

A
B
AT
D
E
F
G
H
I
J
K
L
M

SECTION **AT**

AUTOMATIC TRANSAXLE

CONTENTS

<p>INDEX FOR DTC 5</p> <p> Alphabetical Index 5</p> <p> DTC No. Index 6</p> <p>PRECAUTIONS 7</p> <p> Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 7</p> <p> Precautions Necessary for Steering Wheel Rotation After Battery Disconnect 7</p> <p> Precautions for On Board Diagnostic (OBD) System of A/T and Engine 8</p> <p> Precautions 8</p> <p> Service Notice or Precautions 9</p> <p>PREPARATION 11</p> <p> Special Service Tools 11</p> <p> Commercial Service Tools 14</p> <p>A/T FLUID 16</p> <p> Checking A/T Fluid 16</p> <p> Changing A/T Fluid 17</p> <p> A/T Fluid Cooler Cleaning 17</p> <p>A/T CONTROL SYSTEM 20</p> <p> Cross-Sectional View 20</p> <p> Shift Mechanism 21</p> <p> TCM Function 30</p> <p> CAN Communication 31</p> <p> Input/Output Signal of TCM 31</p> <p> Line Pressure Control 32</p> <p> Shift Control 33</p> <p> Lock-up Control 34</p> <p> Engine Brake Control (Overrun Clutch Control) 35</p> <p> Control Valve 37</p> <p> Centrifugal Cancel Mechanism 38</p> <p>ON BOARD DIAGNOSTIC (OBD) SYSTEM 39</p> <p> Introduction 39</p> <p> OBD-II Function for A/T System 39</p> <p> One or Two Trip Detection Logic of OBD-II 39</p> <p> OBD-II Diagnostic Trouble Code (DTC) 39</p> <p> Malfunction Indicator Lamp (MIL) 42</p> <p>TROUBLE DIAGNOSIS 43</p> <p> DTC Inspection Priority Chart 43</p>	<p> Fail-safe 43</p> <p> How to Perform Trouble Diagnoses for Quick and Accurate Repair 45</p> <p> A/T Electrical Parts Location 50</p> <p> Circuit Diagram 52</p> <p> Inspections Before Trouble Diagnosis 53</p> <p> Road Test 58</p> <p> Check Before Engine is Started 58</p> <p> Check at Idle 59</p> <p> Cruise Test — Part 1 61</p> <p> Cruise Test — Part 2 64</p> <p> Cruise Test — Part 3 65</p> <p> Vehicle Speed at Which Gear Shifting Occurs 67</p> <p> Vehicle Speed at Which Lock-up Occurs/Releases.. 67</p> <p> Symptom Chart 68</p> <p> TCM Terminals and Reference Values 78</p> <p> CONSULT-II Function (A/T) 80</p> <p> Diagnostic Procedure Without CONSULT-II 86</p> <p>DTC U1000 CAN COMMUNICATION LINE 90</p> <p> Description 90</p> <p> On Board Diagnosis Logic 90</p> <p> Possible Cause 90</p> <p> DTC Confirmation Procedure 90</p> <p> Wiring Diagram — AT — CAN 91</p> <p> Diagnostic Procedure 92</p> <p>DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH 93</p> <p> Description 93</p> <p> CONSULT-II Reference Value 93</p> <p> On Board Diagnosis Logic 93</p> <p> Possible Cause 93</p> <p> DTC Confirmation Procedure 93</p> <p> Wiring Diagram — AT — PNP/SW 94</p> <p> Diagnostic Procedure 95</p> <p> Component Inspection 97</p> <p>DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT 98</p> <p> Description 98</p> <p> CONSULT-II Reference Value 98</p> <p> On Board Diagnosis Logic 98</p>
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Possible Cause	98	CONSULT-II Reference Value	135
DTC Confirmation Procedure	98	On Board Diagnosis Logic	135
Wiring Diagram — AT — FTS	99	Possible Cause	135
Diagnostic Procedure	100	DTC Confirmation Procedure	136
Component Inspection	102	Diagnostic Procedure	137
DTC P0720 VEHICLE SPEED SENSOR-A/T (REV- OLUTION SENSOR)	103	DTC P0745 LINE PRESSURE SOLENOID VALVE.....	141
Description	103	Description	141
CONSULT-II Reference Value	103	CONSULT-II Reference Value	141
On Board Diagnosis Logic	103	On Board Diagnosis Logic	141
Possible Cause	103	Possible Cause	141
DTC Confirmation Procedure	103	DTC Confirmation Procedure	141
Wiring Diagram — AT — VSSA/T	105	Wiring Diagram — AT — LPSV	142
Diagnostic Procedure	106	Diagnostic Procedure	143
DTC P0725 ENGINE SPEED SIGNAL	109	Component Inspection	146
Description	109	DTC P0750 SHIFT SOLENOID VALVE A	147
CONSULT-II Reference Value	109	Description	147
On Board Diagnosis Logic	109	CONSULT-II Reference Value	147
Possible Cause	109	On Board Diagnosis Logic	147
DTC Confirmation Procedure	109	Possible Cause	147
Wiring Diagram — AT — ENGSS	110	DTC Confirmation Procedure	147
Diagnostic Procedure	111	Wiring Diagram — AT — SSV/A	148
DTC P0731 A/T 1ST GEAR FUNCTION	113	Diagnostic Procedure	149
Description	113	Component Inspection	150
On Board Diagnosis Logic	113	DTC P0755 SHIFT SOLENOID VALVE B	152
Possible Cause	113	Description	152
DTC Confirmation Procedure	114	CONSULT-II Reference Value	152
Diagnostic Procedure	115	On Board Diagnosis Logic	152
DTC P0732 A/T 2ND GEAR FUNCTION	117	Possible Cause	152
Description	117	DTC Confirmation Procedure	152
On Board Diagnosis Logic	117	Wiring Diagram — AT — SSV/B	153
Possible Cause	117	Diagnostic Procedure	154
DTC Confirmation Procedure	118	Component Inspection	155
Diagnostic Procedure	119	DTC P1760 OVERRUN CLUTCH SOLENOID VALVE	157
DTC P0733 A/T 3RD GEAR FUNCTION	120	Description	157
Description	120	CONSULT-II Reference Value	157
On Board Diagnosis Logic	120	On Board Diagnosis Logic	157
Possible Cause	120	Possible Cause	157
DTC Confirmation Procedure	121	DTC Confirmation Procedure	157
Diagnostic Procedure	122	Wiring Diagram — AT — OVRCSV	158
DTC P0734 A/T 4TH GEAR FUNCTION	124	Diagnostic Procedure	159
Description	124	Component Inspection	161
CONSULT-II Reference Value	124	DTC VEHICLE SPEED SENSOR MTR	162
On Board Diagnosis Logic	124	Description	162
Possible Cause	124	CONSULT-II Reference Value	162
DTC Confirmation Procedure	125	On Board Diagnosis Logic	162
Diagnostic Procedure	126	Possible Cause	162
DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE	130	DTC Confirmation Procedure	162
Description	130	Wiring Diagram — AT — VSSMTR	163
CONSULT-II Reference Value	130	Diagnostic Procedure	164
On Board Diagnosis Logic	130	DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE).....	165
Possible Cause	130	Description	165
DTC Confirmation Procedure	130	CONSULT-II Reference Value	165
Wiring Diagram — AT — TCV	131	On Board Diagnosis Logic	165
Diagnostic Procedure	132	Possible Cause	165
Component Inspection	134	DTC Confirmation Procedure	165
DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP).....	135	Wiring Diagram — AT — BA/FTS	166
Description	135		

Diagnostic Procedure	167	TRANSMISSION CONTROL MODULE	222	
Component Inspection	170	Removal and Installation	222	A
DTC TURBINE REVOLUTION SENSOR	171	SHIFT CONTROL SYSTEM	223	
Description	171	Control Device Removal and Installation	223	
CONSULT-II Reference Value	171	Control Device Disassembly and Assembly	226	B
On Board Diagnosis Logic	171	Selector Lever Knob Removal and Installation	227	
Possible Cause	171	Adjustment of A/T Position	227	
DTC Confirmation Procedure	171	Checking of A/T Position	228	
Wiring Diagram — AT — PT/SEN	172	A/T SHIFT LOCK SYSTEM	229	AT
Diagnostic Procedure	173	Description	229	
CONTROL UNIT (RAM), CONTROL UNIT (ROM). 177		Shift Lock System Parts Location	229	
Description	177	Wiring Diagram — AT — SHIFT	230	D
On Board Diagnosis Logic	177	Diagnostic Procedure	231	
Possible Cause	177	KEY INTERLOCK CABLE	233	
DTC Confirmation Procedure	177	Removal and Installation	233	E
Diagnostic Procedure	177	ON-VEHICLE SERVICE	236	
MAIN POWER SUPPLY AND GROUND CIRCUIT. 178		Control Valve Assembly and Accumulators	236	
Wiring Diagram — AT — MAIN	178	Park/Neutral Position (PNP) Switch	240	F
Diagnostic Procedure	179	Revolution Sensor	241	
PNP, OD SWITCH AND CLOSED THROTTLE,		Turbine Revolution Sensor (Power Train Revolution		
WIDE OPEN THROTTLE POSITION SIGNAL CIR-		Sensor)	242	
CUIT	181	Differential Side Oil Seal	244	G
CONSULT-II Reference Value	181	AIR BREATHER HOSE	246	
TCM Terminals and Reference Value	181	Removal and Installation	246	
Diagnostic Procedure	182	TRANSAXLE ASSEMBLY	247	H
Component Inspection	186	Removal and Installation	247	
SHIFT POSITION INDICATOR CIRCUIT	187	OVERHAUL	251	
Description	187	Components	251	I
CONSULT-II Reference Value	187	Oil Channel	259	
Diagnostic Procedure	187	Locations of Adjusting Shims, Needle Bearings and		
TROUBLE DIAGNOSIS FOR SYMPTOMS	188	Thrust Washers	260	J
Wiring Diagram — AT — NONDTC	188	Locations of Snap Rings	261	
OD OFF Indicator Lamp Does Not Come On	192	DISASSEMBLY	262	
Engine Cannot Be Started in “P” and “N” Position	194	Disassembly	262	
In “P” Position, Vehicle Moves Forward or Backward	195	REPAIR FOR COMPONENT PARTS	279	K
When Pushed	195	Manual Shaft	279	
In “N” Position, Vehicle Moves	195	Oil Pump	283	
Large Shock “N” → “R” Position	196	Control Valve Assembly	287	L
Vehicle Does Not Creep Backward in “R” Position	197	Control Valve Upper Body	296	
Vehicle Does Not Creep Forward in “D”, “2” or “1”	199	Control Valve Lower Body	300	
Position	199	Reverse Clutch	303	
Vehicle Cannot Be Started from D1	200	High Clutch	308	M
A/T Does Not Shift: D1 → D2 or Does Not Kickdown:		Forward and Overrun Clutches	314	
D4 → D2	202	Low & Reverse Brake	321	
A/T Does Not Shift: D2 → D3	204	Rear Internal Gear and Forward Clutch Hub	326	
A/T Does Not Shift: D3 → D4	206	Output Shaft, Output Gear, Idler Gear, Reduction		
A/T Does Not Perform Lock-up	208	Pinion Gear and Bearing Retainer	330	
A/T Does Not Hold Lock-up Condition	209	Band Servo Piston Assembly	337	
Lock-up Is Not Released	210	Final Drive	343	
Engine Speed Does Not Return to Idle (Light Brak-		ASSEMBLY	348	
ing D4 → D3)	211	Assembly (1)	348	
A/T Does Not Shift: D4 → D3 , When OD OFF ...	212	Adjustment (1)	349	
A/T Does Not Shift: D3 → 22 , When Selector Lever		Assembly (2)	355	
“D” → “2” Position	213	Adjustment (2)	360	
A/T Does Not Shift: 22 → 11 , When Selector Lever		Assembly (3)	363	
“2” → “1” Position	215	SERVICE DATA AND SPECIFICATIONS (SDS) ...	372	
Vehicle Does Not Decelerate by Engine Brake ...	217	General Specifications	372	
TCM Self-diagnosis Does Not Activate	221	Vehicle Speed at Which Gear Shifting Occurs	372	
		Vehicle Speed at When Lock-up Occurs/Releases	372	

Stall Speed	372	Output Shaft	376
Line Pressure	372	Bearing Retainer	377
Adjusting shims, Needle Bearings, Thrust Washers and Snap Rings	373	Total End Play	377
Control Valves	374	Reverse Clutch End Play	377
Accumulator	374	Removal and Installation	377
Clutches and Brakes	374	Shift Solenoid Valves	377
Final Drive	376	Solenoid Valves	377
Planetary Carrier	376	A/T Fluid Temperature Sensor	377
Oil Pump	376	Revolution Sensor	377
Input Shaft	376	Dropping Resistor	377
Reduction Pinion Gear	376	Turbine Revolution Sensor (Power Train Revolution Sensor)	377
Band Servo	376		

INDEX FOR DTC

INDEX FOR DTC

PFP:00024

Alphabetical Index

UCS005LY

NOTE:

If DTC “CAN COMM CIRCUIT” is displayed with other DTCs, first perform the trouble diagnosis for DTC “CAN COMM CIRCUIT”. Refer to [AT-90](#) .

Items (CONSULT-II screen terms)	DTC	Reference page
	CONSULT-II or GST ^{*1}	
A/T 1ST GR FNCTN	P0731	AT-113
A/T 2ND GR FNCTN	P0732	AT-117
A/T 3RD GR FNCTN	P0733	AT-120
A/T 4TH GR FNCTN	P0734	AT-124
A/T TCC S/V FNCTN	P0744	AT-135
ATF TEMP SEN/CIRC	P0710	AT-98
BATT/FLUID TEMP SEN	—	AT-165
CAN COMM CIRCUIT	U1000	AT-90
CONTROL UNIT (RAM)	—	AT-177
CONTROL UNIT (ROM)	—	AT-177
ENGINE SPEED SIG	P0725	AT-109
LINE PRESSURE S/V	P0745	AT-141
OVERRUN CLUTCH S/V	P1760	AT-157
PNP SW/CIRC	P0705	AT-93
SHIFT SOLENOID/V A ^{*2}	P0750	AT-147
SHIFT SOLENOID/V B ^{*2}	P0755	AT-152
T/C CLUTCH SOL/V	P0740	AT-130
TURBINE SENSOR	—	AT-171
VHCL SPEED SEN-A/T ^{*3}	P0720	AT-103
VHCL SPEED SEN-MTR	—	AT-162

*1: These numbers is prescribed by SAE J2012.

*2: When the fail-safe operation occurs, the MIL illuminates.

*3: The MIL illuminates when both the “Revolution sensor signal” and the “Vehicle speed sensor signal” meet the fail-safe condition at the same time.

INDEX FOR DTC

UCS005LZ

DTC No. Index

NOTE:

If DTC “CAN COMM CIRCUIT” is displayed with other DTCs, first perform the trouble diagnosis for DTC “CAN COMM CIRCUIT”. Refer to [AT-90](#) .

DTC	Items (CONSULT-II screen terms)	Reference page
CONSULT-II or GST* ¹		
P0705	PNP SW/CIRC	AT-93
P0710	ATF TEMP SEN/CIRC	AT-98
P0720	VHCL SPEED SEN-A/T* ³	AT-103
P0725	ENGINE SPEED SIG	AT-109
P0731	A/T 1ST GR FNCTN	AT-113
P0732	A/T 2ND GR FNCTN	AT-117
P0733	A/T 3RD GR FNCTN	AT-120
P0734	A/T 4TH GR FNCTN	AT-124
P0740	T/C CLUTCH SOL/V	AT-130
P0744	A/T TCC S/V FNCTN	AT-135
P0745	LINE PRESSURE S/V	AT-141
P0750	SHIFT SOLENOID/V A* ²	AT-147
P0755	SHIFT SOLENOID/V B* ²	AT-152
P1760	OVERRUN CLUTCH S/V	AT-157
U1000	CAN COMM CIRCUIT	AT-90
—	BATT/FLUID TEMP SEN	AT-165
—	CONTROL UNIT (RAM)	AT-177
—	CONTROL UNIT (ROM)	AT-177
—	TURBINE SENSOR	AT-171
—	VHCL SPEED SEN-MTR	AT-162

*1: These numbers is prescribed by SAE J2012.

*2: When the fail-safe operation occurs, the MIL illuminates.

*3: The MIL illuminates when both the “Revolution sensor signal” and the “Vehicle speed sensor signal” meet the fail-safe condition at the same time.

PRECAUTIONS

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

UCS006XG

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

Precautions Necessary for Steering Wheel Rotation After Battery Disconnect

UCS006XH

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NVIS/IVIS (NISSAN/INFINITI VEHICLE IMMOBILIZER SYSTEM - NATS).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the “LOCK” position.
- Always use CONSULT-II to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NVIS/IVIS, an electrically controlled steering lock mechanism is adopted on the key cylinder.

For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.

If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.

NOTE:

Supply power using jumper cables if battery is discharged.

2. Use the Intelligent Key or mechanical key to turn the ignition switch to the “ACC” position. At this time, the steering lock will be released.
3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
4. Perform the necessary repair operation.
5. When the repair work is completed, return the ignition switch to the “LOCK” position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
6. Perform a self-diagnosis check of all control units using CONSULT-II.

PRECAUTIONS

Precautions for On Board Diagnostic (OBD) System of A/T and Engine

UCS005M2

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

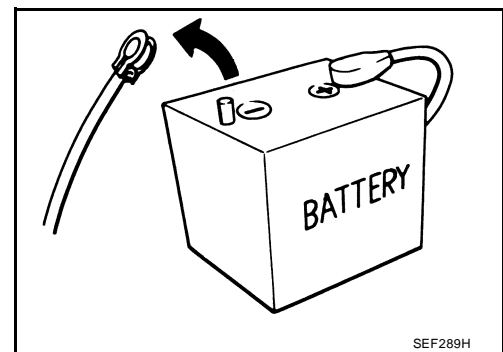
CAUTION:

- Be sure to turn the ignition switch OFF and disconnect battery negative cable from battery negative terminal before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to an open circuit. (Be sure the connectors are free from water, grease, dirt, bent terminals, etc.)
- Be sure to route and secure the harnesses properly after work. Interference of the harness with a bracket, etc. may cause the MIL to light up due to a short circuit.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the TCM and ECM before returning the vehicle to the customer.

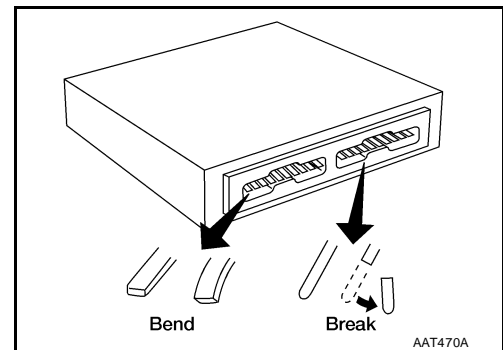
Precautions

UCS005M3

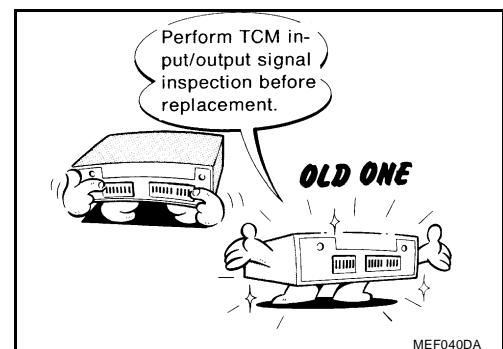
- Before connecting or disconnecting the TCM harness connector, turn ignition switch OFF and disconnect the battery cable from the negative terminal. Failure to do so may damage the TCM. Because battery voltage is applied to TCM even if ignition switch is turned off.



- When connecting or disconnecting pin connectors into or from TCM, take care not to damage pin terminals (bend or break). Make sure that there are not any bends or breaks on TCM pin terminal, when connecting pin connectors.



- Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly or not. (See page [AT-78, "TCM Terminals and Reference Values"](#).)
- After performing each TROUBLE DIAGNOSIS, perform "DTC (Diagnostic Trouble Code) Confirmation Procedure". The DTC should not be displayed in the "DTC Confirmation Procedure" if the repair is completed.



- Before proceeding with disassembly, thoroughly clean the outside of the transaxle. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Disassembly should be done in a clean work area.
- Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the A/T.
- Place disassembled parts in order for easier and proper assembly.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.

PRECAUTIONS

- Gaskets, seals and O-rings should be replaced any time the A/T is disassembled.
- It is very important to perform functional tests whenever they are indicated.
- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place disassembled valve body parts in order for easier and proper assembly. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. will slide along bores in valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Do not use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- Clean or replace ATF cooler if excessive foreign material is found in oil pan or clogging strainer. Refer to Refer to .
- After overhaul, refill the A/T with new ATF.
- When the A/T drain plug is removed, only some of the fluid is drained. Old A/T fluid will remain in torque converter and ATF cooling system.
Always follow the procedures under "Changing A/T Fluid" in the AT section when changing A/T fluid. Refer to [MA-23, "Changing A/T Fluid"](#) , [MA-22, "Checking A/T Fluid"](#) .

Service Notice or Precautions

UCS005M4

ATF COOLER SERVICE

If A/T fluid contains frictional material (clutches, bands, etc.), or if an A/T is repaired, overhauled, or replaced, inspect and clean the A/T oil cooler mounted in the radiator or replace the radiator. Flush cooler lines using cleaning solvent and compressed air after repair. Check Service Bulletins for latest A/T oil cooler cleaning procedure. For radiator replacement, refer to Refer to [CO-11, "RADIATOR"](#) .

TORQUE CONVERTER SERVICE

The torque converter should be replaced under any of the following conditions:

- External leaks in the hub weld area.
- Converter hub is scored or damaged.
- Converter pilot is broken, damaged or fits poorly into crankshaft.
- Steel particles are found after flushing the cooler and cooler lines.
- Pump is damaged or steel particles are found in the converter.
- Vehicle has TCC shudder and/or no TCC apply. Replace only after all hydraulic and electrical diagnoses have been made. (Converter clutch material may be glazed.)
- Converter is contaminated with engine coolant containing antifreeze.
- Internal malfunction of stator roller clutch.
- Heavy clutch debris due to overheating (blue converter).
- Steel particles or clutch lining material found in fluid filter or on magnet when no internal parts in unit are worn or damaged — indicates that lining material came from converter.

The torque converter should not be replaced if:

- The fluid has an odor, is discolored, and there is no evidence of metal or clutch facing particles.
- The threads in one or more of the converter bolt holes are damaged.
- A/T malfunction did not display evidence of damaged or worn internal parts, steel particles or clutch plate lining material in unit and inside the fluid filter.
- Vehicle has been exposed to high mileage (only). The exception may be where the torque converter clutch dampener plate lining has seen excess wear by vehicles operated in heavy and/or constant traffic, such as taxi, delivery or police use.

PRECAUTIONS

OBD-II SELF-DIAGNOSIS

- A/T self-diagnosis is performed by the TCM in combination with the ECM. The results can be read through the blinking pattern of the OD OFF indicator lamp or the malfunction indicator lamp (MIL). Refer to the table on [AT-87, "Judgement of Self-diagnosis Code"](#) for the indicator used to display each self-diagnostic result.
- The self-diagnostic results indicated by the MIL are automatically stored in both the ECM and TCM memories.
Always perform the procedure "HOW TO ERASE DTC" on [AT-40, "HOW TO ERASE DTC"](#) to complete the repair and avoid unnecessary blinking of the MIL.
- The following self-diagnostic items can be detected using ECM self-diagnostic results mode* only when the OD OFF indicator lamp does not indicate any malfunctions.

- PNP switch
- A/T 1st, 2nd, 3rd, or 4th gear function

*: For details of OBD-II, refer to [AT-39, "ON BOARD DIAGNOSTIC \(OBD\) SYSTEM"](#) .

- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector.**
For description and how to disconnect, refer to [PG-73, "HARNESS CONNECTOR"](#) .

PREPARATION

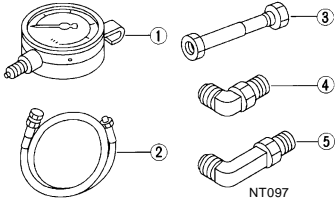
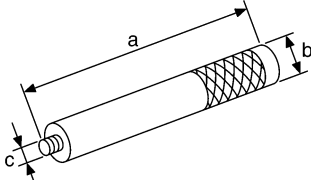
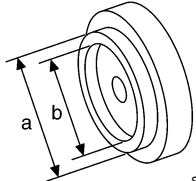
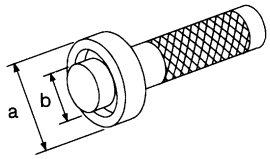
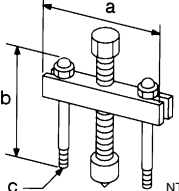
PREPARATION

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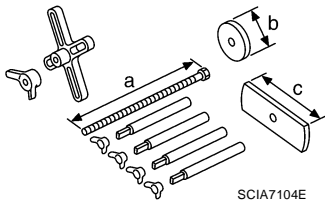
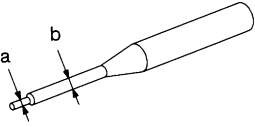
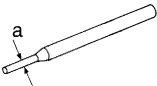
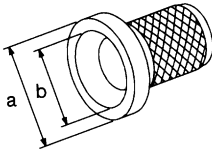

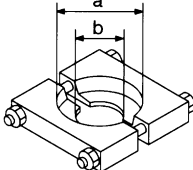
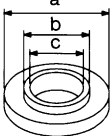
Special Service Tools

UCS005M6

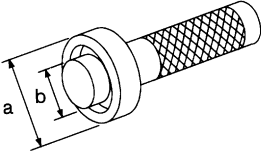
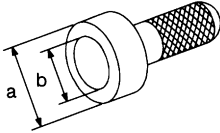
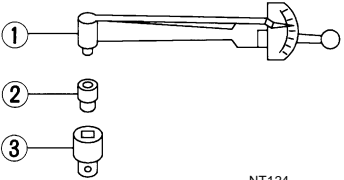
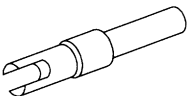
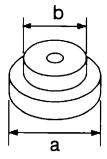
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
<p>ST2505S001 (J-34301) Oil pressure gauge set</p> <ol style="list-style-type: none"> 1. ST25051001 (J-34301) Oil pressure gauge 2. ST25052000 (J-34301) Hose 3. ST25053000 (J-25695-3) Joint pipe 4. ST25054000 (J-25695-4) Adapter 5. ST25055000 (J-25695-5) Adapter 	<p>Measuring line pressure</p>
<p>ST35325000 (—) Drift</p>  <p style="text-align: center;">SCIA7102E</p>	<p>Installing LH differential side oil seal (Use with KV31103000) a: 215 mm (8.46 in) b: 25 mm (0.98 in) dia. c: M12 X 1.5P</p>
<p>KV31103000 (J-38982) Drift</p>  <p style="text-align: center;">SCIA7103E</p>	<p>Installing LH differential side oil seal (Use with ST35325000) a: 59 mm (2.32 in) dia. b: 49 mm (1.93 in) dia.</p>
<p>ST37830000 (—) Drift</p>  <p style="text-align: center;">NT084</p>	<p>Installing idler gear bearing outer race a: 61.9 mm (2.437 in) dia. b: 39 mm (1.54 in) dia.</p>
<p>ST27180001 (J-25726-A) Puller</p>  <p style="text-align: center;">NT424</p>	<p>Removing idler gear a: 100 mm (3.94 in) b: 110 mm (4.33 in) c: M8 X 1.25P</p>

PREPARATION

Tool number (Kent-Moore No.) Tool name	Description
KV31103200 (J-39186) Clutch spring compressor  SCIA7104E	<ul style="list-style-type: none"> ● Removing and installing clutch spring retainer assembly ● Removing and installing cancel cover a: 179 mm (7.05 in) b: 76 mm (2.99 in) dia. c: 174 mm (6.85 in)
ST23540000 (J-25689-A) Pin punch  NT442	<ul style="list-style-type: none"> ● Removing and installing retaining pin of manual plate ● Installing retaining pin of manual shaft ● Installing retaining pin of parking rod plate a: 2.3 mm (0.091 in) dia. b: 4 mm (0.16 in) dia.
KV32101000 (J-25689-A) Pin punch  NT410	Removing and installing lock pin of pinion mate shaft a: 4 mm (0.16 in) dia.
ST33400001 (J-26082) Drift  NT086	Installing oil pump housing oil seal a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.
KV381054S0 (J-34286) Puller  NT414	<ul style="list-style-type: none"> ● Removing radial needle bearing ● Removing idler gear bearing outer race ● Removing differential side bearing outer races a: 250 mm (9.84 in) b: 160 mm (6.30 in)
ST30031000 (J-22912-01) Puller  NT411	Removing reduction pinion gear bearing inner race a: 90 mm (3.54 in) dia. b: 50 mm (1.97 in) dia.
ST35272000 (J-26092) Drift  NT107	<ul style="list-style-type: none"> ● Installing reduction pinion gear bearing inner race ● Installing idler gear bearing inner race a: 72 mm (2.83 in) dia. b: 40 mm (1.57 in) dia. c: 35.5 mm (1.398 in) dia.

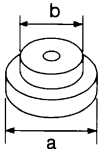
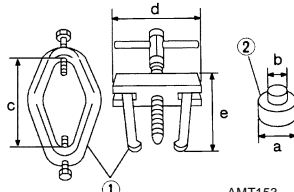
PREPARATION

Tool number (Kent-Moore No.) Tool name	Description	A
ST37830000 (—) Drift <div style="text-align: center;">  <p>NT084</p> </div>	Installing idler gear bearing outer race a: 61.9 mm (2.437 in) dia. b: 39 mm (1.54 in) dia.	B
ST35271000 (J-26091) Drift <div style="text-align: center;">  <p>NT115</p> </div>	Installing idler gear a: 72 mm (2.83 in) dia. b: 63 mm (2.48 in) dia.	D
ST3127S000 (J-25765-A) Preload gauge 1. GG91030000 (J-25765-A) Torque wrench 2. HT62940000 (—) Socket adapter 3. HT629000000 (—) Socket adapter <div style="text-align: center;">  <p>NT124</p> </div>	<ul style="list-style-type: none"> ● Measuring turning torque of reduction pinion gear ● Measuring turning torque of final drive assembly 	F
KV38105710 (J-39026) Preload adapter <div style="text-align: center;">  <p>NT087</p> </div>	<ul style="list-style-type: none"> ● Selecting differential side bearing adjusting shim ● Measuring turning torque of final drive assembly 	J
ST35321000 (—) Drift <div style="text-align: center;">  <p>NT073</p> </div>	Installing output shaft bearing a: 49 mm (1.93 in) dia. b: 41 mm (1.61 in) dia.	L

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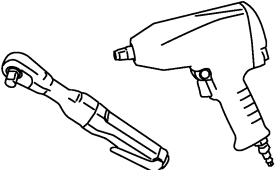
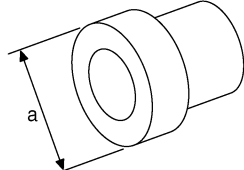
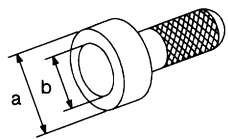
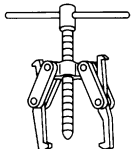
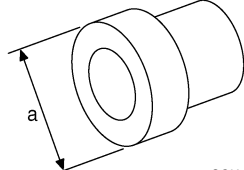
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PREPARATION

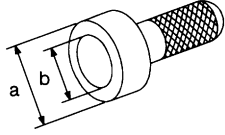
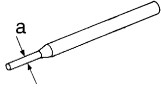
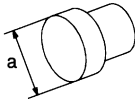
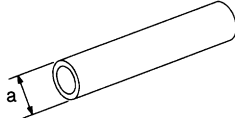
Tool number (Kent-Moore No.) Tool name	Description
ST30633000 (—) Drift	Installing differential side bearing outer races a: 67 mm (2.48 in) dia. b: 49 mm (1.93 in) dia.
 NT073	
ST3306S001 (J-22888-D) Differential side bearing puller set 1. ST33051001 Puller 2. ST33061000 Adapter	Removing differential side bearing inner race a: 38 mm (1.50 in) dia. b: 28.5 mm (1.122 in) dia. c: 130 mm (5.12 in) d: 135 mm (5.31 in) e: 100 mm (3.94 in)
 AMT153	

Commercial Service Tools

UCS005M7

Tool name	Description
Power tool	Loosening bolts and nuts
 PBIC0190E	
Drift	Installing manual shaft oil seal a: 22 mm (0.87 in) dia.
 SCIA7105E	
Drift	Installing RH differential side oil seal a: 54 mm (2.13 in) dia. b: 47 mm (1.85 in) dia.
 NT115	
Puller	<ul style="list-style-type: none"> ● Removing idler gear bearing inner race ● Removing and installing band servo piston snap ring
 NT077	
Drift	Removing idler gear bearing inner race a: 34 mm (1.34 in) dia.
 SCIA7105E	

PREPARATION

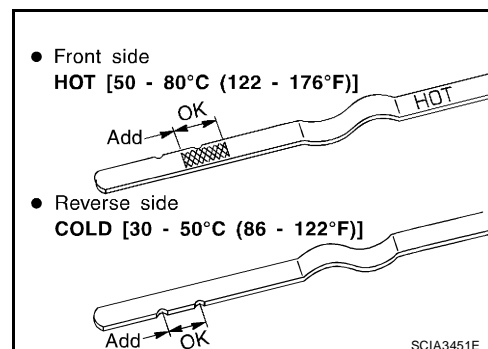
Tool name	Description
<p>Drift</p>  <p style="text-align: center;">NT115</p>	<p>Installing differential side bearings a: 45 mm (1.77 in) dia. b: 41 mm (1.61 in) dia.</p>
<p>Pin punch</p>  <p style="text-align: center;">NT410</p>	<p>Aligning groove of manual shaft and hole of transaxle case a: 2 mm (0.08 in) dia.</p>
<p>Drift</p>  <p style="text-align: center;">NT109</p>	<p>Removing idler gear bearing inner race a: 34 mm (1.34 in) dia.</p>
<p>Drift</p>  <p style="text-align: center;">NT083</p>	<p>Installing radial needle bearing on bearing retainer a: 36 mm (1.42 in) dia.</p>

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A/T FLUID

Checking A/T Fluid

1. Warm up engine.
2. Check for A/T fluid leakage.
3. Before driving, A/T fluid level can be checked at A/T fluid temperatures of 30 to 50°C (86 to 122°F) using the “COLD” range on A/T fluid level gauge.
 - a. Park vehicle on level surface and set parking brake.
 - b. Start engine and move selector lever through each gear position. Leave selector lever in “P” position.
 - c. Check A/T fluid level with engine idling.



- d. Remove A/T fluid level gauge and wipe clean with lint-free cloth.

CAUTION:

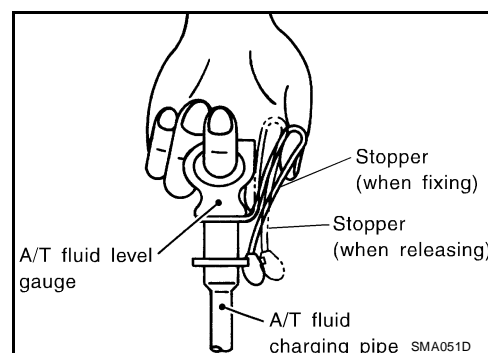
When wiping the A/T fluid level gauge, always use lint-free cloth.

- e. Re-insert A/T fluid level gauge into A/T fluid charging pipe as far as it will go.

CAUTION:

Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using the stopper attached.

- f. Remove A/T fluid level gauge and note reading. If reading is at low side of range, add A/T fluid to the A/T fluid charging pipe.



CAUTION:

Do not overfill.

4. Drive vehicle for approximately 5 minutes.
5. Re-check A/T fluid level at A/T fluid temperatures of 50 to 80°C (122 to 176°F) using “HOT” range on A/T fluid level gauge.

CAUTION:

● **When wiping the A/T fluid level gauge, always use lint-free cloth.**

● **Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using the stopper attached.**

6. Check A/T fluid condition and make any necessary repairs. Refer to [AT-53, "Fluid Condition Check"](#) . If the A/T fluid contains frictional material (clutches, bands, etc.), or if the A/T is repaired, overhauled, or replaced, inspect and clean the A/T fluid cooler mounted in the radiator. Refer to [AT-17, "A/T Fluid Cooler Cleaning"](#) .
7. Install the removed A/T fluid level gauge into the A/T fluid charging pipe.

CAUTION:

Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using the stopper attached.

Changing A/T Fluid

1. Warm up A/T fluid.
2. Stop engine.
3. Drain A/T fluid by removing the drain plug. Reinstall the drain plug to the specified torque.

CAUTION:

Do not reuse drain plug gasket.

Drain plug: Refer to [AT-251, "Components"](#) .

4. Refill the transaxle with new specified A/T fluid through the A/T fluid charging pipe. Always refill the transaxle with the same volume of A/T fluid that was drained out.

Fluid grade and capacity: Refer to [MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS"](#) .

5. Run engine at idle speed for 5 minutes.
6. Check A/T fluid level and condition. Refer to [MA-22, "Checking A/T Fluid"](#) .

A/T Fluid Cooler Cleaning

Whenever the A/T is repaired, overhauled, or replaced, the A/T fluid cooler mounted in the radiator must be inspected and cleaned.

Metal debris and friction material, if present, can become trapped in the A/T fluid cooler. This debris can contaminate the newly serviced A/T or, in severe cases, can block or restrict the flow of A/T fluid. In either case, malfunction of the newly serviced A/T may result.

Debris, if present, may build up as A/T fluid enters the cooler inlet. It will be necessary to back flush the cooler through the cooler outlet in order to flush out any built up debris.

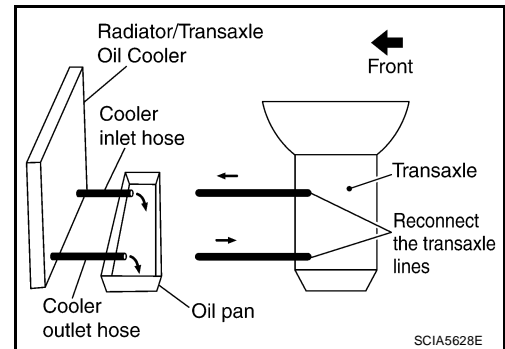
A/T FLUID COOLER CLEANING PROCEDURE

1. Identify the A/T inlet and outlet fluid cooler hoses.
2. Position an oil pan under the A/T inlet and outlet fluid cooler hoses.
3. Disconnect the A/T fluid cooler inlet and outlet rubber hoses from the steel cooler tubes or bypass valve.

NOTE:

Replace the cooler hoses if rubber material from the hose remains on the tube fitting.

4. Allow any A/T fluid that remains in the cooler hoses to drain into the oil pan.

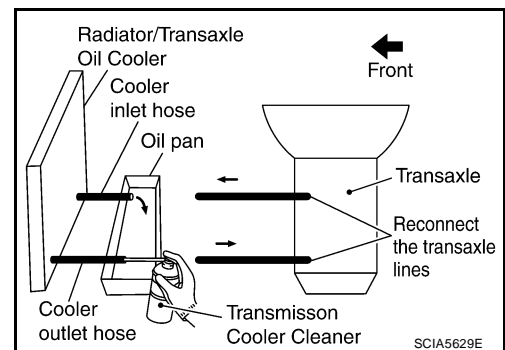


5. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.

CAUTION:

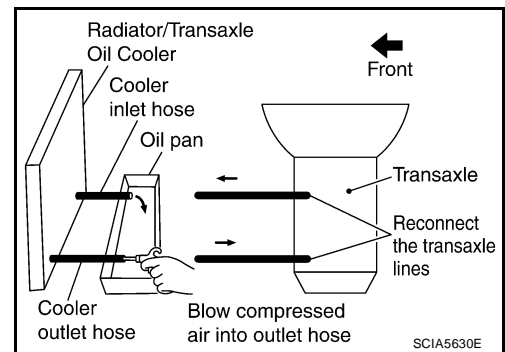
- **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
- **Spray Transmission Cooler Cleaner only with adequate ventilation.**
- **Avoid contact with eyes and skin.**
- **Do not breath vapors or spray mist.**

6. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until A/T fluid flows out of the cooler inlet hose for 5 seconds.



A/T FLUID

- Insert the tip of an air gun into the end of the cooler outlet hose.
- Wrap a shop rag around the air gun tip and end of cooler outlet hose.



- Blow compressed air regulated to 5 - 9 kg/cm² (70 - 130 psi) through the cooler outlet hose for 10 seconds to force out any remaining A/T fluid.
- Repeat steps 5 through 9 three additional times.
- Position an oil pan under the banjo bolts that connect the A/T fluid cooler steel lines to the A/T.
- Remove the banjo bolts.
- Flush each steel line from the cooler side back toward the A/T by spraying Transmission Cooler Cleaner in a continuous stream for 5 seconds.
- Blow compressed air regulated to 5 - 9 kg/cm² (70 - 130 psi) through each steel line from the cooler side back toward the A/T for 10 seconds to force out any remaining A/T fluid.
- Ensure all debris is removed from the steel cooler lines.
- Ensure all debris is removed from the banjo bolts and fittings.
- Perform [AT-18, "A/T FLUID COOLER DIAGNOSIS PROCEDURE"](#) .

A/T FLUID COOLER DIAGNOSIS PROCEDURE

NOTE:

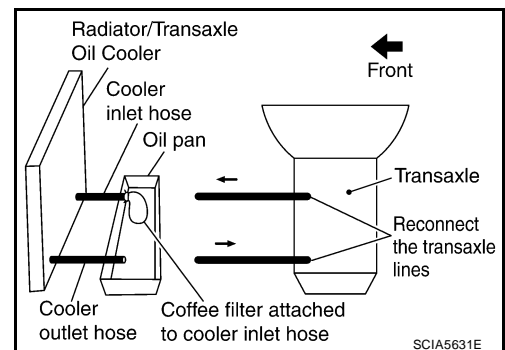
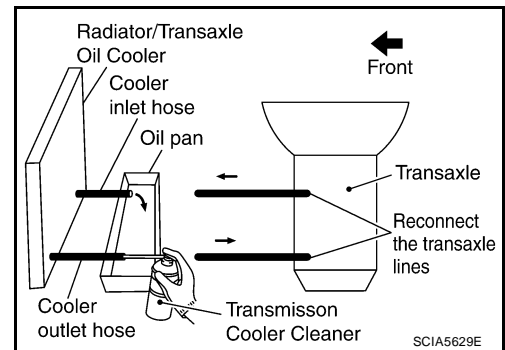
Insufficient cleaning of the cooler inlet hose exterior may lead to inaccurate debris identification.

- Position an oil pan under the A/T inlet and outlet cooler hoses.
- Clean the exterior and tip of the cooler inlet hose.
- Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.

CAUTION:

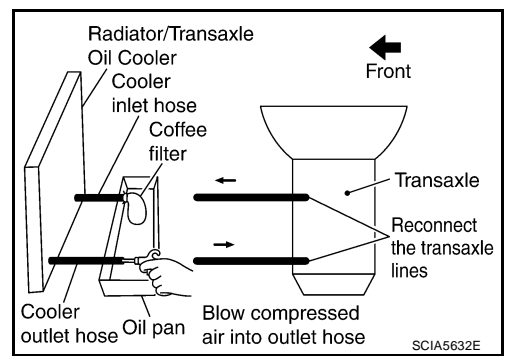
- Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.
- Spray Transmission Cooler Cleaner only with adequate ventilation.
- Avoid contact with eyes and skin.
- Do not breath vapors or spray mist.

- Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until A/T fluid flows out of the cooler inlet hose for 5 seconds.
- Tie a common white, basket-type coffee filter to the end of the cooler inlet hose.



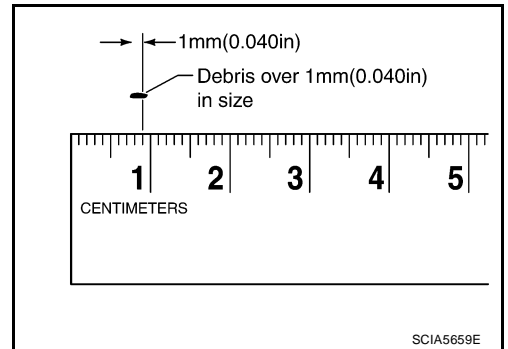
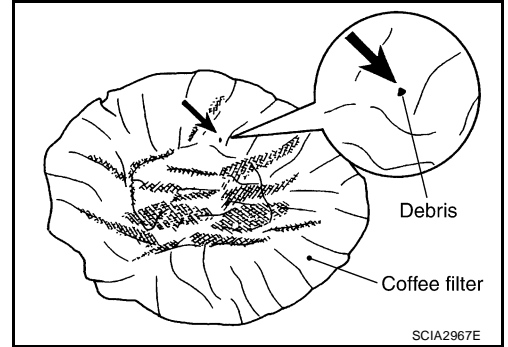
A/T FLUID

6. Insert the tip of an air gun into the end of the cooler outlet hose.
7. Wrap a shop rag around the air gun tip and end of cooler outlet hose.
8. Blow compressed air regulated to 5 - 9 kg/cm² (70 - 130 psi) through the cooler outlet hose to force any remaining A/T fluid into the coffee filter.
9. Remove the coffee filter from the end of the cooler inlet hose.
10. Perform [AT-19, "A/T FLUID COOLER INSPECTION PROCEDURE"](#) .



A/T FLUID COOLER INSPECTION PROCEDURE

1. Inspect the coffee filter for debris.
 - a. If small metal debris less than 1mm (0.040 in) in size or metal powder is found in the coffee filter, this is normal. If normal debris is found, the A/T fluid cooler/radiator can be re-used and the procedure is ended.
 - b. If one or more pieces of debris are found that are over 1mm (0.040 in) in size and/or peeled clutch facing material is found in the coffee filter, the A/T fluid cooler is not serviceable. The A/T fluid cooler/radiator must be replaced and the inspection procedure is ended. Refer to [CO-11, "RADIATOR"](#) .



A/T FLUID COOLER FINAL INSPECTION

After performing all procedures, ensure that all remaining oil is cleaned from all components.

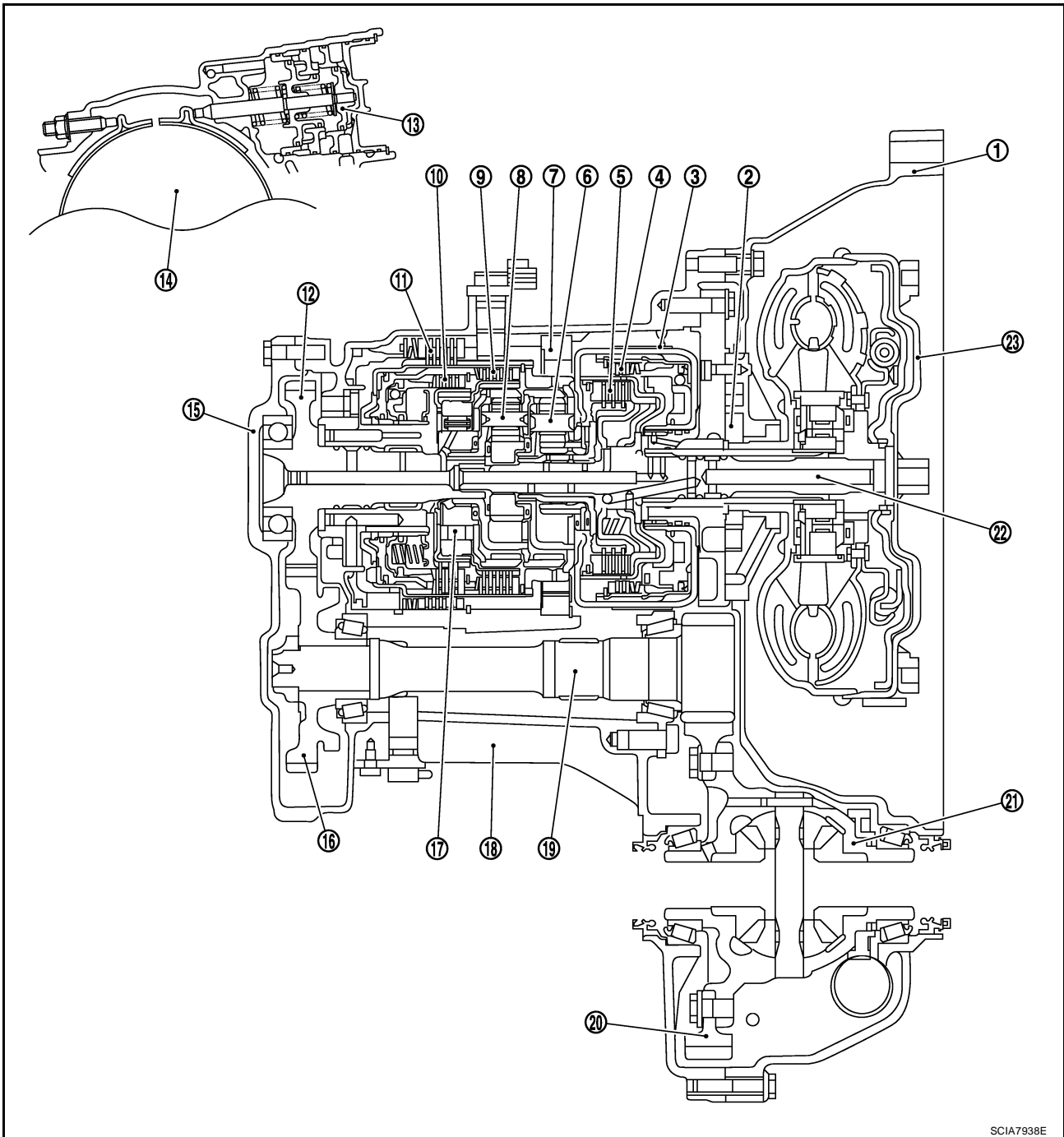
A/T CONTROL SYSTEM

A/T CONTROL SYSTEM

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Cross-Sectional View

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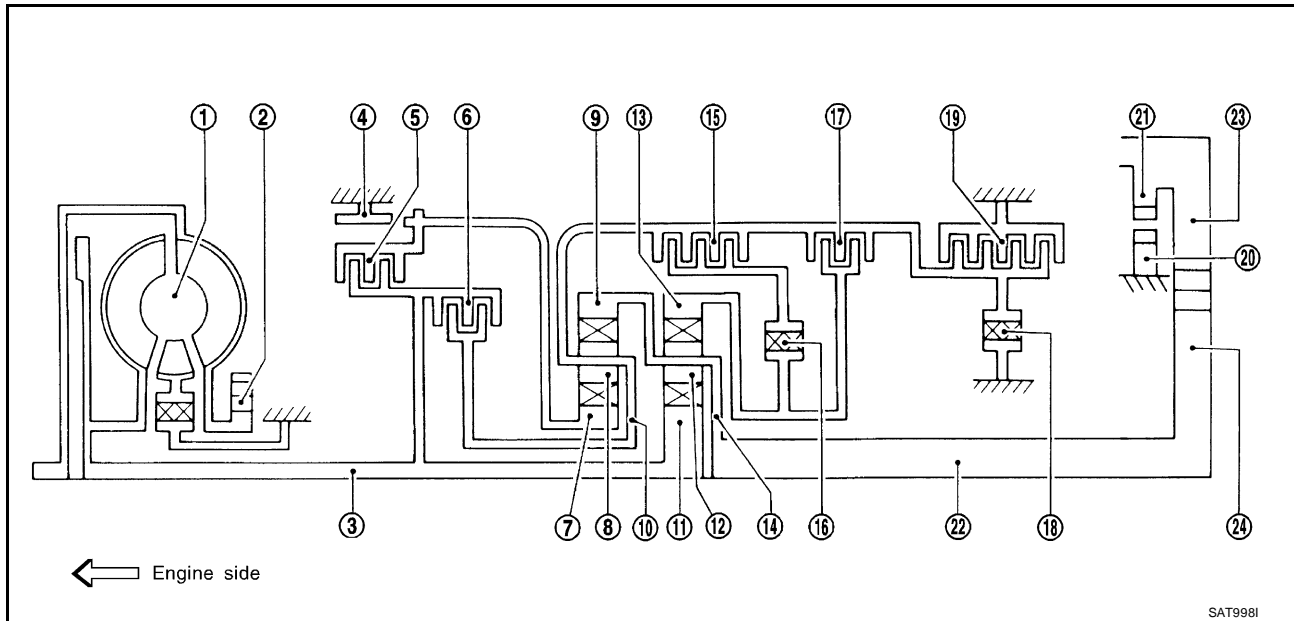
SCIA7938E

- | | | |
|---------------------------|----------------------------|-------------------------|
| 1. Converter housing | 2. Oil pump | 3. Brake band |
| 4. Reverse clutch | 5. High clutch | 6. Front planetary gear |
| 7. Low one-way clutch | 8. Rear planetary gear | 9. Forward clutch |
| 10. Overrun clutch | 11. Low & reverse brake | 12. Output gear |
| 13. Band servo piston | 14. Reverse clutch drum | 15. Side cover |
| 16. Idler gear | 17. Forward one-way clutch | 18. Transaxle case |
| 19. Reduction pinion gear | 20. Final gear | 21. Differential case |
| 22. Input shaft | 23. Torque converter | |

A/T CONTROL SYSTEM

UCS005MB

Shift Mechanism CONSTRUCTION



- | | | |
|-----------------------------|----------------------------|------------------------|
| 1. Torque converter | 2. Oil pump | 3. Input shaft |
| 4. Brake band | 5. Reverse clutch | 6. High clutch |
| 7. Front sun gear | 8. Front pinion gear | 9. Front internal gear |
| 10. Front planetary carrier | 11. Rear sun gear | 12. Rear pinion gear |
| 13. Rear internal gear | 14. Rear planetary carrier | 15. Forward clutch |
| 16. Forward one-way clutch | 17. Overrun clutch | 18. Low one-way clutch |
| 19. Low & reverse brake | 20. Parking pawl | 21. Parking gear |
| 22. Output shaft | 23. Idle gear | 24. Output gear |

FUNCTION OF CLUTCH AND BRAKE

Clutch and brake components	Abbr.	Function
5 Reverse clutch	R/C	To transmit input power to front sun gear 7 .
6 High clutch	H/C	To transmit input power to front planetary carrier 10 .
15 Forward clutch	F/C	To connect front planetary carrier 10 with forward one-way clutch 16 .
17 Overrun clutch	O/C	To connect front planetary carrier 10 with rear internal gear 13 .
4 Brake band	B/B	To lock front sun gear 7 .
16 Forward one-way clutch	F/O.C	When forward clutch 15 is engaged, to stop rear internal gear 13 from rotating in opposite direction against engine revolution.
18 Low one-way clutch	L/O.C	To stop front planetary carrier 10 from rotating in opposite direction against engine revolution.
19 Low & reverse brake	L & R/B	To lock front planetary carrier 10 .

A/T CONTROL SYSTEM

CLUTCH AND BAND CHART

Shift position	R/C 5	H/C 6	F/C 15	O/C 17	Band servo			F/O.C 16	L/O.C 18	L&R/B 19	Lock-up	Remarks
					2nd apply	3rd release	4th apply					
P												PARK POSITION
R	○									○		REVERSE POSITION
N												NEUTRAL POSITION
D*4	1st		○	*1D				B	B			Automatic shift 1 ⇔ 2 ⇔ 3 ⇔ 4
	2nd		○	*1A	○			B				
	3rd		○	○	*1A	*2C	C	B			*1○	
	4th		○	C		*3C	C	○			○	
2	1st		○	○				B	B			Automatic shift 1 ⇔ 2 ⇔ 3
	2nd		○	○	○			B				
	3rd		○	○	○	*2C	C	B				
1	1st		○	○				B	B	○		Locks (held stationary) in 1st speed 1 ⇔ 2 ⇔ 3
	2nd		○	○	○			B				
	3rd		○	○	○	*2C	C	B				

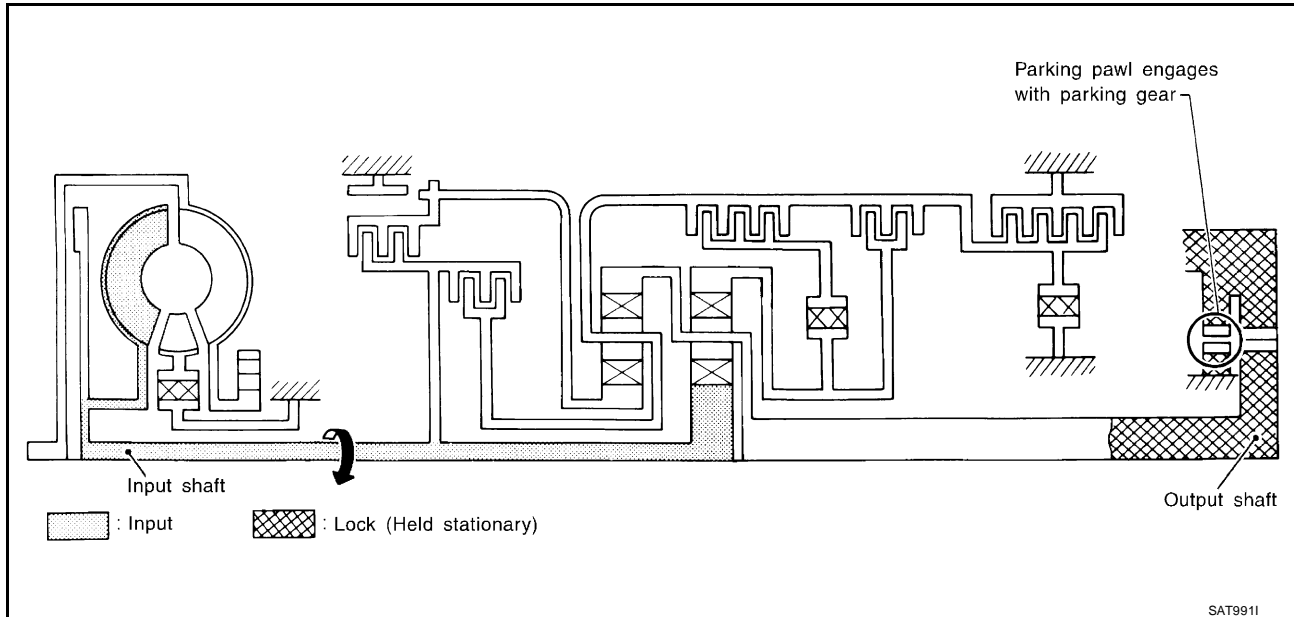
- *1: Operates when OD OFF. (OD OFF indicator lamp is on.)
 - *2: Oil pressure is applied to both 2nd “apply” side and 3rd “release” side of band servo piston. However, brake band does not contract because oil pressure area on the “release” side is greater than that on the “apply” side.
 - *3: Oil pressure is applied to 4th “apply” side on condition *2 above, and brake band contracts.
 - *4: A/T will not shift to 4th when OD OFF. (OD OFF indicator lamp is on.)
 - ○: Operates.
 - A: Operates when throttle opening is less than specification**, activating engine brake.
 - B: Operates during “progressive” acceleration.
 - C: Operates but does not affect power transmission.
 - D: Operates when throttle opening is less than specification**, but does not affect engine brake.
- **: Overrun clutch remains in engaged condition when throttle opening is less than 1/16.

A/T CONTROL SYSTEM

POWER TRANSMISSION

“N” and “P” Positions

- “N” position
Power from the input shaft is not transmitted to the output shaft because the clutches do not operate.
- “P” position
Similar to the “N” position, the clutches do not operate. The parking pawl engages with the parking gear to mechanically hold the output shaft so that the power train is locked.



A

B

AT

D

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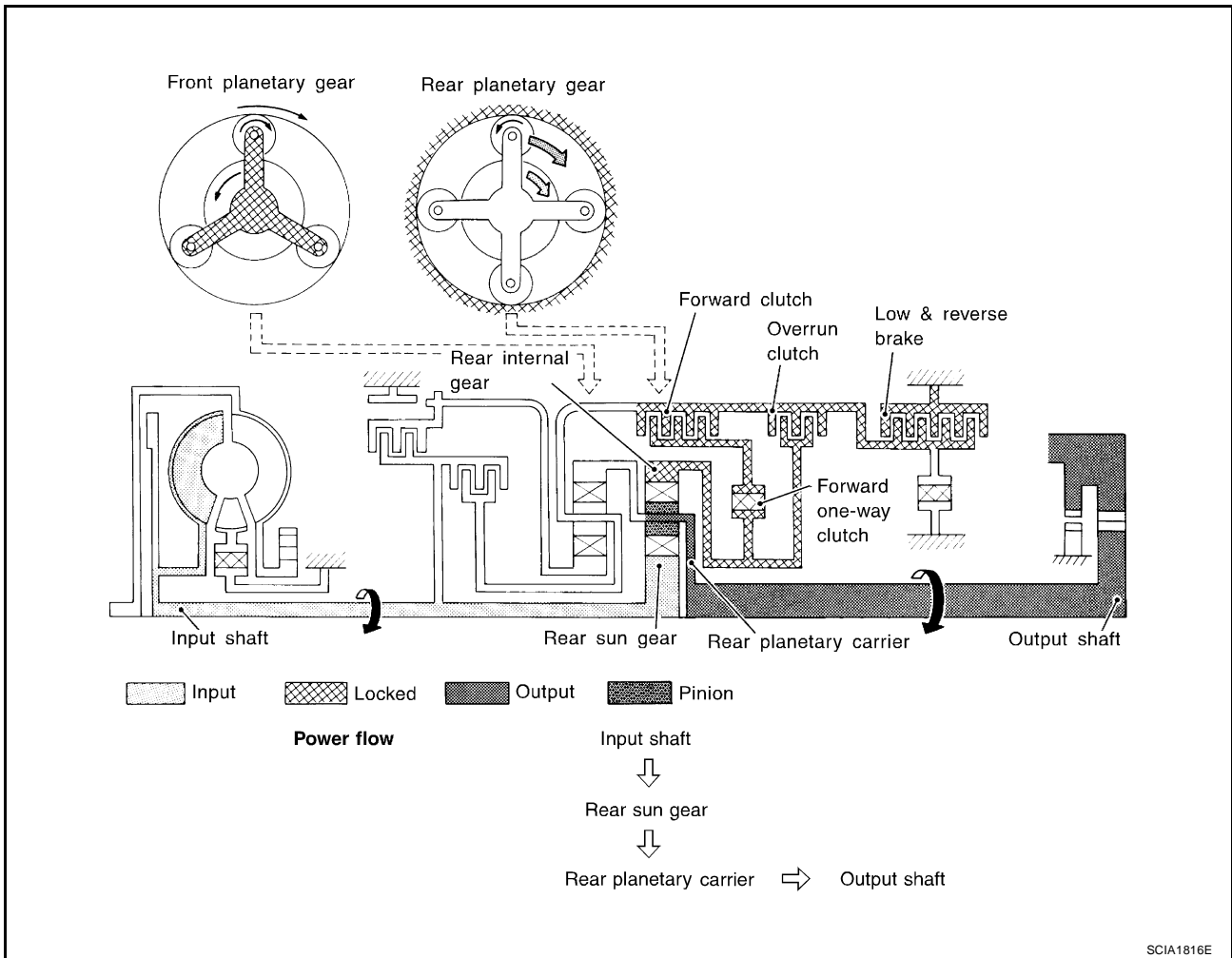
L

M

A/T CONTROL SYSTEM

"11" Position

<ul style="list-style-type: none"> ● Forward clutch ● Forward one-way clutch ● Overrun clutch ● Low & reverse brake 	<p>As overrun clutch engages, rear internal gear is locked by the operation of low and reverse brake. This is different from that of D1 and 21 .</p>
<p>Engine brake</p>	<p>Overrun clutch always engages, therefore engine brake can be obtained when decelerating.</p>

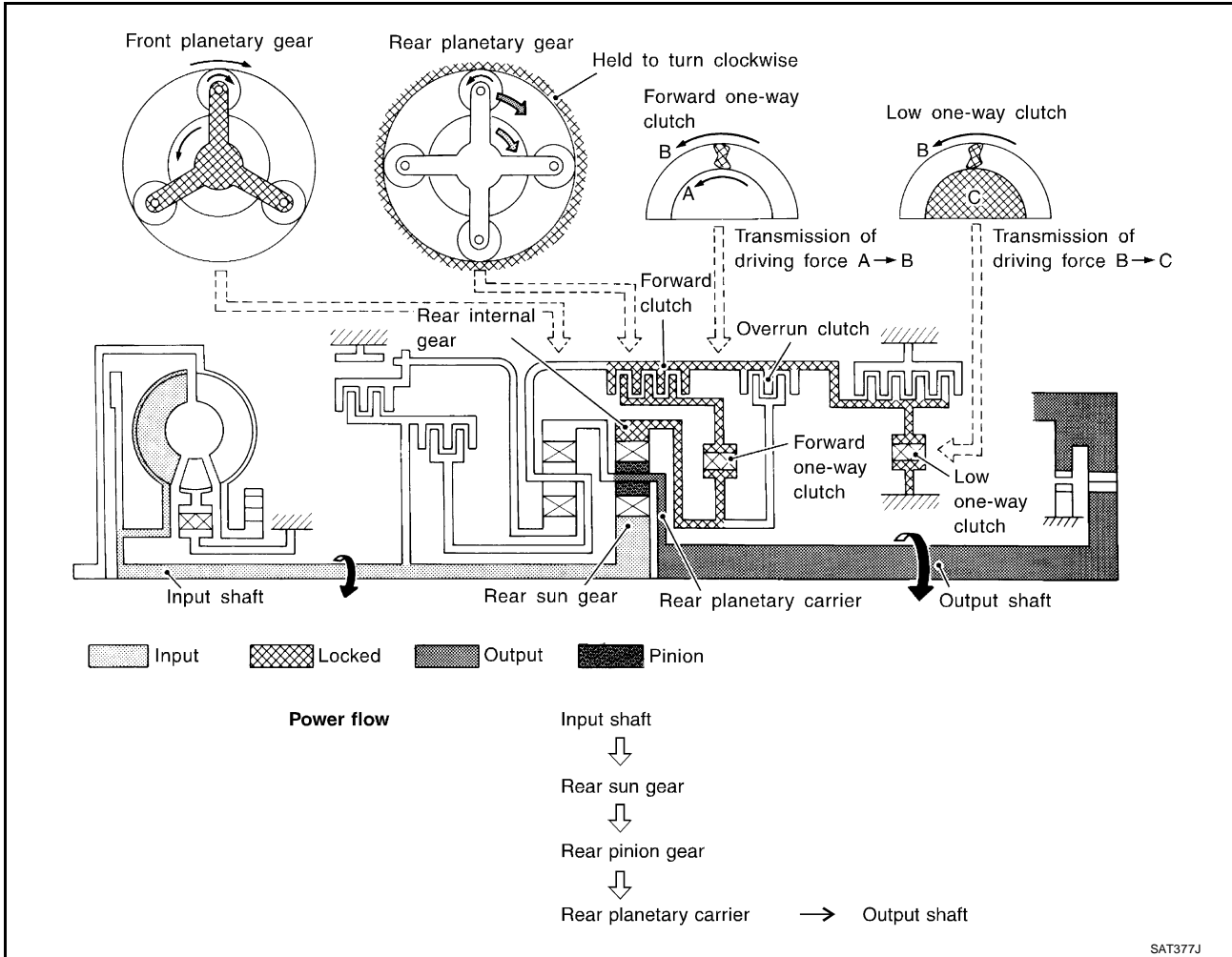


A/T CONTROL SYSTEM

"D1" and "21" Positions

<ul style="list-style-type: none"> ● Forward one-way clutch ● Forward clutch ● Low one-way clutch 	Rear internal gear is locked to rotate counterclockwise because of the functioning of these three clutches.
Overrun clutch engagement conditions (Engine brake)	D1 : OD OFF (OD OFF indicator lamp is on) and throttle opening is less than specification* 21 : Always engaged At D1 and 21 positions, engine brake is not activated due to free turning of low one-way clutch.

*: Overrun clutch remains in engaged condition when throttle opening is less than 1/16.

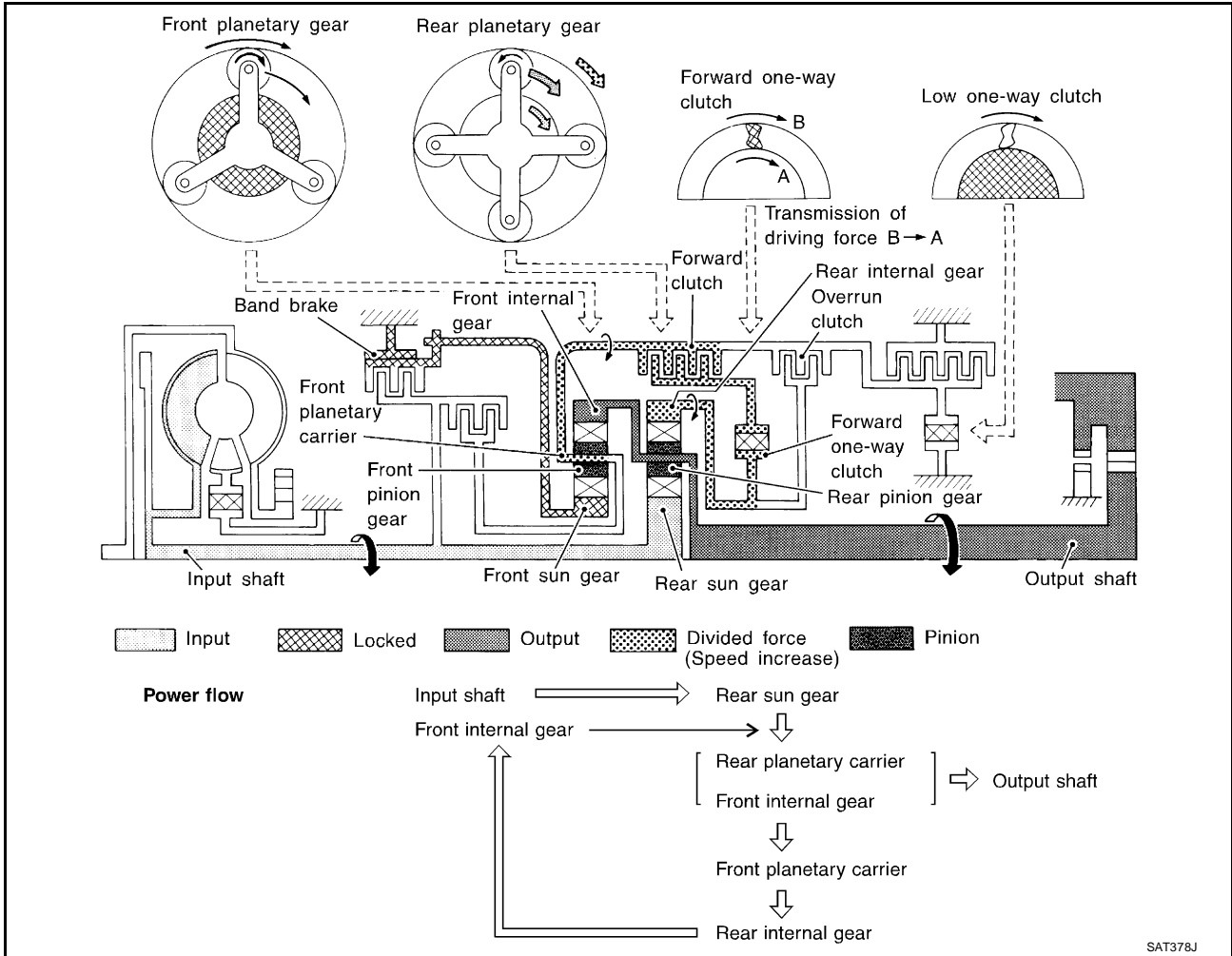


A/T CONTROL SYSTEM

“D2 ”, “22 ” and “12 ” Positions

<ul style="list-style-type: none"> ● Forward clutch ● Forward one-way clutch ● Brake band 	<p>Rear sun gear drives rear planetary carrier and combined front internal gear. Front internal gear now rotates around front sun gear accompanying front planetary carrier.</p> <p>As front planetary carrier transfers the power to rear internal gear through forward clutch and forward one-way clutch, this rotation of rear internal gear increases the speed of rear planetary carrier compared with that of the 1st speed.</p>
<p>Overrun clutch engagement conditions</p>	<p>D2 : OD OFF (OD OFF indicator lamp is on) and throttle opening is less than specification*</p> <p>22 and 12 : Always engaged</p>

*: Overrun clutch remains in engaged condition when throttle opening is less than 1/16.

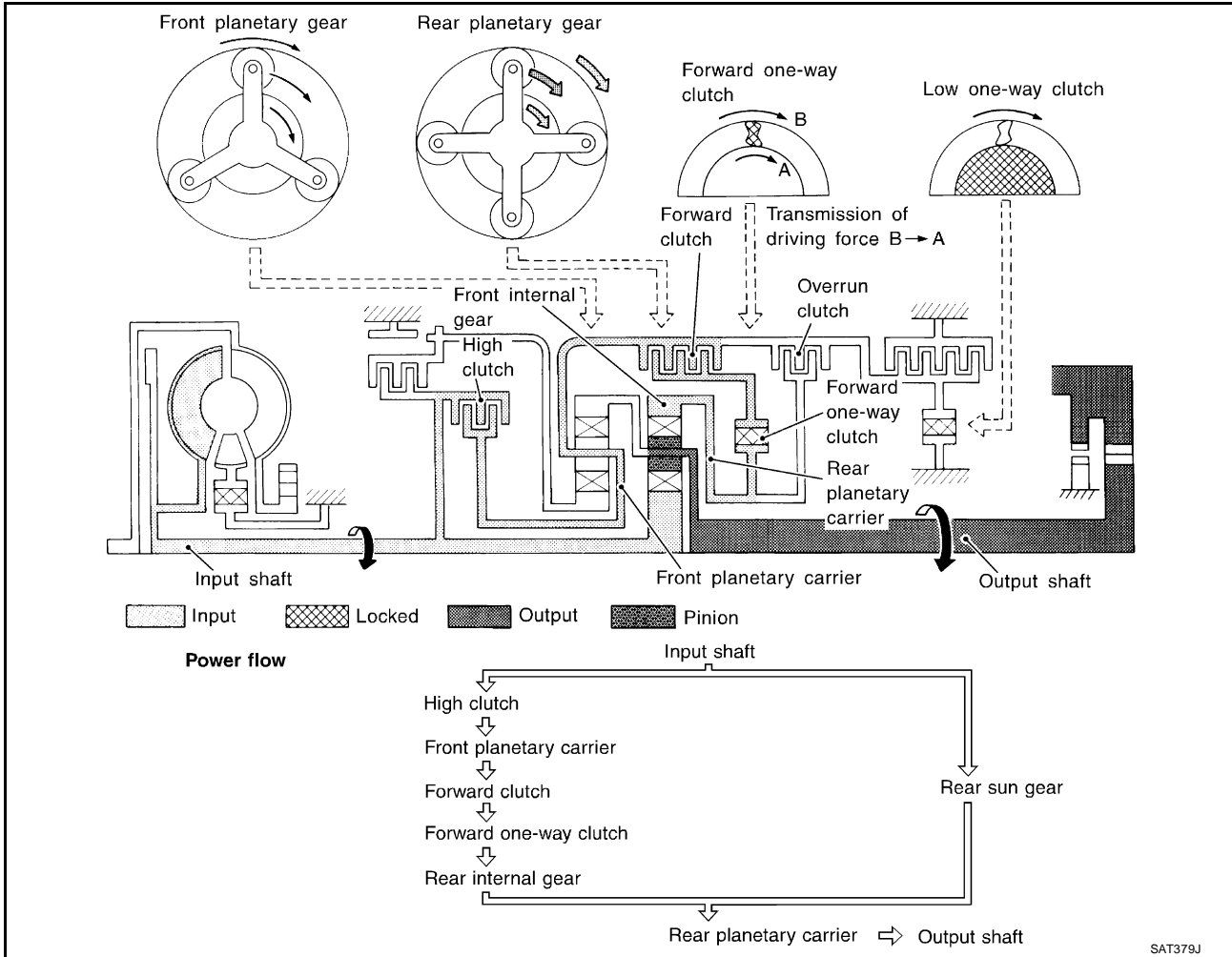


A/T CONTROL SYSTEM

"D3 ", "23 " and "13 " Positions

<ul style="list-style-type: none"> ● High clutch ● Forward clutch ● Forward one-way clutch 	<p>Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch.</p> <p>This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.</p>
<p>Overrun clutch engagement conditions</p>	<p>D3 : OD OFF (OD OFF indicator lamp is on) and throttle opening is less than specification*</p> <p>23 and 13 : Always engaged</p>

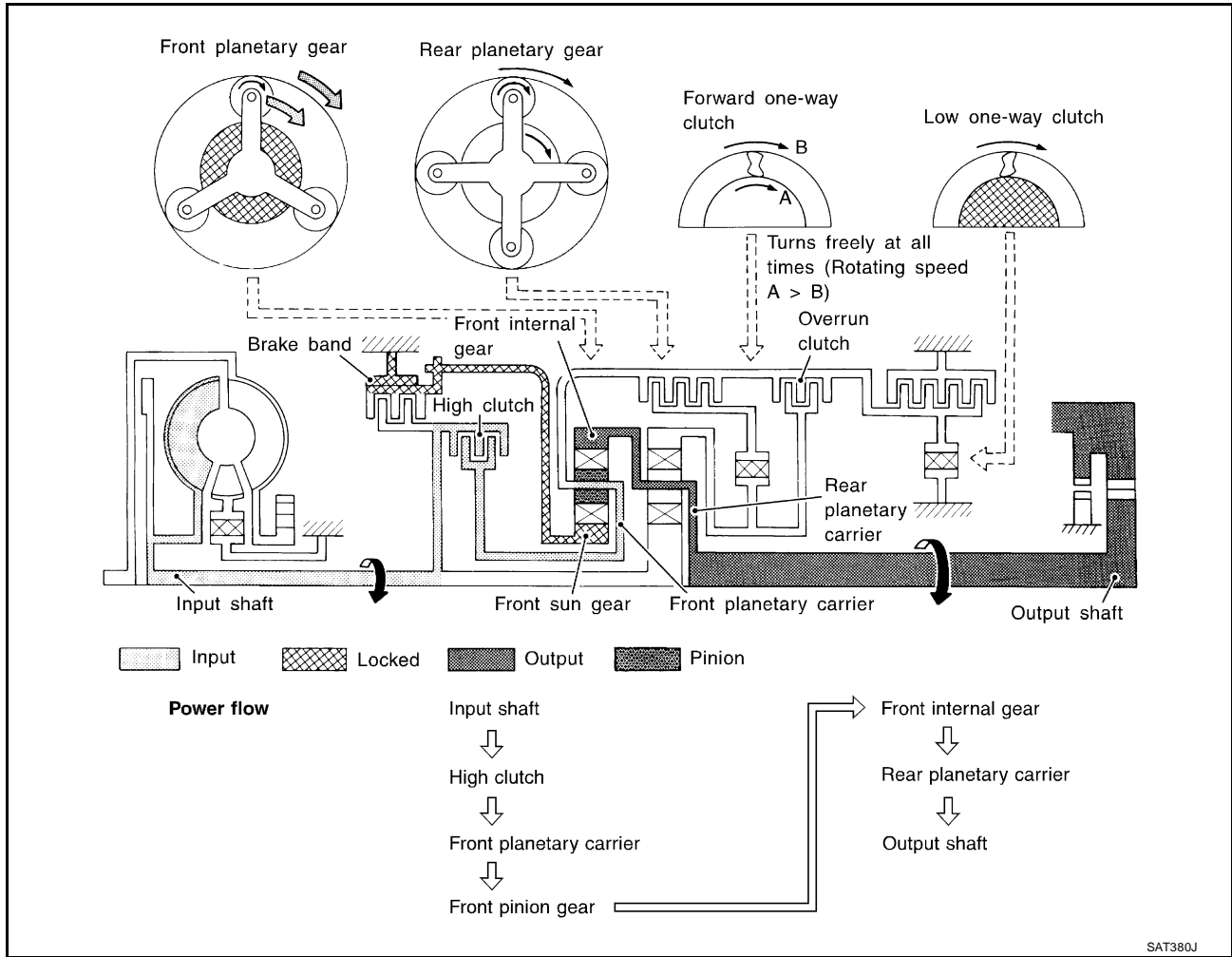
*: Overrun clutch remains in engaged condition when throttle opening is less than 1/16.



