NISSAN
RE4R02A

INDEX

ELECTRICAL COMPONENT LOCATION..... 4

RETRIEVING TROUBLE CODES..... 5

TROUBLE CODE CHECKS..... 10

DIAGNOSIS PROCEDURES..... 21

WIRING DIAGRAMS..... 38

ELECTRICAL COMPONENT INSPECTION..... 40

LINE PRESSURE TESTS..... 48

HYDRAULIC CIRCUIT..... 50

TRANSMISSION DISASSEMBLY..... 54

SUB ASSEMBLY..... 59

VALVE BODY..... 63

ASSEMBLY..... 85

SPECIFICATIONS..... 95

AUTOMATIC TRANSMISSION SERVICE GROUP
18639 SW 107TH AVENUE
MIAMI, FLORIDA 33157
(305) 670-4161

INTRODUCTION
NISSAN RE4F02A

Updated
November, 2003

The Nissan RE4F02A is a fully automatic, electronically controlled transaxle that features a combination of electronic and mechanical systems to control the upshift and downshift of all forward gears and the apply and release of the torque converter clutch.
This manual provides the procedures necessary to diagnose, service, repair and overhaul this unit.

We wish to thank Nissan Motor Company for the information and illustrations that have made this booklet possible.

The information and part numbers contained in this booklet have been carefully compiled from industry sources known for their reliability, but ATSG does not guarantee its accuracy.

DALE ENGLAND
FIELD SERVICE CONSULTANT

WAYNE COLONNA
TECHNICAL SUPERVISOR

PETER LUBAN
TECHNICAL CONSULTANT

JON GLATSTEIN
TECHNICAL CONSULTANT

ROLAND ALVAREZ
TECHNICAL CONSULTANT

GERALD CAMPBELL
TECHNICAL CONSULTANT

JIM DIAL
TECHNICAL CONSULTANT

ED KRUSE
TECHNICAL CONSULTANT

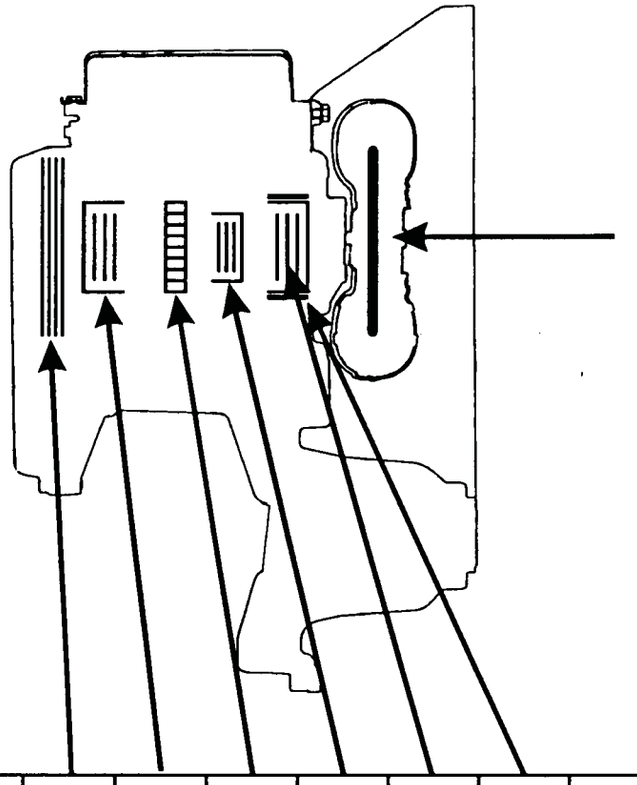
GREGORY LIPNICK
TECHNICAL CONSULTANT

DAVID CHALKER
TECHNICAL CONSULTANT

JERRY GOTT
TECHNICAL CONSULTANT

MIKE SOUZA
TECHNICAL CONSULTANT

AUTOMATIC TRANSMISSION SERVICE GROUP
18639 SW 107TH AVENUE
MIAMI, FLORIDA 33157
(305) 670-4161



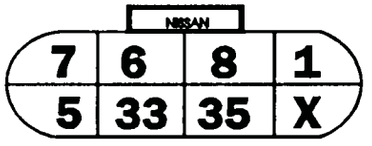
1. LOCK-UP OPERATES IN 3rd WHEN O.D. CONTROL SWITCH IS OFF

2. LOCK-UP OPERATES IN 4th WHEN O.D. CONTROL SWITCH IS ON

GEAR		LOW/REV CLUTCH	LOW CLUTCH	LOW ROLLER CLUTCH	HIGH CLUTCH	REVERSE CLUTCH	2 - 4 BAND	GEAR RATIO
REVERSE	R	ON				ON		2.272
D	1		ON	ON				2.785
	2		ON				ON	1.545
	3		ON		ON			1.000
	4				ON		ON	0.694
2	1		ON	ON				2.785
	2		ON				ON	1.545
1	1	ON	ON	ON				2.785
	2		ON				ON	1.545

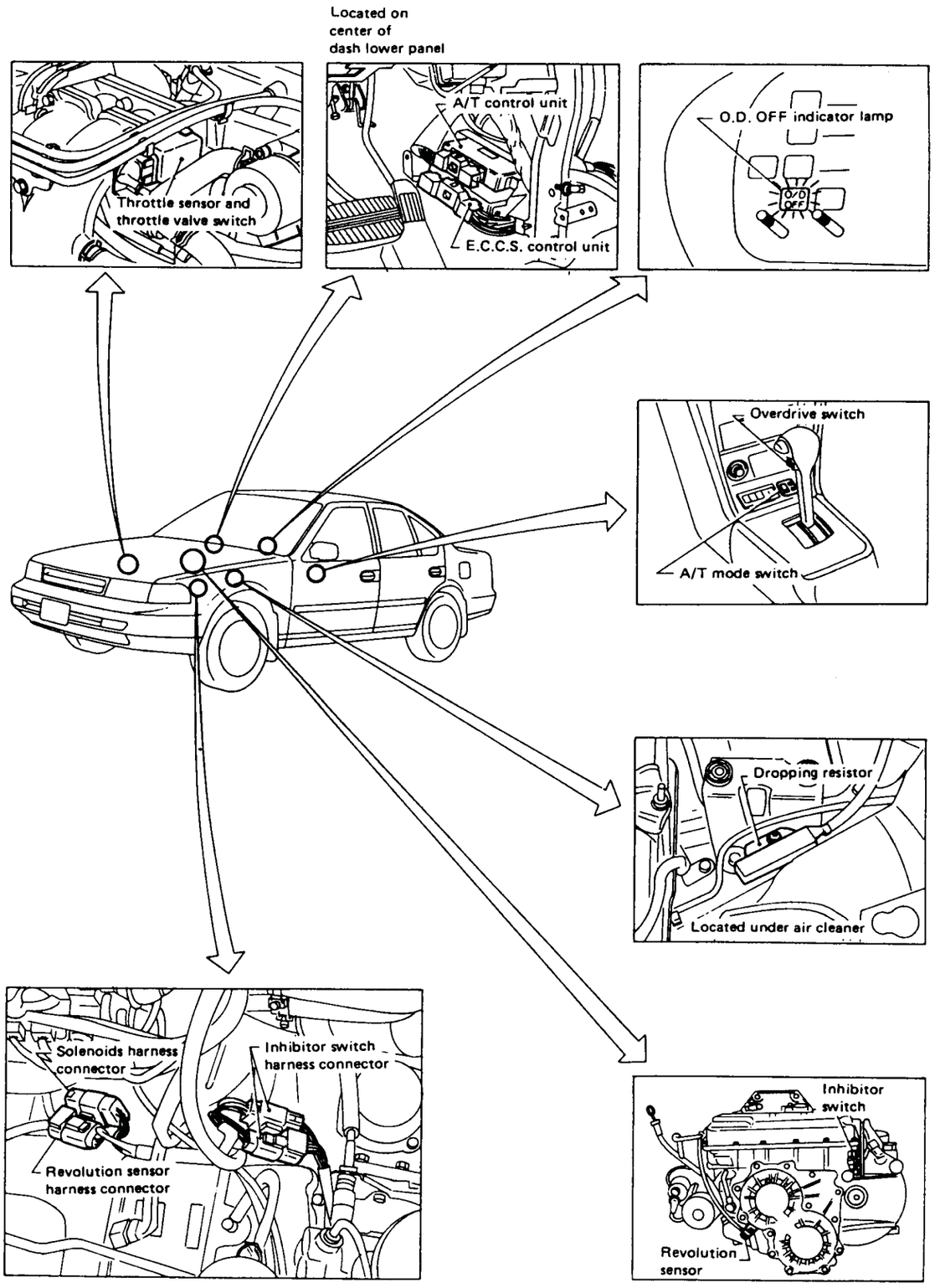
Pin	Description	Wire Color
7	Shift Solenoid B.	Yellow
6	Shift Solenoid A.	Green
8	Overrun Solenoid.	Gray
1	Line Pressure Solenoid.	Red
5	Lock-up Solenoid.	Blue
33	Fluid Temp. Sensor.	White
35	Fluid Temp. Sensor.	Black

PIN SIDE OF 8 TERMINAL CONNECTOR GOING TO THE TRANSMISSION.

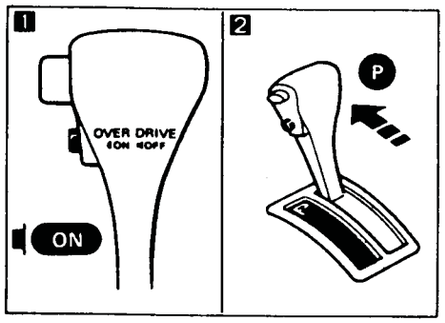


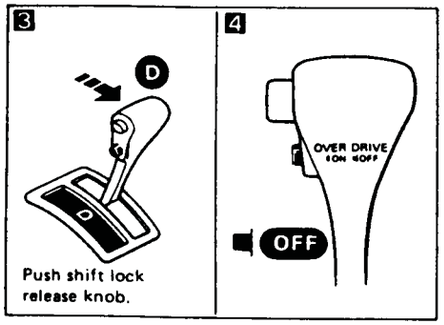
GEAR	SOLENOID A	SOLENOID B	LOCK-UP SOLENOID	OVERRUN SOLENOID	PRESSURE SOLENOID
1st	ON	ON	OFF	ACTIVATES UPON VARIOUS THRROTTLE OPENINGS	PULSE MODULATION CONTROLLED BY COMPUTER
2nd	OFF	ON	OFF		
3rd	OFF	OFF	OFF		
4th	ON	OFF	ON	OFF	
OHMS	20 - 30	20 - 30	10 - 16	20 - 30	2.5 - 5

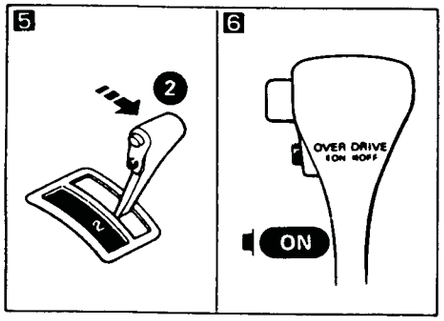
A/T Electrical Parts Location

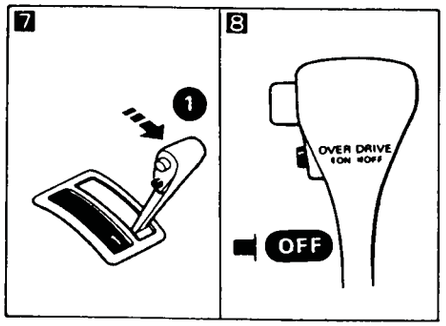


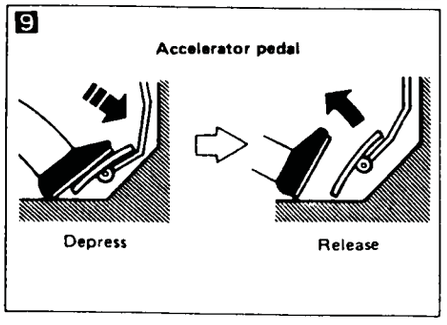
TROUBLE DIAGNOSES









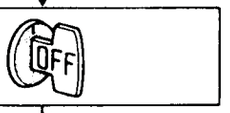


Self-diagnosis

SELF-DIAGNOSTIC PROCEDURE

DIAGNOSIS START

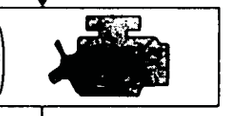
Start engine and warm it up to normal engine operating temperature.



Set A/T mode switch in "AUTO" position.

1 Set overdrive switch in "ON" position.

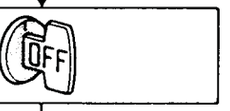
2 Move selector lever to "P" range.



Does power indicator lamp come on for about 2 seconds?

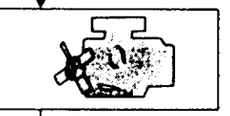
Yes

No → Go to Diagnostic Procedure 1. p.21



3 Move selector lever to "D" range after pushing shift lock release knob.

4 Set overdrive switch in "OFF" position.



5 Move selector lever to "2" range.

6 Set overdrive switch in "ON" position.

7 Move selector lever to "1" range.

8 Set overdrive switch in "OFF" position.

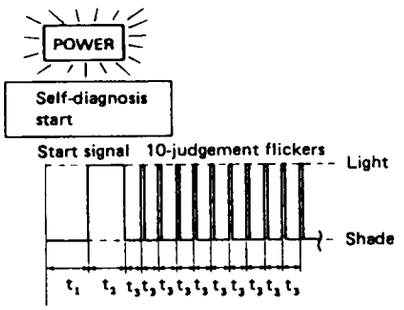
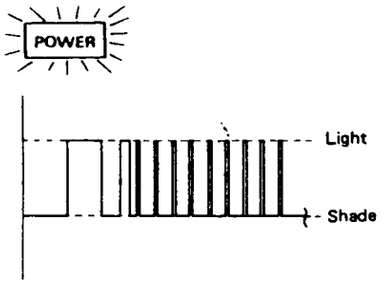
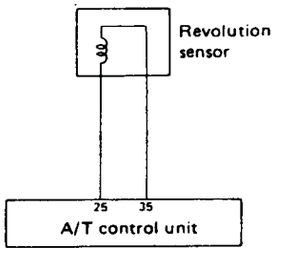
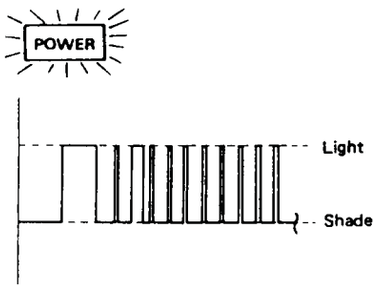
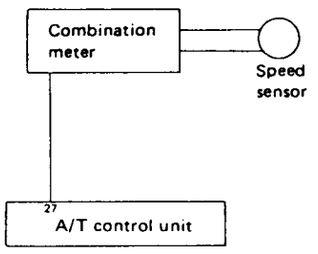
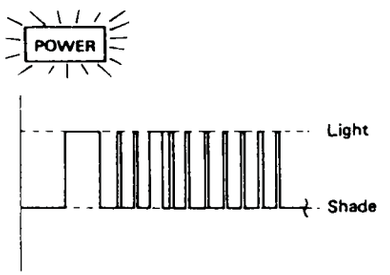
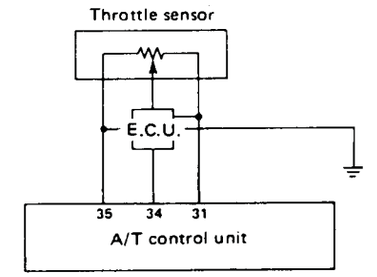
9 Depress accelerator pedal fully and release it.

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

DIAGNOSIS END

Self-diagnosis (Cont'd)

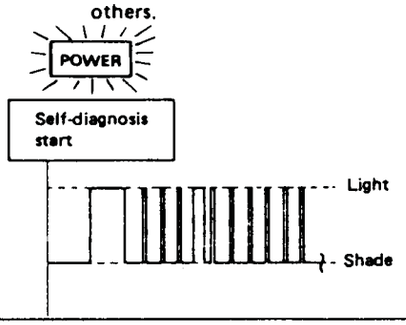
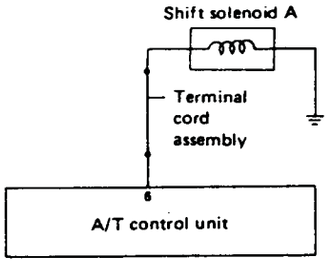
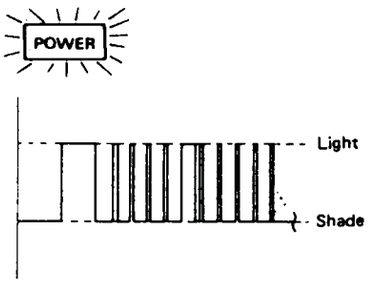
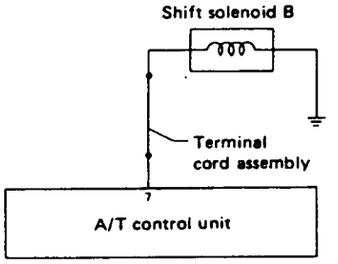
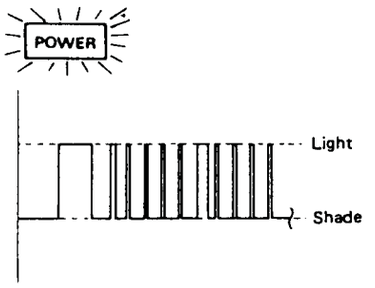
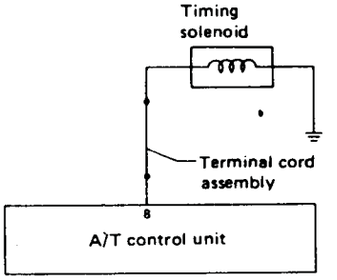
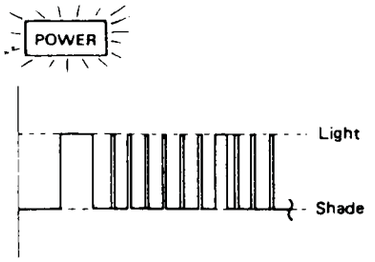
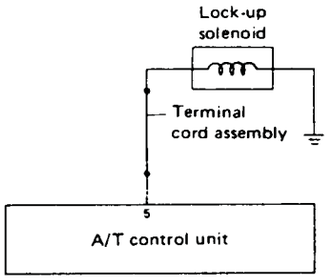
JUDGEMENT OF SELF-DIAGNOSIS CODE

Power indicator lamp:	Damaged circuit
All judgement flickers are same. 	All circuits that can be confirmed by self-diagnosis are O.K.
1st judgement flicker is longer than others. 	Revolution sensor circuit is short-circuited or disconnected.  ➡ Go to revolution sensor circuit check. p.11
2nd judgement flicker is longer than others. 	Speed sensor circuit is short-circuited or disconnected.  ➡ Go to speed sensor circuit check. p.11
3rd judgement flicker is longer than others. 	Throttle sensor circuit is short-circuited or disconnected.  ➡ Go to throttle sensor circuit check. p.12

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

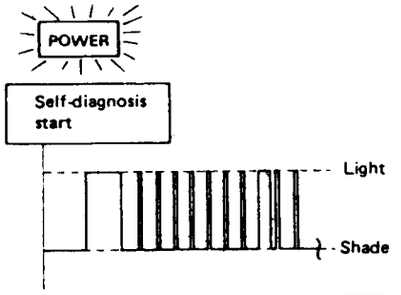
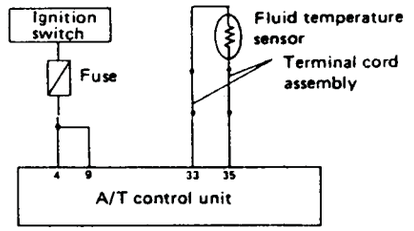
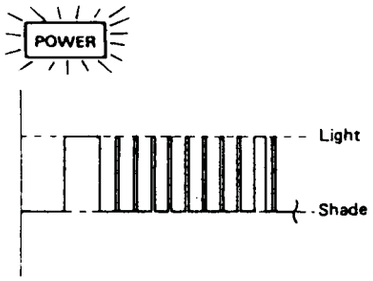
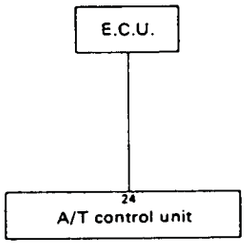
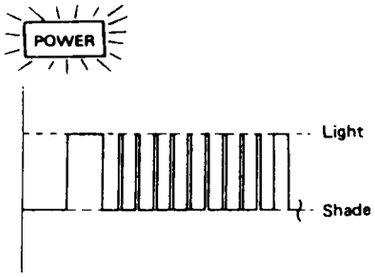
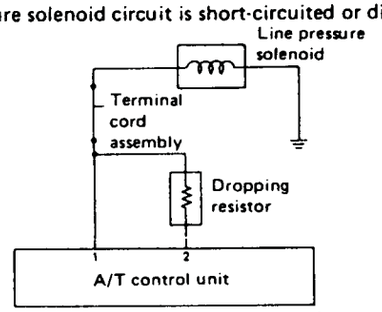
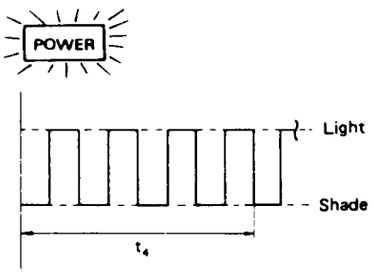
TROUBLE DIAGNOSES

Self-diagnosis (Cont'd)

Power indicator lamp:	Damaged circuit
4th judgement flicker is longer than others. 	Shift solenoid A circuit is short-circuited or disconnected.  ➡ Go to shift solenoid A circuit check. p.13
5th judgement flicker is longer than others. 	Shift solenoid B circuit is short-circuited or disconnected.  ➡ Go to shift solenoid B circuit check. p.14
6th judgement flicker is longer than others. 	Timing solenoid circuit is short-circuited or disconnected.  ➡ Go to timing solenoid circuit check. p.15
7th judgement flicker is longer than others. 	Lock-up solenoid circuit is short-circuited or disconnected.  ➡ Go to lock-up solenoid circuit check. p.16

TROUBLE DIAGNOSES

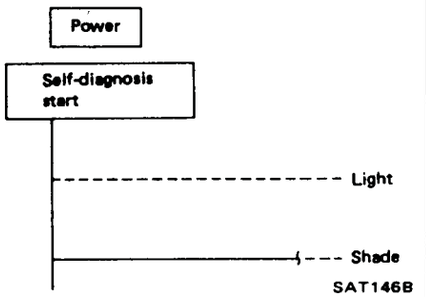
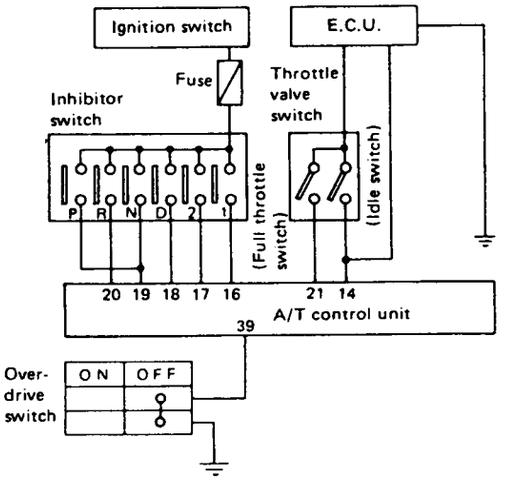
Self-diagnosis (Cont'd)

Power indicator lamp:	Damaged circuit
8th judgement flicker is longer than others. 	Fluid temperature sensor is disconnected or A/T control unit power source circuit is damaged.  ➡ **Go to fluid temperature sensor and A/T control unit power source circuit check.** p.17
9th judgement flicker is longer than others. 	Engine revolution signal circuit is short-circuited or disconnected.  ➡ **Go to engine revolution signal circuit check.** p.18
10th judgement flicker is longer than others. 	Line pressure solenoid circuit is short-circuited or disconnected.  ➡ **Go to line pressure solenoid circuit check.** p.18
Flickers as shown below. 	Battery power is low. Battery has been disconnected for a long time. Battery is connected conversely. (When reconnecting A/T control unit connectors. – This is not a problem.)

t_4 = 1.0 second

TROUBLE DIAGNOSES

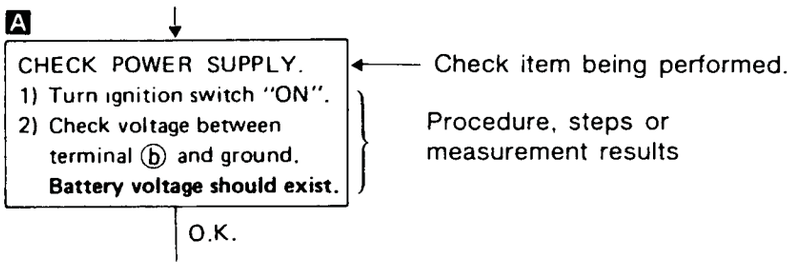
Self-diagnosis (Cont'd)

Power indicator lamp:	Damaged circuit
Does not come on. 	Inhibitor switch, overdrive switch or throttle valve switch circuit is disconnected or A/T control unit is damaged.  ➡ **Go to inhibitor, overdrive and throttle valve switch circuit checks.** p.19

HOW TO FOLLOW THIS FLOW CHART

1 **Work and diagnostic procedure**

Start to diagnose a problem using procedures indicated in enclosed blocks, as shown in the following example.



2 **Measurement results**

Required results are indicated in bold type in the corresponding block, as shown below:

These have the following meanings:

Battery voltage → 11 - 14V or approximately 12V
Voltage: Approximately 0V → Less than 1V

3 **Cross reference of work symbols in the text and illustrations**

Illustrations are provided as visual aids for work procedures. For example, symbol A indicated in the left upper portion of each illustration corresponds with the symbol in the flow chart for easy identification. More precisely, the procedure under the "CHECK POWER SUPPLY" outlined previously is indicated by an illustration A .

4 **Symbols used in illustrations**

Symbols included in illustrations refer to measurements or procedures. Before diagnosing a problem, familiarize yourself with each symbol.

Direction mark

A direction mark is shown to clarify the side of connector (terminal side or harness side).

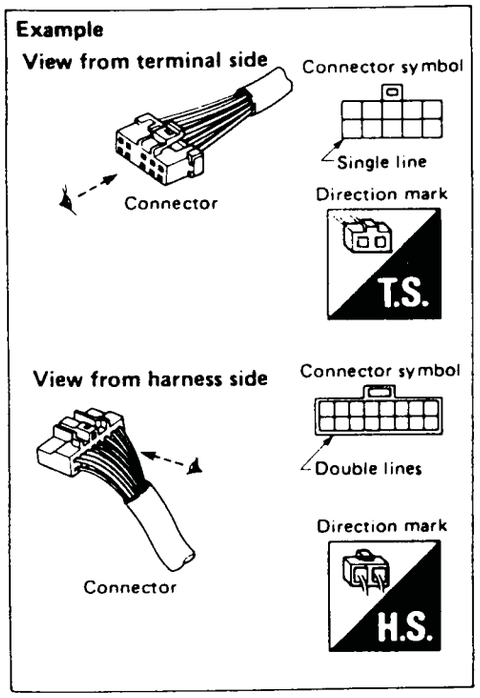
Direction marks are mainly used in the illustrations indicating terminal inspection.

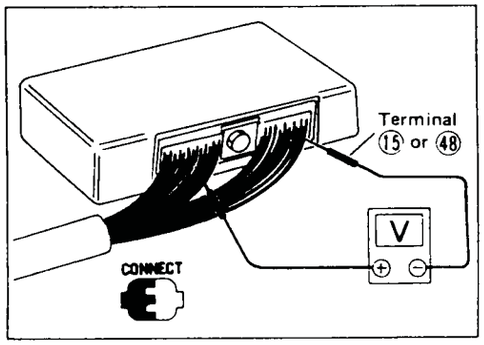
: **View from terminal side ... T.S.**

- **All connector symbols shown from the terminal side are enclosed by a single line.**

: **View from harness side ... H.S.**

- **All connector symbols shown from the harness side are enclosed by a double line.**



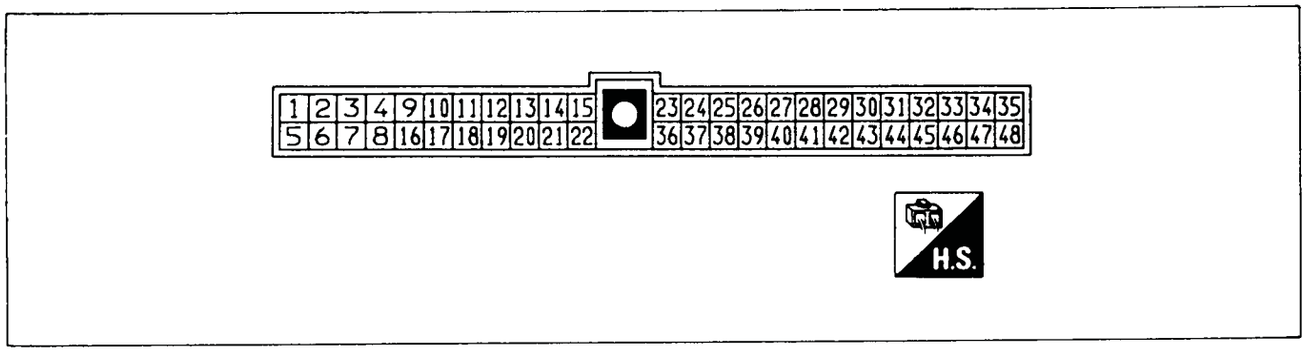


INSPECTION OF A/T CONTROL UNIT

- Measure voltage between each terminal and terminal 15 or 48.

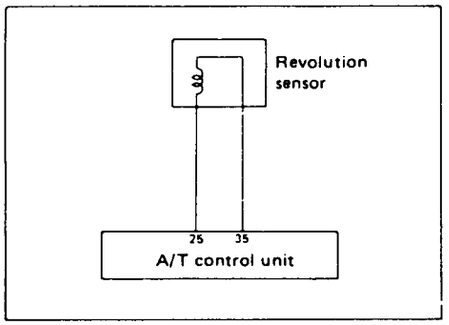
  Both terminals are ground.

- Pin connector terminal layout.



Self-diagnosis (Cont'd)

REVOLUTION SENSOR CIRCUIT CHECK



CHECK REVOLUTION SENSOR. – Refer to "Electrical Components Inspection". **p.44**

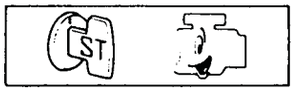
N.G. → Repair or replace revolution sensor.

O.K. ↓

A

CHECK INPUT SIGNAL.

1.



2. 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.

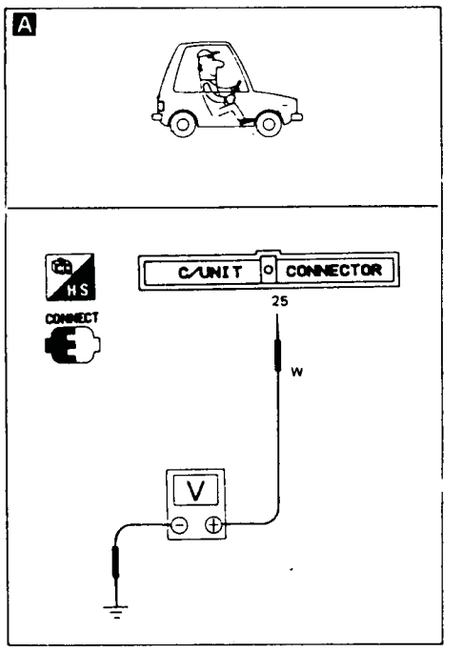
O.K. ↓

Perform self-diagnosis again after driving for a while.

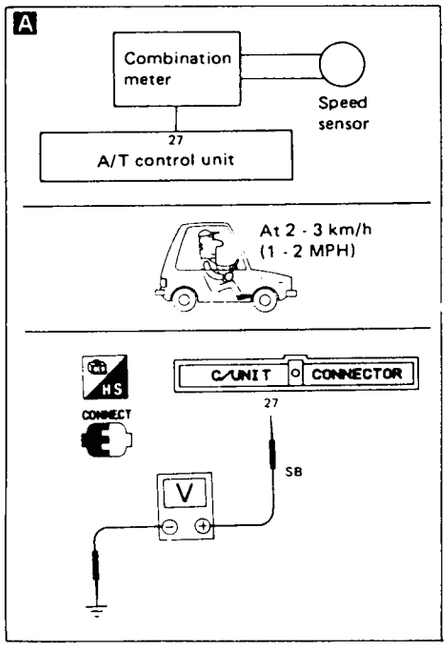
N.G. → 1. Perform A/T control unit input/output signal inspection. 2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

O.K. ↓

INSPECTION END



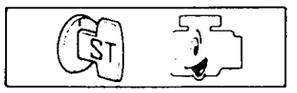
SPEED SENSOR CIRCUIT CHECK



A

CHECK INPUT SIGNAL.

1.



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

Voltage: Varies from 0V to 5V

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

O.K. ↓

Perform self-diagnosis again after driving for a while.

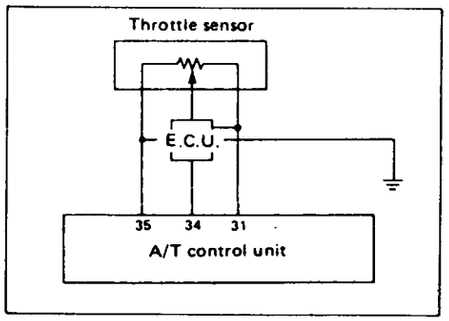
N.G. → 1. Perform A/T control unit input/output signal inspection. 2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

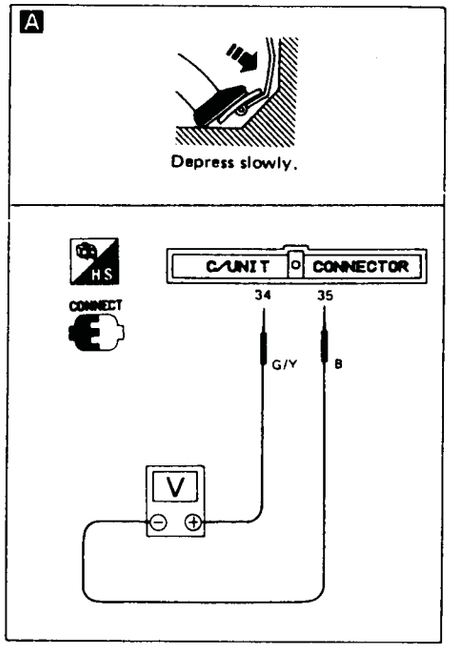
O.K. ↓

INSPECTION END

Self-diagnosis (Cont'd)

THROTTLE SENSOR CIRCUIT CHECK



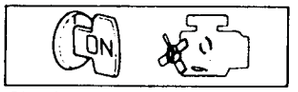


Perform self-diagnosis → N.G. → Check throttle sensor circuit for engine control.

O.K. ↓

A

CHECK INPUT SIGNAL. → N.G. → Check harness continuity between E.C.U. and A/T control unit regarding throttle sensor circuit.

1. 

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

Voltage:

Fully-closed throttle:
0.2 - 0.6V

Fully-open throttle:
2.9 - 3.9V

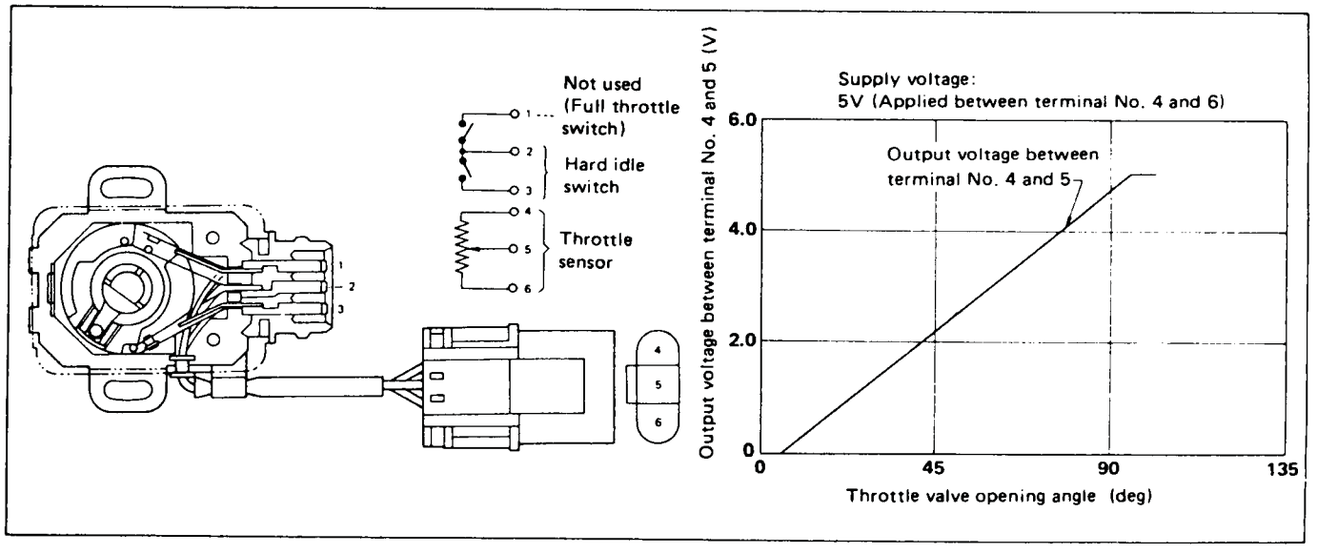
(Voltage rises gradually in response to throttle valve opening.)

