

AUTOMATIC TRANSAXLE

SECTION AT

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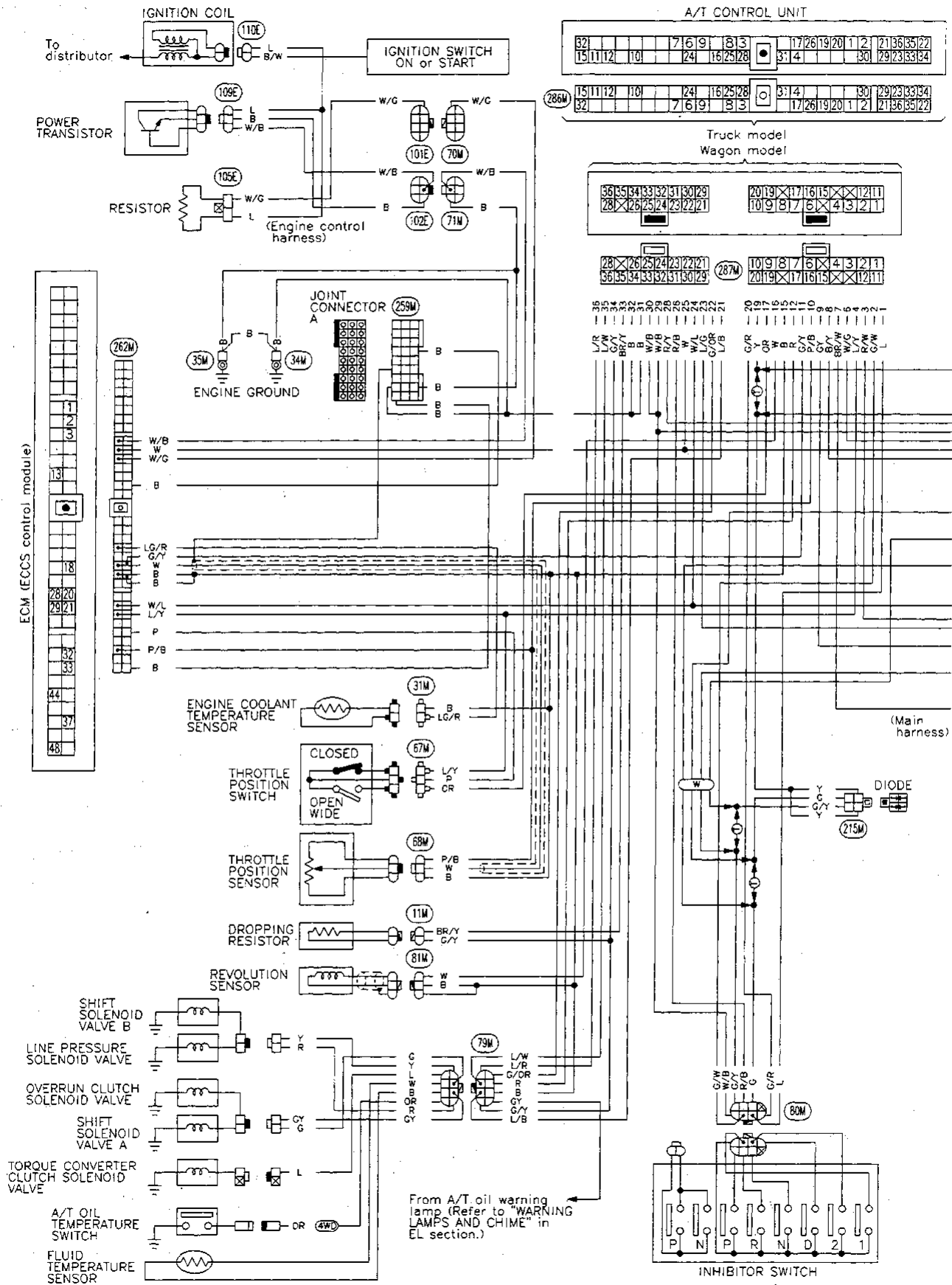
When you read wiring diagrams:

- Read GI section, "HOW TO READ WIRING DIAGRAMS".
- See EL section, "POWER SUPPLY ROUTING" for power distribution circuit.

When you perform trouble diagnoses, read GI section, "HOW TO FOLLOW FLOW CHART IN TROUBLE DIAGNOSES".

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Wiring Diagram

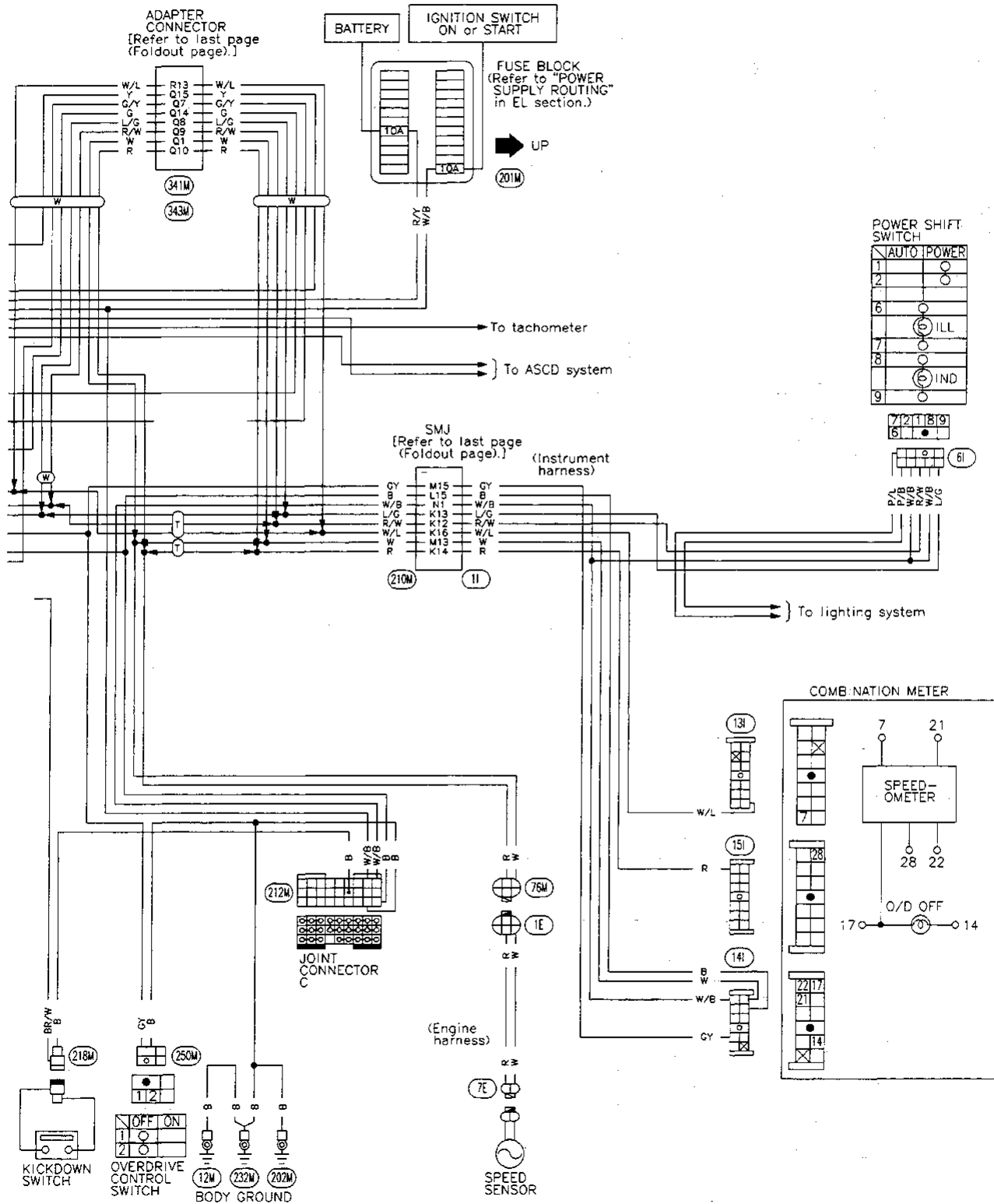


TROUBLE DIAGNOSES

Wiring Diagram (Cont'd)

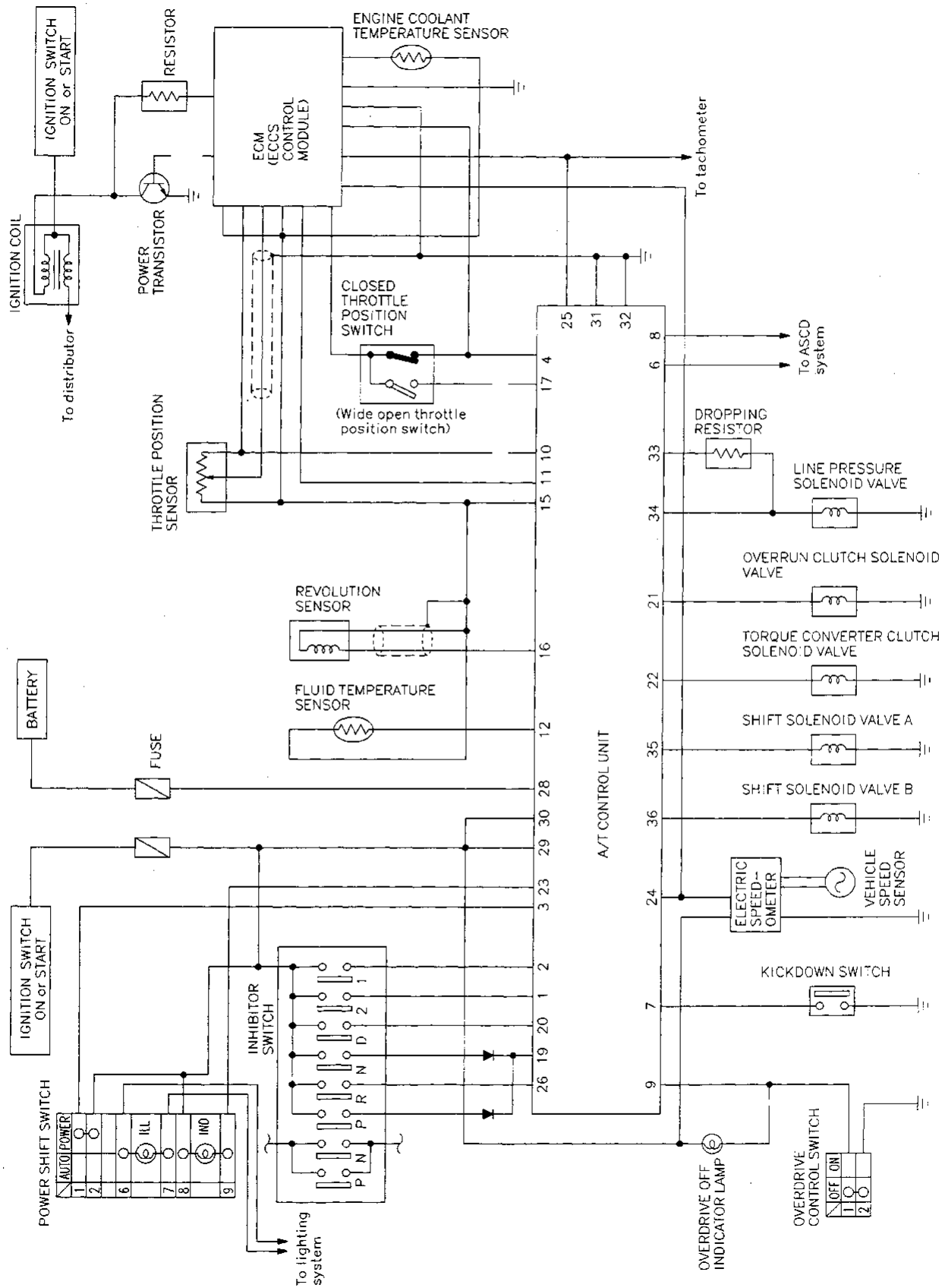
RE4R01A

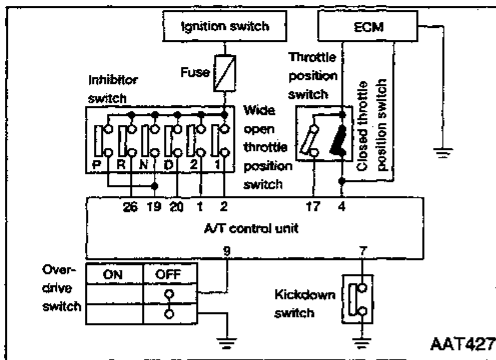
(W) : Wagon model
 (T) : Truck model



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Circuit Diagram for Quick Pinpoint Check





AAT427

Self-diagnosis

INHIBITOR, OVERDRIVE, KICKDOWN AND CLOSED THROTTLE POSITION SWITCH CIRCUIT CHECKS

A

CHECK INHIBITOR SWITCH CIRCUIT.

1. Turn ignition switch to "ON" position. (Do not start engine.)
2. Check voltage between A/T control unit terminals ①, ②, ⑱, ⑳, ㉑ and ground while moving selector lever through each position.

Voltage:

B: Battery voltage

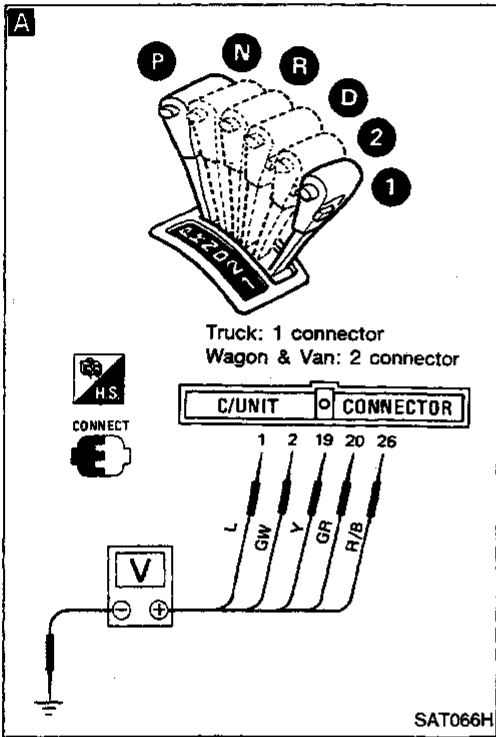
0: 0V

Lever position	Terminal No.				
	⑱	㉑	⑳	①	②
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-93 in the Service Manual.
- Harness continuity between ignition switch and inhibitor switch (Main harness)
- Harness continuity between inhibitor switch and A/T control unit (Main harness)



OK

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CHECK OVERDRIVE SWITCH CIRCUIT.

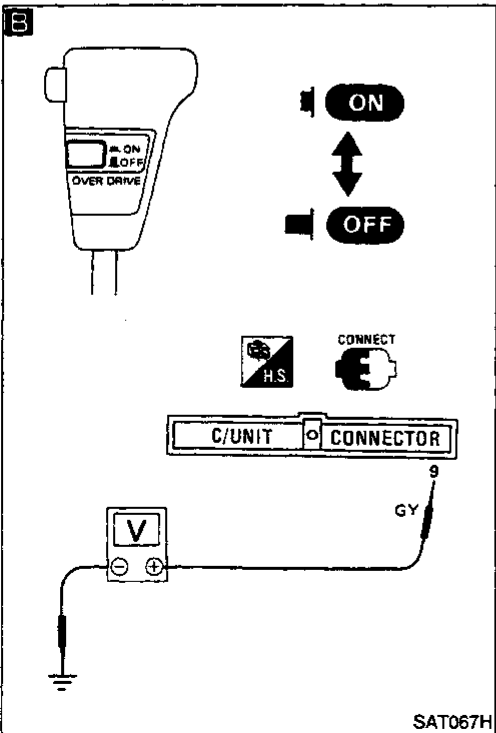
1. Turn ignition switch to "ON" position. (Do not start engine.)
2. Check voltage between A/T control unit terminal ⑨ and ground when overdrive switch is in "ON" position and in "OFF" position.

Switch position	Voltage
ON	Battery voltage
OFF	1V or less

NG

Check the following items.

- Overdrive switch — Refer to "Electrical Components Inspection", AT-93 in the Service Manual.
- Harness continuity between A/T control unit and overdrive switch (Main harness)
- Harness continuity of ground circuit for overdrive switch (Main harness)

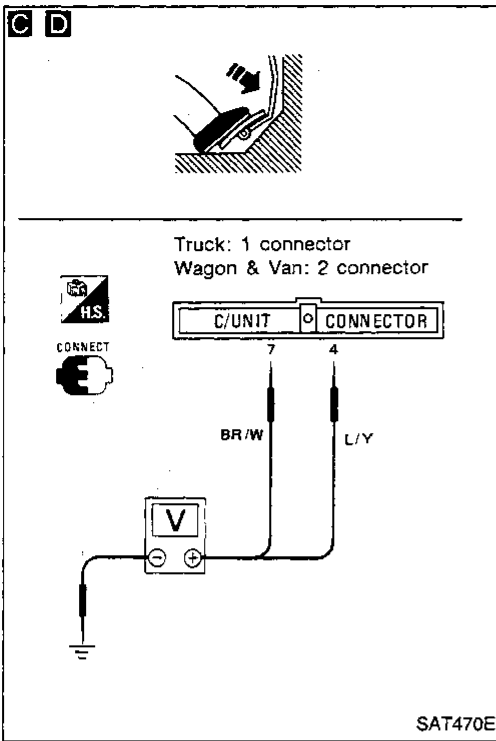


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Self-diagnosis (Cont'd)



(A)

C

CHECK KICKDOWN SWITCH CIRCUIT.

1. Turn ignition switch to "ON" position. (Do not start engine.)
2. Check voltage between A/T control unit terminal (7) and ground while depressing accelerator pedal slowly. (after warming up engine)

Voltage:
When releasing accelerator pedal: 3 - 8V
When depressing accelerator pedal fully: 1V or less

NG → Check the following items.
 ● Kickdown switch
 ● Harness continuity between A/T control unit and kickdown switch (Main harness)
 ● Harness continuity of ground circuit for kickdown switch

OK

D

CHECK CLOSED THROTTLE POSITION SWITCH CIRCUIT.

- Check voltage between A/T control unit terminal (4) and ground in the same way as kickdown switch circuit.

Voltage:
When releasing accelerator pedal: 8 - 15V
When depressing accelerator pedal fully: 1V or less

NG → Perform self-diagnosis for engine control. Check closed throttle position switch circuit.

OK → Check harness continuity between A/T control unit and closed throttle position switch. (Main harness)

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

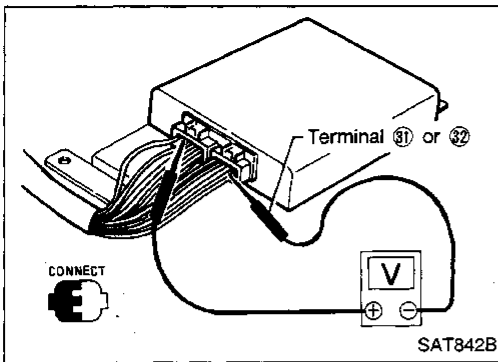
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Perform self-diagnosis again after driving for a while.

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

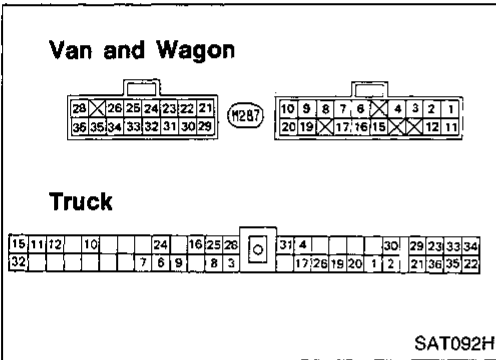
INSPECTION END



Electrical Components Inspection

INSPECTION OF A/T CONTROL UNIT

- Measure voltage between each terminal and terminal 31 or 32 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	Inhibitor "2" position switch	When selector lever is set to "2" position.	Battery voltage
		When selector lever is set to other positions.	1V or less
2	Inhibitor "1" position switch	When selector lever is set to "1" position.	Battery voltage
		When selector lever is set to other positions.	1V or less
3	Power shift switch	When power shift switch is set to "POWER" position.	Battery voltage
		When power shift switch is set to "AUTO" position.	1V or less
4	Closed throttle position switch (in throttle position switch)	When accelerator pedal is released after warming up engine.	8 - 15V
		When accelerator pedal is depressed after warming up engine.	1V or less
5	—	—	—
6	ASCD and OD cut signal	When "ACCEL" set switch is released on ASCD cruise.	5 - 8V
		When "ACCEL" set switch is applied on ASCD cruise.	1V or less
7	Kickdown switch	When accelerator pedal is released after warming up engine.	3 - 8V
		When accelerator pedal is depressed fully after warming up engine.	1V or less

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Electrical Components Inspection (Cont'd)

Terminal No.	Item	Condition	Judgement standard	
8	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 come on.)	1V or less
9	Overdrive control switch		When overdrive switch is set to "ON" position.	Battery voltage
			When overdrive switch is set to "OFF" position.	1V or less
10	Throttle position sensor (Power source)	—	4.5 - 5.5V	
11	Throttle position sensor		When accelerator pedal is depressed slowly after warming up engine.	Fully-closed throttle: 0.2 - 0.6V
			Voltage rises gradually in response to throttle opening angle.	Fully-open throttle: 2.9 - 3.9V
12	Fluid temperature sensor	When ATF temperature is 20°C (68°F).	1.56V	
		When ATF temperature is 80°C (176°F).	0.45V	
13	—	—	—	
14	—	—	—	
15	Throttle position sensor (Ground)	—	—	
16	Revolution sensor (Measure in AC position)		When vehicle is cruising at 30 km/h (19 MPH).	1V or more Voltage rises gradually in response to vehicle speed.
			When vehicle is parked.	0V
17	Wide open throttle position switch		When accelerator pedal is depressed more than half-way after warming up engine.	8 - 15V
			When accelerator pedal is released after warming up engine.	1V or less
18	—	—	—	
19	Inhibitor "N" and "P" position switch		When selector lever is set to "N" or "P" position.	Battery voltage
			When selector lever is set to other positions.	1V or less
20	Inhibitor "D" position switch		When selector lever is set to "D" position.	Battery voltage
			When selector lever is set to other positions.	1V or less
21	Overrun clutch solenoid valve		When overrun clutch solenoid valve is operating.	Battery voltage
			When overrun clutch solenoid valve is not operating.	1V or less
22	Torque converter clutch solenoid valve		When A/T is performing lock-up.	8 - 15V
			When A/T is not performing lock-up.	1V or less
23	Power shift indicator lamp	 	When power shift switch is set to "AUTO" position.	Battery voltage
			When power shift switch is set to "POWER" position.	1V or less

Electrical Components Inspection (Cont'd)

Terminal No.	Item	Condition	Judgement standard
24	Vehicle speed sensor	 When vehicle is moving at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Vary from 0 to 5V
25	Engine speed signal	 When engine is running at idle speed.	9.5 - 12V
		 When engine is running at 2,500 rpm.	Approximately 10V
26	Inhibitor "R" position switch	 When selector lever is set to "R" position.	Battery voltage
		When selector lever is set to other positions.	1V or less
27	—	 —	—
28	Power source (Back-up)	 When ignition switch is turned to "OFF".	Battery voltage
		When ignition switch is turned to "ON".	Battery voltage
29 30	Power source	or	
		 When ignition switch is turned to "ON".	Battery voltage
31 32	Ground	When ignition switch is turned to "OFF".	1V or less
		—	—
33	Line pressure solenoid valve (with dropping resistor)	 When accelerator pedal is released after warming up engine.	5 - 14V
		When accelerator pedal is depressed fully after warming up engine.	0.5V or less
34	Line pressure solenoid valve	 When accelerator pedal is released after warming up engine.	1.5 - 2.5V
		When accelerator pedal is depressed fully after warming up engine.	0.5V or less
35	Shift solenoid valve A	When shift solenoid valve A is operating. (When driving in "D ₁ " or "D ₄ ".)	Battery voltage
		When shift solenoid valve A is not operating. (When driving in "D ₂ " or "D ₃ ".)	1V or less
36	Shift solenoid valve B	 When shift solenoid valve B is operating. (When driving in "D ₁ " or "D ₂ ".)	Battery voltage
		When shift solenoid valve B is not operating. (When driving in "D ₃ " or "D ₄ ".)	1V or less

