AUTOMATIC TRANSMISSION

SECTION AT

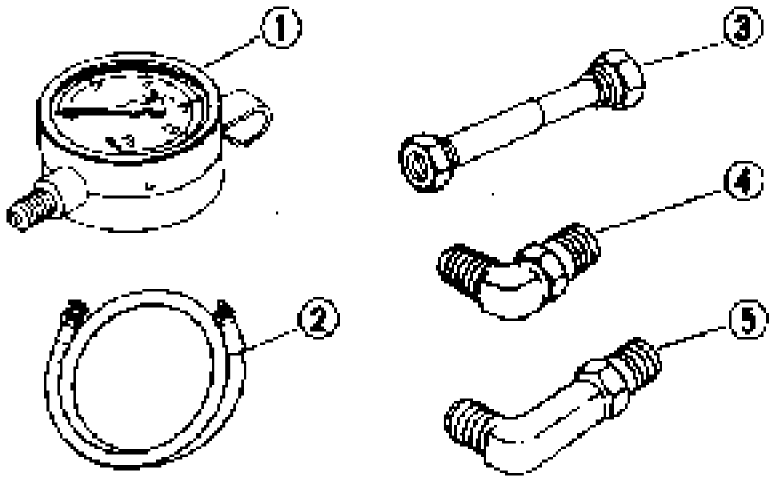
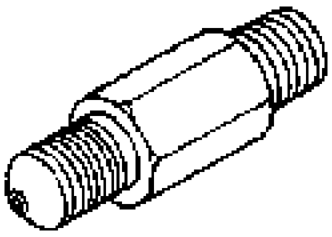
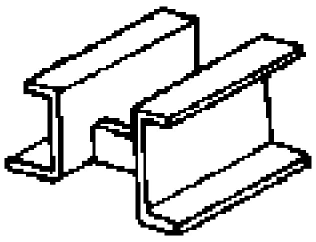
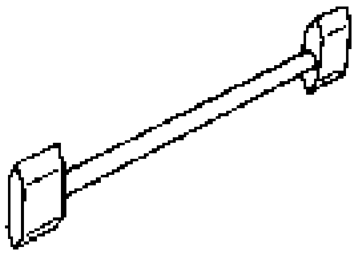
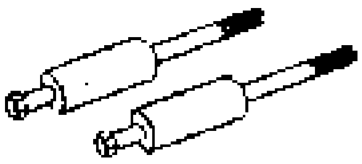
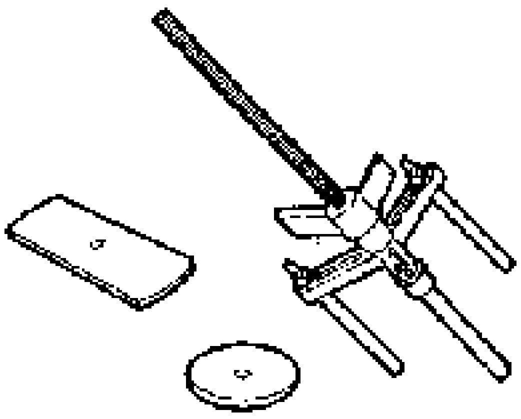
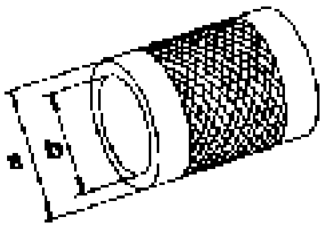
CONTENTS

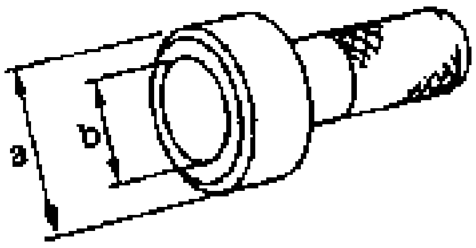
When you read wiring diagrams:
- **Read GI section, "HOW TO READ WIRING DIAGRAMS".**
- **See EL section, "POWER SUPPLY ROUTING" for power distribution circuit.**

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

PREPARATION

SPECIAL SERVICE TOOLS

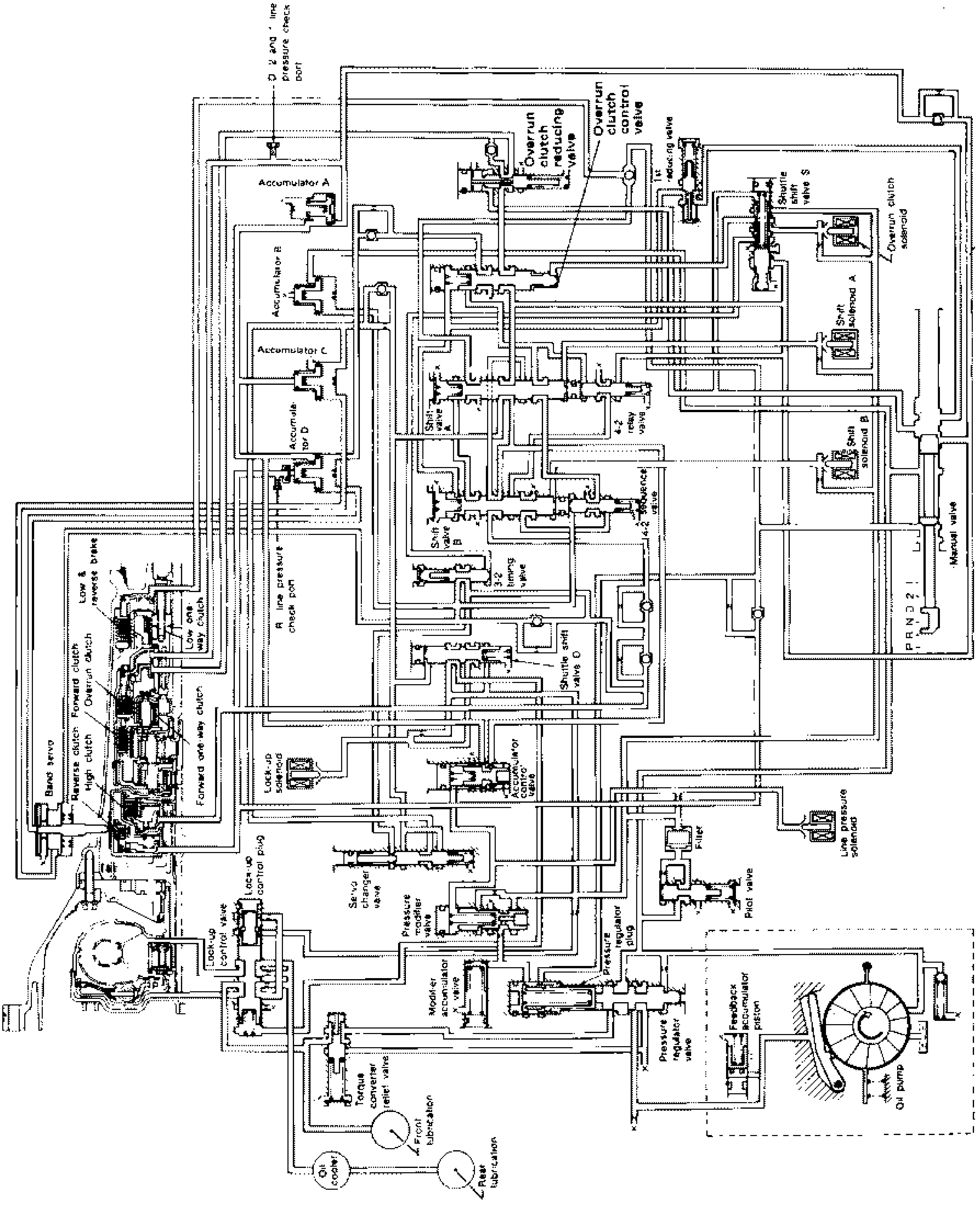
Tool number Tool name	Description	
ST2505S001 Oil pressure gauge set ① ST25051001 Oil pressure gauge ② ST25052000 Hose ③ ST25053000 Joint pipe ④ ST25054000 Adapter ⑤ ST25055000 Adapter		Measuring line pressure
KV31101201 Oil pressure gauge adapter		Measuring line pressure
ST07870000 Transmission case stand		Disassembling and assembling A/T
KV31102100 Torque converter one-way clutch check tool		Checking one-way clutch in torque converter
ST25850000 Sliding hammer		Removing oil pump assembly
KV31102400 Clutch spring compressor		Removing and installing clutch return springs
ST33200000 Drift		Installing oil pump housing oil seal Installing rear oil seal (RE4R01A) **a: 60 mm (2.36 in) dia.** **b: 44.5 mm (1.752 in) dia.**

Tool number Tool name	Description	
ST30720000 Drift		Installing rear oil seal (RE4R03A) **a: 77 mm (3.03 in) dia.** **b: 55.5 mm (2.185 in) dia.**

Service Notice

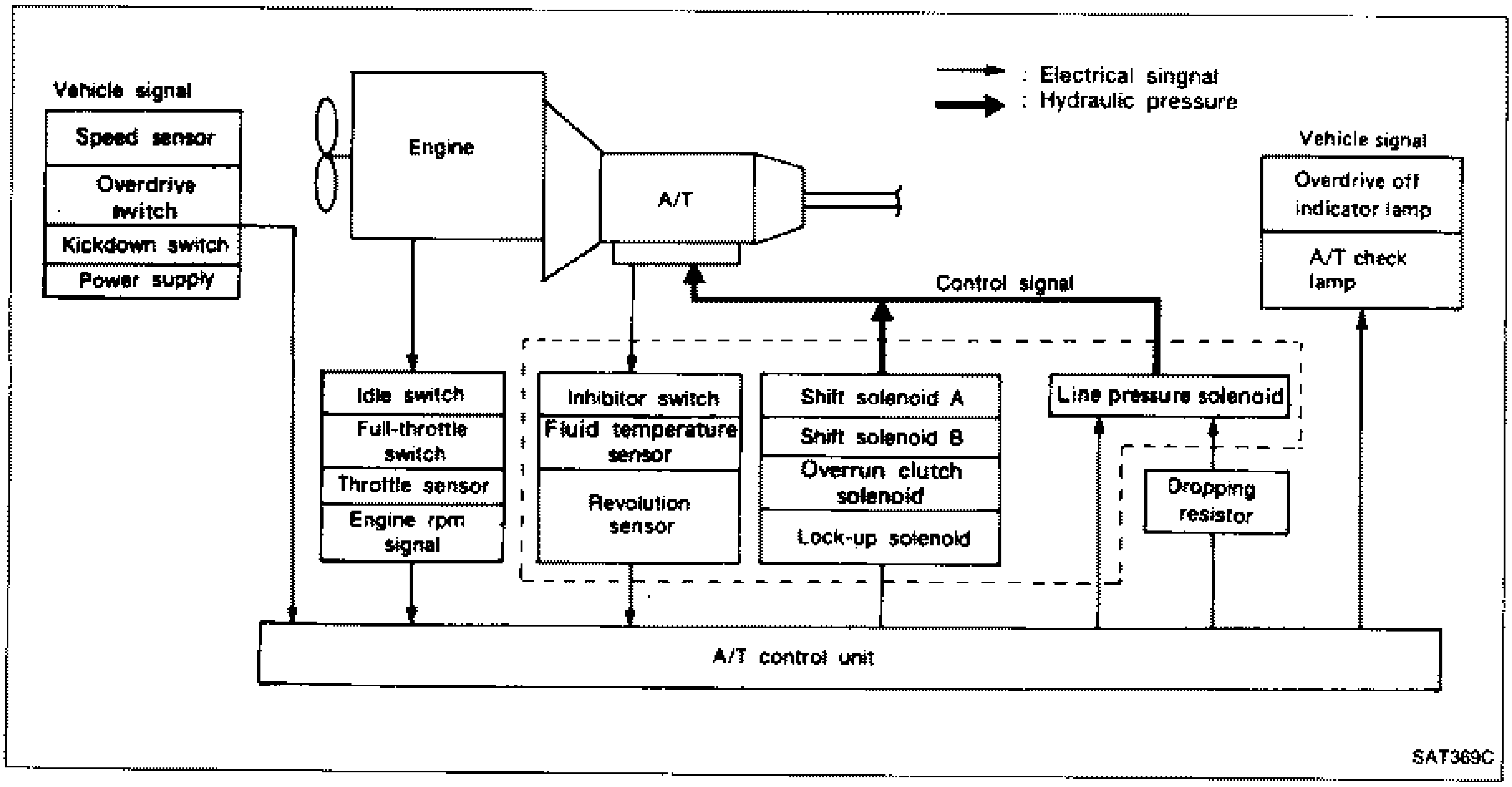
- Before proceeding with disassembly, thoroughly clean the outside of the transmission. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Disassembly should be done in a clean work area.
- Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transmission.
- 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 transmission is disassembled.
- 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 valves, sleeves, plugs, etc. will slide along their bores in the valve body under their own weight.
- Before assembly, apply a coat of recommended A.T.F. 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.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- After overhaul, refill the transmission with new A.T.F.

Hydraulic Control Circuits



SAT123B

Electrical Control Chart



Mechanical Operation

Shift position		Reverse clutch	High clutch	Forward clutch	Overrun clutch	Band servo			Forward one-way clutch	Low one-way clutch	Low & reverse brake	Lock-up	Remarks
						2nd apply	3rd release	4th apply					
P													PARK
R		○									○		REVERSE
N													NEUTRAL
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, because oil pressure area on the "release" side is greater than that on the "apply" side, brake band does not contract.

*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.

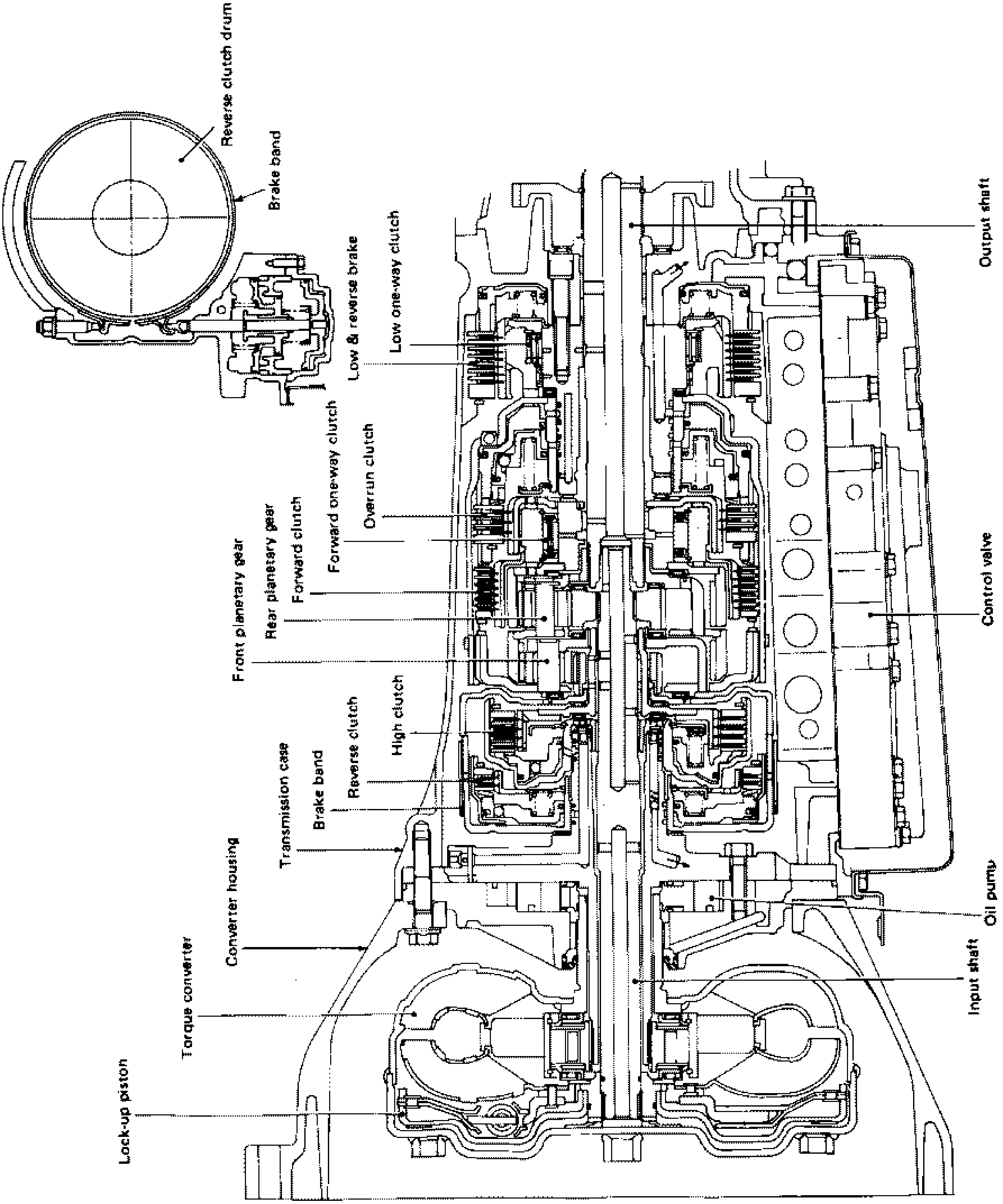
⭘ : Operates when throttle opening is less than 1/16. Engine brake activates.

● : Operates during "progressive" acceleration.

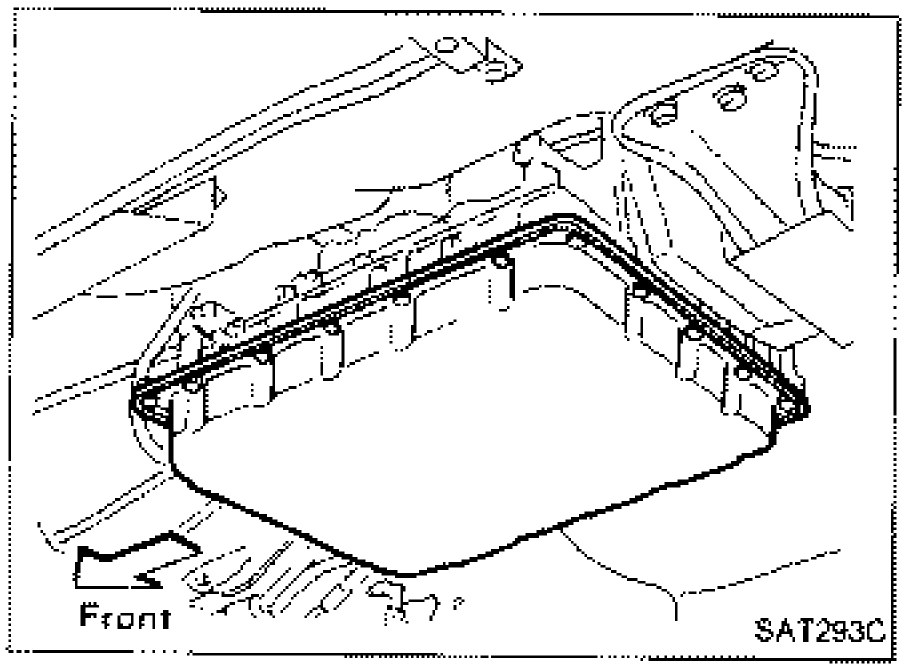
⊗ : Operates but does not affect power transmission.

⨂ : Operates when throttle opening is less than 1/16 but does not affect engine brake.

Cross-Sectional View



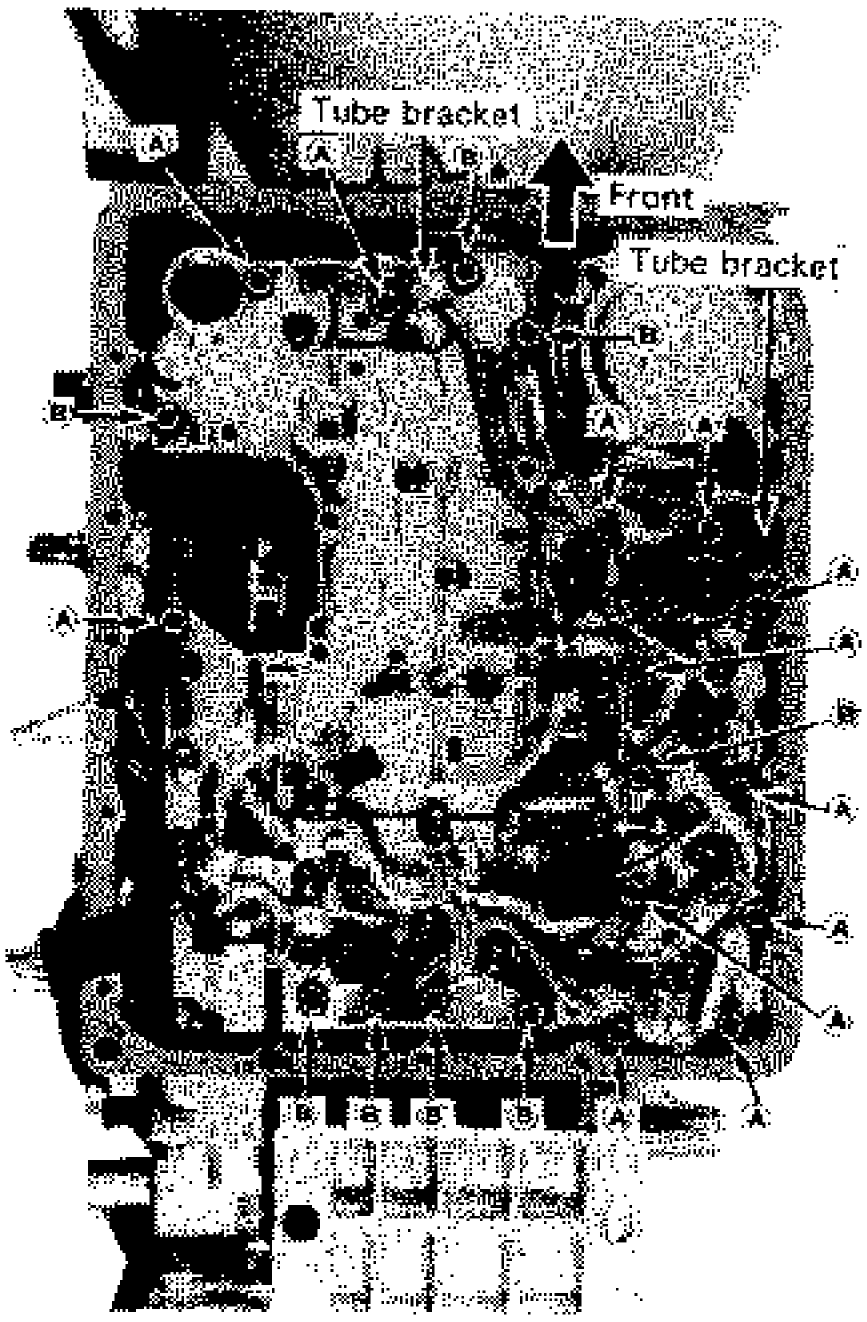
SAT125B



Control Valve Assembly and Accumulators Inspection

1. Remove oil pan and gasket and drain A.T.F.

2. Remove oil strainer.

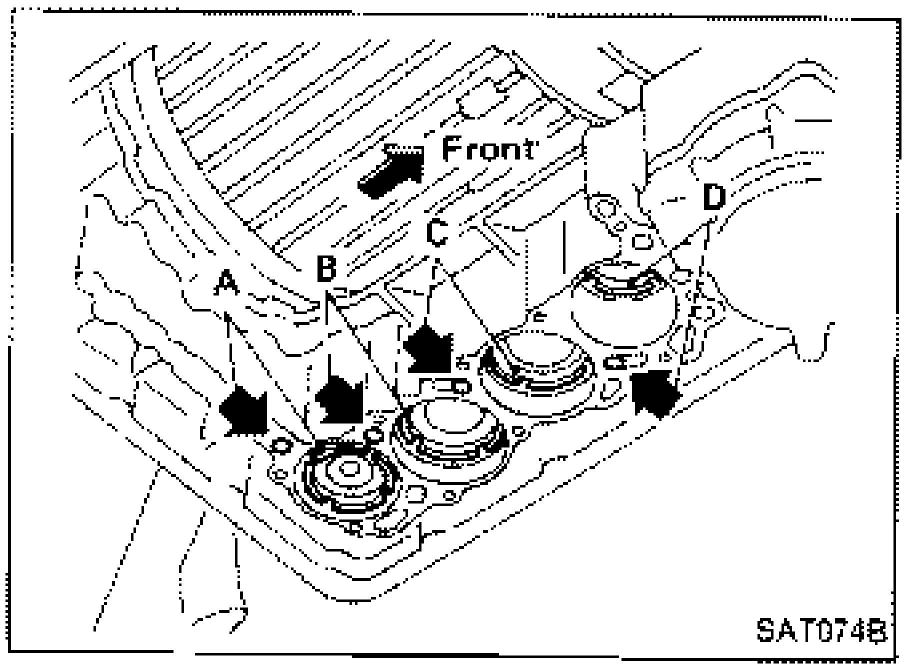


3. Remove control valve assembly by removing fixing bolts and disconnecting harness connector.

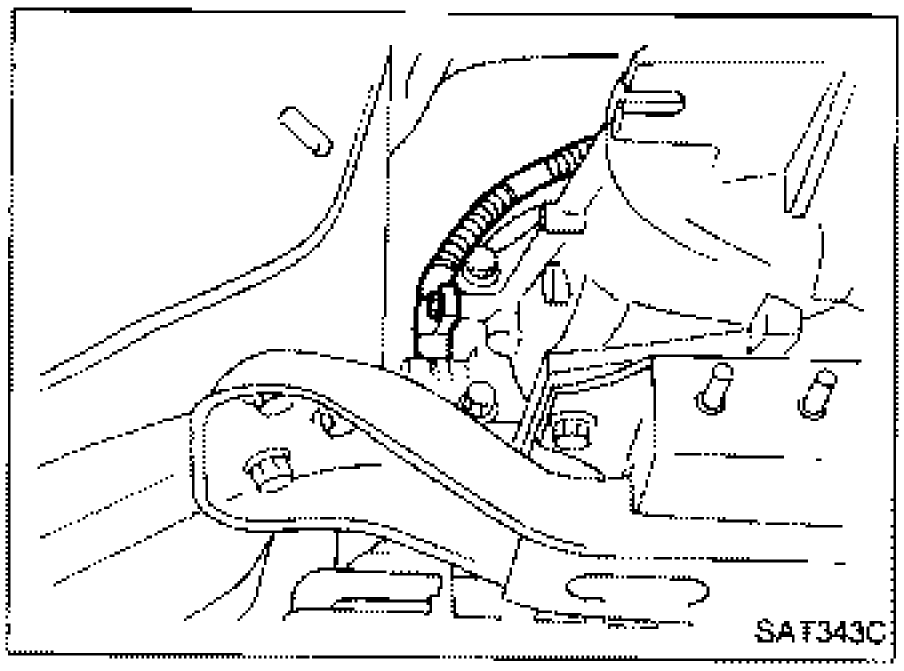
Bolt length and location

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

4. Remove solenoids and valves from valve body if necessary.
5. Remove terminal cord assembly if necessary.



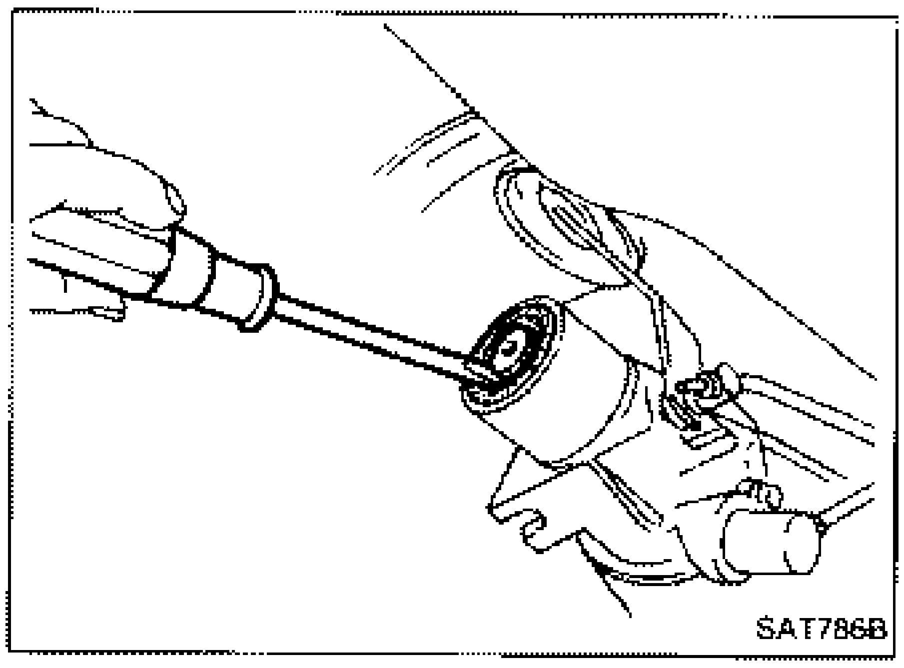
6. Remove accumulators A, B, C and D by applying compressed air if necessary.
- **Hold each piston with rag.**
7. Reinstall any part removed.
- **Always use new sealing parts.**



Revolution Sensor Replacement

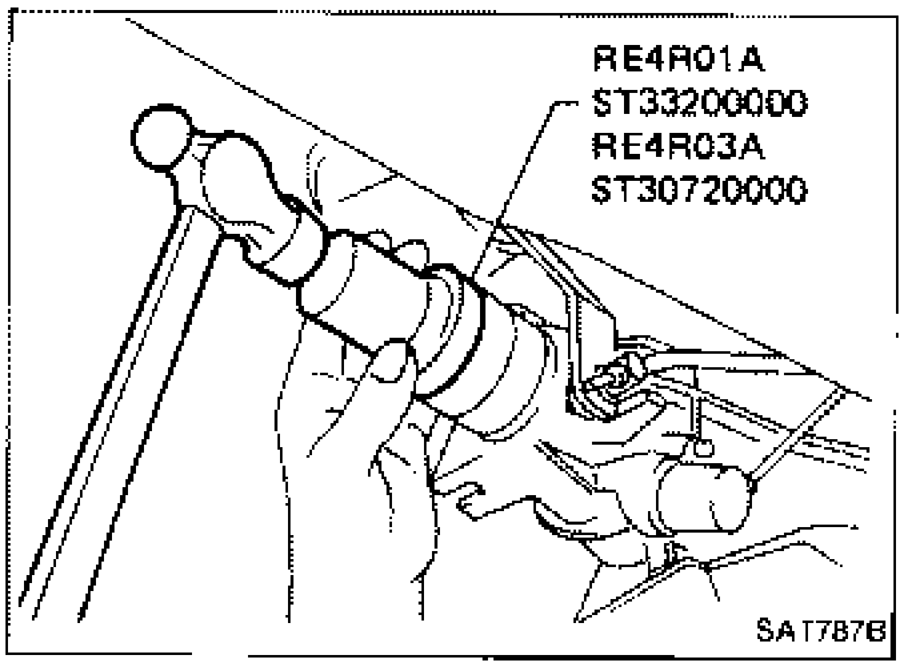
1. Remove exhaust tube.
2. Remove revolution sensor from A/T assembly.
3. Reinstall any part removed.

- **Always use new sealing parts.**



Rear Oil Seal Replacement

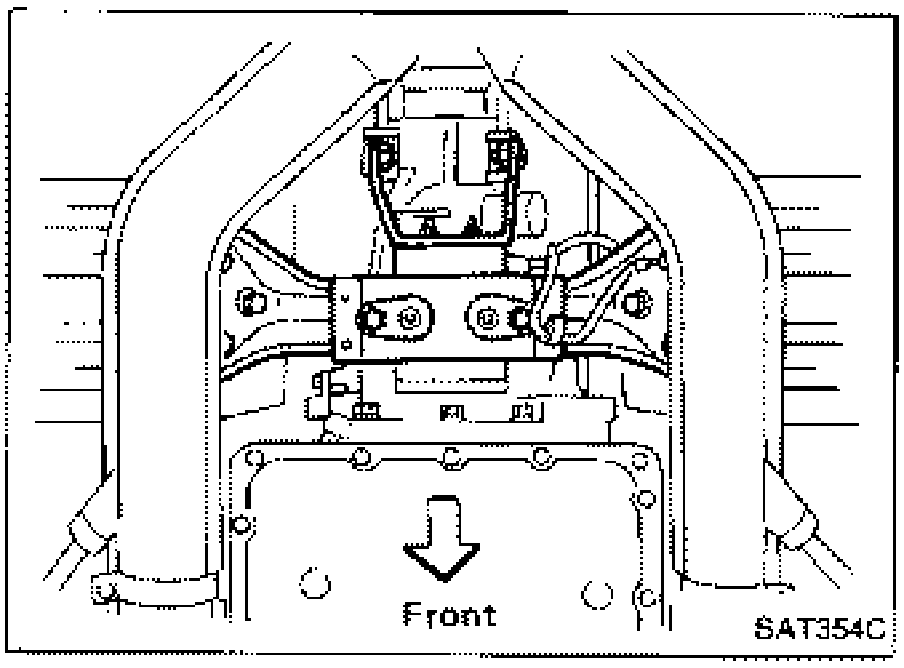
1. Remove propeller shaft from vehicle. — Refer to section PD.
2. Remove rear oil seal.



3. Install rear oil seal.

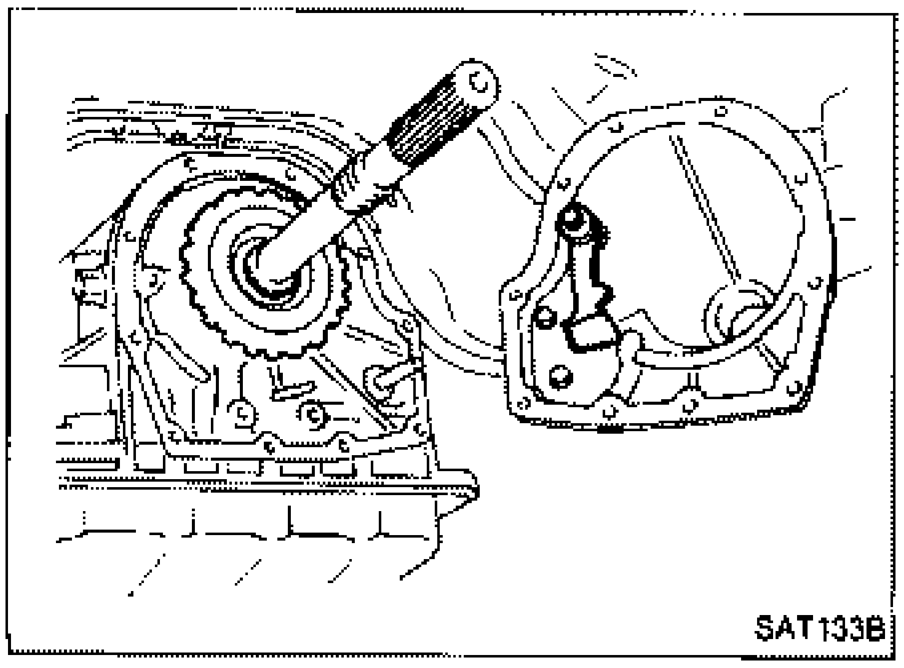
- **Apply A.T.F. before installing.**

4. Reinstall any part removed.



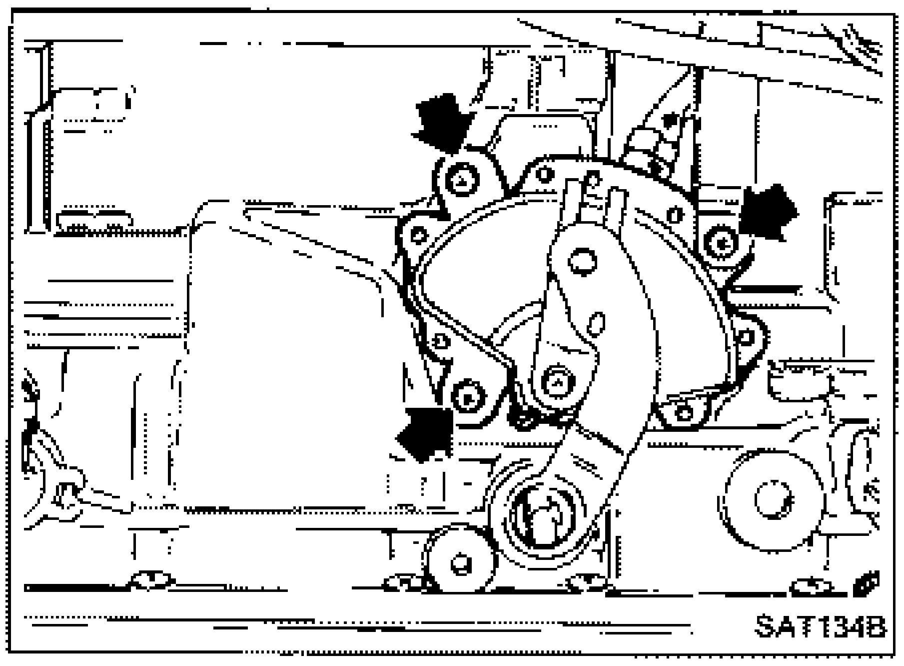
Parking Components Inspection

1. Remove exhaust tube.
2. Remove propeller shaft from vehicle. — Refer to section PD.
3. Remove rear engine mounting member from A/T assembly while supporting A/T with jack.



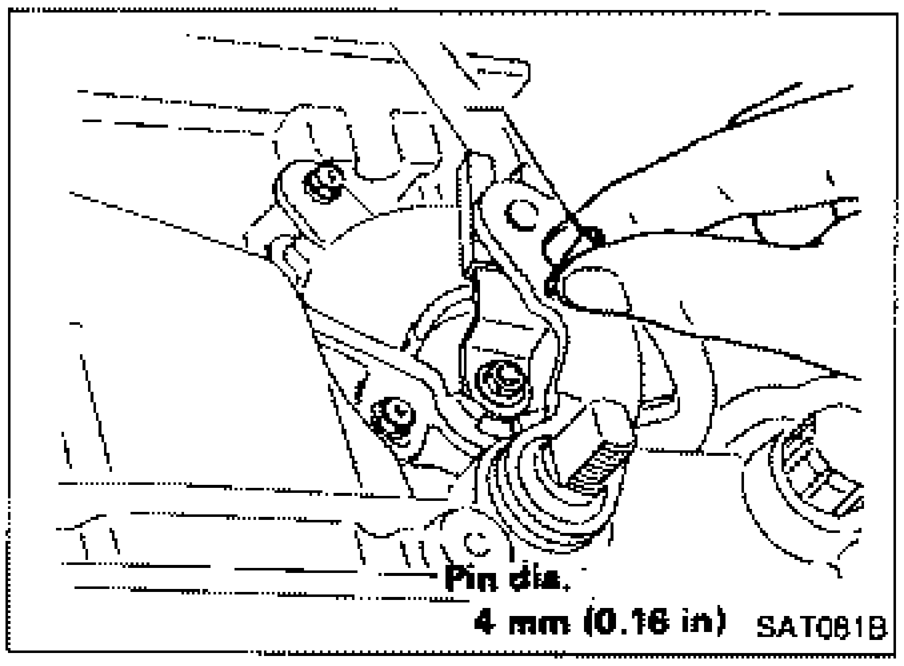
4. Remove rear extension from transmission case.
5. Replace parking components if necessary.
6. Reinstall any part removed.

- **Always use new sealing parts.**

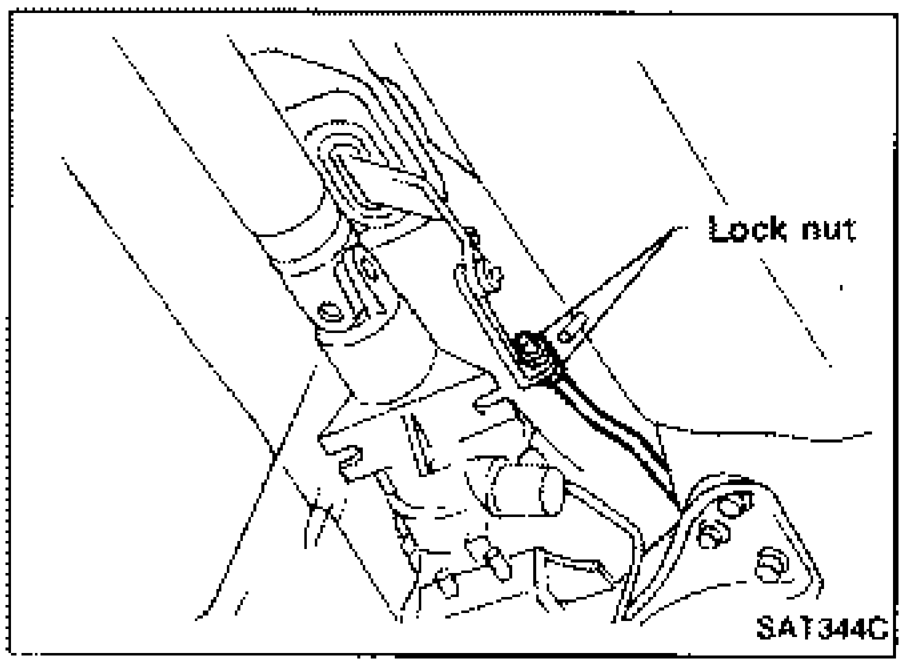


Inhibitor Switch Adjustment

1. Remove manual control linkage from manual shaft of A/T assembly.
2. Set manual shaft of A/T assembly in "N" position.
3. Loosen inhibitor switch fixing bolts.



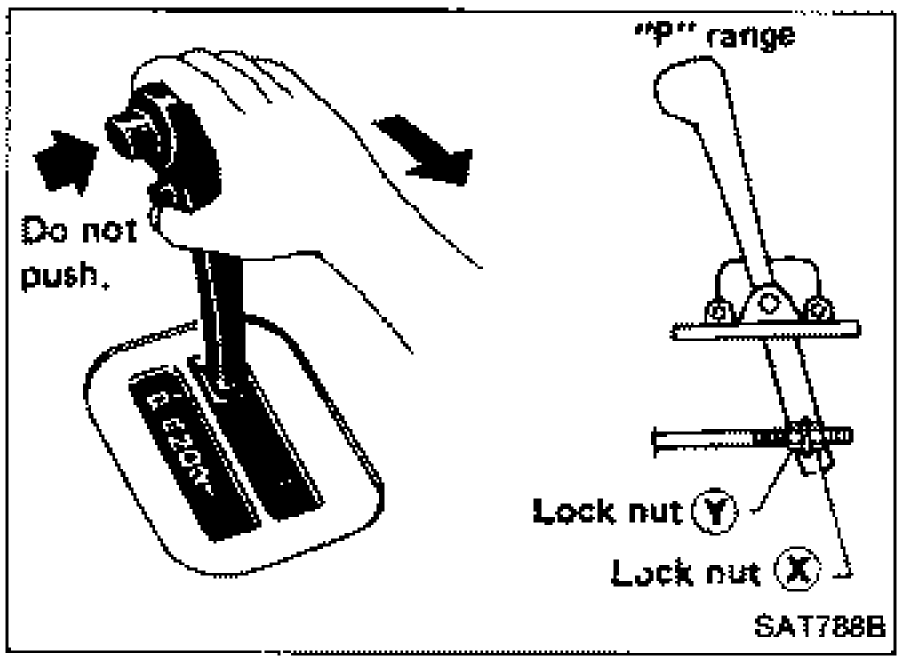
4. Insert pin into adjustment holes in both inhibitor switch and manual shaft of A/T assembly as near vertical as possible.
5. Reinstall any part removed.
6. Check continuity of inhibitor switch. — Refer to "Electrical Components Inspection".



Manual Control Linkage Adjustment

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

1. Place selector lever in "P" range.
2. Loosen lock nuts.



3. Tighten lock nut Ⓧ until it touches trunnion pulling selector lever toward "R" range side without pushing button.
4. Back off lock nut Ⓧ 1 turn and tighten lock nut Ⓨ to the specified torque.

   Lock nut:

   🔧: 11 - 15 N·m (1.1 - 1.5 kg-m, 8 - 11 ft-lb)
5. Move selector lever from "P" range to "1" range. Make sure that selector lever can move smoothly.

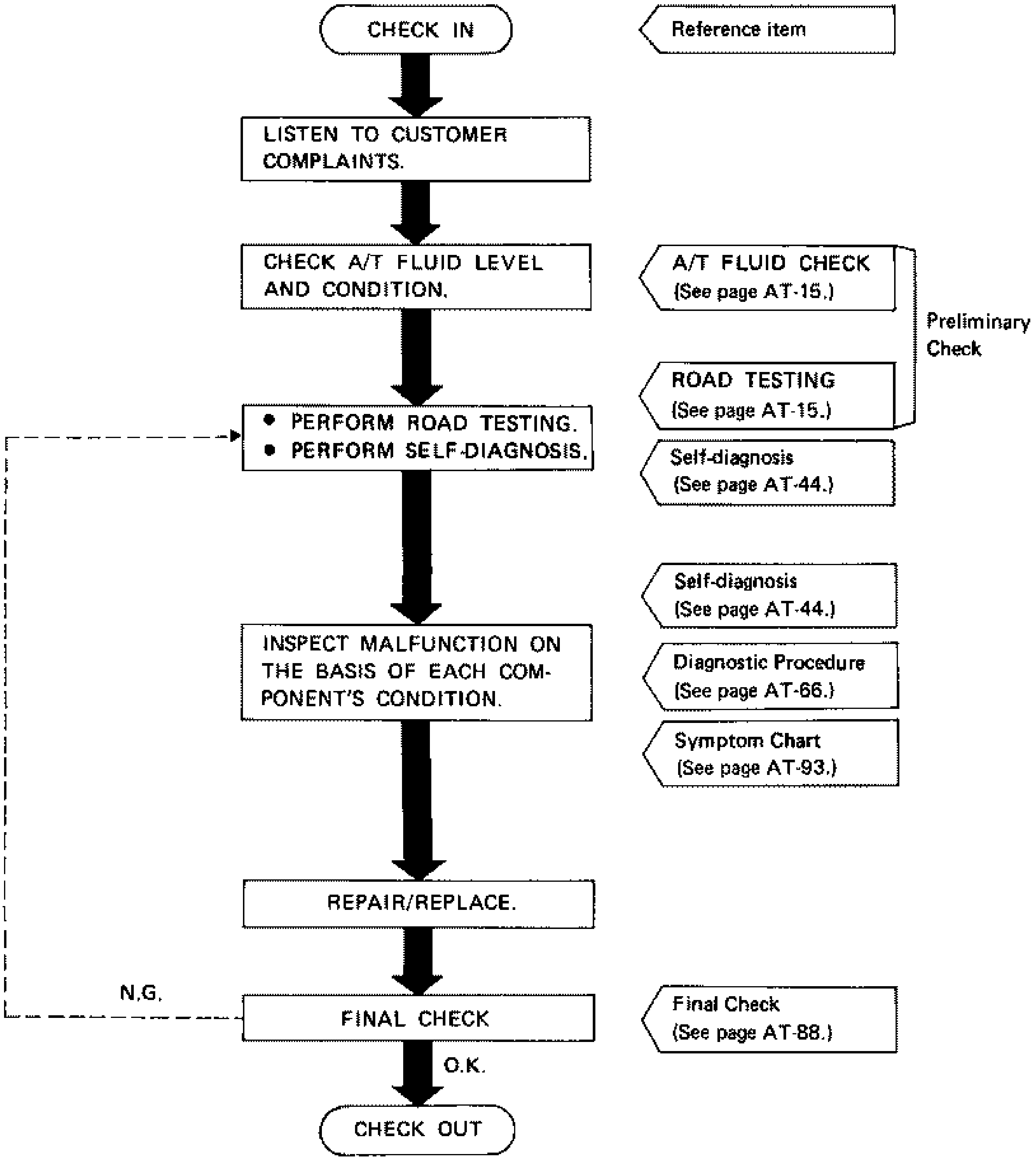
NOTE

Contents

Contents (Cont'd)

How to Perform Trouble Diagnoses for Quick and Accurate Repair

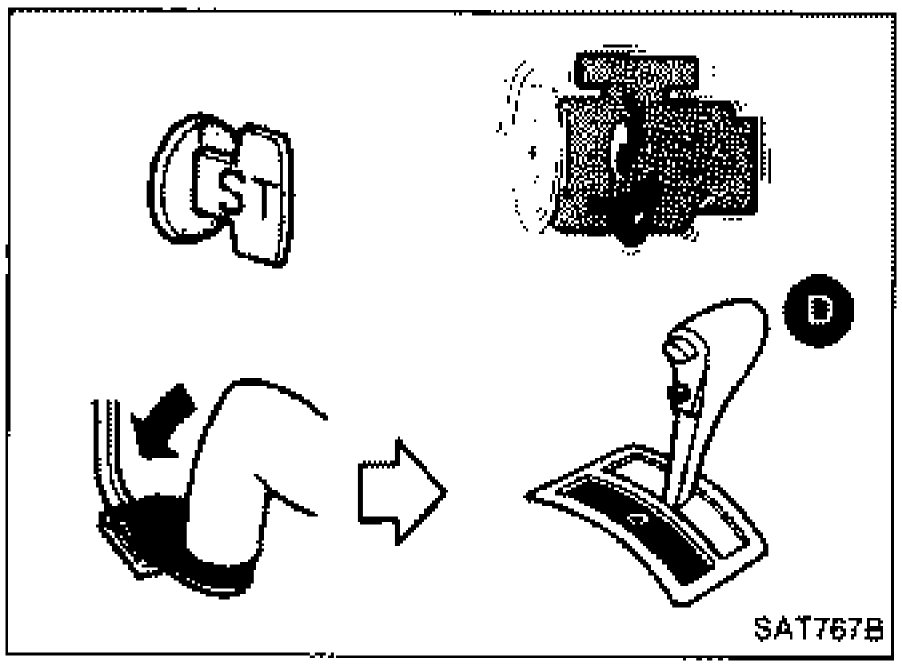
WORK FLOW



Preliminary Check

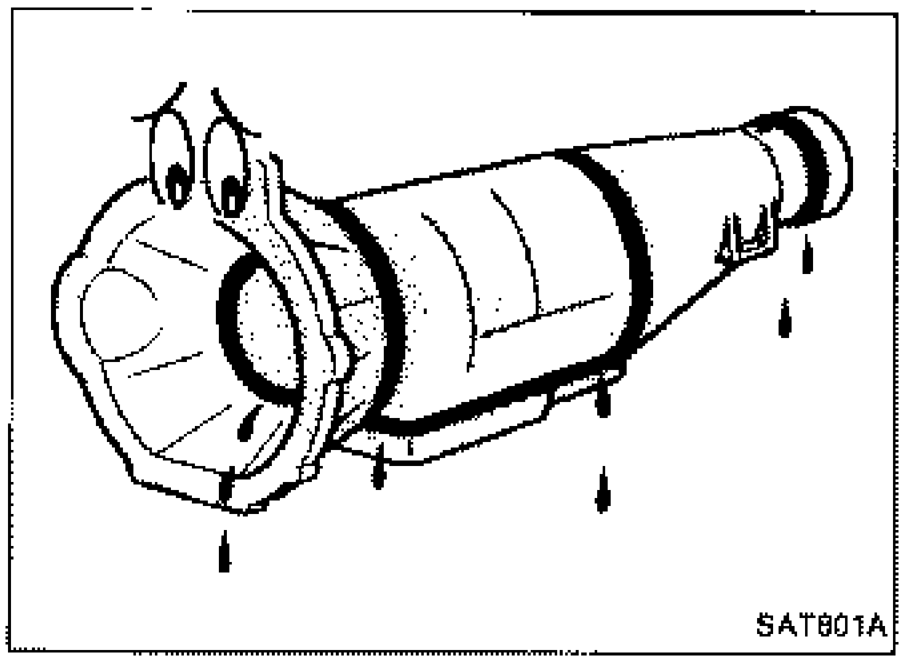
A/T FLUID CHECK

Fluid leakage check



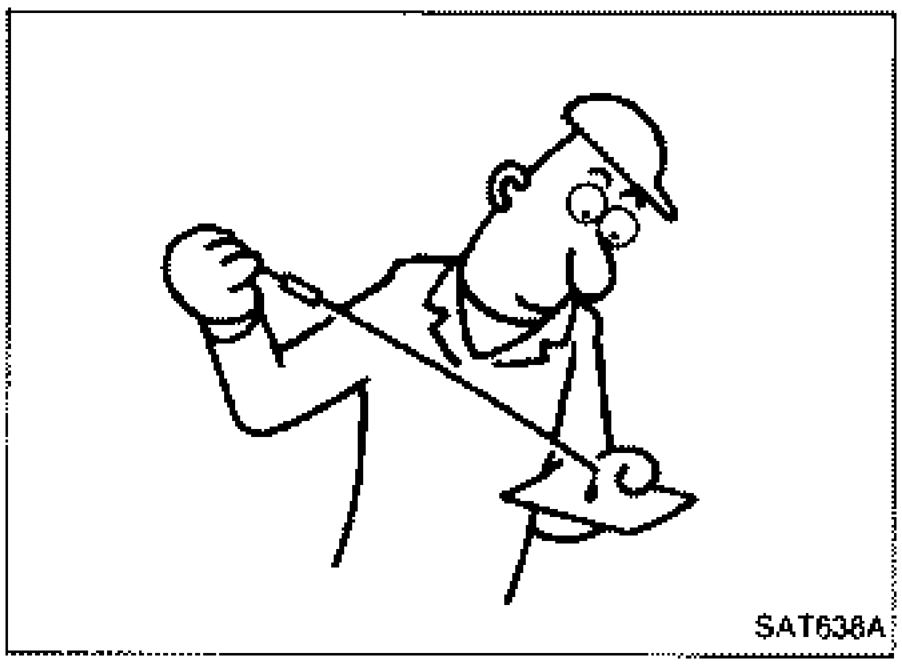
SAT767B

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" range and wait a few minutes.
3. Stop engine.



SAT801A

4. Check for fresh leakage.

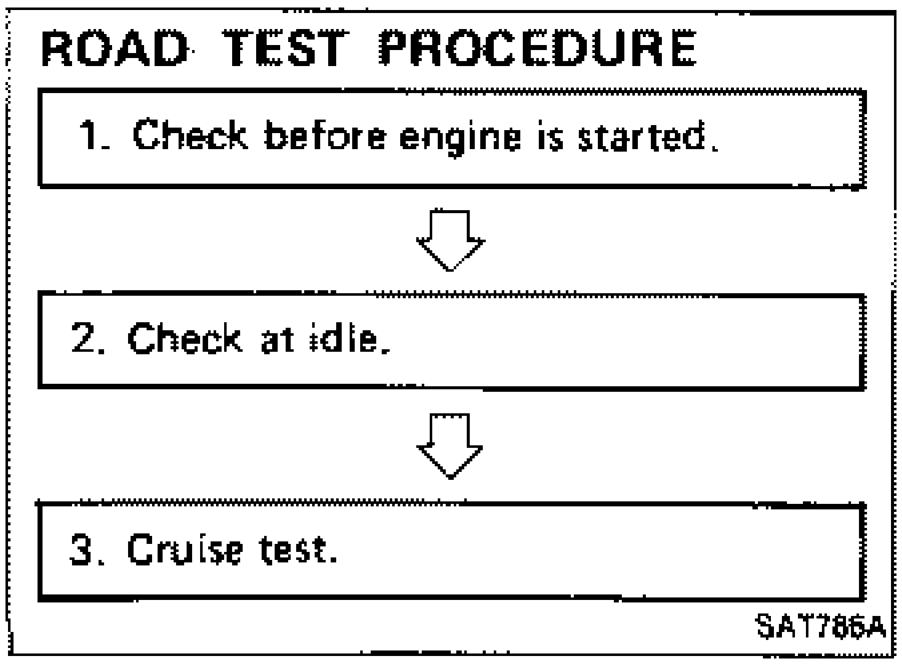


SAT638A

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 section MA.



ROAD TEST PROCEDURE

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

SAT786A

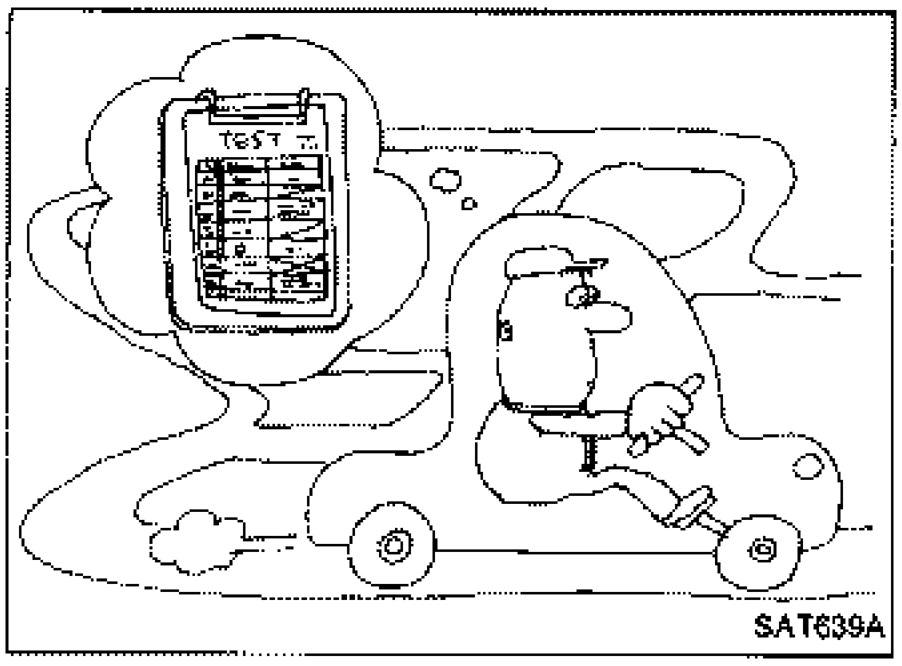
ROAD TESTING

Description

- The purpose of this road test is to determine overall performance of automatic transmission 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

Preliminary Check (Cont'd)

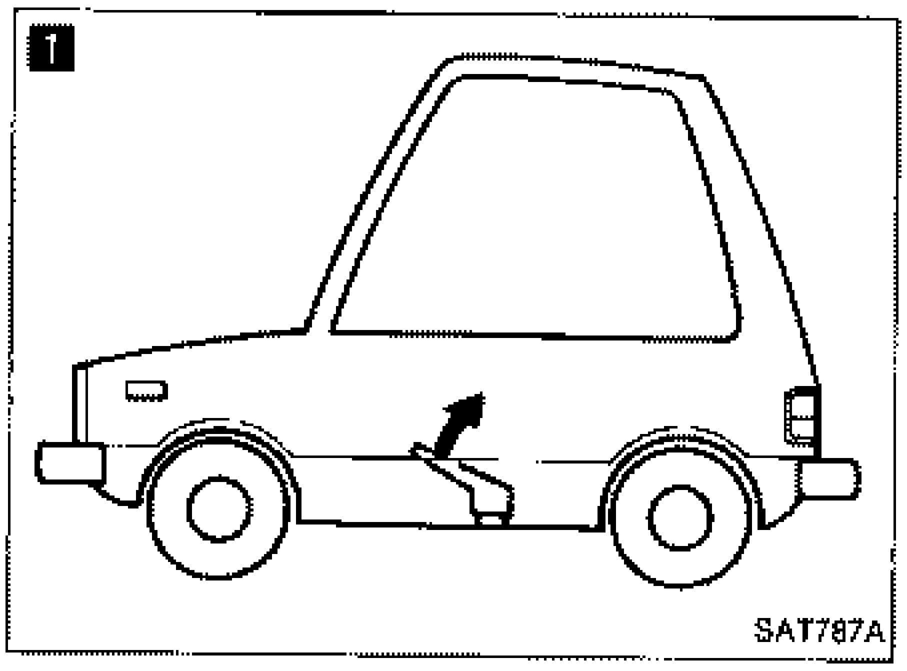


SAT639A

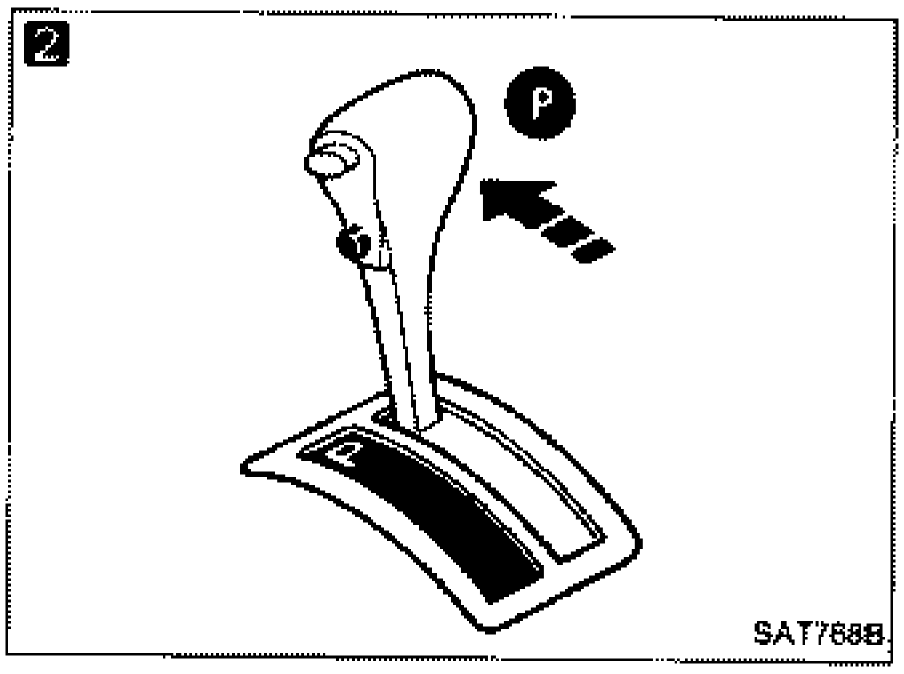
- Before road test, familiarize yourself with all test procedures and items to check.
- Conduct tests on all items. Troubleshoot items which check out No Good after road test. Refer to "Self-diagnosis" and "Diagnostic Procedure".

Preliminary Check (Cont'd)

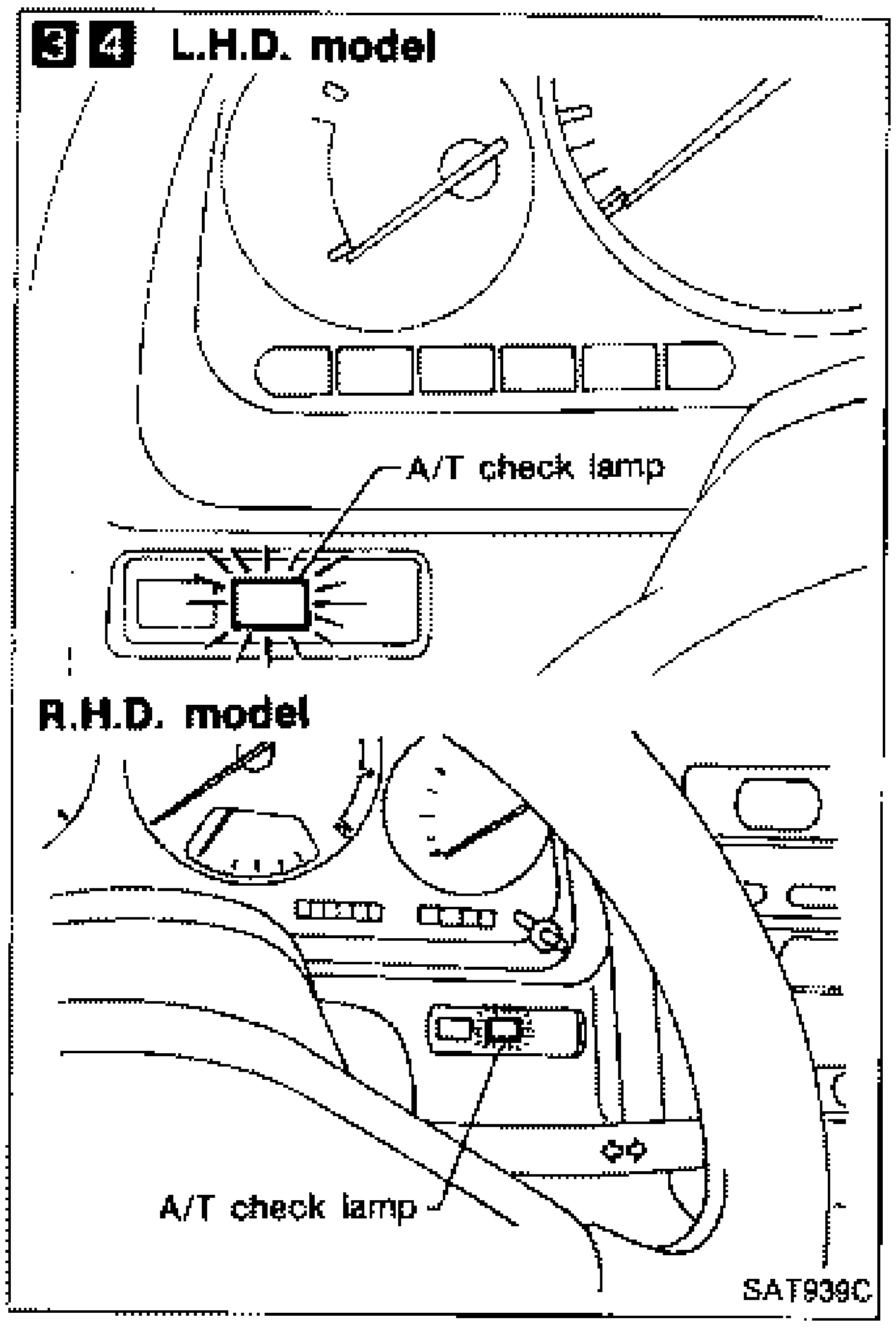
1. Check before engine is started



SAT787A



SAT768B



SAT939C

1

Park vehicle on flat surface.

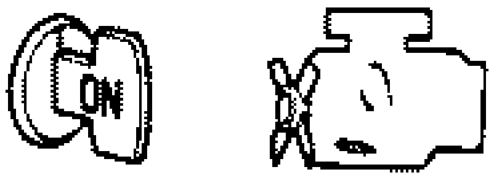
↓

↓

2

Move selector lever to "P" range.

↓



↓

3

Does A/T check lamp come on for about 2 seconds?

No → Go to Diagnostic Procedure 1.

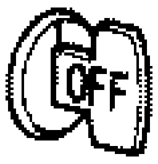
Yes ↓

4

Does A/T check lamp flicker for about 8 seconds?

Yes → Perform self-diagnosis. — Refer to SELF-DIAGNOSIS PROCEDURE.

No ↓



↓

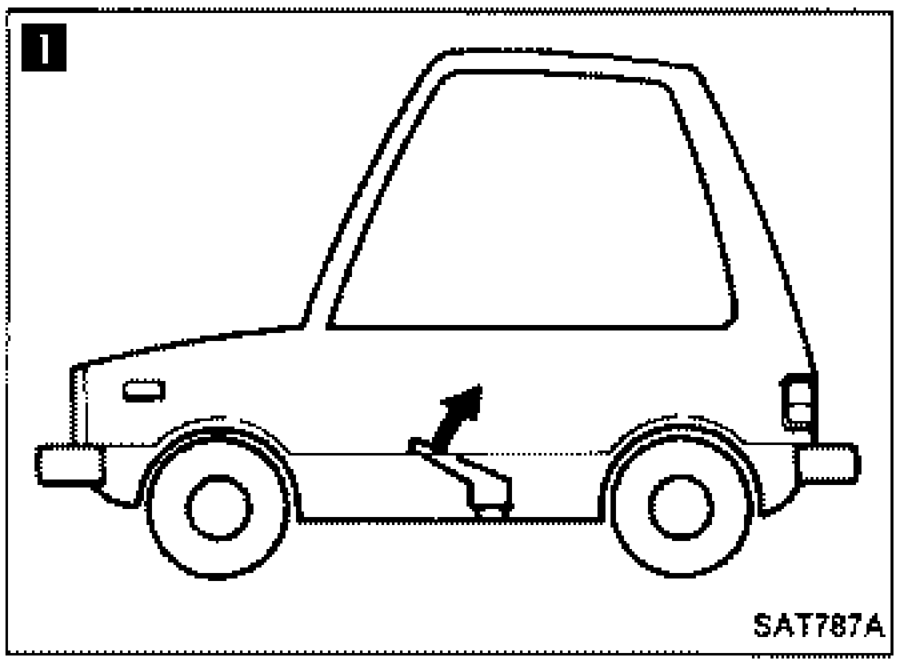
Perform self-diagnosis. — Refer to SELF-DIAGNOSIS PROCEDURE and note N.G. items.

↓

Go to "ROAD TESTING — 2. Check at idle".

Preliminary Check (Cont'd)

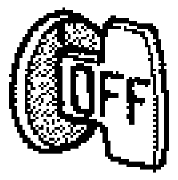
2. Check at idle



1

Park vehicle on flat surface.

↓



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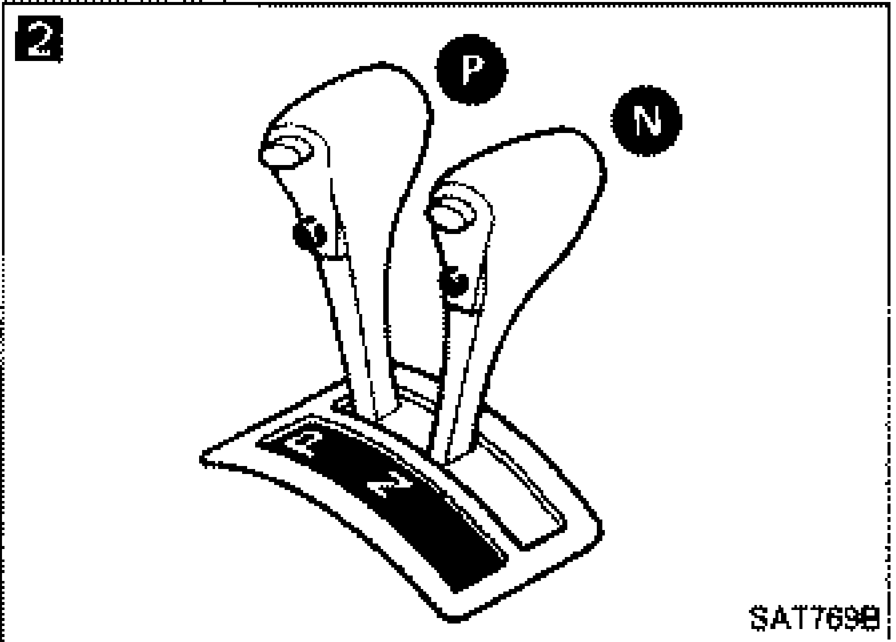
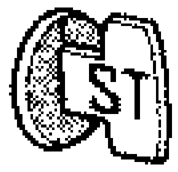


2

Move selector lever to "P" or "N" range.

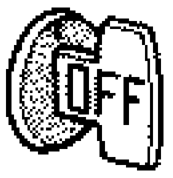
↓



↓

Is engine started? No → Go to Diagnostic Procedure 2.

Yes ↓



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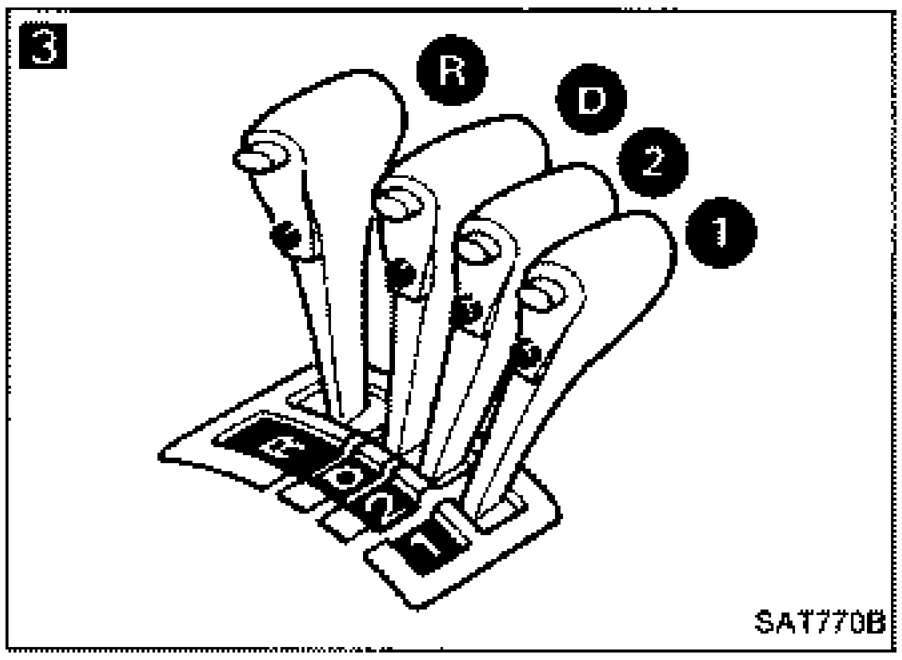
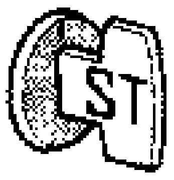


3

Move selector lever to "D", "1", "2" or "R" range.

↓

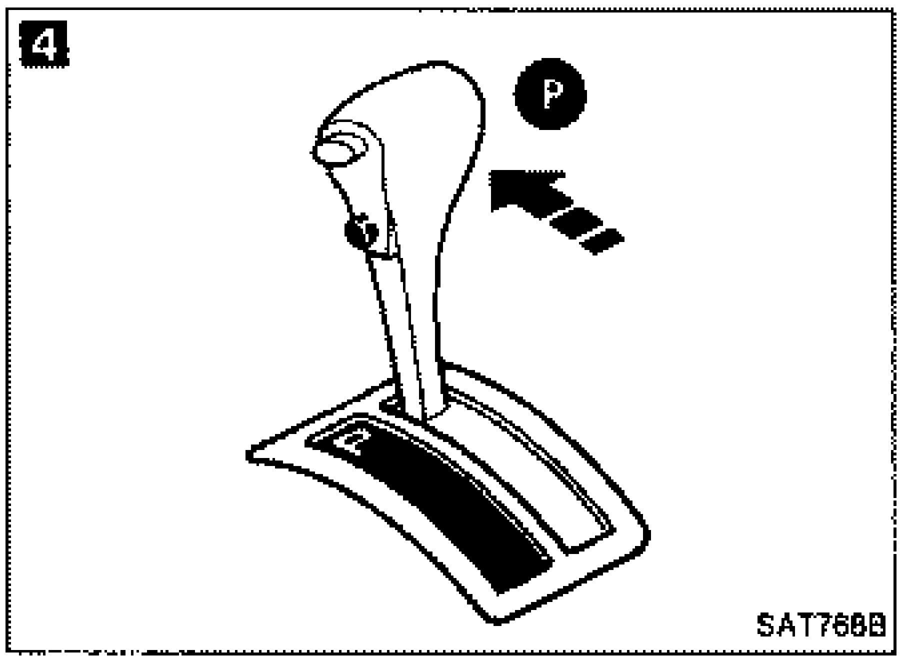


↓

Is engine started? Yes → Go to Diagnostic Procedure 2.

No ↓

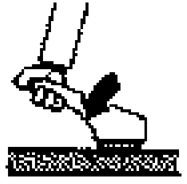
↓



4

Move selector lever to "P" range.

↓



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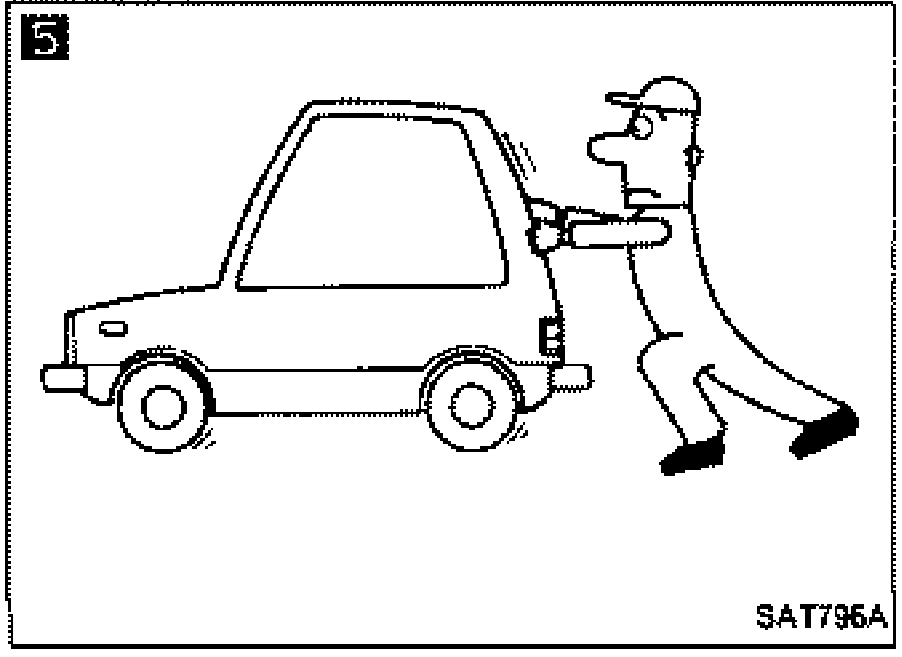


5

Push vehicle forward or backward.

↓

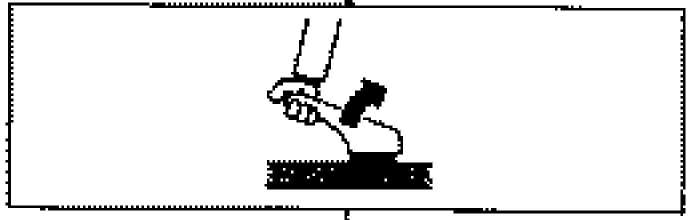
Does vehicle move when it is pushed forward or backward? Yes → Go to Diagnostic Procedure 3.

No ↓

Ⓐ

Preliminary Check (Cont'd)

Ⓐ



6

Move selector lever to "N" range.

Does vehicle move forward or backward?

Yes → Go to Diagnostic Procedure 4.

No

7

Apply foot brake.

8

Move selector lever to "R" range.

Is there large shock when changing from "N" to "R" range?

Yes → Go to Diagnostic Procedure 5.

No

9

Release foot brake for several seconds.

Does vehicle creep backward when foot brake is released?

No → Go to Diagnostic Procedure 6.

Yes

10

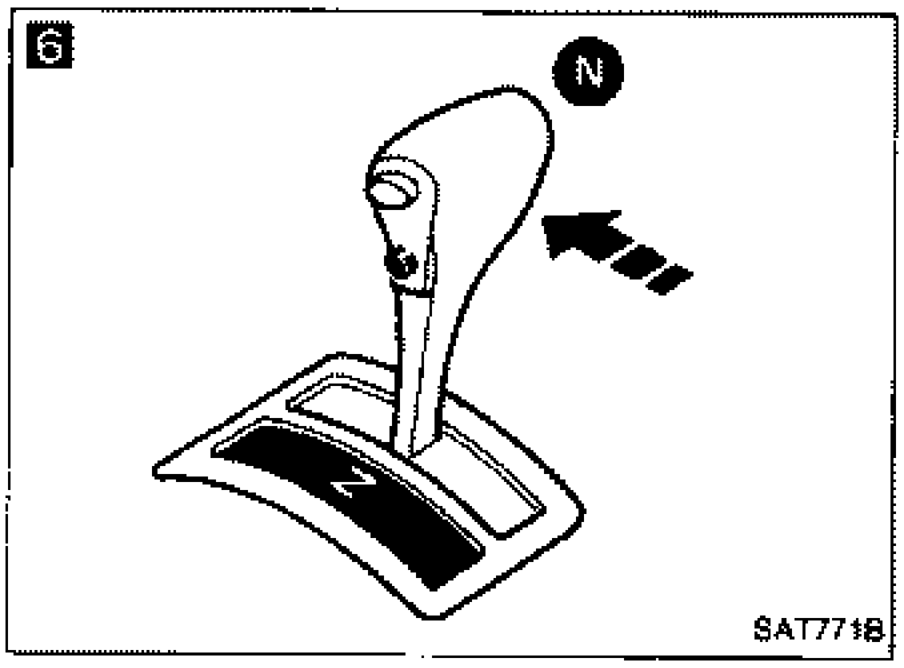
Move selector lever to "D", "1" and "2" ranges and check if vehicle creeps forward.

Does vehicle creep forward in all three ranges?

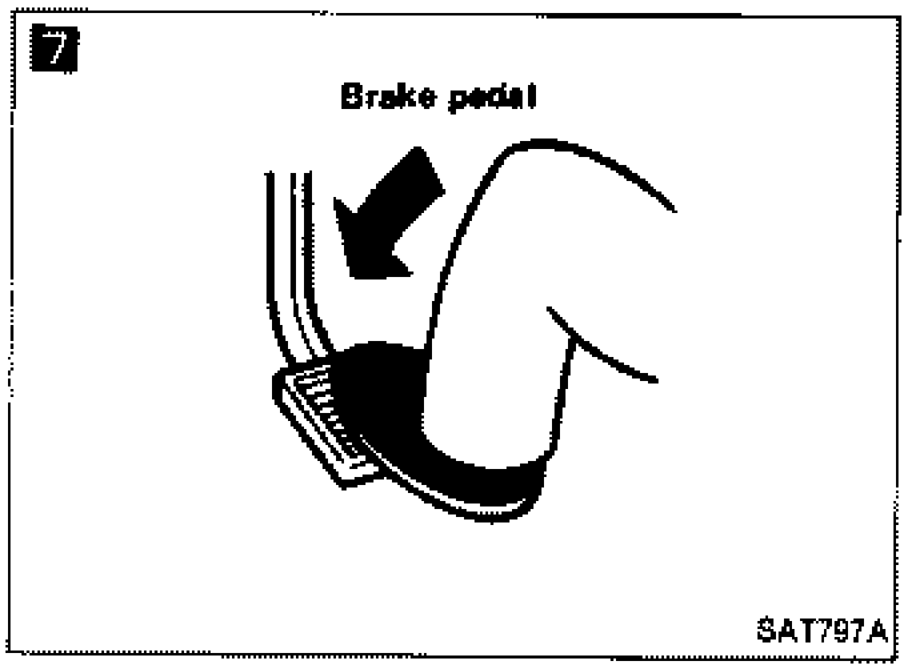
Yes → Go to Cruise test.

No

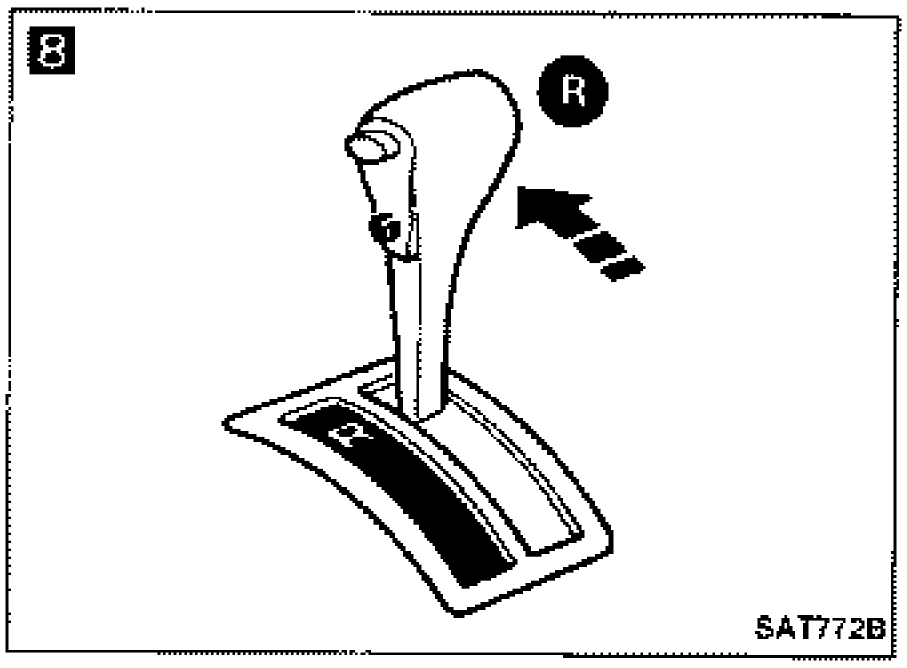
Go to Diagnostic Procedure 7.



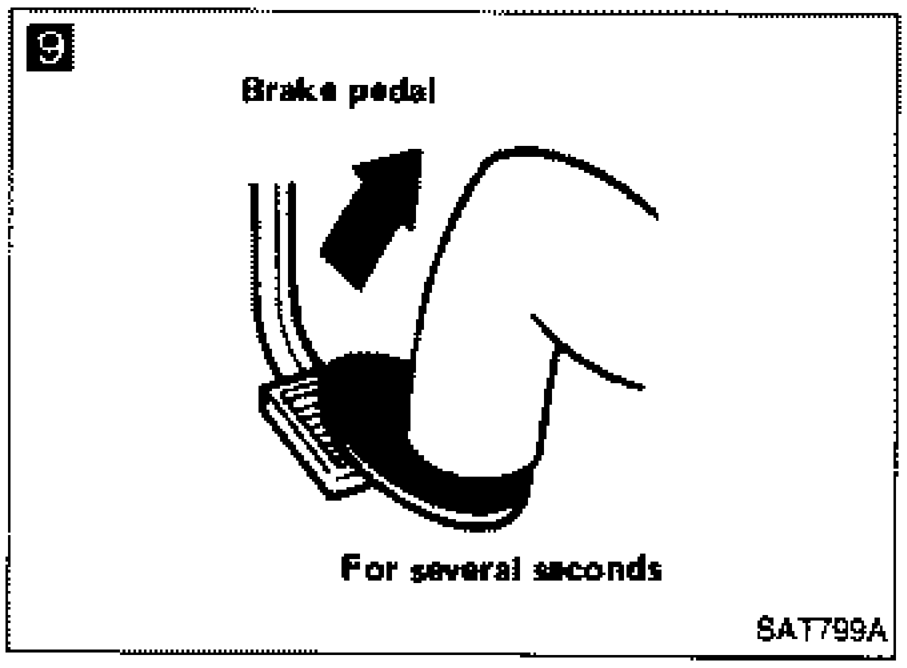
SAT771B



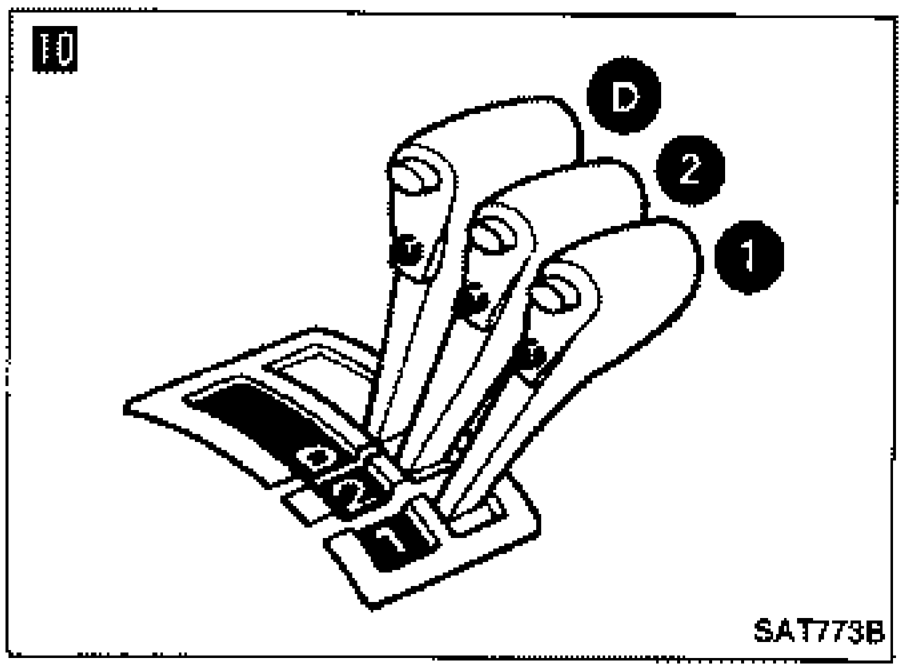
SAT797A



SAT772B



SAT799A



SAT773B

Preliminary Check (Cont'd)

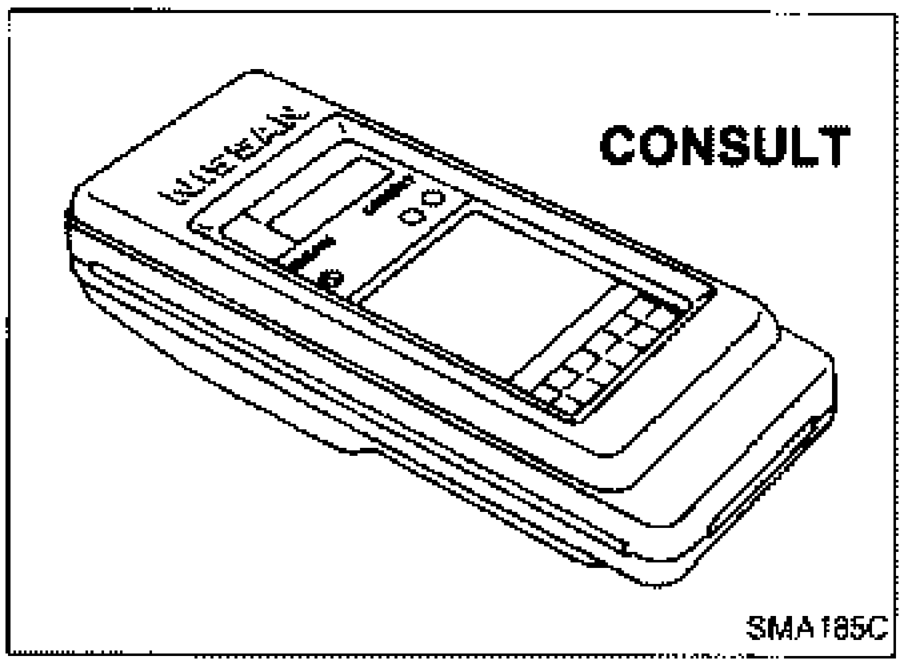
3. Cruise test

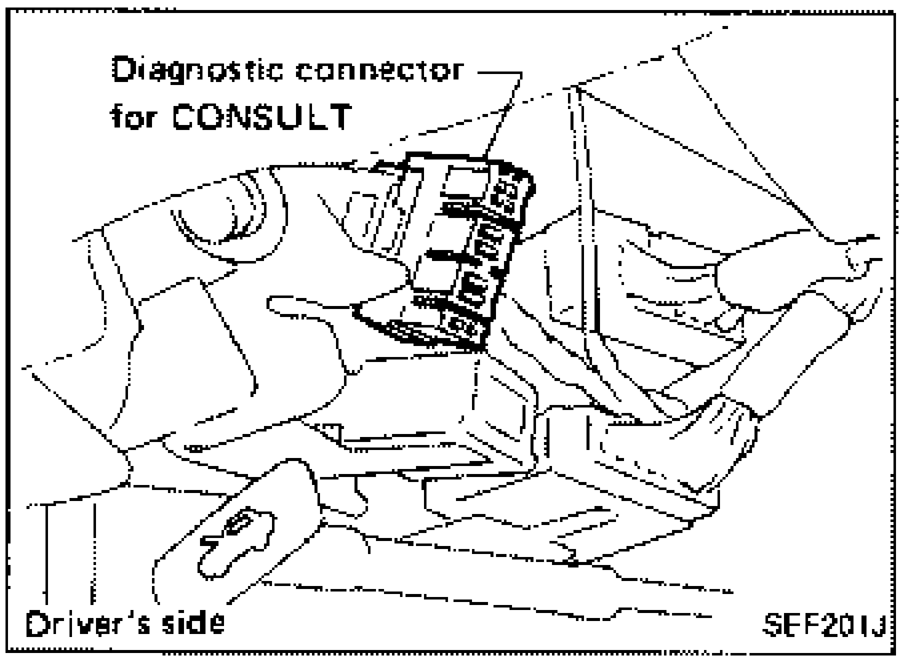
With CONSULT

- 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."
- Check all items listed in Parts 1 through 3.

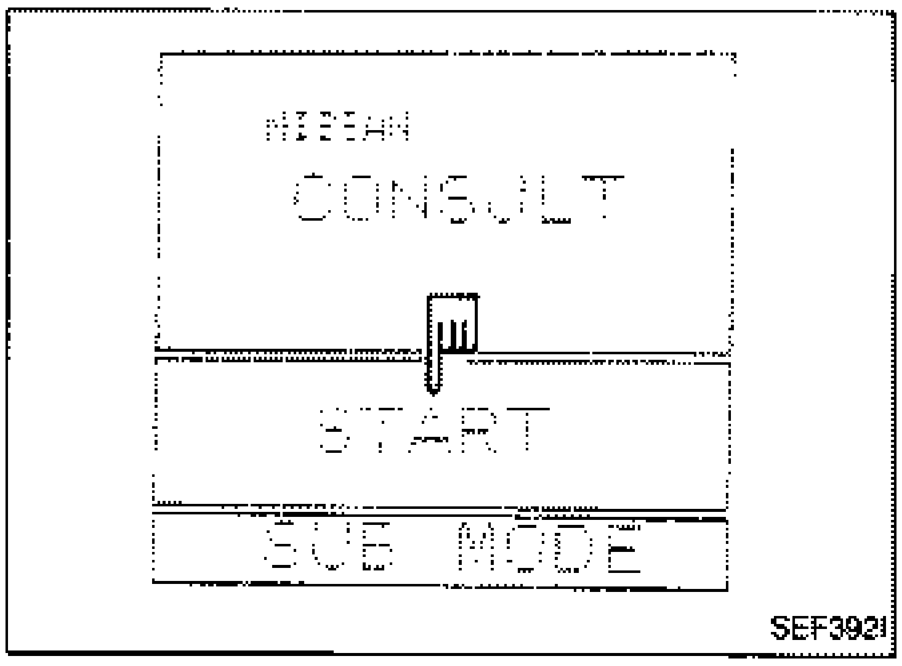
CONSULT setting procedure

1. Turn off ignition switch.
2. Connect "CONSULT" to diagnostic connector. (Diagnostic connector is located in left dash side panel.)

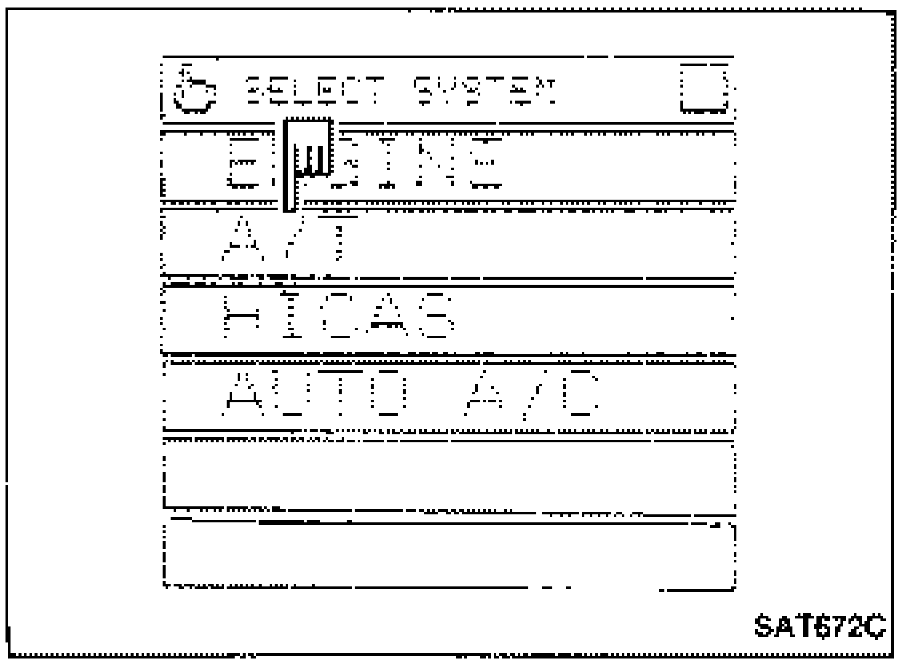




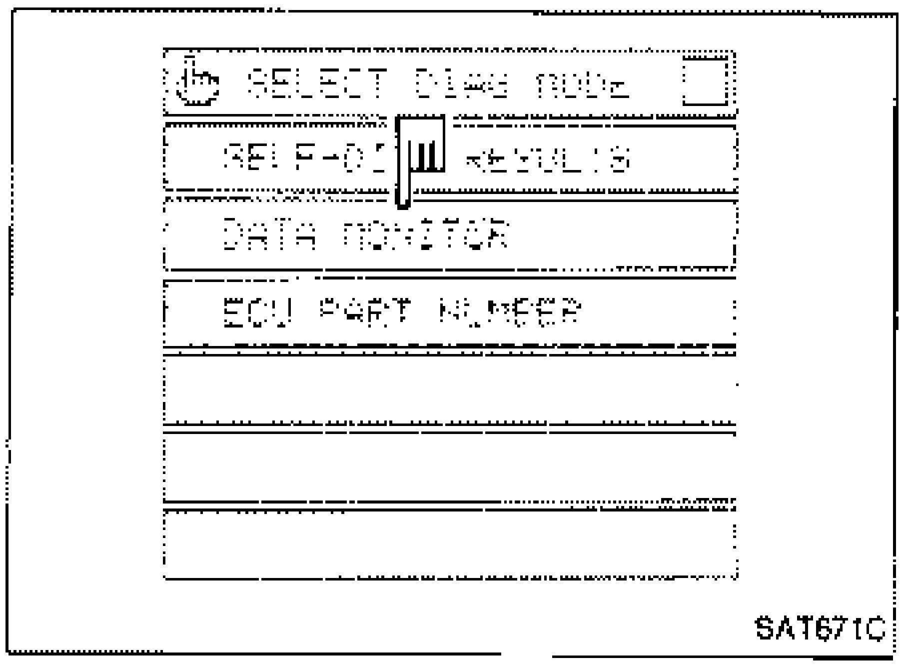
3. Turn on ignition switch.
4. Touch "START".



5. Touch "A/T".

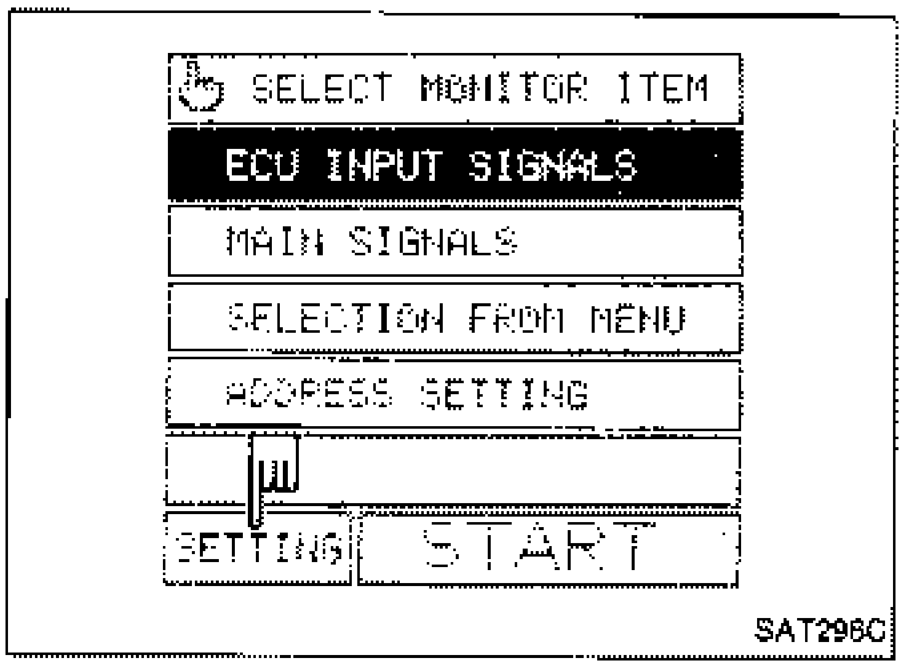


Preliminary Check (Cont'd)



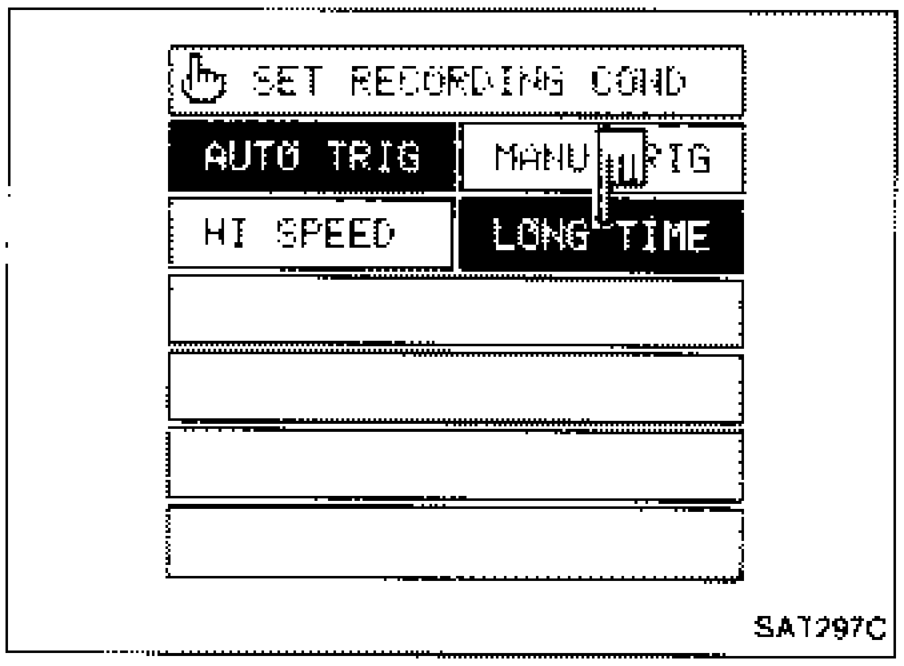
SAT671C

6. Touch "DATA MONITOR".



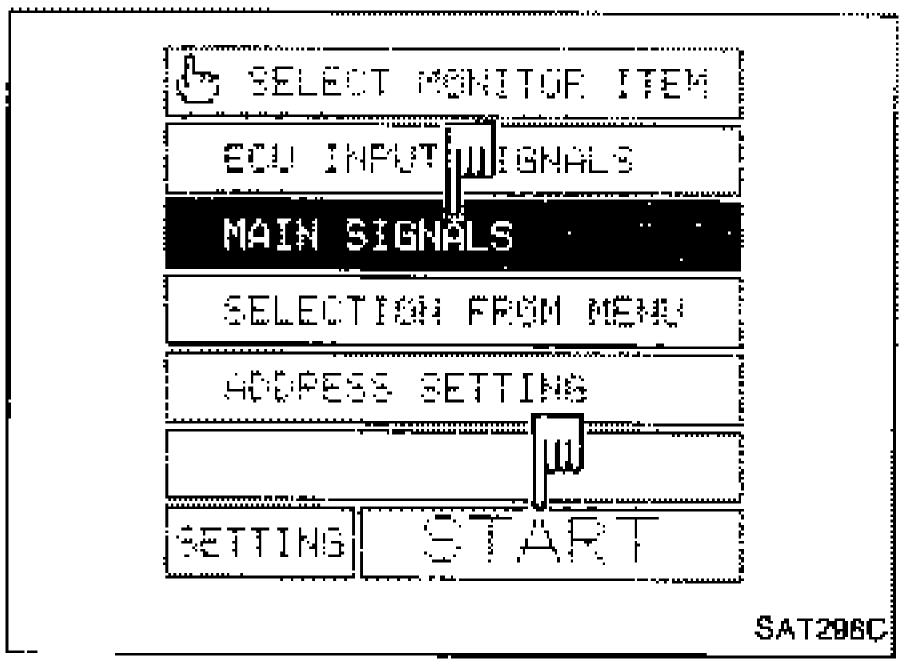
SAT296C

7. Touch "SETTING" to set recording condition.



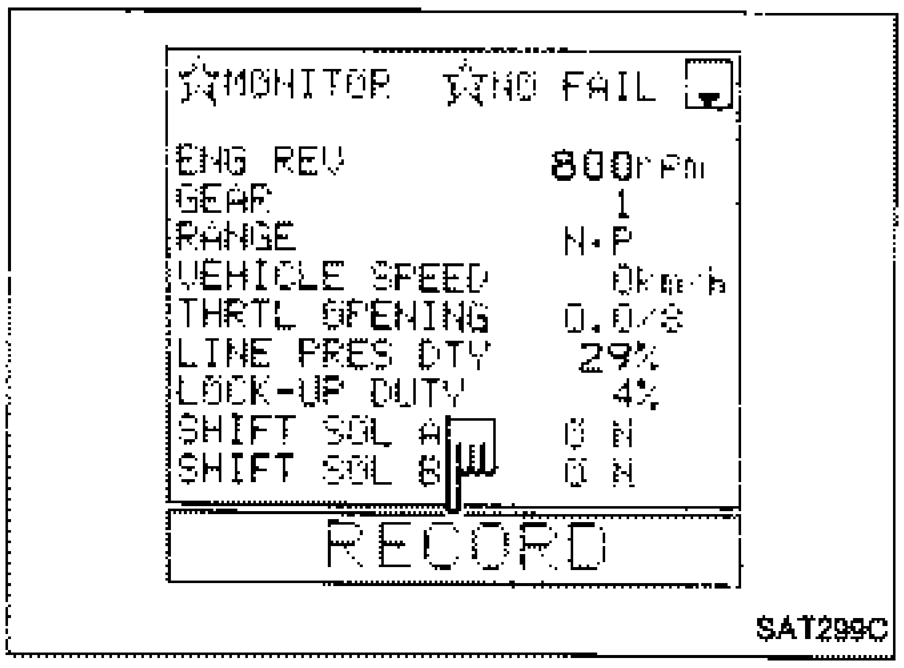
SAT297C

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



SAT298C

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

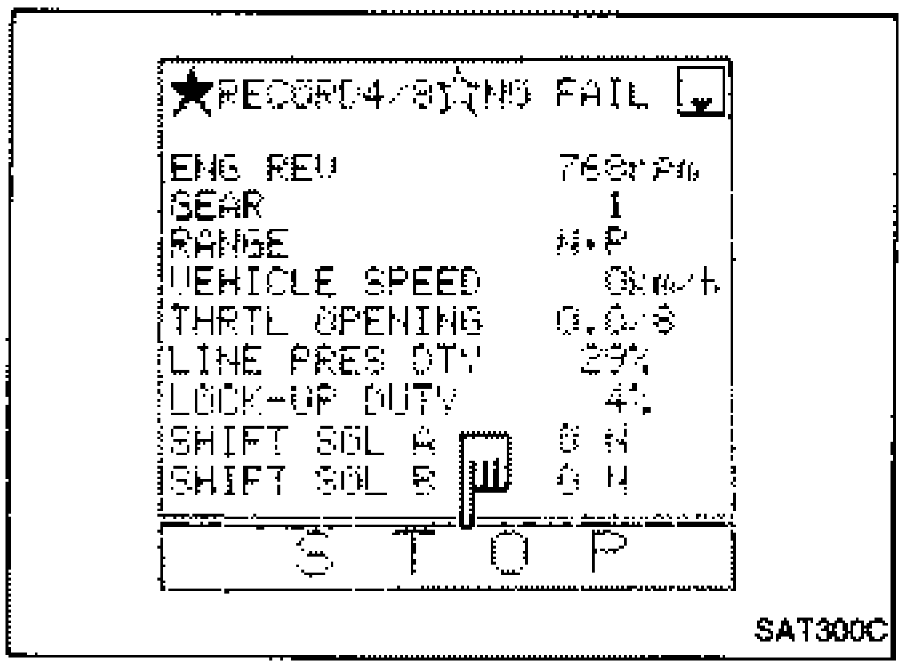


```
ENG REV             800rpm
GEAR                   1
RANGE                N·P
VEHICLE SPEED         0km/h
THRTL OPENING        0.0/8
LINE PRES DTY         29%
LOCK-UP DUTY           4%
SHIFT SOL A          ON
SHIFT SOL B          ON
```

SAT299C

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

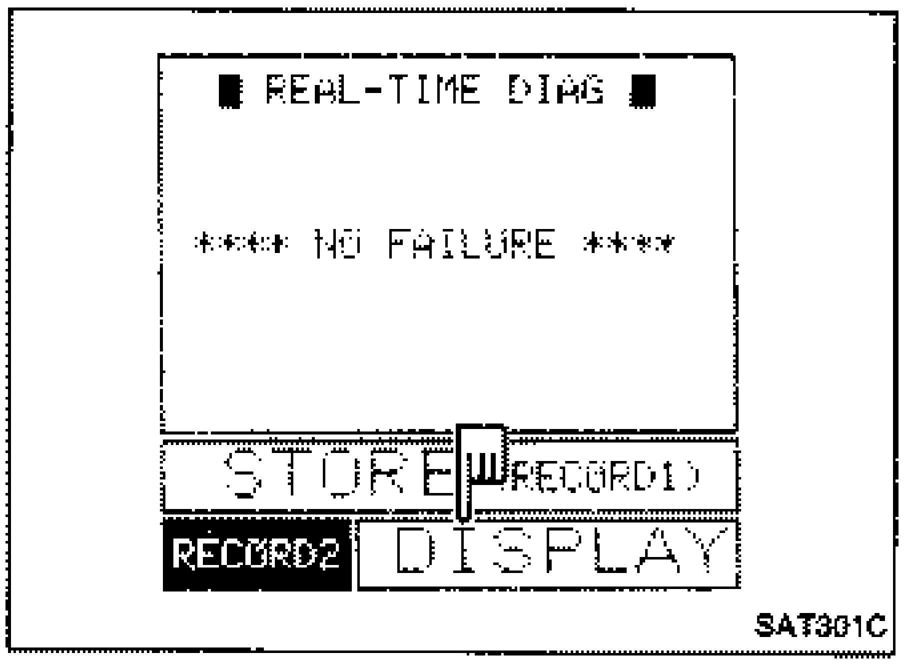
Preliminary Check (Cont'd)



```
★RECORD4/8☆NO FAIL
ENG REV              768rpm
GEAR                   1
RANGE                 N·P
VEHICLE SPEED          0km/h
THRTL OPENING        0.0/8
LINE PRES DTY         29%
LOCK-UP DUTY           4%
SHIFT SOL A           ON
SHIFT SOL B           ON
```

SAT300C

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

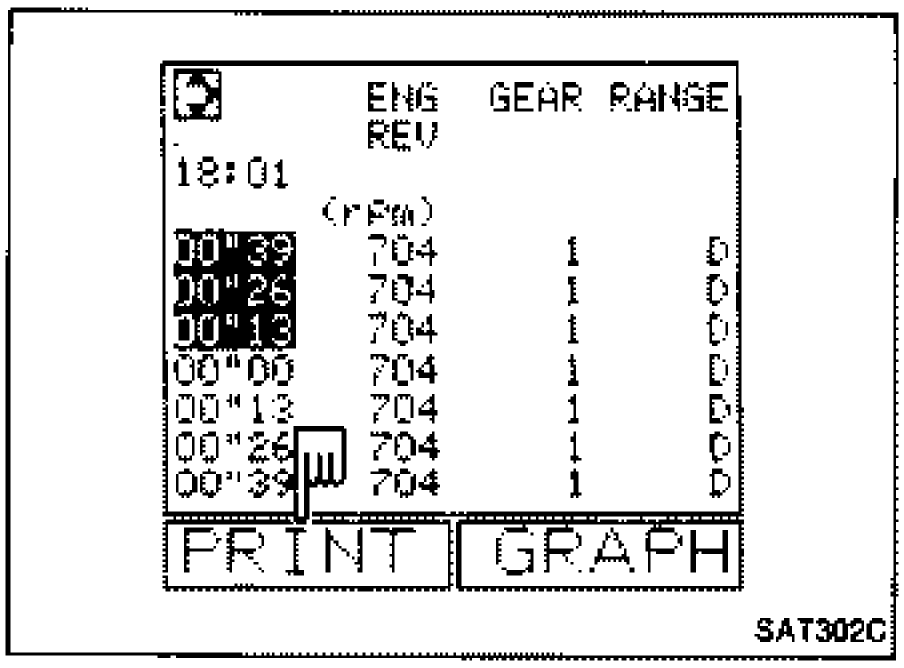


```
■ REAL-TIME DIAG ■

**** NO FAILURE ****
```

SAT301C

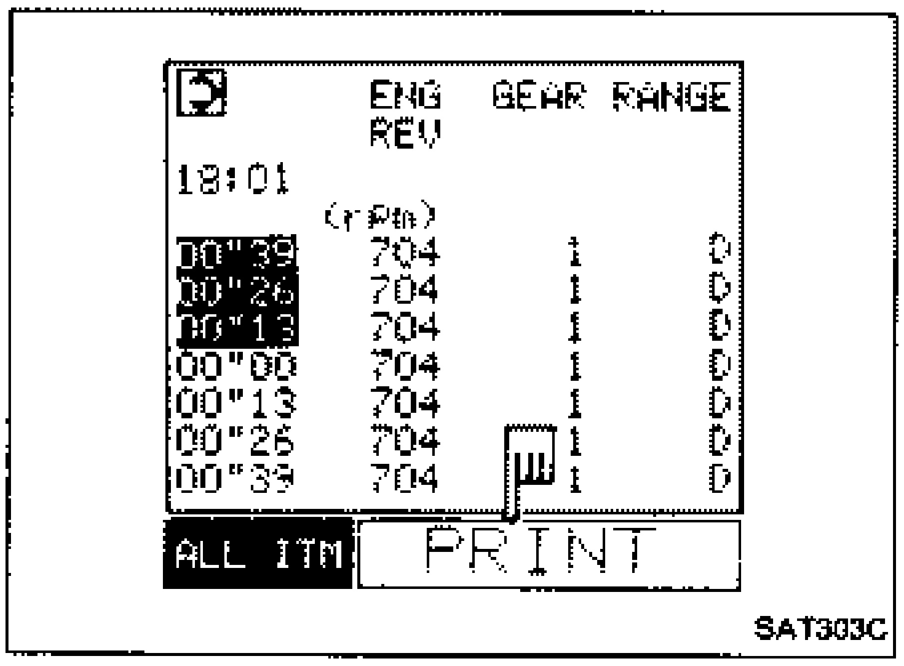
13. Touch "DISPLAY".



```
        ENG    GEAR  RANGE
        REV
18:01
       (rpm)
00"39    704      1      D
00"26    704      1      D
00"13    704      1      D
00"00    704      1      D
00"13    704      1      D
00"26    704      1      D
00"39    704      1      D
```

SAT302C

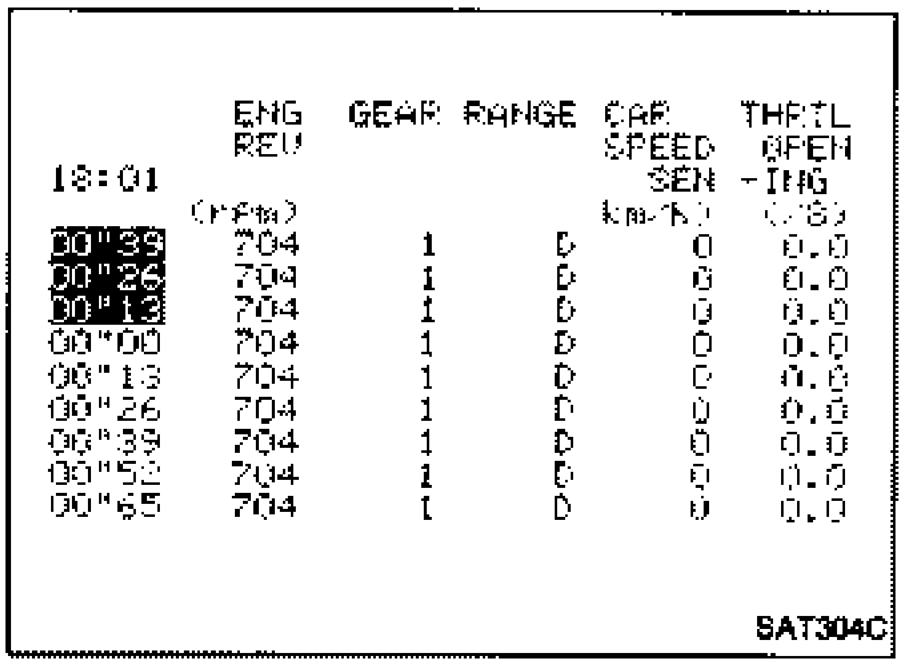
14. Touch "PRINT".



```
        ENG    GEAR  RANGE
        REV
18:01
       (rpm)
00"39    704      1      D
00"26    704      1      D
00"13    704      1      D
00"00    704      1      D
00"13    704      1      D
00"26    704      1      D
00"39    704      1      D
```

SAT303C

15. Touch "PRINT" again.

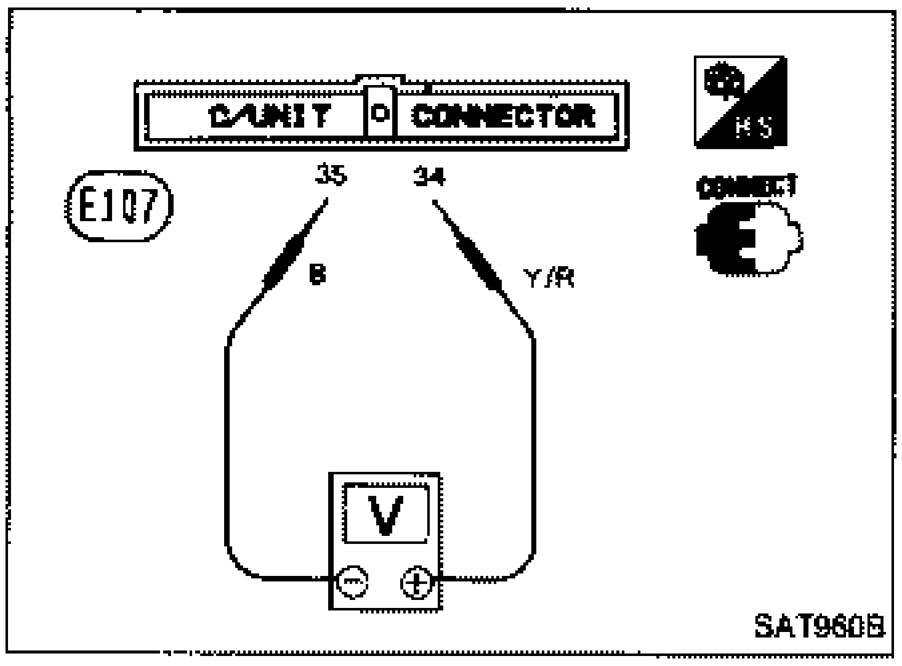


```
        ENG   GEAR RANGE CAR    THRTL
        REV              SPEED  OPEN
18:01                     SEN  -ING
       (rpm)             (km/h)  (/8)
00"39   704     1     D      0    0.0
00"26   704     1     D      0    0.0
00"13   704     1     D      0    0.0
00"00   704     1     D      0    0.0
00"13   704     1     D      0    0.0
00"26   704     1     D      0    0.0
00"39   704     1     D      0    0.0
00"52   704     1     D      0    0.0
00"65   704     1     D      0    0.0
```

SAT304C

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

Preliminary Check (Cont'd)

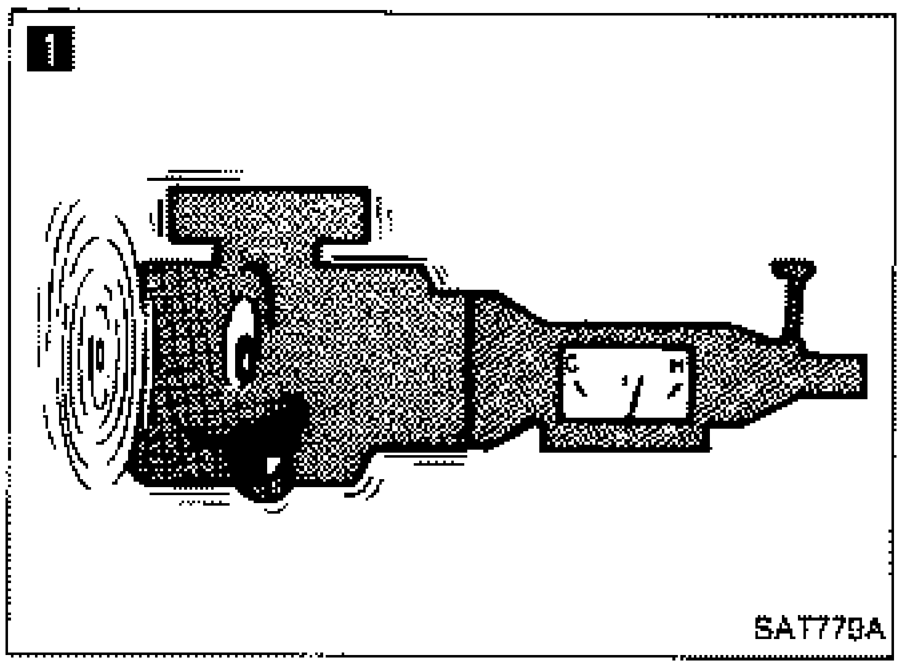


Without CONSULT

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

Preliminary Check (Cont'd)

Cruise test — Part 1



SAT779A

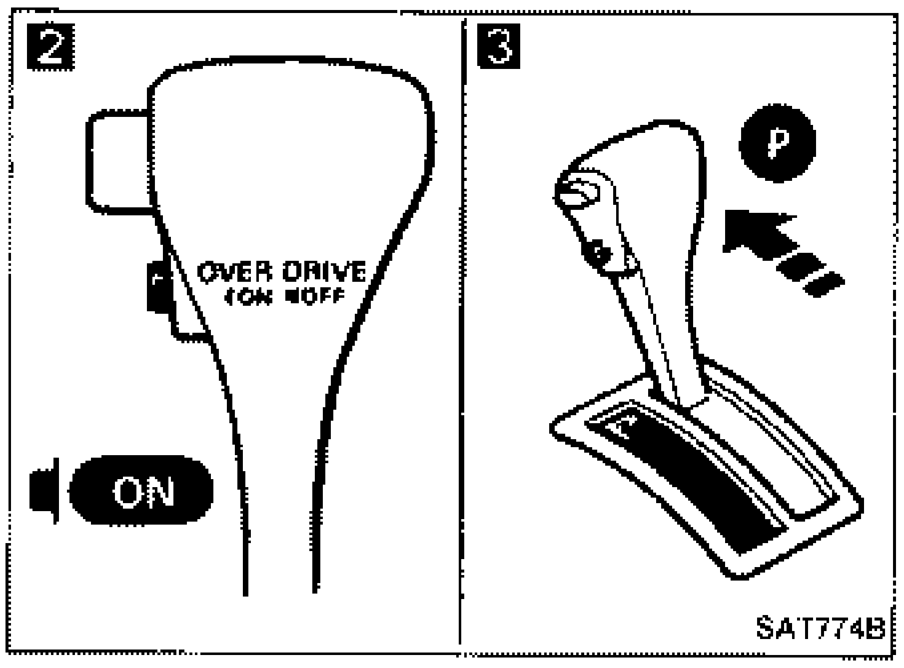
1

Warm up engine until engine oil and A.T.F. reach operating temperature after vehicle has been driven approx. 10 minutes.

A.T.F. operating temperature:
50 - 80°C (122 - 176°F)

↓

Park vehicle on flat surface.



SAT774B

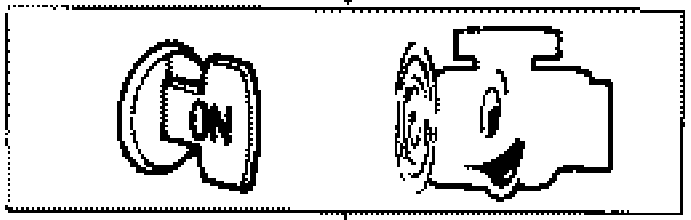
2

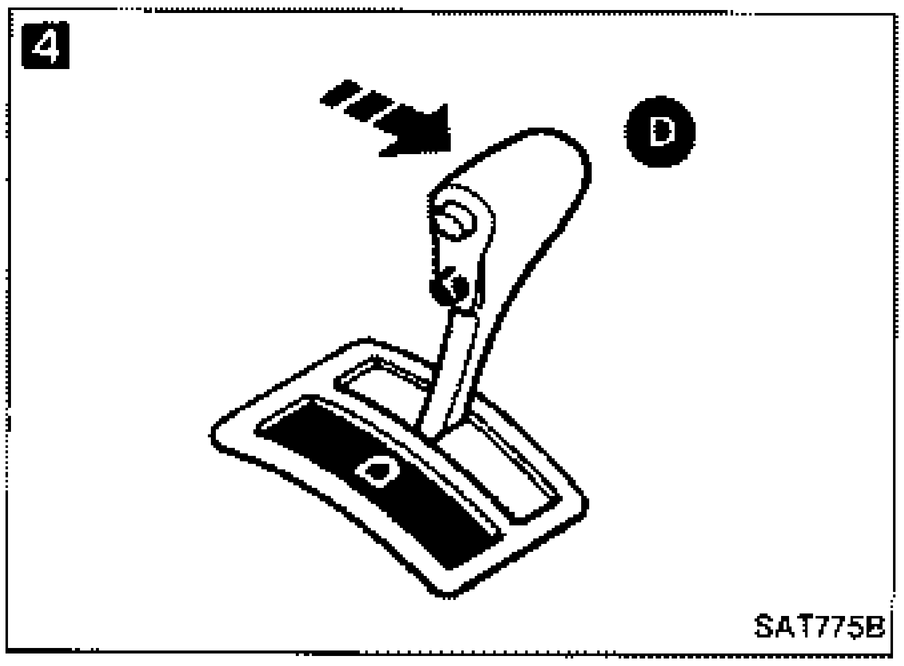
Set overdrive switch in "ON" position.

3

Move selector lever to "P" range.

↓





SAT775B

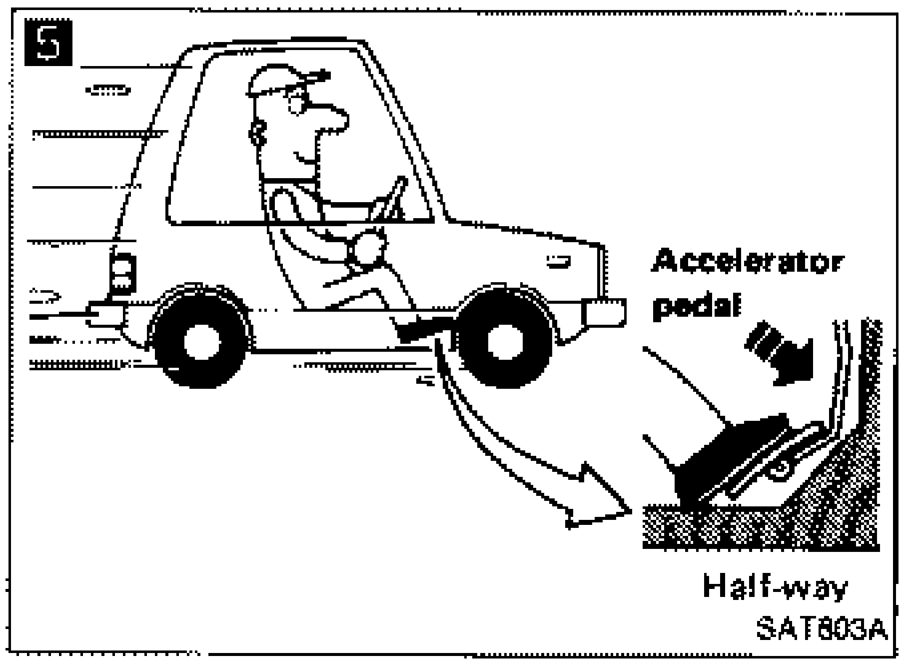
4

Move selector lever to "D" range.

5

Accelerate vehicle to half throttle.

↓



SAT803A

Does vehicle start from D_1?

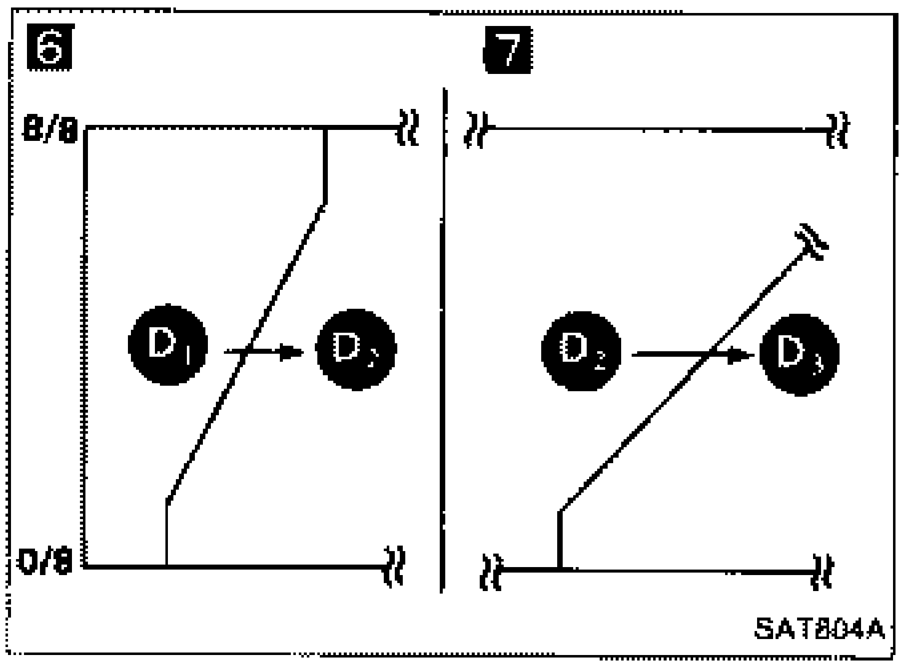
Read gear position.

No → Go to Diagnostic Procedure 8.

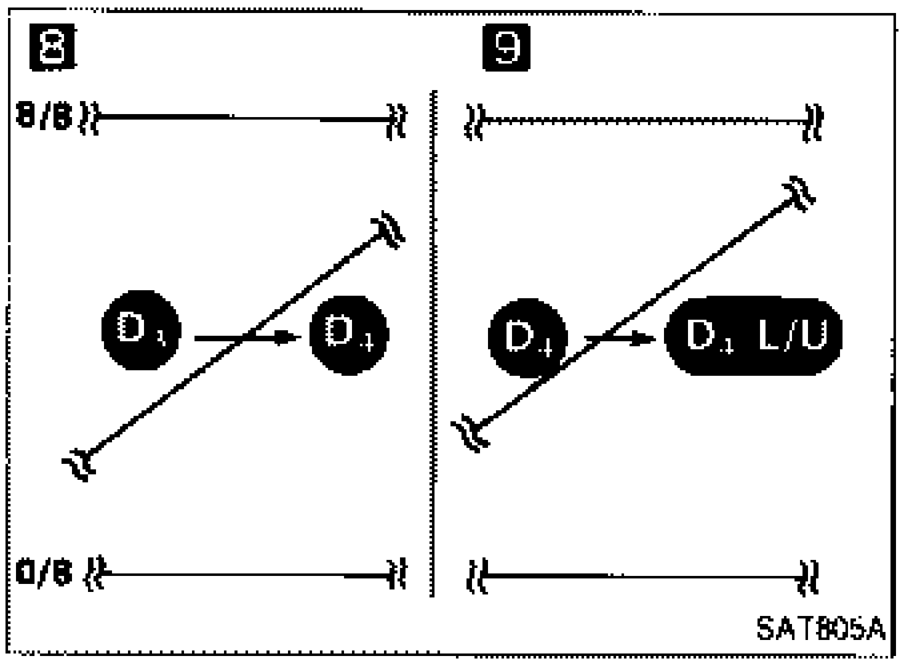
Yes ↓

Ⓐ

Preliminary Check (Cont'd)



SAT804A



SAT805A

Ⓐ

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.

No → Go to Diagnostic Procedure 9.

Yes ↓

7

Does A/T shift from D_2 to D_3 at the specified speed?

Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D_2 to D_3:
Refer to Shift schedule.

No → Go to Diagnostic Procedure 10.

Yes ↓

8

Does A/T shift from D_3 to D_4 at the specified speed?

Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D_3 to D_4:
Refer to Shift schedule.

No → Go to Diagnostic Procedure 11.

Yes ↓

9

Does A/T perform lock-up at the specified speed?

Read vehicle speed, throttle opening when lock-up duty becomes 94%.

Specified speed when lock-up occurs:
Refer to Shift schedule.

No → Go to Diagnostic Procedure 12.

Yes ↓

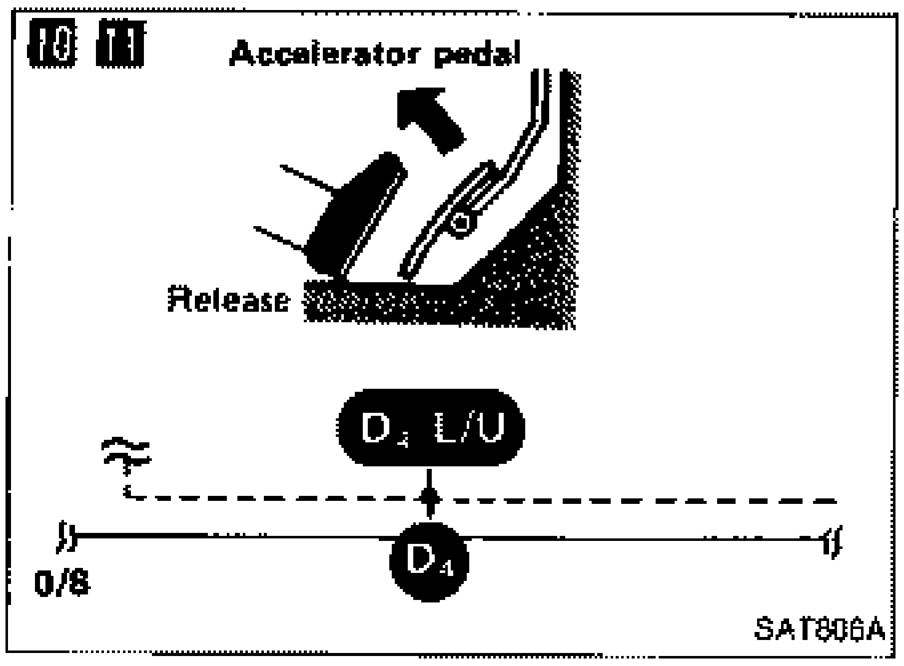
Does A/T hold lock-up condition for more than 30 seconds?

No → Go to Diagnostic Procedure 13.

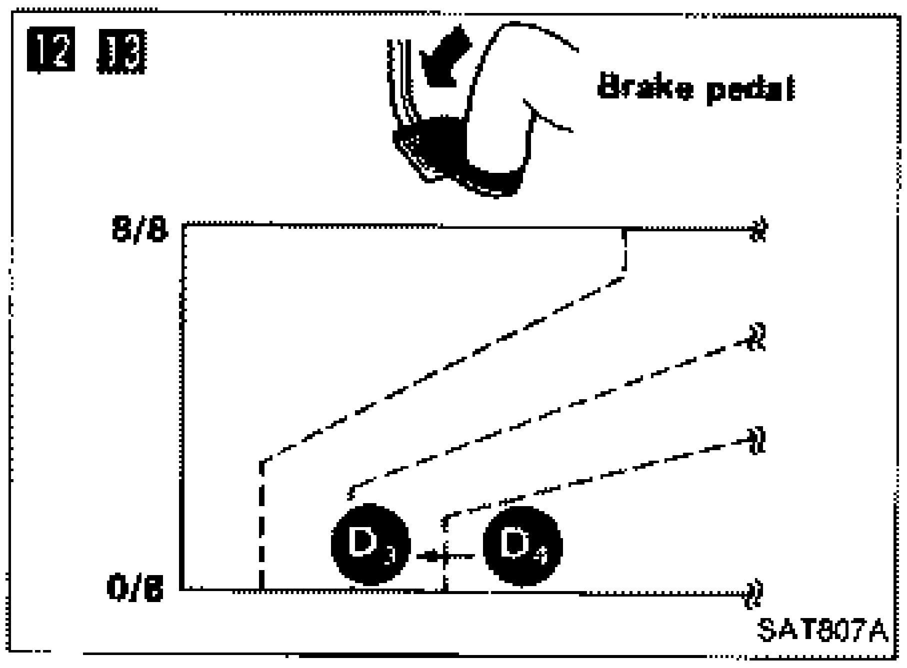
Yes ↓

Ⓑ

Preliminary Check (Cont'd)



SAT806A



SAT807A

(B)

10

Release accelerator pedal.

11

Is lock-up released when accelerator pedal is released?

- No → Go to Diagnostic Procedure 14.
- Yes ↓

12

Decelerate vehicle by applying foot brake lightly.

13

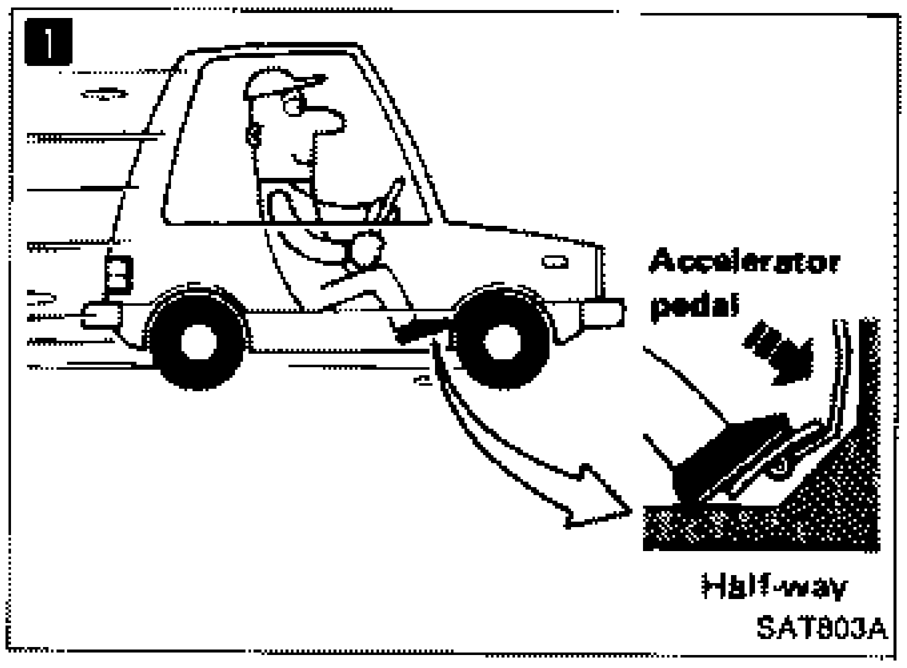
Does engine speed return to idle smoothly when A/T is shifted from D_4 to D_3?

Read gear position and engine speed.

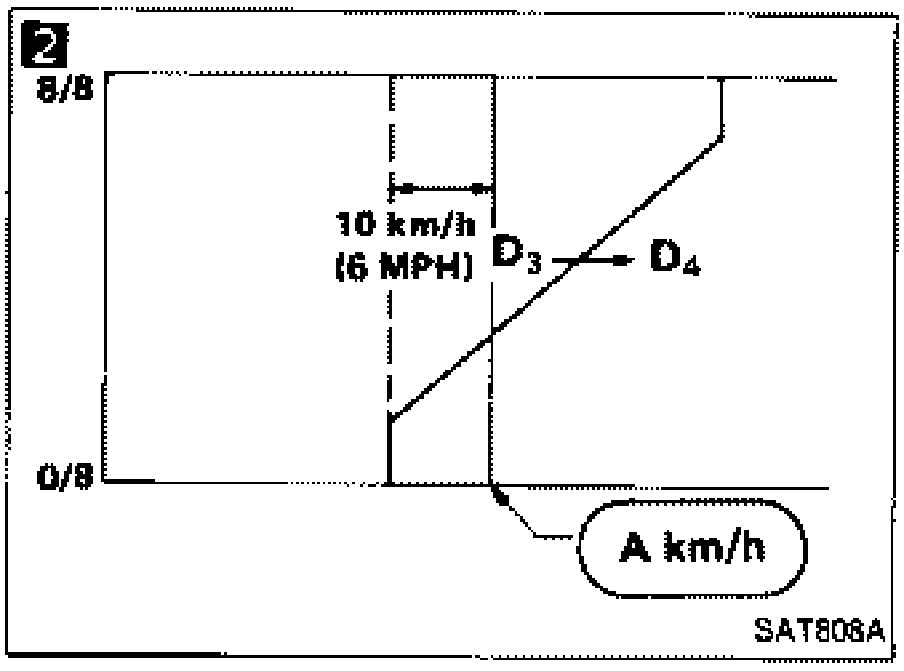
- No → Go to Diagnostic Procedure 15.
- Yes ↓

Stop vehicle.

Go to "Cruise test — Part 2".



SAT803A



SAT808A

Cruise test — Part 2

Confirm overdrive switch is in "ON" position.

Confirm selector lever is in "D" range.

1

Accelerate vehicle to half throttle again.

Does vehicle start from D_1?

Read gear position.

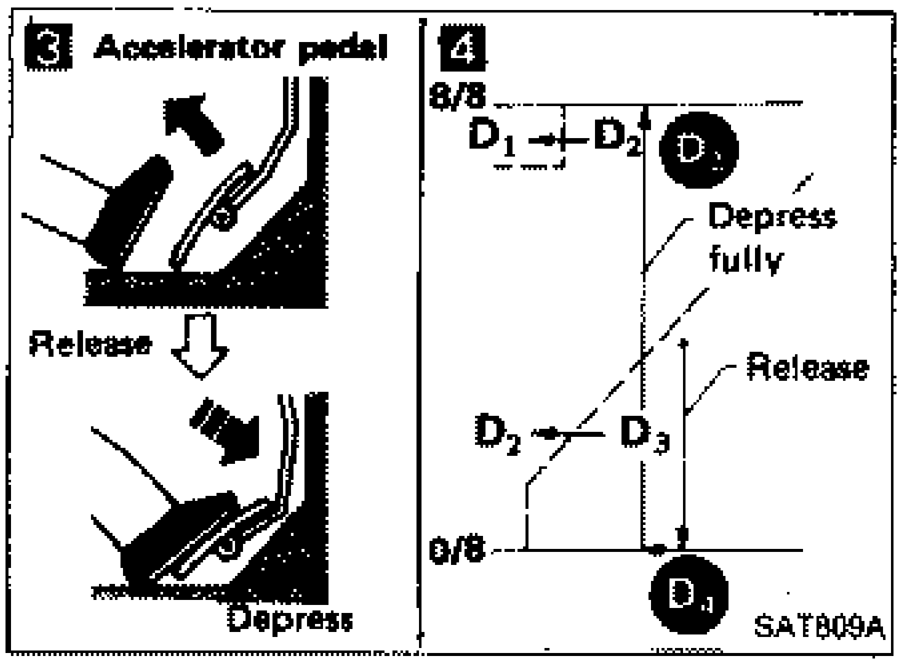
- No → Go to Diagnostic Procedure 16.
- Yes ↓

2

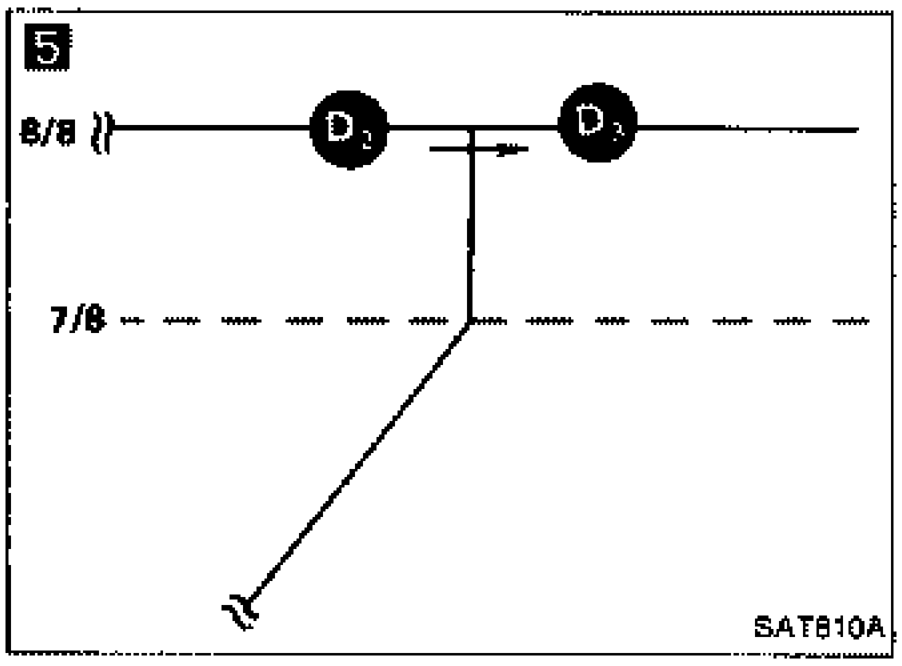
Accelerate vehicle to A km/h as shown in illustration.

(A)

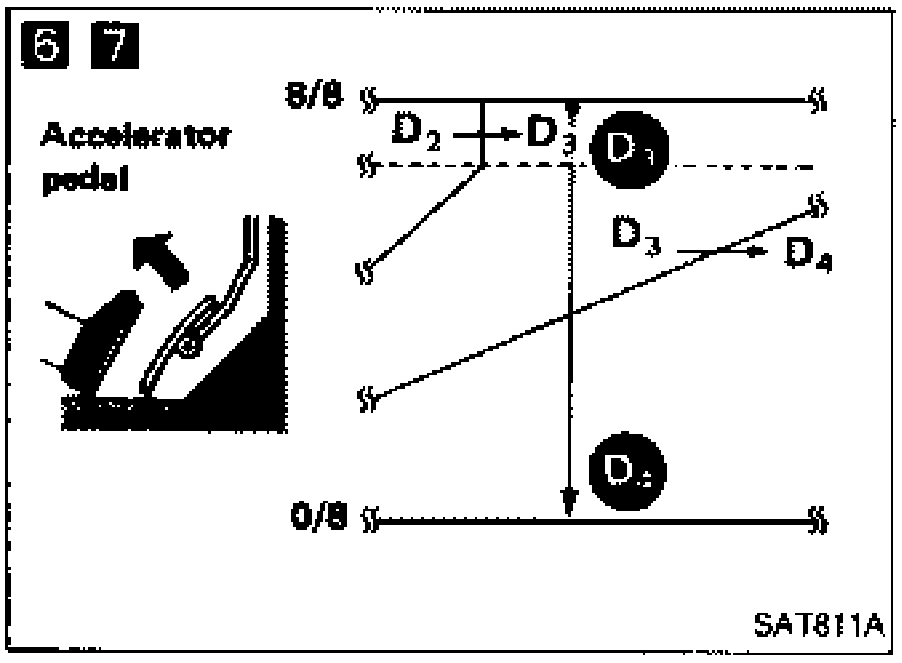
Preliminary Check (Cont'd)



SAT809A



SAT810A



SAT811A

Ⓐ

3

Release accelerator pedal and then quickly depress it fully.

4

Does A/T shift from D_4 to D_2 as soon as accelerator pedal is depressed fully?

Read gear position and throttle opening.

No → Go to Diagnostic Procedure 9.

Yes ↓

5

Does A/T shift from D_2 to D_3 at the specified speed?

Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D_2 to D_3:
Refer to Shift schedule.

No → Go to Diagnostic Procedure 10.

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 opening and vehicle speed.

No → Go to Diagnostic Procedure 11.

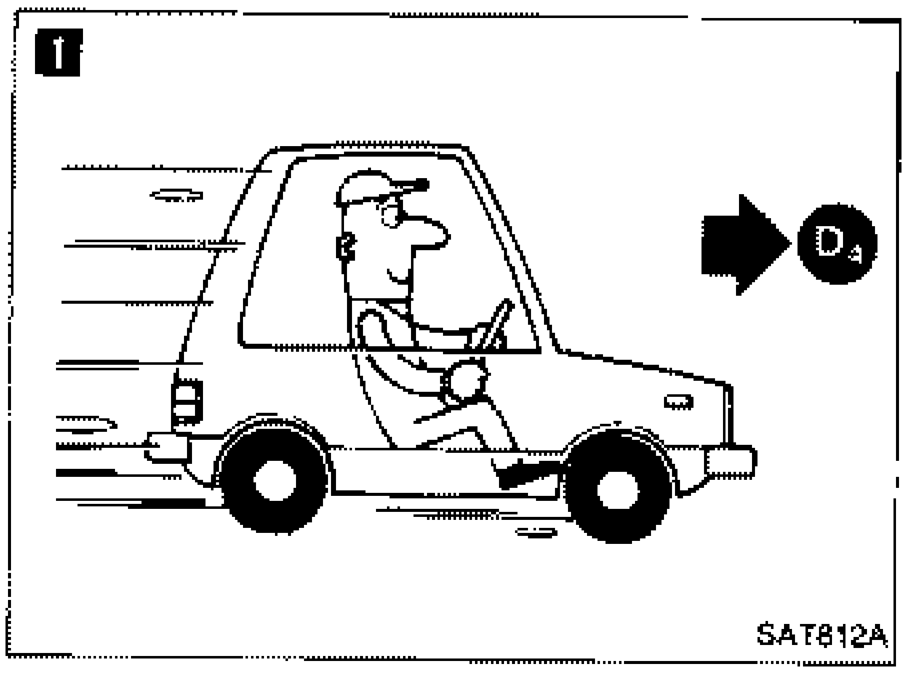
Yes ↓

Stop vehicle.

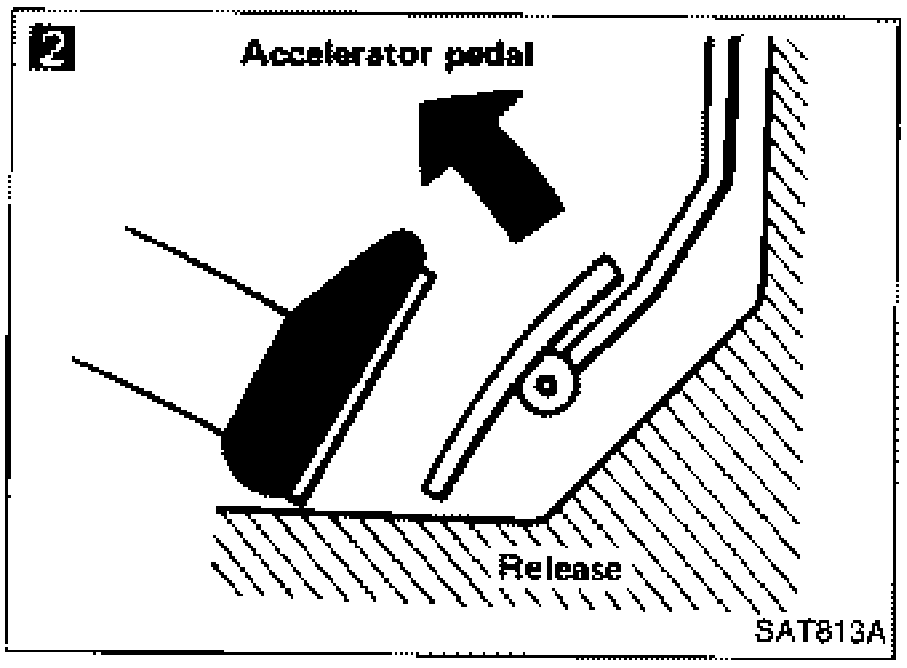
Go to "Cruise test — Part 3".

Preliminary Check (Cont'd)

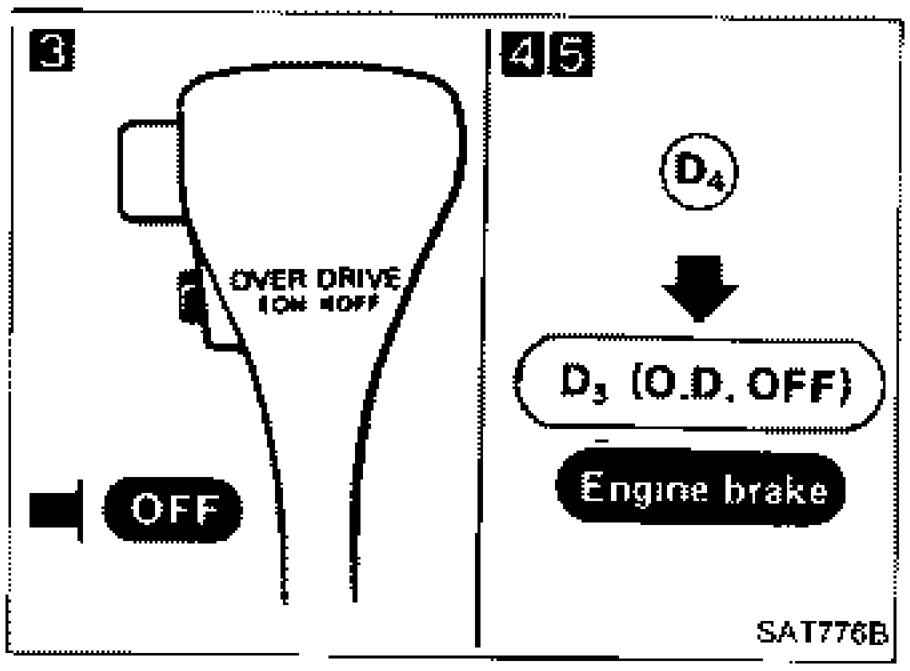
Cruise test — Part 3



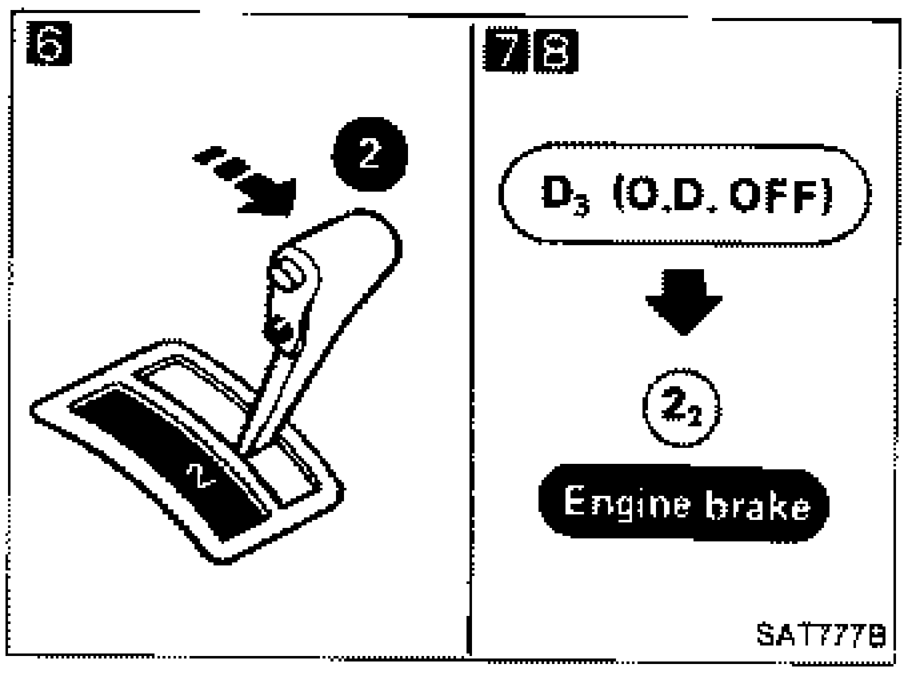
SAT812A



SAT813A



SAT776B



SAT777B

Confirm overdrive switch is in "ON" position.

↓

Confirm selector lever is in "D" range.

↓

1 Accelerate vehicle, using half-throttle, to D_4.

↓

2 Release accelerator pedal.

↓

3 Set overdrive switch in "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 17.
- Yes ↓

5 Does vehicle decelerate by engine brake?
- No → Go to Diagnostic Procedure 15.
- Yes ↓

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

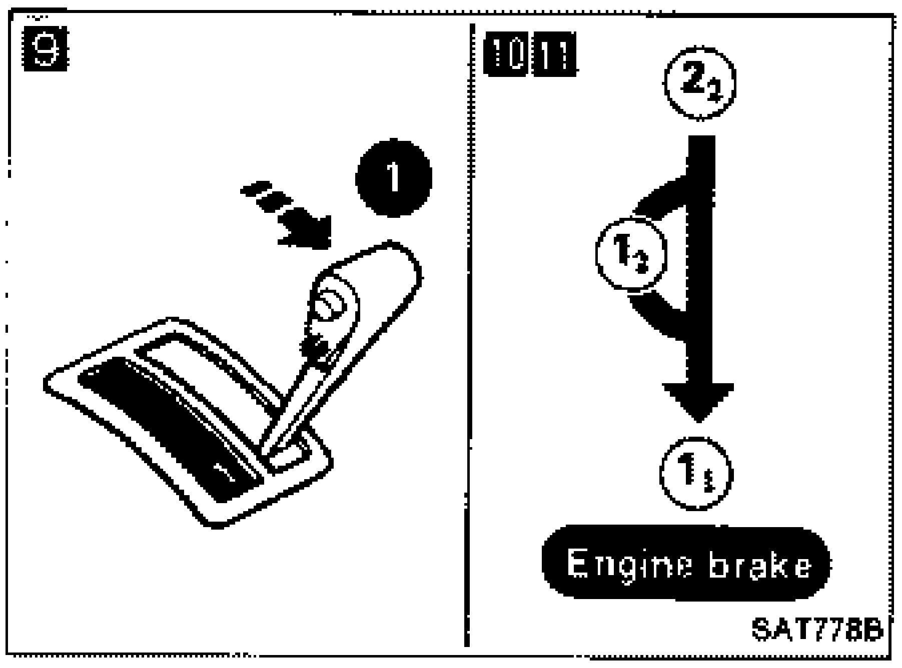
↓

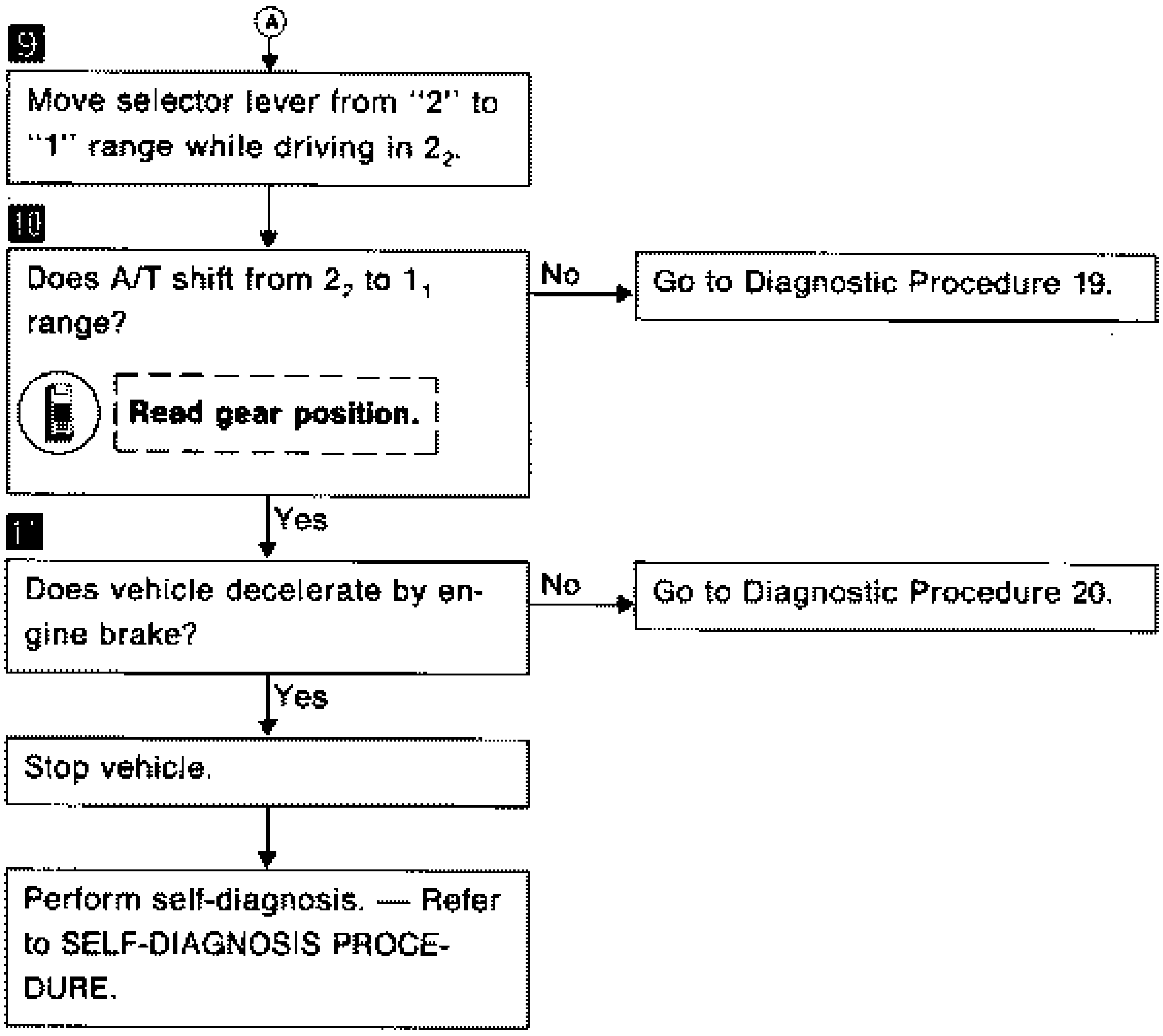
7 Does A/T shift from D_3 to 2_2? **Read gear position.**
- No → Go to Diagnostic Procedure 18.
- Yes ↓

8 Does vehicle decelerate by engine brake?
- No → Go to Diagnostic Procedure 15.
- Yes ↓

Ⓐ

Preliminary Check (Cont'd)





Move selector lever from "2" to "1" range while driving in 2_2.

Does A/T shift from 2_2 to 1_1 range?

Go to Diagnostic Procedure 19.

Does vehicle decelerate by engine brake?

Go to Diagnostic Procedure 20.

Stop vehicle.

Perform self-diagnosis. — Refer to SELF-DIAGNOSIS PROCEDURE.

