AUTOMATIC TRANSAXLE

SECTION AT

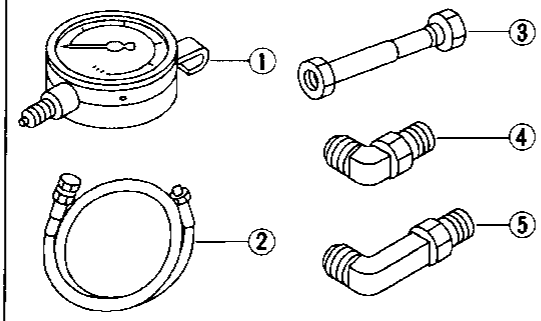
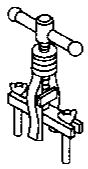
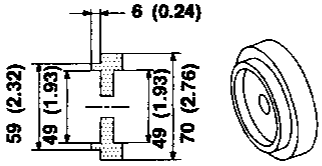
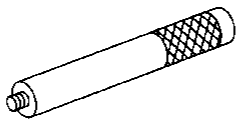
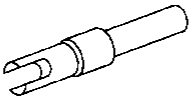
CONTENTS

CONTENTS (Cont'd.)

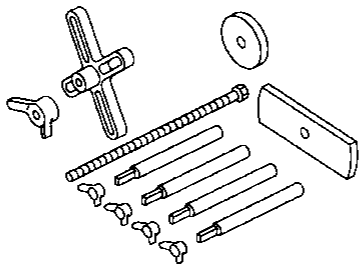
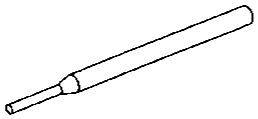
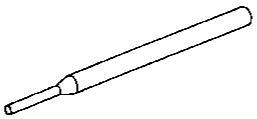
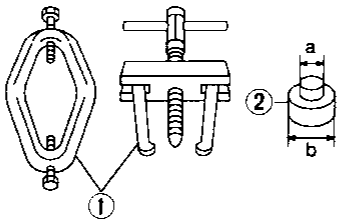
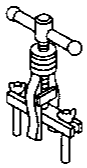
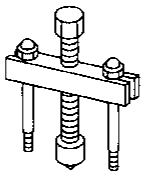
When you read wiring diagrams:
- **Read GI section, "HOW TO READ WIRING DIAGRAMS".**
- **See EL section, "POWER SUPPLY ROUTING" for power distribution circuit.**

Note: Refer to Foldout page for "A/T WIRING DIAGRAM". (SR20DE engine models).

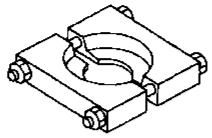
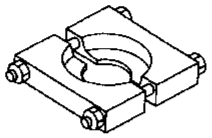
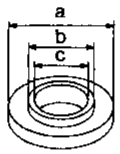
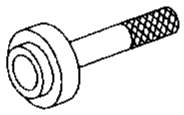
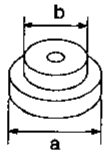
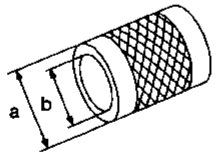
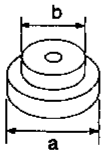
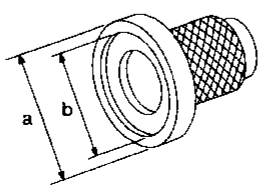
Special Service Tools

Tool number (Kent-Moore No.) Tool name	Description	
ST2505S001 (J25695-A) Oil pressure gauge set ① ST25051001 (J25695-1) Oil pressure gauge ② ST25052000 (J25695-2) Hose ③ ST25053000 (J25695-3) Joint pipe ④ ST25054000 (J25695-4) Adapter ⑤ ST25055000 (J25695-5) Adapter	 NT097	Measuring line pressure and governor pressure
ST33290001 (J25810-A) Puller	 NT076	Removing differential side oil seals
KV31103000 (—) Drift	 NT106	Installing differential oil seal (Use with ST35325000.) Unit: mm (in)
ST35325000 (—) Drift	 NT088	Installing differential oil seal (Use with KV31103000.)
KV38107700 (—) Preload adapter	 NT087	— RE4F03V — • Measuring turning torque of final drive assembly • Measuring clearance between side gear and differential case with washer • Selecting differential side bearing adjusting shim

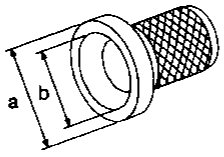
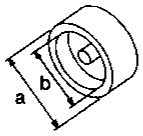
Special Service Tools (Cont'd)

Tool number (Kent-Moore No.) Tool name	Description	
KV31103200 (—) Clutch spring compressor	 NT100	Removing and installing clutch return spring
ST23540000 (—) Pin punch	 NT070	Removing and installing parking rod plate, manual plate and differential pinion mate shaft retaining pins
KV32101000 (J25689-A) Pin punch	 NT070	Installing throttle lever and manual shaft retaining pins
ST3306S001 (—) Differential side bearing puller set (—) ① ST33051001 (—) Puller ② ST33061000 (J8107-2) Adapter	 NT072	Removing differential side bearing inner race (RE4F03V) **a: 28.5 mm (1.122 in) dia.** **b: 38 mm (1.50 in) dia.**
KV381054S0 (—) Puller	 NT076	• Removing idler gear bearing outer race **— RL4F03A —** • Removing output shaft bearing outer race from bearing retainer • Removing output gear bearing outer race from bearing retainer **— RE4F03V —** • Removing differential side bearing outer race • Removing needle bearing from bearing retainer
ST27180001 (—) Puller	 NT099	• Removing idler gear • Removing output gear (RL4F03A)

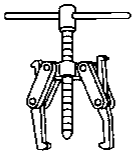
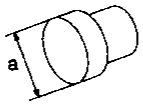
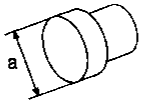
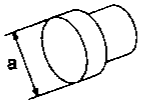
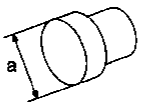
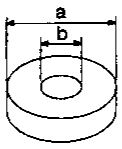
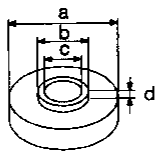
Special Service Tools (Cont'd)

Tool number (Kent-Moore No.) Tool name	Description	
ST30031000 (—) Puller	 NT071	Removing reduction gear bearing inner race
ST30021000 (J22912-1) Puller	 NT071	Removing differential side bearing (RL4F03A)
ST35272000 (—) Drift	 NT107	• Installing reduction gear bearing inner race • Installing idler gear bearing inner race • Installing output gear bearing inner race (RL4F03A) **a: 72 mm (2.83 in) dia.** **b: 40 mm (1.57 in) dia.** **c: 35.5 mm (1.398 in) dia.**
ST37830000 (—) Drift	 NT112	Installing idler gear bearing outer race
ST35321000 (—) Drift	 NT073	Installing output shaft bearing (RE4F03V) **a: 67 mm (2.64 in) dia.** **b: 49 mm (1.93 in) dia.**
ST33200000 (J37067) Drift	 NT091	Installing differential side bearing (RL4F03A) **a: 60 mm (2.36 in) dia.** **b: 44.5 mm (1.752 in) dia.**
ST30633000 (—) Drift	 NT073	Installing differential side bearing outer race (RE4F03V) **a: 67 mm (2.64 in) dia.** **b: 49 mm (1.93 in) dia.**
ST35271000 (—) Drift	 NT104	• Installing idler gear • Installing output gear (RL4F03A) **a: 76 mm (2.99 in) dia.** **b: 67 mm (2.64 in) dia.**

Special Service Tools (Cont'd)

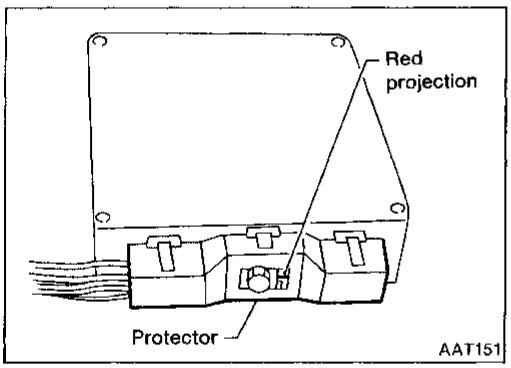
Tool number (Kent-Moore No.) Tool name	Description	
ST33400001 (J26082) Drift	 NT086	• Installing oil pump housing oil seal • Installing output gear bearing outer race onto bearing retainer (RL4F03A) **a: 60 mm (2.36 in) dia.** **b: 47 mm (1.85 in) dia.**
KV40104840 (—) Drift	 NT108	Installing output shaft bearing outer race onto bearing retainer (RL4F03A) **a: 49 mm (1.93 in) dia.** **b: 42 mm (1.65 in) dia.**

Commercial Service Tools

Tool name	Description	
Puller	 NT077	• Removing idler gear bearing inner race • Removing and installing band servo piston snap ring — **RL4F03A** — • Removing output gear bearing inner race • Removing differential side bearing
Drift	 NT109	Removing idler gear bearing inner race **a: 34 mm (1.34 in) dia.**
Drift	 NT109	Installing needle bearing onto bearing retainer (RL4F03V) **a: 36 mm (1.42 in) dia.**
Drift	 NT109	Removing output gear bearing inner race (RL4F03A) **a: 33 mm (1.30 in) dia.**
Drift	 NT109	Removing differential side bearing (RL4F03A) **a: 38 mm (1.50 in) dia.**
Drift	 NT110	Removing output shaft bearing inner race (RL4F03A) **a: 70 mm (2.76 in) dia.** **b: 30 mm (1.18 in) dia.**
Drift	 NT111	Installing output shaft bearing inner race (RL4F03A) **a: 70 mm (2.76 in) dia.** **b: 34 mm (1.34 in) dia.** **c: 30 mm (1.18 in) dia.** **d: 2 mm (0.08 in) dia.**

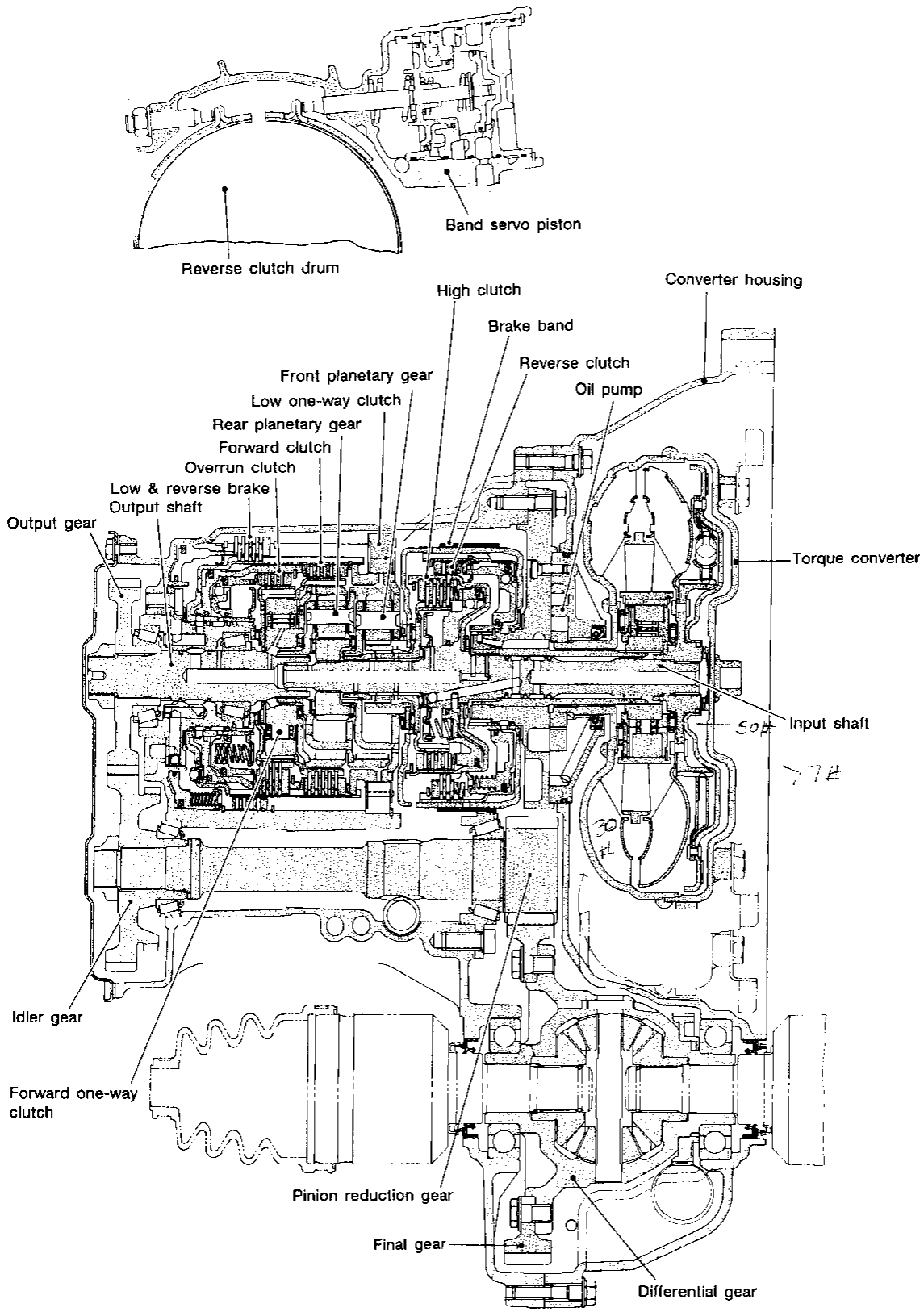
Service Notice

- Before proceeding with disassembly, thoroughly clean the outside of the transaxle. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Disassembly should be done in a clean work area.
- Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transaxle.
- When disassembling parts, place them in order in a parts rack so that they can be put back into the unit in their proper positions.
- All parts should be carefully cleaned with a general purpose, non- flammable solvent before inspection or reassembly.
- Gaskets, seals and O-rings should be replaced any time the transaxle is disassembled.
- When connecting A/T control unit harness connector, tighten bolt until red projection is in-line with connector.



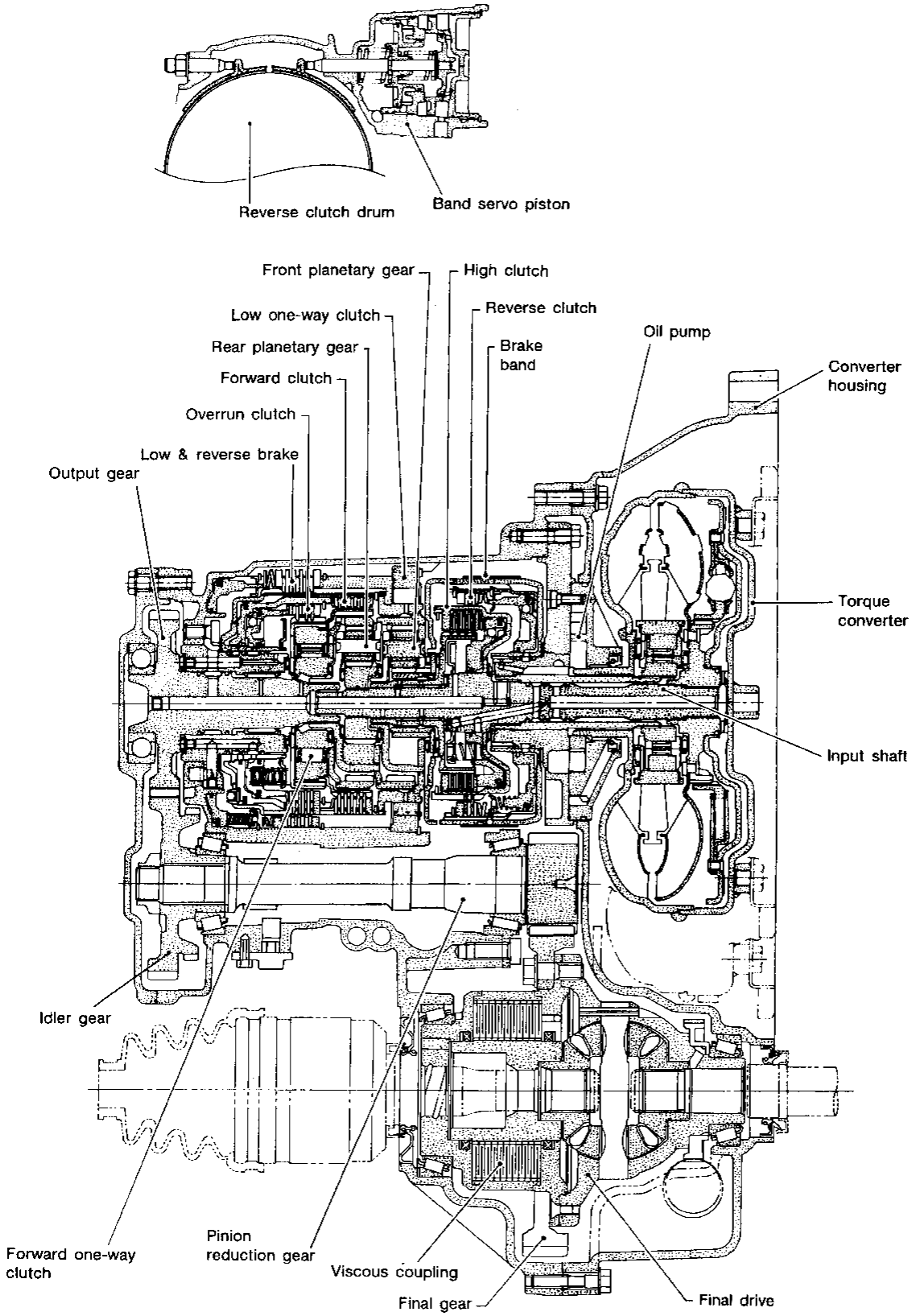
- It is very important to perform functional tests whenever they are indicated.
- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place removed parts in order on a parts rack so they can be put back in the valve body in the same positions and sequences. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed vales, sleeves, plugs, etc. will slide along their bores in the valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Petroleum jelly may be applied to O-rings and seals and used to hold small bearings and washers in place during reassembly. Do not use grease.
- Extremely care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- During overhaul, if excessive foreign material is found in the oil pan or clogging the strainer, flash or replace ATF cooler as required. Refer to TROUBLE DIAGNOSES Remarks, AT-37.
- After overhaul, refill the transaxle with new ATF.
- Even when the drain plug is removed, the old A/T fluid will remain in the torque converter and the A/T fluid cooling system.
  Always follow the procedures under "Changing A/T Fluid" in the MA section when changing A/T fluid.

Cross-sectional View — RL4F03A



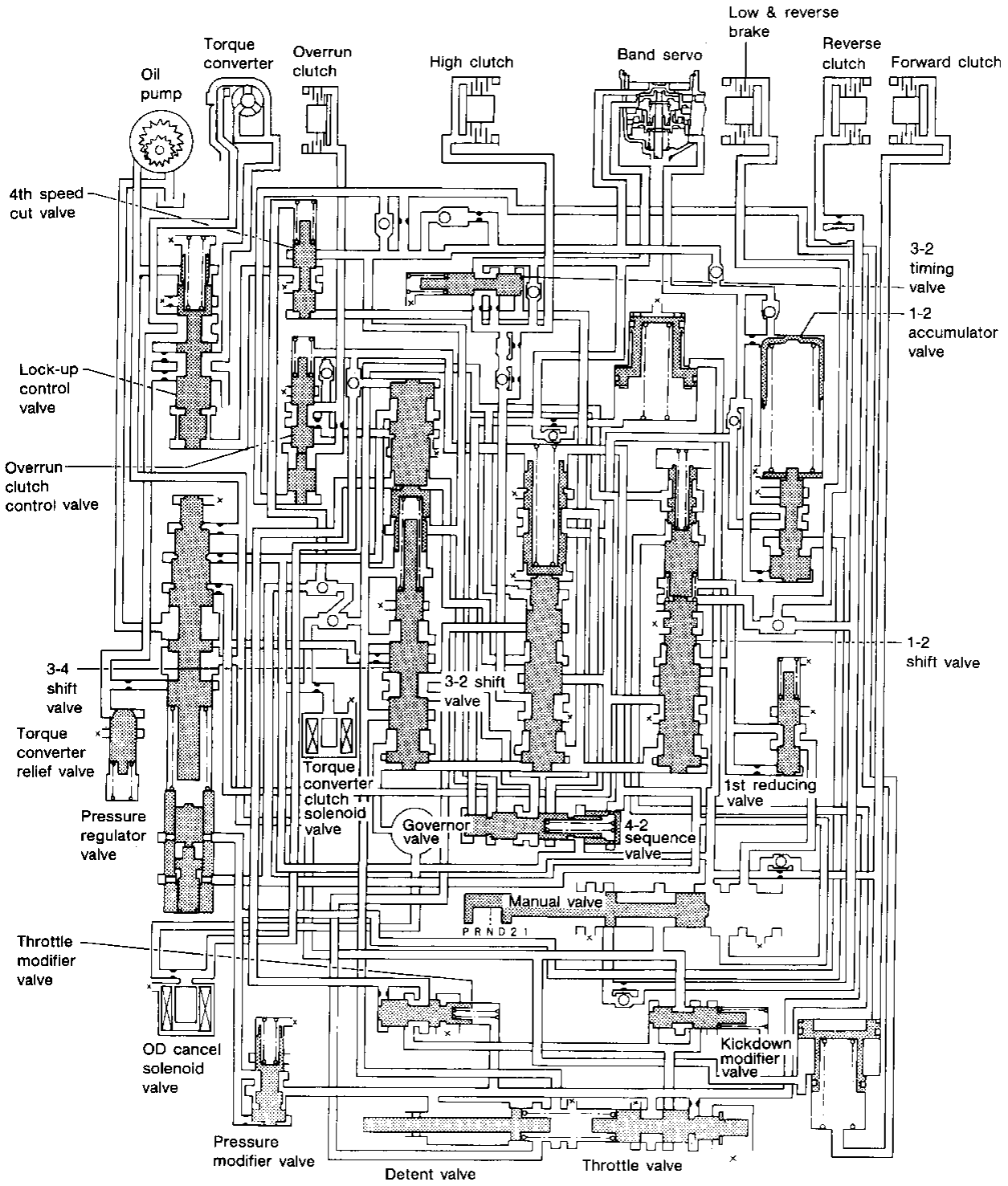
SAT577D

Cross-sectional View — RE4F03V



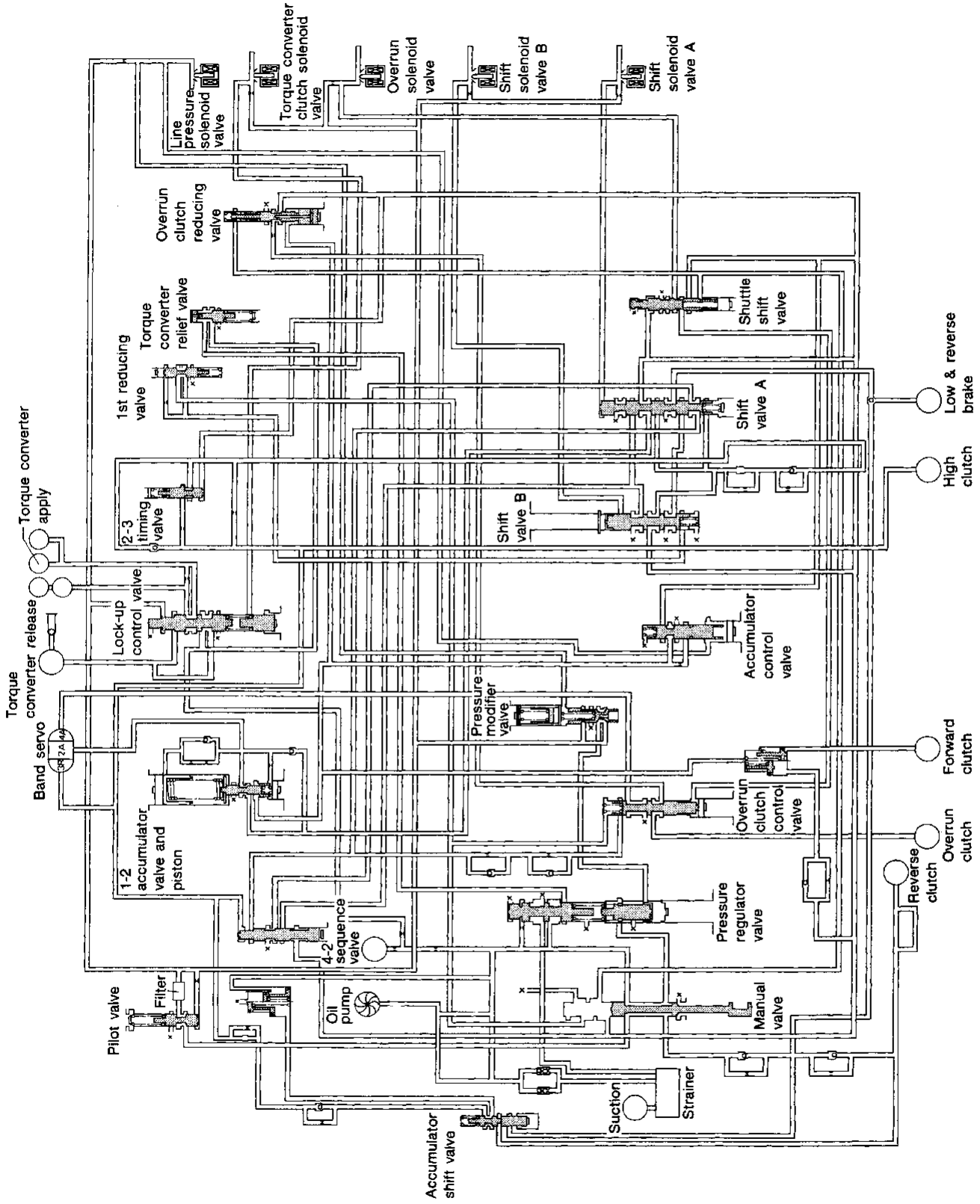
SAT324G

Hydraulic Control Circuit — RL4F03A



MAT231AA

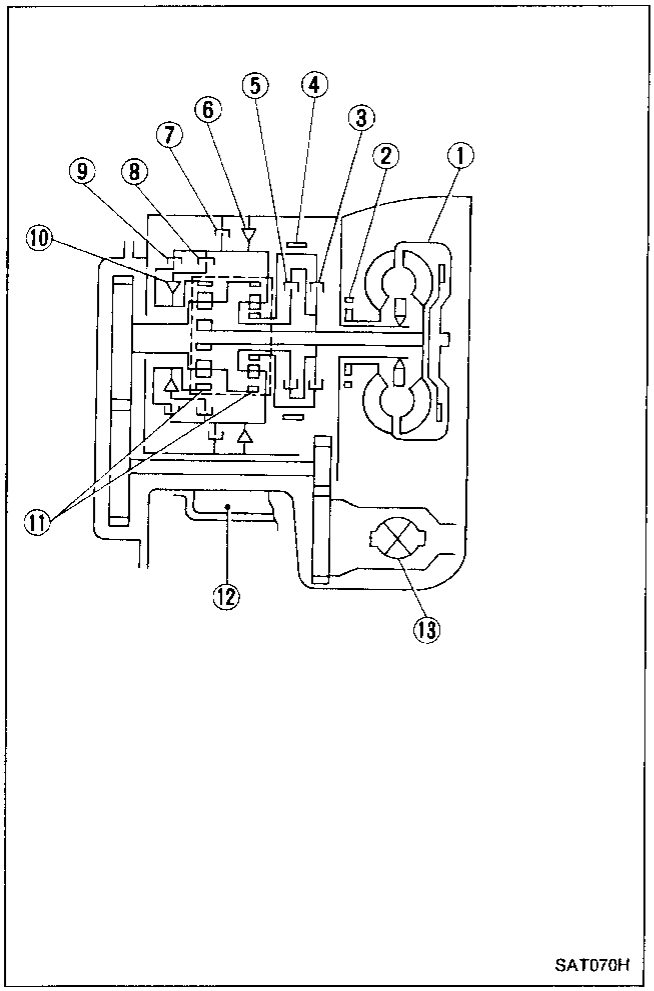
Hydraulic Control Circuit — RE4F03V



SAT307G

Shift Mechanism — RL4F03A and RE4F03V

CONSTRUCTION



① Torque converter
② Oil pump
③ Reverse clutch
④ Brake band
⑤ High clutch
⑥ Low one-way clutch
⑦ Low & reverse brake
⑧ Forward clutch
⑨ Overrun clutch
⑩ Forward one-way clutch
⑪ Planetary gear
⑫ Control valve
⑬ Final drive

FUNCTION OF CLUTCH AND BRAKE

Clutch and brake components	Abbr.	Function
Reverse clutch	R/C	To transmit input power to front sun gear.
High clutch	H/C	To transmit input power to front planetary carrier.
Forward clutch	F/C	To connect front planetary carrier with forward one-way clutch.
Overrun clutch	O/C	To connect front planetary carrier with rear internal gear.
Brake band	B/B	To lock front sun gear.
Forward one-way clutch	F/O.C	When forward clutch is engaged, to stop rear internal gear from rotating in opposite direction against engine revolution.
Low one-way clutch	L/O.C	To stop front planetary carrier from rotating in opposite direction against engine revolution.
Low & reverse brake	L & R/B	To lock front planetary carrier.

Shift Mechanism — RL4F03A and RE4F03V (Cont'd)

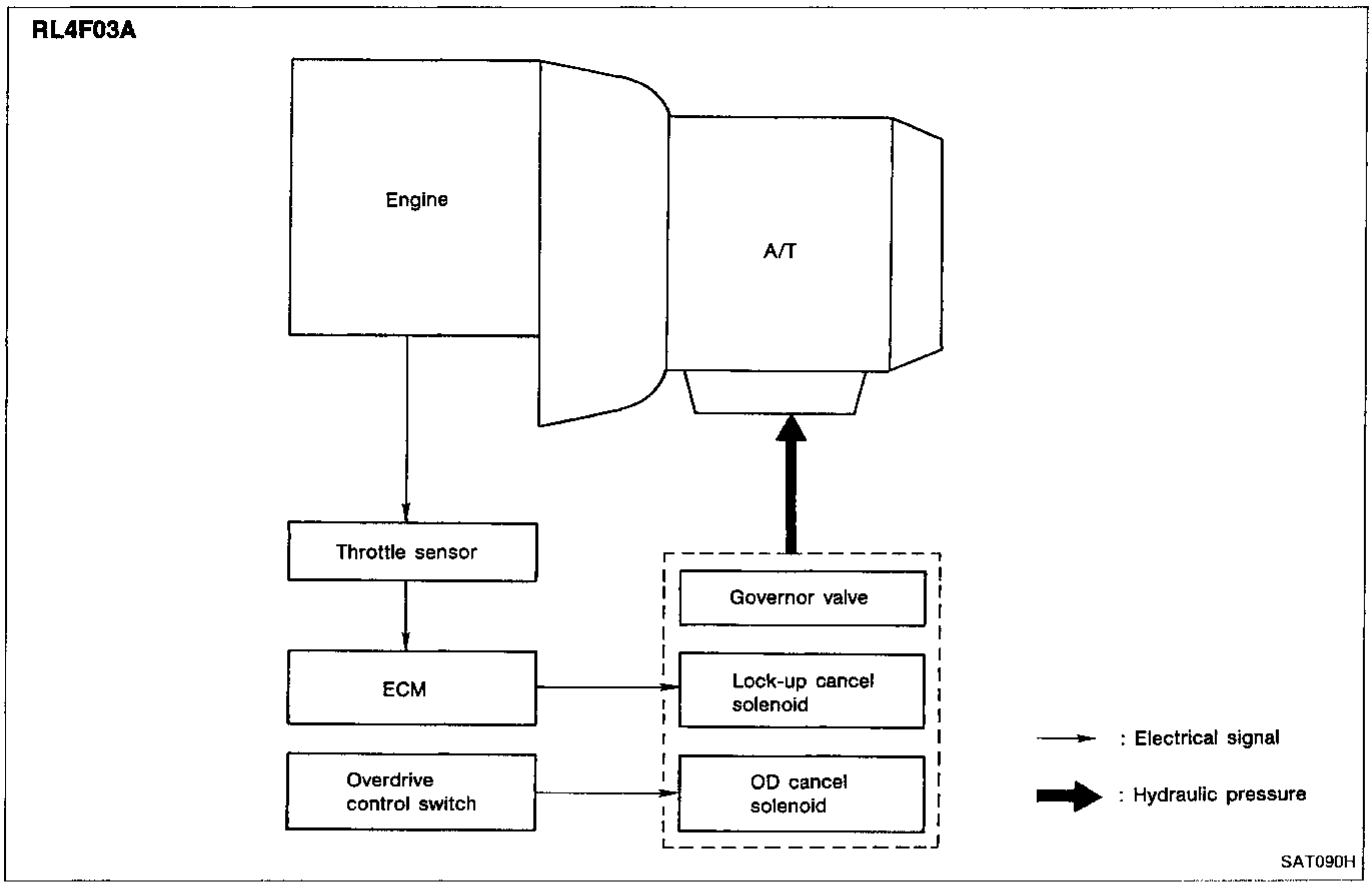
OPERATION OF CLUTCH AND BRAKE

Shift position		Reverse clutch	High clutch	Forward clutch	Overrun clutch	Band servo 2nd apply	Band servo 3rd release	Band servo 4th apply	Forward one-way clutch	Low one-way clutch	Low & reverse brake	Lock-up	Remarks
P													PARK POSITION
R		○									○		REVERSE POSITION
N													NEUTRAL POSITION
D *4	1st			○	◎				●	●			Automatic shift 1 ↔ 2 ↔ 3 ↔ 4
	2nd			○	*1 ◎	○			●				
	3rd		○	○	◎	*2 ⊗	⊗		●				
	4th		○	⊗		*3 ⊗	⊗	○				○	
2	1st			○	○				●	●			Automatic shift 1 ↔ 2
	2nd			○	○	○			●				
1	1st			○	○				●		○		Locks (held stationary) in 1st speed 1 ← 2
	2nd			○	○	○			●				

*1 : Operates when overdrive switch is set to "OFF".
*2 : Oil pressure is applied to both 2nd "apply" side and 3rd "release" side of band servo piston. However, brake band does not contract because oil pressure area on the "release" side is greater than that on the "apply" side.
*3 : Oil pressure is applied to 4th "apply" side in condition *2 above, and brake band contracts.
*4 : A/T will not shift to 4th when overdrive switch is set to "OFF" position.
○ : Operates
◎ : Operates when throttle opening is less than 1/16.
● : Operates during "progressive" acceleration.
⊗ : Operates but does not affect power transmission.

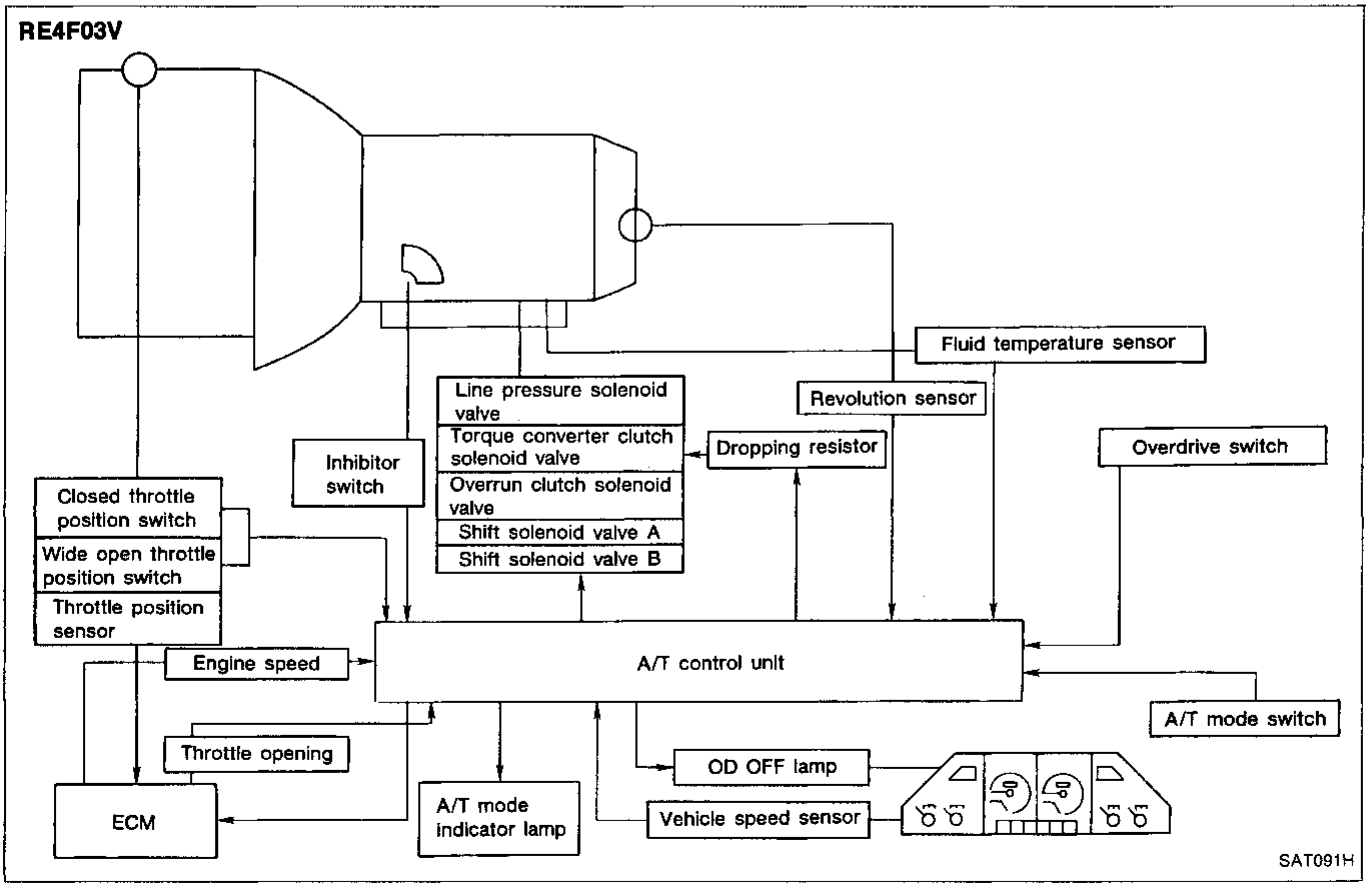
CONTROL SYSTEM

Control System — RL4F03A



CONTROL SYSTEM

Control System — RE4F03V



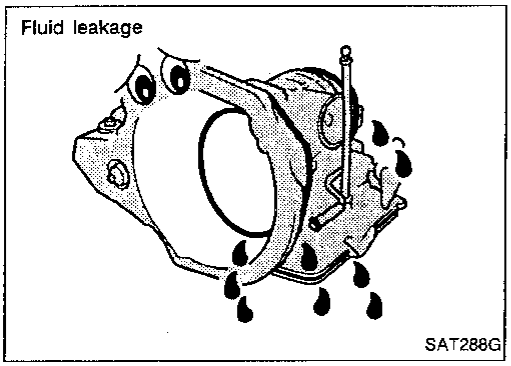
Control System — RE4F03V (Cont'd)

A/T CONTROL UNIT FUNCTION

The A/T control unit receives signals sent from various switches and sensors, determines required line pressure, shifting point, lock-up operation, engine brake operation, and sends required signals to the respective solenoids.

INPUT/OUTPUT SIGNAL OF A/T CONTROL UNIT

	Sensors and solenoid valves	Function
Input	Inhibitor switch	Detects select lever position and sends a signal to A/T control unit.
	Throttle position sensor	Detects throttle valve position and sends a signal to A/T control unit.
	Closed throttle position switch	Detects throttle valve's fully-closed position and sends a signal to A/T control unit.
	Wide open throttle position switch	Detects a throttle valve position of greater than 1/2 of full throttle should throttle sensor malfunction and sends a signal to A/T control unit.
	Engine speed signal	From ECM (ECCS control module).
	Fluid temperature sensor	Detects transmission fluid temperature and sends a signal to A/T control unit.
	Revolution sensor	Detects output shaft rpm and sends a signal to A/T control unit.
	Vehicle speed sensor	Used as an auxiliary vehicle speed sensor. Sends a signal when revolution sensor (installed on transmission) malfunction.
	A/T mode switch	Detects POWER, AUTO or HOLD position selected and sends a signal to A/T control unit.
	OD switch	Sends a signal, which prohibits a shift to D_4 (OD) range, to the A/T control unit.
Output	Shift solenoid valve A/B	Selects shifting point suited to driving conditions in relation to a signal sent from A/T control unit.
	Line pressure solenoid valve	Regulates (or decreases) line pressure suited to driving conditions in relation to a signal sent from A/T control unit.
	Torque converter clutch solenoid valve	Regulates (or decreases) lock-up pressure suited to driving conditions in relation to a signal sent from A/T control unit.
	Overrun clutch solenoid valve	Controls an "engine brake" effect suited to driving conditions invelation to a signal sent from A/T control unit.



Preliminary Check (Prior to Road Testing)

A/T FLUID CHECK

Fluid leakage check

1. Clean area suspected of leaking, — for example, mating surface of converter housing and transmission case.
2. Start engine, apply foot brake, place selector lever in "D" position and wait a few minutes.
3. Stop engine.
4. Check for fresh leakage.

Fluid condition check

Fluid color	Suspected problem
Dark or black with burned odor	Wear of frictional material
Milky pink	Water contamination — Road water entering through filler tube or breather
Varnished fluid, light to dark brown and tacky	Oxidation — Over or under filling — Overheating

Fluid level check — Refer to MA section (CHASSIS AND BODY MAINTENANCE).

Road Testing

Perform road tests using "Symptom" chart. Refer to page AT-20.

"P" POSITION

1. Place selector lever in "P" position and start engine. Stop engine and repeat the procedure in all positions, including neutral position.
2. Stop vehicle on a slight upgrade and place selector lever in "P" position. Release parking brake to make sure vehicle remains locked.

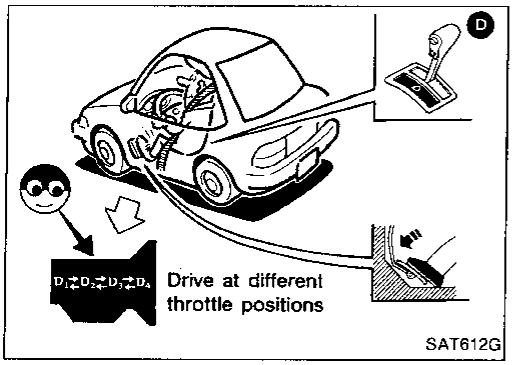
"R" POSITION

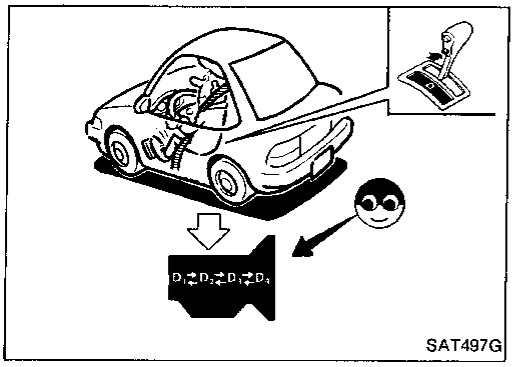
1. Manually move selector lever from "P" to "R", and note shift quality.
2. Drive vehicle in reverse long enough to detect slippage or other abnormalities.

"N" POSITION

1. Manually move selector lever from "R" and "D" to "N" and note shift quality.
2. Release parking brake with selector lever in "N" position. Lightly depress accelerator pedal to make sure vehicle does not move. (When vehicle is new or soon after clutches have been replaced, vehicle may move slightly. This is not a problem.)

Road Testing (Cont'd)





"D" POSITION

1. Manually shift selector lever from "N" to "D" position, and note shift quality.
2. Using the shift schedule as a reference, drive vehicle in "D" position. Record, on symptom chart, respective vehicle speeds at which up-shifting and down-shifting occur. These speeds are to be read at three different throttle positions (light, half and full), respectively. Also determine the timing at which shocks are encountered during shifting and which clutches are engaged.
3. Determine whether lock-up properly occurs while driving vehicle in proper gear position and at proper vehicle speed.
4. Check to determine if shifting to overdrive gear cannot be made while OD control switch is "OFF".
5. While driving vehicle in the 60 to 70 km/h (37 to 43 MPH) position in "D_3" position at half to light throttle position, fully depress accelerator pedal to make sure transaxle downshifts from 3rd to 2nd gear.
6. While driving vehicle in the 25 to 35 km/h (16 to 22 MPH) ("D_2" position) at half to light throttle position, fully depress accelerator pedal to make sure transaxle downshifts from 2nd to 1st gear.

"2" POSITION

1. Shift to "2" position and make sure vehicle starts in 1st gear.
2. Increase vehicle speed to make sure transaxle upshifts from 1st to 2nd gear.
3. Further increase vehicle speed. Make sure transaxle does not upshift to 3rd gear.
4. While driving vehicle at the 25 to 35 km/h (16 to 22 MPH) with throttle at half to light position ("2_2" position), fully depress accelerator pedal to make sure transaxle downshifts from 2nd to 1st gear.
5. Allow vehicle to run idle while in "2" position to make sure that transaxle downshifts to 1st gear.
6. Move selector lever to "D" position and allow vehicle to operate at 30 to 40 km/h (19 to 25 MPH). Then, shift to "2" position to make sure transaxle downshifts to 2nd gear.

"1" POSITION

1. Place selector lever in "1" position and accelerate vehicle. Make sure transaxle does not shift from 1st to 2nd gear although vehicle speed increases.
2. While driving vehicle in "1" position, release accelerator pedal to make sure that engine compression acts as a brake.
3. Place selector lever in "D" or "2" position and allow vehicle to run at 15 to 25 km/h (9 to 16 MPH). Then move selector lever to "1" position to make sure transaxle downshifts to 1st gear.

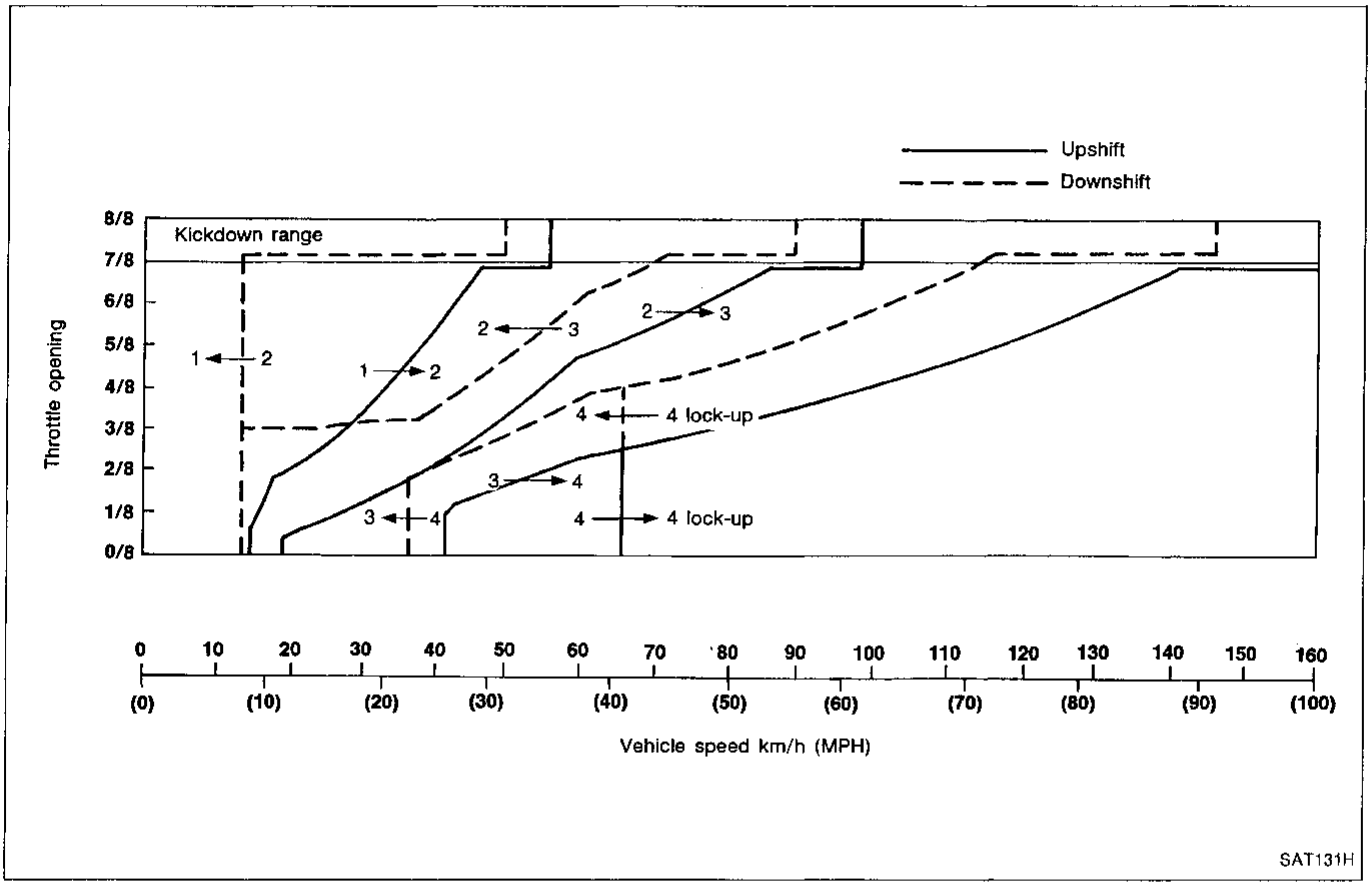
Road Testing (Cont'd)

VEHICLE SPEED WITH SHIFTING GEARS

This check should be carried out when oil temperature is between 50 and 80°C (122 and 176°F) after the vehicle has been driven approx. 10 minutes.

SHIFT SCHEDULE

GA16DE engine



NOTE

Road Testing (Cont'd)

ROAD TEST SYMPTOM CHART

Numbers are arranged in order of probability.
Perform inspections starting with number one and work up.
Circled numbers indicate that the transaxle must be removed from the vehicle.

: Valve expected to be malfunctioning

		ON VEHICLE															
		Oil level and oil quality	Control cable	Inhibitor switch and wiring	Throttle wire	Engine idling speed	Line pressure	9Control valve	Throttle valve & detent valve	Manual valve	Pressure regulator valve	3-4 shift valve	2-3 shift valve	1-2 shift valve	Overrun clutch control valve	Pressure modifier valve
Sharp shocks in shifting from "N" to "D" position		1	2	.	5	3	4	7								
Shift shocks	When shifting from 1st to 2nd or 2nd to 3rd	1	2	.	4	.	3	6								
	When shifting from 3rd to 4th	1	2	.	4	.	3	5								
	When shifting from D to 2 and 1 position. When OD switch is set from "ON" to "OFF"	1	2	.	4	.	3	5								
	When shifting from 2nd to 1st in "1" position	1	2	.	4	.	3	5								
Shift slippage when upshifting	When shifting from 1st to 2nd	1	2	.	4	.	3	5								
	When shifting from 2nd to 3rd	1	2	.	4	.	3	6								
	When shifting from 3rd to 4th	1	2	.	4	.	3	5								
Shift slippage with accelerator pedal depressed	When shifting from 4th to 2nd	1	2	.	5	.	3	6								
	When shifting from 4th to 3rd	1	2	.	4	.	3	6								
	When shifting from 4th to 1st and shifting from 3rd to 1st	1	2	.	5	.	3	6								
Poor power/acceleration	When vehicle starts	1	2	.	4	.	3	6								
	When upshifting	1	2	.	4	.	3	7								
No engine braking	When shifting from "D" to "2" and "1" position	1	2	.	4	.	3	5								
	When OD switch is set from "ON" to "OFF"	1	2	.	4	.	3	7								
	When shifting from 2nd to 1st in "1" position	1	2	.	4	.	3	5								
Shift quality	Too low a gear change point from 2nd to 3rd and from 3rd to 2nd.	1	.	.	3	.	2	6								
	Too high a gear change point from 2nd to 3rd and from 3rd to 2nd.	1	.	.	3	.	2	6								
	Too low a gear change point from 2nd to 1st in "1" position.	1	.	.	3	.	2	6								
	Too high a gear change point from 2nd to 1st in "1" position.	1	.	.	3	.	2	6								

Road Testing (Cont'd)

ON VEHICLE																		OFF VEHICLE																							
Kickdown modifier valve	1-2 accumulator valve	3-2 timing valve	1st reducing valve	Torque converter relief valve	Throttle modifier valve	4th speed cut valve	Lock-up control valve	4-2 sequence valve	Governor pressure		Governor valve		OD cancel solenoid valve		Torque converter clutch solenoid valve		Accumulator servo release		Accumulator N-D		Ignition switch and starter motor		OD control switch and wiring		Torque converter		Oil pump		Reverse clutch		High clutch		Forward clutch		Forward one-way clutch		Overrun clutch		Low one-way clutch		Low & reverse clutch		Brake band		Parking components
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Road Testing (Cont'd)

Numbers are arranged in order of probability.
Perform inspections starting with number one and work up.
Circled numbers indicate that the transaxle must be removed from the vehicle.

▒▒ : Valve expected to be malfunctioning

		ON VEHICLE														
		Oil level and oil quality	Control cable	Inhibitor switch and wiring	Throttle wire	Engine idling speed	Line pressure	Control valve	Throttle valve & detent valve	Manual valve	Pressure regulator valve	3-4 shift valve	2-3 shift valve	1-2 shift valve	Overrun clutch control valve	Pressure modifier valve
Shift quality	Failure to change gear from 4th to 2nd with accelerator pedal depressed.	1	.	.	3	.	2	6	▒▒							
	Failure to change gear from 3rd to 2nd with accelerator pedal depressed.	1	.	.	3	.	2	6	▒▒				▒▒			
	Failure to change gear from 1st to 2nd in "D" and "2" position.	1	.	.	3	.	2	6	▒▒					▒▒		
	Vehicle does not start from "1st" in "D" and "2" position.	1	.	.	3	.	2	6	▒▒					▒▒		
	Failure to change gear to 3rd and 4th in "D" position.	1	.	.	3	.	2	6	▒▒			▒▒	▒▒			
	Changes gear to 1st directly when selector lever is set from "D" to "1" position.	1	.	.	3	.	2	6	▒▒					▒▒		
	Changes gear to 2nd in "1" position.	1	.	.	3	.	2	6	▒▒		▒▒					▒▒
Lock-up quality	Lock-up point is extremely high or low.	1	.	.	3	.	2	6	▒▒		▒▒					▒▒
	Torque converter does not lock-up.	1	.	.	3	.	2	7	▒▒		▒▒					▒▒
	Lock-up is not released when accelerator pedal is released.	1	.	.	.	.	.	2								
Engine does not start in "P" and "N" positions or engine starts in positions other than "P" and "N" positions.		.	2	3	.	.	.	.								
Vehicle moves with selector lever in "P" position.		.	1	.	.	.	.	.								

Road Testing (Cont'd)

ON VEHICLE																						OFF VEHICLE																							
Kickdown modifier valve		1-2 accumulator valve		3-2 timing valve		1st reducing valve		Torque converter relief valve		Throttle modifier valve		4th speed cut valve		Lock-up control valve		4-2 sequence valve		Governor pressure		Governor valve		OD cancel solenoid valve		Torque converter clutch solenoid valve		Accumulator servo release		Accumulator N-D		Ignition switch and starter motor		OD control switch and wiring		Torque converter		Oil pump		Reverse clutch		High clutch		Forward clutch		Forward one-way clutch		Overrun clutch		Low one-way clutch		Low & reverse clutch		Brake band		Parking components
																▨		4	5																														
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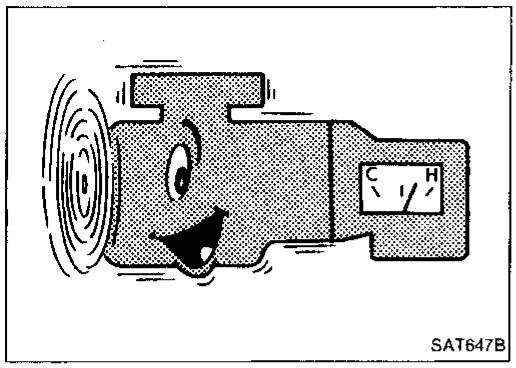


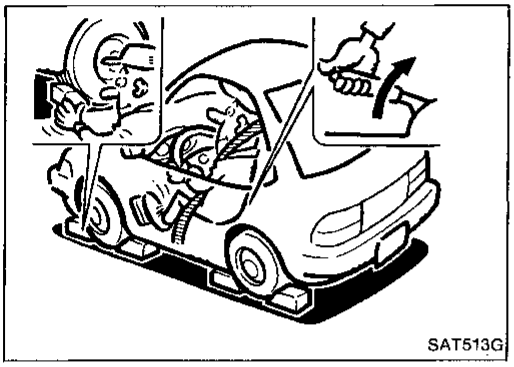
SAT647B

Stall Tasting

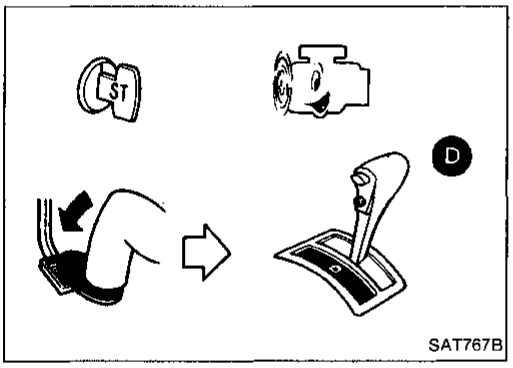
STALL TEST PROCEDURE

1. Check A/T and engine fluid levels. If necessary, add fluid.
2. Warm up engine until engine oil and ATF reach operating temperature after vehicle has been driven approx. 10 minutes.

ATF operating temperature:
50 - 80°C (122 - 176°F)

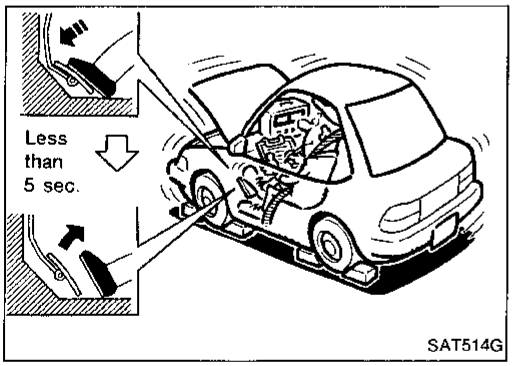

SAT513G

3. Set parking brake and block wheels.
4. Install a tachometer where it can be seen by driver during test.



SAT767B

5. Start engine, apply foot brake, and place selector lever in "D" position.

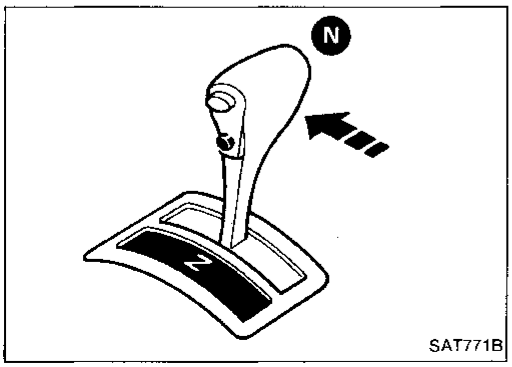


SAT514G

6. Accelerate to wide-open throttle gradually while applying foot brake.
7. Quickly note the engine stall revolution and immediately release throttle.

- **During test, never hold throttle wide-open for more than 5 seconds.**

Stall revolution standard:
2,450 - 2,750 rpm



SAT771B

8. Shift selector lever to "N" position.
9. Cool off ATF.

- **Run engine at idle for at least one minute.**

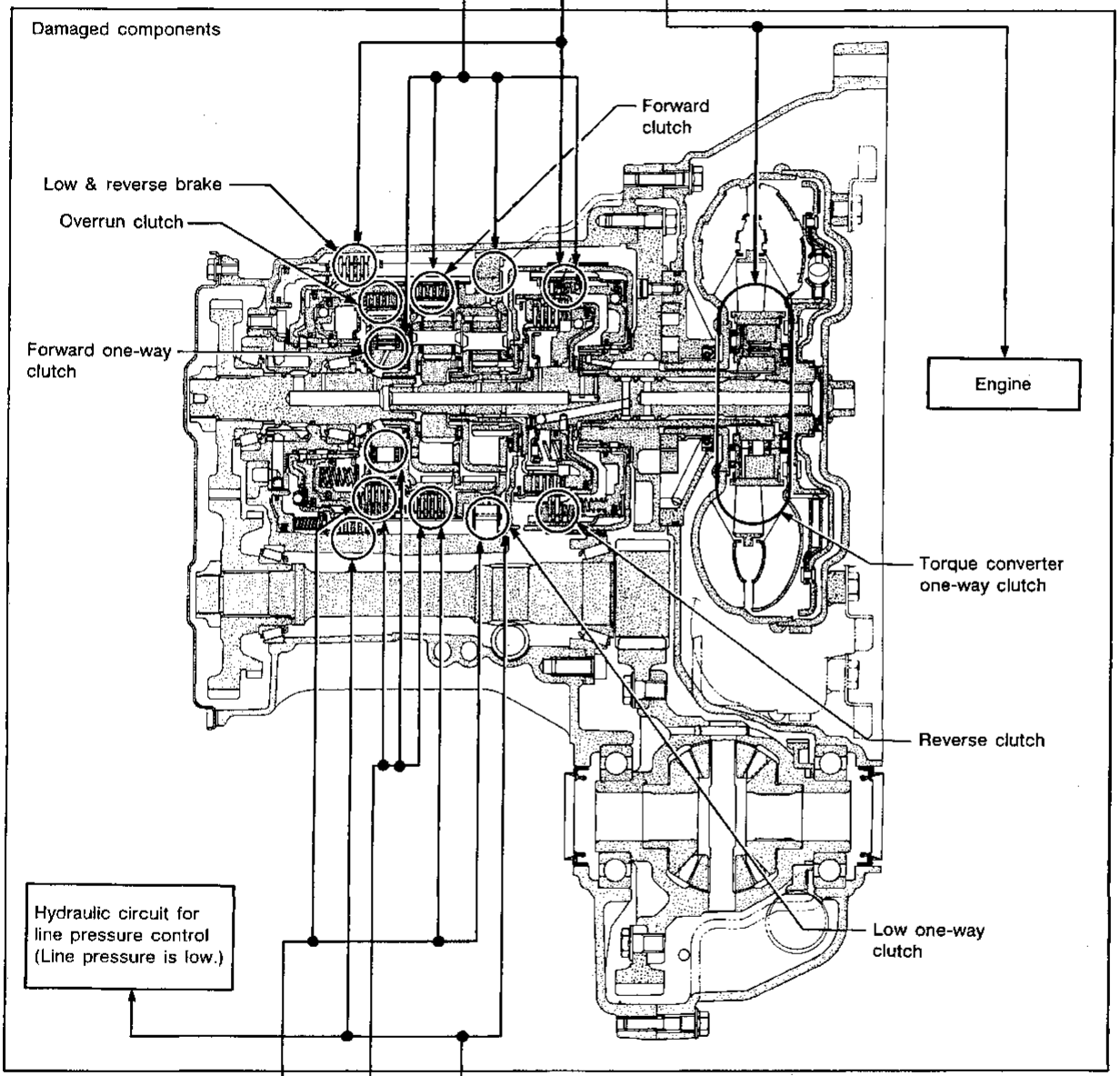
10 Perform stall tests in the same manner as in steps 5 through 9 with selector lever in "2", "1" and "R", respectively.

Stall Tasting (Cont'd)

JUDGMENT OF STALL TEST

Selector lever position	Judgment		
D	H	O	L
2	H	O	L
1	O	O	L
R	H	H	L

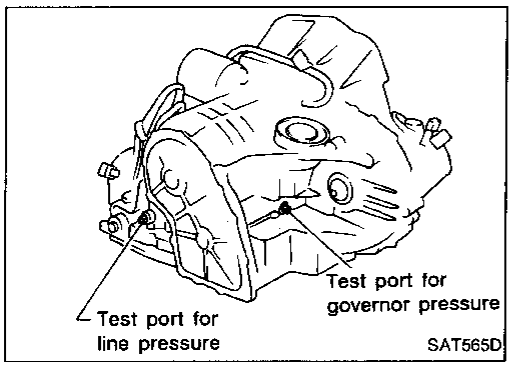
O : Stall revolution is normal.
H : Stall revolution is higher than specified.
L : Stall revolution is lower than specified.



Selector lever position	Judgment			
D	H	H	H	O
2	H	H	H	O
1	O	H	H	O
R	O	O	H	O

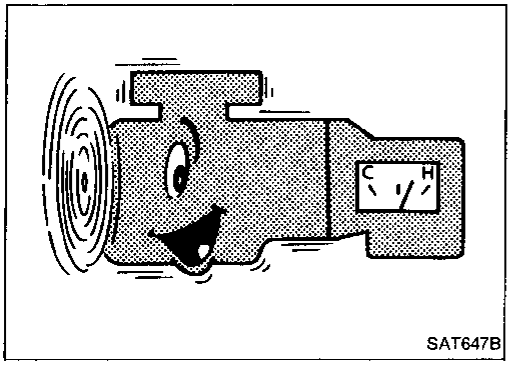
Clutches and brakes except high clutch and brake band are OK. (Condition of high clutch and brake band cannot be confirmed by stall test.)

SAT575D



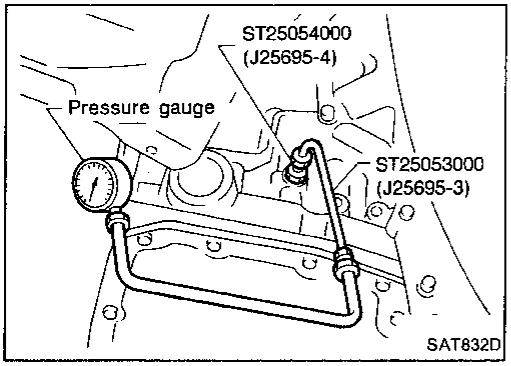
Pressure Testing

- Location of pressure test port.
- **Always replace pressure plugs as they are self-sealing bolts.**

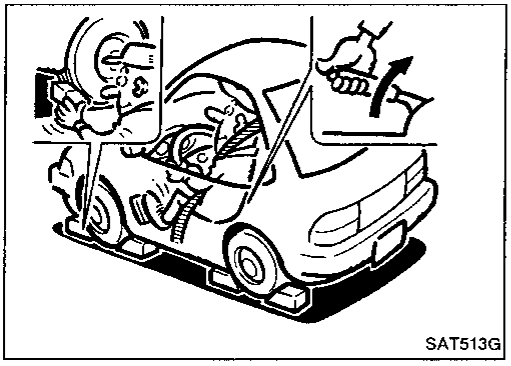


LINE PRESSURE TEST PROCEDURE

1. Check A/T and engine fluid levels. If necessary, add fluid.
2. Warm up engine until engine oil and ATF reach operating temperature; after vehicle has been driven approx. 10 minutes.
   ATF operating temperature:
   50 - 80°C (122 - 176°F)

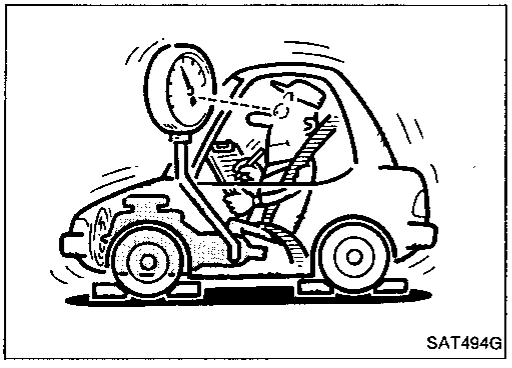


3. Install pressure gauge to line pressure port.



4. Set parking brake and block wheels.

Continue to depress brake pedal fully while performing line pressure test at stall speed.



5. Start engine and measure line pressure at idle and stall speed.
   Line pressure: Refer to SDS, AT-270.

JUDGMENT OF LINE PRESSURE TEST

- **If line pressure does not rise, first check to make sure that throttle wire is connected properly.**

1) When line pressure while idling is low at all positions ("D", "2", "1", "R" and "P"), the problem may be due to:

- Wear on interior of oil pump

Pressure Testing (Cont'd)

- Oil leakage at or around oil pump, control valve body, transmission case or governor
- Sticking pressure regulator valve
- Sticking pressure modifier valve

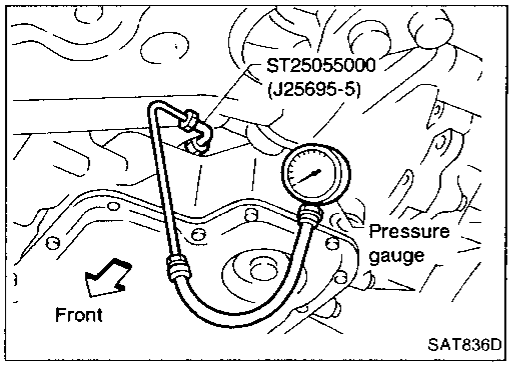
2) When line pressure while idling is low at a particular position, the problem may be due to the following:
- If oil leaks at or around low & reverse brake circuit, line pressure becomes low in "R" position but is normal in "P", "D", "2" or "1" position.

3) When line pressure is high while idling, pressure regulator valve may have stuck.

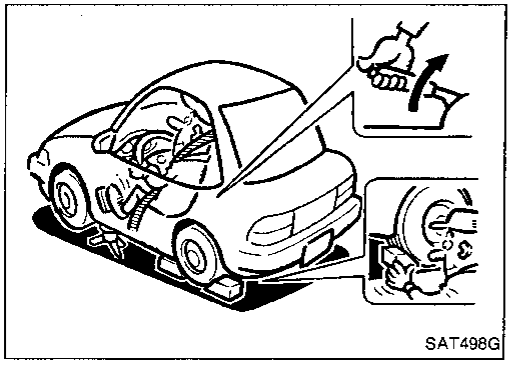
GOVERNOR PRESSURE TESTING

1. Check A/T and engine fluid levels. If necessary, add fluid.
2. Warm up engine until engine oil and ATF reach operating temperature; after vehicle has been driven approx. 10 minutes.

ATF operating temperature:
50 - 80°C (122 - 176°F)

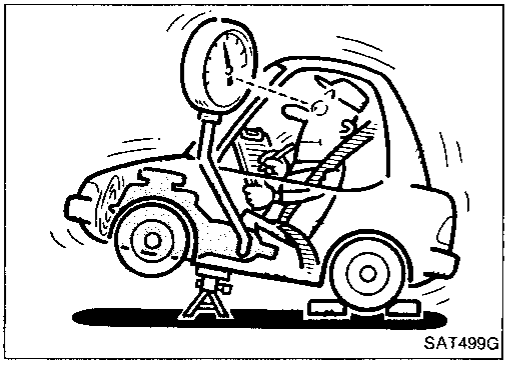


3. Install pressure gauge to governor pressure port.



4. Set parking brake and block rear wheels.
5. Jack up front wheels.
6. Set selector lever in D position and drive vehicle.

Be careful of rotating wheels.

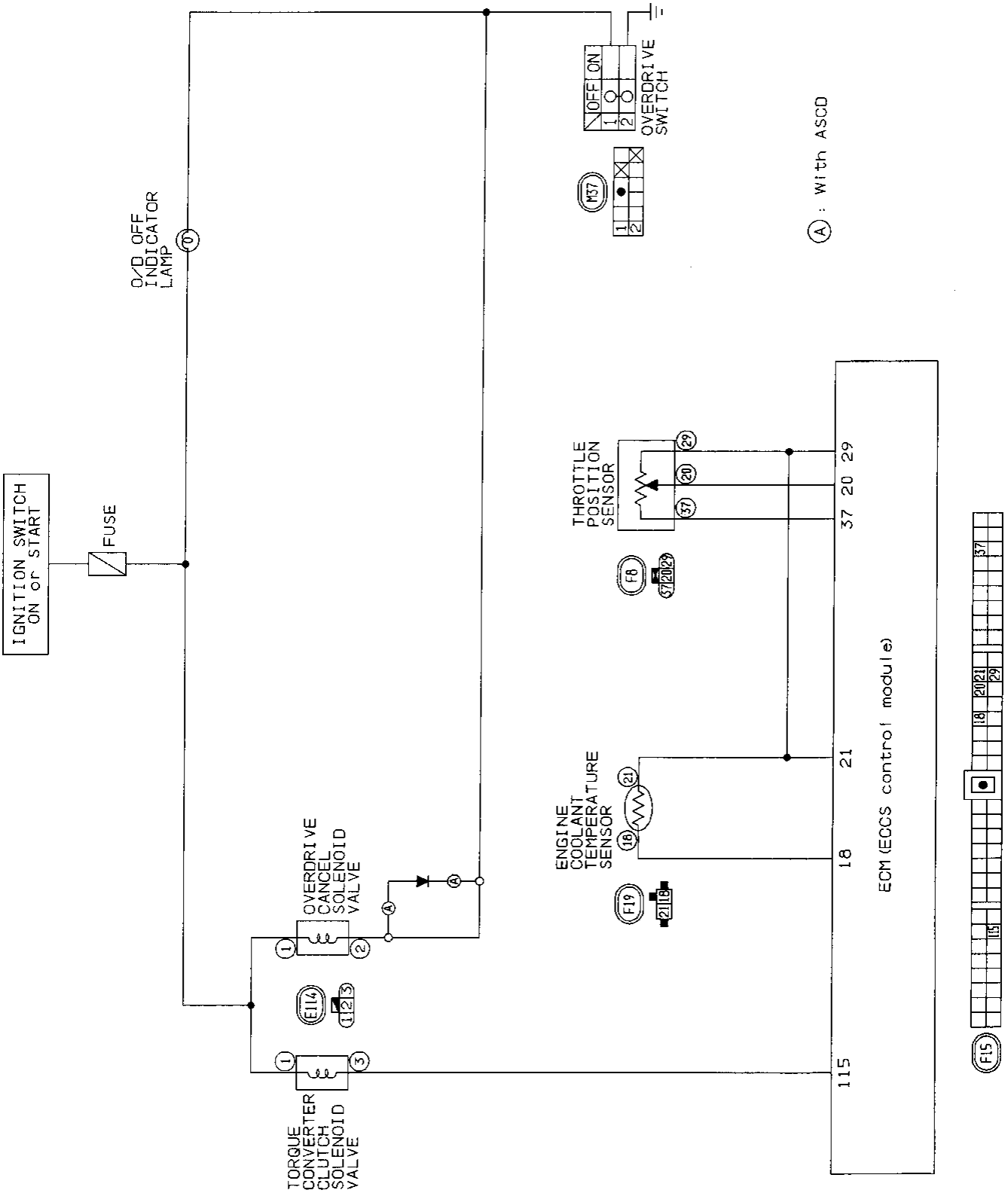


Governor pressure:

- **Governor pressure is not generated when vehicle is stopped. (front wheels are not rotating.)**
- **Governor pressure rises gradually in response to vehicle speed. (front wheel rotating speed.)**

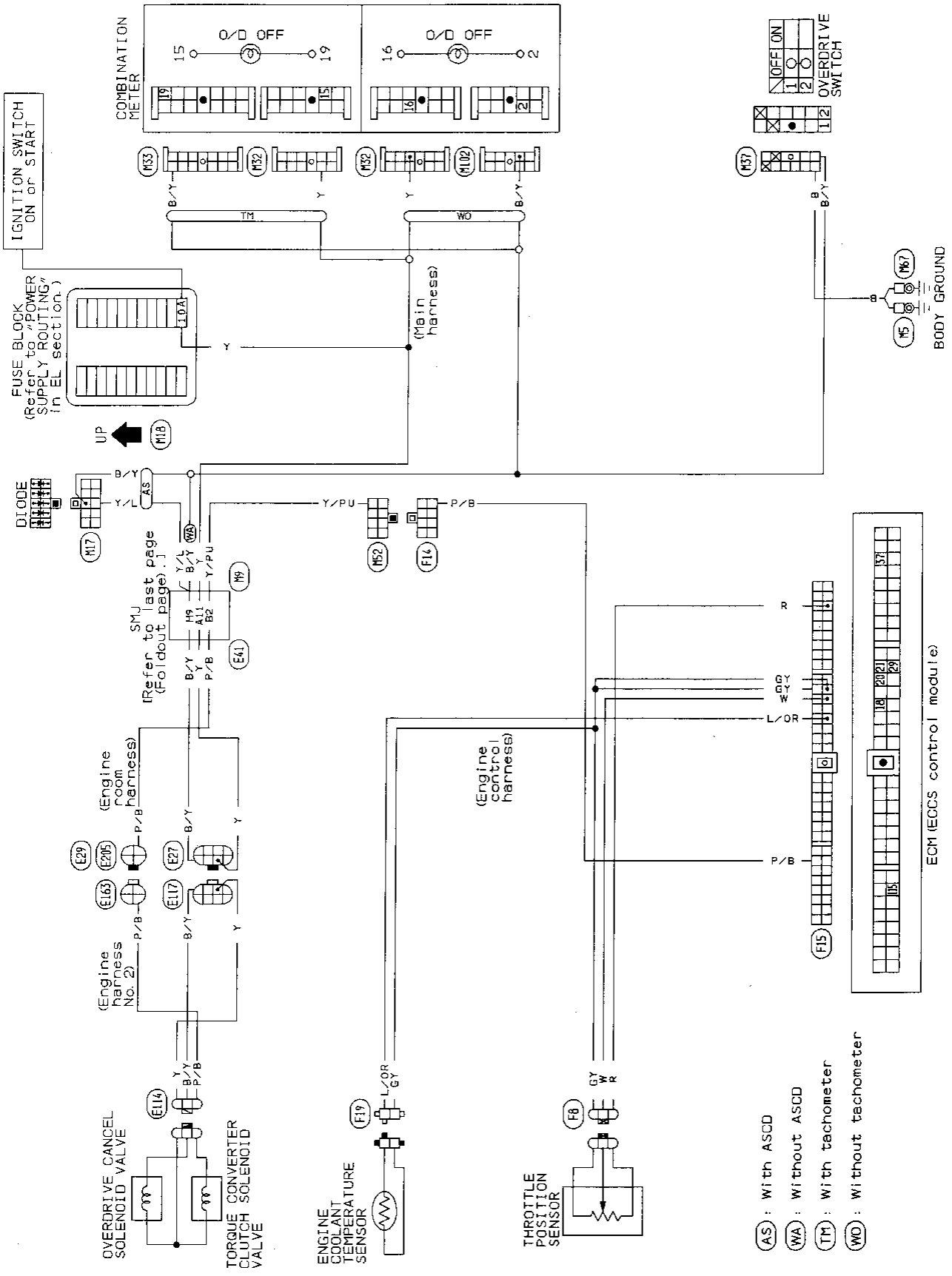
If not, check governor valve assembly.
Refer to "DISASSEMBLY", AT-138.

Circuit Diagram

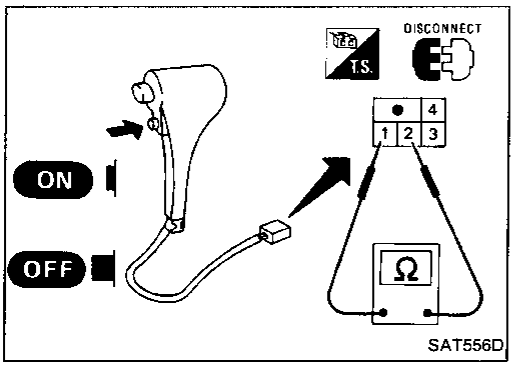


MAT313A

Wiring Diagram



MAT314A

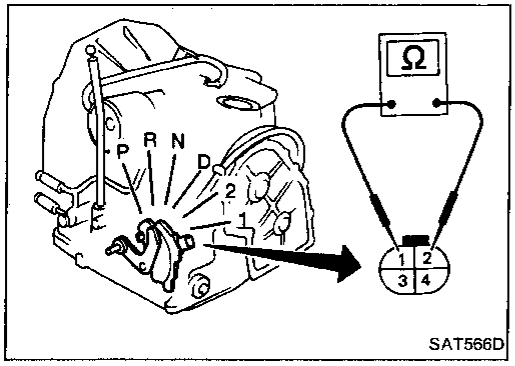


Component Check

OVERDRIVE CONTROL SWITCH

- Check continuity between two terminals.

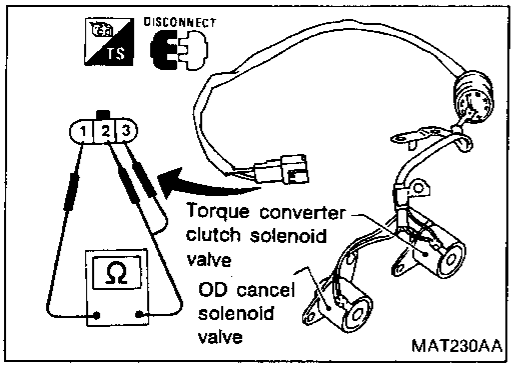
OD switch position	Continuity
ON	No
OFF	Yes



INHIBITOR SWITCH

- Check continuity in "N", "P" and "R" positions.
- With manual shaft held in "N" position, turn manual shaft an equal amount in both directions to see if current flow positions are nearly the same. (When manual lever is in each position, continuity normally exists within 1.5° in either direction.) If current flows outside normal position, or if normal flow position is out of specifications, properly adjust inhibitor switch.

Position	Terminal No.			
	①	②	③	④
Park/neutral position	○——	——○		
R			○——	——○



OD CANCEL SOLENOID VALVE AND TORQUE CONVERTER CLUTCH SOLENOID VALVE

- Check resistance between terminals.

Solenoids	Terminal No.	Resistance
OD cancel solenoid valve	①—②	Approximately 25Ω
Torque converter clutch solenoid valve	①—③	

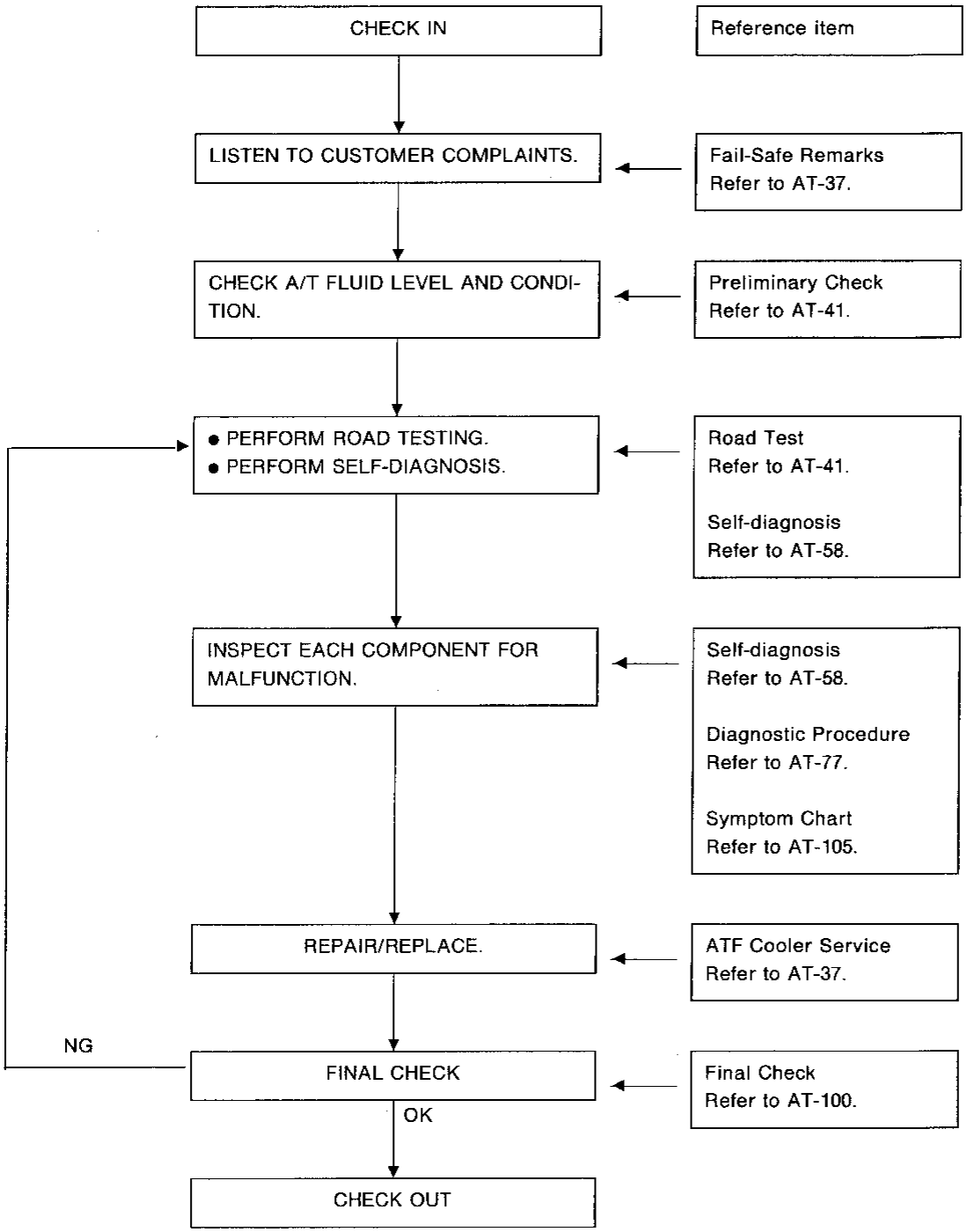
Contents

Contents (Cont'd)

How to Perform Trouble Diagnoses for Quick and Accurate Repair

A good understanding of the malfunctioning conditions can make troubleshooting faster and more accurate.
In general, the feeling about a problem depends on each customer. It is important to fully understand the symptoms or under what conditions a customer complains.
Make good use of the two sheets provided, "Information from customer" and "Diagnostic worksheet", in order to perform the best troubleshooting possible.

WORK FLOW



How to Perform Trouble Diagnoses for Quick and Accurate Repair (Cont'd)

INFORMATION FROM CUSTOMER

KEY POINTS

WHAT ..... Vehicle & A/T model
WHEN ..... Date, Frequencies
WHERE ..... Road conditions
HOW ..... Operating conditions, Symptoms

Customer name MR/MS	Model & Year	VIN
Trans. model RE4F03V	Engine SR20DE	Mileage
Incident Date	Manuf. Date	In Service Date
Frequency	☐ Continuous ☐ Intermittent (times a day)	
Symptoms	☐ Vehicle does not move. (☐ Any position ☐ Particular position)	
	☐ No up-shift (☐ 1st → 2nd ☐ 2nd → 3rd ☐ 3rd → O/D)	
	☐ No down-shift (☐ O/D → 3rd ☐ 3rd → 2nd ☐ 2nd → 1st)	
	☐ Lockup malfunction	
	☐ Shift point too high or too low.	
	☐ Shift shock or slip (☐ N → D ☐ Lockup ☐ Any drive position)	
	☐ Noise or vibration	
	☐ No kickdown	
	☐ No pattern select	
	☐ Others ( )	
Power indicator lamp	Flickers for about 8 seconds.	
	☐ Come on	☐ Come off

How to Perform Trouble Diagnoses for Quick and Accurate Repair (Cont'd)

DIAGNOSTIC WORKSHEET

1.	☐ Read the Fail-safe Remarks and listen to customer complaints.	AT-37
2.	☐ CHECK A/T FLUID ☐ Leakage (Follow specified procedure) ☐ Fluid condition ☐ Fluid level	AT-41
3.	☐ Perform all ROAD TESTING and mark required procedures.	AT-41
	3-1 Check before engine is started. ☐ SELF-DIAGNOSTIC PROCEDURE — Mark detected items. ☐ 1. Revolution sensor ☐ 2. Vehicle speed sensor ☐ 3. Throttle position sensor ☐ 4. Shift solenoid valve A ☐ 5. Shift solenoid valve B ☐ 6. Timing solenoid valve ☐ 7. Torque converter clutch solenoid valve ☐ 8. Fluid temperature sensor and A/T control unit power source ☐ 9. Engine speed signal ☐ 10. Line pressure solenoid valve ☐ 11. Battery ☐ 12. Others	AT-42
	3-2. Check at idle ☐ Diagnostic Procedure 1 (Power indicator lamp came on for 2 seconds.) ☐ Diagnostic Procedure 2 (Power or comfort indicator lamp came on.) ☐ Diagnostic Procedure 3 (OD OFF indicator lamp came on.) ☐ Diagnostic Procedure 4 (Power indicator lamp came on when acc. pedal was depressed.) ☐ Diagnostic Procedure 5 (Engine starts only in P and N position) ☐ Diagnostic Procedure 6 (In P position, vehicle does not move when pushed) ☐ Diagnostic Procedure 7 (In N position, vehicle moves) ☐ Diagnostic Procedure 8 (Select shock. N → R position) ☐ Diagnostic Procedure 9 (Vehicle creeps backward in R position) ☐ Diagnostic Procedure 10 (Vehicle creeps forward in D, 2 or 1 position)	AT-44
	3-3. Cruise test Part-1 ☐ Diagnostic Procedure 11 (Vehicle starts from D_1) ☐ Diagnostic Procedure 12 ☐ Diagnostic Procedure 13 ☐ Diagnostic Procedure 14 (A/T shift schedule: $D_1 \rightarrow D_2/D_2 \rightarrow D_3/D_3 \rightarrow D_4/D_4 \rightarrow D_2$) ☐ Diagnostic Procedure 15 (Shift schedule: Lock-up) ☐ Diagnostic Procedure 16 (Lock-up condition more than 30 seconds) ☐ Diagnostic Procedure 17 (Lock up released) ☐ Diagnostic Procedure 18 (Engine speed return to idle. Light braking $D_4 \rightarrow D_3$)	AT-49

How to Perform Trouble Diagnoses for Quick and Accurate Repair (Cont'd)

	Part-2 ☐ Diagnostic Procedure 11 (Vehicle starts from D_1) ☐ Diagnostic Procedure 12 (Kickdown: $D_4 \rightarrow D_2$) ☐ Diagnostic Procedure 13 (Shift schedule: $D_2 \rightarrow D_3$) ☐ Diagnostic Procedure 14 (Shift schedule: $D_3 \rightarrow D_4$ and engine brake)	AT-52
	Part-3 ☐ Diagnostic Procedure 20 ($D_4 \rightarrow D_3$ when OD OFF switch ON → OFF) ☐ Diagnostic Procedure 18 (Engine brake in D_3) ☐ Diagnostic Procedure 21 ($D_3 \rightarrow 2_2$ when selector lever D → 2 position) ☐ Diagnostic Procedure 19 (Engine brake in 2_2) ☐ Diagnostic Procedure 22 ($2_2 \rightarrow 1_1$, when selector lever 2 → 1 position) ☐ Diagnostic Procedure 23 (Engine brake in 1_1) ☐ SELF-DIAGNOSTIC PROCEDURE — Mark detected items. ☐ 1. Revolution sensor ☐ 2. Vehicle speed sensor ☐ 3. Throttle position sensor ☐ 4. Shift solenoid valve A ☐ 5. Shift solenoid valve B ☐ 6. Timing solenoid valve ☐ 7. Torque converter clutch solenoid valve ☐ 8. Fluid temperature sensor and A/T control unit power source ☐ 9. Engine speed signal ☐ 10. Line pressure solenoid valve ☐ 11. Battery ☐ 12. Others	AT-53
4.	☐ Perform the Diagnostic Procedures marked in ROAD TESTING. Refer to the Symptom Chart when you perform the procedures. (The chart also shows some other possible symptoms and the components inspection orders.)	AT-105
5.	Perform FINAL CHECK. If NG, go back to "CHECK A/T FLUID". ☐ Stall test — Mark possible damaged components/others. ☐ Torque converter one-way clutch ☐ Reverse clutch ☐ Forward clutch ☐ Overrun clutch ☐ Forward one-way clutch ☐ Low & reverse brake ☐ Low one-way clutch ☐ Engine ☐ Line pressure is low ☐ Clutches and brakes except high clutch and brake band are OK ☐ Pressure test — Suspected parts:	AT-100

Remarks

FAIL-SAFE

The A/T control unit has an electronic Fail-Safe (limp home mode) to allow the vehicle to be driven even in the event of damage of a major electrical input or output device circuit.
In this condition, the vehicle runs in third gear in positions 1, 2 or D and will not upshift. Customer may say "Sluggish, poor acceleration".
When Fail-safe operation occurs the next time the key is turned to the ON position, the power indicator lamp will blink for about 8 seconds. (For diagnosis, refer to AT-60.)
If the vehicle is driven under extreme conditions such as excessive wheel spinning and emergency braking suddenly after, Fail-Safe may be activated even if all electrical circuits are undamaged.
In this case, normal shift pattern can be returned by turning key OFF for 3 seconds and then back ON.
The blinking of the power indicator lamp for about 8 seconds will appear only once and be cleared. The customer may resume normal driving conditions by chance.
Always follow the "WORK FLOW" (Refer to AT-33).
The SELF-DIAGNOSIS results will be as follows:

The first SELF-DIAGNOSIS will indicate the damage of the vehicle speed sensor or the revolution sensor.

During the next SELF-DIAGNOSIS performed after checking the sensor, no damages will be indicated.

ATF COOLER SERVICE

During overhaul, if excessive foreign material is found in the oil pan or clogging the strainer, the ATF cooler must be serviced as follows:
GA16, SR20 engines (RL4F03A, RE4F03V) ... fin type cooler

Replace radiator lower tank (which includes ATF cooler) with a new one and flush cooler line using cleaning solvent and compressed air.

Diagnosis by CONSULT

NOTICE

1. The CONSULT electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).
   When a noticeable time difference occurs between shift timing which is manifested by shift shock and the CONSULT display, mechanical parts (except solenoids, sensors, etc.) are considered to be malfunctioning. Check mechanical parts using applicable diagnostic procedures.
2. Shift schedule (which implies gear position) displayed on CONSULT and that indicated in Service Manual may differ slightly. This occurs because of the following reasons:
   - Actual shift schedule has more or less tolerance or allowance,
   - Shift schedule indicated in Service Manual refers to the point where shifts start, and
   - Gear position displayed on CONSULT indicates the point where shifts are completed.
3. Shift solenoid valve "A" or "B" is displayed on CONSULT at the start of shifting while gear position is displayed upon completion of shifting (which is computed by A/T control unit).
4. Additional CONSULT information can be found in the Operation Manual supplied with the CONSULT unit.

APPLICATION

Item	Display	Monitor item		Description	Remarks
		ECU input signals	Main signals		
Vehicle speed sensor 1 (A/T) (Revolution sensor)	VHCL/S SE·A/T [km/h] or [mph]	X	—	• Vehicle speed computed from signal of revolution sensor is displayed.	When racing engine in or P position, meter will not indicate 0 km/h (0 mph) even if vehicle is stationary.
Vehicle speed sensor 2 (Meter)	VHCL/S SE·MTR [km/h] or [mph]	X	—	• Vehicle speed computed from signal of vehicle speed sensor is displayed.	Error may occur under approx. 10 km/h (approx. 6 mph) and meter will not indicate 0 km/h (0 mph) even if vehicle is stationary.
Throttle position sensor	THRTL POS SEN [V]	X	—	• Throttle position sensor signal voltage is displayed.	
Fluid temperature sensor	FLUID TEMP SEN [V]	X	—	• Fluid temperature sensor signal voltage is displayed. • Signal voltage lowers as fluid temperature rises.	
Battery voltage	BATTERY VOLT [V]	X	—	• Source voltage of control unit is displayed.	
Engine speed	ENGINE SPEED [rpm]	X	X	• Engine speed, computed from engine speed signal, is displayed.	Error may occur under approx. 800 rpm and meter will not indicate 0 rpm even if engine is not running.
Overdrive switch	OVERDRIVE SW [ON/OFF]	X	—	• ON/OFF state computed from signal of overdrive SW is displayed.	
P/N position switch	P/N POSI SW [ON/OFF]	X	—	• ON/OFF state computed from signal of P/N position SW is displayed.	
R position switch	R POSITION SW [ON/OFF]	X	—	• ON/OFF state computed from signal of R position SW is displayed.	
D position switch	D POSITION SW [ON/OFF]	X	—	• ON/OFF state computed from signal of D position SW is displayed.	
2 position switch	2 POSITION SW [ON/OFF]	X	—	• ON/OFF status, computed from signal of 2 position SW, is displayed.	
1 position switch	1 POSITION SW [ON/OFF]	X	—	• ON/OFF status, computed from signal of 1 position SW, is displayed.	

Diagnosis by CONSULT (Cont'd)

Item	Display	Monitor item: ECU input signals	Monitor item: Main signals	Description	Remarks
ASCD-cruise signal	ASCD-CRUISE [ON/OFF]	X	—	• Status of ASCD cruise signal is displayed. ON ... Cruising state OFF ... Normal running state	• This is displayed even when no ASCD is mounted.
ASCD-OD cut signal	ASCD-OD CUT [ON/OFF]	X	—	• Status of ASCD-OD release signal is displayed. ON ... OD released OFF ... OD not released	• This is displayed even when no ASCD is mounted.
Kickdown switch	KICKDOWN SW [ON/OFF]	X	—	• ON/OFF status, computed from signal of kickdown SW, is displayed.	
Power shift switch	POWER SHIFT SW [ON/OFF]	X	—	• ON/OFF status, computed from signal of power shift SW, is displayed.	• This is displayed even when no power SW is equipped. On vehicles with power SW mounted on lever, this item is invalid although displayed.
Closed throttle position switch	CLOSED THL/SW [ON/OFF]	X	—	• ON/OFF status, computed from signal of closed throttle position SW, is displayed.	
Wide open throttle position switch	W/O THRL/P-SW [ON/OFF]	X	—	• ON/OFF status, computed from signal of wide open throttle position SW, is displayed.	
Hold switch	HOLD SW [ON/OFF]	X	—	• ON/OFF status, computed from signal of hold SW, is displayed.	
Gear position	GEAR		X	• Gear position data used for computation by control unit, is displayed.	
Selector lever position	SLCT LVR POSI		X	• Selector lever position data, used for computation by control unit, is displayed.	• A specific value used for control is displayed if fail-safe is activated due to error.
Vehicle speed	VEHICLE SPEED [km/h] or [mph]		X	• Vehicle speed data, used for computation by control unit, is displayed.	
Throttle position	THROTTLE POSI [/8]		X	• Throttle position data, used for computation by control unit, is displayed.	• A specific value used for control is displayed if fail-safe is activated due to error.
Line pressure duty	LINE PRES DTY [%]		X	• Control value of line pressure solenoid valve, computed by control unit from each input signal, is displayed.	
Lock-up duty	TCC S/V DUTY [%]		X	• Control value of torque converter clutch solenoid valve, computed by control unit from each input signal, is displayed.	
Shift solenoid valve A	SHIFT S/V A [ON/OFF]	—	X	• Control value of shift solenoid valve A, computed by control unit from each input signal, is displayed.	Control value of solenoid is displayed even if solenoid circuit is disconnected. The "OFF" signal is displayed if solenoid circuit is shorted.
Shift solenoid valve B	SHIFT S/V B [ON/OFF]	—	X	• Control value of shift solenoid valve B, computed by control unit from each input signal, is displayed.	

Diagnosis by CONSULT (Cont'd)

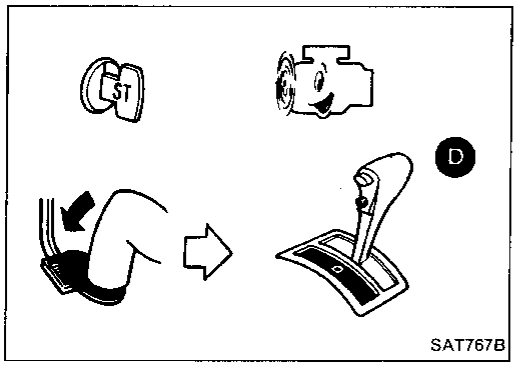
Item	Display	Monitor item		Description	Remarks
		ECU input signals	Main signals		
Overrun clutch solenoid valve	OVERRUN/C S/V [ON/OFF]	—	X	• Control value of overrun clutch solenoid valve computed by control unit from each input signal is displayed.	
Self-diagnosis display lamp (Power shift lamp)	SELF-D DP LMP [ON/OFF]	—	X	• Control status of power shift lamp is displayed.	

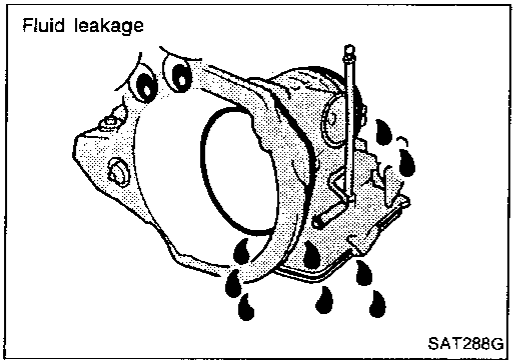
X: Applicable
—: Not applicable
Note:
1. When select ECU input signals on CONSULT, electronic control unit input signal are set.
2. When select main signals on CONSULT, monitored items for understanding the overall operation of the system are set, and this setting is indicated by a reversed display.

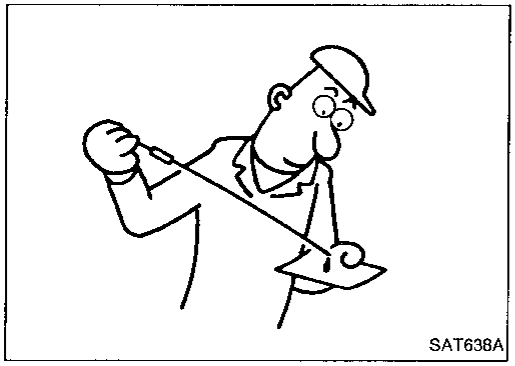
DATA ANALYSIS

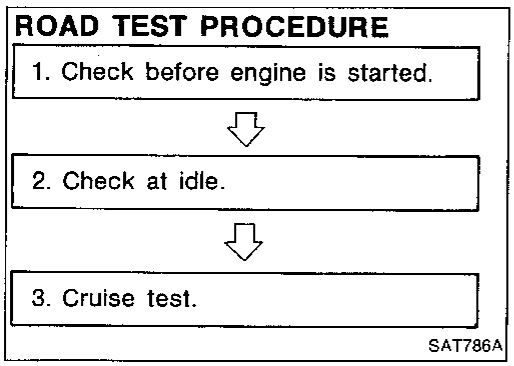
Item	Display form	Meaning
Lock-up duty	Approximately 4% ↓ Approximately 94%	Lock-up "OFF" ↓ Lock-up "ON"
Line pressure duty	Approximately 29% ↓ Approximately 94%	Low line-pressure (Small throttle opening) ↓ High line-pressure (Large throttle opening)
Throttle position sensor	Approximately 0.5V	Fully-closed throttle
	Approximately 4V	Fully-open throttle
Fluid temperature sensor	Approximately 1.5V ↓ Approximately 0.5V	Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]

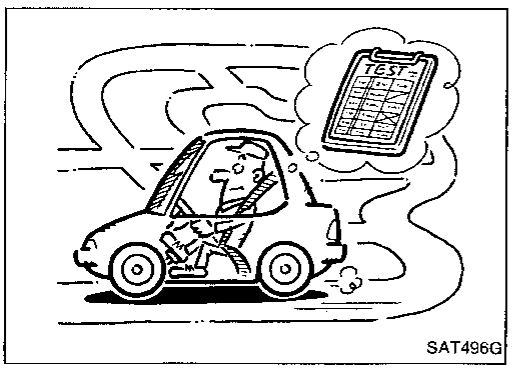
Gear position	1	2	3	4
Shift solenoid valve A	ON	OFF	OFF	ON
Shift solenoid valve B	ON	ON	OFF	OFF











Preliminary Check

A/T FLUID CHECK

Fluid leakage check

1. Clean area suspected of leaking. — for example, mating surface of converter housing and transmission case.
2. Start engine, apply foot brake, place selector lever in "D" position and wait a few minutes.
3. Stop engine.
4. Check for fresh leakage.

Fluid condition check

Fluid color	Suspected problem
Dark or black with burned odor	Wear of frictional material
Milky pink	Water contamination — Road water entering through filler tube or breather
Varnished fluid, light to dark brown and tacky	Oxidation — Over or under filling, — Overheating

Fluid level check — Refer to MA section (CHASSIS AND BODY MAINTENANCE).

ROAD TESTING

Description

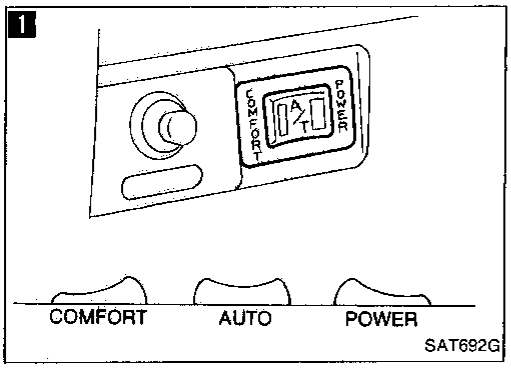
- The purpose of this road test is to determine overall performance of automatic transaxle and analyze causes of problems.
- The road test consists of the following three parts:

1. Check before engine is started
2. Check at idle
3. Cruise test

- Before road test, familiarize yourself with all test procedures and items to check.
- Conduct tests on all items. Troubleshoot items which check out No Good after road test. Refer to "Self-diagnosis" and "Diagnostic Procedure", AT-60, 77.

Preliminary Check (Cont'd)

1. Check before engine is started

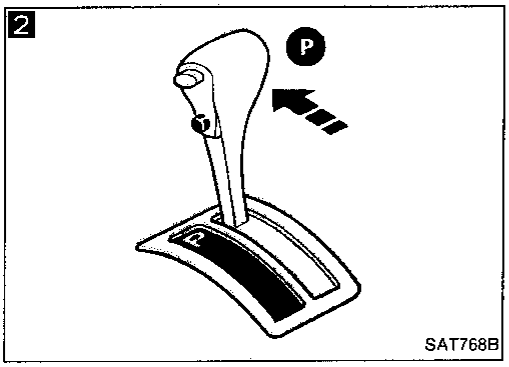


1. Park vehicle on flat surface.
2. Turn ignition switch to "OFF" position.

↓

1 Set A/T mode switch to "AUTO" position.

↓

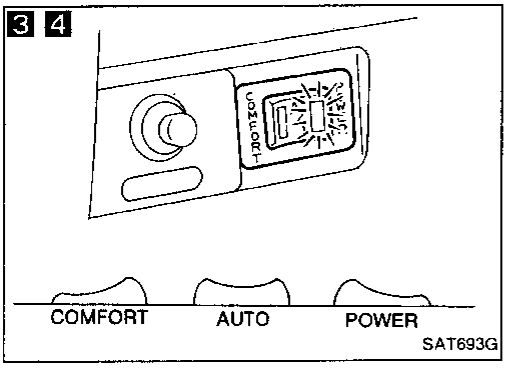


2
1. Move selector lever to "P" position.
2. Turn ignition switch to "ON" position. (Do not start engine.)

↓

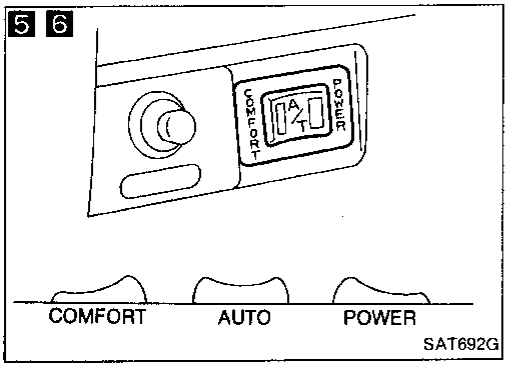
3 Does power indicator lamp come on for about 2 seconds? — No → Go to Diagnostic Procedure 1, AT-77.

↓ Yes



4 Does power indicator lamp flicker for about 8 seconds? — Yes → Perform self-diagnosis. — Refer to SELF-DIAGNOSIS PROCEDURE, AT-58.

↓ No

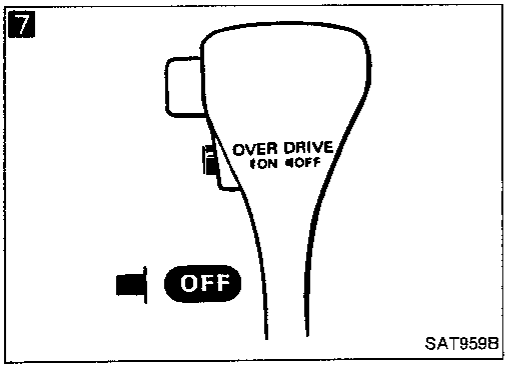


5
1. Set A/T mode switch to "POWER" position.
2. Does power indicator lamp come on? — No → Go to Diagnostic Procedure 2, AT-78.

↓ Yes

6
1. Set A/T mode switch to "COMFORT" position.
2. Does comfort indicator lamp come on? — No → Go to Diagnostic Procedure 2, AT-78.

↓ Yes



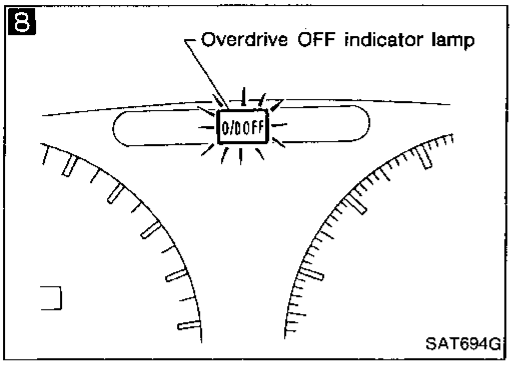
7 Set overdrive switch to "OFF" position.

↓

Ⓐ

Preliminary Check (Cont'd)

8



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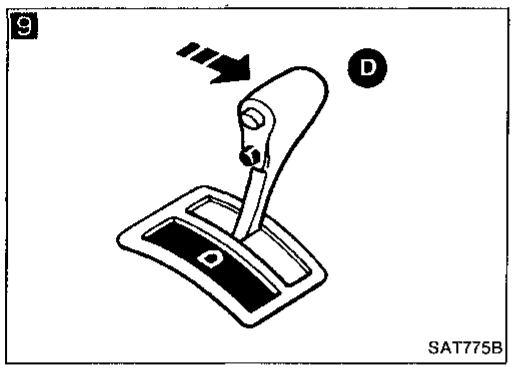

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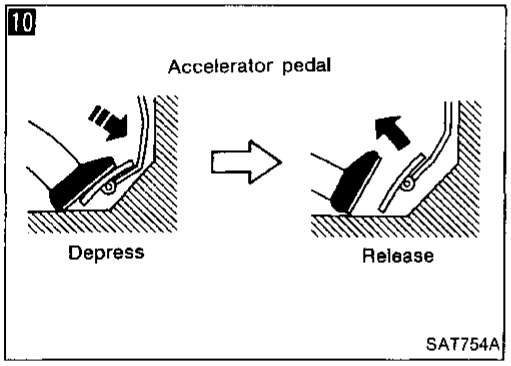

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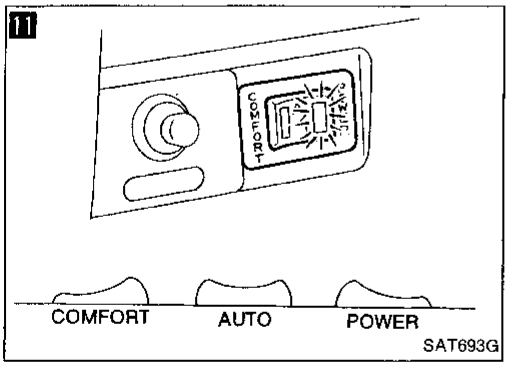

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8 Does OD OFF indicator lamp come on?

No → Go to Diagnostic Procedure 3, AT-78.

Yes

9 Move selector lever to "D" position.

10 Depress and release accelerator pedal quickly.

11 Does power indicator lamp come on for about 3 seconds after accelerator pedal is depressed?

No → Go to Diagnostic Procedure 4, AT-78.

Yes

Turn ignition switch to "OFF" position.

Perform self-diagnosis.
— Refer to SELF-DIAGNOSIS PROCEDURE and note NG items.

Go to "ROAD TESTING — Check at idle", AT-44.

Preliminary Check (Cont'd)

2. Check at idle

1. Park vehicle on flat surface.
2. Turn ignition switch to "OFF" position.

1

1. Move selector lever to "P" or "N" position.
2. Turn ignition switch to "START" position.

Is engine started?

- No → Go to Diagnostic Procedure 5, AT-79.
- Yes ↓

Turn ignition switch to "OFF" position.

2

1. Move selector lever to "D", "1", "2" or "R" position.
2. Turn ignition switch to "START" position.

Is engine started?

- Yes → Go to Diagnostic Procedure 5, AT-79.
- No ↓

3

1. Turn ignition switch to "OFF" position.
2. Move selector lever to "P" position.
3. Release parking brake.

4

1. Push vehicle forward or backward.
2. Does vehicle move when it is pushed forward or backward?
3. Apply parking brake.

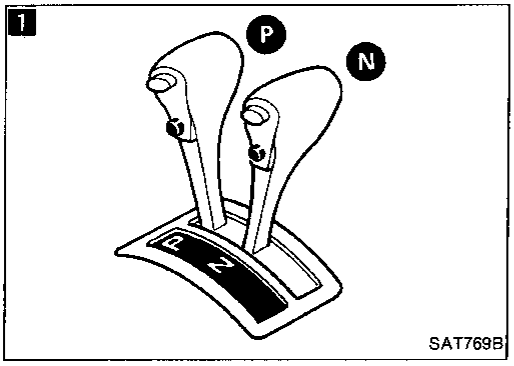
- Yes → Go to Diagnostic Procedure 6, AT-79.
- No ↓

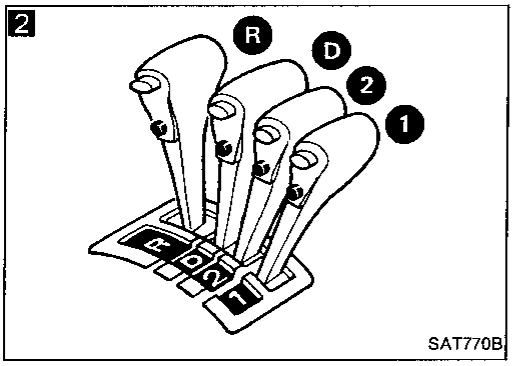
5

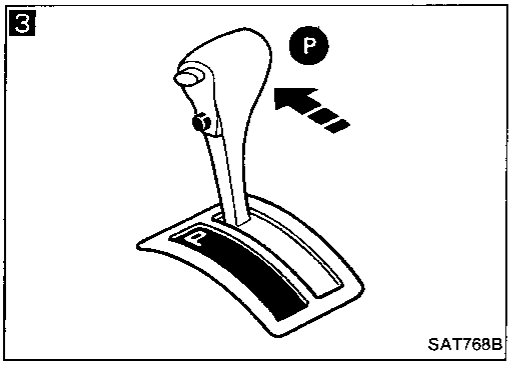
1. Move selector lever to "N" position.
2. Start engine.
3. Release parking brake.
4. Does vehicle move forward or backward?

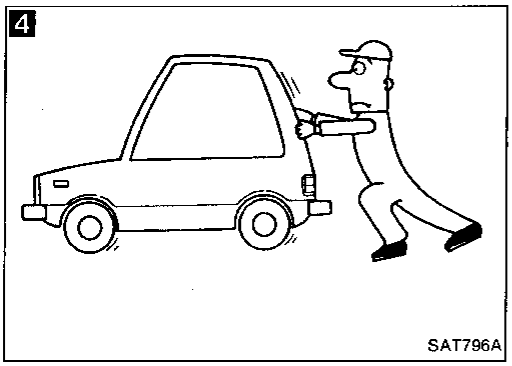
- Yes → Go to Diagnostic Procedure 7, AT-80.
- No ↓

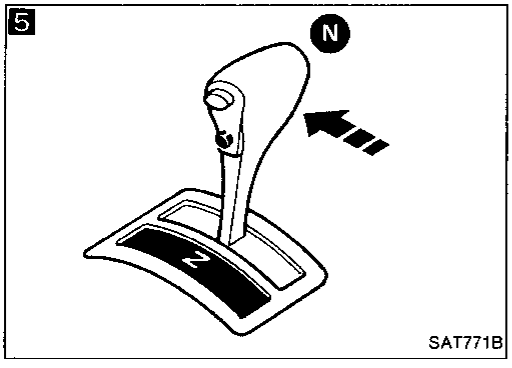
Ⓐ



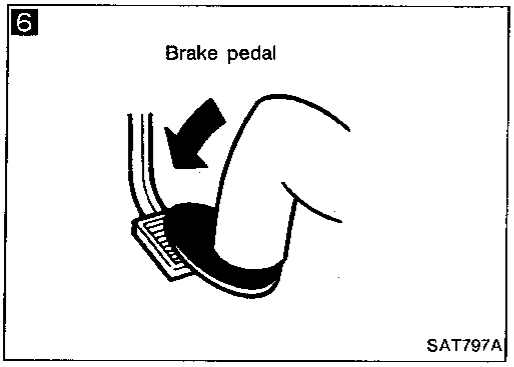


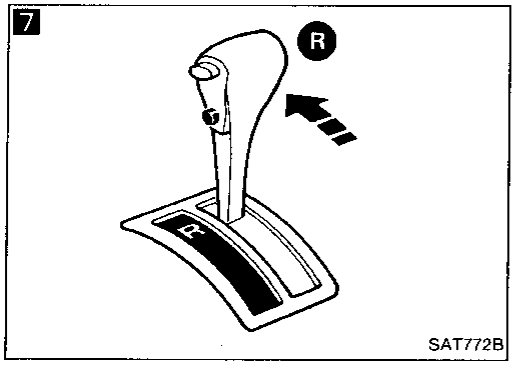


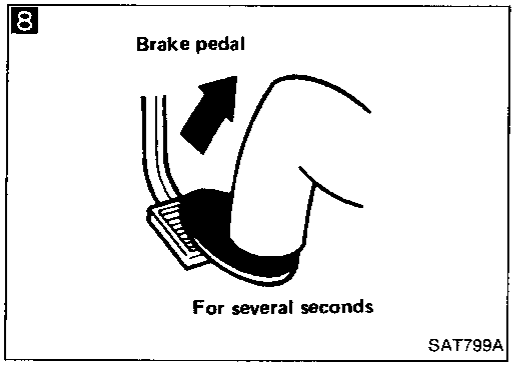


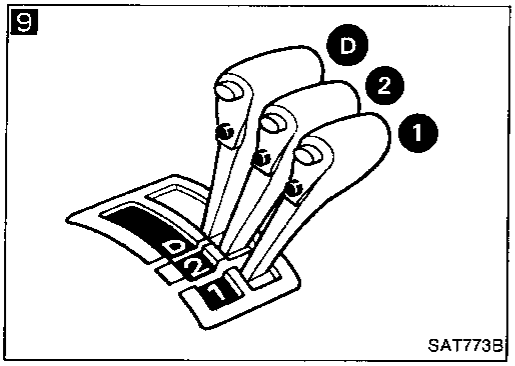


Preliminary Check (Cont'd)









Ⓐ

6 Apply foot brake.

7 1. Move selector lever to "R" position.
2. Is there large shock when changing from "N" to "R" position?

No → Go to Diagnostic Procedure 8, AT-81.

Yes

8 1. Release foot brake for several seconds.
2. Does vehicle creep backward when foot brake is released?

No → Go to Diagnostic Procedure 9, AT-82.

Yes

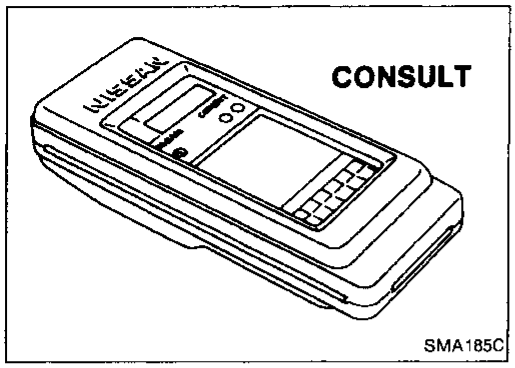
9 1. Move selector lever to "D", "2" and "1" positions and check if vehicle creeps forward.
2. Does vehicle creep forward in all three position?

No → Go to Diagnostic Procedure 10, AT-84.

Yes

Go to Cruise test, AT-46.

Preliminary Check (Cont'd)

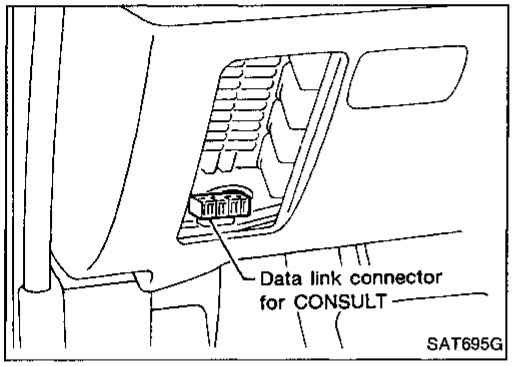


3. Cruise test

- Check all items listed in Parts 1 through 3.

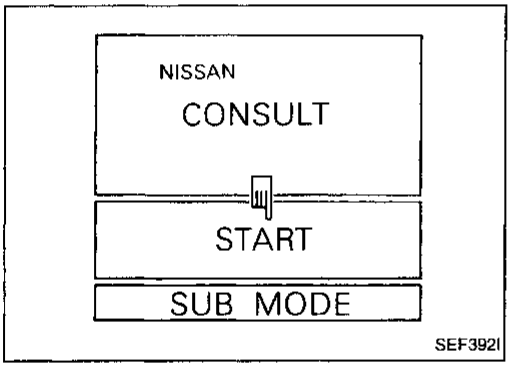
With CONSULT

- Using CONSULT, conduct a cruise test and record the result.
- Print the result and ensure that shifts and lock-ups take place as per "Shift Schedule".