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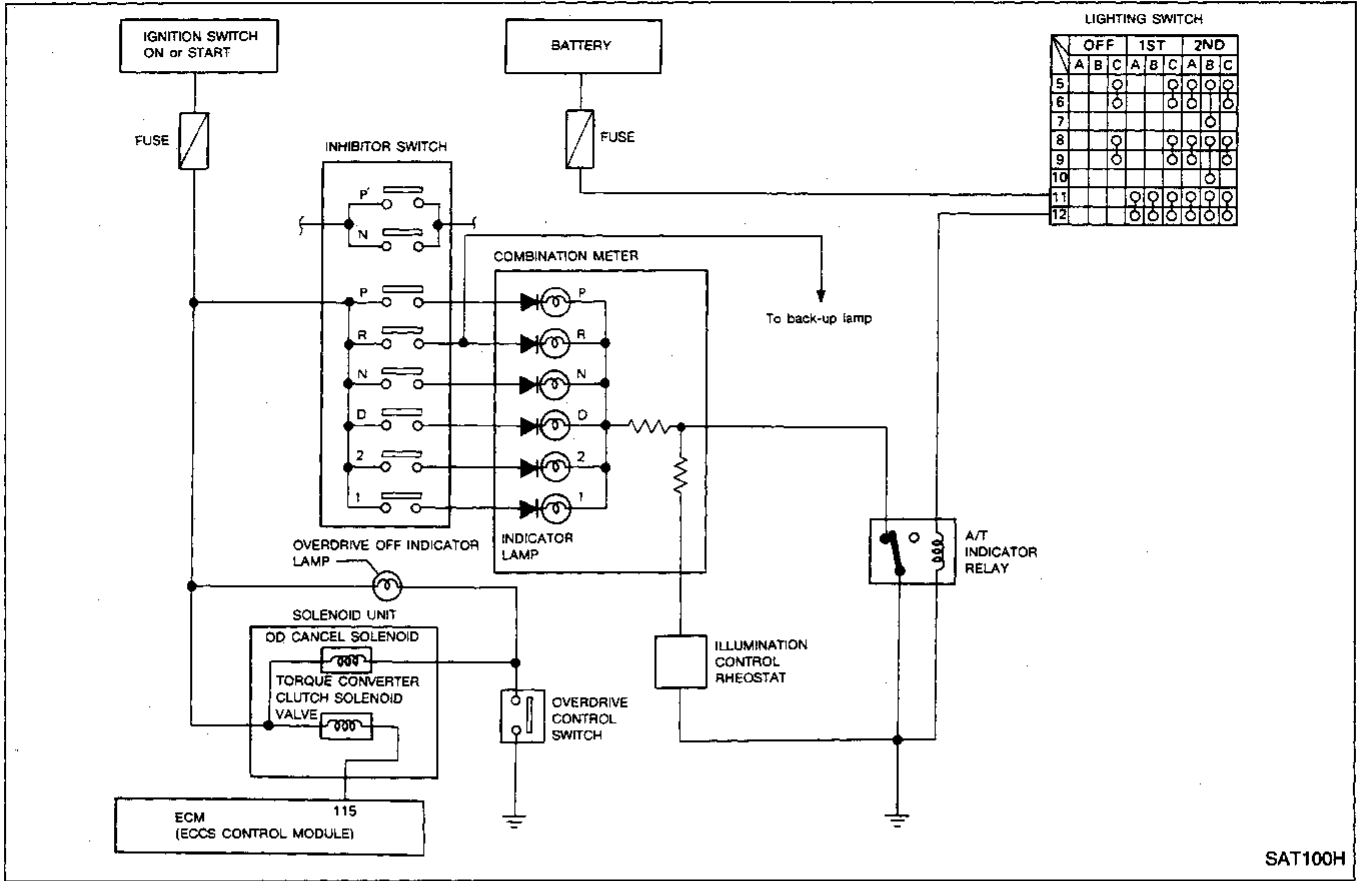
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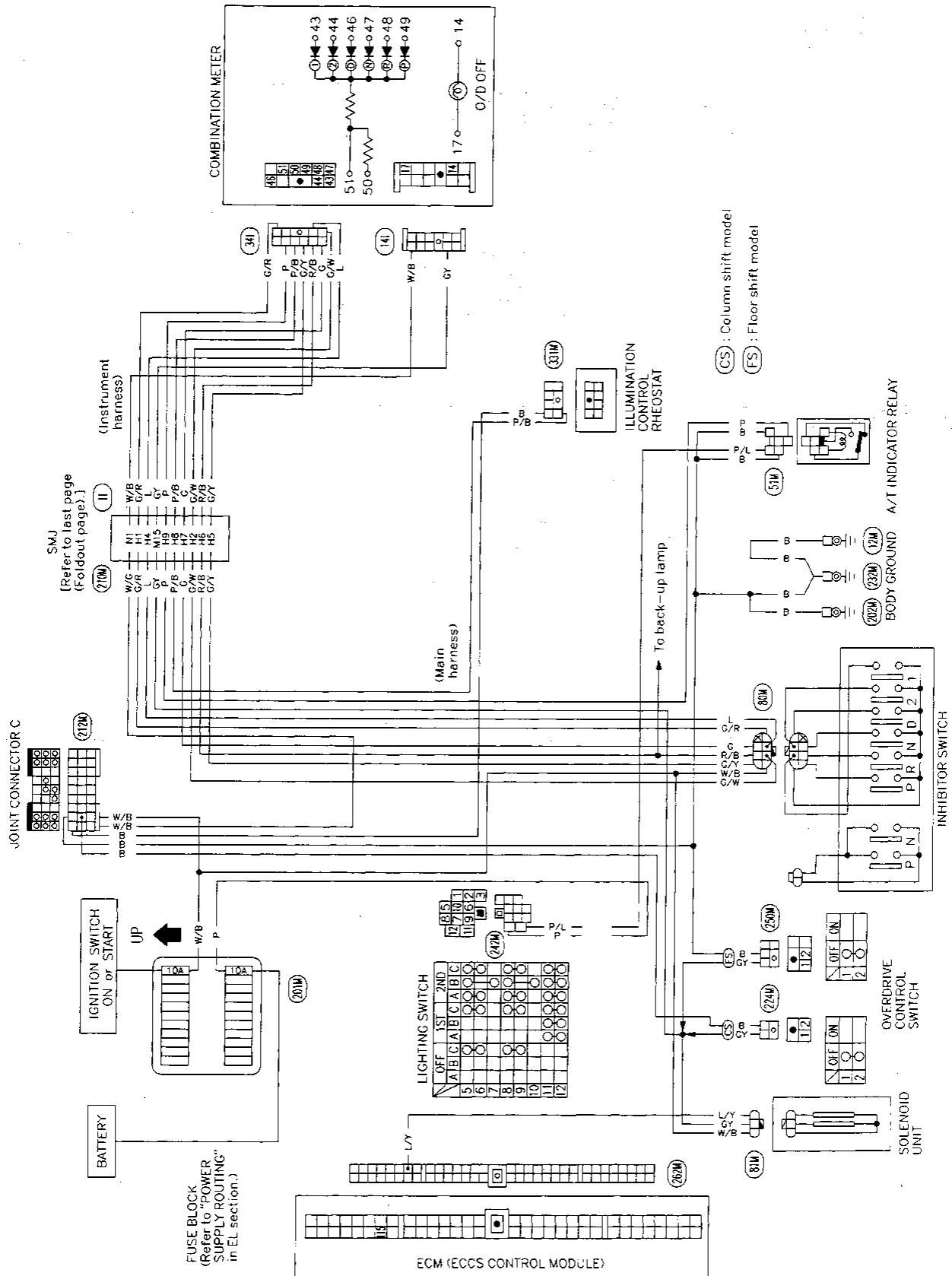
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Circuit Diagram



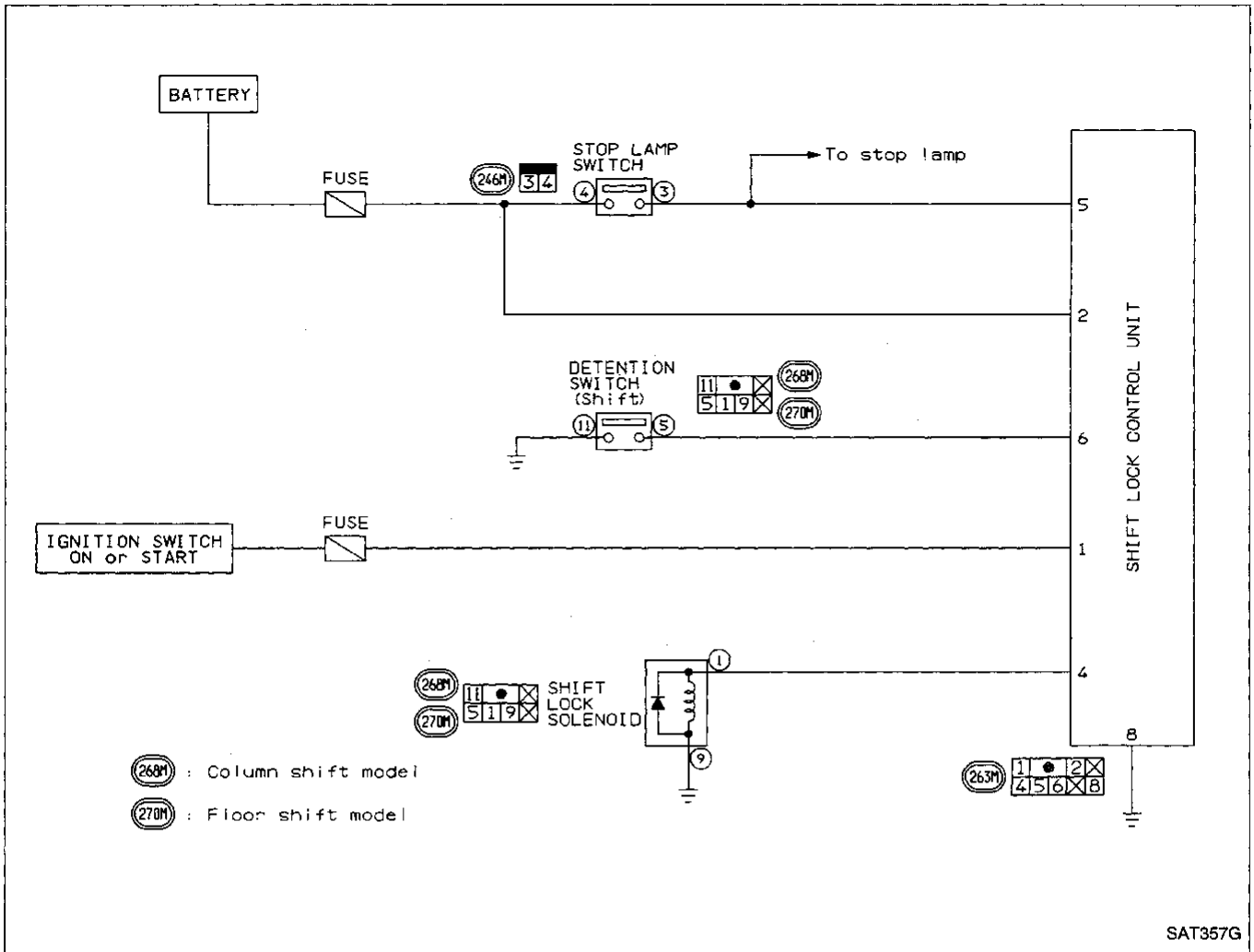
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Wiring Diagram



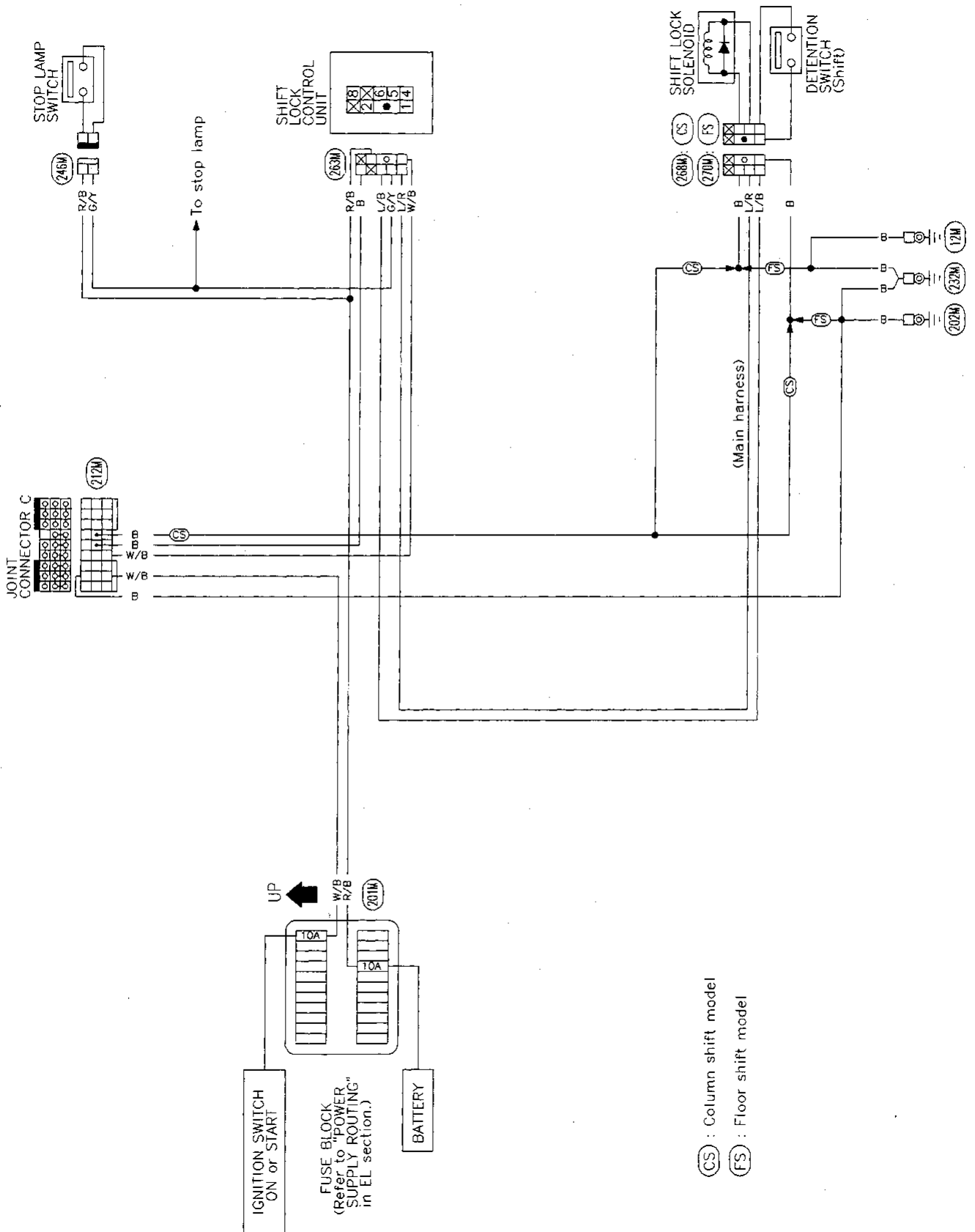
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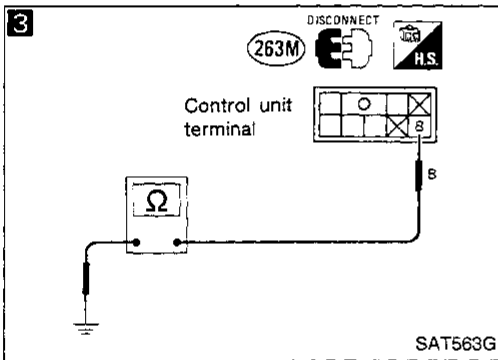
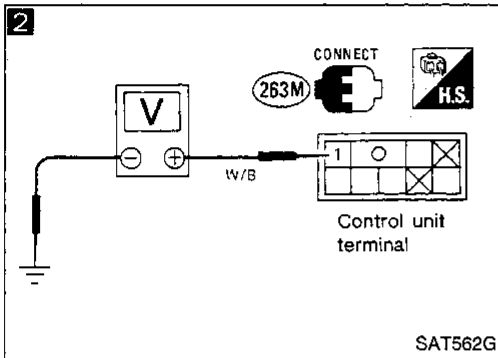
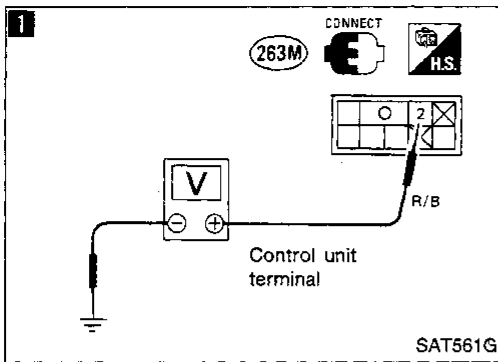
Circuit Diagram for Quick Pinpoint Check



Wiring Diagram

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Diagnostic Procedure

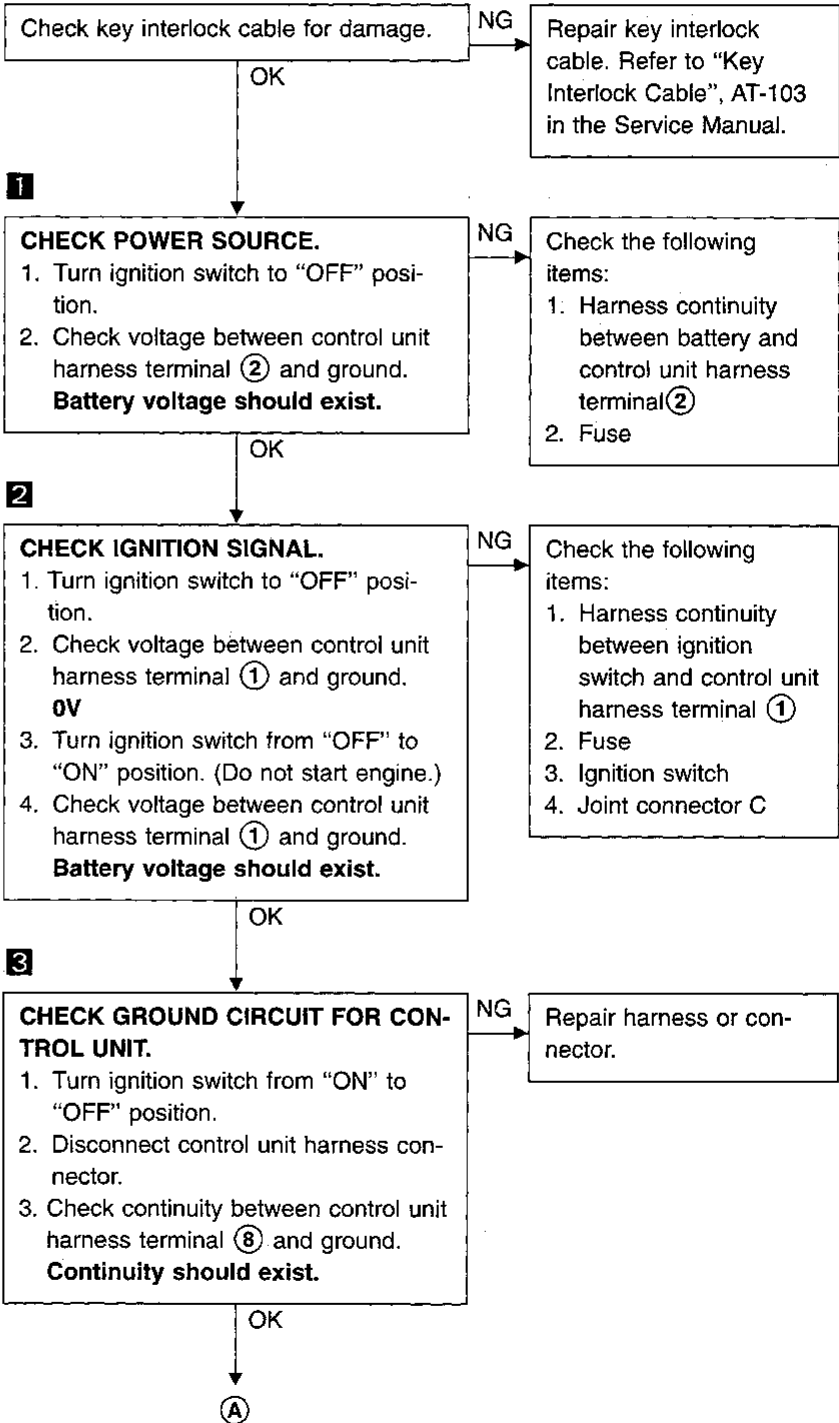
SYMPTOM 1:

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.

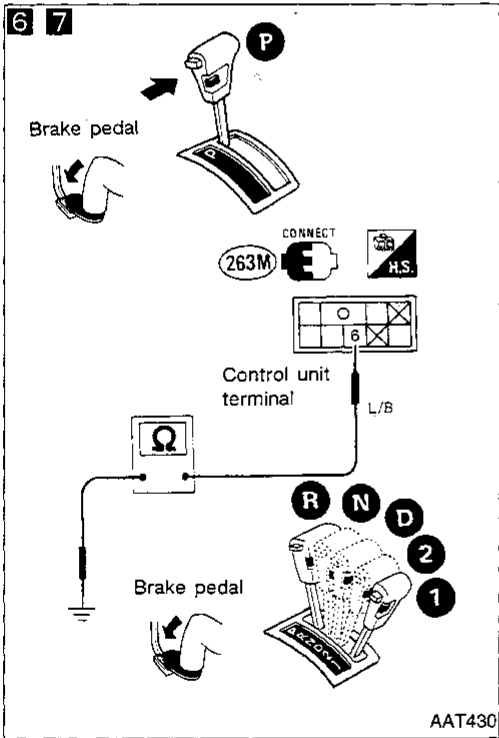
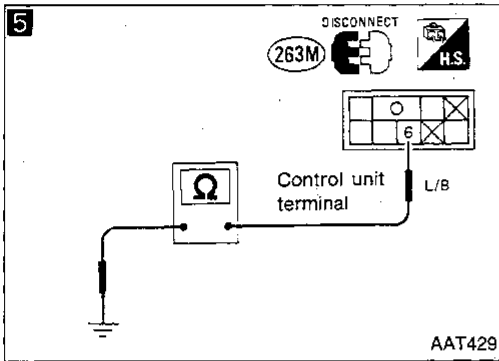
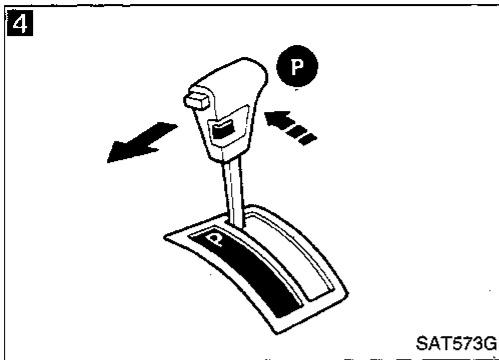
SYMPTOM 2:

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".



TROUBLE DIAGNOSES — AT Shift Lock System

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 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-105 in the Service Manual.

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".

Continuity should not exist.

NG

Check the following items:

1. Harness continuity between control unit harness terminal ⑥ and detention switch harness terminal ⑥
2. Harness continuity between detention switch harness terminal ⑥ and ground
3. Detention switch
Refer to "COMPONENT CHECK", AT-105 in the Service Manual.

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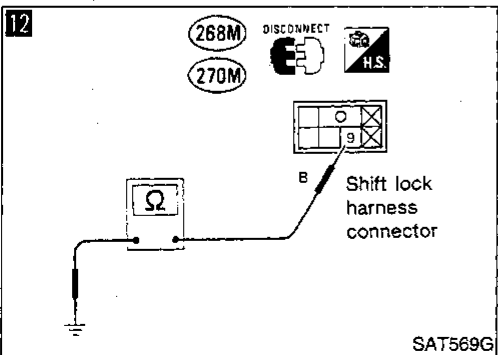
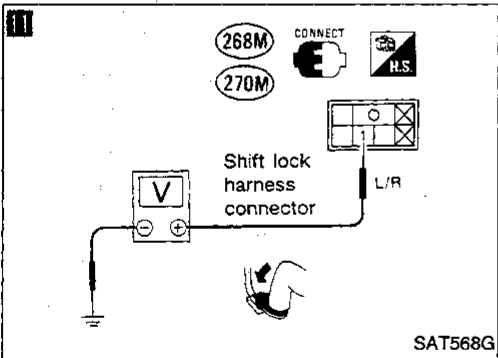
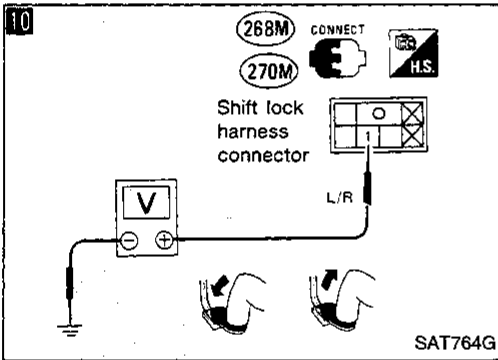
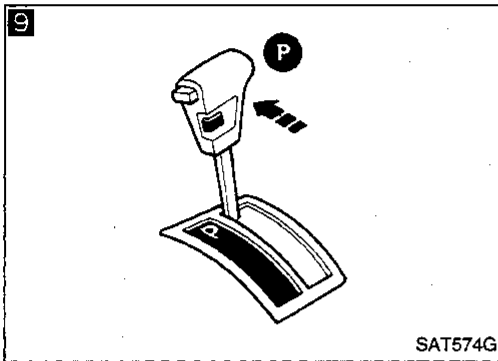
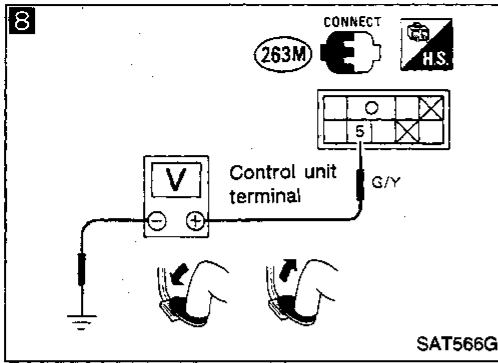
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TROUBLE DIAGNOSES — A/T Shift Lock System

Diagnostic Procedure (Cont'd)



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CHECK INPUT SIGNAL (STOP LAMP SWITCH).