A/T CONTROL SYSTEM

"D4" (OD) Position

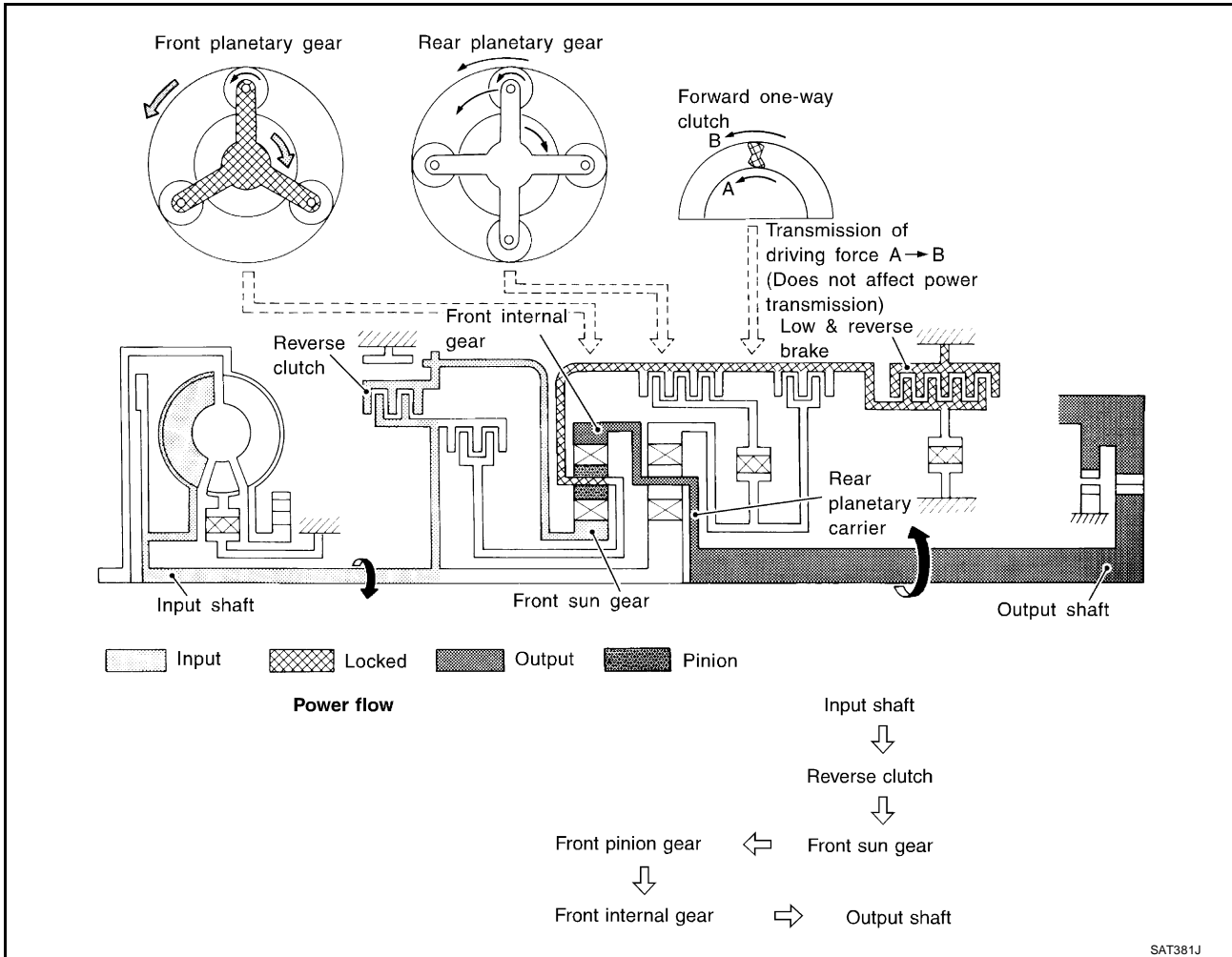
<ul style="list-style-type: none"> ● High clutch ● Brake band ● Forward clutch (Does not affect power transmission) 	<p>Input power is transmitted to front carrier through high clutch. This front carrier turns around the sun gear which is fixed by brake band and makes front internal gear (output) turn faster.</p>
<p>Engine brake</p>	<p>At D4 position, there is no one-way clutch in the power transaxle line and engine brake can be obtained when decelerating.</p>



A/T CONTROL SYSTEM

"R" Position

<ul style="list-style-type: none"> ● Reverse clutch ● Low & reverse brake 	<p>Front planetary carrier is stationary because of the operation of low and reverse brake. Input power is transmitted to front sun gear through reverse clutch, which drives front internal gear in the opposite direction.</p>
<p>Engine brake</p>	<p>As there is no one-way clutch in the power transaxle line, engine brake can be obtained when decelerating.</p>



A/T CONTROL SYSTEM

UCS005MC

TCM Function

The function of the TCM is to:

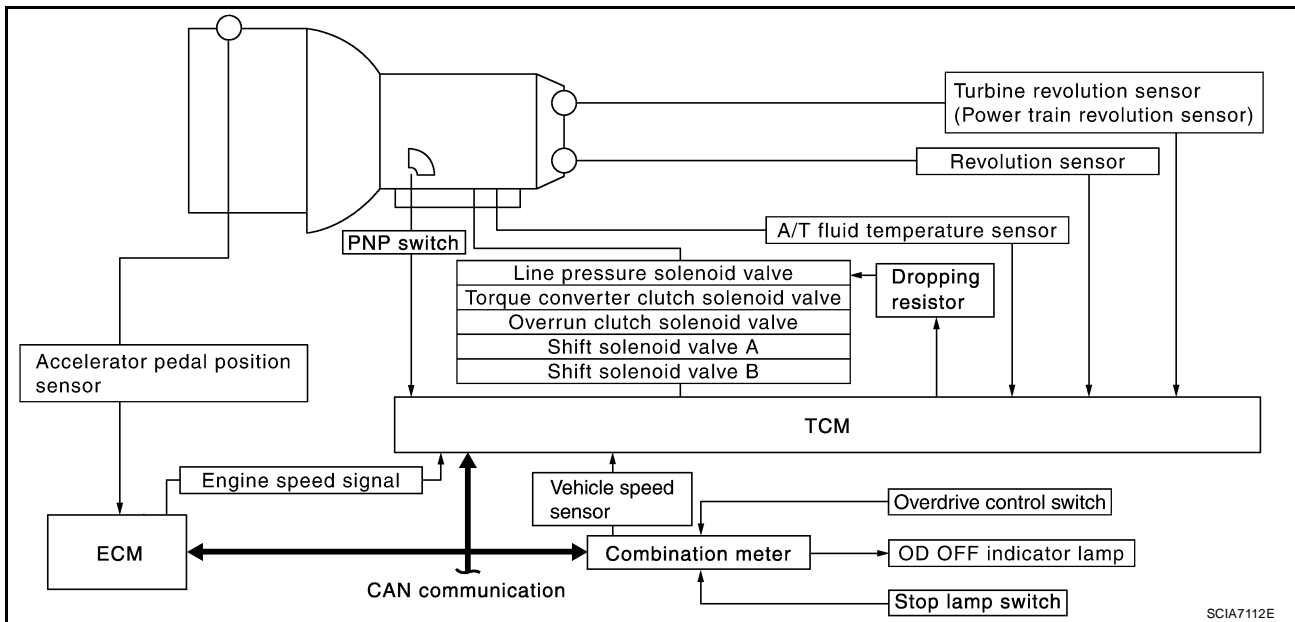
- Receive input signals sent from various switches and sensors.
- Determine required line pressure, shifting point, lock-up operation, and engine brake operation.
- Send required output signals to the respective solenoids.

CONTROL SYSTEM OUTLINE

The automatic transaxle senses vehicle operating conditions through various sensors or signals. It always controls the optimum shift position and reduces shifting and lock-up shocks.

SWITCHES & SENSORS		TCM		ACTUATORS
PNP switch Accelerator pedal position signal Closed throttle position signal Wide open throttle position signal Engine speed signal A/T fluid temperature sensor Revolution sensor Turbine revolution sensor (Power train revolution sensor) Vehicle speed sensor Overdrive control switch signal Stop lamp switch signal	⇒	Shift control Line pressure control Lock-up control Overrun clutch control Fail-safe control Self-diagnosis CONSULT-II communication line control	⇒	Shift solenoid valve A Shift solenoid valve B Overrun clutch solenoid valve Torque converter clutch solenoid valve Line pressure solenoid valve OD OFF indicator lamp

CONTROL SYSTEM DIAGRAM



SCIA7112E

A/T CONTROL SYSTEM

CAN Communication SYSTEM DESCRIPTION

UCS005MD

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. For details, refer to [LAN-47. "CAN System Specification Chart"](#) .

Input/Output Signal of TCM

UCS005ME

Control item		Line pressure control	Vehicle speed control	Shift control	Lock-up control	Engine brake control	Fail-safe function	Self-diagnostics function
Input	Accelerator pedal position signal ^(*5)	X	X	X	X	X	(*3) X	X
	Vehicle speed sensor-A/T (Revolution sensor)	X	X	X	X	X	(*3) X	X
	Vehicle speed sensor-MTR	(*1) X	(*1) X	(*1) X	(*1) X			X
	Closed throttle position signal ^(*5)	(*2) X	(*2) X		X	X		(*4) X
	Wide open throttle position signal ^(*5)	(*2) X	(*2) X					(*4) X
	Turbine revolution sensor (Power train revolution sensor)	X	X		X		X	X
	Engine speed signal		X		X		X	X
	PNP switch	X	X	X	X	X	(*3) X	(*4) X
	Stop lamp switch signal ^(*5)		X		X			(*4) X
	A/T fluid temperature sensors ^(*5)	X	X	X	X		X	X
	Overdrive control switch signal ^(*5)		X	X	X	X		(*4) X
	TCM power supply voltage signal	X			X		X	X
Output	Shift solenoid valve A/B		X				(*3) X	X
	Line pressure solenoid	X					(*3) X	X
	Torque converter clutch solenoid valve				X		(*3) X	X
	Overrun clutch solenoid valve		X			X	(*3) X	X
	OD OFF indicator lamp ^(*6)		X					X

*1: Spare for vehicle speed sensor-A/T (revolution sensor)

*2: Spare for accelerator pedal position signal

*3: If these input and output signals are different, the TCM triggers the fail-safe function.

*4: Used as a condition for starting self-diagnostics; if self-diagnosis are not started, it is judged that there is some kind of error.

*5: Input by CAN communications.

*6: Output by CAN communications.

A/T CONTROL SYSTEM

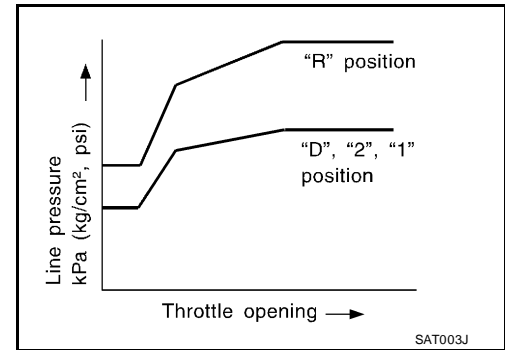
UCS005MF

Line Pressure Control

- TCM has various line pressure control characteristics to match the driving conditions.
- An ON-OFF duty signal is sent to the line pressure solenoid valve based on TCM characteristics.
- Hydraulic pressure on the clutch and brake is electronically controlled through the line pressure solenoid valve to accommodate engine torque. This results in smooth shift operation.

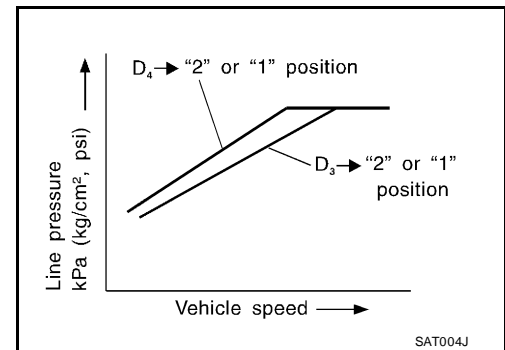
NORMAL CONTROL

The characteristic of the line pressure to the throttle opening is set for suitable clutch operation.



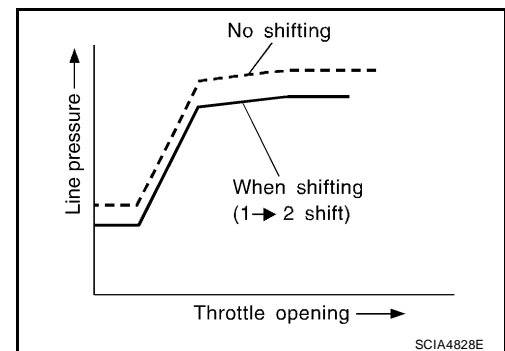
BACK-UP CONTROL (ENGINE BRAKE)

If the selector lever is shifted to "2" position while driving in D4 or D3, great driving force is applied to the clutch inside the transaxle. Clutch operating pressure (line pressure) must be increased to deal with this driving force.



DURING SHIFT CHANGE

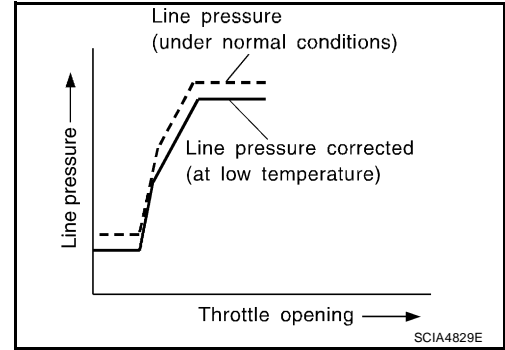
The line pressure is temporarily reduced corresponding to a change in engine torque when shifting gears (that is, when the shift solenoid valve is switched for clutch operation) to reduce shifting shock.



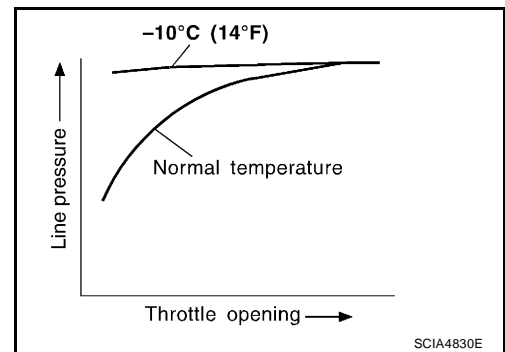
A/T CONTROL SYSTEM

AT LOW FLUID TEMPERATURE

- A/T fluid viscosity and frictional characteristics of the clutch facing change with A/T fluid temperature. Clutch engaging or band-contacting pressure is compensated for, according to A/T fluid temperature, to stabilize shifting quality.
- The line pressure is reduced below 60°C (140°F) to prevent shifting shock due to high viscosity of A/T fluid when temperature is low.



- Line pressure is increased to a maximum irrespective of the throttle opening when A/T fluid temperature drops to -10°C (14°F). This pressure rise is adopted to prevent a delay in clutch and brake operation due to extreme drop of A/T fluid viscosity at low temperature.



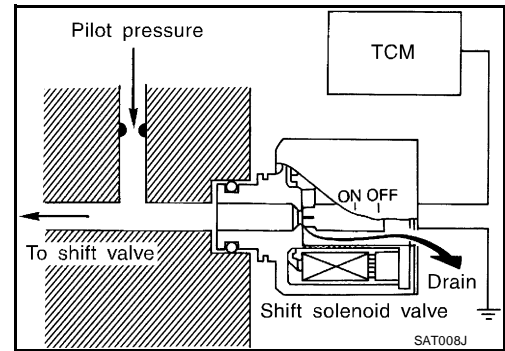
Shift Control

The shift is regulated entirely by electronic control to accommodate vehicle speed and varying engine operations. This is accomplished by electrical signals transmitted by the revolution sensor and the ECM (accelerator pedal position sensor). This results in improved acceleration performance and fuel economy.

CONTROL OF SHIFT SOLENOID VALVES A AND B

The TCM activates shift solenoid valves A and B according to signals from the accelerator pedal position sensor and revolution sensor to select the optimum gear position on the basis of the shift schedule memorized in the TCM.

The shift solenoid valve performs simple ON-OFF operation. When set to "ON", the drain circuit closes and pilot pressure is applied to the shift valve.

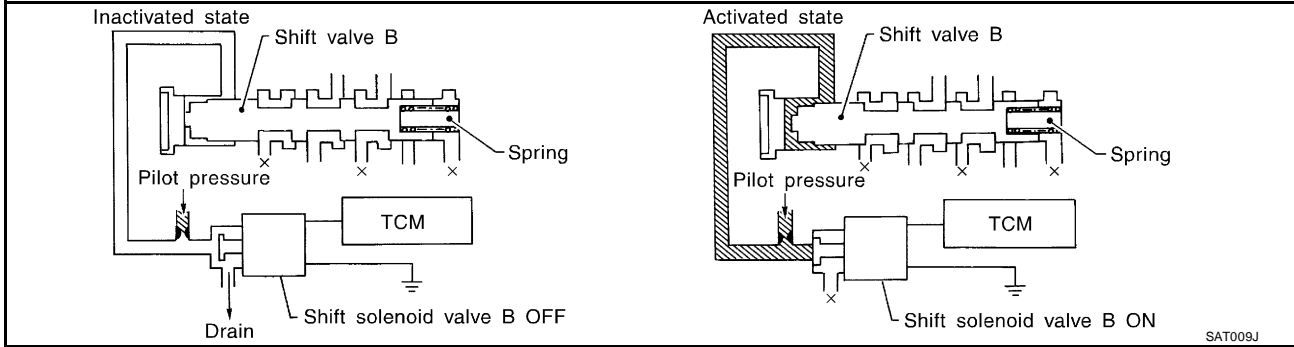


RELATION BETWEEN SHIFT SOLENOID VALVES A AND B AND GEAR POSITIONS

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

A/T CONTROL SYSTEM

CONTROL OF SHIFT VALVES A AND B



Pilot pressure generated by the operation of shift solenoid valves A and B is applied to the end face of shift valves A and B.

The figure above shows the operation of shift valve B. When the shift solenoid valve is "ON", pilot pressure applied to the end face of the shift valve overcomes spring force, moving the valve upward.

Lock-up Control

UCS005MH

The torque converter clutch piston in the torque converter is locked to eliminate torque converter slip and to increase power transmission efficiency. The solenoid valve is controlled by an ON-OFF duty signal sent from the TCM. The signal is converted to an oil pressure signal which controls the torque converter clutch piston.

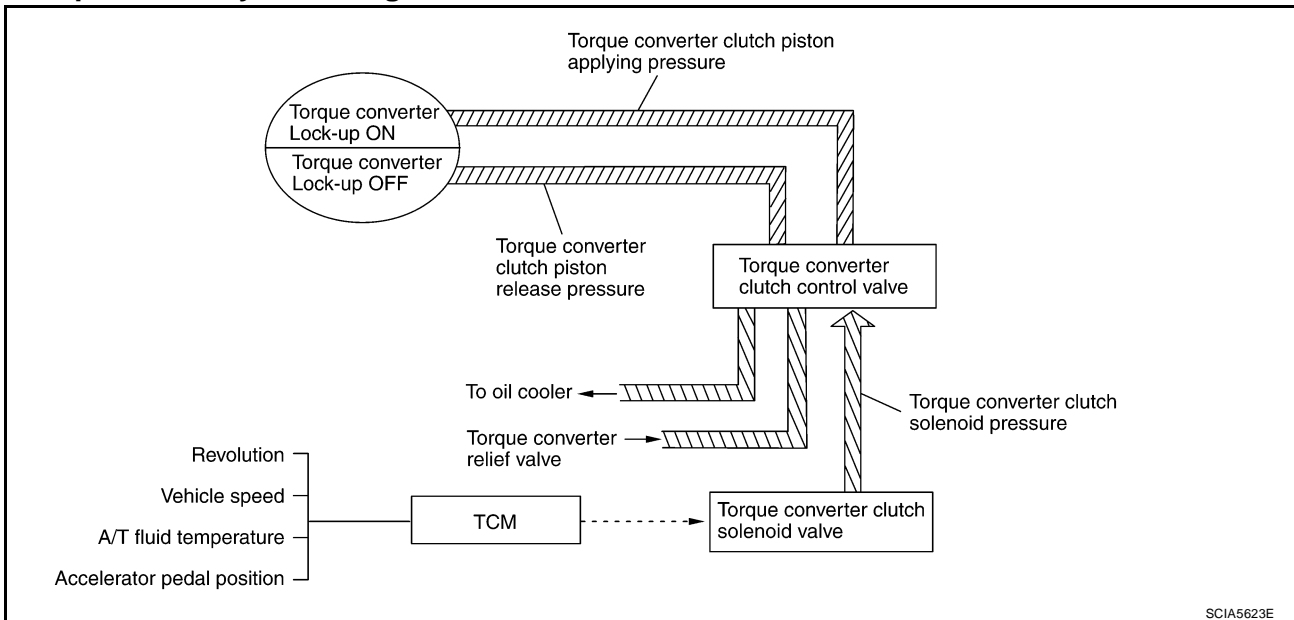
CONDITIONS FOR LOCK-UP OPERATION

When vehicle is driven in 3rd and 4th gear positions, vehicle speed and throttle opening are detected. If the detected values fall within the lock-up zone memorized in the TCM, lock-up is performed.

OD	ON	OFF
Selector lever	"D" position	
Gear position	D4	D3
Vehicle speed sensor	More than set value	
Accelerator pedal position signal	Less than set opening	
Closed throttle position signal	OFF	
A/T fluid temperature sensor	More than 40°C (104°F)	

TORQUE CONVERTER CLUTCH SOLENOID VALVE CONTROL

Lock-up Control System Diagram



A/T CONTROL SYSTEM

Lock-up Released

In the lock-up released state, the torque converter clutch control valve is set into the unlocked state by draining the torque converter clutch piston applying pressure and the torque converter clutch piston release pressure is generated.

In this way, the torque converter clutch piston is not coupled.

Lock-up Applied

In the lock-up applied state, the torque converter clutch control valve is set into the locked state by generating the torque converter clutch piston applying pressure and the torque converter clutch piston release pressure is drained.

In this way, the torque converter clutch piston is pressed and coupled.

SMOOTH LOCK-UP CONTROL

When shifting from the lock-up released state to the lock-up applied state, the current output to the torque converter clutch solenoid is controlled with the TCM. In this way, when shifting to the lock-up applied state, the torque converter clutch is temporarily set to the half-clutched state to reduce the shock.

Half-clutched State

The current output from the TCM to the torque converter clutch solenoid is varied to steadily increase the torque converter clutch solenoid pressure.

In this way, the lock-up applying pressure gradually rises and while the torque converter clutch piston is put into half-clutched status, the torque converter clutch piston applying pressure is increased and the coupling is completed smoothly.

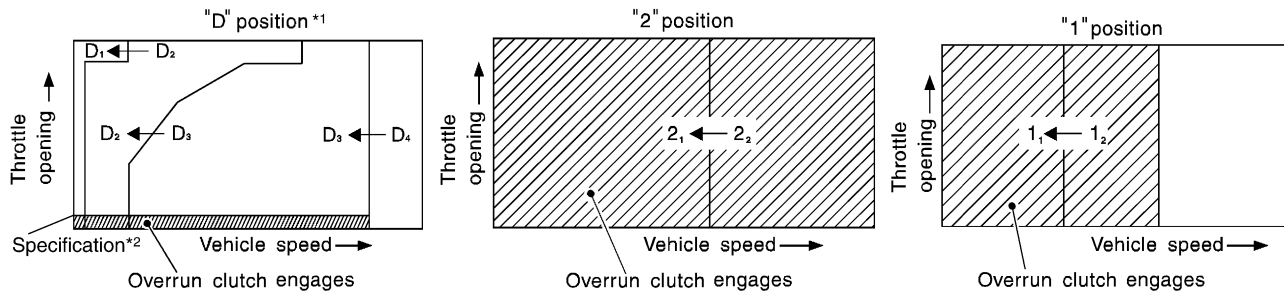
Engine Brake Control (Overrun Clutch Control)

UCS005MI

Forward one-way clutch is used to reduce shifting shocks in downshifting operations. This clutch transmits engine torque to the wheels. However, drive force from the wheels is not transmitted to the engine because the one-way clutch rotates idle. This means the engine brake is not effective.

The overrun clutch operates when the engine brake is needed.

OVERRUN CLUTCH OPERATING CONDITIONS



Selector lever position	Gear position	Throttle opening
"D" position *1	D ₁ , D ₂ , D ₃ gear position	Less than specification *2
"2" position	2 ₁ , 2 ₂ gear position	At any position
"1" position	1 ₁ , 1 ₂ gear position	

*1 : When OD OFF (OD OFF indicator lamp is on.)

*2 : Overrun clutch remains in engaged condition when throttle opening is less than 1/16.

SCIA7186E

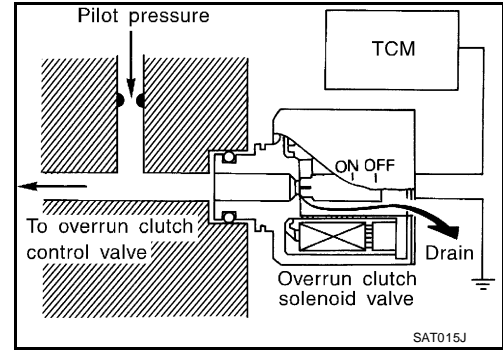
A/T CONTROL SYSTEM

OVERRUN CLUTCH SOLENOID VALVE CONTROL

The overrun clutch solenoid valve is operated by an ON-OFF signal transmitted by the TCM to provide overrun clutch control (engine brake control).

When this solenoid valve is "ON", the pilot pressure drain port closes. When it is "OFF", the drain port opens.

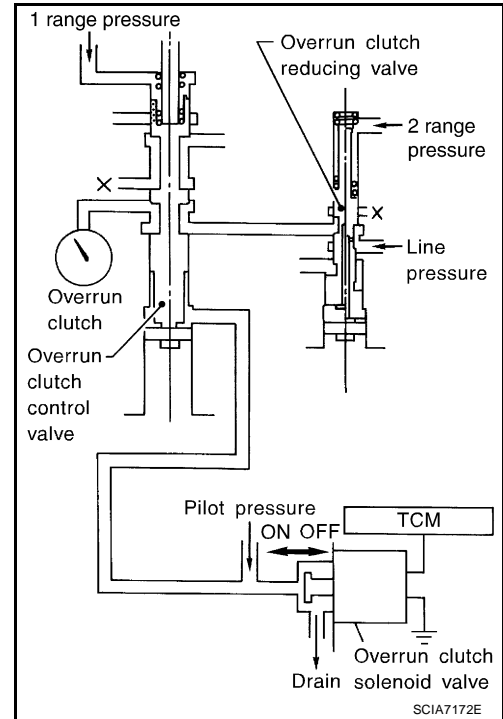
During the solenoid valve "ON" pilot pressure is applied to the end face of the overrun clutch control valve.



OVERRUN CLUTCH CONTROL VALVE OPERATION

When the solenoid valve is "ON", pilot pressure is applied to the overrun clutch control valve. This pushes up the overrun clutch control valve. The line pressure is then shut off so that the clutch does not engage. Only in "1" position, however, 1 range pressure is applied to overrun clutch control valve, resulting in valve moving downward and clutch engaged.

When the solenoid valve is "OFF", pilot pressure is not generated. At this point, the overrun clutch control valve moves downward by spring force. As a result, overrun clutch operation pressure is provided by the overrun clutch reducing valve. At overrun clutch reducing valve in "D" position, the hydraulic pressure is reduced to a level that balances the spring force. This is sent to overrun clutch control valve and becomes the operating pressure of overrun clutch which is engaged at all times. In "2" position and "1" position, overrun clutch reducing valve is pushed down by 2 range pressure. Line pressure is directly sent to overrun clutch control valve and becomes the operating pressure of overrun clutch which is engaged at all times.



A/T CONTROL SYSTEM

Control Valve FUNCTION OF CONTROL VALVES

UCS005MJ

Valve name	Function
Pressure regulator valve, plug and sleeve plug	Regulates oil discharged from the oil pump to provide optimum line pressure for all driving conditions.
Pressure modifier valve and sleeve	Used as a signal supplementary valve to the pressure regulator valve. Regulates pressure-modifier pressure (signal pressure) which controls optimum line pressure for all driving conditions.
Pilot valve	Regulates line pressure to maintain a constant pilot pressure level which controls lock-up mechanism, overrun clutch, shift timing.
Accumulator control valve	Regulates accumulator back-pressure to pressure suited to driving conditions.
Manual valve	Directs line pressure to oil circuits corresponding to select positions. Hydraulic pressure drains when the shift lever is in Neutral.
Shift valve A	Simultaneously switches three oil circuits using output pressure of shift solenoid valve A to meet driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and upshifting (1st → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve B.
Shift valve B	Simultaneously switches two oil circuits using output pressure of shift solenoid valve B in relation to driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and upshifting (1st → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve A.
Overrun clutch control valve	Switches hydraulic circuits to prevent engagement of the overrun clutch simultaneously with application of the brake band in D4 . (Interlocking occurs if the overrun clutch engages during D4 .)
1st reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when downshifting from the 1st position 12 to 11 .
Overrun clutch reducing valve	Reduces oil pressure directed to the overrun clutch and prevents engine-brake shock. In the 1st and 2nd positions, line pressure acts on the overrun clutch reducing valve to increase the pressure-regulating point, with resultant engine brake capability.
Torque converter relief valve	Prevents an excessive rise in torque converter pressure.
Torque converter clutch control valve, plug and sleeve	Activates or inactivates the lock-up function. Also provides smooth lock-up through transient application and release of the lock-up system.
1-2 accumulator valve and piston	Lessens the shock find when the 2nd gear band servo contracts, and provides smooth shifting.
3-2 timing valve	Switches the pace that oil pressure is released depending on vehicle speed; maximizes the high clutch release timing, and allows for soft downshifting.
Shuttle valve	Determines if the overrun clutch solenoid valve should control the 3-2 timing valve or the overrun clutch control valve and switches between the two.
Cooler check valve	At low speeds and with a small load when a little heat is generated, saves the volume of cooler flow, and stores the oil pressure for lock-up.

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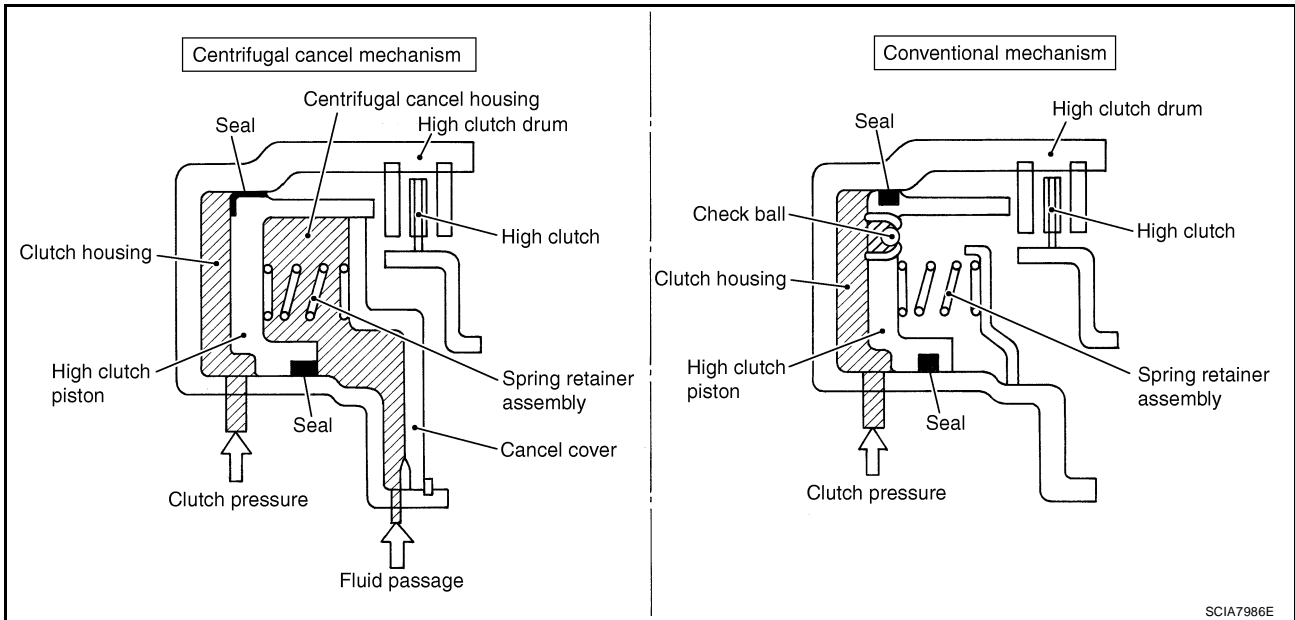
Centrifugal Cancel Mechanism

FUNCTION

The centrifugal cancel mechanism is a mechanism to cancel the centrifugal hydraulic pressure instead of the conventional check balls. It cancels the centrifugal hydraulic pressure which is generated as high clutch drum rotates, and it allows for preventing high clutch from dragging and for providing stable high clutch piston pressing force in all revolution speeds.

STRUCTURE/OPERATION

A centrifugal cancel housing is provided to cancel the clutch housing pressure. The centrifugal cancel housing is always filled with ATF from the dedicated fluid passage of oil pump.

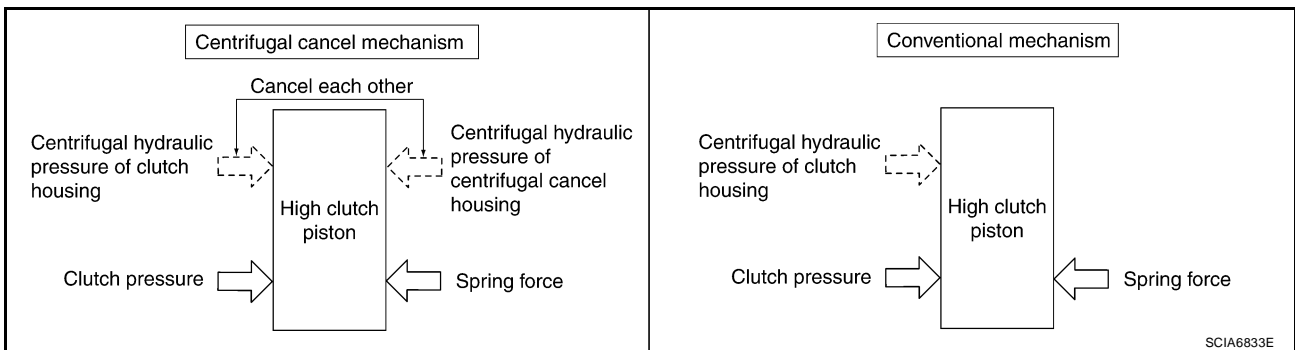


When Clutch Pressure Is Not Applied

As high clutch drum rotates, a centrifugal force applies to the remaining ATF in clutch housing to push high clutch piston. However, on the other hand, the centrifugal force also applies to ATF filled in centrifugal cancel housing, resulting in a force that pushes high clutch piston back. Consequently the high clutch piston does not move because both forces cancel each other, and thus high clutch is prevented from dragging.

When Clutch Pressure Is Applied

Clutch pressure that applies to clutch housing overcomes the fluid pressure and spring force of the opposing centrifugal housing to push high clutch piston, and high clutch is engaged. At this time, the centrifugal force caused by the revolution speed of high clutch drum has no impact any more since the centrifugal force that applies to the clutch pressure of clutch housing is canceled by the centrifugal force that applies to centrifugal cancel housing. As a result, high clutch piston pressing force is always stable in all revolution speeds, and thus smooth shifting characteristics are achieved.



ON BOARD DIAGNOSTIC (OBD) SYSTEM

PF0:00028

Introduction

UCS005N3

A/T system has two self-diagnostic systems.

The first is emission-related on board diagnostic system (OBD-II) performed by the TCM in combination with the ECM. The malfunction is indicated by the MIL (malfunction indicator lamp) and is stored as a DTC in the ECM memory but not the TCM memory.

The second is the TCM original self-diagnosis indicated by the OD OFF indicator lamp. The malfunction is stored in the TCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For detail, refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#).

OBD-II Function for A/T System

UCS005N4

The ECM provides emission-related on board diagnostic (OBD-II) functions for the A/T system. One function is to receive a signal from the TCM used with OBD-related parts of the A/T system. The signal is sent to the ECM when a malfunction occurs in the corresponding OBD-related part. The other function is to indicate a diagnostic result by means of the MIL (malfunction indicator lamp) on the instrument panel. Sensors, switches and solenoid valves are used as sensing elements.

The MIL automatically illuminates in One or Two Trip Detection Logic when a malfunction is sensed in relation to A/T system parts.

One or Two Trip Detection Logic of OBD-II

UCS005N5

ONE TRIP DETECTION LOGIC

If a malfunction is sensed during the first test drive, the MIL will illuminate and the malfunction will be stored in the ECM memory as a DTC. The TCM is not provided with such a memory function.

TWO TRIP DETECTION LOGIC

When a malfunction is sensed during the first test drive, it is stored in the ECM memory as a 1st trip DTC (diagnostic trouble code) or 1st trip freeze frame data. At this point, the MIL will not illuminate. — 1st trip

If the same malfunction as that experienced during the first test drive is sensed during the second test drive, the MIL will illuminate. — 2nd trip

The “trip” in the “One or Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation.

OBD-II Diagnostic Trouble Code (DTC)

UCS005N6

HOW TO READ DTC AND 1ST TRIP DTC

DTC and 1st trip DTC can be read by the following methods.

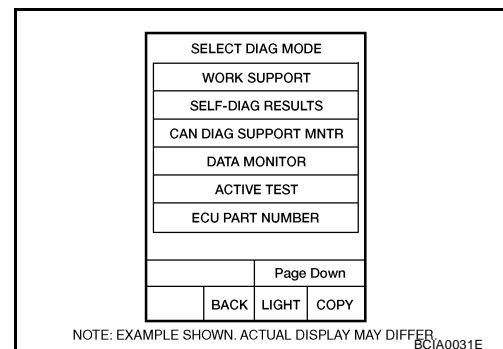
( with **CONSULT-II** or ( **GST**) CONSULT-II or GST (Generic Scan Tool) Examples: P0705, P0720 etc.

These DTC are prescribed by SAE J2012.

(CONSULT-II also displays the malfunctioning component or system.)

- **1st trip DTC No. is the same as DTC No.**
- **Output of the diagnostic trouble code indicates that the indicated circuit has a malfunction. However, in case of the Mode II and GST, they do not indicate whether the malfunction is still occurring or occurred in the past and returned to normal.**
CONSULT-II can identify them as shown below, therefore, CONSULT-II (if available) is recommended.

A sample of CONSULT-II display for DTC and 1st trip DTC is shown on the next page. DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode for “ENGINE” with CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.



ON BOARD DIAGNOSTIC (OBD) SYSTEM

If the DTC is being detected currently, the time data will be "0".

SELF-DIAG RESULTS	
DTC RESULTS	TIME
PNP SW/CIRC [P0705]	0

SAT015K

If a 1st trip DTC is stored in the ECM, the time data will be "1t".

SELF-DIAG RESULTS	
DTC RESULTS	TIME
PNP SW/CIRC [P0705]	1 t

SAT016K

Freeze Frame Data and 1st Trip Freeze Frame Data

The ECM has a memory function, which stores the driving condition such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed and vehicle speed at the moment the ECM detects a malfunction.

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data, and the data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For detail, refer to [EC-113, "CONSULT-II Function \(ENGINE\)"](#).

Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0306 Fuel Injection System Function — DTC: P0171, P0172, P0174, P0175
2		Except the above items (Includes A/T related items)
3	1st trip freeze frame data	

Both 1st trip freeze frame data and freeze frame data (along with the DTC) are cleared when the ECM memory is erased.

HOW TO ERASE DTC

The diagnostic trouble code can be erased by CONSULT-II, GST or ECM DIAGNOSTIC TEST MODE as described following.

- If the battery cable is disconnected, the diagnostic trouble code will be cleared within 24 hours.
- When you erase the DTC, using CONSULT-II or GST is easier and quicker than switching the mode selector on the ECM.

The following emission-related diagnostic information is cleared from the ECM memory when erasing DTC related to OBD-II. For details, refer to [EC-48, "Emission-related Diagnostic Information"](#).

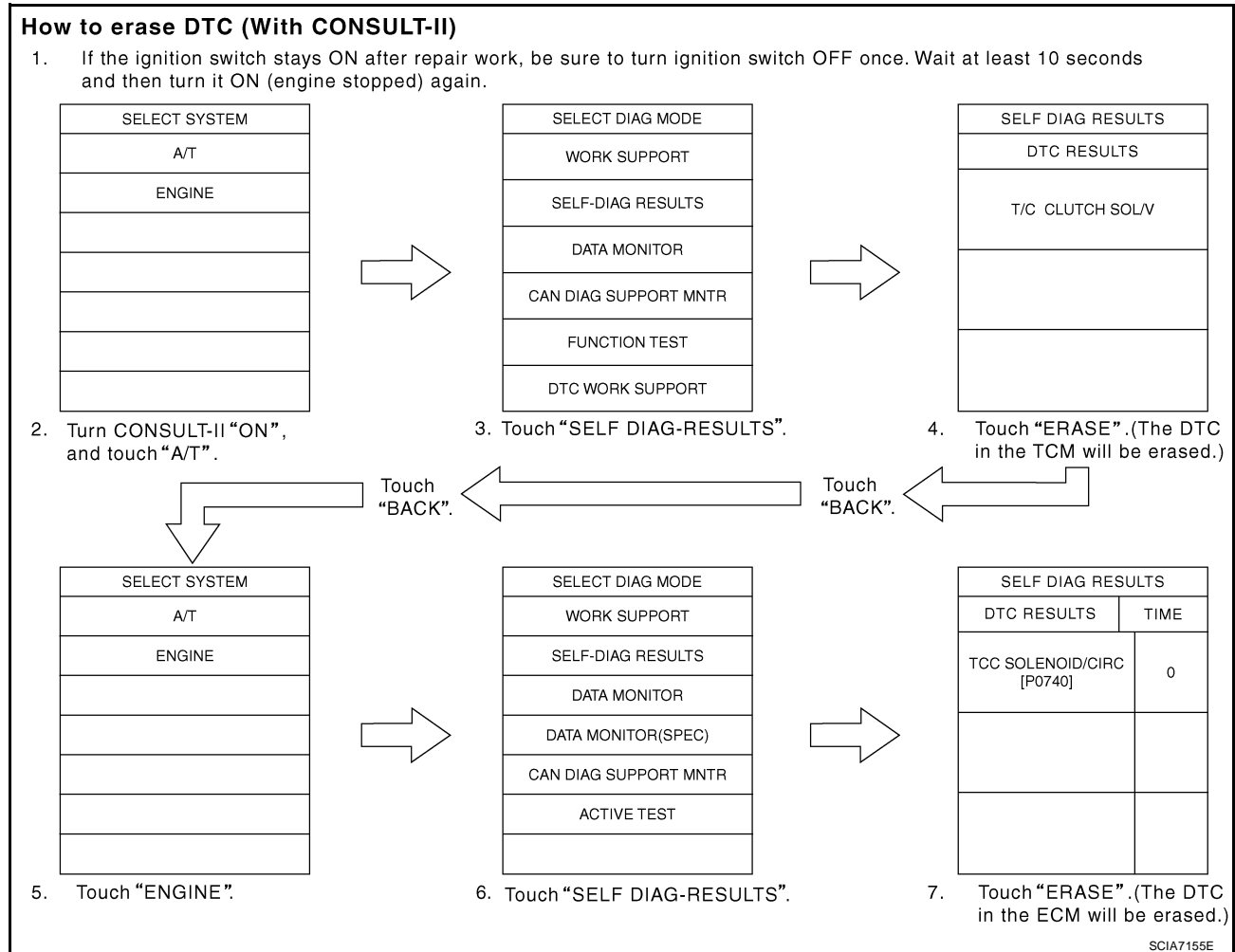
- Diagnostic trouble codes (DTC)
- 1st trip diagnostic trouble codes (1st trip DTC)
- Freeze frame data

ON BOARD DIAGNOSTIC (OBD) SYSTEM

- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

HOW TO ERASE DTC (WITH CONSULT-II)

- If a DTC is displayed for both ECM and TCM, it is necessary to be erased for both ECM and TCM.
1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
 2. Turn CONSULT-II "ON" and touch "A/T".
 3. Touch "SELF-DIAG RESULTS".
 4. Touch "ERASE". (The DTC in the TCM will be erased.) Then touch "BACK" twice.
 5. Touch "ENGINE".
 6. Touch "SELF-DIAG RESULTS".
 7. Touch "ERASE". (The DTC in the ECM will be erased.)



HOW TO ERASE DTC (WITH GST)

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Perform "TCM SELF-DIAGNOSTIC PROCEDURE (No Tools)". Refer to [AT-86, "Diagnostic Procedure Without CONSULT-II"](#). (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Select Mode 4 with Generic Scan Tool (GST). For details, refer to [EC-126, "Generic Scan Tool \(GST\) Function"](#).

ON BOARD DIAGNOSTIC (OBD) SYSTEM

HOW TO ERASE DTC (NO TOOLS)

The OD OFF indicator lamp is located on the combination meter.

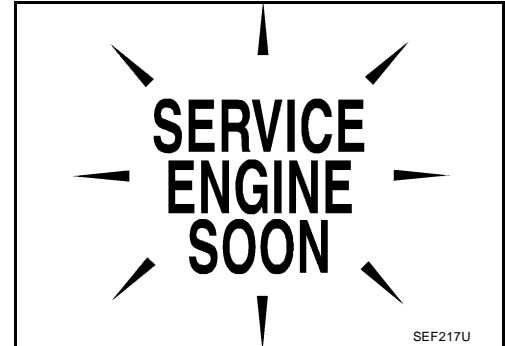
1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Perform "TCM SELF-DIAGNOSTIC PROCEDURE (No Tools)". Refer to [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) . (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Perform "OBD-II SELF-DIAGNOSTIC PROCEDURE (No tools)". Refer to [EC-60, "How to Erase DTC"](#) .

Malfunction Indicator Lamp (MIL) DESCRIPTION

UCS005N7

The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
 - If the MIL does not light up, refer to [DI-24, "WARNING LAMPS"](#) , or see [EC-597, "MIL AND DATA LINK CONNECTOR"](#) .
2. When the engine is started, the MIL should go off.
 - If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.



TROUBLE DIAGNOSIS

TROUBLE DIAGNOSIS

PFP:00004

DTC Inspection Priority Chart

UCS005ML

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

NOTE:

If DTC “CAN COMM CIRCUIT” is displayed with other DTCs, first perform the trouble diagnosis for DTC “CAN COMM CIRCUIT”. Refer to [AT-90](#) .

Priority	Detected items
1	CAN communication line
2	Except above

Fail-safe

UCS005MM

The TCM has an electronic Fail-safe mode. This allows the vehicle to be driven even if a major electrical input/output device circuit is damaged.

Under Fail-Safe, the vehicle always runs in third gear, even with a shift lever position of “1”, “2” or “D”. The customer may complain of sluggish or poor acceleration.

Always follow the “[AT-46, "WORK FLOW"](#)”.

The SELF-DIAGNOSIS results will be as follows:

- The first SELF-DIAGNOSIS will indicate damage to the vehicle speed sensor or the revolution sensor.
- During the next SELF-DIAGNOSIS, performed after checking the sensor, no damages will be indicated.

FAIL-SAFE FUNCTION

The following fail-safe functions allow vehicles to be driven even when sensor, switch or solenoid malfunction occurs.

Vehicle Speed Sensor-A/T (Revolution Sensor)

Vehicle speed sensor-MTR signal is input from combination meter.

Accelerator Pedal Position Signal and Throttle Position Signal

TCM controls the throttle opening angle to a predetermined fixed position to enable driving if a malfunctioning signal is input to TCM.

PNP Switch

When the multiple PNP switch signals are input to TCM, the priority of selector lever position becomes “D”, “N”, “R”, “2” and “1” in order by internal TCM determination.

The use of 4th gear is inhibited until normal operation resumes. Because the hydraulic circuit of the control valve is switched by manual valve according to the selector lever position, however, actual operating condition of vehicle becomes as follows.

Actual lever position	PNP switch input signal	Running status
“P”	“P” position and other position signals	P
“R”	“R” position and other position signals	R
“N”	“N” position and other position signals	N
“D”	“D” position and other position signals	D1 ↔D2 ↔D3 ↔D4
“2”	“2” position and other position signals (Except “1” position)	21 ↔22 ↔23
	“2” position and “1” position signals	21 ↔22
“1”	“1” position and other position signals (Except “2” position)	11 ↔12 ↔13
	“1” position and “2” position signals	11 ↔12

TROUBLE DIAGNOSIS

Shift Solenoid Valve A and B

If non-standard solenoid signal is sent to TCM, use of certain gears is limited. Refer to chart shown below.

Shift position	Normal			Malfunction in solenoid valve A			Malfunction in solenoid valve B			Malfunction in solenoid valves A and B		
	A	B	Gear	A	B	Gear	A	B	Gear	A	B	Gear
"D" position	●	●	1st	–	●→×	3rd	●→×	–	3rd	–	–	3rd
	×	●	2nd	–	●→×		×	–		–	–	
	×	×	3rd	–	x		×	–		–	–	
	●	×	4th	–	x		●→×	–		–	–	
"2" position	●	●	1st	–	●→×	3rd	●→×	–	3rd	–	–	3rd
	×	●	2nd	–	●→×		×	–		–	–	
	×	×	3rd	–	x		×	–		–	–	
"1" position	●	●	1st	–	●→×	3rd	●→×	–	3rd	–	–	3rd
	×	●	2nd	–	●→×		×	–		–	–	
	×	×	3rd	–	x		×	–		–	–	

●: Solenoid ON

×: Solenoid OFF

–: Non-standard condition

Line Pressure Solenoid Valve

If non-standard solenoid signal is sent to TCM, line pressure solenoid valve is turned OFF to achieve maximum oil pressure.

Torque Converter Clutch Solenoid Valve

If non-standard solenoid signal is sent to TCM, torque converter clutch solenoid valve is turned OFF to release lock-up.

Overrun Clutch Solenoid Valve

If non-standard solenoid signal is sent to TCM, overrun clutch solenoid valve is turned OFF to engage overrun clutch. This will result in more effective engine brake during deceleration.

TROUBLE DIAGNOSIS

How to Perform Trouble Diagnoses for Quick and Accurate Repair INTRODUCTION

UCS005MN

The TCM receives a signal from the vehicle speed sensor, accelerator pedal position sensor or PNP switch and provides shift control or lock-up control via A/T solenoid valves.

The TCM also communicates with the ECM by means of a signal sent from sensing elements used with the OBD-related parts of the A/T system for malfunction-diagnostic purposes. The TCM is capable of diagnosing malfunctioning parts while the ECM can store malfunctions in its memory.

Input and output signals must always be correct and stable in the operation of the A/T system. The A/T system must be in good operating condition and be free of valve seizure, solenoid valve malfunction, etc.

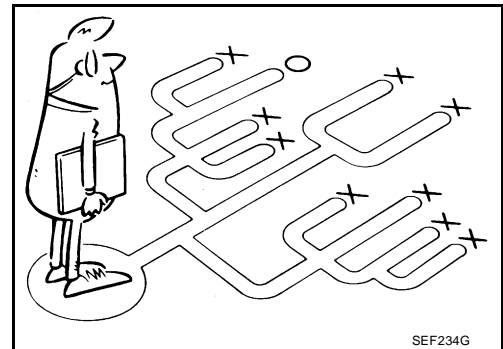
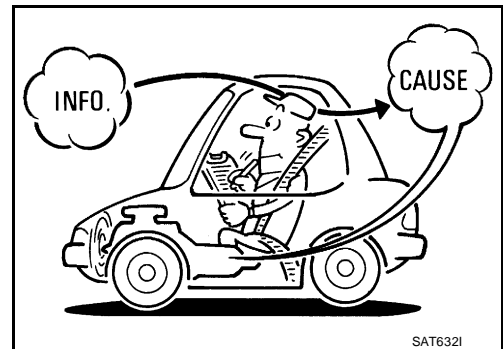
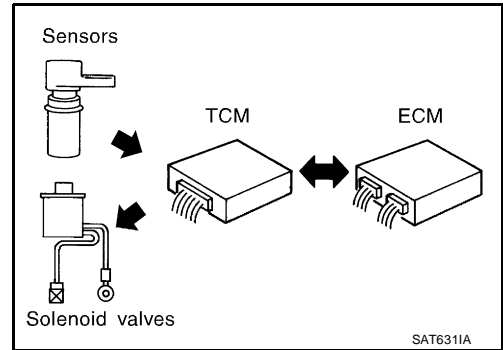
It is much more difficult to diagnose a malfunction that occurs intermittently rather than continuously. Most intermittent malfunctions are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

A visual check only, may not find the cause of the malfunctions. A road test with CONSULT-II or a circuit tester connected should be performed. Follow the [AT-46, "WORK FLOW"](#) .

Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such malfunctions, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "DIAGNOSTIC WORKSHEET" like the example ([AT-47, "DIAGNOSTIC WORKSHEET"](#)) should be used.

Start your diagnosis by looking for "conventional" malfunctions first. This will help troubleshoot driveability malfunctions on an electronically controlled engine vehicle.

Also check related Service bulletins for information.



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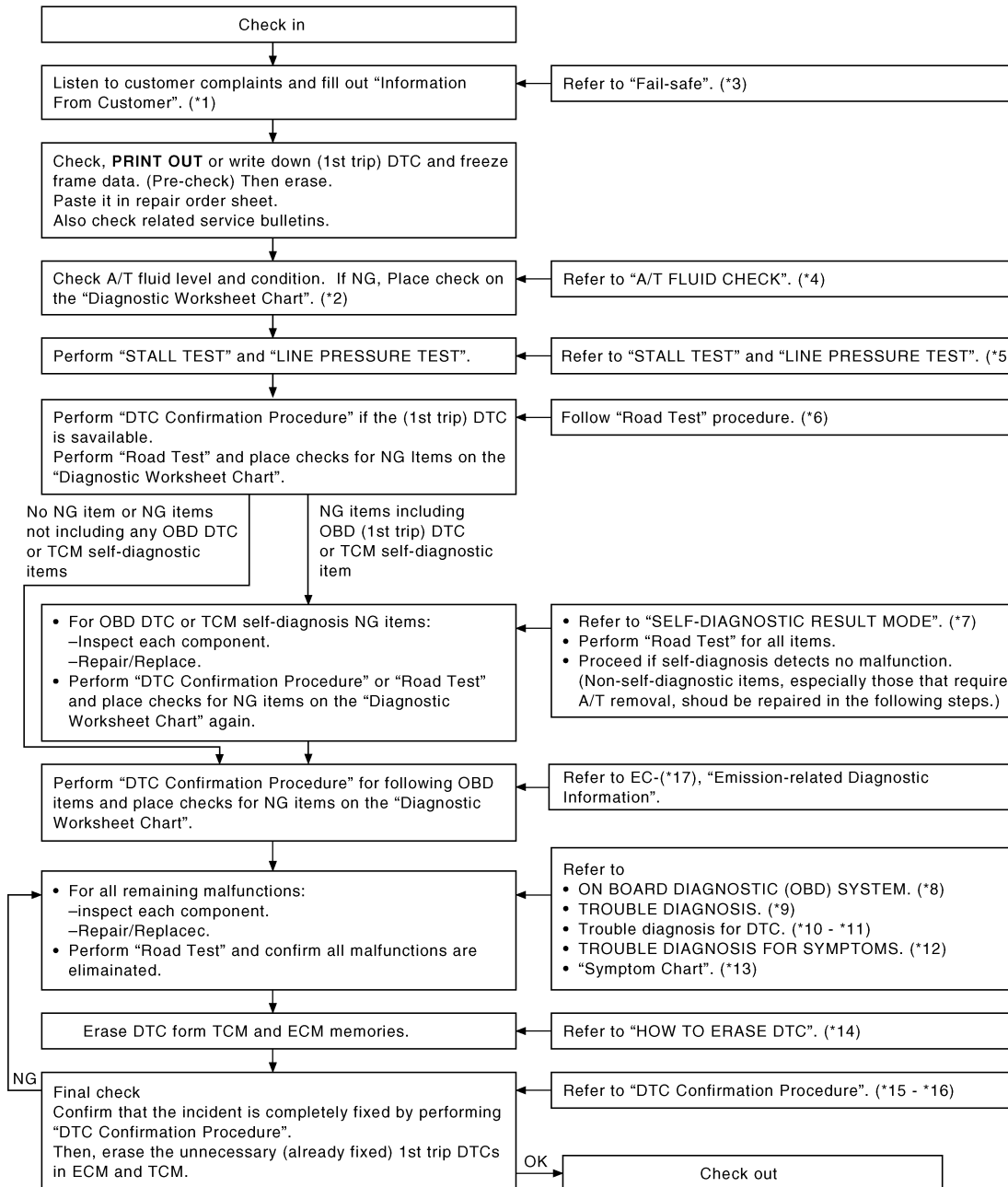
TROUBLE DIAGNOSIS

WORK FLOW

A good understanding of the malfunction conditions can make troubleshooting faster and more accurate. In general, each customer feels differently about a malfunction. It is important to fully understand the symptoms or conditions for a customer complaint.

Make good use of the two sheets provided, [AT-47, "Information from Customer"](#) and [AT-47, "Diagnostic Worksheet Chart"](#), to perform the best troubleshooting possible.

Work Flow Chart



SCIA7146E

*1 [AT-47](#)

*4 [AT-53](#)

*7 [AT-82](#)

*10 [AT-103](#)

*13 [AT-68](#)

*16 [AT-177](#)

*2 [AT-47](#)

*5 [AT-53, AT-56](#)

*8 [AT-39](#)

*11 [AT-177](#)

*14 [AT-40](#)

*17 [EC-48](#)

*3 [AT-43](#)

*6 [AT-58](#)

*9 [AT-43](#)

*12 [AT-188](#)

*15 [AT-90](#)

TROUBLE DIAGNOSIS

4.	<input type="checkbox"/> Perform "Road Test".	AT-58
4-1.	"Check Before Engine is Started" <ul style="list-style-type: none"> <input type="checkbox"/> AT-192, "OD OFF Indicator Lamp Does Not Come On" <input type="checkbox"/> Perform self-diagnosis. Enter checks for detected items. AT-82 , AT-86 . 	AT-58
	<ul style="list-style-type: none"> <input type="checkbox"/> AT-90, "DTC U1000 CAN COMMUNICATION LINE" . <input type="checkbox"/> AT-93, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" . <input type="checkbox"/> AT-98, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" . <input type="checkbox"/> AT-103, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)" . <input type="checkbox"/> AT-109, "DTC P0725 ENGINE SPEED SIGNAL" . <input type="checkbox"/> AT-113, "DTC P0731 A/T 1ST GEAR FUNCTION" <input type="checkbox"/> AT-117, "DTC P0732 A/T 2ND GEAR FUNCTION" . <input type="checkbox"/> AT-120, "DTC P0733 A/T 3RD GEAR FUNCTION" . <input type="checkbox"/> AT-124, "DTC P0734 A/T 4TH GEAR FUNCTION" . <input type="checkbox"/> AT-130, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" . <input type="checkbox"/> AT-135, "DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)" . <input type="checkbox"/> AT-141, "DTC P0745 LINE PRESSURE SOLENOID VALVE" . <input type="checkbox"/> AT-147, "DTC P0750 SHIFT SOLENOID VALVE A" . <input type="checkbox"/> AT-152, "DTC P0755 SHIFT SOLENOID VALVE B" . <input type="checkbox"/> AT-157, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" . <input type="checkbox"/> AT-162, "DTC VEHICLE SPEED SENSOR MTR" . <input type="checkbox"/> AT-165, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)" . <input type="checkbox"/> AT-171, "DTC TURBINE REVOLUTION SENSOR" . <input type="checkbox"/> AT-177, "CONTROL UNIT (RAM), CONTROL UNIT (ROM)" . <input type="checkbox"/> AT-178, "MAIN POWER SUPPLY AND GROUND CIRCUIT" . 	
4-2.	"Check at Idle" <ul style="list-style-type: none"> <input type="checkbox"/> AT-194, "Engine Cannot Be Started in "P" and "N" Position" . <input type="checkbox"/> AT-195, "In "P" Position, Vehicle Moves Forward or Backward When Pushed" . <input type="checkbox"/> AT-195, "In "N" Position, Vehicle Moves" . <input type="checkbox"/> AT-196, "Large Shock "N" → "R" Position" . <input type="checkbox"/> AT-197, "Vehicle Does Not Creep Backward in "R" Position" . <input type="checkbox"/> AT-199, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" . 	AT-59

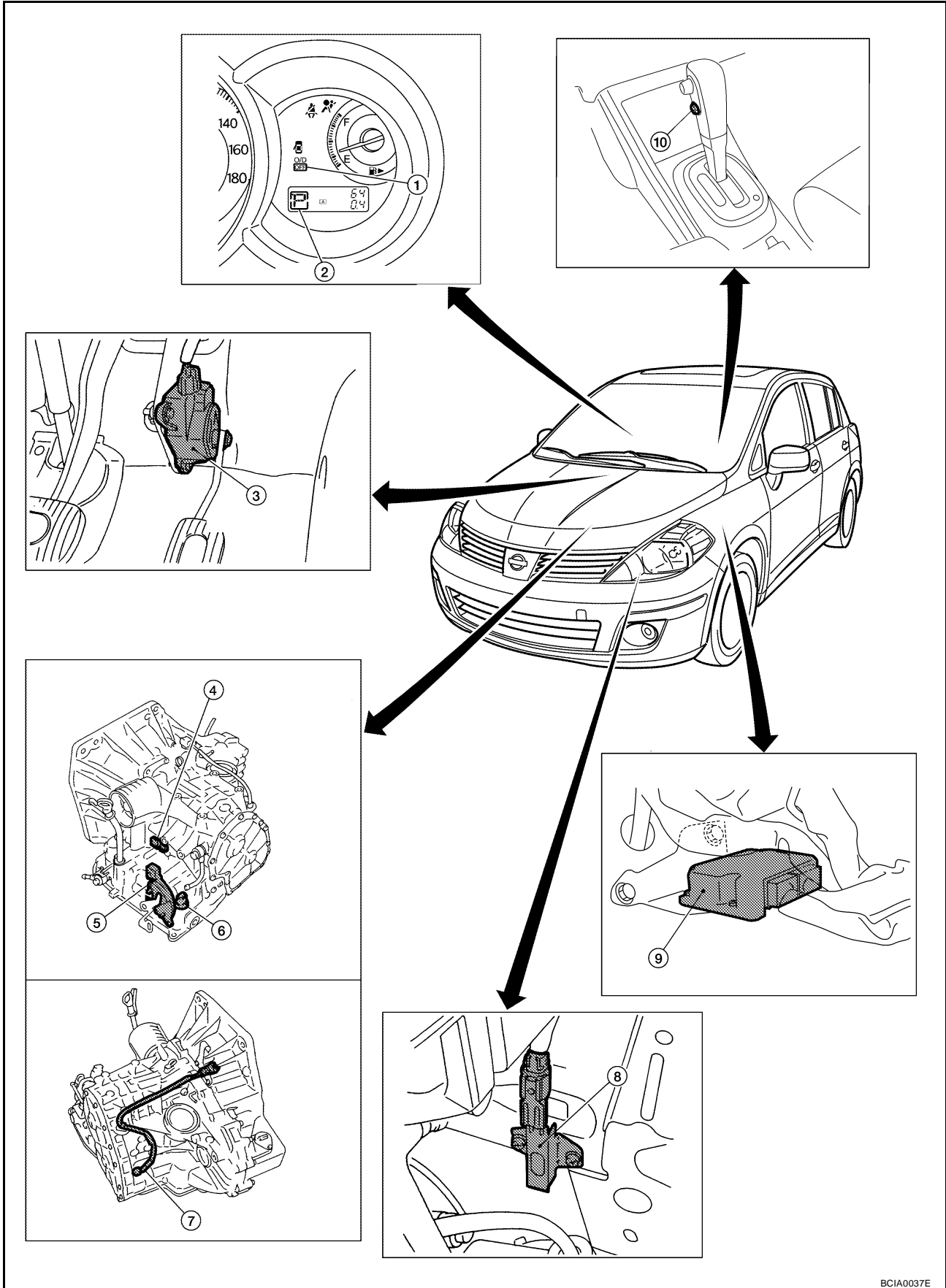
TROUBLE DIAGNOSIS

4.	4-3.	<p>“Cruise Test”</p> <p>Part 1</p> <ul style="list-style-type: none"> <input type="checkbox"/> AT-200, "Vehicle Cannot Be Started from D1" . <input type="checkbox"/> AT-202, "A/T Does Not Shift: D1 → D2 or Does Not Kickdown: D4 → D2" . <input type="checkbox"/> AT-204, "A/T Does Not Shift: D2 → D3" . <input type="checkbox"/> AT-206, "A/T Does Not Shift: D3 → D4" . <input type="checkbox"/> AT-208, "A/T Does Not Perform Lock-up" . <input type="checkbox"/> AT-209, "A/T Does Not Hold Lock-up Condition" . <input type="checkbox"/> AT-210, "Lock-up Is Not Released" . <input type="checkbox"/> AT-211, "Engine Speed Does Not Return to Idle (Light Braking D4 → D3)" . <p>Part 2</p> <ul style="list-style-type: none"> <input type="checkbox"/> AT-200, "Vehicle Cannot Be Started from D1" . <input type="checkbox"/> AT-202, "A/T Does Not Shift: D1 → D2 or Does Not Kickdown: D4 → D2" . <input type="checkbox"/> AT-204, "A/T Does Not Shift: D2 → D3" . <input type="checkbox"/> AT-206, "A/T Does Not Shift: D3 → D4" . <p>Part 3</p> <ul style="list-style-type: none"> <input type="checkbox"/> AT-212, "A/T Does Not Shift: D4 → D3, When OD OFF" . <input type="checkbox"/> AT-213, "A/T Does Not Shift: D3 → 22, When Selector Lever “D” → “2” Position" . <input type="checkbox"/> AT-215, "A/T Does Not Shift: 22 → 11, When Selector Lever “2” → “1” Position" . <input type="checkbox"/> AT-217, "Vehicle Does Not Decelerate by Engine Brake" . <input type="checkbox"/> Perform self-diagnosis. Enter checks for detected items. AT-82 , AT-86 . <ul style="list-style-type: none"> <input type="checkbox"/> AT-90, "DTC U1000 CAN COMMUNICATION LINE" . <input type="checkbox"/> AT-93, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" . <input type="checkbox"/> AT-98, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" . <input type="checkbox"/> AT-103, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)" . <input type="checkbox"/> AT-109, "DTC P0725 ENGINE SPEED SIGNAL" . <input type="checkbox"/> AT-113, "DTC P0731 A/T 1ST GEAR FUNCTION" . <input type="checkbox"/> AT-117, "DTC P0732 A/T 2ND GEAR FUNCTION" . <input type="checkbox"/> AT-120, "DTC P0733 A/T 3RD GEAR FUNCTION" . <input type="checkbox"/> AT-124, "DTC P0734 A/T 4TH GEAR FUNCTION" . <input type="checkbox"/> AT-130, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" . <input type="checkbox"/> AT-135, "DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)" . <input type="checkbox"/> AT-141, "DTC P0745 LINE PRESSURE SOLENOID VALVE" . <input type="checkbox"/> AT-147, "DTC P0750 SHIFT SOLENOID VALVE A" . <input type="checkbox"/> AT-152, "DTC P0755 SHIFT SOLENOID VALVE B" . <input type="checkbox"/> AT-157, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" . <input type="checkbox"/> AT-162, "DTC VEHICLE SPEED SENSOR MTR" . <input type="checkbox"/> AT-165, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)" . <input type="checkbox"/> AT-171, "DTC TURBINE REVOLUTION SENSOR" . <input type="checkbox"/> AT-177, "CONTROL UNIT (RAM), CONTROL UNIT (ROM)" . <input type="checkbox"/> AT-178, "MAIN POWER SUPPLY AND GROUND CIRCUIT" . 	<p>AT-61</p> <p>AT-64</p> <p>AT-65</p>	<p>A</p> <p>B</p> <p>AT</p> <p>D</p> <p>E</p> <p>F</p> <p>G</p> <p>H</p> <p>I</p> <p>J</p> <p>K</p> <p>L</p>
5.		<input type="checkbox"/> For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.	<p>AT-82,</p> <p>AT-87</p>	M
6.		<input type="checkbox"/> Perform “Road Test”.	AT-58	
7.		<input type="checkbox"/> Perform the Diagnostic Procedures for all remaining items marked NG. Repair or replace the damaged parts. Refer to the Symptom Chart when you perform the procedures. (The chart also shows some other possible symptoms and the component inspection orders.)	AT-68	
8.		<input type="checkbox"/> Erase DTC from TCM and ECM memories.	<p>AT-40,</p> <p>AT-89</p>	

TROUBLE DIAGNOSIS

A/T Electrical Parts Location

UCS005MO



BCIA0037E

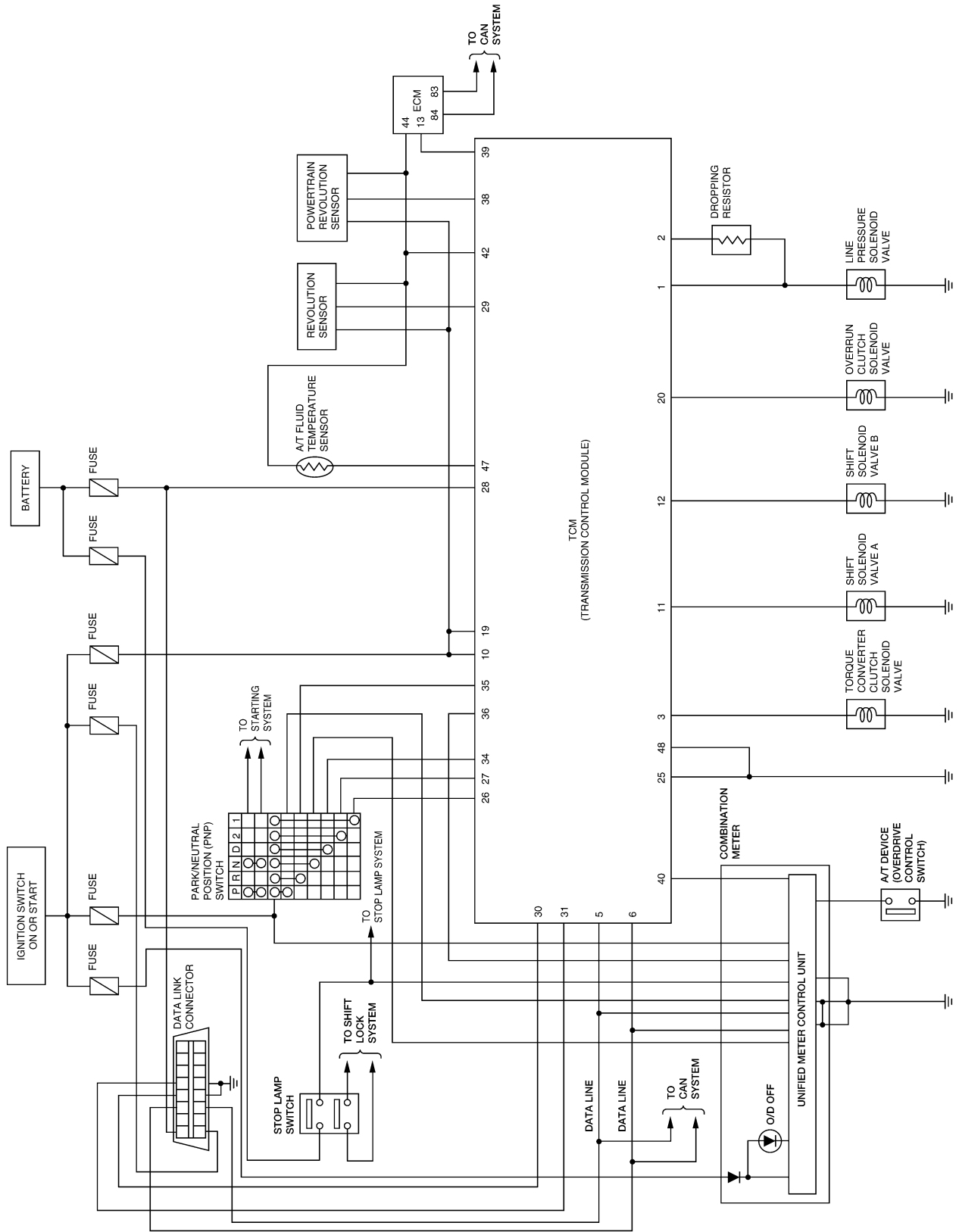
TROUBLE DIAGNOSIS

- | | | | |
|--|-----------------------------|---|----|
| 1. OD OFF indicator lamp | 2. Shift position indicator | 3. Accelerator pedal position (APP) sensor | A |
| 4. Turbine revolution sensor (Power train revolution sensor) | 5. PNP switch | 6. Terminal body (Terminal cord assembly connector) | B |
| 7. Revolution sensor | 8. Dropping resistor | 9. TCM | AT |
| 10. Overdrive control switch | | | D |
| | | | E |
| | | | F |
| | | | G |
| | | | H |
| | | | I |
| | | | J |
| | | | K |
| | | | L |
| | | | M |

TROUBLE DIAGNOSIS

Circuit Diagram

UCS005MP



BCWA0647E

TROUBLE DIAGNOSIS

UCS005MQ

Inspections Before Trouble Diagnosis

A/T FLUID CHECK

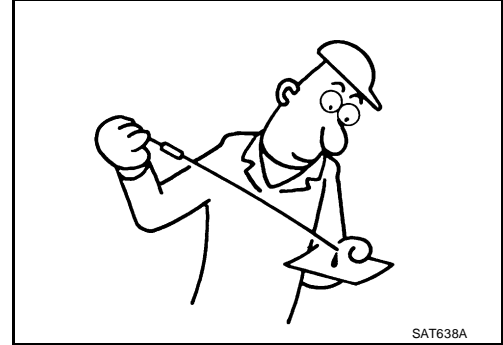
Fluid Leakage and Fluid Level Check

Check fluid leakage and check the fluid level. Refer to [MA-22, "Checking A/T Fluid"](#) .

Fluid Condition Check

Check the A/T fluid condition.

Fluid status	Conceivable Cause	Required Operation
Varnished (viscous varnish state)	Clutch, brake scorched	Replace the ATF and check the A/T main unit and the vehicle for mal-functions (wire harnesses, cooler pipes, etc.)
Milky white or cloudy	Water in the ATF	Replace the ATF and check for places where water is getting in.
Large amount of metal powder mixed in	Unusual wear of sliding parts within A/T	Replace the ATF and check for improper operation of the A/T.

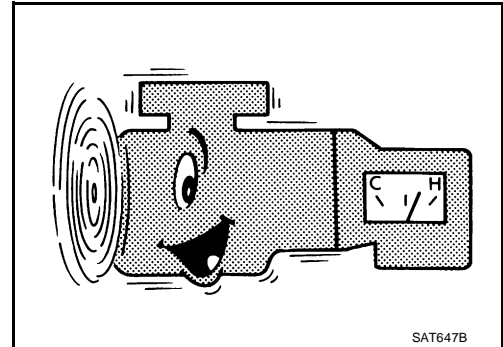


STALL TEST

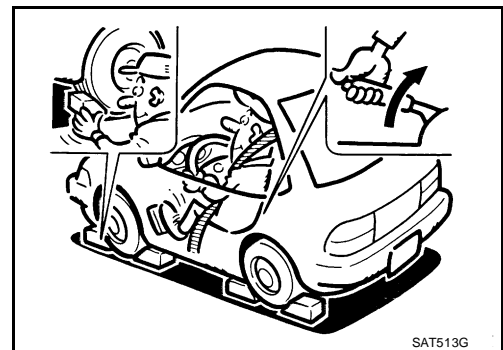
Stall Test Procedure

1. Check ATF and engine oil levels. If necessary, add ATF and engine oil.
2. Drive vehicle for approximately 10 minutes or until ATF and engine oil reach operating temperature.

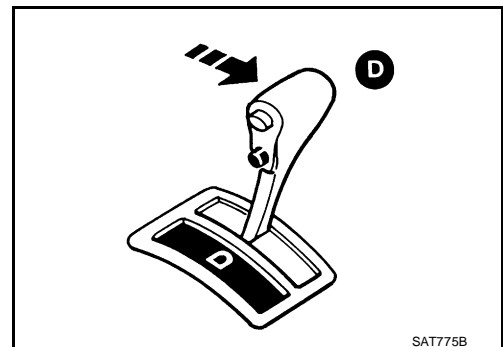
ATF operating temperature: 50 - 80°C (122 - 176°F)



3. Set parking brake and block wheels.
4. Install a tachometer where it can be seen by driver during test.
 - It is good practice to mark the point of specified engine rpm on indicator.



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



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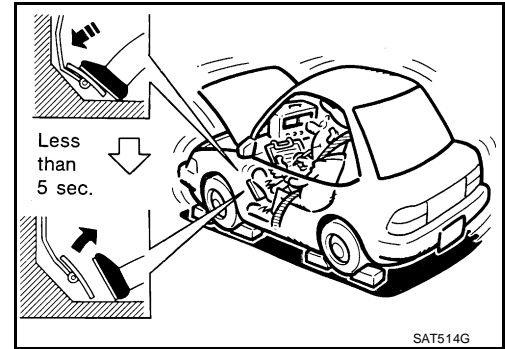
TROUBLE DIAGNOSIS

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

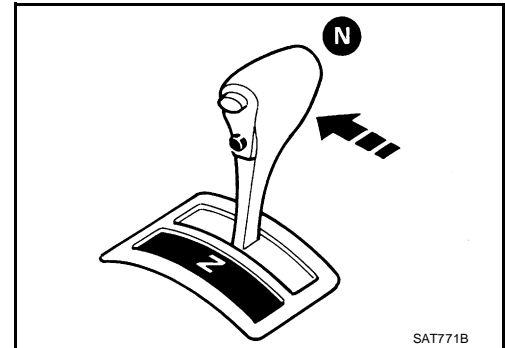
CAUTION:

Do not hold down the accelerator pedal for more than 5 seconds during this test.

Stall revolution: 2,300 - 2,750 rpm



- Move selector lever to "N" position.
 - Cool off ATF.
- CAUTION:**
Run the engine at idle for at least 1 minute.
- Repeat steps 6 through 9 with selector lever in "2", "1" and "R" positions.



Judgement of Stall Test

The test result and possible damaged components relating to each result are shown in the illustrations on next page.

In order to pinpoint the possible damaged components, refer to [AT-46, "Work Flow Chart"](#) .

NOTE:

Stall revolution is too high in "D", "2", or "1" position:

- Slippage occurs in 1st gear but not in 2nd and 3rd gears. Low one-way clutch slippage
- Slippage occurs in the following gears:
1st through 3rd gears in "D" position and engine brake functions with OD OFF. (OD OFF indicator lamp is on.)
1st and 2nd gears in "2" position and engine brake functions with accelerator pedal released (fully closed throttle)..... Forward clutch or forward one-way clutch slippage

Stall revolution is too high in "R" position:

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

Stall revolution within specifications:

- Vehicle does not achieve speed of more than 80 km/h (50 MPH). One-way clutch seizure in torque converter housing

CAUTION:

Be careful because automatic fluid temperature increases abnormally:

- Slippage occurs in 3rd and 4th gears in "D" position. High clutch slippage
- Slippage occurs in 2nd and 4th gears in "D" position. Brake band slippage
- Engine brake does not function in 2nd and 3rd gears in "D" position, 2nd gear in "2" position, and 1st gear in "1" position with OD OFF. (OD OFF indicator lamp is on.) Overrun clutch slippage

Stall revolution less than specifications:

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

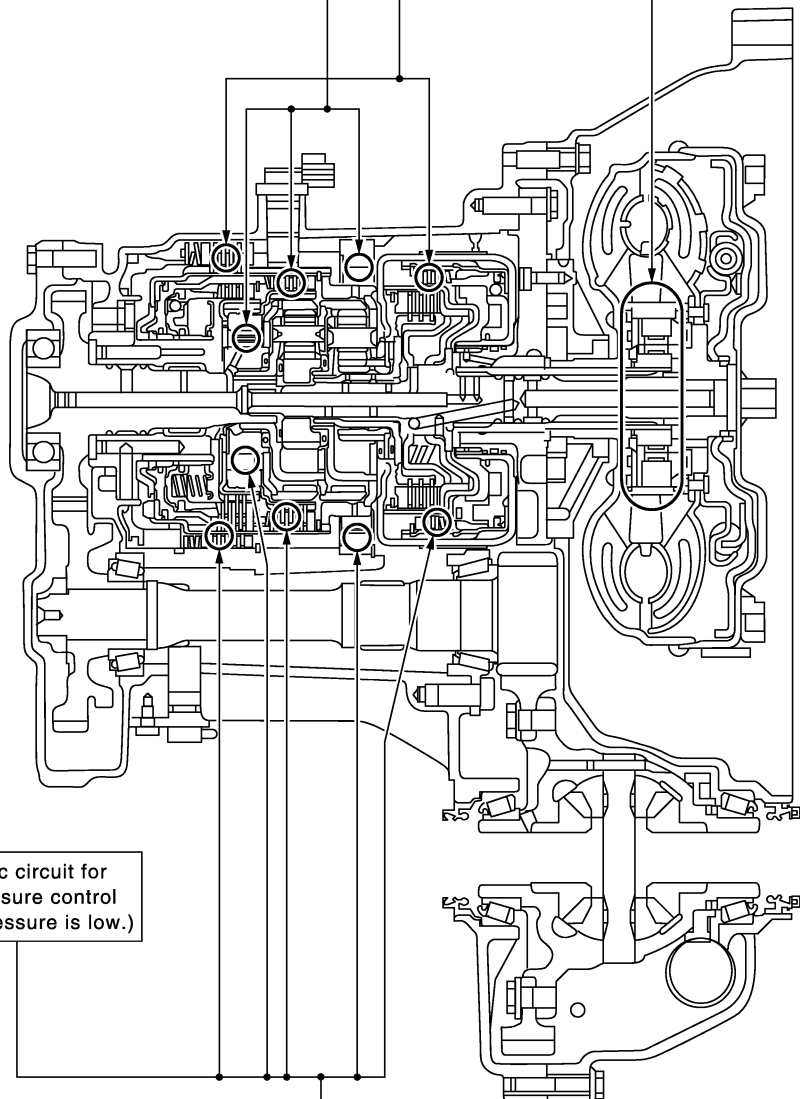
TROUBLE DIAGNOSIS

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

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

Damaged components

Engine



Hydraulic circuit for line pressure control (Line pressure is low.)