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.

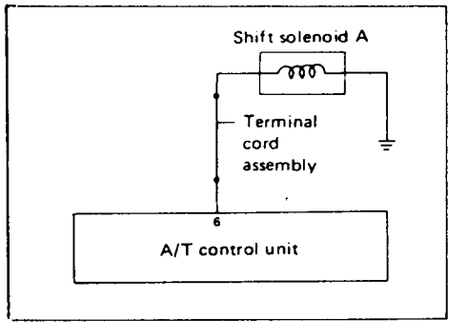
O.K. ↓

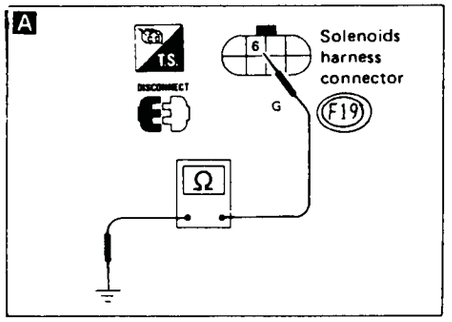
INSPECTION END

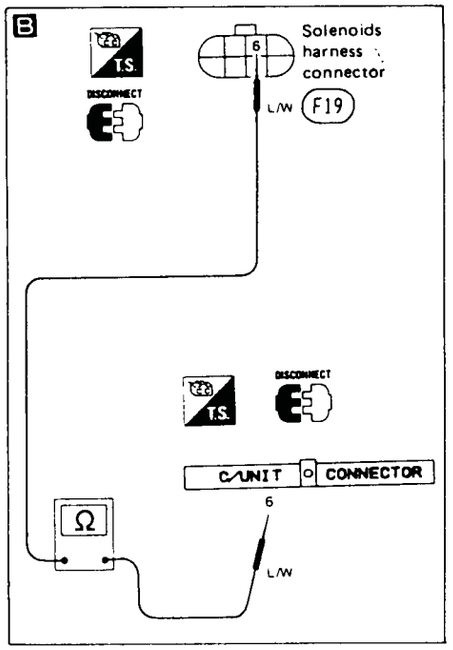


Self-diagnosis (Cont'd)

SHIFT SOLENOID A CIRCUIT CHECK

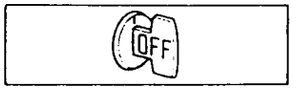






A

CHECK GROUND CIRCUIT.

1. 

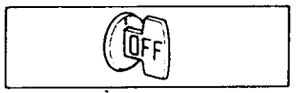
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal ⑥ and ground.
   Resistance: 20 - 40Ω

N.G. →
1. Remove control valve assembly.
2. Check the following items.
   - Shift solenoid A – Refer to "Electrical Components Inspection". p.44
   - 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.

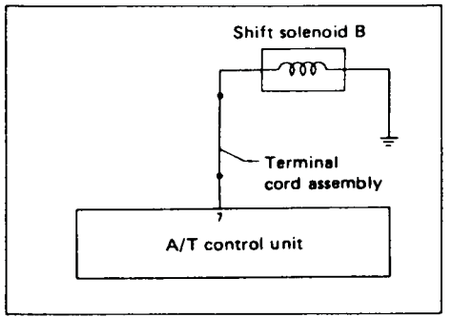
N.G. →
1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

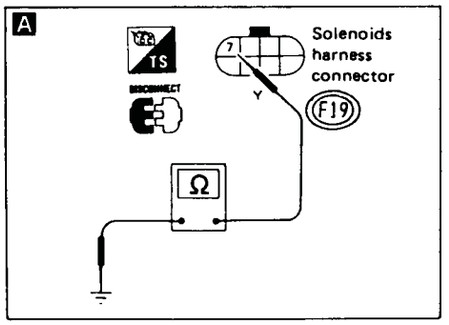
O.K. ↓

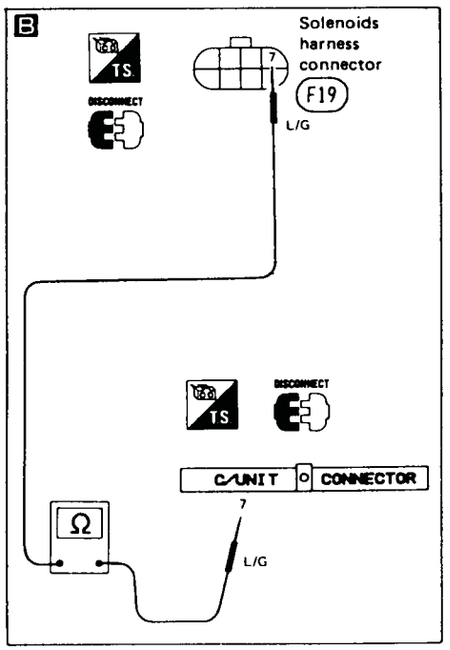
INSPECTION END

Self-diagnosis (Cont'd)

SHIFT SOLENOID B CIRCUIT CHECK

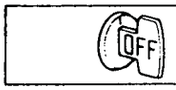






A

CHECK GROUND CIRCUIT.

1. 

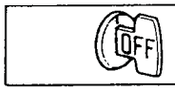
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal ⑦ and ground.
   Resistance: 20 - 40Ω

N.G. →
1. Remove control valve assembly.
2. Check the following items.
   - Shift solenoid B – Refer to "Electrical Components Inspection". p.44
   - 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.

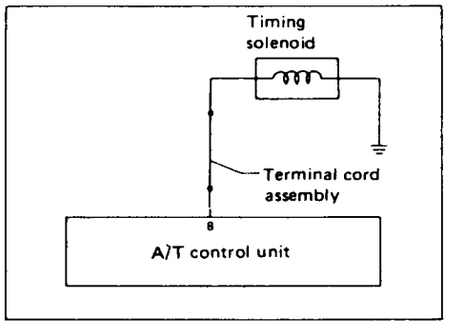
N.G. →
1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

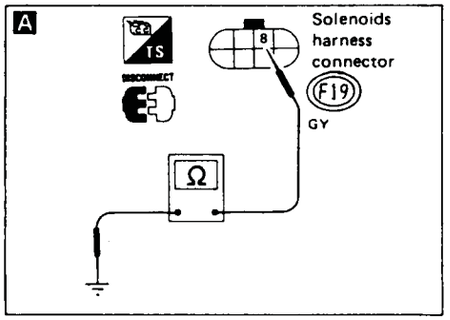
O.K. ↓

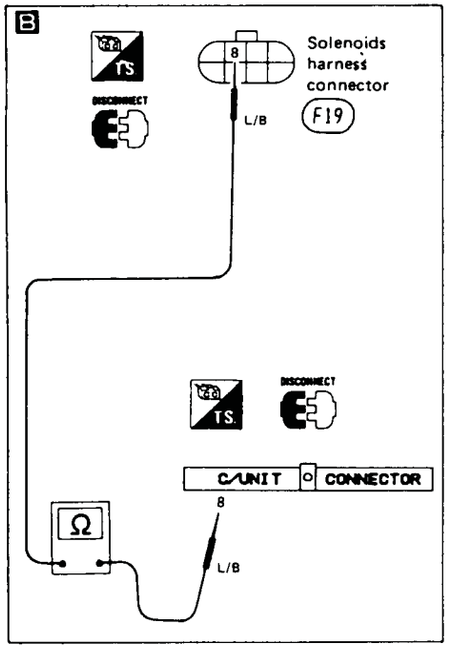
INSPECTION END

Self-diagnosis (Cont'd)

TIMING SOLENOID CIRCUIT CHECK

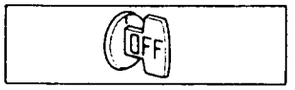






A

CHECK GROUND CIRCUIT.

1. 

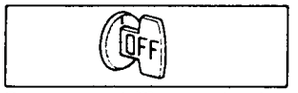
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal ⑧ and ground.
   Resistance: 20 - 40Ω

N.G. →
1. Remove control valve assembly.
2. Check the following items.
- Timing solenoid. – Refer to "Electrical Components Inspection". **p.44**
- 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 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.

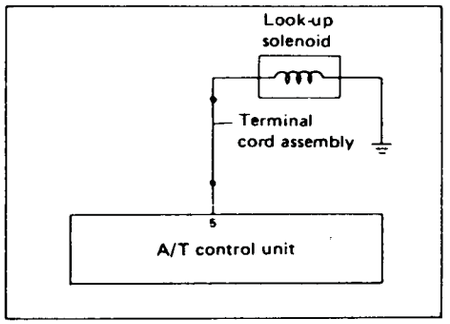
N.G. →
1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

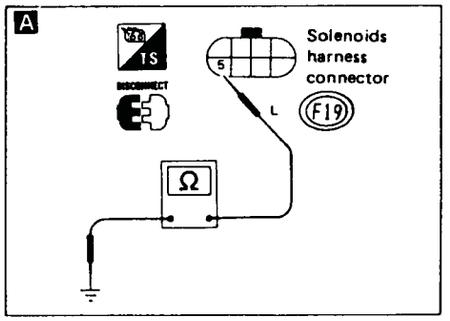
O.K. ↓

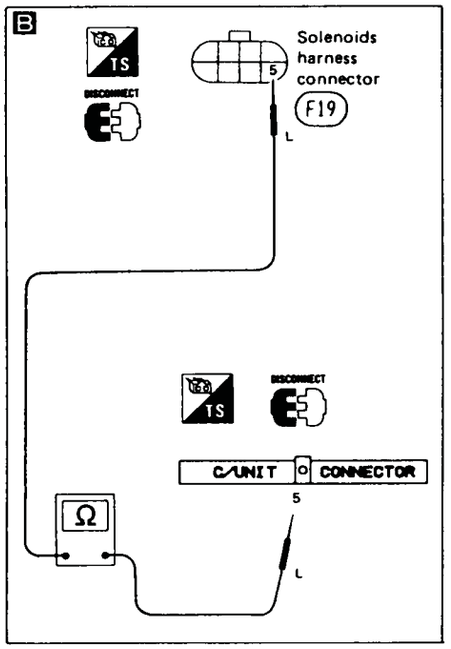
INSPECTION END

Self-diagnosis (Cont'd)

LOCK-UP SOLENOID CIRCUIT CHECK

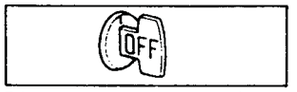






A

CHECK GROUND CIRCUIT.

1. 

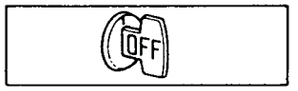
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal ⑤ and ground.
   Resistance: 10 - 20Ω

N.G. →
1. Remove control valve assembly.
2. Check the following items.
   - Lock-up solenoid – Refer to "Electrical Components Inspection". p.44
   - 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 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.

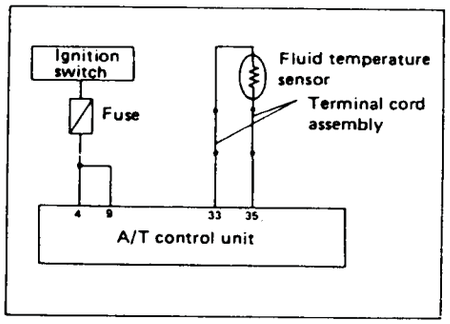
N.G. →
1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

O.K. ↓

INSPECTION END

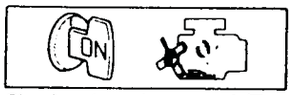
Self-diagnosis (Cont'd)

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



A

CHECK A/T CONTROL UNIT POWER SOURCE.

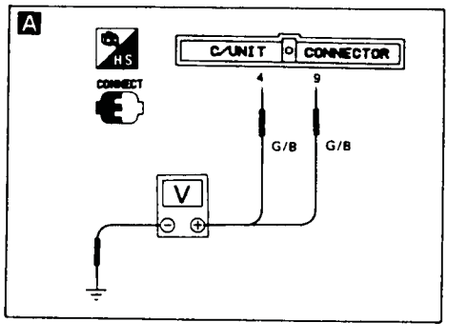
1. 

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

Battery voltage should exist.

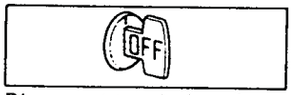
N.G. → Check the following items.
- Harness continuity between ignition switch and A/T control unit
- Ignition switch and fuse

O.K. ↓



B

CHECK FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

1. 

2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminals ㉝ and ㉟ when A/T is cold.

Resistance:

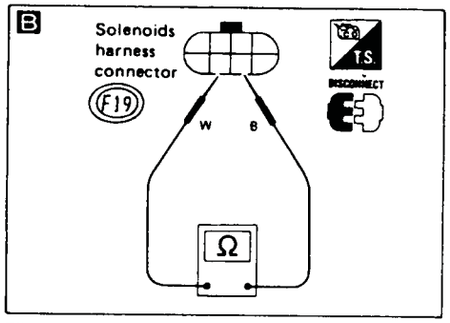
Cold [20°C (68°F)]

Approximately 2.5 kΩ

4. Reinstall any part removed.

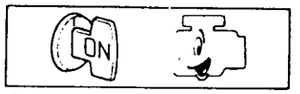
N.G. → 1. Remove control valve cover.
2. Check the following items.
- Fluid temperature sensor – Refer to "Electrical Components Inspection". p.44
- Harness continuity of terminal cord assembly

O.K. ↓



C

CHECK INPUT SIGNAL OF FLUID TEMPERATURE SENSOR.

1. 

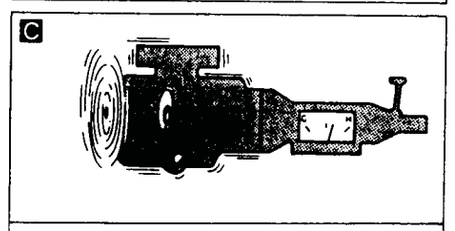
2. Check voltage between A/T control unit terminal ㉝ and ground while warming up A/T.

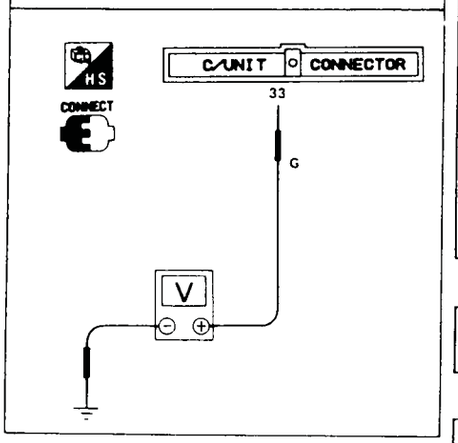
Voltage:

Cold [20°C (68°F)] →
Hot [80°C (176°F)]:
1.56V → 0.45V

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

O.K. ↓





Perform self-diagnosis after driving for a while.

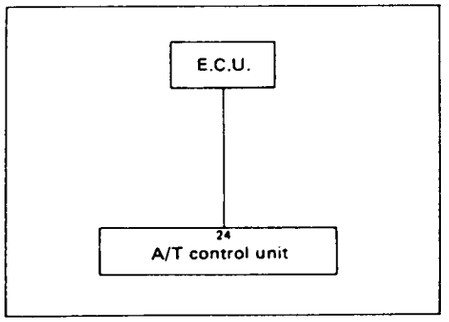
N.G. → 1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

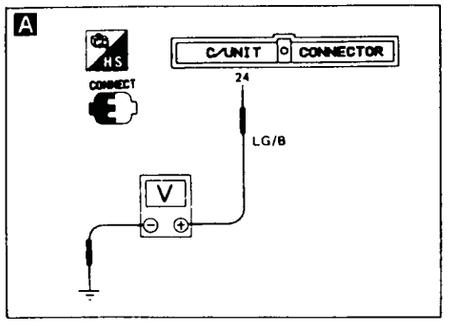
O.K. ↓

INSPECTION END

Self-diagnosis (Cont'd)

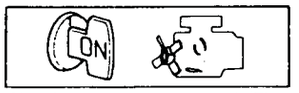
ENGINE REVOLUTION SIGNAL CIRCUIT CHECK





Perform self-diagnosis
Check ignition signal circuit condition.
N.G. → Check ignition signal circuit for engine control.
O.K. ↓

A

CHECK INPUT SIGNAL.
1. 

2. 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.U.

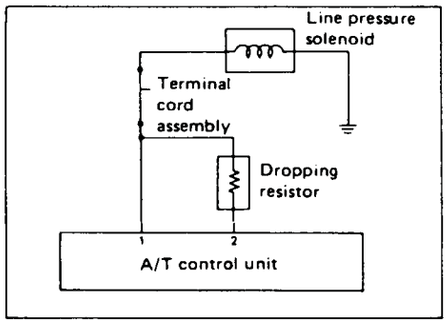
O.K. ↓

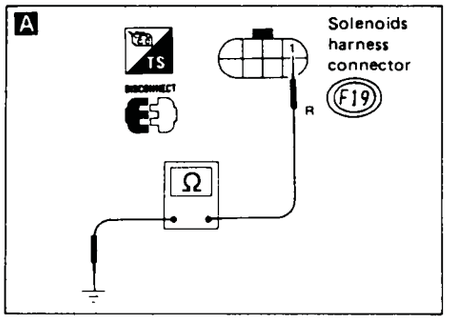
Perform self-diagnosis again after driving for a while.
N.G. → 1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

O.K. ↓

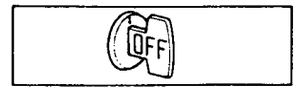
INSPECTION END

LINE PRESSURE SOLENOID CIRCUIT CHECK





A

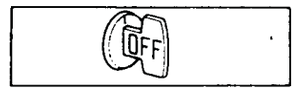
CHECK GROUND CIRCUIT.
1. 

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.
2. Check the following items.
- Line pressure solenoid — Refer to "Electrical Components Inspection". p.44
- Harness continuity of terminal cord assembly

O.K. ↓

B

CHECK POWER SOURCE CIRCUIT.
1. 

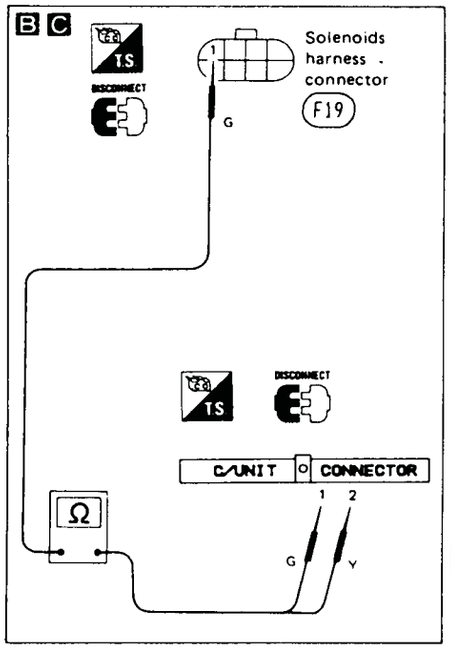
2. Disconnect A/T control unit connector.
3. Check resistance between terminal ① and A/T control unit terminal ②.
Resistance: 11.2 - 12.8Ω

N.G. → Check the following items.
- Dropping resistor — Refer to "Electrical Components Inspection". p.44
- Harness continuity between A/T control unit ② and terminal cord assembly

O.K. ↓

Ⓐ

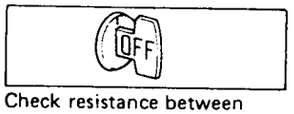
Self-diagnosis (Cont'd)



Ⓐ

C

CHECK POWER SOURCE CIRCUIT

1. 

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.

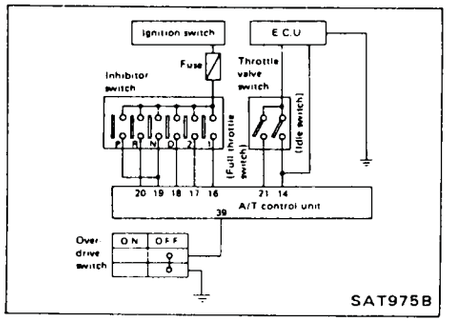
O.K.

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.

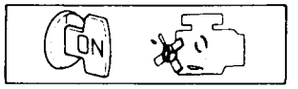
INSPECTION END



INHIBITOR, OVERDRIVE AND THROTTLE VALVE SWITCH CIRCUIT CHECKS

A

CHECK INHIBITOR SWITCH CIRCUIT.

1. 

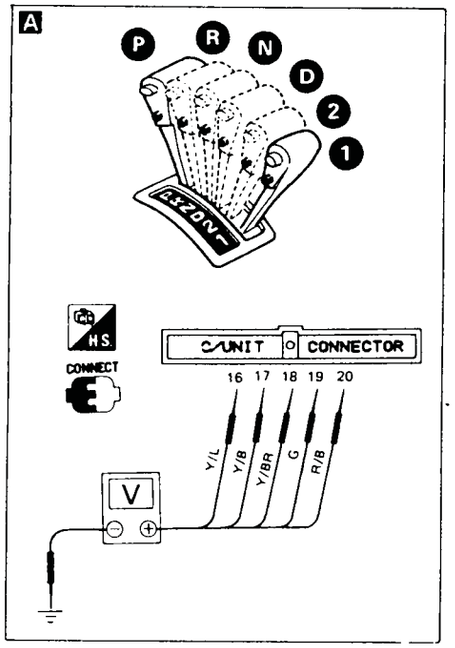
2. Check voltage between A/T control unit terminals ⑯, ⑰, ⑱, ⑲, ⑳ and ground while moving selector lever through each range.
   Voltage:
   B: Battery voltage
   0: 0V

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

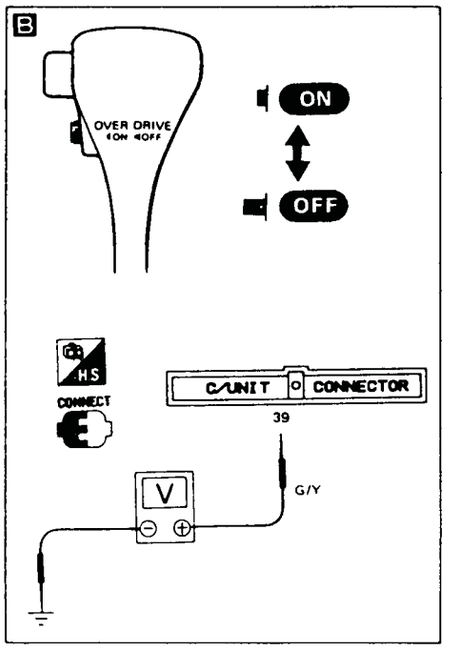
N.G. → Check the following items.
- Inhibitor switch – Refer to "Electrical Components Inspection". p.45
- Harness continuity between ignition switch and inhibitor switch
- Harness continuity between inhibitor switch and A/T control unit

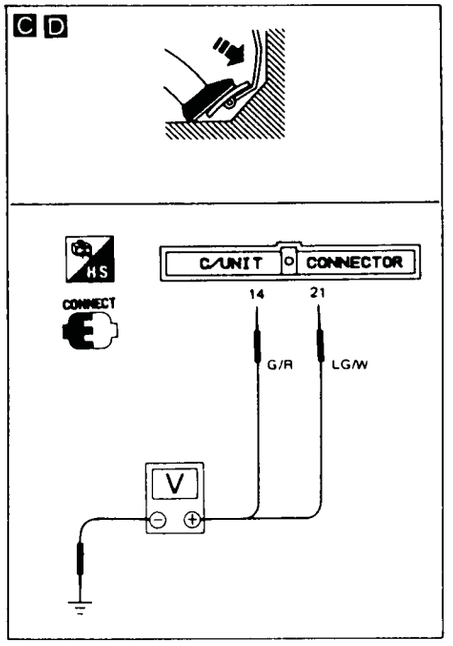
O.K.

Ⓐ



Self-diagnosis (Cont'd)

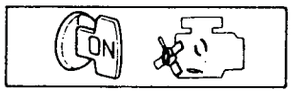




Ⓐ

B

CHECK OVERDRIVE SWITCH CIRCUIT.

1. 

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

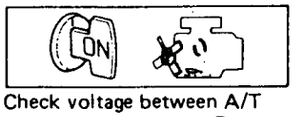
Switch position	Voltage
ON	Battery voltage
OFF	1V or less

N.G. → Check the following items.
- Overdrive switch – Refer to "Electrical Components Inspection". p.46
- Harness continuity between A/T control unit and overdrive switch
- Harness continuity of ground circuit for overdrive switch

O.K. ↓

C

CHECK IDLE SWITCH CIRCUIT.

1. 

2. 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

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.

O.K. ↓

D

CHECK FULL THROTTLE SWITCH CIRCUIT.

- Check voltage between A/T control unit terminal ㉑ and ground in the same way as idle switch circuit.
  Voltage:
  When releasing accelerator pedal: 1V or less
  When depressing accelerator pedal fully: 8 - 15V

N.G. → Check harness continuity between A/T control unit and full throttle switch.

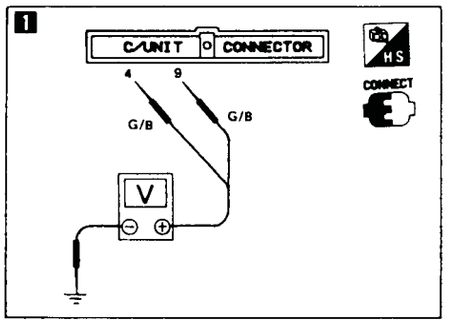
O.K. ↓

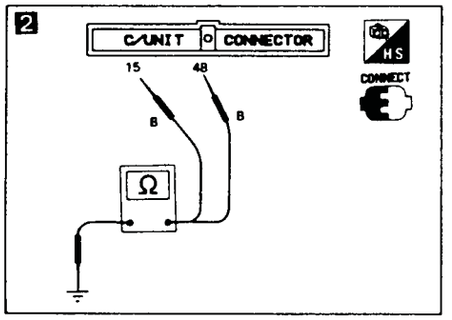
Perform self-diagnosis again after driving for a while.

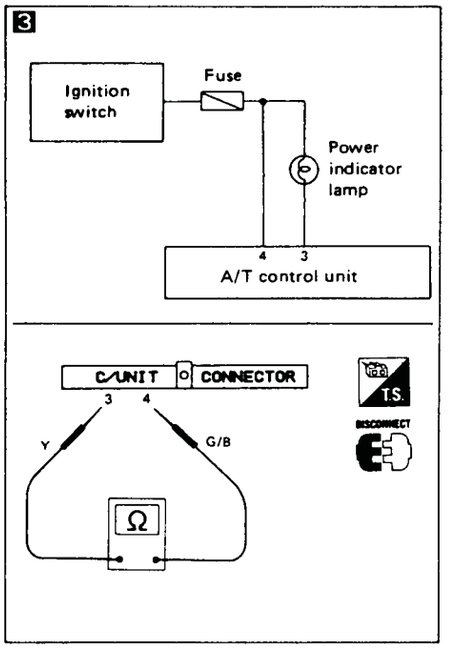
N.G. → 1. Perform A/T control unit input/output signal inspection.
2. If N.G., recheck A/T control unit pin terminals for damage or connection of A/T control unit harness connector.

O.K. ↓

INSPECTION END





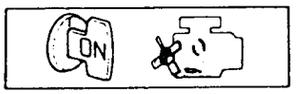


Diagnostic Procedure 1

SYMPTOM:

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

1 **CHECK A/T CONTROL UNIT POWER SOURCE.**

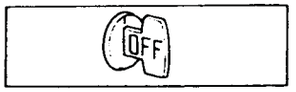
1. 

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

O.K. ↓

2 **CHECK A/T CONTROL UNIT GROUND CIRCUIT.**

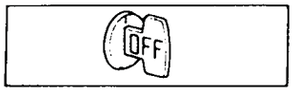
1. 

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.**

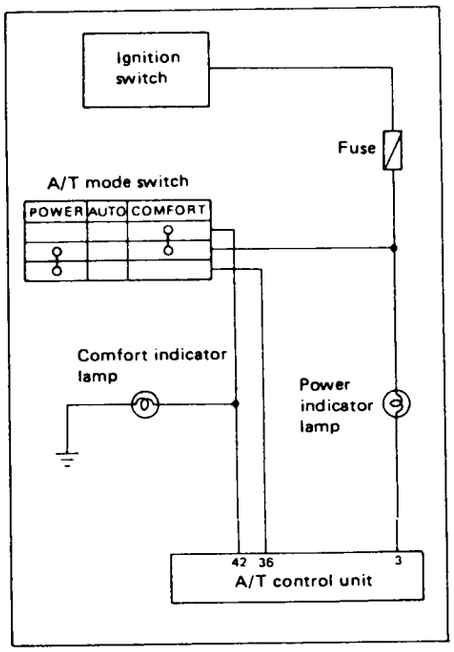
1. 

2. Disconnect A/T control unit connector.
3. Check resistance between A/T control unit terminals ③ and ④.
   Resistance: 5 - 20Ω
4. Reinstall any part removed.

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

O.K. ↓

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.



Diagnostic Procedure 2

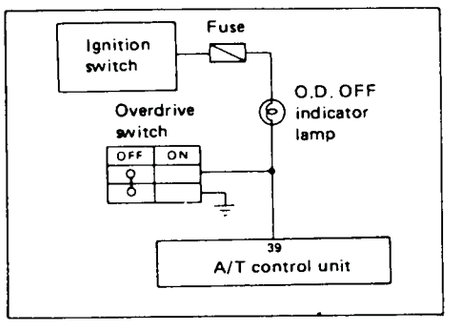
SYMPTOM:
Power indicator lamp or comfort indicator lamp does not come on when turning A/T mode switch to the appropriate position.

Is Diagnostic Procedure 1 O.K.? — No → Go to Diagnostic Procedure 1.

Yes ↓

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

N.G. → Repair or replace damaged parts.

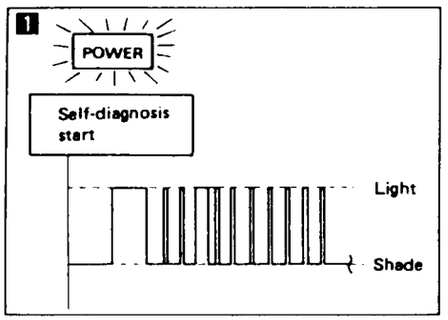


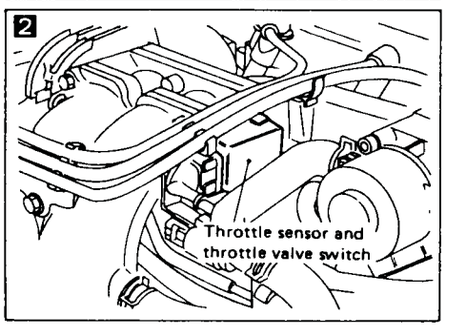
Diagnostic Procedure 3

SYMPTOM:
O.D. OFF indicator lamp does not come on when setting overdrive switch to "OFF" position.

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

N.G. → Repair or replace damaged parts.





Diagnostic Procedure 4

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

1

Does self-diagnosis show damage to throttle sensor circuit? — No → Check throttle sensor circuit.

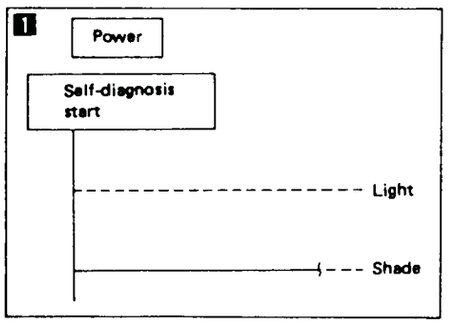
Yes ↓

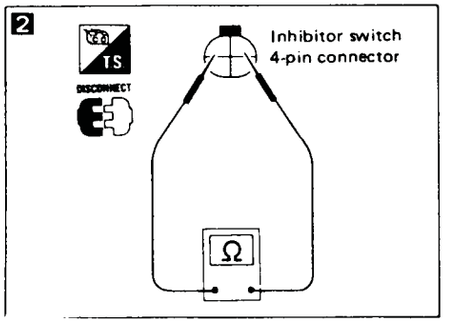
2

Check throttle sensor. — N.G. → Repair or replace throttle sensor.

O.K. ↓

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.





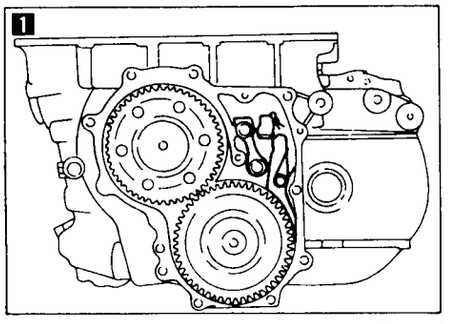
Diagnostic Procedure 5

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.

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

2 Check continuity of inhibitor switch 4-pin connector.
- N.G. → Repair or replace inhibitor switch.
- O.K. ↓

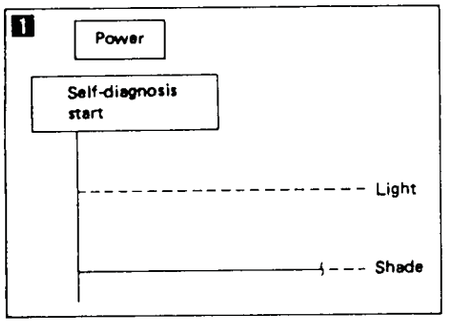
Check starting system.
- N.G. → Repair or replace damaged parts.

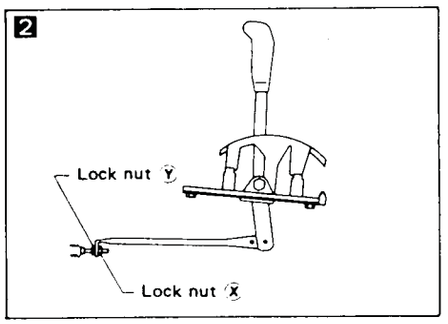


Diagnostic Procedure 6

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

1 Check parking components.
- N.G. → Repair or replace damaged parts.





Diagnostic Procedure 7

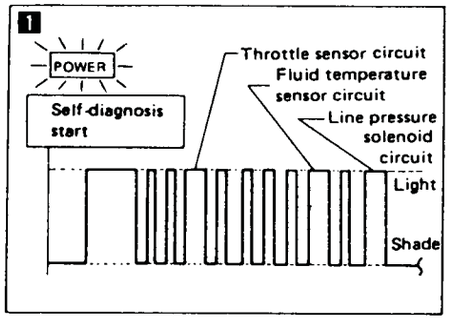
SYMPTOM:
Vehicle moves forward or backward when selecting "N" range.

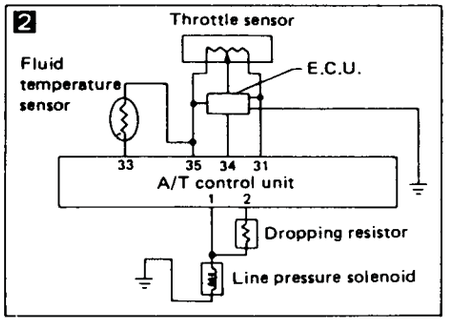
1 Does self-diagnosis show damage to inhibitor switch after cruise test?
- Yes → Check inhibitor switch circuit. – Refer to "Self-diagnosis".
- No ↓

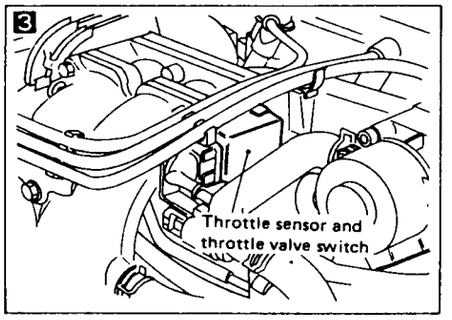
2 Check manual control linkage.
- N.G. → Adjust manual control linkage.
- O.K. ↓

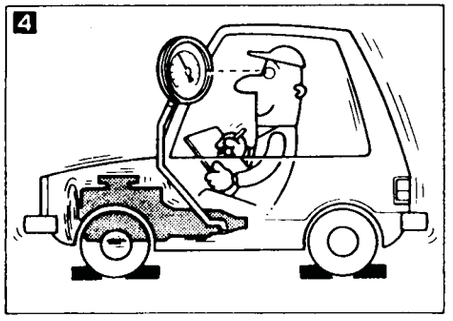
3 Check A/T fluid level again.
- N.G. → Refill A.T.F.
- O.K. ↓

4 Check A/T fluid condition.
- N.G. →
  1. Disassemble A/T.
  2. Check the following items.
  - Low clutch assembly
  - Reverse clutch assembly









Diagnostic Procedure 8

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

Check engine idling speed. — N.G. → Adjust engine idling speed.

O.K.

1 Does self-diagnosis show damage to throttle sensor, line pressure solenoid or fluid temperature sensor circuit? — Yes → 2 Check damaged circuit.

No

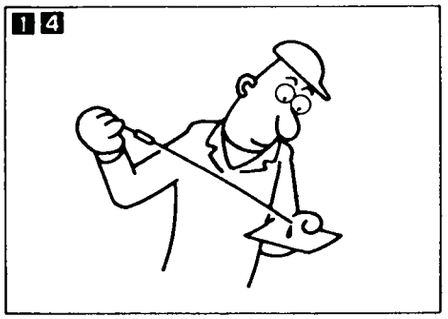
3 Check throttle sensor. — N.G. → Repair or replace throttle sensor.