1. Turn ignition switch to "ON" position. (Do not start engine.)
2. Check voltage between control unit harness terminal ⑤ and ground.

Brake pedal	Voltage
Depressed	Battery voltage
Released	0

NG → Check the following items:

1. Harness continuity between control unit harness terminal ⑤ and stop lamp switch harness terminal ③
2. Harness continuity between stop lamp switch harness terminal ④ and fuse
3. Stop lamp switch Refer to "COMPONENT CHECK", AT-105 in the Service Manual.

OK ↓

9

1. Set selector lever in "P" position.
2. Turn ignition switch to "ON" position. (Do not start engine.)
3. Check voltage between shift lock harness connector terminal ① and body ground.

Brake pedal	Voltage
Depressed	Battery voltage
Released	0

4. Turn ignition switch from "ON" to "OFF" position.
5. Check voltage between shift lock harness connector terminal ① and ground with brake pedal depressed. **0V**

NG → Check harness continuity between control unit harness terminal ① and shift lock solenoid harness terminal ⑨.

OK ↓

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CHECK GROUND CIRCUIT FOR SHIFT LOCK SOLENOID.

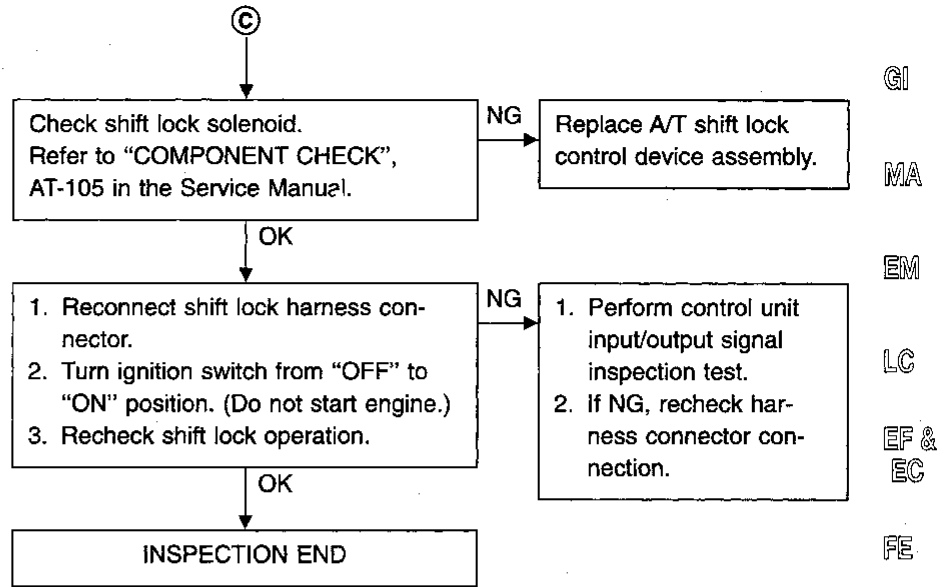
1. Disconnect shift lock harness connector.
2. Check continuity between shift lock harness terminal ⑨ and ground. **Continuity should exist.**

NG → Repair harness or connector.

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TROUBLE DIAGNOSES — A/T Shift Lock System

Diagnostic Procedure (Cont'd)



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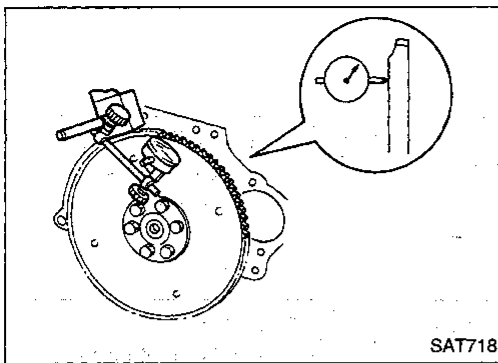
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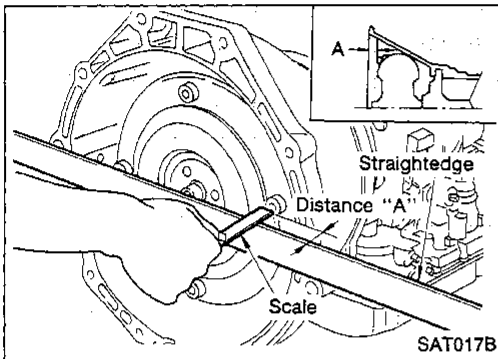
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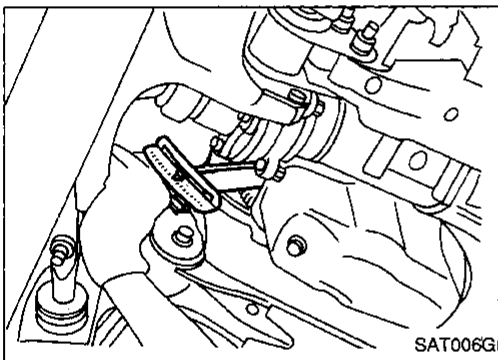
REMOVAL AND INSTALLATION



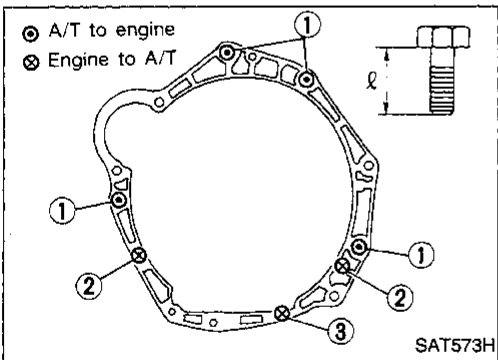
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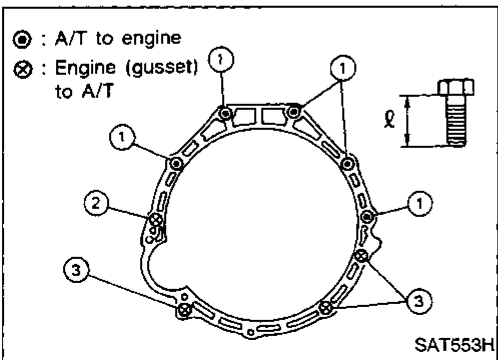
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SAT573H



SAT553H

Installation

- Drive plate runout
**Maximum allowable runout:
 0.5 mm (0.020 in)**
 If this runout is out of specification, replace drive plate with ring gear.

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

**Distance "A":
 26.0 mm (1.024 in) or more**

- Install converter to drive plate.
- **After converter is installed to drive plate, rotate crankshaft several turns and check to be sure that transmission rotates freely without binding.**

- Tighten bolts securing transmission.

— KA24E engine model —

	Tightening torque N·m (kg·m, ft·lb)	Bolt length "l" mm (in)
①	39 - 49 (4.0 - 5.0, 29 - 36)	43 (1.69)
②	3 - 4 (0.3 - 0.4, 2.2 - 2.9)	16 (0.63)
③	16 - 22 (1.6 - 2.2, 12 - 16)	16 (0.63)

— VG30E engine model —

Bolt No.	Tightening torque N·m (kg·m, ft·lb)	Bolt length "l" mm (in)
①	39 - 49 (4.0 - 5.0, 29 - 36)	47.5 (1.870)
②	39 - 49 (4.0 - 5.0, 29 - 36)	58.0 (2.283)
③	29 - 39 (3.0 - 4.0, 22 - 29)	25 (0.98)
Gusset to engine	29 - 39 (3.0 - 4.0, 22 - 29)	20 (0.79)

REMOVAL AND INSTALLATION

Installation (Cont'd)

- Reinstall any part removed.
- Check fluid level in transmission.
- Move selector lever through all position to be sure that transmission operates correctly.
With parking brake applied, rotate engine at idling. Move selector lever through "N" to "D", to "2", to "1" and to "R". A slight shock should be felt by hand gripping selector each time transmission is shifted.
- Perform road test. — Refer to "ROAD TESTING", AT-20 in the Service Manual.

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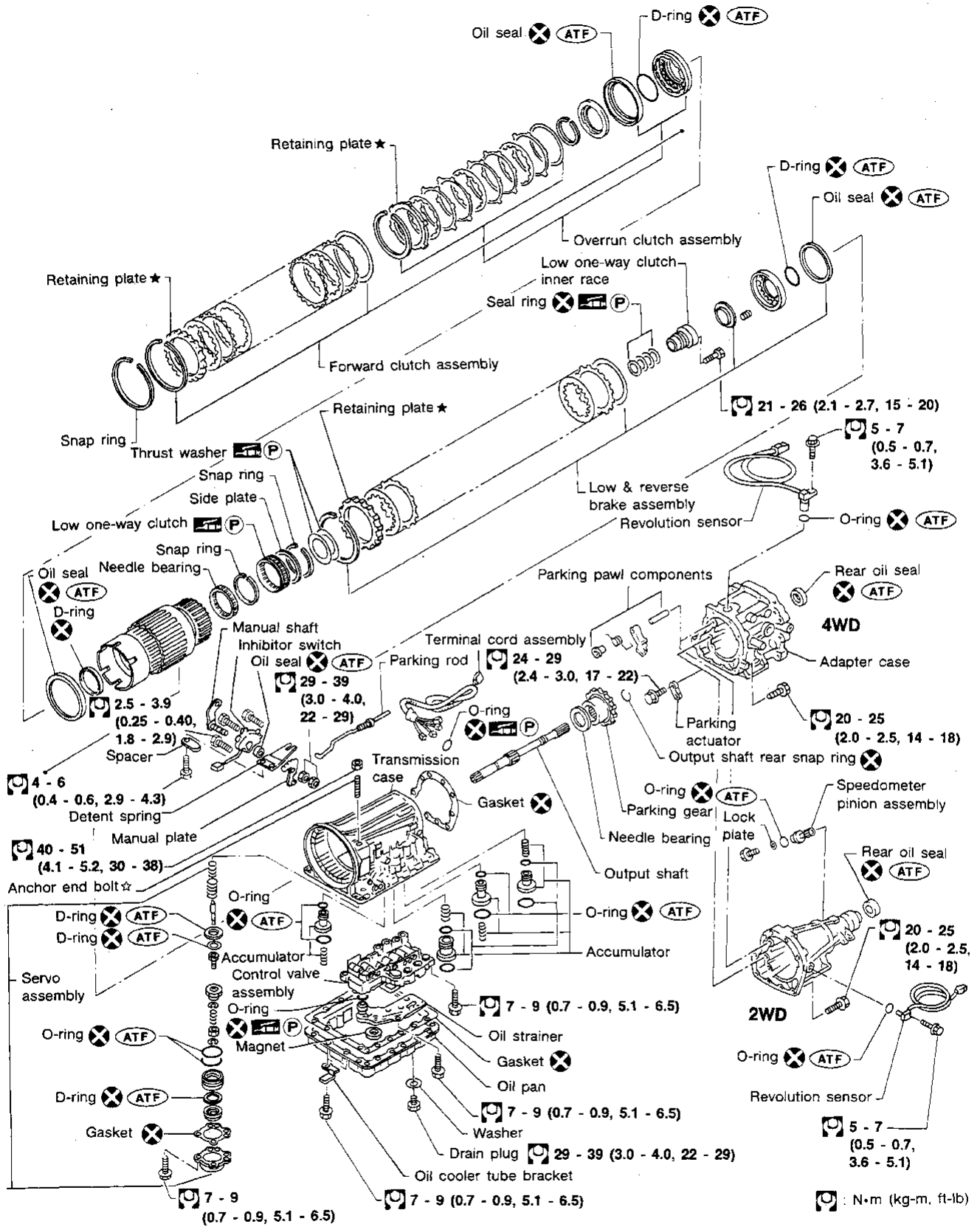
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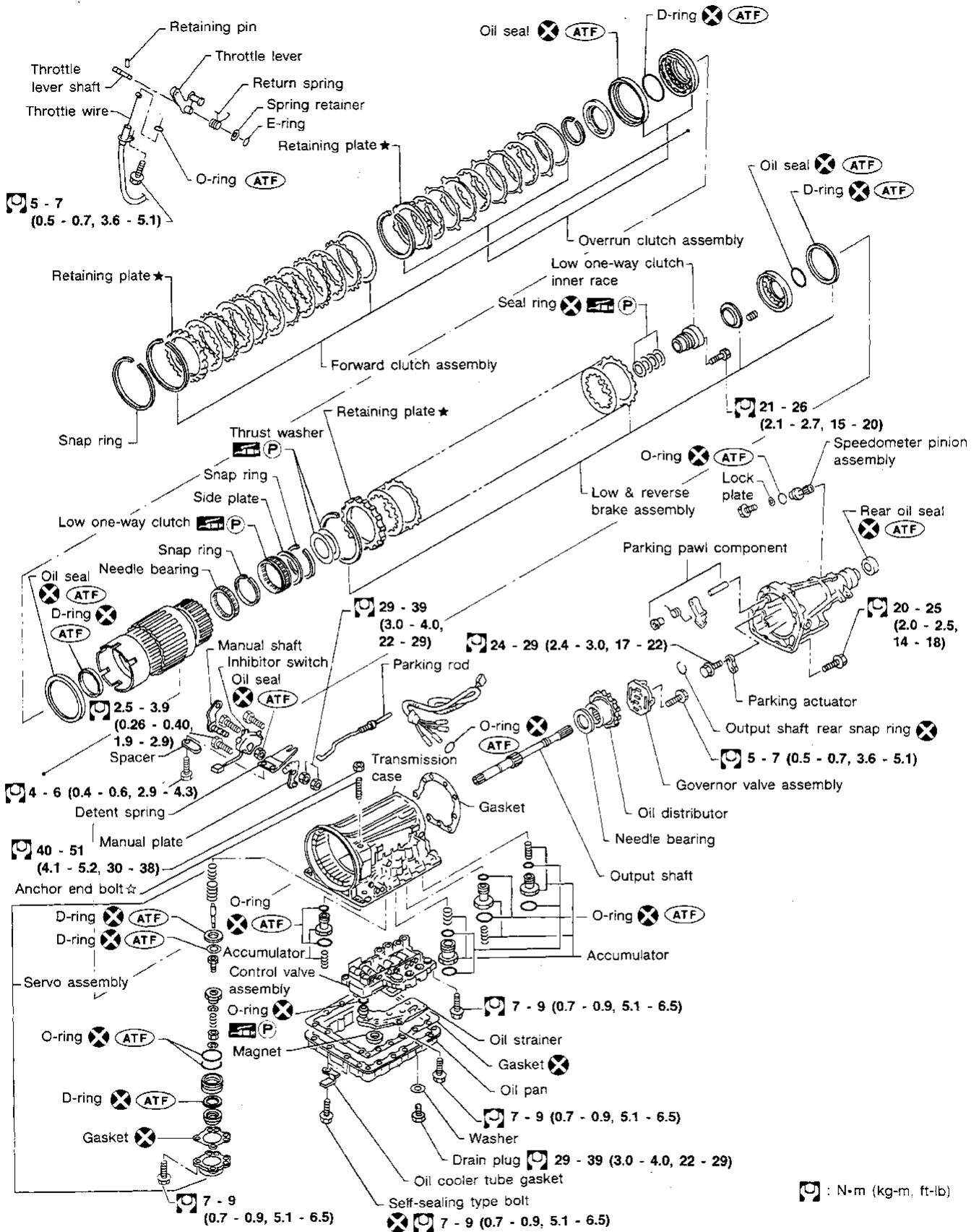
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MAJOR OVERHAUL RE4R01A (Cont'd)



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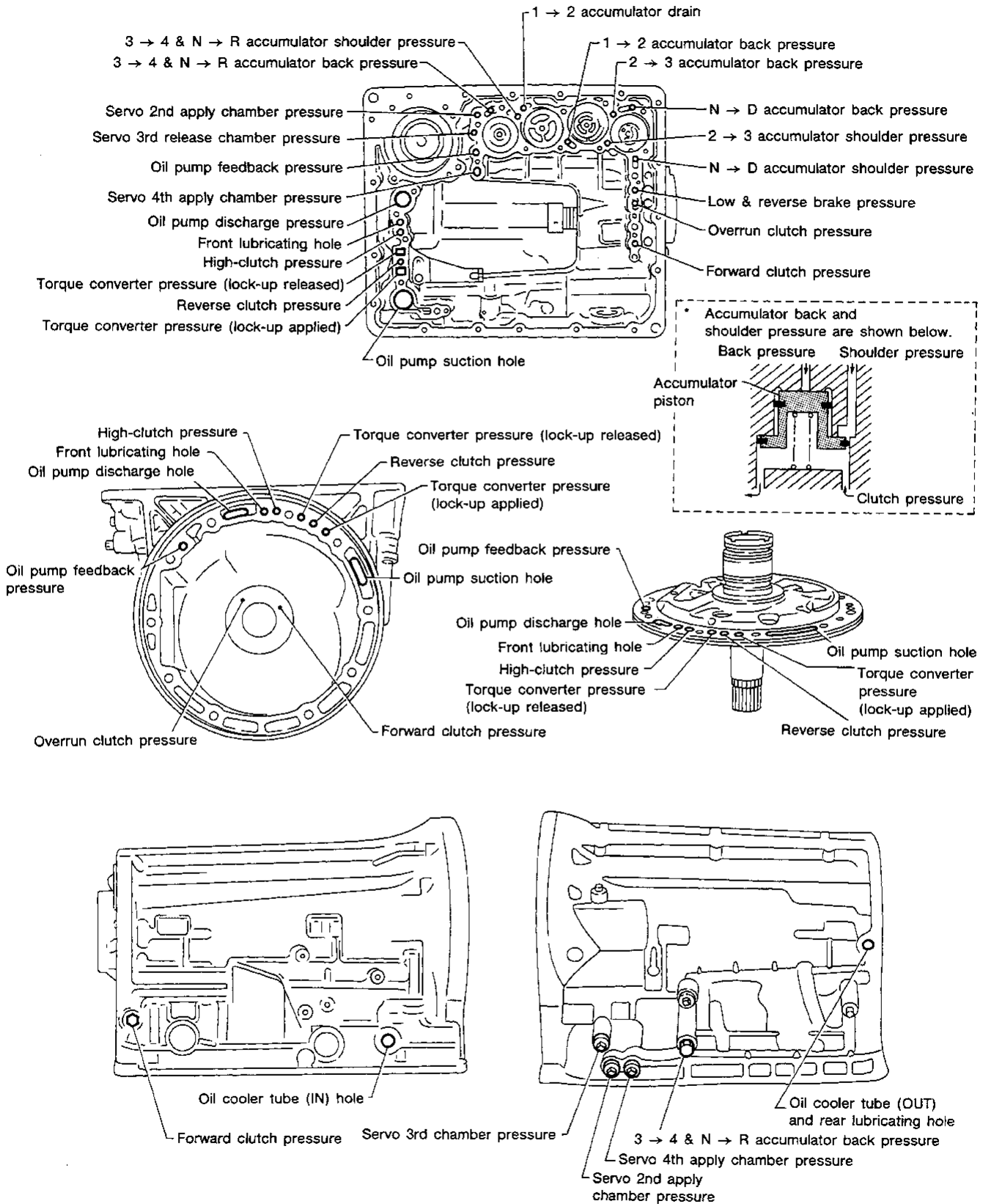
MAJOR OVERHAUL RL4R01A (Cont'd)



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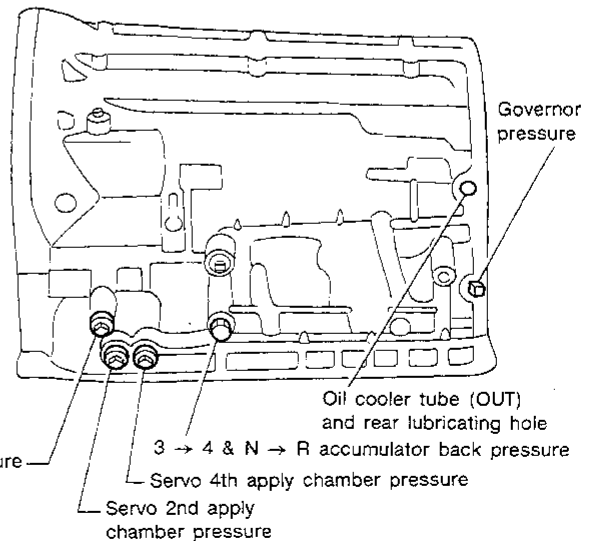
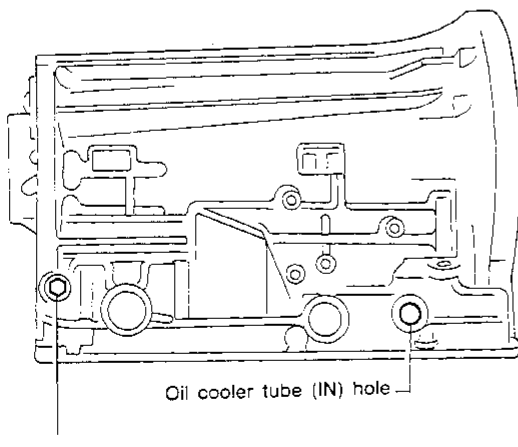
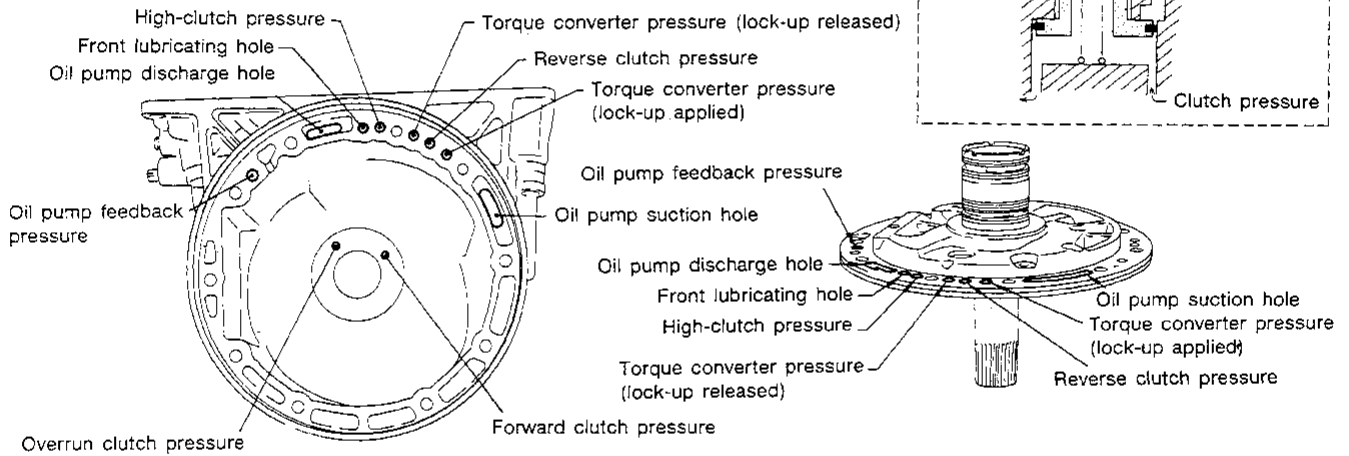
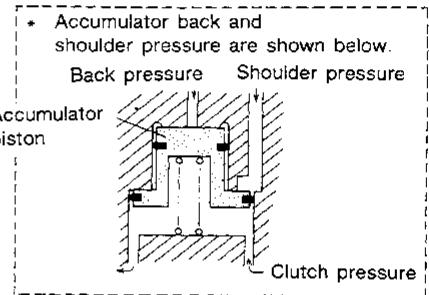
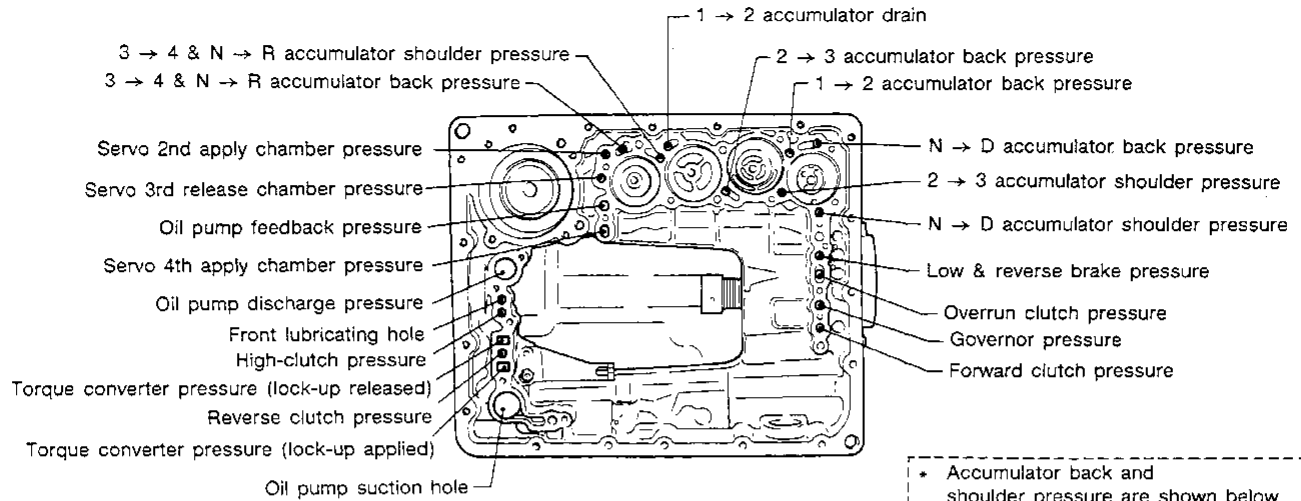
MAJOR OVERHAUL