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

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

A
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SCIA7987E

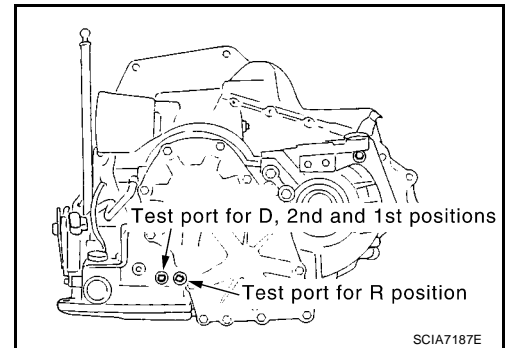
TROUBLE DIAGNOSIS

LINE PRESSURE TEST

Line Pressure Test Ports

Location of line pressure test ports are shown in the figure.

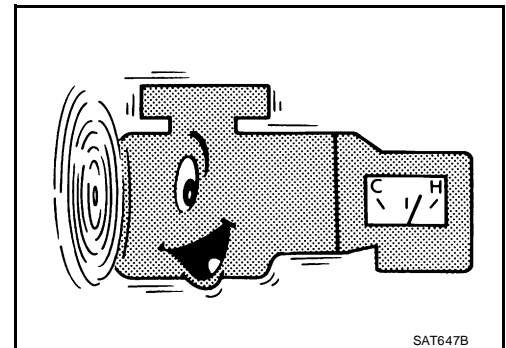
- Always replace pressure plugs as they are self-sealing bolts.



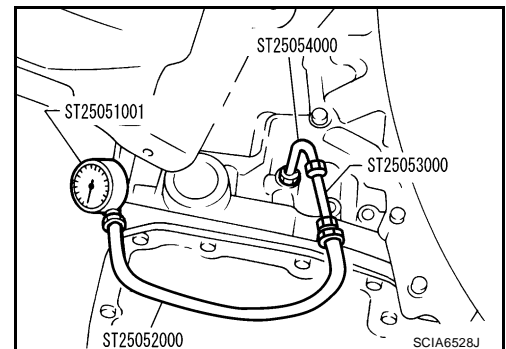
Line Pressure Test Procedure

1. Check ATF and engine oil levels. If necessary, add ATF or engine oil.
2. Drive vehicle for approx. 10 minutes or until engine oil and ATF reach operating temperature.

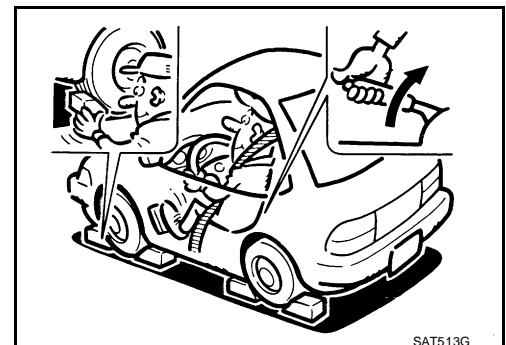
ATF operating temperature: 50 - 80°C (122 -176°F)



3. Install oil pressure gauge to corresponding line pressure test port.



4. Set parking brake and block wheels.

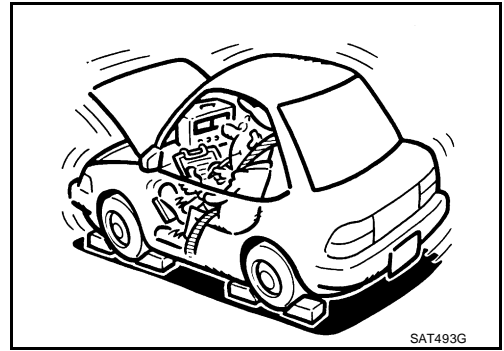


TROUBLE DIAGNOSIS

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

CAUTION:

- Keep the brake pedal pressed all the way down during measurement.
- When measuring the line pressure at the stall speed, refer to [AT-53, "STALL TEST"](#) .



Line Pressure

Engine speed	Line pressure [kPa (kg/cm ² , psi)]	
	D, 2nd and 1st positions	R position
Idle speed	500 (5.1, 73)	778 (7.9, 113)
Stall speed	1,173 (12.0, 170)	1,825 (18.6, 265)

Judgement of Line Pressure Test

Judgement		Suspected parts
At idle	Line pressure is low in all positions.	<ul style="list-style-type: none"> ● 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 ● Clogged strainer
	Line pressure is low in particular position.	<ul style="list-style-type: none"> ● Fluid pressure leakage between manual valve and particular clutch ● For example, line pressure is: <ul style="list-style-type: none"> – Low in "R" and "1" positions, but – Normal in "D", and "2" positions. Therefore, fluid leakage exists at or around low and reverse brake circuit. Refer to AT-22, "CLUTCH AND BAND CHART" .
	Line pressure is high.	<ul style="list-style-type: none"> ● Accelerator pedal position signal malfunction ● A/T fluid temperature sensor damaged ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure modifier valve sticking ● Pressure regulator valve or plug sticking ● Open in dropping resistor circuit
At stall speed	Line pressure is low.	<ul style="list-style-type: none"> ● Accelerator pedal position signal malfunction ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure regulator valve or plug sticking ● Pressure modifier valve sticking ● Pilot valve sticking

TROUBLE DIAGNOSIS

UCS005MR

Road Test DESCRIPTION

- The purpose of the test is to determine overall performance of A/T and analyze causes of malfunctions.
- The road test consists of the following three parts:
 1. Check before engine is started. Refer to [AT-58](#) .
 2. Check at idle. Refer to [AT-59](#) .
 3. Cruise test
 - Inspection all the item from Part 1 to Part 3. Refer to [AT-61](#) , [AT-64](#) and [AT-65](#) .
- Before road test, familiarize yourself with all test procedures and items to check.
- Perform tests on all items until specified symptom is found. Troubleshoot the items which are checked out to be no good after road test. Refer to [AT-80](#), "[CONSULT-II Function \(A/T\)](#)" , [AT-86](#), "[Diagnostic Procedure Without CONSULT-II](#)" and [AT-188](#), "[TROUBLE DIAGNOSIS FOR SYMPTOMS](#)" .

ROAD TEST PROCEDURE

1. Check before engine is started.



2. Check at idle.



3. Cruise test.

SAT786A



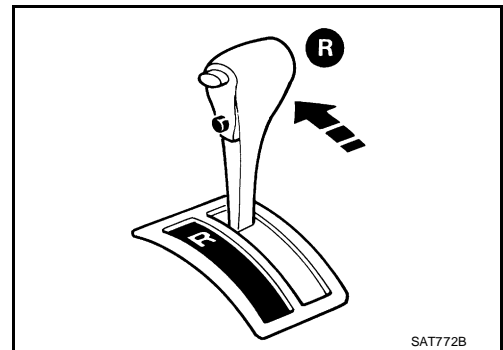
SAT496G

Check Before Engine is Started

1. CHECK OD OFF INDICATOR LAMP

UCS005MS

1. Park vehicle on flat surface.
2. Move selector lever to "P" position.
3. Turn ignition switch OFF. Wait at least 5 seconds.



SAT772B

4. Turn ignition switch ON. (Do not start engine.)

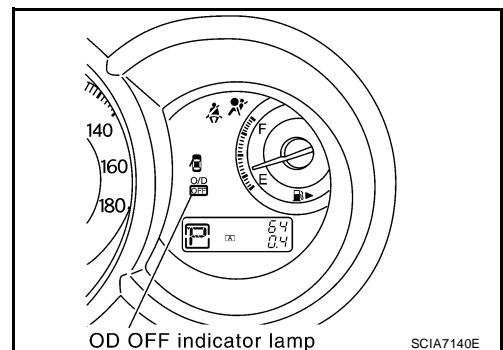
Does OD OFF indicator lamp come on for about 2 seconds?

YES >> 1. Turn ignition switch OFF.

2. Perform self-diagnosis and note NG items.
Refer to [AT-82](#), "[SELF-DIAGNOSTIC RESULT MODE](#)" , [AT-86](#), "[Diagnostic Procedure Without CONSULT-II](#)" .

3. Go to [AT-59](#), "[Check at Idle](#)" .

NO >> Stop "Road Test". Go to [AT-192](#), "[OD OFF Indicator Lamp Does Not Come On](#)" .



OD OFF indicator lamp

SCIA7140E

TROUBLE DIAGNOSIS

UCS005MT

Check at Idle

1. CHECK ENGINE START

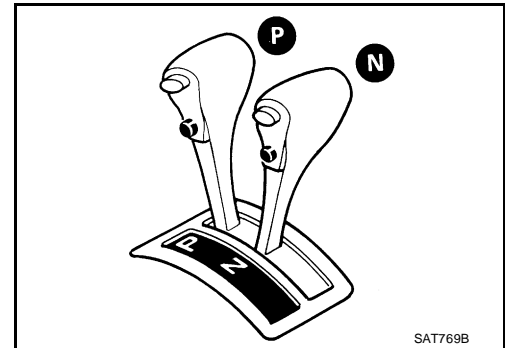
1. Park vehicle on flat surface.
2. Turn ignition switch ON. (Do not start engine.)
3. Move selector lever to "P" or "N" position.
4. Turn ignition switch to "START" position.

Is engine started?

YES >> GO TO 2.

NO >> ● Stop "Road Test". Mark the box on the [AT-47, "DIAGNOSTIC WORKSHEET"](#) .

- Go to [AT-194, "Engine Cannot Be Started in "P" and "N" Position"](#) .



2. CHECK ENGINE START

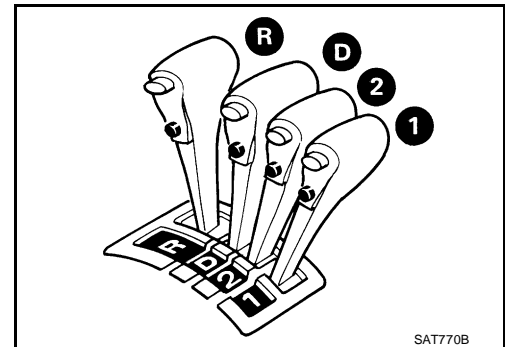
1. Turn ignition switch ON. (Do not start engine.)
2. Move selector lever to "R", "D", "2" or "1" position.
3. Turn ignition switch to "START" position.

Is engine started?

YES >> ● Stop "Road Test". Mark the box on the [AT-47, "DIAGNOSTIC WORKSHEET"](#) .

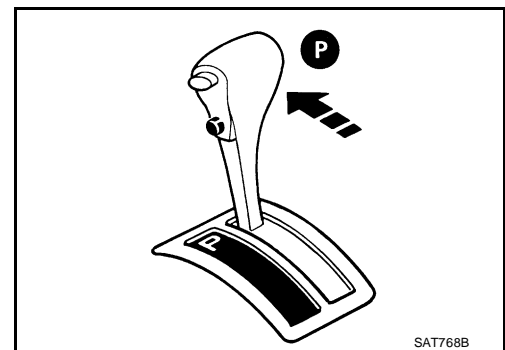
- Go to [AT-194, "Engine Cannot Be Started in "P" and "N" Position"](#) .
- Continue "Road Test".

NO >> GO TO 3.



3. CHECK VEHICLE MOVE

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



4. Push vehicle forward or backward.

Does vehicle move when it is pushed forward or backyard?

YES >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORKSHEET"](#) .

- Go to [AT-195, "In "P" Position, Vehicle Moves Forward or Backward When Pushed"](#) .

- Continue "Road Test".

NO >> GO TO 4.



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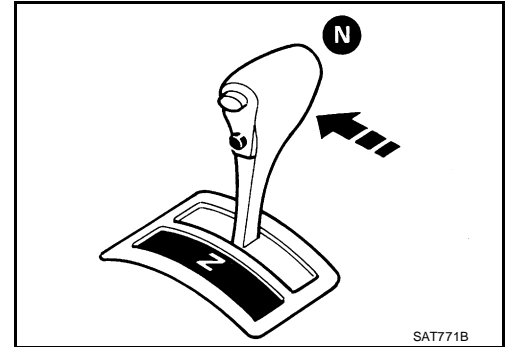
TROUBLE DIAGNOSIS

4. CHECK VEHICLE MOVE

1. Apply parking brake.
2. Start engine.
3. Move selector lever to "N" position.
4. Release parking brake.

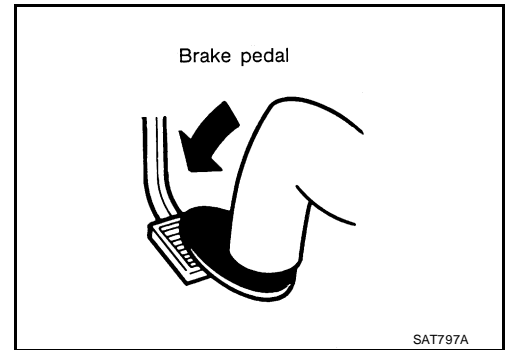
Does vehicle move forward or backward?

- YES >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .
- Go to [AT-195, "In "N" Position, Vehicle Moves"](#) .
 - Continue "Road Test".
- NO >> GO TO 5.



5. CHECK SHIFT SHOCK

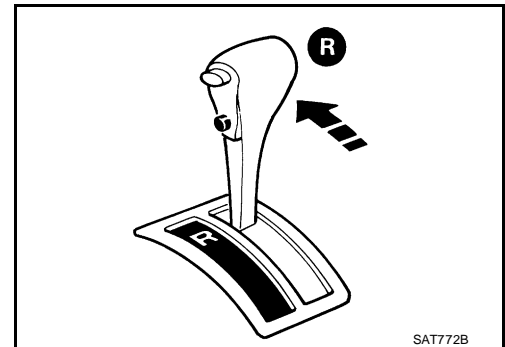
1. Apply foot brake.



2. Move selector lever to "R" position.

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

- YES >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .
- Go to [AT-196, "Large Shock "N" → "R" Position"](#) .
 - Continue "Road Test".
- NO >> GO TO 6.

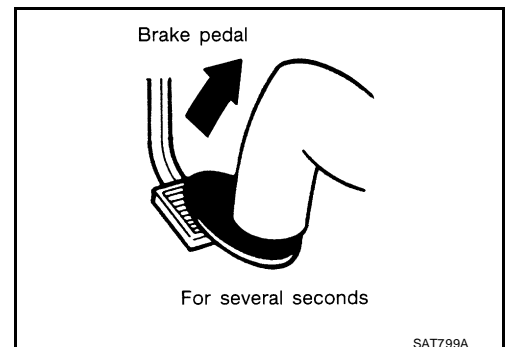


6. CHECK VEHICLE MOVE

Release foot brake for several seconds.

Does vehicle creep backward when foot brake is released?

- YES >> GO TO 7.
- NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .
- Go to [AT-197, "Vehicle Does Not Creep Backward in "R" Position"](#) .
 - Continue "Road Test".



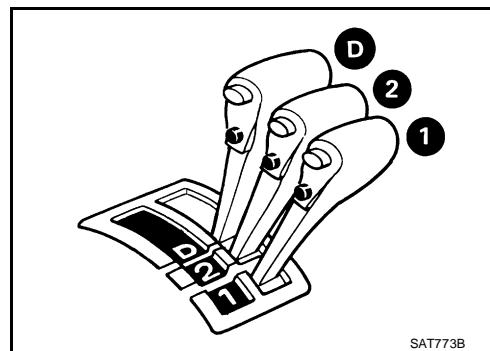
TROUBLE DIAGNOSIS

7. CHECK VEHICLE MOVE

Move selector lever to “D”, “2” and “1” positions and check if vehicle creeps forward.

Does vehicle creep forward in all three positions?

- YES >> Go to [AT-61, "Cruise Test — Part 1"](#) .
NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .
● Go to [AT-199, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position"](#) .
● Continue “Road Test”.



UCS005MU

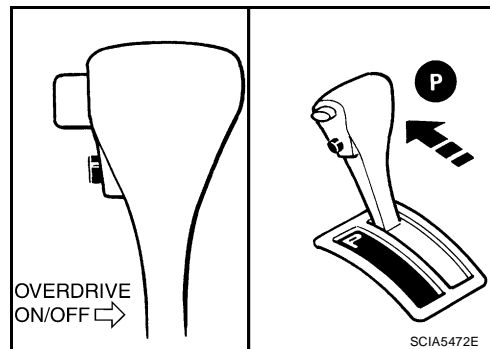
Cruise Test — Part 1

1. CHECK STARTING GEAR (D₁) POSITION

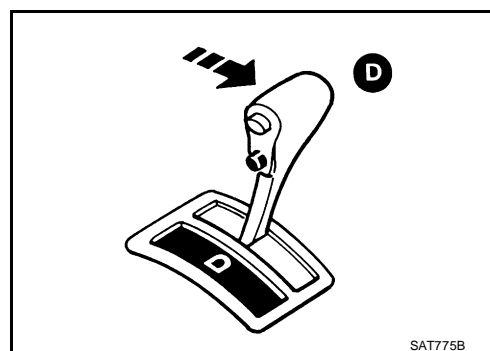
1. Drive vehicle for approximately 10 minutes to warm engine oil and ATF up to operating temperature.

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

2. Park vehicle on flat surface.
3. Push overdrive control switch. (OD OFF indicator lamp is off.)
4. Move selector lever to “P” position.
5. Start engine.



6. Move selector lever to “D” position.

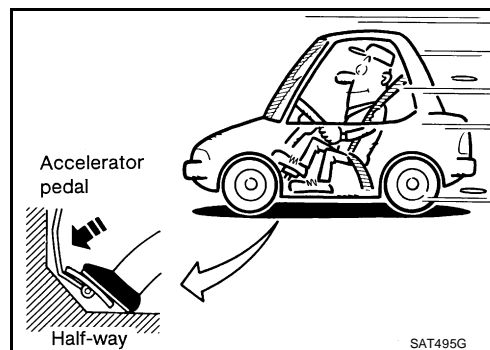


7. Accelerate vehicle by constantly depressing accelerator pedal half-way.

📖 **Read gear position. Refer to [AT-83, "DATA MONITOR MODE"](#) .**

Does vehicle start from D₁ ?

- YES >> GO TO 2.
NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .
● Go to [AT-200, "Vehicle Cannot Be Started from D₁"](#) .
● Continue “Road Test”.



TROUBLE DIAGNOSIS

2. CHECK SHIFT-UP (D1 TO D2)

Check shift-up (D1 to D2).

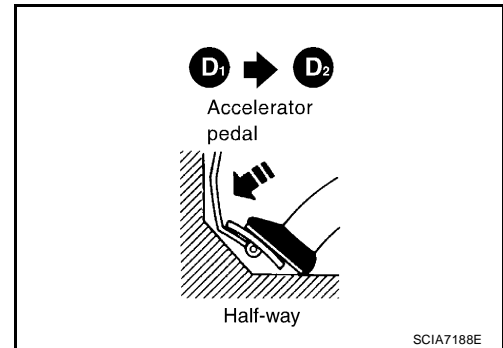
Specified speed when shifting from D1 to D2. Refer to [AT-67, "Vehicle Speed at Which Gear Shifting Occurs"](#)

① Read gear position, throttle opening and vehicle speed.
Refer to [AT-83, "DATA MONITOR MODE"](#) .

Does A/T shift from D1 to D2 at the specified speed?

YES >> GO TO 3.

- NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .
- Go to [AT-202, "A/T Does Not Shift: D1 → D2 or Does Not Kickdown: D4 → D2"](#) .
 - Continue "Road Test".



3. CHECK SHIFT-UP (D2 TO D3)

Check shift-up (D2 to D3).

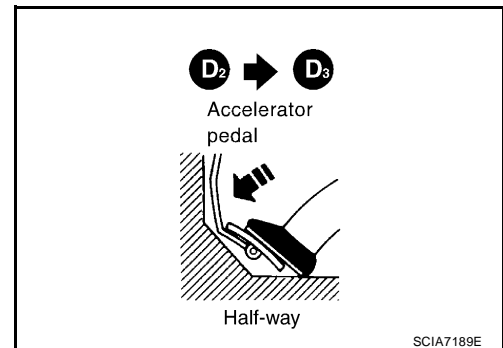
Specified speed when shifting from D2 to D3. Refer to [AT-67, "Vehicle Speed at Which Gear Shifting Occurs"](#)

① Read gear position, throttle opening and vehicle speed.
Refer to [AT-83, "DATA MONITOR MODE"](#) .

Does A/T shift from D2 to D3 at the specified speed?

YES >> GO TO 4.

- NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .
- Go to [AT-204, "A/T Does Not Shift: D2 → D3"](#) .
 - Continue "Road Test".



4. CHECK SHIFT-UP (D3 TO D4)

Check shift-up (D3 to D4).

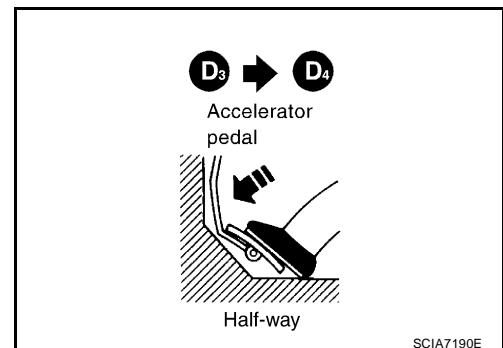
Specified speed when shifting from D3 to D4. Refer to [AT-67, "Vehicle Speed at Which Gear Shifting Occurs"](#)

① Read gear position, throttle opening and vehicle speed.
Refer to [AT-83, "DATA MONITOR MODE"](#) .

Does A/T shift from D3 to D4 at the specified speed?

YES >> GO TO 5.

- NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .
- Go to [AT-206, "A/T Does Not Shift: D3 → D4"](#) .
 - Continue "Road Test".



TROUBLE DIAGNOSIS

5. CHECK LOCK-UP (D4 TO D4 L/U)

Check lock-up (D4 to D4 L/U).

Specified speed when lock-up occurs. Refer to [AT-67, "Vehicle Speed at Which Lock-up Occurs/Releases"](#) .

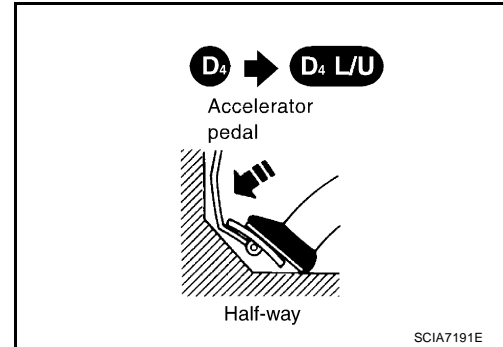
④ **Read vehicle speed, throttle opening when lock-up duty becomes 94%. Refer to [AT-83, "DATA MONITOR MODE"](#) .**

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

YES >> GO TO 6.

NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORKSHEET"](#) .

- Go to [AT-208, "A/T Does Not Perform Lock-up"](#) .
- Continue "Road Test".



6. CHECK LOCK-UP HOLD

Check lock-up hold.

④ **When lock-up duty becomes 94%. Refer to [AT-83, "DATA MONITOR MODE"](#) .**

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

YES >> GO TO 7.

NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORKSHEET"](#) .

- Go to [AT-209, "A/T Does Not Hold Lock-up Condition"](#) .
- Continue "Road Test".

7. CHECK SHIFT-DOWN (D4 L/U TO D4)

Release accelerator pedal.

④ **When lock-up duty becomes 4%. Refer to [AT-83, "DATA MONITOR MODE"](#) .**

Is lock-up released when accelerator pedal is released?

YES >> GO TO 8.

NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORKSHEET"](#) .

- Go to [AT-210, "Lock-up Is Not Released"](#) .
- Continue "Road Test".

8. CHECK SHIFT-DOWN (D4 TO D3)

Decelerate vehicle by applying foot brake lightly.

④ **Read gear position and engine speed. Refer to [AT-83, "DATA MONITOR MODE"](#) .**

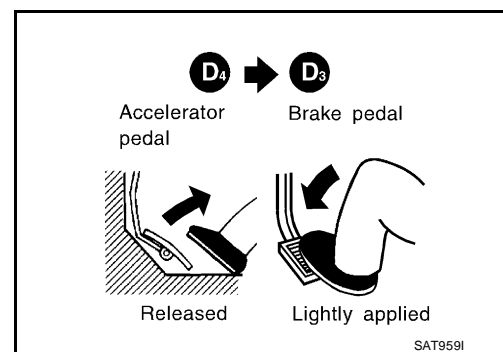
Does engine speed return to idle smoothly when A/T is shifted from D4 to D3 ?

YES >> 1. Stop vehicle.

2. Go to [AT-64, "Cruise Test — Part 2"](#) .

NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORKSHEET"](#) .

- Go to [AT-211, "Engine Speed Does Not Return to Idle \(Light Braking D4 → D3\)"](#) .
- Continue "Road Test".



TROUBLE DIAGNOSIS

UCS005MV

Cruise Test — Part 2

1. CHECK STARTING GEAR (D1) POSITION

1. Push overdrive control switch. (OD OFF indicator lamp is off.)
2. Move selector lever to "D" position.
3. Accelerate vehicle by half throttle again.

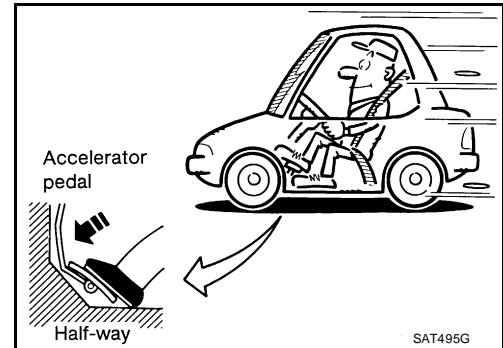
Ⓛ Read gear position. Refer to [AT-83, "DATA MONITOR MODE"](#) .

Does vehicle start from D1 ?

YES >> GO TO 2.

NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .

- Go to [AT-200, "Vehicle Cannot Be Started from D1"](#) .
- Continue "Road Test".



2. CHECK SHIFT-UP AND SHIFT-DOWN (D3 TO D4 TO D2)

1. Accelerate vehicle to 80 km/h (50 MPH) as shown in the figure.
2. Release accelerator pedal and then quickly depress it fully.

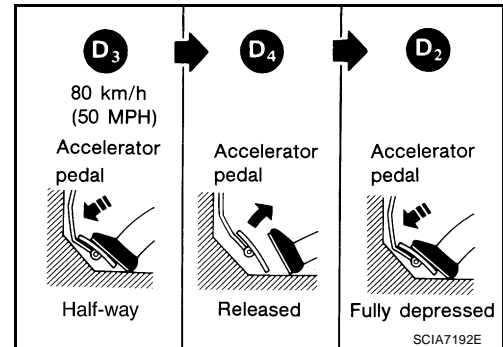
Ⓛ Read gear position and throttle opening. Refer to [AT-83, "DATA MONITOR MODE"](#) .

Does A/T shift from D4 to D2 as soon as accelerator pedal is depressed fully?

YES >> GO TO 3.

NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .

- Go to [AT-202, "A/T Does Not Shift: D1 → D2 or Does Not Kickdown: D4 → D2"](#) .
- Continue "Road Test".



3. CHECK SHIFT-UP (D2 TO D3)

Check shift-up (D2 to D3)

Specified speed when shifting from D2 to D3 . Refer to [AT-67, "Vehicle Speed at Which Gear Shifting Occurs"](#) .

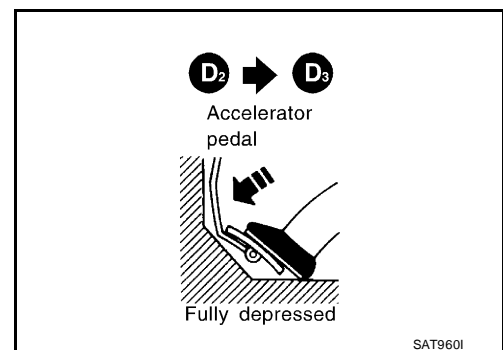
Ⓛ Read gear position, throttle opening and vehicle speed. Refer to [AT-83, "DATA MONITOR MODE"](#) .

Does A/T shift from D2 to D3 at the specified speed?

YES >> GO TO 4.

NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .

- Go to [AT-204, "A/T Does Not Shift: D2 → D3"](#) .
- Continue "Road Test".



TROUBLE DIAGNOSIS

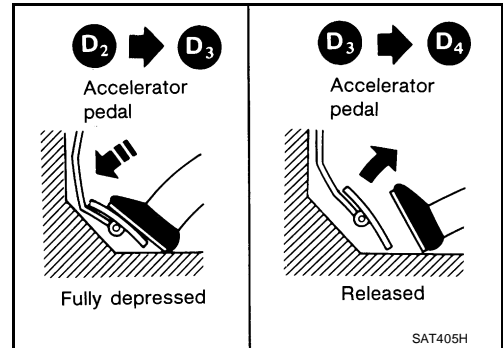
4. CHECK SHIFT-UP (D₃ TO D₄) AND ENGINE BRAKE

Release accelerator pedal after shifting from D₂ to D₃ .

Ⓜ Read gear position, throttle opening and vehicle speed. Refer to [AT-83, "DATA MONITOR MODE"](#) .

Does A/T shift from D₃ to D₄ and does vehicle decelerate by engine brake?

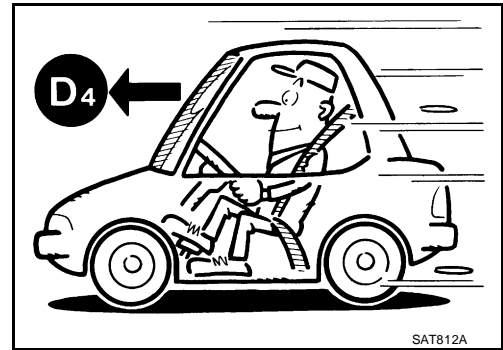
- YES >> 1. Stop vehicle.
2. Go to [AT-65, "Cruise Test — Part 3"](#) .
- NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .
● Go to [AT-206, "A/T Does Not Shift: D₃ → D₄"](#) .
● Continue "Road Test".



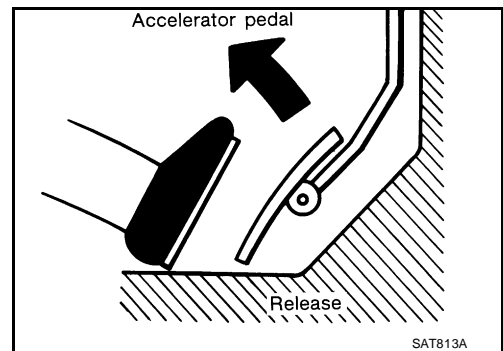
Cruise Test — Part 3

1. CHECK SHIFT-DOWN (D₄ TO D₃)

1. Push overdrive control switch. (OD OFF indicator lamp is off.)
2. Move selector lever to "D" position.
3. Accelerate vehicle using half throttle to D₄ .



4. Release accelerator pedal.

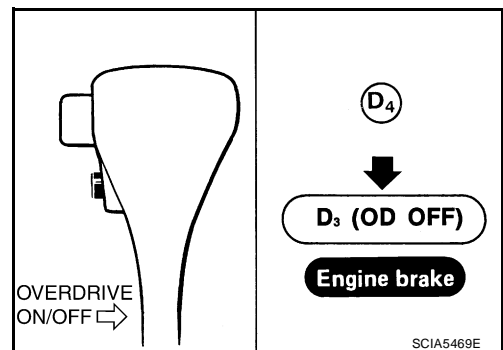


5. Push overdrive control switch. (OD OFF indicator lamp is on.)

Ⓜ Read gear position and vehicle speed. Refer to [AT-83, "DATA MONITOR MODE"](#) .

Does A/T shift from D₄ to D₃ (OD OFF)?

- YES >> GO TO 2.
- NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .
● Go to [AT-212, "A/T Does Not Shift: D₄ → D₃ , When OD OFF"](#) .
● Continue "Road Test".



TROUBLE DIAGNOSIS

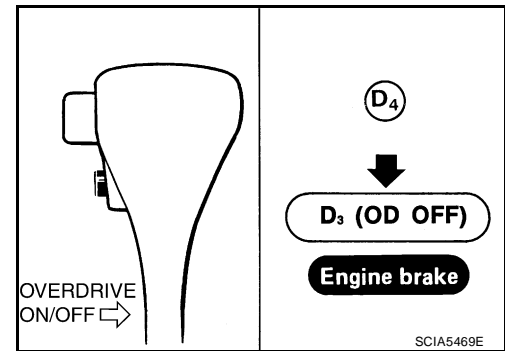
2. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >> GO TO 3.

- NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .
- Go to [AT-217, "Vehicle Does Not Decelerate by Engine Brake"](#) .
 - Continue "Road Test".



3. CHECK SHIFT-DOWN (D₃ TO 2₂)

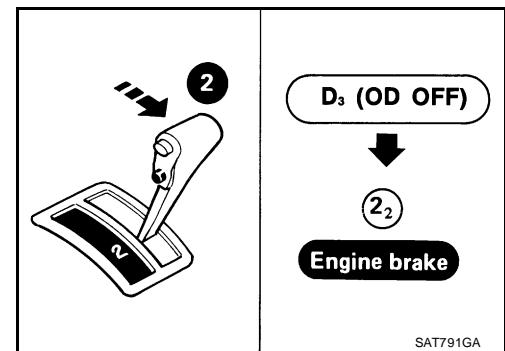
Move selector lever from "D" to "2" position while driving in D₃ (OD OFF).

④ Read gear position. Refer to [AT-83, "DATA MONITOR MODE"](#) .

Does A/T shift from D₃ (OD OFF) to 2₂ ?

YES >> GO TO 4.

- NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .
- Go to [AT-213, "A/T Does Not Shift: D₃ → 2₂ , When Selector Lever "D" → "2" Position"](#) .
 - Continue "Road Test".



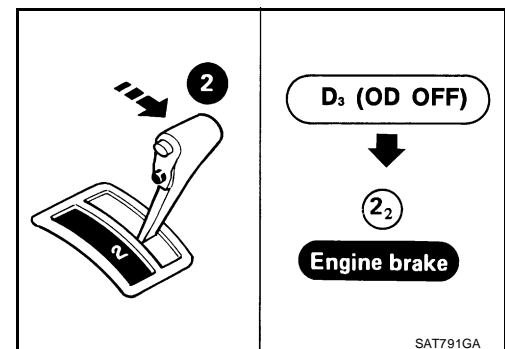
4. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >> GO TO 5.

- NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .
- Go to [AT-217, "Vehicle Does Not Decelerate by Engine Brake"](#) .
 - Continue "Road Test".



5. CHECK SHIFT-DOWN (2₂ TO 1₁)

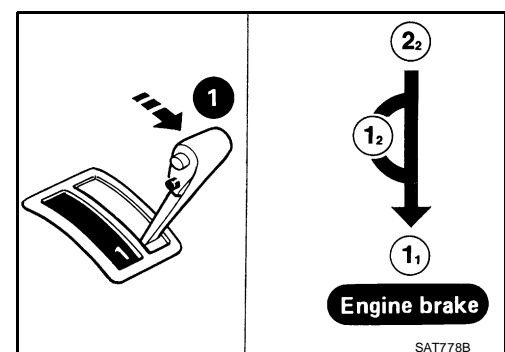
Move selector lever from "2" to "1" position while driving in 2₂ .

④ Read gear position. Refer to [AT-83, "DATA MONITOR MODE"](#) .

Does A/T shift from 2₂ to 1₁ position?

YES >> GO TO 6.

- NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .
- Go to [AT-215, "A/T Does Not Shift: 2₂ → 1₁ , When Selector Lever "2" → "1" Position"](#) .
 - Continue "Road Test".



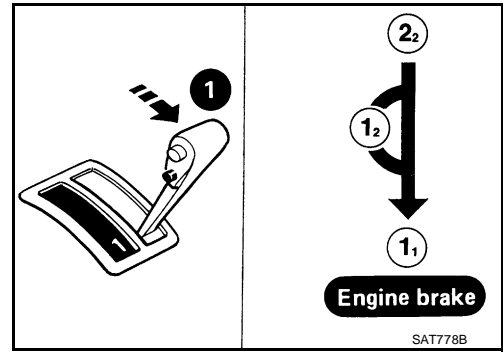
TROUBLE DIAGNOSIS

6. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

- YES >> 1. Stop vehicle.
 2. Perform self-diagnosis. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) , [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .
- NO >> ● Mark the box on the [AT-47, "DIAGNOSTIC WORK-SHEET"](#) .
 ● Go to [AT-217, "Vehicle Does Not Decelerate by Engine Brake"](#) .
 ● Stop "Road Test".



Vehicle Speed at Which Gear Shifting Occurs

UCS005MX

Throttle position	Vehicle speed km/h (MPH)					
	D1 → D2	D2 → D3	D3 → D4	D4 → D3	D3 → D2	D2 → D1
Full throttle	51 - 59 (32 - 37)	97 - 105 (60 - 65)	154 - 162 (96 - 101)	150 - 158 (93 - 98)	87 - 95 (54 - 59)	40 - 48 (25 - 30)
Half throttle	34 - 42 (21 - 26)	62 - 70 (39 - 43)	124 - 132 (77 - 82)	69 - 77 (43 - 48)	36 - 44 (22 - 27)	19 - 27 (12 - 17)

- At half throttle, the accelerator opening is 4/8 of the full opening.

Vehicle Speed at Which Lock-up Occurs/Releases

UCS005MY

Throttle position	Selector lever position	Vehicle speed km/h (MPH)	
		Lock-up ON	Lock-up OFF
2.0/8	"D" position	86 - 94 (53 - 58)	59 - 67 (37 - 42)
	"D" position (OD OFF)	86 - 94 (53 - 58)	83 - 91 (52 - 57)

TROUBLE DIAGNOSIS

Symptom Chart

UCS005MZ

Numbers are arranged in order of inspection.
Perform inspections starting with number one and work up.

Items	Symptom	Condition	Diagnostic item	Reference page
No Lock-up Engagement/TCC Inoperative	Torque converter is not locked up.	ON vehicle	1. Accelerator pedal position sensor	EC-537
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-103, AT-162
			3. Engine speed signal	AT-109
			4. A/T fluid temperature sensor	AT-98
			5. Line pressure test	AT-56
			6. Torque converter clutch solenoid valve	AT-130
			7. Control valve assembly	AT-236
		OFF vehicle	8. Torque converter	AT-262
	Torque converter clutch piston slip.	ON vehicle	1. A/T fluid level	MA-22
			2. Accelerator pedal position sensor	EC-537
			3. Line pressure test	AT-56
			4. Torque converter clutch solenoid valve	AT-130
			5. Line pressure solenoid valve	AT-141
			6. Control valve assembly	AT-236
		OFF vehicle	7. Torque converter	AT-262
Lock-up point is extremely high or low.	ON vehicle	1. Accelerator pedal position sensor	EC-537	
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-103, AT-162	
		3. Torque converter clutch solenoid valve	AT-130	
		4. Control valve assembly	AT-236	
Shift Shock	Sharp shock in shifting from "N" to "D" position.	ON vehicle	1. Engine idling speed	EC-75
			2. Accelerator pedal position sensor	EC-537
			3. Line pressure test	AT-56
			4. A/T fluid temperature sensor	AT-98
			5. Engine speed signal	AT-109
			6. Line pressure solenoid valve	AT-141
			7. Control valve assembly	AT-236
			8. Accumulator N-D	AT-236
		OFF vehicle	9. Forward clutch	AT-314
	Too sharp a shock in changing from D1 to D2 .	ON vehicle	1. Accelerator pedal position sensor	EC-537
			2. Line pressure test	AT-56
			3. Accumulator servo release	AT-236
			4. Control valve assembly	AT-236
			5. A/T fluid temperature sensor	AT-98
		OFF vehicle	6. Brake band	AT-337

TROUBLE DIAGNOSIS

Items	Symptom	Condition	Diagnostic item	Reference page
Shift Shock	Too sharp a shock in changing from D2 to D3 .	ON vehicle	1. Accelerator pedal position sensor	EC-537
			2. Line pressure test	AT-56
			3. Control valve assembly	AT-236
		OFF vehicle	4. High clutch	AT-308
			5. Brake band	AT-337
	Too sharp a shock in changing from D3 to D4 .	ON vehicle	1. Accelerator pedal position sensor	EC-537
			2. Line pressure test	AT-56
			3. Control valve assembly	AT-236
		OFF vehicle	4. Brake band	AT-337
			5. Overrun clutch	AT-314
	Gear change shock during deceleration by releasing accelerator pedal.	ON vehicle	1. Accelerator pedal position sensor	EC-537
			2. Line pressure test	AT-56
3. Overrun clutch solenoid valve			AT-157	
4. Control valve assembly			AT-236	
Large shock in changing from 12 to 11 in "1" position.	ON vehicle	1. Control valve assembly	AT-236	
	OFF vehicle	2. Low & reverse brake	AT-321	
Improper Shift Timing	Too high a gear change point from D1 to D2 , from D2 to D3 , from D3 to D4 .	ON vehicle	1. Accelerator pedal position sensor	EC-537
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-103 , AT-162
			3. Shift solenoid valve A	AT-147
			4. Shift solenoid valve B	AT-152
	Gear change directly from D1 to D3 occurs.	ON vehicle	1. A/T fluid level	MA-22
		OFF vehicle	2. Accumulator servo release	AT-236
	Too high a change point from D4 to D3 , from D3 to D2 , from D2 to D1 .	ON vehicle	3. Brake band	AT-337
			1. Accelerator pedal position sensor	EC-537
	Kickdown does not operate when depressing accelerator pedal in D4 within kickdown vehicle speed.	ON vehicle	2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-103 , AT-162
			3. Shift solenoid valve A	AT-147
			4. Shift solenoid valve B	AT-152
			1. Accelerator pedal position sensor	EC-537
	Kickdown operates or engine overruns when depressing accelerator pedal in D4 beyond kickdown vehicle speed limit.	ON vehicle	2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-103 , AT-162
			2. Accelerator pedal position sensor	EC-537
			3. Shift solenoid valve A	AT-147
			4. Shift solenoid valve B	AT-152
	Gear change from 22 to 23 in "2" position.	ON vehicle	1. PNP switch adjustment	AT-241
2. Control cable adjustment			AT-227	
Gear change from 11 to 12 in "1" position.	ON vehicle	1. PNP switch adjustment	AT-241	
		2. Control cable adjustment	AT-227	

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TROUBLE DIAGNOSIS

Items	Symptom	Condition	Diagnostic item	Reference page
No Down Shift	Failure to change gear from D4 to D3 .	ON vehicle	1. A/T fluid level	MA-22
			2. Accelerator pedal position sensor	EC-537
			3. Overrun clutch solenoid valve	AT-157
			4. Shift solenoid valve A	AT-147
			5. Line pressure solenoid valve	AT-141
			6. Control valve assembly	AT-236
		OFF vehicle	7. Brake band	AT-337
			8. Overrun clutch	AT-314
	Failure to change gear from D3 to D2 or from D4 to D2 .	ON vehicle	1. A/T fluid level	MA-22
			2. Accelerator pedal position sensor	EC-537
			3. Shift solenoid valve A	AT-147
			4. Shift solenoid valve B	AT-152
			5. Control valve assembly	AT-236
		OFF vehicle	6. High clutch	AT-308
			7. Brake band	AT-337
	Failure to change gear from D2 to D1 or from D3 to D1 .	ON vehicle	1. A/T fluid level	MA-22
			2. Accelerator pedal position sensor	EC-537
			3. Shift solenoid valve A	AT-147
			4. Shift solenoid valve B	AT-152
			5. Control valve assembly	AT-236
		OFF vehicle	6. Low one-way clutch	AT-262
7. High clutch			AT-308	
8. Brake band			AT-337	
Failure to change from D3 to 2 nd when shifting selector lever into "2" position. AT-213	ON vehicle	1. Accelerator pedal position sensor	EC-537	
		2. Shift solenoid valve B	AT-152	
		3. Control valve assembly	AT-236	
		4. Control cable adjustment	AT-227	
	OFF vehicle	5. Brake band	AT-337	
Does not change from 12 to 11 in 1st position.	ON vehicle	1. PNP switch adjustment	AT-241	
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-103 , AT-162	
		3. Shift solenoid valve A	AT-147	
		4. Control valve assembly	AT-236	
		5. Overrun clutch solenoid valve	AT-157	
	OFF vehicle	6. Overrun clutch	AT-314	
		7. Low & reverse brake	AT-321	

TROUBLE DIAGNOSIS

Items	Symptom	Condition	Diagnostic item	Reference page	
No Up Shift	Failure to change gear from D1 to D2 .	ON vehicle	1. Control cable adjustment	AT-227	A
			2. Shift solenoid valve A	AT-147	B
			3. Control valve assembly	AT-236	AT
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-103 , AT-162	
			5. Accelerator pedal position sensor	EC-537	
		OFF vehicle	6. Brake band	AT-337	
	Failure to change gear from D2 to D3 .	ON vehicle	1. Control cable adjustment	AT-227	D
			2. Shift solenoid valve B	AT-152	E
			3. Control valve assembly	AT-236	
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-103 , AT-162	
			5. Accelerator pedal position sensor	EC-537	
		OFF vehicle	6. High clutch	AT-308	F
			7. Brake band	AT-337	
	Failure to change gear from D3 to D4 .	ON vehicle	1. PNP switch adjustment	AT-241	G
			2. Overdrive control switch	AT-181	H
			3. Control cable adjustment	AT-227	
			4. Shift solenoid valve A	AT-147	
			5. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-103 , AT-162	I
			6. A/T fluid temperature sensor	AT-98	J
		OFF vehicle	7. Brake band	AT-337	
	A/T does not shift to D4 when driving with OD ON. (OD OFF indicator lamp is off.)	ON vehicle	1. Accelerator pedal position sensor	EC-537	K
2. PNP switch adjustment			AT-241	L	
3. Overdrive control switch			AT-181	M	
4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR			AT-103 , AT-162		
5. Shift solenoid valve A			AT-147		
6. Overrun clutch solenoid valve			AT-157		
7. Control valve assembly			AT-236		
8. A/T fluid temperature sensor			AT-98		
9. Line pressure solenoid valve			AT-141		
OFF vehicle		10. Brake band	AT-337		
		11. Overrun clutch	AT-314		

TROUBLE DIAGNOSIS

Items	Symptom	Condition	Diagnostic item	Reference page
Slips/Will Not Engage	Vehicle will not run in "R" position (but runs in "D", "2" and "1" positions). Clutch slips. Very poor acceleration.	ON vehicle	1. Control cable adjustment	AT-227
			2. Stall test	AT-53
			3. Line pressure test	AT-56
			4. Line pressure solenoid valve	AT-141
			5. Control valve assembly	AT-236
		OFF vehicle	6. Reverse clutch	AT-303
			7. High clutch	AT-308
			8. Forward clutch	AT-314
			9. Overrun clutch	AT-314
			10. Low & reverse brake	AT-321
	Vehicle will not run in "D" and "2" positions (but runs in "1" and "R" positions).	ON vehicle	1. Control cable adjustment	AT-227
		OFF vehicle	2. Low one-way clutch	AT-262
	Vehicle will not run in "D", "1", "2" positions (but runs in R position). Clutch slips. Very poor acceleration.	ON vehicle	1. A/T fluid level	MA-22
			2. Stall test	AT-53
			3. Line pressure test	AT-56
			4. Line pressure solenoid valve	AT-141
			5. Control valve assembly	AT-236
			6. Accumulator N-D	AT-236
		OFF vehicle	7. Reverse clutch	AT-303
			8. High clutch	AT-308
			9. Forward clutch	AT-314
10. Forward one-way clutch			AT-326	
11. Low one-way clutch			AT-262	
Clutches or brakes slip somewhat in starting.	ON vehicle	1. A/T fluid level	MA-22	
		2. Control cable adjustment	AT-227	
		3. Accelerator pedal position sensor	EC-537	
		4. Line pressure test	AT-56	
		5. Line pressure solenoid valve	AT-141	
		6. Control valve assembly	AT-236	
		7. Accumulator N-D	AT-236	
	OFF vehicle	8. Forward clutch	AT-314	
		9. Reverse clutch	AT-303	
		10. Low & reverse brake	AT-321	
		11. Oil pump	AT-283	
		12. Torque converter	AT-262	

TROUBLE DIAGNOSIS

Items	Symptom	Condition	Diagnostic item	Reference page
Slips/Will Not Engage	No creep at all. AT-197 , AT-199	ON vehicle	1. A/T fluid level	MA-22
			2. Line pressure test	AT-56
			3. Control valve assembly	AT-236
		OFF vehicle	4. Forward clutch	AT-314
			5. Oil pump	AT-283
			6. Torque converter	AT-262
	Almost no shock or clutches slipping in change from D1 to D2 .	ON vehicle	1. A/T fluid level	MA-22
			2. Accelerator pedal position sensor	EC-537
			3. Line pressure test	AT-56
			4. Accumulator servo release	AT-236
		OFF vehicle	5. Control valve assembly	AT-236
	Almost no shock or slipping in changing from D2 to D3 .	ON vehicle	1. A/T fluid level	MA-22
			2. Accelerator pedal position sensor	EC-537
			3. Line pressure test	AT-56
			4. Control valve assembly	AT-236
		OFF vehicle	5. High clutch	AT-308
			6. Forward clutch	AT-314
	Almost no shock or slipping in changing from D3 to D4 .	ON vehicle	1. A/T fluid level	MA-22
			2. Accelerator pedal position sensor	EC-537
			3. Line pressure test	AT-56
			4. Control valve assembly	AT-236
		OFF vehicle	5. Brake band	AT-337
	Races extremely fast or slips in changing from D4 to D3 when depressing accelerator pedal.	ON vehicle	1. A/T fluid level	MA-22
			2. Accelerator pedal position sensor	EC-537
			3. Line pressure test	AT-56
			4. Line pressure solenoid valve	AT-141
			5. Shift solenoid valve A	AT-147
6. Control valve assembly			AT-236	
OFF vehicle		7. Brake band	AT-337	
		8. Forward clutch	AT-314	
Races extremely fast or slips in changing from D4 to D2 when depressing accelerator pedal.	ON vehicle	1. A/T fluid level	MA-22	
		2. Accelerator pedal position sensor	EC-537	
		3. Line pressure test	AT-56	
		4. Line pressure solenoid valve	AT-141	
		5. Shift solenoid valve A	AT-147	
		6. Shift solenoid valve B	AT-152	
		7. Control valve assembly	AT-236	
	OFF vehicle	8. Brake band	AT-337	
		9. Forward clutch	AT-314	

TROUBLE DIAGNOSIS

Items	Symptom	Condition	Diagnostic item	Reference page
Slips/Will Not Engage	Races extremely fast or slips in changing from D3 to D2 when depressing accelerator pedal.	ON vehicle	1. A/T fluid level	MA-22
			2. Accelerator pedal position sensor	EC-537
			3. Line pressure test	AT-56
			4. Line pressure solenoid valve	AT-141
			5. Shift solenoid valve B	AT-152
			6. Control valve assembly	AT-236
	Races extremely fast or slips in changing from D4 or D3 to D1 when depressing accelerator pedal.	ON vehicle	7. Brake band	AT-337
			8. High clutch	AT-308
			1. A/T fluid level	MA-22
			2. Accelerator pedal position sensor	EC-537
Vehicle will not run in any position.	OFF vehicle	3. Line pressure test	AT-56	
		4. Line pressure solenoid valve	AT-141	
		5. Shift solenoid valve A	AT-147	
		6. Shift solenoid valve B	AT-152	
		7. Control valve assembly	AT-236	
		8. Forward clutch	AT-314	
Others	Engine cannot be started in "P" and "N" positions. AT-194	ON vehicle	9. Forward one-way clutch	AT-326
			10. Low one-way clutch	AT-262
			1. A/T fluid level	MA-22
	Engine starts in positions other than "P" and "N".	OFF vehicle	2. Control cable adjustment	AT-227
			3. Line pressure test	AT-56
			4. Line pressure solenoid valve	AT-141
	Transaxle noise in "P" and "N" positions.	ON vehicle	5. Oil pump	AT-283
			6. High clutch	AT-308
			7. Brake band	AT-337
		OFF vehicle	8. Low & reverse brake	AT-321
9. Torque converter			AT-262	
10. Parking components			AT-251	
Others	Engine cannot be started in "P" and "N" positions. AT-194	ON vehicle	1. Ignition switch and starter	PG-4, SC-8
			2. Control cable adjustment	AT-227
			3. PNP switch adjustment	AT-241
	Engine starts in positions other than "P" and "N".	ON vehicle	1. Control cable adjustment	AT-227
			2. PNP switch adjustment	AT-241
			1. A/T fluid level	MA-22
Transaxle noise in "P" and "N" positions.	ON vehicle	2. Line pressure test	AT-56	
		3. Accelerator pedal position sensor	EC-537	
		4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-103, AT-162	
		5. Oil pump	AT-283	
OFF vehicle	OFF vehicle	6. Torque converter	AT-262	

TROUBLE DIAGNOSIS

Items	Symptom	Condition	Diagnostic item	Reference page	
Others	Vehicle moves when changing into "P" position or parking gear does not disengage when shifted out of "P" position.	ON vehicle	1. Control cable adjustment	AT-227	A
		OFF vehicle	2. Parking components	AT-251	B
	Vehicle runs in "N" position. AT-195	ON vehicle	1. Control cable adjustment	AT-227	AT
		OFF vehicle	2. Forward clutch	AT-314	
			3. Reverse clutch	AT-303	
			4. Overrun clutch	AT-314	D
	Vehicle braked when shifting into "R" position.	ON vehicle	1. A/T fluid level	MA-22	E
			2. Control cable adjustment	AT-227	
			3. Line pressure test	AT-56	F
			4. Line pressure solenoid valve	AT-141	
			5. Control valve assembly	AT-236	G
		OFF vehicle	6. High clutch	AT-308	
			7. Brake band	AT-337	H
			8. Forward clutch	AT-314	
			9. Overrun clutch	AT-314	I
	Excessive creep.	ON vehicle	1. Engine idling speed	EC-75	J
	Engine stops when shifting lever into "R", "D", "2" and "1" positions.	ON vehicle	1. Engine idling speed	EC-75	K
			2. A/T fluid level	MA-22	
			3. Torque converter clutch solenoid valve	AT-130	L
			4. Control valve assembly	AT-236	
		OFF vehicle	5. Torque converter	AT-262	M
	Vehicle braked by gear change from D1 to D2 .	ON vehicle	1. A/T fluid level	MA-22	
		OFF vehicle	2. Reverse clutch	AT-303	
			3. Low & reverse brake	AT-321	K
4. High clutch			AT-308		
5. Low one-way clutch			AT-262	L	
Vehicle braked by gear change from D2 to D3 .	ON vehicle	1. A/T fluid level	MA-22		
	OFF vehicle	2. Brake band	AT-337		
Vehicle braked by gear change from D3 to D4 .	ON vehicle	1. A/T fluid level	MA-22		
	OFF vehicle	2. Overrun clutch	AT-314		
		3. Forward one-way clutch	AT-326		
		4. Reverse clutch	AT-303		

TROUBLE DIAGNOSIS

Items	Symptom	Condition	Diagnostic item	Reference page
Others	Maximum speed not attained. Poor acceleration.	ON vehicle	1. A/T fluid level	MA-22
			2. PNP switch adjustment	AT-240
			3. Overdrive control switch	AT-181
			4. Accelerator pedal position sensor	EC-537
			5. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-103 , AT-162
			6. Shift solenoid valve A	AT-147
			7. Shift solenoid valve B	AT-152
			8. Control valve assembly	AT-236
		OFF vehicle	9. Reverse clutch	AT-303
			10. High clutch	AT-308
			11. Brake band	AT-337
			12. Low & reverse brake	AT-321
			13. Oil pump	AT-283
			14. Torque converter	AT-262
	Transaxle noise in "D", "2", "1" and "R" positions.	ON vehicle	1. A/T fluid level	MA-22
		OFF vehicle	2. Torque converter	AT-262
	Engine brake does not operate in "1" position.	ON vehicle	1. PNP switch adjustment	AT-240
			2. Control cable adjustment	AT-227
			3. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-103 , AT-162
			4. Control valve assembly	AT-236
			5. Overrun clutch solenoid valve	AT-157
		OFF vehicle	6. Overrun clutch	AT-314
			7. Low & reverse brake	AT-321
	Transaxle overheats.	ON vehicle	1. A/T fluid level	MA-22
			2. Engine idling speed	EC-75
			3. Accelerator pedal position sensor	EC-537
			4. Line pressure test	AT-56
			5. Line pressure solenoid valve	AT-141
6. Control valve assembly			AT-236	
OFF vehicle		7. Oil pump	AT-283	
		8. Reverse clutch	AT-303	
		9. High clutch	AT-308	
		10. Brake band	AT-337	
		11. Forward clutch	AT-314	
		12. Overrun clutch	AT-314	
		13. Low & reverse brake	AT-321	
		14. Torque converter	AT-262	

TROUBLE DIAGNOSIS

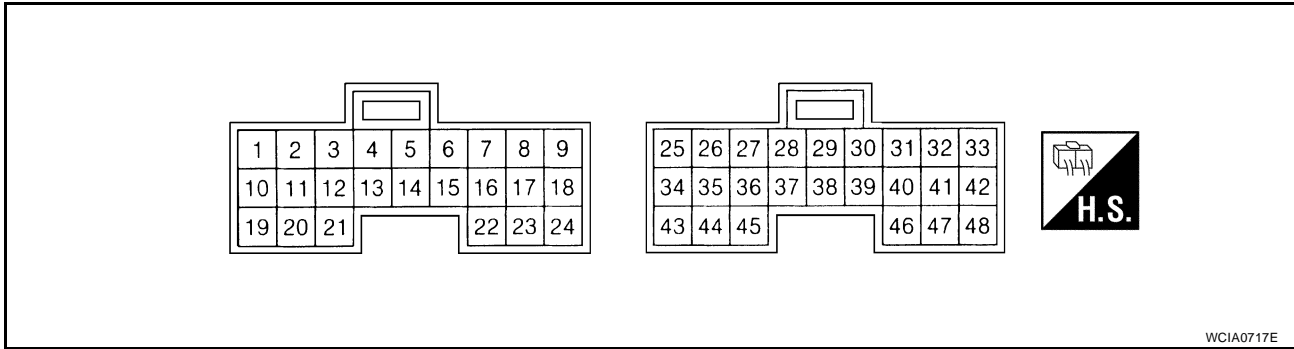
Items	Symptom	Condition	Diagnostic item	Reference page
Others	ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. A/T fluid level	MA-22
		OFF vehicle	2. Reverse clutch	AT-303
			3. High clutch	AT-308
			4. Brake band	AT-337
			5. Forward clutch	AT-314
			6. Overrun clutch	AT-314
			7. Low & reverse brake	AT-321
	Unusual smell at A/T fluid charging pipe.	ON vehicle	1. A/T fluid level	MA-22
		OFF vehicle	2. Torque converter	AT-262
			3. Oil pump	AT-283
			4. Reverse clutch	AT-303
			5. High clutch	AT-308
			6. Brake band	AT-337
			7. Forward clutch	AT-314
			8. Overrun clutch	AT-314
		9. Low & reverse brake	AT-321	

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TROUBLE DIAGNOSIS







TCM Terminals and Reference Values TCM HARNESS CONNECTOR TERMINAL LAYOUT

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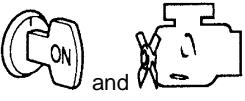

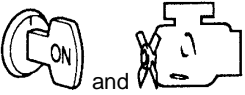

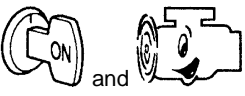

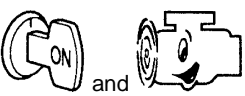


TERMINALS AND REFERENCE VALUES FOR TCM

TCM terminal data are reference values, measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
1	W	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0 V
				When depressing accelerator pedal fully after warming up engine.	0 V
2	P	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	4 - 14 V
				When depressing accelerator pedal fully after warming up engine.	0 V
3	GR	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15 V
				When A/T does not perform lock-up.	0 V
5	L	CAN H	—		—
6	P	CAN L	—		—
10	R	Power supply	When turning ignition switch to "ON".		Battery voltage
			When turning ignition switch to "OFF".		0 V
11	O	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in "D1 " or "D4 ".)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in "D2 " or "D3 ".)	0 V
12	G	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in "D1 " or "D2 ".)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in "D3 " or "D4 ".)	0 V
19	R	Power supply	When turning ignition switch to "ON".		Battery voltage
			When turning ignition switch to "OFF".		0 V
20	V	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to AT-22 .)	Battery voltage
				When overrun clutch solenoid valve does not operate. (When overrun clutch engaged. Refer to AT-22 .)	0 V
25	B	Ground	Always		0 V

TROUBLE DIAGNOSIS

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)	
26	Y	PNP switch "1" position		When setting selector lever to "1" position.	Battery voltage	
				When setting selector lever to other positions.	0 V	
27	G	PNP switch "2" position		When setting selector lever to "2" position.	Battery voltage	
				When setting selector lever to other positions.	0 V	
28	GR	Power supply (memory back-up)	Always		Battery voltage	
29	V	Revolution sensor		When driving at 20 km/h (12 MPH)	150 Hz	
30 ^{*1}	BR	CONSULT- II (RX)	—		—	
31 ^{*1}	Y	CONSULT- II (TX)	—		—	
34	LG	PNP switch "D" position		When setting selector lever to "D" position.	Battery voltage	
				When setting selector lever to other positions.	0 V	
35	SB	PNP switch "R" position		When setting selector lever to "R" position.	Battery voltage	
				When setting selector lever to other positions.	0 V	
36	R	PNP switch "N" or "P" position	When setting selector lever to "N" or "P" position.	Battery voltage		
			When setting selector lever to other positions.	0 V		
38	G	Turbine revolution sensor (power train revolution sensor)		When driving at 20 km/h (12 MPH)	360 Hz	
39 ^{*2}	L	Engine speed signal		Refer to EC-105 .		
40	O	Vehicle speed sensor		When driving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 0 V and more than 4.5 V	
42	B	Sensor ground	Always		0 V	
47	BR	A/T fluid temperature sensor		When A/T fluid temperature is 20°C (68°F).	1.5 V	
				When A/T fluid temperature is 80°C (176°F).	0.5 V	
48	B	Ground		Always		0 V

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

*2: These terminals are connected to the ECM.

TROUBLE DIAGNOSIS

CONSULT-II Function (A/T)

UCS005N1

CONSULT-II can display each diagnostic item using the diagnostic test models shown following.

FUNCTION

Diagnostic test mode	Function	Reference page
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-II.	—
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.	AT-82
Data monitor	Input/Output data in the TCM can be read.	AT-83
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.	AT-85
Function test	Performed by CONSULT-II instead of a technician to determine whether each system is "OK" or "NG".	—
DTC work support	Select the operating condition to confirm Diagnostic Trouble Codes.	AT-85
TCM part number	TCM part number can be read.	—

CONSULT-II REFERENCE VALUE

NOTICE:

- The CONSULT-II electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).
Check for time difference between actual shift timing and the CONSULT-II display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.
- Shift schedule (which implies gear position) displayed on CONSULT-II and that indicated in Service Manual may differ slightly. This occurs because of the following reasons:
 - Actual shift schedule has more or less tolerance or allowance,
 - Shift schedule indicated in Service Manual refers to the point where shifts start, and
 - Gear position displayed on CONSULT-II indicates the point where shifts are completed.
- Shift solenoid valve "A" or "B" is displayed on CONSULT-II at the start of shifting. Gear position is displayed upon completion of shifting (which is computed by TCM).

Item name	Condition	Display value (Approx.)
VHCL/S SE-A/T	During driving	Approximately matches the speedometer reading.
VHCL/S SE-MTR		
THROTTLE POSI	Released accelerator pedal.	0.0/8
	Fully depressed accelerator pedal.	8.0/8
FLUID TEMP SE	When A/T fluid temperature is 20°C (68°F).	1.5 V
	When A/T fluid temperature is 80°C (176°F).	0.5 V
BATTERY VOLT	When turning ignition switch to "ON".	Battery voltage
ENGINE SPEED	Engine running	Approximately matches the tachometer reading.
TURBINE REV	During driving (lock-up ON)	Approximately matches the engine speed.
OVERDRIVE SW	When overdrive control switch is depressed.	ON
	When overdrive control switch is released.	OFF
PN POSI SW	When setting selector lever to "N" or "P" position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to "R" position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to "D" position.	ON
	When setting selector lever to other positions.	OFF

TROUBLE DIAGNOSIS

Item name	Condition	Display value (Approx.)	
2 POSITION SW	When setting selector lever to "2" position.	ON	A
	When setting selector lever to other positions.	OFF	
1 POSITION SW	When setting selector lever to "1" position.	ON	B
	When setting selector lever to other positions.	OFF	
CLOSED THL/SW	Released accelerator pedal.	ON	AT
	Depressed accelerator pedal.	OFF	
W/O THRL/P-SW	Fully depressed accelerator pedal.	ON	
	Released accelerator pedal.	OFF	D
SHIFT S/V A	When shift solenoid valve A operates. (When driving in "D1 " or "D4 ".)	ON	
	When shift solenoid valve A does not operate. (When driving in "D2 " or "D3 ".)	OFF	E
SHIFT S/V B	When shift solenoid valve B operates. (When driving in "D1 " or "D2 ".)	ON	F
	When shift solenoid valve B does not operate. (When driving in "D3 " or "D4 ".)	OFF	
OVERRUN/C S/V	When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to AT-22 .)	ON	G
	When overrun clutch solenoid valve does not operate. (When overrun clutch engaged. Refer to AT-22 .)	OFF	H
BRAKE SW	Depressed brake pedal.	ON	
	Released brake pedal.	OFF	I
GEAR	During driving	1, 2, 3, 4	
SLCT LVR POSI	When setting selector lever to "N" or "P" positions.	N · P	J
	When setting selector lever to "R" position.	R	
	When setting selector lever to "D" position.	D	K
	When setting selector lever to "2" position.	2	
VEHICLE SPEED	During driving	Approximately matches the speedometer reading.	L
LINE PRES DTY	Line pressure low ⇔ Line pressure high	0 % ⇔ 94 %	
TCC S/V DUTY	Lock-up OFF ⇔ Lock-up ON	4 % ⇔ 94 %	M

TROUBLE DIAGNOSIS

CONSULT-II SETTING PROCEDURE

Rafer to [GI-38, "CONSULT-II Start Procedure"](#) .

SELF-DIAGNOSTIC RESULT MODE

After performing [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) , place check marks for results on the [AT-47, "DIAGNOSTIC WORKSHEET"](#) . Reference pages are provided following the items.

Display Items List

Items (CONSULT-II screen terms)	Malfunction is detected when...	OBD-II (DTC)	Reference page
		MIL indicator lamp*1, "ENGINE" with CONSULT-II or GST	
CAN COMM CIRCUIT	● When TCM is not transmitting or receiving CAN communication signal for 2 seconds or more.	U1000	AT-90
PNP SW/CIRC	● TCM does not receive the correct voltage signal (based on the gear position) from the switch.	P0705	AT-93
ATF TEMP SEN/CIRC	● TCM receives an excessively low or high voltage from the sensor.	P0710	AT-98
VHCL SPEED SEN-A/T	● TCM does not receive the proper voltage signal from the sensor.	P0720	AT-103
ENGINE SPEED SIG	● TCM does not receive the proper voltage signal from the ECM.	P0725	AT-109
A/T 1ST GR FNCTN	● A/T cannot be shifted to the 1st gear position even if electrical circuit is good.	P0731*2	AT-113
A/T 2ND GR FNCTN	● A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	P0732*2	AT-117
A/T 3RD GR FNCTN	● A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.	P0733*2	AT-120
A/T 4TH GR FNCTN	● A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	P0734*2	AT-124
T/C CLUTCH SOL/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P0740	AT-130
A/T TCC S/V FNCTN	● A/T cannot perform lock-up even if electrical circuit is good.	P0744*2	AT-135
LINE PRESSURE S/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P0745	AT-141
SHIFT SOLENOID/V A	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P0750	AT-147
SHIFT SOLENOID/V B	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P0755	AT-152
OVERRUN CLUTCH S/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P1760	AT-157
VHCL SPEED SEN-MTR	● TCM does not receive the proper voltage signal from the sensor.	—	AT-162
BATT/FLUID TEMP SEN	● TCM receives an excessively low or high voltage from the sensor.	—	AT-165
TURBINE SENSOR	● TCM does not receive proper voltage signal from sensor.	—	AT-171
CONTROL UNIT (RAM)	● TCM memory (RAM) is malfunctioning.	—	AT-177
CONTROL UNIT (ROM)	● TCM memory (ROM) is malfunctioning.	—	AT-177
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED)	● No failure has been detected.	—	—

*1: Refer to [AT-42, "Malfunction Indicator Lamp \(MIL\)"](#) .

*2: These malfunctions cannot be displayed MIL if another malfunction is assigned to MIL.

TROUBLE DIAGNOSIS

DATA MONITOR MODE

Display Items List

X: Standard, —: Not applicable, ▼: Option

Monitored item (Unit)	Monitor Item Selection			Remarks
	TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
VHCL/S SE-A/T (km/h)	X	—	▼	Revolution sensor
VHCL/S SE-MTR (km/h)	X	—	▼	Vehicle speed display may not be accurate under approx. 10 km/h (6 mph). It may not indicate 0 km/h (0 mph) when vehicle is stationary.
THRTL POS SEN (V)	X	—	▼	
FLUID TEMP SE (V)	X	—	▼	
BATTERY VOLT (V)	X	—	▼	
ENGINE SPEED (rpm)	X	X	▼	
TURBINE REV (rpm)	X	—	▼	
OVERDRIVE SW (ON/OFF)	X	—	▼	
PN POSI SW (ON/OFF)	X	—	▼	
R POSITION SW (ON/OFF)	X	—	▼	
D POSITION SW (ON/OFF)	X	—	▼	
2 POSITION SW (ON/OFF)	X	—	▼	
1 POSITION SW (ON/OFF)	X	—	▼	
ASCD-CRUISE (ON/OFF)	X	—	▼	Signal input with CAN communication.
ASCD-OD CUT (ON/OFF)	X	—	▼	
KICKDOWN SW (ON/OFF)	X	—	▼	Not mounted but displayed.
POWERSHIFT SW (ON/OFF)	X	—	▼	
CLOSED THL/SW (ON/OFF)	X	—	▼	Signal input with CAN communication.
W/O THRL/P-SW (ON/OFF)	X	—	▼	
*SHIFT S/V A (ON/OFF)	—	—	▼	Displays status of check signal (reinput signal) for TCM control signal output. Remains unchanged when solenoid valves are open or shorted.
*SHIFT S/V B (ON/OFF)	—	—	▼	
*OVRRUN/C S/V (ON/OFF)	—	—	▼	
HOLD SW (ON/OFF)	X	—	▼	Not mounted but displayed.
BRAKE SW (ON/OFF)	X	—	▼	Stop lamp switch (Signal input with CAN communication)
GEAR	—	X	▼	Gear position recognized by the TCM updated after gear-shifting
SLCT LVR POSI	—	X	▼	Selector lever position is recognized by the TCM. For fail-safe operation, the specific value used for control is displayed.
VEHICLE SPEED (km/h)	—	X	▼	Vehicle speed recognized by the TCM.
THROTTLE POSI (0.0/8)	—	X	▼	Degree of opening for accelerator recognized by the TCM For fail-safe operation, the specific value used for control is displayed.

A
B
AT
D
E
F
G
H
I
J
K
L
M

TROUBLE DIAGNOSIS

Monitored item (Unit)	Monitor Item Selection			Remarks
	TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
LINE PRES DTY (%)	—	X	▼	
TCC S/V DUTY (%)	—	X	▼	
SHIFT S/V A (ON/OFF)	—	X	▼	
SHIFT S/V B (ON/OFF)	—	X	▼	
OVERRUN/C S/V (ON/OFF)	—	X	▼	
SELF-D DP LMP (ON/OFF)	—	X	▼	
TC SLIP RATIO (0.000)	—	—	▼	
TC SLIP SPEED (rpm)	—	—	▼	Difference between engine speed and torque converter input shaft speed
Voltage (V)	—	—	▼	Displays the value measured by the voltage probe.
Frequency (Hz)	—	—	▼	The value measured by the pulse probe is displayed.
DUTY-HI (high) (%)	—	—	▼	
DUTY-LOW (low) (%)	—	—	▼	
PLS WIDTH-HI (ms)	—	—	▼	
PLS WIDTH-LOW (ms)	—	—	▼	

TROUBLE DIAGNOSIS

CAN DIAGNOSTIC SUPPORT MONITOR MODE

Refer to [LAN-13, "CAN Diagnostic Support Monitor"](#) .

DTC WORK SUPPORT MODE

Display Items List

DTC work support item	Description	Check item
1ST GR FNCTN P0731	<p>Following items for "A/T 1st gear function (P0731)" can be confirmed.</p> <ul style="list-style-type: none"> ● Self-diagnosis status (whether the diagnosis is being performed or not) ● Self-diagnostic results (OK or NG) 	<ul style="list-style-type: none"> ● Shift solenoid valve A ● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit
2ND GR FNCTN P0732	<p>Following items for "A/T 2nd gear function (P0732)" can be confirmed.</p> <ul style="list-style-type: none"> ● Self-diagnosis status (whether the diagnosis is being performed or not) ● Self-diagnostic results (OK or NG) 	<ul style="list-style-type: none"> ● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit
3RD GR FNCTN P0733	<p>Following items for "A/T 3rd gear function (P0733)" can be confirmed.</p> <ul style="list-style-type: none"> ● Self-diagnosis status (whether the diagnosis is being performed or not) ● Self-diagnostic results (OK or NG) 	<ul style="list-style-type: none"> ● Shift solenoid valve A ● Each clutch ● Hydraulic control circuit
4TH GR FNCTN P0734	<p>Following items for "A/T 4th gear function (P0734)" can be confirmed.</p> <ul style="list-style-type: none"> ● Self-diagnosis status (whether the diagnosis is being performed or not) ● Self-diagnostic results (OK or NG) 	<ul style="list-style-type: none"> ● Shift solenoid valve A ● Shift solenoid valve B ● Overrun clutch solenoid valve ● Line pressure solenoid valve ● Each clutch ● Hydraulic control circuit
TCC S/V FNCTN P0744	<p>Following items for "A/T TCC S/V function (lock-up) (P0744)" can be confirmed.</p> <ul style="list-style-type: none"> ● Self-diagnosis status (whether the diagnosis is being performed or not) ● Self-diagnostic results (OK or NG) 	<ul style="list-style-type: none"> ● Torque converter clutch solenoid valve ● Each clutch ● Hydraulic control circuit

TROUBLE DIAGNOSIS

Diagnostic Procedure Without CONSULT-II

UCS005N2

⊗ TCM SELF-DIAGNOSTIC PROCEDURE

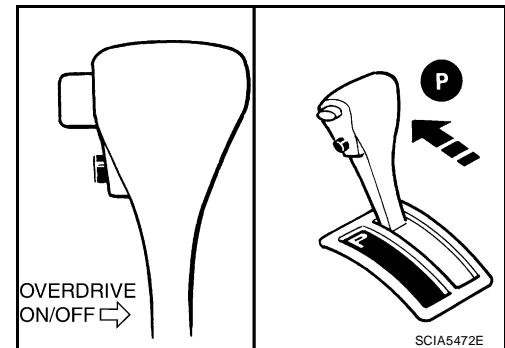
Description

If a malfunction occurs in electrical system, turning ignition switch ON will illuminate OD OFF indicator lamp for 2 seconds. To detect a malfunction, entering a self-diagnosis start signal retrieves information on malfunctions from memory and indicates malfunction by blinking OD OFF indicator lamp.

Diagnostic Procedure

1. CHECK OD OFF INDICATOR LAMP

1. Park vehicle on flat surface.
2. Move selector lever to "P" position.
3. Turn ignition switch OFF. Wait at least 5 seconds.

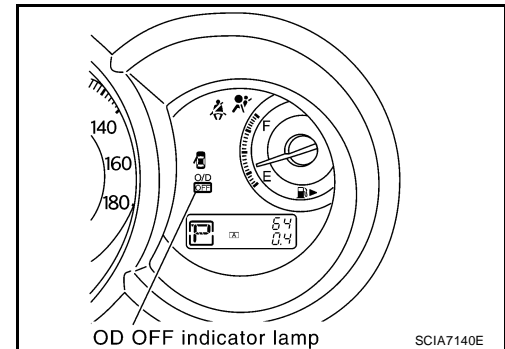


4. Turn ignition switch ON. (Do not start engine.)

Does OD OFF indicator lamp come on about 2 seconds?

YES >> GO TO 2.

NO >> Stop procedure. Perform [AT-192, "OD OFF Indicator Lamp Does Not Come On"](#) before proceeding.



2. JUDGEMENT PROCEDURE STEP 1

1. Turn ignition switch OFF.
2. Keep pressing shift lock release button.
3. Move selector lever from "P" to "D" position.
4. Turn ignition switch ON. (Do not start engine.)
5. Keep pressing overdrive control switch while OD OFF indicator lamp is lighting up for 2 seconds. (OD OFF indicator lamp is on.)
6. Keep pressing overdrive control switch and shift selector lever to the "2" position. (OD OFF indicator lamp is on.)
7. Stop pressing overdrive control switch. (OD OFF indicator lamp is on.)
8. Shift selector lever to the "1" position. (OD OFF indicator lamp is on.)
9. Keep pressing overdrive control switch. (OD OFF indicator lamp is off.)
10. Depress accelerator pedal fully while pressing overdrive control switch.

>> GO TO 3.

TROUBLE DIAGNOSIS

3. CHECK SELF-DIAGNOSIS CODE

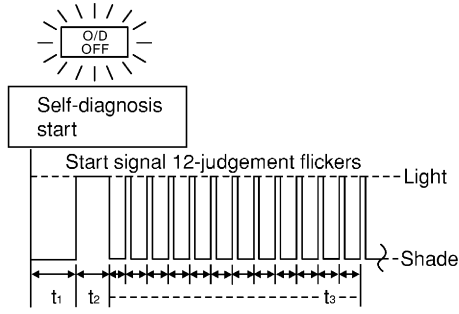
Check OD OFF indicator lamp. Refer to [AT-87, "Judgement of Self-diagnosis Code"](#) .

>> DIAGNOSIS END

Judgement of Self-diagnosis Code

OD OFF indicator lamp

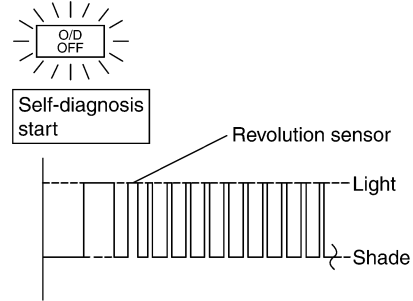
All judgement flickers are the same.



SCIA7161E

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

1st judgement flicker is longer than others.

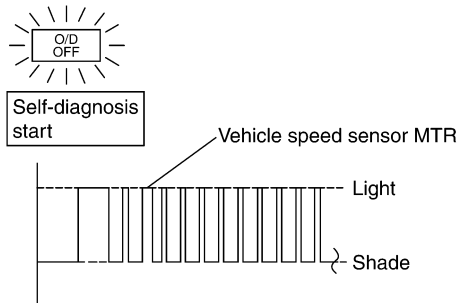


SCIA5591E

Revolution sensor circuit is short-circuited or disconnected.

⇒ Go to [AT-103, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) .

2nd judgement flicker is longer than others.

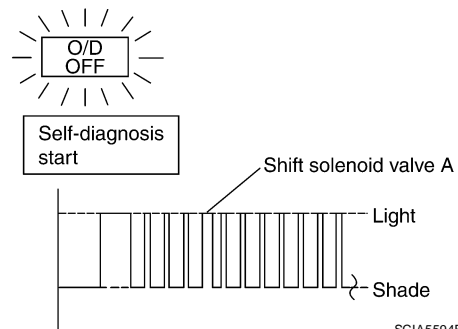


SCIA5592E

Vehicle speed sensor circuit is short-circuited or disconnected.