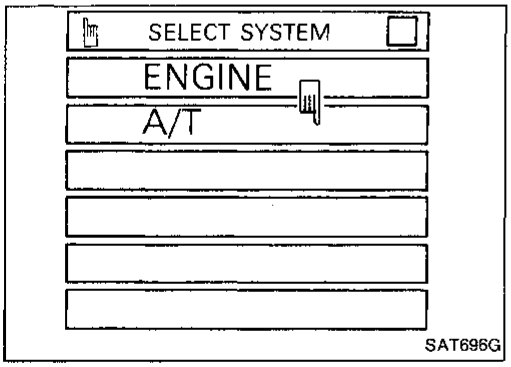


CONSULT setting procedure

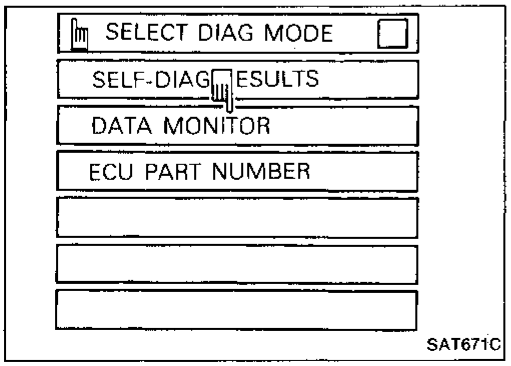
1. Turn off ignition switch.
2. Connect "CONSULT" to Data link connector for CONSULT.



3. Turn on ignition switch.
4. Touch "START".

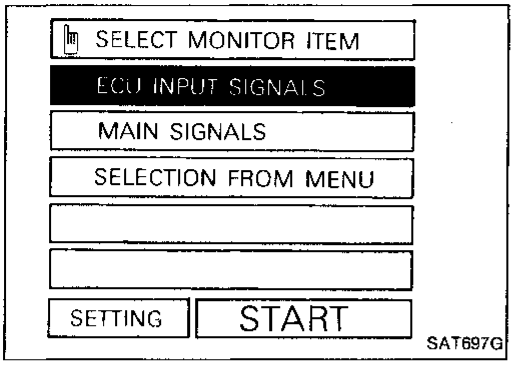


5. Touch "A/T".

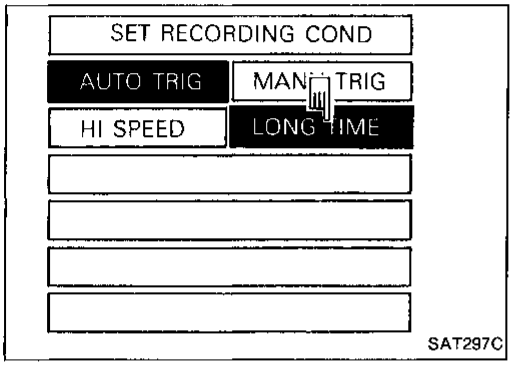


6. Touch "DATA MONITOR".

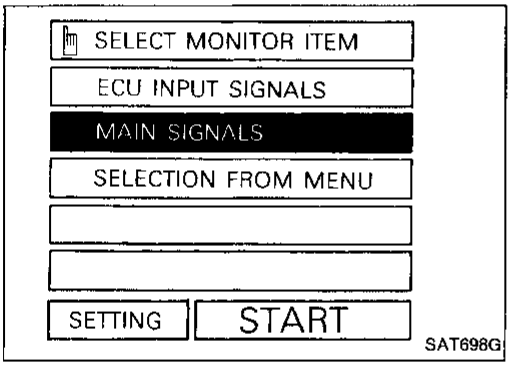
Preliminary Check (Cont'd)



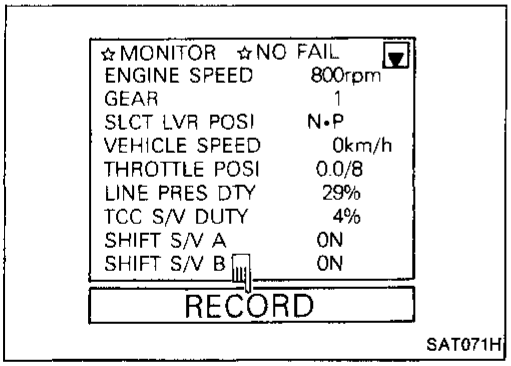
7. Touch "SETTING" to set recording condition.



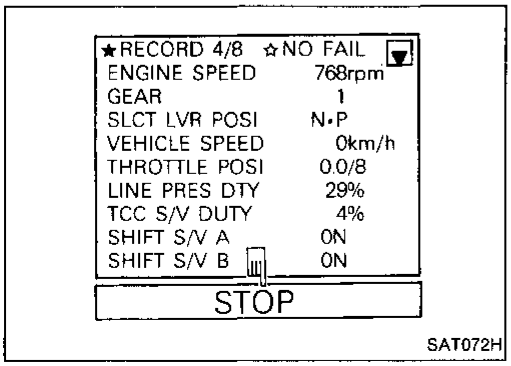
8. Touch "LONG TIME" and "ENTER" key.



9. Go back to SELECT MONITOR ITEM and touch "MAIN SIGNALS".
10. Touch "START".

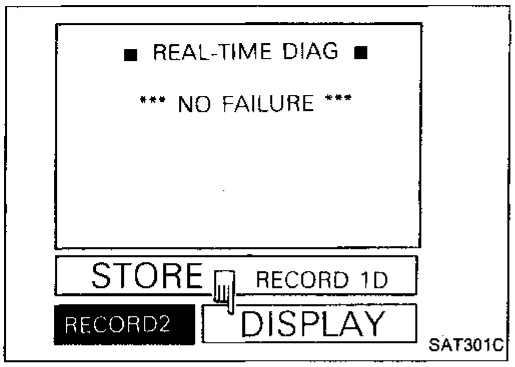


11. When performing cruise test, touch "RECORD".

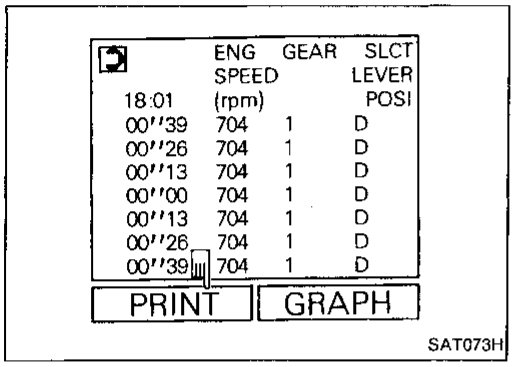


12. After finishing cruise test part 1, touch "STOP".

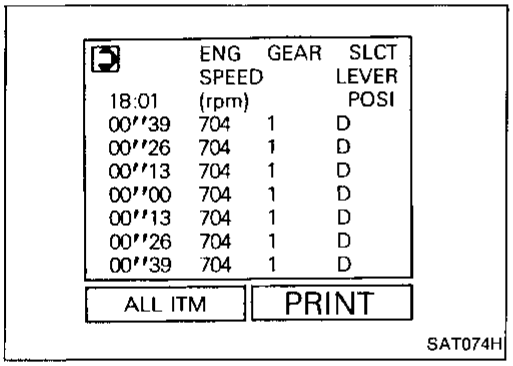
Preliminary Check (Cont'd)



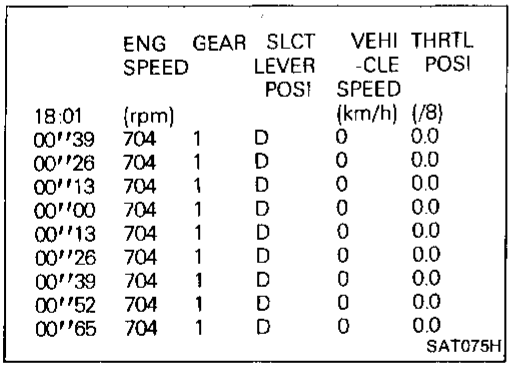
13. Touch "DISPLAY".



14. Touch "PRINT".

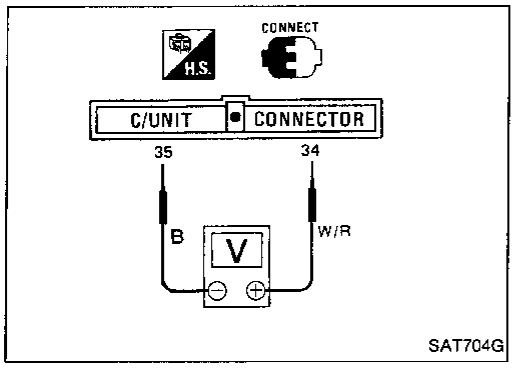


15. Touch "PRINT" again.



16. Check the monitor data printed out.
17. Continue cruise test part 2 and 3.

Preliminary Check (Cont'd)

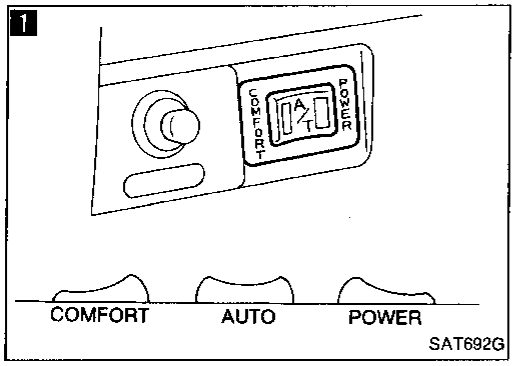


Without CONSULT

- Throttle position can be controlled by voltage across terminals ㉞ and ㉟ of A/T control unit.

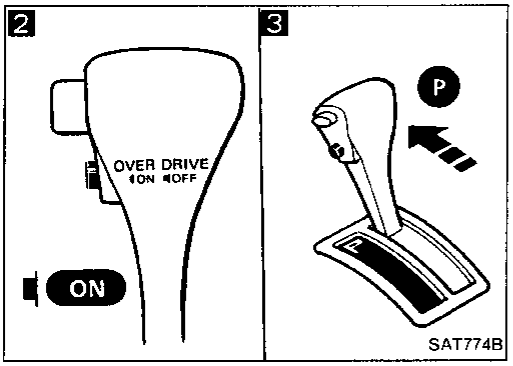
Cruise test — Part 1

1. Warm up engine until engine oil and ATF reach operating temperature after vehicle has been driven approx. 10 minutes.
   ATF operating temperature:
   50 - 80°C (122 - 176°F)



1

1. Park vehicle on flat surface.
2. Set A/T mode switch to "AUTO" position.

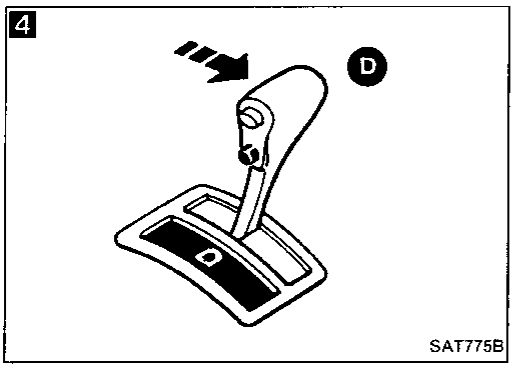


2

Set overdrive switch to "ON" position.

3

1. Move selector lever to "P" position.
2. Start engine.

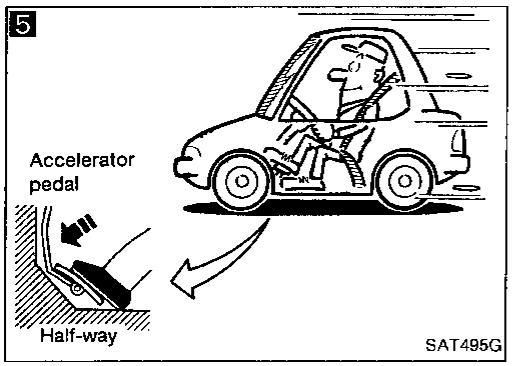


4

Move selector lever to "D" position.

Ⓐ

Preliminary Check (Cont'd)



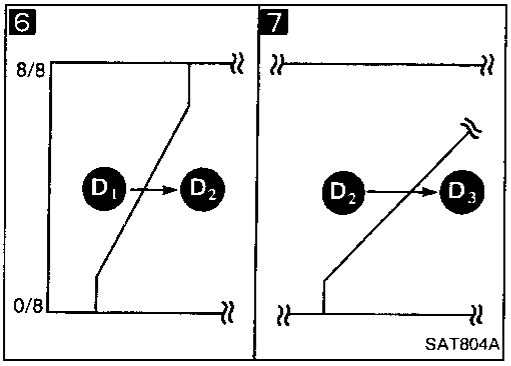
Ⓐ

5

Accelerate vehicle by constantly depressing accelerator pedal halfway.

Does vehicle start from D_1?
Read gear position.
No → Go to Diagnostic Procedure 11, AT-85.

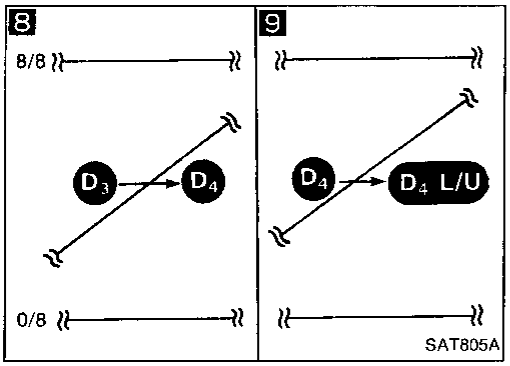
Yes



6

Does A/T shift from D_1 to D_2 at the specified speed?
Read gear position, throttle opening and vehicle speed.
Specified speed when shifting from D_1 to D_2:
Refer to Shift schedule, AT-55.
No → Go to Diagnostic Procedure 12, AT-86.

Yes



7

Does A/T shift from D_2 to D_3 at the specified speed?
Read gear position, throttle position and vehicle speed.
Specified speed when shifting from D_2 to D_3:
Refer to Shift schedule, AT-55.
No → Go to Diagnostic Procedure 13, AT-87.

Yes

8

Does A/T shift from D_3 to D_4 at the specified speed?
Read gear position, throttle position and vehicle speed.
Specified speed when shifting from D_3 to D_4:
Refer to Shift schedule, AT-55.
No → Go to Diagnostic Procedure 14, AT-88.

Yes

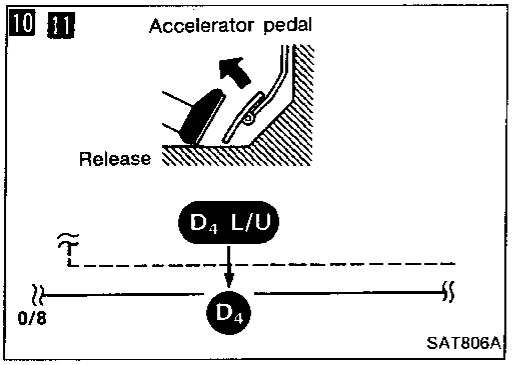
9

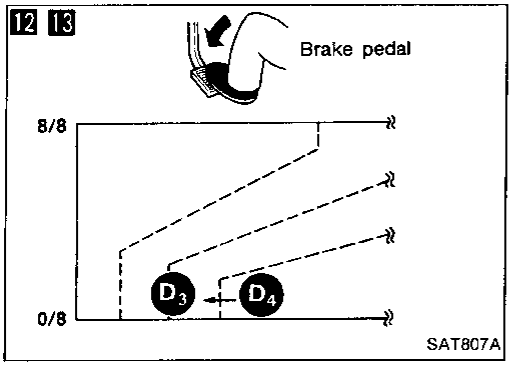
Does A/T perform lock-up at the specified speed?
Read vehicle speed, throttle position when lock-up duty becomes 94%.
Specified speed when lock-up occurs:
Refer to Shift schedule, AT-55.
No → Go to Diagnostic Procedure 15, AT-89.

Yes

Ⓑ

Preliminary Check (Cont'd)





Ⓑ

Does A/T hold lock-up condition for more than 30 seconds?

No → Go to Diagnostic Procedure 16, AT-90.

Yes

10 11

1. Release accelerator pedal.
2. Is lock-up released when accelerator pedal is released?

No → Go to Diagnostic Procedure 17, AT-90.

Yes

12 13

1. Decelerate vehicle by applying foot brake lightly.
2. Does engine speed return to idle smoothly when A/T is shifted from D_4 to D_3?

Read gear position and engine speed.

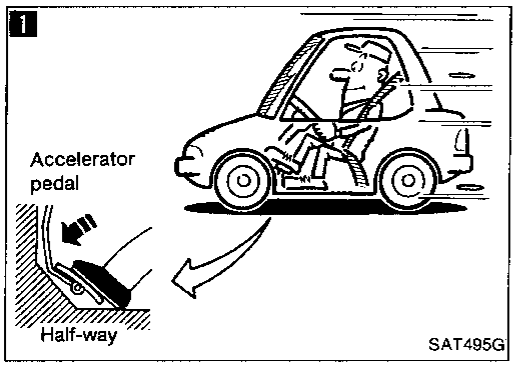
No → Go to Diagnostic Procedure 18, AT-91.

Yes

1. Stop vehicle.
2. Go to "Cruise test — Part 2", AT-52.

Preliminary Check (Cont'd)

Cruise test — Part 2



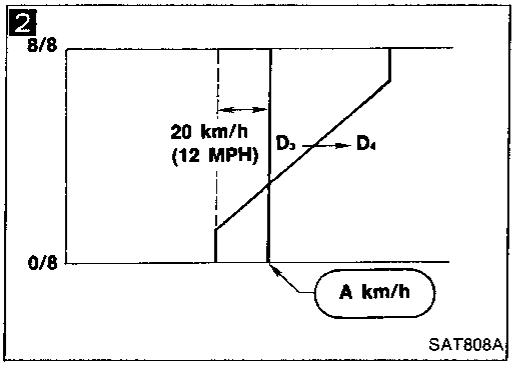
1. Confirm A/T mode switch is in "Auto" position and overdrive switch is in "ON" position.
2. Confirm selector lever is in "D" position.

1

1. Accelerate vehicle by half throttle again.
2. Does vehicle start from D_1?
   Read gear position.

No → Go to Diagnostic Procedure 19, AT-92.

Yes

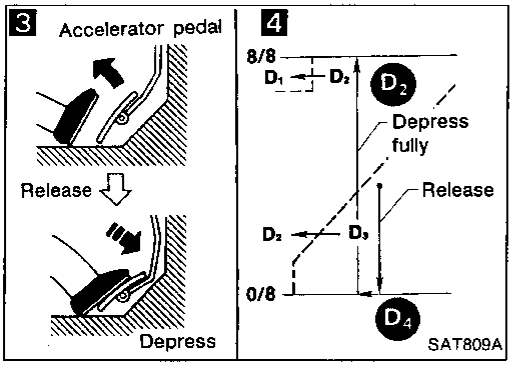


2 3 4

1. Accelerate vehicle to A km/h as shown in illustration.
2. Release accelerator pedal and then quickly depress it fully.
3. Does A/T shift from D_4 to D_2 as soon as accelerator pedal is depressed fully?
   Read gear position and throttle position.

No → Go to Diagnostic Procedure 12, AT-86.

Yes

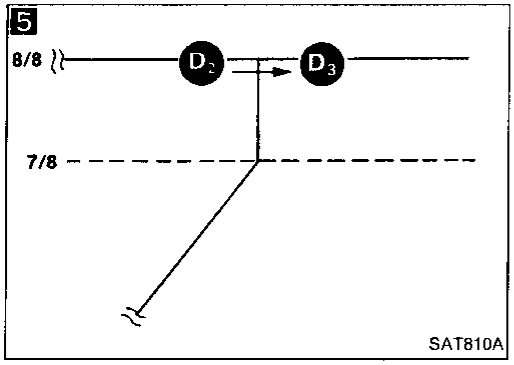


5

Does A/T shift from D_2 to D_3 at the specified speed?
Read gear position, throttle position and vehicle speed.
Specified speed when shifting from D_2 to D_3:
Refer to Shift schedule, AT-55.

No → Go to Diagnostic Procedure 13, AT-87.

Yes



6

Release accelerator pedal after shifting from D_2 to D_3.

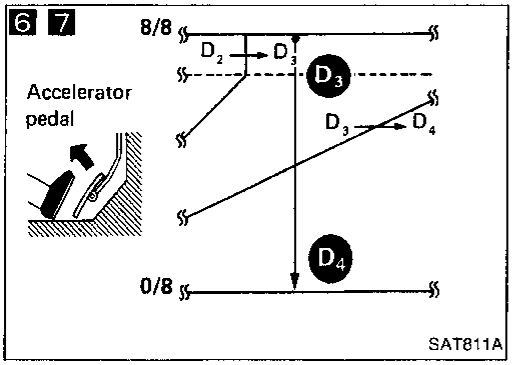
7

Does A/T shift from D_3 to D_4 and does vehicle decelerate by engine brake?
Read gear position, throttle position and vehicle speed.

No → Go to Diagnostic Procedure 14, AT-88.

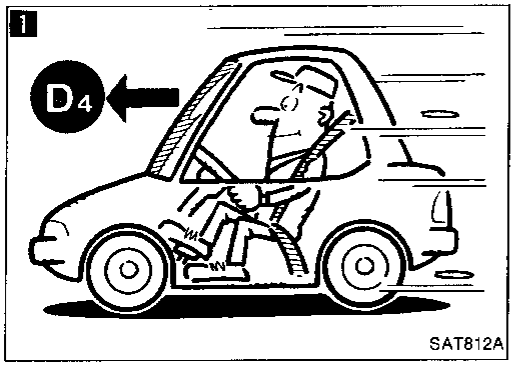
Yes

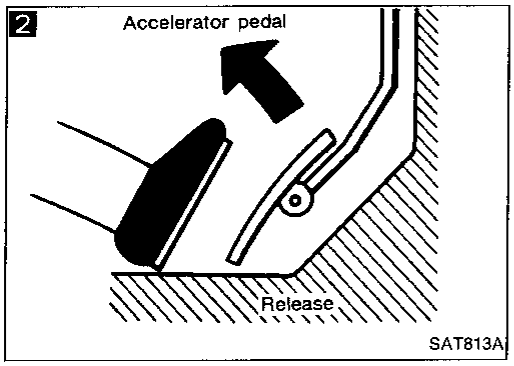
1. Stop vehicle.
2. Go to "Cruise test — Part 3", AT-53.

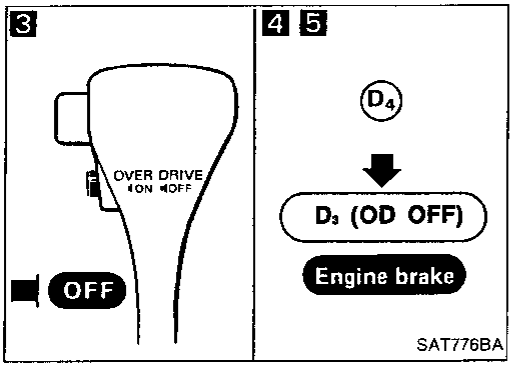


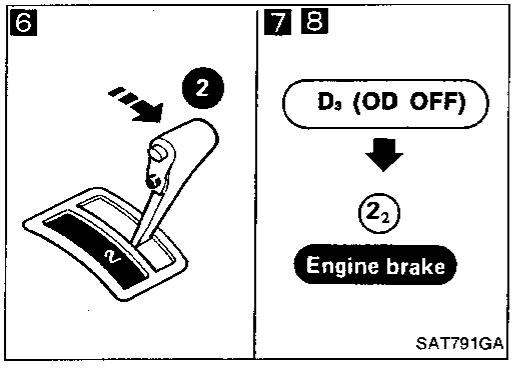
Preliminary Check (Cont'd)

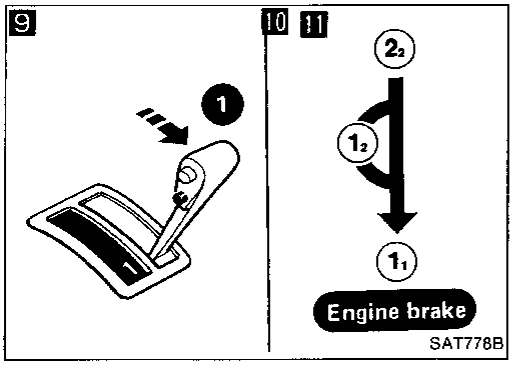
Cruise test — Part 3











1. Confirm A/T mode switch is in "Auto" position and overdrive switch is in "ON" position.
2. Confirm selector lever is in "D" position.

↓

1 Accelerate vehicle using half-throttle to D_4.

↓

2 Release accelerator pedal.

↓

3 Set overdrive switch to "OFF" position while driving in D_4 range.

↓

4 Does A/T shift from D_4 to D_3? **Read gear position and vehicle speed.**
- No → Go to Diagnostic Procedure 20, AT-92.
- Yes ↓

5 Does vehicle decelerate by engine brake?
- No → Go to Diagnostic Procedure 18, AT-91.
- Yes ↓

6 Move selector lever from "D" to "2" position while driving in D_3.

↓

7 Does A/T shift from D_3 to 2_2? **Read gear position.**
- No → Go to Diagnostic Procedure 21, AT-93.
- Yes ↓

8 Does vehicle decelerate by engine brake?
- No → Go to Diagnostic Procedure 18, AT-91.
- Yes ↓

9 10
1. Move selector lever from "2" to "1" position while driving in 2_2.
2. Does A/T shift from 2_2 to 1_1 position? **Read gear position.**
- No → Go to Diagnostic Procedure 22, AT-93.
- Yes ↓

11 Does vehicle decelerate by engine brake?
- No → Go to Diagnostic Procedure 23, AT-93.
- Yes ↓

1. Stop vehicle.
2. Perform self-diagnosis. — Refer to SELF-DIAGNOSTIC PROCEDURE, AT-58.

Preliminary Check (Cont'd)

Vehicle speed when shifting gears

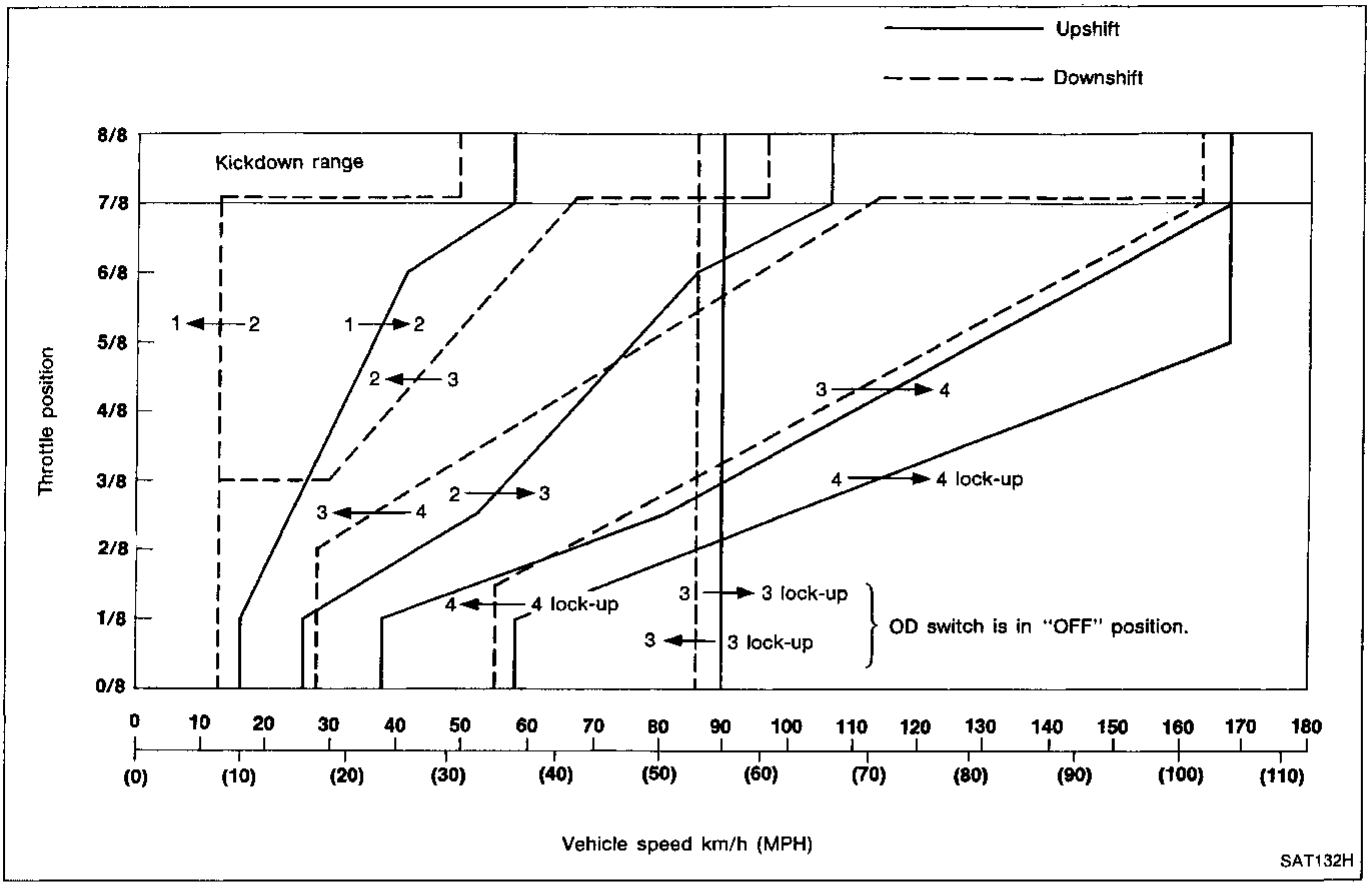
Throttle position	Shift pattern	Vehicle speed km/h (MPH)						
		$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$	$1_2 \rightarrow 1_1$
Full throttle	Comfort	54 - 62 (34 - 39)	103 - 111 (64 - 69)	164 - 172 (102 - 107)	160 - 168 (99 - 104)	93 - 101 (58 - 63)	41 - 49 (25 - 30)	54 - 62 (34 - 39)
	Power	54 - 62 (34 - 39)	103 - 111 (64 - 69)	164 - 172 (102 - 107)	160 - 168 (99 - 104)	93 - 101 (58 - 63)	41 - 49 (25 - 30)	54 - 62 (34 - 39)
Half throttle	Comfort	28 - 36 (17 - 22)	62 - 70 (39 - 43)	106 - 114 (66 - 71)	58 - 66 (36 - 41)	35 - 43 (22 - 27)	9 - 17 (6 - 11)	54 - 62 (34 - 39)
	Power	31 - 39 (19 - 24)	69 - 77 (43 - 48)	116 - 124 (72 - 77)	92 - 100 (57 - 62)	40 - 48 (25 - 30)	9 - 17 (6 - 11)	54 - 62 (34 - 39)

Vehicle speed when performing lock-up

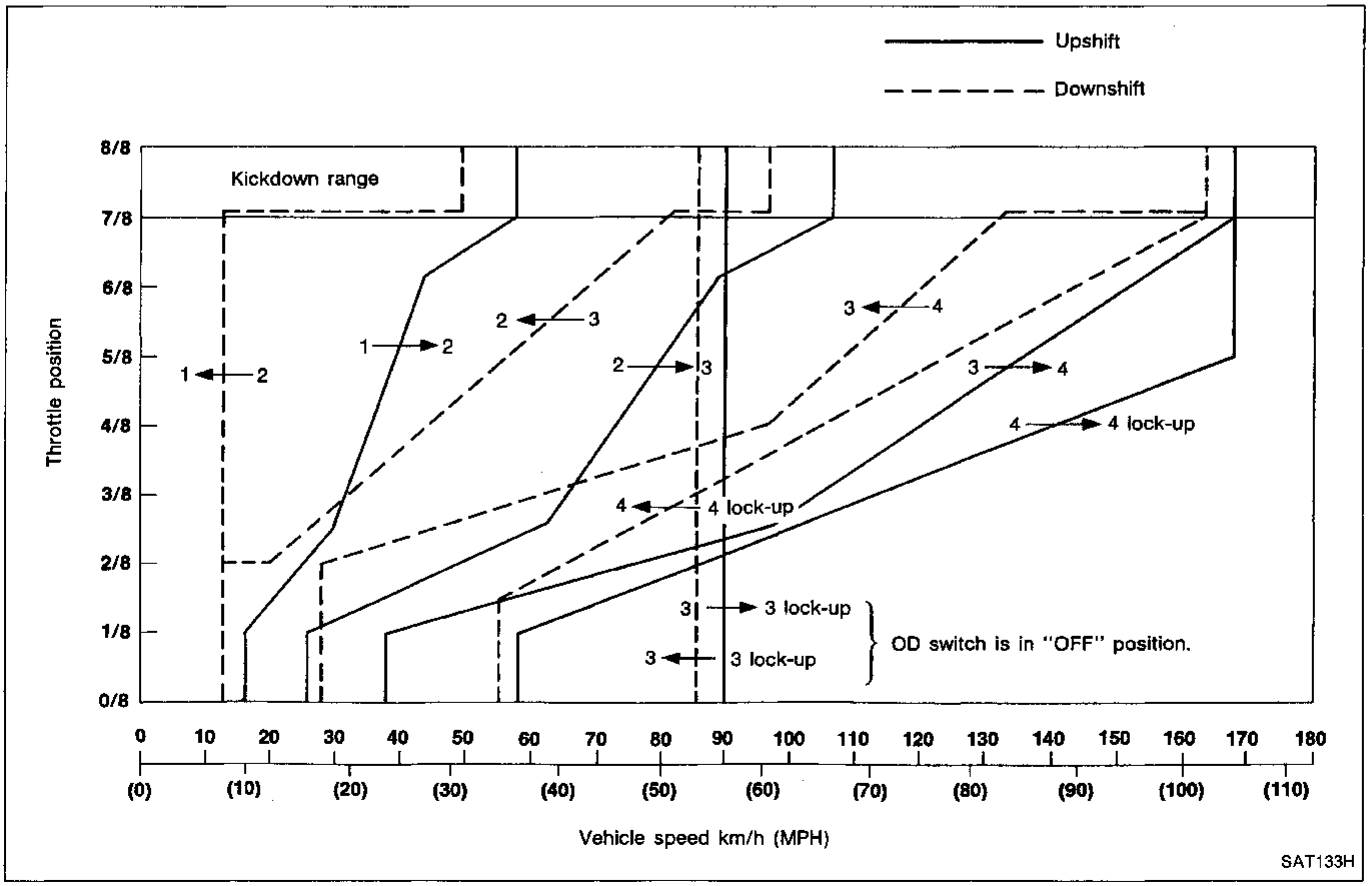
Throttle opening	OD switch	Shift pattern	Vehicle speed km/h (MPH)	
			Lock-up "ON"	Lock-up "OFF"
2/8	ON (D_4)	Comfort	82 - 90 (51 - 56)	61 - 69 (38 - 43)
		Power		
	OFF (D_3)	Comfort	86 - 94 (53 - 58)	83 - 91 (52 - 57)
		Power		

Preliminary Check (Cont'd)

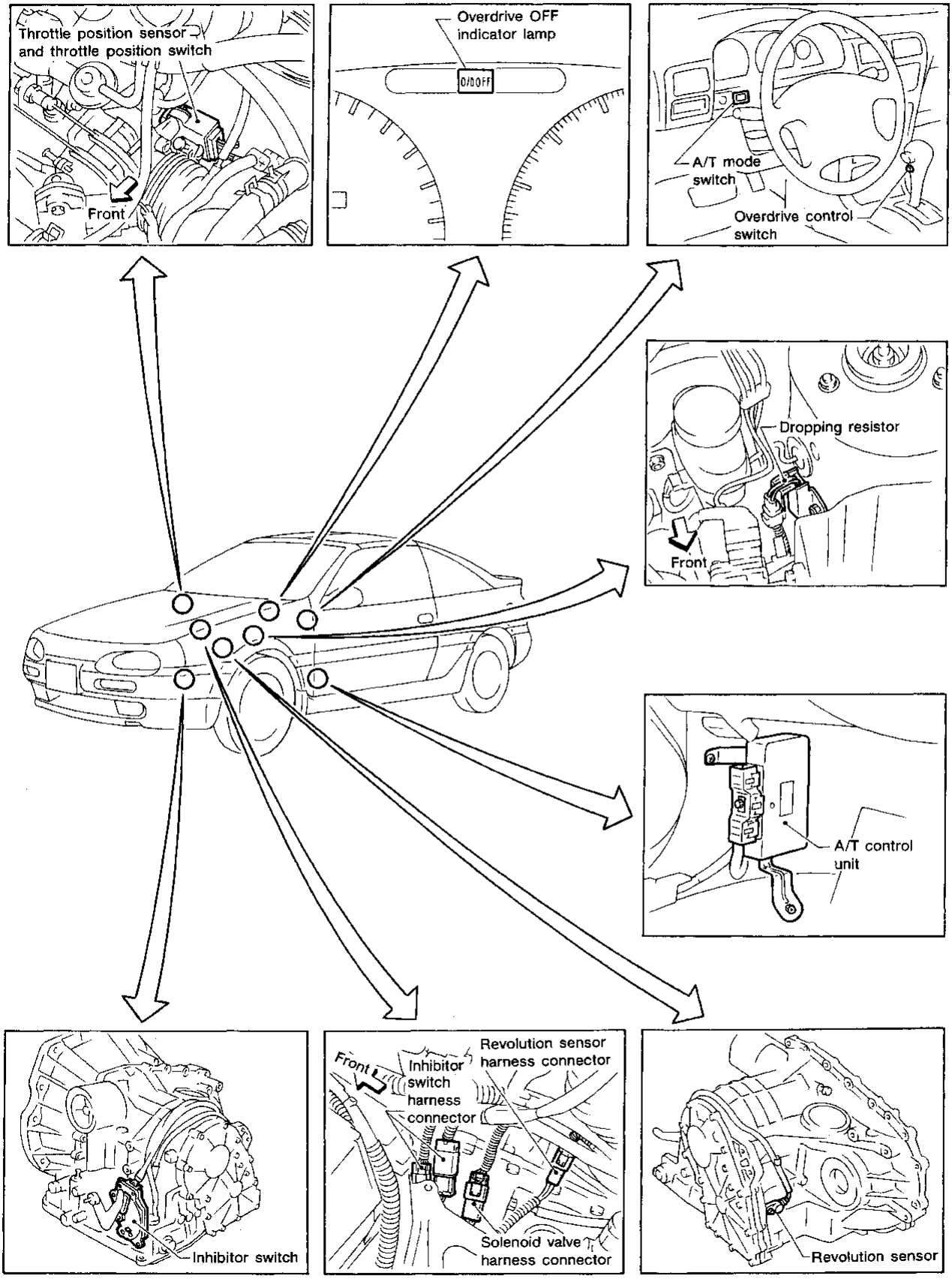
Shift schedule (Comfort pattern)



Shift schedule (Power pattern)

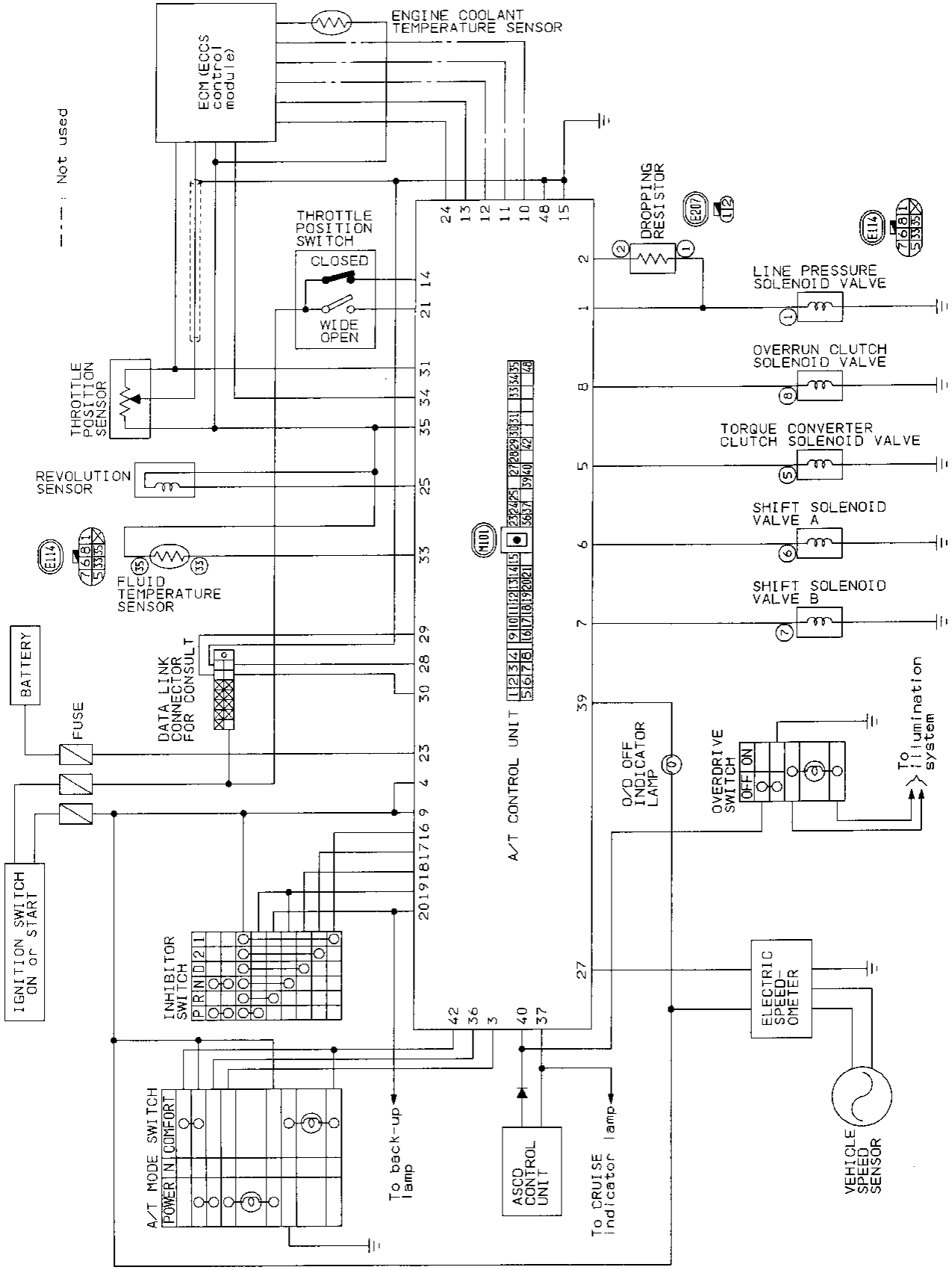


A/T Electrical Parts Location



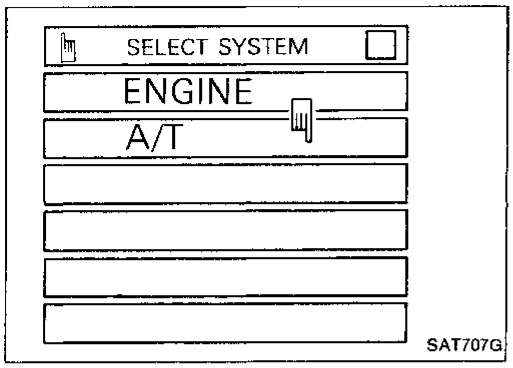
SAT790G

Circuit Diagram for Quick Pinpoint Check



Refer to Foldout page for "A/T WIRING DIAGRAM".

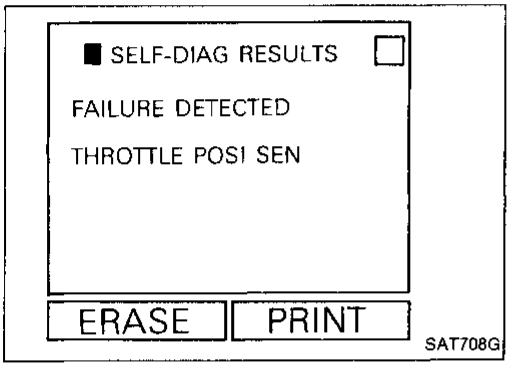
MAT315A



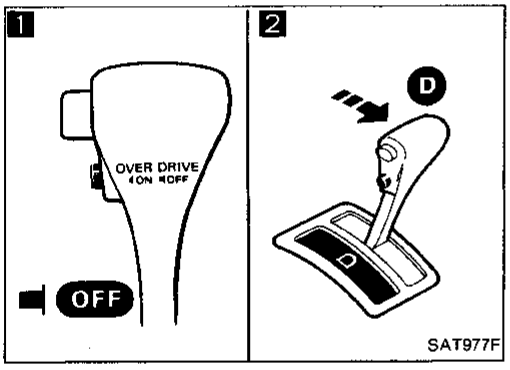
Self-diagnosis

SELF-DIAGNOSTIC PROCEDURE (With CONSULT)

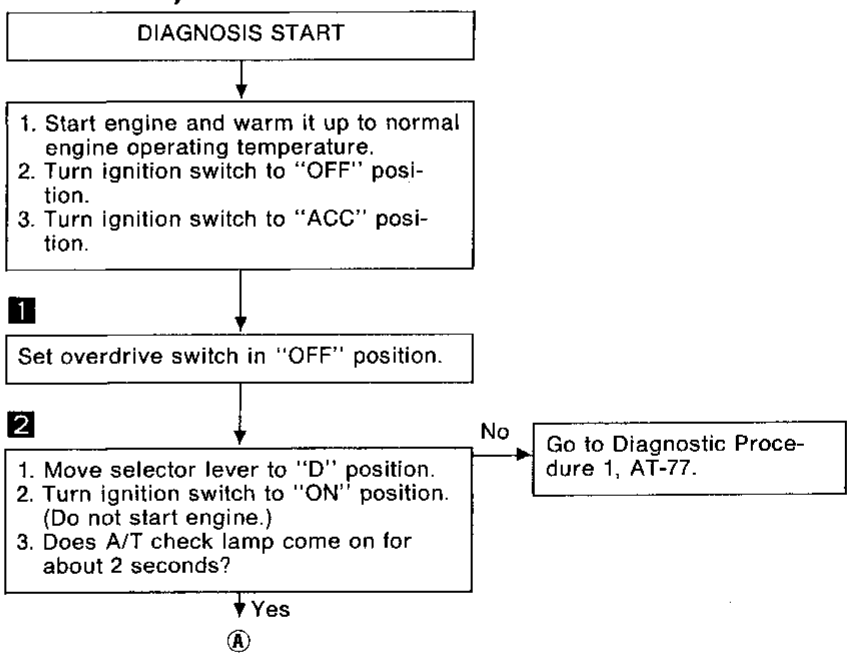
1. Turn on CONSULT.
2. Touch "A/T".



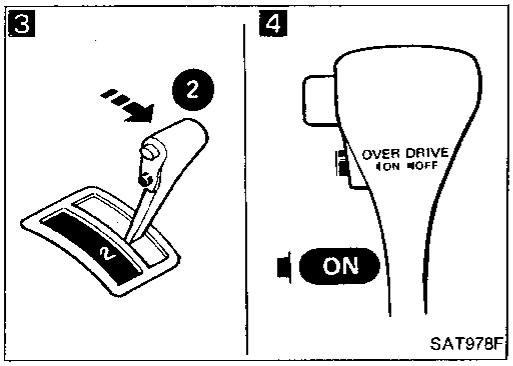
3. Touch "SELF-DIAG RESULTS".
   CONSULT performs REAL-TIME SELF-DIAGNOSIS.

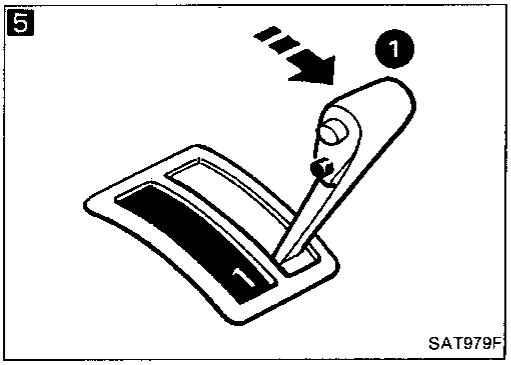


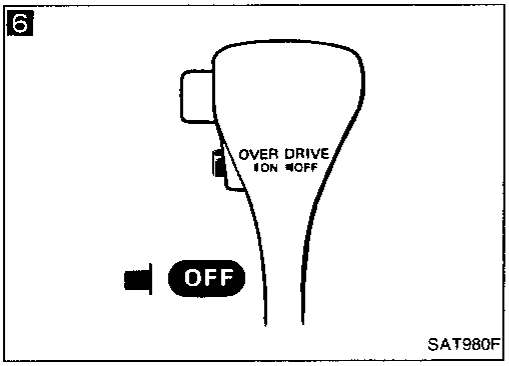
SELF-DIAGNOSTIC PROCEDURE (Without CONSULT)

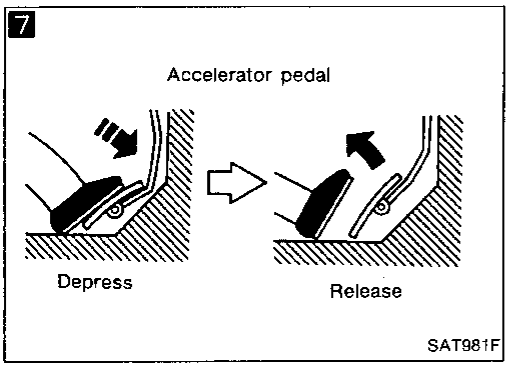


Self-diagnosis (Cont'd)









Ⓐ

3 4

1. Move selector lever to "2" position.
2. Set overdrive switch in "ON" position.

↓

5

Move selector lever to "1" position.

↓

6

Set overdrive switch in "OFF" position.

↓

7

Depress accelerator pedal fully and release it.

↓

Check powershift indicator lamp.
Refer to JUDGEMENT OF SELF-DIAGNOSIS CODE on next page.

↓

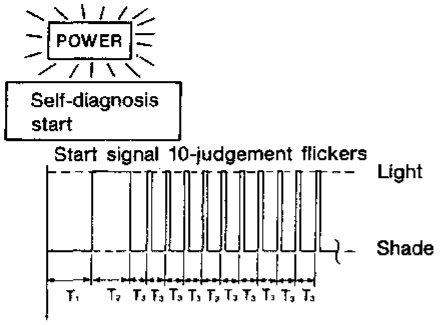
DIAGNOSIS END

Self-diagnosis (Cont'd)

JUDGEMENT OF SELF-DIAGNOSIS CODE

Power indicator lamp:

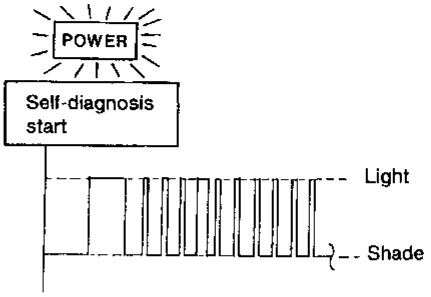
All judgement flickers are same.



All circuits that can be confirmed by self-diagnosis are OK.

SAT755A

4th judgement flicker is longer than others.

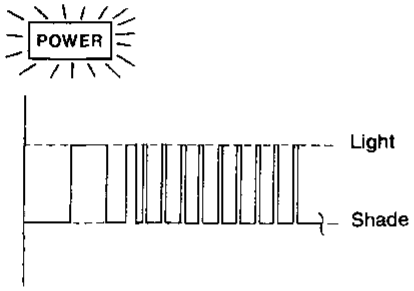


Shift solenoid valve A circuit is short-circuited or disconnected.

➡**Go to SHIFT SOLENOID VALVE A CIRCUIT CHECK, AT-65.**

SAT762A

1st judgement flicker is longer than others.

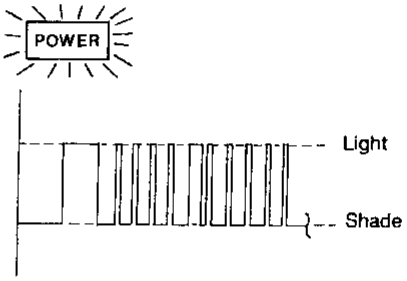


Revolution sensor circuit is short-circuited or disconnected.

➡**Go to REVOLUTION SENSOR CIRCUIT CHECK, AT-62.**

SAT756A

5th judgement flicker is longer than others.

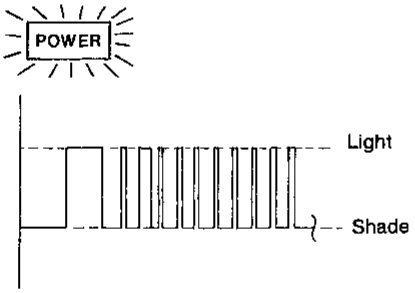


Shift solenoid valve B circuit is short-circuited or disconnected.

➡**Go to SHIFT SOLENOID VALVE B CIRCUIT CHECK, AT-66.**

SAT763A

2nd judgement flicker is longer than others.

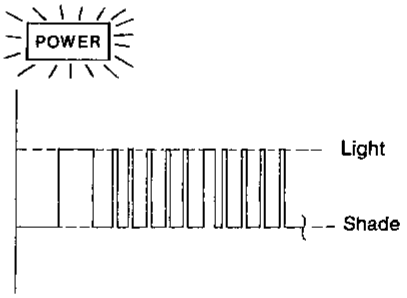


Vehicle speed sensor circuit is short-circuited or disconnected.

➡**Go to VEHICLE SPEED SENSOR CIRCUIT CHECK, AT-63.**

SAT757A

6th judgement flicker is longer than others.

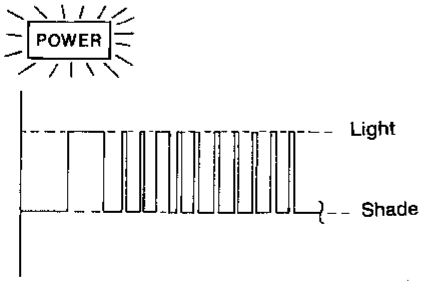


Overrun clutch solenoid valve circuit is short-circuited or disconnected.

➡**Go to OVERRUN CLUTCH SOLENOID VALVE CIRCUIT CHECK, AT-67.**

SAT764A

3rd judgement flicker is longer than others.

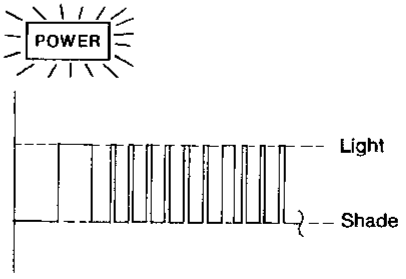


Throttle position sensor circuit is short-circuited or disconnected.

➡**Go to THROTTLE POSITION SENSOR CIRCUIT CHECK, AT-64.**

SAT758A

7th judgement flicker is longer than others.



Torque converter clutch solenoid valve circuit is short-circuited or disconnected.

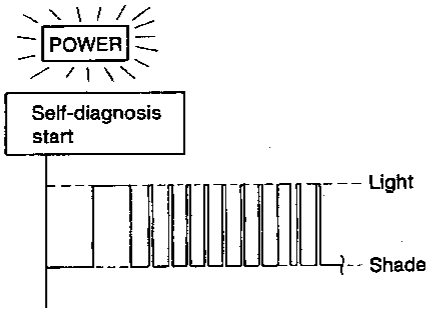
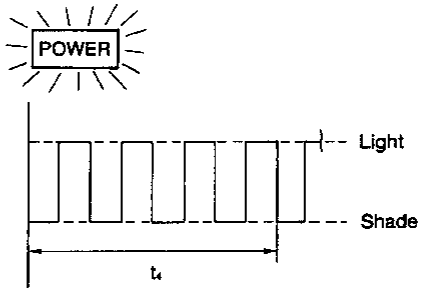
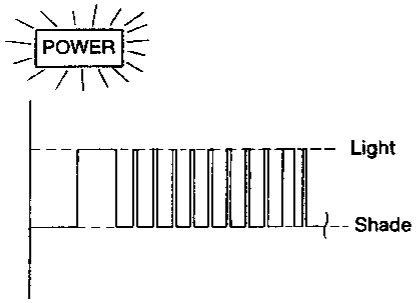
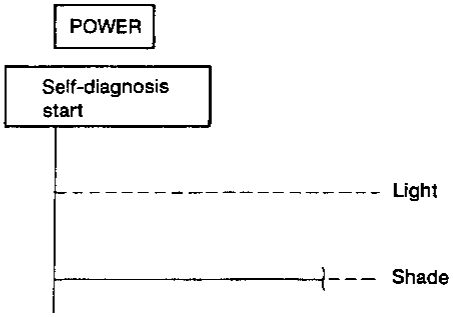
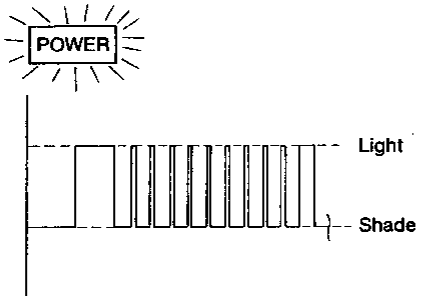
➡**Go to TORQUE CONVERTER CLUTCH SOLENOID VALVE CIRCUIT CHECK, AT-68.**

SAT765A

t_1 = 2.5 seconds t_2 = 2.0 seconds t_3 = 1.0 second

Self-diagnosis (Cont'd)

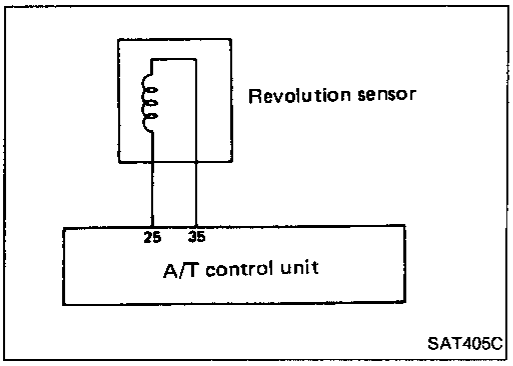
Power indicator lamp:

8th judgement flicker is longer than others.  Fluid temperature sensor is disconnected or A/T control unit power source circuit is damaged. ➡**Go to FLUID TEMPERATURE SENSOR AND A/T CONTROL UNIT POWER SOURCE CIRCUIT CHECKS, AT-69.** SAT770A	Flickers as shown below.  Battery power is low. Battery has been disconnected for a long time. Battery is connected conversely. (When reconnecting A/T control unit connectors. — This is not a problem.) SAT773A
9th judgement flicker is longer than others.  Engine speed signal circuit is short-circuited or disconnected. ➡**Go to ENGINE SPEED SIGNAL CIRCUIT CHECK, AT-71.** SAT771A	Does not come on.  Inhibitor switch, overdrive switch or throttle position switch circuit is disconnected or A/T control unit is damaged. ➡**Go to INHIBITOR, OVERDRIVE AND THROTTLE POSITION SWITCH CIRCUIT CHECKS, AT-73.** SAT146B
10th judgement flicker is longer than others.  Line pressure solenoid valve circuit is short-circuited or disconnected. ➡**Go to LINE PRESSURE SOLENOID VALVE CIRCUIT CHECK, AT-72.** SAT772A	

t_4 = 1.0 second

Self-diagnosis (Cont'd)

REVOLUTION SENSOR CIRCUIT CHECK



CHECK REVOLUTION SENSOR. — Refer to "Electrical Components Inspection", AT-100.

NG → Repair or replace revolution sensor.

OK ↓

A

CHECK INPUT SIGNAL.

1. Turn ignition switch to "START" position and start engine.
2. ● Select "ECU INPUT SIGNALS" in Data Monitor.
   ● Read out the value of "VHCL/S SE·A/T" while driving.
   ● Check the value changes according to driving speed.

OR

2. Check voltage between A/T control unit terminal ㉕ and ground while driving.
   (Measure with AC range.)
   Voltage:
   At 0 km/h (0 MPH):
   0V
   At 30 km/h (19 MPH):
   1V or more
   (Voltage rises gradually in response to vehicle speed.)

NG → Check the following items.
- Harness continuity between A/T control unit and revolution sensor (Main harness)
- Harness continuity between revolution sensor and ECM (Main harness)
- Ground circuit for ECM — Refer to section EF & EC.

OK ↓

Perform self-diagnosis again after driving for a while.

NG → 1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

OK ↓

INSPECTION END

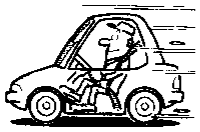
A

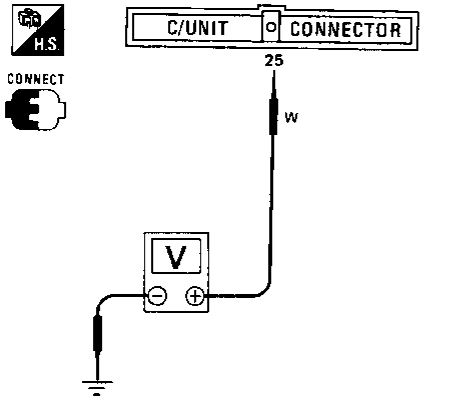
☆MONITOR ☆NO FAIL	
VHCL/S SE•A/T	0km/h
VHCL/S SE•MTR	5km/h
THRTL POS SEN	0.4V
FLUID TEMP SE	1.2V
BATTERY VOLT	13.4V
ENGINE SPEED	1024rpm
OVERDRIVE SW	O N
P/N POSI SW	O N
R POSITION SW	OFF

RECORD

SAT076H

A





SAT344G

Self-diagnosis (Cont'd)

VEHICLE SPEED SENSOR CIRCUIT CHECK

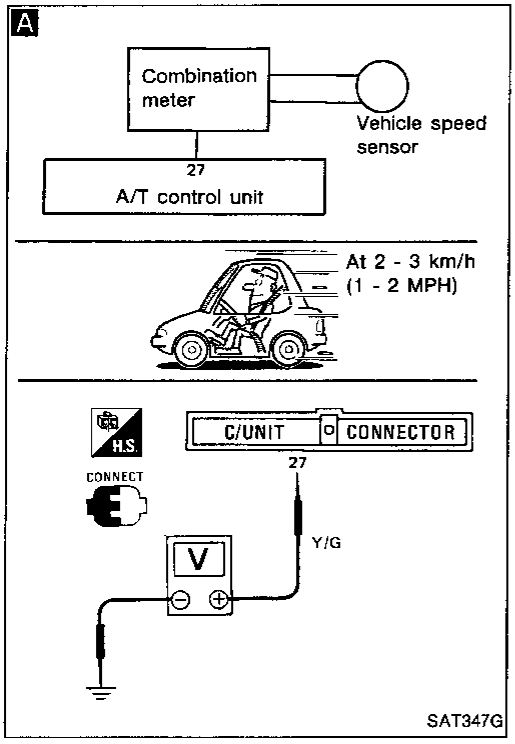
A

☆MONITOR	☆NO FAIL
VHCL/S SE•A/T	0km/h
VHCL/S SE•MTR	5km/h
THRTL POS SEN	0.4V
FLUID TEMP SE	1.2V
BATTERY VOLT	13.4V
ENGINE SPEED	1024rpm
OVERDRIVE SW	O N
P/N POSI SW	O N
R POSITION SW	OFF

RECORD

SAT076H

A



SAT347G

A

CHECK INPUT SIGNAL.

1. Turn ignition switch to "START" position and start engine.
2. ● Select "ECU INPUT SIGNALS" in Data Monitor.
   ● Read out the value of "VHCL/S SE·MTR" while driving.
   ● Check the value changes according to driving speed.

NG → Check the following items.
- Vehicle speed sensor and ground circuit for vehicle speed sensor — Refer to section EL.
- Harness continuity between A/T control unit and vehicle speed sensor (Main harness)

OR

2. Check voltage between A/T control unit terminal (27) and ground while driving at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.
   Voltage:
   Varies from 0V to 5V

OK ↓

Perform self-diagnosis again after driving for a while.

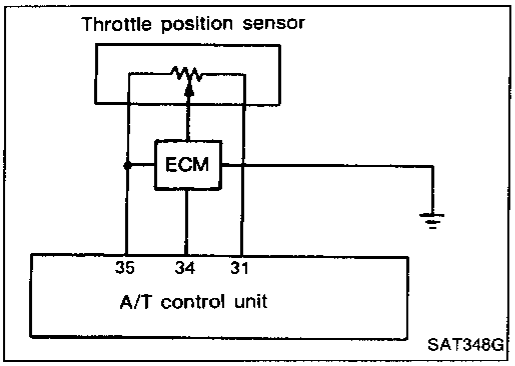
NG → 1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

OK ↓

INSPECTION END

Self-diagnosis (Cont'd)

THROTTLE POSITION SENSOR CIRCUIT CHECK



Perform diagnostic test mode II (self-diagnostic results) for engine control.

NG → Check throttle position sensor circuit for engine control. — Refer to section EF & EC.

OK ↓

A

CHECK INPUT SIGNAL.

1. Turn ignition switch to "ON" position. (Do not start engine.)
2. ● Select "ECU INPUT SIGNALS" in Data Monitor.
   ● Read out the value of "THRTL POS SEN".
   Voltage:
   Fully-closed throttle:
   0.2 - 0.6V
   Fully-open throttle:
   2.9 - 3.9V

NG → Check harness continuity between ECM and A/T control unit regarding throttle position sensor circuit. (Main harness)

OR

2. ● Check voltage between A/T control unit terminals ㉞ and ㉟ while accelerator pedal is depressed slowly.
   Voltage:
   Fully-closed throttle valve:
   0.2 - 0.6V
   Fully-open throttle valve:
   2.9 - 3.9V
   (Voltage rises gradually in response to throttle position)

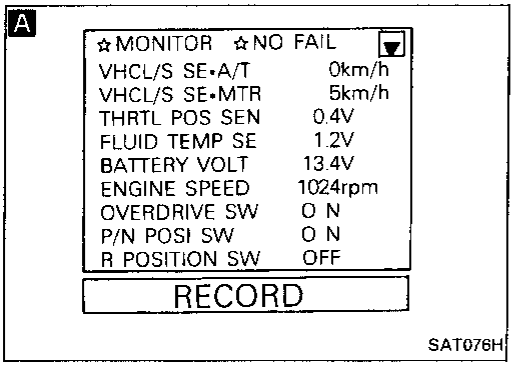
OK ↓

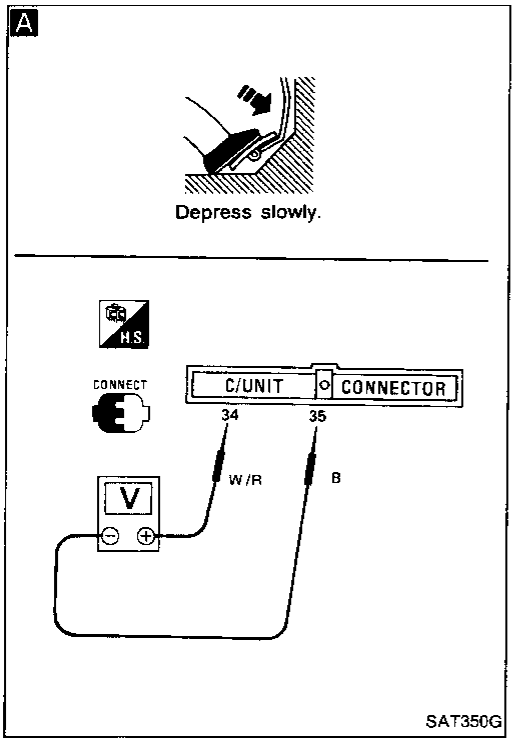
Perform self-diagnosis again after driving for a while.

NG → 1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

OK ↓

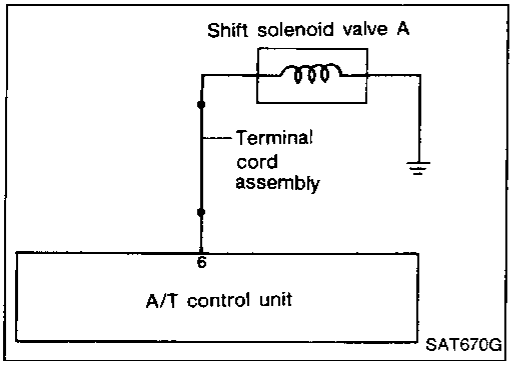
INSPECTION END

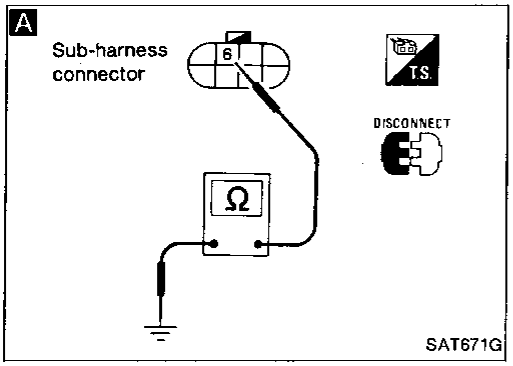


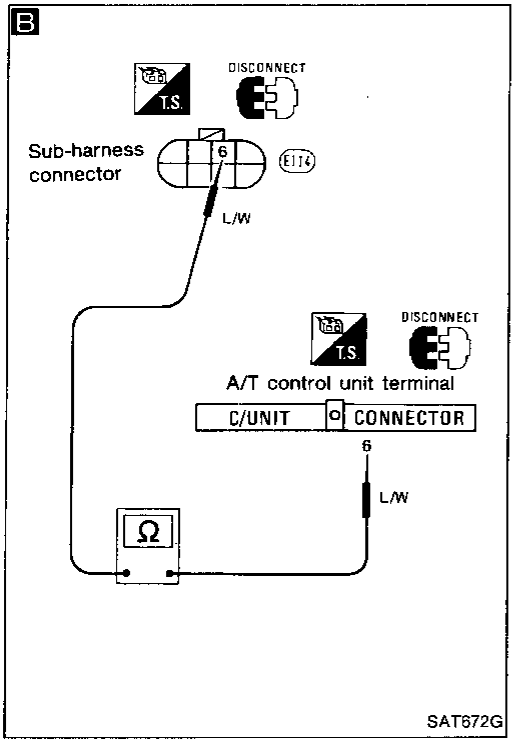


Self-diagnosis (Cont'd)

SHIFT SOLENOID VALVE A CIRCUIT CHECK







A

CHECK GROUND CIRCUIT.
1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal ⑥ and ground.
   Resistance: 20 - 30Ω

NG →
1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Shift solenoid valve A — Refer to "Electrical Components Inspection", AT-98.
- Harness continuity of terminal cord assembly

OK ↓

B

CHECK POWER SOURCE CIRCUIT.
1. Turn ignition switch to "OFF" position.
2. Disconnect A/T control unit harness connector.
3. Check resistance between terminal ⑥ and A/T control unit terminal ⑥.
   Resistance:
   Approximately 0Ω
4. Reinstall any part removed.

NG → Repair or replace harness between A/T control unit and terminal cord assembly. (Main harness)

OK ↓

Perform self-diagnosis after driving for a while.

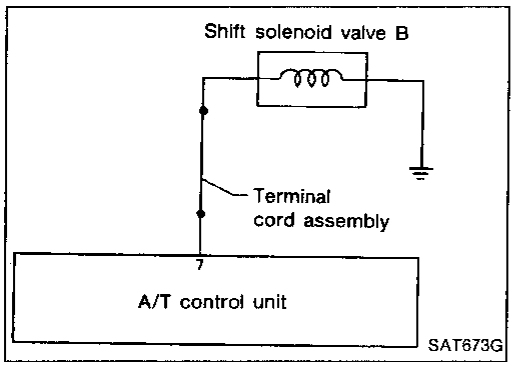
NG →
1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

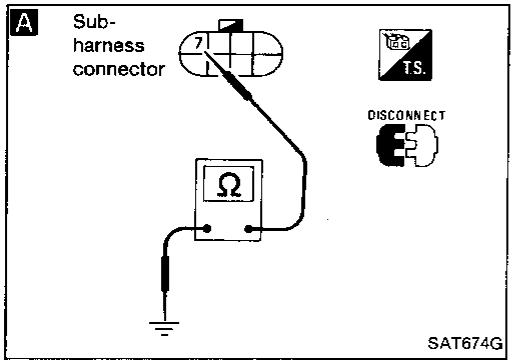
OK ↓

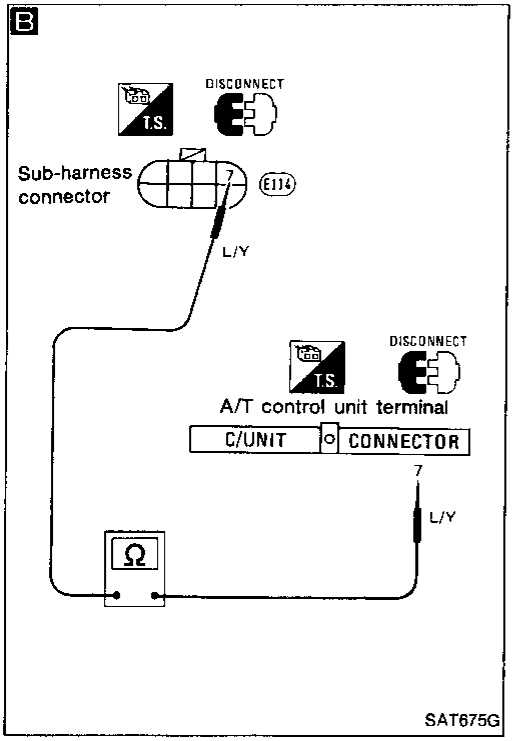
INSPECTION END

Self-diagnosis (Cont'd)

SHIFT SOLENOID VALVE B CIRCUIT CHECK







A

CHECK GROUND CIRCUIT.
1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal ⑦ and ground.
   Resistance: 20 - 30Ω

NG →
1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Shift solenoid valve B — Refer to "Electrical Components Inspection", AT-98.
- Harness continuity of terminal cord assembly

OK ↓

B

CHECK POWER SOURCE CIRCUIT.
1. Turn ignition switch to "OFF" position.
2. Disconnect A/T control unit harness connector.
3. Check resistance between terminal ⑦ and A/T control unit terminal ⑦.
   Resistance:
   Approximately 0Ω
4. Reinstall any part removed.

NG → Repair or replace harness between A/T control unit and terminal cord assembly. (Main harness)

OK ↓

Perform self-diagnosis after driving for a while.

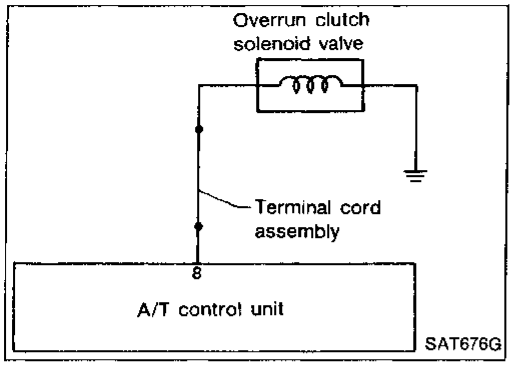
NG →
1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

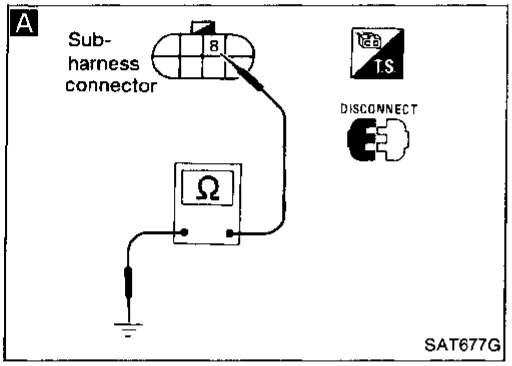
OK ↓

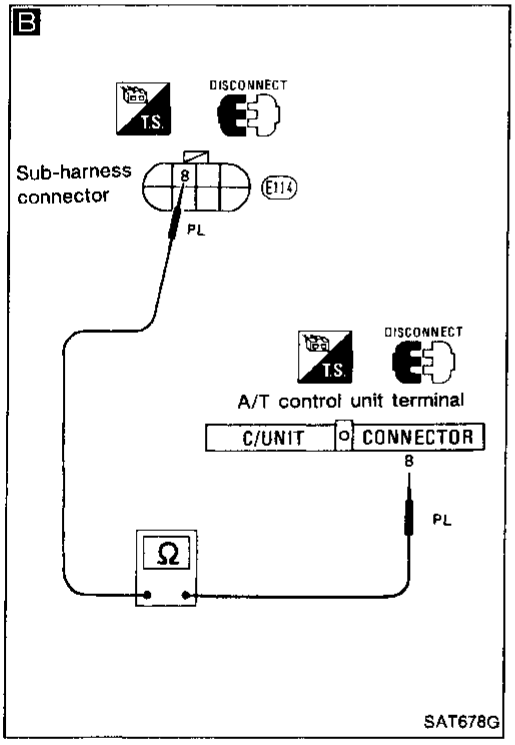
INSPECTION END

Self-diagnosis (Cont'd)

OVERRUN CLUTCH SOLENOID VALVE CIRCUIT CHECK







A

CHECK GROUND CIRCUIT.
1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal ⑧ and ground.
   Resistance: 20 - 30Ω

NG →
1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Overrun clutch solenoid valve. — Refer to "Electrical Components Inspection", AT-98.
- Harness continuity of terminal cord assembly

OK ↓

B

CHECK POWER SOURCE CIRCUIT.
1. Turn ignition switch to "OFF" position.
2. Disconnect A/T control unit harness connector.
3. Check resistance between terminal ⑧ and A/T control unit terminal ⑧.
   Resistance:
   Approximately 0Ω
4. Reinstall any part removed.

NG → Repair or replace harness between A/T control unit and terminal cord assembly. (Main harness)

OK ↓

Perform self-diagnosis after driving for a while.

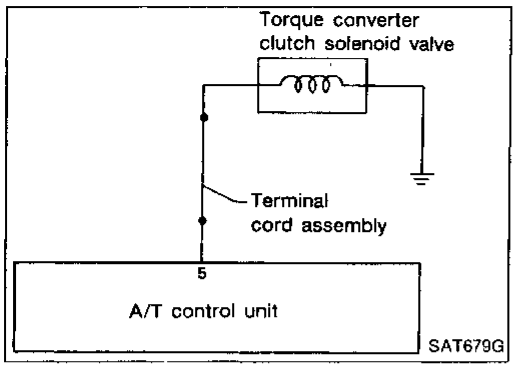
NG →
1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

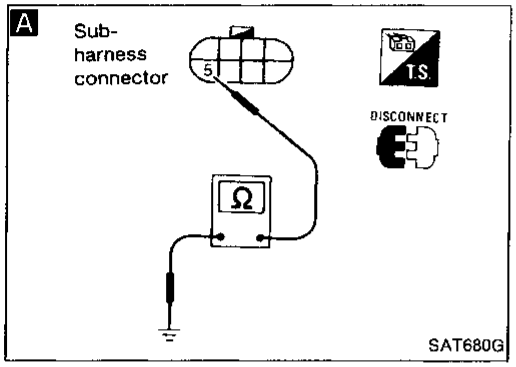
OK ↓

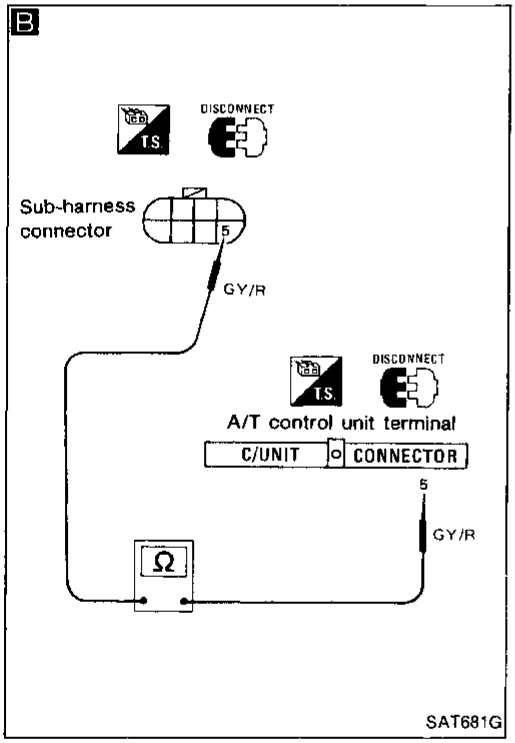
INSPECTION END

Self-diagnosis (Cont'd)

TORQUE CONVERTER CLUTCH SOLENOID VALVE CIRCUIT CHECK







A

CHECK GROUND CIRCUIT.
1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal ⑤ and ground.
   Resistance: 2.5 - 5Ω

NG →
1. Remove oil pan. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Torque converter clutch solenoid valve — Refer to "Electrical Components Inspection", AT-98.
- Harness continuity of terminal cord assembly

OK ↓

B

CHECK POWER SOURCE CIRCUIT.
1. Turn ignition switch to "OFF" position.
2. Disconnect A/T control unit harness connector.
3. Check resistance between terminal ⑤ and A/T control unit terminal ⑤.
   Resistance:
   Approximately 0Ω
4. Reinstall any part removed.

NG → Repair or replace harness between A/T control unit and terminal cord assembly. (Main harness)

OK ↓

Perform self-diagnosis after driving for a while.

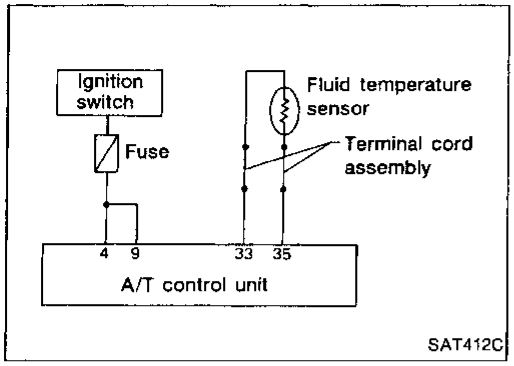
NG →
1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

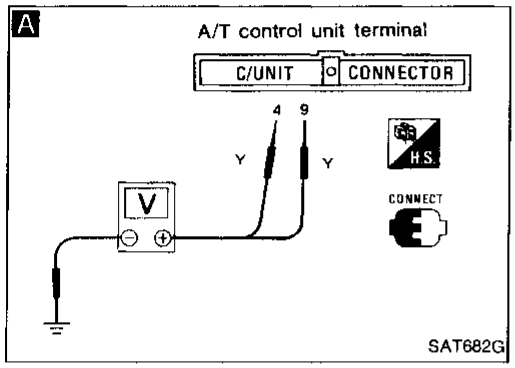
OK ↓

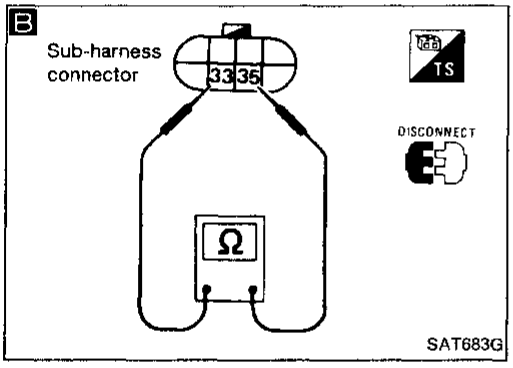
INSPECTION END

Self-diagnosis (Cont'd)

FLUID TEMPERATURE SENSOR CIRCUIT AND A/T CONTROL UNIT POWER SOURCE CIRCUIT CHECKS







A

CHECK A/T CONTROL UNIT POWER SOURCE.

1. Turn ignition switch to "ON" position. (Do not start engine.)
2. Check voltage between A/T control unit terminals ④, ⑨ and ground.

Battery voltage should exist.

NG → Check the following items.
- Harness continuity between ignition switch and A/T control unit (Main harness)
- Ignition switch and fuse — Refer to section EL.

OK ↓

B

CHECK FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY.

1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminals ㉝ and ㉟ when A/T is cold.

Resistance:
Cold [20°C (68°F)]
Approximately 2.5 kΩ

4. Reinstall any part removed.

NG → 1. Remove oil pan.
2. Check the following items.
- Fluid temperature sensor — Refer to "Electrical Components Inspection", AT-98.
- Harness continuity of terminal cord assembly

OK ↓

Ⓐ

Self-diagnosis (Cont'd)

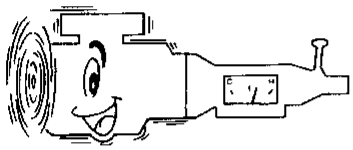
C

☆MONITOR	☆NO FAIL
VHCL/S SE•A/T	0km/h
VHCL/S SE•MTR	5km/h
THRTL POS SEN	0.4V
FLUID TEMP SE	1.2V
BATTERY VOLT	13.4V
ENGINE SPEED	1024rpm
OVERDRIVE SW	O N
P/N POSI SW	O N
R POSITION SW	OFF

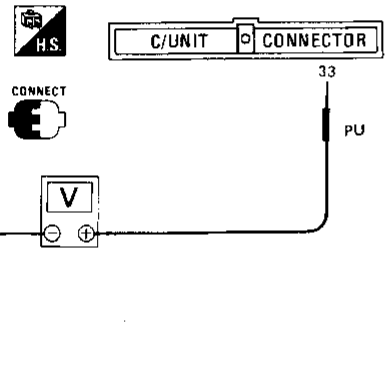
RECORD

SAT076H

C



A/T control unit terminal



SAT685G

Ⓐ

C

CHECK INPUT SIGNAL OF FLUID TEMPERATURE SENSOR.

1. Turn ignition switch to "ON" position, and start engine.
2. ● Select "ECU INPUT SIGNALS" in Data Monitor.
   ● Read out the value of "FLUID TEMP SE".
   Voltage:
   Cold [20°C (68°F)] →
   Hot [80°C (176°F)]:
   Approximately
   1.5V → 0.5V

NG → Check the following items.
● Harness continuity between A/T control unit and terminal cord assembly (Main harness)

OR

2. ● Check voltage between A/T control unit terminal ㉝ and ground while warming up A/T.
   Voltage:
   Cold [20°C (68°F)] →
   Hot [80°C (176°F)]:
   Approximately
   1.5V → 0.5V

OK ↓

Perform self-diagnosis after driving for a while.

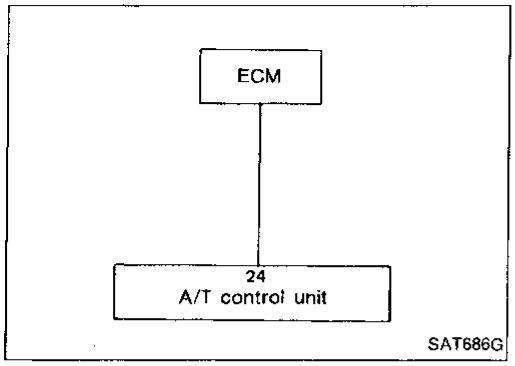
NG → 1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

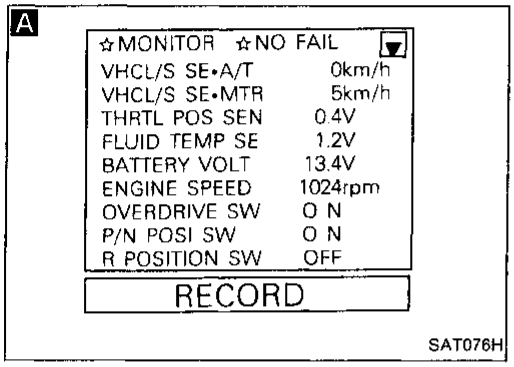
OK ↓

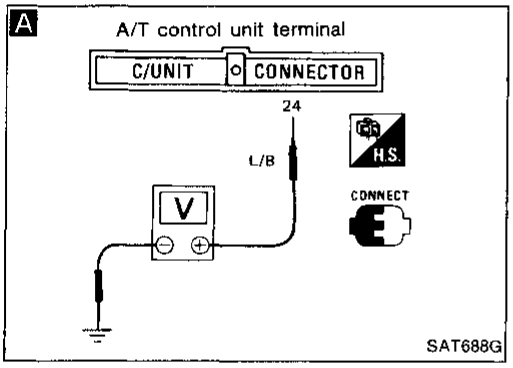
INSPECTION END

Self-diagnosis (Cont'd)

ENGINE SPEED SIGNAL CIRCUIT CHECK







Perform diagnostic test mode II (self-diagnostic results) for engine control. Check ignition signal circuit condition.

NG → Check ignition signal circuit for engine control. — Refer to section EF & EC.

OK

A

CHECK INPUT SIGNAL.

1. Turn ignition switch to "ON" position and start engine.
2. ● Select "ECU INPUT SIGNALS" in Data Monitor.
   ● Read out the value of "ENGINE SPEED".
   ● Check engine speed changes according to throttle position.

OR

● Check voltage between A/T control unit terminal ㉔ and ground.
Voltage: 0.9 - 4.5V

NG → Check the following items.
- Harness continuity between A/T control unit and ignition coil.
- Resistor
- Ignition coil — Refer to section EF & EC.

OK

Perform self-diagnosis again after driving for a while.

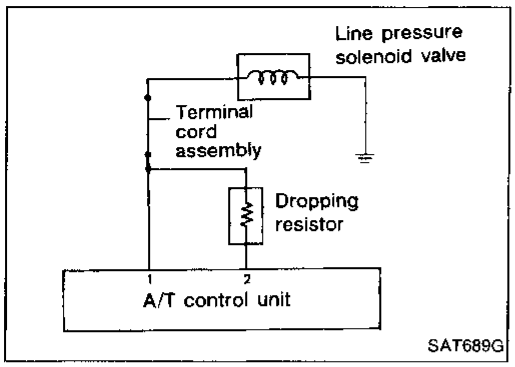
NG → 1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

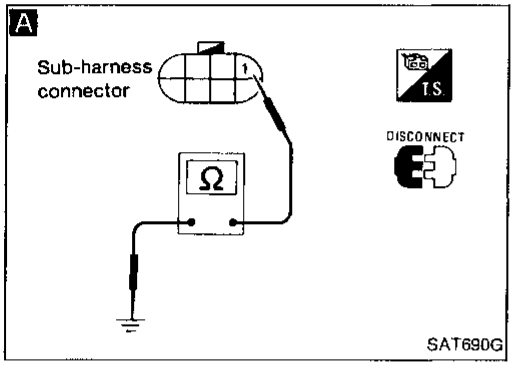
OK

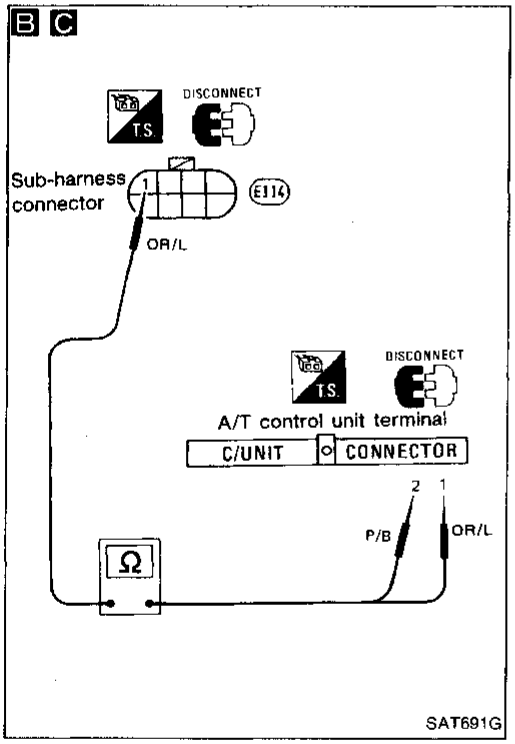
INSPECTION END

Self-diagnosis (Cont'd)

LINE PRESSURE SOLENOID VALVE CIRCUIT CHECK







A

CHECK GROUND CIRCUIT.
1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal ① and ground.
   Resistance: 2.5 - 5Ω

NG →
1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
   - Line pressure solenoid valve — Refer to "Electrical Components Inspection".
   - Harness continuity of terminal cord assembly

OK ↓

B

CHECK POWER SOURCE CIRCUIT.
1. Turn ignition switch to "OFF" position.
2. Disconnect A/T control unit harness connector.
3. Check resistance between terminal ① and A/T control unit terminal ②.
   Resistance: 11.2 - 12.8Ω

NG →
Check the following items.
- Dropping resistor — Refer to "Electrical Components Inspection", AT-100.
- Harness continuity between A/T control unit ② and terminal cord assembly (Main harness)

OK ↓

C

CHECK POWER SOURCE CIRCUIT.
1. Turn ignition switch to "OFF" position.
2. Check resistance between terminal ① and A/T control unit terminal ①.
   Resistance:
   Approximately 0Ω
3. Reinstall any part removed.

NG →
Repair or replace harness between A/T control unit ① and terminal cord assembly.

OK ↓

Perform self-diagnosis after driving for a while.

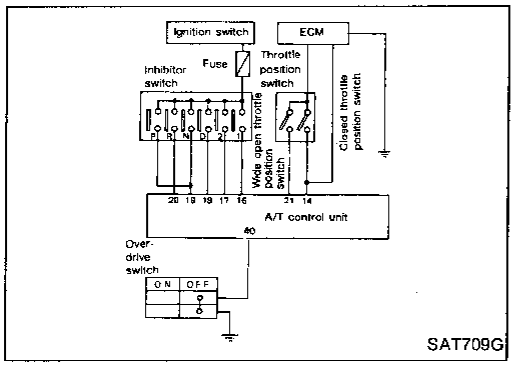
NG →
1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

OK ↓

INSPECTION END

Self-diagnosis (Cont'd)

INHIBITOR, OVERDRIVE AND THROTTLE POSITION SWITCH CIRCUIT CHECKS



SAT709G

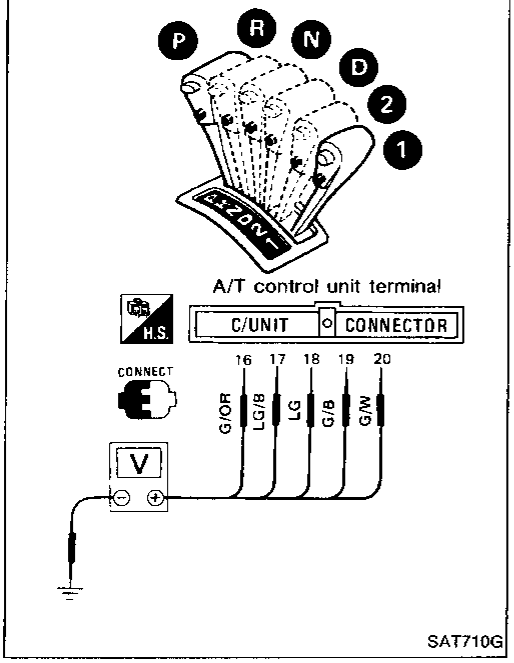
A

☆MONITOR	☆NO FAIL
VHCL/S SE•A/T	0km/h
VHCL/S SE•MTR	5km/h
THRTL POS SEN	0.4V
FLUID TEMP SE	1.2V
BATTERY VOLT	13.4V
ENGINE SPEED	1024rpm
OVERDRIVE SW	O N
P/N POSI SW	O N
R POSITION SW	OFF

RECORD

SAT076H

A



SAT710G

A

CHECK INHIBITOR SWITCH CIRCUIT.

1. Turn ignition switch to "ON" position. (Do not start engine.)
2. ● Select "ECU INPUT SIGNALS" in Data Monitor.
   ● Read out "R, N, D, 1 and 2 position switches" moving selector lever to each position.
   ● Check the signal of the selector lever position is indicated properly.

OR

2. Check voltage between A/T control unit terminals ⑯, ⑰, ⑱, ⑲, ⑳ and ground while moving selector lever through each position.

Voltage:

B: Battery voltage

0: 0V

Lever position	Terminal No.				
	⑲	⑳	⑱	⑰	⑯
P, N	B	0	0	0	0
R	0	B	0	0	0
D	0	0	B	0	0
2	0	0	0	B	0
1	0	0	0	0	B

NG → Check the following items.
- Inhibitor switch — Refer to "Electrical Components Inspection", AT-99.
- Harness continuity between ignition switch and inhibitor switch (Main harness)
- Harness continuity between inhibitor switch and A/T control unit (Main harness)

OK → Ⓐ

Self-diagnosis (Cont'd)

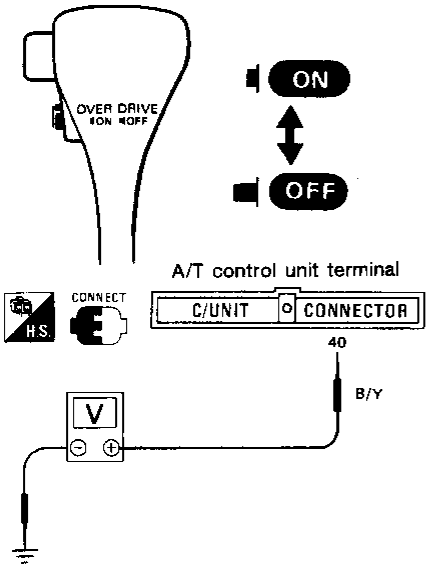
B

☆MONITOR ☆NO FAIL	
VHCL/S SE•A/T	0km/h
VHCL/S SE•MTR	5km/h
THRTL POS SEN	0.4V
FLUID TEMP SE	1.2V
BATTERY VOLT	13.4V
ENGINE SPEED	1024rpm
OVERDRIVE SW	O N
P/N POSI SW	O N
R POSITION SW	OFF

RECORD

SAT076H

B



SAT713G

Ⓐ

B

CHECK OVERDRIVE SWITCH CIRCUIT.

1. Turn ignition switch to "ON" position. (Do not start engine.)
2. ● Select "ECU INPUT SIGNALS" in Data Monitor.
   ● Read out "OVERDRIVE SWITCH".
   ● Check the signal of the overdrive switch is indicated properly.
   (Overdrive switch "ON" displayed on CONSULT means overdrive "OFF".)

NG → Check the following items.
- Overdrive switch — Refer to "Electrical Components Inspection", AT-99.
- Harness continuity between A/T control unit and overdrive switch (Main harness)
- Harness continuity of ground circuit for overdrive switch (Main harness)

OR

2. ● Check voltage between A/T control unit terminal ㊵ and ground when overdrive switch is in "ON" position and in "OFF" position.

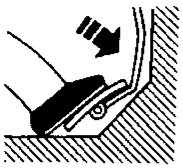
Switch position	Voltage
ON	Battery voltage
OFF	1V or less

OK

Ⓑ

Self-diagnosis (Cont'd)

C D

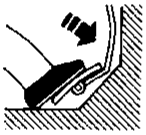


☆MONITOR	☆NO FAIL
D POSITION SW	OFF
2 POSITION SW	OFF
1 POSITION SW	OFF
ASCD•CRUISE	OFF
ASCD•OD CUT	OFF
KICKDOWN SW	OFF
POWERSHIFT SW	OFF
CLOSED THL/SW	O N
W/O THRL/P-SW	OFF

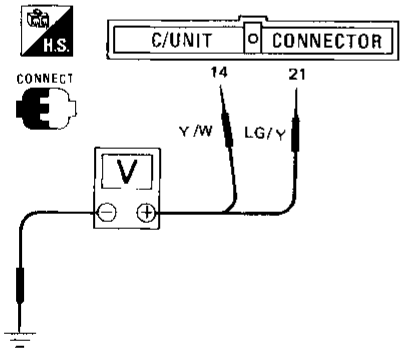
RECORD

SAT714G

C D



A/T control unit terminal



SAT715G

Ⓑ

C

CHECK WIDE OPEN THROTTLE POSITION SWITCH CIRCUIT.

1. Turn ignition switch to "ON" position. (Do not start engine.)
2. ● Select "ECU INPUT SIGNALS" in Data Monitor.
   ● Read out "W/O THRL/P-SW" depressing accelerator pedal fully.
   ● Check the signal of wide open throttle position switch is indicated properly.

NG → Check harness continuity between A/T control unit and wide open throttle position switch.

OR

2. ● Check voltage between A/T control unit terminal ㉑ and ground while depressing accelerator pedal slowly. (after warming up engine)

Voltage:

When releasing accelerator pedal:

1V or less

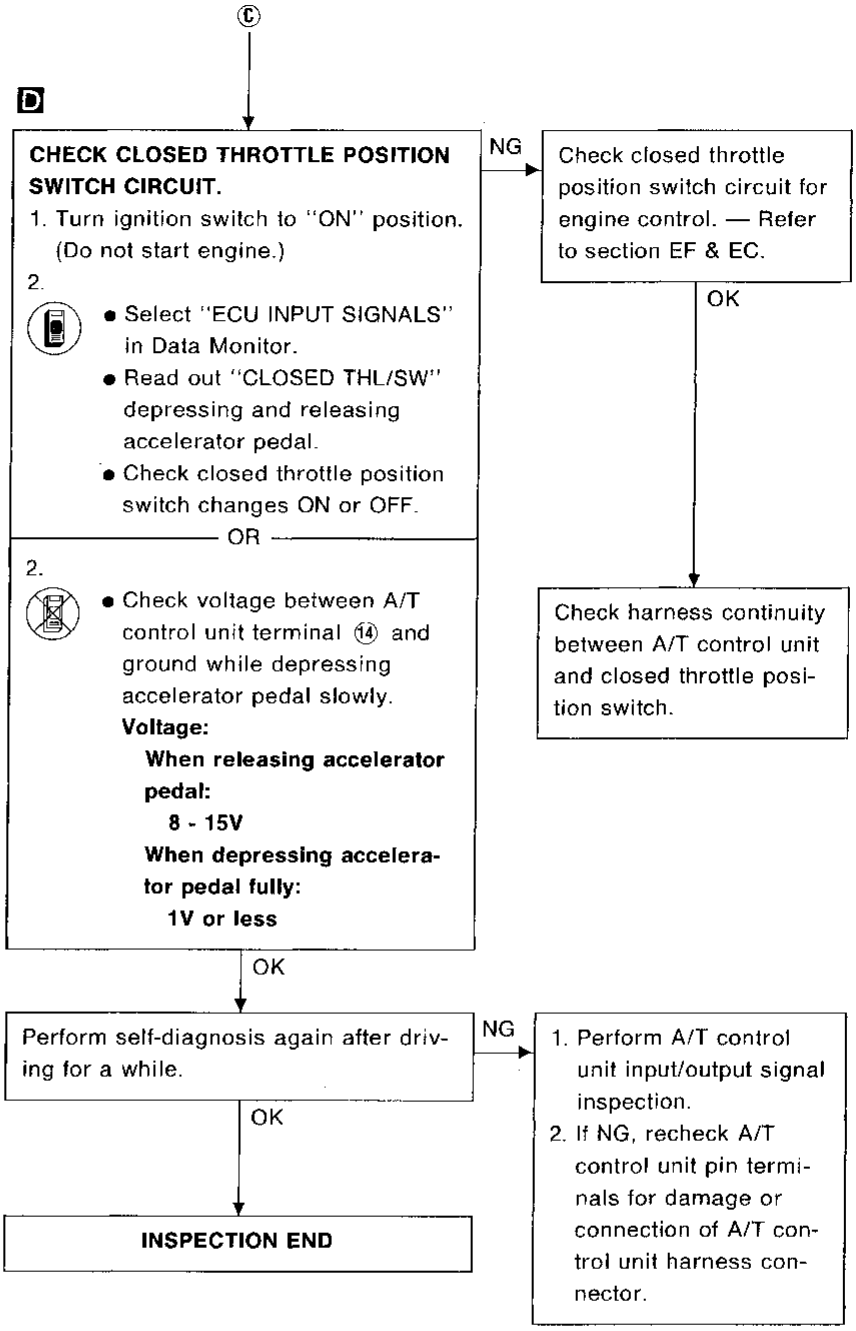
When depressing accelerator pedal fully:

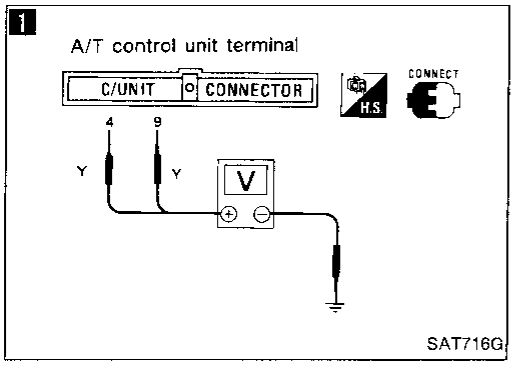
8 - 15V

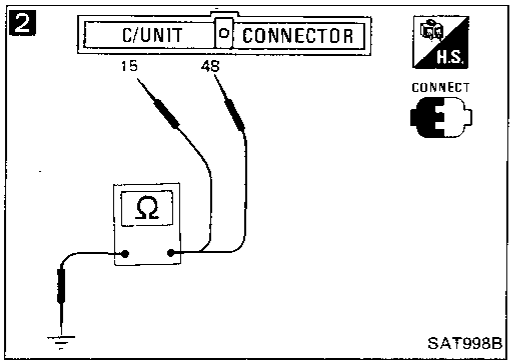
OK

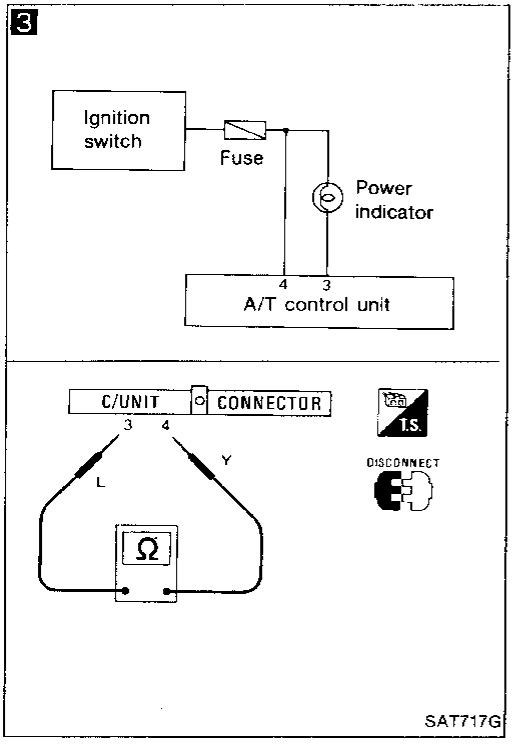
Ⓒ

Self-diagnosis (Cont'd)









Diagnostic Procedure 1

SYMPTOM:

Power indicator lamp does not come on for about 2 seconds when turning ignition switch to "ON".

1

CHECK A/T CONTROL UNIT POWER SOURCE.

1. Turn ignition switch to "ON" position. (Do not start engine.)
2. Check voltage between A/T control unit terminals ④, ⑨ and ground.

Battery voltage should exist.

NG → Check the following items.
- Harness continuity between ignition switch and A/T control unit (Main harness)
- Ignition switch and fuse — Refer to section EL.

OK ↓

2

CHECK A/T CONTROL UNIT GROUND CIRCUIT.

1. Turn ignition switch to "OFF" position.
2. Disconnect A/T control unit harness connector.
3. Check resistance between A/T control unit terminals ⑮, ㊽ and ground.

Resistance:

Approximately 0Ω

NG → Check harness continuity between A/T control unit and ground.

OK ↓

3

CHECK LAMP CIRCUIT.

1. Turn ignition switch to "OFF" position.
2. Check resistance between A/T control unit terminals ③ and ④.

Resistance: 50 - 100Ω

3. Reinstall any part removed.

NG → Check the following items.
- Power indicator lamp — Refer to section EL.
- Harness continuity between ignition switch and power indicator lamp (Main harness)
- Harness continuity between power indicator lamp and A/T control unit

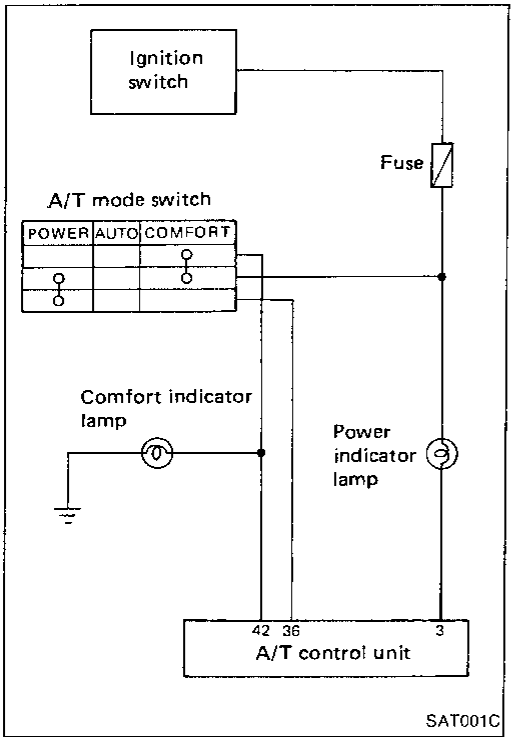
OK ↓

Check again.

NG → 1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

OK ↓

INSPECTION END



Diagnostic Procedure 2

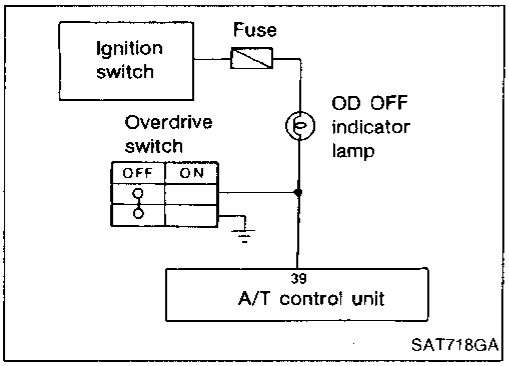
SYMPTOM:

Power indicator lamp or comfort indicator lamp does not come on when turning A/T mode switch to the appropriate position.

Is Diagnostic Procedure 1 OK?
- No → Go to Diagnostic Procedure 1, AT-77.
- Yes ↓

Check the following items.
- A/T mode switch
- Comfort indicator lamp
- Harness continuity between ignition switch and A/T mode switch
- Harness continuity between A/T mode switch and A/T control unit

NG → Repair or replace damaged parts.



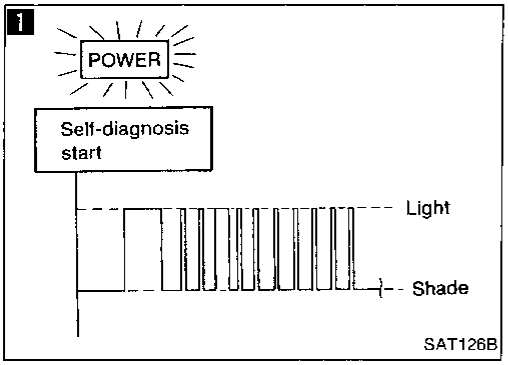
Diagnostic Procedure 3

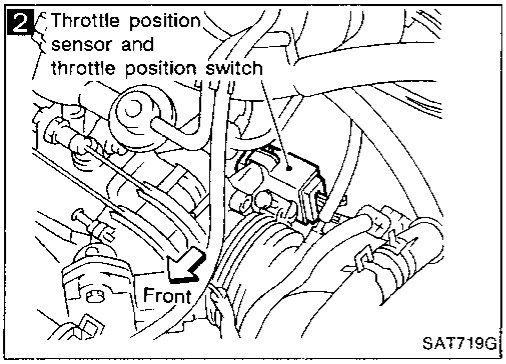
SYMPTOM:

OD OFF indicator lamp does not come on when setting overdrive switch to "OFF" position.

Check the following items.
- Overdrive switch
- OD OFF indicator lamp
- Harness continuity between ignition switch and OD OFF indicator lamp

NG → Repair or replace damaged parts.





Diagnostic Procedure 4

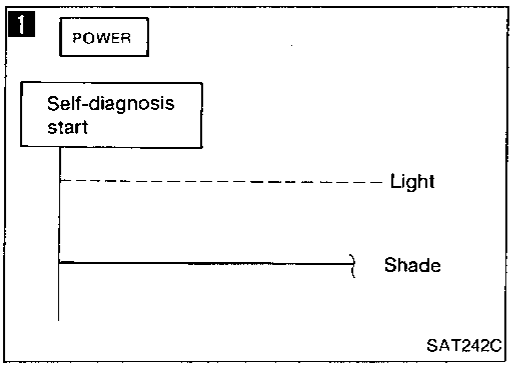
SYMPTOM:

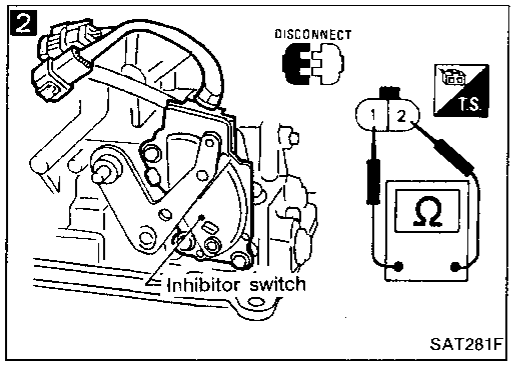
Power indicator lamp does not come on for about 3 seconds when depressing and releasing accelerator pedal fully.

1 Does self-diagnosis show damage to throttle position sensor circuit?
- No → Check throttle position sensor circuit. — Refer to "Self-diagnosis", AT-64.
- Yes ↓

2 Check throttle position sensor. — Refer to section EF & EC.
- NG → Repair or replace throttle position sensor.
- OK ↓

1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.





Diagnostic Procedure 5

SYMPTOM:

Engine cannot be started with selector lever in "P" or "N" position or engine can be started with selector lever in "D", "2", "1" or "R" position.

Does "ECU INPUT SIGNALS" in Data Monitor show damage to inhibitor switch circuit? — Yes → Check inhibitor switch circuit. — Refer to "Self-diagnosis", AT-73.

OR

1

Does self-diagnosis show damage to inhibitor switch circuit?

No

2

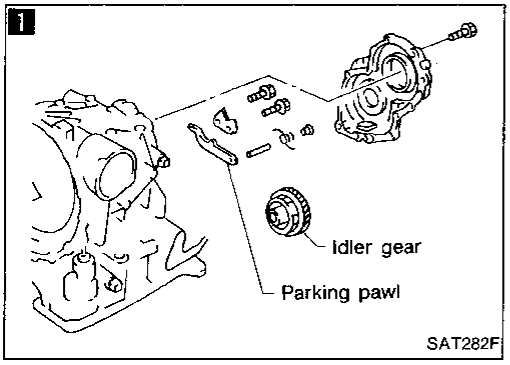
Check continuity of inhibitor switch 2-pin connector. — Refer to "Electrical Components Inspection". — NG → Repair or replace inhibitor switch.

OK

Check starting system. — Refer to section EL. — NG → Repair or replace damaged parts.

OK

INSPECTION END



Diagnostic Procedure 6

SYMPTOM:

Vehicle moves when it is pushed forward or backward with selector lever in "P" position.

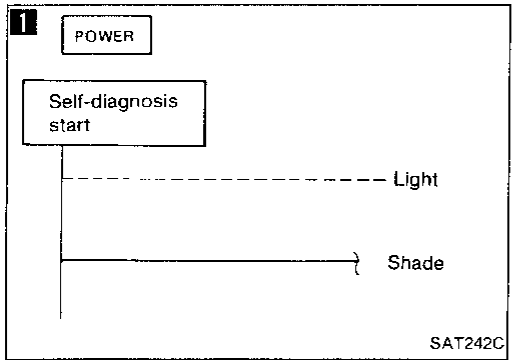
1

Check parking components. — Refer to "DISASSEMBLY" and "ASSEMBLY", AT-152. — NG → Repair or replace damaged parts.

OK

INSPECTION END

1



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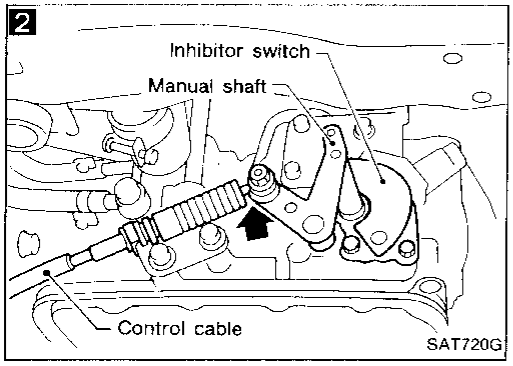

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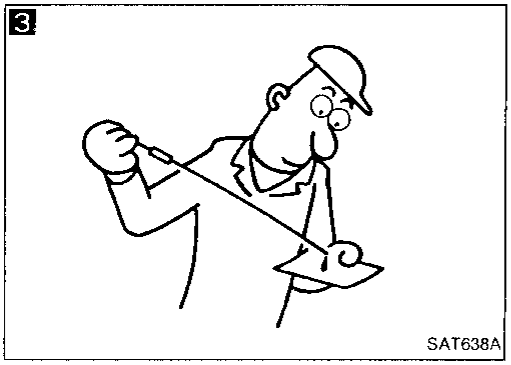

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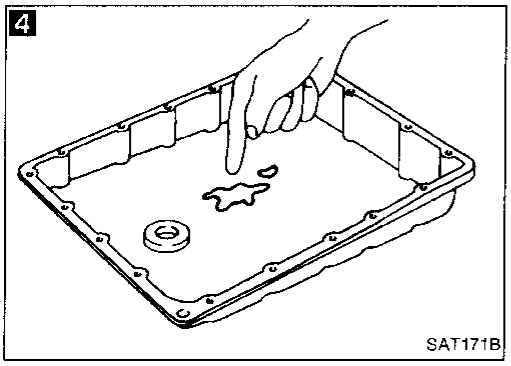


Diagnostic Procedure 7

SYMPTOM:

Vehicle moves forward or backward when selecting "N" position.

Does "ECU INPUT SIGNALS" in Data Monitor show damage to inhibitor switch circuit? — Yes → Check inhibitor switch circuit. — Refer to "Self-diagnosis", AT-73.

OR

1

Does self-diagnosis show damage to inhibitor switch circuit?

No ↓

Check control cable. — Refer to "ON-VEHICLE SERVICE", AT-120. — NG → 2 Adjust control cable. — Refer to "ON-VEHICLE SERVICE", AT-120.

OK ↓

3 Check A/T fluid level again. — NG → Refill ATF.

OK ↓

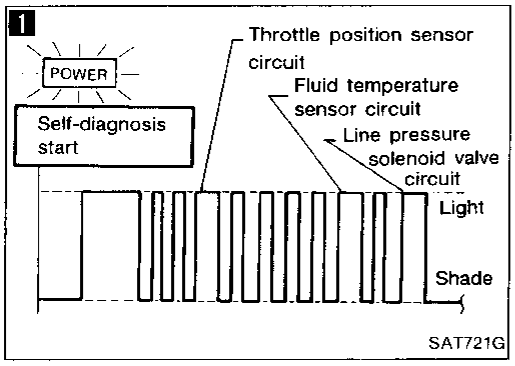
4 1. Remove oil pan. 2. Check A/T fluid condition. — NG →
1. Disassemble A/T.
2. Check the following items.
- Forward clutch assembly
- Overrun clutch assembly
- Reverse clutch assembly

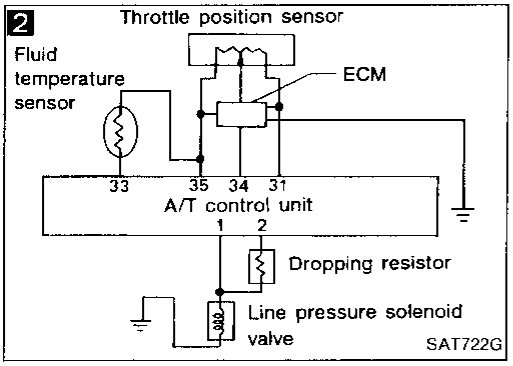
OK ↓

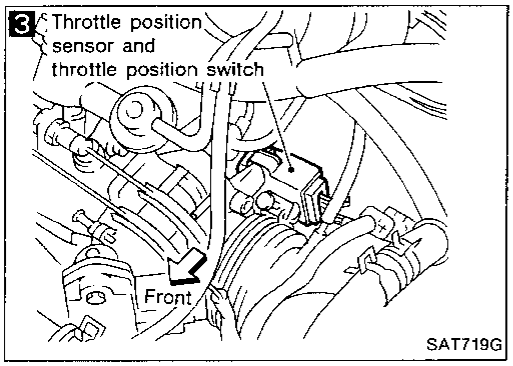
Check again. — NG →
1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

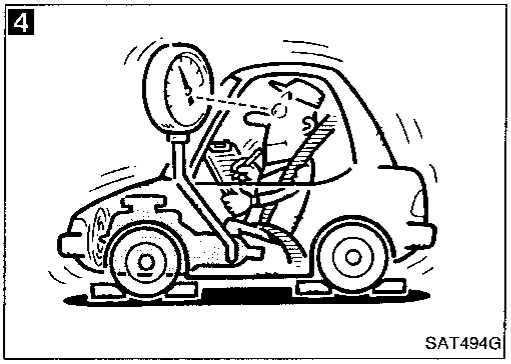
OK ↓

INSPECTION END









Diagnostic Procedure 8

SYMPTOM:

There is large shock when changing from "N" to "R" position.

1

Does self-diagnosis show damage to throttle position sensor, line pressure solenoid valve or fluid temperature sensor circuit?

Yes → **2** Check damaged circuit. — Refer to "Self-diagnosis", AT-73.

No ↓

3

Check throttle position sensor. — Refer to section EF & EC.

NG → Repair or replace throttle position sensor.

OK ↓

4

Check line pressure at idle with selector lever in "D" position. — Refer to "PRESSURE TESTING", AT-103.