Oil Channel — RE4R01A



MAJOR OVERHAUL

Oil Channel — RL4R01A



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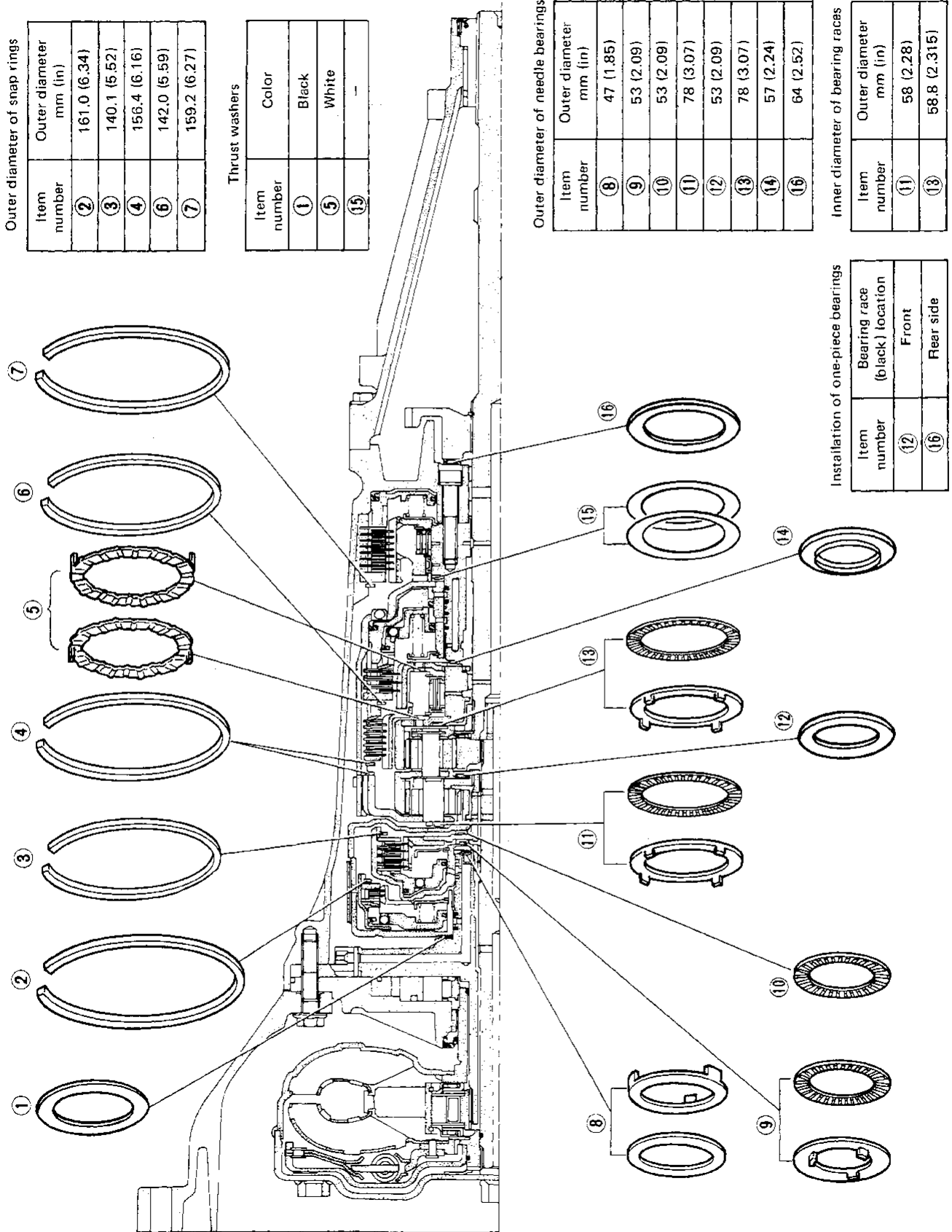
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Locations of Needle Bearings, Thrust Washers and Snap Rings



Outer diameter of snap rings

Item number	Outer diameter mm (in)
②	161.0 (6.34)
③	140.1 (5.52)
④	156.4 (6.16)
⑥	142.0 (5.59)
⑦	159.2 (6.27)

Thrust washers

Item number	Color
①	Black
⑤	White
⑮	-

Outer diameter of needle bearings

Item number	Outer diameter mm (in)
⑧	47 (1.85)
⑨	53 (2.09)
⑩	53 (2.09)
⑪	78 (3.07)
⑫	53 (2.09)
⑬	78 (3.07)
⑭	57 (2.24)
⑯	64 (2.52)

Inner diameter of bearing races

Item number	Outer diameter mm (in)
⑪	58 (2.28)
⑬	58.8 (2.315)

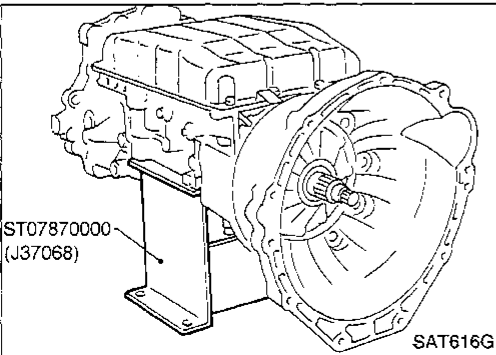
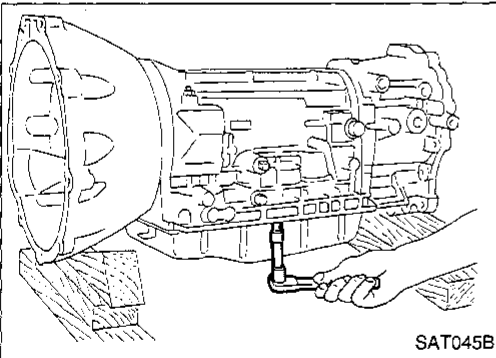
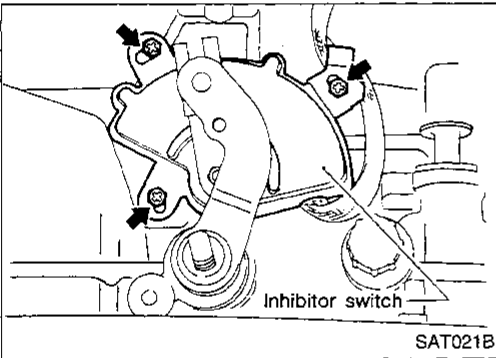
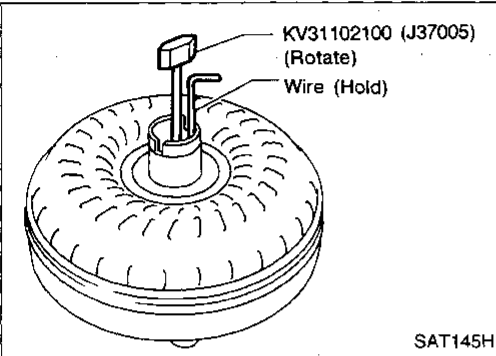
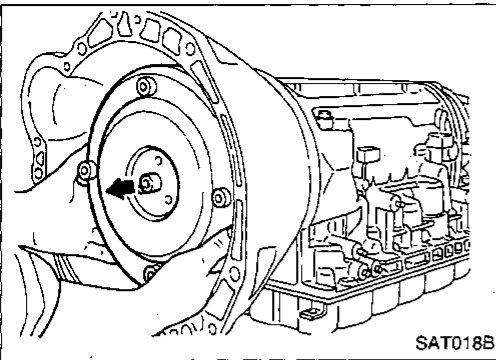
Installation of one-piece bearings

Item number	Bearing race (black) location
⑫	Front
⑯	Rear side

DISASSEMBLY

Disassembly

— RE4R01A and RL4R01A —



1. Removing torque converter by holding it firmly and turning while pulling straight out.

2. Check torque converter one-way clutch.
 - a. Insert Tool into spline of one-way clutch inner race.
 - b. Hook bearing support unitized with one-way clutch outer race with suitable wire.
 - c. Check that one-way clutch inner race rotates only clockwise with Tool while holding bearing support with wire.

3. Remove inhibitor switch from transmission case.

4. Remove oil pan.
 - a. Drain ATF from drain plug.
 - b. Raise oil pan by placing wooden blocks under converter housing and adapter case.
 - c. Separate the oil pan and transmission case.
 - **Always place oil pan straight down so that foreign particles inside will not move.**

5. Place transmission into Tool with the control valve facing up.
6. Check oil pan and oil strainer for accumulation of foreign particles.
 - If materials of clutch facing are found, clutch plates may be worn.
 - If metal filings are found, clutch plates, brake bands, etc. may be worn.
 - If aluminum filings are found, bushings or aluminum cast parts may be worn.

In above cases, replace torque converter and check unit for cause of particle accumulation.

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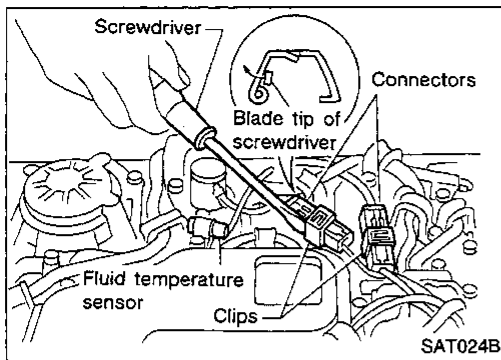
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DISASSEMBLY

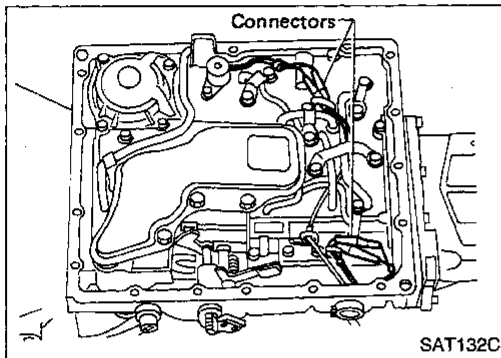
Disassembly (Cont'd)



7.

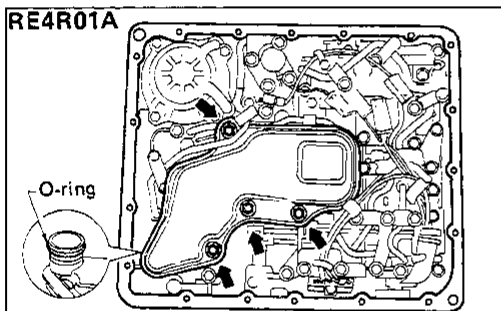
— RE4R01A —

- Remove torque converter clutch solenoid valve and fluid temperature sensor-1 and 2 connectors.
- **Be careful not to damage connector.**



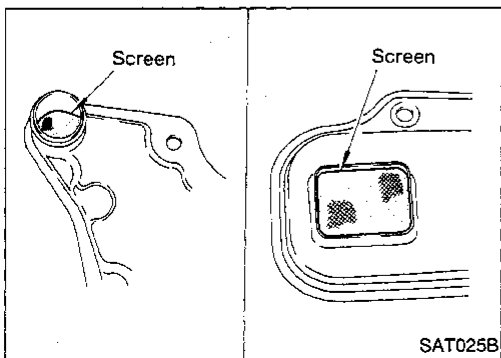
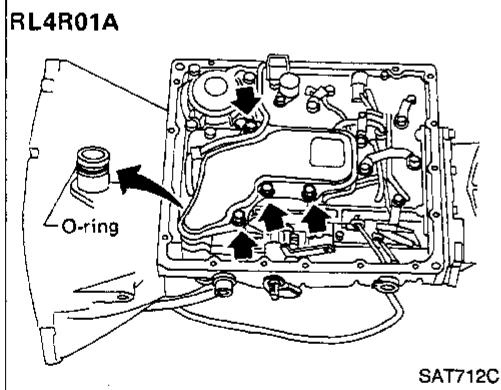
— RL4R01A —

- Remove torque converter clutch solenoid valve and OD cancel solenoid connectors.



8. Remove oil strainer.

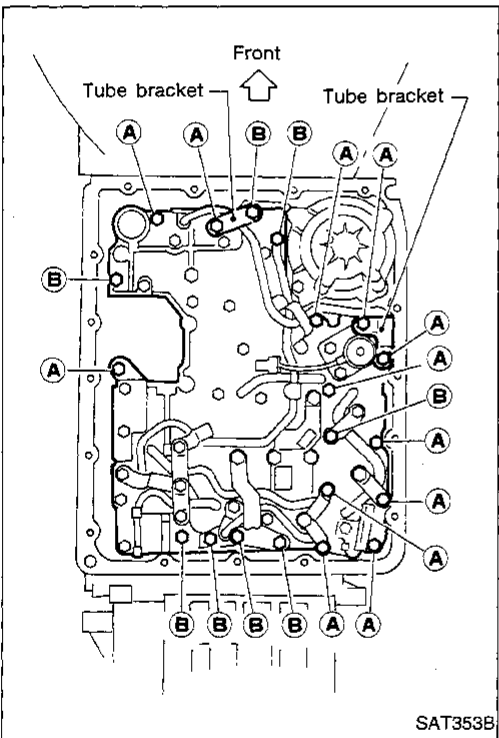
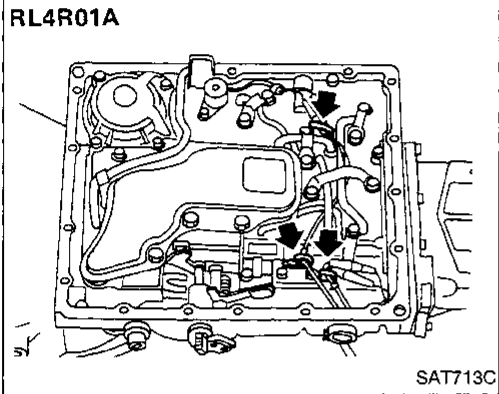
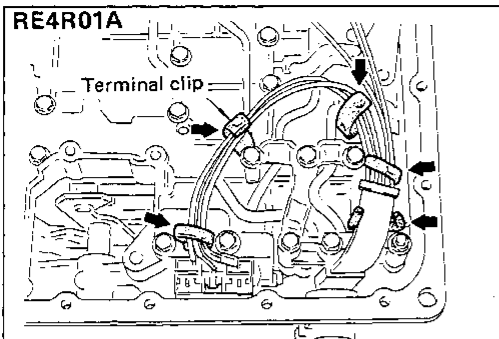
- a. Remove oil strainer from control valve assembly. Then remove O-ring from oil strainer.



- b. Check oil strainer screen for damage.


DISASSEMBLY

Disassembly (Cont'd)



9. Remove control valve assembly.
 - a. Straighten terminal clips to free terminal cords then remove terminal clips.

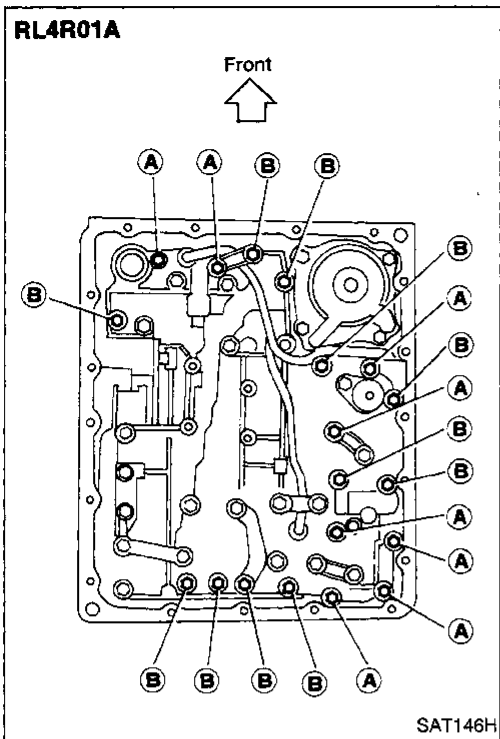
- b. Remove bolts (A) and (B), and remove control valve assembly from transmission.


Bolt	ℓ mm (in)	 ℓ
(A)	33 (1.30)	
(B)	45 (1.77)	

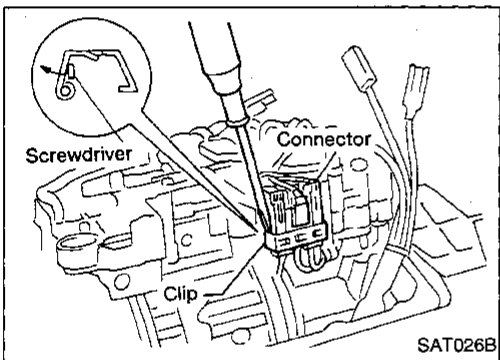
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DISASSEMBLY

Disassembly (Cont'd)

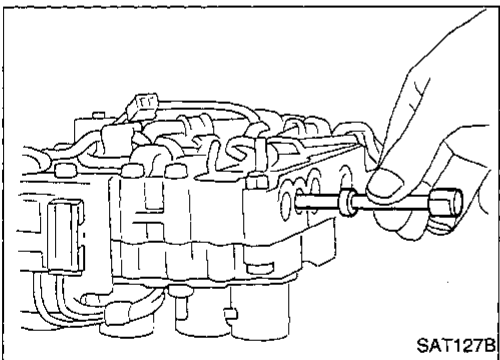


Bolt	ℓ mm (in)	 ℓ
(A)	33 (1.30)	
(B)	45 (1.77)	



— RE4R01A —

- c. Remove solenoid connector.
- **Be careful not to damage connector.**

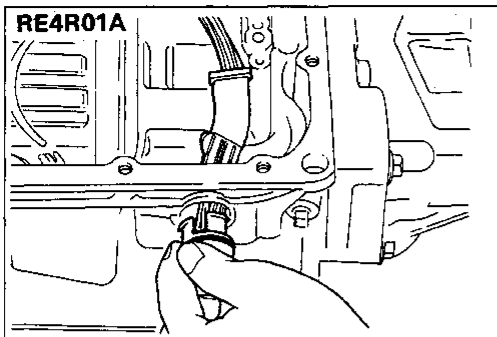


— RE4R01A and RL4R01A —

- d. Remove manual valve from control valve assembly.

DISASSEMBLY

Disassembly (Cont'd)



10. Remove terminal cord assembly from transmission case while pushing on stopper.

- Be careful not to damage cord.
- Do not remove terminal cord assembly unless it is damaged.

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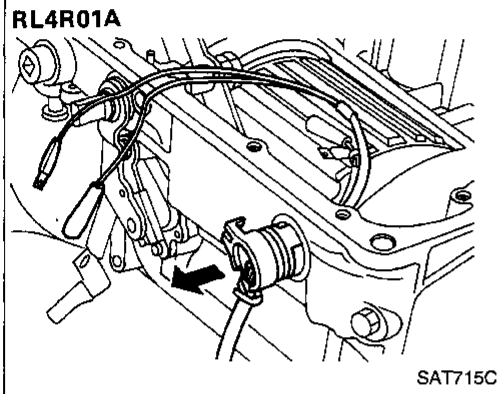
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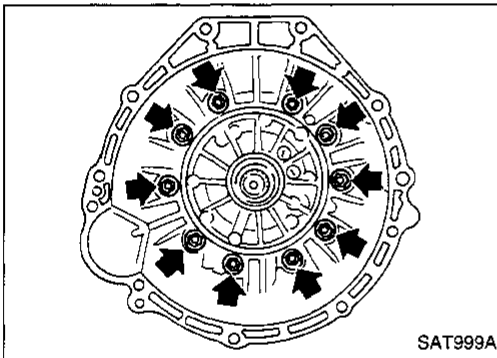
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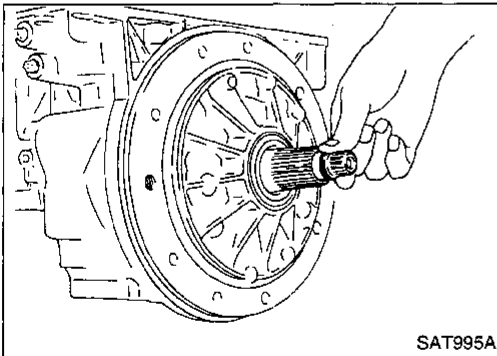
11. Remove converter housing.

- Remove converter housing from transmission case.
- Remove traces of sealant.

- Be careful not to scratch converter housing.

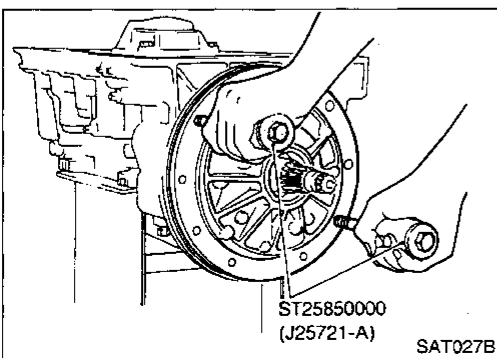


12. Remove O-ring from input shaft.



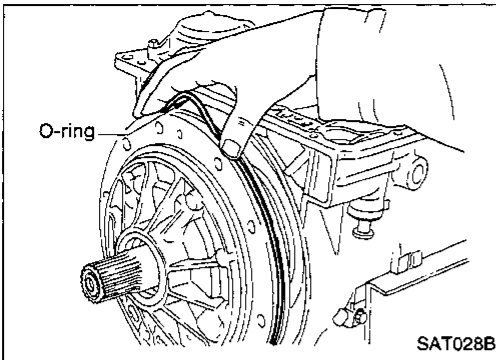
13. Remove oil pump assembly.

- Attach Tool to oil pump assembly and extract it evenly from transmission case.

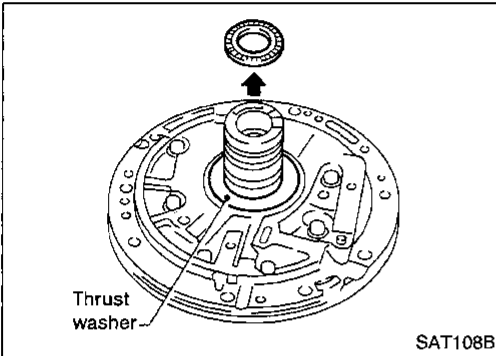


DISASSEMBLY

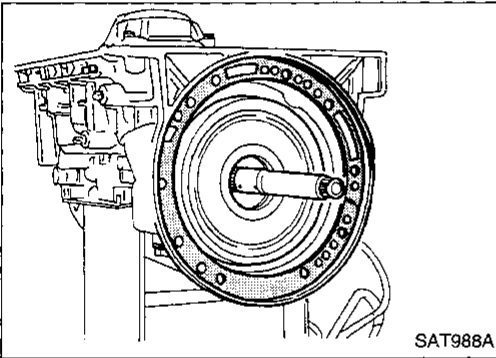
Disassembly (Cont'd)



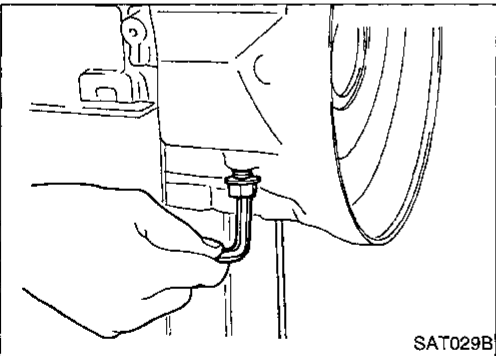
- b. Remove O-ring from oil pump assembly.
- c. Remove traces of sealant from oil pump housing.
- **Be careful not to scratch pump housing.**



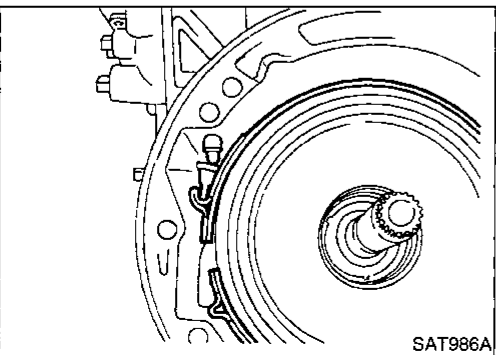
- d. Remove needle bearing and thrust washer from oil pump assembly.