⇒ Go to [AT-162, "DTC VEHICLE SPEED SENSOR MTR"](#) .

4th judgement flicker is longer than others.

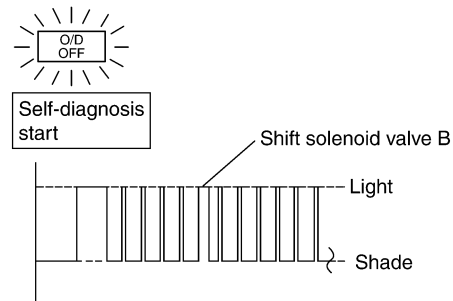


SCIA5594E

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

⇒ Go to [AT-147, "DTC P0750 SHIFT SOLENOID VALVE A"](#) .

5th judgement flicker is longer than others.

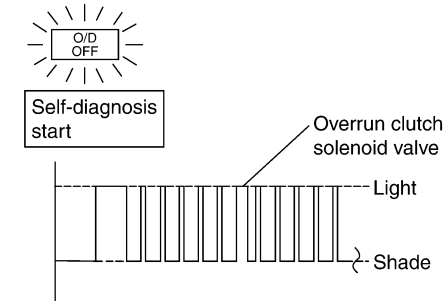


SCIA5595E

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

⇒ Go to [AT-152, "DTC P0755 SHIFT SOLENOID VALVE B"](#) .

6th judgement flicker is longer than others.



SCIA5596E

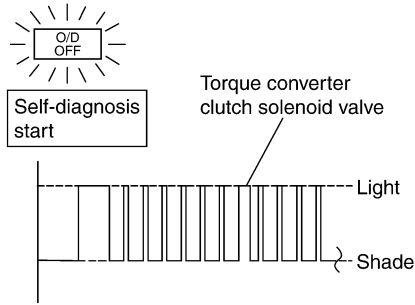
Overrun clutch solenoid valve circuit is short-circuited or disconnected.

⇒ Go to [AT-157, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"](#) .

TROUBLE DIAGNOSIS

OD OFF indicator lamp

7th judgement flicker is longer than others.

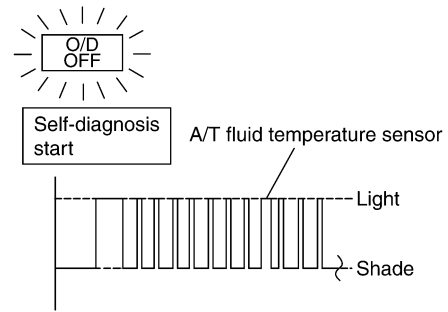


SCIA5597E

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

⇒ Go to **AT-130, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"** .

8th judgement flicker is longer than others.

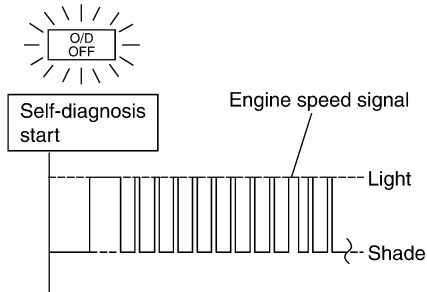


SCIA5598E

A/T fluid temperature sensor is disconnected or TCM power supply circuit is damaged.

⇒ Go to **AT-165, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"** .

9th judgement flicker is longer than others.

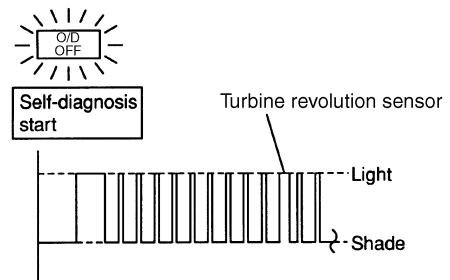


SCIA5599E

Engine speed signal circuit is short-circuited or disconnected.

⇒ Go to **AT-109, "DTC P0725 ENGINE SPEED SIGNAL"** .

10th judgement flicker is longer than others.



SCIA7082E

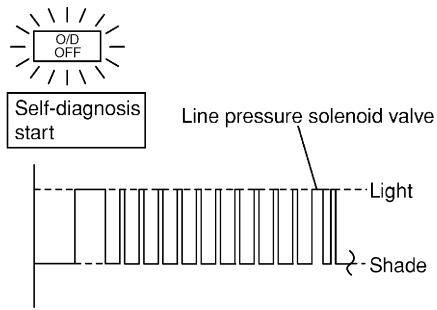
Turbine revolution sensor (power train revolution sensor) circuit is short-circuited or disconnected.

⇒ Go to **AT-171, "DTC TURBINE REVOLUTION SENSOR"** .

TROUBLE DIAGNOSIS

OD OFF indicator lamp

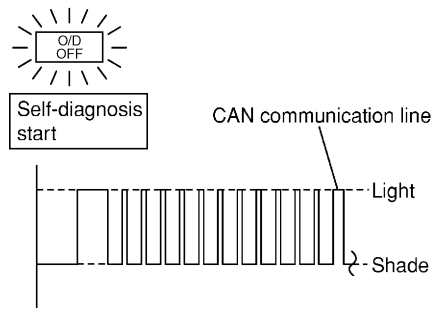
11th judgement flicker is longer than others.



Line pressure solenoid valve circuit is short-circuited or disconnected.

⇒ Go to [AT-141, "DTC P0745 LINE PRESSURE SOLENOID VALVE"](#) .

12th judgement flicker is longer than others.



CAN communication line is damaged.

⇒ Go to [AT-90, "DTC U1000 CAN COMMUNICATION LINE"](#) .

Lamp turns off.



Park/neutral position (PNP) switch, overdrive control switch, closed throttle position signal or wide open throttle position signal circuit is disconnected or TCM is damaged.

(Because overdrive control switch signal, closed throttle position signal and wide open throttle position signal are input via CAN communication line malfunction may continue after self-diagnosis.)

⇒ Go to [AT-221, "TCM Self-diagnosis Does Not Activate"](#) .

t1 = 2.5 seconds t2 = 2.0 seconds t3 = 1.0 second

How to Erase Self-diagnostic Results

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait for at least 5 seconds and then turn it ON again.
2. Perform [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .
3. Turn ignition switch OFF. (The self-diagnostic results will be erased.)

DTC U1000 CAN COMMUNICATION LINE

DTC U1000 CAN COMMUNICATION LINE

PFP:31940

Description

UCS005N8

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent malfunction detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

On Board Diagnosis Logic

UCS005N9

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code "U1000 CAN COMM CIRCUIT" with CONSULT-II or 12th judgement flicker without CONSULT-II is detected when TCM cannot communicate to other control units.

Possible Cause

UCS005NA

Harness or connector
(CAN communication line is open or shorted.)

DTC Confirmation Procedure

UCS005NB

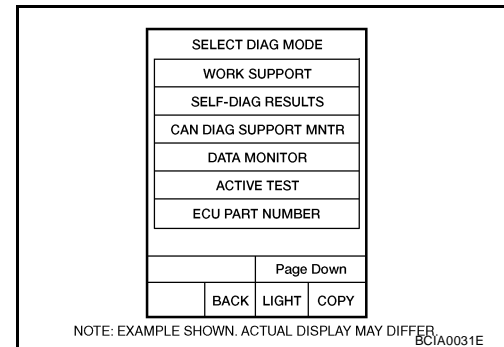
CAUTION:

If performing this "DTC Confirmation Procedure" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Touch "START".
4. Wait at least 6 seconds or start engine and wait for at least 6 seconds.
5. If DTC is detected, go to [AT-92, "Diagnostic Procedure"](#).



WITH GST

Follow the procedure "WITH CONSULT-II".

WITHOUT CONSULT-II




1. Turn ignition switch ON.
2. Wait at least 6 seconds or start engine and wait at least 6 seconds.
3. Perform self-diagnosis. Refer to [AT-86, "Diagnostic Procedure Without CONSULT-II"](#).
4. If DTC is detected, go to [AT-92, "Diagnostic Procedure"](#).

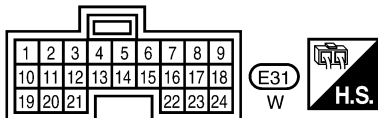
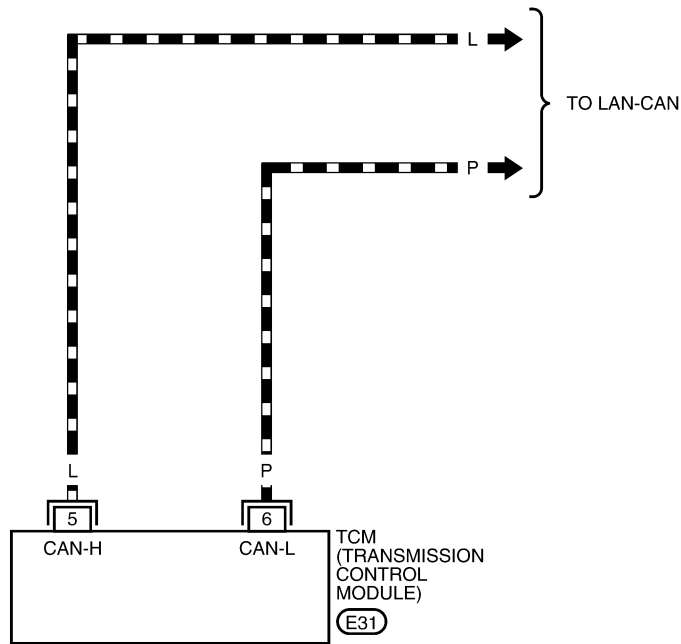
DTC U1000 CAN COMMUNICATION LINE

Wiring Diagram — AT — CAN

UCS005NC

AT-CAN-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : DATA LINE



BCWA0648E

DTC U1000 CAN COMMUNICATION LINE

TCM TERMINALS AND REFERENCE VALUES

Refer to [AT-78, "TCM HARNESS CONNECTOR TERMINAL LAYOUT"](#) .

Diagnostic Procedure

UCS005ND

1. CHECK CAN COMMUNICATION CIRCUIT

Ⓟ With CONSULT-II

1. Turn ignition switch ON and start engine.
2. Select "SELF-DIAG RESULTS" mode for "A/T" with CONSULT-II.

Is any malfunction of the "U1000 CAN COMM CIRCUIT" indicated?

- YES >> Print out CONSULT-II screen, Go to LAN section. Refer to [LAN-47, "CAN System Specification Chart"](#) .
- NO >> **INSPECTION END**

SELF-DIAG RESULTS			
DTC RESULTS			
CAN COMM CIRCUIT			
			F.F. DATA
ERASE		PRINT	
MODE	BACK	LIGHT	COPY

SCIA7135E

DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

PF0:32006

Description

UCS005NE

- The PNP switch assembly includes a transaxle range switch.
- The transaxle range switch detects the selector lever position and sends a signal to the TCM.

CONSULT-II Reference Value

UCS005NF

Item name	Condition	Display value
PN POSI SW	When setting selector lever to "N" or "P" position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to "R" position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to "D" position.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to "2" position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to "1" position.	ON
	When setting selector lever to other positions.	OFF

On Board Diagnosis Logic

UCS005NG

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code "P0705 PNP SW/CIRC" with CONSULT-II is detected when TCM does not receive the correct voltage signal from the switch based on the gear position.

Possible Cause

UCS005NH

- Harness or connectors
[The PNP switch circuit is open or shorted.]
- PNP switch

DTC Confirmation Procedure

UCS005NI

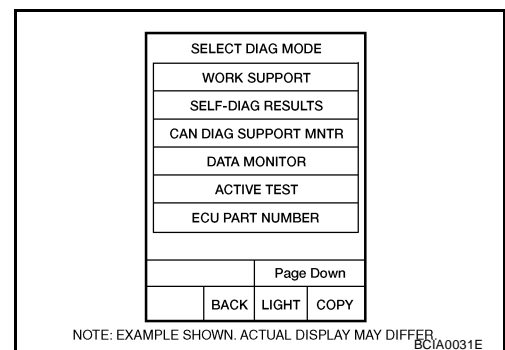
CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this "DTC Confirmation Procedure" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

Ⓟ WITH CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Touch "START".
4. Start engine and maintain the following conditions for at least 5 consecutive seconds.
VEHICLE SPEED: 10 km/h (6 MPH) or more
THROTTLE POSI: More than 1.0/8
SLCT LVR POSI: "D" position
5. If the check result is NG, go to [AT-95, "Diagnostic Procedure"](#).



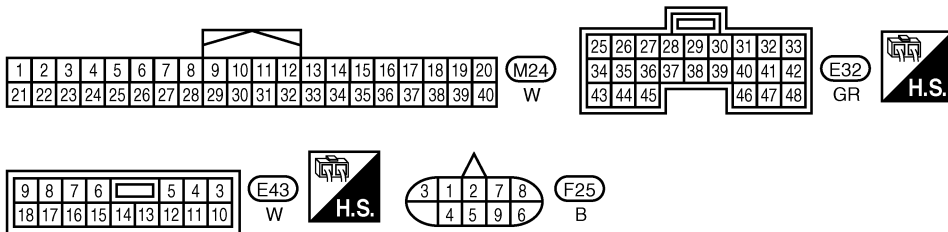
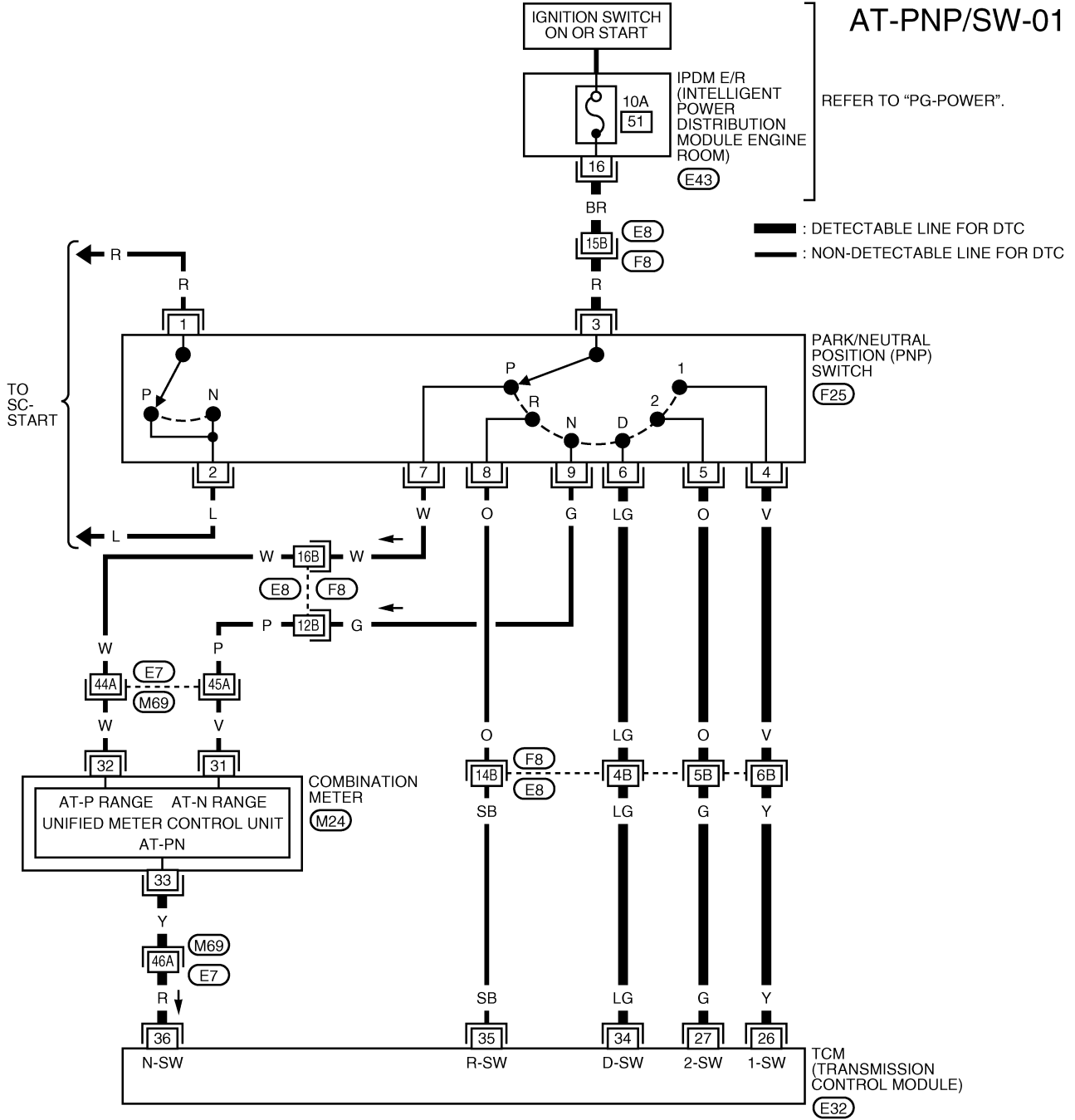
Ⓢ WITH GST

Follow the procedure "WITH CONSULT-II".

DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

UCS005NJ

Wiring Diagram — AT — PNP/SW



REFER TO THE FOLLOWING.
 (M69), (F8) - SUPER
 MULTIPLE JUNCTION (SMJ)

BCWA0771E

DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

TCM TERMINALS AND REFERENCE VALUES

Refer to [AT-78, "TCM HARNESS CONNECTOR TERMINAL LAYOUT"](#) .

Diagnostic Procedure

UCS005NK

1. CHECK INPUT SIGNAL

Ⓜ With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out "P·N", "R", "D", "2" and "1" position switches moving selector lever to each position.

Item name	Condition	Display value
PN POSI SW	When setting selector lever to "N" or "P" position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to "R" position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to "D" positions.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to "2" position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to "1" position.	ON
	When setting selector lever to other positions.	OFF

DATA MONITOR	
MONITORING	
PN POSI SW	OFF
R POSITION SW	OFF
D POSITION SW	OFF
2 POSITION SW	ON
1 POSITION SW	OFF

SAT701J

OK or NG

- OK >> GO TO 6.
 NG >> GO TO 3.

A
B
AT
D
E
F
G
H
I
J
K
L
M

DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

2. CHECK INPUT SIGNAL

⊗ Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground while moving selector lever through each position.

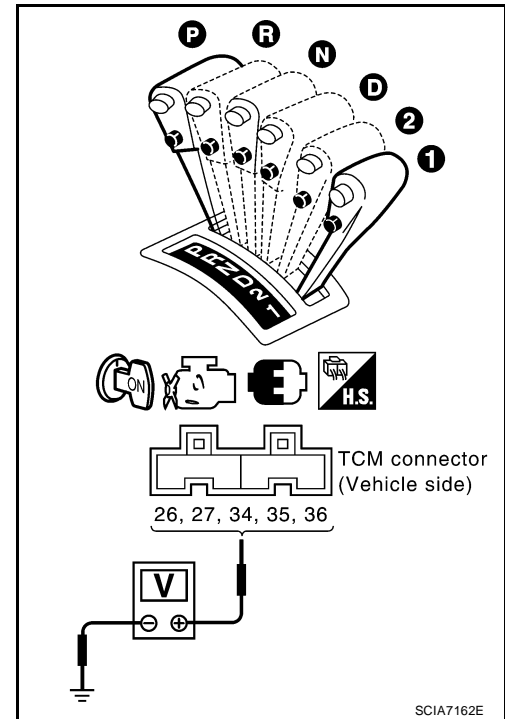
Selector lever position	Terminal				
	36	35	34	27	26
P, N	B	0	0	0	0
R	0	B	0	0	0
D	0	0	B	0	0
2	0	0	0	B	0
1	0	0	0	0	B

B: Battery voltage

0: 0V

OK or NG

- OK >> GO TO 6.
 NG >> GO TO 3.



SCIA7162E

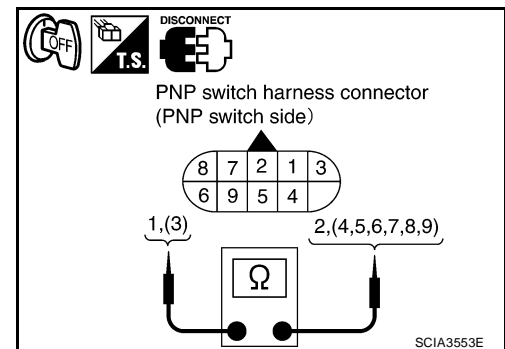
3. CHECK PNP SWITCH

1. Turn ignition switch OFF.
2. Disconnect PNP switch harness connector.
3. Check continuity between PNP switch harness connector terminals.

Selector lever position	Connector	Terminal	Continuity
P	F25	1 - 2, 3 - 7	Yes *Continuity should not exist in positions other than the specified positions.
R		3 - 8	
N		1 - 2, 3 - 9	
D		3 - 6	
2		3 - 5	
1		3 - 4	

OK or NG

- OK >> GO TO 5.
 NG >> GO TO 4.



SCIA3553E

4. CHECK CONTROL CABLE ADJUSTMENT

Check PNP switch again with control cable disconnected from manual shaft of A/T assembly. Refer to test group 3.

OK or NG

- OK >> Adjust control cable. Refer to [AT-227, "Adjustment of A/T Position"](#) .
 NG >> Check PNP switch (Refer to test group 1) again after adjusting PNP switch (Refer to [AT-241](#)) .
- If OK, **INSPECTION END**
 - If NG, repair or replace PNP switch. Refer to [AT-240, "Park/Neutral Position \(PNP\) Switch"](#) .

DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

5. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between ignition switch and PNP switch.
- Harness for short or open between PNP switch and TCM.
- Harness for short or open between combination meter and PNP switch.
- Harness for short or open between combination meter and TCM.
- 10A fuse (No.51, located in the IPDM E/R)
- Combination meter. Refer to [DI-5, "COMBINATION METERS"](#) .
- Ignition switch. Refer to [PG-4, "POWER SUPPLY ROUTING CIRCUIT"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace damaged parts.

6. CHECK DTC

Perform [AT-93, "DTC Confirmation Procedure"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 7.

7. CHECK TCM

1. Check TCM input/output signal. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
- NG >> Repair or replace damaged parts.

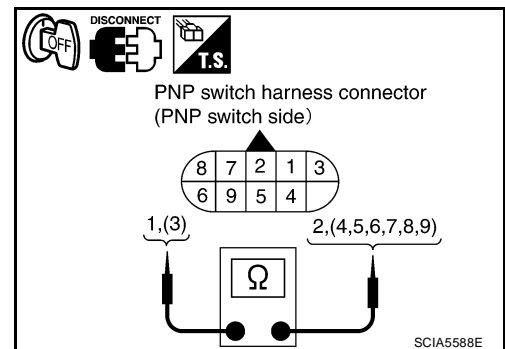
Component Inspection

PNP SWITCH

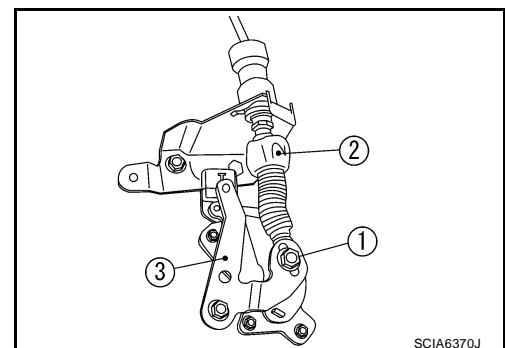
UCS005NL

1. Check continuity between PNP switch harness connector terminals.

Selector lever position	Connector	Terminal	Continuity
"P"	F25	1 - 2, 3 - 7	Yes *Continuity should not exist in positions other than the specified positions.
"R"		3 - 8	
"N"		1 - 2, 3 - 9	
"D"		3 - 6	
"2"		3 - 5	
"1"		3 - 4	



2. If NG, check again with control cable (2) disconnected from manual shaft of A/T assembly. Refer to step 1.
(1): Lock nut
(3): Manual shaft
3. If OK on step 2, adjust control cable (2). Refer to [AT-227, "Adjustment of A/T Position"](#) .
4. If NG on step 2, remove PNP switch from A/T and check continuity of PNP switch terminals. Refer to step 1.
5. If OK on step 4, adjust PNP switch. Refer to [AT-241, "PARK/NEUTRAL POSITION \(PNP\) SWITCH ADJUSTMENT"](#) .
6. If NG on step 4, replace PNP switch. Refer to [AT-240, "Park/Neutral Position \(PNP\) Switch"](#) .



DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

PF3:31940

Description

UCS005NM

The A/T fluid temperature sensor detects the A/T fluid temperature and sends a signal to the TCM.

CONSULT-II Reference Value

UCS005NN

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
FLUID TEMP SE	When A/T fluid temperature is 20°C (68°F).	1.5 V
	When A/T fluid temperature is 80°C (176°F).	0.5 V

On Board Diagnosis Logic

UCS005NO

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0710 ATF TEMP SEN/CIRC” with CONSULT-II is detected when TCM receives an excessively low or high voltage from the sensor.

Possible Cause

UCS005NP

- Harness or connector
(The sensor circuit is open or shorted.)
- A/T fluid temperature sensor

DTC Confirmation Procedure

UCS005NQ

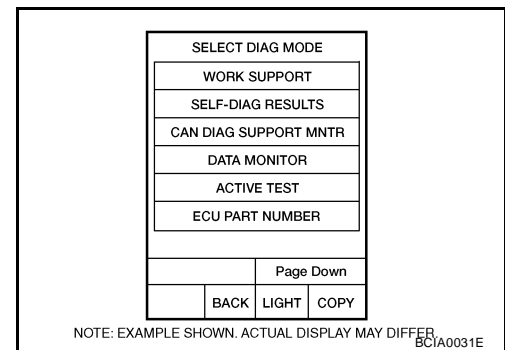
CAUTION:

- Always drive vehicle at a safe speed.
- If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

④ WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Touch “START”.
3. Start engine and maintain the following conditions for at least 10 minutes (Total). (It is not necessary to maintain continuously.)
ENGINE SPEED: 450 rpm or more
VEHICLE SPEED: 10 km/h (6 MPH) or more
THROTTLE POSI: More than 1.0/8
SLCT LVR POSI: “D” position
4. If the check result is NG, go to [AT-100, "Diagnostic Procedure"](#).



④ WITH GST

Follow the procedure “With CONSULT-II”.

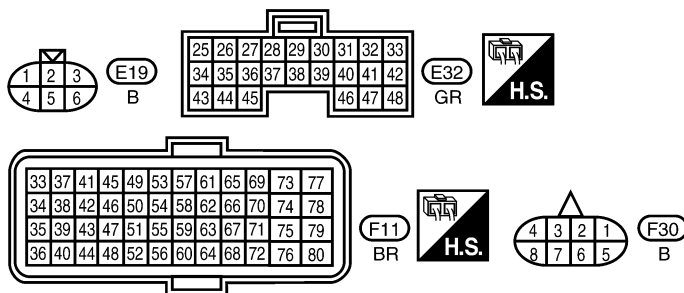
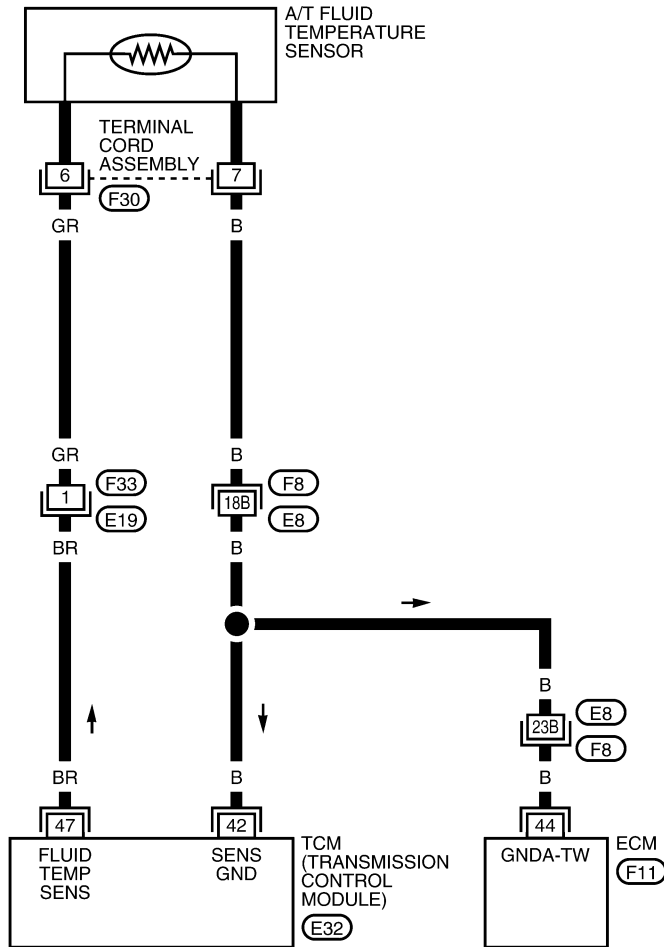
DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

Wiring Diagram — AT — FTS

UCS005NR

AT-FTS-01

— : DETECTABLE LINE FOR DTC
— : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.
(F8) - SUPER MULTIPLE JUNCTION (SMJ)

BCWA0650E

DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

TCM TERMINALS AND REFERENCE VALUES

Refer to [AT-78, "TCM HARNESS CONNECTOR TERMINAL LAYOUT"](#) .

Diagnostic Procedure

UCS005NS

1. CHECK INPUT SIGNAL

Ⓟ With CONSULT-II

1. Start engine.
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "FLUID TEMP SE".

Item name	Condition	Display value (Approx.)
FLUID TEMP SE	When A/T fluid temperature is 20°C (68°F).	1.5 V
	When A/T fluid temperature is 80°C (176°F).	0.5 V

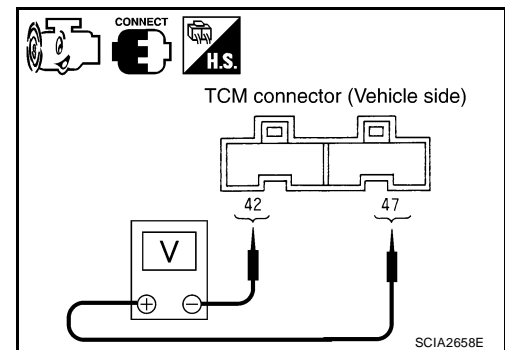
DATA MONITOR	
MONITORING	
VHCL/S SE-A/T	XXX km/h
VHCL/S SE-MTR	XXX km/h
THRTL POS SEN	XXX V
FLUID TEMP SE	XXX V
BATTERY VOLT	XXX V

LCIA0090E

⊗ Without CONSULT-II

1. Start engine.
2. Check voltage TCM connector terminals while warming up A/T.

Item	Connector	Terminal	Condition	Judgement standard (Approx.)
A/T fluid temperature sensor	E32	47 - 42	When A/T fluid temperature is 20°C (68°F).	1.5 V
			When A/T fluid temperature is 80°C (176°F).	0.5 V



OK or NG

- OK >> GO TO 7.
 NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEMS

Check the following.

- Harness for short or open between TCM, ECM and terminal cord assembly
- Ground circuit for ECM, Refer to [EC-144, "POWER SUPPLY AND GROUND CIRCUIT"](#) .

OK or NG

- OK >> GO TO 3.
 NG >> Repair or replace damaged parts.

DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

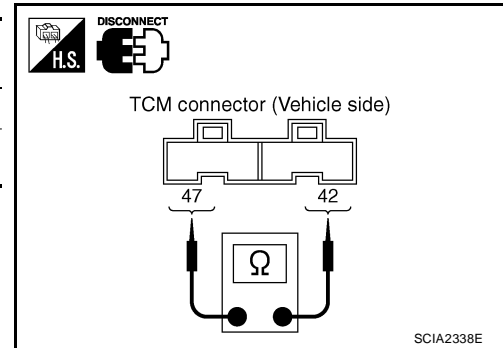
3. CHECK FLUID TEMPERATURE SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect the TCM connector.
3. Check resistance between TCM connector terminals.

Item	Connector	Terminal	Temperature [°C (°F)]	Resistance (Approx.)
A/T fluid temperature sensor	E32	47 - 42	20 (68)	2.5 kΩ
			80 (176)	0.3 kΩ

OK or NG

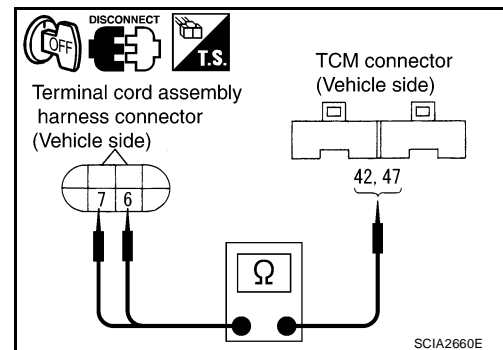
- OK >> GO TO 7.
 NG >> GO TO 4.



4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector	Terminal	Continuity
TCM	E32	42	Yes
Terminal cord assembly harness connector	F30	7	
TCM	E32	47	Yes
Terminal cord assembly harness connector	F30	6	



4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

OK or NG

- OK >> GO TO 5.
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

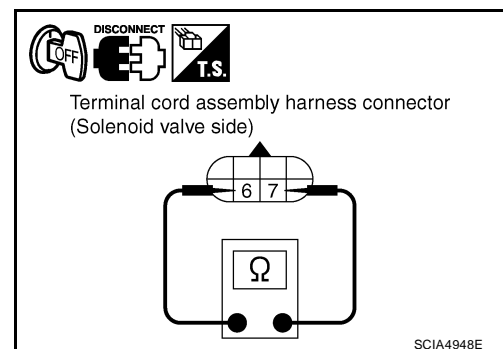
1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminals.

Item	Connector	Terminal	Temperature [°C (°F)]	Resistance (Approx.)
A/T fluid temperature sensor	F30	6 - 7	20 (68)	2.5 kΩ
			80 (176)	0.3 kΩ

4. Reinstall any part removed.

OK or NG

- OK >> GO TO 6.
 NG >> Repair or replace damaged parts.



DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

6. DETECT MALFUNCTIONING ITEM

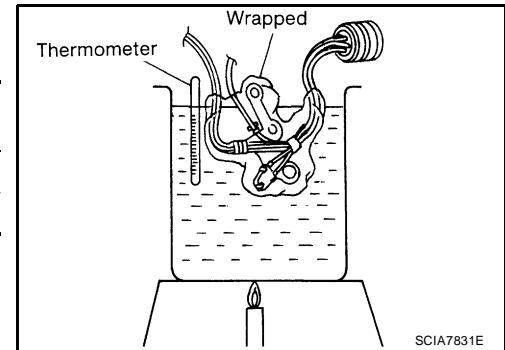
1. Remove oil pan. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
2. Check the following.
 - A/T fluid temperature sensor
 - Check resistance between terminal cord assembly harness connector terminals while changing temperature as shown.

Item	Connector	Terminal	Temperature [°C (°F)]	Resistance (Approx.)
A/T fluid temperature sensor	F30	6 - 7	20 (68)	2.5 kΩ
			80 (176)	0.3 kΩ

- Harness of terminal cord assembly for short or open

OK or NG

- OK >> GO TO 7.
- NG >> Repair or replace damaged parts.



7. CHECK DTC

Perform [AT-98, "DTC Confirmation Procedure"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 8.

8. CHECK TCM

1. Check TCM input/output signal. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

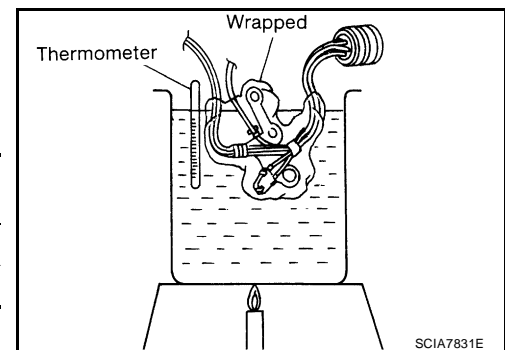
OK or NG

- OK >> **INSPECTION END**
- NG >> Repair or replace damaged parts.

Component Inspection A/T FLUID TEMPERATURE SENSOR

- Remove oil pan. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
- Check resistance between terminal cord assembly harness connector terminals while changing temperature as shown.

Item	Connector	Terminal	Temperature [°C (°F)]	Resistance (Approx.)
A/T fluid temperature sensor	F30	6 - 7	20 (68)	2.5 kΩ
			80 (176)	0.3 kΩ



DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

PF:32702

Description

UCS005NU

The revolution sensor detects the revolution of the idler gear parking pawl lock gear and emits a pulse signal. The pulse signal is sent to the TCM which converts it into vehicle speed.

CONSULT-II Reference Value

UCS005NV

Remarks: Specification data are reference values.

Item name	Condition	Display value
VHCL/S SE-A/T	During driving	Approximately matches the speedometer reading.

On Board Diagnosis Logic

UCS005NW

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code "P0720 VHCL SPEED SEN-AT" with CONSULT-II or 1st judgement flicker without CONSULT-II is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

UCS005NX

- Harness or connector
(The sensor circuit is open or shorted.)
- Revolution sensor

DTC Confirmation Procedure

UCS005NY

CAUTION:

- Always drive vehicle at a safe speed.
- Be careful not to rev engine into the red zone on the tachometer.
- If performing this "DTC Confirmation Procedure" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Touch "START".
3. Drive vehicle and check for an increase of "VHCL/S SE-MTR" value.
If the check result is NG, go to [AT-106, "Diagnostic Procedure"](#) .
If the check result is OK, go to following step.
4. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
5. Touch "START".
6. Start engine and maintain the following conditions for at least 5 consecutive seconds.

VEHICLE SPEED: 30 km/h (19 MPH) or more

THROTTLE POSI: More than 1.0/8

SLCT LVR POSI: "D" position

Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

If the check result is NG, go to [AT-106, "Diagnostic Procedure"](#) .

If the check result is OK, go to following step.

7. Maintain the following conditions for at least 5 consecutive seconds.

ENGINE SPEED: 3,500 rpm or more

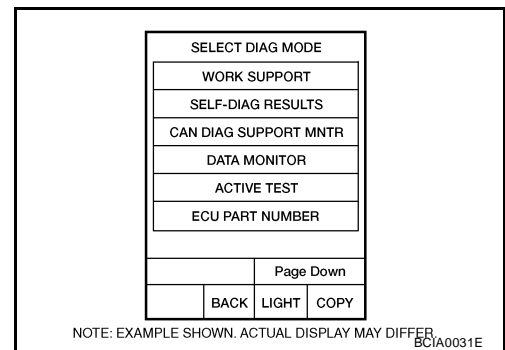
THROTTLE POSI: More than 1.0/8

SLCT LVR POSI: "D" position

Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

WITH GST

Follow the procedure "WITH CONSULT-II".



DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

⊗ WITHOUT CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions for more than 5 seconds.
Selector lever position: "D" position
Vehicle speed: 30 km/h (19 MPH) or more
Throttle position: greater than 1.0/8 of the full throttle position
3. Perform self-diagnosis. Refer to [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .
4. If the check result is NG, go to [AT-106, "Diagnostic Procedure"](#) .

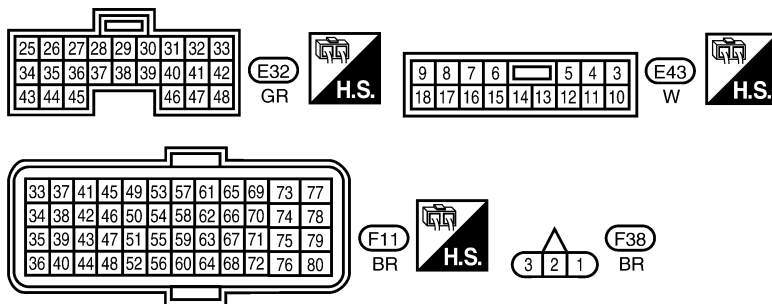
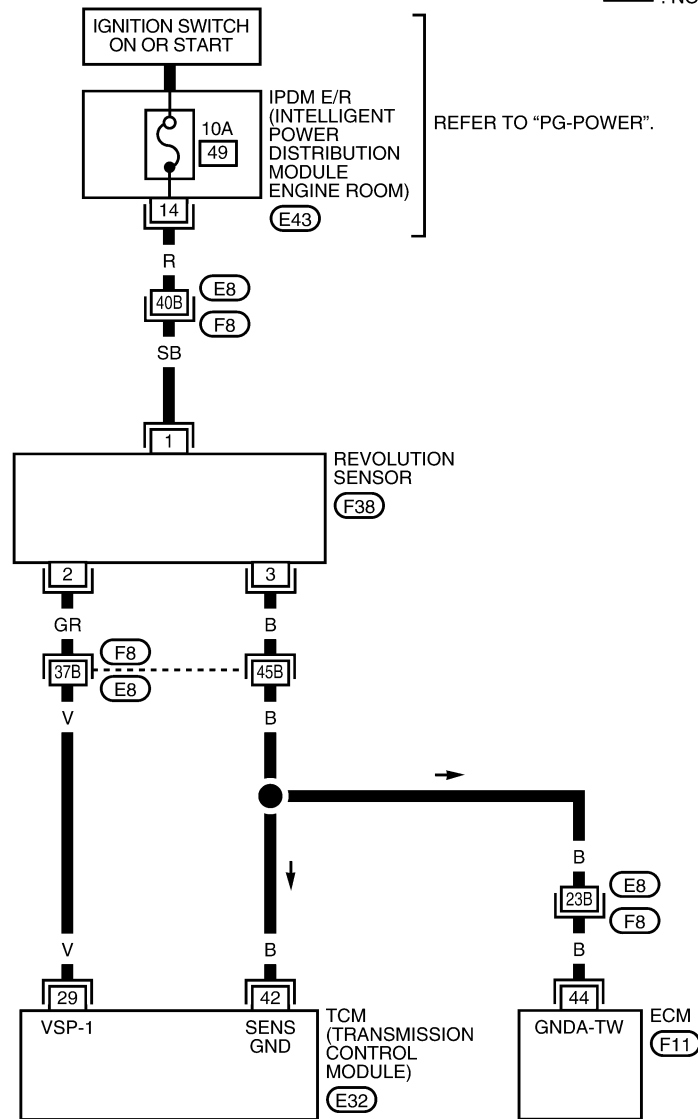
DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

Wiring Diagram — AT — VSSA/T

UCS005NZ

AT-VSSA/T-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.
 (F8) - SUPER MULTIPLE JUNCTION (SMJ)

BCWA0651E

DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

TCM TERMINALS AND REFERENCE VALUES

Refer to [AT-78, "TCM HARNESS CONNECTOR TERMINAL LAYOUT"](#) .

Diagnostic Procedure

UCS00500

1. CHECK INPUT SIGNAL

Ⓟ With CONSULT-II

1. Start engine.
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "VHCL/S SE-A/T" while driving.
Check the value changes according to driving speed.

OK or NG

- OK >> GO TO 8.
NG >> GO TO 2.

DATA MONITOR	
MONITORING	
VHCL/S SE-A/T	XXX km/h
VHCL/S SE-MTR	XXX km/h
THRTL POS SEN	XXX V
FLUID TEMP SE	XXX V
BATTERY VOLT	XXX V

LCIA0090E

2. CHECK REVOLUTION SENSOR

Ⓟ With CONSULT-II

1. Start engine.
2. Check power supply to revolution sensor by voltage between TCM connector terminals. Refer to [AT-178, "Wiring Diagram — AT — MAIN"](#) and [AT-105, "Wiring Diagram — AT — VSSA/T"](#) .

Item	Connector	Terminal	Judgement standard (Approx.)
TCM	E31, E32	10 - 42	Battery voltage
		19 - 42	

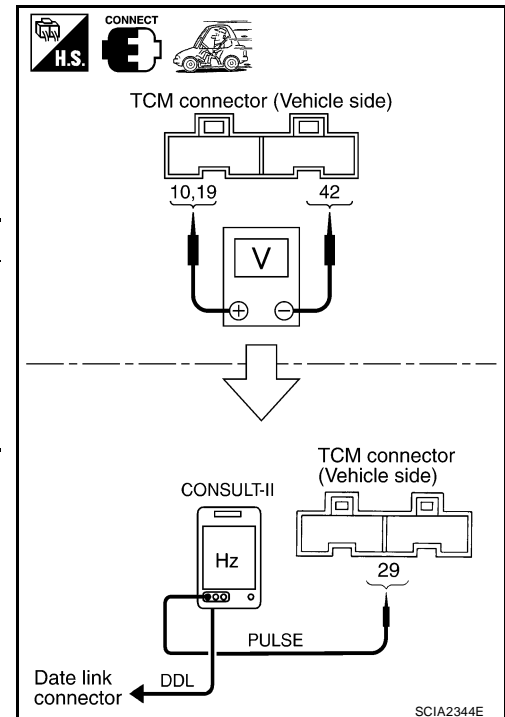
3. If OK, check the pulse when vehicle cruises.

Item	Condition
Revolution sensor	When driving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 CAUTION: Connect the diagnosis data link cable to the data link connector. *1: A circuit tester cannot be used to test this item.

Item	Connector	Terminal	Condition	Judgement standard (Approx.)
TCM	E32	29	When driving at 20 km/h (12 MPH)	150 Hz

OK or NG

- OK >> GO TO 8.
NG >> GO TO 3.

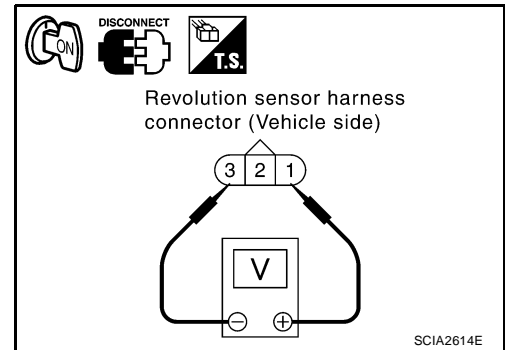


DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

3. CHECK POWER AND SENSOR GROUND

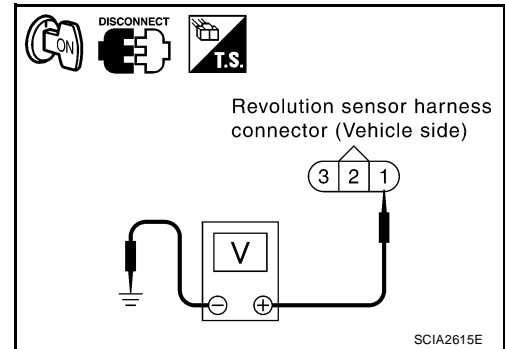
1. Turn ignition switch OFF.
2. Disconnect the revolution sensor harness connector.
3. Turn ignition switch ON. (Do not start engine.)
4. Check voltage between revolution sensor harness connector terminals.

Item	Connector	Terminal	Judgement standard (Approx.)
Revolution sensor	F38	1 - 3	Battery voltage



5. Check voltage between revolution sensor harness connector terminal and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
Revolution sensor	F38	1 - ground	Battery voltage



6. If OK, check harness for short to ground and short to power.
7. Reinstall any part removed.

OK or NG

OK >> GO TO 4.

NG - 1 >> Battery voltage is not supplied between terminals 1 and 3, terminals 1 and ground: GO TO 6.

NG - 2 >> Battery voltage is not supplied between terminals 1 and 3 only: GO TO 7.

4. CHECK HARNESS BETWEEN TCM AND REVOLUTION SENSOR

1. Turn ignition switch OFF.
2. Disconnect the TCM connector and revolution sensor harness connector.
3. Check continuity between TCM connector terminal and revolution sensor harness connector terminal.

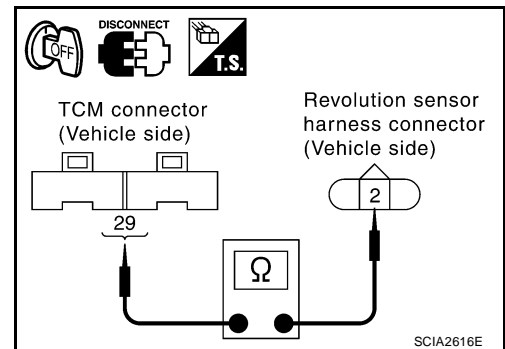
Item	Connector	Terminal	Continuity
TCM	E32	29	Yes
Revolution sensor	F38	2	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



5. CHECK TCM

1. Check TCM input/output signal. Refer to [AT-78, "TCM Terminals and Reference Values"](#).
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> GO TO 8.

NG >> Repair or replace damaged parts.

DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

6. CHECK HARNESS BETWEEN TCM AND REVOLUTION SENSOR (POWER)

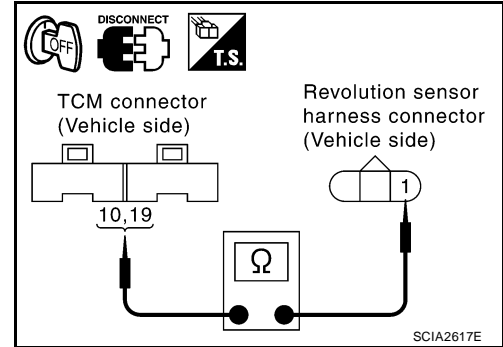
1. Turn ignition switch OFF.
2. Disconnect the TCM connector and revolution sensor harness connector.
3. Check continuity between TCM connector terminals and revolution sensor harness connector terminal. Refer to [AT-52, "Circuit Diagram"](#) and [AT-178, "Wiring Diagram — AT — MAIN"](#).

Item	Connector	Terminal	Continuity
TCM	E31	10	Yes
Revolution sensor	F38	1	
TCM	E31	19	Yes
Revolution sensor	F38	1	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

- OK >> 10A fuse (No.49, located in the IPDM E/R) or ignition switch are malfunctioning.
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.



7. CHECK HARNESS BETWEEN TCM AND REVOLUTION SENSOR (SENSOR GROUND)

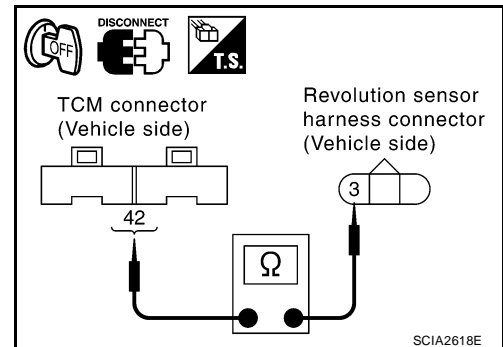
1. Turn ignition switch OFF.
2. Disconnect the TCM connector and revolution sensor harness connector.
3. Check continuity between TCM connector terminal and revolution sensor harness connector terminal.

Item	Connector	Terminal	Continuity
TCM	E32	42	Yes
Revolution sensor	F38	3	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

- OK >> GO TO 5.
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.



8. CHECK DTC

Perform [AT-103, "DTC Confirmation Procedure"](#).

OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 5.

DTC P0725 ENGINE SPEED SIGNAL

DTC P0725 ENGINE SPEED SIGNAL

PF:24825

Description

UCS00501

The engine speed signal is sent from the ECM to the TCM.

CONSULT-II Reference Value

UCS00502

Remarks: Specification data are reference values.

Item name	Condition	Display value
ENGINE SPEED	Engine running	Approximately matches the tachometer reading.

On Board Diagnosis Logic

UCS00503

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code "P0725 ENGINE SPEED SIG" with CONSULT-II or 9th judgement flicker without CONSULT-II is detected when TCM does not receive the proper voltage signal from ECM.

Possible Cause

UCS00504

Harness or connector
(Circuit is open or shorted.)

DTC Confirmation Procedure

UCS00505

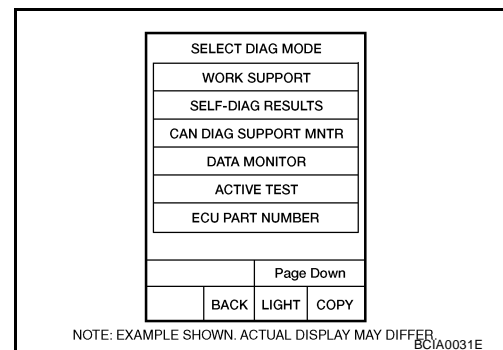
CAUTION:

- Always drive vehicle at a safe speed.
- If performing this "DTC Confirmation Procedure" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Touch "START".
3. Start engine and maintain the following conditions for at least 10 consecutive seconds.
VEHICLE SPEED: 10 km/h (6 MPH) or more
THROTTLE POS: More than 1.0/8
SLCT LVR POS: "D" position
4. If the check result is NG, go to [AT-111, "Diagnostic Procedure"](#).



WITH GST

Follow the procedure "WITH CONSULT-II".

WITHOUT CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions for more than 10 seconds.
Selector lever position: "D" position
Vehicle speed: Higher than 10 km/h (6 MPH)
Throttle position: Greater than 1.0/8 of the full throttle position
3. Perform self-diagnosis. Refer to [AT-86, "Diagnostic Procedure Without CONSULT-II"](#).
4. If the check result is NG, go to [AT-111, "Diagnostic Procedure"](#).

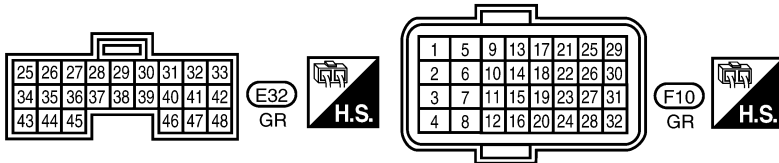
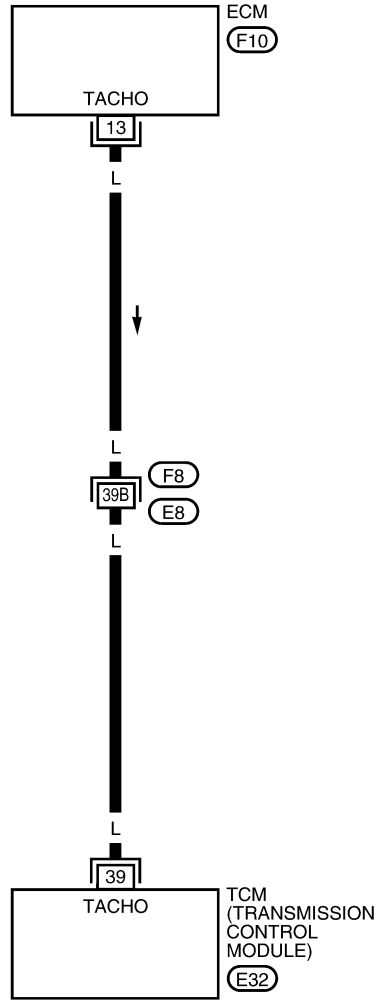
DTC P0725 ENGINE SPEED SIGNAL

Wiring Diagram — AT — ENGSS

UCS00506

AT-ENGSS-01

— : DETECTABLE LINE FOR DTC
— : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.
(F8) - SUPER MULTIPLE JUNCTION (SMJ)

BCWA0652E

DTC P0725 ENGINE SPEED SIGNAL

TCM TERMINALS AND REFERENCE VALUES

Refer to [AT-78, "TCM HARNESS CONNECTOR TERMINAL LAYOUT"](#) .

Diagnostic Procedure

UCS00507

1. CHECK DTC WITH ECM

Check DTC with CONSULT-II "ENGINE".

Turn ignition switch ON and select "SELF-DIAGNOSTIC RESULTS" mode for "ENGINE" with CONSULT-II.

Refer to [EC-113, "CONSULT-II Function \(ENGINE\)"](#) .

OK or NG

OK >> GO TO 2.

NG >> Check ignition signal circuit for engine control. Refer to [EC-581, "IGNITION SIGNAL"](#) .

2. CHECK INPUT SIGNAL

Ⓜ With CONSULT-II

1. Start engine.
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "ENGINE SPEED". Check engine speed changes according to throttle position.

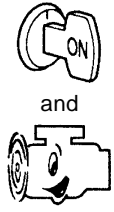
Item name	Condition	Display value
ENGINE SPEED	Engine running	Approximately matches the tachometer reading.

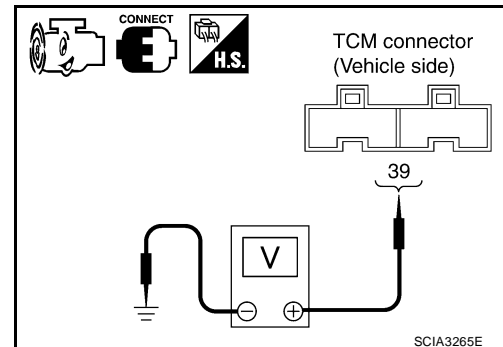
DATA MONITOR	
MONITOR	NO DTC
VHCL/S SE-AT	0 km/h
VHCL/S SE-MTR	5 km/h
THRTL POS SEN	0.8 V
FLUID TEMP SE	1.4 V
BATTERY VOLT	11.6 V
ENGINE SPEED	384 rpm
TURBINE REV	0 rpm
OVERDRIVE SW	OFF
PN POSI SW	ON
Page Down	
RECORD	
MODE	BACK
LIGHT	COPY

SCIA4730E

⊗ Without CONSULT-II

1. Start engine.
2. Check voltage between TCM harness connector terminal and ground.

item	Connector	Terminal	Condition	Judgement standard (Approx.)
Engine speed signal	E32	39 - Ground		Refer to EC-105 .



OK or NG

OK >> GO TO 4.

NG >> GO TO 3.

DTC P0725 ENGINE SPEED SIGNAL

3. CHECK HARNESS BETWEEN TCM AND ECM

1. Turn ignition switch OFF.
2. Disconnect ECM connector and TCM connector.
3. Check continuity between ECM connector and TCM connector.

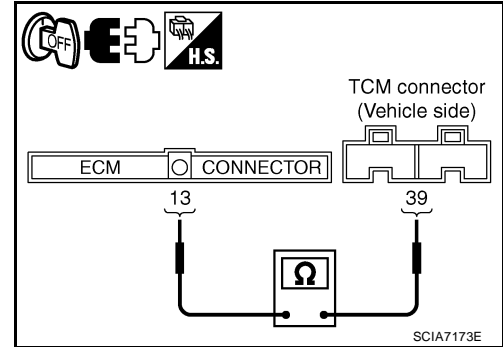
Item	Connector	Terminal	Continuity
TCM	E32	39	Yes
ECM	F10	13	

4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between body ground and transaxle assembly.
6. Reinstall any part removed.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK DTC

Perform [AT-109, "DTC Confirmation Procedure"](#) .

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 5.

5. CHECK TCM

1. Check TCM input/output signal. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.

DTC P0731 A/T 1ST GEAR FUNCTION

DTC P0731 A/T 1ST GEAR FUNCTION

PDF:31940

Description

UCS00508

- This malfunction will not be detected while the OD OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into first gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

On Board Diagnosis Logic

UCS00509

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code "P0731 A/T 1ST GR FNCTN" with CONSULT-II is detected when A/T cannot be shifted to the 1st gear position even if electrical circuit is good.
- This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = $A \times C/B$
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
If the actual gear position is higher than the position (1st) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.
This malfunction will be caused when either shift solenoid valve A is stuck open or shift solenoid valve B is stuck open.
- Gear positions supposed by TCM are as follows:
In case of gear position with no malfunctions: 1, 2, 3 and 4 positions
In case of gear position with shift solenoid valve A stuck open: 2*, 2, 3 and 3 positions
In case of gear position with shift solenoid valve B stuck open: 4*, 3, 3 and 4 positions to each position above
*: "P0731 A/T 1ST GR FNCTN" is detected.

Possible Cause

UCS0050A

- Shift solenoid valve A
- Shift solenoid valve B
- Each clutch
- Hydraulic control circuit

DTC P0731 A/T 1ST GEAR FUNCTION

UCS0050B

DTC Confirmation Procedure

CAUTION:

- Always drive vehicle at a safe speed.
- If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.

2. Touch “START”.

3. Make sure that output voltage of A/T fluid temperature sensor is within the range below.

FLUID TEMP SE: 0.4 - 1.5 V

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).

4. Select “1ST GR FNCTN P0731” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.

5. Accelerate vehicle to 20 to 25 km/h (12 to 16 MPH) under the following conditions and release the accelerator pedal completely.

THROTTLE POSI: Less than 1.0/8 (at all times during step 4)

SLCT LVR POSI: “D” position

– Make sure that “GEAR” shows “2” after releasing pedal.

6. Depress accelerator pedal to WOT (more than 7.0/8 of “THROTTLE POSI”) quickly from a speed of 20 to 25 km/h (12 to 16 MPH) until “TESTING” changes to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)

If the check result NG appears on CONSULT-II screen, go to [AT-115, "Diagnostic Procedure"](#) .

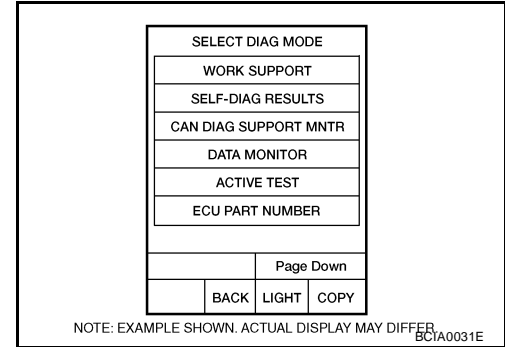
If “STOP VEHICLE” appears on CONSULT-II screen, go to the following step.

– Make sure that “GEAR” shows “1” when depressing accelerator pedal to WOT.

– If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAG RESULTS” for “A/T”. In case a DTC other than “P0731 A/T 1ST GR FNCTN” is shown, refer to [AT-82, "Display Items List"](#) .

7. Stop vehicle.

8. Follow the instruction displayed. (Check for normal shifting referring to the table below.)



Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4
No malfunction exists.	1 → 2 → 3 → 4
Malfunction for “A/T 1ST GR FNCTN ” exists.	2 → 2 → 3 → 3
	4 → 3 → 3 → 4

9. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “Diagnostic Procedure”.)

Refer to [AT-115, "Diagnostic Procedure"](#) .

Refer to [AT-67, "Vehicle Speed at Which Gear Shifting Occurs"](#) .

WITH GST

Follow the procedure “WITH CONSULT-II”.

DTC P0731 A/T 1ST GEAR FUNCTION

UCS0050C

Diagnostic Procedure

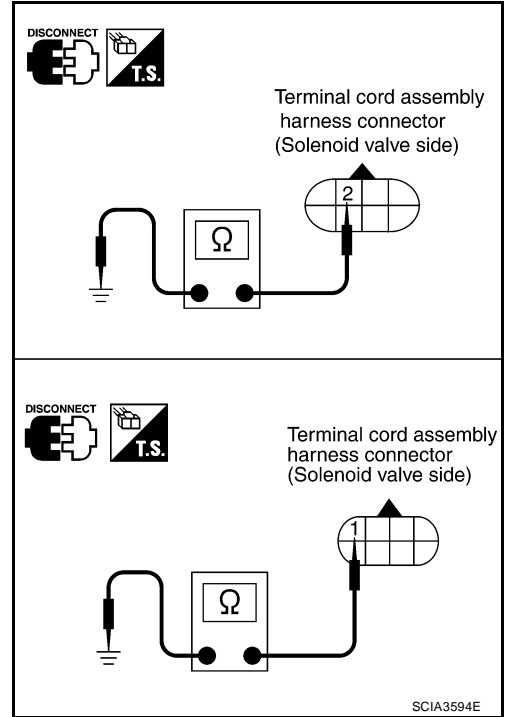
1. CHECK VALVE RESISTANCE

- Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
 - Shift solenoid valve A
 - Shift solenoid valve B
- Check resistance between terminal cord assembly harness connector terminals and ground. Refer to [AT-148, "Wiring Diagram — AT — SSV/A"](#) and [AT-153, "Wiring Diagram — AT — SSV/B"](#) .

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve A	F30	2 - Ground	20 - 30 Ω
Shift solenoid valve B		1 - Ground	5 - 20 Ω

OK or NG

- OK >> GO TO 2.
 NG >> Repair or replace damaged parts.

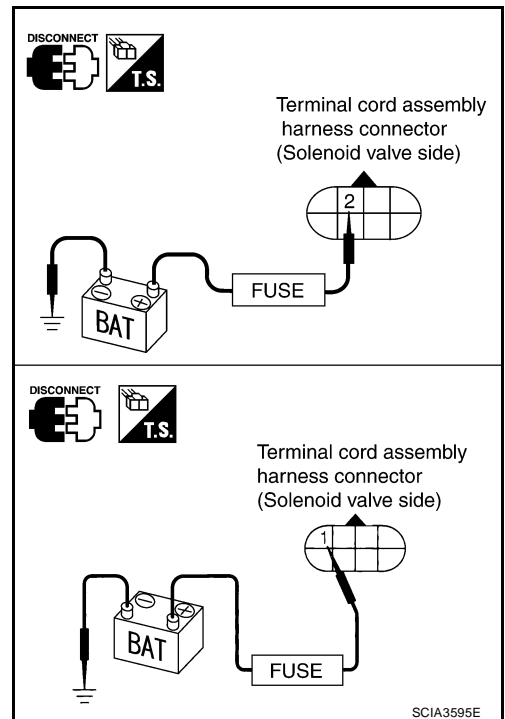


2. CHECK VALVE OPERATION

- Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
 - Shift solenoid valve A
 - Shift solenoid valve B
- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminals and ground. Refer to [AT-148, "Wiring Diagram — AT — SSV/A"](#) and [AT-153, "Wiring Diagram — AT — SSV/B"](#) .

OK or NG

- OK >> GO TO 3.
 NG >> Repair or replace shift solenoid valve assembly.



DTC P0731 A/T 1ST GEAR FUNCTION

3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-287, "Control Valve Assembly"](#) .
2. Check to ensure that:
 - Valve, sleeve and plug slide along valve bore under their own weight.
 - Valve, sleeve and plug are free from burrs, dents and scratches.
 - Control valve springs are free from damage, deformation and fatigue.
 - Hydraulic line is free from obstacles.

OK or NG

- OK >> GO TO 4.
- NG >> Repair control valve assembly.

4. CHECK DTC

Perform [AT-114, "DTC Confirmation Procedure"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> Check control valve again. If NG, repair or replace control valve assembly.

DTC P0732 A/T 2ND GEAR FUNCTION

DTC P0732 A/T 2ND GEAR FUNCTION

PFP:31940

Description

UCS0050D

- This malfunction will not be detected while the OD OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into second gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

On Board Diagnosis Logic

UCS0050E

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code "P0732 A/T 2ND GR FNCTN" with CONSULT-II is detected when A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.
- This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = $A \times C/B$
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
If the actual gear position is higher than the position (2nd) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.
This malfunction will be caused when shift solenoid valve B is stuck open.
- Gear positions supposed by TCM are as follows:
In case of gear position with no malfunctions: 1, 2, 3 and 4 positions
In case of gear position with shift solenoid valve B stuck open: 4, 3*, 3 and 4 positions to each position above
*: "P0732 A/T 2ND GR FNCTN" is detected.

Possible Cause

UCS0050F

- Shift solenoid valve B
- Each clutch
- Hydraulic control circuit

DTC P0732 A/T 2ND GEAR FUNCTION

UCS0050G

DTC Confirmation Procedure

CAUTION:

- Always drive vehicle at a safe speed.
- If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.

2. Touch “START”.

3. Make sure that output voltage of A/T fluid temperature sensor is within the range below.

FLUID TEMP SE: 0.4 - 1.5 V

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).

4. Select “2ND GR FNCTN P0732” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.

5. Accelerate vehicle to 45 to 50 km/h (28 to 31 MPH) under the following conditions and release the accelerator pedal completely.

THROTTLE POSI: Less than 1.0/8

SLCT LVR POSI: “D” position

– Make sure that “GEAR” shows “3” or “4” after releasing pedal.

6. Depress accelerator pedal to WOT (more than 7.0/8 of “THROTTLE POSI”) quickly from a speed of 45 to 50 km/h (28 to 31 MPH) until “TESTING” changes to “STOP VEHICLE” or “COMPLETE”. (It will take approximately 3 seconds.)

If the check result NG appears on CONSULT-II screen, go to [AT-119, "Diagnostic Procedure"](#) .

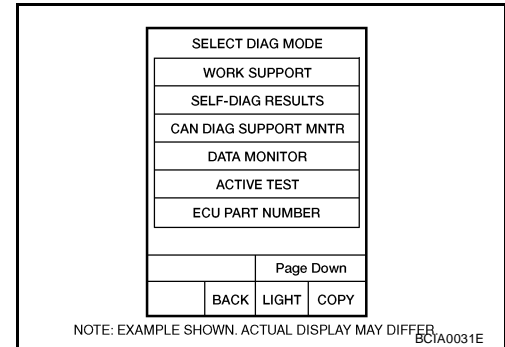
If “STOP VEHICLE” appears on CONSULT-II screen, go to following step.

– Make sure that “GEAR” shows “2” when depressing accelerator pedal to WOT.

– If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAG RESULTS” for “A/T”. In case a DTC other than “P0732 A/T 2ND GR FNCTN” is shown, refer to [AT-82, "Display Items List"](#) .

7. Stop vehicle.

8. Follow the instruction displayed. (Check for normal shifting referring to the table below.)



Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4
No malfunction exists	1 → 2 → 3 → 4
Malfunction for “A/T 2ND GR FNCTN” exists.	4 → 3 → 3 → 4

9. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “Diagnostic Procedure”.)

Refer to [AT-119, "Diagnostic Procedure"](#) .

Refer to [AT-67, "Vehicle Speed at Which Gear Shifting Occurs"](#) .

WITH GST

Follow the procedure “WITH CONSULT-II”.

DTC P0732 A/T 2ND GEAR FUNCTION

UCS0050H

Diagnostic Procedure

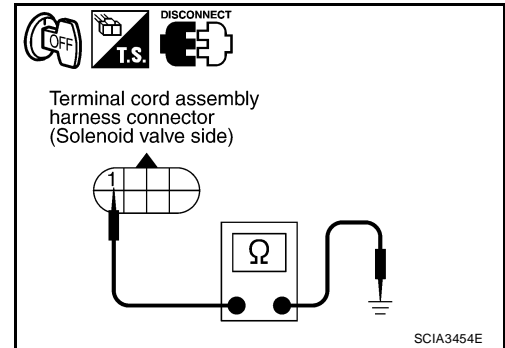
1. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
 - Shift solenoid valve B
2. Check resistance between terminal cord assembly harness connector terminal and ground. Refer to [AT-153, "Wiring Diagram — AT — SSV/B"](#) .

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve B	F30	1 - Ground	5 - 20 Ω

OK or NG

- OK >> GO TO 2.
NG >> Repair or replace shift solenoid valve assembly.

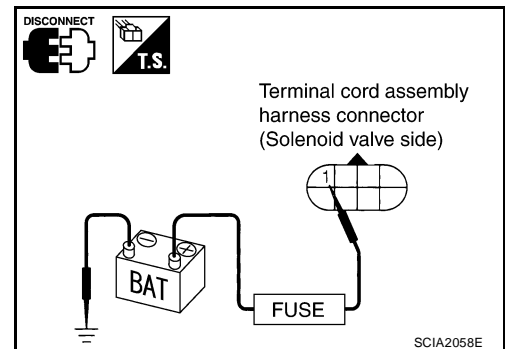


2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
 - Shift solenoid valve B
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground. Refer to [AT-153, "Wiring Diagram — AT — SSV/B"](#) .

OK or NG

- OK >> GO TO 3.
NG >> Repair or replace shift solenoid valve assembly.



3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-287, "Control Valve Assembly"](#) .
2. Check to ensure that:
 - Valve, sleeve and plug slide along valve bore under their own weight.
 - Valve, sleeve and plug are free from burrs, dents and scratches.
 - Control valve springs are free from damage, deformation and fatigue.
 - Hydraulic line is free from obstacles.

OK or NG

- OK >> GO TO 4.
NG >> Repair control valve assembly.

4. CHECK DTC

Perform [AT-118, "DTC Confirmation Procedure"](#) .

OK or NG

- OK >> **INSPECTION END**
NG >> Check control valve again. If NG, repair or replace control valve assembly.

DTC P0733 A/T 3RD GEAR FUNCTION

DTC P0733 A/T 3RD GEAR FUNCTION

PFP:31940

Description

UCS0050I

- This malfunction will not be detected while the OD OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into third gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning servo piston or brake band, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

On Board Diagnosis Logic

UCS0050J

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code "P0733 A/T 3RD GR FNCTN" with CONSULT-II is detected when A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.
- This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
If the actual gear position is higher than the position (3rd) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.
This malfunction will be caused when shift solenoid valve A is stuck closed.
- Gear positions supposed by TCM are as follows.
In case of gear position with no malfunctions: 1, 2, **3** and 4 positions
In case of gear position with shift solenoid valve A stuck closed: 1, 1, **4*** and 4 positions to each gear position above
*: "P0733 A/T 3RD GR FNCTN" is detected.

Possible Cause

UCS0050K

- Shift solenoid valve A
- Each clutch
- Hydraulic control circuit

DTC P0733 A/T 3RD GEAR FUNCTION

UCS0050L

DTC Confirmation Procedure

CAUTION:

- Always drive vehicle at a safe speed.
- If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.

2. Touch “START”.

3. Make sure that output voltage of A/T fluid temperature sensor is within the range below.

FLUID TEMP SE: 0.4 - 1.5 V

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).

4. Select “3RD GR FNCTN P0733” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.

5. Accelerate vehicle to 60 to 75 km/h (37 to 47 MPH) under the following conditions and release the accelerator pedal completely.

THROTTLE POSI: Less than 1.0/8 (at all times during step 4)

SLCT LVR POSI: “D” position

– Make sure that “GEAR” shows “4” after releasing pedal.

6. Depress accelerator pedal steadily with 3.5/8 - 4.5/8 of “THROTTLE POSI” from a speed of 60 to 75 km/h (37 to 47 MPH) until “TESTING” changes to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)

If the check result NG appears on CONSULT-II screen, go to [AT-122, "Diagnostic Procedure"](#) .

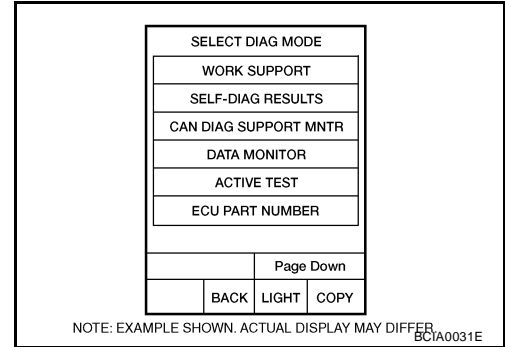
If “STOP VEHICLE” appears on CONSULT-II screen, go to following step.

– Make sure that “GEAR” shows “3” when depressing accelerator pedal with 3.5/8 - 4.5/8 of “THROTTLE POSI”.

– If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAG RESULTS” for “A/T”. In case a DTC other than “P0733 A/T 3RD GR FNCTN” is shown, refer to [AT-82, "Display Items List"](#) .

7. Stop vehicle.

8. Follow the instruction displayed. (Check for normal shifting referring to the table below.)



Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4
No malfunction exists.	1 → 2 → 3 → 4
Malfunction for “A/T 3RD GR FNCTN” exists.	1 → 1 → 4 → 4

9. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “Diagnostic Procedure”.)

Refer to [AT-122, "Diagnostic Procedure"](#) .

Refer to [AT-67, "Vehicle Speed at Which Gear Shifting Occurs"](#) .

WITH GST

Follow the procedure “WITH CONSULT-II”.

DTC P0733 A/T 3RD GEAR FUNCTION

UCS0050M

Diagnostic Procedure

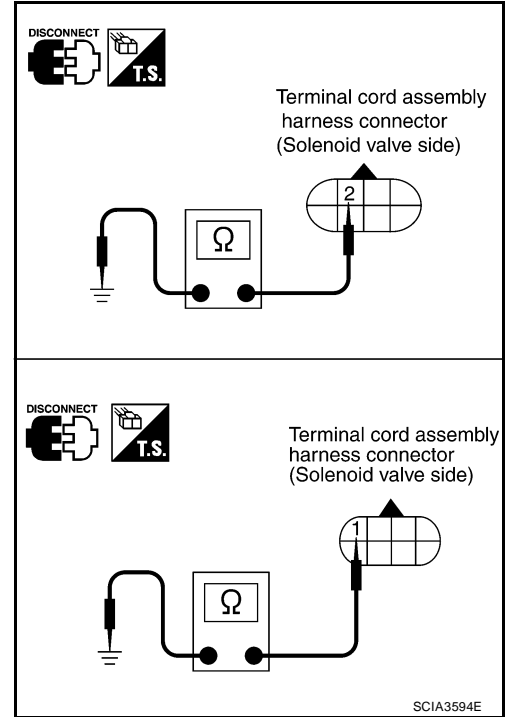
1. CHECK VALVE RESISTANCE

- Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
 - Shift solenoid valve A
 - Shift solenoid valve B
- Check resistance between terminal cord assembly harness connector terminals and ground. Refer to [AT-148, "Wiring Diagram — AT — SSV/A"](#) and [AT-153, "Wiring Diagram — AT — SSV/B"](#) .

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve A	F30	2 - Ground	20 - 30 Ω
Shift solenoid valve B		1 - Ground	5 - 20 Ω

OK or NG

- OK >> GO TO 2.
 NG >> Repair or replace shift solenoid valve assembly.

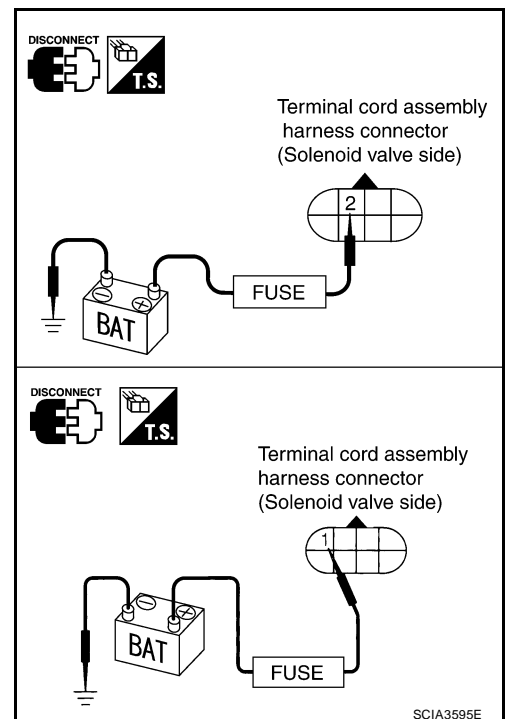


2. CHECK VALVE OPERATION

- Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
 - Shift solenoid valve A
 - Shift solenoid valve B
- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminals and ground. Refer to [AT-148, "Wiring Diagram — AT — SSV/A"](#) and [AT-153, "Wiring Diagram — AT — SSV/B"](#) .

OK or NG

- OK >> GO TO 3.
 NG >> Repair or replace shift solenoid valve assembly.



DTC P0733 A/T 3RD GEAR FUNCTION

3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-287, "Control Valve Assembly"](#) .
2. Check to ensure that:
 - Valve, sleeve and plug slide along valve bore under their own weight.
 - Valve, sleeve and plug are free from burrs, dents and scratches.
 - Control valve springs are free from damage, deformation and fatigue.
 - Hydraulic line is free from obstacles.

OK or NG

- OK >> GO TO 4.
- NG >> Repair control valve assembly.

4. CHECK DTC

Perform [AT-121, "DTC Confirmation Procedure"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> Check control valve again. If NG, repair or replace control valve assembly.

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DTC P0734 A/T 4TH GEAR FUNCTION

DTC P0734 A/T 4TH GEAR FUNCTION

PF3:31940

Description

UCS0050N

- This malfunction will not be detected while the OD OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into fourth gear position or the torque converter clutch does not lock up as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning oil pump or torque converter clutch, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

CONSULT-II Reference Value

UCS0050Q

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
LINE PRES DTY	Small throttle opening (Low line pressure) ↔ Large throttle opening (High line pressure)	0% ↔ 94%

On Board Diagnosis Logic

UCS0050P

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code "P0734 A/T 4TH GR FNCTN" with CONSULT-II is detected when A/T cannot be shifted to the 4th gear position even if electrical circuit is good.
- This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction.
This malfunction will be caused when shift solenoid valve A is stuck open or shift solenoid valve B is stuck closed.
- Gear positions supposed by TCM are as follows.
In case of gear position with no malfunctions: 1, 2, 3 and 4 positions
In case of gear position with shift solenoid valve A stuck open: 2, 2, 3 and 3* positions
In case of gear position with shift solenoid valve B stuck closed: 1, 2, 2 and 1* positions to each gear position above
*: "P0734 A/T 4TH GR FNCTN" is detected.

Possible Cause

UCS0050Q

- Shift solenoid valve A
- Shift solenoid valve B
- Line pressure solenoid valve
- Each clutch
- Hydraulic control circuit

DTC P0734 A/T 4TH GEAR FUNCTION

UCS0050R

DTC Confirmation Procedure

CAUTION:

- Always drive vehicle at a safe speed.
- If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.

2. Touch “START”.

3. Make sure that output voltage of A/T fluid temperature sensor is within the range below.

FLUID TEMP SE: 0.4 - 1.5 V

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).

4. Select “4TH GR FNCTN P0734” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.

5. Accelerate vehicle to 55 to 65 km/h (34 to 40 MPH) under the following conditions and release the accelerator pedal completely.