NG →
1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve

OK ↓

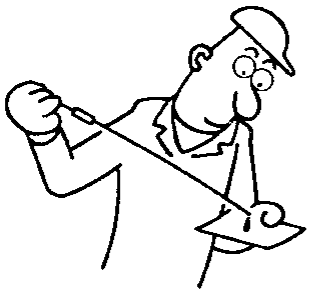
Check again.

NG →
1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

OK ↓

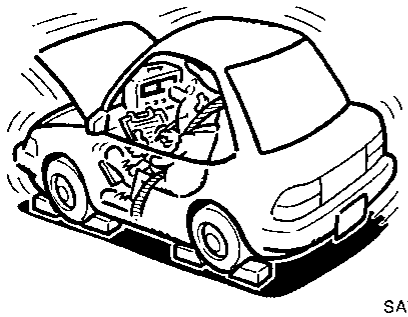
INSPECTION END

1



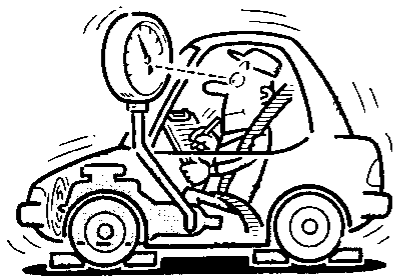
SAT638A

2



SAT493G

3



SAT494G

Diagnostic Procedure 9

SYMPTOM:

Vehicle does not creep backward when selecting "R" position.

1

Check A/T fluid level again.

NG → Refill ATF.

OK ↓

2

Check stall revolution with selector lever in "1" and "R" positions.

NG in both "1" and "R" positions →

1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
3. Disassemble A/T.
4. Check the following items.
- Oil pump assembly
- Torque converter
- Reverse clutch assembly
- High clutch assembly
- Low & reverse brake assembly
- Low one-way clutch

OK ↓

OK in "1" position
NG in "R" position →

1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
3. Disassemble A/T.
4. Check the following items.
- Oil pump assembly
- Torque converter
- Reverse clutch assembly
- High clutch assembly

3

Check line pressure at idle with selector lever in "R" position. — Refer to "PRESSURE TESTING", AT-103.

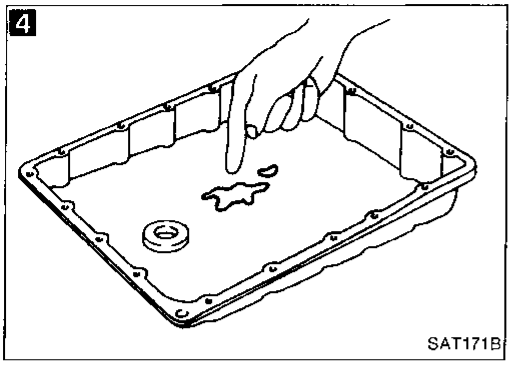
NG →

1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
3. Disassemble A/T.
4. Check the following items.
- Oil pump assembly

OK ↓

Ⓐ

Diagnostic Procedure 9 (Cont'd)



Ⓐ

4

1. Remove oil pan.
2. Check fluid condition.

NG →
1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve

3. Disassemble A/T.
4. Check the following items.
- Oil pump assembly
- Torque converter
- Reverse clutch assembly
- High clutch assembly
- Low & reverse brake assembly
- Low one-way clutch

OK ↓

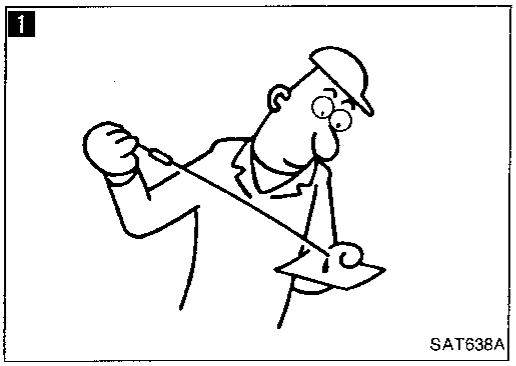
Check again.

NG →
1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

OK ↓

INSPECTION END

1



SAT638A

Diagnostic Procedure 10

SYMPTOM:

Vehicle does not creep forward when selecting "D", "2" or "1" position.

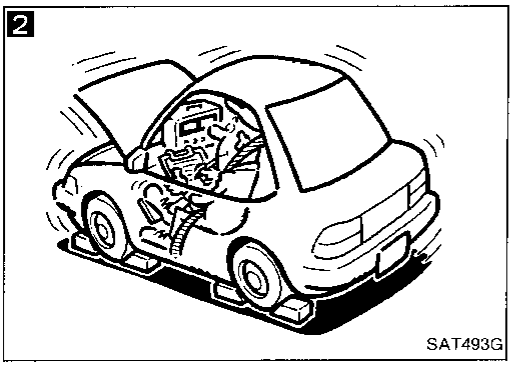
1

Check A/T fluid level again.

NG → Refill ATF.

OK

2



SAT493G

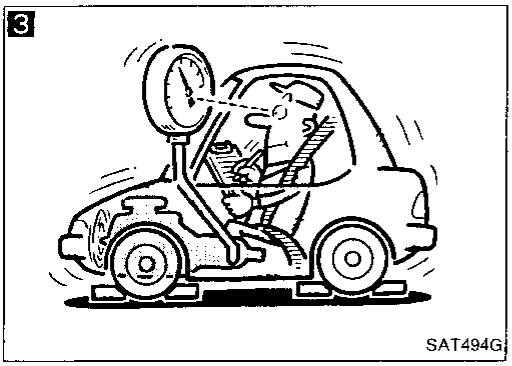
Check stall revolution with selector lever in "D" position. — Refer to "STALL TESTING", AT-100.

NG → 1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve

3. Disassemble A/T
4. Check the following items.
- Oil pump assembly
- Forward clutch assembly
- Forward one-way clutch
- Low one-way clutch
- Low & reverse brake assembly
- Torque converter

OK

3



SAT494G

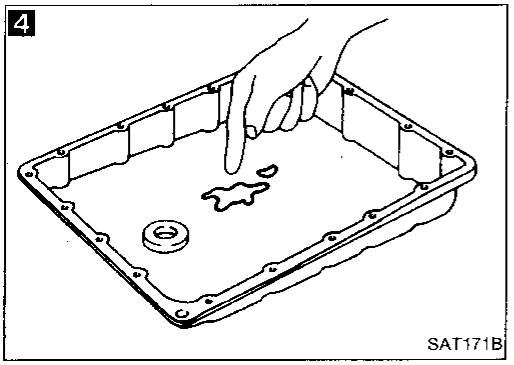
Check line pressure at idle with selector lever in "D" position. — Refer to "PRESSURE TESTING", AT-103.

OK

NG → 1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve

3. Disassemble A/T
4. Check the following items.
- Oil pump assembly

4



SAT171B

1. Remove oil pan.
2. Check A/T fluid condition.

NG → Ⓐ

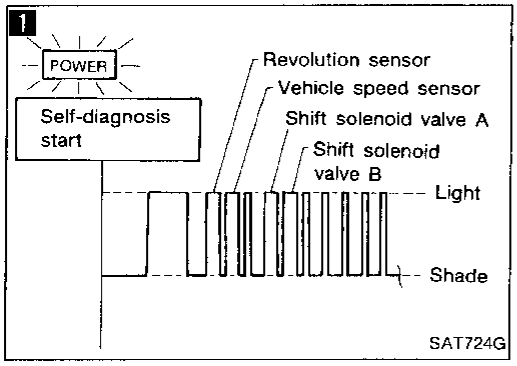
OK

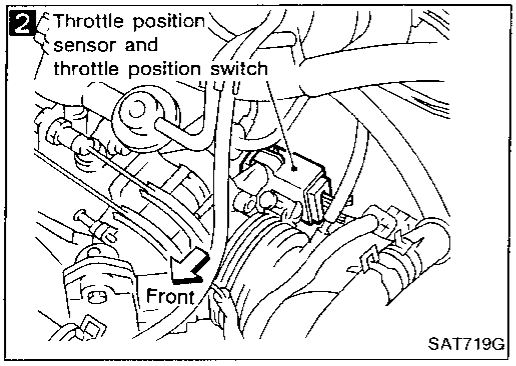
Check again.

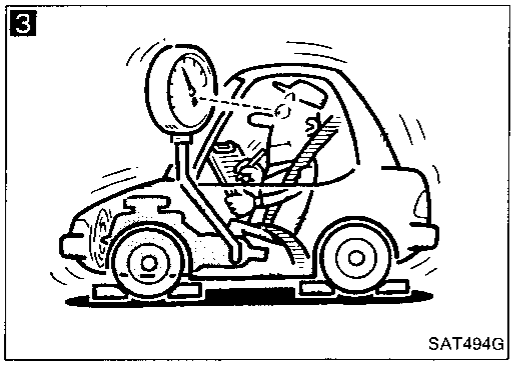
NG → 1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

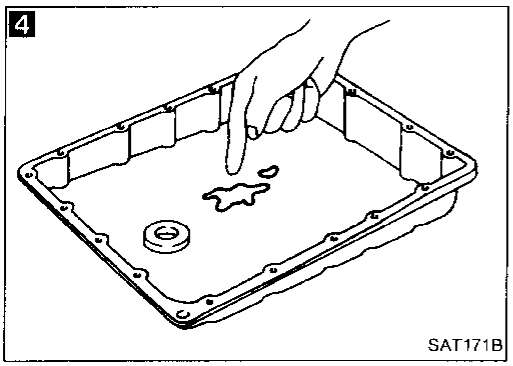
OK

INSPECTION END









Diagnostic Procedure 11

SYMPTOM:

Vehicle cannot be started from D_1 on Cruise test — Part 1.

Is Diagnostic Procedure 9 OK?
- No → Go to Diagnostic Procedure 9, AT-82.
- Yes ↓

1 Does self-diagnosis show damage to revolution sensor, vehicle speed sensor, shift solenoid valve A or B after cruise test?
- Yes → Check damaged circuit. — Refer to "Self-diagnosis", AT-60.
- No ↓

2 Check throttle position sensor. — Refer to section EF & EC.
- NG → Repair or replace throttle position sensor.
- OK ↓

3 Check line pressure at stall point with selector lever in "D" position. — Refer to "PRESSURE TESTING", AT-103.
- NG →
  1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
  2. Check the following items.
  - Shift valve A
  - Shift valve B
  - Shift solenoid valve A
  - Shift solenoid valve B
  - Pilot valve
  - Pilot filter
  3. Disassemble A/T.
  4. Check the following items.
  - Forward clutch assembly
  - Forward one-way clutch
  - Low one-way clutch
  - High clutch assembly
  - Torque converter
  - Oil pump assembly
- OK ↓

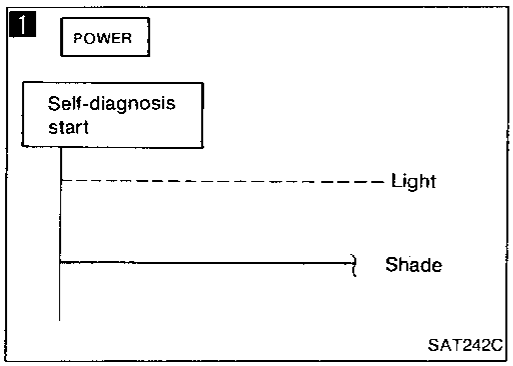
4
1. Remove oil pan.
2. Check A/T fluid condition.
- NG → (same items as above)
- OK ↓

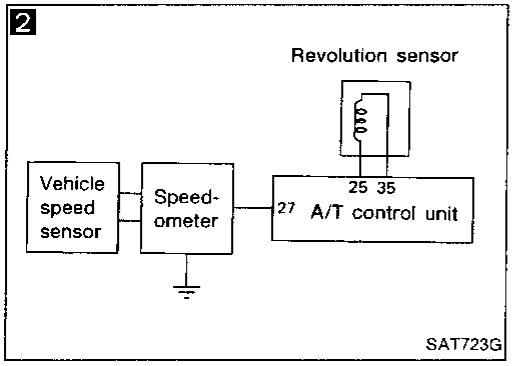
1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

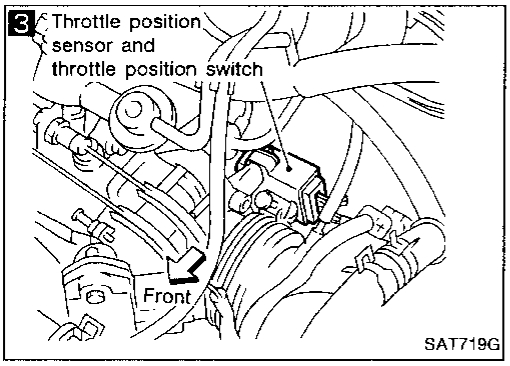
OK ↓

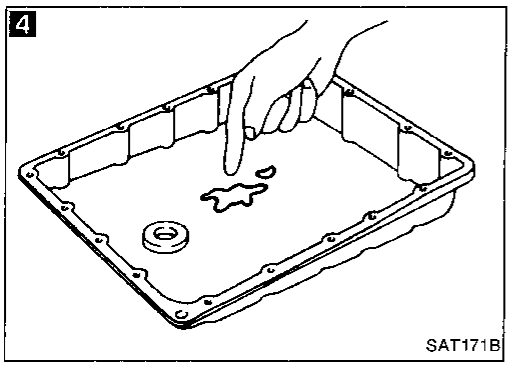
Check again.
- NG →
  1. Perform A/T control unit input/output signal inspection.
  2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.
- OK ↓

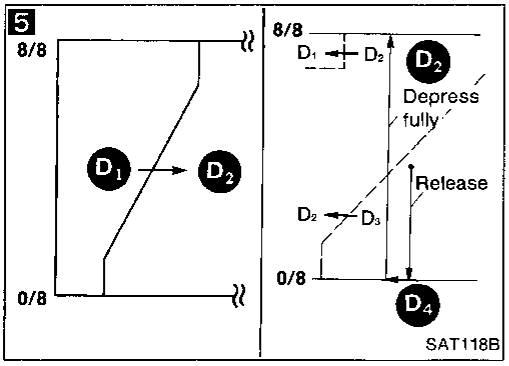
INSPECTION END











Diagnostic Procedure 12

SYMPTOM:

A/T does not shift from D_1 to D_2 at the specified speed.
A/T does not shift from D_4 to D_2 when depressing accelerator pedal fully at the specified speed.

Are Diagnostic Procedures 10 and 11 OK?
- No → Go to Diagnostic Procedure 10 or 11, AT-84, 85.
- Yes ↓

Does "ECU INPUT SIGNALS" in Data Monitor show damage to inhibitor switch circuit?
- Yes → Check inhibitor switch circuit. — Refer to "Self-diagnosis", AT-73.

OR

1 Does self-diagnosis show damage to inhibitor switch circuit?
- No ↓

2 Check revolution sensor and vehicle speed sensor circuit. — Refer to "Self-diagnosis", AT-62, 63.
- NG → Repair or replace revolution sensor and vehicle speed sensor circuits.
- OK ↓

3 Check throttle position sensor. — Refer to section EF & EC.
- NG → Repair or replace throttle position sensor.
- OK ↓

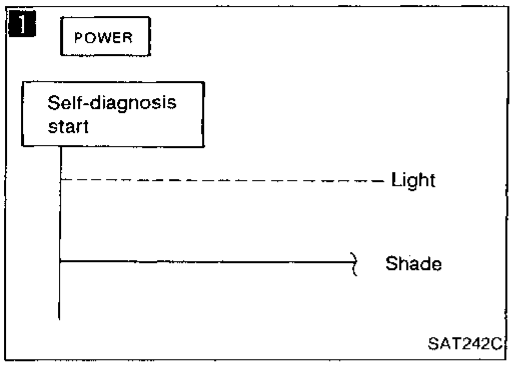
4
1. Remove oil pan.
2. Check A/T fluid condition.
- NG → 1. Remove control valve. — Refer to "ON-VEHICLE SERVICE", AT-118.
  2. Check the following items.
  - Shift valve A
  - Shift solenoid valve A
  - Pilot valve
  - Pilot filter
  3. Disassemble A/T.
  4. Check the following items.
  - Servo piston assembly
  - Brake band
  - Oil pump assembly
- OK ↓

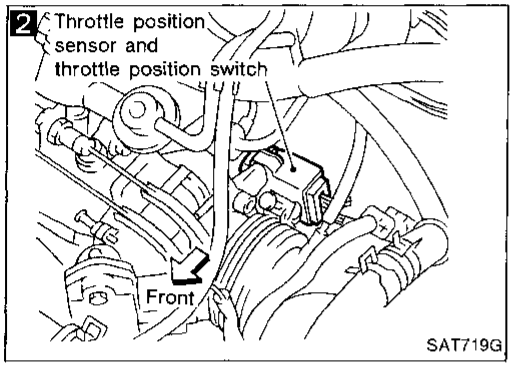
1. Remove control valve. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Shift valve A
- Shift solenoid valve A
- Pilot valve
- Pilot filter

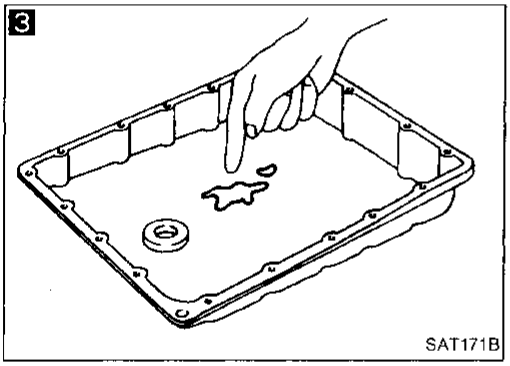
OK ↓

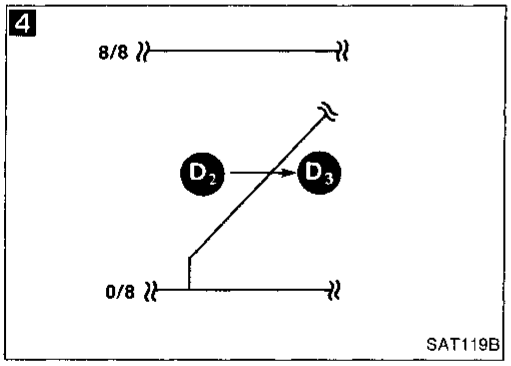
5 Check again.
- NG → 1. Perform A/T control unit input/output signal inspection.
  2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.
- OK ↓

INSPECTION END









Diagnostic Procedure 13

SYMPTOM:

A/T does not shift from D_2 to D_3 at the specified speed.

Are Diagnostic Procedures 10 and 11 OK? — No → Go to Diagnostic Procedure 10 or 11, AT-84, 85.

Yes ↓

Does "ECU INPUT SIGNALS" in Data Monitor show damage to inhibitor switch circuit? — Yes → Check inhibitor switch circuit. — Refer to "Self-diagnosis", AT-73.

OR

1 Does self-diagnosis show damage to inhibitor switch circuit?

No ↓

2 Check throttle position sensor. — Refer to section EF & EC. — NG → Repair or replace throttle position sensor.

OK ↓

3 1. Remove oil pan.
2. Check A/T fluid condition. — NG →
1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Shift valve B
- Shift solenoid valve B
- Pilot valve
- Pilot filter
3. Disassemble A/T.
4. Check the following items.
- Servo piston assembly
- High clutch assembly
- Oil pump assembly

OK ↓

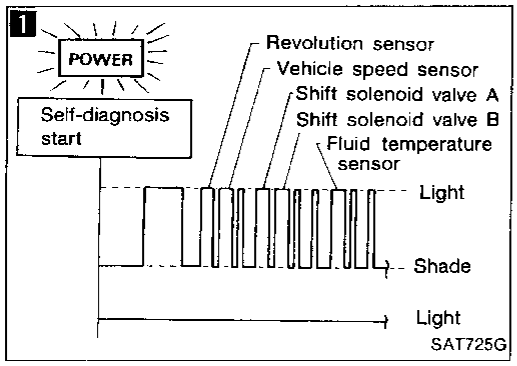
1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Shift valve B
- Shift solenoid valve B
- Pilot valve
- Pilot filter

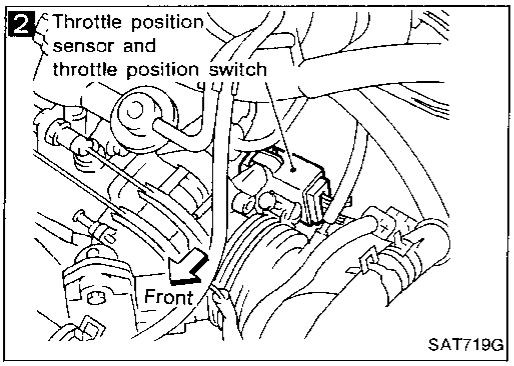
OK ↓ (OK ← from NG)

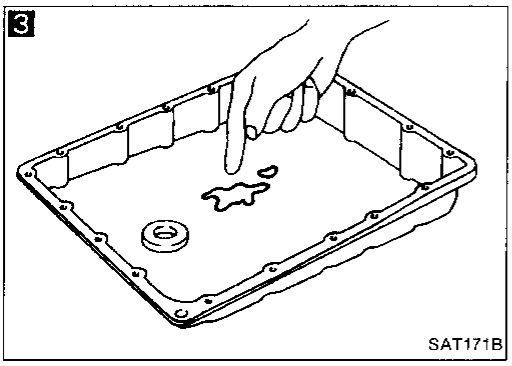
4 Check again. — NG →
1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

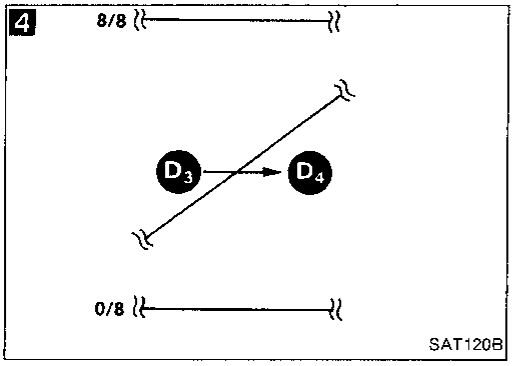
OK ↓

INSPECTION END









Diagnostic Procedure 14

SYMPTOM:

A/T does not shift from D_3 to D_4 at the specified speed.

Are Diagnostic Procedure 10 and 11 OK?
- No → Go to Diagnostic Procedure 10 or 11, AT-84, 85.
- Yes ↓

1

Does self-diagnosis show damage to inhibitor switch, overdrive switch, shift solenoid valve A, B, revolution sensor, vehicle speed sensor or fluid temperature sensor circuit after road test?
- Yes → Check damaged circuit. — Refer to "Self-diagnosis", AT-60.
- No ↓

2

Check throttle position sensor. — Refer to section EF & EC.
- NG → Repair or replace throttle position sensor.
- OK ↓

3

1. Remove oil pan.
2. Check A/T fluid condition.

- NG → 1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
  2. Check the following items.
  - Shift valve B
  - Overrun clutch control valve
  - Shift solenoid valve B
  - Pilot valve
  - Pilot filter
  3. Disassemble A/T.
  4. Check the following items.
  - Servo piston assembly
  - Brake band
  - Torque converter
  - Oil pump assembly
- OK ↓

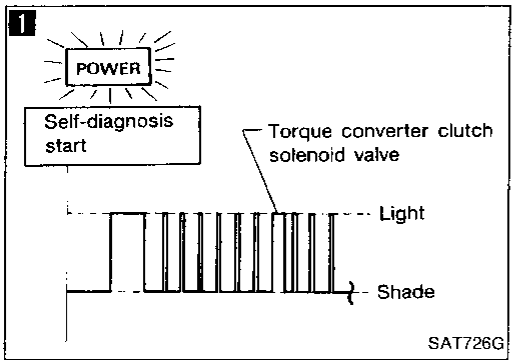
1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Shift valve B
- Overrun clutch control valve
- Shift solenoid valve B
- Pilot valve
- Pilot filter

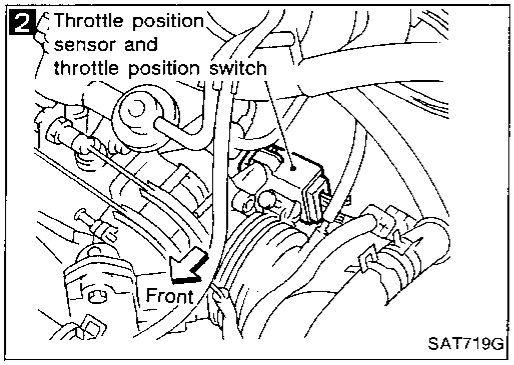
OK ↓

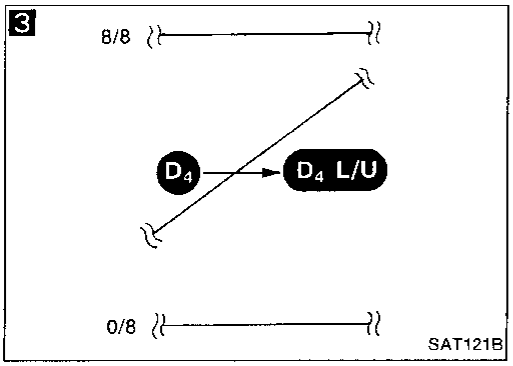
4

Check again.
- NG → 1. Perform A/T control unit input/output signal inspection.
  2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.
- OK ↓

INSPECTION END







Diagnostic Procedure 15

SYMPTOM:
A/T does not perform lock-up at the specified speed.

1

Does self-diagnosis show damage to torque converter clutch solenoid valve circuit after cruise test?

Yes → Check torque converter clutch solenoid valve circuit. — Refer to "Self-diagnosis", AT-68.

No ↓

2

Check throttle position sensor. — Refer to section EF & EC.

NG → Repair or replace throttle position sensor.

OK ↓

1. Remove control valve. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check following items.
- Lock-up control valve
- Torque converter relief valve
- Torque converter clutch solenoid valve
- Pilot valve
- Pilot filter

NG → Repair or replace damaged parts.

OK ↓

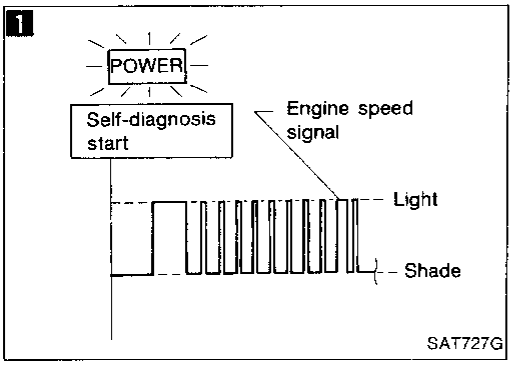
3

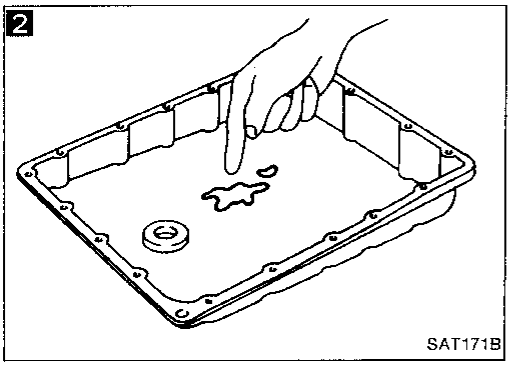
Check again.

NG → 1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

OK ↓

INSPECTION END





Diagnostic Procedure 16

SYMPTOM:

A/T does not hold lock-up condition for more than 30 seconds.

1

Does self-diagnosis show damage to engine speed signal circuit after cruise test?

Yes → Check engine speed signal circuit. — Refer to "Self-diagnosis", AT-71.

No

2

1. Remove oil pan.
2. Check A/T fluid condition.

NG →
1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Lock-up control valve
- Pilot valve
- Pilot filter
3. Disassemble A/T.
4. Check torque converter and oil pump assembly.

OK

1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Lock-up control valve
- Pilot valve
- Pilot filter

OK

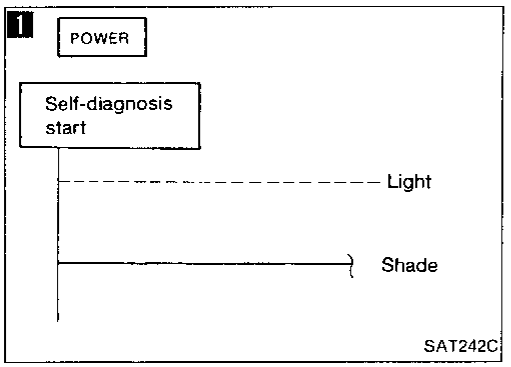
OK

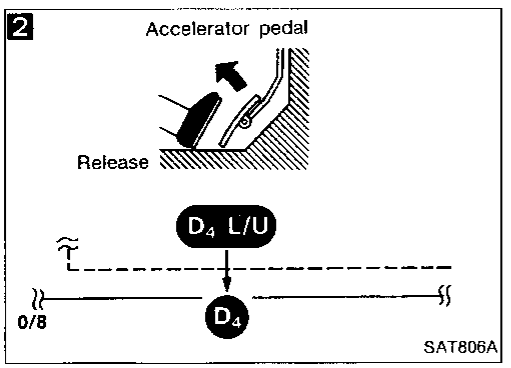
Check again.

NG →
1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

OK

INSPECTION END





Diagnostic Procedure 17

SYMPTOM:

Lock-up is not released when accelerator pedal is released.

Does "ECU INPUT SIGNALS" in Data Monitor show damage to closed throttle position switch circuit?

Yes → Check closed throttle position switch circuit. — Refer to "Self-diagnosis", AT-73.

OR

1

Does self-diagnosis show damage to closed throttle position switch circuit?

No

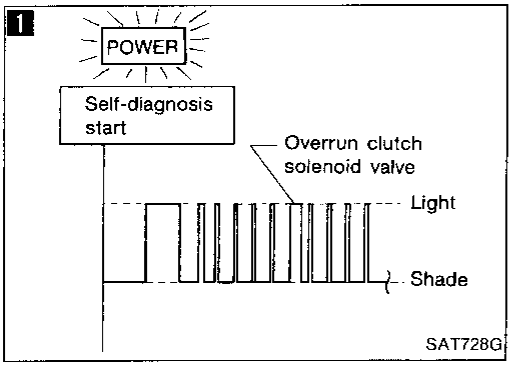
2

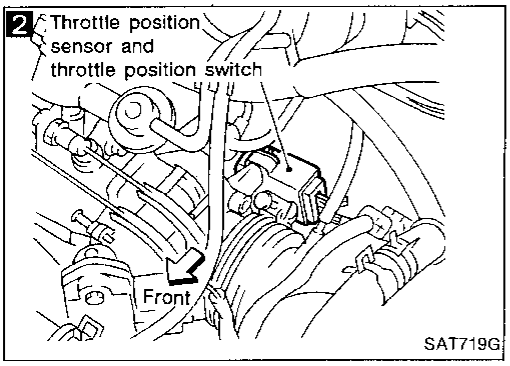
Check again.

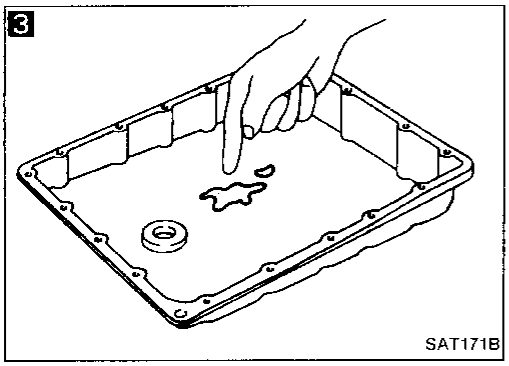
NG →
1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

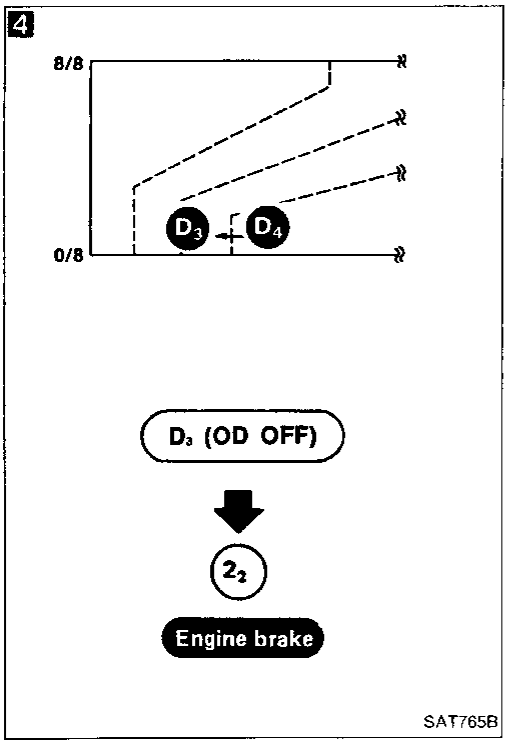
OK

INSPECTION END









Diagnostic Procedure 18

SYMPTOM:

Engine speed does not return to idle smoothly when A/T is shifted from D_4 to D_3 with accelerator pedal released.

Vehicle does not decelerate by engine brake when changing overdrive switch to "OFF" position with accelerator pedal released.

Vehicle does not decelerate by engine brake when changing selector lever from "D" to "2" position with accelerator pedal released.

1

Does self-diagnosis show damage to overrun clutch solenoid valve circuit after cruise test?

Yes → Check overrun clutch solenoid valve circuit. — Refer to "Self-diagnosis", AT-67.

No

2

Check throttle position sensor. — Refer to section EF & EC.

NG → Repair or replace throttle position sensor.

OK

3

1. Remove oil pan.
2. Check A/T fluid condition.

NG → 1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve
3. Disassemble A/T.
4. Check the following items.
- Overrun clutch assembly
- Oil pump assembly

OK

1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE", AT-118.
2. Check the following items.
- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve

OK

OK

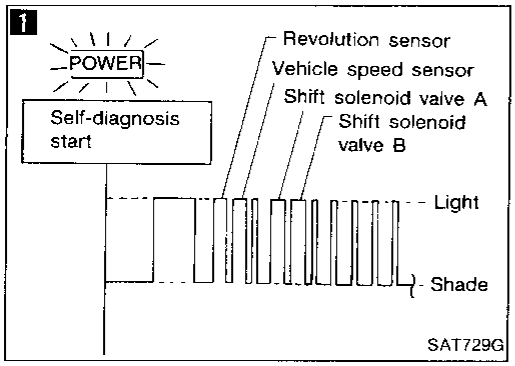
4

Check again.

NG → 1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

OK

INSPECTION END



Diagnostic Procedure 19

SYMPTOM:

Vehicle does not start from D_1 on Cruise test — Part 2.

1

Does self-diagnosis show damage to revolution sensor, vehicle speed sensor, shift solenoid valve A or B after cruise test?

Yes → Check damaged circuit. — Refer to "Self-diagnosis", AT-60.

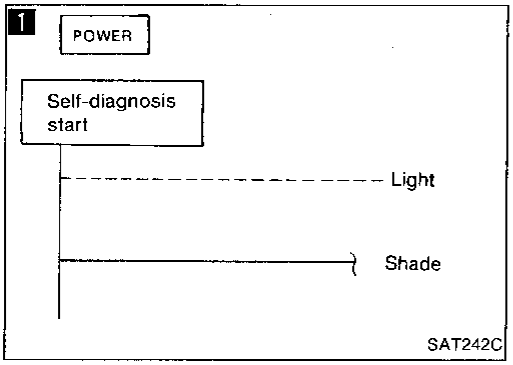
No ↓

Check again.

NG → 1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

OK ↓

Go to Diagnostic Procedure 11, AT-85.



Diagnostic Procedure 20

SYMPTOM:

A/T does not shift from D_4 to D_3 when changing overdrive switch to "OFF" position.

Does "ECU INPUT SIGNALS" in Data Monitor show damage to overdrive switch circuit?

Yes → Check overdrive switch circuit. — Refer to "Self-diagnosis", AT-73.

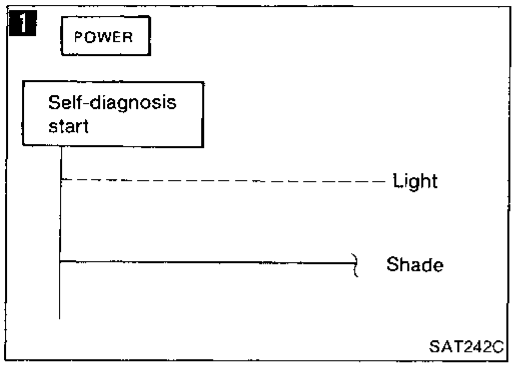
OR

1

Does self-diagnosis show damage to overdrive switch circuit?

No ↓

Go to Diagnostic Procedure 13, AT-87.



Diagnostic Procedure 21

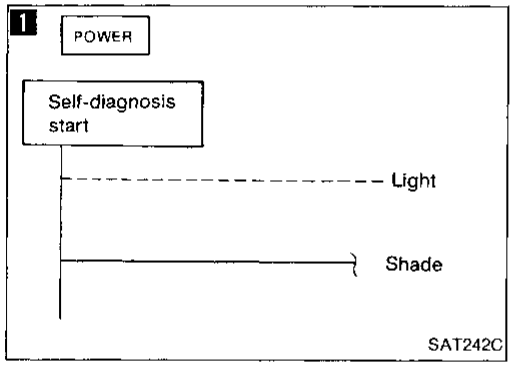
SYMPTOM:
A/T does not shift from D_3 to 2_2 when changing selector lever from "D" to "2" position.

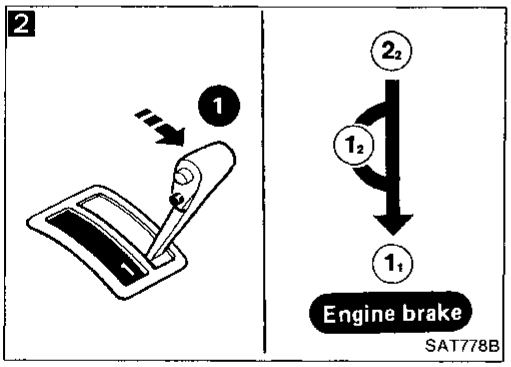
Does "ECU INPUT SIGNALS" in Data Monitor show damage to inhibitor switch circuit? — Yes → Check inhibitor switch circuit. — Refer to "Self-diagnosis", AT-73.

OR

1 Does self-diagnosis show damage to inhibitor switch circuit?

No → Go to Diagnostic Procedure 12, AT-86.





Diagnostic Procedure 22

SYMPTOM:
A/T does not shift from 2_2 to 1_1 when changing selector lever from "2" to "1" position.

Does "ECU INPUT SIGNALS" in Data Monitor show damage to inhibitor switch circuit? — Yes → Check inhibitor switch circuit. — Refer to "Self-diagnosis", AT-73.

OR

1 Does self-diagnosis show damage to inhibitor switch circuit?

No → 2 Check again.

NG → 1. Perform A/T control unit input/output signal inspection.
2. If NG, recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

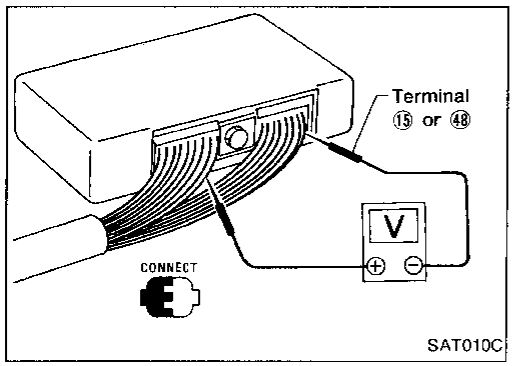
OK → **INSPECTION END**

Diagnostic Procedure 23

SYMPTOM:
Vehicle does not decelerate by engine brake when shifting from 2_2 (1_2) to 1_1.

Is Diagnostic Procedure 9 OK? — No → Go to Diagnostic Procedure 9, AT-82.

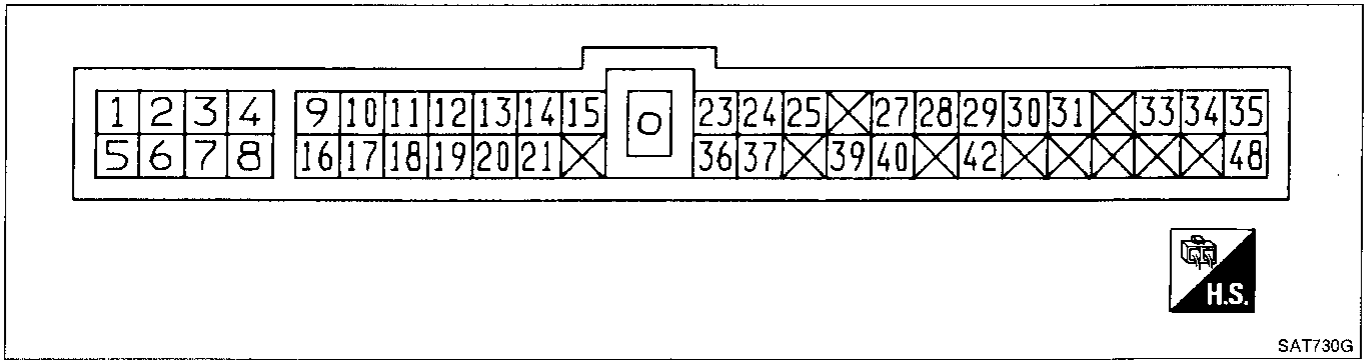
Yes → Go to Diagnostic Procedure 18, AT-91.



Electrical Components Inspection

INSPECTION OF A/T CONTROL UNIT

- Measure voltage between each terminal and terminal ⑮ or ㊽ by following "A/T CONTROL UNIT INSPECTION TABLE".
- Pin connector terminal layout.



A/T CONTROL UNIT INSPECTION TABLE

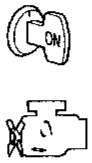
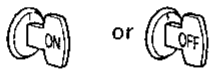
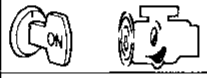
(Data are reference values.)

Terminal No.	Item	Condition		Judgement standard
1	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 2.5V
			When depressing accelerator pedal fully after warming up engine.	0.5V or less
2	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	5 - 14V
			When depressing accelerator pedal fully after warming up engine.	0.5V or less
3	Power indicator lamp		When setting A/T mode switch in "POWER" position.	1V or less
			When setting A/T mode switch except in "POWER" position.	Battery voltage
4	Power source		When turning ignition switch to "ON".	Battery voltage
			When turning ignition switch to "OFF".	1V or less

Electrical Components Inspection (Cont'd)

Terminal No.	Item	Condition		Judgement standard
5	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
			When A/T does not perform lock-up.	1V or less
6	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in "D_1" or "D_4".)	Battery voltage
			When shift solenoid valve A does not operate. (When driving in "D_2" or "D_3".)	1V or less
7	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in "D_1" or "D_2".)	Battery voltage
			When shift solenoid valve B does not operate. (When driving in "D_3" or "D_4".)	1V or less
8	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage
			When overrun clutch solenoid valve does not operate.	1V or less
9	Power source		Same as No. 4	
10	—		—	—
11	—		—	—
12	—		—	—
13	—		—	—
14	Closed throttle position switch (in throttle position switch)		When releasing accelerator pedal after warming up engine.	8 - 15V
			When depressing accelerator pedal after warming up engine.	1V or less
15	Ground		—	—
16	Inhibitor "1" position switch		When setting selector lever to "1" position.	Battery voltage
			When setting selector lever to other positions.	1V or less
17	Inhibitor "2" position switch		When setting selector lever to "2" position.	Battery voltage
			When setting selector lever to other positions.	1V or less
18	Inhibitor "D" position switch		When setting selector lever to "D" position.	Battery voltage
			When setting selector lever to other positions.	1V or less

Electrical Components Inspection (Cont'd)

Terminal No.	Item	Condition		Judgement standard
19	Inhibitor "N" or "P" position switch		When setting selector lever to "N" position.	Battery voltage
			When setting selector lever to other positions.	1V or less
20	Inhibitor "R" position switch		When setting selector lever to "R" position.	Battery voltage
			When setting selector lever to other positions.	1V or less
21	Wide open throttle position switch (in throttle position switch)		When depressing accelerator pedal more than half-way after warming up engine.	8 - 15V
			When releasing accelerator pedal after warming up engine.	1V or less
22	—		—	—
23	Power source (Back-up)		When turning ignition switch to "OFF".	Battery voltage
			When turning ignition switch to "ON".	Battery voltage
24	Engine speed signal		When engine runs at idle speed.	0.6V
			When engine runs at 4,000 rpm.	Approximately 2.2V
25	Revolution sensor (Measure in AC position)		When vehicle cruises at 30 km/h (19 MPH).	1V or more Voltage rises gradually in response to vehicle speed.
			When vehicle parks.	0V
26	—		—	—
27	Vehicle speed sensor		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Vary from 0 to 5V
28*	—		—	—
29*	—		—	—
30*	—		—	—
31	Throttle position sensor (Power source)		—	4.5 - 5.5V
32	—		—	—

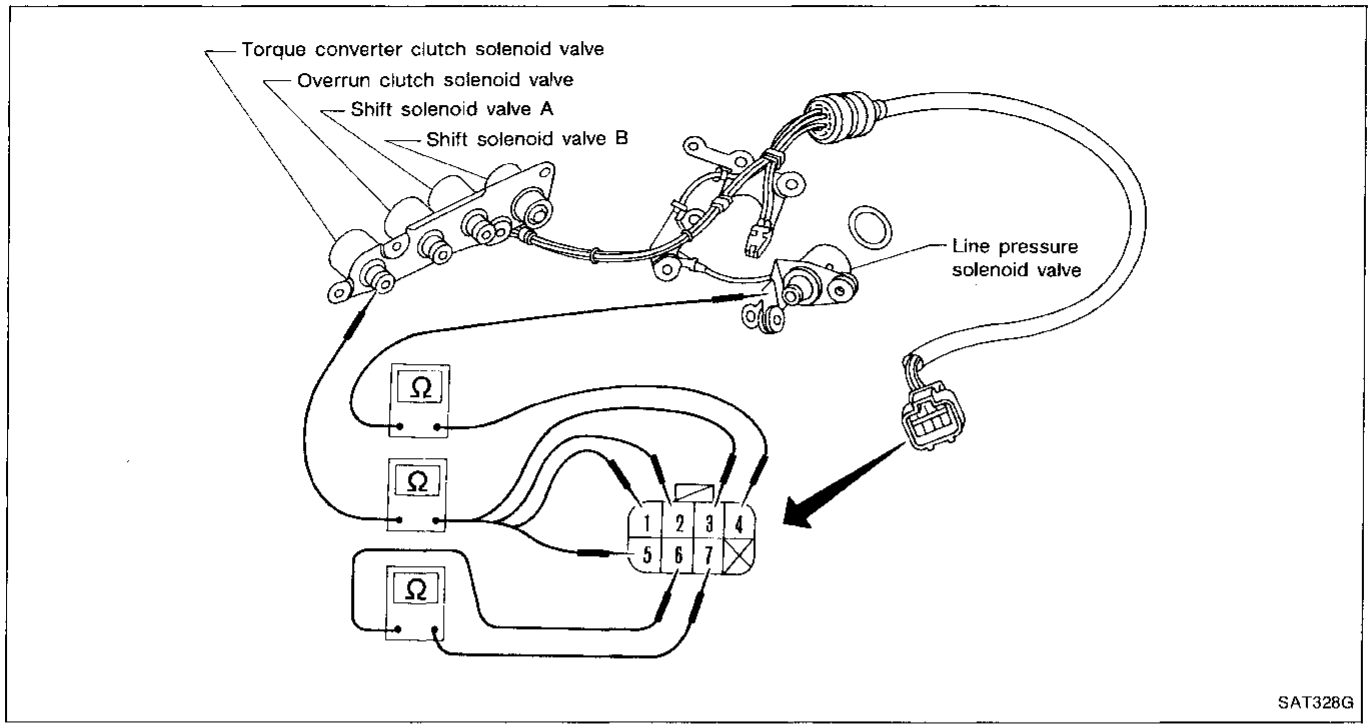
*: These terminals are connected to the data link connector for CONSULT.

Electrical Components Inspection (Cont'd)

Terminal No.	Item	Condition		Judgement standard
33	Fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.56V
			When ATF temperature is 80°C (176°F).	0.45V
34	Throttle position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.2 - 0.6V Fully-open throttle: 2.9 - 3.9V
35	Throttle position sensor (Ground)		—	—
36	A/T mode switch "POWER"		When setting A/T mode switch in "POWER" position.	Battery voltage
			When setting A/T mode switch except in "POWER" position.	1V or less
37	ASCD cruise signal		When ASCD cruise is being performed. ("CRUISE" light comes on.)	Battery voltage
			When ASCD cruise is not being performed. ("CRUISE" light does not comes on.)	1V or less
38	—		—	—
39	Overdrive OFF indicator lamp		When setting overdrive switch in "ON" position	Battery voltage
			When setting overdrive switch in "OFF" position	1V or less
40	ASCD OD cut signal		When "ACCEL" set switch on ASCD cruise is released.	5 - 8V
			When "ACCEL" set switch on ASCD cruise is applied.	1V or less
41	—		—	—
42	A/T mode switch "COMFORT"		When setting A/T mode switch in "COMFORT" position.	Battery voltage
			When setting A/T mode switch except in "COMFORT" position.	1V or less
43	—		—	—
44	—		—	—
45	—		—	—
46	—		—	—
47	—		—	—
48	Ground		—	—

Electrical Components Inspection (Cont'd)

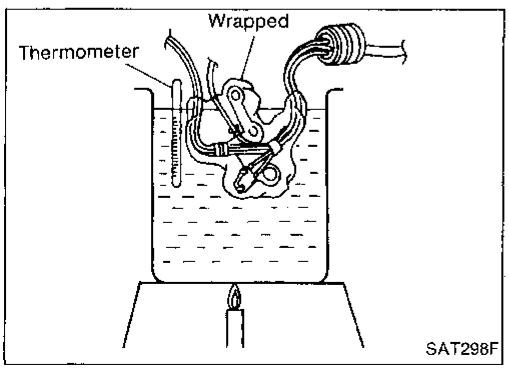
SOLENOID VALVES AND FLUID TEMPERATURE SENSOR



- For removal and installation, refer to "ON-VEHICLE SERVICE", AT-118.
- Check resistance between two terminals.

Solenoid valves

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve A	②	Ground (Bracket)	25Ω
Shift solenoid valve B	①		
Overrun clutch solenoid valve	③		
Line pressure solenoid valve	④		3.2Ω
Torque converter clutch solenoid valve	⑤		13.4Ω

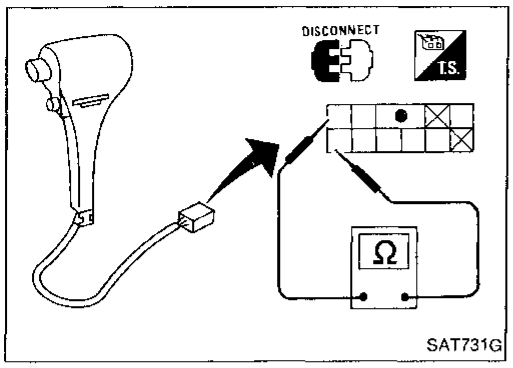


Fluid temperature sensor

Check resistance between terminals ⑥ and ⑦ while changing temperature as shown at left.

Temperature °C (°F)	Resistance (Approx.)
20 (68)	2.5 kΩ
80 (176)	0.3 kΩ

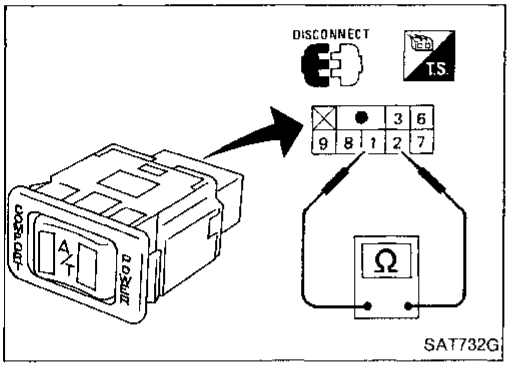
Electrical Components Inspection (Cont'd)



OVERDRIVE SWITCH

- Check continuity between two terminals.

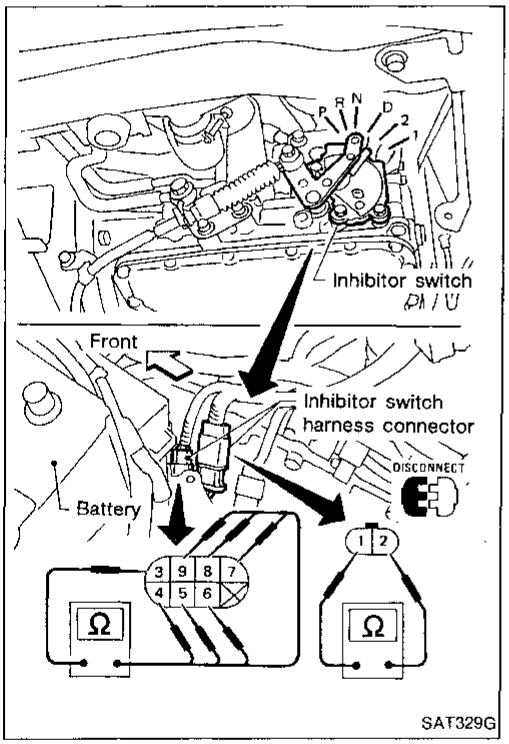
OD switch position	Continuity
ON	No
OFF	Yes



A/T MODE SWITCH

- Check continuity between A/T mode switch terminals.

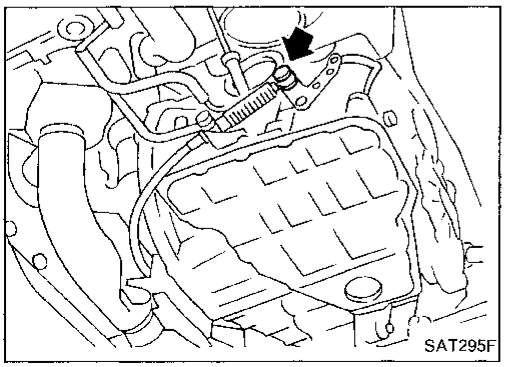
A/T mode switch position	Continuity
POWER	② - ③
AUTO	No
COMFORT	① - ②



INHIBITOR SWITCH

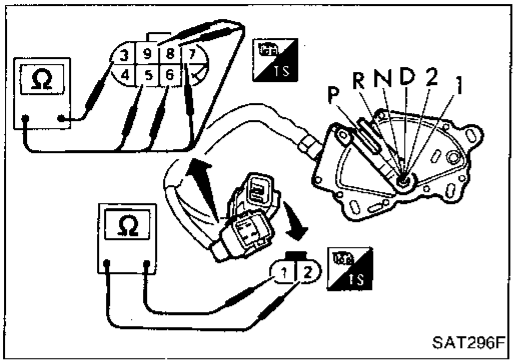
1. Check continuity between terminals ① and ② and between terminals ③ and ④, ⑤, ⑥, ⑦, ⑧, ⑨ while moving selector lever through each range.

Lever position	Terminal No.								
	①	②	③	④	⑤	⑥	⑦	⑧	⑨
P	○	○	○	○					
R			○		○				
N	○	○	○			○			
D			○				○		
2			○					○	
1			○						○

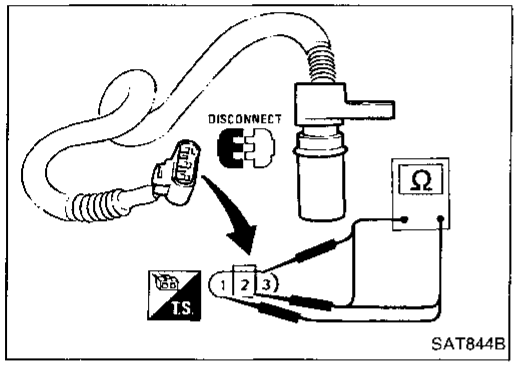


2. If NG, check again with control cable disconnected from manual shaft of A/T assembly. — Refer to step 1.
3. If OK on step 2, adjust control cable. — Refer to "ON-VEHICLE SERVICE", AT-120.

Electrical Components Inspection (Cont'd)



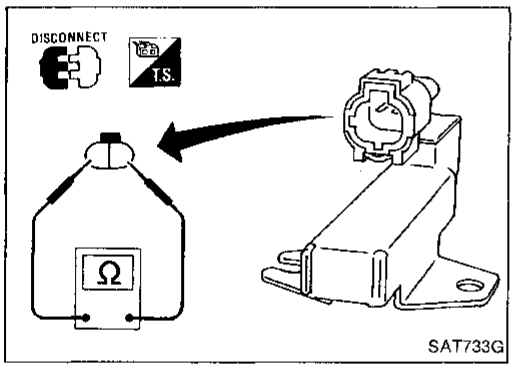
4. If NG on step 2, remove inhibitor switch from A/T and check continuity of inhibitor switch terminals. — Refer to step 1.
5. If OK on step 4, adjust inhibitor switch. — Refer to "ON-VEHICLE SERVICE", AT-120.
6. If NG on step 4, replace inhibitor switch.



REVOLUTION SENSOR

- For removal and installation, refer to "ON-VEHICLE SERVICE", AT-122.
- Check resistance between terminals ①, ② and ③.

Terminal No.		Resistance
①	②	500 - 650Ω
②	③	No continuity
①	③	No continuity



DROPPING RESISTOR

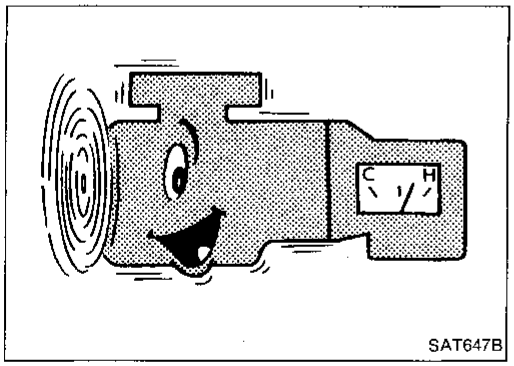
- Check resistance between two terminals.
  Resistance: 11.2 - 12.8Ω

Final Check

STALL TESTING

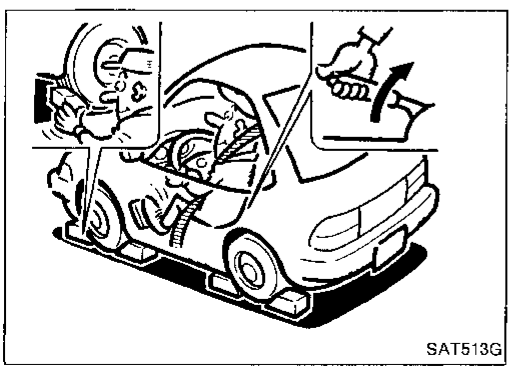
Stall test procedure

1. Check A/T and engine fluid levels. If necessary, add.
2. Warm up engine until engine oil and ATF reach operating temperature after vehicle has been driven approx. 10 minutes.
   ATF operating temperature:
   50 - 80°C (122 - 176°F)

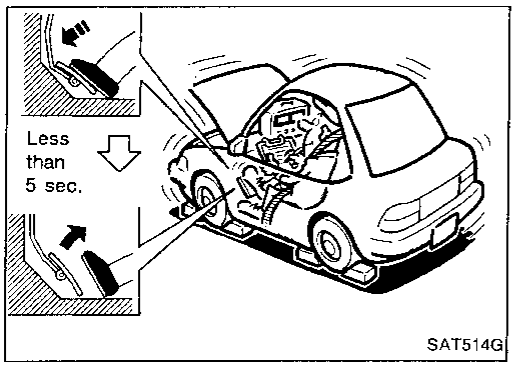


3. Set parking brake and block wheels.
4. Install a tachometer where it can be seen by driver during test.

- **It is good practice to put a mark on point of specified engine speed on indicator.**



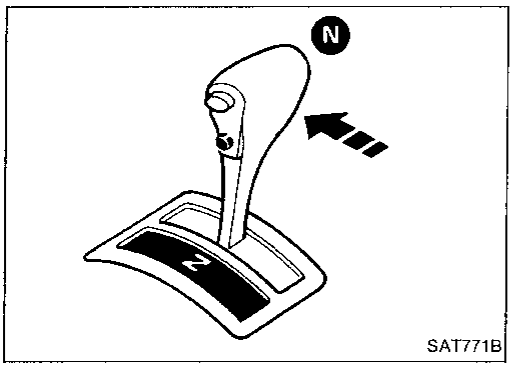
Final Check (Cont'd)



5. Start engine, apply foot brake, and place selector lever in "D" position.
6. Accelerate to wide-open throttle gradually while applying foot brake.
7. Quickly note the engine stall revolution and immediately release throttle.

- **During test, never hold throttle wide-open for more than 5 seconds.**

Stall revolution:
1,850 - 2,150 rpm



8. Shift selector lever to "N" position.
9. Cool off ATF.

- **Run engine at idle for at least one minute.**

10. Perform stall tests in the same manner as in steps 5 through 9 with selector lever in "2", "1" and "R" positions, respectively.

JUDGEMENT OF STALL TEST

The test result and possible damaged components relating to each result are shown in the illustration. In order to pinpoint the possible damaged components, follow the WORK FLOW shown in AT-33.

Note

Stall revolution is too high in "D" or "2" position:

- Slippage occurs in 1st gear but not in 2nd and 3rd gears. ..... Low one-way clutch slippage
- Slippage occurs in 1st through 3rd gears in "D" position and engine brake functions with power shift switch set to "POWER", or slippage occurs in 1st and 2nd gears in "2" position and engine brake functions with accelerator pedal completely released (fully closed throttle). ..... Forward clutch or forward one-way clutch slippage

Stall revolution is too high in "R" position:

- Engine brake does not function in "1" position. ..... Low & reverse brake slippage
- Engine brake functions in "1" position. ..... Reverse clutch slippage

Stall revolution within specifications:

- Vehicle does not achieve speed of more than 80 km/h. ..... One-way clutch seizure in torque converter housing

CAUTION:
Be careful since automatic fluid temperature increases abnormally.

- Slippage occurs in 3rd and 4th gears in "D" position. ..... High clutch slippage
- Slippage occurs in 2nd and 4th gear in "D" position. ..... Brake band slippage

Stall revolution less than specifications:

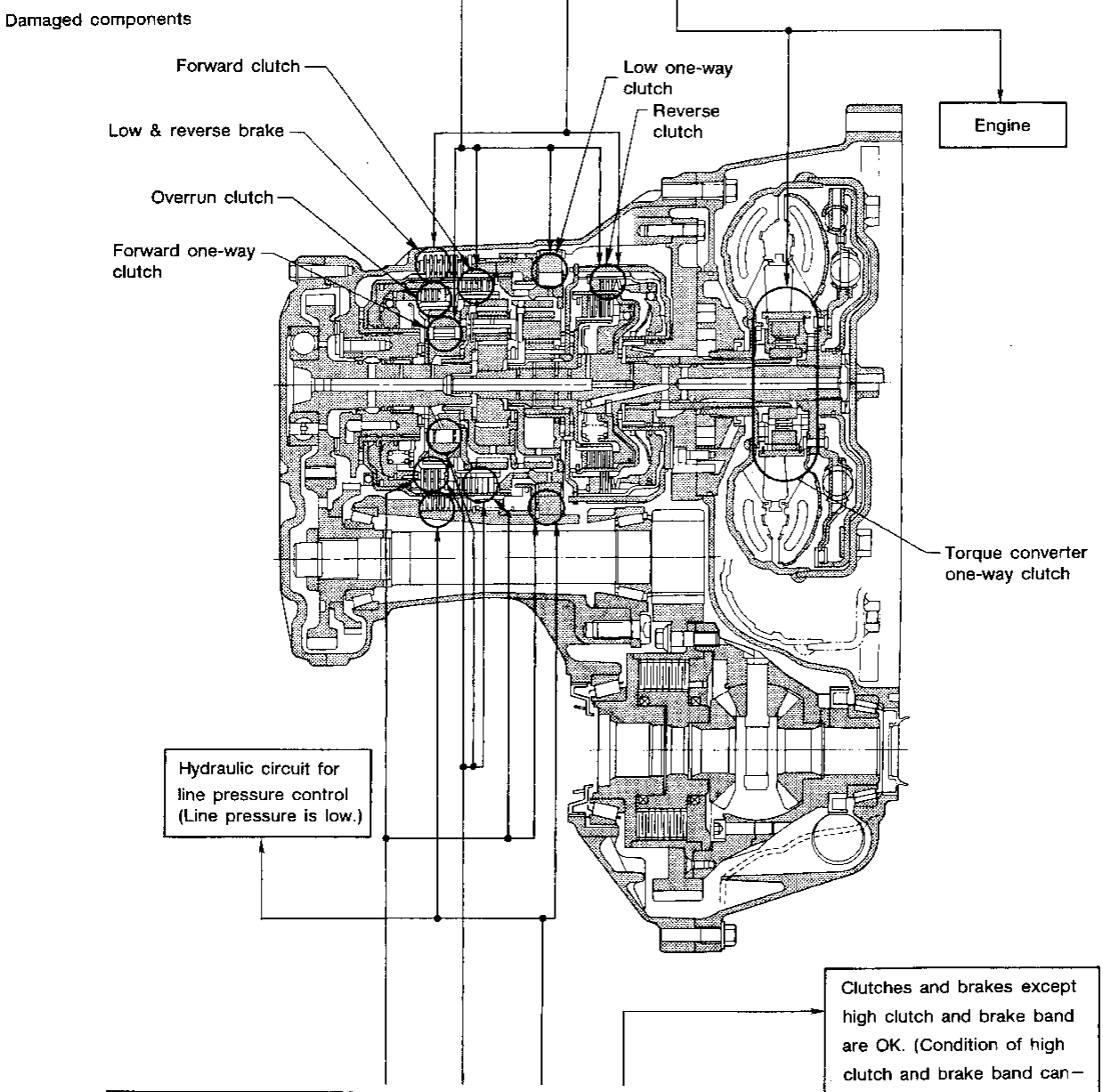
- Poor acceleration during starts. ..... One-way clutch seizure in torque converter

Final Check (Cont'd)

Judgement of stall test

Selector lever position	Judgement		
D	H	O	L
2	H	O	L
1	O	O	L
R	H	H	L

O : Stall revolution is normal.
H : Stall revolution is higher than specified.
L : Stall revolution is lower than specified.



Selector lever position	Judgement			
D	H	H	H	O
2	H	H	H	O
1	O	H	H	O
R	O	O	H	O

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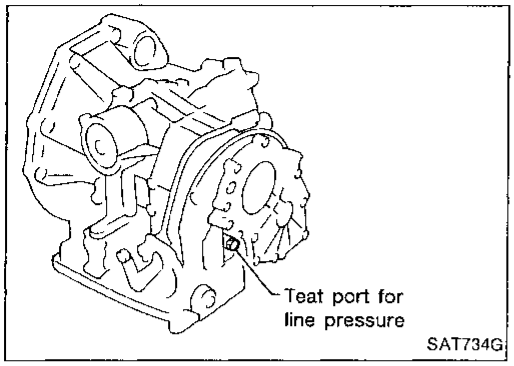
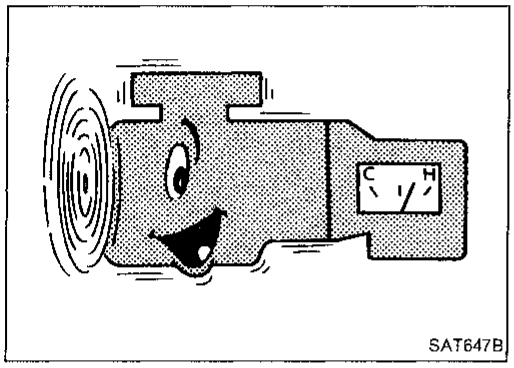
Final Check (Cont'd)

PRESSURE TESTING



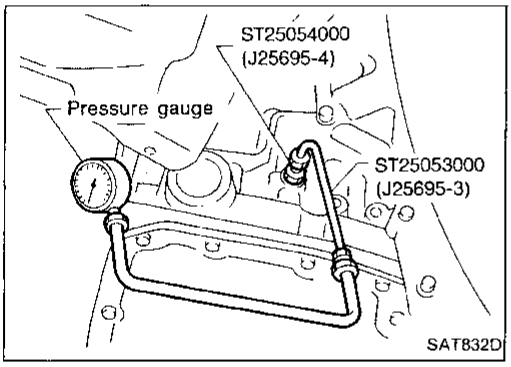
- Location of pressure test ports.
- **Always replace pressure plugs as they are self-sealing bolts.**



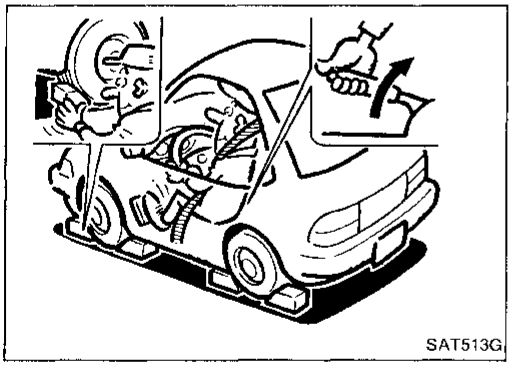
Line pressure test procedure

1. Check A/T and engine fluid levels. If necessary, add fluid.
2. Warm up engine until engine oil and ATF reach operating temperature after vehicle has been driven approx. 10 minutes.

   ATF operating temperature:
   50 - 80°C (122 - 176°F)



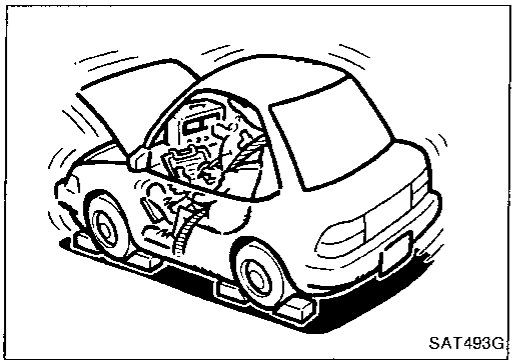
3. Install pressure gauge to corresponding line pressure port.



4. Set parking brake and block wheels.

- **Continue to depress brake pedal fully while line pressure test is being performed at stall speed.**

Final Check (Cont'd)


SAT493G

5. Start engine and measure line pressure at idle and stall speed.

- **When measuring line pressure at stall speed, follow the stall test procedure.**

Line pressure: Refer to SDS, AT-270.

JUDGEMENT OF LINE PRESSURE TEST

	Judgement	Suspected parts
At idle	Line pressure is low in all positions.	• Oil pump wear • Control piston damage • Pressure regulator valve or plug sticking • Spring for pressure regulator valve damaged • Fluid pressure leakage between oil strainer and pressure regulator valve
	Line pressure is low in particular position.	• Fluid pressure leakage between manual valve and particular clutch • For example: If line pressure is low in "R" and "1" positions but is normal in "D" and "2" positions, fluid leakage exists at or around low & reverse brake circuit.
	Line pressure is high.	• Mal-adjustment of throttle position sensor • Fluid temperature sensor damaged • Line pressure solenoid valve sticking • Short circuit of line pressure solenoid valve circuit • Pressure modifier valve sticking • Pressure regulator valve or plug sticking
At stall speed	Line pressure is low.	• Mal-adjustment of throttle position sensor • Line pressure solenoid valve sticking • Short circuit of line pressure solenoid valve circuit • Pressure regulator valve or plug sticking • Pressure modifier valve sticking • Pilot valve sticking

Symptom Chart

Reference page (AT-)		ON vehicle									OFF vehicle					
		41, 120	120	122	103	118	118	118	118	118	160	194, 198	203, 215	203	209, 227	—
Reference page (AT-)	Numbers are arranged in order of probability. Perform inspections starting with number one and work up. Circled numbers indicate that the transaxle must be removed from the vehicle.	Fluid level / Control cable	Inhibitor switch / Throttle position sensor (Adjustment)	Revolution sensor and vehicle speed sensor / Engine speed signal	Engine idling speed / Line pressure	Control valve assembly / Shift solenoid valve A	Shift solenoid valve B / Line pressure solenoid valve	Torque converter clutch solenoid valve / Overrun clutch solenoid valve	Fluid temperature sensor / Accumulator N-D	Accumulator servo release / Ignition switch and starter	Torque converter / Oil pump	Reverse clutch / High clutch	Forward clutch / Forward one-way clutch	Overrun clutch / Low one-way clutch	Low & reverse brake / Brake band	Parking components
79	Engine does not start in "N", "P" positions.	2	3							1						
79	Engine starts in positions other than "N" and "P".	1	2													
—	Transaxle noise in "P" and "N" positions.	1	3	4 5	2						⑦ ⑥					
79	Vehicle moves when changing into "P" position or parking gear does not disengage when shifted out of "P" position.	1														②
80	Vehicle runs in "N" position.	1										③	②	④		
82	Vehicle will not run in "R" position (but runs in "D", "2" and "1" positions). Clutch slips. Very poor acceleration.	1			2	4	3					⑤ ⑥	⑦	⑧	⑨	
—	Vehicle braked when shifting into "R" position.	1 2			3	5	4					⑥	⑧	⑨	⑦	
—	Sharp shock in shifting from "N" to "D" position.		2	5	1 3	7	6		4 8				⑨			
—	Vehicle will not run in "D" and "2" positions (but runs in "1" and "R" positions).	1												②		
84	Vehicle will not run in "D", "1", "2" positions (but runs in "R" position). Clutch slips. Very poor acceleration.	1			2	4	3		5			⑥ ⑦	⑧ ⑨	⑪		
—	Clutches or brakes slip somewhat in starting.	1 2	3		4	6	5		7		⑫ ⑪	⑨	⑧		⑩	
—	Excessive creep.				1											
82, 84	No creep at all.	1			2	3					⑥ ⑤		④			
—	Failure to change gear from "D_1" to "D_2".	2	1	5		4 3									⑥	
—	Failure to change gear from "D_2" to "D_3".	2	1	5		4	3					⑥			⑦	
—	Failure to change gear from "D_3" to "D_4".	2	1	4		3			5						⑥	
86, 87, 88	Too high a gear change point from "D_1" to "D_2", from "D_2" to "D_3", from "D_3" to "D_4".		1	2		3	4									
—	Gear change directly from "D_1" to "D_3" occurs.	1								2					③	
—	Engine stops when shifting lever into "R", "D", "2" and "1".				1	3		2			④					
—	Too sharp a shock in change from "D_1" to "D_2".		1		2	4			5	3					⑥	
—	Too sharp a shock in change from "D_2" to "D_3".		1		2	3						④			⑤	

Symptom Chart (Cont'd)

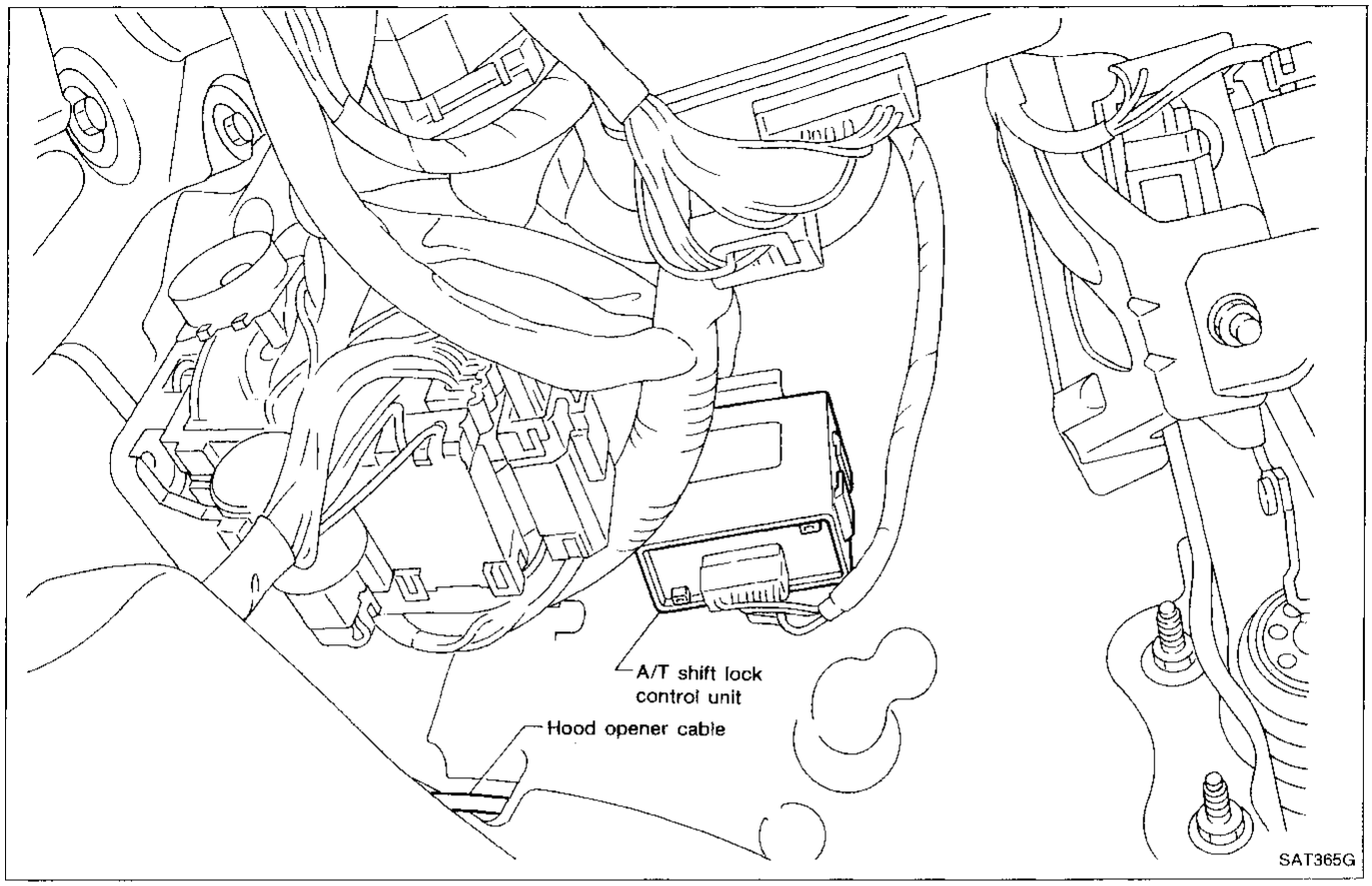
Reference page (AT-)	Numbers are arranged in order of probability. Perform inspections starting with number one and work up. Circled numbers indicate that the transaxle must be removed from the vehicle.	ON vehicle									OFF vehicle					
		41, 120	120	122	103	118	118	118	118	118	160	194, 198	203, 215	203	209, 227	—
		Fluid level / Control cable	Inhibitor switch	Throttle position sensor (Adjustment)	Revolution sensor and vehicle speed sensor	Engine speed signal	Engine idling speed	Line pressure	Control valve assembly	Shift solenoid valve A	Shift solenoid valve B	Line pressure solenoid valve	Torque converter clutch solenoid valve	Overrun clutch solenoid valve	Fluid temperature sensor	Accumulator N-D	Accumulator servo release	Ignition switch and starter	Torque converter	Oil pump	Reverse clutch	High clutch	Forward clutch	Forward one-way clutch	Overrun clutch	Low one-way clutch	Low & reverse brake	Brake band	Parking components
—	Too sharp a shock in change from "D_3" to "D_4".		1			2	3																	⑤		④	
—	Almost no shock or clutches slipping in change from "D_1" to "D_2".	1	2			3	5									4										⑥	
—	Almost no shock or slipping in change from "D_2" to "D_3".	1	2			3	4														⑤					⑥	
—	Almost no shock or slipping in change from "D_3" to "D_4".	1	2			3	4														⑤					⑥	
—	Vehicle braked by gear change from "D_1" to "D_2".	1																			② ④			⑤	③		
—	Vehicle braked by gear change from "D_2" to "D_3".	1																								②	
—	Vehicle braked by gear change from "D_3" to "D_4".	1																			④		③	②			
—	Maximum speed not attained. Acceleration poor.	1	2					5	3	4									⑪	⑩	⑥	⑦				⑨	⑧	
—	Failure to change gear from "D_4" to "D_3".	1	2					6	4	5	3													⑧		⑦		
—	Failure to change gear from "D_3" to "D_2" or from "D_4" to "D_2".	1	2					5	3	4											⑥					⑦		
—	Failure to change gear from "D_2" to "D_1" or from "D_3" to "D_1".	1	2					5	3	4											⑦				⑥	⑧		
—	Gear change shock felt during deceleration by releasing accelerator pedal.		1			2	4				3																	
—	Too high a change point from "D_4" to "D_3", from "D_3" to "D_2", from "D_2" to "D_1".		1	2																								
—	Kickdown does not operate when depressing pedal in "D_4" within kickdown vehicle speed.		1	2				3	4																			
—	Kickdown operates or engine overruns when depressing pedal in "D_4" beyond kickdown vehicle speed limit.		2	1				3	4																			
—	Races extremely fast or slips in changing from "D_4" to "D_3" when depressing pedal.	1	2			3	5		4												⑥	⑦						
—	Races extremely fast or slips in changing from "D_4" to "D_2" when depressing pedal.	1	2			3	6	5	4													⑧				⑦		
—	Races extremely fast or slips in changing from "D_3" to "D_2" when depressing pedal.	1	2			3	5		4						8						⑨	⑦				⑥		
—	Races extremely fast or slips in changing from "D_4" or "D_3" to "D_1" when depressing pedal.	1	2			3	5		4													⑥ ⑦		⑧				
—	Vehicle will not run in any position.	1 2				3			4										⑨	⑤		⑥				⑧	⑦	⑩
—	Transaxle noise in "D", "2", "1" and "R" positions.	1																	②									

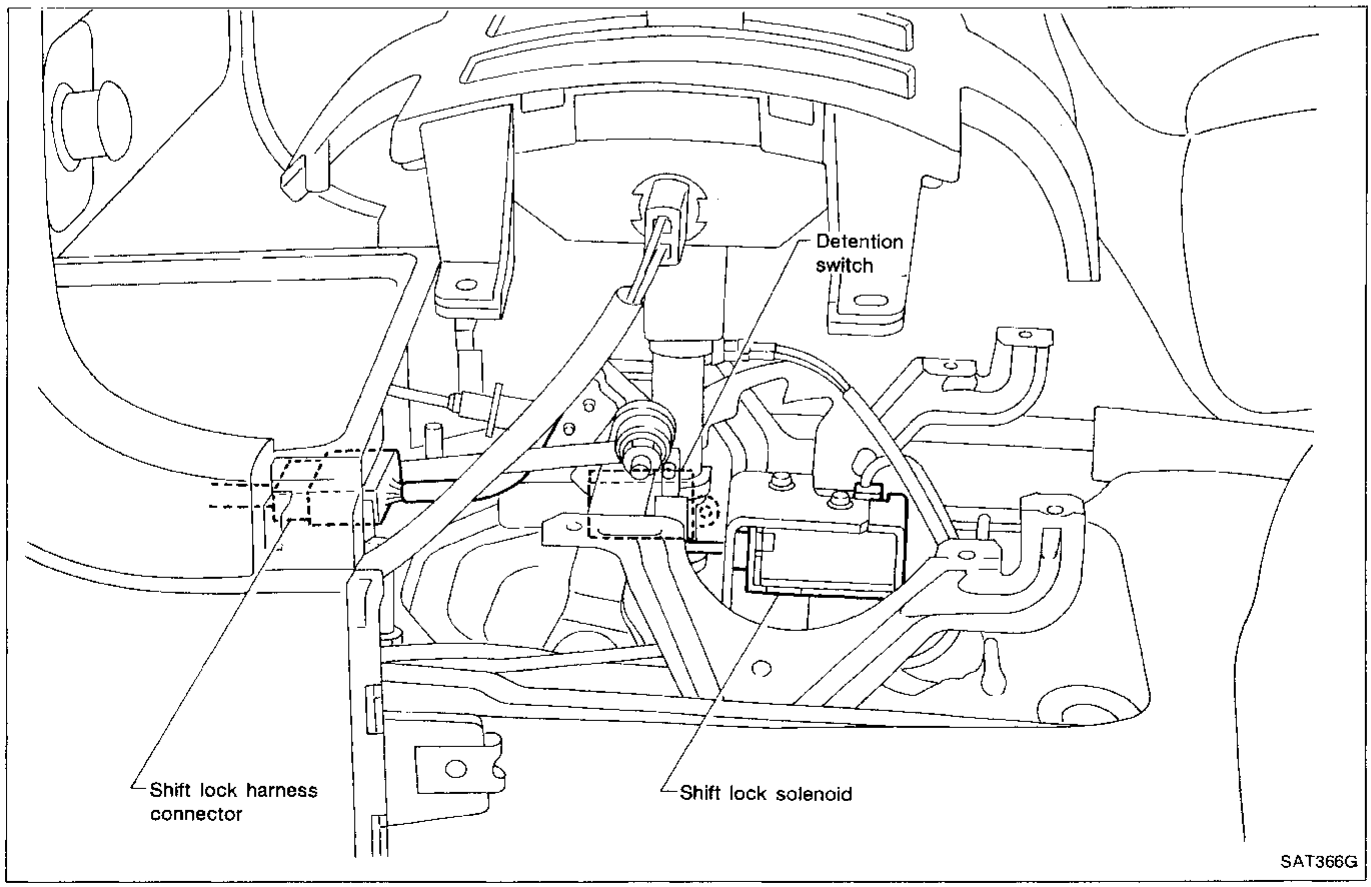
Symptom Chart (Cont'd)

Reference page (AT-)		ON vehicle									OFF vehicle					
		41, 120	120	122	103	118	118	118	118	118	160	194, 198	203, 215	203	209, 227	—
Reference page (AT-)	Numbers are arranged in order of probability. Perform inspections starting with number one and work up. Circled numbers indicate that the transaxle must be removed from the vehicle.	Fluid level Control cable	Inhibitor switch Throttle position sensor (Adjustment)	Revolution sensor and vehicle speed sensor Engine speed signal	Engine idling speed Line pressure	Control valve assembly Shift solenoid valve A	Shift solenoid valve B Line pressure solenoid valve	Torque converter clutch solenoid valve	Overrun clutch solenoid valve	Fluid temperature sensor Accumulator N-D	Accumulator servo release Ignition switch and starter	Torque converter Oil pump	Reverse clutch High clutch	Forward clutch Forward one-way clutch	Overrun clutch Low one-way clutch	Low & reverse brake Brake band	Parking components
93	Failure to change from "D_3" to "2_2" when changing lever into "2" position.	. 7	1 2	. .	. .	6 5	4 .	. 3	. .	. .	. .	. .	. .	. .	⑨ .	. ⑧	.
—	Gear change from "2_2" to "2_3" in "2" position.	. .	1 .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	.
93	Engine brake does not operate in "1" position.	. 2	1 3	4 .	. .	6 5	. .	. 7	. .	. .	. .	. .	. .	⑧ .	⑨ .	.
—	Gear change from "1_1" to "1_2" in "1" position.	. 2	1 .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	.
—	Does not change from "1_2" to "1_1" in "1" position.	. .	1 .	2 .	. .	4 3	. .	. 5	. .	. .	. .	. .	. .	⑥ .	⑦ .	.
—	Large shock changing from "1_2" to "1_1" in "1" position.	. .	. .	. .	. .	1 .	. .	. .	. .	. .	. .	. .	. .	. .	② .	.
—	Transaxle overheats.	1 .	. 3	. .	2 4	6 .	. 5	. .	. .	. .	⑭ ⑦	⑧ ⑨	⑪ .	⑫ .	⑬ ⑩	.
—	ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	1 .	. .	. .	. .	. .	. .	. .	. .	. .	. .	② ③	⑤ .	⑥ .	⑦ ④	.
—	Offensive smell at fluid charging pipe.	1 .	. .	. .	. .	. .	. .	. .	. .	. .	② ③	④ ⑤	⑦ .	⑧ .	⑨ ⑥	.
—	Torque converter is not locked up.	. .	3 1	2 4	. 6	8 .	. .	7 .	5 .	. .	⑨ .	. .	. .	. .	. .	.
—	Lock-up piston slip.	1 .	. 2	. .	. 3	6 .	. 5	4 .	. .	. .	⑦ .	. .	. .	. .	. .	.
89	Lock-up point is extremely high or low.	. .	. 1	2 .	. .	4 .	. .	3 .	. .	. .	. .	. .	. .	. .	. .	.
—	A/T does not shift to "D_4" when driving with overdrive switch "ON".	. .	2 1	3 .	. 8	6 4	. .	. 5	7 .	. .	. .	. .	. .	⑩ .	. ⑨	.
—	Engine is stopped at "R", "D", "2" and "1" positions.	1 .	. .	. .	. .	5 4	3 .	2 .	. .	. .	. .	. .	. .	. .	. .	.

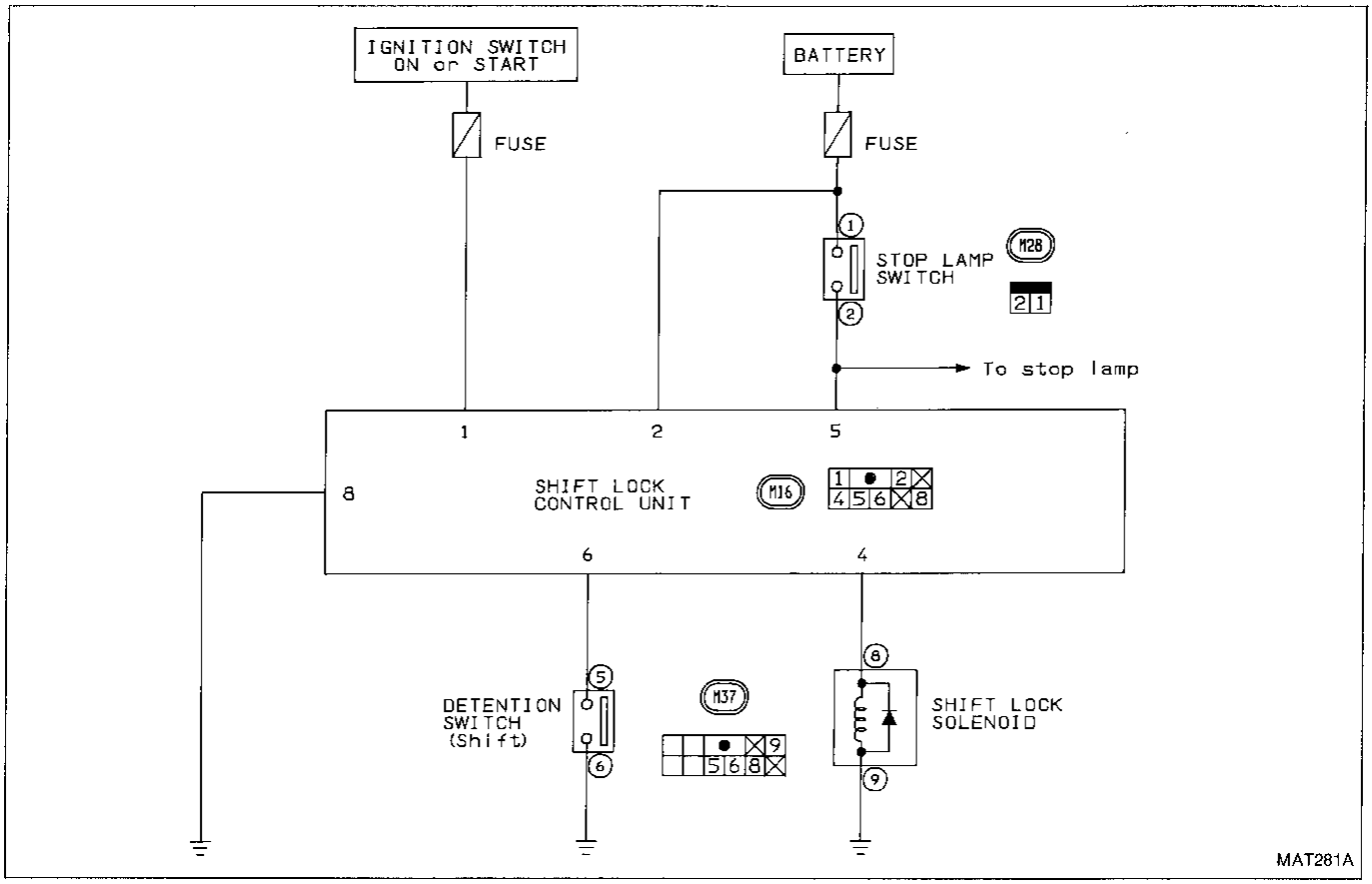
Contents

Shift Lock System Electrical Parts Location

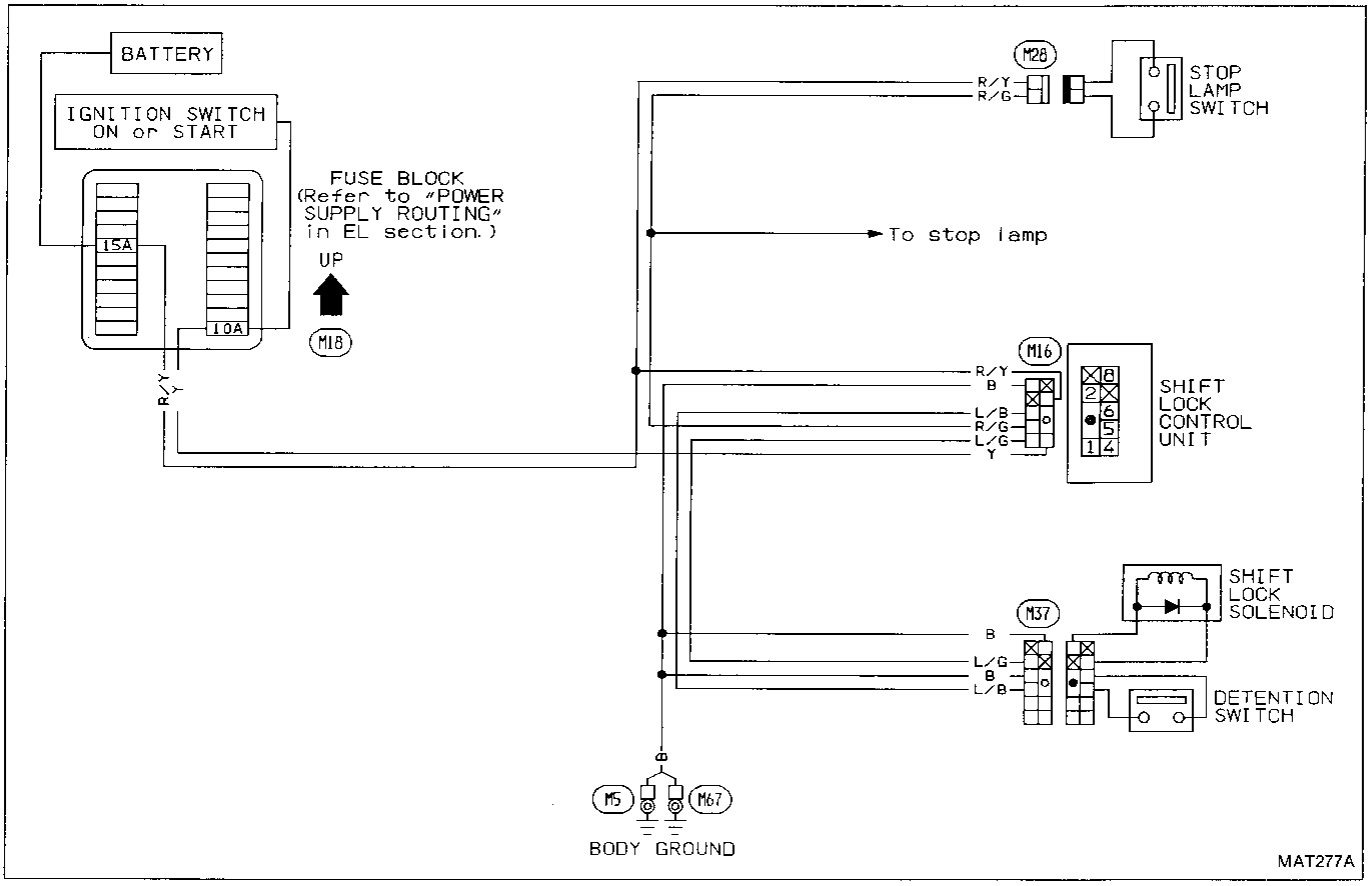


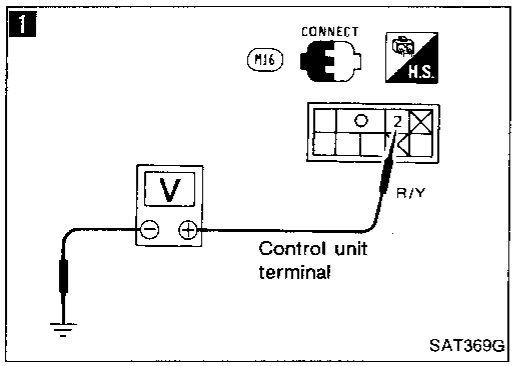


Circuit Diagram for Quick Pinpoint Check



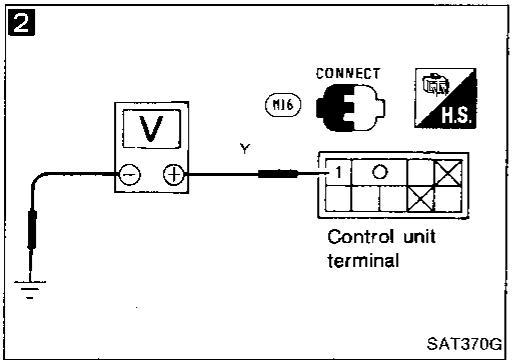
Wiring Diagram

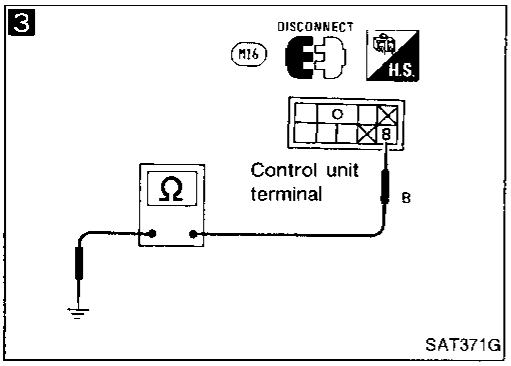




Diagnostic Procedure

SYMPTOM 1:
With key in "ON" position, selector lever cannot be moved from "P" position when applying brake pedal or can be moved when releasing brake pedal.
Selector lever can be moved from "P" position when key is removed from key cylinder.
SYMPTOM 2:
Ignition key cannot be removed when selector lever is set to "P" position or can be removed when selector lever is set to any position except "P".





Check key interlock cable for damage. — NG → Repair key interlock cable. Refer to "Key Interlock Cable", AT-115.

OK ↓

1

CHECK POWER SOURCE.
1. Turn ignition switch to "OFF" position.
2. Check voltage between control unit harness terminal ② and ground.
Battery voltage should exist.

NG → Check the following items:
1. Harness continuity between battery and control unit harness terminal ②
2. Fuse

OK ↓

2

CHECK IGNITION SIGNAL.
1. Turn ignition switch to "OFF" position.
2. Check voltage between control unit harness terminal ① and ground.
0V
3. Turn ignition switch from "OFF" to "ON" position. (Do not start engine.)
4. Check voltage between control unit harness terminal ① and ground.
Battery voltage should exist.

NG → Check the following items:
1. Harness continuity between battery and control unit harness terminal ①
2. Fuse
3. Ignition switch

OK ↓

3

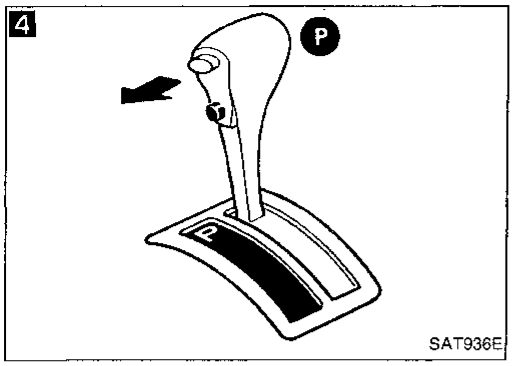
CHECK GROUND CIRCUIT FOR CONTROL UNIT.
1. Turn ignition switch from "ON" to "OFF" position.
2. Disconnect control unit harness connector.
3. Check continuity between control unit harness terminal ⑧ and ground.
Continuity should exist.

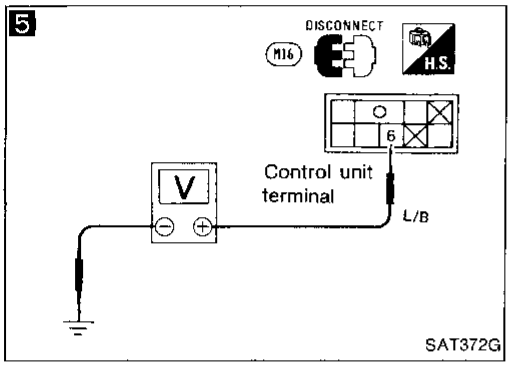
NG → Repair harness or connector.

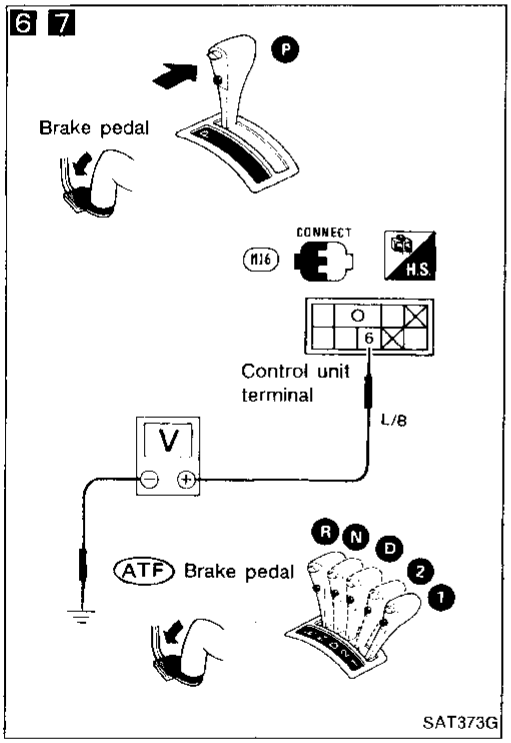
OK ↓

Ⓐ

Diagnostic Procedure (Cont'd)







Ⓐ

CHECK INPUT SIGNAL (DETENTION SWITCH).

1. Reconnect control unit harness connector.
2. Turn ignition switch from "OFF" to "ON" position. (Do not start engine.)

4 3. Set selector lever in "P" position and release selector lever button.
When selector lever cannot be moved from "P" position with brake pedal depressed, set ignition key to "ACC" position and move lever. Then set ignition key to "ON" position.

5 4. Disconnect control unit harness connector.

5. Check continuity between control unit harness terminal ⑥ and ground.
Continuity should not exist.

NG → Check detention switch —shift. (Refer to "COMPONENT CHECK".) AT-117

OK ↓

CHECK INPUT SIGNAL (DETENTION SWITCH).

1. Turn ignition switch to "ON" position. (Do not start engine.)

6 2. Check continuity between control unit harness terminal ⑥ and ground with brake pedal depressed and selector lever button pushed.
Continuity should exist.

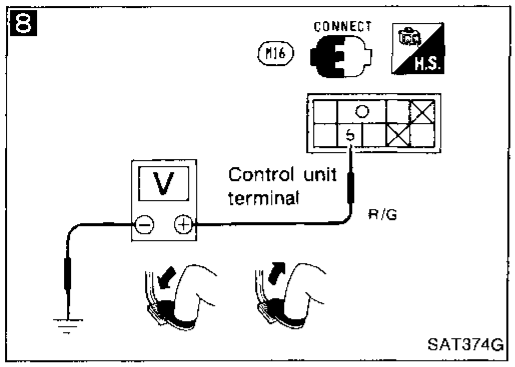
7 3. Check continuity between control unit harness terminal ⑥ and ground with selector lever set in any position except "P".
Battery voltage should exist.

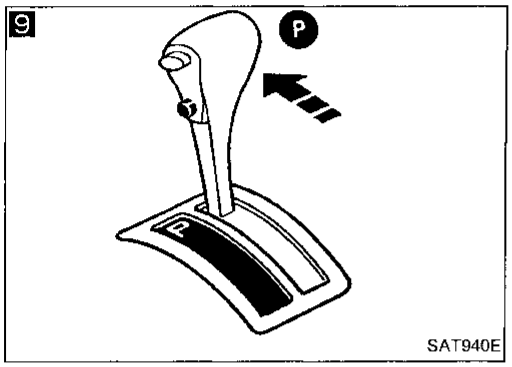
NG → Check the following items:
1. Harness continuity between control unit harness terminal ⑥ and detention switch harness terminal ⑤
2. Harness continuity between detention switch harness terminal ⑥ and ground
3. Detention switch (Refer to "COMPONENT CHECK".) AT-117

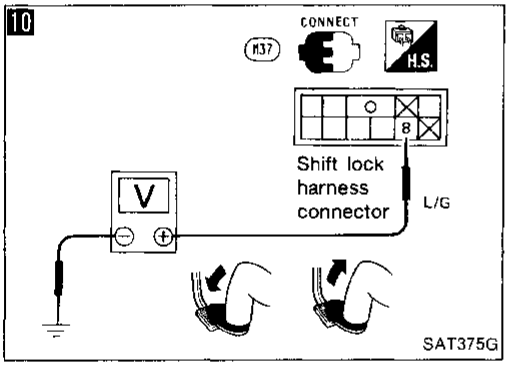
OK ↓

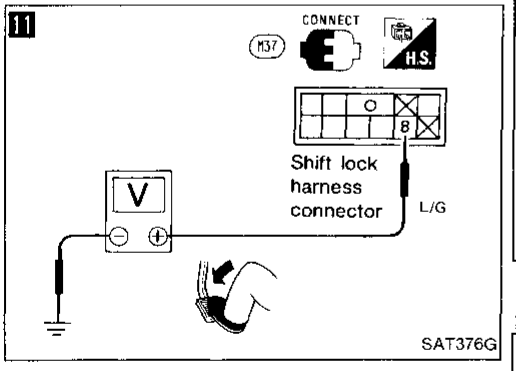
Ⓑ

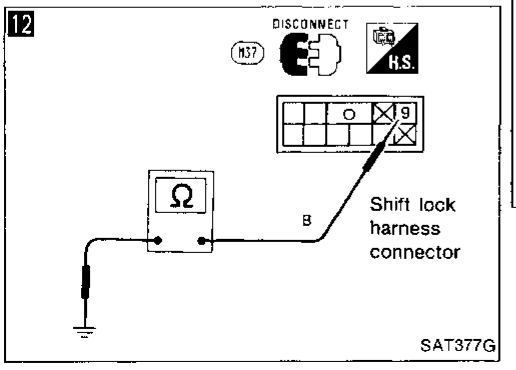
Diagnostic Procedure (Cont'd)











Ⓑ

8

CHECK INPUT SIGNAL (STOP LAMP SWITCH).

Turn ignition switch to "ON" position. (Do not start engine.)

- Check voltage between control unit harness terminal ⑤ and ground.

Brake pedal	Voltage
Depressed	Battery voltage
Released	0V

NG → Check the following items:
1. Harness continuity between control unit harness terminal ⑤ and stop lamp switch harness terminal ②
2. Harness continuity between stop lamp switch harness terminal ① and fuse
3. Stop lamp switch (Refer to "COMPONENT CHECK".) AT-117

OK ↓

9

Set selector lever in "P" position.

CHECK OUTPUT SIGNAL (SHIFT LOCK SOLENOID).

1. Turn ignition switch to "ON" position. (Do not start engine.)

10 2. Check voltage between shift lock harness connector terminal ⑧ and body ground.

Brake pedal	Voltage
Depressed	Battery voltage
Released	0V

3. Turn ignition switch from "ON" to "OFF" position.

11 4. Check voltage between shift lock harness connector terminal ⑧ and ground with brake pedal depressed.
0V

NG → Check harness continuity between control unit harness terminal ④ and shift lock solenoid harness terminal ⑧.

OK ↓

12

CHECK GROUND CIRCUIT FOR SHIFT LOCK SOLENOID.

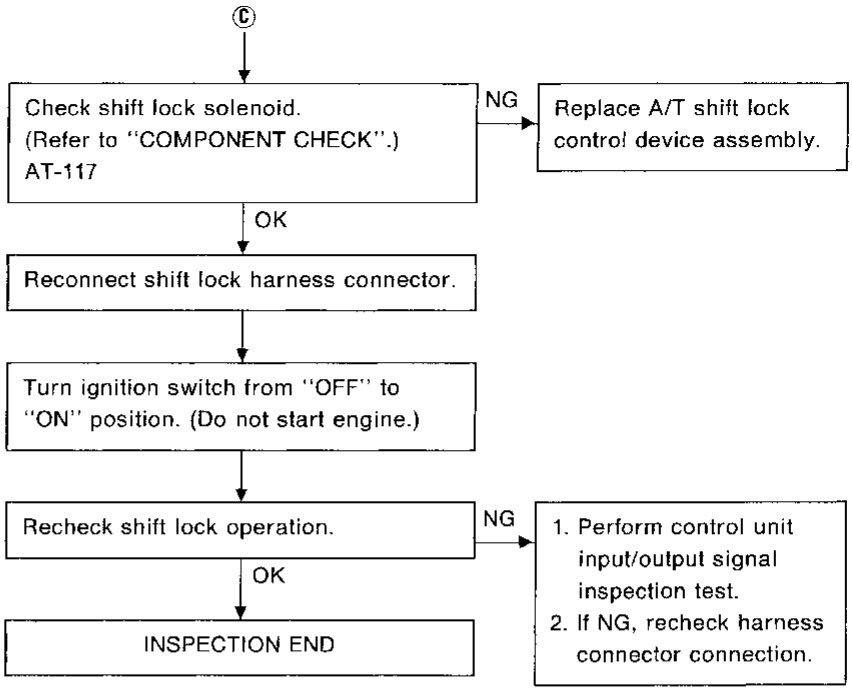
1. Disconnect shift lock harness connector.
2. Check continuity between shift lock harness terminal ⑨ and ground.
Continuity should exist.

NG → Repair harness or connector.

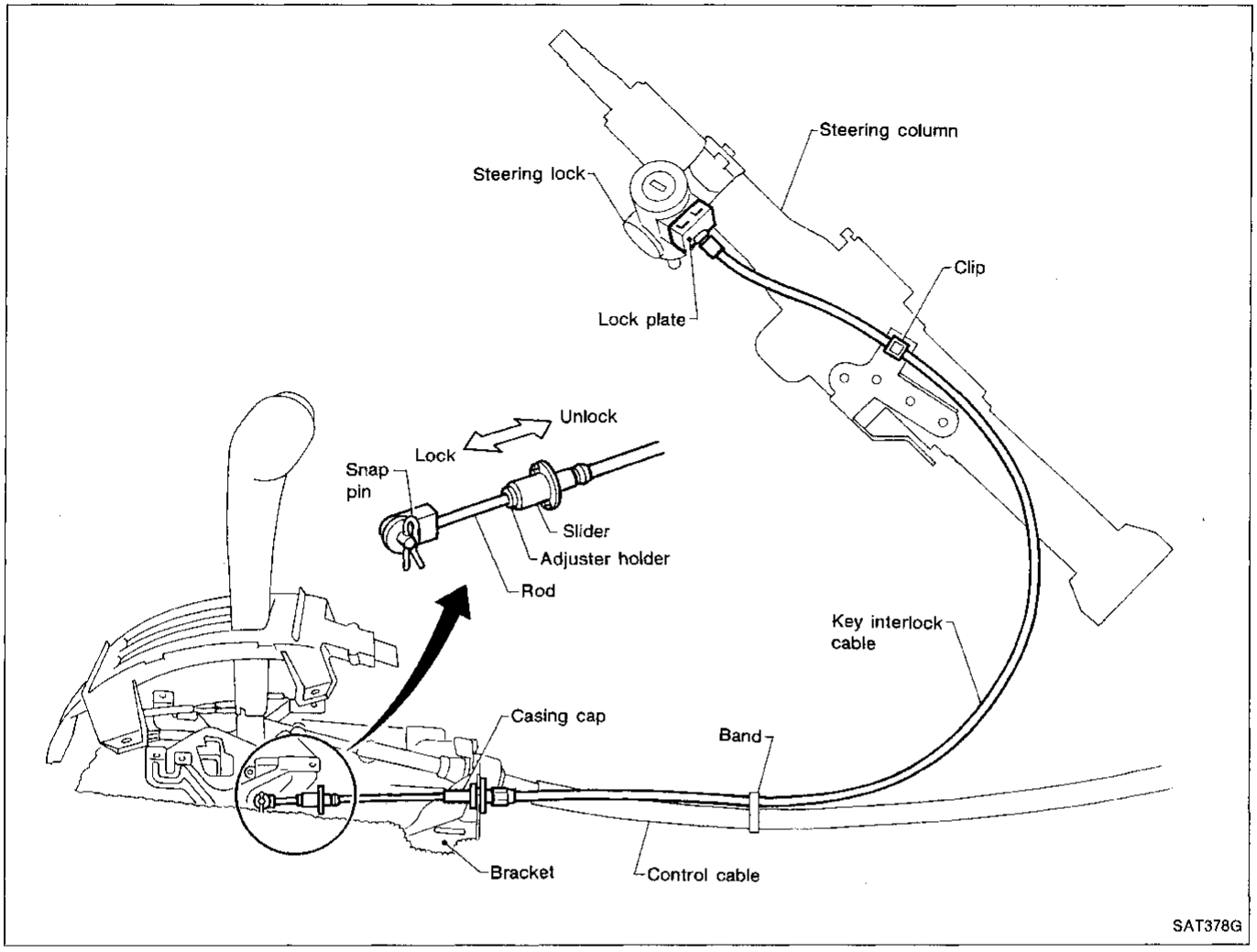
OK ↓

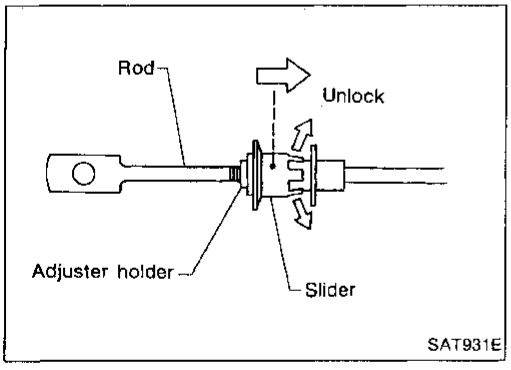
Ⓒ

Diagnostic Procedure (Cont'd)



Key Interlock Cable



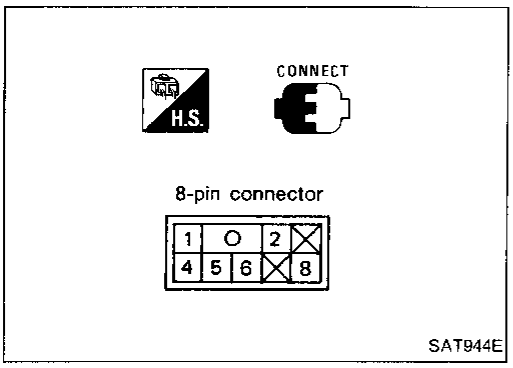


REMOVAL

1. Remove snap pin temporarily and remove key interlock cable from vehicle.
2. Unlock slider from adjuster holder and remove rod from cable.
3. Install rod to control device with snap pin.

INSTALLATION

1. Set key interlock cable to steering lock assembly and install lock plate.
2. Clamp cable to steering column and fix to control cable with band.
3. Set control lever to "P".
4. Insert rod into adjuster holder.
5. Install casing cap to bracket.
6. Move slider in order to fix adjuster holder to rod.



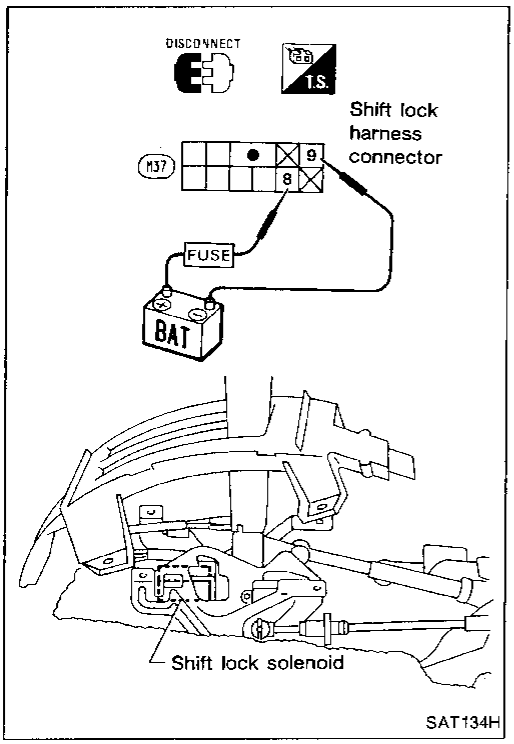
Shift Lock Control Unit Inspection

- Measure voltage between each terminal and terminal ⑧ by following "Shift Lock Control Unit Inspection Table".
- Pin connector terminal layout.

Shift Lock Control Unit Inspection Table

(Data are reference values.)

Terminal No. ⊕	Terminal No. ⊖	Item	Condition	Judgment standard
1	8	Ignition signal	Ignition switch "ON"	Battery voltage
			Except above	0V
2		Power source	Any condition	Battery voltage
4		Shift lock signal	• Ignition switch "ON" • When selector lever is set in "P" position and brake pedal is depressed.	Battery voltage
			Except above	0V
5		Stop lamp switch	When brake pedal is depressed.	Battery voltage
			When brake pedal is released.	0V
6		Detention switch	• When key is inserted into key cylinder and selector lever is set in "P" position with selector lever button pushed. • When selector lever is set in any position except "P".	Battery voltage
			Except above	0V

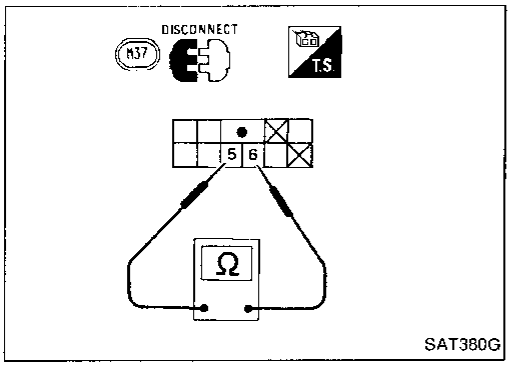


SAT134H

Component Check

SHIFT LOCK SOLENOID

- Check operation by applying battery voltage to shift lock harness connector.

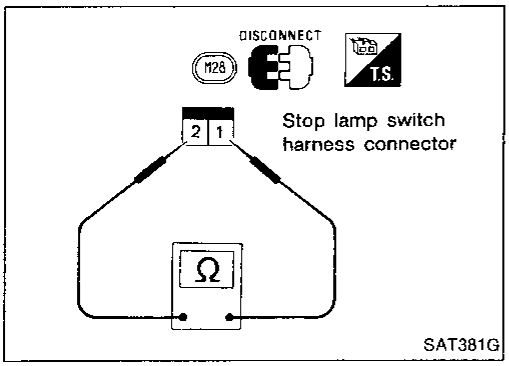


SAT380G

DETENTION SWITCH

- Check continuity between terminals ⑤ and ⑥ of shift lock harness connector.

Condition	Continuity
When selector lever is set in "P" position and selector lever button is released	No
Except above	Yes



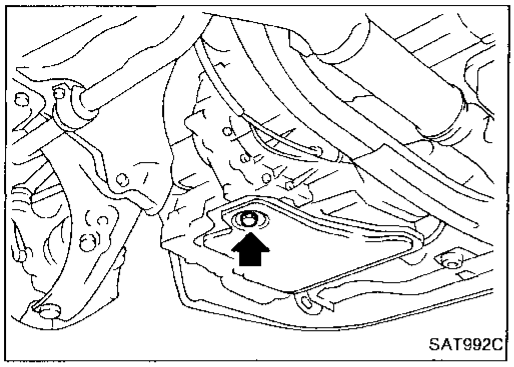
SAT381G

STOP LAMP SWITCH

- Check continuity between terminals ① and ② of stop lamp switch harness connector.

Condition	Continuity
When brake pedal is depressed	Yes
When brake pedal is released	No

Check stop lamp switch after adjusting brake pedal — refer to section BR.