Preliminary Check (Cont'd)

Vehicle speed when shifting gears

RE4R01A

Throttle position	Vehicle speed km/h (MPH)					
	$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$
Full throttle	50 - 54 (31 - 34)	107 - 115 (66 - 71)	166 - 176 (103 - 109)	161 - 169 (100 - 105)	97 - 105 (60 - 65)	44 - 48 (27 - 30)
Half throttle	45 - 49 (28 - 30)	83 - 89 (52 - 55)	119 - 127 (74 - 79)	80 - 88 (50 - 55)	33 - 39 (21 - 24)	10 - 14 (6 - 9)

RE4R03A

Throttle position	Vehicle speed km/h (MPH)					
	$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$
Full throttle	68 - 72 (42 - 45)	120 - 128 (75 - 80)	183 - 193 (114 - 120)	177 - 187 (110 - 116)	111 - 119 (69 - 74)	47 - 51 (29 - 32)
Half throttle	47 - 51 (29 - 32)	89 - 95 (55 - 59)	136 - 144 (85 - 89)	118 - 126 (73 - 78)	79 - 85 (49 - 53)	10 - 14 (6 - 9)

Vehicle speed when performing and releasing lock-up

RE4R01A

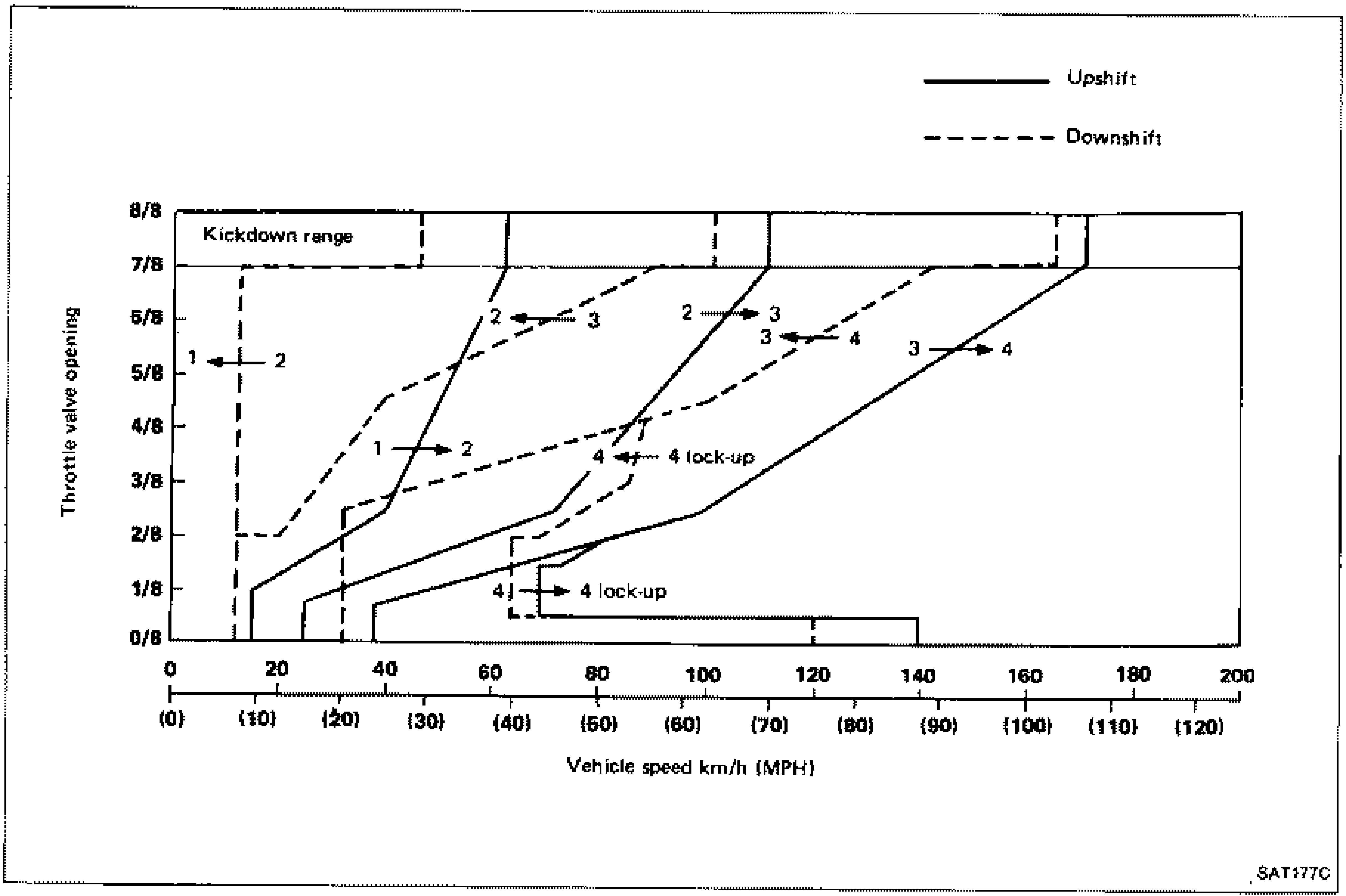
Throttle position	O.D. switch [Shift range]	Vehicle speed km/h (MPH)	
		Lock-up "ON"	Lock-up "OFF"
Full throttle	ON [D_4]	167 - 175 (104 - 109)	161 - 169 (100 - 105)
	OFF [D_3]	107 - 115 (66 - 71)	97 - 105 (60 - 65)
Half throttle	ON [D_4]	120 - 128 (75 - 80)	84 - 92 (52 - 57)
	OFF [D_3]	91 - 99 (57 - 62)	86 - 94 (53 - 58)

RE4R03A

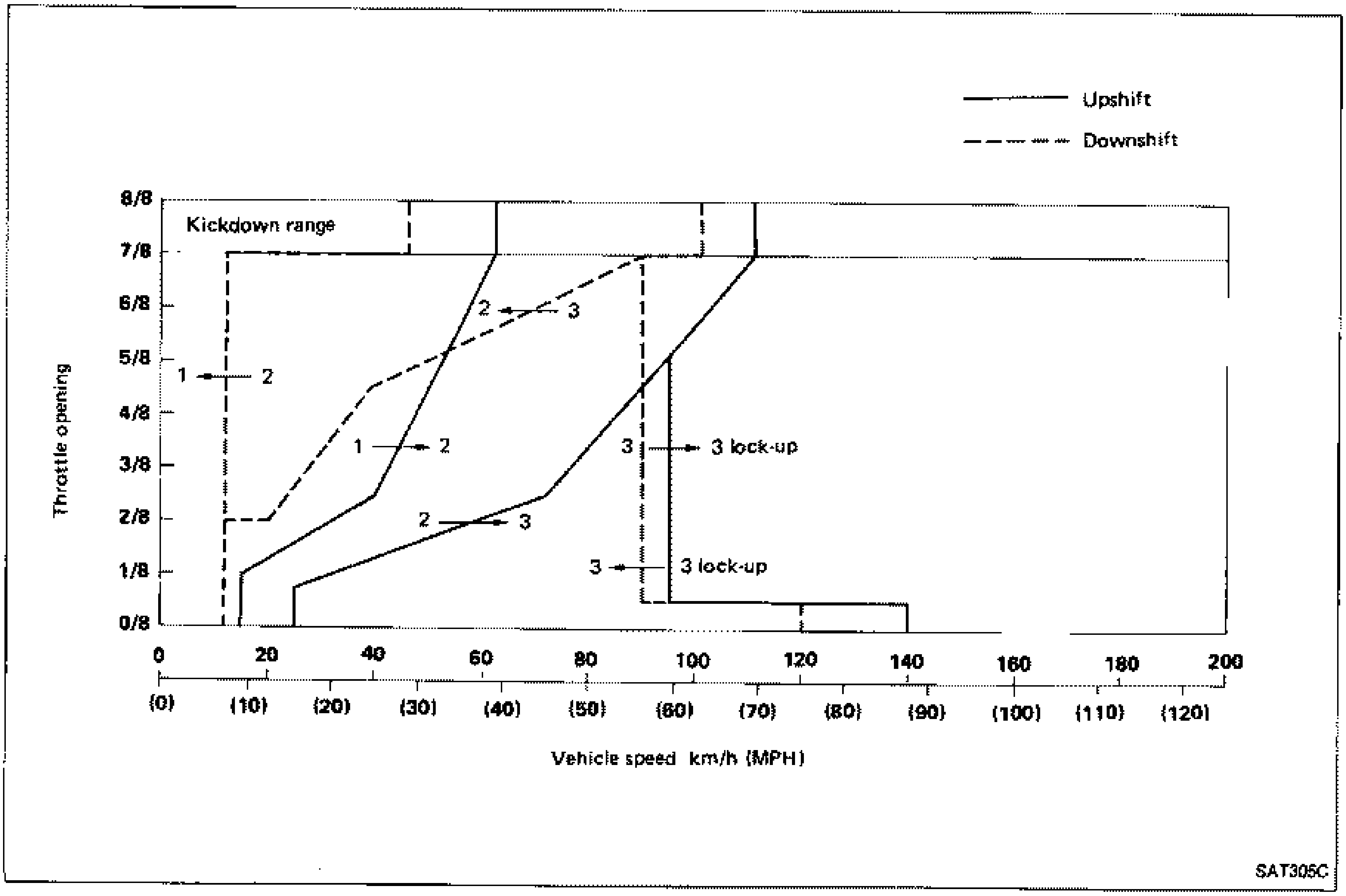
Throttle position	O.D. switch [Shift range]	Vehicle speed km/h (MPH)	
		Lock-up "ON"	Lock-up "OFF"
Full throttle	ON [D_4]	184 - 192 (114 - 119)	178 - 186 (111 - 116)
	OFF [D_3]	120 - 128 (75 - 80)	111 - 119 (69 - 74)
Half throttle	ON [D_4]	136 - 144 (85 - 89)	117 - 125 (73 - 78)
	OFF [D_3]	91 - 99 (57 - 62)	86 - 94 (53 - 58)

Preliminary Check (Cont'd)

Shift schedule (Overdrive ON) — RE4R01A

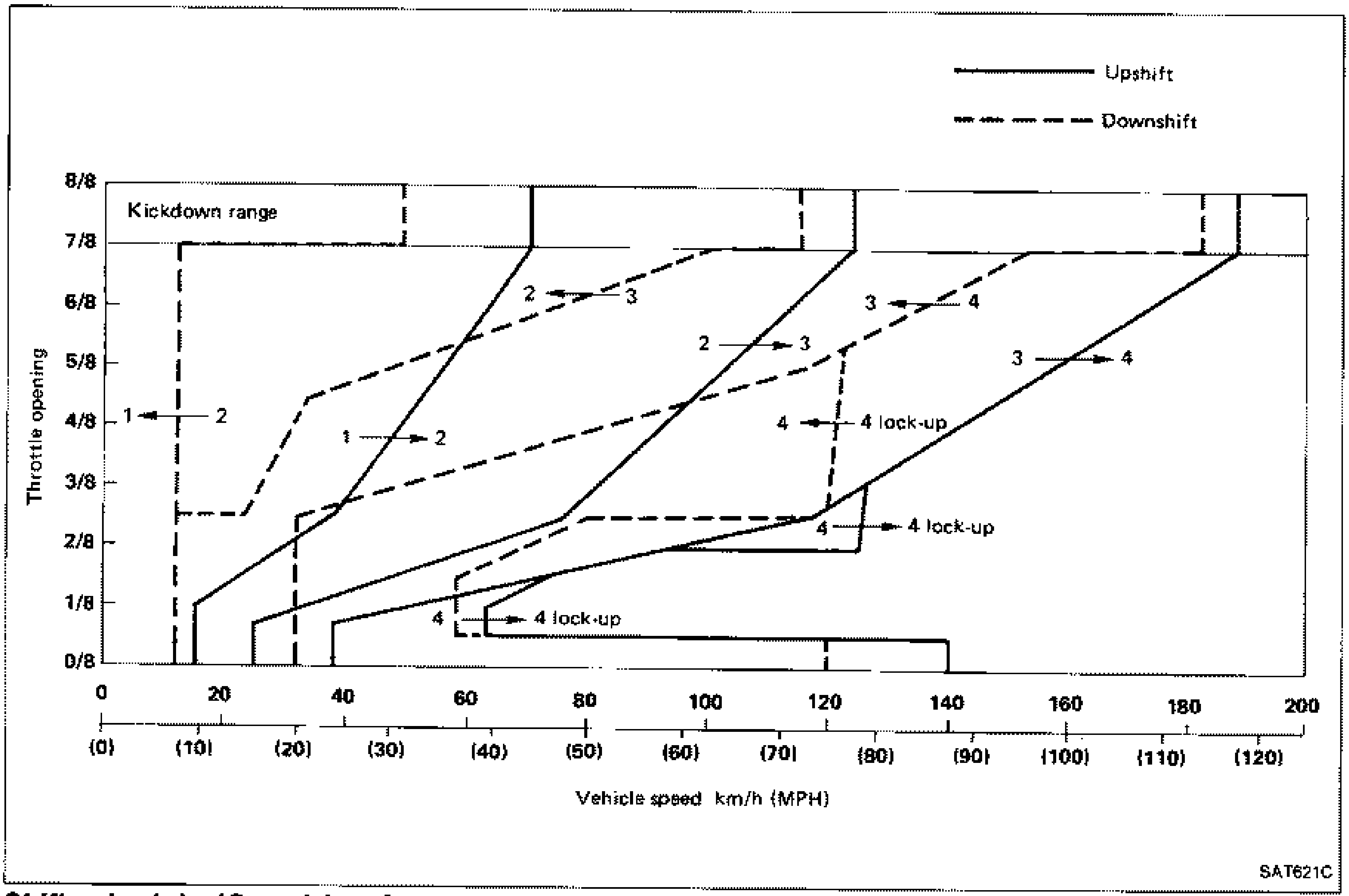


Shift schedule (Overdrive OFF) — RE4R01A



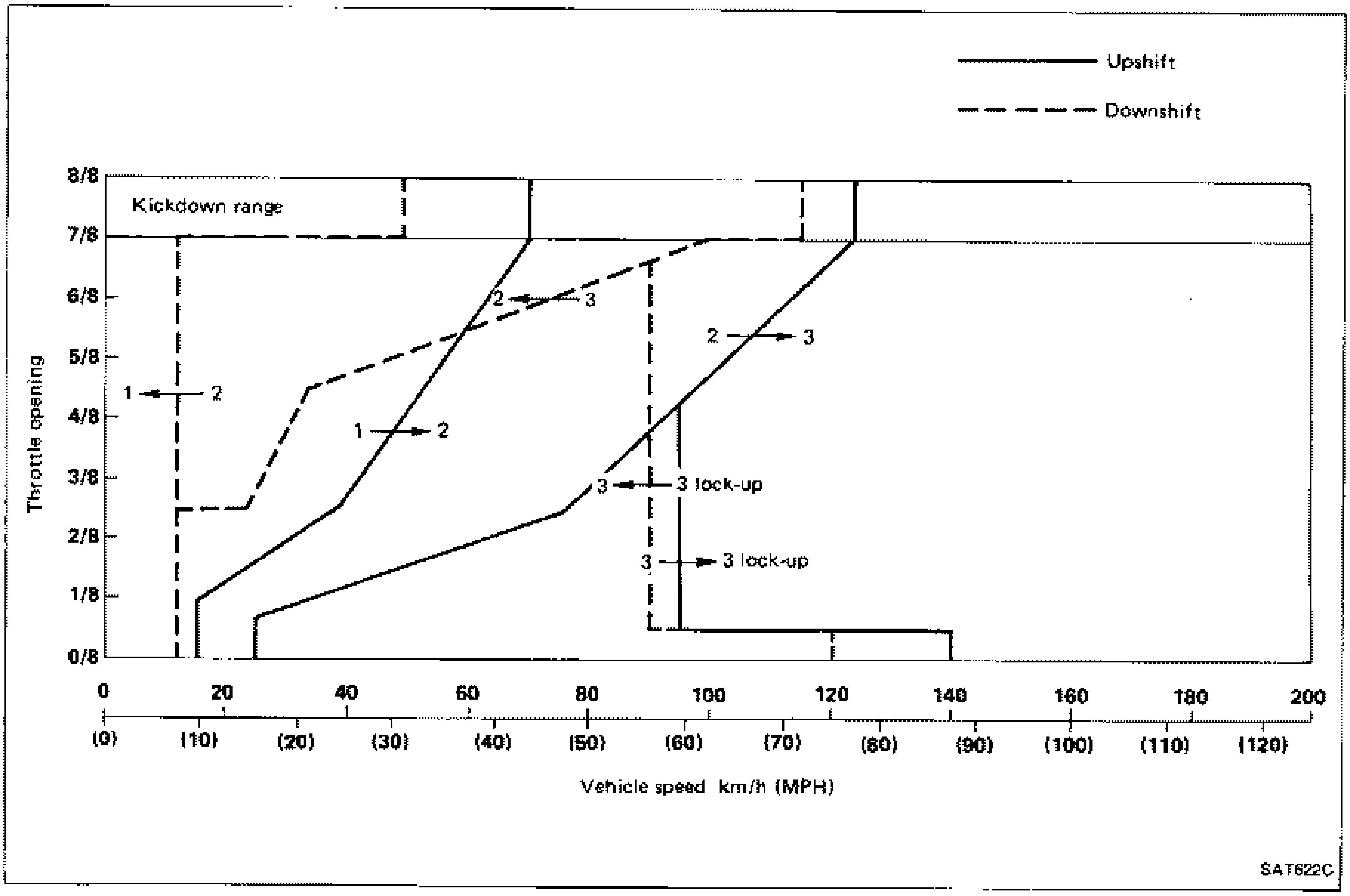
Preliminary Check (Cont'd)

Shift schedule (Overdrive ON) — RE4R03A



SAT621C

Shift schedule (Overdrive OFF) — RE4R03A



SAT622C

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 starts, and
    - Gear position displayed on CONSULT indicates the point where shifts are completed.
3. Shift solenoid "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).

Diagnosis by CONSULT (Cont'd)

DATA MONITOR APPLICATION

Item	Application
Vehicle speed sensor 1 (A/T)	X
Vehicle speed sensor 2 (meter)	X
Throttle sensor	X
Fluid temperature sensor	X
Battery voltage	X
Engine rpm	X
Selector lever switch (O.D. switch)	X
A.S.C.D. — cruise signal	X
A.S.C.D. — O.D. cut signal	X
Kickdown switch	X
Power shift switch	—
Idle switch	X
Full throttle switch	X
Shift solenoid A	X
Shift solenoid B	X
Overrun clutch solenoid	X
*Shift solenoid A (feedback)	X
*Shift solenoid B (feedback)	X
*Overrun clutch solenoid (feedback)	X
Hold mode switch	—
1 range switch	X
2 range switch	X
D range switch	X
N range switch	X
R range switch	X
Gear position	X
Range position	X
Vehicle speed	X
Throttle opening	X
Line-pressure solenoid	X
Lock-up solenoid	X

X: Applicable —: Not applicable

Diagnosis by CONSULT (Cont'd)

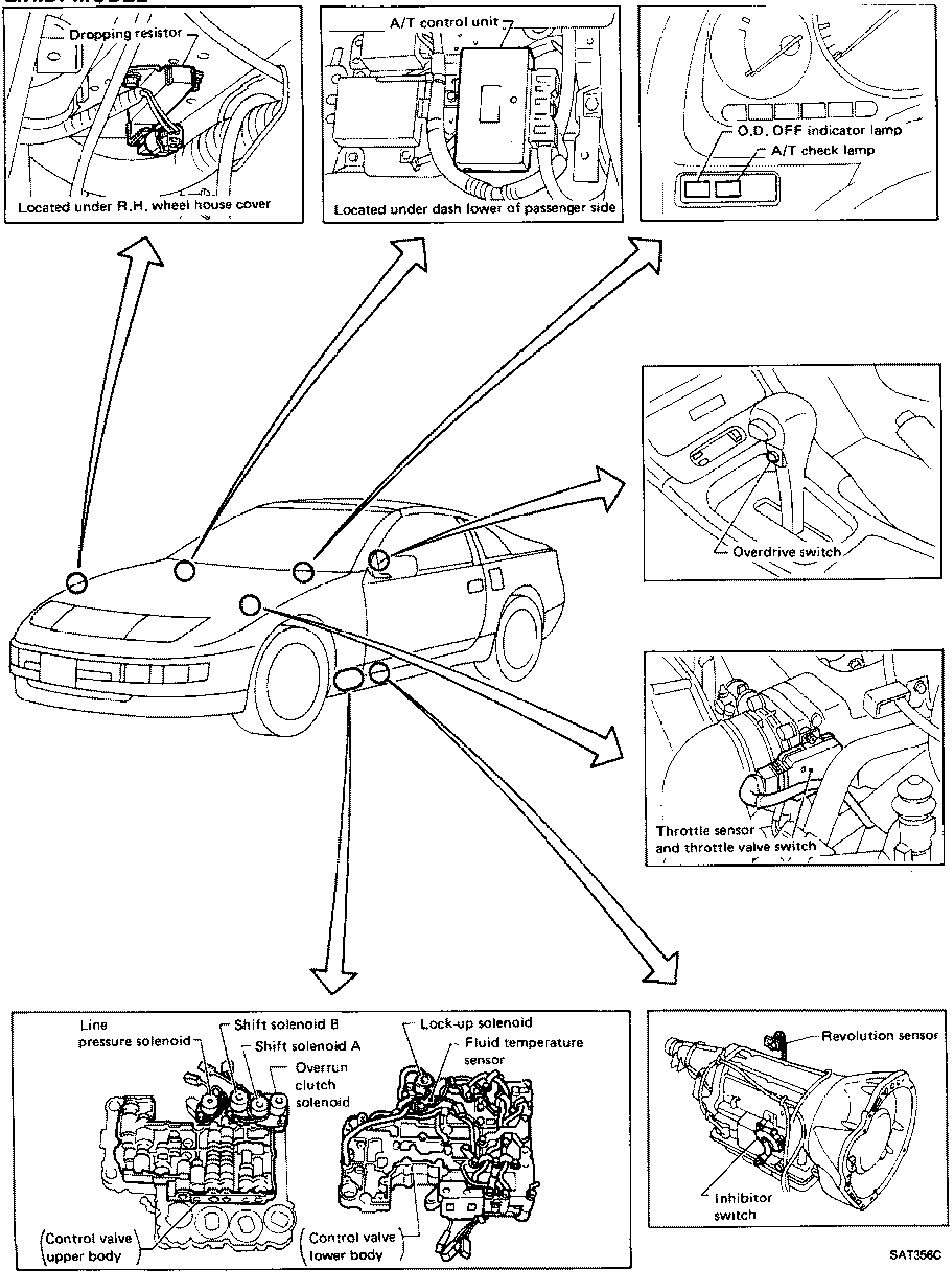
DATA ANALYSIS

Item	Display	Condition
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 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)]

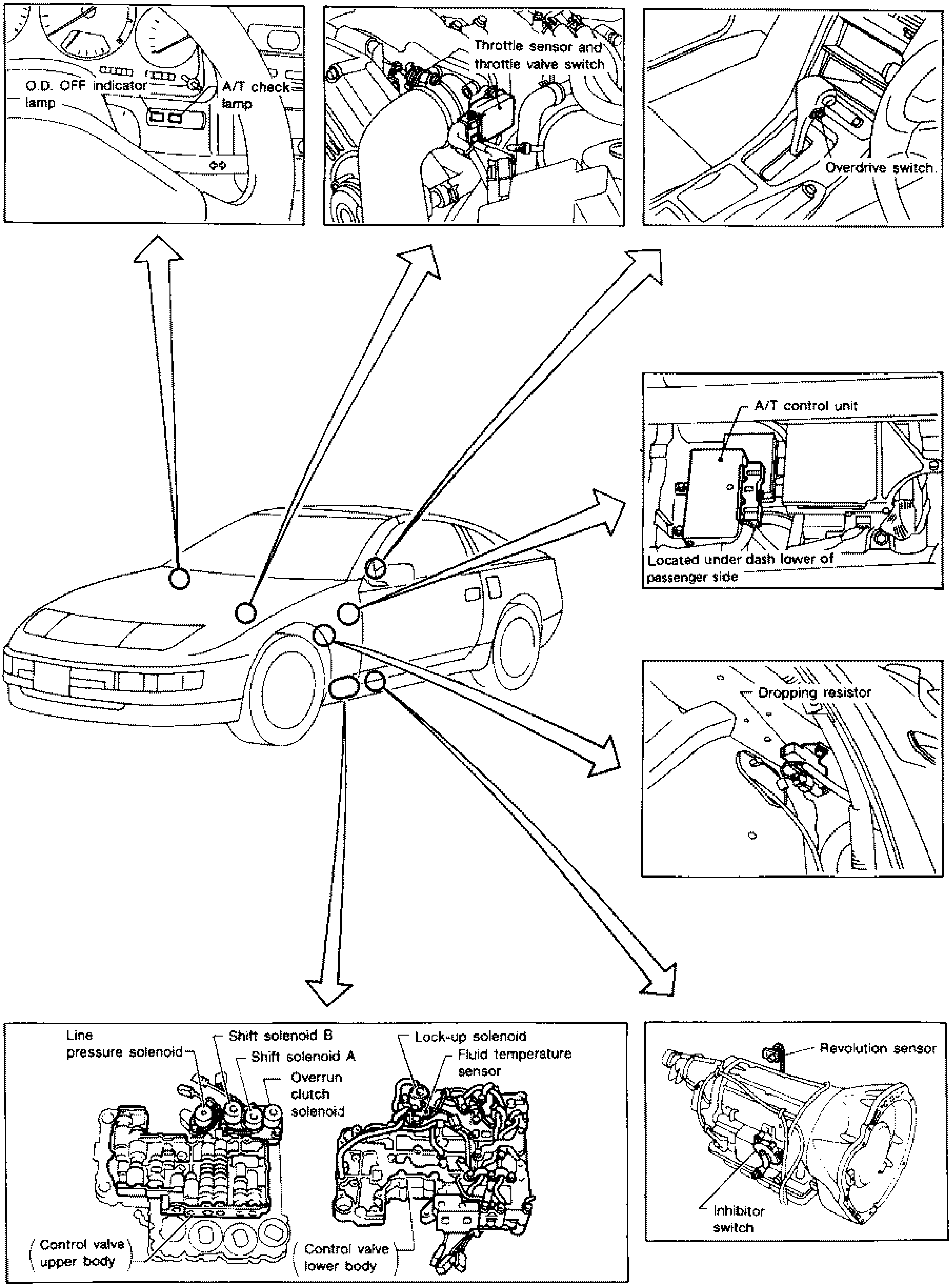
Gear position	1	2	3	4
Shift solenoid A	ON	OFF	OFF	ON
Shift solenoid B	ON	ON	OFF	OFF

A/T Electrical Parts Location

L.H.D. MODEL

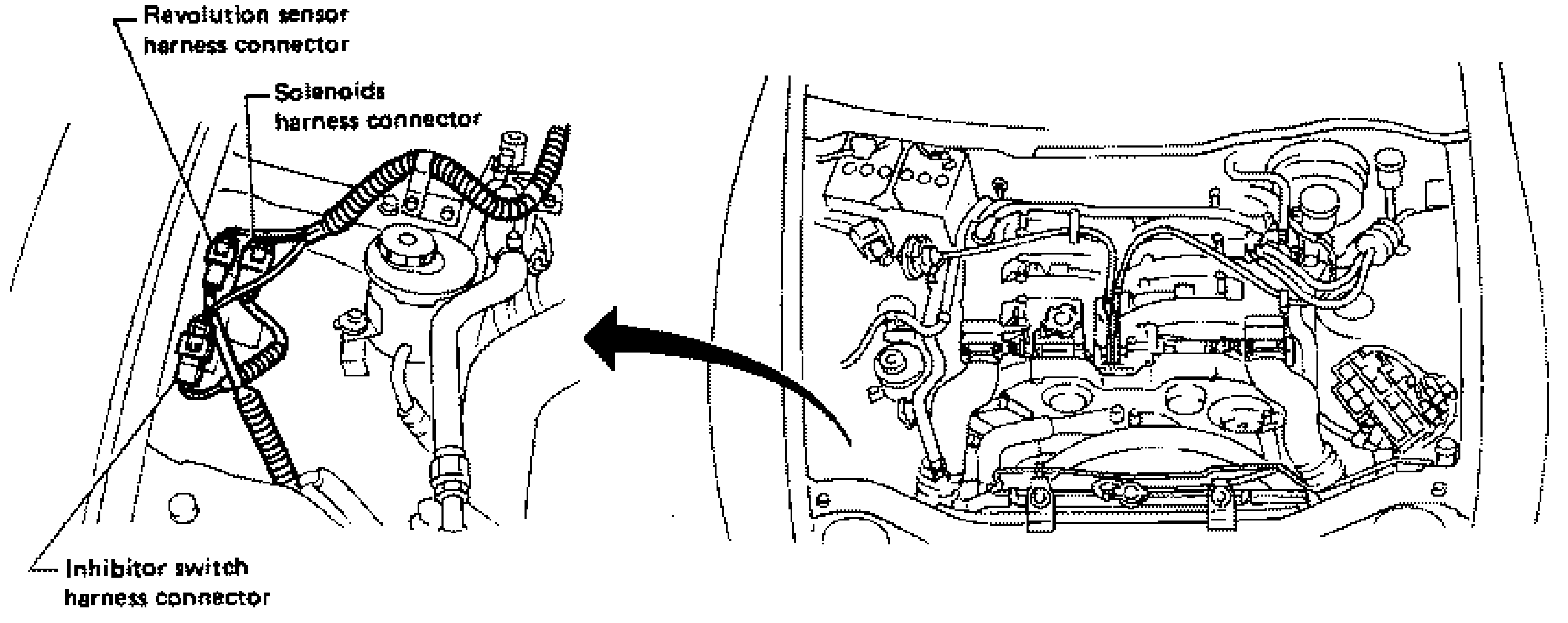


R.H.D. MODEL



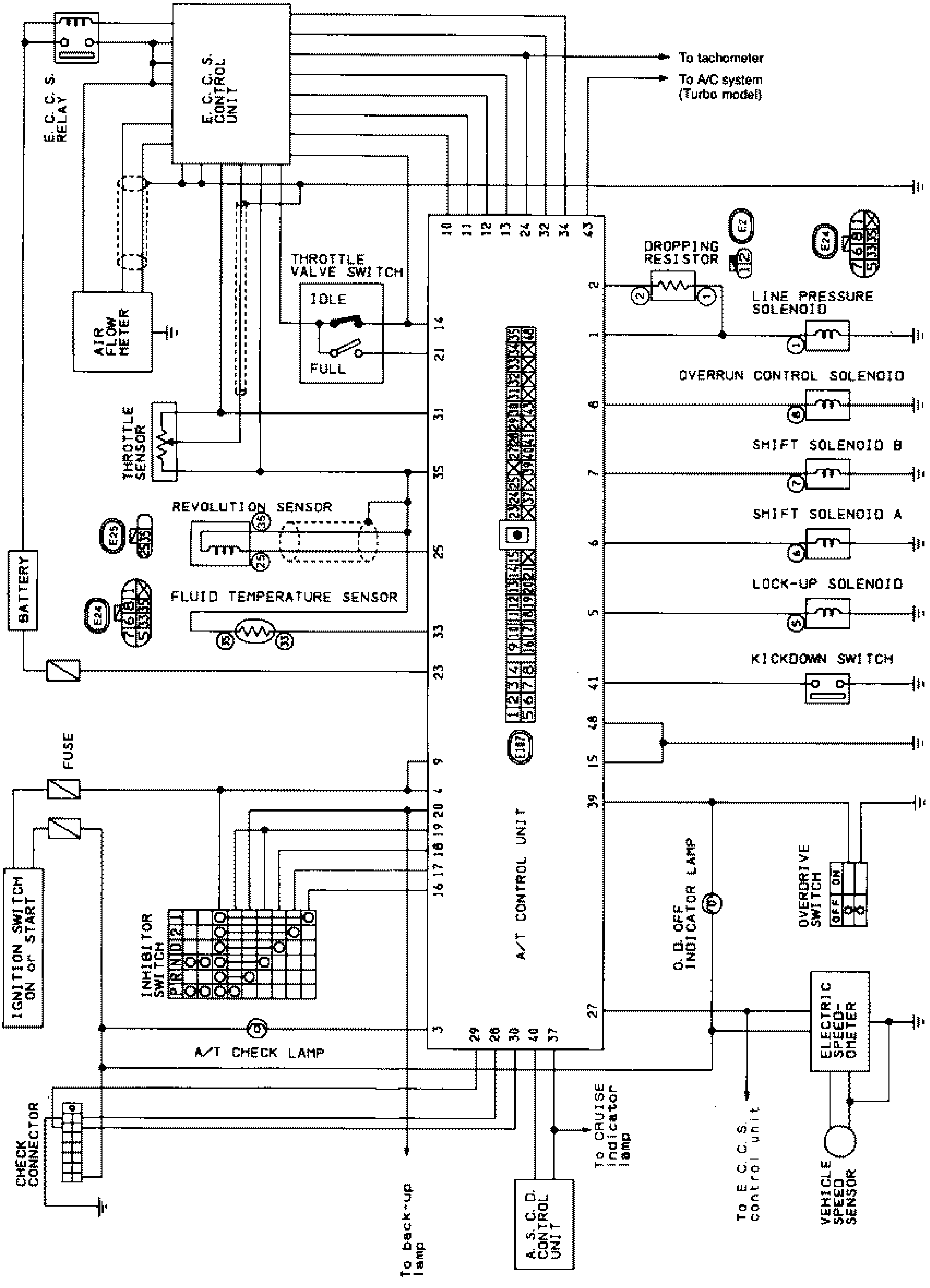
SAT916C

A/T Electrical Parts Location (Cont'd)



SAT306C

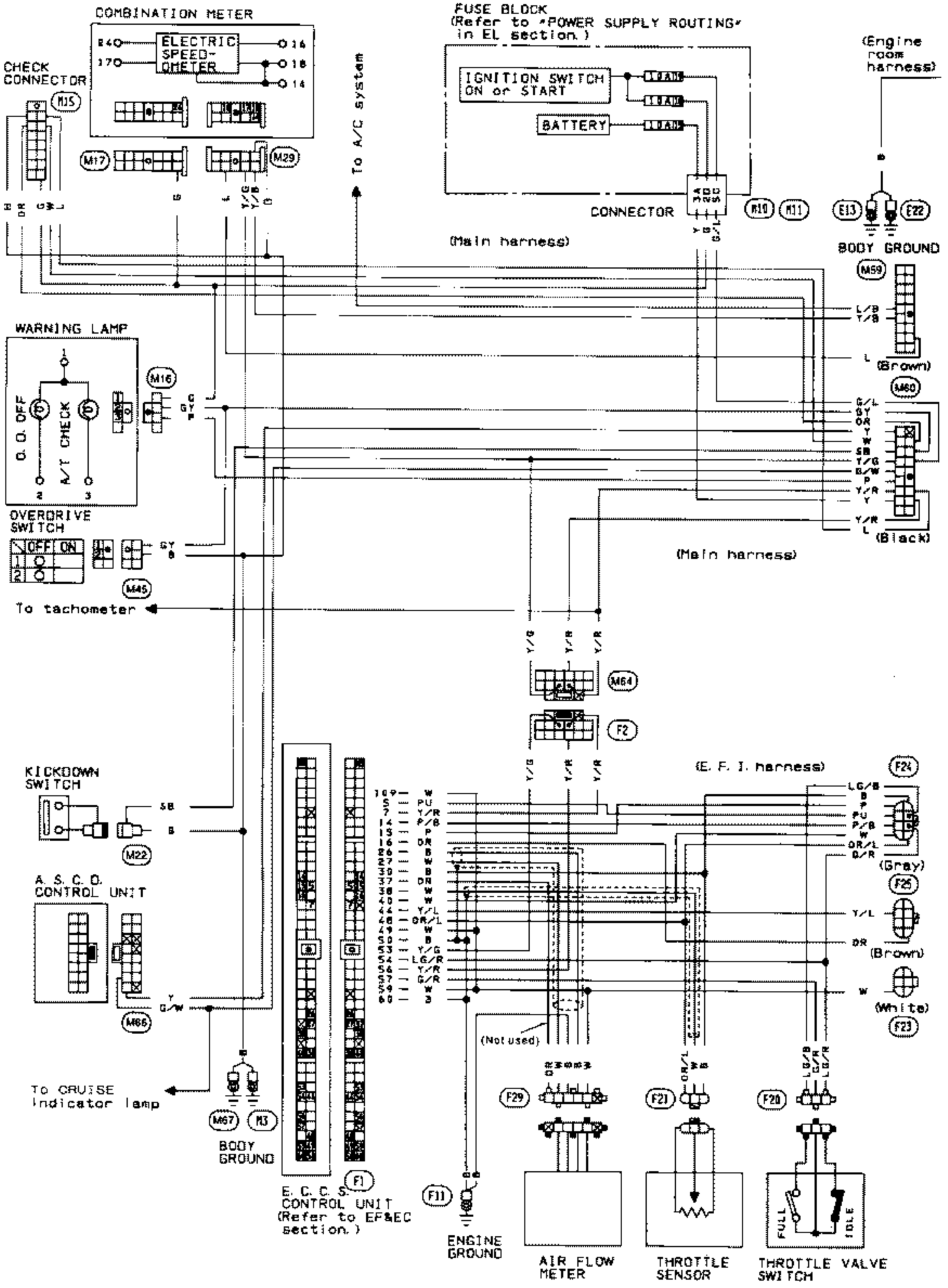
Circuit Diagram for Quick Pinpoint Check



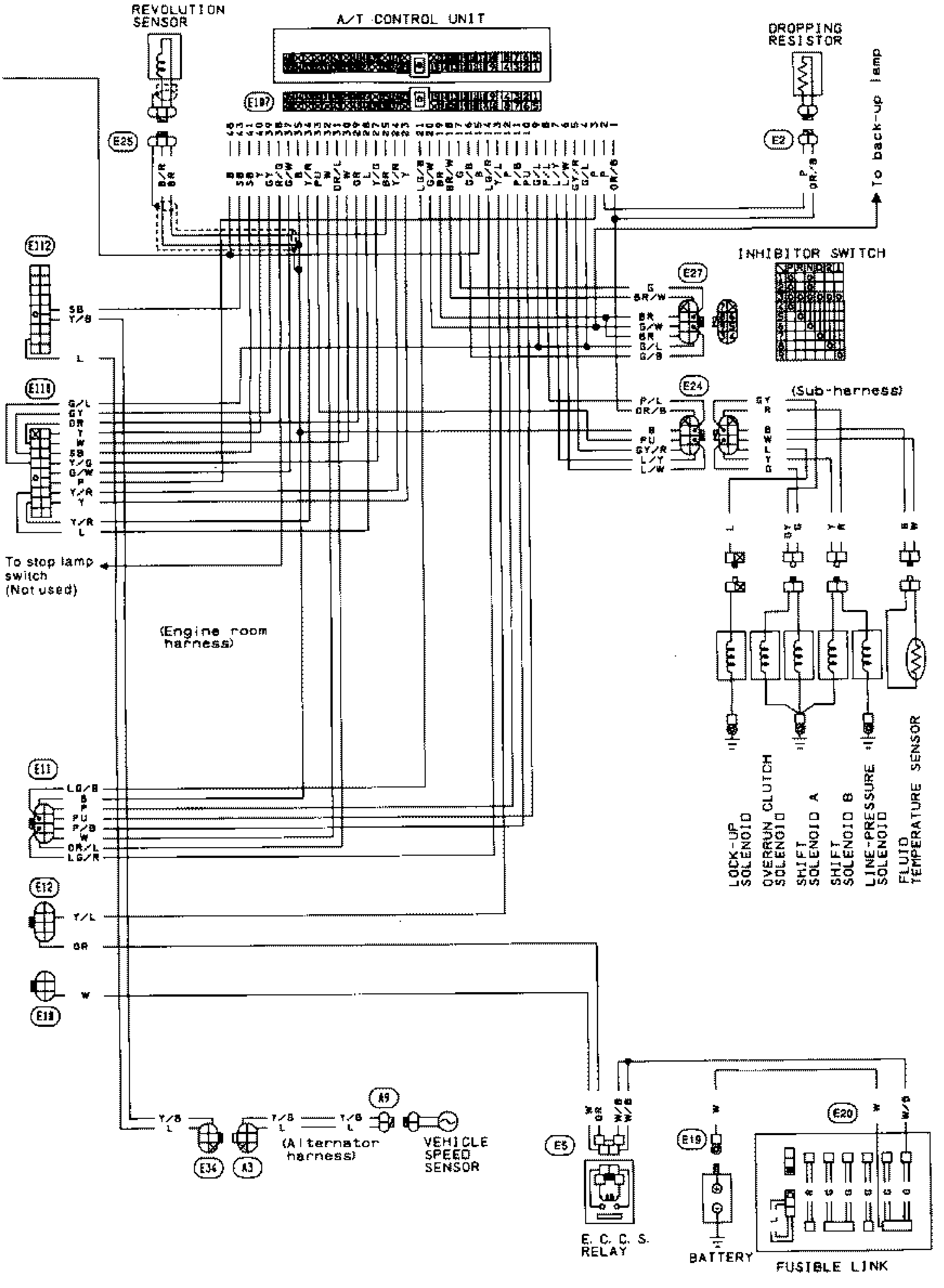
SAT501D

Wiring Diagram

L.H.D. model



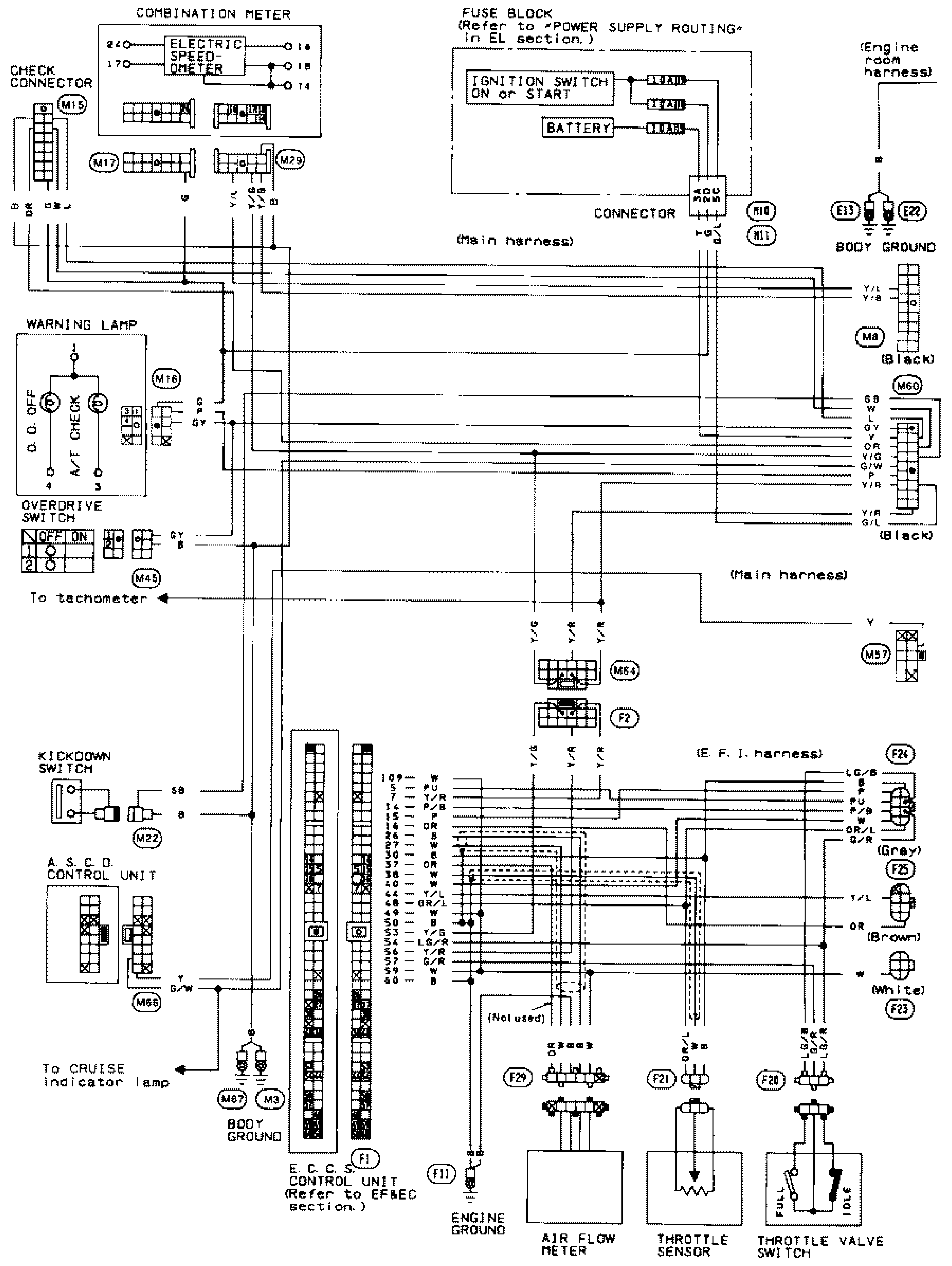
Wiring Diagram (Cont'd)



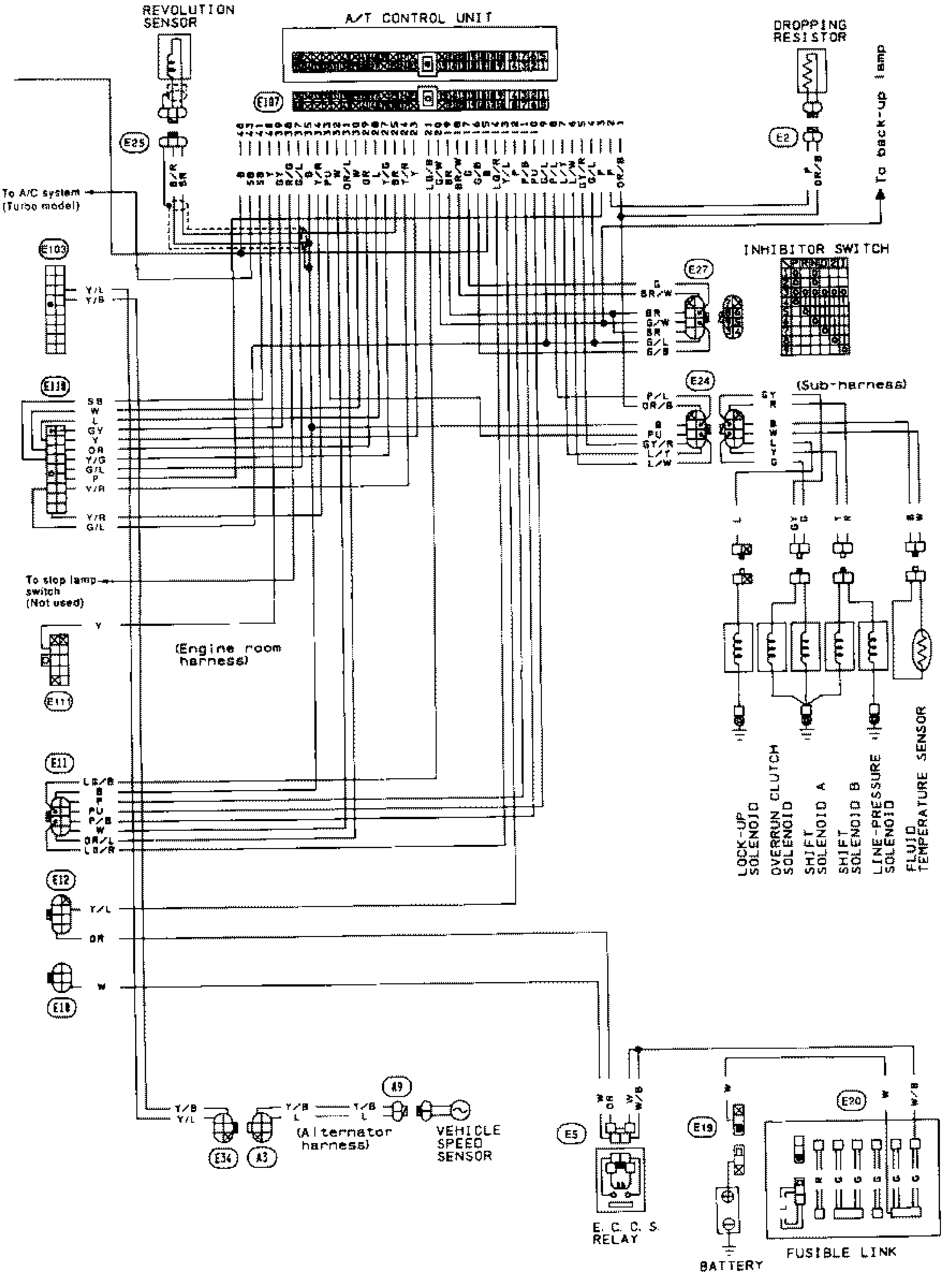
SAT502D

Wiring Diagram (Cont'd)

R.H.D. MODEL



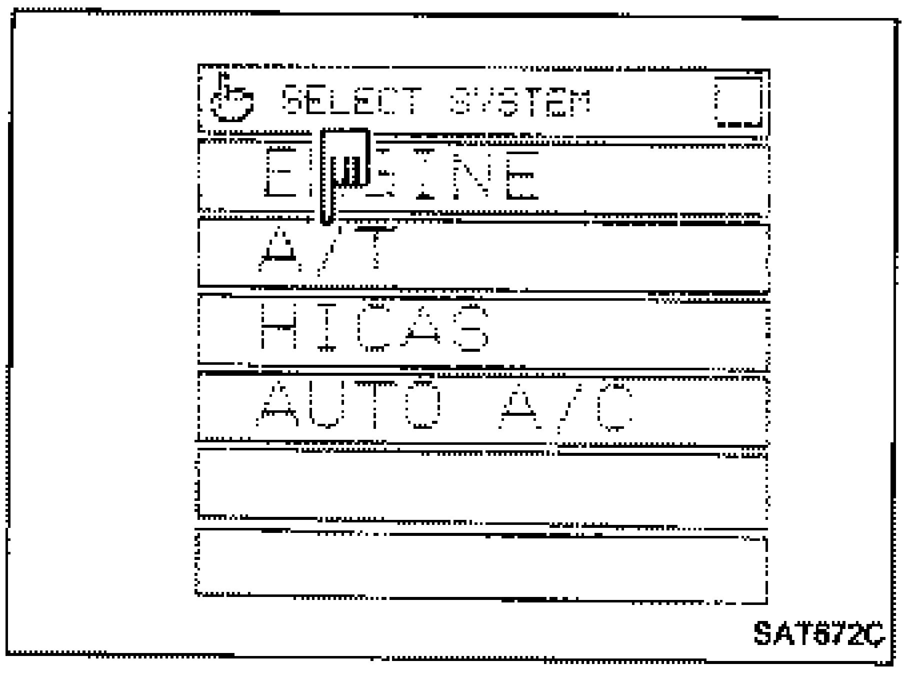
Wiring Diagram (Cont'd)



SAT503D

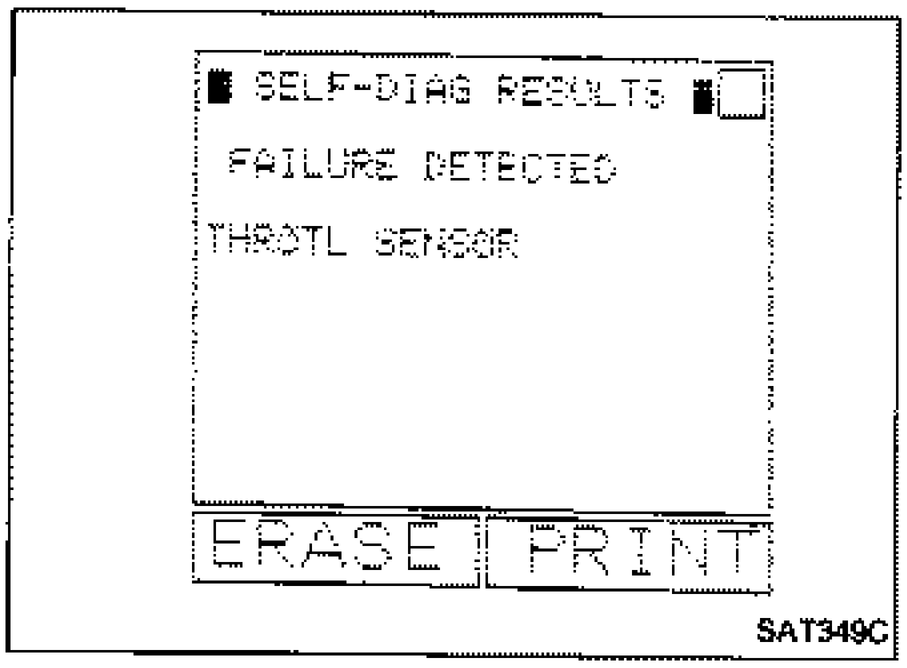
Self-diagnosis

SELF-DIAGNOSTIC PROCEDURE (With CONSULT)



SAT672C

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



FAILURE DETECTED

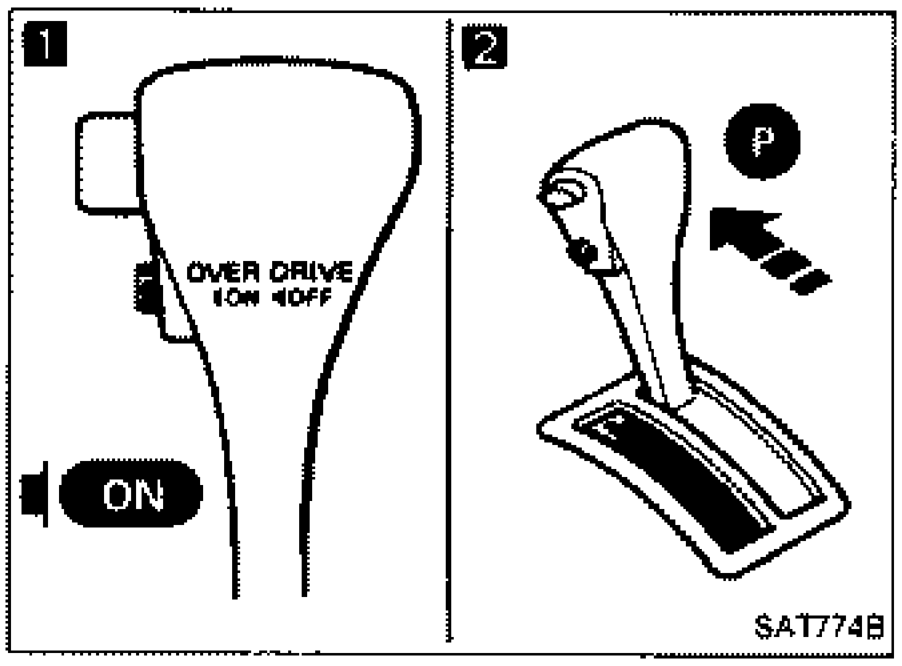
THROTL SENSOR

SAT349C

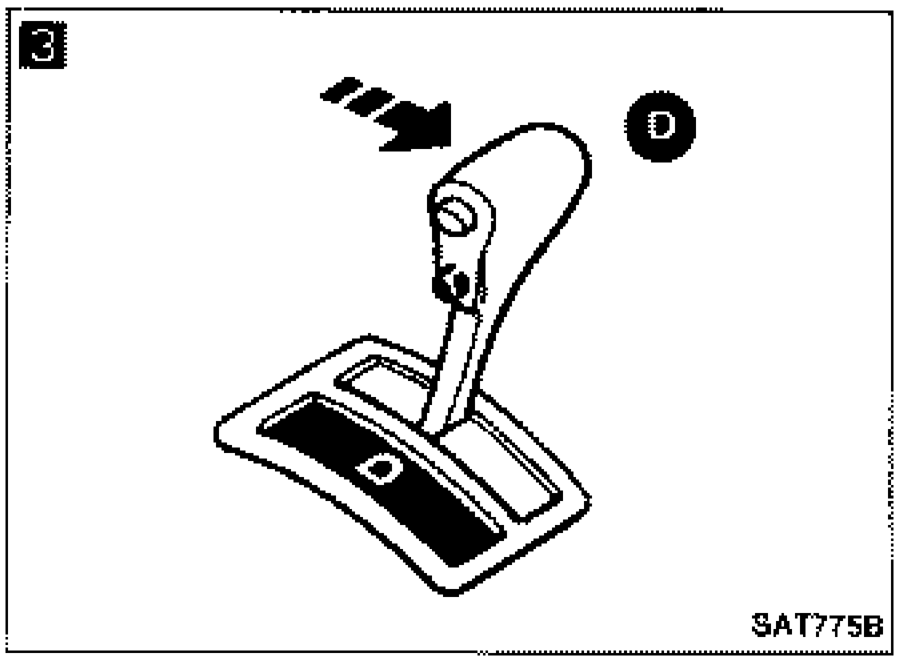
3. Touch "SELF-DIAGNOSIS".
   CONSULT performs REAL-TIME SELF-DIAGNOSIS.

Self-diagnosis (Cont'd)

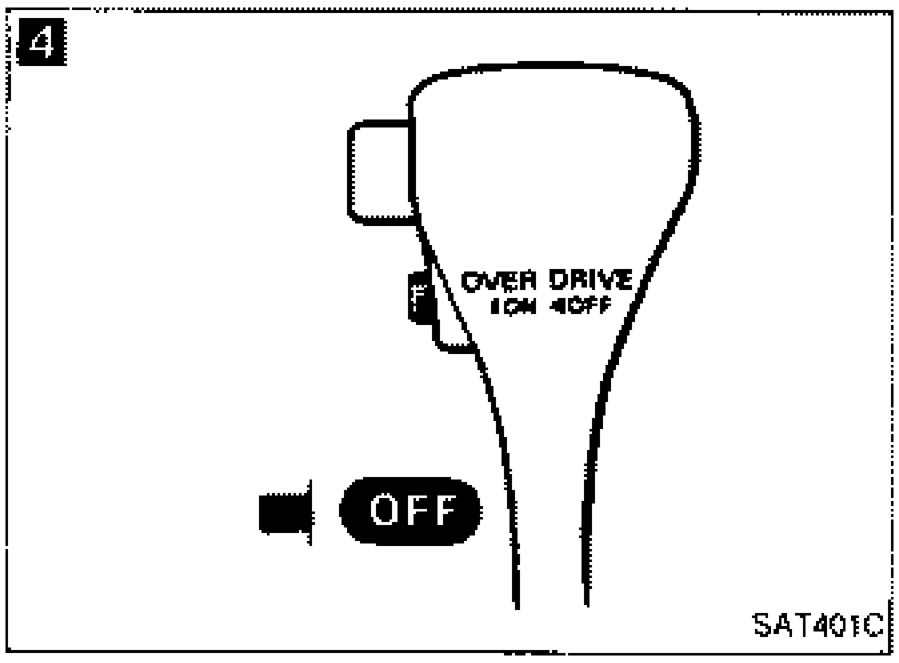
SELF-DIAGNOSTIC PROCEDURE (Without CONSULT)



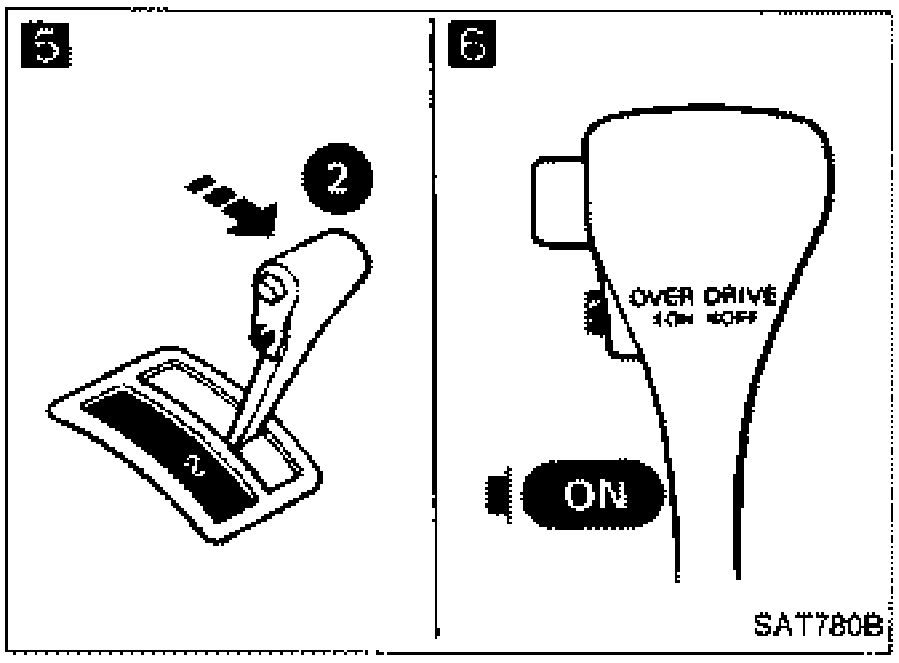
SAT774B



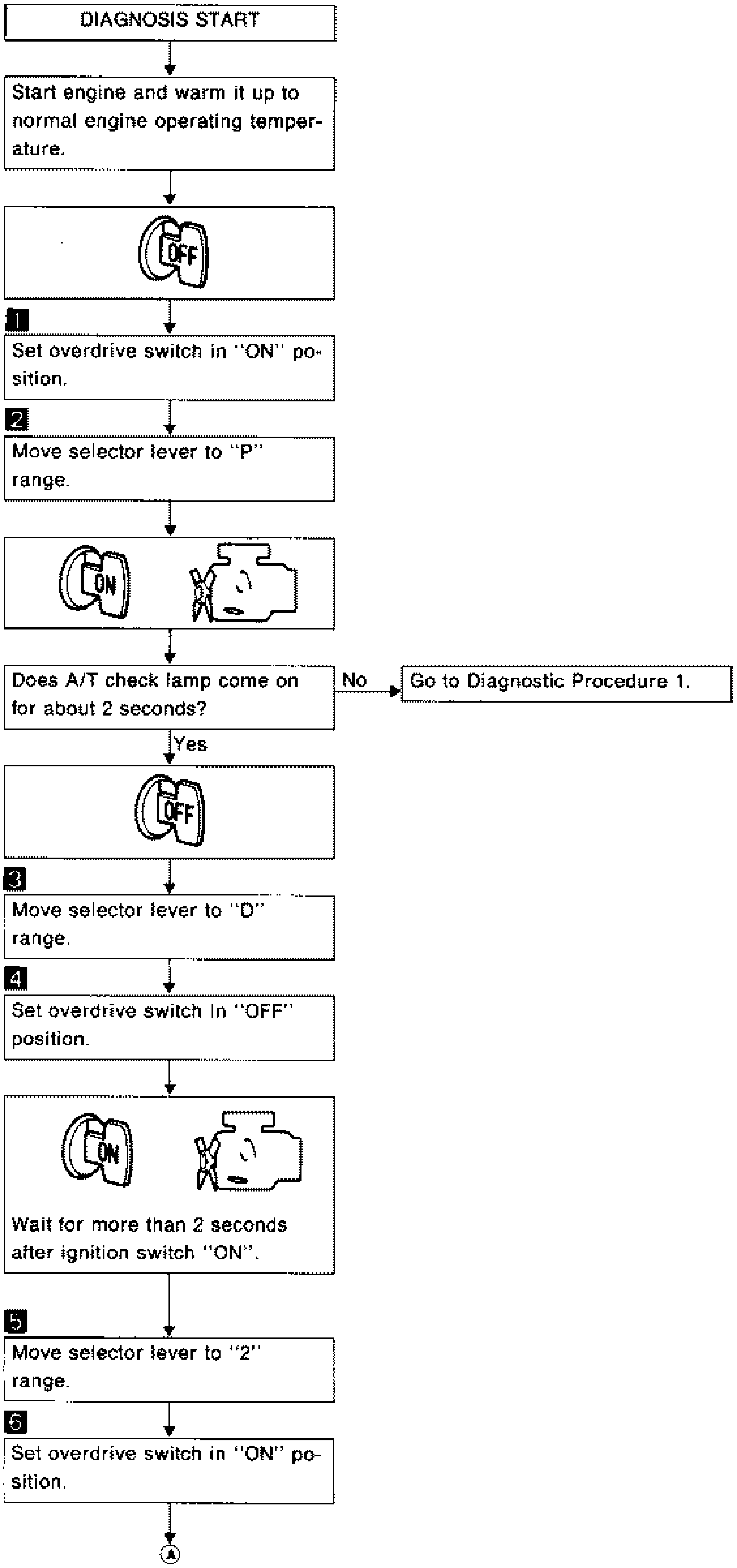
SAT775B



SAT401C



SAT780B



DIAGNOSIS START

Start engine and warm it up to normal engine operating temperature.

1 Set overdrive switch in "ON" position.

2 Move selector lever to "P" range.

Does A/T check lamp come on for about 2 seconds?

No: Go to Diagnostic Procedure 1.

Yes

3 Move selector lever to "D" range.

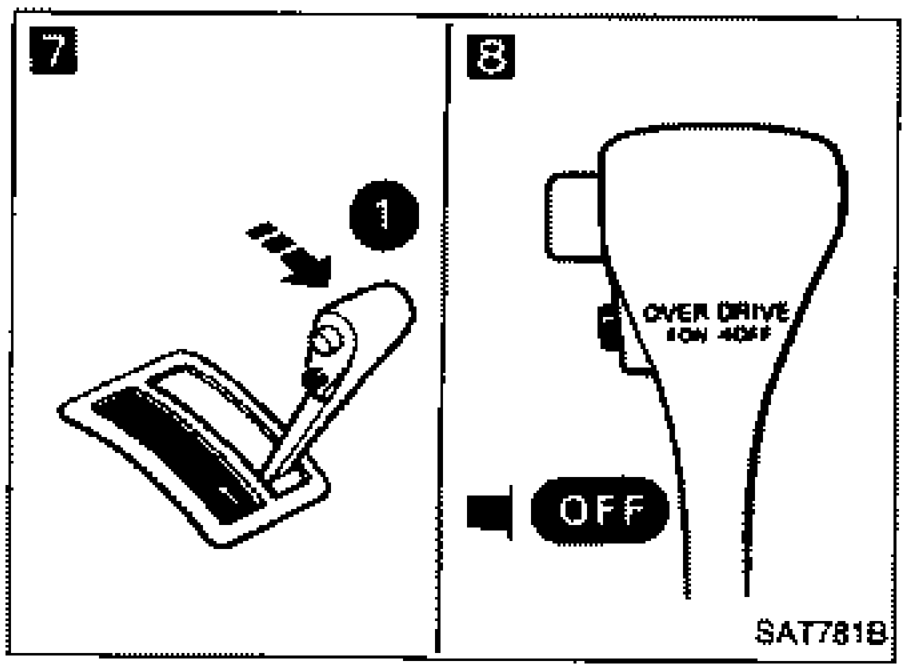
4 Set overdrive switch in "OFF" position.

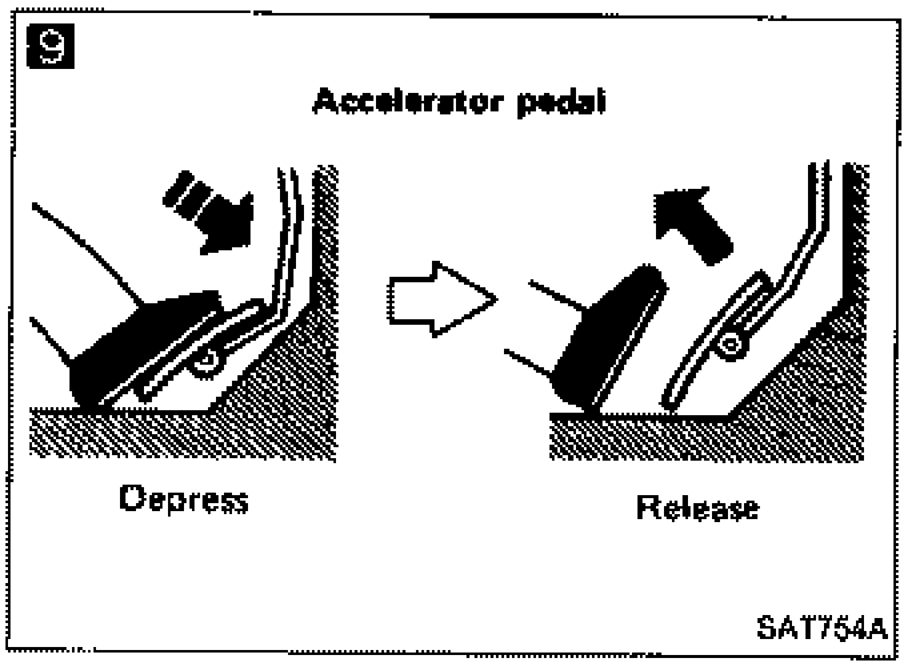
Wait for more than 2 seconds after ignition switch "ON".

5 Move selector lever to "2" range.

6 Set overdrive switch in "ON" position.

Self-diagnosis (Cont'd)





Ⓐ

7 Move selector lever to "1" range.

↓

8 Set overdrive switch in "OFF" position.

↓

9 Depress accelerator pedal fully and release it.

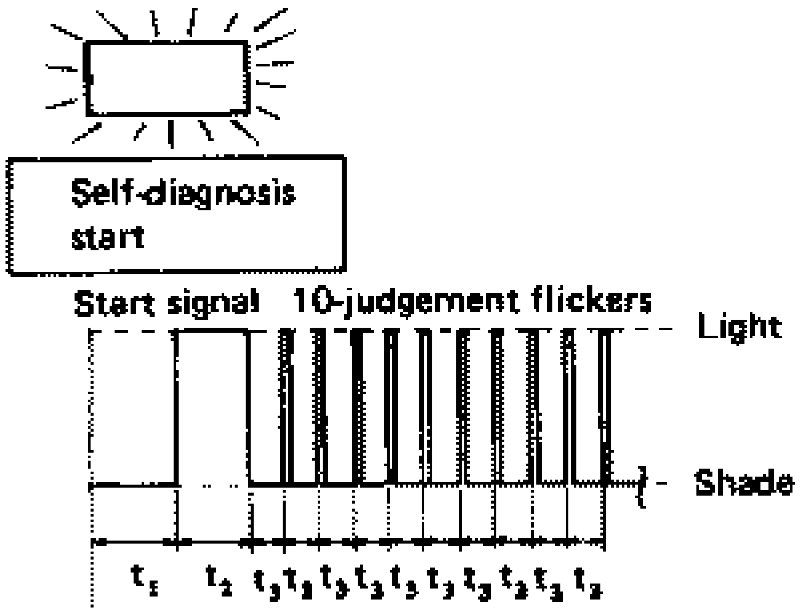
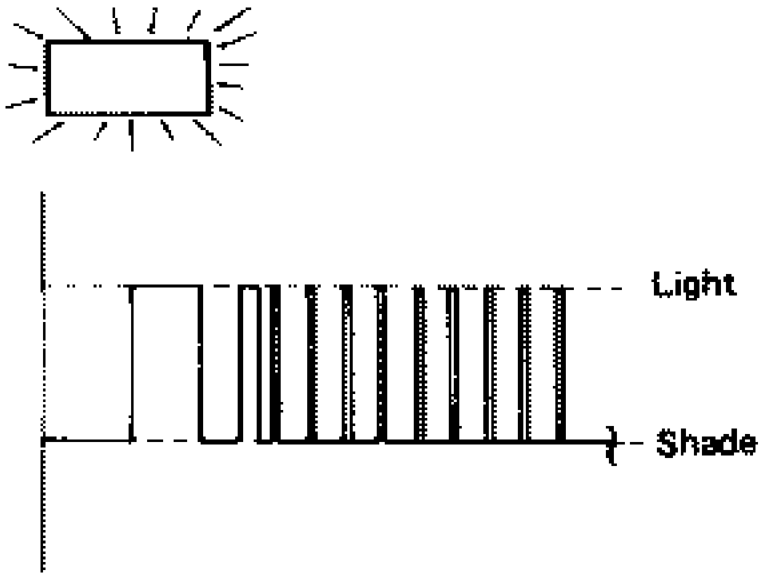
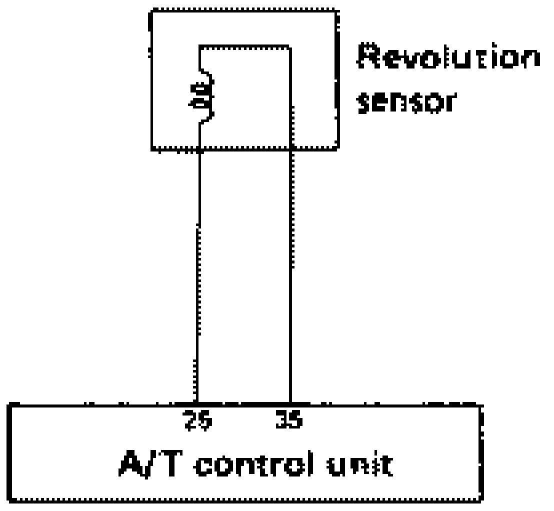
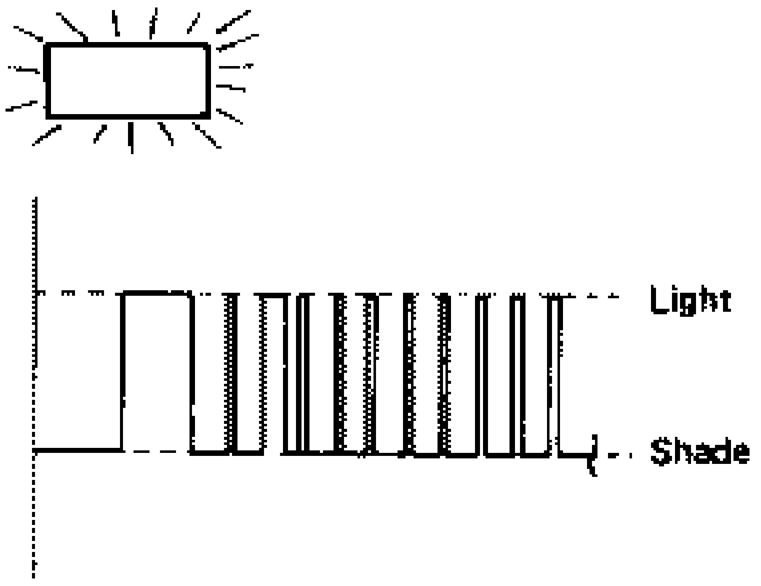
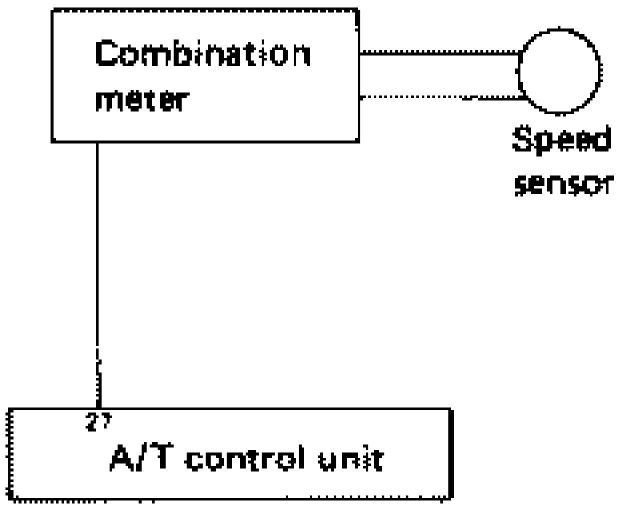
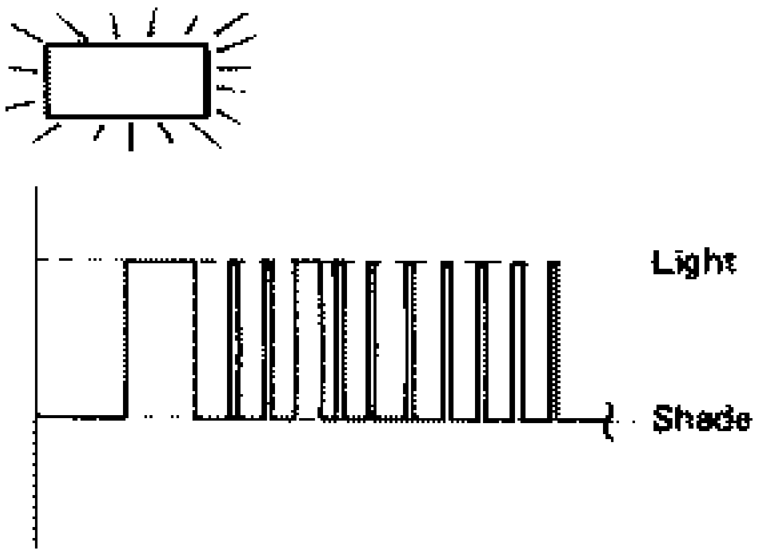
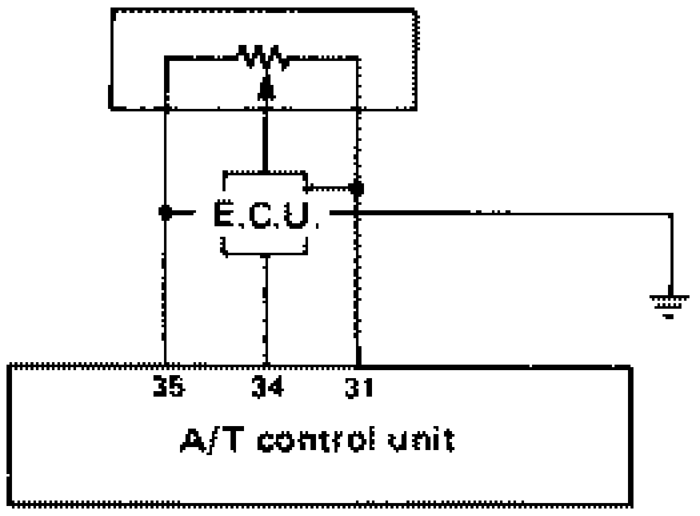
↓

Check A/T check lamp.
Refer to JUDGMENT OF SELF-DIAGNOSIS CODE on next page.

↓

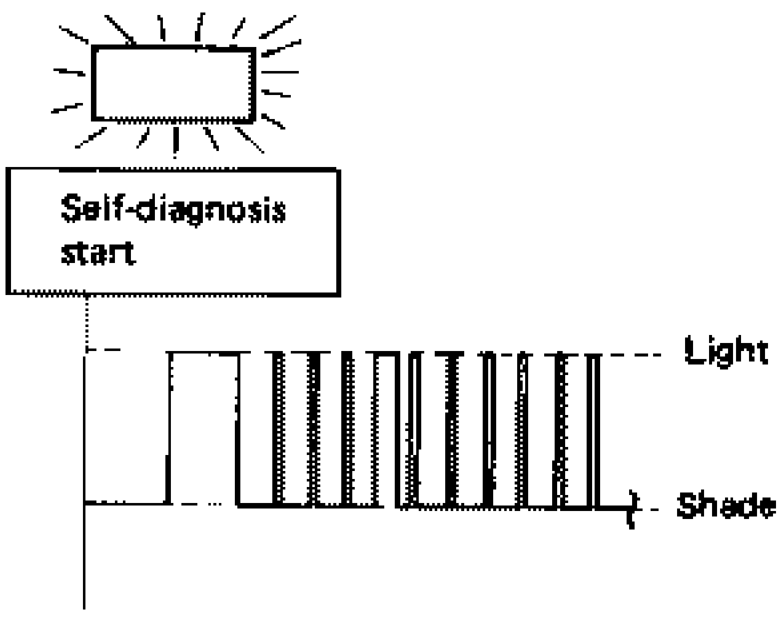
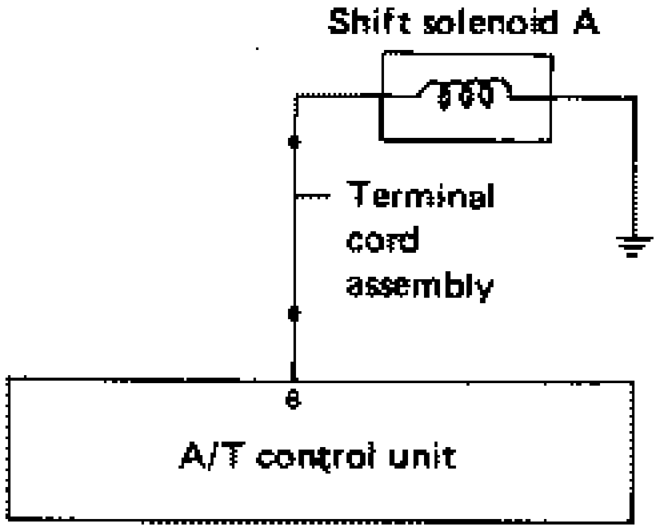
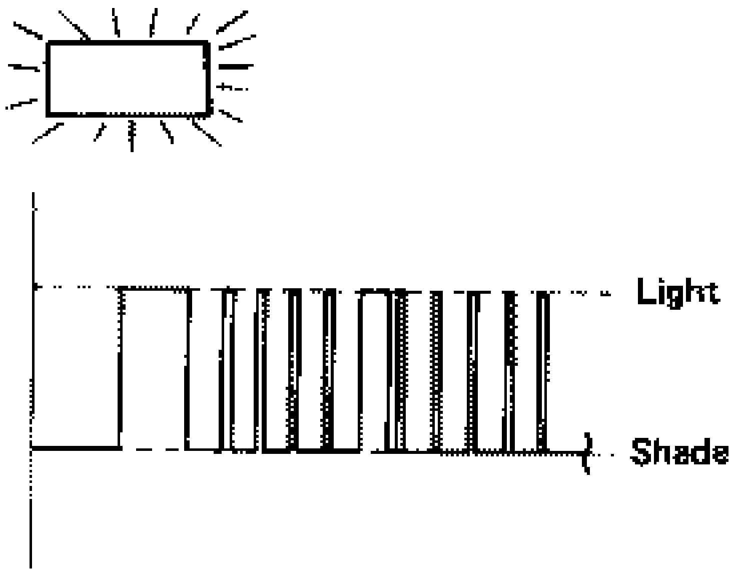
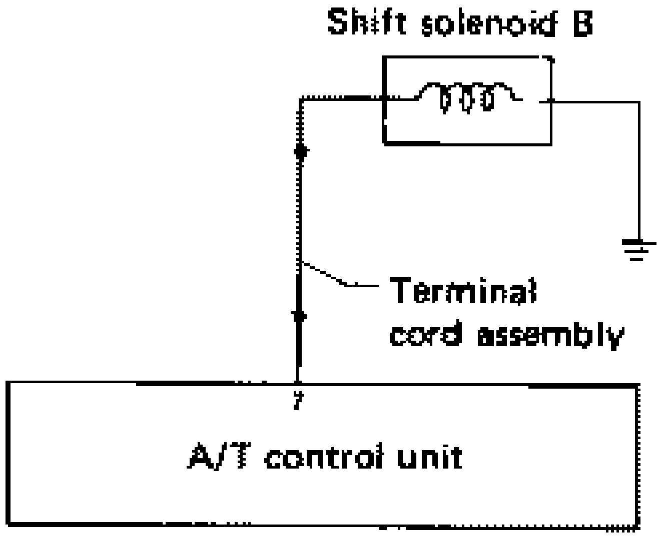
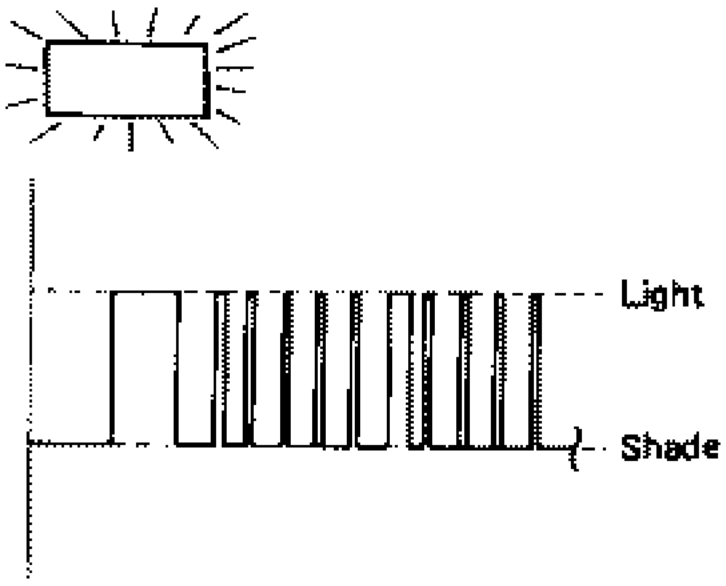
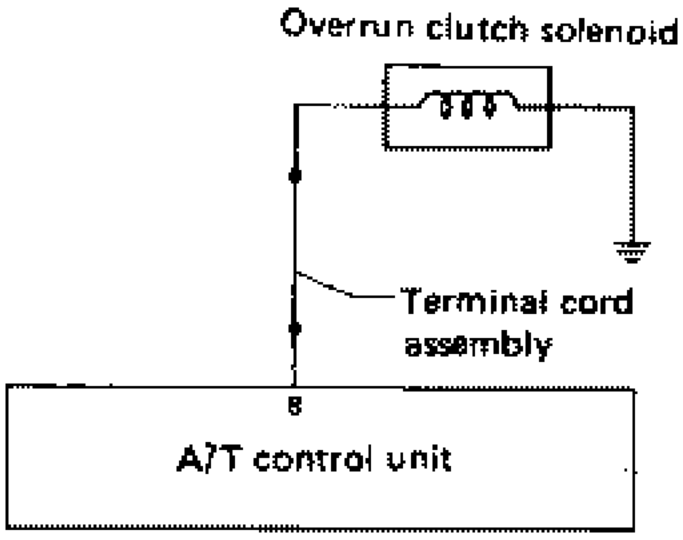
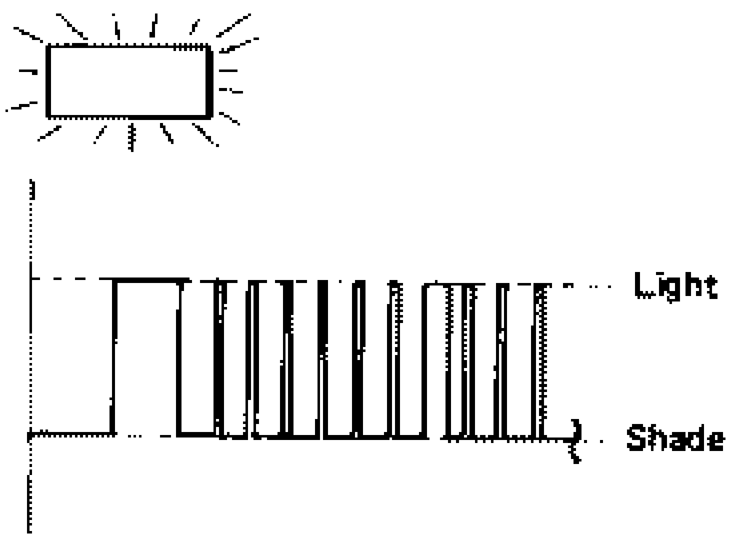
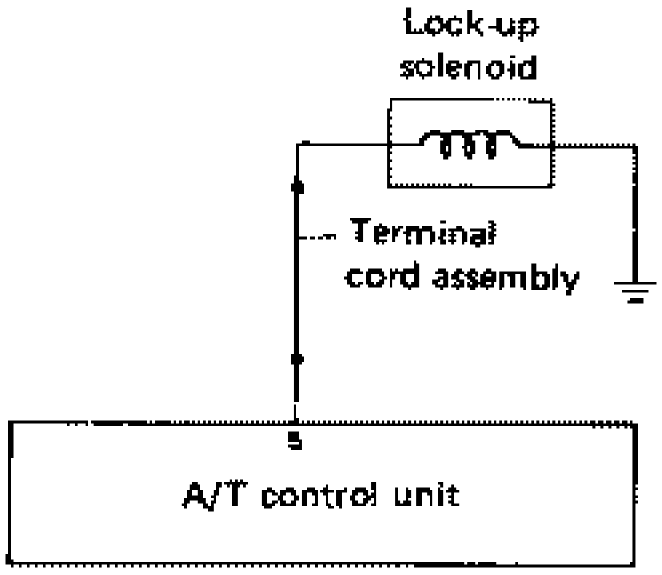
DIAGNOSIS END

JUDGMENT OF SELF-DIAGNOSIS CODE

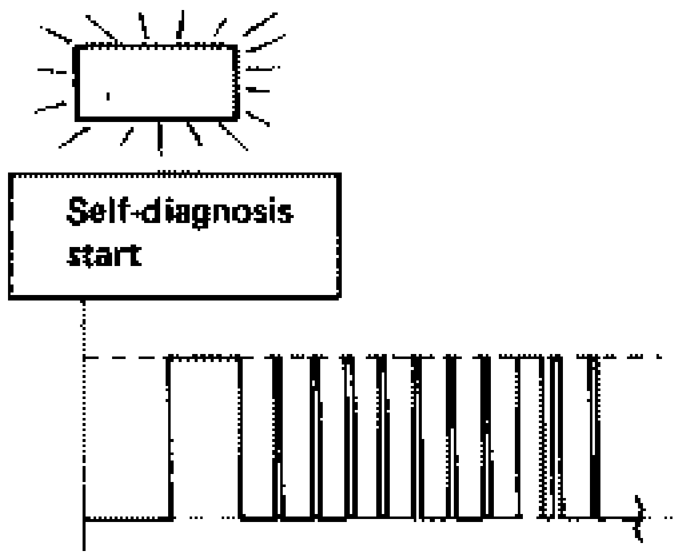
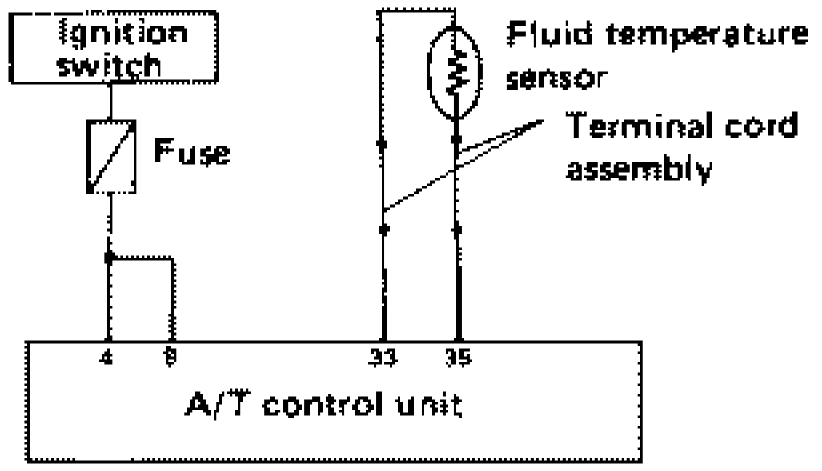
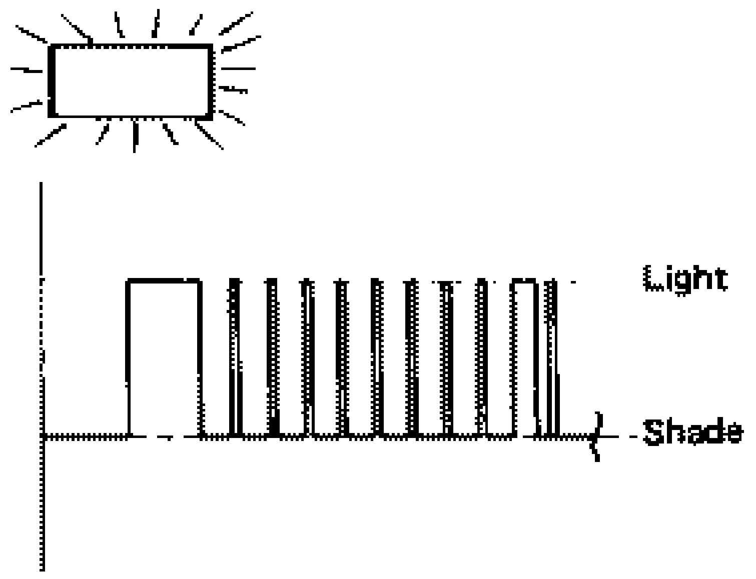
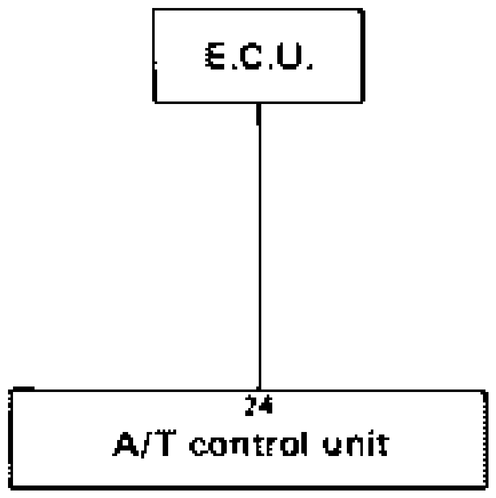
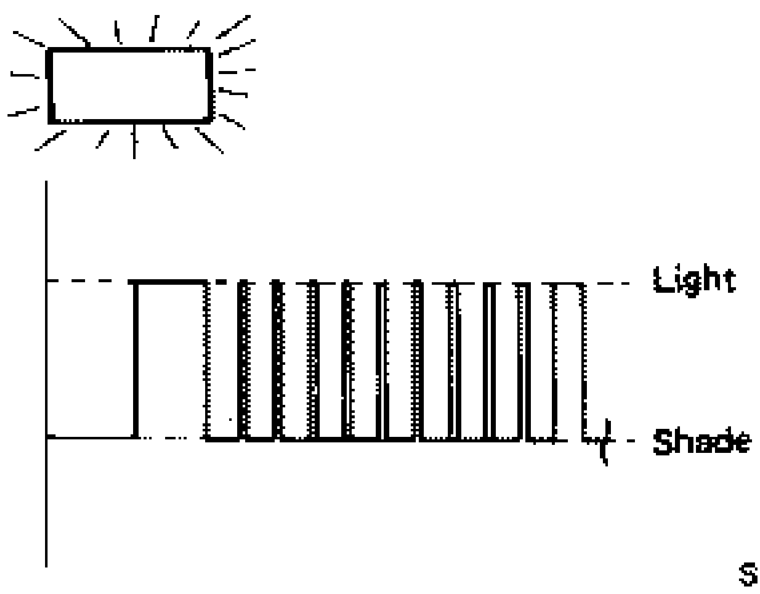
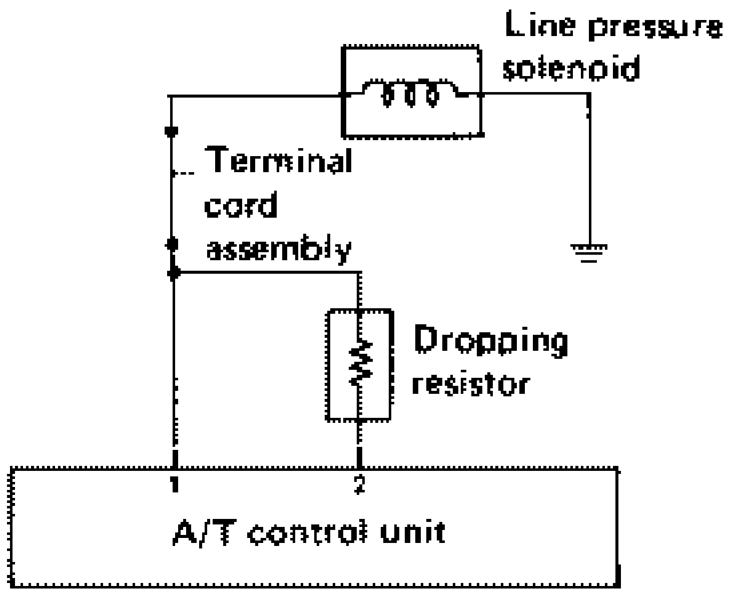
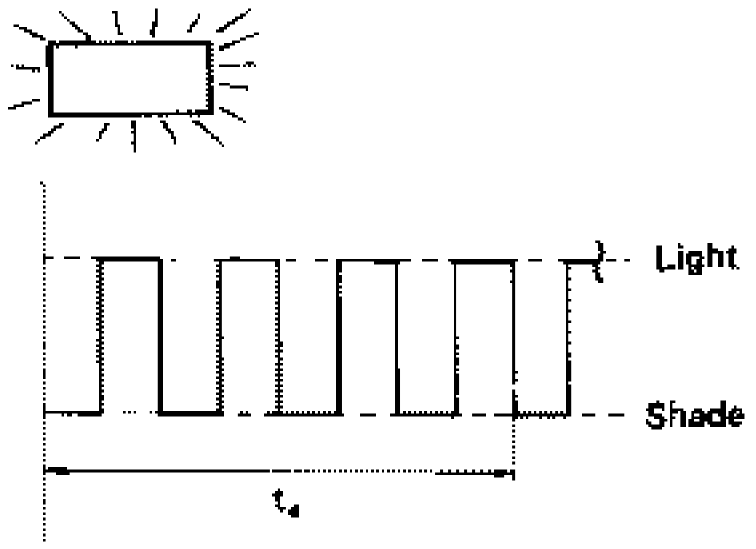
A/T check lamp	Damaged circuit
All judgment flickers are same.  SAT307C	All circuits that can be confirmed by self-diagnosis are O.K.
1st judgment flicker is longer than others.  SAT308C	Revolution sensor circuit is short-circuited or disconnected.  ➡ **Go to revolution sensor circuit check.** SAT965B
2nd judgment flicker is longer than others.  SAT309C	Speed sensor circuit is short-circuited or disconnected.  ➡ **Go to speed sensor circuit check.** SAT966B
3rd judgment flicker is longer than others.  SAT310C	Throttle sensor circuit is short-circuited or disconnected.  ➡ **Go to throttle sensor circuit check.** SAT967B

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

Self-diagnosis (Cont'd)

A/T check lamp	Damaged circuit
4th judgment flicker is longer than others.  SAT311C	Shift solenoid A circuit is short-circuited or disconnected.  **➡ Go to shift solenoid A circuit check.** SAT968B
5th judgment flicker is longer than others.  SAT312C	Shift solenoid B circuit is short-circuited or disconnected.  **➡ Go to shift solenoid B circuit check.** SAT969B
6th judgment flicker is longer than others.  SAT313C	Overrun clutch solenoid circuit is short-circuited or disconnected.  **➡ Go to overrun clutch solenoid circuit check.** SAT970B
7th judgment flicker is longer than others.  SAT314C	Lock-up solenoid circuit is short-circuited or disconnected.  **➡ Go to lock-up solenoid circuit check.** SAT971B

Self-diagnosis (Cont'd)

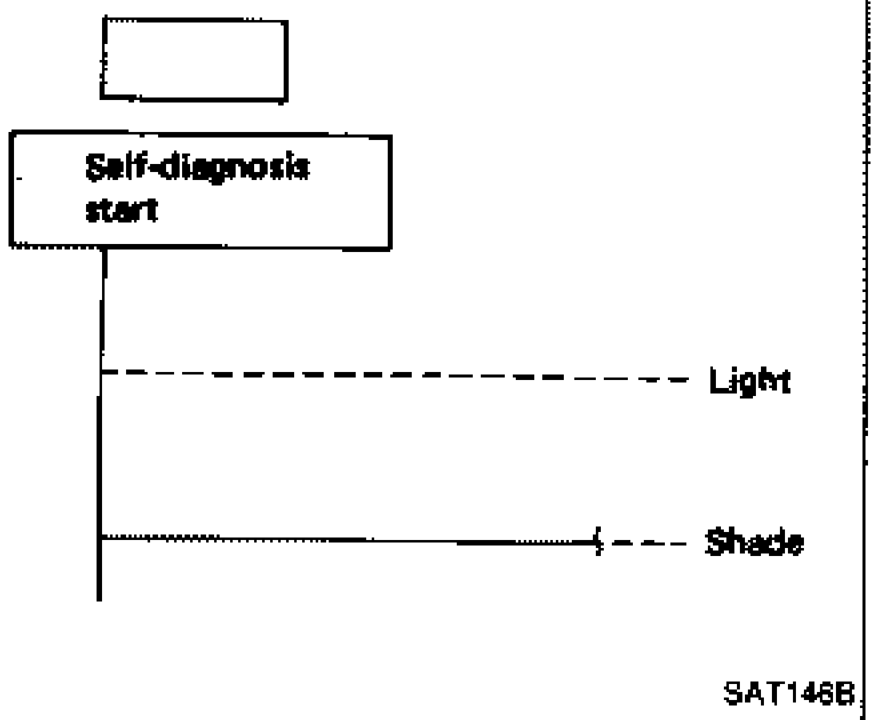
A/T check lamp	Damaged circuit
8th judgment flicker is longer than others.  SAT315C	Fluid temperature sensor is disconnected or A/T control unit power source circuit is damaged.  **➡ Go to fluid temperature sensor and A/T control unit power source circuit check.** SAT972B
9th judgment flicker is longer than others.  SAT316C	Engine revolution signal circuit is short-circuited or disconnected.  **➡ Go to engine revolution signal circuit check.** SAT973B
10th judgment flicker is longer than others.  SAT317C	Line pressure solenoid circuit is short-circuited or disconnected.  **➡ Go to line pressure solenoid circuit check.** SAT974B
Flickers as shown below.  SAT318C	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.)

t_4 = 1.0 second

Self-diagnosis (Cont'd)

<table>
<tr><th>A/T check lamp</th><th>Damaged circuit</th></tr>
<tr><td>

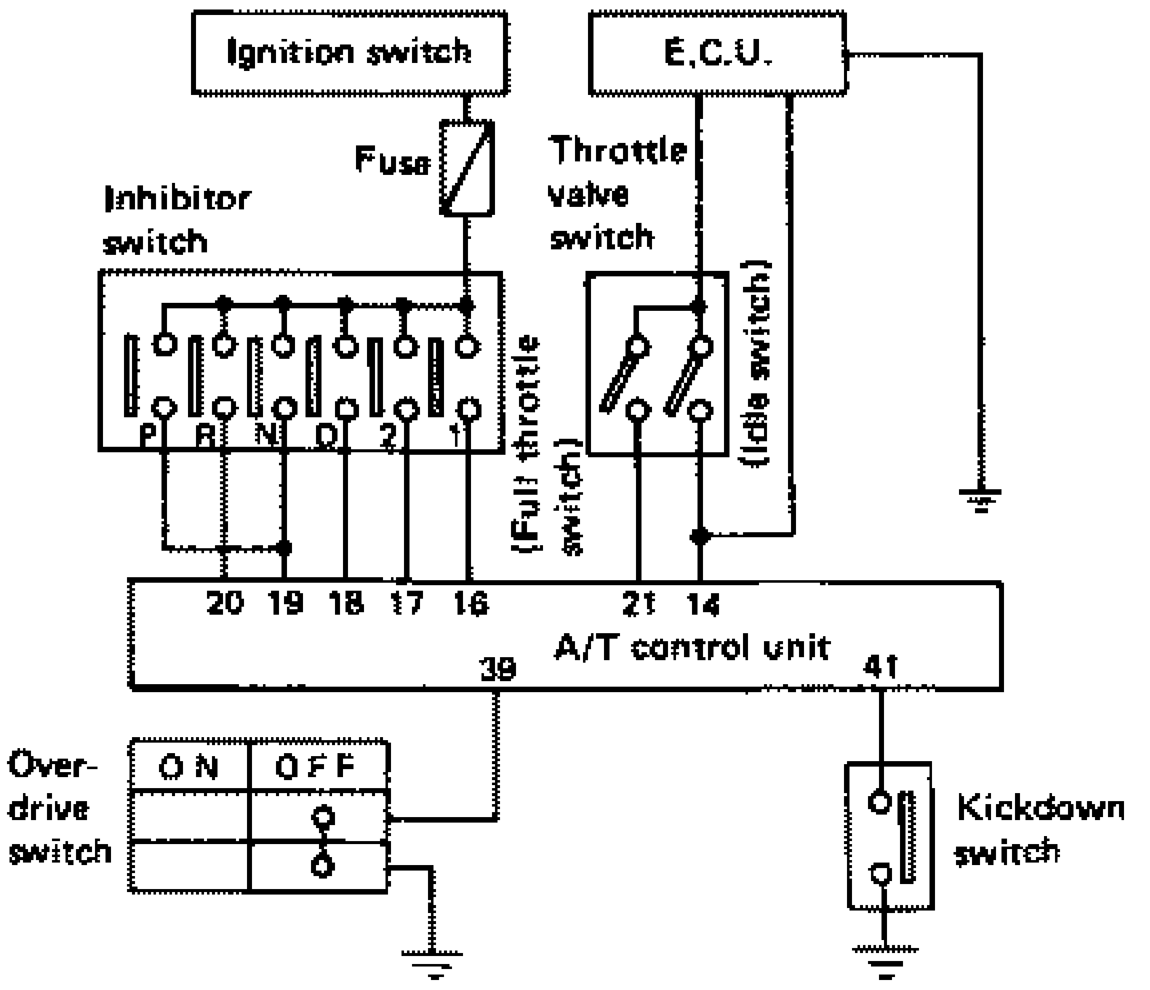
Does not come on.



SAT146B

</td><td>

Inhibitor switch, overdrive switch, kickdown switch or idle switch circuit is disconnected or A/T control unit is damaged.



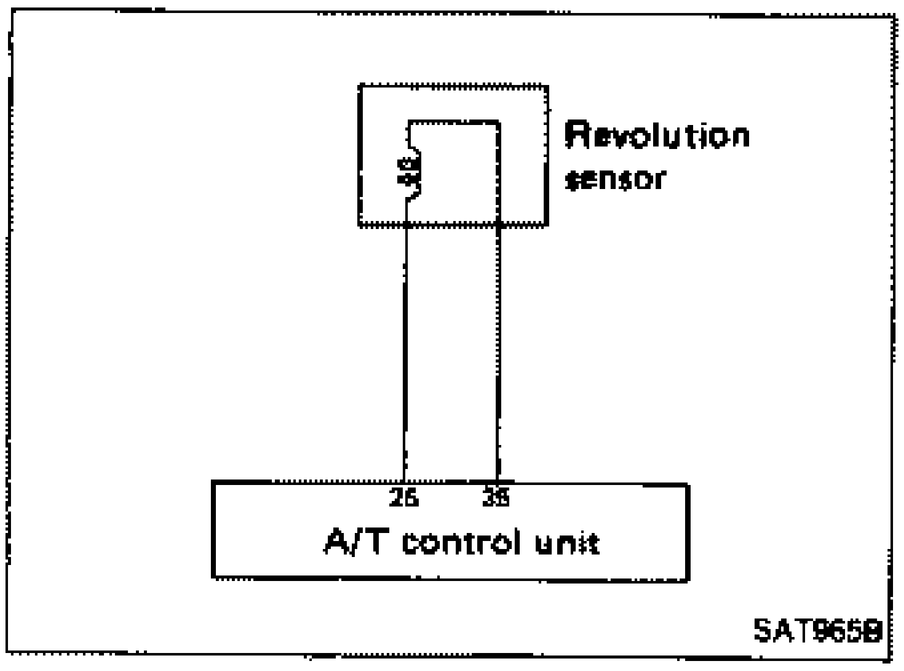
➡ Go to inhibitor, overdrive, kickdown and idle switch circuit checks.

SAT319C

</td></tr>
</table>

Self-diagnosis (Cont'd)

REVOLUTION SENSOR CIRCUIT CHECK



SAT965B

CHECK REVOLUTION SENSOR.
— Refer to "Electrical Components Inspection".

N.G. → Repair or replace revolution sensor.

O.K. ↓

A **CHECK INPUT SIGNAL.**

1. (ST) (engine)
2.
   - Select "E.C.U. INPUT SIGNALS".
   - Read out the value of "CAR SPEED SENSOR 1" while driving.
   - Check the value changes according to driving speed.

OR

Check voltage between A/T control unit terminal ㉕ and ground while driving.
(Measure with A.C. 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.)

N.G. → Check harness continuity between A/T control unit and revolution sensor.

O.K. ↓

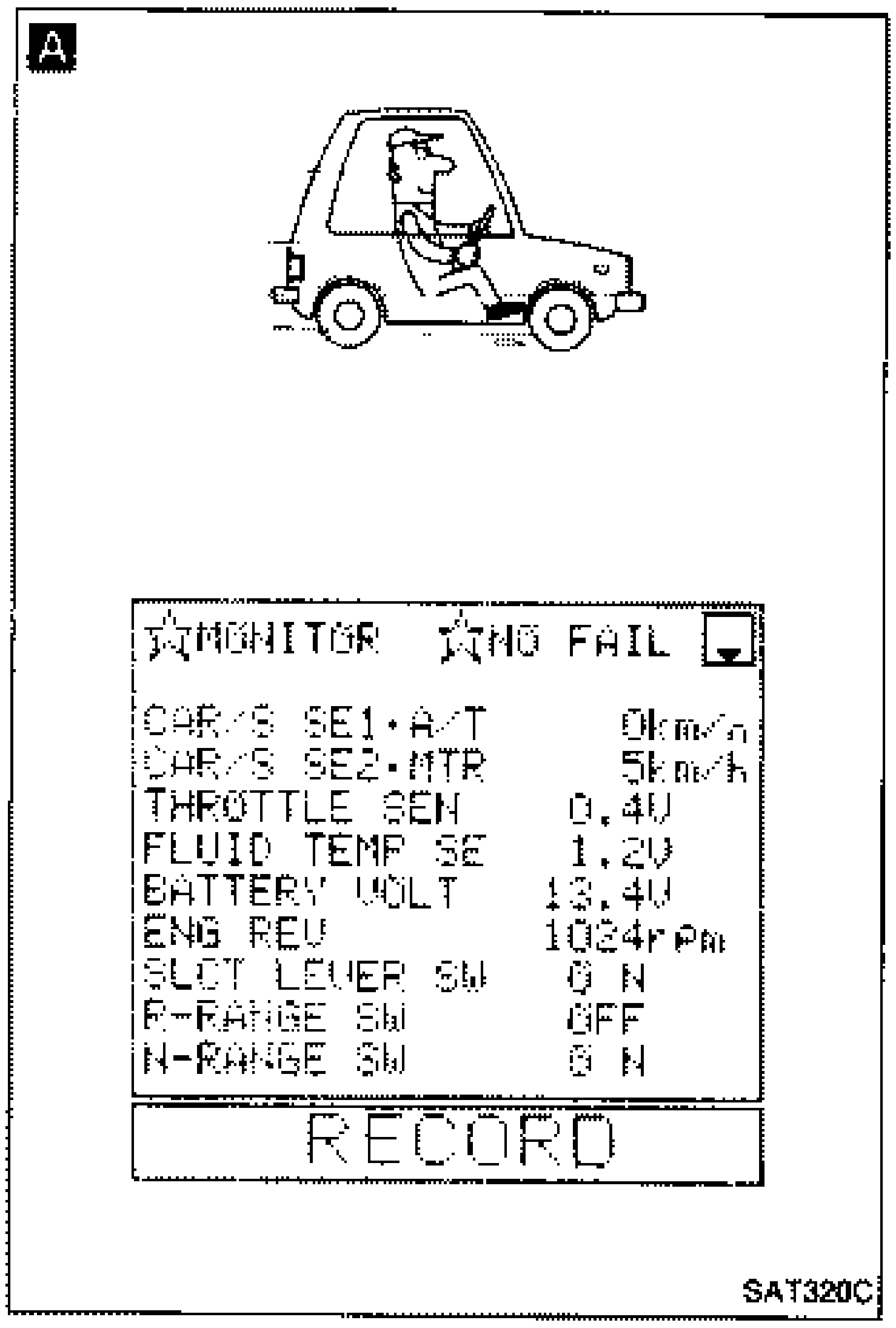
Perform self-diagnosis again after driving for a while.

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

O.K. ↓

INSPECTION END

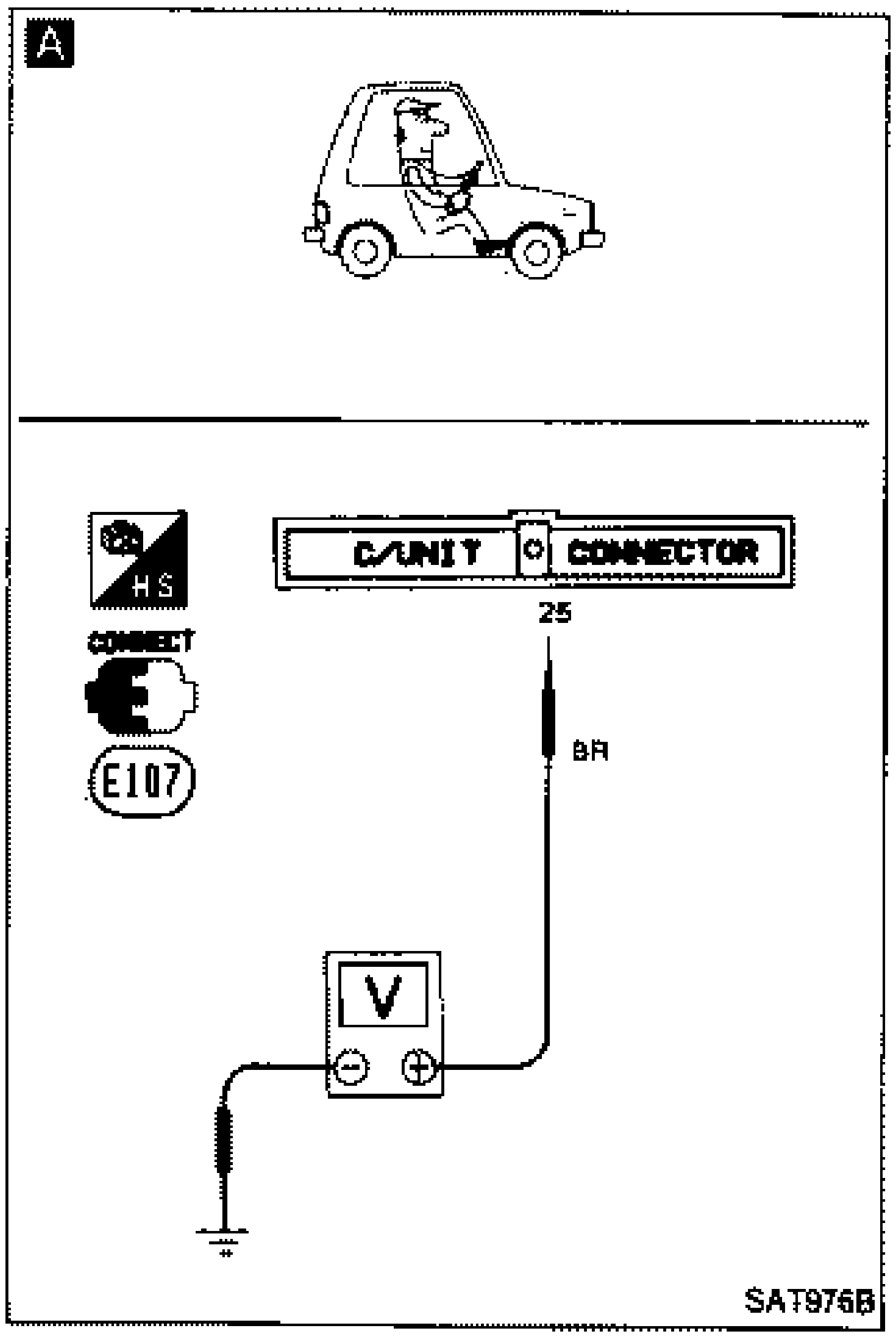
A



```
☆MONITOR  ☆NO FAIL
CAR/S SE1·A/T       0km/h
CAR/S SE2·MTR       5km/h
THROTTLE SEN     0.4V
FLUID TEMP SE    1.2V
BATTERY VOLT    13.4V
ENG REV         1024rpm
SLCT LEVER SW    ON
R-RANGE SW       OFF
N-RANGE SW       ON
          RECORD
```

SAT320C

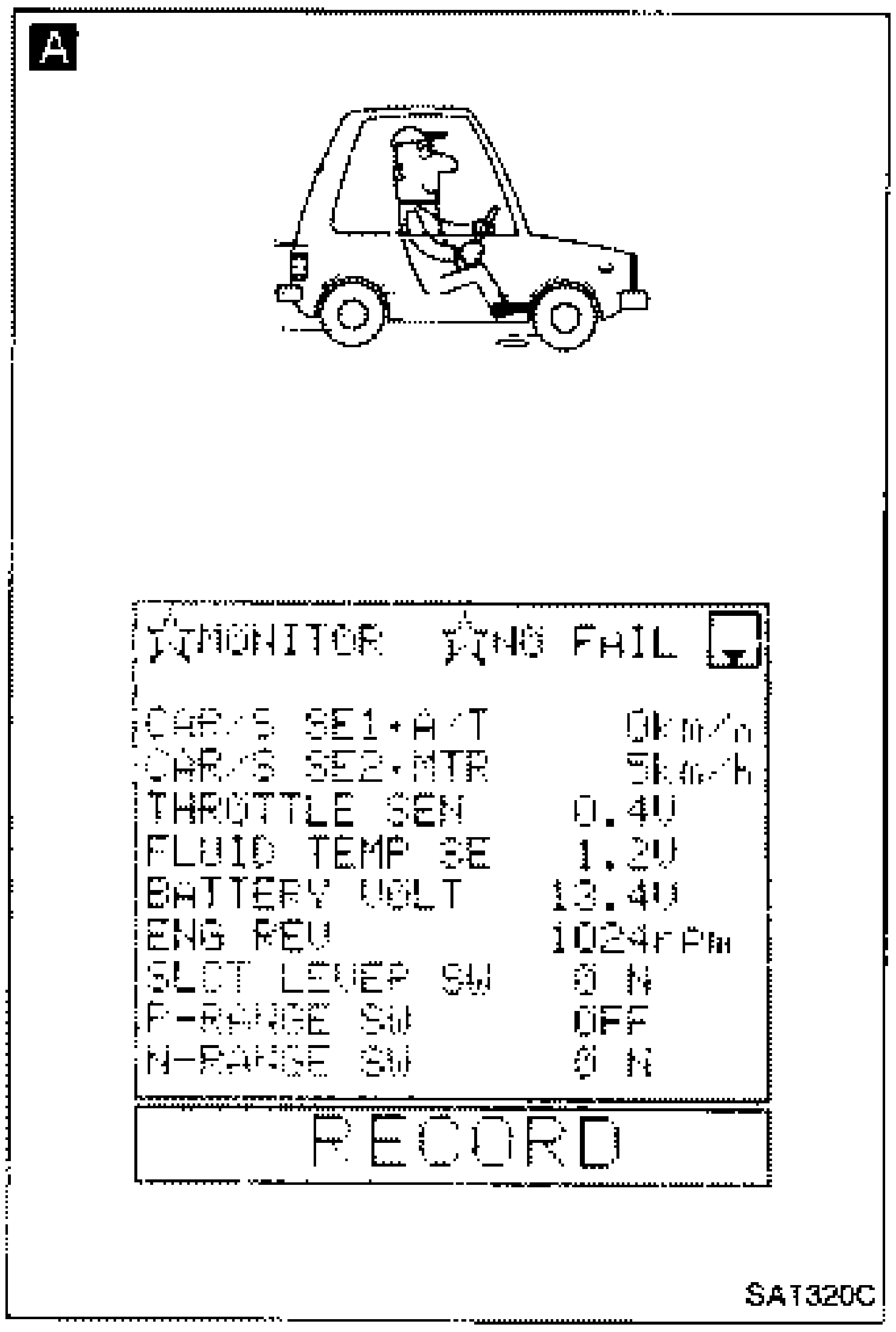
A



SAT976B

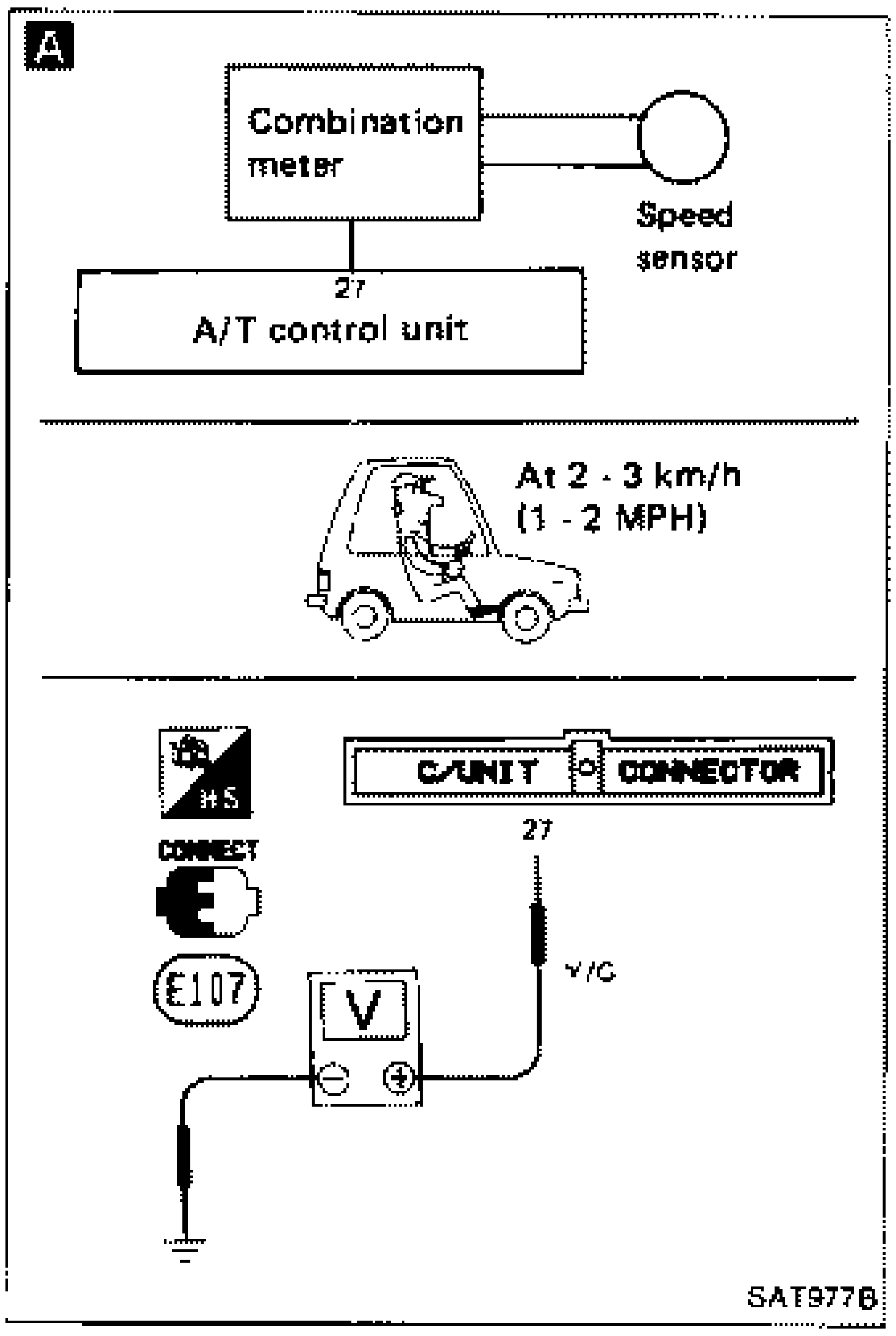
Self-diagnosis (Cont'd)

SPEED SENSOR CIRCUIT CHECK



```
☆MONITOR  ☆NO FAIL
CAR/S SE1·A/T       0km/h
CAR/S SE2·MTR       5km/h
THROTTLE SEN      0.4V
FLUID TEMP SE     1.2V
BATTERY VOLT     13.4V
ENG REV          1024rpm
SLCT LEVER SW     ON
P-RANGE SW        OFF
N-RANGE SW        ON
         RECORD
```

SAT320C



SAT977B

A

CHECK INPUT SIGNAL.

1.

2.

- Select "E.C.U. INPUT SIGNALS".
- Read out the value of "CAR SPEED SENSOR 2" while driving.
- Check the value changes according to driving speed.

OR

- 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

N.G. → Check the following items.
- Speed sensor and ground circuit for speed sensor — Refer to section EL.
- Harness continuity between A/T control unit and speed sensor

O.K.

Perform self-diagnosis again after driving for a while.

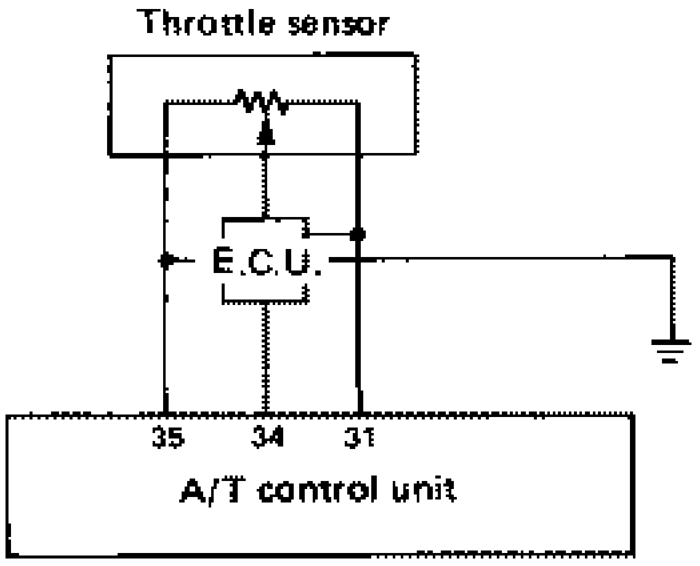
N.G. →
1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

O.K.

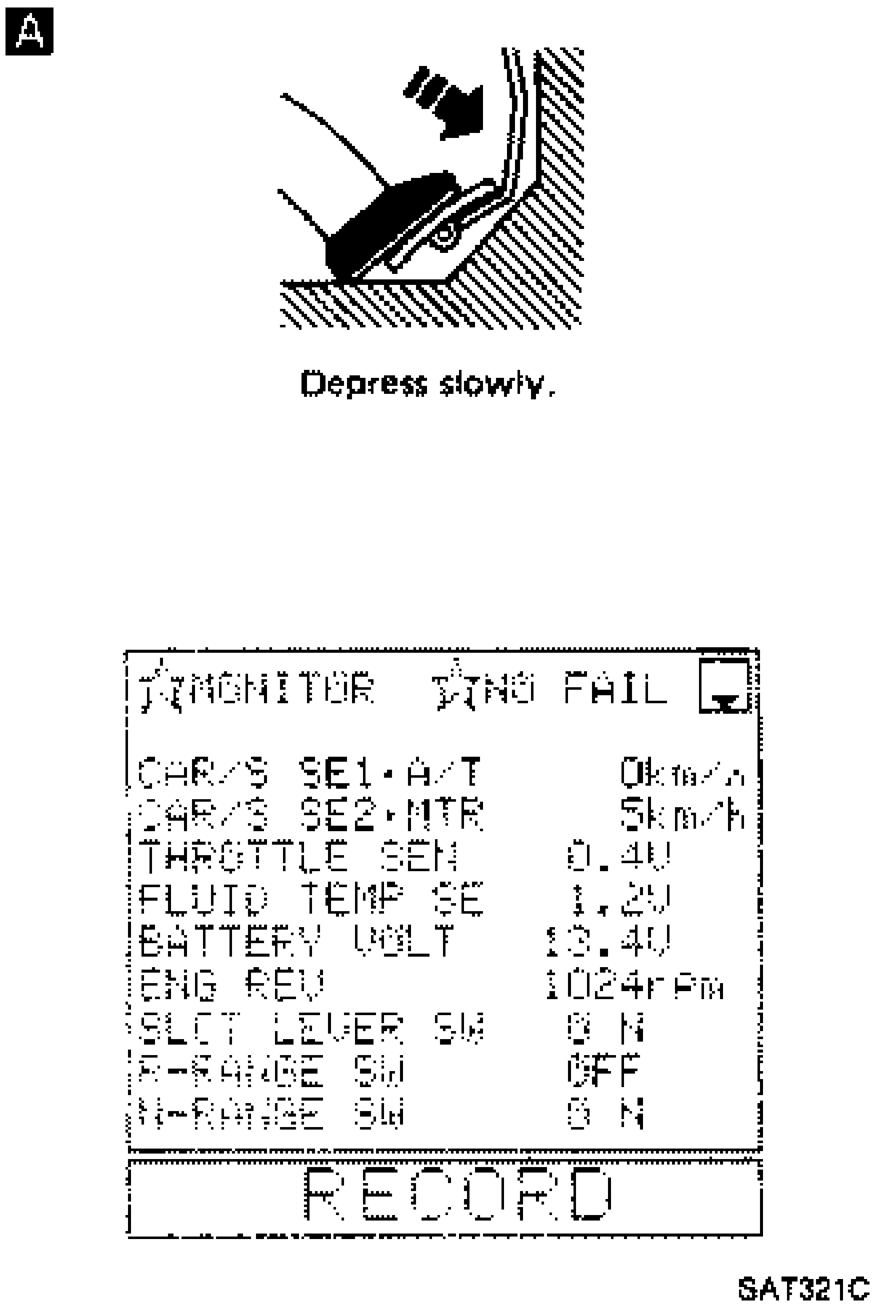
INSPECTION END

Self-diagnosis (Cont'd)

THROTTLE SENSOR CIRCUIT CHECK

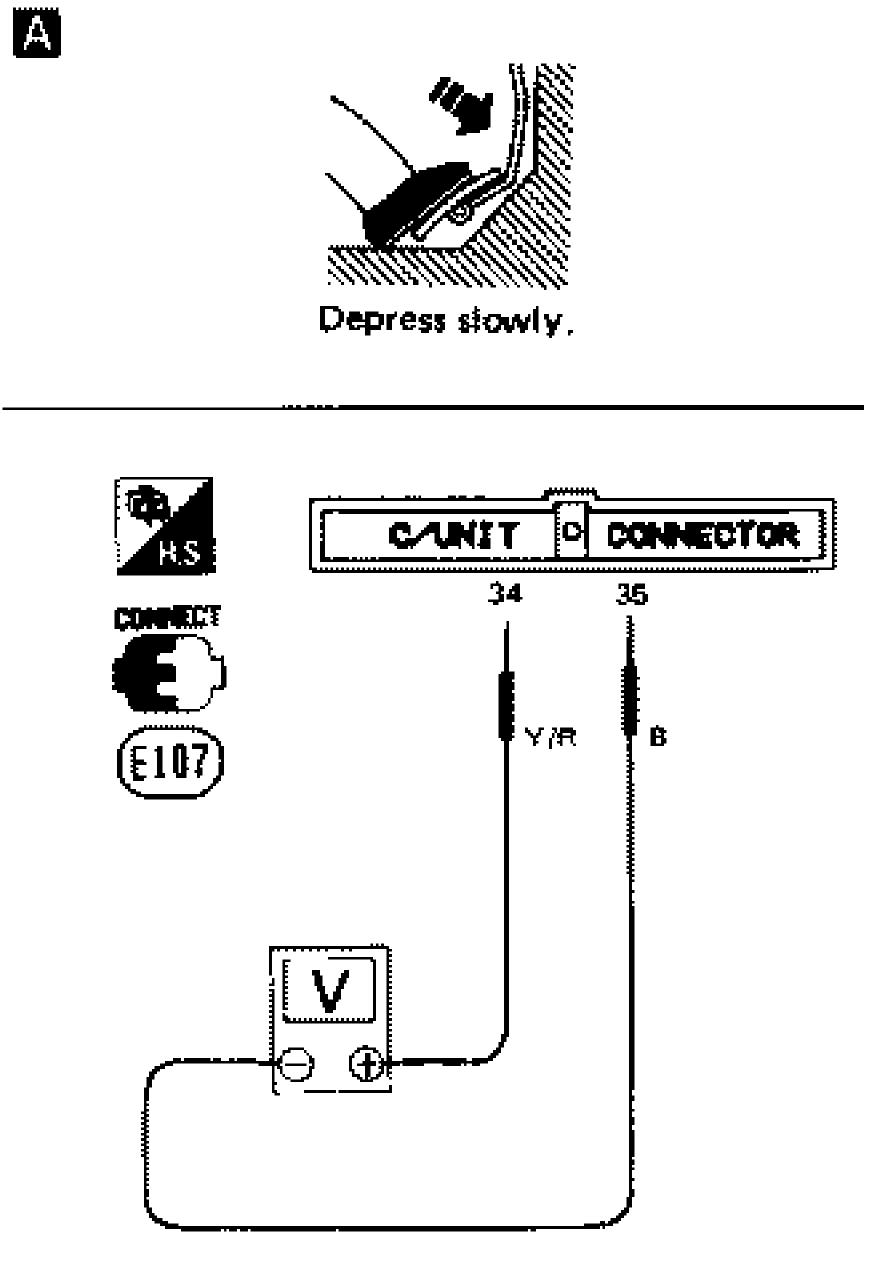


SAT967B



```
MONITOR   NO FAIL
CAR/S SE1·A/T      0km/h
CAR/S SE2·MTR      5km/h
THROTTLE SEN     0.4V
FLUID TEMP SE    1.2V
BATTERY VOLT    13.4V
ENG REV         1024rpm
SLCT LEVER SW    ON
P-RANGE SW       OFF
N-RANGE SW       ON
          RECORD
```

SAT321C



SAT978B

Perform self-diagnosis (Mode III) for engine control.

- N.G. → Check throttle sensor circuit for engine control. — Refer to section EF & EC.
- O.K. ↓

A

CHECK INPUT SIGNAL.

1. (Ignition switch ON, engine not running)
2. - Select "E.C.U. INPUT SIGNALS".
   - Read out the value of "THROTTLE SENSOR".

   Voltage:

   Fully-closed throttle:
   Approximately 0.5V

   Fully-open throttle:
   Approximately 4V

OR

- Check voltage between A/T control unit terminals ㉞ and ㉟ while accelerator pedal is depressed slowly.

Voltage:

Fully-closed throttle:
Approximately 0.5V

Fully-open throttle:
Approximately 4V

(Voltage rises gradually in response to throttle valve opening.)

- N.G. → Check harness continuity between E.C.U. and A/T control unit regarding throttle sensor circuit.
- O.K. ↓

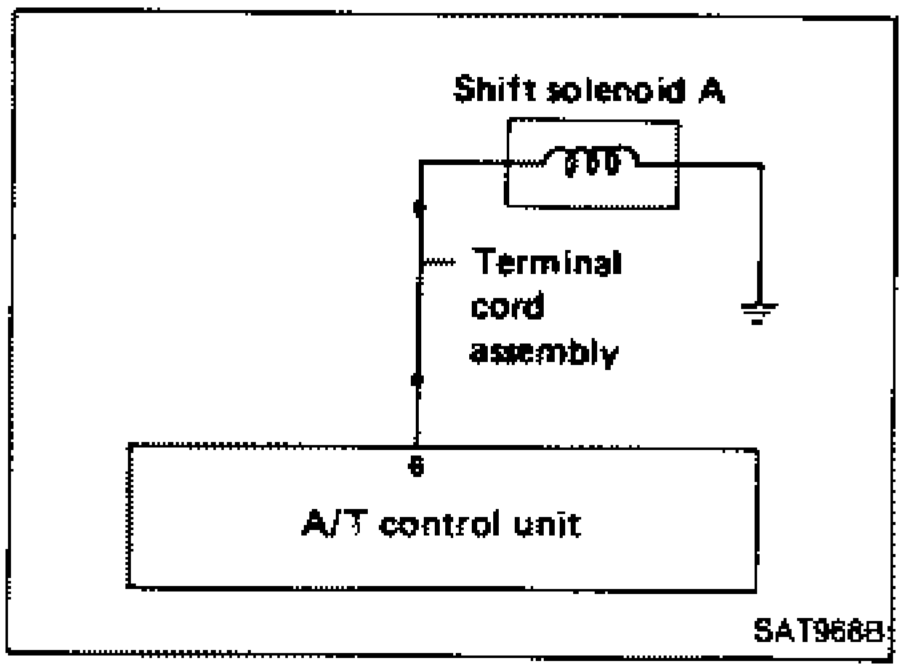
Perform self-diagnosis again after driving for a while.

- N.G. →
  1. Perform A/T control unit input/output signal inspection.
  2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.
- O.K. ↓

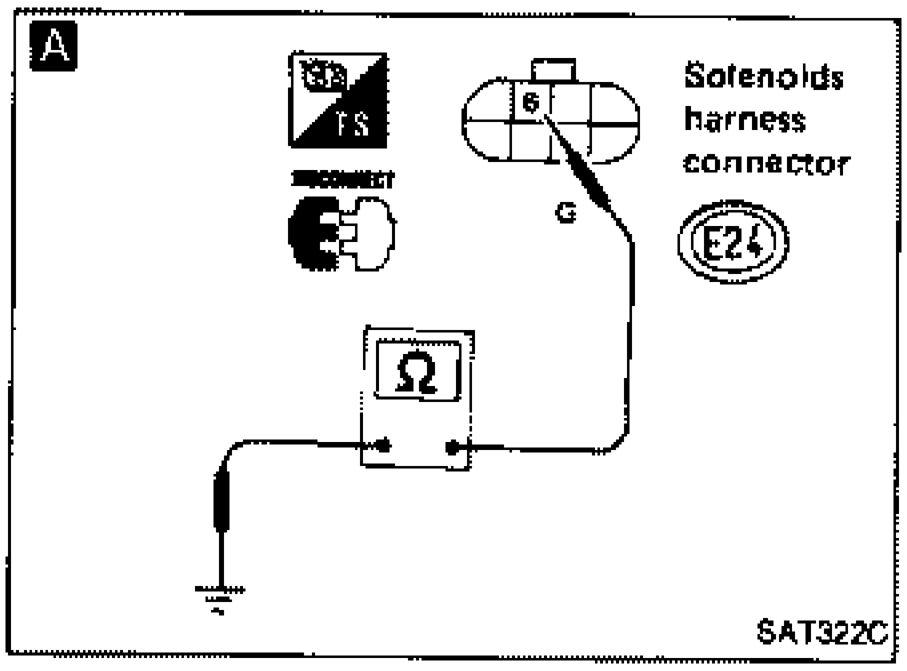
INSPECTION END

Self-diagnosis (Cont'd)

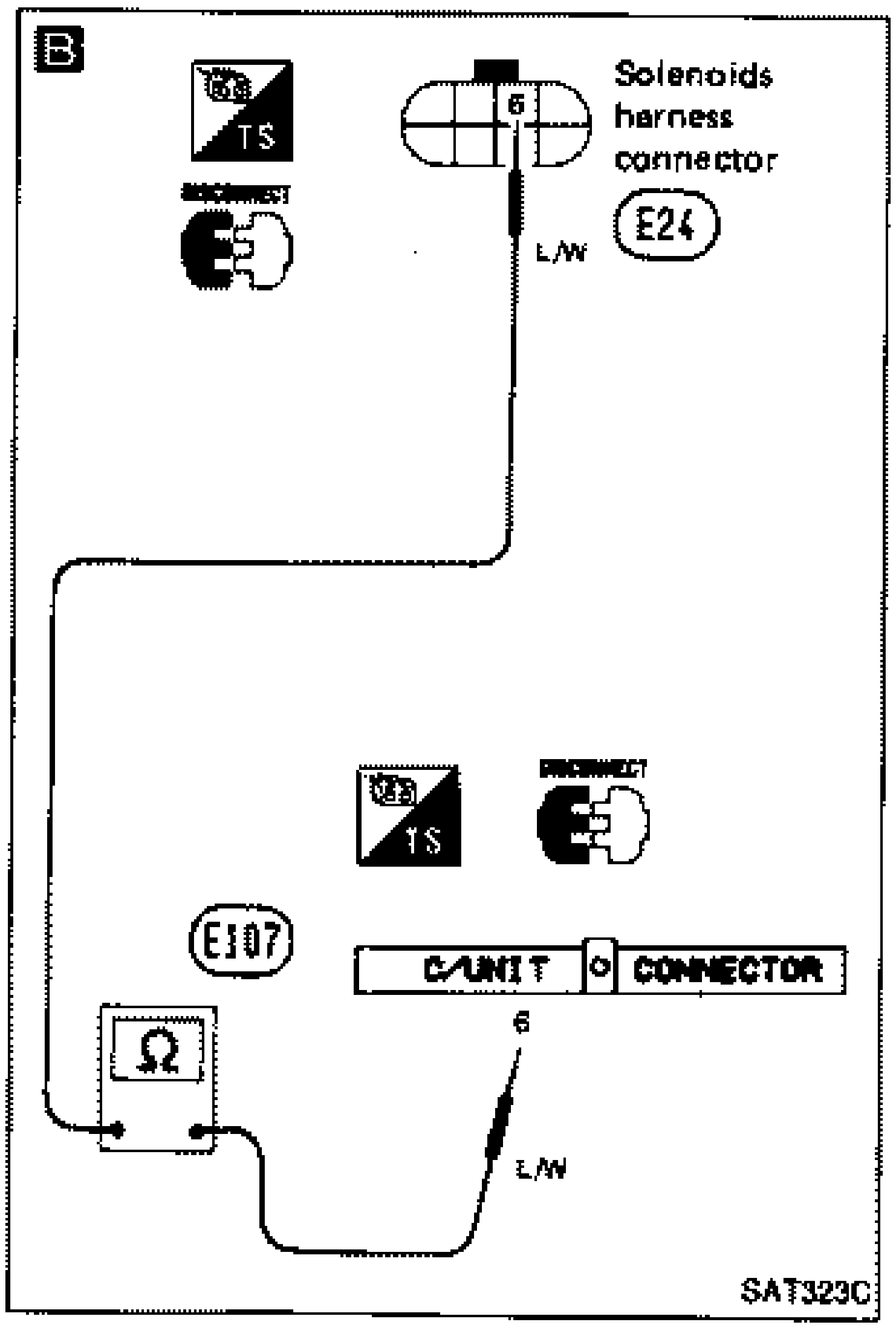
SHIFT SOLENOID A CIRCUIT CHECK



SAT968B



SAT322C



SAT323C

A

CHECK GROUND CIRCUIT.

1.

2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal ⑥ and ground.

Resistance: 20 - 40Ω

N.G. →

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

O.K. ↓

B

CHECK POWER SOURCE CIRCUIT.

1.

2. Disconnect A/T control unit connector.
3. Check resistance between terminal ⑥ and A/T control unit terminal ⑥.

   Resistance:

   Approximately 0Ω
4. Reinstall any part removed.

N.G. →

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

O.K. ↓

Perform self-diagnosis after driving for a while.

N.G. →

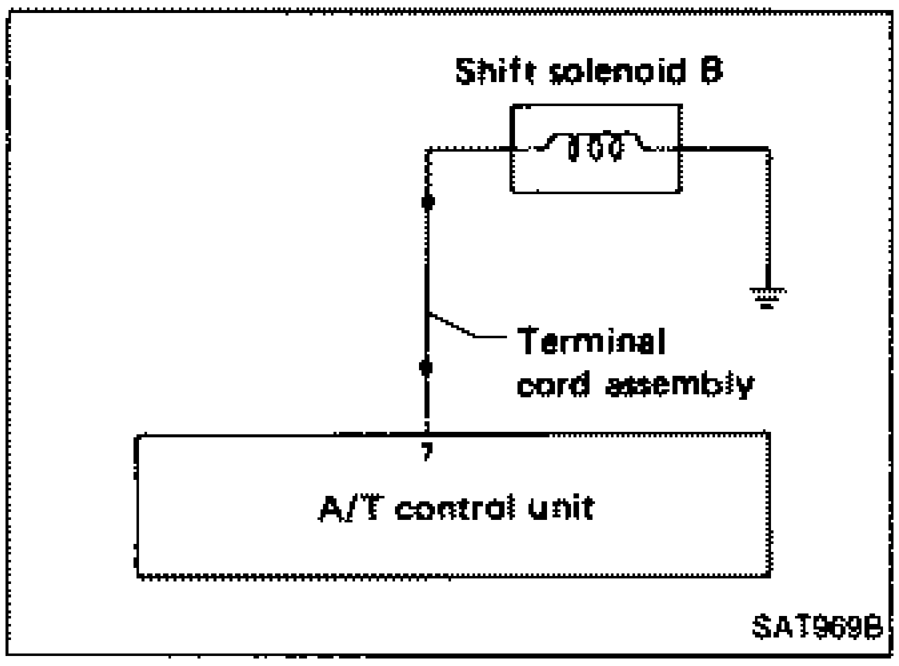
1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

O.K. ↓

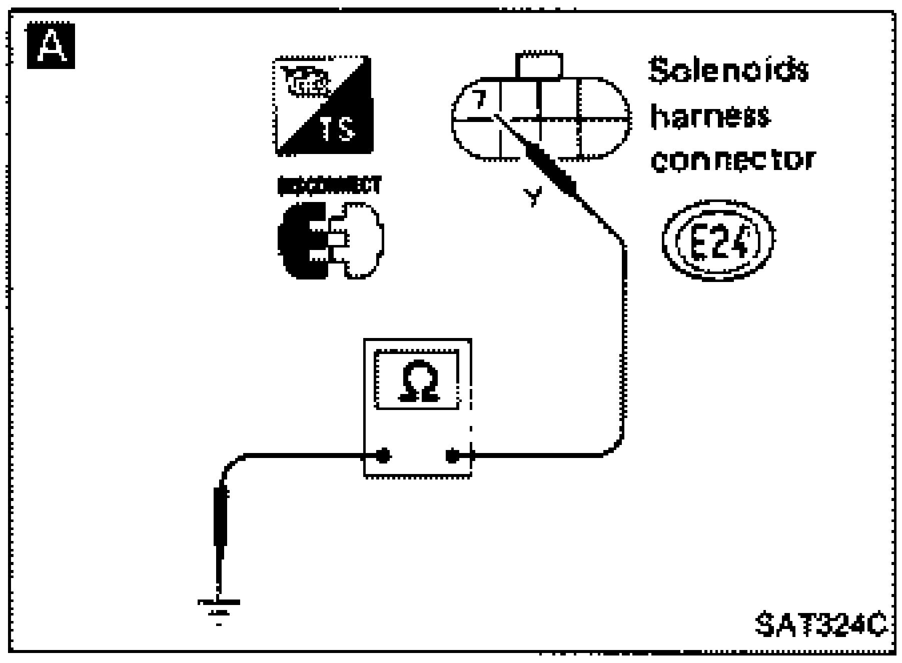
INSPECTION END

Self-diagnosis (Cont'd)

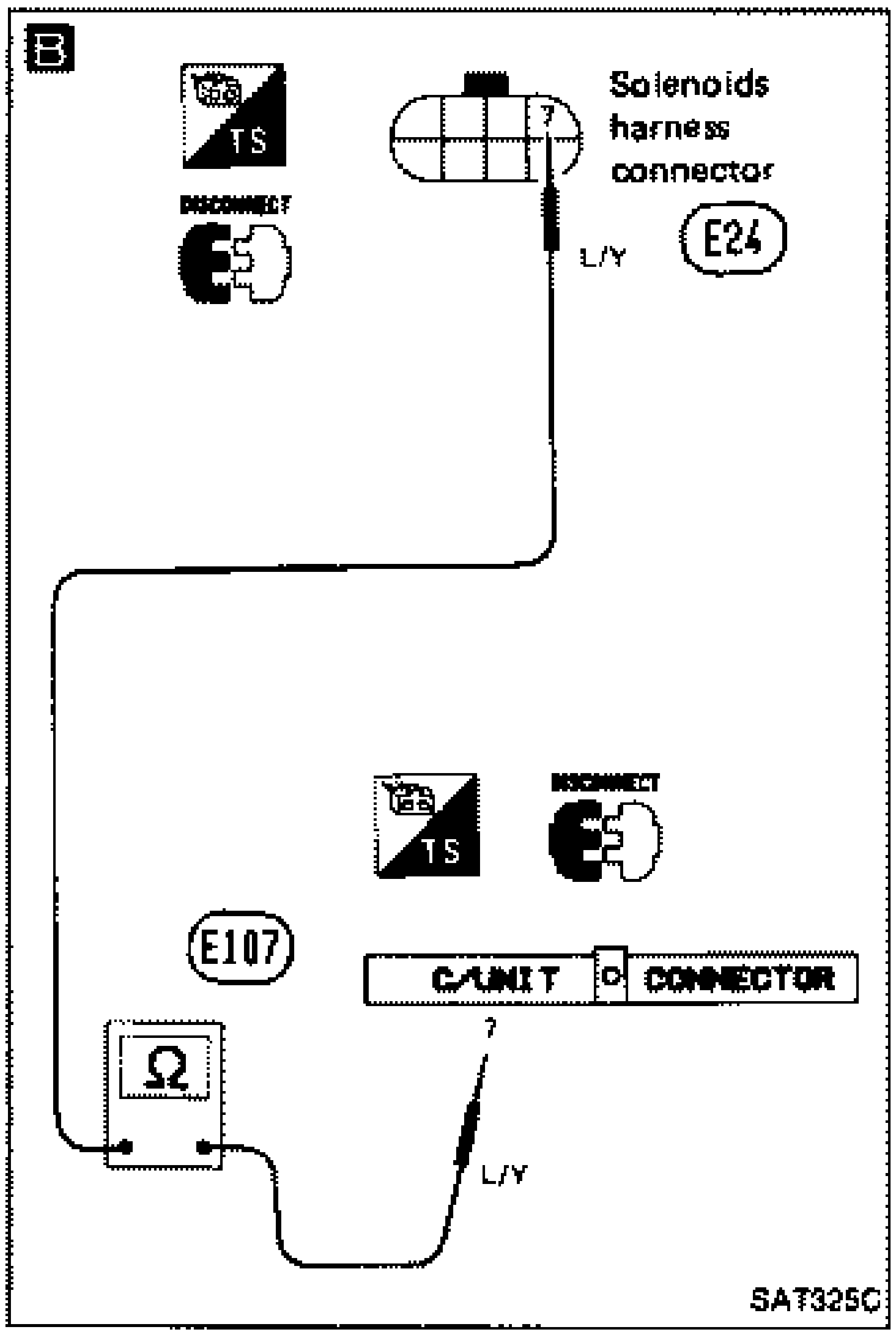
SHIFT SOLENOID B CIRCUIT CHECK



SAT969B



SAT324C



SAT325C

A

CHECK GROUND CIRCUIT.

1.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal ⑦ and ground.
   Resistance: 20 - 40Ω

N.G. →

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

O.K. ↓

B

CHECK POWER SOURCE CIRCUIT.

1.
2. Disconnect A/T control unit connector.
3. Check resistance between terminal ⑦ and A/T control unit terminal ⑦.
   Resistance:
   Approximately 0Ω
4. Reinstall any part removed.

N.G. →

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

O.K. ↓

Perform self-diagnosis after driving for a while.

N.G. →

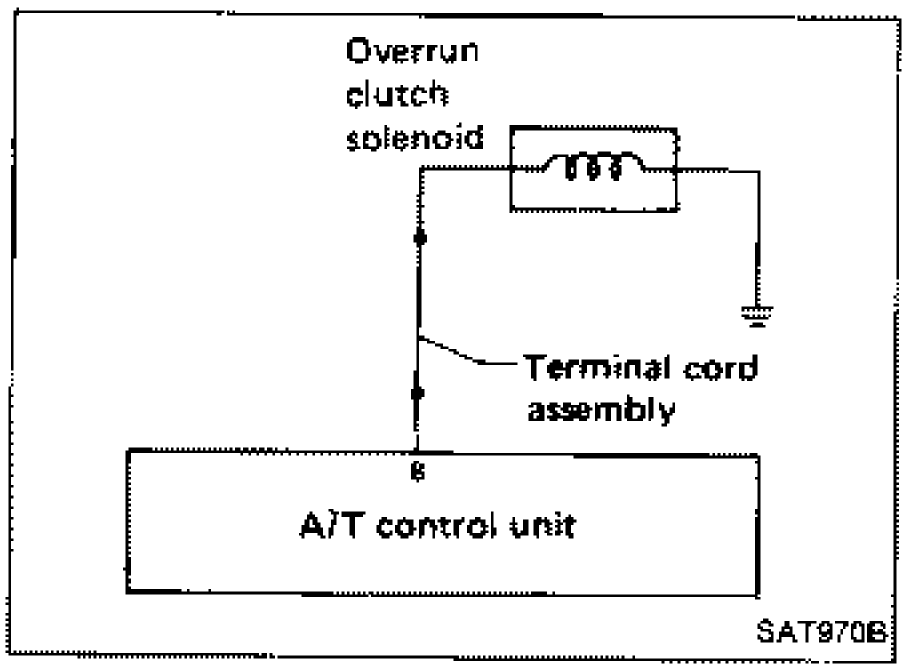
1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

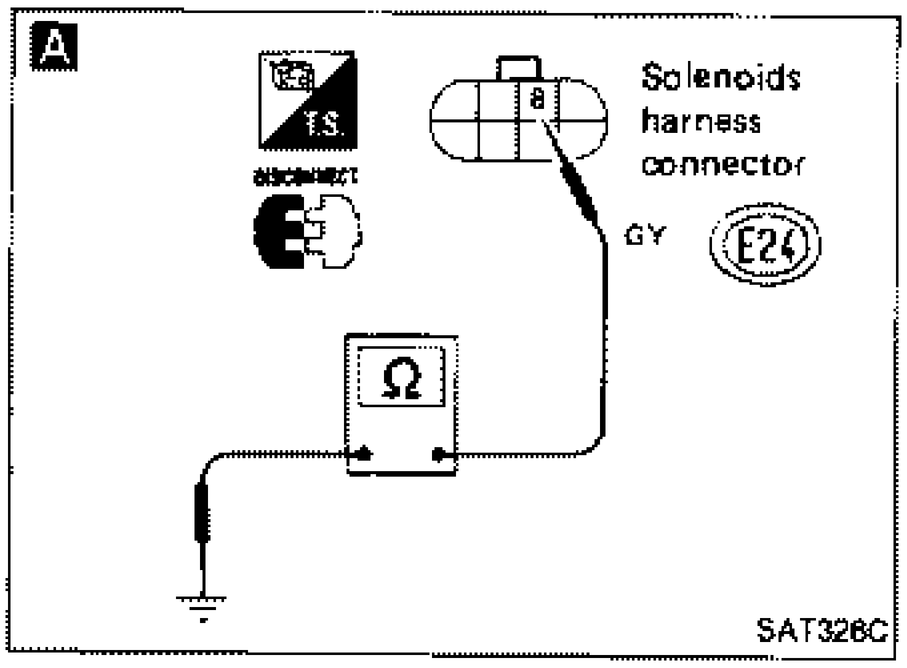
O.K. ↓

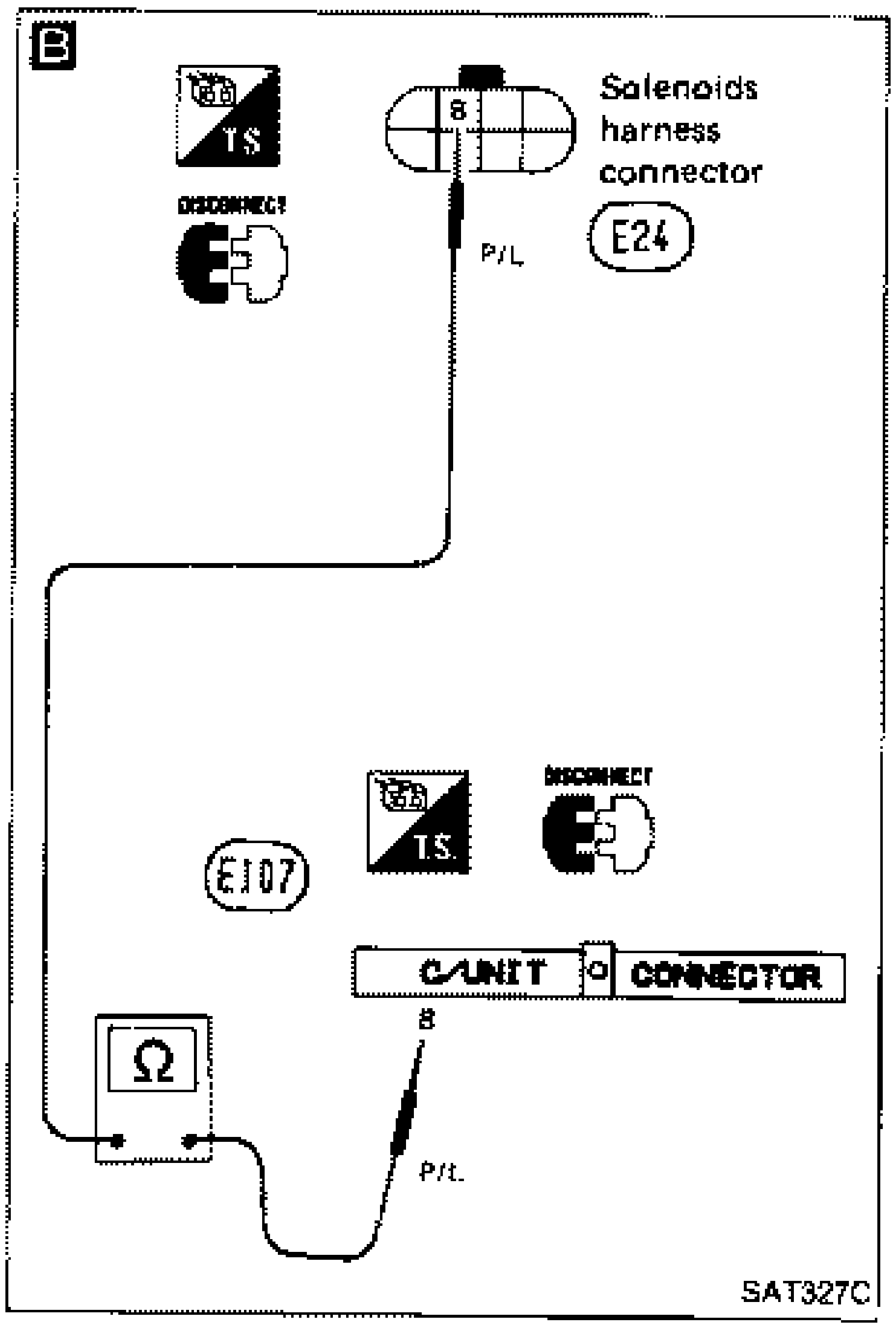
INSPECTION END

Self-diagnosis (Cont'd)

OVERRUN CLUTCH SOLENOID CIRCUIT CHECK







A

CHECK GROUND CIRCUIT.

1. OFF
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal ⑧ and ground.
   Resistance: 20 - 40Ω

N.G. →

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

O.K. ↓

B

CHECK POWER SOURCE CIRCUIT.

1. OFF
2. Disconnect A/T control unit connector.
3. Check resistance between terminal ⑧ and A/T control unit terminal ⑧.
   Resistance:
   Approximately 0Ω
4. Reinstall any part removed.

N.G. →

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

O.K. ↓

Perform self-diagnosis after driving for a while.

N.G. →

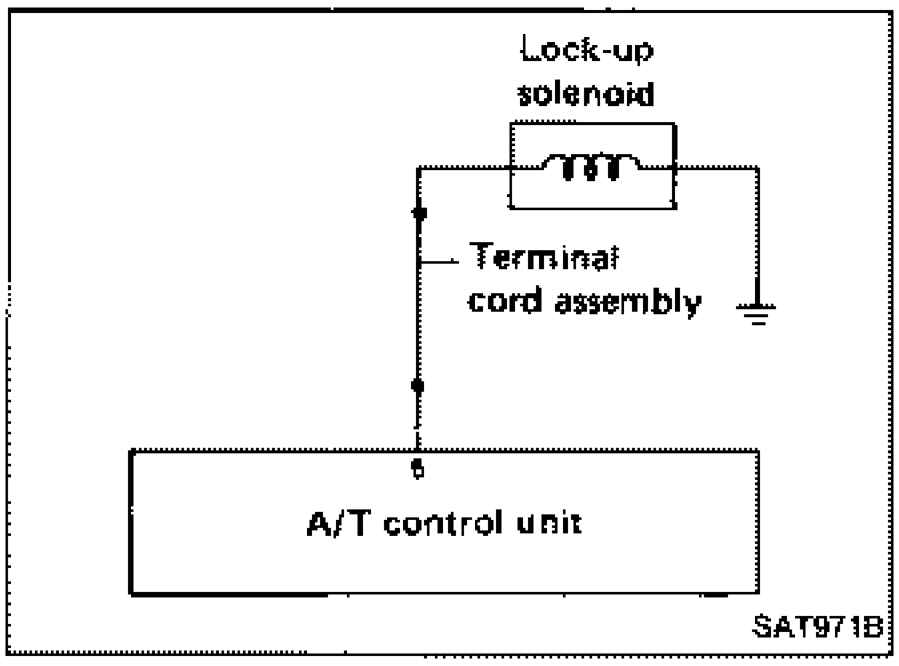
1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

O.K. ↓

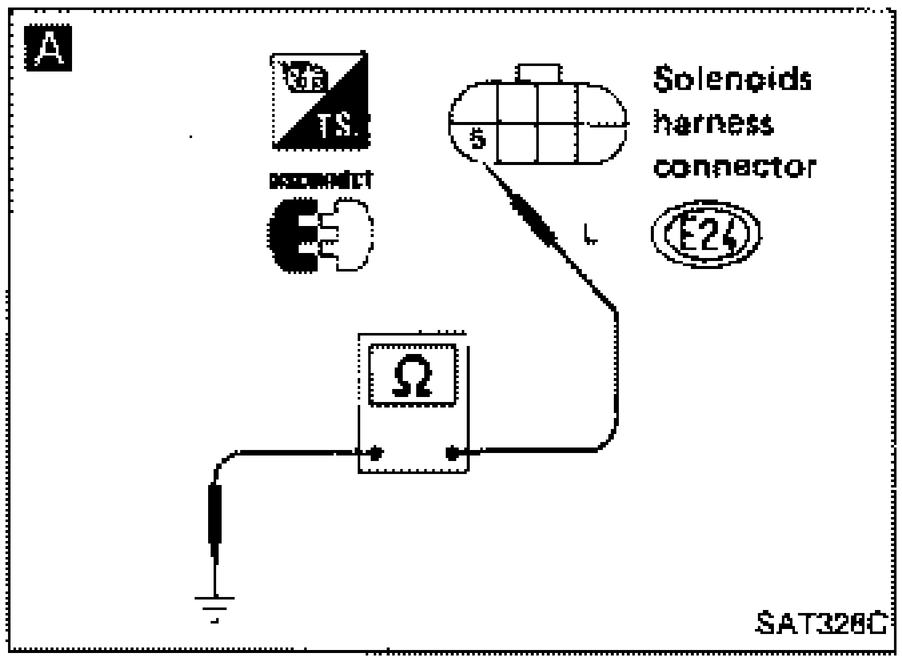
INSPECTION END

Self-diagnosis (Cont'd)

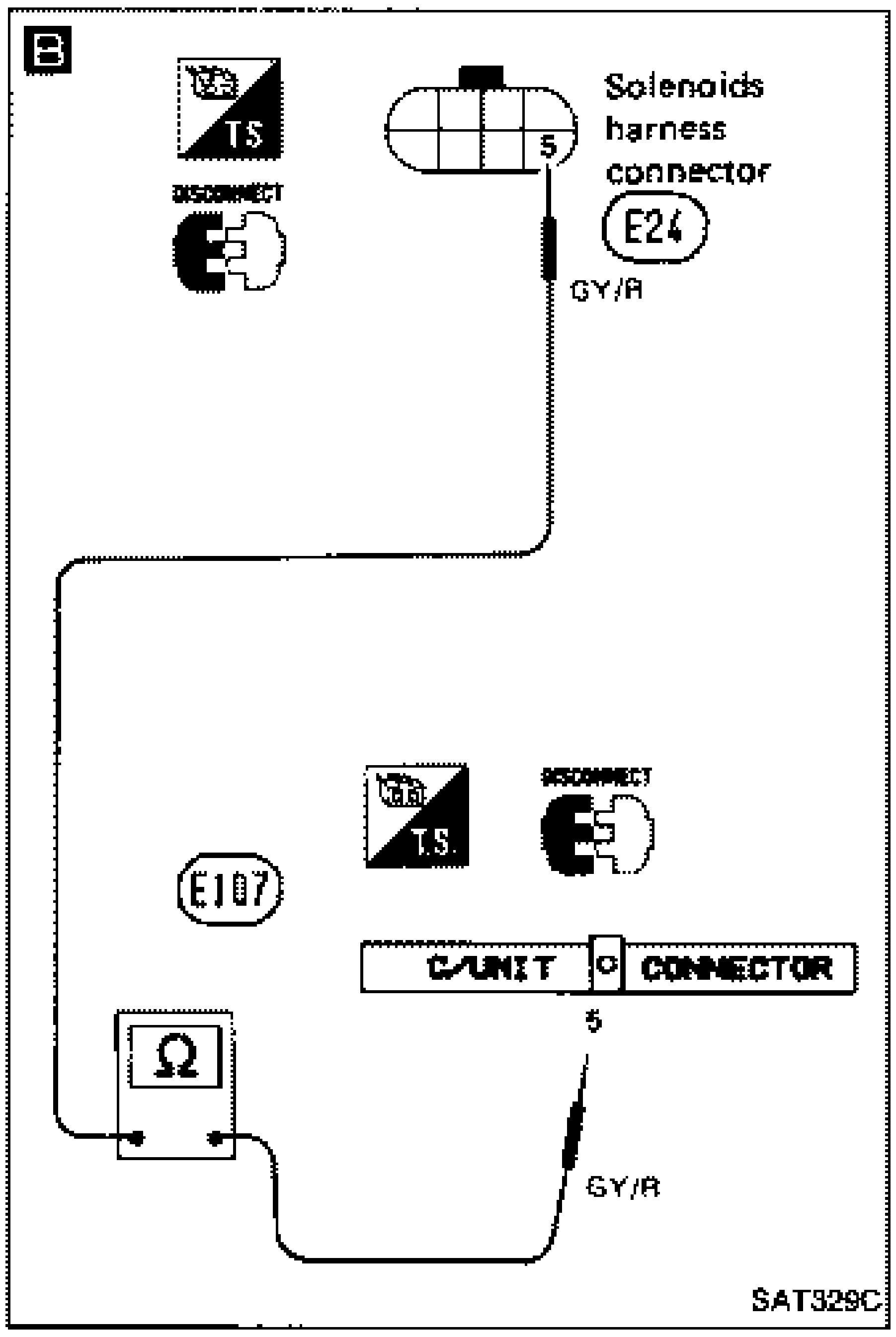
LOCK-UP SOLENOID CIRCUIT CHECK



SAT971B



SAT328C



SAT329C

A

CHECK GROUND CIRCUIT.

1. OFF
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal ⑤ and ground.
   Resistance: 10 - 20Ω

N.G. →

1. Remove oil pan. — Refer to "ON-VEHICLE SERVICE".
2. Check the following items.
- Lock-up solenoid — Refer to "Electrical Components Inspection".
- Harness continuity of terminal cord assembly

O.K. ↓

B

CHECK POWER SOURCE CIRCUIT.

1. OFF
2. Disconnect A/T control unit connector.
3. Check resistance between terminal ⑤ and A/T control unit terminal ⑤.
   Resistance:
   Approximately 0Ω
4. Reinstall any part removed.

N.G. →

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

O.K. ↓

Perform self-diagnosis after driving for a while.

N.G. →

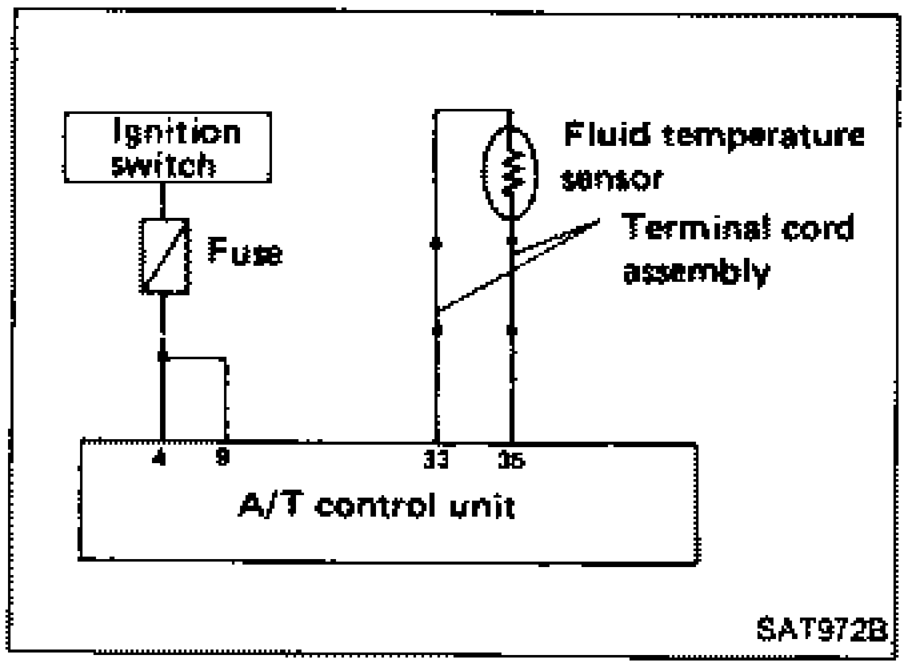
1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

O.K. ↓

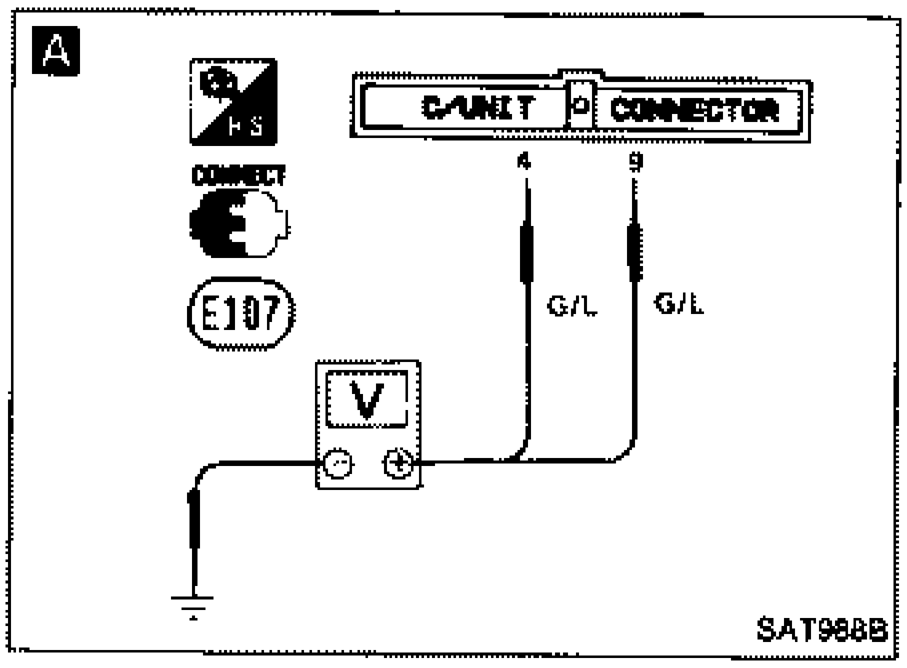
INSPECTION END

Self-diagnosis (Cont'd)

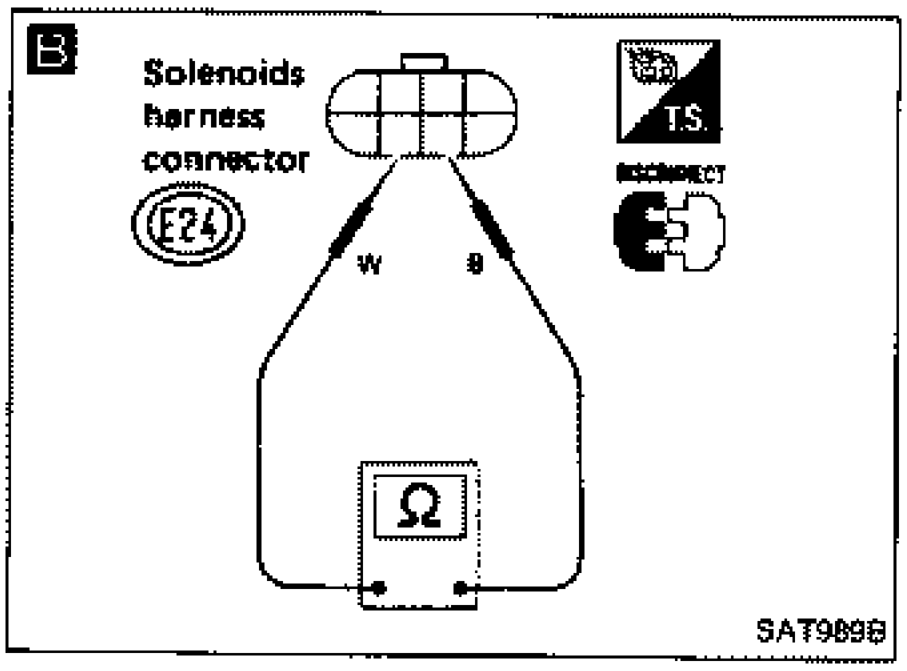
FLUID TEMPERATURE SENSOR CIRCUIT AND A/T CONTROL UNIT POWER SOURCE CIRCUIT CHECKS



SAT972B



SAT988B



SAT989B

A

CHECK A/T CONTROL UNIT POWER SOURCE.

1. ON

2. Check voltage between A/T control unit terminals ④, ⑨ and ground.

   Battery voltage should exist.

N.G. → Check the following items.

- Harness continuity between ignition switch and A/T control unit
- Ignition switch and fuse
  — Refer to section EL.

O.K. ↓

B

CHECK FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY.