- 14. Remove input shaft and oil pump gasket.



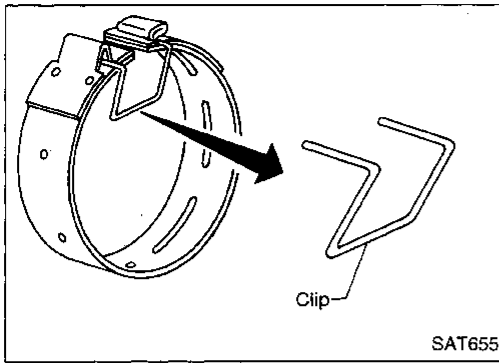
- 15. Remove brake band and band strut.
- a. Loosen lock nut and remove band servo anchor end pin from transmission case.



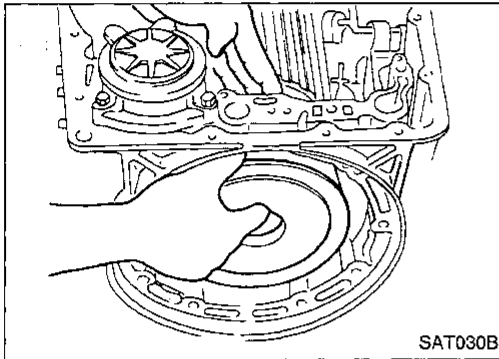
- b. Remove brake band and band strut from transmission case.

DISASSEMBLY

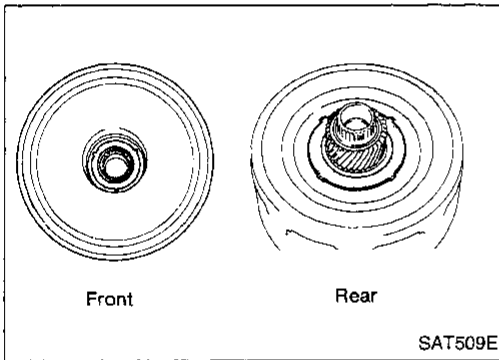
Disassembly (Cont'd)



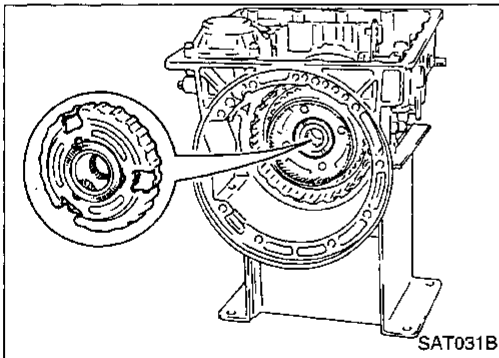
- c. Hold brake band in a circular shape with clip. Check brake band facing for damage, cracks, wear or burns.



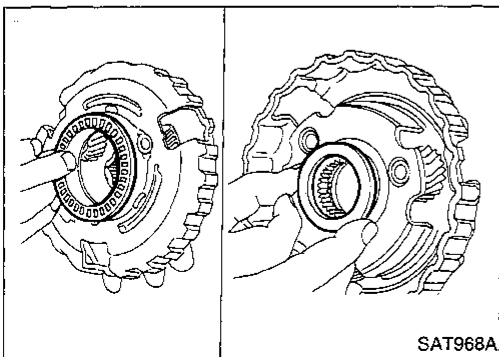
- 16. Remove front side clutch and gear components.
 - a. Remove clutch pack (reverse clutch, high clutch and front sun gear) from transmission case.



- b. Remove front bearing race from clutch pack.
 - c. Remove rear bearing race from clutch pack.



- d. Remove front planetary carrier from transmission case.

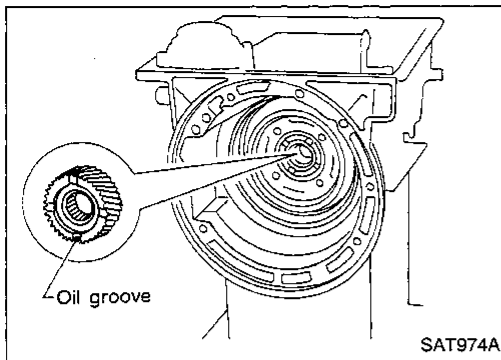


- e. Remove front needle bearing from front planetary carrier.
 - f. Remove rear bearing from front planetary carrier.

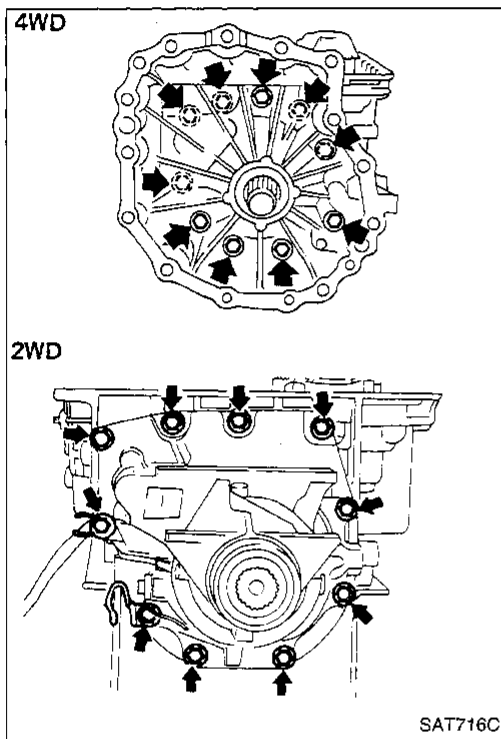
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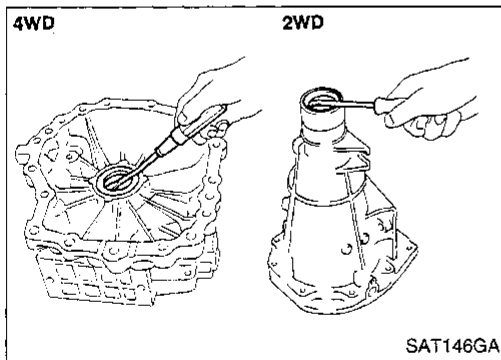
Disassembly (Cont'd)



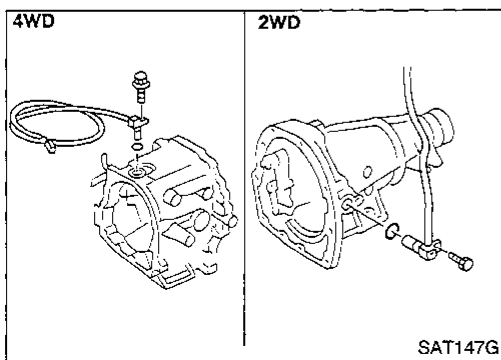
- g. Remove rear sun gear from transmission case.



17. Remove rear extension or adapter case.
- a. Remove rear extension or adapter case from transmission case.
- b. Remove rear extension or adapter case gasket from transmission case.



- c. Remove oil seal from rear extension or adapter case.
- Do not remove oil seal unless it is to be replaced.



— RE4R01A —

- d. Remove revolution sensor from rear extension or adapter case.
- e. Remove O-ring from revolution sensor.

DISASSEMBLY

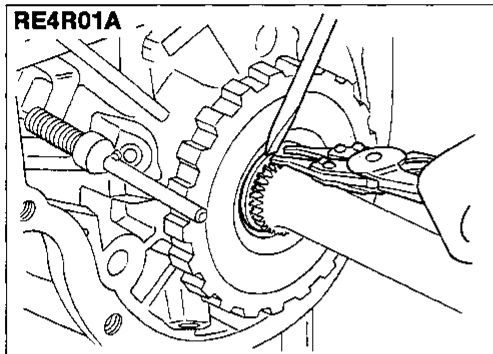
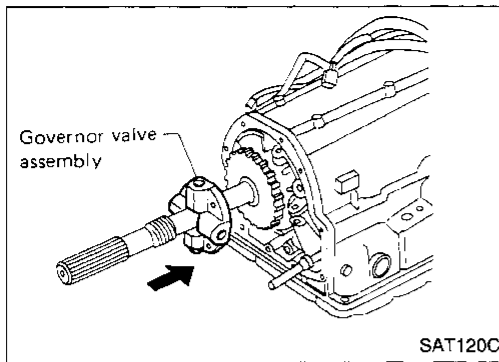
Disassembly (Cont'd)

— RE4R01A and RL4R01A —

18. Remove output shaft and parking gear.

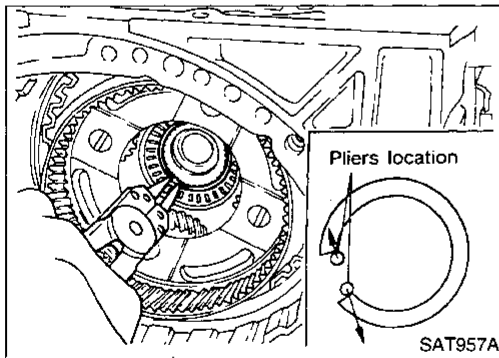
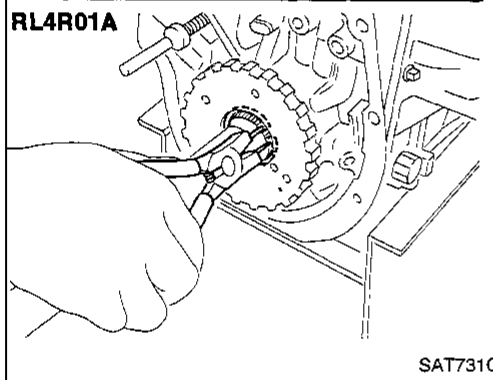
— RL4R01A —

a. Remove governor valve assembly.



— RE4R01A and RL4R01A —

b. Remove rear snap ring from output shaft.



c. Slowly push output shaft all the way forward.

● **Do not use excessive force.**

d. Remove snap ring from output shaft.

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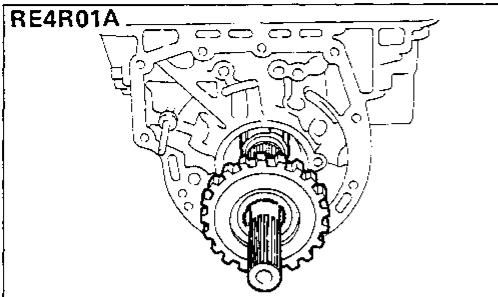
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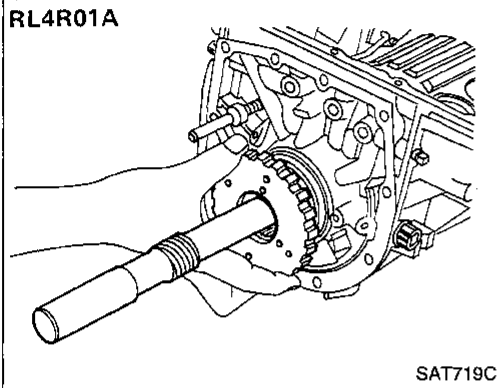
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DISASSEMBLY

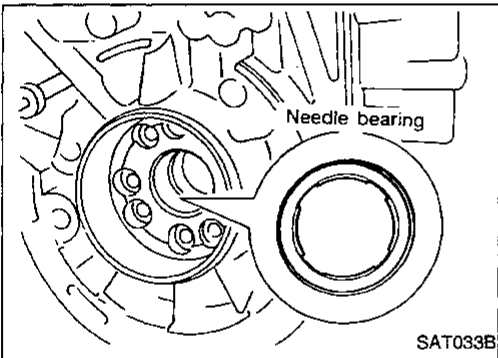
Disassembly (Cont'd)



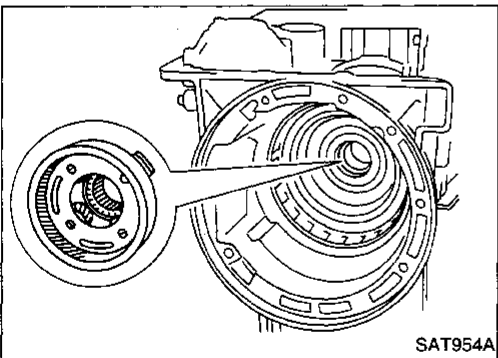
- e. Remove output shaft and parking gear as a unit from transmission case.
- f. Remove parking gear from output shaft.



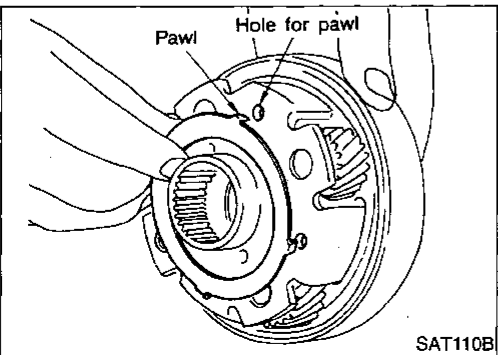
- g. Remove needle bearing from transmission case.



- 19. Remove rear side clutch and gear components.
 - a. Remove front internal gear.

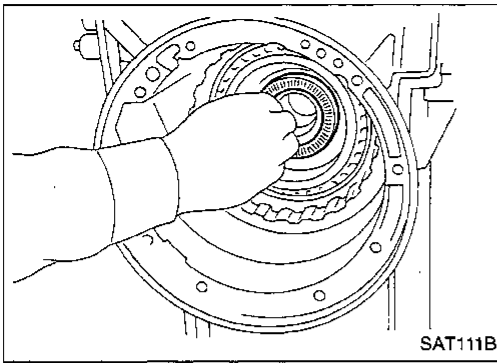


- b. Remove bearing race from front internal gear.

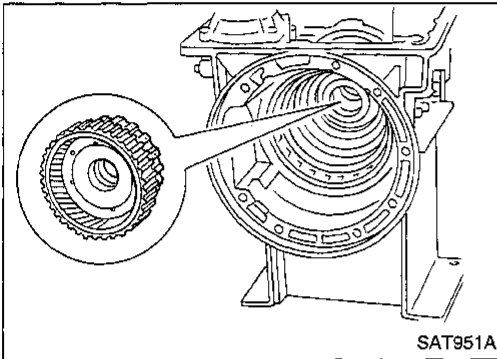


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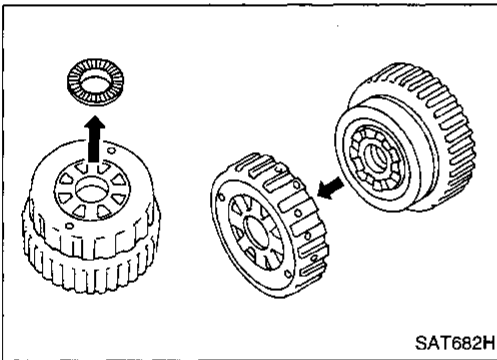
Disassembly (Cont'd)



c. Remove needle bearing from gear internal gear.

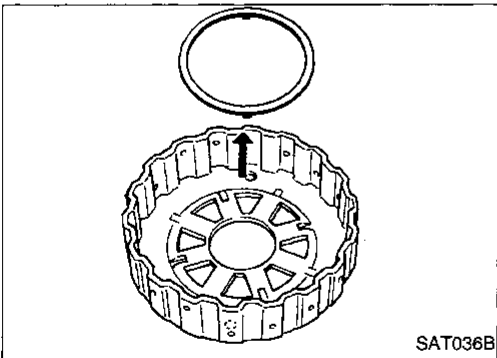


d. Remove rear internal gear, forward clutch hub and overrun clutch hub as a set from transmission case.

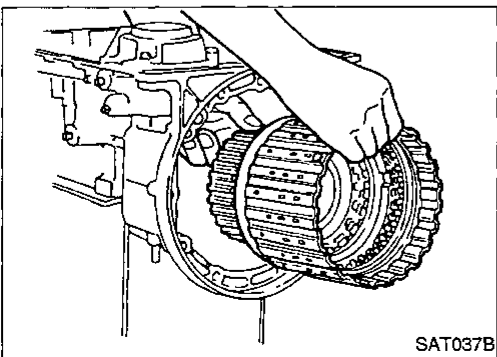


e. Remove needle bearing from overrun clutch hub.

f. Remove overrun clutch hub from rear internal gear and forward clutch hub.



g. Remove thrust washer from overrun clutch hub.



h. Remove forward clutch assembly from transmission case.

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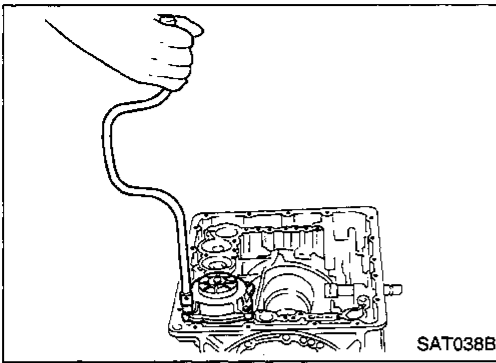
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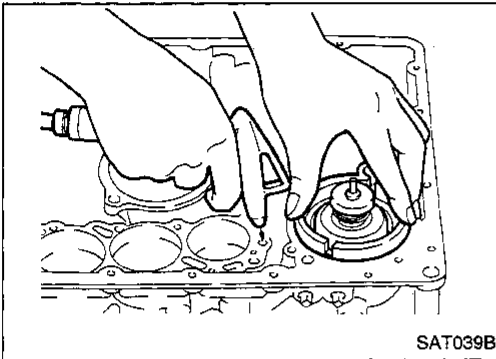
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DISASSEMBLY

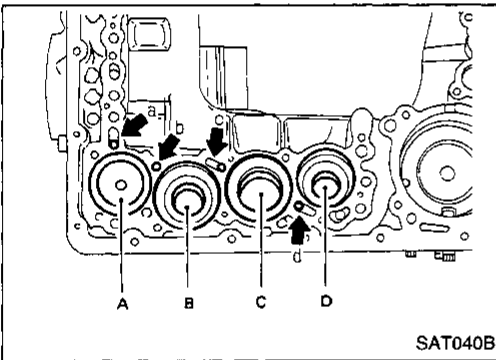
Disassembly (Cont'd)



20. Remove band servo and accumulator components.
- Remove band servo retainer from transmission case.

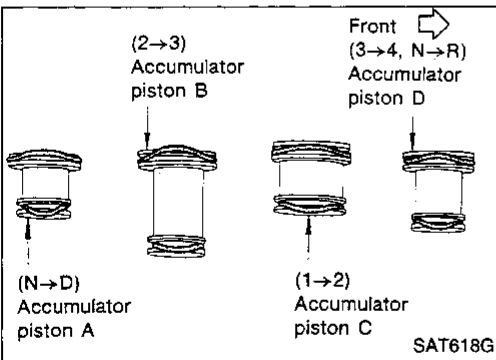


- Apply compressed air to oil hole until band servo piston comes out of transmission case.
 - Hold piston with a rag and gradually direct air to oil hole.
- Remove return springs.

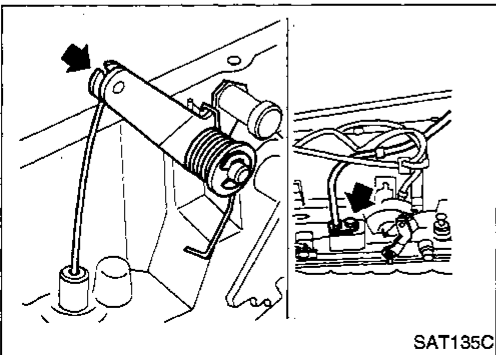


- Remove springs from accumulator pistons B, C and D.
- Apply compressed air to each oil hole until piston comes out.
 - Hold piston with a rag and gradually direct air to oil hole.

Identification of accumulator pistons	A	B	C	D
Identification of oil holes	a	b	c	d



- Remove O-ring from each piston.

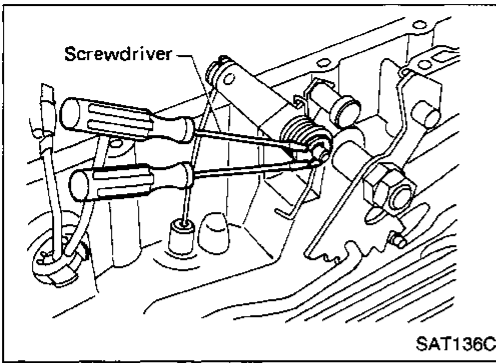


— RL4R01A —

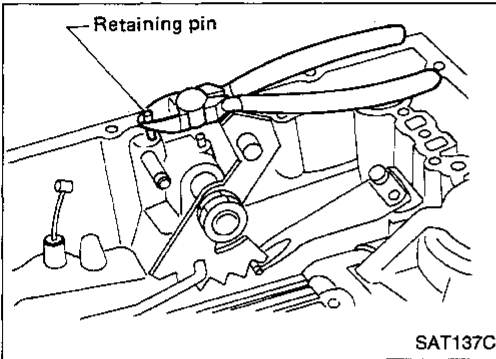
21. Remove throttle wire components if necessary.
- Remove throttle wire from A/T assembly.

DISASSEMBLY

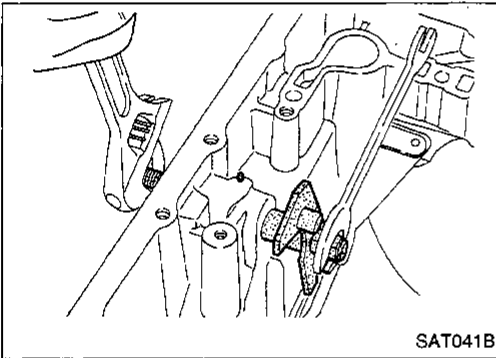
Disassembly (Cont'd)



- b. Remove throttle lever shaft E-ring.
- c. Remove return spring.
- d. Remove throttle lever.



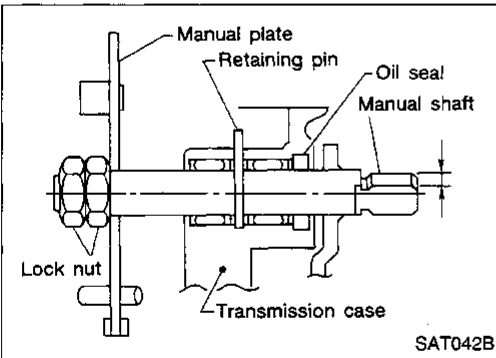
- e. Remove throttle lever shaft retaining pin and throttle lever shaft.



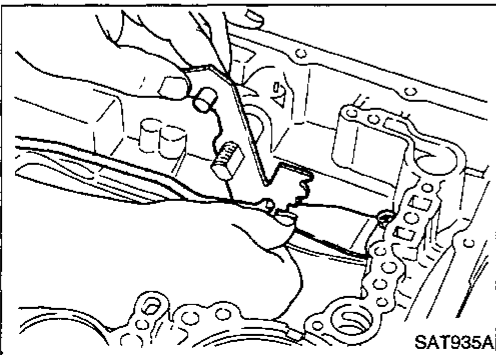
— RE4R01A and RL4R01A —

22. Remove manual shaft components, if necessary.

- a. Hold width across flats of manual shaft (outside the transmission case) and remove lock nut from shaft.



- b. Remove retaining pin from transmission case.



- c. While pushing detent spring down, remove manual plate and parking rod from transmission case.

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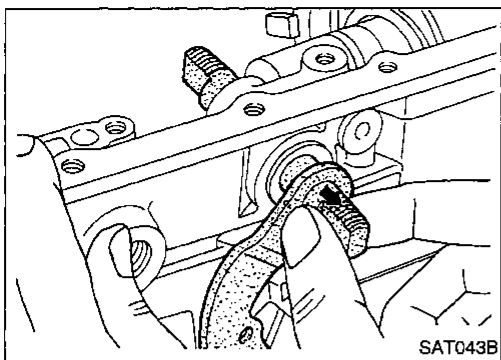
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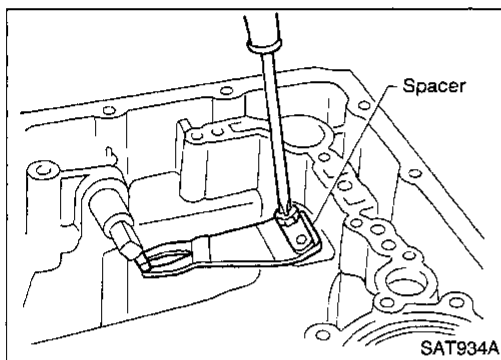
DISASSEMBLY

Disassembly (Cont'd)

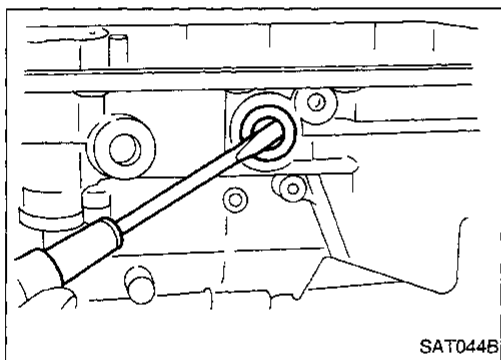
- d. Remove manual shaft from transmission case.