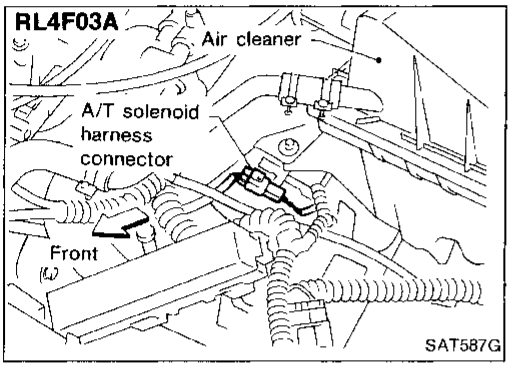


Control Valve Assembly and Accumulator

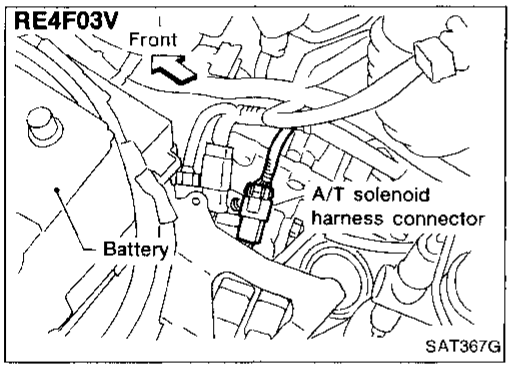
REMOVAL

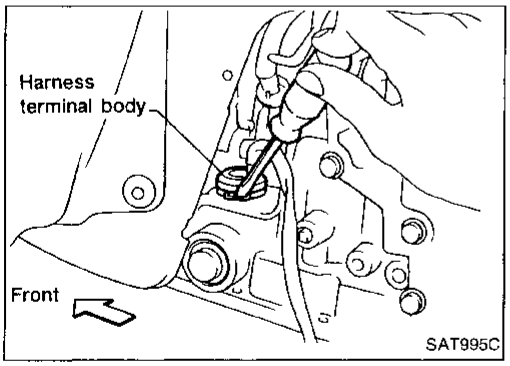
— RL4F03A & RE4F03V —

1. Drain ATF from transaxle.
2. Remove oil pan and gasket.



3. Disconnect A/T solenoid harness connector.

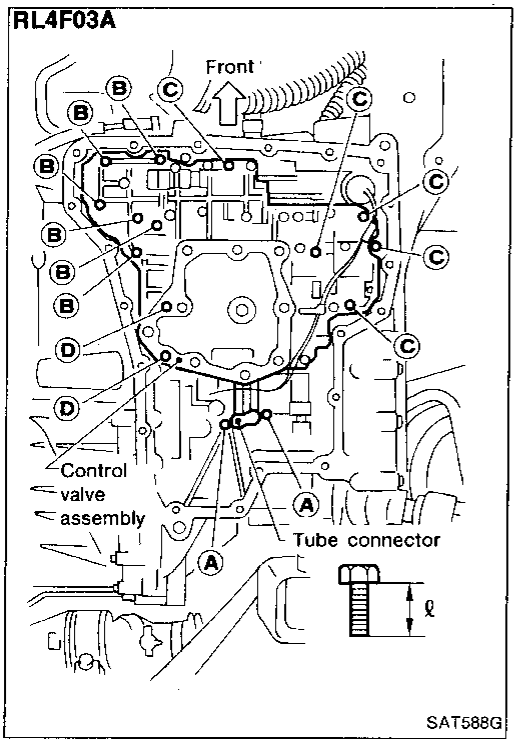




4. Remove stopper ring from A/T solenoid harness terminal body.
5. Remove A/T solenoid harness by pushing terminal body into transmission case.

Control Valve Assembly and Accumulator (Cont'd)

RL4F03A



— RL4F03A —

6. Remove control valve assembly by removing fixing bolts.

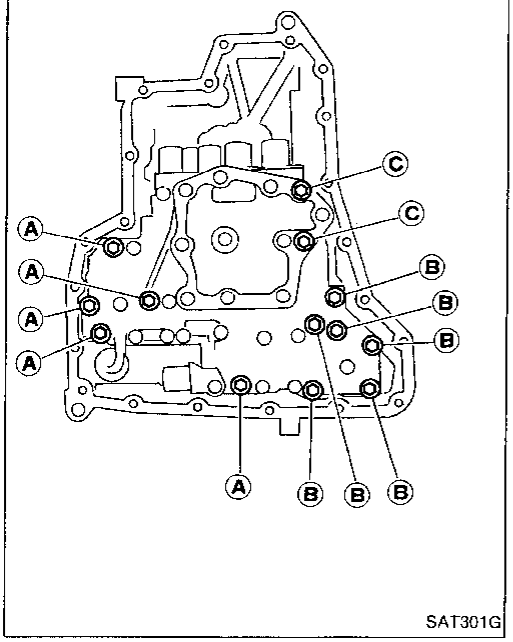
Bolt length, number and location:

Bolt symbol	A	B	C	D
Bolt length "ℓ" mm (in)	25.0 (0.984)	33.0 (1.299)	40.0 (1.575)	43.5 (1.713)
Number of bolts	2	6	5	2

- **Be careful not to drop manual valve, tube connector, tubes and servo release accumulator return spring.**

7. Disassemble and inspect control valve assembly if necessary — Refer to "REPAIR FOR COMPONENT PARTS", AT-171.

RE4F03V



— RE4F03V —

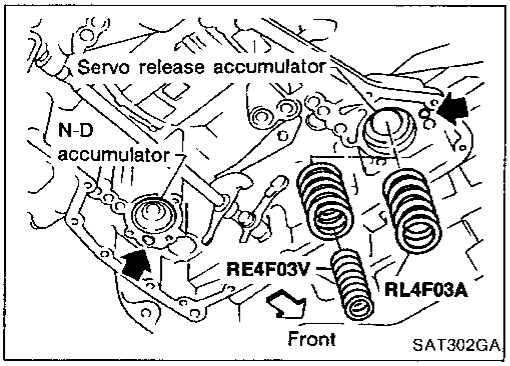
6. Remove control valve assembly by removing fixing bolts.

Bolt length, number and location:

Bolt symbol	A	B	C
Bolt length "ℓ" mm (in)	40.0 (1.575)	33.0 (1.299)	43.5 (1.713)
Number of bolts	5	6	2

- **Be careful not to drop manual valve and servo release accumulator return springs.**

7. Disassemble and inspect control valve assembly if necessary — Refer to "REPAIR FOR COMPONENT PARTS", AT-172.

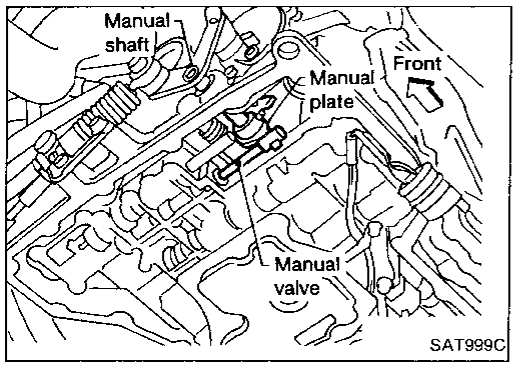


— RL4F03A & RE4F03V —

8. Remove servo release and N-D accumulators by applying compressed air if necessary.

- **Hold each piston with a rag.**

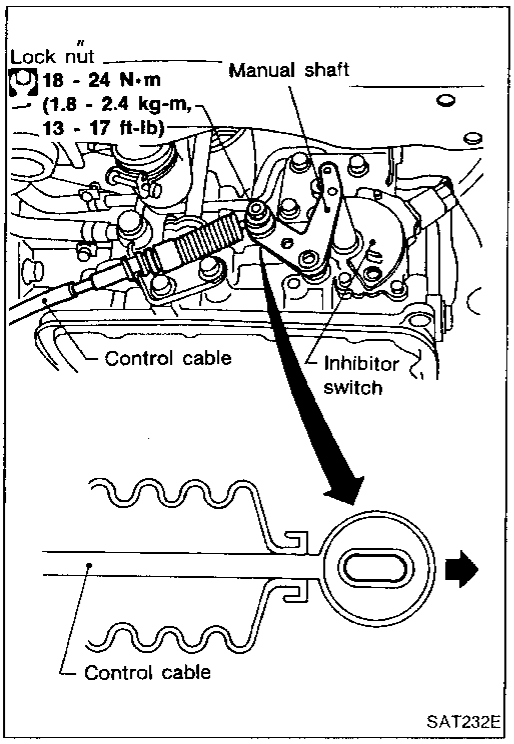
Control Valve Assembly and Accumulator (Cont'd)



INSTALLATION

- **Set manual shaft in Neutral position, then align manual plate with groove in manual valve.**
- **After installing control valve assembly to transmission case, make sure that selector lever can be moved to all positions.**

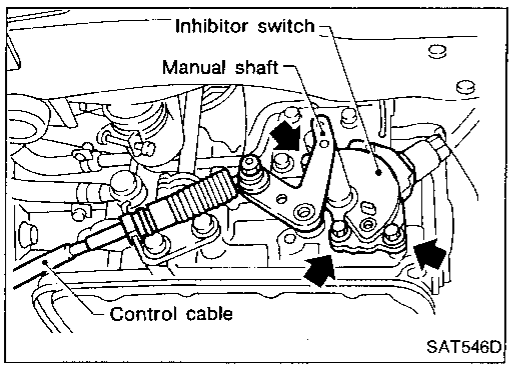
Control Cable Adjustment



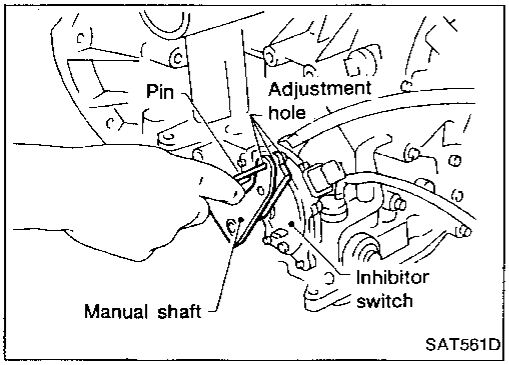
Move selector lever from the "P" position to the "1" position. You should be able to feel the detents in each position. If the detents cannot be felt or the pointer indicating the position is improperly aligned, the control cable needs adjustment.

1. Place selector lever in "P" position.
2. Loosen control cable lock nut and place manual shaft in "P" position.
3. Pull control cable in the direction of the arrow shown in the illustration by specified force.
   Specified force: 6.9 N (0.7 kg, 1.5 lb)
4. Return control cable in the opposite direction of the arrow for 1.0 mm (0.039 in).
5. Tighten control cable lock nut.
6. Move selector lever from "P" position to "1" position and make sure that selector lever can be moved smoothly and without any sliding noise.
7. Apply grease to contacting areas of selector lever and control cable. Install any part removed.

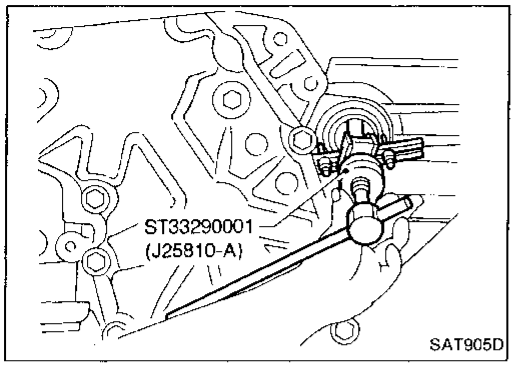
Inhibitor Switch Adjustment



1. Remove control cable end from manual shaft.
2. Set manual shaft in "N" position.
3. Loosen inhibitor switch fixing bolts.

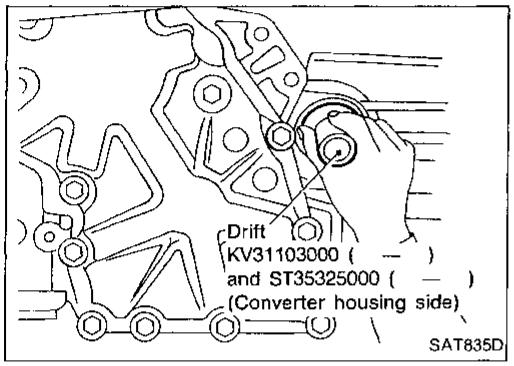


4. Insert 4.0 mm (0.157 in) dia. pin into adjustment hole in both inhibitor switch and manual shaft as near vertically as possible.
5. Tighten inhibitor switch fixing bolts.
6. Remove pin from adjustment hole after adjusting inhibitor switch.
7. Reinstall any part removed.
8. Adjust control cable — Refer to "Control Cable Adjustment".
9. Check continuity of inhibitor switch — Refer to "TROUBLE DIAGNOSES", AT-99.



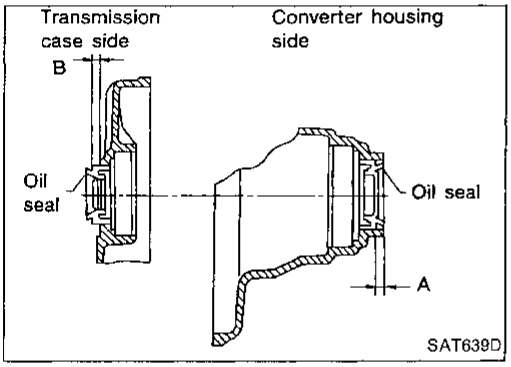
Differential Side Oil Seal Replacement

1. Remove drive shaft assemblies. — Refer to section FA.
2. Remove oil seals.



3. Install oil seals.

- **Apply ATF to oil seal surface before installing.**

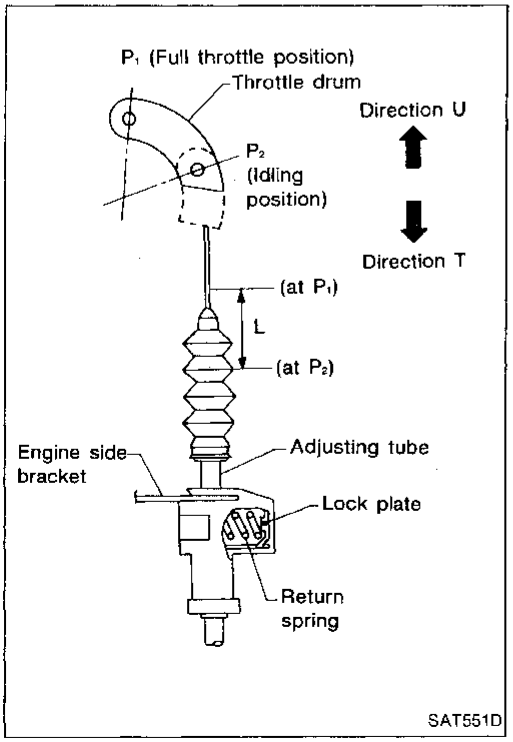


- **Install oil seals so that dimensions "A" and "B" are within specifications.**

Unit: mm (in)

A	B
5.5 - 6.5 (0.217 - 0.256)	0.5 (0.020) or less

4. Reinstall any part removed.



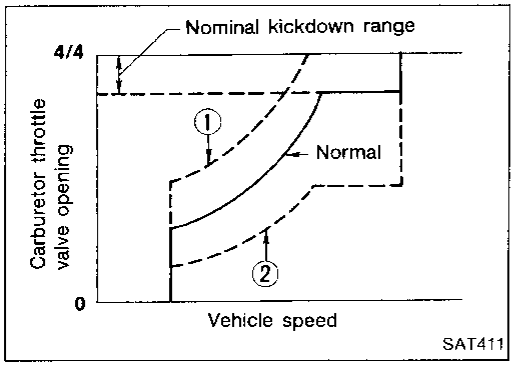
Throttle Wire Adjustment

— RL4F03A only —

1. Turn ignition switch to OFF.
2. While pressing lock plate, move adjusting tube in direction "T" (Transaxle side).
3. Return lock plate.
   (Adjusting tube is locked at this time.)
4. Move throttle drum from "P_2" to "P_1" quickly [Adjusting tube moves in direction "U" (Engine side) while depressing the lock plate.] Ensure that throttle wire stroke "L" is within the specified range, between full throttle and idle.
   Throttle wire stroke "L":
   40 - 42 mm (1.57 - 1.65 in)

- **Adjust throttle wire stroke when throttle wire/accelerator wire is installed and adjusted.**
- **Put mark on throttle wire to facilitate measuring wire stroke.**

Throttle Wire Adjustment (Cont'd)



If throttle wire stroke is improperly adjusted the following problems may arise.

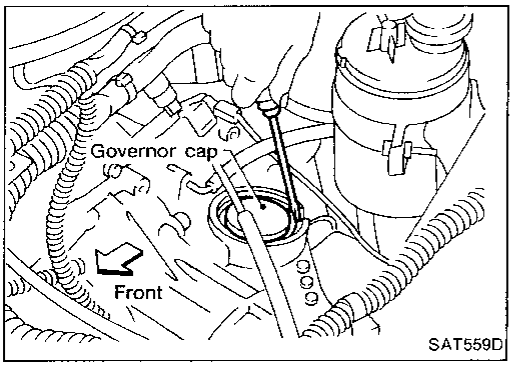
- When the throttle drum fully-open position "P_1" is too far in direction "T", the shift schedule will be as shown by ② in the figure, and the kickdown range will greatly increase.
- When the throttle drum fully-open position "P_1" is too far in direction "U", the shift schedule will be as shown by ① in the figure, and kickdown will not occur.

5. After properly adjusting throttle wire, ensure the parting line is as straight as possible.

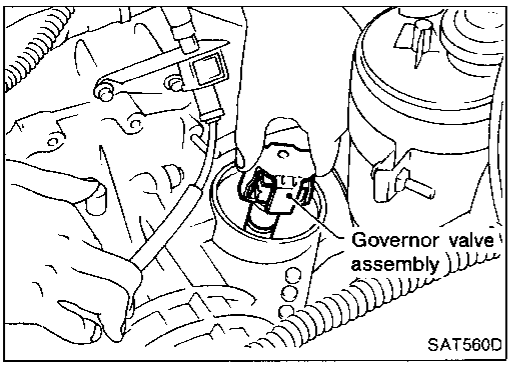
Governor Valve

— RL4F03A only —

1. Remove air duct.
2. Remove governor cap snap ring and spacer.
3. Remove governor cap.



4. Remove governor valve assembly from transaxle.
5. Check governor valve assembly if necessary — Refer to "DISASSEMBLY", AT-152.

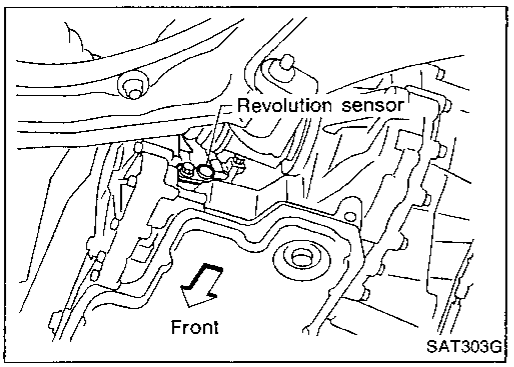


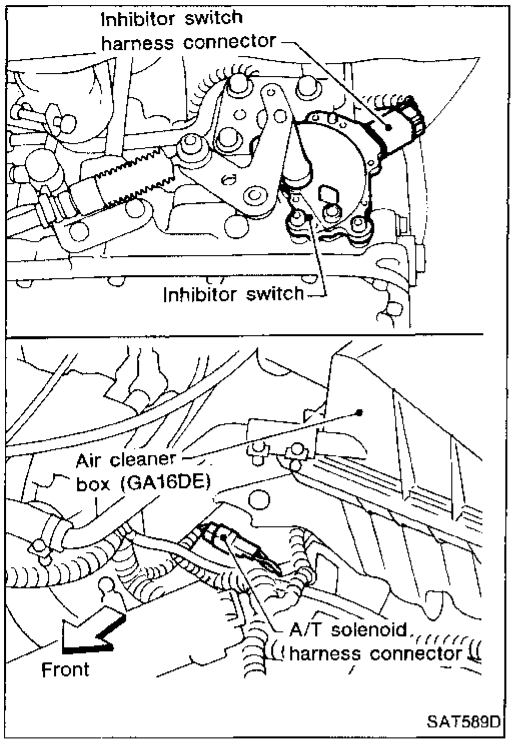
Revolution Sensor Replacement

— RE4F03V only —

1. Disconnect revolution sensor harness connector.
2. Remove revolution sensor from A/T.
3. Reinstall any part removed.

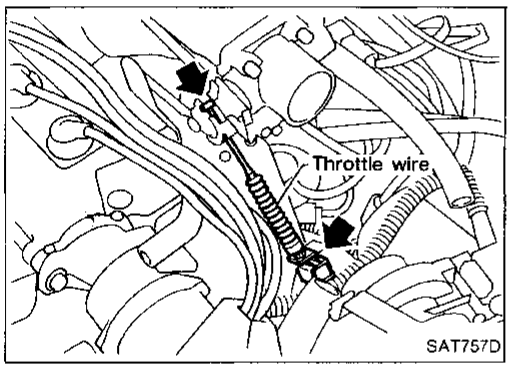
Always use new sealing parts.



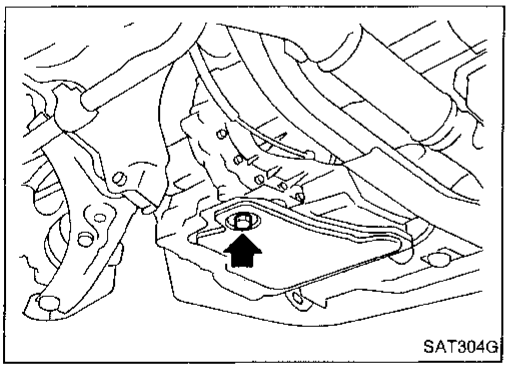


Removal

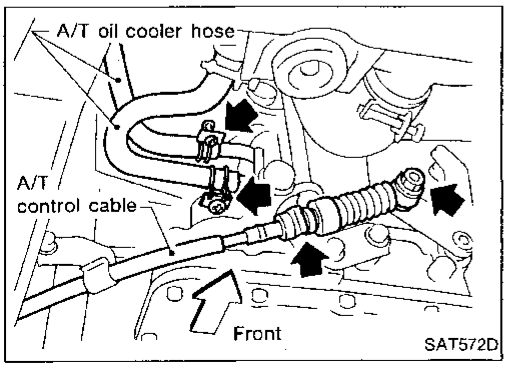
- Remove battery and bracket.
- Remove air duct.
- Disconnect A/T solenoid harness connector, inhibitor switch harness connector and revolution sensor harness connector (RE4F03V).



- Disconnect throttle wire at engine side (RL4F03A).

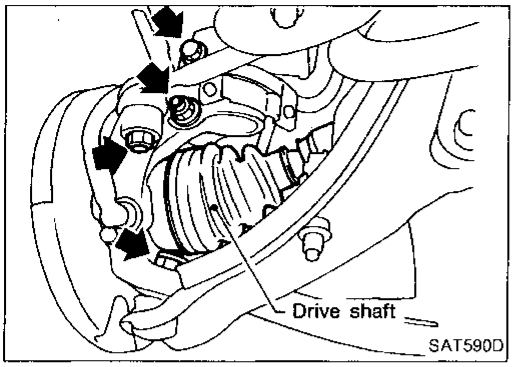


- Drain ATF from transaxle.

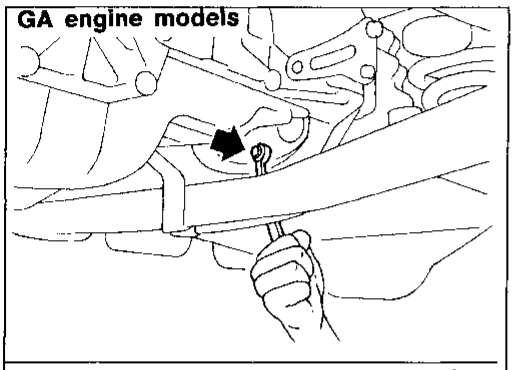


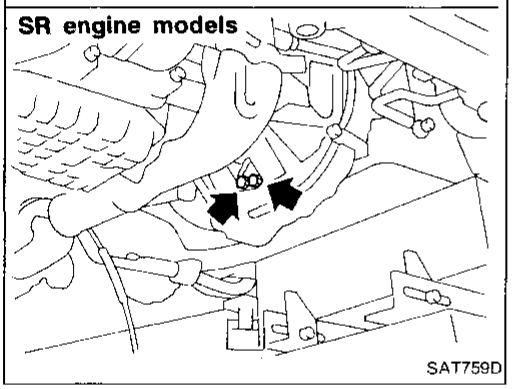
- Disconnect control cable from transaxle.
- Disconnect oil cooler hoses.

Removal (Cont'd)



- Remove drive shafts — Refer to "Section FA".
- Remove front exhaust tube.
- Remove starter motor from transaxle.





- Remove front and rear gussets and engine rear plate (GA engine models).
- Remove rear plate cover (SR engine models).

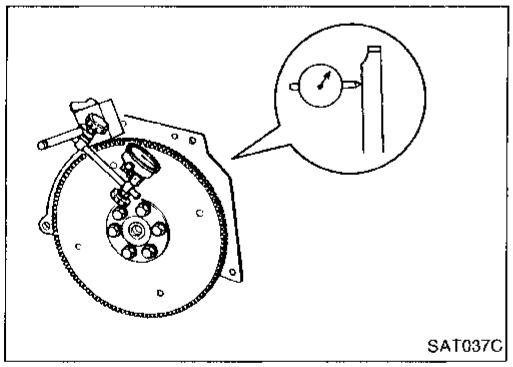
Rotate crankshaft to gain access to securing bolts.

- Support engine by placing a jack under oil pan.

Do not place jack under oil pan drain plug.

- Support transaxle with a jack.
- Remove mountings from transaxle.
- Remove bolts fixing A/T to engine.
- Lower transaxle while supporting it with a jack.

Installation



- Drive plate runout

  Maximum allowable runout:

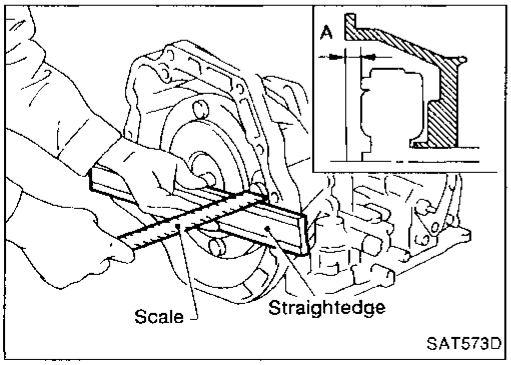
  GA engine models

  0.5 mm (0.020 in)

  SR engine models

  0.2 mm (0.008 in)

  If this runout is out of specification, replace drive plate with ring gear.



- When connecting torque converter to transaxle, measure distance "A" to be certain that they are correctly assembled.

  Distance "A":

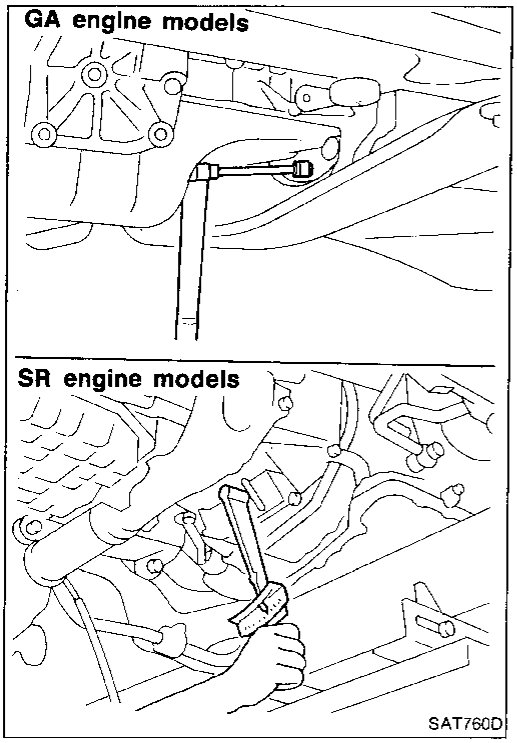
  GA engine models

  21.1 mm (0.831 in) or more

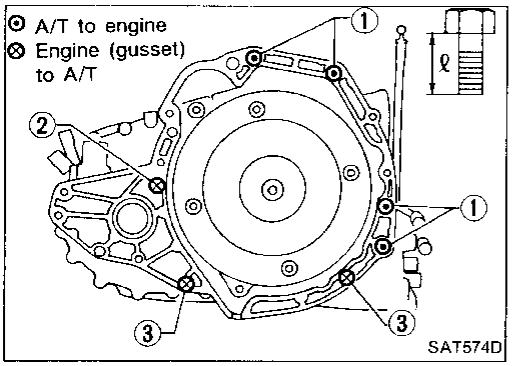
  SR engine models

  15.9 mm (0.626 in) or more

Installation (Cont'd)



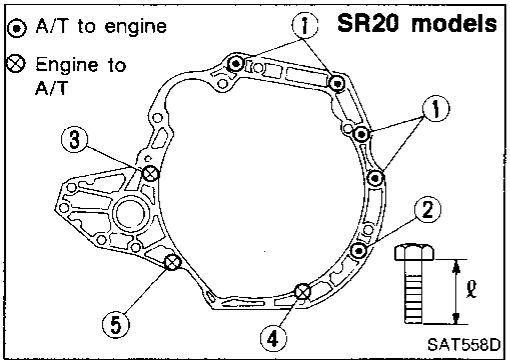
- Install torque converter to drive plate.
- **After installing converter to drive plate, rotate crankshaft several turns and check to be sure that transaxle rotates freely without binding.**



- Tighten bolts fixing transaxle

RL4F03A

Bolt No.	Tightening torque N·m (kg-m, ft-lb)	Bolt length "ℓ" mm (in)
①	30 - 40 (3.1 - 4.1, 22 - 30)	50 (1.97)
②	30 - 40 (3.1 - 4.1, 22 - 30)	30 (1.18)
③	16 - 21 (1.6 - 2.1, 12 - 15)	25 (0.98)
Front gusset to engine	30 - 40 (3.1 - 4.1, 22 - 30)	20 (0.79)
Rear gusset to engine	16 - 21 (1.6 - 2.1, 12 - 15)	16 (0.63)



RE4F03V

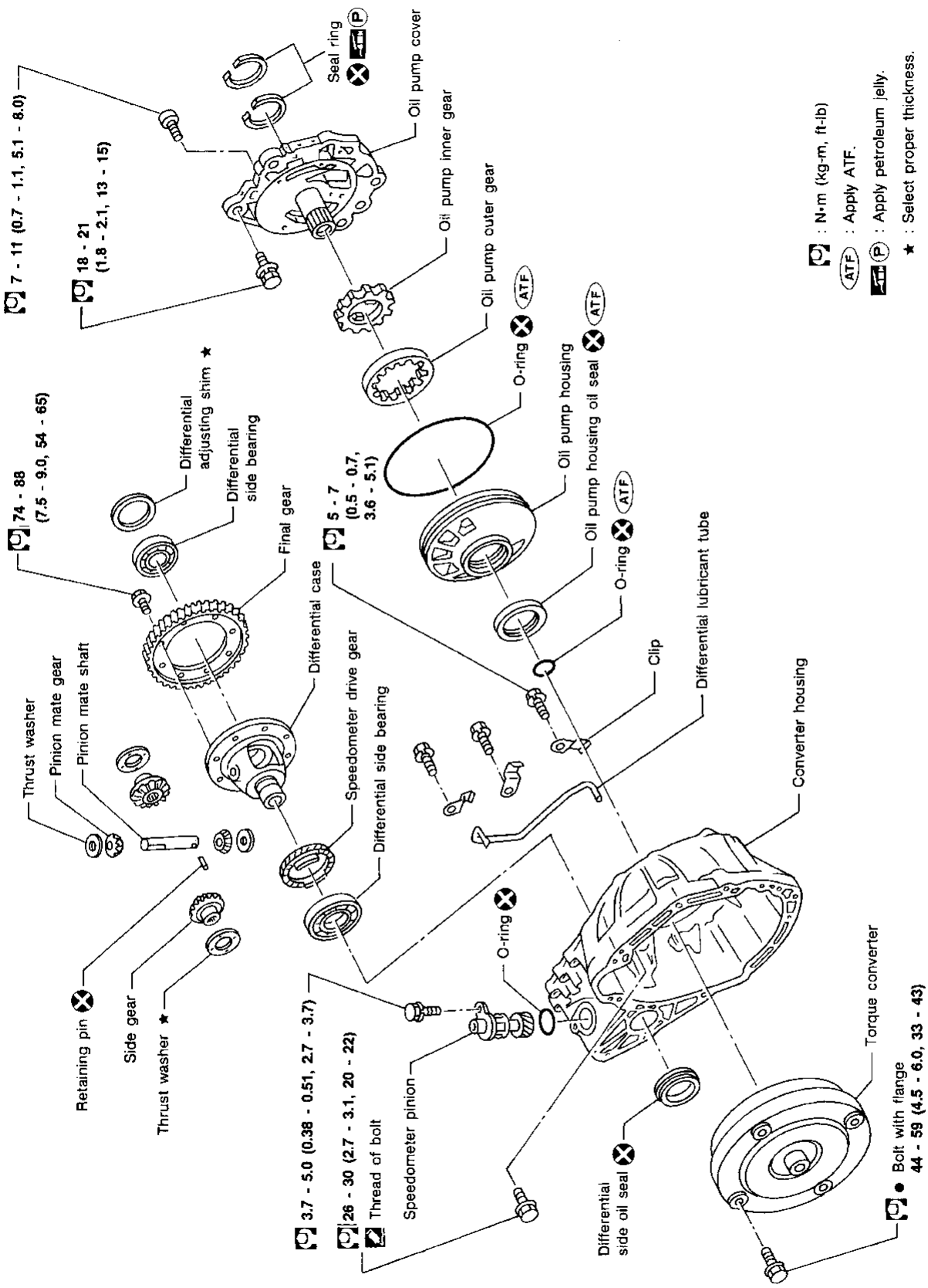
Bolt No.	Tightening torque N·m (kg-m, ft-lb)	Bolt length "ℓ" mm (in)
①	70 - 79 (7.1 - 8.1, 51 - 59)	55 (2.17)
②	70 - 79 (7.1 - 8.1, 51 - 59)	50 (1.97)
③	70 - 79 (7.1 - 8.1, 51 - 59)	65 (2.56)
④	16 - 21 (1.6 - 2.1, 12 - 15)	35 (1.38)
⑤	16 - 21 (1.6 - 2.1, 12 - 15)	45 (1.77)

- Reinstall any part removed.

Installation (Cont'd)

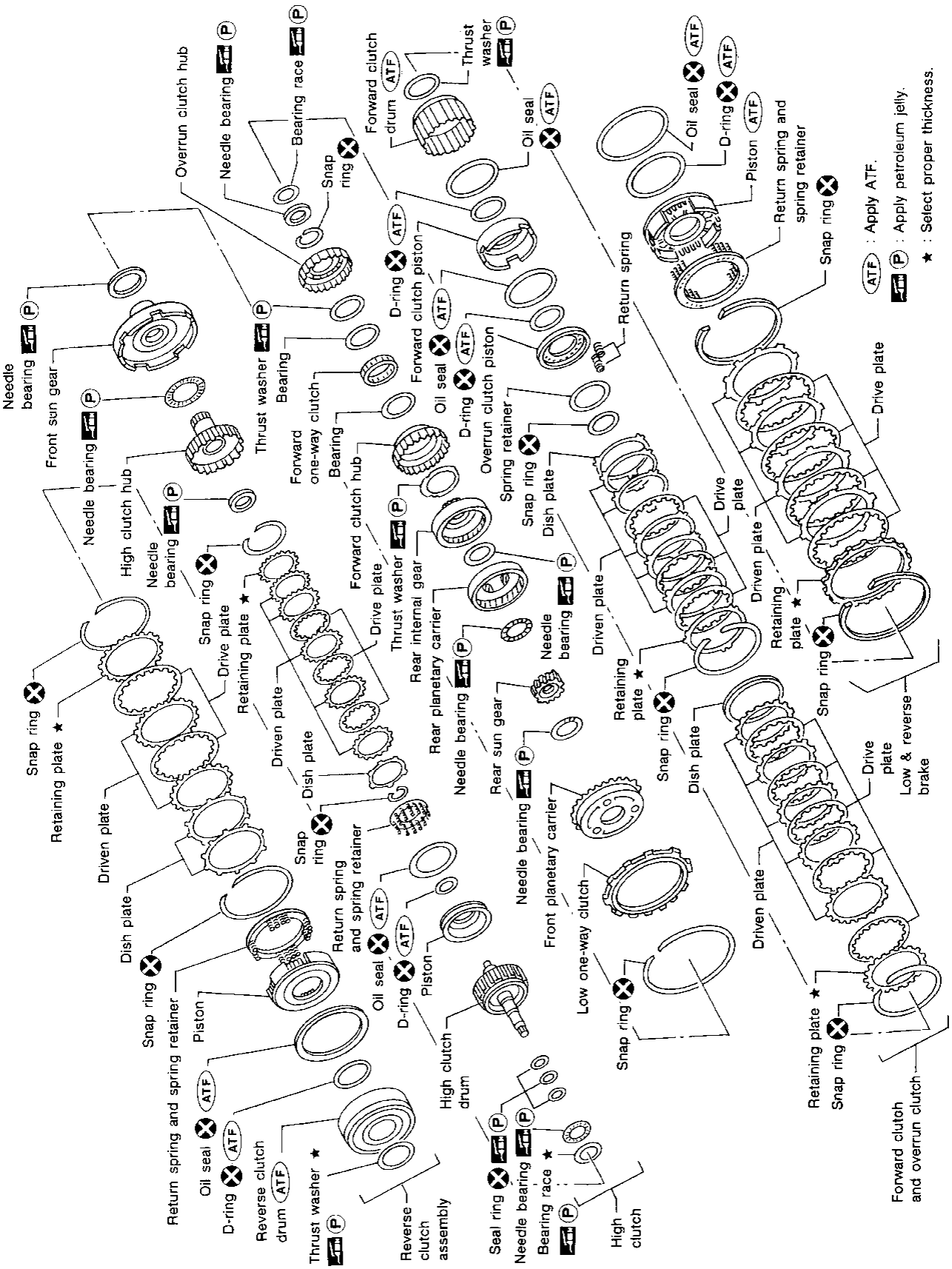
- Adjust control cable. Refer to ON-VEHICLE SERVICE.
- Adjust throttle wire. Refer to ON-VEHICLE SERVICE. (RL4F03A only)
- Check continuity of inhibitor switch. Refer to TROUBLE DIAGNOSES.
- Refill transaxle with ATF and check fluid level.
- Move selector lever through all positions to be sure that transaxle operates correctly. With parking brake applied, idle engine. Move selector lever through "N" to "D", to "2", to "1" and "R" positions. A slight shock should be felt through the hand gripping the selector each time the transaxle is shifted.
- Perform road test — Refer to "ROAD TESTING", AT-16, 41.

RL4F03A



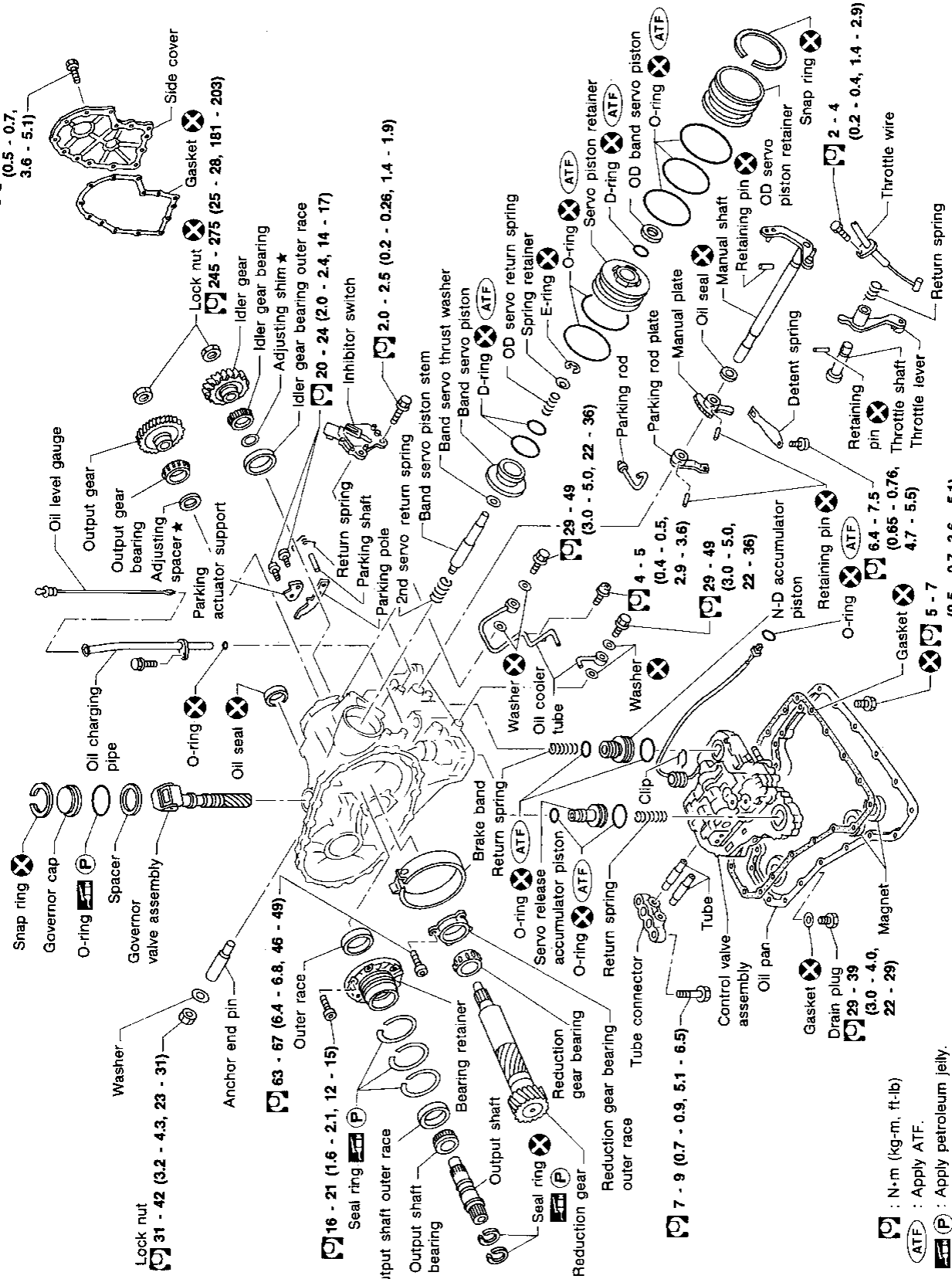
SAT910DA

RL4F03A (Cont'd)



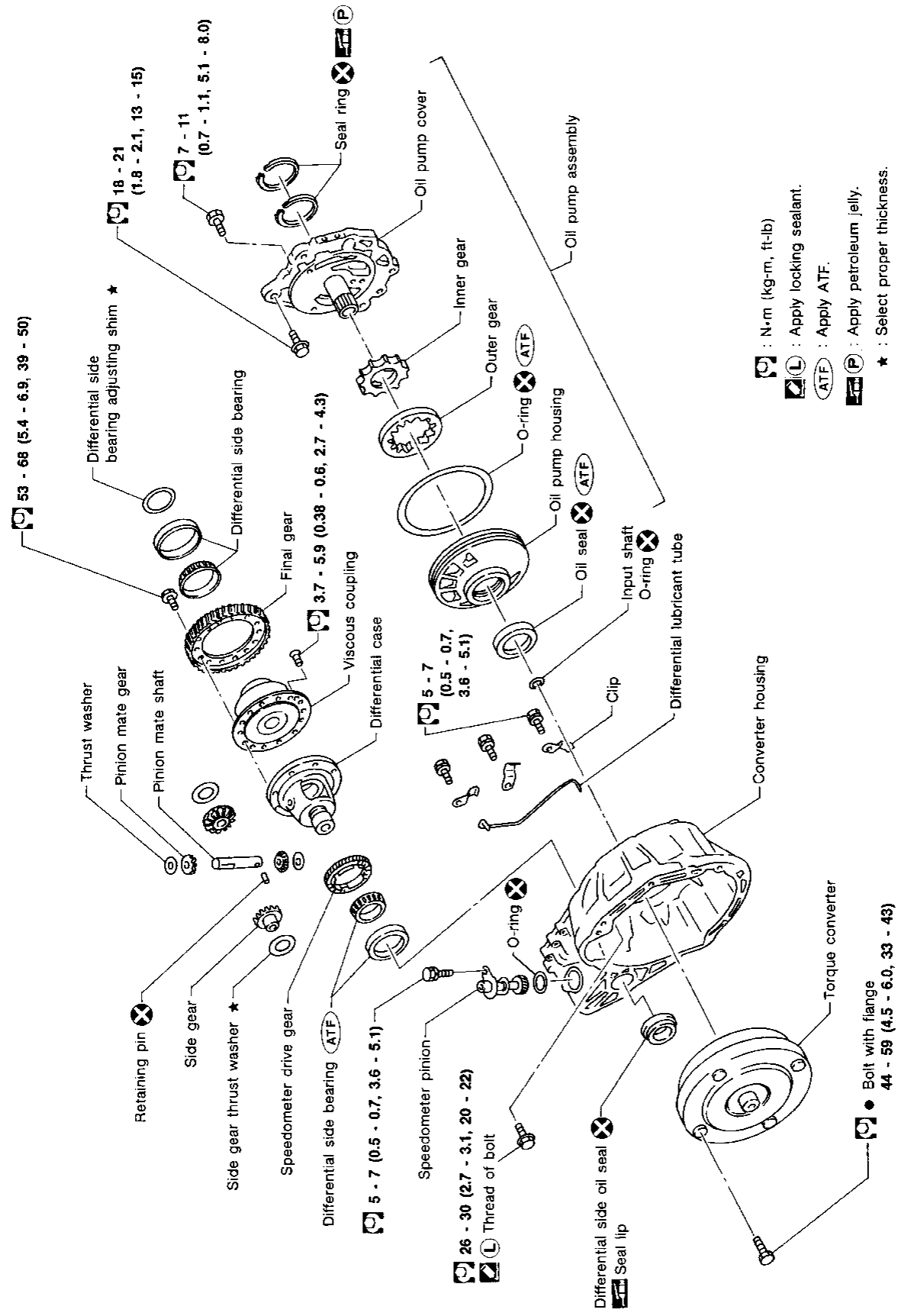
SAT023EA

RL4F03A (Cont'd)

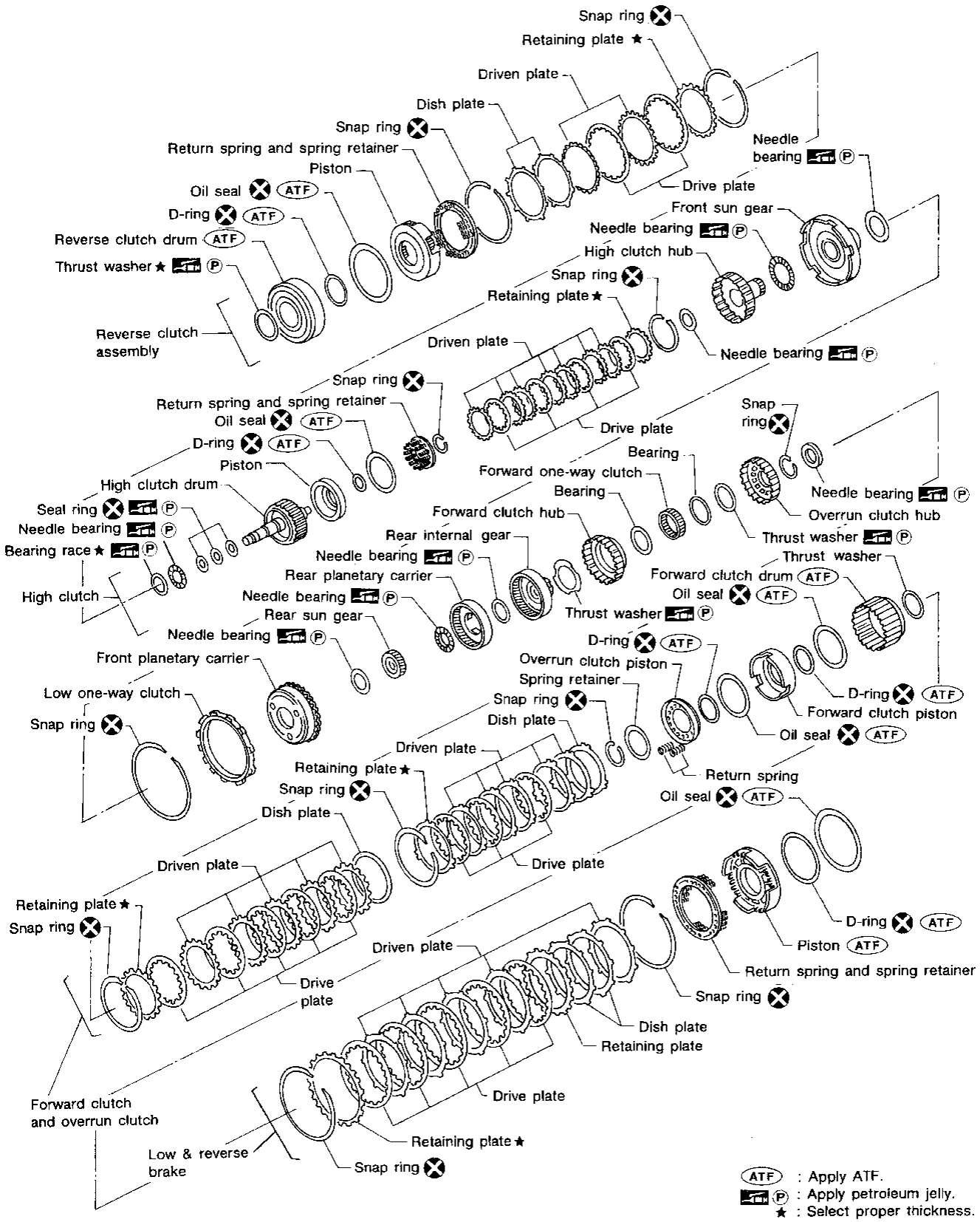


SAT270EA

RE4F03V

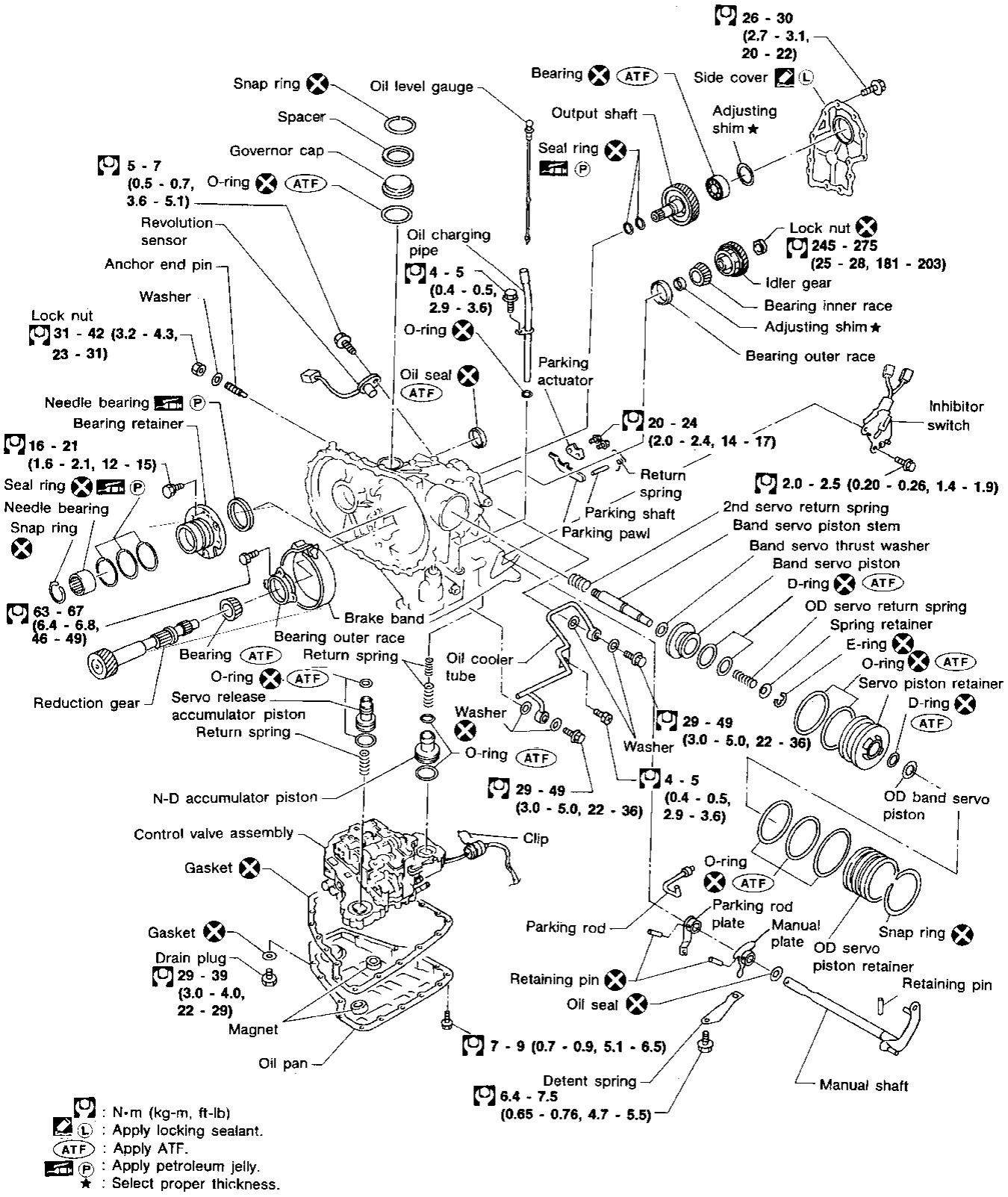


SAT795DA


Snap ring
Retaining plate ★
Driven plate
Dish plate
Snap ring
Return spring and spring retainer
Piston
Oil seal ATF
D-ring ATF
Reverse clutch drum ATF
Thrust washer ★ P
Reverse clutch assembly
Needle bearing P
Drive plate
Front sun gear
Needle bearing P
High clutch hub
Snap ring
Retaining plate ★
Driven plate
Needle bearing P
Drive plate
Snap ring
Return spring and spring retainer
Oil seal ATF
D-ring ATF
Piston
High clutch drum
Seal ring P
Needle bearing P
Bearing race ★ P
High clutch
Snap ring
Bearing
Forward one-way clutch
Bearing
Forward clutch hub
Rear internal gear
Needle bearing P
Rear planetary carrier
Needle bearing P
Rear sun gear
Needle bearing P
Front planetary carrier
Low one-way clutch
Snap ring
Needle bearing P
Overrun clutch hub
Thrust washer P
Thrust washer
Forward clutch drum ATF
Oil seal ATF
Thrust washer P
D-ring ATF
Overrun clutch piston
Spring retainer
Snap ring
Dish plate
Driven plate
Retaining plate ★
Snap ring
Dish plate
Driven plate
Retaining plate ★
Snap ring
Drive plate
Drive plate
Driven plate
Drive plate
Retaining plate
Retaining plate ★
Snap ring
Forward clutch and overrun clutch
Low & reverse brake
Snap ring
D-ring ATF
Forward clutch piston
Oil seal ATF
Return spring
Oil seal ATF
D-ring ATF
Piston ATF
Return spring and spring retainer
Snap ring
ATF : Apply ATF.
P : Apply petroleum jelly.
★ : Select proper thickness.

SAT305GA

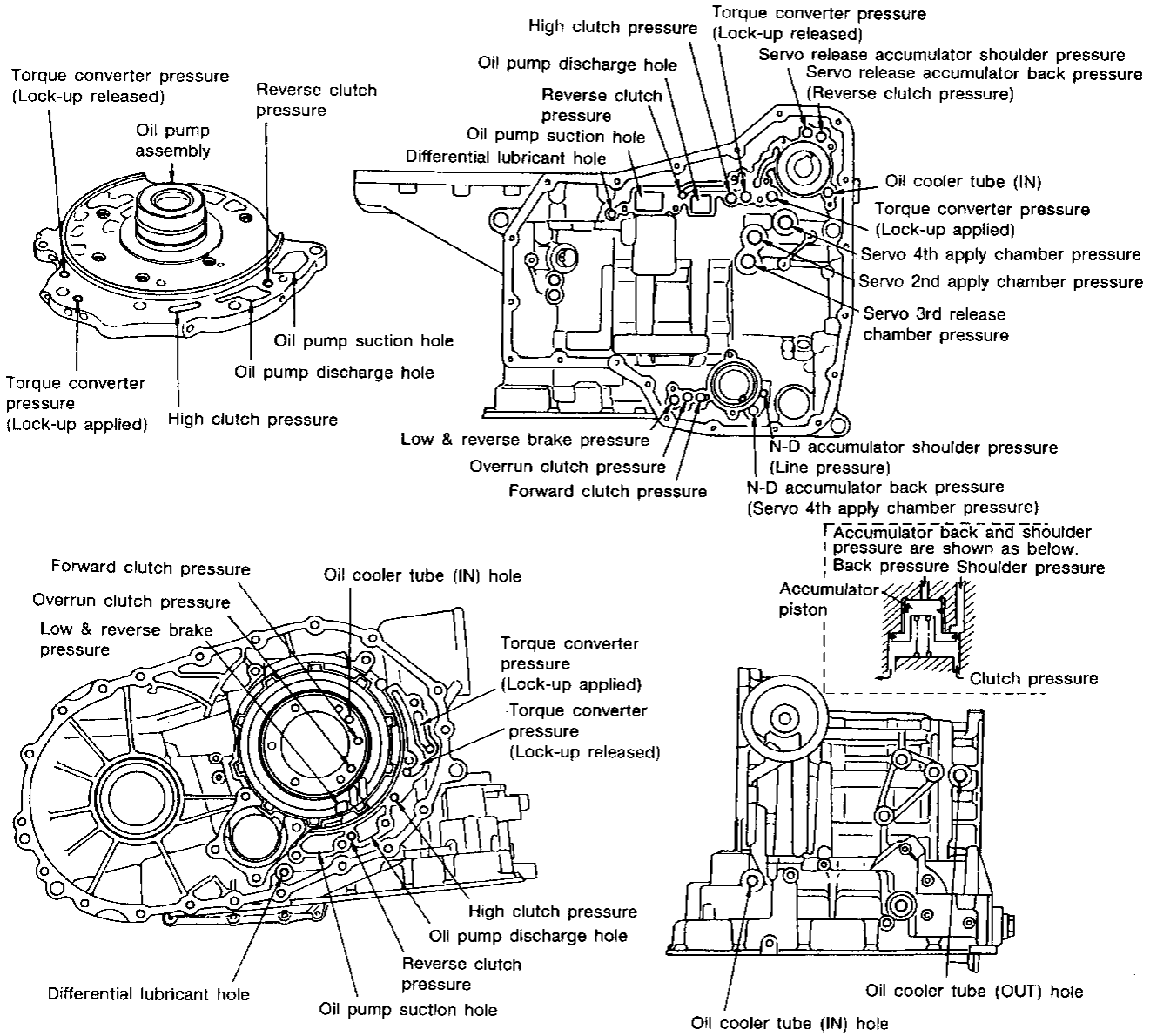
RE4F03V (Cont'd)



: N·m (kg-m, ft-lb)
(L) : Apply locking sealant.
(ATF) : Apply ATF.
(P) : Apply petroleum jelly.
★ : Select proper thickness.

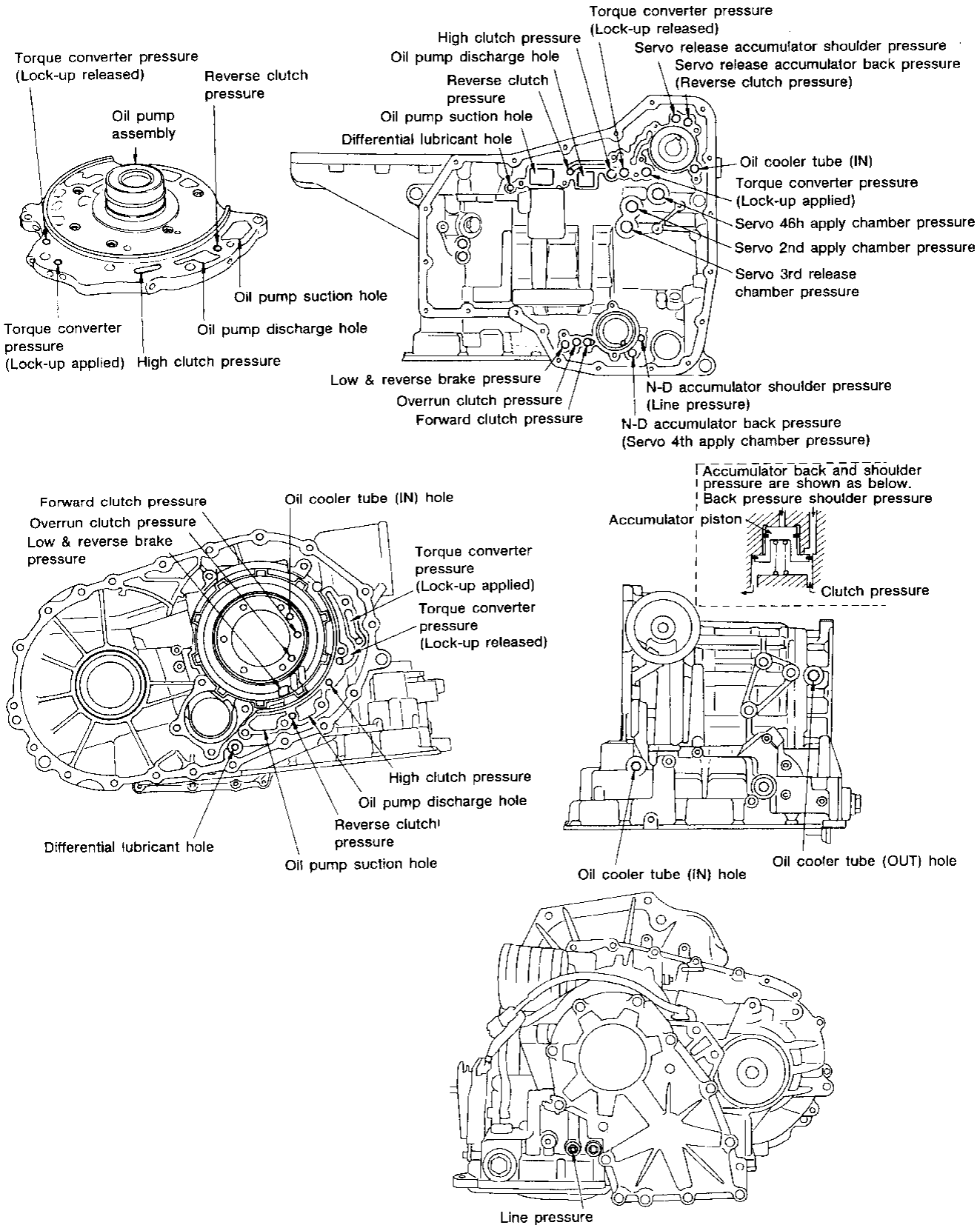
SAT306GA

Oil Channel — RL4F03A



SAT586DA

Oil Channel — RE4F03V



SAT308GA

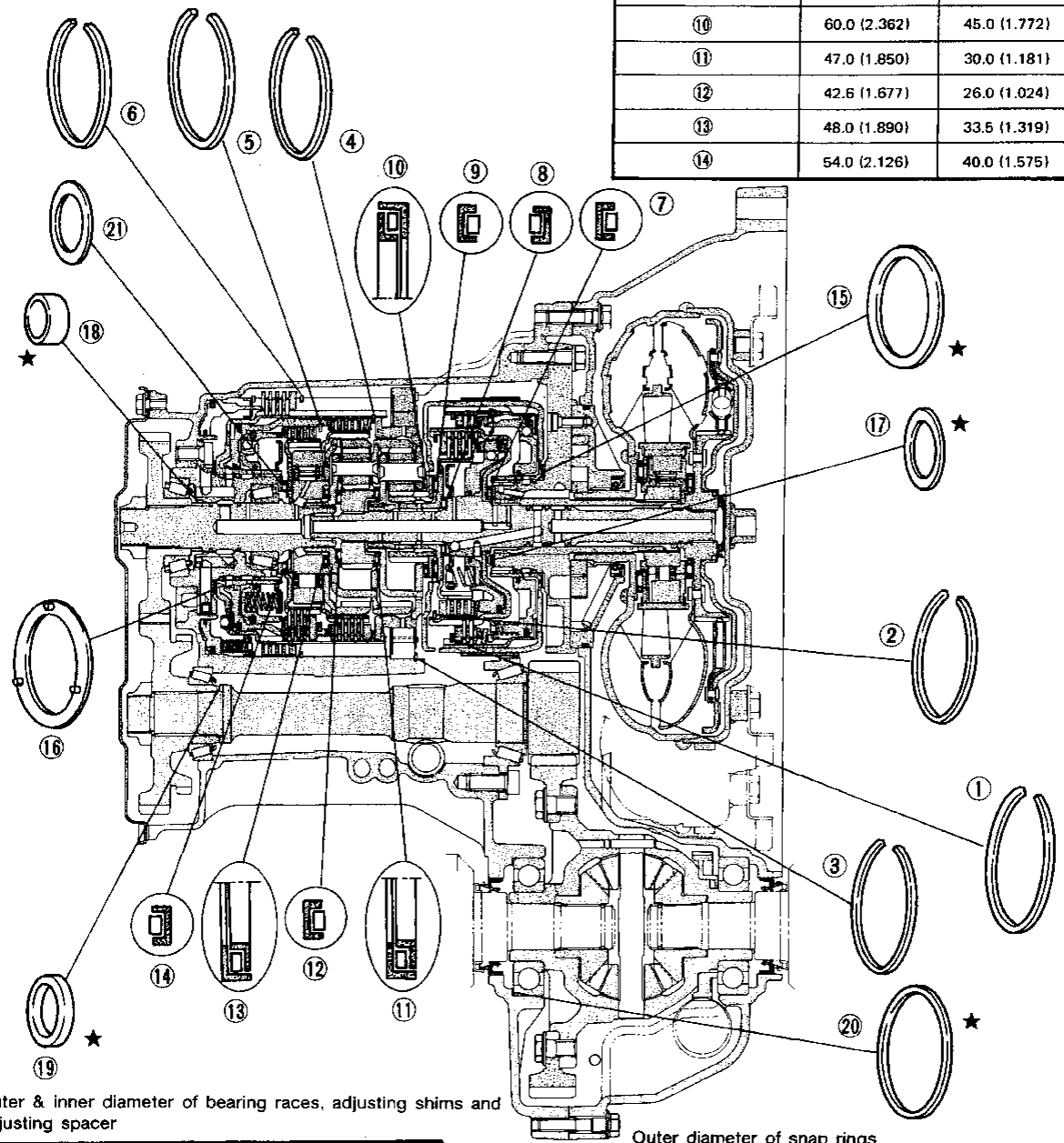
Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings — RL4F03A

Outer diameter and color of thrust washers

Item number	Outer diameter mm (in)	Color
⑮	72.0 (2.835)	black
⑯	78.5 (3.091)	

Outer and inner diameter of needle bearings

Item number	Outer diameter mm (in)	Inner diameter mm (in)
⑦	47.0 (1.850)	32.0 (1.260)
⑧	35.0 (1.378)	20.0 (0.787)
⑨	60.0 (2.362)	42.0 (1.654)
⑩	60.0 (2.362)	45.0 (1.772)
⑪	47.0 (1.850)	30.0 (1.181)
⑫	42.6 (1.677)	26.0 (1.024)
⑬	48.0 (1.890)	33.5 (1.319)
⑭	54.0 (2.126)	40.0 (1.575)



Outer & inner diameter of bearing races, adjusting shims and adjusting spacer

Item number	Outer diameter mm (in)	Inner diameter mm (in)
⑰	48.0 (1.890)	33 (1.30)
⑱	29.0 (1.142)	25.0 (0.984)
⑲	34.5 (1.358)	26.1 (1.028)
⑳	79.5 (3.130)	72.0 (2.835)
㉑	55.0 (2.165)	42.0 (1.654)

★: Select proper thickness

Outer diameter of snap rings

Item number	Outer diameter mm (in)
①	142.0 (5.59)
②	113.0 (4.45)
③	162.4 (6.39)
④	135.4 (5.33)
⑤	126.0 (4.96)
⑥	159.0 (6.26)

SAT587D

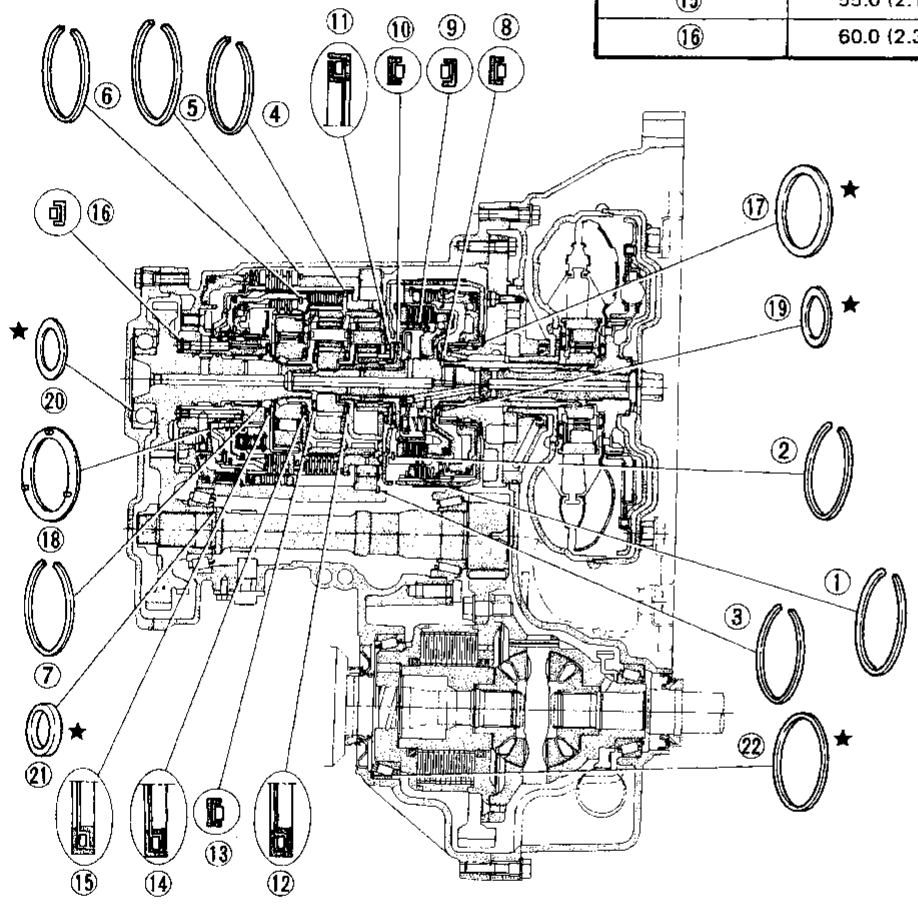
Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings — RE4F03V

Outer diameter and color of thrust washers

Item number	Outer diameter mm (in)	Color
⑰	72.0 (2.835)	Black
⑱	78.5 (3.091)	

Outer & inner diameter of needle bearings

Item number	Outer diameter mm (in)	Inner diameter mm (in)
⑧	47.0 (1.850)	32.0 (1.260)
⑨	35.0 (1.378)	20.0 (0.787)
⑩	60.0 (2.362)	42.0 (1.654)
⑪	60.0 (2.362)	45.0 (1.772)
⑫	47.0 (1.850)	30.0 (1.181)
⑬	42.6 (1.677)	26.0 (1.024)
⑭	48.0 (1.890)	33.5 (1.319)
⑮	55.0 (2.165)	40.5 (1.594)
⑯	60.0 (2.362)	40.0 (1.575)



★: Select proper thickness.

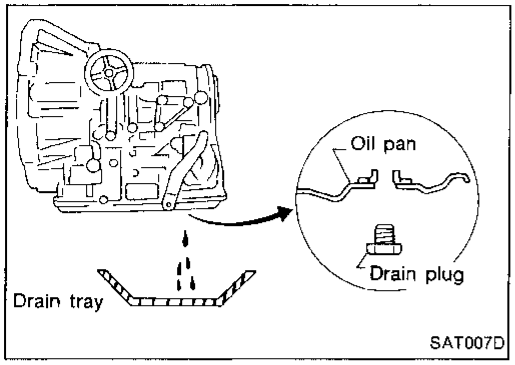
Outer & inner diameter of bearing race and adjusting shims

Item number	Outer diameter mm (in)	Inner diameter mm (in)
⑲	48.0 (1.890)	33.0 (1.299)
⑳	72.0 (2.835)	61.0 (2.402)
㉑	34.5 (1.358)	26.1 (1.028)
㉒	105.0 (4.13)	96.0 (3.78)

Outer diameter of snap rings

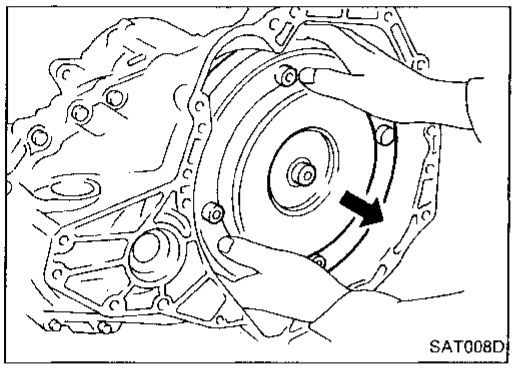
Item number	Out diameter mm (in)
①	142.0 (5.59)
②	113.0 (4.45)
③	162.4 (6.39)
④	135.4 (5.33)
⑤	159.0 (6.26)
⑥	126.0 (4.96)
⑦	40.5 (1.594)

SAT325G

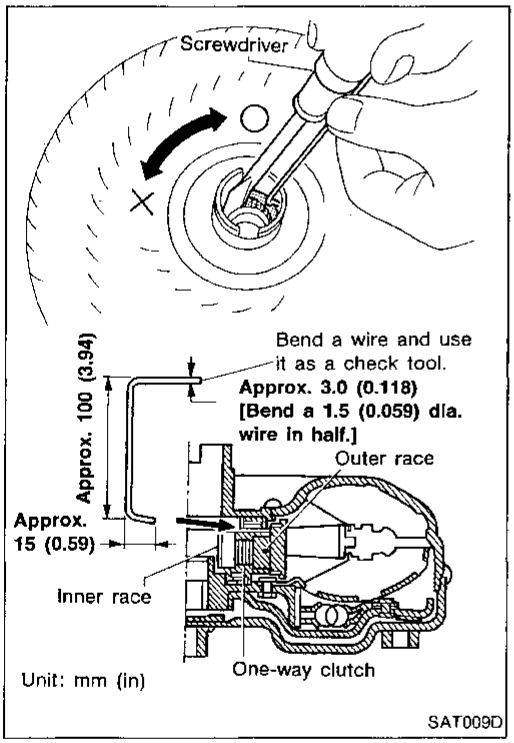


— RL4F03A & RE4F03V —

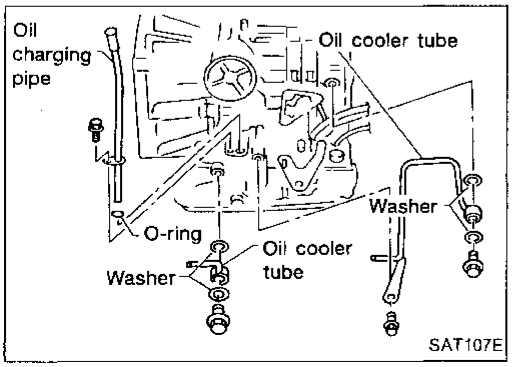
1. Drain ATF through drain plug.



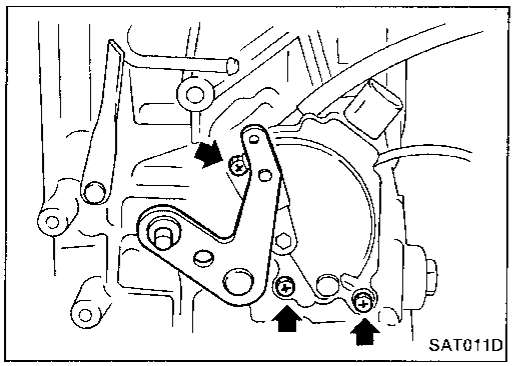
2. Remove torque converter.



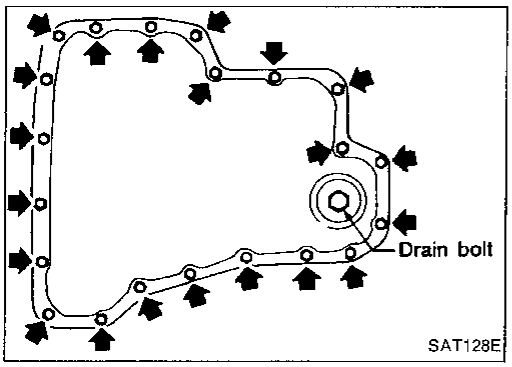
3. Check torque converter one-way clutch using check tool as shown at left.
   a. Insert check tool into the groove of bearing support built into one-way clutch outer race.
   b. While fixing bearing support with check tool, rotate one-way clutch spline using flat-bladed screwdriver.
   c. Check inner race rotates clockwise only. If not, replace torque converter assembly.



4. Remove oil charging pipe and oil cooler tube.



5. Set manual lever to "P" position.
6. Remove inhibitor switch.

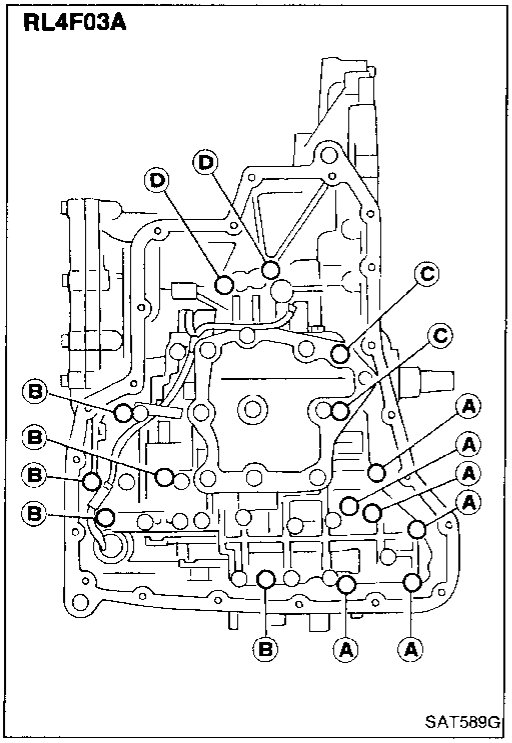


7. Remove oil pan and oil pan gasket.

- **Do not reuse oil pan bolts.**

8. Check foreign materials in oil pan to help determine cause of malfunction. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, 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.

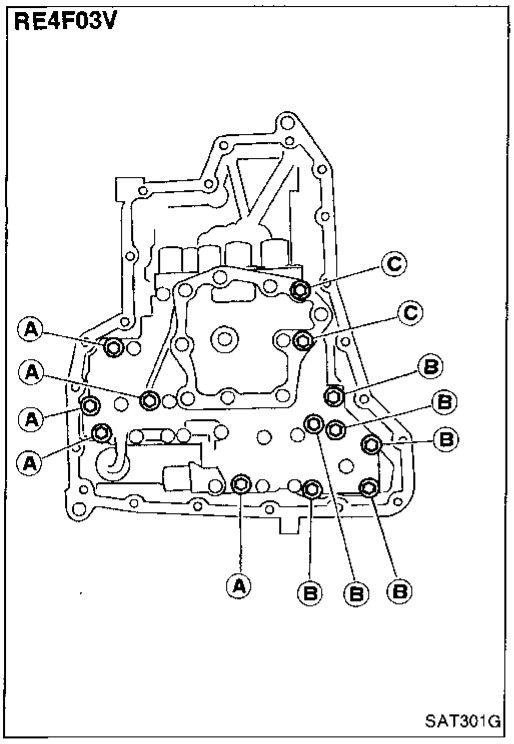
RL4F03A



9. Remove control valve assembly according to the following procedures.

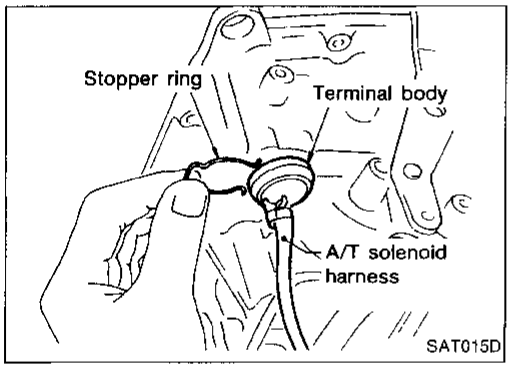
— RL4F03A —

a. Remove control valve assembly mounting bolts Ⓐ, Ⓑ, Ⓒ and Ⓓ.

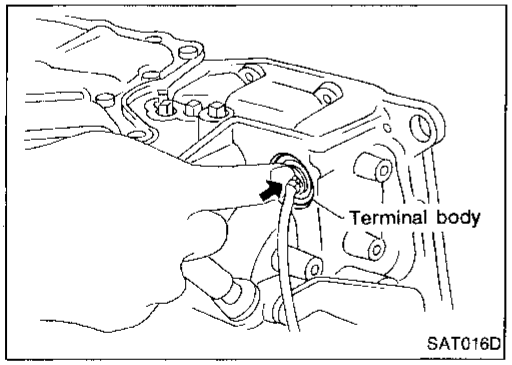


— RE4F03V —

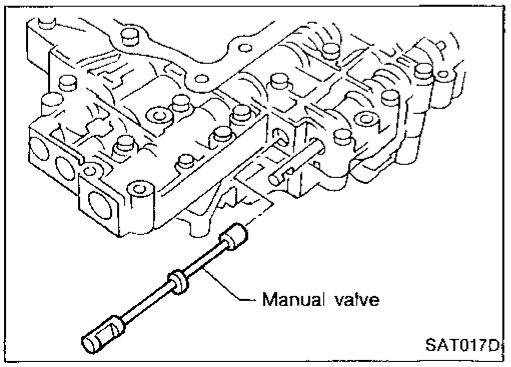
a. Remove control valve assembly mounting bolts Ⓐ, Ⓑ and Ⓒ.



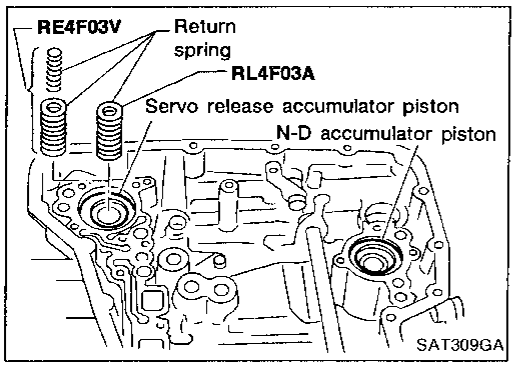
b. Remove stopper ring from terminal body.



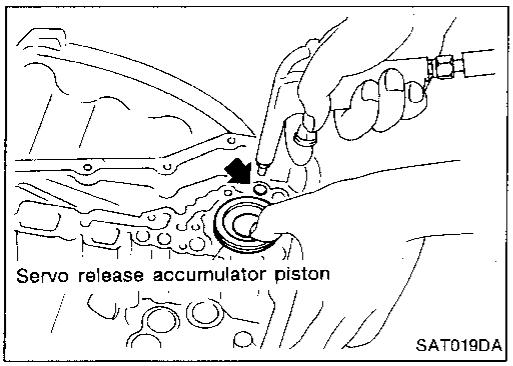
c. Push terminal body into transmission case and draw out solenoid harness.



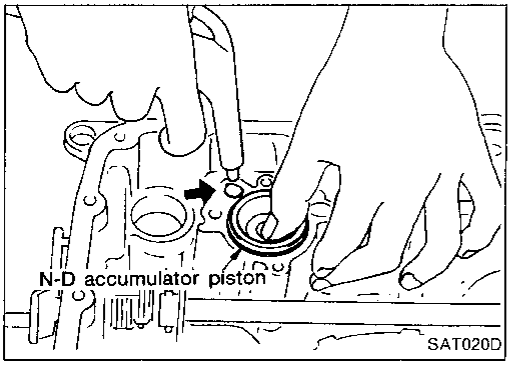
10. Remove manual valve from control valve assembly as a precaution.



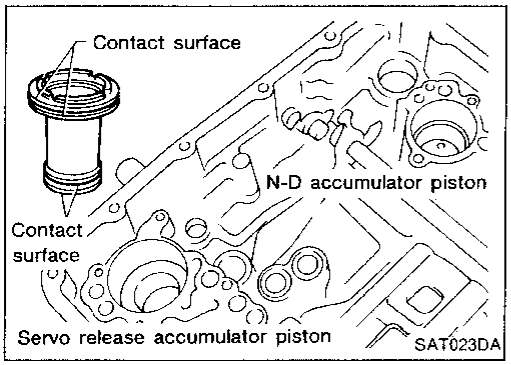
11. Remove return spring from servo release accumulator piston.



12. Remove servo release accumulator piston with compressed air.
13. Remove O-rings from servo release accumulator piston.



14. Remove N-D accumulator piston and return spring with compressed air.
15. Remove O-rings from N-D accumulator piston.



16. Check accumulator pistons and contact surface of transmission case for damage.
17. Check accumulator return springs for damage and free length.

RL4F03A

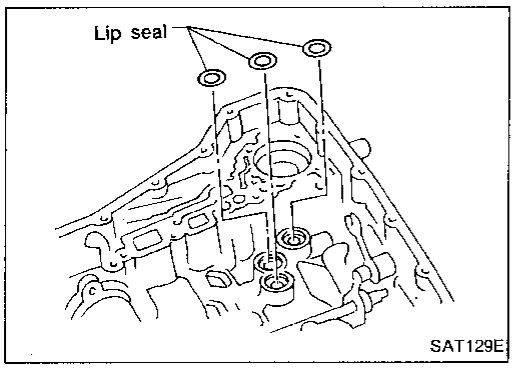
Unit: mm (in)

Spring	Free length	Outer diameter
Servo release accumulator spring	56.4 (2.220)	21.0 (0.827)
N-D accumulator spring	43.5 (1.713)	28.0 (1.102)

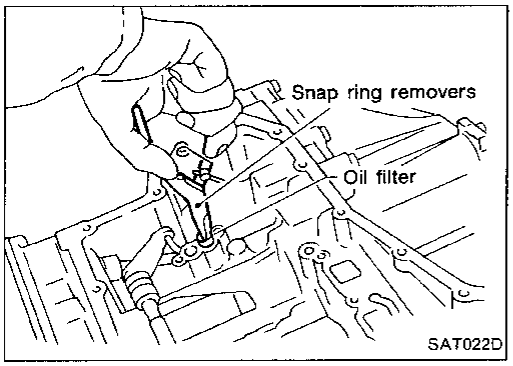
RE4F03V

Unit: mm (in)

Spring		Free length	Outer diameter
Servo release accumulator spring	Outer	52.5 (2.067)	19.6 (0.772)
	Inner	52.0 (2.047)	15.1 (0.594)
N-D accumulator spring		43.5 (1.713)	28.0 (1.102)

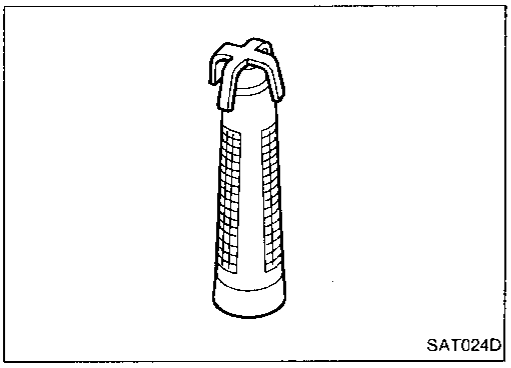


18. Remove lip seals from band servo oil port.

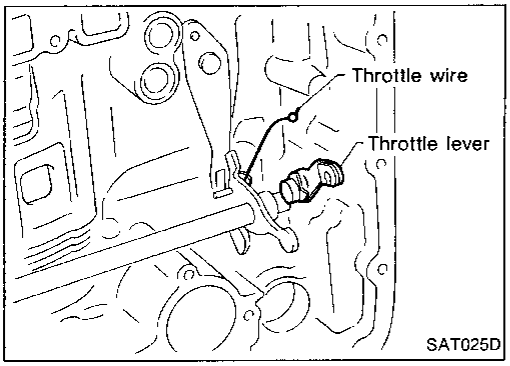


— RL4F03A only —

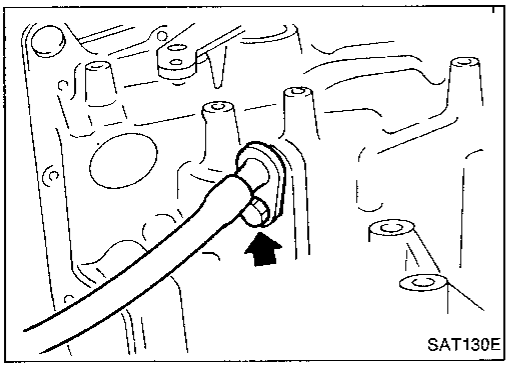
19. Remove oil filter for governor.



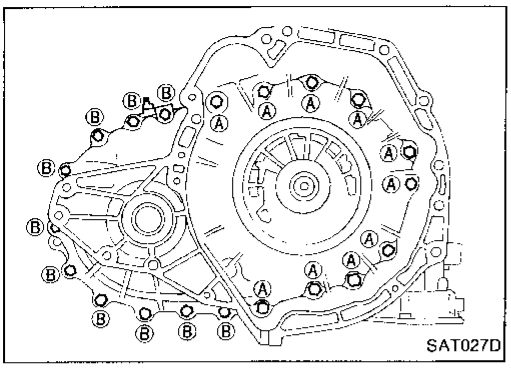
20. Check oil filter for governor for damage or clogging.



21. Remove throttle wire from throttle lever.



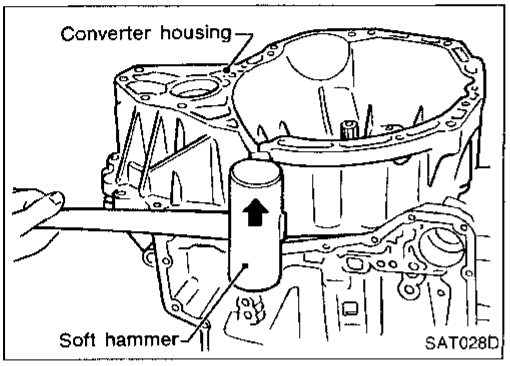
22. Remove throttle wire mounting bolt.
23. Draw out throttle wire from transmission case.



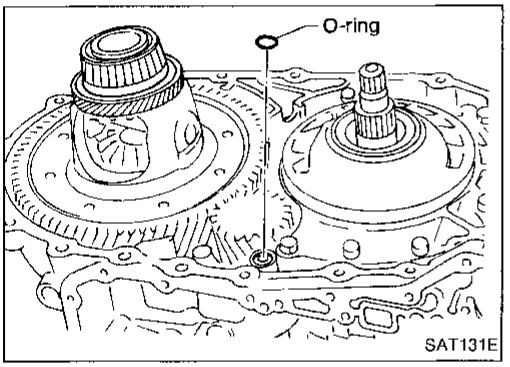
— RL4F03A & RE4F03V —

24. Remove converter housing according to the following procedures.

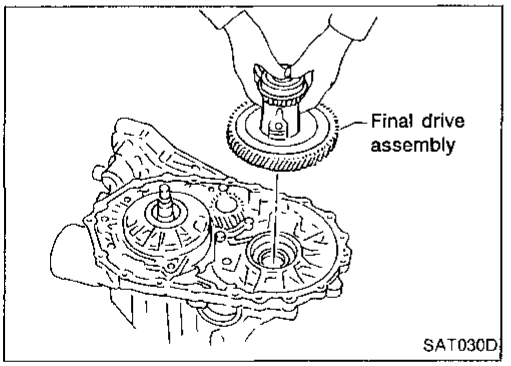
a. Remove converter housing mounting bolts Ⓐ and Ⓑ.



b. Remove converter housing.

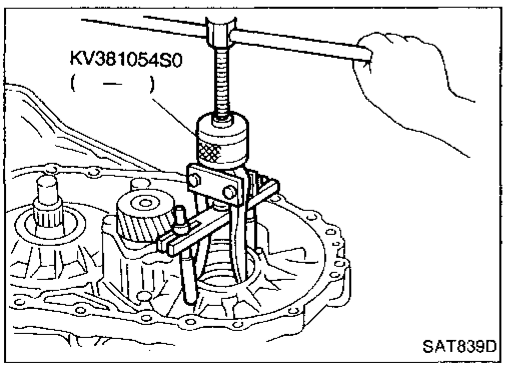


c. Remove O-ring from differential oil port.

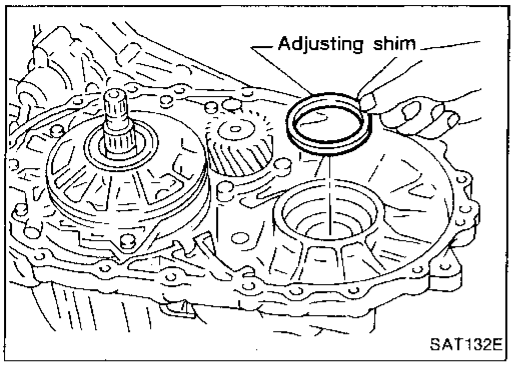


25. Remove final drive assembly from transmission case.

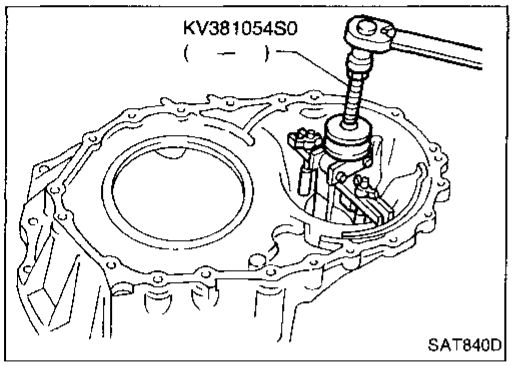
If it is difficult to lift up by hand, tap final drive slightly with a soft hammer (RL4F03A).



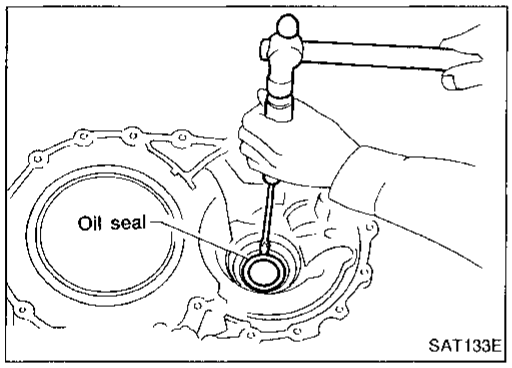
26. Remove differential side bearing outer race from transmission case (RE4F03V).



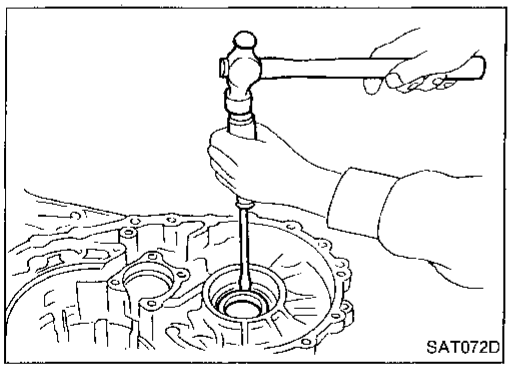
27. Remove differential side bearing adjusting shim from transmission case.



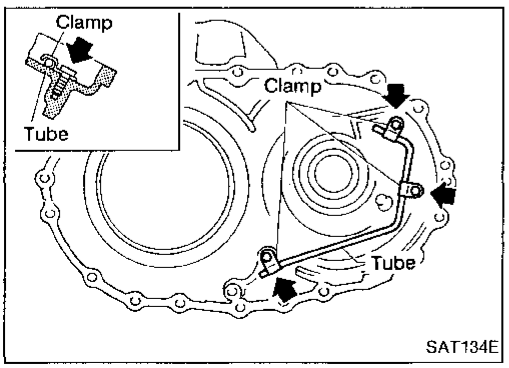
28. Remove differential side bearing outer race from converter housing (RE4F03V).



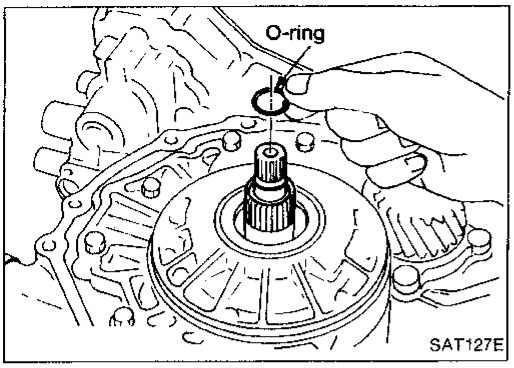
29. Remove oil seal from converter housing using a screwdriver.
- **Be careful not to damage case.**



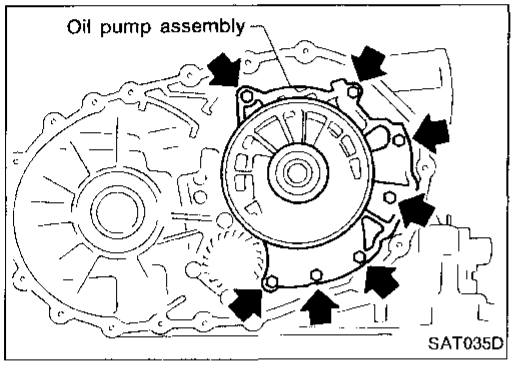
30. Remove side oil seal from transmission case using a screwdriver.



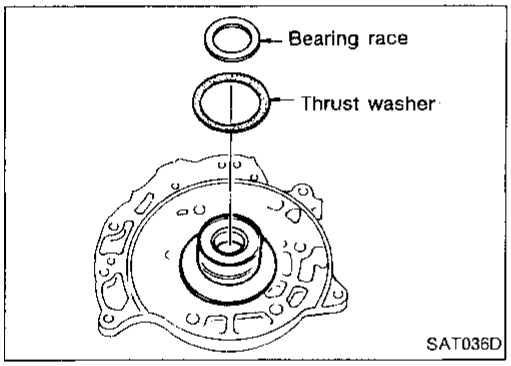
31. Remove oil tube from converter housing.



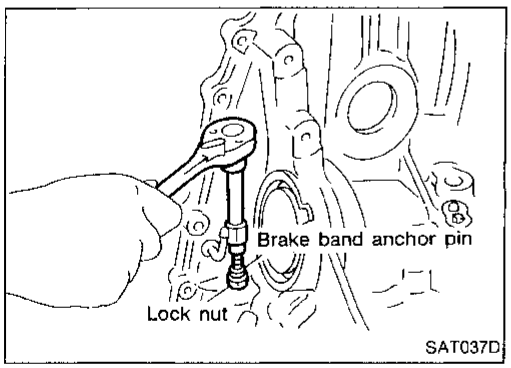
32. Remove oil pump according to the following procedures.
a. Remove O-ring from input shaft.



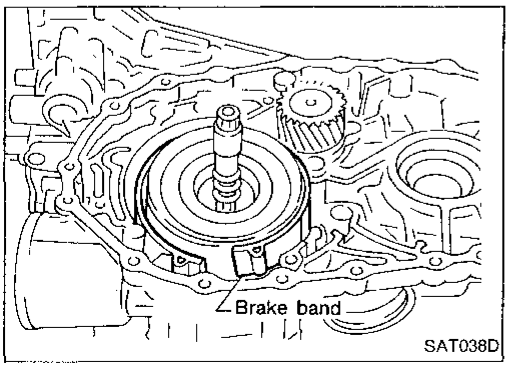
b. Remove oil pump assembly from transmission case.



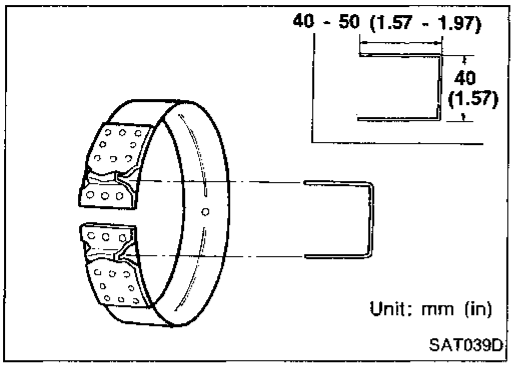
c. Remove thrust washer and bearing race from oil pump assembly.



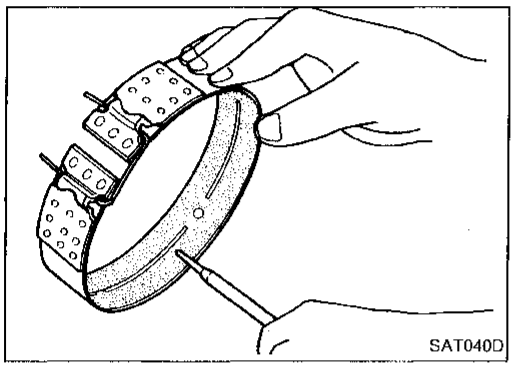
33. Remove brake band according to the following procedures.
a. Loosen lock nut, then back off band servo anchor end pin.



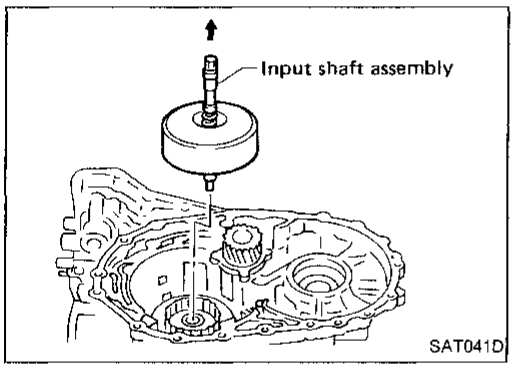
b. Remove brake band from transmission case.



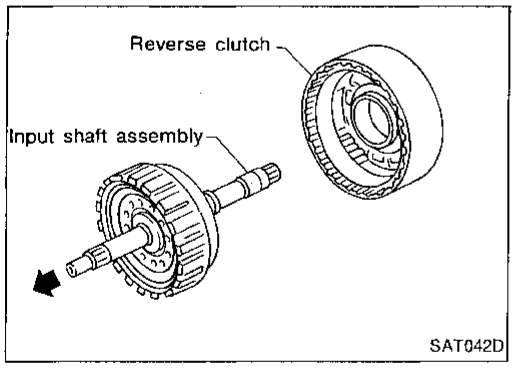
- **To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. When removing the brake band, always secure it with a clip as shown in the figure at left.**
  Leave the clip in position after removing the brake band.



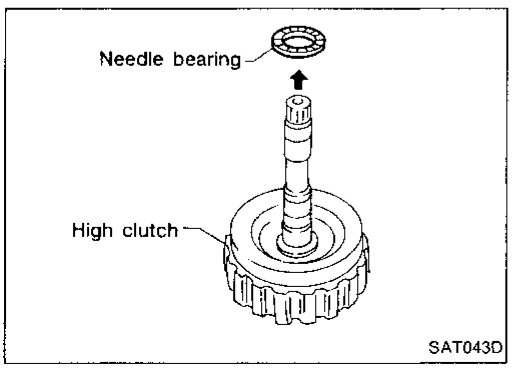
c. Check brake band facing for damage, cracks, wear or burns.



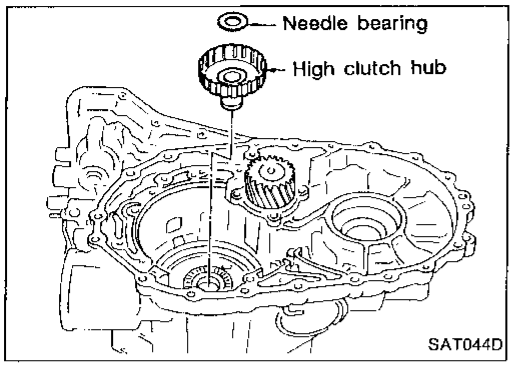
34. Remove input shaft assembly (high clutch) and reverse clutch according to the following procedures.
a. Remove input shaft assembly (high clutch) with reverse clutch.



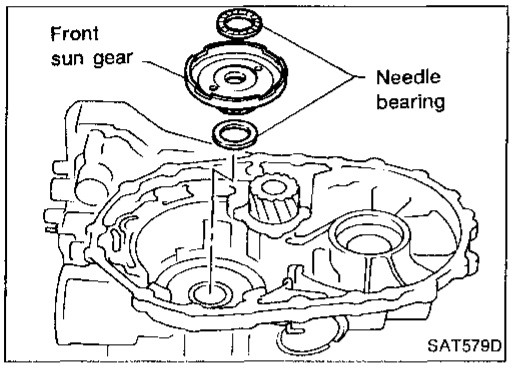
b. Remove input shaft assembly (high clutch) from reverse clutch.



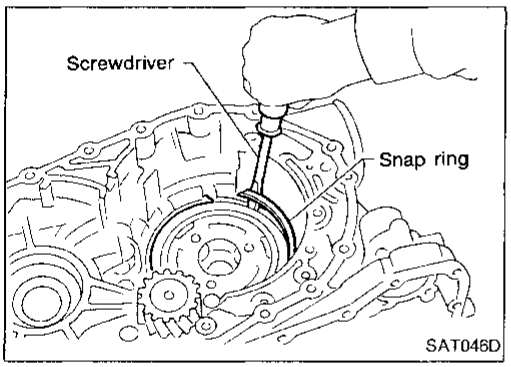
c. Remove needle bearing from high clutch drum.
d. Check input shaft assembly and needle bearing for damage or wear.



35. Remove high clutch hub and needle bearing from transmission case.
36. Check high clutch hub and needle bearing for damage or wear.

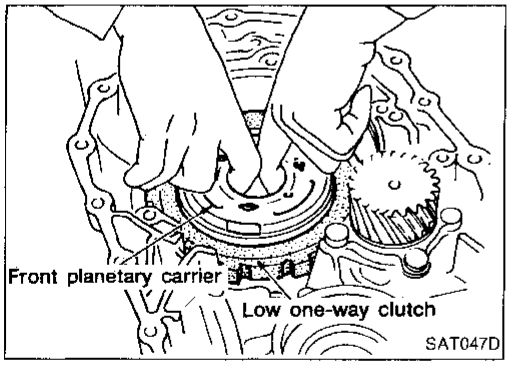


37. Remove front sun gear and needle bearings from transmission case.
38. Check front sun gear and needle bearings for damage or wear.

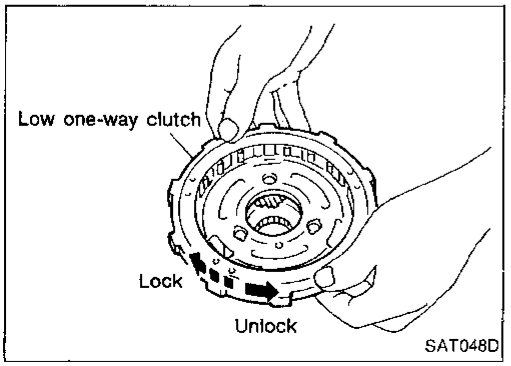


39. Remove front planetary carrier assembly and low one-way clutch according to the following procedures.

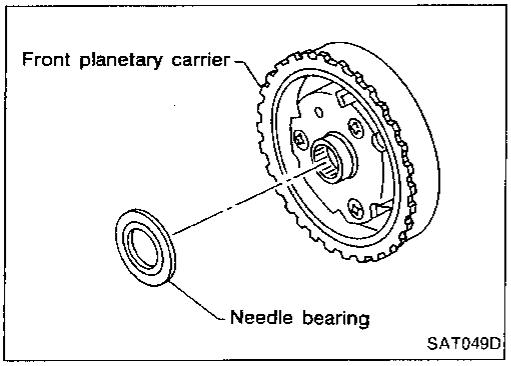
a. Remove snap ring using a screwdriver.



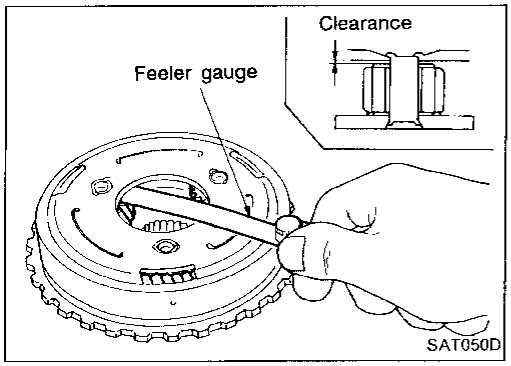
b. Remove front planetary carrier with low one-way clutch.



c. Check that low one-way clutch rotates in the direction of the arrow and locks in the opposite direction.
d. Remove low one-way clutch from front planetary carrier by rotating it in the direction of unlock.



e. Remove needle bearing from front planetary carrier.



f. Check front planetary carrier, low one-way clutch and needle bearing for damage or wear.

g. Check clearance between pinion washer and planetary carrier using feeler gauge.

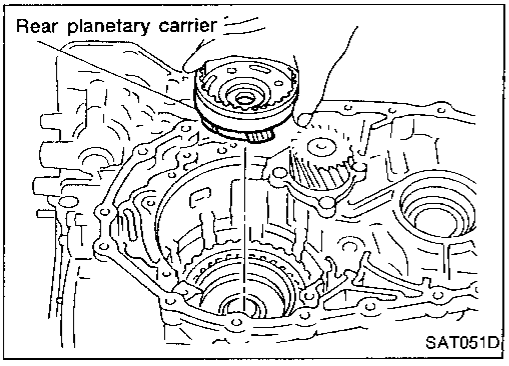
Standard clearance:

0.15 - 0.70 mm (0.0059 - 0.0276 in)

Allowable limit:

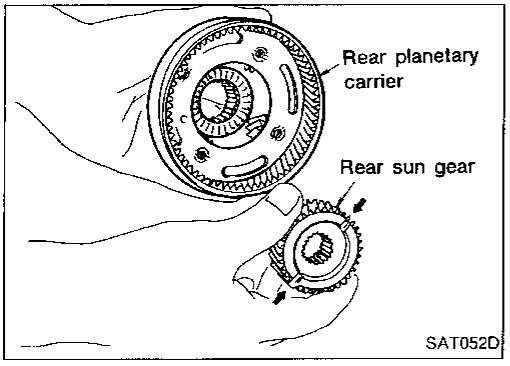
0.80 mm (0.0315 in)

Replace front planetary carrier if the clearance exceeds allowable limit.

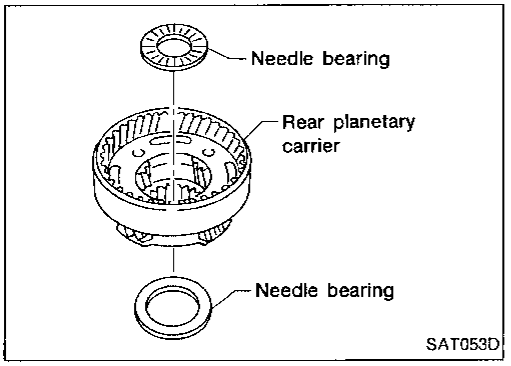


40. Remove rear planetary carrier assembly and rear sun gear according to the following procedures.

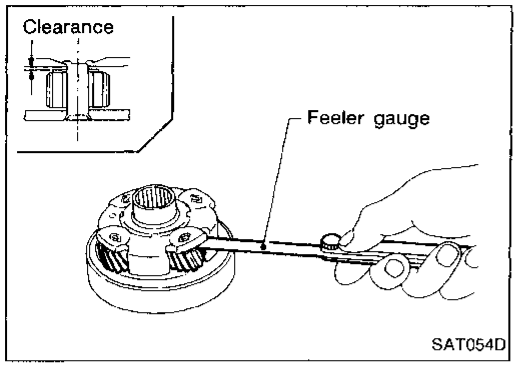
a. Remove rear planetary carrier assembly from transmission case.



b. Remove rear sun gear from rear planetary carrier.



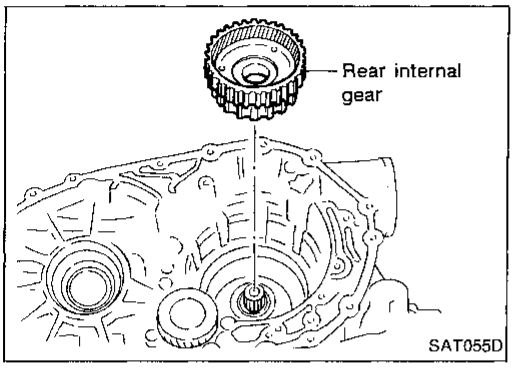
c. Remove needle bearings from rear planetary carrier assembly.



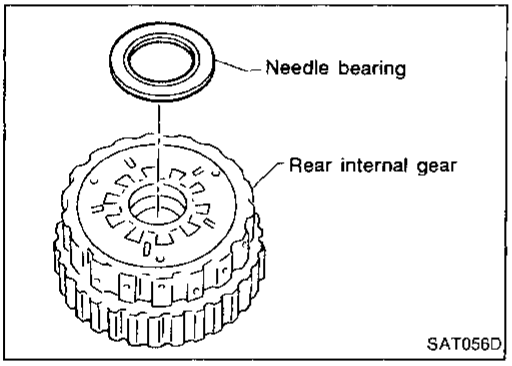
d. Check rear planetary carrier, rear sun gear and needle bearings for damage or wear.
e. Check clearance between pinion washer and rear planetary carrier using feeler gauge.

Standard clearance:
0.15 - 0.70 mm (0.0059 - 0.0276 in)
Allowable limit:
0.80 mm (0.0315 in)

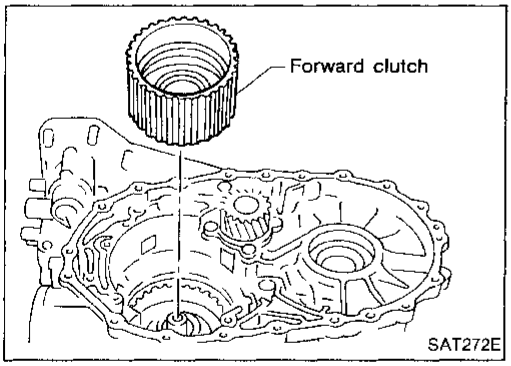
Replace rear planetary carrier if the clearance exceeds allowable limit.



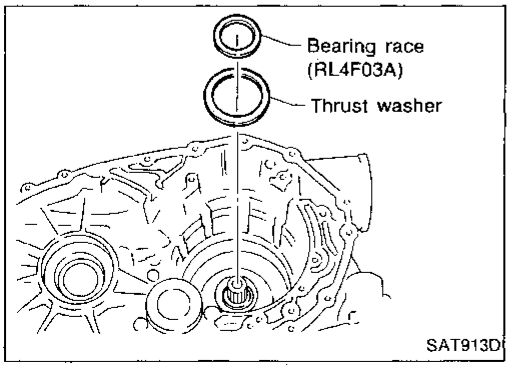
41. Remove rear internal gear from transmission case.



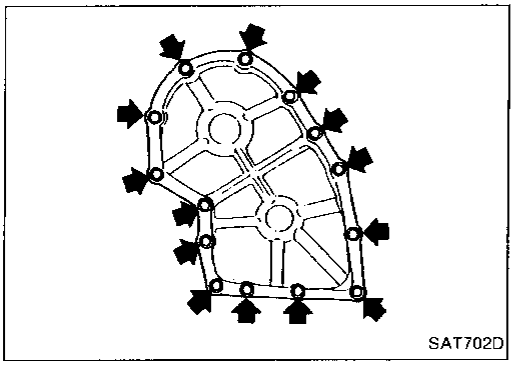
42. Remove needle bearing from rear internal gear.
43. Check needle bearing for damage or wear.



44. Remove forward clutch assembly from transmission case.



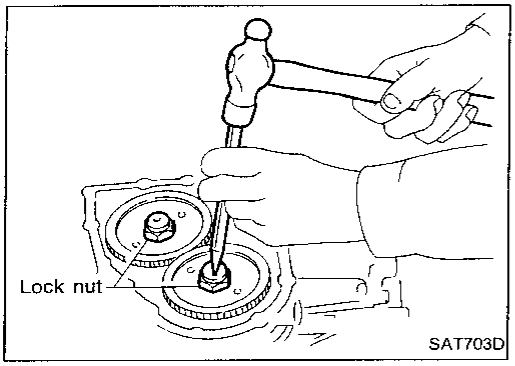
45. Remove thrust washer and bearing race (only RL4F03A) from transmission case.


SAT702D

— RL4F03A —

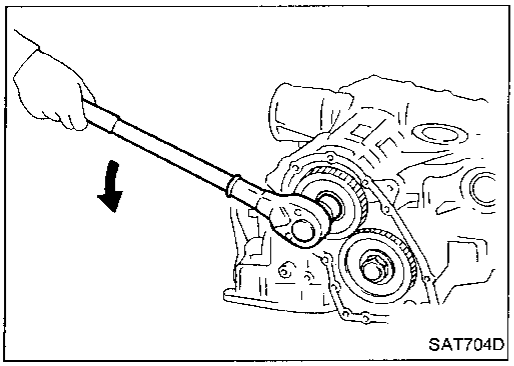
46. Remove output shaft, output gear and reduction gear according to the following procedures.
a. Remove side cover.

- **Do not reuse side cover bolts.**



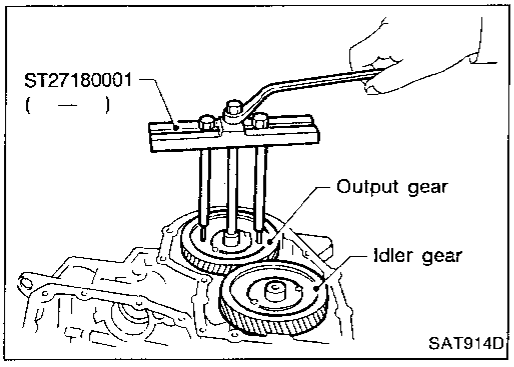
SAT703D

b. Set manual lever to "P" position to fix idler gear and output gear.
c. Unlock both idler gear and output gear lock nuts using a pin punch.


SAT704D

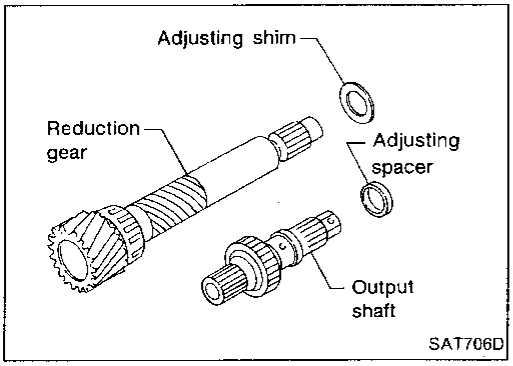
d. Remove idler gear and output gear lock nuts.

- **Do not reuse idler gear and output gear lock nuts.**



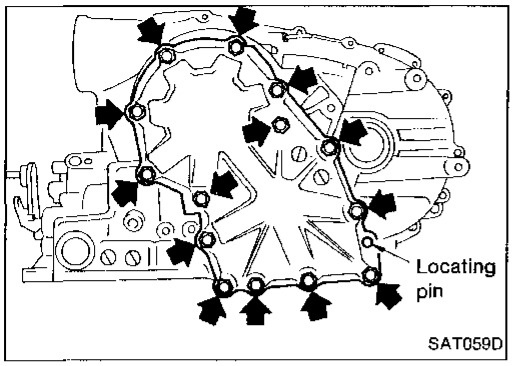
SAT914D

e. Remove idler gear and output gear using a puller.



SAT706D

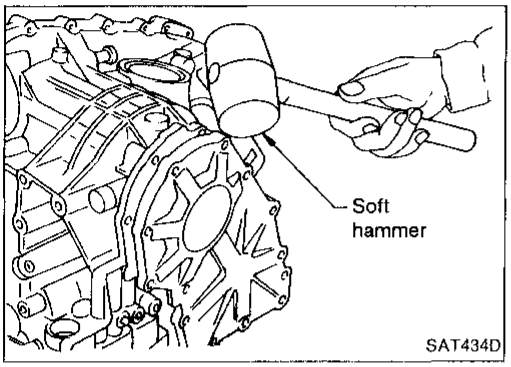
f. Remove reduction gear and output shaft.
g. Remove adjusting shim from reduction gear.
h. Remove adjusting spacer from output shaft.



— RE4F03V —

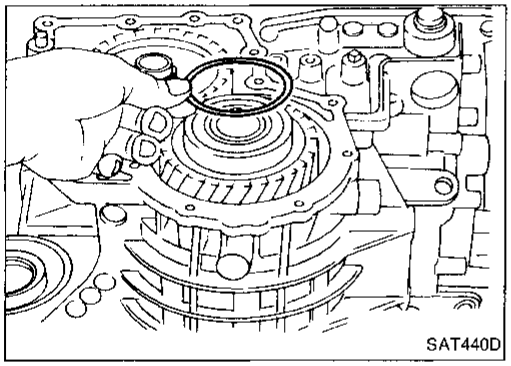
46. Remove output shaft assembly according to the following procedures.

a. Remove side cover bolts.

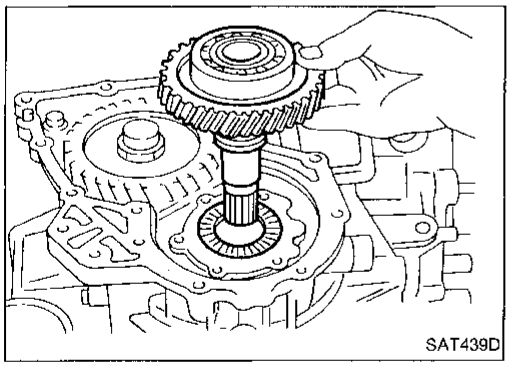


b. Remove side cover by lightly tapping it with a soft hammer.