1. OFF
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.

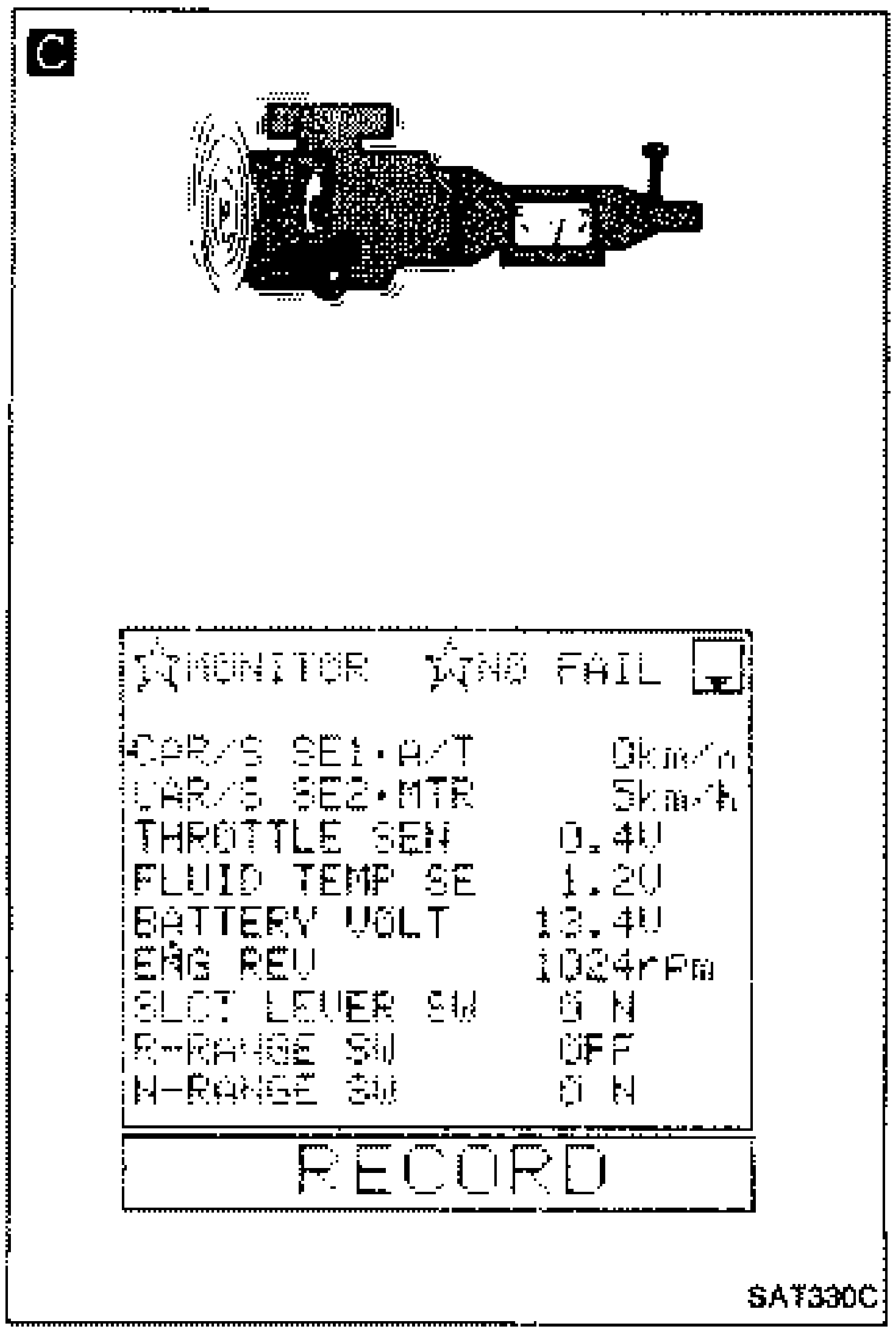
N.G. →

1. Remove control valve cover.
2. Check the following items.
- Fluid temperature sensor
  — Refer to "Electrical Components Inspection".
- Harness continuity of terminal cord assembly

O.K. ↓

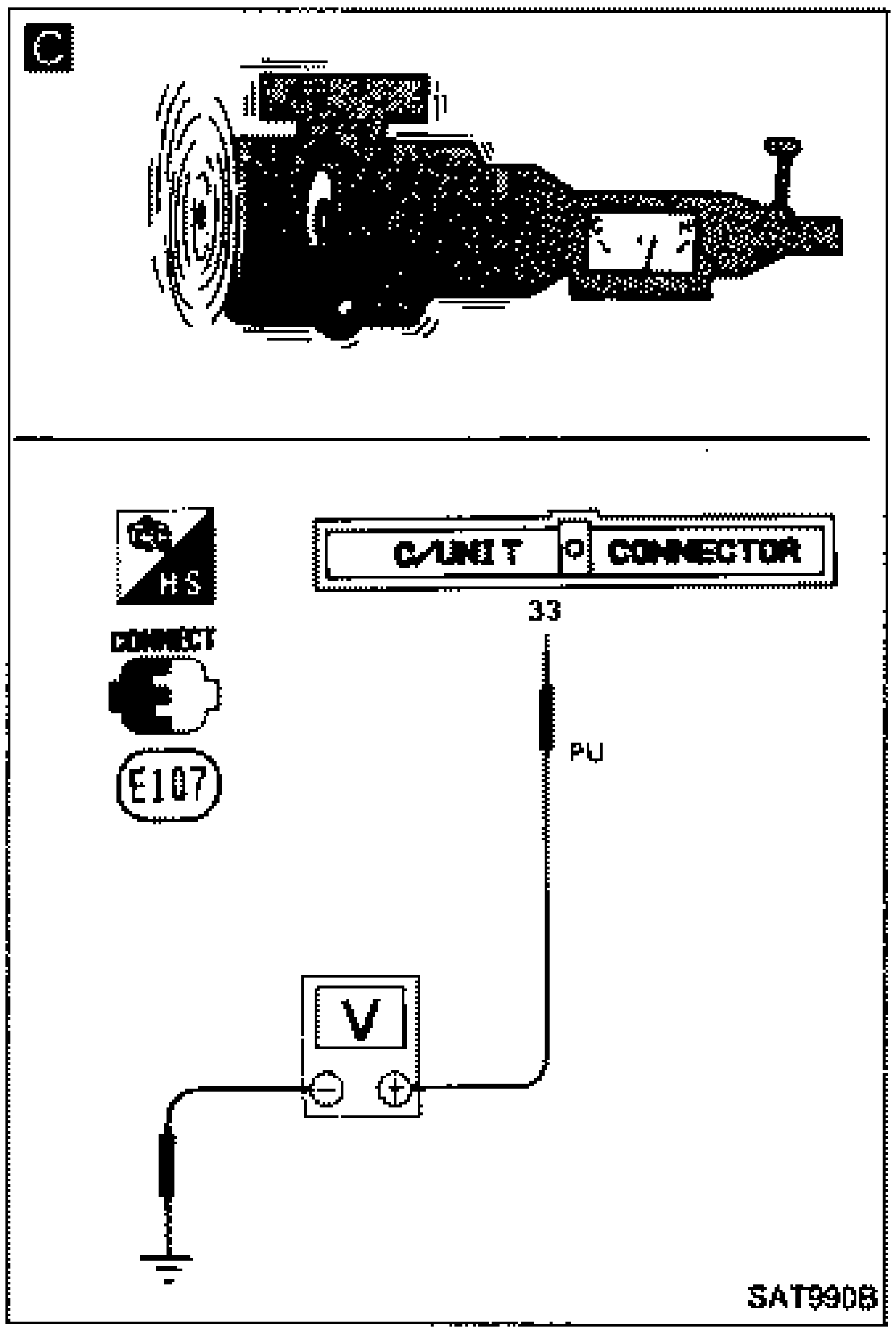
Ⓐ

Self-diagnosis (Cont'd)



```
☆MONITOR    ☆NO FAIL
CAR/S SE1·A/T      0km/h
CAR/S SE2·MTR      5km/h
THROTTLE SEN      0.4V
FLUID TEMP SE     1.2V
BATTERY VOLT     13.4V
ENG REV         1024rpm
SLCT LEVER SW     ON
R-RANGE SW        OFF
N-RANGE SW        ON
        RECORD
```

SAT330C



SAT990B

Ⓐ

CHECK INPUT SIGNAL OF FLUID TEMPERATURE SENSOR.

1.

2.
- Select "E.C.U. INPUT SIGNALS".
- Read out the value of "FLUID TEMPERATURE SENSOR ".

Voltage:
Cold [20°C (68°F)] →
Hot [80°C (176°F)]:
Approximately
1.5V → 0.5V

OR

- 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

N.G. → Check harness continuity between A/T control unit and terminal cord assembly.

O.K. ↓

Perform self-diagnosis after driving for a while.

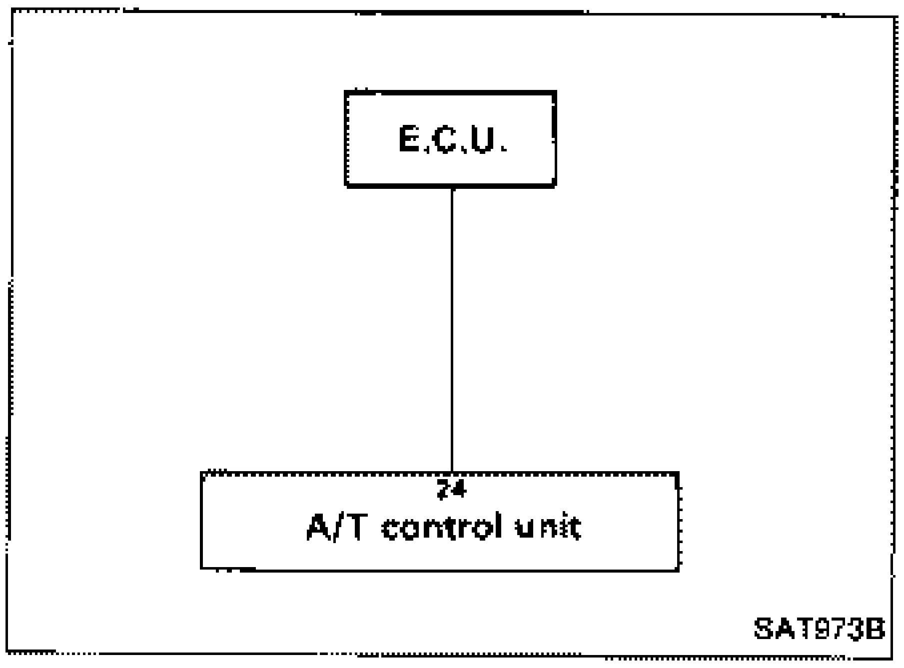
N.G. →
1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

O.K. ↓

INSPECTION END

Self-diagnosis (Cont'd)

ENGINE REVOLUTION SIGNAL CIRCUIT CHECK



Check ignition circuit condition for engine.

- N.G. → Repair or replace. — Refer to section EF & EC.
- O.K. ↓

A **CHECK INPUT SIGNAL.**

1.

2.
- Select "E.C.U. INPUT SIGNALS".
- Read out the value of "ENGINE REVOLUTION".
- Check engine revolution changes according to throttle opening.

OR

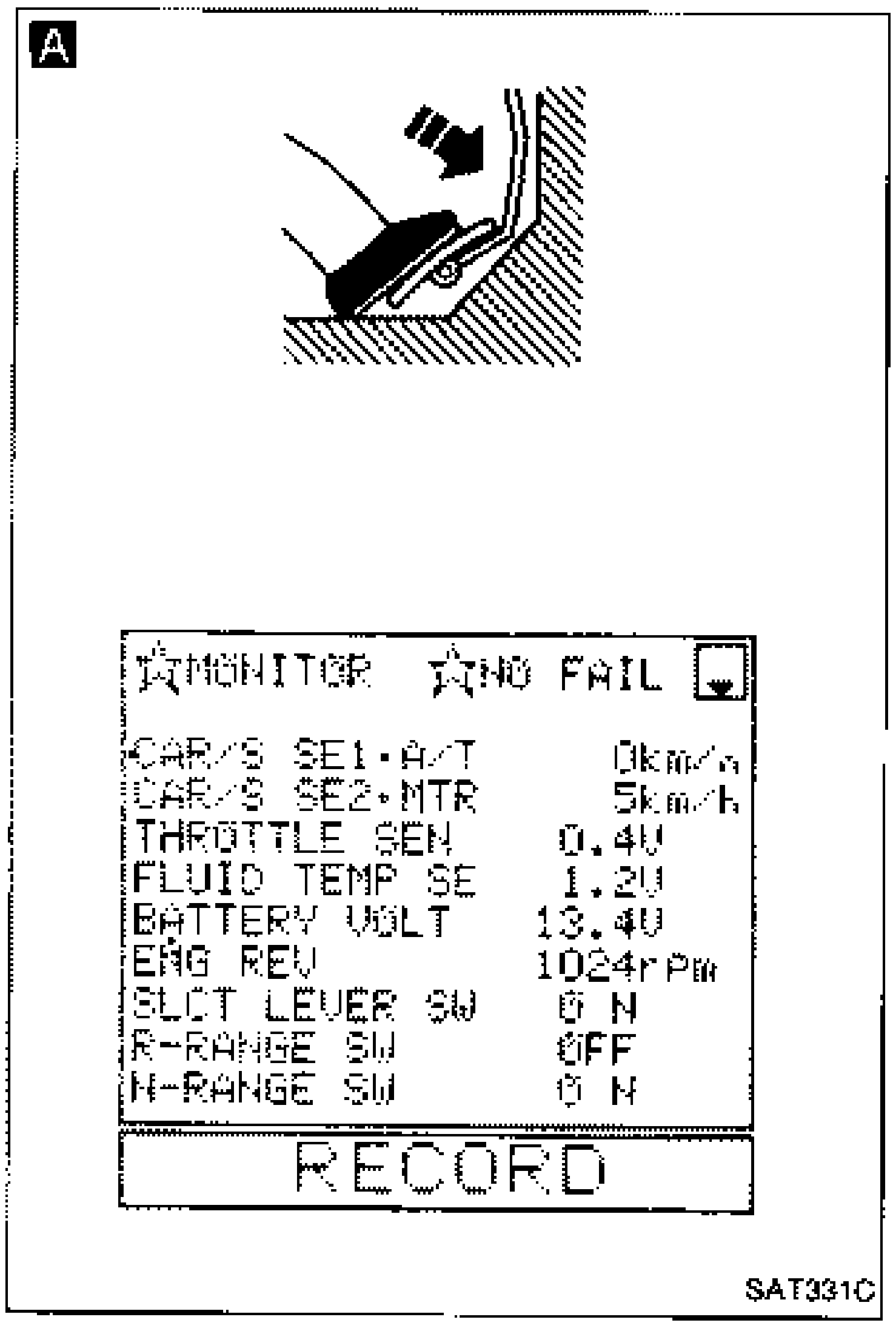
- Check voltage between A/T control unit terminal ㉔ and ground.
  Voltage: 0.9 - 4.5V

- N.G. → Check harness continuity between A/T control unit and E.C.C.S. control unit.
- O.K. ↓

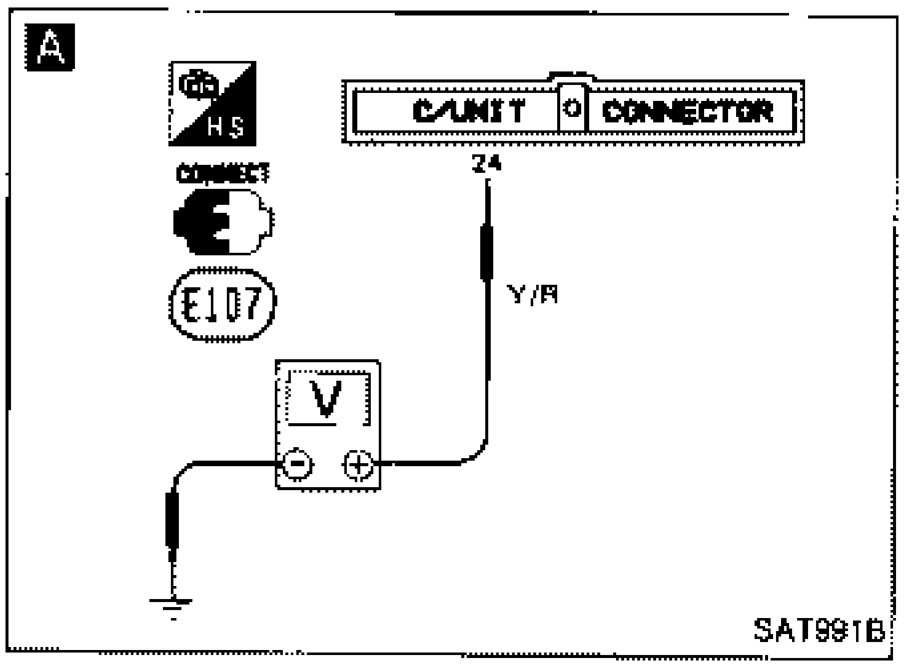
Perform self-diagnosis again after driving for a while.

- N.G. →
  1. Perform A/T control unit input/output signal inspection.
  2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.
- O.K. ↓

INSPECTION END

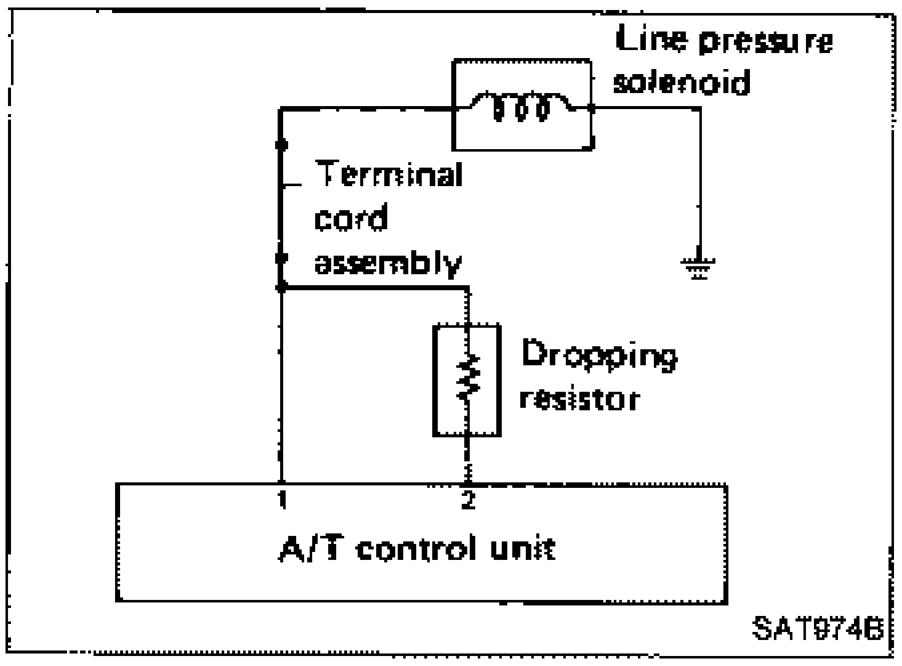


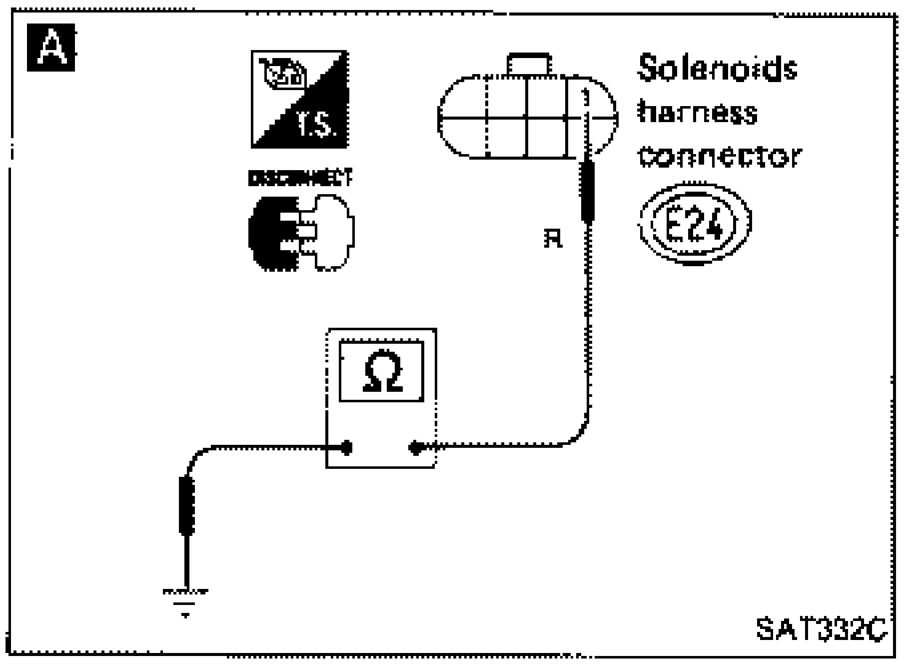
```
☆MONITOR  ☆NO FAIL
CAR/S SE1·A/T      0km/h
CAR/S SE2·MTR      5km/h
THROTTLE SEN     0.4V
FLUID TEMP SE    1.2V
BATTERY VOLT    13.4V
ENG REV         1024rpm
SLCT LEVER SW    ON
R-RANGE SW       OFF
N-RANGE SW       ON
        RECORD
```



Self-diagnosis (Cont'd)

LINE PRESSURE SOLENOID CIRCUIT CHECK





A

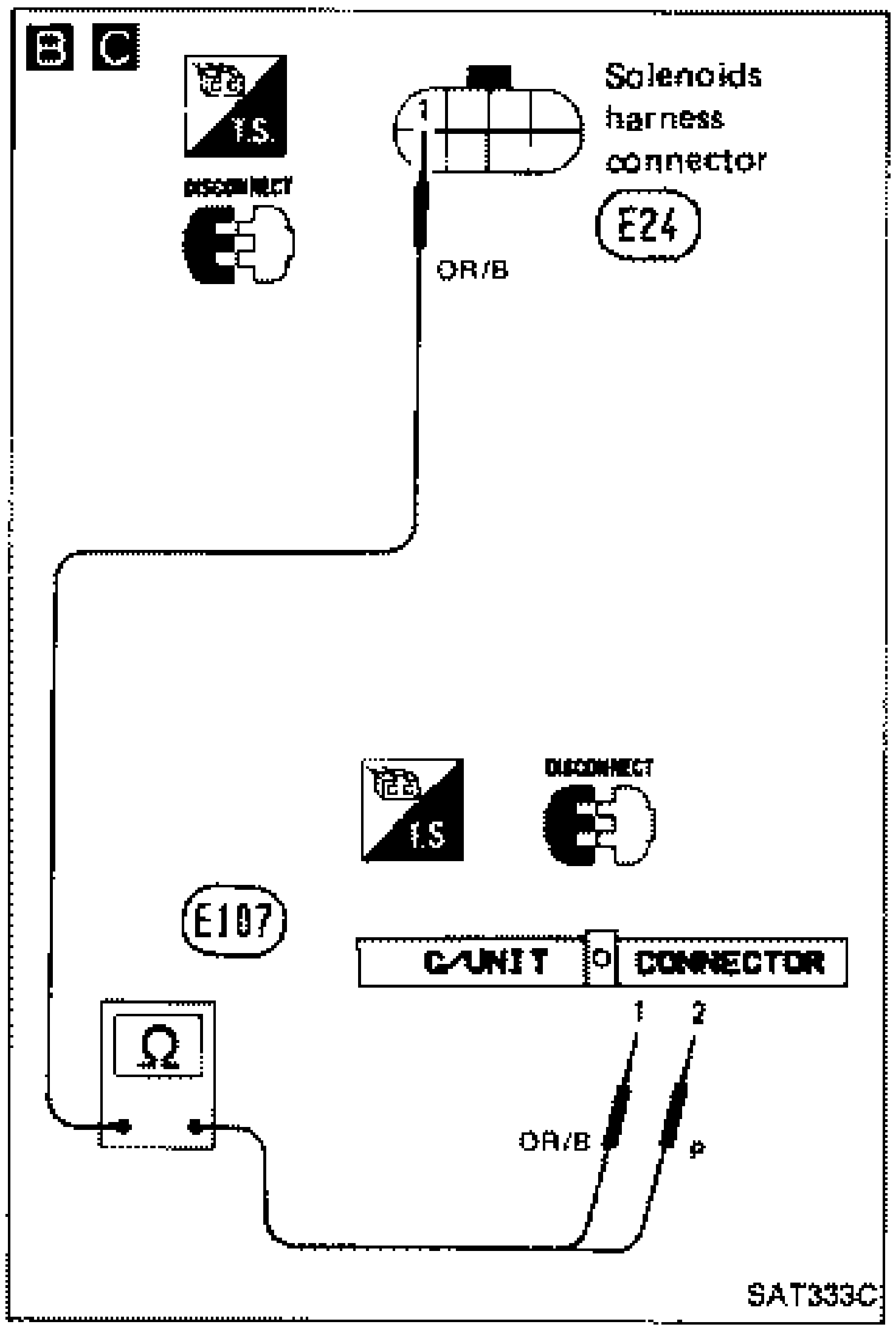
CHECK GROUND CIRCUIT.

1. OFF
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal ① and ground.
   Resistance: 2.5 - 5Ω

N.G. →

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

O.K. ↓



B

CHECK POWER SOURCE CIRCUIT.

1. OFF
2. Disconnect A/T control unit connector.
3. Check resistance between terminal ① and A/T control unit terminal ②.
   Resistance: 11.2 - 12.8Ω

N.G. →

Check the following items.
- Dropping resistor — Refer to "Electrical Components Inspection".
- Harness continuity between A/T control unit ② and terminal cord assembly

O.K. ↓

C

CHECK POWER SOURCE CIRCUIT.

1. OFF
2. Check resistance between terminal ① and A/T control unit terminal ①.
   Resistance:
   Approximately 0Ω
3. Reinstall any part removed.

N.G. →

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

O.K. ↓

Perform self-diagnosis after driving for a while.

N.G. →

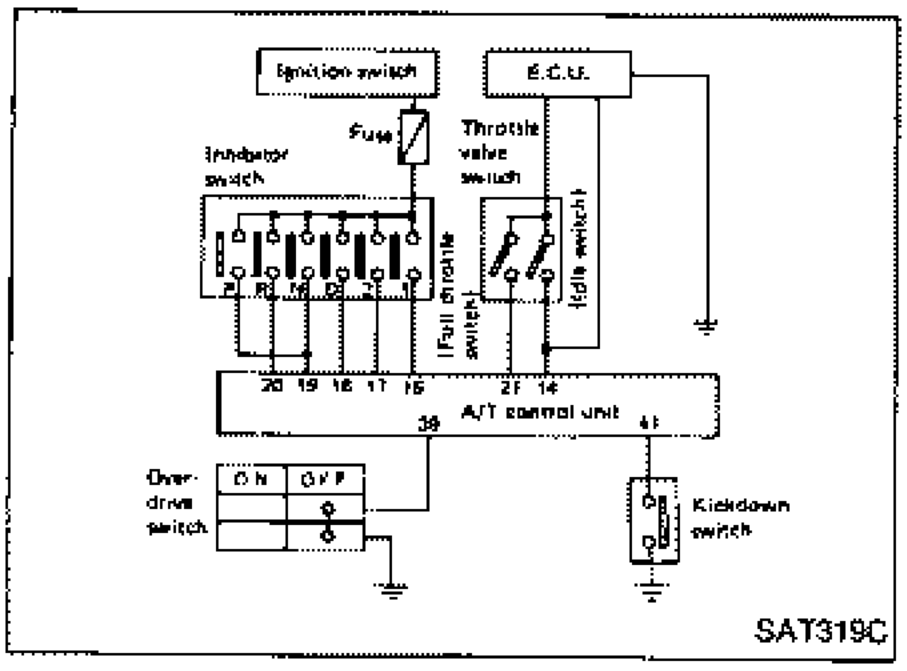
1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

O.K. ↓

INSPECTION END

Self-diagnosis (Cont'd)

INHIBITOR, OVERDRIVE, KICKDOWN AND IDLE SWITCH CIRCUIT CHECKS

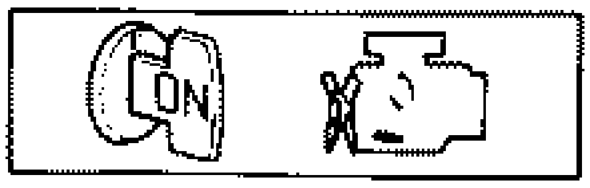


SAT319C

A

CHECK INHIBITOR SWITCH CIRCUIT.

1.



2.

- Select "E.C.U. INPUT signals".
- Read out "R, N, D, 1 and 2 range switches" moving selector lever to each range.
- Check the selector lever position is indicated properly.

OR

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

Voltage:

B: Battery voltage

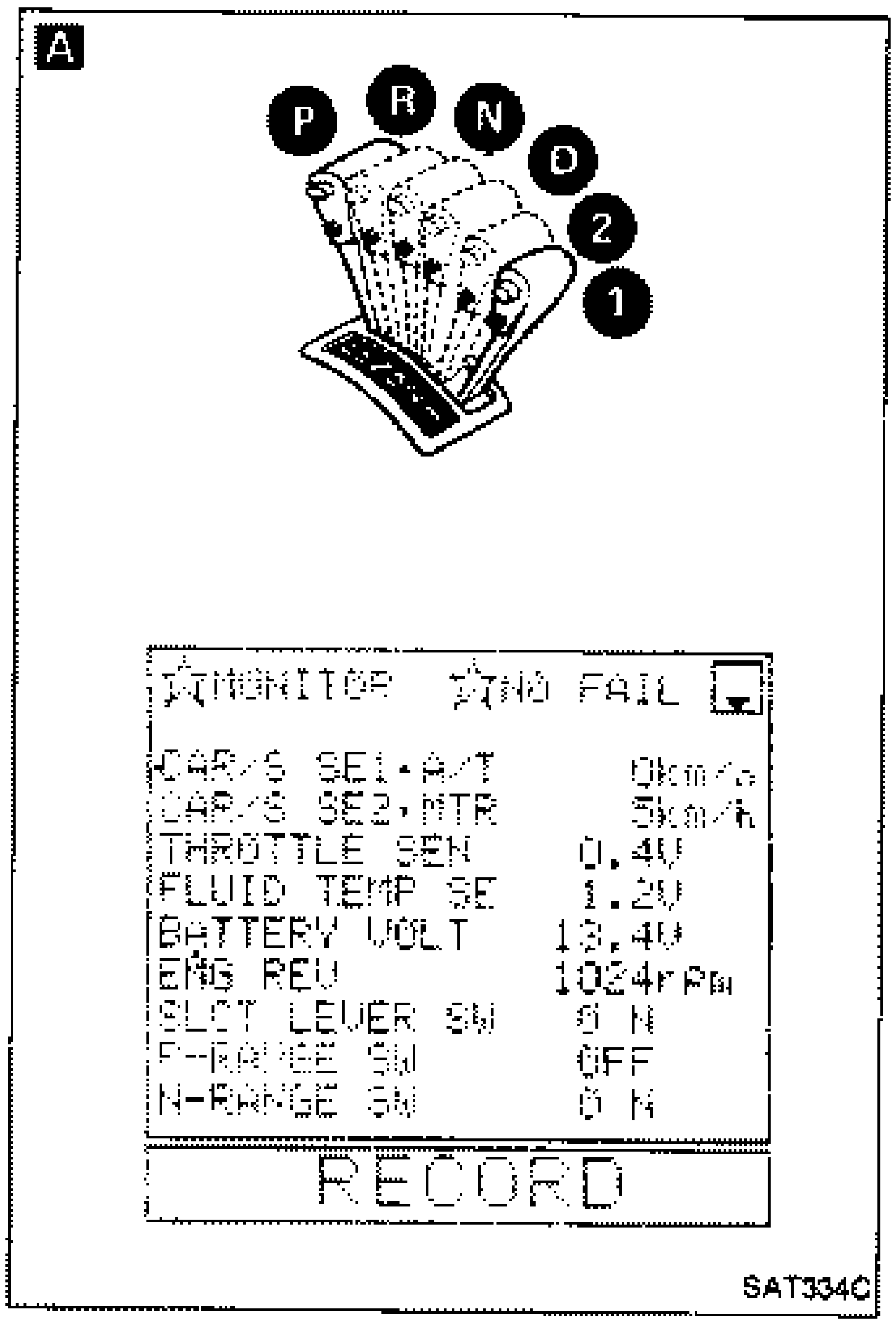
0: 0V

Terminal No. / Lever position	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

N.G. → Check the following items.

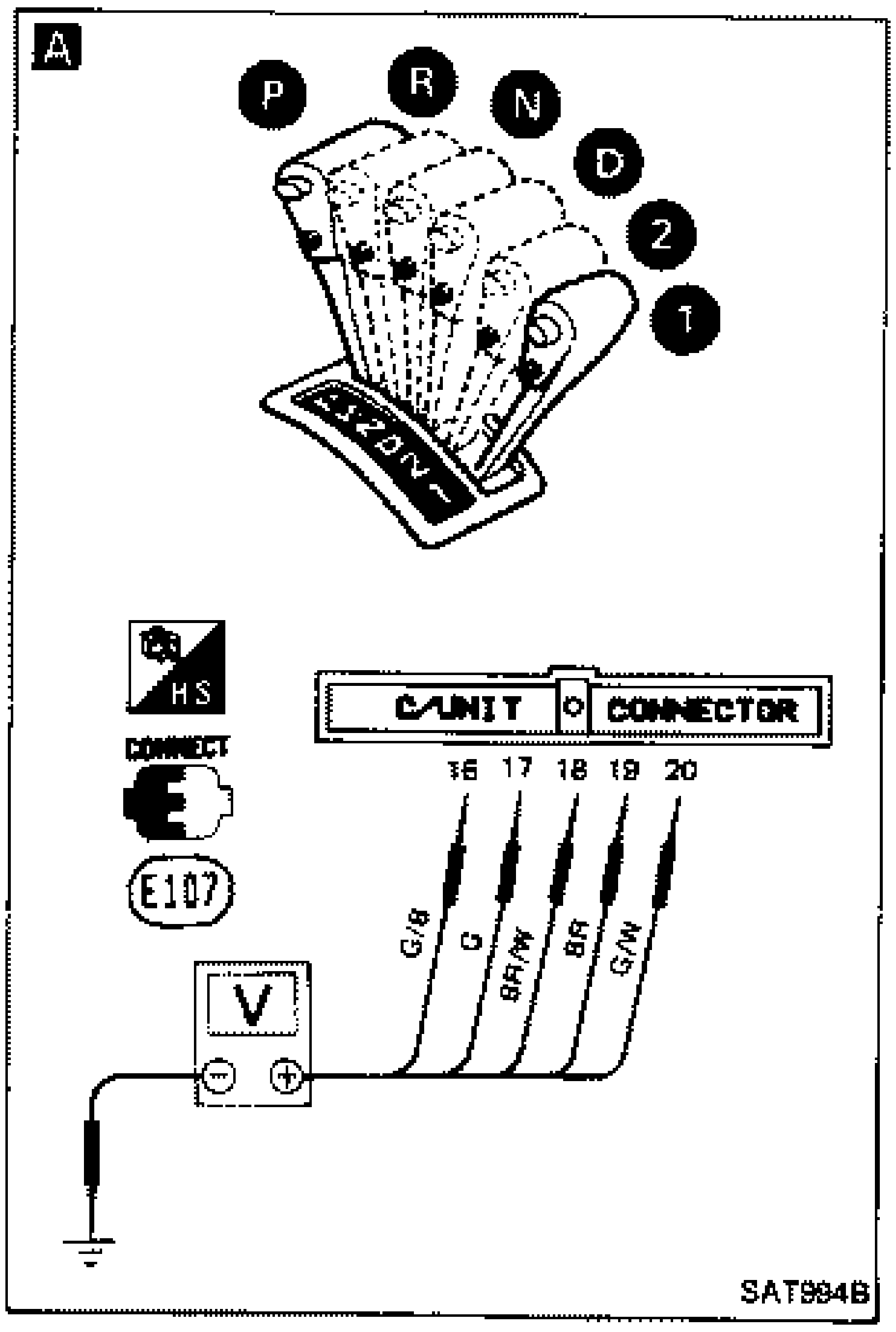
- Inhibitor switch — Refer to "Electrical Components Inspection".
- Harness continuity between ignition switch and inhibitor switch
- Harness continuity between inhibitor switch and A/T control unit

O.K. → Ⓐ

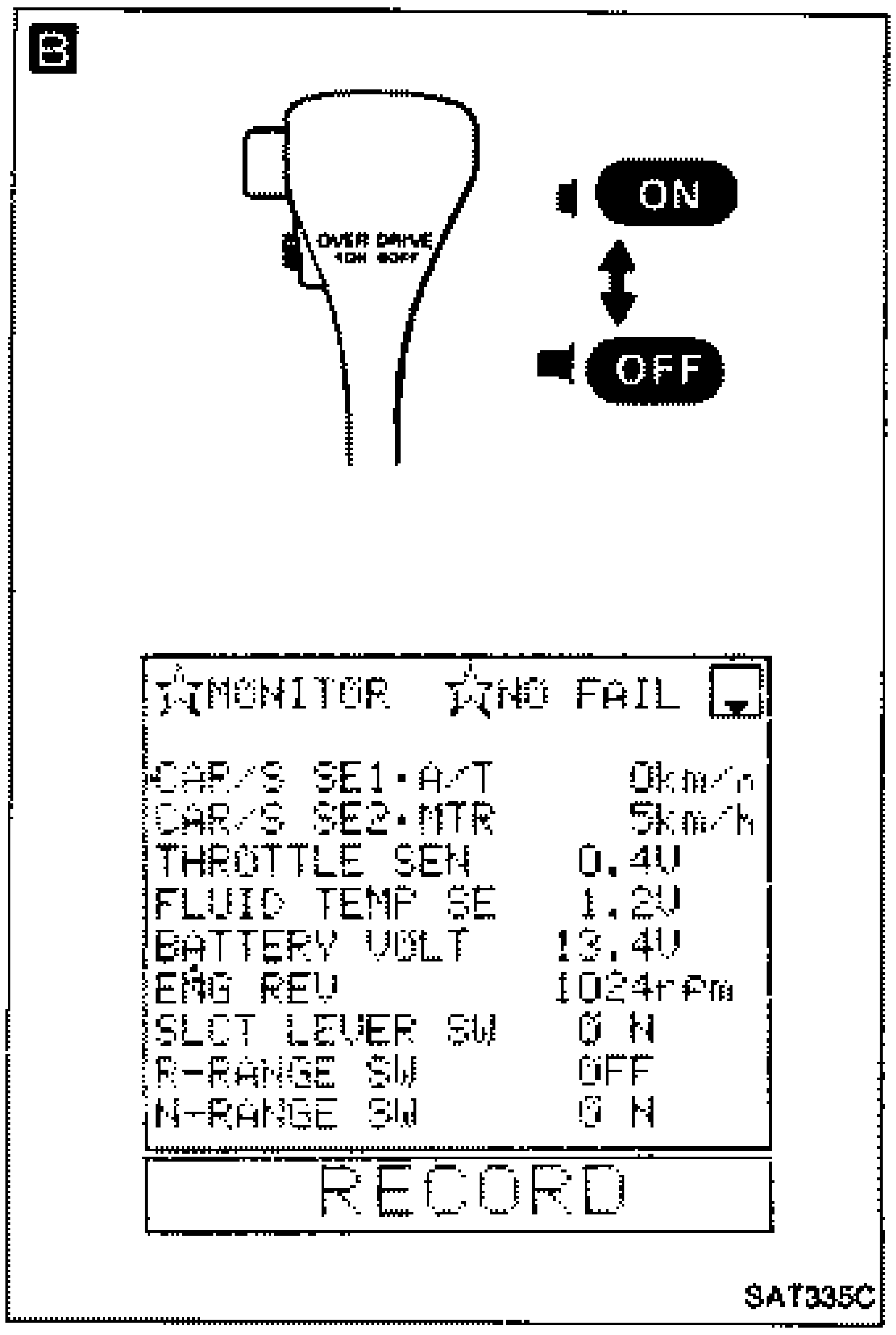


```
☆MONITOR  ☆NO FAIL
CAR/S SE1·A/T       0km/h
CAR/S SE2,MTR       5km/h
THROTTLE SEN      0.4V
FLUID TEMP SE     1.2V
BATTERY VOLT     13.4V
ENG REV          1024rpm
SLCT LEVER SW     ON
P-RANGE SW        OFF
N-RANGE SW        ON
           RECORD
```

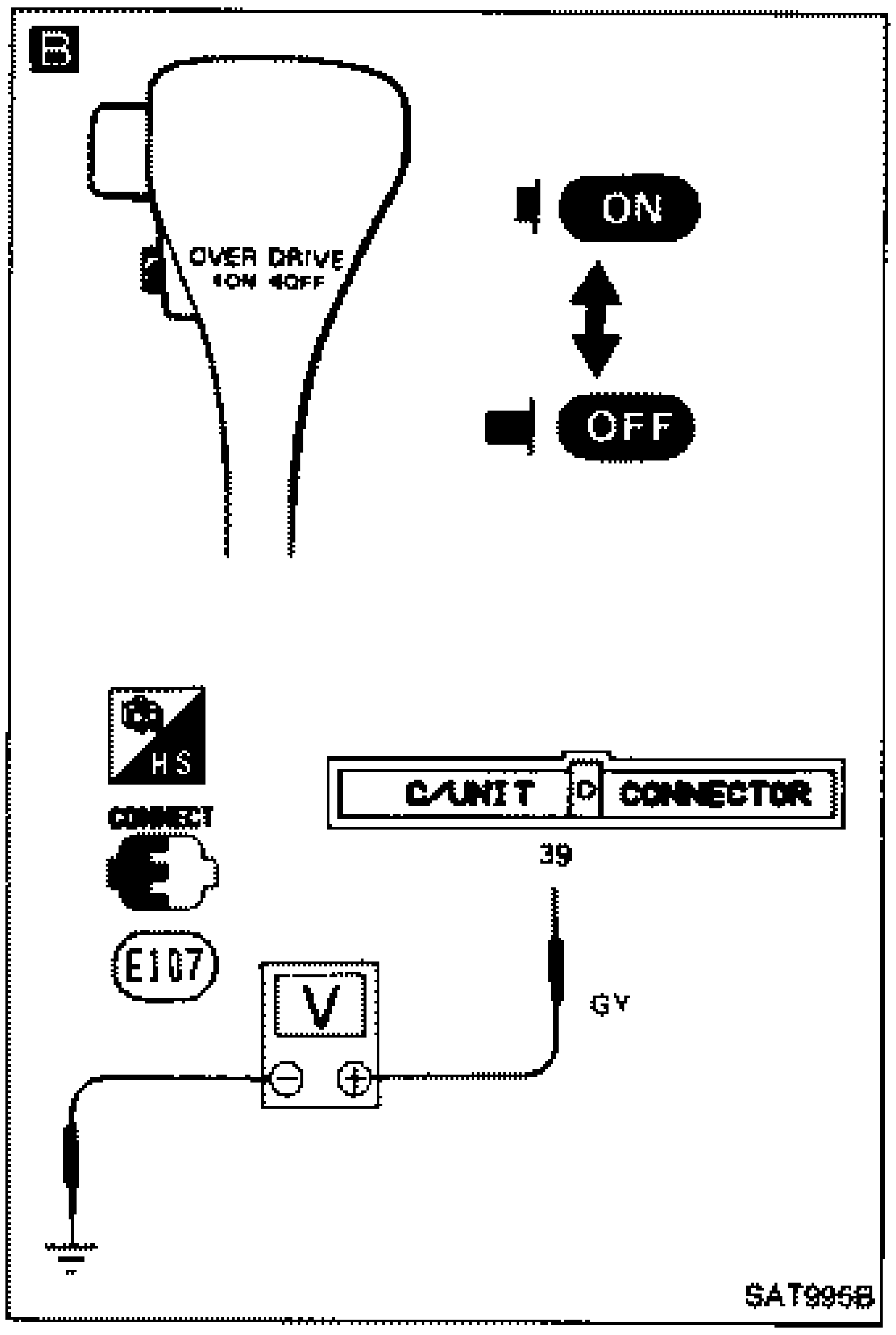
SAT334C



SAT984B



```
☆MONITOR   ☆NO FAIL
CAR/S SE1·A/T     0km/h
CAR/S SE2·MTR     5km/h
THROTTLE SEN    0.4V
FLUID TEMP SE   1.2V
BATTERY VOLT   13.4V
ENG REV        1024rpm
SLCT LEVER SW   ON
R-RANGE SW      OFF
N-RANGE SW      ON
        RECORD
```



Ⓐ

B

CHECK OVERDRIVE SWITCH CIRCUIT.

1. ON

2.
- Select "E.C.U. INPUT SIGNALS".
- Read out "SELECTOR LEVER SWITCH (Overdrive switch)".
- Check the selector lever switch position is indicated properly. (Selector lever switch "ON" displayed on CONSULT means overdrive "OFF".)

OR

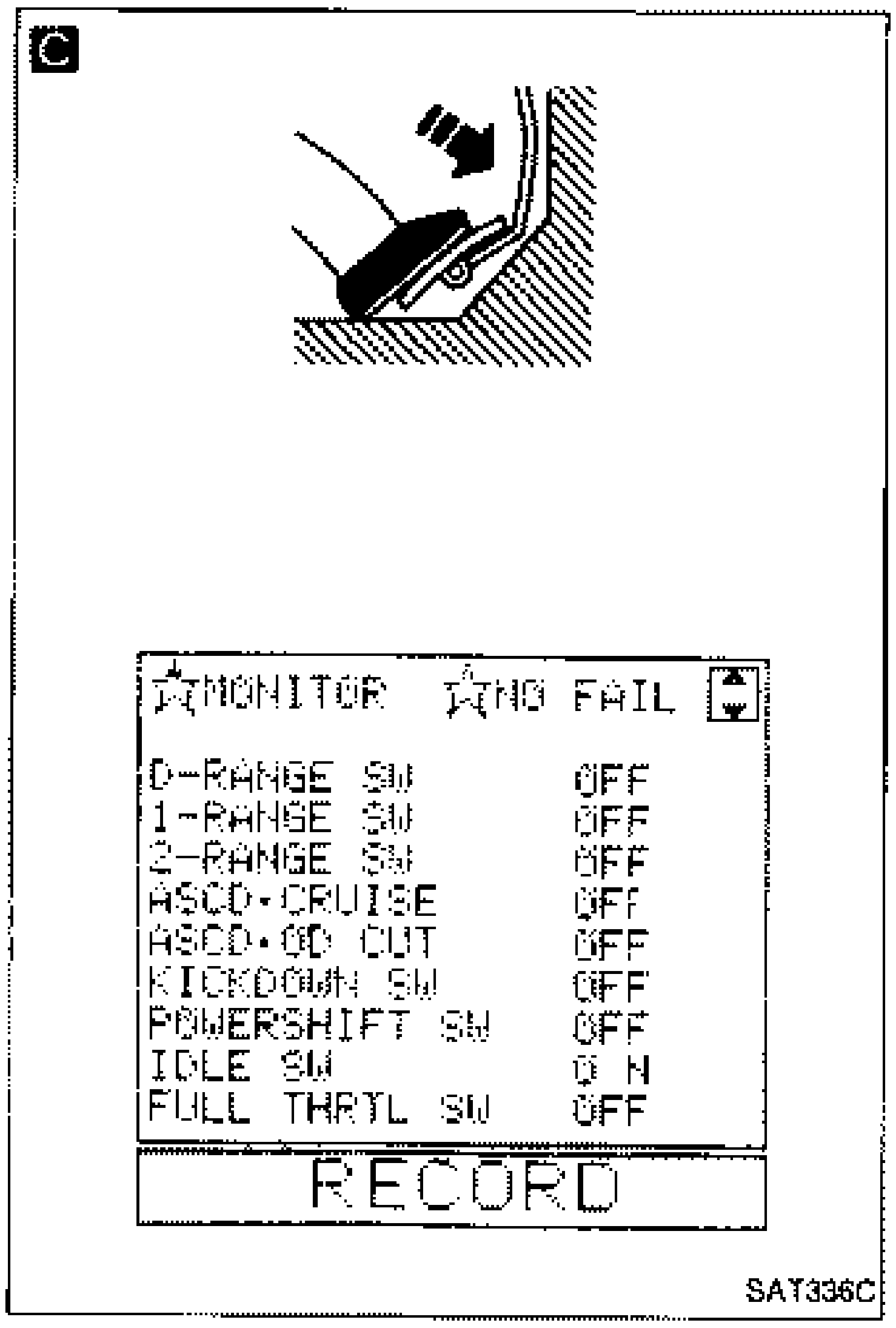
- Check voltage between A/T control unit terminal ㊴ and ground when overdrive switch is in "ON" position and in "OFF" position.

Switch position	Voltage
ON	Battery voltage
OFF	1V or less

N.G. → Check the following items.
- Overdrive switch — Refer to "Electrical Components Inspection".
- Harness continuity between A/T control unit and overdrive switch
- Harness continuity of ground circuit for overdrive switch

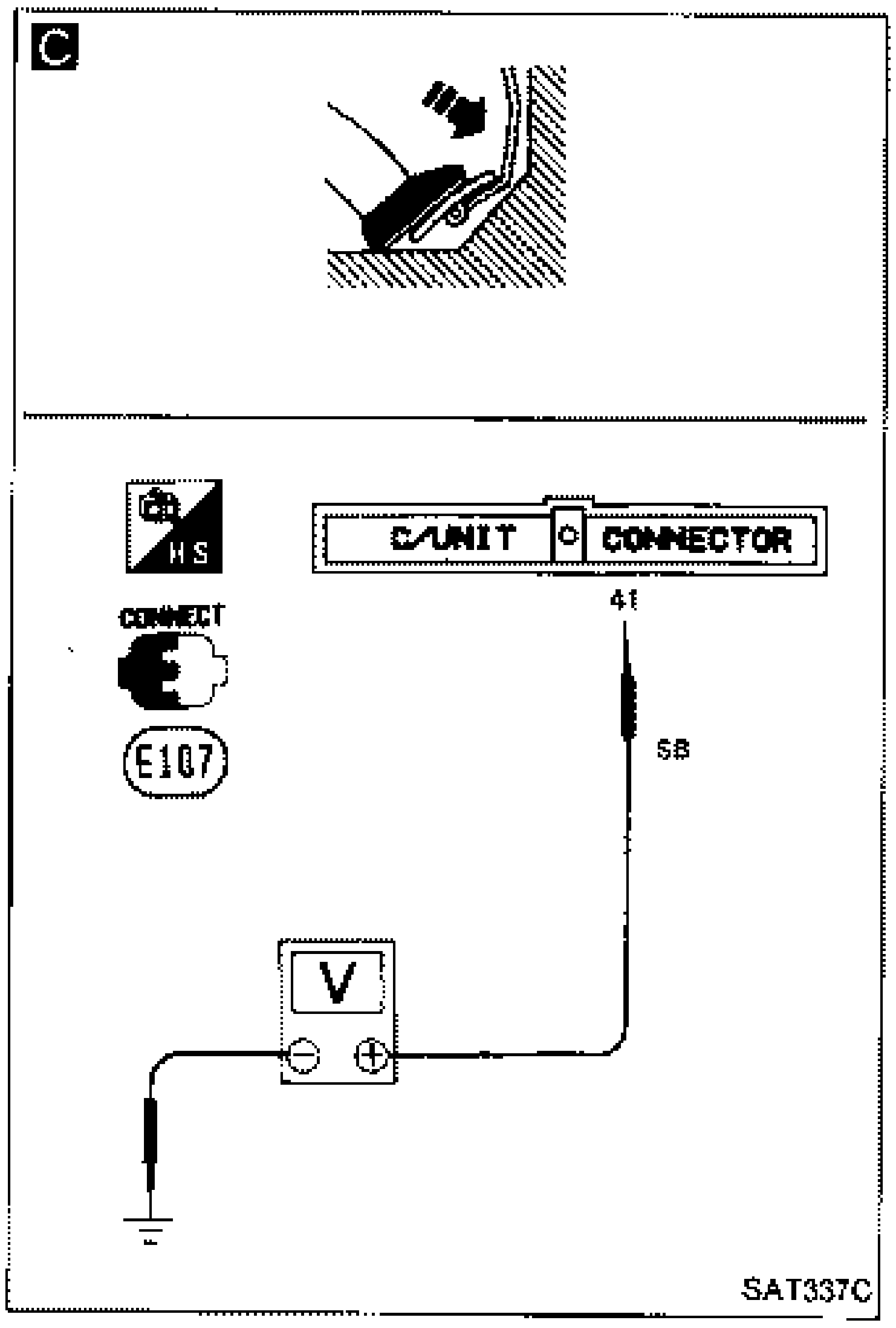
O.K. → Ⓑ

Self-diagnosis (Cont'd)



```
☆MONITOR  ☆NO FAIL
D-RANGE SW        OFF
1-RANGE SW        OFF
2-RANGE SW        OFF
ASCD·CRUISE       OFF
ASCD·OD CUT       OFF
KICKDOWN SW       OFF
POWERSHIFT SW     OFF
IDLE SW           ON
FULL THRTL SW     OFF
      RECORD
```

SAT336C



SAT337C

Ⓑ

C **CHECK KICKDOWN SWITCH CIRCUIT.**

1. ON

2.
- Select "E.C.U. INPUT SIGNALS".
- Read out "KICKDOWN SWITCH" depressing accelerator pedal fully.
- Check kickdown switch position is indicated properly.

OR

- Check voltage between A/T control unit terminal ㊶ and ground while depressing accelerator pedal slowly. (after warming up engine)

Voltage:

When releasing accelerator pedal:
3 - 8V

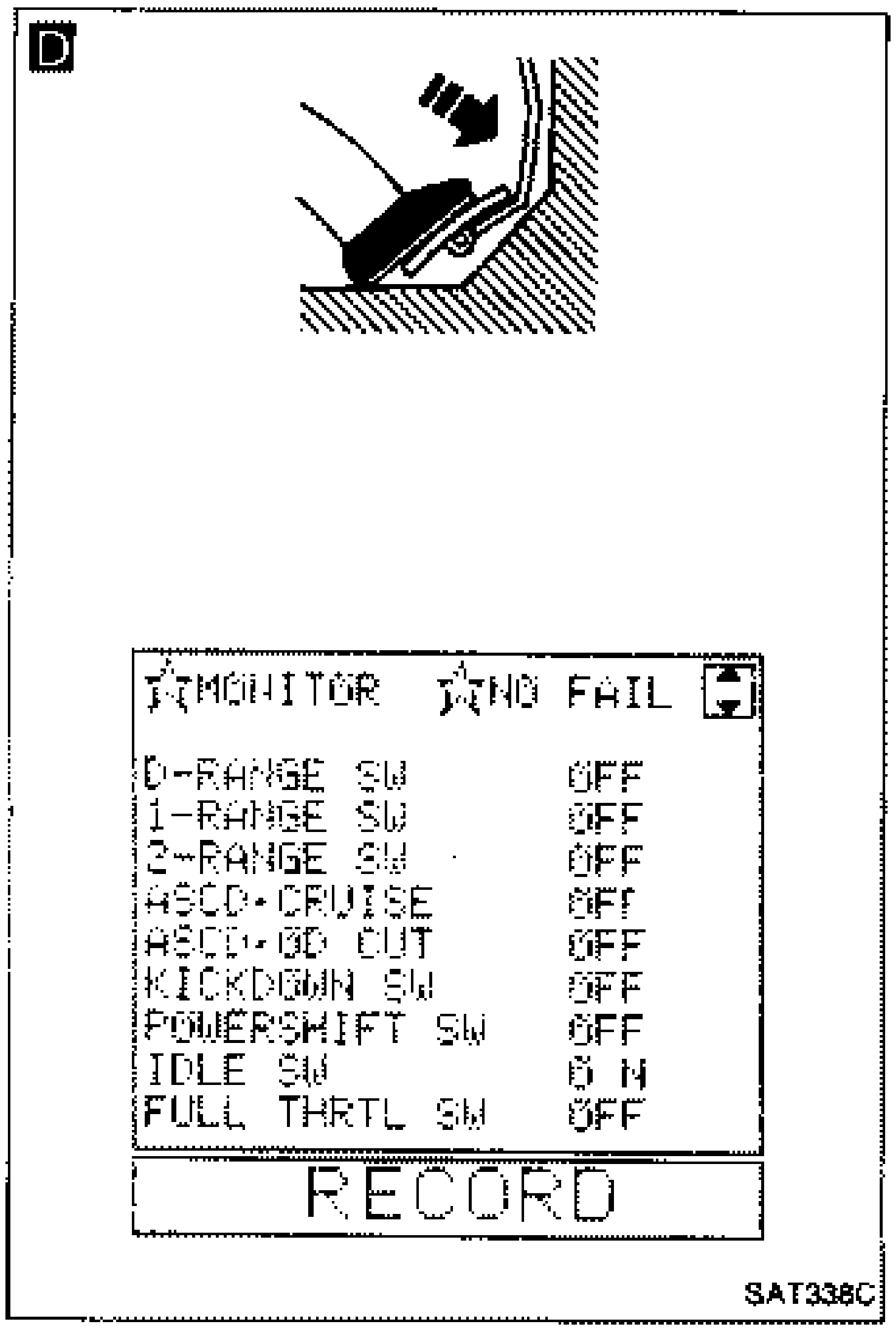
When depressing accelerator pedal fully:
1V or less

N.G. → Check the following items.
- Kickdown switch
- Harness continuity between A/T control unit and kickdown switch
- Harness continuity of ground circuit for kickdown switch

O.K. ↓

Ⓒ

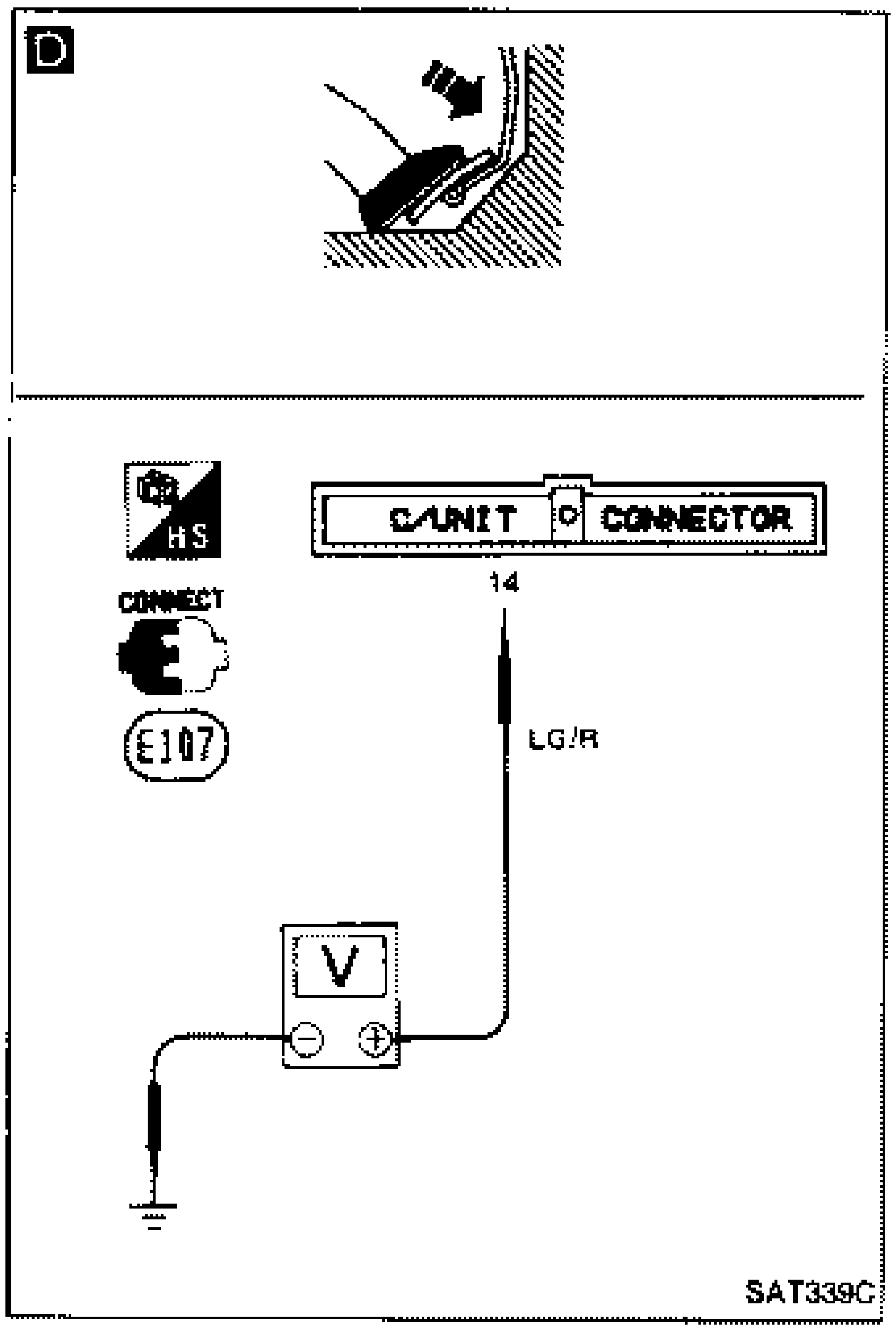
Ⓓ



```
☆MONITOR  ☆NO FAIL
D-RANGE SW        OFF
1-RANGE SW        OFF
2-RANGE SW        OFF
ASCD·CRUISE       OFF
ASCD·OD CUT       OFF
KICKDOWN SW       OFF
POWERSHIFT SW     OFF
IDLE SW           ON
FULL THRTL SW     OFF
        RECORD
```

SAT338C

Ⓓ



SAT339C

Ⓒ

Ⓓ

CHECK IDLE SWITCH CIRCUIT.

1.

2.

- Select "E.C.U. INPUT SIGNALS".
- Read out "IDLE SWITCH" depressing and releasing accelerator pedal.
- Check idle switch changes ON or OFF.

OR

- Check voltage between A/T control unit terminal ⑭ and ground while depressing accelerator pedal slowly.

Voltage:

When releasing accelerator pedal:

8 - 15V

When depressing accelerator pedal fully:

1V or less

N.G. → Perform self-diagnosis (Mode IV) for engine control. Check idle switch circuit.

- O.K. → Check harness continuity between A/T control unit and idle switch.
- N.G. → Check idle switch circuit for engine control. — Refer to section EF & EC.

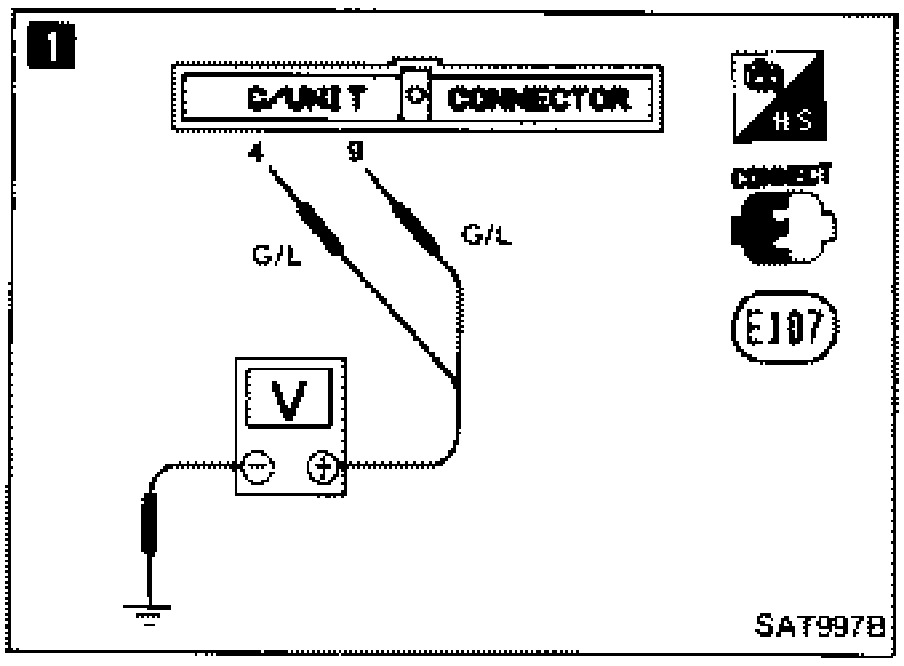
O.K. → Perform self-diagnosis again after driving for a while.

- N.G. →
  1. Perform A/T control unit input/output signal inspection.
  2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.
- O.K. → **INSPECTION END**

Diagnostic Procedure 1

SYMPTOM: A/T CHECK lamp does not come on for about 2 seconds when turning ignition switch to "ON".

1



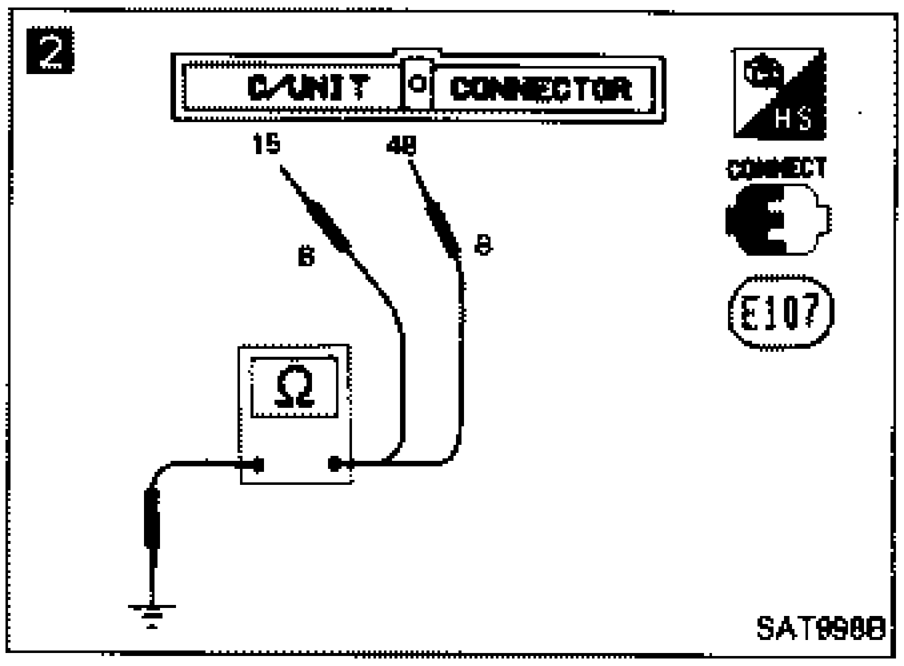
CHECK A/T CONTROL UNIT POWER SOURCE.

1. ON
2. Check voltage between A/T control unit terminals ④, ⑨ and ground.
   Battery voltage should exist.

N.G. → Check the following items.
- Harness continuity between ignition switch and A/T control unit.
- Ignition switch and fuse — Refer to section EL.

O.K. ↓

2



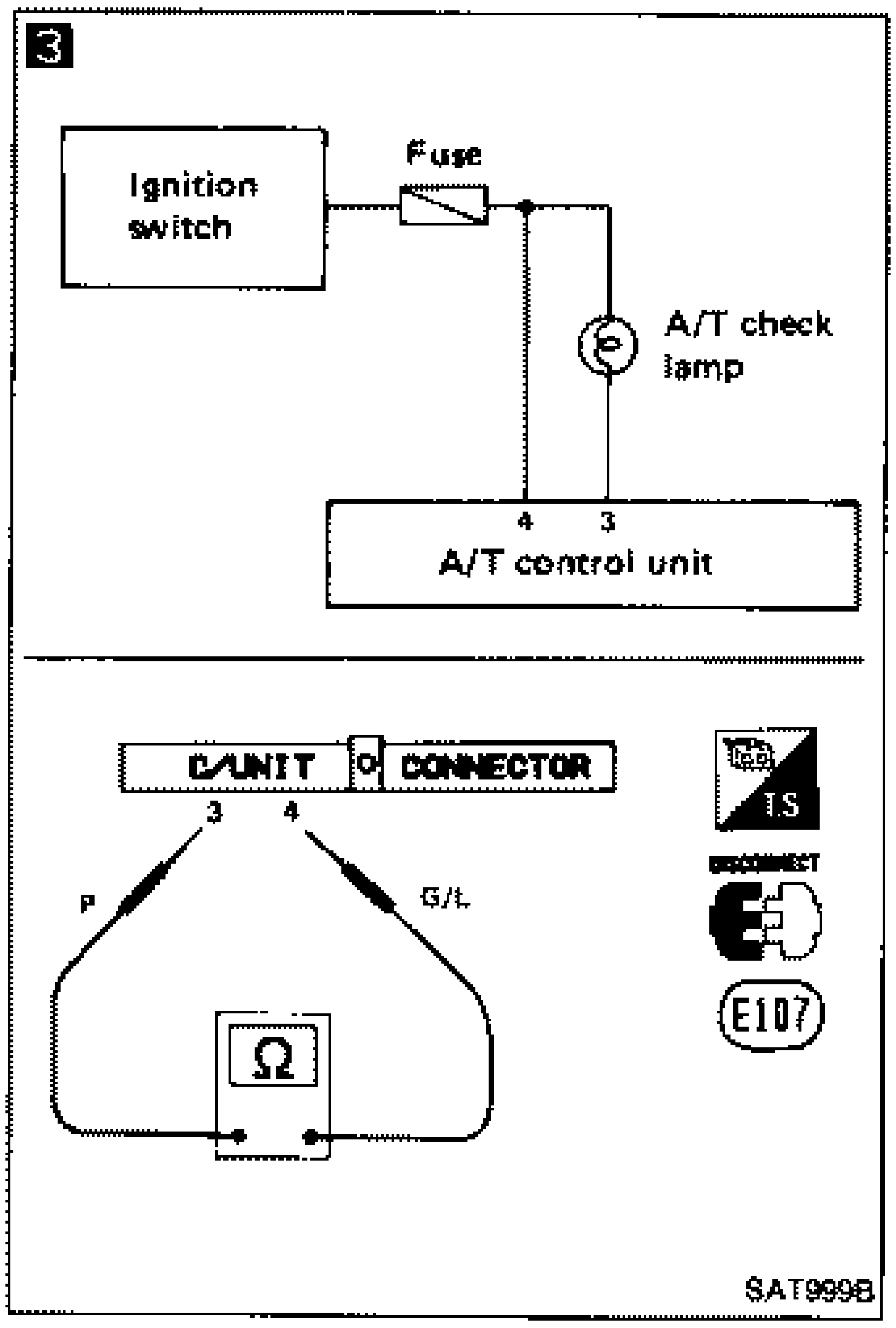
CHECK A/T CONTROL UNIT GROUND CIRCUIT.

1. OFF
2. Disconnect A/T control unit connector.
3. Check resistance between A/T control unit terminals ⑮, ㊽ and ground.
   Resistance:
   Approximately 0Ω

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

O.K. ↓

3



CHECK LAMP CIRCUIT.

1. OFF
2. Disconnect A/T control unit connector.
3. Check resistance between A/T control unit terminals ③ and ④.
   Resistance: 50 - 100Ω
4. Reinstall any part removed.

N.G. → Check the following items.
- A/T check lamp
- Harness continuity between ignition switch and A/T check lamp
- Harness continuity between A/T check lamp and A/T control unit

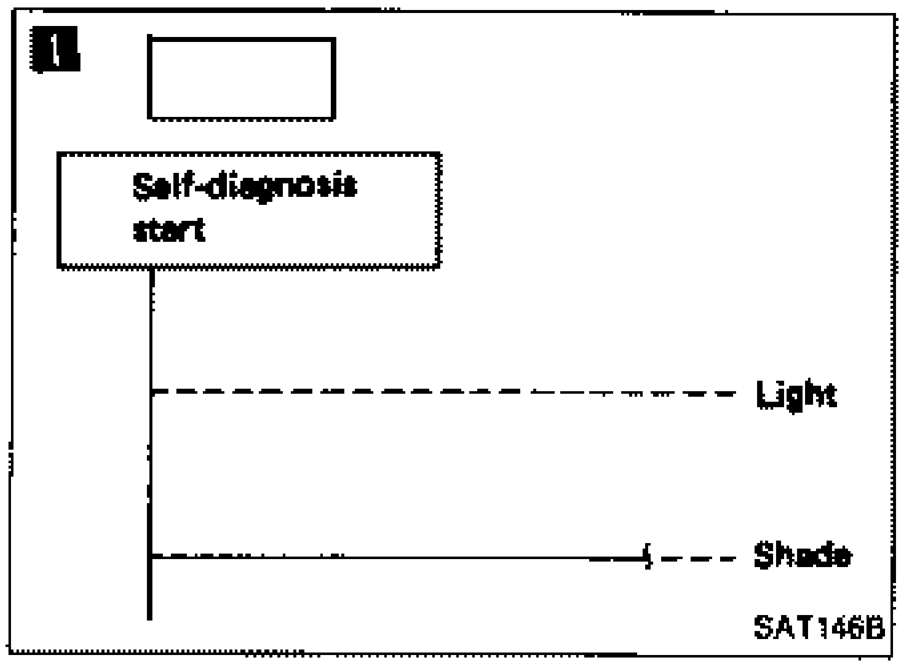
O.K. ↓

Check again.

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

O.K. ↓

INSPECTION END



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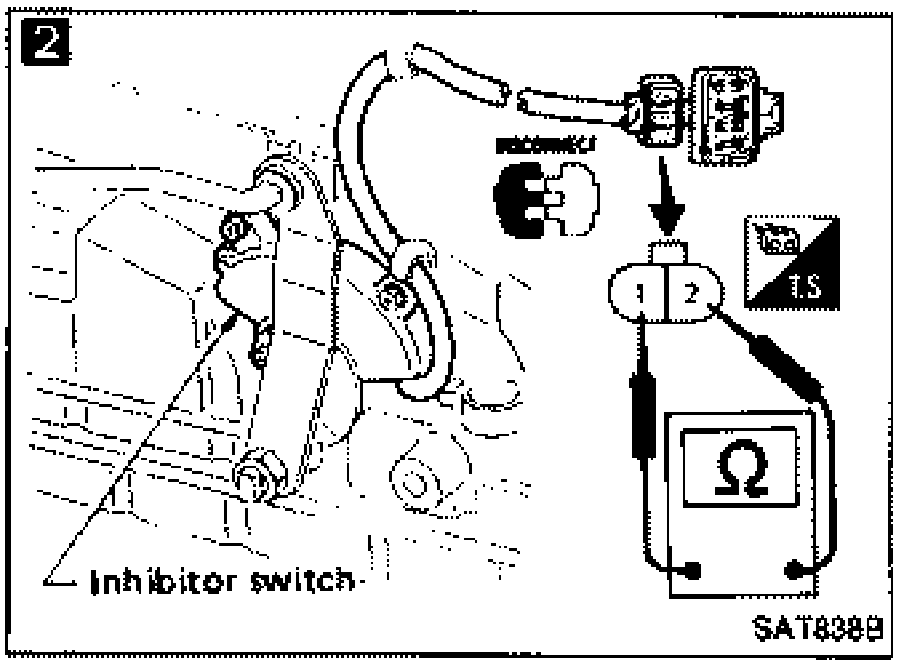


SAT838B

Diagnostic Procedure 2

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

Does "E.C.U. INPUT SIGNALS" show damage to inhibitor switch circuit?

OR

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

Yes → Check inhibitor switch circuit. — Refer to "Self-diagnosis".

No ↓

2 Check continuity of inhibitor switch 2-pin connector. — Refer to "Electrical Components Inspection".

N.G. → Repair or replace inhibitor switch.

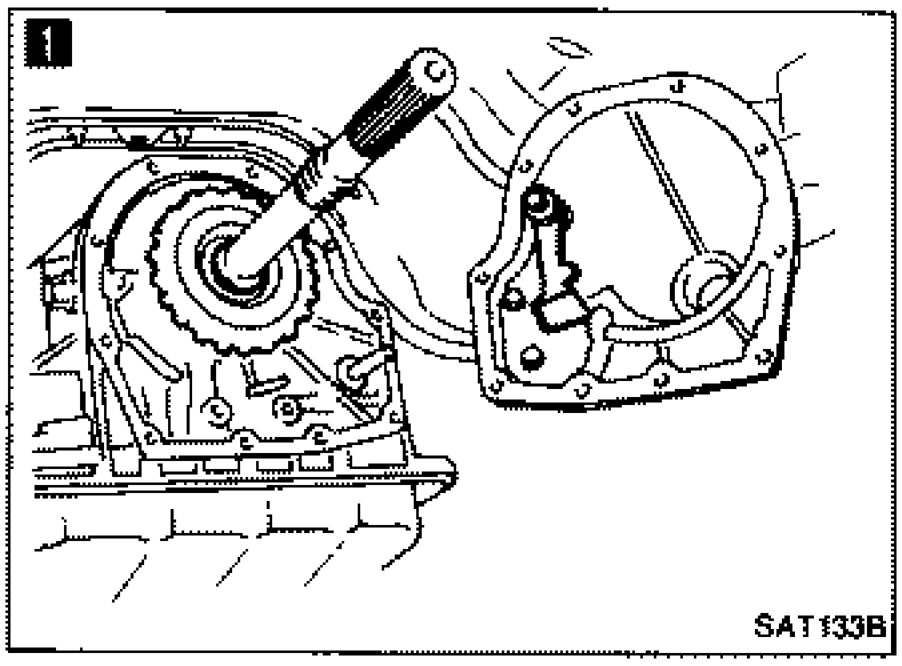
O.K. ↓

Check starting system. — Refer to section EL.

N.G. → Repair or replace damaged parts.

O.K. ↓

INSPECTION END



SAT133B

Diagnostic Procedure 3

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

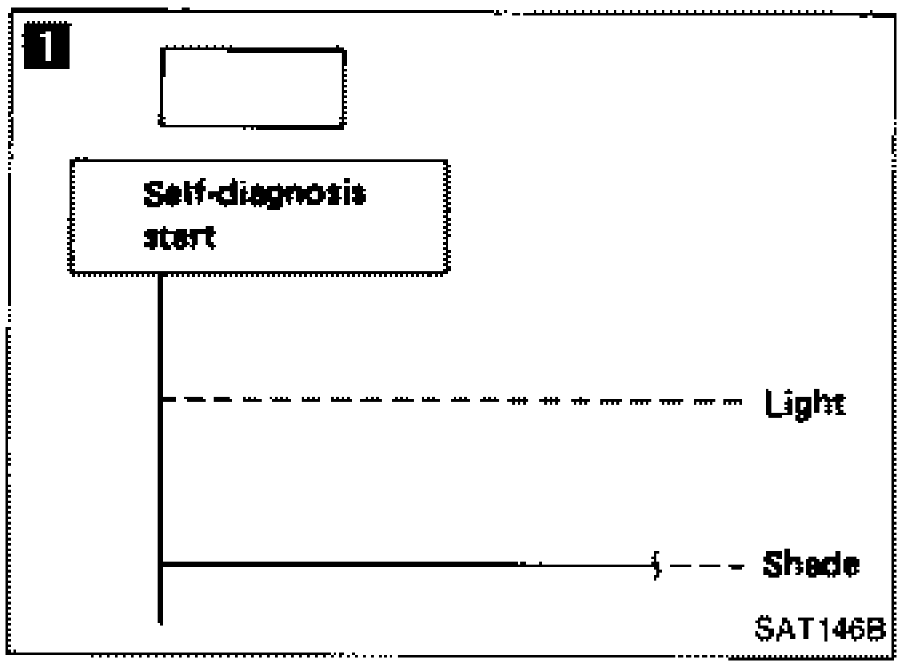
1 Check parking components. — Refer to "ON-VEHICLE SERVICE".

N.G. → Repair or replace damaged parts.

O.K. ↓

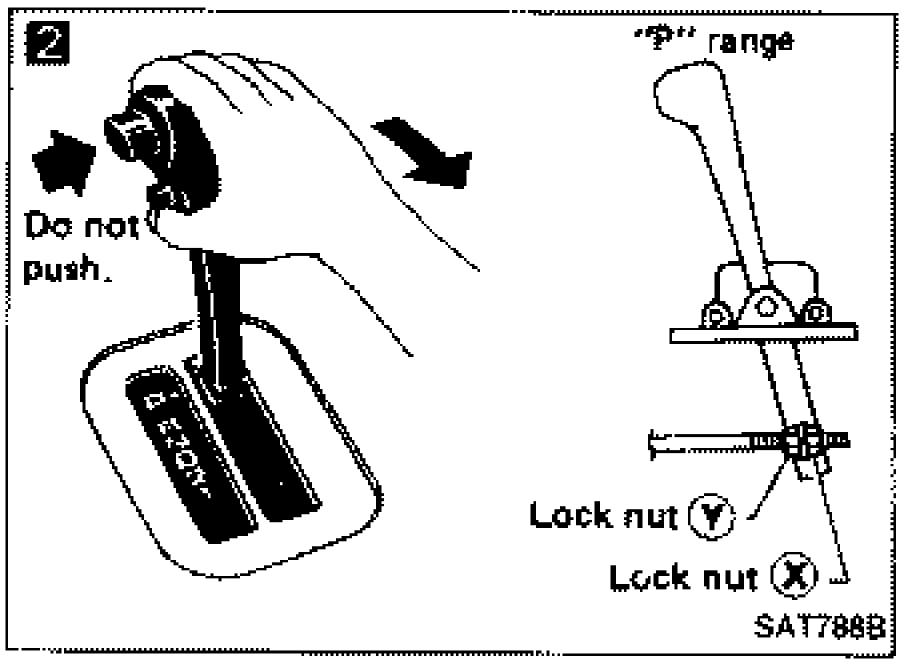
INSPECTION END

1



SAT146B

2



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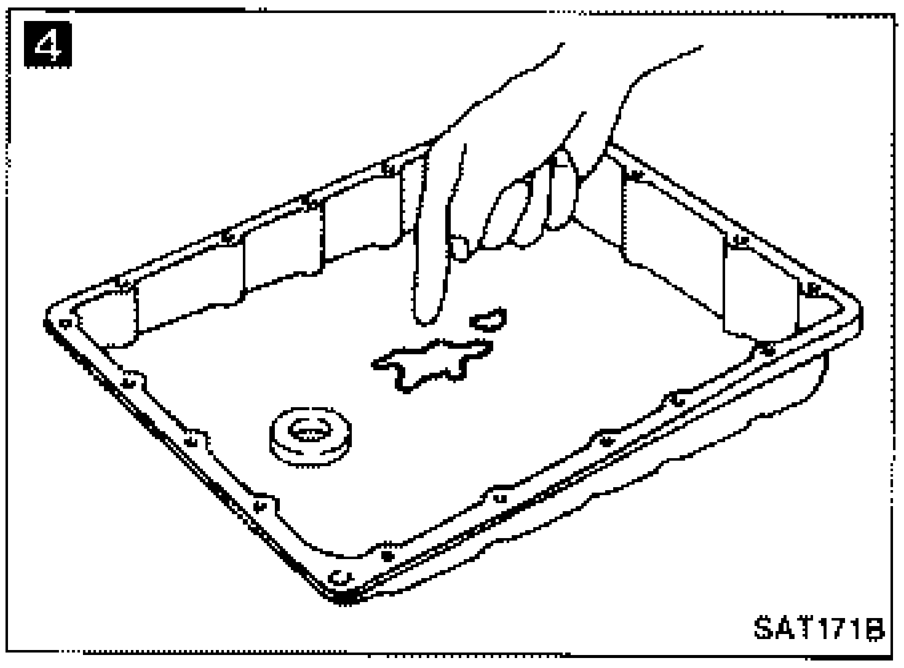
3

SAT638A

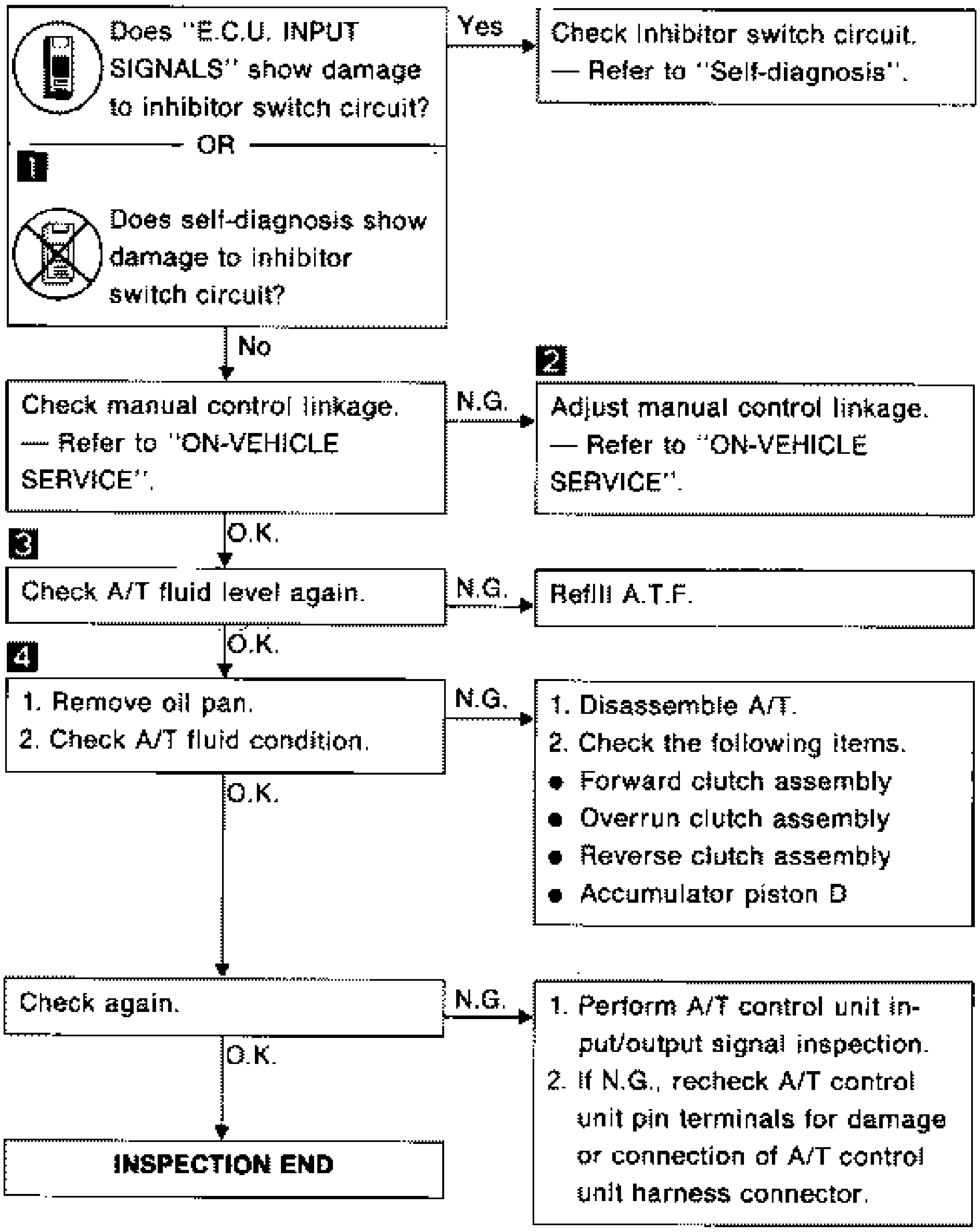
4



SAT171B

Diagnostic Procedure 4

SYMPTOM: Vehicle moves forward or backward when selecting "N" range.



Does "E.C.U. INPUT SIGNALS" show damage to inhibitor switch circuit?

OR

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

Yes → Check inhibitor switch circuit. — Refer to "Self-diagnosis".

No ↓

Check manual control linkage. — Refer to "ON-VEHICLE SERVICE".

N.G. → 2 Adjust manual control linkage. — Refer to "ON-VEHICLE SERVICE".

O.K. ↓

3 Check A/T fluid level again.

N.G. → Refill A.T.F.

O.K. ↓

4
1. Remove oil pan.
2. Check A/T fluid condition.

N.G. →
1. Disassemble A/T.
2. Check the following items.
- Forward clutch assembly
- Overrun clutch assembly
- Reverse clutch assembly
- Accumulator piston D

O.K. ↓

Check again.

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

O.K. ↓

INSPECTION END

Diagnostic Procedure 5

SYMPTOM: There is large shock when changing from "N" to "R" range.

1
Does self-diagnosis show damage to throttle sensor, line pressure solenoid or fluid temperature sensor circuit?

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

No ↓

3
Check throttle sensor. — Refer to section EF & EC.

N.G. → Repair or replace throttle sensor.

O.K. ↓

4
Check line pressure at idle with selector lever in "D" range. — Refer to "PRESSURE TESTING".

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

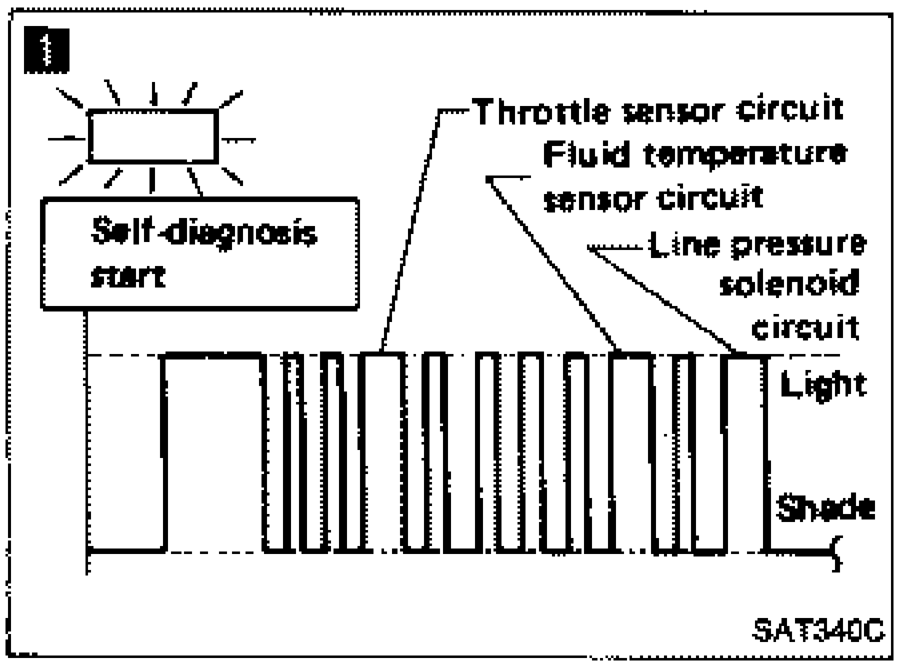
O.K. ↓

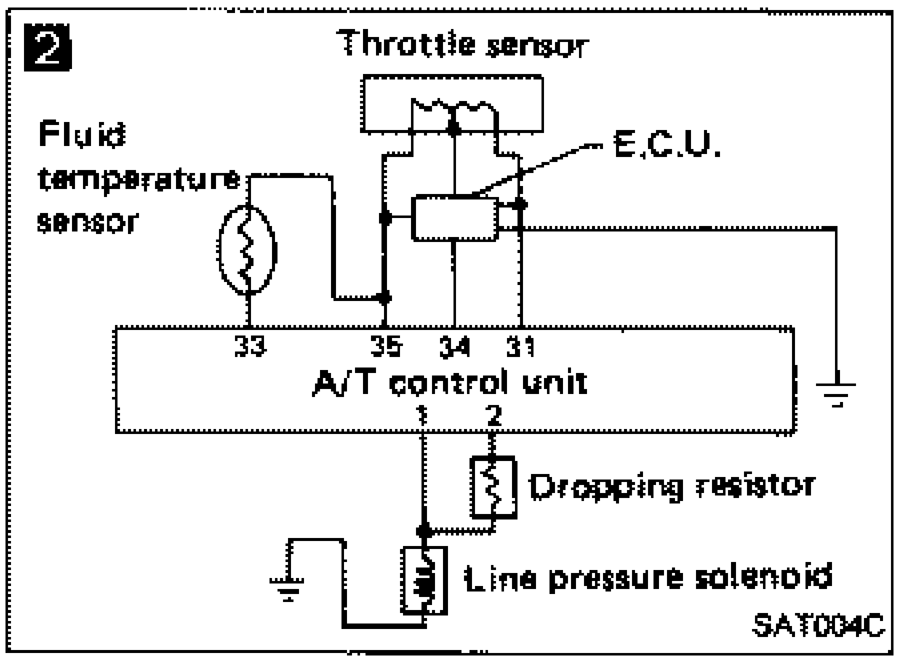
Check again.

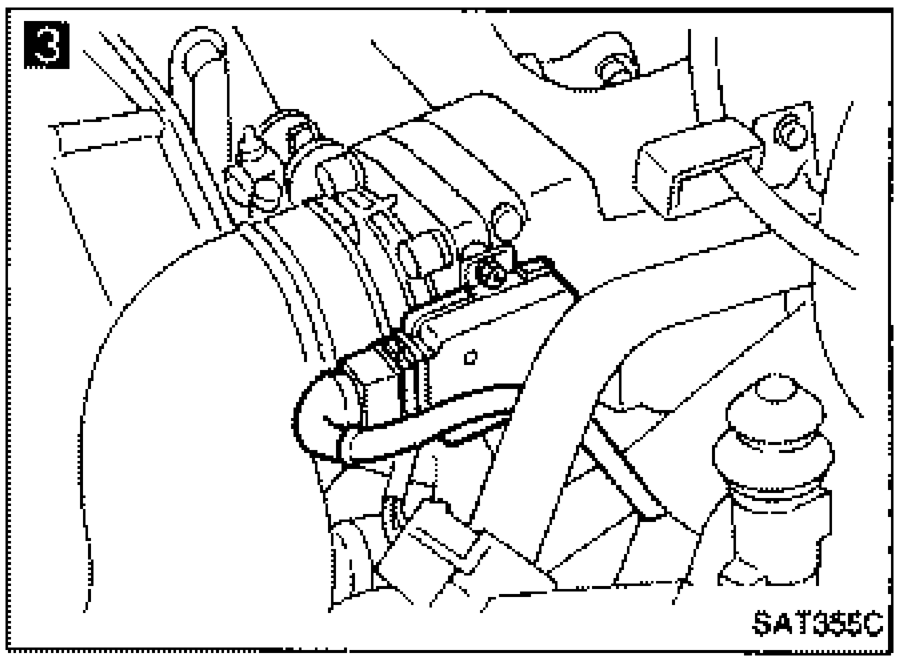
N.G. →
1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

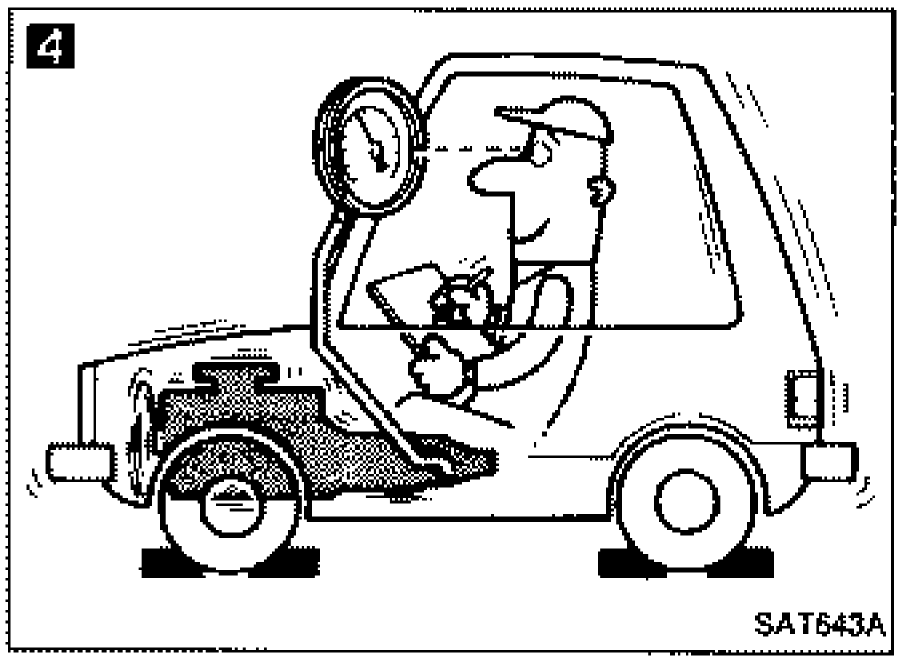
O.K. ↓

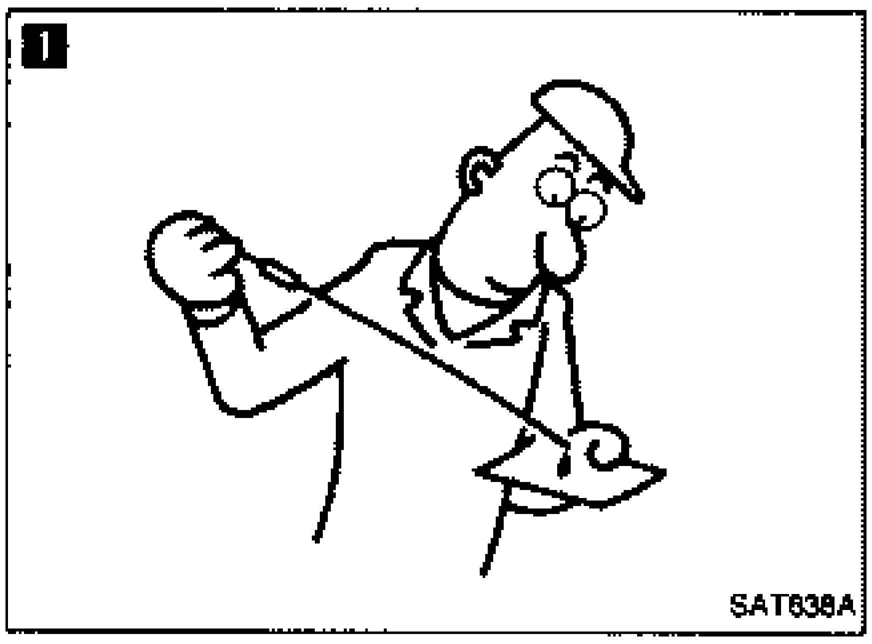
INSPECTION END











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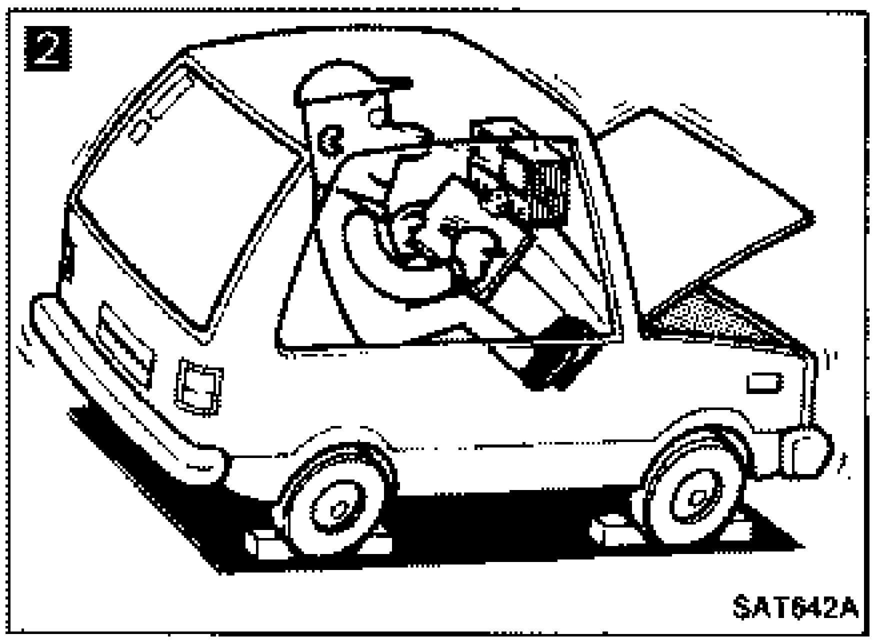
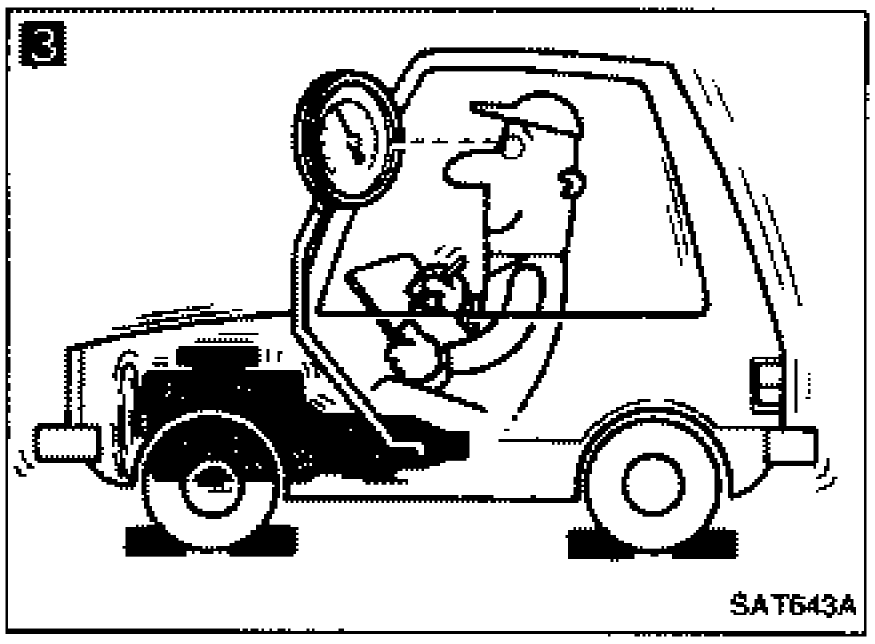
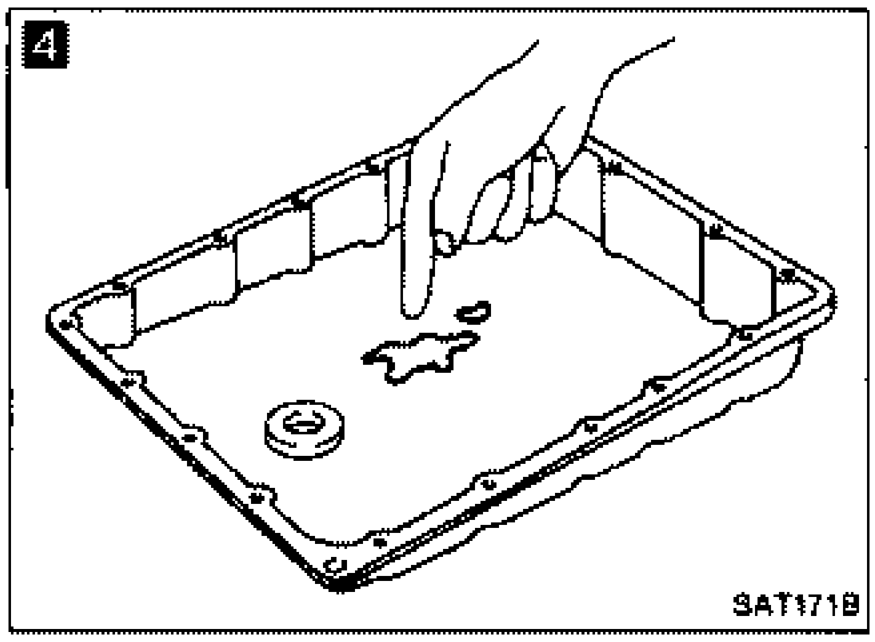


SAT642A



SAT643A



SAT171B

Diagnostic Procedure 6

SYMPTOM: Vehicle does not creep backward when selecting "R" range.

1

Check A/T fluid level again.

N.G. → Refill A.T.F.

O.K.

2

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

N.G. in both "1" and "R" ranges →

O.K. in "1" range
N.G. in "R" range →

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

O.K.

3

Check line pressure at idle with selector lever in "R" range. — Refer to "PRESSURE TESTING".

N.G. →

O.K.

4

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

N.G →

O.K.

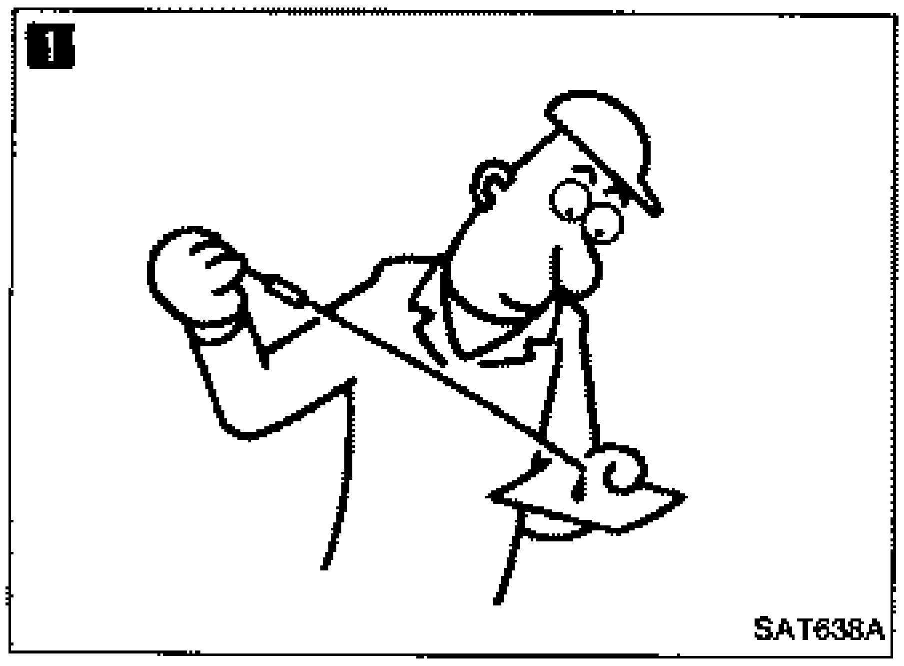
Check again.

N.G. →

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

O.K.

INSPECTION END



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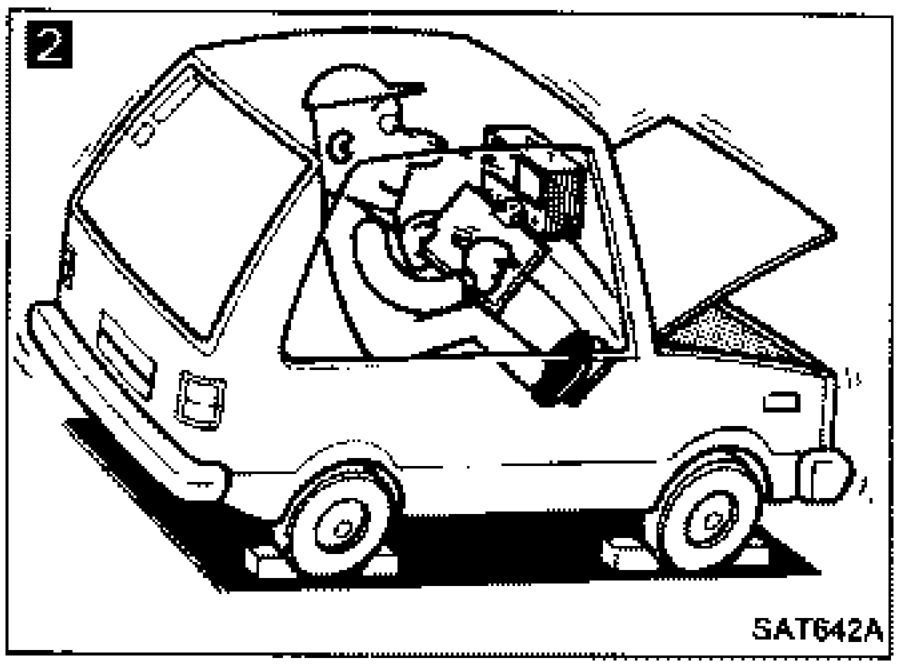

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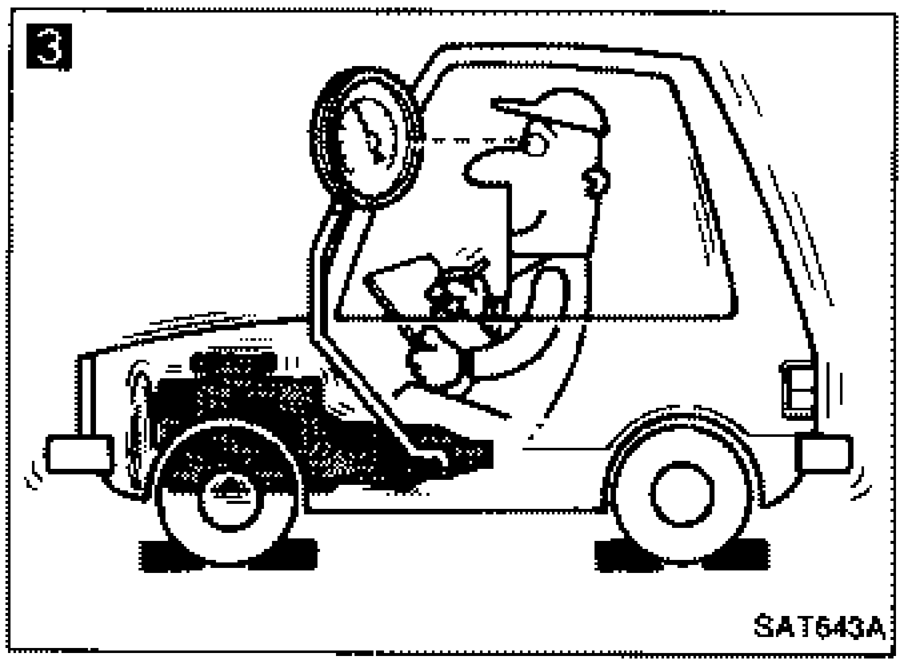

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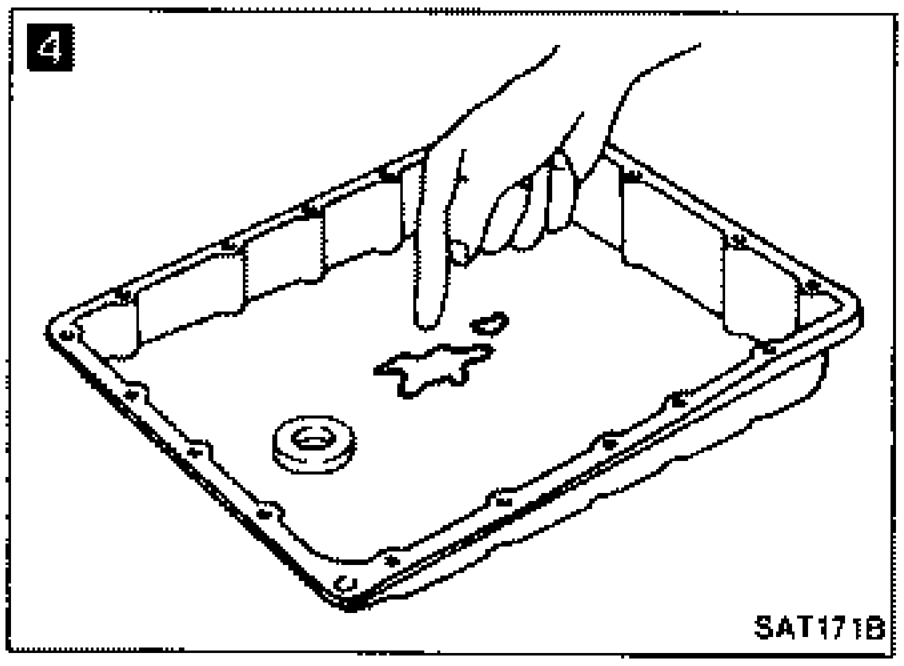
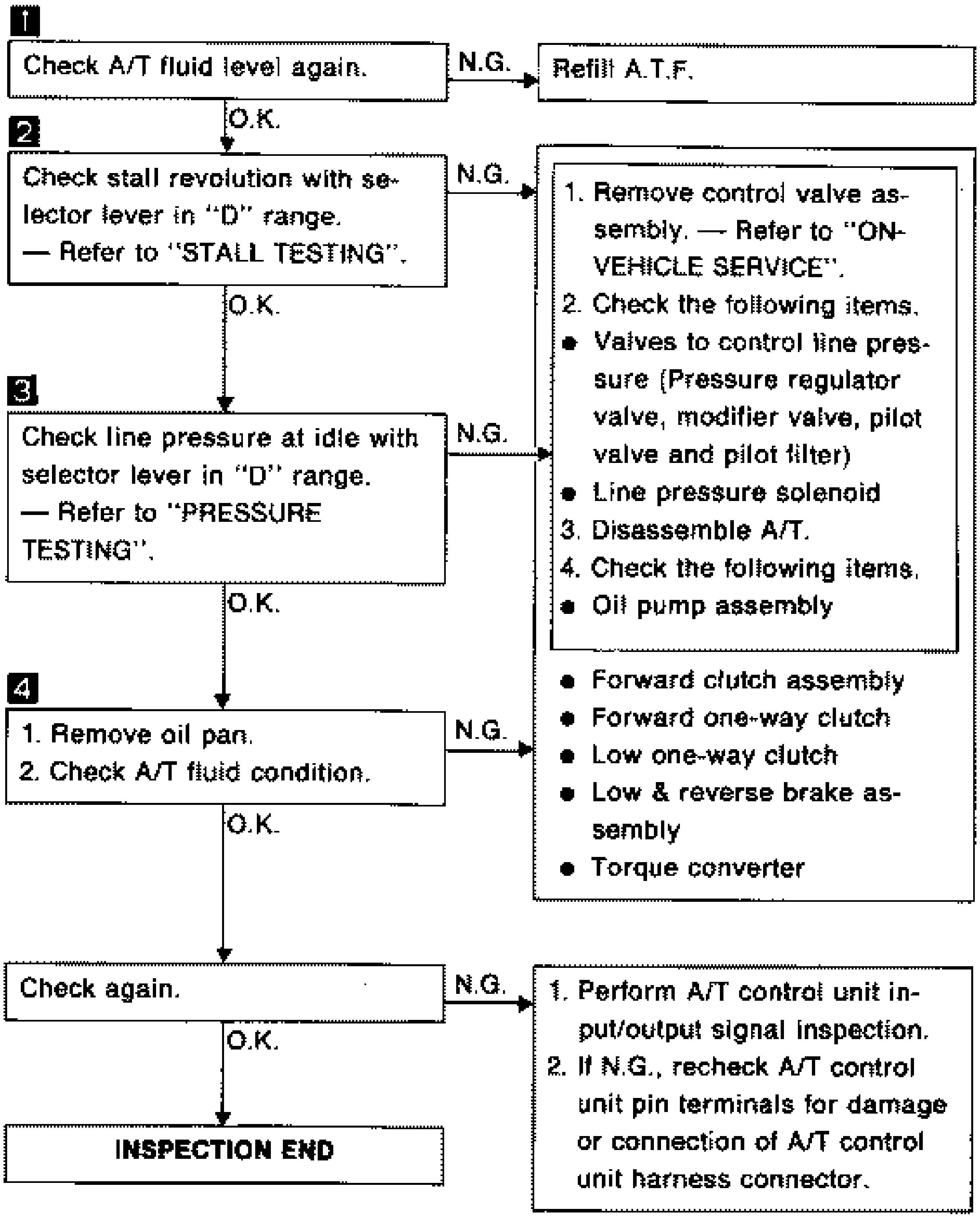


SAT171B

Diagnostic Procedure 7

SYMPTOM: Vehicle does not creep forward when selecting "D", "2" or "1" range.



1

Check A/T fluid level again.

N.G. → Refill A.T.F.

O.K.

2

Check stall revolution with selector lever in "D" range.
— Refer to "STALL TESTING".

N.G. →

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

O.K.

3

Check line pressure at idle with selector lever in "D" range.
— Refer to "PRESSURE TESTING".

N.G. →

O.K.

4

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

N.G. →

O.K.

Check again.

N.G. →

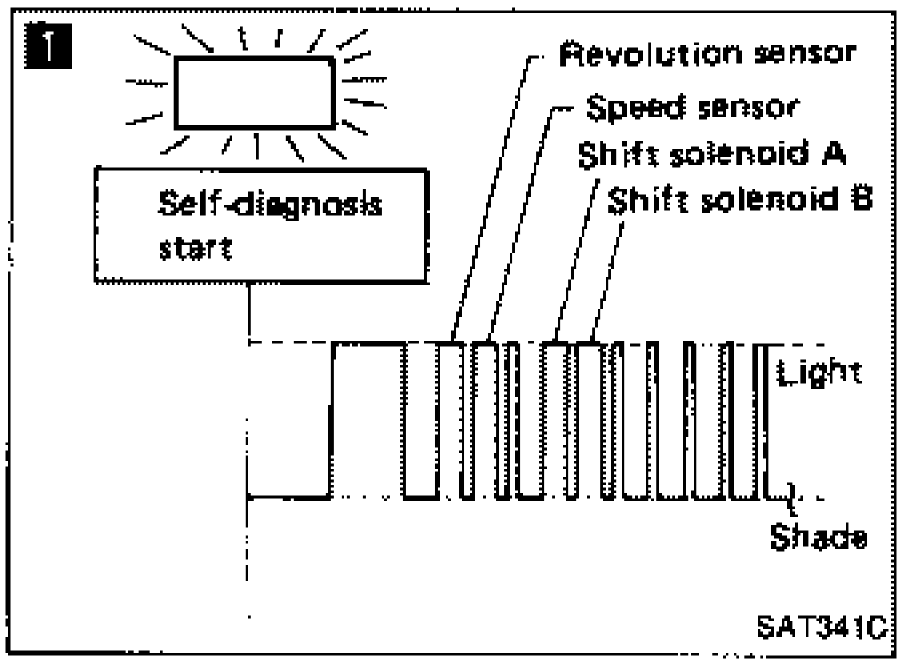
1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

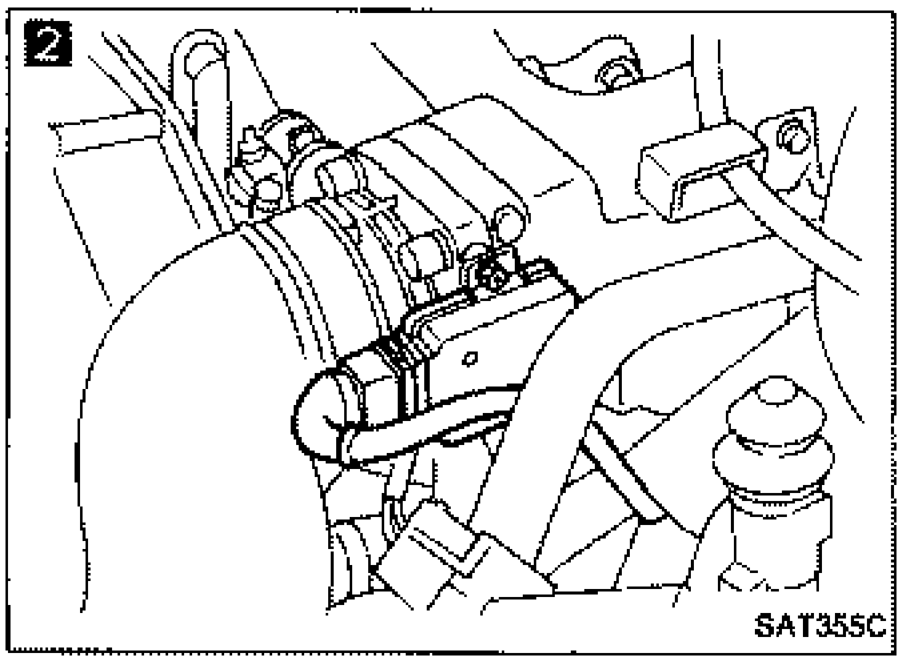
O.K.

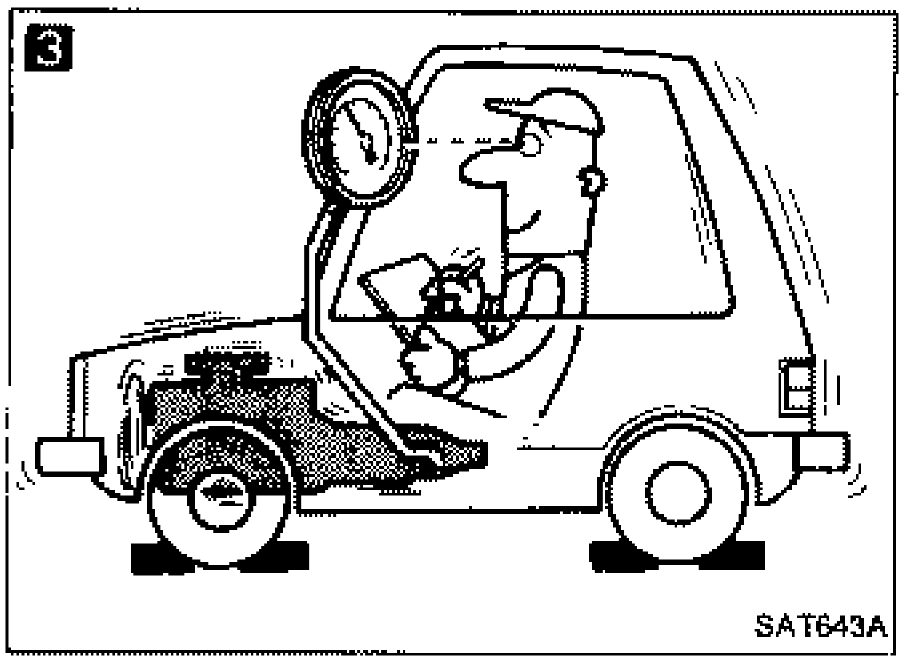
INSPECTION END

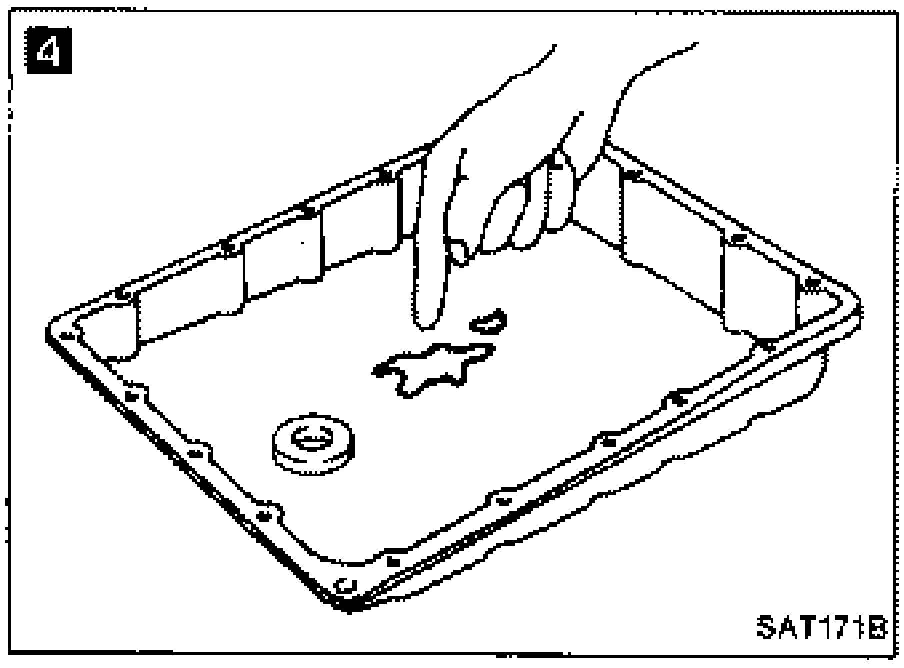
Diagnostic Procedure 8

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









Is Diagnostic Procedure 7 O.K.? — No → Go to Diagnostic Procedure 7.

Yes

1 Does self-diagnosis show damage to revolution sensor, speed sensor, shift solenoid A or B after cruise test? — Yes → Check damaged circuit. — Refer to "Self-diagnosis".

No

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

O.K.

3 Check line pressure at stall point with selector lever in "D" range. — Refer to "PRESSURE TESTING". — N.G. →

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

O.K.

4
1. Remove oil pan.
2. Check A/T fluid condition.

O.K. → (to box above)

N.G. → (to box above)

O.K.

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

O.K.

Check again. — N.G. →

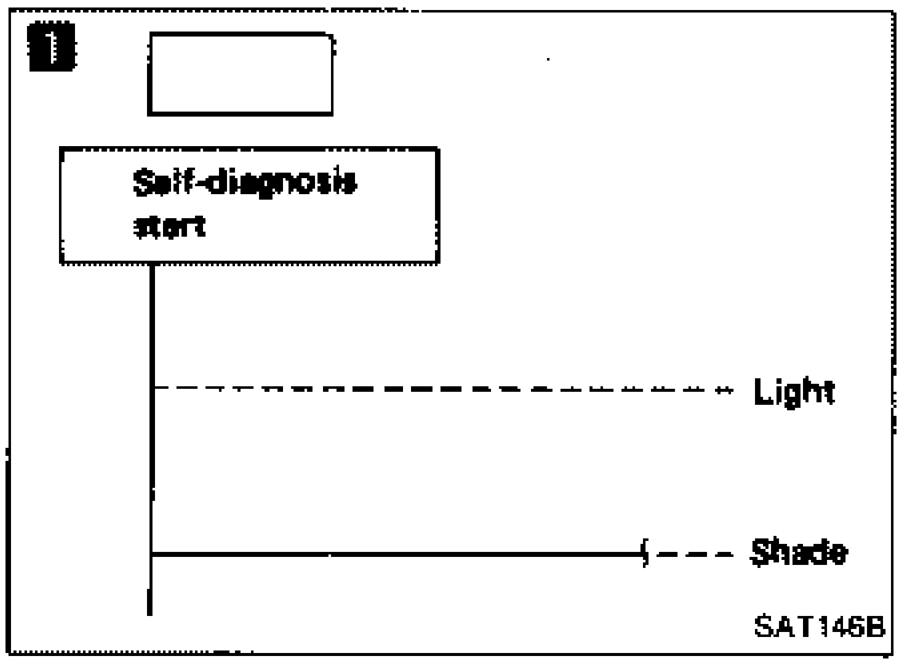
1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

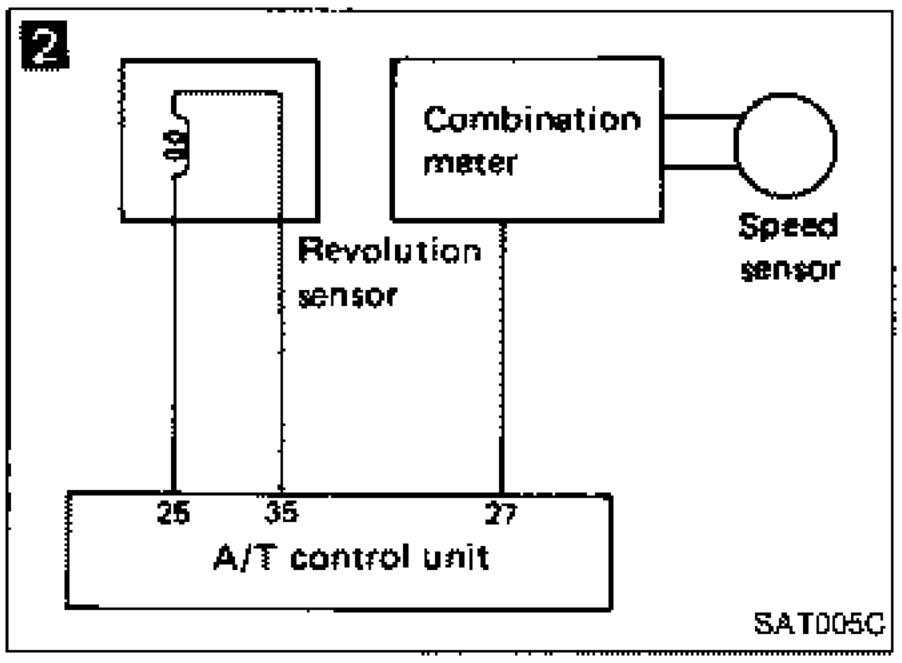
O.K.

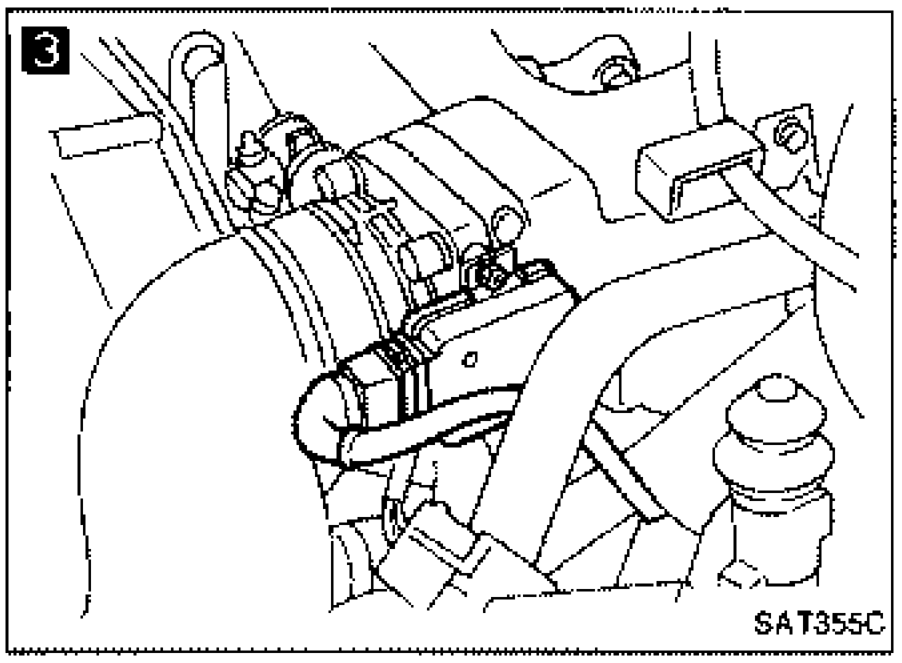
INSPECTION END

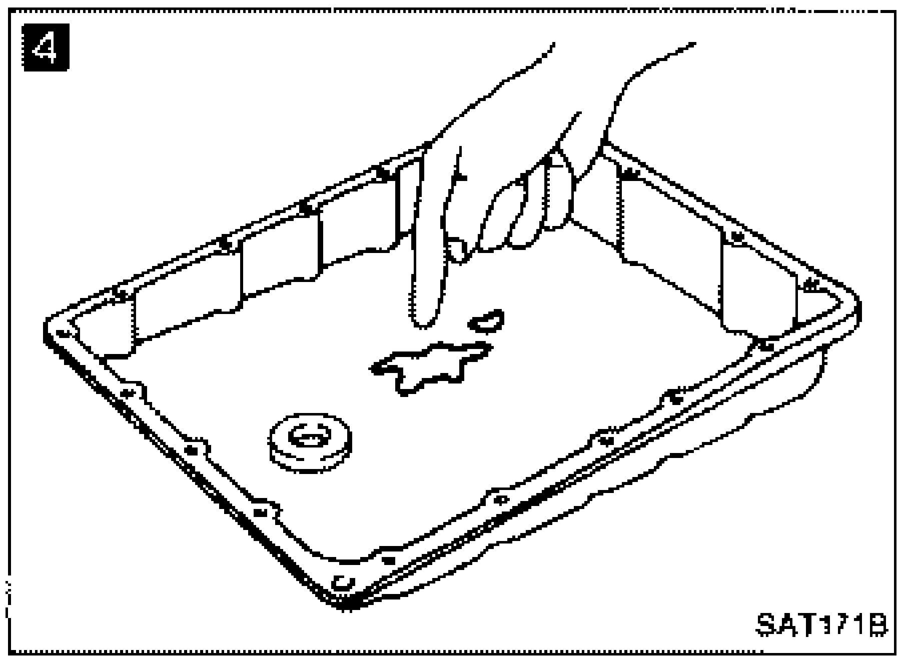
Diagnostic Procedure 9

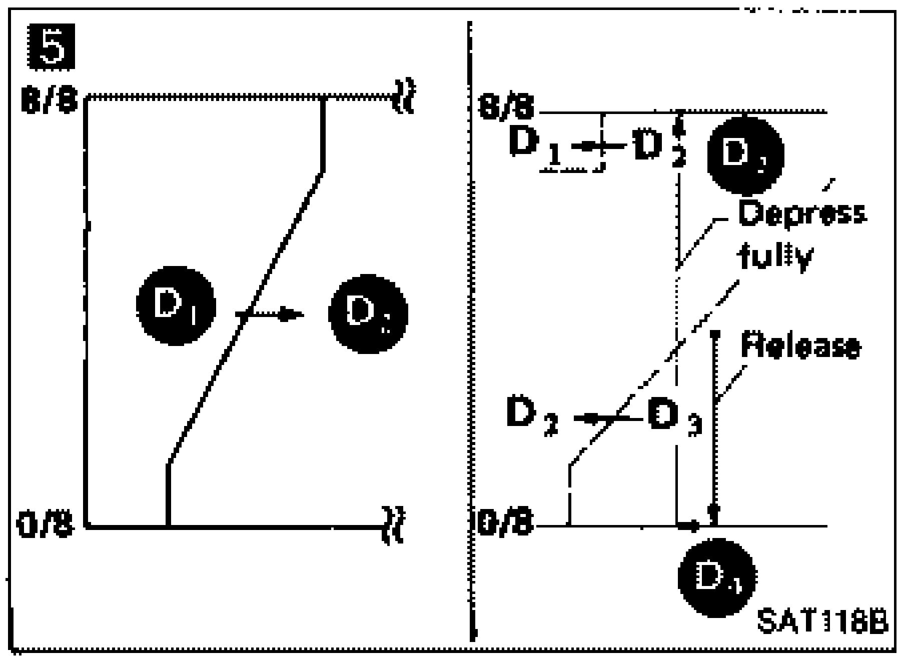
SYMPTOM: **A/T does not shift from D_1 to D_2 at the specified speed.**
A/T does not shift from D_4 to D_2 when depressing accelerator pedal fully at the specified speed.











Are Diagnostic Procedures 7 and 8 O.K.?
- No → Go to Diagnostic Procedure 7 or 8.
- Yes ↓

Does "E.C.U. INPUT SIGNALS" show damage to inhibitor switch circuit?

OR

1 Does self-diagnosis show damage to inhibitor switch circuit?
- Yes → Check inhibitor switch circuit. — Refer to "Self-diagnosis".
- No ↓

2 Check revolution sensor and speed sensor circuit. — Refer to "Self-diagnosis".
- N.G. → Repair or replace revolution sensor and speed sensor circuits.
- O.K. ↓

3 Check throttle sensor. — Refer to section EF & EC.
- N.G. → Repair or replace throttle sensor.
- O.K. ↓

4
1. Remove oil pan.
2. Check A/T fluid condition.
- N.G. → 1. Remove control valve. — Refer to "ON-VEHICLE SERVICE".
- O.K. → 2. Check the following items.

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

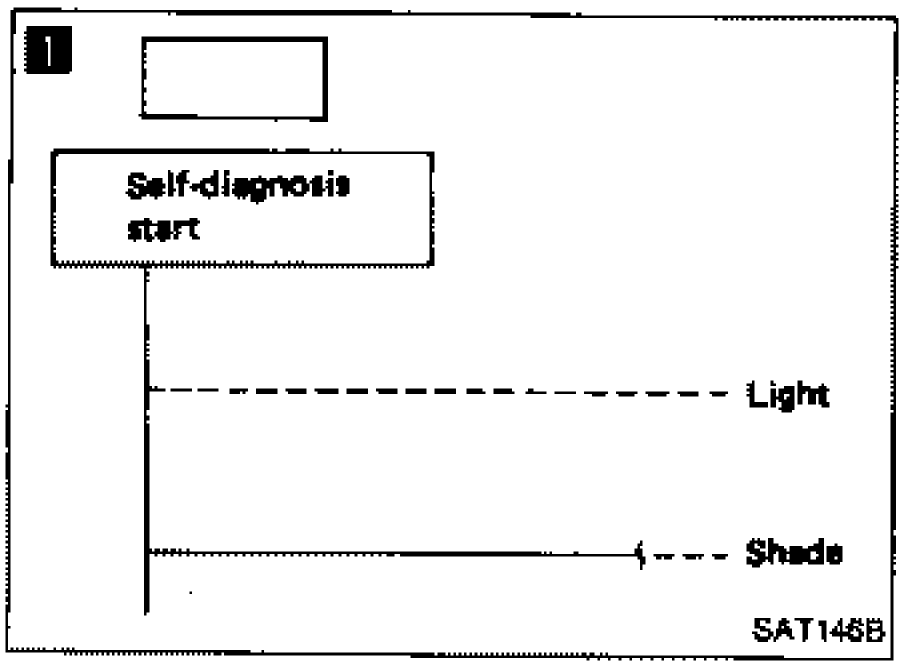
O.K. → 5

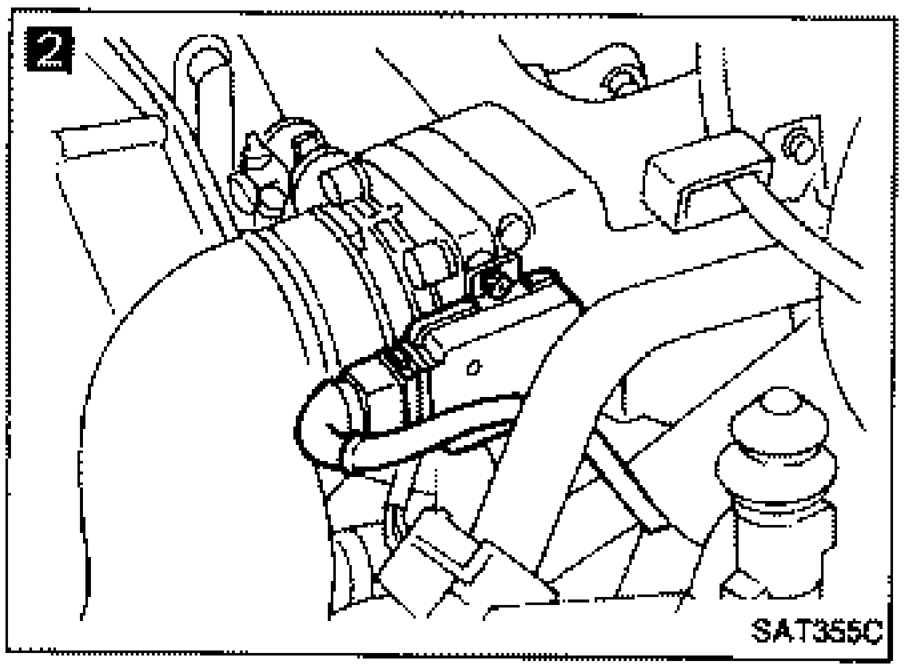
3. Disassemble A/T.
4. Check the following items.
   - Servo piston assembly
   - Brake band
   - Oil pump assembly

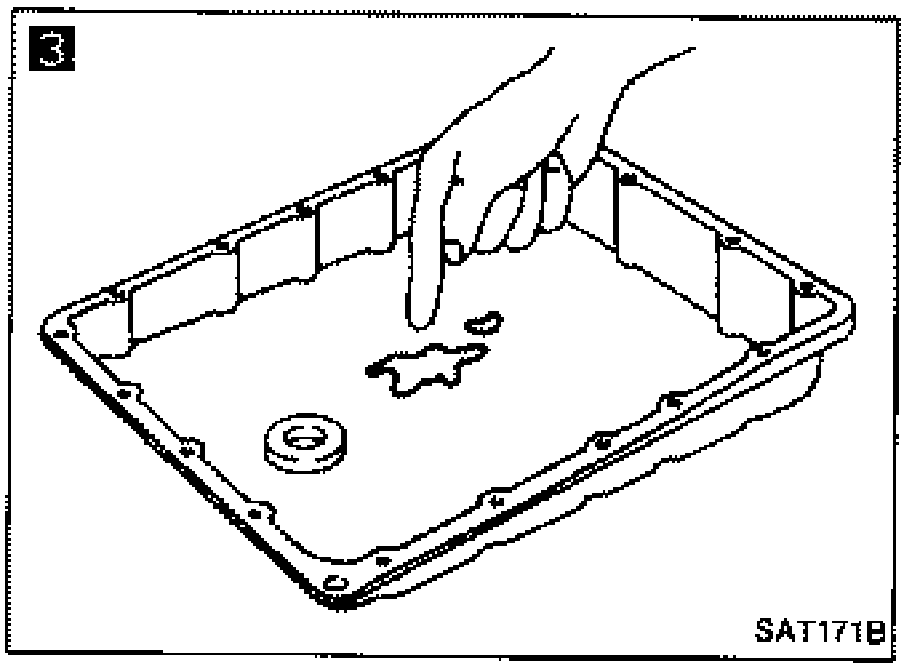
O.K. → 5

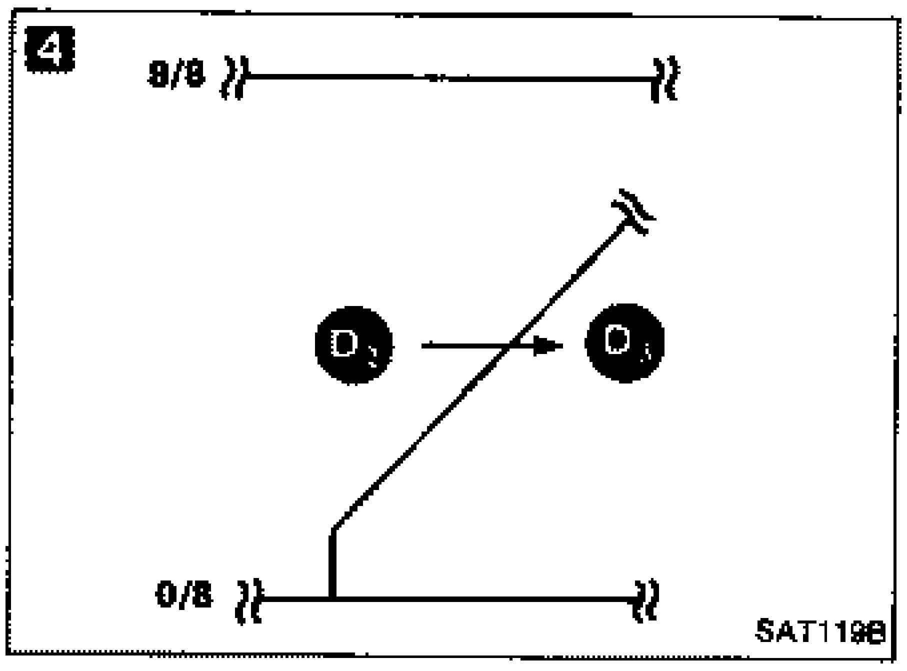
5 Check again.
- N.G. → 1. Perform A/T control unit input/output signal inspection. 2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.
- O.K. ↓

INSPECTION END









Diagnostic Procedure 10

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

Are Diagnostic Procedures 7 and 8 O.K.?
- No → Go to Diagnostic Procedure 7 or 8.
- Yes ↓

Does "E.C.U. INPUT SIGNALS" show damage to inhibitor switch circuit?

OR

1 Does self-diagnosis show damage to inhibitor switch circuit?
- Yes → Check inhibitor switch circuit. — Refer to "Self-diagnosis".
- No ↓

2 Check throttle sensor. — Refer to section EF & EC.
- N.G. → Repair or replace throttle sensor.
- O.K. ↓

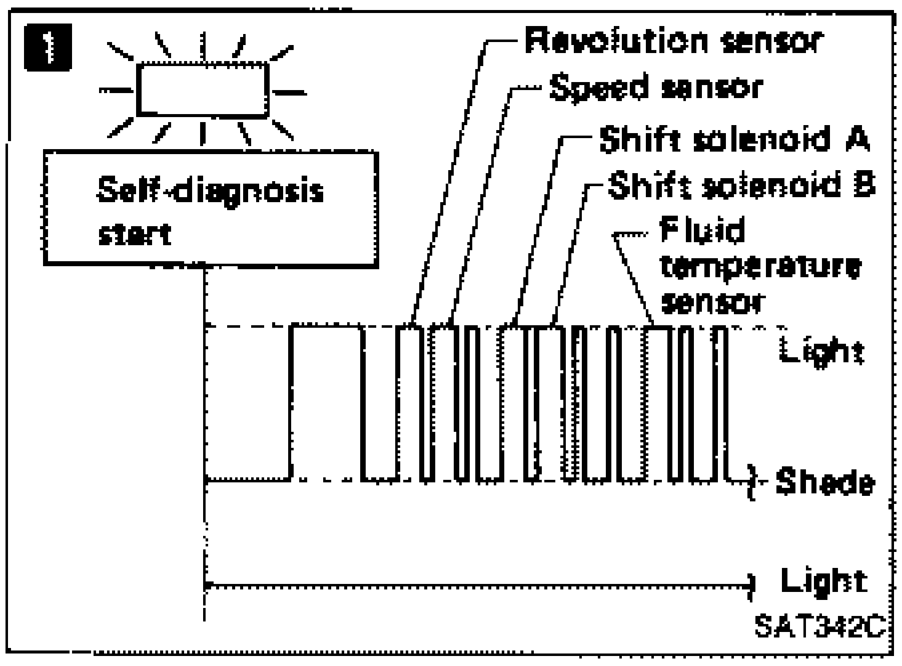
3
1. Remove oil pan.
2. Check A/T fluid condition.
- N.G. → / O.K. →
  1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE".
  2. Check the following items.
     - Shift valve B
     - Shift solenoid B
     - Pilot valve
     - Pilot filter
  - O.K. → 4
  3. Disassemble A/T.
  4. Check the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

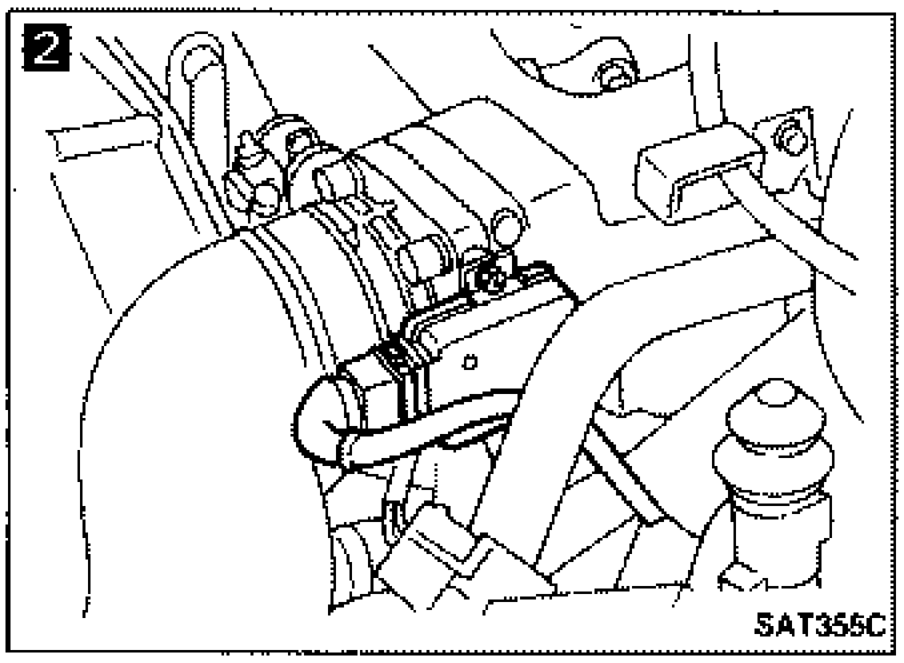
4 Check again.
- N.G. →
  1. Perform A/T control unit input/output signal inspection.
  2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.
- O.K. ↓

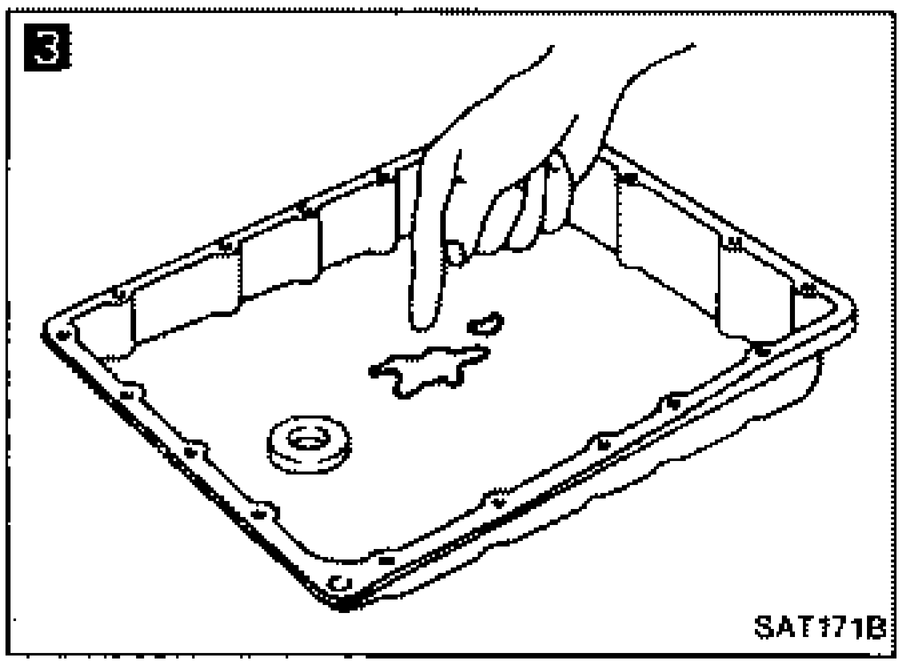
INSPECTION END

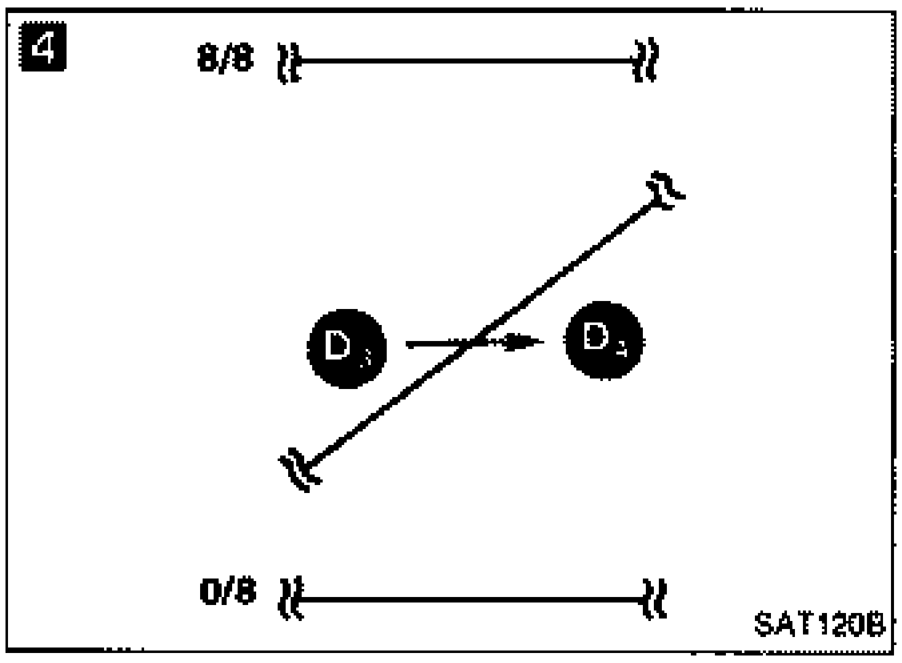
Diagnostic Procedure 11

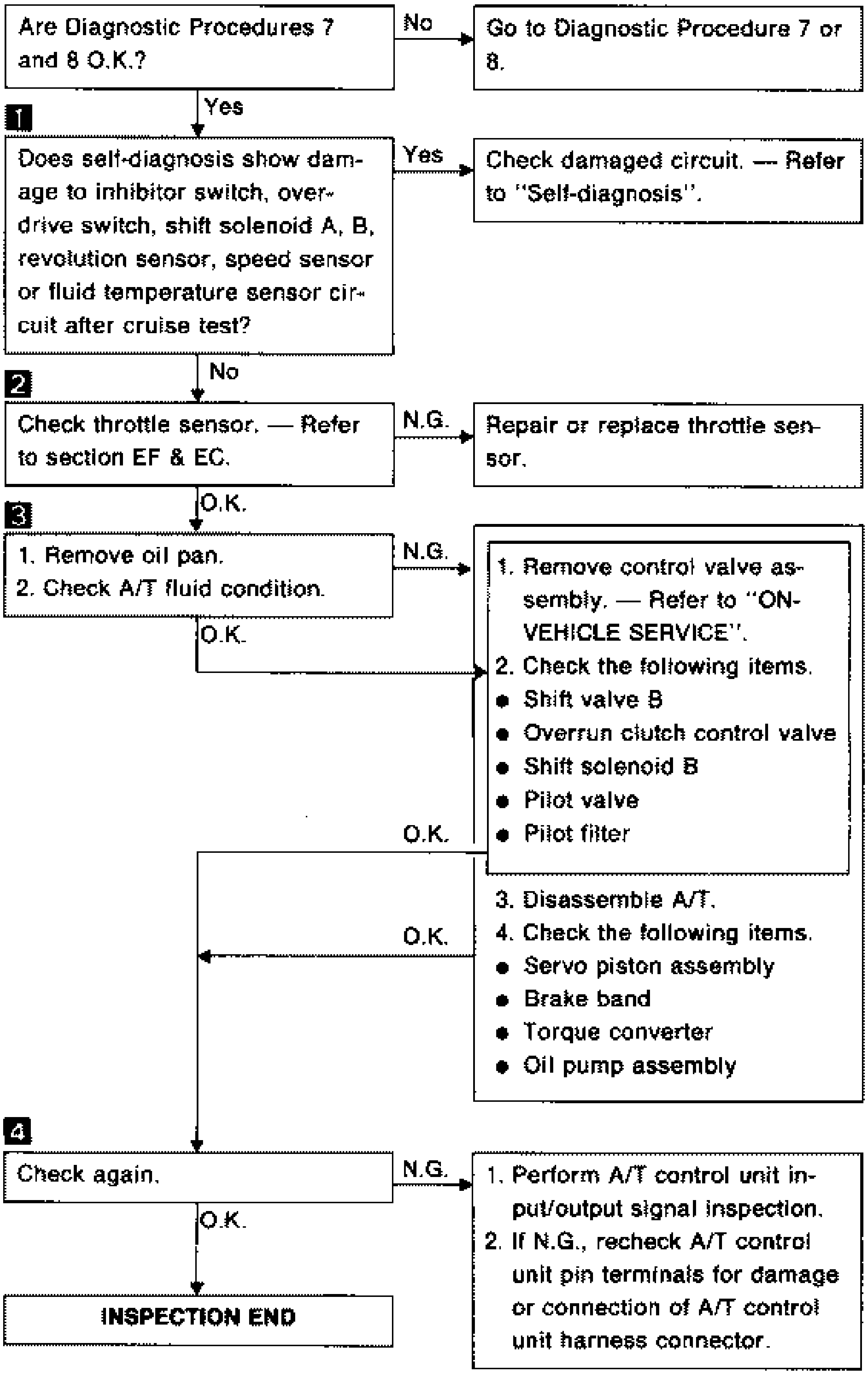
SYMPTOM: A/T does not shift from D_3 to D_4 at the specified speed.











Are Diagnostic Procedures 7 and 8 O.K.?
- No → Go to Diagnostic Procedure 7 or 8.
- Yes ↓

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

2 Check throttle sensor. — Refer to section EF & EC.
- N.G. → Repair or replace throttle sensor.
- O.K. ↓

3
1. Remove oil pan.
2. Check A/T fluid condition.

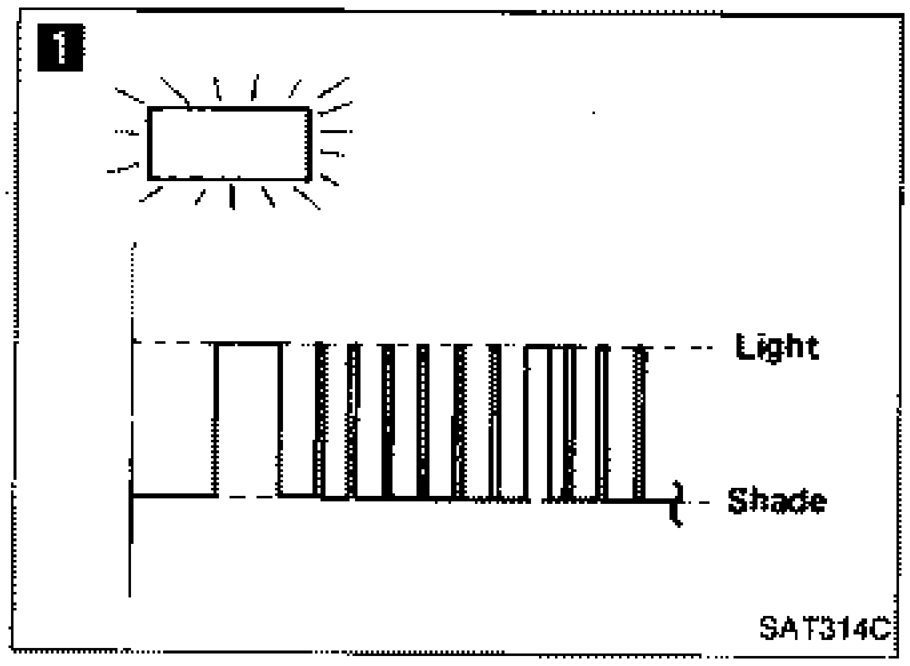
- N.G. / O.K. →
  1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE".
  2. Check the following items.
     - Shift valve B
     - Overrun clutch control valve
     - Shift solenoid B
     - Pilot valve
     - Pilot filter
  - O.K. ↓
  3. Disassemble A/T.
  4. Check the following items.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

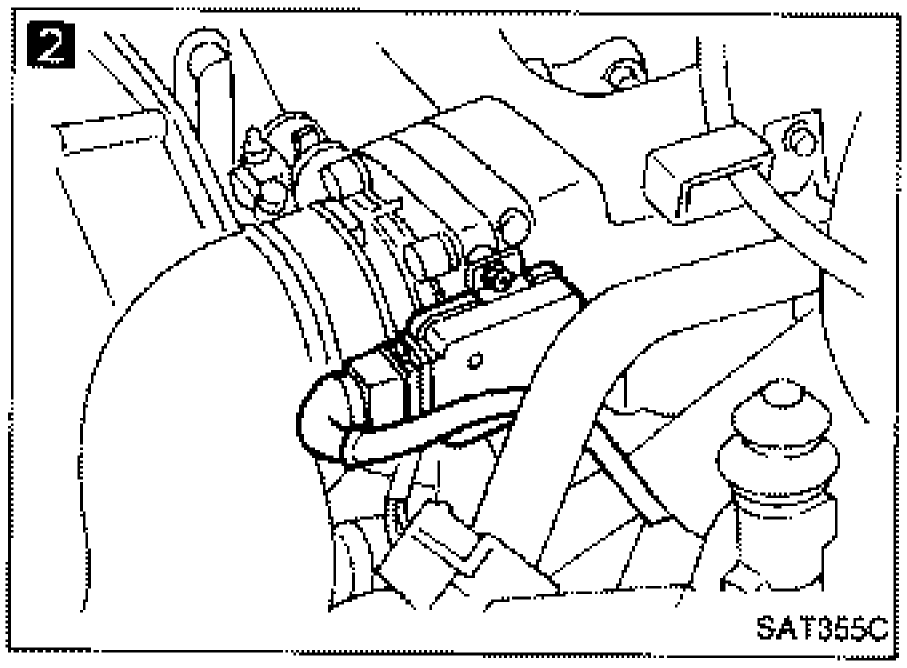
4 Check again.
- N.G. →
  1. Perform A/T control unit input/output signal inspection.
  2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.
- O.K. ↓

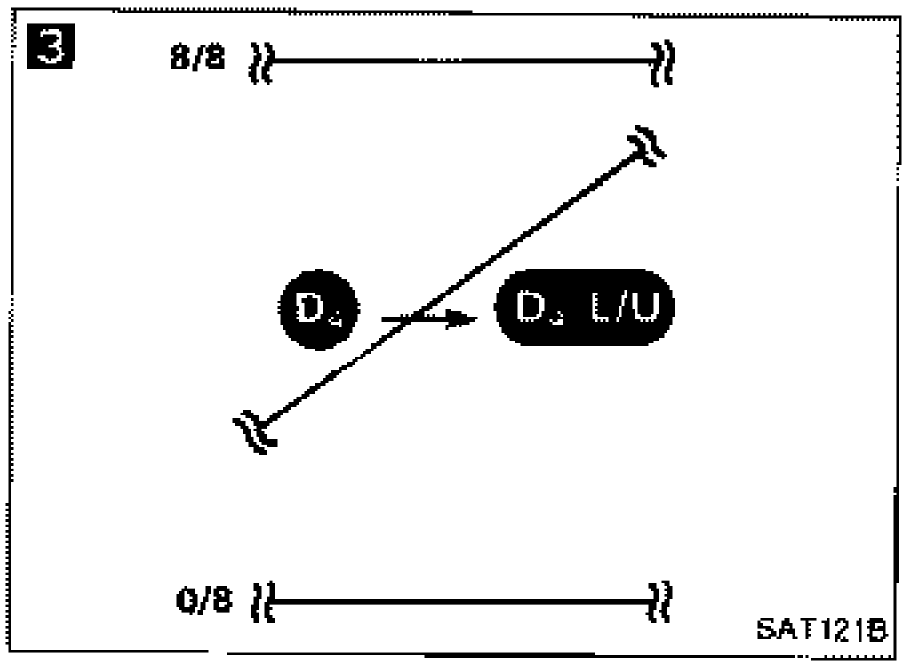
INSPECTION END

Diagnostic Procedure 12

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







1

Does self-diagnosis show damage to lock-up solenoid circuit after cruise test?

Yes → Check lock-up solenoid circuit. — Refer to "Self-diagnosis".

No ↓

2

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

N.G. → Repair or replace throttle sensor.

O.K. ↓

1. Remove control valve. — Refer to "ON-VEHICLE SERVICE".
2. Check the following items.
- Lock-up control valve
- Shuttle shift valve D
- Torque converter relief valve
- Lock-up solenoid
- Pilot valve
- Pilot filter

N.G. → Repair or replace damaged parts.

O.K. ↓

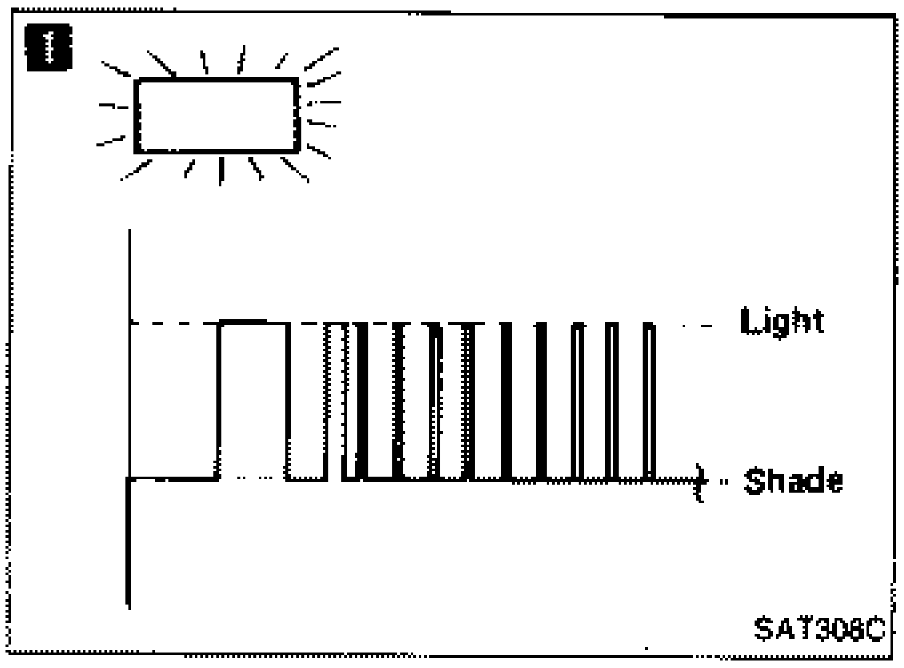
3

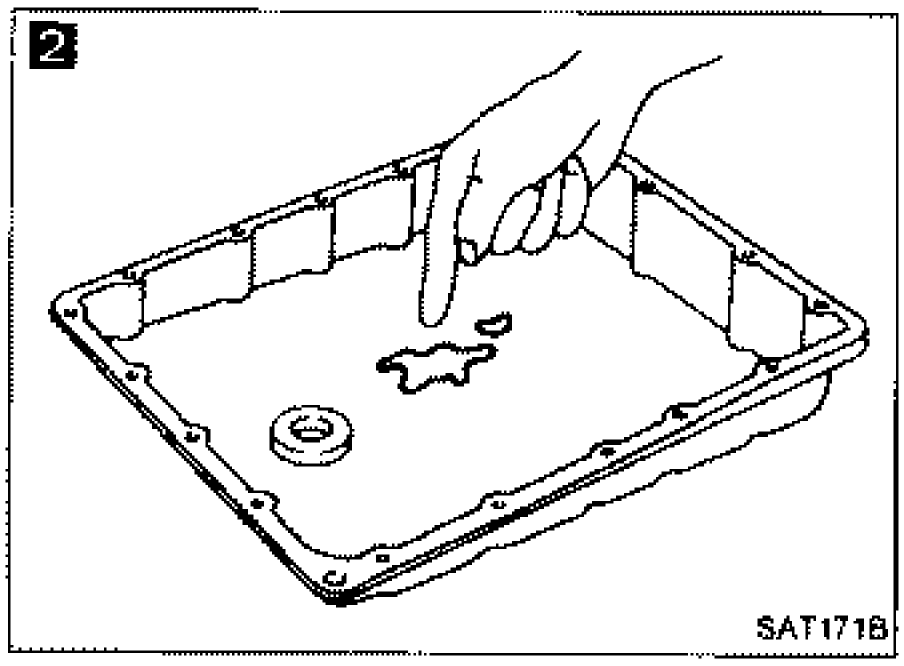
Check again.