THROTTLE POSI: Less than 5.5/8 (at all times during step 4)

SLCT LVR POSI: “D” position

– Make sure that “GEAR” shows “3” after releasing pedal.

6. Depress accelerator pedal steadily with 1.0/8 - 2.0/8 of “THROTTLE POSI” from a speed of 55 to 65 km/h (34 to 40 MPH) until “TESTING” has turned to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)

If the check result NG appears on CONSULT-II screen, go to [AT-126, "Diagnostic Procedure"](#) .

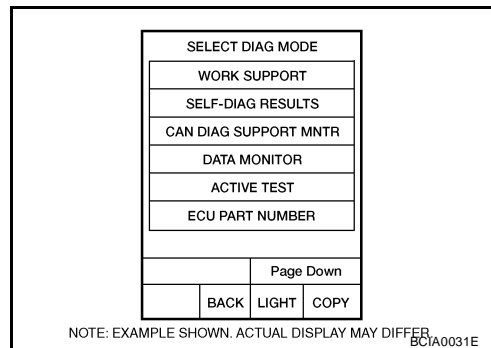
If “STOP VEHICLE” appears on CONSULT-II screen, go to following step.

– Make sure that “GEAR” shows “4” when depressing accelerator pedal with 1.0/8 - 2.0/8 of “THROTTLE POSI”.

– If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAG RESULTS” for “A/T”. In case a DTC other than “P0734 A/T 4TH GR FNCTN” is shown, refer to [AT-82, "Display Items List"](#) .

7. Stop vehicle.

8. Follow the instruction displayed. (Check for normal shifting referring to the table below.)



Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4
No malfunction exists	1 → 2 → 3 → 4
Malfunction for “A/T 4TH GR FNCTN” exists.	2 → 2 → 3 → 3
	1 → 2 → 2 → 1

9. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “Diagnostic Procedure”.)

Refer to [AT-126, "Diagnostic Procedure"](#) .

Refer to [AT-67, "Vehicle Speed at Which Gear Shifting Occurs"](#) .

WITH GST

Follow the procedure “WITH CONSULT-II”.

DTC P0734 A/T 4TH GEAR FUNCTION

UCS0050S

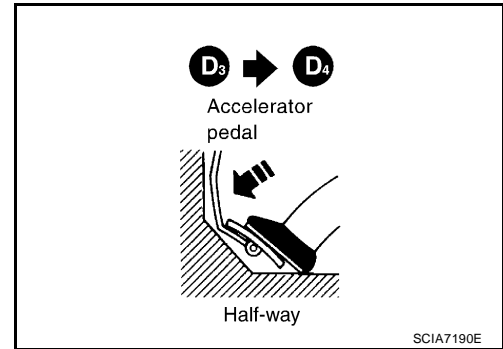
Diagnostic Procedure

1. CHECK SHIFT-UP (D₃ TO D₄)

During [AT-61, "Cruise Test — Part 1"](#) .

Does A/T shift from D₃ to D₄ at the specified speed?

- YES >> GO TO 11.
NO >> GO TO 2.



2. CHECK LINE PRESSURE

Perform line pressure test. Refer to [AT-56, "LINE PRESSURE TEST"](#) .

OK or NG

- OK >> GO TO 3.
NG >> GO TO 7.

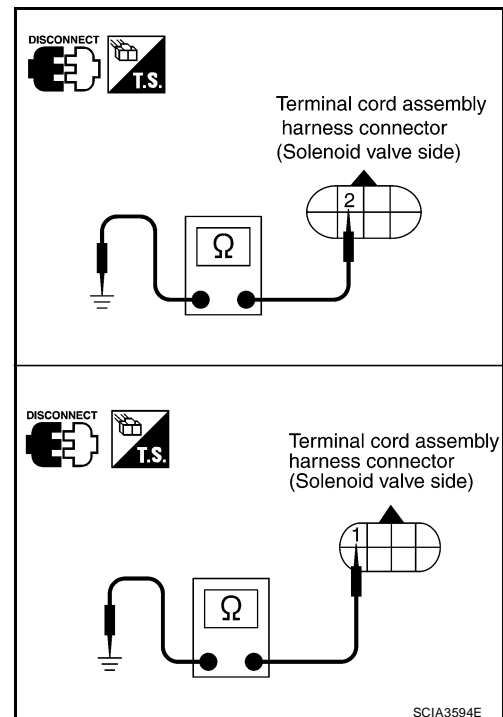
3. CHECK VALVE RESISTANCE

- Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
 - Shift solenoid valve A
 - Shift solenoid valve B
- Check resistance between terminal cord assembly harness connector terminals and ground. Refer to [AT-148, "Wiring Diagram — AT — SSV/A"](#) and [AT-153, "Wiring Diagram — AT — SSV/B"](#) .

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve A	F30	2 - Ground	20 - 30 Ω
Shift solenoid valve B		1 - Ground	5 - 20 Ω

OK or NG

- OK >> GO TO 4.
NG >> Replace solenoid valve assembly.



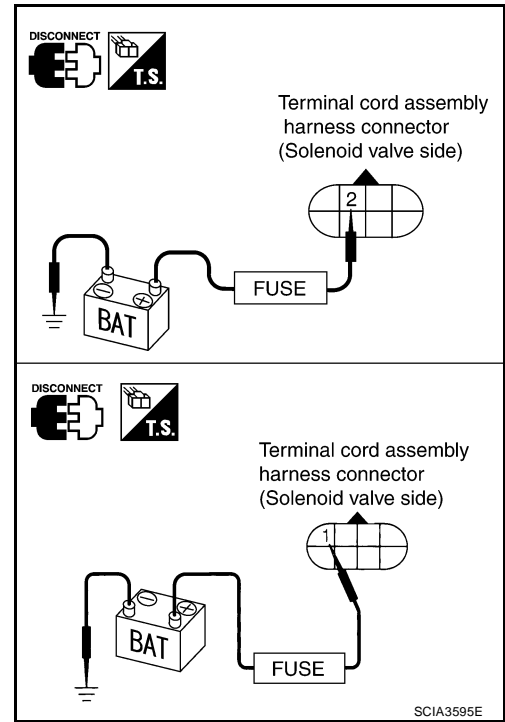
DTC P0734 A/T 4TH GEAR FUNCTION

4. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
 - Shift solenoid valve A
 - Shift solenoid valve B
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminals and ground. Refer to [AT-148, "Wiring Diagram — AT — SSV/A"](#) and [AT-153, "Wiring Diagram — AT — SSV/B"](#) .

OK or NG

- OK >> GO TO 5.
NG >> Replace solenoid valve assembly.



5. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-287, "Control Valve Assembly"](#) .
2. Check to ensure that:
 - Valve, sleeve and plug slide along valve bore under their own weight.
 - Valve, sleeve and plug are free from burrs, dents and scratches.
 - Control valve springs are free from damage, deformation and fatigue.
 - Hydraulic line is free from obstacles.

OK or NG

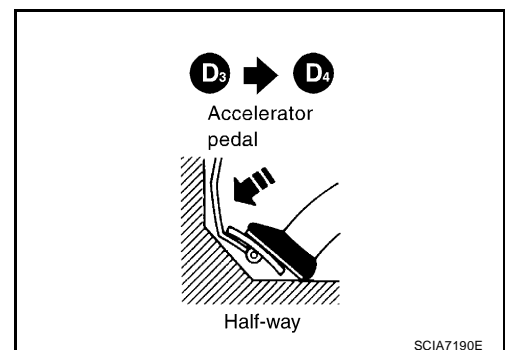
- OK >> GO TO 6.
NG >> Repair control valve.

6. CHECK SHIFT-UP (D₃ TO D₄)

During [AT-61, "Cruise Test — Part 1"](#) .

Does A/T shift from D₃ to D₄ at the specified speed?

- YES >> GO TO 11.
NO >> Check control valve again. Repair or replace control valve assembly.



DTC P0734 A/T 4TH GEAR FUNCTION

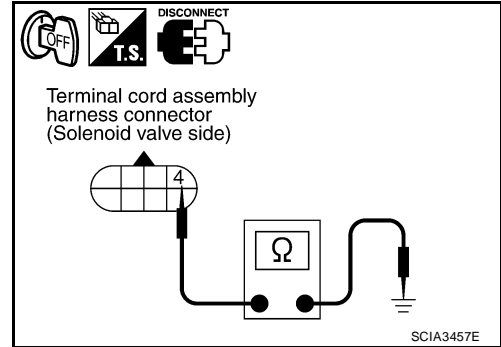
7. CHECK VALVE RESISTANCE

- Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
 - Line pressure solenoid valves
- Check resistance between terminal cord assembly harness connector terminal and ground. Refer to [AT-142, "Wiring Diagram — AT — LPSV"](#) .

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Line pressure solenoid valve	F30	4 - Ground	2.5 - 5 Ω

OK or NG

- OK >> GO TO 8.
- NG >> Replace solenoid valve assembly.

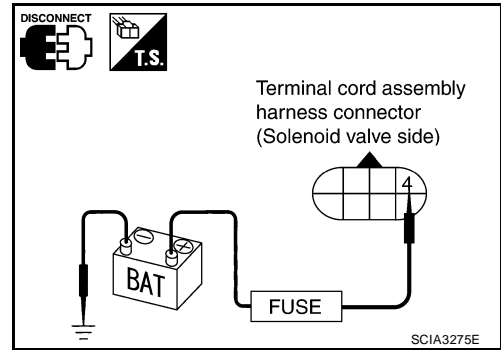


8. CHECK VALVE OPERATION

- Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
 - Line pressure solenoid valves
- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground. Refer to [AT-142, "Wiring Diagram — AT — LPSV"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Replace solenoid valve assembly.



9. CHECK CONTROL VALVE

- Disassemble control valve assembly. Refer to [AT-287, "Control Valve Assembly"](#) .
- Check line pressure circuit valves for sticking.
 - Pilot valve
 - Shift solenoid valve A
 - Shift solenoid valve B

OK or NG

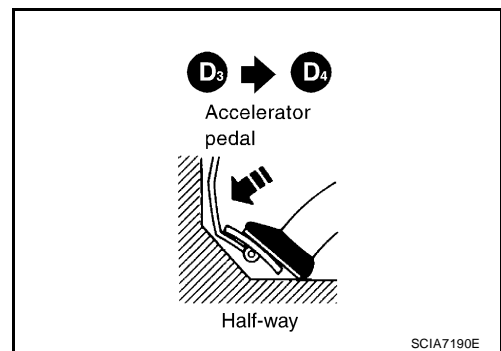
- OK >> GO TO 10.
- NG >> Repair control valve.

10. CHECK SHIFT-UP (D₃ TO D₄)

During [AT-61, "Cruise Test — Part 1"](#) .

Does A/T shift from D₃ to D₄ at the specified speed?

- YES >> GO TO 11.
- NO >> Check control valve again. Repair or replace control valve assembly.



DTC P0734 A/T 4TH GEAR FUNCTION

11. CHECK DTC

Perform [AT-125, "DTC Confirmation Procedure"](#) .

OK or NG

OK >> **INSPECTION END**

NG >> Perform [AT-61, "Cruise Test — Part 1"](#) again and return to the start point of this test group.

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DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

PF:31940

Description

UCS0050T

- The torque converter clutch solenoid valve is activated, with the gear in D4 and D3, by the TCM in response to signals sent from the vehicle speed sensor and the ECM (throttle opening). Lock-up piston operation will then be controlled.
- Lock-up operation, however, is prohibited when A/T fluid temperature is too low.
- When the accelerator pedal is depressed (less than 2/8) on lock-up condition, the engine speed should not change abruptly. If there is an abrupt change in engine speed, there is no lock-up.

CONSULT-II Reference Value

UCS0050U

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx)
TCC S/V DUTY	Lock-up OFF ↔ Lock-up ON	4% ↔ 94%

On Board Diagnosis Logic

UCS0050V

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code "P0740 T/C CLUTCH SOL/V" with CONSULT-II or 7th judgement flicker without CONSULT-II is detected when TCM detects an improper voltage drop while it tries to operate solenoid valve.

Possible Cause

UCS0050W

- Torque converter clutch solenoid valve
- Harness or connector
(The solenoid circuit is open or shorted.)

DTC Confirmation Procedure

UCS0050X

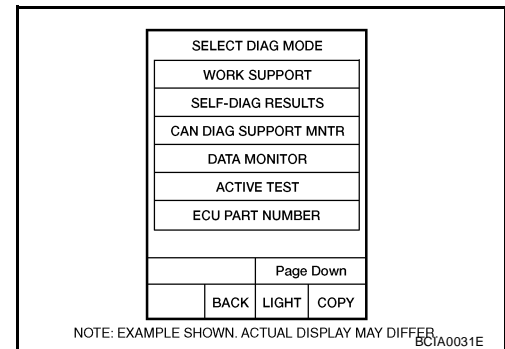
CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this "DTC Confirmation Procedure" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II and wait at least 1 second.
3. Touch "START".
4. Start engine and maintain the following conditions for at least 5 consecutive seconds.
VEHICLE SPEED: 80 km/h (50 MPH) or more
THROTTLE POSI: 0.5/8 - 1.0/8
SLCT LVR POSI: "D" position
Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
5. If the check result is NG, go to [AT-132, "Diagnostic Procedure"](#).



WITH GST

Follow the procedure "WITH CONSULT-II".

WITHOUT CONSULT-II



1. Start engine.
2. Drive vehicle in D1 → D2 → D3 → D4 → D4 lock-up position.
3. Perform self-diagnosis. Refer to [AT-86, "Diagnostic Procedure Without CONSULT-II"](#).
4. If the check result is NG, go to [AT-132, "Diagnostic Procedure"](#).

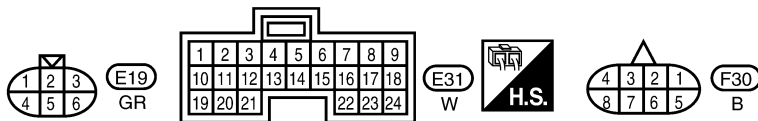
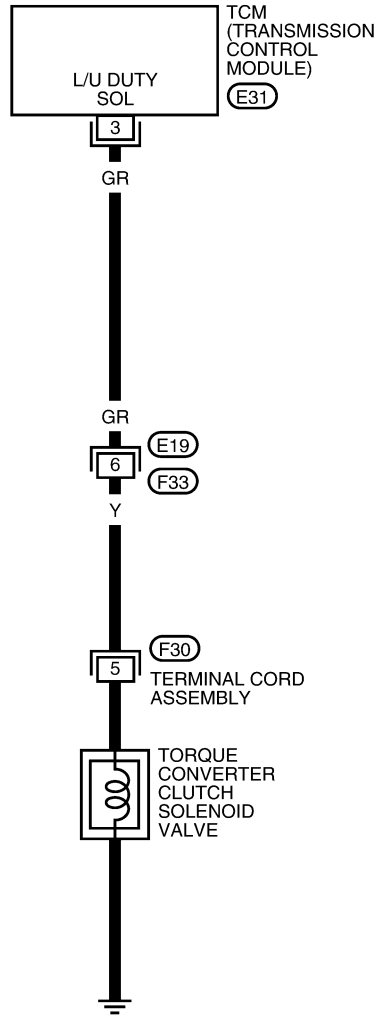
DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

Wiring Diagram — AT — TCV

UCS0050Y

AT-TCV-01

 : DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



BCWA0653E

DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

TCM TERMINALS AND REFERENCE VALUES

Refer to [AT-78, "TCM HARNESS CONNECTOR TERMINAL LAYOUT"](#) .

Diagnostic Procedure

UCS0050Z

1. CHECK INPUT SIGNAL

Ⓟ With CONSULT-II

1. Start engine.
2. Select "MAIN SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "TCC S/V DUTY" while driving. Check the value changes according to driving speed.

Monitor item	Condition	Display value (Approx)
TCC S/V DUTY	Lock-up OFF ⇔ Lock-up ON	4 % ⇔ 94 %

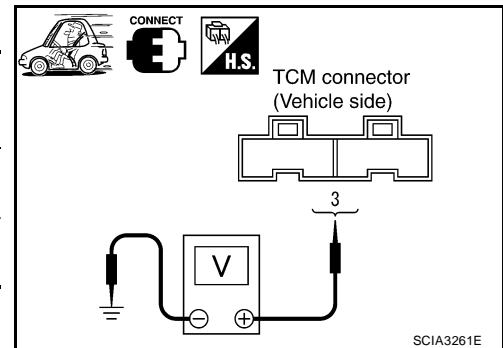
DATA MONITOR			
MONITOR		NO DTC	
SLCTLR POSI		N/P	
VEHICLE SPEED		0 km/h	
THROTTLE POSI		0.0 /8	
LINE PRES DTY		0 %	
TCC S/V DUTY		4 %	
SHIFT S/V A		ON	
SHIFT S/V B		ON	
OVERRUN/C S/V		OFF	
SELF-D DP LMP		OFF	
Page Up			
RECORD			
MODE	BACK	LIGHT	COPY

SCIA3257E

⊗ Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

Name	Connector	Terminal	Condition	Judgement standard (Approx.)
Torque converter clutch solenoid valve	E31	3 - Ground	When A/T performs lock-up.	8 - 15 V
			When A/T does not perform lock-up.	0 V



OK or NG

- OK >> GO TO 5.
 NG >> GO TO 2.

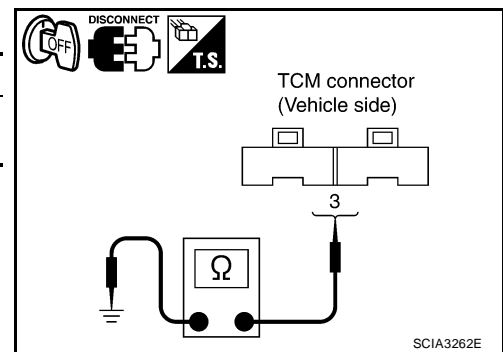
2. CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid Valve	Connector	Terminal	Resistance (Approx.)
Torque converter clutch solenoid valve	E31	3 - Ground	5 - 20 Ω

OK or NG

- OK >> GO TO 5.
 NG >> GO TO 3.



DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

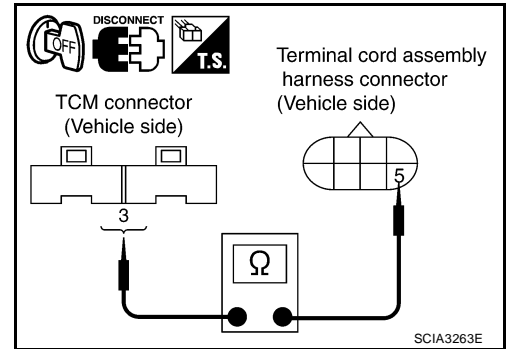
Item	Connector	Terminal	Continuity
TCM	E31	3	Yes
Terminal cord assembly harness connector	F30	5	

4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK VALVE RESISTANCE

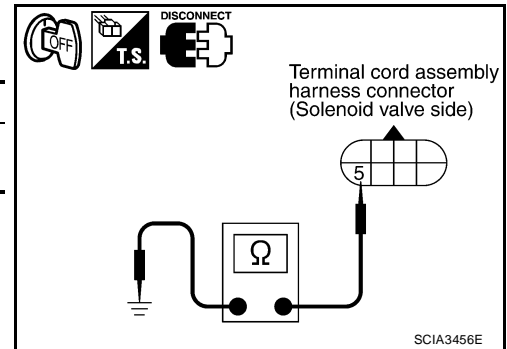
1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Torque converter clutch solenoid valve	F30	5 - Ground	5 - 20 Ω

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.



5. CHECK DTC

Perform [AT-130, "DTC Confirmation Procedure"](#) .

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.

DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

UCS005P0

Component Inspection

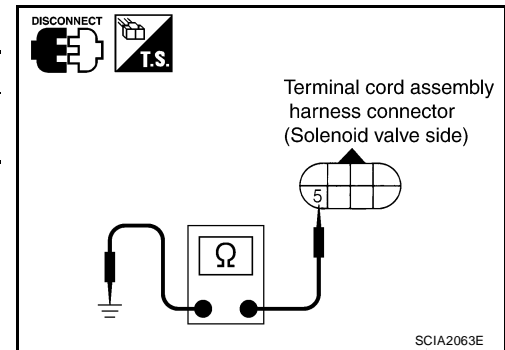
TORQUE CONVERTER CLUTCH SOLENOID VALVE

- For removal, refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .

Resistance Check

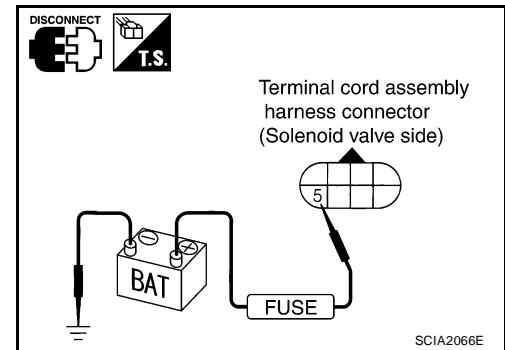
- Check resistance between terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Torque converter clutch solenoid valve	F30	5 - Ground	5 - 20 Ω



Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

PDF:31940

Description

UCS005P1

- This malfunction will not be detected while the OD OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into fourth gear position or the torque converter clutch does not lock-up as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning oil pump or torque converter clutch, etc.

CONSULT-II Reference Value

UCS005P2

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx)
TCC S/V DUTY	Lock-up OFF ↔ Lock-up ON	4% ↔ 94%

On Board Diagnosis Logic

UCS005P3

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code "P0744 A/T TCC S/V FNCTN" with CONSULT-II is detected when A/T cannot perform lock-up even if electrical circuit is good.
- This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = $A \times C/B$
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction.
This malfunction will be caused when shift solenoid valve B is stuck closed.
- Gear positions supposed by TCM are as follows.
In case of gear position with no malfunctions: 1, 2, 3 and 4 positions
In case of gear position with shift solenoid valve B stuck closed: 1, 2, 2 and 1* positions to each gear position above
*: "P0744 A/T TCC S/V FNCTN" is detected.

Possible Cause

UCS005P4

- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- Each clutch
- Hydraulic control circuit

DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

UCS005P5

DTC Confirmation Procedure

CAUTION:

- Always drive vehicle at a safe speed.
- If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.

2. Touch “START”.

3. Make sure that output voltage of A/T fluid temperature sensor is within the range below.

FLUID TEMP SE: 0.4 - 1.5 V

If out of range, drive vehicle to decrease voltage (warm up the fluid) or stop engine to increase voltage (cool down the fluid).

4. Select “TCC S/V FNCTN P0744” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.

5. Accelerate vehicle to more than 80 km/h (50 MPH) and maintain the following conditions continuously until “TESTING” has turned to “COMPLETE”. (It will take approximately 30 seconds after “TESTING” shows.)

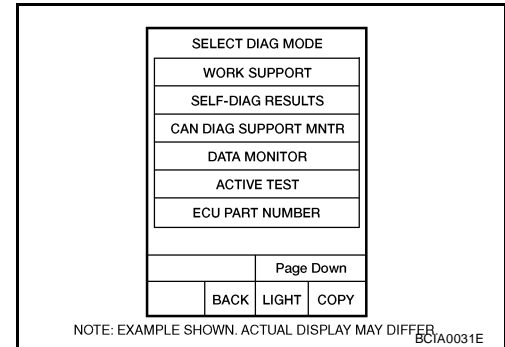
THROTTLE POSI: 1.0/8 - 2.0/8 (at all times during step 4)

SLCT LVR POSI: “D” position

TCC S/V DUTY: More than 94%

VEHICLE SPEED: Constant speed of more than 80 km/h (50 MPH)

- Make sure that “GEAR” shows “4”.
 - For shift schedule, refer to [AT-67, "Vehicle Speed at Which Gear Shifting Occurs"](#) .
 - If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAG RESULTS”. In case a DTC other than “P0744 A/T TCC S/V FNCTN” is shown, refer to [AT-82, "Display Items List"](#) .
6. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “DIAGNOSTIC PROCEDURE”.)
Refer to [AT-137, "Diagnostic Procedure"](#) .
Refer to [AT-67, "Vehicle Speed at Which Lock-up Occurs/Releases"](#) .



WITH GST

Follow the procedure “WITH CONSULT-II”.

DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

UCS005P6

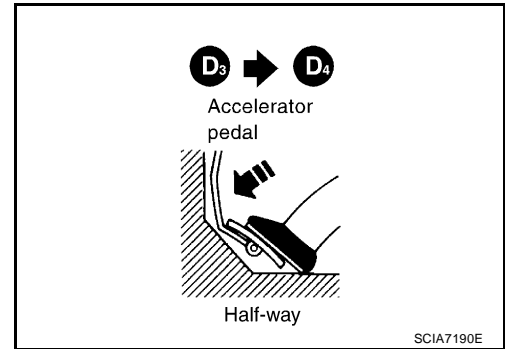
Diagnostic Procedure

1. CHECK SHIFT-UP (D₃ TO D₄)

During [AT-61, "Cruise Test — Part 1"](#) .

Does A/T shift from D₃ to D₄ at the specified speed?

- YES >> GO TO 11.
- NO >> GO TO 2.



2. CHECK LINE PRESSURE

Perform line pressure test. Refer to [AT-56, "LINE PRESSURE TEST"](#) .

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 6.

3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-287, "Control Valve Assembly"](#) .
2. Check to ensure that:
 - Valve, sleeve and plug slide along valve bore under their own weight.
 - Valve, sleeve and plug are free from burrs, dents and scratches.
 - Control valve springs are free from damage, deformation and fatigue.
 - Hydraulic line is free from obstacles.

OK or NG

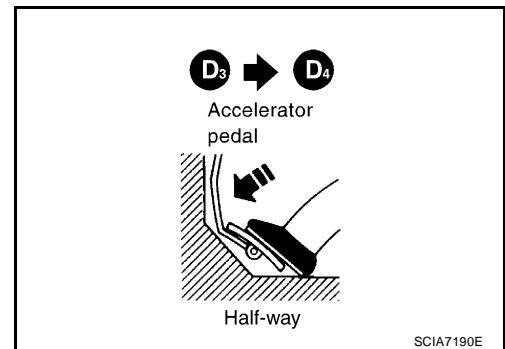
- OK >> GO TO 4.
- NG >> Repair control valve.

4. CHECK SHIFT-UP (D₃ TO D₄)

During [AT-61, "Cruise Test — Part 1"](#) .

Does A/T shift from D₃ to D₄ at the specified speed?

- YES >> GO TO 5.
- NO >> Check control valve again. Repair or replace control valve assembly.



5. CHECK DTC

Perform [AT-136, "DTC Confirmation Procedure"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 11. Check for proper lock-up.

DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

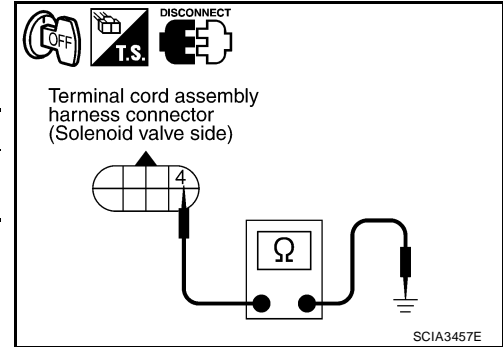
6. CHECK VALVE RESISTANCE

- Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
 - Line pressure solenoid valve
- Check resistance between terminal cord assembly harness connector terminal and ground. Refer to [AT-142, "Wiring Diagram — AT — LPSV"](#) .

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Line pressure solenoid valve	F30	4 - Ground	2.5 - 5 Ω

OK or NG

- OK >> GO TO 7.
 NG >> Replace solenoid valve assembly.

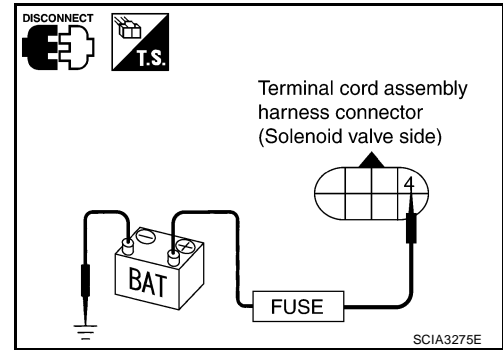


7. CHECK VALVE OPERATION

- Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
 - Line pressure solenoid valve
- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground. Refer to [AT-142, "Wiring Diagram — AT — LPSV"](#) .

OK or NG

- OK >> GO TO 8.
 NG >> Replace solenoid valve assembly.



8. CHECK CONTROL VALVE

- Disassemble control valve assembly. Refer to [AT-287, "Control Valve Assembly"](#) .
- Check line pressure circuit valves for sticking.
 - Pressure regulator valve
 - Pilot valve
 - Pressure modifier valve

OK or NG

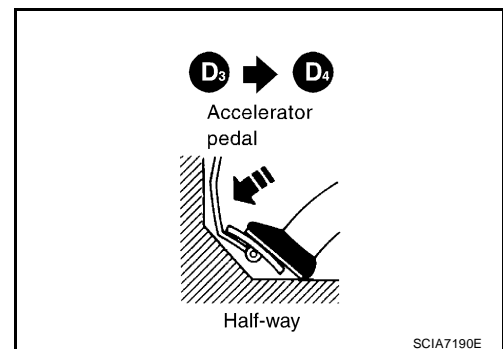
- OK >> GO TO 9.
 NG >> Repair control valve.

9. CHECK SHIFT-UP (D₃ TO D₄)

During [AT-61, "Cruise Test — Part 1"](#) .

Does A/T shift from D₃ to D₄ at the specified speed?

- YES >> GO TO 10.
 NO >> Check control valve again. Repair or replace control valve assembly.



DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

10. CHECK DTC

Perform [AT-136, "DTC Confirmation Procedure"](#) .

OK or NG

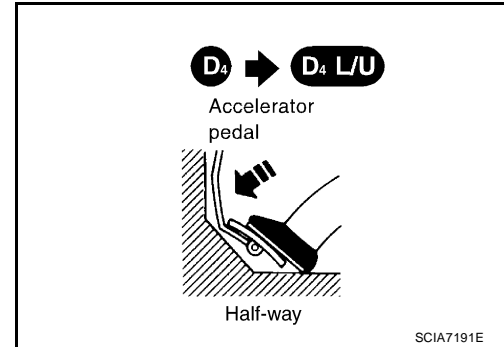
- OK >> **INSPECTION END**
- NG >> GO TO 11. Check for proper lock-up.

11. CHECK LOCK-UP

During [AT-61, "Cruise Test — Part 1"](#) .

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

- YES >> Perform "Cruise test — Part 1" again and return to the start point of this test group.
- NO >> GO TO 12.



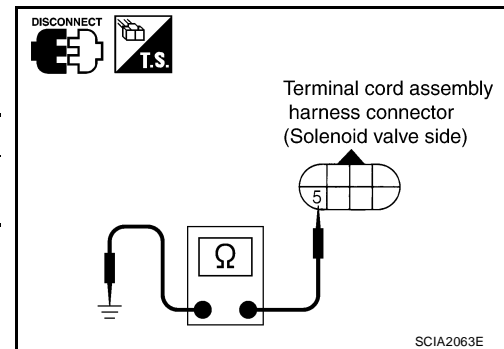
12. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
 - Torque converter clutch solenoid valve
2. Check resistance between terminal cord assembly harness connector terminal and ground. Refer to [AT-131, "Wiring Diagram — AT — TCV"](#) .

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Torque converter clutch solenoid valve	F30	5 - Ground	5 - 20 Ω

OK or NG

- OK >> GO TO 13.
- NG >> Replace solenoid valve assembly.

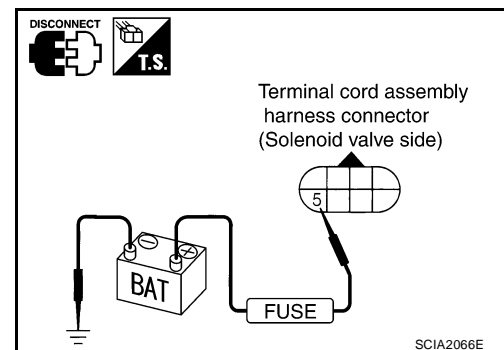


13. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
 - Torque converter clutch solenoid valve
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground. Refer to [AT-131, "Wiring Diagram — AT — TCV"](#) .

OK or NG

- OK >> GO TO 14.
- NG >> Replace solenoid valve assembly.



DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

14. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-287, "Control Valve Assembly"](#) .
2. Check control valves for sticking.
 - Torque converter clutch control valve
 - Torque converter clutch relief valve

OK or NG

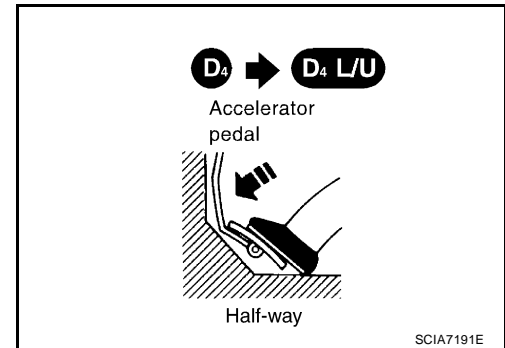
- OK >> GO TO 15.
NG >> Repair control valve.

15. CHECK LOCK-UP

During [AT-61, "Cruise Test — Part 1"](#) .

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

- YES >> GO TO 16.
NO >> Check control valve again. Repair or replace control valve assembly.



16. CHECK DTC

Perform [AT-136, "DTC Confirmation Procedure"](#) .

OK or NG

- OK >> **INSPECTION END**
NG >> Perform "Cruise test — Part 1" again and return to the start point of this test group.

DTC P0745 LINE PRESSURE SOLENOID VALVE

DTC P0745 LINE PRESSURE SOLENOID VALVE

PF3:31940

Description

UCS005P7

The line pressure solenoid valve regulates the oil pump discharge pressure to suit the driving condition in response to signals sent from the TCM.

The line pressure duty cycle value is not constant when the closed throttle position switch is ON. To confirm the line pressure duty cycle at low-pressure, the accelerator (throttle) should be open until the closed throttle position switch is OFF.

CONSULT-II Reference Value

UCS005P8

Remarks: Specification data are reference values.

Item name	Condition	Display value (Approx.)
LINE PRES DTY	Small throttle opening (Low line pressure) ↔ Large throttle opening (High line pressure)	0% ↔ 94%

On Board Diagnosis Logic

UCS005P9

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P0745 LINE PRESSURE S/V” with CONSULT-II or 11th judgement flicker without CONSULT-II is detected when TCM detects an improper voltage drop while it tries to operate the solenoid valve.

Possible Cause

UCS005PA

- Harness or connector
(The solenoid circuit is open or shorted.)
- Line pressure solenoid valve

DTC Confirmation Procedure

UCS005PB

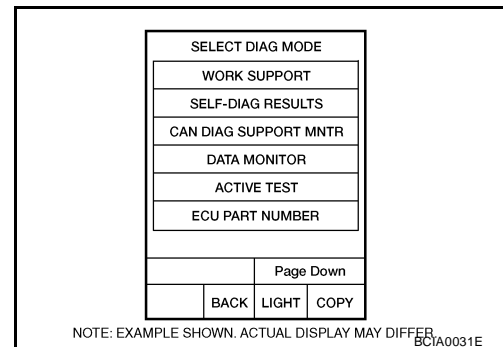
CAUTION:

If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Touch “START”.
3. Depress accelerator pedal completely and wait at least 1 second.
4. If the check result is NG, go to [AT-143, "Diagnostic Procedure"](#) .



WITH GST

Follow the procedure “WITH CONSULT-II”.

WITHOUT CONSULT-II

1. Start engine.
2. With brake pedal depressed, shift the lever from “P” → “N” → “D” → “N” → “P” positions.
3. Perform self-diagnosis. Refer to [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .
4. If the check result is NG, go to [AT-143, "Diagnostic Procedure"](#) .

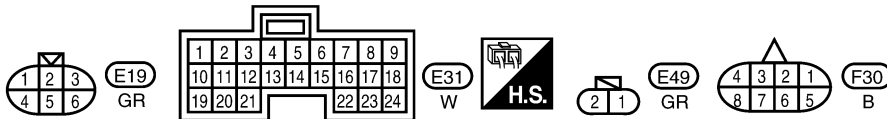
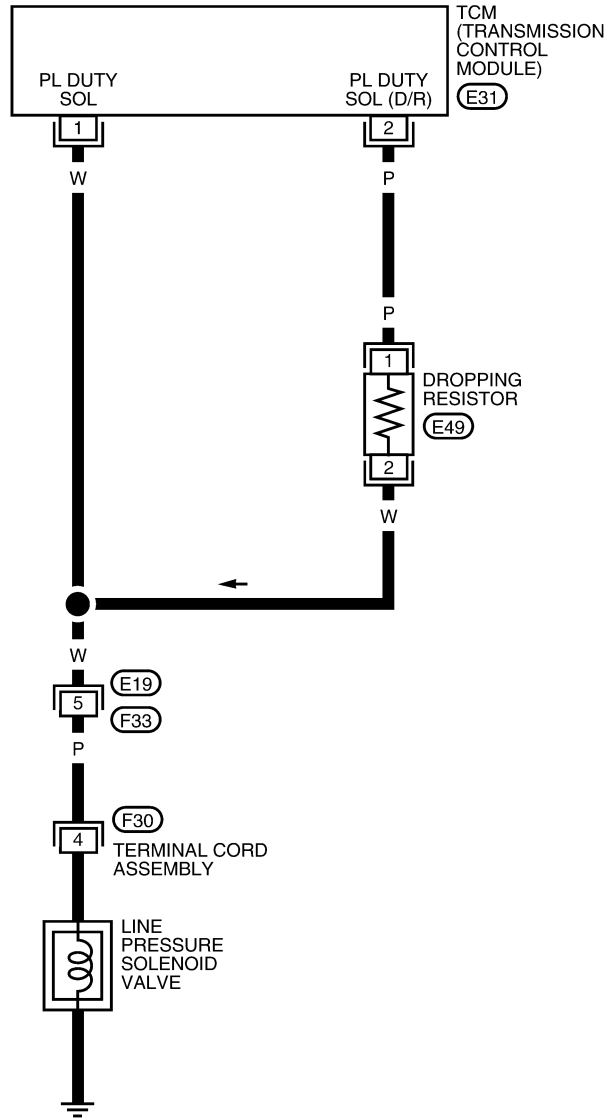
DTC P0745 LINE PRESSURE SOLENOID VALVE

Wiring Diagram — AT — LPSV

UCS005PC

AT-LPSV-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



BCWA0654E

DTC P0745 LINE PRESSURE SOLENOID VALVE

TCM TERMINALS AND REFERENCE VALUES

Refer to [AT-78, "TCM HARNESS CONNECTOR TERMINAL LAYOUT"](#) .

Diagnostic Procedure

UCS005PD

1. CHECK INPUT SIGNAL

Ⓜ With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select "MAIN SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "LINE PRES DTY" while driving. Check the value changes according to driving speed.

Item name	Condition	Display value
LINE PRES DTY	Small throttle opening (Low line pressure) ↔ Large throttle opening (High line pressure)	0 % ↔ 94 %

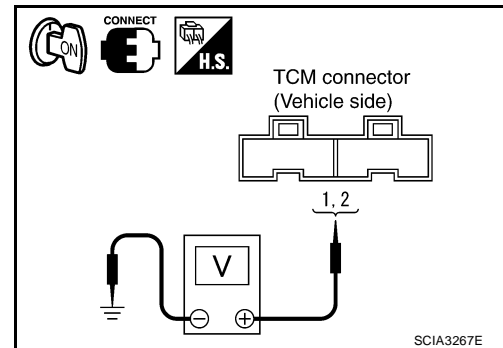
DATA MONITOR	
MONITOR	NO DTC
ENGINE SPEED	384 rpm
GEAR	1
SLCTLR POSI	N/P
VEHICLE SPEED	0 km/h
THROTTLE POSI	0.0 /8
LINE PRES DTY	0 %
TCC S/V DUTY	4 %
SHIFT S/V A	ON
SHIFT S/V B	ON
Page Down	
RECORD	
MODE	BACK LIGHT COPY

SCIA3251E

ⓧ Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground.

Item	Connector	Terminal	Condition	Judgment standard (Approx.)
Line pressure solenoid valve	E31	1 - Ground	When releasing accelerator pedal after warming up engine.	1.5 - 3.0 V
			When depressing accelerator pedal fully after warming up engine.	0 V
Line pressure solenoid valve (with dropping resistor)	E31	2 - Ground	When releasing accelerator pedal after warming up engine.	4 - 14 V
			When depressing accelerator pedal fully after warming up engine.	0 V



OK or NG

- OK >> GO TO 5.
NG >> GO TO 2.

DTC P0745 LINE PRESSURE SOLENOID VALVE

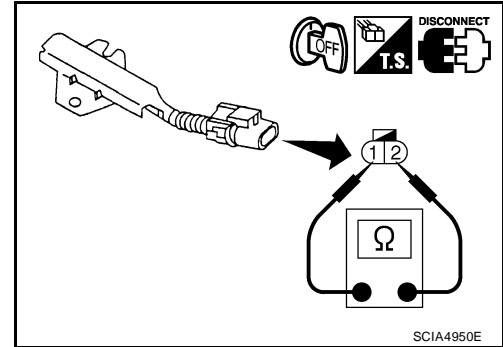
2. CHECK DROPPING RESISTOR

1. Turn ignition switch OFF.
2. Disconnect dropping resistor harness connector in engine room.
3. Check resistance between terminals.

Item	Connector	Terminal	Resistance (Approx.)
Dropping resistor	E49	1 - 2	12 Ω

OK or NG

- OK >> GO TO 3.
NG >> Repair or replace damaged parts.



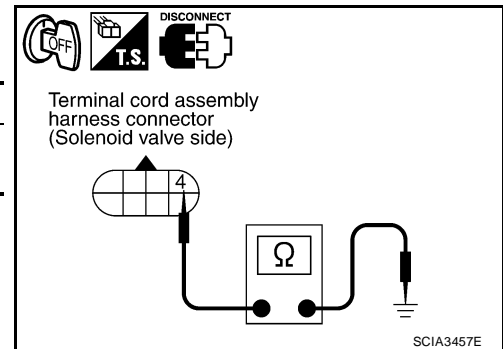
3. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Line pressure solenoid valve	F30	4 - Ground	2.5 - 5.0 Ω

OK or NG

- OK >> GO TO 4.
NG >> Repair or replace damaged parts.

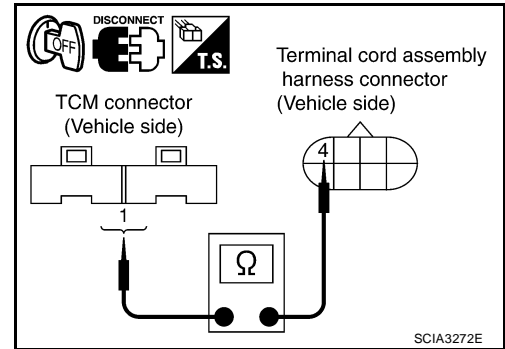


DTC P0745 LINE PRESSURE SOLENOID VALVE

4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

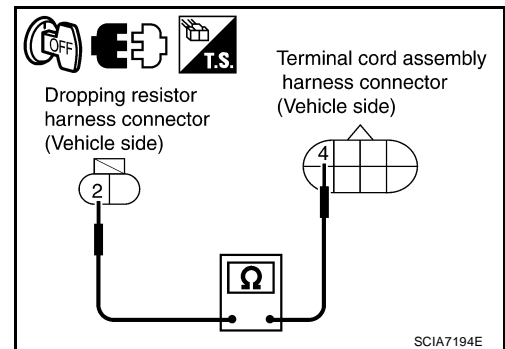
1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector	Terminal	Continuity
TCM	E31	1	Yes
Terminal cord assembly harness connector	F30	4	



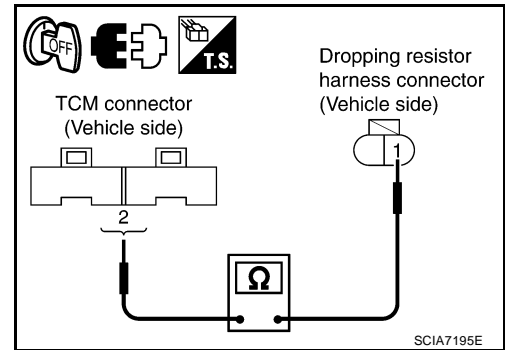
4. Check continuity between terminal cord assembly harness connector terminal and dropping resistor harness connector terminal.

Item	Connector	Terminal	Continuity
Dropping resistor harness connector	E49	2	Yes
Terminal cord assembly harness connector	F30	4	



5. Check continuity between dropping resistor harness connector terminal and TCM connector terminal.

Item	Connector	Terminal	Continuity
TCM	E31	2	Yes
Dropping resistor harness connector	E49	1	



6. If OK, check harness for short to ground and short to power.
7. If OK, check continuity between ground and transaxle assembly.
8. Reinstall any part removed.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK DTC

Perform [AT-141, "DTC Confirmation Procedure"](#) .

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.

DTC P0745 LINE PRESSURE SOLENOID VALVE

UCS005PE

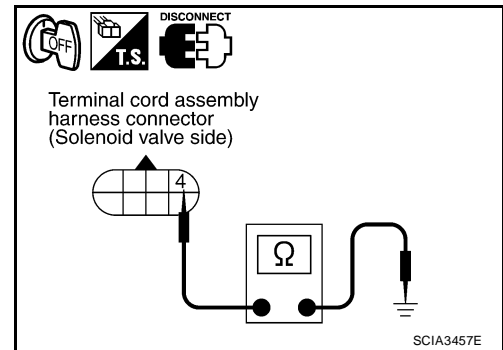
Component Inspection LINE PRESSURE SOLENOID VALVE

- For removal, refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .

Resistance Check

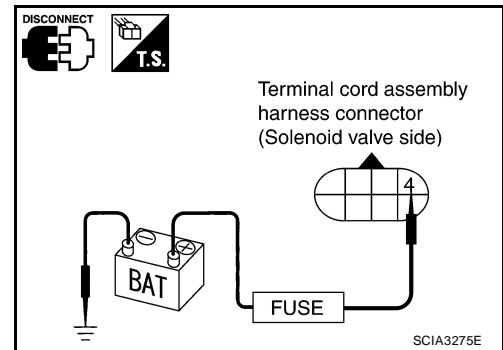
- Check resistance between terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Line pressure solenoid valve	F30	4 - Ground	2.5 - 5 Ω



Operation Check

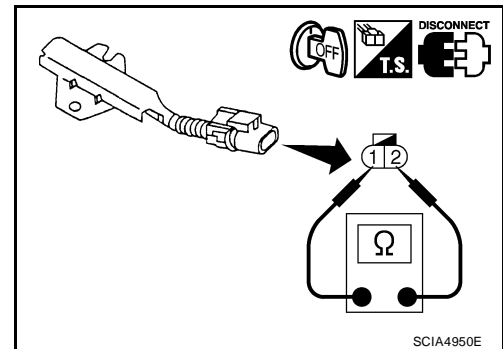
- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DROPPING RESISTOR

- Check resistance between terminals.

Item	Connector	Terminal	Resistance (Approx.)
Dropping resistor	E49	1 - 2	12 Ω



DTC P0750 SHIFT SOLENOID VALVE A

DTC P0750 SHIFT SOLENOID VALVE A

PDF:31940

Description

UCS005PF

Shift solenoid valves A and B are turned ON or OFF by the TCM in response to signals sent from the PNP switch, vehicle speed and ECM (throttle opening). Gears will then be shifted to the optimum position.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

CONSULT-II Reference Value

UCS005PG

Item name	Condition	Display value
SHIFT S/V A	When shift solenoid valve A operates. (When driving in "D1 " or "D4 ".)	ON
	When shift solenoid valve A does not operate. (When driving in "D2 " or "D3 ".)	OFF

On Board Diagnosis Logic

UCS005PH

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code "P0750 SHIFT SOLENOID/V A" with CONSULT-II or 4th judgement flicker without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

UCS005PI

- Harness or connector
(The solenoid circuit is open or shorted.)
- Shift solenoid valve A

DTC Confirmation Procedure

UCS005PJ

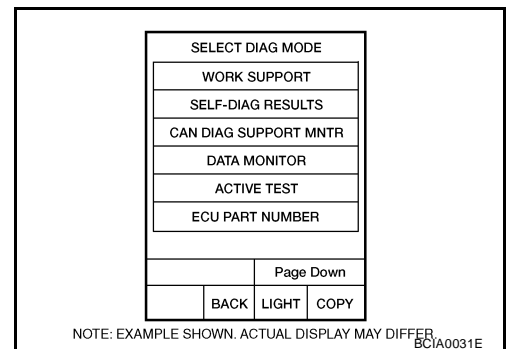
CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this "DTC Confirmation Procedure" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Touch "START".
3. Start engine.
4. Drive vehicle in "D" position and allow the transaxle to shift 1 → 2 ("GEAR").
5. If the check result is NG, go to [AT-149, "Diagnostic Procedure"](#) .



WITH GST

Follow the procedure "WITH CONSULT-II".

WITHOUT CONSULT-II

1. Start engine.
2. Drive vehicle in D1 → D2 position.
3. Perform self-diagnosis. Refer to [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .
4. If the check result is NG, go to [AT-149, "Diagnostic Procedure"](#) .

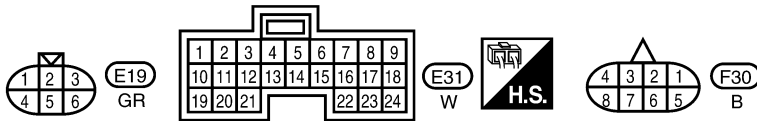
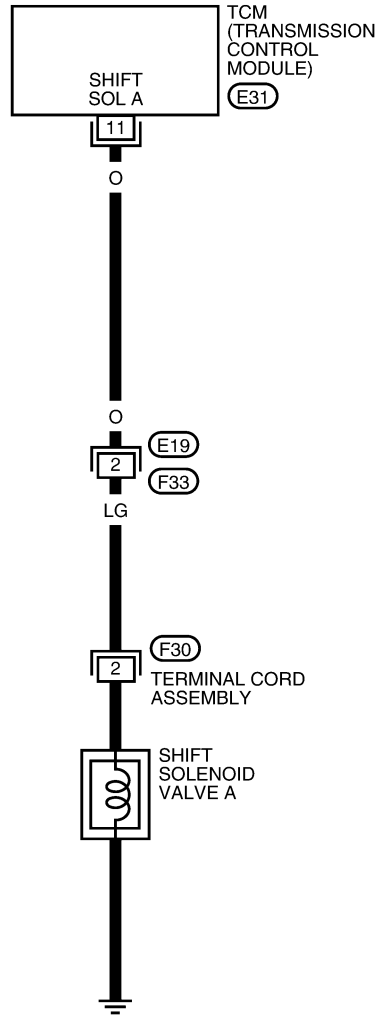
DTC P0750 SHIFT SOLENOID VALVE A

Wiring Diagram — AT — SSV/A

UCS005PK

AT-SSV/A-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



BCWA0655E

DTC P0750 SHIFT SOLENOID VALVE A

TCM TERMINALS AND REFERENCE VALUES

Refer to [AT-78, "TCM HARNESS CONNECTOR TERMINAL LAYOUT"](#) .

Diagnostic Procedure

UCS005PL

1. CHECK INPUT SIGNAL

Ⓜ With CONSULT-II

1. Start engine.
2. Select "MAIN SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "SHIFT S/V A" while driving.
Check the value changes according to driving speed.

Item name	Condition	Display value
SHIFT S/V A	When shift solenoid valve A operates. (When driving in "D1 " or "D4 ".)	ON
	When shift solenoid valve A does not operate. (When driving in "D2 " or "D3 ".)	OFF

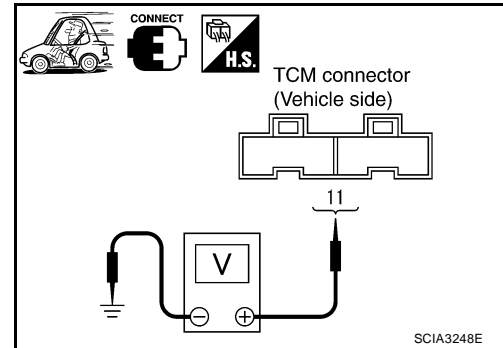
DATA MONITOR	
MONITOR	NO DTC
ENGINE SPEED	384 rpm
GEAR	1
SLCTLVR POSI	N/P
VEHICLE SPEED	0 km/h
THROTTLE POSI	0.0 /8
LINE PRES DTY	0 %
TCC S/V DUTY	4 %
SHIFT S/V A	ON
SHIFT S/V B	ON
Page Down	
RECORD	
MODE	BACK
LIGHT	COPY

SCIA3251E

⊗ Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

Item	Connector	Terminal	Condition	Judgment standard (Approx.)
Shift solenoid valve A	E31	11 - Ground	When shift solenoid valve A operates. (When driving in "D1 " or "D4 ".)	Battery voltage
			When shift solenoid valve A does not operate. (When driving in "D2 " or "D3 ".)	0 V



OK or NG

- OK >> GO TO 5.
NG >> GO TO 2.

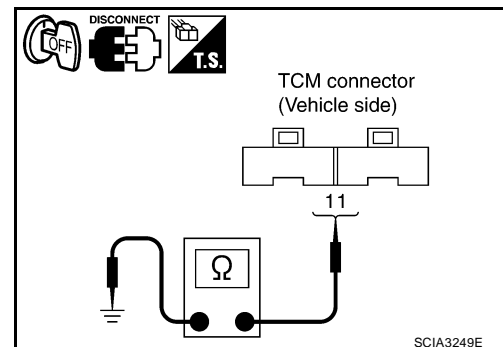
2. CHECK SHIFT SOLENOID VALVE A CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid Valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve A	E31	11 - Ground	20 - 30 Ω

OK or NG

- OK >> GO TO 5.
NG >> GO TO 3.



DTC P0750 SHIFT SOLENOID VALVE A

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

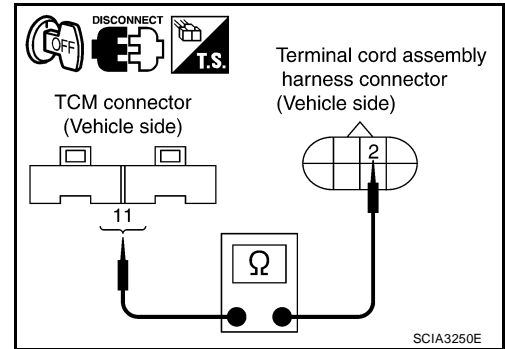
Item	Connector	Terminal	Continuity
TCM	E31	11	Yes
Terminal cord assembly harness connector	F30	2	

4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK VALVE RESISTANCE

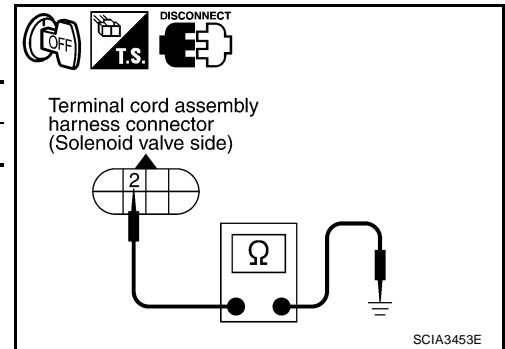
1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve A	F30	2 - Ground	20 - 30 Ω

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.



5. CHECK DTC

Perform [AT-147, "DTC Confirmation Procedure"](#) .

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.

Component Inspection SHIFT SOLENOID VALVE A

UCS005PM

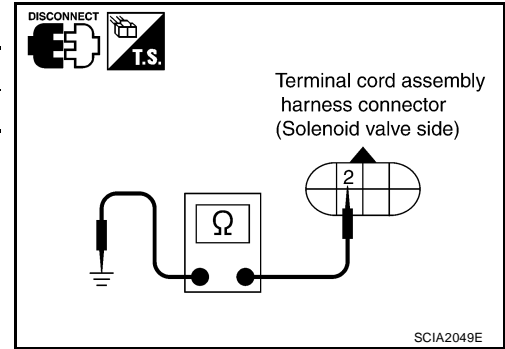
- For removal, refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .

DTC P0750 SHIFT SOLENOID VALVE A

Resistance Check

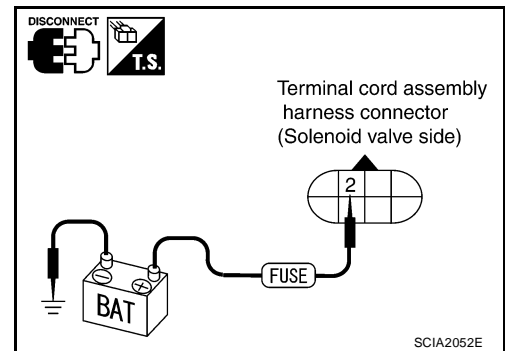
- Check resistance between terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve A	F30	2 - Ground	20 - 30 Ω



Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



A
B
AT
D
E
F
G
H
I
J
K
L
M

DTC P0755 SHIFT SOLENOID VALVE B

DTC P0755 SHIFT SOLENOID VALVE B

PF3:31940

Description

UCS005PN

Shift solenoid valves A and B are turned ON or OFF by the TCM in response to signals sent from the PNP switch, vehicle speed and ECM (throttle opening). Gears will then be shifted to the optimum position.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

CONSULT-II Reference Value

UCS005PO

Item name	Condition	Display value
SHIFT S/V B	When shift solenoid valve B operates. (When driving in "D1 " or "D2 ".)	ON
	When shift solenoid valve B does not operate. (When driving in "D3 " or "D4 ".)	OFF

On Board Diagnosis Logic

UCS005PP

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code "P0755 SHIFT SOLENOID/V B" with CONSULT-II or 5th judgement flicker without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

UCS005PQ

- Harness or connector
(The solenoid circuit is open or shorted.)
- Shift solenoid valve B

DTC Confirmation Procedure

UCS005PR

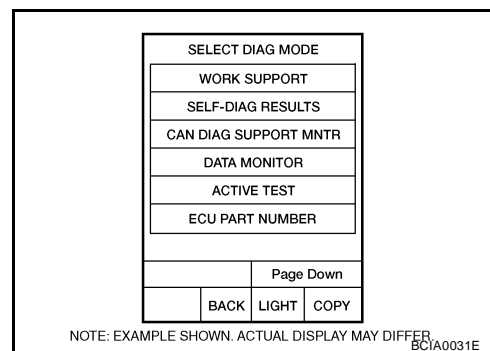
CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this "DTC Confirmation Procedure" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

④ WITH CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Touch "START".
3. Start engine.
4. Drive vehicle in D position and allow the transaxle to shift 1 → 2 → 3 ("GEAR").
5. If the check result is NG, go to [AT-154, "Diagnostic Procedure"](#) .



④ WITH GST

Follow the procedure "WITH CONSULT-II".

⊗ WITHOUT CONSULT-II

1. Start engine.
2. Drive vehicle in D1 → D2 → D3 position.
3. Perform self-diagnosis. Refer to [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .
4. If the check result is NG, go to [AT-154, "Diagnostic Procedure"](#) .

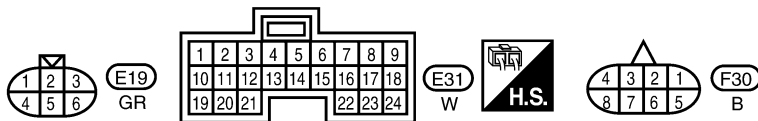
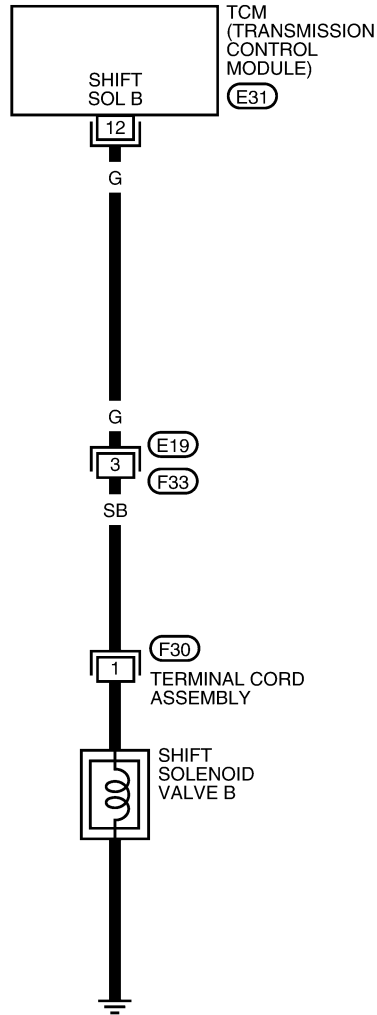
DTC P0755 SHIFT SOLENOID VALVE B

Wiring Diagram — AT — SSV/B

UCS005PS

AT-SSV/B-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



BCWA0656E

DTC P0755 SHIFT SOLENOID VALVE B

TCM TERMINALS AND REFERENCE VALUES

Refer to [AT-78, "TCM HARNESS CONNECTOR TERMINAL LAYOUT"](#).

Diagnostic Procedure

UCS005PT

1. CHECK INPUT SIGNAL

Ⓟ With CONSULT-II

1. Start engine.
2. Select "MAIN SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "SHIFT S/V B" while driving.
Check the value changes according to driving speed.

Item name	Condition	Display value
SHIFT S/V B	When shift solenoid valve B operates. (When driving in "D1 " or "D2 ".)	ON
	When shift solenoid valve B does not operate. (When driving in "D3 " or "D4 ".)	OFF

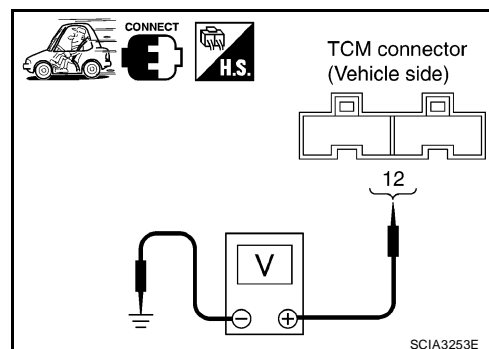
DATA MONITOR	
MONITOR	NO DTC
ENGINE SPEED	384 rpm
GEAR	1
SLCTLVR POSI	N/P
VEHICLE SPEED	0 km/h
THROTTLE POSI	0.0 /8
LINE PRES DTY	0 %
TCC S/V DUTY	4 %
SHIFT S/V A	ON
SHIFT S/V B	ON
Page Down	
RECORD	
MODE	BACK
LIGHT	COPY

SCIA3251E

⊗ Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

Item	Connector	Terminal	Condition	Judgment standard (Approx.)
Shift solenoid valve B	E31	12 - Ground	When shift solenoid valve B operates. (When driving in "D1 " or "D2 ".)	Battery voltage
			When shift solenoid valve B does not operate. (When driving in "D3 " or "D4 ".)	0 V



OK or NG

- OK >> GO TO 5.
NG >> GO TO 2.

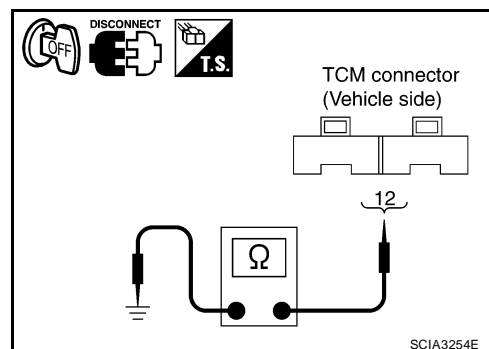
2. CHECK SHIFT SOLENOID VALVE B CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid Valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve B	E31	12 - Ground	5 - 20 Ω

OK or NG

- OK >> GO TO 5.
NG >> GO TO 3.



DTC P0755 SHIFT SOLENOID VALVE B

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

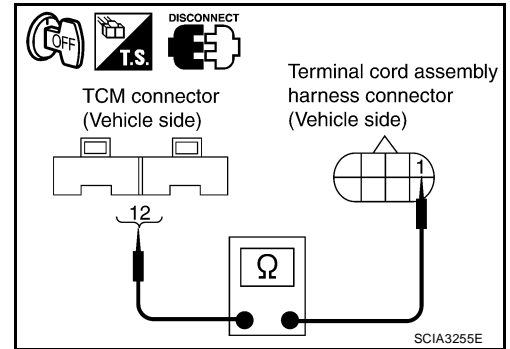
Item	Connector	Terminal	Continuity
TCM	E31	12	Yes
Terminal cord assembly harness connector	F30	1	

4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK VALVE RESISTANCE

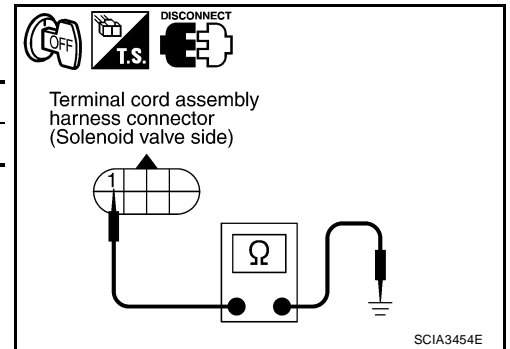
1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve B	F30	1 - Ground	5 - 20 Ω

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.



5. CHECK DTC

Perform [AT-152, "DTC Confirmation Procedure"](#) .

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.

Component Inspection SHIFT SOLENOID VALVE B

UCS005PU

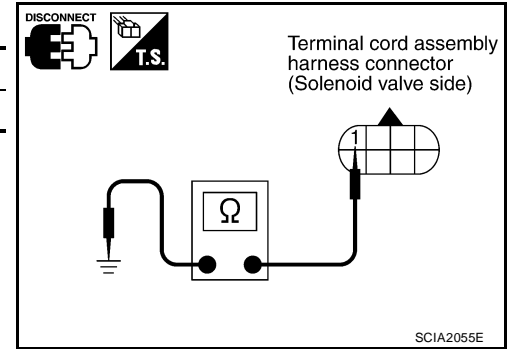
- For removal, refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .

DTC P0755 SHIFT SOLENOID VALVE B

Resistance Check

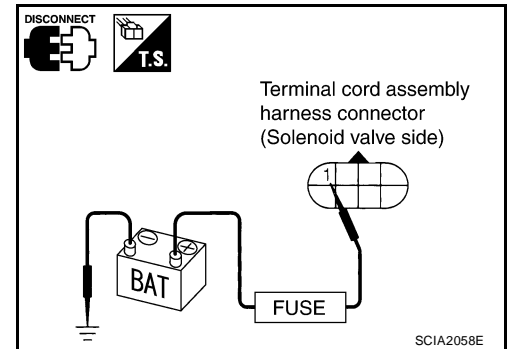
- Check resistance between terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve B	F30	1 - Ground	5 - 20 Ω



Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

PF3:31940

Description

UCS005Q1

The overrun clutch solenoid valve is activated by the TCM in response to signals sent from the PNP switch, overdrive control switch, vehicle speed and ECM (throttle opening). The overrun clutch operation will then be controlled.

CONSULT-II Reference Value

UCS005Q2

Item name	Condition	Display value
OVERRUN/C S/V	When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to AT-22 .)	ON
	When overrun clutch solenoid valve does not operate. (When overrun clutch engaged. Refer to AT-22 .)	OFF

On Board Diagnosis Logic

UCS005Q3

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “P1760 OVERRUN CLUTCH S/V” with CONSULT-II or 6th judgement flicker without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate solenoid valve.

Possible Cause

UCS005Q4

- Harness or connector
(The solenoid circuit is open or shorted.)
- Overrun clutch solenoid valve

DTC Confirmation Procedure

UCS005Q5

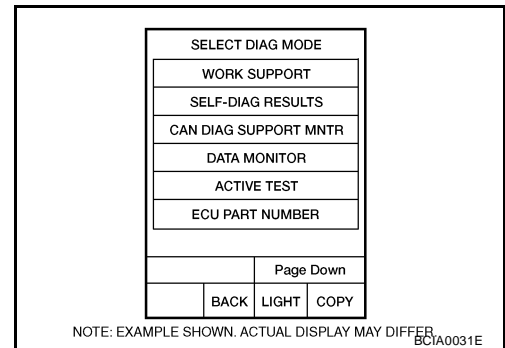
CAUTION:

- Always drive vehicle at a safe speed.
- If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Touch “START”.
3. Start engine.
4. Accelerate vehicle to a speed of more than 10 km/h (6 MPH) with “D” position (OD ON).
5. Release accelerator pedal completely with “D” position (OD OFF).
6. If the check result is NG, go to [AT-159, "Diagnostic Procedure"](#) .



WITH GST

Follow the procedure “WITH CONSULT-II”.

WITHOUT CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions:
Selector lever position: “D” position (OD ON)
Vehicle speed: Higher than 10 km/h (6 MPH)
3. Perform self-diagnosis. Refer to [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .
4. If the check result is NG, go to [AT-159, "Diagnostic Procedure"](#) .

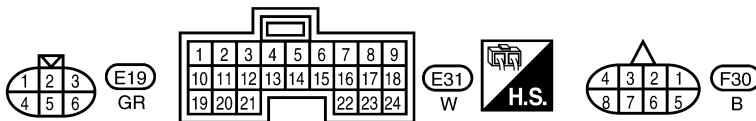
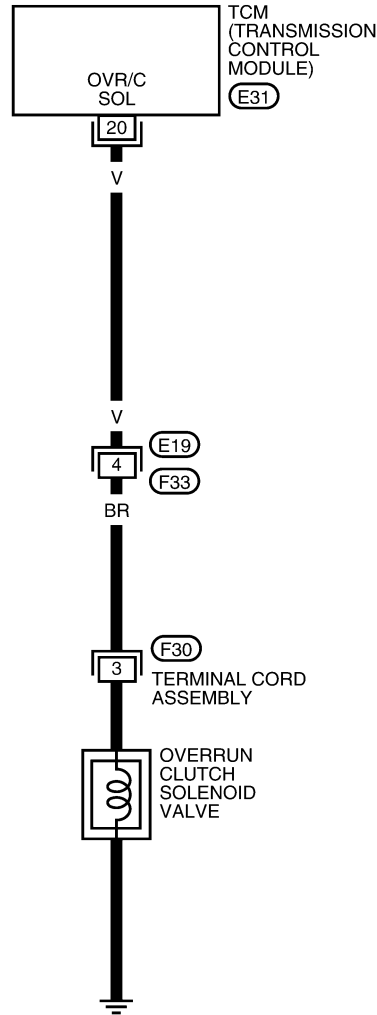
DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

Wiring Diagram — AT — OVRCSV

UCS00506

AT-OVRCSV-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



BCWA0657E

DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

TCM TERMINALS AND REFERENCE VALUES

Refer to [AT-78, "TCM HARNESS CONNECTOR TERMINAL LAYOUT"](#) .

Diagnostic Procedure

UCS005Q7

1. CHECK INPUT SIGNAL

Ⓜ With CONSULT-II

1. Start engine.
2. Select "MAIN SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "OVERRUN/C S/V" while driving.
Check the value changes according to driving speed.

Item name	Condition	Display value
OVERRUN/C S/V	When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to AT-22 .)	ON
	When overrun clutch solenoid valve does not operate. (When overrun clutch engaged. Refer to AT-22 .)	OFF

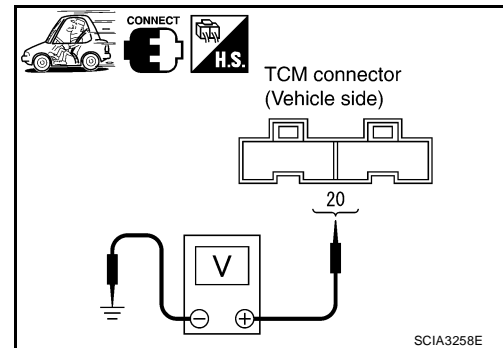
DATA MONITOR	
MONITOR	NO DTC
SLCTLVR POSI	N/P
VEHICLE SPEED	0 km/h
THROTTLE POSI	0.0 /8
LINE PRES DTY	0 %
TCC S/V DUTY	4 %
SHIFT S/V A	ON
SHIFT S/V B	ON
OVERRUN/C S/V	OFF
SELF-D DP LMP	OFF
Page Up	
RECORD	
MODE	BACK
LIGHT	COPY

SCIA3257E

⊗ Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Overrun clutch solenoid valve	E31	20 - Ground	When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to AT-22 .)	Battery voltage
			When overrun clutch solenoid valve does not operate. (When overrun clutch engaged. Refer to AT-22 .)	0 V



OK or NG

- OK >> GO TO 5.
NG >> GO TO 2.

DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

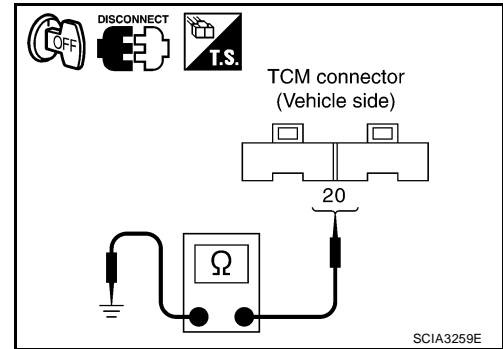
2. CHECK OVERRUN CLUTCH SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid Valve	Connector	Terminal	Resistance (Approx.)
Overrun clutch solenoid valve	E31	20 - Ground	20 - 30 Ω

OK or NG

- OK >> GO TO 5.
 NG >> GO TO 3.



3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

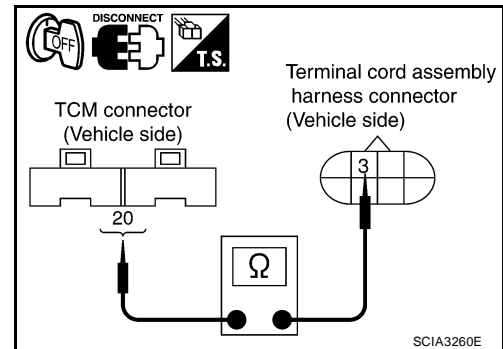
1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector	Terminal	Continuity
TCM	E31	20	Yes
Terminal cord assembly harness connector	F30	3	

4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

OK or NG

- OK >> GO TO 4.
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.



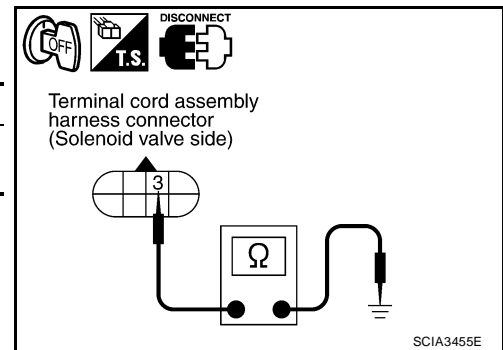
4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Overrun clutch solenoid valve	F30	3 - Ground	20 - 30 Ω

OK or NG

- OK >> GO TO 5.
 NG >> Repair or replace damaged parts.



5. CHECK DTC

Perform [AT-157, "DTC Confirmation Procedure"](#) .

OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 6.

DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

6. CHECK TCM

1. Check TCM input/output signal. Refer to [AT-78, "TCM Terminals and Reference Values"](#).
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.

Component Inspection OVERRUN CLUTCH SOLENOID VALVE

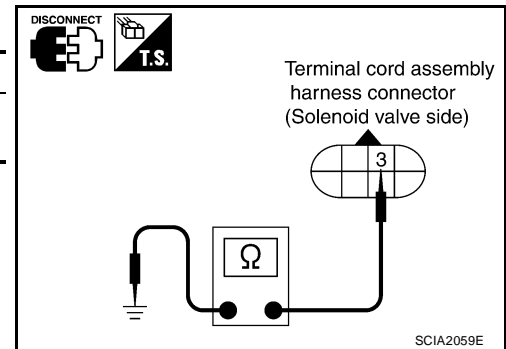
UCS005Q8

- For removal, refer to [AT-236, "Control Valve Assembly and Accumulators"](#).

Resistance Check

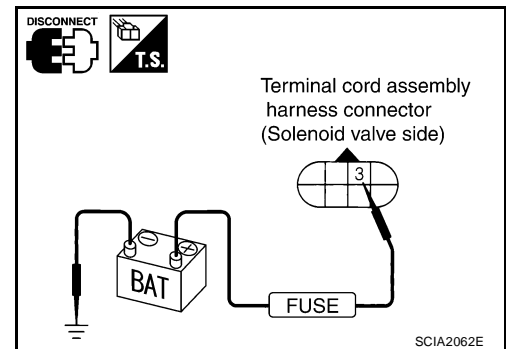
- Check resistance between terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Overrun clutch solenoid valve	F30	3 - Ground	20 - 30 Ω



Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DTC VEHICLE SPEED SENSOR MTR

DTC VEHICLE SPEED SENSOR MTR

PF2:24814

Description

UCS005Q9

The vehicle speed sensor-MTR is built into the speedometer assembly. The sensor functions as an auxiliary device to the revolution sensor when it is malfunctioning. The TCM will then use a signal sent from the vehicle speed sensor-MTR.

CONSULT-II Reference Value

UCS005QA

Remarks: Specification data are reference values.

Item name	Condition	Display value
VHCL/S SE-MTR	During driving	Approximately matches the speedometer reading.

On Board Diagnosis Logic

UCS005QB

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code "VHCL SPEED SEN-MTR" with CONSULT-II or 2nd judgement flicker without CONSULT-II is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

UCS005QC

- Harness or connector
(The sensor circuit is open or shorted.)
- Vehicle speed sensor

DTC Confirmation Procedure

UCS005QD

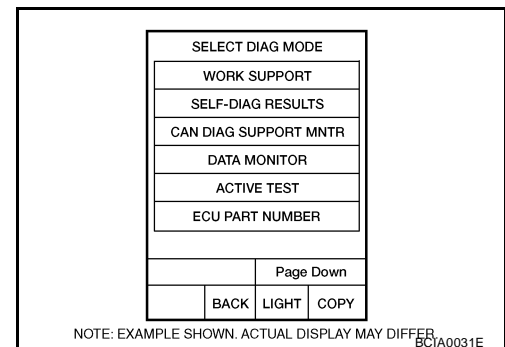
CAUTION:

- Always drive vehicle at a safe speed.
- If performing this "DTC Confirmation Procedure" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

④ WITH CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Touch "START".
3. Start engine and accelerate vehicle from 0 to 25 km/h (0 to 16 MPH).
4. If the check result is NG, go to [AT-164, "Diagnostic Procedure"](#) .



⊗ WITHOUT CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions:
Selector lever position: "D" position
Vehicle speed: Higher than 25 km/h (16 MPH)
3. Perform self-diagnosis. Refer to [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .
4. If the check result is NG, go to [AT-164, "Diagnostic Procedure"](#) .

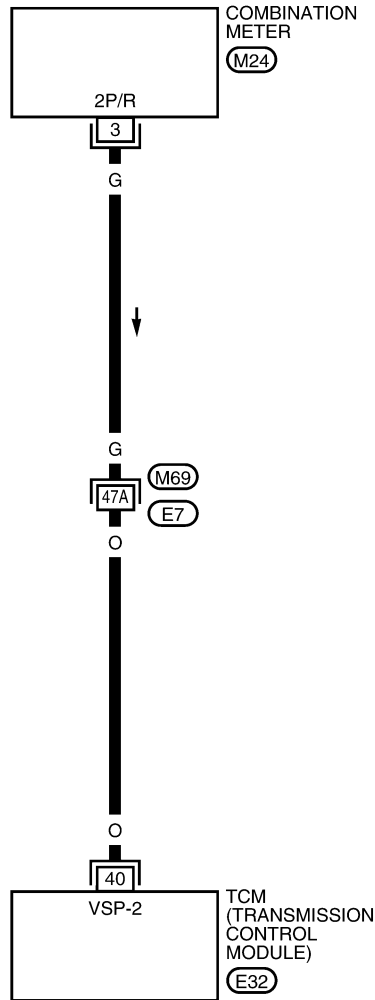
DTC VEHICLE SPEED SENSOR MTR

Wiring Diagram — AT — VSSMTR

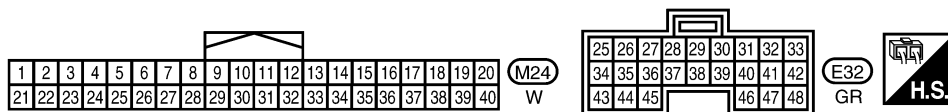
UCS0050E

AT-VSSMTR-01

— : DETECTABLE LINE FOR DTC
— : NON-DETECTABLE LINE FOR DTC



A
B
AT
D
E
F
G
H
I
J
K
L
M



REFER TO THE FOLLOWING.
 (M69) - SUPER MULTIPLE JUNCTION (SMJ)

BCWA0658E

DTC VEHICLE SPEED SENSOR MTR

TCM TERMINALS AND REFERENCE VALUES

Refer to [AT-78, "TCM HARNESS CONNECTOR TERMINAL LAYOUT"](#) .

Diagnostic Procedure

UCS005QF

1. CHECK INPUT SIGNAL

④ With CONSULT-II

1. Start engine.
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "VHCL/S SE-MTR" while driving. Check the value changes according to driving speed.