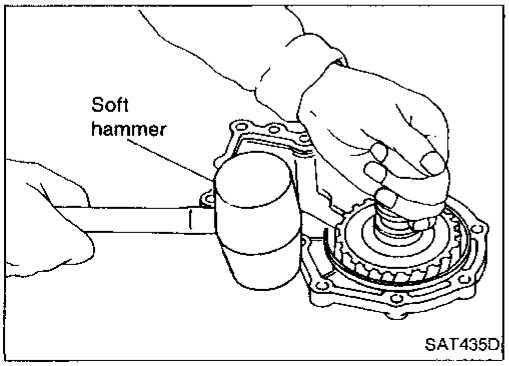
- **Be careful not to drop output shaft assembly as output shaft assembly may be removed together with side cover.**



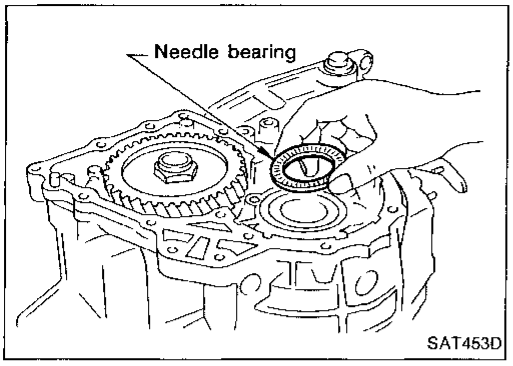
c. Remove adjusting shim.



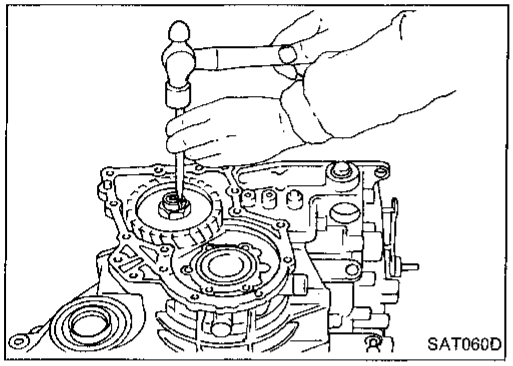
d. Remove output shaft assembly.



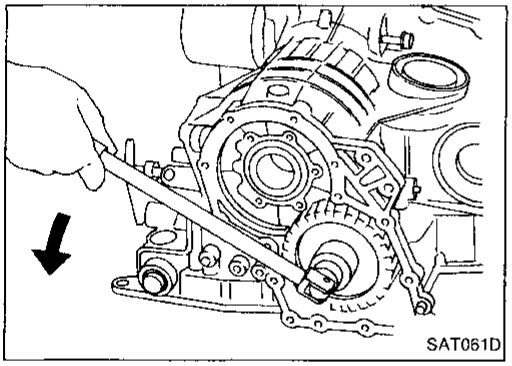
- If output shaft assembly was removed together with side cover, remove side cover by tapping it lightly with a soft hammer.



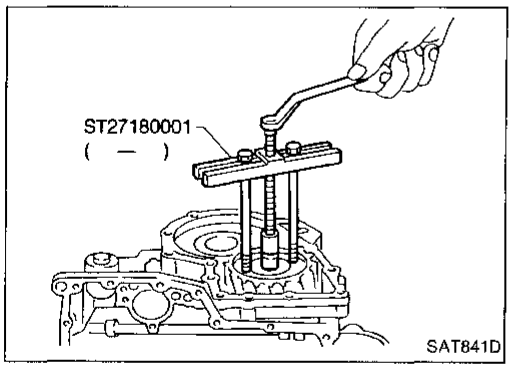
e. Remove needle bearing.



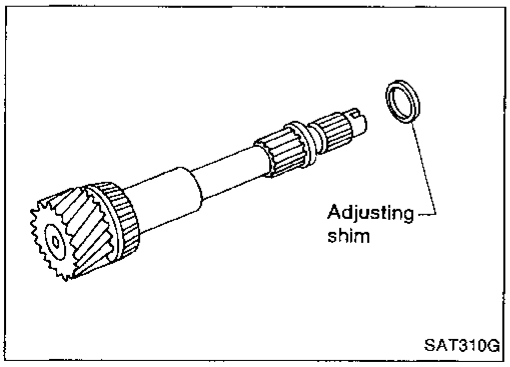
47. Disassemble reduction gear according to the following procedures.
a. Set manual shaft to position "P" to fix idler gear.
b. Unlock idler gear lock nut using a pin punch.



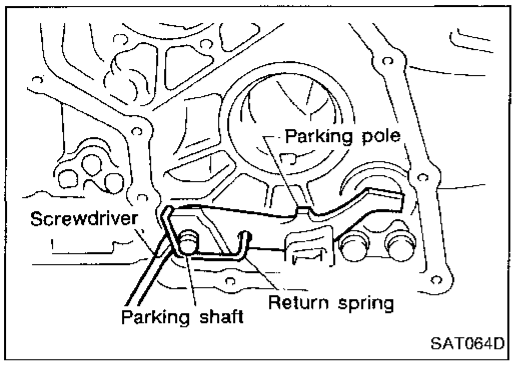
c. Remove idler gear lock nut.
- **Do not reuse idler gear lock nut.**



d. Remove idler gear with puller.

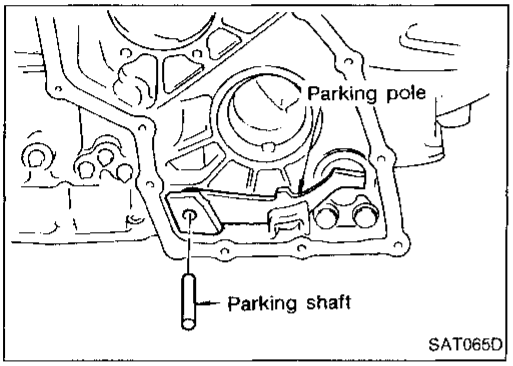


e. Remove reduction gear.
f. Remove adjusting shim from reduction gear.

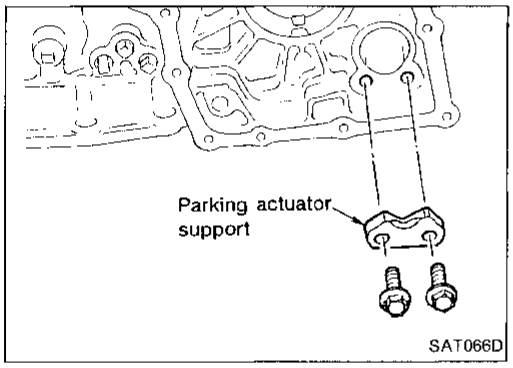


— RL4F03A & RE4F03V —

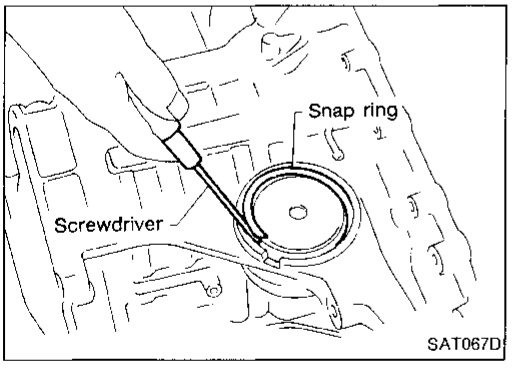
48. Remove return spring from parking shaft using a screwdriver.



49. Draw out parking shaft and remove parking pole from transmission case.
50. Check parking pole and shaft for damage or wear.



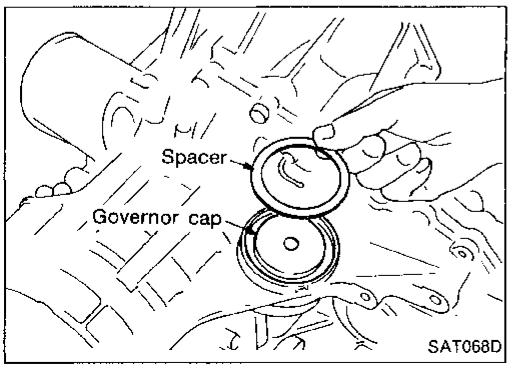
51. Remove parking actuator support from transmission case.
52. Check parking actuator support for damage or wear.



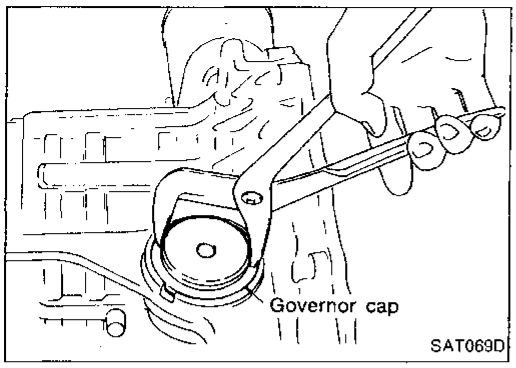
— RL4F03A only —

53. Remove governor valve assembly according to the following procedures.

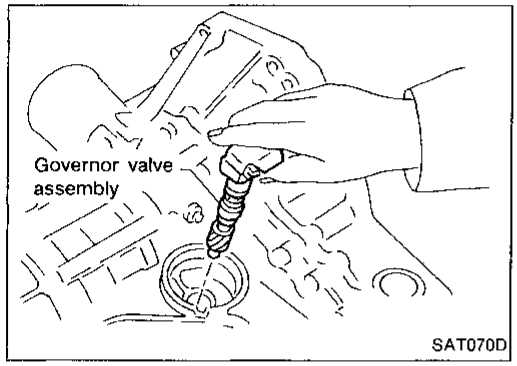
a. Remove snap ring using a screwdriver.



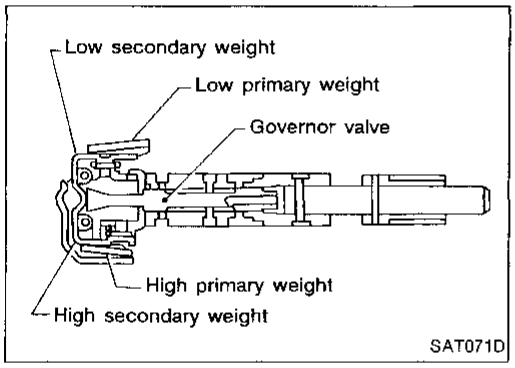
b. Remove spacer from governor cap.



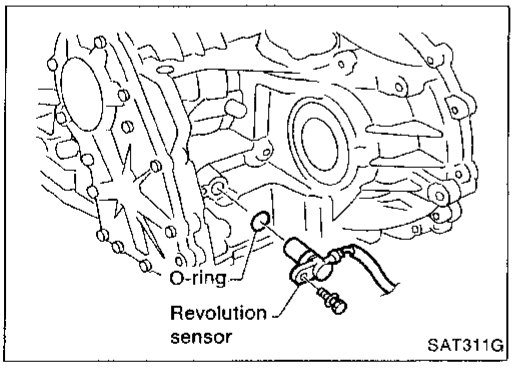
c. Remove governor cap using water pump pliers.
d. Remove O-ring from governor cap.



e. Remove governor valve assembly.



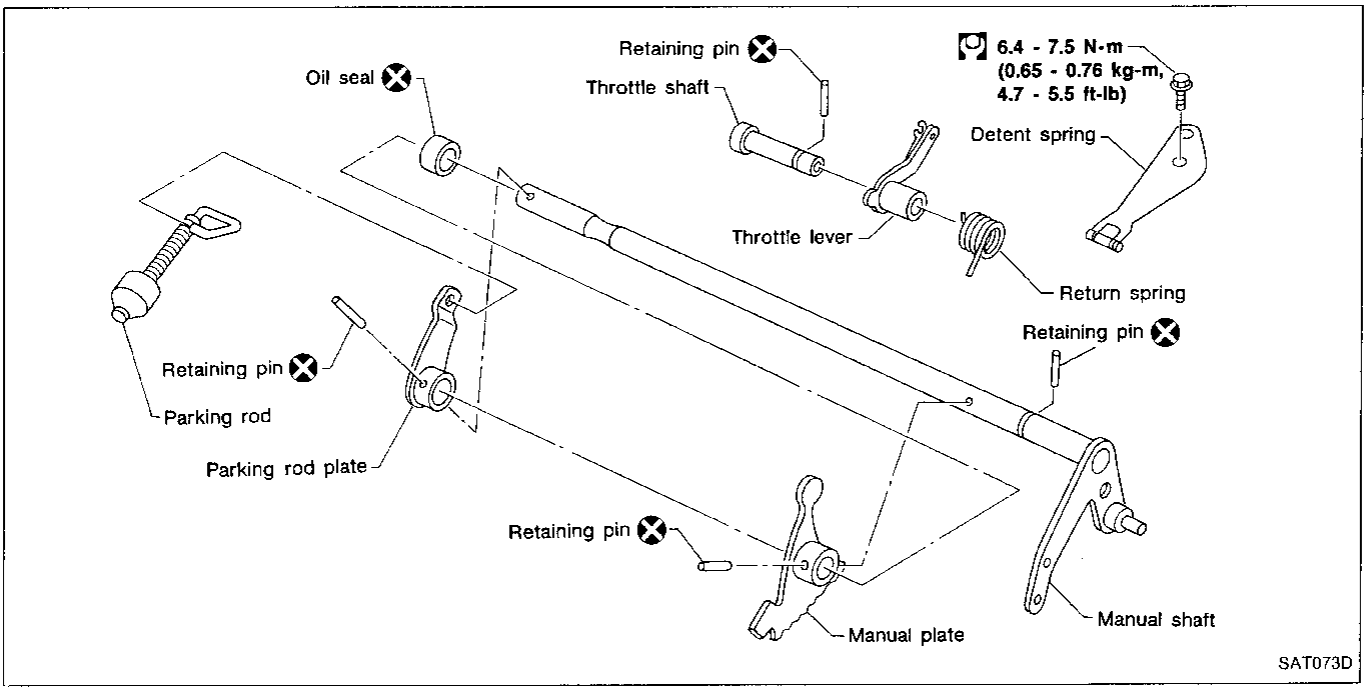
f. With low primary weight closed, place top of governor valve assembly down to make sure governor valve properly lowers under its own weight.
g. Place top of governor assembly down. Operate both low and high secondary weights to make sure governor valve functions properly.

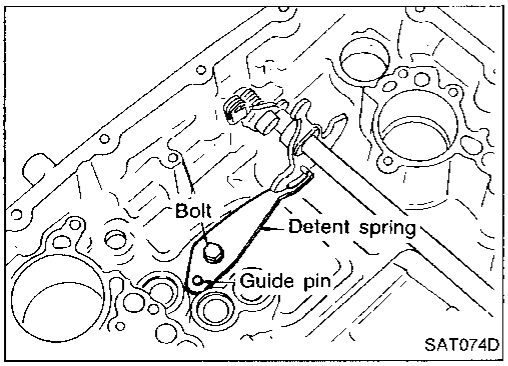


— RE4F03V only —

54. Remove revolution sensor from transmission case.

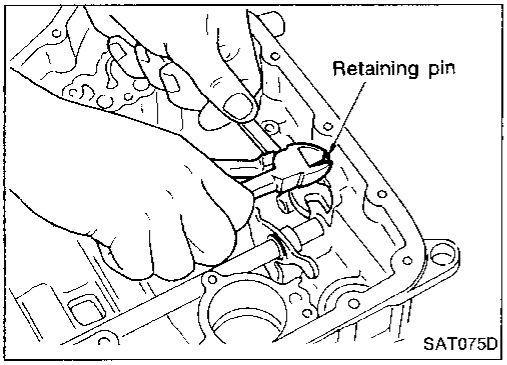
Manual Shaft and Throttle Lever — RL4F03A



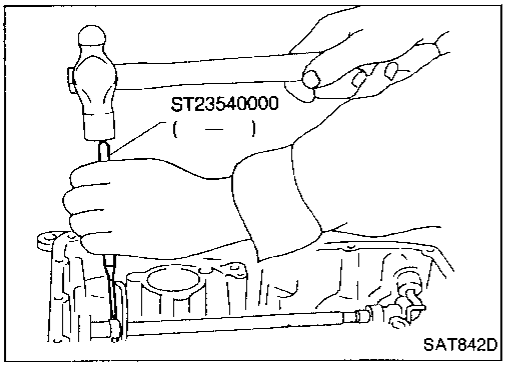


REMOVAL

1. Remove detent spring from transmission case.

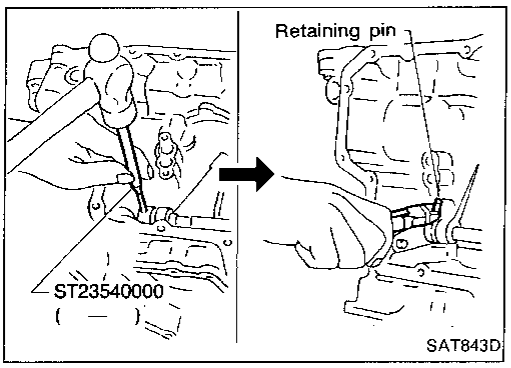


2. Pull out throttle shaft retaining pin, then draw out throttle shaft from transmission case.

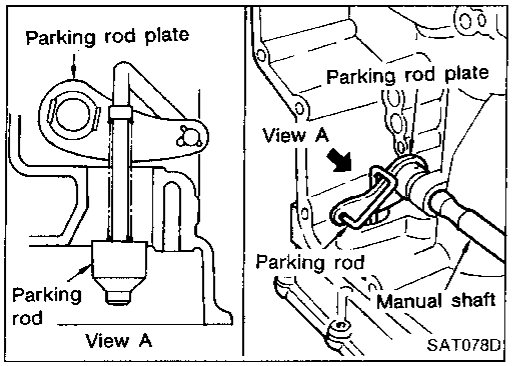


3. Drive out manual plate retaining pin.

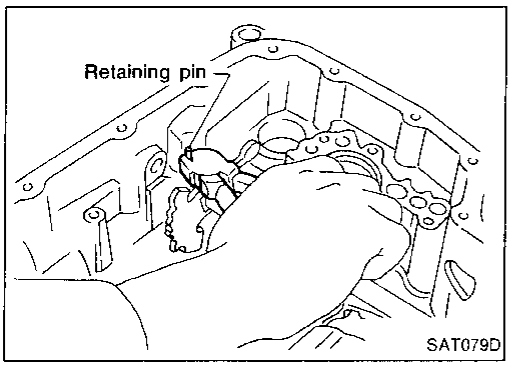
Manual Shaft and Throttle Lever — RL4F03A (Cont'd)



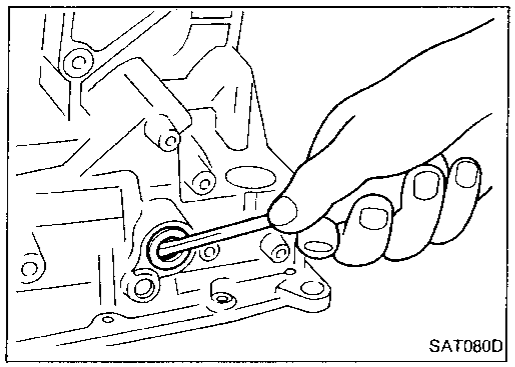
4. Drive and then pull out parking rod plate retaining pin.



5. Remove parking rod plate from manual shaft.
6. Draw out parking rod from transmission case.



7. Pull out manual shaft retaining pin.
8. Remove manual shaft and manual plate from transmission case.



9. Remove manual shaft oil seal.

INSPECTION

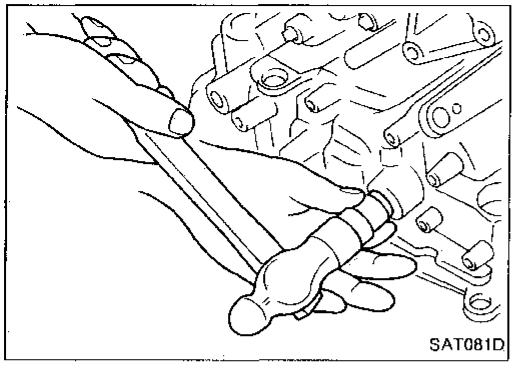
- Check component parts for wear or damage. Replace if necessary.

Manual Shaft and Throttle Lever — RL4F03A (Cont'd)

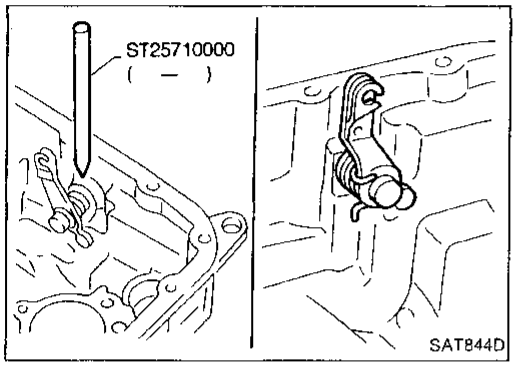
INSTALLATION

1. Install manual shaft oil seal.

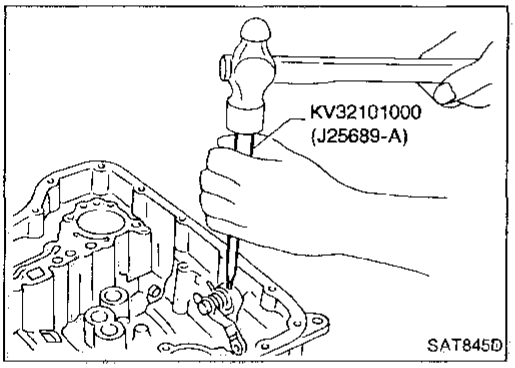
- **Apply ATF to outer surface of oil seal.**



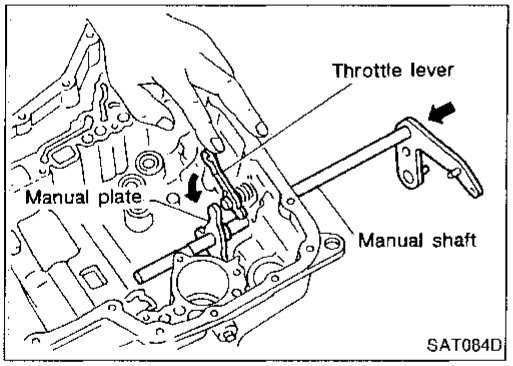
2. Install throttle lever and return spring on throttle shaft.
3. Install throttle lever assembly on transmission case.



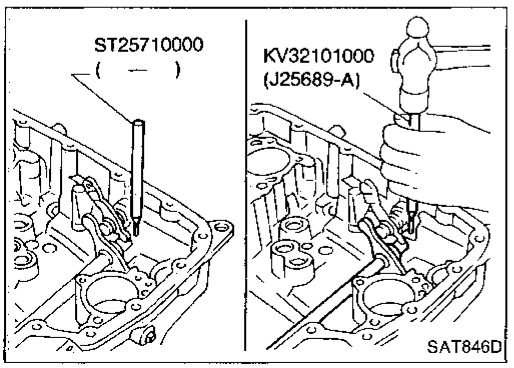
4. Align groove of throttle shaft and hole of transmission case.
5. Install throttle shaft retaining pin.



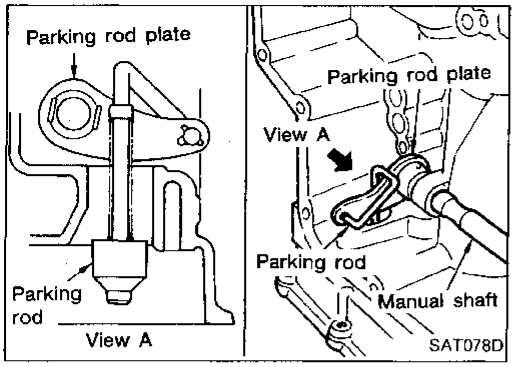
6. Move throttle lever in the direction of the arrow.
7. Install manual shaft and manual plate.



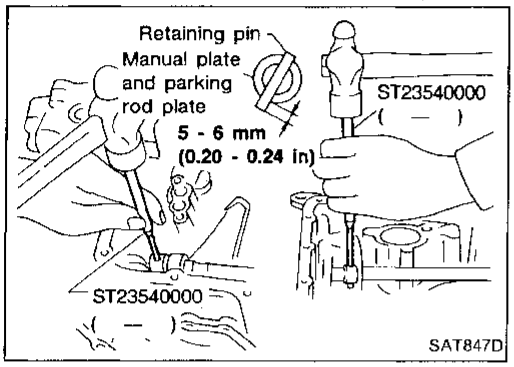
8. Align groove of manual shaft and hole of transmission case.
9. Install manual shaft retaining pin.



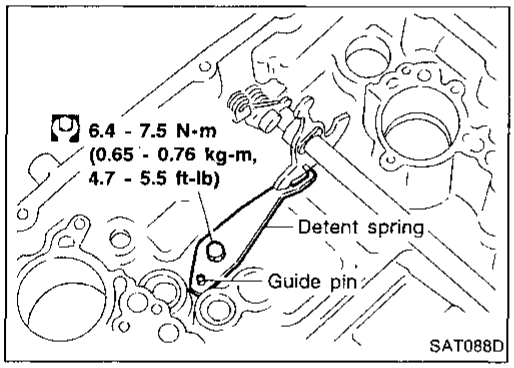
Manual Shaft and Throttle Lever — RL4F03A (Cont'd)



10. Install parking rod to parking rod plate.
11. Install parking rod assembly to manual shaft.

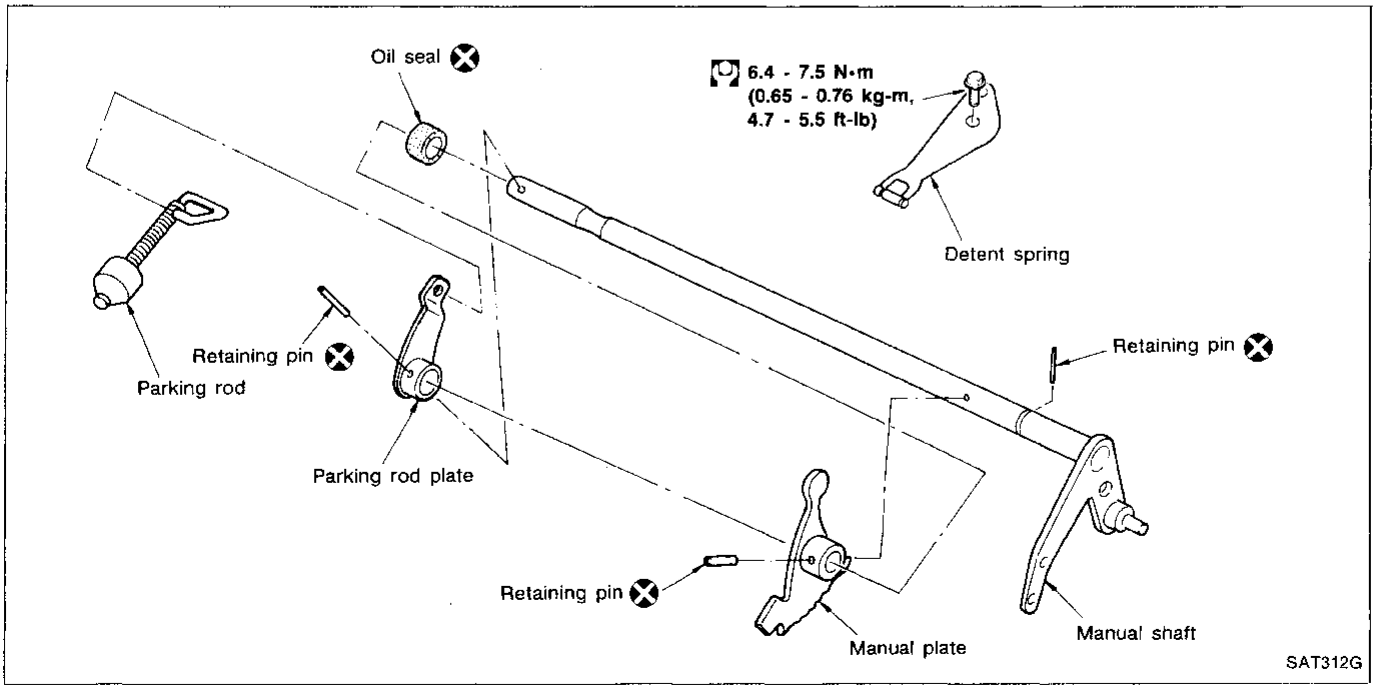


12. Install manual plate retaining pin and parking rod plate retaining pin.



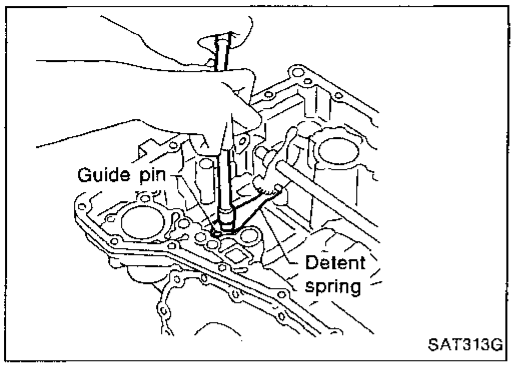
13. Install detent spring.

Manual Shaft — RE4F03V

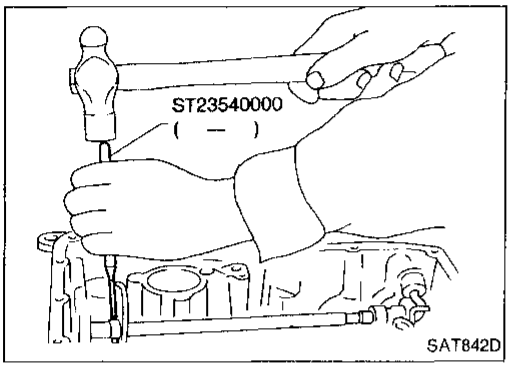


Manual Shaft — RE4F03V (Cont'd)

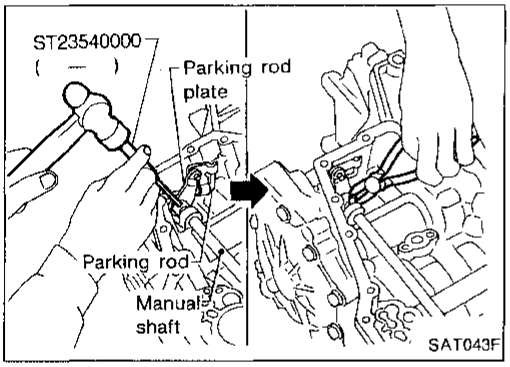
REMOVAL



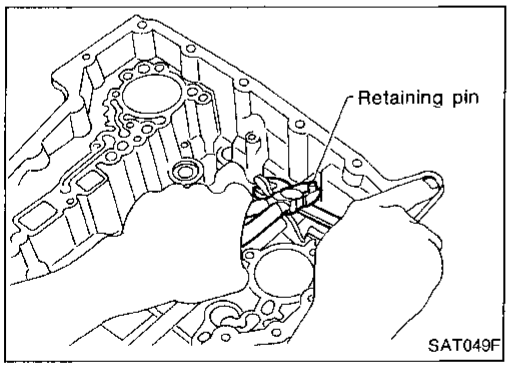
1. Remove detent spring from transmission case.



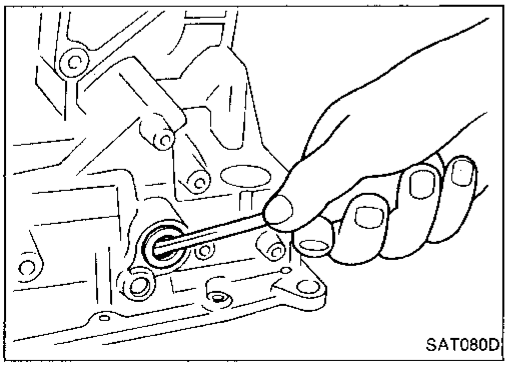
2. Drive out manual plate retaining pin.



3. Drive and pull out parking rod plate retaining pin.
4. Remove parking rod plate from manual shaft.
5. Draw out parking rod from transmission case.



6. Pull out manual shaft retaining pin.
7. Remove manual shaft and manual plate from transmission case.

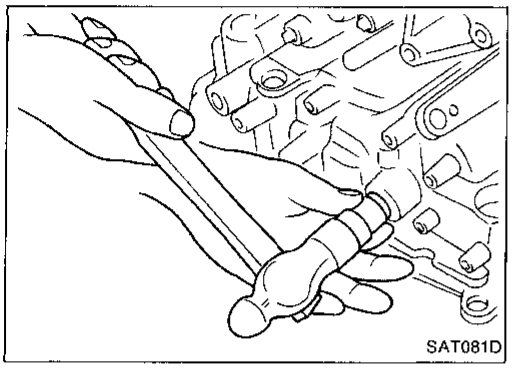


8. Remove manual shaft oil seal.

Manual Shaft — RE4F03V (Cont'd)

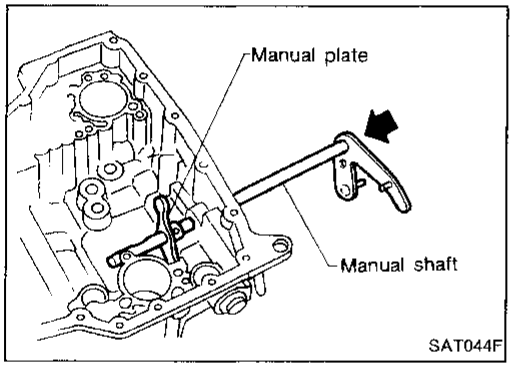
INSPECTION

- Check component parts for wear or damage. Replace if necessary.

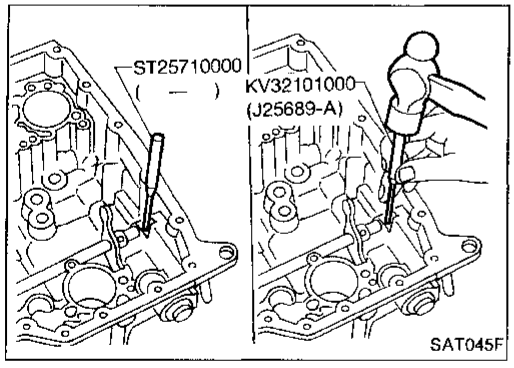


INSTALLATION

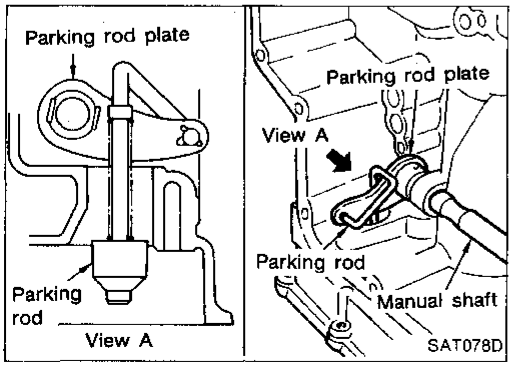
1. Install manual shaft oil seal.
- **Apply ATF to outer surface of oil seal.**



2. Install manual shaft and manual plate.

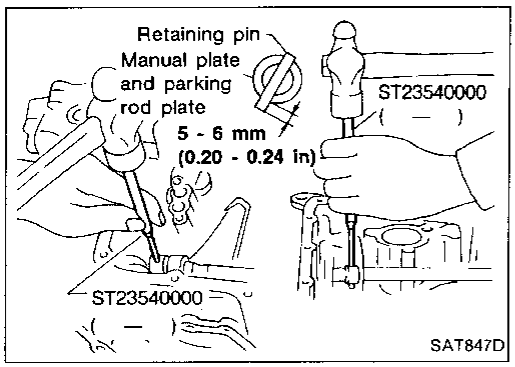


3. Align groove of manual shaft and hole of transmission case.
4. Install manual shaft retaining pin.

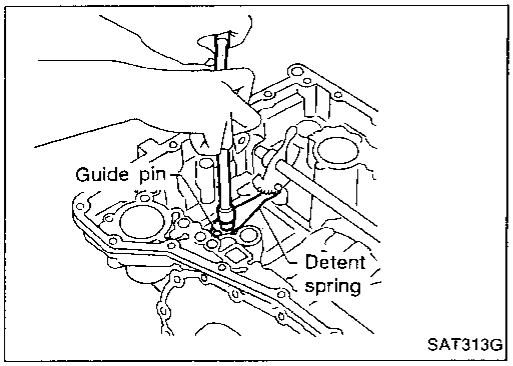


5. Install parking rod to parking rod plate.
6. Set parking rod assembly onto manual shaft.

Manual Shaft — RE4F03V (Cont'd)

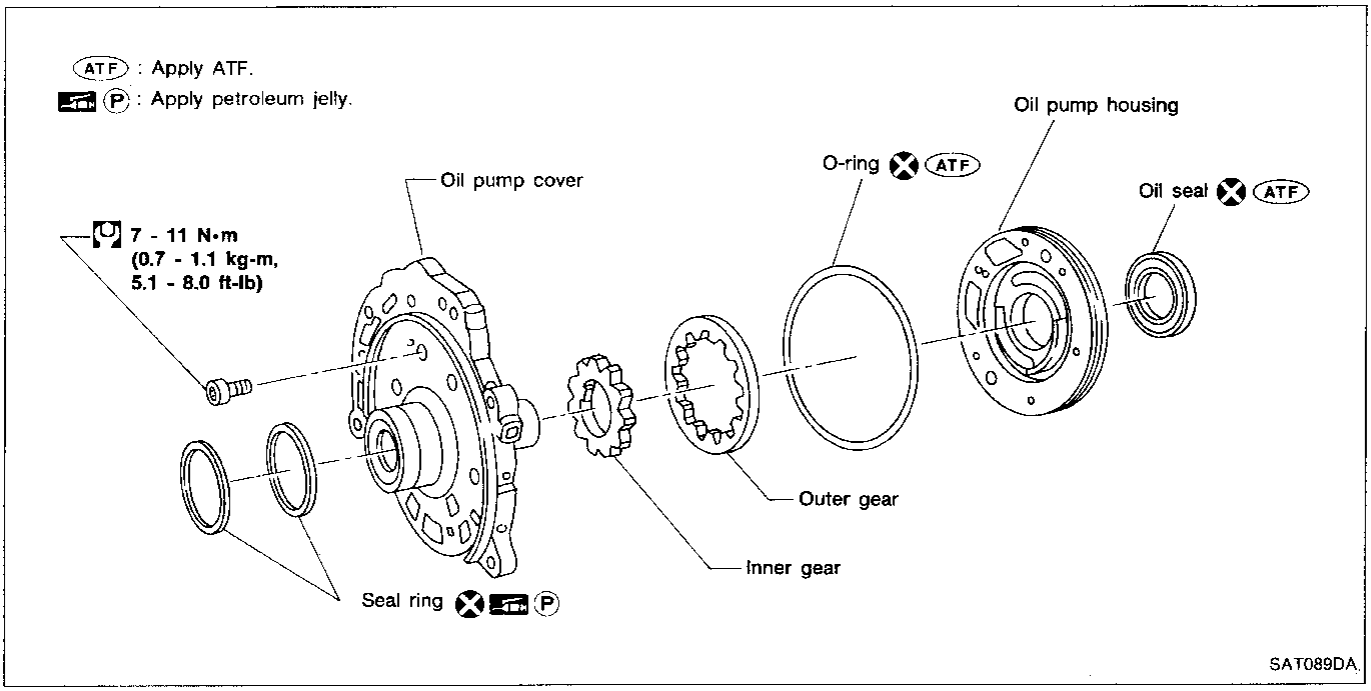


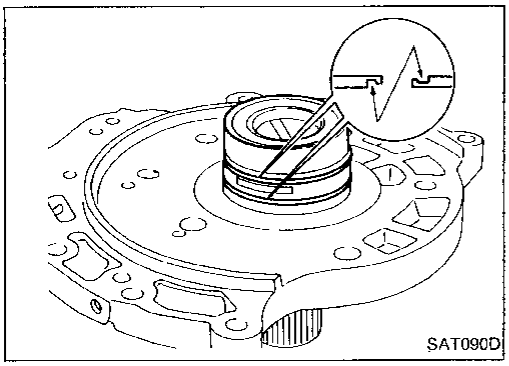
7. Drive in manual plate retaining pin and parking rod plate retaining pin.



8. Install detent spring.

Oil Pump

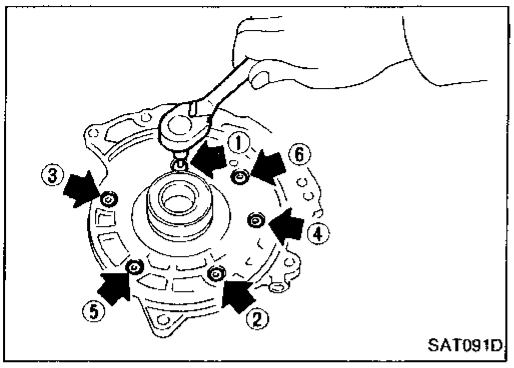




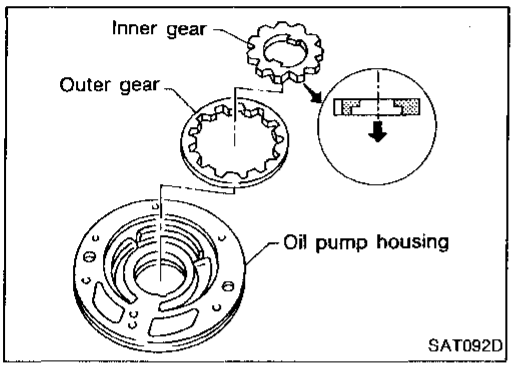
DISASSEMBLY

1. Remove seal rings by undoing hooks.

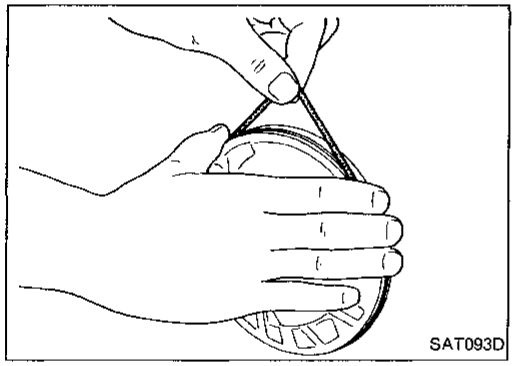
Oil Pump (Cont'd)



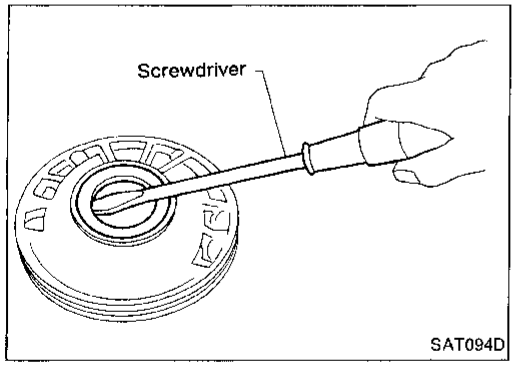
2. Loosen bolts in numerical order and remove oil pump cover.



3. Remove inner and outer gear from oil pump housing.



4. Remove O-ring from oil pump housing.



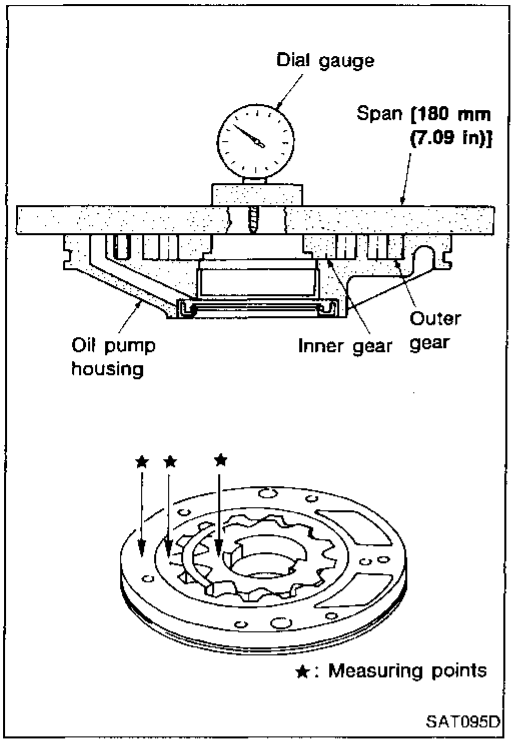
5. Remove oil pump housing oil seal.

INSPECTION

Oil pump housing, oil pump cover, inner gear and outer gear

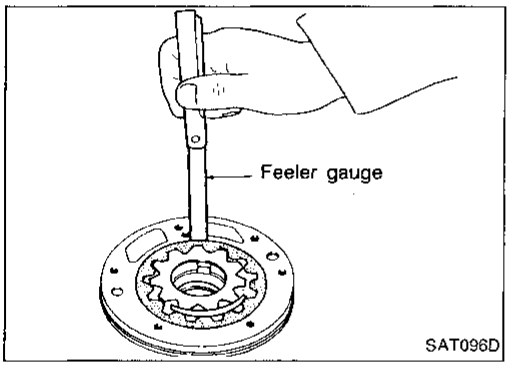
- Check for wear or damage.

Oil Pump (Cont'd)

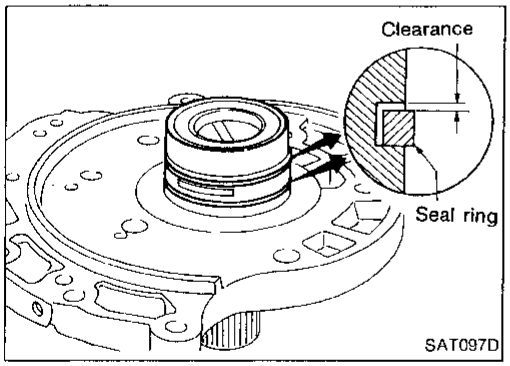


Side clearance

- Measure side clearance between end of oil pump housing and inner and outer gears in at least four places along their circumferences. Maximum measured values should be within specified range.
  Standard clearance:
  0.02 - 0.04 mm (0.0008 - 0.0016 in)
- If clearance is less than standard, select inner and outer gear as a set so that clearance is within specifications.
  Inner and outer gear:
  Refer to SDS, AT-275.
- If clearance is more than standard, replace whole oil pump assembly except oil pump cover.

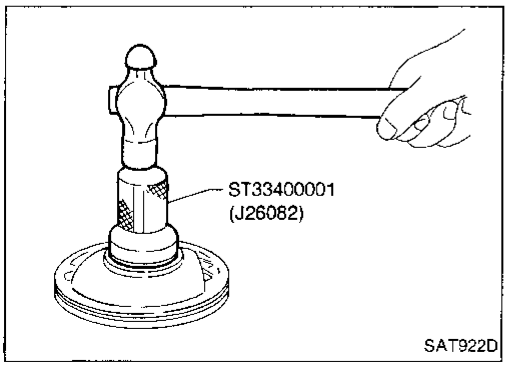


- Measure clearance between outer gear and oil pump housing.
  Standard clearance:
  0.08 - 0.15 mm (0.0031 - 0.0059 in)
  Allowable limit:
  0.15 mm (0.0059 in)
- If not within allowable limit, replace whole oil pump assembly except oil pump cover.



Seal ring clearance

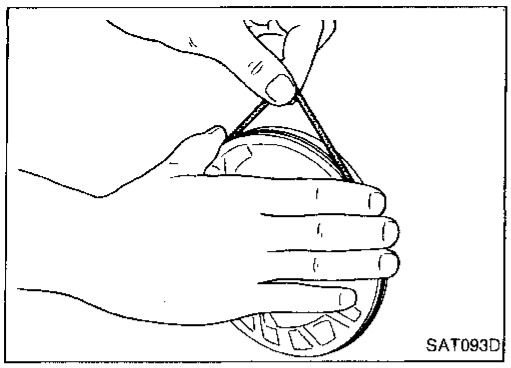
- Install new seal rings onto oil pump cover.
- Measure clearance between seal ring and ring groove.
  Standard clearance:
  0.1 - 0.25 mm (0.0039 - 0.0098 in)
  Allowable limit:
  0.25 mm (0.0098 in)
- If not within allowable limit, replace oil pump cover assembly.



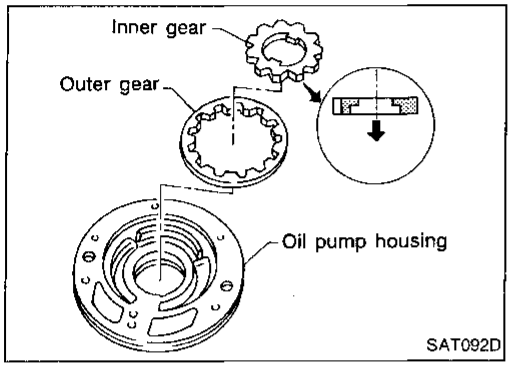
ASSEMBLY

1. Install oil seal on oil pump housing.

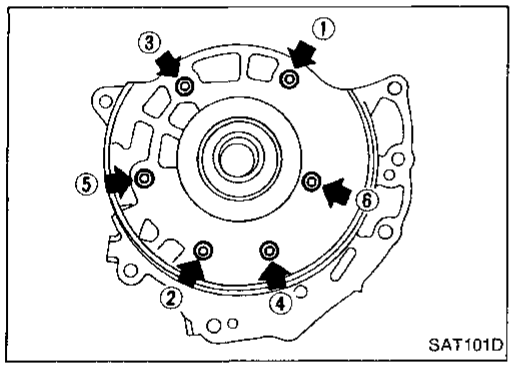
Oil Pump (Cont'd)



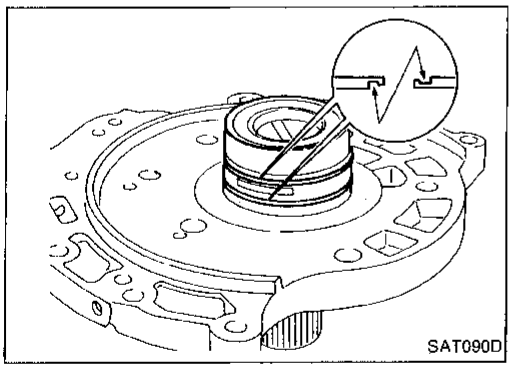
2. Install O-ring on oil pump housing.
- **Apply ATF to O-ring.**



3. Install inner and outer gears on oil pump housing.
- **Take care with the direction of the inner gear.**

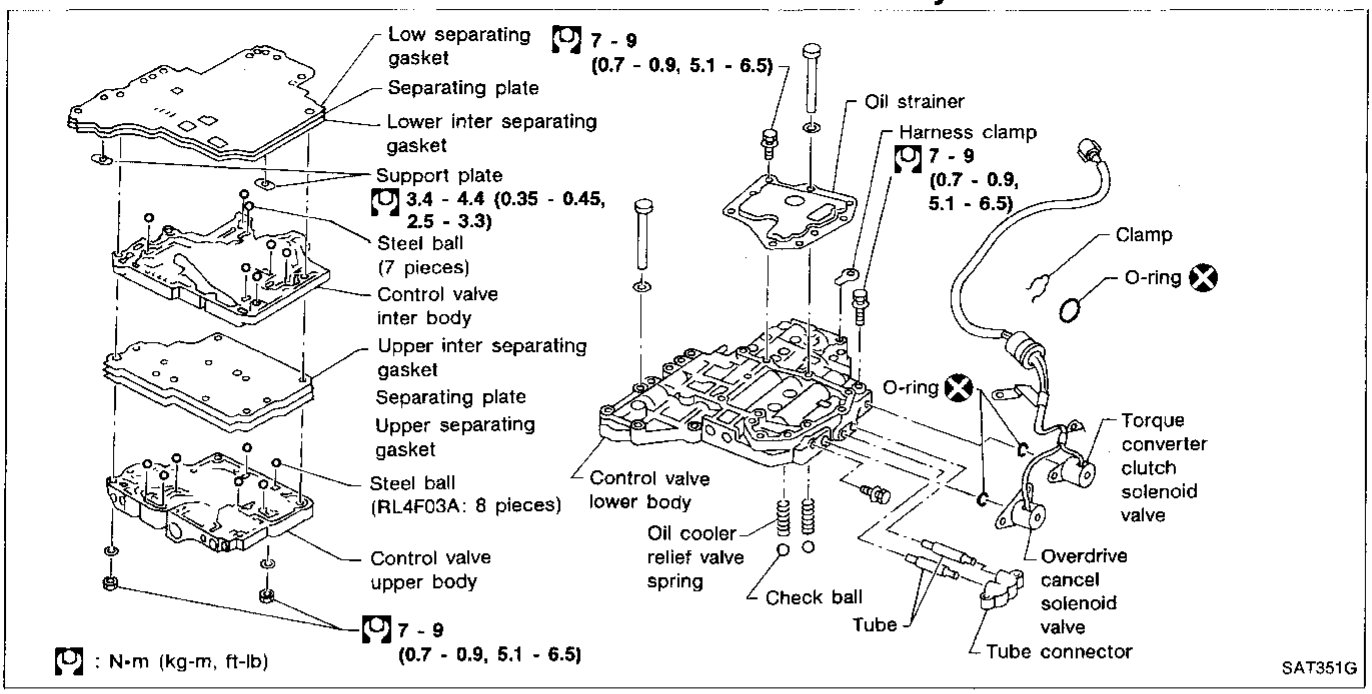


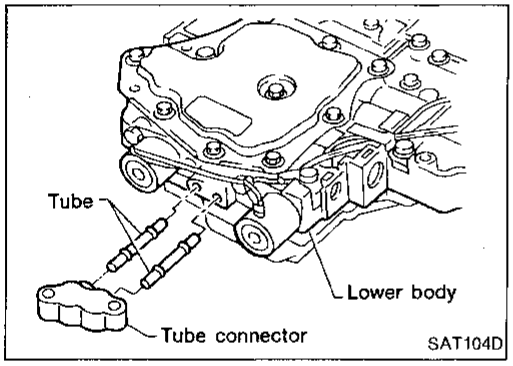
4. Install oil pump cover on oil pump housing.
a. Wrap masking tape around splines of oil pump cover assembly to protect seal. Position oil pump cover assembly on oil pump housing assembly, then remove masking tape.
b. Tighten bolts in numerical order.



5. Install new seal rings carefully after packing ring groove with petroleum jelly and connect hooks.
- **Do not spread gap of seal ring excessively while installing. It may deform the ring.**

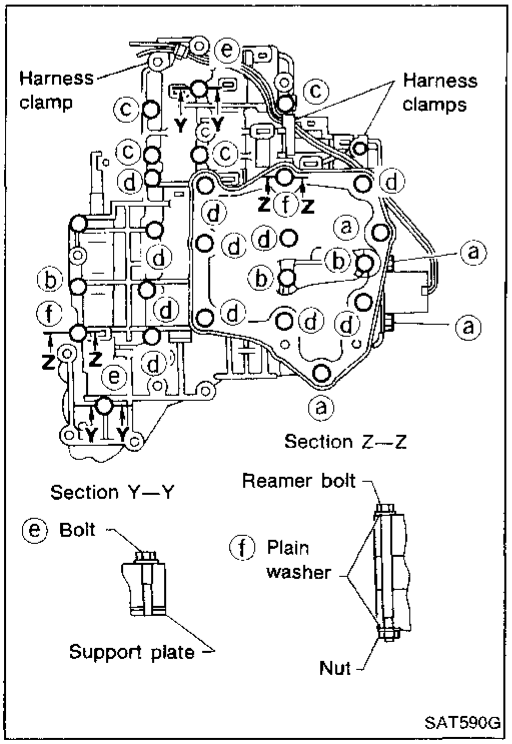
Control Valve Assembly — RL4F03A





DISASSEMBLY

1. Remove tube connector and tube from control valve lower body.

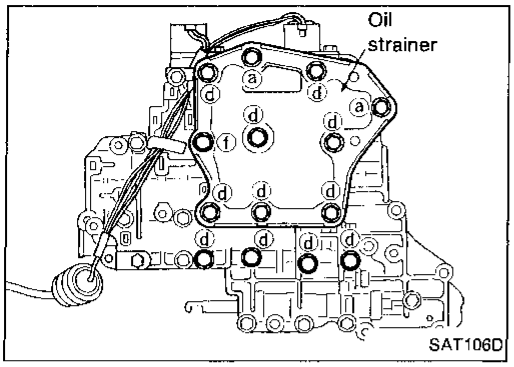


2. Disassemble upper, inter and lower bodies.

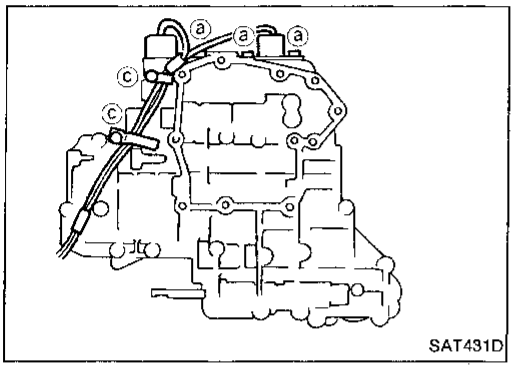
Bolt length, number and location:

Bolt symbol	a	b	c	d	e	f
Bolt length "ℓ" mm (in)	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)
Number of bolts	4	3	6	11	2	2

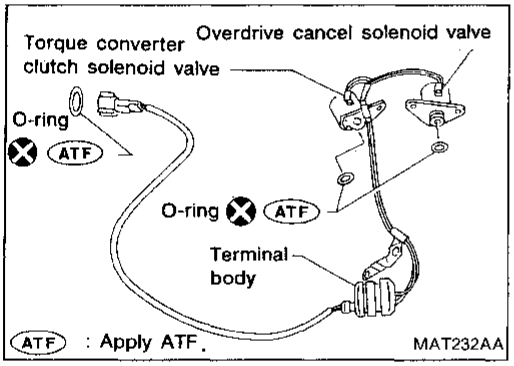
Control Valve Assembly — RL4F03A (Cont'd)



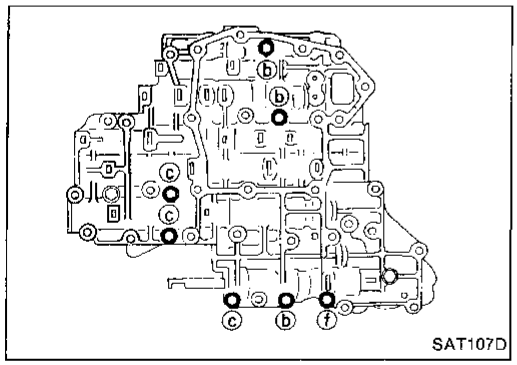
a. Remove bolts ⓐ, ⓓ and ⓕ and remove oil strainer from control valve assembly.



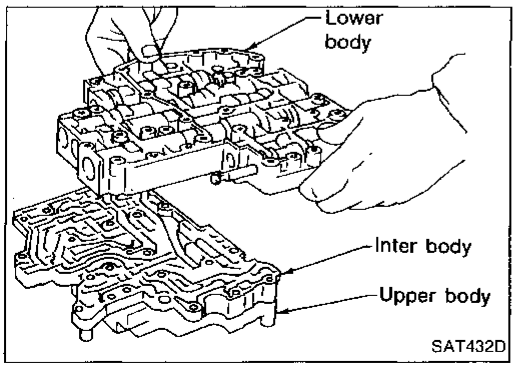
b. Remove OD cancel solenoid valve and torque converter clutch solenoid valve from control valve assembly.



c. Remove O-rings from OD cancel solenoid valve, torque converter clutch solenoid valve and harness terminal body.

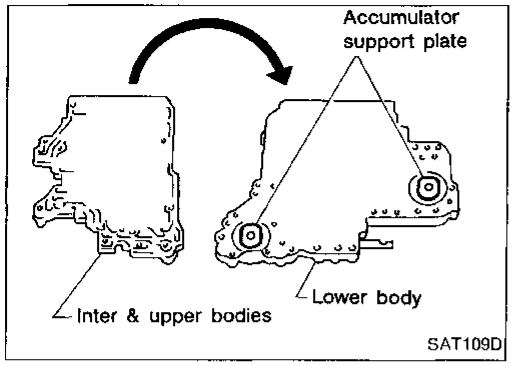


d. Place upper body facedown, and remove bolts ⓑ, ⓒ and ⓕ.

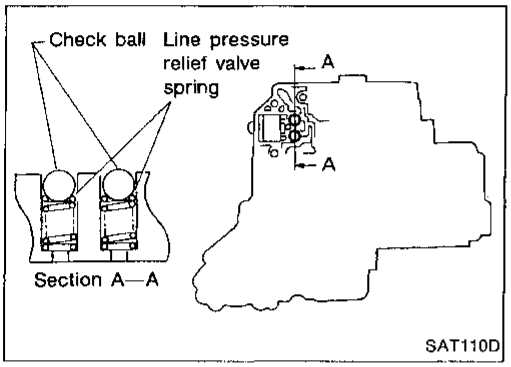


e. Remove inter body from lower body.

Control Valve Assembly — RL4F03A (Cont'd)

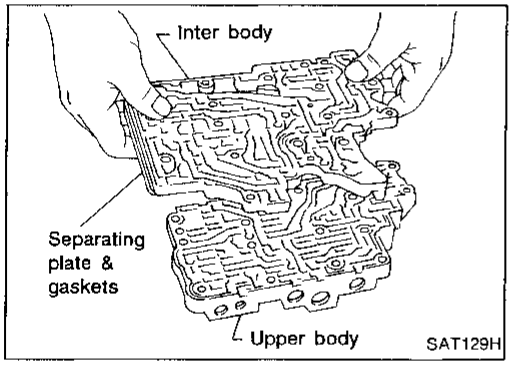


f. Turn over lower body, and remove accumulator support plate.

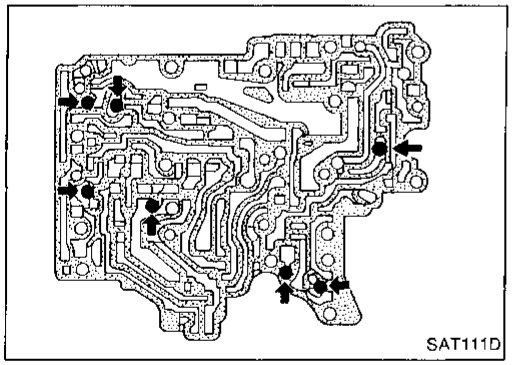


g. Remove separating plate and separating gasket from lower body.
h. Remove steel balls and relief valve springs from lower body.

- **Be careful not to lose steel balls and relief valve springs.**

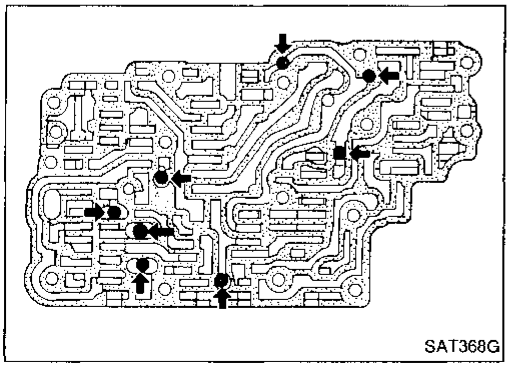


i. Remove inter body with separating plate and separating gasket from upper body.



j. Check to see that steel balls are properly positioned in inter body and then remove them from inter body.

- **Be careful not to lose steel balls.**

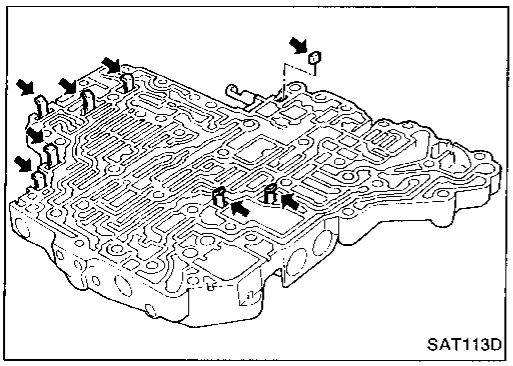


k. Check to see that steel balls are properly positioned in upper body and then remove them from upper body.

- **Be careful not to lose steel balls.**

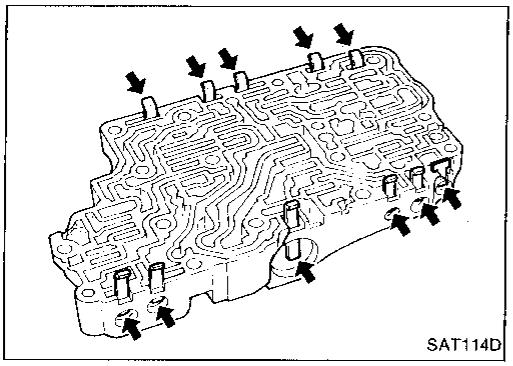
Control Valve Assembly — RL4F03A (Cont'd)

INSPECTION

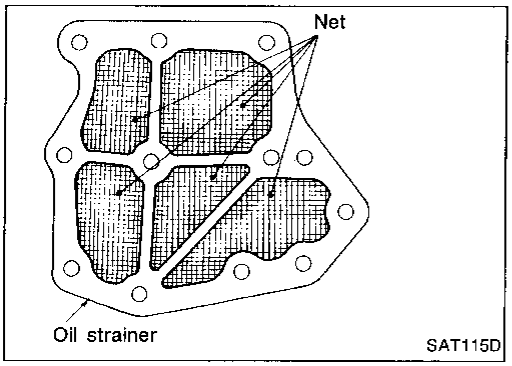

SAT113D

Lower and upper bodies

- Check to see that retainer plates are properly positioned in lower body.


SAT114D

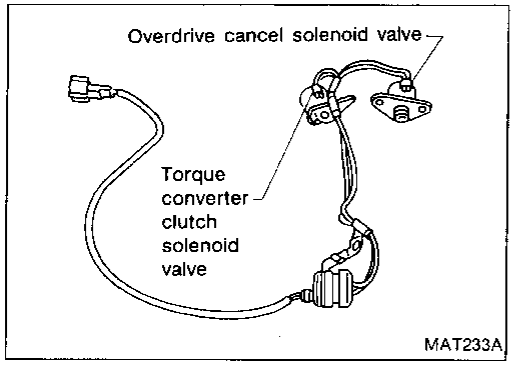
- Check to see that retainer plates are properly positioned in upper body.
- **Be careful not to lose these parts.**



SAT115D

Oil strainer

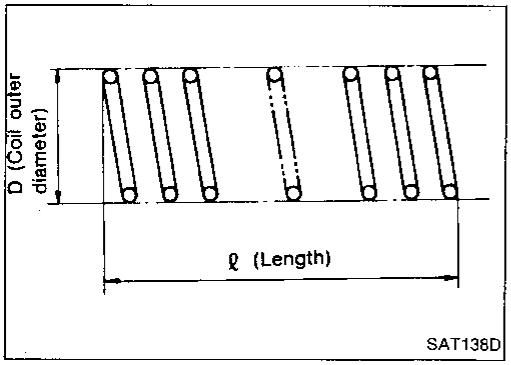
- Check wire netting of oil strainer for damage.



MAT233A

OD cancel solenoid valve and torque converter clutch solenoid valve

- Measure resistance — Refer to "ELECTRICAL SYSTEM", AT-30.



SAT136D

Oil cooler relief valve spring.

- Check springs for damage or deformation.
- Measure free length and outer diameter

Inspection standard:

Unit: mm (in)

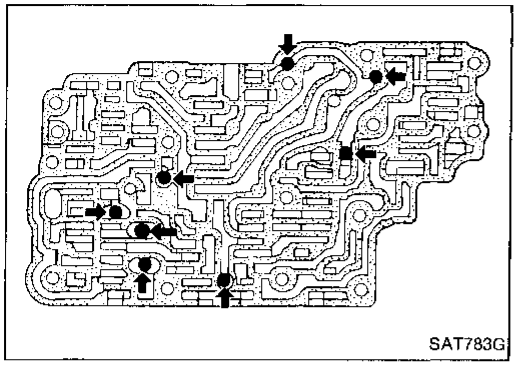
Part No.	ℓ	D
31872-31X00	17.02 (0.6701)	8.0 (0.315)

Control Valve Assembly — RL4F03A (Cont'd)

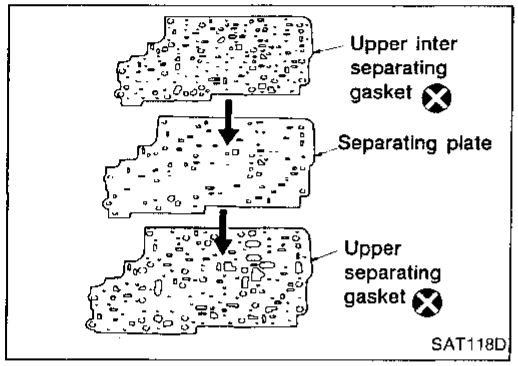
ASSEMBLY

1. Install upper, inter and lower body.

a. Place oil circuit of upper body face up. Install steel balls in their proper positions.

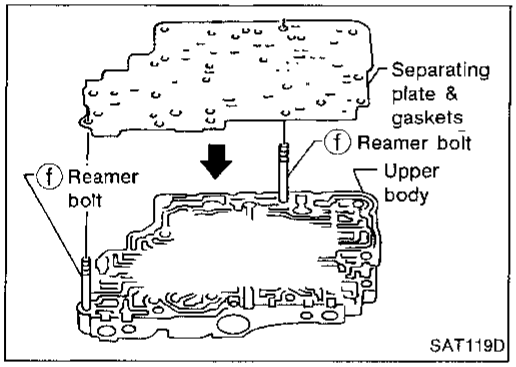

SAT783G

b. Install upper separating gasket, upper inter separating gasket and upper separating plate in order shown in illustration.



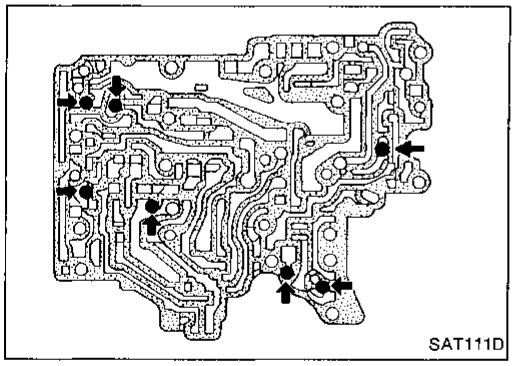
SAT118D

c. Install reamer bolts ⓕ from bottom of upper body and install separating gaskets and separating plate as a set on upper body using reamer bolts as guides.



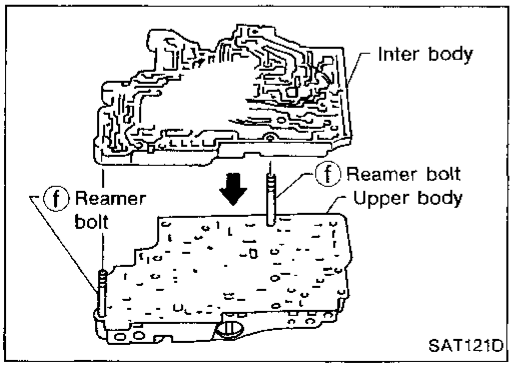
SAT119D

d. Place lower body side of inter body face up. Install steel balls in their proper positions.


SAT111D

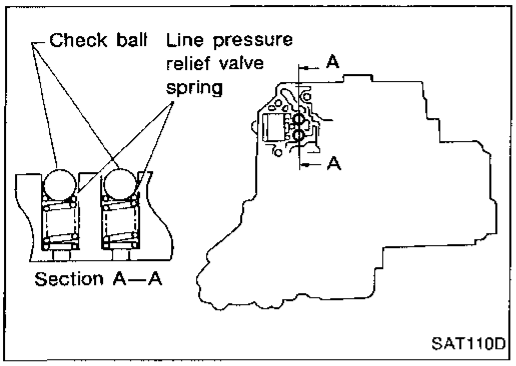
e. Install inter body on upper body using reamer bolts ⓕ as guides.

- **Be careful not to dislocate or drop steel balls.**

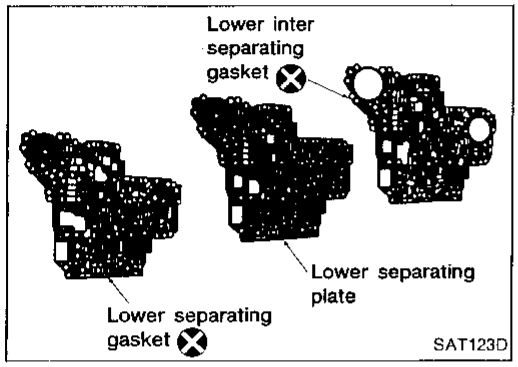


SAT121D

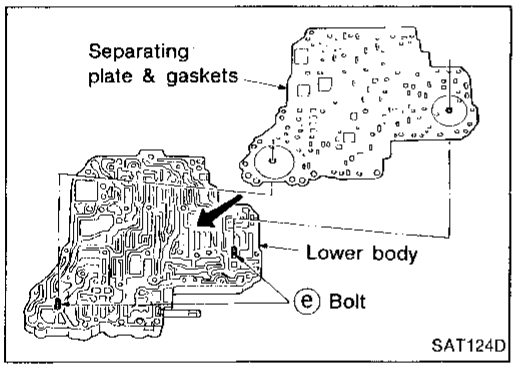
Control Valve Assembly — RL4F03A (Cont'd)



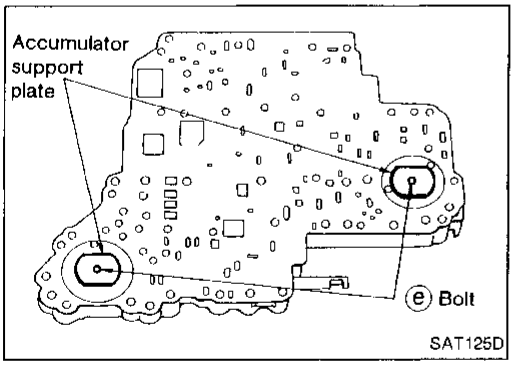
f. Install steel balls and relief valve springs in their proper positions in lower body.



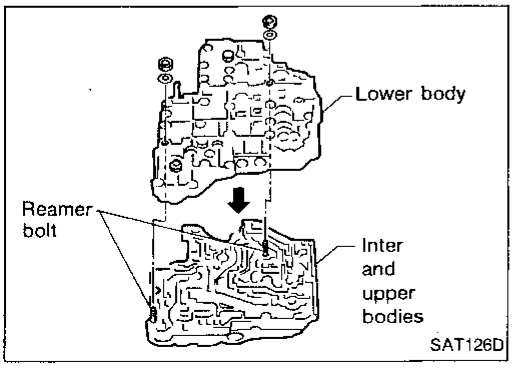
g. Install lower separating gasket, inter separating gasket and lower separating plate in order shown in illustration.



h. Install support plate fixing bolts ⓔ from bottom of lower body and install separating gaskets and separating plate as a set on lower body using bolts ⓔ as guides.

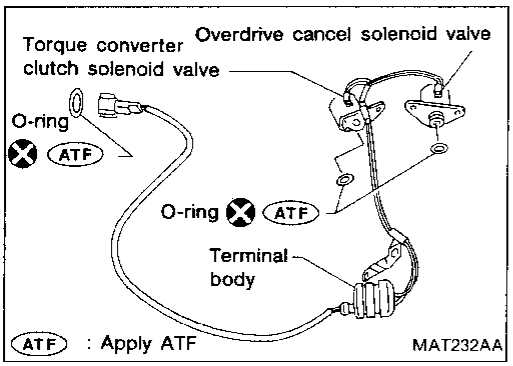


i. Temporarily install support plates on lower body.



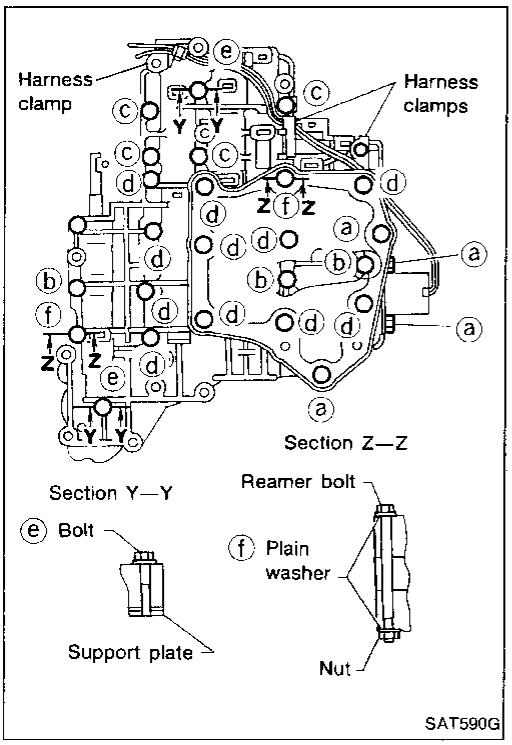
j. Install lower body on inter body using reamer bolts ⓕ as guides and tighten reamer bolts ⓕ slightly.

Control Valve Assembly — RL4F03A (Cont'd)



2. Install O-rings to OD cancel solenoid valve, torque converter clutch solenoid valve and harness connector.

- **Apply ATF to O-rings.**

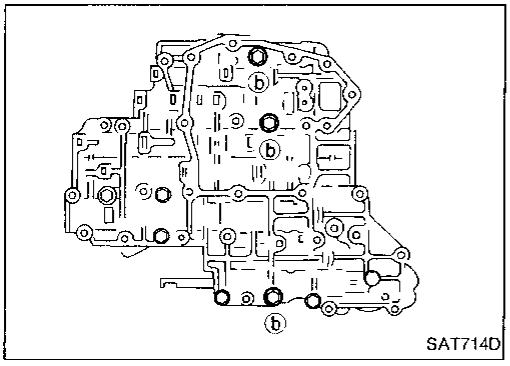


3. Install and tighten bolts.

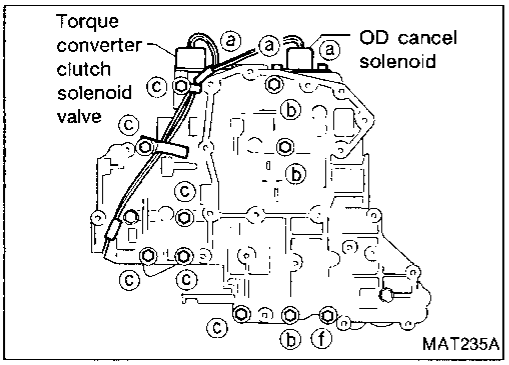
Bolt length, number and location:

Bolt symbol	a	b	c	d	e	f
Bolt length "ℓ" mm (in)	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)
Number of bolts	4	3	6	11	2	2

Take care with the tightening torque for e.

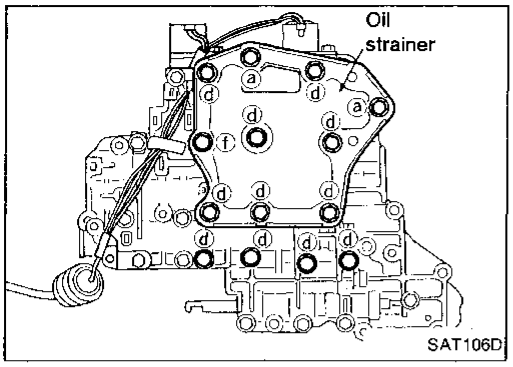


a. Install and tighten bolts ⓑ slightly.

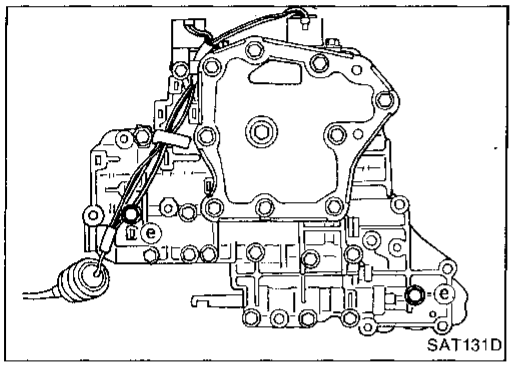


b. Install OD cancel solenoid valve and torque converter clutch solenoid valve to lower body.
c. Install and tighten bolts ⓐ and ⓒ slightly.
d. Remove both reamer bolts ⓕ previously installed as guides. Install one reamer bolt ⓕ (marked in illustration) from lower body side.
e. Tighten bolts ⓐ, ⓑ, ⓒ and ⓕ to specified torque.

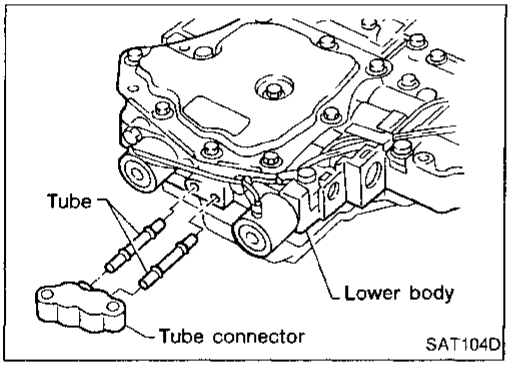
Control Valve Assembly — RL4F03A (Cont'd)



f. Install oil strainer and the other reamer bolt ⓕ (marked in illustration), then tighten bolts ⓐ, ⓓ and ⓕ to specified torque.



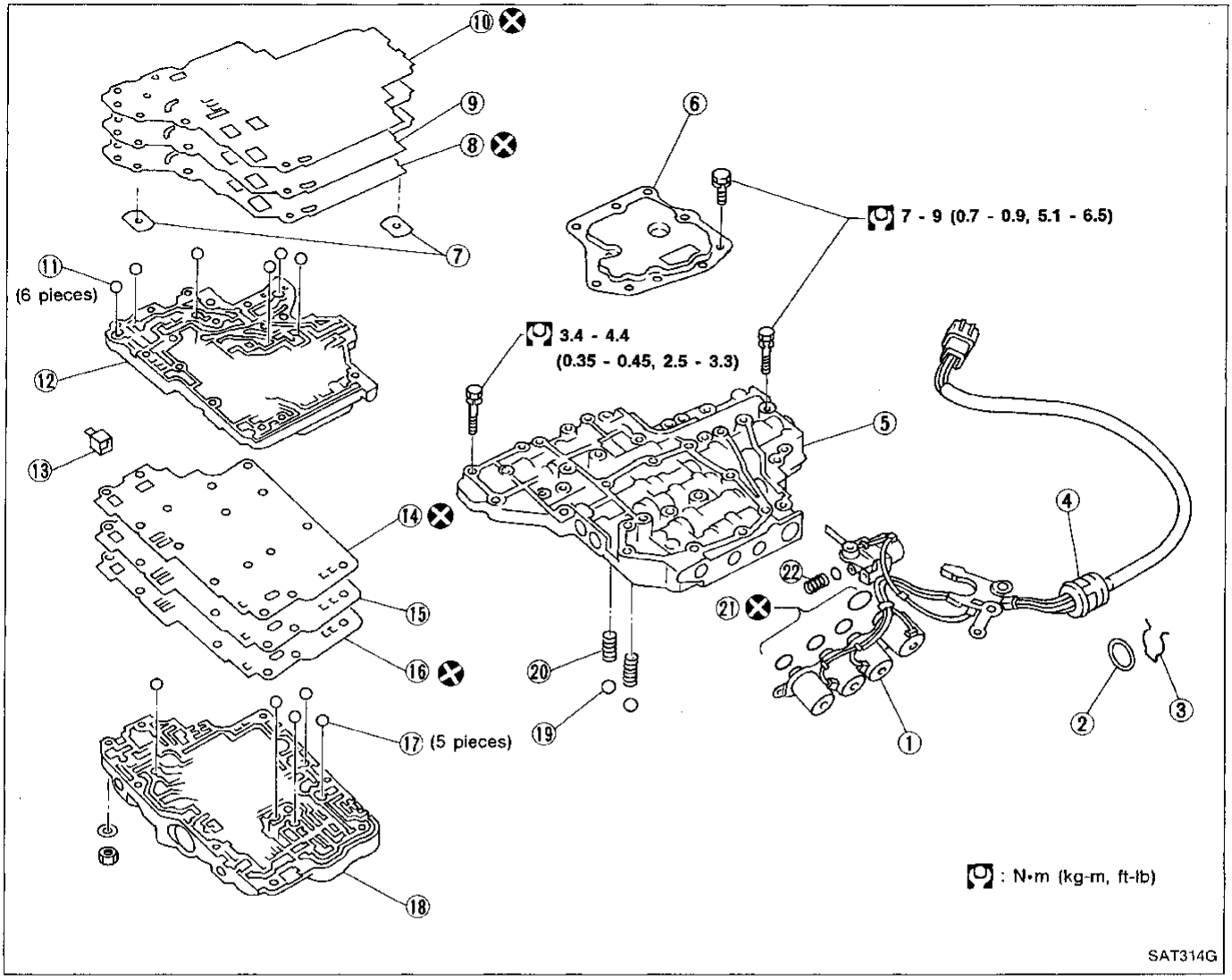
g. Install support plates and tighten bolts ⓔ to specified torque.



h. Install tube connector and tubes to lower body.

- **Install oil circuit side of tube connector face up.**

Control Valve Assembly — RE4F03V



① Solenoid valve assembly
② O-ring
③ Clip
④ Terminal body
⑤ Control valve lower body
⑥ Oil strainer
⑦ Support plate
⑧ Lower inter separating gasket
⑨ Separating plate
⑩ Lower separating gasket
⑪ Steel ball
⑫ Control valve inter body
⑬ Pilot filter
⑭ Upper inter separating gasket
⑮ Separating plate
⑯ Upper separating gasket
⑰ Steel ball
⑱ Control valve upper body
⑲ Check ball
⑳ Oil cooler relief valve spring
㉑ O-ring
㉒ Line pressure solenoid valve spring

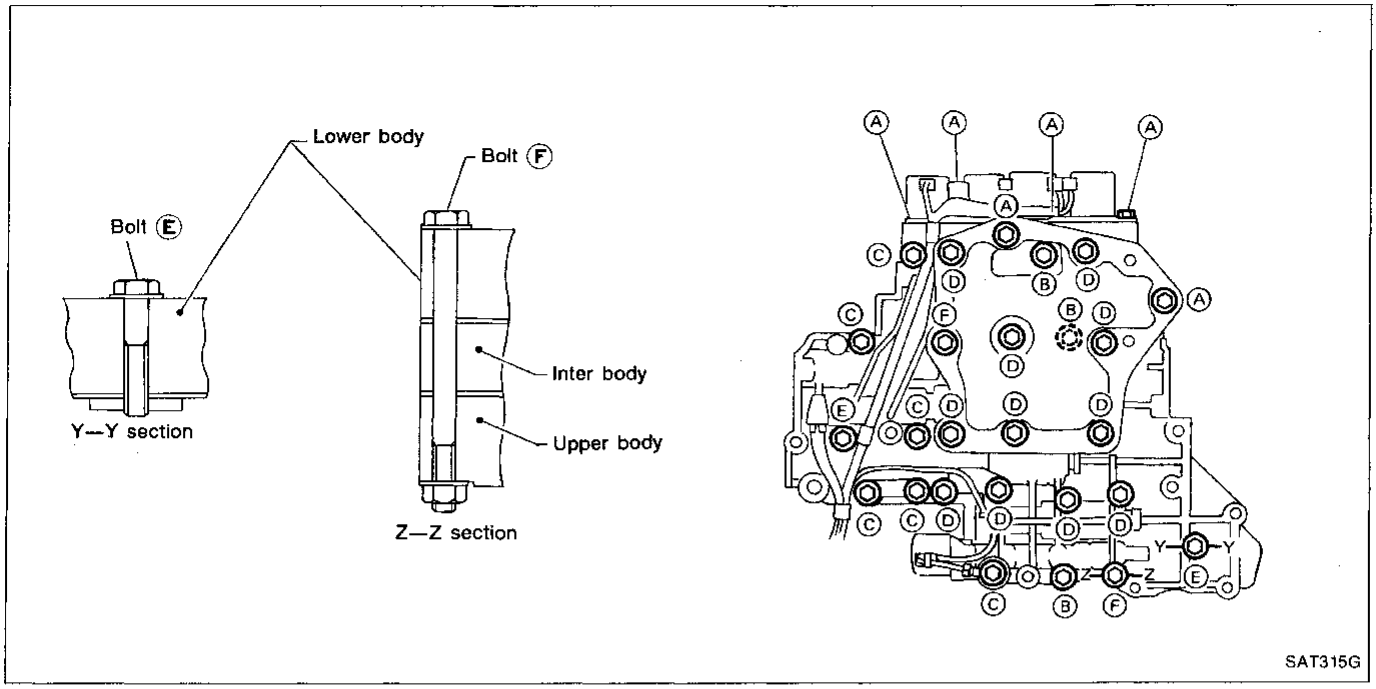
DISASSEMBLY

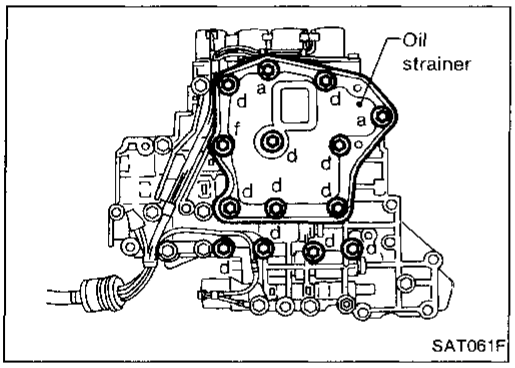
- Disassemble upper, inter and lower bodies.

Bolt length, number and location:

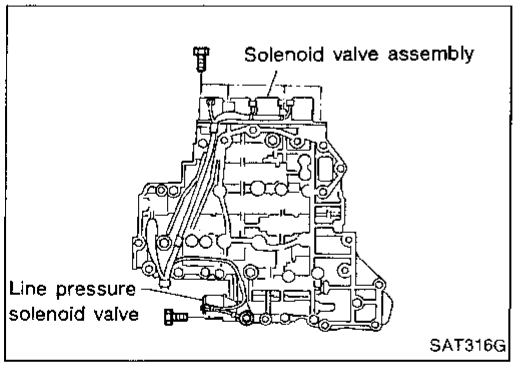
Bolt symbol	A	B	C	D	E	F
Bolt length "ℓ" mm (in)	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)
Number of bolts	6	3	6	11	2	2

F: Reamer bolt with nut



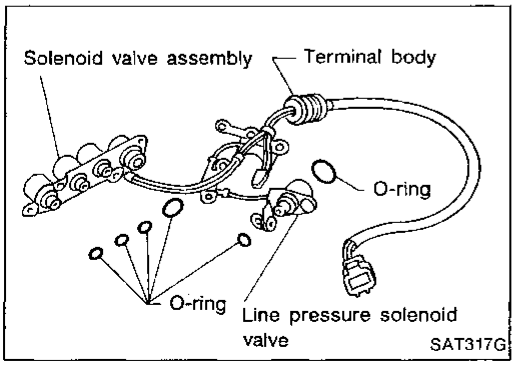


a. Remove bolts Ⓐ, Ⓓ and Ⓕ, and remove oil strainer from control valve assembly.



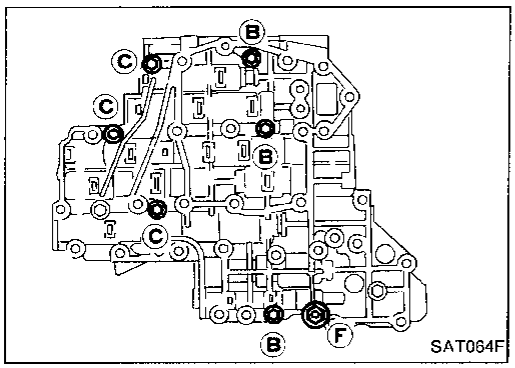
b. Remove solenoid valve assembly and line pressure solenoid valve from control valve assembly.

- **Be careful not to lose the line pressure solenoid valve spring.**

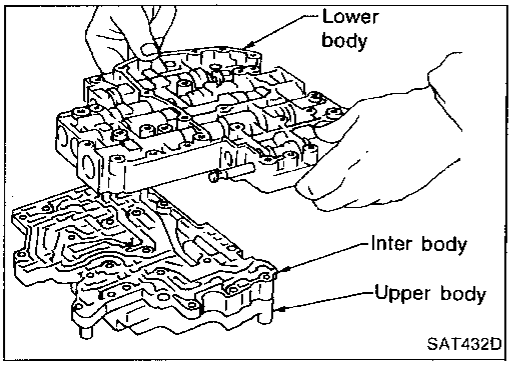


c. Remove O-rings from solenoid valves and terminal body.

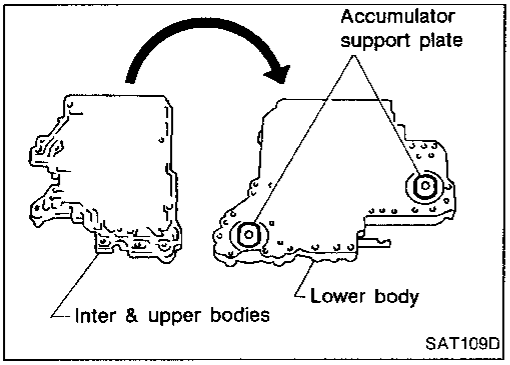
Control Valve Assembly — RE4F03V (Cont'd)



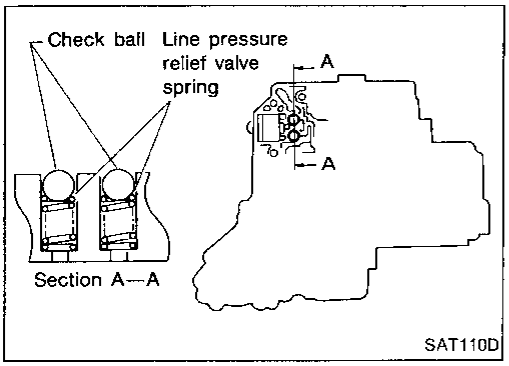
d. Place upper body facedown, and remove bolts Ⓑ, Ⓒ and Ⓕ.



e. Remove lower body from inter body.

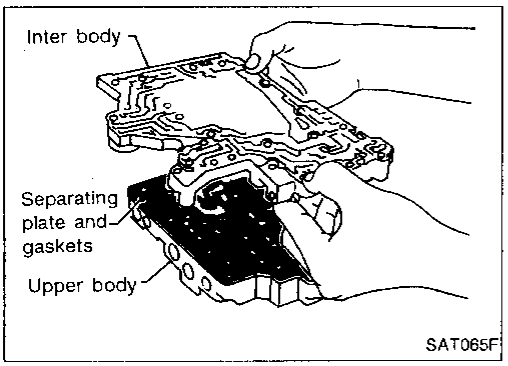


f. Turn over lower body, and accumulator support plates.



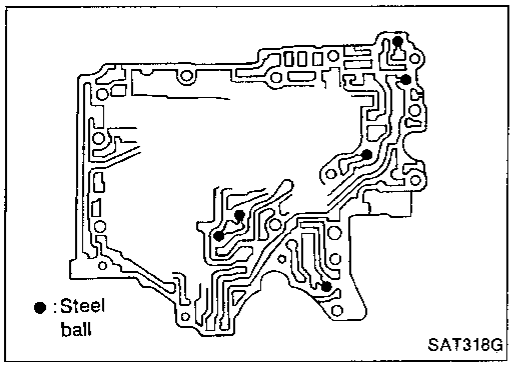
g. Remove bolts Ⓔ, separating plate and separating gaskets from lower body.
h. Remove steel balls and relief valve springs from lower body.

- **Be careful not to lose steel balls and relief valve springs.**



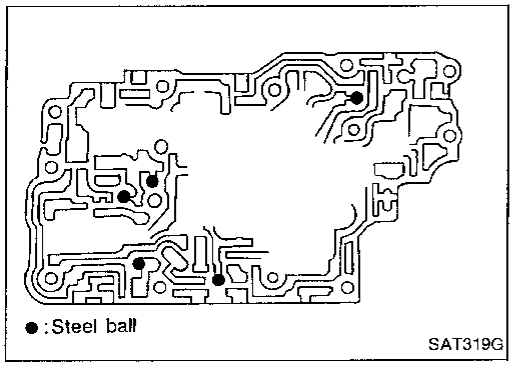
i. Remove inter body from upper body.
j. Remove pilot filter, separating plate and gaskets from upper body.

Control Valve Assembly — RE4F03V (Cont'd)



k. Check to see that steel balls are properly positioned in inter body and then remove them from inter body.

- **Be careful not to lose steel balls.**

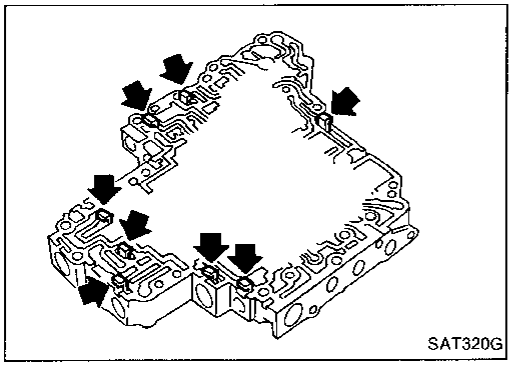


l. Check to see that steel balls are properly positioned in upper body and then remove them from upper body.

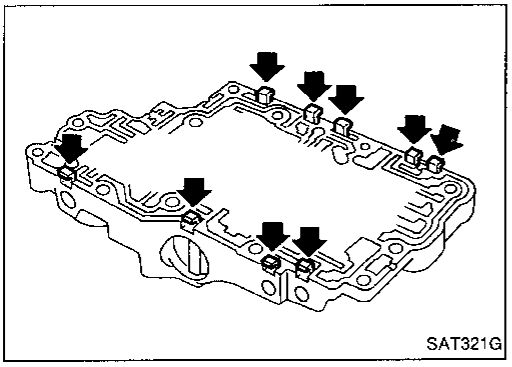
- **Be careful not to lose steel balls.**

INSPECTION

Lower and upper bodies

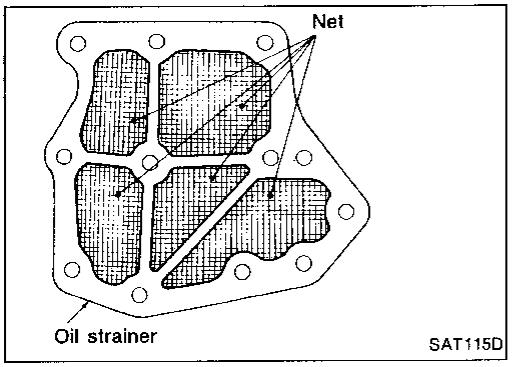


- Check to see that retainer plates are properly positioned in lower body.



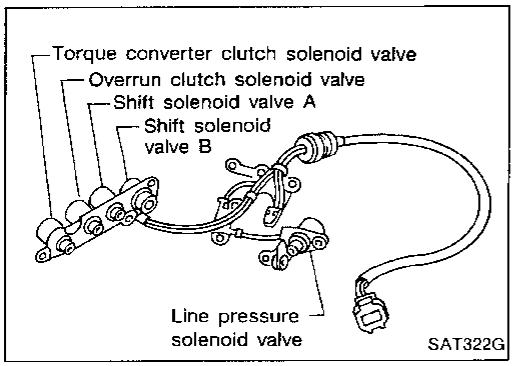
- Check to see that retainer plates are properly positioned in upper body.

Oil strainer



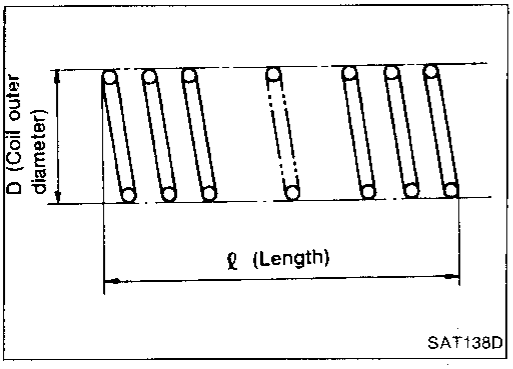
- Check wire netting of oil strainer for damage.

Control Valve Assembly — RE4F03V (Cont'd)



Shift solenoid valves A and B, line pressure solenoid valve, torque converter clutch solenoid valve and overrun clutch solenoid valve

- Measure resistance — Refer to "TROUBLE DIAGNOSES", AT-98.



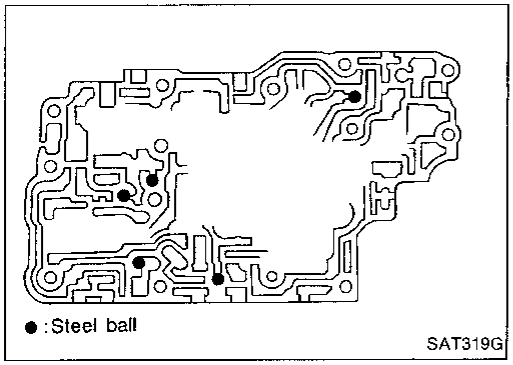
Oil cooler relief valve spring

- Check springs for damage or deformation.
- Measure free length and outer diameter.

Inspection standard:

Unit: mm (in)

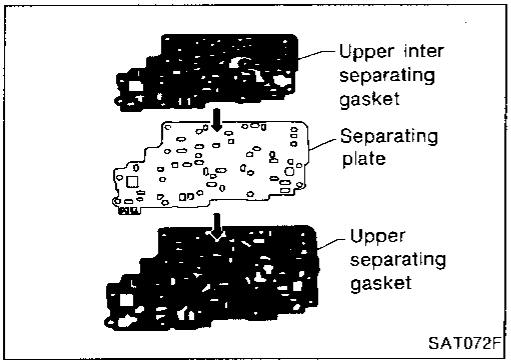
Part No.	ℓ	D
31872 31X00	17.02 (1.6701)	8.0 (0.315)



ASSEMBLY

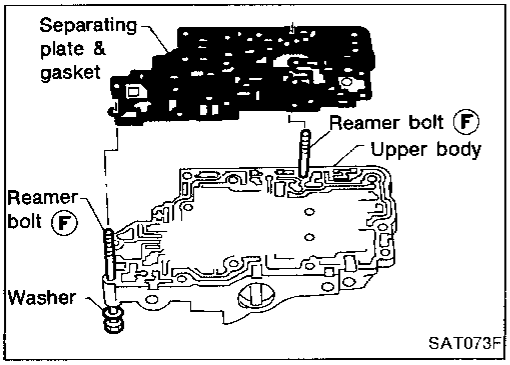
1. Install upper, inter and lower body.

a. Place oil circuit of upper body face up. Install steel balls in their proper positions.



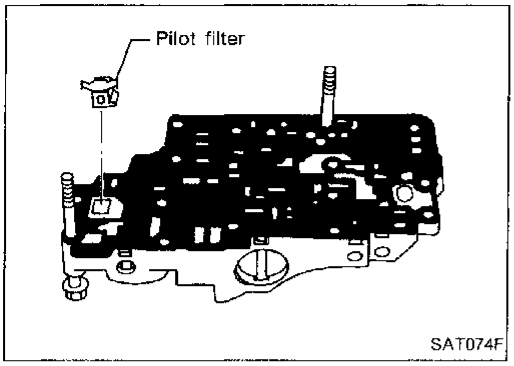
b. Install upper separating gasket, upper inter separating gasket and upper separating plate in order shown in illustration.

- **Always use new gaskets.**

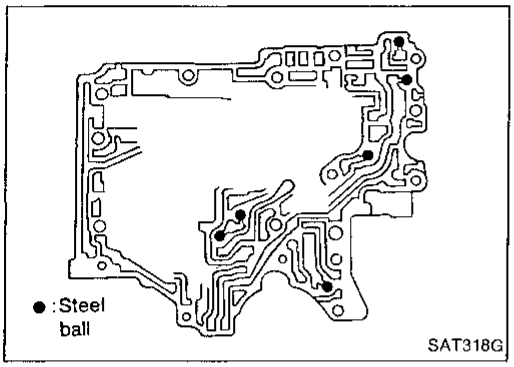


c. Install reamer bolts Ⓕ from bottom of upper body and install separating plate and gaskets as a set on upper body using reamer bolts as guides.

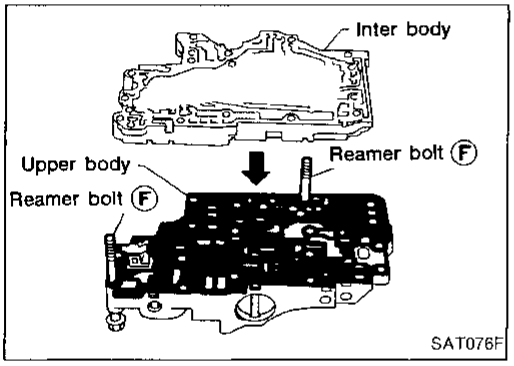
Control Valve Assembly — RE4F03V (Cont'd)



d. Install pilot filter.

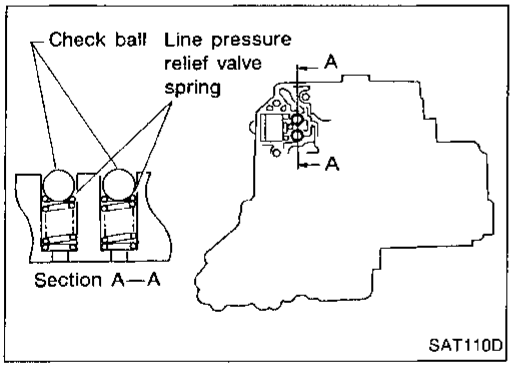


e. Place inter body as shown in the illustration. Install steel balls in their proper positions.

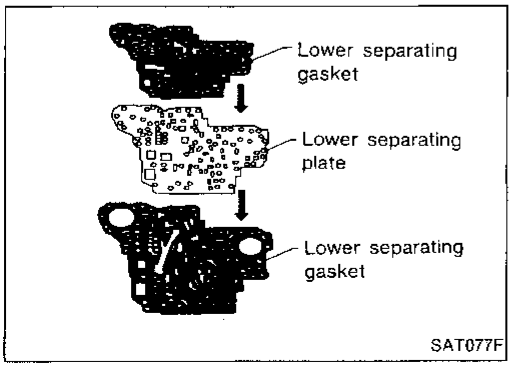


f. Install inter body on upper body using reamer bolts Ⓕ as guides.

- **Be careful not to dislocate or drop steel balls.**

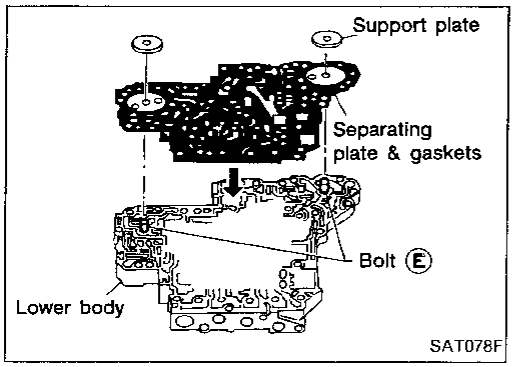


g. Install steel balls and relief valve springs in their proper positions in lower body.



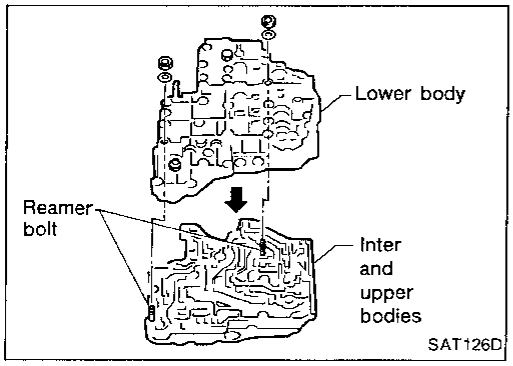
h. Install lower separating gasket, inner separating gasket and lower separating plate in order shown in the illustration.

Control Valve Assembly — RE4F03V (Cont'd)

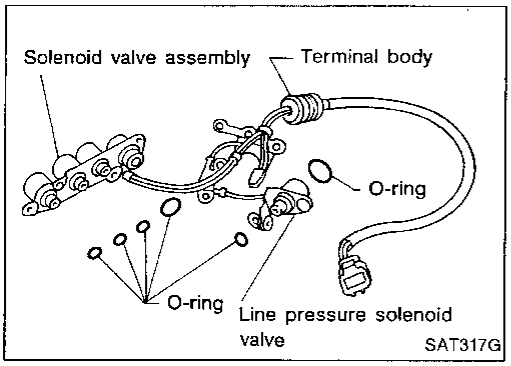


i. Install bolts Ⓔ from bottom of lower body and install separating plate and gaskets as a set on lower body using bolts Ⓔ as guides.

j. Install support plates on lower body.



k. Install lower body on inter body using reamer bolts Ⓕ as guides and tighten reamer bolts Ⓕ slightly.



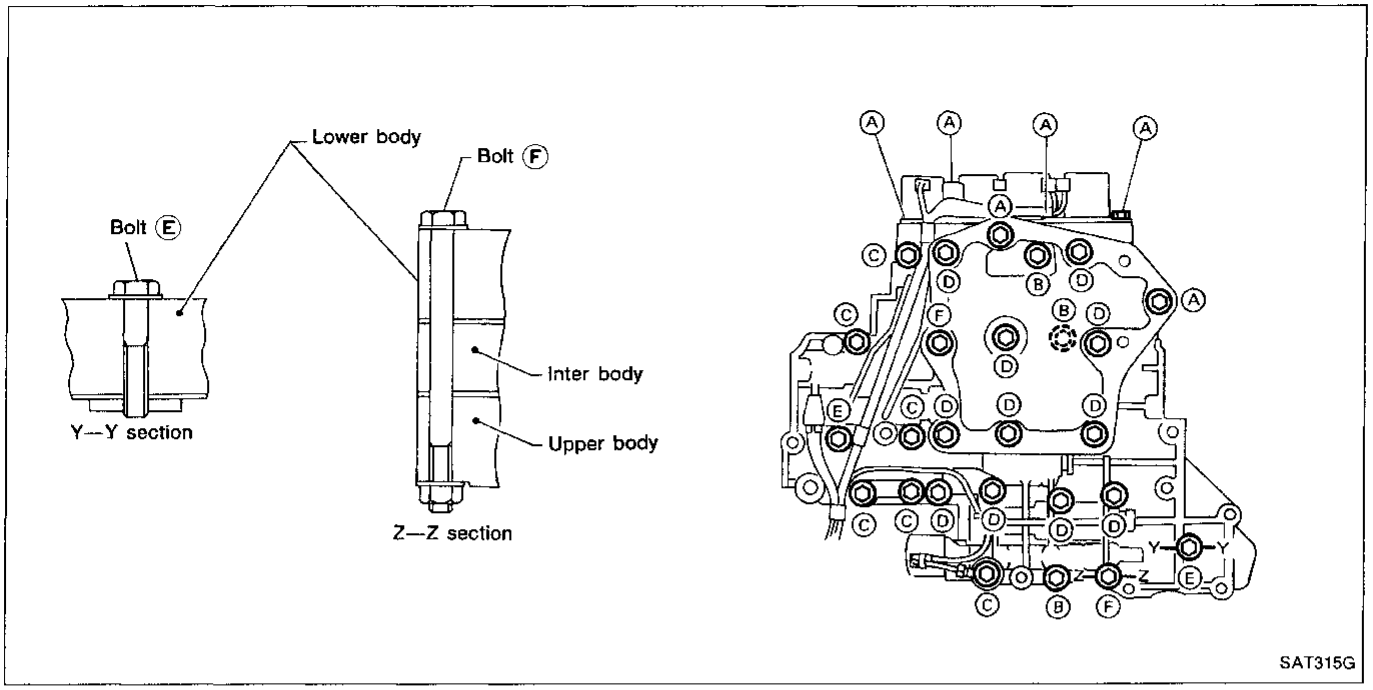
2. Install O-rings to solenoid valves and terminal body.

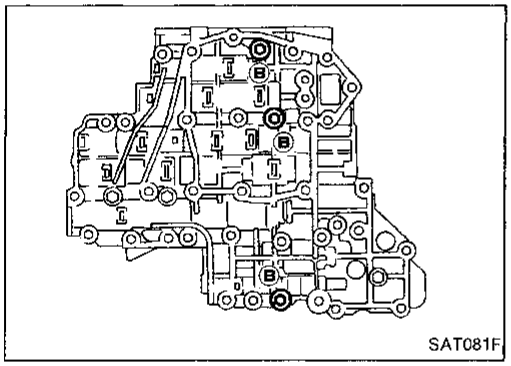
- **Apply ATF to O-rings.**

3. Install and tighten bolts.

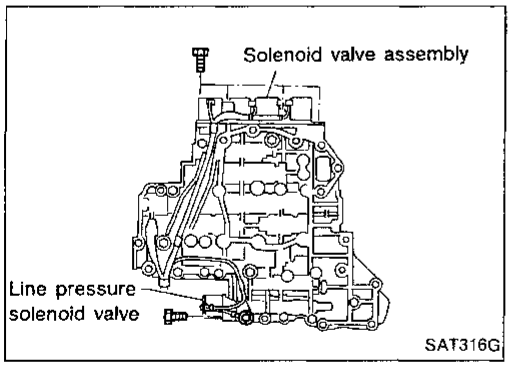
Bolt length, number and location:

Bolt symbol	A	B	C	D	E	F
Bolt length "ℓ" mm (in) 	13.5 (0.531)	58.0 (2.283)	44.0 (1.732)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)
Number of bolts	6	3	6	11	2	2

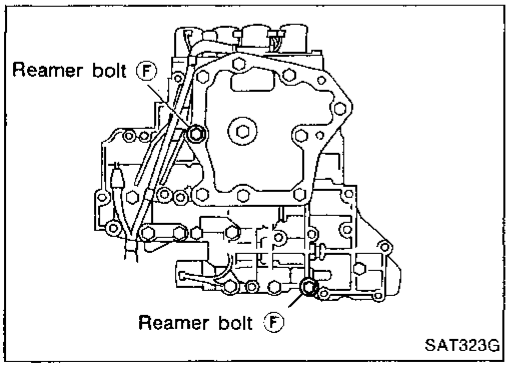




a. Install and tighten bolts Ⓑ to specified torque.

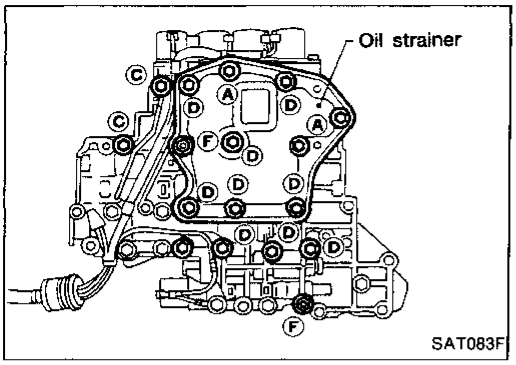


b. Install solenoid valve assembly and line pressure solenoid valve to lower body.

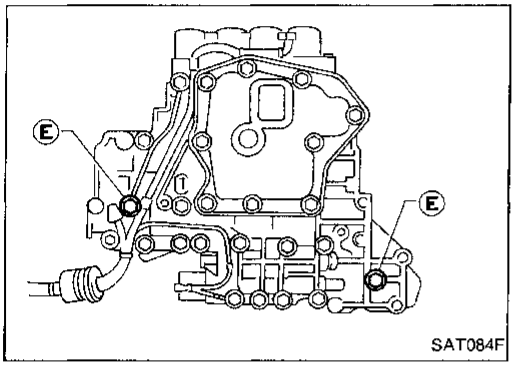


c. Remove reamer bolts Ⓕ and set oil strainer on control valve assembly.
d. Reinstall reamer bolts Ⓕ from lower body side.

Control Valve Assembly — RE4F03V (Cont'd)

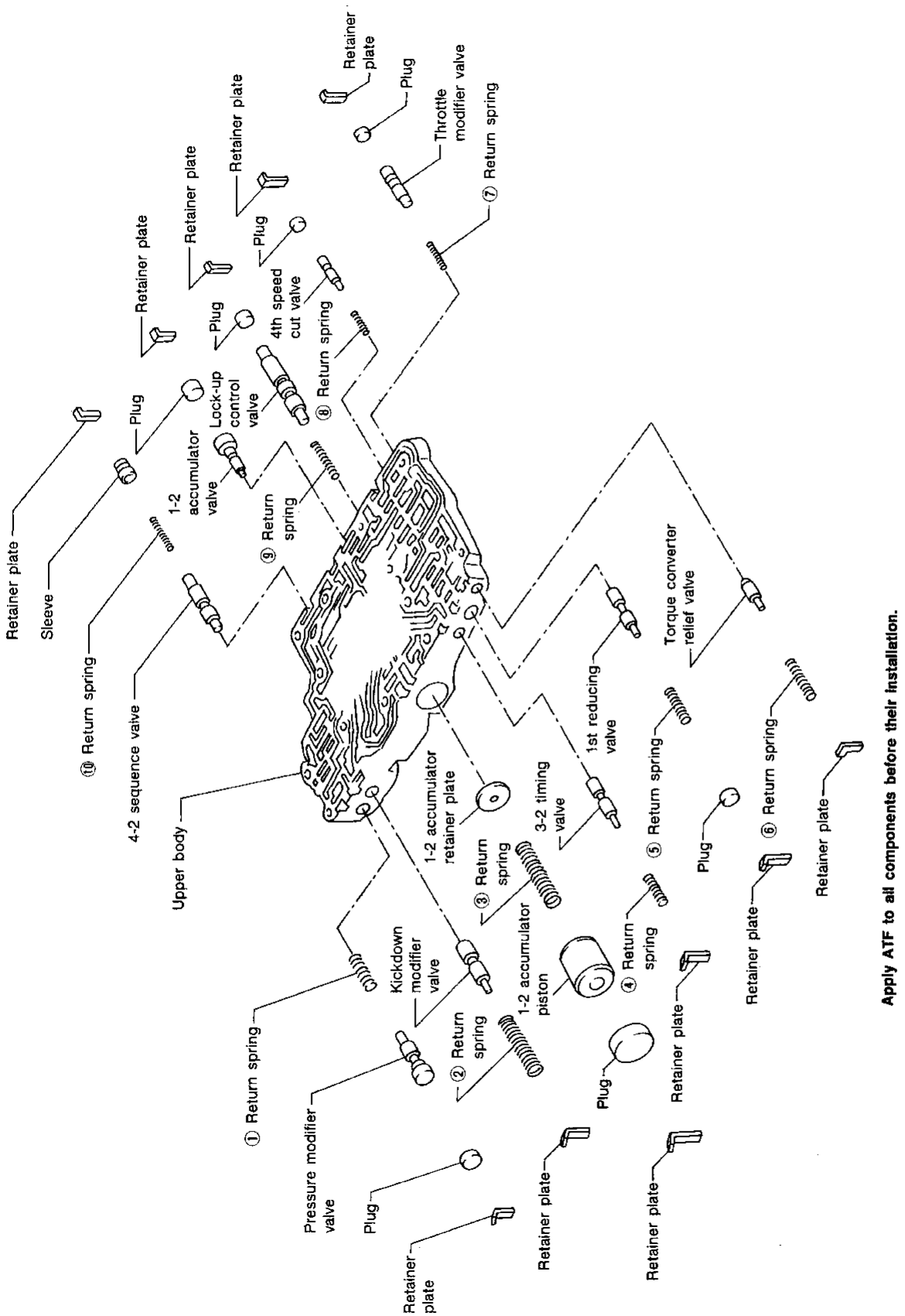


e. Tighten bolts Ⓐ, Ⓒ, Ⓓ and Ⓕ to specified torque.



f. Tighten bolts Ⓔ to specified torque.

Control Valve Upper Body — RL4F03A

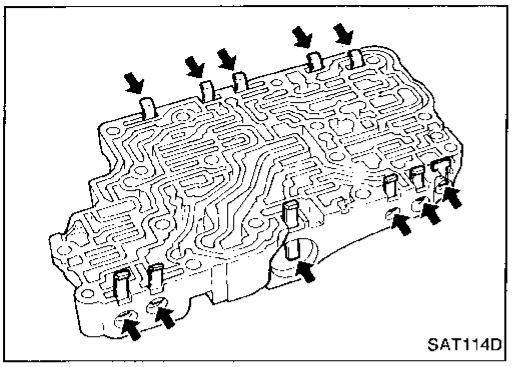


Numbers preceding valve springs correspond with those shown in SDS table on page AT-271.

SAT708DA

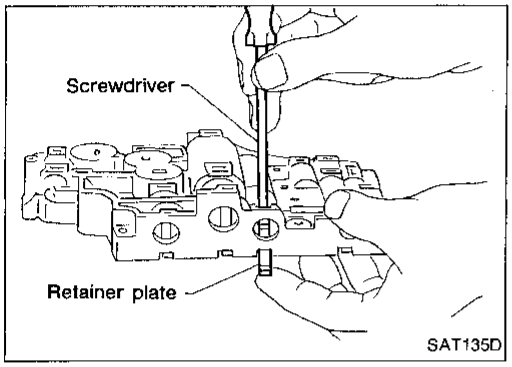
Control Valve Upper Body — RL4F03A (Cont'd)

DISASSEMBLY


SAT114D

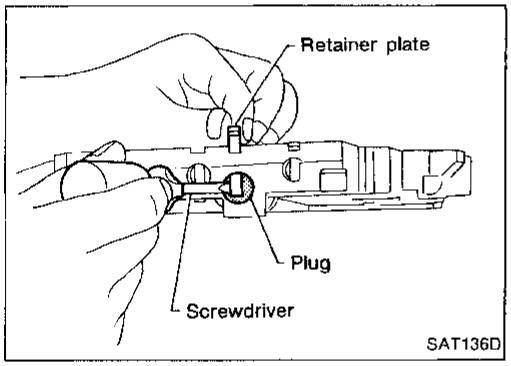
1. Remove valves at retainer plates.

- **Do not use a magnetic "hand".**



SAT135D

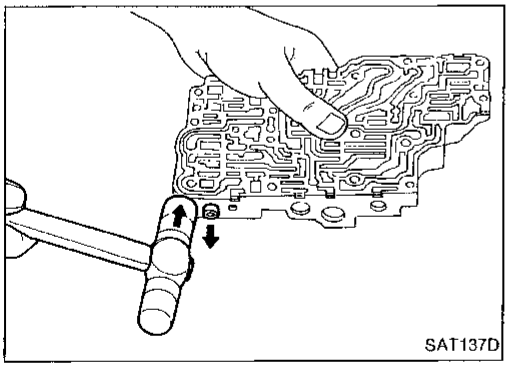
a. Use a screwdriver to pry out retainer plates.