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

O.K. ↓

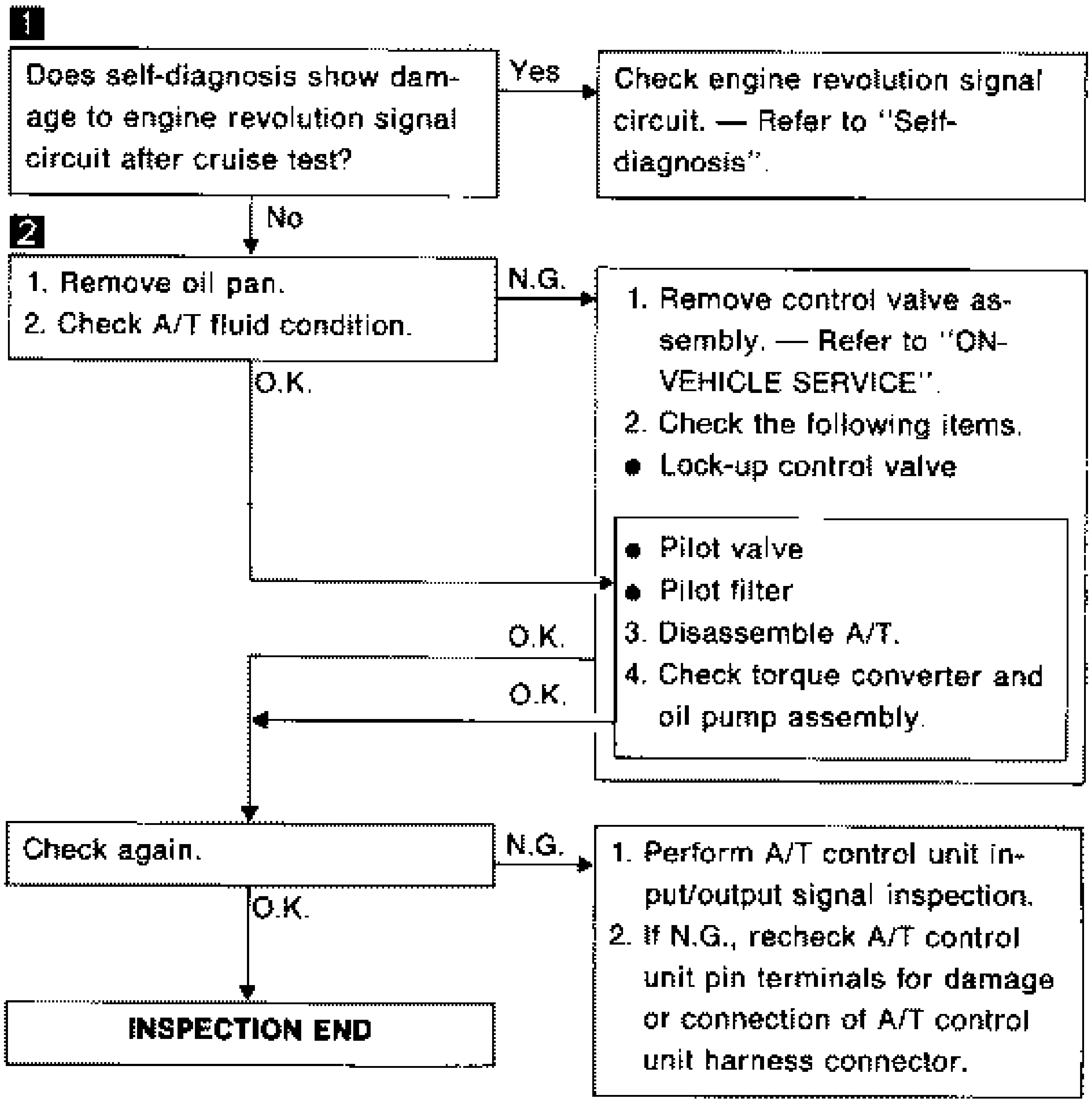
INSPECTION END





Diagnostic Procedure 13

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



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

- Yes → Check engine revolution signal circuit. — Refer to "Self-diagnosis".
- No ↓

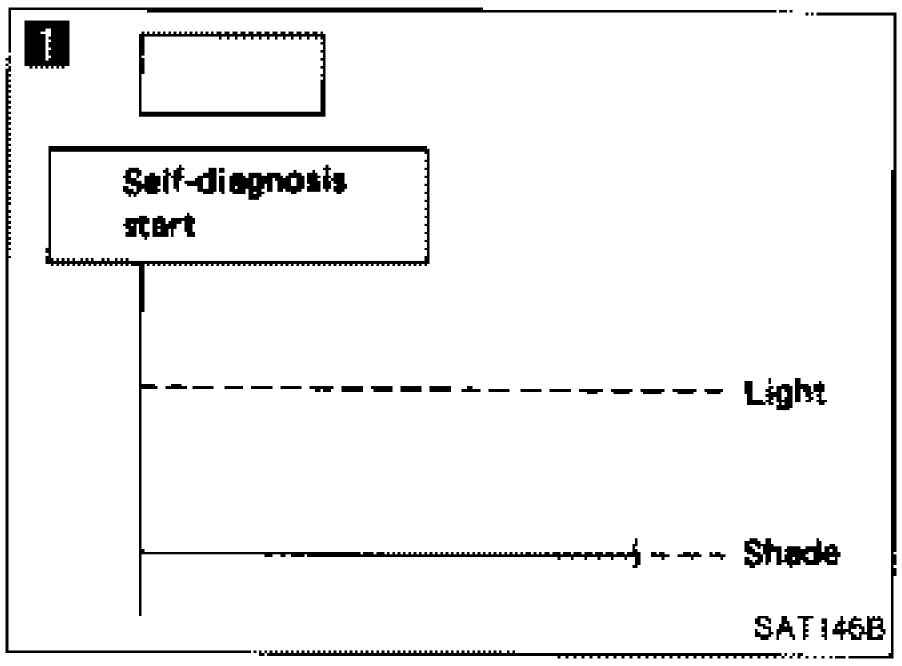
2
1. Remove oil pan.
2. Check A/T fluid condition.

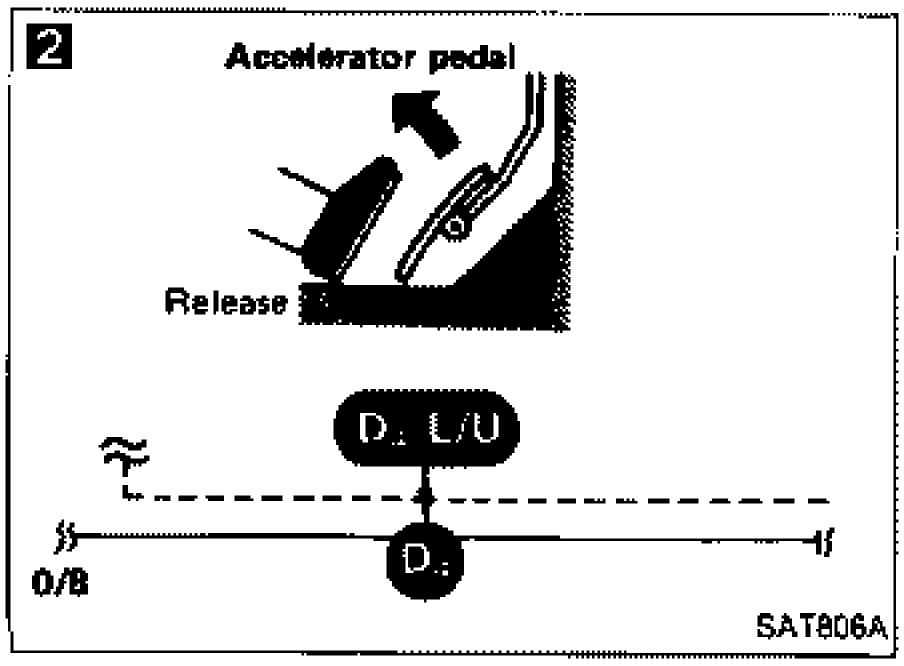
- N.G. →
  1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE".
  2. Check the following items.
  - Lock-up control valve
  - Pilot valve
  - Pilot filter
  3. Disassemble A/T.
  4. Check torque converter and oil pump assembly.
- O.K. → (to "Pilot valve")
- O.K. ↓

Check again.

- N.G. →
  1. Perform A/T control unit input/output signal inspection.
  2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.
- O.K. ↓

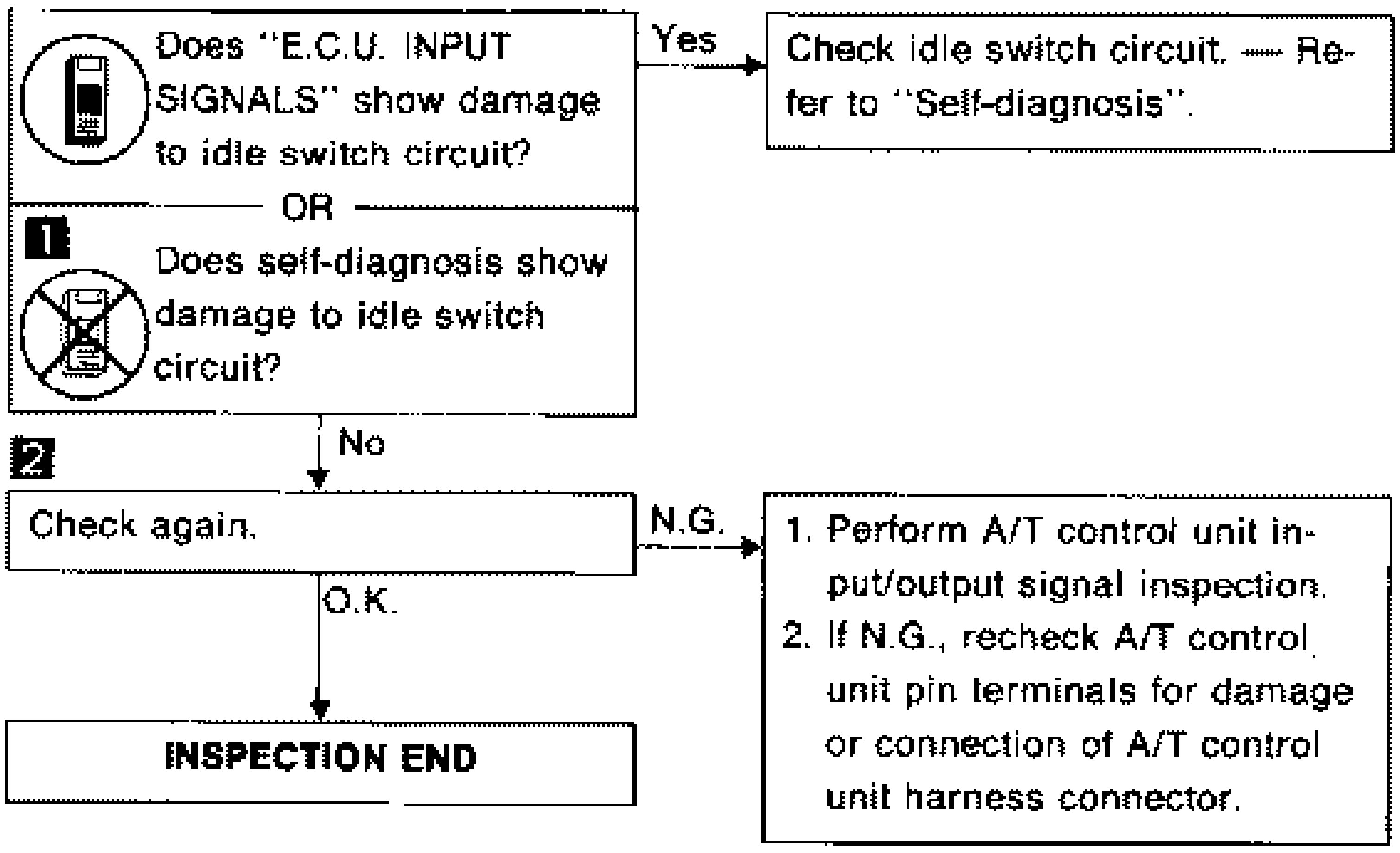
INSPECTION END





Diagnostic Procedure 14

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



Does "E.C.U. INPUT SIGNALS" show damage to idle switch circuit?

OR

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

- Yes → Check idle switch circuit. — Refer to "Self-diagnosis".
- No ↓

2 Check again.

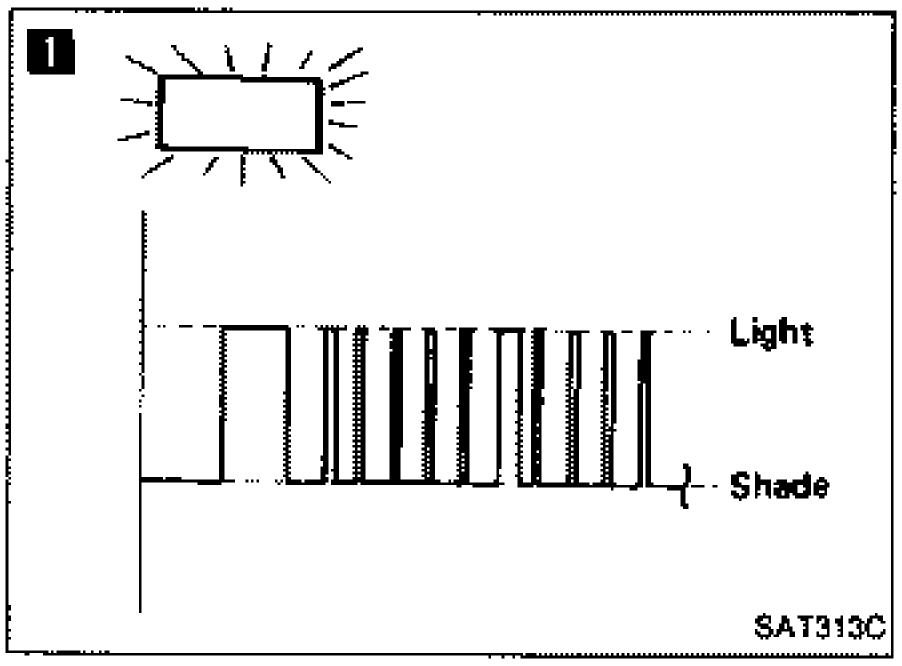
- N.G. →
  1. Perform A/T control unit input/output signal inspection.
  2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.
- O.K. ↓

INSPECTION END

Diagnostic Procedure 15

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" range with accelerator pedal released.

1

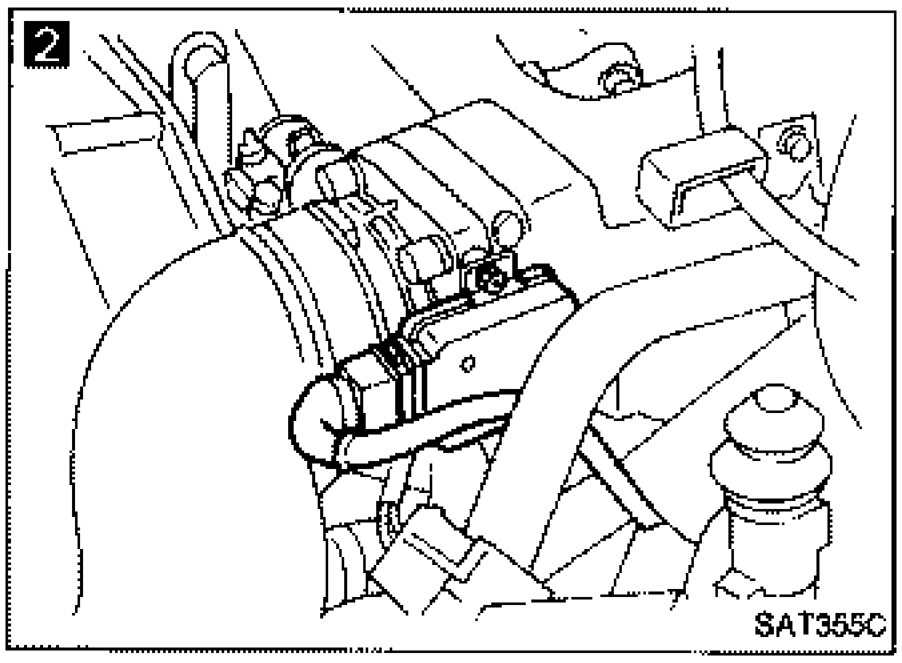


SAT313C

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

- Yes → Check overrun clutch solenoid circuit. — Refer to "Self-diagnosis".
- No ↓

2

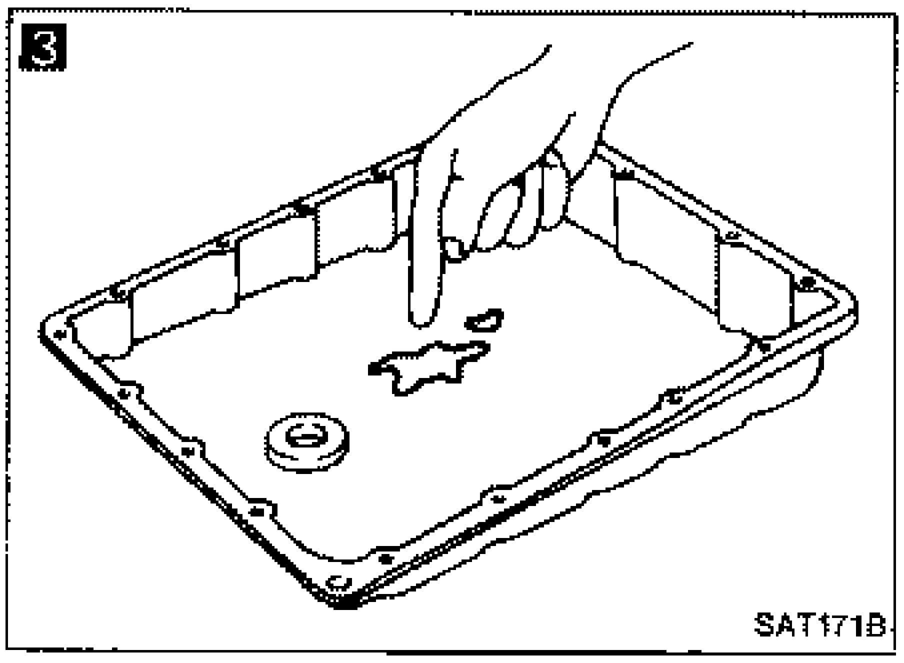


SAT355C

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

- N.G. → Repair or replace throttle sensor.
- O.K. ↓

3

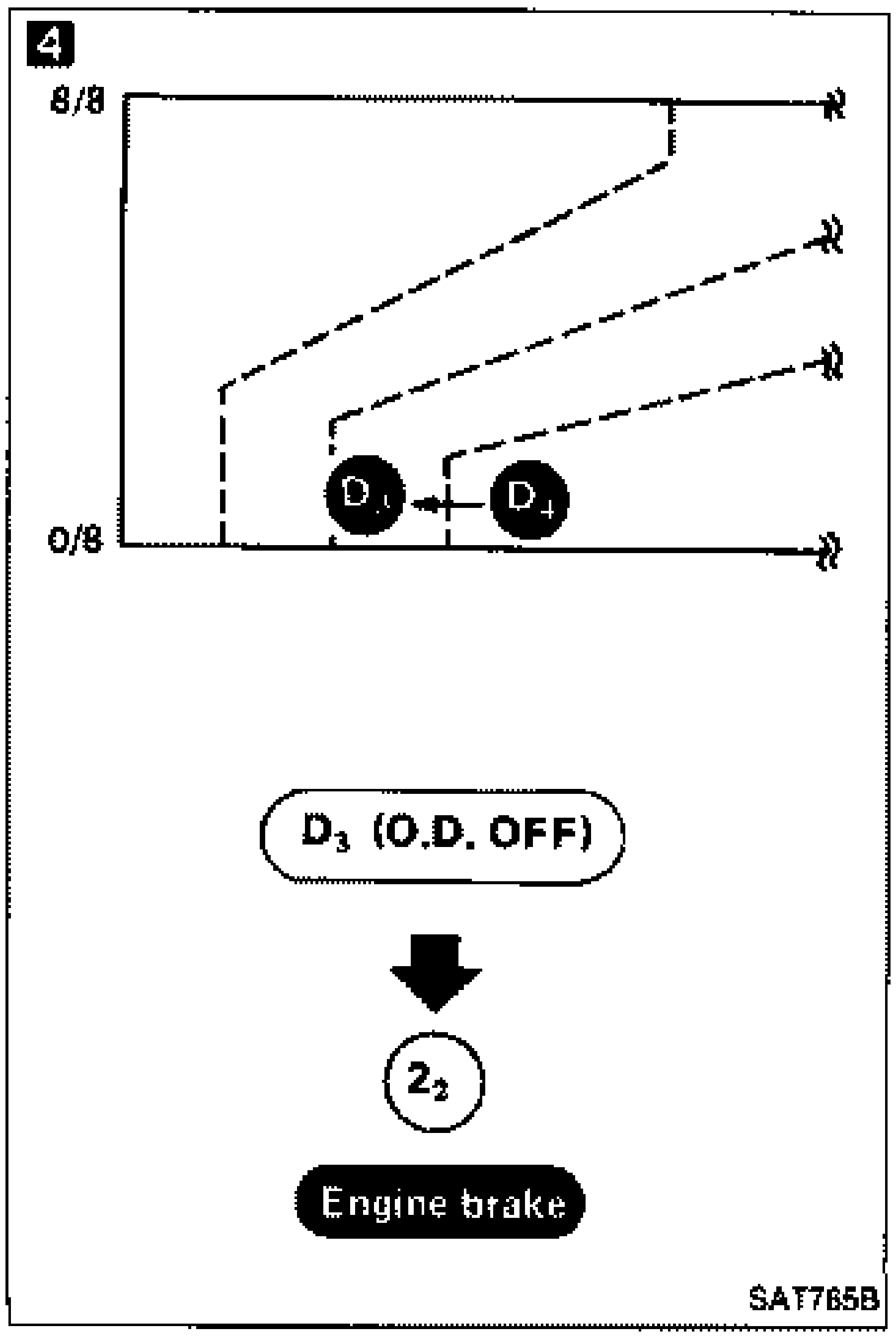


SAT171B

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

- N.G. → 1. Remove control valve assembly. — Refer to "ON-VEHICLE SERVICE".
- O.K. → 2. Check the following items.
  - Overrun clutch control valve
  - Overrun clutch reducing valve
  - Overrun clutch solenoid
  - O.K. ↓ (to 4)
- 3. Disassemble A/T.
- 4. Check the following items.
  - Overrun clutch assembly
  - Oil pump assembly
  - O.K. ↓ (to 4)

4

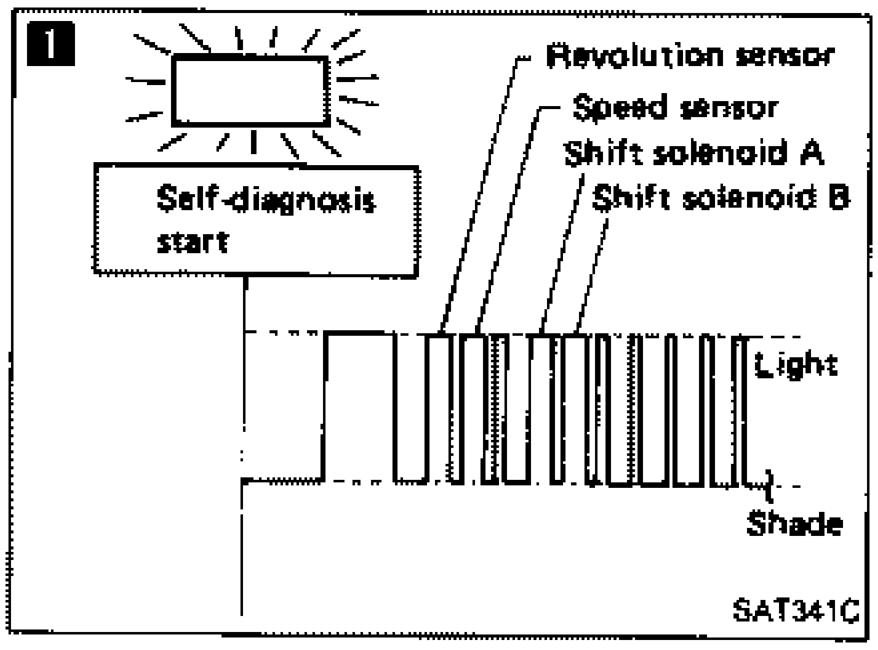


SAT765B

Check again.

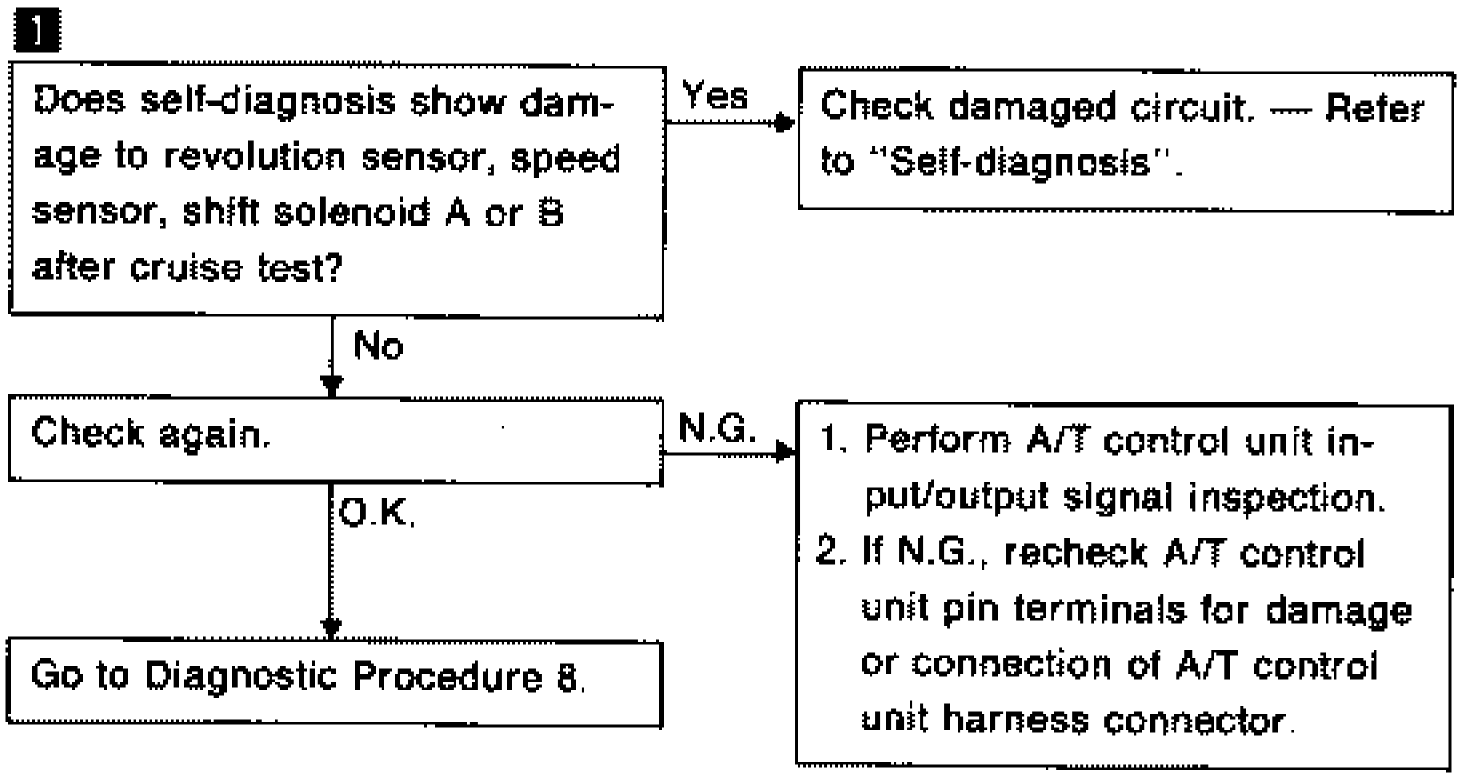
- N.G. → 1. Perform A/T control unit input/output signal inspection.
  2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.
- O.K. ↓

INSPECTION END



Diagnostic Procedure 16

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



1

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

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

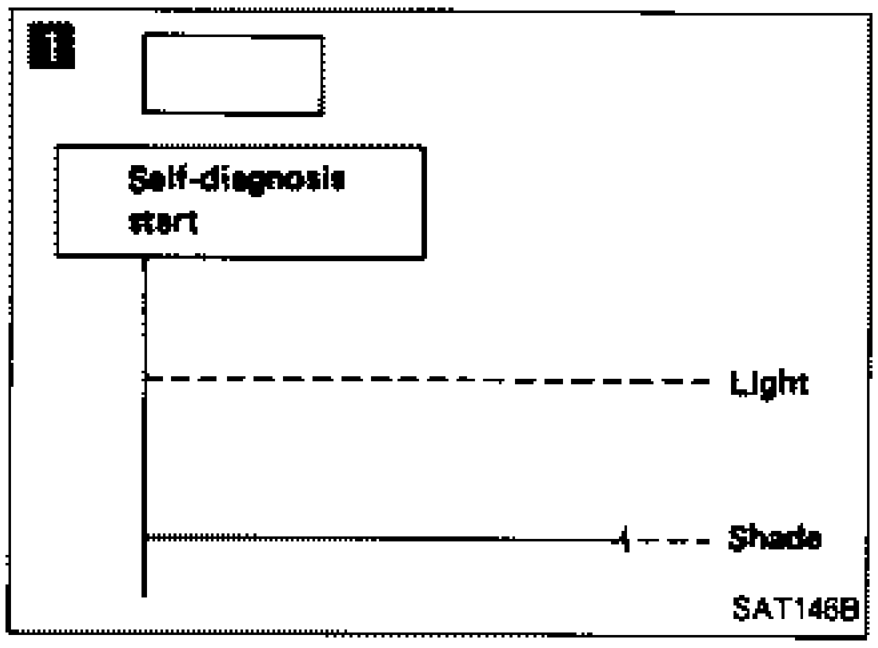
No ↓

Check again.

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

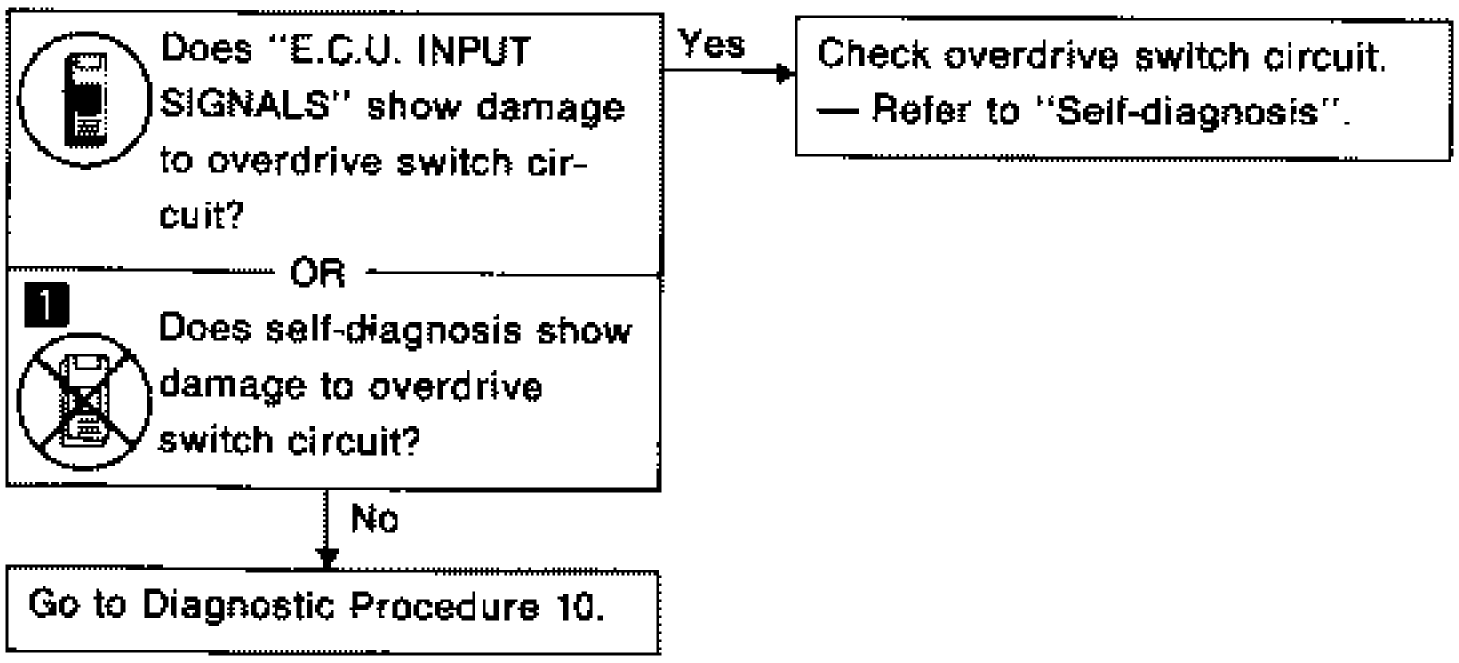
O.K. ↓

Go to Diagnostic Procedure 8.



Diagnostic Procedure 17

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



Does "E.C.U. INPUT SIGNALS" show damage to overdrive switch circuit?

— OR —

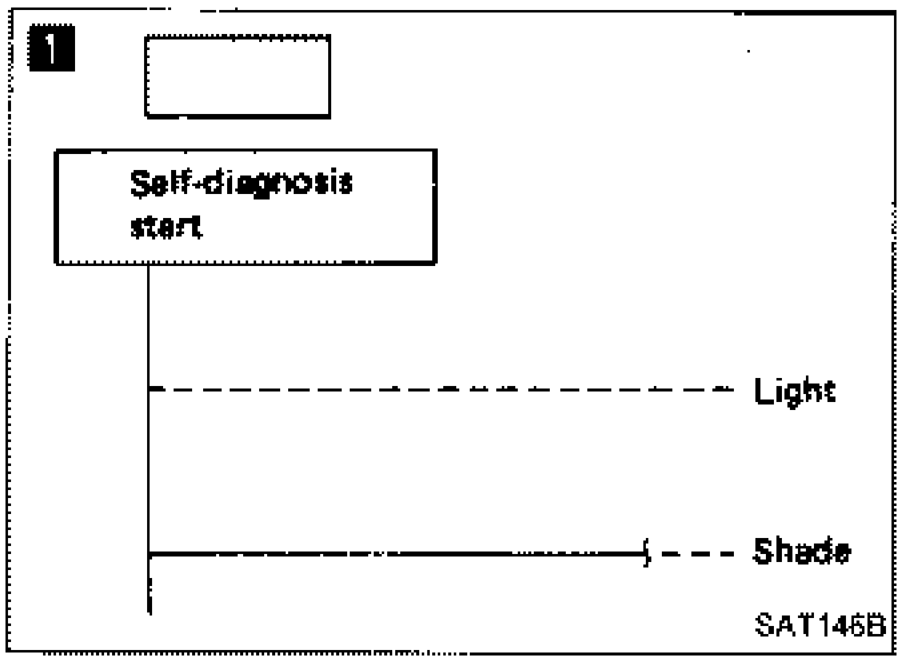
1

Does self-diagnosis show damage to overdrive switch circuit?

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

No ↓

Go to Diagnostic Procedure 10.



Diagnostic Procedure 18

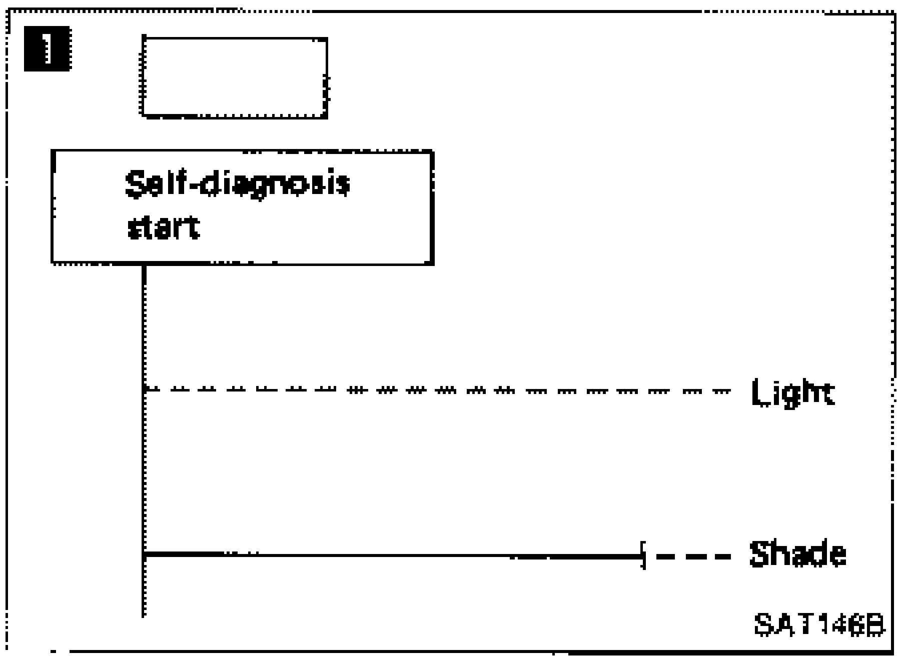
SYMPTOM: A/T does not shift from D_3 to 2_2 when changing selector lever from "D" to "2" range.

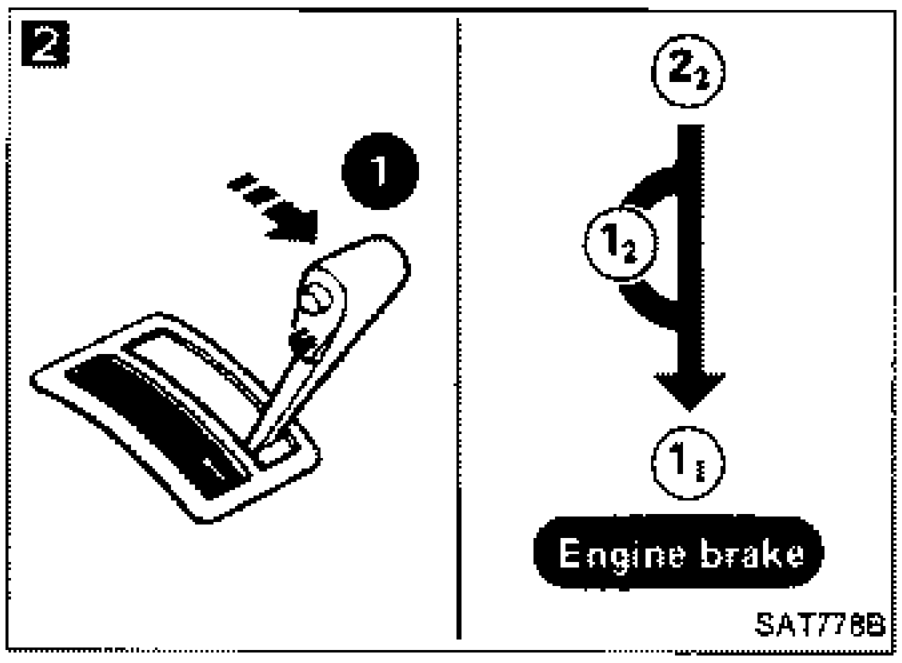
Does "E.C.U. INPUT SIGNALS" show damage to inhibitor switch circuit?
OR
1 Does self-diagnosis show damage to inhibitor switch circuit?

Yes → Check inhibitor switch circuit.
— Refer to "Self-diagnosis".

No ↓

Go to Diagnostic Procedure 9.





Diagnostic Procedure 19

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

Does "E.C.U. INPUT SIGNALS" show damage to inhibitor switch circuit?
OR
1 Does self-diagnosis show damage to inhibitor switch circuit?

Yes → Check inhibitor switch circuit.
— Refer to "Self-diagnosis".

No ↓

2 Check again.

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

O.K. ↓

INSPECTION END

Diagnostic Procedure 20

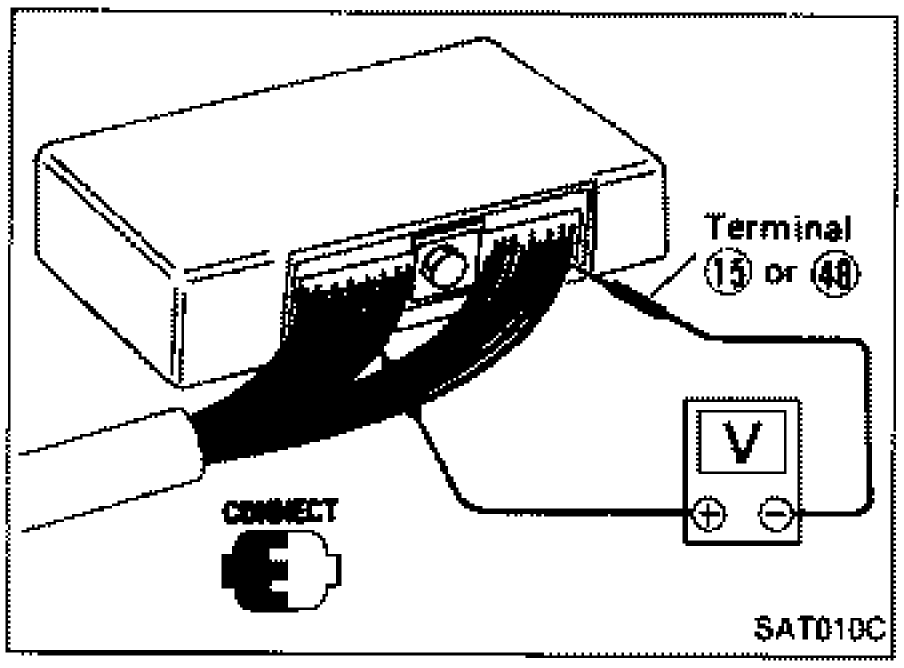
SYMPTOM: Vehicle does not decelerate by engine brake when shifting from 2_2 (1_2) to 1_1.

Is diagnostic procedure 6 O.K.?

No → Go to Diagnostic Procedure 6.

Yes ↓

Go to Diagnostic Procedure 15.

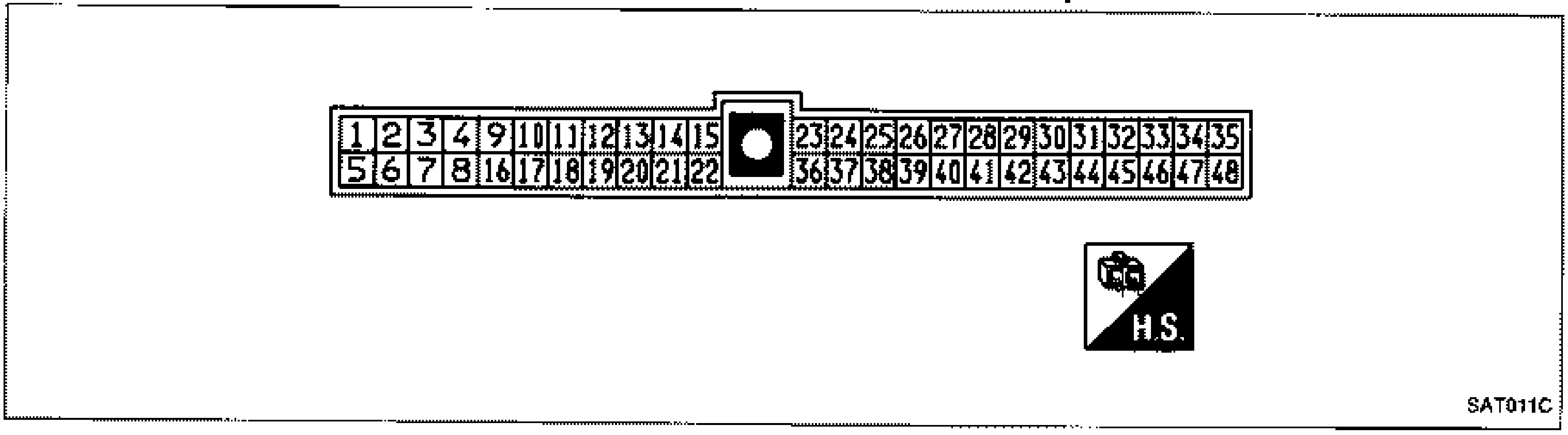


Electrical Components Inspection

INSPECTION OF A/T CONTROL UNIT

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

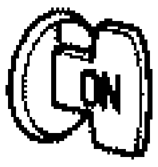
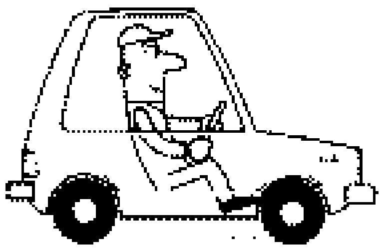
- Pin connector terminal layout.



Electrical Components Inspection (Cont'd)

A/T CONTROL UNIT INSPECTION TABLE

(Data are reference values.)

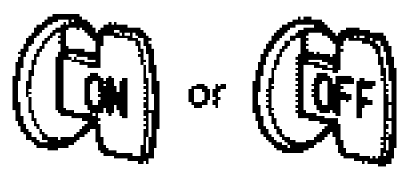
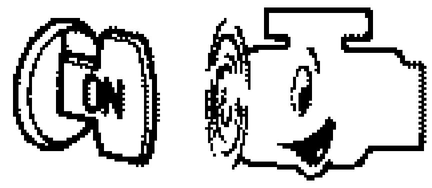
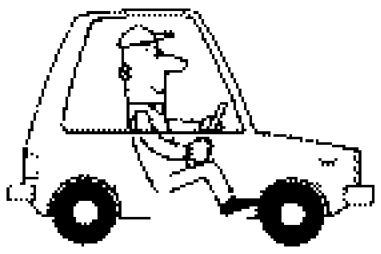
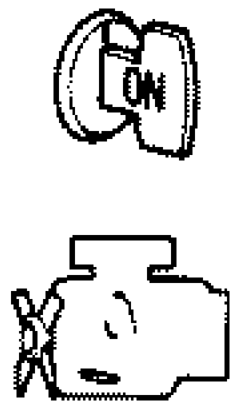
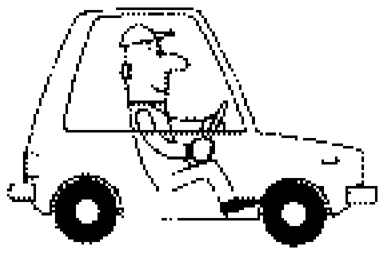
Terminal No.	Item	Condition		Judgment standard
1	Line pressure solenoid	 	When accelerator pedal is released after warming up engine.	1.5 - 2.5V
			When accelerator pedal is depressed fully after warming up engine.	0.5V or less
2	Line pressure solenoid (with dropping resistor)		When accelerator pedal is released after warming up engine.	5 - 14V
			When accelerator pedal is depressed fully after warming up engine.	0.5V or less
3	A/T check lamp		When A/T check lamp is on.	1V or less
			When A/T check lamp is not on.	Battery voltage
4	Power source		When ignition switch is turned to "ON".	Battery voltage
			When ignition switch is turned to "OFF".	1V or less
5	Lock-up solenoid		When A/T is performing lock-up.	8 - 15V
			When A/T is not performing lock-up.	1V or less
6	Shift solenoid A		When shift solenoid A is operating. (When driving in "D_1" or "D_4".)	Battery voltage
			When shift solenoid A is not operating. (When driving in "D_2" or "D_3".)	1V or less
7	Shift solenoid B		When shift solenoid B is operating. (When driving in "D_1" or "D_2".)	Battery voltage
			When shift solenoid B is not operating. (When driving in "D_3" or "D_4".)	1V or less
8	Overrun clutch solenoid		When timing solenoid is operating. (When driving in "D_1" or "D_4".)	Battery voltage
			When timing solenoid is not operating. (When driving in "D_2" or "D_3".)	1V or less

Electrical Components Inspection (Cont'd)

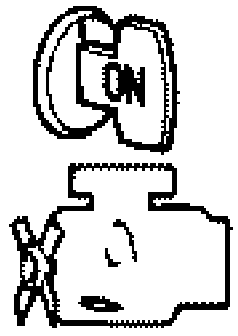
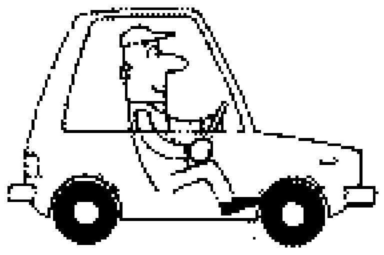
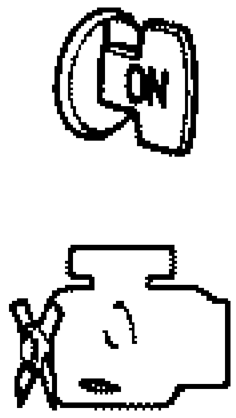
Terminal No.	Item	Condition		Judgment standard
9	Power source	ON	Same as No. 4	
10*	—		—	—
11	—		—	—
12	—		—	—
13	—		—	—
14	Idle switch (in throttle valve switch)		When accelerator pedal is released after warming up engine.	8 - 15V
			When accelerator pedal is depressed after warming up engine.	1V or less
15	Ground		—	—
16	Inhibitor "1" range switch		When selector lever is set to "1" range.	Battery voltage
			When selector lever is set to other ranges.	1V or less
17	Inhibitor "2" range switch		When selector lever is set to "2" range.	Battery voltage
			When selector lever is set to other ranges.	1V or less
18	Inhibitor "D" range switch		When selector lever is set to "D" range.	Battery voltage
			When selector lever is set to other ranges.	1V or less
19	Inhibitor "N" or "P" range switch		When selector lever is set to "N" range.	Battery voltage
			When selector lever is set to other ranges.	1V or less
20	Inhibitor "R" range switch		When selector lever is set to "R" range.	Battery voltage
			When selector lever is set to other ranges.	1V or less
21	Full throttle 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
22	—		—	—

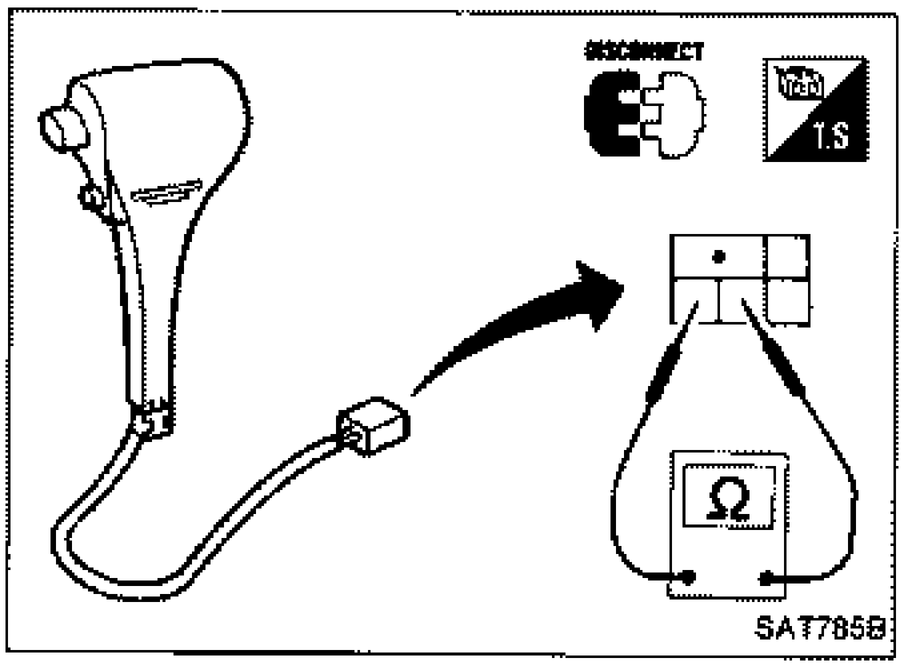
*: This terminal is connected to terminal No. 36 of E.C.C.S. control unit.
When code No. 54 appears during engine self-diagnosis, check line between above terminals for proper continuity.

Electrical Components Inspection (Cont'd)

Terminal No.	Item	Condition		Judgment standard
23	Power source (Back-up)		When ignition switch is turned to "OFF".	Battery voltage
			When ignition switch is turned to "ON".	Battery voltage
24	Engine revolution signal		When engine is running at idle speed.	0.9V
			When engine is running at 3,000 rpm.	Approximately 3.7V
25	Revolution sensor (Measure in AC range)		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
26	—		—	—
27	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
28	—		—	—
29	—		—	—
30	—		—	—
31	Throttle sensor (Power source)		—	4.5 - 5.5V
32	—		—	—
33	Fluid temperature sensor		When A.T.F. temperature is 20°C (68°F).	Approximately 1.5V
			When A.T.F. temperature is 80°C (176°F).	Approximately 0.5V
34	Throttle sensor		When accelerator pedal is depressed slowly after warming up engine. Voltage rises gradually in response to throttle opening angle.	Fully-closed throttle: Approximately 0.5V Fully-open throttle: Approximately 4V
35	Throttle sensor (Ground)		—	—
36	—		—	—
37	A.S.C.D. cruise signal		When A.S.C.D. cruise is being performed. ("CRUISE" light comes on.)	Battery voltage
			When A.S.C.D. cruise is not being performed. ("CRUISE" light does not come on.)	1V or less

Electrical Components Inspection (Cont'd)

Terminal No.	Item	Condition		Judgment standard
38	—		—	—
39	Overdrive switch		When overdrive switch is set in "ON" position.	Battery voltage
			When overdrive switch is set in "OFF" position.	1V or less
40	A.S.C.D. O.D. cut signal		When "ACCEL" set switch on A.S.C.D. cruise is released.	5 - 8V
			When "ACCEL" set switch on A.S.C.D. cruise is applied.	1V or less
41	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
42	—		—	—
43	—		—	—
44	—		—	—
45	—		—	—
46	—		—	—
47	—		—	—
48	Ground		—	—



SAT785B

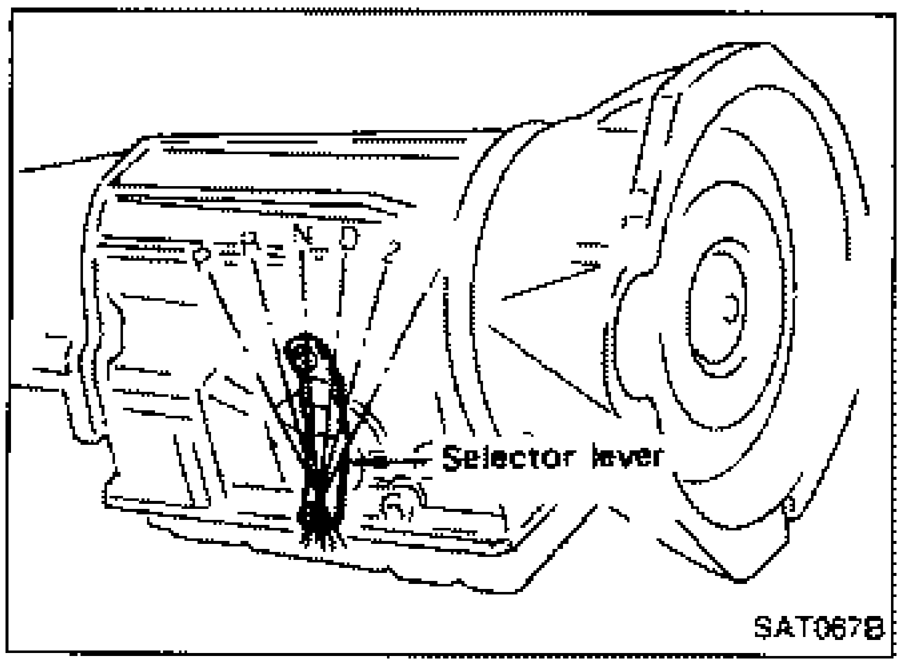
OVERDRIVE SWITCH

- Check continuity between two terminals.

O.D. switch position	Continuity
ON	No
OFF	Yes

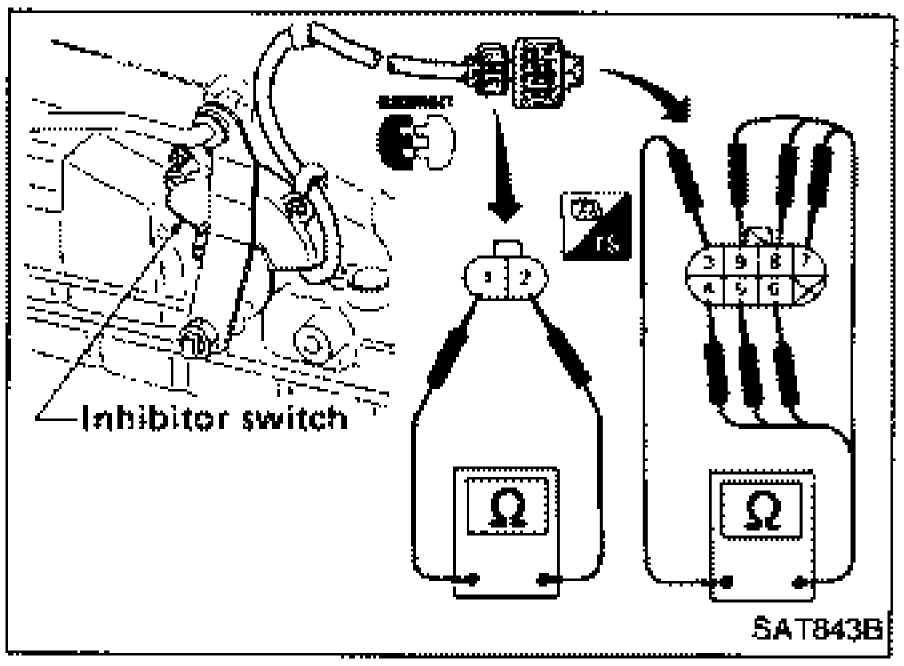
Electrical Components Inspection (Cont'd)

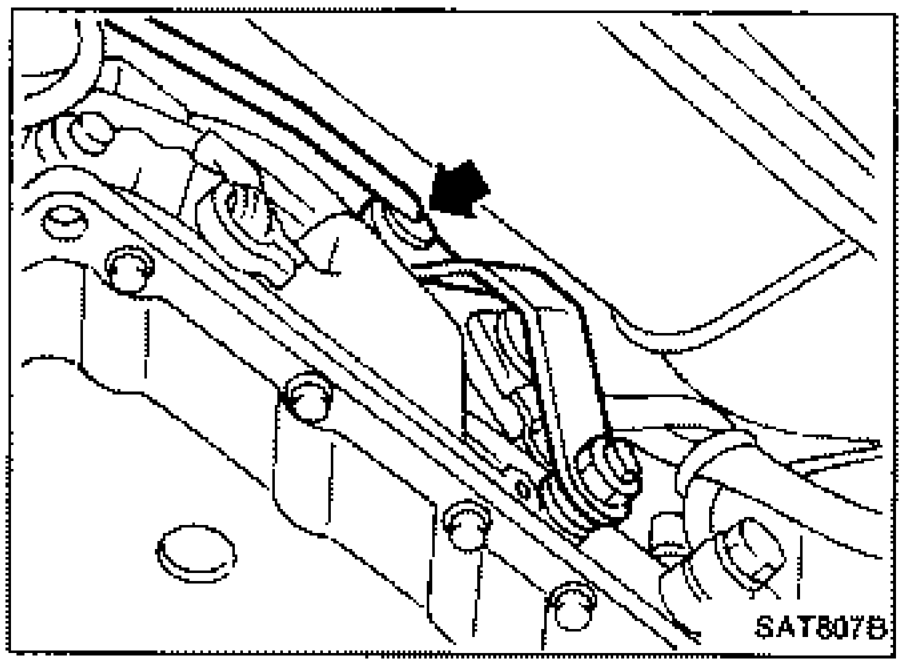
INHIBITOR SWITCH



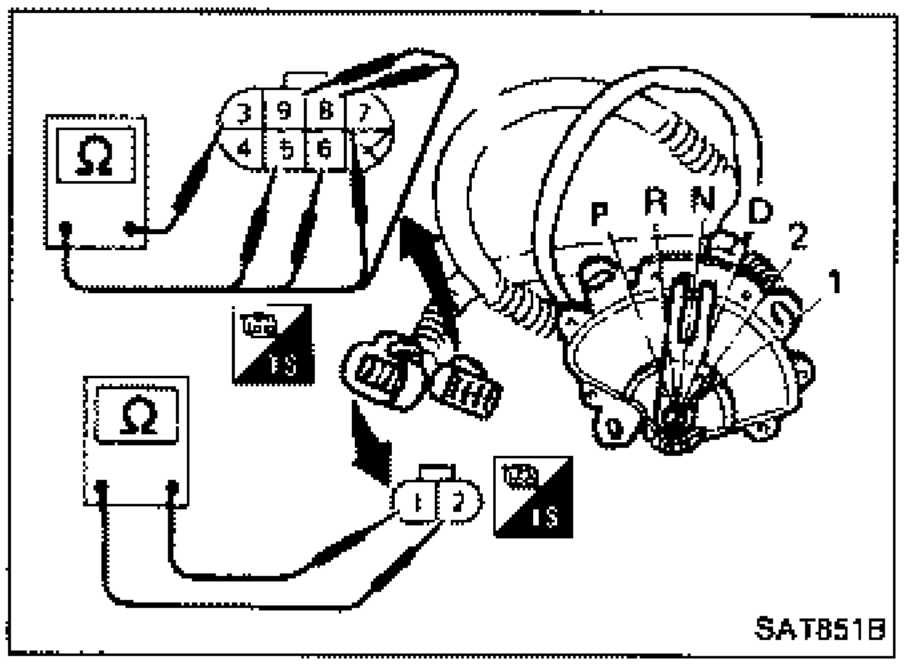
1. Check continuity between terminals ① and ② and between terminals ③ and ④, ⑤, ⑥, ⑦, ⑧, ⑨ while moving selector lever through each range.

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



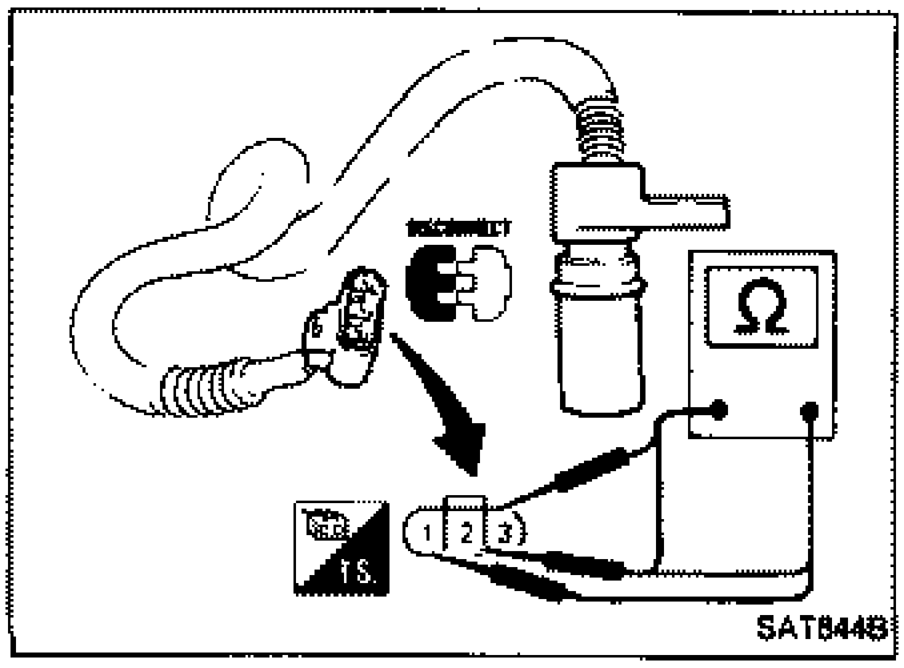


2. If N.G., check again with manual control linkage disconnected from manual shaft of A/T assembly. — Refer to step 1.
3. If O.K. on step 2, adjust manual control linkage. — Refer to "ON-VEHICLE SERVICE".



4. If N.G. on step 2, remove inhibitor switch from A/T and check continuity of inhibitor switch terminal. — Refer to step 1.
5. If O.K. on step 4, adjust inhibitor switch. — Refer to "ON-VEHICLE SERVICE".
6. If N.G. on step 4, replace inhibitor switch.

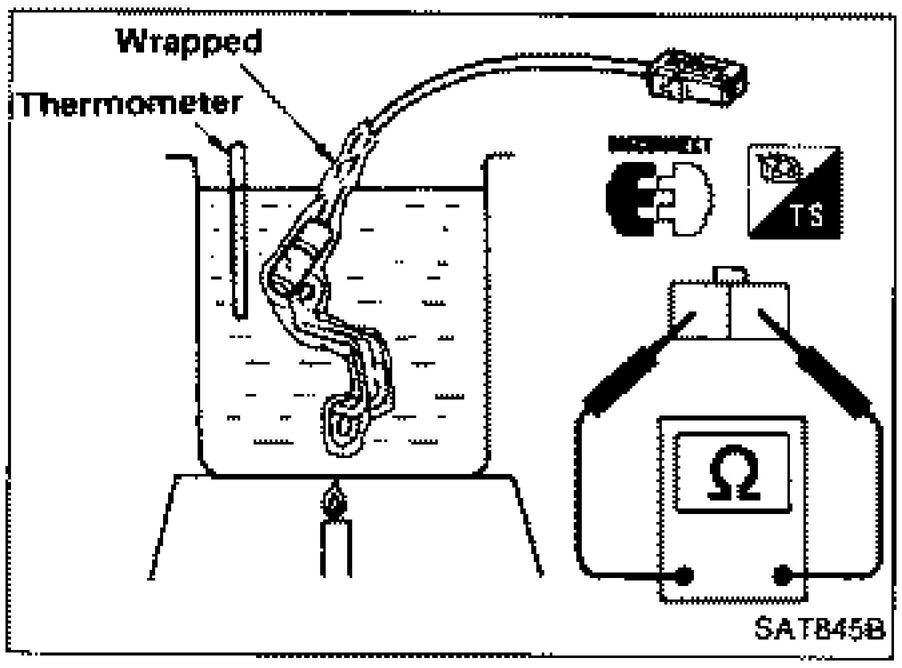
REVOLUTION SENSOR



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

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

Electrical Components Inspection (Cont'd)

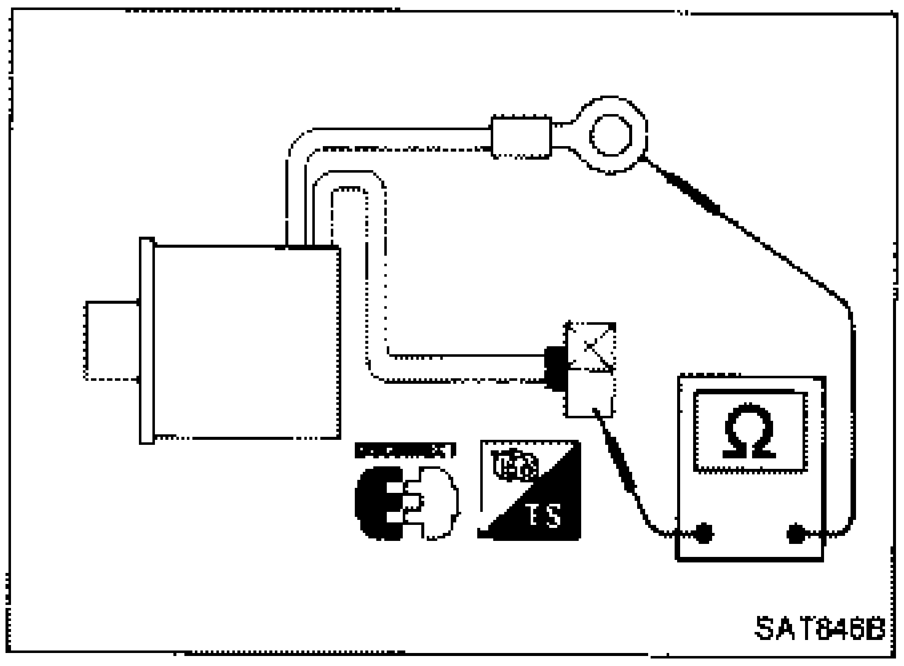


SAT845B

FLUID TEMPERATURE SENSOR

- For removal and installation, refer to "ON-VEHICLE SERVICE".
- Check resistance between two terminals while changing temperature as shown at left.

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



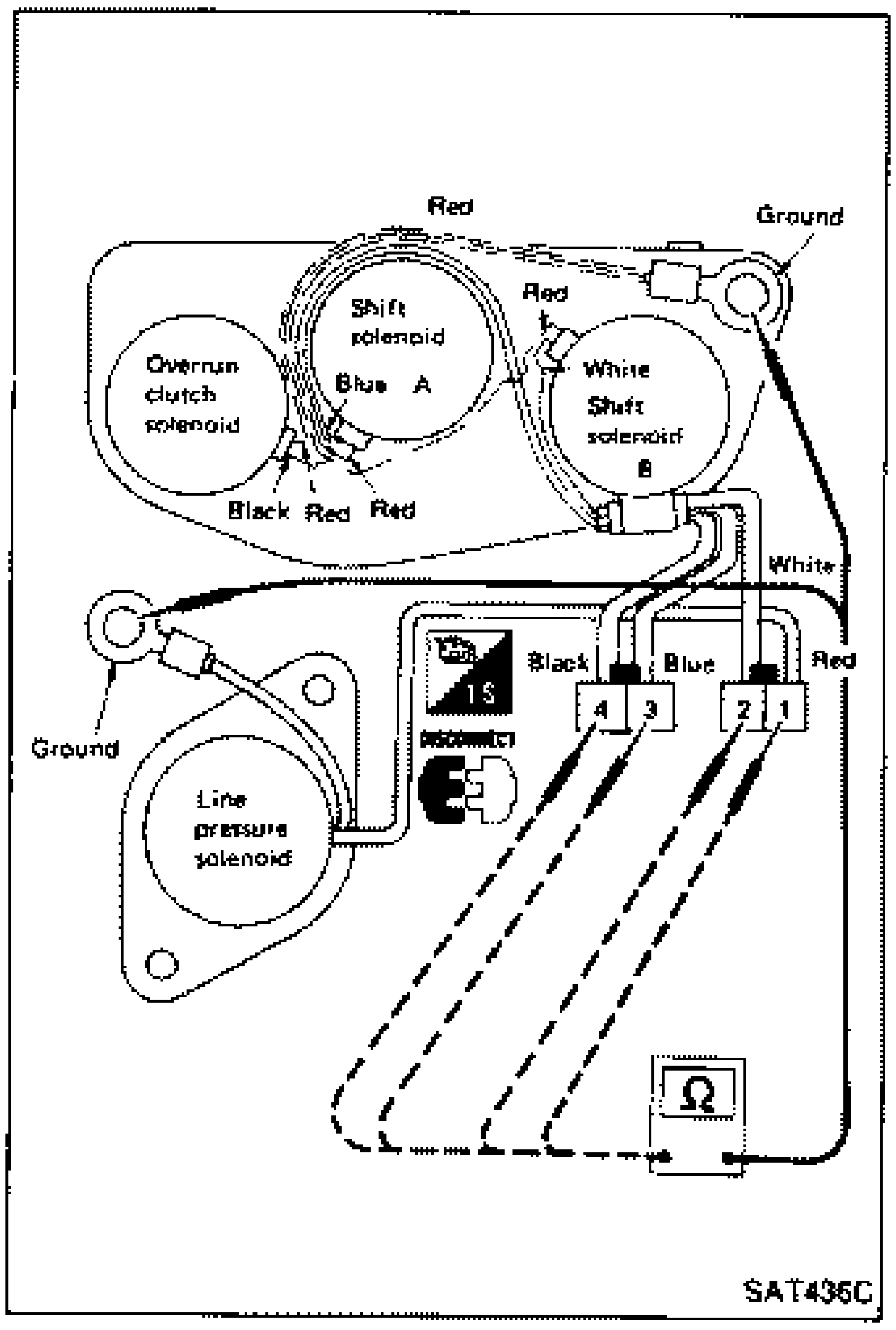
SAT846B

LOCK-UP SOLENOID

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

  Resistance:

  Lock-up solenoid 10 - 20Ω

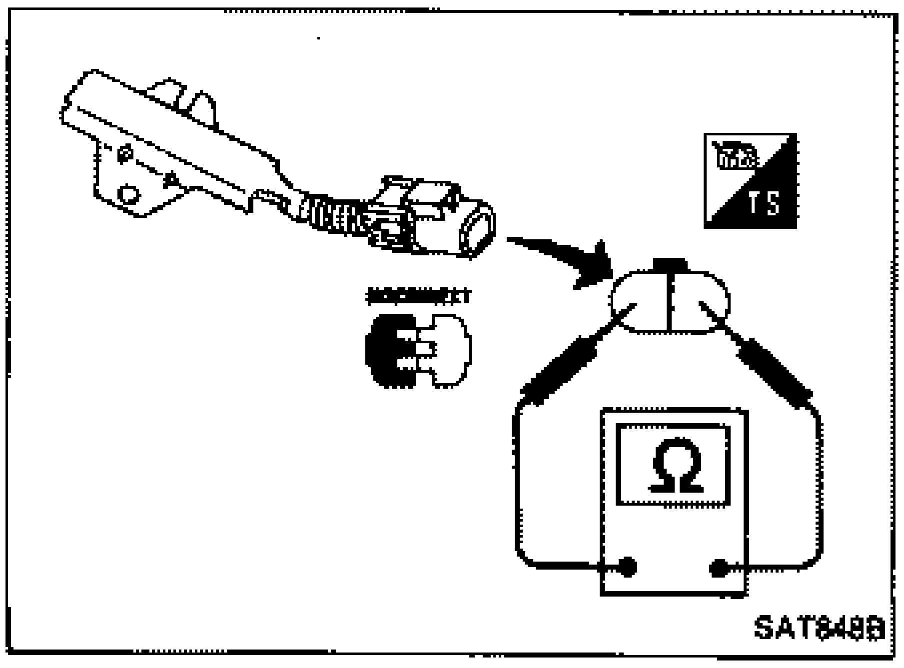


SAT436C

3-UNIT SOLENOID ASSEMBLY (Shift solenoids A, B and overrun clutch solenoid) AND LINE PRESSURE SOLENOID

- For removal and installation, refer to "ON-VEHICLE SERVICE".
- Check resistance between terminals of each solenoid.

Solenoid	Terminal No.		Resistance
Shift solenoid A	③	Ground terminal	20 - 40Ω
Shift solenoid B	②		
Overrun clutch solenoid	④		
Line pressure solenoid	①		2.5 - 5Ω

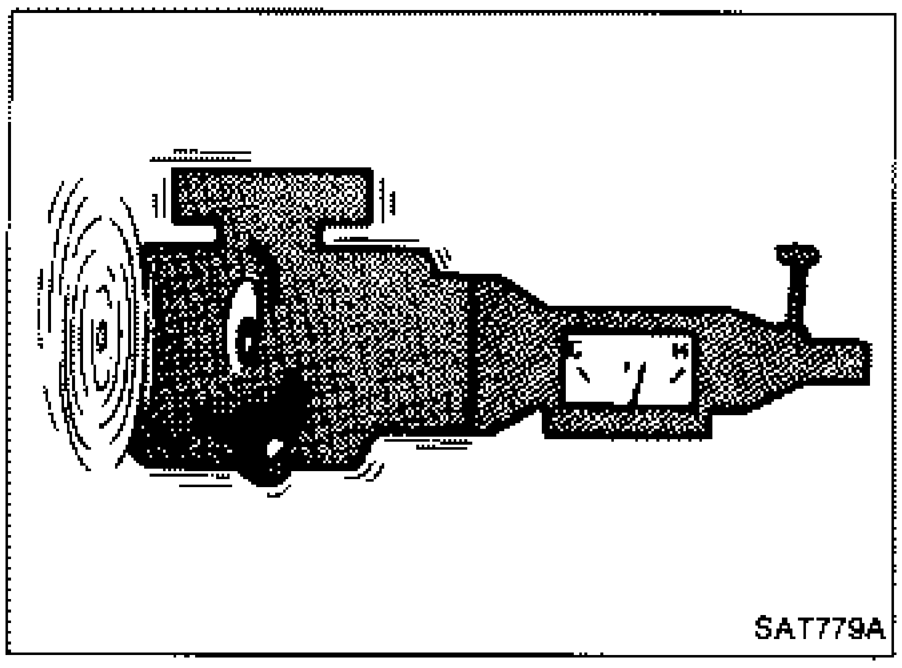


SAT848B

DROPPING RESISTOR

- Check resistance between two terminals.

  Resistance: 11.2 - 12.8Ω



SAT779A

Final Check

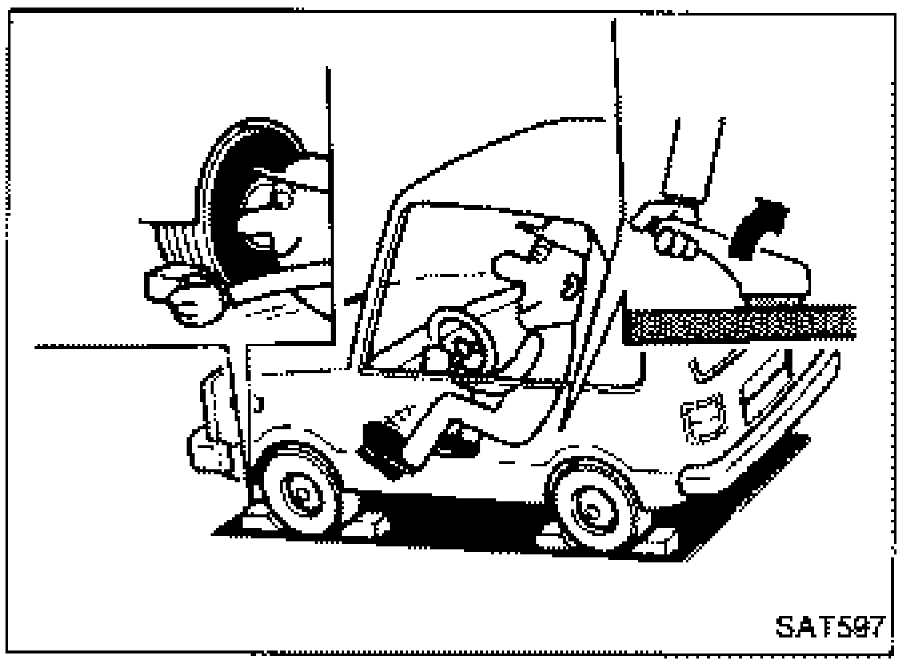
STALL TESTING

Stall test procedure

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

   A.T.F. operating temperature:

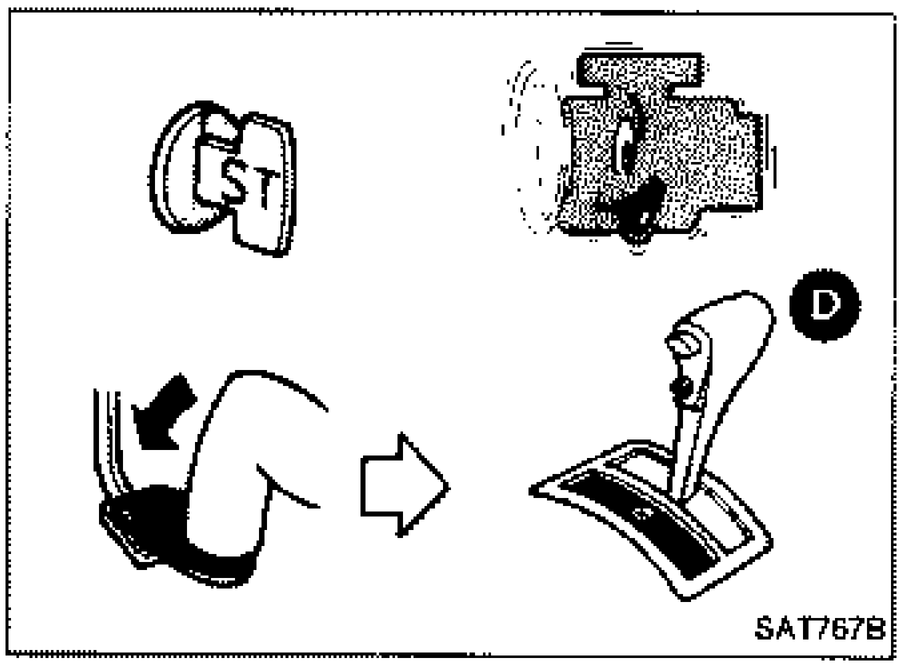
   50 - 80°C (122 - 176°F)



SAT597

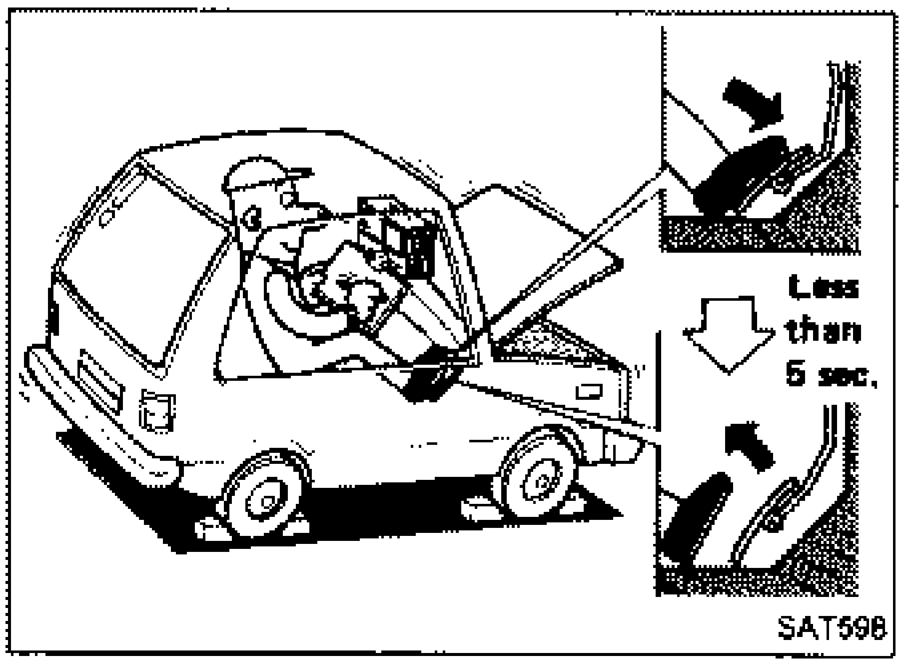
3. Set parking brake and block wheels.
4. Install a tachometer where it can be seen by driver during test.

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



SAT767B

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



SAT598

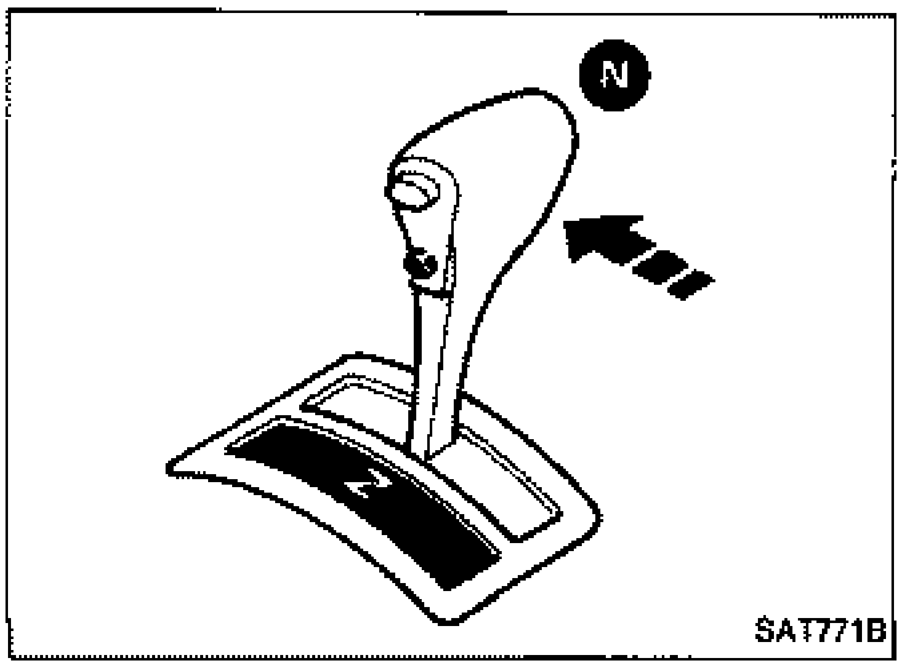
6. Accelerate to wide-open throttle gradually while applying foot brake.
7. Quickly note the engine stall revolution and immediately release throttle.

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

  Stall revolution:

  2,450 - 2,650 rpm (RE4R01A)

  2,950 - 3,200 rpm (RE4R03A)



SAT771B

8. Shift selector lever to "N".
9. Cool off A.T.F.

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

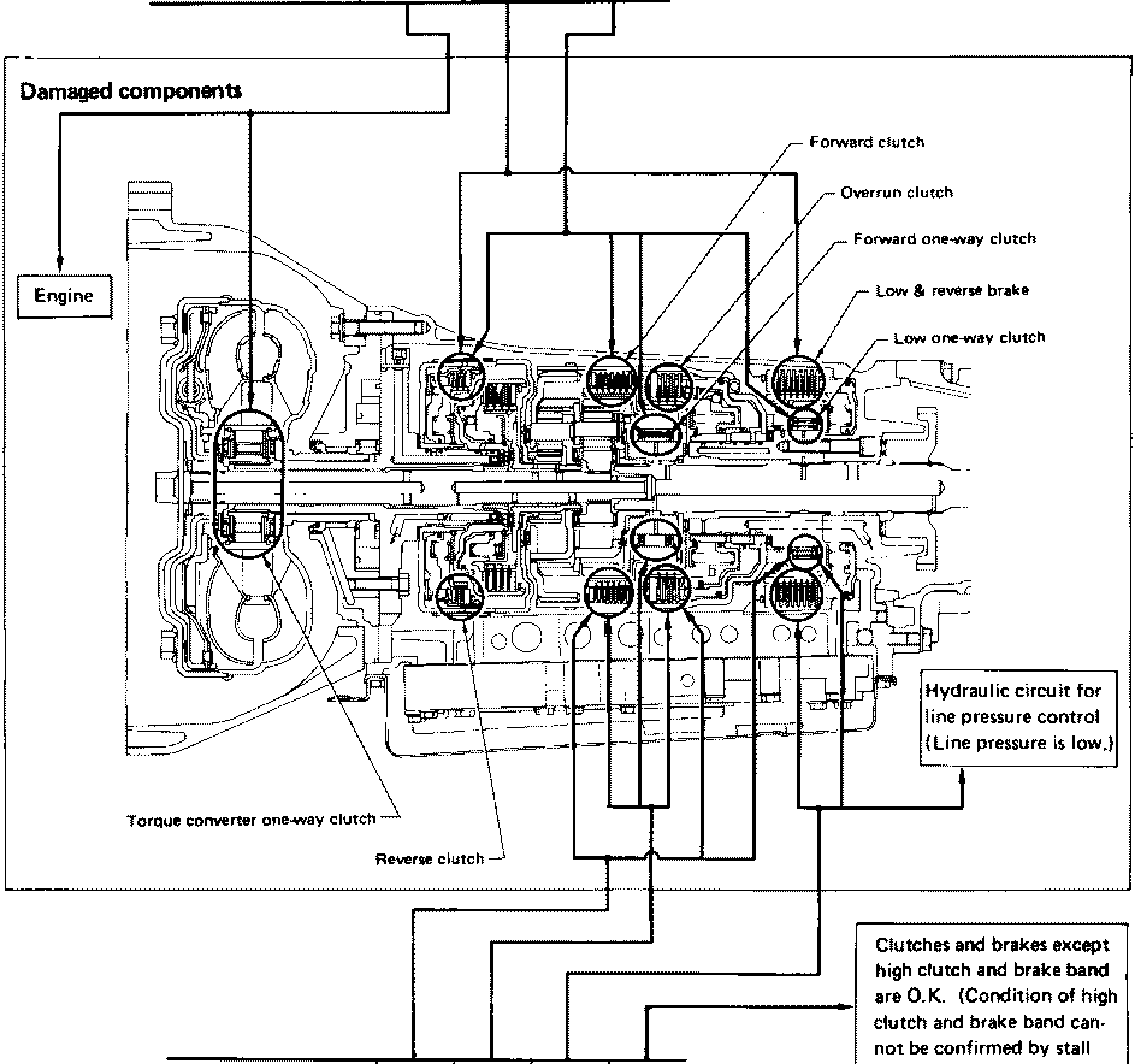
10. Perform stall tests in the same manner as in steps 5 through 9 with selector lever in "2", "1" and "R", respectively.

Final Check (Cont'd)

Judgment of stall test

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

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



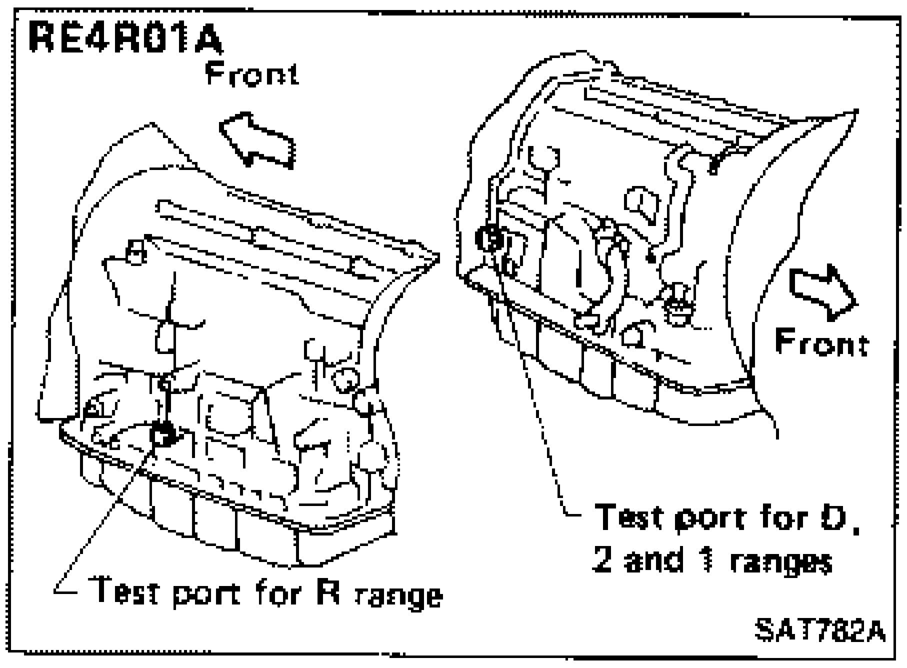
Clutches and brakes except high clutch and brake band are O.K. (Condition of high clutch and brake band cannot be confirmed by stall test.)

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

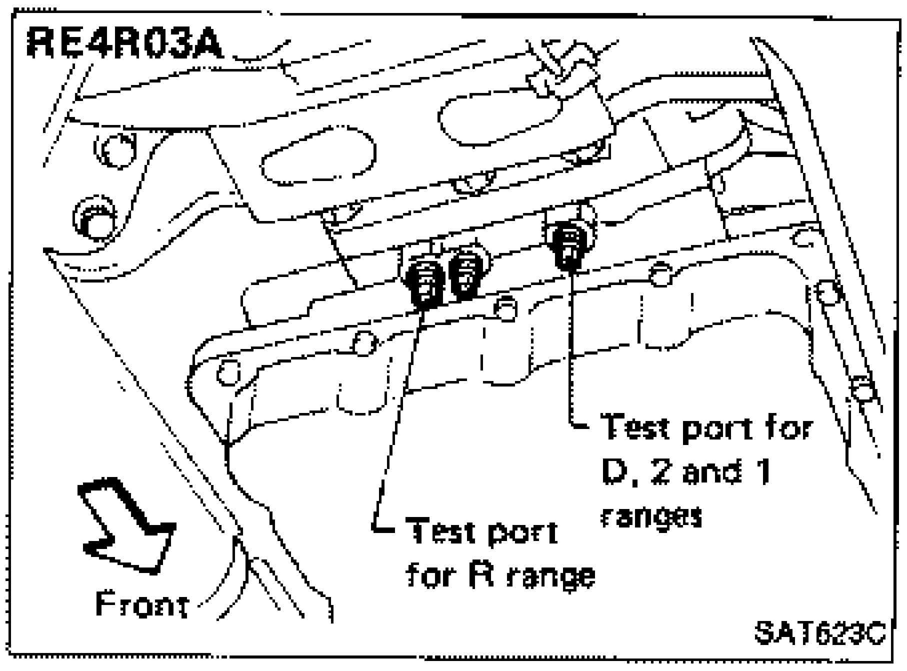
SAT107B

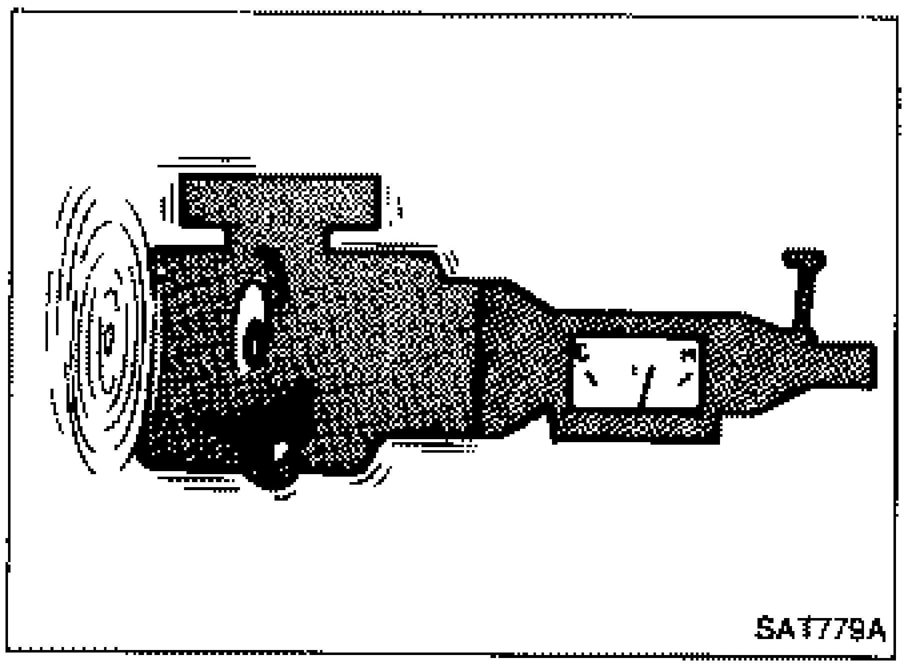
Final Check (Cont'd)

PRESSURE TESTING



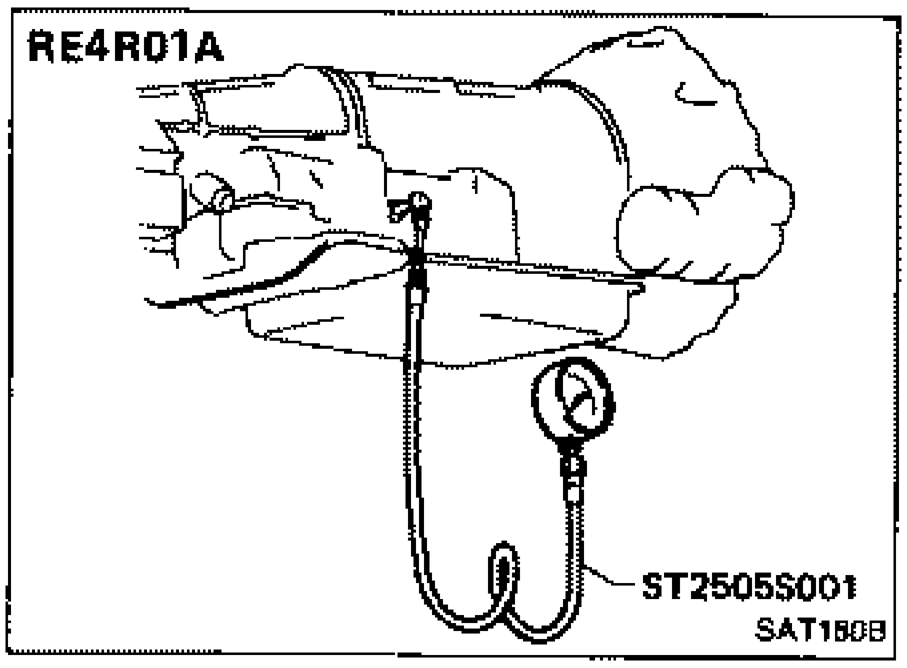
- Location of line pressure test port
- **Line pressure plugs are hexagon headed bolts.**
- **Always replace line pressure plugs as they are self-sealing bolts.**

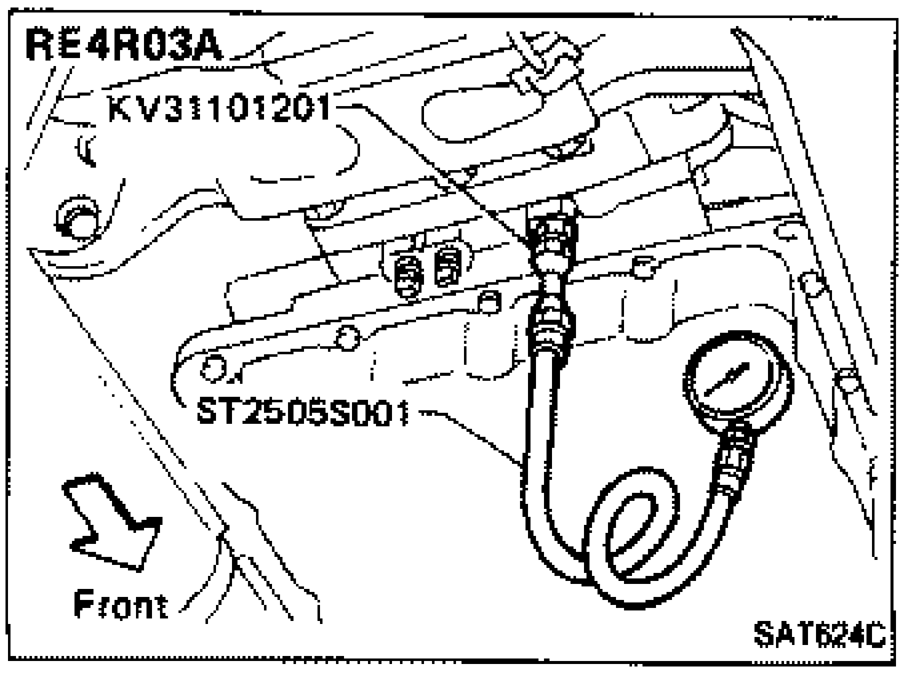




Line pressure test procedure

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



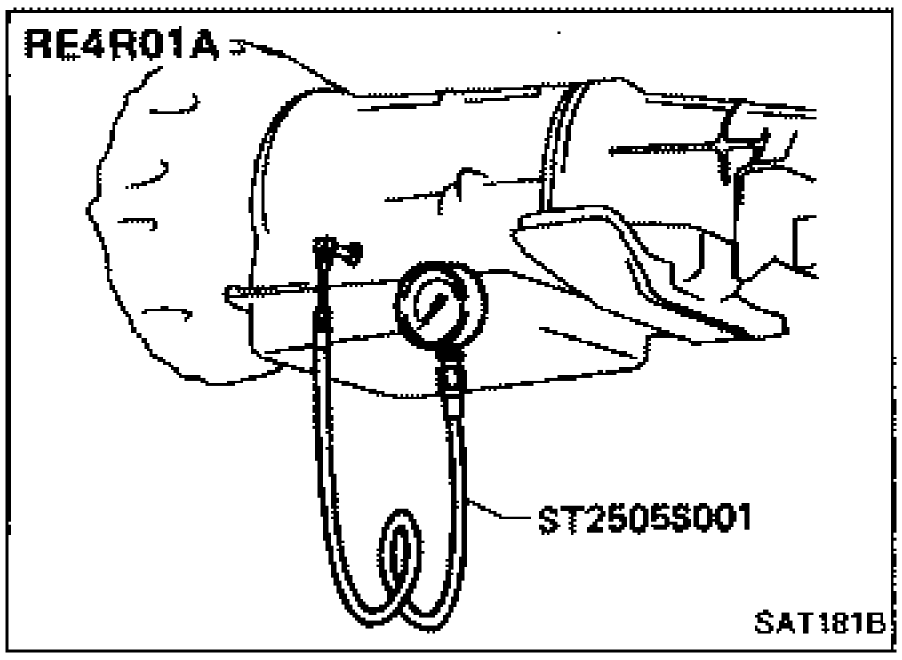


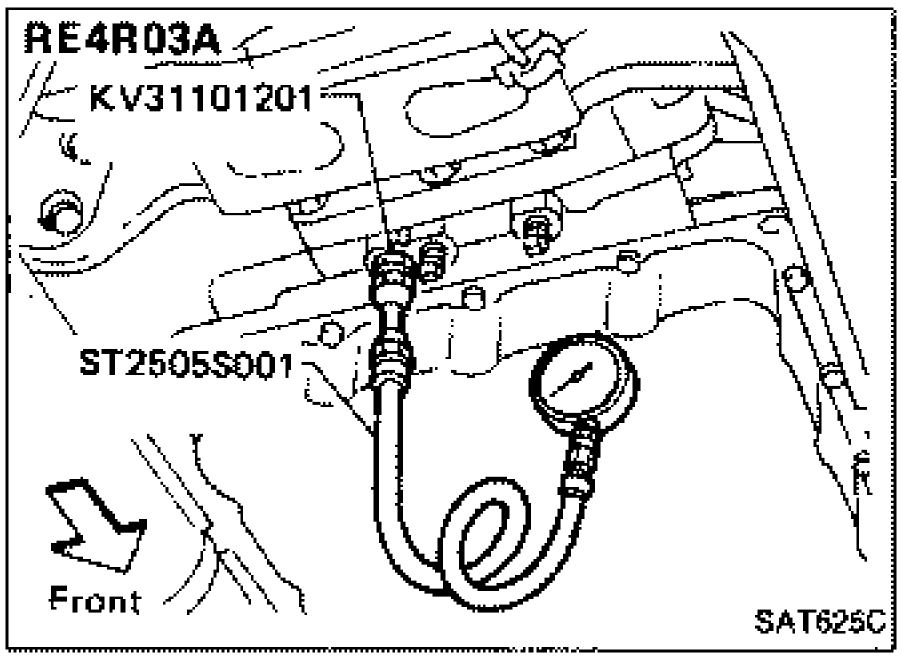
3. Install pressure gauge to line pressure port.

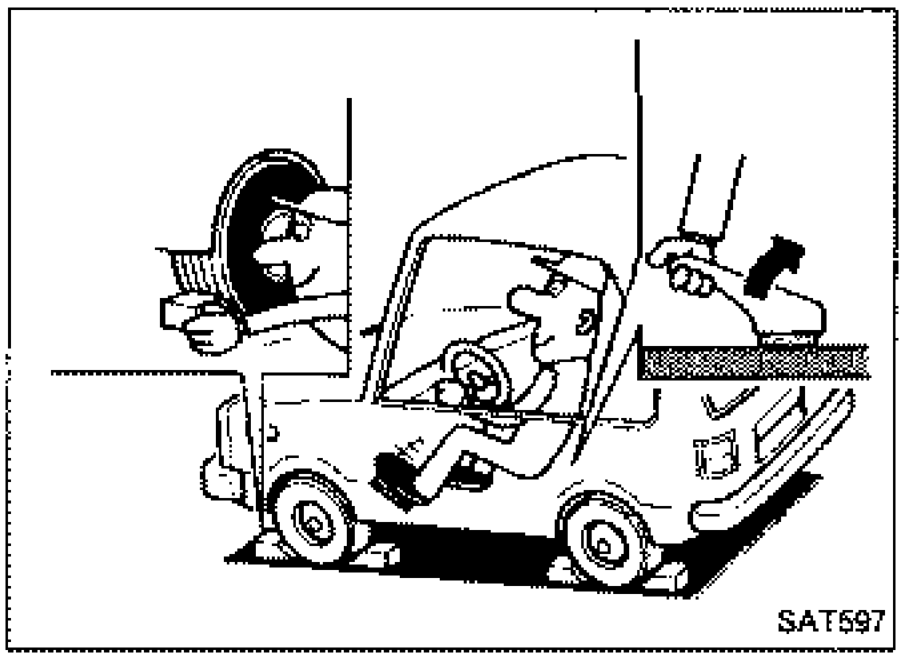
— D, 2 and 1 ranges —

Final Check (Cont'd)

— R range —

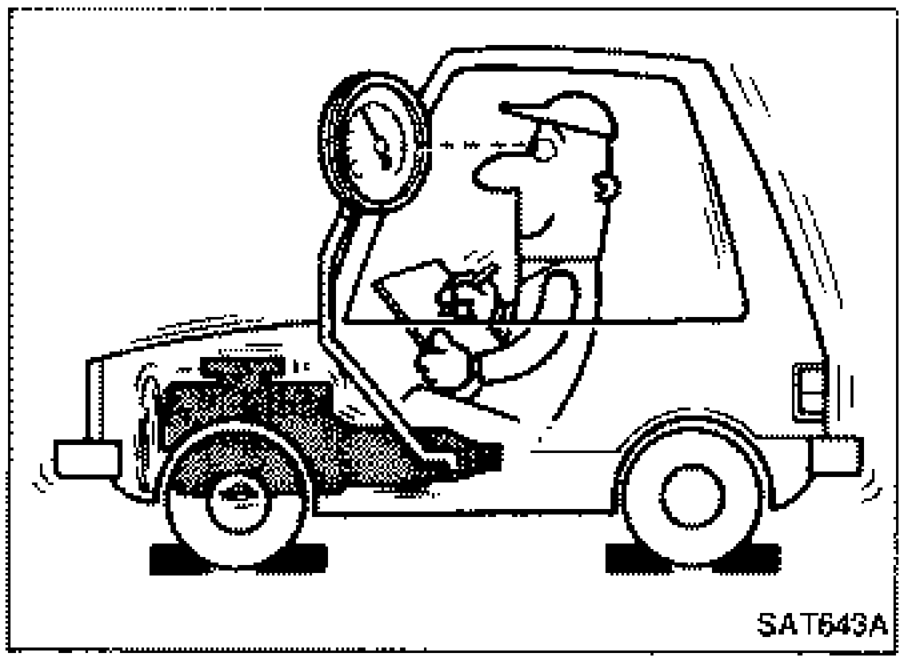






4. Set parking brake and block wheels.

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



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:

Engine speed rpm	Line pressure kPa (bar, kg/cm², psi)	
	D, 2 and 1 ranges	R range
Idle	412 - 490 (4.12 - 4.90, 4.2 - 5.0, 60 - 71)	608 - 647 (6.08 - 6.47, 6.2 - 6.6, 88 - 94)
Stall	1,020 - 1,098 (10.20 - 10.98, 10.4 - 11.2, 148 - 159)	1,422 - 1,500 (14.22 - 15.00, 14.5 - 15.3, 206 - 218)

Final Check (Cont'd)

JUDGMENT OF LINE PRESSURE TEST

Judgment		Suspected parts
At idle	Line pressure is low in all ranges.	• 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 range.	• Fluid pressure leakage between manual valve and particular clutch • For example; If line pressure is low in "R" and "1" ranges but is normal in "D" and "2" range, fluid leakage exists at or around low & reverse brake circuit.
	Line pressure is high.	• Mal-adjustment of throttle sensor • Fluid temperature sensor damaged • Line pressure solenoid sticking • Short circuit of line pressure solenoid circuit • Pressure modifier valve sticking • Pressure regulator valve or plug sticking
At stall speed	Line pressure is low.	• Mal-adjustment of throttle sensor • Control piston damaged • Line pressure solenoid sticking • Short circuit of line pressure solenoid circuit • Pressure regulator valve or plug sticking • Pressure modifier valve sticking • Pilot valve sticking

Symptom Chart

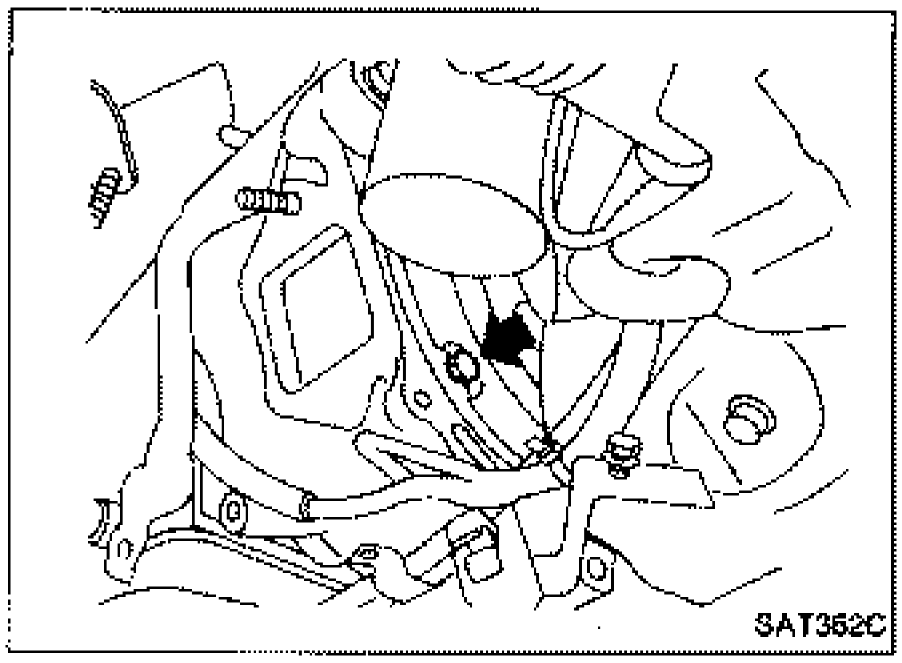
		ON vehicle																				OFF vehicle										
	Reference page (AT-)	9, 15		86		86		90		87, 123		87		87		8, 87		8		8		106, 118		137, 142		144, 159		144, 153		148		166
Reference page (AT-)	Numbers are arranged in order of probability. Perform inspections starting with number one and working up. Circled numbers indicate that the transmission must be removed from the vehicle.	Fluid level	Control linkage	Inhibitor switch	Throttle sensor (Adjustment)	Revolution sensor and speed sensor	Engine revolution signal	Engine idling rpm	Line pressure	Control valve assembly	Shift solenoid A	Shift solenoid B	Line pressure solenoid	Lock-up solenoid	Overrun clutch solenoid	Fluid temperature sensor	Accumulator N-D	Accumulator 1-2	Accumulator 2-3	Accumulator 3-4 (N-R)	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
67	Engine does not start in "N", "P" ranges.	.	2	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
67	Engine starts in range other than "N" and "P".	.	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
—	Transmission noise in "P" and "N" ranges.	1	.	.	3	4	5	.	2	.	.	.	.	.	.	.	.	.	.	.	.	⑦	⑥	.	.	.	.	.	.	.	.	.
67	Vehicle moves when changing into "P" range or parking gear does not disengage when shifted out of "P" range.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	②
68	Vehicle runs in "N" range.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	③	.	②	.	⑤	.	.	.	.
70	Vehicle will not run in "R" range (but runs in "D", "2" and "1" ranges). Clutch slips. Very poor acceleration.	.	1	.	.	.	.	.	2	4	.	.	3	.	.	.	.	.	.	.	.	.	.	⑤	⑥	⑦	.	⑧	.	⑨	.	.
—	Vehicle braked when shifting into "R" range.	1	2	.	.	.	.	.	3	5	.	.	4	.	.	.	.	.	.	.	.	.	.	.	⑥	⑧	.	⑨	.	.	⑦	.
—	Sharp shock in shifting from "N" to "D" range.	.	.	.	2	.	5	1	3	7	.	.	6	.	.	4	8	.	.	.	.	.	.	.	.	⑨	.	.	.	.	.	.
—	Vehicle will not run in "D" and "2" ranges (but runs in "1" and "R" range).	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	②	.	.	.
71	Vehicle will not run in "D", "1", "2" ranges (but runs in "R" range). Clutch slips. Very poor acceleration.	1	.	.	.	.	.	.	2	4	.	.	3	.	.	.	5	.	.	.	.	.	.	⑥	⑦	⑧	⑨	.	⑩	.	.	.
—	Clutches or brakes slip somewhat in starting.	1	2	.	3	.	.	.	4	6	.	.	5	.	.	.	7	.	.	8	.	⑬	⑫	⑩	.	⑨	.	.	.	⑪	.	.
—	Excessive creep.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
70, 71	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	.
73, 74, 75	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	4	.	.	.	.	.	.	.	.	3	.	.	.	.	.	⑤	.	.	.	.	.	⑥	.

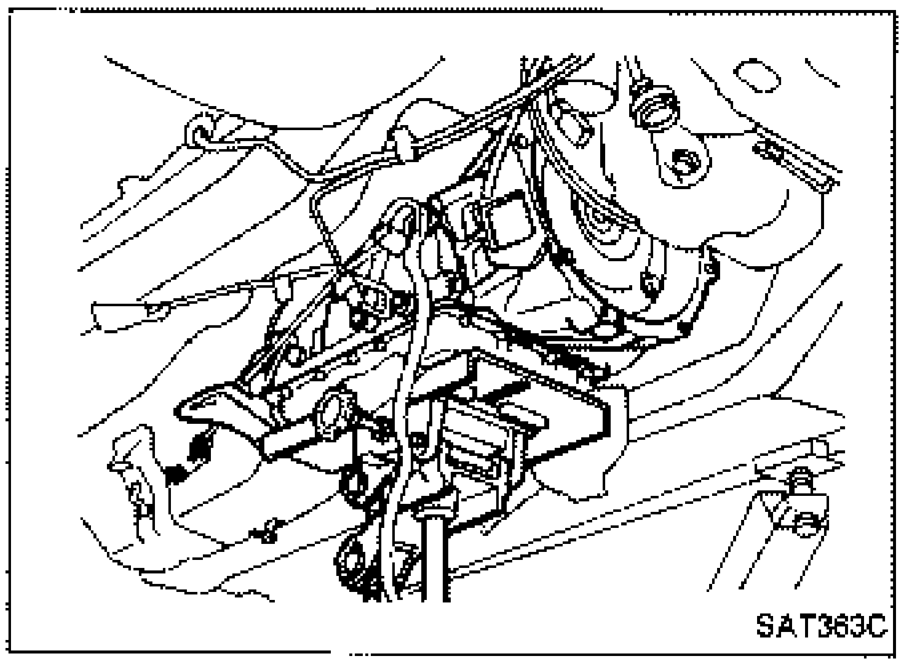
Symptom Chart (Cont'd)

		ON vehicle																				OFF vehicle										
	Reference page (AT-)	9, 15		86		86		90		87, 123		87		87		8, 87		8		8		106, 118		137, 142		144, 159		144, 153		148		166
Reference page (AT-)	Numbers are arranged in order of probability. Perform inspections starting with number one and working up. Circled numbers indicate that the transmission must be removed from the vehicle.	Fluid level	Control linkage	Inhibitor switch	Throttle sensor (Adjustment)	Revolution sensor and speed sensor	Engine revolution signal	Engine idling rpm	Line pressure	Control valve assembly	Shift solenoid A	Shift solenoid B	Line pressure solenoid	Lock-up solenoid	Overrun clutch solenoid	Fluid temperature sensor	Accumulator N-D	Accumulator 1-2	Accumulator 2-3	Accumulator 3-4 (N-R)	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	4	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	⑥	.	.	⑤	.
—	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	5	.	.	.	.	.	.	.	.	4	.	.	.	.	.	⑥	.	.	.	.	.	⑦	.
—	Almost no shock or slipping in change from "D_3" to "D_4".	1	.	.	2	.	.	.	3	5	.	.	.	.	.	.	.	.	.	4	.	.	.	.	⑥	.	.	.	.	.	⑦	.
—	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	.	.	6	.	.	7	.	.	.	.	.	⑩	⑨	.	.	.	.	⑧	.
—	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 range.	1	2	.	.	.	.	.	3	.	.	.	4	.	.	.	.	.	.	.	.	⑨	⑤	.	⑥	.	.	.	.	⑧	⑦	⑩
—	Transmission noise in "D", "2", "1" and "R" ranges.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	②	.	.	.	.	.	.	.	.	.	.

Symptom Chart (Cont'd)

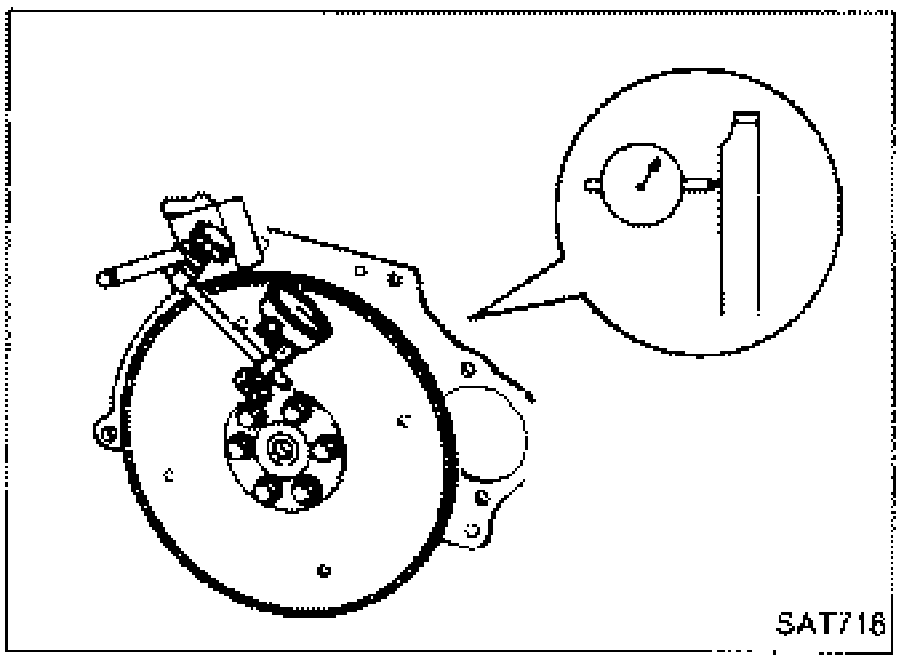
		ON vehicle																				OFF vehicle										
	Reference page (AT-)	9, 15		86		86		90		87, 123		87		87		8, 87		8		8		106, 118		137, 142		144, 159		144, 153		148		166
Reference page (AT-)	Numbers are arranged in order of probability. Perform inspections starting with number one and working up. Circled numbers indicate that the transmission must be removed from the vehicle.	Fluid level	Control linkage	Inhibitor switch	Throttle sensor (Adjustment)	Revolution sensor and speed sensor	Engine revolution signal	Engine idling rpm	Line pressure	Control valve assembly	Shift solenoid A	Shift solenoid B	Line pressure solenoid	Lock-up solenoid	Overrun clutch solenoid	Fluid temperature sensor	Accumulator N-D	Accumulator 1-2	Accumulator 2-3	Accumulator 3-4 (N-R)	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
80	Failure to change from "D_3" to "2_2" when changing lever into "2" range.	.	7	1	2	.	.	.	.	6	5	4	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	⑨	.	.	⑧	.
—	Gear change from "2_2" to "2_3" in "2" range.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
80	Engine brake does not operate in "1" range.	.	2	1	3	4	.	.	.	6	5	.	.	.	7	.	.	.	.	.	.	.	.	.	.	.	.	⑧	.	⑨	.	.
—	Gear change from "1_1" to "1_2" in "1" range.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
—	Does not change from "1_2" to "1_1" in "1" range.	.	.	1	.	2	.	.	.	4	3	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	⑥	.	⑦	.	.
—	Large shock changing from "1_2" to "1_1" in "1" range.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	②	.	.
—	Transmission overheats.	1	.	.	3	.	.	2	4	6	.	.	5	.	.	.	.	.	.	.	.	⑭	⑦	⑧	⑨	⑪	.	⑫	.	⑬	⑩	.
—	A.T.F. 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	.	.	.	.	.	.	.	.	.	.
76	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" ranges.	1	.	.	.	.	.	.	.	5	4	3	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.





Removal

- Remove exhaust tube.
- Remove fluid charging pipe from A/T assembly.
- Remove oil cooler pipe from A/T assembly.
- Remove control linkage from selector lever.
- Disconnect inhibitor switch and solenoid harness connectors.
- Remove speedometer cable from A/T assembly.
- Plug up openings such as the oil charging pipe hole, etc.
- Remove propeller shaft. — Refer to section PD.
- **Insert plug into rear oil seal after removing propeller shaft.**
- **Be careful not to damage spline, sleeve yoke and rear oil seal, when removing propeller shaft.**
- Remove starter motor.
- Remove gusset securing engine to A/T assembly.
- Remove bolts securing torque converter to drive plate.
- **Remove the bolts by turning crankshaft.**
- Support engine by placing a jack under oil pan.
- **Do not place jack under oil pan drain plug.**
- Remove transmission from engine.
- **Support automatic transmission, while removing it.**



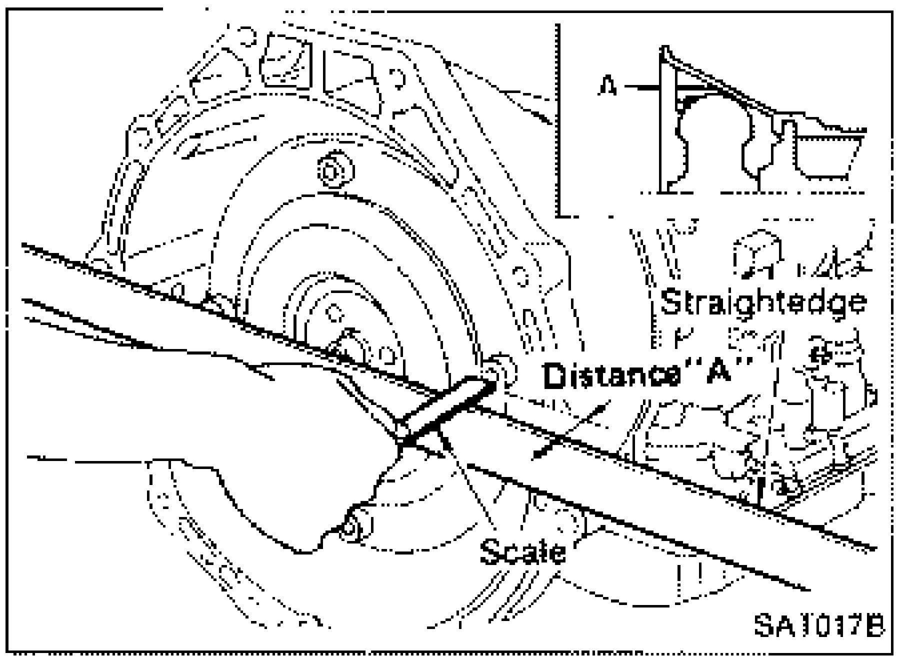
Installation

- Drive plate runout

  Maximum allowable runout:

  0.5 mm (0.020 in)

  If this runout is out of allowance, 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":

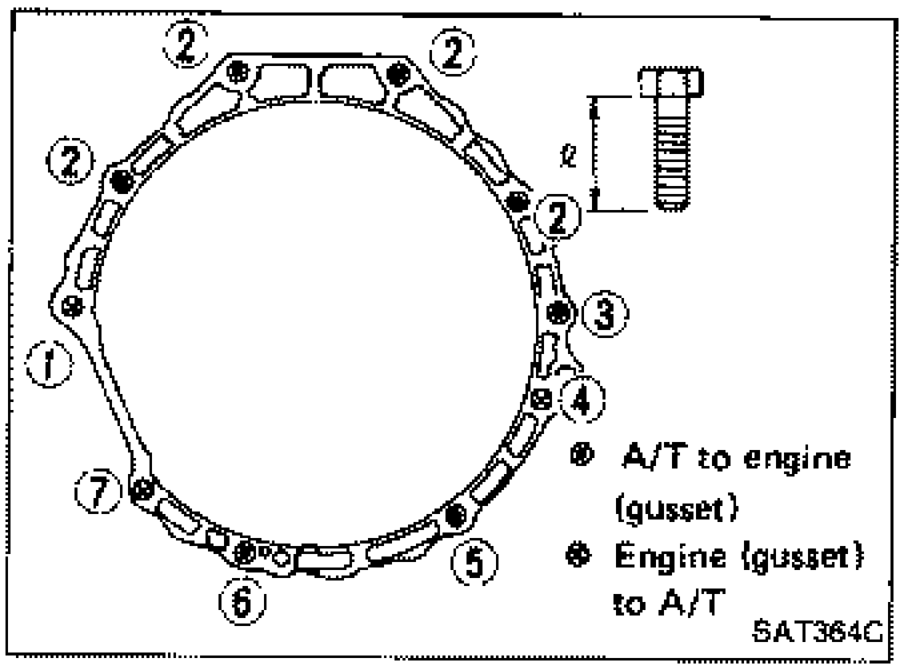
  RE4R01A

  26 mm (1.02 in) or more

  RE4R03A

  25 mm (0.98 in) or more
- Install converter to drive plate.
- Reinstall any part removed.
- **After converter is installed to drive plate, rotate crankshaft several turns and check to be sure that transmission rotates freely without binding.**

Installation (Cont'd)



- Tighten bolts securing transmission.

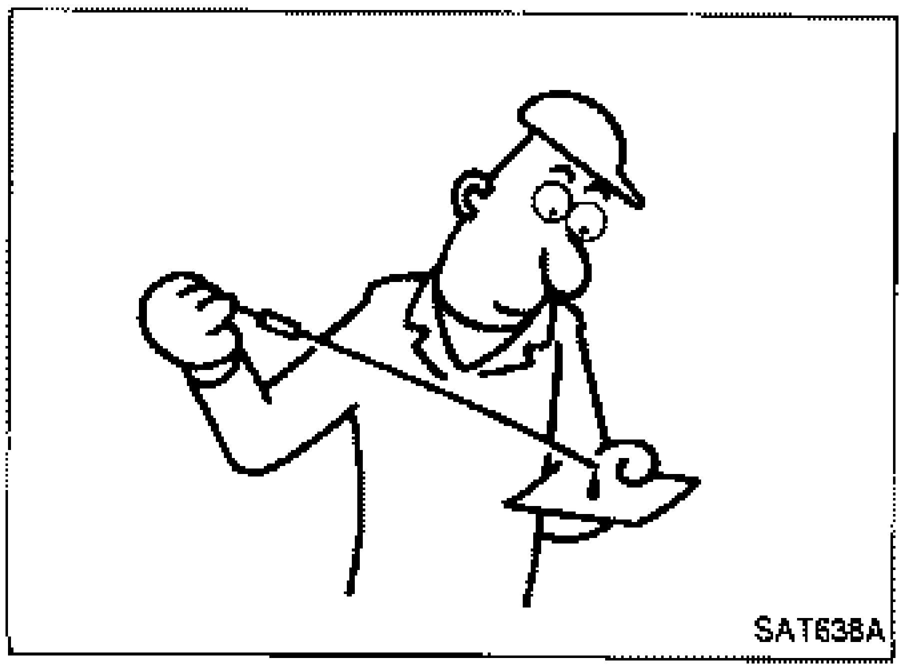
RE4R01A

Bolt No.	Tightening torque N·m (kg-m, ft-lb)	Bolt length "ℓ" mm (in)
1	39 - 49 (4.0 - 5.0, 29 - 36)	60 (2.36)
2	39 - 49 (4.0 - 5.0, 29 - 36)	50 (1.97)
3	39 - 49 (4.0 - 5.0, 29 - 36)	45 (1.77)
4	29 - 39 (3.0 - 4.0, 22 - 29)	25 (0.98)
5	29 - 39 (3.0 - 4.0, 22 - 29)	60 (2.36)
6	39 - 49 (4.0 - 5.0, 29 - 36)	65 (2.56)
7	39 - 49 (4.0 - 5.0, 29 - 36)	25 (0.98)
Gusset to engine	29 - 39 (3.0 - 4.0, 22 - 29)	20 (0.79)

RE4R03A

Bolt No.	Tightening torque N·m (kg-m, ft-lb)	Bolt length "ℓ" mm (in)
1	39 - 49 (4.0 - 5.0, 29 - 36)	60 (2.36)
2	39 - 49 (4.0 - 5.0, 29 - 36)	60 (2.36)
3	39 - 49 (4.0 - 5.0, 29 - 36)	65 (2.56)
4	29 - 39 (3.0 - 4.0, 22 - 29)	25 (0.98)
5	29 - 39 (3.0 - 4.0, 22 - 29)	60 (2.36)
6	39 - 49 (4.0 - 5.0, 29 - 36)	65 (2.56)
7	39 - 49 (4.0 - 5.0, 29 - 36)	25 (0.98)
Gusset to engine	29 - 39 (3.0 - 4.0, 22 - 29)	20 (0.79)

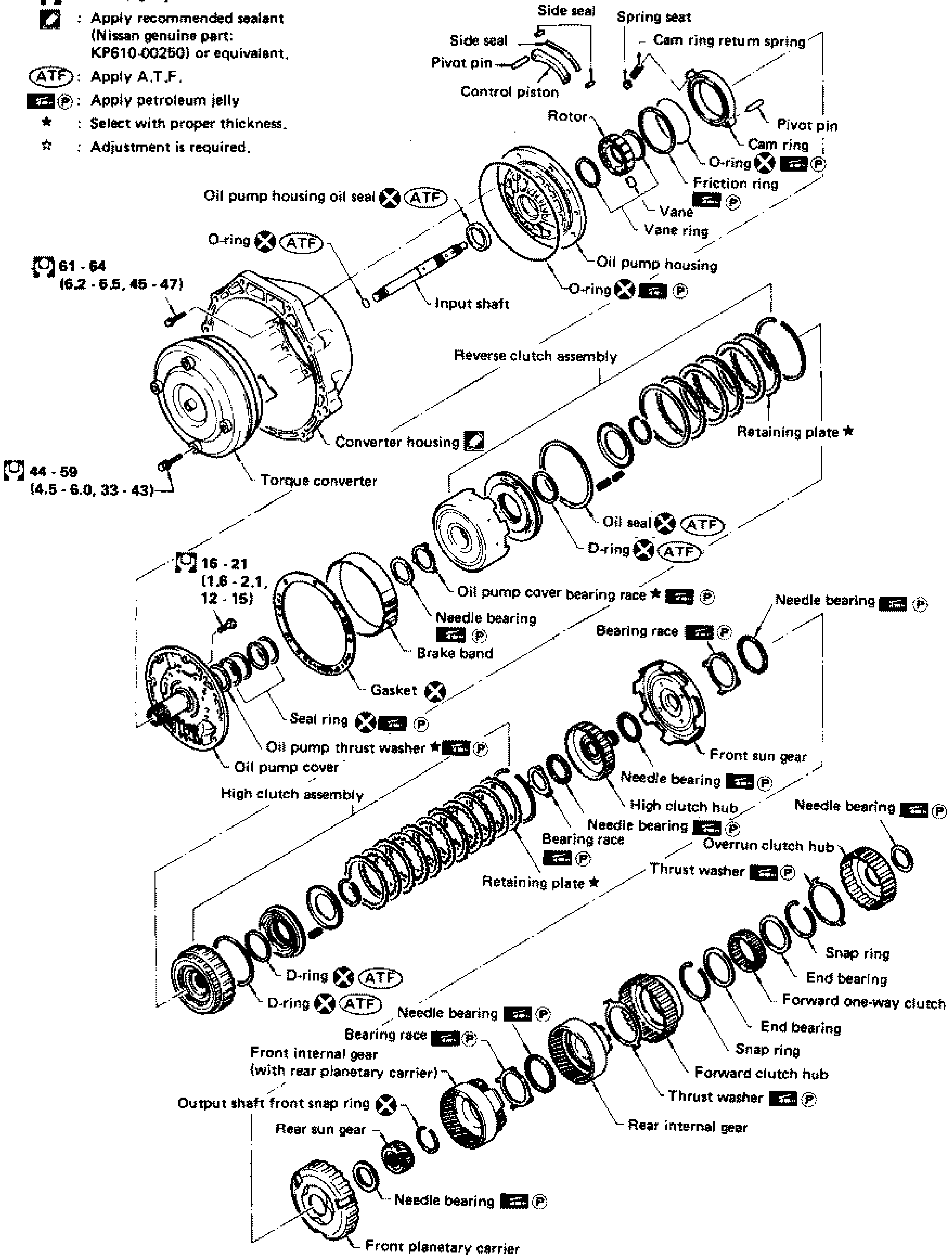
- Reinstall any part removed.



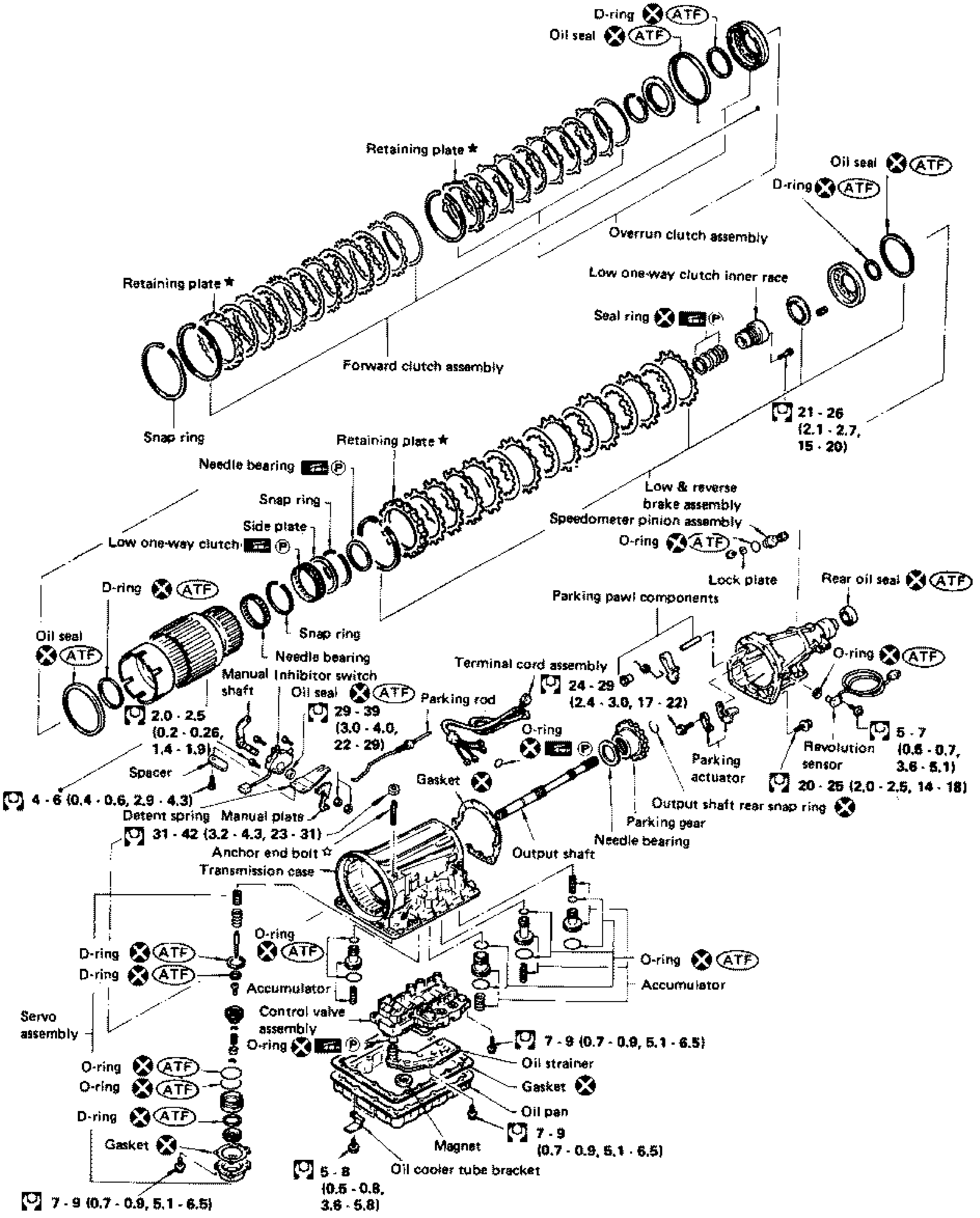
- Check fluid level in transmission.
- Move selector lever through all positions to be sure that transmission operates correctly.
  With parking brake applied, rotate engine at idling. Move selector lever through "N" to "D", to "2", to "1" and to "R".
  A slight shock should be felt by hand gripping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

RE4R01A

🔧 : N·m (kg-m, ft-lb)
▨ : Apply recommended sealant (Nissan genuine part: KP610-00250) or equivalent.
(ATF) : Apply A.T.F.
▬Ⓟ : Apply petroleum jelly
★ : Select with proper thickness.
☆ : Adjustment is required.



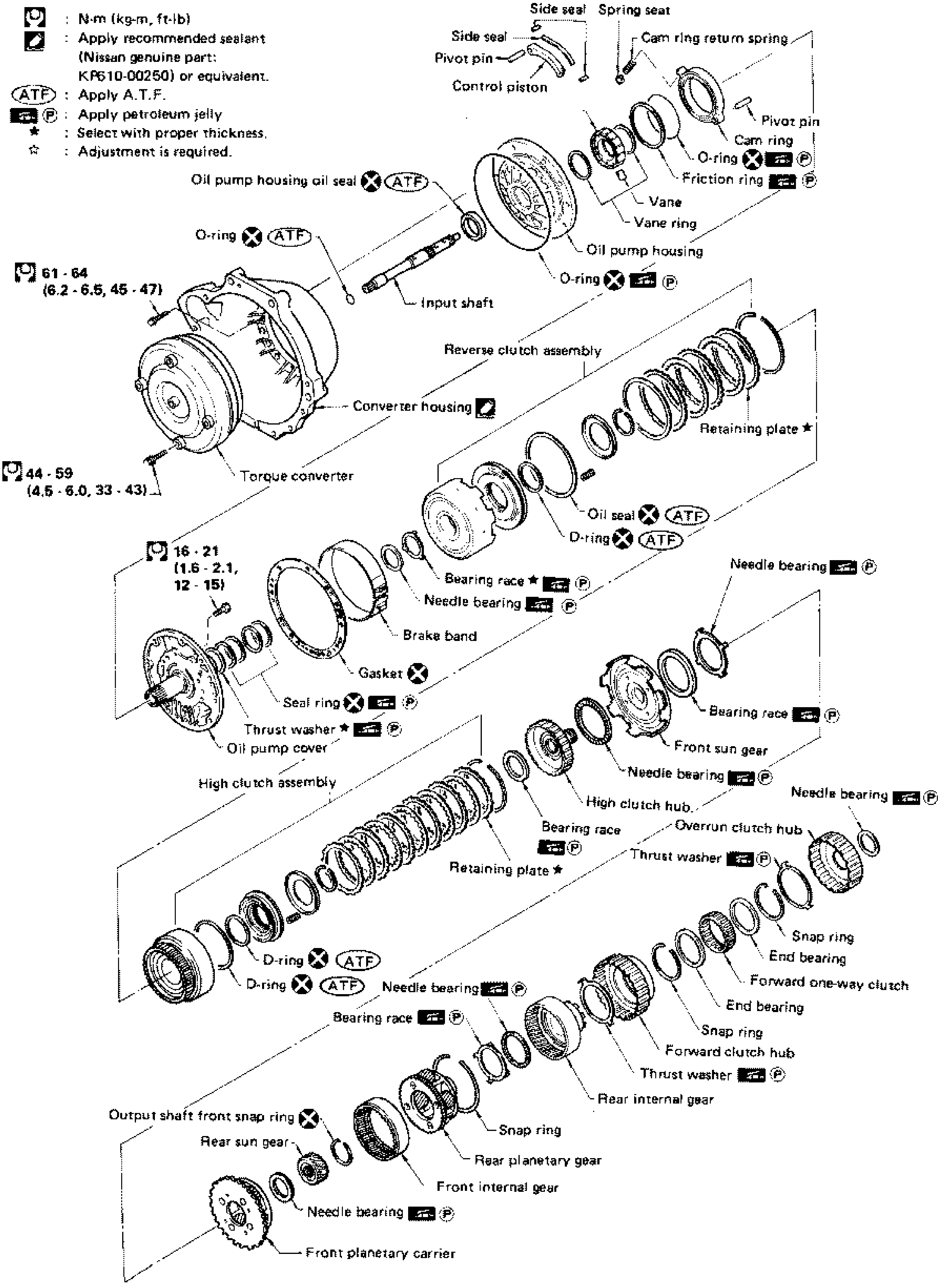
RE4R01A (Cont'd)



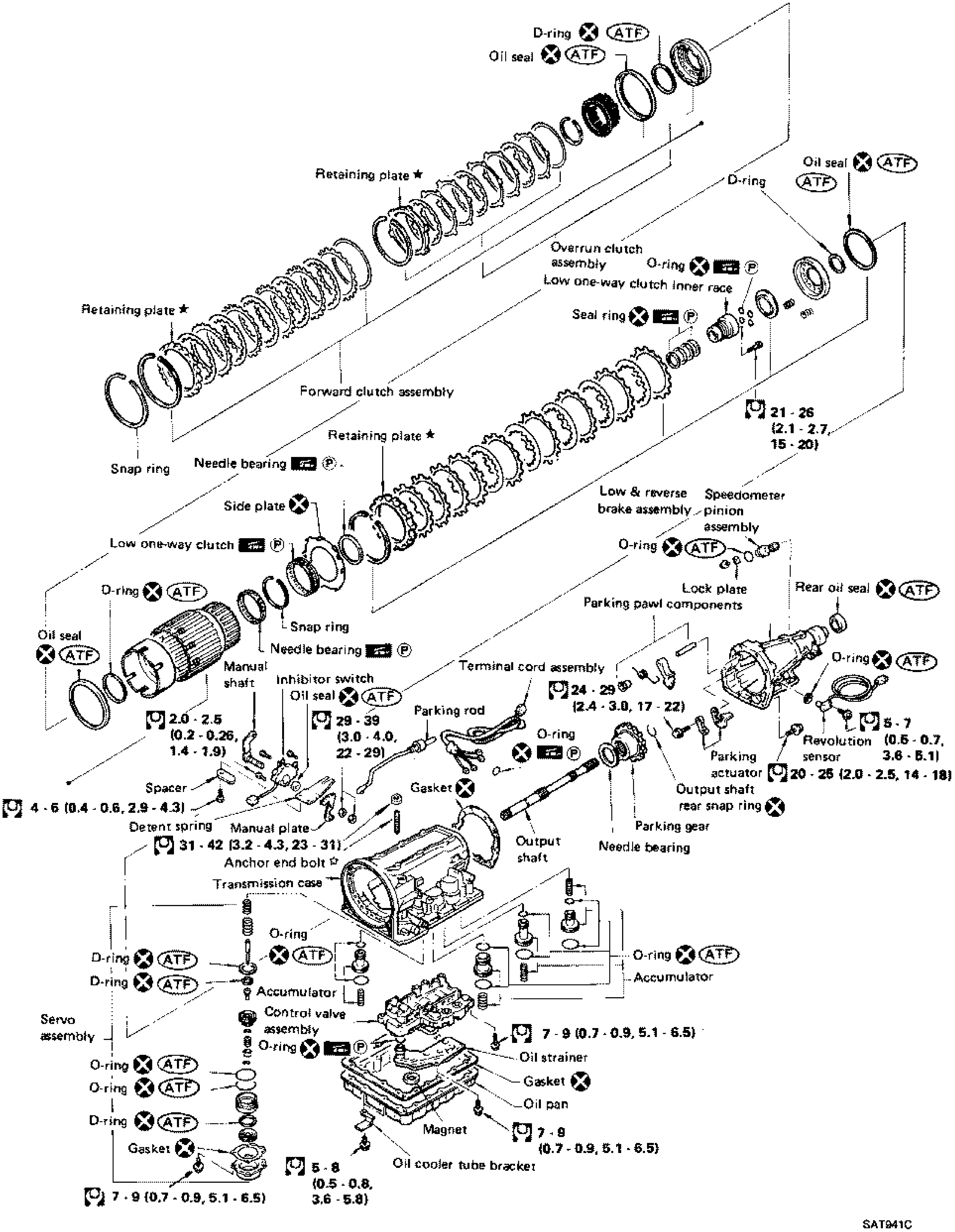
SAT940C

RE4R03A

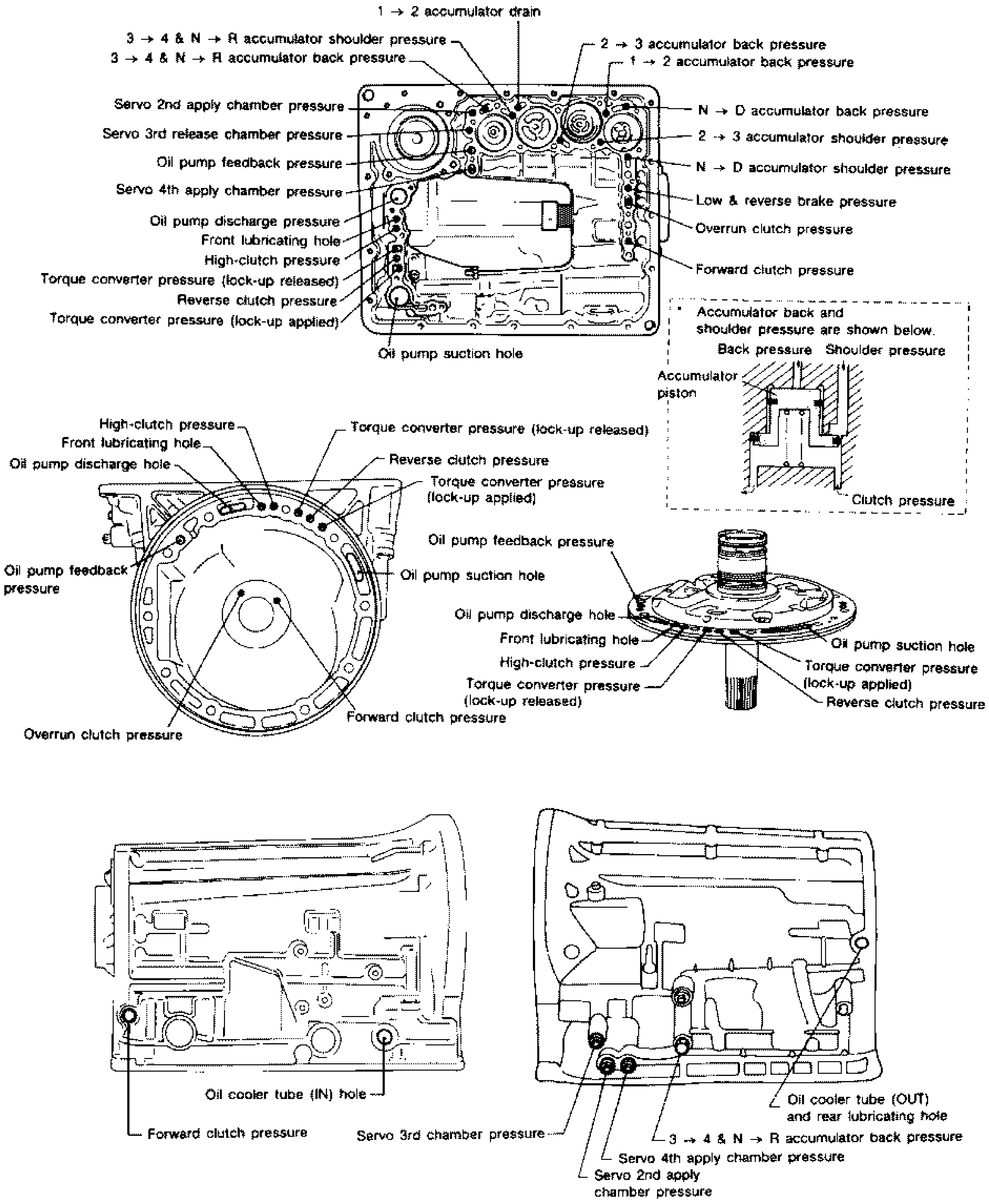
- : N·m (kg-m, ft-lb)
- : Apply recommended sealant (Nissan genuine part: KP610-00250) or equivalent.
- ATF : Apply A.T.F.
- Ⓟ : Apply petroleum jelly.
- ★ : Select with proper thickness.
- ☆ : Adjustment is required.



RE4R03A (Cont'd)

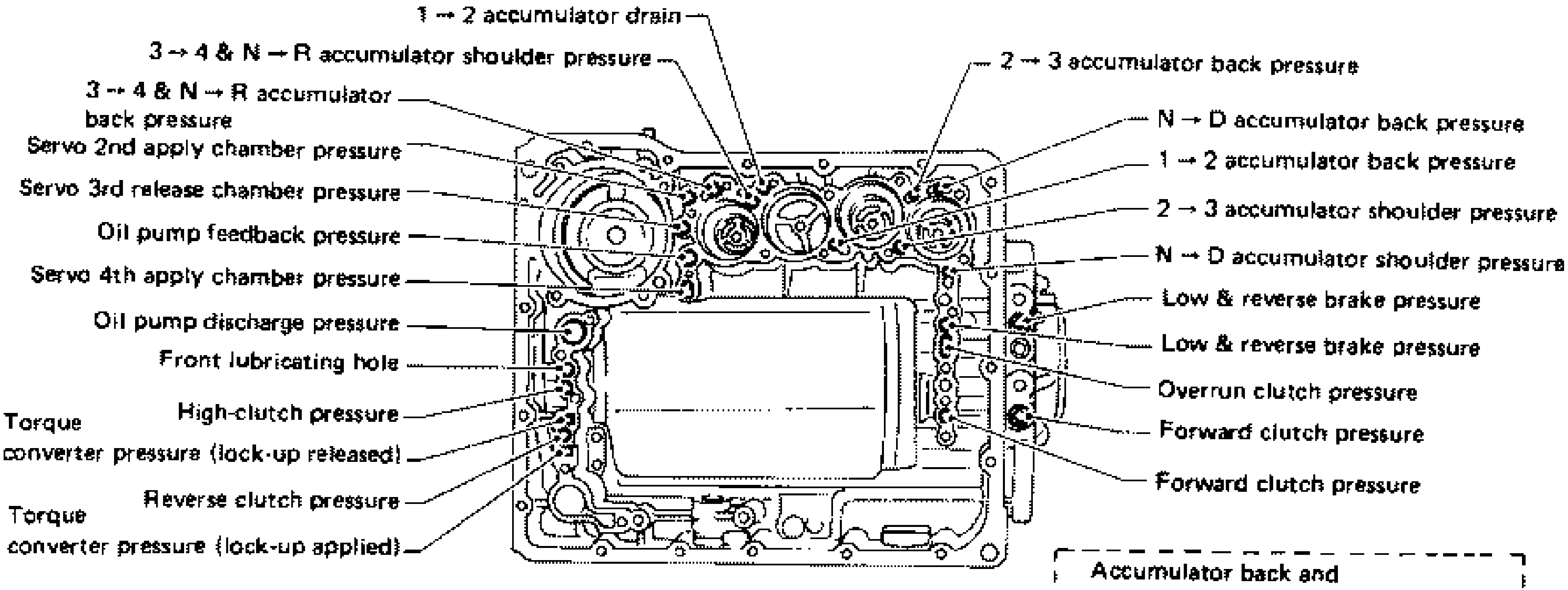


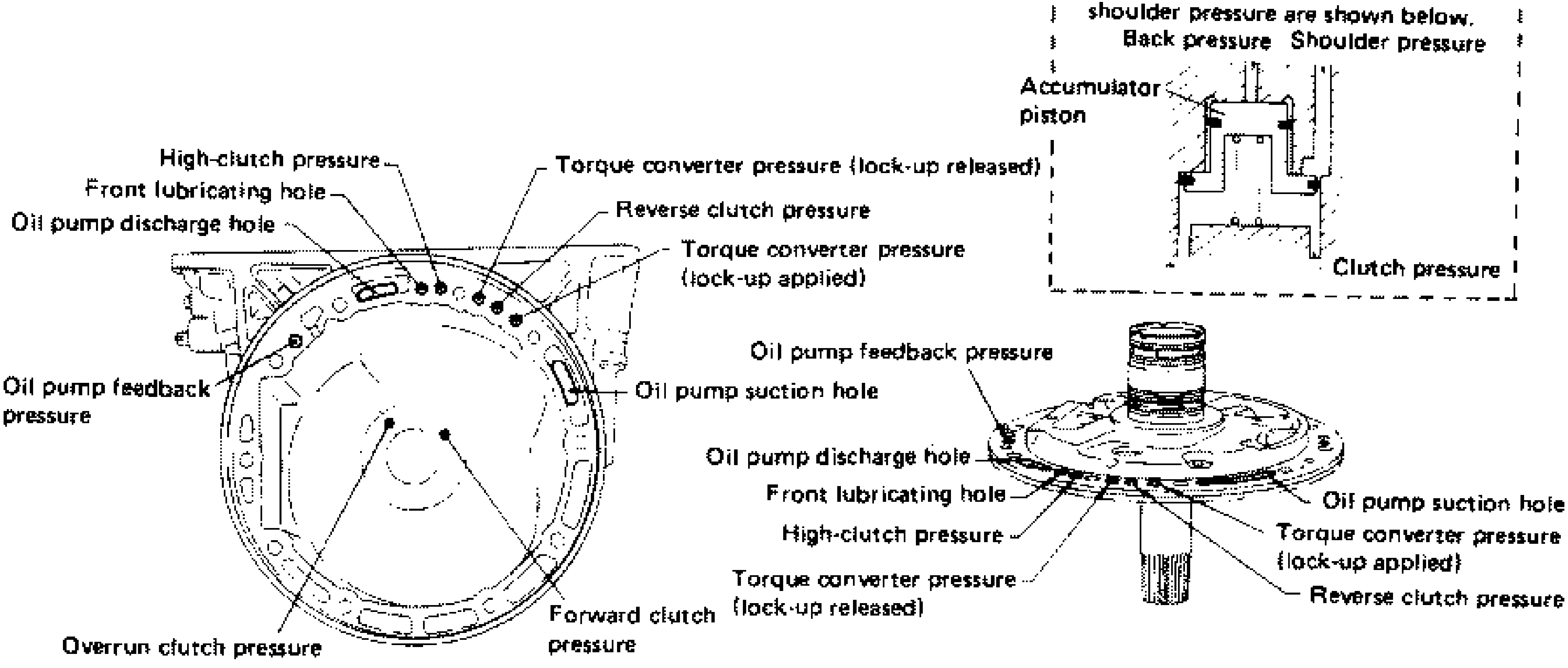
Oil Channel — RE4R01A

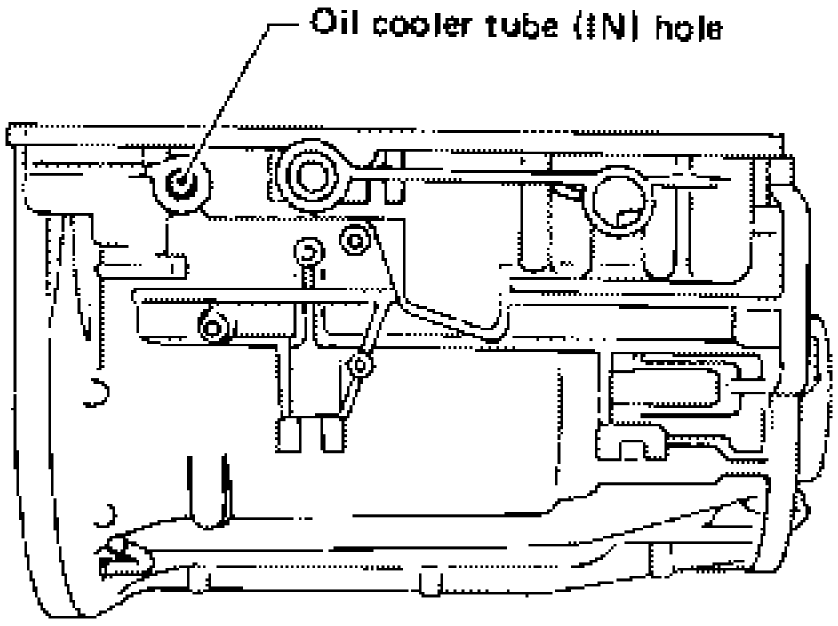


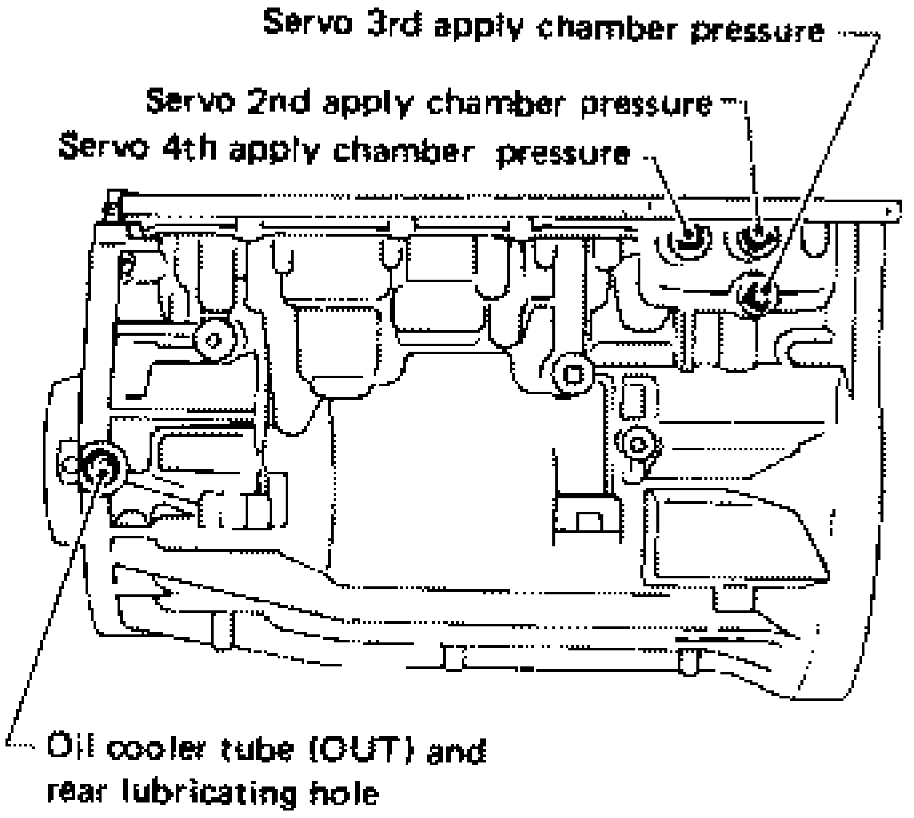
SAT185B

Oil Channel — RE4R03A



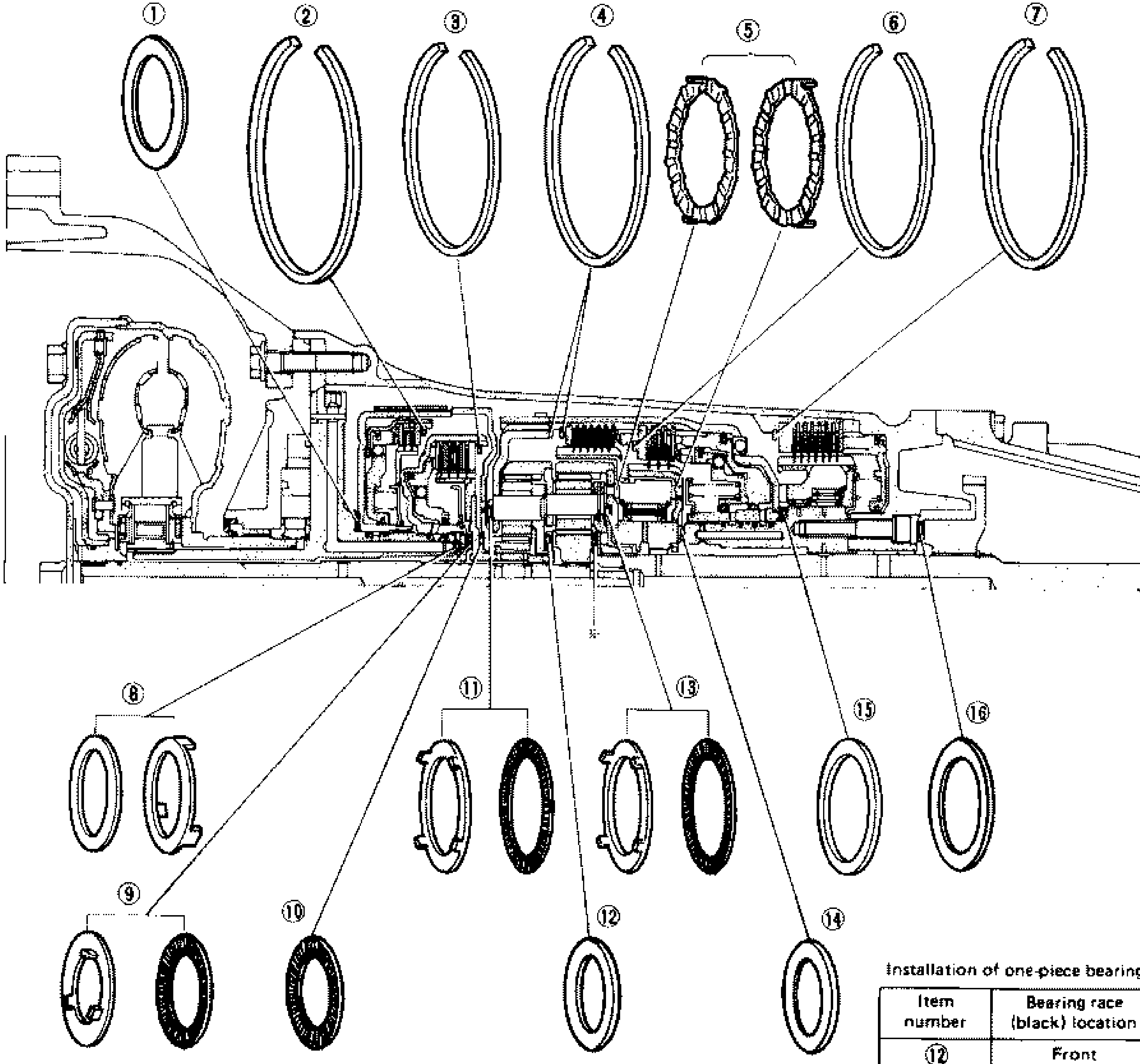






SAT611B

Locations of Needle Bearings, Thrust Washers and Snap Rings — RE4R01A



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

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	59 (2.32)
⑮	78 (3.07)
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
⑮	Rear side
⑯	Rear side

SAT647A

Locations of Needle Bearings, Thrust Washers and Snap Rings — RE4R03A

Outer diameter of snap rings

Item number	Outer diameter mm (in)
②, ⑤	164.0 (6.46)
③	176.0 (6.93)
⑥	172.0 (6.77)

Thrust washers

Item number	Color
①	Black
④	White

Outer diameter of bearing races

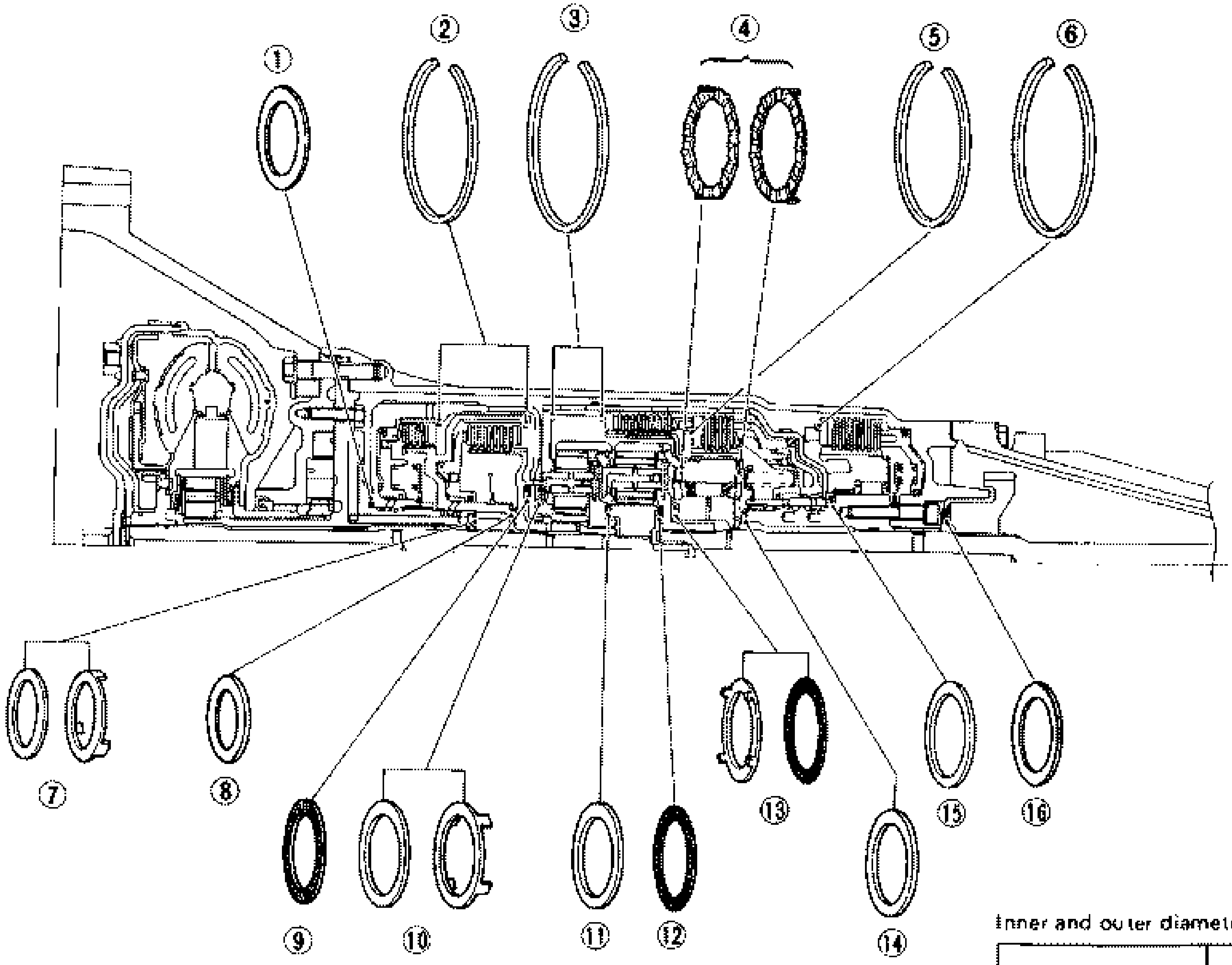
Item number	Outer diameter mm (in)
⑦	43.5 (1.713)
⑩	82.0 (3.228)
⑬	63.2 (2.488)

Installation of one-piece bearings

Item number	Bearing race (black) location
⑮	Rear side
⑯	Rear side

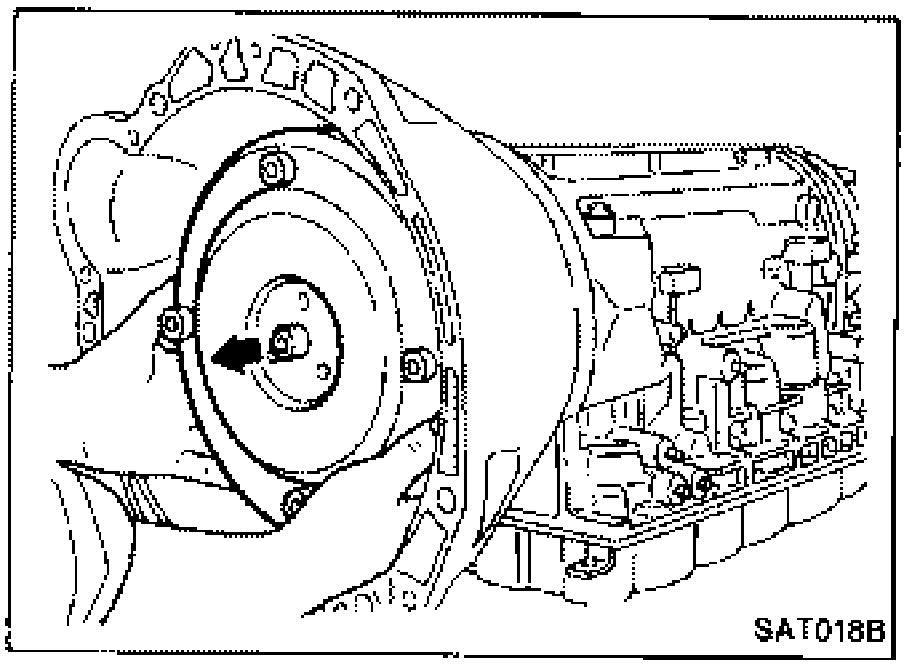
Inner and outer diameter of needle bearings

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Number of needles
⑦	47.0 (1.850)	30.0 (1.181)	–
⑧	53.0 (2.087)	35.1 (1.382)	–
⑨, ⑩	85.0 (3.346)	62.7 (2.468)	–
⑪, ⑫	64.0 (2.520)	45.0 (1.772)	52
⑬	64.0 (2.520)	45.0 (1.772)	50
⑭	64.0 (2.520)	44.0 (1.732)	34
⑮	78.1 (3.075)	–	–
⑯	64.0 (2.520)	–	–

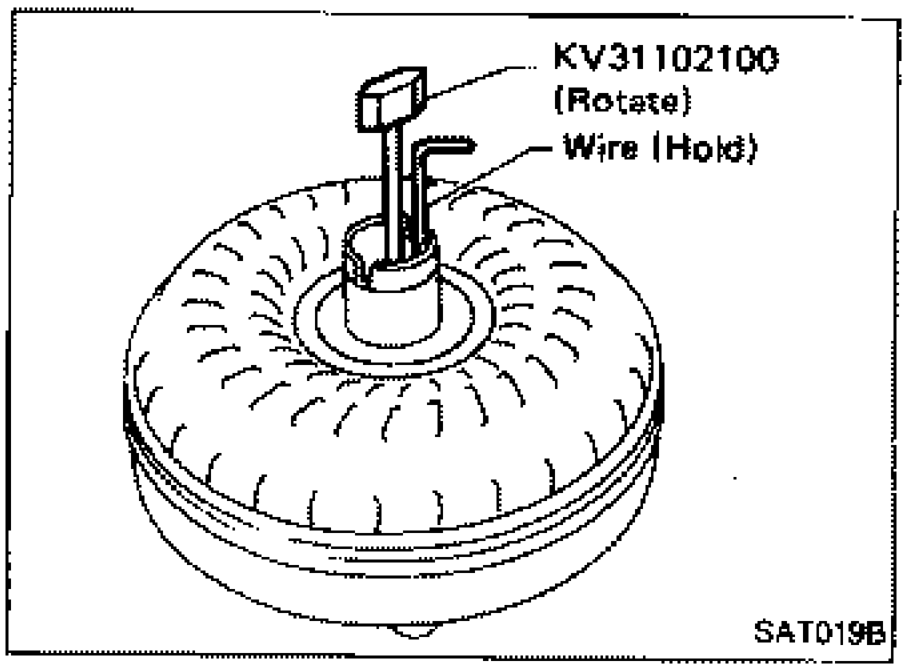


SAT636A

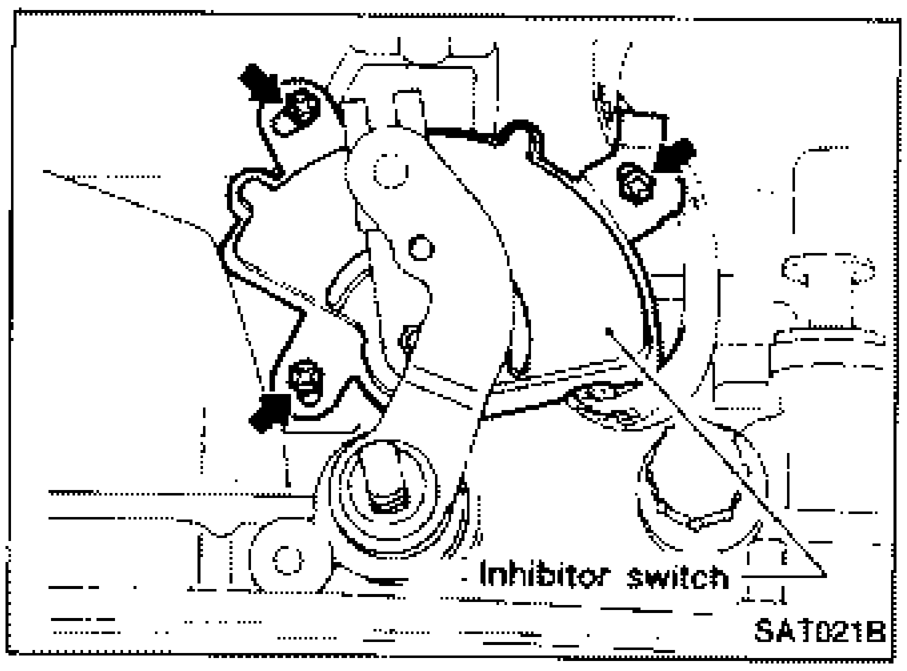
Disassembly



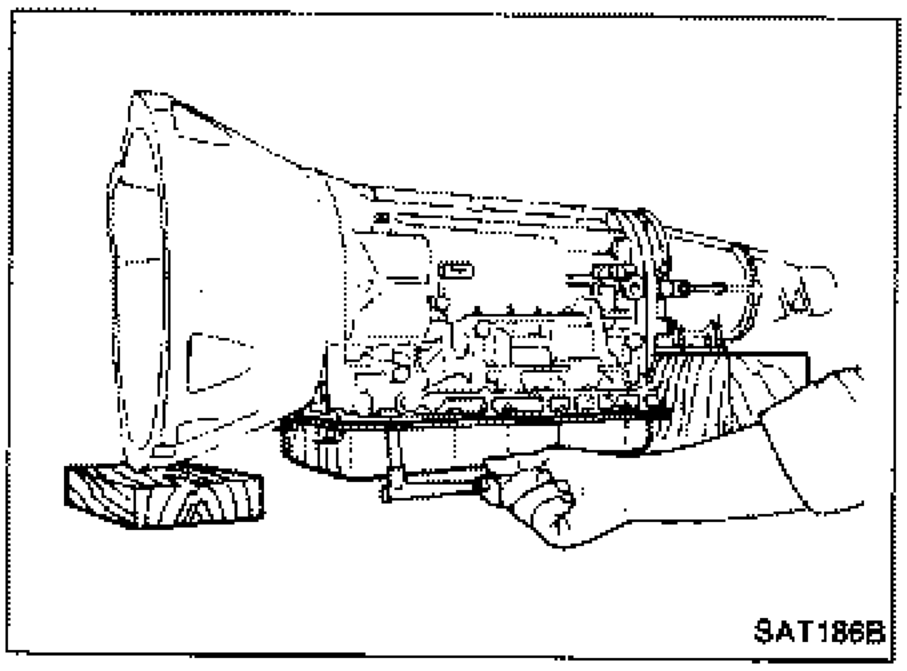
1. Remove torque converter by holding it firmly and turning while pulling straight out.