Item name	Condition	Display value
VHCL/S SE-MTR	During driving	Approximately matches the speedometer reading.

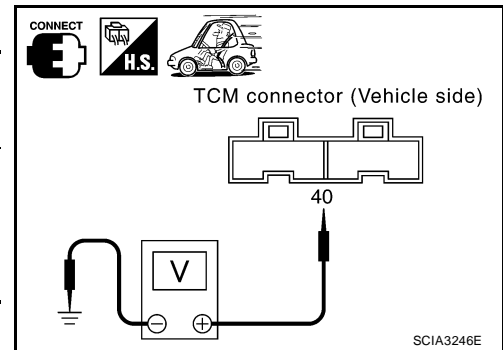
DATA MONITOR	
MONITORING	
VHCL/S SE-A/T	XXX km/h
VHCL/S SE-MTR	XXX km/h
THRTL POS SEN	XXX V
FLUID TEMP SE	XXX V
BATTERY VOLT	XXX V

LCIA0090E

⊗ Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Vehicle speed sensor	E32	40 - Ground	When driving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 0 V and more than 4.5 V



OK or NG

- OK >> GO TO 3.
 NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEM

Check the following items:

- Combination meter. Refer to [DI-5, "COMBINATION METERS"](#) .
- Harness for short or open between TCM and combination meter.

OK or NG

- OK >> GO TO 3.
 NG >> Repair or replace damaged parts.

3. CHECK DTC

Perform [AT-162, "DTC Confirmation Procedure"](#) .

OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 4.

4. CHECK TCM

1. Check TCM input/output signal. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
 NG >> Repair or replace damaged parts.

DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

PF3:31940

Description

UCS005QG

The A/T fluid temperature sensor detects the A/T fluid temperature and sends a signal to the TCM.

CONSULT-II Reference Value

UCS005QH

Remarks: Specification data are reference values.

Item name	Condition	Display value
FLUID TEMP SE	When A/T fluid temperature is 20°C (68°F).	1.5 V
	When A/T fluid temperature is 80°C (176°F).	0.5 V

On Board Diagnosis Logic

UCS005QI

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code "BATT/FLUID TEMP SEN" with CONSULT-II or 8th judgement flicker without CONSULT-II is detected when TCM receives an excessively low or high voltage from the sensor.

Possible Cause

UCS005QJ

- Harness or connector
(The sensor circuit is open or shorted.)
- A/T fluid temperature sensor

DTC Confirmation Procedure

UCS005QK

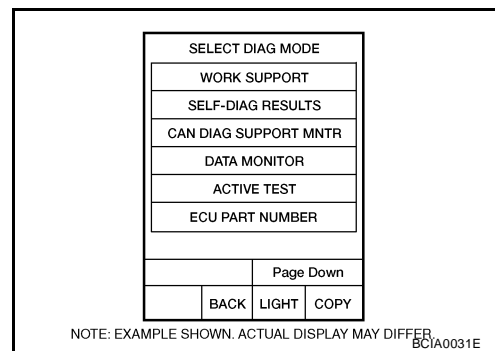
CAUTION:

- Always drive vehicle at a safe speed.
- If performing this "DTC Confirmation Procedure" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Start engine.
2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Touch "START".
4. Drive vehicle under the following conditions.
SLCT LVR POSI: "D" position
VEHICLE SPEED: Higher than 20 km/h (12 MPH)
5. If the check result is NG, go to [AT-167, "Diagnostic Procedure"](#).



WITHOUT CONSULT-II

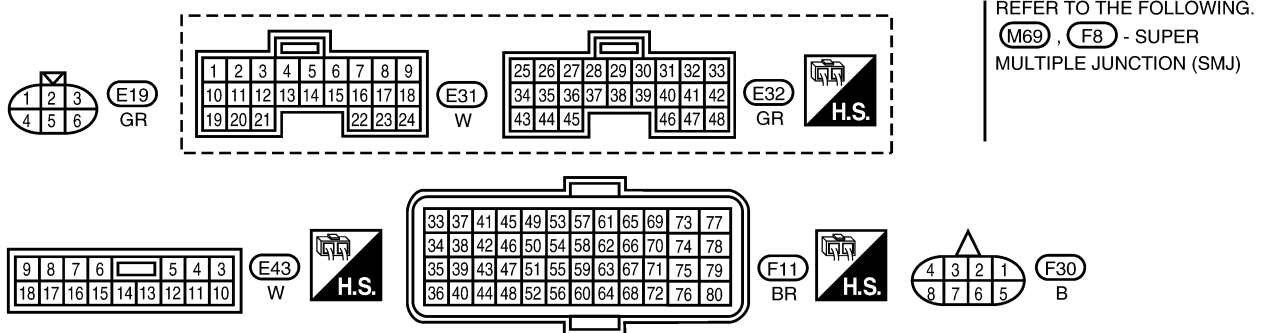
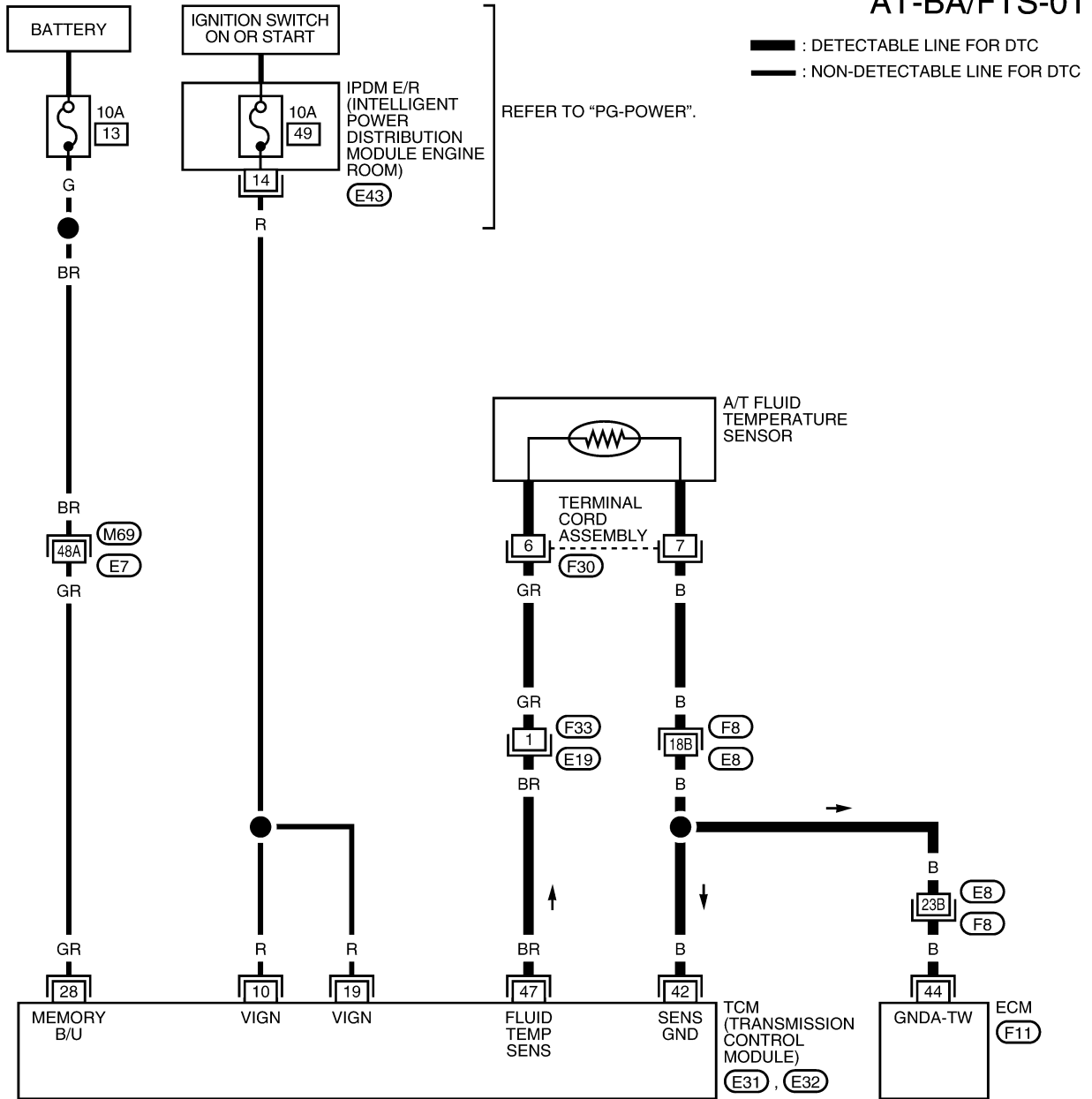
1. Start engine.
2. Drive vehicle under the following conditions.
Selector lever position: D position
Vehicle speed: higher than 20 km/h (12 MPH)
3. Perform self-diagnosis. Refer to [AT-86, "Diagnostic Procedure Without CONSULT-II"](#).
4. If the check result is NG, go to [AT-167, "Diagnostic Procedure"](#).

DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

Wiring Diagram — AT — BA/FTS

UCS0050L

AT-BA/FTS-01



BCWA0659E

DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

TCM TERMINALS AND REFERENCE VALUES

Refer to [AT-78, "TCM HARNESS CONNECTOR TERMINAL LAYOUT"](#) .

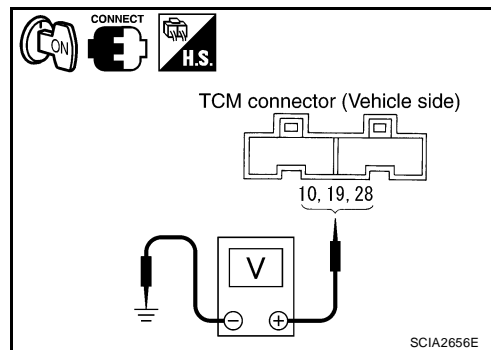
Diagnostic Procedure

UCS005QM

1. CHECK TCM POWER SOURCE

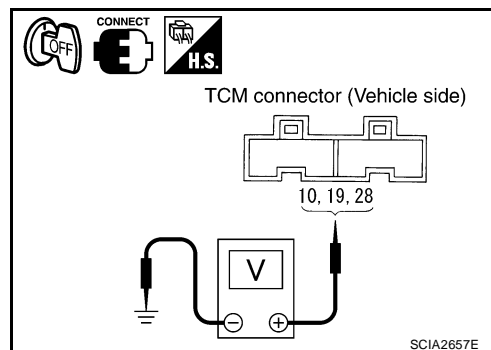
1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
Power supply	E31	10	Battery voltage
		19	Battery voltage
Power supply (memory back-up)	E32	28	Battery voltage



3. Turn ignition switch OFF.
4. Check voltage between TCM connector terminals and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
Power supply	E31	10	0 V
		19	0 V
Power supply (memory back-up)	E32	28	Battery voltage



OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between ignition switch and TCM terminals 10, 19
- Harness for short or open between battery and TCM terminal 28
- 10A fuse (No.13, located in the fuse block) and 10A fuse (No.49, located in the IPDM E/R)
- Ignition switch. Refer to [PG-4, "POWER SUPPLY ROUTING CIRCUIT"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Repair or replace damaged parts.

DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

3. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR

With CONSULT-II

1. Start engine.
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "FLUID TEMP SE".

Item name	Condition	Display value
FLUID TEMP SE	When A/T fluid temperature is 20°C (68°F).	1.5 V
	When A/T fluid temperature is 80°C (176°F).	0.5 V

DATA MONITOR	
MONITORING	
VHCL/S SE-A/T	XXX km/h
VHCL/S SE-MTR	XXX km/h
THRTL POS SEN	XXX V
FLUID TEMP SE	XXX V
BATTERY VOLT	XXX V

LCIA0090E

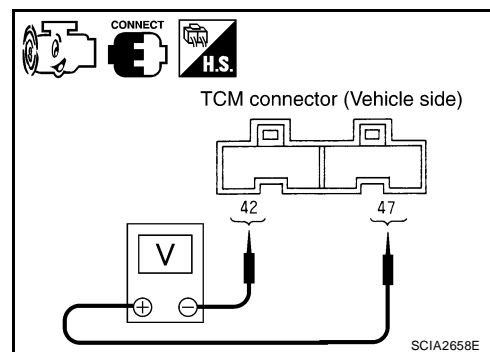
Without CONSULT-II

1. Start engine.
2. Check voltage TCM connector terminals while warming up A/T.

Item	Connector	Terminal	Condition	Judgment standard (Approx.)
A/T fluid temperature sensor	E32	47 - 42	When A/T fluid temperature is 20°C (68°F).	1.5 V
			When A/T fluid temperature is 80°C (176°F).	0.5 V

OK or NG

- OK >> GO TO 9.
 NG >> GO TO 4.



4. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between TCM, ECM and terminal cord assembly
- Ground circuit for ECM
 Refer to [EC-144, "POWER SUPPLY AND GROUND CIRCUIT"](#) .

OK or NG

- OK >> GO TO 5.
 NG >> Repair or replace damaged parts.

DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

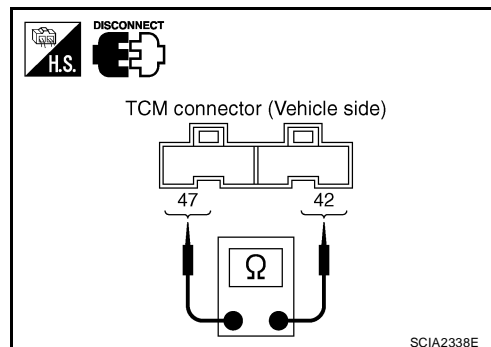
5. CHECK FLUID TEMPERATURE SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect the TCM connector.
3. Check resistance between terminals.

Item	Connector	Terminal	Temperature °C (°F)	Resistance (Approx.)
A/T fluid temperature sensor	E32	47 - 42	20 (68)	2.5 kΩ
			80 (176)	0.3 kΩ

OK or NG

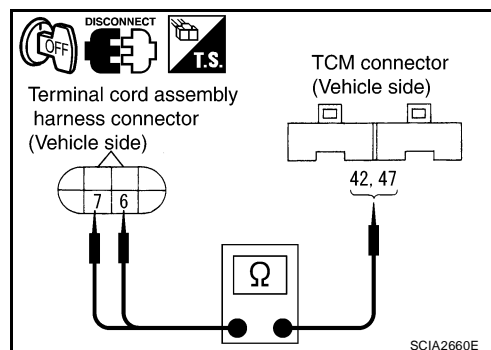
- OK >> GO TO 9.
 NG >> GO TO 6.



6. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector	Terminal	Continuity
TCM	E32	42	Yes
Terminal cord assembly harness connector	F30	7	
TCM	E32	47	Yes
Terminal cord assembly harness connector	F30	6	



4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

OK or NG

- OK >> GO TO 7.
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

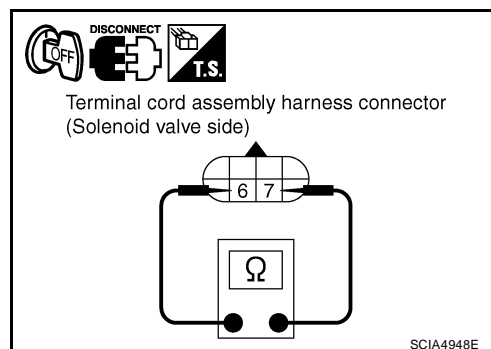
1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly terminals.

Item	Connector	Terminal	Temperature [°C (°F)]	Resistance (Approx.)
A/T fluid temperature sensor	F30	6 - 7	20 (68)	2.5 kΩ
			80 (176)	0.3 kΩ

4. Reinstall any part removed.

OK or NG

- OK >> GO TO 8.
 NG >> Repair or replace damaged parts.



DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

8. DETECT MALFUNCTIONING ITEM

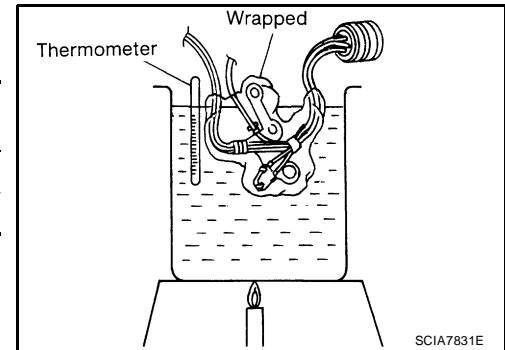
1. Remove oil pan. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
2. Check the following items:
 - A/T fluid temperature sensor
 - Check resistance between terminal cord assembly harness connector terminals while changing temperature as shown.

Item	Connector	Terminal	Temperature [°C (°F)]	Resistance (Approx.)
A/T fluid temperature sensor	F30	6 - 7	20 (68)	2.5 kΩ
			80 (176)	0.3 kΩ

- Harness of terminal cord assembly for short or open

OK or NG

- OK >> GO TO 9.
- NG >> Repair or replace damaged parts.



9. CHECK DTC

Perform [AT-165, "DTC Confirmation Procedure"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 10.

10. CHECK TCM

1. Check TCM input/output signal. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

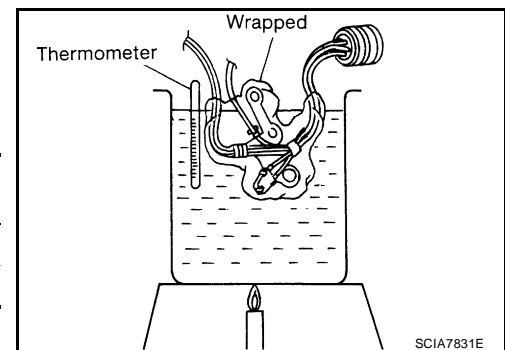
- OK >> **INSPECTION END**
- NG >> Repair or replace damaged parts.

Component Inspection A/T FLUID TEMPERATURE SENSOR

UCS005QN

- Remove oil pan. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
- Check resistance between terminal cord assembly harness connector terminals while changing temperature as shown.

Item	Connector	Terminal	Temperature [°C (°F)]	Resistance (Approx.)
A/T fluid temperature sensor	F30	6 - 7	20 (68)	2.5 kΩ
			80 (176)	0.3 kΩ



DTC TURBINE REVOLUTION SENSOR

DTC TURBINE REVOLUTION SENSOR

PFP:31935

Description

UCS005Q0

The turbine revolution sensor (power train revolution sensor) detects forward clutch drum rpm (revolutions per minute). It is located on the input side of the automatic transaxle. The vehicle speed sensor A/T (Revolution sensor) is located on the output side of the automatic transaxle. With the two sensors, input and output rpms are accurately detected. As a result, optimal shift timing during deceleration and shift quality can be improved.

CONSULT-II Reference Value

UCS005QP

Remarks: Specification data are reference values.

Item name	Condition	Display value
TURBINE REV	During driving (lock-up ON)	Approximately matches the engine speed.

On Board Diagnosis Logic

UCS005Q0

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code "TURBINE SENSOR" with CONSULT-II or 10th judgement flicker without CONSULT-II is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

UCS005QR

- Harness or connector
(The sensor circuit is open or shorted.)
- Turbine revolution sensor (power train revolution sensor)

DTC Confirmation Procedure

UCS005QS

CAUTION:

- **Always drive vehicle at a safe speed.**
- **Be careful not to rev engine into the red zone on the tachometer.**
- **If performing this "DTC Confirmation Procedure" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Start engine.
2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Touch "START".
4. Drive vehicle under the following conditions for more than 5 seconds.

SLCT LVR POSI: "D" position

VEHICLE SPEED: Higher than 40 km/h (25 MPH)

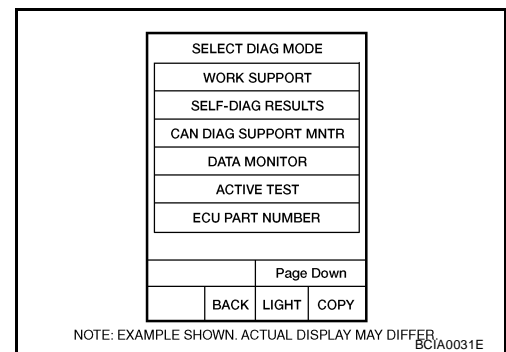
ENGINE SPEED: Higher than 1,500 rpm

THROTTLE POSI: Greater than 1.0/8 of the full throttle position

5. If the check result is NG, go to [AT-173, "Diagnostic Procedure"](#).

WITHOUT CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions for more than 5 seconds.
Selector lever position: "D" position
Vehicle speed: Higher than 40 km/h (25 MPH)
Engine speed: Higher than 1,500 rpm
Throttle position: 1.0/8 of the full throttle position
3. Perform self-diagnosis. Refer to [AT-86, "Diagnostic Procedure Without CONSULT-II"](#).
4. If the check result is NG, go to [AT-173, "Diagnostic Procedure"](#).



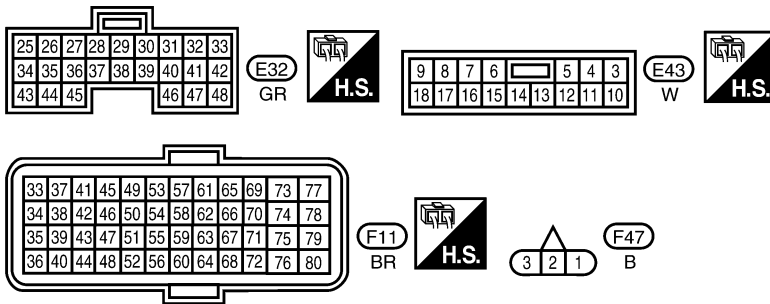
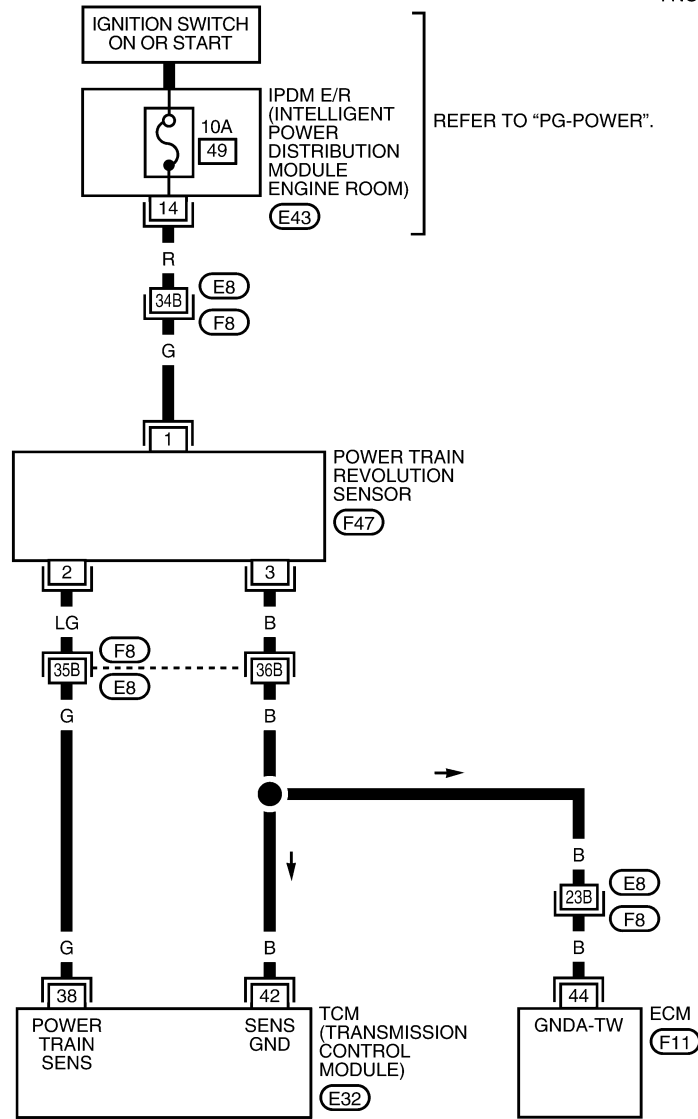
DTC TURBINE REVOLUTION SENSOR

Wiring Diagram — AT — PT/SEN

UCS0050T

AT-PT/SEN-01

— : DETECTABLE LINE FOR DTC
- - - : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.
 (F8) - SUPER MULTIPLE JUNCTION (SMJ)

BCWA0660E

DTC TURBINE REVOLUTION SENSOR

TCM TERMINALS AND REFERENCE VALUES

Refer to [AT-78, "TCM HARNESS CONNECTOR TERMINAL LAYOUT"](#) .

Diagnostic Procedure

UCS005QU

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "TURBINE REV" while driving. Check the value changes according to driving speed.

Item name	Condition	Display value
TURBINE REV	During driving (lock-up ON)	Approximately matches the engine speed.

OK or NG

- OK >> GO TO 8.
NG >> GO TO 2.

DATA MONITOR	
MONITOR	NO DTC
VHCL/S SE-AT	0 km/h
VHCL/S SE-MTR	5 km/h
THRTL POS SEN	0.8 V
FLUID TEMP SE	1.4 V
BATTERY VOLT	11.6 V
ENGINE SPEED	384 rpm
TURBINE REV	0 rpm
OVERDRIVE SW	OFF
PN POSI SW	ON
Page Down	
RECORD	
MODE	BACK LIGHT COPY

SCIA4730E

2. CHECK TURBINE REVOLUTION SENSOR (POWER TRAIN REVOLUTION SENSOR)

With CONSULT-II

1. Start engine.
2. Check power supply to turbine revolution sensor (power train revolution sensor) by voltage between TCM connector terminals. Refer to [AT-178, "Wiring Diagram — AT — MAIN"](#) and [AT-172, "Wiring Diagram — AT — PT/SEN"](#) .

Item	Connector	Terminal	Judgement standard (Approx.)
TCM	E31, E32	10 - 42	Battery voltage
		19 - 42	

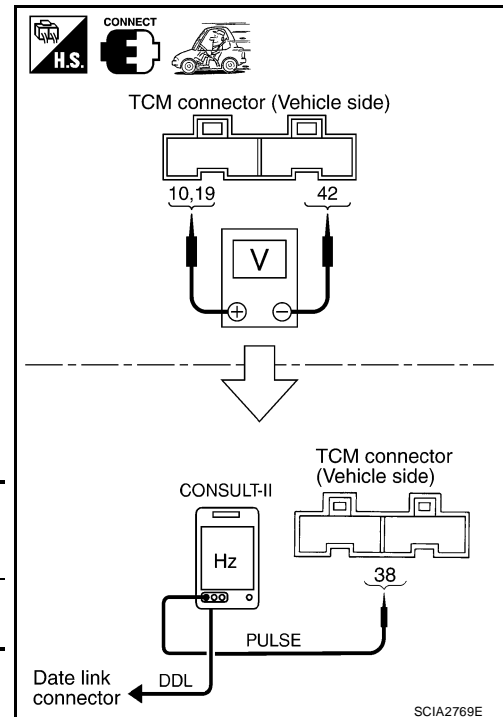
3. If OK, check the pulse when vehicle cruises.

Name	Condition
Turbine revolution sensor (power train revolution sensor)	When driving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 CAUTION: Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.

Item	Connector	Terminal	Name	Judgement standard (Approx.)
TCM	E32	38	Turbine revolution sensor (power train revolution sensor)	360 Hz

OK or NG

- OK >> GO TO 8.
NG >> GO TO 3.



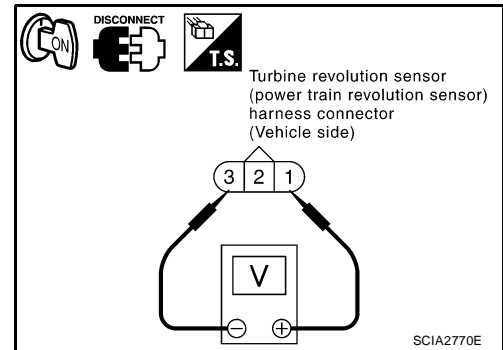
SCIA2769E

DTC TURBINE REVOLUTION SENSOR

3. CHECK POWER AND SENSOR GROUND

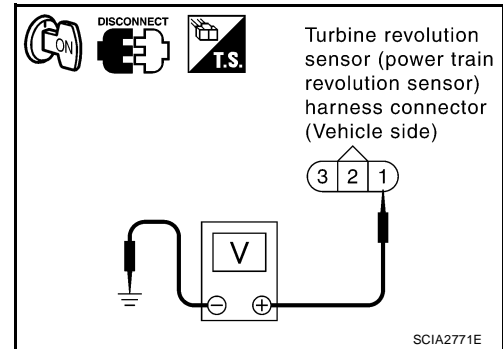
1. Turn ignition switch OFF.
2. Disconnect the turbine revolution sensor (power train revolution sensor) harness connector.
3. Turn ignition switch ON.
4. Check voltage between turbine revolution sensor (power train revolution sensor) harness connector terminals.

Item	Connector	Terminal	Judgement standard (Approx.)
Turbine revolution sensor (power train revolution sensor)	F47	1 - 3	Battery voltage



5. Check voltage between turbine revolution sensor (power train revolution sensor) harness connector terminal and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
Turbine revolution sensor (power train revolution sensor)	F47	1 - ground	Battery voltage



6. If OK, check harness for short to ground and short to power.
7. Reinstall any part removed.

OK or NG

OK >> GO TO 4.

NG - 1 >> Battery voltage is not supplied between terminals 1 and 3, terminals 1 and ground: GO TO 6.

NG - 2 >> Battery voltage is not supplied between terminals 1 and 3 only: GO TO 7.

4. CHECK HARNESS BETWEEN TCM AND TURBINE REVOLUTION SENSOR (POWER TRAIN REVOLUTION SENSOR)

1. Turn ignition switch OFF.
2. Disconnect the turbine revolution sensor (power train revolution sensor) harness connector.
3. Check continuity between TCM connector terminal and turbine revolution sensor (power train revolution sensor) harness connector terminal.

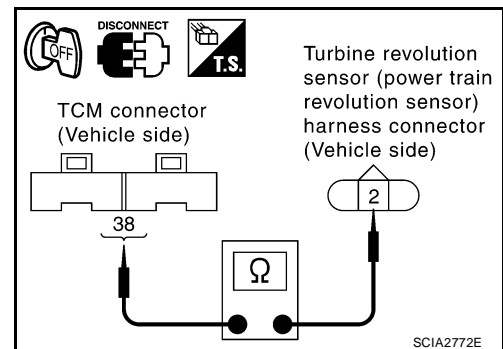
Item	Connector	Terminal	Continuity
TCM	E32	38	Yes
Turbine revolution sensor (power train revolution sensor)	F47	2	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



DTC TURBINE REVOLUTION SENSOR

5. CHECK TCM

1. Check TCM input/output signal. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

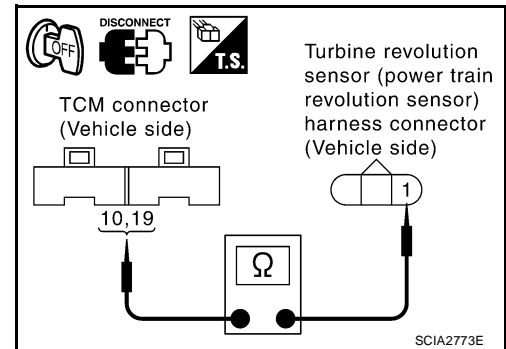
OK or NG

- OK >> GO TO 8.
 NG >> Repair or replace damaged parts.

6. CHECK HARNESS BETWEEN TCM AND TURBINE REVOLUTION SENSOR [(POWER TRAIN REVOLUTION SENSOR) POWER]

1. Turn ignition switch OFF.
2. Disconnect the turbine revolution sensor (power train revolution sensor) harness connector.
3. Check continuity between TCM connector terminals and turbine revolution sensor (power train revolution sensor) harness connector terminal. Refer to [AT-52, "Circuit Diagram"](#) and [AT-178, "Wiring Diagram — AT — MAIN"](#) .

Item	Connector	Terminal	Continuity
TCM	E31	10	Yes
Turbine revolution sensor (power train revolution sensor)	F47	1	
TCM	E31	19	Yes
Turbine revolution sensor (power train revolution sensor)	F47	1	



4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

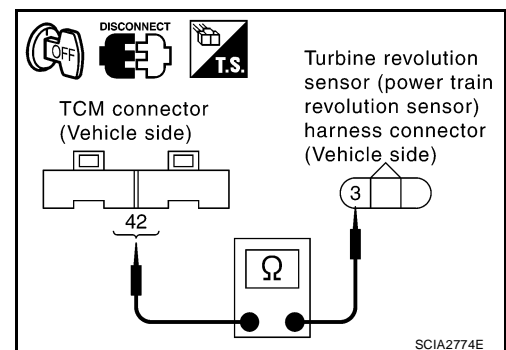
OK or NG

- OK >> 10A fuse (No.49, located in the IPDM E/R) or ignition switch are malfunctioning.
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK HARNESS BETWEEN TCM AND TURBINE REVOLUTION [(POWER TRAIN REVOLUTION SENSOR) SENSOR GROUND]

1. Turn ignition switch OFF.
2. Disconnect the turbine revolution sensor (power train revolution sensor) harness connector.
3. Check continuity between TCM connector terminal and turbine revolution sensor (power train revolution sensor) harness connector terminal.

Item	Connector	Terminal	Continuity
TCM	E32	42	Yes
Turbine revolution sensor (power train revolution sensor)	F47	3	



4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

- OK >> GO TO 5.
 NG >> Repair open circuit or short to ground or short to power in harness or connectors.

DTC TURBINE REVOLUTION SENSOR

8. CHECK DTC

Perform [AT-171, "DTC Confirmation Procedure"](#) .

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 5.

CONTROL UNIT (RAM), CONTROL UNIT (ROM)

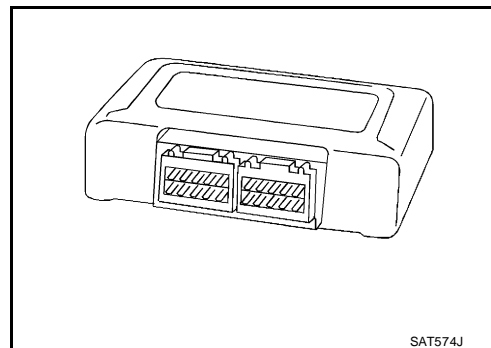
CONTROL UNIT (RAM), CONTROL UNIT (ROM)

PFP:31036

Description

UCS005QV

The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls the A/T.



UCS005QW

On Board Diagnosis Logic

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “CONTROL UNIT (RAM)”, “CONTROL UNIT (ROM)” with CONSULT-II is detected when TCM memory (RAM) or (ROM) is malfunctioning.

Possible Cause

UCS005QX

TCM.

DTC Confirmation Procedure

UCS005QY

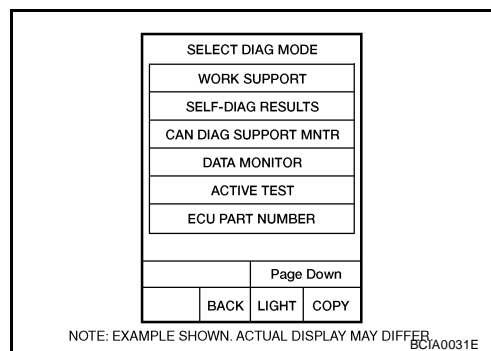
CAUTION:

If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for A/T with CONSULT-II.
2. Touch “START”.
3. Start engine.
4. Run engine for at least 2 seconds at idle speed.
5. If the check result is NG, go to [AT-177, "Diagnostic Procedure"](#) .



Diagnostic Procedure

1. CHECK DTC

UCS005QZ

With CONSULT-II

1. Turn ignition switch ON and select “SELF-DIAG RESULTS” mode for A/T with CONSULT-II.
2. Touch “ERASE”.
3. Perform [AT-177, "DTC Confirmation Procedure"](#) .

Is the “CONTROL UNIT (RAM)” or “CONTROL UNIT (ROM)” displayed again?

- YES >> Replace TCM. Refer to [AT-222, "Removal and Installation"](#) .
NO >> **INSPECTION END**

MAIN POWER SUPPLY AND GROUND CIRCUIT

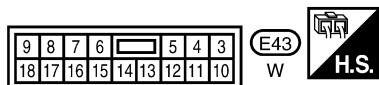
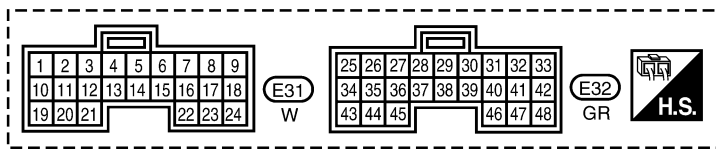
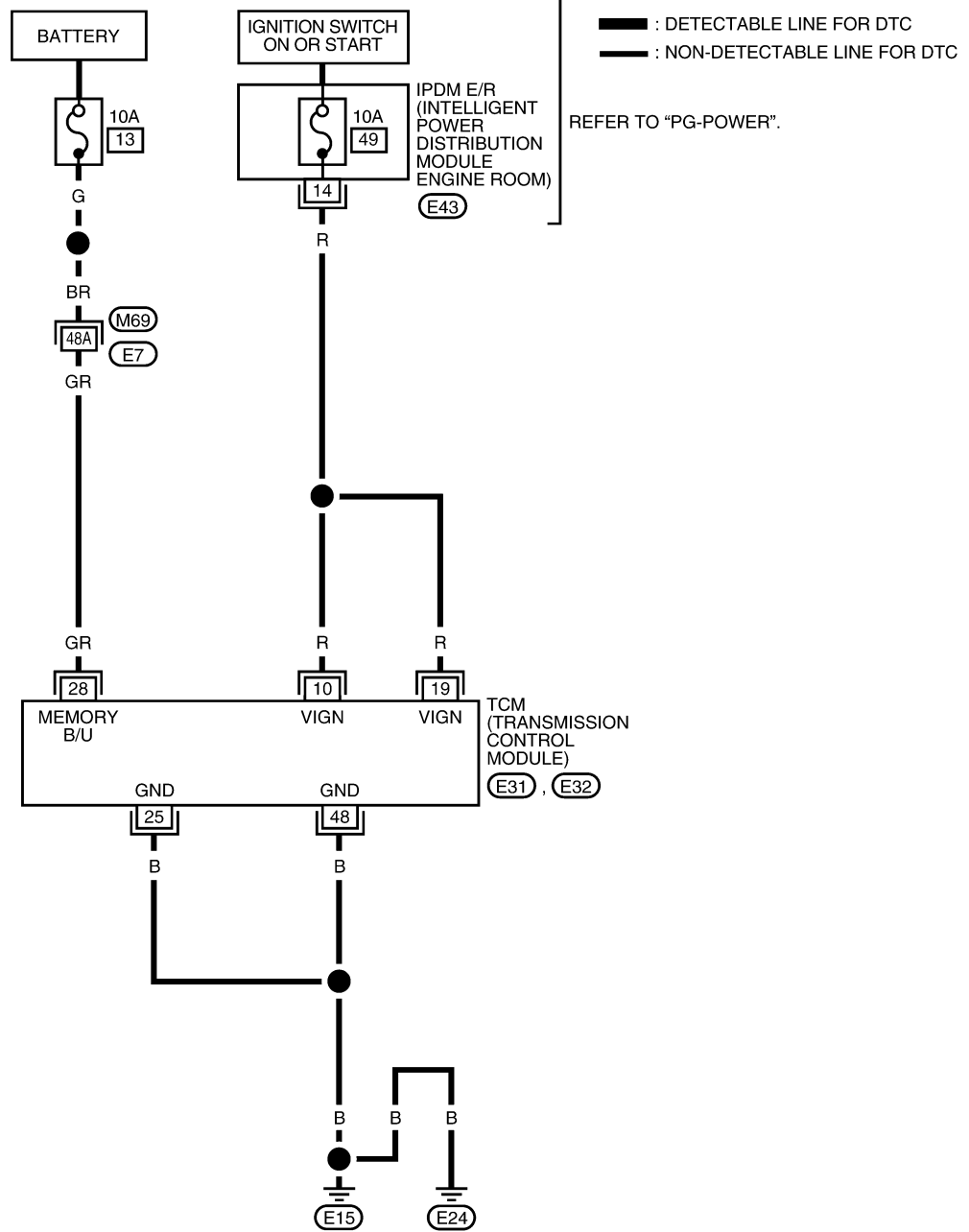
MAIN POWER SUPPLY AND GROUND CIRCUIT

PF:00100

Wiring Diagram — AT — MAIN

UCS005R4

AT-MAIN-01



REFER TO THE FOLLOWING.

M69 - SUPER MULTIPLE JUNCTION (SMJ)

BCWA0661E

MAIN POWER SUPPLY AND GROUND CIRCUIT

TCM TERMINALS AND REFERENCE VALUES

Refer to [AT-78, "TCM HARNESS CONNECTOR TERMINAL LAYOUT"](#) .

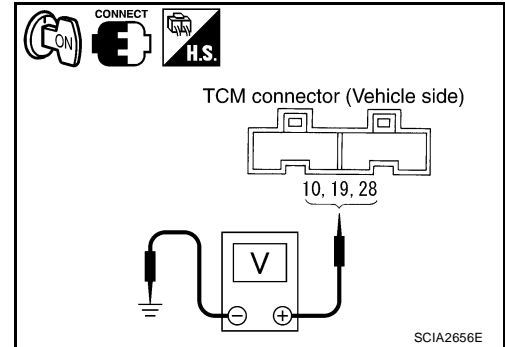
Diagnostic Procedure

UCS005R5

1. CHECK TCM POWER SOURCE

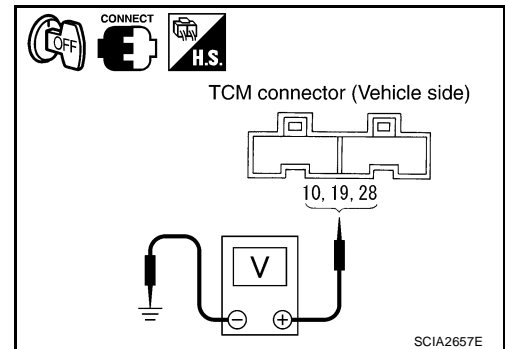
1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
Power supply	E31	10	Battery voltage
		19	Battery voltage
Power supply (memory back-up)	E32	28	Battery voltage



3. Turn ignition switch OFF.
4. Check voltage between TCM connector terminals and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
Power supply	E31	10	0 V
		19	0 V
Power supply (memory back-up)	E32	28	Battery voltage



OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between ignition switch and TCM terminals 10, 19
- Harness for short or open between battery and TCM terminal 28
- 10A fuse (No.13, located in the fuse block) and 10A fuse (No.49, located in the IPDM E/R)
- Ignition switch. Refer to [PG-4, "POWER SUPPLY ROUTING CIRCUIT"](#) .

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace damaged parts.

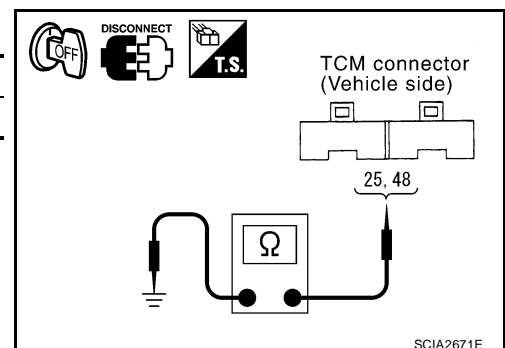
3. CHECK TCM GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between TCM connector terminals and ground.

Item	Connector	Terminal	Continuity
Ground	E32	25, 48 - Ground	Yes

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



MAIN POWER SUPPLY AND GROUND CIRCUIT

4. CHECK SYMPTOM

Drive for a while to check that there is no malfunction.

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

5. CHECK TCM

1. Check TCM input/output signal. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

PNP, OD SWITCH AND CLOSED THROTTLE, WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT

PNP, OD SWITCH AND CLOSED THROTTLE, WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT

PF3:31918

CONSULT-II Reference Value

UCS005R6

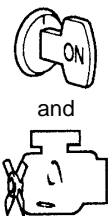
Item name	Condition	Display value
PN POSI SW	When setting selector lever to "N" or "P" position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to "R" position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to "D" position.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to "2" position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to "1" position.	ON
	When setting selector lever to other positions.	OFF
OVERDRIVE SW	When overdrive control switch is depressed.	ON
	When overdrive control switch is released.	OFF
CLOSED THL/SW	Released accelerator pedal.	ON
	Depressed accelerator pedal.	OFF
W/O THRL/P-SW	Fully depressed accelerator pedal.	ON
	Released accelerator pedal.	OFF

TCM Terminals and Reference Value

UCS005R7

TCM terminal data are reference values, measured between each terminal and ground.

Terminal	Wire color	Item	Condition	Judgement standard (Approx.)
26	Y	PNP switch "1" position	When setting selector lever to "1" position.	Battery voltage
			When setting selector lever to other positions.	0 V
27	G	PNP switch "2" position	When setting selector lever to "2" position.	Battery voltage
			When setting selector lever to other positions.	0 V
34	LG	PNP switch "D" position	When setting selector lever to "D" position.	Battery voltage
			When setting selector lever to other positions.	0 V
35	SB	PNP switch "R" position	When setting selector lever to "R" position.	Battery voltage
			When setting selector lever to other positions.	0 V
36	R	PNP switch "N" or "P" position	When setting selector lever to "N" or "P" positions.	Battery voltage
			When setting selector lever to other positions.	0 V



PNP, OD SWITCH AND CLOSED THROTTLE, WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT

UCS005R8

Diagnostic Procedure

1. CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) .

Is a malfunction in the CAN communication indicated in the results?

- YES >> Check CAN communication line. Refer to [AT-90, "DTC U1000 CAN COMMUNICATION LINE"](#) .
- NO (With CONSULT-II) >>GO TO 2.
- NO (Without CONSULT-II) >>GO TO 3.

2. CHECK PNP SWITCH CIRCUIT

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out "P-N", "R", "D", "2" and "1" position switches moving selector lever to each position.

Item name	Condition	Display value
PN POSI SW	When setting selector lever to "N" or "P" position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to "R" position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to "D" positions.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to "2" position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to "1" position.	ON
	When setting selector lever to other positions.	OFF

DATA MONITOR	
MONITORING	
PN POSI SW	OFF
R POSITION SW	OFF
D POSITION SW	OFF
2 POSITION SW	ON
1 POSITION SW	OFF

SAT701J

OK or NG

- OK >> GO TO 4.
- NG >> Check PNP switch circuit. Refer to [AT-93, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#) .

PNP, OD SWITCH AND CLOSED THROTTLE, WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT

3. CHECK PNP SWITCH CIRCUIT

⊗ Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground while moving selector lever through each position. Refer to [AT-94, "Wiring Diagram — AT — PNP/SW"](#) .

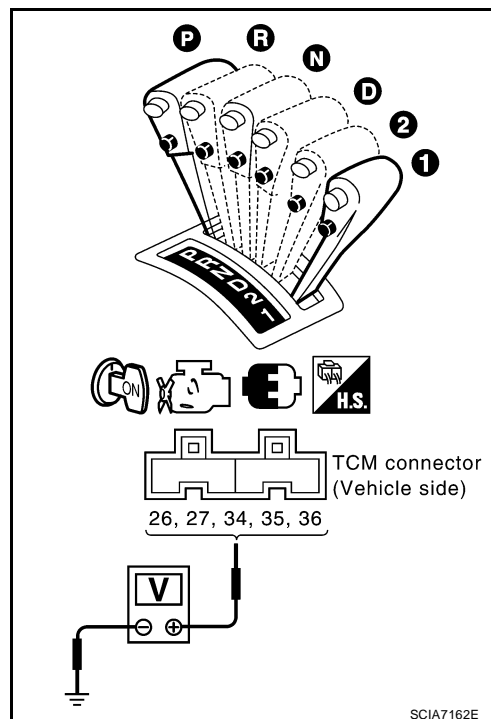
Selector lever position	Terminal				
	36	35	34	27	26
"P", "N"	B	0	0	0	0
"R"	0	B	0	0	0
"D"	0	0	B	0	0
"2"	0	0	0	B	0
"1"	0	0	0	0	B

B: Battery voltage
0: 0V

OK or NG

OK >> GO TO 4.

NG >> Check PNP switch circuit. Refer to [AT-93, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#) .



4. CHECK PNP SWITCH

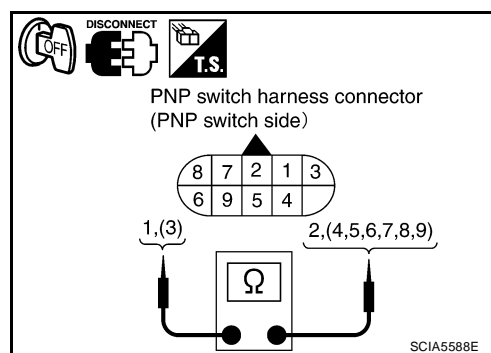
1. Turn ignition switch OFF.
2. Disconnect PNP switch harness connector.
3. Check continuity between PNP switch harness connector terminals.

Selector lever position	Connector	Terminal	Continuity
"P"	F25	1 - 2, 3 - 7	Yes *Continuity should not exist in positions other than the specified positions.
"R"		3 - 8	
"N"		1 - 2, 3 - 9	
"D"		3 - 6	
"2"		3 - 5	
"1"		3 - 4	

OK or NG

OK >> GO TO 6.

NG >> GO TO 5.



5. CHECK CONTROL CABLE ADJUSTMENT

Check PNP switch again with control cable disconnected from manual shaft of A/T assembly. Refer to test group 4.

OK or NG

OK >> Adjust control cable. Refer to [AT-227, "Adjustment of A/T Position"](#) .

NG >> Check PNP switch (Refer to test group 1) again after adjusting PNP switch (Refer to [AT-241](#)).

● If OK, **INSPECTION END**

● If NG, repair or replace PNP switch. Refer to [AT-240, "Park/Neutral Position \(PNP\) Switch"](#) .

PNP, OD SWITCH AND CLOSED THROTTLE, WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT

6. DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between ignition switch and PNP switch
- Harness for short or open between PNP switch and TCM
- Harness for short or open between PNP switch and combination meter
- Harness for short or open between combination meter and TCM
- 10A fuse (No.51, located in the IPDM E/R)
- Combination meter. Refer to [DI-5, "COMBINATION METERS"](#) .
- Ignition switch. Refer to [PG-4, "POWER SUPPLY ROUTING CIRCUIT"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Repair or replace damaged parts.

7. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out "OVERDRIVE SW". Check the signal of overdrive control switch is indicated properly.

Item name	Overdrive control switch Condition	Display value
OVERDRIVE SW	Depressed	ON
	Released	OFF

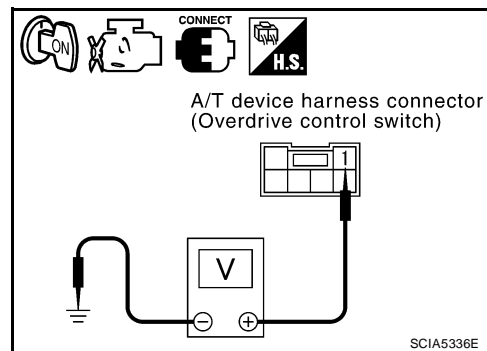
DATA MONITOR	
MONITOR	NO DTC
VHCL/S SE-AT	0 km/h
VHCL/S SE-MTR	5 km/h
THRTL POS SEN	0.8 V
FLUID TEMP SE	1.4 V
BATTERY VOLT	11.6 V
ENGINE SPEED	384 rpm
TURBINE REV	0 rpm
OVERDRIVE SW	OFF
PN POSI SW	ON
Page Down	
RECORD	
MODE	BACK
LIGHT	COPY

SCIA4730E

Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between A/T device harness connector terminal and ground. Refer to [AT-188, "Wiring Diagram — AT — NON-DTC"](#) .

Item	Connector	Terminal	Overdrive control switch Condition	Judge-ment standard (Approx.)
A/T device harness connector (Overdrive control switch)	M38	1 - Ground	Released	Battery voltage
			Depressed	0 V



OK or NG

- OK >> GO TO 10.
- NG >> GO TO 8.

PNP, OD SWITCH AND CLOSED THROTTLE, WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT

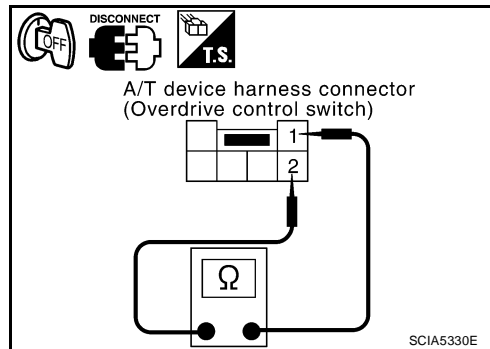
8. CHECK OVERDRIVE CONTROL SWITCH

1. Turn ignition switch OFF.
2. Disconnect A/T device harness connector.
3. Check continuity between A/T device harness connector terminals. Refer to [AT-188, "Wiring Diagram — AT — NONDTC"](#) .

Item	Connector	Terminal	Overdrive control switch condition	Continuity
A/T device harness connector (Overdrive control switch)	M38	1 - 2	Released	No
			Depressed	Yes

OK or NG

- OK >> GO TO 9.
 NG >> Repair or replace damaged parts.



9. DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between combination meter and A/T device harness connector
- Harness for short or open between A/T device harness connector and ground
- Combination meter. Refer to [DI-5, "COMBINATION METERS"](#) .

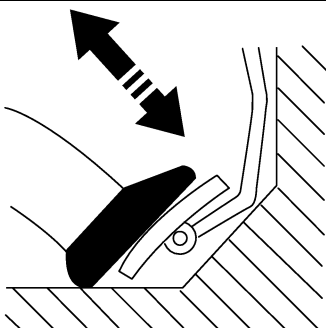
OK or NG

- OK >> GO TO 10.
 NG >> Repair or replace damaged parts.

10. CHECK CLOSED THROTTLE POSITION AND WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for A/T with CONSULT-II.
3. Read out "CLOSED THL/SW" and "W/O THRL/P-SW" depressing and releasing accelerator pedal. Check that the signals of throttle position are indicated properly.



DATA MONITOR			
MONITOR	NO DTC		
1 POSITION SW	OFF		
ASCD-CRUISE	OFF		
ASCD-OD CUT	OFF		
KICKDOWN SW	OFF		
POWERSHIFT SW	OFF		
CLOSED THL/SW	ON		
W/O THRL/P-SW	OFF		
HOLD SW	OFF		
BRAKE SW	OFF		
Page Up			
RECORD			
MODE	BACK	LIGHT	COPY

SCIA4731E

Accelerator pedal condition	Data monitor	
	CLOSED THL/SW	W/O THRL/P-SW
Released	ON	OFF
Fully depressed	OFF	ON

OK or NG

- OK >> GO TO 11.
 NG >> Check the following. If any items are damaged, repair or replace damaged parts.
- Accelerator pedal position sensor. Refer to [EC-537, "DTC P2138 APP SENSOR"](#) .

PNP, OD SWITCH AND CLOSED THROTTLE, WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT

11. PERFORM SELF-DIAGNOSIS

⊗ Without CONSULT-II

Perform self-diagnosis. Refer to [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .

OK or NG

OK >> **INSPECTION END**

NG – 1 >> Self-diagnosis does not activate: GO TO 12.

NG – 2 >> DTC is displayed: Check the malfunctioning system. Refer to [AT-87, "Judgement of Self-diagnosis Code"](#) .

12. CHECK TCM

1. Check TCM input/output signal. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**

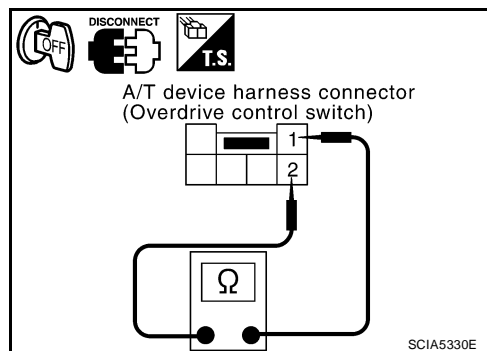
NG >> Repair or replace damaged parts.

Component Inspection OVERDRIVE CONTROL SWITCH

UCS005R9

- Check continuity between A/T device harness connector terminals.

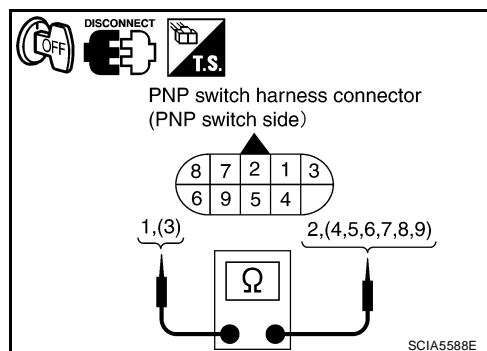
Item	Connector	Terminal	Overdrive control switch condition	Continuity
A/T device harness connector (Overdrive control switch)	M38	1 - 2	Released	No
			Depressed	Yes



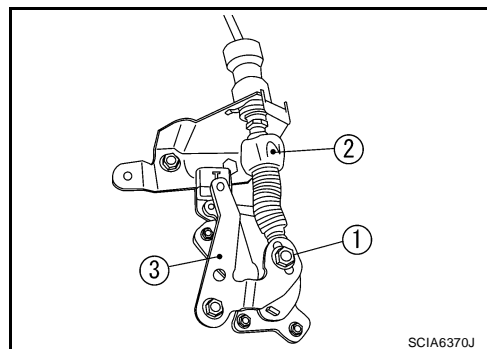
PNP SWITCH

1. Check continuity between PNP switch harness connector terminals.

Selector lever position	Connector	Terminal	Continuity
"P"	F25	1 - 2, 3 - 7	Yes *Continuity should not exist in positions other than the specified positions.
"R"		3 - 8	
"N"		1 - 2, 3 - 9	
"D"		3 - 6	
"2"		3 - 5	
"1"		3 - 4	



2. If NG, check again with control cable (2) disconnected from manual shaft (3) of A/T assembly. Refer to step 1. (1): Lock nut
3. If OK on step 2, adjust control cable (2). Refer to [AT-227, "Adjustment of A/T Position"](#) .
4. If NG on step 2, remove PNP switch from A/T assembly and check continuity of PNP switch terminals. Refer to step 1.
5. If OK on step 4, adjust PNP switch. Refer to [AT-241, "PARK/NEUTRAL POSITION \(PNP\) SWITCH ADJUSTMENT"](#) .
6. If NG on step 4, replace PNP switch. Refer to [AT-240, "Park/Neutral Position \(PNP\) Switch"](#) .



SHIFT POSITION INDICATOR CIRCUIT

PDF:24810

SHIFT POSITION INDICATOR CIRCUIT

Description

UCS006XM

TCM sends the switch signals to combination meter via CAN communication line. Then selector lever position is indicated on the shift position indicator.

CONSULT-II Reference Value

UCS006XN

Item name	Condition	Display value
SLCT LVR POSI	When setting selector lever to "N" or "P" positions.	N · P
	When setting selector lever to "R" position.	R
	When setting selector lever to "D" position.	D
	When setting selector lever to "2" position.	2
	When setting selector lever to "1" position.	1

Diagnostic Procedure

UCS006XO

1. CHECK INPUT SIGNALS

With CONSULT-II

- Start engine.
- Select "MAIN SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II and read out the value of "SLCT LVR POSI".
- Check that the following three positions or indicators are same.
 - Actual position of the selector lever
 - "SLCT LVR POSI" on CONSULT-II screen
 - Shift position indicator in the combination meter

OK or NG

- OK >> **INSPECTION END**
 NG >> Check the following.

SHIFT POSITION INDICATOR SYMPTOM CHART

Items	Presumed location of trouble
Actual position does not change.	Park/neutral position (PNP) switch <ul style="list-style-type: none"> Refer to AT-93, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" . A/T main system (Fail-safe function actuated) <ul style="list-style-type: none"> Refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" and AT-86, "Diagnostic Procedure Without CONSULT-II" .
Shift position indicator in the combination meter does not indicate any position.	Perform the self-diagnosis for A/T and the combination meter. <ul style="list-style-type: none"> Refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" and DI-5, "COMBINATION METERS" .
Actual position changes, but the shift position indicator in the combination meter does not change.	
Actual position differs from the shift position indicator in the combination meter.	
Shift position indicator in the combination meter does not indicate specific position only.	Check the combination meter. <ul style="list-style-type: none"> Refer to DI-5, "COMBINATION METERS" .

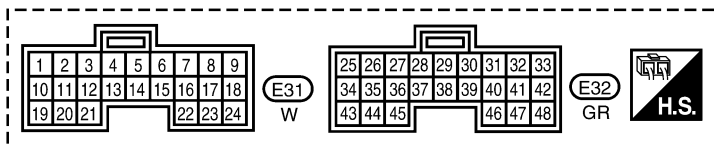
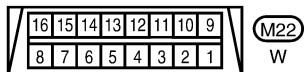
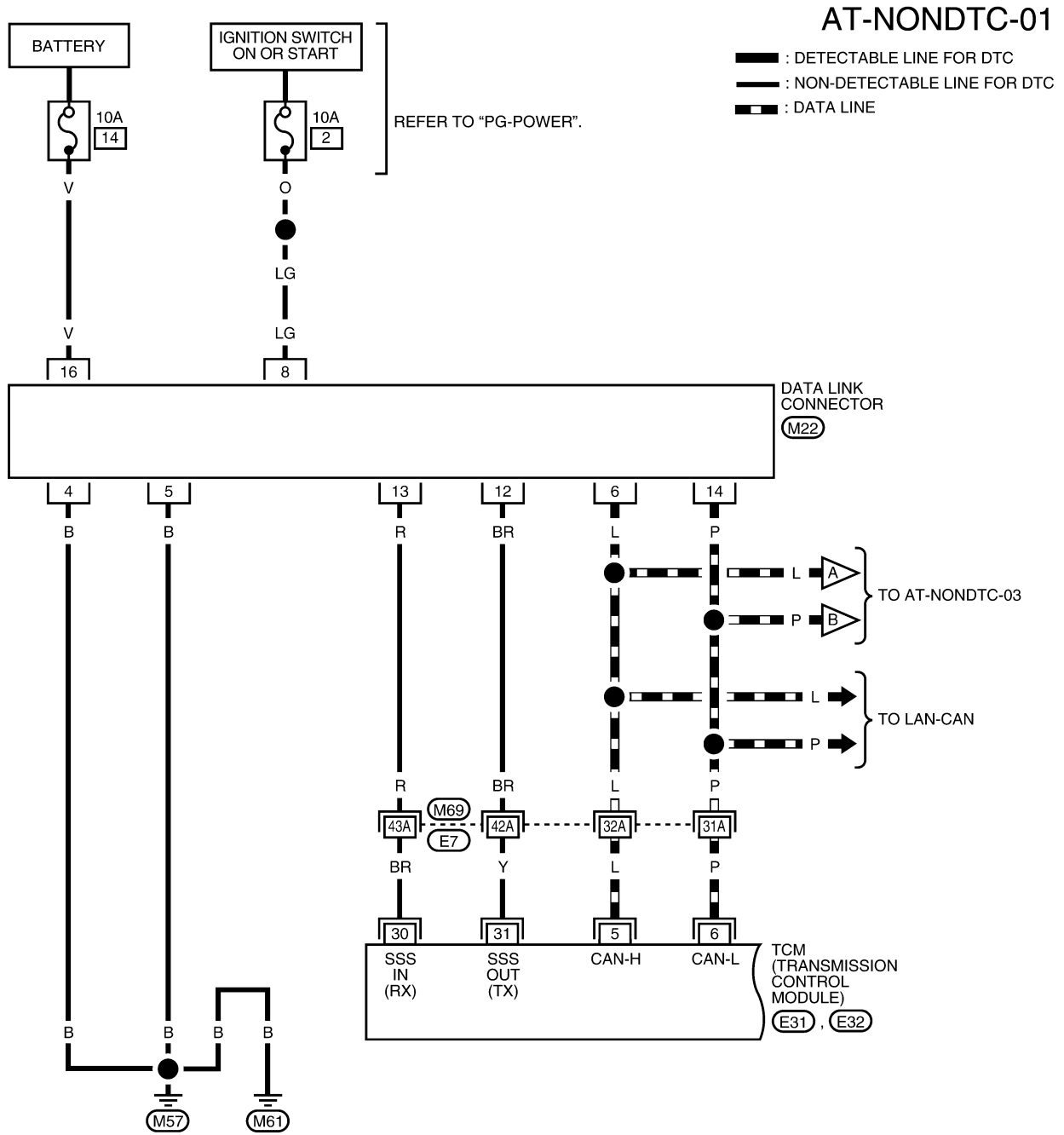
TROUBLE DIAGNOSIS FOR SYMPTOMS

PF0:00007

TROUBLE DIAGNOSIS FOR SYMPTOMS

Wiring Diagram — AT — NONDTC

UCS005UV



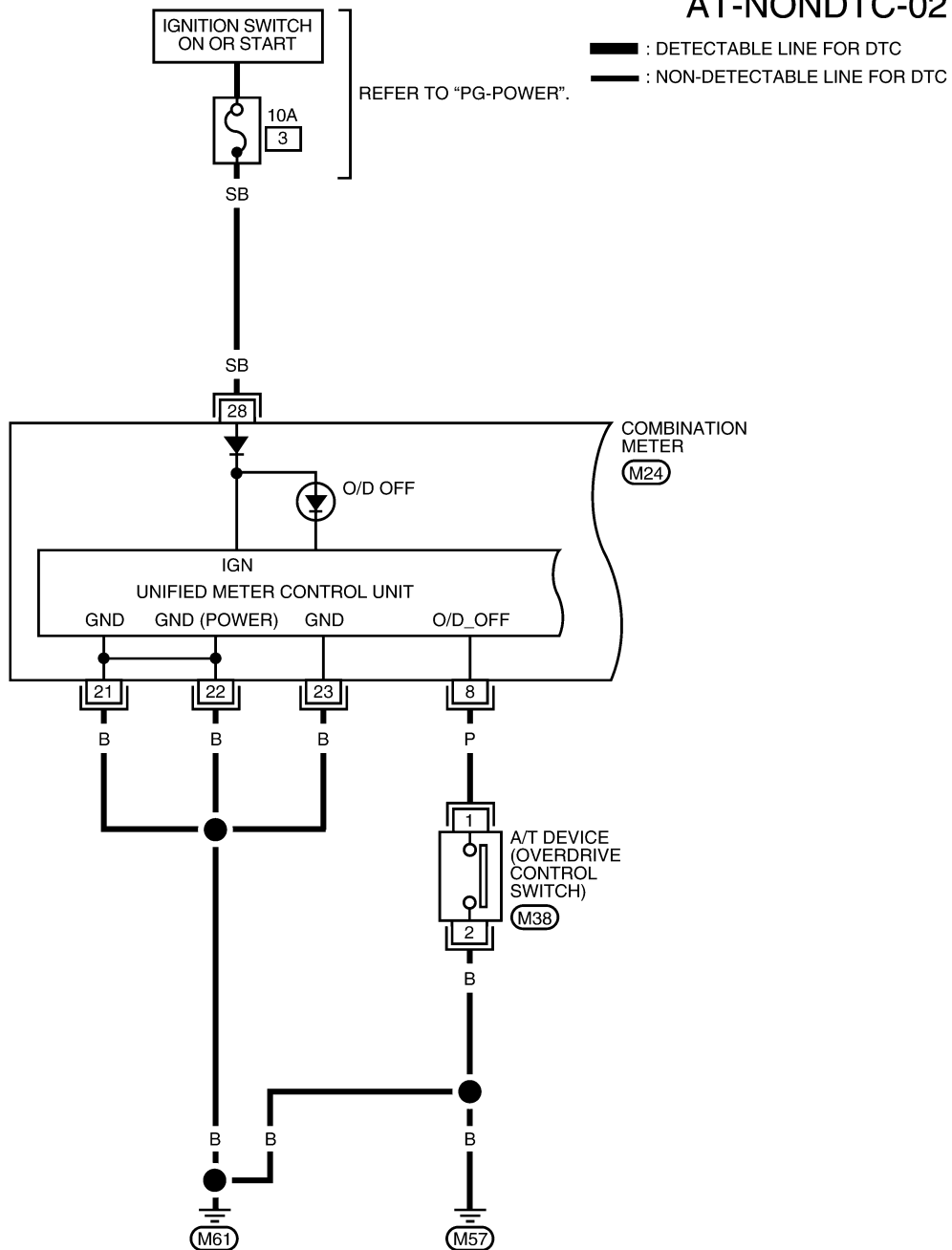
REFER TO THE FOLLOWING.

(M69) - SUPER MULTIPLE JUNCTION (SMJ)

BCWA0662E

TROUBLE DIAGNOSIS FOR SYMPTOMS

AT-NONDTC-02



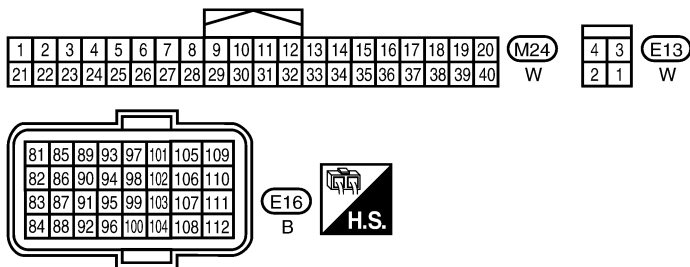
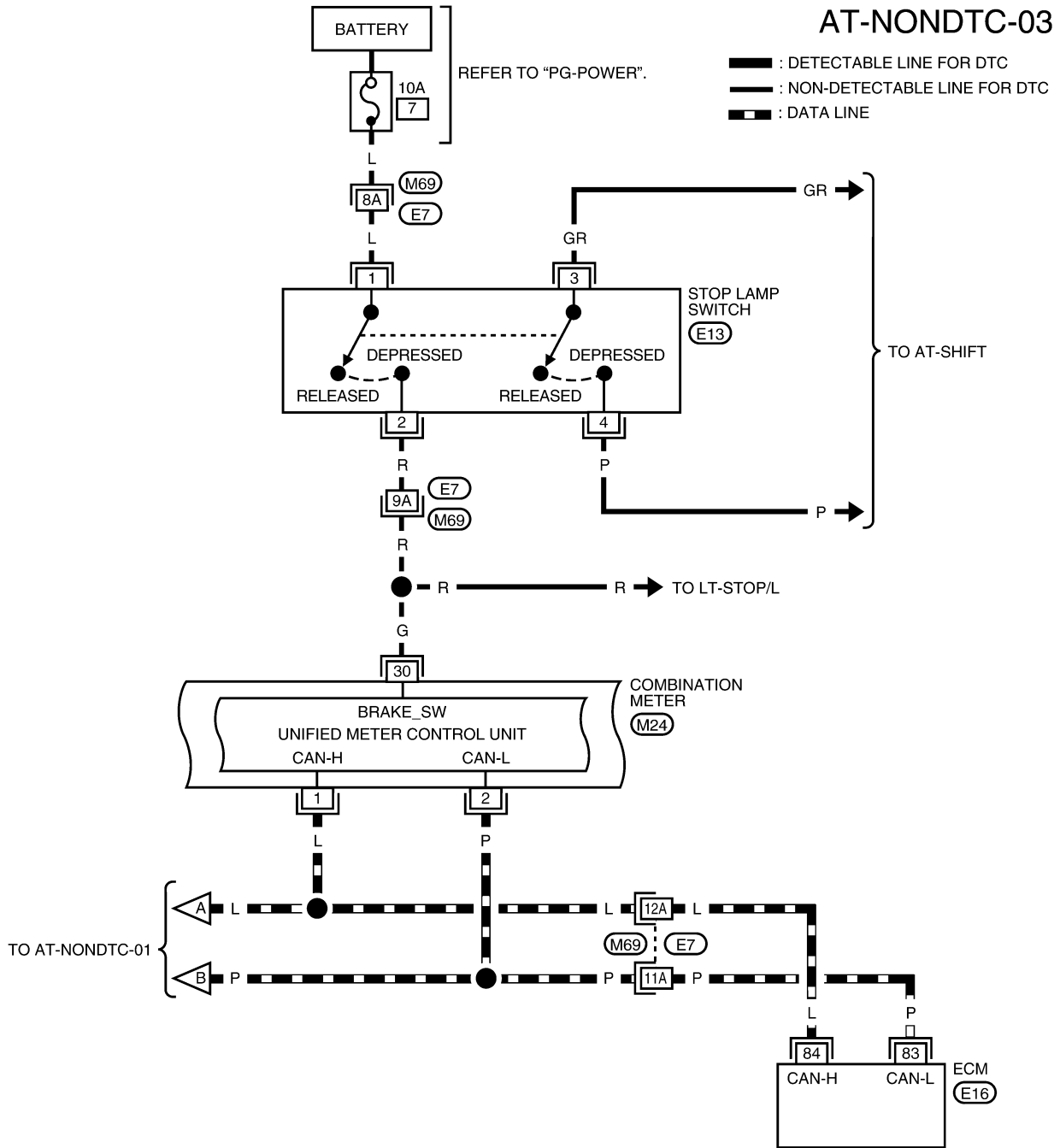
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	(M24)
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	W

1	2	3	4	5	6	(M38)
2	3	4	5	6	W	

BCWA0663E

TROUBLE DIAGNOSIS FOR SYMPTOMS

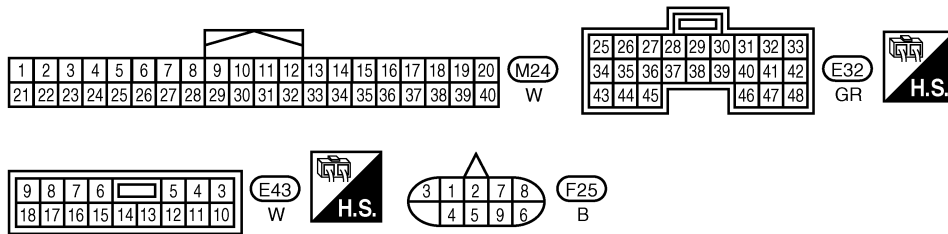
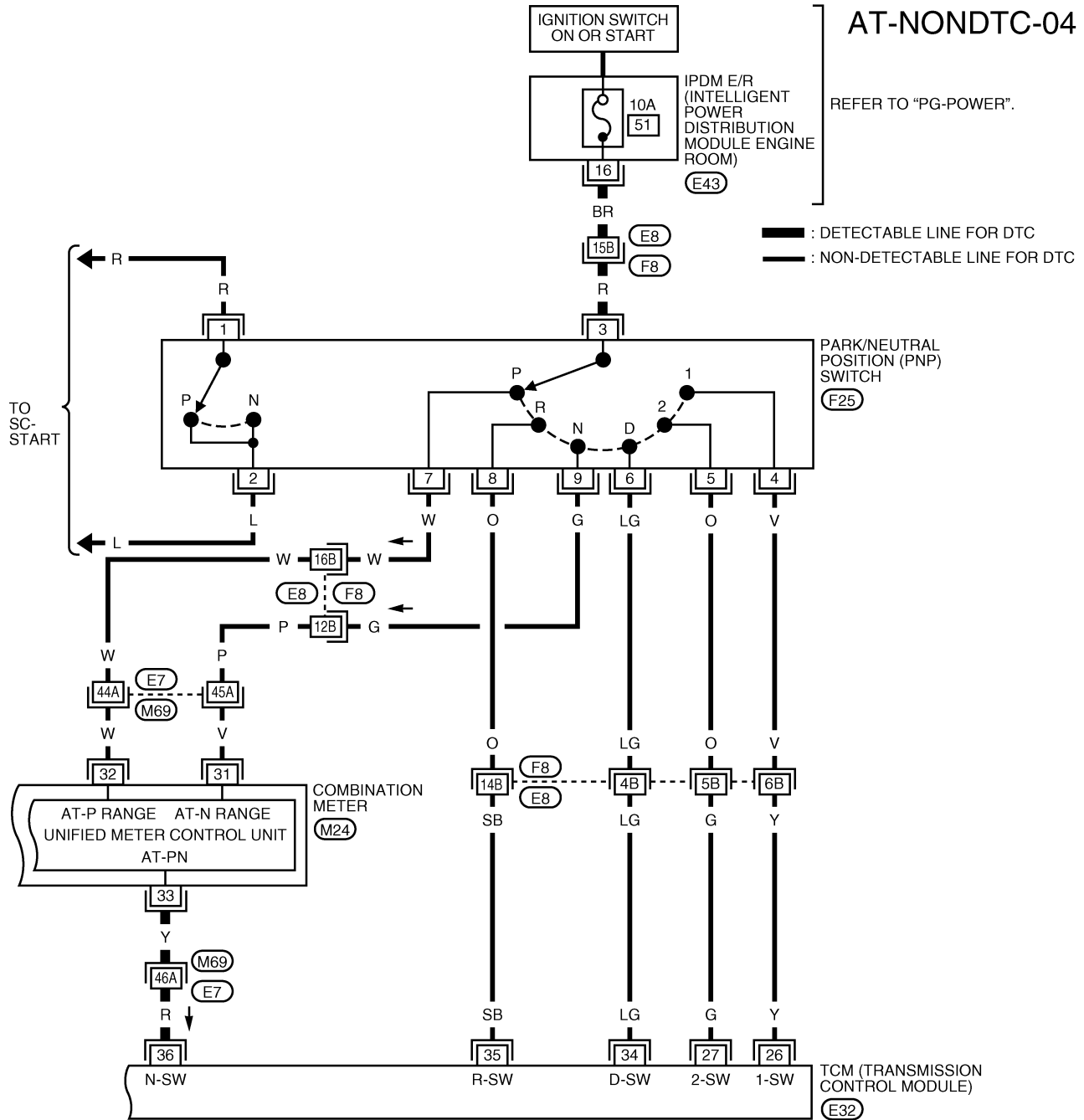
AT-NONDTC-03



REFER TO THE FOLLOWING.
(M69) - SUPER MULTIPLE JUNCTION (SMJ)

BCWA0664E

TROUBLE DIAGNOSIS FOR SYMPTOMS



REFER TO THE FOLLOWING.
 (M69), (F8) - SUPER MULTIPLE JUNCTION (SMJ)

BCWA0772E

TROUBLE DIAGNOSIS FOR SYMPTOMS

TCM TERMINALS AND REFERENCE VALUES

Refer to [AT-78, "TCM HARNESS CONNECTOR TERMINAL LAYOUT"](#) .

OD OFF Indicator Lamp Does Not Come On SYMPTOM:

UCS005UW

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

DIAGNOSTIC PROCEDURE

1. CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) .

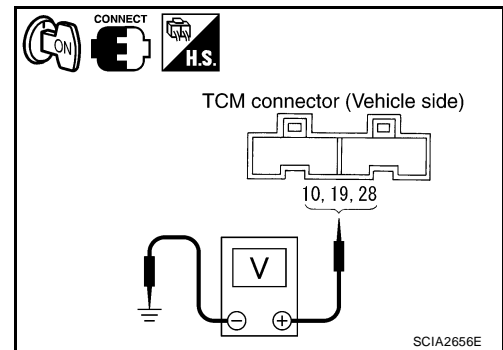
Is a malfunction in CAN communication indicated in the results?

- YES >> Check CAN communication line. Refer to [AT-90, "DTC U1000 CAN COMMUNICATION LINE"](#) .
NO >> GO TO 2.

2. CHECK TCM POWER SOURCE

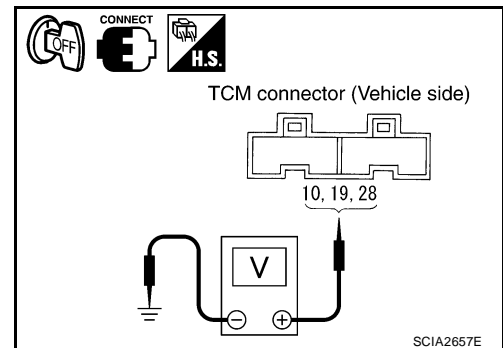
- Turn ignition switch ON. (Do not start engine.)
- Check voltage between TCM connector terminals and ground.
Refer to [AT-178, "Wiring Diagram — AT — MAIN"](#) .

Item	Connector	Terminal	Judgement standard (Approx.)
TCM connector	E31	10 - Ground	Battery voltage
		19 - Ground	
	E32	28 - Ground	



- Turn ignition switch OFF.
- Check voltage between TCM connector terminals and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
TCM connector	E31	10 - Ground	0V
		19 - Ground	0V
	E32	28 - Ground	Battery voltage



OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between ignition switch and TCM connector terminals 10, 19. Refer to [AT-178, "Wiring Diagram — AT — MAIN"](#) .
- Harness for short or open between battery and TCM connector terminal 28. Refer to [AT-178, "Wiring Diagram — AT — MAIN"](#) .
- 10A fuse (No.13, located in the fuse block) and 10A fuse (No.49, located in the IPDM E/R). Refer to [AT-178, "Wiring Diagram — AT — MAIN"](#) .
- Ignition switch. Refer to [PG-4, "POWER SUPPLY ROUTING CIRCUIT"](#) .

OK or NG

- OK >> GO TO 4.
NG >> Repair or replace damaged parts.