SAT136D

b. Remove retainer plates while holding spring, plugs and sleeves.

- **Remove plug slowly to prevent internal parts from jumping out.**


SAT137D

c. Place mating surface of valve face down, and remove internal parts.

- **If a valve is hard to remove, place valve body face down and lightly tap it with a soft hammer.**
- **Be careful not to drop or damage valves and sleeves.**

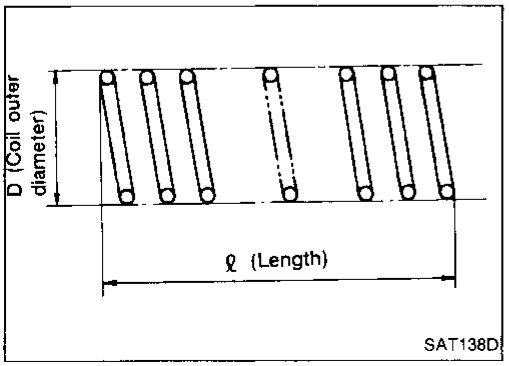
INSPECTION

Valve spring

- Measure free length and outer diameter of each valve spring. Also check for damage or deformation.
  Inspection standard: Refer to SDS, AT-271.
- Replace valve springs if deformed or fatigued.

Control valves

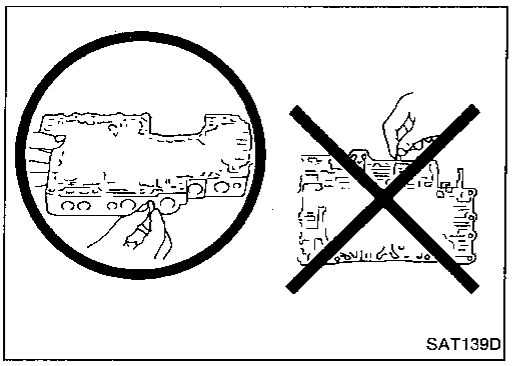
- Check sliding surfaces of valves, sleeves and plugs.



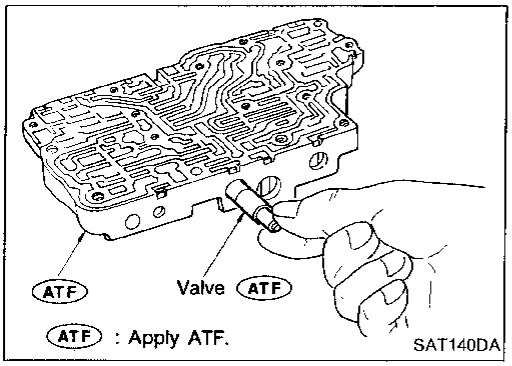
SAT138D

Control Valve Upper Body — RL4F03A (Cont'd)

ASSEMBLY

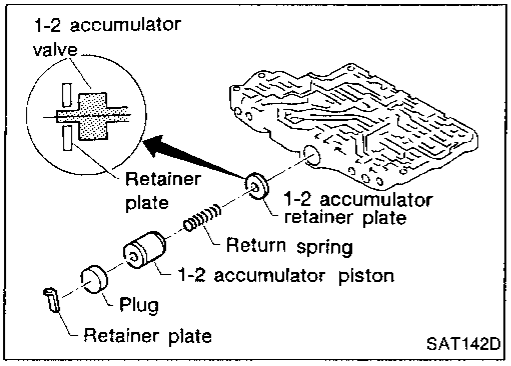

SAT139D

- **Lay the control valve body down when installing valves.**
- **Do not stand the control valve body on edge.**



SAT140DA

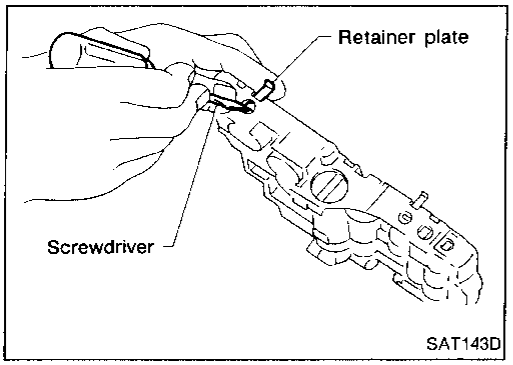
1. Lubricate the control valve body and all valves with ATF. Install control valves by sliding them carefully into their bores.
- **Be careful not to scratch or damage valve body.**
- Wrap a small screwdriver with vinyl tape and use it to insert the valves into their proper positions.



SAT142D

1-2 accumulator valve

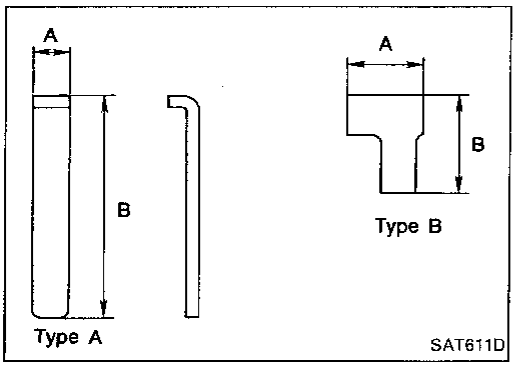
- Install 1-2 accumulator valve and then align 1-2 accumulator retainer plate with 1-2 accumulator valve from opposite side of control valve body.
- Install return spring and 1-2 accumulator piston.



SAT143D

2. Install retainer plates
- While pushing plug or return spring, install retainer plate.

Control Valve Upper Body — RL4F03A (Cont'd)



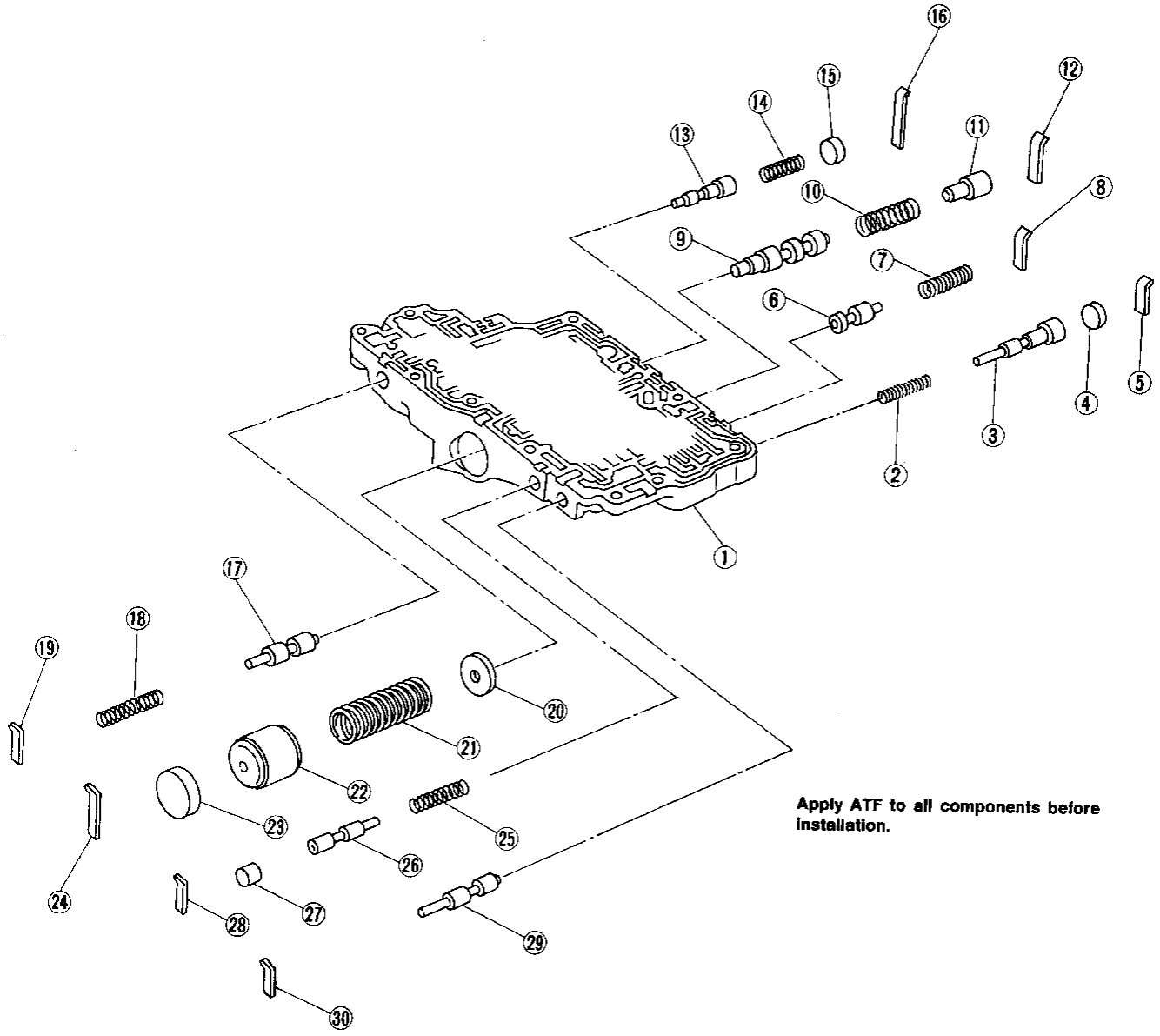
Retainer plate:

Unit: mm (in)

Name of control valves	Length A	Length B	Type
Pressure modifier valve	6.0 (0.236)	28.0 (1.102)	A
Lock-up control valve			
4-2 sequence valve			
Kickdown modifier valve	6.0 (0.236)	21.5 (0.846)	
3-2 timing valve			
1st reducing valve			
Throttle modifier valve			
4th speed cut valve			
1-2 accumulator valve	6.0 (0.236)	37.5 (1.476)	
Torque converter relief valve	13.0 (0.512)	17.0 (0.669)	B

- Install proper retainer plates.

Control Valve Upper Body — RE4F03V



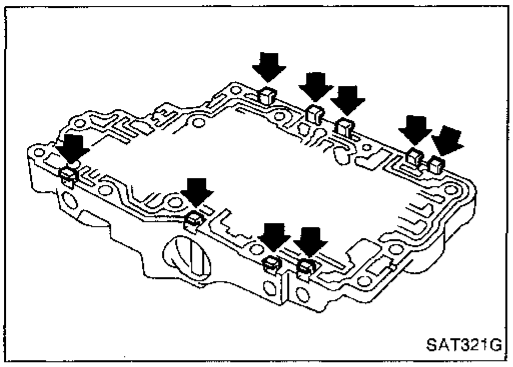
Numbers preceding valve springs correspond with those shown in SDS table on page AT-271.

SAT326GA

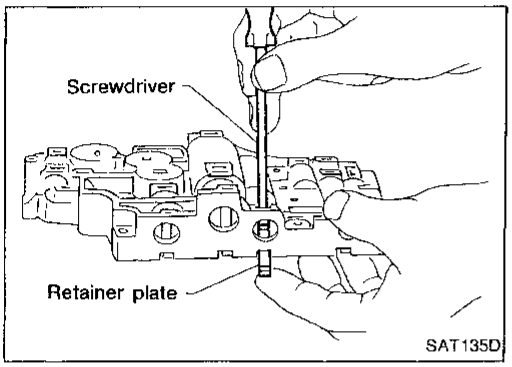
① Control valve upper body
② Return spring
③ Overrun clutch reducing valve
④ Plug
⑤ Retainer plate
⑥ Torque converter relief valve
⑦ Return spring
⑧ Retainer plate
⑨ Lock-up control valve
⑩ Return spring
⑪ Plug
⑫ Retainer plate
⑬ 1-2 accumulator valve
⑭ Return spring
⑮ Plug
⑯ Retainer plate
⑰ Pilot valve
⑱ Return spring
⑲ Retainer plate
⑳ 1-2 accumulator retainer plate
㉑ Return spring
㉒ 1-2 accumulator piston
㉓ Plug
㉔ Retainer plate
㉕ Return spring
㉖ 1st reducing valve
㉗ Plug
㉘ Retainer plate
㉙ 2-3 timing valve
㉚ Retainer plate

Control Valve Upper Body — RE4F03V (Cont'd)

DISASSEMBLY

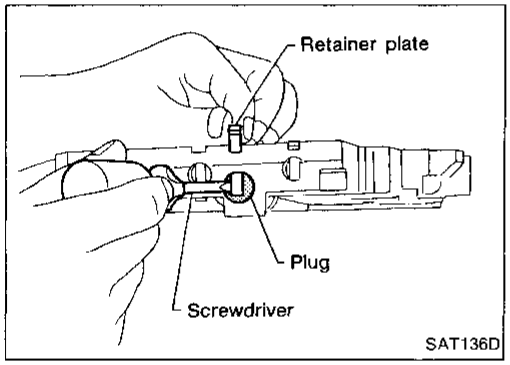

SAT321G

1. Remove valves at retainer plates.
- **Do not use a magnetic "hand".**



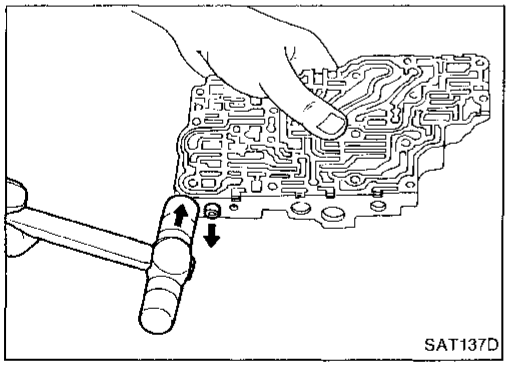
SAT135D

a. Use a screwdriver to pry out retainer plates.

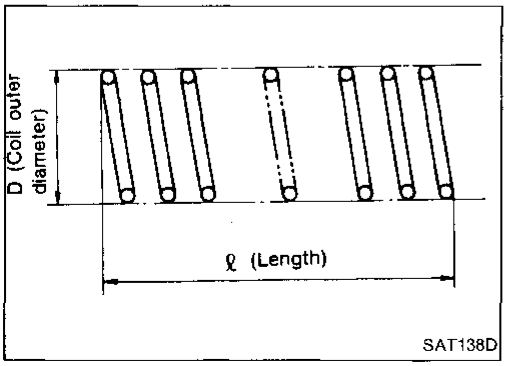


SAT136D

b. Remove retainer plates while holding spring, plugs or sleeves.
- **Remove plugs slowly to prevent internal parts from jumping out.**


SAT137D

c. Place mating surface of valve body face down, and remove internal parts.
- **If a valve is hard to remove, place valve body face down and lightly tap it with a soft hammer.**
- **Be careful not to drop or damage valves and sleeves.**



SAT138D

INSPECTION

Valve spring

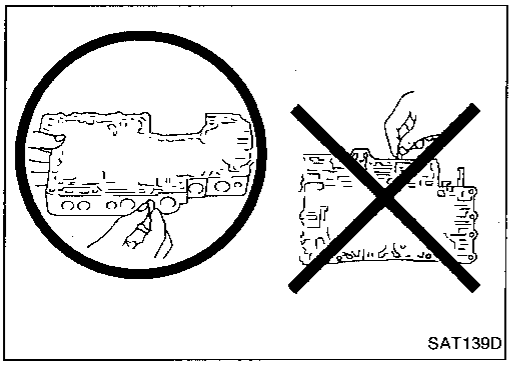
- Measure free length and outer diameter of each valve spring. Also check for damage or deformation.
  Inspection standard: Refer to SDS, AT-271.
- Replace valve springs if deformed or fatigued.

Control valves

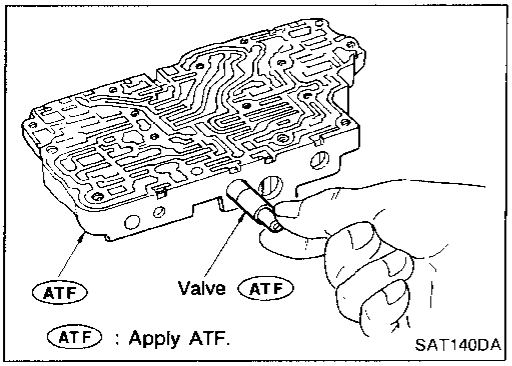
- Check sliding surfaces of valves, sleeves and plugs.

Control Valve Upper Body — RE4F03V (Cont'd)

ASSEMBLY

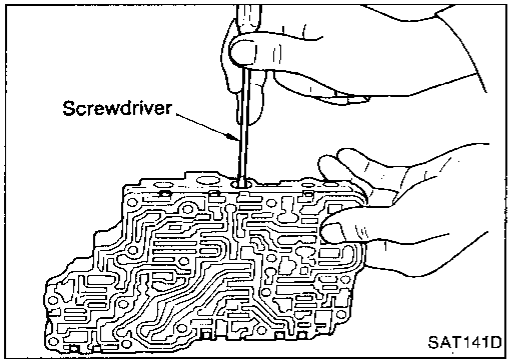

SAT139D

- **Lay control valve body down when installing valves. Do not stand the control valve body upright.**



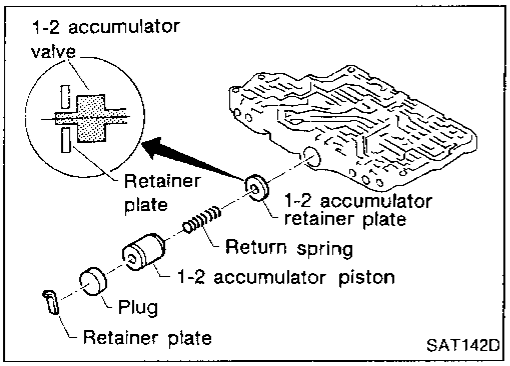
SAT140DA

1. Lubricate the control valve body and all valves with ATF. Install control valves by sliding them carefully into their bores.
- **Be careful not to scratch or damage valve body.**



SAT141D

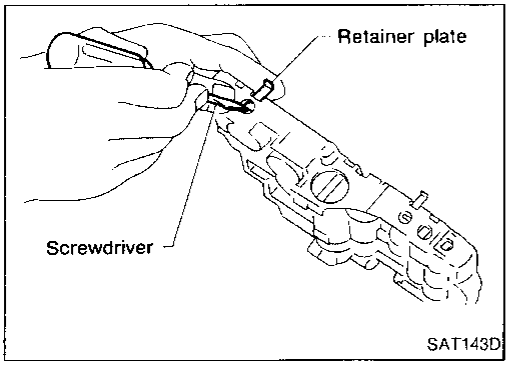
- Wrap a small screwdriver with vinyl tape and use it to insert the valves into their proper positions.



SAT142D

1-2 accumulator valve

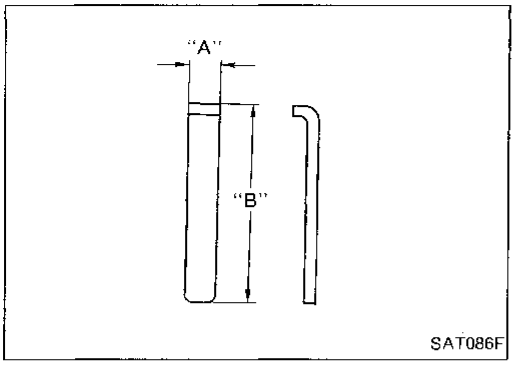
- Install 1-2 accumulator valve and then align 1-2 accumulator retainer plate with 1-2 accumulator valve from opposite side of control valve body.
- Install return spring, 1-2 accumulator piston and plug.



SAT143D

2. Install retainer plates
- Install retainer plate while pushing plug or return spring.

Control Valve Upper Body — RE4F03V (Cont'd)



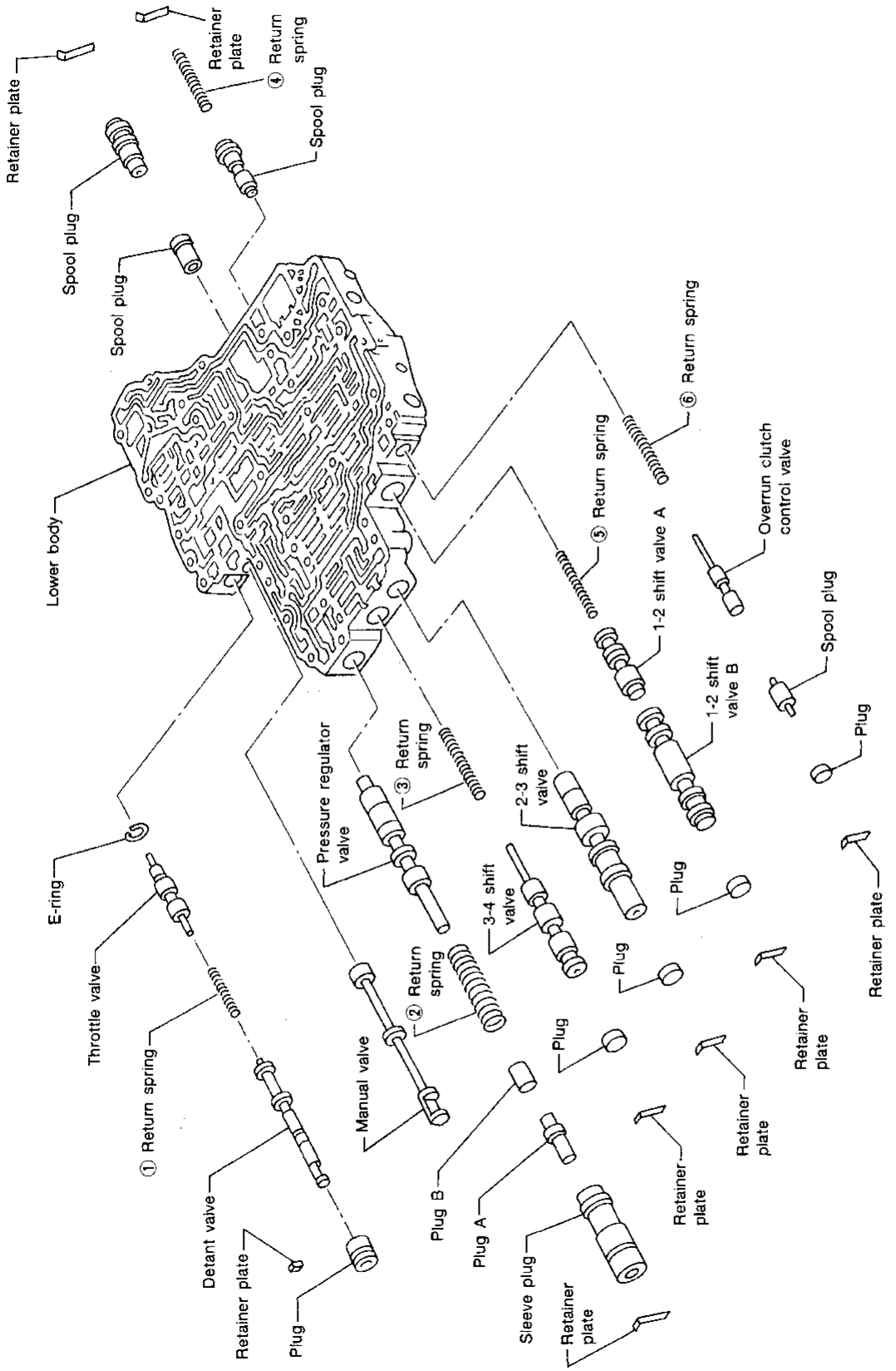
Retainer plate

Unit: mm (in)

Name of control valve	Length A	Length B
Pilot valve	6.0 (0.236)	21.5 (0.846)
1-2 accumulator valve		38.5 (1.516)
1-2 accumulator piston valve		
1st reducing valve		21.5 (0.846)
Overrun clutch reducing valve		24.0 (0.945)
Torque converter relief valve		21.5 (0.846)
Lock-up control valve		28.0 (1.102)
2-3 timing valve		

- Install proper retainer plates.

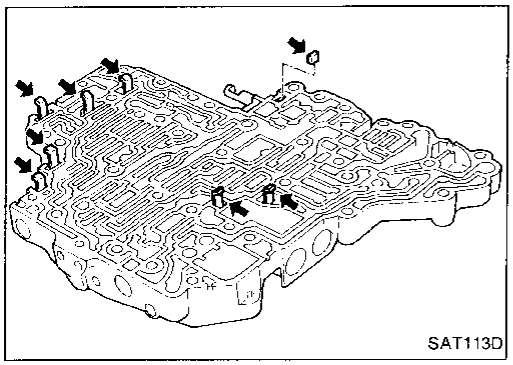
Control Valve Lower Body — RL4F03A



Numbers preceding valve springs correspond with those shown in SDS table on page AT-271.

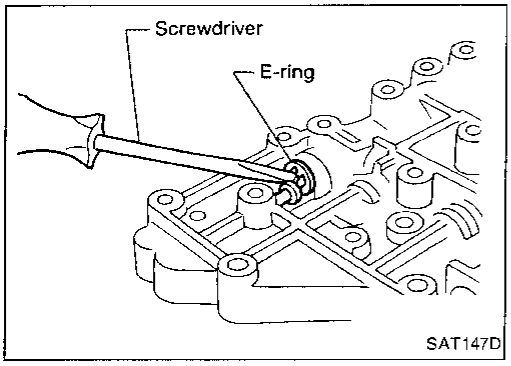
SAT003EA

Control Valve Lower Body — RL4F03A (Cont'd)



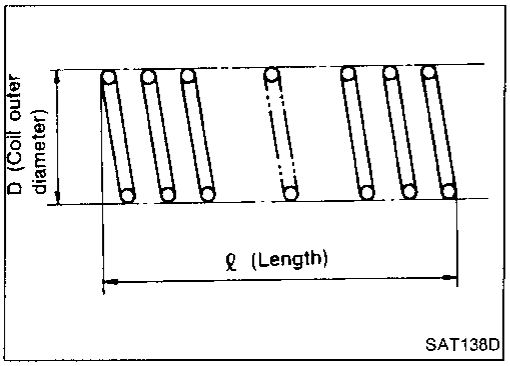
DISASSEMBLY

1. Remove valves at retainer plate.
   For removal procedures, refer to "DISASSEMBLY" in "Control Valve Upper Body", AT-182.



Throttle valve

- Remove throttle valve at E-ring.



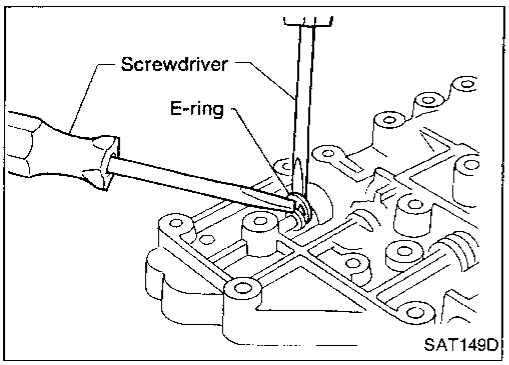
INSPECTION

Valve springs

- Check each valve spring for damage or deformation. Also measure free length and outer diameter.
  Inspection standard: Refer to SDS, AT-271.
- Replace valve springs if deformed or fatigued.

Control valves

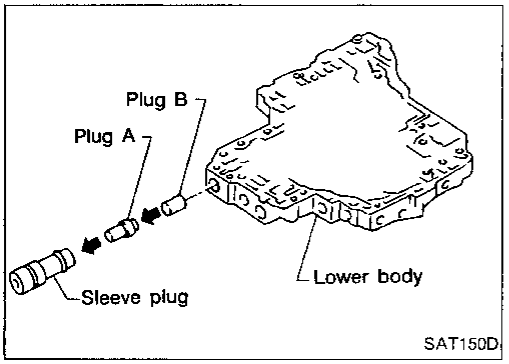
- Check sliding surfaces of control valves, sleeves and plugs for damage.



ASSEMBLY

Throttle valve

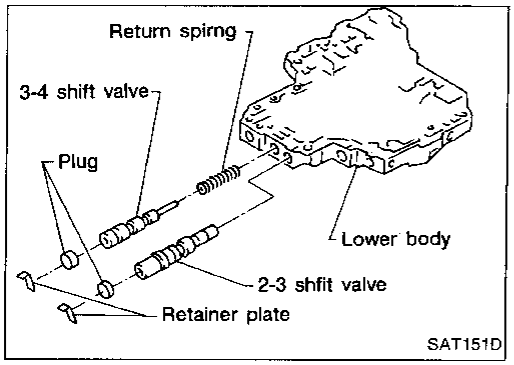
- Insert throttle valve to control valve body and then install E-ring to throttle valve.



Pressure regulator valve

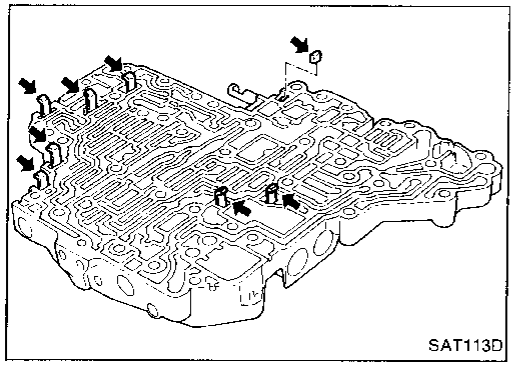
- Install pressure regulator valve after assembling sleeve plug, plug A and plug B.

Control Valve Lower Body — RL4F03A (Cont'd)

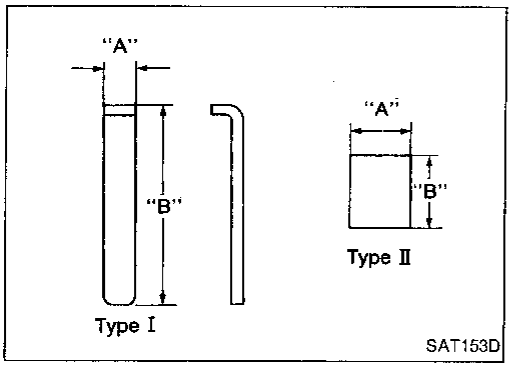


3-4 shift valve and 2-3 shift valve

- Install 3-4 shift valve and 2-3 shift valve after fixing plugs to retainer plates on the opposite side.



- Install control valves.
  For installation procedures, refer to "ASSEMBLY in "Control Valve Upper Body", AT-183.



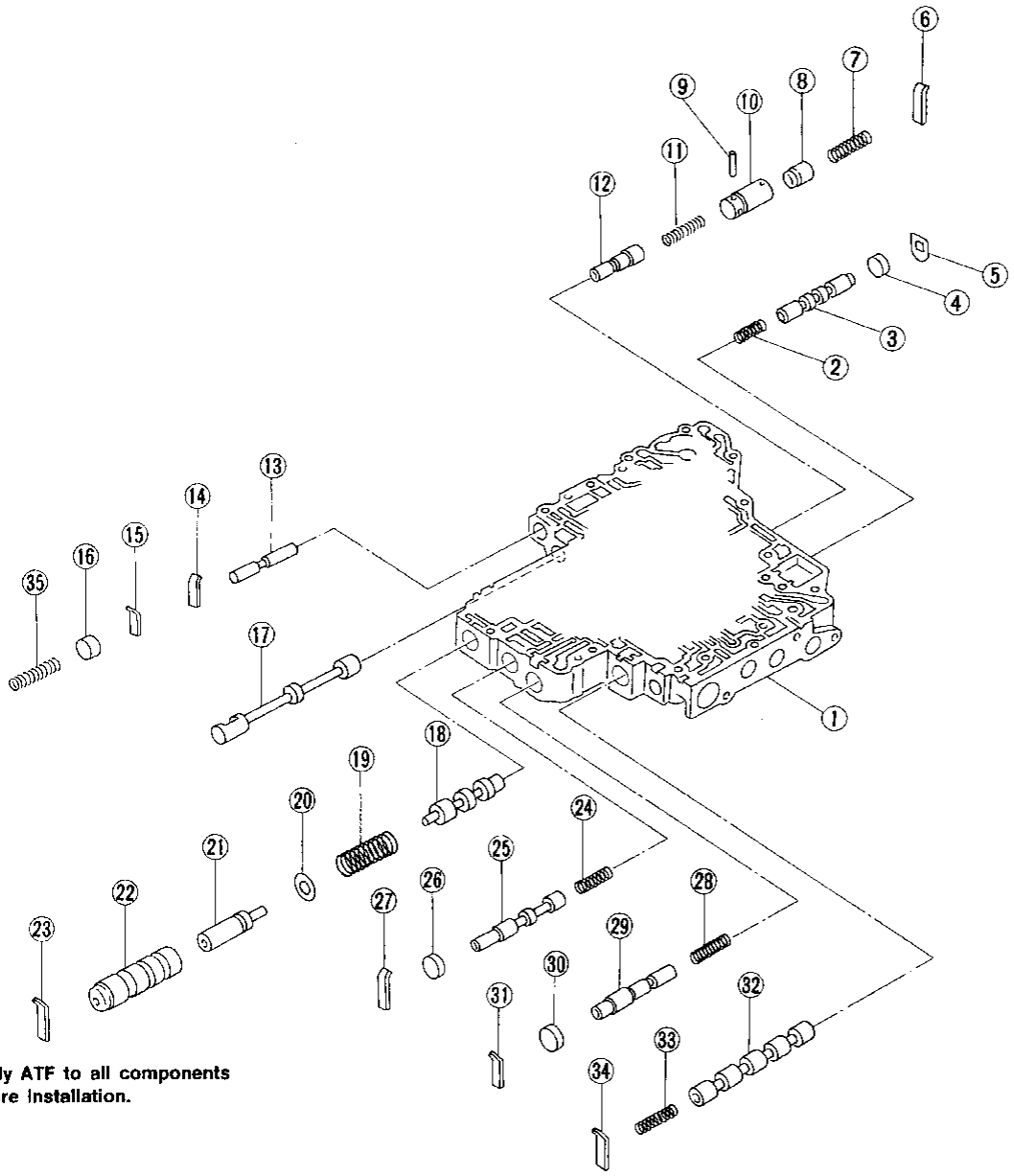
Retainer plate:

Unit: mm (in)

Name of control valve	Length A	Length B	Type
Throttle valve & detent valve	6.0 (0.236)	7.2 (0.283)	II
Pressure regulator valve	6.0 (0.236)	28.0 (1.102)	I
3-4 shift valve			
2-3 shift valve			
1-2 shift valve			
Overrun clutch control valve			

- Install proper retainer plates

Control Valve Lower Body — RE4F03V



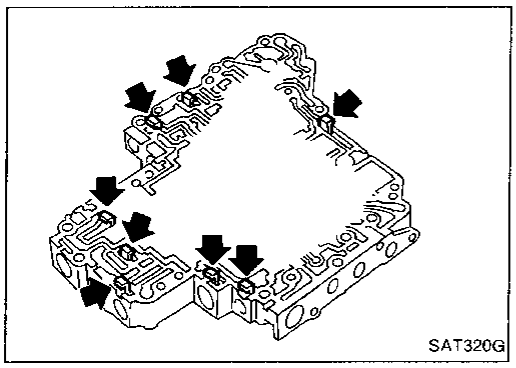
Apply ATF to all components before installation.

SAT327GA

Numbers preceding valve springs correspond with those shown in SDS table on page AT-271.

① Control valve lower body
② Return spring
③ Shift valve B
④ Plug
⑤ Retainer plate
⑥ Retainer plate
⑦ Return spring
⑧ Piston
⑨ Parallel pin
⑩ Sleeve
⑪ Return spring
⑫ Pressure modifier valve
⑬ Accumulator shift valve
⑭ Retainer plate
⑮ Retainer plate
⑯ Plug
⑰ Manual valve
⑱ Pressure regulator valve
⑲ Return spring
⑳ Spring seat
㉑ Plug
㉒ Sleeve
㉓ Retaining plate
㉔ Return spring
㉕ Overrun clutch control valve
㉖ Plug
㉗ Retaining plate
㉘ Return spring
㉙ Accumulator control valve
㉚ Plug
㉛ Retainer plate
㉜ Shift valve A
㉝ Return spring
㉞ Retainer plate
㉟ Return spring

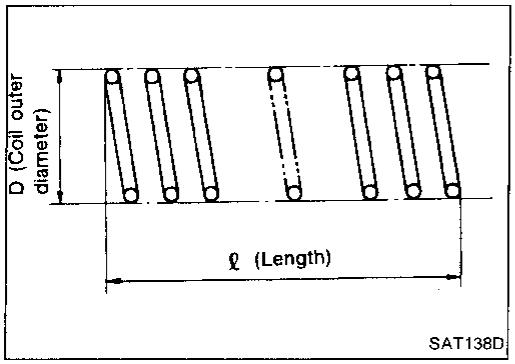
Control Valve Lower Body — RE4F03V (Cont'd)


SAT320G

DISASSEMBLY

Remove valves at retainer plate.

For removal procedures, refer to "DISASSEMBLY" of Control Valve Upper Body, AT-186.



SAT138D

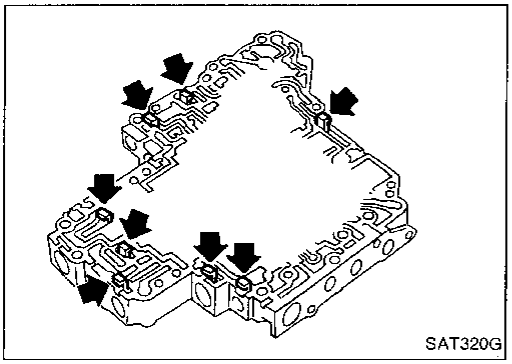
INSPECTION

Valve springs

- Check each valve spring for damage or deformation. Also measure free length and outer diameter.
  Inspection standard: Refer to SDS, AT-271.
- Replace valve springs if deformed or fatigued.

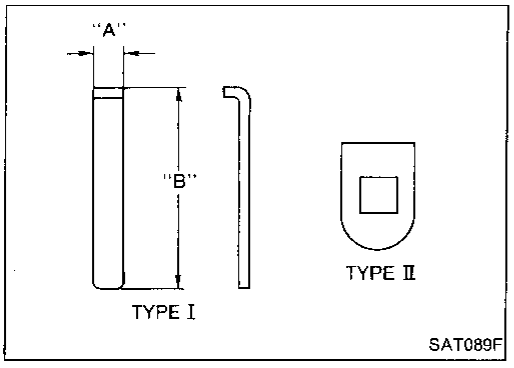
Control valves

- Check sliding surfaces of control valves, sleeves and plugs for damage.


SAT320G

ASSEMBLY

- Install control valves.
  For installation procedures, refer to "ASSEMBLY" of Control Valve Upper Body, AT-187.



SAT089F

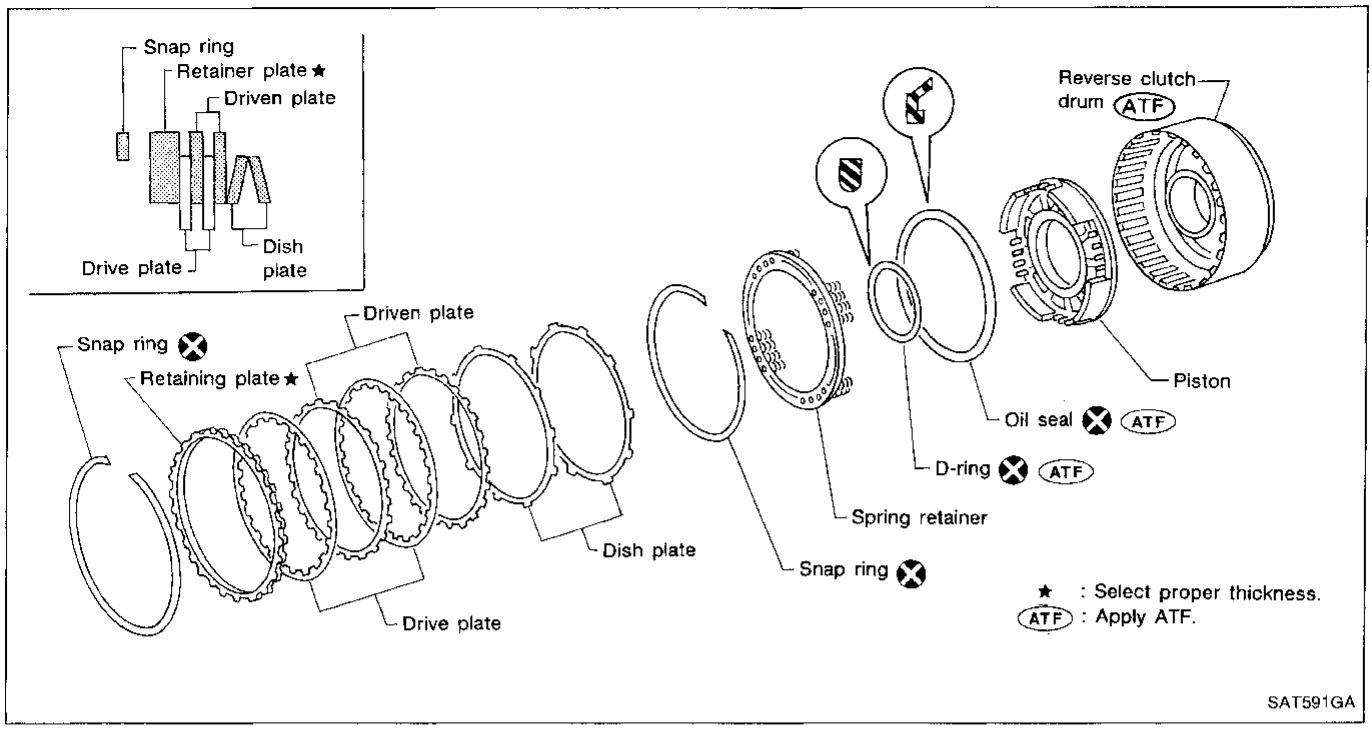
Retainer plate

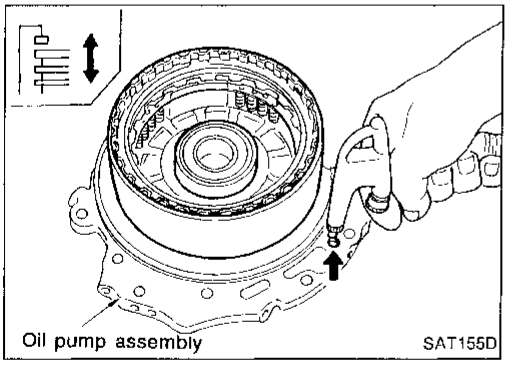
Unit: mm (in)

Name of control valve	Length A	Length B	Type
Accumulator shift valve	6.0 (0.236)	19.5 (0.768)	I
Pressure regulator valve		28.0 (1.102)	
Pressure clutch control			
Accumulator control valve			
Shift valve A			
Overrun clutch control valve			
Pressure modifier valve			
Shift valve B	—	—	II

- Install proper retainer plates

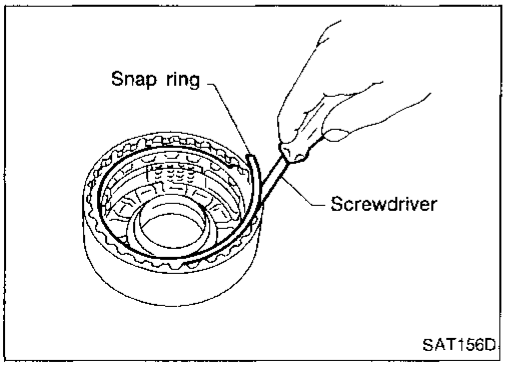
Reverse Clutch





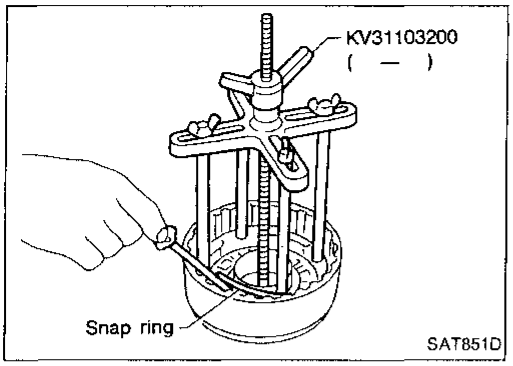
DISASSEMBLY

1. Check operation of reverse clutch
a. Install seal ring onto drum support of oil pump cover and install reverse clutch assembly. Apply compressed air to oil hole.
b. Check to see that retaining plate moves to snap ring.
c. If retaining plate does not move to snap ring, D-ring or oil seal may be damaged or fluid may be leaking at piston check ball.

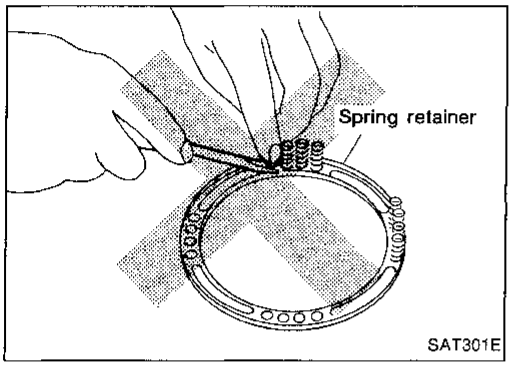


2. Remove snap ring.
3. Remove drive plates, driven plates, retaining plate, and dish plates.

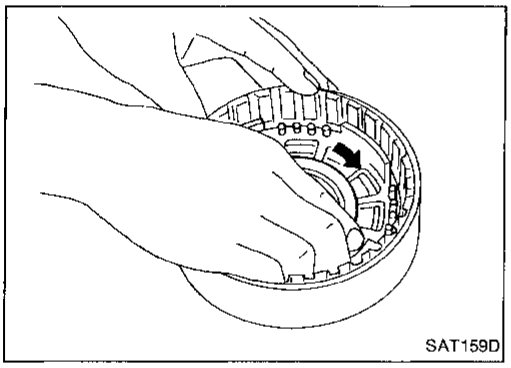
Reverse Clutch (Cont'd)



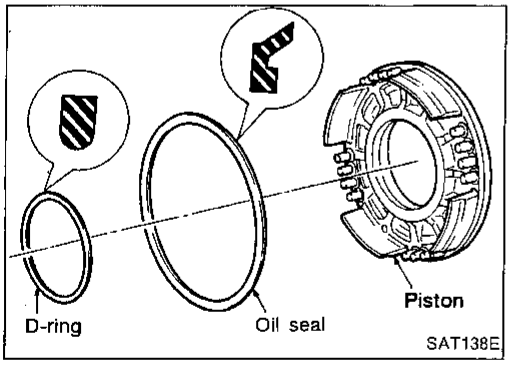
4. Set Tool on spring retainer and remove snap ring from reverse clutch drum while compressing return springs.
- **Set Tool directly above springs.**
- **Do not expand snap ring excessively.**
5. Remove spring retainer and return springs.



- **Do not remove return springs from spring retainer.**



6. Remove piston from reverse clutch drum by turning it.



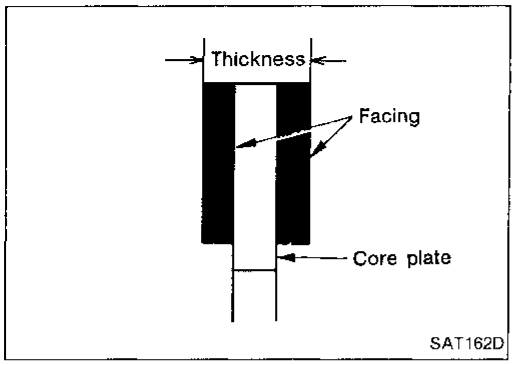
7. Remove D-ring and oil seal from piston.

INSPECTION

Reverse clutch snap ring, spring retainer and return springs

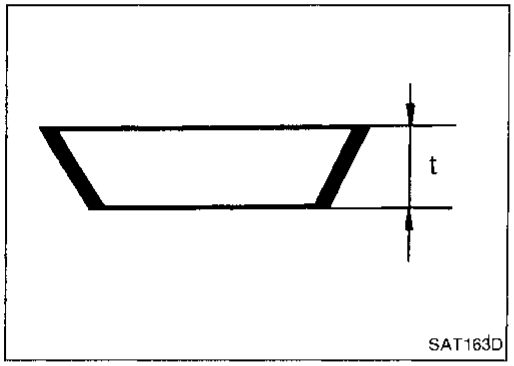
- Check for deformation, fatigue or damage.
- Replace if necessary.
- **When replacing spring retainer and return springs, replace them as a set.**

Reverse Clutch (Cont'd)



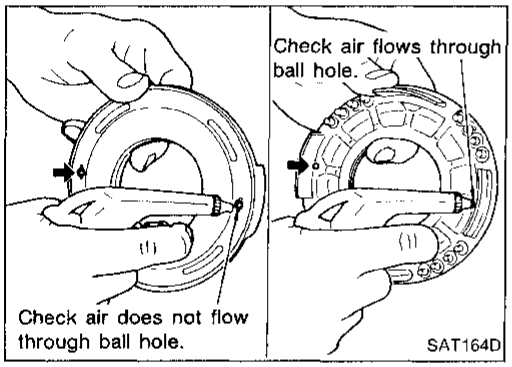
Reverse clutch drive plates

- Check facing for burns, cracks or damage.
- Measure thickness of facing.
  Thickness of drive plate:
  Standard value: 2.0 mm (0.079 in)
  Wear limit: 1.8 mm (0.071 in)
- If not within wear limit, replace.



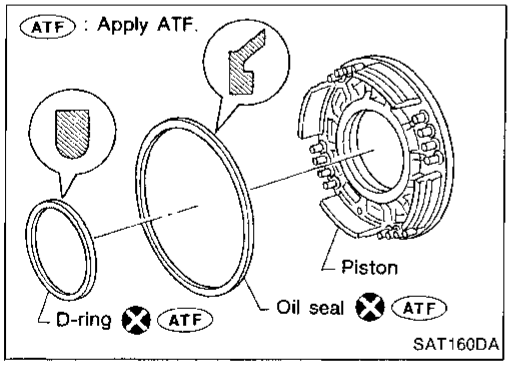
Reverse clutch dish plates

- Check for deformation or damage.
- Measure thickness of dish plate.
  Thickness of dish plate "t": 2.8 mm (0.110 in)
- If deformed or fatigued, replace.



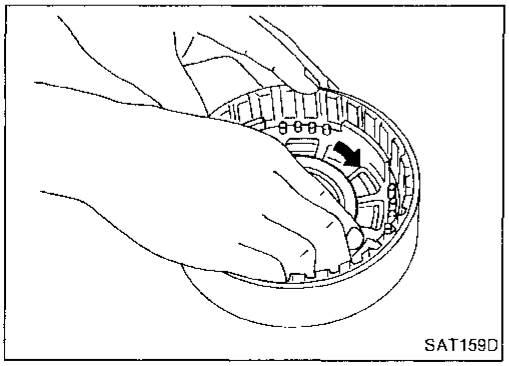
Reverse clutch piston

- Make sure check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring to make sure that there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure air leaks past ball.



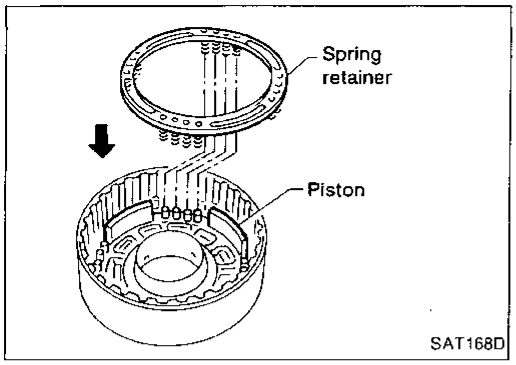
ASSEMBLY

1. Install D-ring and oil seal on piston.
- **Take care with the direction of the oil seal.**
- **Apply ATF to both parts.**

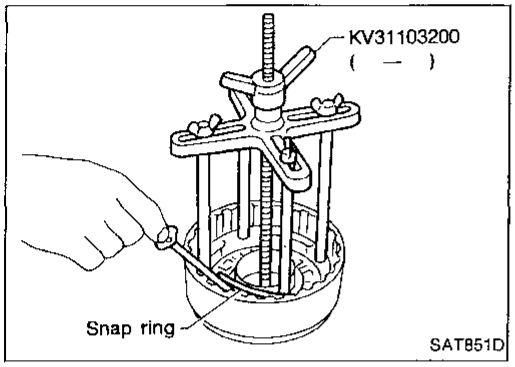


2. Install piston assembly by turning it slowly.
- **Apply ATF to inner surface of drum.**

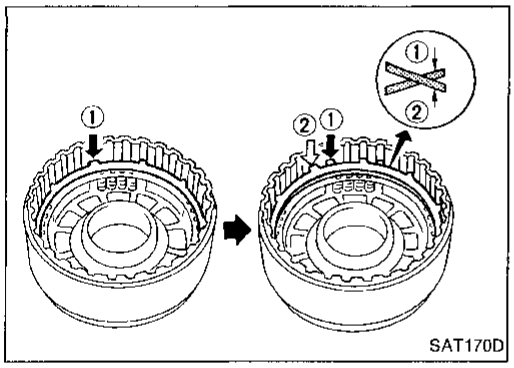
Reverse Clutch (Cont'd)



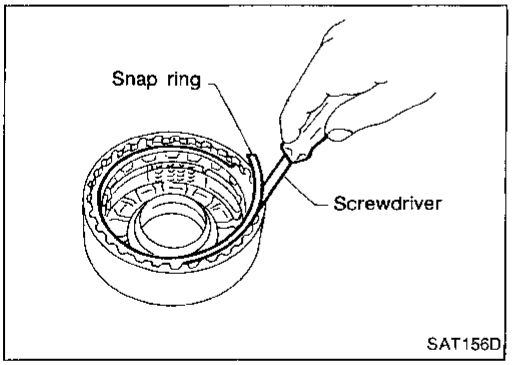
3. Install return springs and spring retainer on piston.



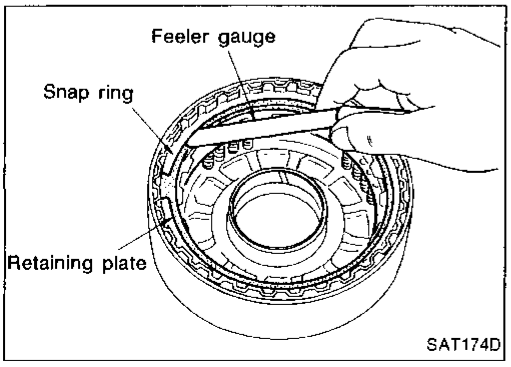
4. Set Tool on spring retainer and install snap ring while compressing return springs.
- **Set Tool directly above return springs.**



5. Install drive plates, driven plates, retaining plate and dish plates.
- **Do not align the projections of any two dish plates.**
- **Take care with the order and direction of plates.**

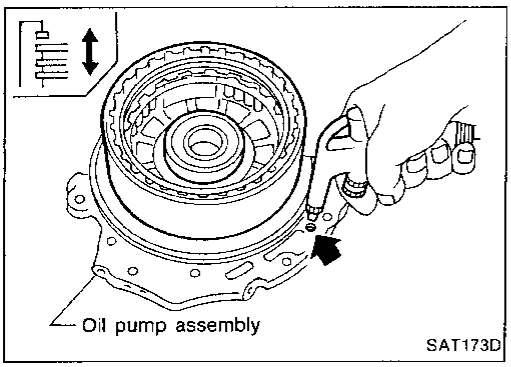


6. Install snap ring.



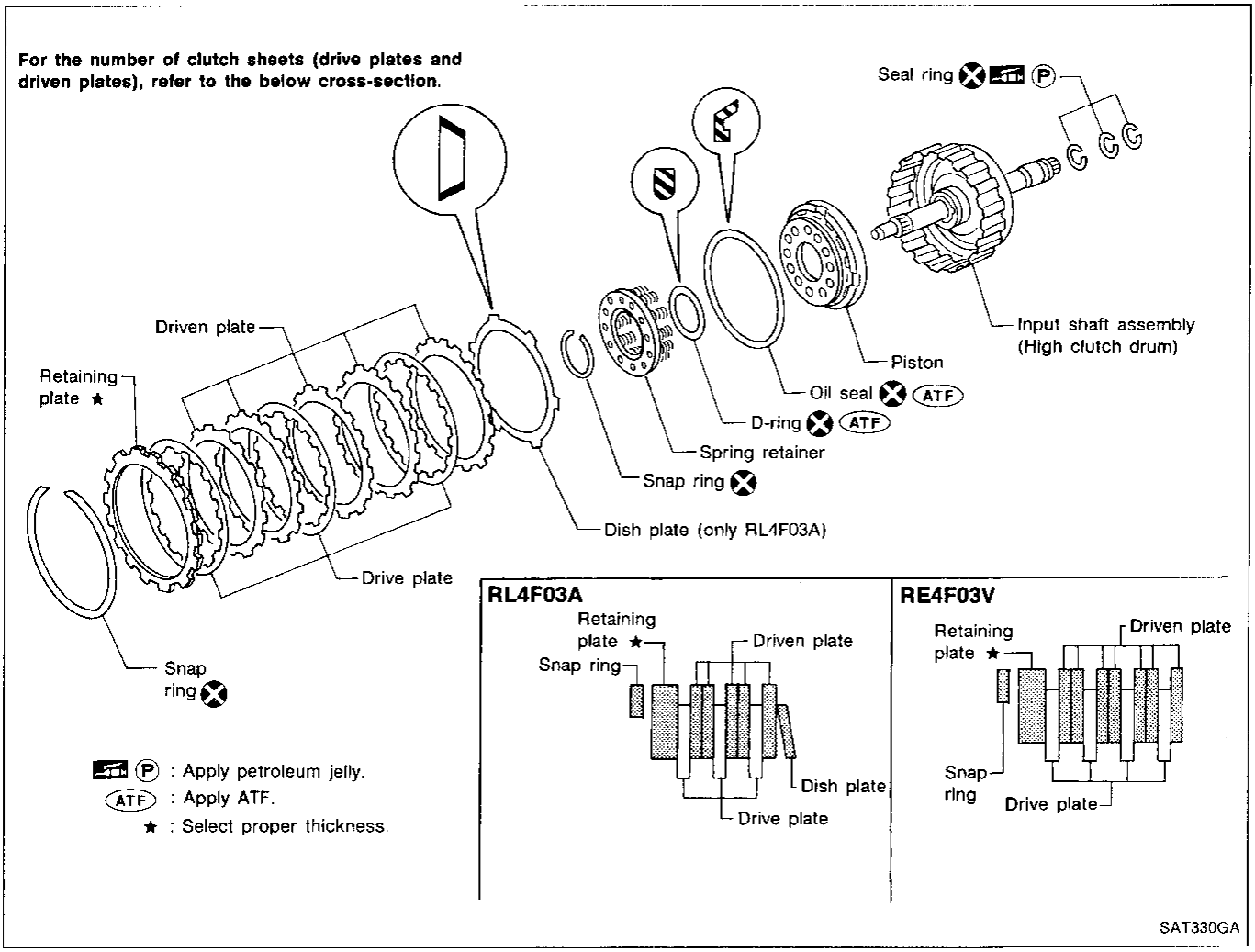
7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.
   Specified clearance:
   Standard: 0.5 - 0.8 mm (0.020 - 0.031 in)
   Allowable limit: 1.2 mm (0.047 in)
   Retaining plate: Refer to SDS, AT-272.

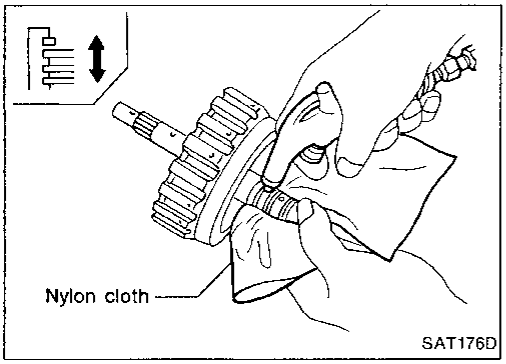
Reverse Clutch (Cont'd)



8. Check operation of reverse clutch.
   Refer to "DISASSEMBLY" in "Reverse Clutch", AT-194.

High Clutch





DISASSEMBLY

1. Check operation of high clutch.

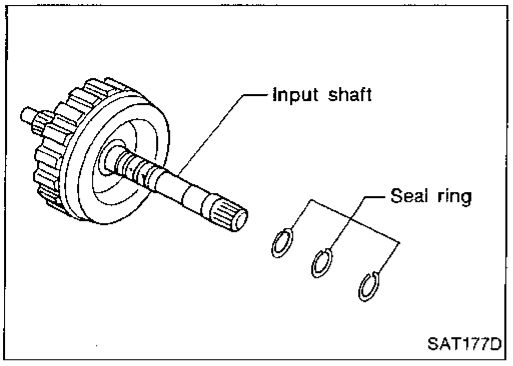
a. Apply compressed air to oil hole of input shaft.

- **Stop up a hole on opposite side of input shaft.**

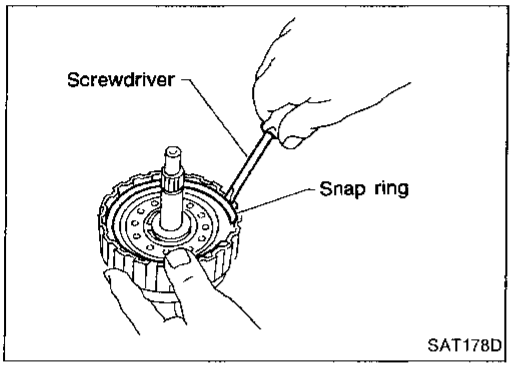
b. Check to see that retaining plate moves to snap ring.

c. If retaining plate does not move to snap ring, D-ring or oil seal may be damaged or fluid may be leaking at piston check ball.

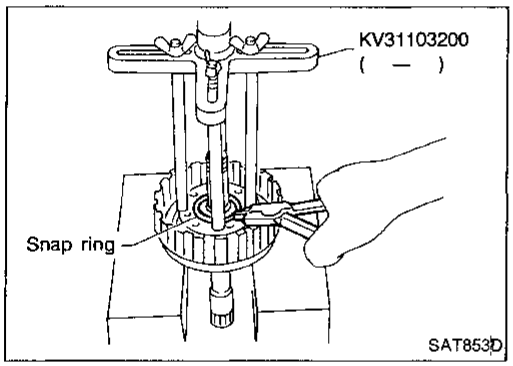
High Clutch (Cont'd)



2. Remove seal rings from input shaft.

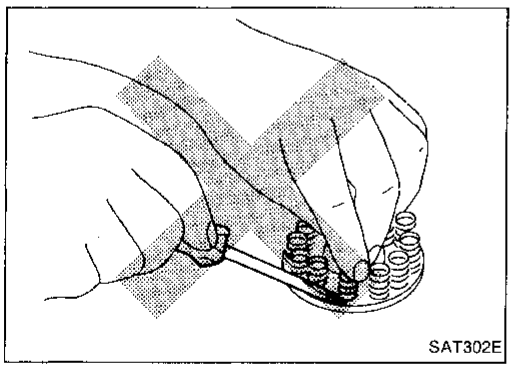


3. Remove snap ring.
4. Remove drive plates, driven plates, retaining plate and dish plate.

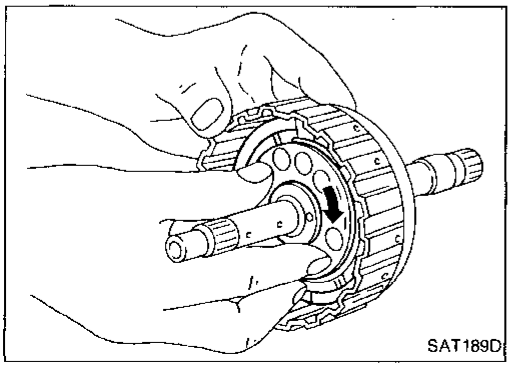


5. Set Tool on spring retainer and remove snap ring from high clutch drum while compressing return springs.
- **Set Tool directly above springs.**
- **Do not expand snap ring excessively.**

6. Remove spring retainer and return springs.

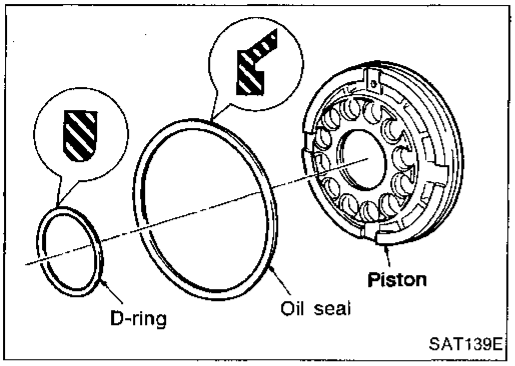


- **Do not remove return spring from spring retainer.**



7. Remove piston from high clutch drum by turning it.

High Clutch (Cont'd)

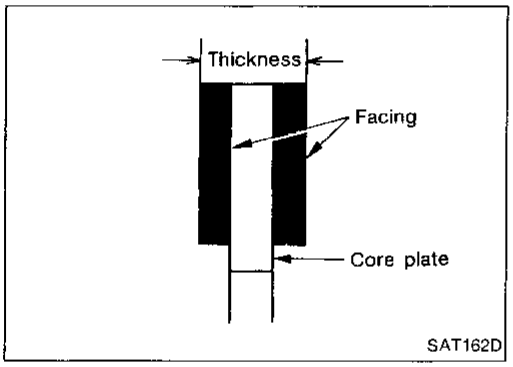


8. Remove D-ring and oil seal from piston.

INSPECTION

Reverse clutch snap ring, spring retainer and return springs

- Check for deformation, fatigue or damage.
- Replace if necessary.
- **When replacing spring retainer and return springs, replace them as a set.**



High clutch drive plates

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

  Thickness of drive plate:

  RL4F03A

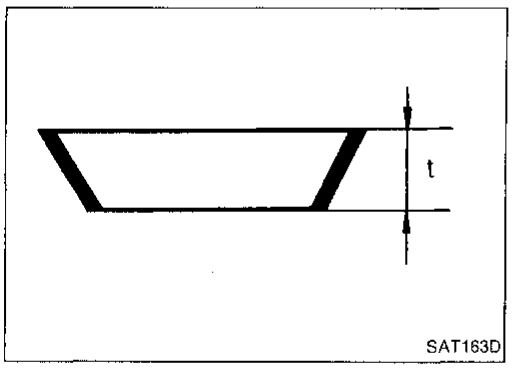
  Standard value: 2.0 mm (0.079 in)

  Wear limit: 1.8 mm (0.071 in)

  RL4F03V

  Standard value: 1.6 mm (0.063 in)

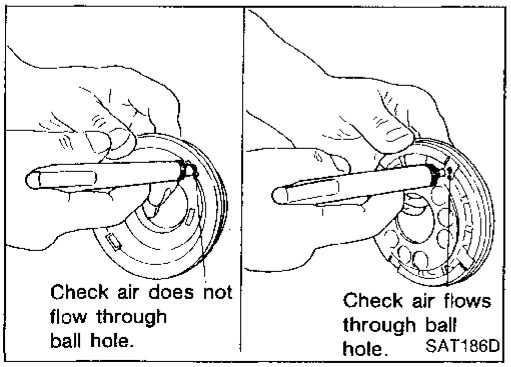
  Wear limit: 1.4 mm (0.055 in)
- If not within wear limit, replace.



High clutch dish plate

- Check for deformation or damage.
- Measure thickness of dish plate.

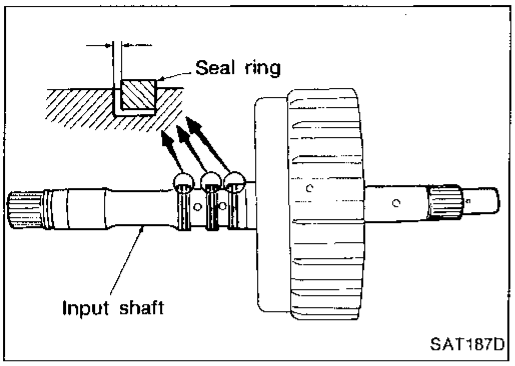
  Thickness of dish plate "t": 2.7 mm (0.106 in)
- If deformed or fatigued, replace.



High clutch piston

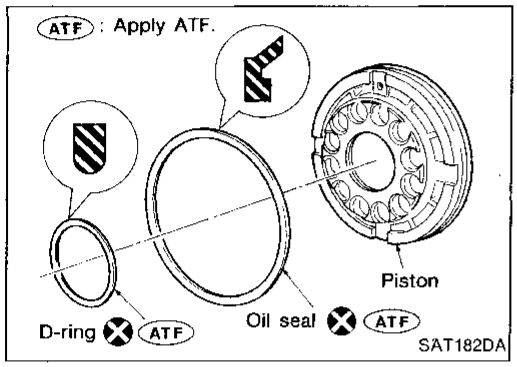
- Make sure check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring to make sure that there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure air leaks past ball.

High Clutch (Cont'd)



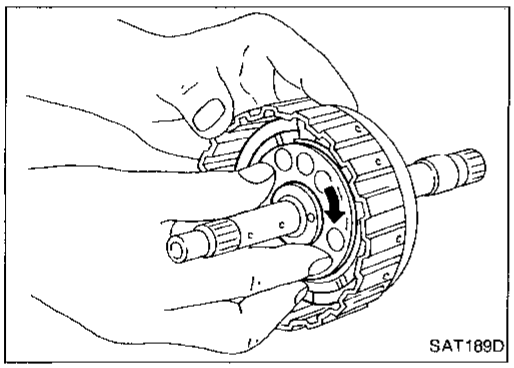
Seal ring clearance

- Install new seal rings onto input shaft.
- Measure clearance between seal ring and ring groove.
  Standard clearance:
  0.08 - 0.23 mm (0.0031 - 0.0091 in)
  Allowable limit:
  0.23 mm (0.0091 in)
- If not within wear limit, replace input shaft assembly.

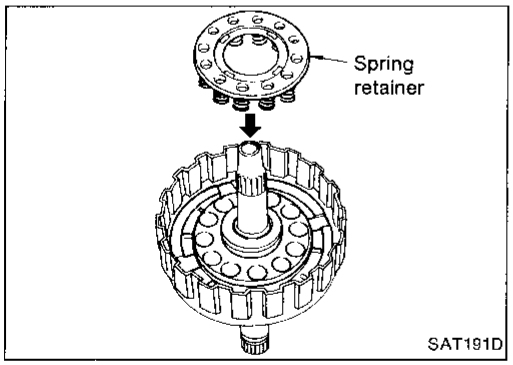


ASSEMBLY

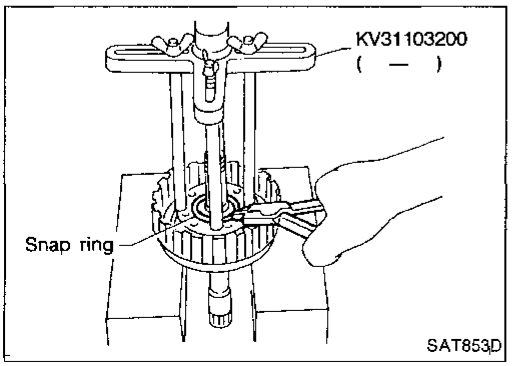
1. Install D-ring and oil seal on piston.
- **Take care with the direction of the oil seal.**
- **Apply ATF to both parts.**



2. Install piston assembly by turning it slowly.
- **Apply ATF to inner surface of drum.**

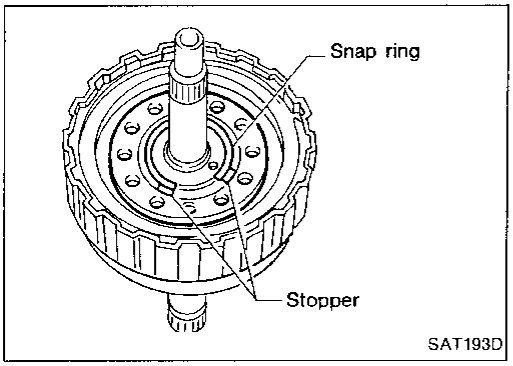


3. Install return springs and spring retainer on piston.

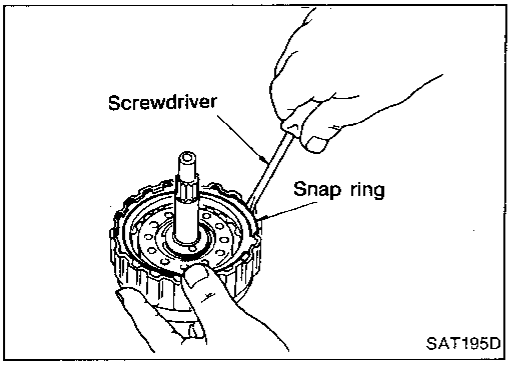


4. Set Tool on spring retainer and install snap ring while compressing return springs.
- **Set Tool directly above return springs.**

High Clutch (Cont'd)



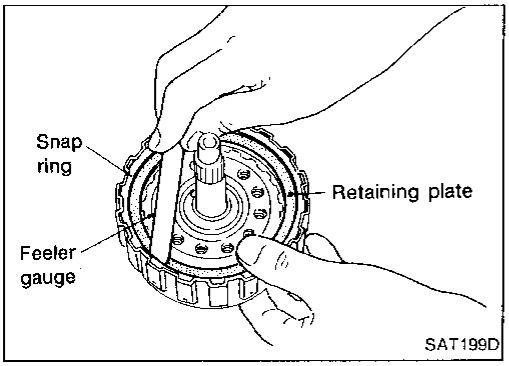
- **Do not align snap ring gap with spring retainer stopper.**



5. Install drive plates, driven plates, retaining plate and dish plate.

Take care with the order and direction of plates.

6. Install snap ring.



7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

Specified clearance:

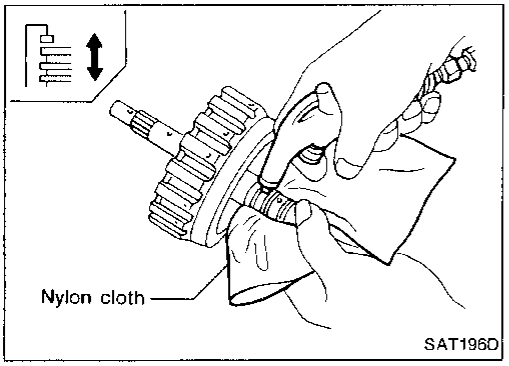
Standard: 1.4 - 1.8 mm (0.055 - 0.071 in)

Allowable limit:

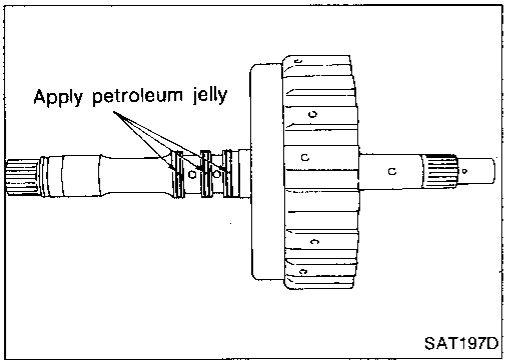
RL4F03A 2.4 mm (0.094 in)

RL4F03V 2.6 mm (0.102 in)

Retaining plate: Refer to SDS, AT-272.



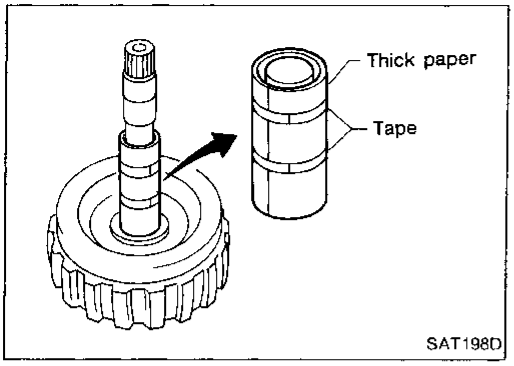
8. Check operation of high clutch.
Refer to "DISASSEMBLY" in "High Clutch", AT-198.



9. Install seal rings to input shaft.

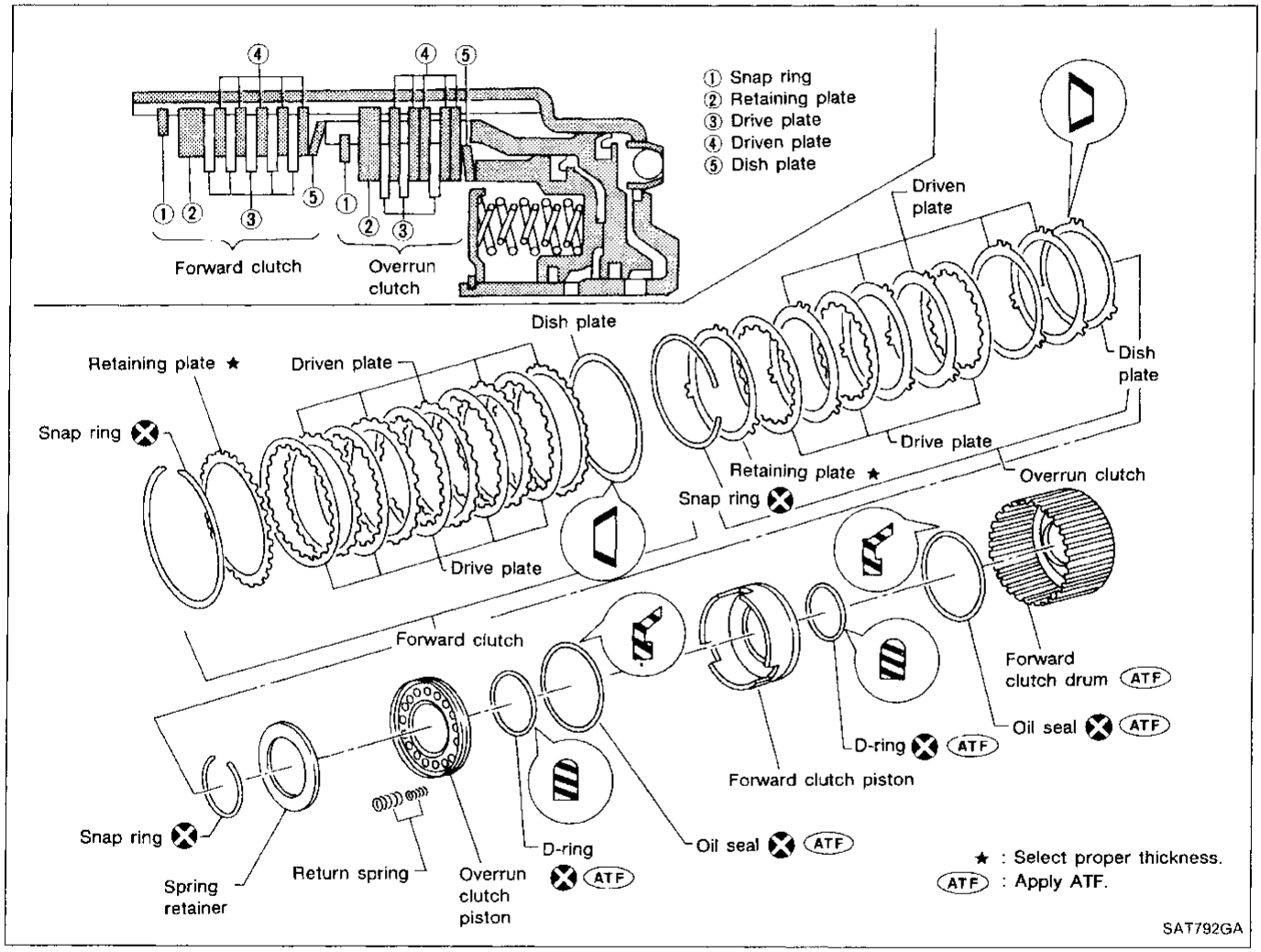
- **Apply petroleum jelly to seal rings.**

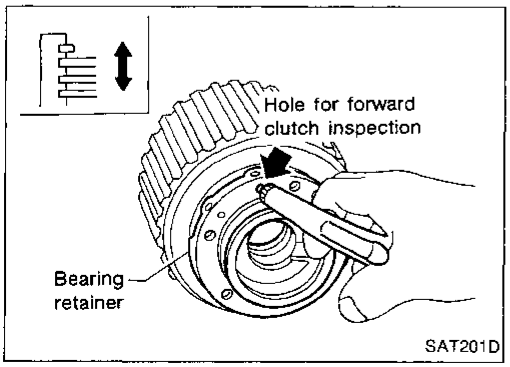
High Clutch (Cont'd)



- **Roll paper around seal rings to prevent seal rings from spreading.**

Forward Clutch and Overrun Clutch

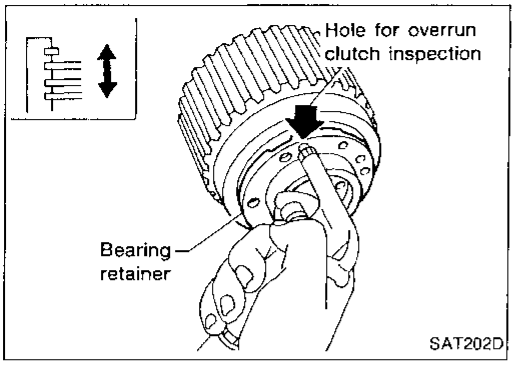




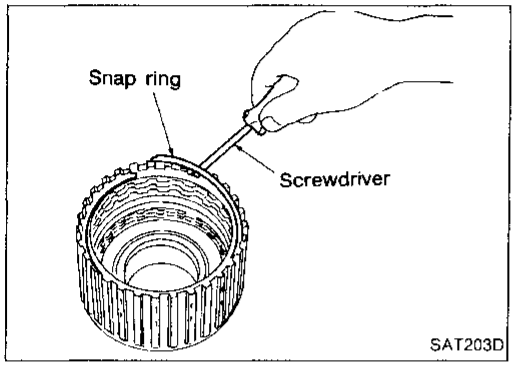
DISASSEMBLY

1. Check operation of forward clutch and overrun clutch.
a. Install bearing retainer on forward clutch drum.
b. Apply compressed air to oil hole of forward clutch drum.
c. Check to see that retaining plate moves to snap ring.

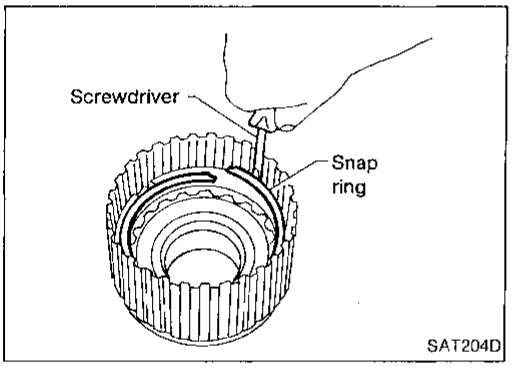
Forward Clutch and Overrun Clutch (Cont'd)



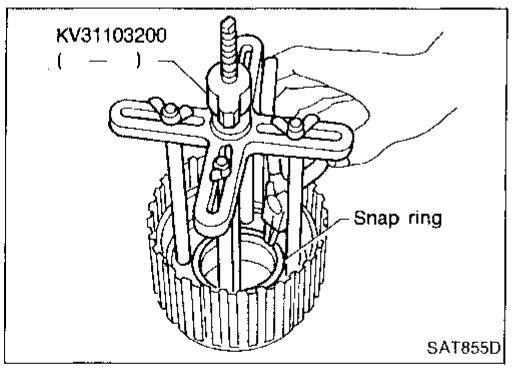
d. If retaining plate does not move to snap ring, D-ring or oil seal may be damaged or fluid may be leaking at piston check ball.



2. Remove snap ring for forward clutch.
3. Remove drive plates, driven plates, retaining plate and dish plate for forward clutch.

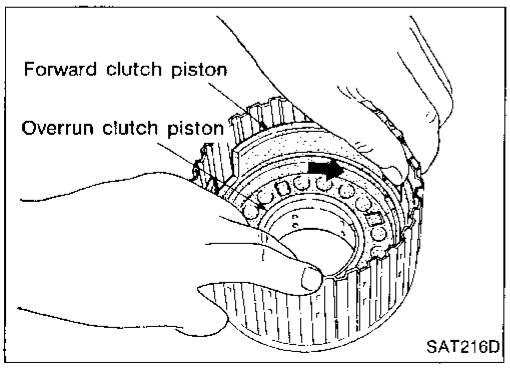


4. Remove snap ring for overrun clutch.
5. Remove drive plates, driven plates, retaining plate and dish plate for overrun clutch.



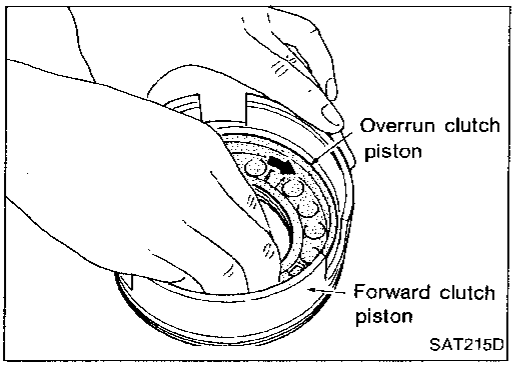
6. Set Tool on spring retainer and remove snap ring from forward clutch drum while compressing return springs.
- **Set Tool directly above return springs.**
- **Do not expand snap ring excessively.**

7. Remove spring retainer and return springs.

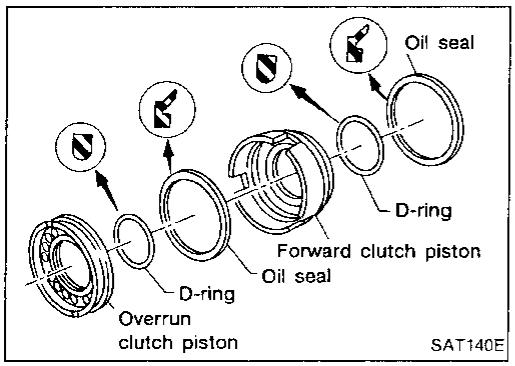


8. Remove forward clutch piston with overrun clutch piston from forward clutch drum by turning it.

Forward Clutch and Overrun Clutch (Cont'd)



9. Remove overrun clutch piston from forward clutch piston by turning it.

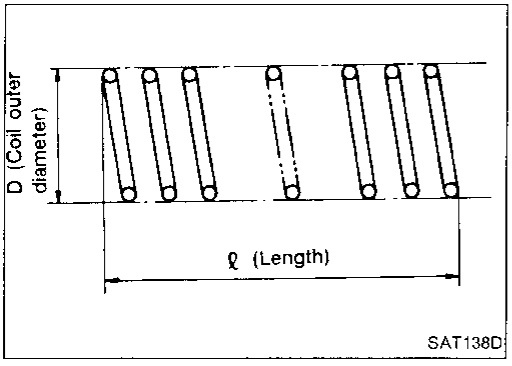


10. Remove D-rings and oil seals from forward clutch piston and overrun clutch piston.

INSPECTION

Snap rings and spring retainer

- Check for deformation, fatigue or damage.



Forward clutch and overrun clutch return springs

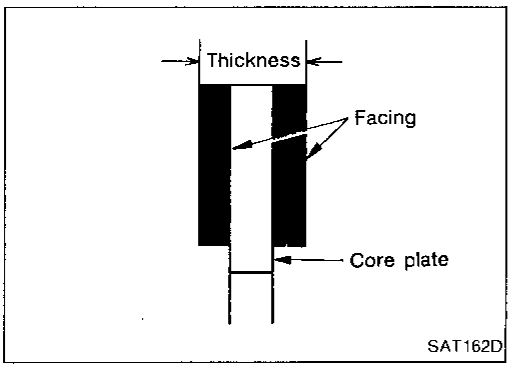
- Check for deformation or damage.
- Measure free length and outer diameter.

Inspection standard:

Unit: mm (in)

Parts		Part No.	ℓ	D
Return spring	Inner	31505-31X03	26.3 (1.035)	7.7 (0.303)
	Outer	31505-31X02	26.6 (1.047)	10.6 (0.417)

- Replace if deformed or fatigued.



Forward clutch and overrun clutch drive plates

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

  Thickness of drive plate:

  Forward clutch

  Standard value: 1.8 mm (0.071 in)

  Wear limit: 1.6 mm (0.063 in)

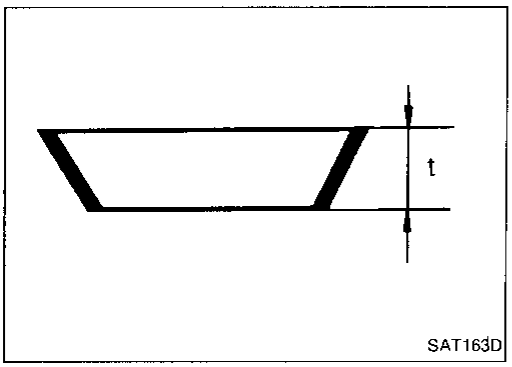
  Overrun clutch

  Standard value: 1.6 mm (0.063 in)

  Wear limit: 1.4 mm (0.055 in)

- If not within wear limit, replace.

Forward Clutch and Overrun Clutch (Cont'd)

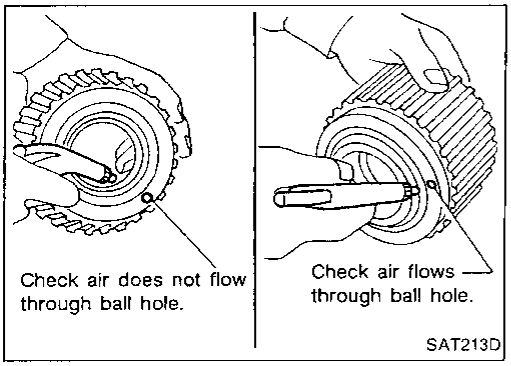


Forward clutch and overrun clutch dish plates

- Check for deformation or damage.
- Measure thickness of dish plate.

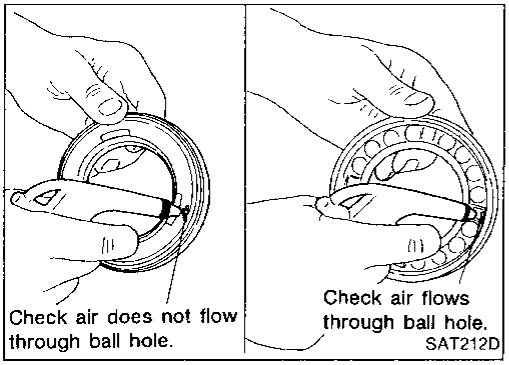
Thickness of dish plate "t":
Forward clutch: 2.5 mm (0.098 in)
Overrun clutch: 2.15 mm (0.0846 in)

- If deformed or fatigued, replace.



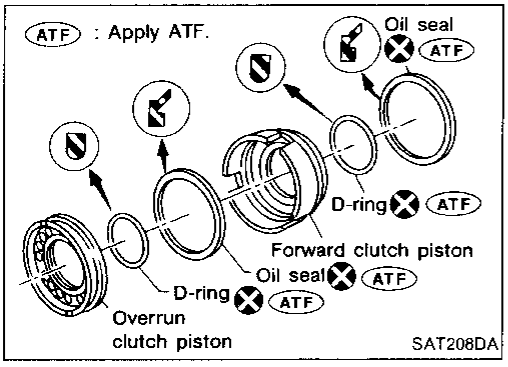
Forward clutch drum

- Make sure check balls are not fixed.
- Apply compressed air to check ball oil hole from outside of forward clutch drum to make sure air leaks past ball.
- Apply compressed air to oil hole from inside of forward clutch drum to make sure there is no air leakage.



Overrun clutch piston

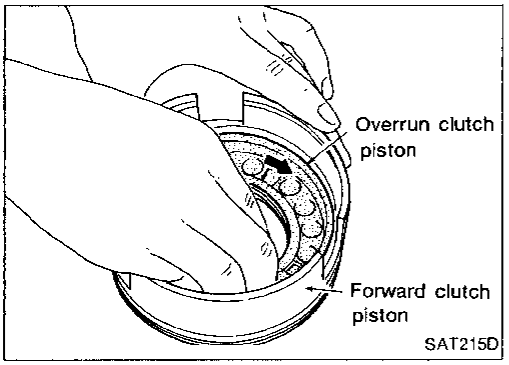
- Make sure check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring to make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure air leaks past ball.



ASSEMBLY

1. Install D-rings and oil seals on forward clutch piston and overrun clutch piston.

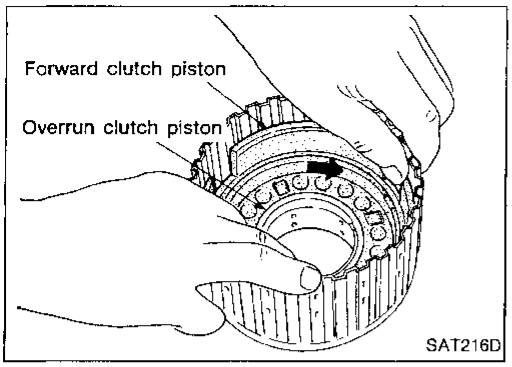
- **Take care with direction of oil seal.**
- **Apply ATF to both parts.**



2. Install overrun clutch piston assembly on forward clutch piston while turning it slowly.

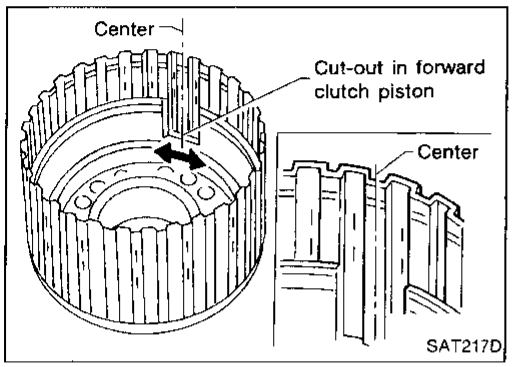
- **Apply ATF to inner surface of forward clutch piston.**

Forward Clutch and Overrun Clutch (Cont'd)

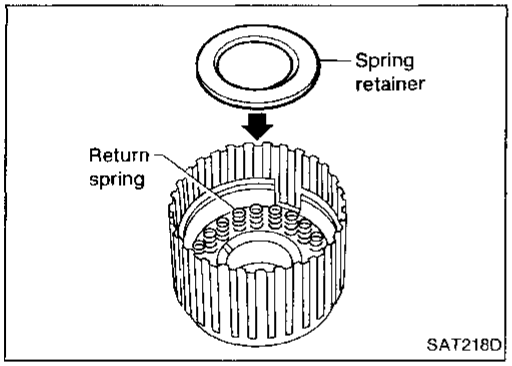


3. Install forward clutch piston assembly on forward clutch drum while turning it slowly.

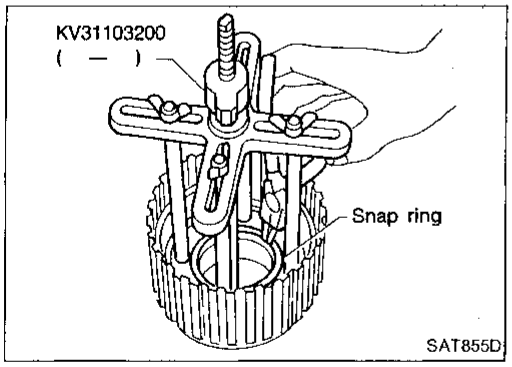
- **Apply ATF to inner surface of drum.**



4. Align notch in forward clutch piston with groove in forward clutch drum.

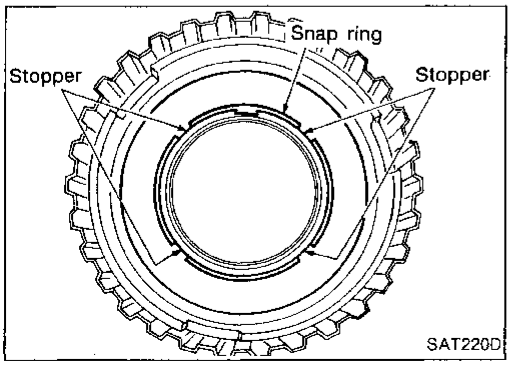


5. Install return spring on piston.
6. Install spring retainer on return springs.



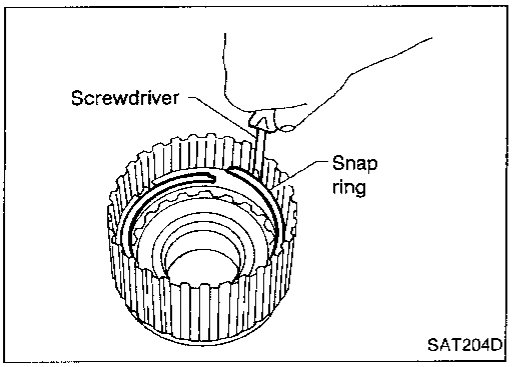
7. Set Tool on spring retainer and install snap ring while compressing return springs.

- **Set Tool directly above return springs.**

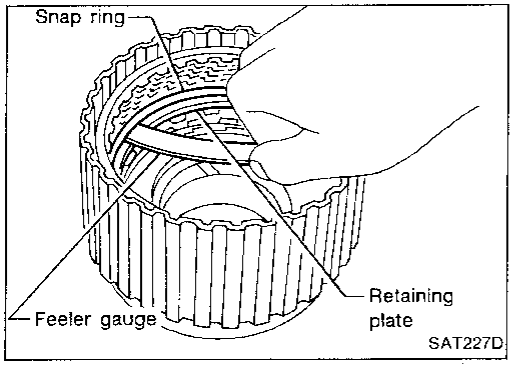


- **Do not align snap ring gap with spring retainer stopper.**

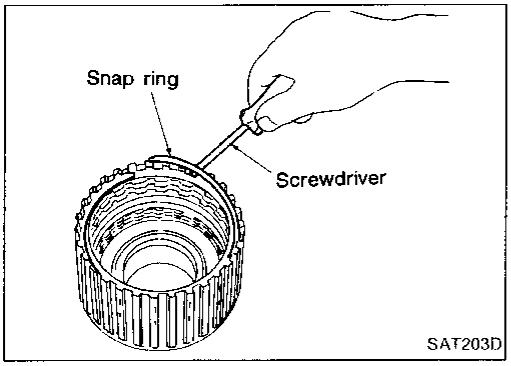
Forward Clutch and Overrun Clutch (Cont'd)



8. Install drive plates, driven plates, retaining plate and dish plate for overrun clutch.
9. Install snap ring for overrun clutch.



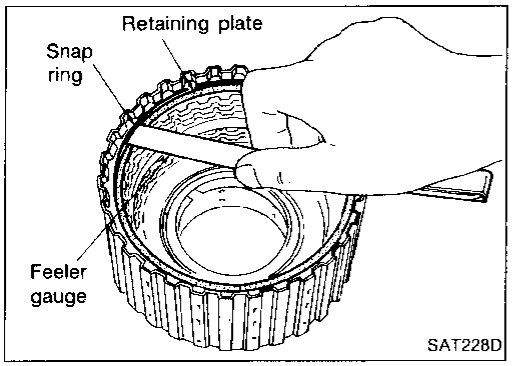
10. Measure clearance between overrun clutch retaining plate and snap ring.
    If not within allowable limit, select proper retaining plate.
    Specified clearance:
    Standard: 1.0 - 1.4 mm (0.039 - 0.055 in)
    Allowable limit: 2.0 mm (0.079 in)
    Overrun clutch retaining plate: Refer to SDS, AT-273.



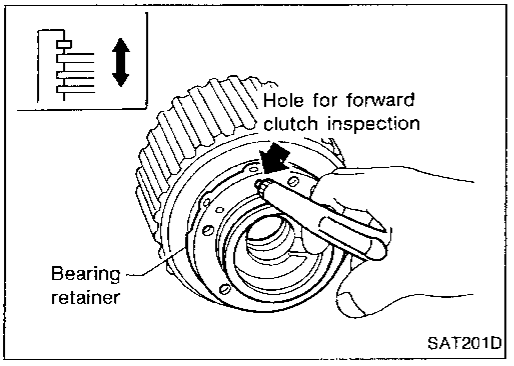
11. Install drive plates, driven plates, retaining plate and dish plate for forward clutch.

Take care with the order and direction of plates.

12. Install snap ring for forward clutch.

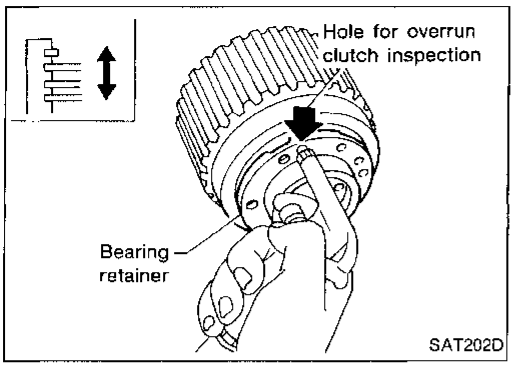


13. Measure clearance between forward clutch retaining plate and snap ring.
    If not within allowable limit, select proper retaining plate.
    Specified clearance:
    Standard: 0.45 - 0.85 mm (0.0177 - 0.0335 in)
    Allowable limit: 1.85 mm (0.0728 in)
    Forward clutch retaining plate: Refer to SDS, AT-273.



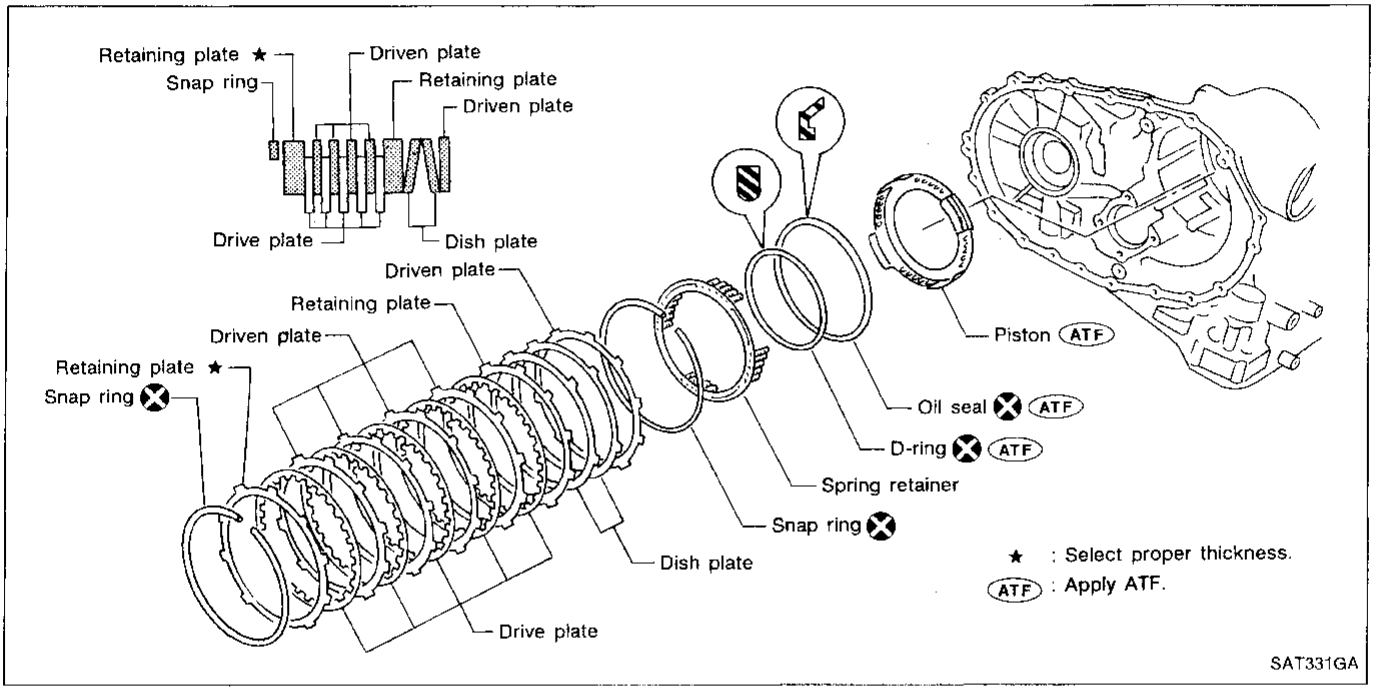
14. Check operation of forward clutch.
    Refer to "DISASSEMBLY" in "Forward Clutch and Overrun Clutch", AT-203.

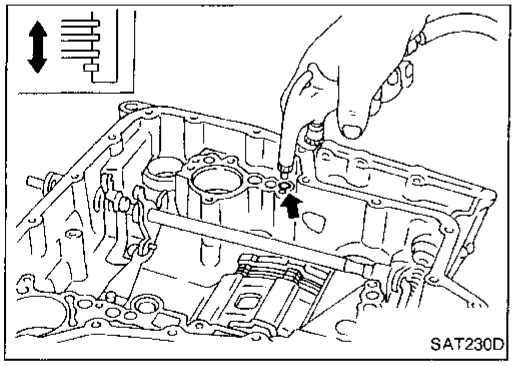
Forward Clutch and Overrun Clutch (Cont'd)



15. Check operation of overrun clutch.
    Refer to "DISASSEMBLY" in "Forward Clutch and Overrun Clutch", AT-203.

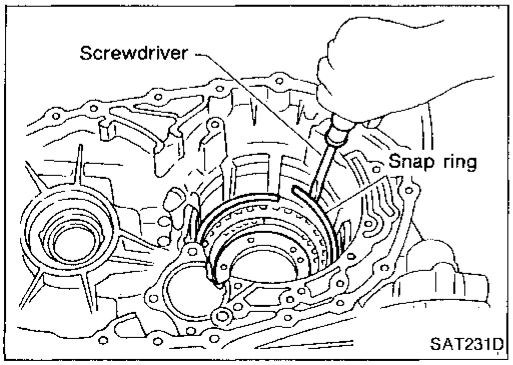
Low & Reverse Brake





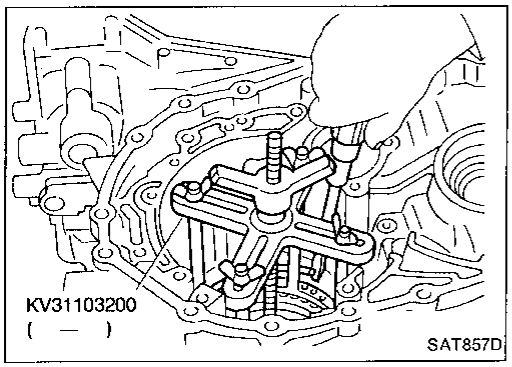
DISASSEMBLY

1. Check operation of low & reverse brake.
a. Apply compressed air to oil hole of transmission case.
b. Check to see that retaining plate moves to snap ring.
c. If retaining plate does not move to snap ring, D-ring or oil seal may be damaged or fluid may be leaking at piston check ball.

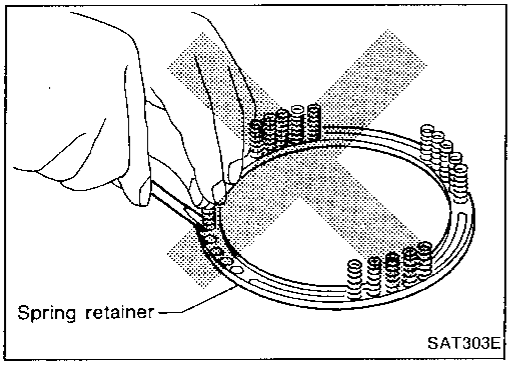


2. Stand transmission case.
3. Remove snap ring.
4. Remove drive plates, driven plates, retaining plate from transmission case.

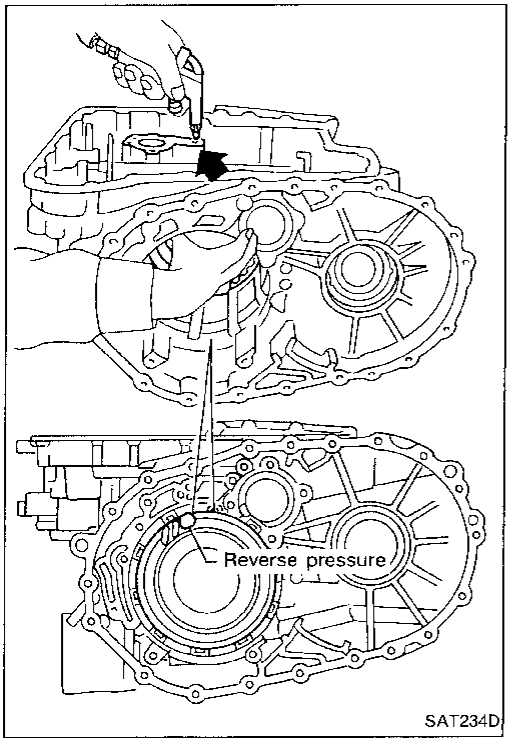
Low & Reverse Brake (Cont'd)



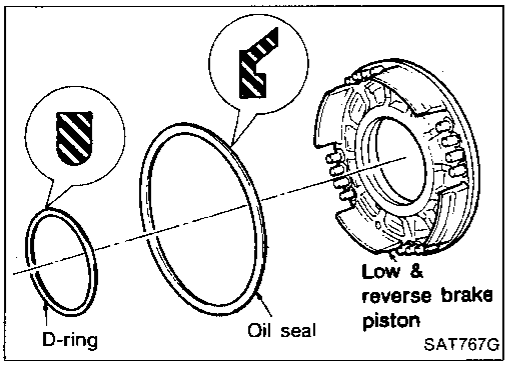
5. Set Tool on spring retainer and remove snap ring while compressing return springs.
- **Set Tool directly above return springs.**
- **Do not expand snap ring excessively.**
6. Remove spring retainer and return springs.



- **Do not remove return springs from spring retainer.**



7. Apply compressed air to oil hole of transmission case while holding piston.
8. Remove piston from transmission case by turning it.



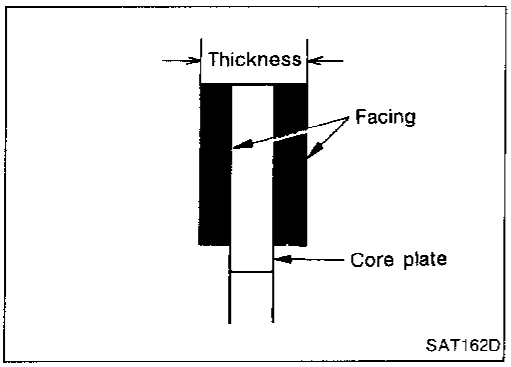
9. Remove D-ring and oil seal from piston.

Low & Reverse Brake (Cont'd)

INSPECTION

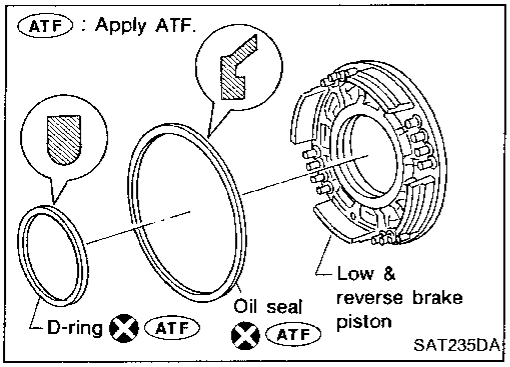
Low & reverse clutch snap ring, spring retainer and return springs

- Check for deformation, fatigue or damage.
- Replace if necessary.
- **When replacing spring retainer and return springs, replace them as a set.**



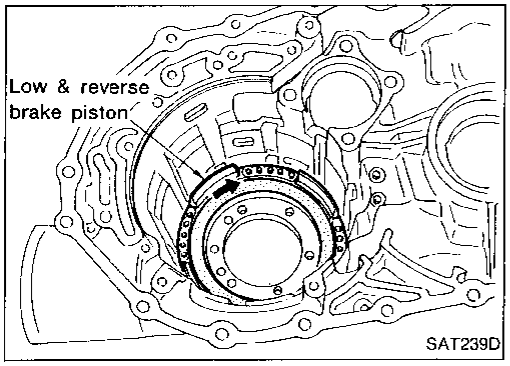
Low & reverse brake drive plate

- Check facing for burns, cracks or damage.
- Measure thickness of facing.
  Thickness of drive plate:
  Standard value: 2.0 mm (0.079 in)
  Wear limit: 1.8 mm (0.071 in)
- If not within wear limit, replace.

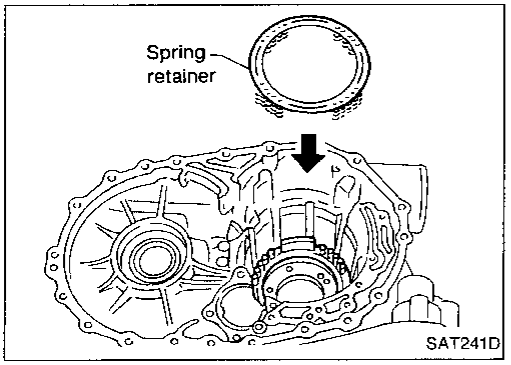


ASSEMBLY

1. Install D-ring and oil seal on piston.
- **Take care with the direction of the oil seal.**
- **Apply ATF to both parts.**

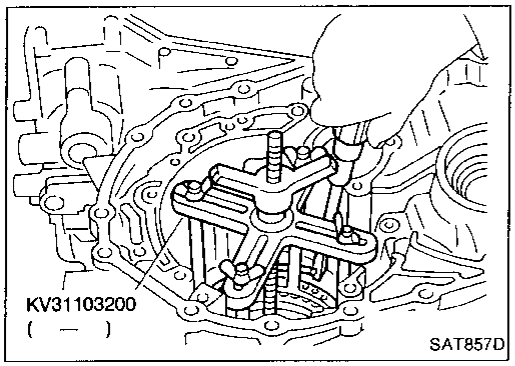


2. Stand transmission case.
3. Install piston assembly on transmission case while turning it slowly.
- **Apply ATF to inner surface of transmission case.**

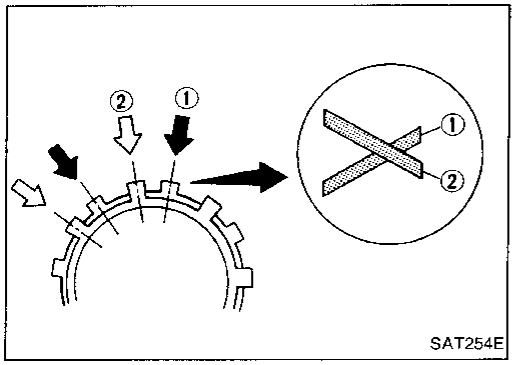


4. Install return springs and spring retainer on piston.

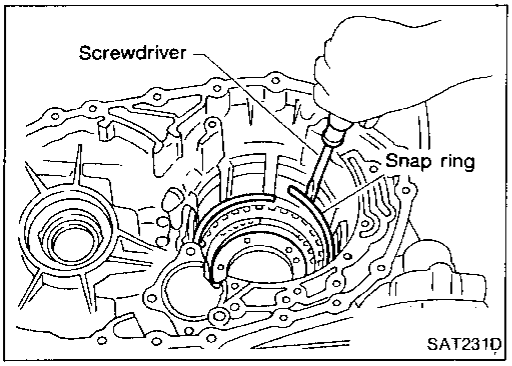
Low & Reverse Brake (Cont'd)



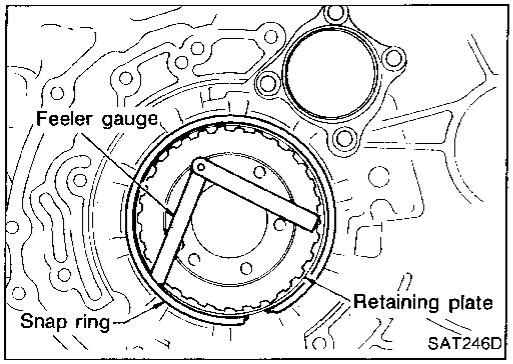
5. Install snap ring while compressing return springs.
- **Set Tool directly above return springs.**



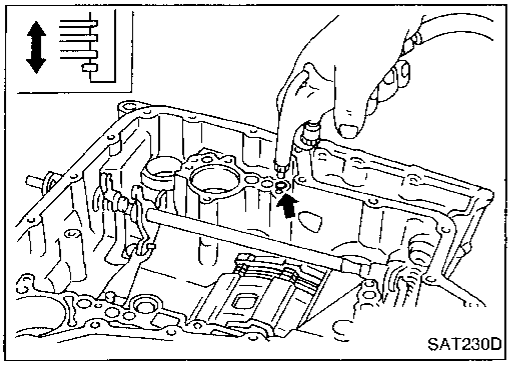
6. Install drive plates, driven plates, retaining plates and dished plates.
- **Do not align the projections on the two dished plates.**
- **Make sure to put the plates in the correct order and direction.**



7. Install snap ring.

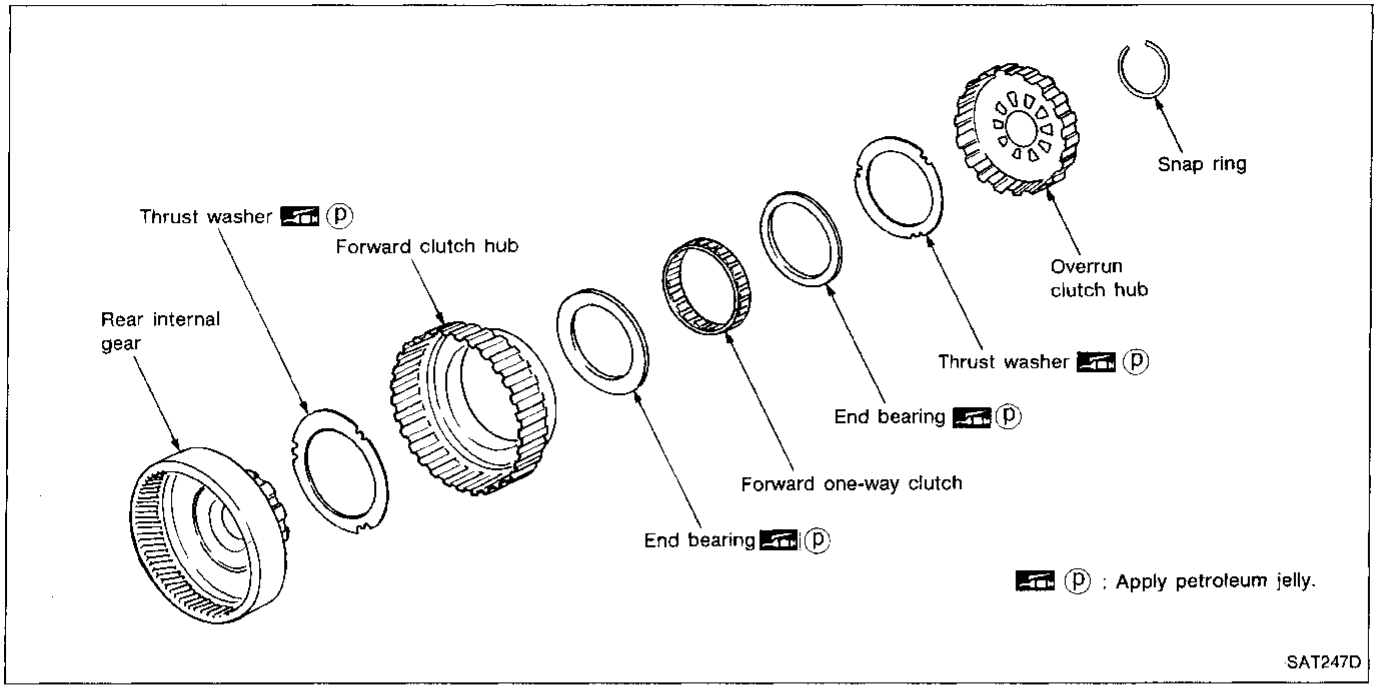


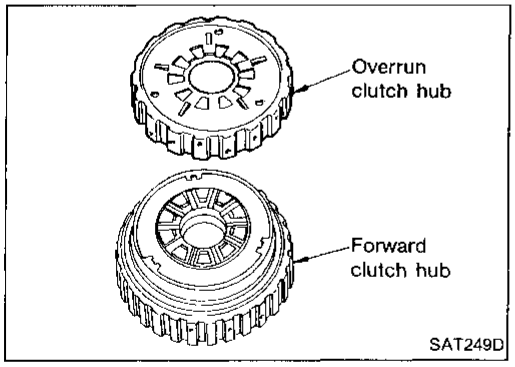
8. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate (front side).
   Specified clearance:
   Standard: 1.4 - 1.8 mm (0.055 - 0.071 in)
   Allowable limit:
   2.8 mm (0.110 in)
   Retaining plate: Refer to SDS, AT-274.