- e. Remove spacer and detent spring from transmission case.

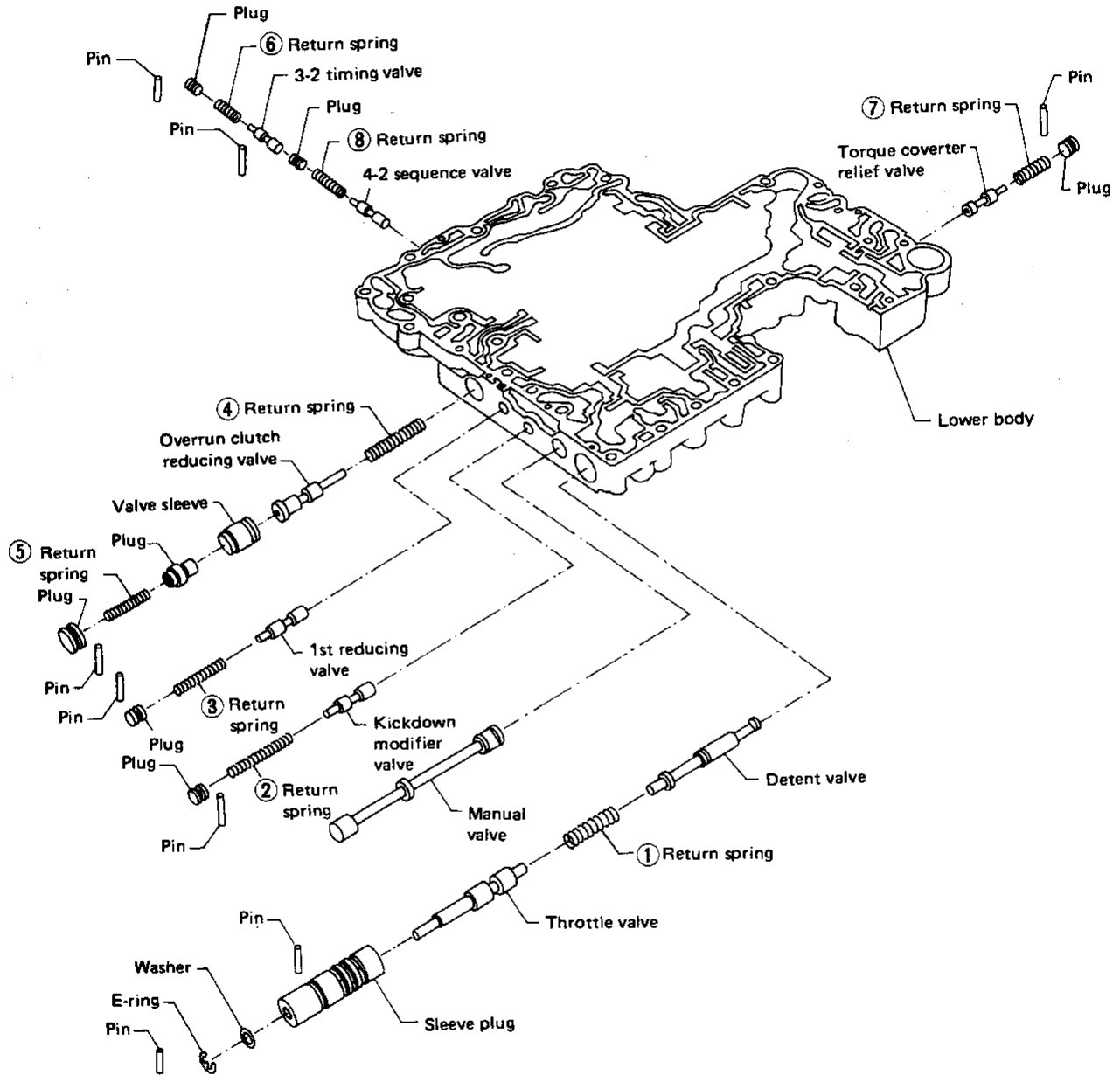


- f. Remove oil seal from transmission case.



REPAIR FOR COMPONENT PARTS

Control Valve Lower Body — RL4R01A



Apply ATF to all components before their installation.

Numbers preceding valve springs correspond with those shown in Spring Chart.

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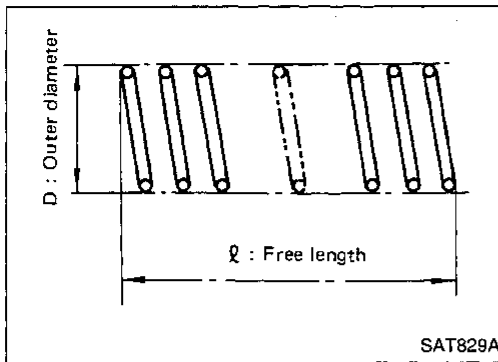
REPAIR FOR COMPONENT PARTS

Control Valve Lower Body — RL4R01A (Cont'd)

INSPECTION

Valve springs

- Check each valve spring for damage or deformation. Also measure free length and outer diameter.
- Numbers of each valve spring listed in table below are the same as those in the figure in AT-41.



Inspection standard

Unit: mm (in)

Parts	Item		
	Part No.	ℓ	D
① Throttle valve & detent valve spring	31802-48X02	34.23 (1.3476)	11.0 (0.433)
② Kickdown modifier valve spring	31756-48X01	45.3 (1.783)	7.0 (0.276)
③ 1st reducing valve spring	31756-48X08	29.7 (1.169)	7.2 (0.283)
④ Overrun clutch reducing valve spring	31742-48X21	33.2 (1.307)	7.7 (0.303)
⑤ Overrun clutch reducing valve spring	31742-48X05	31.0 (1.220)	5.2 (0.205)
⑥ 3-2 timing valve spring	31742-48X15	23.0 (0.906)	7.0 (0.276)
⑦ Torque converter relief valve spring	31742-41X23	38.0 (1.496)	9.0 (0.354)
⑧ 4-2 sequence valve spring	31756-41X00	29.1 (1.146)	6.95 (0.2736)

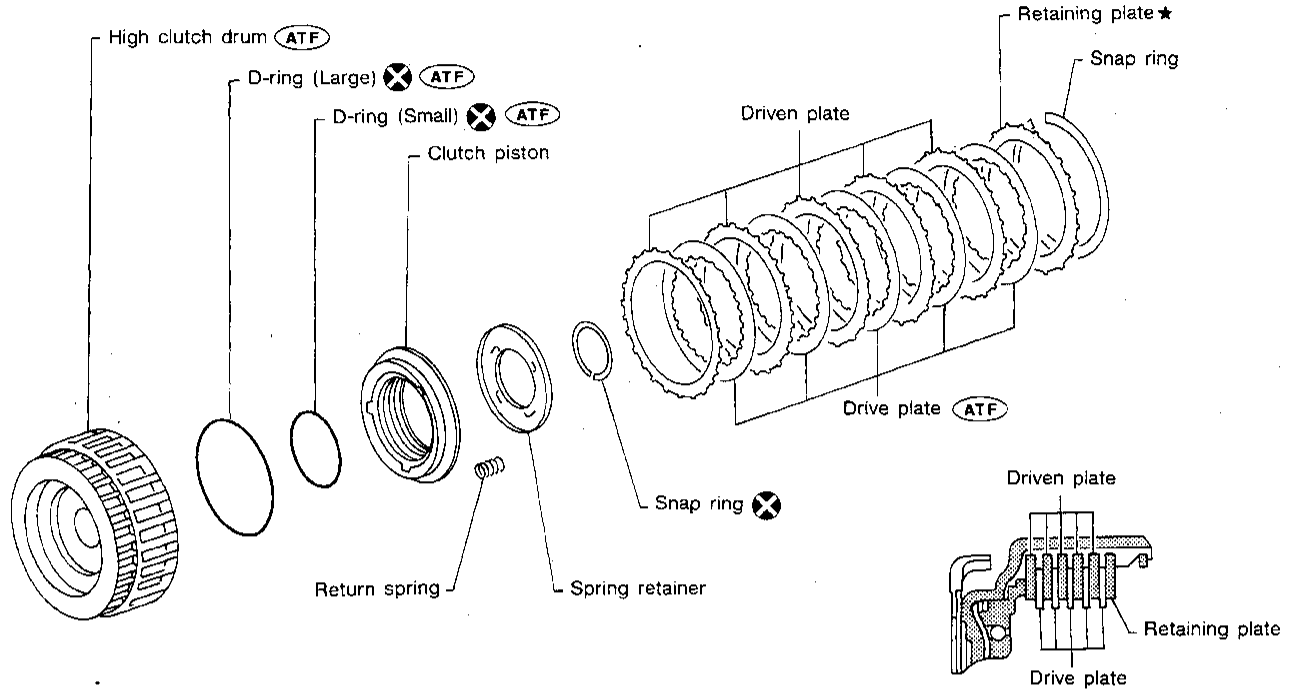
- Replace valve springs if deformed or fatigued.

Control valves

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

High Clutch — RE4R01A and RL4R01A

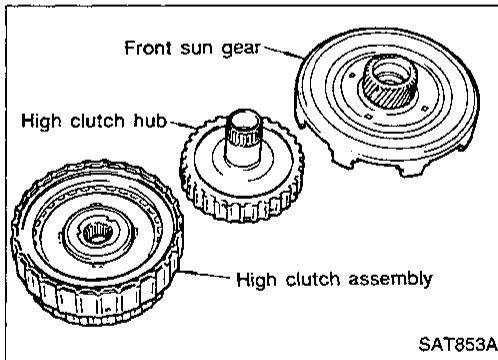
For the number of clutch sheets (drive plate and driven plate), refer to the below cross-section.



(ATF) : Apply ATF.
 ★ : Select with proper thickness.

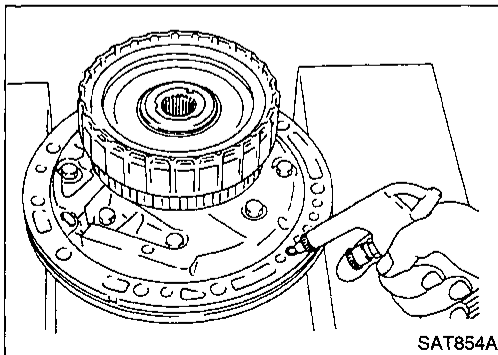
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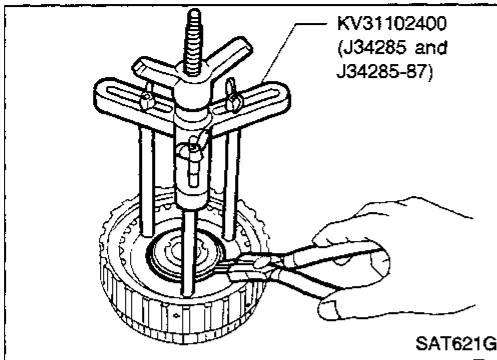
Service procedures for high clutch are essentially the same as those for reverse clutch, with the following exception:

- Check of high clutch operation

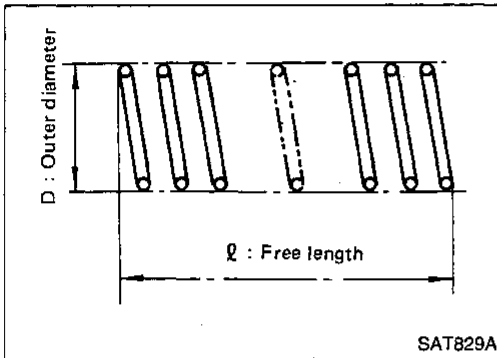


REPAIR FOR COMPONENT PARTS

High Clutch — RE4R01A and RL4R01A (Cont'd)

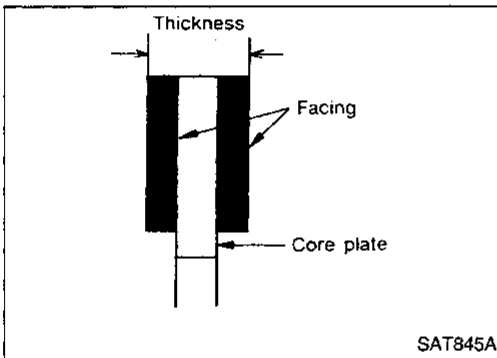


- Removal and installation of return spring



- Inspection of high clutch return springs
- Inspection standard**

Part No.	Unit: mm (in)	
	ℓ	D
31505-21X03	22.06 (0.8685)	11.6 (0.457)



- Inspection of high clutch drive plate

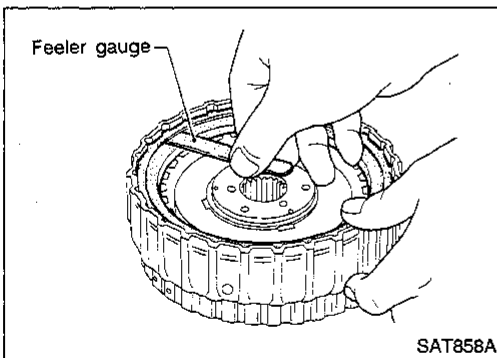
Thickness of drive plate:

Standard

1.52 - 1.67 mm (0.0598 - 0.0657 in)

Wear limit

1.40 mm (0.0551 in)



- Measurement of clearance between retaining plate and snap ring

Specified clearance:

Standard

1.8 - 2.2 mm (0.071 - 0.087 in)

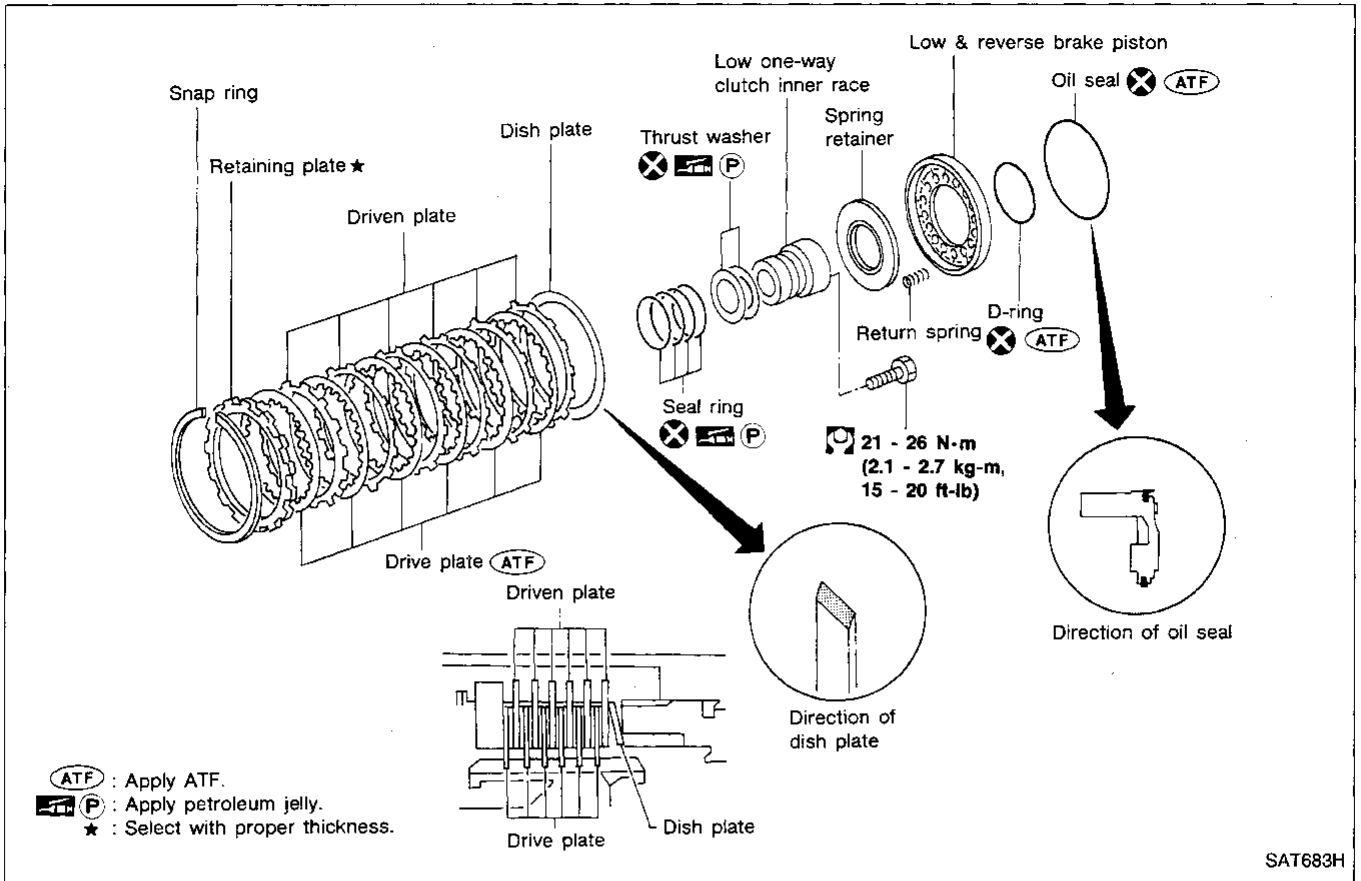
Allowable limit

2.8 mm (0.110 in)

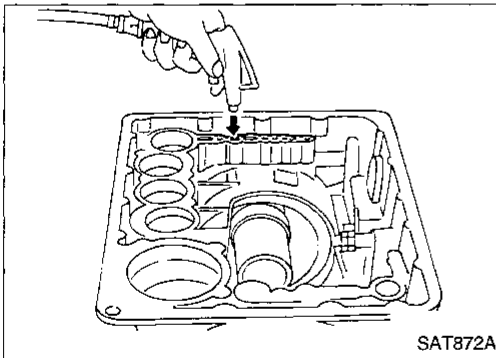
Retaining plate:

Refer to SDS (AT-62).

Low & Reverse Brake — RE4R01A and RL4R01A

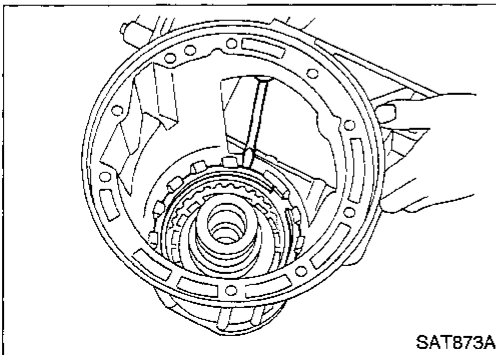


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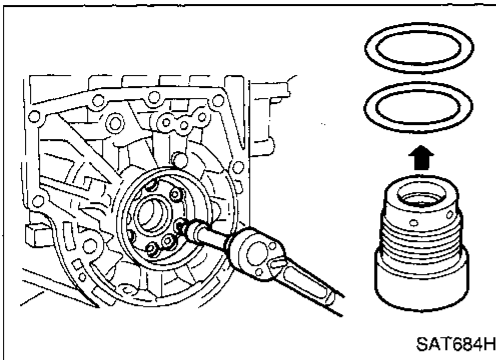
DISASSEMBLY

1. Check operation of low & reverse brake.
 - a. Install seal ring onto oil pump cover and install reverse clutch. 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, low & reverse brake drive plates, driven plates and dish plate.

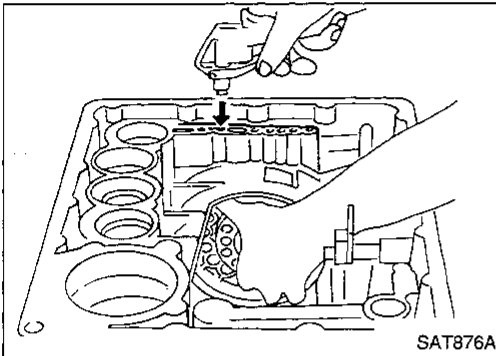


REPAIR FOR COMPONENT PARTS

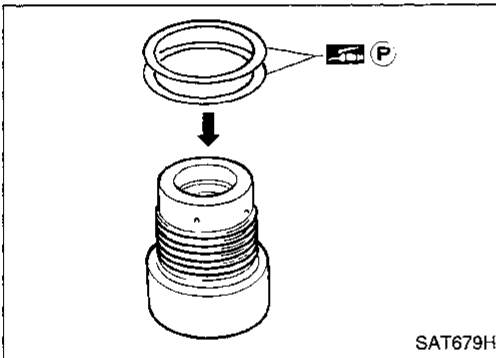
Low & Reverse Brake — RE4R01A and RL4R01A (Cont'd)



3. Remove low one-way clutch inner race, spring retainer and return spring from transmission case.
4. Remove seal rings from low one-way clutch inner race.
5. Remove thrust washers from low one-way clutch inner race.

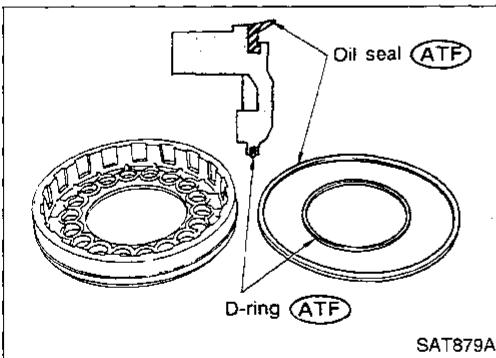


6. Remove low & reverse brake piston using compressed air.
7. Remove oil seal and D-ring from piston.

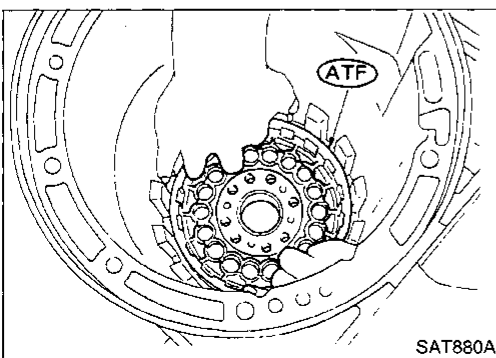


ASSEMBLY

1. Install thrust washers onto one-way clutch inner race.
 - Pay attention to its direction — Black surface goes to rear side.
 - Apply petroleum jelly to thrust washers.



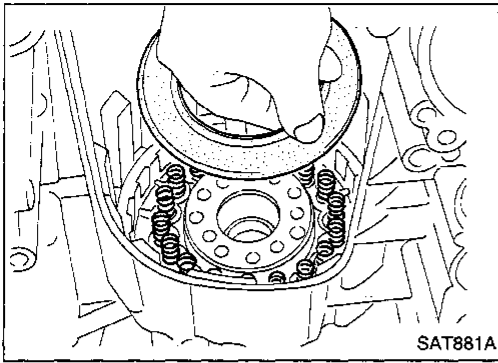
2. Install oil seal and D-ring onto piston.
 - Apply ATF to oil seal and D-ring.



3. Install piston by rotating it slowly and evenly.
 - Apply ATF to inner surface of transmission case.

REPAIR FOR COMPONENT PARTS

Low & Reverse Brake — RE4R01A and RL4R01A (Cont'd)



4. Install return springs, spring retainer and low one-way clutch inner race onto transmission case.

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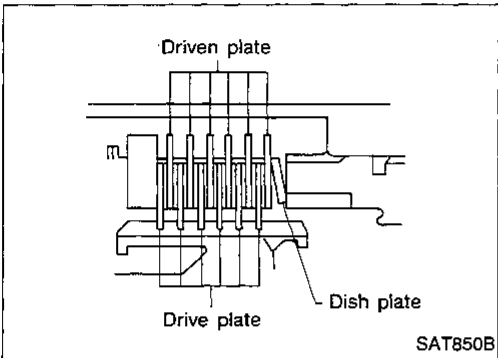
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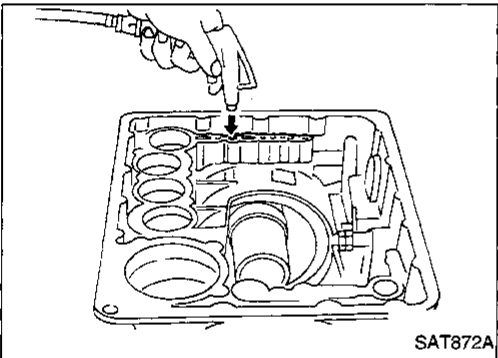
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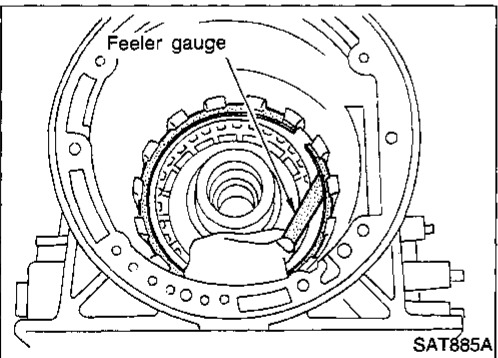
IDX



5. Install dish plate low & reverse brake drive plates, driven plates and retaining plate.
6. Install snap ring on transmission case.