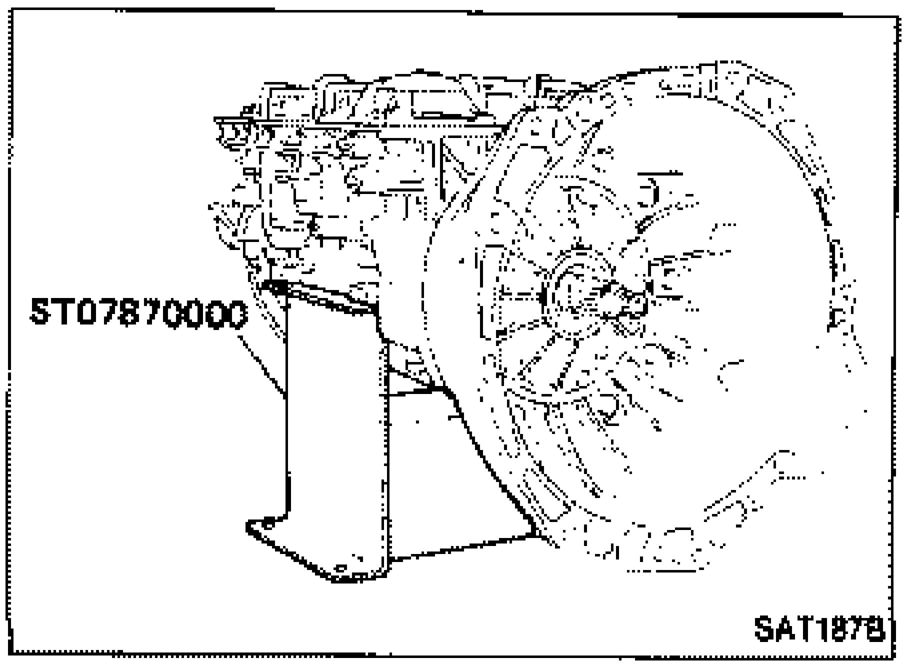
2. Check torque converter one-way clutch.
   a. Insert Tool into spline of one-way clutch inner race.
   b. Hook bearing support unitized with one-way clutch outer race with suitable wire.
   c. Check that one-way clutch inner race rotates only clockwise with Tool while holding bearing support with wire.



3. Remove inhibitor switch from transmission case.

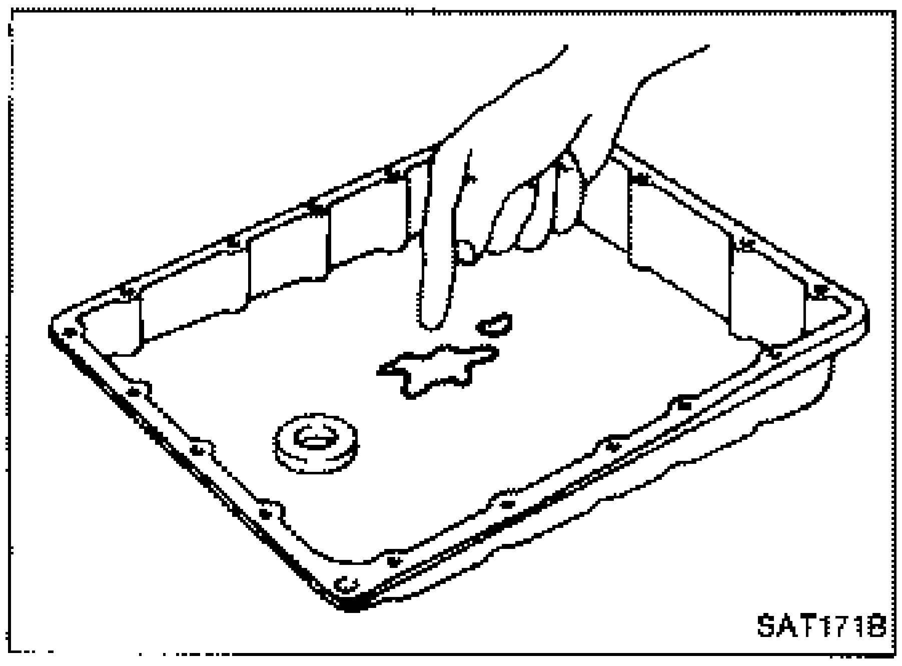


4. Remove oil pan.
   a. Drain A.T.F. from rear extension.
   b. Raise oil pan by placing wooden blocks under converter housing and rear extension.
   c. Separate the oil pan and transmission case.
   - **Always place oil pan straight down so that foreign particles inside will not move.**



5. Place transmission into Tool with the control valve facing up.

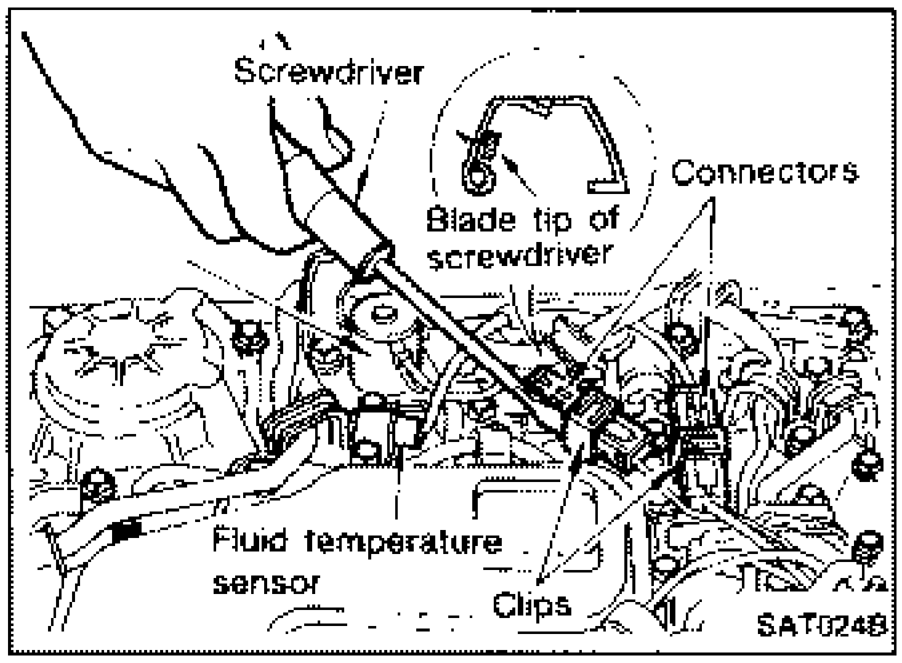
Disassembly (Cont'd)


SAT171B

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.

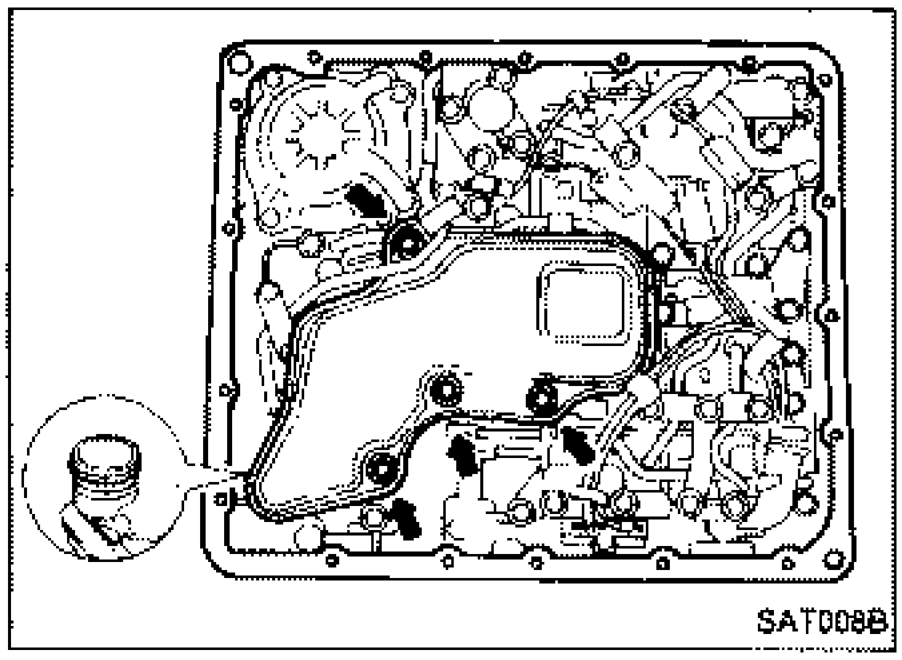
In above cases, replace torque converter and check unit for cause of particle accumulation.



SAT024B

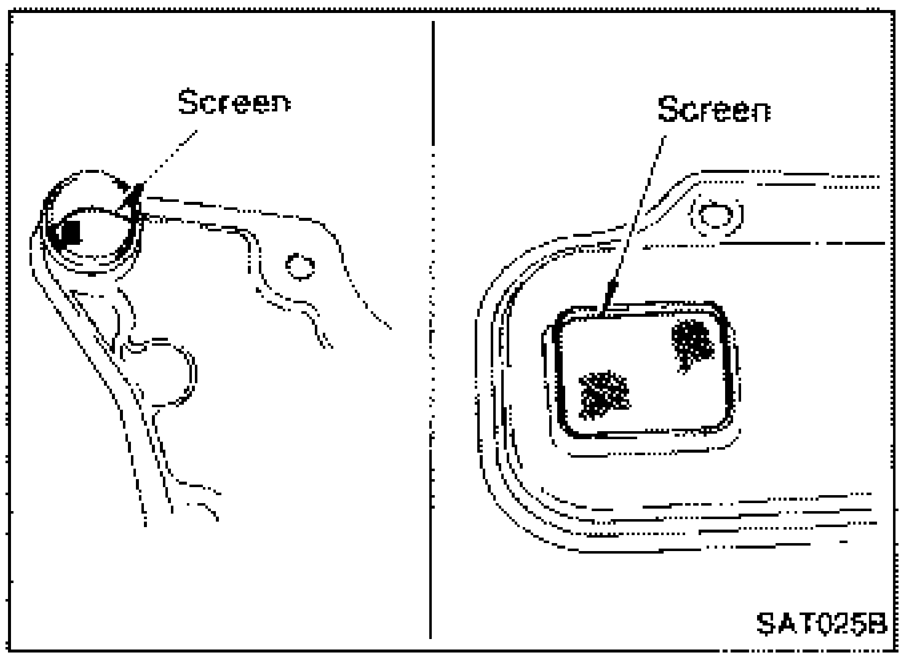
7. Remove lock-up solenoid and fluid temperature sensor connectors.

- **Be careful not to damage connector.**


SAT008B

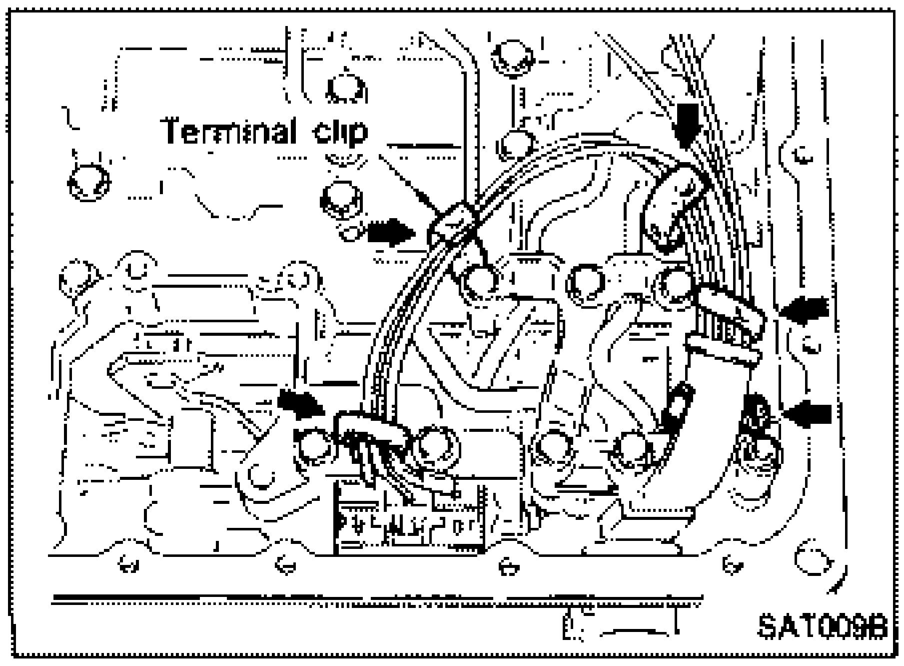
8. Remove oil strainer.

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



SAT025B

b. Check oil strainer screen for damage.

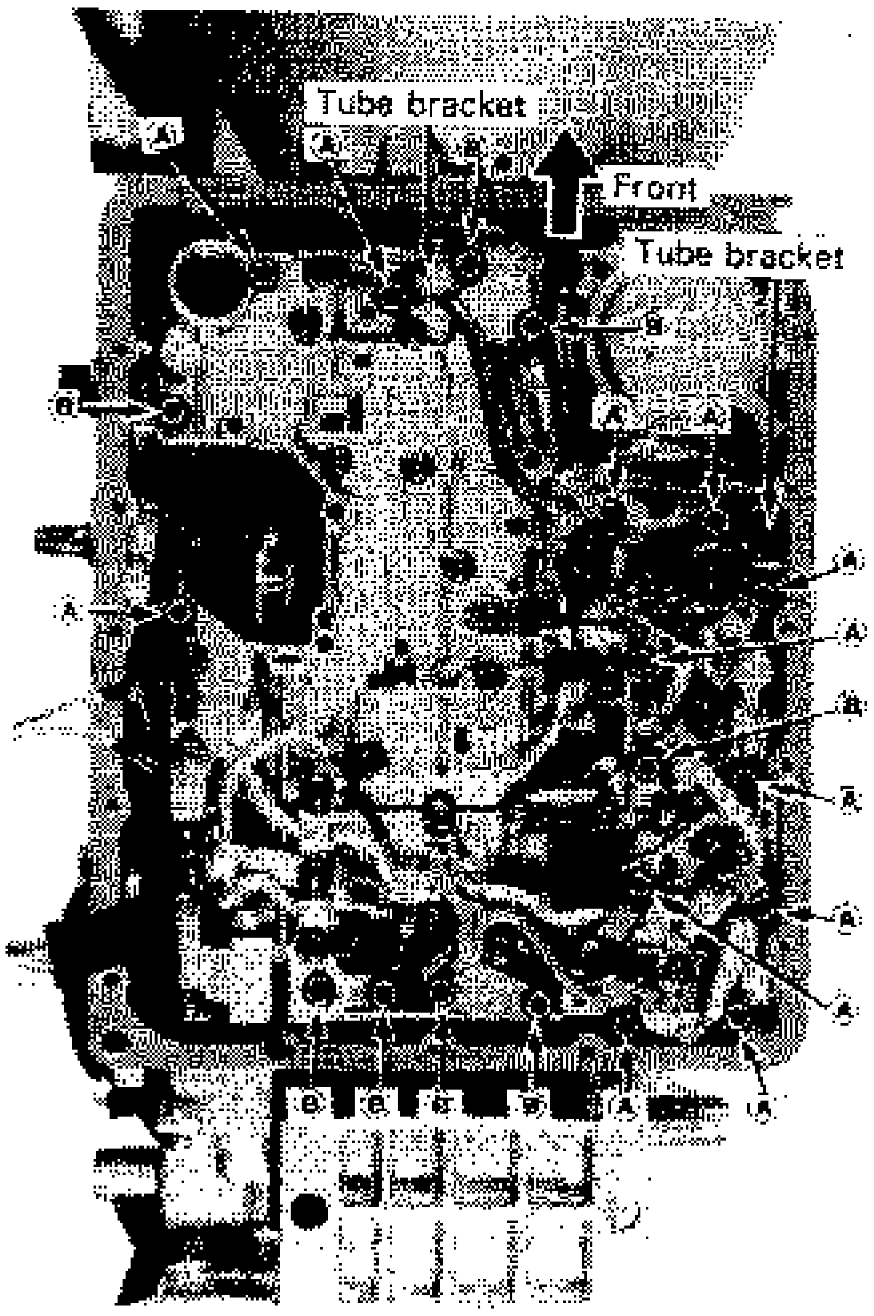


SAT009B

9. Remove control valve assembly.

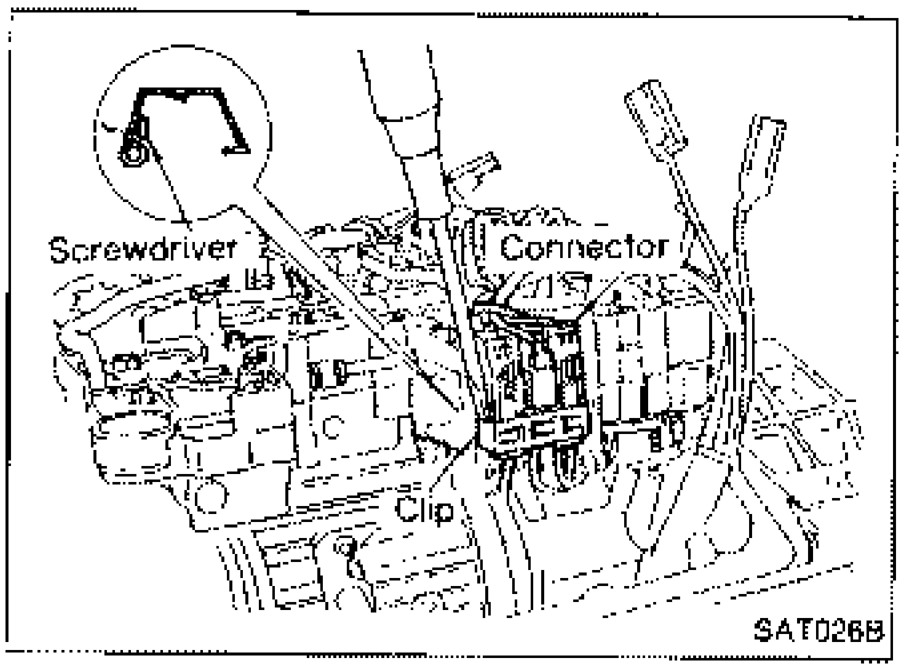
a. Straighten terminal clips to free terminal cords then remove terminal clips.

Disassembly (Cont'd)



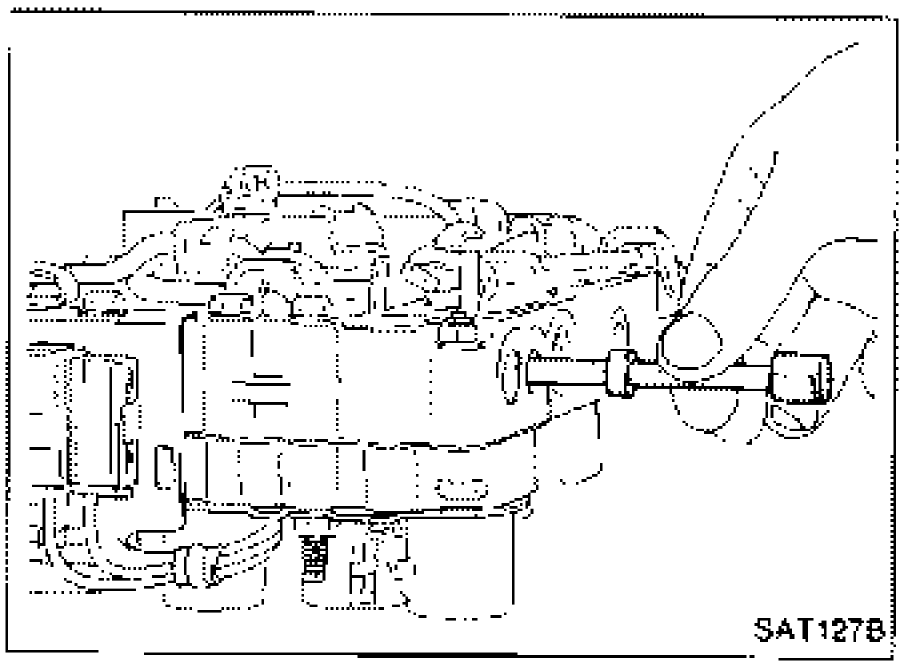
b. Remove bolts Ⓐ and Ⓑ, and remove control valve assembly from transmission.

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

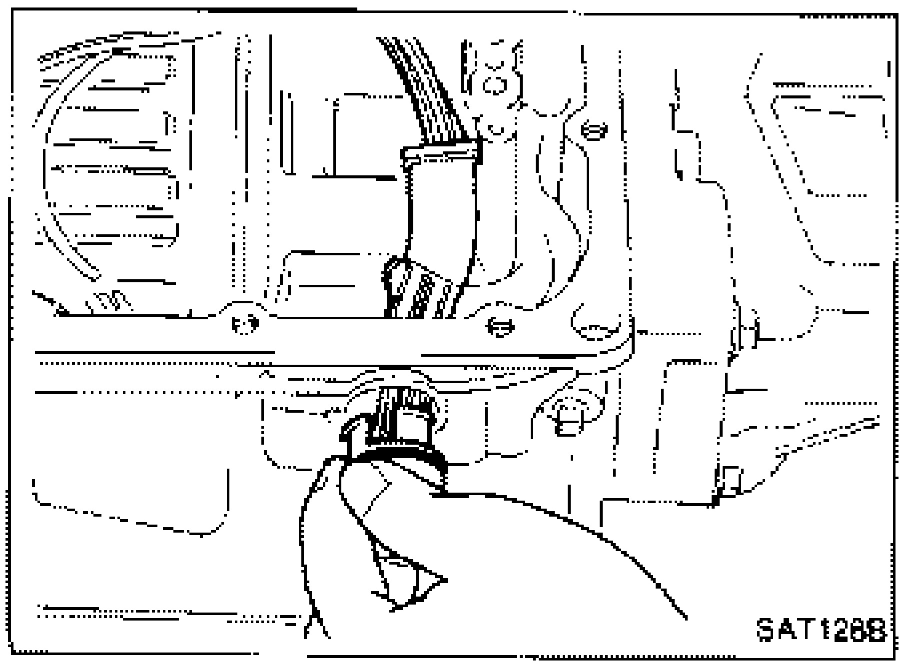


c. Remove solenoid connector.

- **Be careful not to damage connector.**



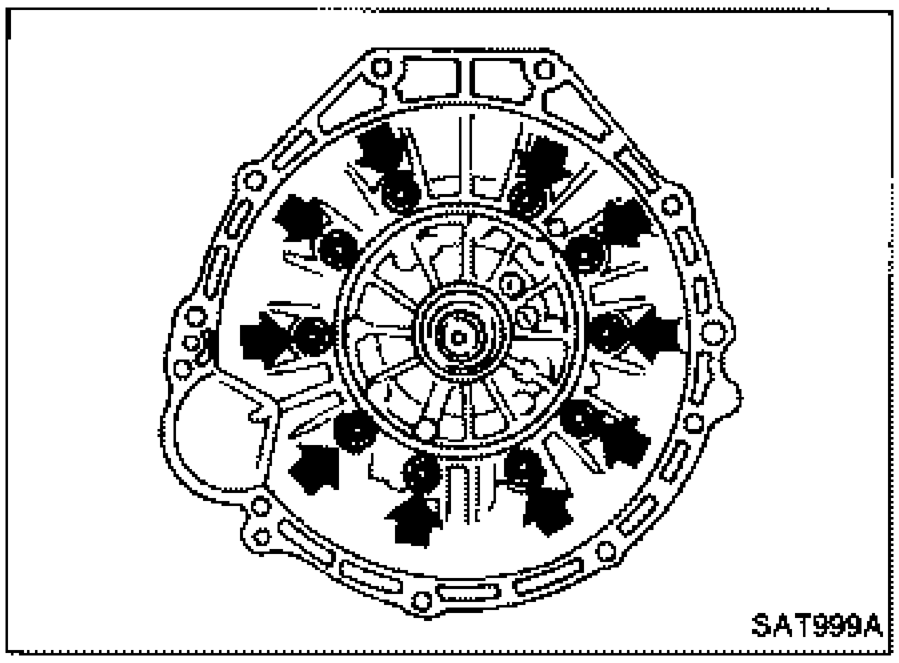
d. Remove manual valve from control valve assembly.



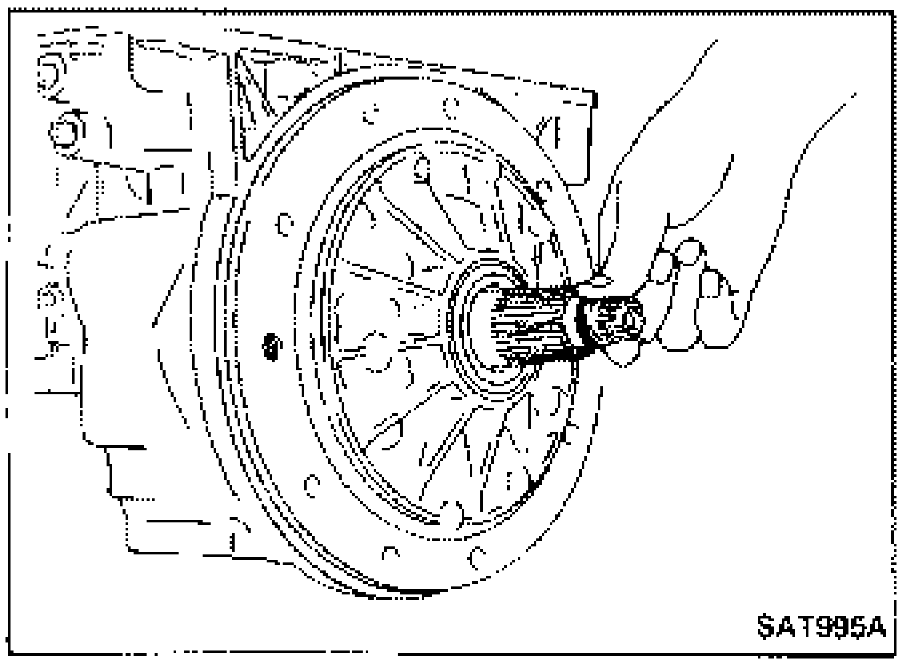
10. Remove terminal cord assembly from transmission case while pushing on stopper.

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

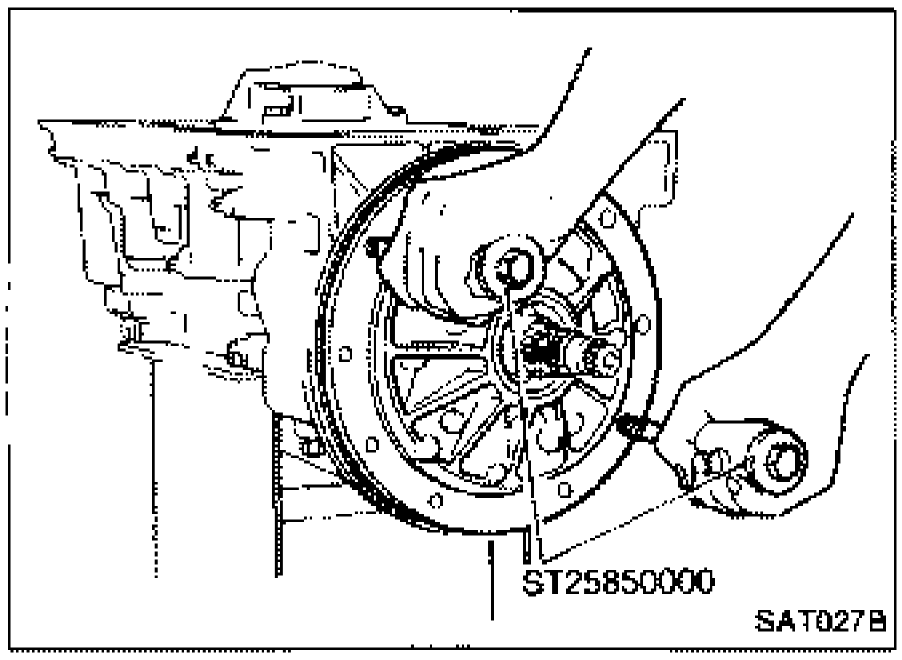
Disassembly (Cont'd)


SAT999A

11. Remove converter housing from transmission case.

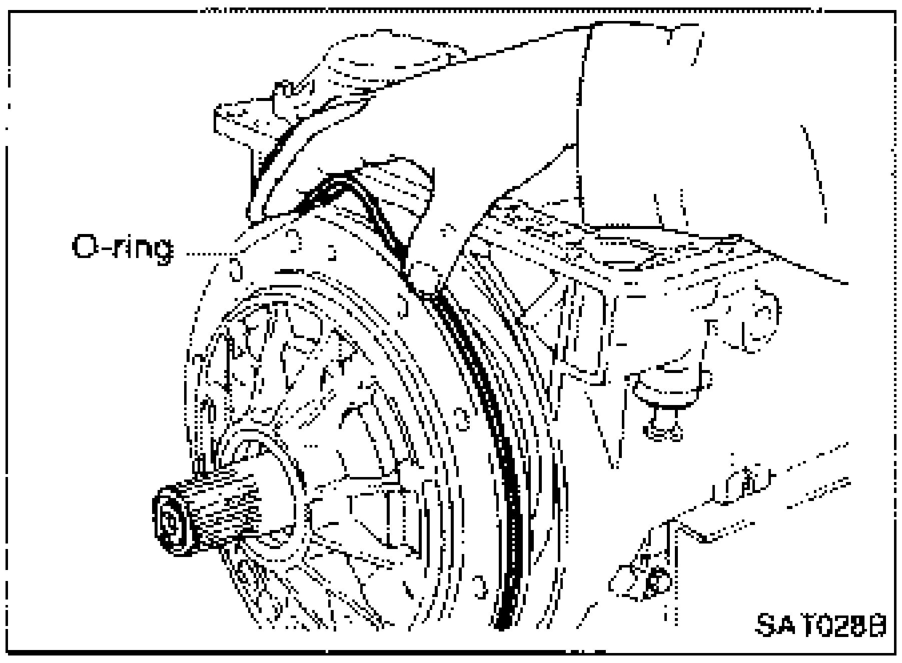

SAT995A

12. Remove O-ring from input shaft.



SAT027B

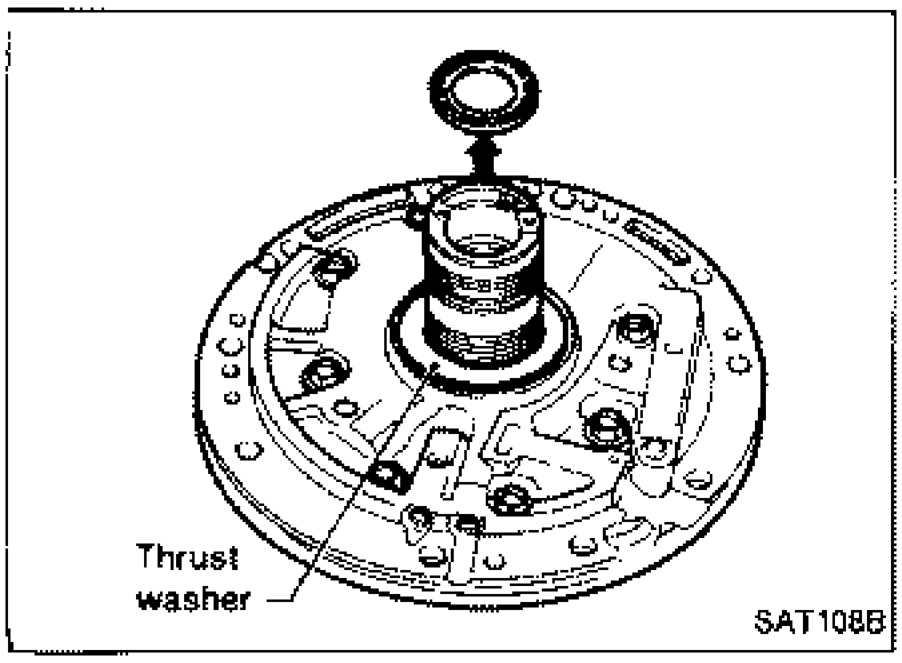
13. Remove oil pump assembly.
a. Attach Tool to oil pump assembly and extract it evenly from transmission case.



SAT028B

b. Remove O-ring from oil pump assembly.
c. Remove traces of sealant from oil pump housing.

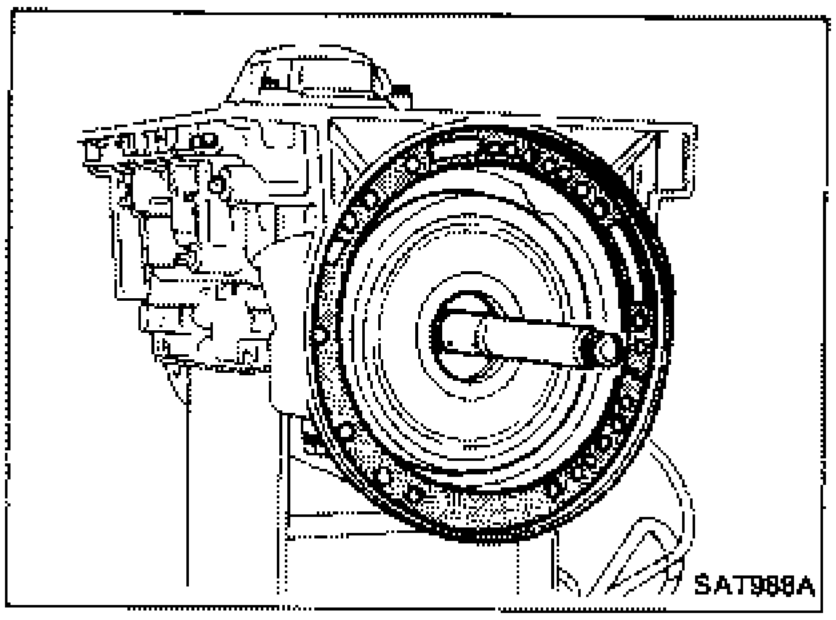
- **Be careful not to scratch pump housing.**



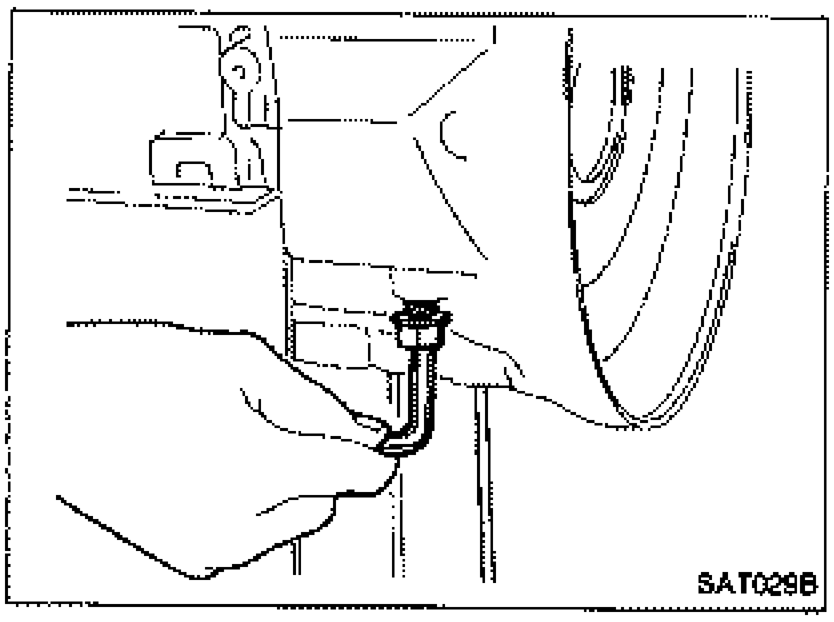
SAT108B

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

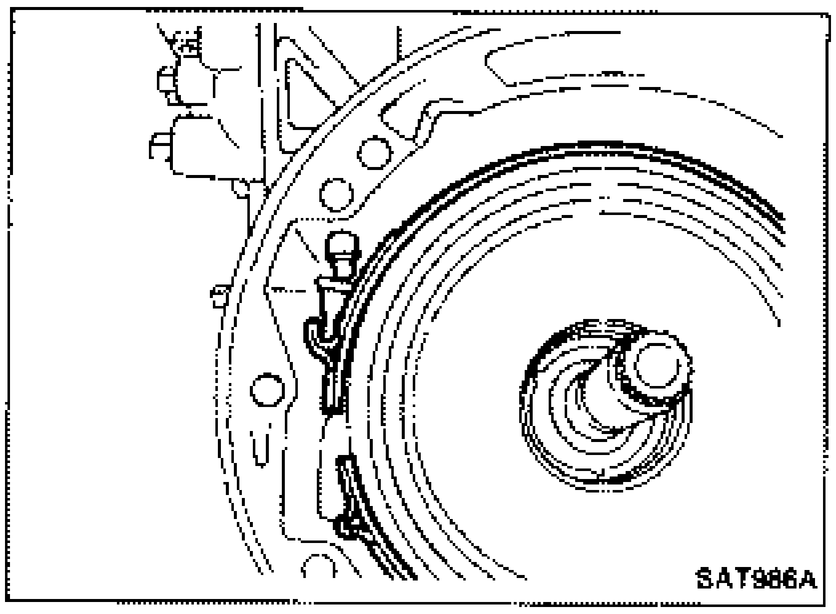
Disassembly (Cont'd)



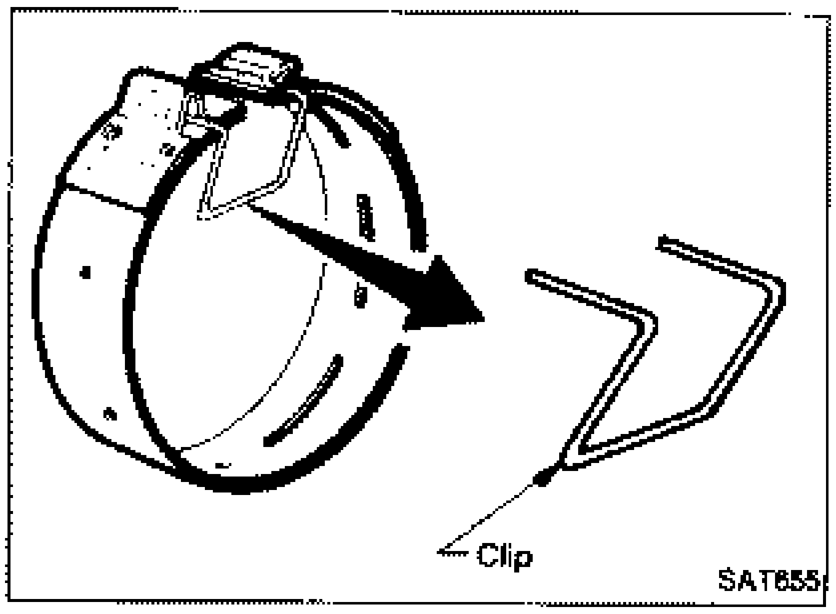
14. Remove input shaft and oil pump gasket.



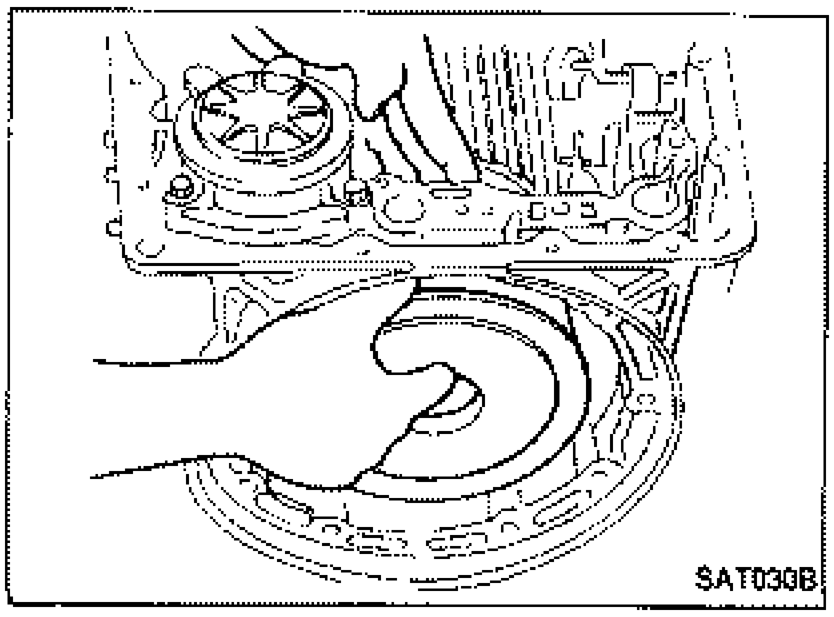
15. Remove brake band and band strut.
a. Loosen lock nut and remove band servo anchor end pin from transmission case.



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



c. Hold brake band in a circular shape with clip.

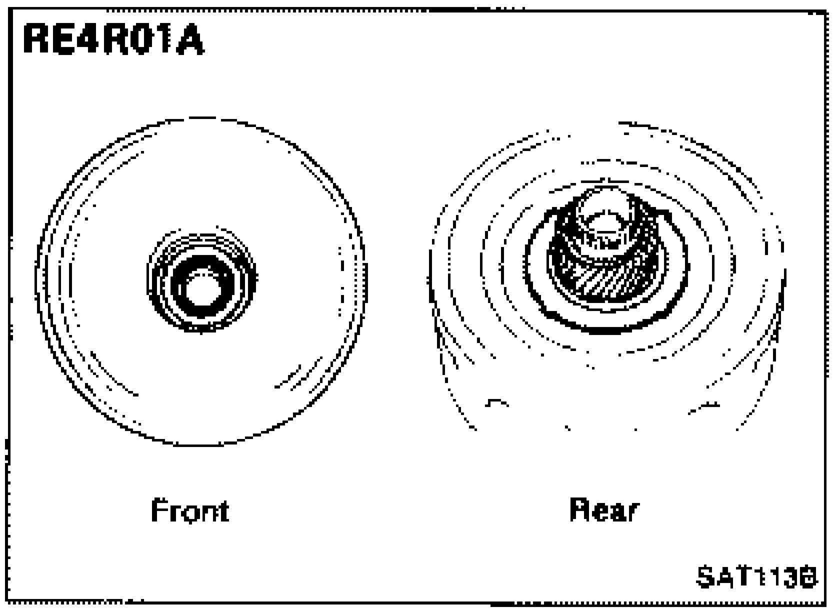


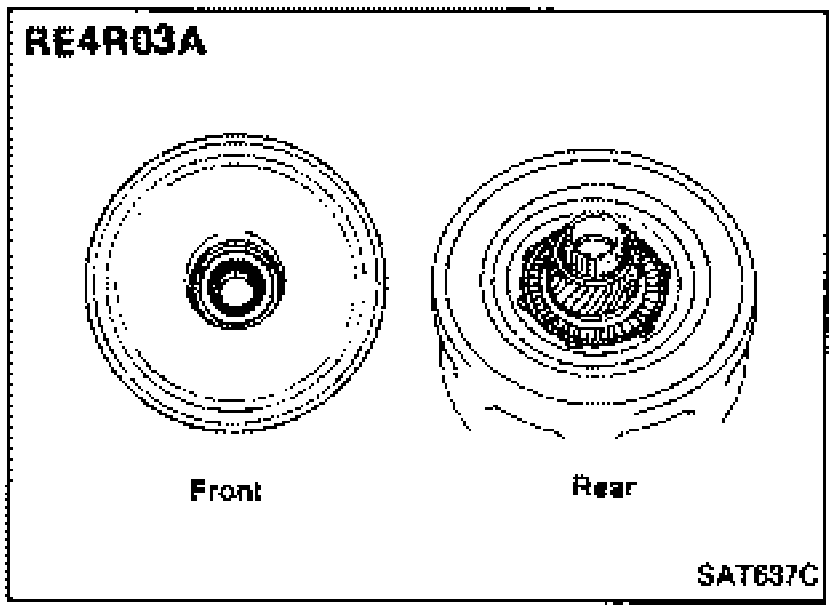
16. Remove front side clutch and gear components.
a. Remove clutch pack (reverse clutch, high clutch and front sun gear) from transmission case.

Disassembly (Cont'd)

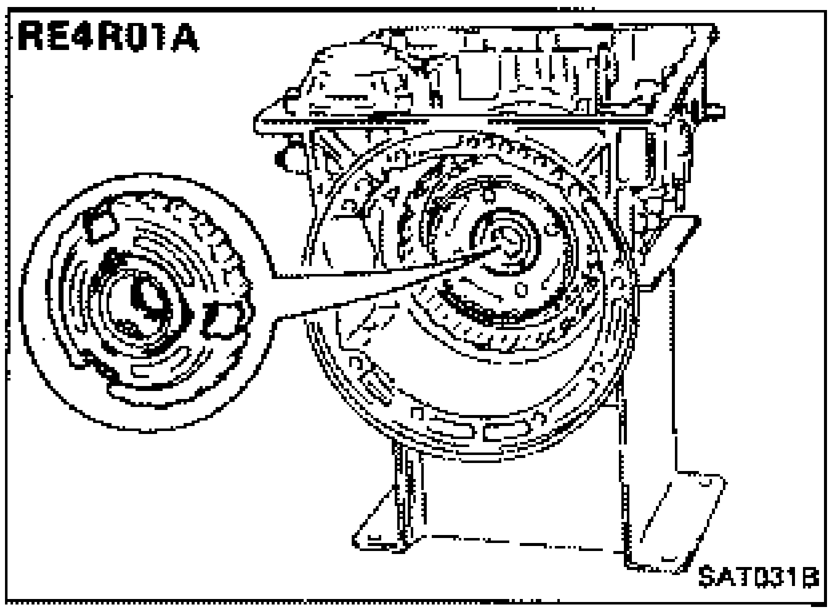
b. Remove front bearing race from clutch pack.

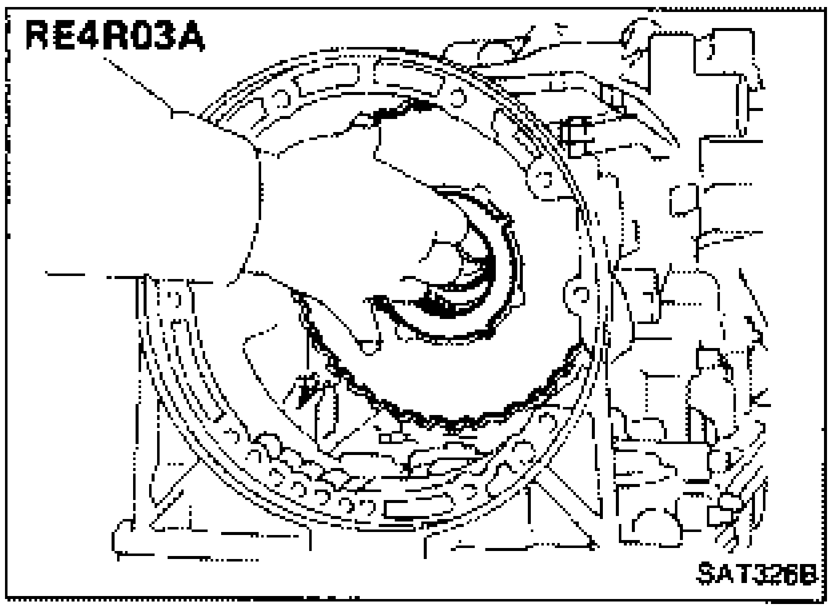
c. Remove rear bearing race or front needle bearing from clutch pack.





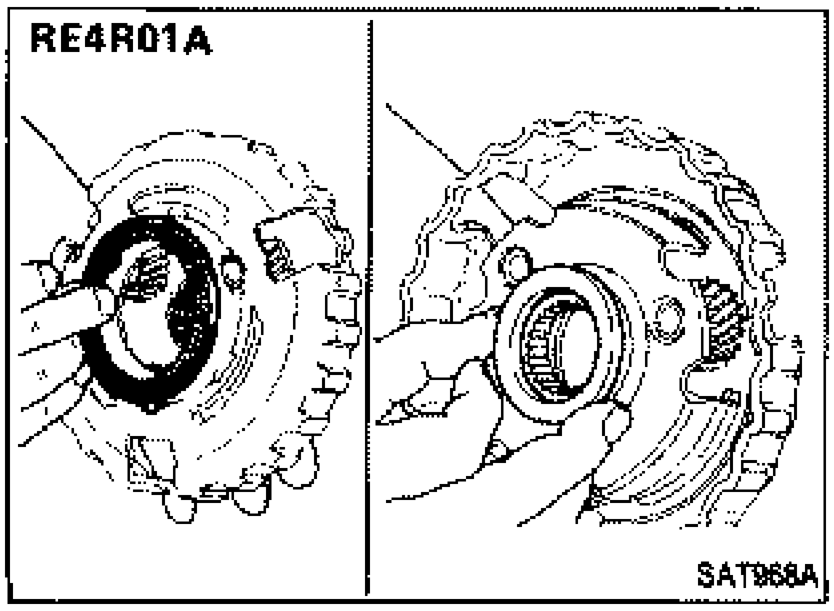
d. Remove front planetary carrier from transmission case.



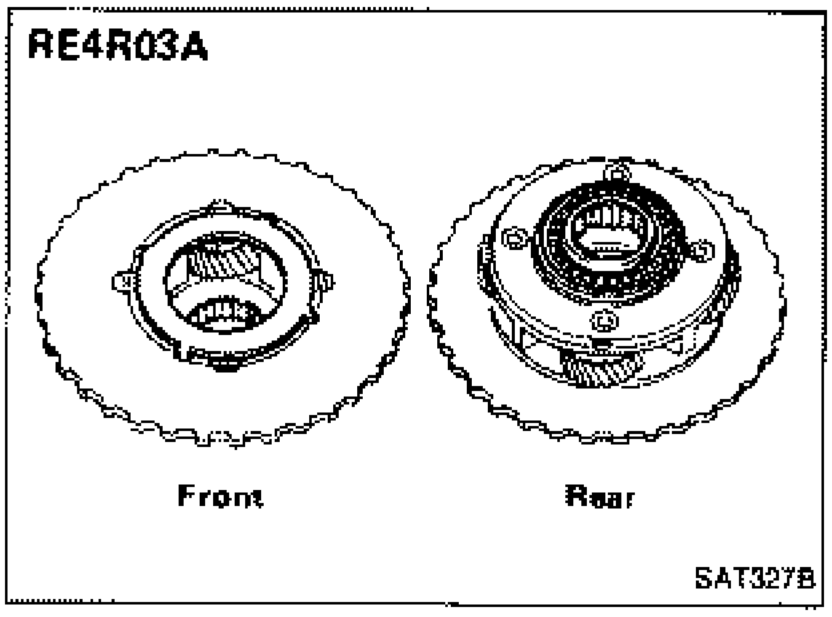


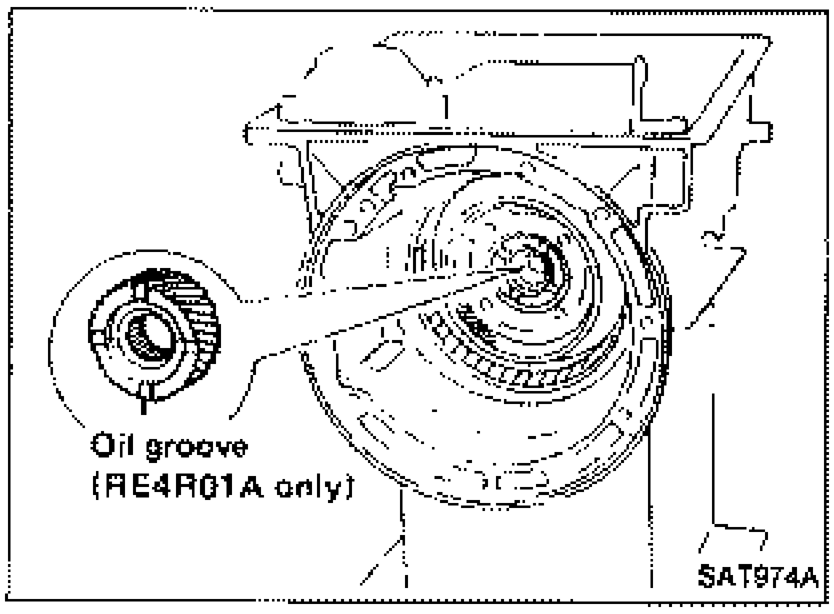
e. Remove front needle bearing or front bearing race from front planetary carrier.

f. Remove rear needle bearing from front planetary carrier.

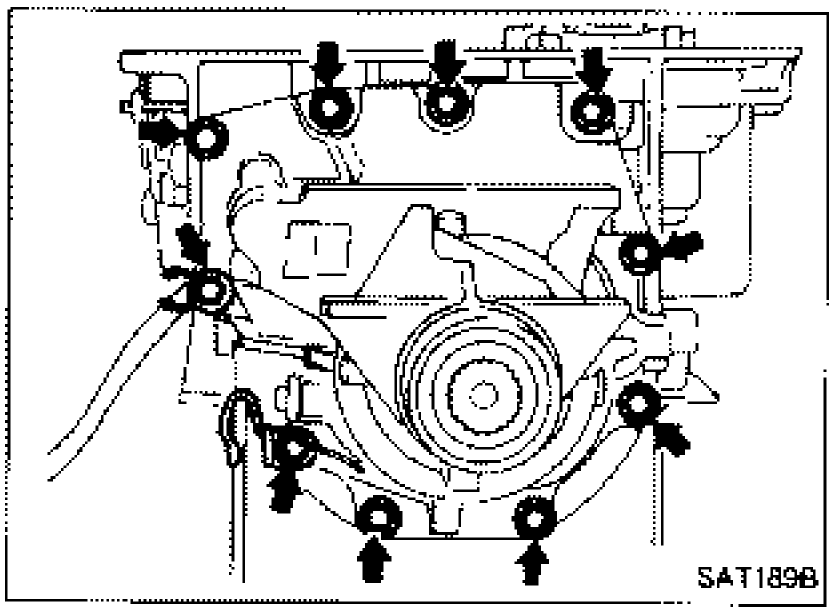


Disassembly (Cont'd)





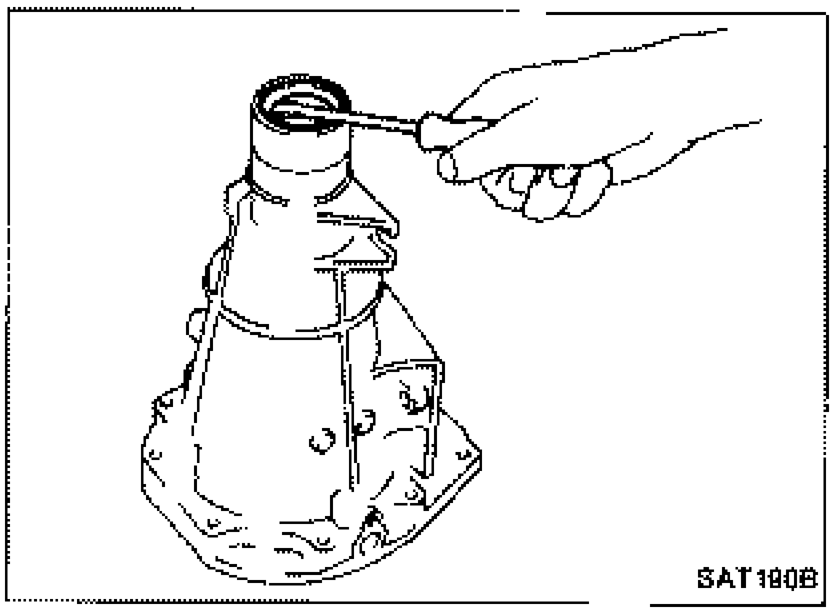
g. Remove rear sun gear from transmission case.



17. Remove rear extension.

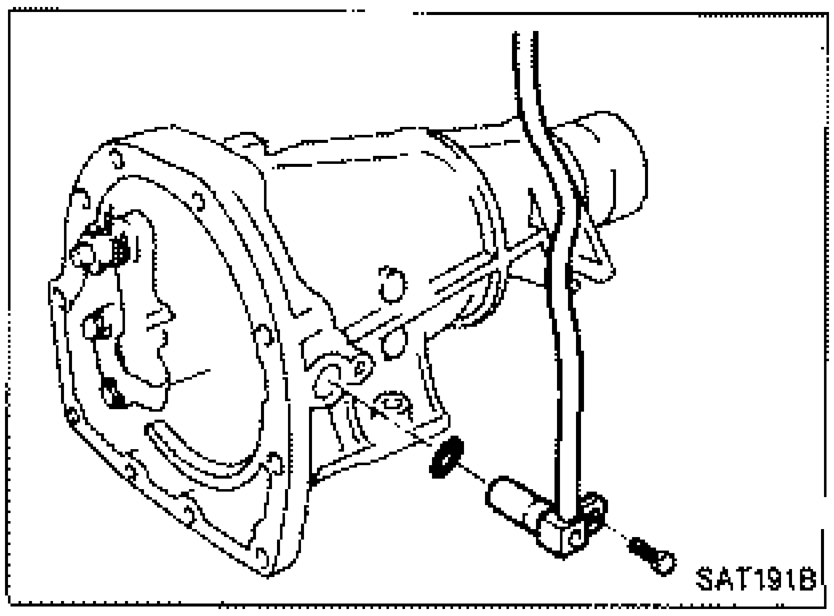
a. Remove rear extension from transmission case.

b. Remove rear extension gasket from transmission case.



c. Remove oil seal from rear extension.

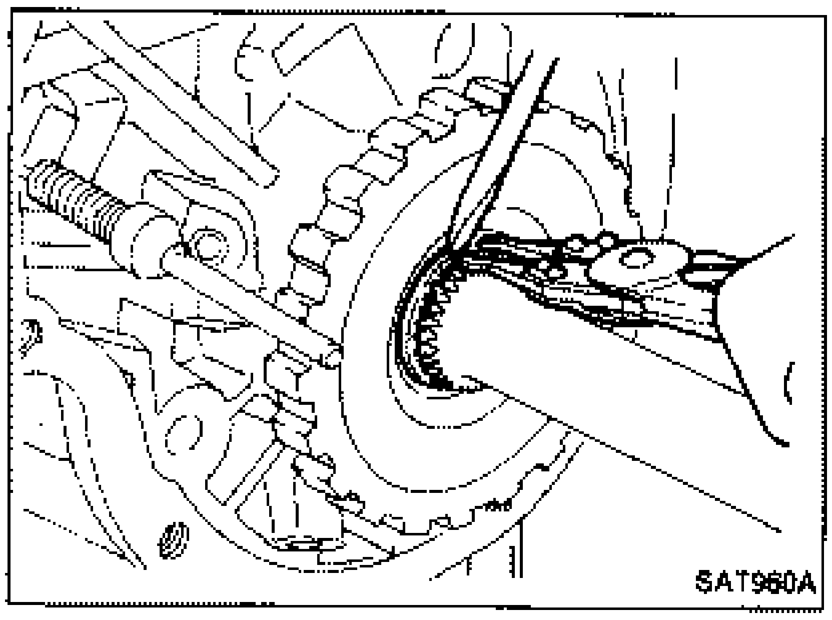
- **Do not remove oil seal unless it is to be replaced.**



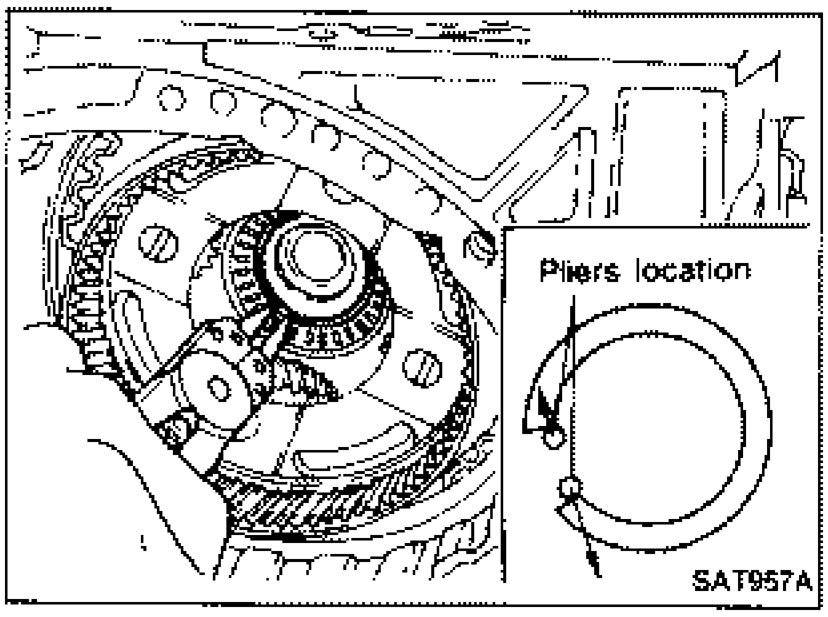
d. Remove revolution sensor from rear extension.

e. Remove O-ring from revolution sensor.

Disassembly (Cont'd)

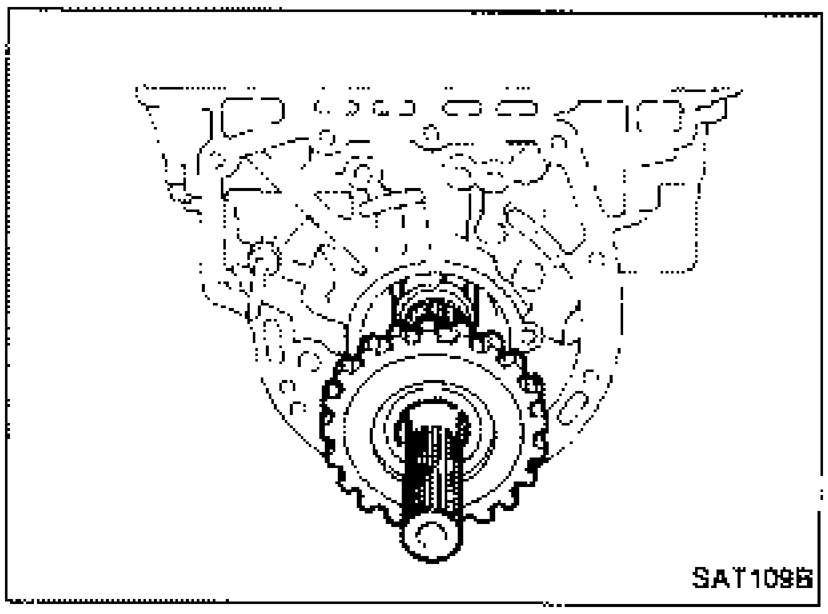


18. Remove output shaft and parking gear.
a. Remove rear snap ring from output shaft.

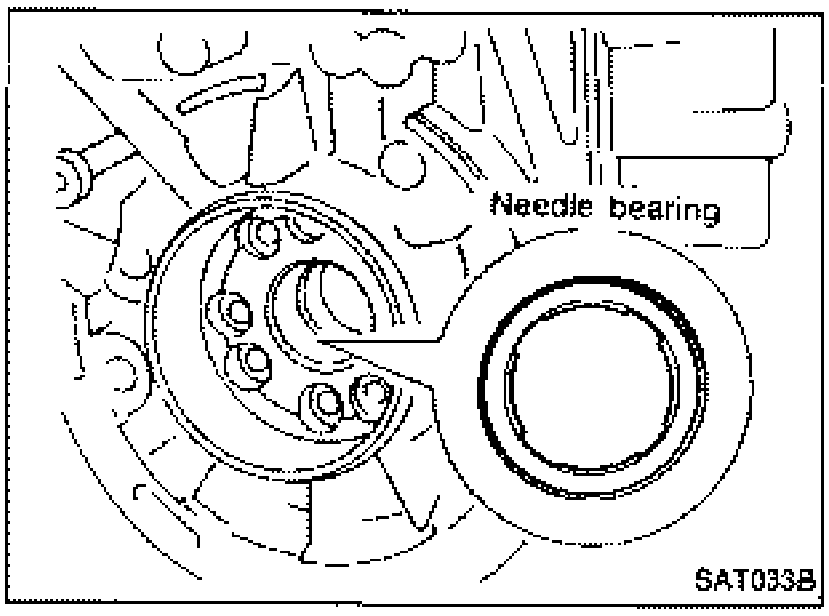


b. Slowly push output shaft all the way forward.
- **Do not use excessive force.**

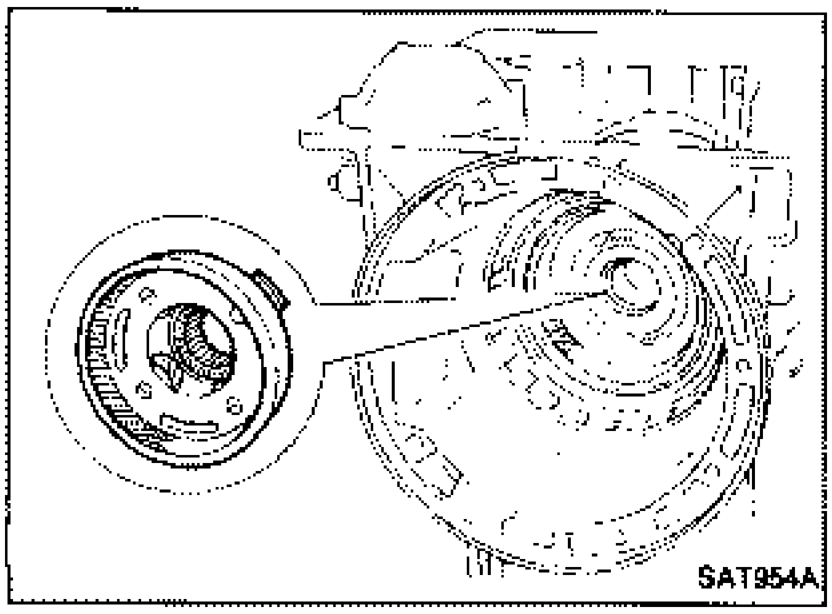
c. Remove snap ring from output shaft.



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

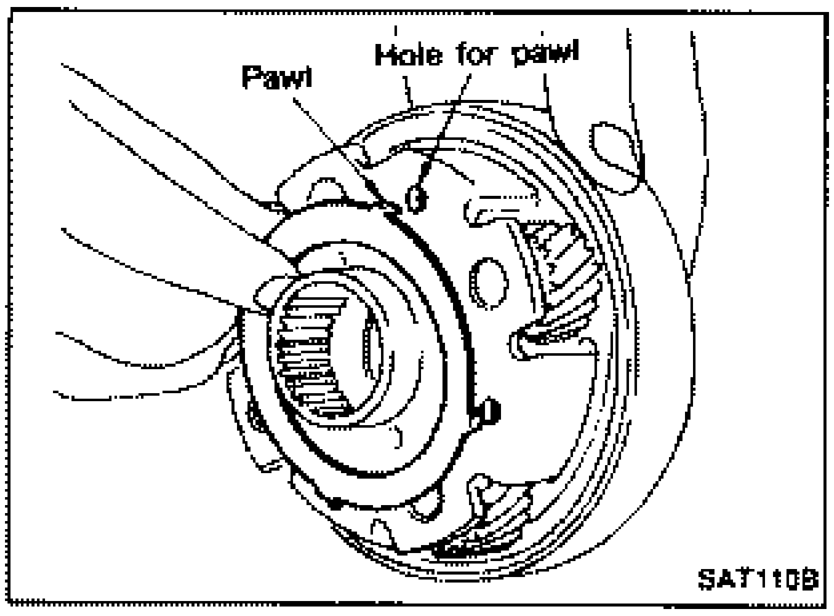


f. Remove needle bearing from transmission case.

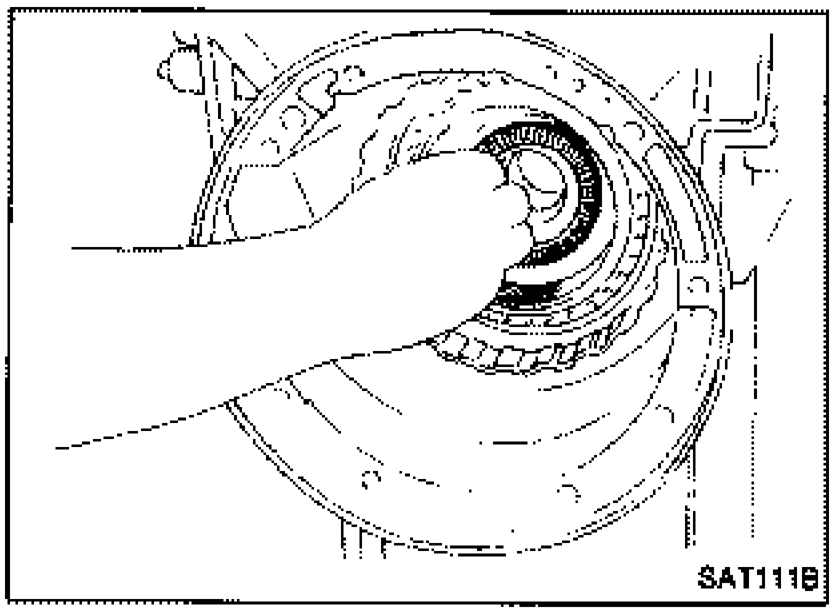


19. Remove rear side clutch and gear components.
a. Remove front internal gear.

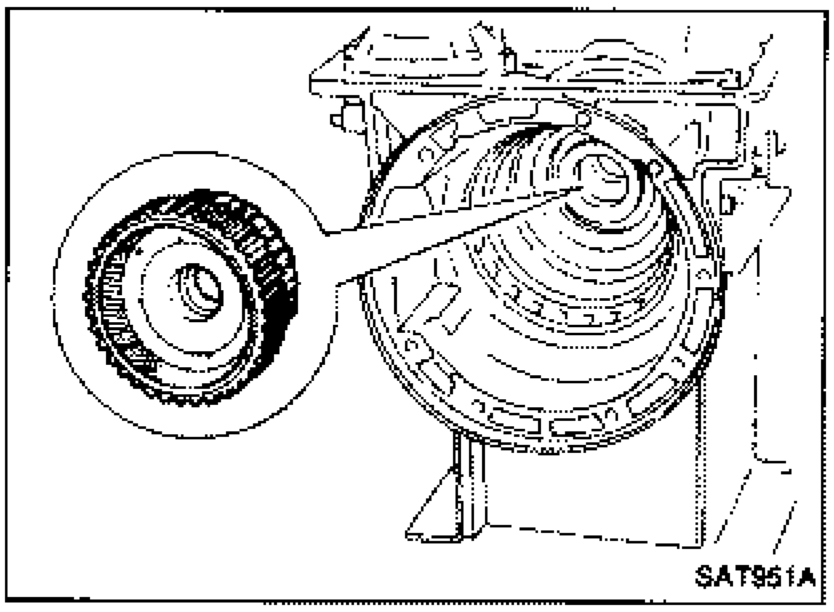
Disassembly (Cont'd)



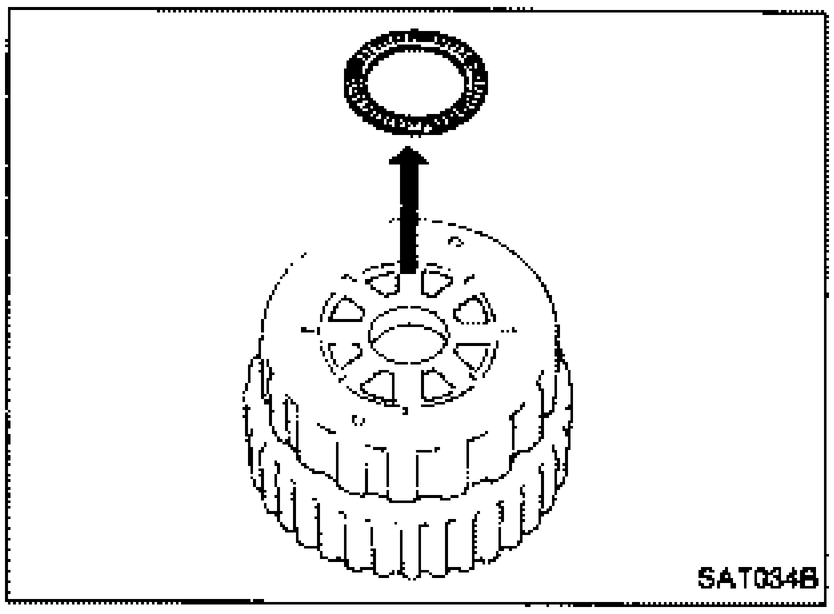
b. Remove bearing race from front internal gear.



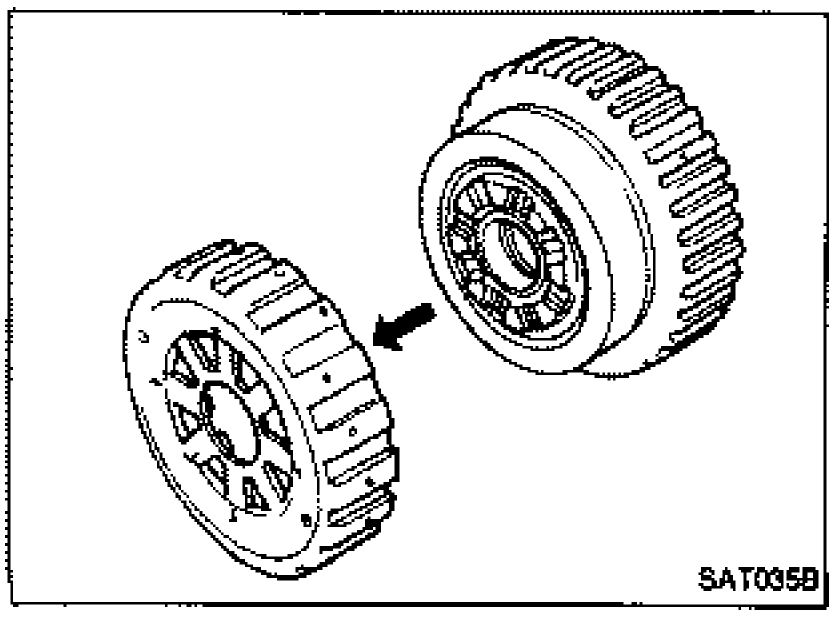
c. Remove needle bearing from rear internal gear.



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

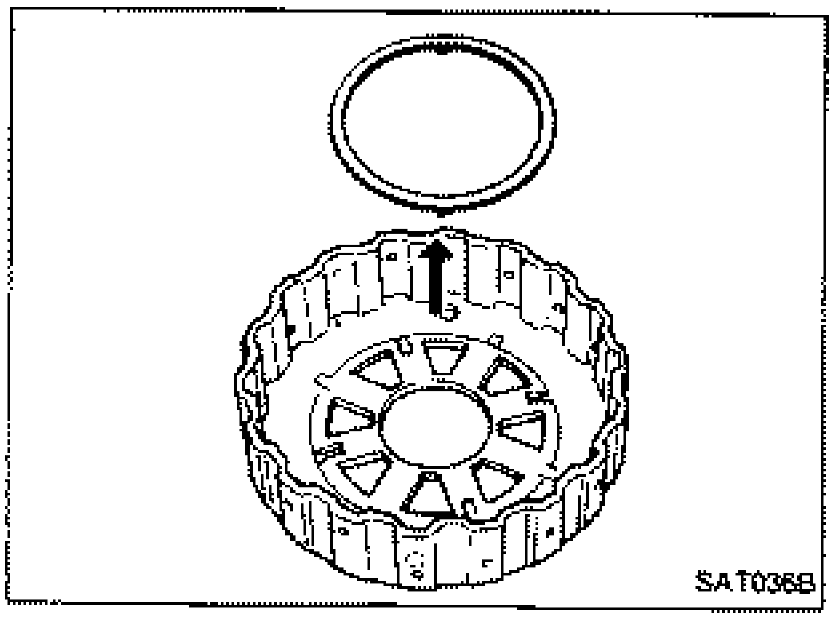


e. Remove needle bearing from overrun clutch hub.

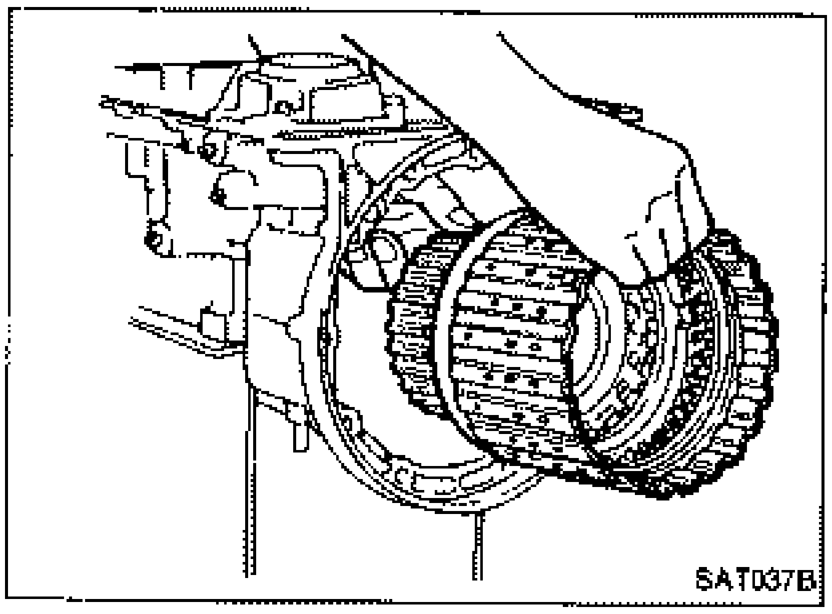


f. Remove overrun clutch hub from rear internal gear and forward clutch hub.

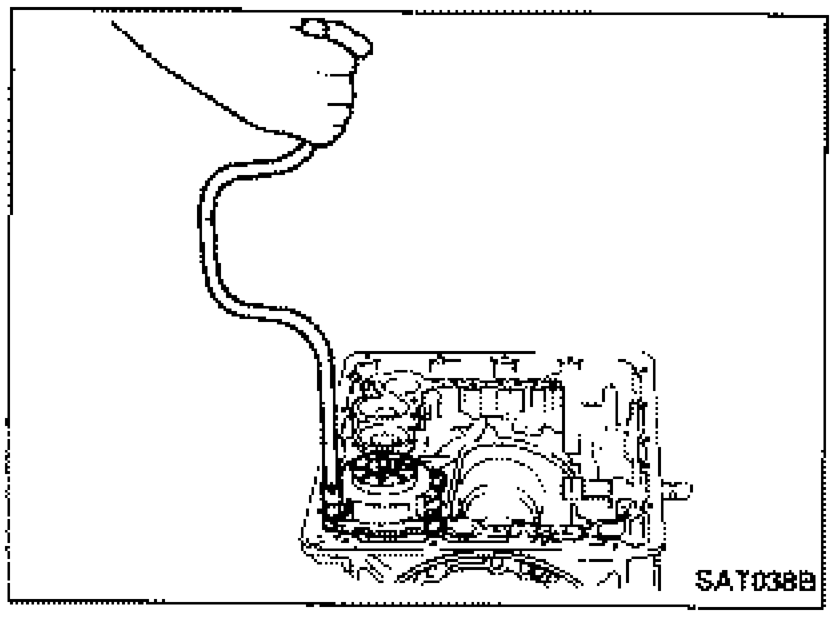
Disassembly (Cont'd)



g. Remove thrust washer from overrun clutch hub.

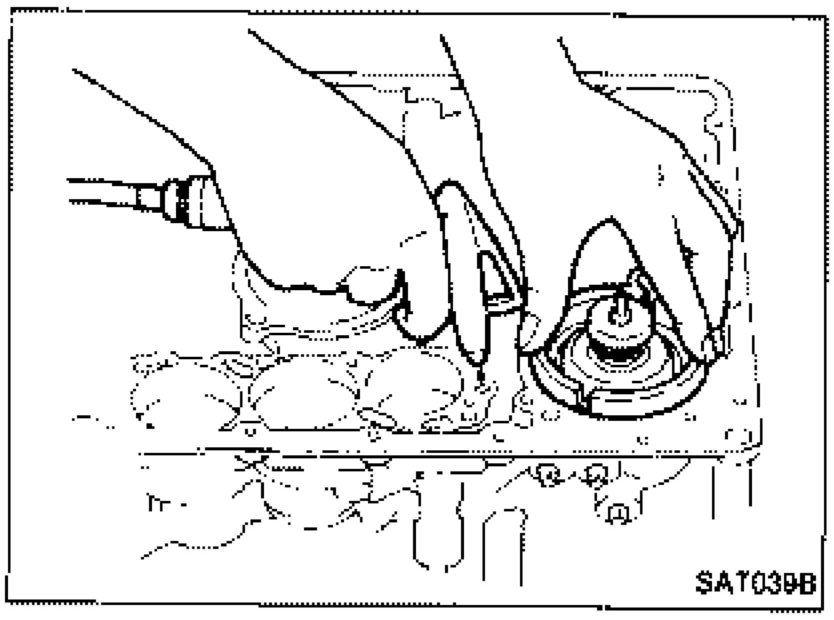


h. Remove forward clutch assembly from transmission case.



20. Remove band servo and accumulator components.

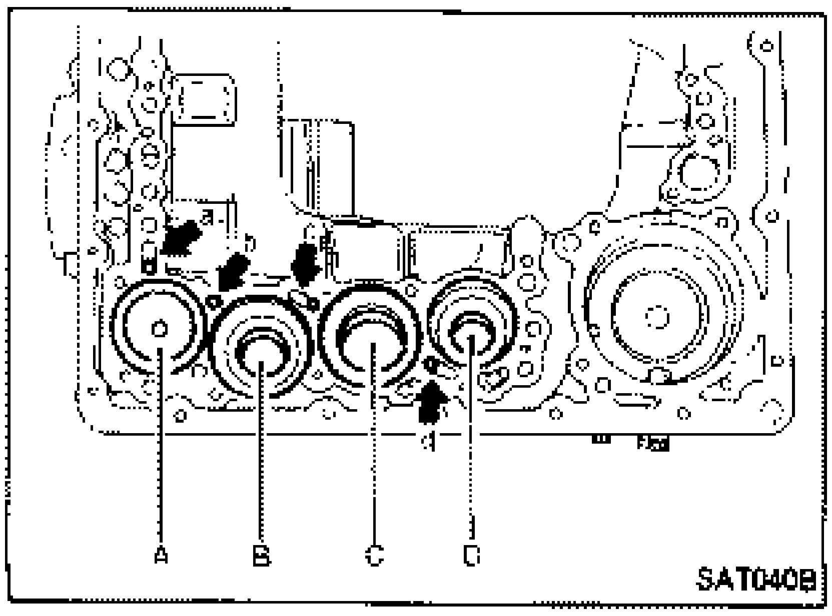
a. Remove band servo retainer from transmission case.



b. 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.**

c. Remove return springs.



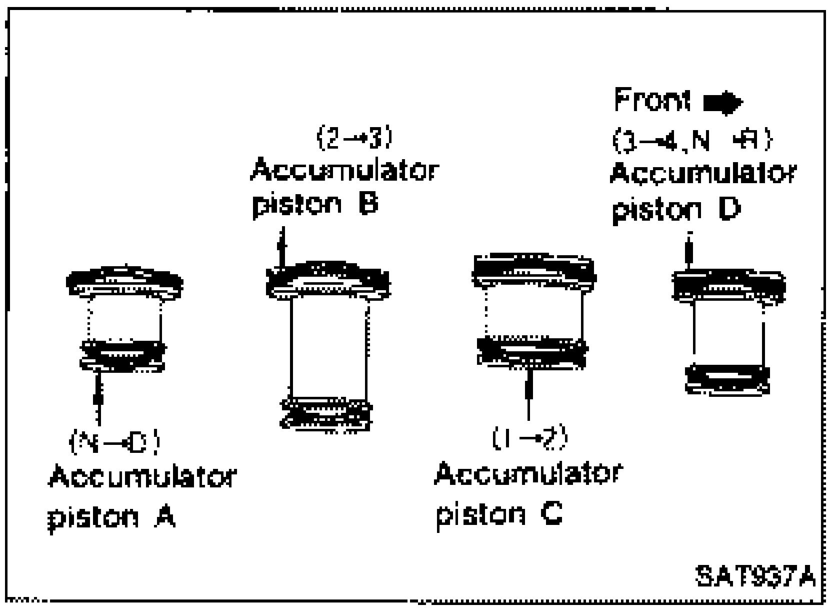
d. Remove springs from accumulator pistons B, C and D.

e. Apply compressed air to each oil hole until piston comes out.

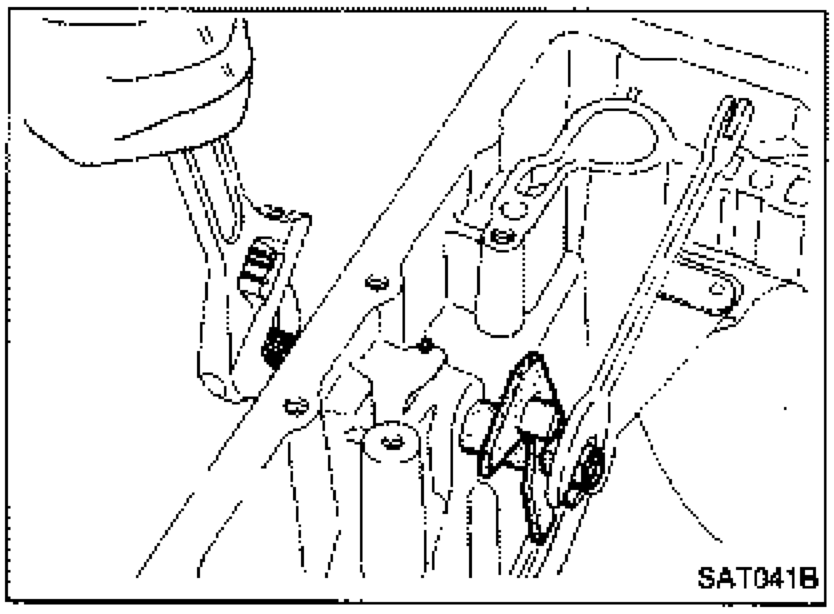
- **Hold piston with a rag and gradually direct air to oil hole.**

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

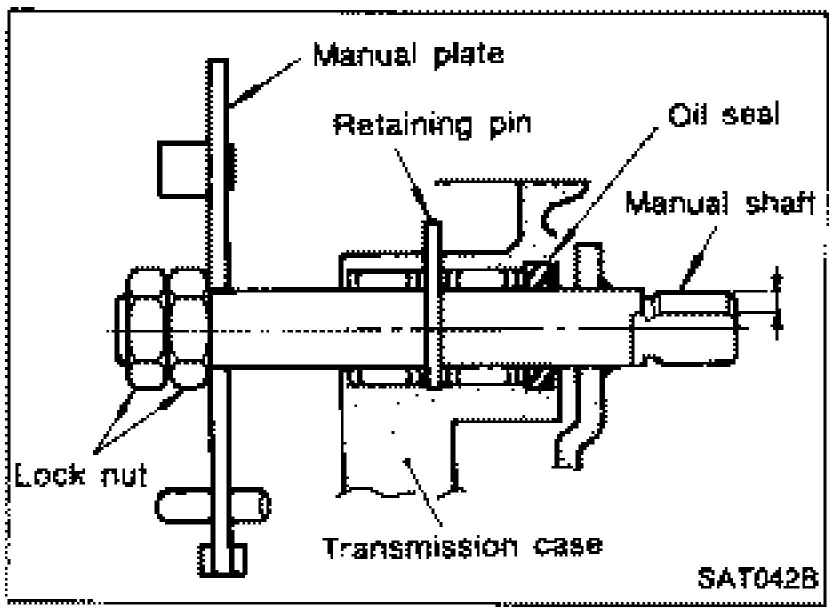
Disassembly (Cont'd)



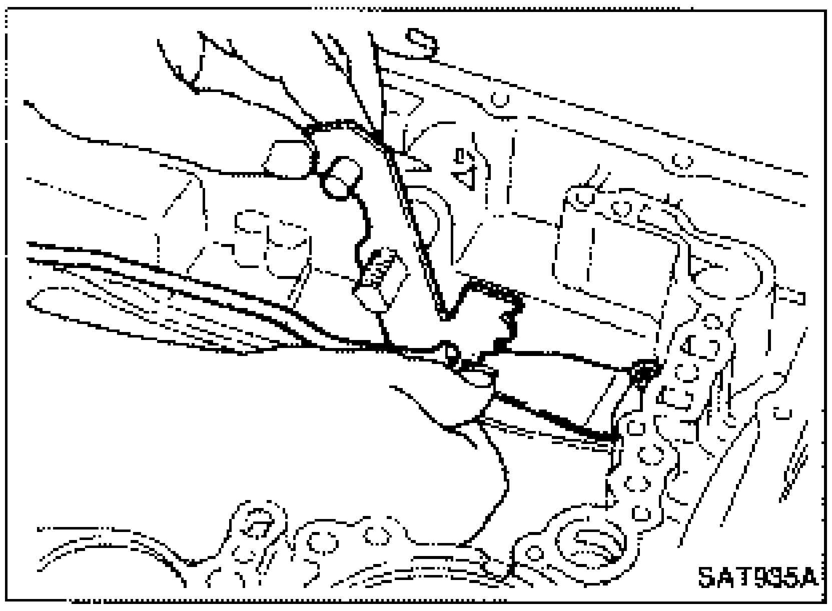
f. Remove O-ring from each piston.



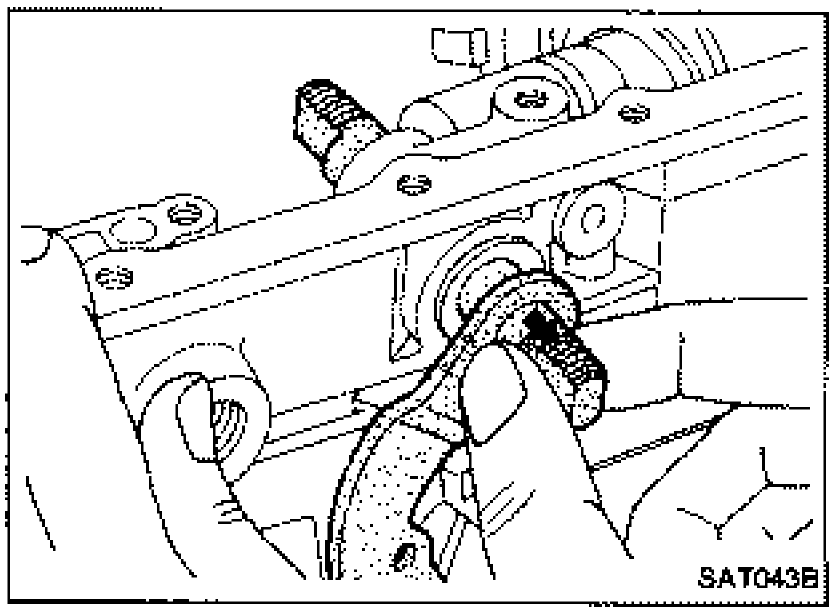
21. Remove manual shaft components, if necessary.
a. Hold width across flats of manual shaft (outside the transmission case) and remove lock nut from shaft.



b. Remove retaining pin from transmission case.

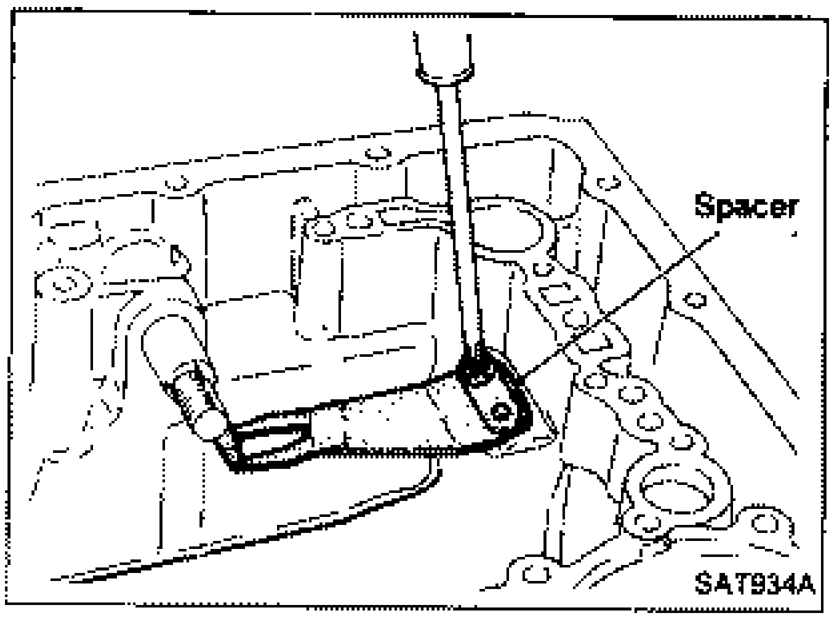


c. While pushing detent spring down, remove manual plate and parking rod from transmission case.

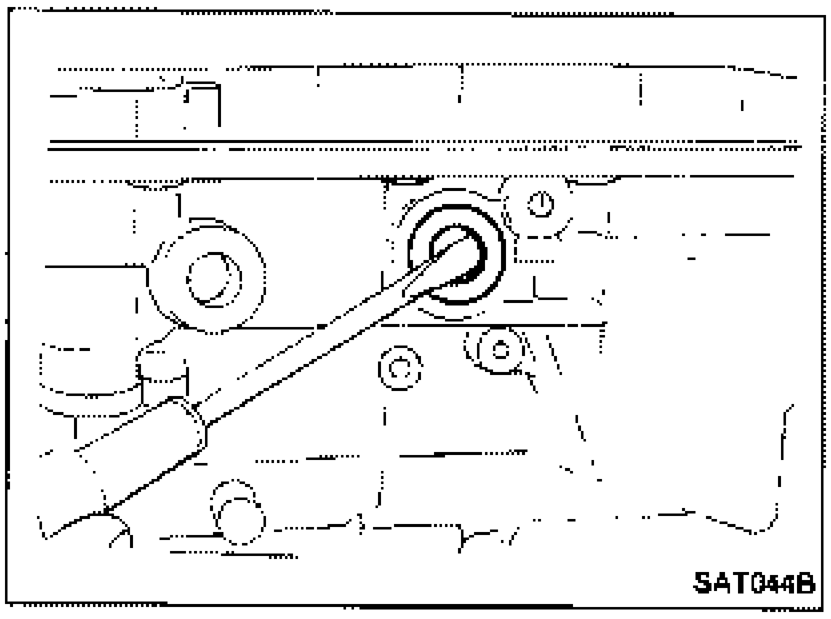


d. Remove manual shaft from transmission case.

Disassembly (Cont'd)

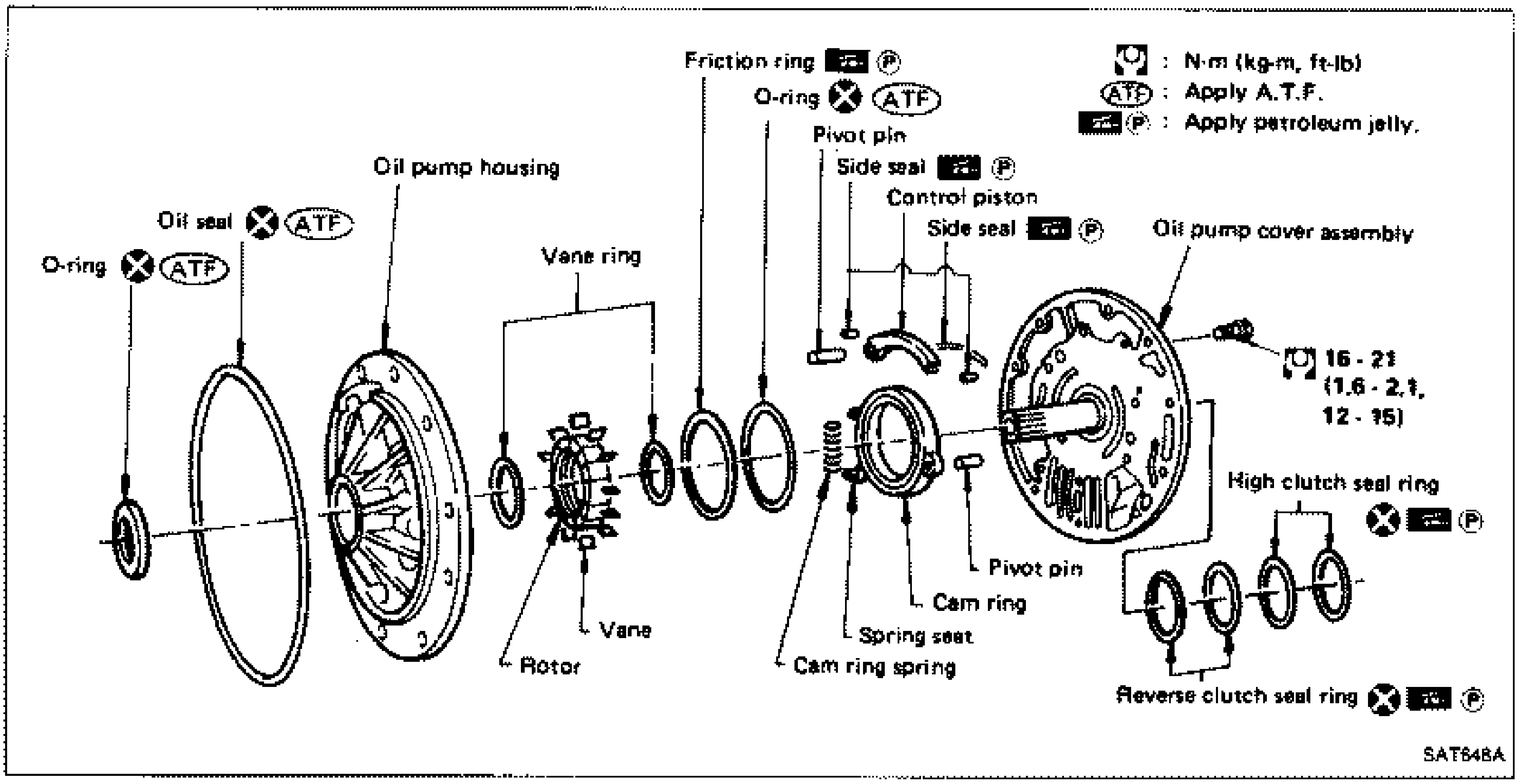


e. Remove spacer and detent spring from transmission case.

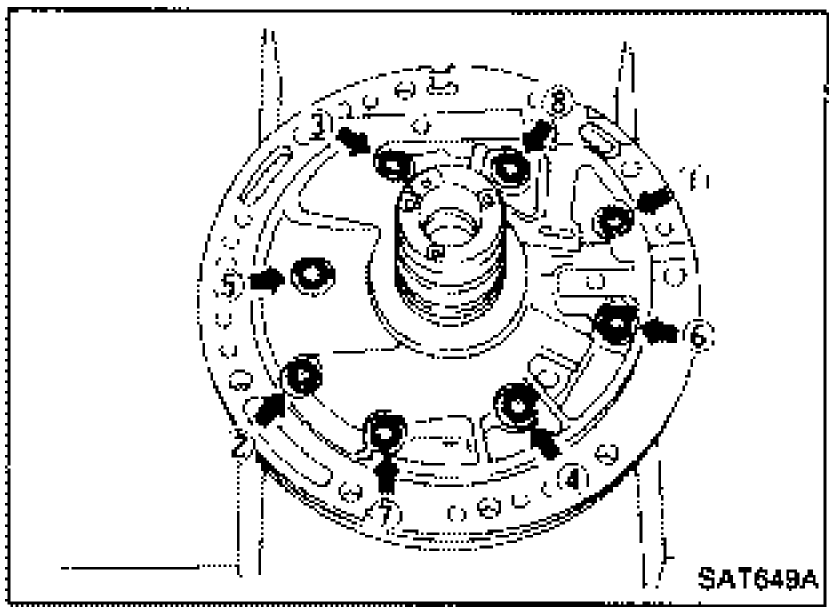


f. Remove oil seal from transmission case.

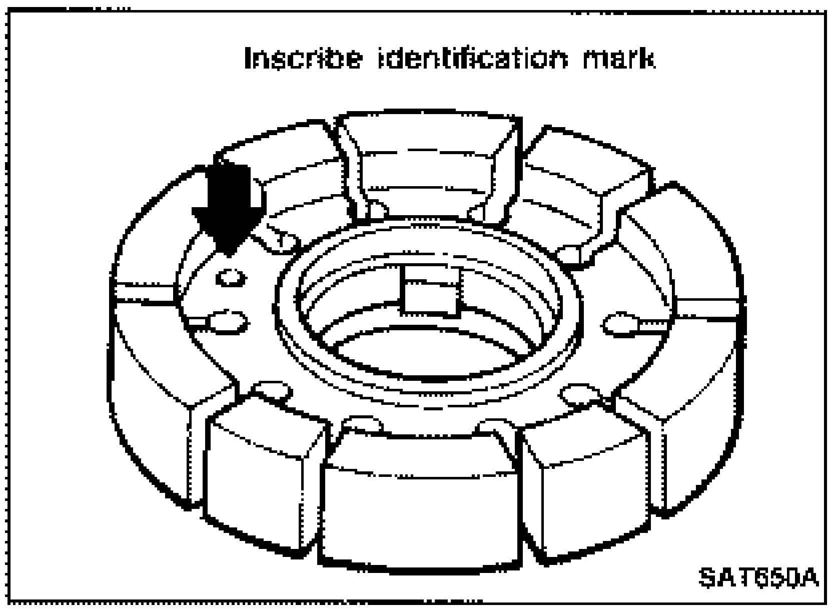
Oil Pump



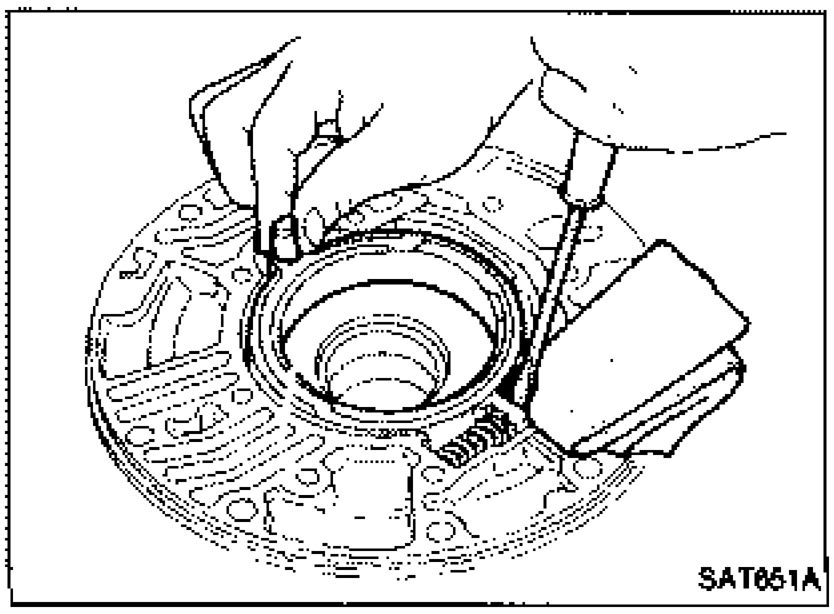
DISASSEMBLY



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

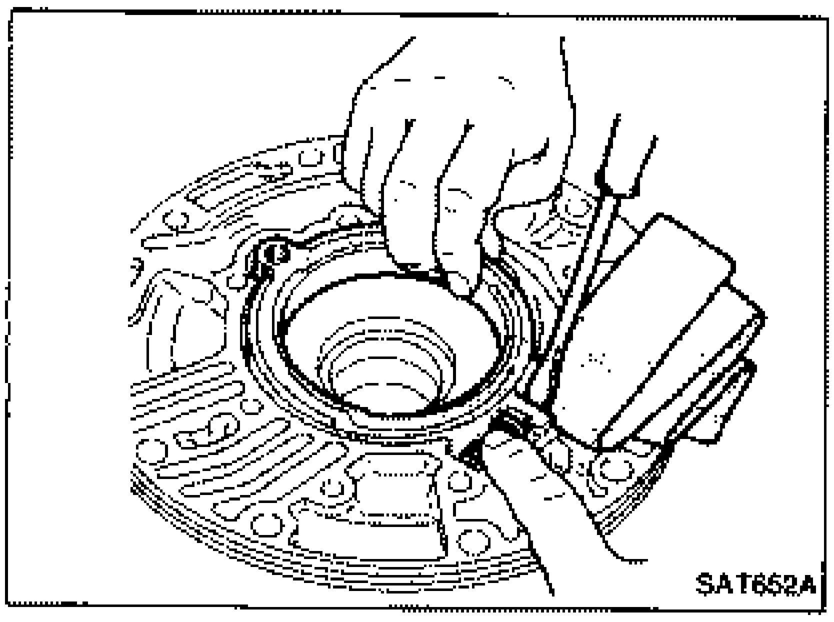


2. Remove rotor, vane rings and vanes.
- **Inscribe a mark on back of rotor for identification of fore-aft direction when reassembling rotor. Then remove rotor.**



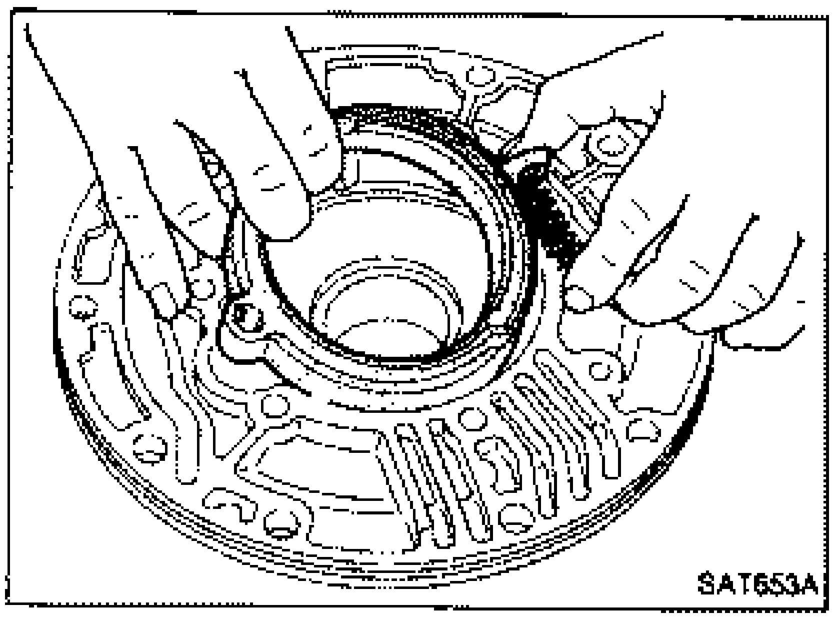
3. While pushing on cam ring remove pivot pin.
- **Be careful not to scratch oil pump housing.**

Oil Pump (Cont'd)

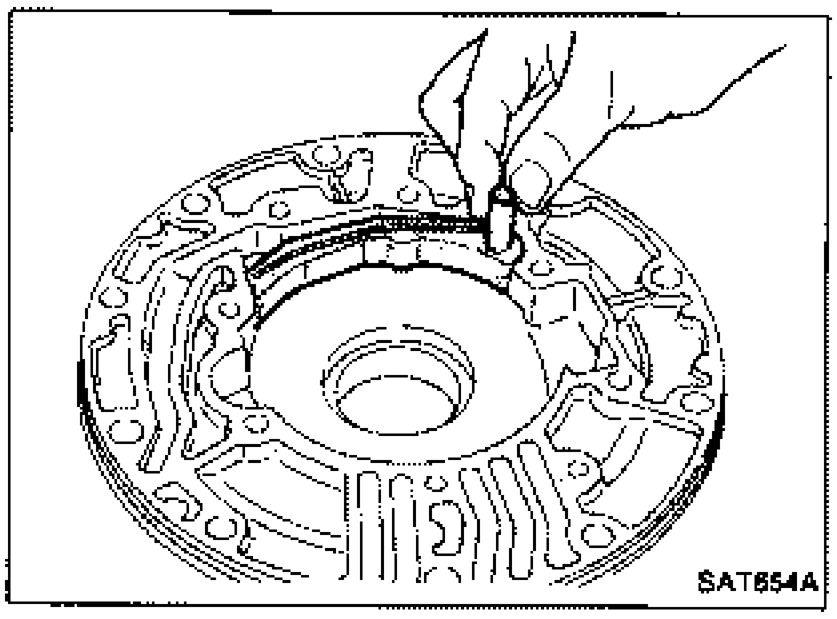

SAT652A

4. While holding cam ring and spring lift out cam ring spring.

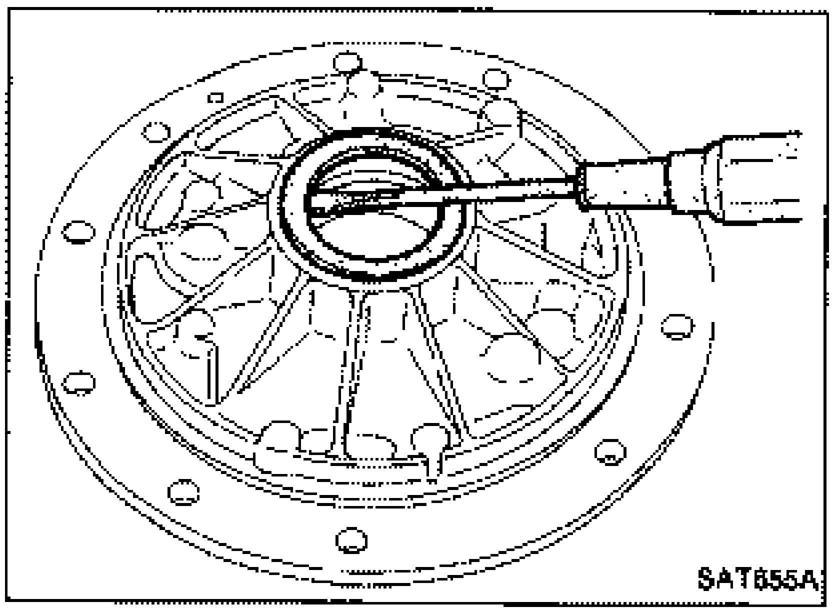
- **Be careful not to damage oil pump housing.**
- **Hold cam ring spring to prevent it from jumping.**


SAT653A

5. Remove cam ring and cam ring spring from oil pump housing.

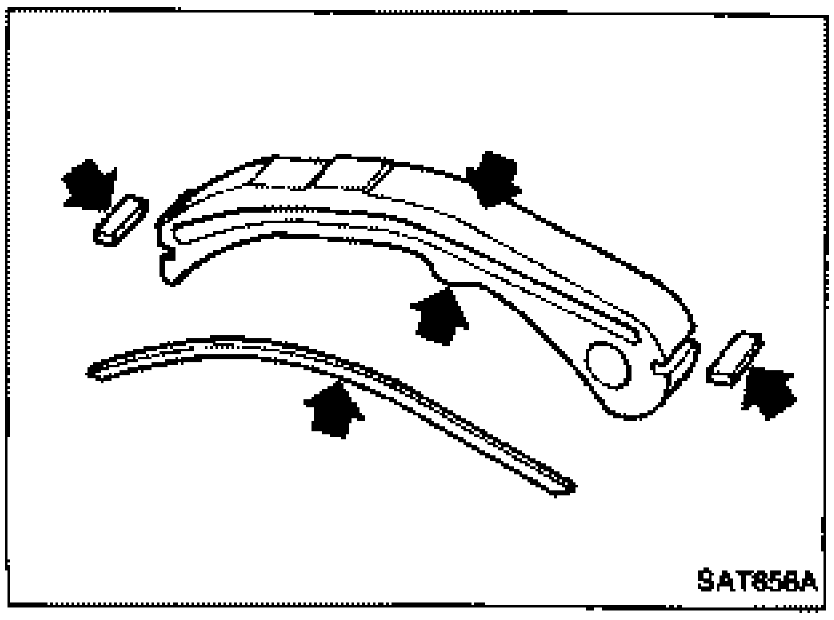

SAT654A

6. Remove pivot pin from control piston and remove control piston assembly.


SAT655A

7. Remove oil seal from oil pump housing.

- **Be careful not to scratch oil pump housing.**

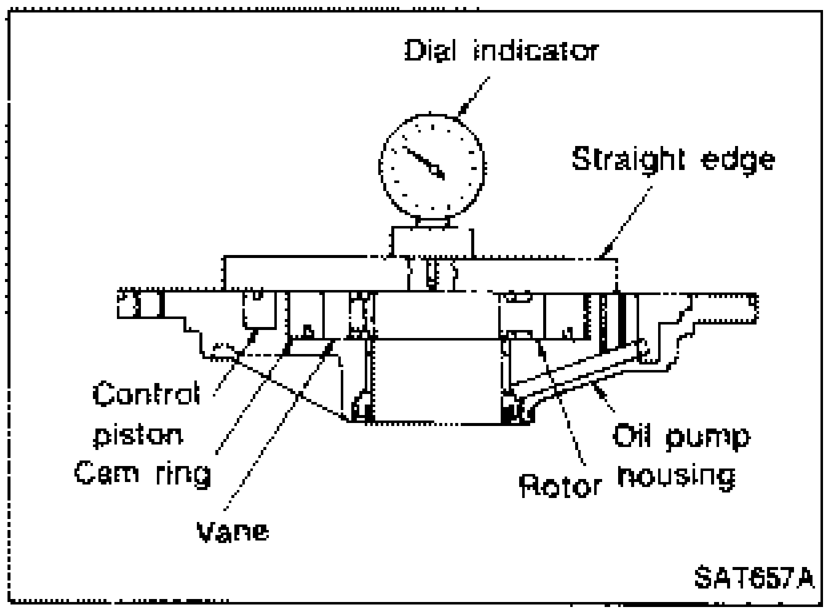

SAT656A

INSPECTION

Oil pump cover, rotor, vanes, control piston, side seals, cam ring and friction ring

- Check for wear or damage.

Oil Pump (Cont'd)



Side clearances

- Measure side clearances between end of oil pump housing and cam ring, rotor, vanes and control piston in at least four places along their circumferences. Maximum measured values should be within specified ranges.
- **Before measuring side clearance, check that friction rings, O-ring, control piston side seals and cam ring spring are removed.**

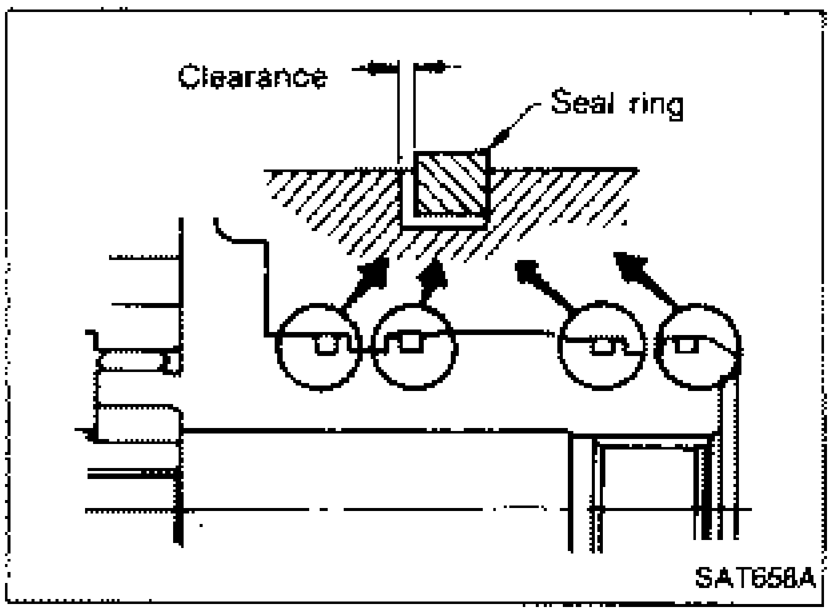
  Standard clearance:

  Cam ring

  0.01 - 0.024 mm (0.0004 - 0.0009 in)

  Rotor, vanes, control piston

  0.03 - 0.044 mm (0.0012 - 0.0017 in)
- If not within standard clearance, replace oil pump assembly except oil pump cover assembly.



Seal ring clearance

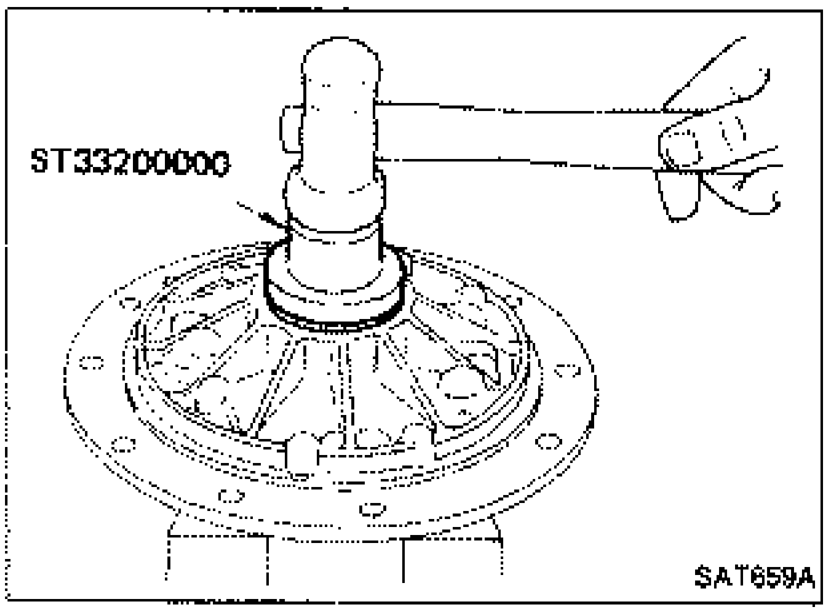
- Measure clearance between seal ring and ring groove.

  Standard clearance:

  0.10 - 0.25 mm (0.0039 - 0.0098 in)

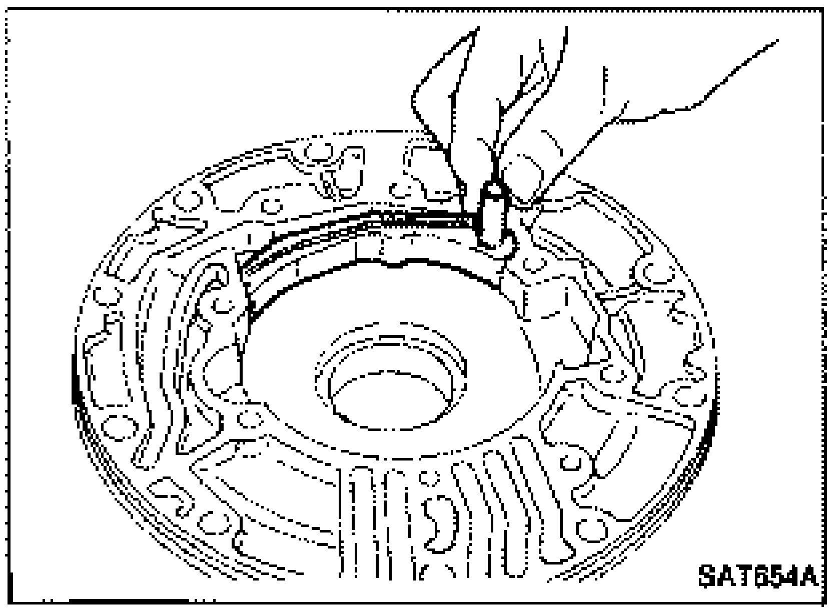
  Wear limit:

  0.25 mm (0.0098 in)
- If not within wear limit, replace oil pump cover assembly.



ASSEMBLY

1. Drive oil seal into oil pump housing.
- **Apply A.T.F. to outer periphery and lip surface.**



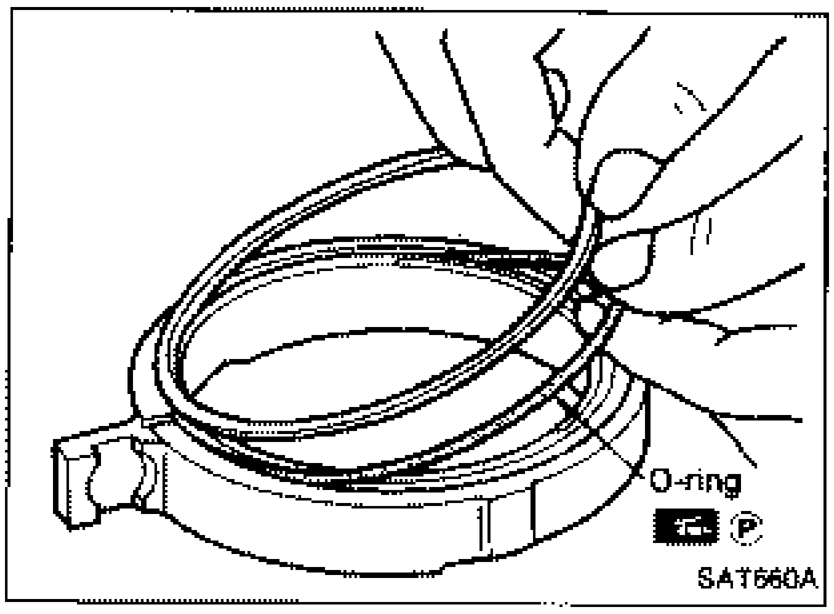
2. Install cam ring in oil pump housing by the following steps.

a. Install side seal on control piston.

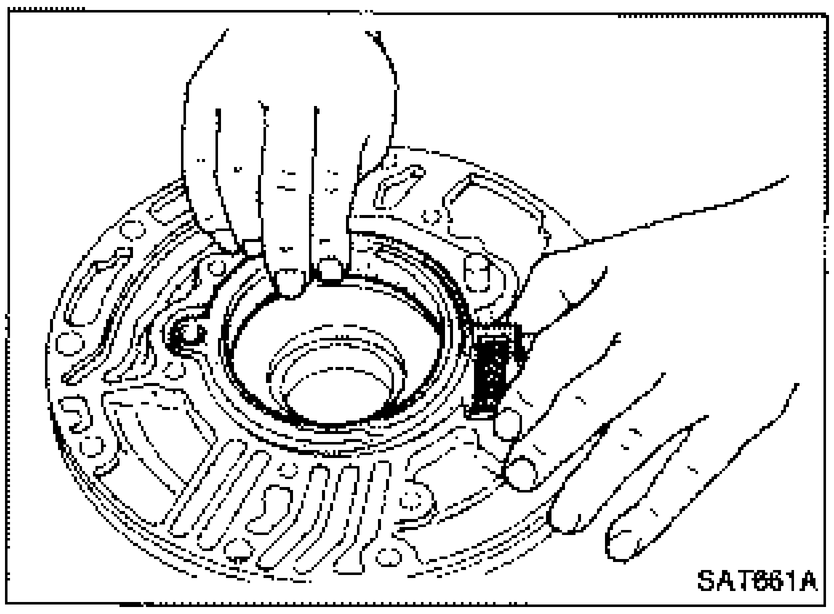
- **Pay attention to its direction — Black surface goes toward control piston.**
- **Apply petroleum jelly to side seal.**

b. Install control piston on oil pump.

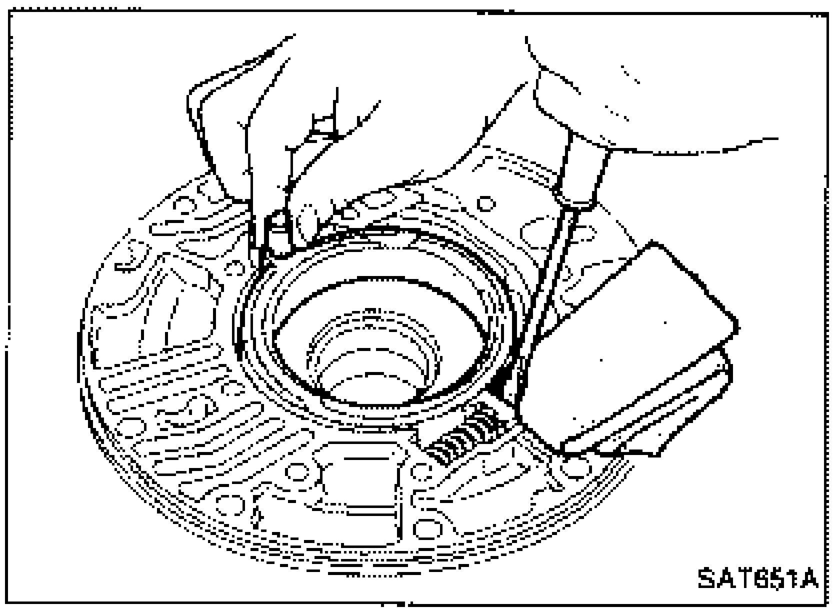
Oil Pump (Cont'd)



c. Install O-ring and friction ring on cam ring.
- **Apply petroleum jelly to O-ring.**

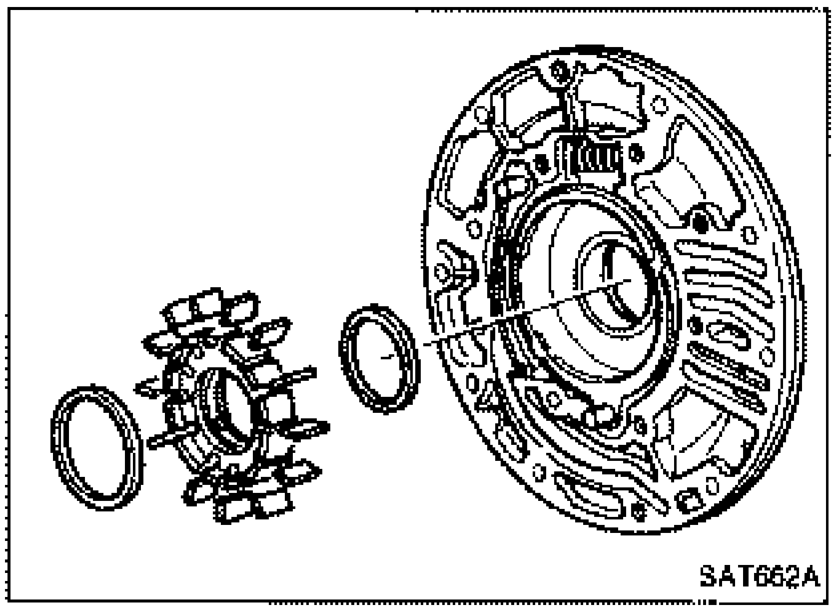


d. Assemble cam ring, cam ring spring and spring seat. Install spring by pushing it against pump housing.



e. While pushing on cam ring install pivot pin.

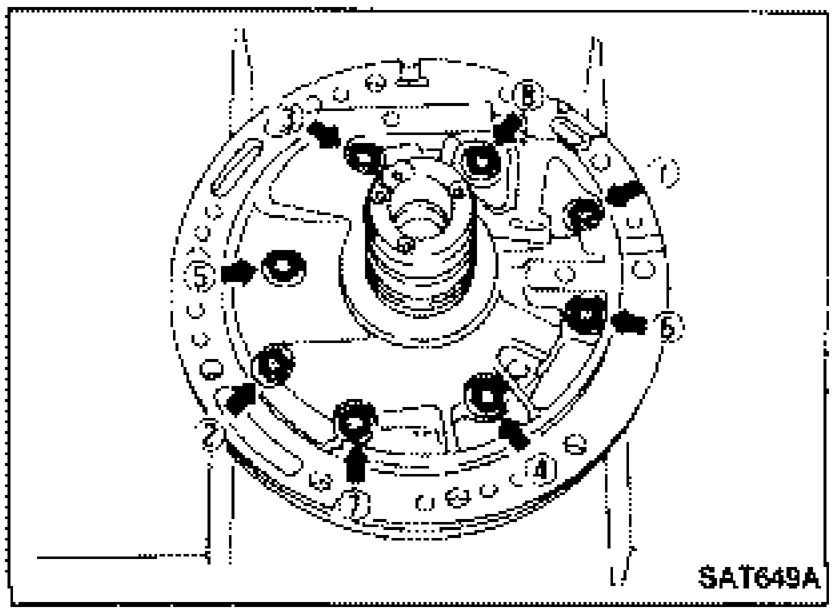
3. Install rotor, vanes and vane rings.
- **Pay attention to direction of rotor.**



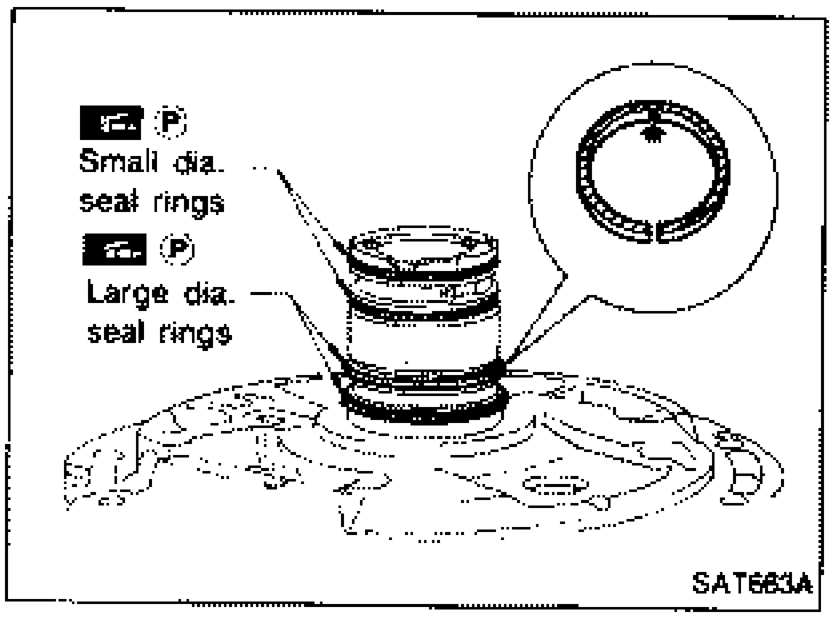
4. Install oil pump housing and oil pump cover.

a. Wrap masking tape around splines of oil pump cover assembly to protect seal. Position oil pump cover assembly in oil pump housing assembly, then remove masking tape.

b. Tighten bolts in a criss-cross pattern.



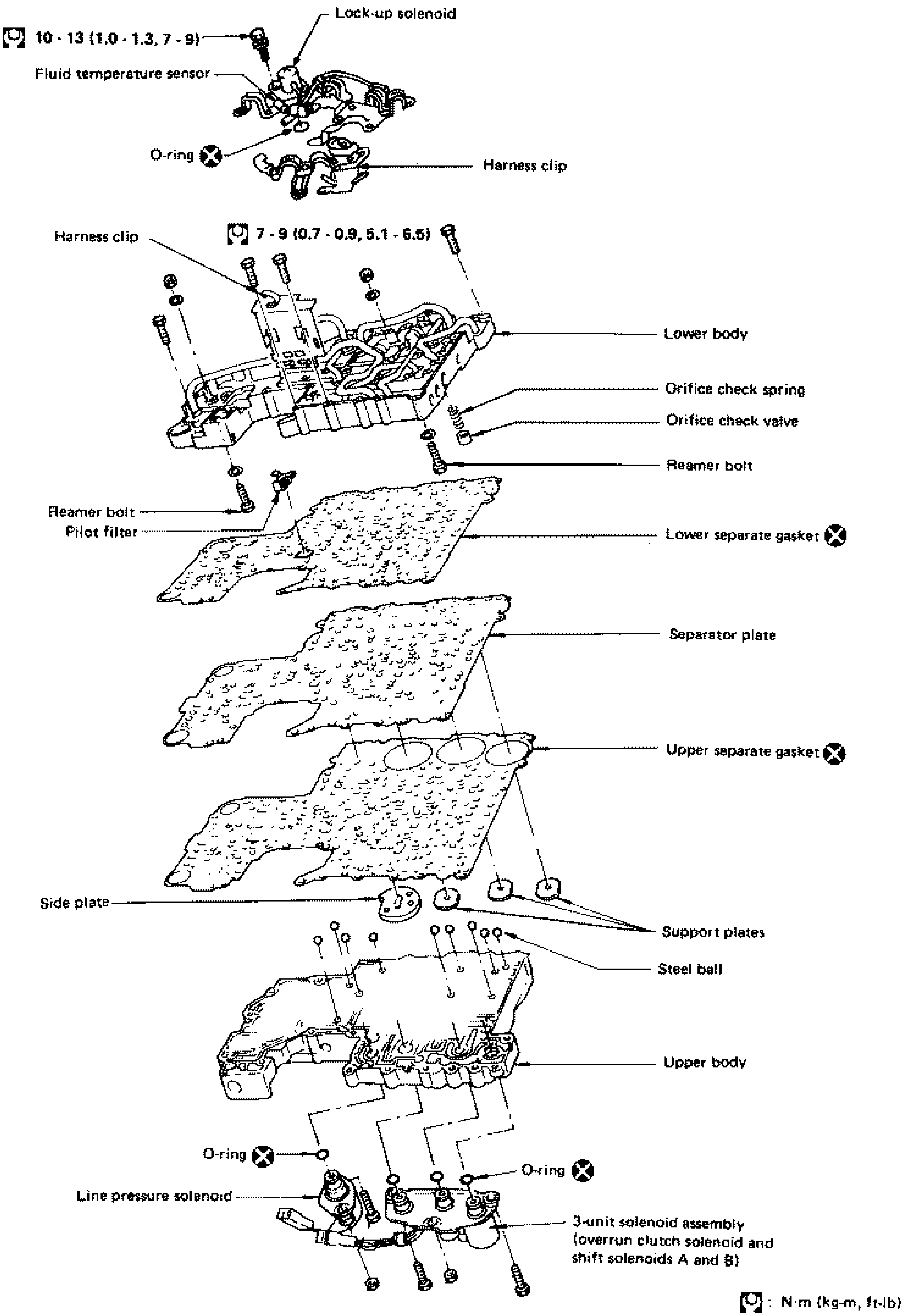
Oil Pump (Cont'd)



5. Install seal rings carefully after packing ring grooves with petroleum jelly. Press rings down into jelly to a close fit.

- **Seal rings come in two different diameters. Check fit carefully in each groove.**
  - **Small dia. seal ring:**
    - **No mark**
  - **Large dia. seal ring:**
    - **Yellow mark in area shown by arrow**
- **Do not spread gap of seal ring excessively while installing. It may deform ring.**

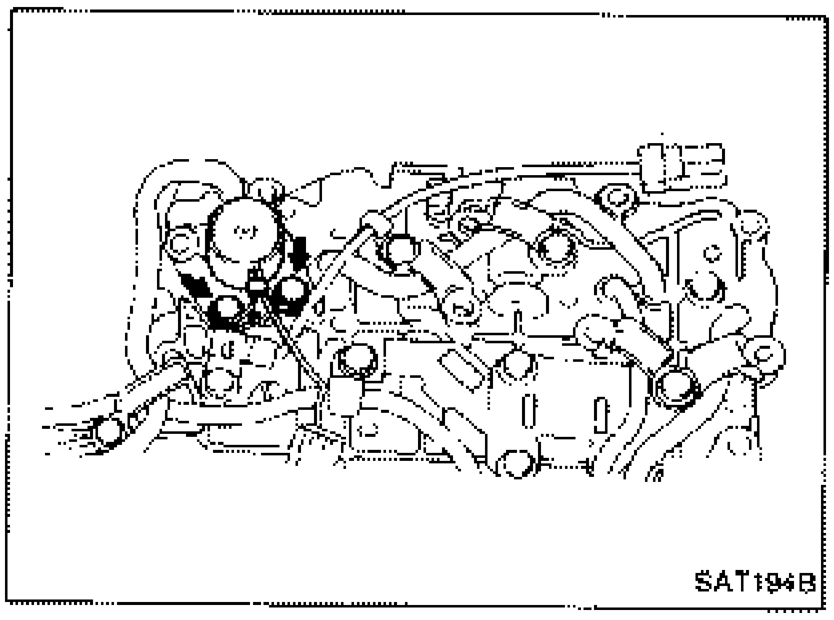
Control Valve Assembly



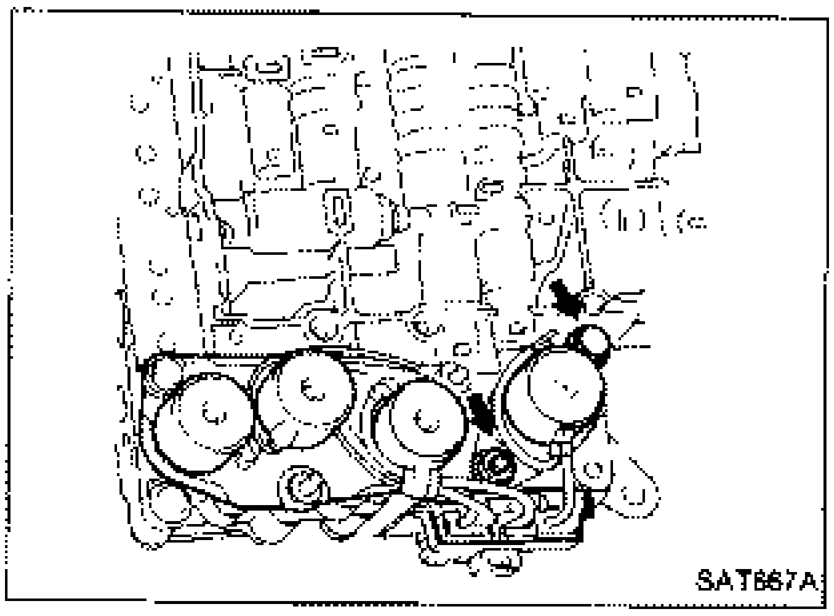
SAT638C

Control Valve Assembly (Cont'd)

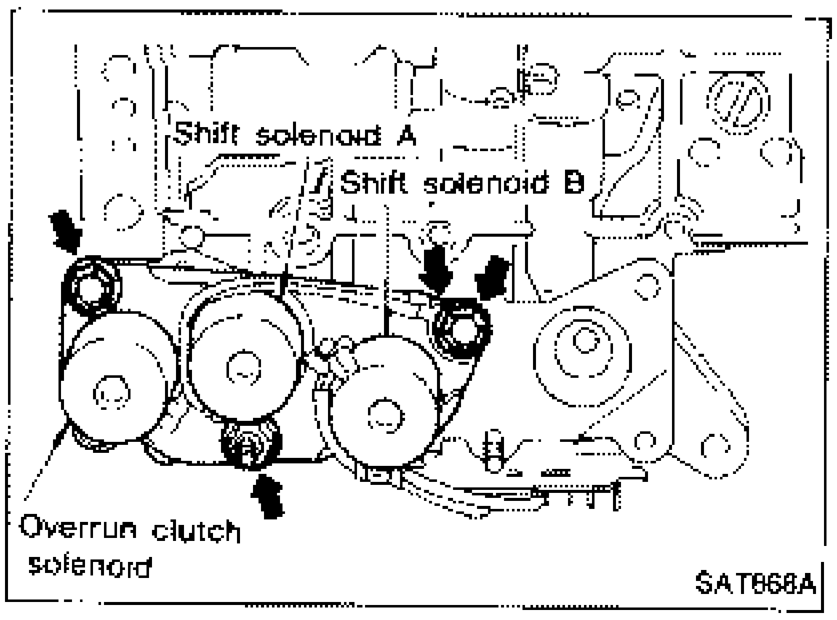
DISASSEMBLY



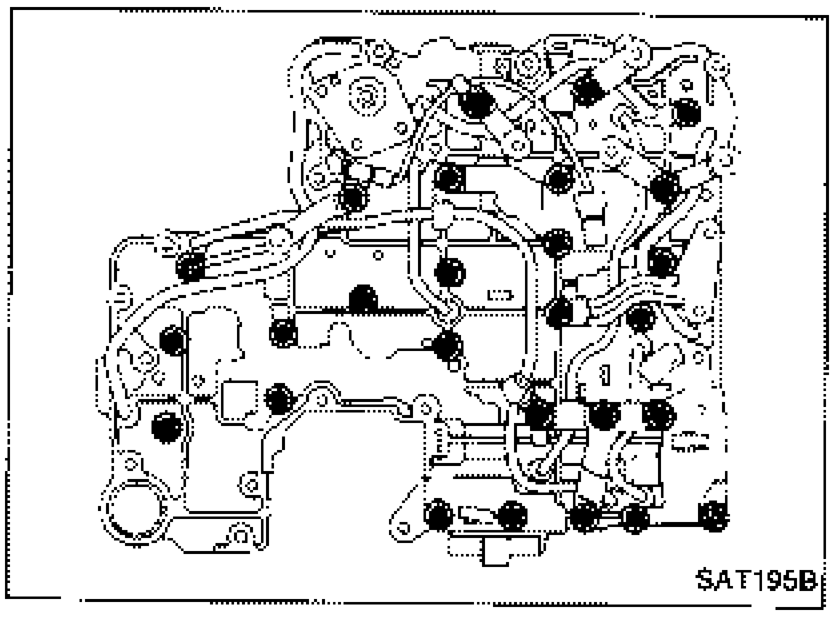
1. Remove solenoids.
   a. Remove lock-up solenoid and side plate from lower body.
   b. Remove O-ring from solenoid.



   c. Remove line pressure solenoid from upper body.
   d. Remove O-ring from solenoid.

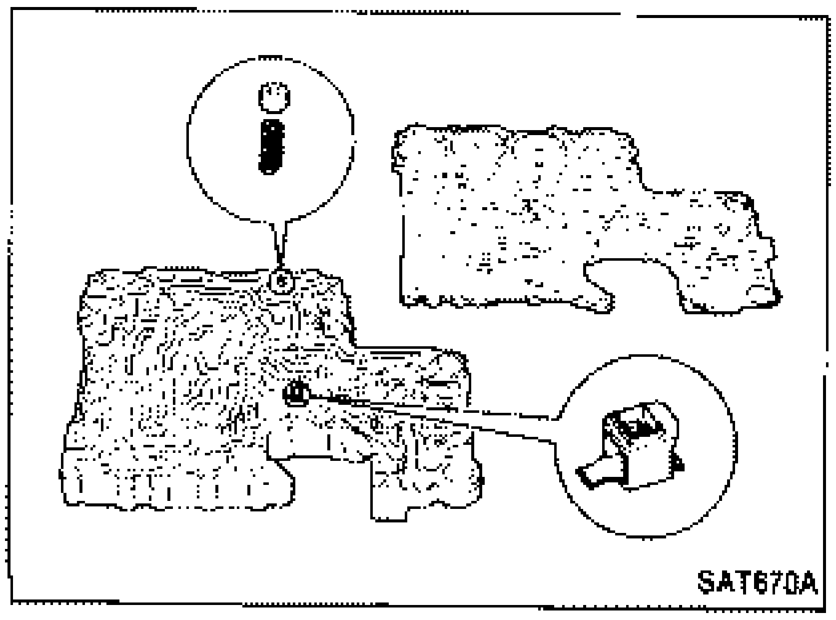


   e. Remove 3-unit solenoid assembly from upper body.
   f. Remove O-rings from solenoids.



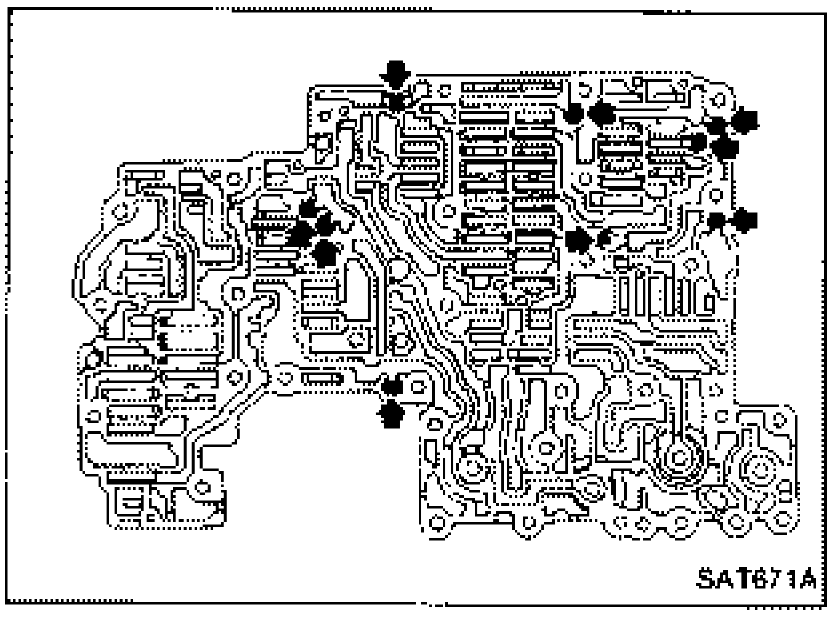
2. Disassemble upper and lower bodies.
   a. Place upper body facedown, and remove bolts, reamer bolts and support plates.
   b. Remove lower body, separator plate and separate gasket as a unit from upper body.

- **Be careful not to drop pilot filter, orifice check valve, spring and steel balls.**



   c. Place lower body facedown, and remove separate gasket and separator plate.
   d. Remove pilot filter, orifice check valve and orifice check spring.

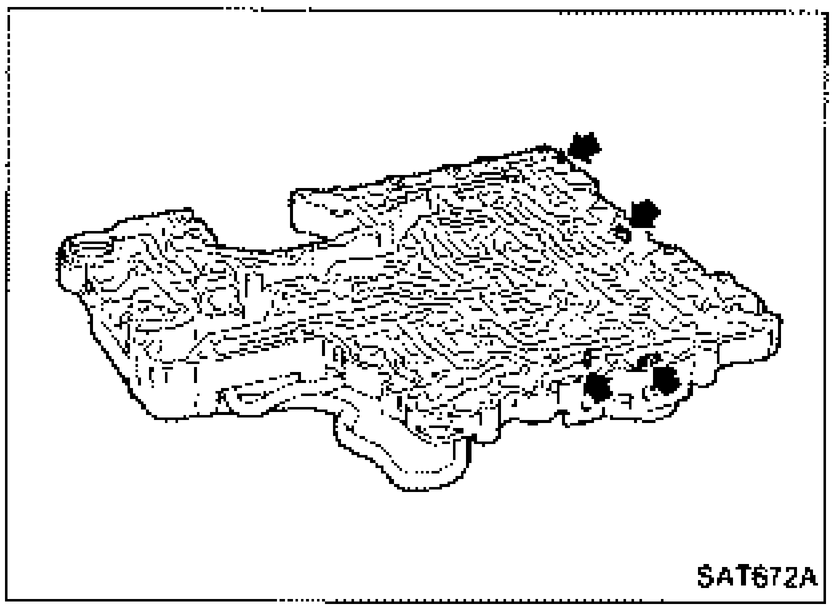
Control Valve Assembly (Cont'd)



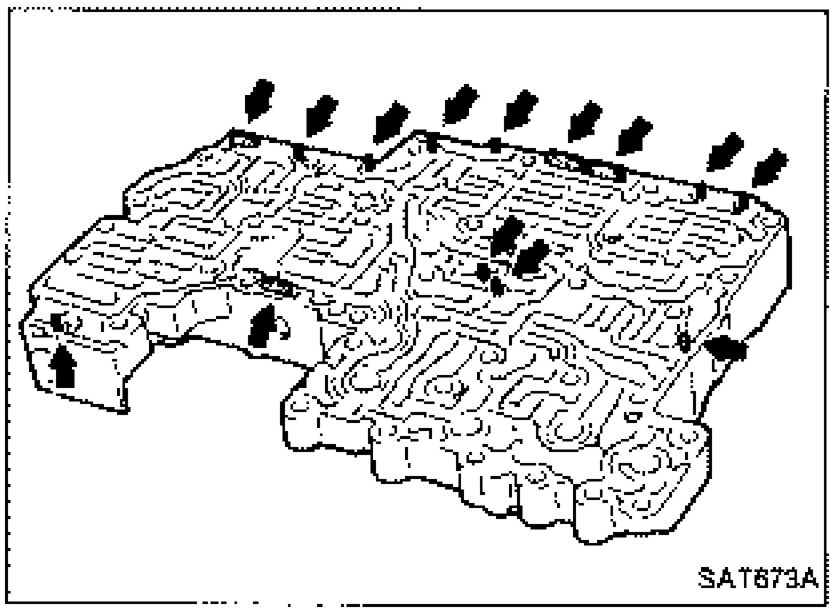
e. Check to see that steel balls are properly positioned in upper body and then remove them from upper body.

INSPECTION

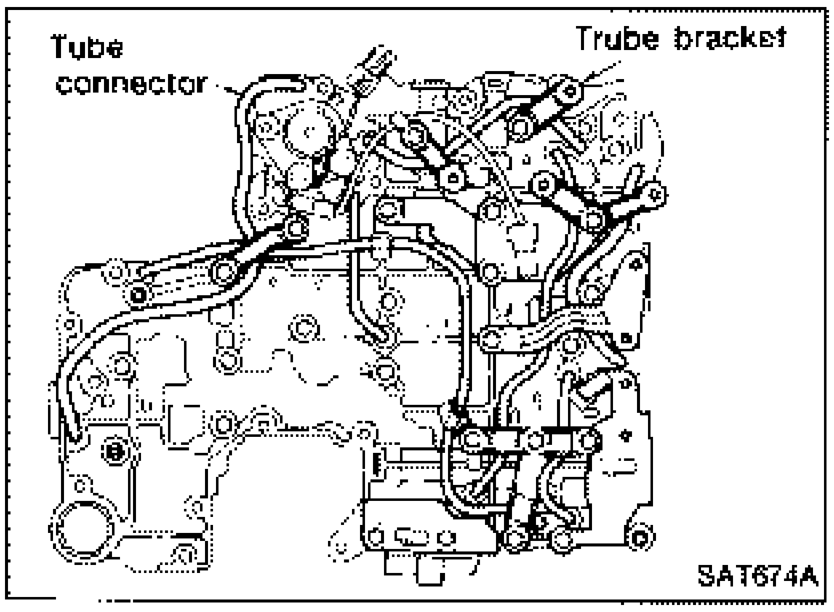
Lower and upper bodies



- Check to see that there are pins and retainer plates in lower body.

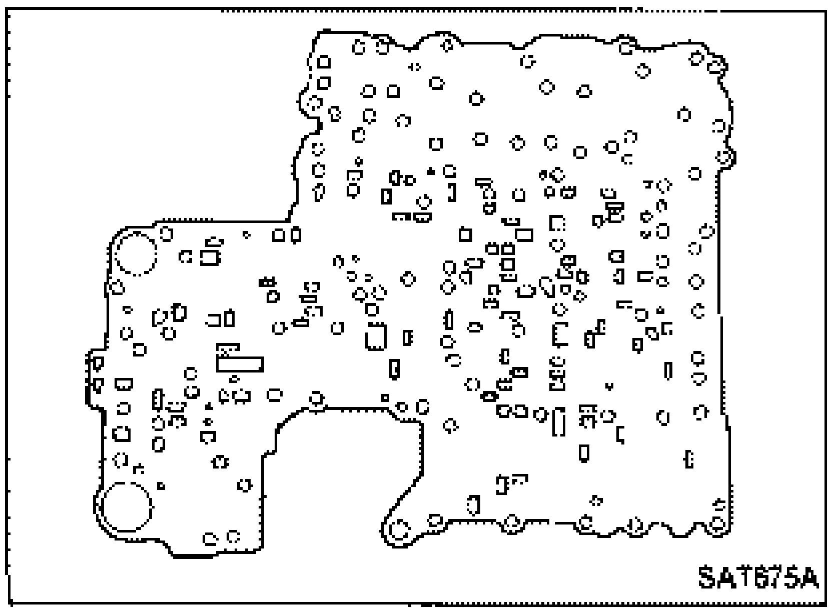


- Check to see that there are pins and retainer plates in upper body.
- **Be careful not to lose these parts.**



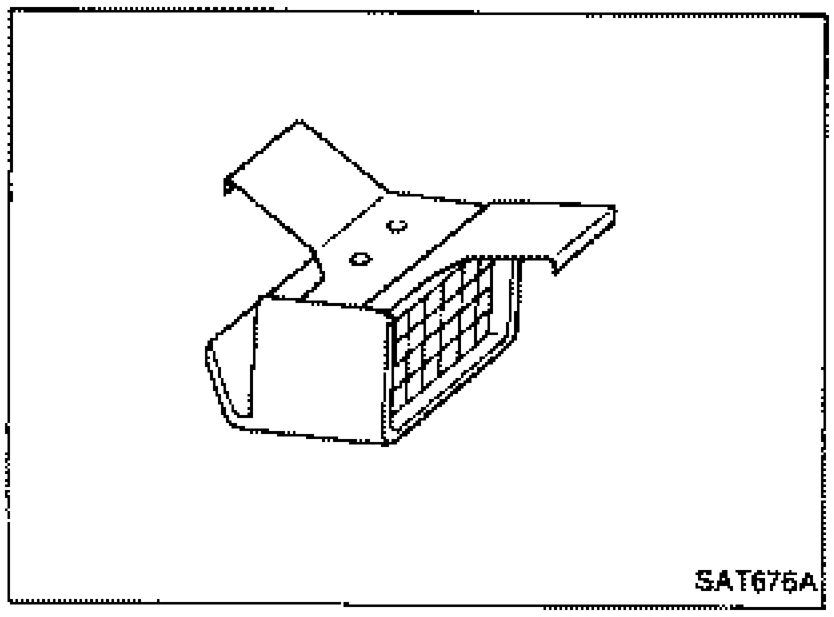
- Check to make sure that oil circuits are clean and free from damage.
- Check tube brackets and tube connectors for damage.

Separator plates



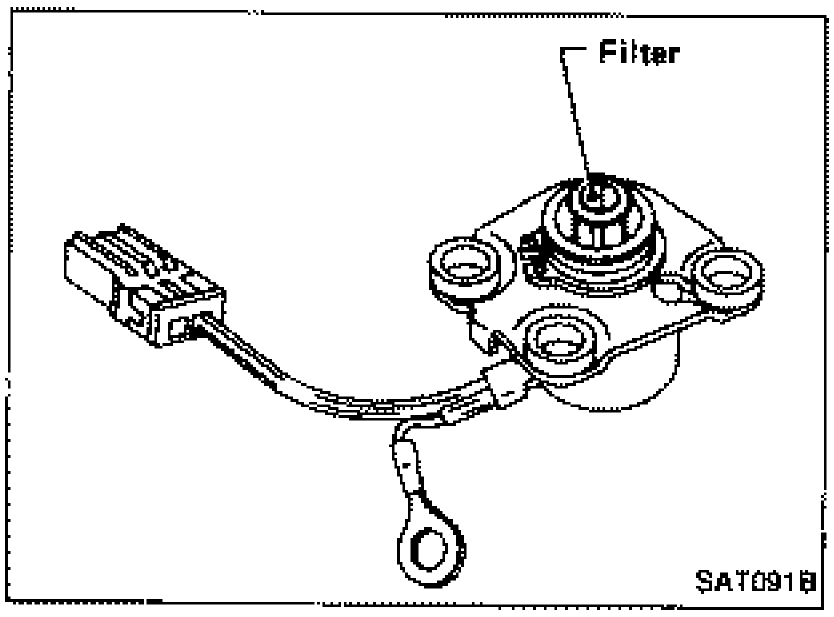
- Check to make sure that separator plate is free of damage and not deformed and oil holes are clean.

Control Valve Assembly (Cont'd)



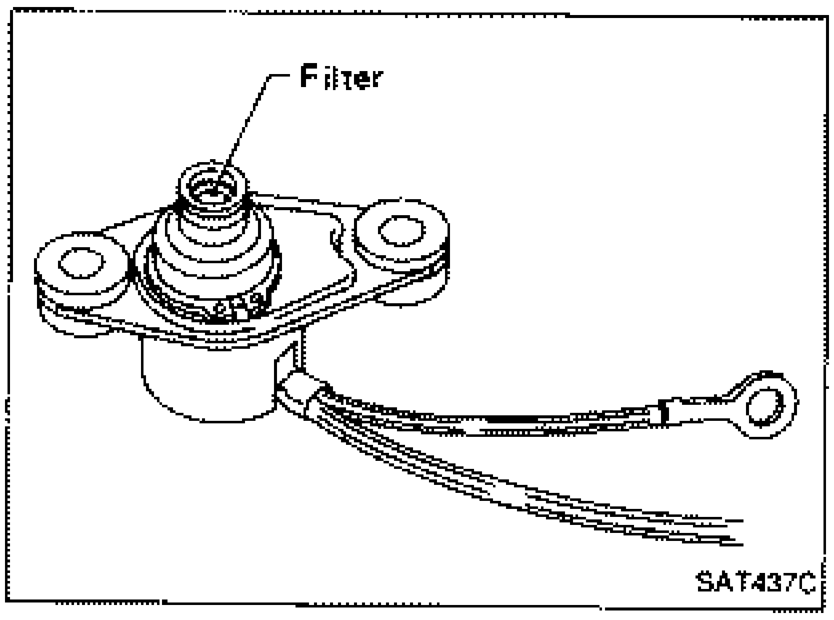
Pilot filter

- Check to make sure that filter is not clogged or damaged.



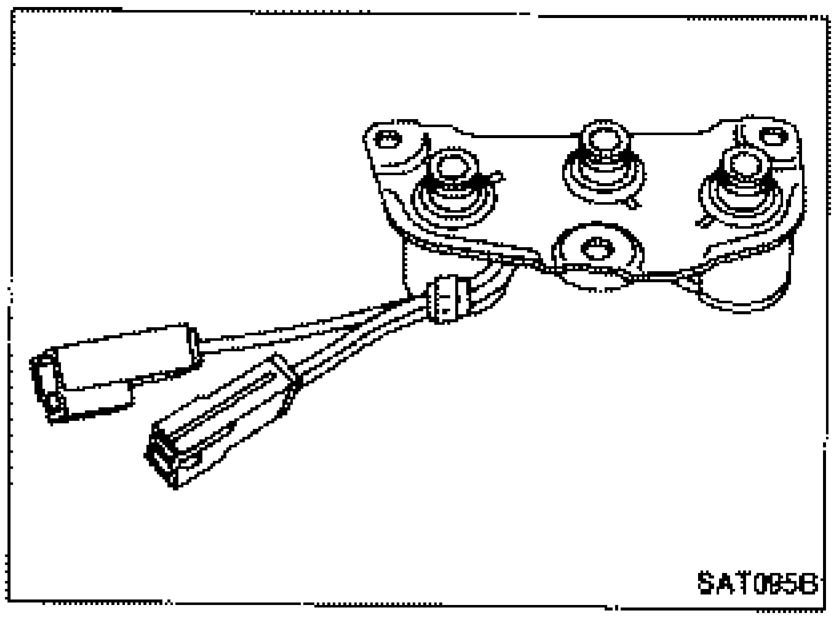
Lock-up solenoid

- Check that filter is not clogged or damaged.
- Measure resistance. — Refer to "Electrical Components Inspection".



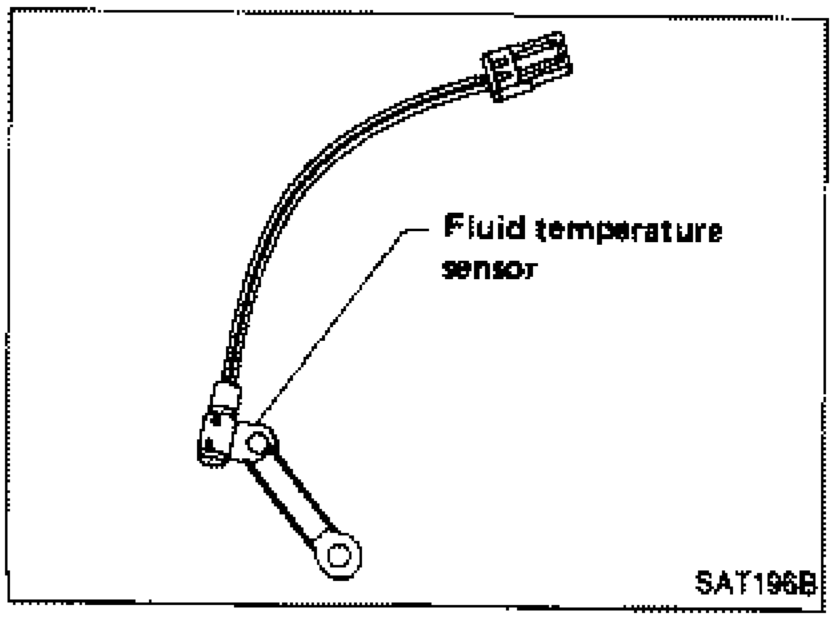
Line pressure solenoid

- Check that filter is not clogged or damaged.
- Measure resistance. — Refer to "Electrical Components Inspection".



3-unit solenoid assembly (Overrun clutch solenoid and shift solenoids A and B)

- Measure resistance of each solenoid. — Refer to "Electrical Components Inspection".



Fluid temperature sensor

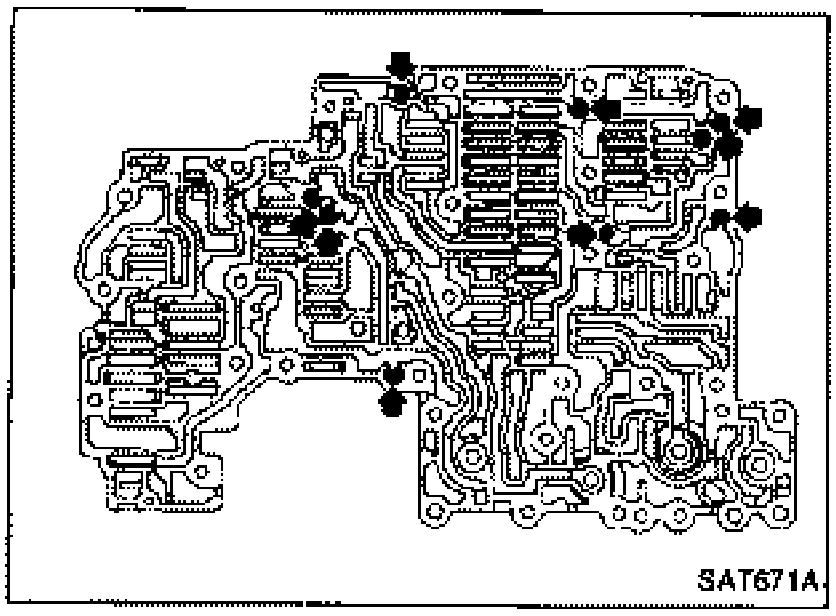
- Measure resistance. — Refer to "Electrical Components Inspection".