9. Check operation of low & reverse brake.
   Refer to "DISASSEMBLY" in "Low & Reverse Brake", AT-209.

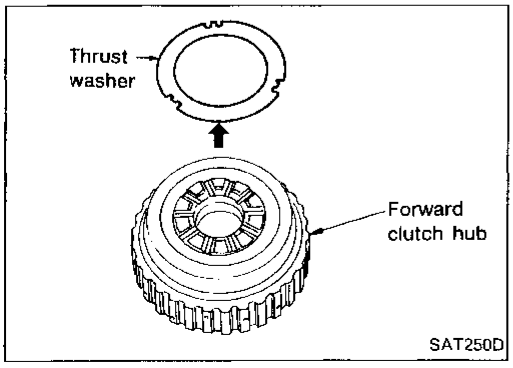
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub





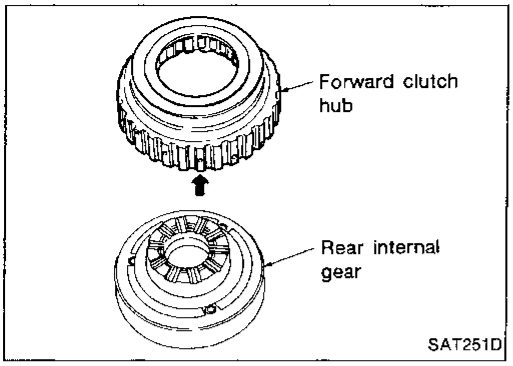
DISASSEMBLY

1. Remove snap ring from overrun clutch hub.
2. Remove overrun clutch hub from forward clutch hub.

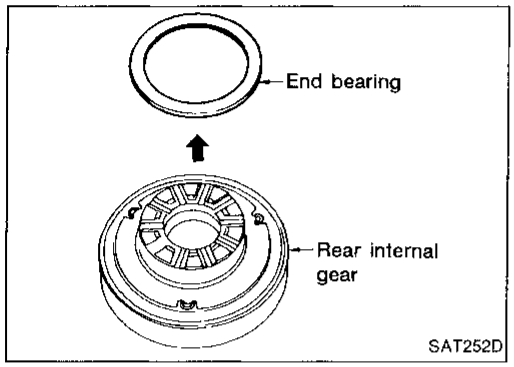


3. Remove thrust washer from forward clutch hub.

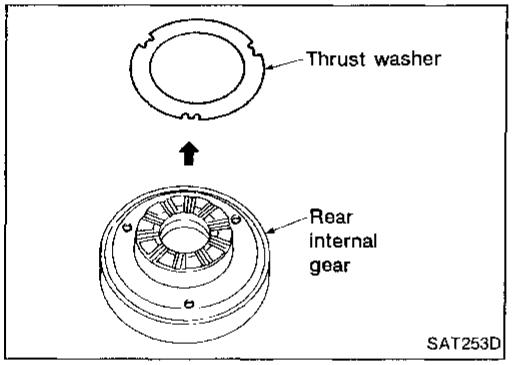
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub (Cont'd)



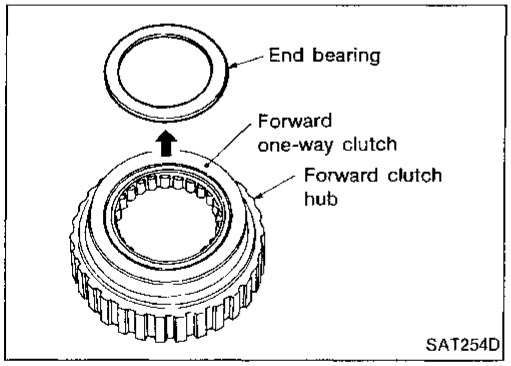
4. Remove forward clutch hub from rear internal gear.



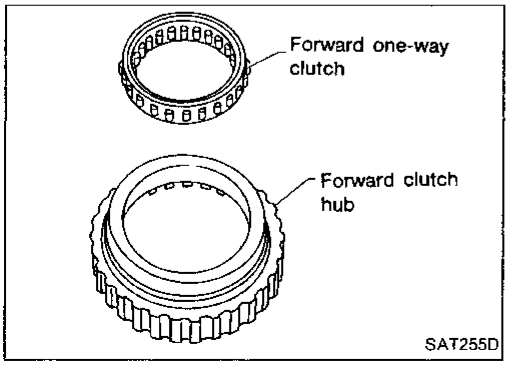
5. Remove end bearing from rear internal gear.



6. Remove thrust washer from rear internal gear.



7. Remove end bearing from forward one-way clutch.



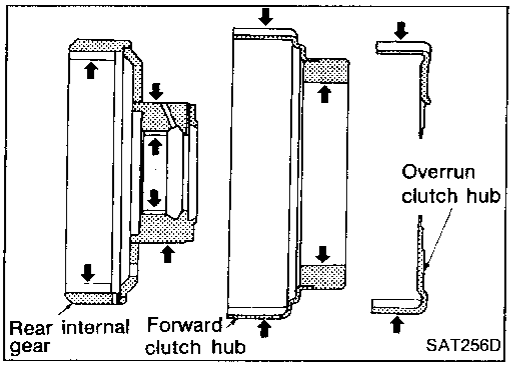
8. Remove one-way clutch from forward clutch hub.

Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub (Cont'd)

INSPECTION

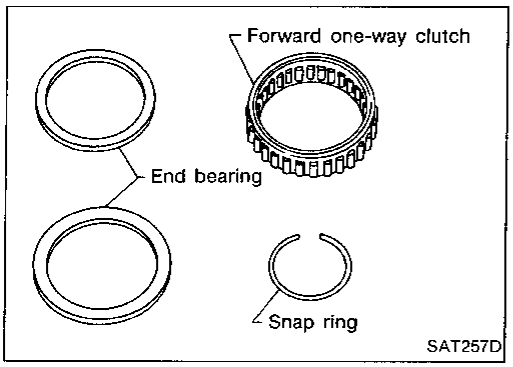
Rear internal gear, forward clutch hub and overrun clutch hub

- Check rubbing surfaces for wear or damage.



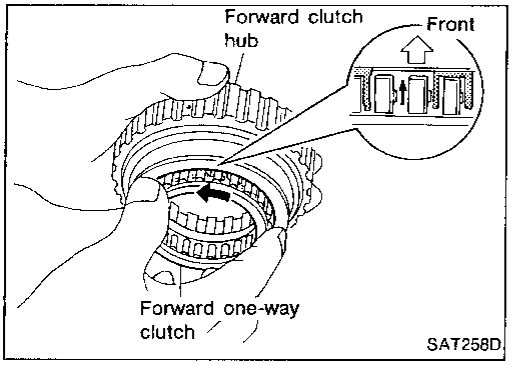
Snap ring, end bearings and forward one-way clutch

- Check snap ring and end bearings for deformation and damage.
- Check forward one-way clutch for wear and damage.

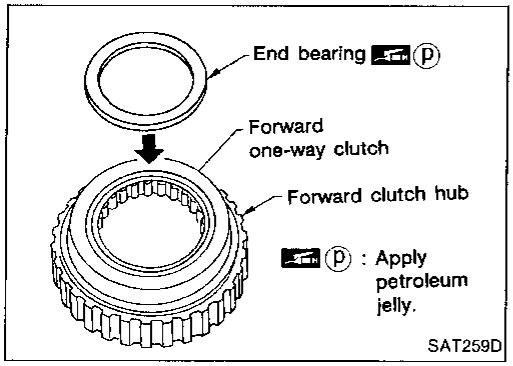


ASSEMBLY

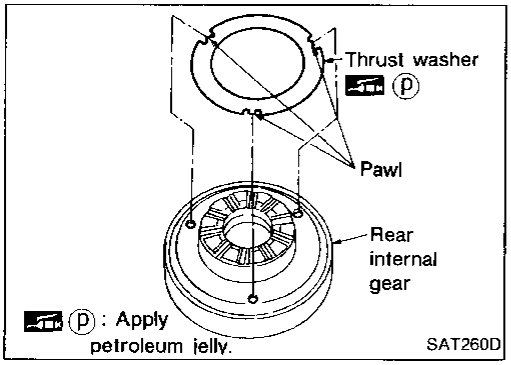
1. Install forward one-way clutch on forward clutch.
- **Take care with the direction of forward one-way clutch.**



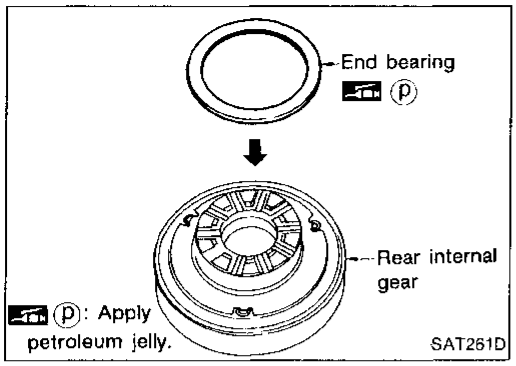
2. Install end bearing on forward one-way clutch.
- **Apply petroleum jelly to end bearing.**



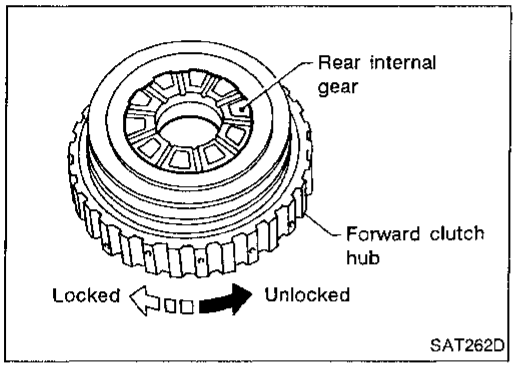
3. Install thrust washer on rear internal gear.
- **Apply petroleum jelly to thrust washer.**
- **Align pawls of thrust washer with holes of rear internal gear.**



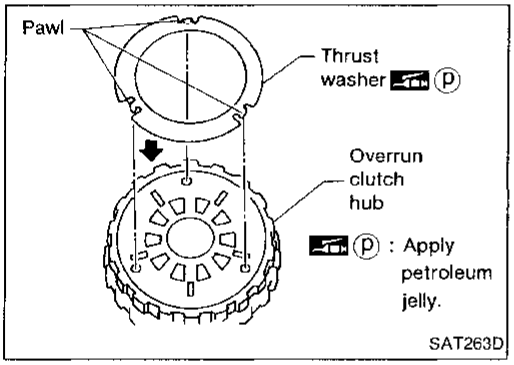
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub (Cont'd)



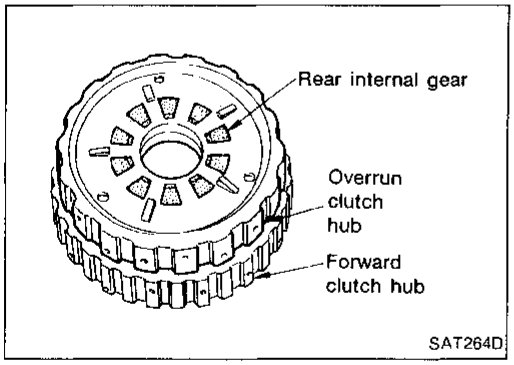
4. Install end bearing on rear internal gear.
- **Apply petroleum jelly to end bearing.**



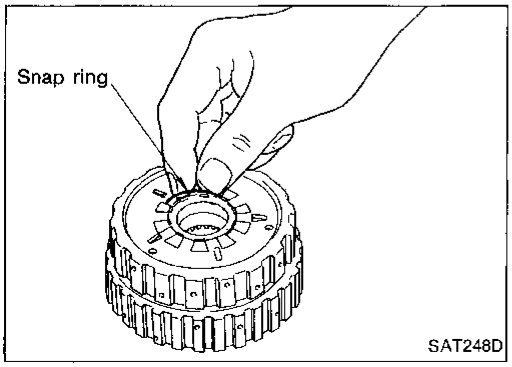
5. Install forward clutch hub on rear internal gear.
- **Check operation of forward one-way clutch.**



6. Install thrust washer and overrun clutch hub.
- **Apply petroleum jelly to thrust washer.**
- **Align pawls of thrust washer with holes of overrun clutch hub.**

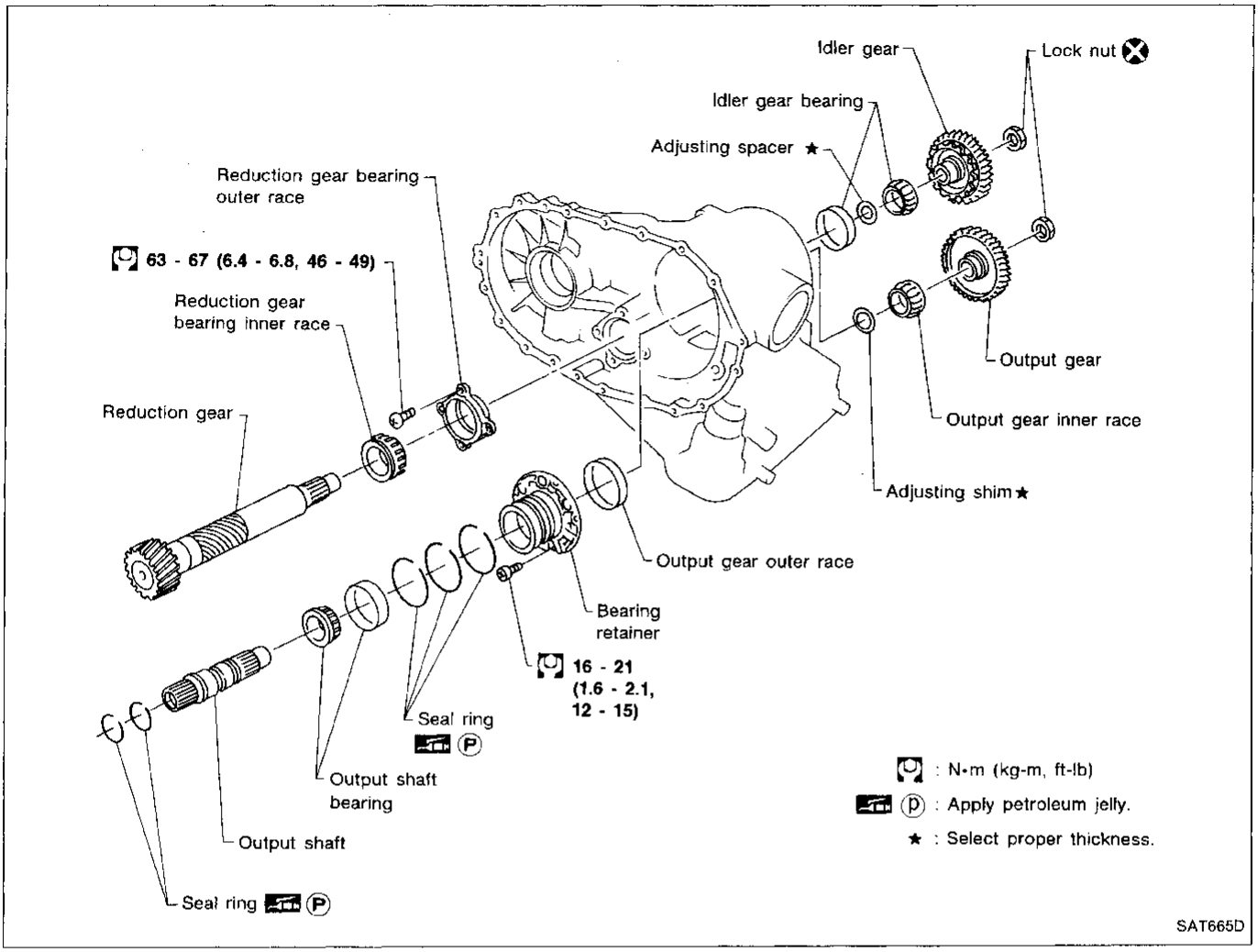


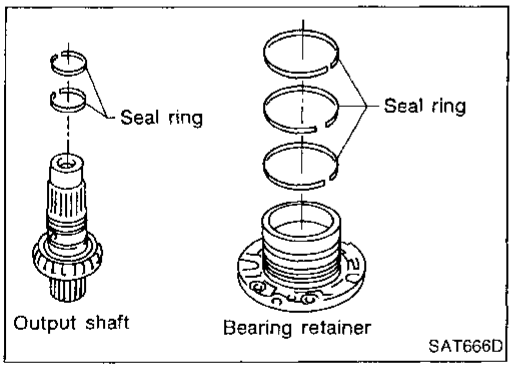
7. Install overrun clutch hub on rear internal gear.
- **Align projections of rear internal gear with holes of overrun clutch hub.**



8. Install snap ring to groove of rear internal gear.

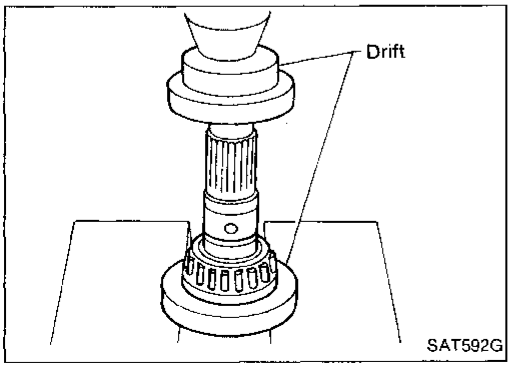
Output Shaft, Output Gear, Idler Gear, Reduction Gear and Bearing Retainer — RL4F03A





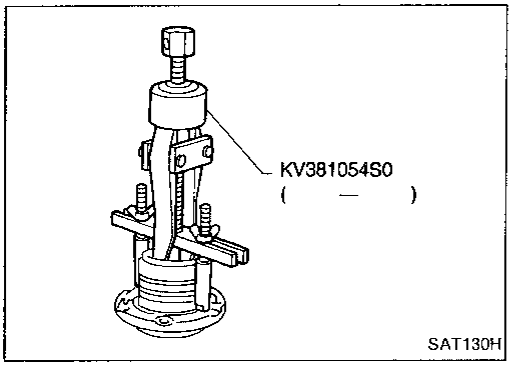
DISASSEMBLY

1. Remove seal rings from output shaft and bearing retainer.

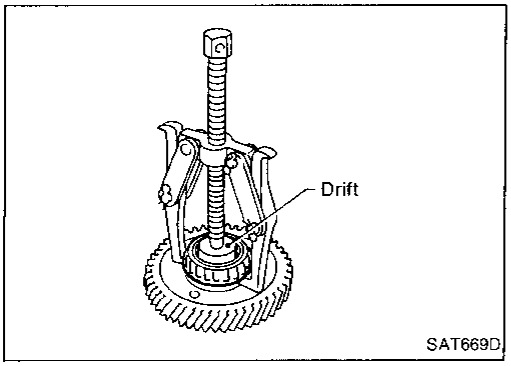


2. Press out output shaft bearing inner race.

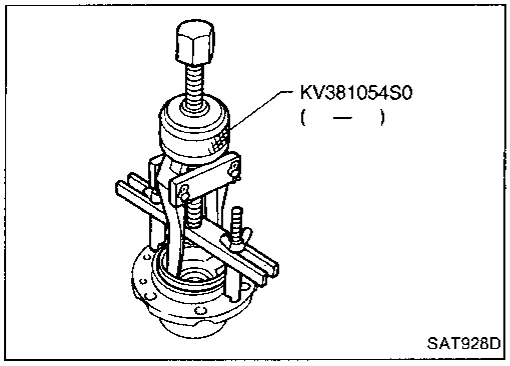
Output Shaft, Output Gear, Idler Gear, Reduction Gear and Bearing Retainer — RL4F03A (Cont'd)



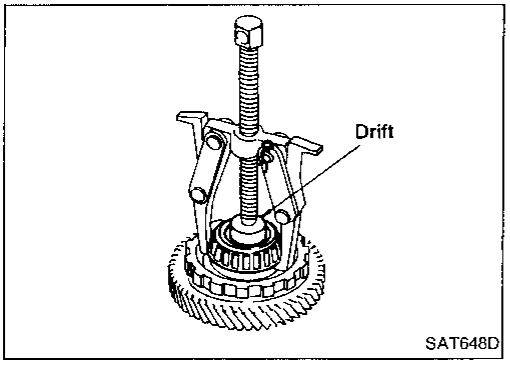
3. Remove output shaft bearing outer race from bearing retainer.



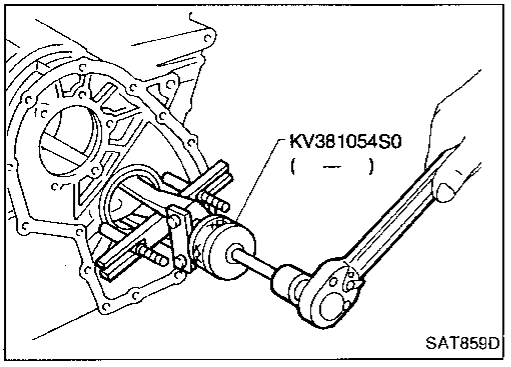
4. Remove output gear bearing inner race.



5. Remove output gear bearing outer race from bearing retainer.

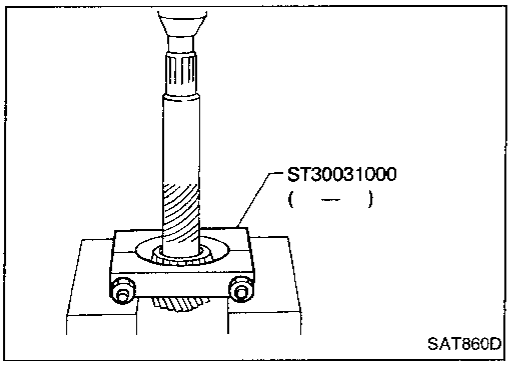


6. Remove idler gear bearing inner race.

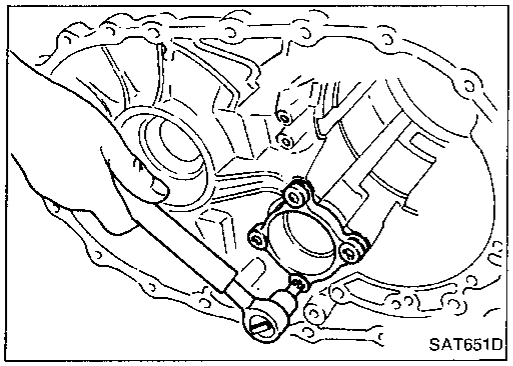


7. Remove idler gear bearing outer race from transmission case.

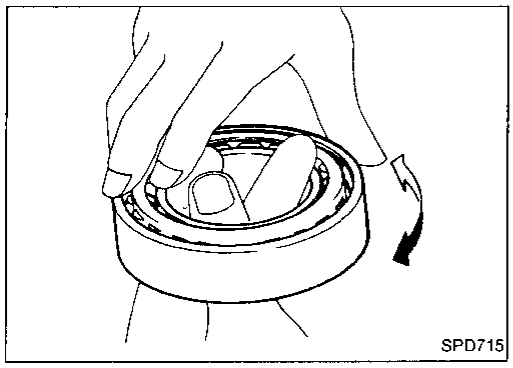
Output Shaft, Output Gear, Idler Gear, Reduction Gear and Bearing Retainer — RL4F03A (Cont'd)



8. Press out reduction gear inner race from reduction gear.



9. Remove reduction gear bearing outer race from transmission case.



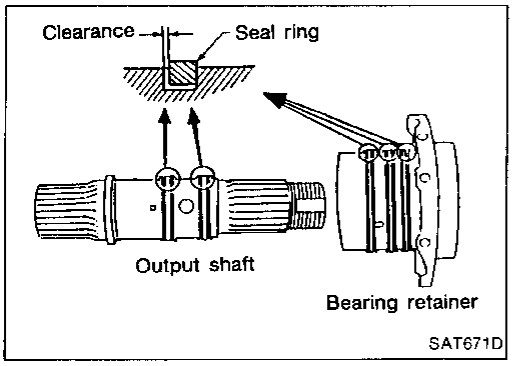
INSPECTION

Output shaft, output gear, idler gear and reduction gear

- Check shafts for cracks, wear or bending.
- Check gears for wear, chips and cracks.

Bearings

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- **When replacing taper roller bearing, replace inner and outer race as a set.**



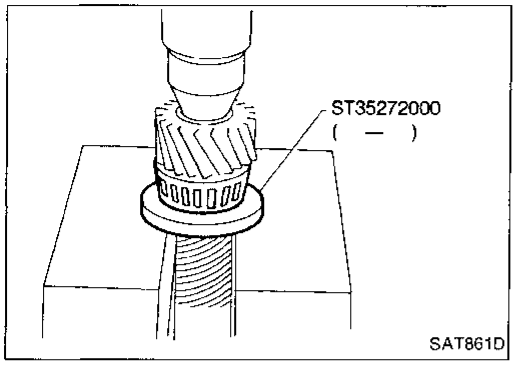
Seal ring clearance

- Install new seal rings to output shaft.
- Measure clearance between seal ring and ring groove of output shaft.
  Standard clearance:
  0.10 - 0.25 mm (0.0039 - 0.0098 in)
  Wear limit:
  0.25 mm (0.0098 in)
- If not within wear limit, replace output shaft.

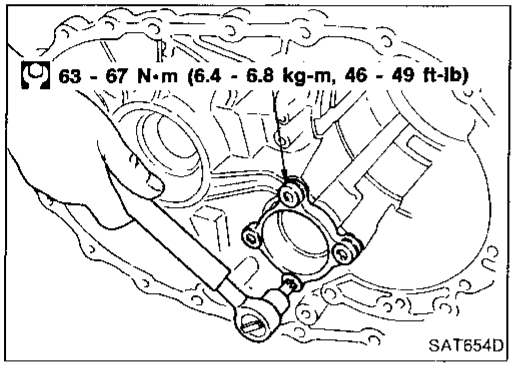
- Install new seal rings to bearing retainer.
- Measure clearance between seal ring and ring groove of bearing retainer.
  Standard clearance:
  0.10 - 0.25 mm (0.0039 - 0.0098 in)
  Wear limit:
  0.25 mm (0.0098 in)
- If not within wear limit, replace bearing retainer.

Output Shaft, Output Gear, Idler Gear, Reduction Gear and Bearing Retainer — RL4F03A (Cont'd)

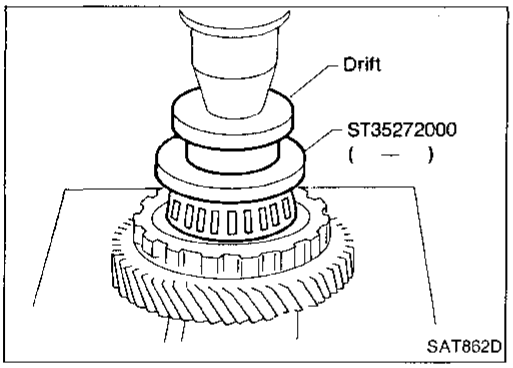
ASSEMBLY



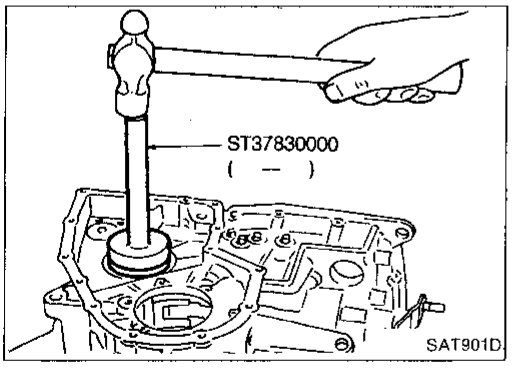
1. Press reduction gear bearing inner race on reduction gear.



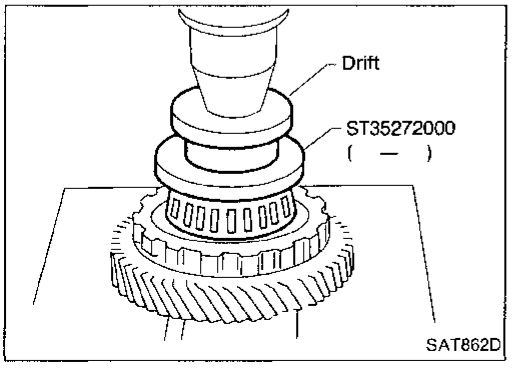
2. Install reduction gear bearing outer race on transmission case.



3. Press idler gear bearing inner race on idler gear.

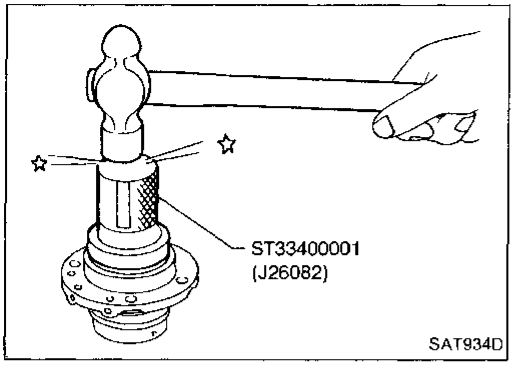


4. Install idler gear bearing outer race on transmission case.

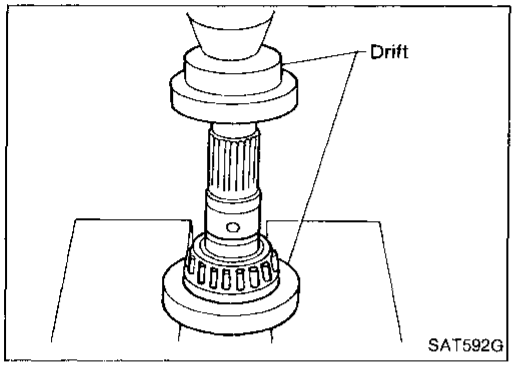


5. Press output gear bearing inner race on output gear.

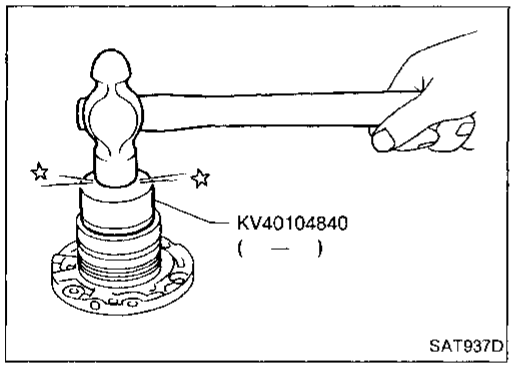
Output Shaft, Output Gear, Idler Gear, Reduction Gear and Bearing Retainer — RL4F03A (Cont'd)



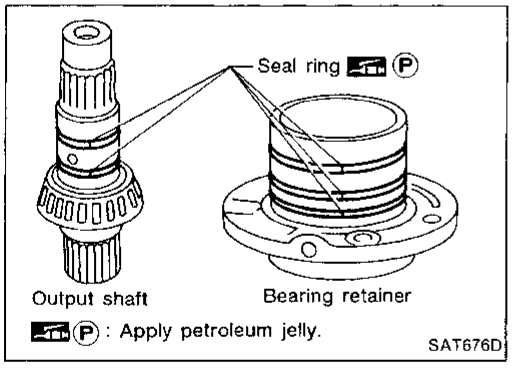
6. Install output gear bearing outer race on bearing retainer.



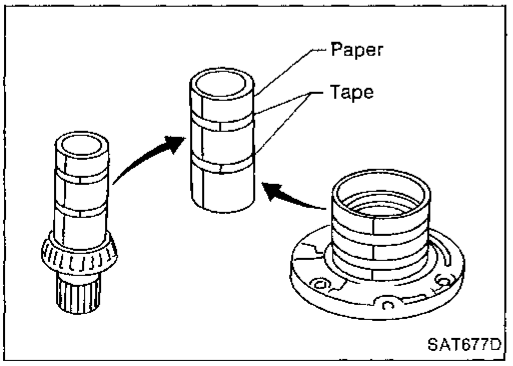
7. Press output shaft bearing inner race on output shaft.



8. Install output shaft bearing outer race on bearing retainer.

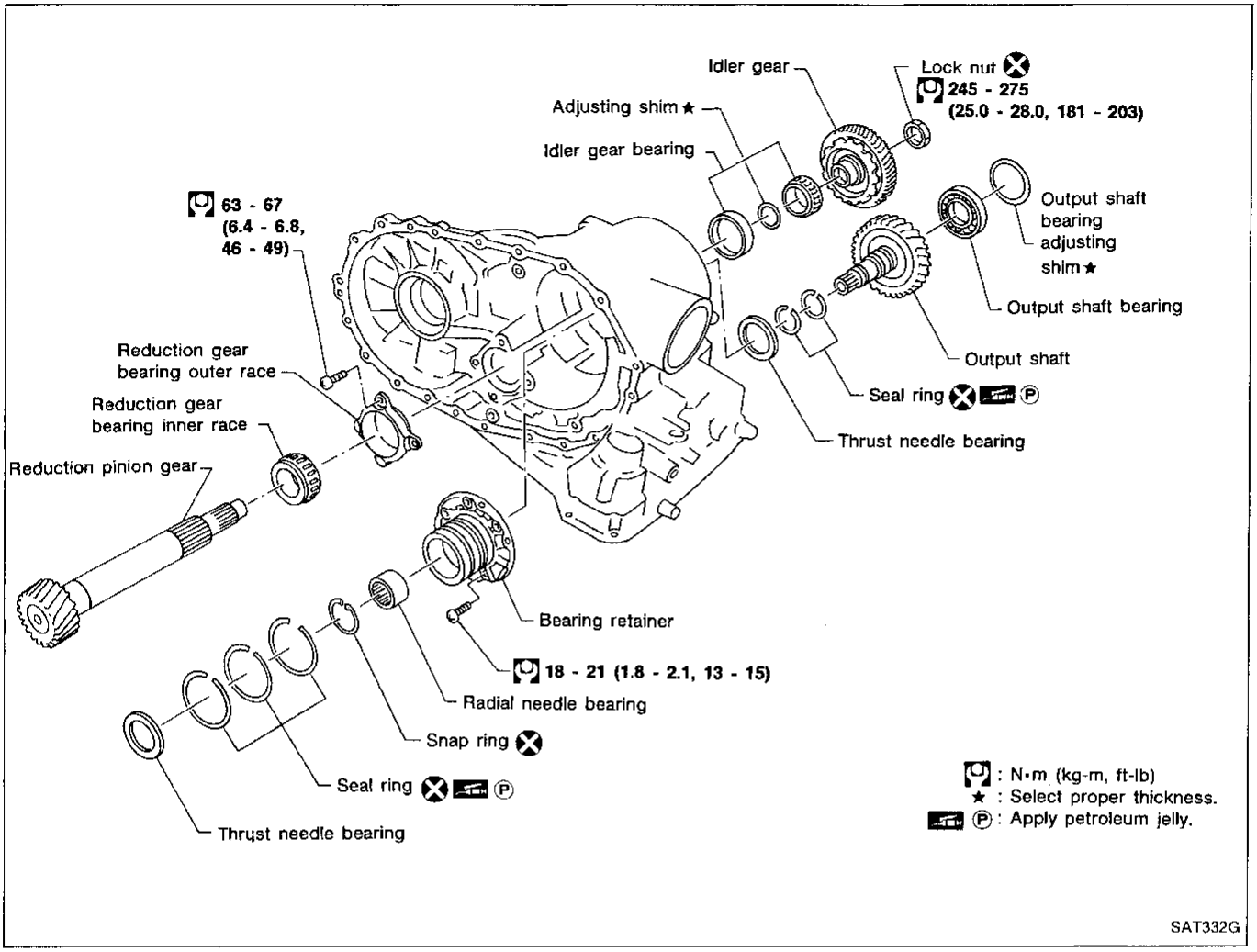


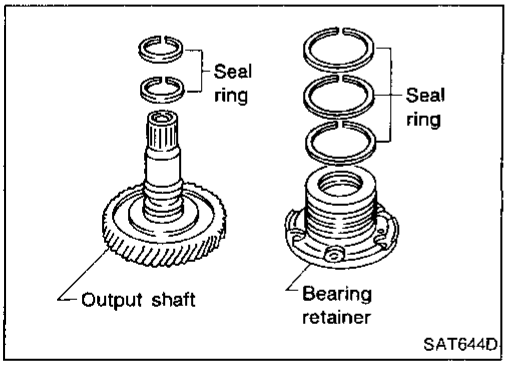
9. Install new seal rings onto output shaft and bearing retainer.
- **Apply petroleum jelly to seal rings.**



10. Roll paper around seal rings to prevent seal rings from spreading.

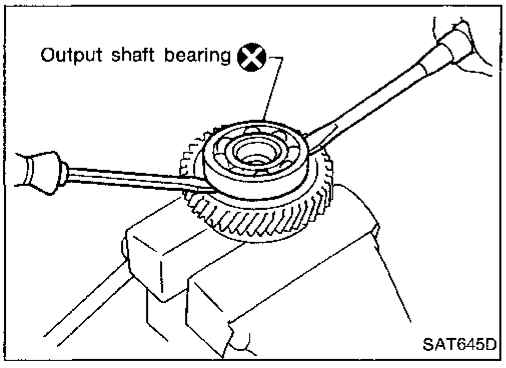
Output Shaft, Idler Gear, Reduction Gear and Bearing Retainer — RE4F03V





DISASSEMBLY

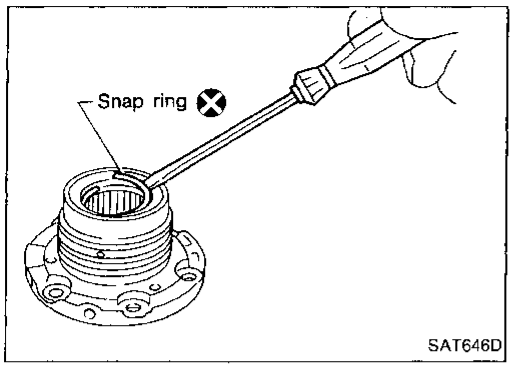
1. Remove seal rings from output shaft and bearing retainer.



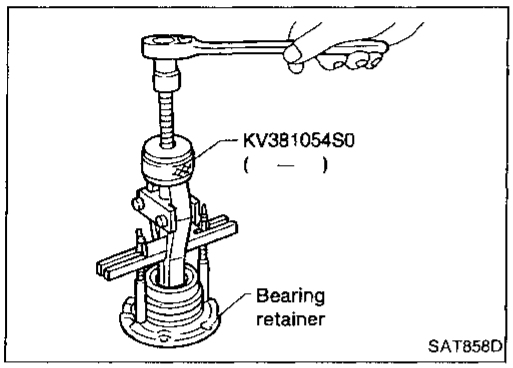
2. Remove output shaft bearing with screwdrivers.

- **Always replace bearing with a new one when removed.**
- **Do not damage output shaft.**

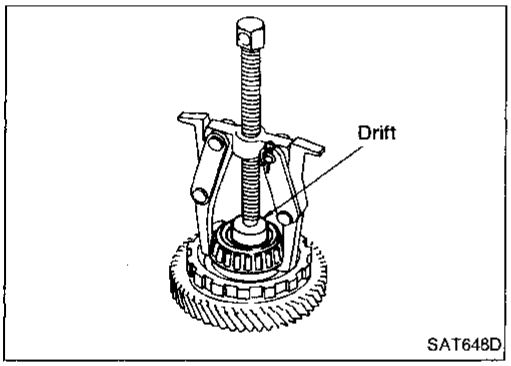
Output Shaft, Idler Gear, Reduction Gear and Bearing Retainer — RE4F03V (Cont'd)



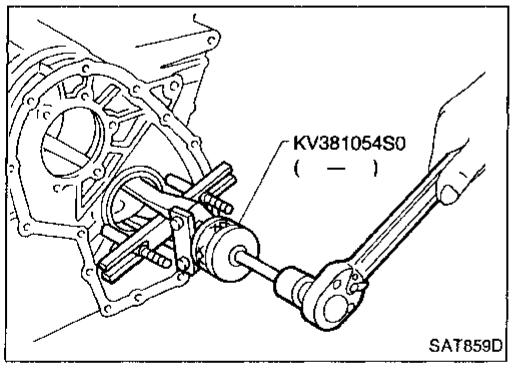
3. Remove snap ring from bearing retainer.



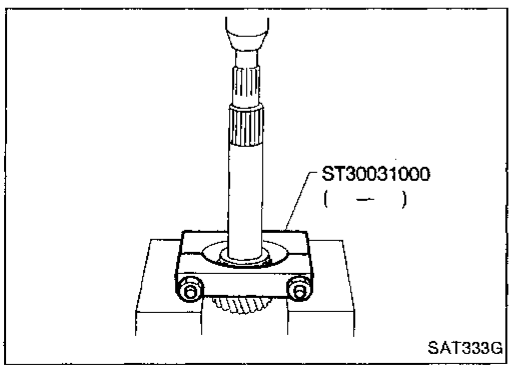
4. Remove needle bearing from bearing retainer.



5. Remove idler gear bearing inner race from idler gear.

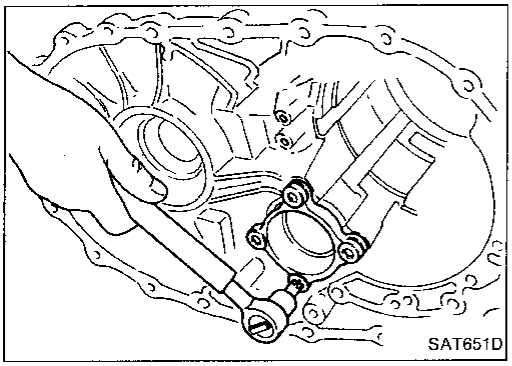


6. Remove idler gear bearing outer race from transmission case.



7. Press out reduction gear bearing inner race from reduction gear.

Output Shaft, Idler Gear, Reduction Gear and Bearing Retainer — RE4F03V (Cont'd)

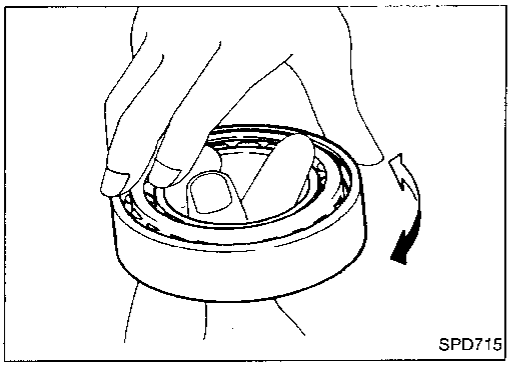

SAT651D

8. Remove reduction gear bearing outer race from transmission case.

INSPECTION

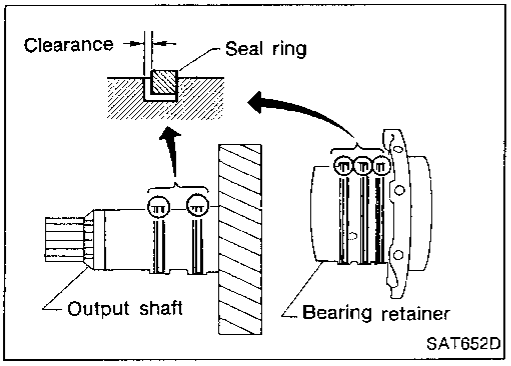
Output shaft, idler gear and reduction gear

- Check shafts for cracks, wear or bending.
- Check gears for wear, chips and cracks.


SPD715

Bearing

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- **When replacing taper roller bearing, replace outer and inner race as a set.**



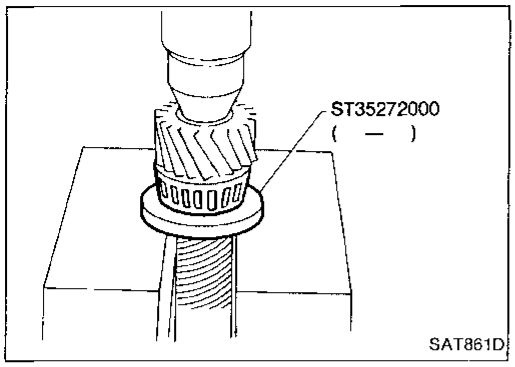
SAT652D

Seal ring clearance

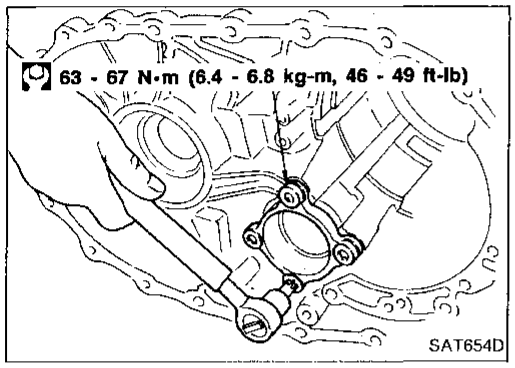
- Install new seal rings to output shaft.
- Measure clearance between seal ring and ring groove of output shaft.
  Standard clearance:
  0.10 - 0.25 mm (0.0039 - 0.0098 in)
  Allowable limit:
  0.25 mm (0.0098 in)
- If not within allowable limit, replace output shaft.
- Install new seal rings to bearing retainer.
- Measure clearance between seal ring and ring groove of bearing retainer.
  Standard clearance:
  0.10 - 0.25 mm (0.0039 - 0.0098 in)
  Allowable limit:
  0.25 mm (0.0098 in)
- If not within allowable limit, replace bearing retainer.

Output Shaft, Idler Gear, Reduction Gear and Bearing Retainer — RE4F03V (Cont'd)

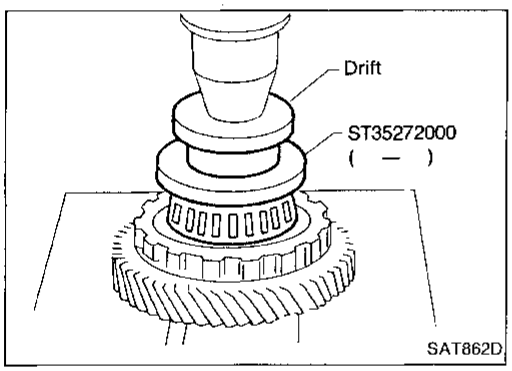
ASSEMBLY



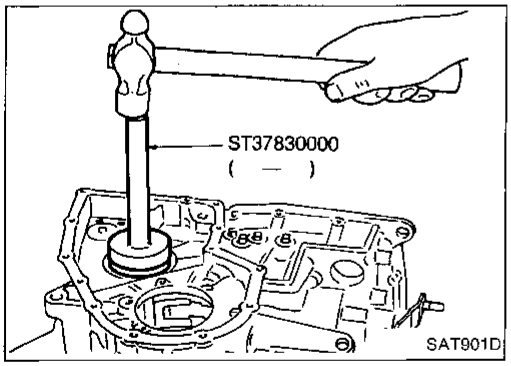
1. Press reduction gear bearing inner race on reduction gear.



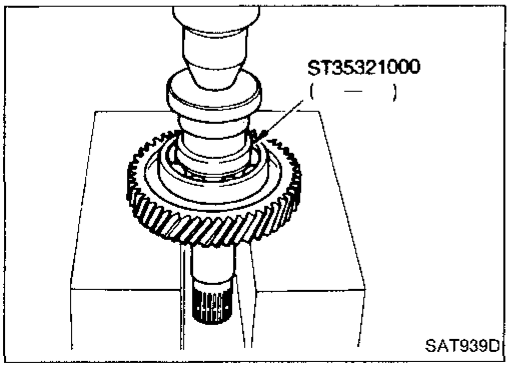
2. Install reduction gear bearing outer race on transmission case.



3. Press idler gear bearing inner race on idler gear.

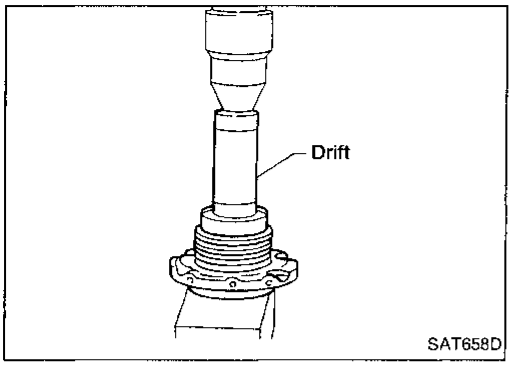


4. Install idler gear bearing outer race on transmission case.

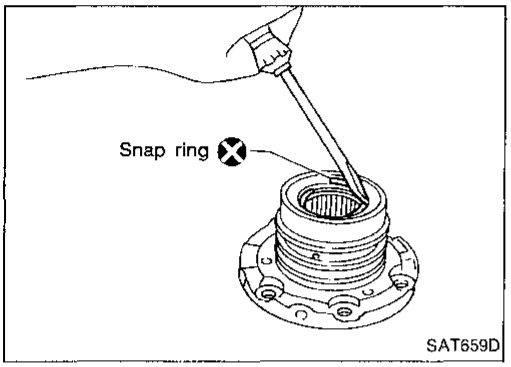


5. Press output shaft bearing on output shaft.

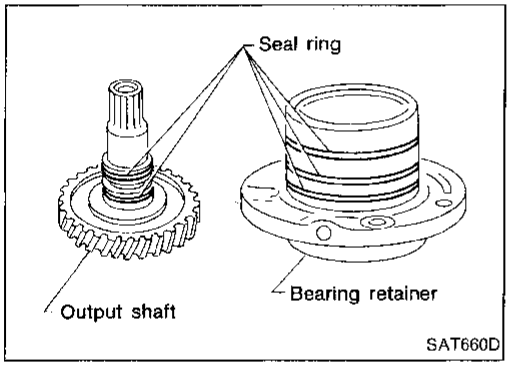
Output Shaft, Idler Gear, Reduction Gear and Bearing Retainer — RE4F03V (Cont'd)



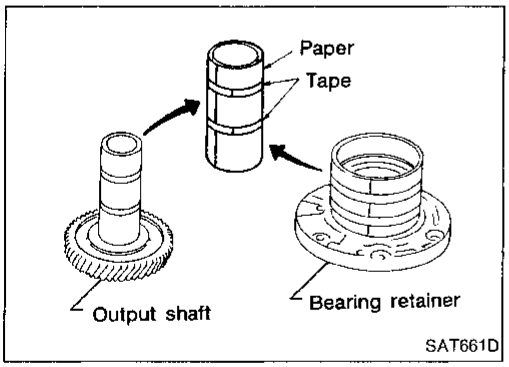
6. Press needle bearing on bearing retainer.



7. Install snap ring to bearing retainer.

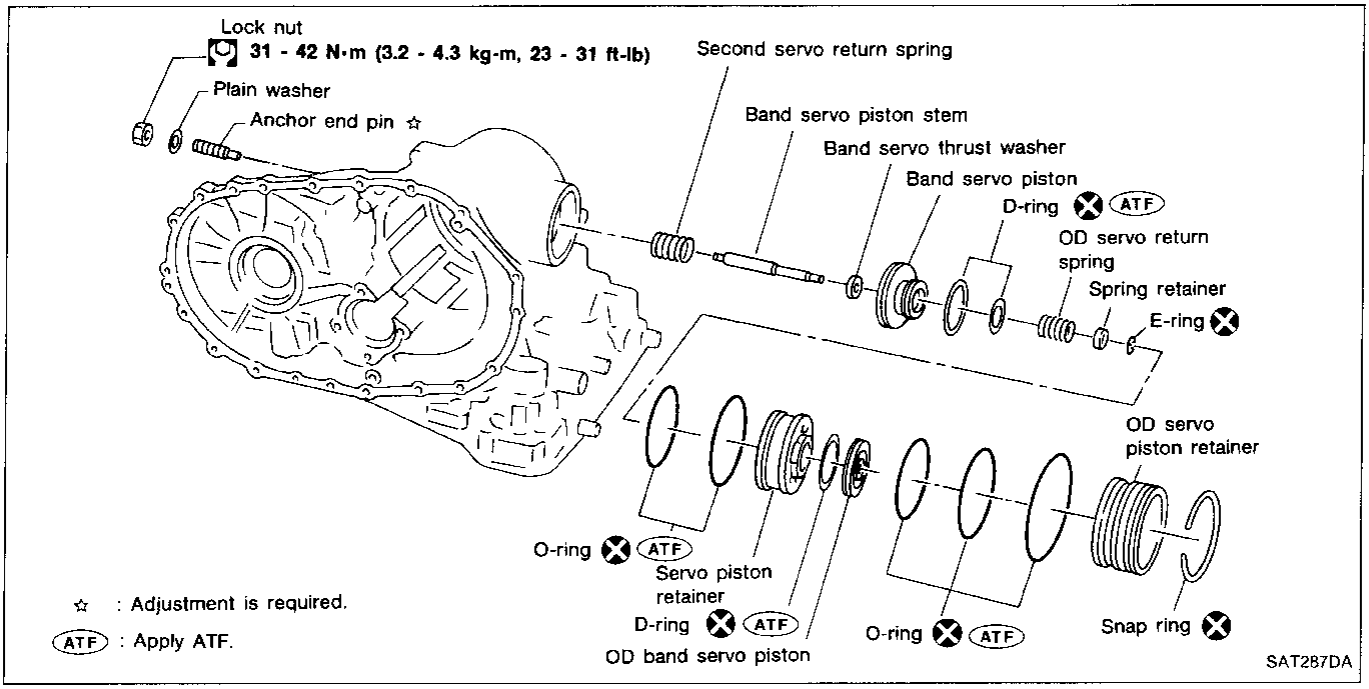


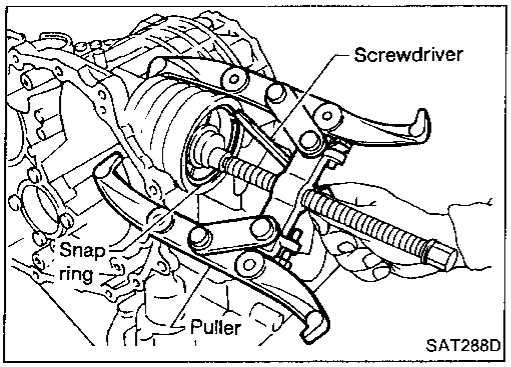
8. Install new seal rings to output shaft and bearing retainer carefully after packing ring grooves with petroleum jelly.



- **Roll paper around seal rings to prevent seal rings from spreading.**

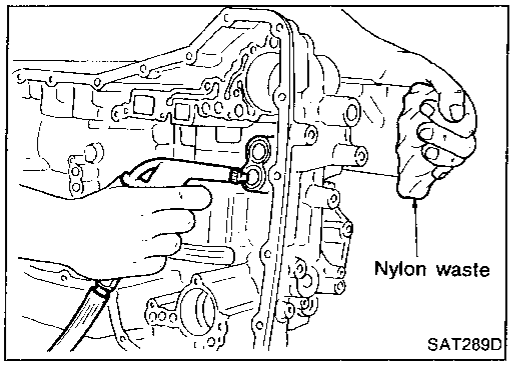
Band Servo Piston Assembly



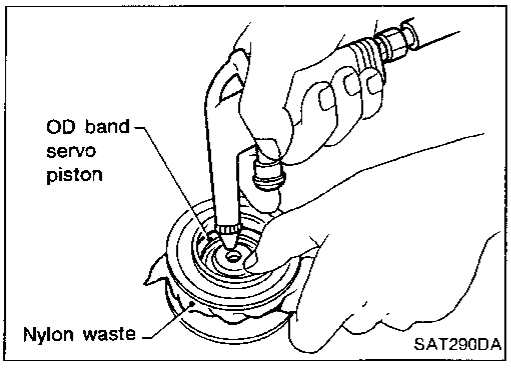


DISASSEMBLY

1. Remove band servo piston snap ring.

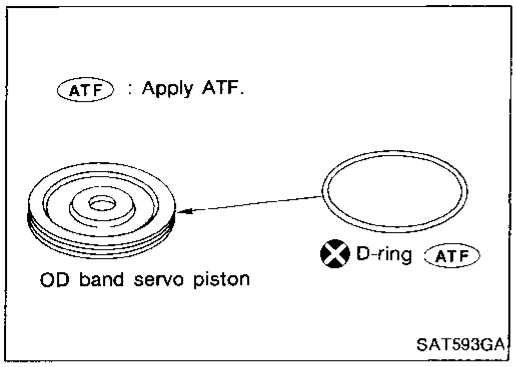


2. Apply compressed air to oil hole in transmission case to remove OD servo piston retainer and band servo piston assembly.
- **Hold band servo piston assembly with a rag.**

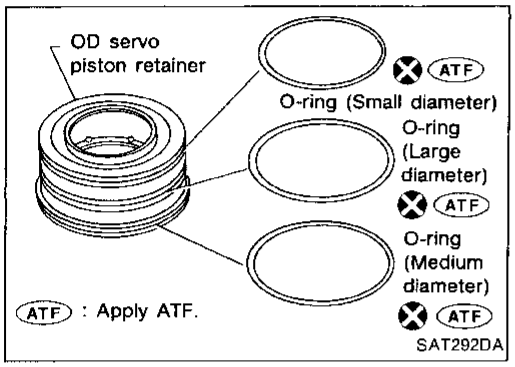


3. Apply compressed air to oil hole in OD servo piston retainer to remove OD band servo piston from retainer.
- **Hold OD band servo piston while applying compressed air.**

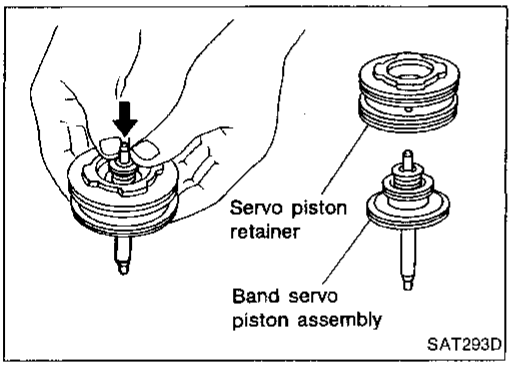
Band Servo Piston Assembly (Cont'd)



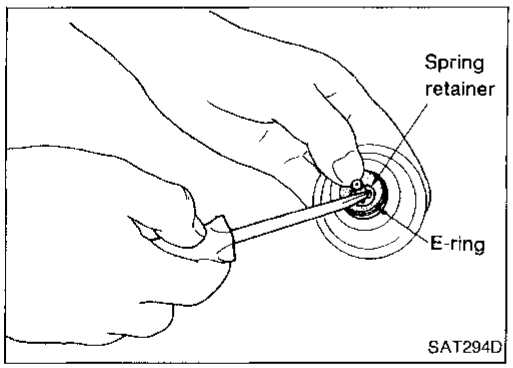
4. Remove D-ring from OD band servo piston.



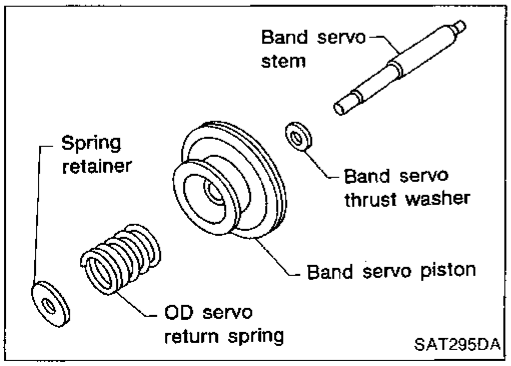
5. Remove O-rings from OD servo piston retainer.



6. Remove band servo piston assembly from servo piston retainer by pushing it forward.

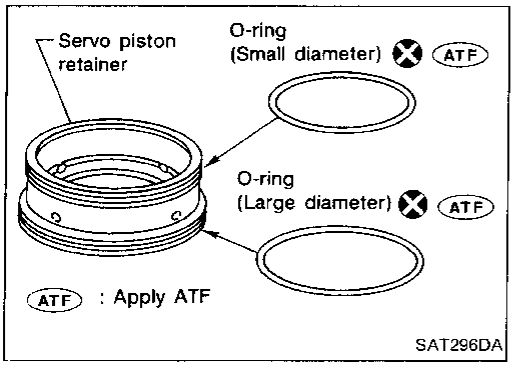


7. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, remove E-ring.

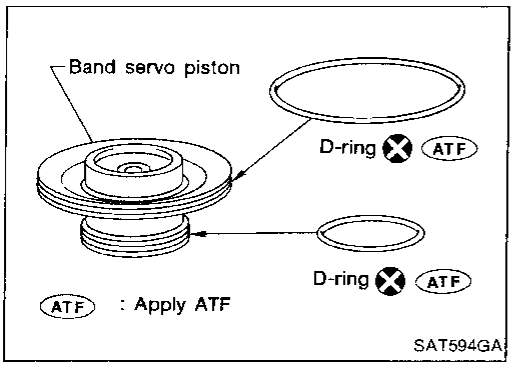


8. Remove OD servo return spring, band servo thrust washer and band servo piston stem from band servo piston.

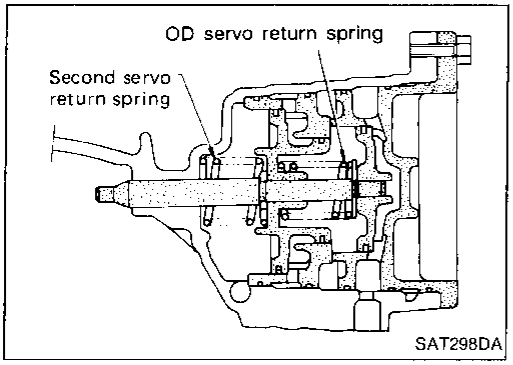
Band Servo Piston Assembly (Cont'd)



9. Remove O-rings from servo piston retainer.



10. Remove D-rings from band servo piston.



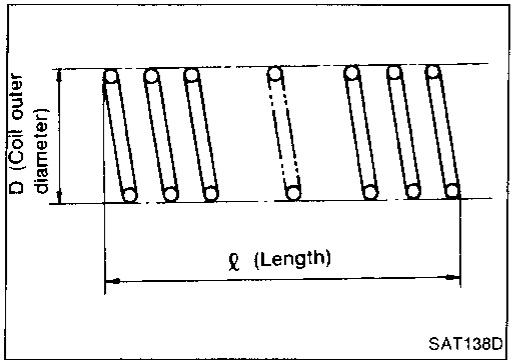
INSPECTION

Pistons, retainers and piston stem

- Check frictional surfaces for abnormal wear or damage.

Return springs

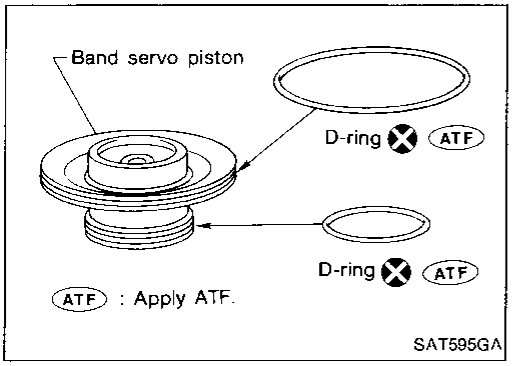
- Check for deformation or damage.
- Measure free length and outer diameter.



Inspection standard

Unit: mm (in)

Parts	Free length	Outer diameter
2nd servo return spring	32.5 (1.280)	25.9 (1.020)
OD servo return spring	31.0 (1.220)	21.7 (0.854)

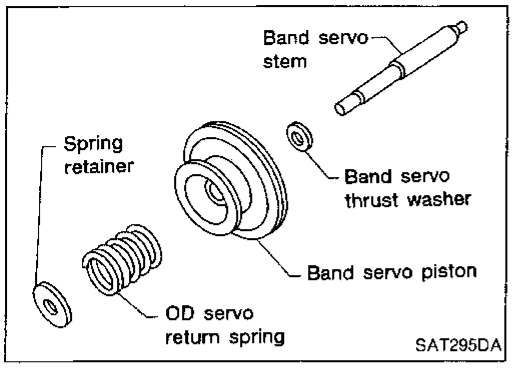


ASSEMBLY

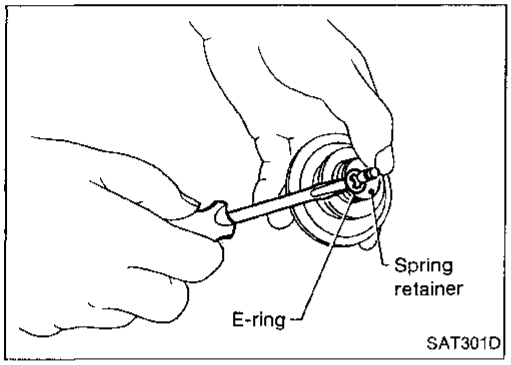
1. Install D-rings to servo piston retainer.

- **Apply ATF to O-rings.**
- **Pay attention to position of each O-ring.**

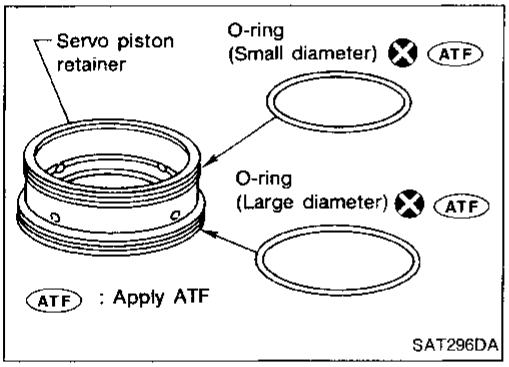
Band Servo Piston Assembly (Cont'd)



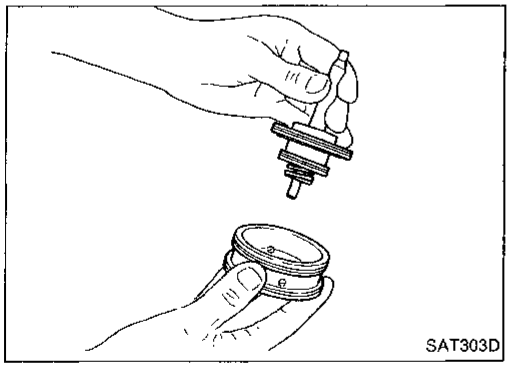
2. Install band servo piston stem, band servo thrust washer, OD servo return spring and spring retainer to band servo piston.



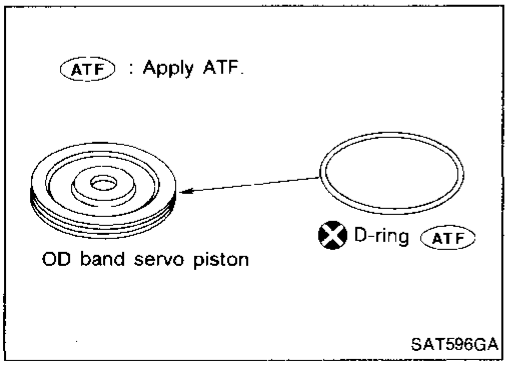
3. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, install E-ring.



4. Install O-rings to servo piston retainer.
- **Apply ATF to O-rings.**
- **Pay attention to the positions of the O-rings.**

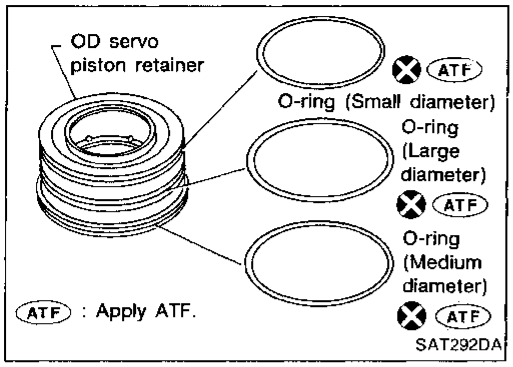


5. Install band servo piston assembly to servo piston retainer by pushing it inward.

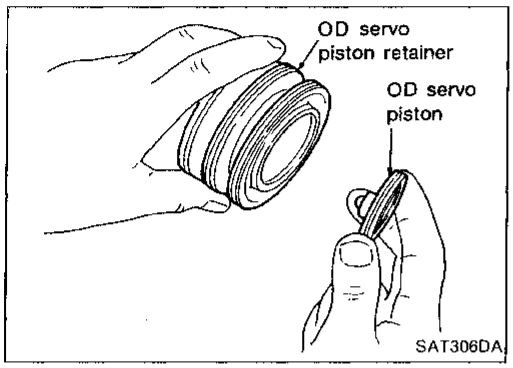


6. Install D-ring to OD band servo piston.
- **Apply ATF to D-ring.**

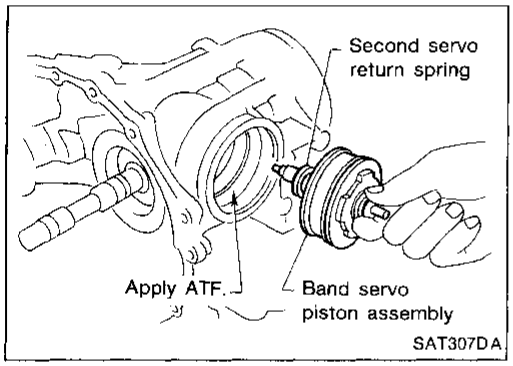
Band Servo Piston Assembly (Cont'd)



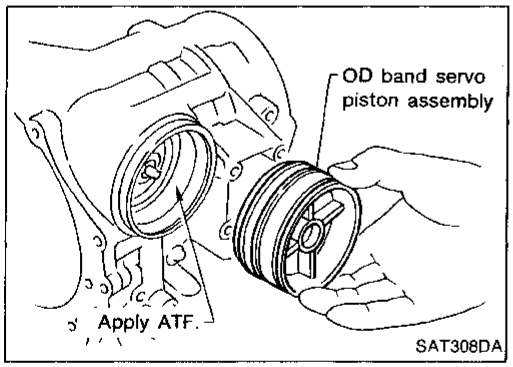
7. Install O-rings to OD servo piston retainer.
- **Apply ATF to O-rings.**
- **Pay attention to the positions of the O-rings.**



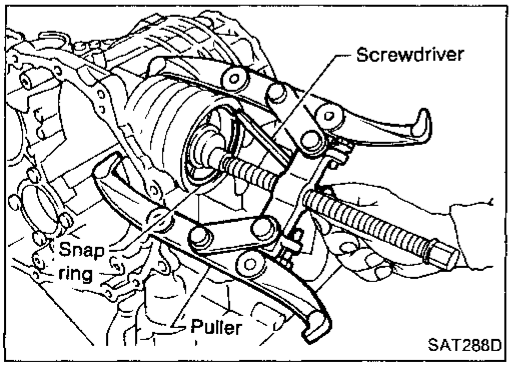
8. Install OD band servo piston to OD servo piston retainer.



9. Install band servo piston assembly and 2nd servo return spring to transmission case.
- **Apply ATF to O-ring of band servo piston and transmission case.**

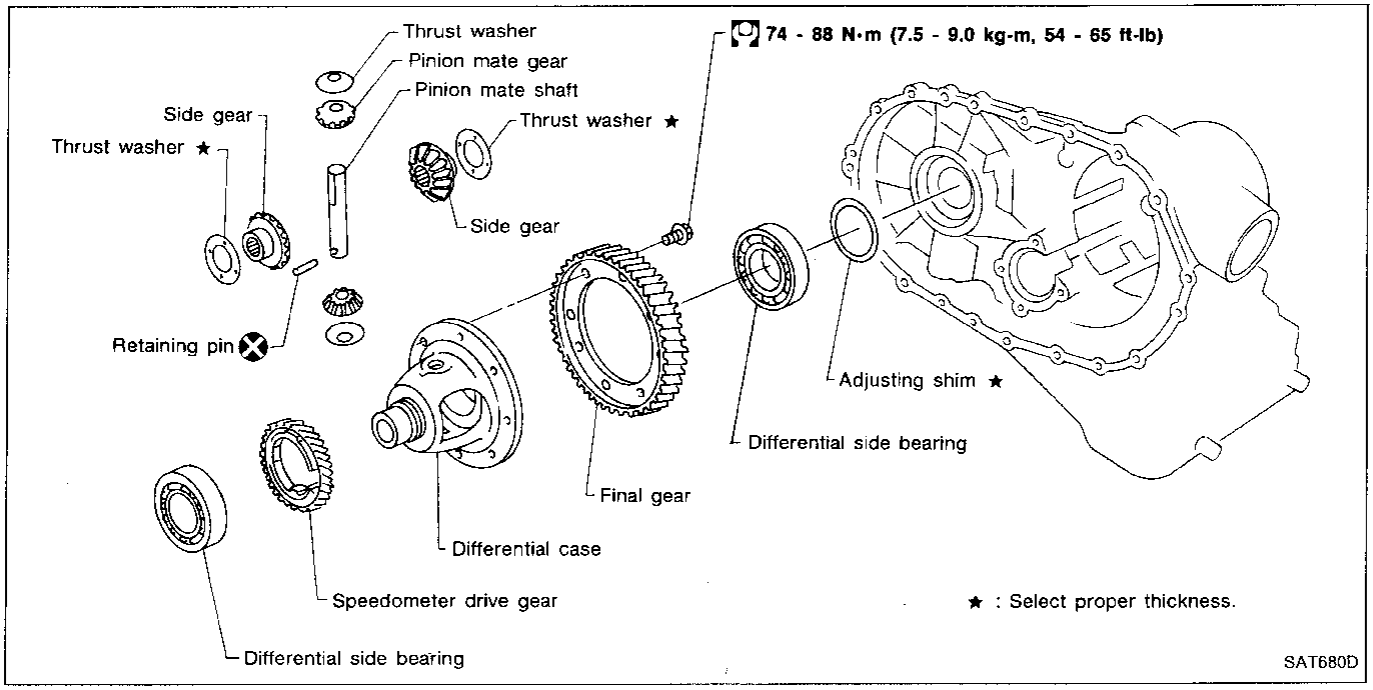


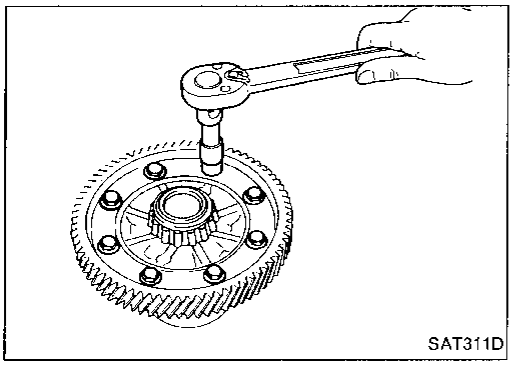
10. Install OD band servo piston assembly to transmission case.
- **Apply ATF to O-ring of band servo piston and transmission case.**



11. Install band servo piston snap ring to transmission case.

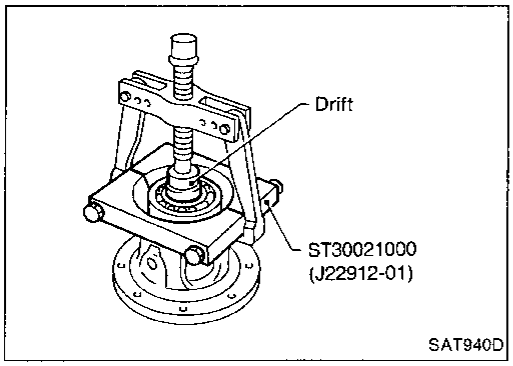
Final Drive — RL4F03A



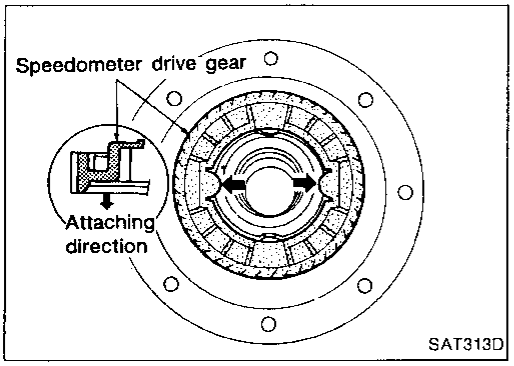


DISASSEMBLY

1. Remove final gear.

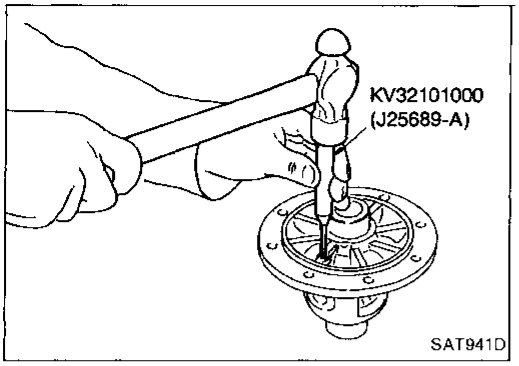


2. Press out differential side bearings.

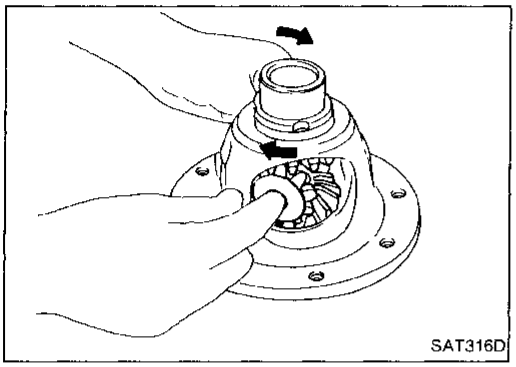


3. Remove speedometer drive gear.

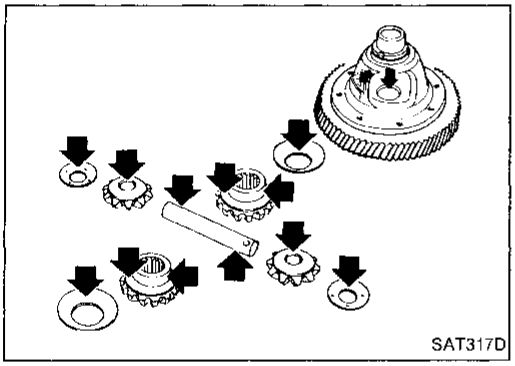
Final Drive — RL4F03A (Cont'd)



4. Drive out pinion mate shaft retaining pin.



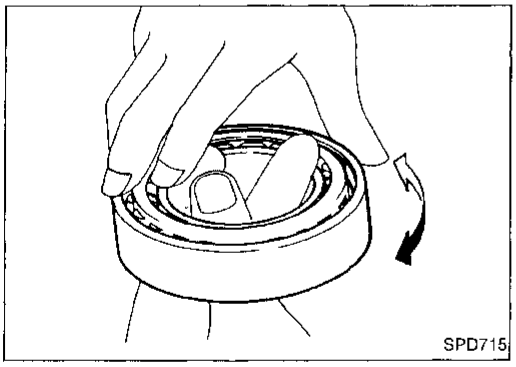
5. Draw out pinion mate shaft from differential case.
6. Remove pinion mate gears and side gears.



INSPECTION

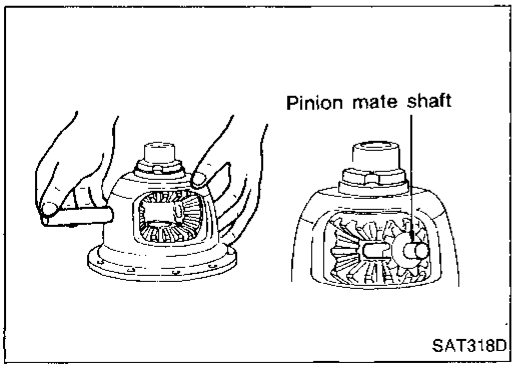
Gear, washer, shaft and case

- Check mating surfaces of differential case, side gears and pinion mate gears.
- Check washers for wear.



Bearings

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.

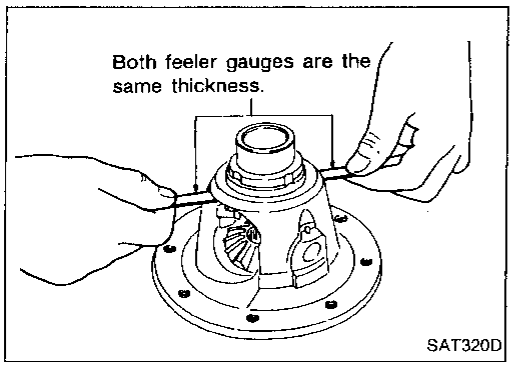


ASSEMBLY

1. Install side gears and thrust washers in differential case.
2. Install pinion mate gears and thrust washers in the differential case while rotating them.

- **Apply ATF to all parts.**

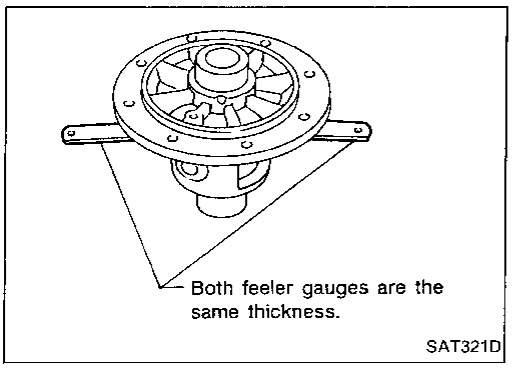
Final Drive — RL4F03A (Cont'd)



3. Measure clearance between side gear and differential case with washers.

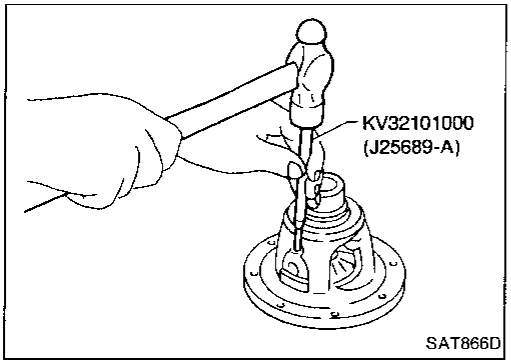
Clearance between side gear and differential case with washers:

0.1 - 0.2 mm (0.004 - 0.008 in)

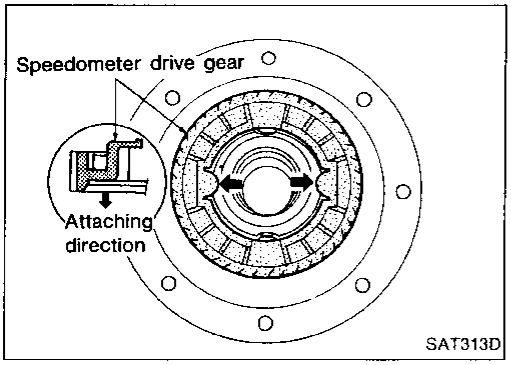


- If not within specification, adjust clearance by changing thickness of side gear thrust washers.

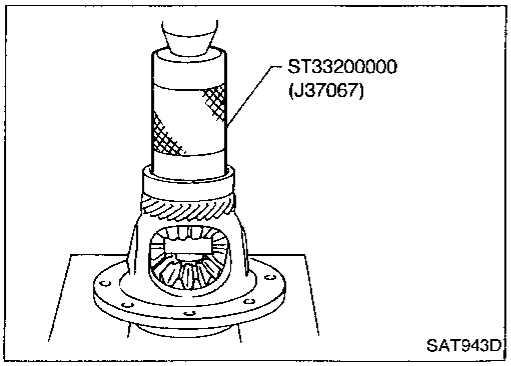
Side gear thrust washer: Refer to SDS, AT-275.



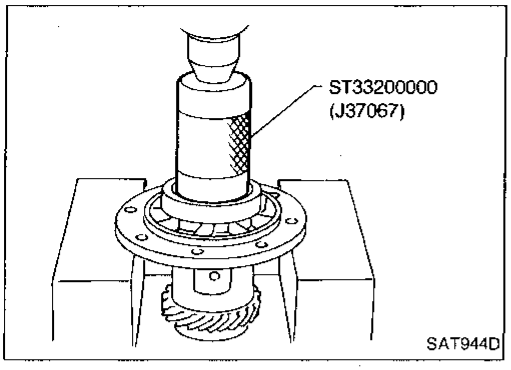
4. Install retaining pin.
- **Make sure that retaining pin is flush with case.**

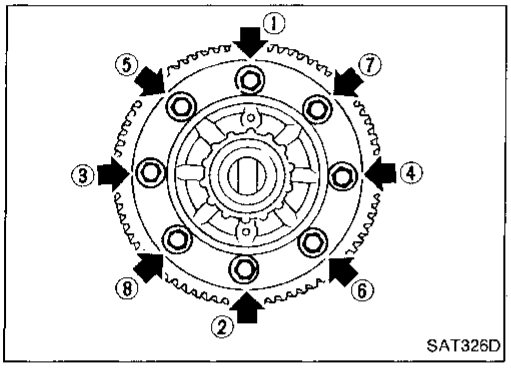


5. Install speedometer drive gear on differential case.
- **Align projection of speedometer drive gear with groove of differential case.**



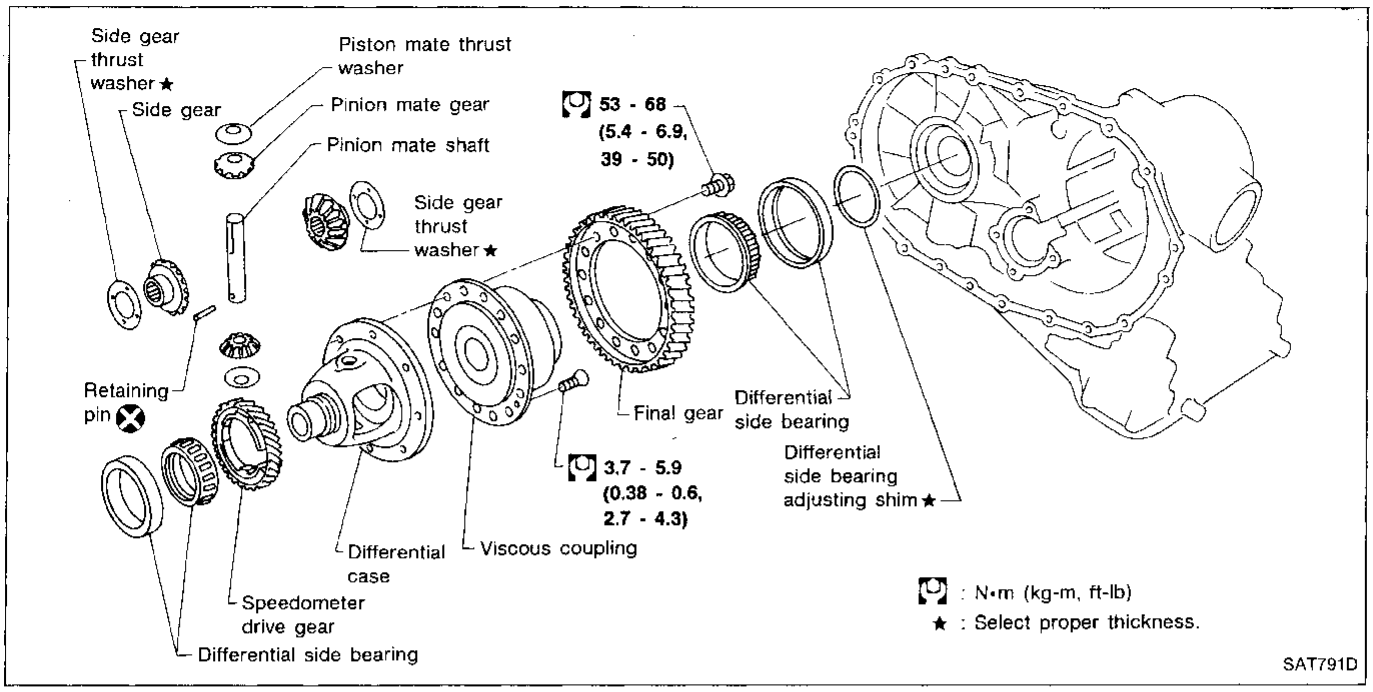
6. Press differential side bearings on differential case.

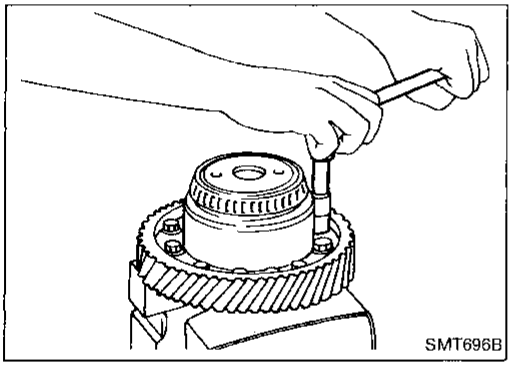




7. Install final gear and tighten fixing bolts in numerical order.

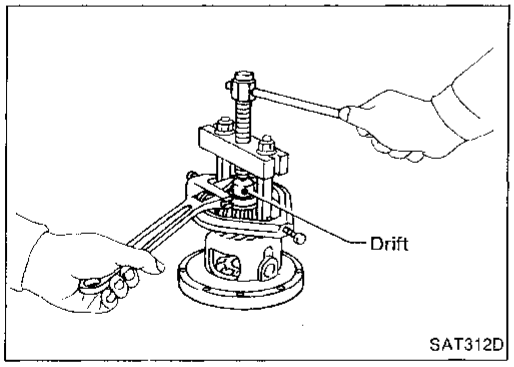
Final Drive — RE4F03V



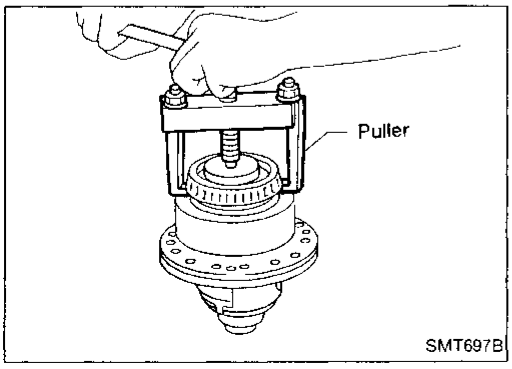


DISASSEMBLY

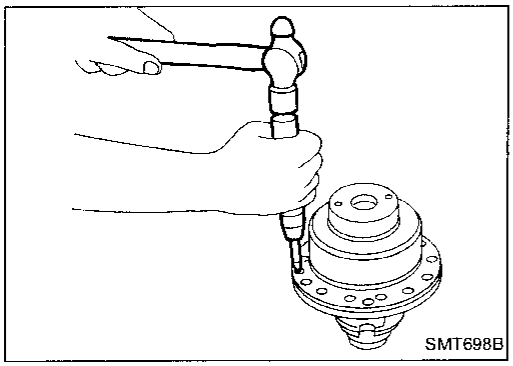
1. Remove final gear.



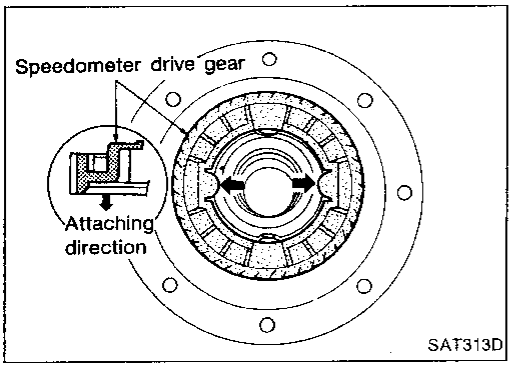
2. Press out differential side bearings.



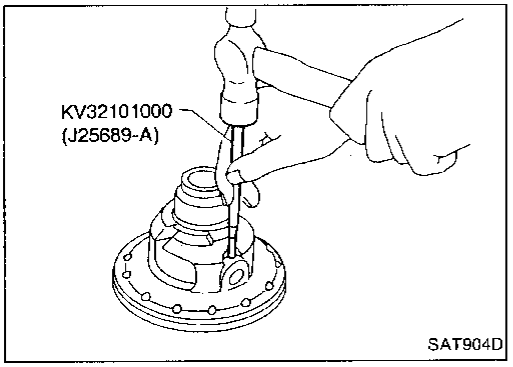
Final Drive — RE4F03V (Cont'd)



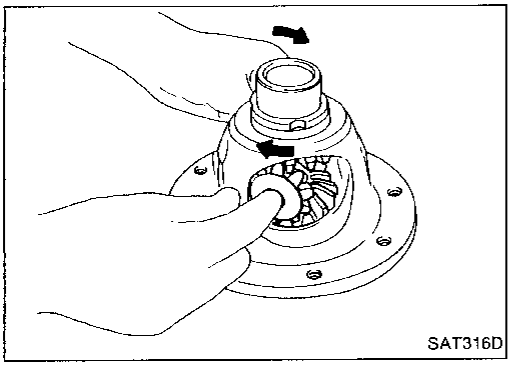
3. Remove viscous coupling.



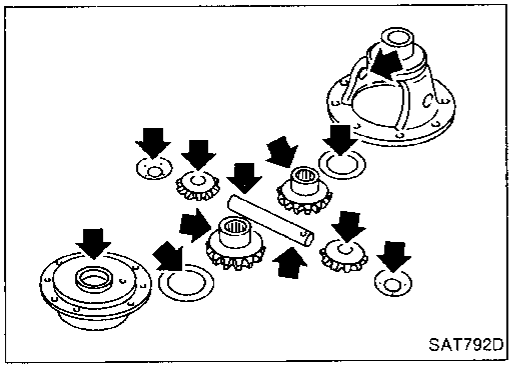
4. Remove speedometer drive gear.



5. Drive out pinion mate shaft retaining pin.



6. Draw out pinion mate shaft from differential case.
7. Remove pinion mate gears and side gears.

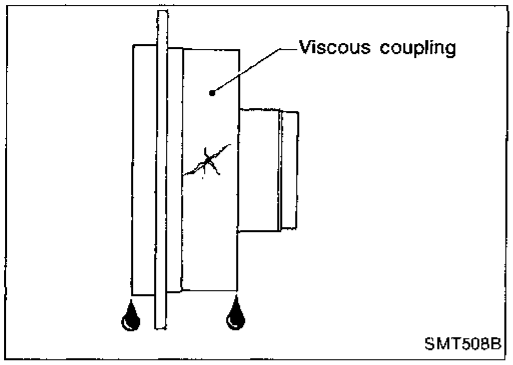


INSPECTION

Gear, washer, shaft and case

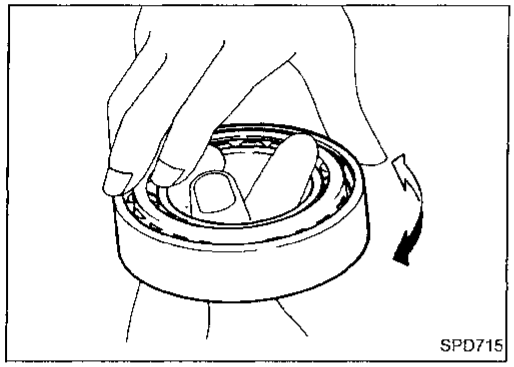
- Check mating surfaces of differential case, side gears, pinion mate gears and viscous coupling.
- Check washers for wear.

Final Drive — RE4F03V (Cont'd)



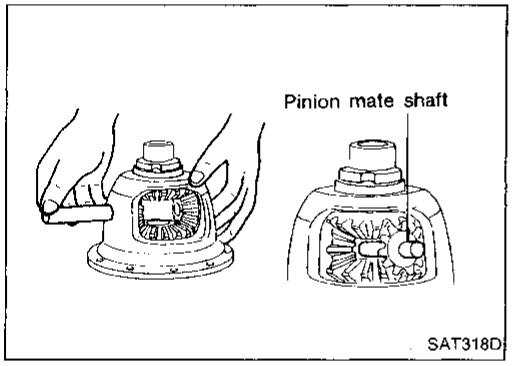
Viscous coupling

- Check case for cracks.
- Check silicone oil for leakage.



Bearings

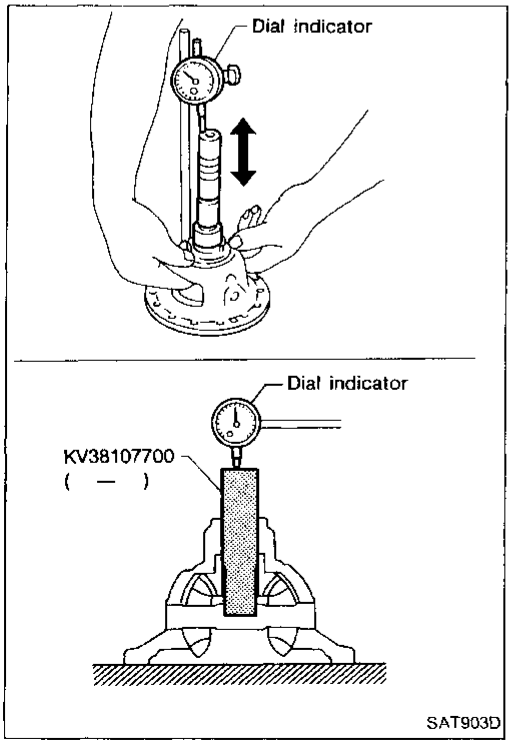
- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- **When replacing taper roller bearing, replace outer and inner race as a set.**



ASSEMBLY

1. Install side gear and thrust washers in differential case.
2. Install pinion mate gears and thrust washers in differential case while rotating them.

- **Apply ATF to any parts.**



3. Measure clearance between side gear and differential case & viscous coupling with washers using the following procedure:

Differential case side

a. Set Tool and dial indicator on side gear.
b. Move side gear up and down to measure dial indicator deflection.

Clearance between side gear and differential case with washers:

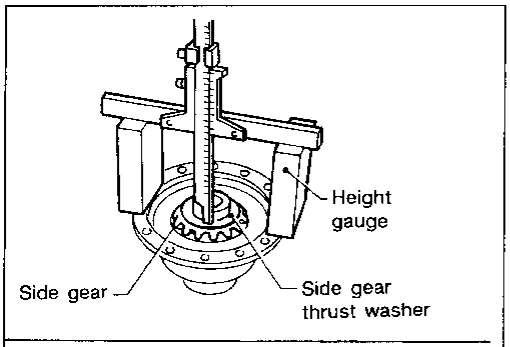
0.1 - 0.2 mm (0.004 - 0.008 in)

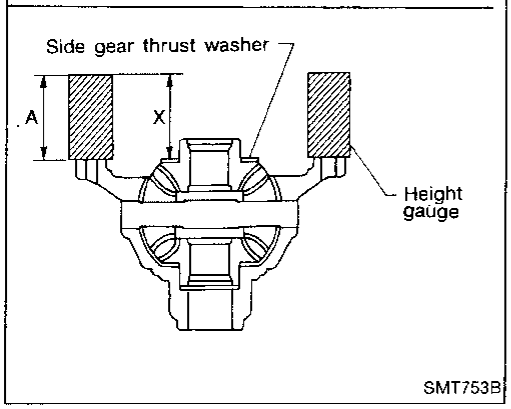
c. If not within specification adjust clearance by changing thickness of side gear thrust washer.

Side gear thrust washers for differential case side:

Refer to SDS, AT-276.

Final Drive — RE4F03V (Cont'd)



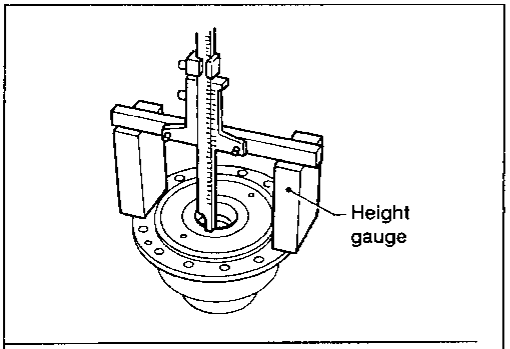


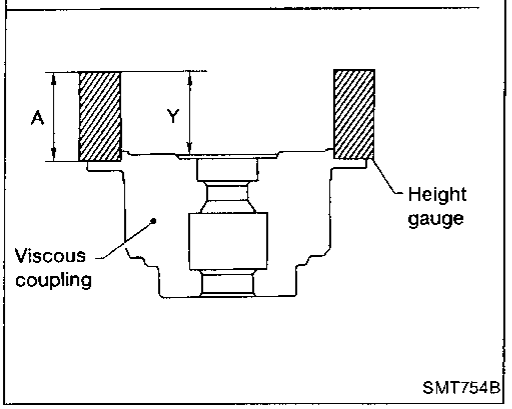
Viscous coupling side

a. Place side gear and thrust washer on pinion mate gears installed on differential case.

b. Measure dimension X.

- **Measure dimension X in at least two places.**

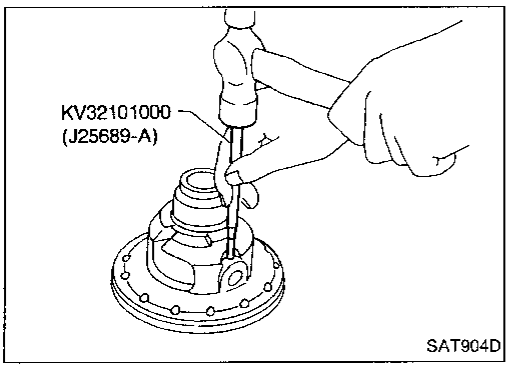




c. Measure dimension Y.

- **Measure dimension Y in at least two places.**
  Clearance between side gear and viscous coupling = X + Y − 2A: 0.1 - 0.2 mm (0.004 - 0.008 in)
  A: Height of gauge

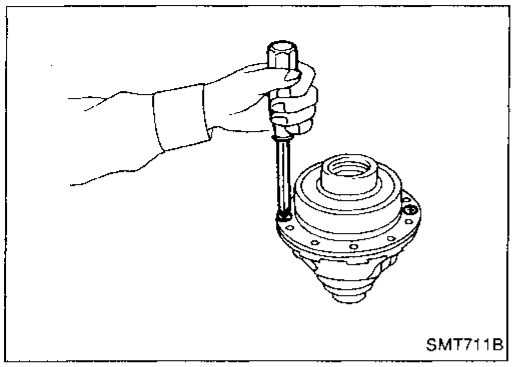
d. If not within specification, adjust clearance by changing thickness of side gear thrust washer.
   Side gear thrust washers for viscous coupling side: Refer to SDS, AT-276.



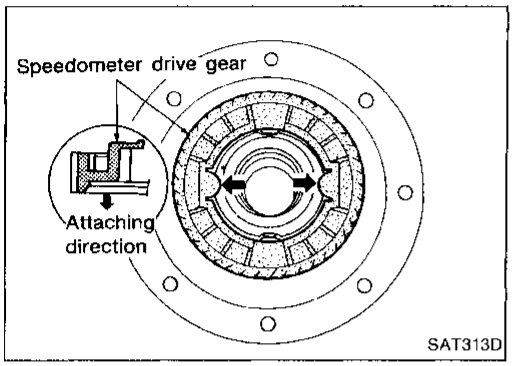
4. Install retaining pin.

- **Make sure that retaining pin is flush with case.**

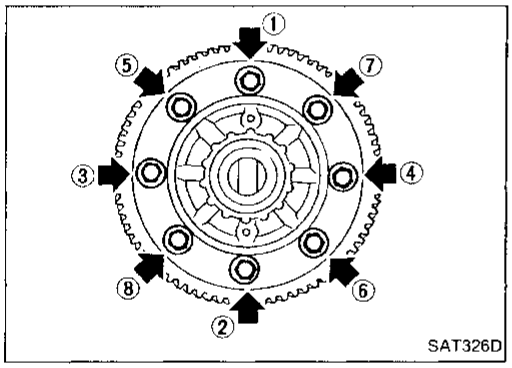
Final Drive — RE4F03V (Cont'd)



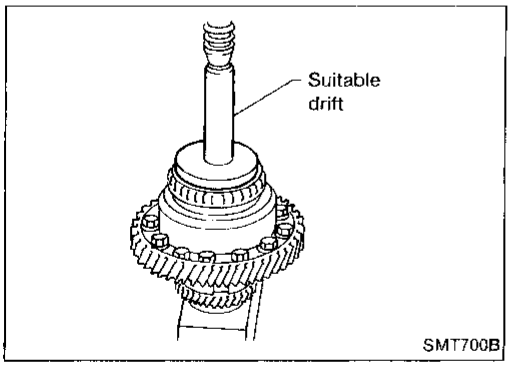
5. Install side gear (viscous coupling side) on differential case and then install viscous coupling.



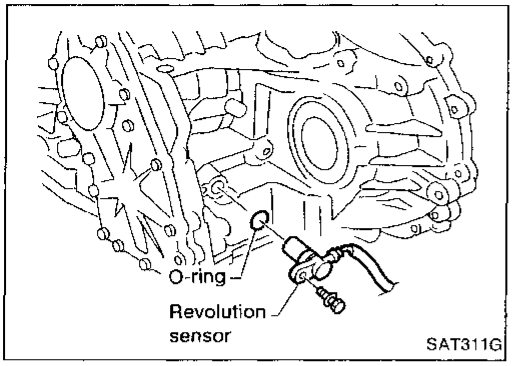
6. Install speedometer drive gear on differential case.
- **Align the projection of speedometer drive gear with the groove of differential case.**



7. Install final gear and tighten fixing bolts in numerical order.



8. Press on differential side bearings.

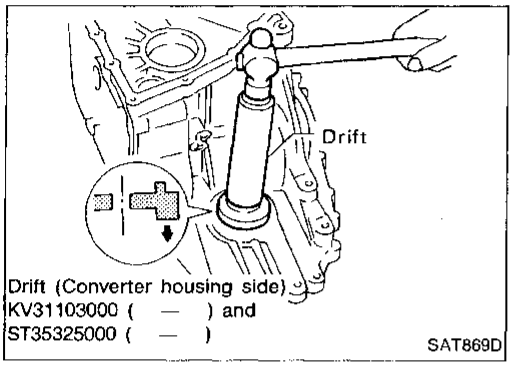


Assembly 1

— RE4F03V only —

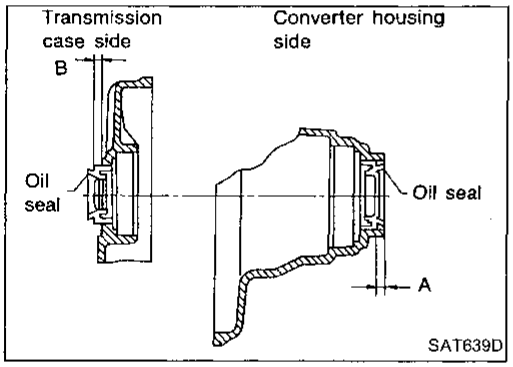
1. Install revolution sensor onto transmission case.

Always use new sealing parts.



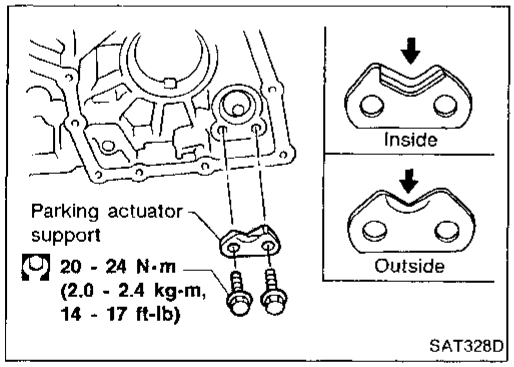
— RL4F03A & RE4F03V —

2. Install differential side oil seals on transmission case and converter housing, so that "A" and "B" are within specifications.

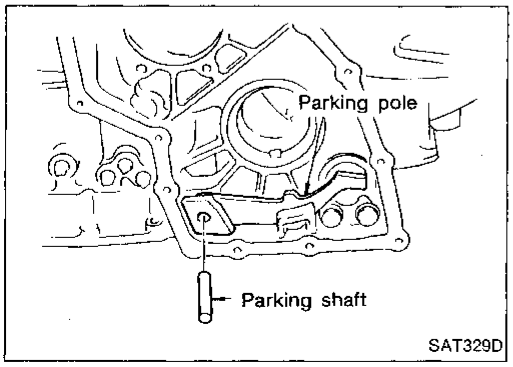


Unit: mm (in)

A	B
5.5 - 6.5 (0.217 - 0.256)	0.5 (0.020) or less

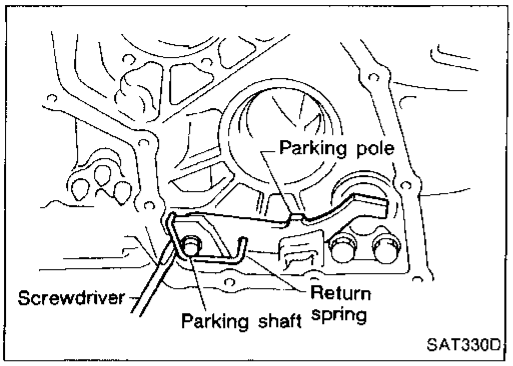


3. Install parking actuator support to transmission case.
- **Pay attention to direction of parking actuator support.**

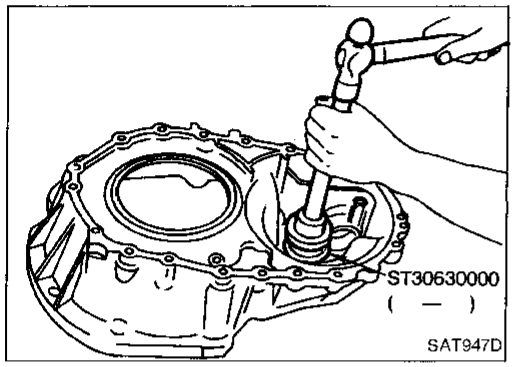


4. Install parking pawl on transmission case and fix it with parking shaft.

Assembly 1 (Cont'd)



5. Install return spring.

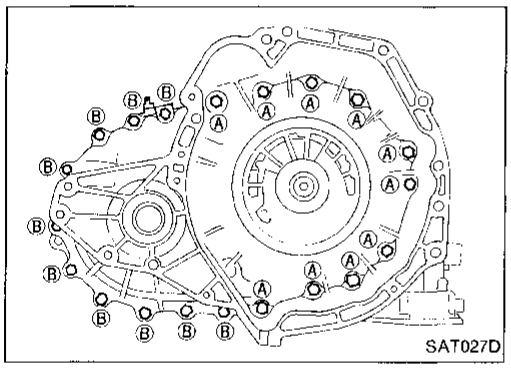


Adjustment 1

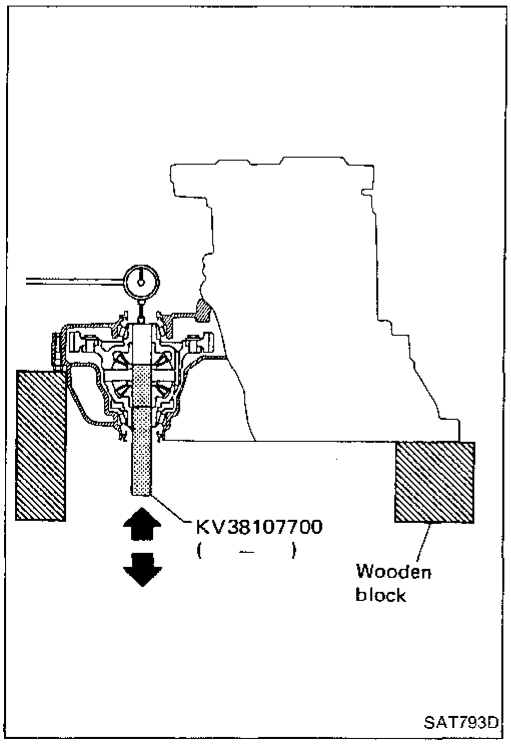
DIFFERENTIAL SIDE BEARING PRELOAD

— RE4F03V —

1. Install differential side bearing outer race without adjusting shim on transmission case.
2. Install differential side bearing outer race on converter housing.



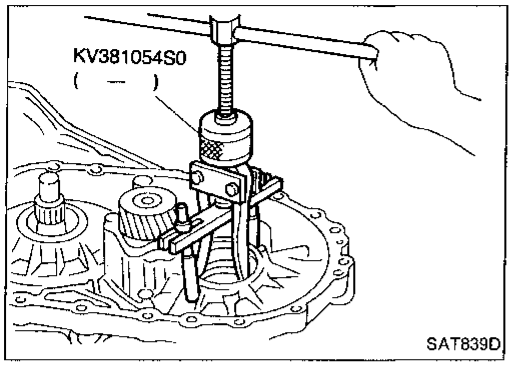
3. Place final drive assembly on transmission case.
4. Install transmission case on converter housing and tighten transmission case fixing bolts Ⓐ and Ⓑ to the specified torque.



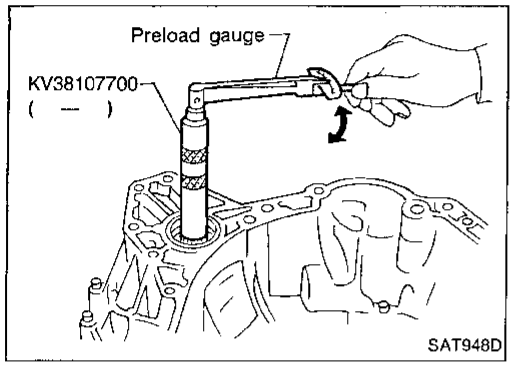
5. Attach dial indicator on differential case at transmission case side.
6. Insert Tool into differential side gear from converter housing.
7. Move Tool up and down and measure dial indicator deflection.
8. Select proper thickness of differential side bearing adjusting shim(s) using SDS table as a guide.

Differential side bearing adjusting shim: Refer to SDS, AT-276.

Adjustment 1 (Cont'd)



9. Remove converter housing from transmission case.
10. Remove final drive assembly from transmission case.
11. Remove differential side bearing outer race from transmission case.
12. Reinstall differential side bearing outer race and shim(s) selected from SDS table on transmission case.
13. Reinstall converter housing on transmission case and tighten transmission case fixing bolts to the specified torque.



14. Insert Tool into differential case and measure turning torque of final drive assembly.

- **When measuring turning torque, turn final drive assembly in both directions several times to seat bearing rollers correctly.**

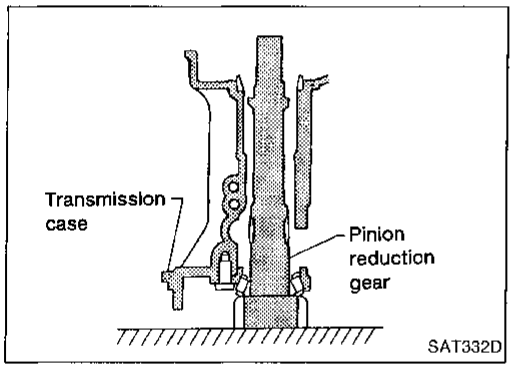
  Turning torque of final drive assembly (New bearing):
  0.49 - 1.08 N·m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb)
- **When old bearing is used again, turning torque will be slightly less than the above.**
- **Make sure torque is close to the specified range.**

REDUCTION GEAR BEARING PRELOAD

— RL4F03A & RE4F03V —

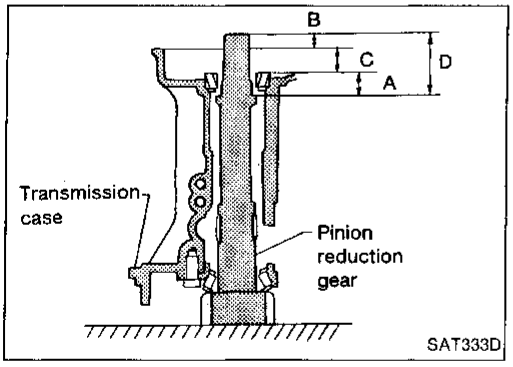
1. Remove transmission case and final drive assembly from converter housing.
2. Select proper thickness of reduction gear bearing adjusting shim using the following procedures.

a. Place reduction gear on transmission case as shown.



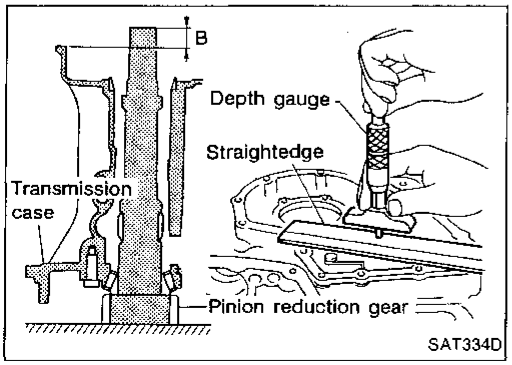
b. Place idler gear bearing on transmission case.

c. Measure dimensions "B" "C" and "D" and calculate dimension "A".



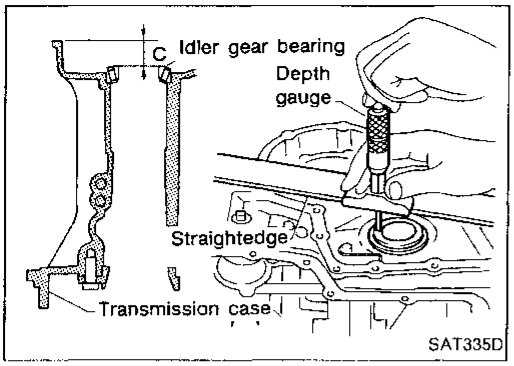
A = D – (B + C)

"A": Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction gear.

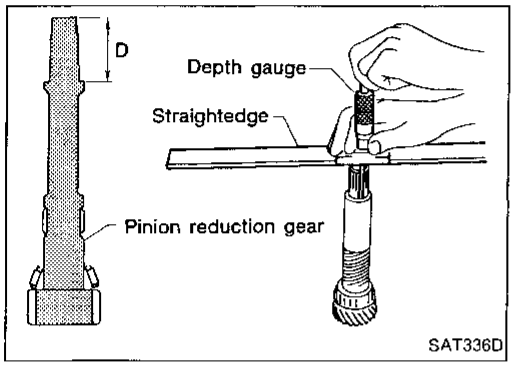


- Measure dimension "B" between the end of reduction gear and the surface of transmission case.
- **Measure dimension "B" in at least two places.**

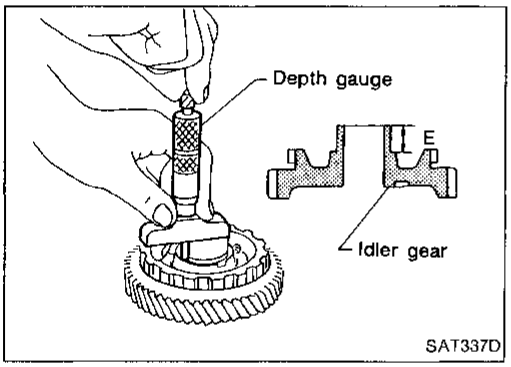
Adjustment 1 (Cont'd)



- Measure dimension "C" between the surface of idler gear bearing inner race and the surface of transmission case.
- **Measure dimension "C" in at least two places.**



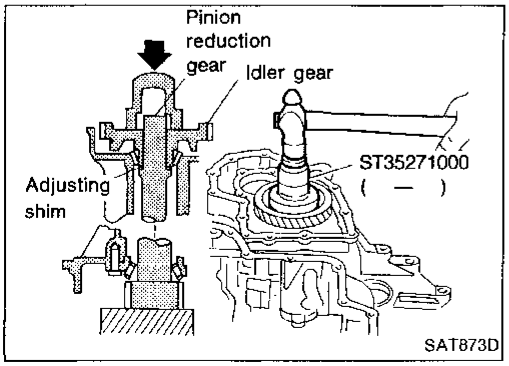
- Measure dimension "D" between the end of reduction gear and the adjusting shim mating surface of reduction gear.
- **Measure dimension "D" in at least two places.**
- Calculate dimension "A"
  A = D – (B + C)



d. Measure dimension "E" between the end of idler gear and the idler gear bearing inner race mating surface of idler gear.
- **Measure dimension "E" in at least two places.**

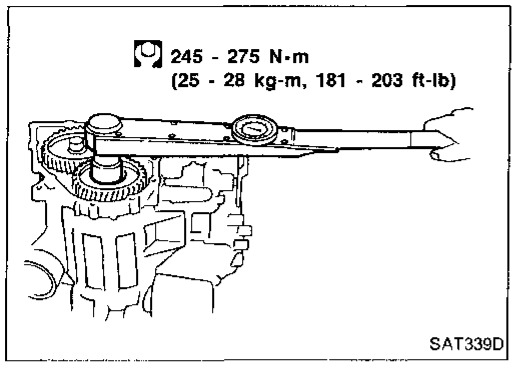
e. Calculate "T" and select proper thickness of reduction gear bearing adjusting shim using SDS table as a guide.
  T = A – E

Reduction gear bearing adjusting shim: Refer to SDS, AT-278.



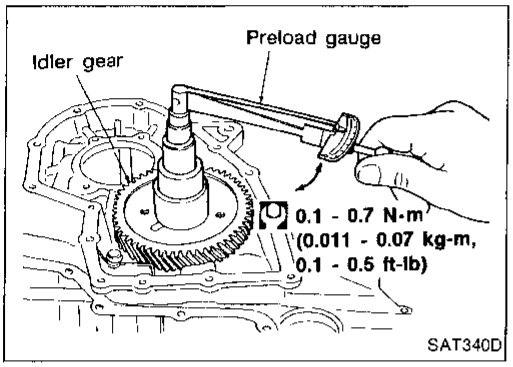
3. Install reduction gear and reduction gear bearing adjusting shim selected in step 2-e on transmission case.
4. Press idler gear bearing inner race on idler gear.
5. Press idler gear on reduction gear.
- **Press idler gear so that idler gear can be locked by parking pawl.**

Adjustment 1 (Cont'd)



6. Tighten idler gear lock nut to the specified torque.

- **Lock idler gear with parking pawl when tightening lock nut.**

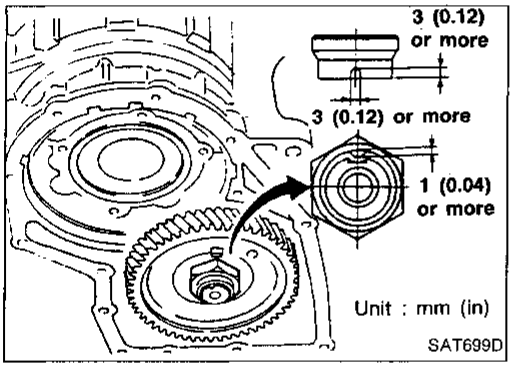


7. Measure turning torque of reduction gear.

- **When measuring turning torque, turn reduction gear in both directions several times to seat bearing rollers correctly.**

  Turning torque of reduction gear:

  0.11 - 0.69 N·m (1.1 - 7.0 kg-cm, 0.95 - 6.08 in-lb)



8. After properly adjusting turning torque, clinch idler gear lock nut as shown (only RL4F03V).

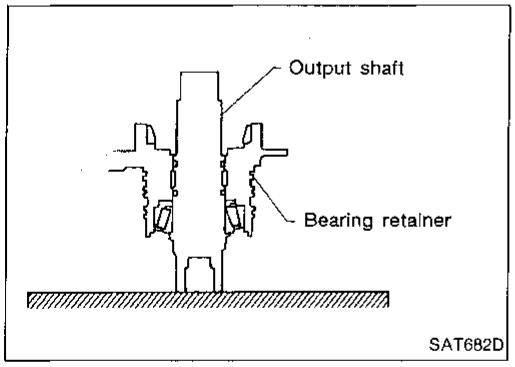
OUTPUT SHAFT BEARING PRELOAD

— RL4F03A —

1. Select proper thickness of output shaft bearing adjusting spacer using the following procedures.

a. Remove paper rolled around output shaft.

b. Place bearing retainer on output shaft.