TROUBLE DIAGNOSIS FOR SYMPTOMS

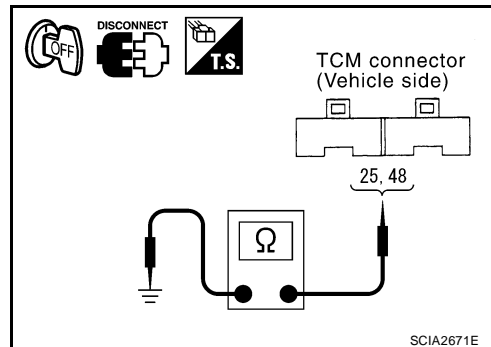
4. CHECK TCM GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminals and ground.
Refer to [AT-178, "Wiring Diagram — AT — MAIN"](#) .

Item	Connector	Terminal	Continuity
TCM connector	E32	25, 48 - Ground	Yes

OK or NG

- OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



5. DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between ignition switch and combination meter
- Combination meter. Refer to [DI-5, "COMBINATION METERS"](#) .

OK or NG

- OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK SYMPTOM

Check again. Refer to [AT-58, "Check Before Engine is Started"](#) .

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 7.

7. CHECK TCM

1. Check TCM input/output. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

TROUBLE DIAGNOSIS FOR SYMPTOMS

UCS005UX

Engine Cannot Be Started in "P" and "N" Position

SYMPTOM:

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

DIAGNOSTIC PROCEDURE

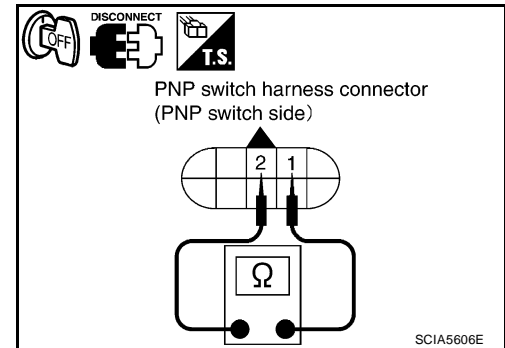
1. CHECK PNP SWITCH

Check continuity between PNP switch harness connector terminals. Refer to [AT-94, "Wiring Diagram — AT — PNP/SW"](#) .

Selector lever position	Connector	terminal	Continuity
"P", "N"	F25	1 - 2	Yes
Other positions			No

OK or NG

- OK >> GO TO 3.
NG >> GO TO 2.



2. CHECK PNP SWITCH

Check PNP switch again with control cable disconnected from manual shaft of A/T assembly. Refer to test group 1.

OK or NG

- OK >> Adjust A/T position. Refer to [AT-227, "Adjustment of A/T Position"](#) .
NG >> 1. Check PNP switch (Refer to test group 1.) again after adjusting PNP switch (Refer to [AT-241](#)).
- If OK, **INSPECTION END**
 - If NG, repair or replace PNP switch. Refer to [AT-240, "Park/Neutral Position \(PNP\) Switch"](#) .

3. CHECK STARTING SYSTEM

Check starting system. Refer to [SC-8, "STARTING SYSTEM"](#) .

OK or NG

- OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

TROUBLE DIAGNOSIS FOR SYMPTOMS

In "P" Position, Vehicle Moves Forward or Backward When Pushed

UCS005UY

SYMPTOM:

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

DIAGNOSTIC PROCEDURE

1. CHECK A/T POSITION

Check A/T position. Refer to [AT-228, "Checking of A/T Position"](#) .

OK or NG

OK >> GO TO 2.

NG >> Adjust A/T position. Refer to [AT-227, "Adjustment of A/T Position"](#) .

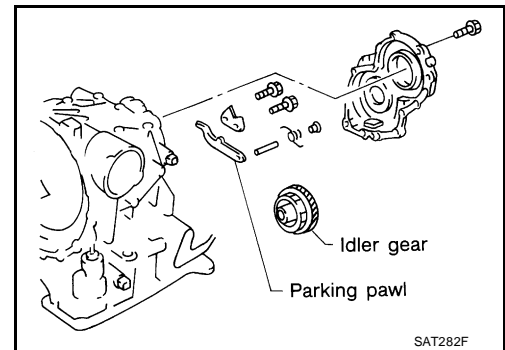
2. CHECK PARKING COMPONENTS

Check parking components. Refer to [AT-251, "Components"](#) and [AT-262, "DISASSEMBLY"](#) .

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.



In "N" Position, Vehicle Moves

SYMPTOM:

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

DIAGNOSTIC PROCEDURE

1. CHECK A/T POSITION

Check A/T position. Refer to [AT-228, "Checking of A/T Position"](#) .

OK or NG

OK >> GO TO 2.

NG >> Adjust A/T position. Refer to [AT-227, "Adjustment of A/T Position"](#) .

2. CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to [MA-22, "Checking A/T Fluid"](#) .

OK or NG

OK >> GO TO 3.

NG >> Refill ATF.

3. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to [AT-251, "Components"](#) .

2. Check A/T fluid condition. Refer to [AT-53, "Fluid Condition Check"](#) .

OK or NG

OK >> GO TO 5.

NG >> GO TO 4.

TROUBLE DIAGNOSIS FOR SYMPTOMS

4. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to [AT-262, "Disassembly"](#) .
2. Check the following items:
 - Forward clutch assembly. Refer to [AT-314, "Forward and Overrun Clutches"](#) .
 - Overrun clutch assembly. Refer to [AT-314, "Forward and Overrun Clutches"](#) .
 - Reverse clutch assembly. Refer to [AT-303, "Reverse Clutch"](#) .

OK or NG

- OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK SYMPTOM

Check again. Refer to [AT-59, "Check at Idle"](#) .

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signals. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Large Shock "N" → "R" Position SYMPTOM:

UCS005V0

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

DIAGNOSTIC PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) or [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .

Is any malfunction detected by self-diagnostic results?

- YES >> Check the malfunctioning system. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) or [AT-87, "Judgement of Self-diagnosis Code"](#) .
NO >> GO TO 2.

2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in "D" position. Refer to [AT-56, "LINE PRESSURE TEST"](#) .

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.

TROUBLE DIAGNOSIS FOR SYMPTOMS

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
2. Check the following items:
 - Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
 - Line pressure solenoid valve
 - Oil pump assembly. Refer to [AT-283, "Oil Pump"](#) .

OK or NG

- OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK SYMPTOM

Check again. Refer to [AT-59, "Check at Idle"](#) .

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 5.

5. CHECK TCM

1. Check TCM input/output signals. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Vehicle Does Not Creep Backward in "R" Position

SYMPTOM:

UCS005V1

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

DIAGNOSTIC PROCEDURE

1. CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to [MA-22, "Checking A/T Fluid"](#) .

OK or NG

- OK >> GO TO 2.
NG >> Refill ATF.

2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in "R" position. Refer to [AT-56, "LINE PRESSURE TEST"](#) .

OK or NG

- OK >> GO TO 4.
NG >> GO TO 3.

TROUBLE DIAGNOSIS FOR SYMPTOMS

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
2. Check the following items:
 - Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
 - Line pressure solenoid valve
3. Disassemble A/T. Refer to [AT-262, "Disassembly"](#) .
4. Check the following item:
 - Oil pump assembly. Refer to [AT-283, "Oil Pump"](#) .

OK or NG

- OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK STALL REVOLUTION

Check stall revolution with selector lever in "1" and "R" positions. Refer to [AT-53, "STALL TEST"](#) .

OK or NG

- OK >> GO TO 6.
OK in "1" position, NG in "R" position>> GO TO 5.
NG in both "1" and "R" positions>> GO TO 7.

5. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to [AT-262, "Disassembly"](#) .
2. Check the following items:
 - Low & reverse brake assembly. Refer to [AT-321, "Low & Reverse Brake"](#) .
 - Reverse clutch assembly. Refer to [AT-303, "Reverse Clutch"](#) .

OK or NG

- OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to [AT-251, "Components"](#) .
2. Check A/T fluid condition. Refer to [AT-53, "Fluid Condition Check"](#) .

OK or NG

- OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to [AT-262, "Disassembly"](#) .
2. Check the following items:
 - Reverse clutch assembly. Refer to [AT-303, "Reverse Clutch"](#) .
 - High clutch assembly. Refer to [AT-308, "High Clutch"](#) .
 - Low & reverse brake assembly. Refer to [AT-321, "Low & Reverse Brake"](#) .
 - Forward clutch assembly. Refer to [AT-314, "Forward and Overrun Clutches"](#) .
 - Overrun clutch assembly. Refer to [AT-314, "Forward and Overrun Clutches"](#) .

OK or NG

- OK >> GO TO 8.
NG >> Repair or replace damaged parts.

TROUBLE DIAGNOSIS FOR SYMPTOMS

8. CHECK SYMPTOM

Check again. Refer to [AT-59, "Check at Idle"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 9.

9. CHECK TCM

1. Check TCM input/output signals. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
- NG >> Repair or replace damaged parts.

Vehicle Does Not Creep Forward in “D”, “2” or “1” Position

SYMPTOM:

UCS005V2

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

DIAGNOSTIC PROCEDURE

1. CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to [MA-22, "Checking A/T Fluid"](#) .

OK or NG

- OK >> GO TO 2.
- NG >> Refill ATF.

2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “D” position. Refer to [AT-56, "LINE PRESSURE TEST"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
2. Check the following items:
 - Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
 - Line pressure solenoid valve
3. Disassemble A/T. Refer to [AT-262, "Disassembly"](#) .
4. Check the following item:
 - Oil pump assembly. Refer to [AT-283, "Oil Pump"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace damaged parts.

4. CHECK STALL REVOLUTION

Check stall revolution with selector lever in “D” position. Refer to [AT-53, "STALL TEST"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

TROUBLE DIAGNOSIS FOR SYMPTOMS

5. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to [AT-262, "Disassembly"](#) .
2. Check the following items:
 - Oil pump assembly. Refer to [AT-283, "Oil Pump"](#) .
 - Forward clutch assembly. Refer to [AT-314, "Forward and Overrun Clutches"](#) .
 - Forward one-way clutch. Refer to [AT-326, "Rear Internal Gear and Forward Clutch Hub"](#) .
 - Low one-way clutch. Refer to [AT-262, "Disassembly"](#) .
 - Torque converter. Refer to [AT-262, "Disassembly"](#) .

OK or NG

- OK >> GO TO 7.
NG >> Repair or replace damaged parts.

6. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to [AT-251, "Components"](#) .
2. Check A/T fluid condition. Refer to [AT-53, "Fluid Condition Check"](#) .

OK or NG

- OK >> GO TO 7.
NG >> GO TO 5.

7. CHECK SYMPTOM

Check again. Refer to [AT-59, "Check at Idle"](#) .

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 8.

8. CHECK TCM

1. Check TCM input/output signals. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Vehicle Cannot Be Started from D1 SYMPTOM:

UCS005V3

Vehicle cannot be started from D1 on "Cruise Test — Part 1".

DIAGNOSTIC PROCEDURE

1. CHECK SYMPTOM

Check symptom. Refer to [AT-59, "Check at Idle"](#) .

Is "Vehicle Dose Not Creep Backward in "R" Position" OK?

- OK >> GO TO 2.
NG >> Go to [AT-197, "Vehicle Does Not Creep Backward in "R" Position"](#) .

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) or [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .

Is any malfunction detected by self-diagnostic results?

- YES >> Check the malfunctioning system. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) or [AT-87, "Judgement of Self-diagnosis Code"](#) .
NO >> GO TO 3.

TROUBLE DIAGNOSIS FOR SYMPTOMS

3. CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to [EC-537, "DTC P2138 APP SENSOR"](#) .

OK or NG

OK >> GO TO 4.

NG >> Repair or replace accelerator pedal position sensor.

4. CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in "D" position. Refer to [AT-56, "LINE PRESSURE TEST"](#) .

OK or NG

OK >> GO TO 6.

NG >> GO TO 5.

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .

2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T. Refer to [AT-262, "Disassembly"](#) .

4. Check the following items:

- Forward clutch assembly. Refer to [AT-314, "Forward and Overrun Clutches"](#) .
- Low one-way clutch. Refer to [AT-262, "Disassembly"](#) .
- Forward one-way clutch. Refer to [AT-326, "Rear Internal Gear and Forward Clutch Hub"](#) .
- High clutch assembly. Refer to [AT-308, "High Clutch"](#) .
- Torque converter. Refer to [AT-262, "Disassembly"](#) .
- Oil pump assembly. Refer to [AT-283, "Oil Pump"](#) .

OK or NG

OK >> GO TO 8.

NG >> Repair or replace damaged parts.

6. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to [AT-251, "Components"](#) .

2. Check A/T fluid condition. Refer to [AT-53, "Fluid Condition Check"](#) .

OK or NG

OK >> GO TO 7.

NG >> GO TO 5.

TROUBLE DIAGNOSIS FOR SYMPTOMS

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
2. Check the following items:
 - Shift valve A
 - Shift valve B
 - Shift solenoid valve A
 - Shift solenoid valve B
 - Pilot valve
 - Pilot filter

OK or NG

- OK >> GO TO 8.
NG >> Repair or replace damage parts.

8. CHECK SYMPTOM

Check again. Refer to [AT-61, "Cruise Test — Part 1"](#) .

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 9.

9. CHECK TCM

1. Check TCM input/output signals. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

A/T Does Not Shift: D1 → D2 or Does Not Kickdown: D4 → D2

UCS005V4

SYMPTOM:

- A/T does not shift from D1 to D2 at the specified speed on "Cruise Test — Part 1".
- A/T does not shift from D4 to D2 when depressing accelerator pedal fully at the specified speed on "Cruise Test — Part 2".

DIAGNOSTIC PROCEDURE

1. CHECK SYMPTOM

Check symptom . Refer to [AT-59, "Check at Idle"](#) and [AT-61, "Cruise Test — Part 1"](#) .

Are "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" and "Vehicle Cannot Be Started from D1 "

OK?

- YES >> GO TO 2.
NO >> Go to [AT-199, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position"](#) and [AT-200, "Vehicle Cannot Be Started from D1"](#) .

2. CHECK A/T POSITION

Check A/T position. Refer to [AT-228, "Checking of A/T Position"](#) .

OK or NG

- OK >> GO TO 3.
NG >> Adjust A/T position. Refer to [AT-227, "Adjustment of A/T Position"](#) .

TROUBLE DIAGNOSIS FOR SYMPTOMS

3. CHECK VEHICLE SPEED SENSOR-A/T AND VEHICLE SPEED SENSOR-MTR CIRCUIT

Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to [AT-103, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) and [AT-162, "DTC VEHICLE SPEED SENSOR MTR"](#) .

OK or NG

OK >> GO TO 4.

NG >> Repair or replace vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuits.

4. CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to [EC-537, "DTC P2138 APP SENSOR"](#) .

OK or NG

OK >> GO TO 5.

NG >> Repair or replace accelerator pedal position sensor.

5. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to [AT-251, "Components"](#) .

2. Check A/T fluid condition. Refer to [AT-53, "Fluid Condition Check"](#) .

OK or NG

OK >> GO TO 7.

NG >> GO TO 6.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .

2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T. Refer to [AT-262, "Disassembly"](#) .

4. Check the following items:

- Servo piston assembly
- Brake band

OK or NG

OK >> GO TO 8.

NG >> Repair or replace damaged parts.

TROUBLE DIAGNOSIS FOR SYMPTOMS

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
2. Check the following items:
 - Shift valve A
 - Shift valve B
 - Shift solenoid valve A
 - Shift solenoid valve B
 - Pilot valve
 - Pilot filter

OK or NG

- OK >> GO TO 8.
NG >> Repair or replace damaged parts.

8. CHECK SYMPTOM

Check again. Refer to [AT-61, "Cruise Test — Part 1"](#) and [AT-64, "Cruise Test — Part 2"](#) .

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 9.

9. CHECK TCM

1. Check TCM input/output signals. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

A/T Does Not Shift: D2 → D3

UCS005V5

SYMPTOM:

A/T does not shift from D2 to D3 at the specified speed on "Cruise Test — Part 1" and "Cruise Test — Part 2".

DIAGNOSTIC PROCEDURE

1. CHECK SYMPTOM

Check symptom. Refer to [AT-59, "Check at Idle"](#) and [AT-61, "Cruise Test — Part 1"](#) .

Are "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" and "Vehicle Cannot Be Started from D1 "

OK?

- YES >> GO TO 2.
NO >> Go to [AT-199, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position"](#) and [AT-200, "Vehicle Cannot Be Started from D1"](#) .

2. CHECK A/T POSITION

Check A/T position. Refer to [AT-228, "Checking of A/T Position"](#) .

OK or NG

- OK >> GO TO 3.
NG >> Adjust A/T position. Refer to [AT-227, "Adjustment of A/T Position"](#) .

TROUBLE DIAGNOSIS FOR SYMPTOMS

3. CHECK VEHICLE SPEED SENSOR-A/T AND VEHICLE SPEED SENSOR-MTR CIRCUIT

Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to [AT-103, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) and [AT-162, "DTC VEHICLE SPEED SENSOR MTR"](#) .

OK or NG

OK >> GO TO 4.

NG >> Repair or replace vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuits.

4. CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to [EC-537, "DTC P2138 APP SENSOR"](#) .

OK or NG

OK >> GO TO 5.

NG >> Repair or replace accelerator pedal position sensor.

5. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to [AT-251, "Components"](#) .

2. Check A/T fluid condition. Refer to [AT-53, "Fluid Condition Check"](#) .

OK or NG

OK >> GO TO 7.

NG >> GO TO 6.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .

2. Check the following items:

- Shift valve B
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T. Refer to [AT-262, "Disassembly"](#) .

4. Check the following items:

- Servo piston assembly
- High clutch assembly. Refer to [AT-308, "High Clutch"](#) .
- Oil pump assembly. Refer to [AT-283, "Oil Pump"](#) .

OK or NG

OK >> GO TO 8.

NG >> Repair or replace damaged parts.

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .

2. Check the following items:

- Shift valve B
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 8.

NG >> Repair or replace damaged parts.

TROUBLE DIAGNOSIS FOR SYMPTOMS

8. CHECK SYMPTOM

Check again. Refer to [AT-61, "Cruise Test — Part 1"](#) and [AT-64, "Cruise Test — Part 2"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 9.

9. CHECK TCM

1. Check TCM input/output signal. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
- NG >> Repair or replace damaged parts.

A/T Does Not Shift: D3 → D4

UCS005V6

SYMPTOM:

- **A/T does not shift from D3 to D4 at the specified speed on "Cruise Test — Part 1" and "Cruise Test — Part 2".**
- **A/T must be warm before D3 to D4 shift will occur.**

DIAGNOSTIC PROCEDURE

1. CHECK SYMPTOM

Check symptom. Refer to [AT-59, "Check at Idle"](#) and [AT-61, "Cruise Test — Part 1"](#) .

Are "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" and "Vehicle Cannot Be Started from D1 "

OK?

- YES >> GO TO 2.
- NO >> Go to [AT-199, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position"](#) and [AT-200, "Vehicle Cannot Be Started from D1"](#) .

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) or [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .

Is any malfunction detected by self-diagnostic results?

- YES >> Check the malfunctioning system. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) or [AT-87, "Judgement of Self-diagnosis Code"](#) .
- NO >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to [EC-537, "DTC P2138 APP SENSOR"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace accelerator pedal position sensor.

4. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to [AT-251, "Components"](#) .
2. Check A/T fluid condition. Refer to [AT-53, "Fluid Condition Check"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.

TROUBLE DIAGNOSIS FOR SYMPTOMS

5. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
- 2. Check the following items:
 - Shift valve A
 - Overrun clutch control valve
 - Shift solenoid valve A
 - Overrun clutch solenoid valve
 - Pilot valve
 - Pilot filter
- 3. Disassemble A/T. Refer to [AT-262, "Disassembly"](#) .
- 4. Check the following items:
 - Servo piston assembly
 - Brake band
 - Torque converter. Refer to [AT-262, "Disassembly"](#) .
 - Oil pump assembly. Refer to [AT-283, "Oil Pump"](#) .

OK or NG

- OK >> GO TO 7.
- NG >> Repair or replace damaged parts.

6. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
- 2. Check the following items:
 - Shift valve A
 - Overrun clutch control valve
 - Shift solenoid valve A
 - Pilot valve
 - Pilot filter

OK or NG

- OK >> GO TO 7.
- NG >> Repair or replace damaged parts.

7. CHECK SYMPTOM

Check again. Refer to [AT-61, "Cruise Test — Part 1"](#) and [AT-64, "Cruise Test — Part 2"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 8.

8. CHECK TCM

- 1. Check TCM input/output signals. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
- 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
- NG >> Repair or replace damaged parts.

TROUBLE DIAGNOSIS FOR SYMPTOMS

UCS005V7

A/T Does Not Perform Lock-up

SYMPTOM:

A/T does not perform lock-up at the specified speed on "Cruise Test — Part 1".

DIAGNOSTIC PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) or [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .

Is any malfunction detected by self-diagnostic results?

- YES >> Check the malfunctioning system. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) or [AT-87, "Judgement of Self-diagnosis Code"](#) .
- NO >> GO TO 2.

2. CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to [EC-537, "DTC P2138 APP SENSOR"](#) .

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace accelerator pedal position sensor.

3. DETECT MALFUNCTIONING ITEM

-
1. Remove control valve. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
 2. Check following items:
 - Torque converter clutch control valve
 - Torque converter clutch solenoid valve
 - Torque converter relief valve
 - Pilot valve
 - Pilot filter
 3. Disassemble A/T. Refer to [AT-262, "Disassembly"](#) .
 4. Check the following items:
 - Torque converter. Refer to [AT-262, "Disassembly"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace damaged parts.

4. CHECK SYMPTOM

Check again. Refer to [AT-61, "Cruise Test — Part 1"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 5.

5. CHECK TCM

-
1. Check TCM input/output signals. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
- NG >> Repair or replace damaged parts.

TROUBLE DIAGNOSIS FOR SYMPTOMS

UCS005V8

A/T Does Not Hold Lock-up Condition

SYMPTOM:

A/T does not hold lock-up condition for more than 30 seconds on "Cruise Test — Part 1".

DIAGNOSTIC PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) or [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) or [AT-87, "Judgement of Self-diagnosis Code"](#) .

NO >> GO TO 2.

2. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to [AT-251, "Components"](#) .

2. Check A/T fluid condition. Refer to [AT-53, "Fluid Condition Check"](#) .

OK or NG

OK >> GO TO 4.

NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .

2. Check the following items:

- Torque converter clutch control valve
- Torque converter clutch solenoid valve
- Pilot valve
- Pilot filter

3. Disassemble A/T. Refer to [AT-262, "Disassembly"](#) .

4. Check the following items:

- Torque converter. Refer to [AT-262, "Disassembly"](#) .
- Oil pump assembly. Refer to [AT-283, "Oil Pump"](#) .

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.

4. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .

2. Check the following items:

- Torque converter clutch control valve
- Torque converter clutch solenoid valve
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.

TROUBLE DIAGNOSIS FOR SYMPTOMS

5. CHECK SYMPTOM

Check again. Refer to [AT-61, "Cruise Test — Part 1"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signals. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
- NG >> Repair or replace damaged parts.

Lock-up Is Not Released SYMPTOM:

UCS005V9

Lock-up is not released when accelerator pedal is released on "Cruise Test — Part 1".

DIAGNOSTIC PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) or [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .

Is any malfunction detected by self-diagnostic results?

- YES >> Check the malfunctioning system. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) or [AT-87, "Judgement of Self-diagnosis Code"](#) .
- NO >> GO TO 2.

2. CHECK SYMPTOM

Check again. Refer to [AT-61, "Cruise Test — Part 1"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 3.

3. CHECK TCM

1. Check TCM input/output signals. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
- NG >> Repair or replace damaged parts.

TROUBLE DIAGNOSIS FOR SYMPTOMS

Engine Speed Does Not Return to Idle (Light Braking D4 → D3)

UCS005VA

SYMPTOM:

Engine speed does not smoothly return to idle when A/T shifts from D4 to D3 on "Cruise Test — Part 1".

DIAGNOSTIC PROCEDURE

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) or [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) or [AT-87, "Judgement of Self-diagnosis Code"](#) .

NO >> GO TO 2.

2. CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to [EC-537, "DTC P2138 APP SENSOR"](#) .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace accelerator pedal position sensor.

3. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to [AT-251, "Components"](#) .

2. Check A/T fluid condition. Refer to [AT-53, "Fluid Condition Check"](#) .

OK or NG

OK >> GO TO 5.

NG >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .

2. Check the following items:

- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve

3. Disassemble A/T. Refer to [AT-262, "Disassembly"](#) .

4. Check the following items:

- Overrun clutch assembly. Refer to [AT-314, "Forward and Overrun Clutches"](#) .

OK or NG

OK >> GO TO 6.

NG >> Repair or replace damaged parts.

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .

2. Check the following items:

- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve

OK or NG

OK >> GO TO 6.

NG >> Repair or replace damaged parts.

TROUBLE DIAGNOSIS FOR SYMPTOMS

6. CHECK SYMPTOM

Check again. Refer to [AT-61, "Cruise Test — Part 1"](#) .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7. CHECK TCM

1. Check TCM input/output signals. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

A/T Does Not Shift: D4 → D3 , When OD OFF **SYMPTOM:**

UCS005VB

A/T does not shift from D4 to D3 when OD OFF (OD OFF indicator lamp is on) on "Cruise Test — Part 3".

DIAGNOSTIC PROCEDURE

1. CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) or [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .

Is a malfunction in CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to [AT-90, "DTC U1000 CAN COMMUNICATION LINE"](#) .
NO >> GO TO 2.

TROUBLE DIAGNOSIS FOR SYMPTOMS

2. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

With CONSULT-II

- Turn ignition switch ON. (Do not start engine)
- Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
- Read out "OVERDRIVE SW".
Check the signal of the overdrive control switch is indicated properly.

Item name	Overdrive control switch Condition	Display value
OVERDRIVE SW	Depressed	ON
	Released	OFF

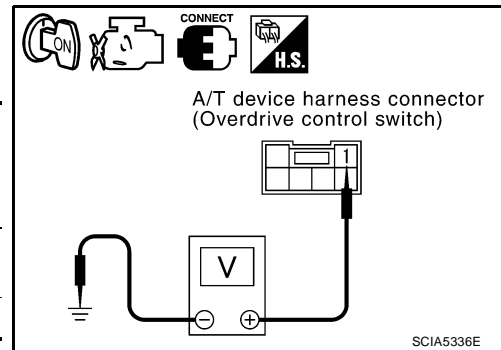
DATA MONITOR	
MONITOR	NO DTC
VHCL/S SE-AT	0 km/h
VHCL/S SE-MTR	5 km/h
THRTL POS SEN	0.8 V
FLUID TEMP SE	1.4 V
BATTERY VOLT	11.6 V
ENGINE SPEED	384 rpm
TURBINE REV	0 rpm
OVERDRIVE SW	OFF
PN POSI SW	ON
Page Down	
RECORD	
MODE	BACK LIGHT COPY

SCIA4730E

Without CONSULT-II

- Turn ignition switch ON. (Do not start engine)
- Check voltage between A/T device harness connector terminal and ground. Refer to [AT-188, "Wiring Diagram — AT — NON-DTC"](#).

Item	Connector	Terminal	Overdrive control switch Condition	Judge-ment standard (Approx.)
A/T device harness connector (Overdrive control switch)	M38	1 - Ground	Released	Battery voltage
			Depressed	0V



OK or NG

OK >> Go to [AT-204, "A/T Does Not Shift: D2 → D3"](#).

NG >> Check overdrive control switch. Refer to [AT-186, "OVERDRIVE CONTROL SWITCH"](#).

A/T Does Not Shift: D3 → 22 , When Selector Lever "D" → "2" Position

UCS005VC

SYMPTOM:

A/T does not shift from D3 to 22 when changing selector lever from "D" to "2" position on "Cruise Test — Part 3".

DIAGNOSTIC PROCEDURE

1. CHECK SYMPTOM

Check symptom. Refer to [AT-61, "Cruise Test — Part 1"](#) or [AT-64, "Cruise Test — Part 2"](#).

Is "A/T Does Not Shift: D1 → D2 or Does Not Kickdown: D4 → D2" OK?

YES (With CONSULT-II) >>GO TO 2.

YES (Without CONSULT-II) >>GO TO 3.

NO >> Go to [AT-202, "A/T Does Not Shift: D1 → D2 or Does Not Kickdown: D4 → D2"](#).

TROUBLE DIAGNOSIS FOR SYMPTOMS

2. CHECK PNP SWITCH CIRCUIT

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out "P·N", "R", "D", "2" and "1" position switches moving selector lever to each position.

DATA MONITOR	
MONITORING	
PN POSI SW	OFF
R POSITION SW	OFF
D POSITION SW	OFF
2 POSITION SW	ON
1 POSITION SW	OFF

SAT701J

Monitor item	Condition	Display value
PN POSI SW	When setting selector lever to "N" or "P" position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to "R" position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to "D" positions.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to "2" position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to "1" position.	ON
	When setting selector lever to other positions.	OFF

OK or NG

OK >> **INSPECTION END**

NG >> Check PNP switch. Refer to [AT-186, "PNP SWITCH"](#) .

3. CHECK PNP SWITCH CIRCUIT

Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground while moving selector lever through each position. Refer to [AT-94, "Wiring Diagram — AT — PNP/SW"](#) .

Selector lever position	Terminal				
	36	35	34	27	26
"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

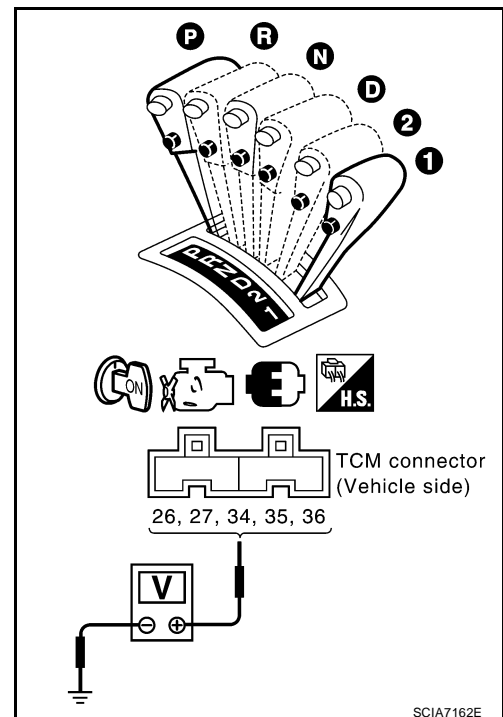
B: Battery voltage

0: 0V

OK or NG

OK >> **INSPECTION END**

NG >> Check PNP switch. Refer to [AT-186, "PNP SWITCH"](#) .



TROUBLE DIAGNOSIS FOR SYMPTOMS

A/T Does Not Shift: 22 → 11 , When Selector Lever “2” → “1” Position

UCS005VD

SYMPTOM:

A/T does not shift from 22 to 11 when changing selector lever from “2” to “1” position on “Cruise Test — Part 3”.

DIAGNOSTIC PROCEDURE

1. CHECK PNP SWITCH CIRCUIT

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out “P·N”, “R”, “D”, “2” and “1” position switches moving selector lever to each position.

Monitor item	Condition	Display value
PN POSI SW	When setting selector lever to “N” or “P” position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to “R” position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to “D” positions.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to “2” position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF

DATA MONITOR	
MONITORING	
PN POSI SW	OFF
R POSITION SW	OFF
D POSITION SW	OFF
2 POSITION SW	ON
1 POSITION SW	OFF

SAT701J

OK or NG

OK >> GO TO 3

NG >> Check PNP switch. Refer to [AT-186, "PNP SWITCH"](#) .

TROUBLE DIAGNOSIS FOR SYMPTOMS

2. CHECK PNP SWITCH CIRCUIT

⊗ Without CONSULT-II

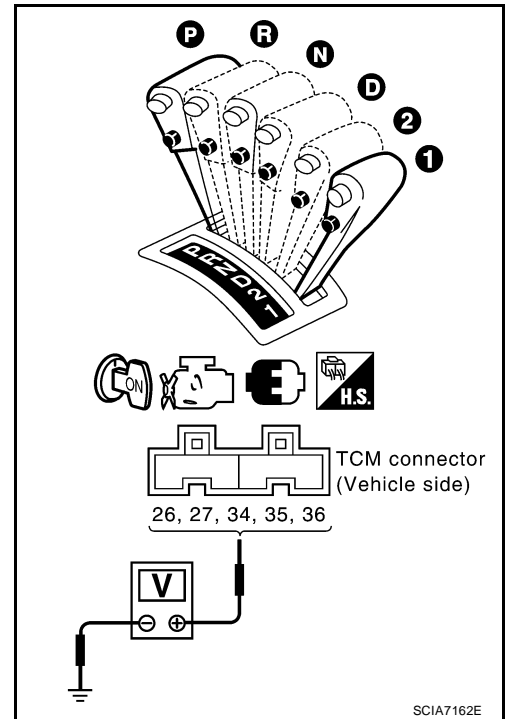
1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground while moving selector lever through each position. Refer to [AT-94, "Wiring Diagram — AT — PNP/SW"](#) .

Selector lever position	Terminal				
	36	35	34	27	26
"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

B: Battery voltage
0: 0V

OK or NG

- OK >> GO TO 3
NG >> Check PNP switch. Refer to [AT-186, "PNP SWITCH"](#) .



3. CHECK A/T POSITION

Check A/T position. Refer to [AT-228, "Checking of A/T Position"](#) .

OK or NG

- OK >> GO TO 4.
NG >> Adjust A/T position. Refer to [AT-227, "Adjustment of A/T Position"](#) .

4. CHECK VEHICLE SPEED SENSOR-A/T AND VEHICLE SPEED SENSOR-MTR CIRCUIT

Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to [AT-103, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) and/or [AT-162, "DTC VEHICLE SPEED SENSOR MTR"](#) .

OK or NG

- OK >> GO TO 5.
NG >> Repair or replace vehicle speed sensor-A/T (revolution sensor) and/or vehicle speed sensor-MTR circuits.

5. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to [AT-251, "Components"](#) .
2. Check A/T fluid condition. Refer to [AT-53, "Fluid Condition Check"](#) .

OK or NG

- OK >> GO TO 7.
NG >> GO TO 6.

TROUBLE DIAGNOSIS FOR SYMPTOMS

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .
2. Check the following items:
 - Shift valve A
 - Shift solenoid valve A
 - Overrun clutch control valve
 - Overrun clutch solenoid valve
3. Disassemble A/T. Refer to [AT-262, "Disassembly"](#) .
4. Check the following items:
 - Servo piston assembly
 - Brake band

OK or NG

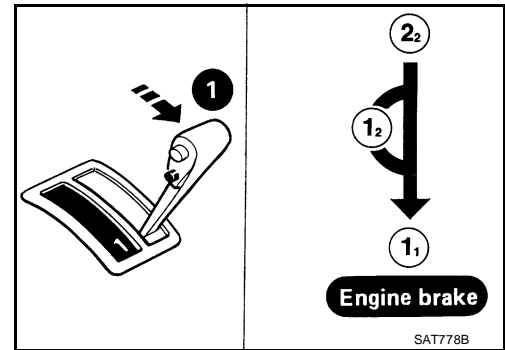
- OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7. CHECK SYMPTOM

Check again. Refer to [AT-65, "Cruise Test — Part 3"](#) .

OK or NG

- OK >> **INSPECTION END**
NG >> GO TO 8.



8. CHECK TCM

1. Check TCM input/output signals. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

- OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Vehicle Does Not Decelerate by Engine Brake

UCS005VE

SYMPTOM:

- Vehicle does not decelerate by engine brake when shifting from 22 (12) to 11 "Cruise Test — Part 3".
- Vehicle does not decelerate by engine brake when OD OFF (OD OFF indicator lamp is on) on "Cruise Test — Part 3".
- Vehicle does not decelerate by engine brake when shifting A/T from "D" to "2" position on "Cruise Test — Part 3".

DIAGNOSTIC PROCEDURE

1. CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to [AT-82, "SELF-DIAGNOSTIC RESULT MODE"](#) or [AT-86, "Diagnostic Procedure Without CONSULT-II"](#) .

Is a malfunction in CAN communication indicated in the results?

- YES >> Check CAN communication line. Refer to [AT-90, "DTC U1000 CAN COMMUNICATION LINE"](#) .
NO >> GO TO 2.

TROUBLE DIAGNOSIS FOR SYMPTOMS

2. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out "OVERDRIVE SW".
Check the signal of the overdrive control switch is indicated properly.

Item name	Overdrive control switch Condition	Display value
OVERDRIVE SW	Depressed	ON
	Released	OFF

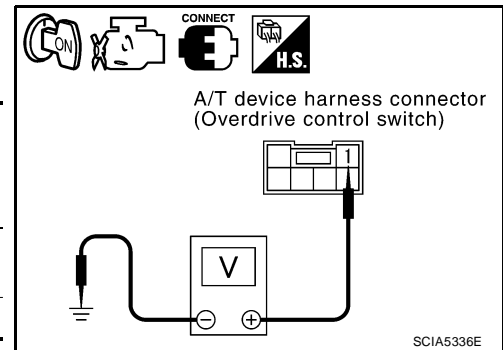
DATA MONITOR	
MONITOR	NO DTC
VHCL/S SE-AT	0 km/h
VHCL/S SE-MTR	5 km/h
THRTL POS SEN	0.8 V
FLUID TEMP SE	1.4 V
BATTERY VOLT	11.6 V
ENGINE SPEED	384 rpm
TURBINE REV	0 rpm
OVERDRIVE SW	OFF
PN POSI SW	ON
Page Down	
RECORD	
MODE	BACK
LIGHT	COPY

SCIA4730E

Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine)
2. Check voltage between A/T device harness connector terminal and ground. Refer to [AT-188, "Wiring Diagram — AT — NON-DTC"](#) .

Item	Connector	Terminal	Overdrive control switch Condition	Judge-ment standard (Approx.)
A/T device harness connector (Overdrive control switch)	M38	1 - Ground	Released	Battery voltage
			Depressed	0V



OK or NG

OK (With CONSULT-II)>>GO TO 3.

OK (Without CONSULT-II)>>GO TO 4.

NG >> Check overdrive control switch. Refer to [AT-186, "OVERDRIVE CONTROL SWITCH"](#) .

TROUBLE DIAGNOSIS FOR SYMPTOMS

3. CHECK PNP SWITCH CIRCUIT

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out "P·N", "R", "D", "2" and "1" position switches moving selector lever to each position.

DATA MONITOR	
MONITORING	
PN POSI SW	OFF
R POSITION SW	OFF
D POSITION SW	OFF
2 POSITION SW	ON
1 POSITION SW	OFF

SAT701J

Monitor item	Condition	Display value
PN POSI SW	When setting selector lever to "N" or "P" position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to "R" position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to "D" positions.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to "2" position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to "1" position.	ON
	When setting selector lever to other positions.	OFF

OK or NG

OK >> GO TO 5

NG >> Check PNP switch. Refer to [AT-186, "PNP SWITCH"](#) .

4. CHECK PNP SWITCH CIRCUIT

Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground while moving selector lever through each position. Refer to [AT-94, "Wiring Diagram — AT — PNP/SW"](#) .

Selector lever position	Terminal				
	36	35	34	27	26
"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

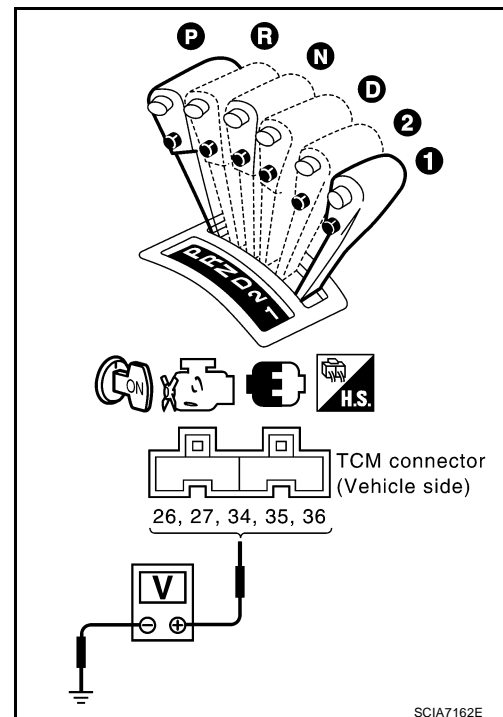
B: Battery voltage

0: 0V

OK or NG

OK >> GO TO 5

NG >> Check PNP switch. Refer to [AT-186, "PNP SWITCH"](#) .



TROUBLE DIAGNOSIS FOR SYMPTOMS

5. CHECK A/T POSITION

Check A/T position. Refer to [AT-228, "Checking of A/T Position"](#) .

OK or NG

OK >> GO TO 6.

NG >> Adjust A/T position. Refer to [AT-227, "Adjustment of A/T Position"](#) .

6. CHECK VEHICLE SPEED SENSOR-A/T AND VEHICLE SPEED SENSOR-MTR CIRCUIT

Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to [AT-103, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) and/or [AT-162, "DTC VEHICLE SPEED SENSOR MTR"](#) .

OK or NG

OK >> GO TO 7.

NG >> Repair or replace vehicle speed sensor-A/T (revolution sensor) and/or vehicle speed sensor-MTR circuits.

7. CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to [EC-537, "DTC P2138 APP SENSOR"](#) .

OK or NG

OK >> GO TO 8.

NG >> Repair or replace accelerator pedal position sensor.

8. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to [AT-251, "Components"](#) .

2. Check A/T fluid condition. Refer to [AT-53, "Fluid Condition Check"](#) .

OK or NG

OK >> GO TO 10.

NG >> GO TO 9.

9. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-236, "Control Valve Assembly and Accumulators"](#) .

2. Check the following.

- Shift valve A

- Overrun clutch solenoid valve

3. Disassemble A/T. Refer to [AT-262, "Disassembly"](#) .

4. Check the following.

- Overrun clutch assembly. Refer to [AT-314, "Forward and Overrun Clutches"](#) .

- Low & reverse brake assembly. Refer to [AT-321, "Low & Reverse Brake"](#) .

OK or NG

OK >> GO TO 10.

NG >> Repair or replace damaged parts.

10. CHECK SYMPTOM

Check again. Refer to [AT-65, "Cruise Test — Part 3"](#) .

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 11.

TROUBLE DIAGNOSIS FOR SYMPTOMS

11. CHECK TCM

1. Check TCM input/output signals. Refer to [AT-78, "TCM Terminals and Reference Values"](#) .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.

TCM Self-diagnosis Does Not Activate

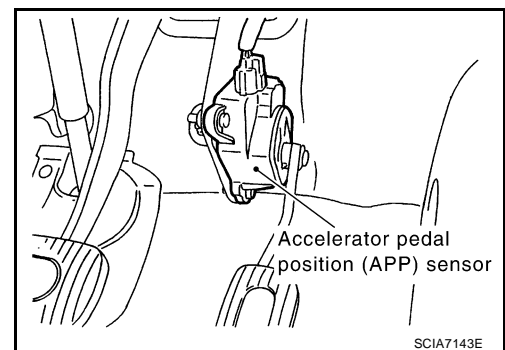
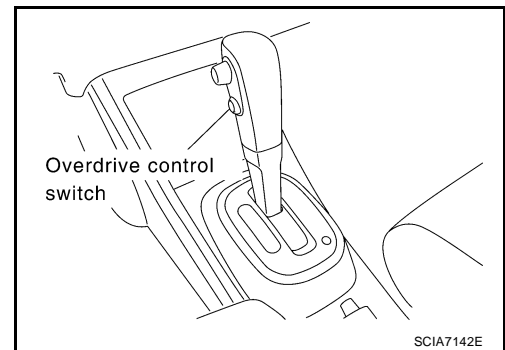
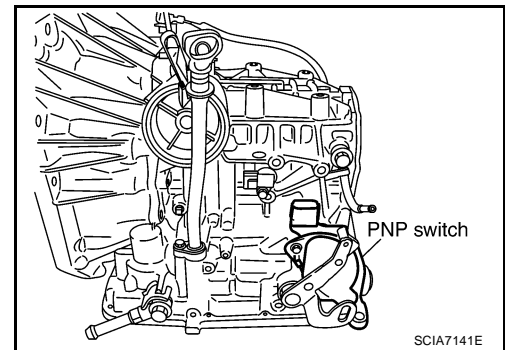
UCS005VF

SYMPTOM:

OD OFF indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

DESCRIPTION

- PNP switch
PNP switch assembly includes a transaxle position switch. The transaxle position switch detects the selector lever position and sends a signal to the TCM.
- Overdrive control switch
Overdrive control switch detects the switch position (ON or OFF) and sends the signal via CAN communication to the TCM.
- Closed throttle position signal and wide open throttle position signal
ECM judges throttle opening based on a signal from accelerator pedal position sensor, and sends the signal via CAN communication to the TCM.



DIAGNOSTIC PROCEDURE

NOTE:

The diagnostic procedure includes inspection for the PNP switch, overdrive control switch, closed throttle position signal and wide open throttle position signal circuit. Refer to [AT-181, "PNP, OD SWITCH AND CLOSED THROTTLE, WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT"](#) .

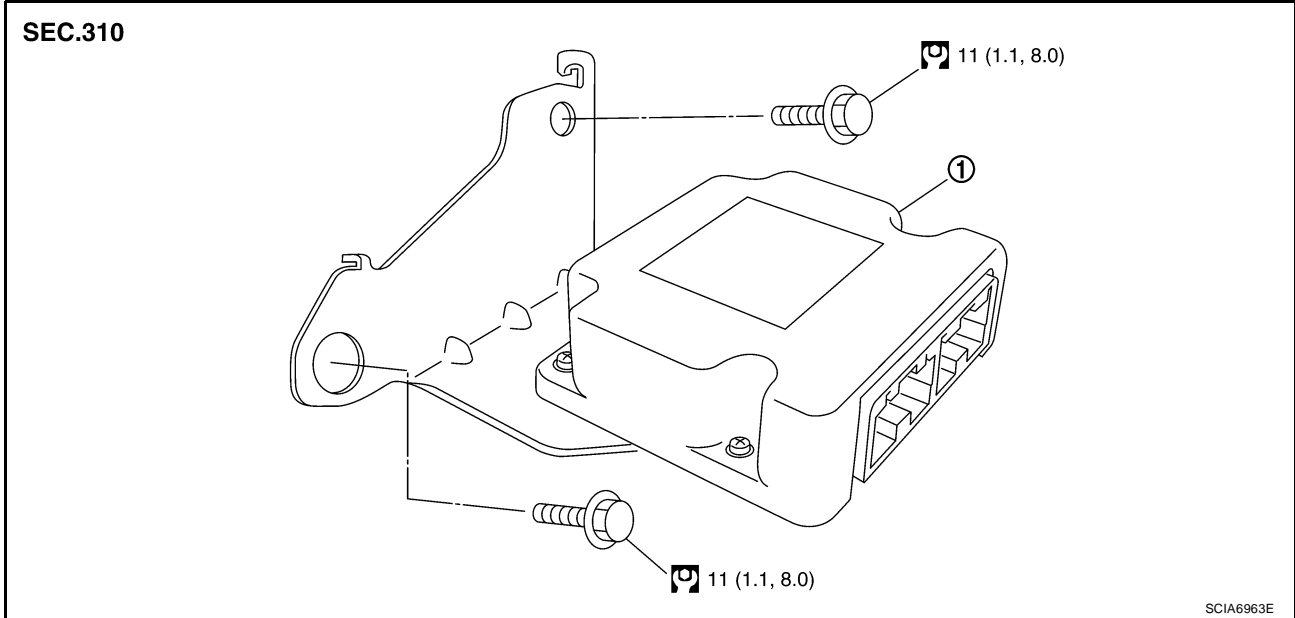
TRANSMISSION CONTROL MODULE

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TRANSMISSION CONTROL MODULE

Removal and Installation COMPONENTS

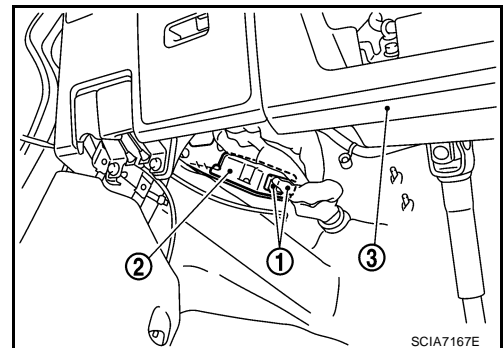
UCS005VG



1. TCM

REMOVAL

1. Disconnect the battery negative terminal.
2. Disconnect TCM harness connectors (1) from TCM (2).
 - Instrument lower finisher (3)
3. Remove TCM (2).



INSTALLATION

Installation is in the reverse order of removal.

SHIFT CONTROL SYSTEM

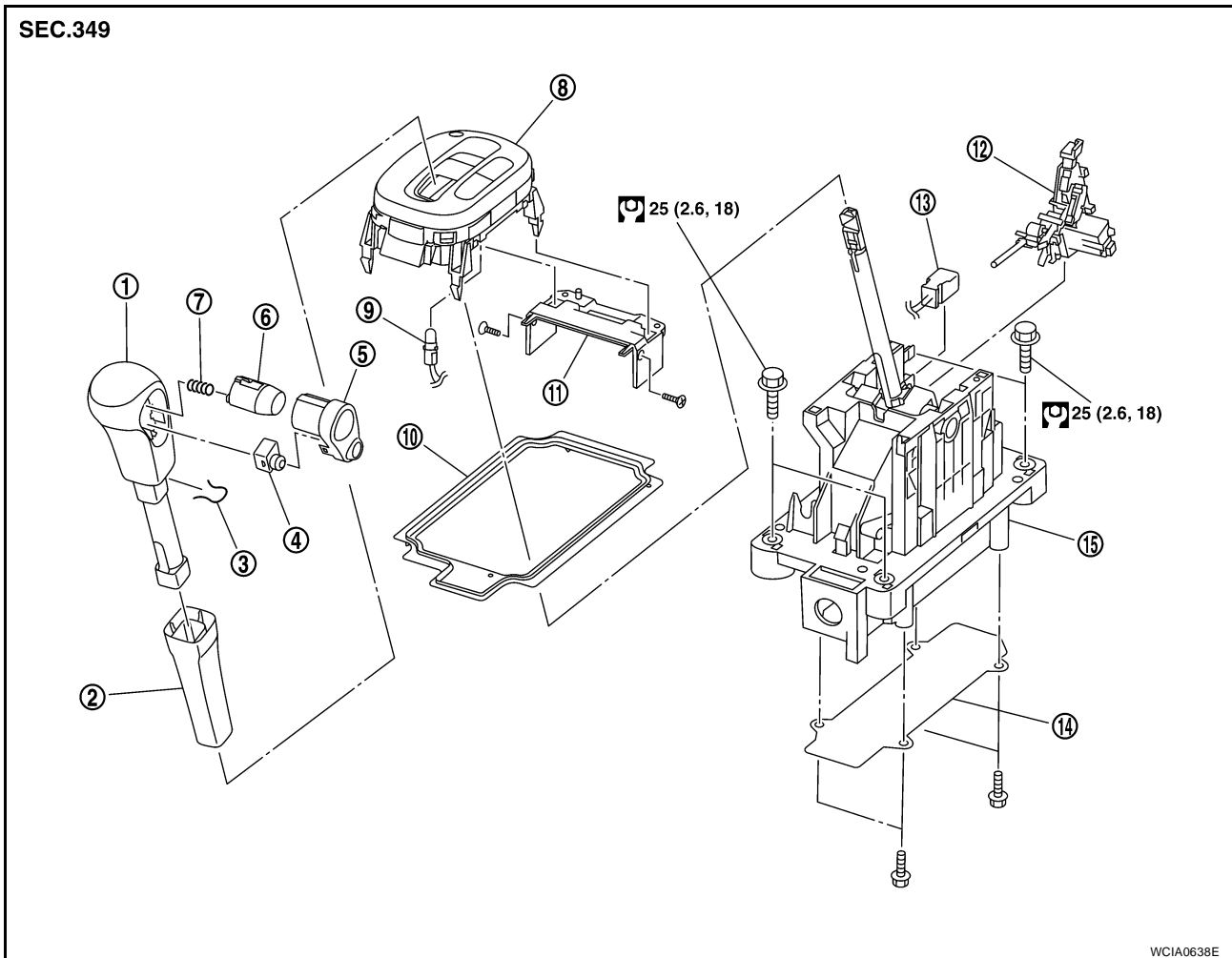
SHIFT CONTROL SYSTEM

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Control Device Removal and Installation CONTROL DEVICE COMPONENTS

UCS005VH

SEC.349

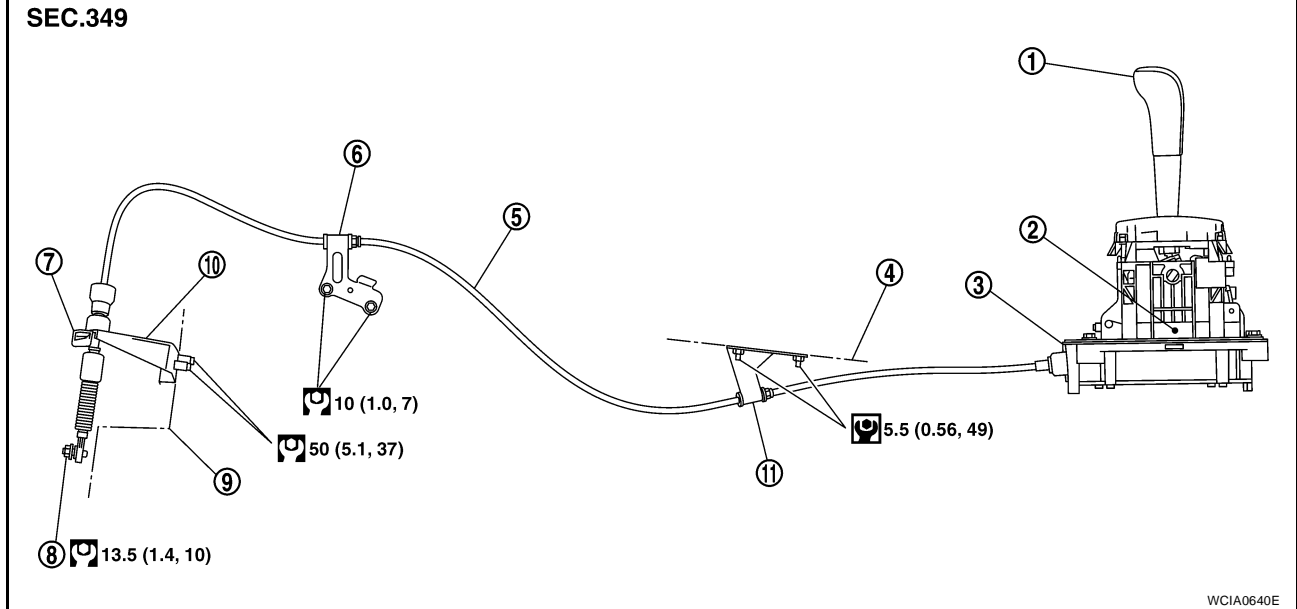


- | | | |
|----------------------------------|-----------------------------|---|
| 1. Selector lever knob | 2. Knob cover | 3. Lock pin |
| 4. Overdrive control switch | 5. Knob finisher | 6. Selector button |
| 7. Selector button return spring | 8. Position indicator plate | 9. Position lamp |
| 10. Dust cover | 11. Bracket | 12. Shift lock solenoid and park position switch assembly |
| 13. A/T device harness connector | 14. Plate | 15. Control device assembly |

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SHIFT CONTROL SYSTEM

CONTROL CABLE COMPONENTS



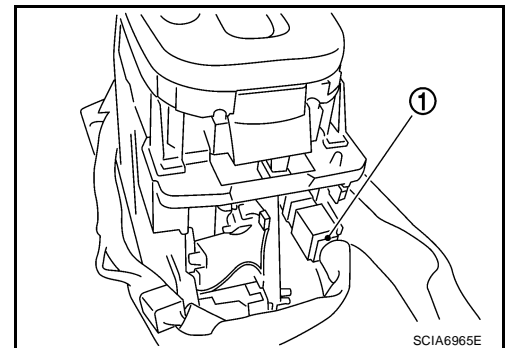
- | | | |
|------------------------|----------------------------|-----------------|
| 1. Selector lever knob | 2. Control device assembly | 3. Lock plate |
| 4. Floor panel | 5. Control cable | 6. Bracket |
| 7. Lock plate | 8. Lock nut | 9. A/T assembly |
| 10. Bracket | 11. Bracket | |

REMOVAL

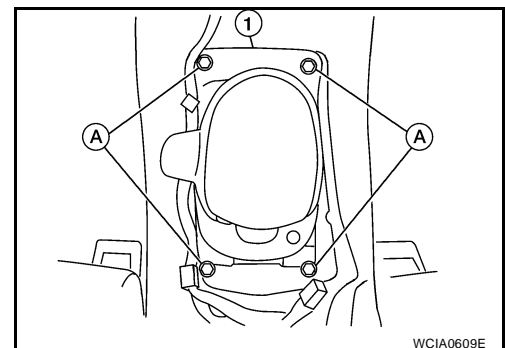
CAUTION:

Make sure that parking brake is applied before removal/installation.

1. Place the selector lever in the "N" position.
2. Remove the center console assembly. Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#) .
3. Disconnect the A/T device harness connector (1).
4. Remove the key interlock cable from the control device assembly. Refer to [AT-233, "Removal and Installation"](#) .



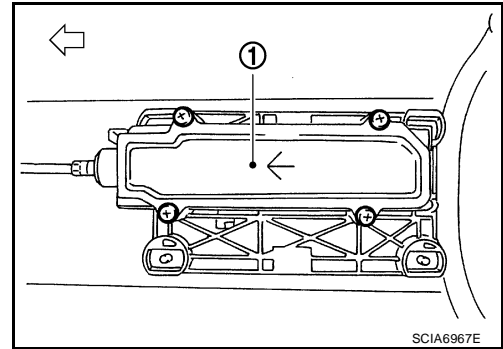
5. Remove the bolts (A) from the control device assembly (1).
6. Remove exhaust front tube, center muffler and heat plates. Refer to [EM-21, "EXHAUST MANIFOLD"](#) .



SHIFT CONTROL SYSTEM

7. Remove the plate (1) from the control device assembly.

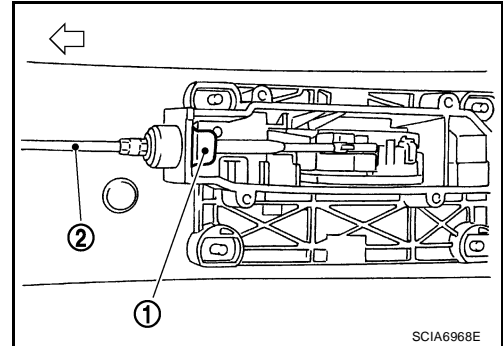
⇐: Vehicle front



8. Remove the lock plate (1) from the control cable (2).

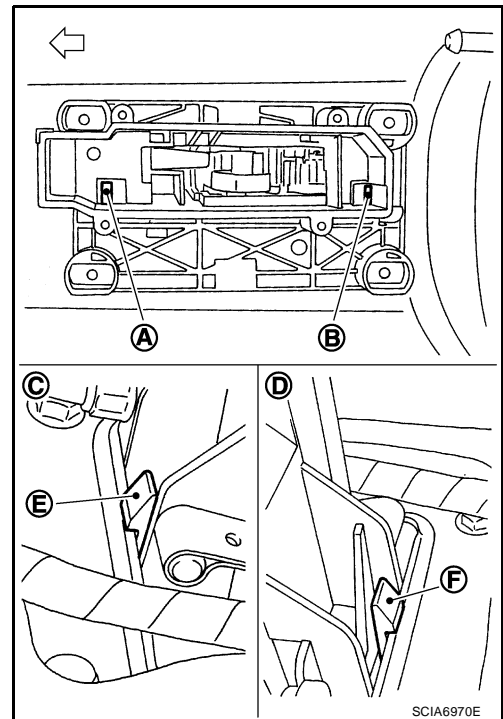
⇐: Vehicle front

9. Remove the control cable (2) from the control device assembly.



10. Insert flat-bladed screwdrivers at points (A) and (B) as shown, and press both tabs (E) and (F) at the front (C) and rear (D) slightly toward the center of the control device assembly to remove the control device assembly from the underside of the vehicle.

⇐: Vehicle front



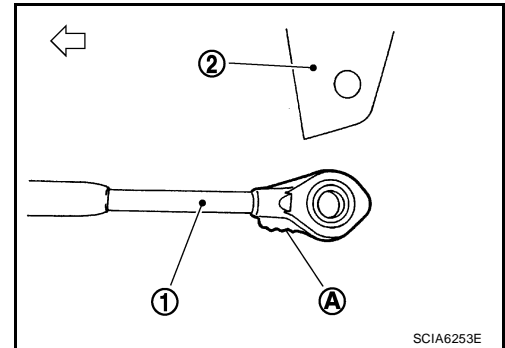
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SHIFT CONTROL SYSTEM

INSTALLATION

Installation is in the reverse order of removal.

- When installing the control cable (1) to the control device assembly (2), make sure that the control cable (1) is fully pressed in with the ribbed surface (A) facing downward from the vehicle.
⇐: Vehicle front
- After installation is completed, adjust and check the A/T position. Refer to [AT-227, "Adjustment of A/T Position"](#) and [AT-228, "Checking of A/T Position"](#).



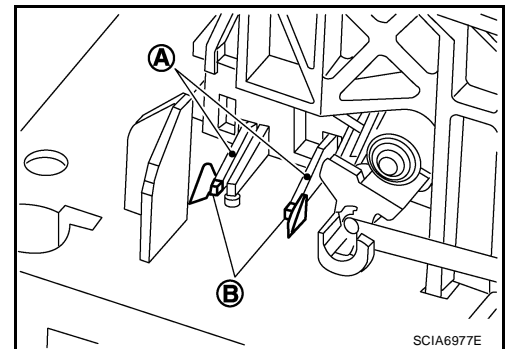
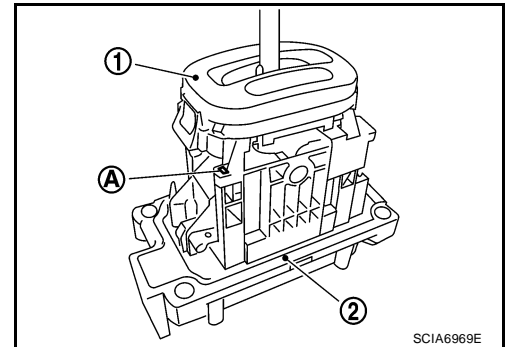
Control Device Disassembly and Assembly

DISASSEMBLY

NOTE:

Refer to [AT-223, "CONTROL DEVICE COMPONENTS"](#) to disassemble.

1. Remove selector lever knob from control device assembly. Refer to [AT-227, "Selector Lever Knob Removal and Installation"](#).
 2. Remove position lamp from position indicator plate (1).
 3. Insert a flat-bladed screwdriver to (A) (at 4 locations) as shown, and bend each hook slightly to raise position indicator plate (1) and remove from control device assembly (2).
 4. Remove bracket from control device assembly (2).
 5. Remove A/T device harness connector from control device assembly (2).
6. Release tabs (A) on shift lock solenoid and park position switch assembly from hooks (B) on control device assembly to shift lock solenoid and park position switch assembly.



ASSEMBLY

Assemble in the reverse order of disassembly.

SHIFT CONTROL SYSTEM

Selector Lever Knob Removal and Installation

UCS005VJ

REMOVAL

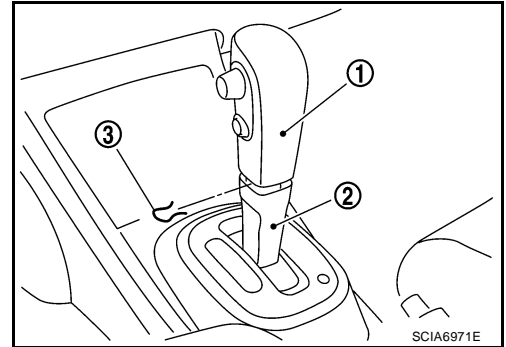
CAUTION:

Make sure that parking brake is applied before removal/installation.

1. Place the selector lever knob (1) in "N" position.
2. Slide knob cover (2) downward.
3. Pull out lock pin (3) from selector lever knob (1).
4. Remove selector lever knob (1) and knob cover (2) as a set from selector lever.

CAUTION:

Do not push selector button.

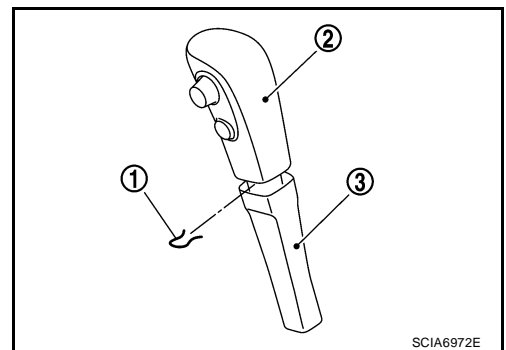


INSTALLATION

1. Insert lock pin (1) to selector lever knob (2).
2. Install knob cover (3) to selector lever knob (2).
3. Place the selector lever in "N" position.
4. Install selector lever knob over selector lever until a click is felt.

CAUTION:

- Do not tilt selector lever knob when installing. Install it straight, and do not tap or apply any shock to install it.
- Do not push selector button.



Adjustment of A/T Position

UCS005VK

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

CAUTION:

Make sure that parking brake is applied before adjustment.

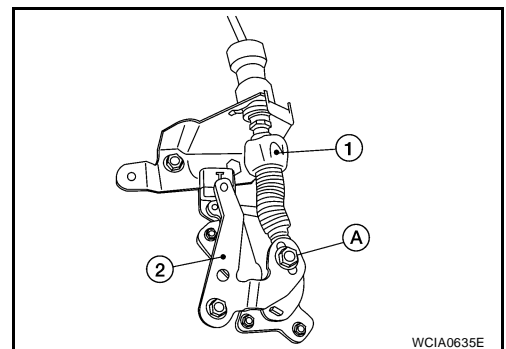
1. Remove the air duct assembly. Refer to [EM-16, "AIR CLEANER AND AIR DUCT"](#) .
2. Remove the control cable nut (A) and control cable (1) and place the manual lever (2) in the "P" position.
3. Place selector lever in "P" position.
4. Hold control cable (1) at the end and pull it with a force of 9.8 N (approximately 1 kg, 2.2 lb). Release the control cable and temporarily tighten control cable nut (A).
5. Tighten control cable nut (A) to the specified torque.

Control cable nut : Refer to [AT-224, "CONTROL CABLE COMPONENTS"](#) .

CAUTION:

Secure manual lever when tightening nut.

6. Move selector lever from "P" to "1" position again. Make sure that selector lever moves smoothly.
7. Check A/T position. Refer to [AT-228, "Checking of A/T Position"](#) .
8. Install air duct assembly. Refer to [EM-16, "AIR CLEANER AND AIR DUCT"](#) .

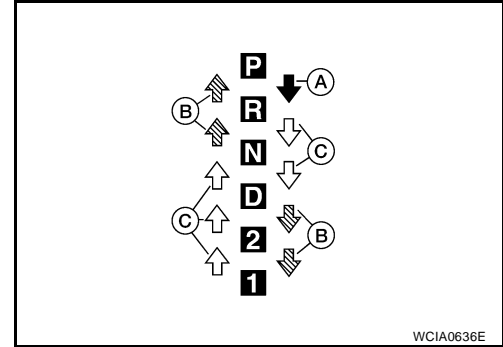


SHIFT CONTROL SYSTEM

UCS005VL

Checking of A/T Position

1. Place selector lever in "P" position, and turn ignition switch ON (Do not start engine).
2. Make sure selector lever can be shifted to other than "P" position when brake pedal is depressed. Also make sure selector lever can be shifted from "P" position only when brake pedal is depressed.
3. Move selector lever and check for excessive effort, sticking, noise or rattle.
4. Confirm selector lever stops at each position with the feel of engagement when it is moved through all the positions. Check whether or not the actual position selector lever is in matches the position shown by the shift position indicator and the transaxle.
5. The method of operating selector lever to individual positions correctly should be as shown.
 - (A): Press selector button to operate selector lever, while depressing the brake pedal.
 - (B): Press selector button to operate selector lever.
 - (C): Selector lever can be operated without pressing selector button.
6. Confirm back-up lamps illuminate only when selector lever is placed in "R" position. Confirm back-up lamps do not illuminate when selector lever is in "P" or "N" position even if it is pushed toward "R" position without pressing selector button.
7. Confirm engine can only be started with selector lever in "P" and "N" positions.
8. Make sure A/T is locked completely in "P" position.



A/T SHIFT LOCK SYSTEM

A/T SHIFT LOCK SYSTEM

PFP:34950

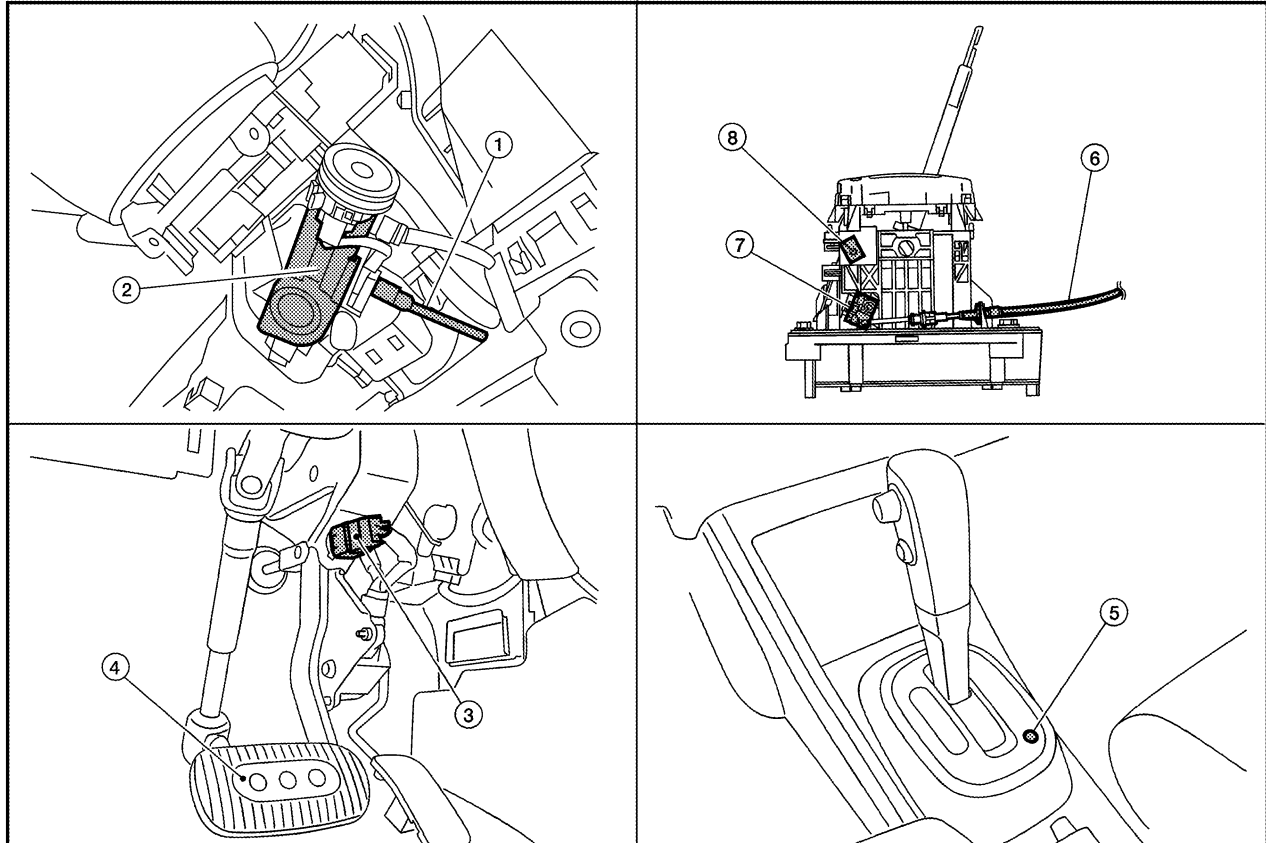
UCS005VM

Description

- The mechanical key interlock mechanism also operates as a shift lock:
With the ignition switch turned to ON, selector lever cannot be shifted from "P" position to any other position unless brake pedal is depressed.
With the key removed, selector lever cannot be shifted from "P" position to any other position.
The key cannot be removed unless selector lever is placed in "P" position.
- The shift lock and key interlock mechanisms are controlled by the ON-OFF operation of the shift lock solenoid and by the operation of the rotator and slider located inside key cylinder, respectively.

Shift Lock System Parts Location

UCS005VM



1. Key interlock cable
4. Brake pedal
7. Shift lock solenoid

2. Key cylinder
5. Shift lock release button
8. Park position switch

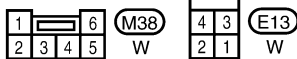
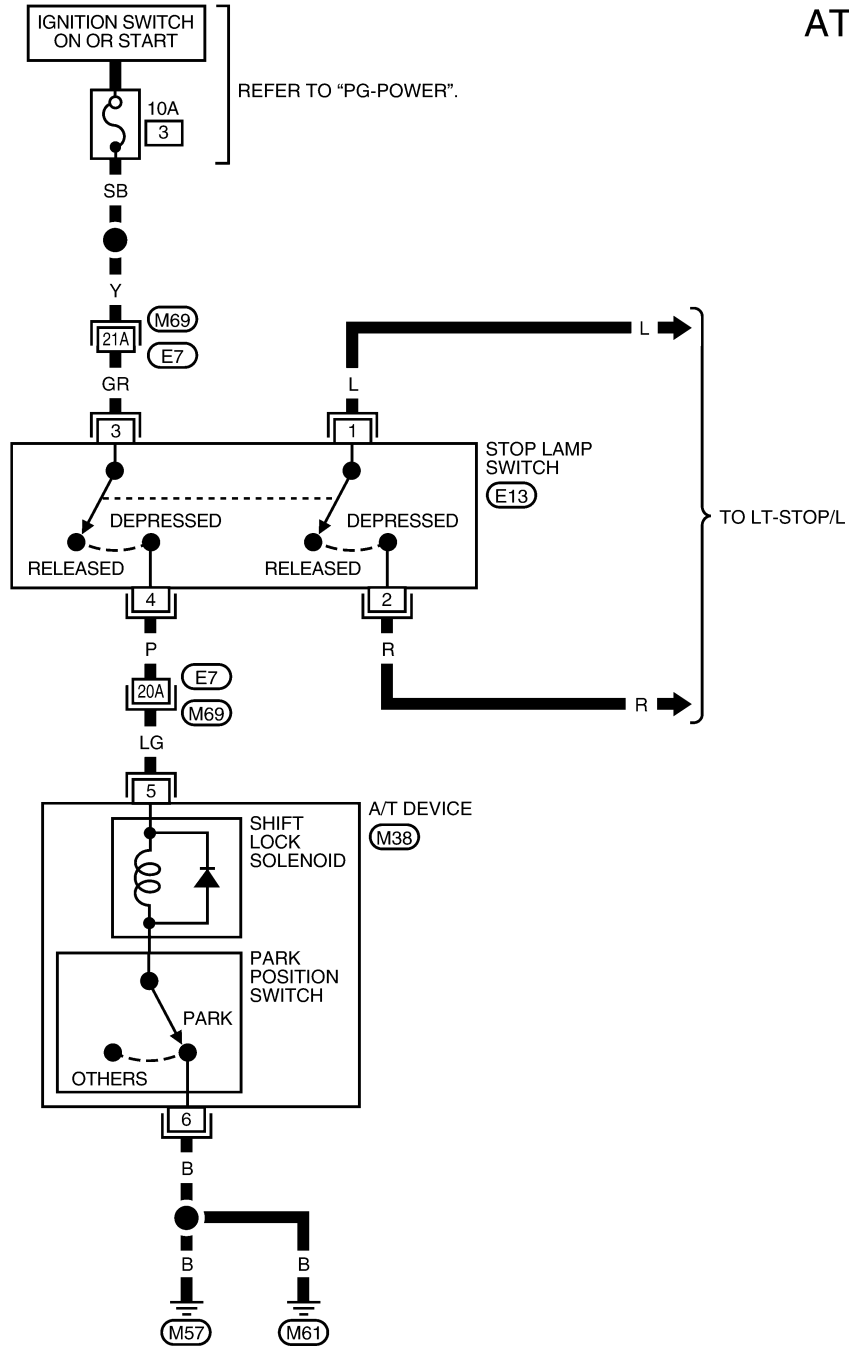
3. Stop lamp switch
6. Key interlock cable

A/T SHIFT LOCK SYSTEM

Wiring Diagram — AT — SHIFT

UCS005VO

AT-SHIFT-01



REFER TO THE FOLLOWING.
 (M69) - SUPER MULTIPLE JUNCTION (SMJ)

BCWA0666E

A/T SHIFT LOCK SYSTEM

UCS005VP

Diagnostic Procedure

SYMPTOM 1:

- Selector lever cannot be moved from “P” position with ignition switch in ON position and brake pedal depressed.
- Selector lever can be moved from “P” position with ignition key in ON position and brake pedal released.
- Selector lever can be moved from “P” position when ignition switch is removed from key cylinder.

SYMPTOM 2:

- Ignition key cannot be removed when selector lever is set to “P” position.
- Ignition key can be removed when selector lever is set to any position except “P” position.

1. CHECK KEY INTERLOCK CABLE

Check key interlock cable for damage.

OK or NG

- OK >> GO TO 2.
- NG >> Repair key interlock cable. Refer to [AT-233, "Removal and Installation"](#) .

2. CHECK A/T POSITION

Check A/T position. Refer to [AT-228, "Checking of A/T Position"](#) .

OK or NG

- OK >> GO TO 3.
- NG >> Adjust control cable. Refer to [AT-227, "Adjustment of A/T Position"](#) .

3. CHECK SHIFT LOCK SOLENOID AND PARK POSITION SWITCH

1. Turn ignition switch ON. (Do not start engine.)
2. Selector lever is set in “P” position.
3. Check operation sound.

Condition	Brake pedal	Operation sound
When ignition switch is turned to ON position and selector lever is set in “P” position.	Depressed	Yes
	Released	No

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 4.

4. CHECK POWER SOURCE

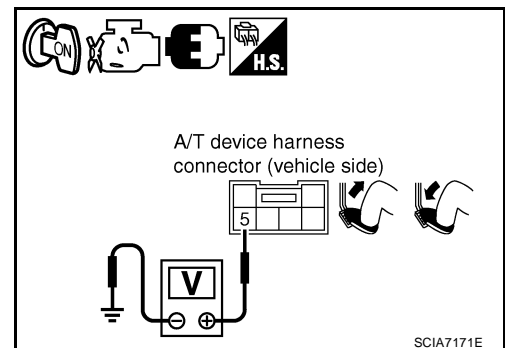
1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between A/T device harness connector terminal 5 and ground.

Voltage:

- Brake pedal depressed: Battery voltage**
- Brake pedal released: 0V**

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 5.



SCIA7171E

A/T SHIFT LOCK SYSTEM

5. CHECK STOP LAMP SWITCH

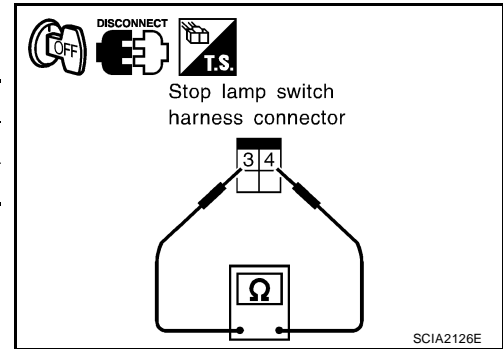
1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch harness connector terminals 3 and 4.

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

Check stop lamp switch after adjusting brake pedal. Refer to [BR-6, "BRAKE PEDAL"](#) .

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace damaged parts.



6. DETECT MALFUNCTIONING ITEM

Check the following. If any items are damaged, repair or replace damaged parts.

- Harness for short or open between ignition switch and stop lamp switch harness connector
- Harness for short or open between stop lamp switch harness connector and A/T device harness connector
- 10A fuse [No.3, located in the fuse block (J/B)]
- Ignition switch, Refer to [PG-4, "POWER SUPPLY ROUTING CIRCUIT"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> Repair or replace damaged parts.

7. CHECK GROUND CIRCUIT

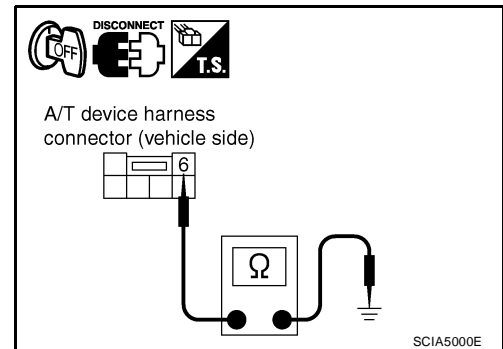
1. Turn ignition switch OFF.
2. Disconnect A/T device harness connector.
3. Check continuity between A/T device harness connector terminal 6 and ground.