Control Valve Assembly (Cont'd)

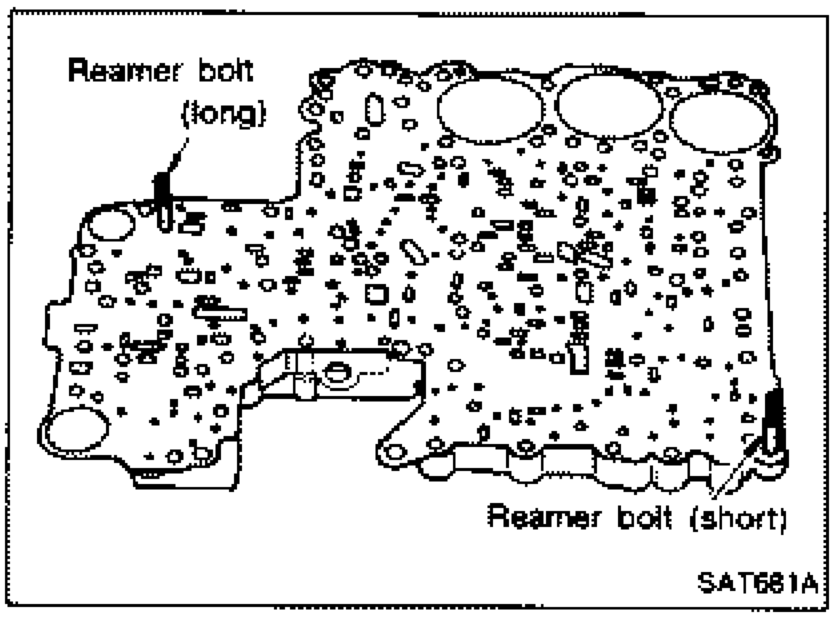
ASSEMBLY

1. Install upper and lower bodies.

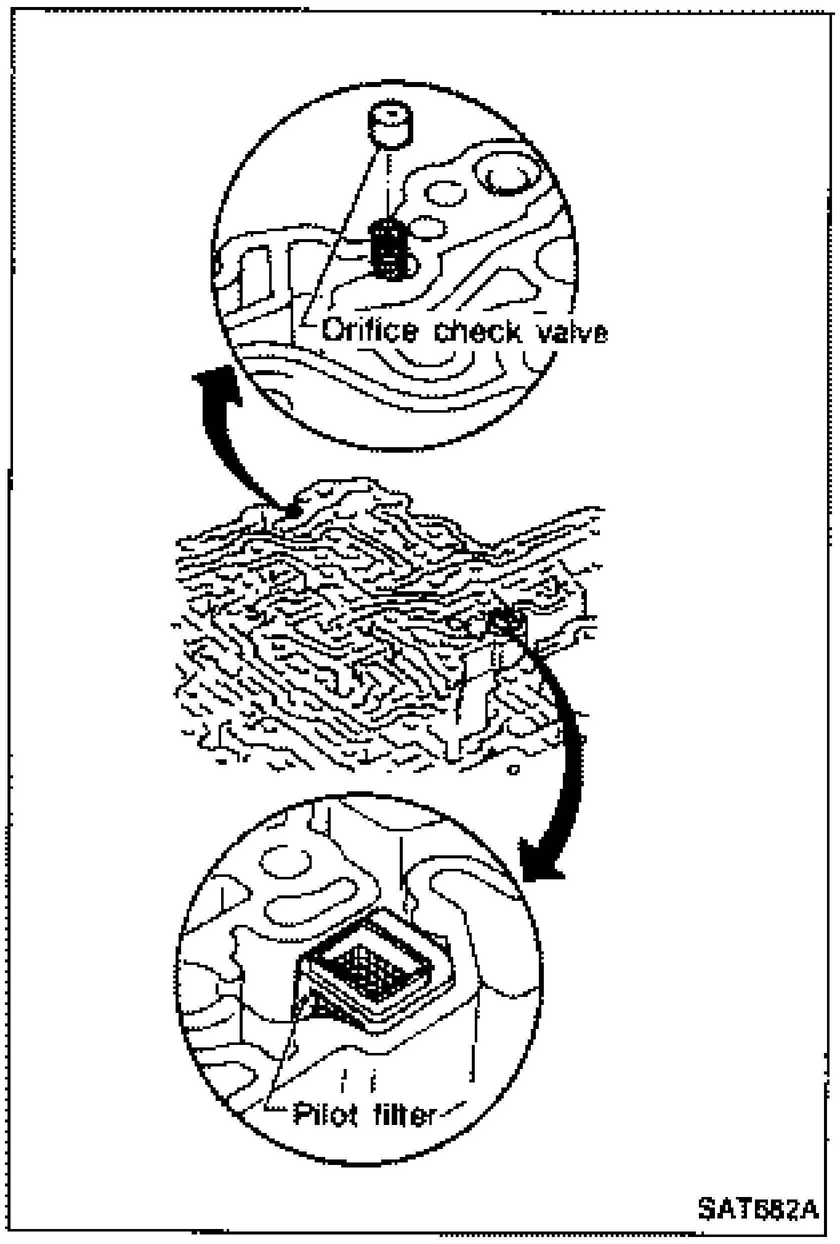
a. Place oil circuit of upper body face up. Install steel balls in their proper positions.



b. Install reamer bolts from bottom of upper body and install separate gaskets.

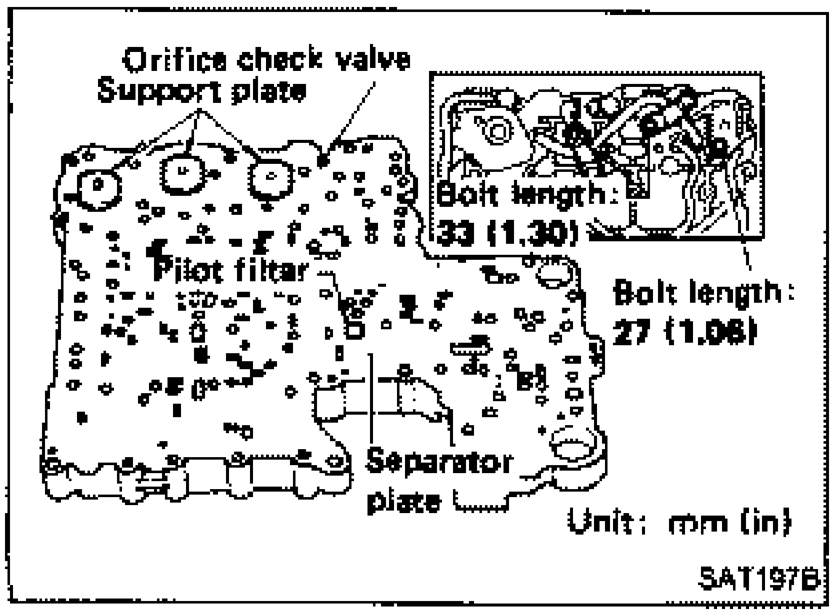


c. Place oil circuit of lower body face up. Install orifice check spring, orifice check valve and pilot filter.

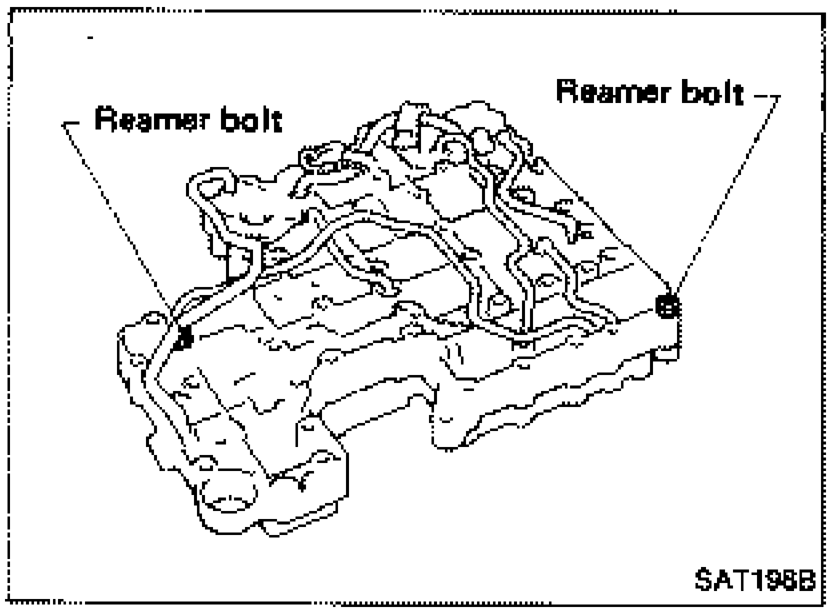


d. Install lower separate gaskets and separator plates on lower body.

e. Install and temporarily tighten support plates, fluid temperature sensor and tube brackets.

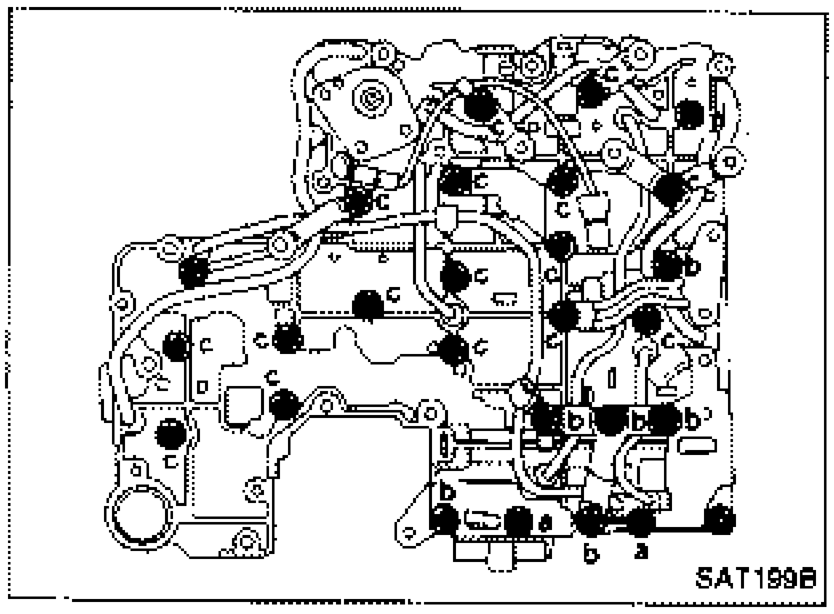


Control Valve Assembly (Cont'd)



f. Temporarily assemble lower and upper bodies, using reamer bolt as a guide.

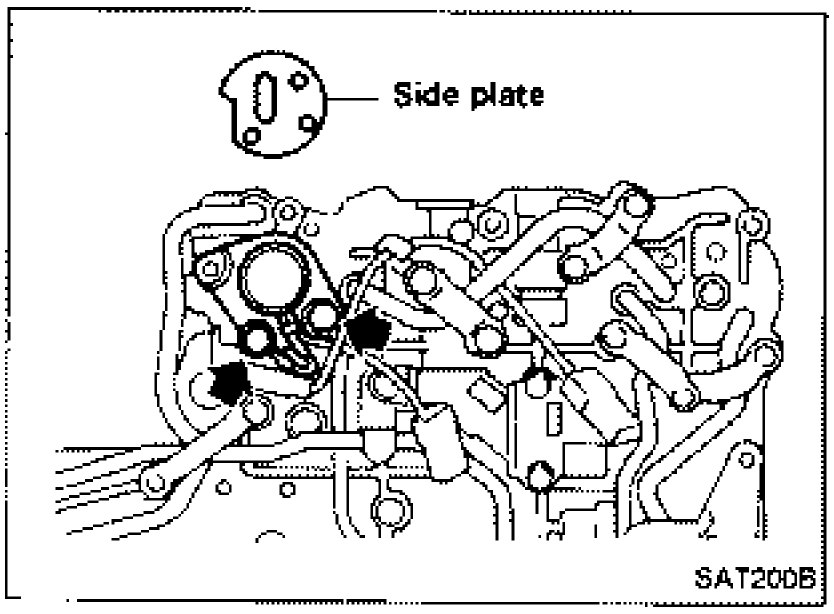
- **Be careful not to dislocate or drop steel balls, orifice check spring, orifice check valve and pilot filter.**



g. Install and temporarily tighten bolts and tube brackets in their proper locations.

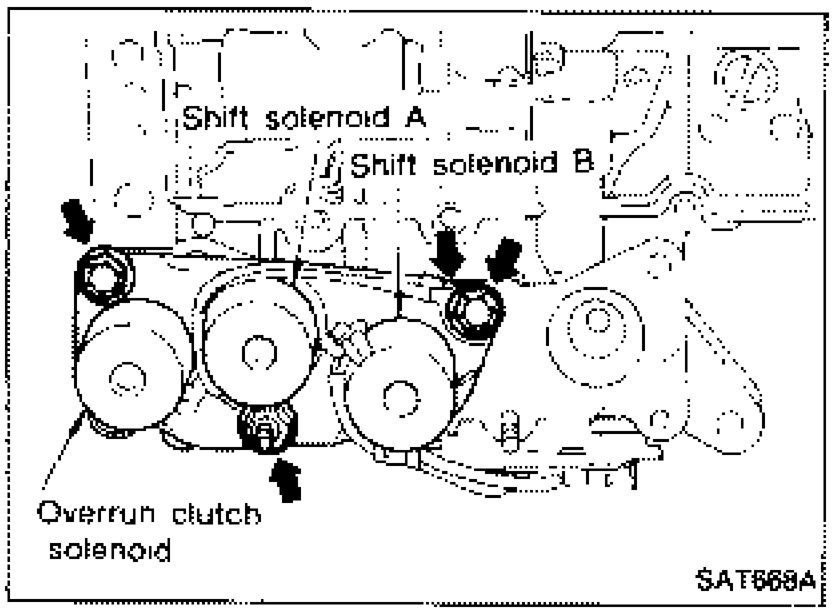
Bolt length and location:

Item \ Bolt symbol	a	b	c	d
Bolt length mm (in)	70 (2.76)	50 (1.97)	33 (1.30)	27 (1.06)

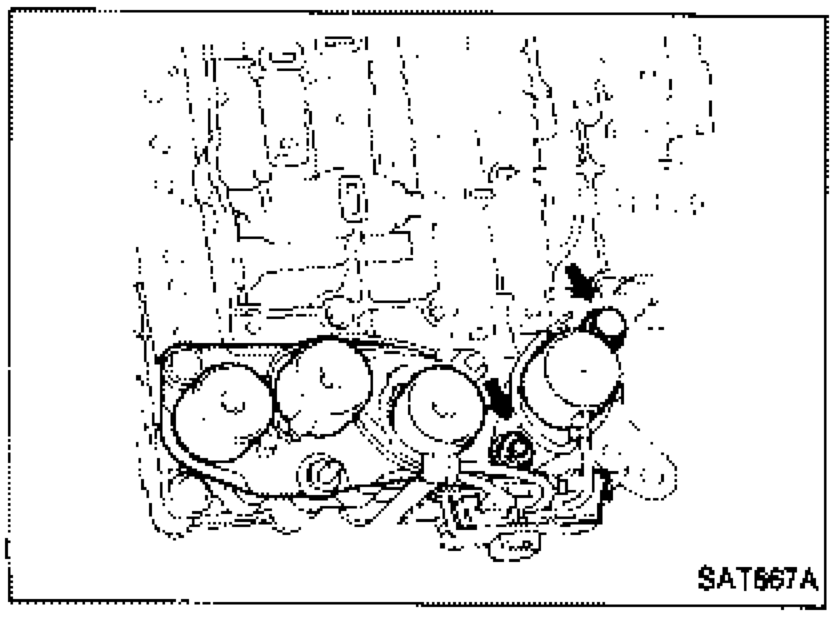


2. Install solenoids.

a. Attach O-ring and install lock-up solenoid and side plates onto lower body.



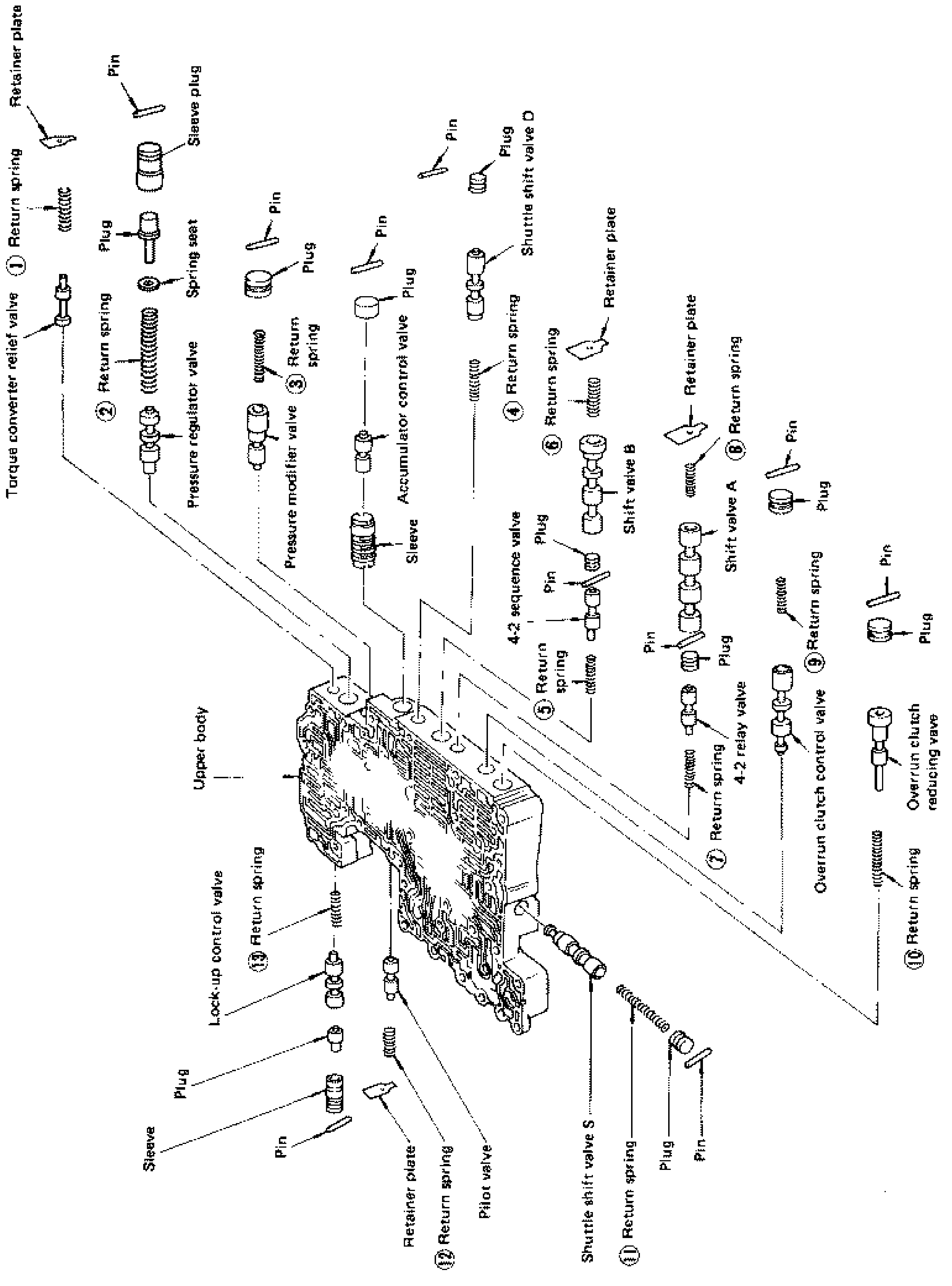
b. Attach O-rings and install 3-unit solenoids assembly onto upper body.



c. Attach O-ring and install line pressure solenoid onto upper body.

3. Tighten all bolts.

Control Valve Upper Body

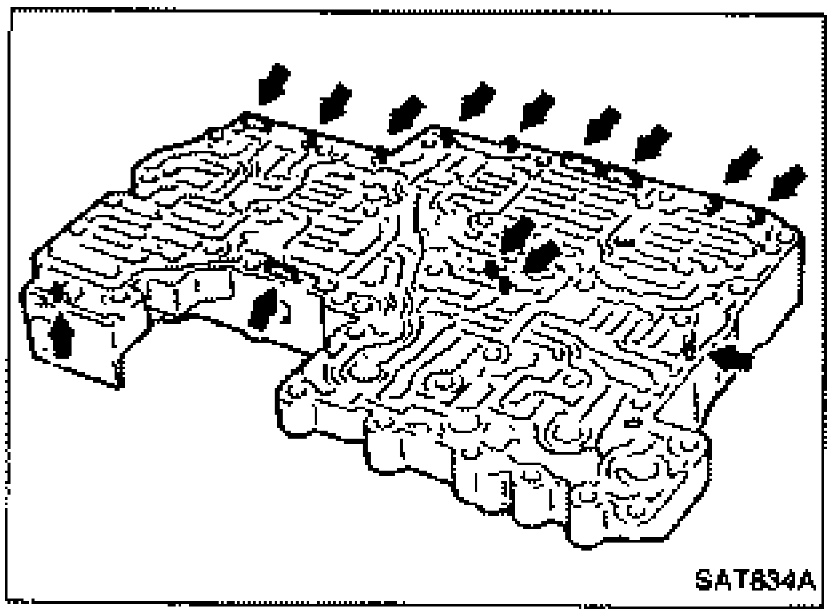


Numbers preceding valve springs correspond with those shown in Spring Chart on page AT-132.

Apply A.T.F. to all components before their installation.

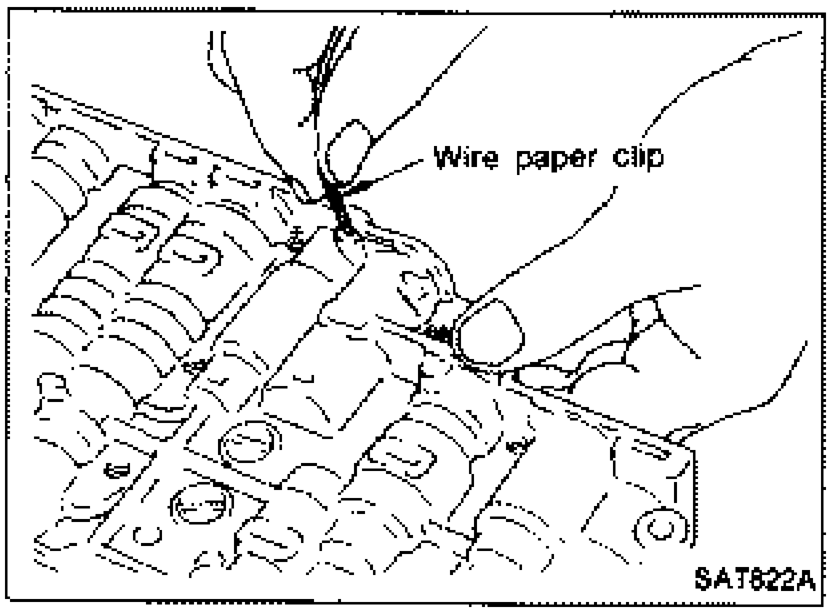
Control Valve Upper Body (Cont'd)

DISASSEMBLY


SAT834A

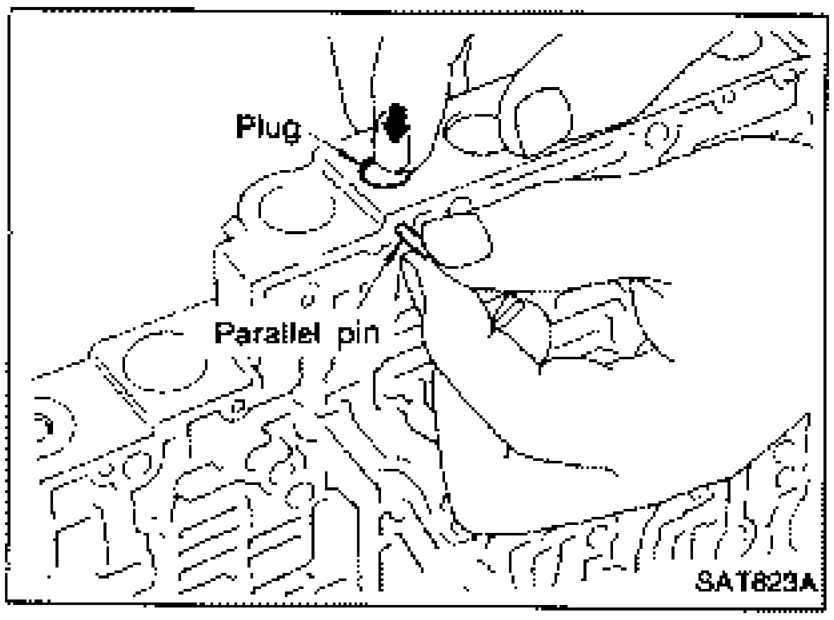
1. Remove valves at parallel pins.

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



SAT822A

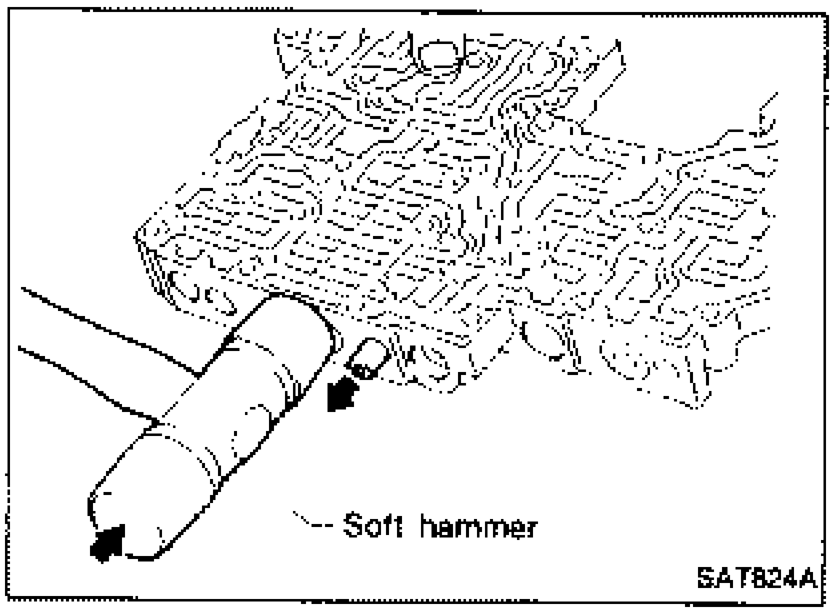
a. Use a wire paper clip to push out parallel pins.



SAT823A

b. Remove parallel pins while pressing their corresponding plugs and sleeves.

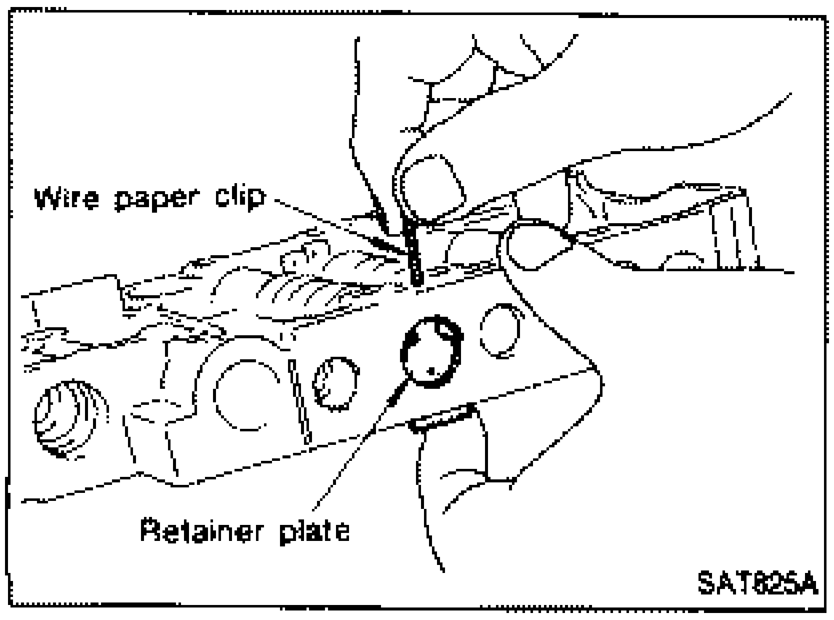
- **Remove plug slowly to prevent internal parts from jumping out.**



SAT824A

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

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

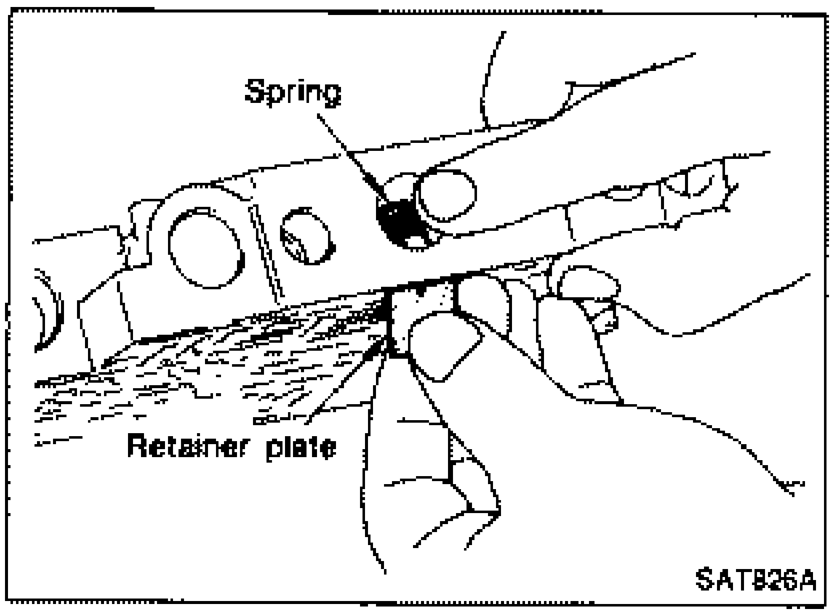


SAT825A

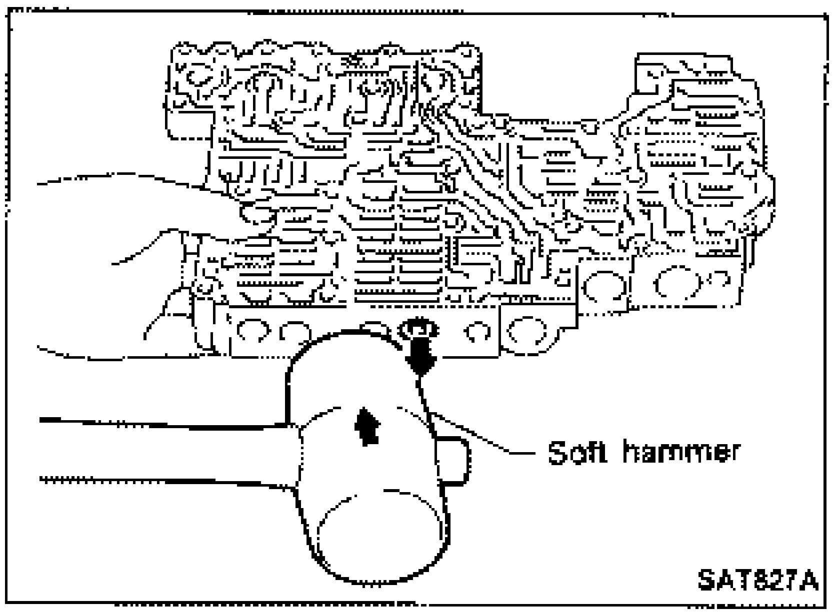
2. Remove valves at retainer plates.

a. Pry out retainer plate with wire paper clip.

Control Valve Upper Body (Cont'd)

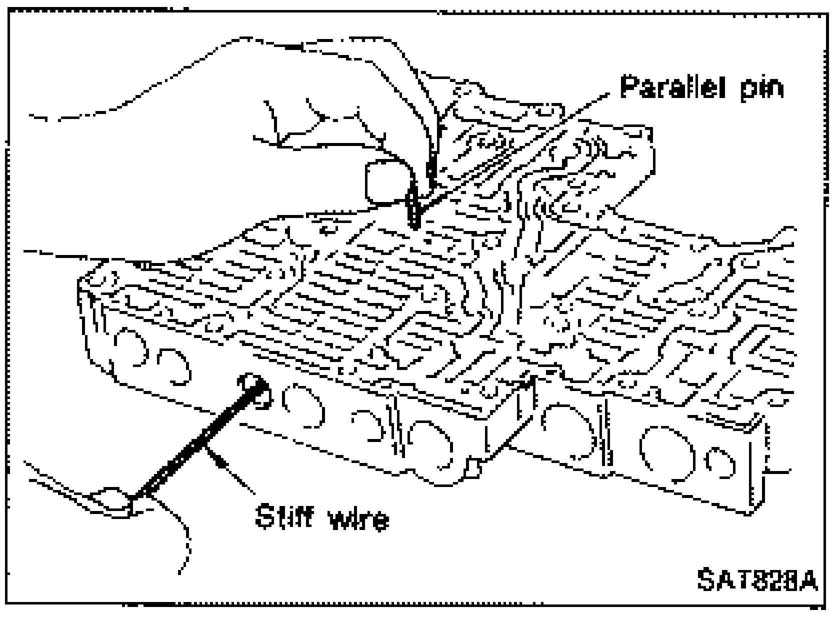


b. Remove retainer plates while holding spring.



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

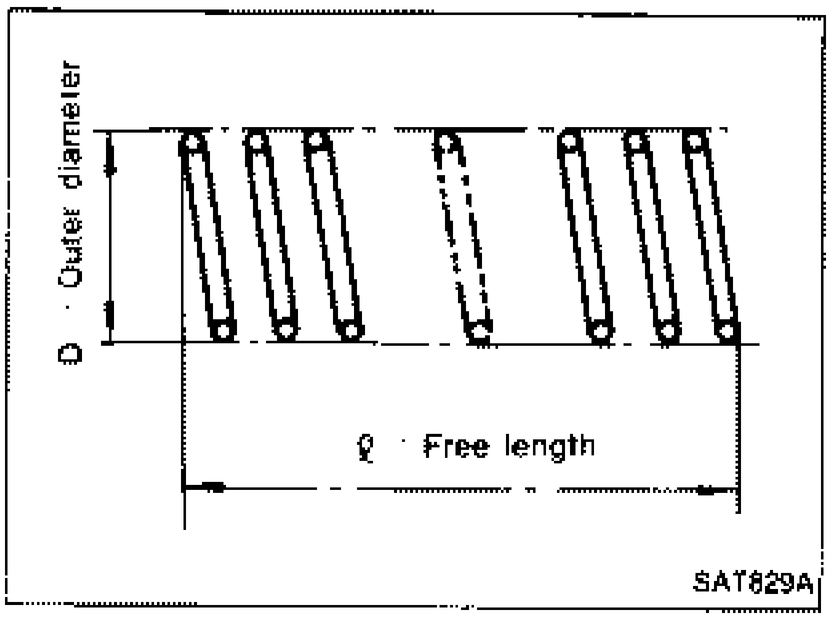
- **If a valve is hard to remove, lightly tap valve body with a soft hammer.**
- **Be careful not to drop or damage valves, sleeves, etc.**



- 4-2 sequence valve and relay valve are located far back in upper body. If they are hard to remove, carefully push them out using stiff wire.
- **Be careful not to scratch sliding surface of valve with wire.**

Control Valve Upper Body (Cont'd)

INSPECTION



Valve springs

- Measure free length and outer diameter of each valve spring. Also check for damage or deformation.
- Numbers of each valve spring listed in table below are the same as those in the figure on AT-129.

Inspection standard

Unit: mm (in)

Item Parts		Part No.	ℓ	D
①	Torque converter relief valve spring	31742-41X23	38.0 (1.496)	9.0 (0.354)
②	Pressure regulator valve spring	31742-41X24	44.02 (1.7331)	14.0 (0.551)
③	Pressure modifier valve spring	31742-41X19	31.95 (1.2579)	6.8 (0.268)
④	Shuttle shift valve D spring	31762-41X00	26.5 (1.043)	6.0 (0.236)
⑤	4-2 sequence valve spring	31756-41X00	29.1 (1.146)	6.95 (0.2736)
⑥	Shift valve B spring	31762-41X01	25.0 (0.984)	7.0 (0.276)
⑦	4-2 relay valve spring	31756-41X00	29.1 (1.146)	6.95 (0.2736)
⑧	Shift valve A spring	31762-41X01	25.0 (0.984)	7.0 (0.276)
⑨	Overrun clutch control valve spring	31762-41X03	23.6 (0.929)	7.0 (0.276)
⑩	Overrun clutch reducing valve spring	31742-41x20	32.5 (1.280)	7.0 (0.276)
⑪	Shuttle shift valve S spring	31762-41X04	51.0 (2.008)	5.65 (0.2224)
⑫	Pilot valve spring	31742-41X13	25.7 (1.012)	9.1 (0.358)
⑬	Lock-up control valve spring	31742-41X22	18.5 (0.728)	13.0 (0.512)

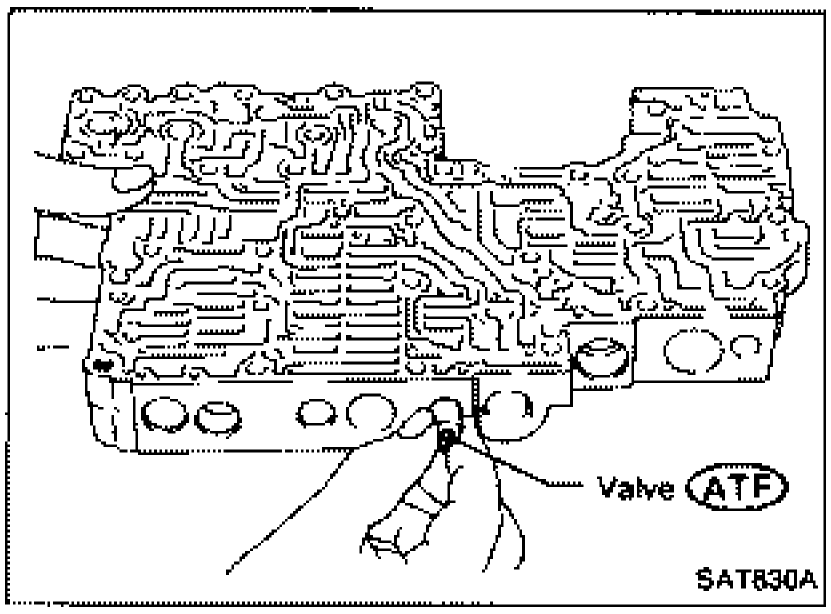
- Replace valve springs if deformed or fatigued.

Control valves

- Check sliding surfaces of valves, sleeves and plugs.

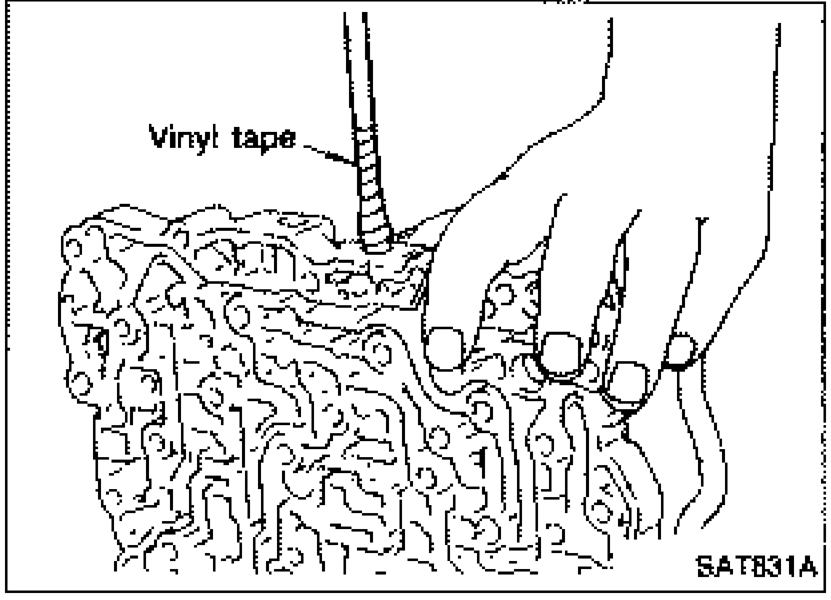
Control Valve Upper Body (Cont'd)

ASSEMBLY

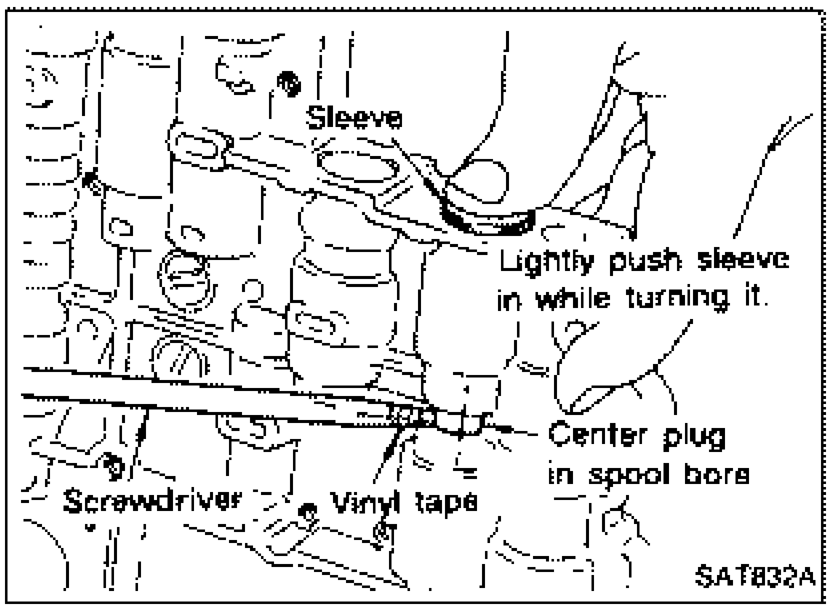


1. Lubricate the control valve body and all valves with A.T.F. Install control valves by sliding them carefully into their bores.

- **Be careful not to scratch or damage valve body.**

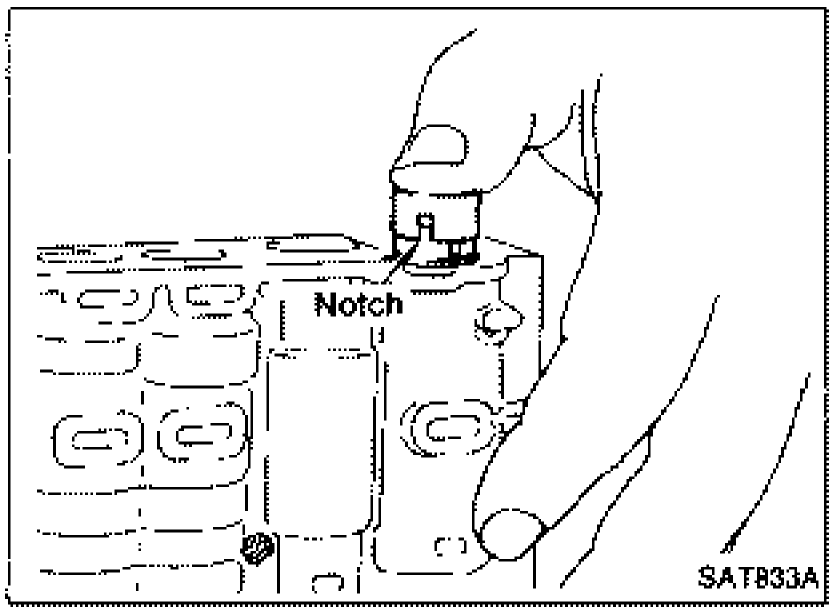


- Wrap a small screwdriver with vinyl tape and use it to insert the valves into proper position.



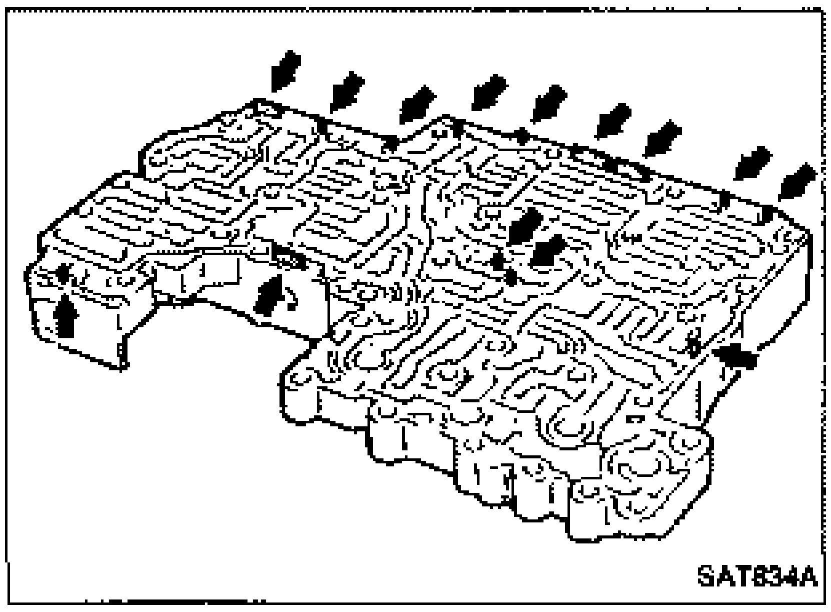
Pressure regulator valve

- If pressure regulator plug is not centered properly, sleeve cannot be inserted into bore in upper body.
  If this happens, use vinyl tape wrapped screwdriver to center sleeve until it can be inserted.
- Turn sleeve slightly while installing.



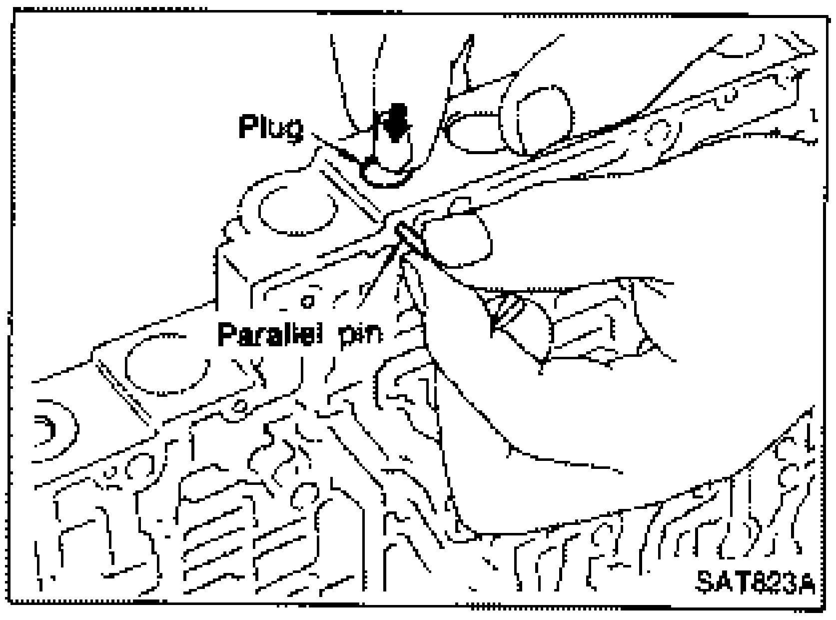
Accumulator control plug

- Align protrusion of accumulator control sleeve with notch in plug.
- Align parallel pin groove in plug with parallel pin, and install accumulator control valve.



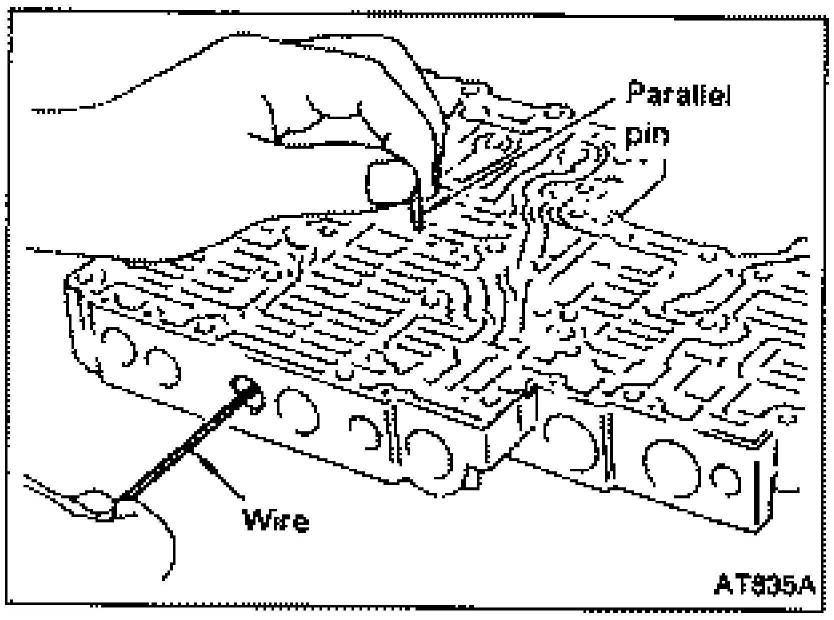
2. Install parallel pins and retainer plates.

Control Valve Upper Body (Cont'd)

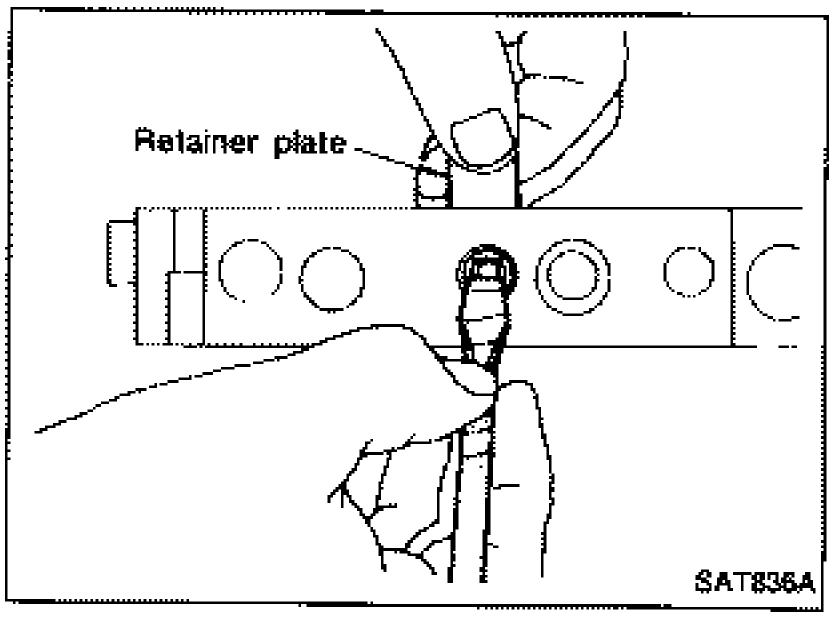


- **While pushing plug, install parallel pin.**

4-2 sequence valve and relay valve

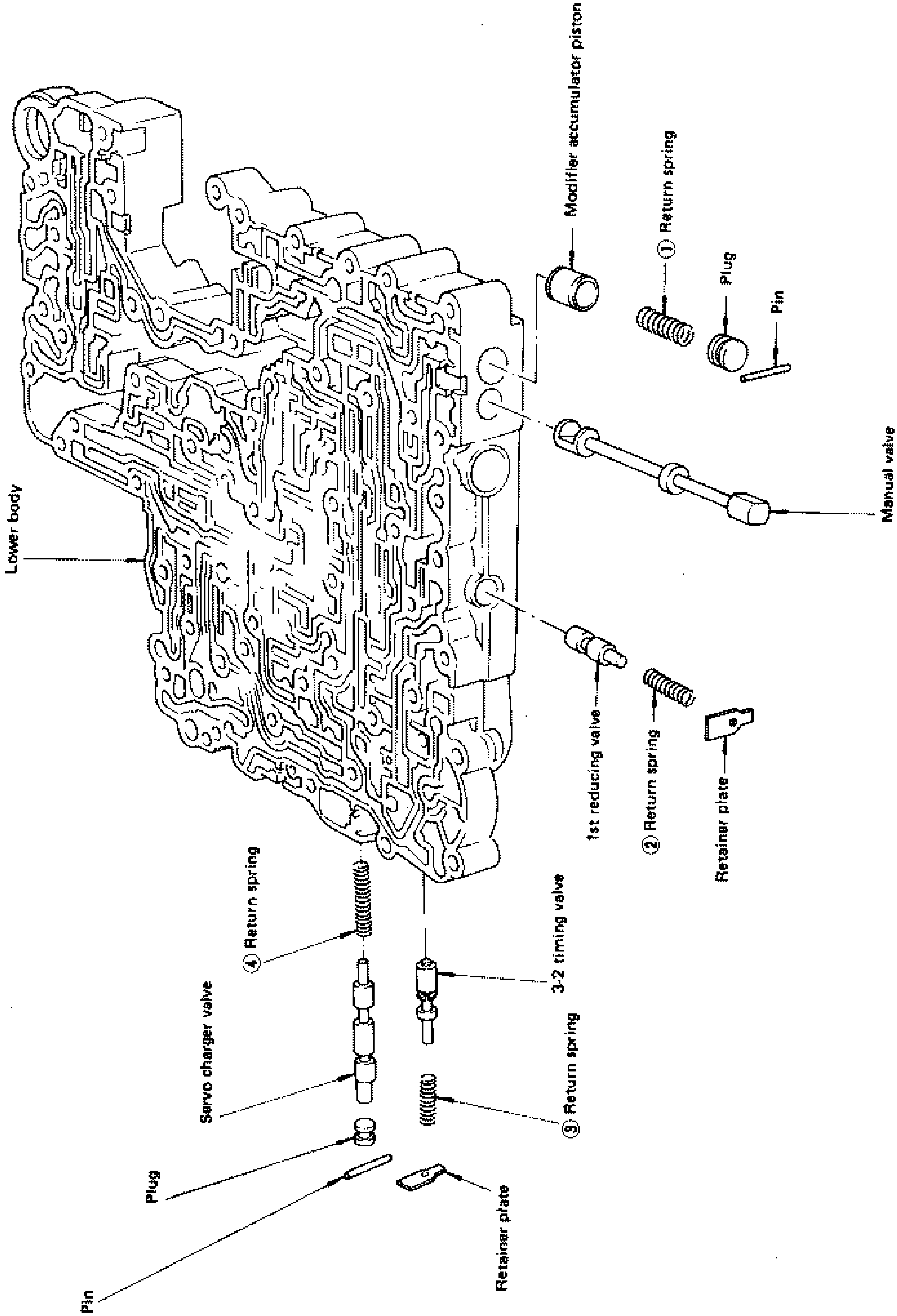


- Push 4-2 sequence valve and relay valve with wire wrapped in vinyl tape to prevent scratching valve body. Install parallel pins.



- Insert retainer plate while pushing spring.

Control Valve Lower Body



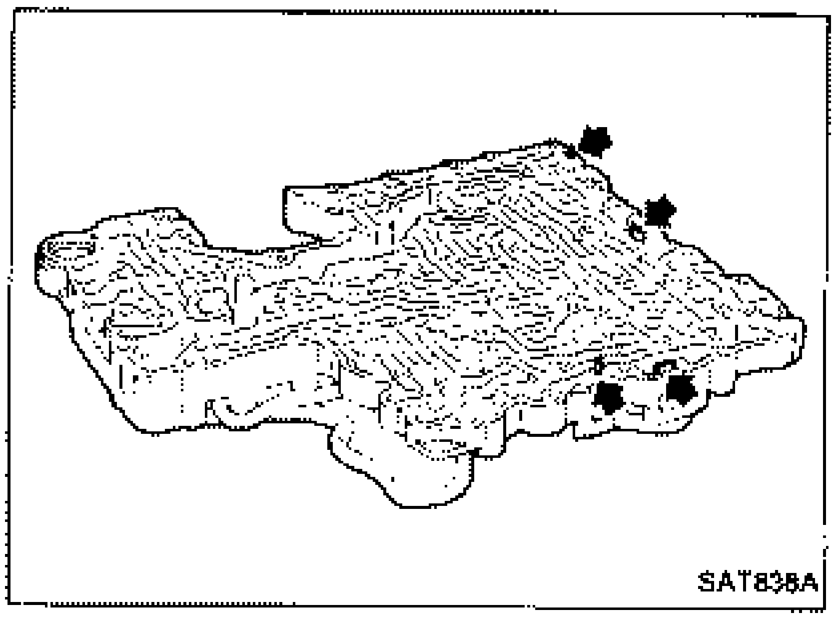
Numbers preceding valve springs correspond with those shown in Spring Chart on page AT-136.

Apply A.T.F. to all components before their installation.

SAT640C

Control Valve Lower Body (Cont'd)

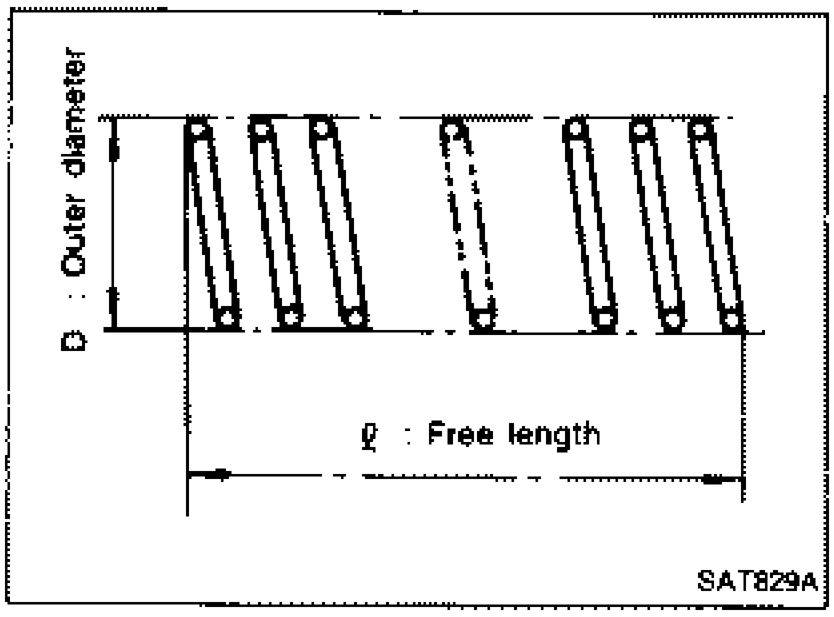
DISASSEMBLY



SAT838A

1. Remove valves at parallel pins.
2. Remove valves at retainer plates.
   For removal procedures, refer to "DISASSEMBLY" of Control Valve Upper Body.

INSPECTION



SAT829A

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 on AT-135.

Inspection standard:

Unit: mm (in)

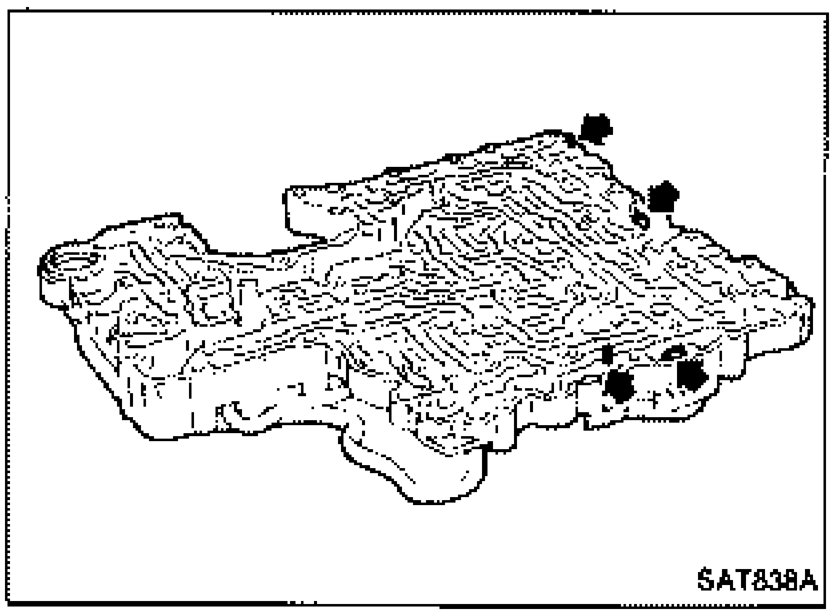
Parts	Item	Part No.	ℓ	D
①	Modifier accumulator piston spring	31742-41X15	30.5 (1.201)	9.8 (0.386)
②	1st reducing valve spring	31756-41X05	25.4 (1.000)	6.75 (0.2657)
③	3-2 timing valve spring	31742-41X08	20.55 (0.8091)	6.75 (0.2657)
④	Servo charger valve spring	31742-41X06	23.0 (0.906)	6.7 (0.264)

- Replace valve springs if deformed or fatigued.

Control valves

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

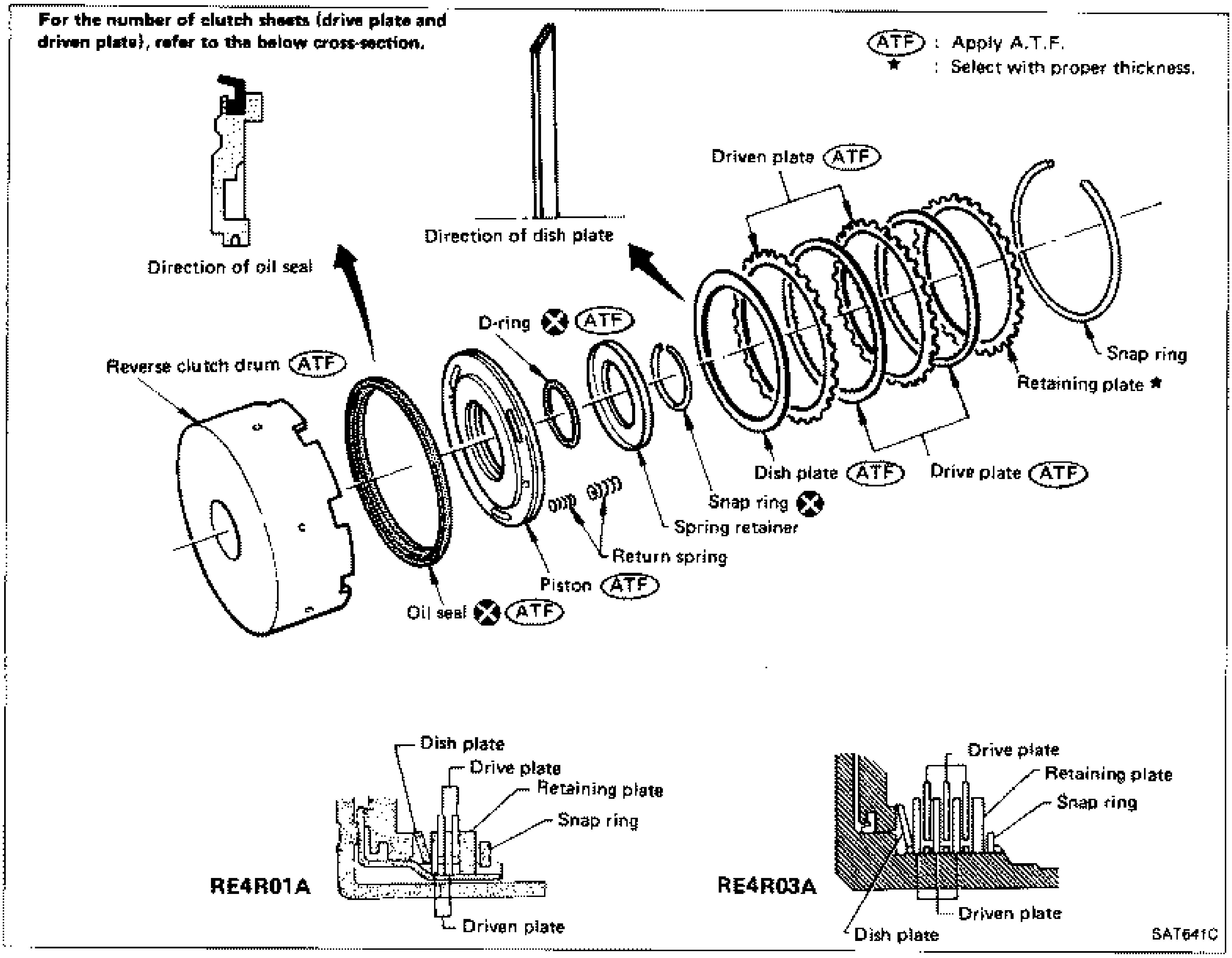
ASSEMBLY

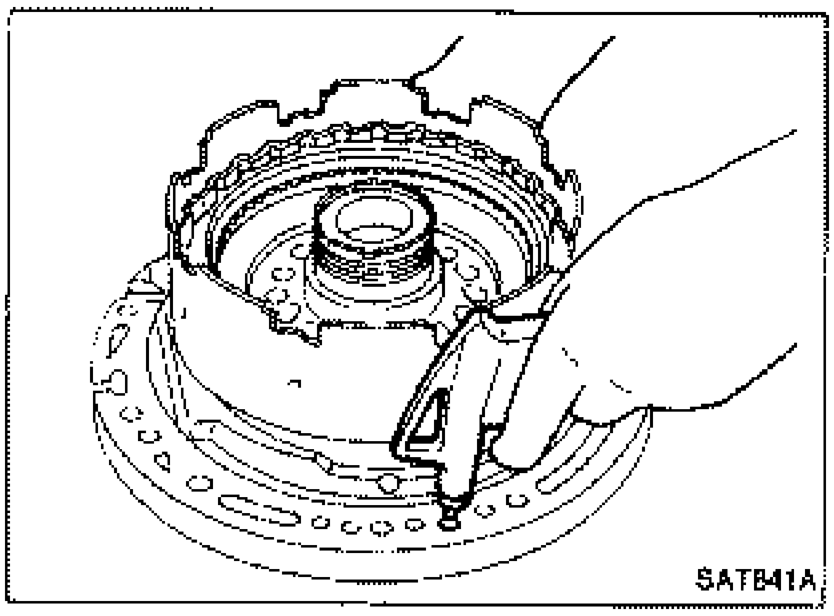


SAT838A

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

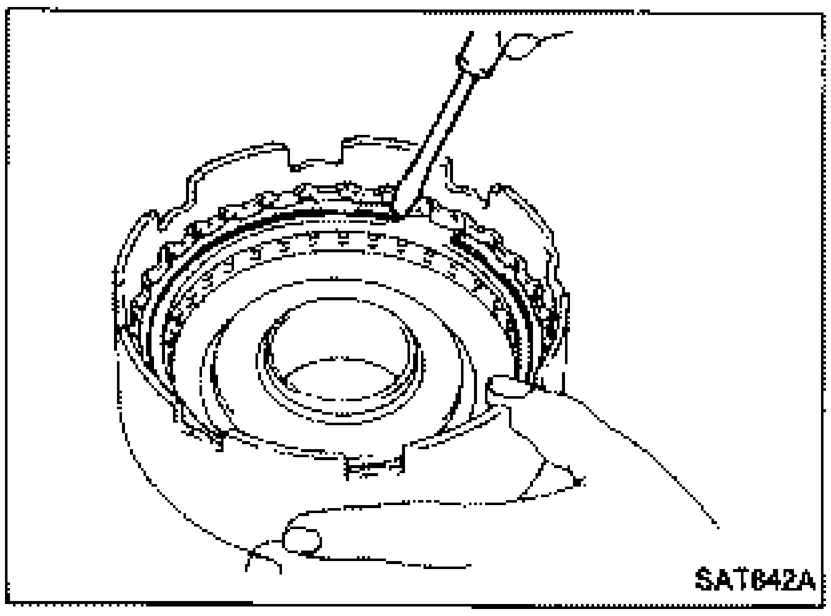
Reverse Clutch





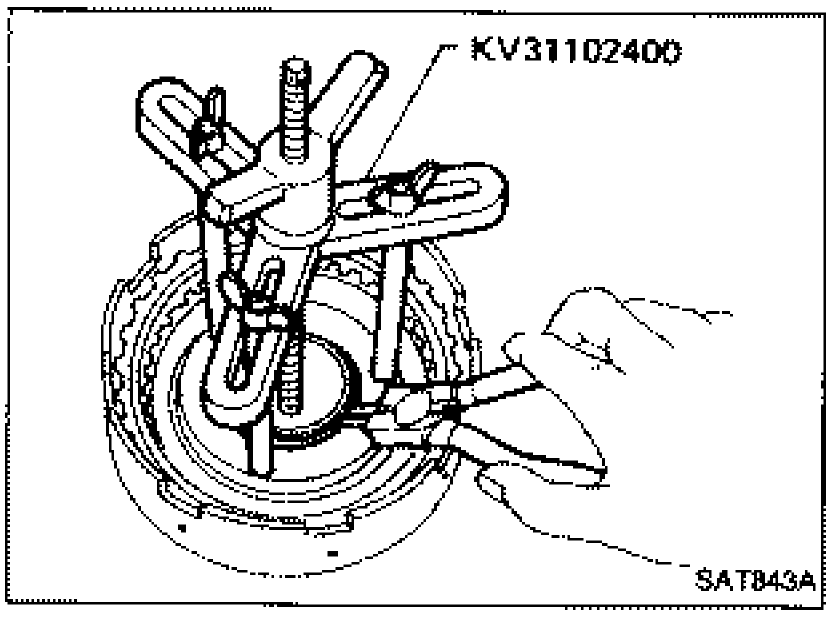
DISASSEMBLY

1. Check operation of reverse clutch.
   - 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.

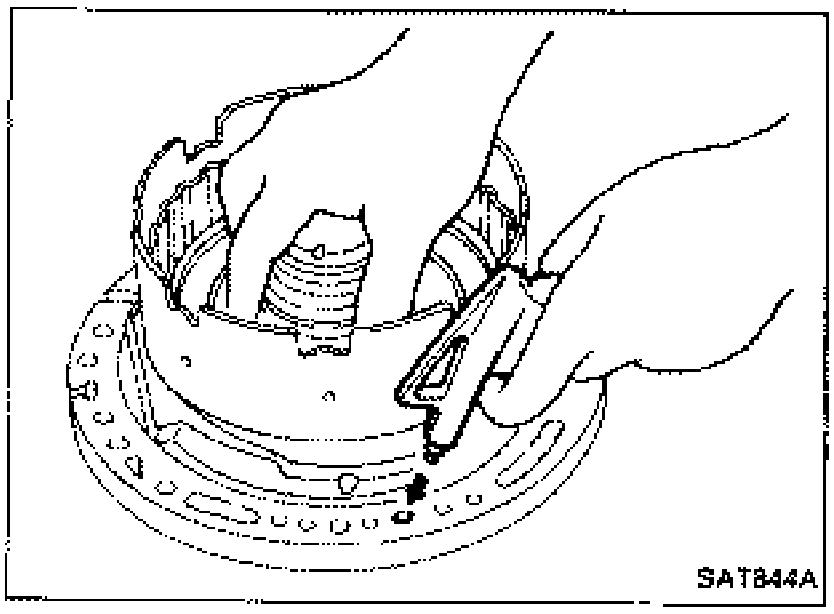


2. Remove drive plates, driven plates, retaining plate, dish plate and snap ring.

Reverse Clutch (Cont'd)



3. Remove snap ring from clutch drum while compressing clutch springs.
- **Do not expand snap ring excessively.**
4. Remove spring retainer and return spring.

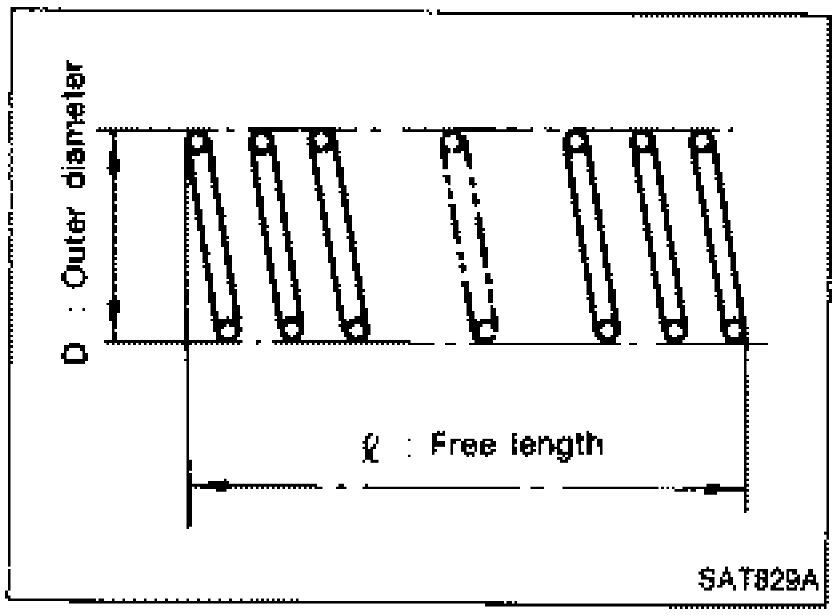


5. Install seal ring onto oil pump cover and install reverse clutch drum. While holding piston, gradually apply compressed air to oil hole until piston is removed.
- **Do not apply compressed air abruptly.**
6. Remove D-ring and oil seal from piston.

INSPECTION

Reverse clutch snap ring and spring retainer

- Check for deformation, fatigue or damage.



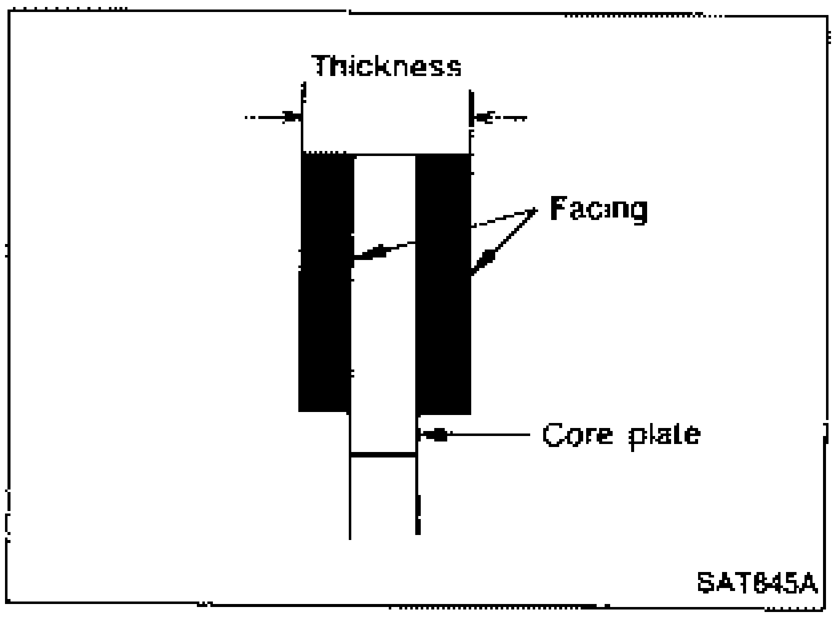
Reverse clutch return springs

- Check for deformation or damage. Also measure free length and outside diameter.

Inspection standard:

Unit: mm (in)

Model	Part No.	ℓ	D
RE4R01A	31505-41X02	19.69 (0.7752)	11.6 (0.457)
RE4R03A	31505-51X00	37.8 (1.488)	14.8 (0.583)



Reverse clutch drive plates

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

Thickness of drive plate:

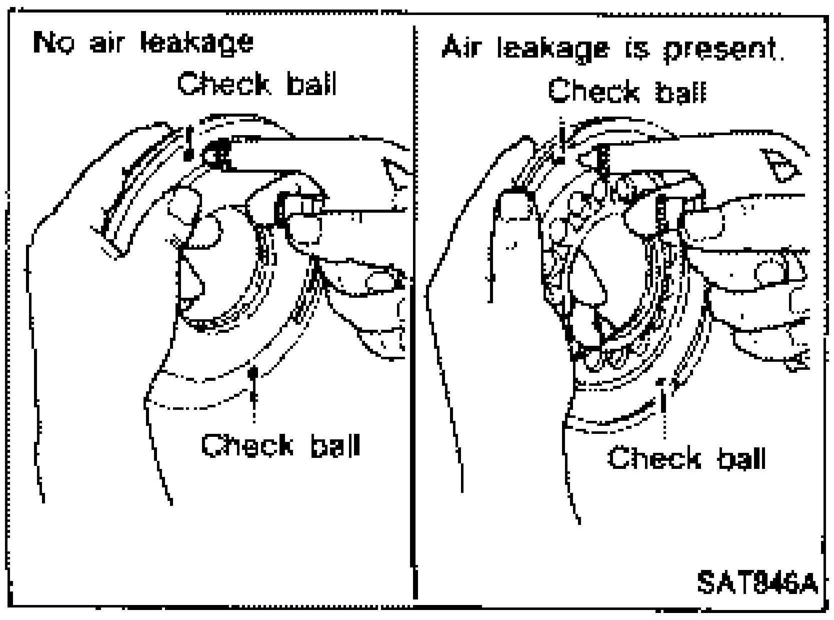
Standard value: 2.0 mm (0.079 in)

Wear limit: 1.8 mm (0.071 in)

- If not within wear limit, replace.

Reverse clutch dish plate

- Check for deformation or damage.

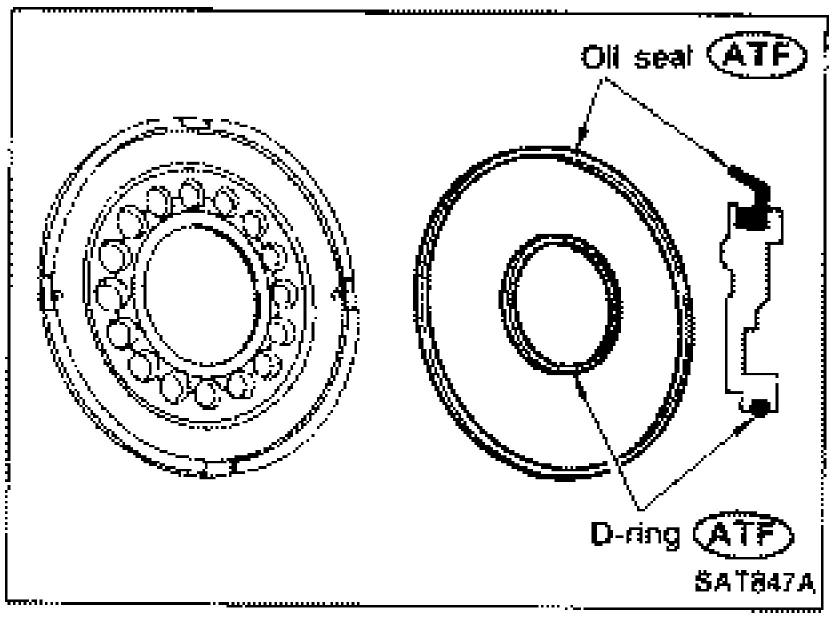


Reverse clutch piston

- Shake piston to assure that balls are not seized.
- Apply compressed air to check ball oil hole opposite the return spring to assure that there is no air leakage.
- Also apply compressed air to oil hole on return spring side to assure that air leaks past ball.

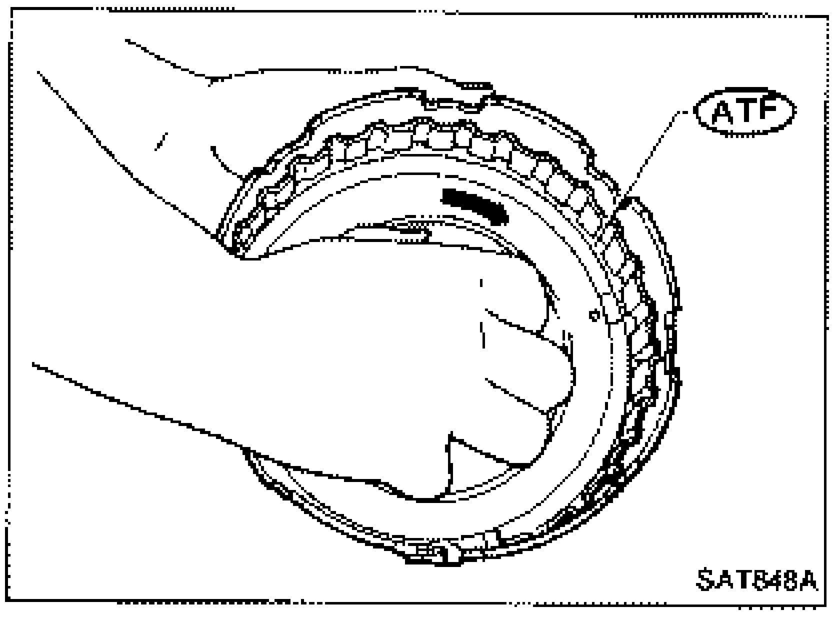
Reverse Clutch (Cont'd)

ASSEMBLY



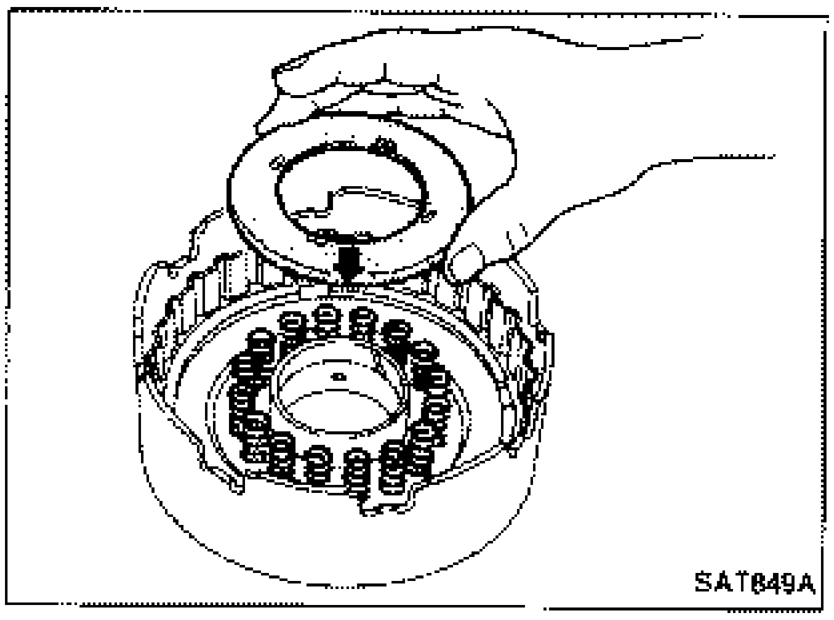
1. Install D-ring and oil seal on piston.

- **Apply A.T.F. to both parts.**

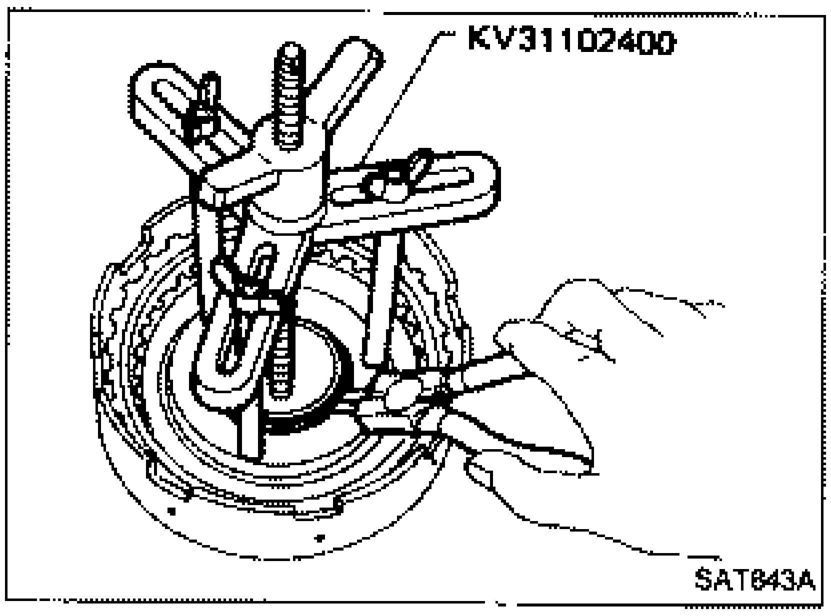


2. Install piston assembly by turning it slowly and evenly.

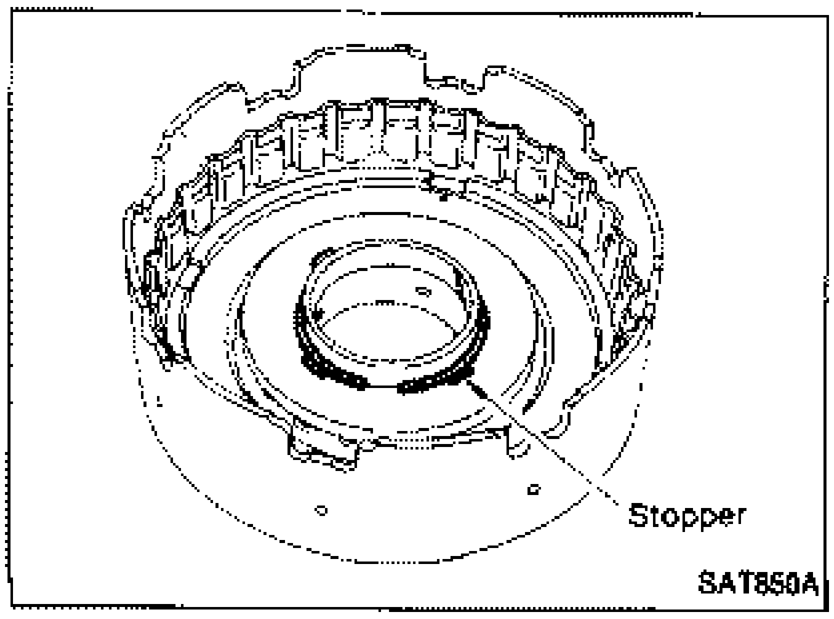
- **Apply A.T.F. to inner surface of drum.**



3. Install return springs and spring retainer.

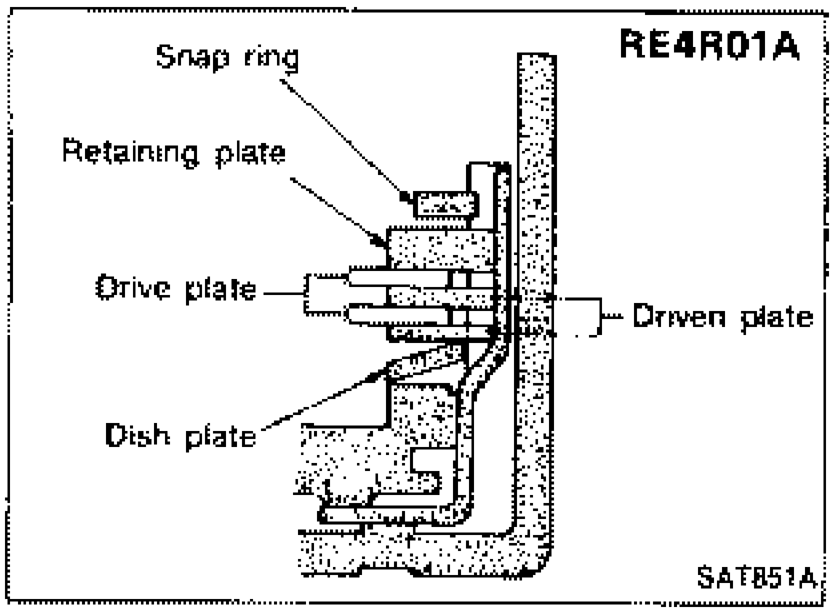


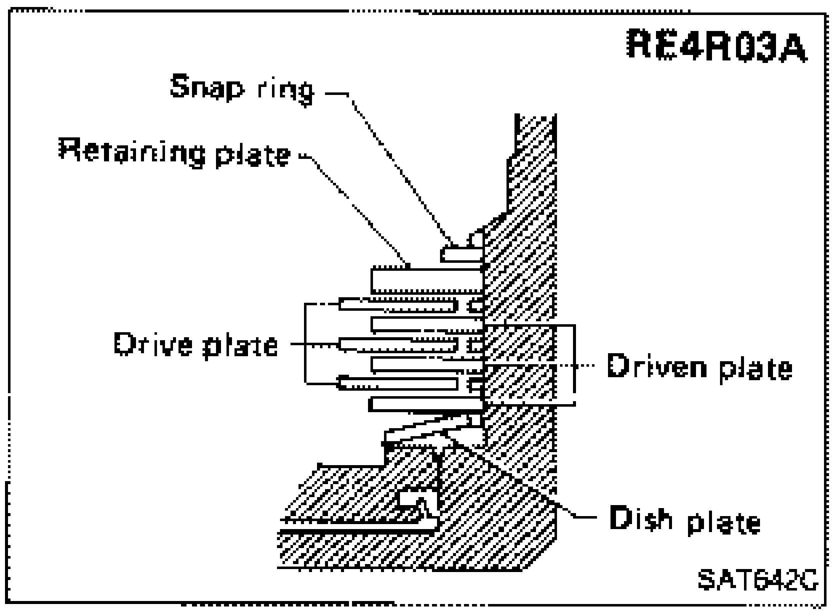
4. Install snap ring while compressing clutch springs.



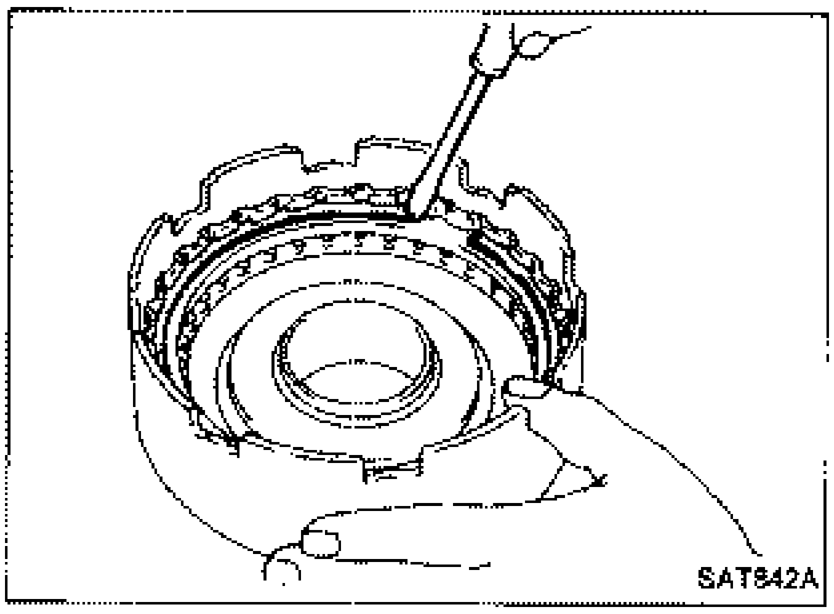
- **Do not align snap ring gap with spring retainer stopper.**

Reverse Clutch (Cont'd)

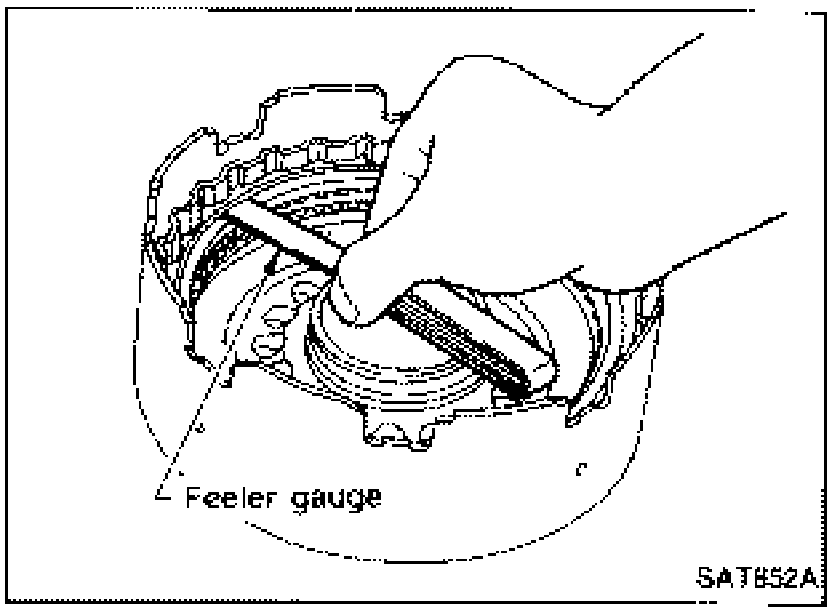




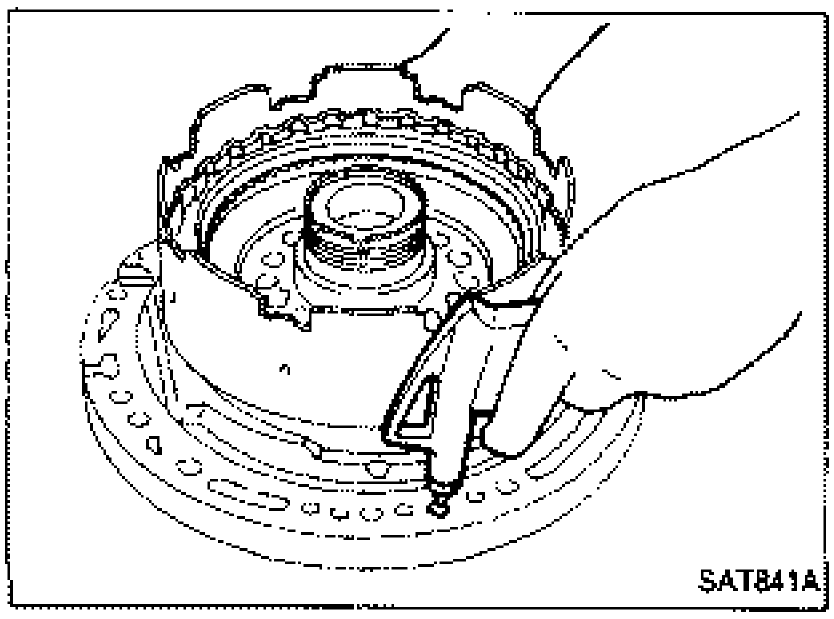
5. Install drive plates, driven plates, retaining plate and dish plate.



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 S.D.S.

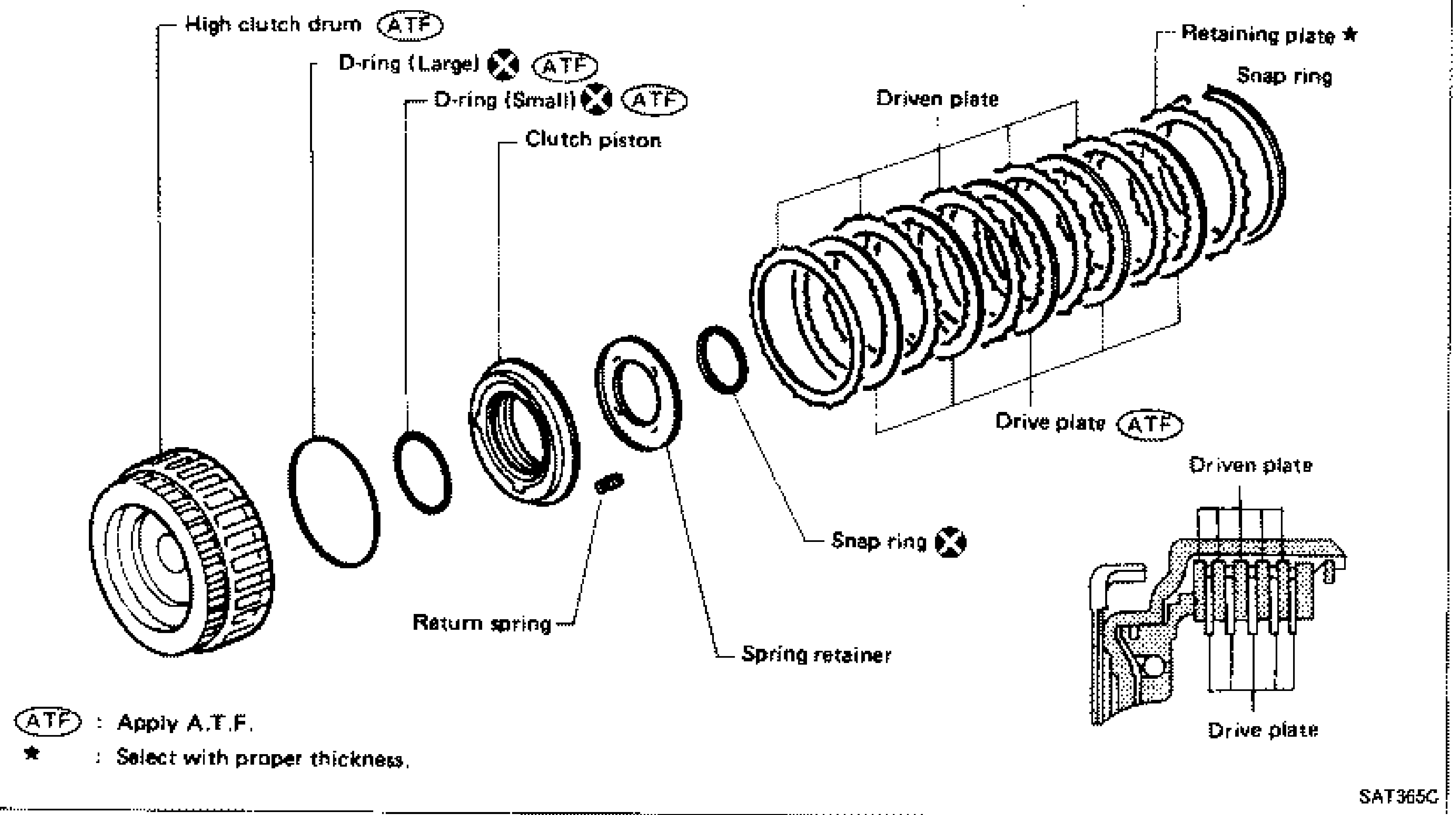


8. Check operation of reverse clutch.
   Refer to "DISASSEMBLY" of Reverse Clutch.

High Clutch

RE4R01A

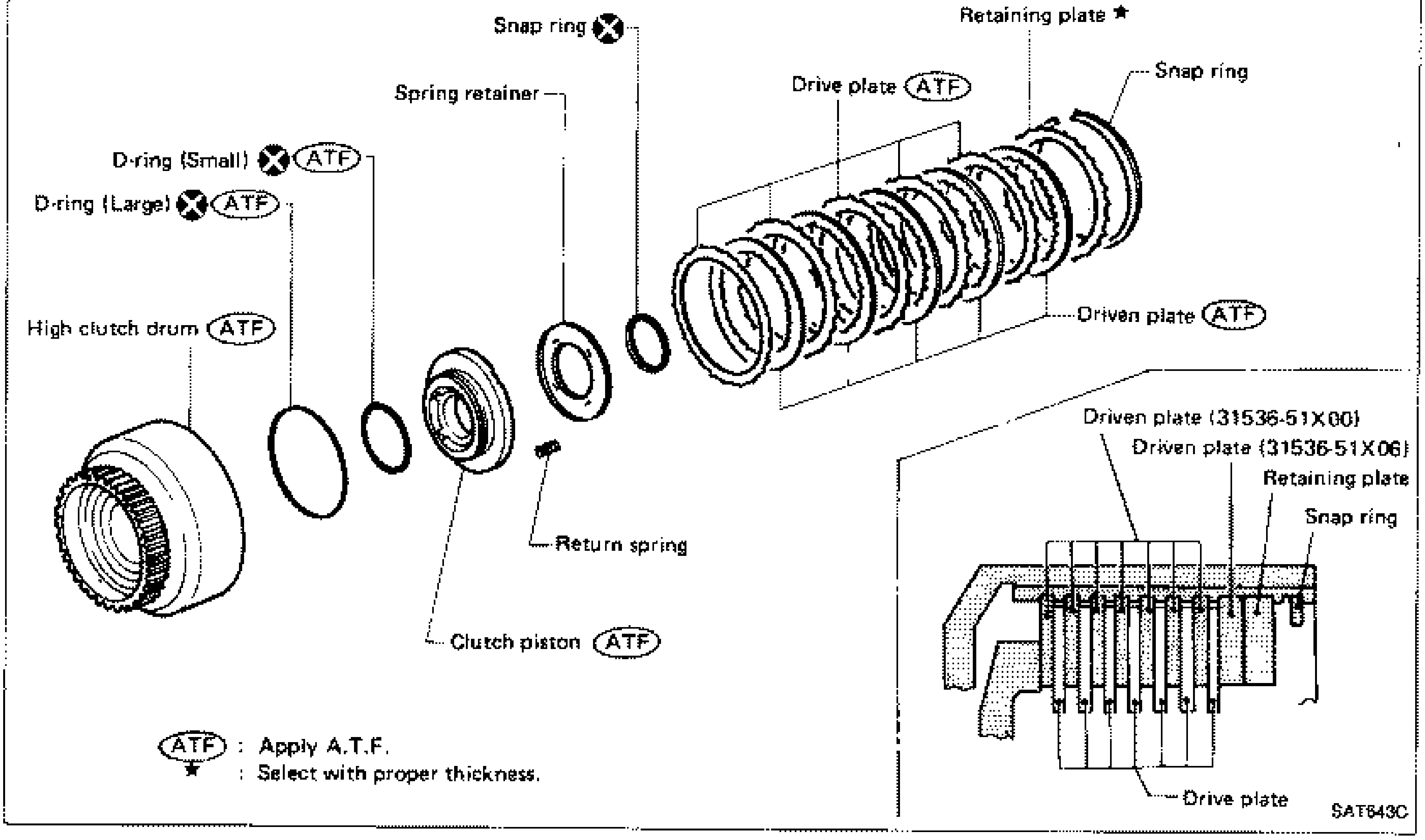
For the number of clutch sheets (drive plate and driven plate), refer to the below cross-section.



ATF : Apply A.T.F.
★ : Select with proper thickness.

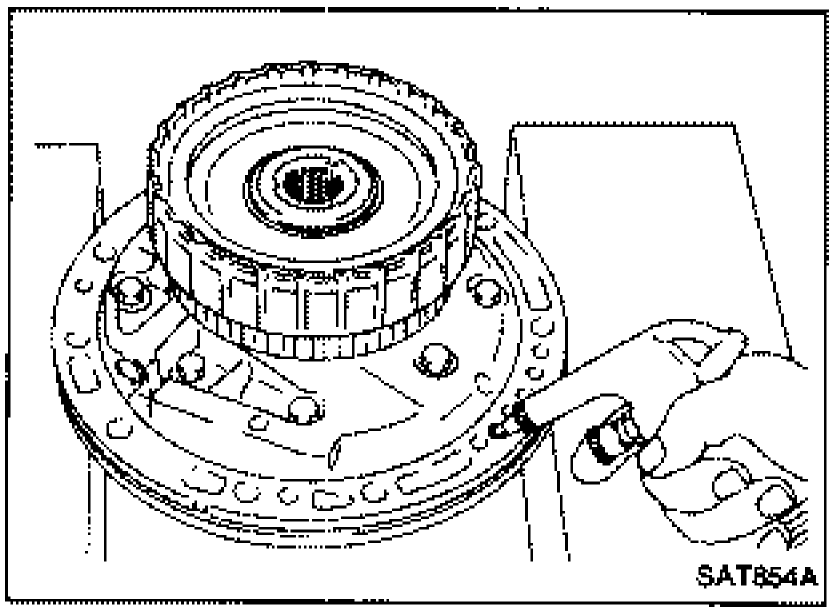
RE4R03A

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



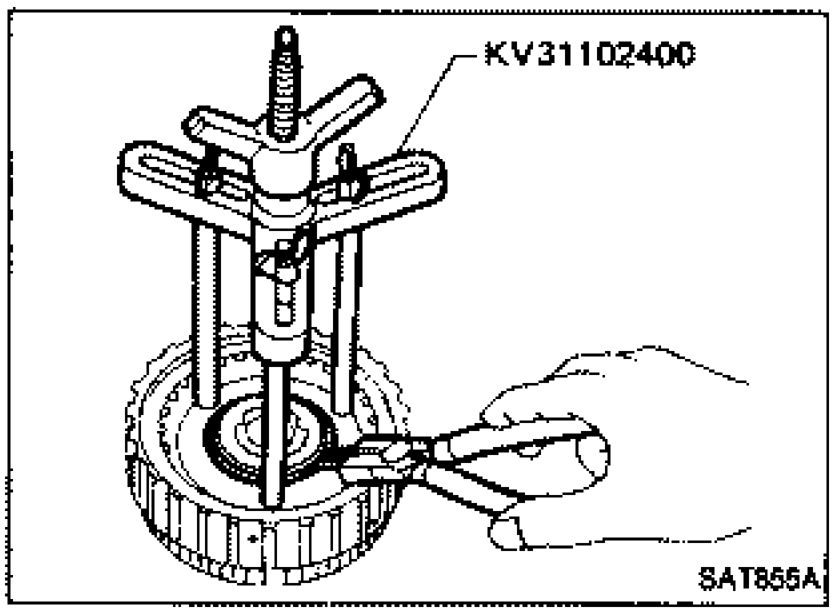
ATF : Apply A.T.F.
★ : Select with proper thickness.

High Clutch (Cont'd)


SAT854A

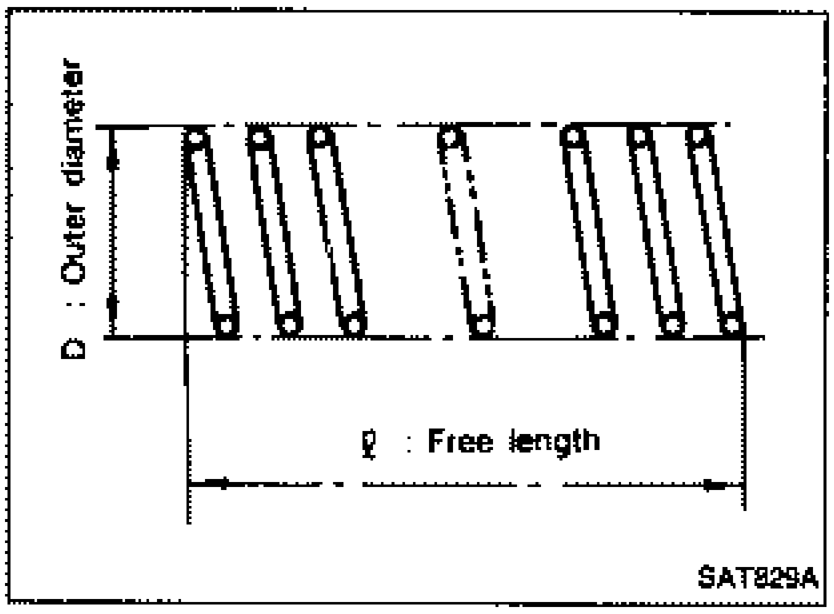
Service procedures for high clutch are essentially the same as those for reverse clutch, with the following exception:

- Check of high clutch operation



SAT856A

- Removal and installation of return spring



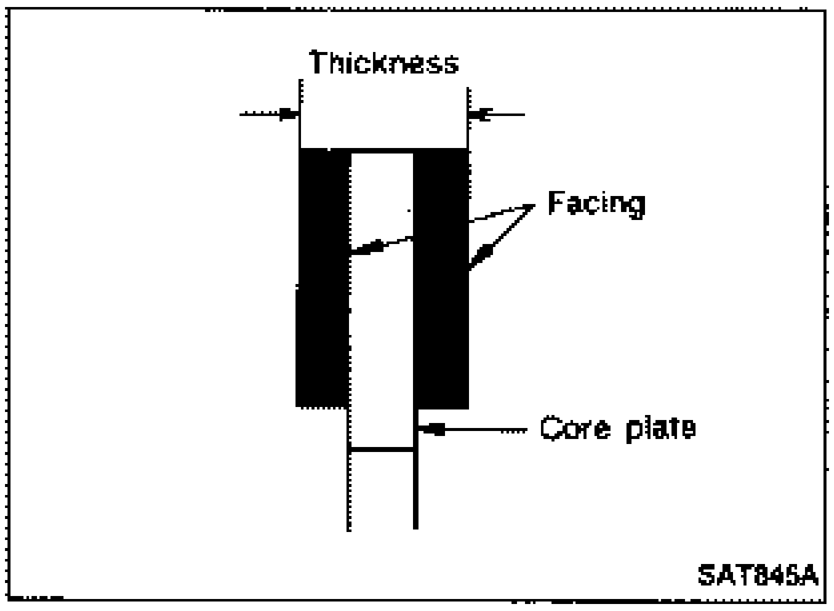
SAT829A

- Inspection of high clutch return springs

Inspection standard:

Unit: mm (in)

Part No.	ℓ	D
31505-21X03	22.06 (0.8685)	11.6 (0.457)



SAT845A

- Inspection of high clutch drive plate

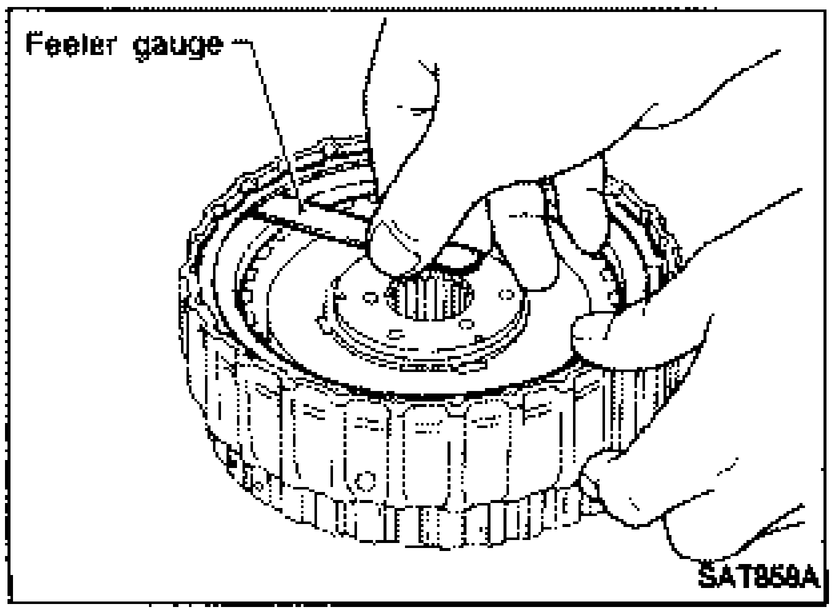
  Thickness of drive plate:

  Standard

  1.6 mm (0.063 in)

  Wear limit

  1.4 mm (0.055 in)



SAT858A

- Measurement of clearance between retaining plate and snap ring

  Specified clearance:

  Standard

  1.8 - 2.2 mm (0.071 - 0.087 in)

  Allowable limit

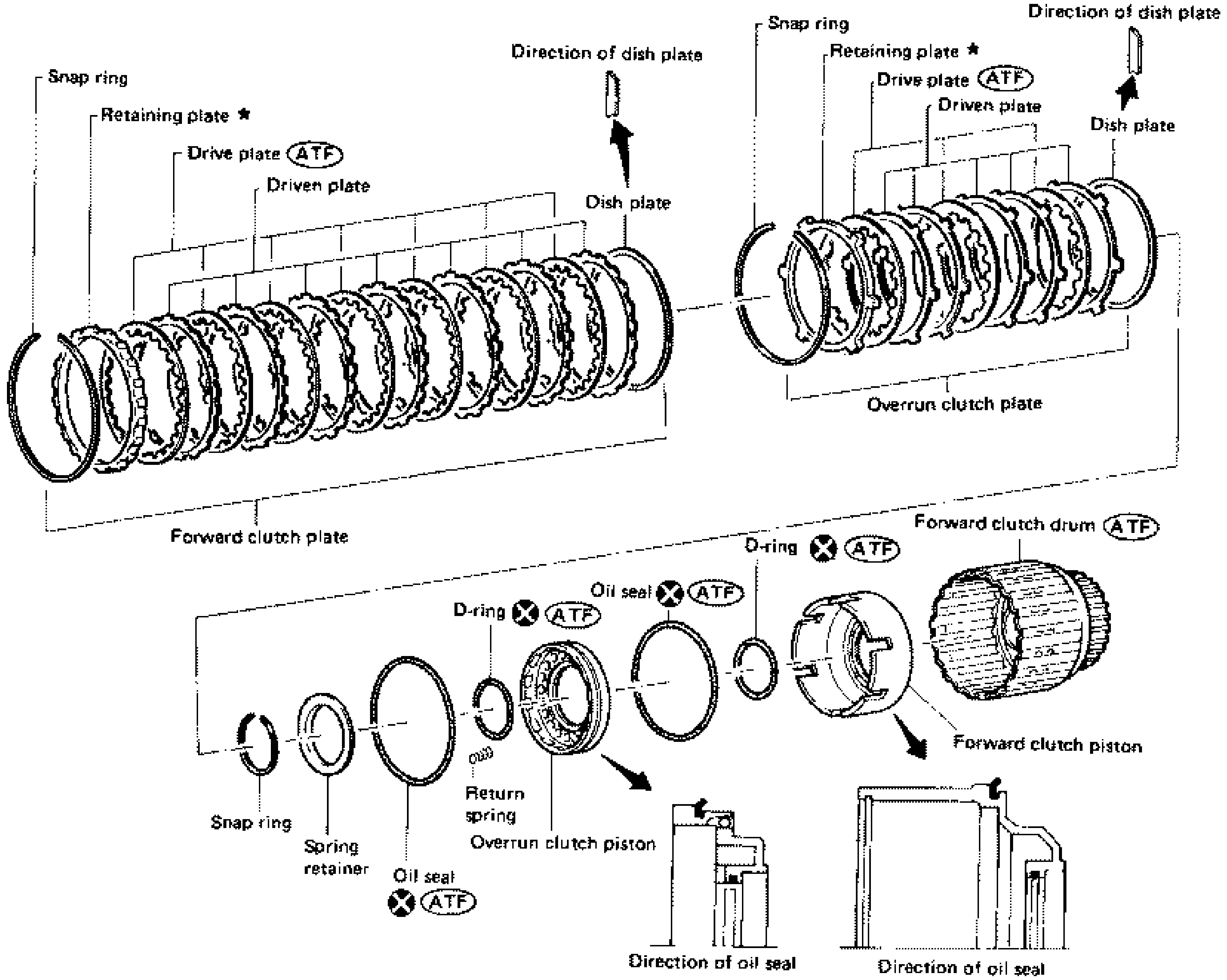
  3.2 mm (0.126 in)

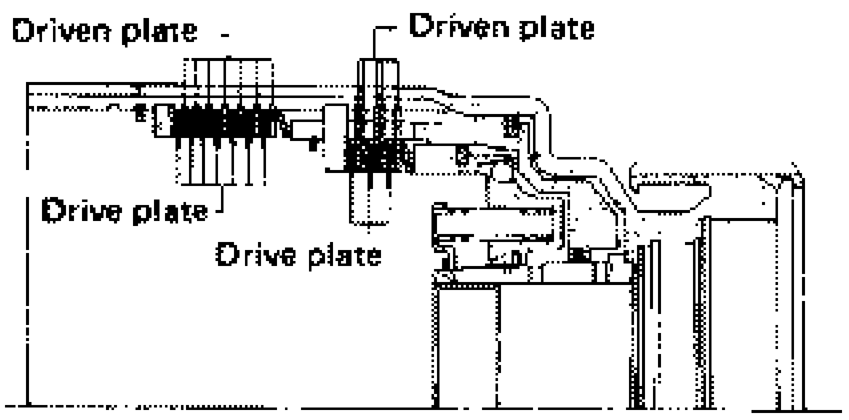
  Retaining plate:

  Refer to S.D.S.

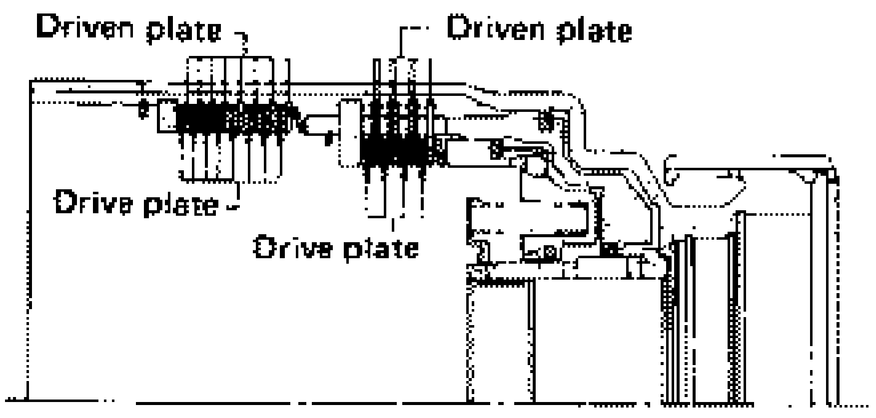
Forward and Overrun Clutches

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





RE4R01A



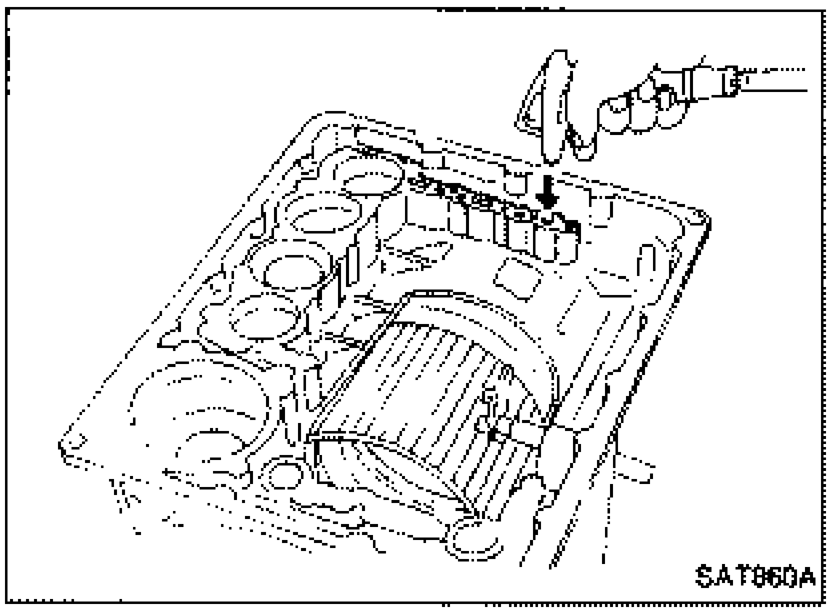
RE4R03A

ATF: Apply A.T.F.

★ : Select with proper thickness.

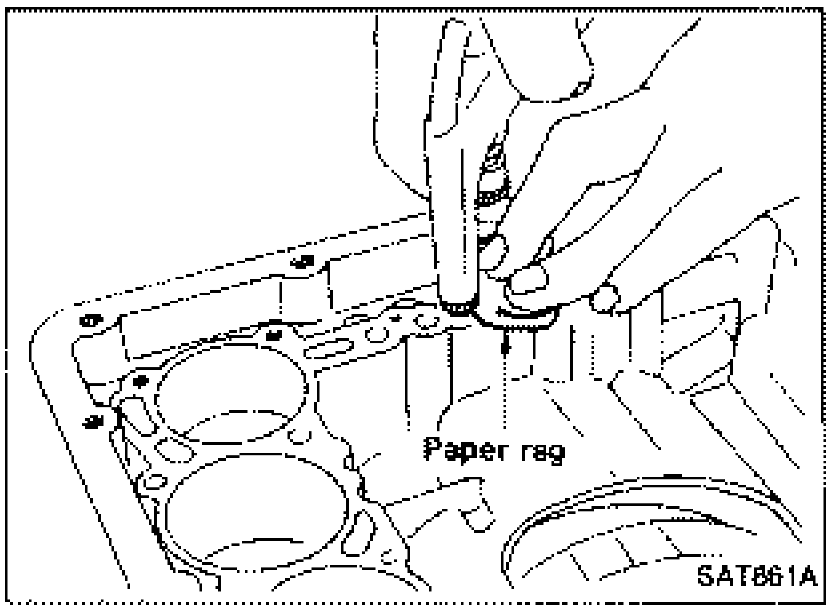
SAT644C

Forward and Overrun Clutches (Cont'd)


SAT860A

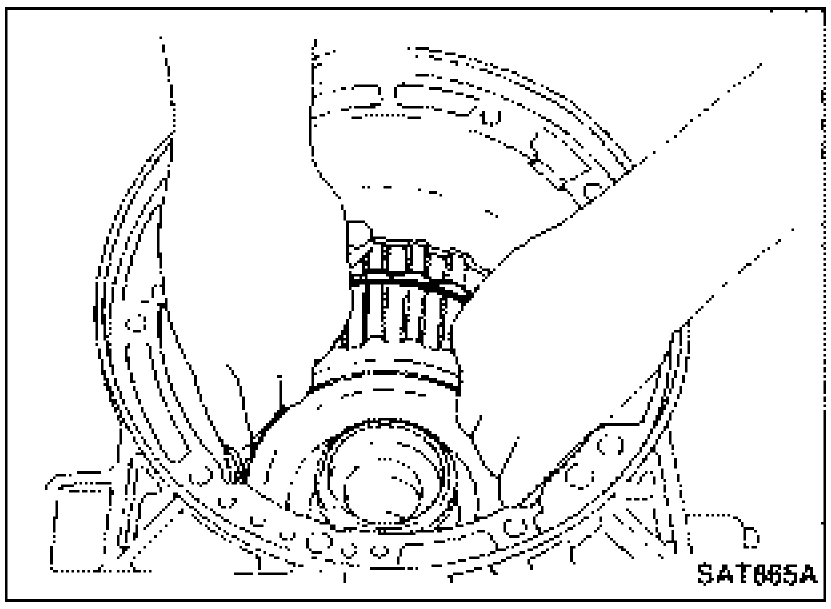
Service procedures for forward and overrun clutches are essentially the same as those for reverse clutch, with the following exception:

- Check of forward clutch operation.

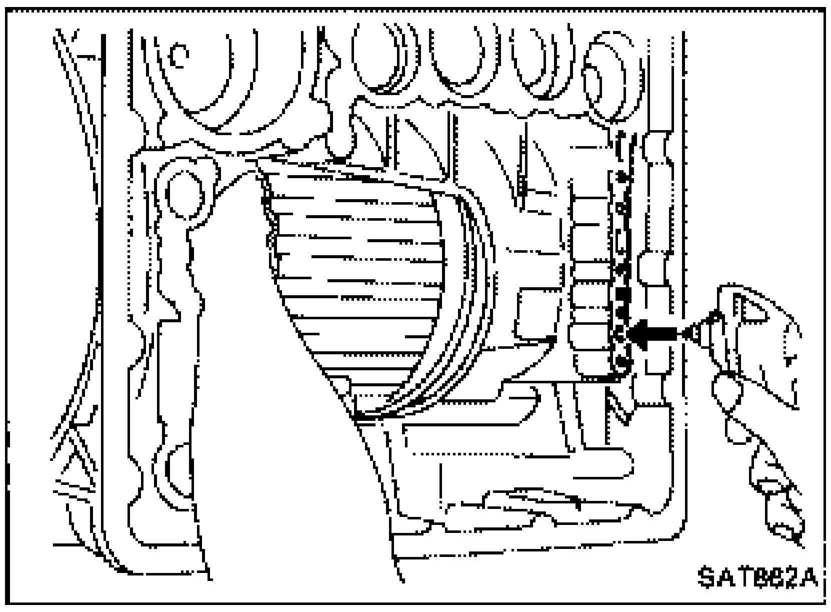


SAT861A

- Check of overrun clutch operation.

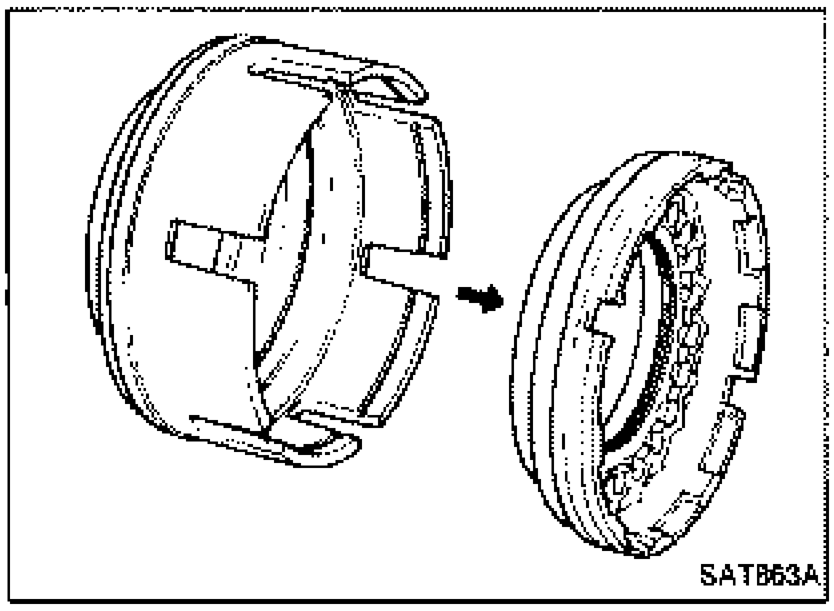

SAT865A

- Removal of forward clutch drum
  Remove forward clutch drum from transmission case by holding snap ring.


SAT862A

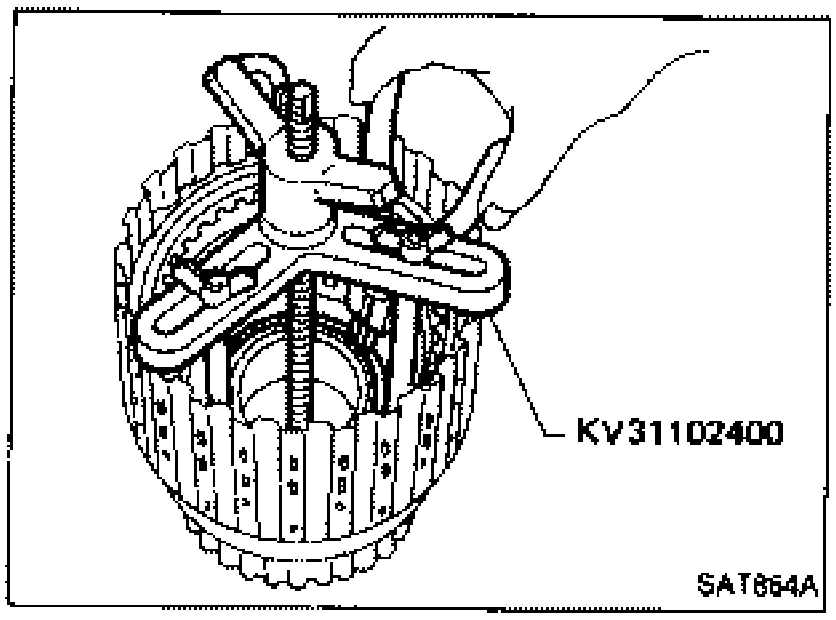
- Removal of forward clutch and overrun clutch pistons

1. While holding overrun clutch piston, gradually apply compressed air to oil hole.

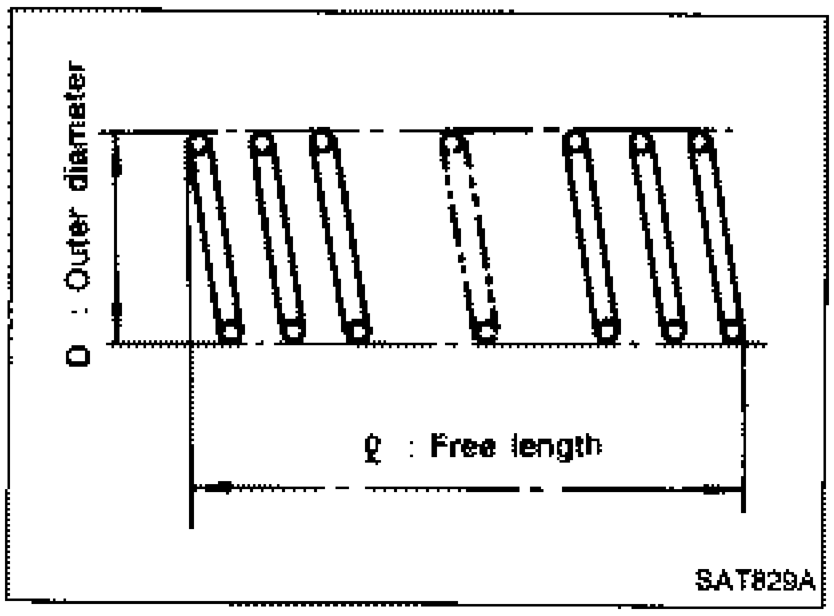

SAT863A

2. Remove overrun clutch from forward clutch.

Forward and Overrun Clutches (Cont'd)



- Removal and installation of return springs

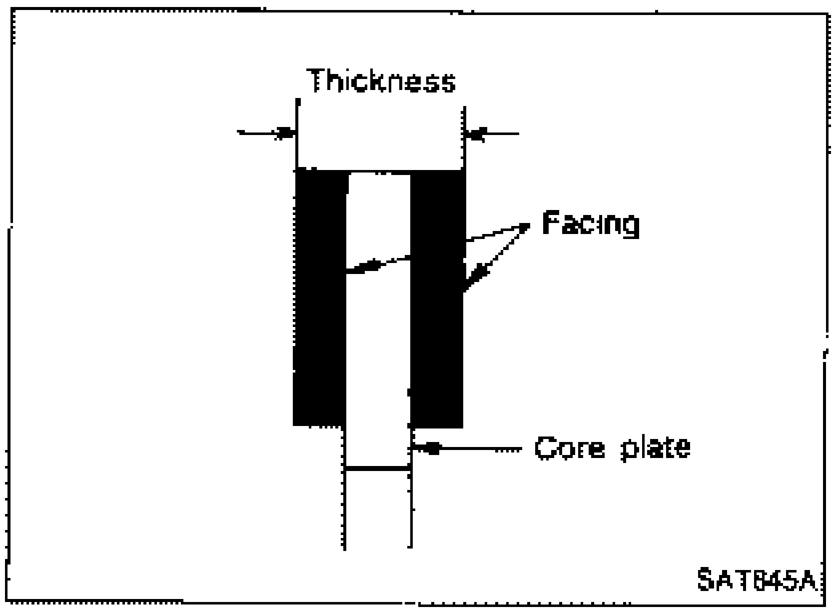


- Inspection of forward clutch and overrun clutch return springs

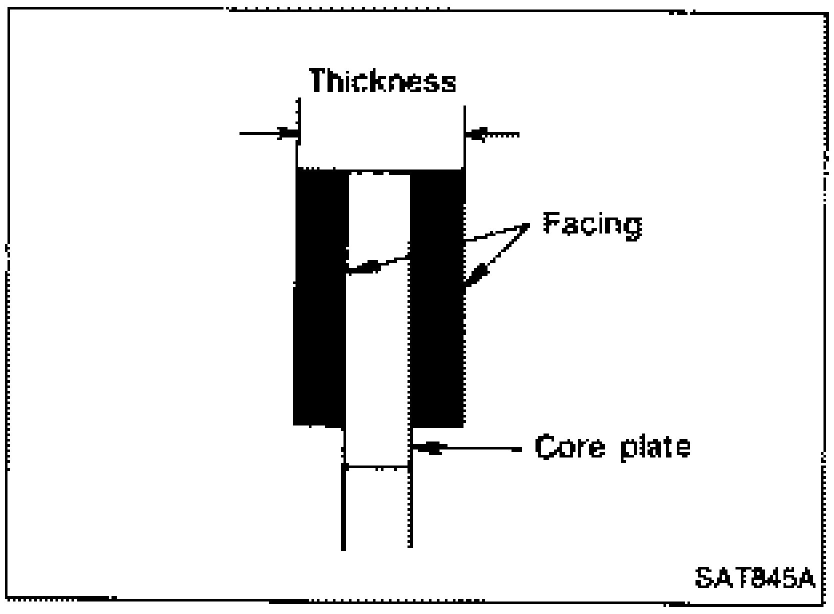
Inspection standard:

Unit: mm (in)

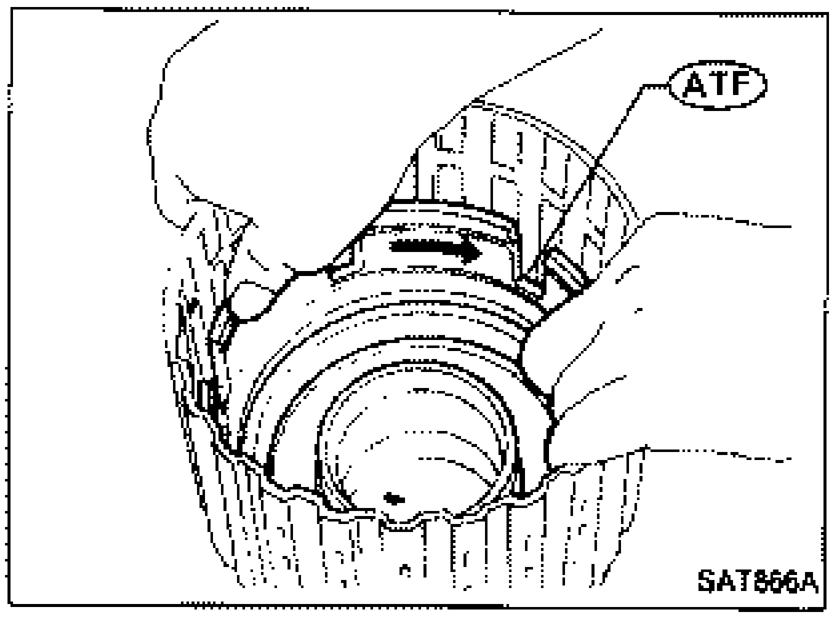
Model	Part No.	ℓ	D
RE4R01A	31505-41X01	35.77 (1.4083)	9.7 (0.382)
RE4R03A	31505-51X04	36.8 (1.449)	9.8 (0.386)



- Inspection of forward clutch drive plates
  Thickness of drive plate:
  Standard
  1.6 mm (0.063 in) (RE4R01A)
  2.0 mm (0.079 in) (RE4R03A)
  Wear limit
  1.4 mm (0.055 in) (RE4R01A)
  1.6 mm (0.063 in) (RE4R03A)



- Inspection of overrun clutch drive plates
  Thickness of drive plate:
  Standard
  2.0 mm (0.079 in) (RE4R01A)
  1.6 mm (0.063 in) (RE4R03A)
  Wear limit
  1.8 mm (0.071 in) (RE4R01A)
  1.4 mm (0.055 in) (RE4R03A)

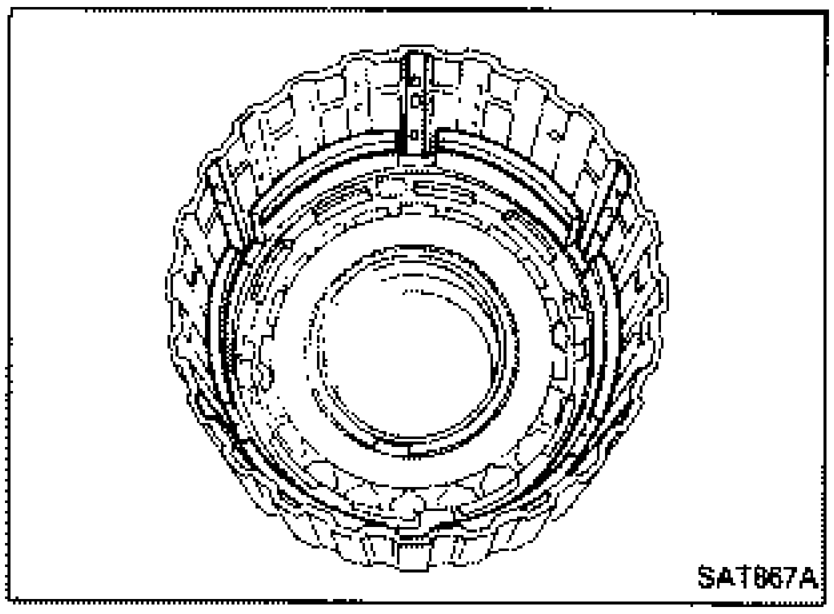


- Installation of forward clutch piston and overrun clutch piston

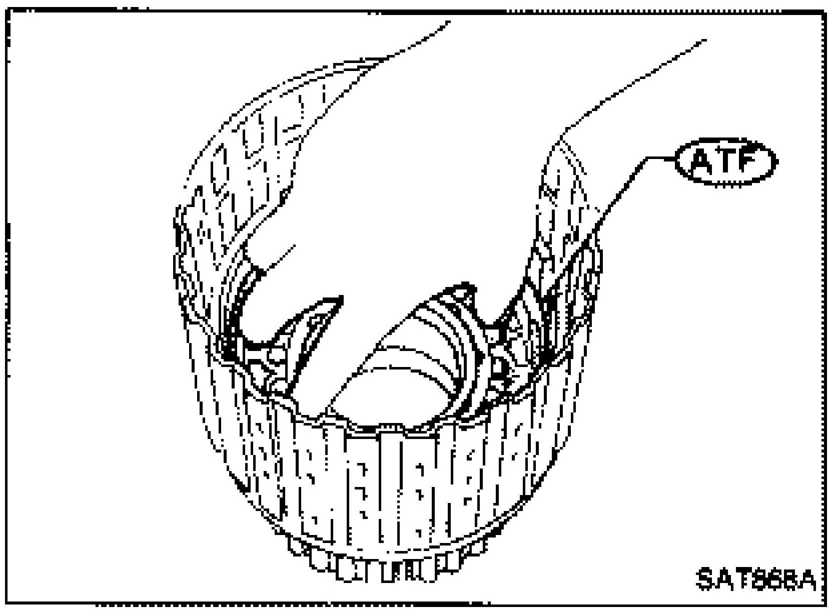
1. Install forward clutch piston by turning it slowly and evenly.

- **Apply A.T.F. to inner surface of clutch drum.**

Forward and Overrun Clutches (Cont'd)

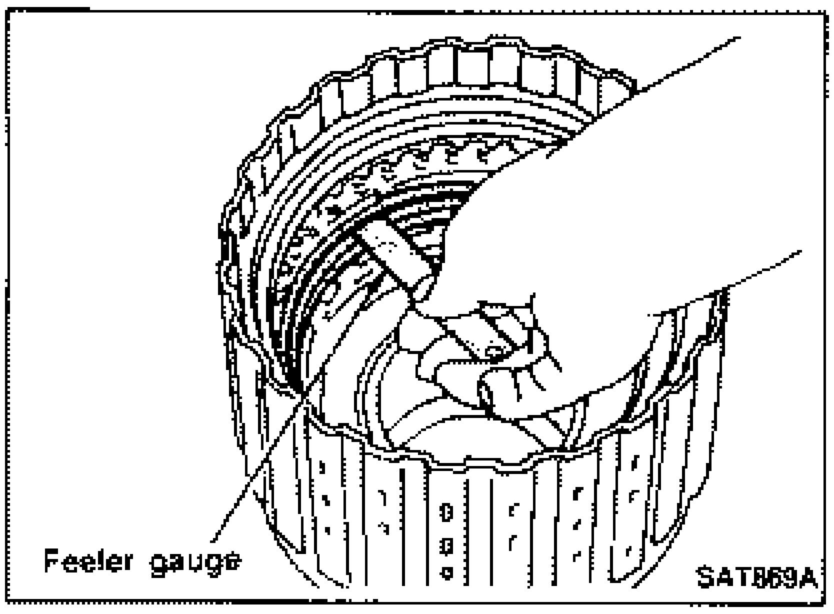


- **Align notch in forward clutch piston with groove in forward clutch drum.**

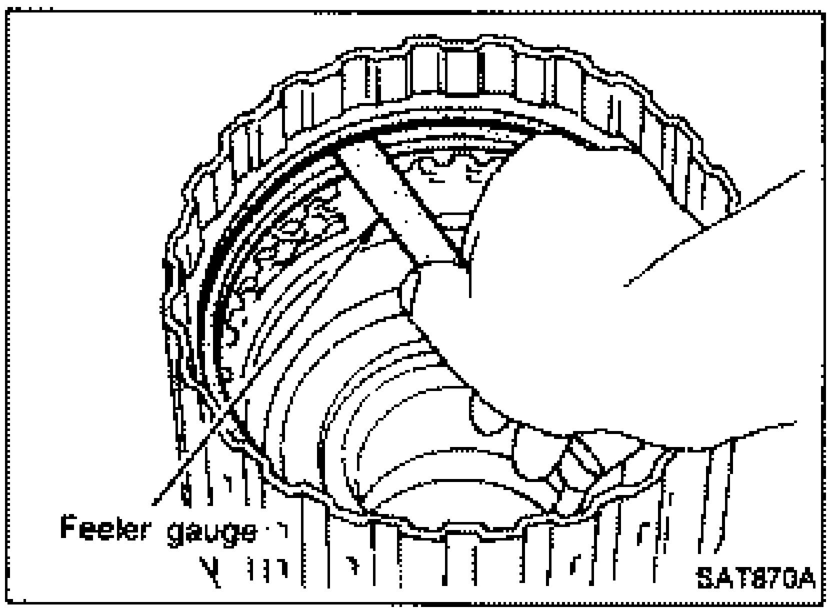


2. Install overrun clutch by turning it slowly and evenly.

- **Apply A.T.F. to inner surface of forward clutch piston.**

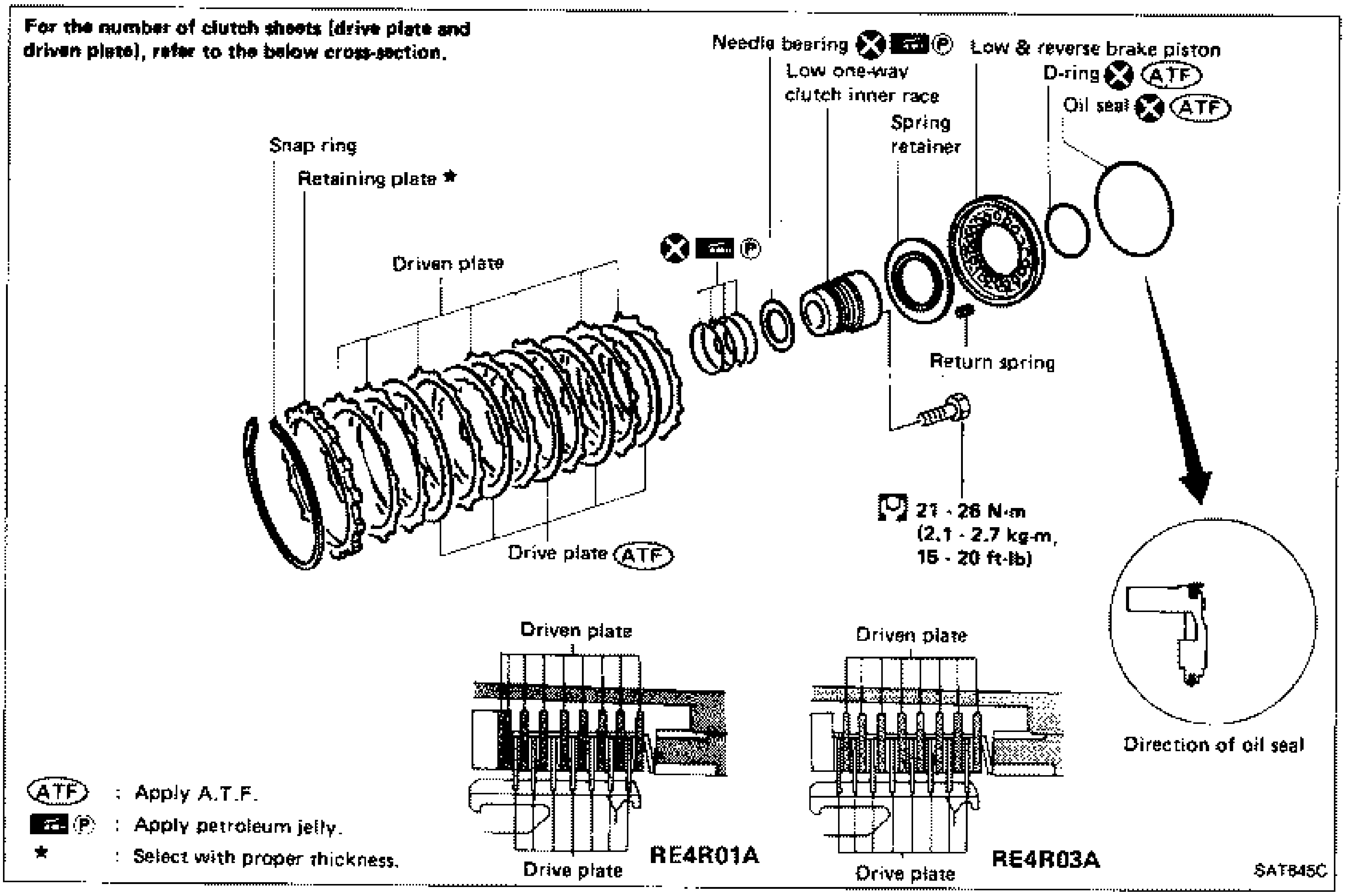


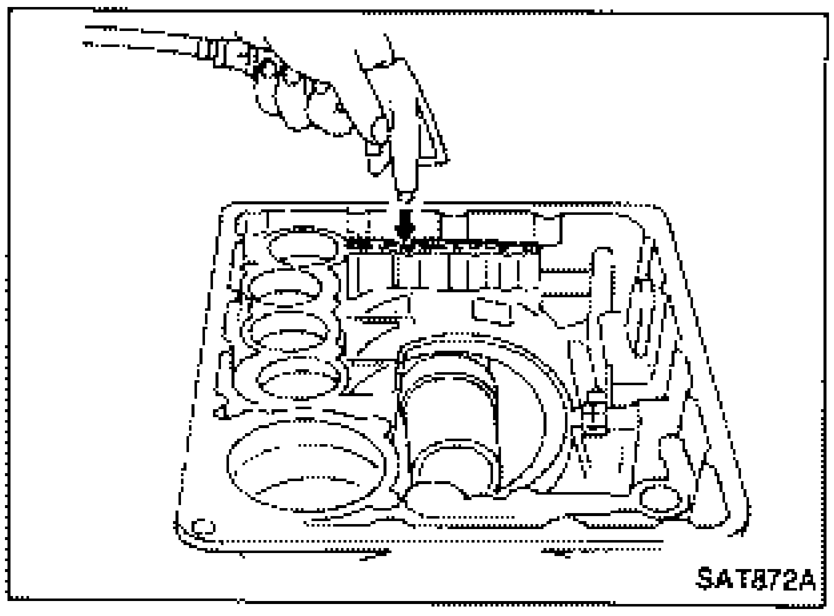
- Measurement of clearance between retaining plate and snap ring of overrun clutch
  Specified clearance:
  Standard
  1.0 - 1.4 mm (0.039 - 0.055 in)
  Allowable limit
  2.0 mm (0.079 in) (RE4R01A)
  2.2 mm (0.087 in) (RE4R03A)
  Retaining plate:
  Refer to S.D.S.



- Measurement of clearance between retaining plate and snap ring of forward clutch
  Specified clearance:
  Standard
  0.45 - 0.85 mm (0.0177 - 0.0335 in)
  Allowable limit
  2.25 mm (0.0886 in) (RE4R01A)
  2.45 mm (0.0965 in) (RE4R03A)
  Retaining plate:
  Refer to S.D.S.

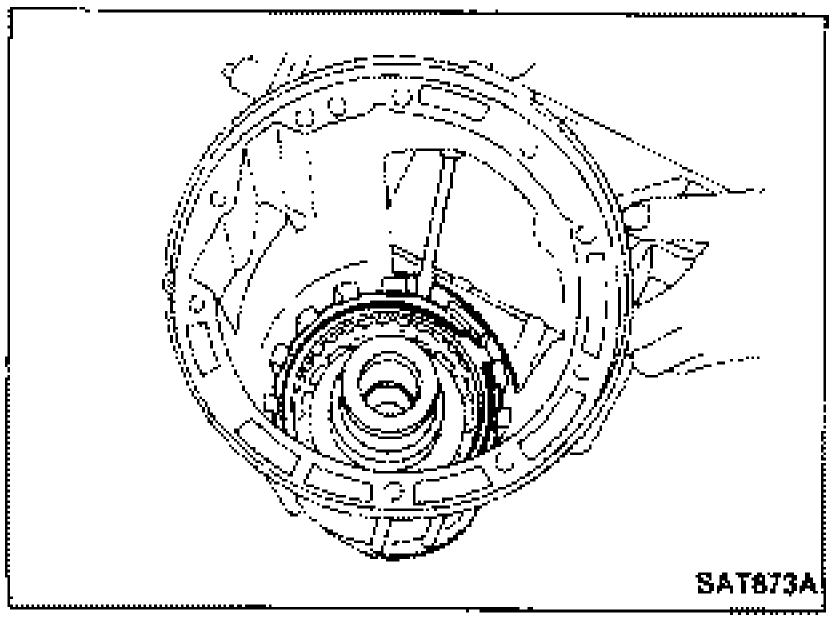
Low & Reverse Brake





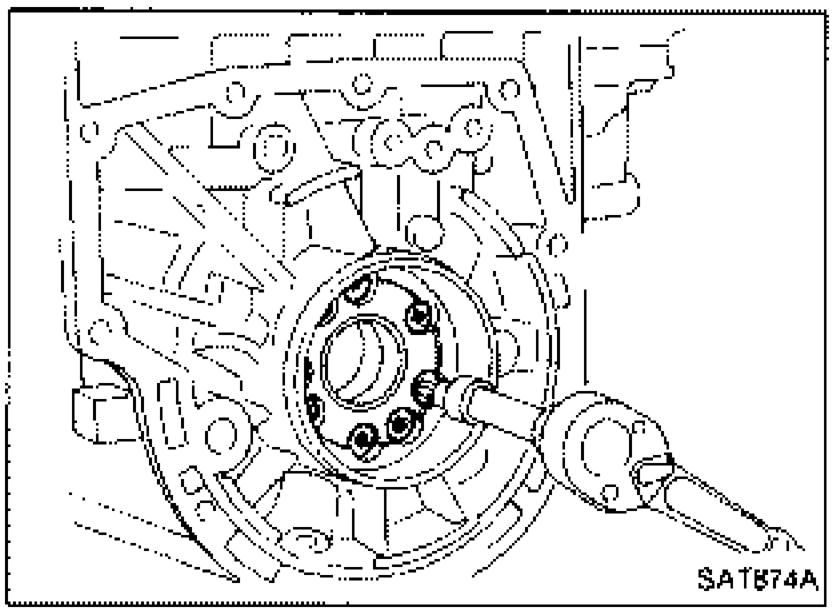
DISASSEMBLY

1. Check operation of low and 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.

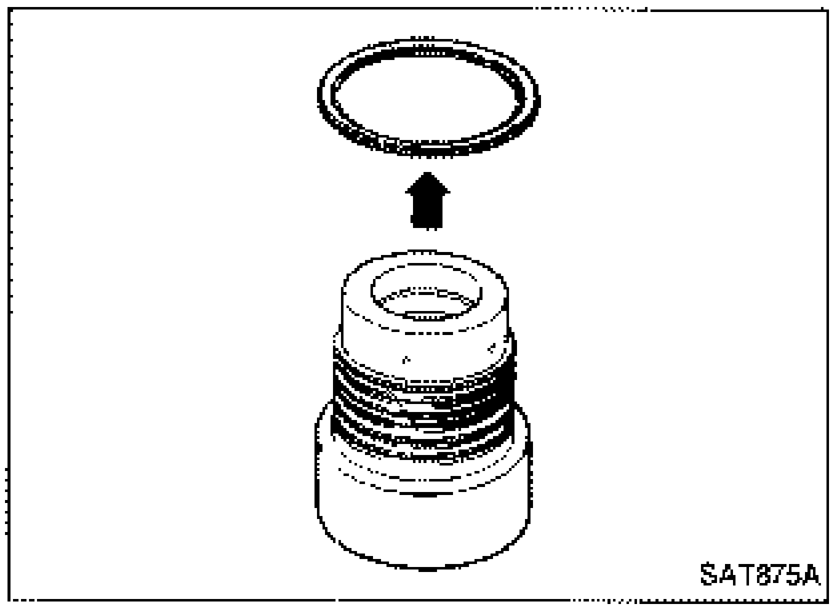


2. Remove snap ring, low and reverse brake drive plates, driven plates and dish plate.

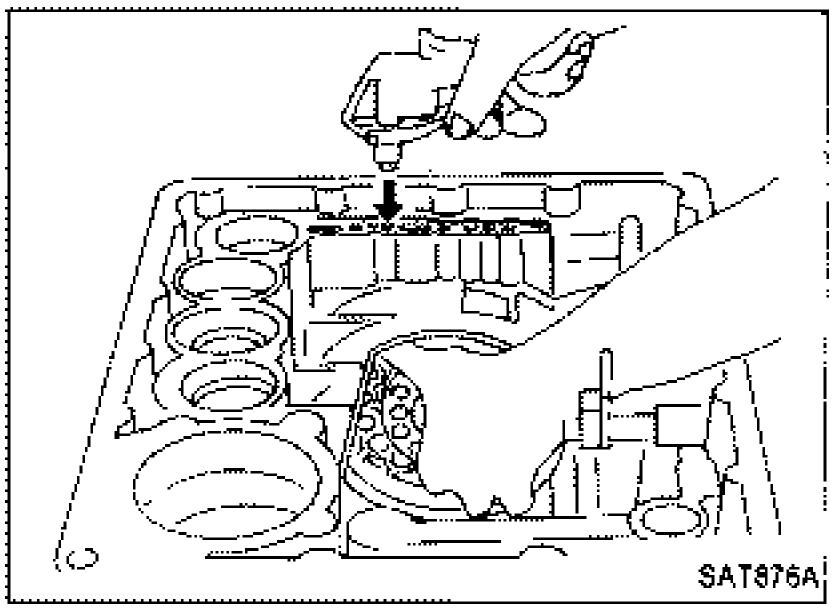
Low & Reverse Brake (Cont'd)



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 needle bearing from low one-way clutch inner race.

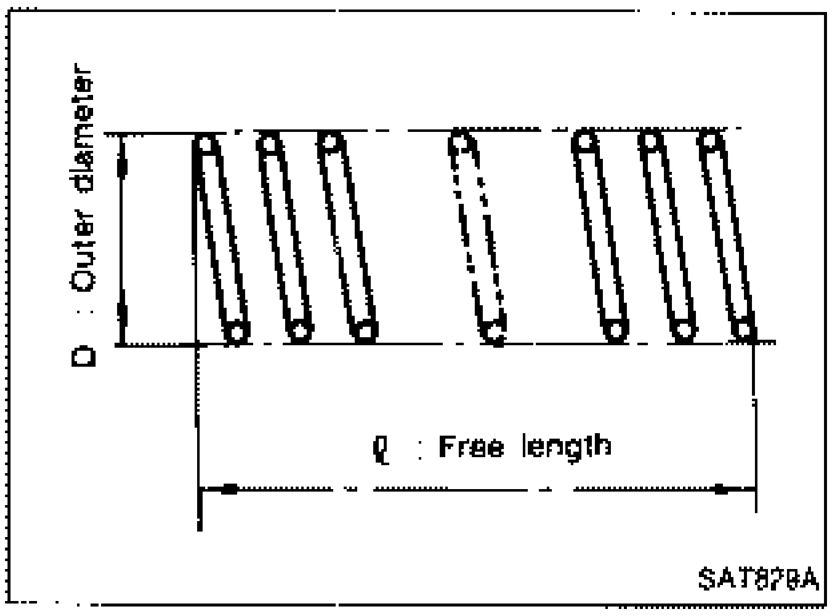


6. Remove low and reverse brake piston using compressed air.
7. Remove oil seal and D-ring from piston.

INSPECTION

Low and reverse brake snap ring and spring retainer

- Check for deformation, or damage.



Low and reverse brake return springs

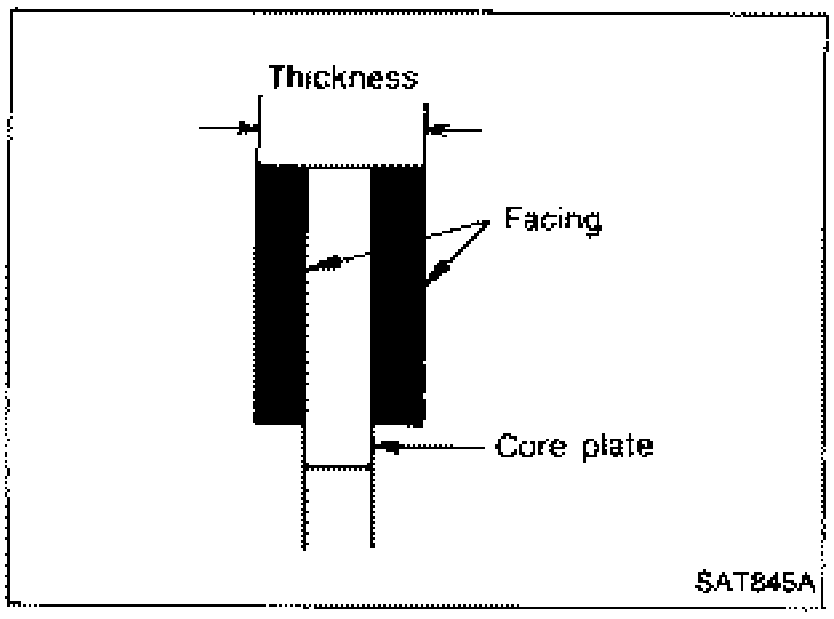
- Check for deformation or damage. Also measure free length and outside diameter.

Inspection standard:

Unit: mm (in)

Model	Part No.	ℓ	D
RE4R01A	31521-21X00	23.7 (0.933)	11.6 (0.457)
RE4R03A	31505-51X00 (Inner)	20.43 (0.8043)	9.4 (0.370)
	31505-51X05 (Outer)	20.35 (0.8012)	11.9 (0.469)

Low & Reverse Brake (Cont'd)



Low and reverse brake drive plates

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

    Thickness of drive plate:

    Standard value

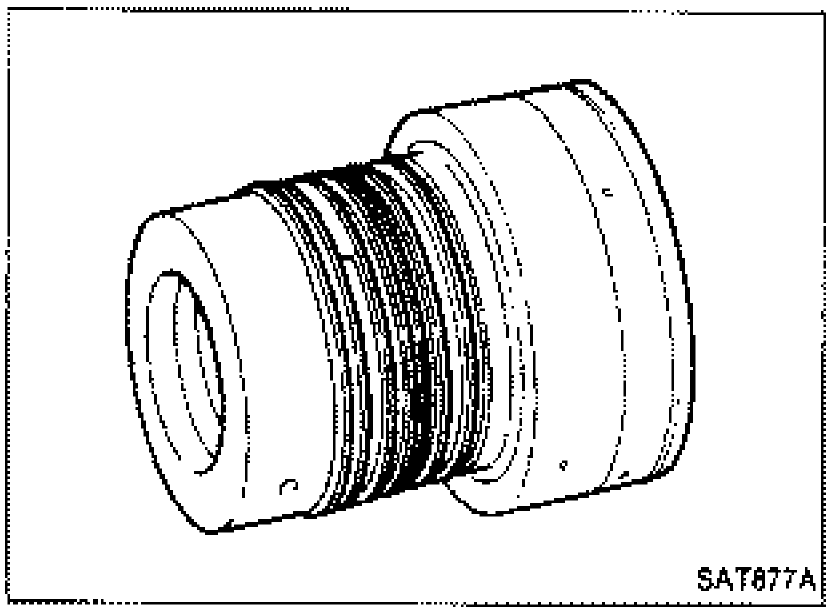
    2.0 mm (0.079 in) (RE4R01A)

    1.6 mm (0.063 in) (RE4R03A)

    Wear limit

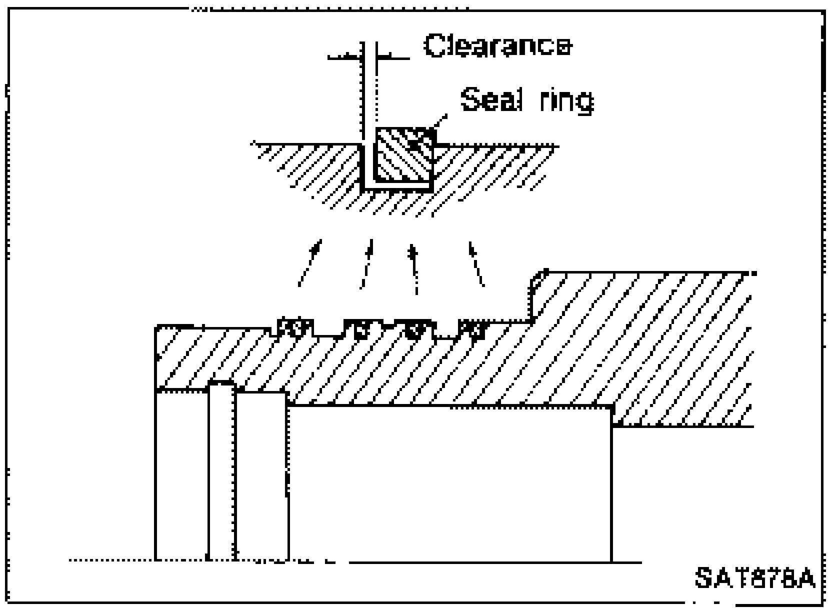
    1.8 mm (0.071 in) (RE4R01A)

    1.4 mm (0.055 in) (RE4R03A)
- If not within wear limit, replace.



Low one-way clutch inner race

- Check frictional surface of inner race for wear or damage.

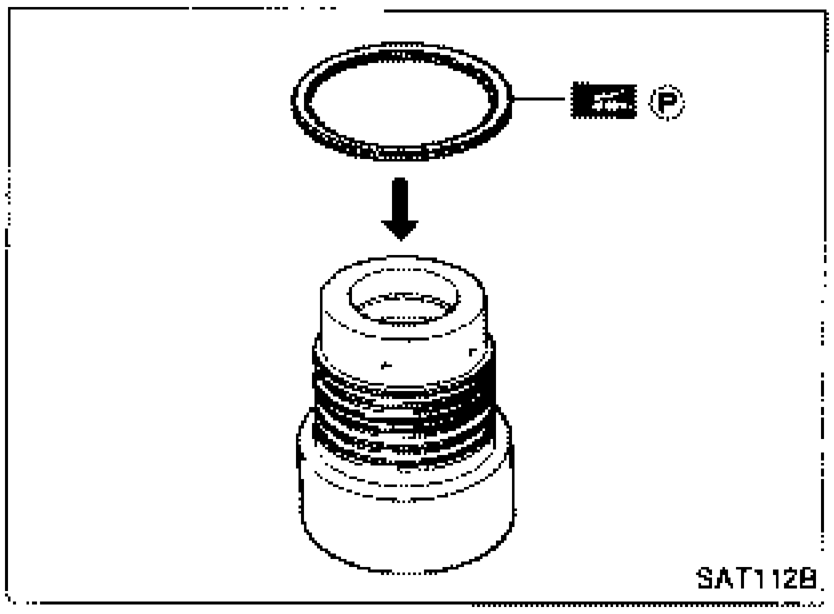


- Install a new seal rings onto low one-way clutch inner race.
- **Be careful not to expand seal ring gap excessively.**
- Measure seal ring-to-groove clearance.

    Inspection standard:

    Standard value: 0.10 - 0.25 mm (0.0039 - 0.0098 in)

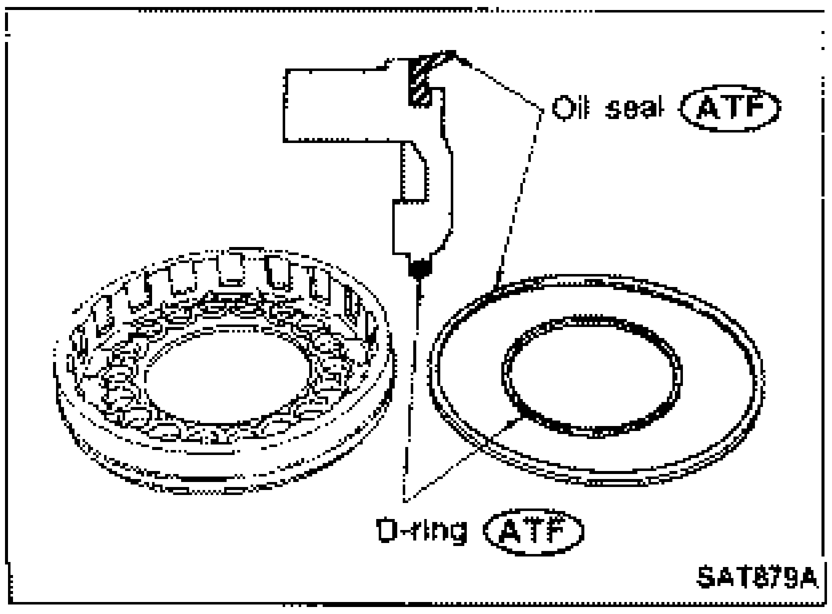
    Allowable limit: 0.25 mm (0.0098 in)
- If not within allowable limit, replace low one-way clutch inner race.



ASSEMBLY

1. Install bearing onto one-way clutch inner race.

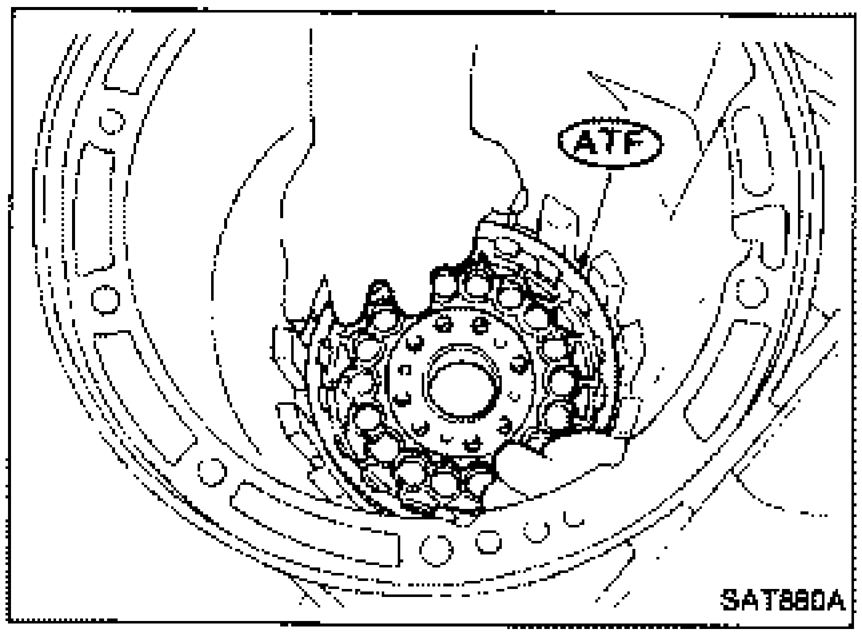
- **Pay attention to its direction — Black surface goes to rear side.**
- **Apply petroleum jelly to needle bearing.**



2. Install oil seal and D-ring onto piston.

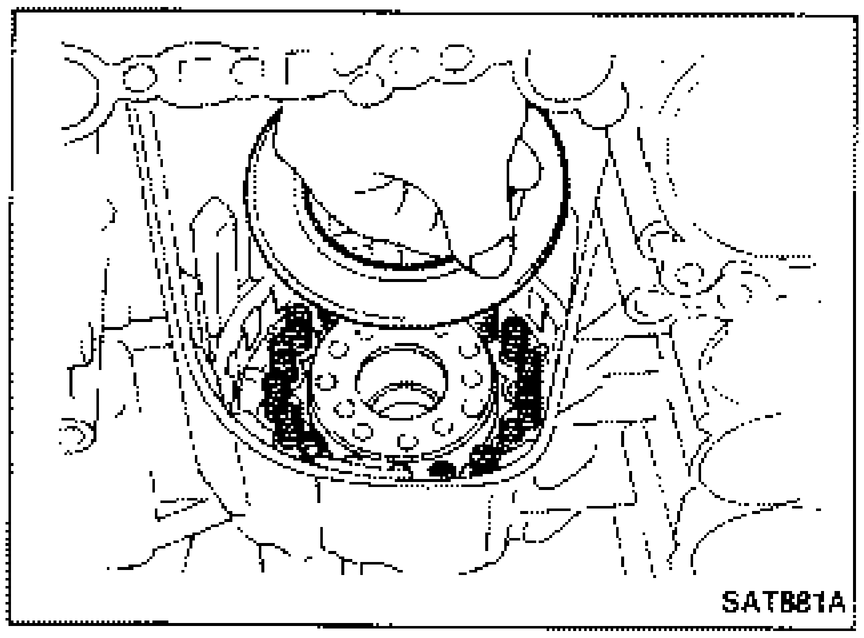
- **Apply A.T.F. to oil seal and D-ring.**

Low & Reverse Brake (Cont'd)

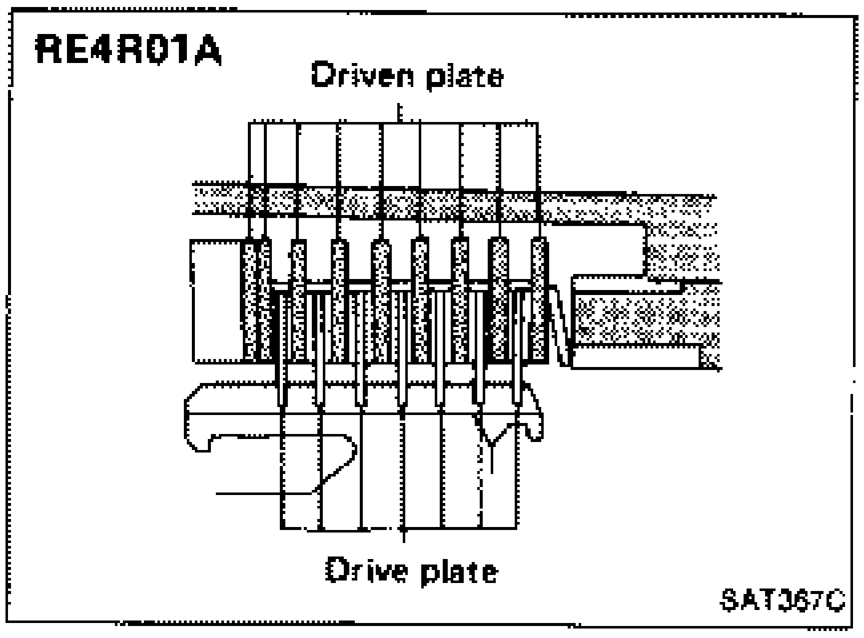


3. Install piston by rotating it slowly and evenly.

- **Apply A.T.F. to inner surface of transmission case.**



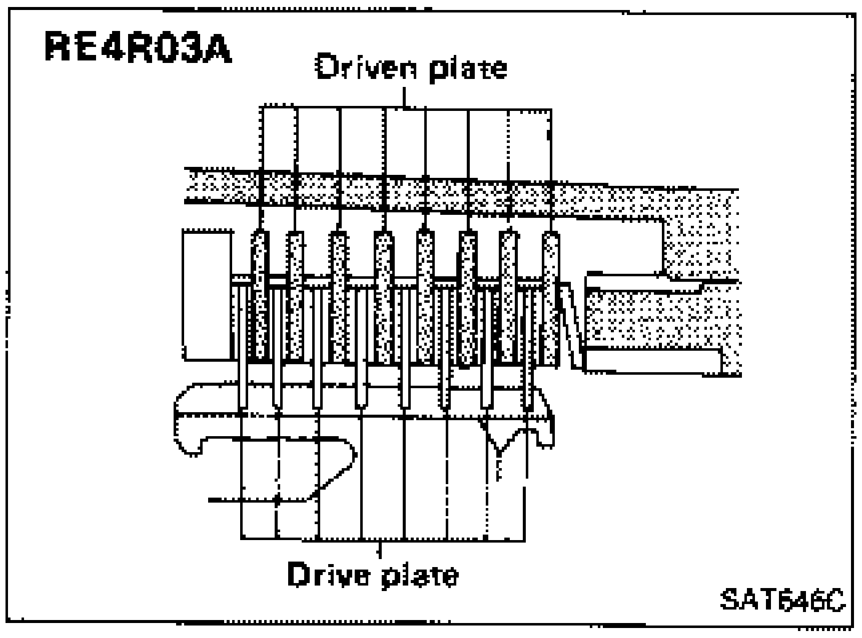
4. Install return springs, spring retainer and low one-way clutch inner race onto transmission case.