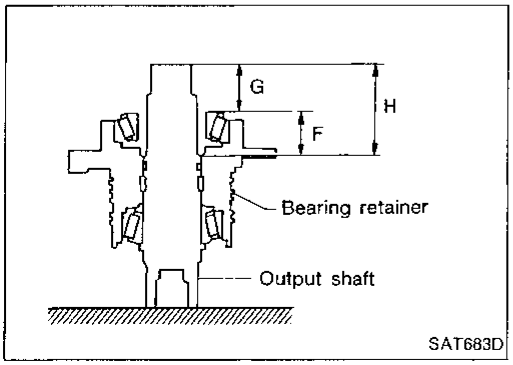


c. Place output gear bearing inner race on bearing retainer.

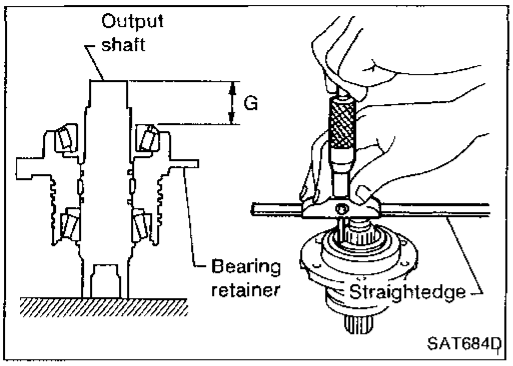
d. Measure dimensions "G" and "H" and calculate dimension "F".

   "F": Distance between the surface of output gear bearing inner race and adjusting shim mating surface of output shaft.

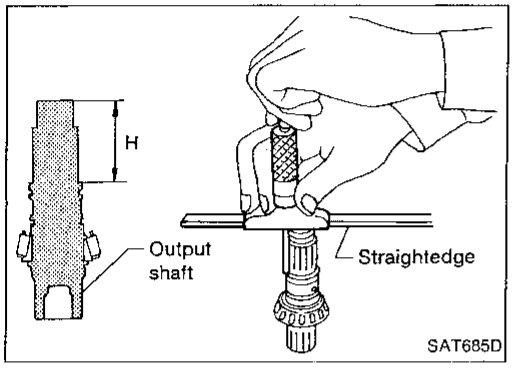
   F = H – G



Adjustment 1 (Cont'd)

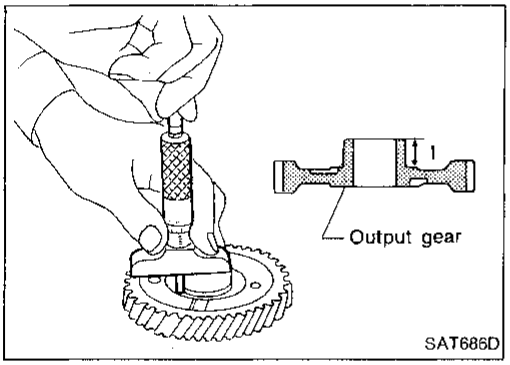


- Measure dimension "G" between end of output shaft and surface of output gear bearing inner race.
- **Measure in at least two places.**



- Measure dimension "H" between end of output shaft and adjusting spacer mating surface of output shaft.
- **Measure in at least two places.**
- Calculate dimension "F".

  F = H – G



e. Measure distance "I" between end of output gear (adjusting spacer mating surface) and bearing inner race fitting surface.

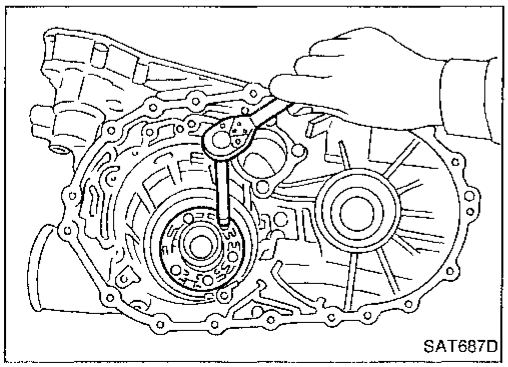
f. Calculate dimension "T_2".

   "T_2": Distance between adjusting spacer mating surface of output gear and output shaft

   T_2 = F – I

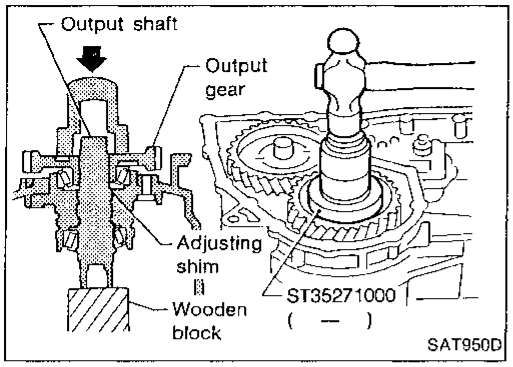
g. Select proper thickness of output shaft bearing adjusting spacer using SDS table as a guide.

   Output shaft bearing adjusting spacer:
   Refer to SDS, AT-280.

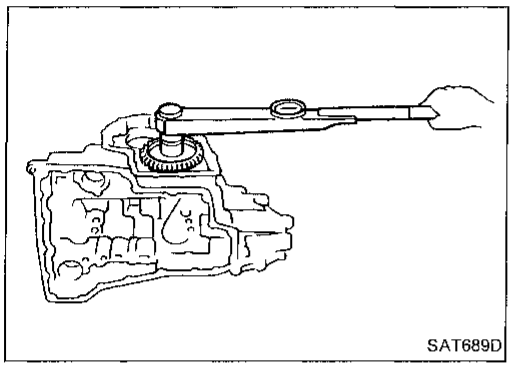


2. Install bearing retainer on transmission case.

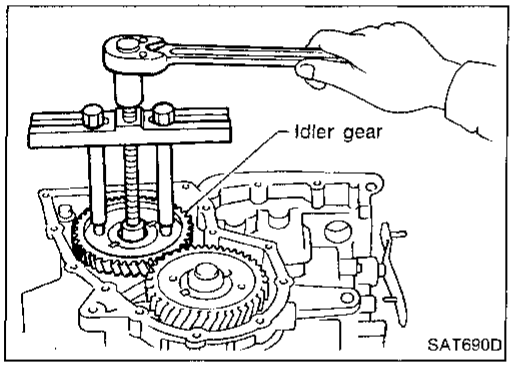
Adjustment 1 (Cont'd)



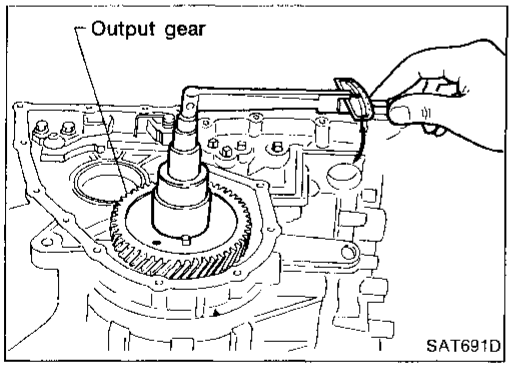
3. Place output shaft on bearing retainer.
4. Place output shaft bearing adjusting spacer selected in step 1-g on output shaft.
5. Press output gear bearing inner race on output gear.
6. Press output gear on output shaft.



7. Tighten output gear lock nut to specified torque.



8. Remove idler gear to measure output shaft preload.



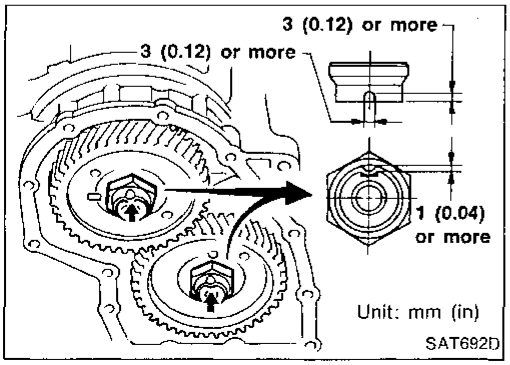
9. Measure turning torque of output shaft.

- **When measuring turning torque, turn output shaft in both directions several times to seat bearing rollers correctly.**

  Turning torque of output shaft:

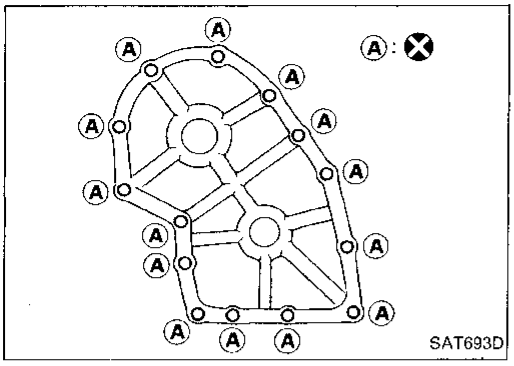
  0.25 - 0.88 N·m

  (2.5 - 9.0 kg-cm, 2.2 - 7.8 in-lb)

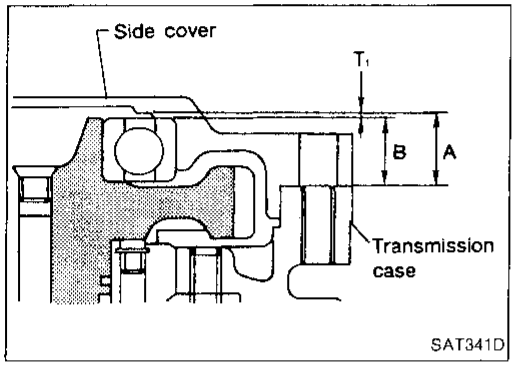


10. Install idler gear and tighten lock nut to specified torque.
11. After properly adjusting "turning" torque, clinch idler gear and output gear lock nuts as shown.

Adjustment 1 (Cont'd)



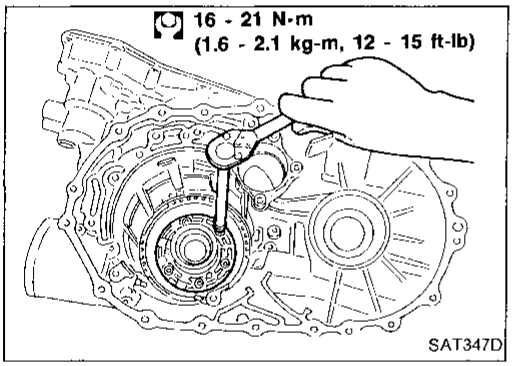
12. Install new gasket and side cover on transmission case.



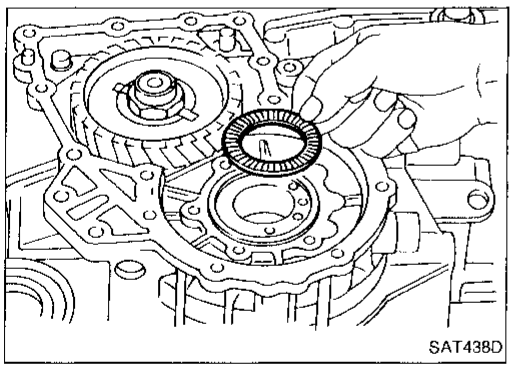
OUTPUT SHAFT END PLAY

— RE4F03V —

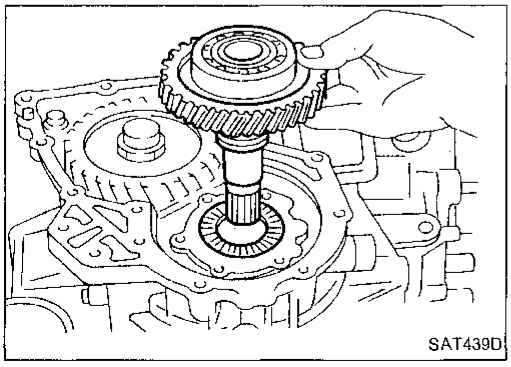
- Measure clearance between side cover and the end of the output shaft bearing.
- Select proper thickness of adjusting shim so that clearance is within specifications.



1. Install bearing retainer for output shaft.

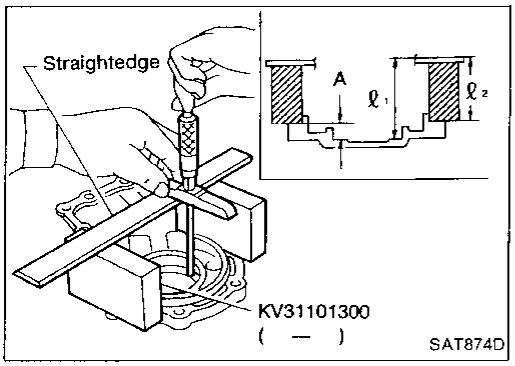


2. Install output shaft thrust needle bearing on bearing retainer.



3. Install output shaft on transmission case.

Adjustment 1 (Cont'd)

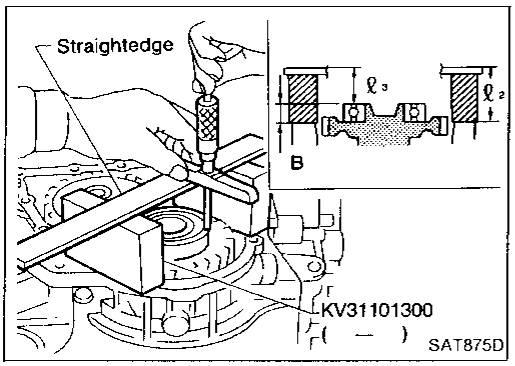


4. Measure dimensions "ℓ_1" and "ℓ_2" at side cover and then calculate dimension "A".

- **Measure dimension "ℓ_1" and "ℓ_2" in at least two places.**

"A": Distance between transmission case fitting surface and adjusting shim mating surface.

$A = \ell_1 - \ell_2$ ℓ_2: Height of gauge

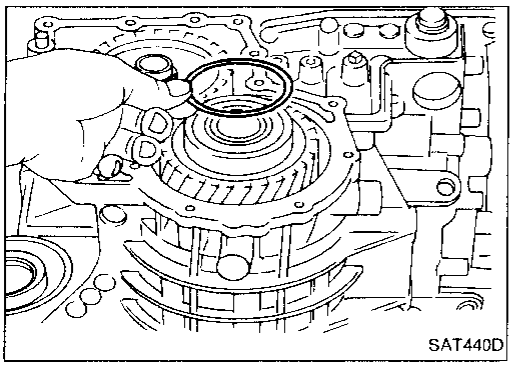


5. Measure dimensions "ℓ_2" and "ℓ_3" and then calculate dimension "B".

Measure "ℓ_2" and "ℓ_3" in at least two places.

"B": Distance between the end of output shaft bearing outer race and the side cover fitting surface of transmission case.

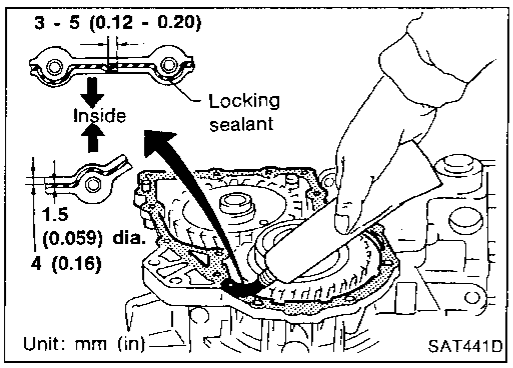
$B = \ell_2 - \ell_3$ ℓ_2: Height of gauge



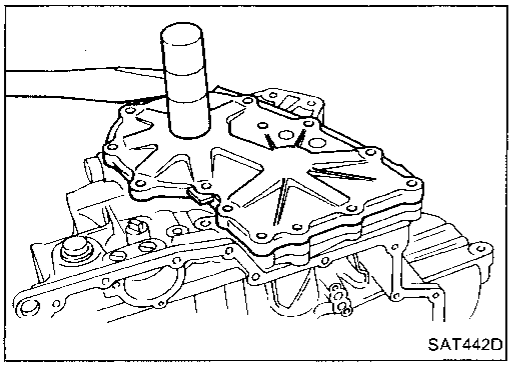
6. Select proper thickness of adjusting shim so that output shaft end play (clearance between side cover and output shaft bearing) is within specifications.

Output shaft end play (A – B):
0 - 0.5 mm (0 - 0.020 in)
Output shaft end play adjusting shim:
Refer to SDS, AT-280.

7. Install adjusting shim on output shaft bearing.



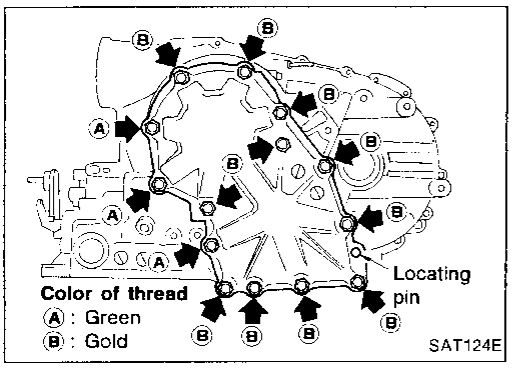
8. Apply locking sealant to transmission case as shown in illustration.



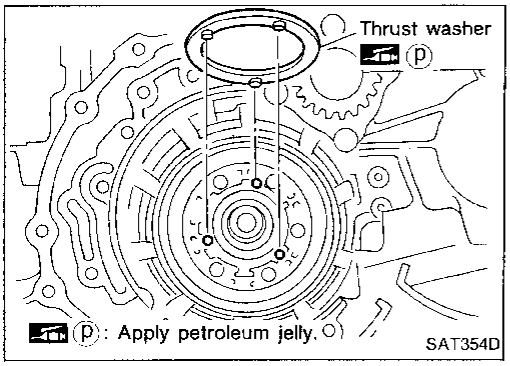
9. Install side cover on transmission case.

- **Apply locking sealant to the mating surface of transmission case.**

Adjustment 1 (Cont'd)



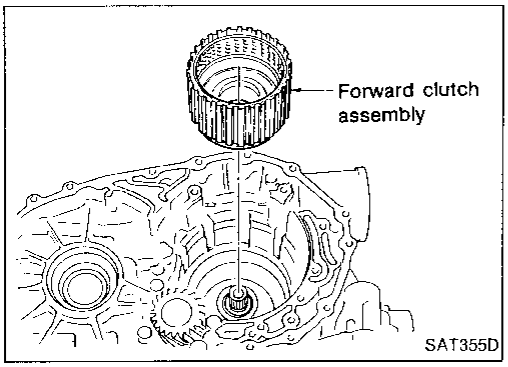
10. Tighten side cover fixing bolts to specified torque.
- **Do not mix bolts Ⓐ and Ⓑ.**
- **Always replace bolts Ⓐ as they are self-sealing bolts.**



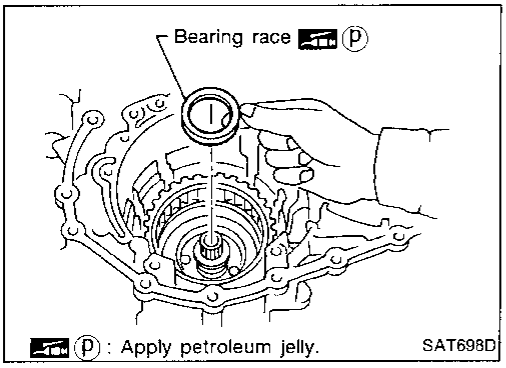
Assembly 2

— RL4F03A & RE4F03V —

1. Remove paper rolled around bearing retainer.
2. Install thrust washer on bearing retainer.
- **Apply petroleum jelly to thrust washer.**

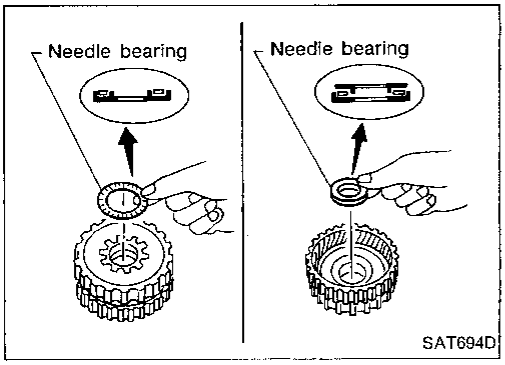


3. Install forward clutch assembly.
- **Align teeth of low & reverse brake drive plates before installing.**
- **Make sure that bearing retainer seal rings are not spread.**



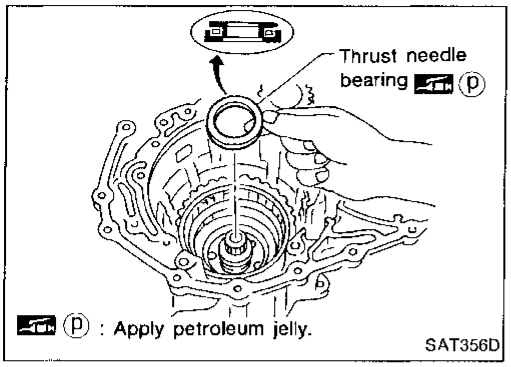
— RL4F03A —

4. Install bearing race on bearing retainer.
- **Apply petroleum jelly to bearing race.**



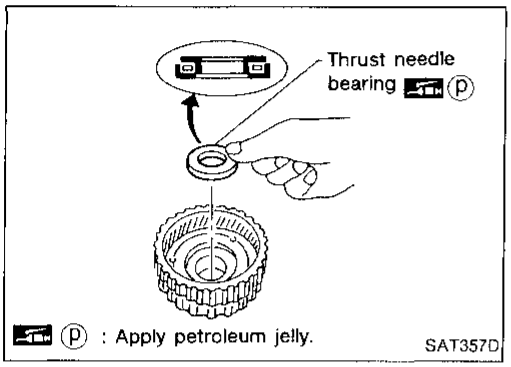
5. Install needle bearings on rear internal gear.
- **Apply petroleum jelly to needle bearings.**
- **Pay attention to direction of needle bearing.**

Assembly 2 (Cont'd)

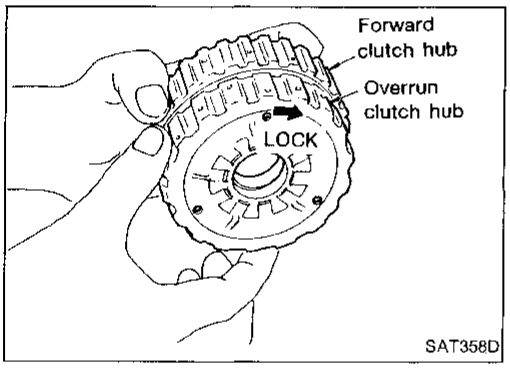


— RE4F03V —

4. Install thrust needle bearing on bearing retainer.
- **Apply petroleum jelly to thrust bearing.**
- **Pay attention to direction of thrust needle bearing.**

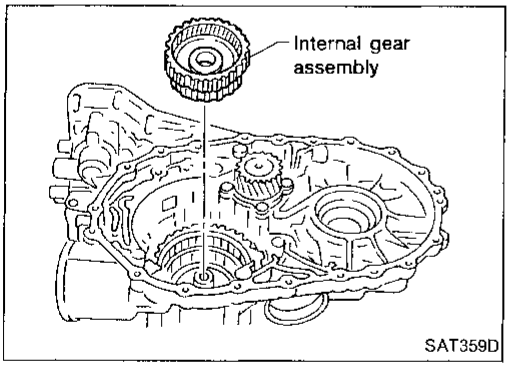


5. Install thrust needle bearing on rear internal gear.
- **Apply petroleum jelly to thrust needle bearing.**
- **Pay attention to direction of thrust needle bearing.**

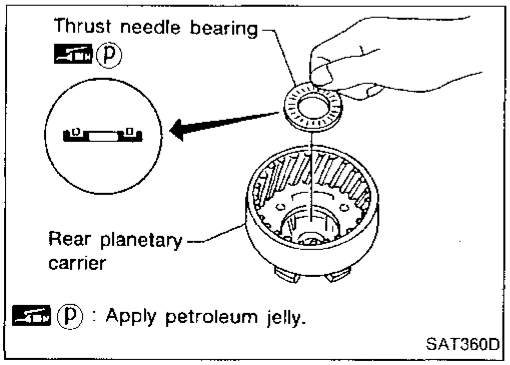


— RL4F03A & RE4F03V —

6. Hold forward clutch hub and turn overrun clutch hub. Check overrun clutch hub for directions of lock and unlock.
- If not as shown in illustration, check installed direction of forward one-way clutch.

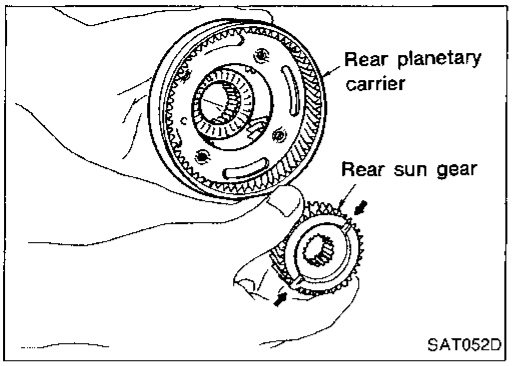


7. Install rear internal gear assembly.
- **Align teeth of forward clutch and overrun clutch drive plate.**

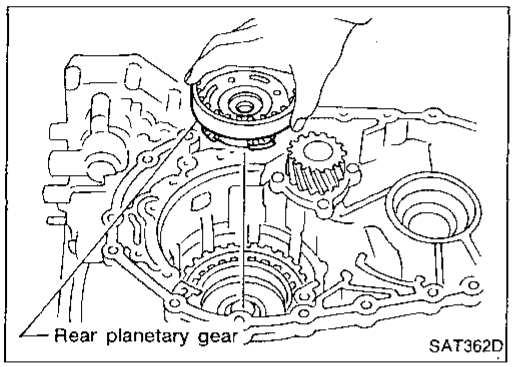


8. Install needle bearing on rear planetary carrier.
- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**

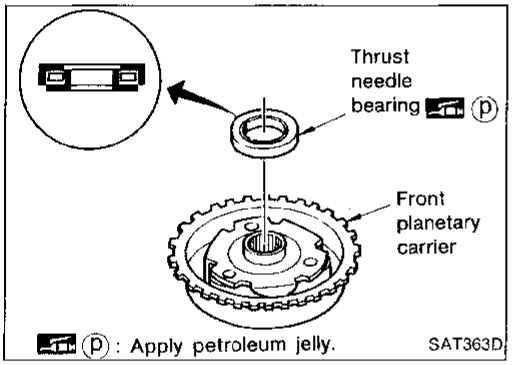
Assembly 2 (Cont'd)



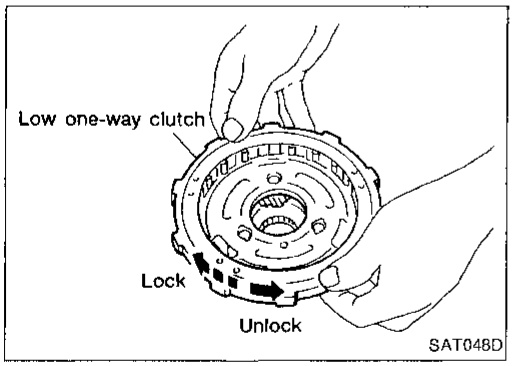
9. Install rear sun gear on rear planetary carrier.
- **Pay attention to direction of rear sun gear.**



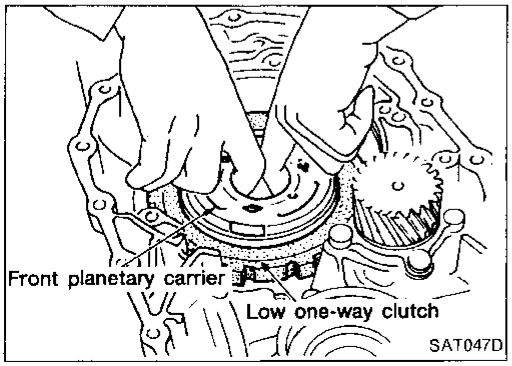
10. Install rear planetary carrier on transmission case.



11. Install thrust needle bearing on front planetary carrier.
- **Apply petroleum jelly to thrust needle bearing.**
- **Pay attention to direction of thrust needle bearing.**

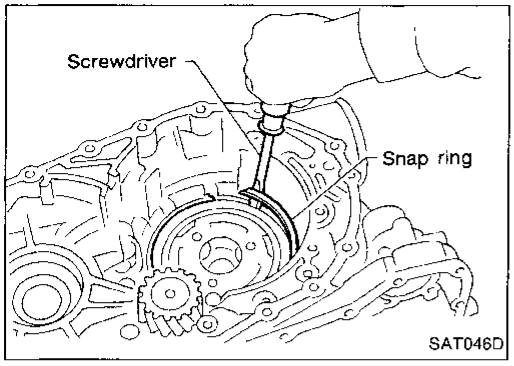


12. Install low one-way clutch to front planetary carrier by turning it in the direction of the arrow as shown.
13. While holding front planetary carrier, turn low one-way clutch.
    Check low one-way clutch for correct directions of lock and unlock.



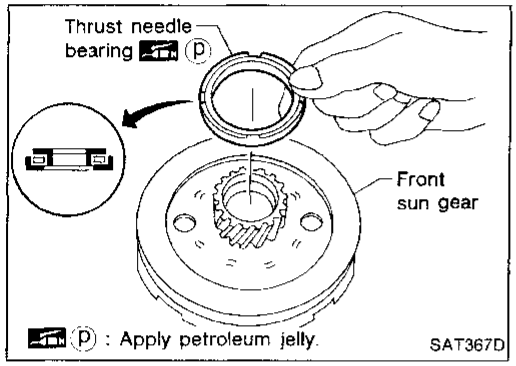
14. Install front planetary carrier assembly on transmission case.

Assembly 2 (Cont'd)



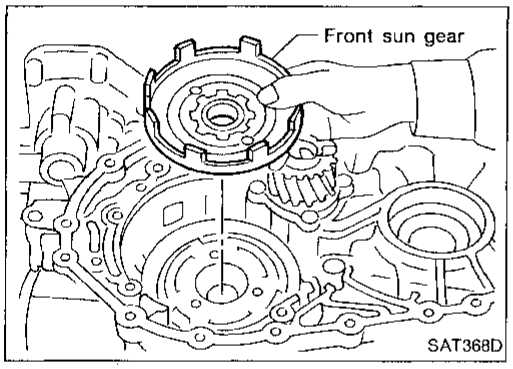
15. Install snap ring with screwdriver.

- **If forward clutch and bearings are not installed correctly, snap ring will not fit groove of transmission case.**

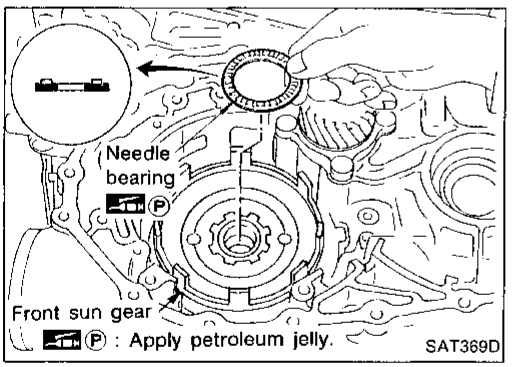


16. Install needle bearing on front sun gear.

- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**

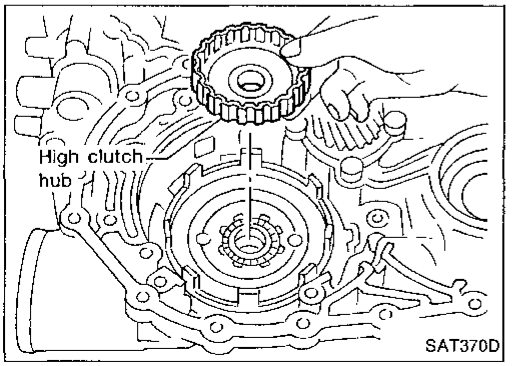


17. Install front sun gear on front planetary carrier.



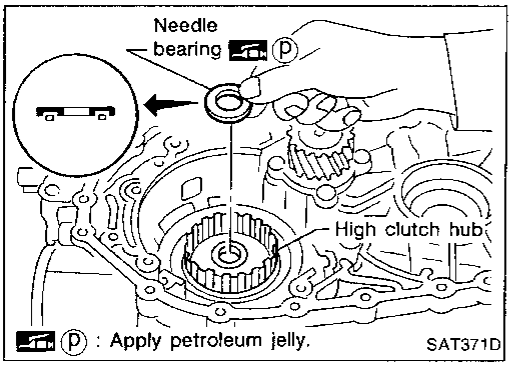
18. Install needle bearing on front sun gear.

- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**

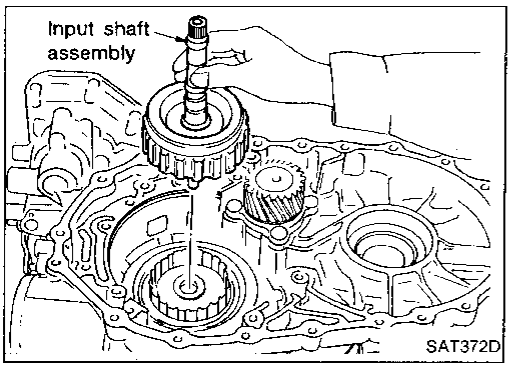


19. Install high clutch hub on front sun gear.

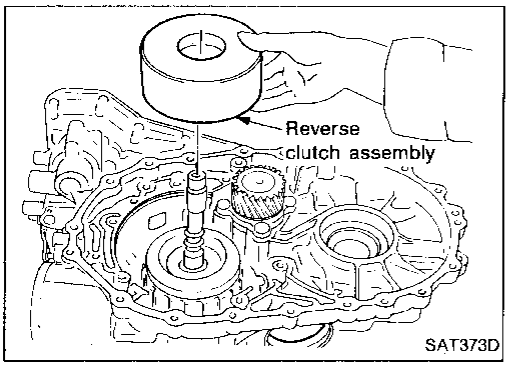
Assembly 2 (Cont'd)



20. Install needle bearing on high clutch hub.
- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**



21. Remove paper rolled around input shaft.
22. Install input shaft assembly.
- **Align teeth of high clutch drive plates before installing.**



23. Install reverse clutch assembly.
- **Align teeth of reverse clutch drive plates before installing.**

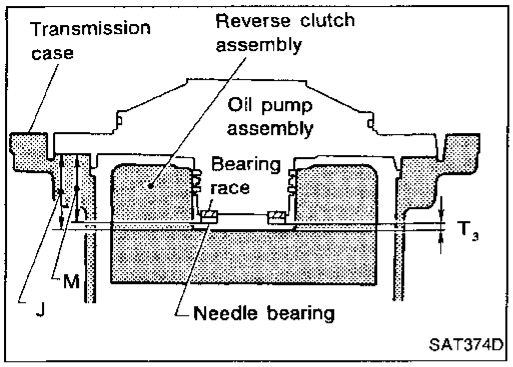
Adjustment 2

When any parts listed in the following table are replaced, total end play or reverse clutch end play must be adjusted.

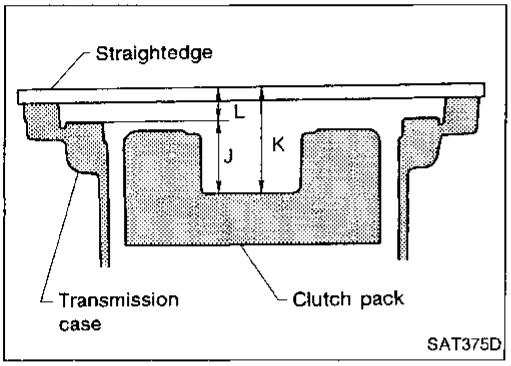
Part name	Total end play	Reverse clutch end play
Transmission case	●	●
Overrun clutch hub	●	●
Rear internal gear	●	●
Rear planetary carrier	●	●
Rear sun gear	●	●
Front planetary carrier	●	●
Front sun gear	●	●
High clutch hub	●	●
High clutch drum	●	●
Oil pump cover	●	●
Reverse clutch drum	●	●

Adjustment 2 (Cont'd)

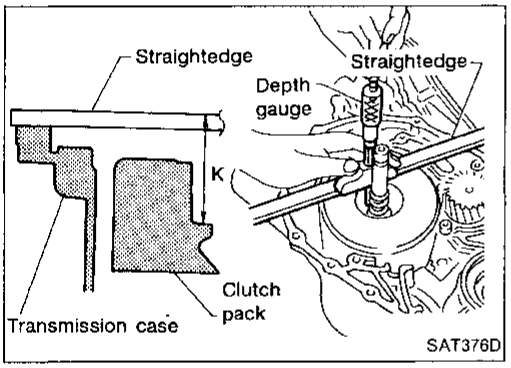
TOTAL END PLAY



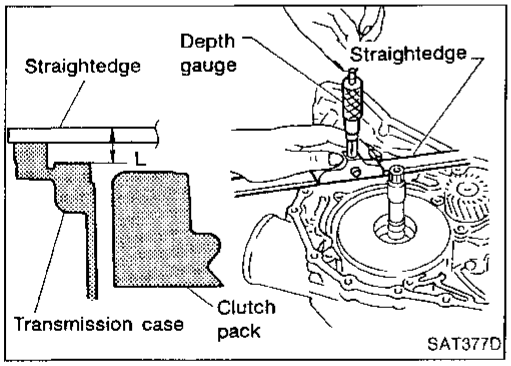
- Measure clearance between reverse clutch drum and needle bearing for oil pump cover.
- Select proper thickness of bearing race so that end play is within specifications.



1. Measure dimensions "K" and "L" and then calculate dimension "J".



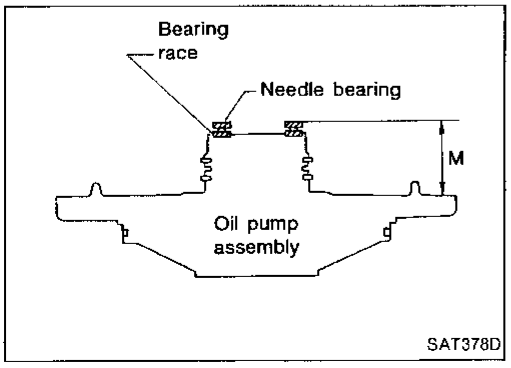
a. Measure dimension "K".



b. Measure dimension "L".
c. Calculate dimension "J".

"J": Distance between oil pump fitting surface of transmission case and needle bearing mating surface of high clutch drum.

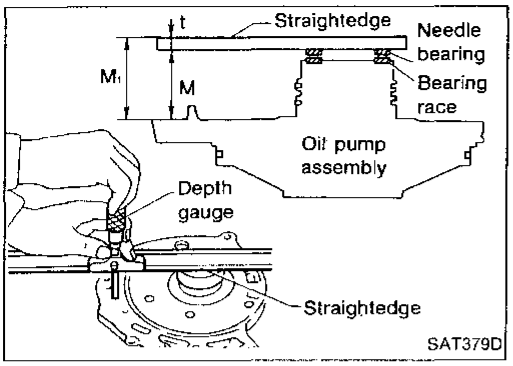
J = K – L



2. Measure dimension "M".

a. Place bearing race and needle bearing on oil pump assembly.

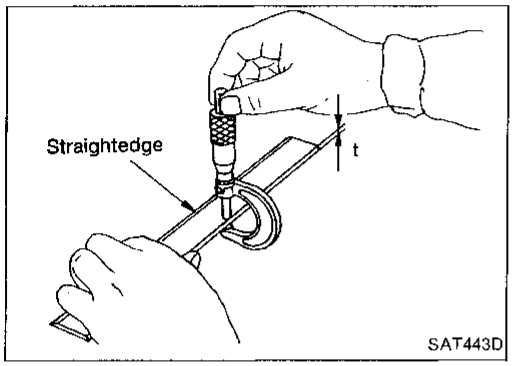
Adjustment 2 (Cont'd)



b. Measure dimension "M".

"M": Distance between transmission case fitting surface and needle bearing on oil pump cover.

"M_1": Indication of gauge.



c. Measure thickness of straightedge "t".

$$M = M_1 - t$$

3. Adjust total end play "T_3".

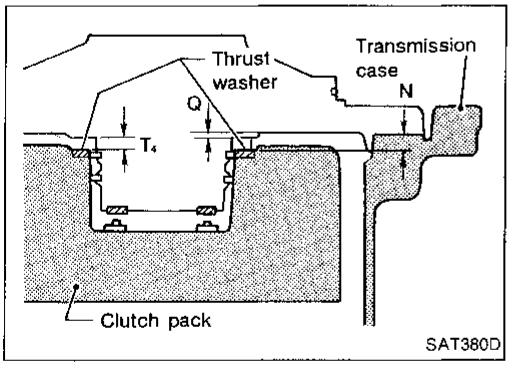
$$T_3 = J - M$$

Total end play "T_3":

0.25 - 0.55 mm (0.0098 - 0.0217 in)

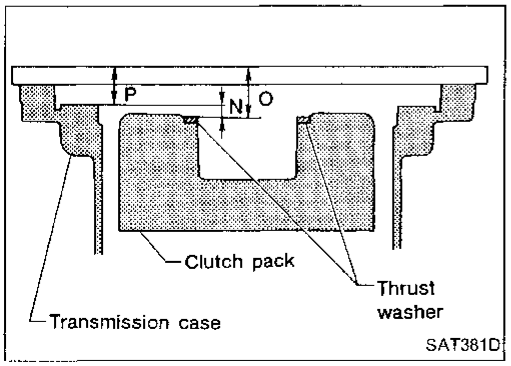
- Select proper thickness of bearing race so that total end play is within specifications.

Bearing races: Refer to SDS, AT-280.



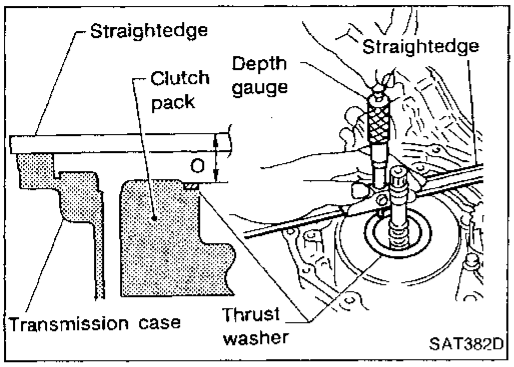
REVERSE CLUTCH END PLAY

- Measure clearance between oil pump cover and thrust washer for reverse clutch drum.
- Select proper thickness of thrust washer so that end play is within specifications.

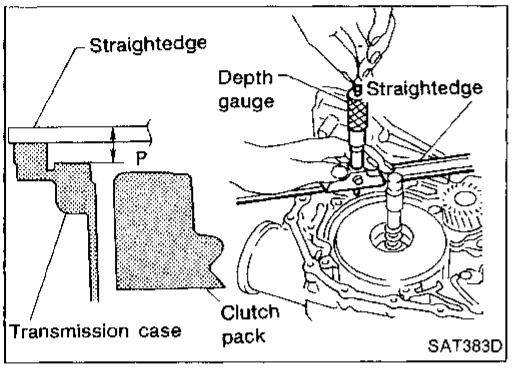


1. Measure dimensions "O" and "P" and then calculate dimension "N".

Adjustment 2 (Cont'd)



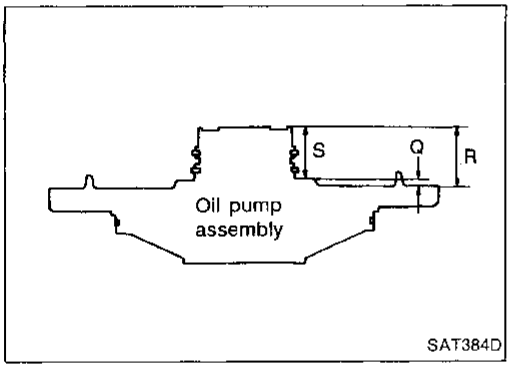
a. Place thrust washer on reverse clutch drum.
b. Measure dimension "O".



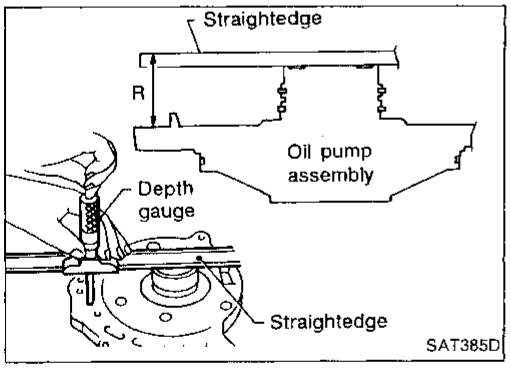
c. Measure dimension "P".
d. Calculate dimension "N".

"N": Distance between oil pump fitting surface of transmission case and thrust washer on reverse clutch drum.

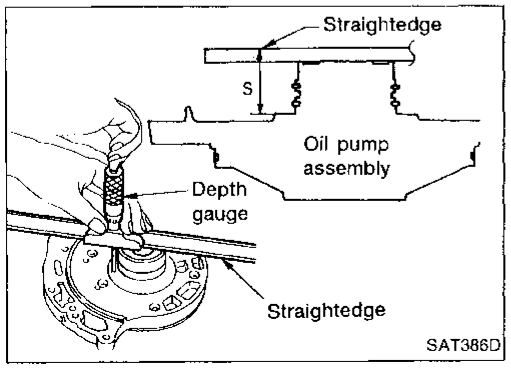
N = O – P



2. Measure dimensions "R" and "S" and then calculate dimension "Q".



a. Measure dimension "R".



b. Measure dimension "S".
c. Calculate dimension "Q".

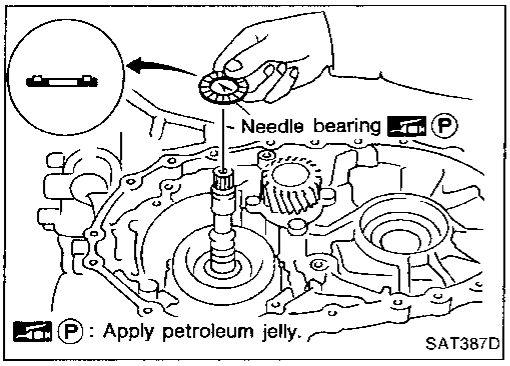
"Q": Distance between transmission case fitting surface and thrust washer mating surface.

Q = R – S

Adjustment 2 (Cont'd)

3. Adjust reverse clutch end play "T_4".
   T_4 = N – Q
   Reverse clutch end play:
   0.65 - 1.00 mm (0.0256 - 0.0394 in)

- Select proper thickness of thrust washer so that reverse clutch end play is within specifications.
  Thrust washer: Refer to SDS, AT-281.

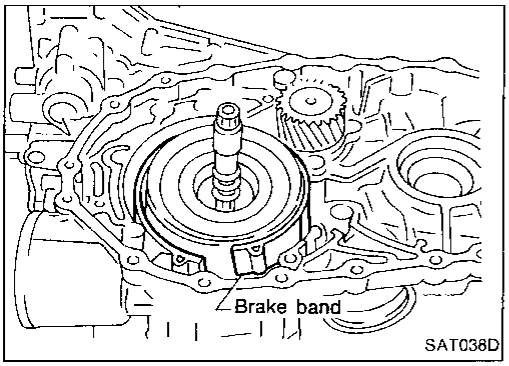


Assembly 3

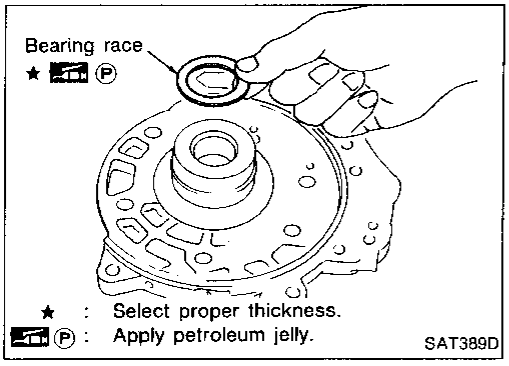
1. Remove reverse clutch assembly and install needle bearing on high clutch assembly.

- **Pay attention to direction of needle bearing.**

2. Install reverse clutch assembly.

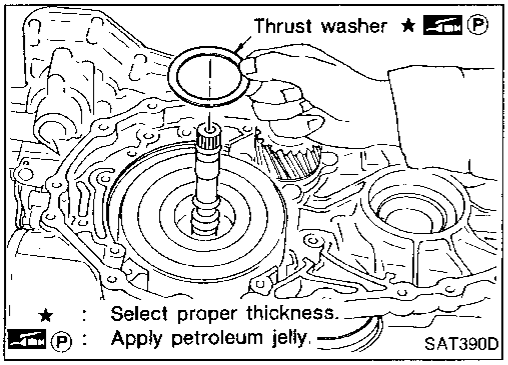


3. Install anchor end pin, washer and lock nut on transmission case.
4. Place brake band on periphery of reverse clutch drum. Then, tighten anchor end pin just enough so that brake band is fitted on periphery of reverse clutch drum uniformly.



5. Place bearing race selected in total end play adjustment step on oil pump cover.

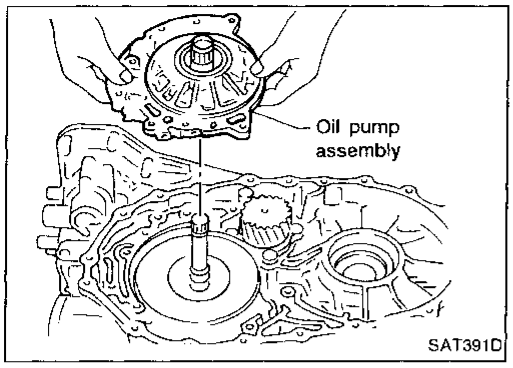
- **Apply petroleum jelly to bearing race.**



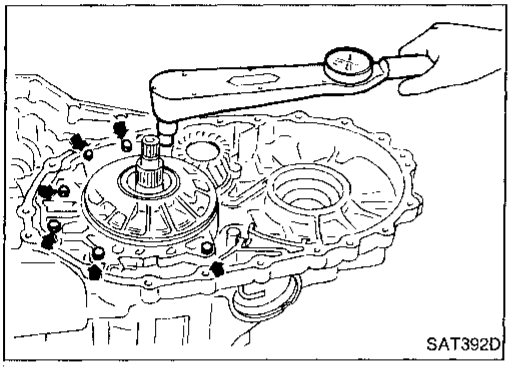
6. Place thrust washer selected in reverse clutch end play step on reverse clutch drum.

- **Apply petroleum jelly to thrust washer.**

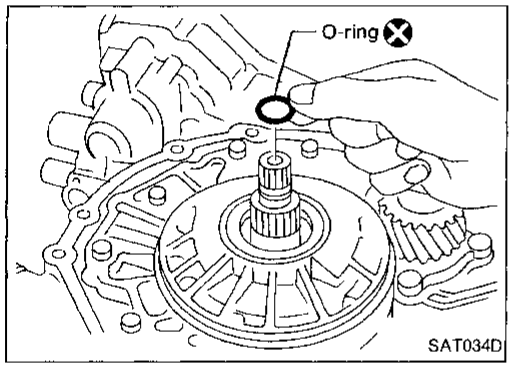
Assembly 3 (Cont'd)



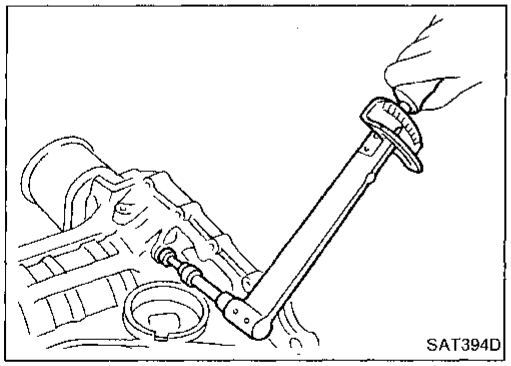
7. Install oil pump assembly on transmission case.



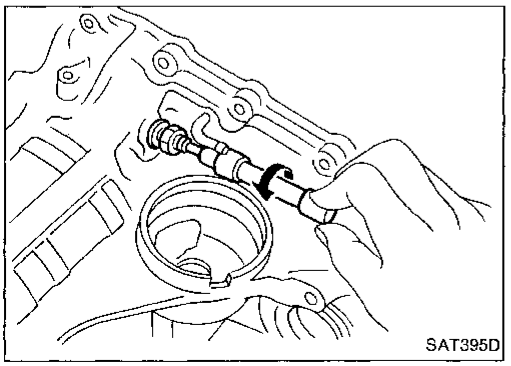
8. Tighten oil pump fixing bolts to specified torque.



9. Install O-ring to input shaft.
- **Apply ATF to O-ring.**

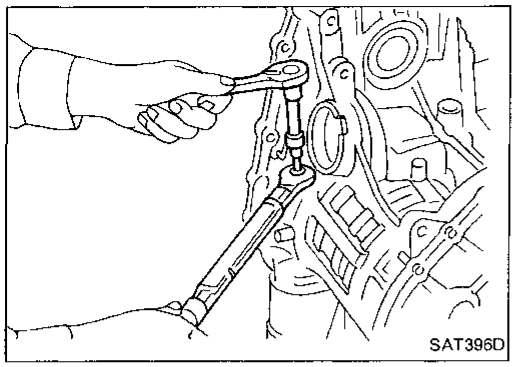


10. Adjust brake band.
a. Tighten anchor end pin to specified torque.
   Anchor end pin:
   4 - 6 N·m (0.4 - 0.6 kg-m, 2.9 - 4.3 ft-lb)

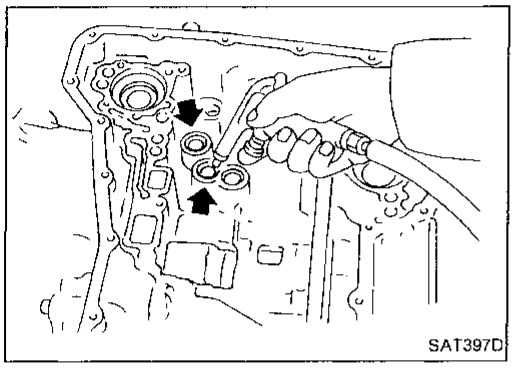


b. Back off anchor end pin two and a half turns.

Assembly 3 (Cont'd)



c. While holding anchor end pin, tighten lock nut.



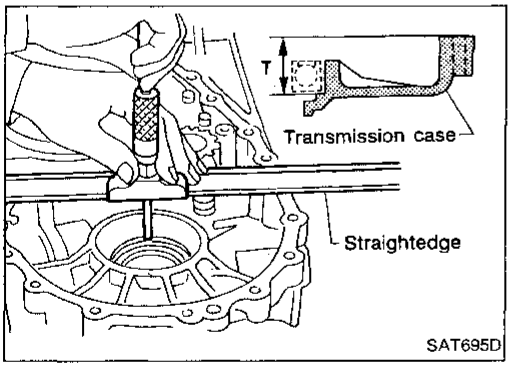
11. Apply compressed air to oil holes of transmission case and check operation of brake band.

Adjustment 3

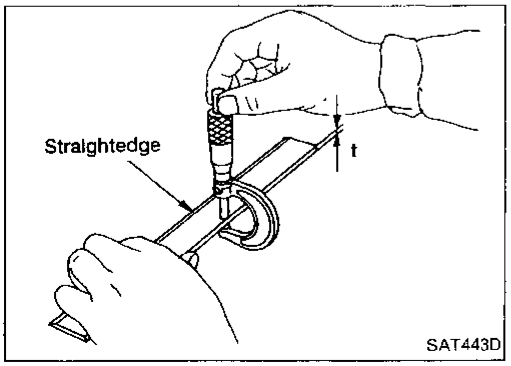
FINAL DRIVE END PLAY

— RL4F03A —

- Measure clearance between differential side bearing and transmission case.
- Select proper thickness of adjusting shim so that end play is within specifications.

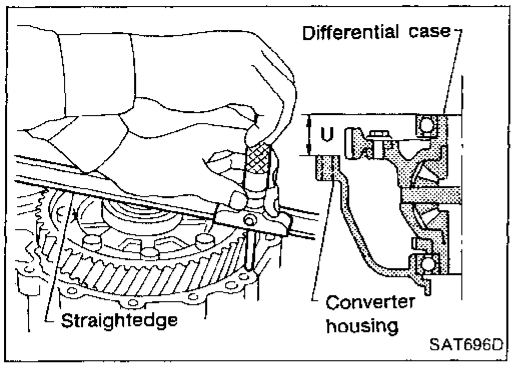


1. Measure dimension "T" between side bearing fitting surface of transmission case and converter housing fitting surface of transmission case.
   "T_1": indication of gauge

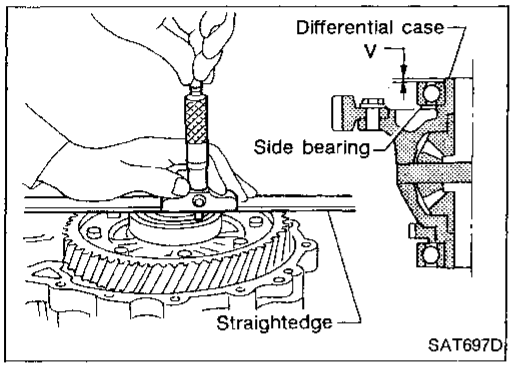


2. Measure thickness of straightedge "t".
   $T = T_1 - t$

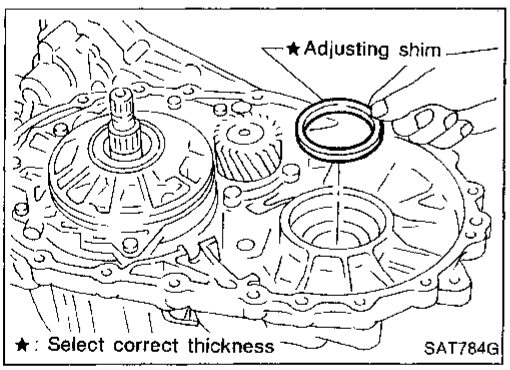
Adjustment 3 (Cont'd)



3. Place final drive assembly on converter housing.
4. Measure dimension "U" between end of differential case and transmission case fitting surface of converter housing.



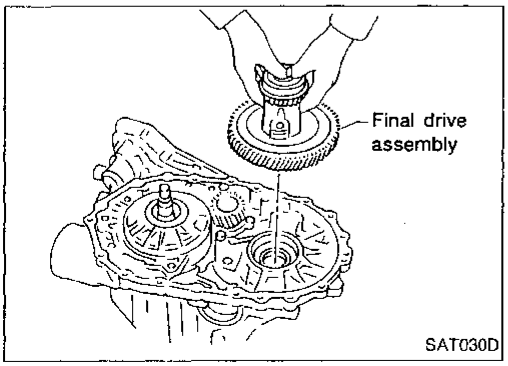
5. Measure dimension "V" between end of differential case and adjusting shim mating surface of differential side bearing.
6. Calculate final drive end play.
   Final drive end play:
   T – U + V
7. Select proper thickness of differential side bearing adjusting shim so that final drive end play is within specifications.
   Final drive end play:
   0 - 0.15 mm (0 - 0.0059 in)
   Differential side bearing adjusting shim:
   Refer to SDS, AT-276.



Assembly 4

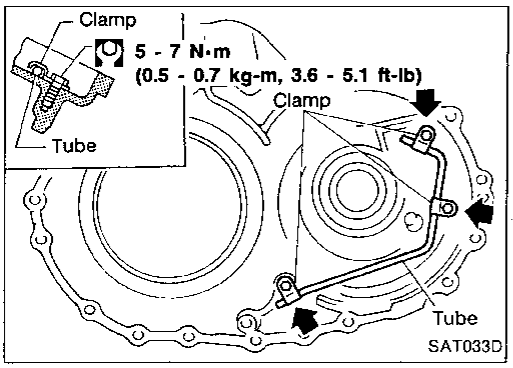
— RL4F03A & RE4F03V —

1. Install differential side bearing adjusting shim selected in final drive end play adjustment step on transmission case (only RL4F03A).

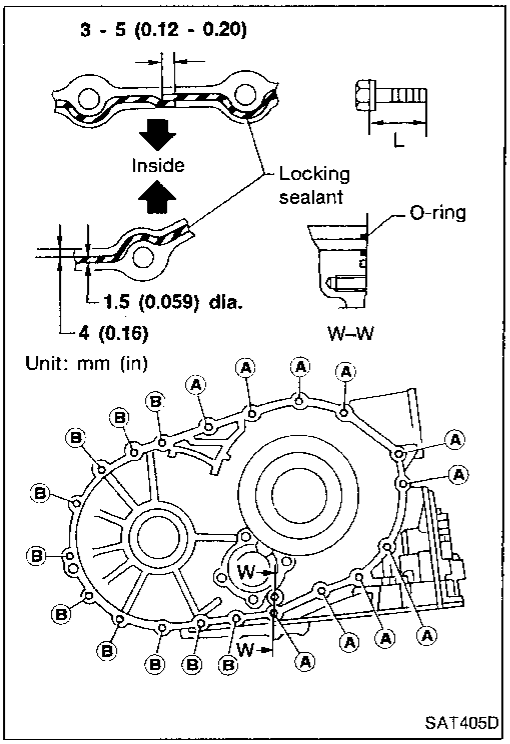


2. Install final drive assembly on transmission case.

Assembly 4 (Cont'd)



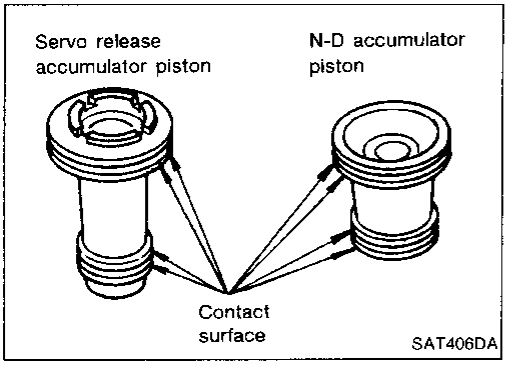
3. Install oil tube on converter housing.



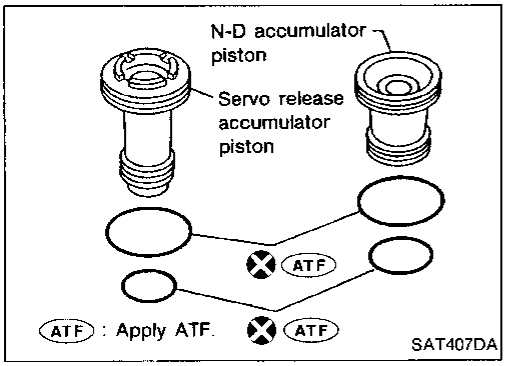
4. Install O-ring on differential oil port of transmission case.
5. Install converter housing on transmission case.

- **Apply locking sealant to mating surface of converter housing.**

Bolt	Length mm (in)
Ⓐ	30 (1.18)
Ⓑ	40 (1.57)



6. Install accumulator piston.
a. Check contact surface of accumulator piston for damage.



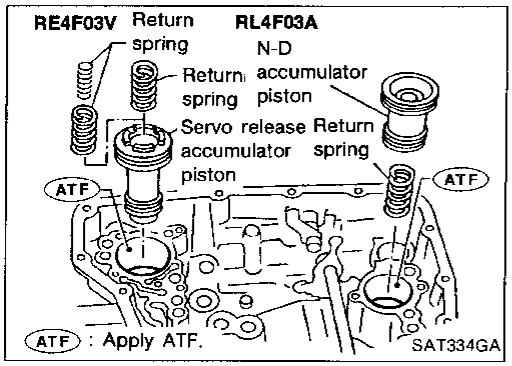
b. Install O-rings on accumulator piston.
- Apply ATF to O-rings.

Accumulator piston O-rings:

Unit: mm (in)

Accumulator	Inner diameter (Small)	Inner diameter (Large)
Servo release accumulator	26.9 (1.059)	44.2 (1.740)
N-D accumulator	34.6 (1.362)	39.4 (1.551)

Assembly 4 (Cont'd)



c. Install accumulator pistons and return springs on transmission case.

- **Apply ATF to inner surface of transmission case.**

Return springs:

RL4F03A

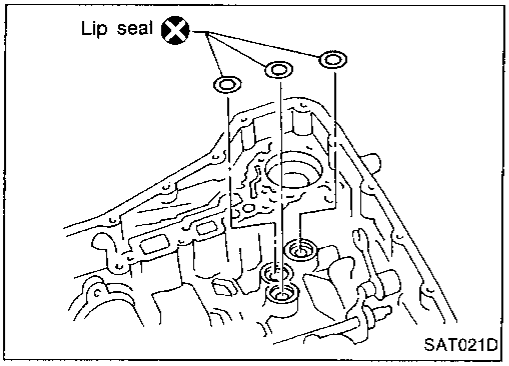
Unit: mm (in)

Spring	Free length	Outer diameter
Servo release accumulator spring	56.4 (2.220)	21.0 (0.827)
N-D accumulator spring	43.5 (1.713)	28.0 (1.102)

RE4F03V

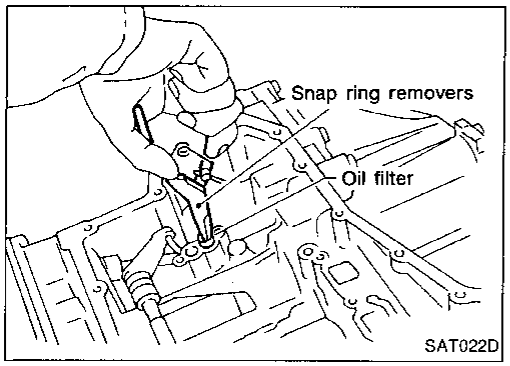
Unit: mm (in)

Spring		Free length	Outer diameter
Servo release accumulator spring	Outer	52.5 (2.067)	19.6 (0.772)
	Inner	52.0 (2.047)	15.1 (0.594)
N-D accumulator spring		43.5 (1.713)	28.0 (1.102)



7. Install lip seals for band servo oil holes on transmission case.

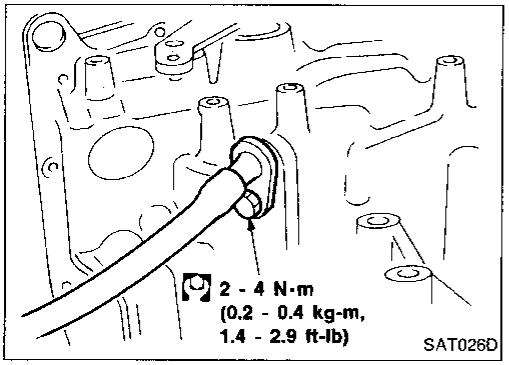
- **Apply petroleum jelly to lip seals.**



— RL4F03A only —

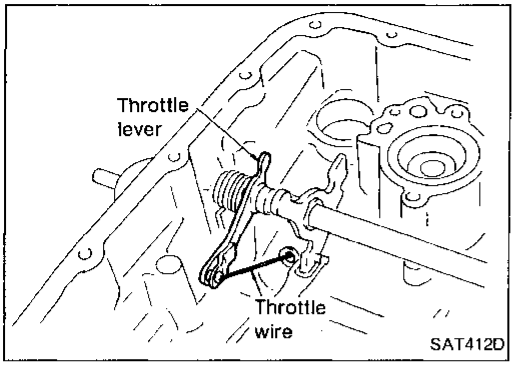
8. Install oil filter for governor valve.

- **Take care with its direction.**

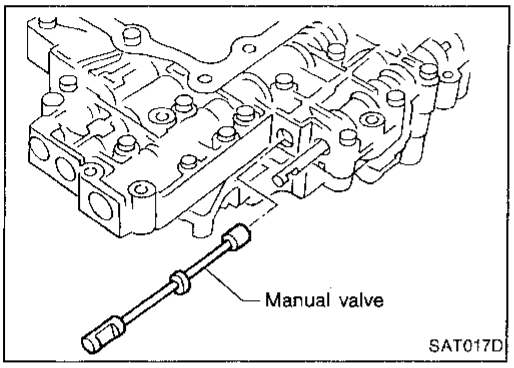


9. Install throttle wire to transmission case.

Assembly 4 (Cont'd)



10. Install throttle wire to throttle lever.

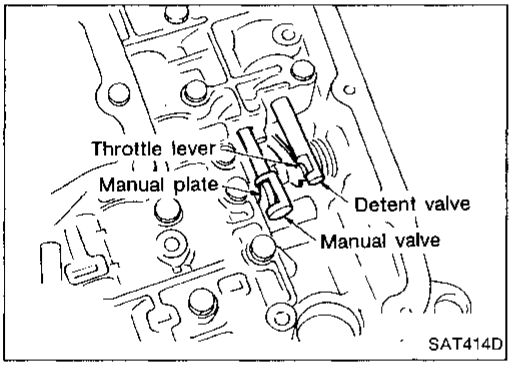


— RL4F03A & RE4F03V —

11. Install control valve assembly.

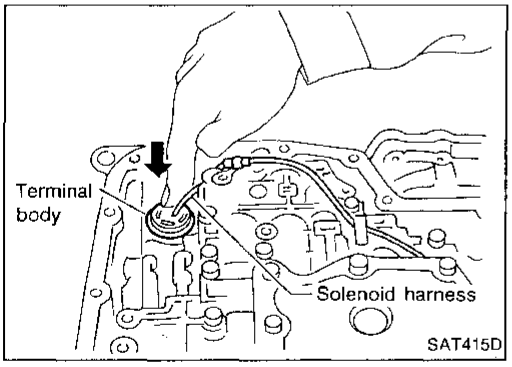
a. Insert manual valve into control valve assembly.

- **Apply ATF to manual valve.**

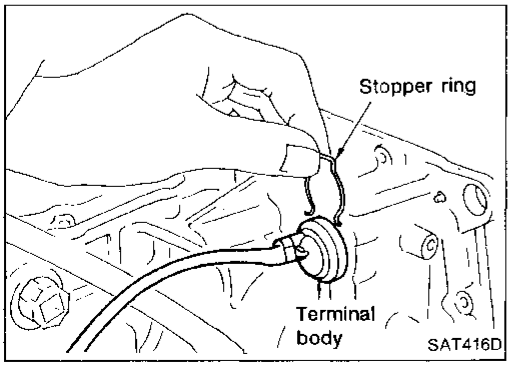


b. Set manual shaft in Neutral position.

c. Install control valve assembly on transmission case while aligning manual valve with manual plate and detent valve with throttle lever. (RL4F03A only)



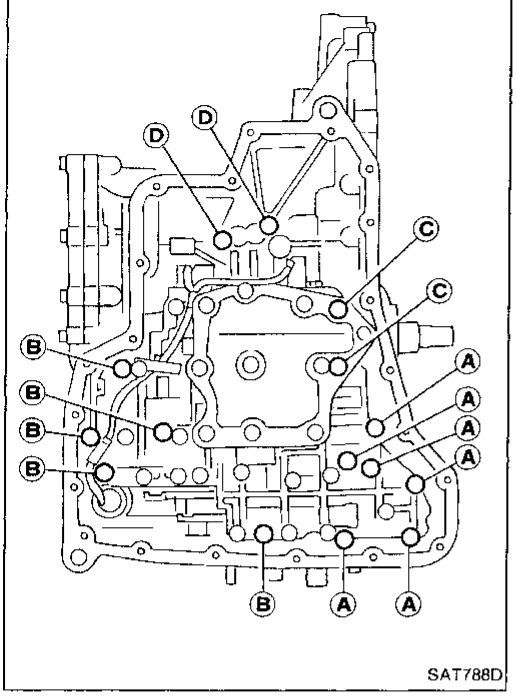
d. Pass solenoid harness through transmission case and install terminal body on transmission case by pushing it.



e. Install clip to terminal body.

Assembly 4 (Cont'd)

RL4F03A



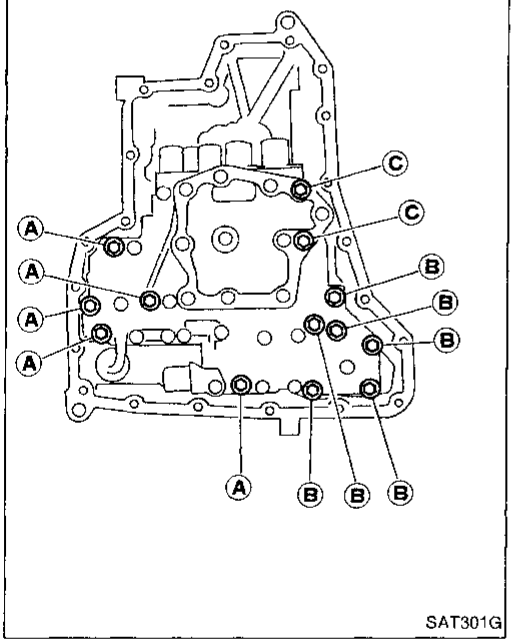
— RL4F03A —

f. Tighten bolts Ⓐ, Ⓑ, Ⓒ and Ⓓ.

Bolt length, number and location:

Bolt symbol	Ⓐ	Ⓑ	Ⓒ	Ⓓ
Bolt length "ℓ" mm (in)	33.0 (1.299)	40.0 (1.575)	43.5 (1.713)	25.0 (0.984)
Number of bolts	6	5	2	2

RE4F03V

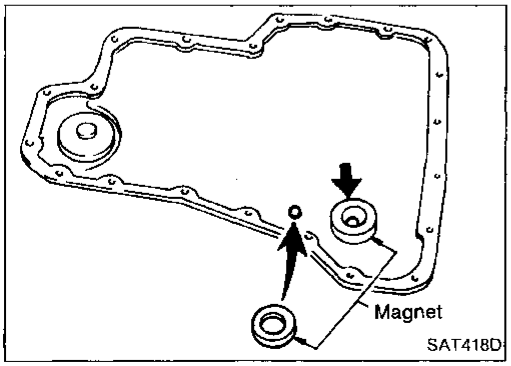


— RE4F03V —

f. Tighten bolts Ⓐ, Ⓑ and Ⓒ.

Bolt length, number and location

Bolt symbol	Ⓐ	Ⓑ	Ⓒ
Bolt length "ℓ" mm (in)	40.0 (1.575)	33.0 (1.299)	43.5 (1.713)
Number of bolts	5	6	2

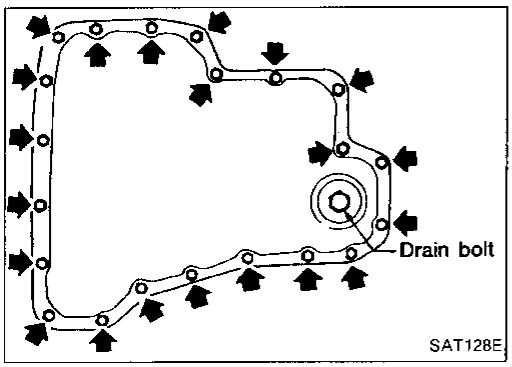


— RL4F03A & RE4F03V —

12. Install oil pan.

a. Attach magnet to oil pan.

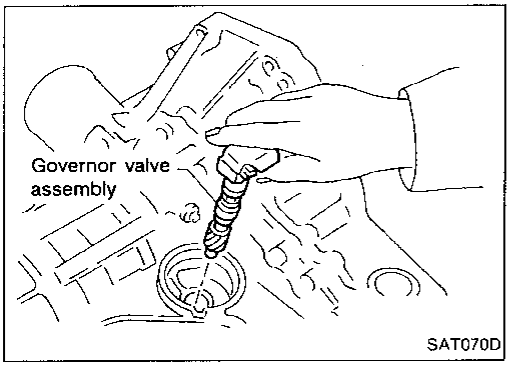
Assembly 4 (Cont'd)



b. Install new oil pan gasket on transmission case.
c. Install oil pan on transmission case.

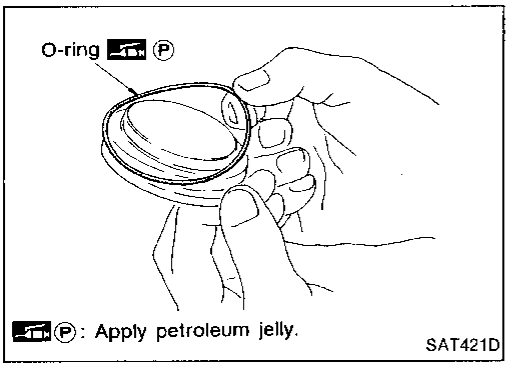
- **Always replace oil pan bolts as they are self-sealing bolts.**
- **Tighten the four bolts in a criss-cross pattern to prevent dislocation of gasket.**

d. Tighten drain plug to specified torque.



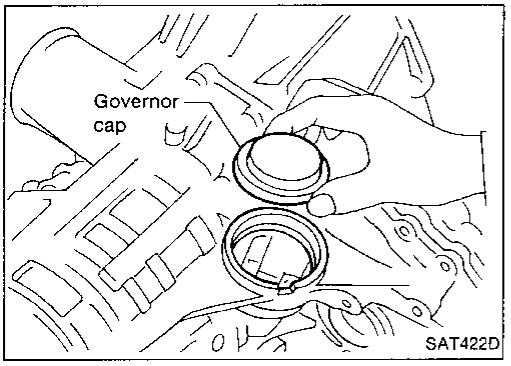
— RL4F03A only —

13. Install governor valve.
a. Install governor valve assembly into transmission case.

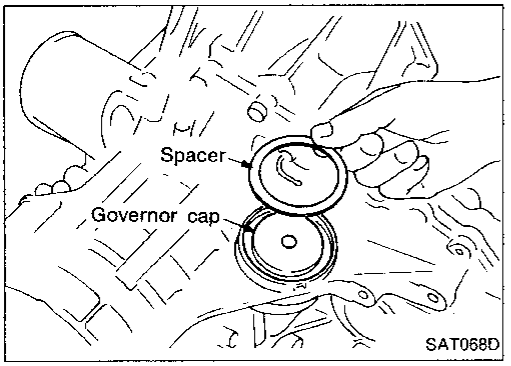


b. Install O-ring to governor cap.

- **Apply ATF to O-ring.**

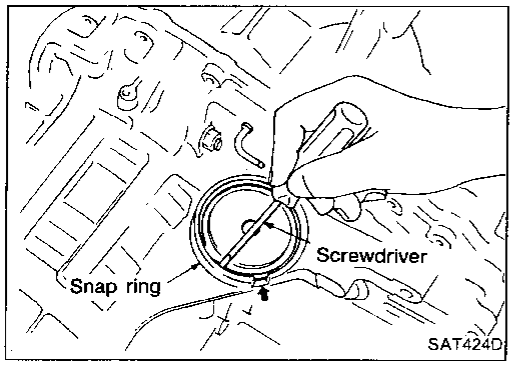


c. Install governor cap onto transmission case.



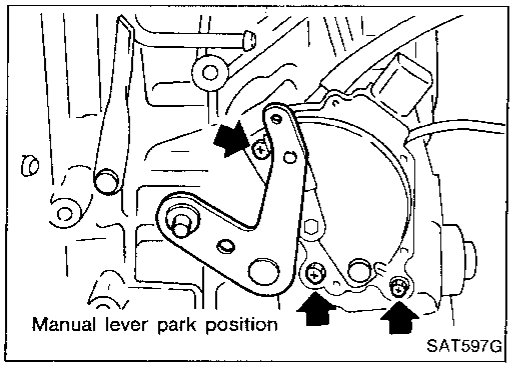
d. Place spacer on governor cap.

Assembly 4 (Cont'd)



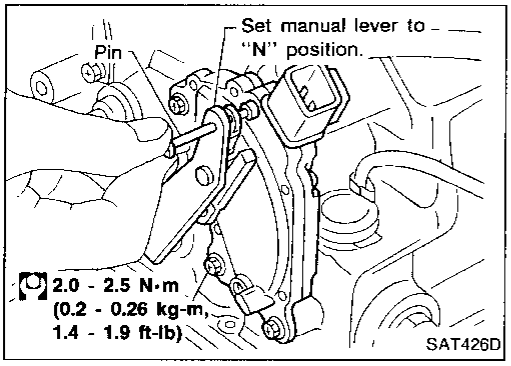
e. Install snap ring onto transmission case with a screwdriver.

- **Align snap ring gap with the notch of transmission case.**

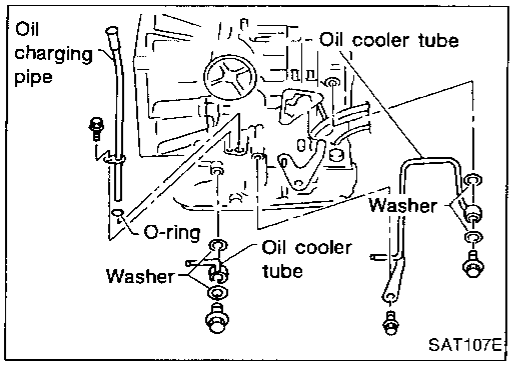


— RL4F03A & RE4F03V —

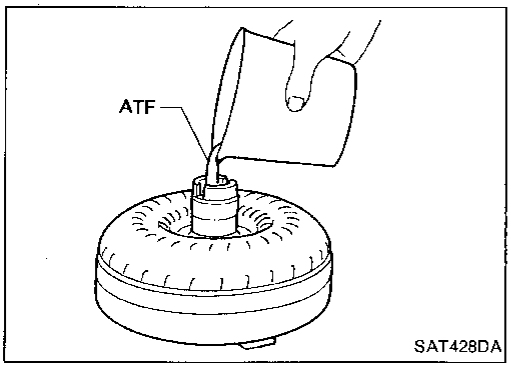
14. Install inhibitor switch.
a. Set manual lever in "P" position.
b. Temporarily install inhibitor switch on manual shaft.
c. Move selector lever to "N" position.



d. Insert 4.0 mm (0.157 in) dia. pin into adjustment hole in both inhibitor switch and manual shaft as near vertically as possible.
e. Tighten inhibitor switch fixing bolts.
f. Remove pin from adjustment hole after adjusting inhibitor switch.



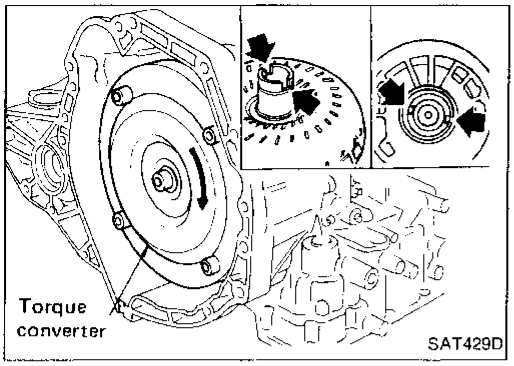
15. Install oil charging pipe and oil cooler tube to transmission case.



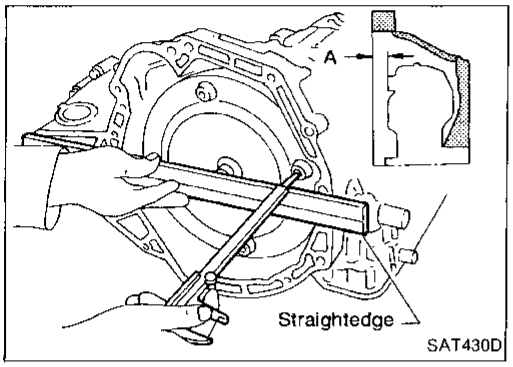
16. Install torque converter.
a. Pour ATF into torque converter.

- **Approximately 1 liter (1 - 1/8 US qt, 7/8 Imp qt) of fluid is required for a new torque converter.**
- **When reusing old torque converter, add the same amount of fluid as was drained.**

Assembly 4 (Cont'd)



b. Install torque converter while aligning notches of torque converter with notches of oil pump.



c. Measure distance "A" to check that torque converter is in proper position.

Distance "A":

GA engine models

21.1 mm (0.831 in) or more

SR engine models

15.9 mm (0.626 in) or more

General Specifications

Engine	GA16DE	SR20DE
Automatic transaxle model	RL4F03A	RE4F03V
Automatic transaxle assembly Model code number	32X79	32X75
Transaxle gear ratio		
1st	2.861	
2nd	1.562	
3rd	1.000	
4th	0.697	
Reverse	2.310	
Final drive	3.827	
Recommended oil	Genuine Nissan ATF or equivalent type DEXRON™II-E	
Oil capacity ℓ (US qt, Imp qt)	7.0 (7-3/8, 6-1/8)	

Specifications and Adjustments

VEHICLE SPEED WHEN SHIFTING GEARS

— RL4F03A —

Throttle position	Vehicle speed km/h (MPH)						
	$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$	$1_2 \rightarrow 1_1$
Full throttle	51 - 59 (32 - 37)	97 - 105 (60 - 65)	—	149 - 157 (93 - 98)	88 - 96 (55 - 60)	39 - 47 (24 - 29)	48 - 56 (30 - 35)
Half throttle	28 - 36 (17 - 22)	50 - 58 (31 - 36)	97 - 105 (60 - 65)	62 - 70 (39 - 43)	40 - 48 (25 - 30)	8 - 16 (5 - 10)	48 - 56 (30 - 35)

— RE4F03V —

Throttle position	Shift pattern	Vehicle speed km/h (MPH)						
		$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$	$1_2 \rightarrow 1_1$
Full throttle	Comfort	54 - 62 (34 - 39)	103 - 111 (64 - 69)	164 - 172 (102 - 107)	160 - 168 (99 - 104)	93 - 101 (58 - 63)	41 - 49 (25 - 30)	54 - 62 (34 - 39)
	Power	54 - 62 (34 - 39)	103 - 111 (64 - 69)	164 - 172 (102 - 107)	160 - 168 (99 - 104)	93 - 101 (58 - 63)	41 - 49 (25 - 30)	54 - 62 (34 - 39)
Half throttle	Comfort	28 - 36 (17 - 22)	62 - 70 (39 - 43)	106 - 114 (66 - 71)	58 - 66 (36 - 41)	35 - 43 (22 - 27)	9 - 17 (6 - 11)	54 - 62 (34 - 39)
	Power	31 - 39 (19 - 24)	69 - 77 (43 - 48)	116 - 124 (72 - 77)	92 - 100 (57 - 62)	40 - 48 (25 - 30)	9 - 17 (6 - 11)	54 - 62 (34 - 39)

VEHICLE SPEED WHEN PERFORMING LOCK-UP

— RL4F03A —

Throttle opening	Gear position	Vehicle speed km/h (MPH)	
		Lock-up "ON"	Lock-up "OFF"
2/8	D_4	66 - 74 (41 - 46)	62 - 70 (39 - 43)

— RE4F03V —

Throttle opening	OD switch	Shift pattern	Vehicle speed km/h (MPH)	
			Lock-up "ON"	Lock-up "OFF"
2/8	ON (D_4)	Comfort	82 - 90 (51 - 56)	61 - 69 (38 - 43)
		Power		
	OFF (D_3)	Comfort	86 - 94 (53 - 58)	83 - 91 (52 - 57)
		Power		

STALL REVOLUTION

Engine	Stall revolution rpm
GA16DE	2,450 - 2,750
SR20DE	1,850 - 2,150

THROTTLE WIRE ADJUSTMENT

— RL4F03A —

Throttle wire stroke mm (in)	40 - 42 (1.57 - 1.65)

LINE PRESSURE

— RL4F03A —

Engine speed rpm	Line pressure kPa (kg/cm^2, psi)			
	R position	D position	2 position	1 position
Idle	883 (9.0, 128)	539 (5.5, 78)	775 (7.9, 112)	775 (7.9, 112)
Stall	1,765 (18.0, 256)	1,079 (11.0, 156)	1,079 (11.0, 156)	1,079 (11.0, 156)

— RE4F03V —

Engine speed rpm	Line pressure kPa (kg/cm^2, psi)			
	R position	D position	2 position	1 position
Idle	853 (8.7, 124)	500 (5.1, 73)	500 (5.1, 73)	500 (5.1, 73)
Stall	1,863 (19.0, 270)	1,098 (11.2, 159)	1,098 (11.2, 159)	1,098 (11.2, 159)

CONTROL VALVES — RL4F03A —

Control valve return springs

Unit: mm (in)

Parts			Part No.	Free length	Outer diameter
Upper body	①	Pressure modifier valve spring	31742-31X10	25.0 (0.984)	8.2 (0.323)
	②	Kickdown modifier valve spring	31742-31X03	40.5 (1.594)	9.0 (0.354)
	③	1-2 accumulator valve spring	31742-31X63	50.9 (2.004)	12.6 (0.496)
	④	3-2 timing valve spring	31736-21X00	26.3 (1.035)	7.2 (0.283)
	⑤	1st reducing valve spring	31835-21X08	22.6 (0.890)	7.3 (0.287)
	⑥	Torque converter relief valve spring	31742-31X06	44.6 (1.756)	5.2 (0.205)
	⑦	Throttle modifier valve spring	31742-31X07	29.5 (1.161)	5.5 (0.217)
	⑧	4th speed cut valve spring	31756-21X01	23.4 (0.921)	6.7 (0.264)
	⑨	Lock-up control valve spring	31742-31X08	39.5 (1.555)	5.0 (0.197)
	⑩	4-2 sequence valve spring	31742-31X09	39.5 (1.555)	5.1 (0.201)
		Oil cooler relief valve spring	31872-31X00	17.02 (0.6701)	8.0 (0.315)
Lower body	①	Throttle valve and detent valve spring	31802-31X01	33.0 (1.299)	10.0 (0.394)
	②	Pressure regulator valve spring	31742-31X00	52.24 (2.0567)	15.0 (0.591)
	③	3-4 shift valve spring	31762-31X00	52.0 (2.047)	8.0 (0.315)
	④	2-3 shift valve spring	31762-31X01	52.7 (2.075)	7.0 (0.276)
	⑤	1-2 shift valve spring	31762-31X02	45.9 (1.807)	5.3 (0.209)
	⑥	Overrun clutch control valve spring	31742-31X60	48.9 (1.925)	7.0 (0.276)

CONTROL VALVES — RE4F03V —

Unit: mm (in)

Parts			Part No.	Free length	Outer diameter
Upper body	⑱	Pilot valve spring	31742-80X14	36.0 (1.417)	8.1 (0.319)
	⑭	1-2 accumulator valve spring	31742-80X10	20.5 (0.807)	7.0 (0.276)
	㉑	1-2 accumulator piston spring	31742-33X01	50.5 (1.988)	19.8 (0.780)
	㉕	1st reducing valve spring	31742-80X05	27.0 (1.063)	7.0 (0.276)
	②	Overrun clutch reducing valve spring	31742-80X06	37.5 (1.476)	7.0 (0.276)
	⑦	Torque converter relief valve spring	31742-33X00	31.0 (1.220)	8.9 (0.350)
	⑩	Lock-up control valve	31742-80X17	39.5 (1.555)	11.0 (0.433)
	—	Oil cooler relief valve spring	31872-31X00	17.02 (0.6701)	8.0 (0.315)
Lower body	㉟	Line pressure solenoid valve spring	31742-80X11	17.0 (0.669)	10.7 (0.421)
	⑲	Pressure regulator valve spring	31742-80X13	45.0 (1.772)	15.0 (0.591)
	㉔	Overrun clutch control valve spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	㉘	Accumulator control valve spring	31742-80X02	22.0 (0.866)	6.5 (0.256)
	㉝	Shift valve A spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	②	Shift valve B spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	⑦	Pressure modifier valve spring	31742-41X15	30.5 (1.201)	9.8 (0.386)
	⑪		31742-80X16	32.0 (1.260)	6.9 (0.272)

Specifications and Adjustments (Cont'd)

CLUTCHES AND BRAKES

Model		RL4F03A		RE4F03V	
Reverse clutch					
Number of drive plates		2			
Number of driven plates		2			
Drive plate thickness	mm (in)				
Standard		2.0 (0.079)			
Allowable limit		1.8 (0.071)			
Clearance	mm (in)				
Standard		0.5 - 0.8 (0.020 - 0.031)			
Allowable limit		1.2 (0.047)			
Thickness of retaining plates		Thickness mm (in)	Part number		
		4.4 (0.173)	31537-31X00		
		4.6 (0.181)	31537-31X01		
		4.8 (0.189)	31537-31X02		
		5.0 (0.197)	31537-31X03		
		5.2 (0.205)	31537-31X04		
High clutch					
Number of drive plates		3		4	
Number of driven plates		5		7	
Drive plate thickness	mm (in)				
Standard		2.0 (0.079)		1.6 (0.063)	
Allowable limit		1.8 (0.071)		1.4 (0.055)	
Clearance	mm (in)				
Standard		1.4 - 1.8 (0.055 - 0.071)		1.4 - 1.8 (0.055 - 0.071)	
Allowable limit		2.4 (0.094)		2.6 (0.102)	
Thickness of retaining plates		Thickness mm (in)	Part number	Thickness mm (in)	Part number
		3.6 (0.142)	31537-31X10	3.6 (0.142)	31537-31X10
		3.8 (0.150)	31537-31X11	3.8 (0.150)	31537-31X11
		4.0 (0.157)	31537-31X12	4.0 (0.157)	31537-31X12
		4.2 (0.165)	31537-31X13	4.2 (0.165)	31537-31X13
		4.4 (0.173)	31537-31X14	4.4 (0.173)	31537-31X14
		4.6 (0.181)	31537-31X15	4.6 (0.181)	31537-31X15
		4.8 (0.189)	31537-31X16	4.8 (0.189)	31537-31X16
				5.0 (0.197)	31537-31X17

Specifications and Adjustments (Cont'd)

Model	RL4F03A	RE4F03V
Forward clutch		
Number of drive plates	5	
Number of driven plates	5	
Drive plate thickness mm (in)		
Standard	1.8 (0.071)	
Allowable limit	1.6 (0.063)	
Clearance mm (in)		
Standard	0.45 - 0.85 (0.0177 - 0.0335)	
Allowable limit	1.85 (0.0728)	
Thickness of retaining plate	Thickness mm (in)	Part number
	3.6 (0.142)	31537-31X60
	3.8 (0.150)	31537-31X61
	4.0 (0.157)	31537-31X62
	4.2 (0.165)	31537-31X63
	4.4 (0.173)	31537-31X64
	4.6 (0.181)	31537-31X65
Overrun clutch		
Number of drive plates	3	
Number of driven plates	5	
Drive plate thickness mm (in)		
Standard	1.6 (0.063)	
Allowable limit	1.4 (0.055)	
Clearance mm (in)		
Standard	1.0 - 1.4 (0.039 - 0.055)	
Allowable limit	2.0 (0.079)	
Thickness of retaining plate	Thickness mm (in)	Part number
	3.6 (0.142)	31567-31X72
	3.8 (0.150)	31567-31X73
	4.0 (0.157)	31567-31X74
	4.2 (0.165)	31567-31X75
	4.4 (0.173)	31567-31X76

Model	RL4F03A	RE4F03V
Low & reverse brake		
Number of drive plates	5	
Number of driven plates	5	
Drive plate thickness mm (in)		
Standard	2.0 (0.079)	
Allowable limit	1.8 (0.071)	
Clearance mm (in)		
Standard	1.4 - 1.8 (0.055 - 0.071)	
Allowable limit	2.8 (0.110)	
Thickness of retaining plate	Thickness mm (in)	Part number
	3.6 (0.142)	31667-31X10
	3.8 (0.150)	31667-31X11
	4.0 (0.157)	31667-31X12
	4.2 (0.165)	31667-31X13
	4.4 (0.173)	31667-31X14
	4.6 (0.181)	31667-31X15
Brake band		
Anchor end bolt tightening torque N·m (kg-m, ft-lb)	4 - 6 (0.4 - 0.6, 2.9 - 4.3)	
Number of returning revolutions for anchor end bolt	2.5 ± 0.125	
Lock nut tightening torque N·m (kg-m, ft-lb)	31 - 42 (3.2 - 4.3, 23 - 31)	

Clutch and brake return springs

Unit: mm (in)

Parts		Free length	Outer diameter
Forward clutch (Overrun clutch) (16 pcs)	Outer	26.6 (1.047)	10.6 (0.417)
	Inner	26.3 (1.035)	7.7 (0.303)

OIL PUMP

Oil pump side clearance mm (in)	0.02 - 0.04 (0.0008 - 0.0016)	
Thickness of inner gears and outer gears	Inner gear	
	Thickness mm (in)	Part number
	9.99 - 10.00 (0.3933 - 0.3937)	31346-31X00
	9.98 - 9.99 (0.3929 - 0.3933)	31346-31X01
	9.97 - 9.98 (0.3925 - 0.3929)	31346-31X02
	Outer gear	
	Thickness mm (in)	Part number
	9.99 - 10.00 (0.3933 - 0.3937)	31347-31X00
	9.98 - 9.99 (0.3929 - 0.3933)	31347-31X01
	9.97 - 9.98 (0.3925 - 0.3929)	31347-31X02
Clearance between oil pump housing and outer gear mm (in)		
Standard	0.08 - 0.15 (0.0031 - 0.0059)	
Allowable limit	0.15 (0.0059)	
Oil pump cover seal ring clearance mm (in)		
Standard	0.1 - 0.25 (0.0039 - 0.0098)	
Allowable limit	0.25 (0.0098)	

INPUT SHAFT

Input shaft seal ring clearance mm (in)	
Standard	0.08 - 0.23 (0.0031 - 0.0091)
Allowable limit	0.23 (0.0091)

PLANETARY CARRIER

Clearance between planetary carrier and pinion washer mm (in)	
Standard	0.15 - 0.70 (0.0059 - 0.0276)
Allowable limit	0.80 (0.0315)

FINAL DRIVE — RL4F03A —

Differential side gear clearance

Clearance between side gear and differential case with washer mm (in)	0.1 - 0.2 (0.004 - 0.008)

Differential side gear thrust washers

Thickness mm (in)	Part number
0.75 - 0.80 (0.0295 - 0.0315)	38424-D2111
0.80 - 0.85 (0.0315 - 0.0335)	38424-D2112
0.85 - 0.90 (0.0335 - 0.0354)	38424-D2113
0.90 - 0.95 (0.0354 - 0.0374)	38424-D2114
0.95 - 1.00 (0.0374 - 0.0394)	38424-D2115

Differential case end play

Differential case end play mm (in)	0 - 0.15 (0 - 0.0059)

Differential side bearing adjusting shims

Thickness mm (in)	Part number
0.44 (0.0173)	38454-M8000
0.48 (0.0189)	38454-M8001
0.56 (0.0220)	38454-M8003
0.60 (0.0236)	38454-M8004
0.64 (0.0252)	38454-M8005
0.68 (0.0268)	38454-M8006
0.72 (0.0283)	38454-M8007
0.76 (0.0299)	38454-M8008
0.80 (0.0315)	38454-M8009
0.84 (0.0331)	38454-M8010
0.88 (0.0346)	38454-M8011

Specifications and Adjustments (Cont'd)

FINAL DRIVE — RE4F03V —

Differential side gear clearance

Clearance between side gear and differential case with washer mm (in)	0.1 - 0.2 (0.004 - 0.008)

Differential side gear thrust washers

Thickness mm (in)		Part number
Viscous coupling side	0.70 - 0.75 (0.0276 - 0.0295)	38424-D2110
	0.75 - 0.80 (0.0295 - 0.0315)	38424-D2111
	0.80 - 0.85 (0.0315 - 0.0335)	38424-D2112
	0.85 - 0.90 (0.0335 - 0.0354)	38424-D2113
	0.90 - 0.95 (0.0354 - 0.0374)	38424-D2114
	0.95 - 1.00 (0.0374 - 0.0394)	38424-D2115
	1.00 - 1.05 (0.0394 - 0.0413)	38424-D2116
	1.05 - 1.10 (0.0413 - 0.0433)	38424-D2117
	1.10 - 1.15 (0.0433 - 0.0453)	38424-D2118
	1.15 - 1.20 (0.0453 - 0.0472)	38424-D2119
	1.20 - 1.25 (0.0472 - 0.0492)	38424-D2120
	1.25 - 1.30 (0.0492 - 0.0512)	38424-D2121
	1.30 - 1.35 (0.0512 - 0.0531)	38424-D2122
Differential case side	0.75 - 0.80 (0.0295 - 0.0315)	38424-D2111
	0.80 - 0.85 (0.0315 - 0.0335)	38424-D2112
	0.85 - 0.90 (0.0335 - 0.0354)	38424-D2113
	0.90 - 0.95 (0.0354 - 0.0374)	38424-D2114
	0.95 - 1.00 (0.0374 - 0.0394)	38424-D2115

Bearing preload

Differential side bearing preload "T" mm (in)	0.04 - 0.09 (0.0016 - 0.0035)

Turning torque

Turning torque of final drive assembly N·m (kg-cm, in-lb)	0.49 - 1.08 (5.0 - 11.0, 4.3 - 9.5)

Differential side bearing adjusting shims

Thickness mm (in)	Part number
0.28 (0.0110)	31439-31X00
0.32 (0.0126)	31439-31X01
0.36 (0.0142)	31439-31X02
0.40 (0.0157)	31439-31X03
0.44 (0.0173)	31439-31X04
0.48 (0.0189)	31439-31X05
0.52 (0.0205)	31439-31X06
0.56 (0.0220)	31439-31X07
0.60 (0.0236)	31439-31X08
0.64 (0.0252)	31439-31X09
0.68 (0.0268)	31439-31X10
0.72 (0.0283)	31439-31X11
0.76 (0.0299)	31439-31X12
0.80 (0.0315)	31439-31X13
0.84 (0.0331)	31439-31X14
0.88 (0.0346)	31439-31X15
0.92 (0.0362)	31439-31X16
0.96 (0.0378)	31439-31X17
1.44 (0.0567)	31439-31X18

Table for selecting differential side bearing adjusting shim(s)

Unit: mm (in)

Dial indicator deflection	Suitable shim(s)
0.19 - 0.23 (0.0075 - 0.0091)	0.28 (0.0110)
0.23 - 0.27 (0.0091 - 0.0106)	0.32 (0.0126)
0.27 - 0.31 (0.0106 - 0.0122)	0.36 (0.0142)
0.31 - 0.35 (0.0122 - 0.0138)	0.40 (0.0157)
0.35 - 0.39 (0.0138 - 0.0154)	0.44 (0.0173)
0.39 - 0.43 (0.0154 - 0.0169)	0.48 (0.0189)
0.43 - 0.47 (0.0169 - 0.0185)	0.52 (0.0205)
0.47 - 0.51 (0.0185 - 0.0201)	0.56 (0.0220)
0.51 - 0.55 (0.0201 - 0.0217)	0.60 (0.0236)
0.55 - 0.59 (0.0217 - 0.0232)	0.64 (0.0252)
0.59 - 0.63 (0.0232 - 0.0248)	0.68 (0.0268)
0.63 - 0.67 (0.0248 - 0.0264)	0.72 (0.0283)
0.67 - 0.71 (0.0264 - 0.0280)	0.76 (0.0299)
0.71 - 0.75 (0.0280 - 0.0295)	0.80 (0.0315)
0.75 - 0.79 (0.0295 - 0.0311)	0.84 (0.0331)
0.79 - 0.83 (0.0311 - 0.0327)	0.88 (0.0346)
0.83 - 0.87 (0.0327 - 0.0343)	0.92 (0.0362)
0.87 - 0.91 (0.0343 - 0.0358)	0.48 (0.0189) + 0.48 (0.0189)
0.91 - 0.95 (0.0358 - 0.0374)	0.48 (0.0189) + 0.52 (0.0205)
0.95 - 0.99 (0.0374 - 0.0390)	0.52 (0.0205) + 0.52 (0.0205)
0.99 - 1.03 (0.0390 - 0.0406)	0.52 (0.0205) + 0.56 (0.0220)
1.03 - 1.07 (0.0406 - 0.0421)	0.56 (0.0220) + 0.56 (0.0220)
1.07 - 1.11 (0.0421 - 0.0437)	0.56 (0.0220) + 0.60 (0.0236)
1.11 - 1.15 (0.0437 - 0.0453)	0.60 (0.0236) + 0.60 (0.0236)
1.15 - 1.19 (0.0453 - 0.0469)	0.60 (0.0236) + 0.64 (0.0252)
1.19 - 1.23 (0.0469 - 0.0484)	0.64 (0.0252) + 0.64 (0.0252)
1.23 - 1.27 (0.0484 - 0.0500)	0.64 (0.0252) + 0.68 (0.0268)
1.27 - 1.31 (0.0500 - 0.0516)	0.68 (0.0268) + 0.68 (0.0268)
1.31 - 1.35 (0.0516 - 0.0531)	0.68 (0.0268) + 0.72 (0.0283)
1.35 - 1.39 (0.0531 - 0.0547)	1.44 (0.0567)
1.39 - 1.43 (0.0547 - 0.0563)	0.72 (0.0283) + 0.76 (0.0299)
1.43 - 1.47 (0.0563 - 0.0579)	0.76 (0.0299) + 0.76 (0.0299)
1.47 - 1.51 (0.0579 - 0.0594)	0.76 (0.0299) + 0.80 (0.0315)
1.51 - 1.55 (0.0594 - 0.0610)	0.80 (0.0315) + 0.80 (0.0315)
1.55 - 1.59 (0.0610 - 0.0626)	0.80 (0.0315) + 0.84 (0.0331)
1.59 - 1.63 (0.0626 - 0.0642)	0.84 (0.0331) + 0.84 (0.0331)
1.63 - 1.67 (0.0642 - 0.0657)	0.84 (0.0331) + 0.88 (0.0346)
1.67 - 1.71 (0.0657 - 0.0673)	0.88 (0.0346) + 0.88 (0.0346)
1.71 - 1.75 (0.0673 - 0.0689)	0.88 (0.0346) + 0.92 (0.0362)
1.75 - 1.79 (0.0689 - 0.0705)	0.92 (0.0362) + 0.92 (0.0362)
1.79 - 1.83 (0.0705 - 0.0720)	0.92 (0.0362) + 0.96 (0.0378)
1.83 - 1.87 (0.0720 - 0.0736)	0.96 (0.0378) + 0.96 (0.0378)
1.87 - 1.91 (0.0736 - 0.0752)	0.52 (0.0205) + 1.44 (0.0567)
1.91 - 1.95 (0.0752 - 0.0768)	0.56 (0.0220) + 1.44 (0.0567)

REDUCTION GEAR

Bearing preload

Reduction gear bearing preload mm (in)	0.05 (0.0020)

Turning torque

Turning torque of reduction gear N·m (kg-cm, in-lb)	0.11 - 0.69 (1.1 - 7.0, 0.95 - 6.08)

Specifications and Adjustments (Cont'd)

Reduction gear bearing adjusting shims

Thickness mm (in)	Part number
1.10 (0.0433)	31438-31X00
1.14 (0.0449)	31438-31X01
1.18 (0.0465)	31438-31X02
1.22 (0.0480)	31438-31X03
1.26 (0.0496)	31438-31X04
1.30 (0.0512)	31438-31X05
1.34 (0.0528)	31438-31X06
1.38 (0.0543)	31438-31X07
1.42 (0.0559)	31438-31X08
1.46 (0.0575)	31438-31X09
1.50 (0.0591)	31438-31X10
1.54 (0.0606)	31438-31X11
1.58 (0.0622)	31438-31X12
1.62 (0.0638)	31438-31X13
1.66 (0.0654)	31438-31X14
1.70 (0.0669)	31438-31X15
1.74 (0.0685)	31438-31X16
1.78 (0.0701)	31438-31X17
1.82 (0.0717)	31438-31X18
1.86 (0.0732)	31438-31X19
1.90 (0.0748)	31438-31X20
1.92 (0.0756)	31439-31X60
1.94 (0.0764)	31438-31X21
1.96 (0.0772)	31439-31X61
1.98 (0.0780)	31438-31X22
2.00 (0.0787)	31439-31X62
2.02 (0.0795)	31438-31X23
2.04 (0.0803)	31439-31X63
2.06 (0.0811)	31438-31X24
2.08 (0.0819)	31439-31X64
2.10 (0.0827)	31438-31X60
2.12 (0.0835)	31439-31X65
2.14 (0.0843)	31438-31X61
2.16 (0.0850)	31439-31X66
2.18 (0.0858)	31438-31X62
2.20 (0.0866)	31439-31X67
2.22 (0.0874)	31438-31X63
2.24 (0.0882)	31439-31X68
2.26 (0.0890)	31438-31X64
2.28 (0.0898)	31439-31X69
2.30 (0.0906)	31438-31X65
2.34 (0.0921)	31438-31X66
2.38 (0.0937)	31438-31X67
2.42 (0.0953)	31438-31X68
2.46 (0.0969)	31438-31X69
2.50 (0.0984)	31438-31X70
2.54 (0.1000)	31438-31X71
2.58 (0.1016)	31438-31X72
2.62 (0.1031)	31438-31X73
2.66 (0.1047)	31438-31X74
2.70 (0.1063)	31438-31X75
2.74 (0.1079)	31438-31X76
2.78 (0.1094)	31438-31X77
2.82 (0.1110)	31438-31X78

Table for selecting reduction gear bearing adjusting shim

Unit: mm (in)

Dimension "T"	Suitable shim(s)
1.13 - 1.17 (0.0445 - 0.0461)	1.10 (0.0433)
1.17 - 1.21 (0.0461 - 0.0476)	1.14 (0.0449)
1.21 - 1.25 (0.0476 - 0.0492)	1.18 (0.0465)
1.25 - 1.29 (0.0492 - 0.0508)	1.22 (0.0480)
1.29 - 1.33 (0.0508 - 0.0524)	1.26 (0.0496)
1.33 - 1.37 (0.0524 - 0.0539)	1.30 (0.0512)
1.37 - 1.41 (0.0539 - 0.0555)	1.34 (0.0528)
1.41 - 1.45 (0.0555 - 0.0571)	1.38 (0.0543)
1.45 - 1.49 (0.0571 - 0.0587)	1.42 (0.0559)
1.49 - 1.53 (0.0587 - 0.0602)	1.46 (0.0575)
1.53 - 1.57 (0.0602 - 0.0618)	1.50 (0.0591)
1.57 - 1.61 (0.0618 - 0.0634)	1.54 (0.0606)
1.61 - 1.65 (0.0634 - 0.0650)	1.58 (0.0622)
1.65 - 1.69 (0.0650 - 0.0665)	1.62 (0.0638)
1.69 - 1.73 (0.0665 - 0.0681)	1.66 (0.0654)
1.73 - 1.77 (0.0681 - 0.0697)	1.70 (0.0669)
1.77 - 1.81 (0.0697 - 0.0713)	1.74 (0.0685)
1.81 - 1.85 (0.0713 - 0.0728)	1.78 (0.0701)
1.85 - 1.89 (0.0728 - 0.0744)	1.82 (0.0717)
1.89 - 1.93 (0.0744 - 0.0760)	1.86 (0.0732)
1.93 - 1.97 (0.0760 - 0.0776)	1.90 (0.0748)
1.97 - 2.01 (0.0776 - 0.0791)	1.94 (0.0764)
2.01 - 2.05 (0.0791 - 0.0807)	1.98 (0.0780)
2.05 - 2.09 (0.0807 - 0.0823)	2.02 (0.0795)
2.09 - 2.13 (0.0823 - 0.0839)	2.06 (0.0811)
2.13 - 2.17 (0.0839 - 0.0854)	2.10 (0.0827)
2.17 - 2.21 (0.0854 - 0.0870)	2.14 (0.0843)
2.21 - 2.25 (0.0870 - 0.0886)	2.18 (0.0858)
2.25 - 2.29 (0.0886 - 0.0902)	2.22 (0.0874)
2.29 - 2.33 (0.0902 - 0.0917)	2.26 (0.0890)
2.33 - 2.37 (0.0917 - 0.0933)	2.30 (0.0906)
2.37 - 2.41 (0.0933 - 0.0949)	2.34 (0.0921)
2.41 - 2.45 (0.0949 - 0.0965)	2.38 (0.0937)
2.45 - 2.49 (0.0965 - 0.0980)	2.42 (0.0953)
2.49 - 2.53 (0.0980 - 0.0996)	2.46 (0.0969)
2.53 - 2.57 (0.0996 - 0.1012)	2.50 (0.0984)
2.57 - 2.61 (0.1012 - 0.1028)	2.54 (0.1000)
2.61 - 2.65 (0.1028 - 0.1043)	2.58 (0.1016)
2.65 - 2.69 (0.1043 - 0.1059)	2.62 (0.1031)
2.69 - 2.73 (0.1059 - 0.1075)	2.66 (0.1047)
2.73 - 2.77 (0.1075 - 0.1091)	2.70 (0.1063)
2.77 - 2.81 (0.1091 - 0.1106)	2.74 (0.1079)
2.81 - 2.85 (0.1106 - 0.1122)	2.78 (0.1094)
2.85 - 2.89 (0.1122 - 0.1138)	2.82 (0.1110)

Specifications and Adjustments (Cont'd)

OUTPUT SHAFT — RL4F03A —

Seal ring clearance

Output shaft seal ring clearance mm (in)	
Standard	0.10 - 0.25 (0.0039 - 0.0098)
Allowable limit	0.25 (0.0098)

Bearing preload

Output shaft bearing preload mm (in)	0.03 - 0.08 (0.0012 - 0.0031)

Turning torque

Turning torque of output shaft N·m (kg-cm, in-lb)	0.25 - 0.88 (2.5 - 9.0, 2.2 - 7.8)

Output shaft bearing adjusting spacers

Thickness mm (in)	Part number
5.62 (0.2213)	31437-31X00
5.66 (0.2228)	31437-31X01
5.70 (0.2244)	31437-31X02
5.74 (0.2260)	31437-31X03
5.78 (0.2276)	31437-31X04
5.82 (0.2291)	31437-31X05
5.86 (0.2307)	31437-31X06
5.90 (0.2323)	31437-31X07
5.94 (0.2339)	31437-31X08
5.98 (0.2354)	31437-31X09
6.02 (0.2370)	31437-31X10
6.06 (0.2386)	31437-31X11
6.10 (0.2402)	31437-31X12
6.14 (0.2417)	31437-31X13
6.18 (0.2433)	31437-31X14
6.22 (0.2449)	31437-31X15
6.26 (0.2465)	31437-31X16
6.30 (0.2480)	31437-31X17
6.34 (0.2496)	31437-31X18
6.38 (0.2512)	31437-31X19
6.42 (0.2528)	31437-31X20
6.46 (0.2543)	31437-31X21
6.50 (0.2559)	31437-31X22
6.54 (0.2575)	31437-31X23
6.58 (0.2591)	31437-31X24
6.62 (0.2606)	31437-31X60
6.64 (0.2614)	31437-31X78
6.66 (0.2622)	31437-31X61
6.68 (0.2630)	31437-31X79
6.70 (0.2638)	31437-31X62
6.72 (0.2646)	31437-31X80
6.74 (0.2654)	31437-31X63
6.76 (0.2661)	31437-31X81
6.78 (0.2669)	31437-31X64
6.80 (0.2677)	31437-31X82
6.82 (0.2685)	31437-31X65
6.84 (0.2693)	31437-31X83
6.86 (0.2701)	31437-31X66
6.88 (0.2709)	31437-31X84
6.90 (0.2717)	31437-31X67
6.92 (0.2724)	31437-31X46
6.94 (0.2732)	31437-31X68
6.96 (0.2740)	31437-31X47
6.98 (0.2748)	31437-31X69
7.00 (0.2756)	31437-31X48
7.02 (0.2764)	31437-31X70
7.06 (0.2780)	31437-31X71
7.10 (0.2795)	31437-31X72
7.14 (0.2811)	31437-31X73
7.18 (0.2827)	31437-31X74
7.22 (0.2843)	31437-31X75

Table for selecting output shaft bearing adjusting spacer

Unit: mm (in)

Dimension "T"	Suitable spacer
5.65 - 5.69 (0.2224 - 0.2240)	5.62 (0.2213)
5.69 - 5.73 (0.2240 - 0.2256)	5.66 (0.2228)
5.73 - 5.77 (0.2256 - 0.2272)	5.70 (0.2244)
5.77 - 5.81 (0.2272 - 0.2287)	5.74 (0.2260)
5.81 - 5.85 (0.2287 - 0.2303)	5.78 (0.2276)
5.85 - 5.89 (0.2303 - 0.2319)	5.82 (0.2291)
5.89 - 5.93 (0.2319 - 0.2335)	5.86 (0.2307)
5.93 - 5.97 (0.2335 - 0.2350)	5.90 (0.2323)
5.97 - 6.01 (0.2350 - 0.2366)	5.94 (0.2339)
6.01 - 6.05 (0.2366 - 0.2382)	5.98 (0.2354)
6.05 - 6.09 (0.2382 - 0.2398)	6.02 (0.2370)
6.09 - 6.13 (0.2398 - 0.2413)	6.06 (0.2386)
6.13 - 6.17 (0.2413 - 0.2429)	6.10 (0.2402)
6.17 - 6.21 (0.2429 - 0.2445)	6.14 (0.2417)
6.21 - 6.25 (0.2445 - 0.2461)	6.18 (0.2433)
6.25 - 6.29 (0.2461 - 0.2476)	6.22 (0.2449)
6.29 - 6.33 (0.2476 - 0.2492)	6.26 (0.2465)
6.33 - 6.37 (0.2492 - 0.2508)	6.30 (0.2480)
6.37 - 6.41 (0.2508 - 0.2524)	6.34 (0.2496)
6.41 - 6.45 (0.2524 - 0.2539)	6.38 (0.2512)
6.45 - 6.49 (0.2539 - 0.2555)	6.42 (0.2528)
6.49 - 6.53 (0.2555 - 0.2571)	6.46 (0.2543)
6.53 - 6.57 (0.2571 - 0.2587)	6.50 (0.2559)
6.57 - 6.61 (0.2587 - 0.2602)	6.54 (0.2575)
6.61 - 6.65 (0.2602 - 0.2618)	6.58 (0.2591)
6.65 - 6.69 (0.2618 - 0.2634)	6.62 (0.2606)
6.69 - 6.73 (0.2634 - 0.2650)	6.66 (0.2622)
6.73 - 6.77 (0.2650 - 0.2665)	6.70 (0.2638)
6.77 - 6.81 (0.2665 - 0.2681)	6.74 (0.2654)
6.81 - 6.85 (0.2681 - 0.2697)	6.78 (0.2669)
6.85 - 6.89 (0.2697 - 0.2713)	6.82 (0.2685)
6.89 - 6.93 (0.2713 - 0.2728)	6.86 (0.2701)
6.93 - 6.97 (0.2728 - 0.2744)	6.90 (0.2717)
6.97 - 7.01 (0.2744 - 0.2760)	6.94 (0.2732)
7.01 - 7.05 (0.2760 - 0.2776)	6.98 (0.2748)
7.05 - 7.09 (0.2776 - 0.2791)	7.02 (0.2764)
7.09 - 7.13 (0.2791 - 0.2807)	7.06 (0.2780)
7.13 - 7.17 (0.2807 - 0.2823)	7.10 (0.2795)
7.17 - 7.21 (0.2823 - 0.2839)	7.14 (0.2811)
7.21 - 7.25 (0.2839 - 0.2854)	7.18 (0.2827)
7.25 - 7.29 (0.2854 - 0.2870)	7.22 (0.2843)

OUTPUT SHAFT — RL4F03V —

Seal ring clearance

Output shaft seal ring clearance mm (in)	
Standard	0.10 - 0.25 (0.0039 - 0.0098)
Allowable limit	0.25 (0.0098)

End play

Output shaft end play mm (in)	0 - 0.5 (0 - 0.020)

Output shaft adjusting shims

Thickness mm (in)	Part number
0.56 (0.0220)	31438-31X46
0.96 (0.0378)	31438-31X47
1.36 (0.0535)	31438-31X48

BEARING RETAINER

Seal ring clearance

Bearing retainer seal ring clearance mm (in)	
Standard	0.10 - 0.25 (0.0039 - 0.0098)
Allowable limit	0.25 (0.0098)

TOTAL END PLAY

Total end play mm (in)	0.25 - 0.55 (0.0098 - 0.0217)

Bearing race for adjusting total end play

Thickness mm (in)	Part number
0.6 (0.024)	31435-31X01
0.8 (0.031)	31435-31X02
1.0 (0.039)	31435-31X03
1.2 (0.047)	31435-31X04
1.4 (0.055)	31435-31X05
1.6 (0.063)	31435-31X06
1.8 (0.071)	31435-31X07
2.0 (0.079)	31435-31X08
2.2 (0.087)	31435-31X09

REVERSE CLUTCH END PLAY

Reverse clutch end play mm (in)	0.65 - 1.00 (0.0256 - 0.0394)

Thrust washers for adjusting reverse clutch end play

Thickness mm (in)	Part number
0.65 (0.0256)	31508-31X00
0.80 (0.0315)	31508-31X01
0.95 (0.0374)	31508-31X02
1.10 (0.0433)	31508-31X03
1.25 (0.0492)	31508-31X04
1.40 (0.0551)	31508-31X05
1.55 (0.0610)	31508-31X06

ACCUMULATOR

O-ring

Unit: mm (in)

Accumulator	Diameter (Small)	Diameter (Large)
Servo release accumulator	26.9 (1.059)	44.2 (1.740)
N-D accumulator	34.6 (1.362)	39.4 (1.551)

Return spring

RL4F03A

Unit: mm (in)

Accumulator	Free length	Outer diameter
Servo release accumulator spring	56.4 (2.220)	21.0 (0.827)
N-D accumulator spring	43.5 (1.713)	28.0 (1.102)

RE4F03V

Unit: mm (in)

Accumulator		Free length	Outer diameter
Servo release accumulator spring	Outer	52.5 (2.067)	19.6 (0.772)
	Inner	52.0 (2.047)	15.1 (0.594)
N-D accumulator spring		43.5 (1.713)	28.0 (1.102)

BAND SERVO

Return spring

Unit: mm (in)

Return spring	Free length	Outer diameter
2nd servo return spring	32.5 (1.280)	25.9 (1.020)
OD servo return spring	31.0 (1.220)	21.7 (0.854)

REMOVAL AND INSTALLATION

Unit: mm (in)

Engine	GA16DE	SR20DE
Distance between end of converter housing and torque converter	21.1 (0.831) or more	15.9 (0.626) or more
Drive plate runout limit	0.5 (0.020)	0.2 (0.008)