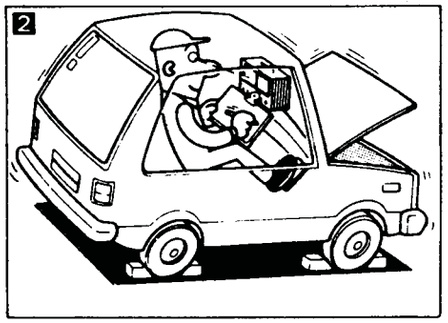
O.K.

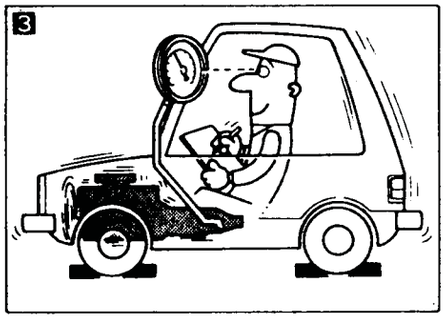
4 Check line pressure at idle with selector lever in "D" range. — N.G. →
1. Remove control valve assembly.
2. Check the following items.
- Valves to control line pressure (Pressure regulator valve, pilot valve and oil filter)
- Line pressure solenoid

O.K.

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.



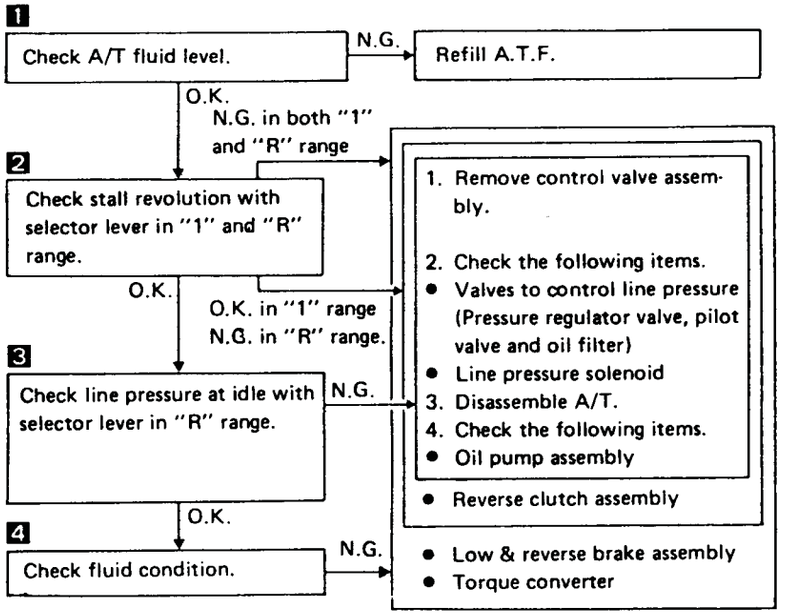


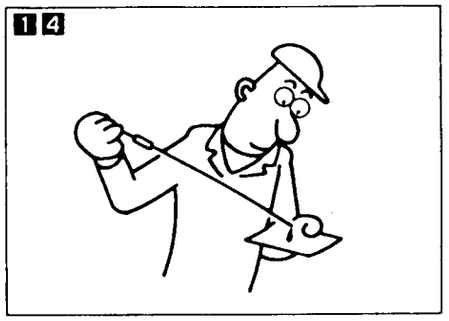


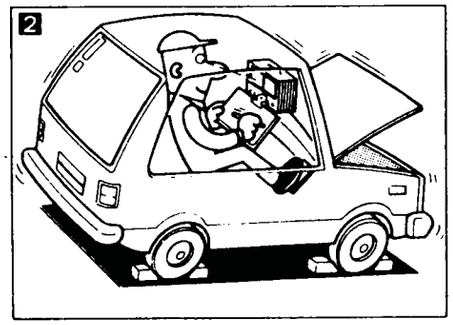
Diagnostic Procedure 9

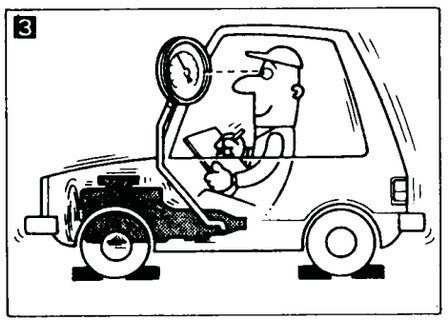
SYMPTOM:

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









Diagnostic Procedure 10

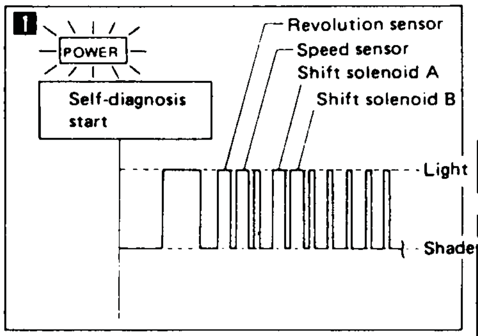
SYMPTOM:
Vehicle does not creep forward when selecting "D", "2" or "1" range.

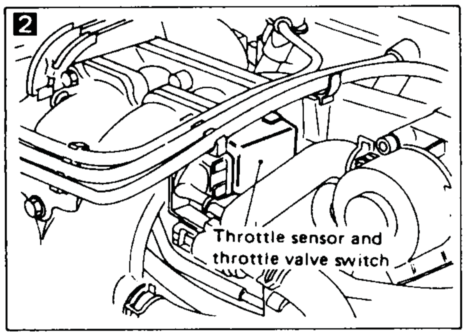
1 Check A/T fluid level.
- N.G. → Refill A.T.F.
- O.K. ↓

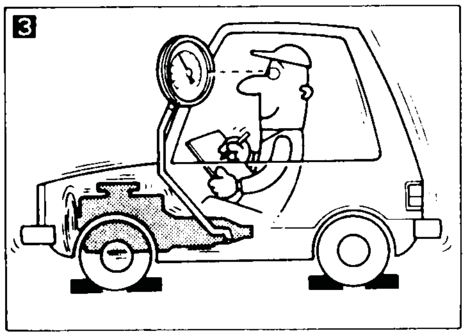
2 Check stall revolution with selector lever in "D" and "1" ranges.
- N.G. →
  1. Remove control valve assembly.
  2. Check the following items.
  - Valves to control line pressure (Pressure regulator valve, pilot valve and oil filter)
  - Line pressure solenoid
  3. Disassemble A/T
  4. Check the following items.
  - Oil pump assembly
- O.K. ↓

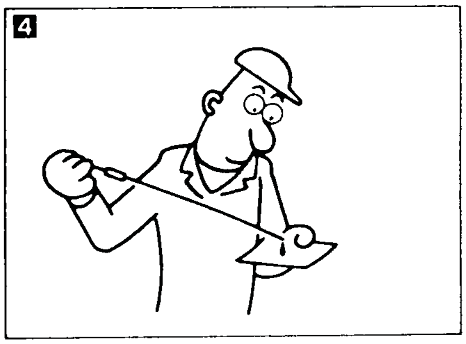
3 Check line pressure at idle with selector lever in "D", "2" and "1" ranges.
- N.G. →
  1. Remove control valve assembly.
  2. Check the following items.
  - Valves to control line pressure (Pressure regulator valve, pilot valve and oil filter)
  - Line pressure solenoid
  3. Disassemble A/T
  4. Check the following items.
  - Oil pump assembly
- O.K. ↓

4 Check A/T fluid condition.
- N.G. →
  - Low clutch assembly
  - One-way clutch
  - Low & reverse brake assembly
  - Torque converter









Diagnostic Procedure 11

SYMPTOM:
Vehicle cannot be started from D_1.

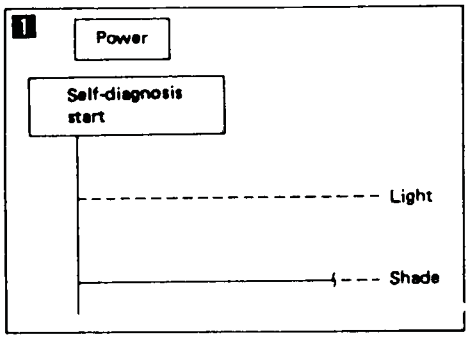
- Is Diagnostic Procedure 10 O.K.?
  - No → Go to Diagnostic Procedure 10.
  - Yes ↓
- **1** Does self-diagnosis show damage to revolution sensor, speed sensor, shift solenoid A or B after cruise test?
  - Yes → Check damaged circuit.
  - No ↓
- **2** Check throttle sensor.
  - N.G. → Repair or replace throttle sensor.
  - O.K. ↓
- **3** Check line pressure at stall point with selector lever in "D" range.
  - N.G. → (box below)
  - O.K. ↓
- **4** Check A/T fluid condition.
  - O.K. → (box below)
  - N.G. → (box below)

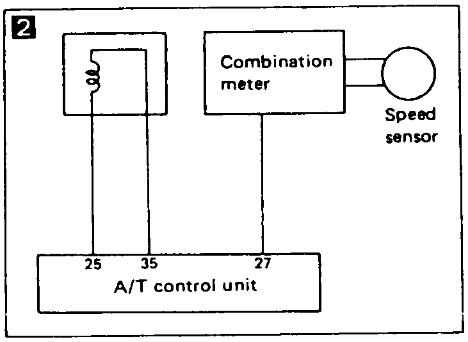
Box:
1. Remove control valve assembly.
2. Check the following items.
   - 1-2 shift valve
   - 2-3 shift valve
   - 3-4 shift valve
   - Shift solenoid A
   - Shift solenoid B

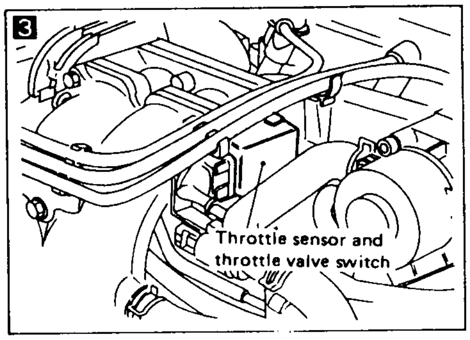
   O.K. ↓
3. Disassemble A/T.
4. Check the following items.
   - Low clutch assembly
   - One-way clutch
   - Torque converter
   - Oil pump assembly

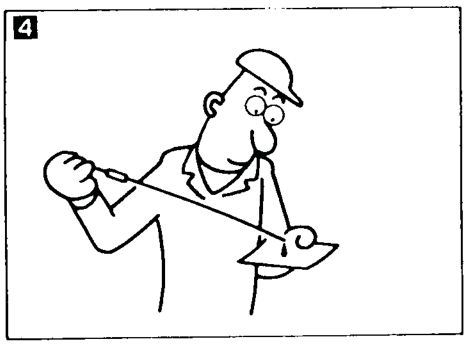
   O.K. ↓

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.







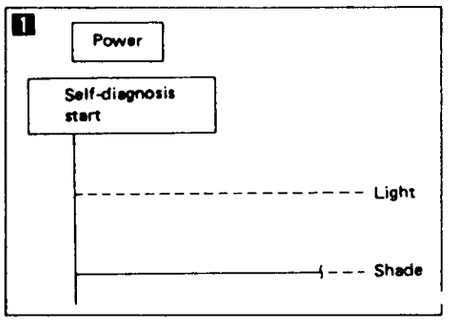


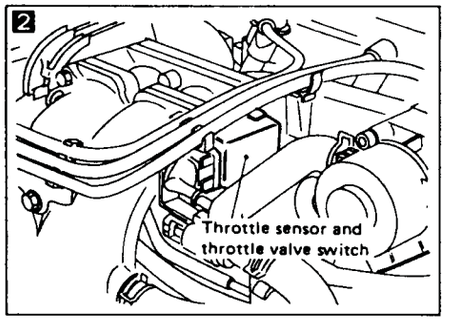
Diagnostic Procedure 12

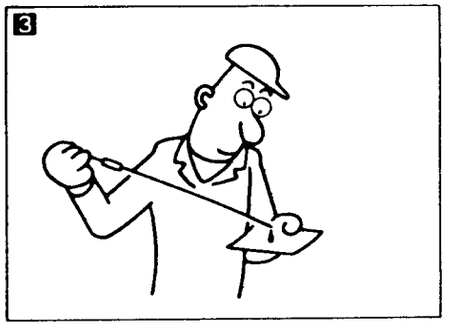
SYMPTOM:
A/T does not shift from D_1 to D_2 at the specified speed.
A/T does not shift from D_4 to D_2 when depressing accelerator pedal fully at the specified speed.

- Are Diagnostic Procedures 10 and 11 O.K.?
  - No → Go to Diagnostic Procedure 10 or 11.
  - Yes ↓
- **1** Does self-diagnosis show damage to inhibitor switch after cruise test?
  - Yes → Check inhibitor switch circuit.
  - No ↓
- **2** Check revolution sensor and speed sensor circuit.
  - N.G. → Repair or replace revolution sensor and speed sensor circuits.
  - O.K. ↓
- **3** Check throttle sensor.
  - N.G. → Repair or replace throttle sensor.
  - O.K. ↓
- **4** Check A/T fluid condition.
  - N.G. →
    1. Remove control valve.
    2. Check the following items.
       - 1-2 shift valve
       - 2-3 shift valve
       - 3-4 shift valve
       - Shift solenoid A
       - Shift solenoid B
    3. Disassemble A/T.
    4. Check the following items.
       - Servo piston assembly
       - Brake band
  - O.K. → 2. Check the following items.
  - O.K. ↓

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.







Diagnostic Procedure 13

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

Are Diagnostic Procedures 10 and 11 O.K.? — No → Go to Diagnostic Procedure 10 or 11.

Yes ↓

1 Does self-diagnosis show damage to inhibitor switch after cruise test? — Yes → Check inhibitor switch circuit.

No ↓

2 Check throttle sensor. — N.G. → Repair or replace throttle sensor.

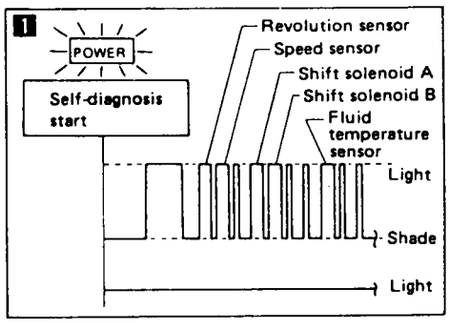
O.K. ↓

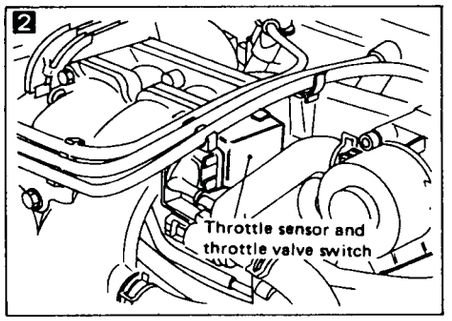
3 Check A/T fluid condition. — N.G. →
1. Remove control valve assembly.
2. Check the following items.
- 2-3 shift valve
- Shift solenoid B

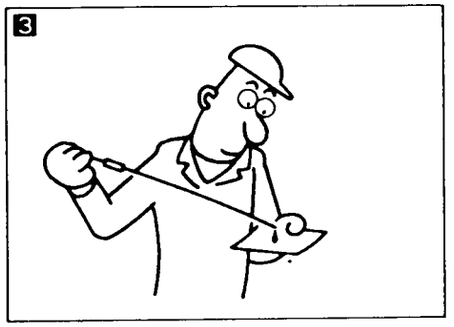
O.K. → 3. Disassemble A/T.
4. Check the following items.
- Servo piston assembly
- High clutch assembly

O.K. ↓

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.







Diagnostic Procedure 14

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

Are Diagnostic Procedure 10 and 11 O.K.? — No → Go to Diagnostic Procedure 10 or 11.

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.

No ↓

2 Check throttle sensor. — N.G. → Repair or replace throttle sensor.

O.K. ↓

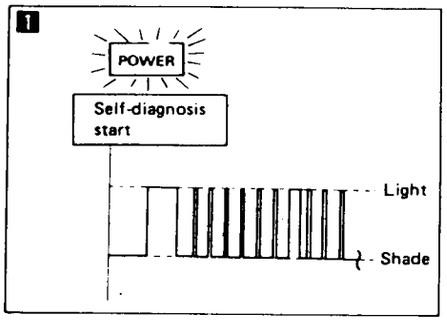
3 Check A/T fluid condition. — N.G. →
1. Remove control valve assembly.
2. Check the following items.
   - 3-4 shift valve
   - Servo release timing valve
   - Shift solenoid A

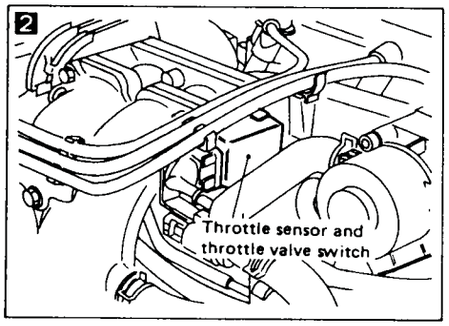
O.K. ↓

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

O.K. ↓

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.





Diagnostic Procedure 15

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.

No ↓

2

Check throttle sensor.

N.G. → Repair or replace throttle sensor.

O.K. ↓

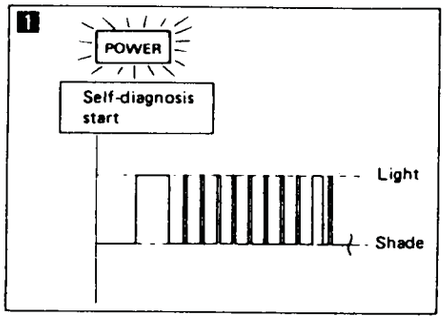
1. Remove control valve.

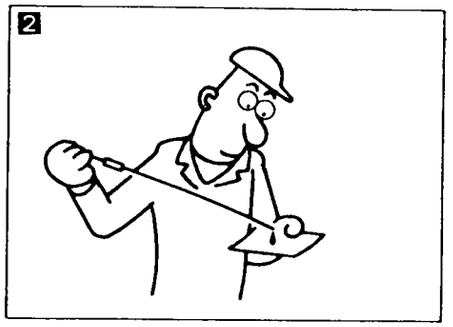
2. Check following items.
- Lock-up control valve
- Lock-up shuttle valve
- Torque converter relief valve
- Lock-up solenoid
- Pilot valve
- Oil filter

N.G. → Repair or replace damaged parts.

O.K. ↓

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.





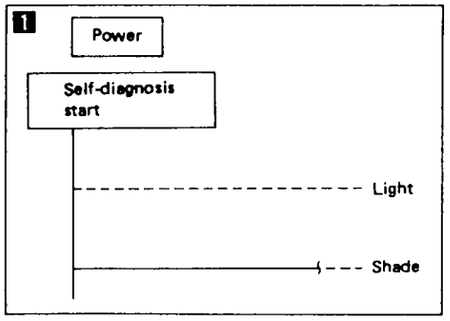
Diagnostic Procedure 16

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

1 Does self-diagnosis show damage to engine revolution signal circuit after cruise test?
- Yes → Check revolution sensor circuit.
- No ↓

2 Check A/T fluid condition.
- N.G. → 1. Remove control valve assembly.
  2. Check the following items.
  - Lock-up control valve
  - Pilot valve
  - Oil filter
  - O.K. → 3. Disassemble A/T.
  4. Check torque converter and oil pump assembly.
  - O.K. ↓
- O.K. ↓

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.

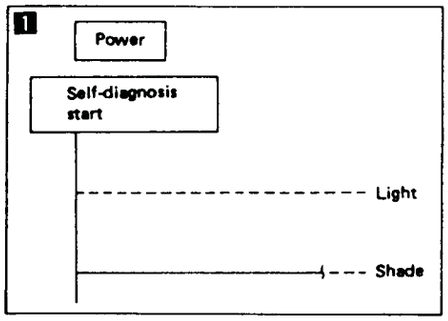


Diagnostic Procedure 17

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

1 Does self-diagnosis show damage to idle switch circuit after cruise test?
- Yes → Check idle switch circuit.
- No ↓

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.



Diagnostic Procedure 18

SYMPTOM:

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

1 Does self-diagnosis show damage to overdrive switch circuit after cruise test?

- Yes → Check overdrive switch circuit.
- No ↓

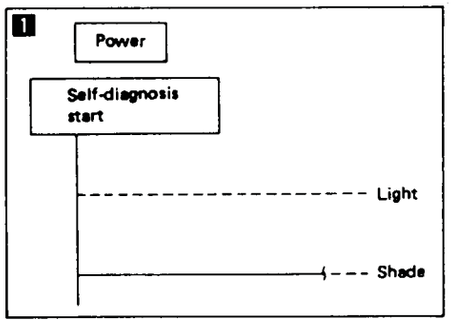
2 Check A/T fluid condition.

- N.G. →
  1. Remove control valve assembly.
  2. Check the following items.
     - 3-4 shift valve
     - Servo release timing valve
     - Shift solenoid A
- O.K. ↓

O.K. ↓

3. Disassemble A/T.
4. Check the following items.
   - Servo piston assembly
   - Low clutch assembly

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.



Diagnostic Procedure 19

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

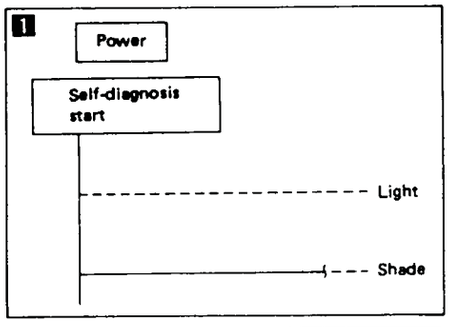
1

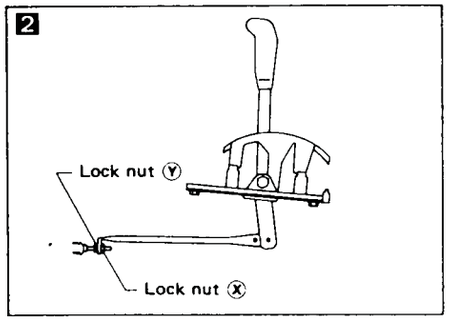
Does self-diagnosis show damage to inhibitor switch circuit after cruise test?

Yes → Check inhibitor switch circuit.

No ↓

Go to Diagnostic Procedure 12.





Diagnostic Procedure 20

SYMPTOM:
A/T does not shift from 2_2 to 1_1 when changing selector lever from "2" to "1" range.
Vehicle does not decelerate by engine brake when shifting from 2_2 (1_2) to 1_1.

1

Does self-diagnosis show damage to inhibitor switch after cruise test?

Yes → Check inhibitor switch circuit.

No ↓

2

Check manual control linkage.

N.G. → Adjust manual control linkage.

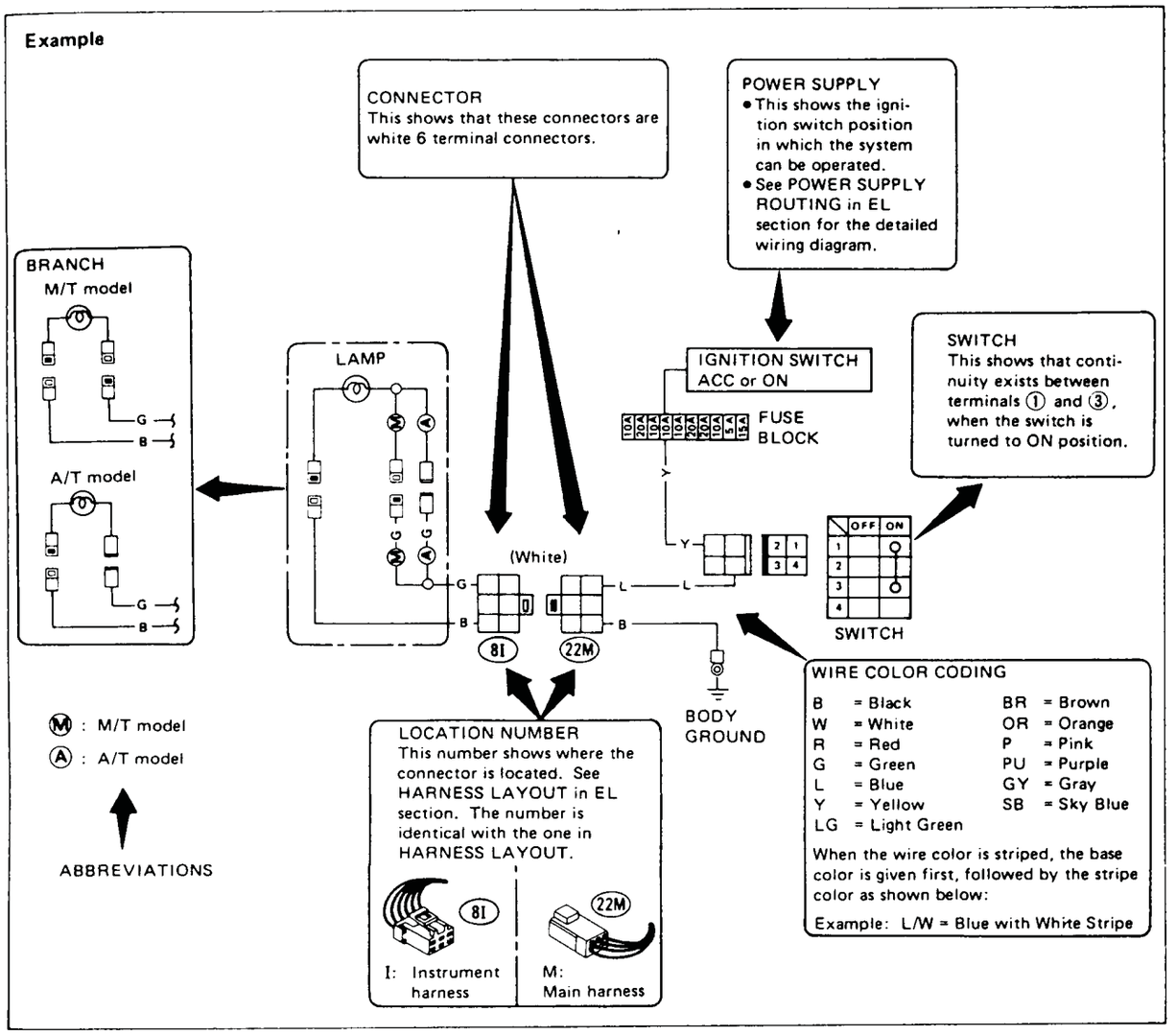
O.K. ↓

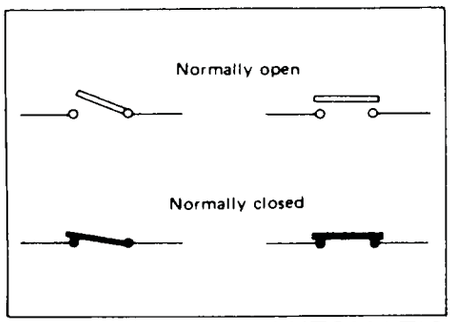
Go to Diagnostic Procedure 9.

HOW TO READ WIRING DIAGRAMS

WIRING DIAGRAM

Symbols used in WIRING DIAGRAM are shown below:

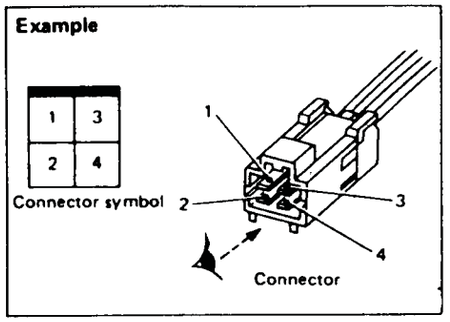




SWITCH POSITIONS

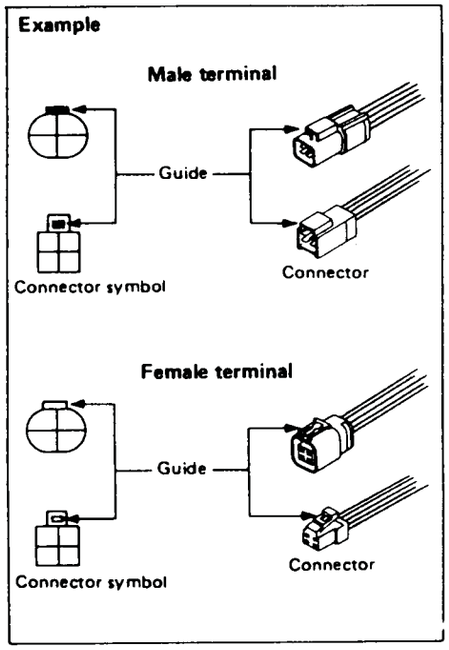
Wiring diagram switches are shown with the vehicle in the following condition.

- Ignition switch "OFF".
- Doors, hood and trunk lid/back door closed.
- Pedals are not depressed and parking brake is released.



CONNECTOR SYMBOLS

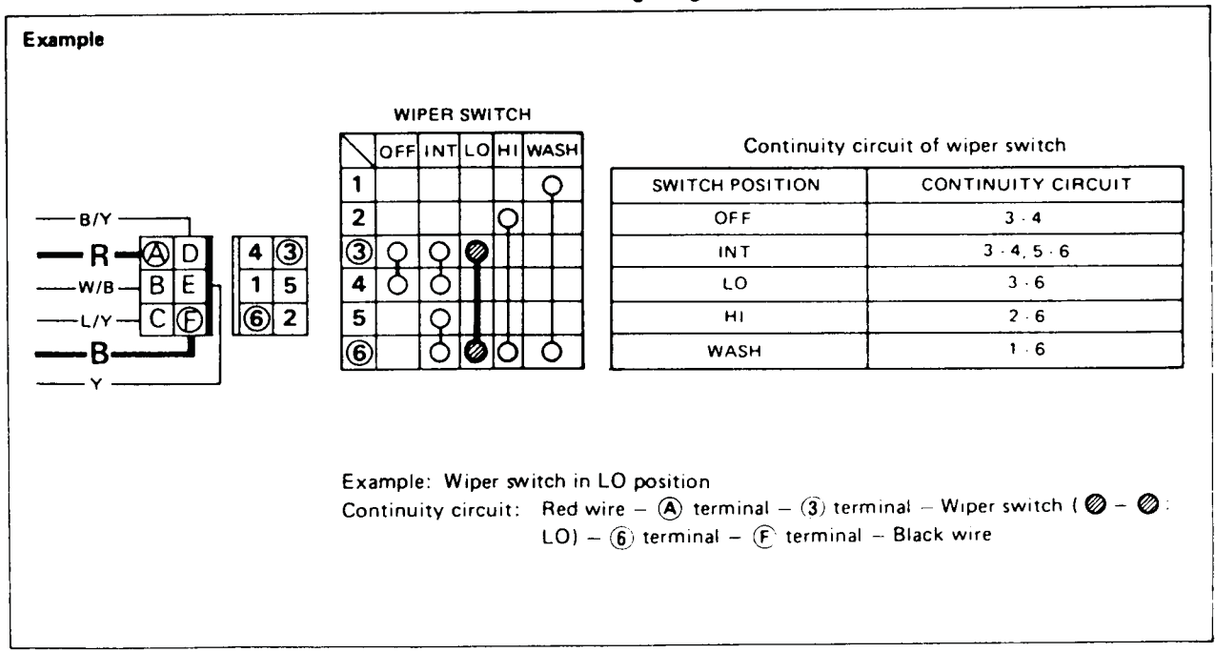
- All connector symbols in wiring diagrams are shown from the terminal side.



- Male and female terminals
  Connector guides for male terminals are shown in black and female terminals in white in wiring diagrams.

MULTIPLE SWITCH

The continuity of the multiple switch is identified in the switch chart in wiring diagrams.

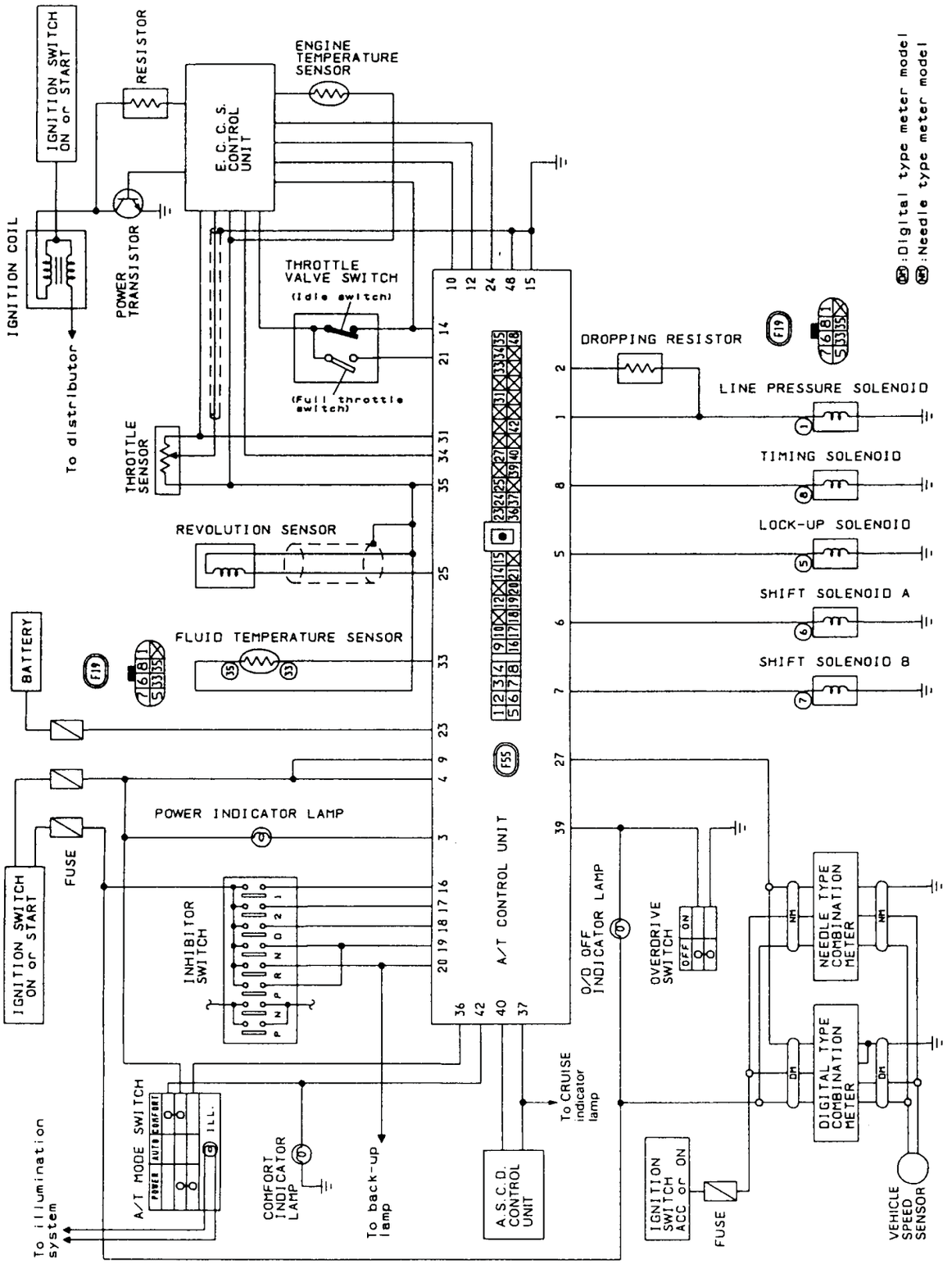


Continuity circuit of wiper switch

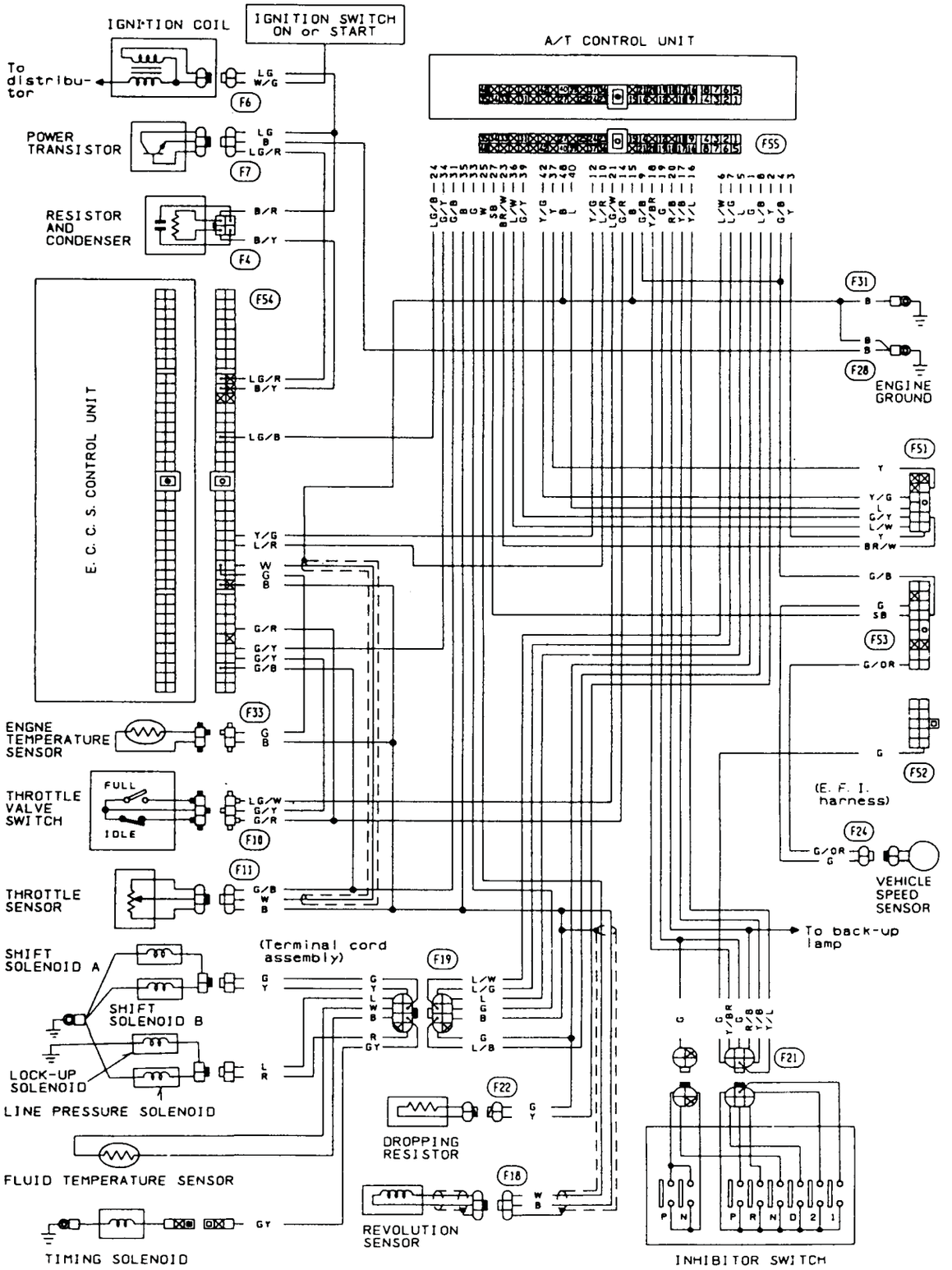
SWITCH POSITION	CONTINUITY CIRCUIT
OFF	3 - 4
INT	3 - 4, 5 - 6
LO	3 - 6
HI	2 - 6
WASH	1 - 6