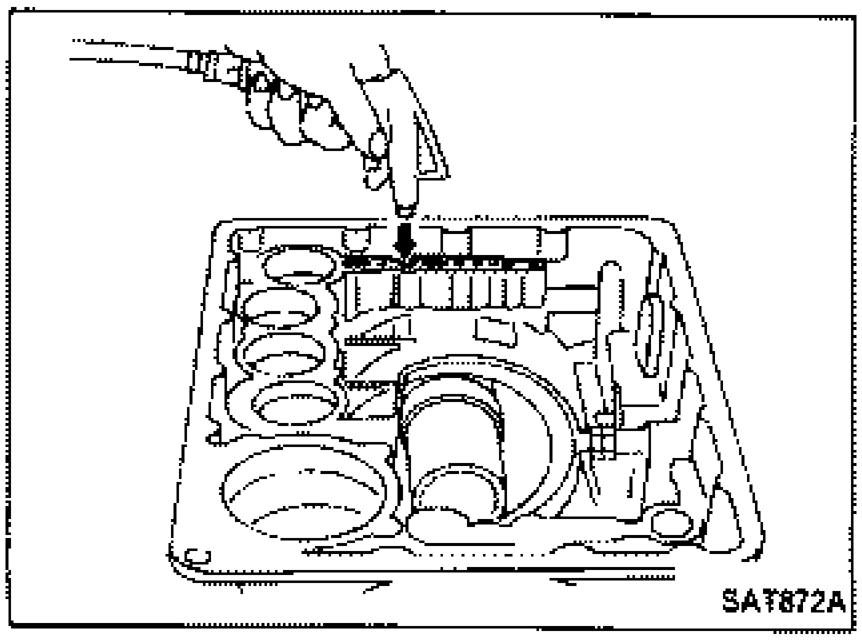


5. Install dish plate, low and reverse brake drive plates, driven plates and retaining plate.

- **Two types of drive plates are used on the RE4R03A transmission. One type uses a "waving" design and the other type uses a "flat" design. Either one can be installed first since they are interchangeable.**

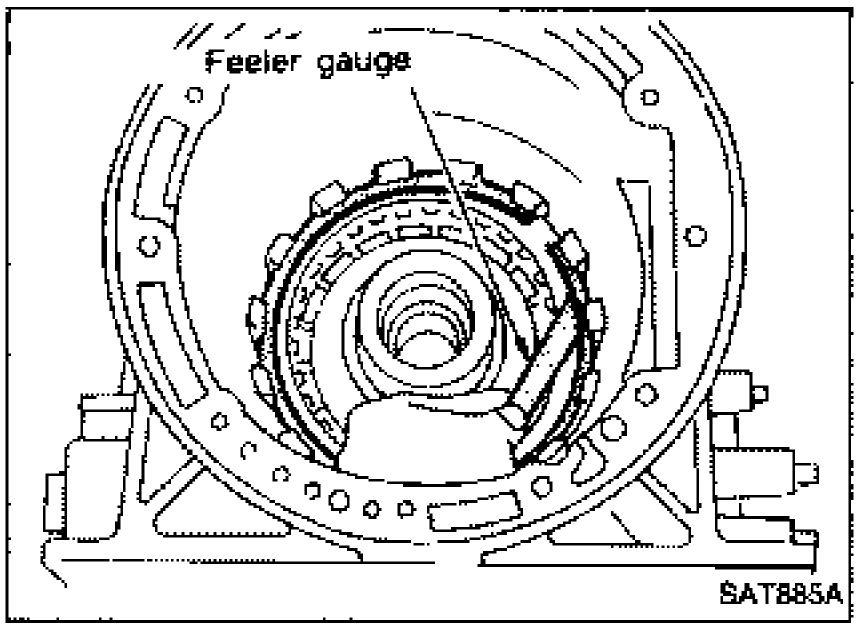
6. Install snap ring on transmission case.





7. Check operation of low and reverse brake clutch piston. Refer to "DISASSEMBLY".

Low & Reverse Brake (Cont'd)



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

   Specified clearance:

   Standard

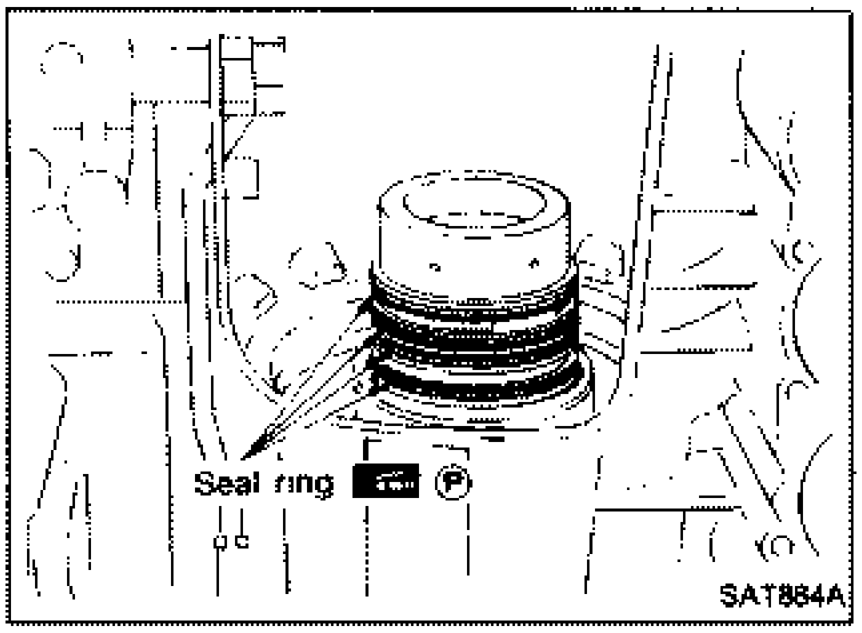
   1.1 - 1.5 mm (0.043 - 0.059 in)

   Allowable limit

   2.9 mm (0.114 in)

   Retaining plate:

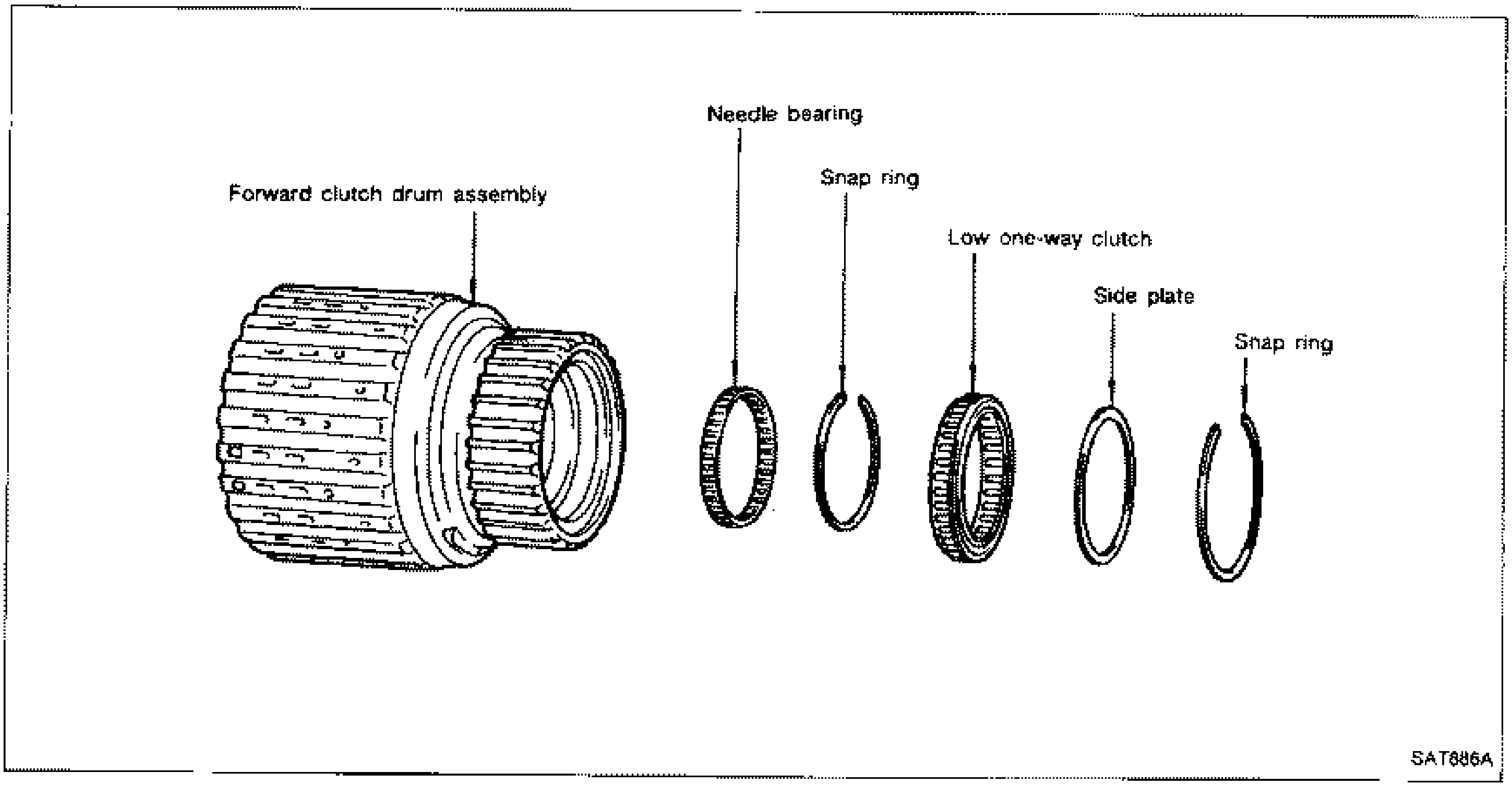
   Refer to S.D.S.



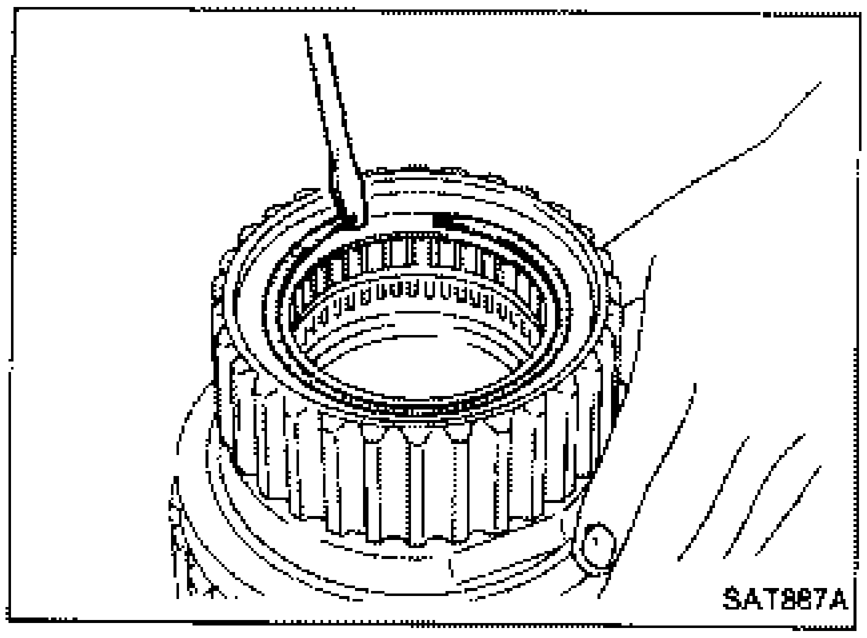
9. Install low one-way clutch inner race seal ring.

- **Apply petroleum jelly to seal ring.**
- **Make sure seal rings are pressed firmly into place and held by petroleum jelly.**

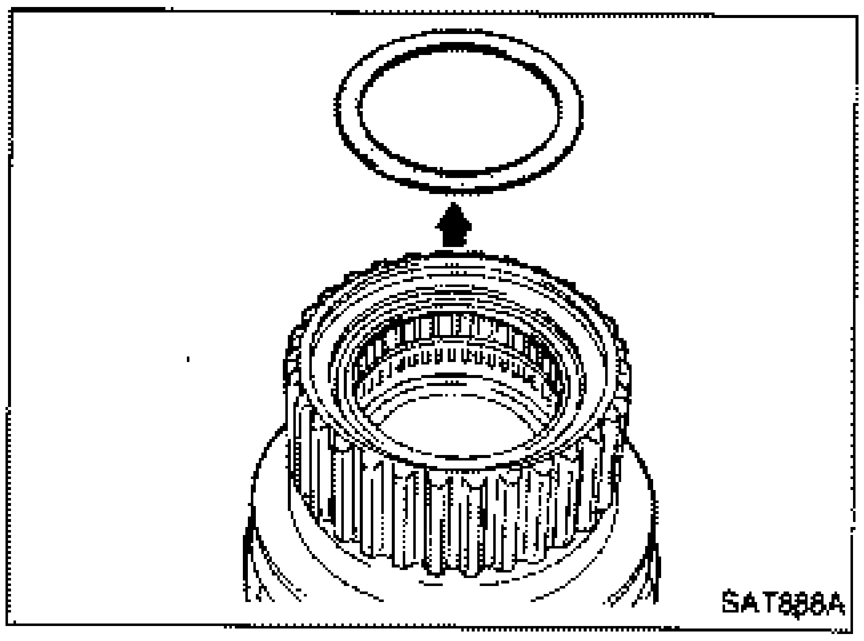
Forward Clutch Drum Assembly — RE4R01A



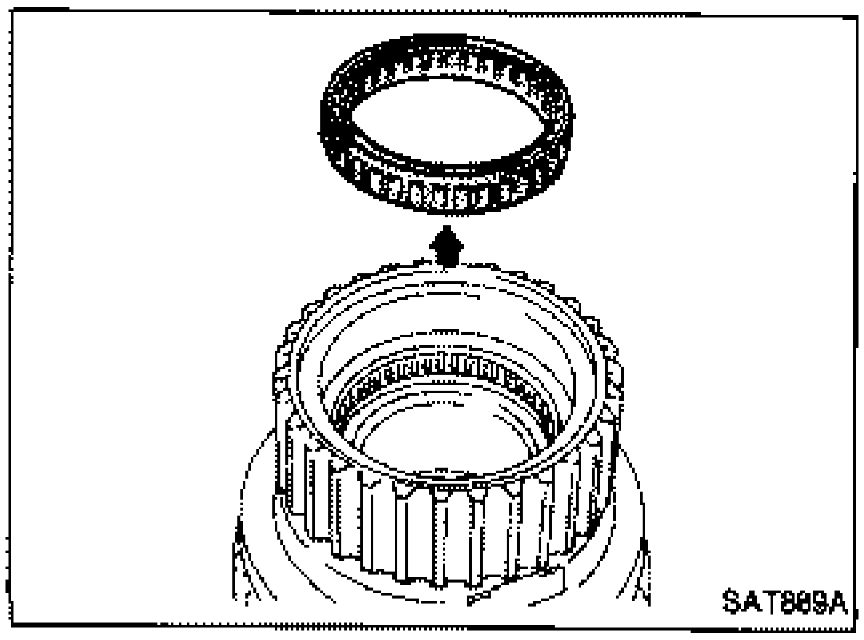
DISASSEMBLY



1. Remove snap ring from forward clutch drum.

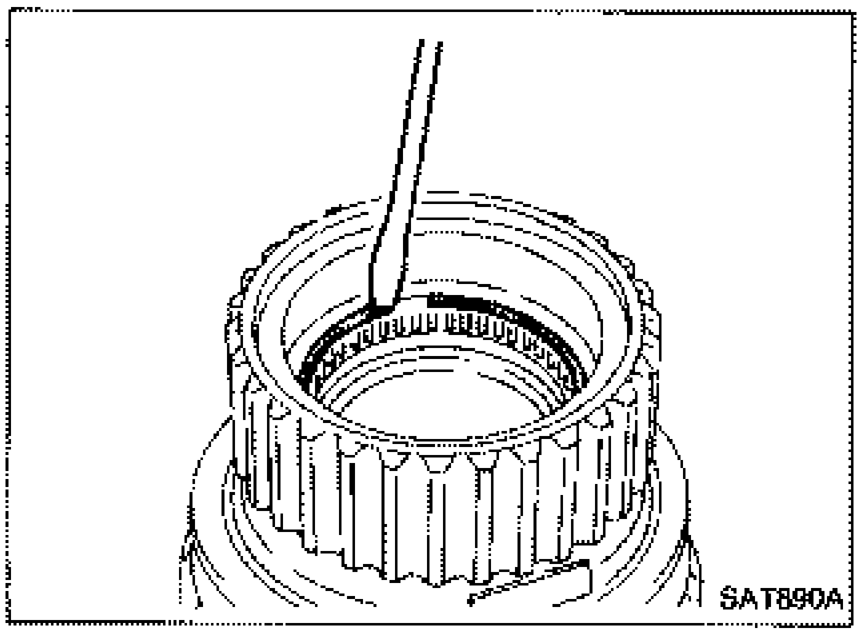


2. Remove side plate from forward clutch drum.

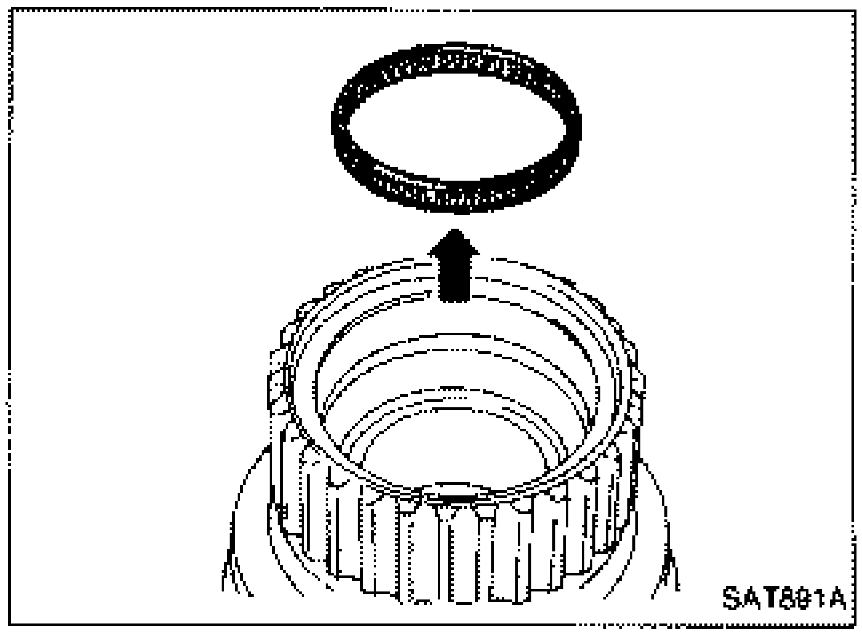


3. Remove low one-way clutch from forward clutch drum.

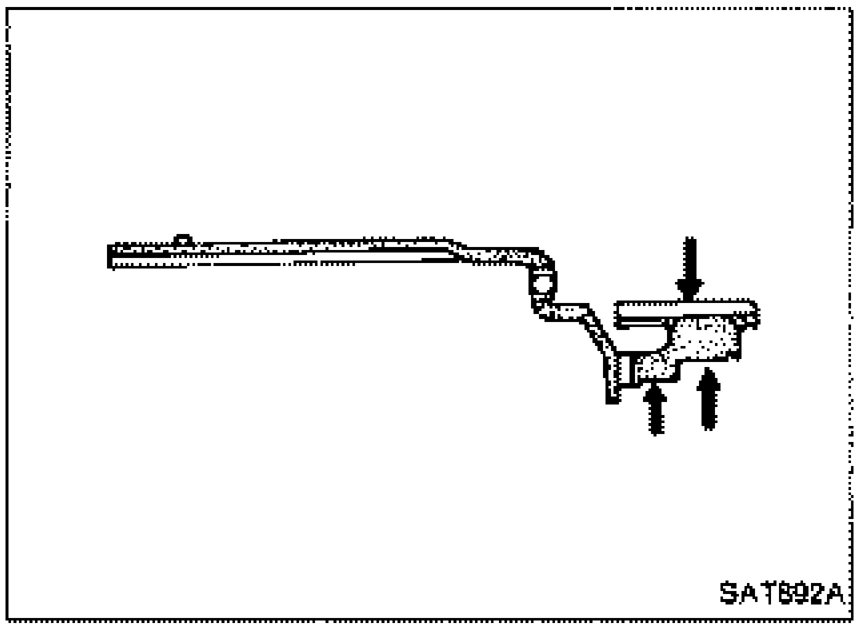
Forward Clutch Drum Assembly — RE4R01A (Cont'd)



4. Remove snap ring from forward clutch drum.



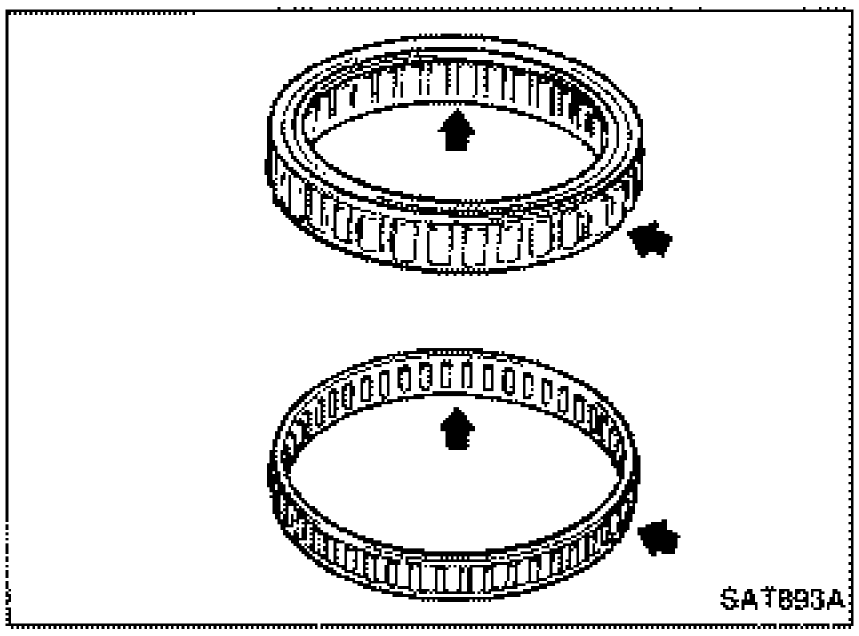
5. Remove needle bearing from forward clutch drum.



INSPECTION

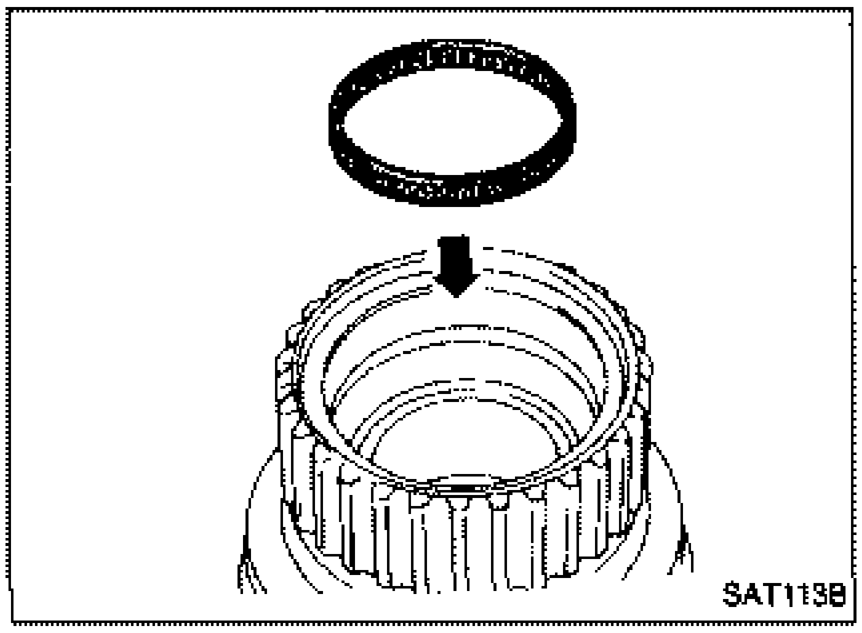
Forward clutch drum

- Check spline portion for wear or damage.
- Check frictional surfaces of low one-way clutch and needle bearing for wear or damage.



Needle bearing and low one-way clutch

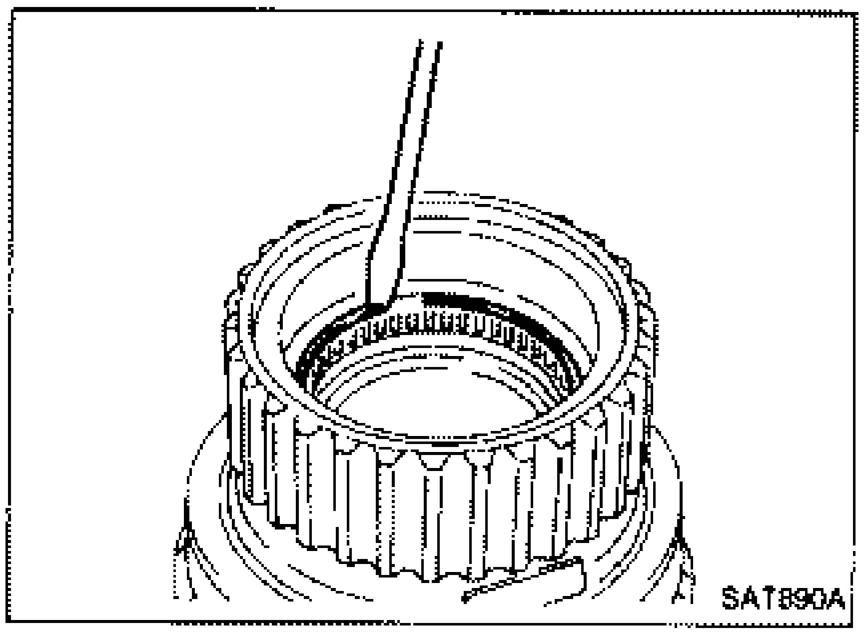
- Check frictional surface for wear or damage.



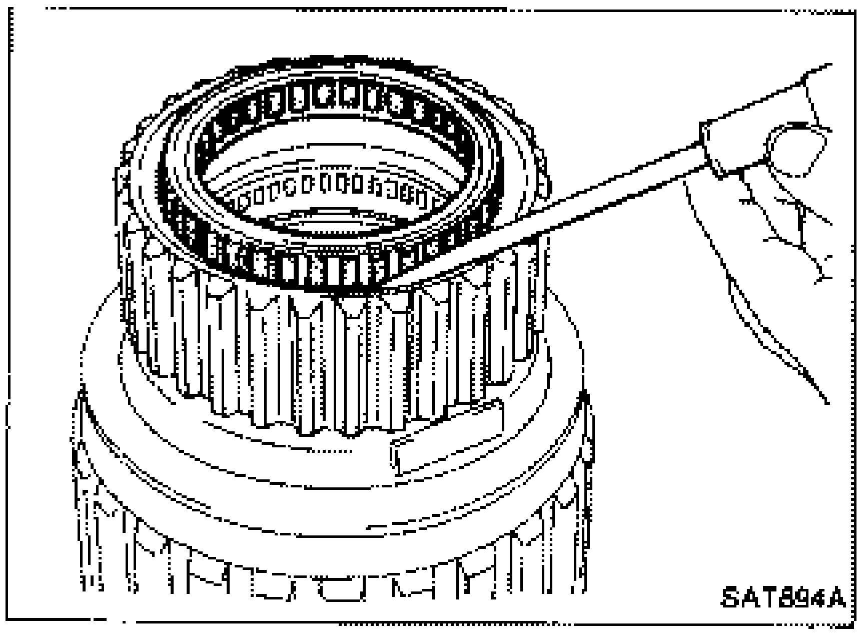
ASSEMBLY

1. Install needle bearing in forward clutch drum.

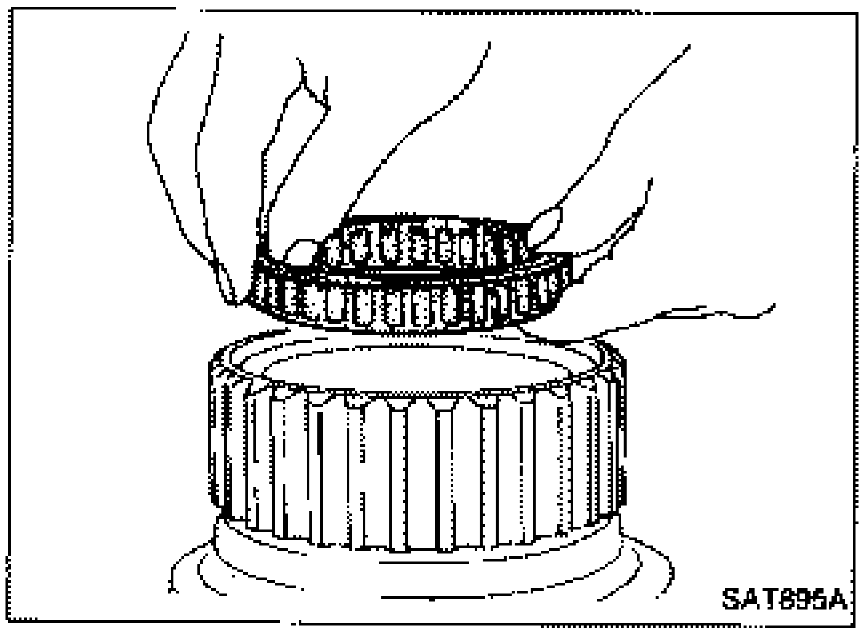
Forward Clutch Drum Assembly — RE4R01A (Cont'd)


SAT890A

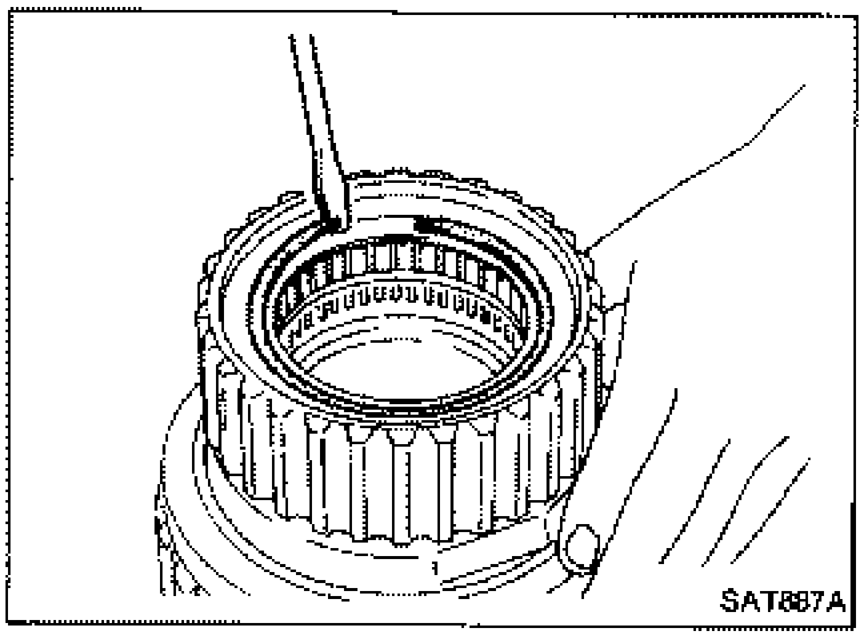
2. Install snap ring onto forward clutch drum.


SAT894A

3. Install low one-way clutch onto forward clutch drum by pushing the roller in evenly.

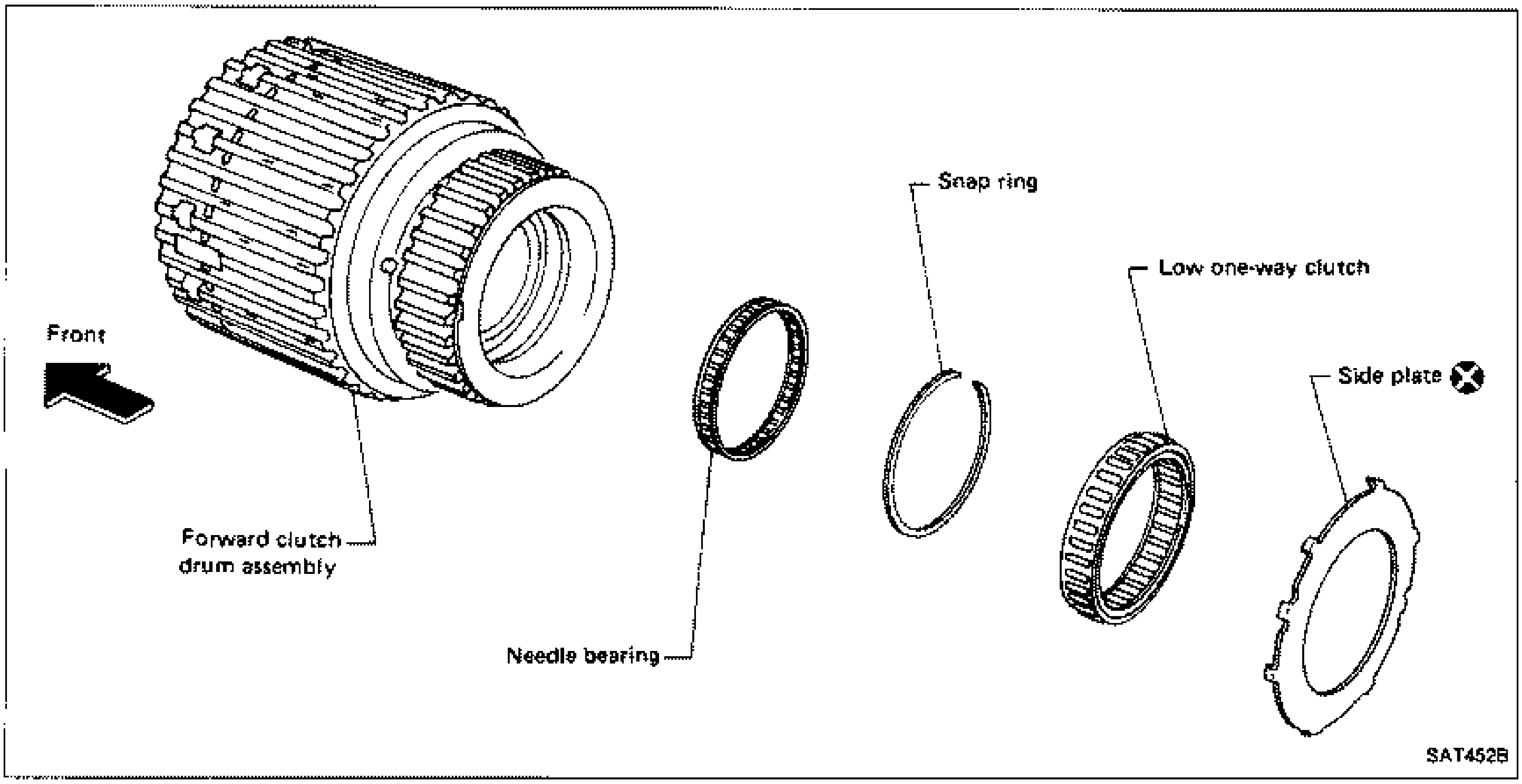

SAT895A

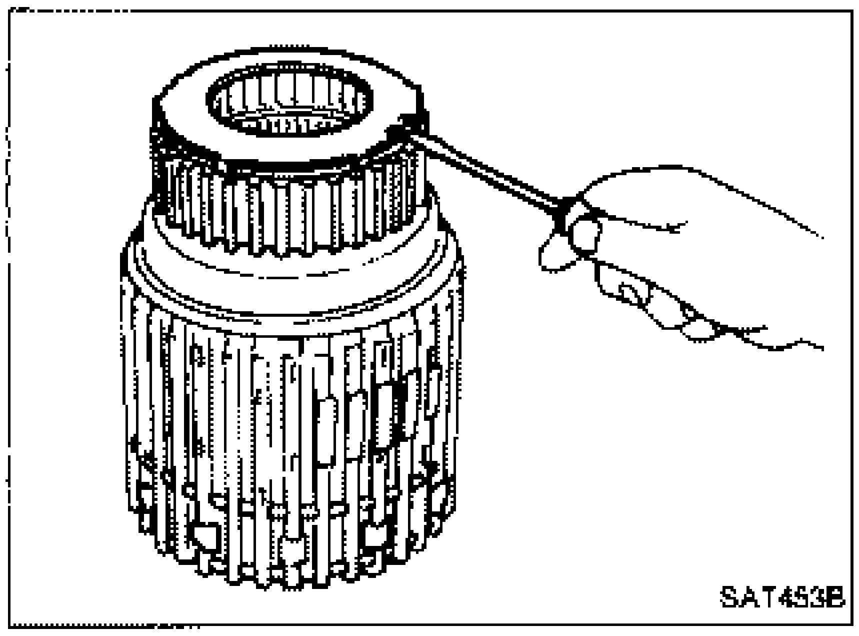
- **Install low one-way clutch with flange facing rearward.**


SAT887A

4. Install side plate onto forward clutch drum.
5. Install snap ring onto forward clutch drum.

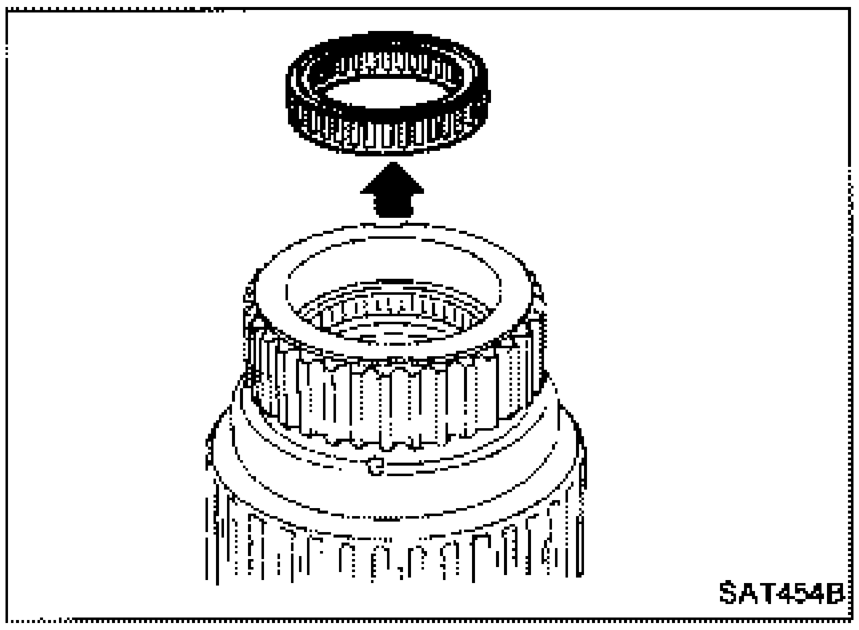
Forward Clutch Drum Assembly — RE4R03A



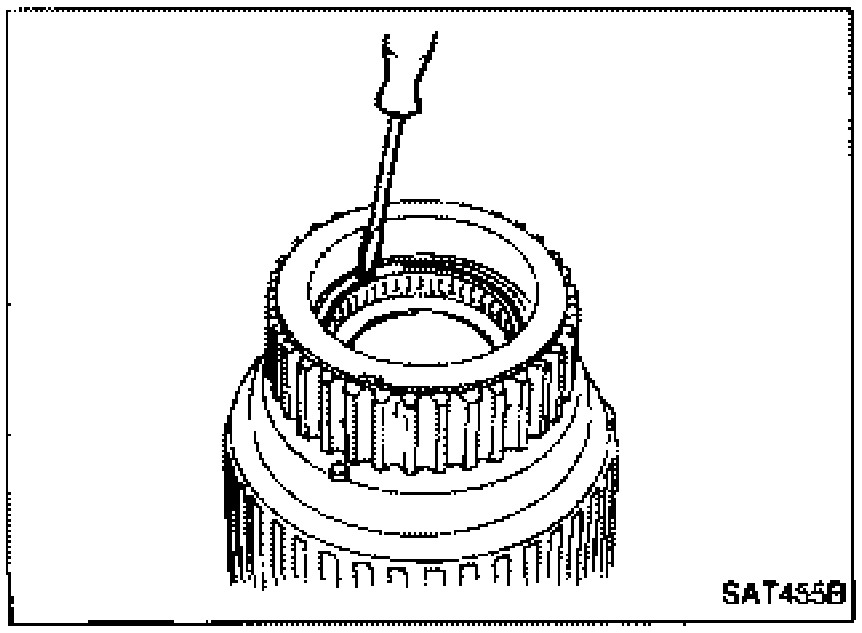


DISASSEMBLY

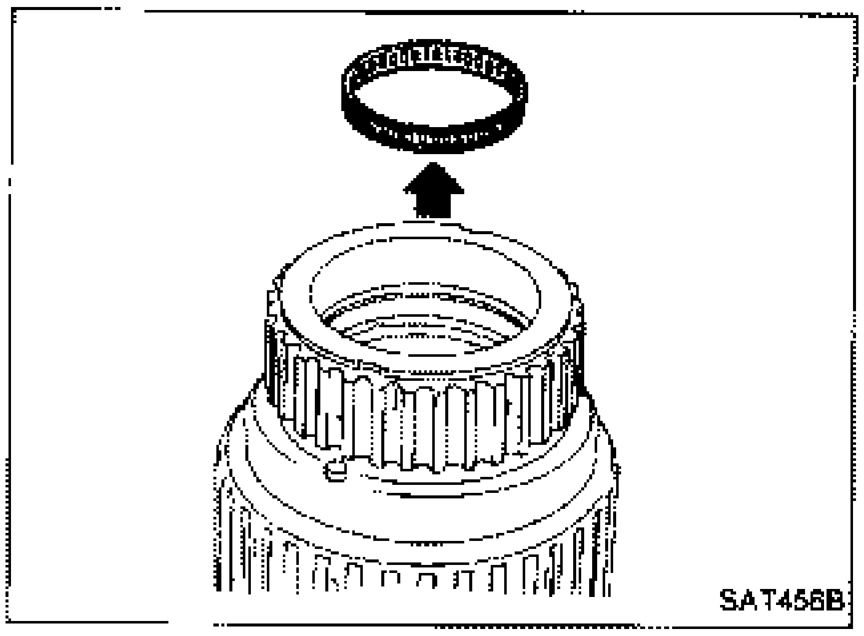
1. Remove side plate from forward clutch drum.



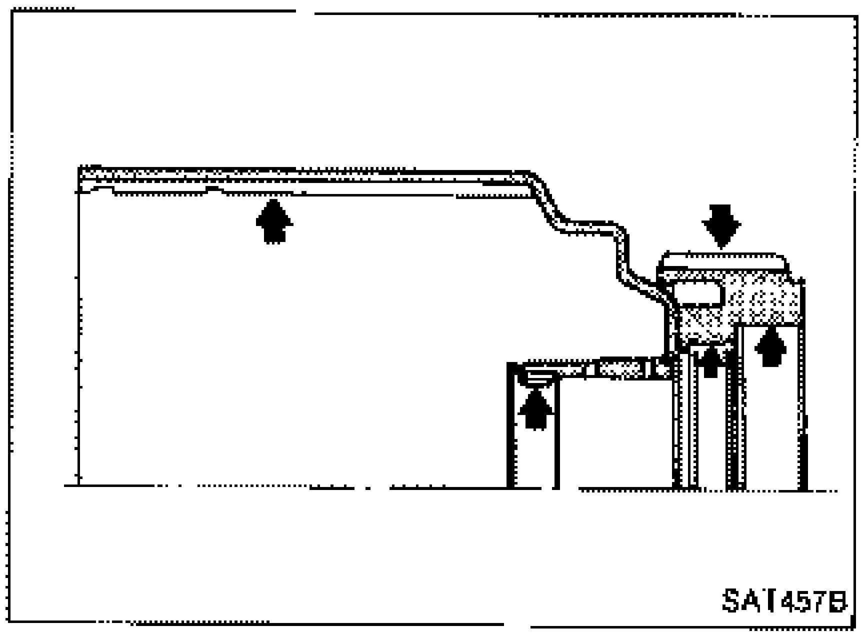
2. Remove low one-way clutch from forward clutch drum.



3. Remove snap ring from forward clutch drum.



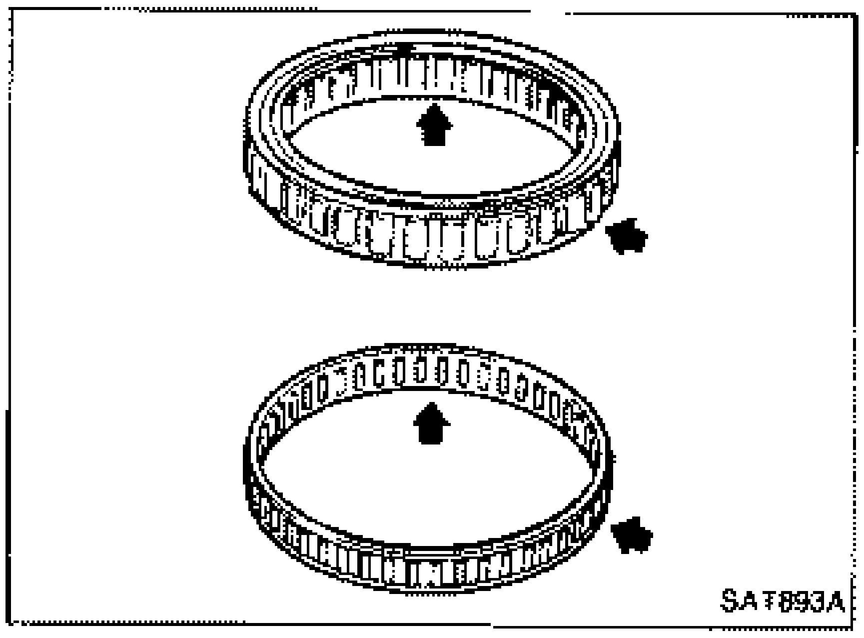
4. Remove needle bearing from forward clutch drum.



INSPECTION

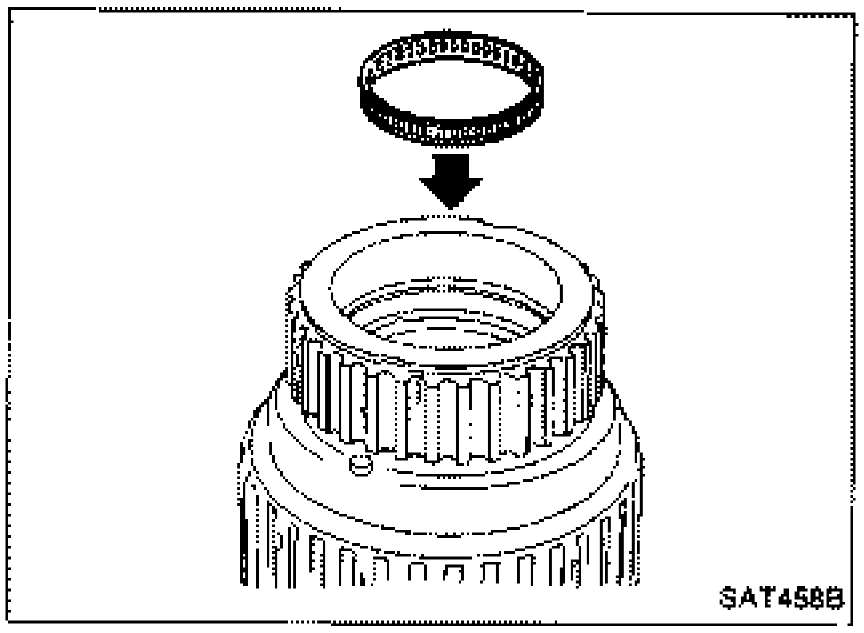
Forward clutch drum

- Check spline portion for wear or damage.
- Check frictional surfaces of low one-way clutch and needle bearing for wear or damage.



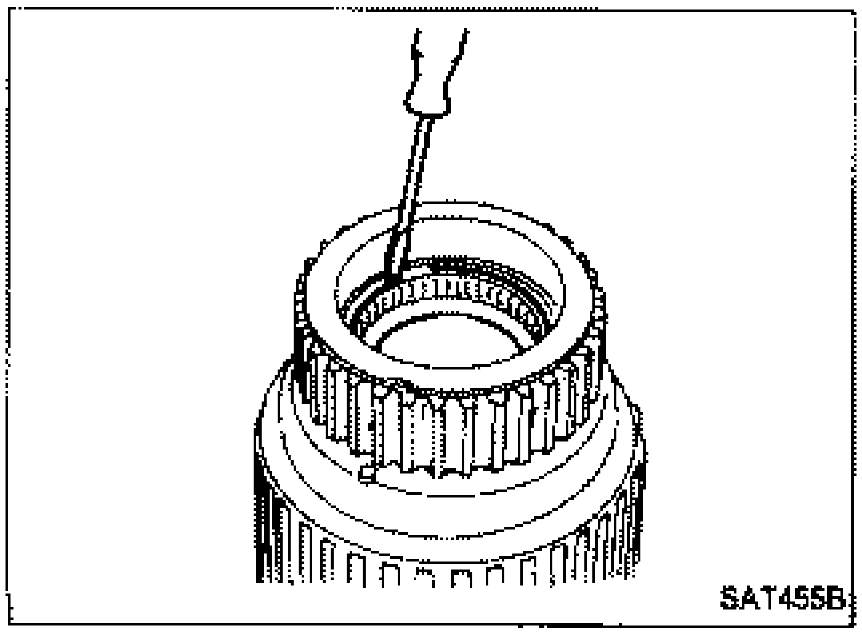
Needle bearing and low one-way clutch

- Check frictional surface for wear or damage.



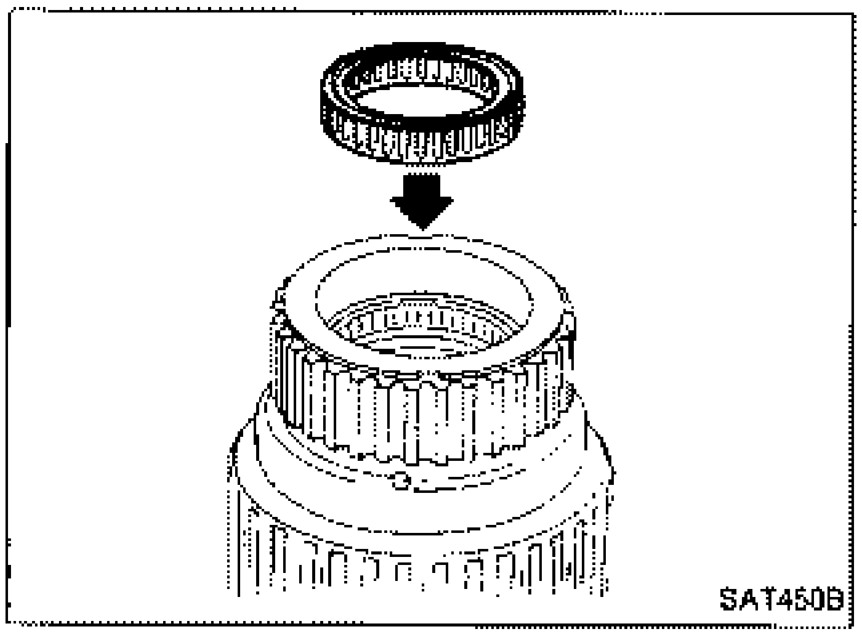
ASSEMBLY

1. Install needle bearing in forward clutch drum.



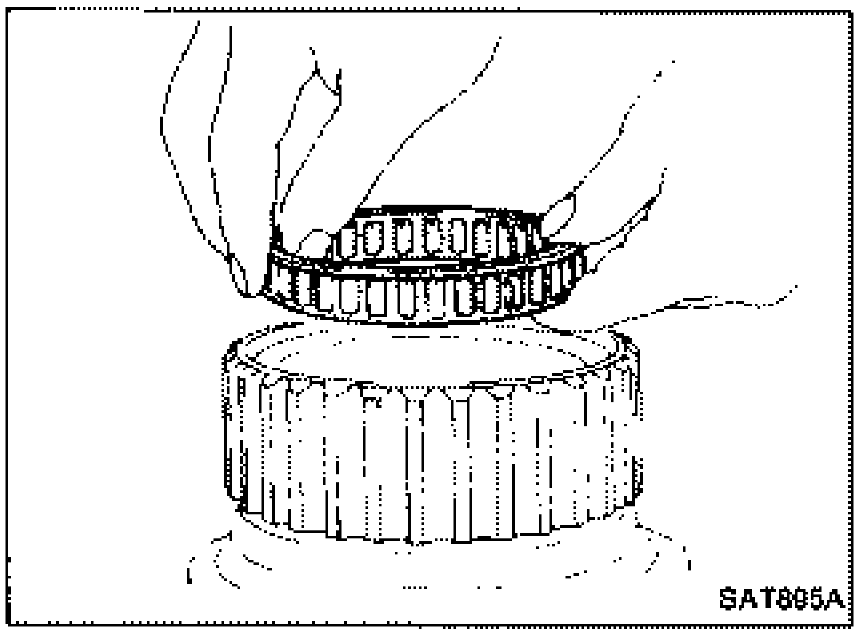
2. Install snap ring onto forward clutch drum.

Forward Clutch Drum Assembly — RE4R03A (Cont'd)



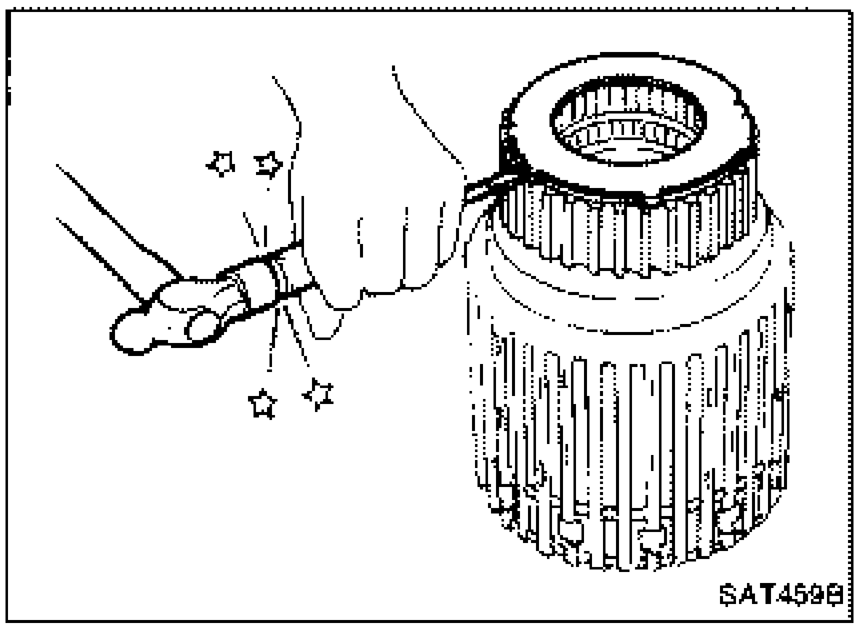
SAT450B

3. Install low one-way clutch onto forward clutch drum by pushing the roller in evenly.



SAT895A

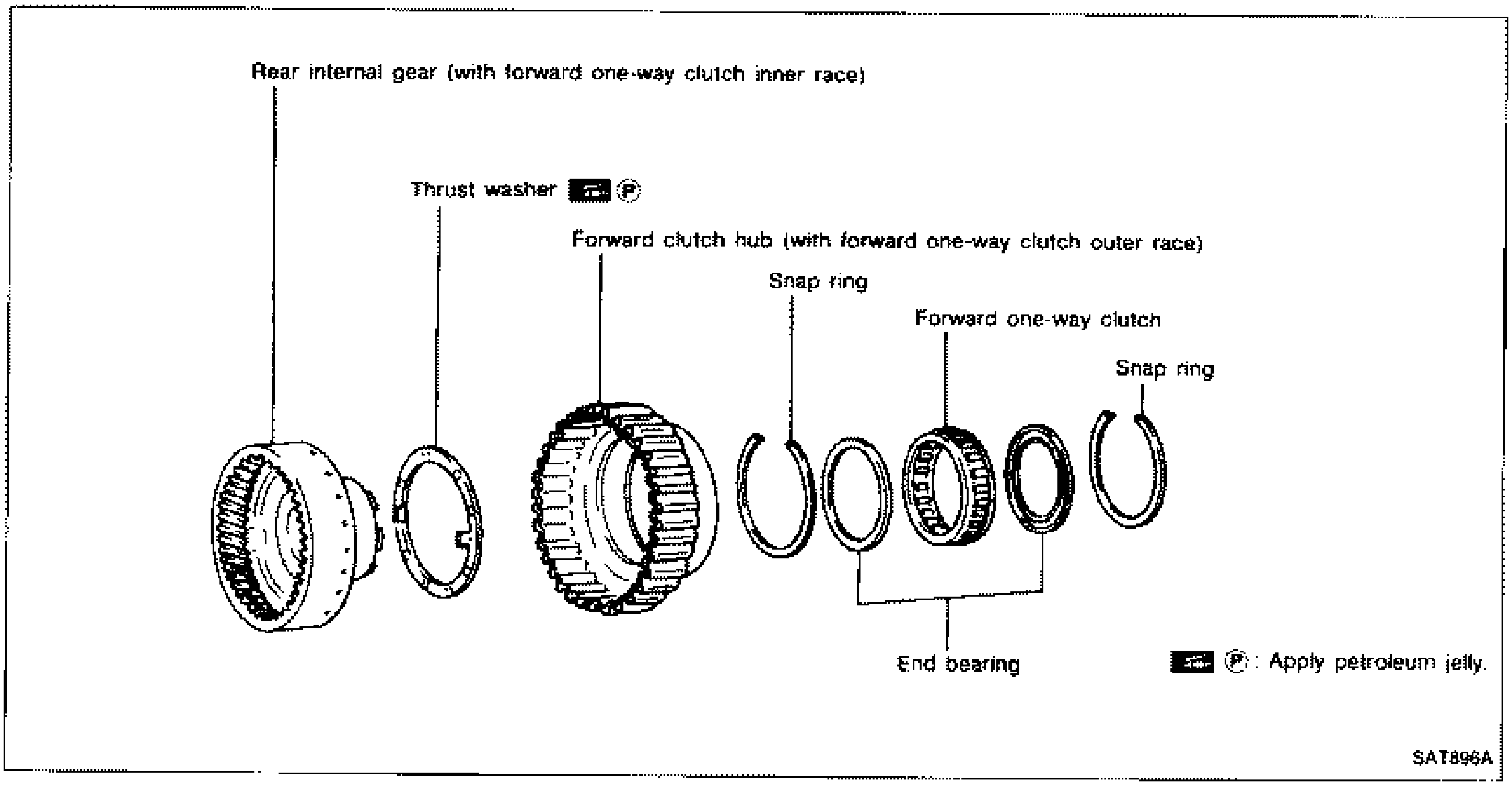
- **Install low one-way clutch with flange facing rearward.**

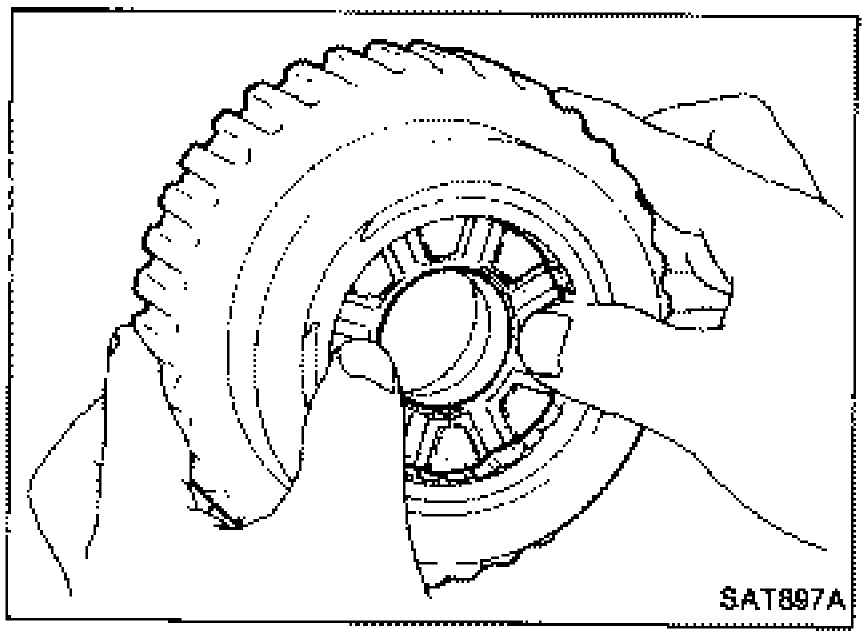


SAT459B

4. Install side plate onto forward clutch drum.

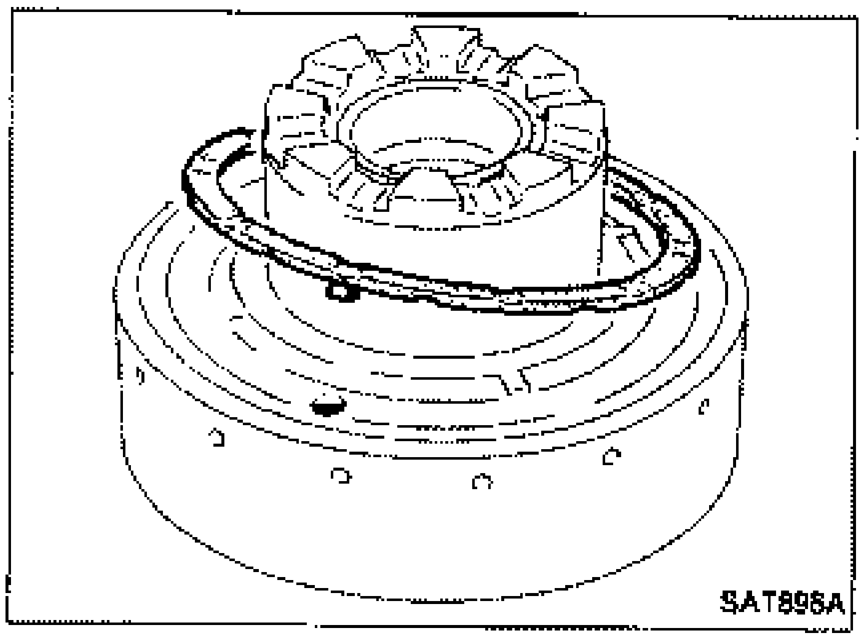
Rear Internal Gear and Forward Clutch Hub



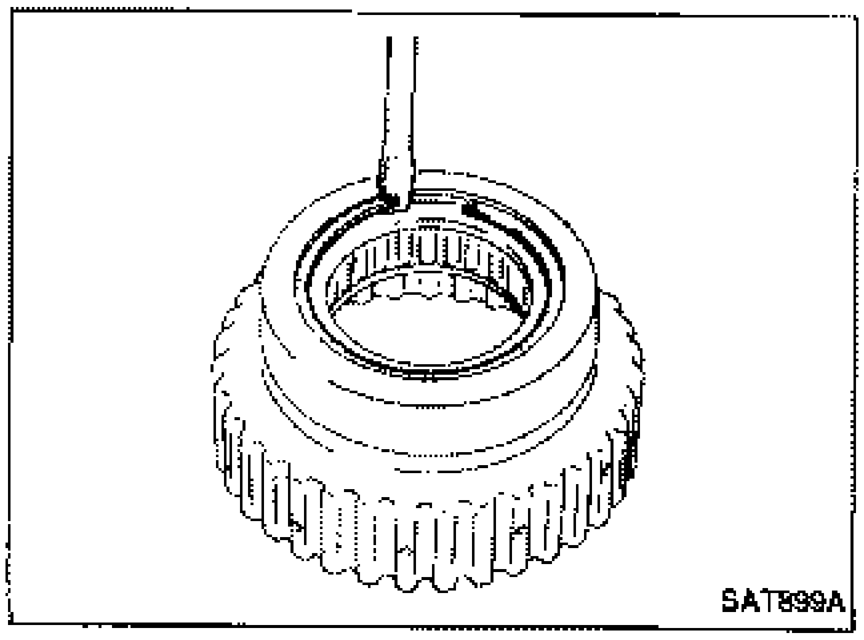


DISASSEMBLY

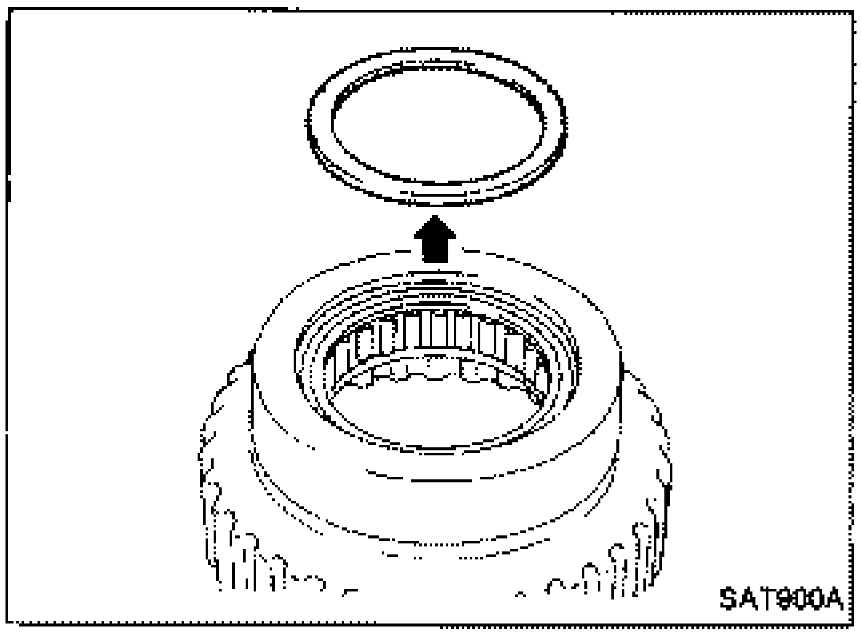
1. Remove rear internal gear by pushing forward clutch hub forward.



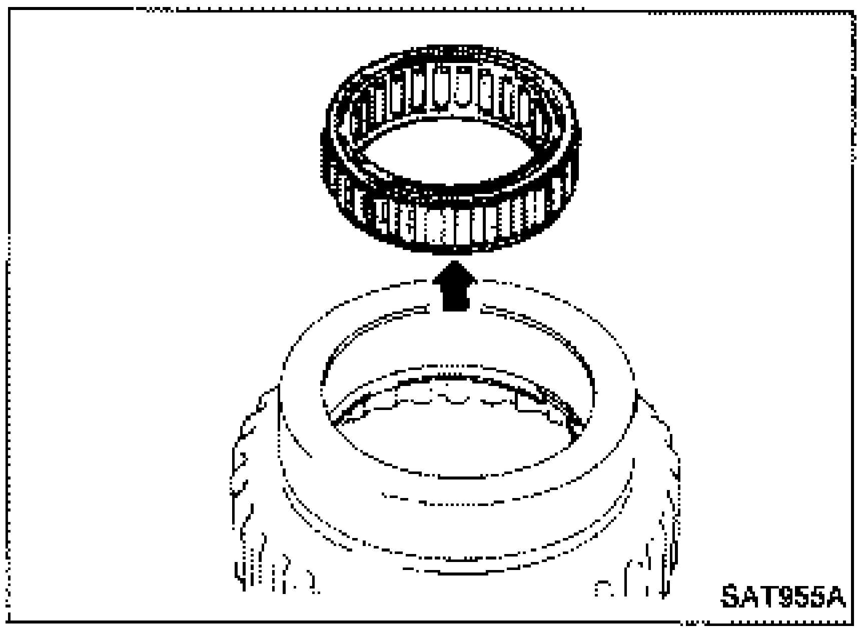
2. Remove thrust washer from rear internal gear.



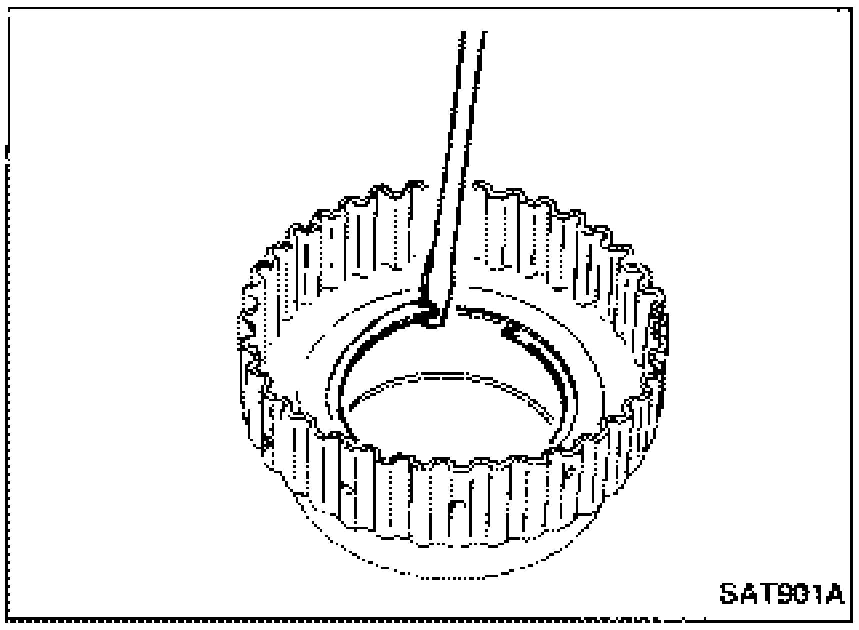
3. Remove snap ring from forward clutch hub.



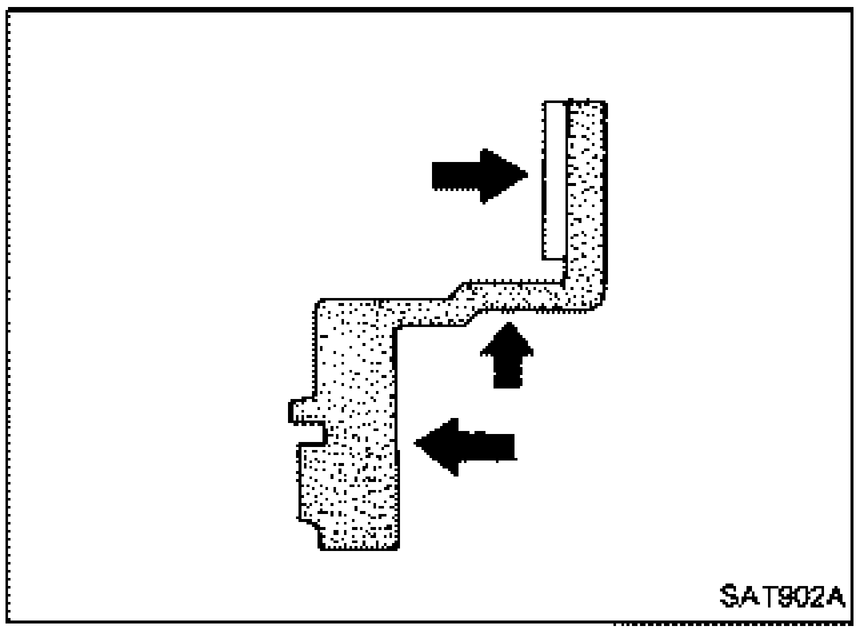
4. Remove end bearing.



5. Remove forward one-way clutch and end bearing as a unit from forward clutch hub.



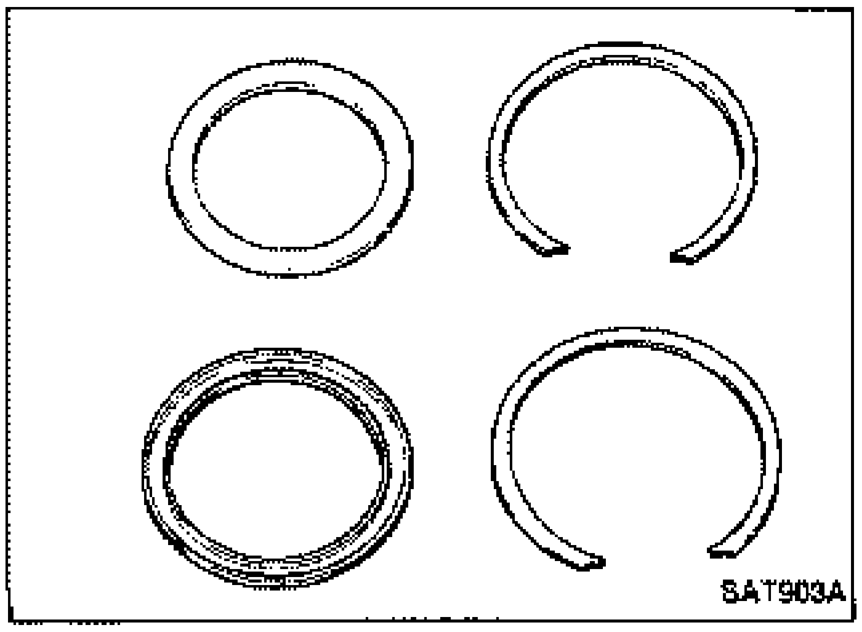
6. Remove snap ring from forward clutch hub.



INSPECTION

Rear internal gear and forward clutch hub

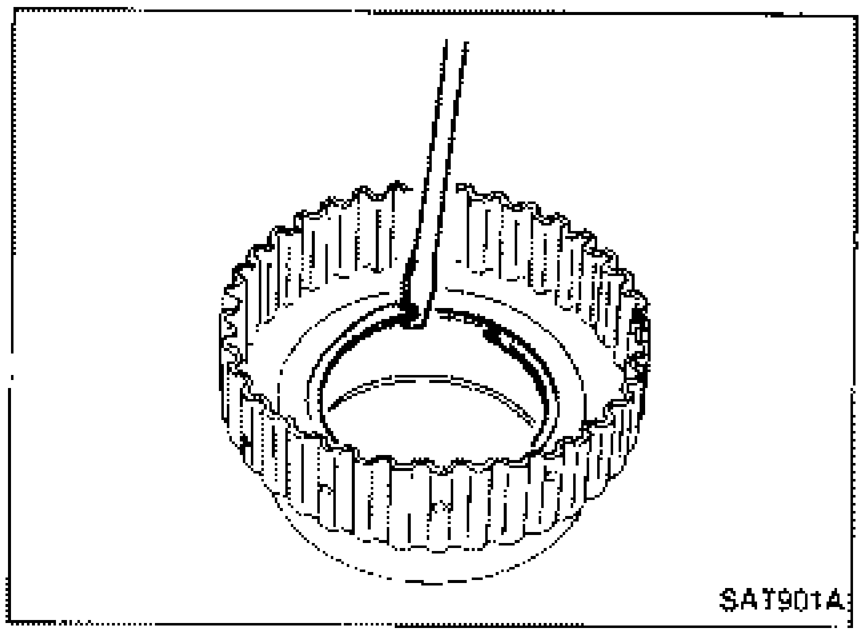
- Check gear for excessive wear, chips or cracks.
- Check frictional surfaces of forward one-way clutch and thrust washer for wear or damage.
- Check spline for wear or damage.



Snap ring and end bearing

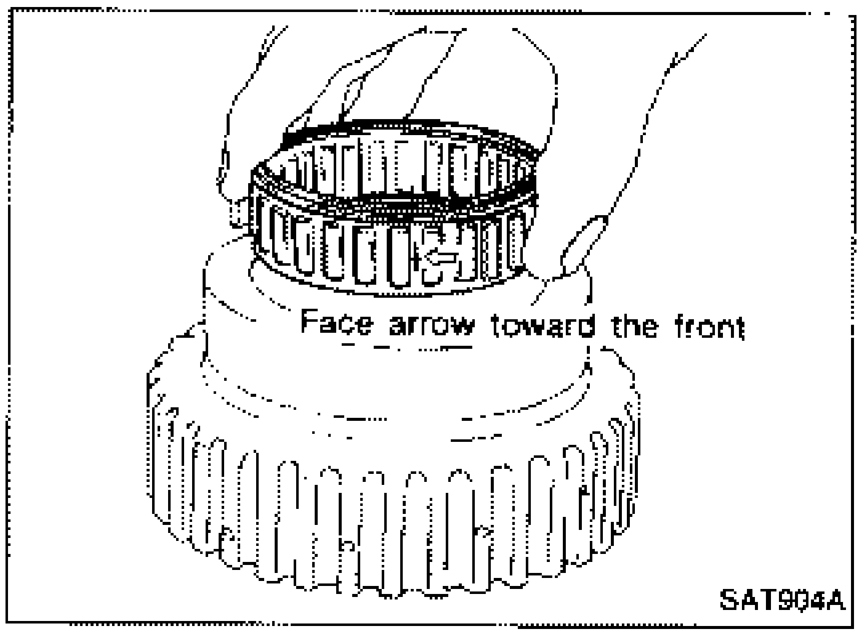
- Check for deformation or damage.

Rear Internal Gear and Forward Clutch Hub (Cont'd)



ASSEMBLY

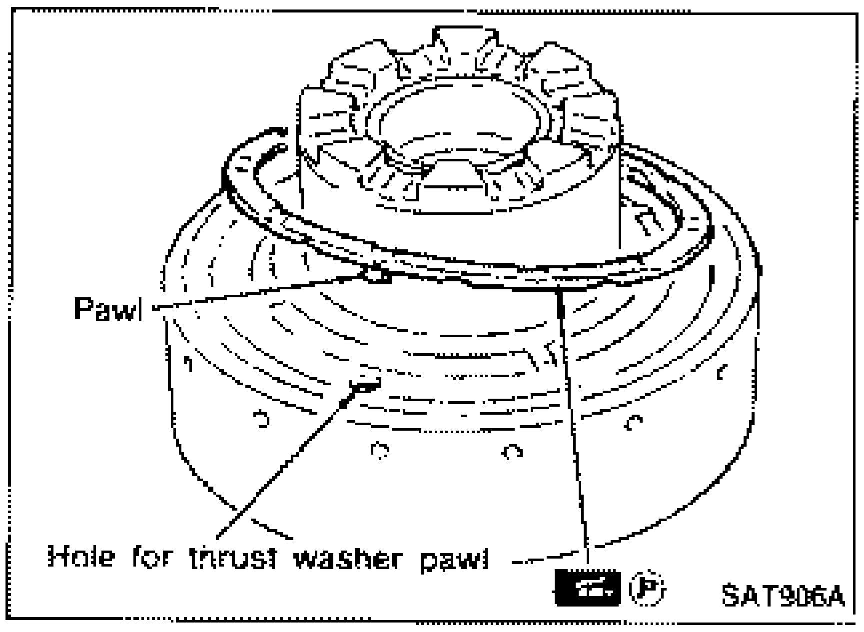
1. Install snap ring onto forward clutch hub.
2. Install end bearing.



3. Install forward one-way clutch onto clutch hub.

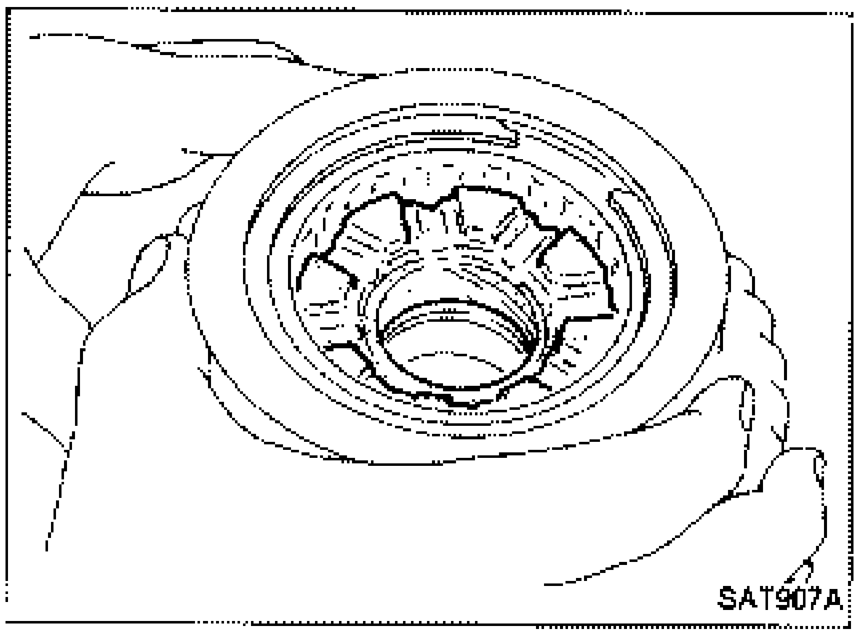
- **Install forward one-way clutch with flange facing rearward.**

4. Install end bearing.
5. Install snap ring onto forward clutch hub.

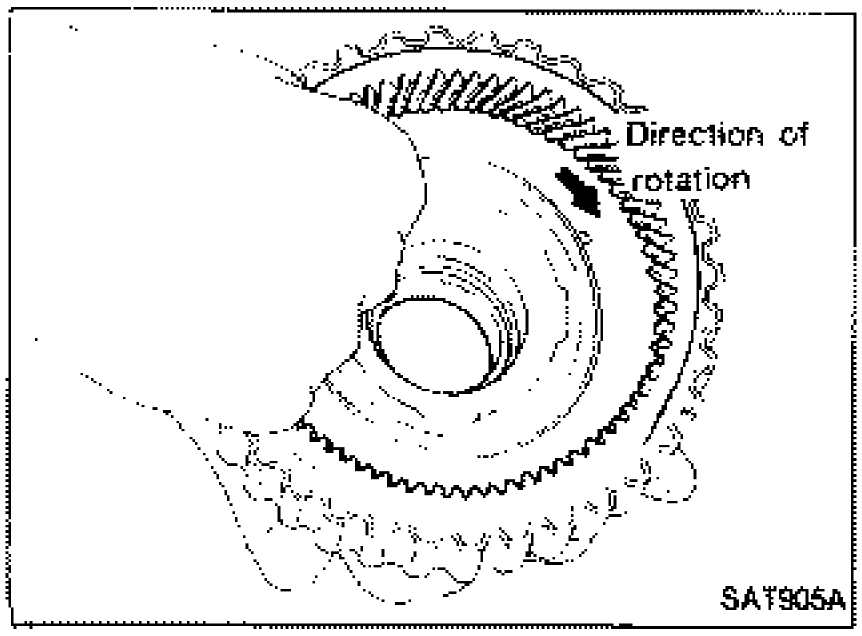


6. Install thrust washer onto rear internal gear.

- **Apply petroleum jelly to thrust washer.**
- **Securely insert pawls of thrust washer into holes in rear internal gear.**

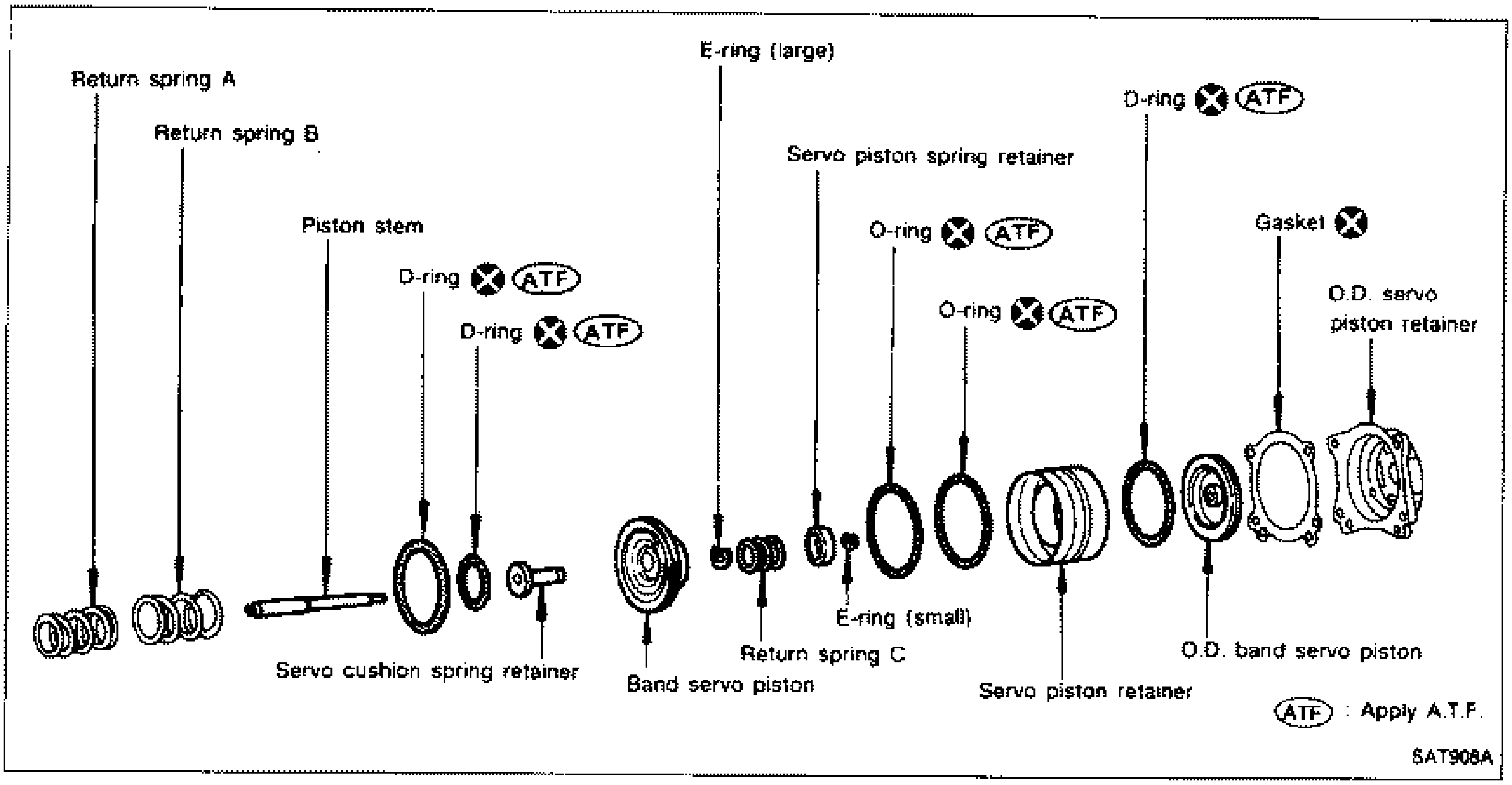


7. Position forward clutch hub in rear internal gear.

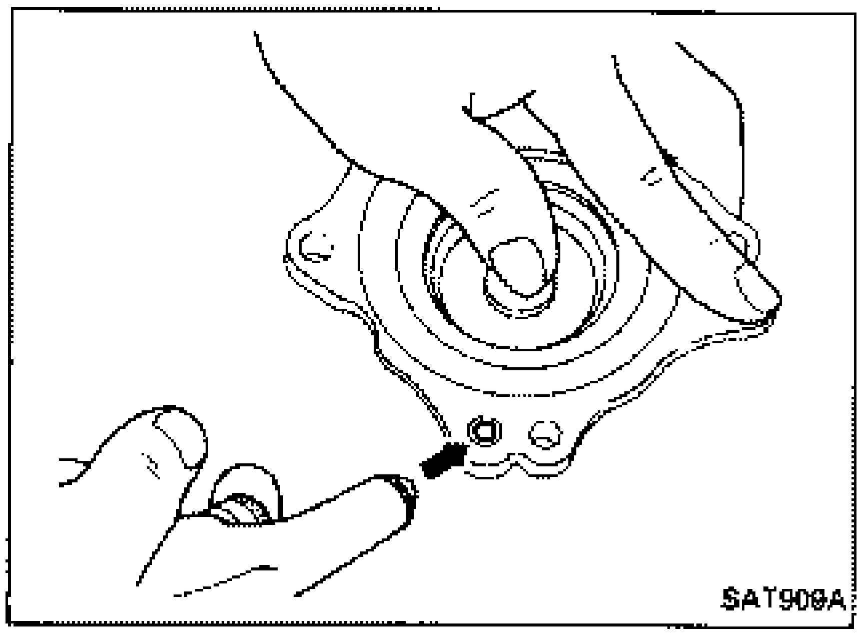


8. After installing, check to assure that forward clutch hub rotates clockwise.

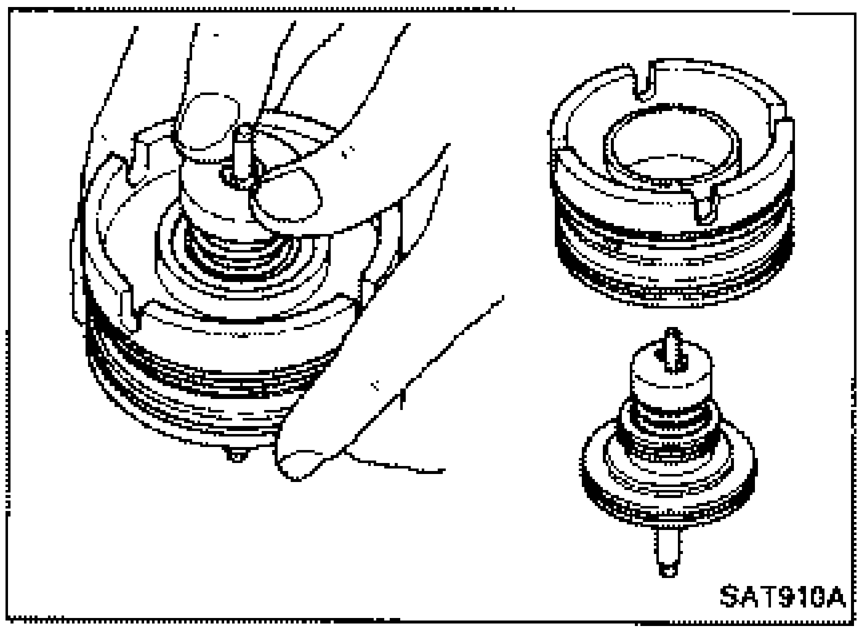
Band Servo Piston Assembly



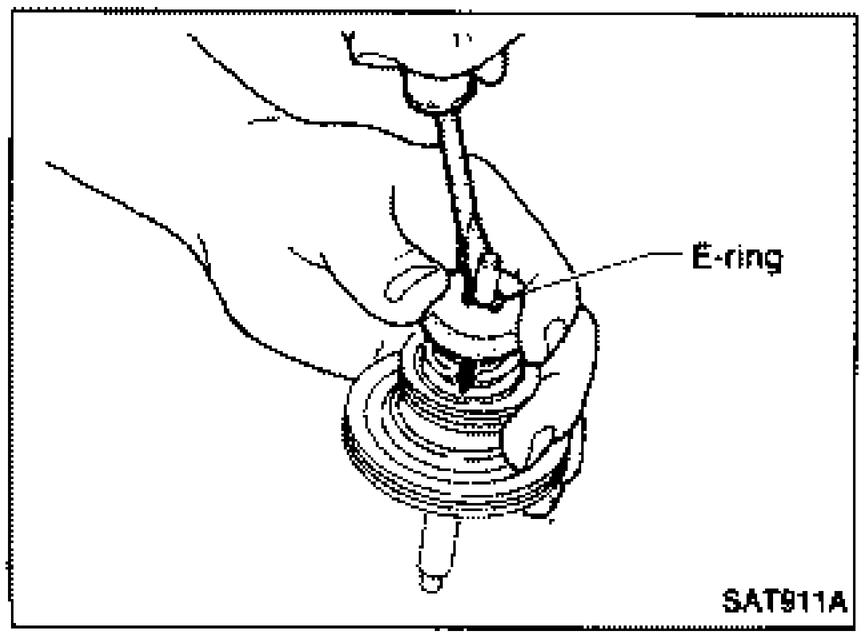
DISASSEMBLY



1. Block one oil hole in O.D. servo piston retainer and the center hole in O.D. band servo piston.
2. Apply compressed air to the other oil hole in piston retainer to remove O.D. band servo piston from retainer.
3. Remove D-ring from O.D. band servo piston.

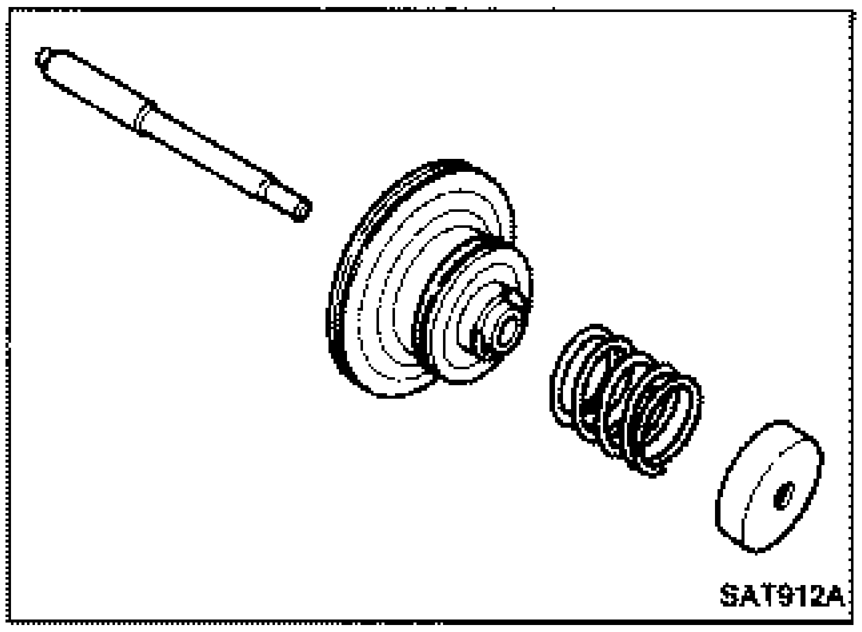


4. Remove band servo piston assembly from servo piston retainer by pushing it forward.

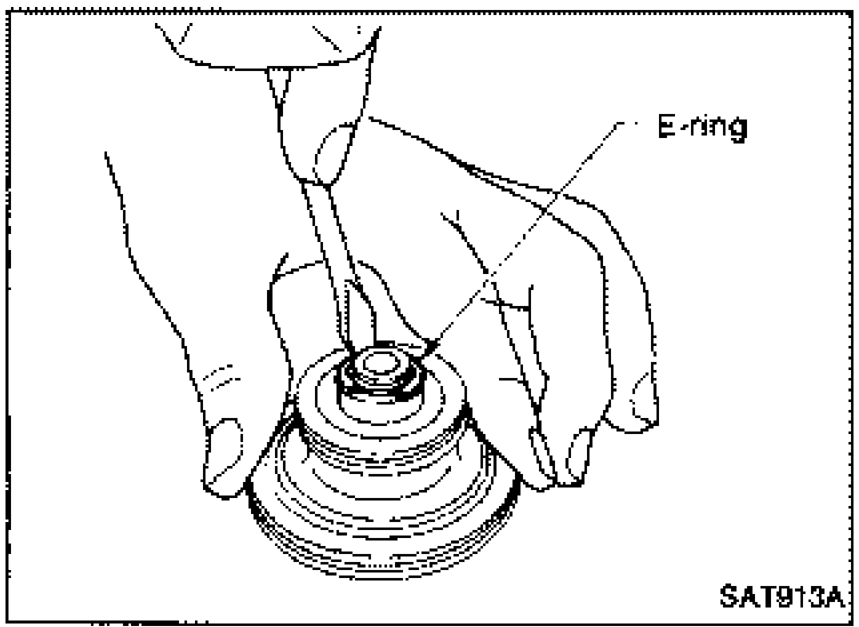


5. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, remove E-ring.

Band Servo Piston Assembly (Cont'd)

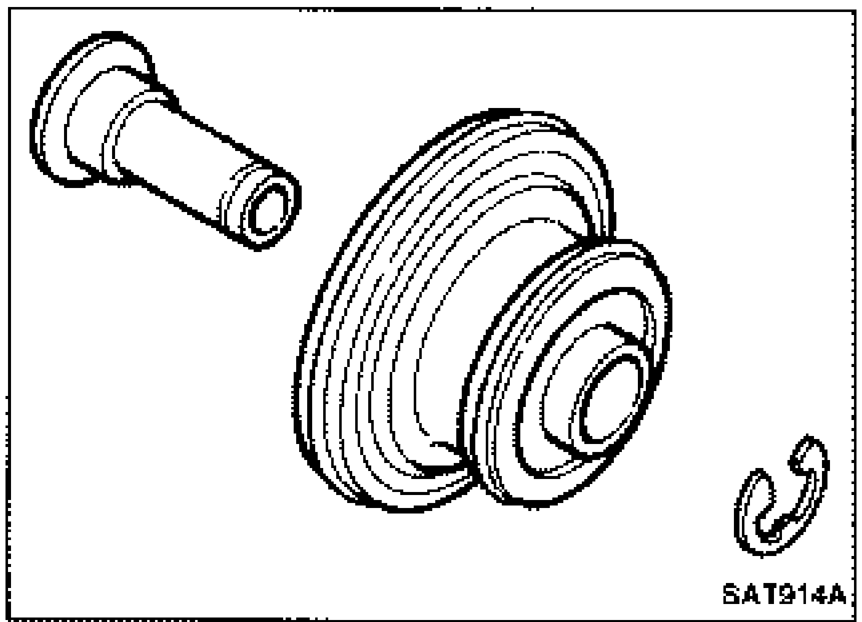

SAT912A

6. Remove servo piston spring retainer, return spring C and piston stem from band servo piston.

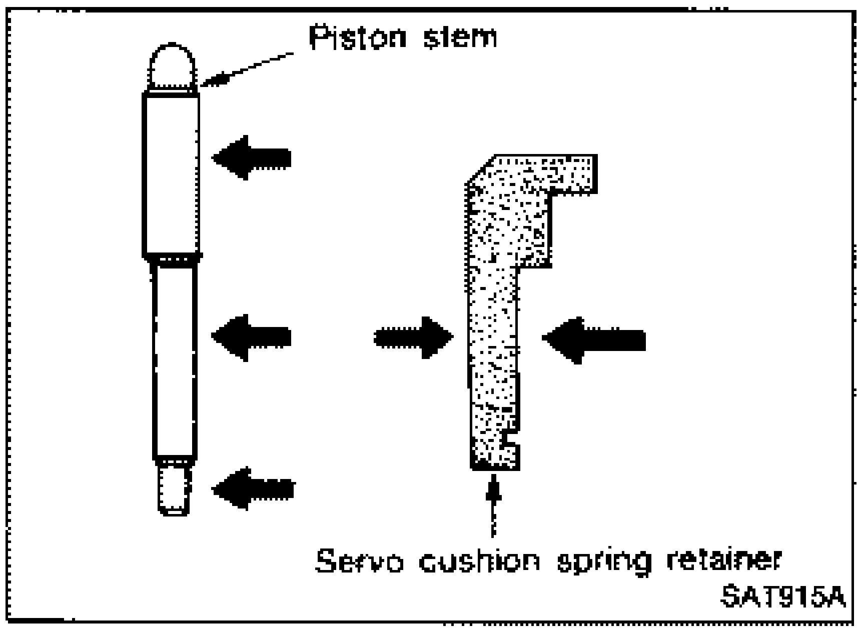


SAT913A

7. Remove E-ring from band servo piston.


SAT914A

8. Remove servo cushion spring retainer from band servo piston.
9. Remove D-rings from band servo piston.
10. Remove O-rings from servo piston retainer.

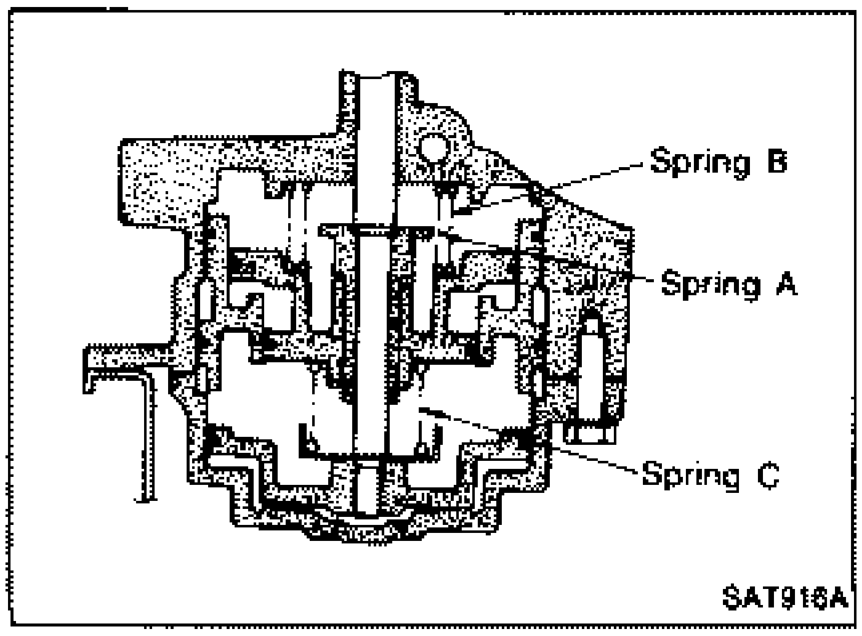


SAT915A

INSPECTION

Pistons, retainers and piston stem

- Check frictional surfaces for abnormal wear or damage.



SAT916A

Return springs

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

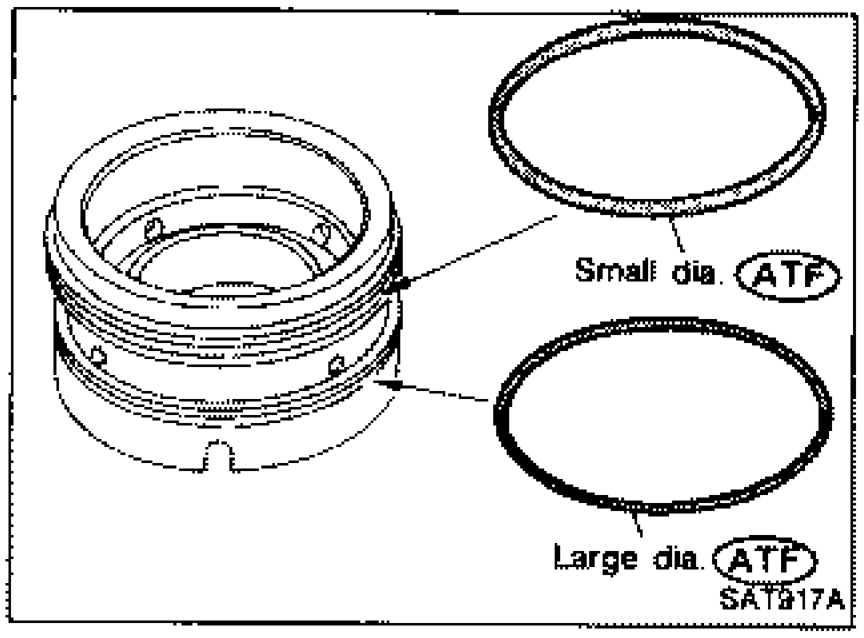
Inspection standard:

Unit: mm (in)

Parts	Free length	Outer diameter
Spring A	45.6 (1.795)	34.3 (1.350)
Spring B	53.8 (2.118)	40.3 (1.587)
Spring C	29.7 (1.169)	27.6 (1.087)

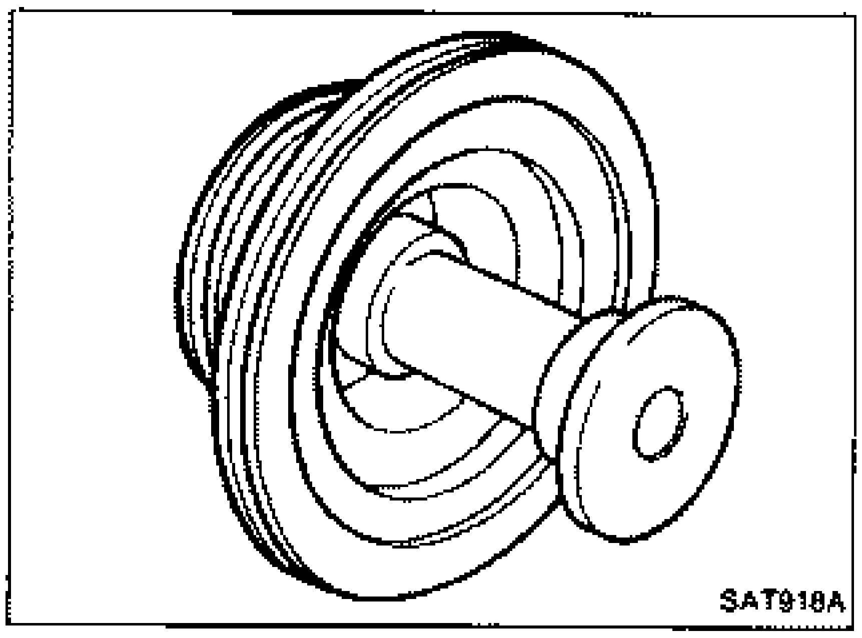
Band Servo Piston Assembly (Cont'd)

ASSEMBLY

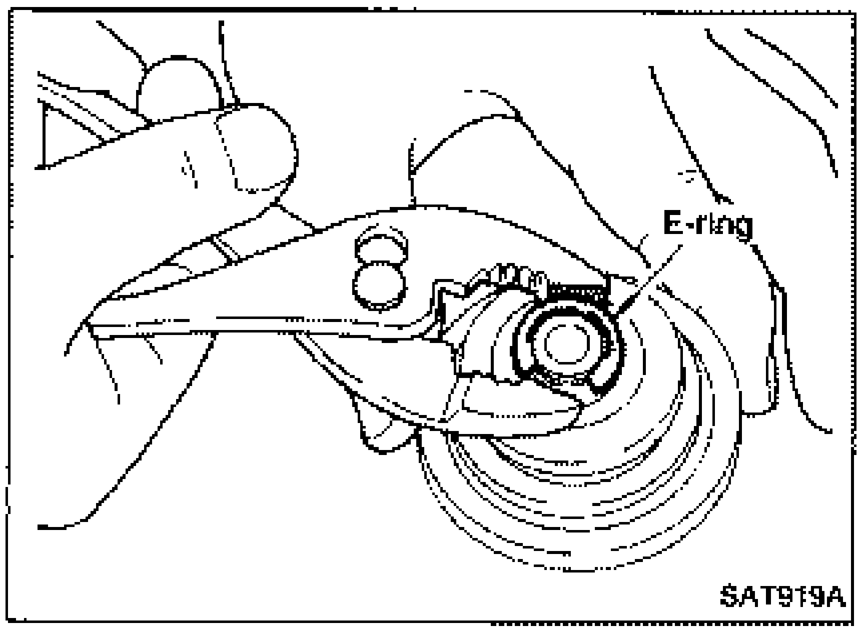


1. Install O-rings onto servo piston retainer.

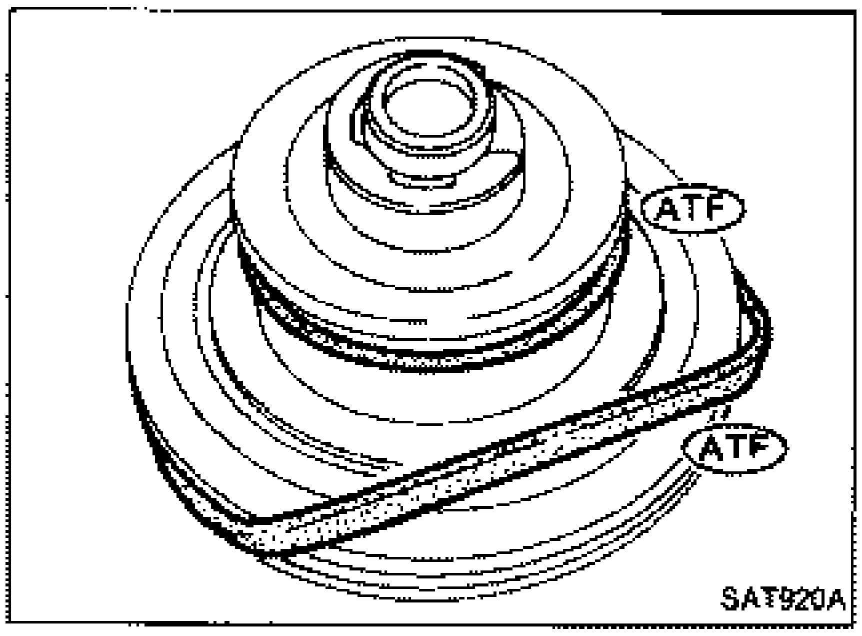
- **Apply A.T.F. to O-rings.**
- **Pay attention to position of each O-ring.**



2. Install servo cushion spring retainer onto band servo piston.

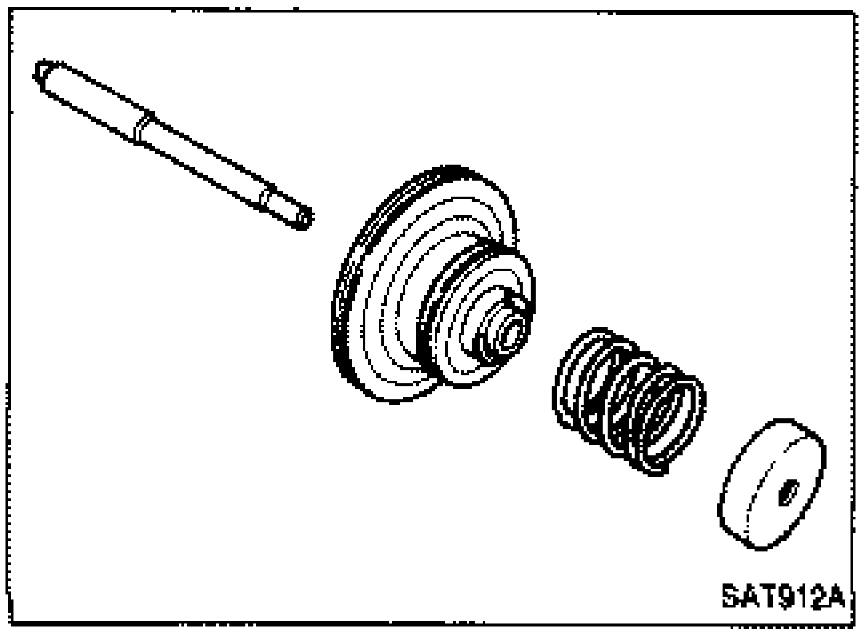


3. Install E-ring onto servo cushion spring retainer.



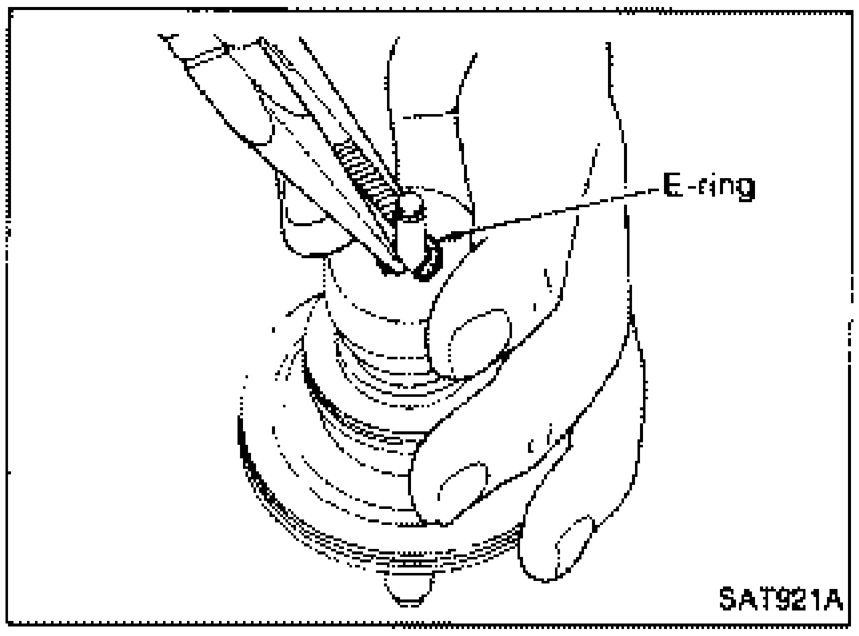
4. Install D-rings onto band servo piston.

- **Apply A.T.F. to D-rings.**

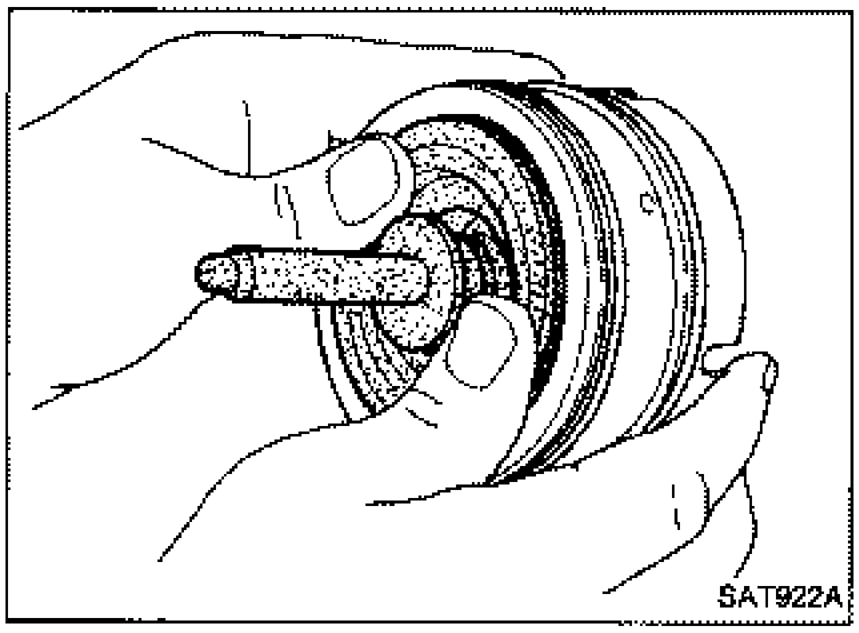


5. Install servo piston spring retainer, return spring C and piston stem onto band servo piston.

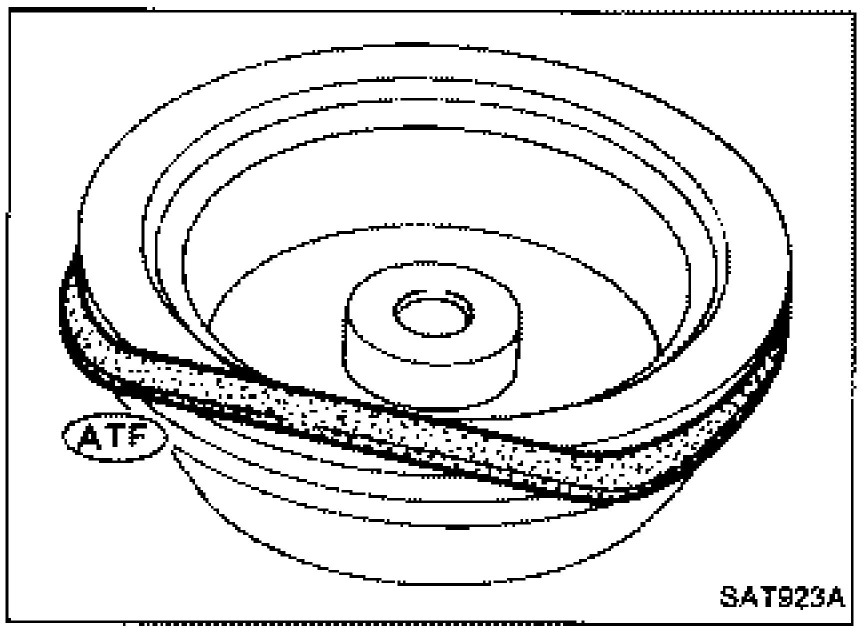
Band Servo Piston Assembly (Cont'd)



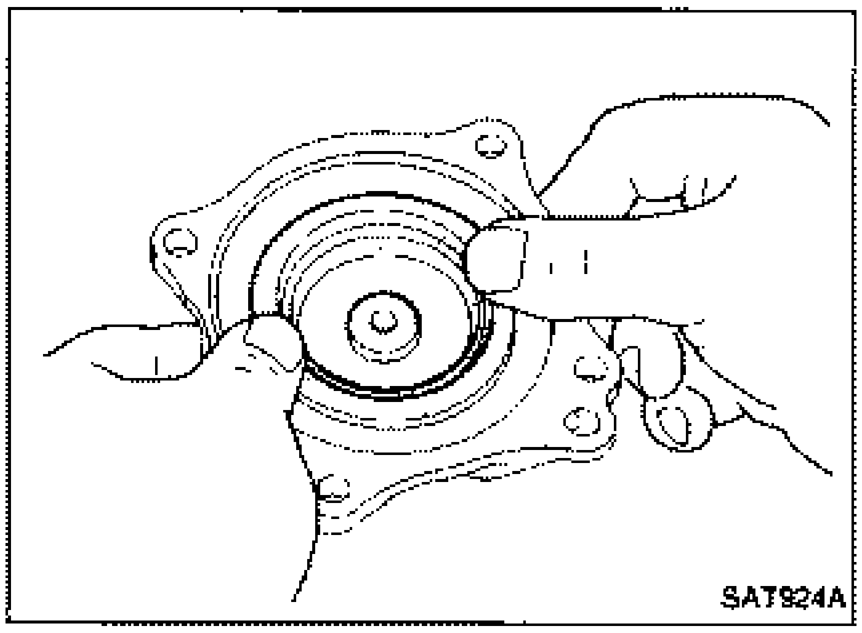
6. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, install E-ring.



7. Install band servo piston assembly onto servo piston retainer by pushing it inward.

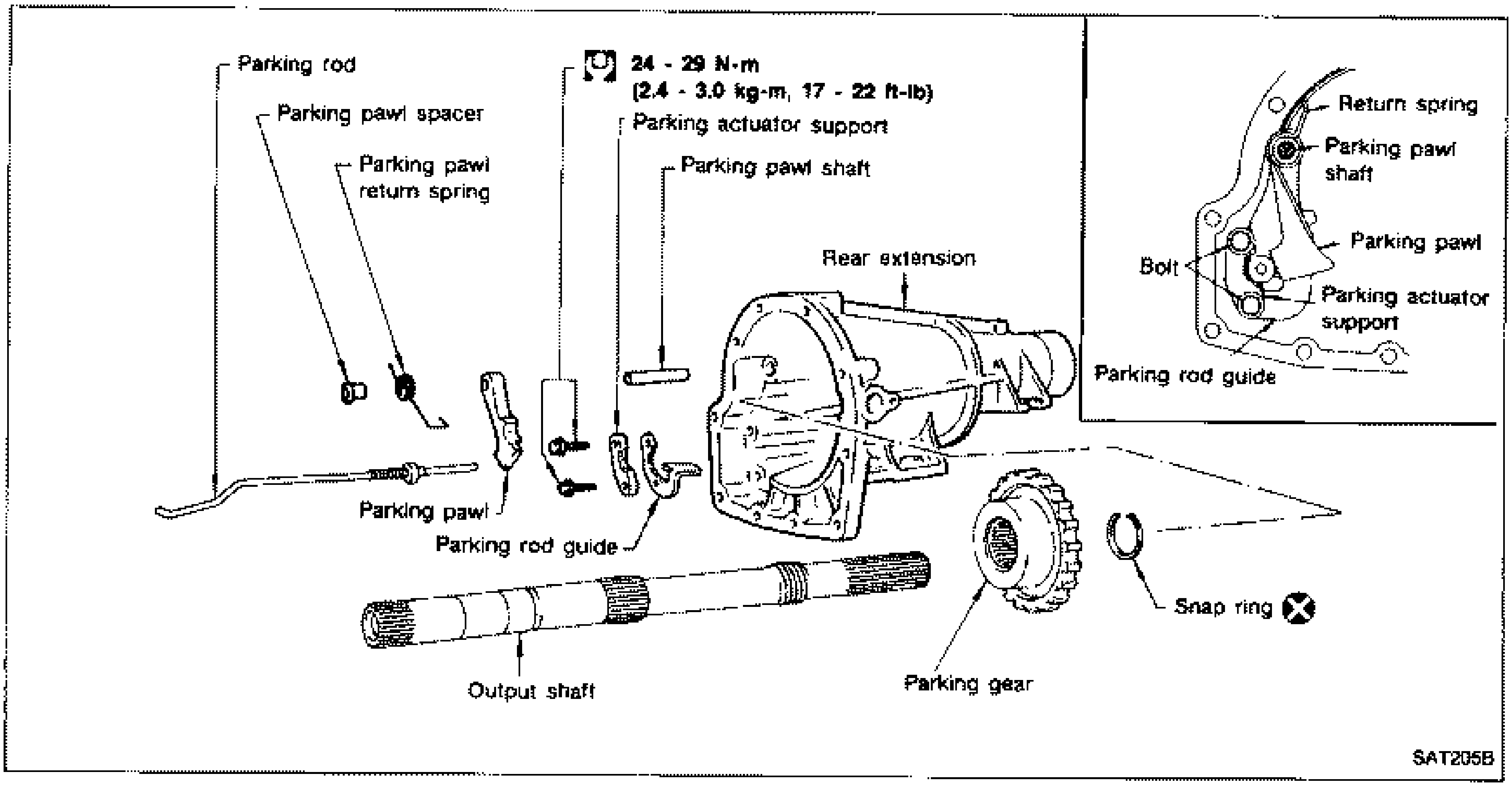


8. Install D-ring on O.D. band servo piston.
- **Apply A.T.F. to D-ring.**

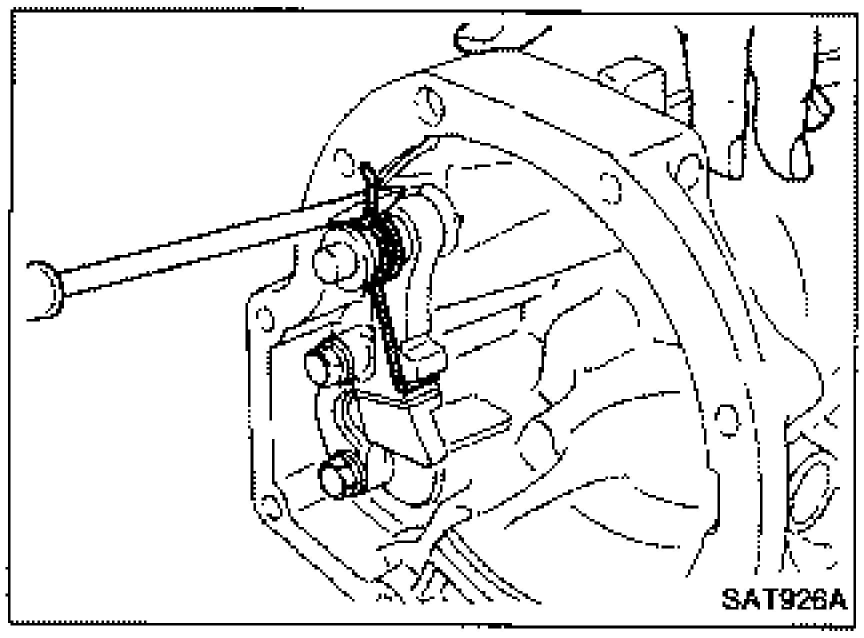


9. Install O.D. band servo piston onto servo piston retainer by pushing it inward.

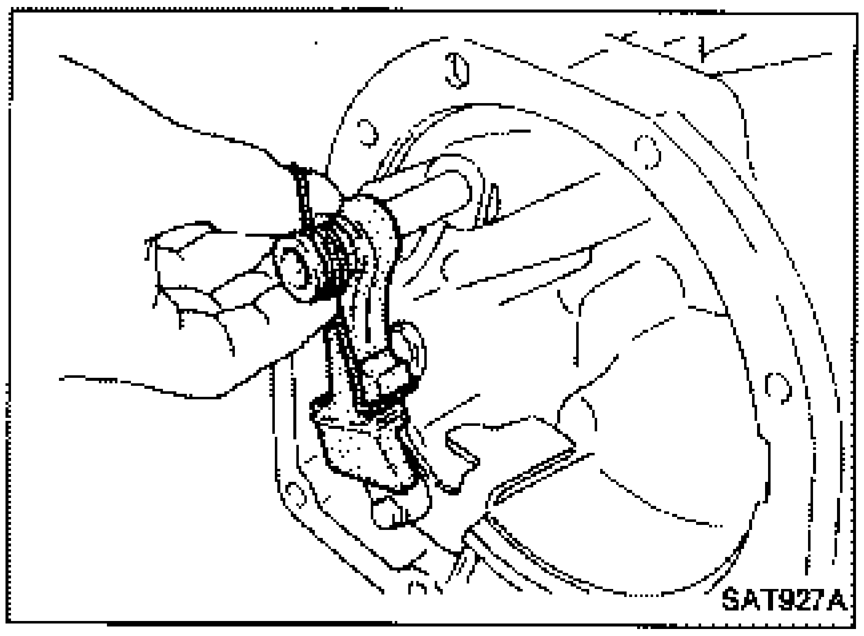
Parking Pawl Components



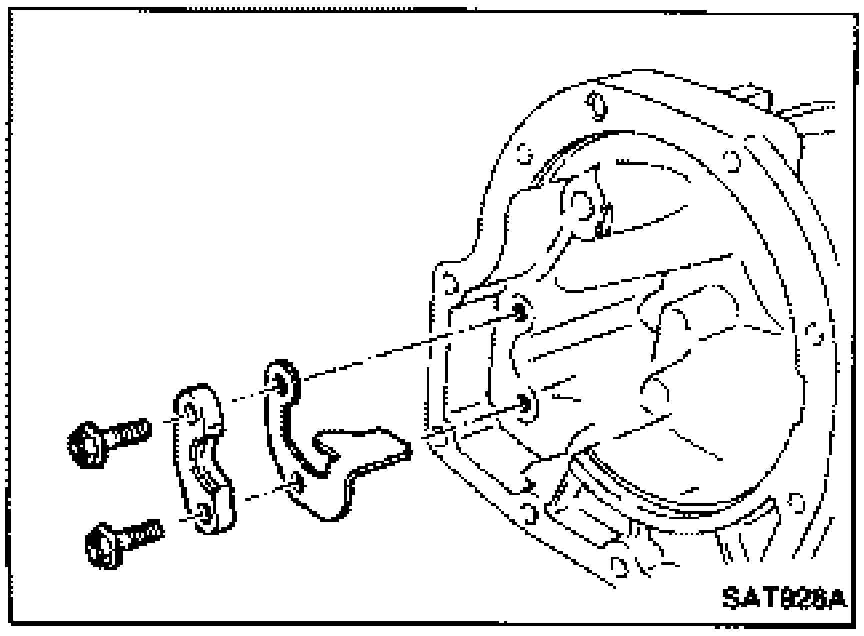
DISASSEMBLY



1. Slide return spring to the front of rear extension flange.



2. Remove return spring, pawl spacer and parking pawl from rear extension.
3. Remove parking pawl shaft from rear extension.



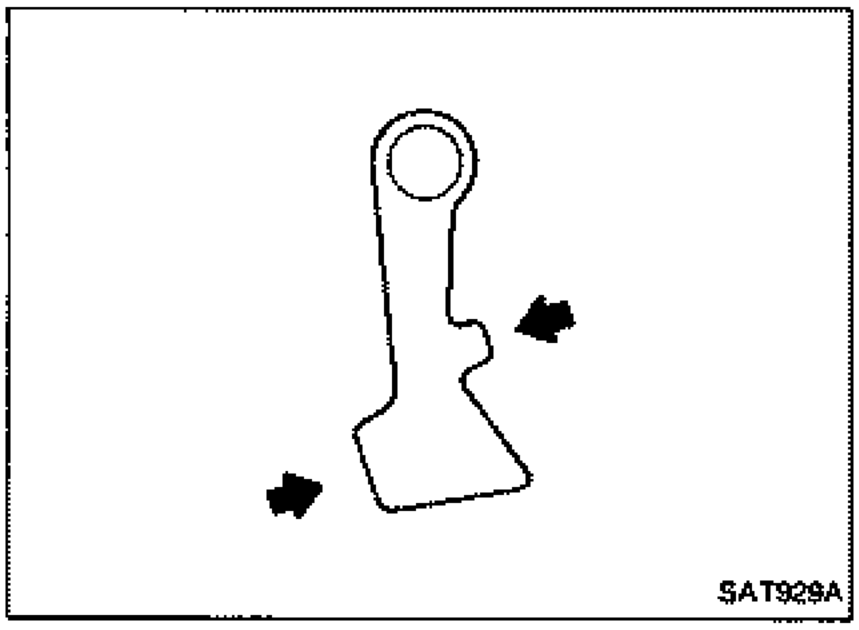
4. Remove parking actuator support and rod guide from rear extension.

Parking Pawl Components (Cont'd)

INSPECTION

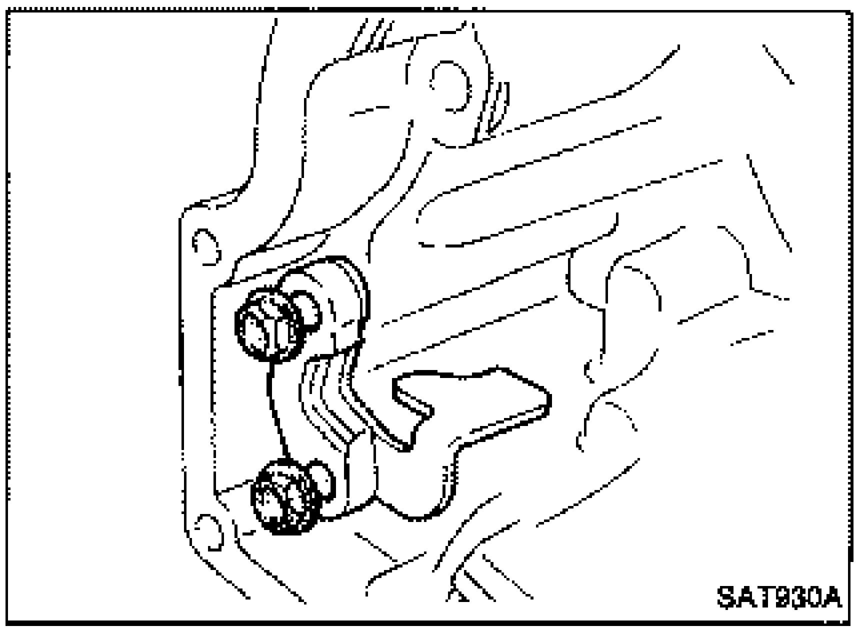
Parking pawl and parking actuator support

- Check contact surface of parking rod for wear.

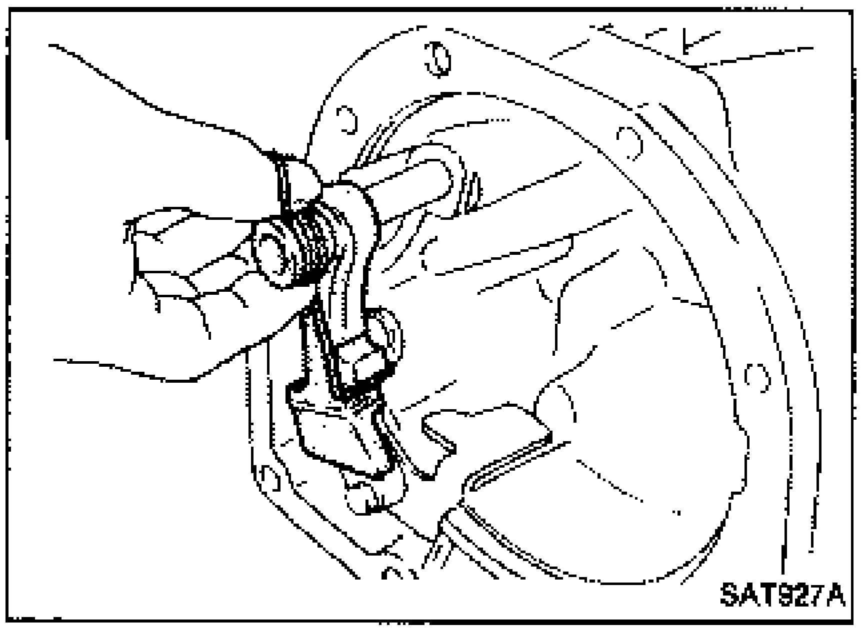


ASSEMBLY

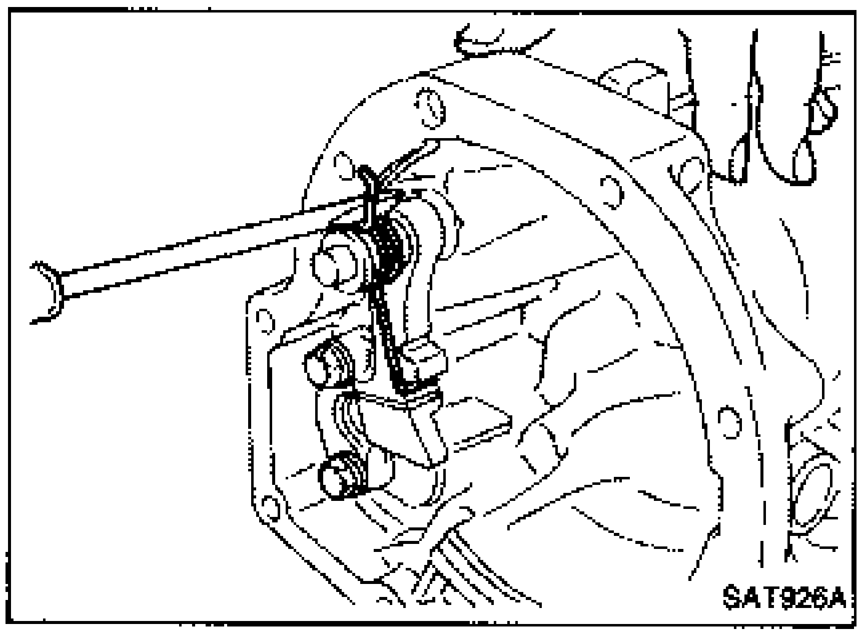
1. Install rod guide and parking actuator support onto rear extension.
2. Insert parking pawl shaft into rear extension.

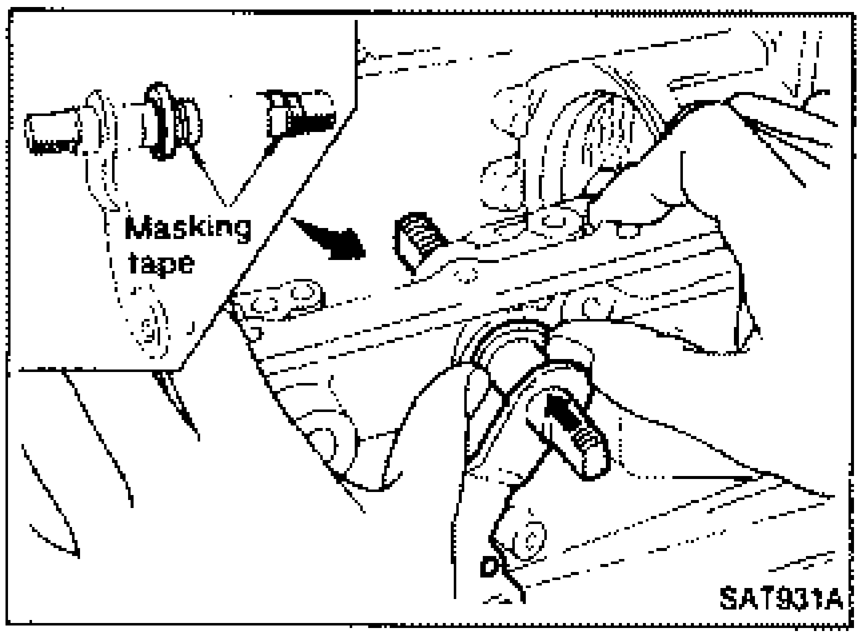


3. Install return spring, pawl spacer and parking pawl onto parking pawl shaft.



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



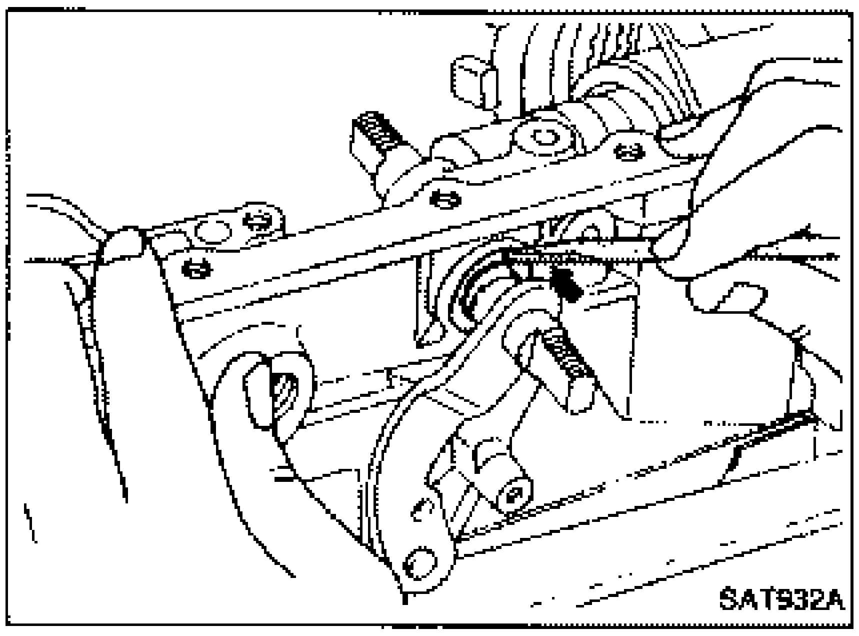


Assembly

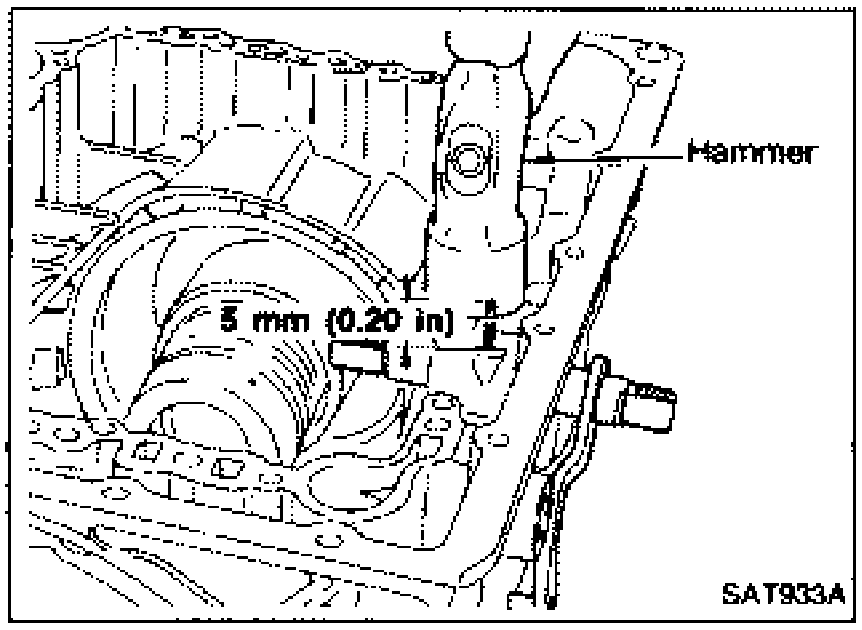
1. Install manual shaft components.
a. Install oil seal onto manual shaft.

- **Apply A.T.F. to oil seal.**
- **Wrap threads of manual shaft with masking tape.**

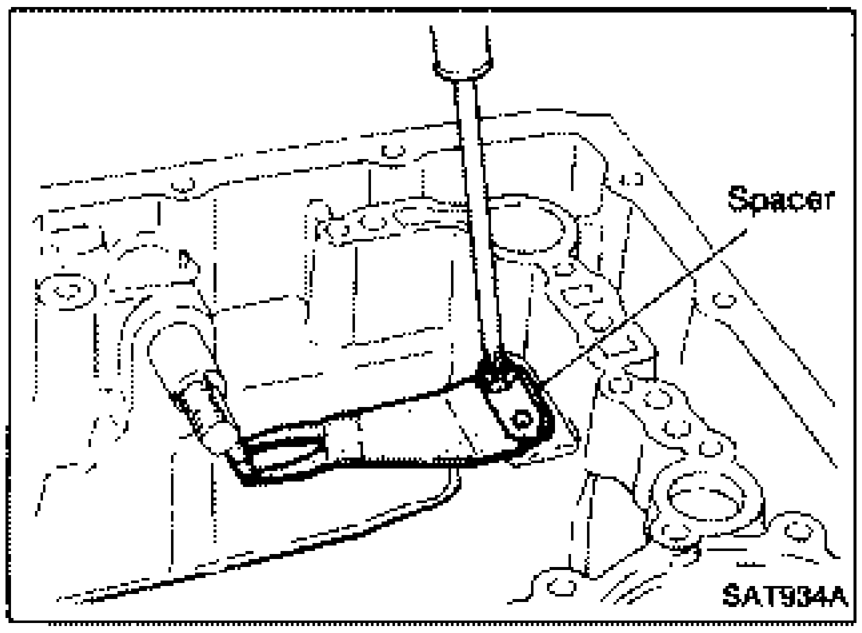
b. Insert manual shaft and oil seal as a unit into transmission case.
c. Remove masking tape.



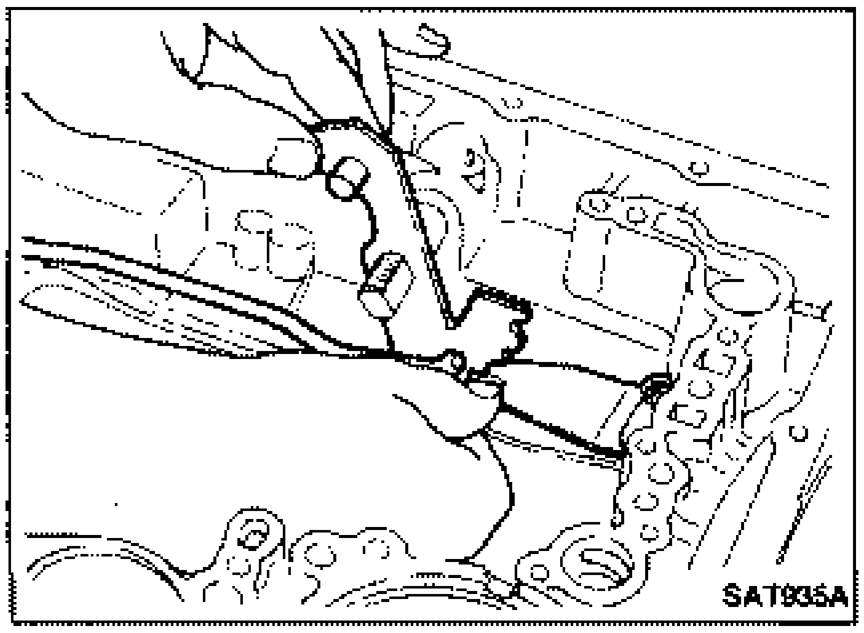
d. Push oil seal evenly and install it onto transmission case.



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

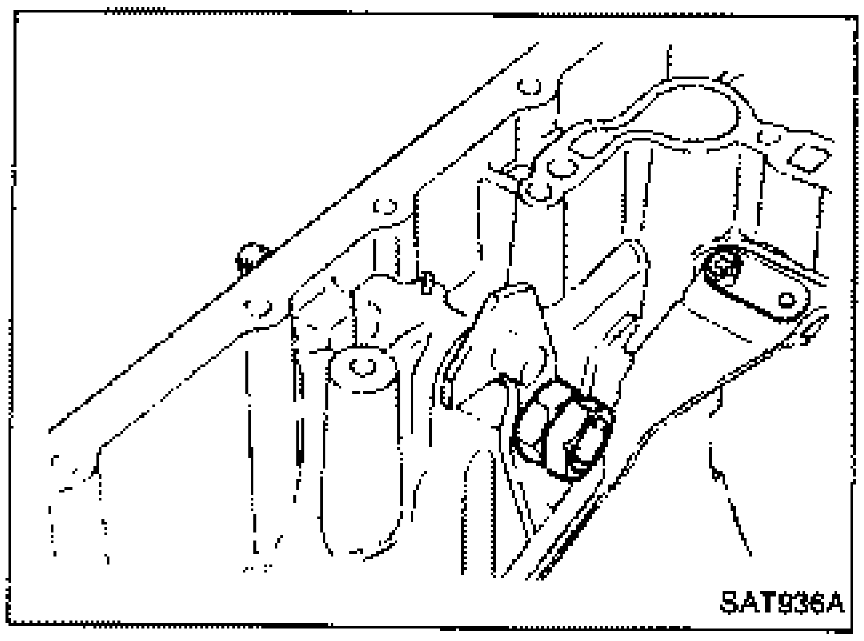


f. Install detent spring and spacer.

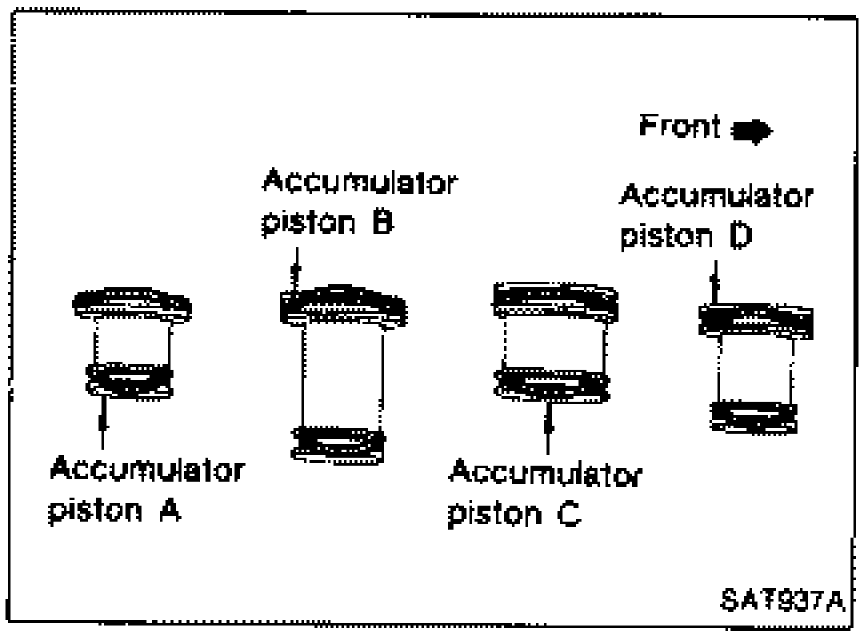


g. While pushing detent spring down, install manual plate onto manual shaft.

Assembly (Cont'd)


SAT936A

h. Install lock nuts onto manual shaft.

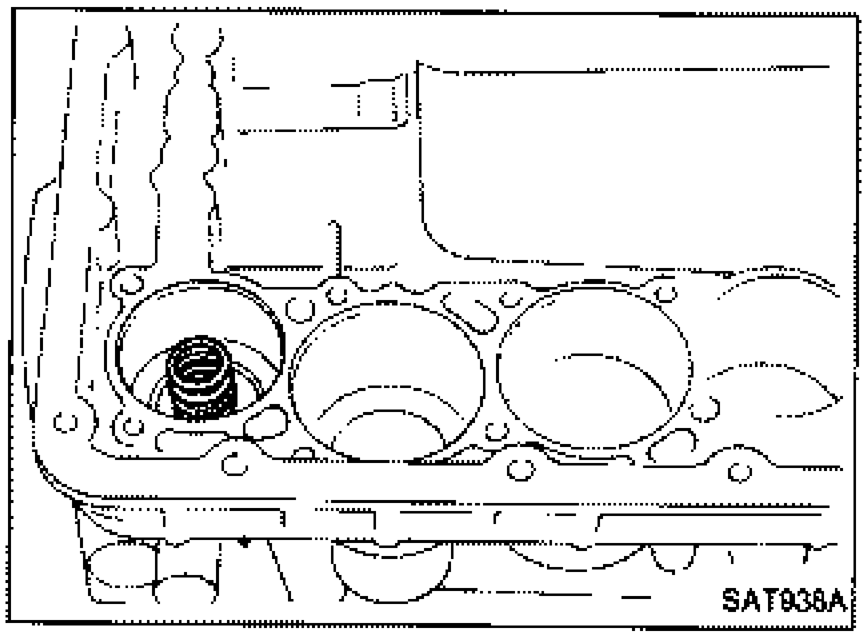


SAT937A

2. Install accumulator piston.
a. Install O-rings onto accumulator piston.
- **Apply A.T.F. to O-rings.**

Accumulator piston O-rings: Unit: mm (in)

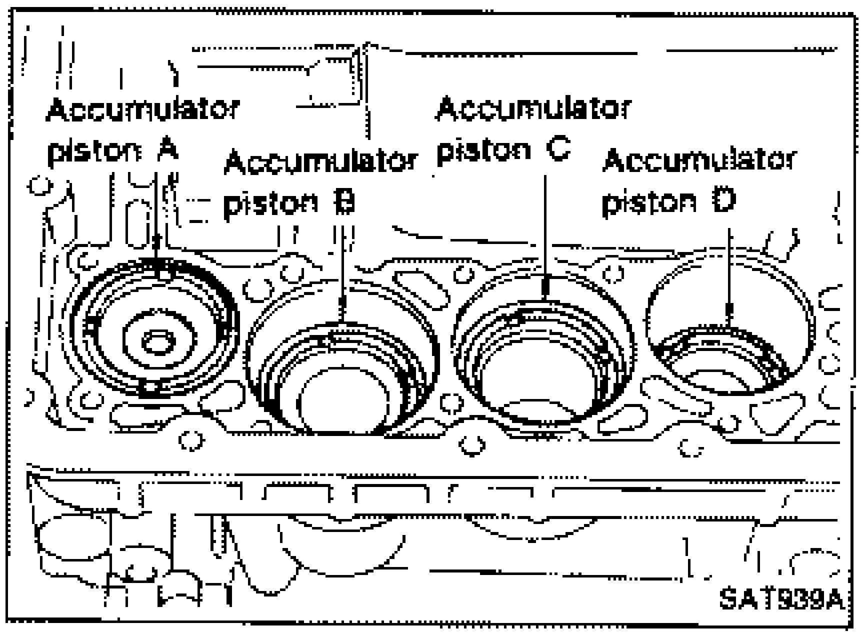
Accumulator	A	B	C	D
Small diameter end	29 (1.14)	32 (1.26)	45 (1.77)	29 (1.14)
Large diameter end	45 (1.77)	50 (1.97)	50 (1.97)	45 (1.77)


SAT938A

b. Install return spring for accumutator A onto transmission case.

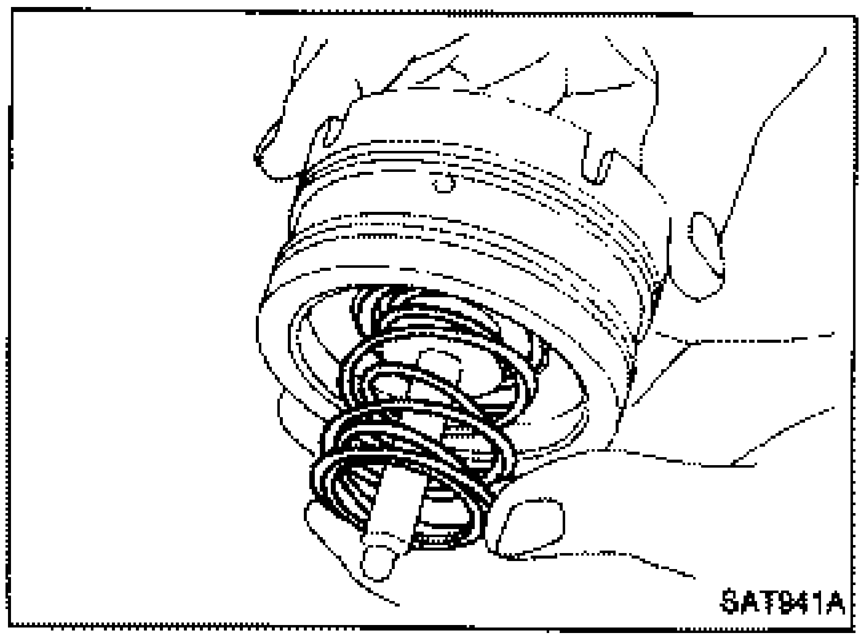
Free length of return spring: Unit: mm (in)

Accumulator	A
Free length	43 (1.69)



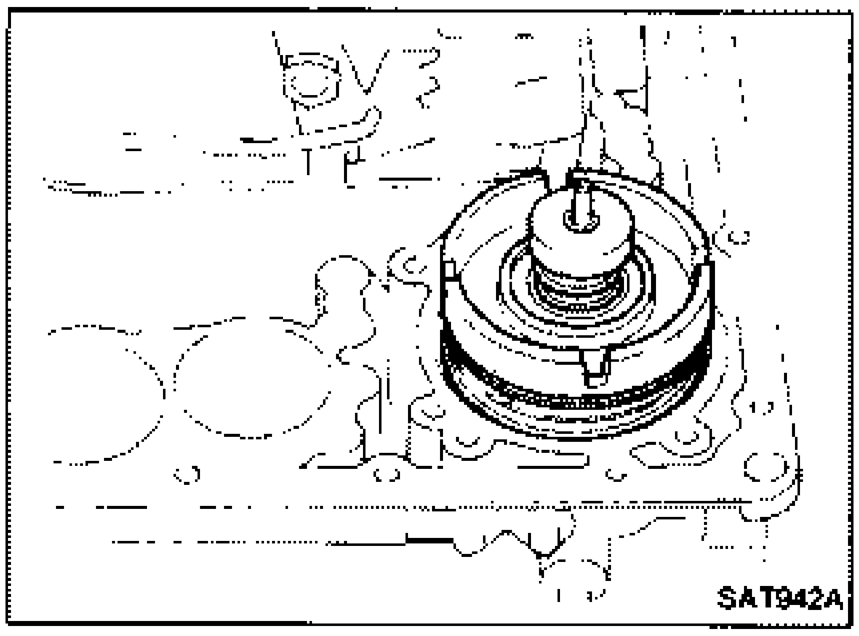
SAT939A

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


SAT941A

3. Install band servo piston.
a. Install return springs onto servo piston.

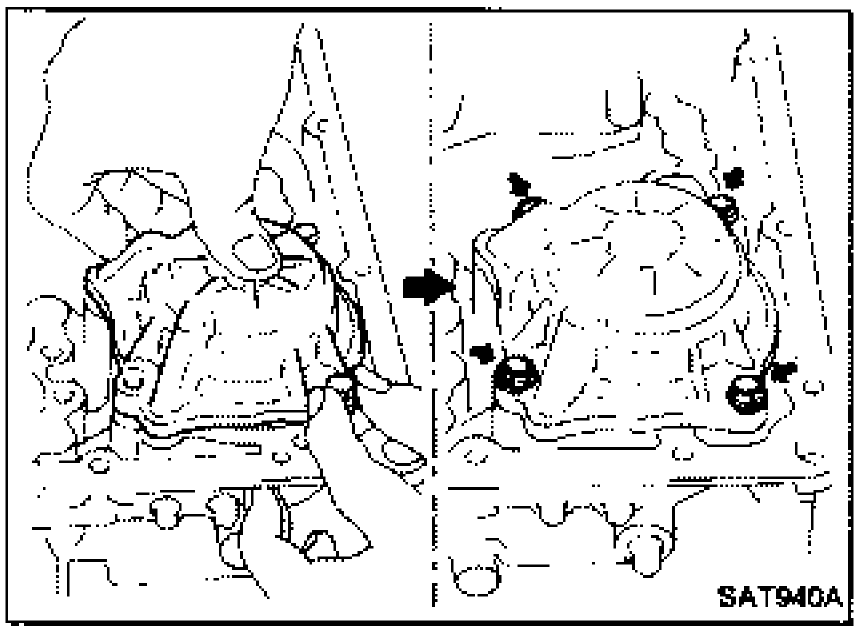
Assembly (Cont'd)



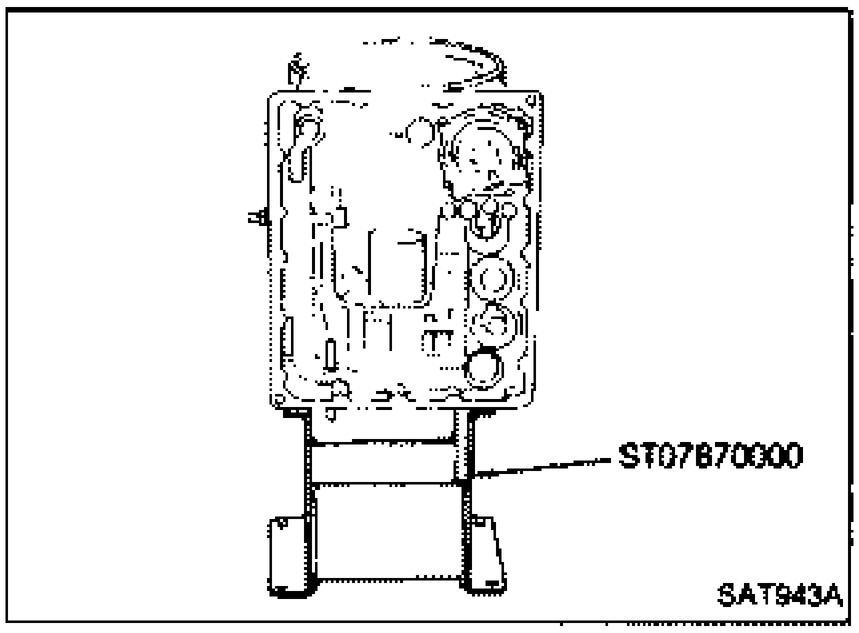
b. Install band servo piston onto transmission case.

- **Apply A.T.F. to O-ring of band servo piston and transmission case.**

c. Install gasket for band servo onto transmission case.

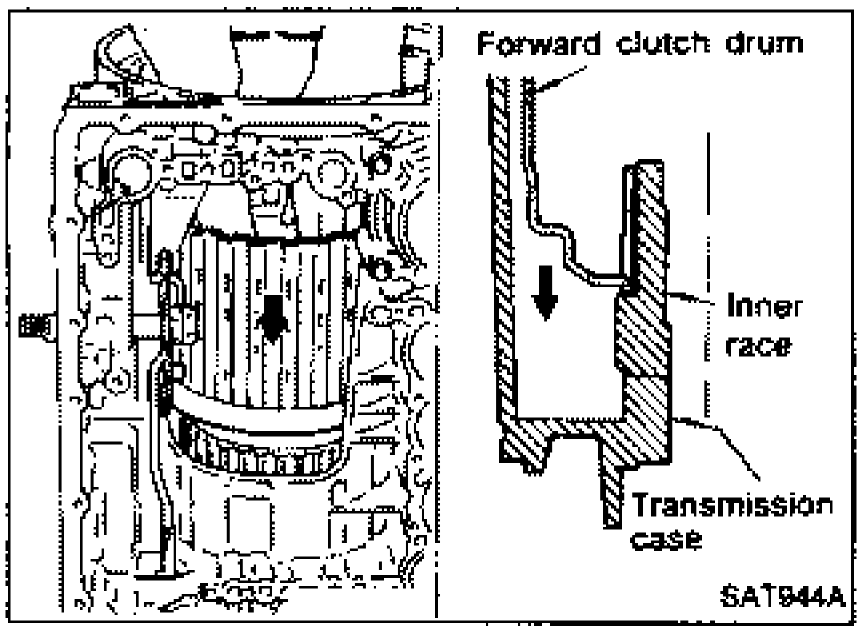


d. Install band servo retainer onto transmission case.

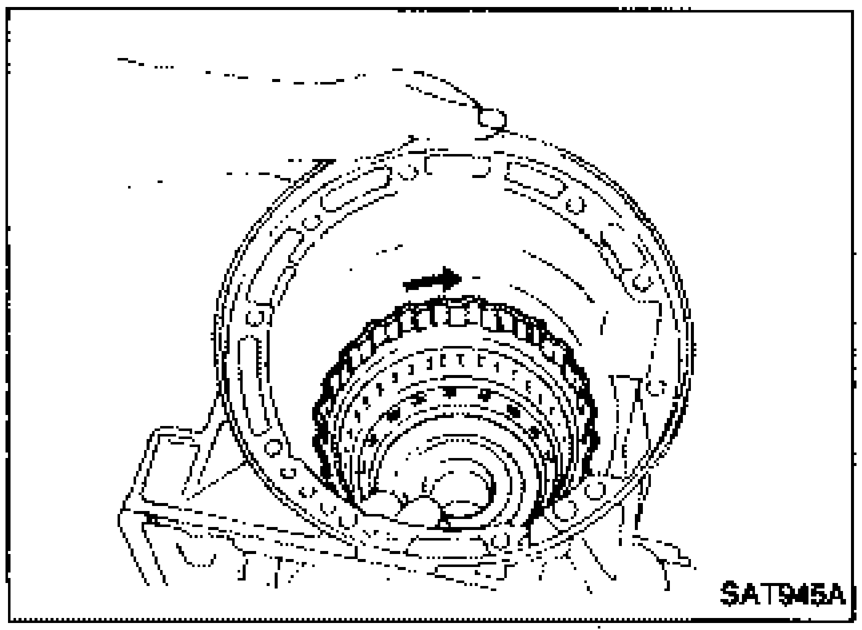


4. Install rear side clutch and gear components.

a. Place transmission case in vertical position.

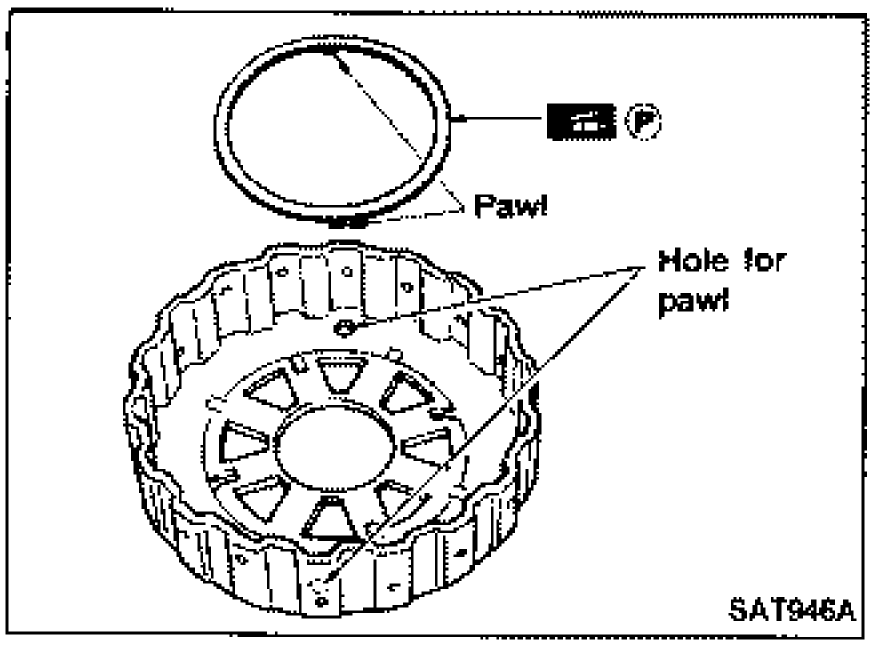


b. Slightly lift forward clutch drum assembly and slowly rotate it clockwise until its hub passes fully over the clutch inner race inside transmission case.



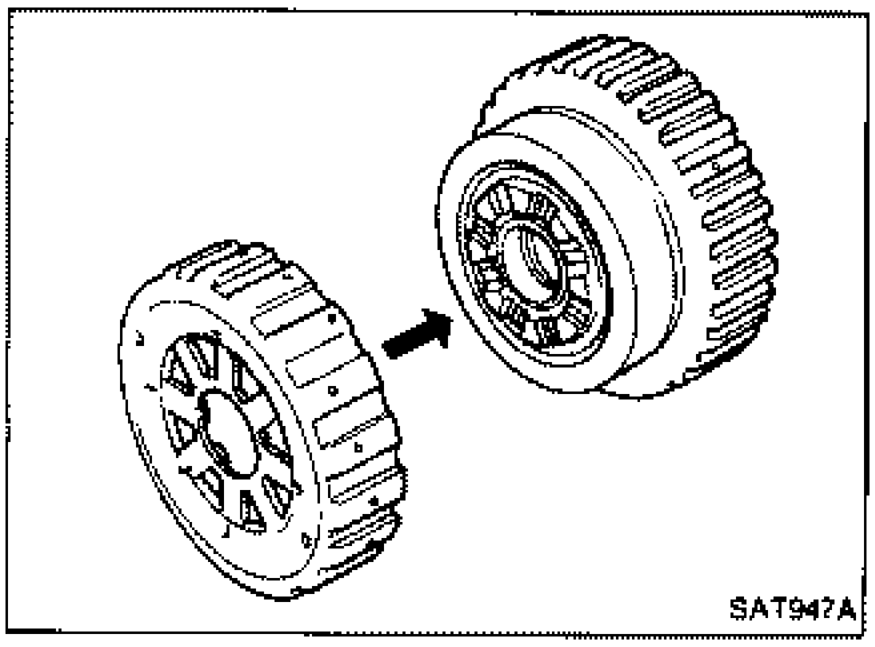
c. Check to be sure that rotation direction of forward clutch assembly is correct.