7. Check operation of low & reverse brake clutch piston. Refer to "DISASSEMBLY" (AT-45).



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

Specified clearance:

Standard

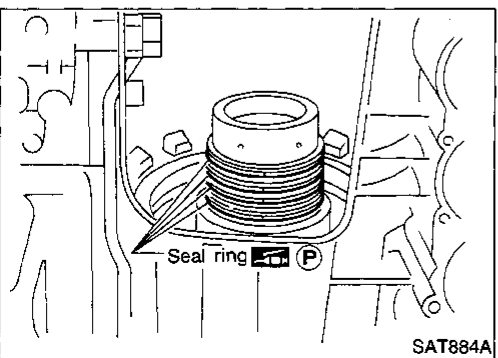
1.1 - 1.5 mm (0.043 - 0.059 in)

Allowable limit

2.3 mm (0.091 in)

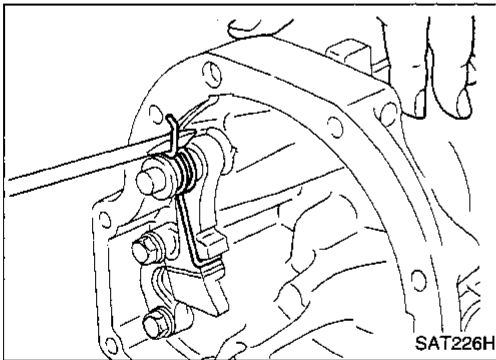
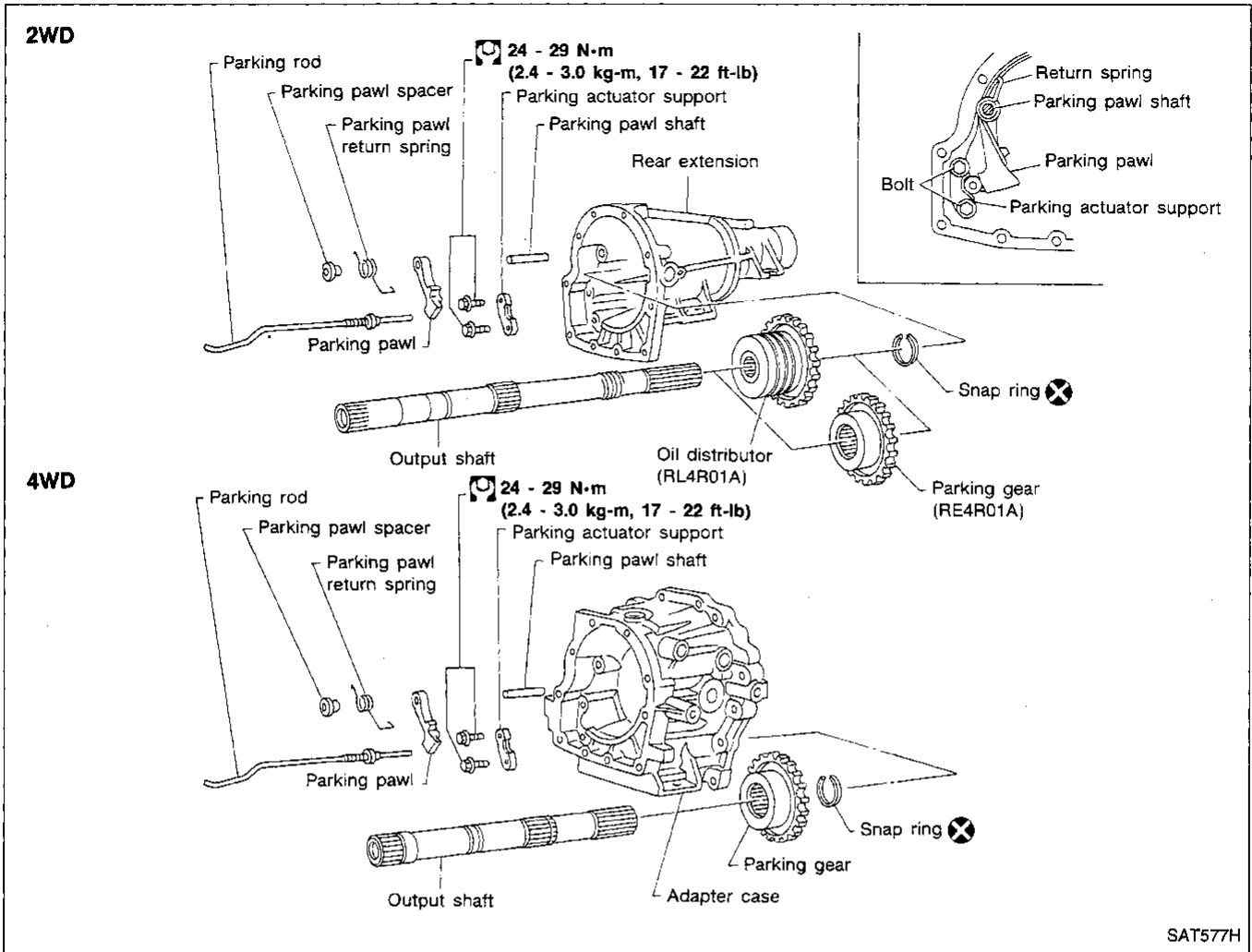
Retaining plate:

Refer to SDS (AT-63).



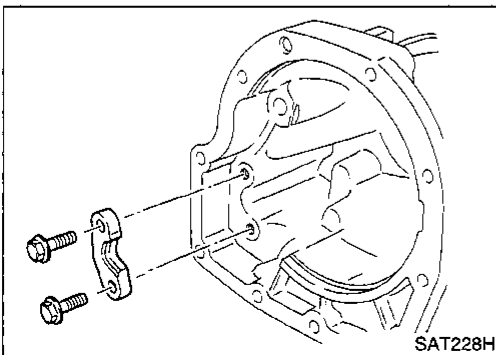
9. Install low one-way clutch inner race seal ring.
- Apply petroleum jelly to seal ring.
 - Make sure seal rings are pressed firmly into place and held by petroleum jelly.

Parking Pawl Components — RE4R01A and RL4R01A



DISASSEMBLY

1. Slide return spring to the front of rear extension case flange or adapter case flange.
2. Remove return spring, pawl spacer and parking pawl from rear extension or adapter case.
3. Remove parking pawl shaft from rear extension or adapter case.



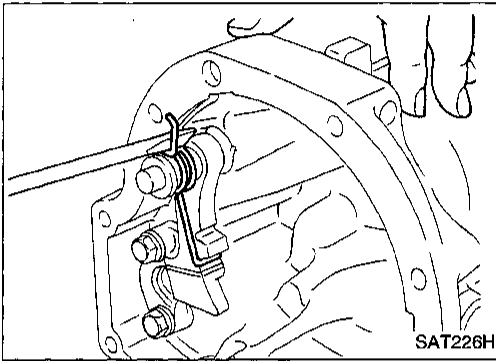
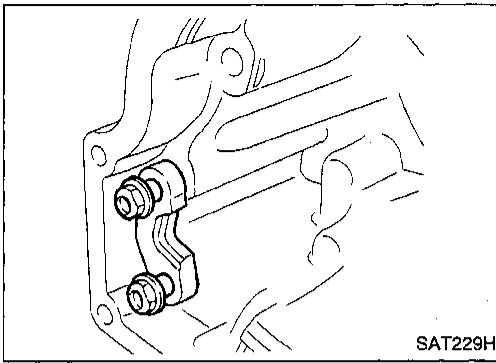
4. Remove parking actuator support from rear extension or adapter case.

REPAIR FOR COMPONENT PARTS

Parking Pawl Components — RE4R01A and RL4R01A (Cont'd)

ASSEMBLY

1. Install parking actuator support onto rear extension or adapter case.
2. Insert parking pawl shaft into rear extension or adapter case.
3. Install return spring, pawl spacer and parking pawl onto parking pawl shaft.



4. Bend return spring upward and install it onto rear extension or adapter case.

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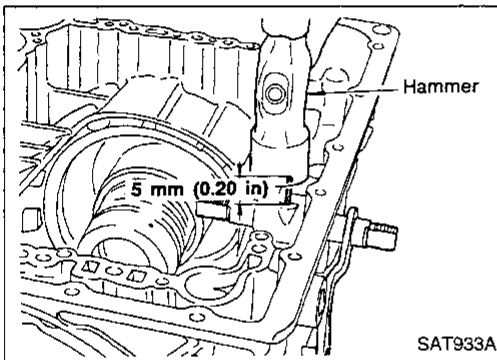
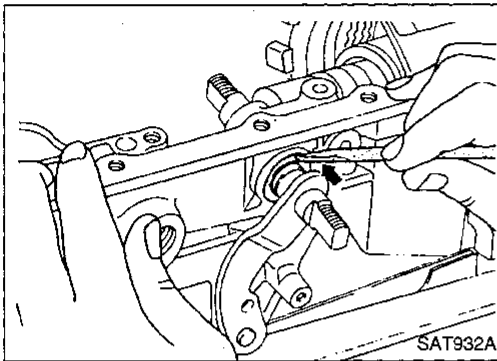
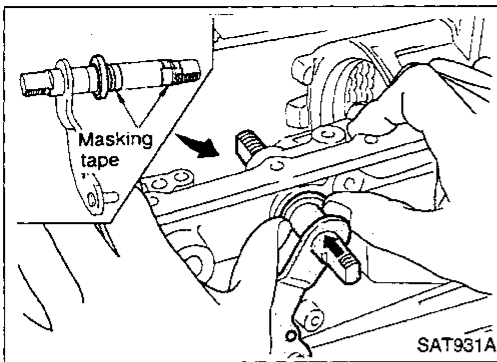
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ASSEMBLY

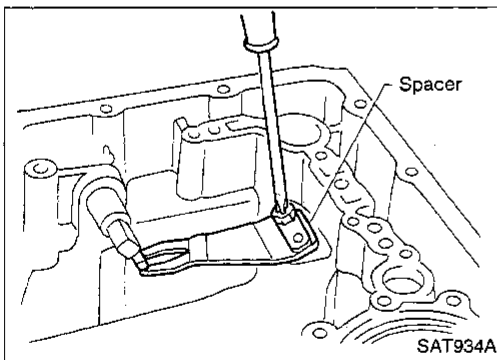
Assembly (1)

— RE4R01A and RL4R01A —

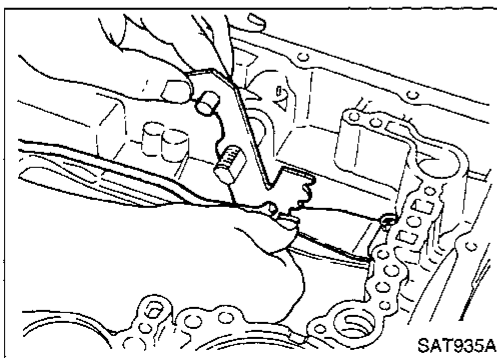
1. Install manual shaft components.
 - a. Install oil seal onto manual shaft.
 - Apply ATF to oil seal.
 - Wrap threads of manual shaft with masking tape.
 - b. Insert manual shaft and oil seal as a unit into transmission case.
 - c. Remove masking tape.
- d. Push oil seal evenly and install it onto transmission case.



- e. Align groove in shaft with drive pin hole, then drive pin into position as shown in figure at left.



- f. Install detent spring and spacer.

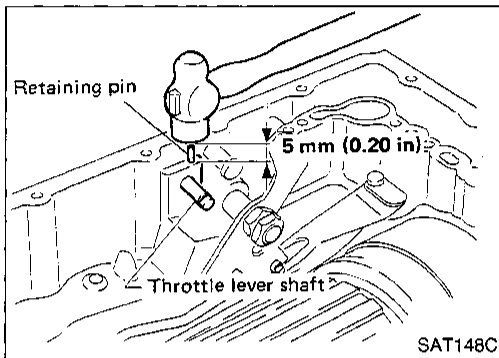
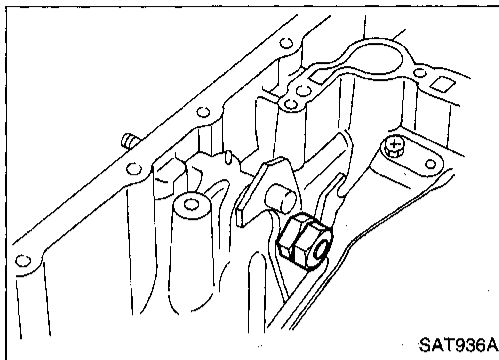


- g. While pushing detent spring down, install manual plate onto manual shaft.

ASSEMBLY

Assembly (1) (Cont'd)

h. Install lock nuts onto manual shaft.

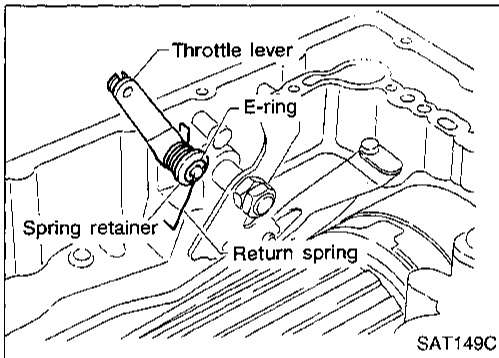


— RL4R01A —

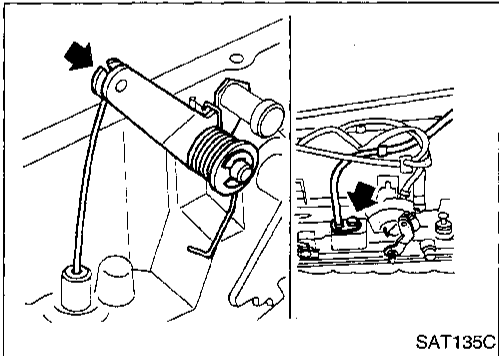
2. Install throttle lever components.

a. Install throttle lever shaft.

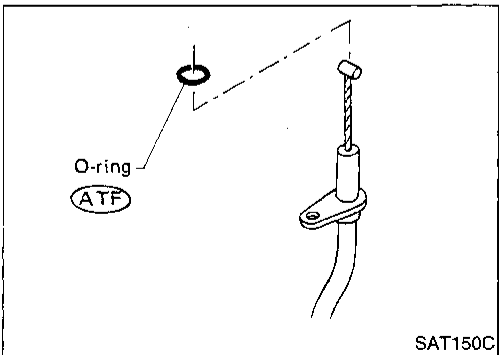
b. Align groove in shaft with drive pin hole, then drive pin into position as shown in figure at left.



c. Install throttle lever, return spring, spring retainer and E-ring.



d. Install throttle wire.



• Apply ATF to O-ring.

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ASSEMBLY

Assembly (1) (Cont'd)

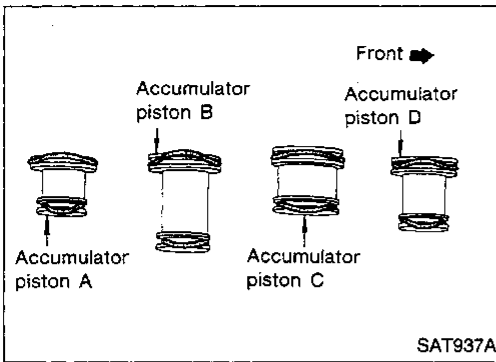
— RE4R01A and RL4R01A —

3. Install accumulator piston.
 - a. Install O-rings onto accumulator piston.
 - **Apply ATF to O-rings.**

Accumulator piston O-rings

Unit: mm (in)

Accumulator	A	B	C	D
Small diameter end	29 (1.14)	32 (1.26)	45 (1.77)	29 (1.14)
Large diameter end	45 (1.77)	50 (1.97)	50 (1.97)	45 (1.77)

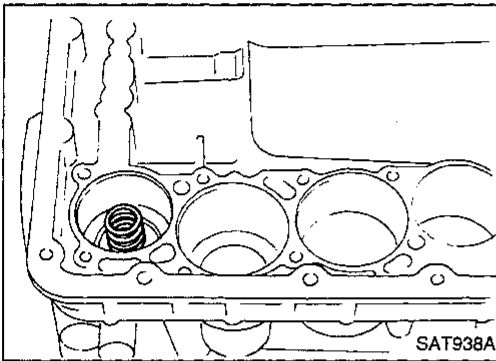


- b. Install return spring for accumulator A onto transmission case.

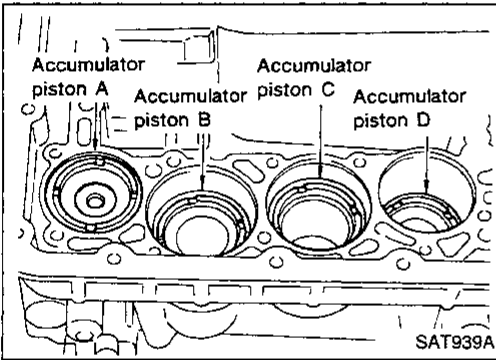
Free length of return spring

Unit: mm (in)

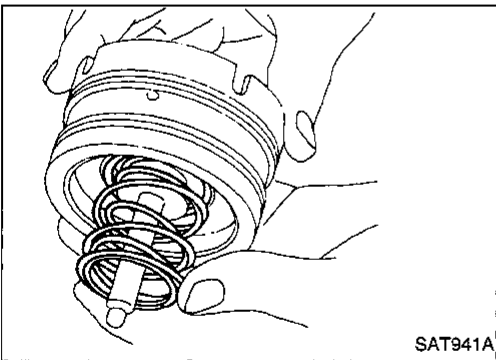
Accumulator	A
Free length	43 (1.69)



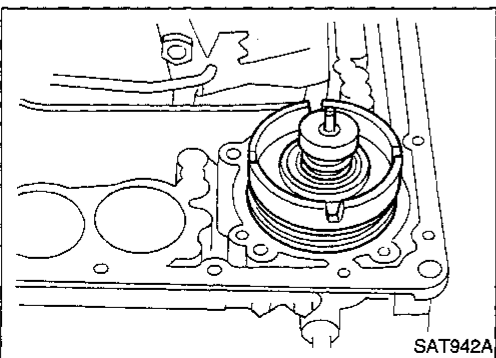
- c. Install accumulator pistons A, B, C and D.
 - **Apply ATF to transmission case.**



4. Install band servo piston.
 - a. Install return springs onto servo piston.

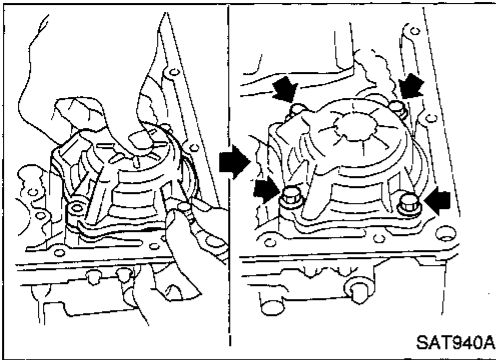


- b. Install band servo piston onto transmission case.
 - **Apply ATF to O-ring of band servo piston and transmission case.**
 - c. Install gasket for band servo onto transmission case.



ASSEMBLY

Assembly (1) (Cont'd)



d. Install band servo retainer onto transmission case.

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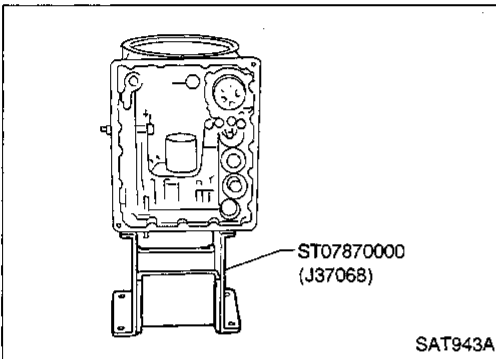
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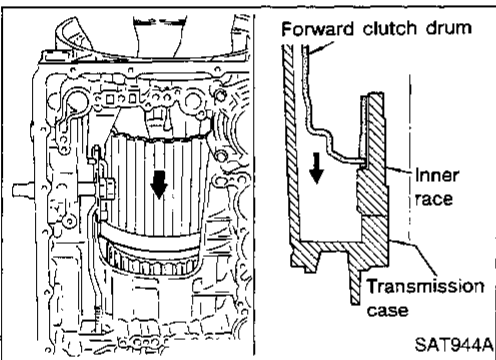
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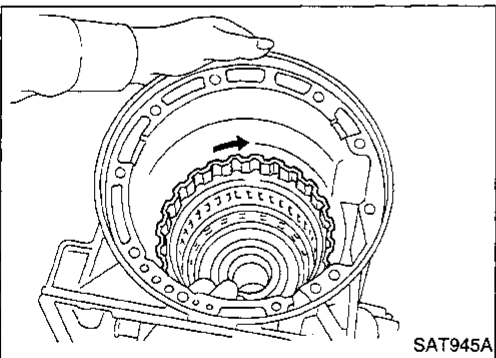


5. Install rear side clutch and gear components.

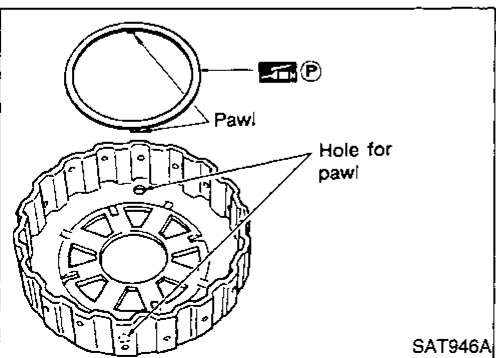
a. Place transmission case in vertical position.



b. Slightly lift forward clutch drum assembly and slowly rotate it clockwise until its hub passes fully over the clutch inner race inside transmission case.



c. Check to be sure that rotation direction of forward clutch assembly is correct.



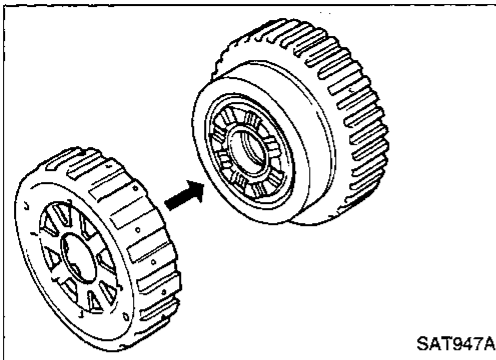
d. Install thrust washer onto front of overrun clutch hub.

- Apply petroleum jelly to the thrust washer.
- Insert pawls of thrust washer securely into holes in overrun clutch hub.

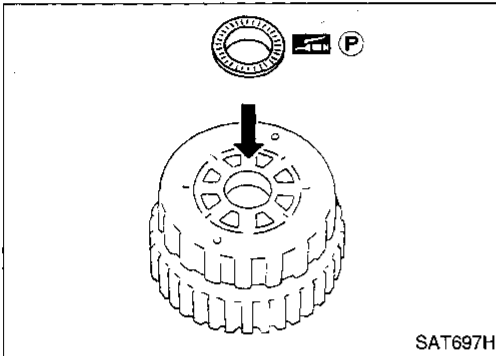
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ASSEMBLY

Assembly (1) (Cont'd)

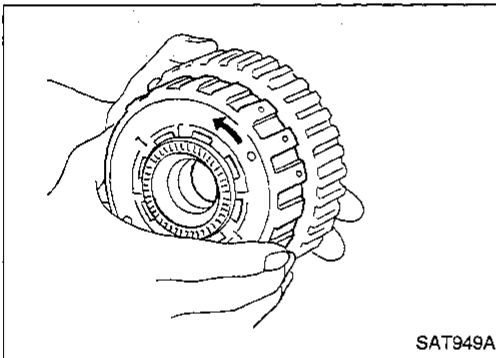


e. Install overrun clutch hub onto rear internal gear assembly.

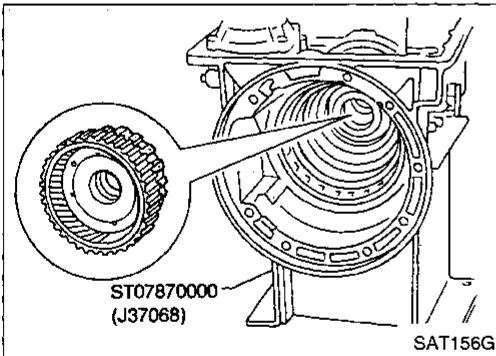


f. Install needle bearing onto rear of overrun clutch hub.

- Apply petroleum jelly to needle bearing.

