race with white vaseline on the oil pump side.

b) Position with the two bolts and install by tapping lightly with a plastic hammer.



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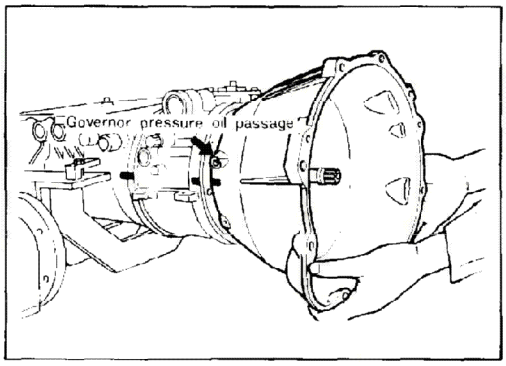
28. Install the input shaft.



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29. Install the converter housing and secure the bolts by the specified torque.

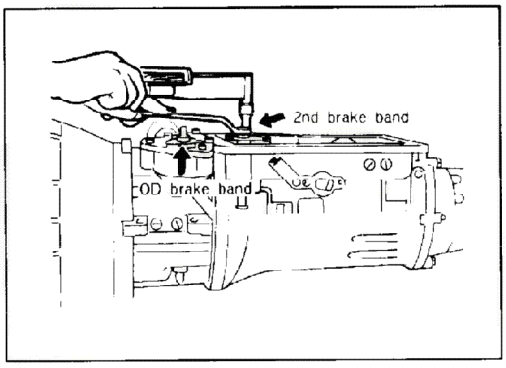
Tightening torque:

45 ~ 55 N·m (32.5 ~ 39.8 ft-lb)

Cautions

a) Apply No. 4 sealant thinly on the bolt flange and converter housing mounting surface.

b) Check that the O ring is inserted in the governor pressure oil passage.



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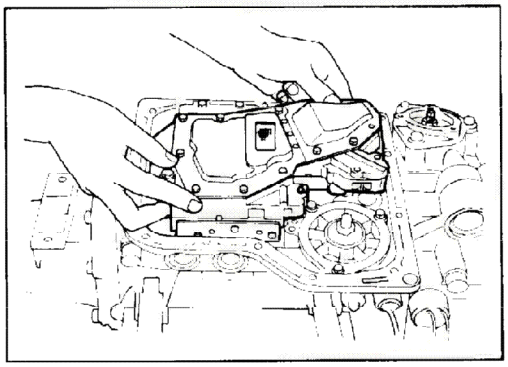
30. Adjust the 2nd and OD brake bands.
Loosen the lock nut and tighten the piston stem with 7 ~ 10 N-m (5.1 ~ 7.2 ft-lb) torque for OD and 12 ~ 15 N-m (8.7 ~ 10.8 ft-lb) torque for 2nd.
Then loosen the stem the number of turns indicated.
- 2nd brake band – loosen 3 turns
- OD brake band – loosen 2 turns

Then secure the lock nut by the specified torque.

Tightening torque:
15 ~ 40 N-m (10.8 ~ 28.9 ft-lb)

Caution
Perform adjustments with automatic transmission fluid applied to the piston stem.



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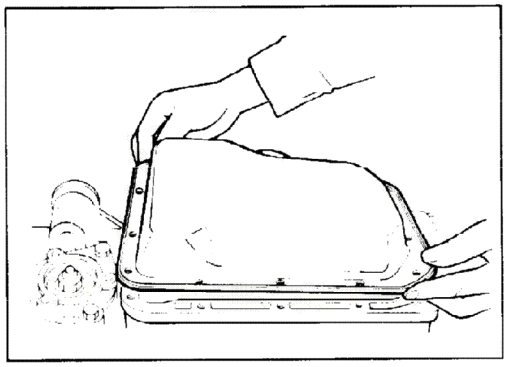
31. Install the control valve assembly and secure the bolts by the specified torque.

Tightening torque: 5.5 ~ 7.5 N-m (4.0 ~ 5.4 ft-lb)



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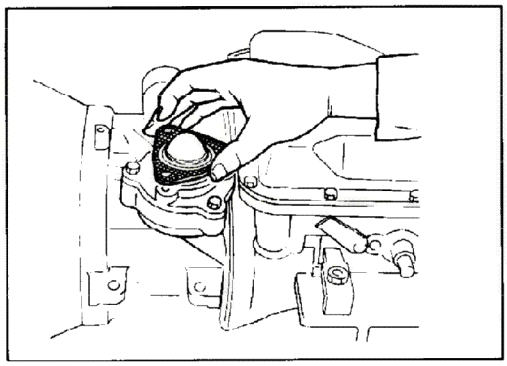
32. Install the gasket and oil pan, and secure the bolts by the specified torque.