Assembly (Cont'd)

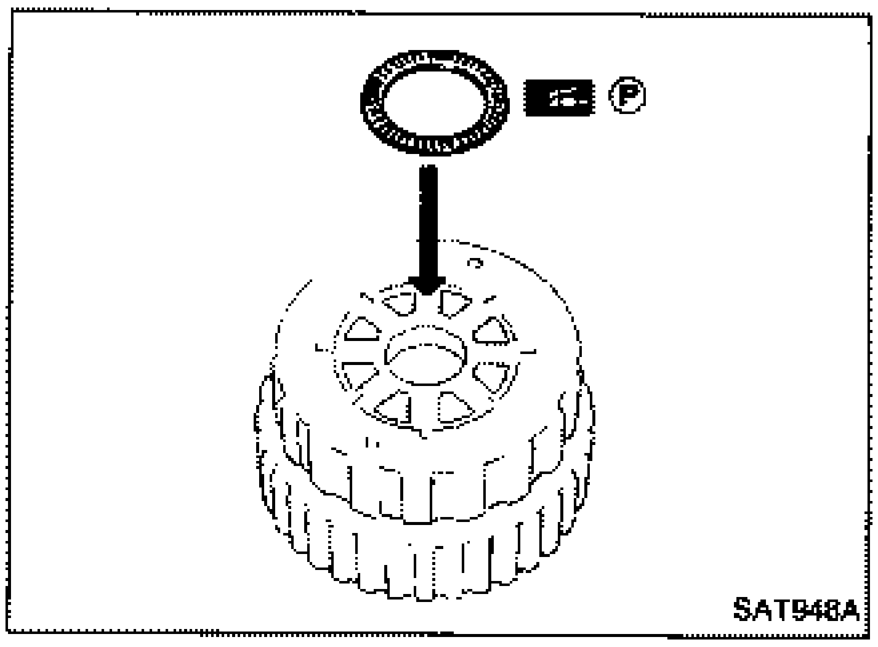


d. Install thrust washer onto front of overrun clutch hub.

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

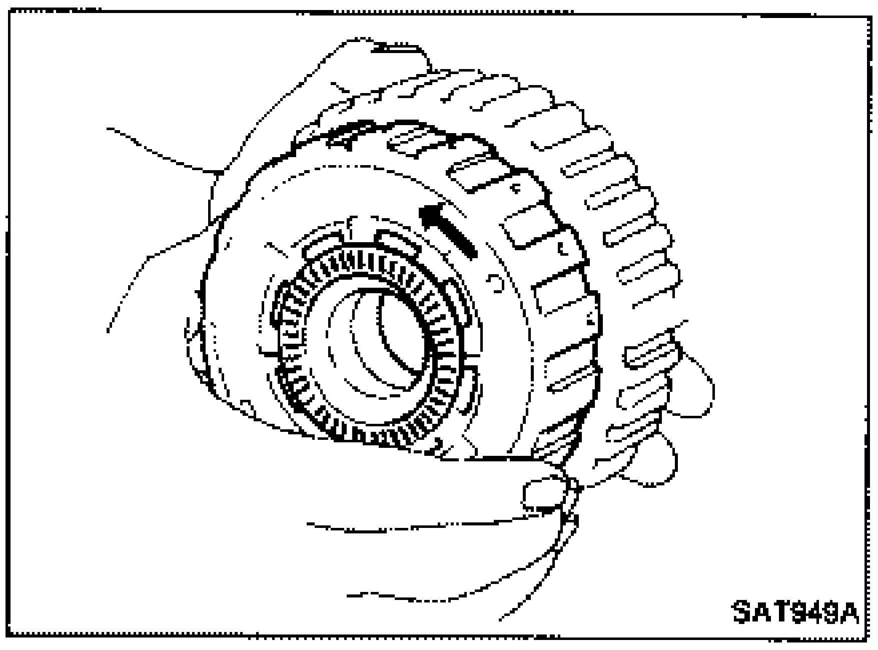


e. Install overrun clutch hub onto rear internal gear assembly.

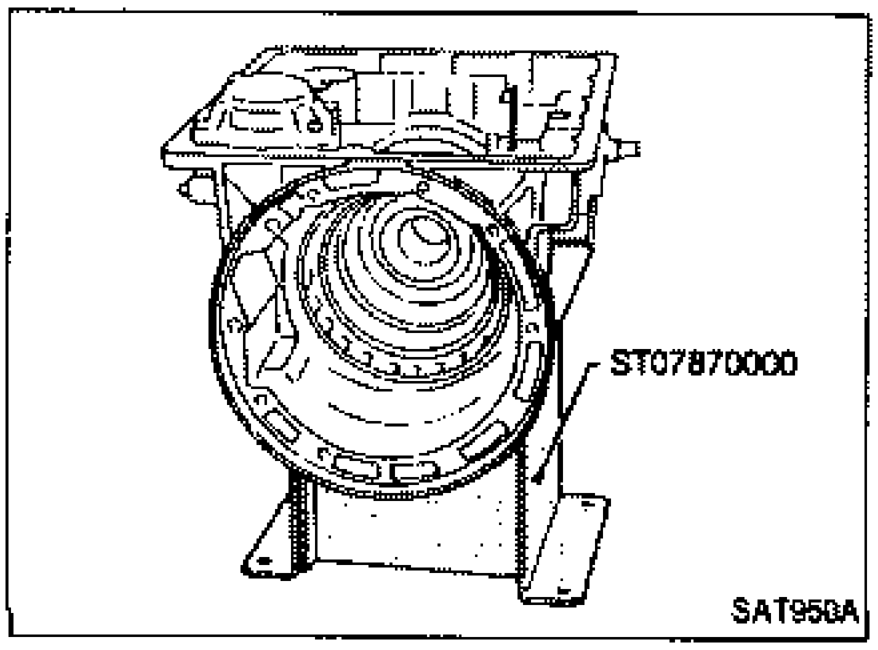


f. Install needle bearing onto rear of overrun clutch hub.

- **Apply petroleum jelly to needle bearing.**

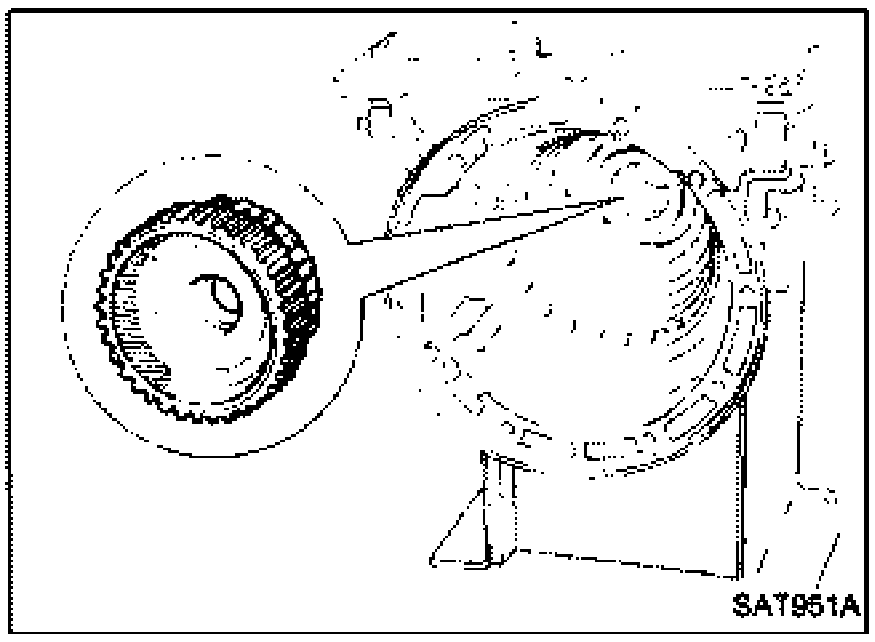


g. Check that overrun clutch hub rotates as shown while holding forward clutch hub.

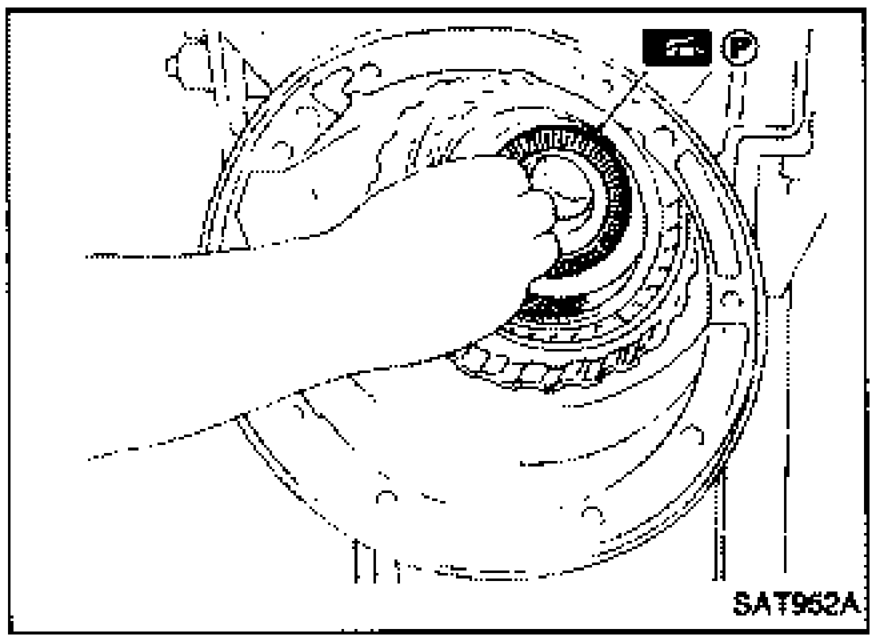


h. Place transmission case into horizontal position.

Assembly (Cont'd)

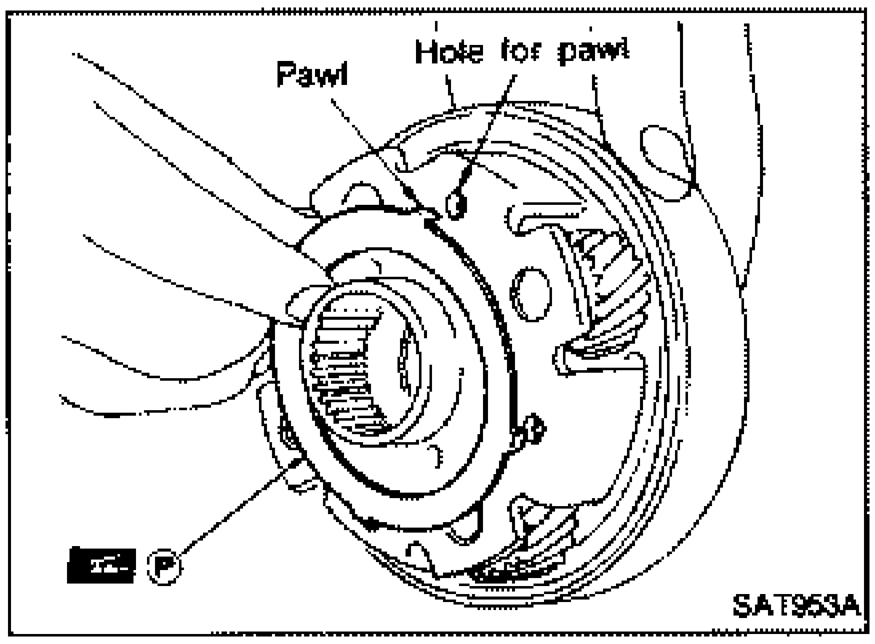


i. Install rear internal gear, forward clutch hub and overrun clutch hub as a unit onto transmission case.



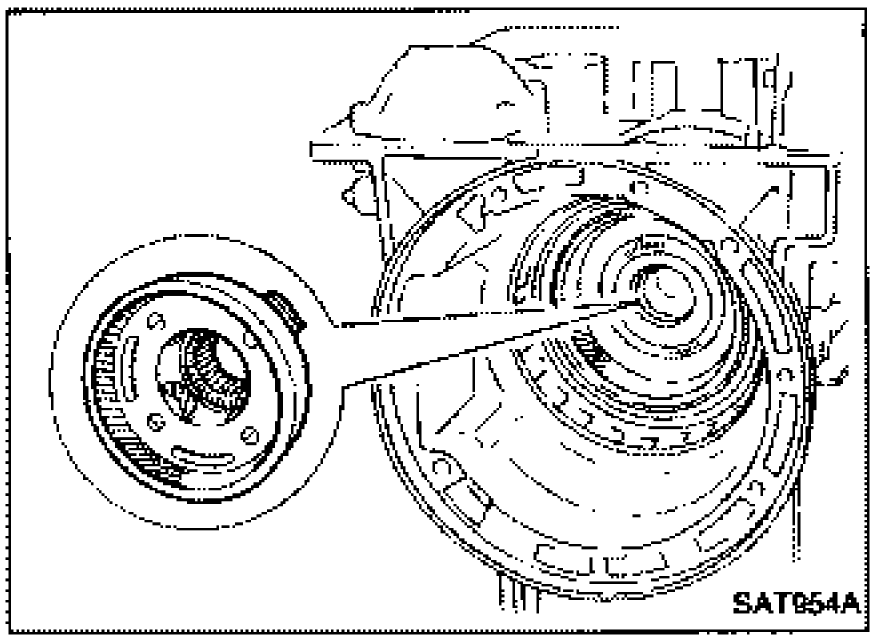
j. Install needle bearing onto rear internal gear.

- **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.**

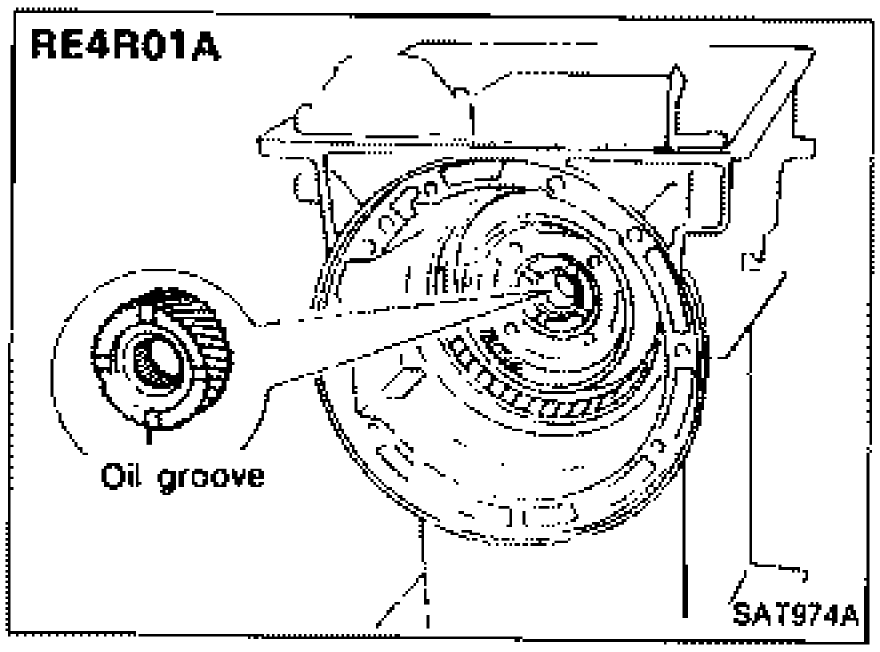


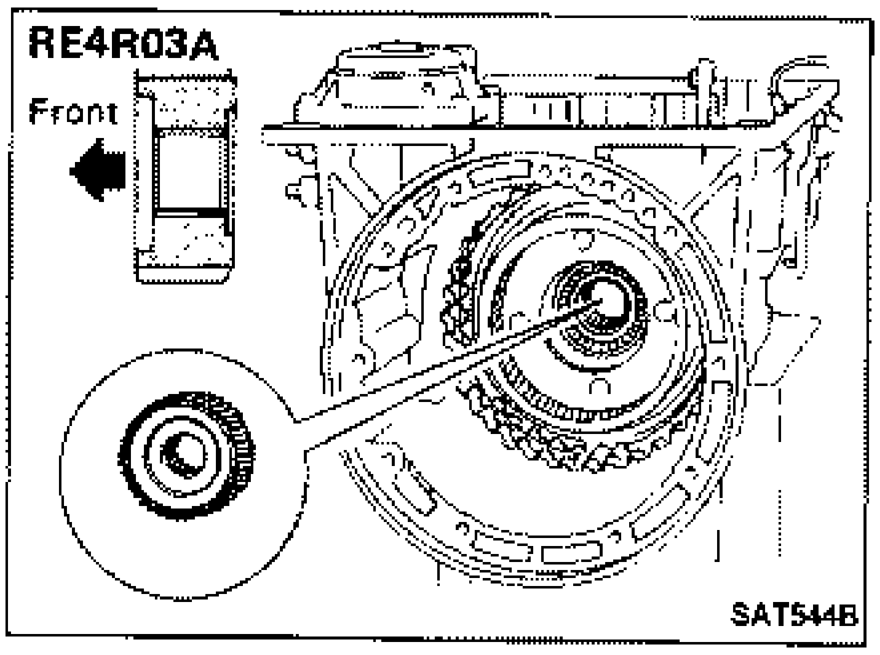
l. Install front internal gear on transmission case.

Adjustment

When any parts listed in the following table are replaced, total end play or reverse clutch end play must be adjusted.

Item / Part name	Total end play	Reverse clutch end play
Transmission case	●	●
Low one-way clutch inner race	●	●
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	—	●



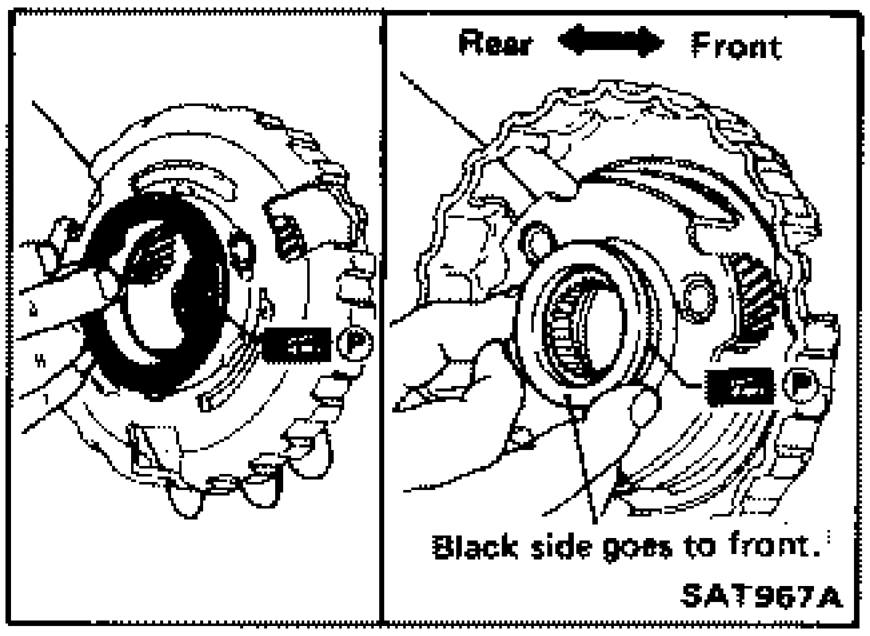


1. Install front side clutch and gear components.

a. Install rear sun gear on transmission case.

- **Pay attention to its direction.**

Adjustment (Cont'd)



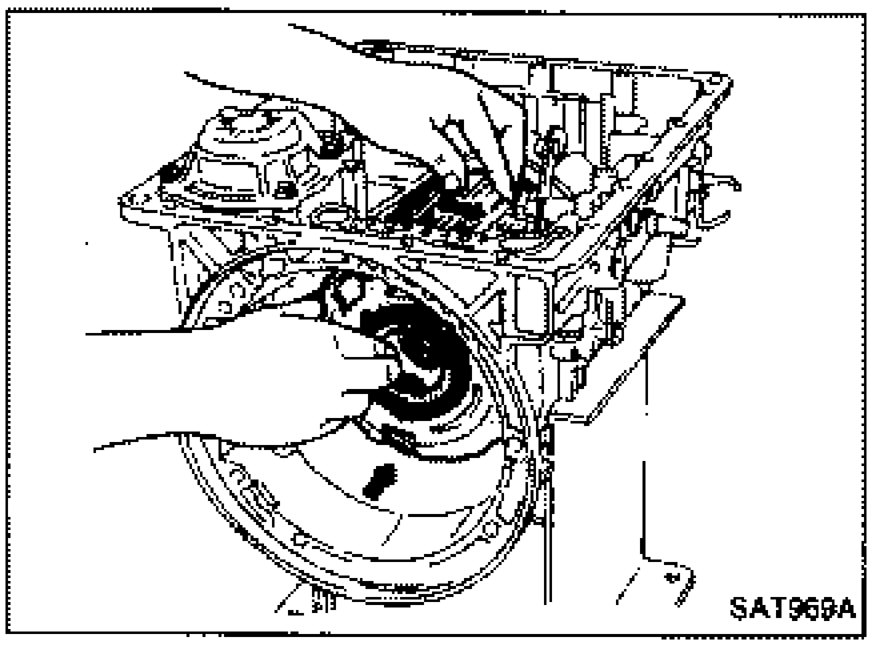
SAT967A

b. Install needle bearing on front of front planetary carrier.

- **Apply petroleum jelly to needle bearing.**

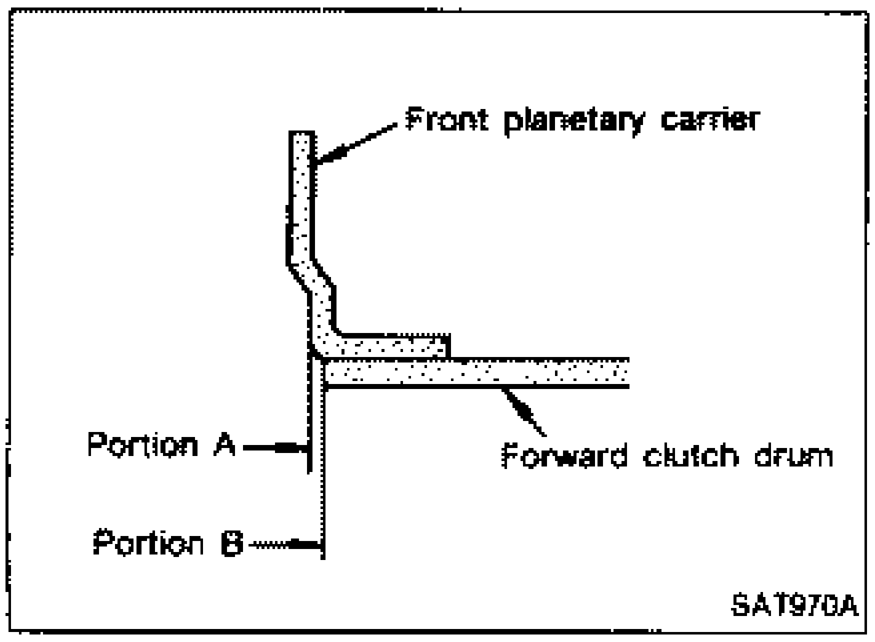
c. Install needle bearing on rear of front planetary carrier.

- **Apply petroleum jelly to bearing.**
- **Pay attention to its direction — Black side goes to front.**



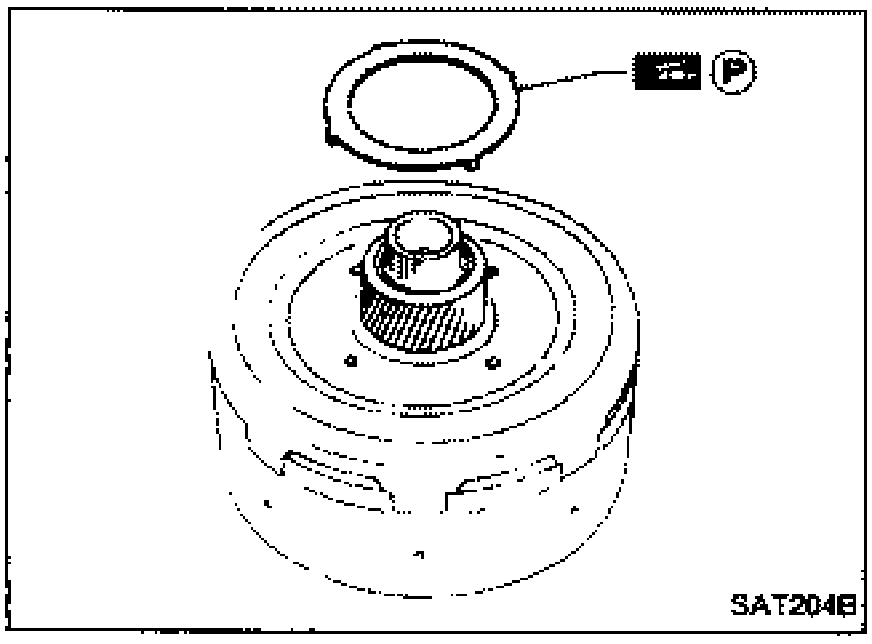
SAT969A

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



SAT970A

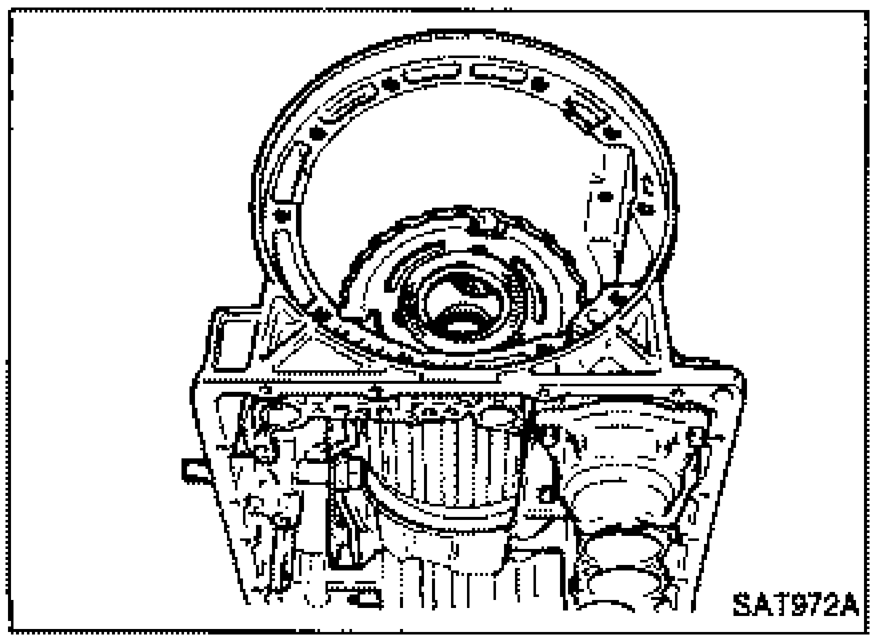
- **Check that portion A of front planetary carrier protrudes approximately 2 mm (0.08 in) beyond portion B of forward clutch assembly. (RE4R01A only)**



SAT204B

e. Install bearing race (RE4R01A) or needle bearing (RE4R03A) on rear of clutch pack.

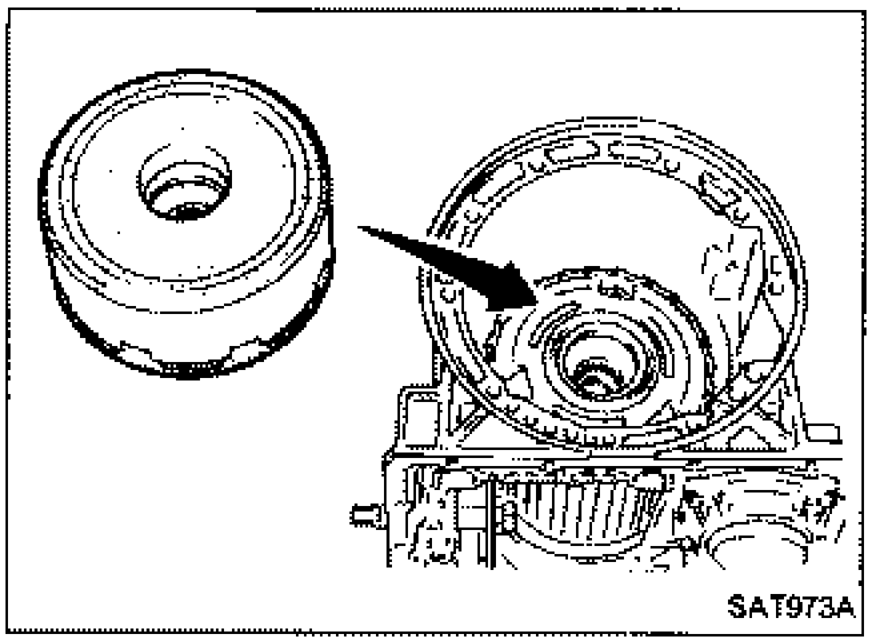
- **Apply petroleum jelly to bearing races.**
- **Securely engage pawls of bearing race with hole in clutch pack.**



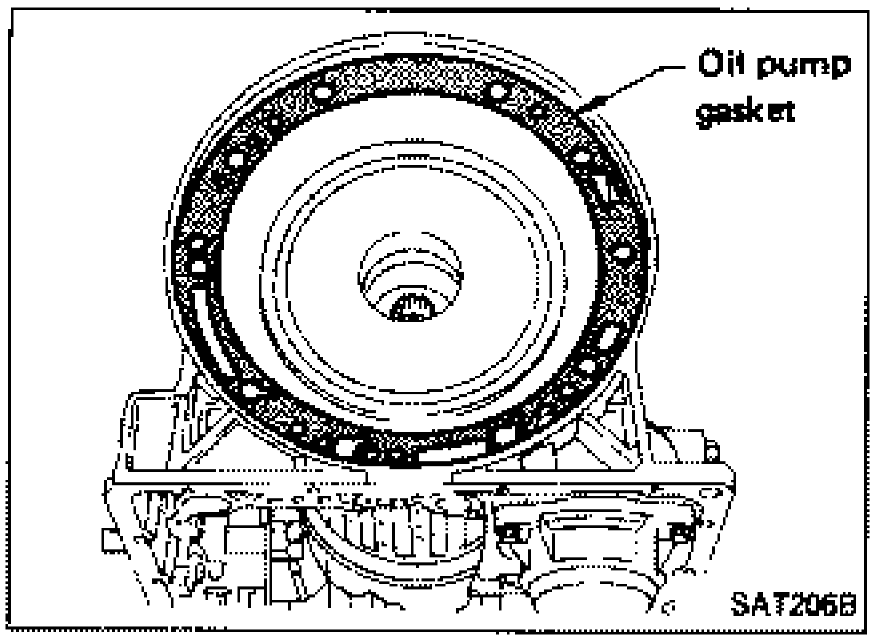
SAT972A

f. Place transmission case in vertical position.

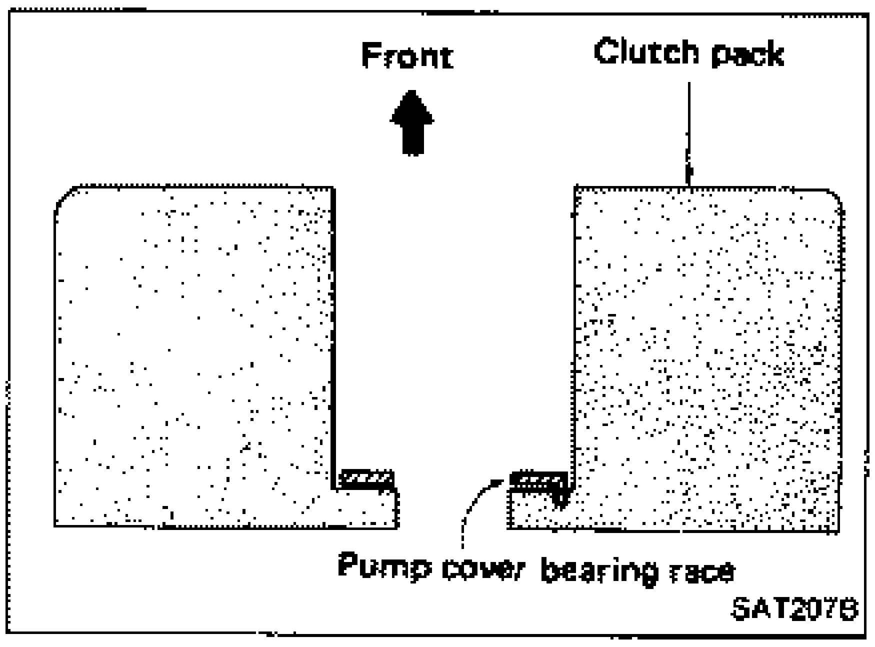
Adjustment (Cont'd)



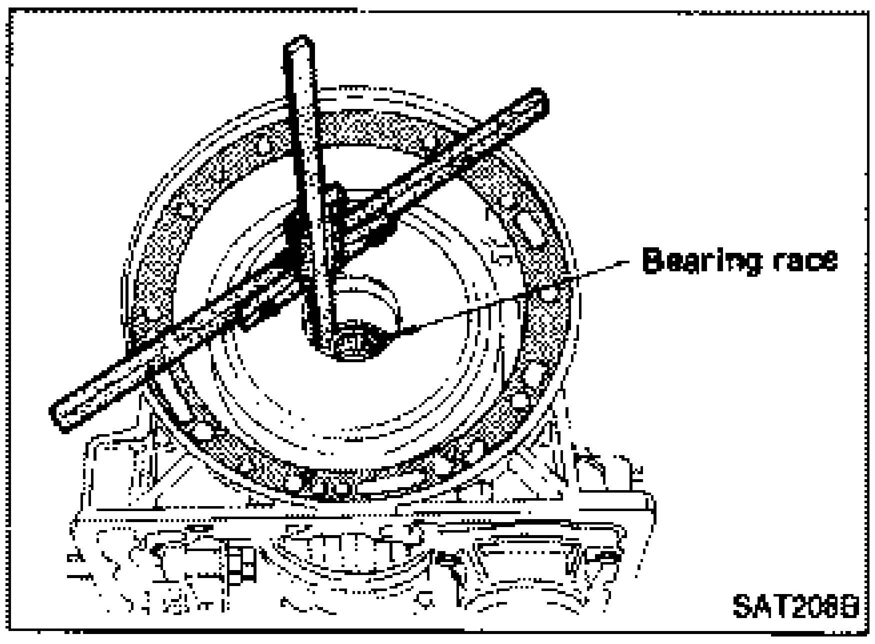
g. Install clutch pack into transmission case.



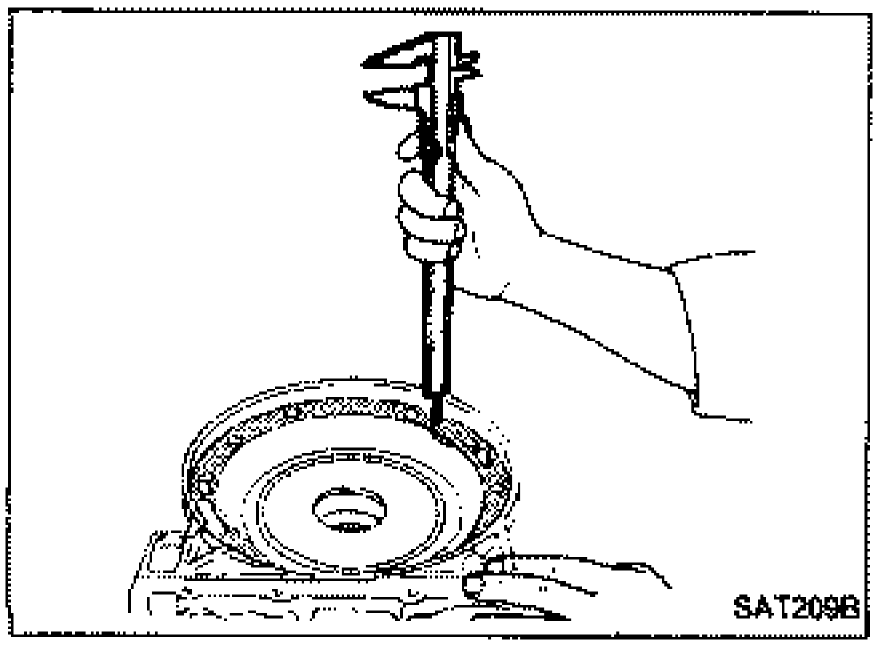
2. Adjust total end play.
a. Install new oil pump gasket on transmission case.



b. Install pump cover bearing race on clutch pack.

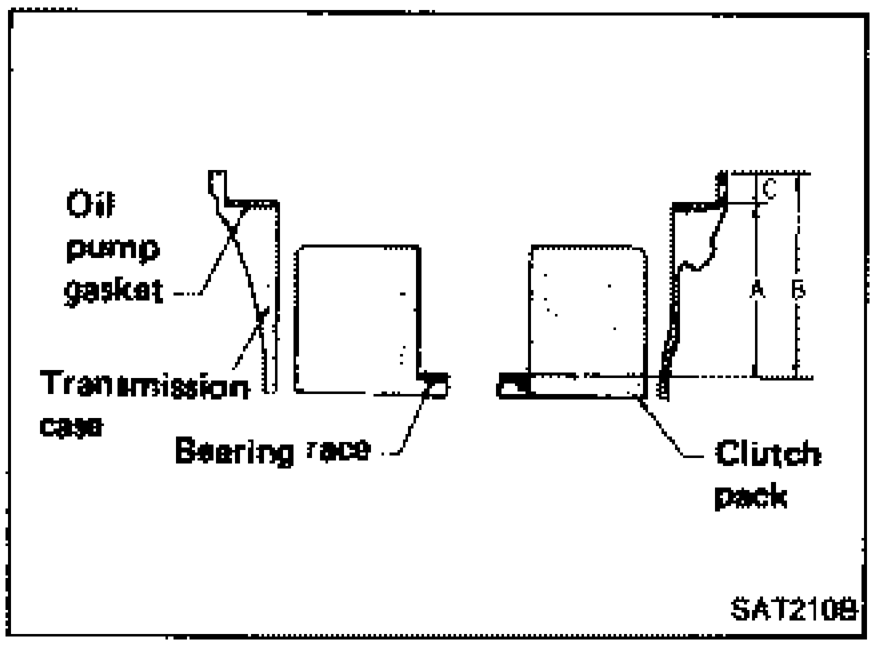


c. Measure distance "B" between front end of transmission case and oil pump cover bearing race.



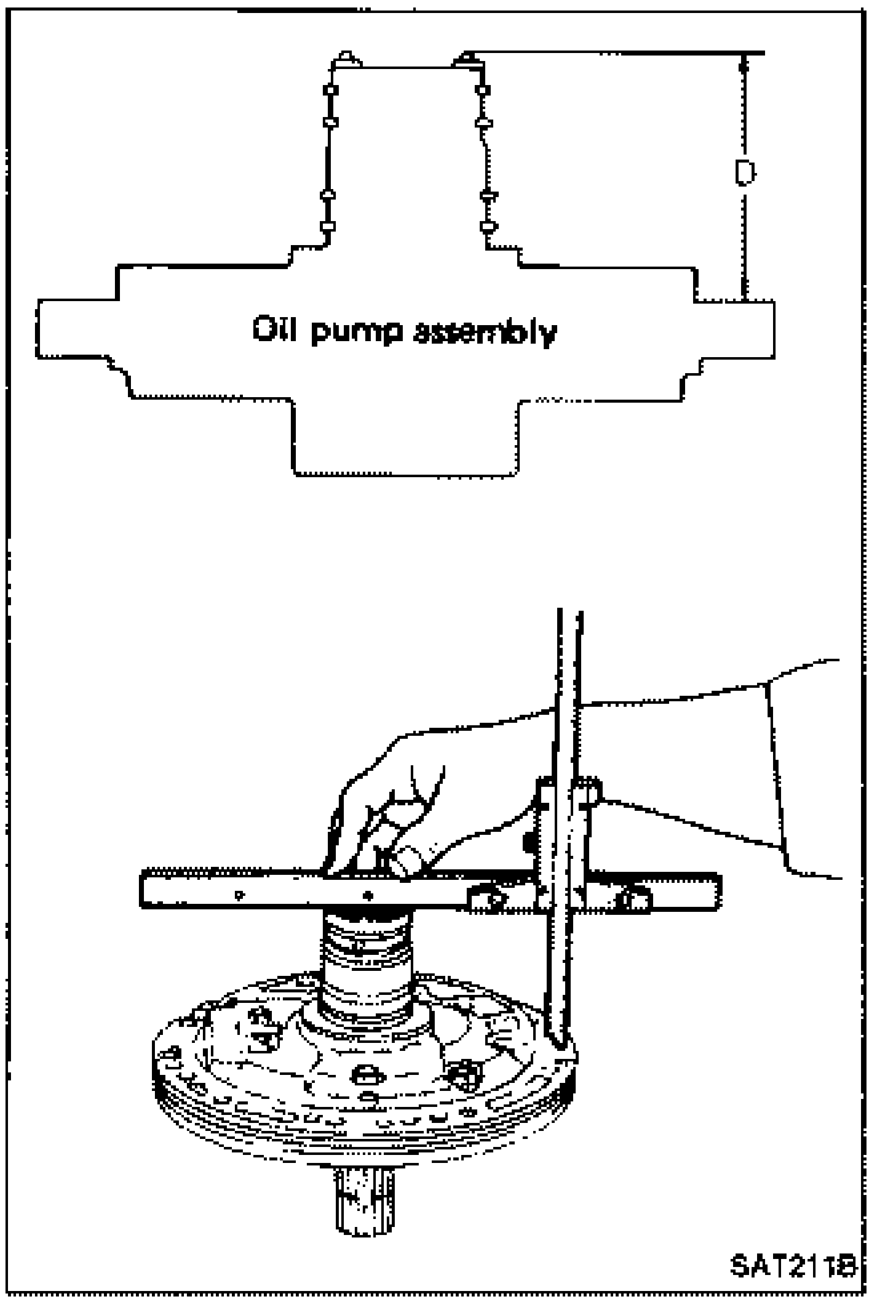
d. Measure distance "C" between front end of transmission case and oil pump gasket.

Adjustment (Cont'd)



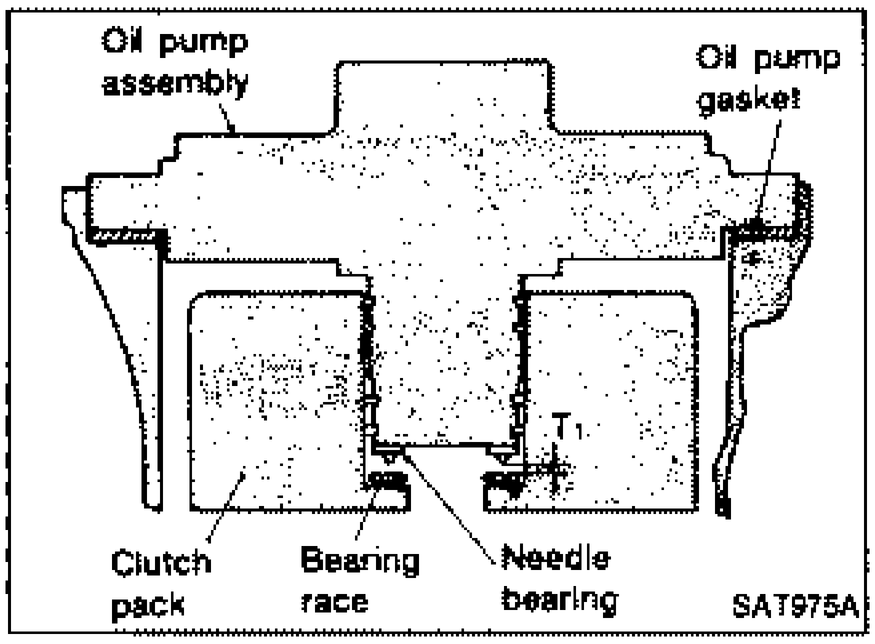
e. Determine dimension "A" by using the following equation.

A = B − C



f. Install needle bearing on oil pump assembly.

g. Measure distance "D" between needle bearing and machined surface of oil pump cover assembly.



h. Determine total end play "T_1" by using the following equation.

T_1 = A − D − 0.1

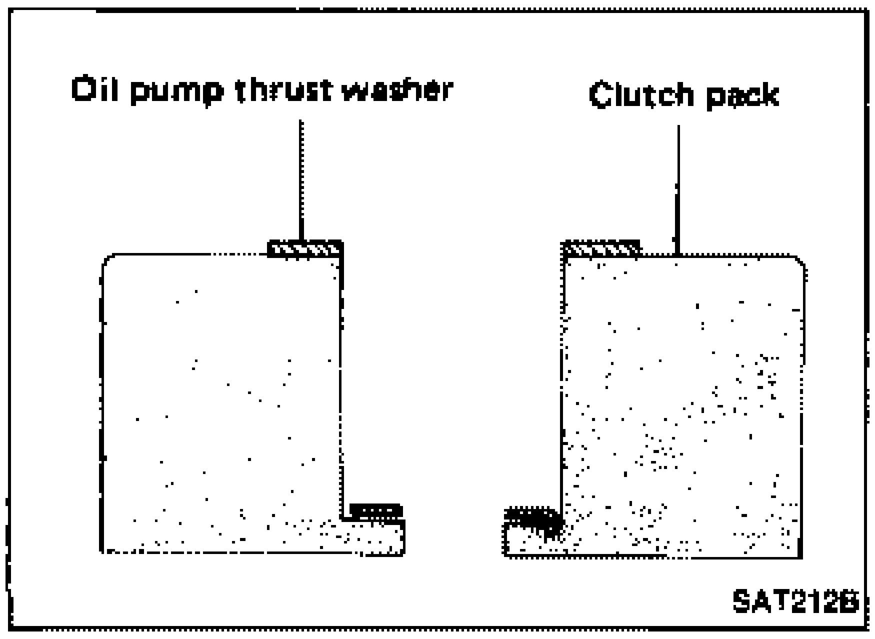
Total end play "T_1":

0.25 - 0.55 mm (0.0098 - 0.0217 in)

- If end play is out of specification, decrease or increase thickness of oil pump cover bearing race as necessary.

  Available oil pump cover bearing race:

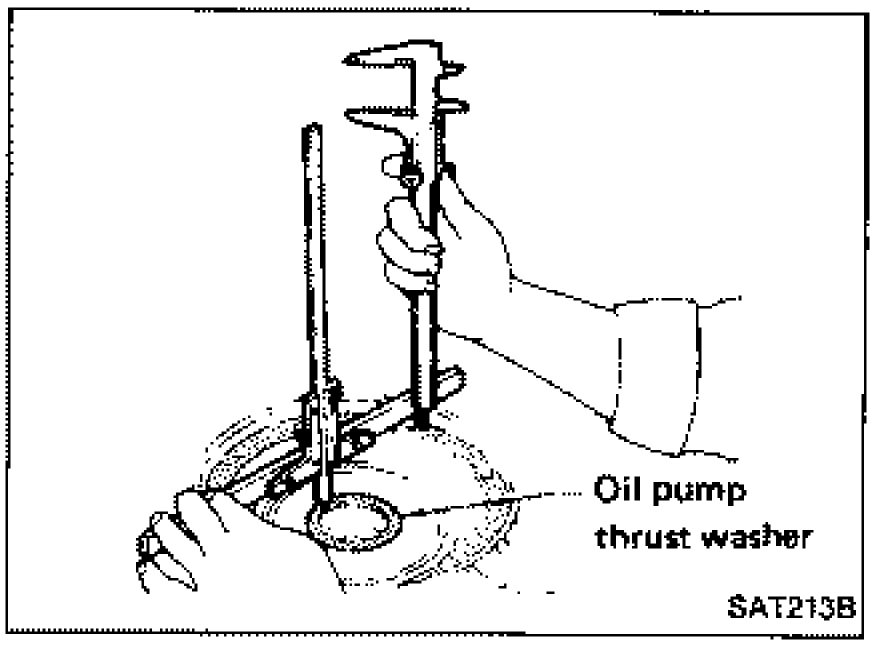
  Refer to S.D.S.



3. Adjust reverse clutch drum end play.

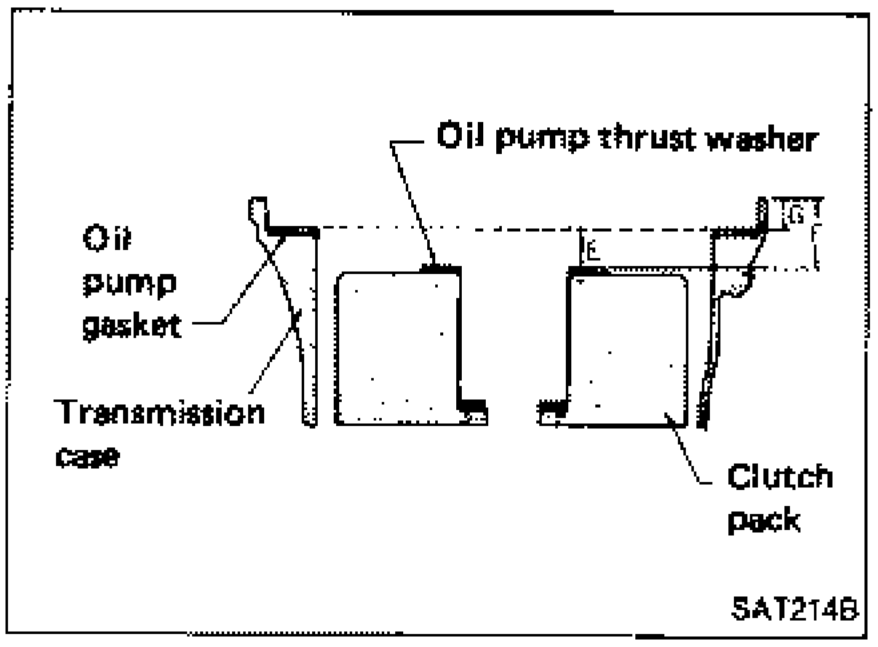
a. Install oil pump thrust washer on clutch pack.

Adjustment (Cont'd)



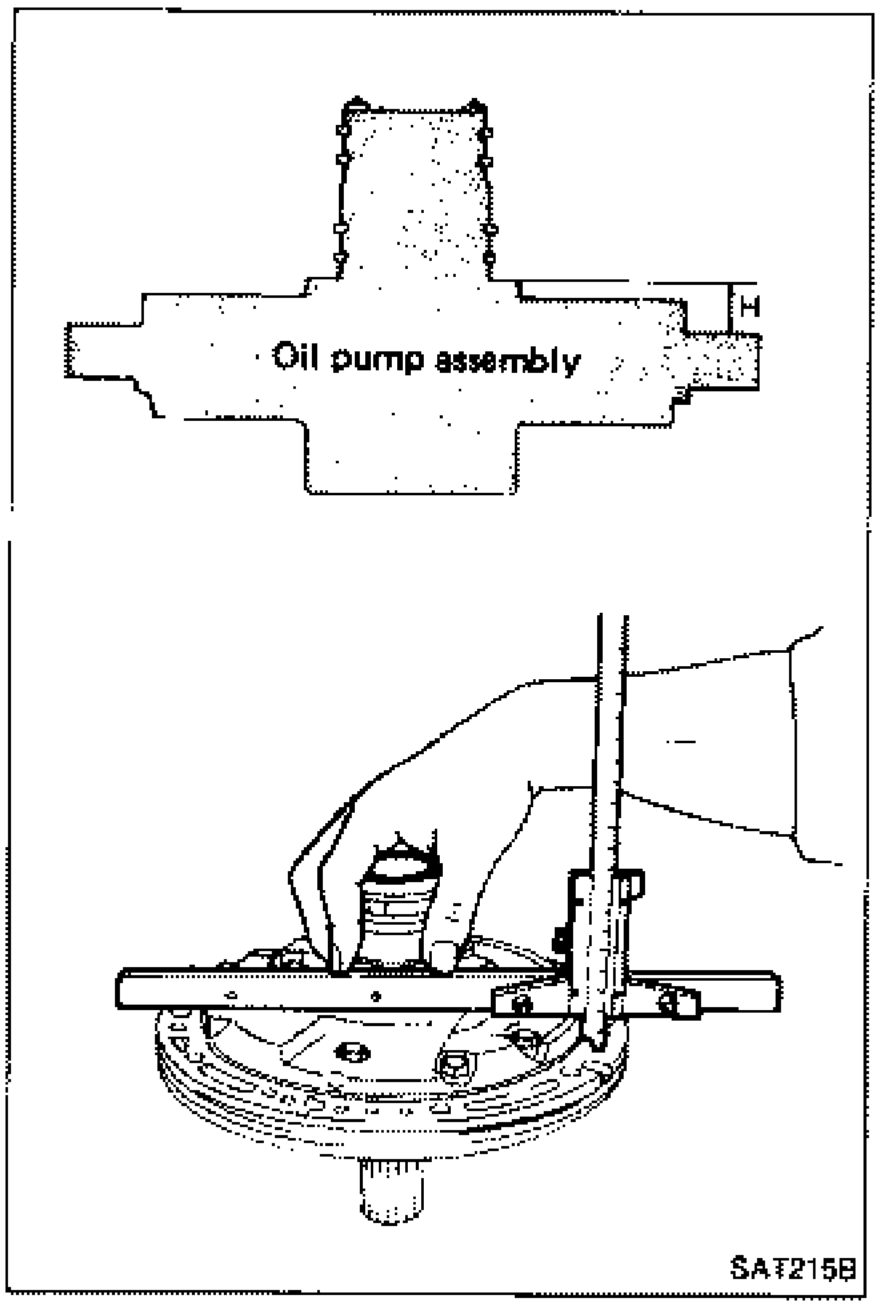
b. Measure distance "F" between front end of transmission case and oil pump thrust washer.

c. Measure distance "G" between front end of transmission case and gasket.

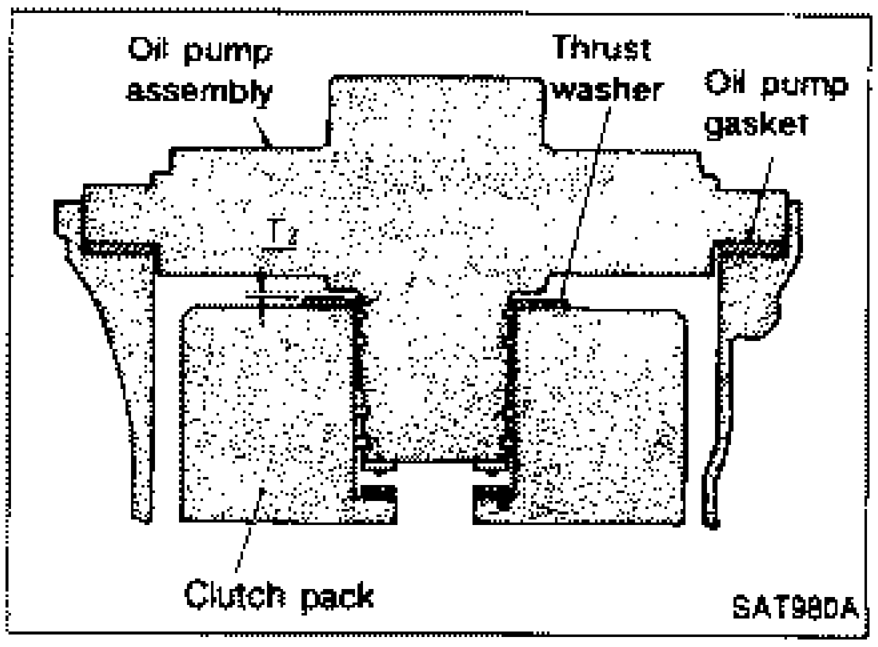


d. Determine dimension "E" by using the following equation.

E = F − G



e. Measure distance "H".



f. Determine reverse clutch drum end play "T_2" by using the following equation.

T_2 = E − H − 0.1

Reverse clutch drum end play "T_2":

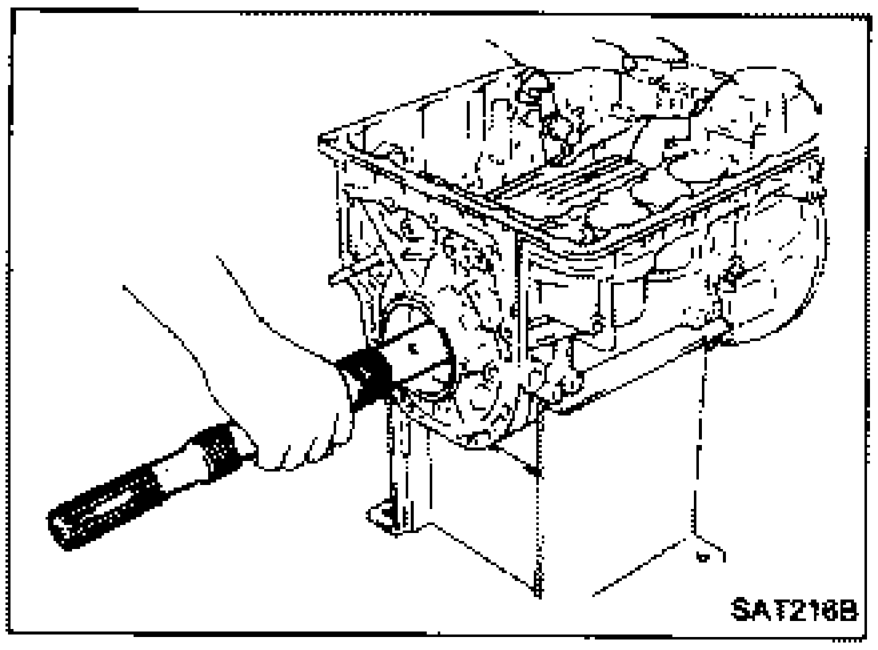
0.55 - 0.90 mm (0.0217 - 0.0354 in)

- If end play is out of specification, decrease or increase thickness of oil pump thrust washer as necessary.

Available oil pump thrust washer:

Refer to S.D.S.

4. Remove any part installed to adjust end plays.

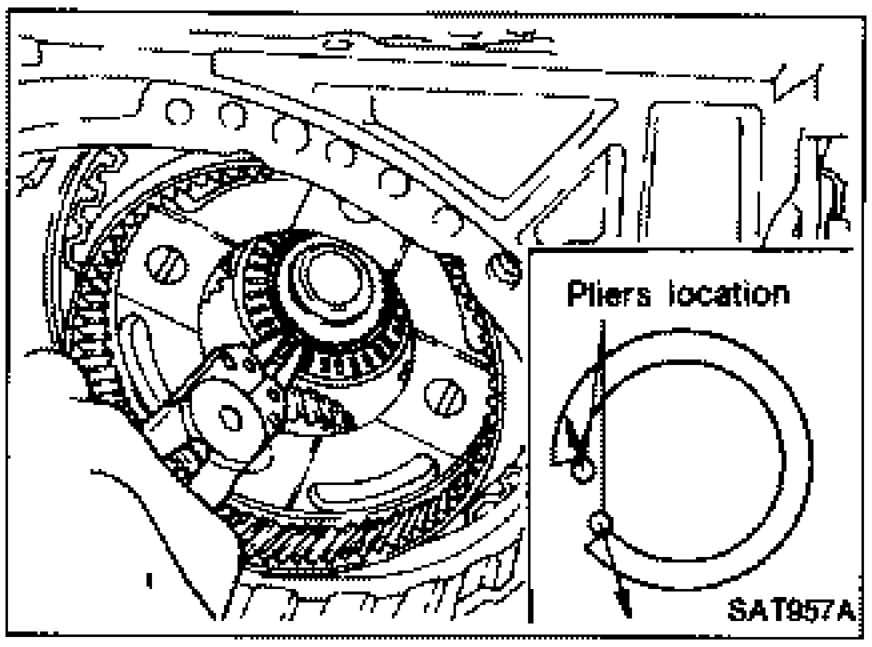


Assembly

1. Install output shaft and parking gear.

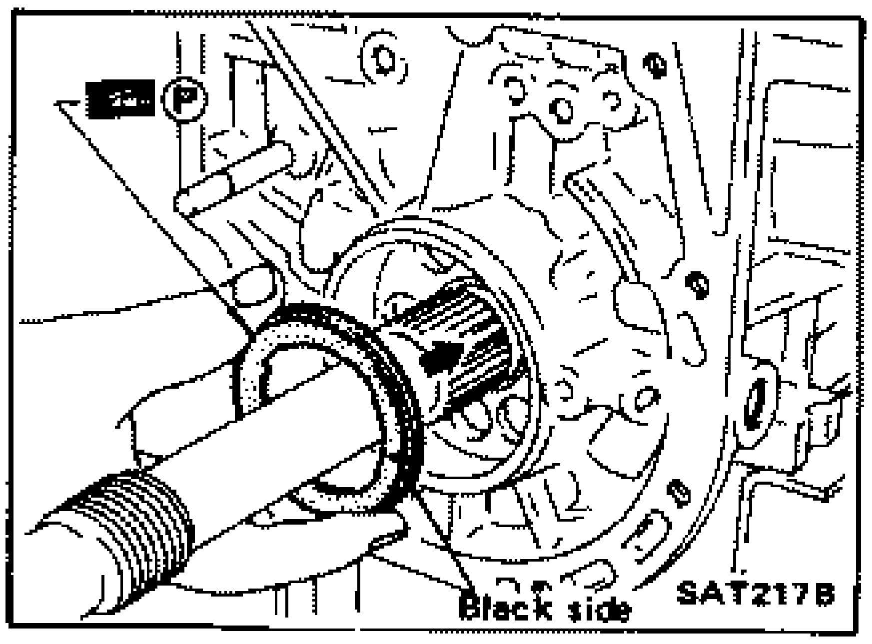
a. Insert output shaft from rear of transmission case while slightly lifting front internal gear.

- **Do not force output shaft against front of transmission case.**



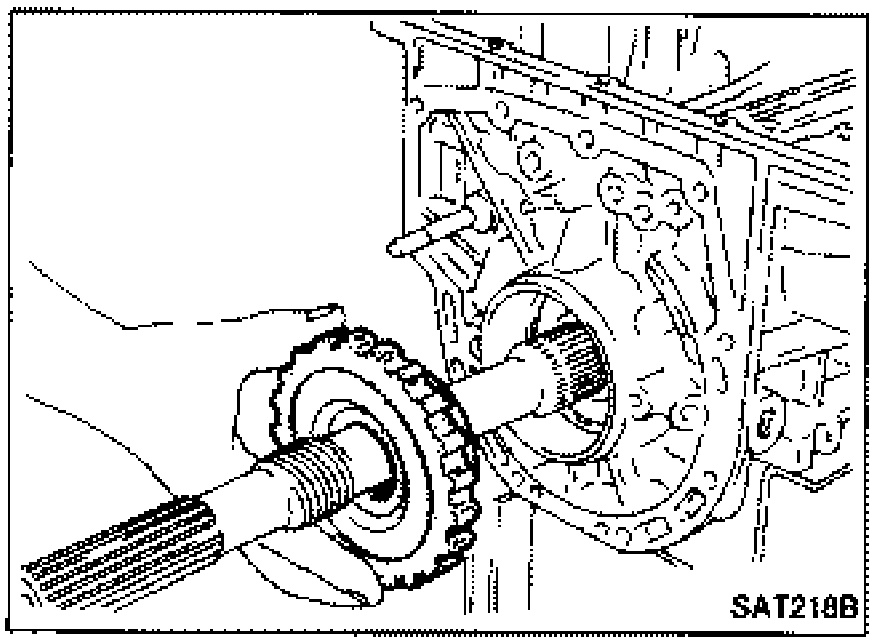
b. Carefully push output shaft against front of transmission case. Install snap ring on front of output shaft.

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

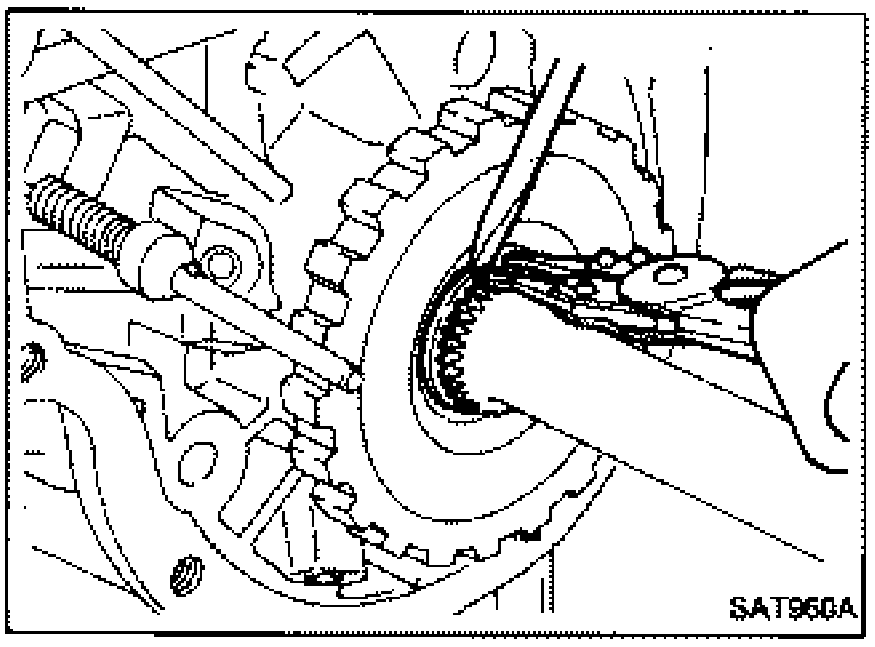


c. Install needle bearing on transmission case.

- **Pay attention to its direction — Black side goes to rear.**
- **Apply petroleum jelly to needle bearing.**



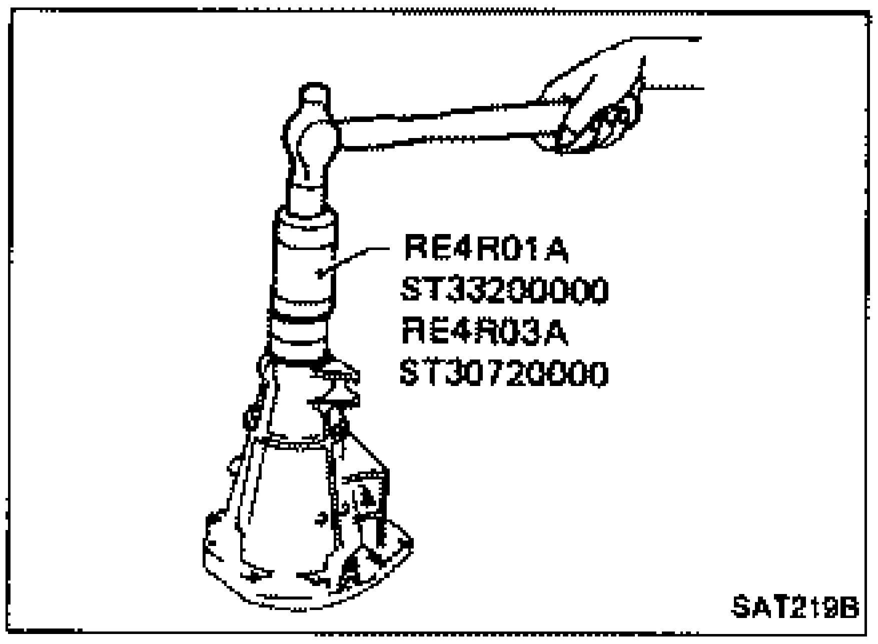
d. Install parking gear on transmission case.



e. Install snap ring on rear of output shaft.

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

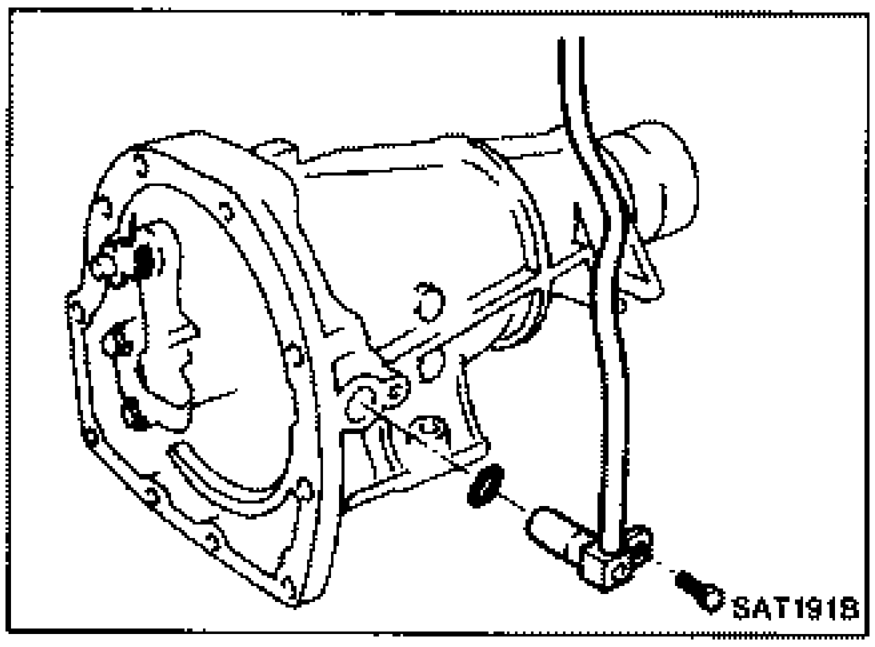
Assembly (Cont'd)



2. Install rear extension.

a. Install oil seal on rear extension.

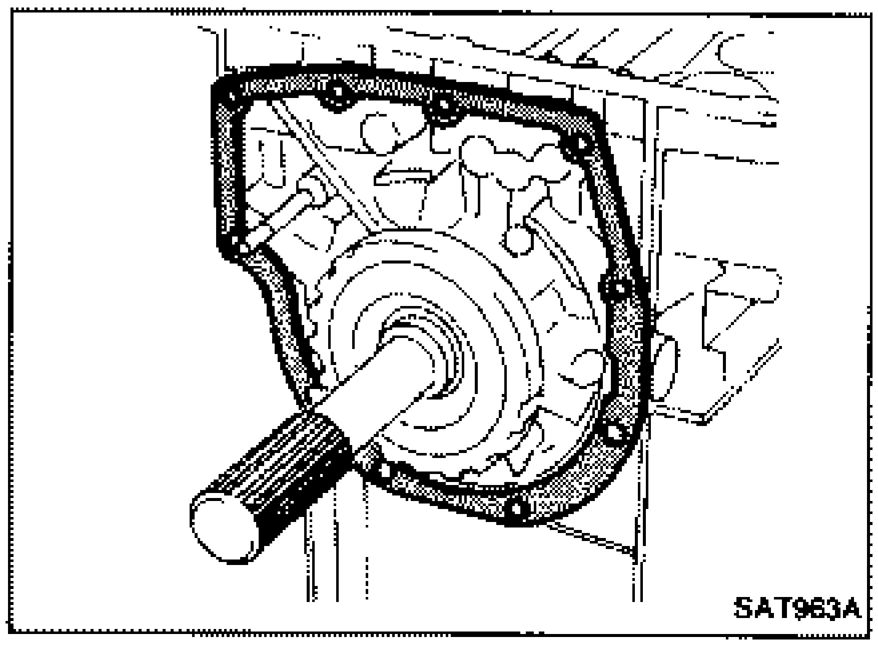
- **Apply A.T.F. to oil seal.**



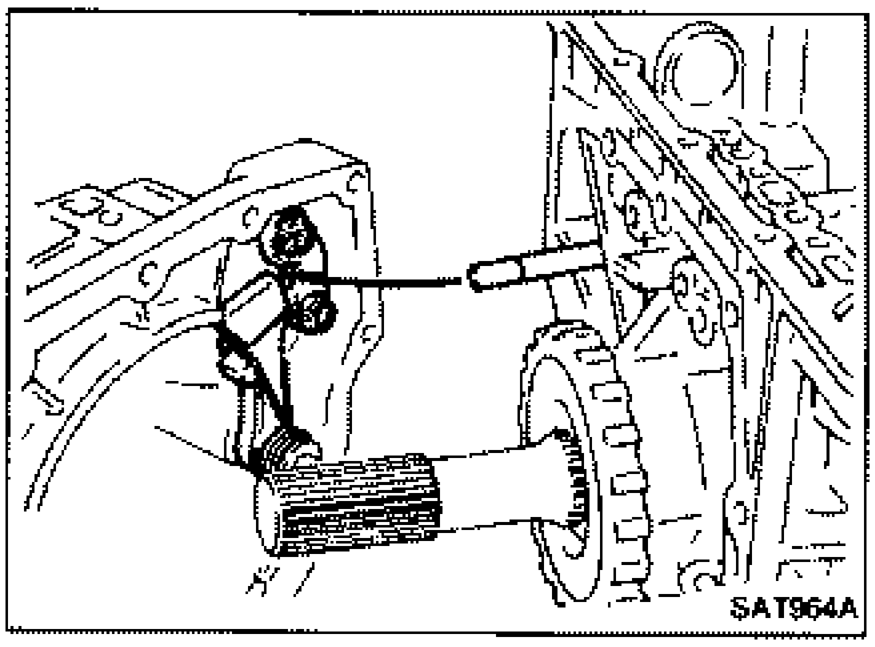
b. Install O-ring on revolution sensor.

- **Apply A.T.F. to O-ring.**

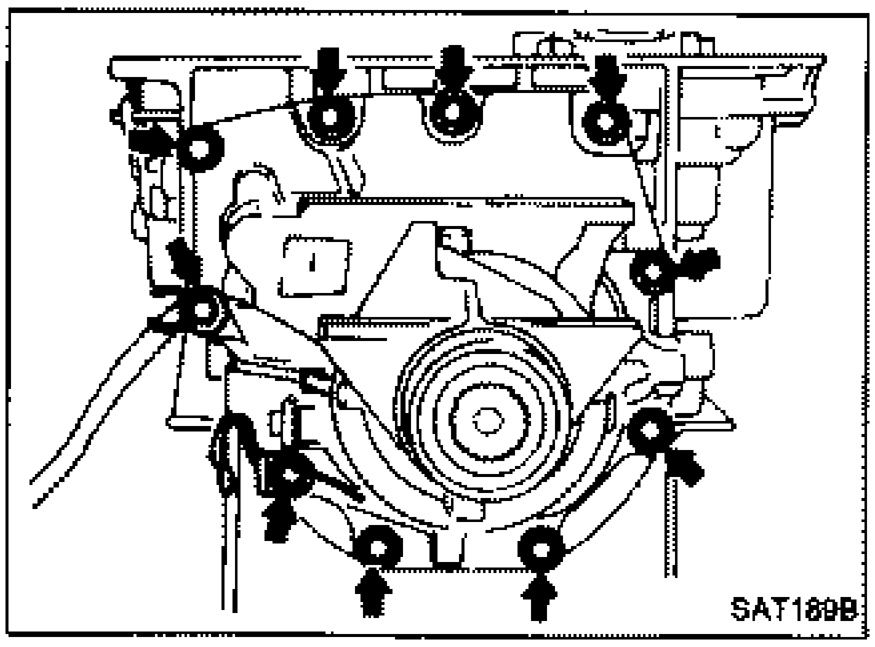
c. Install revolution sensor on rear extension.



d. Install rear extension gasket on transmission case.

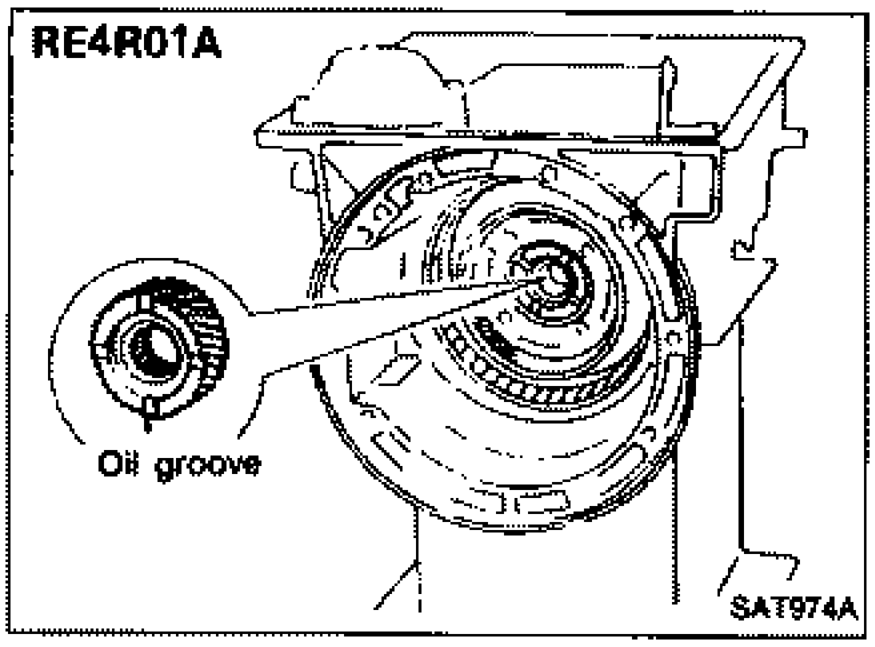


e. Install parking rod on transmission case.

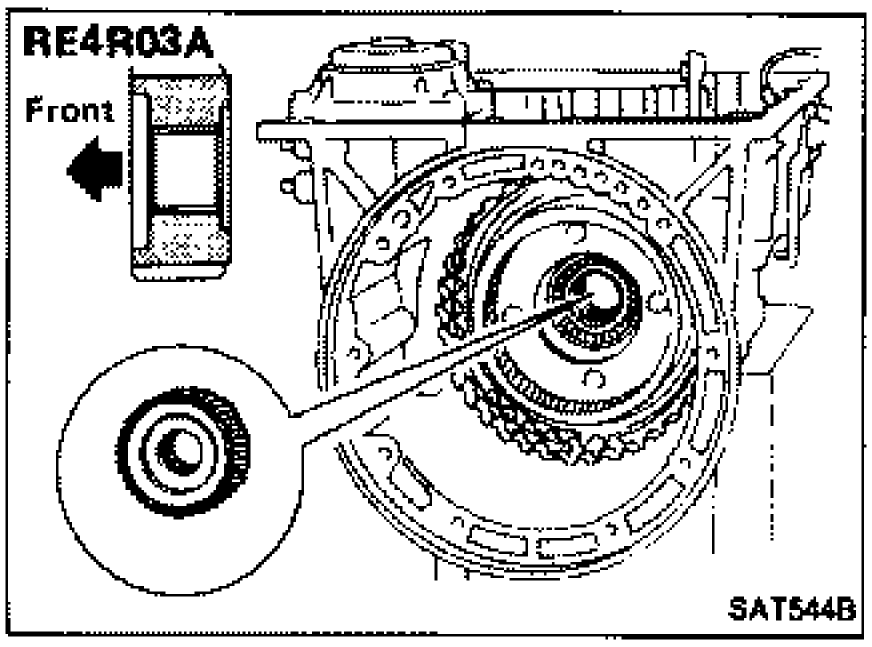


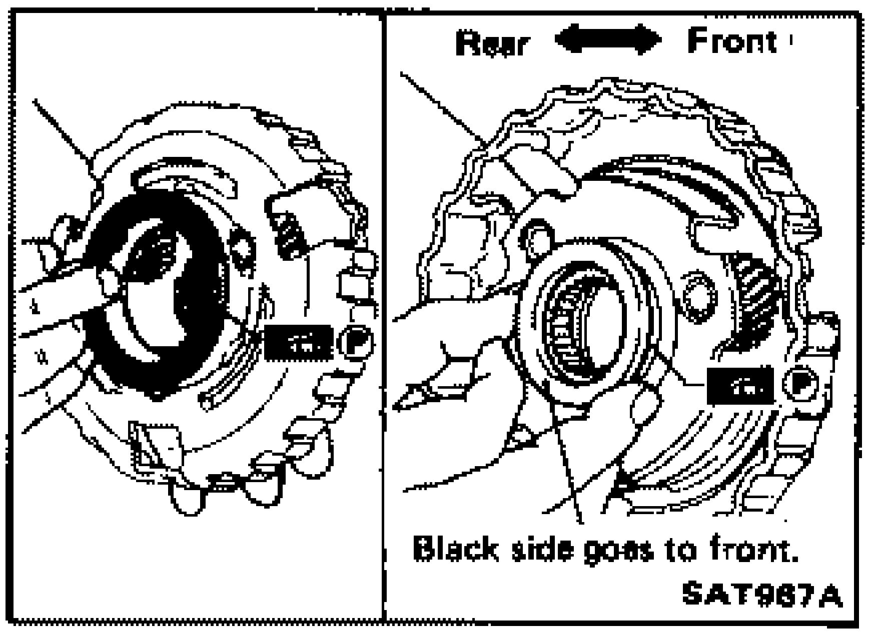
f. Install rear extension on transmission case.

Assembly (Cont'd)



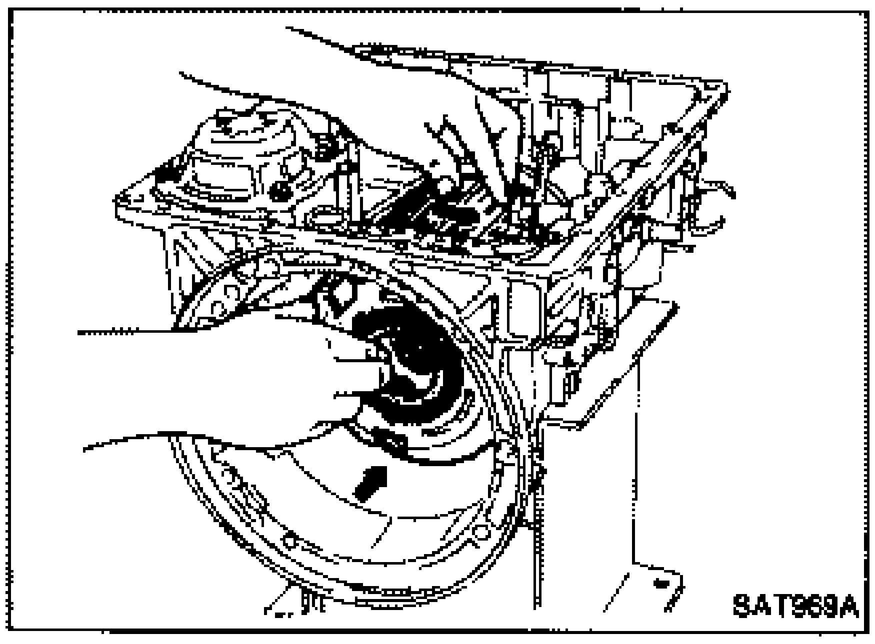
3. Install front side clutch and gear components.
a. Install rear sun gear on transmission case.
- **Pay attention to its direction.**



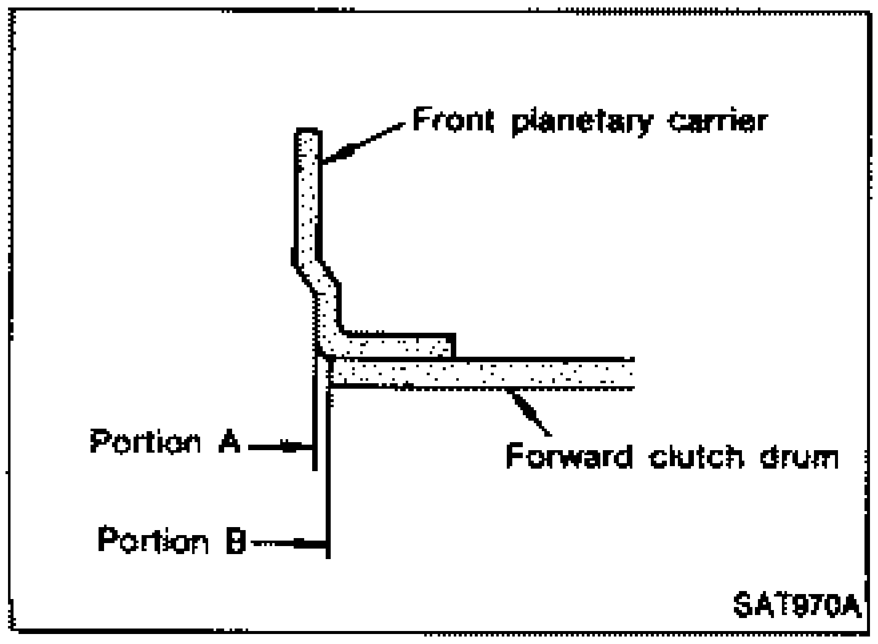


b. Make sure needle bearing is on front of front planetary carrier.
- **Apply petroleum jelly to needle bearing.**

c. Make sure needle bearing is on rear of front planetary carrier.
- **Apply petroleum jelly to bearing.**
- **Pay attention to its direction — Black side goes to front.**

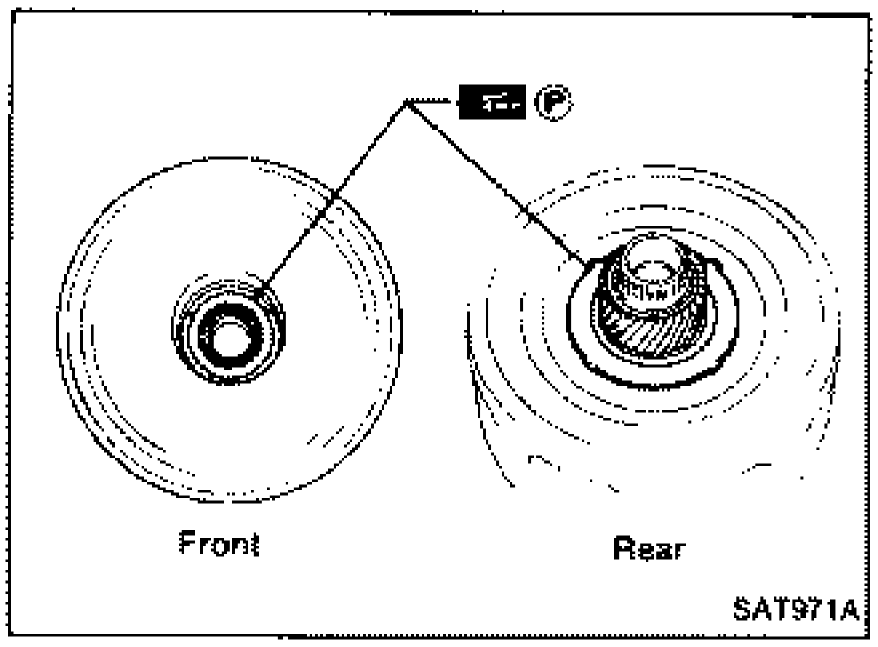


d. While rotating forward clutch drum clockwise, install front planetary carrier on forward clutch drum.



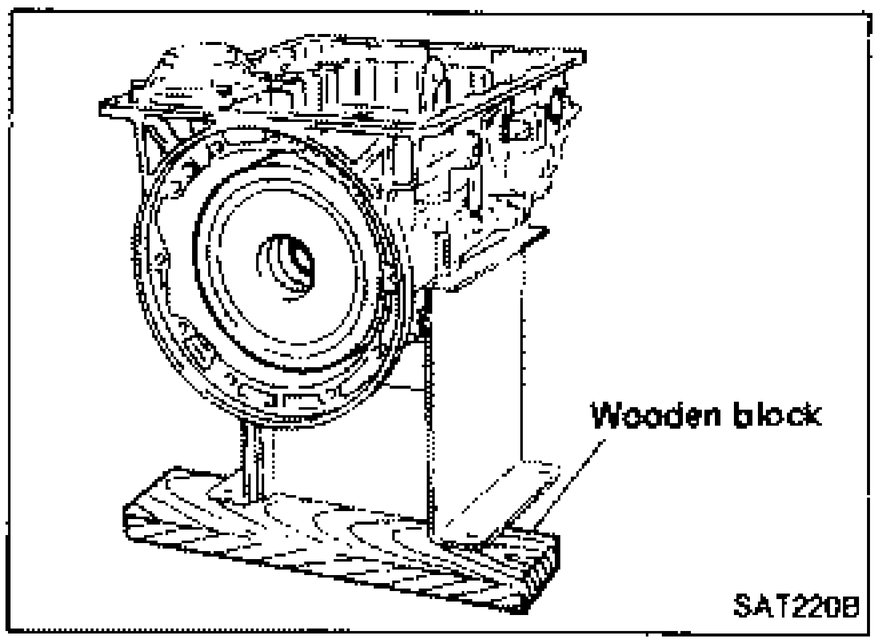
- **Check that portion A of front planetary carrier protrudes approximately 2 mm (0.08 in) beyond portion B of forward clutch assembly. (RE4R01A only)**

Assembly (Cont'd)

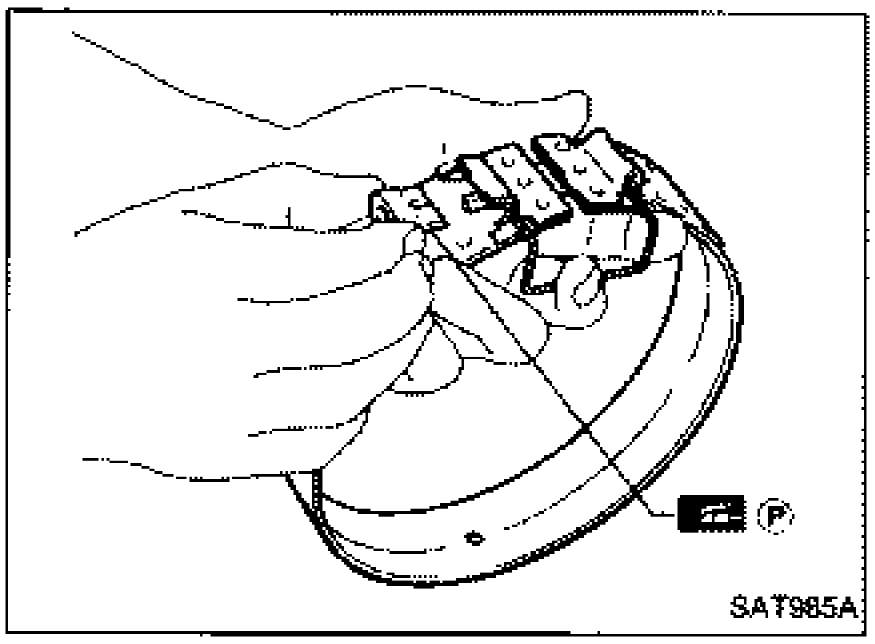


e. Make sure bearing race (RE4R01A) or needle bearing (RE4R03A) are on front and rear of clutch pack.

- **Apply petroleum jelly to bearing races.**
- **Securely engage pawls of bearing races with holes in clutch pack.**



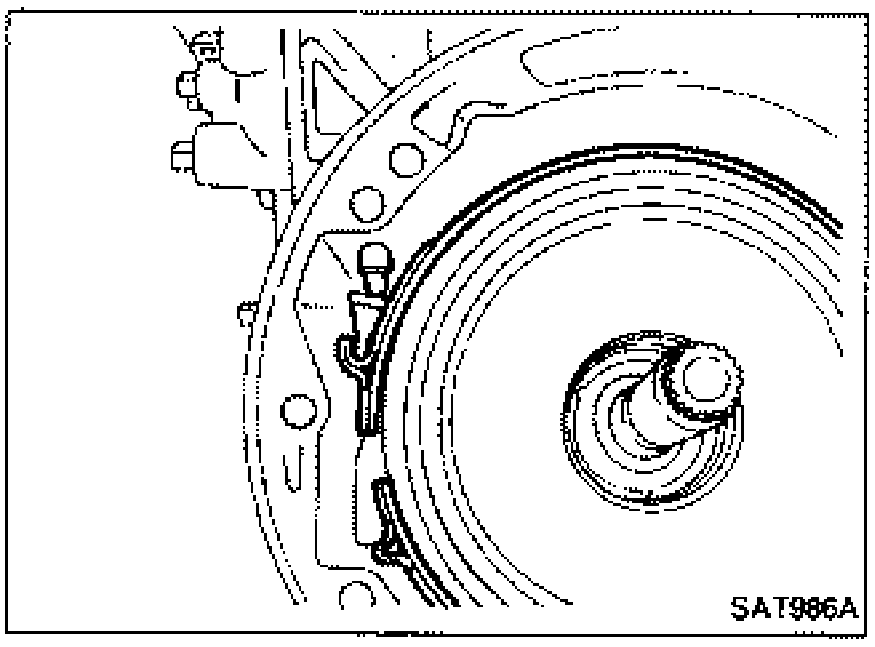
f. Install clutch pack into transmission case.



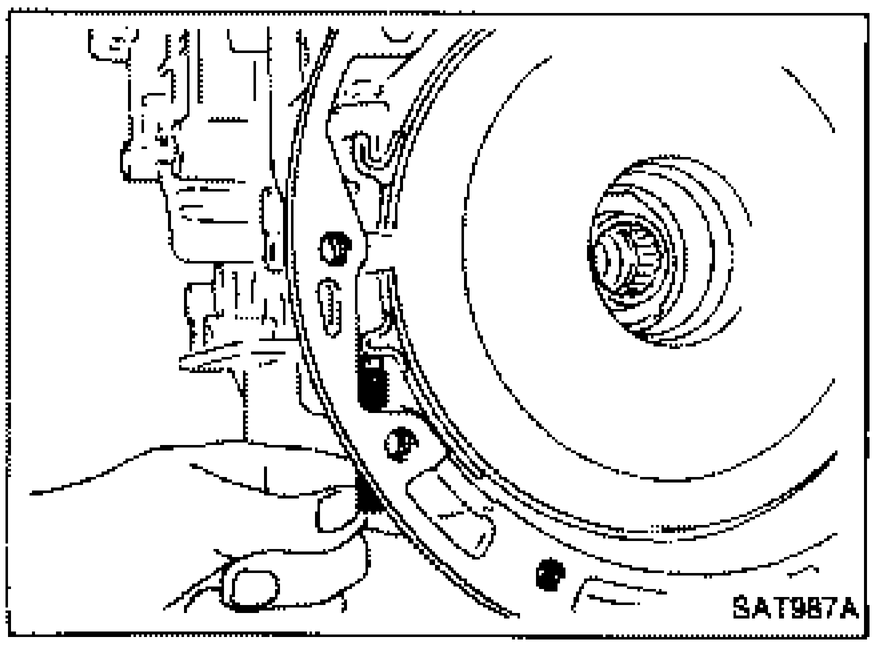
4. Install brake band and band strut.

a. Install band strut on brake band.

- **Apply petroleum jelly to band strut.**

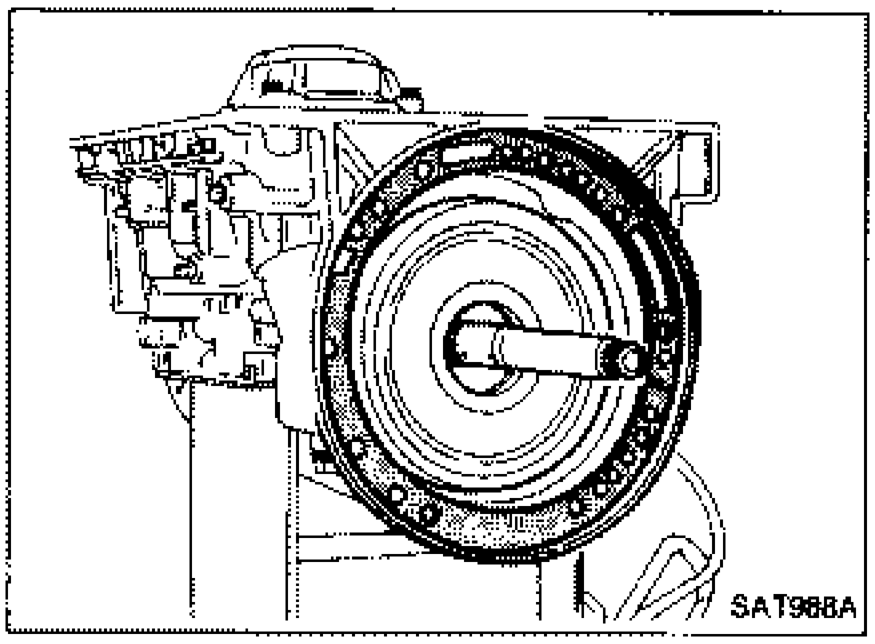


b. Place brake band on periphery of reverse clutch drum, and insert band strut into end of band servo piston stem.

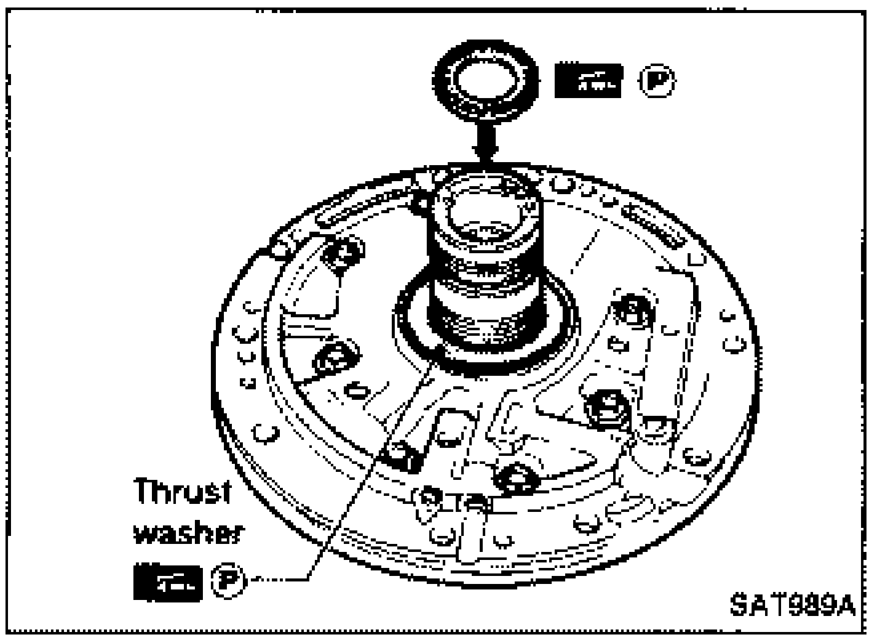


c. Install anchor end bolt on transmission case. Then, tighten anchor end bolt just enough so that reverse clutch drum (clutch pack) will not tilt forward.

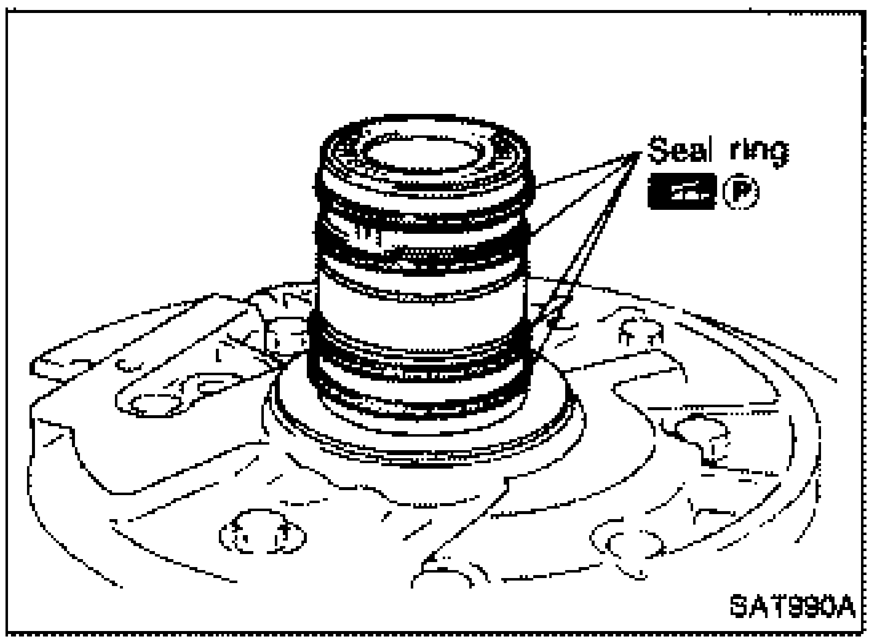
Assembly (Cont'd)



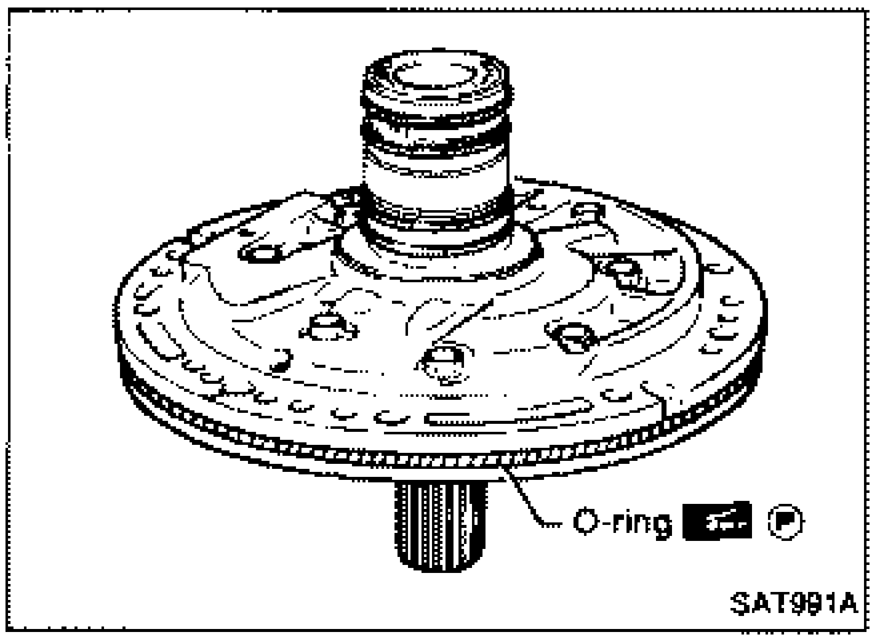
5. Install input shaft on transmission case.
- **Pay attention to its direction — O-ring groove side is front.**
6. Install gasket on transmission case.



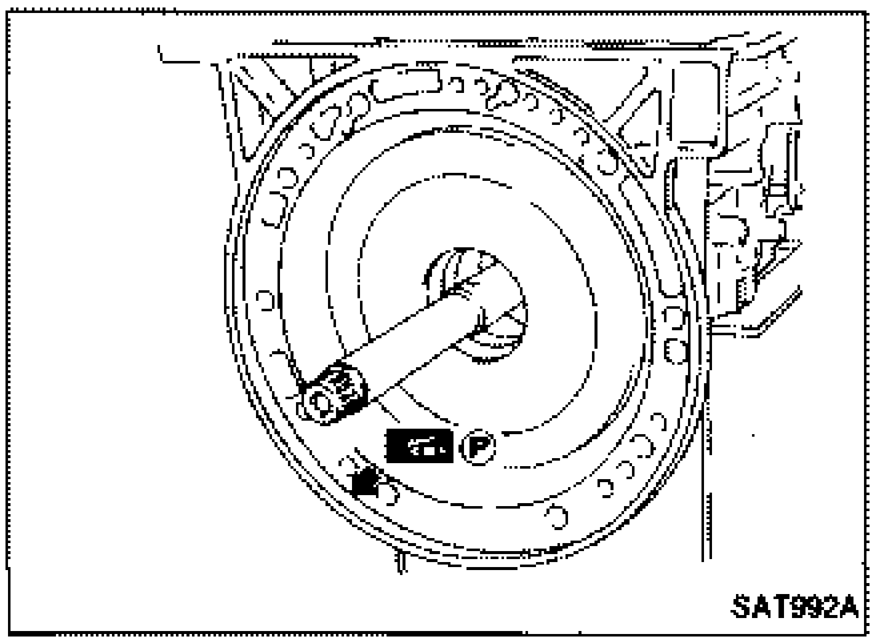
7. Install oil pump assembly.
a. Install needle bearing on oil pump assembly.
- **Apply petroleum jelly to the needle bearing.**
b. Install selected thrust washer on oil pump assembly.
- **Apply petroleum jelly to thrust washer.**



c. Carefully install seal rings into grooves and press them into the petroleum jelly so that they are a tight fit.

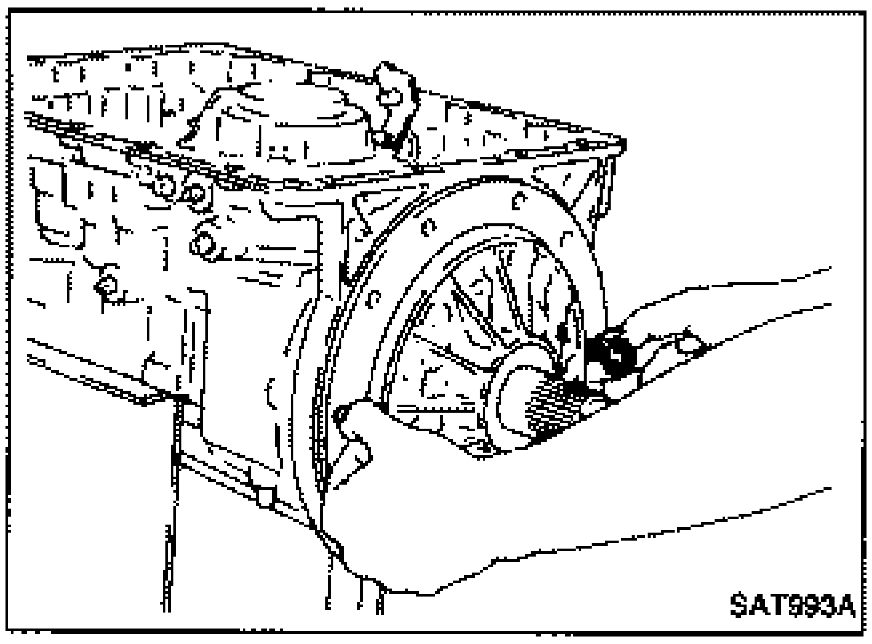


d. Install O-ring on oil pump assembly.
- **Apply petroleum jelly to O-ring.**



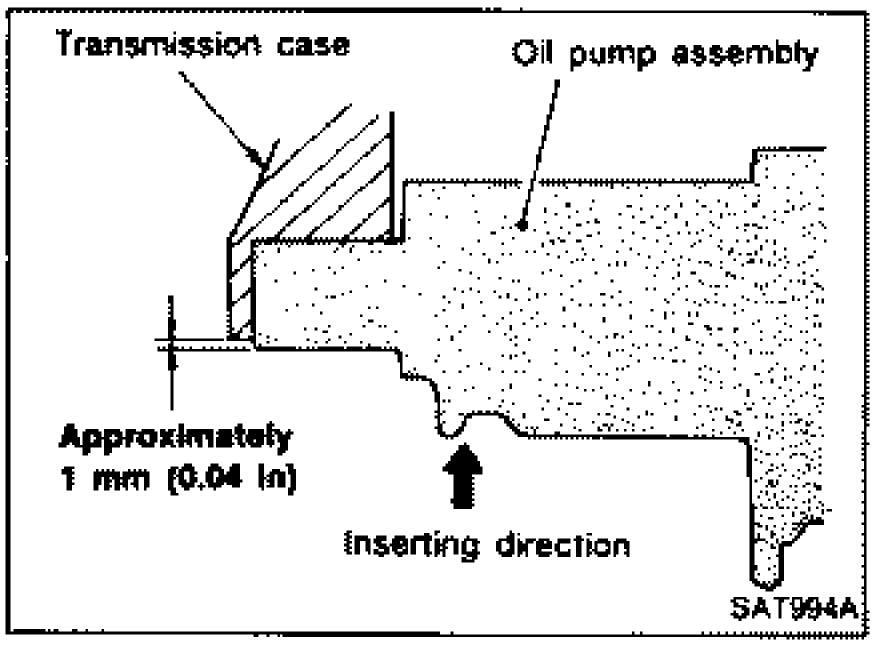
e. Apply petroleum jelly to mating surface of transmission case and oil pump assembly.

Assembly (Cont'd)

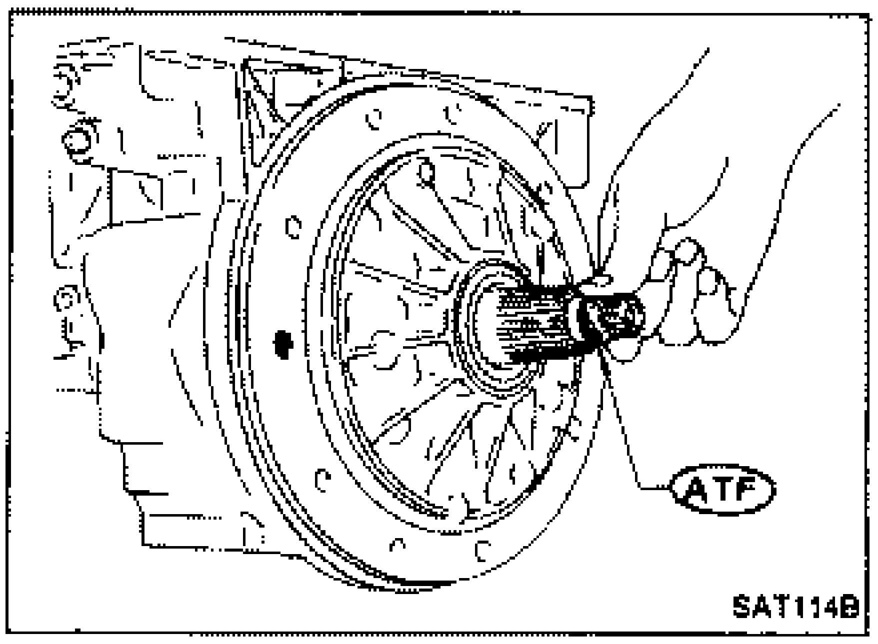


f. Install oil pump assembly.

- **Install two converter housing securing bolts in bolt holes in oil pump assembly as guides.**

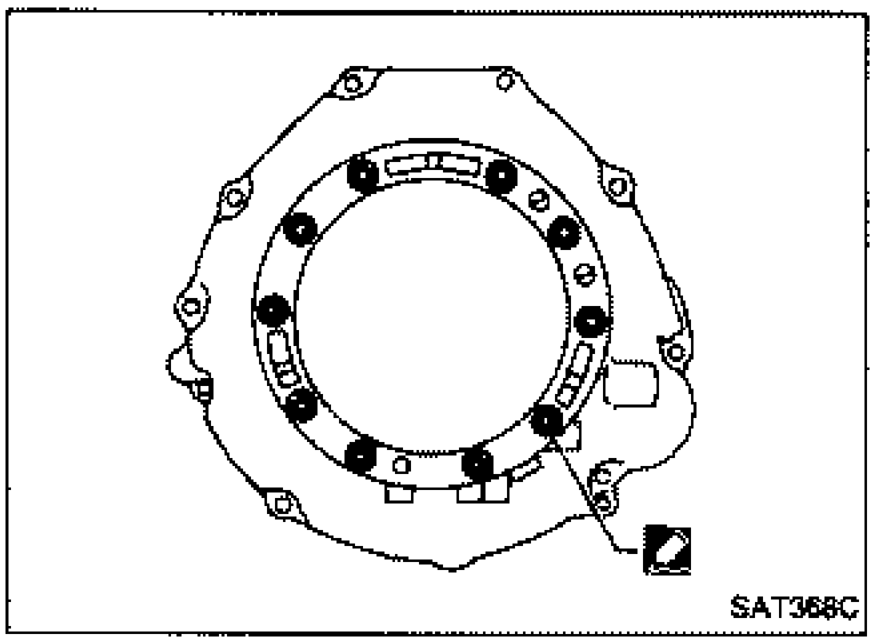


- **Insert oil pump assembly to the specified position in transmission, as shown at left.**



8. Install O-ring on input shaft.

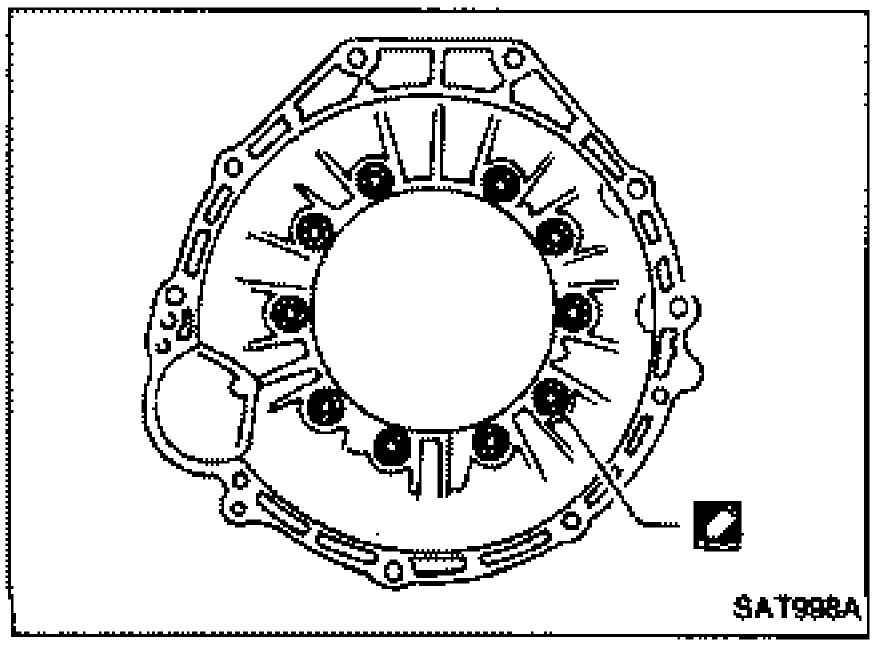
- **Apply A.T.F. to O-rings.**



9. Install converter housing.

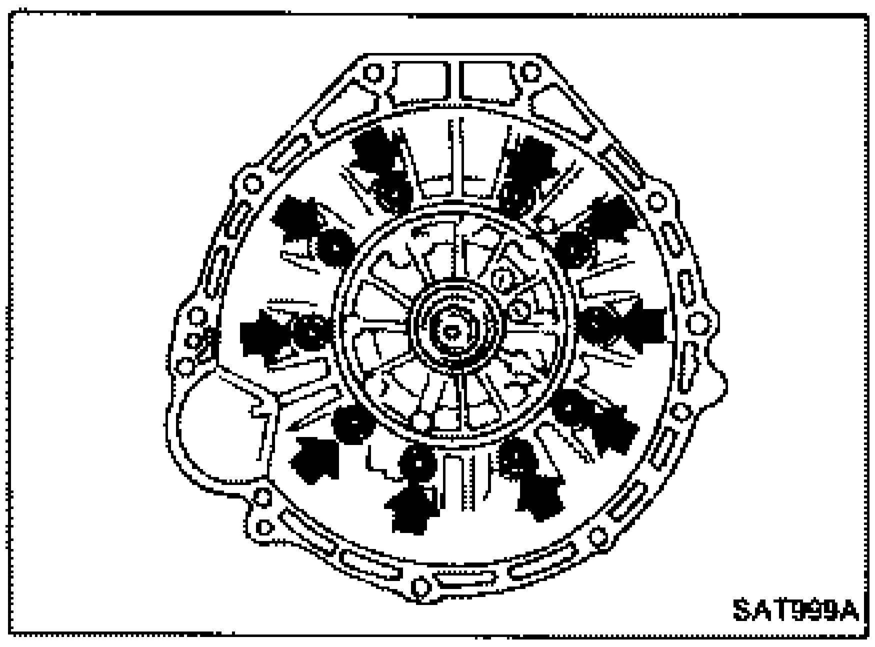
a. Apply recommended sealant (Nissan genuine part: KP610-00250 or equivalent) to outer periphery of bolt holes in converter housing.

- **Do not apply too much sealant.**

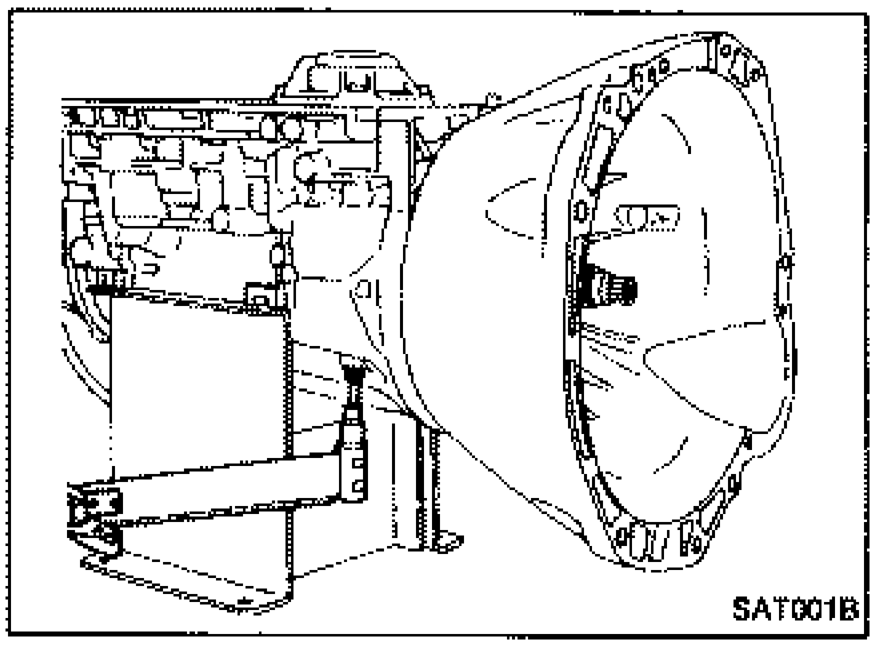


b. Apply recommended sealant (Nissan genuine part: KP610-00250 or equivalent) to seating surfaces of bolts that secure front of converter housing.

Assembly (Cont'd)



c. Install converter housing on transmission case.



10. Adjust brake band.

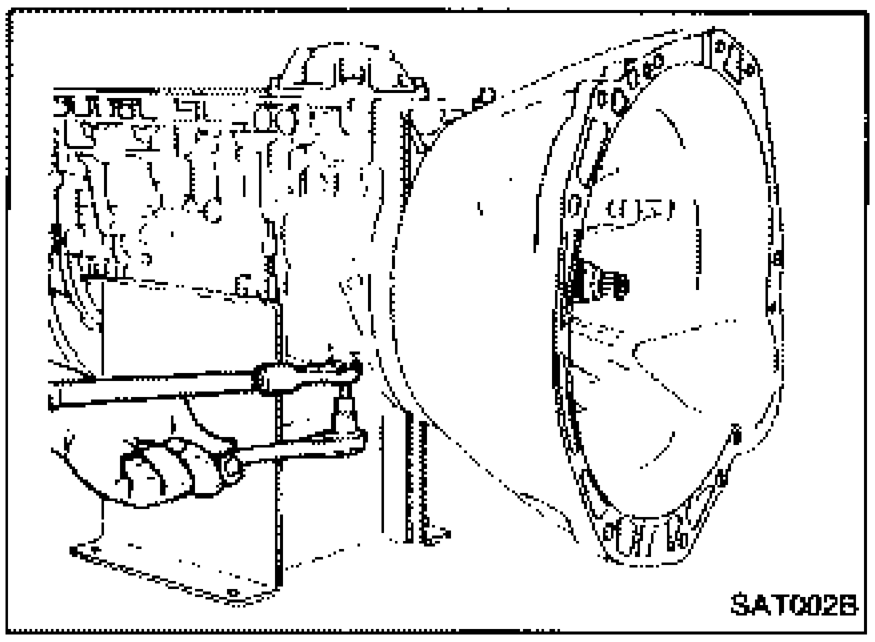
a. Tighten anchor end bolt to specified torque.

Anchor end bolt:

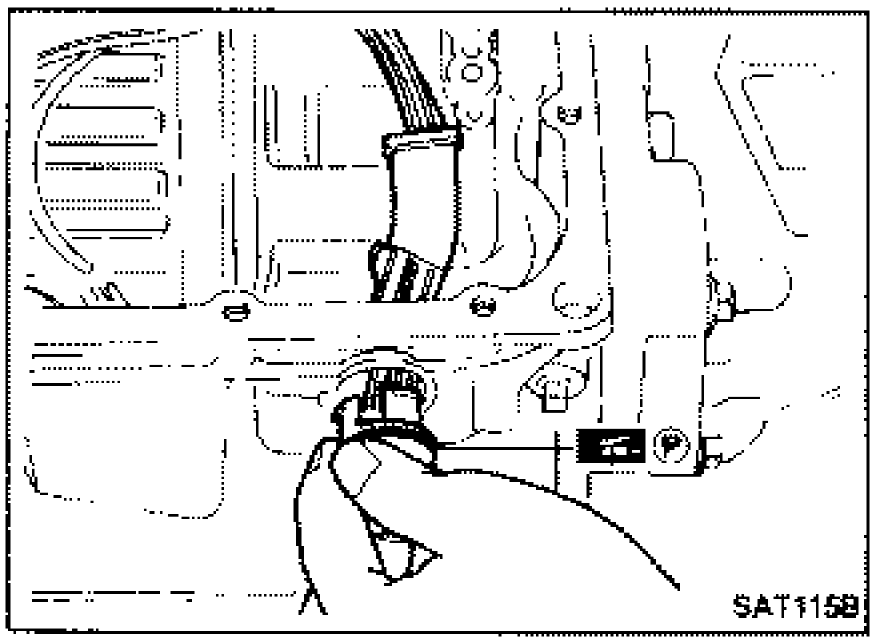
: 4 - 6 N·m

(0.4 - 0.6 kg-m, 2.9 - 4.3 ft-lb)

b. Back off anchor end bolt two and a half turns.



c. While holding anchor end pin, tighten lock nut.

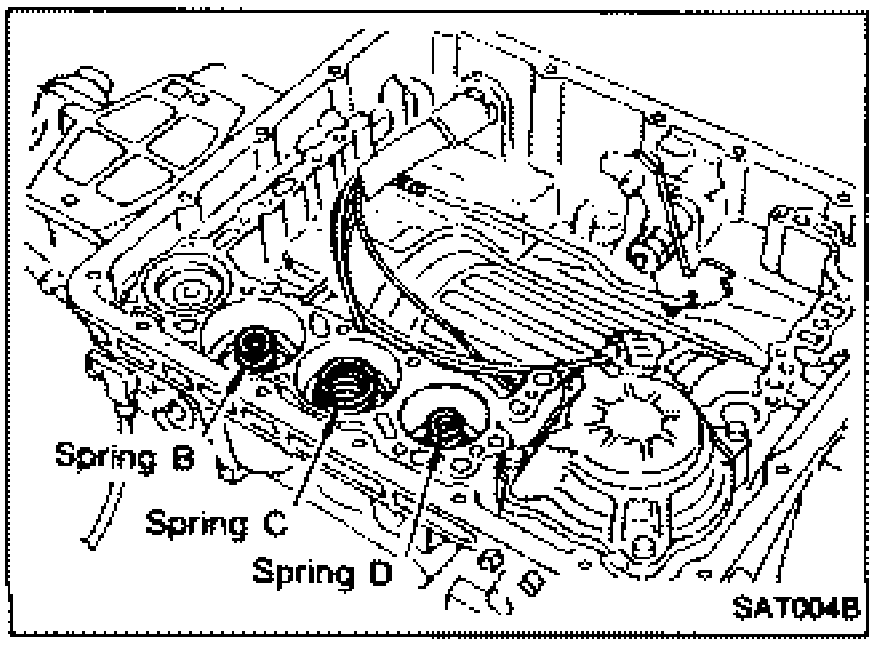


11. Install terminal cord assembly.

a. Install O-ring on terminal cord assembly.

- **Apply petroleum jelly to O-ring.**

b. Compress terminal cord assembly stopper and install terminal cord assembly on transmission case.



12. Install control valve assembly.

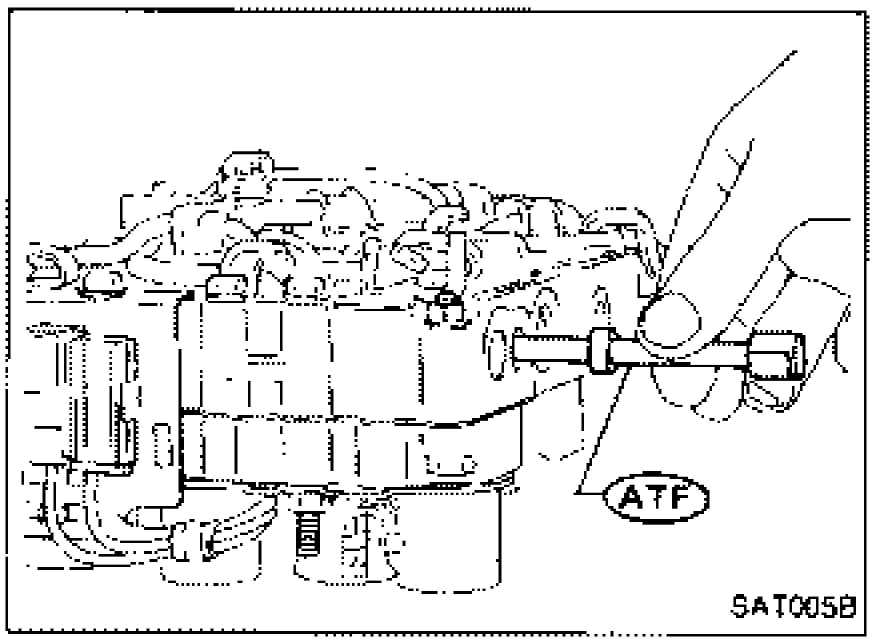
a. Install accumulator piston return springs B, C and D.

Free length of return springs:

Unit: mm (in)

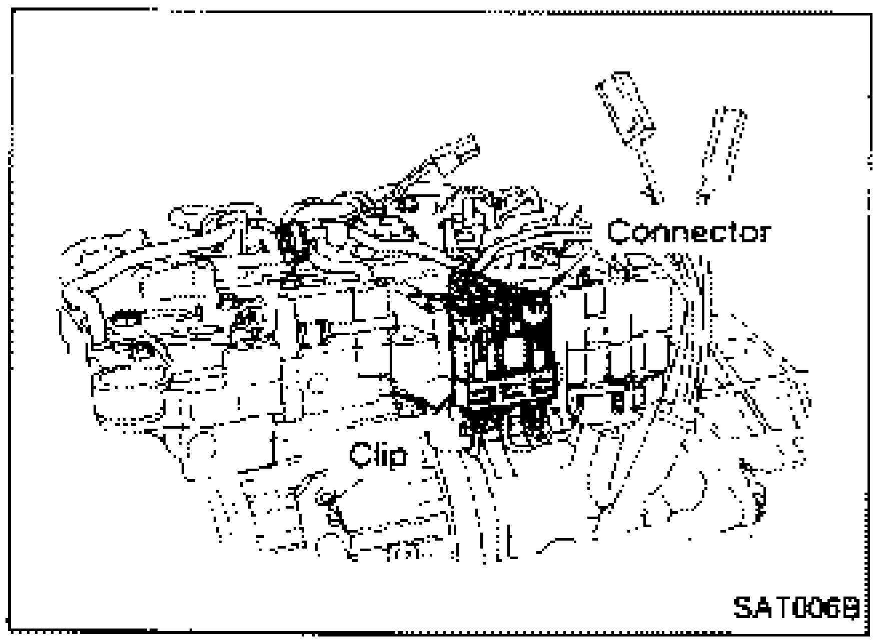
Item \ Accumulator	B	C	D
Free length	66 (2.60)	45 (1.77)	58.4 (2.299)

Assembly (Cont'd)



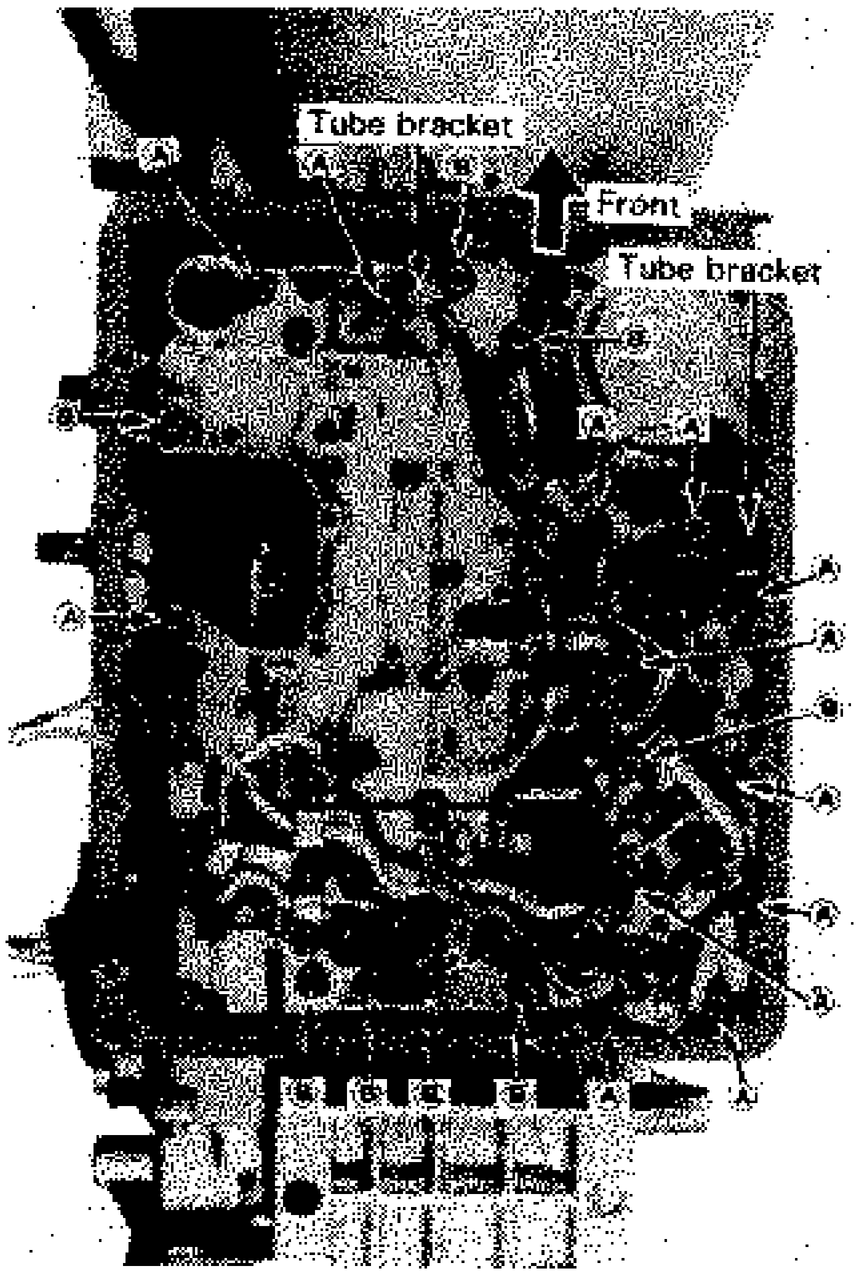
b. Install manual valve on control valve.

- **Apply A.T.F. to manual valve.**



c. Place control valve assembly on transmission case. Connect solenoid connector for upper body.

d. Install connector clip.

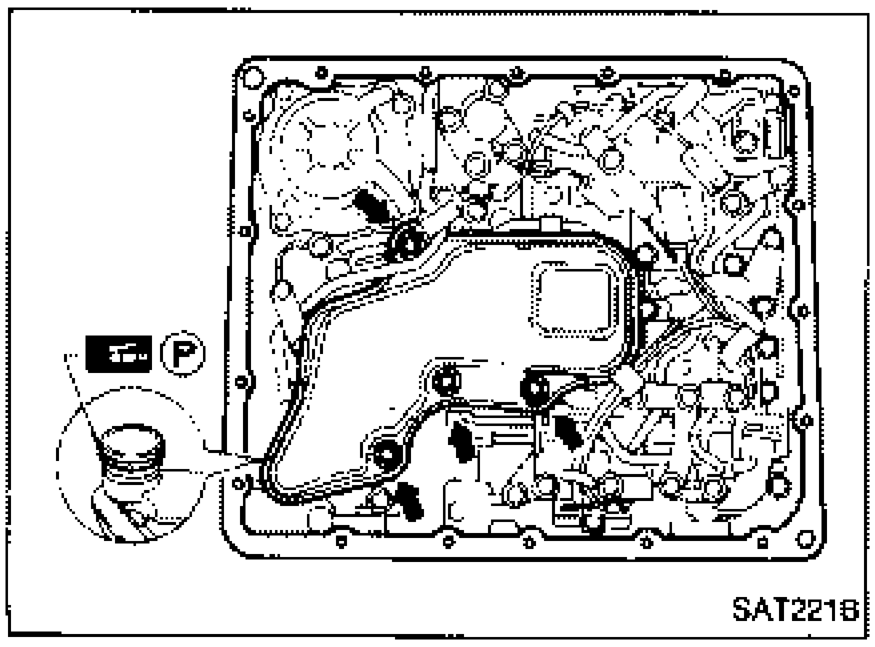


e. Install control valve assembly on transmission case.

f. Install connector tube brackets and tighten bolts Ⓐ and Ⓑ.

- **Check that terminal assembly harness does not catch.**

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

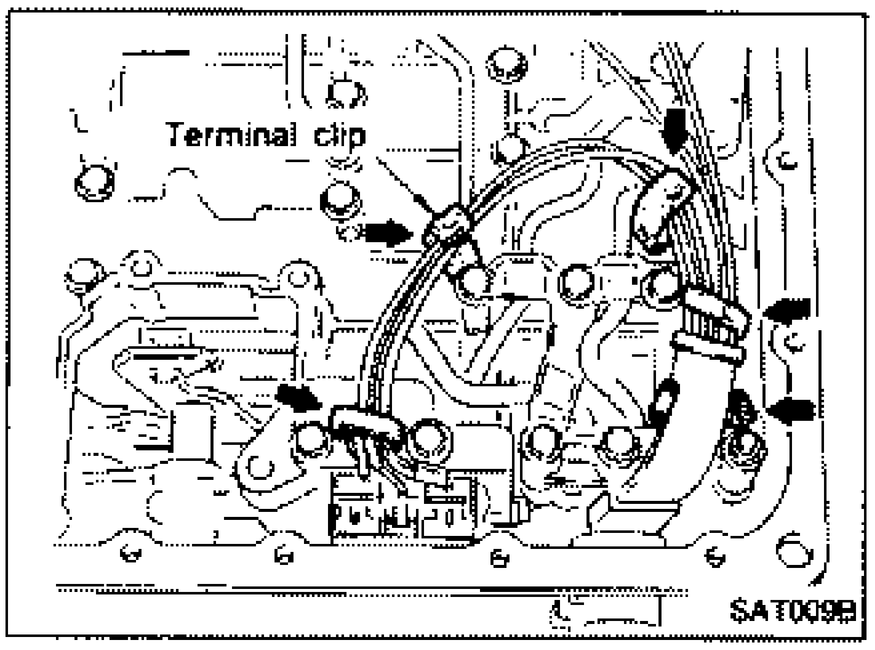


g. Install O-ring on oil strainer.

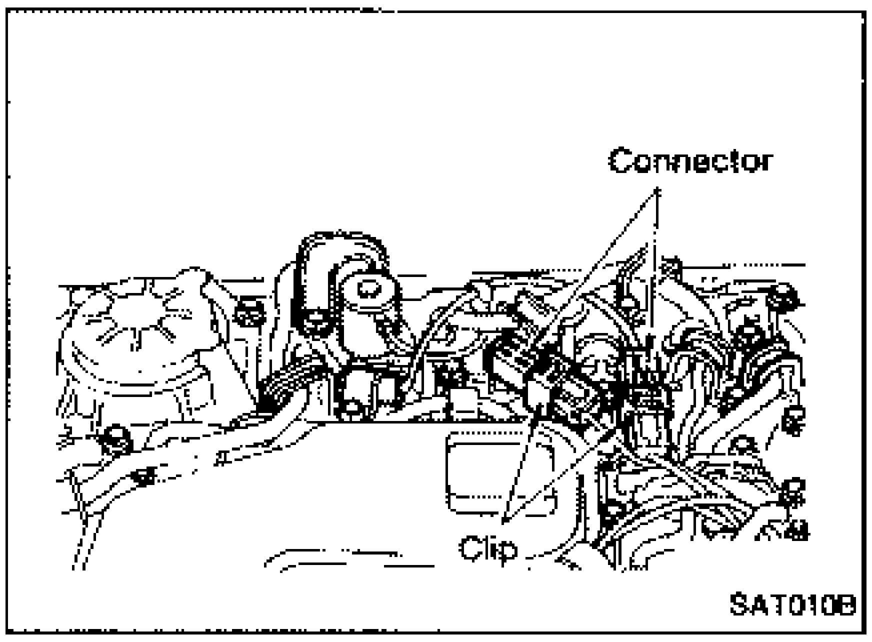
- **Apply petroleum jelly to O-ring.**

h. Install oil strainer on control valve.

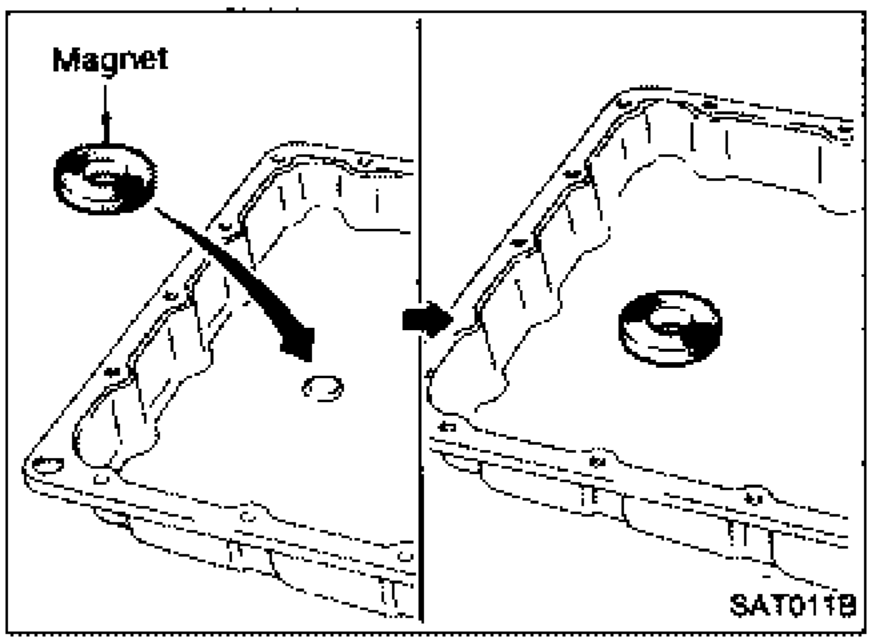
Assembly (Cont'd)



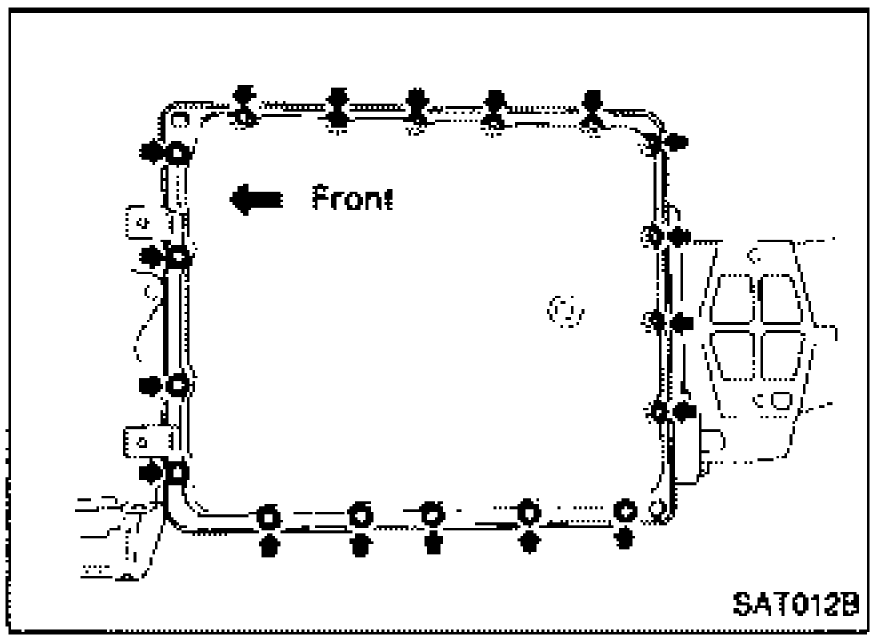
i. Securely fasten terminal harness with clips.



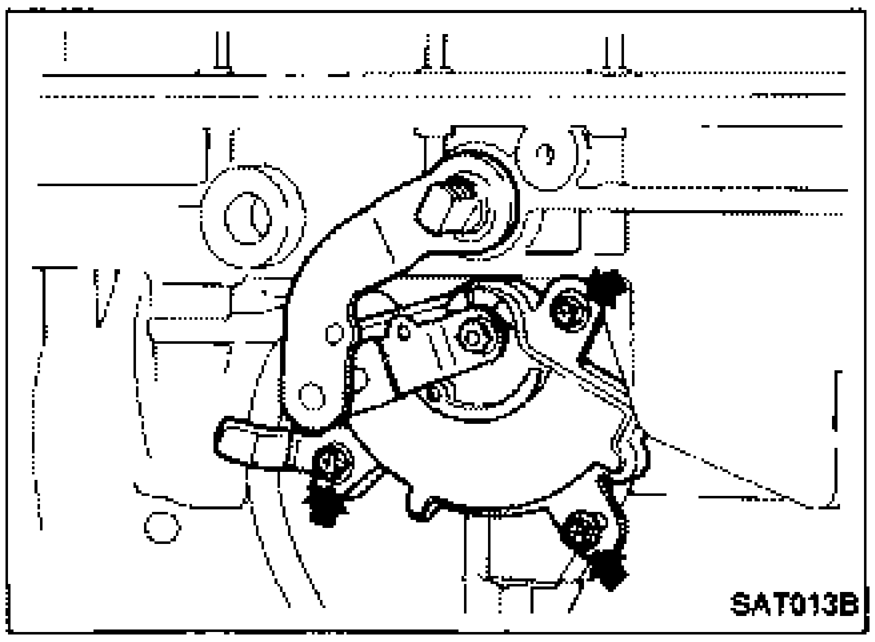
j. Install lock-up solenoid and fluid temperature sensor connectors.



13. Install oil pan.
a. Attach a magnet to oil pan.

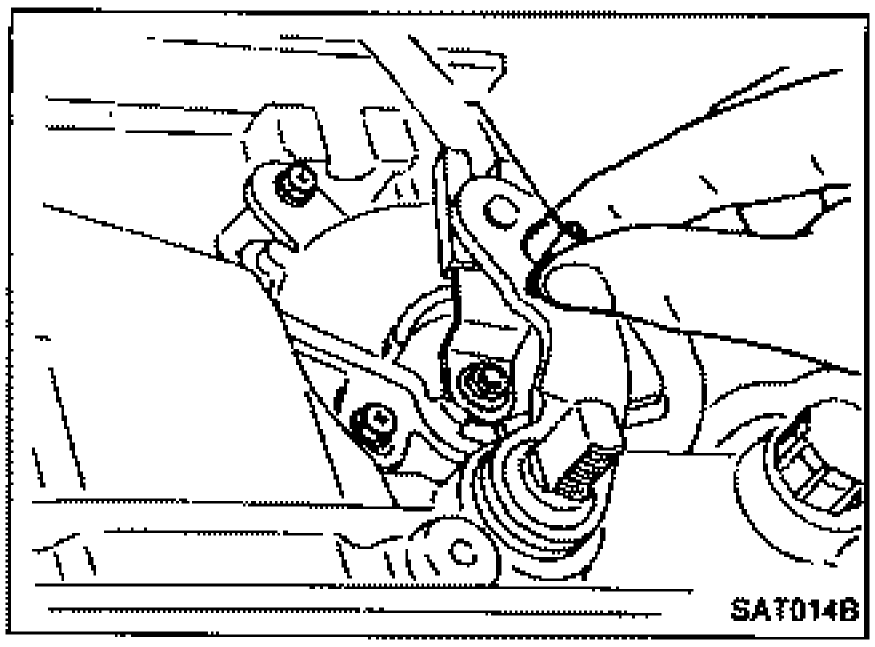


b. Install oil pan gasket on transmission case.
c. Install oil pan and bracket on transmission case.
- **Tighten four bolts in a criss-cross pattern to prevent dislocation of gasket.**

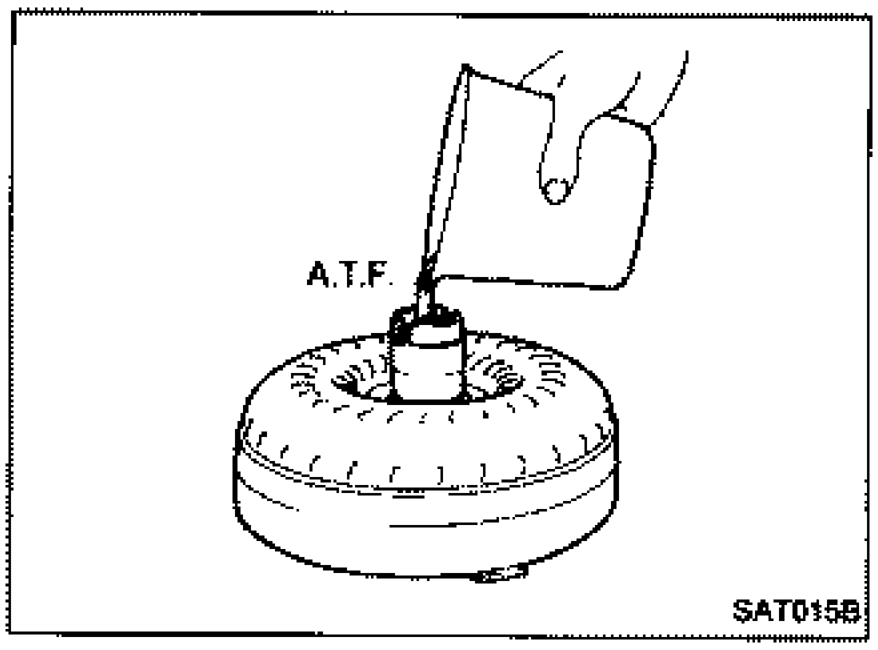


14. Install inhibitor switch.
a. Check that manual shaft is in "1" range.
b. Temporarily install inhibitor switch on manual shaft.
c. Move manual shaft to "N".

Assembly (Cont'd)



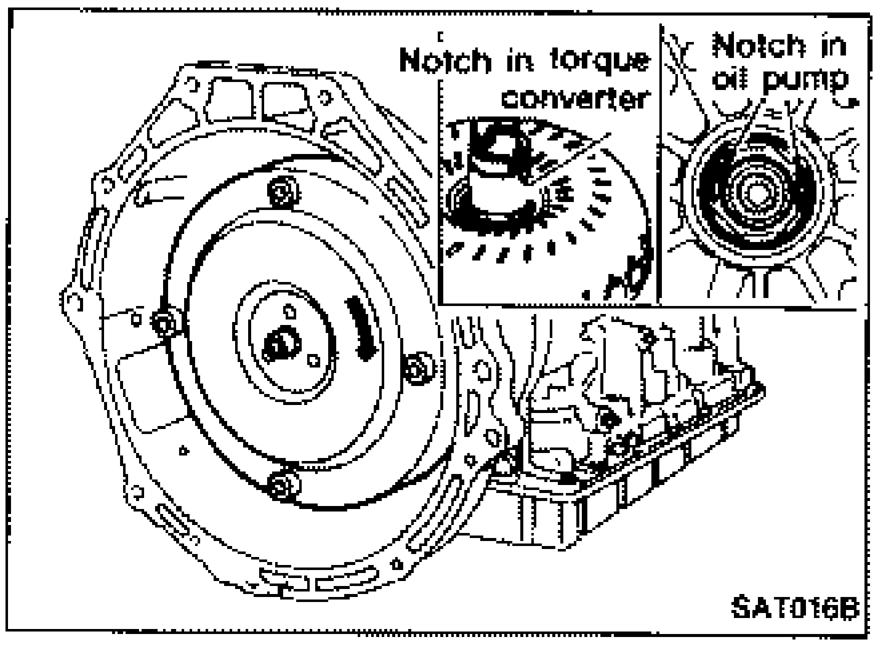
d. Tighten bolts while inserting 4.0 mm (0.157 in) dia. pin vertically into locating holes in inhibitor switch and manual shaft.



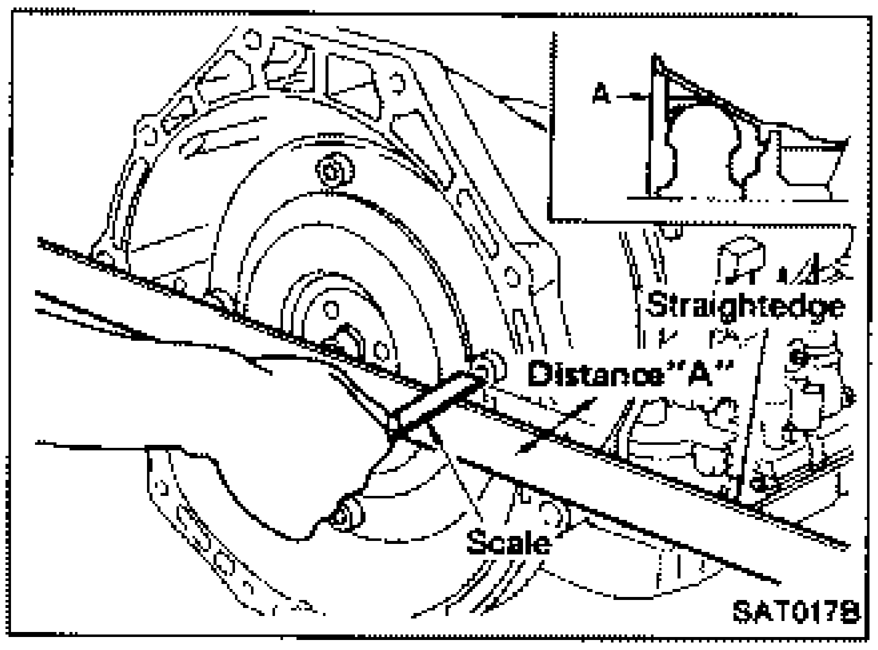
15. Install torque converter.

a. Pour A.T.F. into torque converter.

- **Approximately 2 liters (1-3/4 Imp qt) of fluid are required for a new torque converter.**
- **When reusing old torque converter, add the same amount of fluid as was drained.**



b. Install torque converter while aligning notches and oil pump.



c. Measure distance A to check that torque converter is in proper position.

Distance "A":

RE4R01A

26 mm (1.02 in) or more

RE4R03A

25 mm (0.98 in) or more

General Specifications

Engine	VG30DE	VG30DETT
Automatic transmission model	RE4R01A	RE4R03A
Transmission model code number	45 x 65	51 × 10
Stall torque ratio	2.0 : 1	
Transmission gear ratio		
1st	2.785	2.784
2nd	1.545	1.544
Top	1.000	1.000
O.D.	0.694	0.694
Reverse	2.272	2.275
Recommended oil	Automatic transmission fluid Type DEXRON™	
Oil capacity ℓ (Imp qt)	8.3 (7-1/4)	8.7 (7-5/8)

Specifications and Adjustment — RE4R01A

VEHICLE SPEED WHEN SHIFTING GEARS

Throttle position	Vehicle speed km/h (MPH)					
	$D_1 \to D_2$	$D_2 \to D_3$	$D_3 \to D_4$	$D_4 \to D_3$	$D_3 \to D_2$	$D_2 \to D_1$
Full throttle	50 - 54 (31 - 34)	107 - 115 (66 - 71)	166 - 176 (103 - 109)	161 - 169 (100 - 105)	97 - 105 (60 - 65)	44 - 48 (27 - 30)
Half throttle	45 - 49 (28 - 30)	83 - 89 (52 - 55)	119 - 127 (74 - 79)	80 - 88 (50 - 55)	33 - 39 (21 - 24)	10 - 14 (6 - 9)

VEHICLE SPEED WHEN PERFORMING AND RELEASING LOCK-UP

Throttle position	O.D. switch [Shift range]	Vehicle speed km/h (MPH)	
		Lock-up "ON"	Lock-up "OFF"
Full throttle	ON [D_4]	167 - 175 (104 - 109)	161 - 169 (100 - 105)
	OFF [D_3]	107 - 115 (66 - 71)	97 - 105 (60 - 65)
Half throttle	ON [D_4]	120 - 128 (75 - 80)	84 - 92 (52 - 57)
	OFF [D_3]	91 - 99 (57 - 62)	86 - 94 (53 - 58)

STALL REVOLUTION

Stall revolution rpm
2,450 - 2,650

LINE PRESSURE

Engine speed rpm	Line pressure kPa (bar, kg/cm², psi)	
	D, 2 and 1 ranges	R range
Idle	412 - 490 (4.12 - 4.90, 4.2 - 5.0, 60 - 71)	608 - 647 (6.08 - 6.47, 6.2 - 6.6, 88 - 94)
Stall	1,020 - 1,098 (10.20 - 10.98, 10.4 - 11.2, 148 - 159)	1,422 - 1,500 (14.22 - 15.00, 14.5 - 15.3, 206 - 218)

Specifications and Adjustment — RE4R01A (Cont'd)

RETURN SPRINGS

Unit: mm (in)

Parts		Item	Part No.	Free length	Outer diameter
Control valve	Upper body	Torque converter relief valve spring	31742-41X23	38.0 (1.496)	9.0 (0.354)
		Pressure regulator valve spring	31742-41X24	44.02 (1.7331)	14.0 (0.551)
		Pressure modifier valve spring	31742-41X19	31.95 (1.2579)	6.8 (0.268)
		Shuttle shift valve D spring	31762-41X00	26.5 (1.043)	6.0 (0.236)
		4-2 sequence valve spring	31756-41X00	29.1 (1.146)	6.95 (0.2736)
		Shift valve B spring	31762-41X01	25.0 (0.984)	7.0 (0.276)
		4-2 relay valve spring	31756-41X00	29.1 (1.146)	6.95 (0.2736)
		Shift valve A spring	31762-41X01	25.0 (0.984)	7.0 (0.276)
		Overrun clutch control valve spring	31762-41X03	23.6 (0.929)	7.0 (0.276)
		Overrun clutch reducing valve spring	31742-41X20	32.5 (1.280)	7.0 (0.276)
		Shuttle shift valve S spring	31762-41X04	51.0 (2.008)	5.65 (0.2224)
		Pilot valve spring	31742-41X13	25.7 (1.012)	9.1 (0.358)
		Lock-up control valve spring	31742-41X22	18.5 (0.728)	13.0 (0.512)
	Lower body	Modifier accumulator piston spring	31742-41X15	30.5 (1.201)	9.8 (0.386)
		1st reducing valve spring	31756-41X05	25.4 (1.000)	6.75 (0.2657)
		3-2 timing valve spring	31742-41X08	20.55 (0.8091)	6.75 (0.2657)
		Servo charger valve spring	31742-41X06	23.0 (0.906)	6.7 (0.264)
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	31605-41X10	66.0 (2.598)	
		Accumulator C	31605-41X09	45.0 (1.772)	
		Accumulator D	31605-41X06	58.4 (2.299)	

ACCUMULATOR O-RING

Accumulator	Diameter mm (in)			
	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)

CLUTCHES AND BRAKES

Reverse clutch		
Number of drive plates	2	
Number of driven plates	2	
Thickness of drive plate mm (in)		
Standard	2.0 (0.079)	
Wear limit	1.8 (0.071)	
Clearance mm (in)		
Standard	0.5 - 0.8 (0.020 - 0.031)	
Allowable limit	1.2 (0.047)	
	Thickness mm (in)	Part number
Thickness of retaining plate	4.6 (0.181)	31537-21X00
	4.8 (0.189)	31537-21X01
	5.0 (0.197)	31537-21X02
	5.2 (0.205)	31537-21X03
	5.4 (0.213)	31537-21X04
	5.6 (0.220)	31567-21X13
	5.8 (0.228)	31567-21X14

High clutch		
Number of drive plates	5	
Number of driven plates	5	
Thickness of drive plate mm (in)		
Standard	1.6 (0.063)	
Wear limit	1.4 (0.055)	
Clearance mm (in)		
Standard	1.8 - 2.2 (0.071 - 0.087)	
Allowable limit	3.2 (0.126)	
	Thickness mm (in)	Part number
Thickness of retaining plate	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

Forward clutch		
Number of drive plates	7	
Number of driven plates	7	
Thickness of drive plate mm (in)		
Standard	1.6 (0.063)	
Wear limit	1.4 (0.055)	
Clearance mm (in)		
Standard	0.45 - 0.85 (0.0177 - 0.0335)	
Allowable limit	2.25 (0.0886)	
	Thickness mm (in)	Part number
Thickness of retaining plate	4.0 (0.157)	31537-41X07
	4.2 (0.165)	31537-41X08
	4.4 (0.173)	31537-41X09
	4.6 (0.181)	31537-41X10
	4.8 (0.189)	31537-41X11
	5.0 (0.197)	31537-41X12
	5.2 (0.205)	31537-41X13

Overrun clutch		
Number of drive plates	3	
Number of driven plates	5	
Thickness of drive plate mm (in)		
Standard	2.0 (0.079)	
Wear limit	1.8 (0.071)	
Clearance mm (in)		
Standard	1.0 - 1.4 (0.039 - 0.055)	
Allowable limit	2.0 (0.079)	
	Thickness mm (in)	Part number
Thickness of retaining plate	4.0 (0.157)	31537-41X79
	4.2 (0.165)	31537-41X80
	4.4 (0.173)	31537-41X81
	4.6 (0.181)	31537-41X82
	4.8 (0.189)	31537-41X83
	5.0 (0.197)	31537-41X84
	5.2 (0.205)	31537-41X20

Low & reverse brake		
Number of drive plates	7	
Number of driven plates	9	
Thickness of drive plate mm (in)		
Standard	2.0 (0.079)	
Wear limit	1.8 (0.071)	
Clearance mm (in)		
Standard	1.1 - 1.5 (0.043 - 0.059)	
Allowable limit	2.9 (0.114)	
Thickness of retaining plate	Thickness mm (in)	Part number
	7.2 (0.283) 7.4 (0.291) 7.6 (0.299) 7.8 (0.307) 8.0 (0.315) 8.2 (0.323)	31667-41X13 31667-41X14 31667-41X07 31667-41X08 31667-41X00 31667-41X01
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	

OIL PUMP AND LOW ONE-WAY CLUTCH

Oil pump clearance mm (in)	
Cam ring — oil pump housing	
Standard	0.01 - 0.024 (0.0004 - 0.0009)
Rotor, vanes and control piston — oil pump housing	
Standard	0.03 - 0.044 (0.0012 - 0.0017)
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 "T_1"	0.25 - 0.55 mm (0.0098 - 0.0217 in)	
Thickness of oil pump cover bearing race	Thickness mm (in)	Part number
	0.8 (0.031) 1.0 (0.039) 1.2 (0.047) 1.4 (0.055) 1.6 (0.063) 1.8 (0.071) 2.0 (0.079)	31429-21X00 31429-21X01 31429-21X02 31429-21X03 31429-21X04 31429-21X05 31429-21X06

REVERSE CLUTCH DRUM END PLAY

Reverse clutch drum end play "T_2"	0.55 - 0.90 mm (0.0217 - 0.0354 in)	
Thickness of oil pump thrust washer	Thickness mm (in)	Part number
	0.7 (0.028) 0.9 (0.035) 1.1 (0.043) 1.3 (0.051) 1.5 (0.059) 1.7 (0.067) 1.9 (0.075)	31528-21X00 31528-21X01 31528-21X02 31528-21X03 31528-21X04 31528-21X05 31528-21X06

REMOVAL AND INSTALLATION

Manual control linkage	
Number of returning revolutions for lock nut	1
Lock nut tightening torque	11 - 15 N·m (1.1 - 1.5 kg-m, 8 - 11 ft-lb)
Distance between end of clutch housing and torque converter	26.0 mm (1.024 in) or more
Drive plate runout limit	0.5 mm (0.020 in)

Specifications and Adjustment — RE4R03A

VEHICLE SPEED WHEN SHIFTING GEARS

Throttle position	Vehicle speed km/h (MPH)					
	$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$
Full throttle	68 - 72 (42 - 45)	120 - 128 (75 - 80)	183 - 193 (114 - 120)	177 - 187 (110 - 116)	111 - 119 (69 - 74)	47 - 51 (29 - 32)
Half throttle	47 - 51 (29 - 32)	89 - 95 (55 - 59)	136 - 144 (85 - 89)	118 - 126 (73 - 78)	79 - 85 (49 - 53)	10 - 14 (6 - 9)

VEHICLE SPEED WHEN PERFORMING AND RELEASING LOCK-UP

Throttle position	O.D. switch [Shift range]	Vehicle speed km/h (MPH)	
		Lock-up "ON"	Lock-up "OFF"
Full throttle	ON $[D_4]$	184 - 192 (114 - 119)	178 - 186 (111 - 116)
	OFF $[D_3]$	120 - 128 (75 - 80)	111 - 119 (69 - 74)
Half throttle	ON $[D_4]$	136 - 144 (85 - 89)	117 - 125 (73 - 78)
	OFF $[D_3]$	91 - 99 (57 - 62)	86 - 94 (53 - 58)

STALL REVOLUTION

Stall revolution rpm
2,950 - 3,200

LINE PRESSURE

Engine speed rpm	Line pressure kPa (bar, kg/cm^2, psi)	
	D, 2 and 1 ranges	R range
Idle	412 - 490 (4.12 - 4.90, 4.2 - 5.0, 60 - 71)	608 - 647 (6.08 - 6.47, 6.2 - 6.6, 88 - 94)
Stall	1,020 - 1,098 (10.20 - 10.98, 10.4 - 11.2, 148 - 159)	1,422 - 1,500 (14.22 - 15.00, 14.5 - 15.3, 206 - 218)

Specifications and Adjustment — RE4R03A (Cont'd)

RETURN SPRINGS

Unit: mm (in)

Parts		Item	Part No.	Free length	Outer diameter
Control valve	Upper body	Torque converter relief valve spring	31742-41X23	38.0 (1.496)	9.0 (0.354)
		Pressure regulator valve spring	31742-41X24	44.02 (1.7331)	14.0 (0.551)
		Pressure modifier valve spring	31742-41X19	31.95 (1.2579)	6.8 (0.268)
		Shuttle shift valve D spring	31762-41X00	26.5 (1.043)	6.0 (0.236)
		4-2 sequence valve spring	31756-41X00	29.1 (1.146)	6.95 (0.2736)
		Shift valve B spring	31762-41X01	25.0 (0.984)	7.0 (0.276)
		4-2 relay valve spring	31756-41X00	29.1 (1.146)	6.95 (0.2736)
		Shift valve A spring	31762-41X01	25.0 (0.984)	7.0 (0.276)
		Overrun clutch control valve spring	31762-41X03	23.6 (0.929)	7.0 (0.276)
		Overrun clutch reducing valve spring	31742-41X20	32.5 (1.280)	7.0 (0.276)
		Shuttle shift valve S spring	31762-41X04	51.0 (2.008)	5.65 (0.2224)
		Pilot valve spring	31742-41X13	25.7 (1.012)	9.1 (0.358)
		Lock-up control valve spring	31742-41X22	18.5 (0.728)	13.0 (0.512)
	Lower body	Modifier accumulator piston spring	31742-41X15	30.5 (1.201)	9.8 (0.386)
		1st reducing valve spring	31756-41X05	25.4 (1.000)	6.75 (0.2657)
		3-2 timing valve spring	31742-41X08	20.56 (0.8091)	6.75 (0.2657)
		Servo charger valve spring	31742-41X06	23.0 (0.906)	6.7 (0.264)
Reverse clutch		16 pcs	31505-51X00	37.8 (1.488)	14.8 (0.583)
High clutch		16 pcs	31505-21X03	22.06 (0.8685)	11.6 (0.457)
Forward clutch (Overrun clutch)		20 pcs	31505-51X04	36.8 (1.449)	9.8 (0.386)
Low & reverse brake		Inner 16 pcs	31505-51X06	20.43 (0.8043)	10.3 (0.406)
		Outer 16 pcs	31505-51X05	20.35 (0.8012)	13.0 (0.512)
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	31605-41X10	66.0 (2.598)	
		Accumulator C	31605-41X09	45.0 (1.772)	
		Accumulator D	31605-41X06	58.4 (2.299)	

ACCUMULATOR O-RING

Accumulator	Diameter mm (in)			
	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)

CLUTCHES AND BRAKES

Reverse clutch		
Number of drive plates	3	
Number of driven plates	3	
Thickness of drive plate mm (in)		
Standard	2.0 (0.079)	
Wear 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 plate	Thickness mm (in)	Part number
	4.4 (0.173)	31537-57X61
	4.6 (0.181)	31537-51X00
	4.8 (0.189)	31537-51X01
	5.0 (0.197)	31537-51X02

High clutch		
Number of drive plates	7	
Number of driven plates	7 + 1	
Thickness of drive plate mm (in)		
Standard	1.6 (0.063)	
Wear limit	1.4 (0.055)	
Clearance mm (in)		
Standard	1.8 - 2.2 (0.071 - 0.087)	
Allowable limit	3.0 (0.118)	
Thickness of retaining plate	Thickness mm (in)	Part number
	4.0 (0.157)	31537-51X19
	4.2 (0.165)	31537-51X60
	4.4 (0.173)	31537-51X61
	4.6 (0.181)	31537-51X00
	4.8 (0.189)	31537-51X01
	5.0 (0.197)	31537-51X02

Forward clutch		
Number of drive plates	8	
Number of driven plates	8	
Thickness of drive plate mm (in)		
Standard	2.0 (0.079)	
Wear limit	1.6 (0.063)	
Clearance mm (in)		
Standard	0.45 - 0.85 (0.0177 - 0.0335)	
Allowable limit	2.45 (0.0965)	
Thickness of retaining plate	Thickness mm (in)	Part number
	4.2 (0.165)	31537-51X67
	4.4 (0.173)	31537-51X05
	4.6 (0.181)	31537-51X06
	4.8 (0.189)	31537-51X07
	5.0 (0.197)	31537-51X08
	5.2 (0.205)	31537-51X09

Overrun clutch		
Number of drive plates	4	
Number of driven plates	7	
Thickness of drive plate mm (in)		
Standard	1.6 (0.063)	
Wear limit	1.4 (0.055)	
Clearance mm (in)		
Standard	1.0 - 1.4 (0.039 - 0.055)	
Allowable limit	2.2 (0.087)	
Thickness of retaining plate	Thickness mm (in)	Part number
	3.8 (0.150)	31537-51X11
	4.0 (0.157)	31537-51X12
	4.2 (0.165)	31537-51X13
	4.4 (0.173)	31537-51X14
	4.6 (0.181)	31537-51X15
	4.8 (0.189)	31537-51X64

Specifications and Adjustment — RE4R03A (Cont'd)

Low & reverse brake		
Number of drive plates	2 + 6	
Number of driven plates	6	
Thickness of drive plate mm (in)		
Standard	1.6 (0.063)	
Wear limit	1.4 (0.055)	
Clearance mm (in)		
Standard	1.1 - 1.5 (0.043 - 0.059)	
Allowable limit	2.5 (0.098)	
	Thickness mm (in)	Part number
Thickness of retaining plate	4.2 (0.165)	31567-51X10
	4.4 (0.173)	31667-51X00
	4.6 (0.181)	31667-51X01
	4.8 (0.189)	31667-51X02
	5.0 (0.197)	31667-51X03
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	

OIL PUMP AND LOW ONE-WAY CLUTCH

Oil pump clearance mm (in)	
Cam ring — oil pump housing	
Standard	0.01 - 0.024 (0.0004 - 0.0009)
Rotor, vanes and control piston — oil pump housing	
Standard	0.03 - 0.044 (0.0012 - 0.0017)
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 "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)	31429-21X00
	1.0 (0.039)	31429-21X01
	1.2 (0.047)	31429-21X02
	1.4 (0.055)	31429-21X03
	1.6 (0.063)	31429-21X04
	1.8 (0.071)	31429-21X05
	2.0 (0.079)	31429-21X06

REVERSE CLUTCH DRUM END PLAY

Reverse clutch drum end play "T_2"	0.55 - 0.90 mm (0.0217 - 0.0354 in)	
	Thickness mm (in)	Part number
Thickness of oil pump thrust washer	0.7 (0.028)	31528-21X00
	0.9 (0.035)	31528-21X01
	1.1 (0.043)	31528-21X02
	1.3 (0.051)	31528-21X03
	1.5 (0.059)	31528-21X04
	1.7 (0.067)	31528-21X05
	1.9 (0.075)	31528-21X06

REMOVAL AND INSTALLATION

Manual control linkage	
Number of returning revolutions for lock nut	1
Lock nut tightening torque	11 - 15 N·m (1.1 - 1.5 kg-m, 8 - 11 ft-lb)
Distance between end of clutch housing and torque converter	25.0 mm (0.984 in) or more
Drive plate runout limit	0.5 mm (0.020 in)