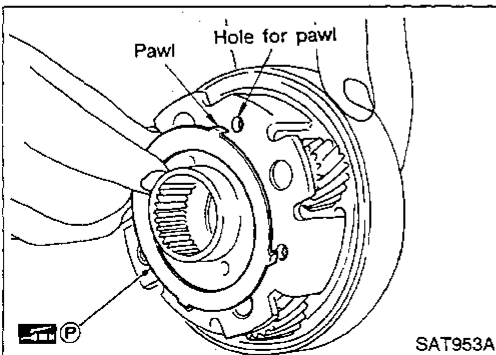


g. Check that overrun clutch hub rotates as shown while holding forward clutch hub.



h. Place transmission case into horizontal position.

i. Install rear internal gear, forward clutch hub and overrun clutch hub as a unit onto transmission case.



j. Install needle bearing onto rear internal gear.

- Apply petroleum jelly to needle bearing.

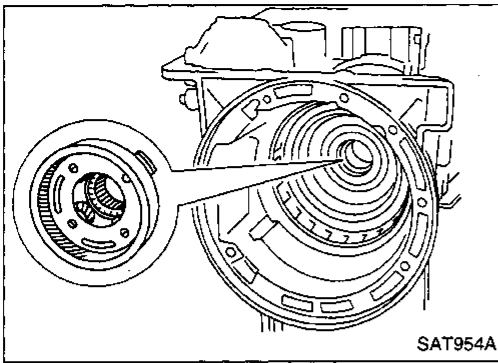
k. Install bearing race onto rear of front internal gear.

- Apply petroleum jelly to bearing race.

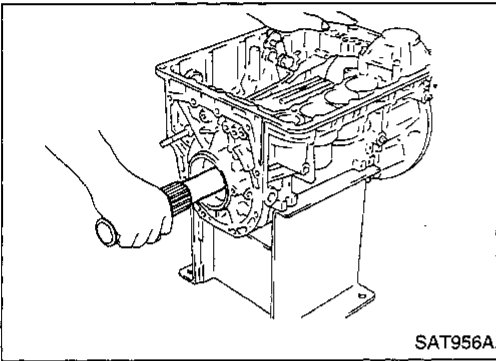
- Securely engage pawls of bearing race with holes in front internal gear.

ASSEMBLY

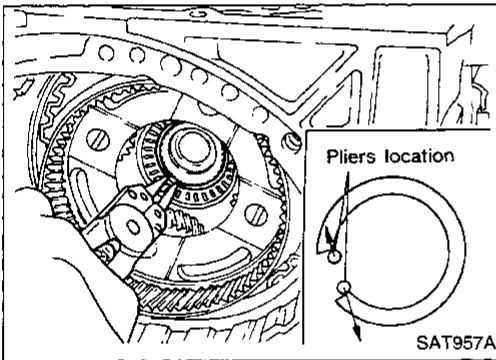
Assembly (1) (Cont'd)



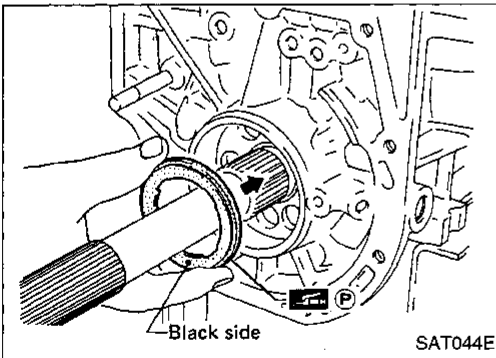
- I. Install front internal gear on transmission case.



6. Install output shaft and parking gear.
 - a. Insert output shaft from rear of transmission case while slightly lifting front internal gear.
 - Do not force output shaft against front of transmission case.



- b. Carefully push output shaft against front of transmission case. Install snap ring on front of output shaft.
 - Check to be sure output shaft cannot be removed in rear direction.



- c. Install needle bearing on transmission case.
 - Pay attention to its direction — Black side goes to rear.
 - Apply petroleum jelly to needle bearing.

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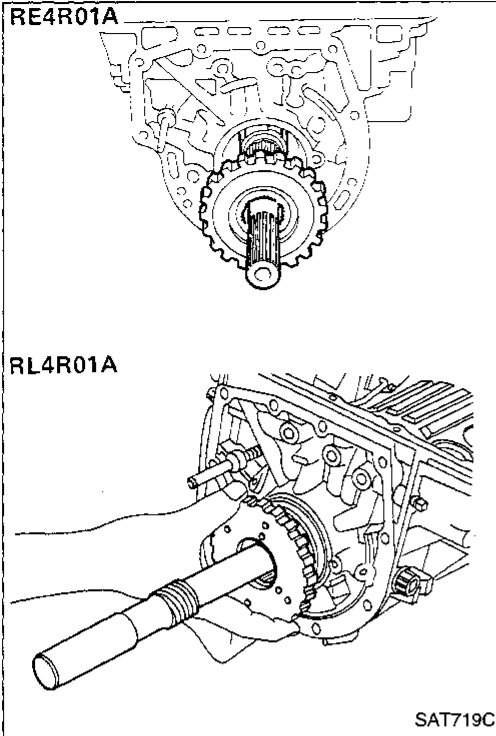
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ASSEMBLY

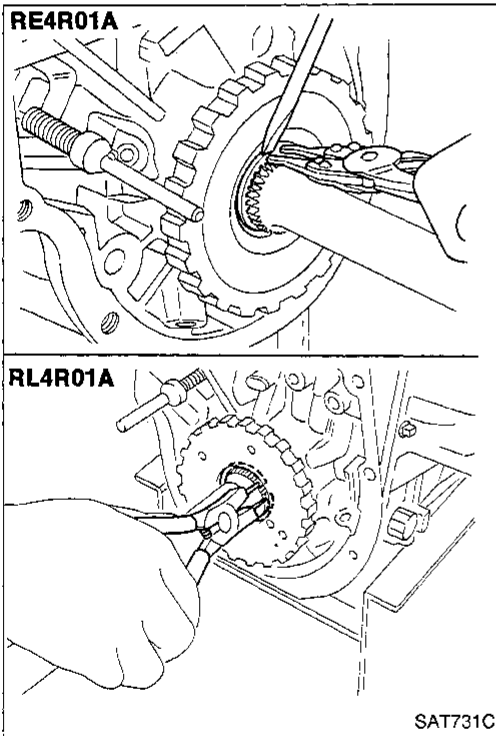
Assembly (1) (Cont'd)

d. Install parking gear on transmission case.



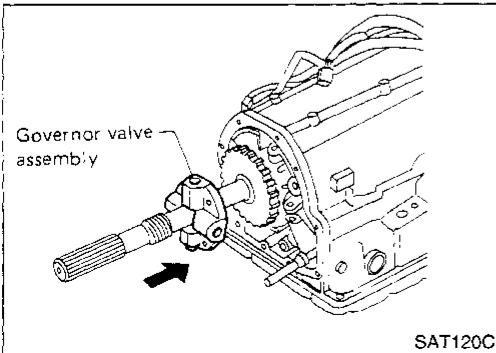
e. Install snap ring on rear of output shaft.

- Check to be sure output shaft cannot be removed in forward direction.



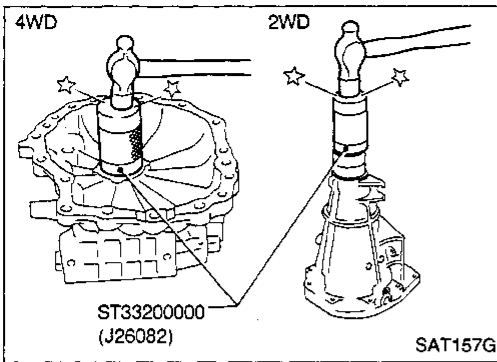
— RL4R01A —

f. Install governor valve assembly on oil distributor.



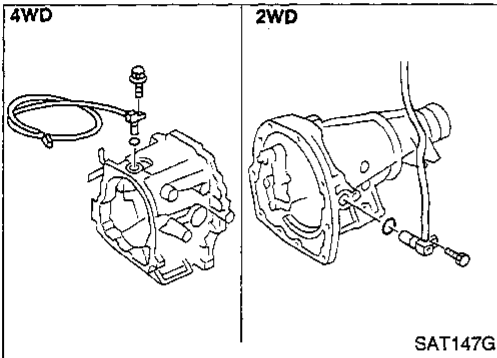
ASSEMBLY

Assembly (1) (Cont'd)



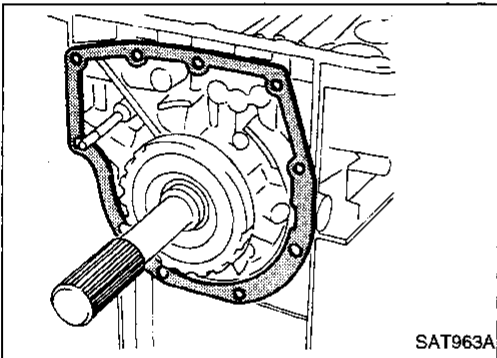
— RE4R01A and RL4R01A —

7. Install rear extension or adapter case.
 - a. Install oil seal on rear extension or adapter case.
 - Apply ATF to oil seal.

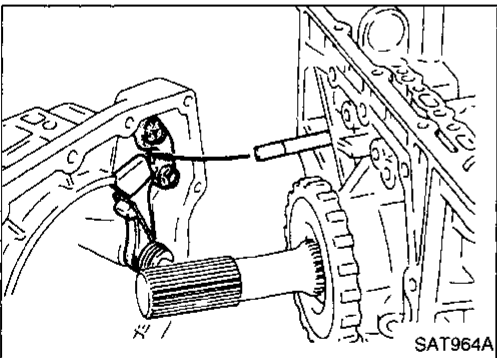


— RE4R01A —

- b. Install O-ring on revolution sensor.
 - Apply ATF to O-ring.
- c. Install revolution sensor on rear extension or adapter case.



- d. Install adapter case gasket or rear extension case gasket on transmission case.



- e. Install parking rod on transmission case.

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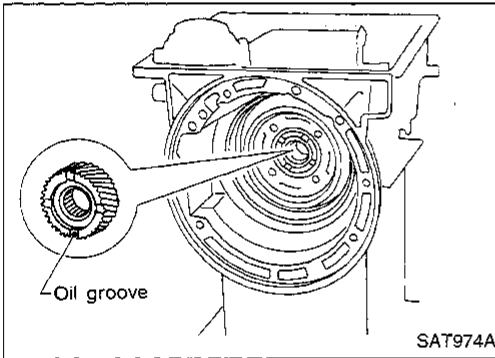
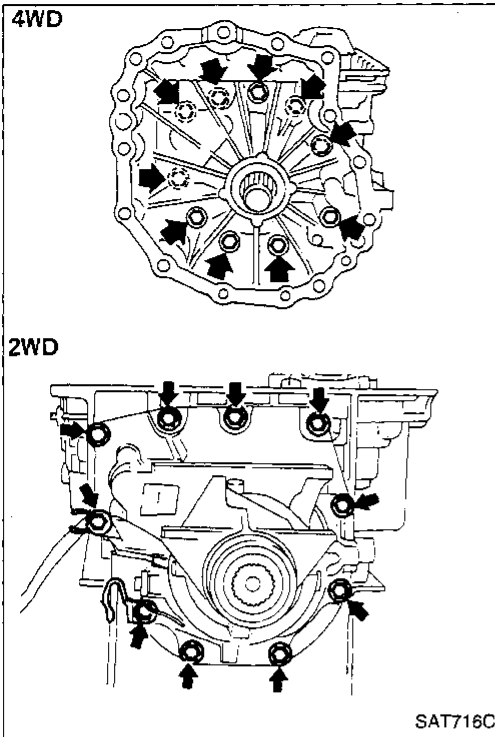
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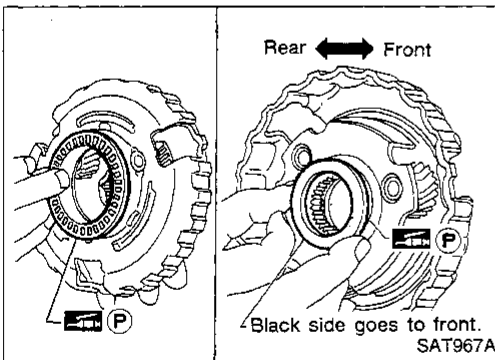
ASSEMBLY

Assembly (1) (Cont'd)

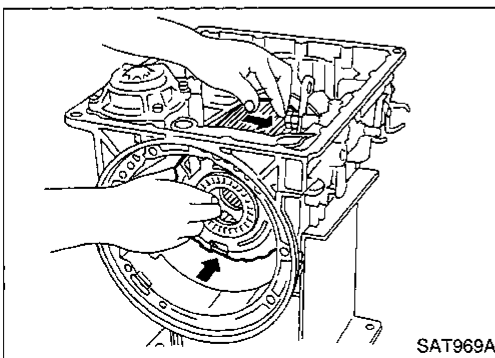
f. Install rear extension or adapter case on transmission case.



8. Install front side clutch and gear components.
- a. Install rear sun gear on transmission case.
- Pay attention to its direction.



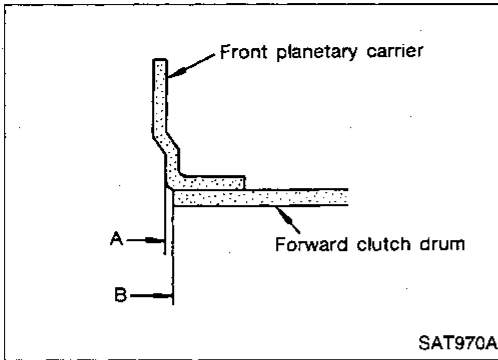
- b. Install needle bearing on front of front planetary carrier.
- Apply petroleum jelly to needle bearing.
- c. Install needle bearing on rear of front planetary carrier.
- Apply petroleum jelly to needle bearing.
 - Pay attention to its direction — Black side goes to front.



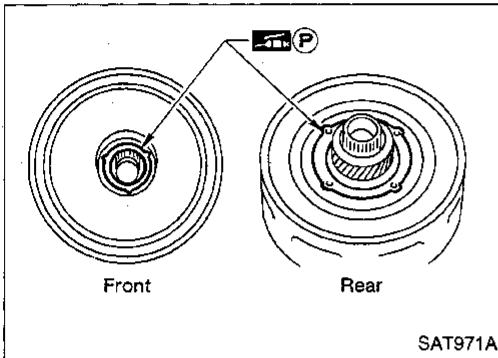
- d. While rotating forward clutch drum clockwise, install front planetary carrier on forward clutch drum.

ASSEMBLY

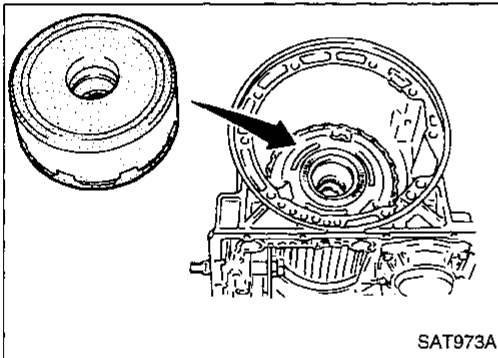
Assembly (1) (Cont'd)



- Check that portion A of front planetary carrier protrudes approximately 2 mm (0.08 in) beyond portion B of forward clutch assembly.



- e. Install bearing races on front and rear of clutch pack.
- Apply petroleum jelly to bearing races.
- Securely engage pawls of bearing races with holes in clutch pack.
- f. Place transmission case in vertical position.



- g. Install clutch pack into transmission case.

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SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

Applied model	KA24E engine		VG30E engine	
	Floor shift	Column shift	2WD	4WD
Automatic transmission model	RL4R01A		RE4R01A	
Transmission model code number	49X06	49X07	45X60	45X72
Stall torque ratio	2.0 : 1			
Transmission gear ratio				
1st	2.785		3.027	
2nd	1.545		1.619	
Top	1.000		1.000	
OD	0.694		0.694	
Reverse	2.272		2.272	
Recommended oil	Genuine Nissan ATF or equivalent			
Oil capacity ℓ (US qt, Imp qt)	8.3 (8-3/4, 7-1/4)			8.5 (9, 7-1/2)

Specifications and Adjustment

STALL REVOLUTION

Engine	Stall revolution rpm
KA24E	2,100 - 2,300
VG30E	2,260 - 2,510

SERVICE DATA AND SPECIFICATIONS (SDS)

Specifications and Adjustment (Cont'd)

RETURN SPRINGS

1) KA24E engine

Unit: mm (in)

	Parts	Item			
		Part No.	Free length	Outer diameter	
Control valve	4th speed cut valve spring	31756-48X09	23.5 (0.925)	7.0 (0.276)	
	Pressure regulator valve spring	31742-48X16	48.5 (1.909)	12.1 (0.476)	
	Pressure modifier valve spring	31742-48X13	40.83 (1.6075)	8.0 (0.315)	
	1-2 shift valve spring	31762-48X00	43.4 (1.709)	6.0 (0.236)	
	2-3 shift valve spring	31762-48X01	42.7 (1.681)	9.0 (0.354)	
	3-4 shift valve spring	31762-48X06	44.03 (1.7335)	8.0 (0.315)	
	Accumulator control valve spring	31742-48X02	29.3 (1.154)	8.0 (0.315)	
	3-2 downshift valve spring	—	—	—	
	2-3 throttle modifier valve spring	31742-41X21	33.0 (1.299)	6.5 (0.256)	
	4-2 relay valve spring	31756-41X00	29.1 (1.146)	6.95 (0.2736)	
	Lock-up control valve spring	31742-48X07	20.0 (0.787)	5.45 (0.2146)	
	Throttle valve & detent valve spring	31802-48X02	34.23 (1.3476)	11.0 (0.433)	
	Kickdown modifier valve spring	31756-48X01	45.3 (1.783)	7.0 (0.276)	
	1st reducing valve spring	31756-48X08	29.7 (1.169)	7.2 (0.283)	
	Overrun clutch reducing valve spring	31742-48X21	33.2 (1.307)	7.7 (0.303)	
		31742-48X05	31.0 (1.220)	5.2 (0.205)	
3-2 timing valve spring	31742-48X15	23.0 (0.906)	7.0 (0.276)		
Torque converter relief valve spring	31742-41X23	38.0 (1.496)	9.0 (0.354)		
Governor valve	Governor valve spring	Primary	31742-48X11	19.1 (0.752)	9.05 (0.3563)
		Secondary ①	31742-48X09	30.58 (1.2039)	9.2 (0.362)
		Secondary ②	31742-48X10	16.79 (0.6610)	9.0 (0.354)
Reverse clutch	16 pcs	31505-41X02	19.69 (0.7752)	11.6 (0.457)	
High clutch	16 pcs	31505-21X03	22.06 (0.8685)	11.6 (0.457)	
Forward clutch (Overrun clutch)	20 pcs	31505-41X01	35.77 (1.4083)	9.7 (0.382)	
Low & reverse brake	18 pcs	31521-21X00	23.7 (0.933)	11.6 (0.457)	
Band servo	Spring A	31605-41X05	45.6 (1.795)	34.3 (1.350)	
	Spring B	31605-41X00	53.8 (2.118)	40.3 (1.587)	
	Spring C	31605-41X01	29.7 (1.169)	27.6 (1.087)	
Accumulator	Accumulator A	31605-41X02	43.0 (1.693)	—	
	Accumulator B	31605-41X15	66.0 (2.598)	—	
	Accumulator C	31605-41X04	45.0 (1.772)	—	
	Accumulator D	31605-41X06	58.4 (2.299)	—	

SERVICE DATA AND SPECIFICATIONS (SDS)

Specifications and Adjustment (Cont'd)

CLUTCHES AND BRAKES

Code number	49X06	49X07	45X60	45X72	
1. Reverse clutch					
Number of drive plates	2				
Number of driven plates	2				
Thickness of drive plate mm (in)	Standard	1.90 - 2.05 (0.0748 - 0.0807)			
	Wear limit	1.80 (0.0709)			
Clearance mm (in)	Standard	0.5 - 0.8 (0.020 - 0.031)			
	Allowable limit	1.2 (0.047)			
Thickness of retaining plate	Thickness mm (in)		Part number		
	4.8 (0.189)		31537-42X02		
	5.0 (0.197)		31537-42X03		
	5.2 (0.205)		31537-42X04		
	5.4 (0.213)		31537-42X05		
	5.6 (0.220)		31537-42X06		
2. High clutch					
Number of drive plates	5				
Number of driven plates	5				
Thickness of drive plate mm (in)	Standard	1.52 - 1.67 (0.0598 - 0.0657)			
	Wear limit	1.40 (0.0551)			
Clearance mm (in)	Standard	1.8 - 2.2 (0.071 - 0.087)			
	Allowable limit	2.8 (0.110)			
Thickness of retaining plate	Thickness mm (in)		Part number		
	3.4 (0.134)		31537-41X71		
	3.6 (0.142)		31537-41X61		
	3.8 (0.150)		31537-41X62		
	4.0 (0.157)		31537-41X63		
	4.2 (0.165)		31537-41X64		
	4.4 (0.173)		31537-41X65		
	4.6 (0.181)		31537-41X66		
	4.8 (0.189)		31537-41X67		
Code number	49X06	49X07	45X60	45X72	
3. Forward clutch					
Number of drive plates	5		7		
Number of driven plates	5		7		
Thickness of drive plate mm (in)	Standard	1.52 - 1.67 (0.0598 - 0.0657)			
	Wear limit	1.40 (0.0551)			
Clearance mm (in)	Standard	0.45 - 0.85 (0.0177 - 0.0335)			
	Allowable limit	1.85 (0.0728)		2.25 (0.0886)	
Thickness of retaining plate	Thickness mm (in)		Part number		
	8.0 (0.315)		31537-41X00		
	8.2 (0.323)		31537-41X01		
	8.4 (0.331)		31537-41X02		
	8.6 (0.339)		31537-41X03		
	8.8 (0.346)		31537-41X04		
	9.0 (0.354)		31537-41X05		
	9.2 (0.362)		31537-41X06		
		Thickness mm (in)		Part number	
		4.0 (0.157)		31537-42X10	
		4.2 (0.165)		31537-42X11	
		4.4 (0.173)		31537-42X12	
		4.6 (0.181)		31537-42X13	
		4.8 (0.189)		31537-42X14	
		5.0 (0.197)		31537-42X15	
		5.2 (0.205)		31537-42X16	

SERVICE DATA AND SPECIFICATIONS (SDS)

Specifications and Adjustment (Cont'd)

Code number	49X06	49X07	45X60	45X72	
4. Overrun clutch					
Number of drive plates	3				GI
Number of driven plates	5				
Thickness of drive plate mm (in)	Standard	1.90 - 2.05 (0.0748 - 0.0807)			MA
	Wear limit	1.80 (0.0709)			
Clearance mm (in)	Standard	1.0 - 1.4 (0.039 - 0.055)			EM
	Allowable limit	2.0 (0.079)			
Thickness of retaining plate	Thickness mm (in)		Part number		LC
	4.0 (0.157)		31537-41X79		
	4.2 (0.165)		31537-41X80		EF &
	4.4 (0.173)		31537-41X81		EC
	4.6 (0.181)		31537-41X82		
	4.8 (0.189)		31537-41X83		FE
	5.0 (0.197)		31537-41X84		
5.2 (0.205)		31537-41X20			
5. Low & reverse brake					
Number of drive plates	6				CL
Number of driven plates	6				MT
Thickness of drive plate mm (in)	Standard	1.90 - 2.05 (0.0748 - 0.0807)			
	Wear limit	1.80 (0.0709)			AT
Clearance mm (in)	Standard	0.7 - 1.1 (0.028 - 0.043)			
	Allowable limit	2.3 (0.091)			TF
Thickness of retaining plate	Thickness mm (in)		Part number		
	8.6 (0.339)		31667-41X03		
	8.8 (0.346)		31667-41X04		PD
	9.0 (0.354)		31667-41X05		
	9.2 (0.362)		31667-41X06		
	9.4 (0.370)		31667-41X09		FA
	9.6 (0.378)		31667-41X10		
9.6 (0.378)		31667-41X10			
6. Brake band					
Anchor end bolt tightening torque N·m (kg·m, ft·lb)	4 - 6 (0.4 - 0.6, 2.9 - 4.3)				RA
Number of returning revolution for anchor end bolt	2.5				BR

SERVICE DATA AND SPECIFICATIONS (SDS)

Specifications and Adjustment (Cont'd)

TOTAL END PLAY

Total end play "T ₁ "	0.25 - 0.55 mm (0.0098 - 0.0217 in)	
	Thickness mm (in)	Part number
Thickness of oil pump cover bearing race	0.8 (0.031)	31435-41X61
	1.0 (0.039)	31435-41X02
	1.2 (0.047)	31435-41X03
	1.4 (0.055)	31429-21X03
	1.6 (0.063)	31429-21X04
	1.8 (0.071)	31429-21X05
	2.0 (0.079)	31429-21X06