Example: Wiper switch in LO position
Continuity circuit: Red wire – (A) terminal – (3) terminal – Wiper switch (● – ●: LO) – (6) terminal – (F) terminal – Black wire

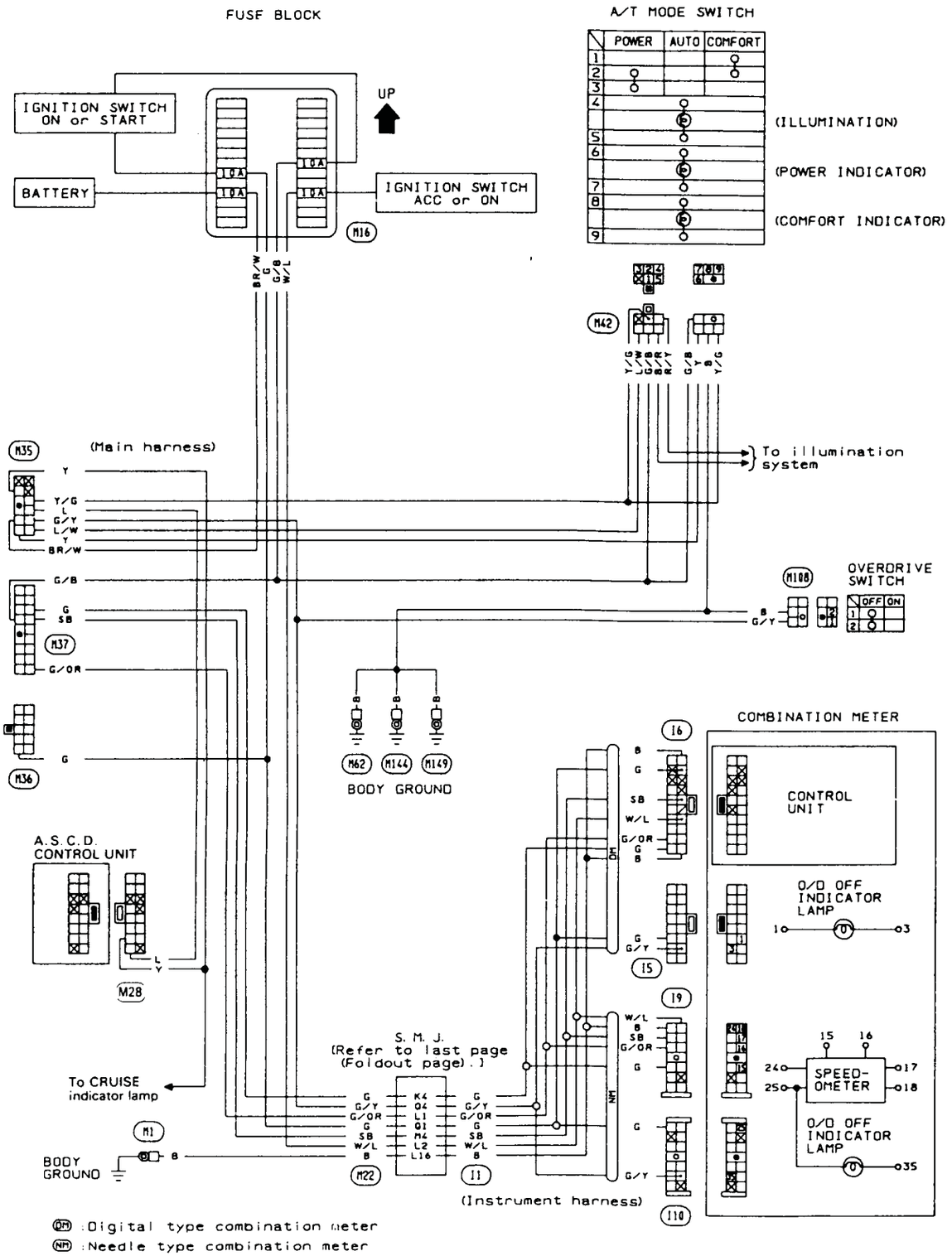
Circuit Diagram for Quick Pinpoint Check

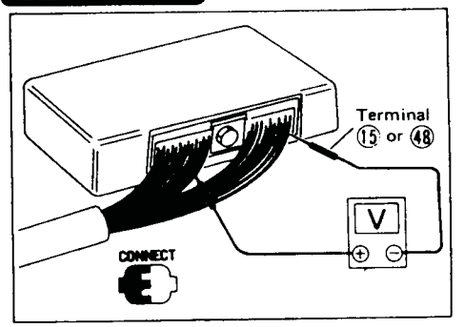


Wiring Diagram



Wiring Diagram (Cont'd)

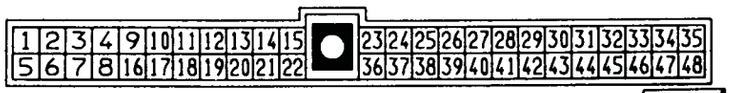




Electrical Components Inspection

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.

H.S.

A/T CONTROL UNIT INSPECTION TABLE
(Data are reference values.)

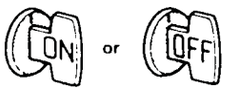
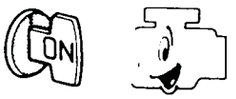
Terminal No.	Item	Condition		Judgement standard
1	Line pressure solenoid		When accelerator pedal is released after warming up engine.	1.5 - 2.5V
			When accelerator pedal is depressed fully after warming up engine.	0.5V or less
2	Line pressure solenoid (with dropping resistor)		When accelerator pedal is released after warming up engine.	5 - 14V
			When accelerator pedal is depressed fully after warming up engine.	0.5V or less
3	Power indicator lamp		When A/T mode switch is set in "POWER" position.	1V or less
			When A/T mode switch is set in any position except in "POWER" position.	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	Timing 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		Judgement standard
9	Power source		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)

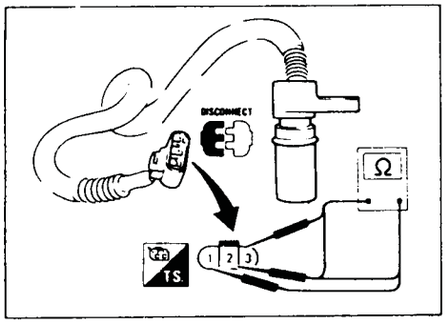
Terminal No.	Item	Condition		Judgement standard
23	Power source (Back-up)		When ignition switch is turned to "OFF".	Battery voltage
			When ignition switch is turned to "ON".	Battery voltage
24	Engine revolution signal		When engine is running at idle speed.	0.9V
			When engine is running at 3,000 rpm.	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 1m (3ft) 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).	1.56V
			When A.T.F. temperature is 80°C (176°F).	0.45V
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: 0.2 - 0.6V Fully-open throttle: 2.9 - 3.9V
35	Throttle sensor (Ground)		–	–
36	A/T mode switch "POWER"		When A/T mode switch is set in "POWER" position.	Battery voltage
			When A/T mode switch is set in any position except in "POWER" position.	1V or less

Electrical Components Inspection (Cont'd)

Terminal No.	Item	Condition		Judgement standard
37	–		–	–
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	–		–	–
41	–		–	–
42	A/T mode switch "COMFORT"		When A/T mode switch is set in "COMFORT" position.	Battery voltage
			When A/T mode switch is set in any position except in "COMFORT" position.	1V or less
43	–		–	–
44	–		–	–
45	–		–	–
46	–		–	–
47	–		–	–
48	Ground		–	–

Electrical Components Inspection (Cont'd)

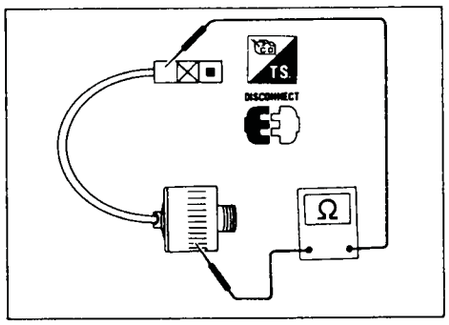
REVOLUTION SENSOR



- Check resistance between terminals ①, ② and ③.

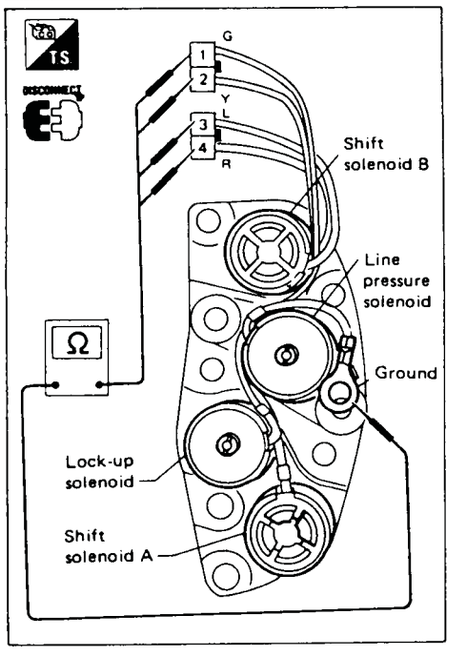
Terminal No.		Resistance
①	②	500 - 650Ω
②	③	No continuity
①	③	No continuity

TIMING SOLENOID



- Check resistance between two terminals.
  Resistance:
  Timing solenoid 20 - 40Ω

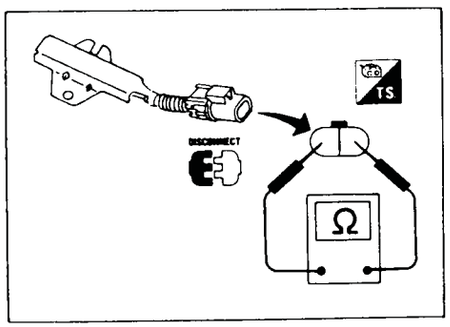
4-UNIT SOLENOID ASSEMBLY
(Shift solenoid A, B, lock-up solenoid and line pressure solenoid)



- Check resistance between terminals of each solenoid.

Solenoid	Terminal No.		Resistance Ω
Shift solenoid A	①	Ground terminal	20 - 40
Shift solenoid B	②		
Lock-up solenoid	③		10 - 20
Line pressure solenoid	④		2.5 - 5

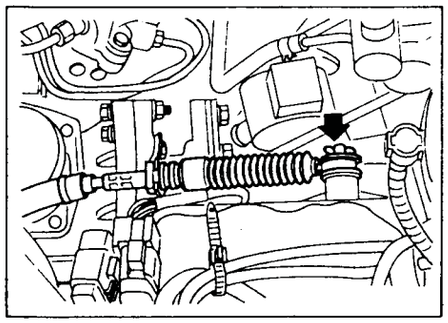
DROPPING RESISTOR



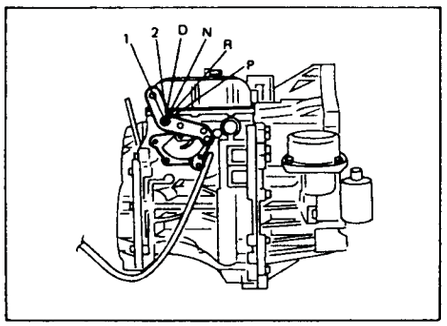
- Check resistance between two terminals.
  Resistance: 11.2 - 12.8Ω

Electrical Components Inspection (Cont'd)

INHIBITOR SWITCH

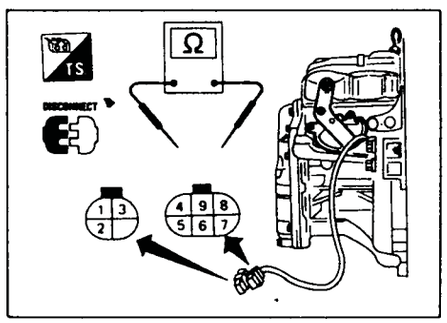


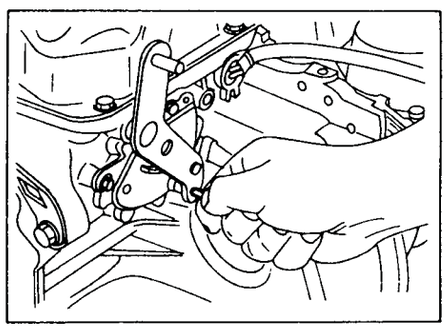
1. Disconnect control cable from manual shaft.



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

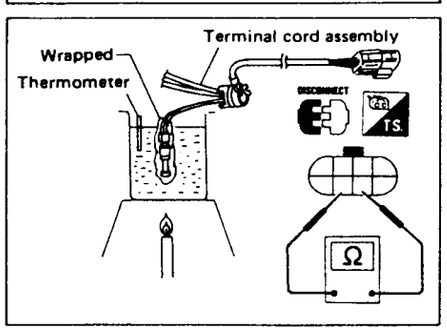
Lever position \ Terminal No.	①	②	③	④	⑤	⑥	⑦	⑧	⑨
P	○		○	○		○			
R				○			○		
N	○	○	○	○					
D				○	○				
2				○				○	
1				○					○





3. If N.G., adjust inhibitor switch.
4. Check terminal continuity again.
5. If N.G., replace inhibitor switch.

FLUID TEMPERATURE SENSOR

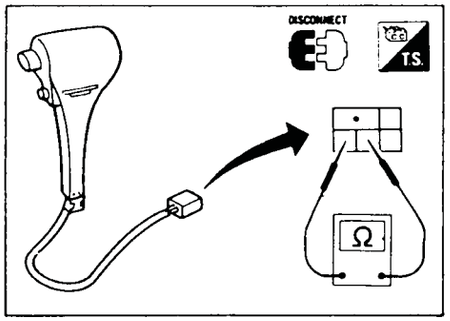


- Check resistance between two terminals while changing temperature as shown as left.

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

Electrical Components Inspection (Cont'd)

OVERDRIVE SWITCH



- Check continuity between two terminals.

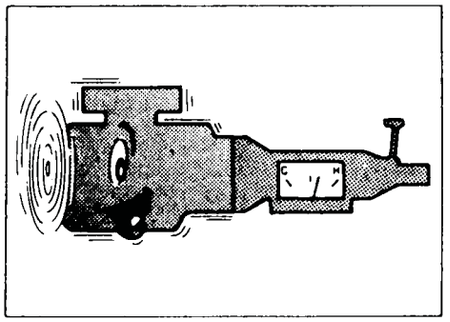
O.D. switch position	Continuity
ON	No
OFF	Yes

Final Check

STALL TESTING

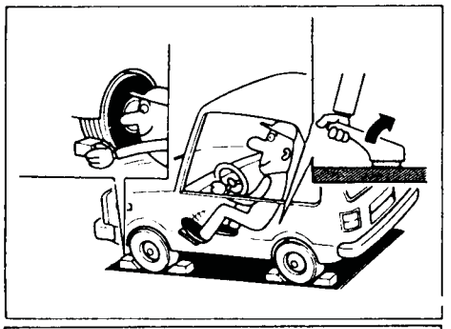
Stall test procedure

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.



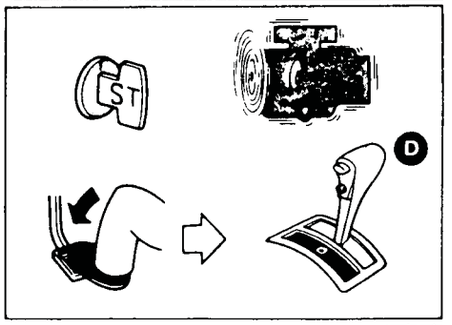
A.T.F. operating temperature:
50 - 80°C (122 - 176°F)

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

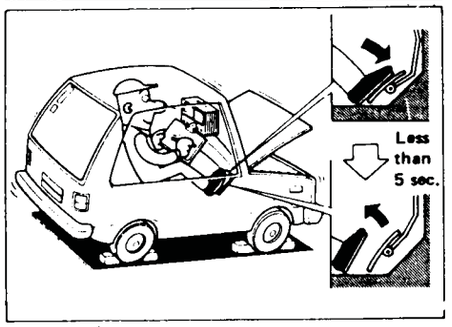


- **It is good practice to put a mark on point of specified engine rpm on indicator.**

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

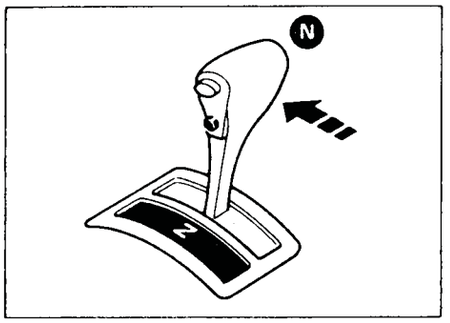


6. Accelerate to wide-open throttle gradually while applying foot brake.
7. Quickly note the engine stall revolution and immediately release throttle.



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

Stall revolution:
2,350 - 2,650 rpm



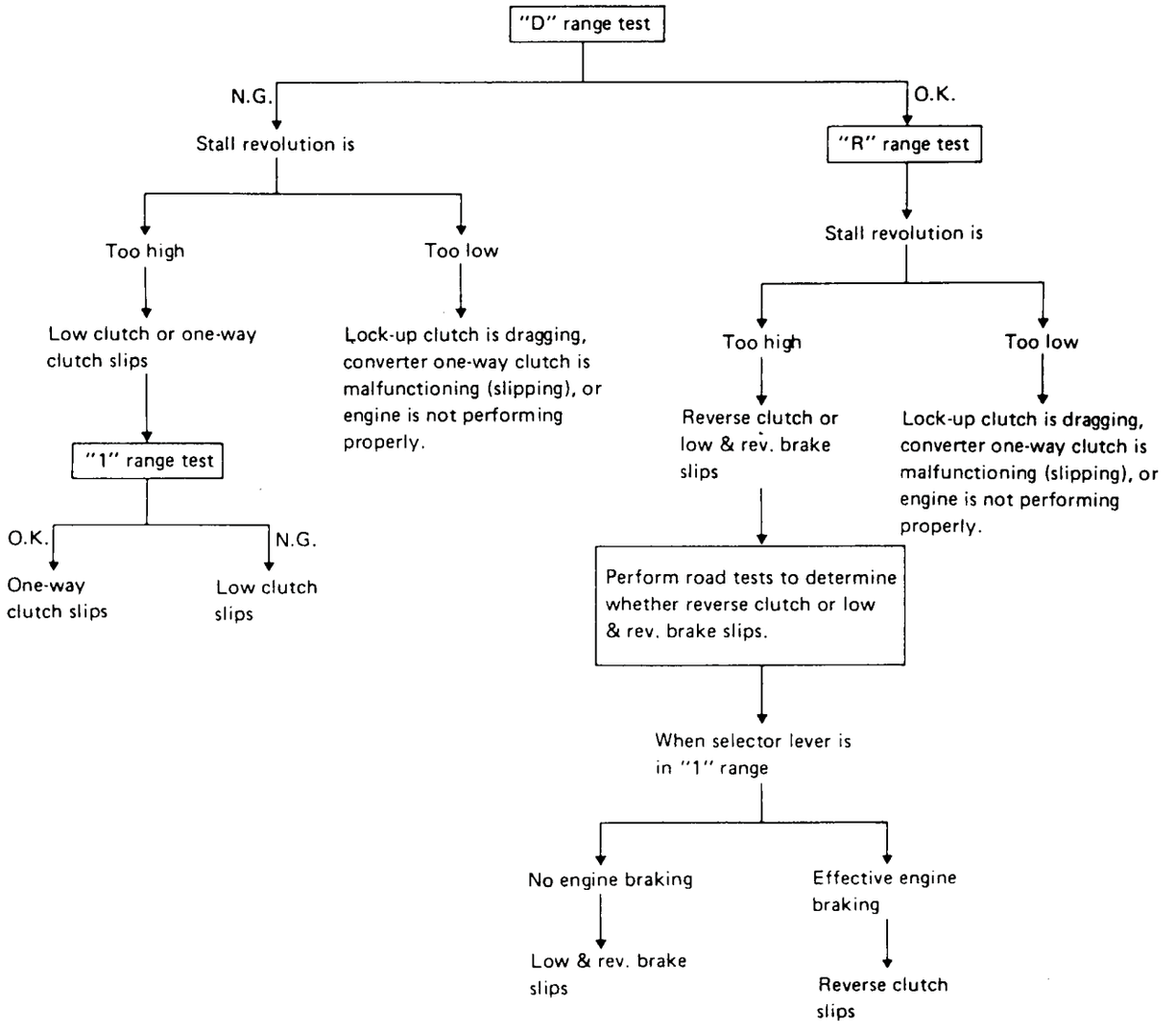
Final Check (Cont'd)

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 "1" and "R", respectively.

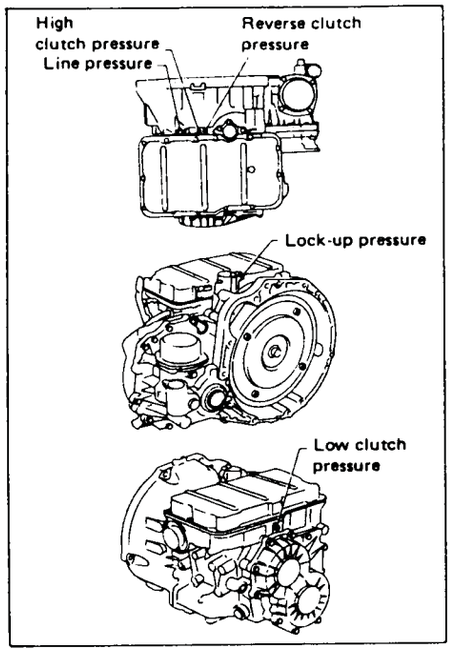
JUDGEMENT OF STALL TEST



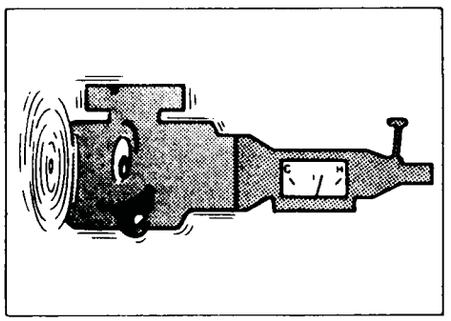
If converter one-way clutch is frozen, vehicle will have poor high-speed performance and low engine rpm when it is raced in "N" range. If converter one-way clutch is slipping, vehicle will be sluggish up to 50 or 60 km/h (30 or 40 MPH).

Final Check (Cont'd)

PRESSURE TESTING



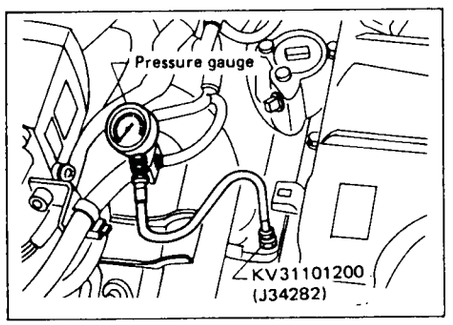
- Location of line pressure test port
- **Always replace line pressure plugs as they are self-sealing bolts.**



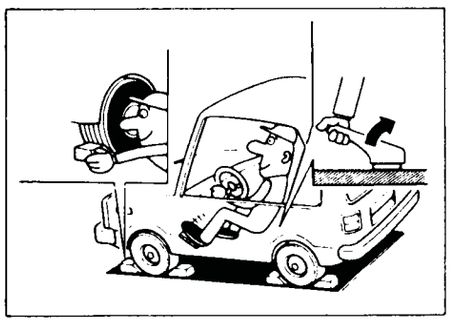
Line pressure test procedure

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)

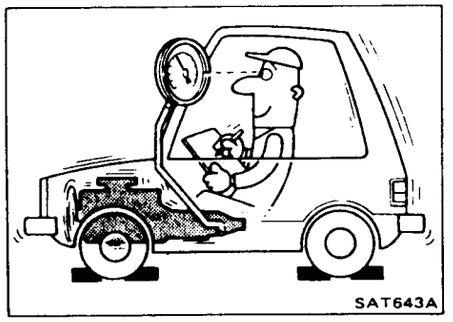


3. Install pressure gauge to line pressure port.



4. Set parking brake and block wheels.
   - **Continue to depress brake pedal fully while line pressure test at stall speed is performed.**

Final Check (Cont'd)



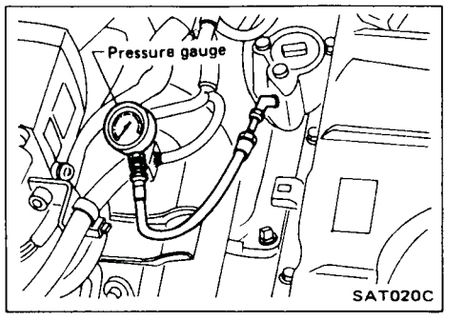
5. Start engine and measure line pressure at idle and stall speed.
- **When measuring line pressure at stall speed, follow the stall test procedure.**

Line pressure:

Engine speed rpm	Line pressure kPa (kg/cm², psi)
	D, 2, 1 and R ranges
Idle	382 - 422 (3.9 - 4.3, 55 - 61)
Stall	1,285 - 1,363 (13.1 - 13.9, 186 - 198)

JUDGEMENT OF LINE PRESSURE TEST

	Judgement	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 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 • Pilot valve sticking



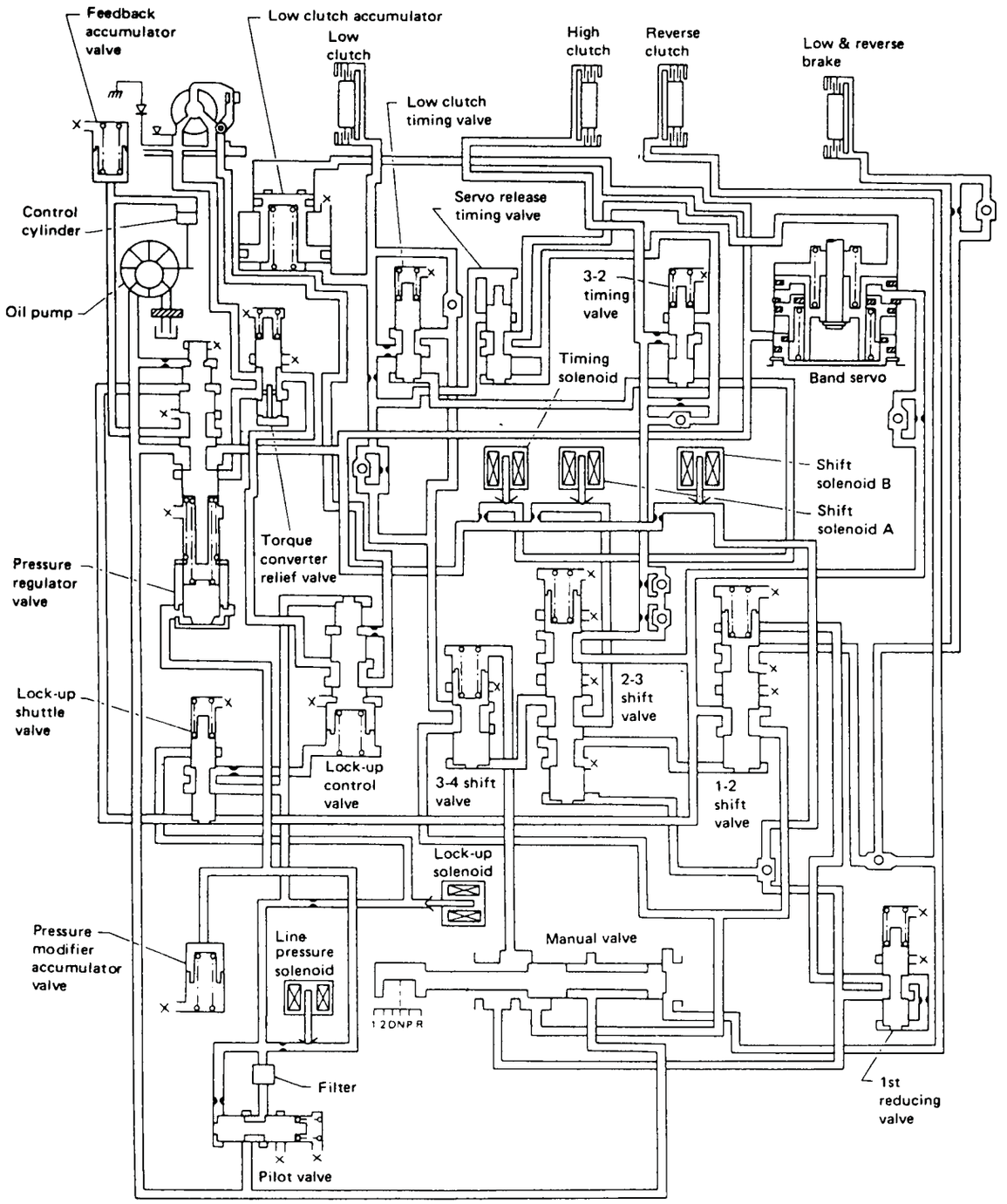
LOCK-UP TEST

Install pressure gauge to lock-up pressure port. Shift selector lever in "D" range.

Condition	Torque converter lock-up pressure kPa (kg/cm², psi)
Lock-up "ON"	49 (0.5, 7) or less
Lock-up "OFF"	196 (2, 28) or more

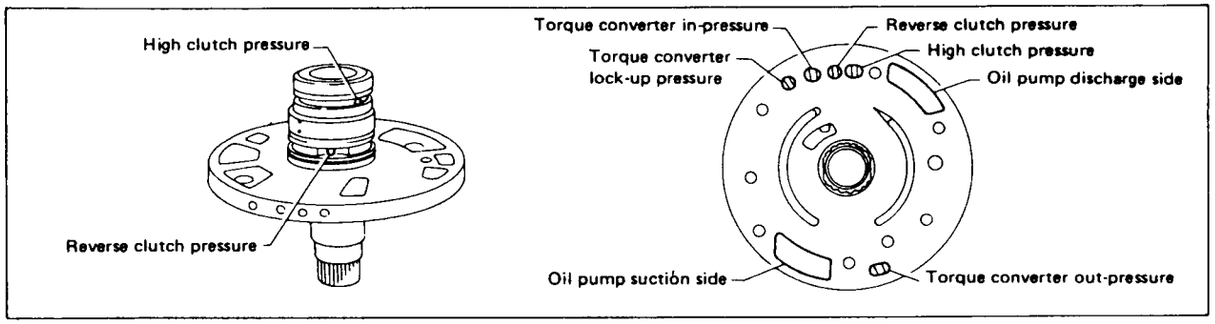
If lock-up pressure is not within specifications, refer to Diagnostic Procedures 15 and 16.