Tightening torque: 6 ~ 8 N-m (4.3 ~ 5.8 ft-lb)



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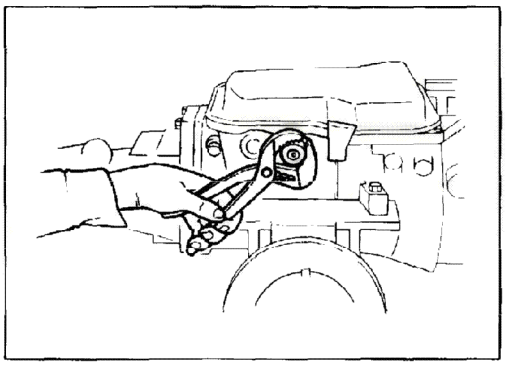
33. Install the OD band servo cover.



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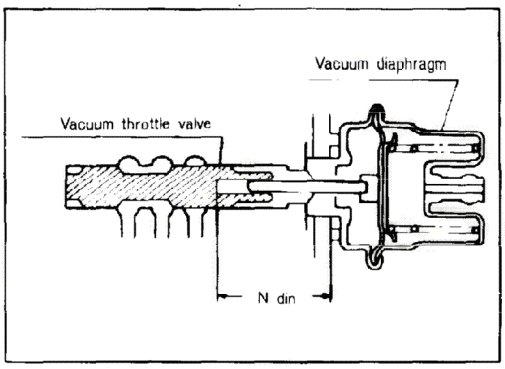
34. Install the vacuum diaphragm.



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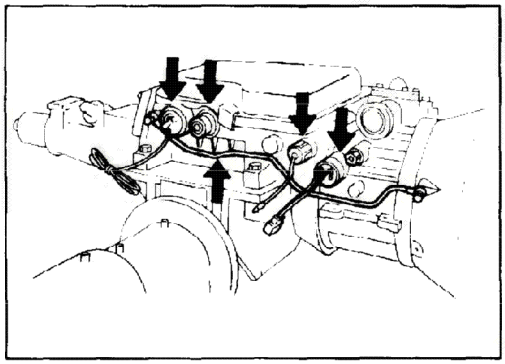
35. Vacuum diaphragm rod adjustment
Always measure the N dimension indicated in the figure, and select the diaphragm rod in accordance with the table below, after replacing the control valve or the transmission case.

N dimension	Applicable diaphragm rod length
25.55 mm (1.0059 in)	29.0 mm (1.1418 in)
25.65 ~ 26.05 mm (1.0099 ~ 1.0256 in)	29.5 mm (1.1614 in)
26.15 ~ 26.55 mm (1.0295 ~ 1.0453 in)	30.0 mm (1.1811 in)
26.65 ~ 27.05 mm (1.0492 ~ 1.0650 in)	30.5 mm (1.2008 in)
Over 27.15 mm (1.0689 in)	31.0 mm (1.2205 in)



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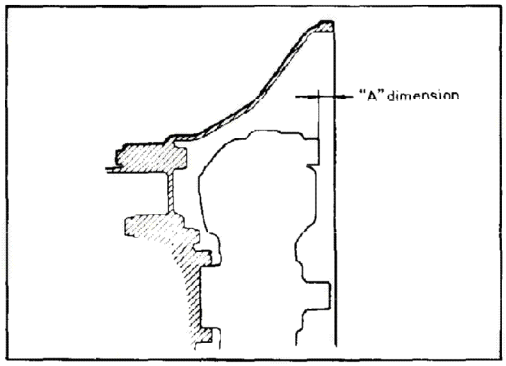
36. Install the kickdown solenoid, governor pressure pipe, OD cancel solenoid, transmission oil pressure switch, etc.
37. Install the torque converter.



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Note
In order to ensure the torque converter is installed accurately, measure the clearance (size A) between the end of the torque converter and the end of the converter housing.

Size A: approx. 33.1 mm (1.303 in)

38. Remove the transmission from the engine stand.

INSTALLATION OF TRANSMISSION
Installation is the reverse order of removal.

LOCATION OF THRUST WASHER AND NEEDLE BEARING