Hydraulic Control Circuits

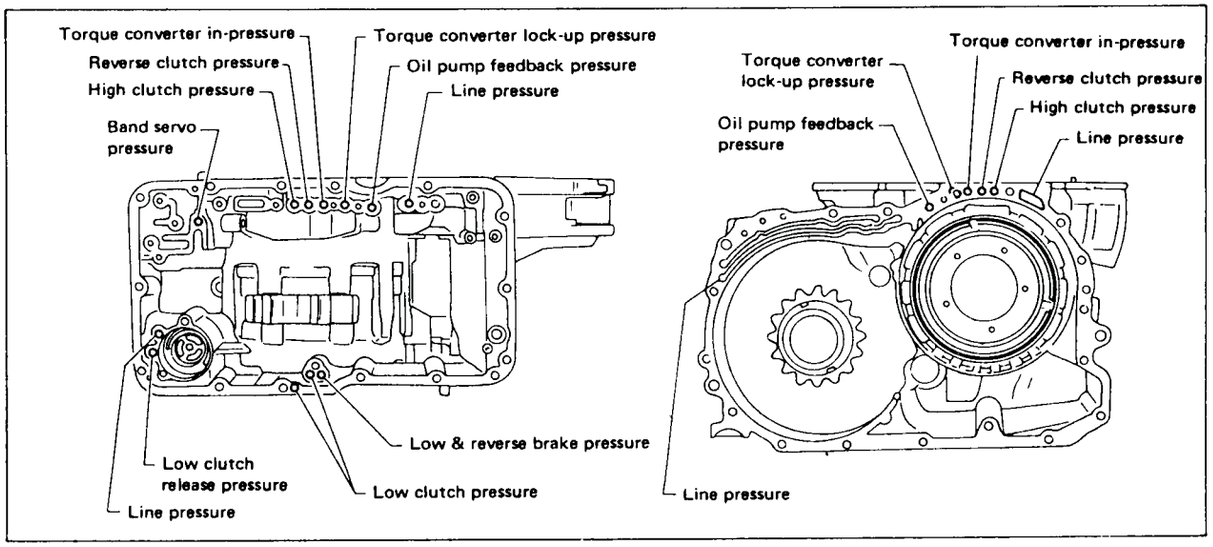


Oil Channel

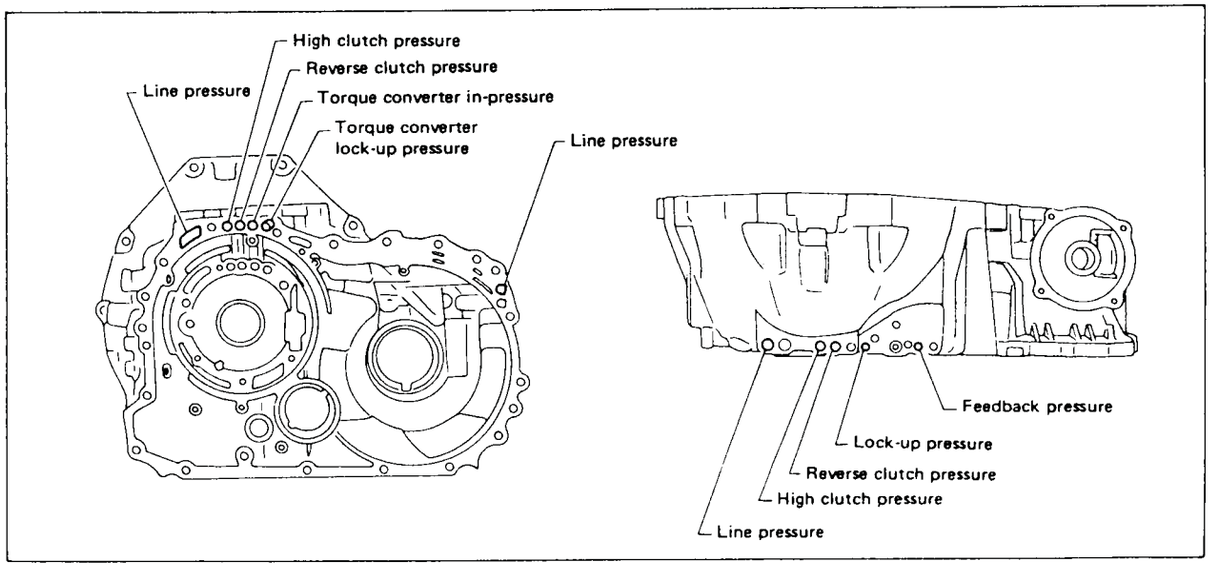
OIL CHANNELS IN OIL PUMP COVER

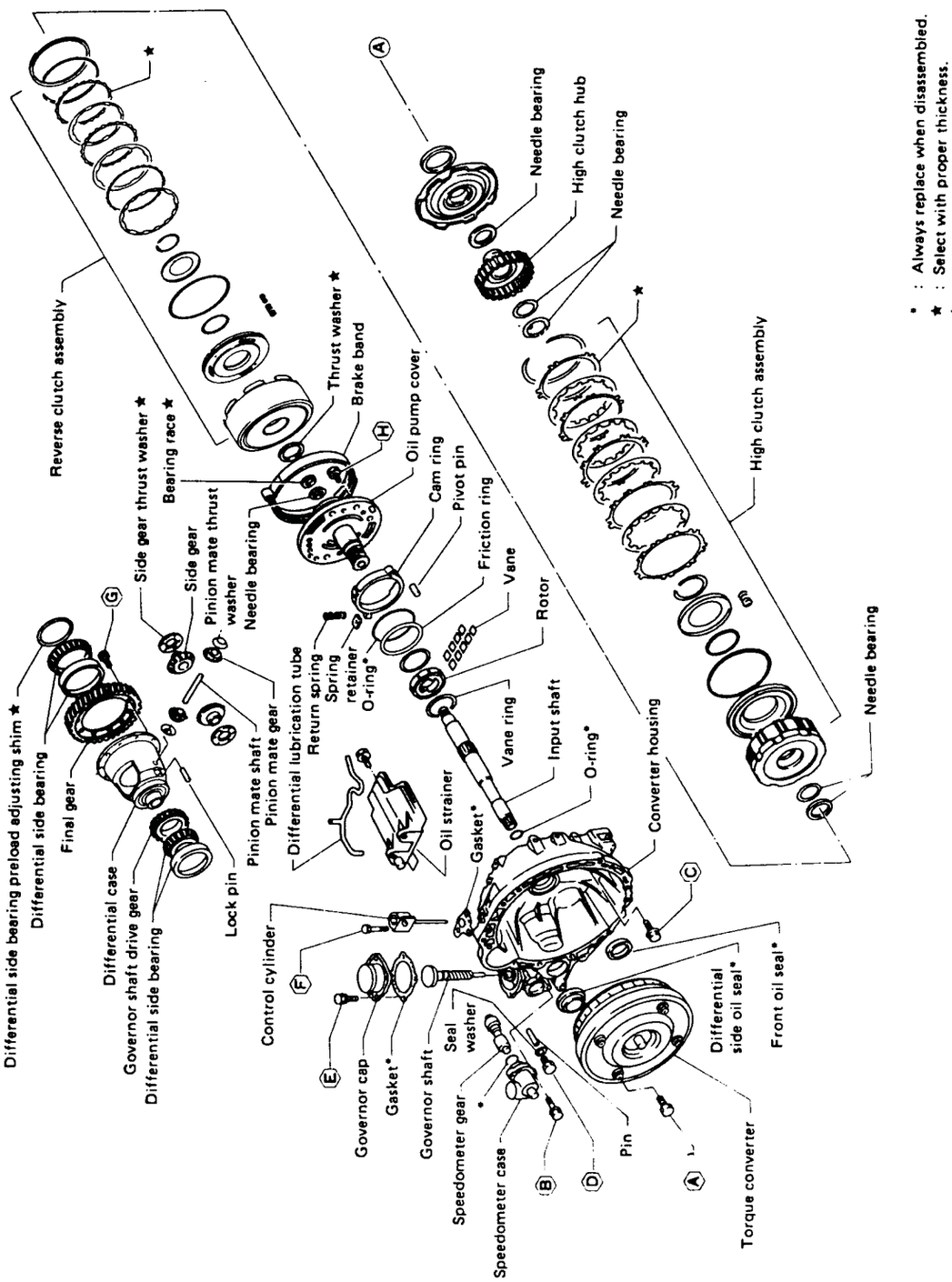


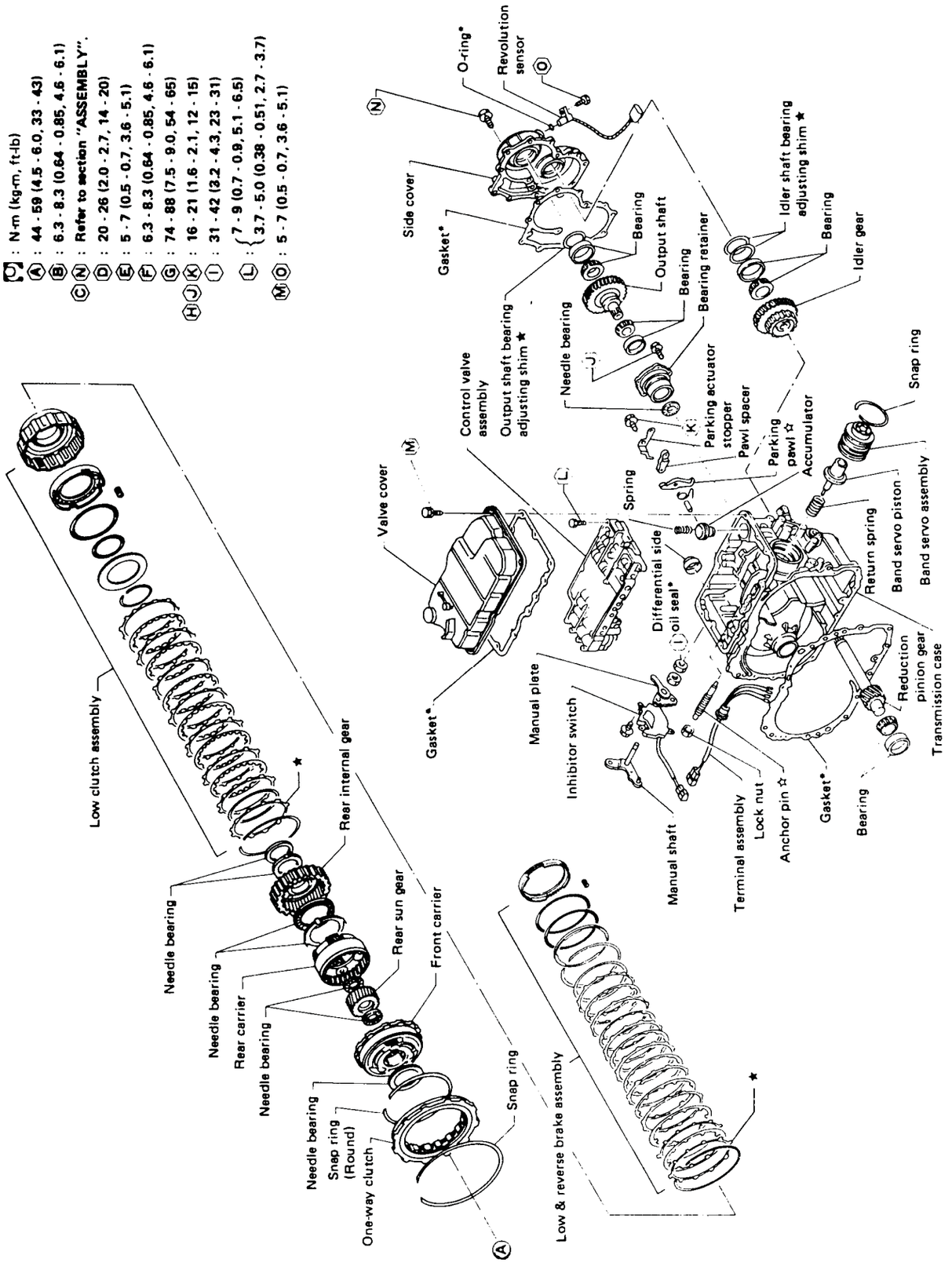
OIL CHANNELS IN TRANSMISSION CASE

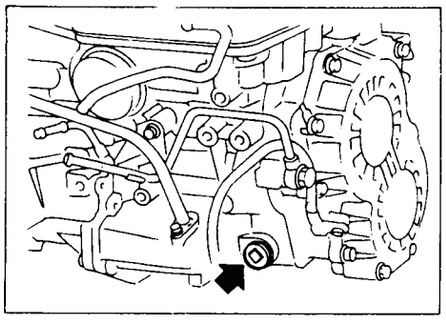


OIL CHANNELS IN CONVERTER HOUSING



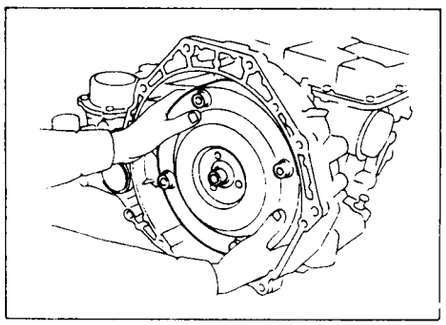




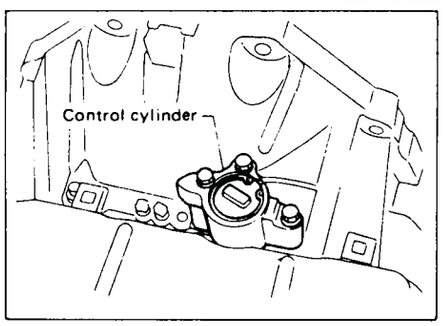


Disassembly

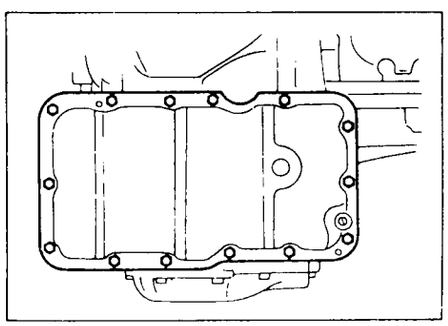
1. Drain A.T.F. through drain hole.



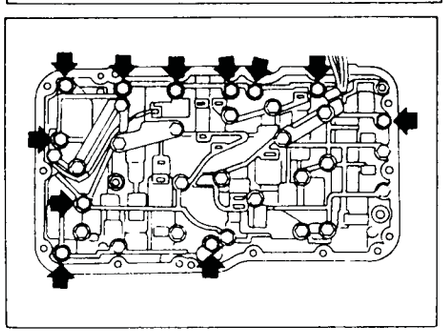
2. Remove torque converter.



3. Remove control cylinder.



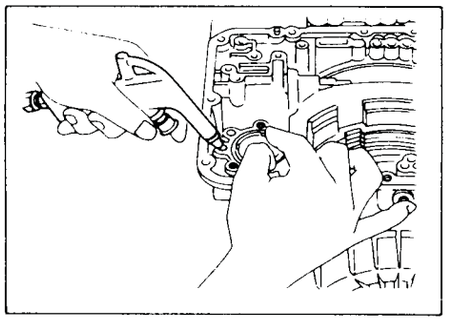
4. Remove control valve cover.



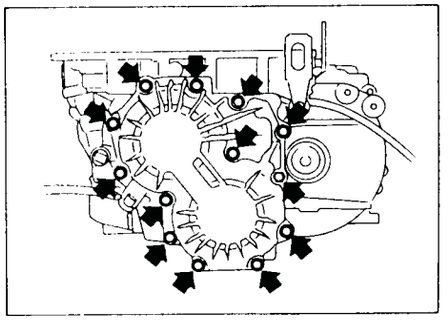
5. Disconnect harness connectors on control valve and remove control valve assembly.

6. Remove terminal assembly.
The terminal retrieving hooks will break if they are forced inward too far. Bend them gently inward while pulling carefully outward on the terminal. Do not pull on the wires.

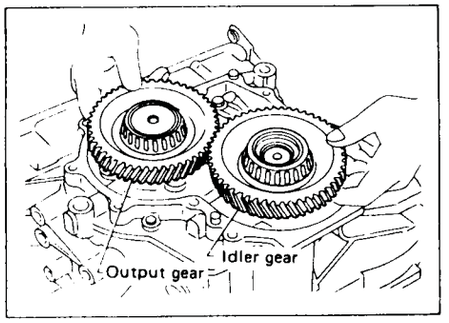
Disassembly (Cont'd)



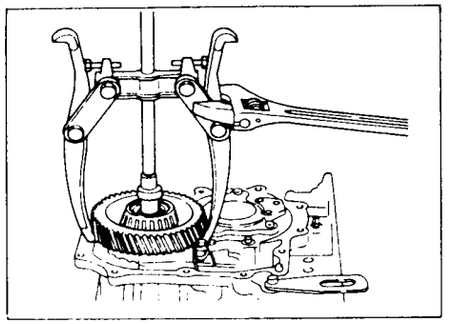
7. Remove accumulator.



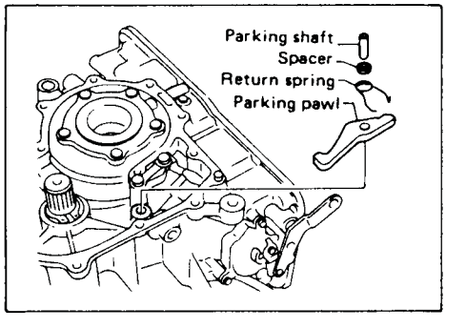
8. Remove side cover.



9. Remove output gear.

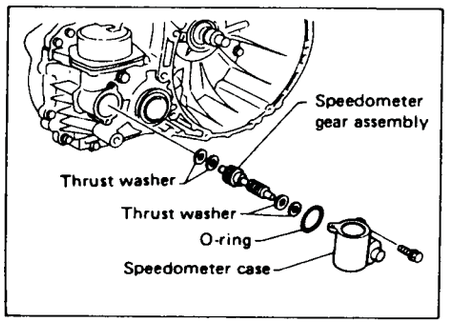


10. Draw out idler gear.

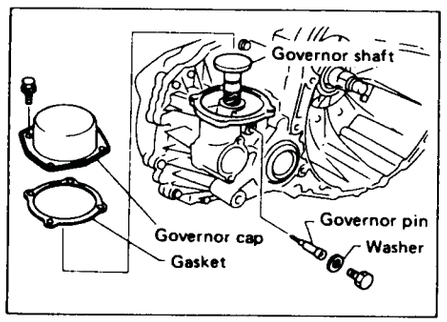


11. Remove parking pawl, return spring, parking shaft and spacer.

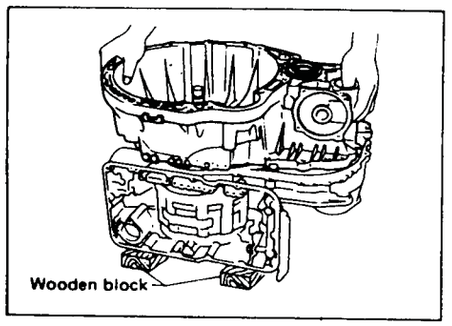
Disassembly (Cont'd)



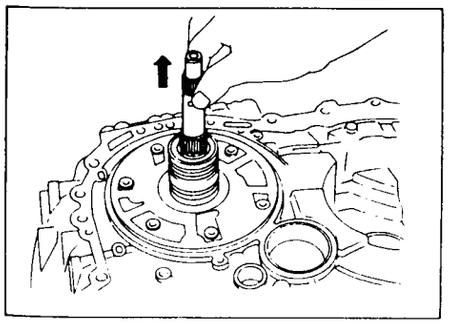
12. Remove speedometer and speedometer gear.



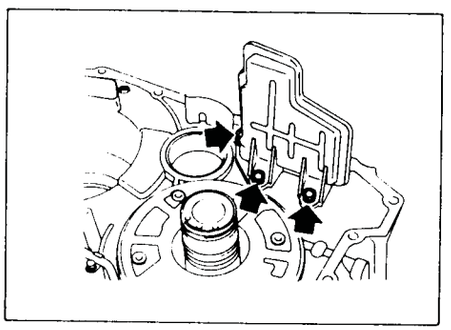
13. Remove governor shaft.



14. Put transaxle assembly on wooden block and remove converter housing.

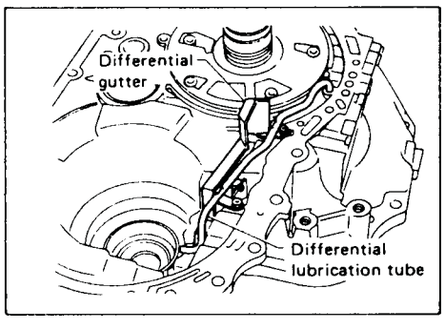


15. Remove final drive assembly and reduction pinion gear.
16. After removing O-ring from input shaft, extract input shaft from converter housing.

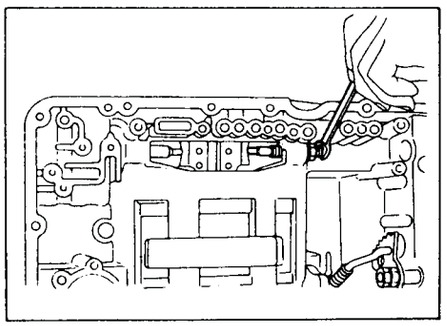


17. Remove oil strainer.

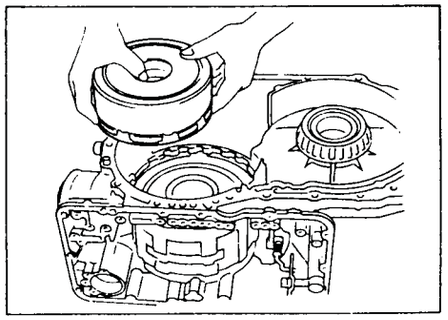
Disassembly (Cont'd)



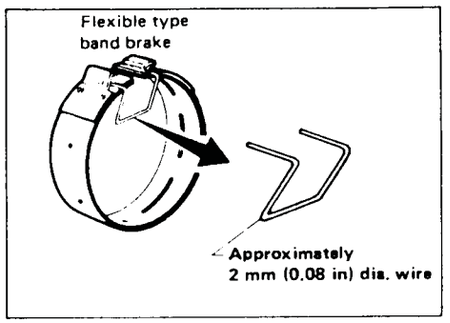
18. Remove differential lubrication tube and gutter.



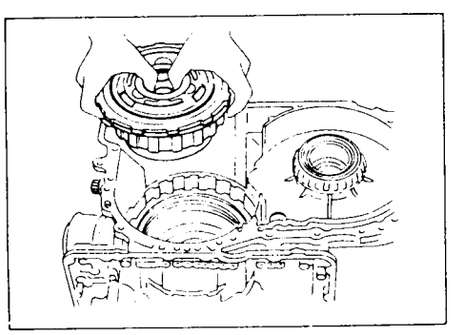
19. Loosen band brake stem lock nut, then back off piston stem.



20. Remove brake band and hight clutch & reverse clutch pack.



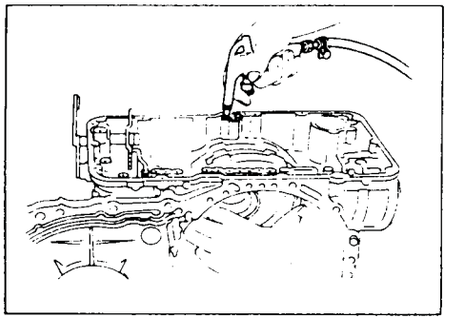
- **To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. Before removing the brake band, always secure it with a clip as shown in the figure at left.**
  Leave the clip in position after removing the brake band.



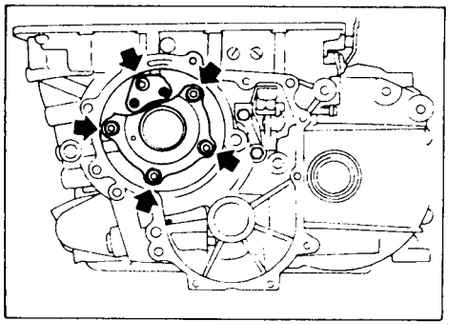
21. Remove one-way clutch, front carrier, rear carrier and low clutch as a set.

22. Remove low & reverse brake clutches, and detach low & reverse brake retainer snap ring pushing retainer.

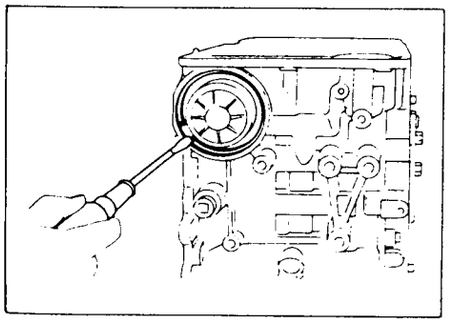
Disassembly (Cont'd)



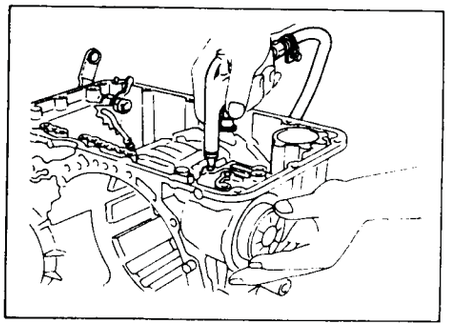
23. Remove low and reverse brake piston with compressed air



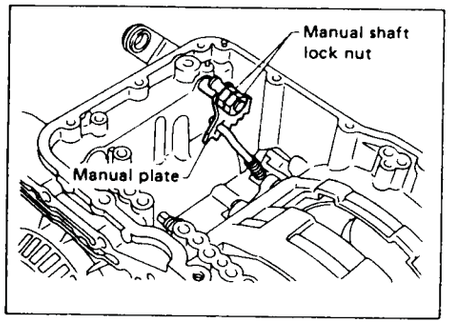
24. Remove bearing retainer assembly.



25. Remove band servo snap ring.

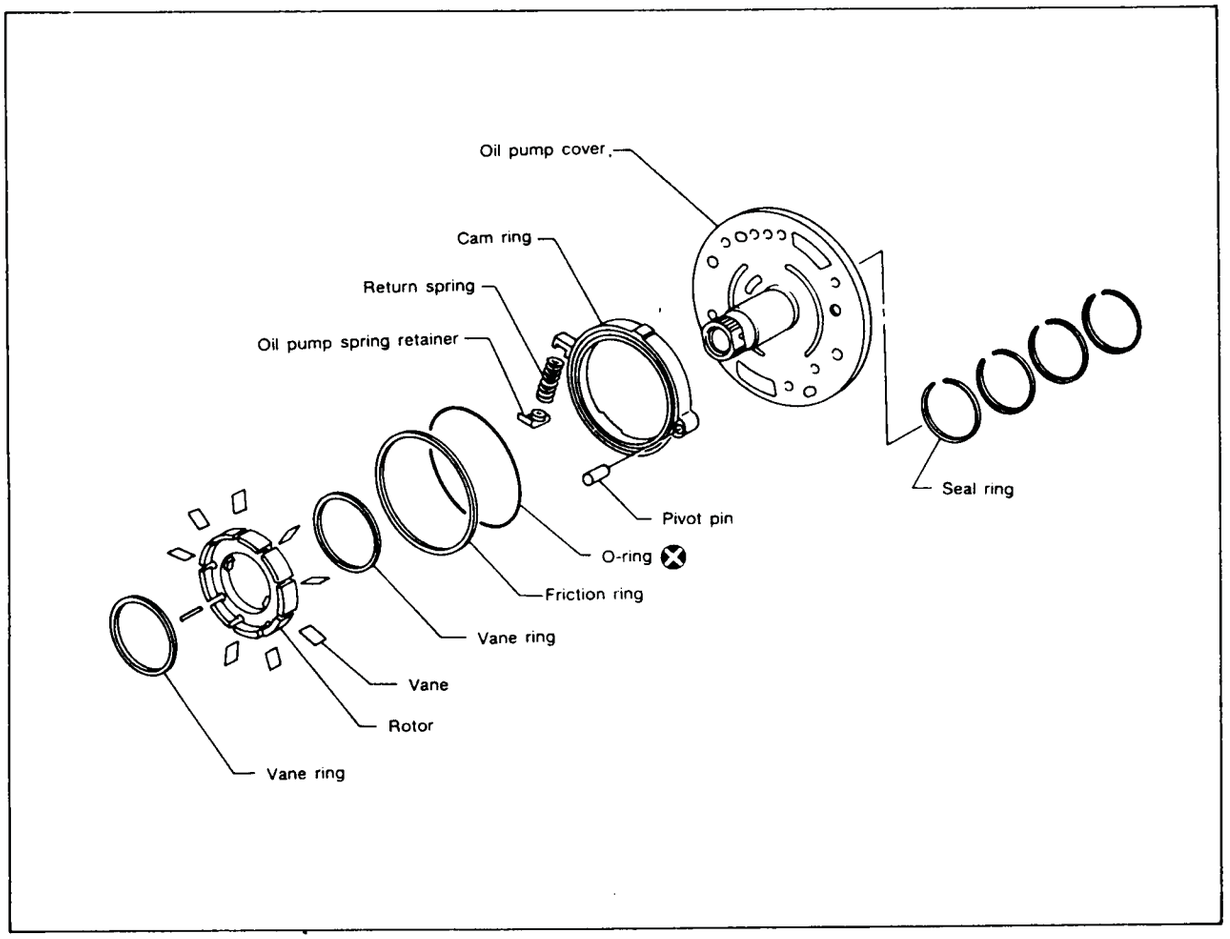


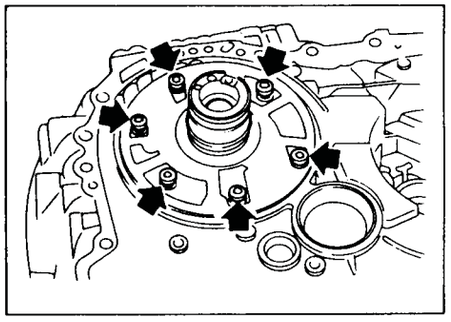
26. Remove band brake servo, retainer and return spring



27. Loosen manual shaft lock nuts and remove manual plate.
28. Pull out retaining pin, then remove manual shaft.

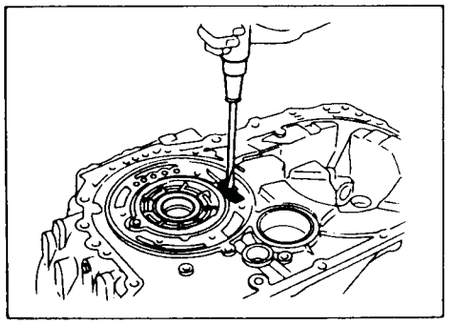
Oil Pump





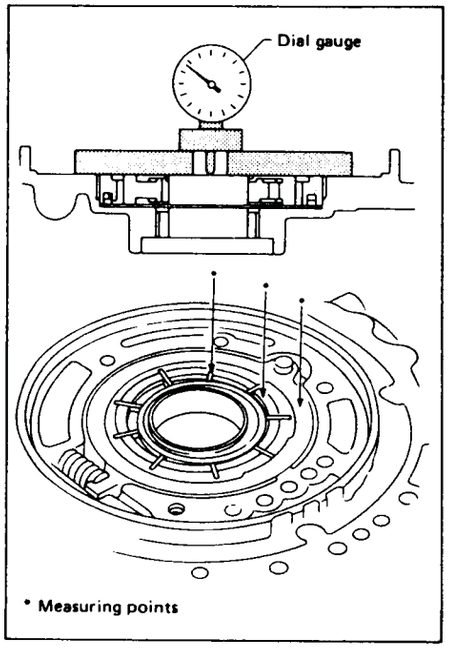
DISASSEMBLY

1. Remove oil pump cover.



2. Remove return spring taking care not to damage converter housing.

Oil Pump (Cont'd)



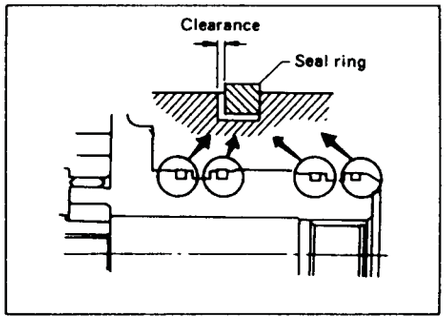
INSPECTION

1. Inspect oil pump cover, cam ring, rotor and vanes for damage and visible wear.
2. Measure clearance between clutch housing and cam ring, rotor and vanes in at least four places along their circumstances. The maximum measured value should be within the specified range.

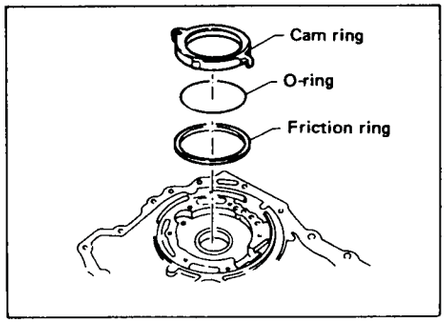
- **Be sure to remove friction ring and vane ring when measuring clearance.**

Standard clearance:
0.010 - 0.024 mm (0.0004 - 0.0009 in)
(Cam ring to oil pump cover)
0.017 - 0.031 mm (0.0007 - 0.0012 in)
(Rotor to oil pump cover)
0.017 - 0.031 mm (0.0007 - 0.0012 in)
(Vane to oil pump cover)
Wear limit:
0.034 mm (0.0013 in)

If the clearance is out of above specification, replace oil pump as an assembly.

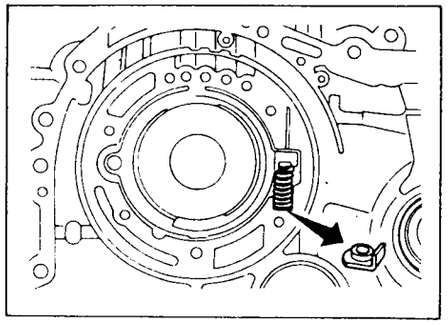


3. Measure clearance between seal ring and ring groove.
Standard clearance:
0.10 - 0.25 mm (0.0039 - 0.0098 in)
Wear limit:
0.25 mm (0.0098 in)



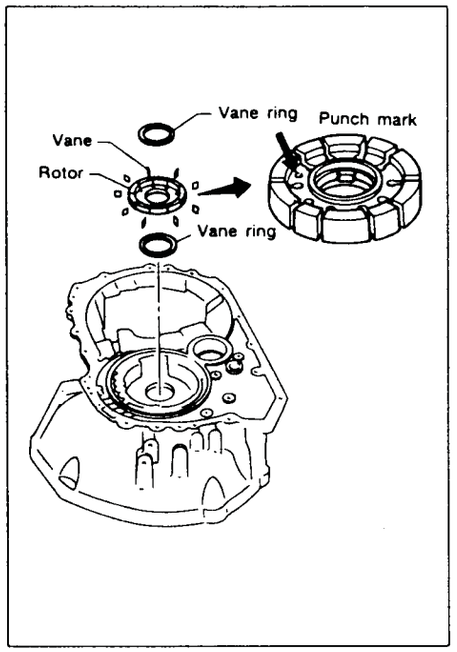
ASSEMBLY

1. Install cam ring, O-ring and friction ring.

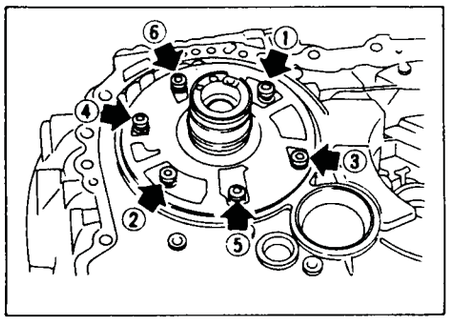


2. Install return spring and spring retainer.

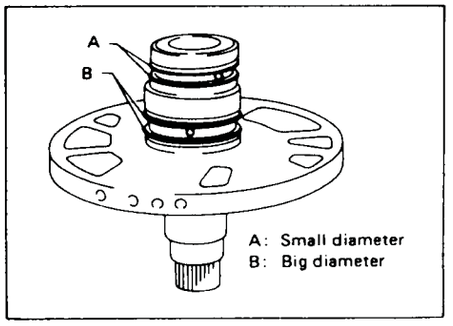
Oil Pump (Cont'd)



3. Assemble rotor, vanes, rotor support ring and vane rings. Pay attention to direction of rotor.



4. Install oil pump cover.
   Tighten down cover evenly in a criss-cross type pattern.

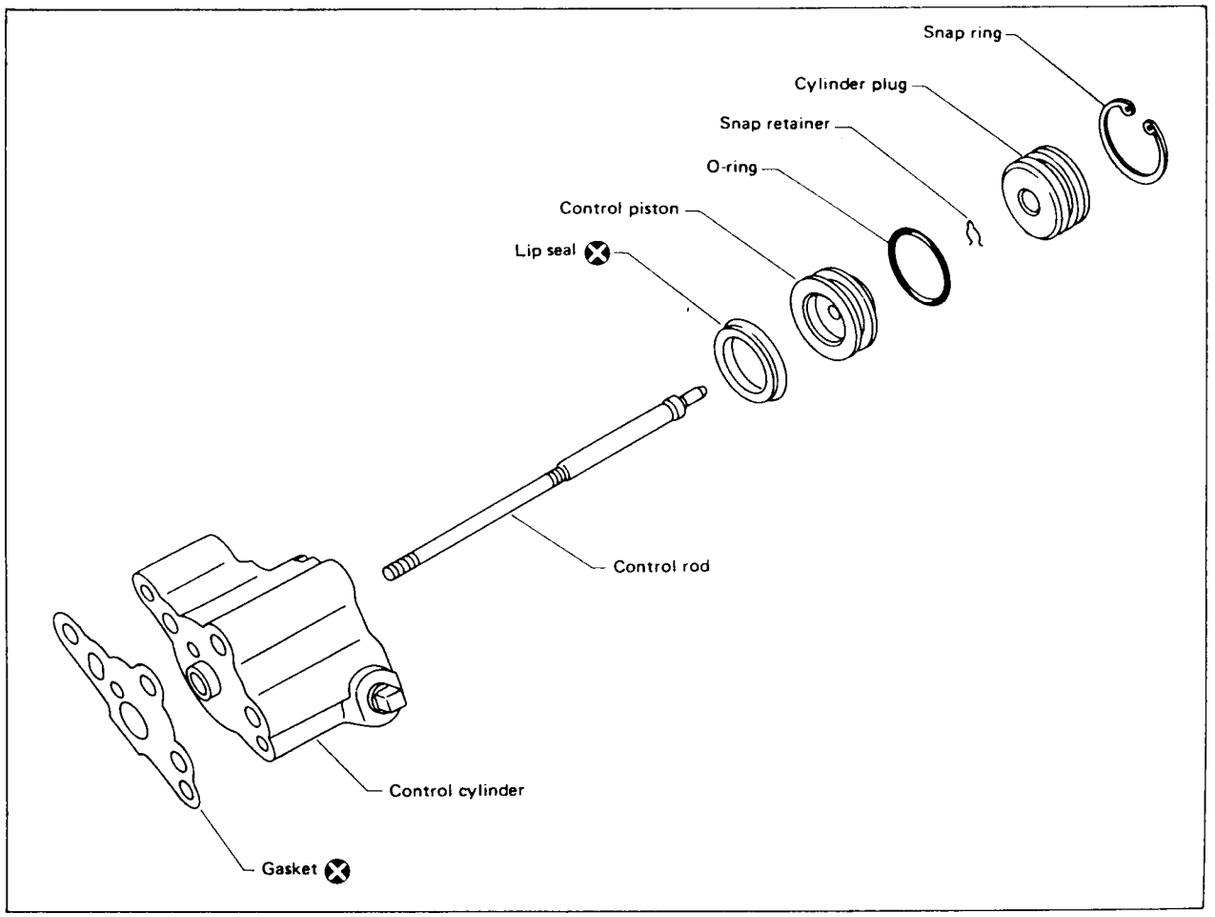


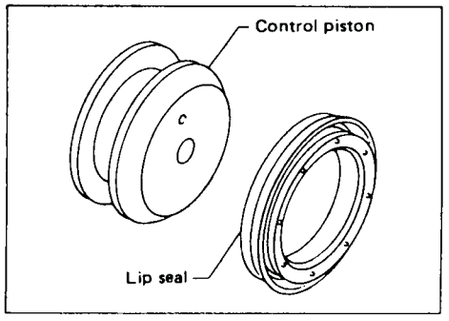
5. Rotate the pump when it has been assembled to ensure that all parts have been correctly assembled.
6. Install seal rings.

Refer to the figure at left for proper locations of the two different types of seal rings.

- **These seal rings can be cut or deformed if they are improperly seated in their grooves when the drum is installed. Clean the ring grooves carefully and fill them with petroleum jelly. Then install the rings making sure they fit into the grooves as tightly as possible.**

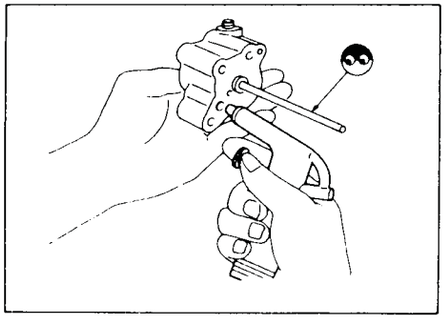
Control Cylinder





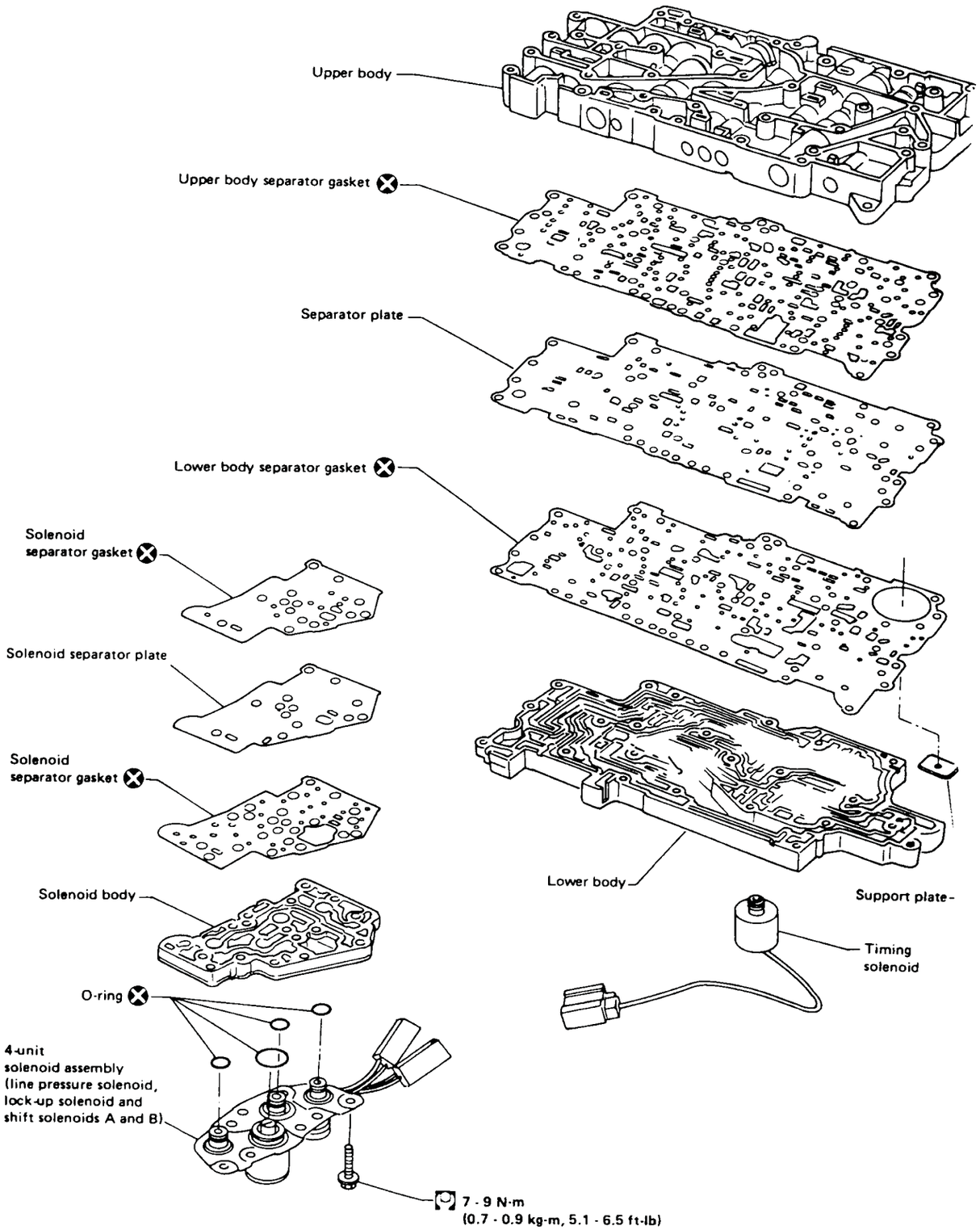
INSPECTION AND ASSEMBLY

- Inspect control cylinder body, control piston and cylinder plug for scratches or damage. Replace if necessary.
- When assembling, pay attention to the direction of lip seal.



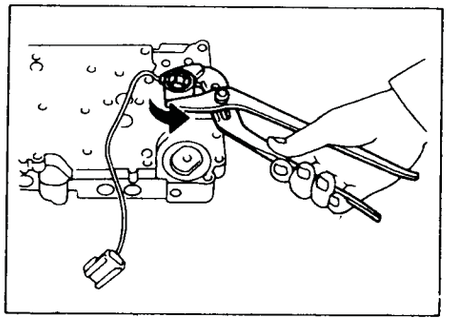
- After assembling, check the operation.

Control Valve Assembly

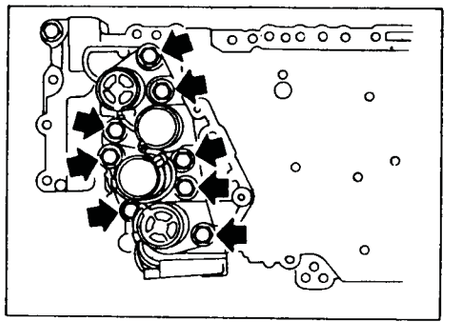


Control Valve Assembly (Cont'd)

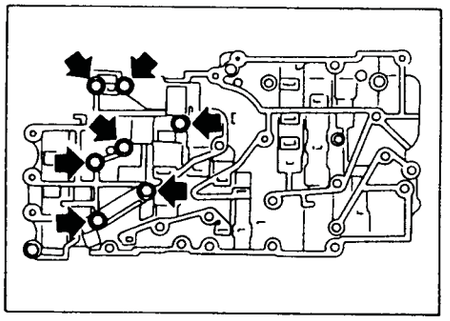
DISASSEMBLY



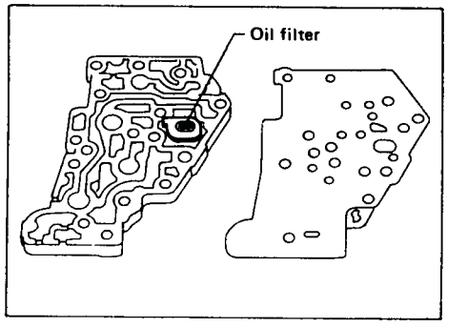
1. Remove solenoids.
a. Remove timing solenoid.
b. Remove O-ring from solenoid.



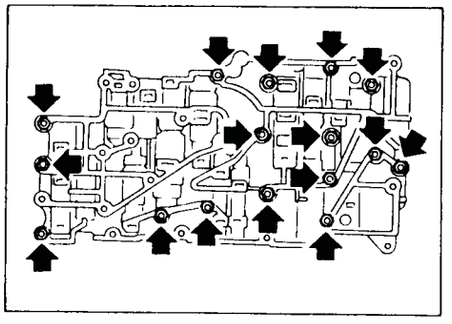
c. Remove shift solenoid A, shift solenoid B, line pressure solenoid and lock-up solenoid.
d. Remove O-rings from solenoids.



2. Remove solenoid body.
a. Place lower body facedown and remove bolts.
Be careful not to drop solenoid body.

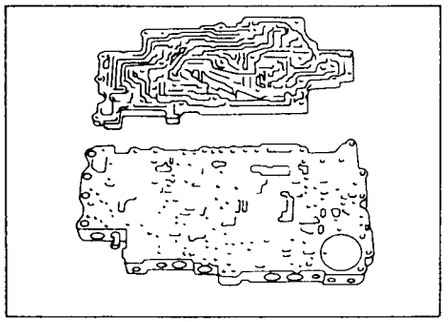


b. Place upper body face down, and remove solenoid body with separator gaskets and separator plate.
c. Remove separator gaskets, separator plate and oil filter from solenoid body.

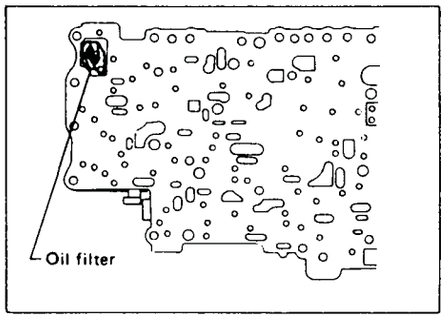


3. Dissasemble upper and lower bodies.
a. Place lower body facedown, and remove bolts, reamer bolts and support plate.

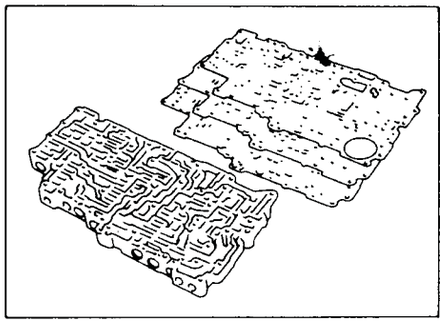
Control Valve Assembly (Cont'd)

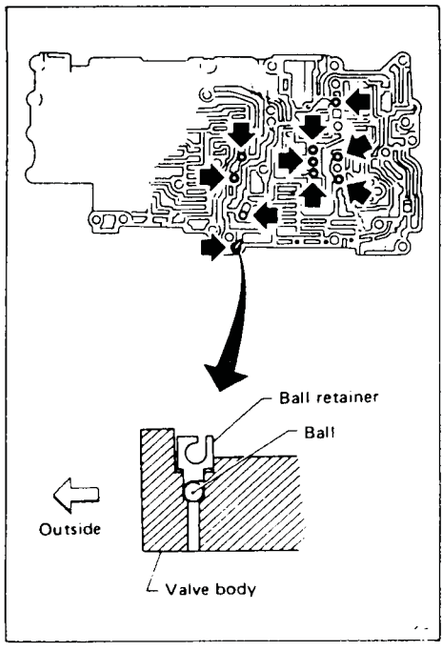


b. Position upper body downward. Remove lower body with separator plate and separator gasket attached to upper body.



c. Remove oil filter,, separator gaskets and separator plate from upper body.





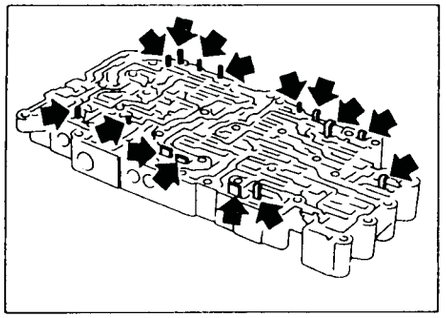
d. Check to see that steel balls are properly positioned in upper body and then remove them from upper body.

Control Valve Upper Body

DISASSEMBLY

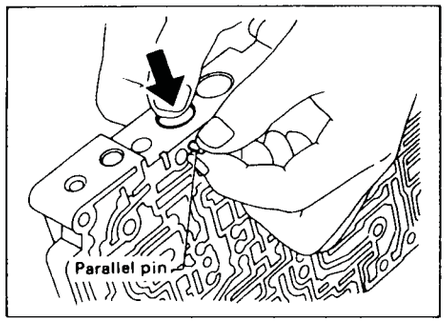
1. Remove valves at parallel pins.

Do not use a magnetic hand.



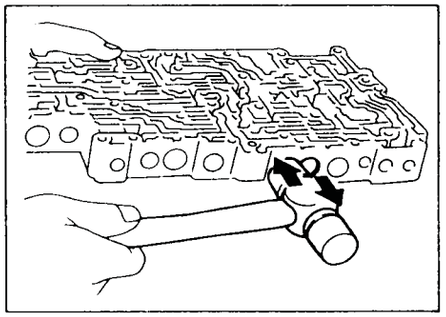
a. Remove parallel pins while pressing their corresponding plugs and sleeves.

Remove plug slowly to prevent internal parts from jumping out.



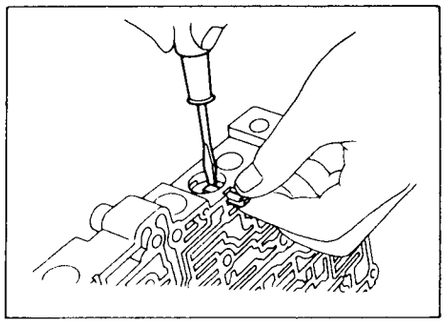
b. Place mating surface of valve facedown, and remove internal parts.

- **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 damge valves and sleeves.**



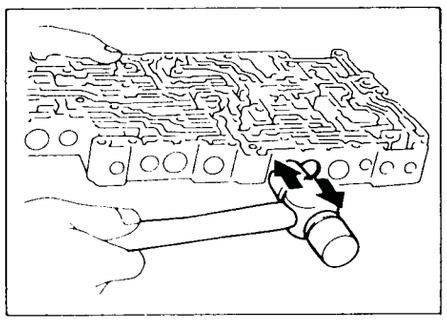
2. Remove valves at retainer plates.

a. Remove retainer plates while pressing their corresponding plugs, sleeves or springs.

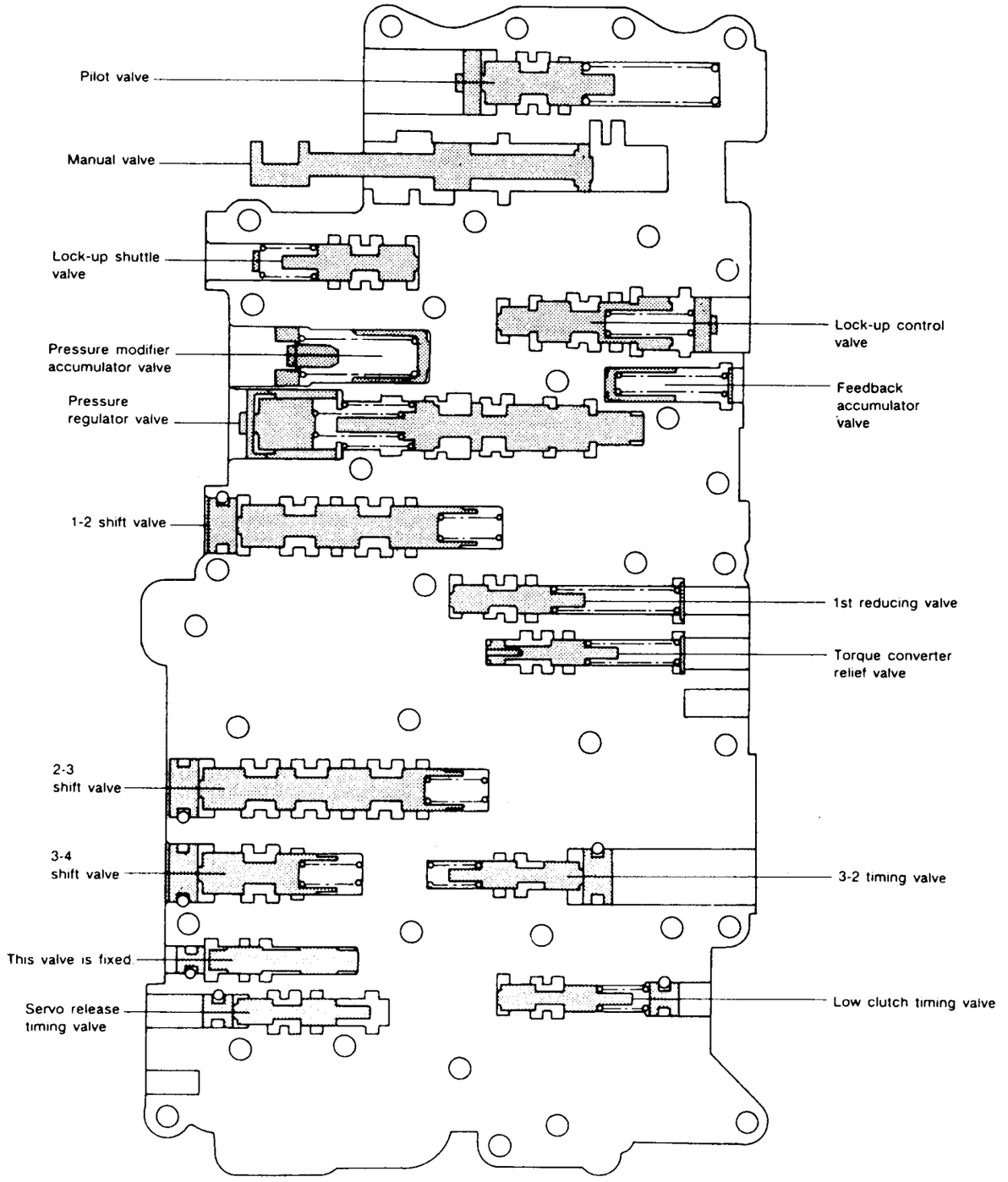


b. Place mating surface of valve facedown, and remove internal parts.

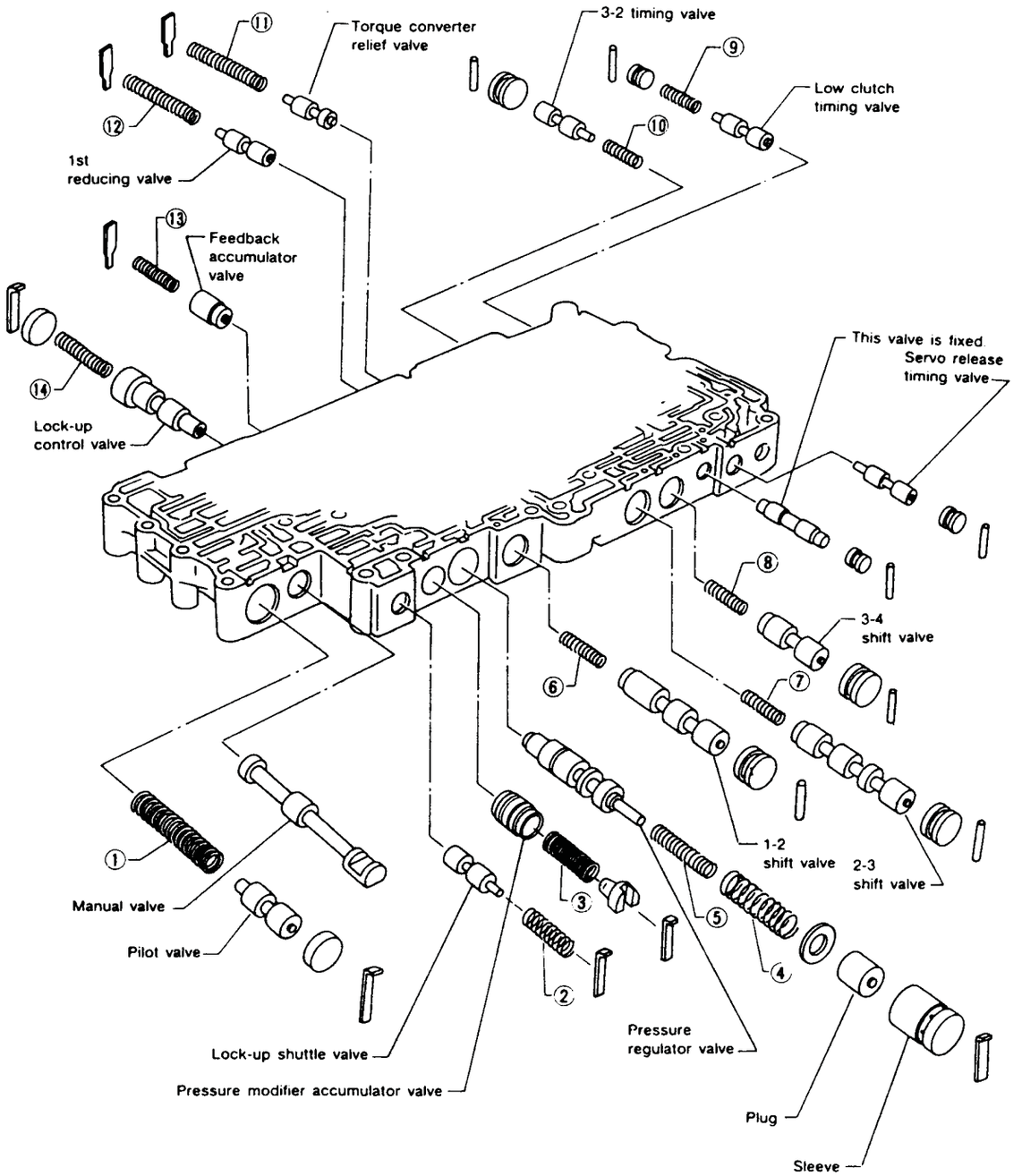
- **If a valve is hard to remove, lightly tap valve body with a soft hammer.**
- **Be careful not to drop or damage valves, sleeves, etc.**

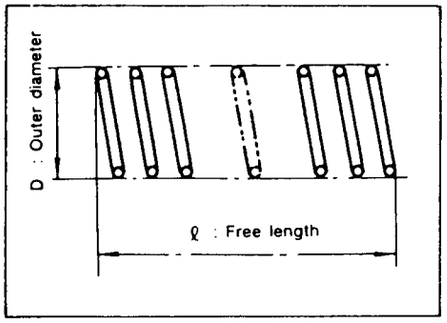


Control Valve Upper Body (Cont'd)



Control Valve Upper Body





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-108.

Inspection standard

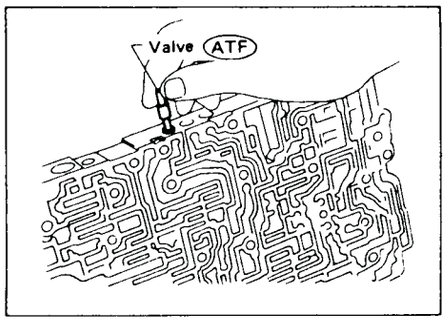
Unit: mm (in)

Parts \ Item		Part No.	ℓ	D
①	Pilot valve spring	31742-27X60	56.6 (2.228)	10.9 (0.429)
②	Lock-up shuttle valve spring	31742-27X65	28.8 (1.134)	9.0 (0.354)
③	Pressure modifier accumulator valve spring	31742-27X72	30.84 (1.2142)	9.8 (0.386)
④	Pressure regulator vlave outer spring	31742-27X61	37.3 (1.469)	12.9 (0.508)
⑤	Pressure regulator valve inner spring	31742-27X62	37.7 (1.484)	7.95 (0.3130)
⑥	1 - 2 shift valve spring	31762-27X61	24.9 (0.980)	7.0 (0.276)
⑦	2 - 3 shift valve spring	31762-27X61	24.9 (0.980)	7.0 (0.276)
⑧	3 - 4 shift valve spring	31762-27X61	24.9 (0.980)	7.0 (0.276)
⑨	Low clutch timing valve spring	31736-01X02	21.7 (0.854)	6.65 (0.2618)
⑩	3 - 2 timing valve spring	31736-01X02	21.7 (0.854)	6.65 (0.2618)
⑪	Torque converter relief valve spring	31742-27X01	44.7 (1.760)	7.0 (0.276)
⑫	1st reducing valve spring	31742-27X67	48.8 (1.921)	6.8 (0.268)
⑬	Feedback accumulator valve spring	31742-27X71	33.75 (1.3287)	6.35 (0.2500)
⑭	Lock-up control valve spring	31742-27X69	41.8 (1.646)	7.0 (0.276)

- Replace valve springs if deformed or fatigued.

Control valves

- Check sliding surfaces of valves, sleeves and plugs.

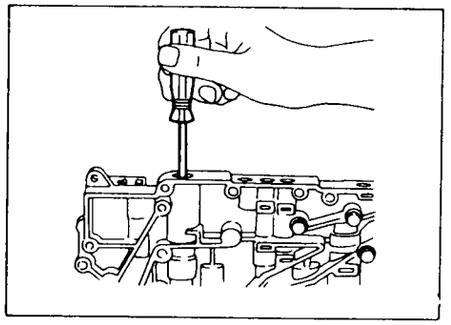


ASSEMBLY

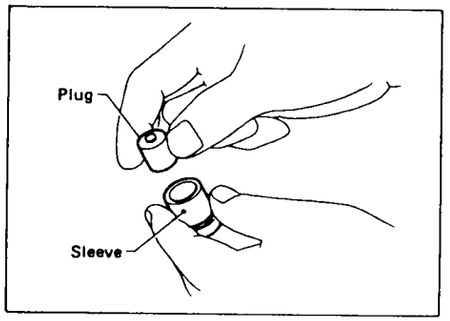
1. Lubricate the control valve body and all valves with A.T.F. Install control valves by sliding them carefully into their bores.

Be careful not to scratch or damage valve body.

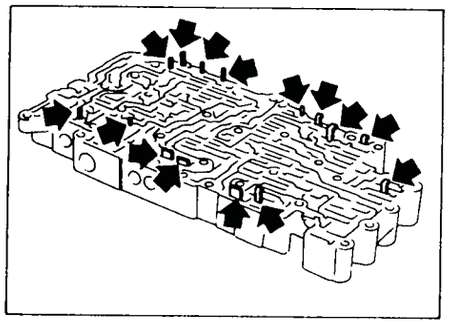
Control Valve Upper Body (Cont'd)



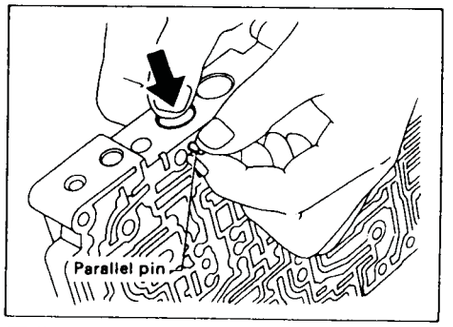
- Wrap a small screwdriver with vinyl tape and use it to insert the valves into proper position.



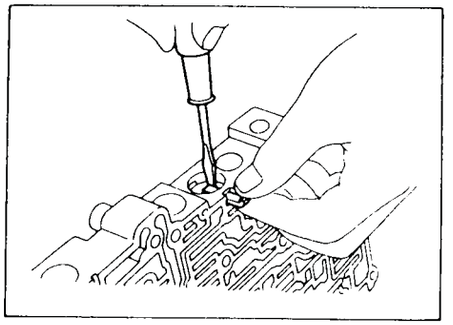
— **Pressure regulator valve** —
Position plug in sleeve and install pressure regulator valve on upper body.



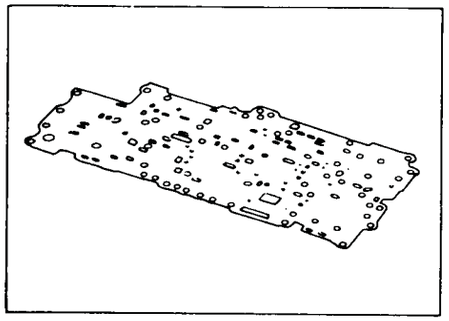
2. Install parallel pins and retainer plates.



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



- Insert retainer plate while pressing their corresponding plugs, sleeves or springs.

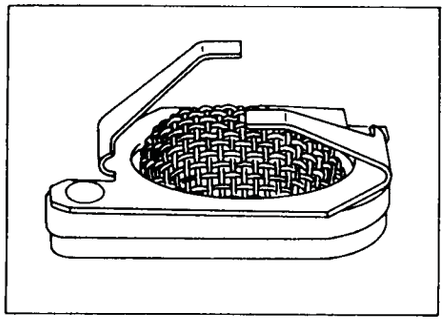


Control Valve Assembly

INSPECTION

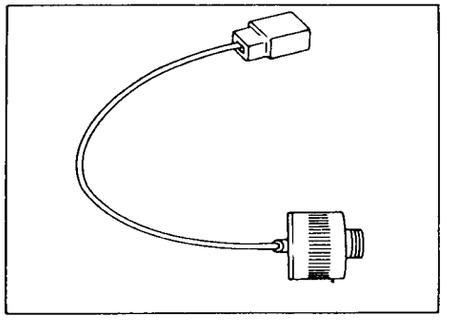
Separator plates

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



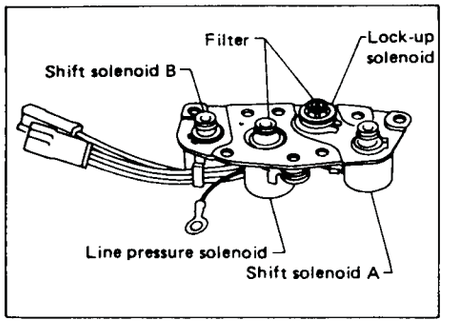
Oil filter

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



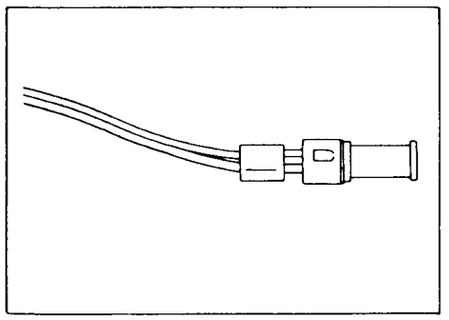
Timing solenoid

Measure resistance — Refer to "Electrical Components Inspection".



4-unit solenoid assembly (Line pressure solenoid, lock-up solenoid and shift solenoids A and B)

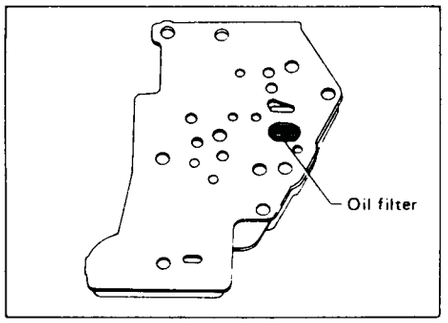
- Check that filter is not clogged or damaged (line pressure solenoid and lock-up solenoid).
- Measure resistance of each solenoid — Refer to "Electrical Components Inspection".



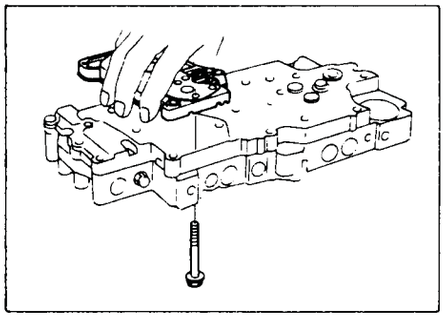
Fluid temperature sensor

Measure resistance — Refer to "Electrical Components Inspection".

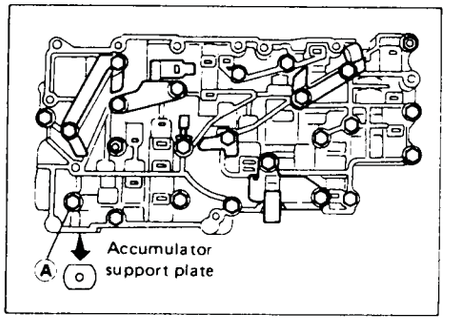
Control Valve Assembly (Cont'd)



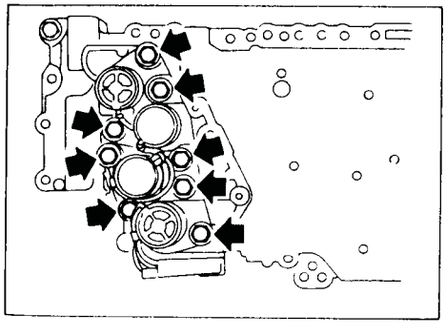
2. Install solenoid body on control valve body.
a. Fit oil filter and install solenoid body separator gaskets and separator plate on solenoid body.



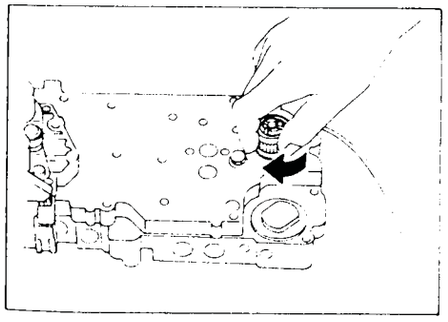
b. Install solenoid body on control valve body and temporarily tighten bolts.



c. Install accumulator support plate and harness clips in thier proper locations, and tighten all bolts.
Bolt (A) :
: 3.4 - 4.4 N·m (0.35 - 0.45 kg-m, 2.5 - 3.3 ft-lb)
Other bolts:
: 7 - 9 N·m (0.7 - 0.9 kg-m, 5.1 - 6.5 ft-lb)

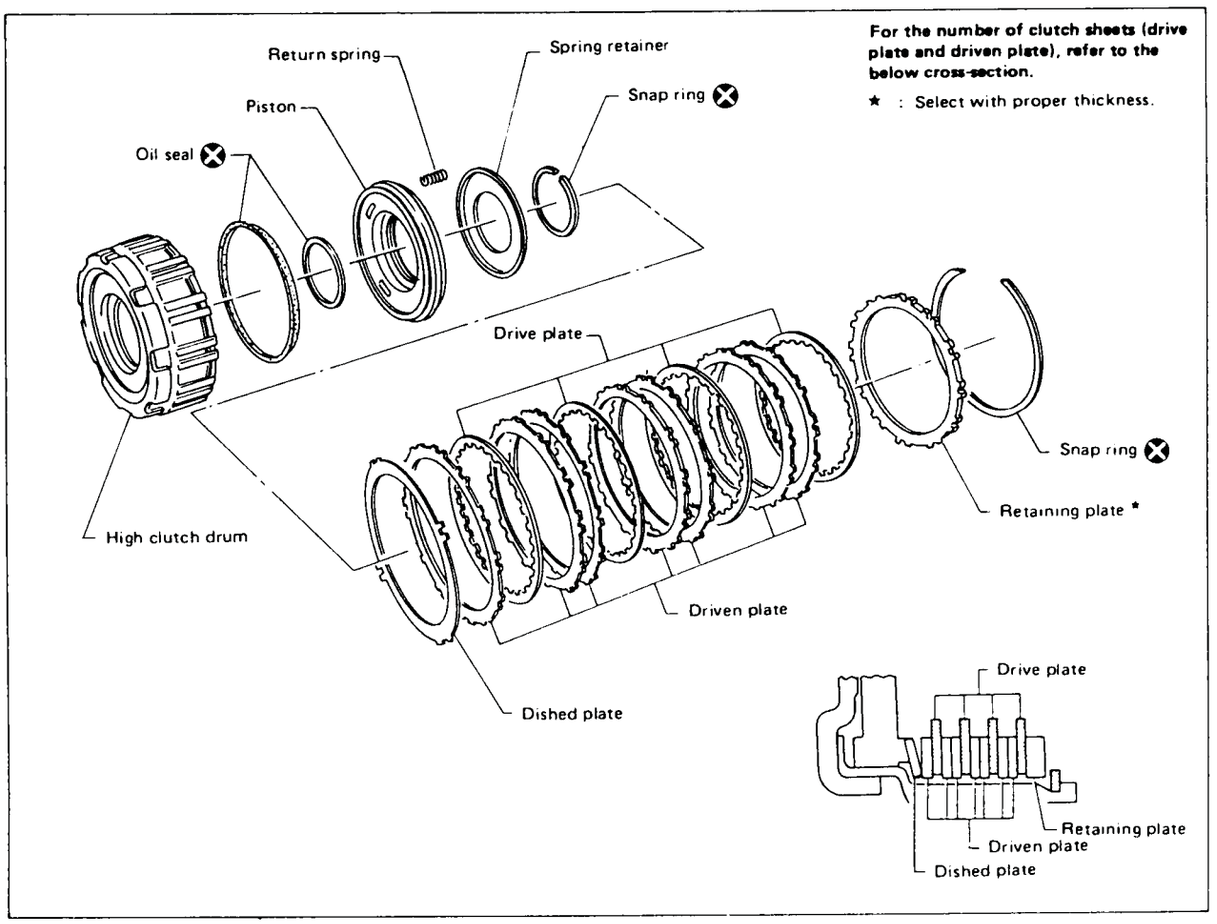


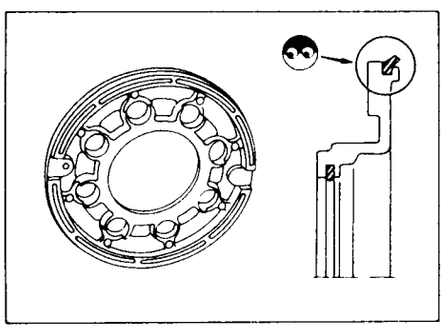
3. Install solenoids.
a. Attach O-ring and install 4-unit solenoid assembly on solenoid body.
: 7 - 9 N·m (0.7 - 0.9 kg-m, 5.1 - 6.5 ft-lb)

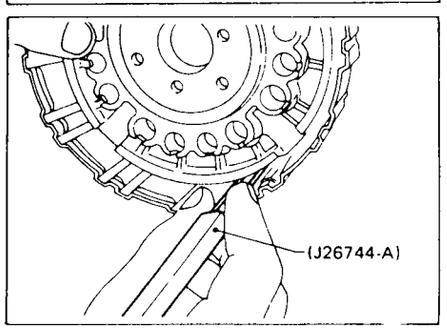


b. Attach O-ring, and install and tighten timing solenoid firmly

High Clutch







DISASSEMBLY

- Compress clutch springs and remove snap ring from spring retainer.
- Place clutch drum onto oil pump, and withdraw clutch piston with compressed air.

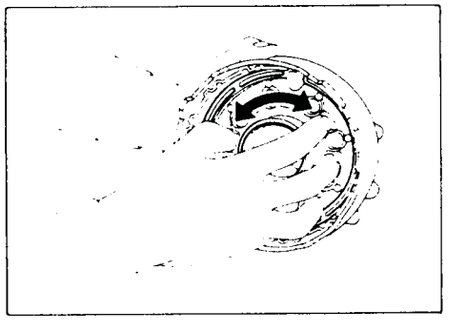
INSPECTION AND ASSEMBLY

1. Check clutch drive plate facing for wear or damage.

   Standard drive plate thickness:
   1.6 mm (0.063 in)
2. Check for wear on snap ring, weak or broken coil springs, and warped spring retainer.
3. Lubricate clutch drum bushing, and install inner seal and piston seal as illustrated. Be careful not to stretch seals during installation.
   - Never assemble clutch dry; always lubricate its components thoroughly.
   - Always install piston seal in direction shown in figure at left.
4. Assemble piston, being careful not to allow seal to kink or become damaged during installation.

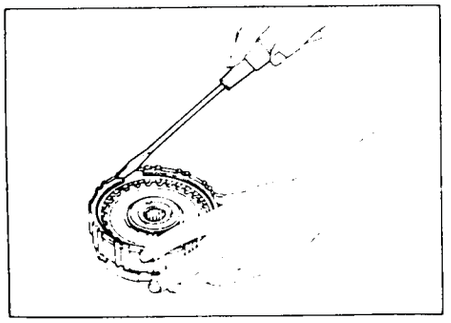
Use Tool, which does not damage lip seal, to make sure the lip seal goes into place.

High Clutch (Cont'd)

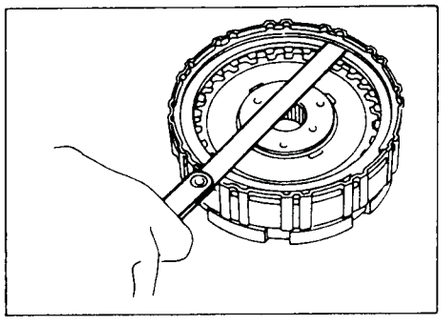


- After installing piston, turn piston by hand to ensure that there is no binding.

5. Install clutch springs.
6. Reinstall snap ring. Be sure snap ring is properly seated.



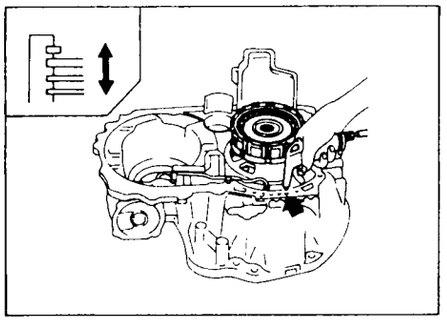
7. Install driven plates, drive plates, and secure with snap ring.



8. Measure clearance between retaining plate and snap ring. Always measure the existing minimum clearance, since snap ring is a wave type.
   Specified clearance:
   Standard
   1.4 - 1.8 mm (0.055 - 0.071 in)
   Allowable limit
   2.6 mm (0.102 in)

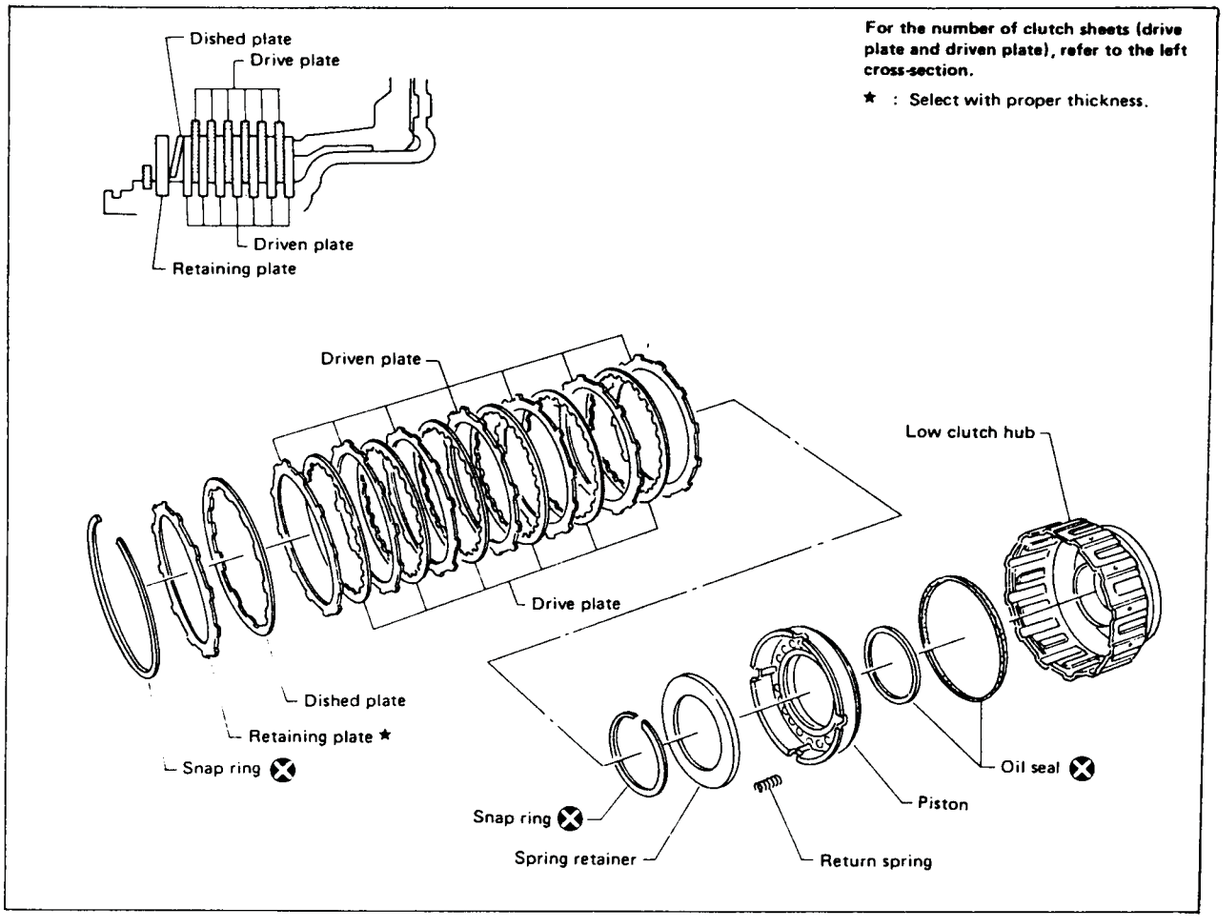
Retaining plate of high clutch

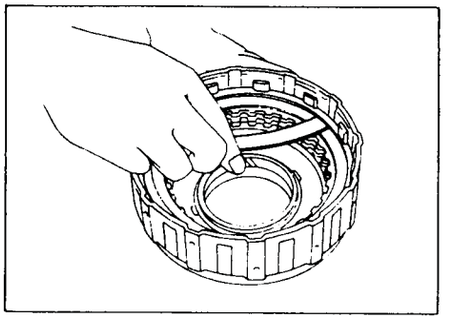
Thickness mm (in)	Part number
3.6 (0.142)	31567-21X00
3.8 (0.150)	31567-21X01
4.0 (0.157)	31567-21X02
4.2 (0.165)	31567-21X03
4.4 (0.173)	31567-21X04
4.6 (0.181)	31567-21X05
4.8 (0.189)	31567-21X06

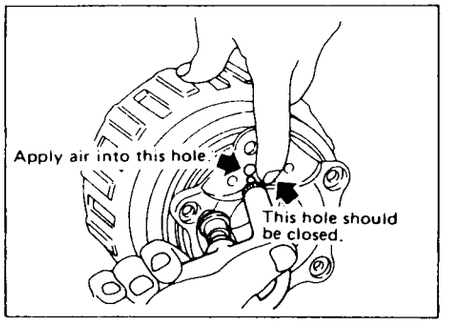


9. Check high clutch operation using compressed air.

Low Clutch







- Use Tool to remove the clutch spring snap ring.
- Service procedures for low clutch are essentially the same as those for high clutch, with the following exception:

Specified clearance between retaining plate and snap ring:

Standard

0.5 - 0.8 mm (0.020 - 0.031 in)

Allowable limit

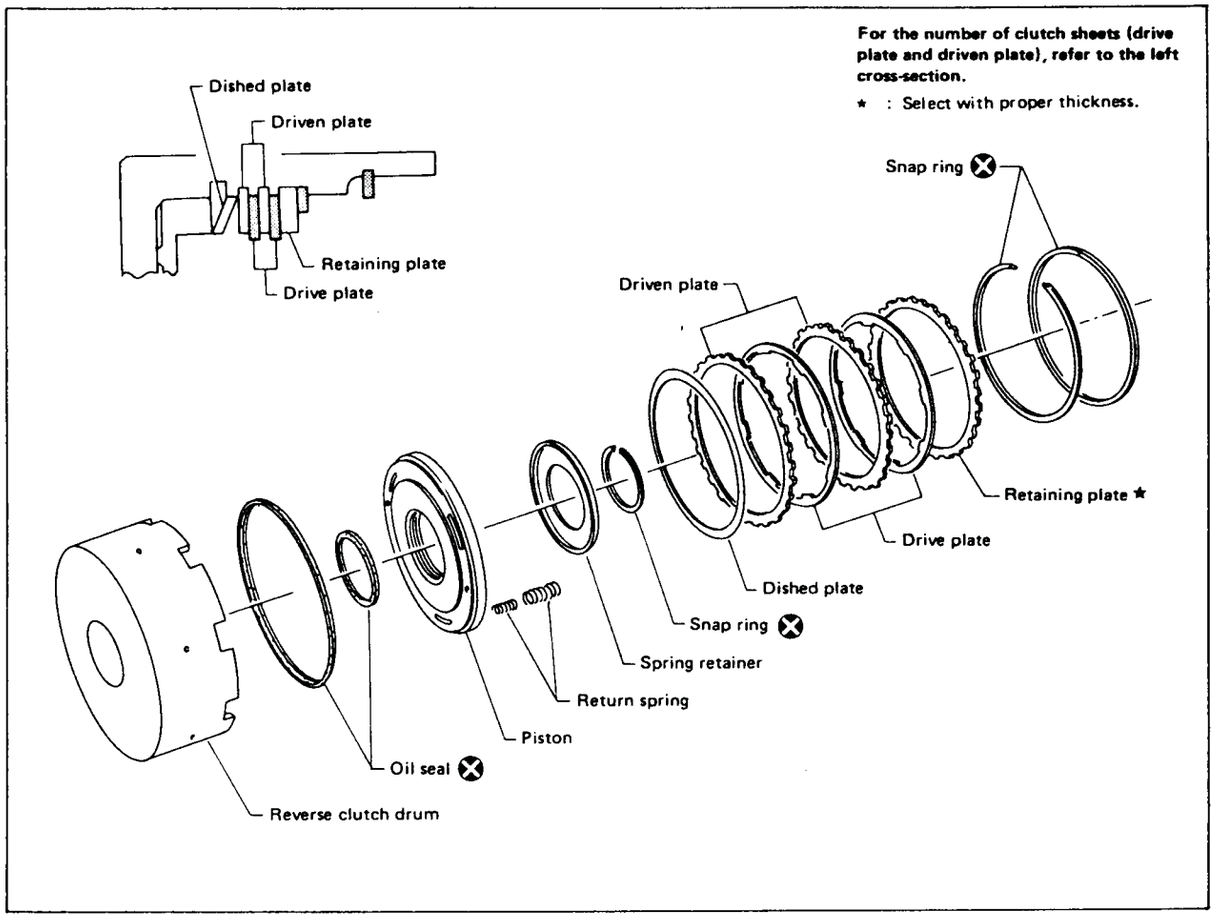
2.0 mm (0.079 in)

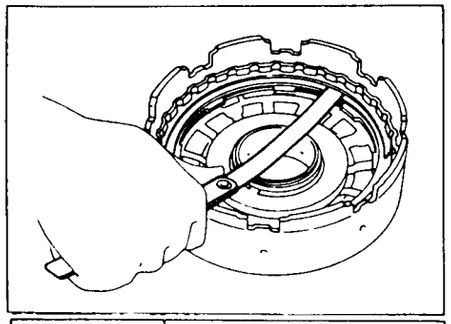
Retaining plate of low clutch

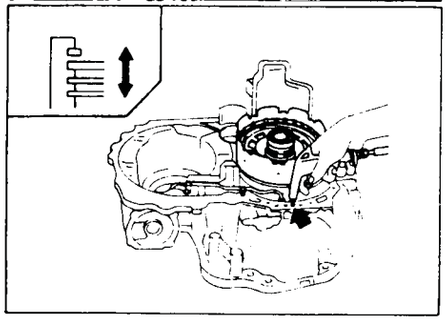
Thickness mm (in)	Part number
3.2 (0.126)	31597-21X10
3.4 (0.134)	31597-21X11
3.6 (0.142)	31597-21X12
3.8 (0.150)	31597-21X13
4.0 (0.157)	31597-21X14
4.2 (0.165)	31597-21X15

- After assembly, check the operation of clutch.

Reverse Clutch







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

- Remove reverse clutch piston.

Specified clearance between retaining plate and snap ring:

Standard
0.5 - 0.8 mm (0.020 - 0.031 in)

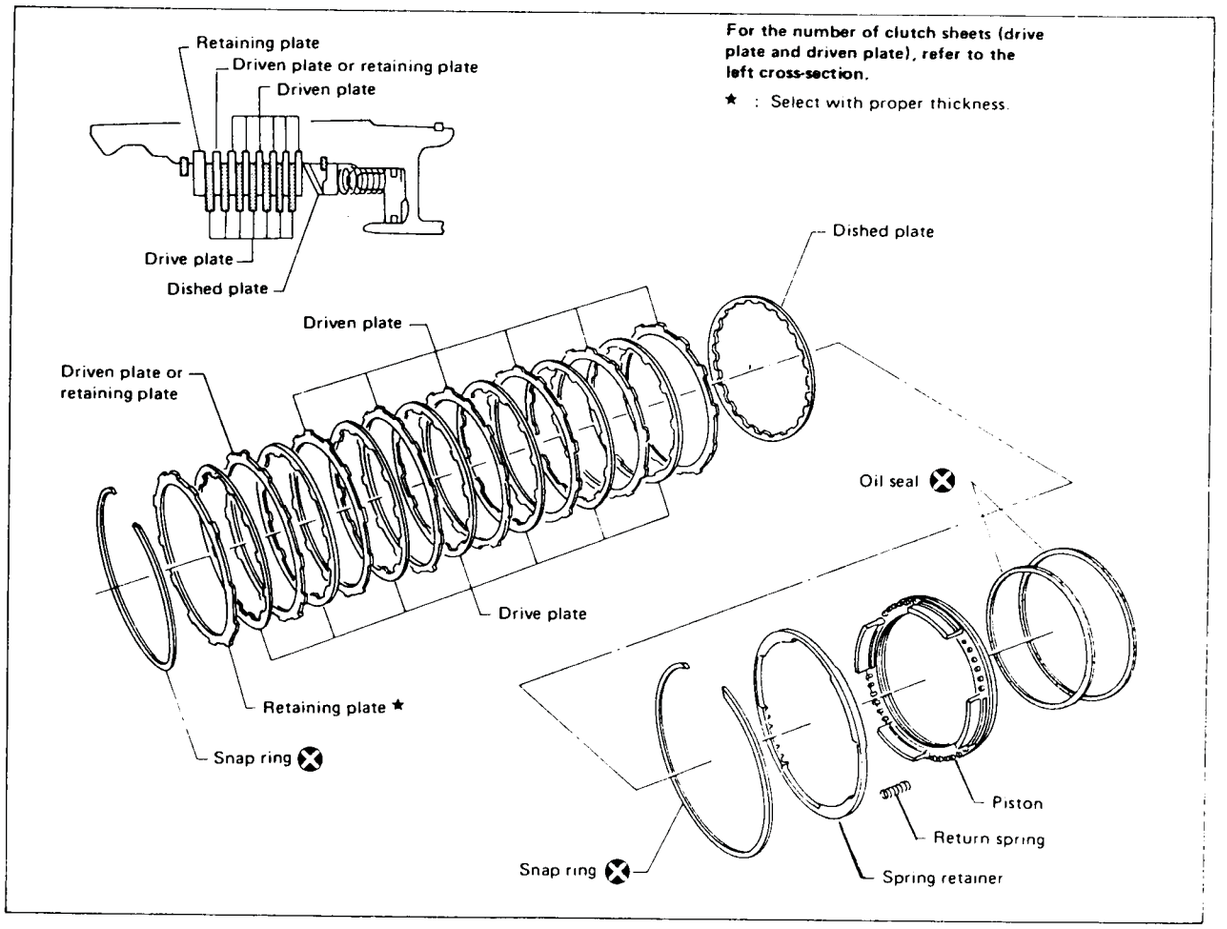
Allowable limit
1.2 mm (0.047 in)

Retaining plate of reverse clutch

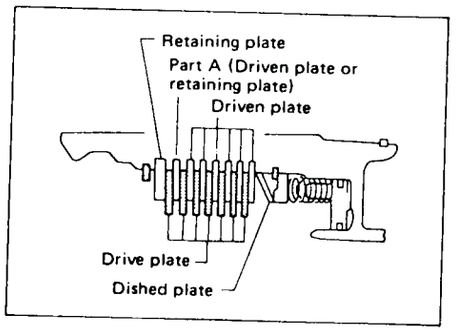
Thickness mm (in)	Part number
4.6 (0.181)	31537-21X10
4.8 (0.189)	31537-21X11
5.6 (0.220)	31537-21X12
5.8 (0.228)	31537-21X13
6.0 (0.236)	31537-21X14

- After assembly, check the operation of clutch.

Low & Reverse Brake



Adjust clearance using driven plate at part A first. If clearance exceeds specified value after using 5.0 mm (0.197 in) retaining plate (31667-23X08), remove driven plate and install 3.4 mm (0.134 in) retaining plate (31667-23X00). Readjust clearance by using another suitable retaining plate.



INSPECTION

- Examine low and reverse brake for damaged clutch drive plate facing and worn snap ring.
- Check drive plate facing for wear or damage; if necessary, replace.

Specified clearance between retaining plate and snap ring:

Standard

1.2 - 1.6 mm (0.047 - 0.063 in)

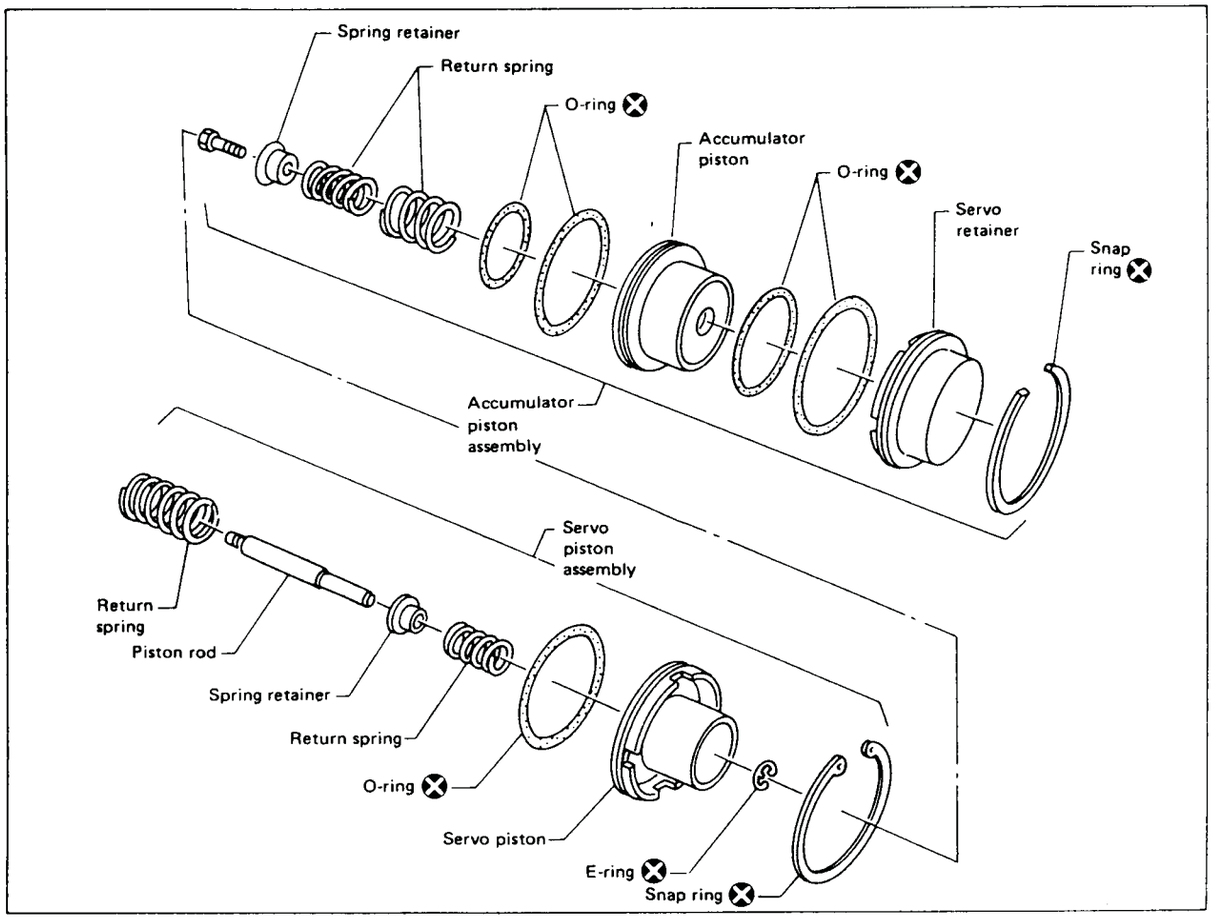
Allowable limit

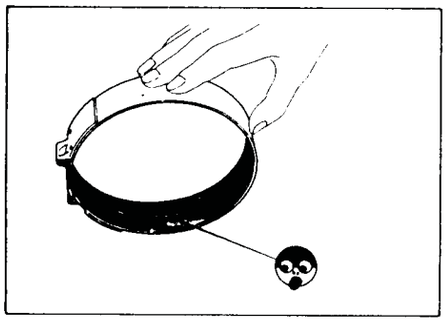
3.0 mm (0.118 in)

Retaining plate of low & reverse brake

Thickness mm (in)	Part number
3.4 (0.134)	31667-23X00
3.6 (0.142)	31667-23X01
3.8 (0.150)	31667-23X02
4.0 (0.157)	31667-23X03
4.2 (0.165)	31667-23X04
4.4 (0.173)	31667-23X05
4.6 (0.181)	31667-23X06
4.8 (0.189)	31667-23X07
5.0 (0.197)	31667-23X08

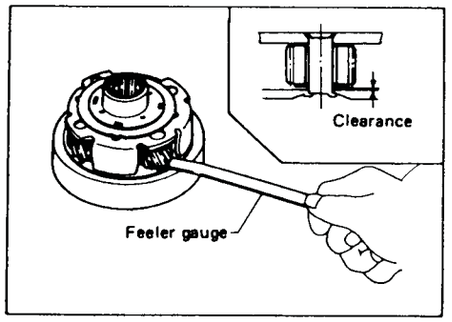
Brake Band and Band Servo





INSPECTION

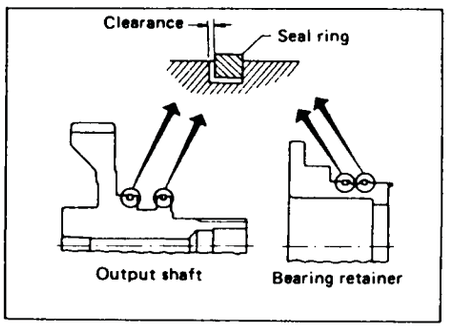
- Inspect band friction material for wear. If cracked, chipped or burnt spots are apparent, replace the band.
- Check band servo components for wear and scoring.



Planetary Carrier

INSPECTION

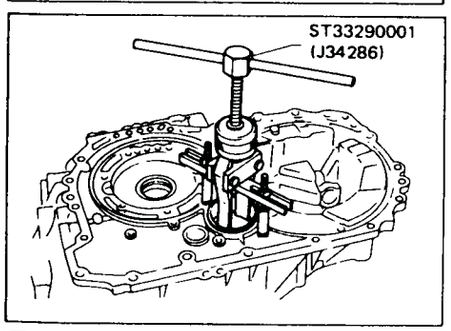
- Check clearance between pinion washer and planetary carrier with a feeler gauge.
  Standard clearance:
  Front carrier
  0.15 - 0.70 mm (0.0059 - 0.0276 in)
  Rear carrier
  0.20 - 0.70 mm (0.0079 - 0.0276 in)
  Replace if the clearance exceeds 0.80 mm (0.0315 in).
- Check planetary gear sets and bearings for damaged or worn gears.



Bearing Retainer and Output Shaft

INSPECTION

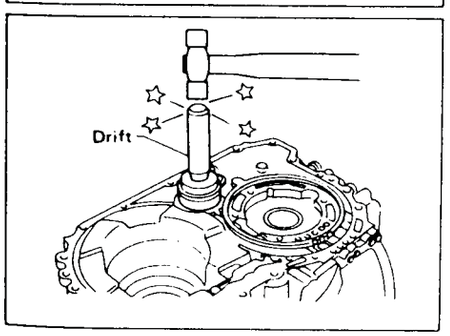
Measure clearance between seal ring and ring groove.
Standard clearance:
0.10 - 0.25 mm (0.0039 - 0.0098 in)
Wear limit:
0.25 mm (0.0098 in)



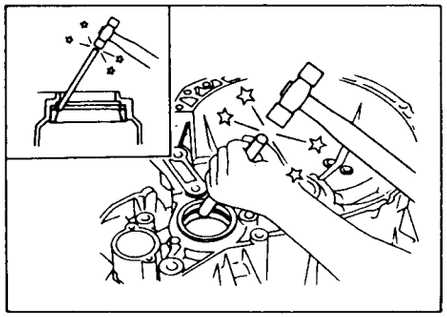
Converter Housing and Transmission Case

BEARING OUTER RACE

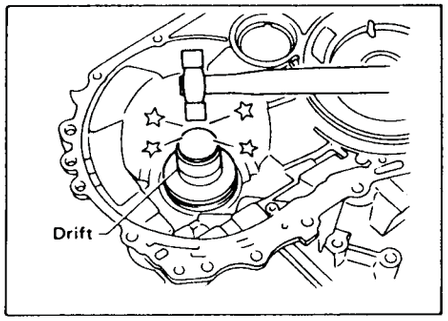
- Reduction pinion gear front bearing outer race



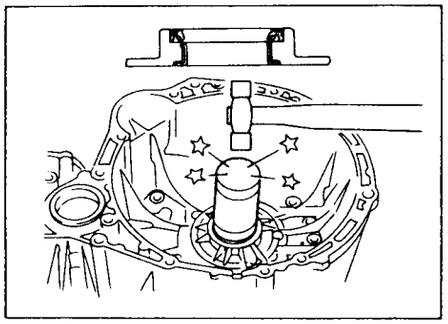
Converter Housing and Transmission Case (Cont'd)



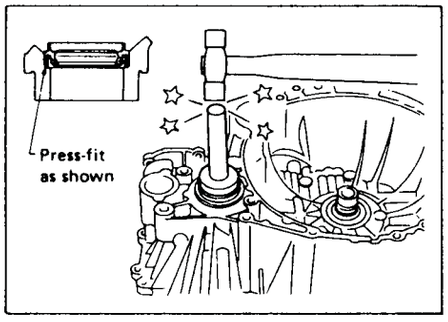
- Differential side bearing outer race



OIL SEAL

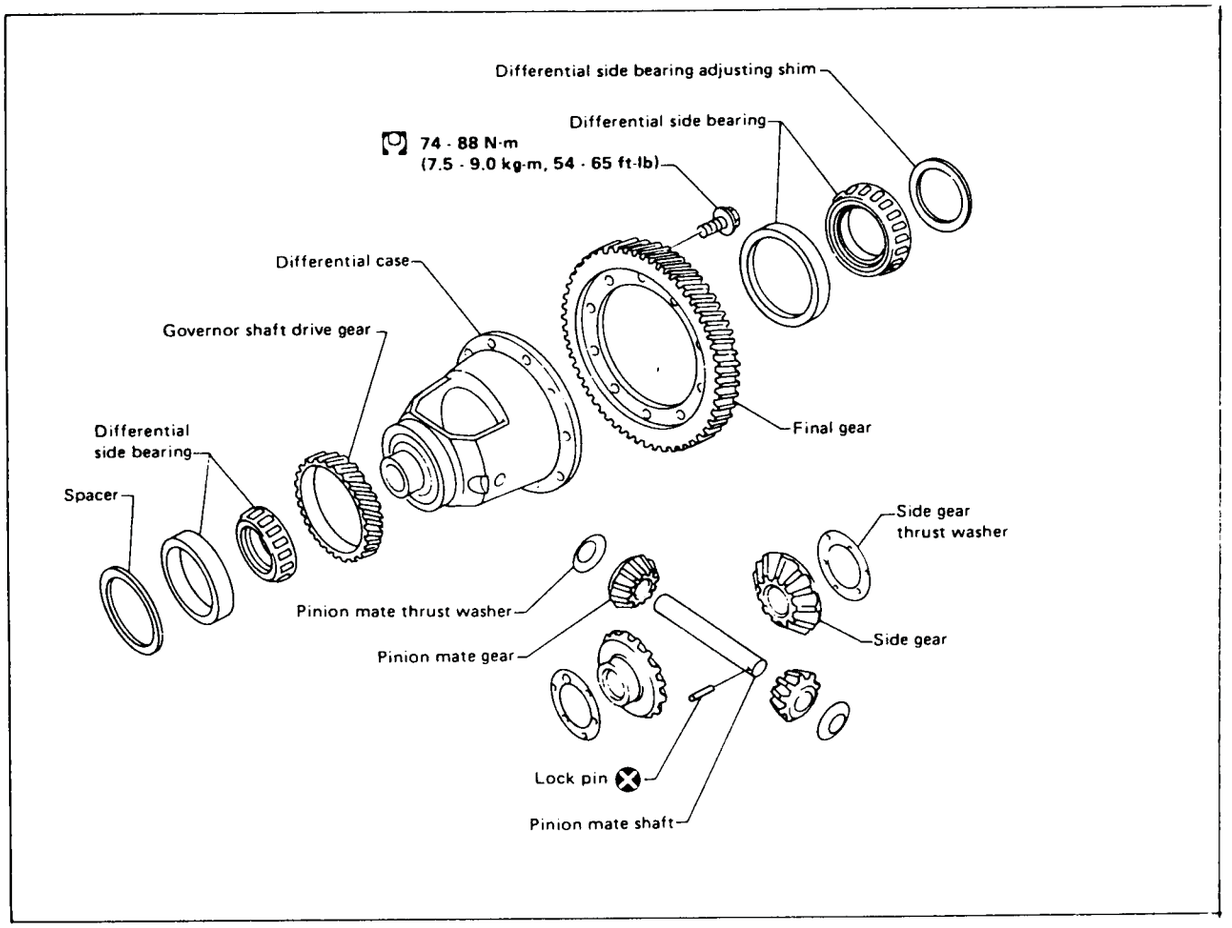


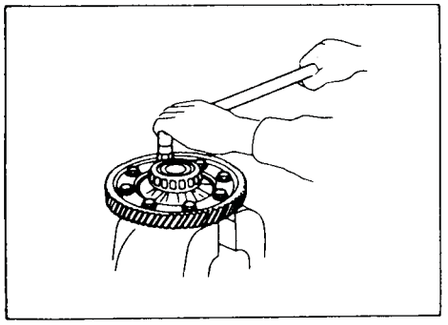
- Torque converter oil seal



- Differential side oil seal

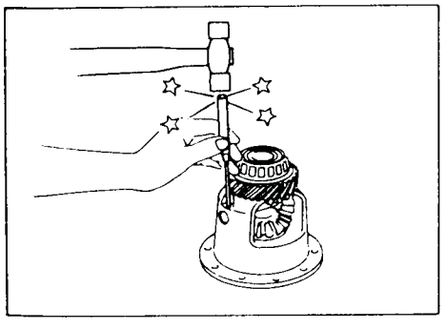
Final Drive





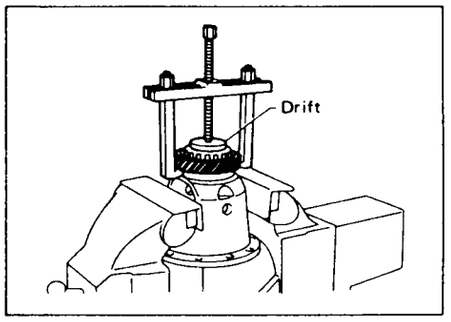
DISASSEMBLY

1. Remove final gear.

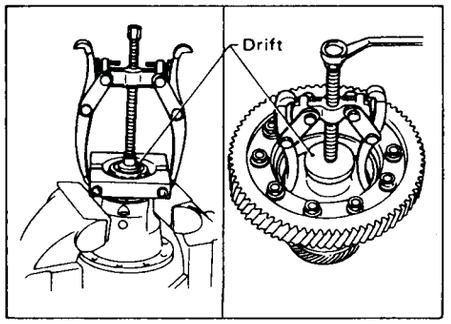


2. Drive out pinion mate shaft lock pin and draw out pinion mate shaft.

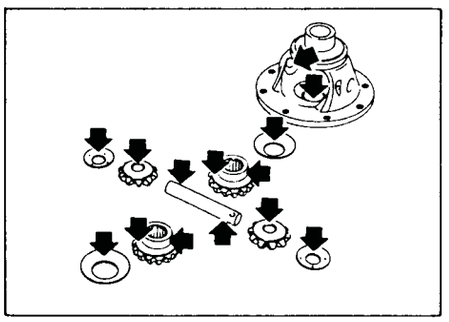
Final Drive (Cont'd)



3. Remove governor shaft drive gear.

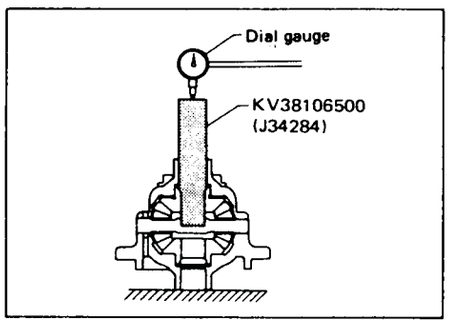


4. Drive out differential side bearing outer race and inner cone.

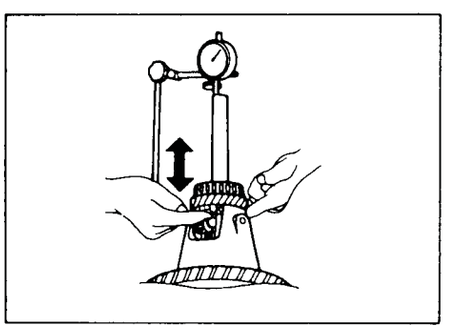


INSPECTION

1. Check mating surface of differential case, side gears and pinion mate gears. Replace as required.



2. Check clearance between side gear and differential case with washer following the procedure below.
a. Set Tool and dial gauge on side gear.



b. Move side gear up and down to measure dial gauge deflection. Always measure gauge deflection on both side gears.

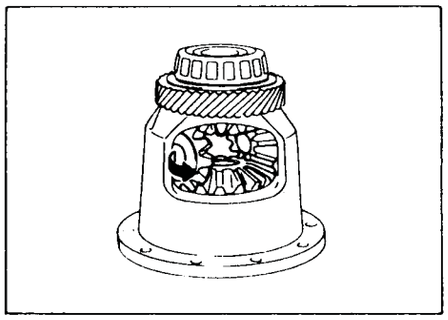
Clearance between side gear and differential case with washer:
0.1 - 0.2 mm (0.004 - 0.008 in)

c. If clearance exceeds the specified value, check for wear and replace necessary parts.
3. Check tapered roller bearings for wear, scratches, pitching or flaking.

Final Drive (Cont'd)

ASSEMBLY

1. Install the side gear and thrust washer in the differential case.
2. Install the pinion mate gear and thrust washer in the differential case while rotating them.

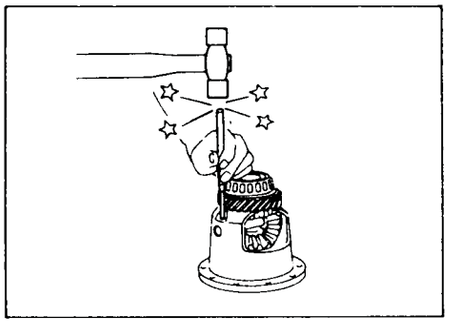


3. Insert pinion mate shaft.

When inserting, be careful not to damage pinion mate washers.

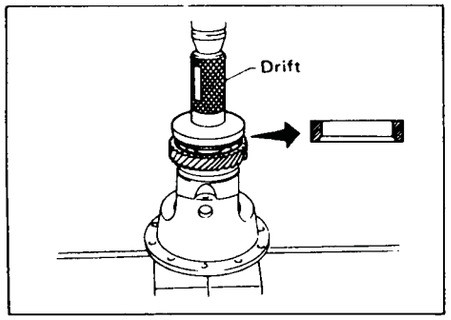
4. Measure clearance between side gear and pinion mate gear, referring to "Inspection". If necessary, adjust.

   * **Side gear to pinion mate clearance:**
   0.1 - 0.2 mm (0.004 - 0.008 in)

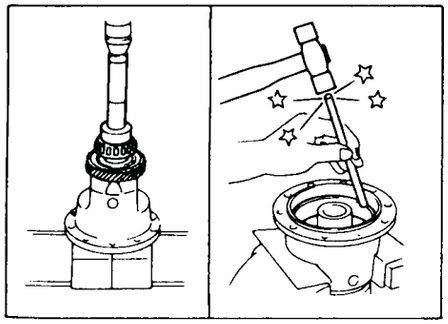


5. Install pinion mate shaft lock pin using a punch.

Make sure that lock pin is flush with case.



6. Install governor shaft drive gear.



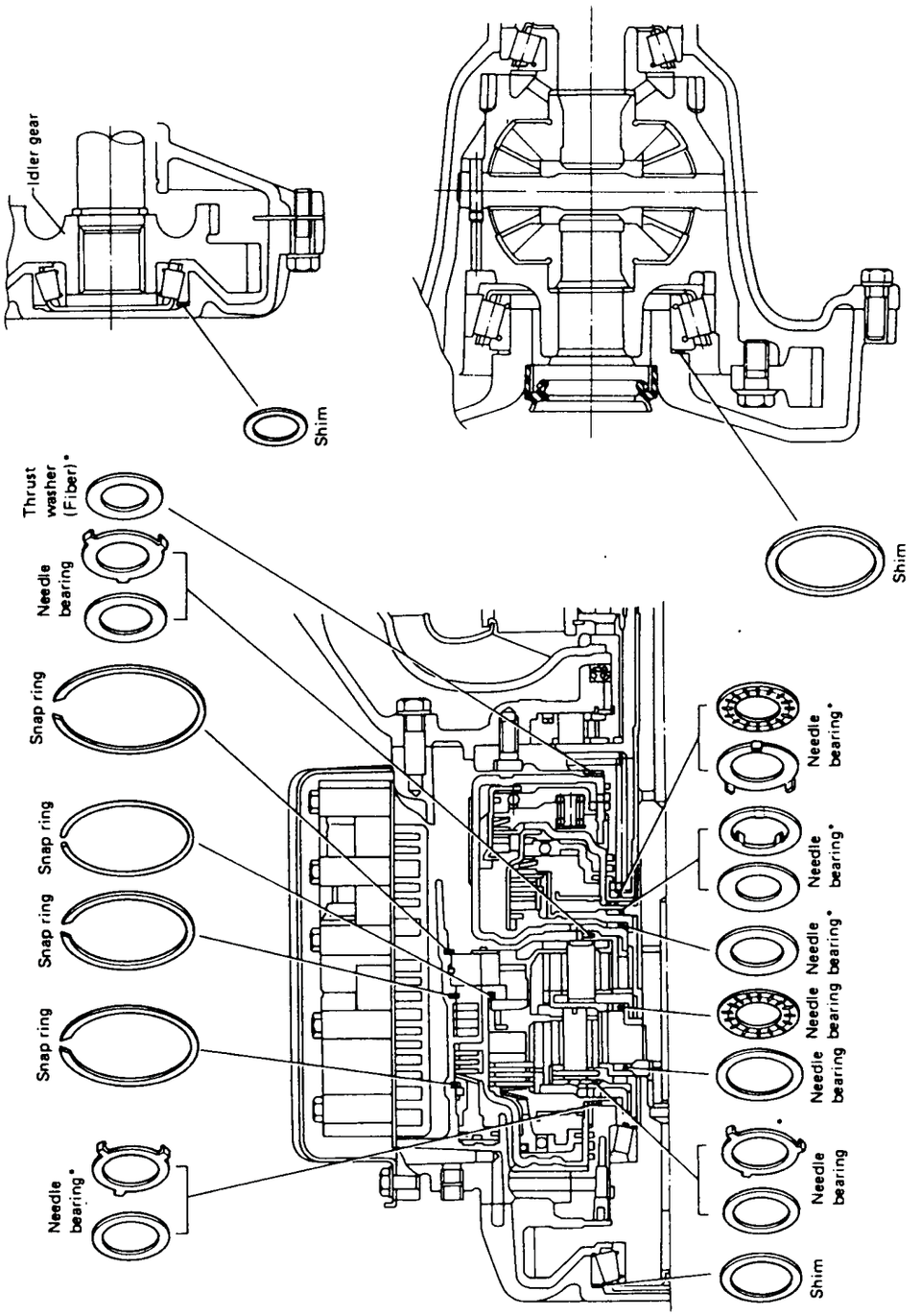
7. Press on differential side bearing inner cone and outer race.
8. Install final gear.

* **SIDE GEAR THRUST WASHER**

Thickness mm (in)	Part number
0.75 - 0.80 (0.0295 - 0.0315)	38424-E3020
0.80 - 0.85 (0.0315 - 0.0335)	38424-E3021
0.85 - 0.90 (0.0335 - 0.0354)	38424-E3022
0.90 - 0.95 (0.0354 - 0.0374)	38424-E3023

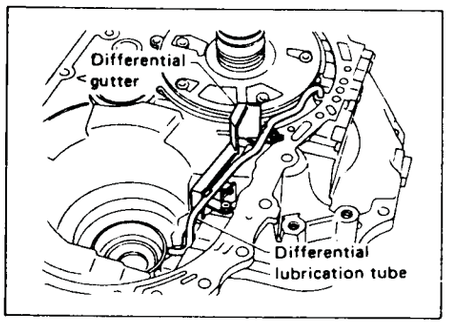
ASSEMBLY

When installing/assembling needle bearing and bearing race, use the following illustrations as a guide to installation procedures and locations.

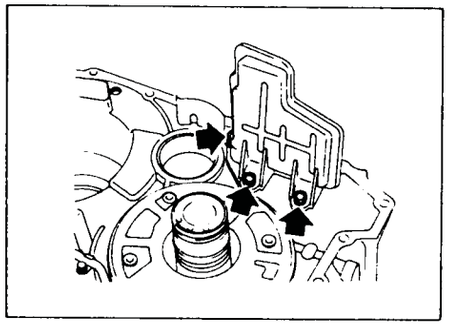


When installing, apply vaseline to parts with "*" so that they will not drop off.

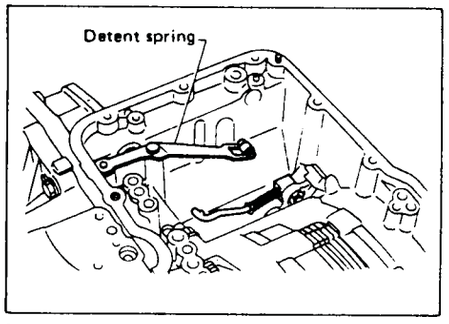
ASSEMBLY



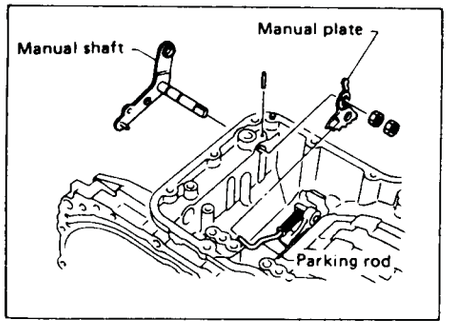
1. Install differential lubrication tube and differential gutter to converter housing.



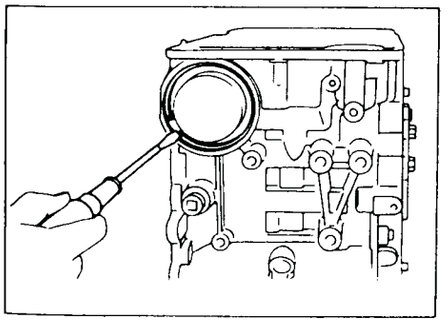
2. Install oil strainer.



3. Install detent spring assembly.

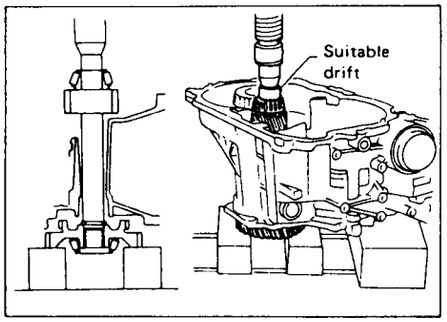


4. Pass parking rod into the hole in the manual plate and then install manual plate on manual shaft.

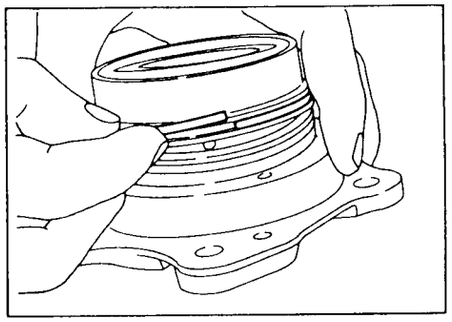


5. Install band brake servo, retainer and return spring and secure with snap ring.

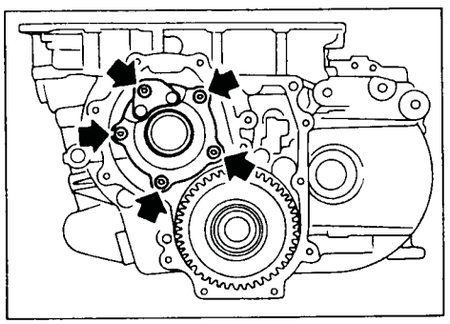
ASSEMBLY



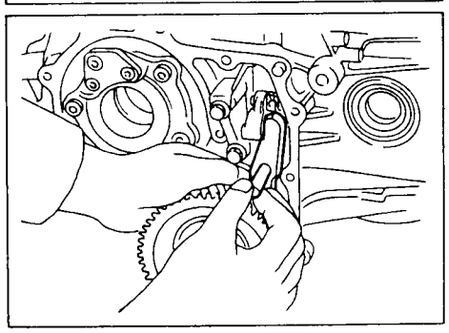
6. Install reduction gear.
a. Position reduction gear in transmission case so that it meshes with idler gear.
b. Press reduction gear into place using a drift, and install idler gear.



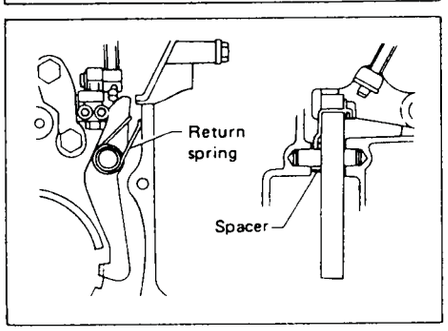
7. Install bearing retainer assembly.
a. Install seal rings onto bearing retainer with great care. Clean the grooves and liberally apply petroleum jelly to hold the rings in place. Otherwise, they could be cut or deformed when the low clutch and carrier assembly are installed.



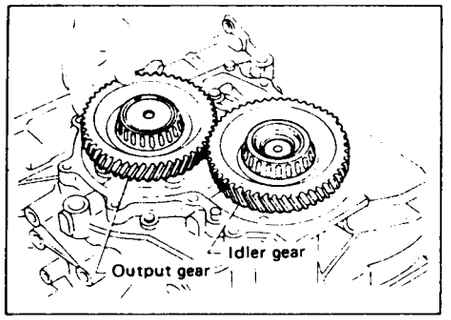
b. Install bearing retainer assembly.



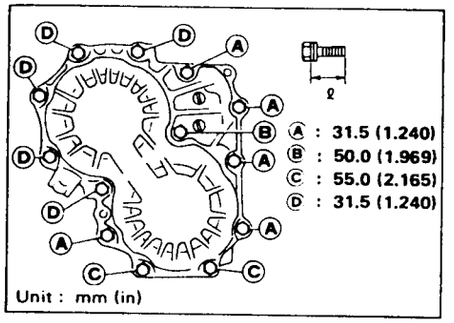
8. Install parking pawl and parking shaft.



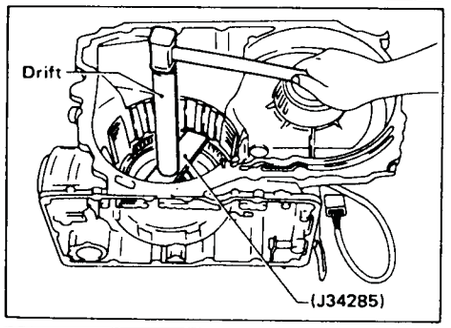
9. Install spacer and return spring.



10. Install output gear.

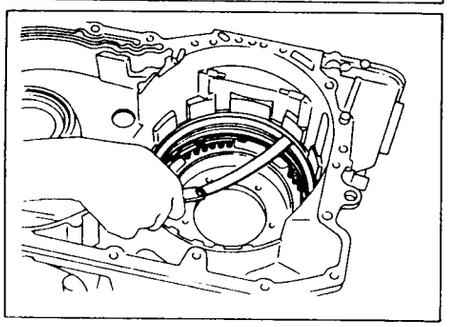


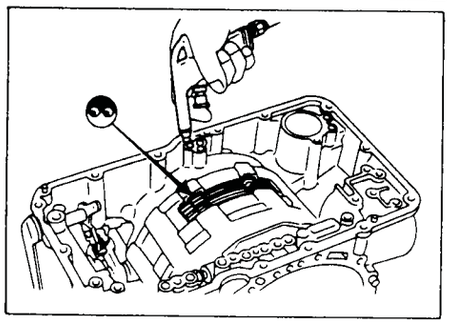
11. Temporarily install side cover and gasket.



12. Lubricate low and reverse brake piston seal, then install piston by tapping it evenly with Tool.
13. Install low and reverse brake retainer, and secure with snap ring.
14. Install low and reverse brake driven & drive plates and retaining plate, then secure with snap ring.
15. After low and reverse brake has been completely assembled, measure clearance between snap ring and retainer plate. If measurement exceeds specifications, it can be adjusted by replacing retainer plate with one of a different thickness.

Low and reverse brake clearance:
Standard
1.2 - 1.6 mm (0.047 - 0.063 in)
Allowable limit
3.0 mm (0.118 in)

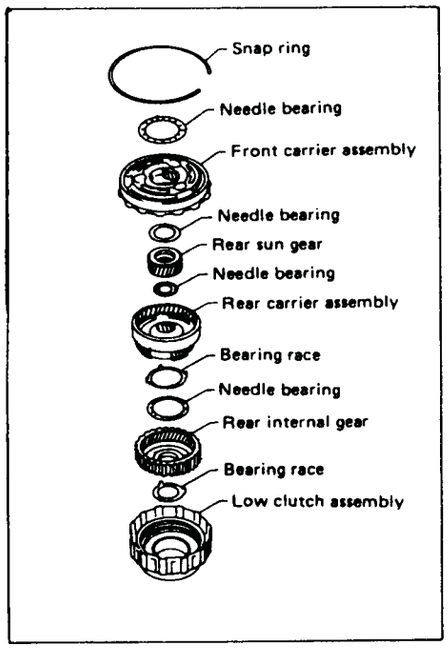




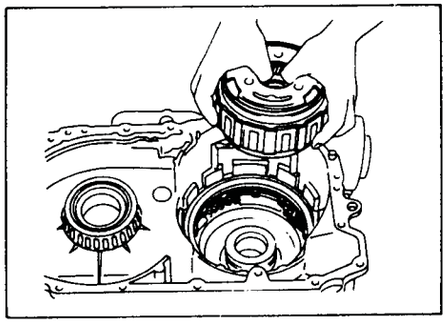
Retaining plate of low & reverse brake

Thickness mm (in)	Part number
2.0 (0.079)	31666-23X00
3.4 (0.134)	31667-23X00
3.6 (0.142)	31667-23X01
3.8 (0.150)	31667-23X02
4.0 (0.157)	31667-23X03
4.2 (0.165)	31667-23X04
4.4 (0.173)	31667-23X05
4.6 (0.181)	31667-23X06
4.8 (0.189)	31667-23X07
5.0 (0.197)	31667-23X08

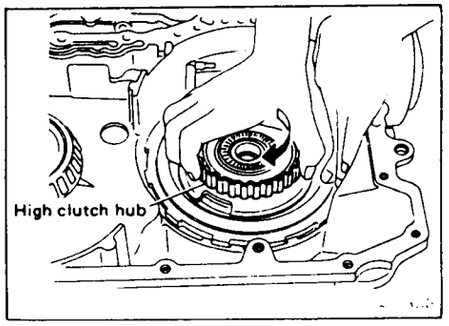
- **Check low & reverse brake operation using air.**



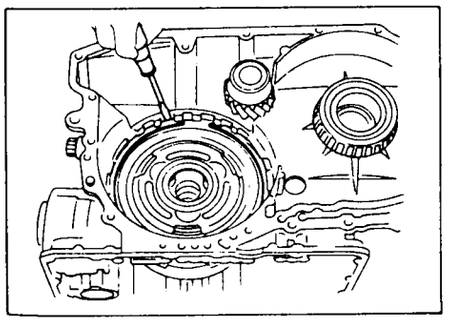
16. Assemble front carrier, rear carrier and low clutch.



17. Install carrier set.

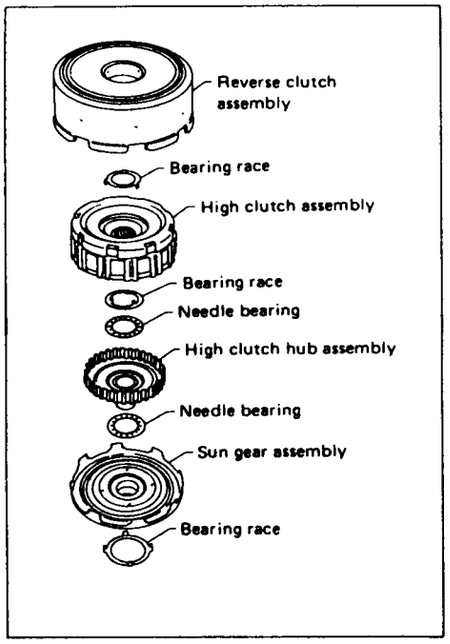


18. Install one-way clutch assembly while rotating front carrier with high clutch hub.

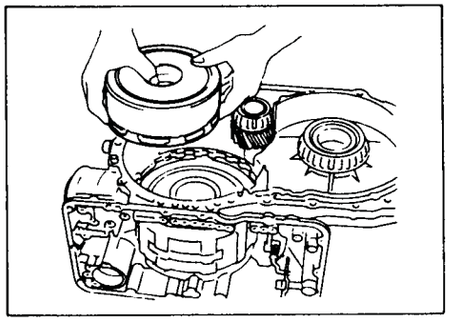


19. Remove high clutch hub, and install clutch snap ring.

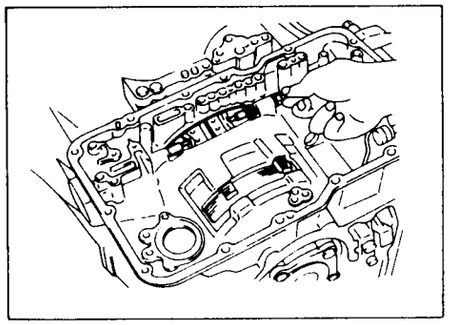
ASSEMBLY



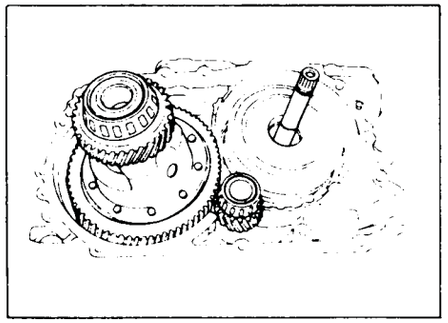
20. Assemble reverse clutch and high clutch.



21. Install reverse and high clutch as a pack.



22. Install brake band and anchor pin. Temporarily tighten anchor bolt by hand.

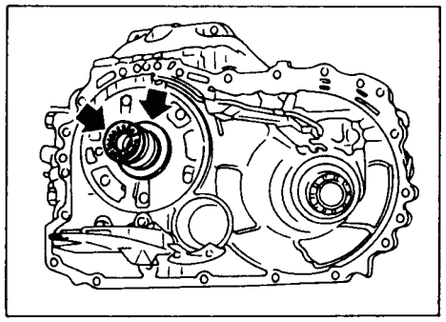


23. Install input shaft.

24. Special factory tool part numbers:
J34290-1, J34290-2, J34290-3,
J34290-6, J34290-7.
are required to set proper end play.

25. To set clutch pack end play use the same special tools.

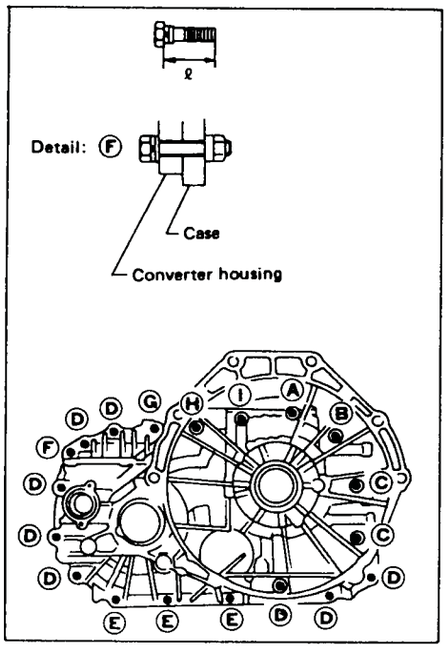
26. To adjust differential bearing preload use the same special tools.



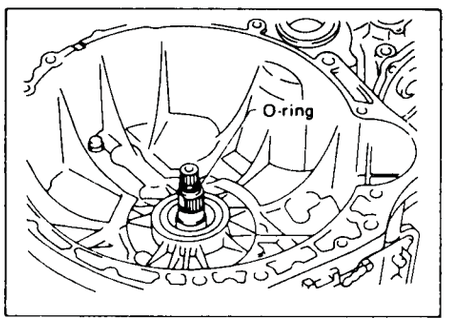
27. Install selected thrust washer and bearing on oil pump cover.

Place gasket on transmission case and install converter housing.

Bolt	Tightening torque N·m (kg-m, ft-lb)	ℓ mm (in)
Ⓐ	21 - 23 (2.1 - 2.3, 15 - 17)	31.5 (1.240)
Ⓑ		27 (1.06)
Ⓒ	19 - 23 (1.9 - 2.3, 14 - 17)	
Ⓓ		31.5 (1.240)
Ⓔ	43 - 47 (4.4 - 4.8, 32 - 35)	35 (1.38)
Ⓕ	21 - 25 (2.1 - 2.6, 15 - 19)	50 (1.97)
Ⓖ	43 - 47 (4.4 - 4.8, 32 - 35)	39 (1.54)
Ⓗ	45 - 47 (4.6 - 4.8, 33 - 35)	
Ⓘ		35 (1.38)

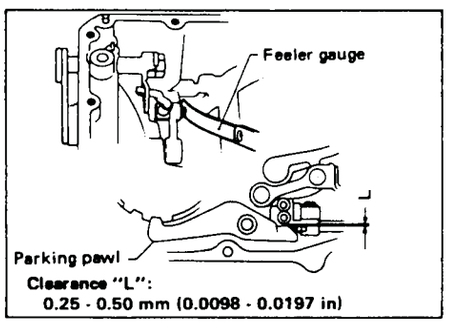


Always use new bolts at portions Ⓐ, Ⓑ, Ⓗ and Ⓘ as they are self-sealing bolts. Apply A.T.F. to thread of other bolts by that fix converter housing to transmission case when installing them.



28. Install O-ring onto input shaft.

29. To adjust the out put shaft and idler bearing preload, an additional factory tool part number J34290-4 is required.

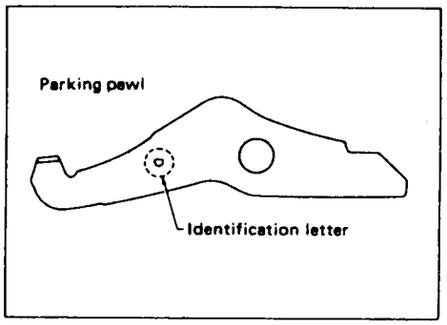


30. Move manual lever until parking pawl engages idler gear. Measure clearance between parking pawl and parking actuator.

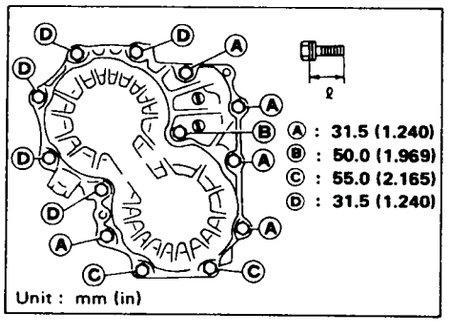
If clearance is outside specifications, replace parking pawl.

Part number	Identification letter
31989-21X00	D
31989-21X01	E
31989-21X02	F

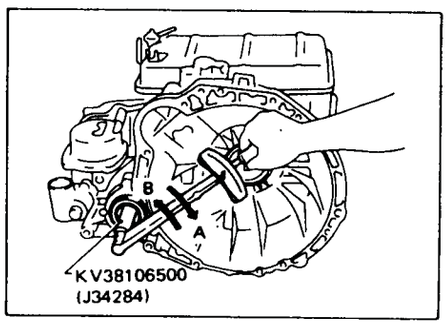
ASSEMBLY



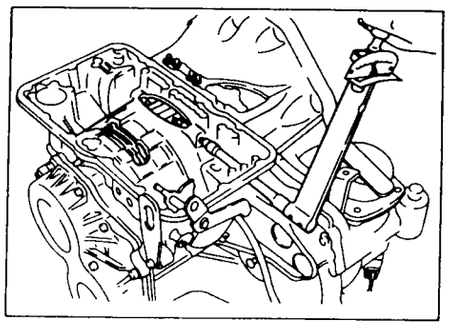
Example:
When parking pawl with identification letter "E" is used:
Clearance "L" is larger.
→ Replace with parking pawl with identification letter "D".
Clearance "L" is smaller.
→ Replace with parking pawl with identification letter "F".



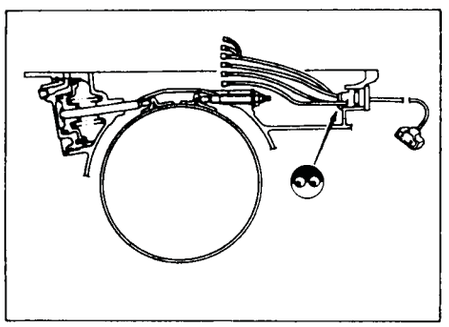
31. Install side cover and gasket.
Always use new bolts at portions Ⓑ and Ⓓ as they are self-sealing bolts. Apply A.T.F. to thread of other bolts by that fix side cover to transmission case when installing them.
Bolts Ⓐ and Ⓒ :
: 19 - 23 N·m (1.9 - 2.3 kg-m, 14 - 17 ft-lb)
Bolts Ⓑ and Ⓓ :
: 21 - 23 N·m (2.1 - 2.3 kg-m, 15 - 17 ft-lb)



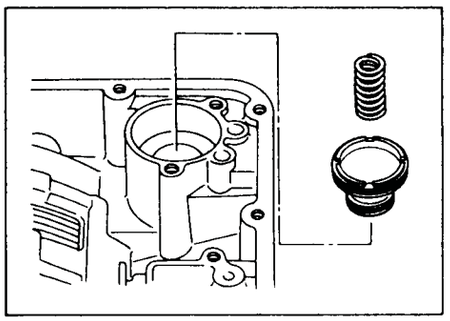
32. Insert Tool into final drive portion to see if internal parts rotates smoothly. Rotating in direction "B" is slightly harder than in direction "A".
If abnormalities are noted, proceed with the following:
- Disassemble parts to see if they are properly assembled.
- Readjust bearing preloads of final drive, output shaft and idler gear.



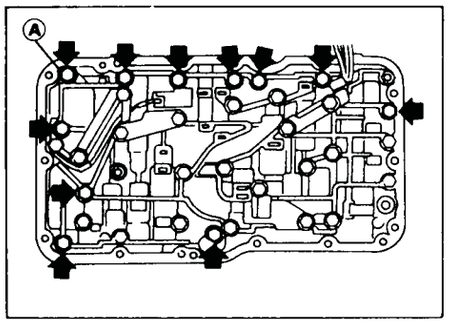
33. Adjust brake band.
1) First tighten anchor end pin.
2) Back off anchor end pin 5-1/4 turns.
3) Tighten lock nut while holding anchor end pin stationary.



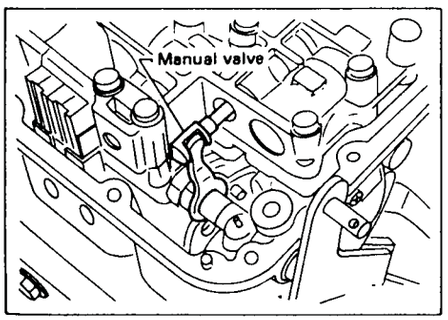
34. Install terminal assembly, paying attention to the direction of its hook.



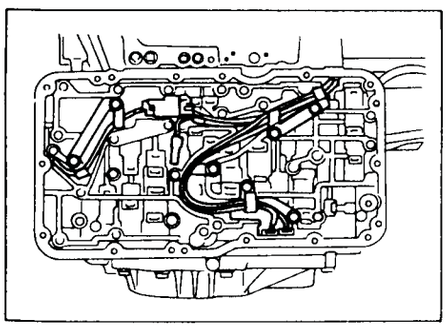
35. Install accumulator and spring.



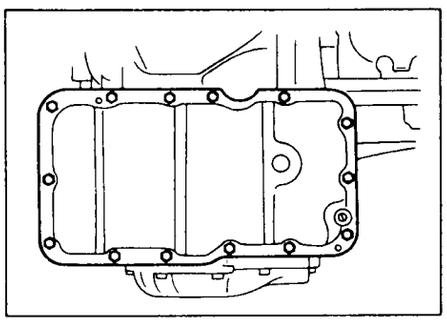
36. Insert manual valve to control valve body, then assemble them to transmission case.
Bolt Ⓐ :
: 3.7 - 5.0 N•m (0.38 - 0.51 kg-m, 2.7 - 3.7 ft-lb)
Other bolts:
: 7 - 9 N•m (0.7 - 0.9 kg-m, 5.1 - 6.5 ft-lb)



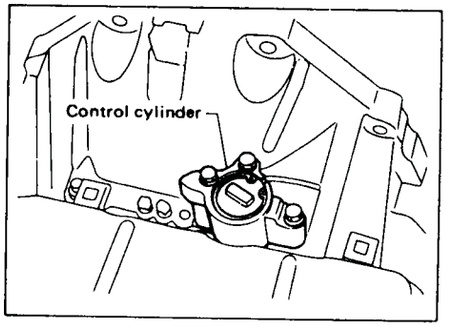
- **Pay attention to the direction of manual valve groove.**



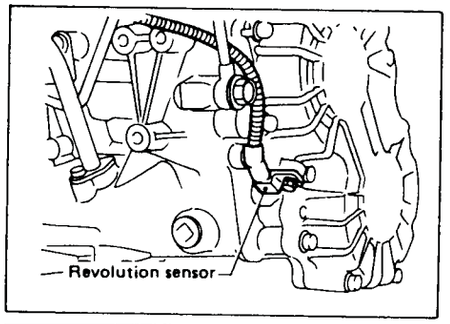
37. Connect harness connectors between terminal assembly and solenoids.



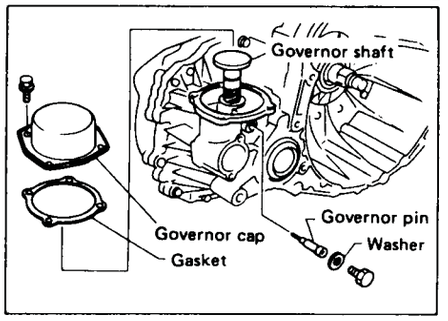
38. Put gasket on transmission case and install valve cover.
Always use new bolts as they are self-sealing bolts.



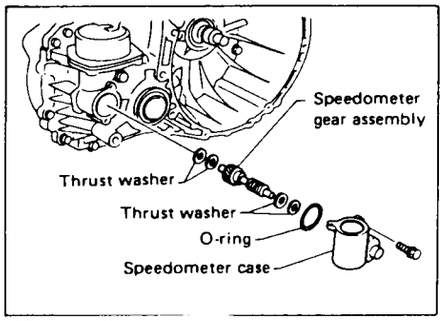
39. Install control cylinder.



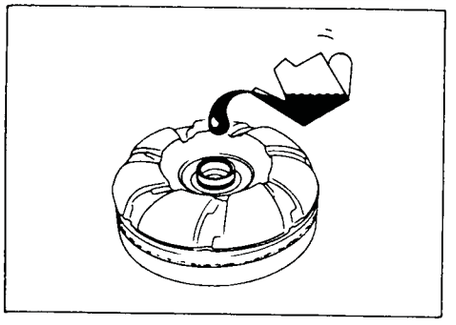
40. Install revolution sensor.



41. Install governor shaft.



42. Install speedometer parts.



43. Pour approx. 2 liters (2-1/8 US qt, 1-3/4 Imp qt) of automatic transmission fluid into converter housing.
44. Install torque converter to converter housing.
Be careful not to scratch front oil seal.

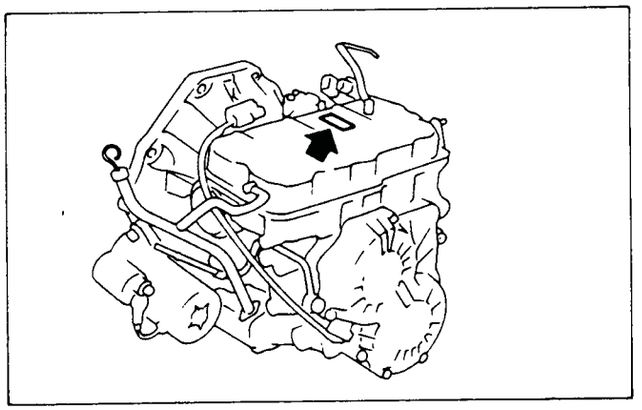
45. Apply sealant to threads of drain plug and install it in place.
46. Install inhibitor switch to transmission case.
47. Adjust inhibitor switch. Refer to On-vehicle Service.
48. Make sure that manual lever operates smoothly.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

General Specifications

Engine	VG30E
Automatic transaxle model	RE4F02A
Automatic transaxle assembly Model code number	27X62
Transaxle gear ratio	
1st	2.785
2nd	1.545
3rd	1.000
4th	0.694
Reverse	2.272
Final drive	3.642
Recommended oil	Automatic transmission fluid Type DEXRON™
Oil capacity ℓ (US qt, Imp qt)	7.3 (7-3/4, 6-3/8)

AUTOMATIC TRANSAXLE NUMBER



Specifications and Adjustment

CLUTCHES AND BRAKES

High clutch		
Number of drive plates	4	
Number of driven plates	7	
Clearance mm (in)		
Standard	1.4 - 1.8 (0.055 - 0.071)	
Allowable limit	2.6 (0.102)	
Drive plate thickness mm (in)		
Standard	1.6 (0.039)	
Allowable limit	1.4 (0.055)	
Thickness of retaining plate	Thickness mm (in)	Part number
	3.6 (0.142)	31567-21X00
	3.8 (0.150)	31567-21X01
	4.0 (0.157)	31567-21X02
	4.2 (0.165)	31567-21X03
	4.4 (0.173)	31567-21X04
	4.6 (0.181)	31567-21X05
	4.8 (0.189)	31567-21X06

Low clutch		
Number of drive plates	6	
Number of driven plates	7	
Clearance mm (in)		
Standard	0.5 - 0.8 (0.020 - 0.031)	
Allowable limit	2.0 (0.079)	
Drive plate thickness mm (in)		
Standard	2.0 (0.079)	
Allowable limit	1.8 (0.071)	
Thickness of retaining plate	Thickness mm (in)	Part number
	3.2 (0.126)	31597-21X10
	3.4 (0.134)	31597-21X11
	3.6 (0.142)	31597-21X12
	3.8 (0.150)	31597-21X13
	4.0 (0.157)	31597-21X14
	4.2 (0.165)	31597-21X15
Reverse clutch		
Number of drive plates	2	
Number of driven plates	2	
Clearance mm (in)		
Standard	0.5 - 0.8 (0.020 - 0.031)	
Allowable limit	1.2 (0.047)	
Drive plate thickness mm (in)		
Standard	2.0 (0.079)	
Allowable limit	1.8 (0.071)	
Thickness of retaining plate	Thickness mm (in)	Part number
	4.6 (0.181)	31537-21X10
	4.8 (0.189)	31537-21X11
	5.0 (0.197)	31537-21X12
	5.2 (0.205)	31537-21X13
	5.4 (0.213)	31537-21X14

Specifications and Adjustment (Cont'd)

Low & reverse brake		
Number of drive plates	7	
Number of driven plates	6 or 7	
Clearance mm (in)		
Standard	1.2 - 1.6 (0.047 - 0.063)	
Allowable limit	3.0 (0.118)	
Drive plate thickness mm (in)		
Standard	2.0 (0.079)	
Allowable limit	1.8 (0.071)	
Thickness of retaining plate	Thickness mm (in)	Part number
	3.4 (0.134)	31667-23X00
	3.6 (0.142)	31667-23X01
	3.8 (0.150)	31667-23X02
	4.0 (0.157)	31667-23X03
	4.2 (0.165)	31667-23X04
	4.4 (0.173)	31667-23X05
	4.6 (0.181)	31667-23X06
	4.8 (0.189)	31667-23X07
	5.0 (0.197)	31667-23X08
Brake band		
Brake band piston size mm (in)		
Big dia.	75 (2.95)	
Small dia.	43 (1.69)	

PLANETARY CARRIER AND OIL PUMP

Planetary carrier mm (in)	
Clearance between pinion washer and planetary carrier	
Front carrier	
Standard	0.15 - 0.70 (0.0059 - 0.0276)
Allowable limit	0.80 (0.0315)
Rear carrier	
Standard	0.20 - 0.70 (0.0079 - 0.0276)
Allowable limit	0.80 (0.0315)
Oil pump	
Oil pump clearance mm (in)	
Cam ring – oil pump cover	
Standard	0.010 - 0.024 (0.0004 - 0.0009)
Allowable limit	0.034 (0.0013)
Rotor – oil pump cover	
Standard	0.017 - 0.031 (0.0007 - 0.0012)
Allowable limit	0.034 (0.0013)
Vane – oil pump cover	
Standard	0.017 - 0.031 (0.0007 - 0.0012)
Allowable limit	0.034 (0.0013)
Seal ring clearance mm (in)	
Standard	0.10 - 0.25 (0.0039 - 0.0098)
Allowable limit	0.25 (0.0098)

CLUTCH PACK END PLAY

0.4 - 0.8 mm (0.016 - 0.031 in)

CLUTCH PACK THRUST WASHER

Thickness mm (in)	Part number
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

TOTAL END PLAY

0.25 - 0.55 mm (0.0098 - 0.0217 in)

OIL PUMP HOUSING BEARING RACE (For total end play)

Thickness mm (in)	Part number
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

Differential side bearing preload adjusting shim

Thickness mm (in)	Part number
0.12 (0.0047)	38453-21X13
0.16 (0.0063)	38453-21X14
0.20 (0.0079)	38453-21X15
0.24 (0.0094)	38435-21X16
0.28 (0.0110)	38435-21X17
0.32 (0.0126)	38453-21X18
0.36 (0.0142)	38453-21X19
0.40 (0.0157)	38453-21X20
0.44 (0.0173)	38453-21X00
0.48 (0.0189)	38453-21X01
0.52 (0.0205)	38453-21X02
0.56 (0.0220)	38453-21X03
0.60 (0.0236)	38453-21X04
0.64 (0.0252)	38453-21X05
0.68 (0.0268)	38453-21X06
0.72 (0.0283)	38453-21X07
0.76 (0.0299)	38453-21X08
0.80 (0.0315)	38453-21X09
0.84 (0.0331)	38453-21X10
0.88 (0.0346)	38453-21X11
0.92 (0.0362)	38453-21X12