Continuity should exist.

4. Connect A/T device harness connector.

OK or NG

- OK >> Replace shift lock solenoid and park position switch assembly.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.



KEY INTERLOCK CABLE

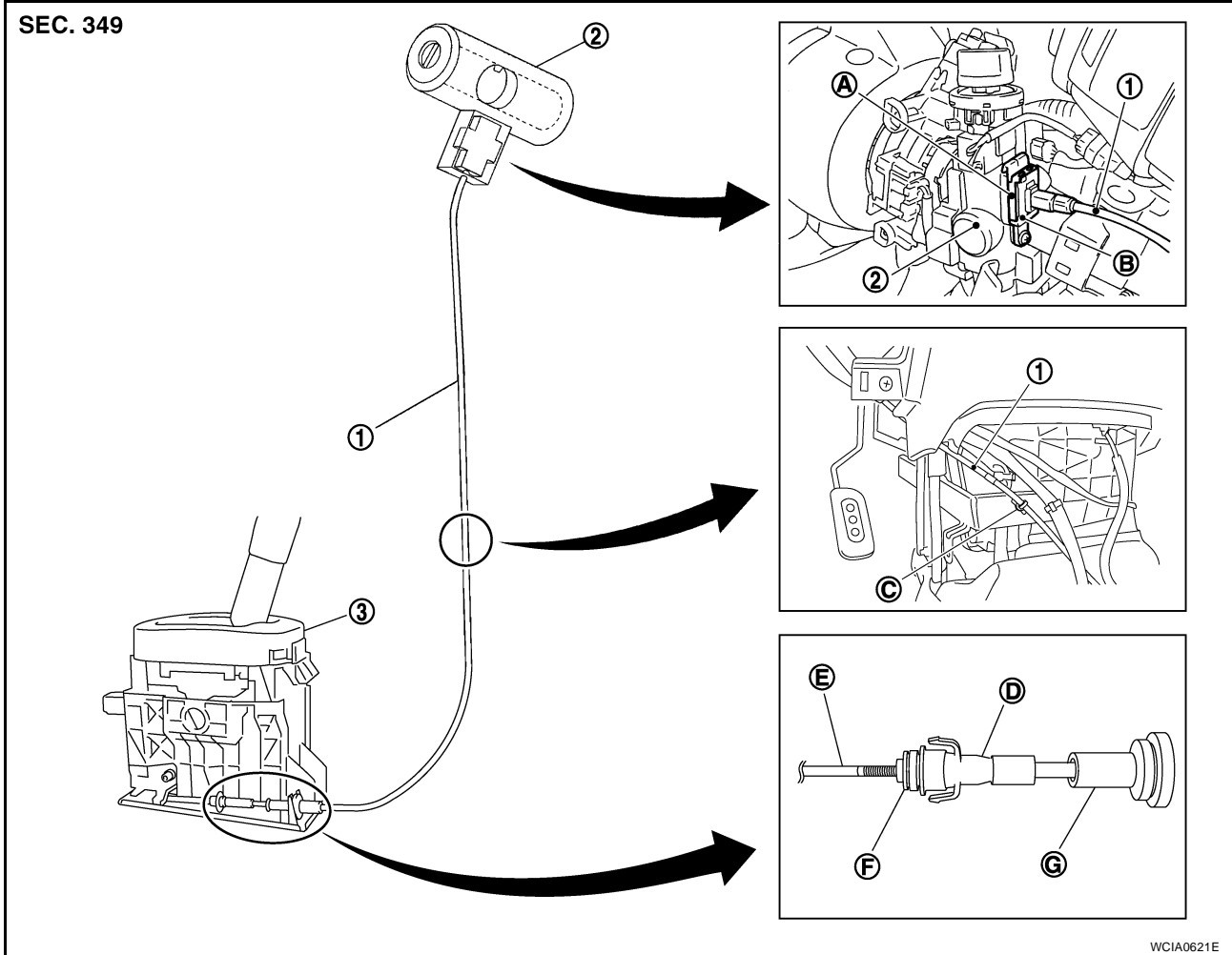
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UCS005VQ

KEY INTERLOCK CABLE

Removal and Installation COMPONENTS

SEC. 349



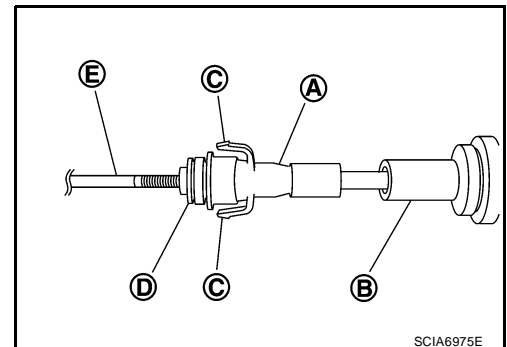
- | | | |
|------------------------|----------------------|----------------------------|
| 1. Key interlock cable | 2. Key cylinder | 3. Control device assembly |
| A. Lock plate | B. Holder | C. Clip |
| D. Slider | E. Key interlock rod | F. Adjust holder |
| G. Casing cap | | |

REMOVAL

CAUTION:

Make sure that parking brake is applied before removal and installation.

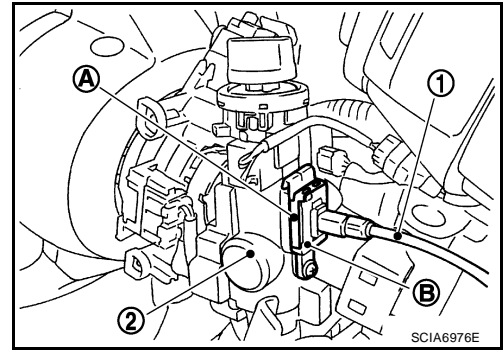
1. Place the selector lever in the "N" position.
2. Remove the selector lever knob. Refer to [AT-227, "Selector Lever Knob Removal and Installation"](#).
3. Remove the center console assembly. Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#).
4. Slide the slider (A) toward the casing cap (B) while pressing tabs (C) on the slider to separate the slider (A) from the adjust holder (D).
5. Remove the casing cap (B) from the cable bracket on the control device assembly.
6. Remove the key interlock cable from the key interlock rod (E).



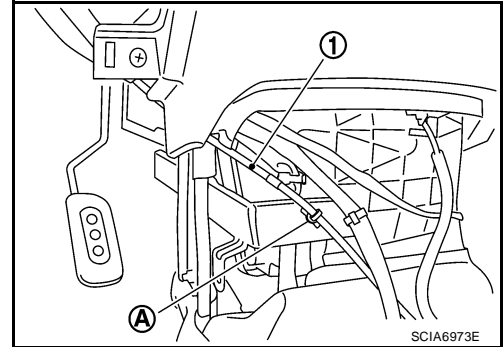
SCIA6975E

KEY INTERLOCK CABLE

- Remove steering column cover (upper and lower) and instrument lower finisher. Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#).
- Pull out the lock plate (A) from the holder (B).
- Remove the key interlock cable (1) from the key cylinder (2).



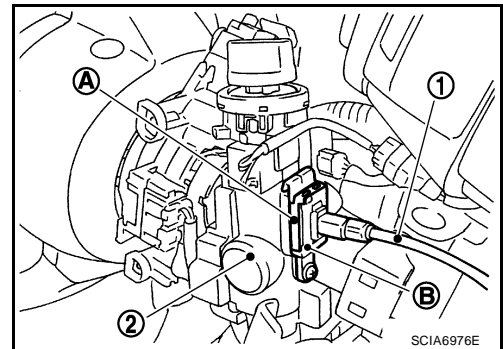
- Remove the clip (A), and then remove the key interlock cable (1).



INSTALLATION

CAUTION:

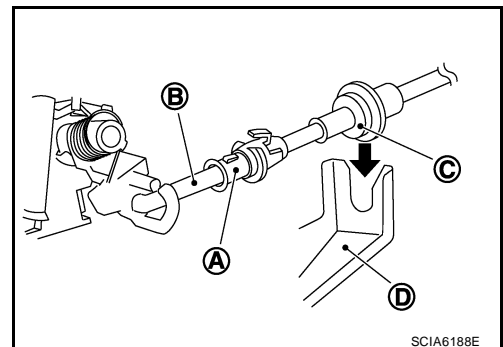
- Install key interlock cable in such a way that it will not be damaged by sharp bends, twists or interference with adjacent parts.
 - After installing key interlock cable to control device assembly, make sure that casing cap and bracket are firmly secured in their positions.
- Place the selector lever in the "P" position.
 - Turn ignition switch to "ACC" or "ON" position.
 - Set the key interlock cable (1) to the key cylinder (2).
 - Install the lock plate (A) to the holder (B).
 - Turn ignition switch to "LOCK" position.



- Temporarily install the adjust holder (A) to the key interlock rod (B).
- Install the casing cap (C) to the cable bracket (D) on the control device assembly.

CAUTION:

- Do not bend or twist key interlock cable excessively when installing.
- After installing key interlock cable to cable bracket (D) on control device assembly, make sure casing cap (C) is firmly secured in cable bracket (D) on control device assembly.
- If casing cap (C) is loose [less than 39.2 N (4.0 kg, 8.8 lb) removing force], replace key interlock cable.

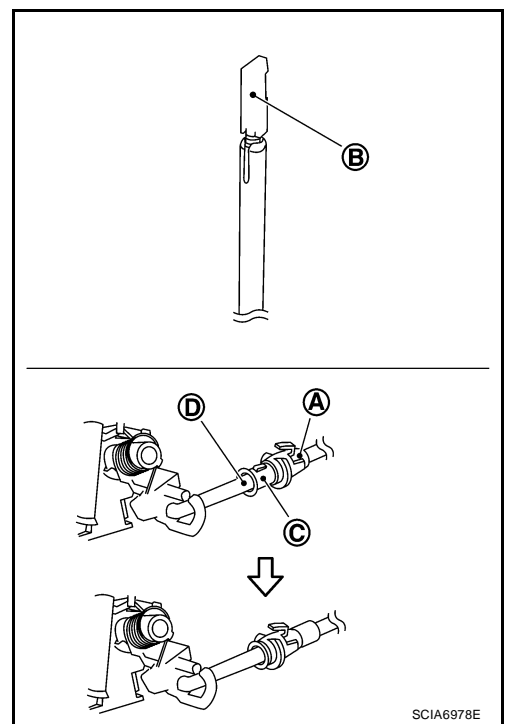


KEY INTERLOCK CABLE

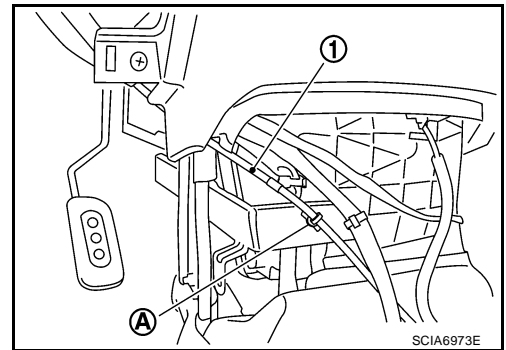
8. Slide the slider (A) toward the key interlock rod (D) while pressing the pull lock (B) down to securely connect the adjust holder (C) with the key interlock rod (D).

CAUTION:

- Do not press tabs when holding slider (A).
- Do not apply any side to side force to key interlock rod (D) when sliding slider (A).



9. Secure the key interlock cable (1) with the clip (A).
10. Install steering column cover (upper and lower) and instrument lower finisher. Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#) .
11. Install the center console assembly. Refer to [IP-10, "INSTRUMENT PANEL ASSEMBLY"](#) .
12. Install the selector lever knob. Refer to [AT-227, "Selector Lever Knob Removal and Installation"](#) .
13. Check shift lock system. Refer to [AT-229, "Description"](#) .

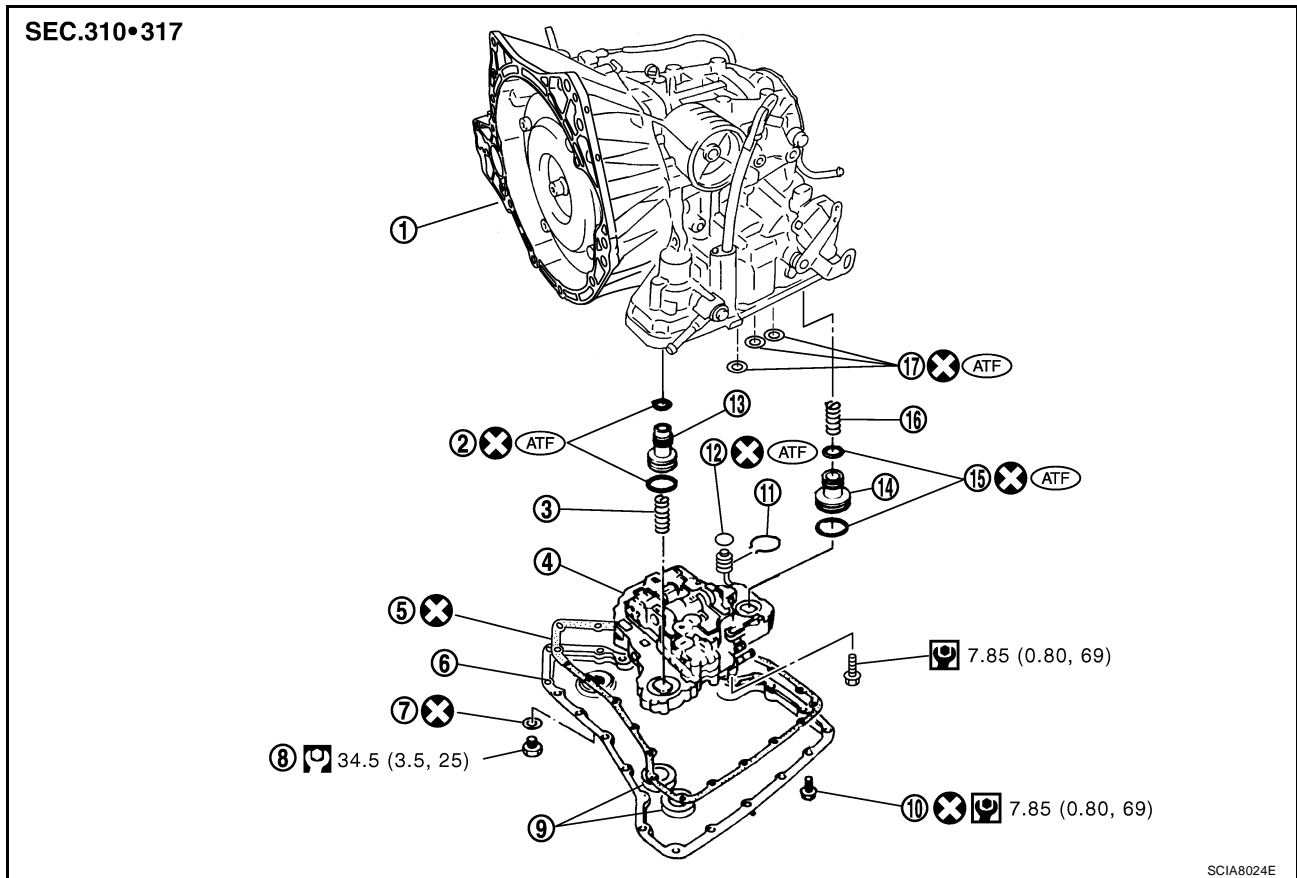


ON-VEHICLE SERVICE

PFP:00000

Control Valve Assembly and Accumulators COMPONENTS

UCS005VR

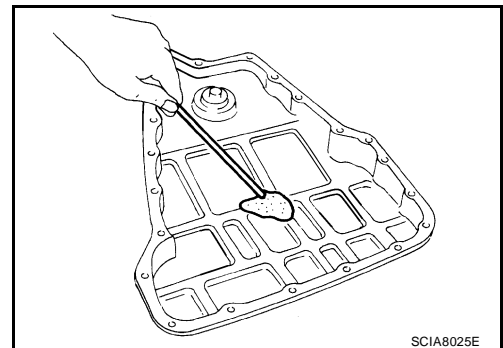


- | | | |
|--------------------------------------|----------------------------|------------------|
| 1. A/T | 2. O-ring | 3. Return spring |
| 4. Control valve assembly | 5. Oil pan gasket | 6. Oil pan |
| 7. Drain plug gasket | 8. Drain plug | 9. Magnet |
| 10. Oil pan fitting bolt | 11. Snap ring | 12. O-ring |
| 13. Servo release accumulator piston | 14. N-D accumulator piston | 15. O-ring |
| 16. Return spring | 17. Lip seal | |

REMOVAL AND INSTALLATION

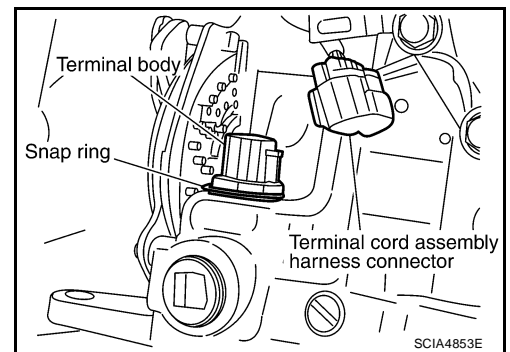
Removal

1. Disconnect the battery negative terminal.
2. Remove engine under cover and fender protector (LH). Refer to [EI-24, "Removal and Installation"](#).
3. Drain the A/T fluid. Refer to [AT-16, "A/T FLUID"](#).
4. Remove oil pan and oil pan gasket.
5. Check for foreign materials in oil pan to help determine cause of malfunction. If the ATF is very dark, smell burned or contains foreign particles, friction material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.
 - If ATF contains frictional material (clutch, bands, etc.), replace radiator and flush cooler line using cleaning solvent and compressed air after repair of A/T. Refer to [CO-11, "RADIATOR"](#).
6. Remove magnets from oil pan.




ON-VEHICLE SERVICE

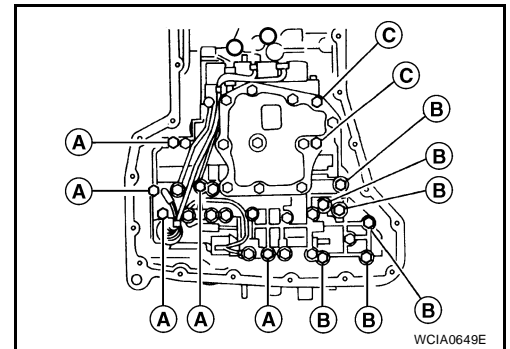
7. Disconnect terminal cord assembly harness connector.
8. Remove snap ring from terminal body.
9. Remove terminal cord assembly by pushing terminal body into transaxle case.



10. Remove control valve assembly bolts (A), (B) and (C).

Bolt length, number and location:

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



11. Remove control valve assembly from transaxle case.

CAUTION:

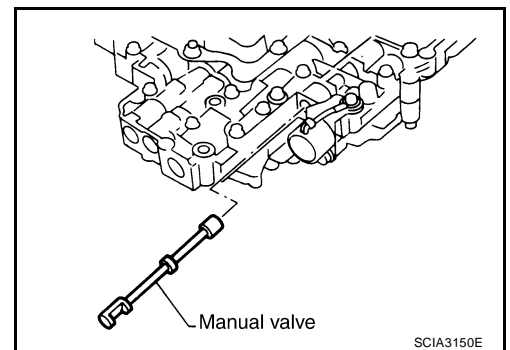
Be careful not to drop manual valve and servo release accumulator return spring.

12. Remove manual valve from control valve assembly.

CAUTION:

Be careful not to drop manual valve.

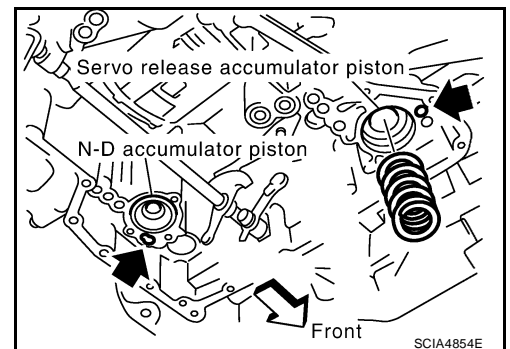
13. Remove O-ring from terminal body.
14. Disassemble and inspect control valve assembly if necessary. Refer to [AT-287, "Control Valve Assembly"](#) , [AT-296, "Control Valve Upper Body"](#) and [AT-300, "Control Valve Lower Body"](#) .



15. Remove servo release accumulator piston and N-D accumulator piston by applying compressed air if necessary.

CAUTION:

Hold each piston with lint-free cloth.

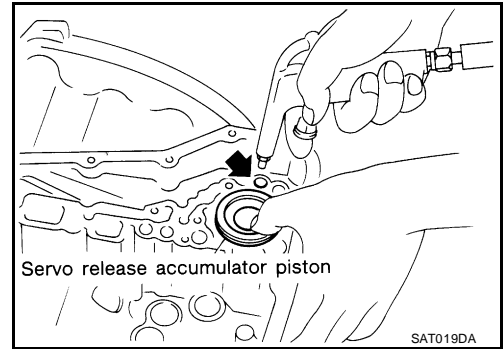


ON-VEHICLE SERVICE

- a. Apply compressed air to the oil hole as shown, and remove servo release accumulator piston from transaxle case.

CAUTION:

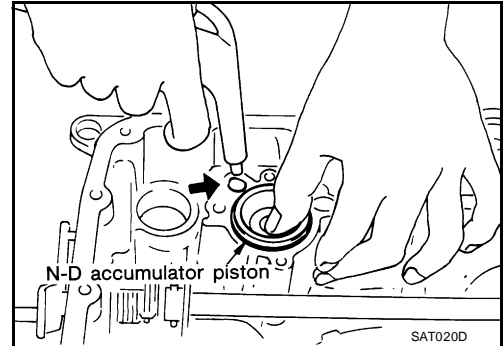
Strong flow of air will push the accumulator piston out along with a splash of ATF. To avoid this cover the area with lint-free cloth and blow air little by little.



- b. Apply compressed air to the oil hole as shown, and remove N-D accumulator piston and return spring from transaxle case.

CAUTION:

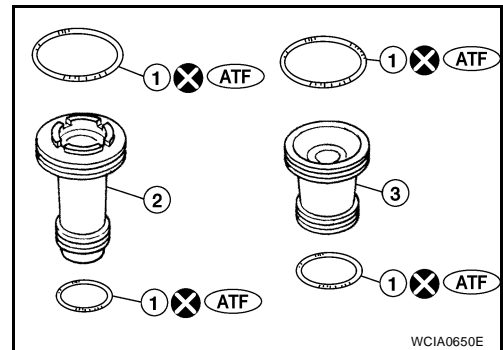
Strong flow of air will push the accumulator piston out along with a splash of ATF. To avoid this cover the area with lint-free cloth and blow air little by little.



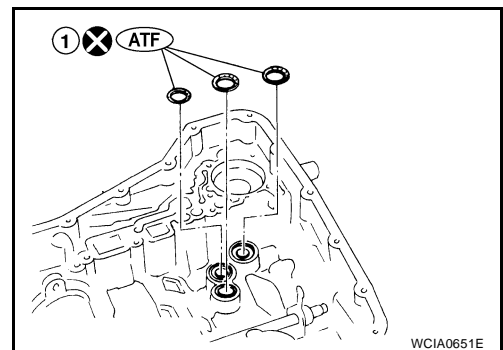
- c. Remove O-rings (1) from servo release accumulator piston (2) and N-D accumulator piston (3).

CAUTION:

Wrap the removed servo release accumulator piston (2) and N-D accumulator piston (3) in a lint-free cloth.



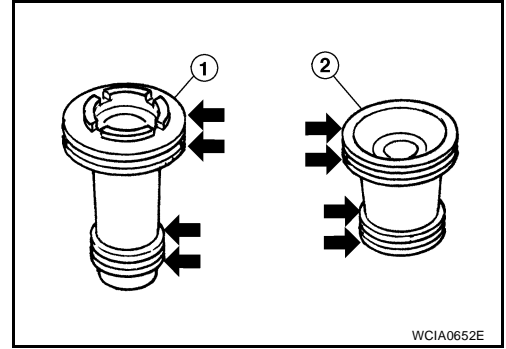
16. Remove lip seals (1) from transaxle case.



ON-VEHICLE SERVICE

Inspection

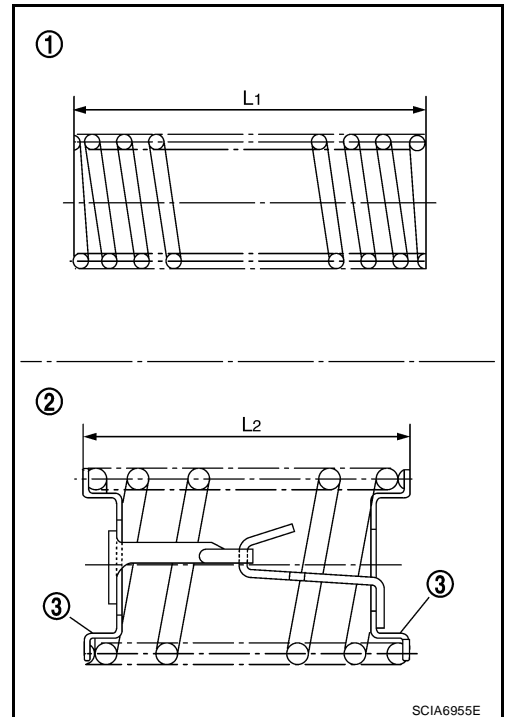
- Inspect the sliding surfaces of each accumulator piston and transaxle case, and replace if damaged or dented.
(1): Servo release accumulator piston
(2): N-D accumulator piston
- Inspect the sliding surfaces of manual valve and valve body, and replace if damaged or dented.



- Inspect each return spring, and replace if damaged, deformed or worn. Refer to [AT-374, "Accumulator"](#) for free length (L1) and length (L2).
(1): Return spring (Servo release accumulator)
(2): Return spring (N-D accumulator)

CAUTION:

Do not remove spring retainer (3).



Installation

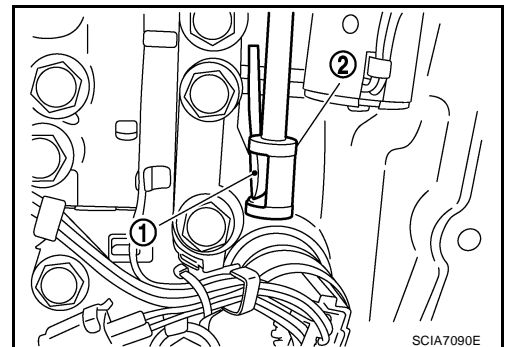
Installation is in the reverse order of removal.

CAUTION:

- Completely remove all moisture, oil and old gasket from the oil pan gasket mounting surface of transaxle case and oil pan.
- Do not reuse O-rings, lip seals, oil pan gasket and oil pan bolts.
- Apply ATF to manual valve, O-rings, lip seals and sliding surfaces of the transaxle case.

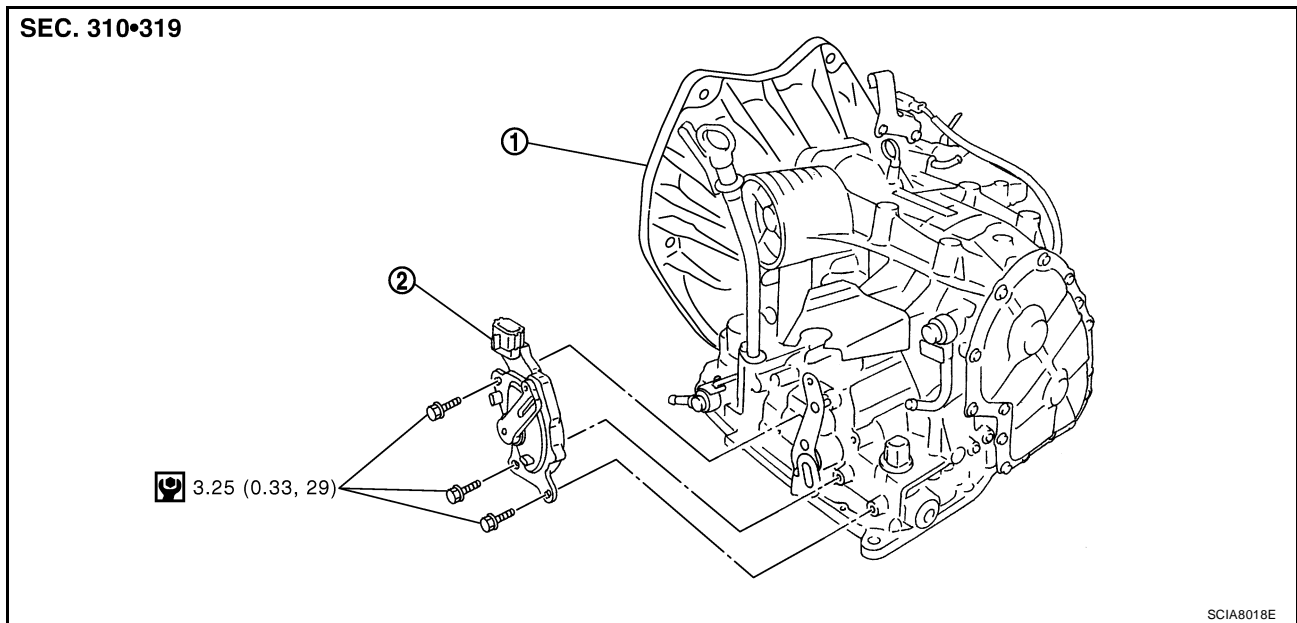
NOTE:

- Set manual shaft in "N" position, then align manual plate (1) with groove in manual valve (2).
- After installing control valve assembly to transaxle case, make sure that selector lever can be moved to all positions.
- After completing installation, check for A/T fluid leakage and A/T fluid level. Refer to [MA-22, "Checking A/T Fluid"](#) .



Park/Neutral Position (PNP) Switch COMPONENTS

UCS005VS



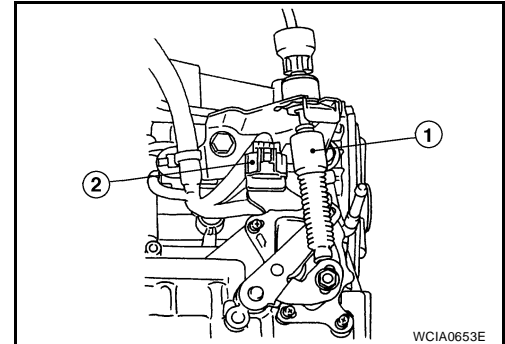
1. A/T

2. PNP switch

REMOVAL AND INSTALLATION

Removal

1. Disconnect the battery negative terminal.
2. Remove air duct (inlet). Refer to [EM-16, "AIR CLEANER AND AIR DUCT"](#) .
3. Remove control cable (1) from manual shaft. Refer to [AT-224, "CONTROL CABLE COMPONENTS"](#) .
4. Disconnect PNP switch harness connector (2).
5. Remove PNP switch bolts.
6. Set manual shaft in "P" position.
7. Remove PNP switch from A/T.



Installation

Installation is in the reverse order of removal.

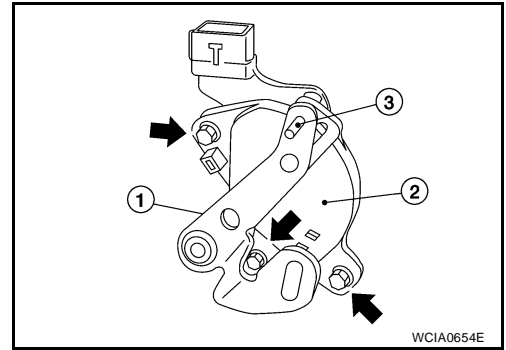
NOTE:

- Align PNP switch position when installing.
- After installation is completed, adjust and check the PNP switch and A/T position. Refer to [AT-241, "PARK/NEUTRAL POSITION \(PNP\) SWITCH ADJUSTMENT"](#) , [AT-227, "Adjustment of A/T Position"](#) and [AT-228, "Checking of A/T Position"](#) .
- After installation is completed, check continuity of PNP switch. Refer to [AT-186, "PNP SWITCH"](#) .

ON-VEHICLE SERVICE

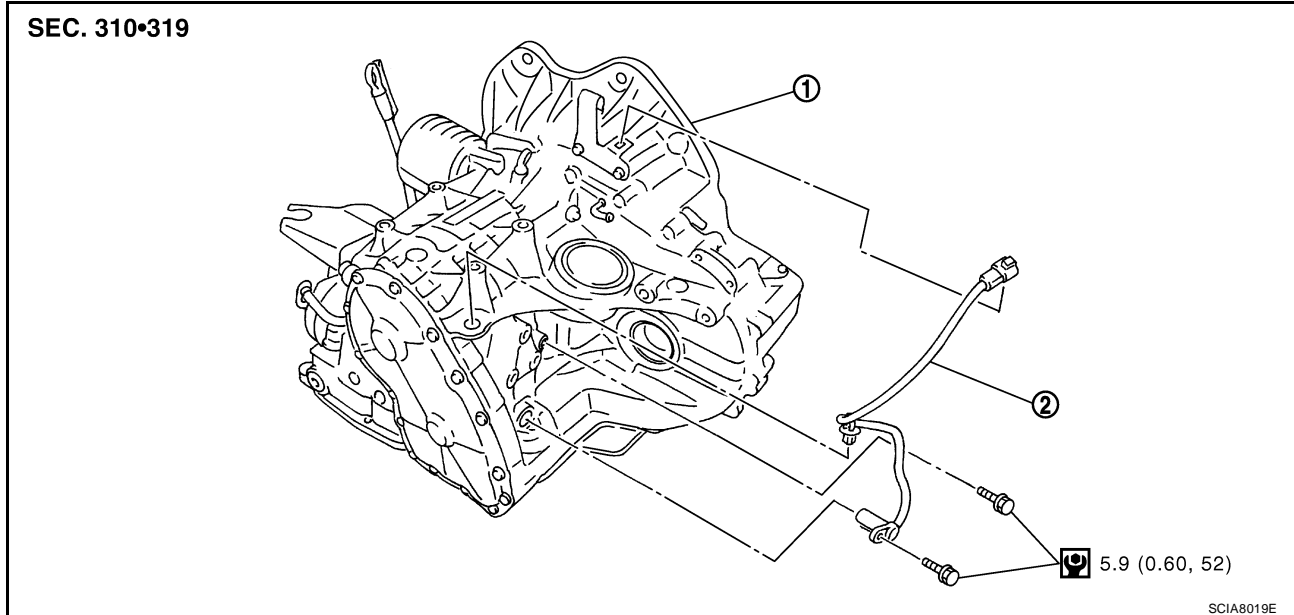
PARK/NEUTRAL POSITION (PNP) SWITCH ADJUSTMENT

1. Remove air duct (inlet). Refer to [EM-16, "AIR CLEANER AND AIR DUCT"](#) .
2. Set selector lever and manual shaft (1) in "N" position.
3. Remove control cable from manual shaft (1). Refer to [AT-224, "CONTROL CABLE COMPONENTS"](#) .
4. Loosen PNP switch bolts.
←: Bolt (3)
5. Insert the pin (3) [4 mm (0.16 in) dia.] straight into manual shaft (1) adjustment hole.
6. Rotate PNP switch (2) until the pin (3) can also be inserted straight into hole in PNP switch (2).
7. Tighten PNP switch bolts to the specified torque. Refer to [AT-240, "COMPONENTS"](#) .
8. Remove the pin (3) from adjustment hole after adjusting PNP switch (2).
9. Install the control cable. Refer to [AT-224, "CONTROL CABLE COMPONENTS"](#) .
10. Adjust and check A/T position. Refer to [AT-227, "Adjustment of A/T Position"](#) and [AT-228, "Checking of A/T Position"](#) .
11. Check continuity of PNP switch (2). Refer to [AT-186, "PNP SWITCH"](#) .
12. Install the air duct (inlet). Refer to [EM-16, "AIR CLEANER AND AIR DUCT"](#) .



Revolution Sensor COMPONENTS

UCS005VT



1. A/T

2. Revolution sensor

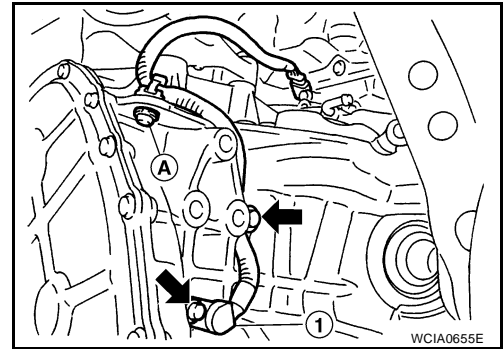
REMOVAL AND INSTALLATION

Removal

1. Disconnect the battery negative terminal.
2. Remove air duct (inlet), air duct and air cleaner case. Refer to [EM-16, "AIR CLEANER AND AIR DUCT"](#) .

ON-VEHICLE SERVICE

3. Disconnect revolution sensor harness connector.
4. Remove clip (A).
5. Remove revolution sensor (1) from A/T.
←: Bolt (2)
6. Remove O-ring from revolution sensor (1)

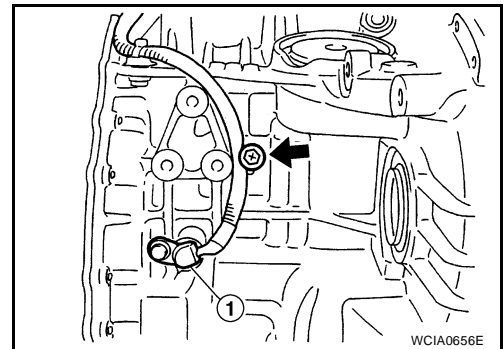


Installation

Installation is in the reverse order of removal.

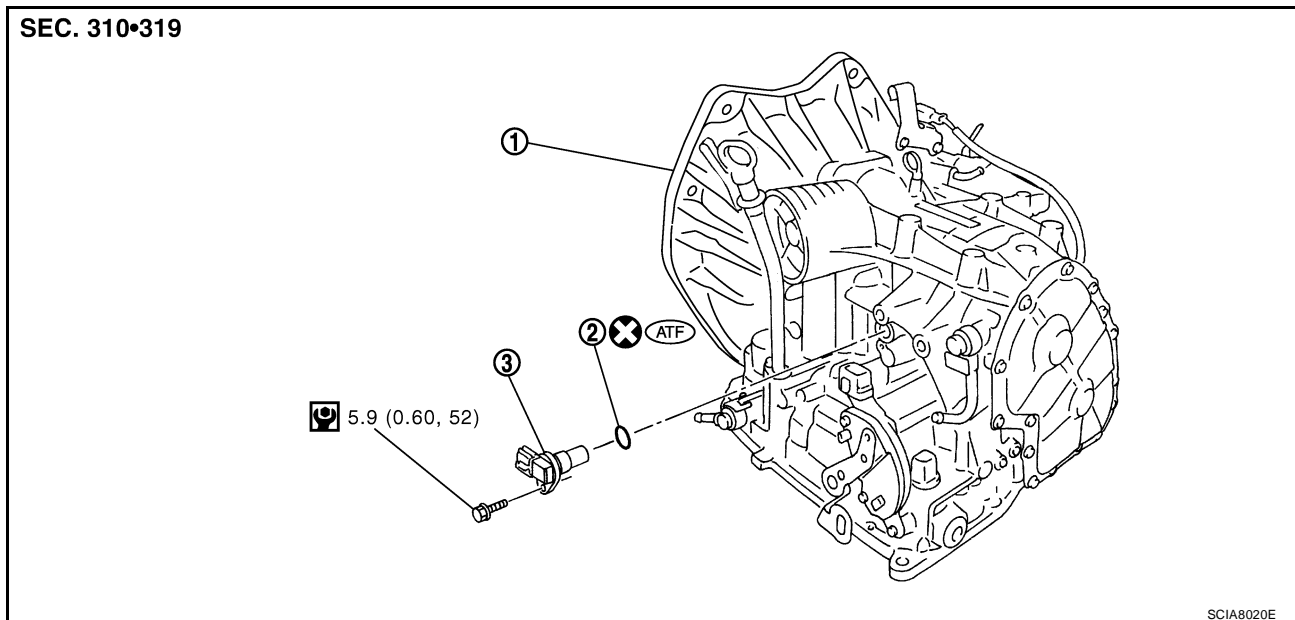
CAUTION:

- Do not reuse O-ring.
 - Apply ATF to O-ring.
 - Ensure revolution sensor harness is firmly secured with bolt.
- (1): Revolution sensor
←: Bolt (1)



Turbine Revolution Sensor (Power Train Revolution Sensor) COMPONENTS

UCS005VU



1. A/T

2. O-ring

3. Turbine revolution sensor (power train revolution sensor)

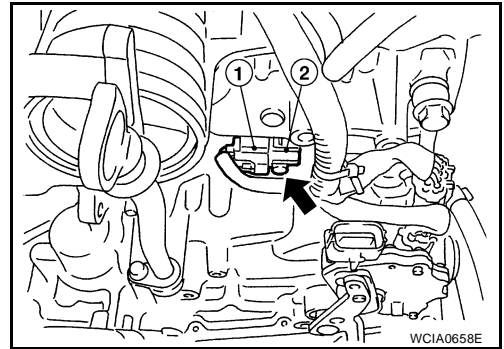
REMOVAL AND INSTALLATION

Removal

1. Disconnect the battery negative terminal.
2. Remove air duct (inlet). Refer to [EM-16, "AIR CLEANER AND AIR DUCT"](#) .

ON-VEHICLE SERVICE

3. Disconnect turbine revolution sensor (power train revolution sensor) harness connector (1).
4. Remove turbine revolution sensor (power train revolution sensor) bolt.
←: Bolt (1)
5. Remove turbine revolution sensor (power train revolution sensor) (2) from A/T.
6. Remove O-ring from turbine revolution sensor (power train revolution sensor) (2).



Installation

Installation is in the reverse order of removal.

CAUTION:

- Do not reuse O-ring.
- Apply ATF to O-ring.

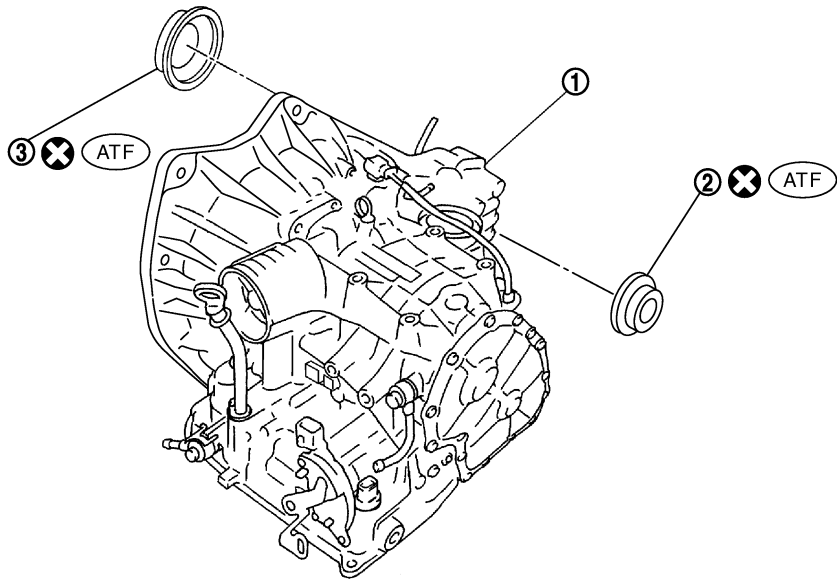
A
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M

ON-VEHICLE SERVICE

Differential Side Oil Seal COMPONENTS

UCS005VV

SEC. 310•311



SCIA8021E

1. A/T

2. LH differential side oil seal

3. RH differential side oil seal

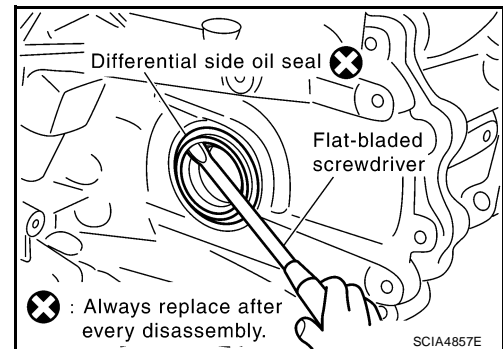
REMOVAL AND INSTALLATION

Removal

1. Remove front drive shaft. Refer to [FAX-8, "FRONT DRIVE SHAFT"](#).
2. Remove differential side oil seals using a flat-bladed screwdriver.

CAUTION:

Be careful not to scratch transaxle case and converter housing.



SCIA4857E

ON-VEHICLE SERVICE

Installation

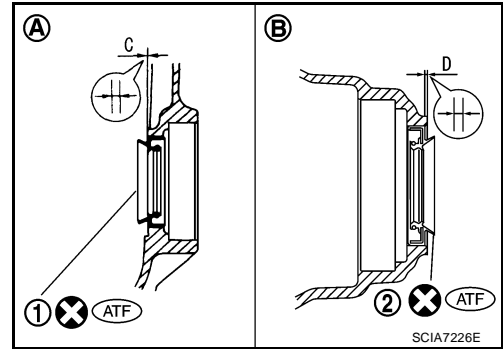
Installation is in the reverse order of removal.

NOTE:

- Drive each differential side oil seal evenly using a drift (SST and commercial service tool) so that differential side oil seal protrudes by the dimension "C" or "D" respectively.
 - (1): LH differential side oil seal
 - (2): RH differential side oil seal
 - (A): Transaxle case side
 - (B): Converter housing side

Unit: mm (in)

Dimension "C"	0 ± 0.5 (0 ± 0.020)
Dimension "D"	6 ± 0.5 (0.043 ± 0.020)



- Differential side oil seal pulling direction is used as the reference.

Drift to be used:

Location	Tool number
Transaxle case side (A)	ST35325000 (-) KV31103000 (J-38982)
Converter housing side (B)	Commercial service tool [Inner diameter: 47 mm (1.85 in), outer diameter: 54 mm (2.13 in)]

- After installing differential side oil seal, check A/T fluid leakage and A/T fluid level. Refer to [MA-22, "Checking A/T Fluid"](#).

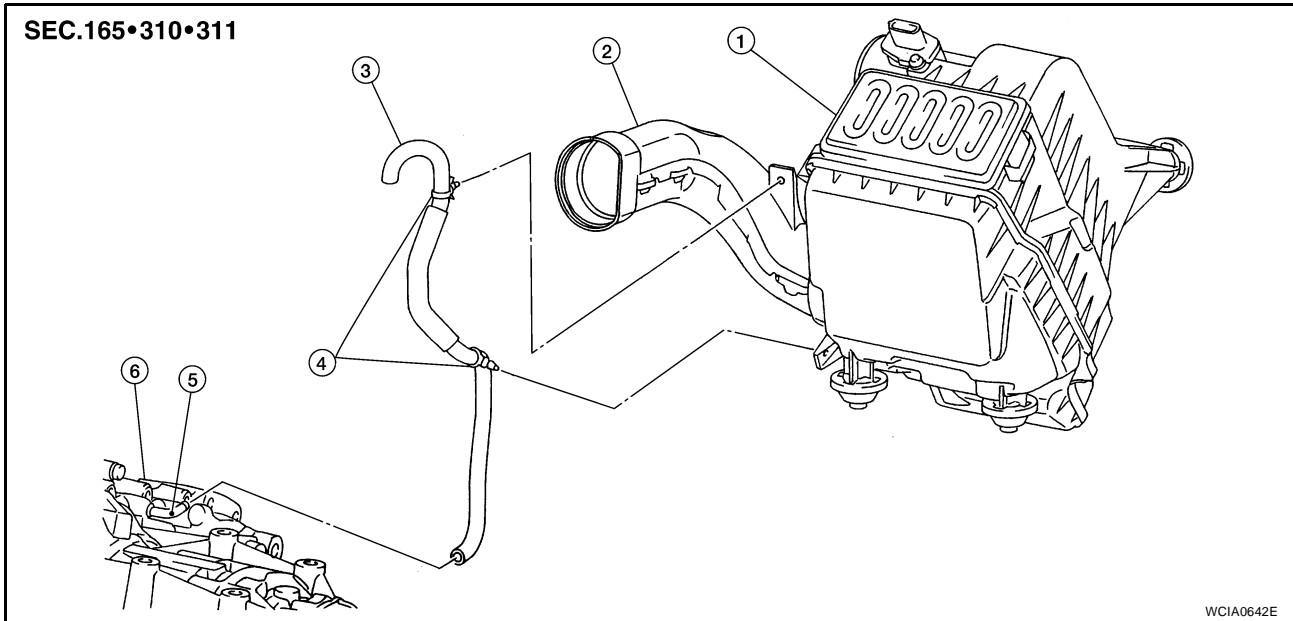
AIR BREATHER HOSE

PFP:31098

AIR BREATHER HOSE

Removal and Installation COMPONENTS

UCS005VW



- | | | |
|---------------------|----------------------|----------------------|
| 1. Air cleaner case | 2. Air duct | 3. Air breather hose |
| 4. Clip | 5. Air breather tube | 6. A/T |

REMOVAL

1. Remove air duct (inlet), air duct and air cleaner case. Refer to [EM-16, "AIR CLEANER AND AIR DUCT"](#).
2. Remove air breather hose.

INSTALLATION

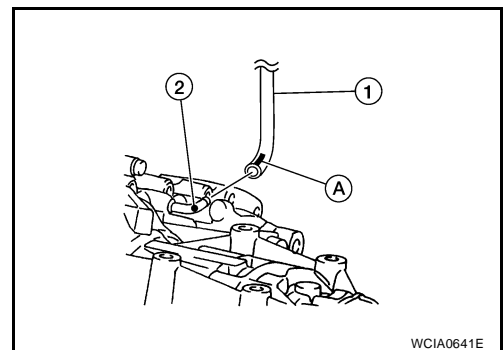
Installation is in the reverse order of removal.

CAUTION:

Make sure air breather hose is not collapsed or blocked due to folding or bending when installed.

NOTE:

- Install the air breather hose (1) to the air breather tube (2) so that the paint mark (A) faces upward. Also make sure the air breather hose end laps with air breather tube 17 mm (0.67 in) or more.
- When installing air breather hose (1) to air duct and air cleaner case, make sure to fully insert the hose clips.



TRANSAXLE ASSEMBLY

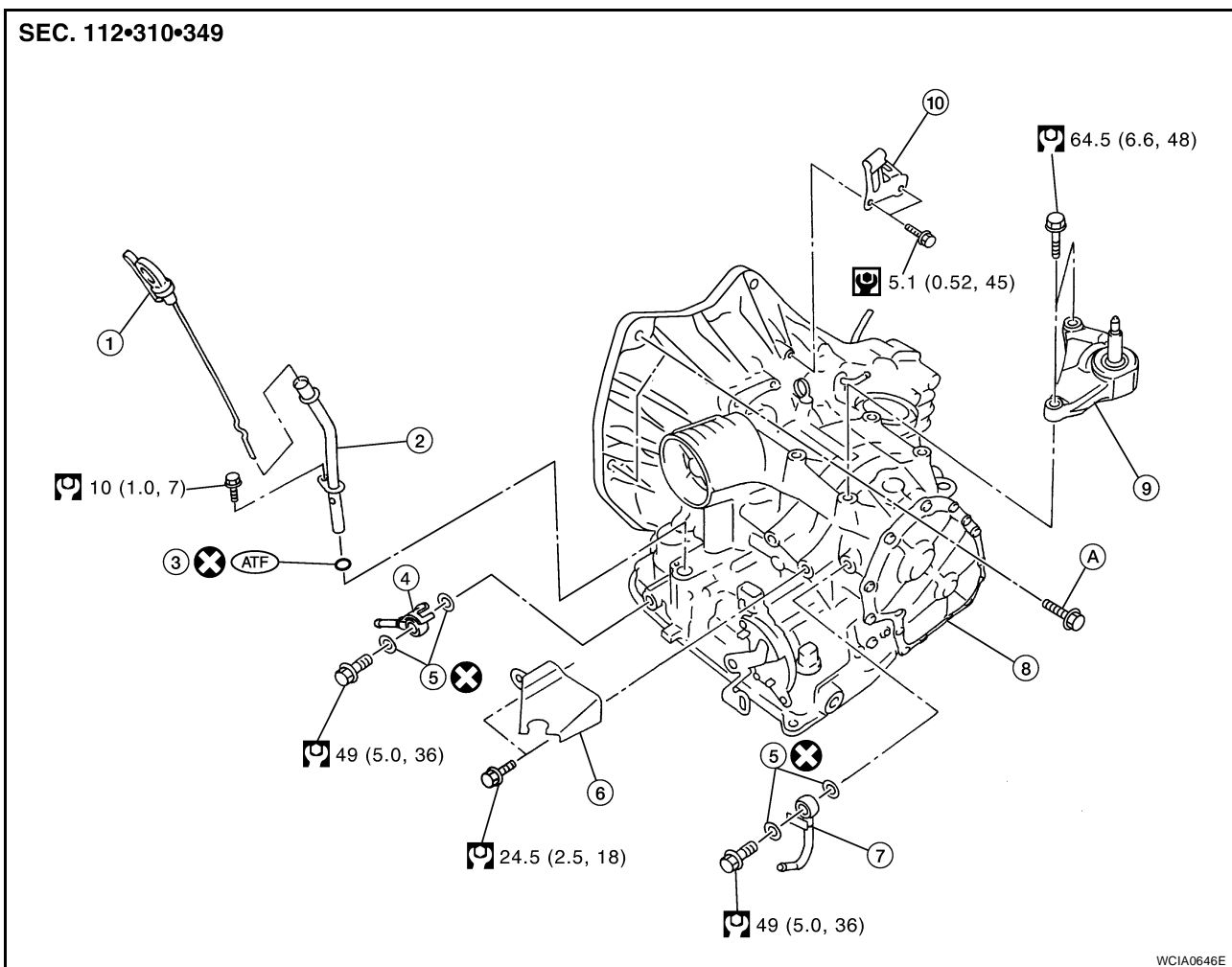
TRANSAXLE ASSEMBLY

PFP:32020

Removal and Installation COMPONENTS

UCS005VX

SEC. 112•310•349



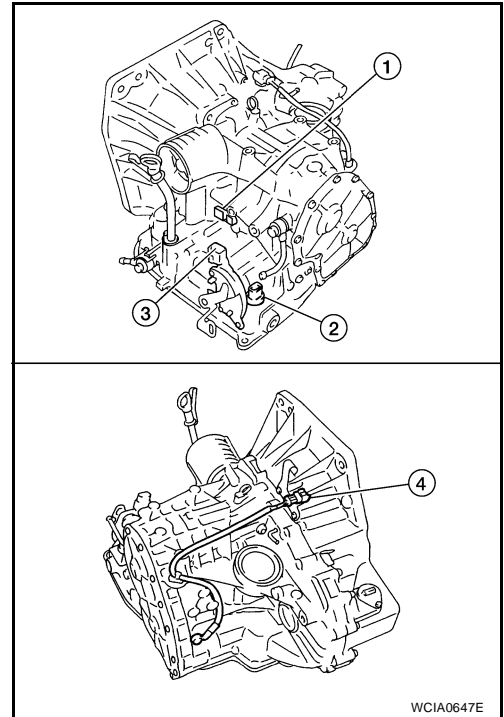
- | | | |
|--------------------------|--|---------------------------------|
| 1. A/T fluid level gauge | 2. A/T fluid charging pipe | 3. O-ring |
| 4. Fluid cooler tube | 5. Copper washer | 6. Bracket |
| 7. Fluid cooler tube | 8. A/T assembly | 9. Engine mounting bracket (LH) |
| 10. Bracket | A. Refer to AT-248, "INSTALLATION" . | |

REMOVAL

1. Remove the engine and transaxle as an assembly. Refer to [EM-73, "Removal and Installation"](#).

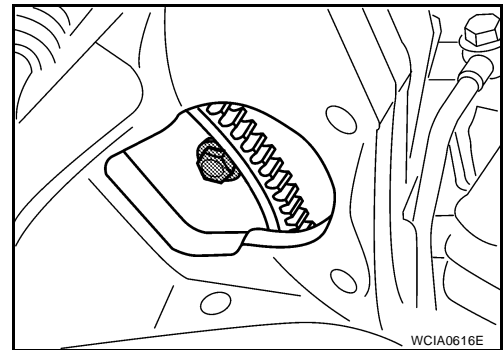
TRANSAXLE ASSEMBLY

2. Disconnect the following connectors and remove the wire harness.
 - Turbine revolution sensor (power train revolution sensor) harness connector (1)
 - Terminal cord assembly harness connector (2)
 - PNP switch connector (3)
 - Revolution sensor harness connector (4)



3. Remove the four drive plate to torque converter bolts.

NOTE:
Rotate the crankshaft clockwise as viewed from front of engine for access to drive plate to torque converter bolts.



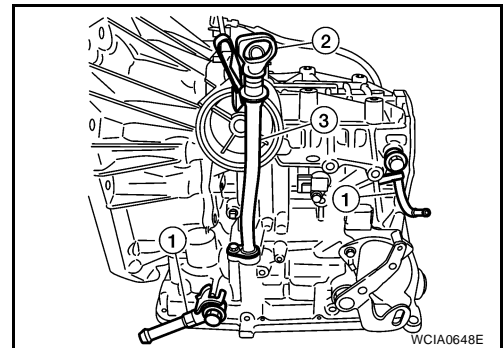
4. Put matching marks on the drive plate and torque converter.

CAUTION:
For matching marks, use paint. Never damage the drive plate or torque converter.

5. Remove the transaxle to engine and engine to transaxle bolts.
6. Separate the transaxle from the engine.

7. If necessary, remove the following from the transaxle:

- Revolution sensor
- Turbine revolution sensor (powertrain revolution sensor)
- Fluid cooler tubes (1) and copper washers
- A/T fluid level gauge (2) and charging pipe (3)
- PNP switch
- Air breather hose
- Engine mounting bracket (LH)
- Any necessary brackets



INSTALLATION

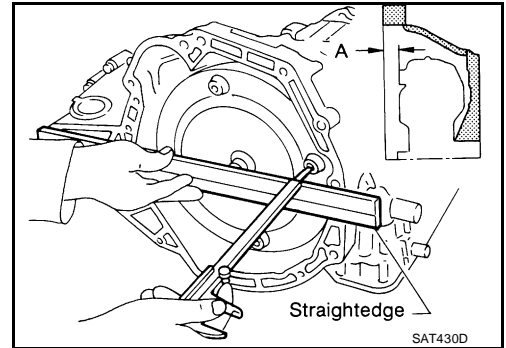
Installation is in the reverse order of removal.

TRANSAXLE ASSEMBLY

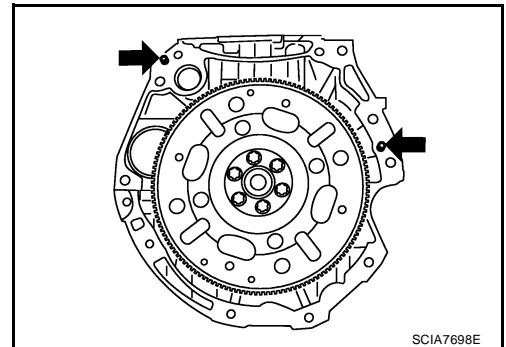
CAUTION:

- When replacing an engine or transmission you must make sure any dowels are installed correctly during re-assembly.
- Improper alignment caused by missing dowels may cause vibration, oil leaks or breakage of drive train components.
- Do not reuse O-rings and copper washers. Refer to [AT-247, "COMPONENTS"](#).
- When turning crankshaft, turn it clockwise as viewed from the front of the engine.
- When tightening the bolts for the torque converter while securing the crankshaft pulley bolt, be sure to confirm the tightening torque of the crankshaft pulley bolt. Refer to [EM-37, "TIMING CHAIN"](#).
- After converter is installed to drive plate, rotate crankshaft several turns to check that transaxle rotates freely without binding.
- When installing the torque converter to the transaxle measure distance A.

Dimension A: 14.4 mm (0.567 in) or more



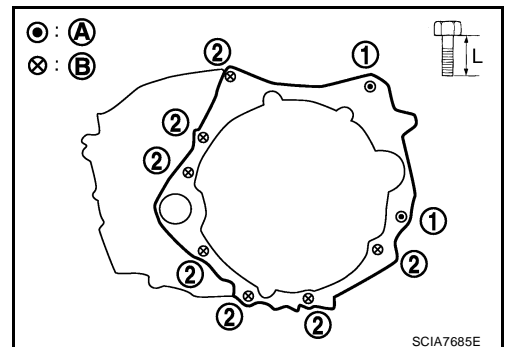
- Check the fitting of the dowel pins when installing the transaxle assembly and the engine assembly.
 ←: Dowel pin (2)



- When installing the transaxle to the engine, align the matching mark on the drive plate with the matching mark on the torque converter.
- When securing the transaxle to the engine, attach the bolts in accordance with the following standard.

Bolt No.	1	2
Number of bolts	2	7
Bolt length "L" [mm (in)]	55 (2.17)	50 (1.97)
Tightening torque [N·m (kg·m, ft·lb)]	62 (6.3, 46)	

(A): A/T to engine
(B): Engine to A/T

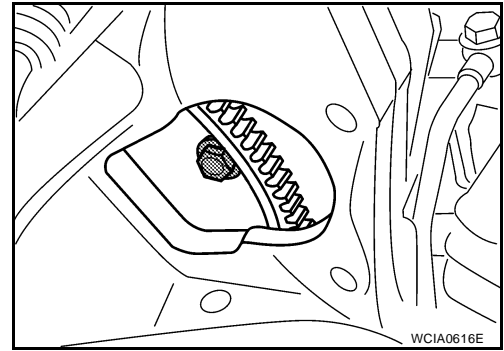


TRANSAXLE ASSEMBLY

- Align the positions for the bolts on drive plate with those of the torque converter, and temporarily tighten bolts. Then, tighten bolts to the specified torque.

Converter nuts : 51 N·m (5.2 kg-m, 38 ft-lb)

- After completing installation, check for A/T fluid leakage, A/T fluid level and A/T positions. Refer to [MA-22, "Checking A/T Fluid"](#) and [AT-228, "Checking of A/T Position"](#).



OVERHAUL

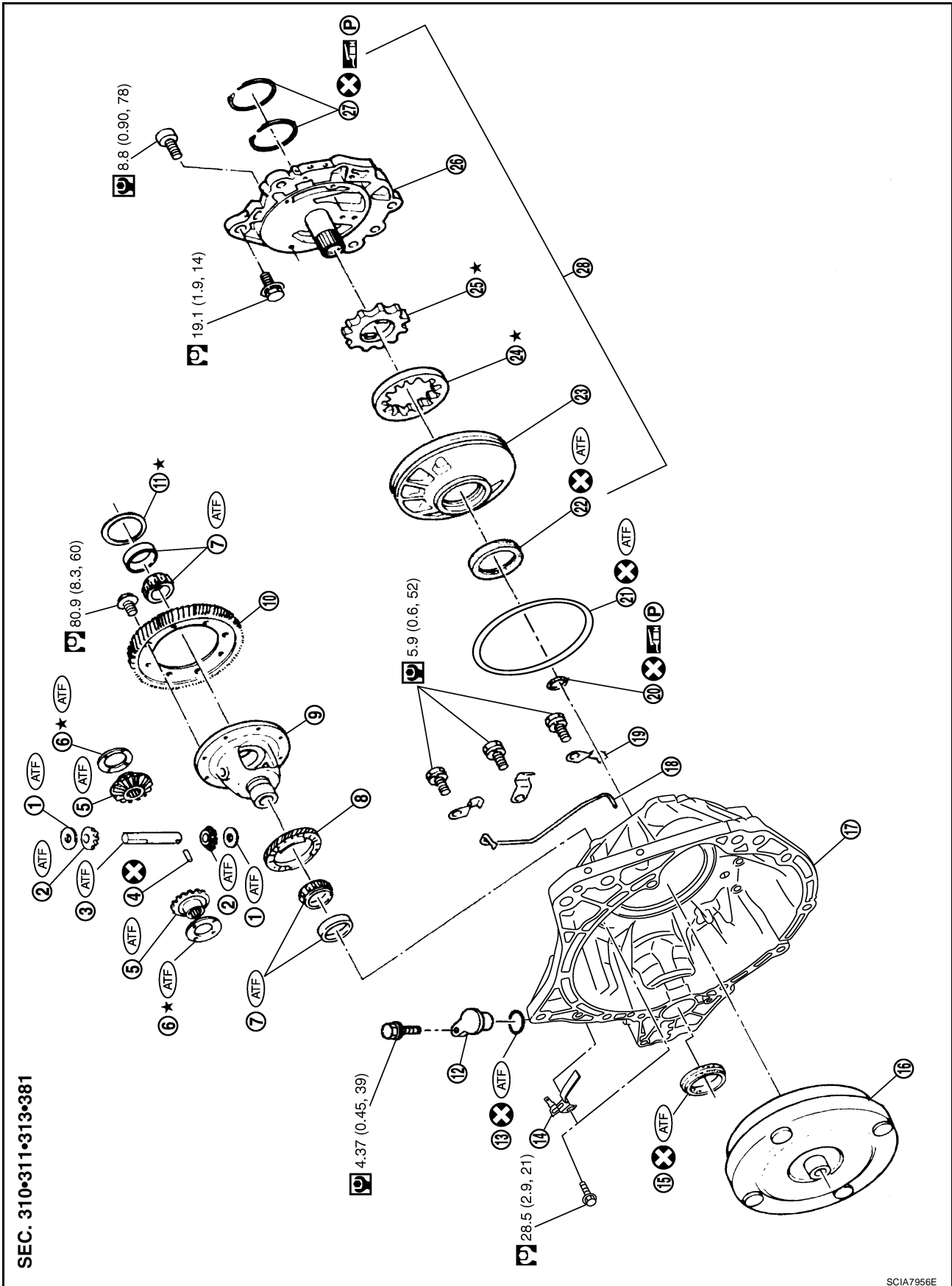
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UCS005VY

OVERHAUL Components

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With ABS



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SCIA7956E

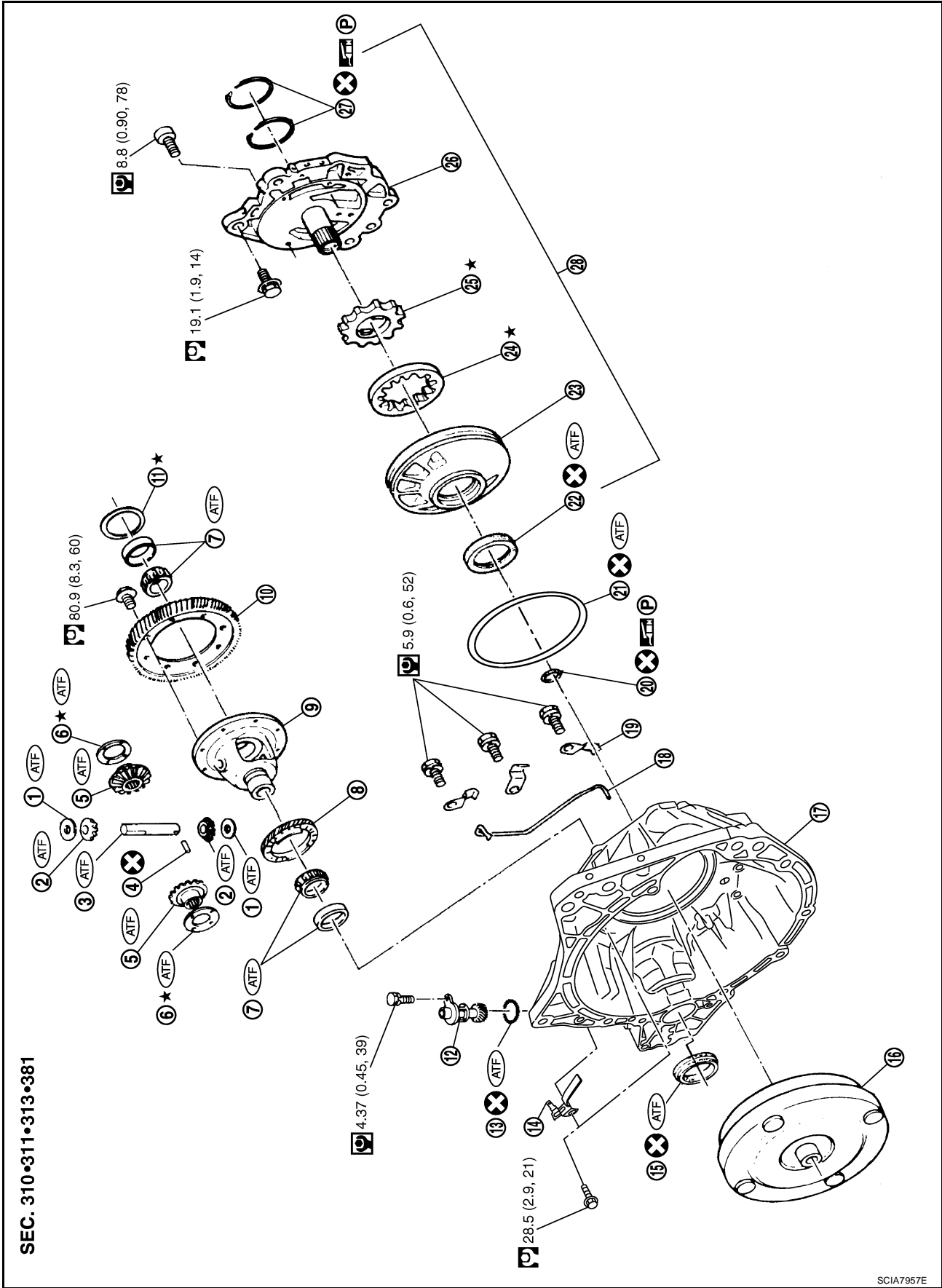
OVERHAUL

- | | | |
|-----------------------------------|--|-----------------------------------|
| 1. Pinion mate gear thrust washer | 2. Pinion mate gear | 3. Pinion mate shaft |
| 4. Lock pin | 5. Side gear | 6. Side gear thrust washer |
| 7. Differential side bearing | 8. Speedometer drive gear | 9. Differential case |
| 10. Final gear | 11. Differential side bearing adjusting shim | 12. Plug |
| 13. O-ring | 14. Bracket | 15. RH differential side oil seal |
| 16. Torque converter | 17. Converter housing | 18. Differential lubricant tube |
| 19. Clip | 20. O-ring | 21. O-ring |
| 22. Oil pump housing oil seal | 23. Oil pump housing | 24. Outer gear |
| 25. Inner gear | 26. Oil pump cover | 27. Seal ring |
| 28. Oil pump assembly | | |

Refer to GI section to make sure icons (symbol marks) in the figure. Refer to [GI-10, "Components"](#) .

OVERHAUL

Without ABS



SEC. 310•311•313•381

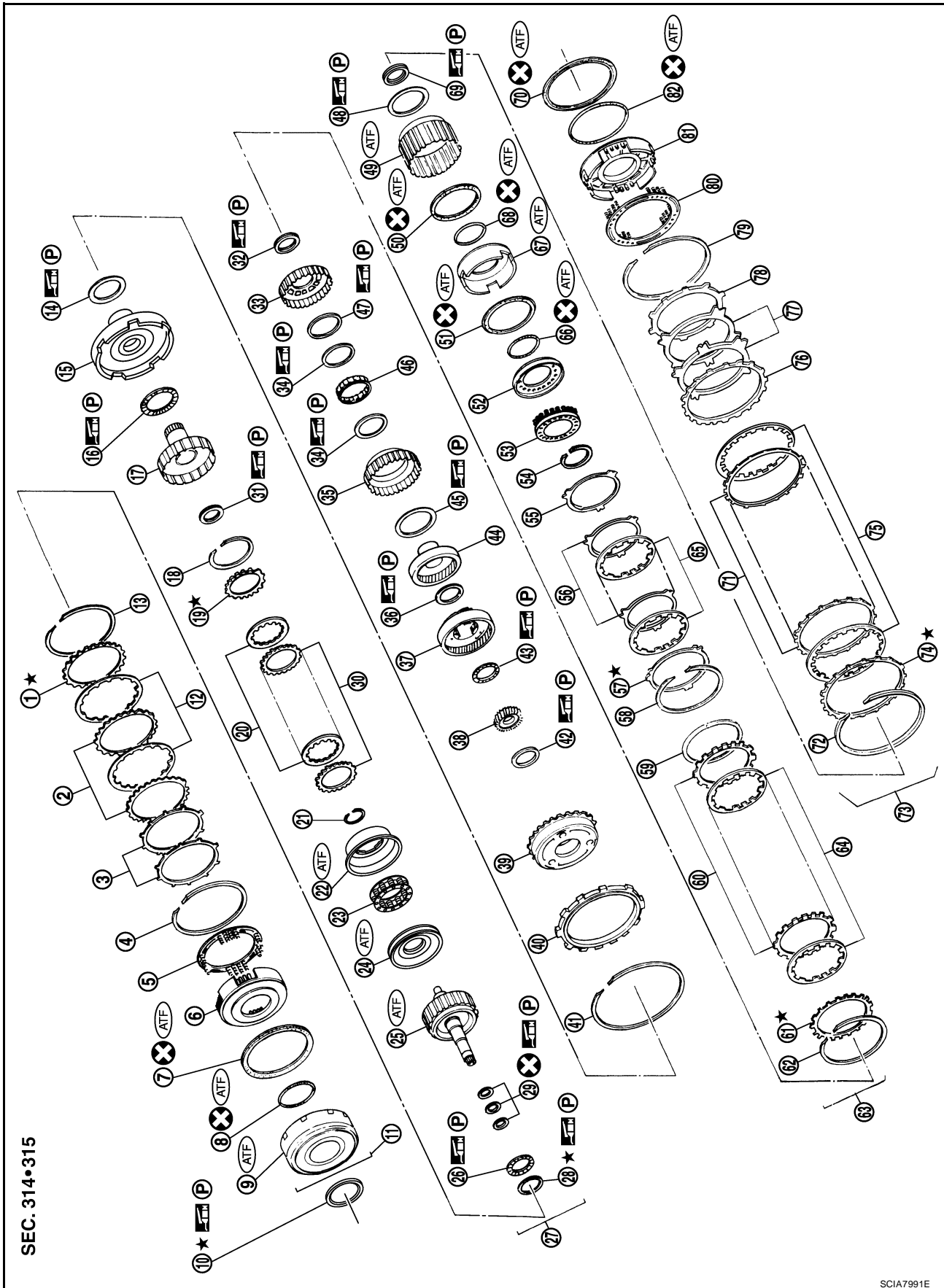
- | | | |
|-----------------------------------|---------------------|----------------------------|
| 1. Pinion mate gear thrust washer | 2. Pinion mate gear | 3. Pinion mate shaft |
| 4. Lock pin | 5. Side gear | 6. Side gear thrust washer |

OVERHAUL

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|-------------------------------|--|-----------------------------------|
| 7. Differential side bearing | 8. Speedometer drive gear | 9. Differential case |
| 10. Final gear | 11. Differential side bearing adjusting shim | 12. Speedometer pinion |
| 13. O-ring | 14. Bracket | 15. RH differential side oil seal |
| 16. Torque converter | 17. Converter housing | 18. Differential lubricant tube |
| 19. Clip | 20. O-ring | 21. O-ring |
| 22. Oil pump housing oil seal | 23. Oil pump housing | 24. Outer gear |
| 25. Inner gear | 26. Oil pump cover | 27. Seal ring |
| 28. Oil pump assembly | | |

Refer to GI section to make sure icons (symbol marks) in the figure. Refer to [GI-10. "Components"](#) .

OVERHAUL



SEC. 314*315

SCIA7991E

- | | | |
|--------------------|-----------------------------|--------------------------|
| 1. Retaining plate | 2. Driven plate | 3. Dish plate |
| 4. Snap ring | 5. Spring retainer assembly | 6. Reverse clutch piston |
| 7. Seal lip | 8. D-ring | 9. Reverse clutch drum |

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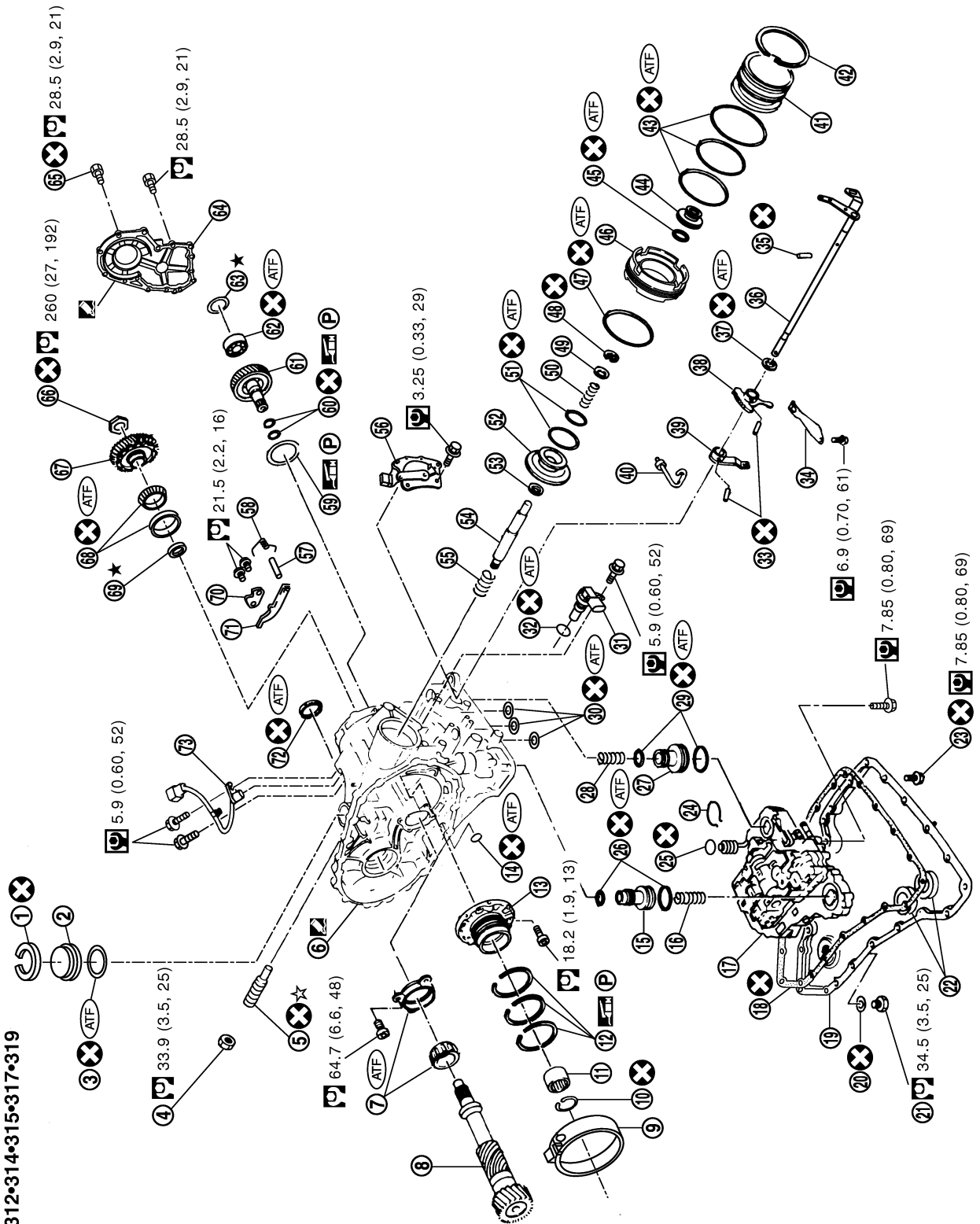
OVERHAUL

- | | | |
|---|------------------------------|---|
| 10. Thrust washer | 11. Reverse clutch assembly | 12. Drive plate |
| 13. Snap ring | 14. Needle bearing | 15. Front sun gear |
| 16. Needle bearing | 17. High clutch hub | 18. Snap ring |
| 19. Retaining plate | 20. Drive plate | 21. Snap ring |
| 22. Cancel cover | 23. Spring retainer assembly | 24. High clutch piston |
| 25. Input shaft assembly (high clutch drum) | 26. Needle bearing | 27. High clutch assembly |
| 28. Bearing race | 29. Seal ring | 30. Driven plate |
| 31. Needle bearing | 32. Needle bearing | 33. Overrun clutch hub |
| 34. End bearing | 35. Forward clutch hub | 36. Needle bearing |
| 37. Rear planetary carrier | 38. Rear sun gear | 39. Front planetary carrier |
| 40. Low one-way clutch | 41. Snap ring | 42. Needle bearing |
| 43. Needle bearing | 44. Rear internal gear | 45. Thrust washer |
| 46. Forward one-way clutch | 47. Thrust washer | 48. Thrust washer |
| 49. Forward clutch drum | 50. Seal lip | 51. Seal lip |
| 52. Overrun clutch piston | 53. Spring retainer assembly | 54. Snap ring |
| 55. Dish plate | 56. Driven plate | 57. Retaining plate |
| 58. Snap ring | 59. Dish plate | 60. Driven plate |
| 61. Retaining plate | 62. Snap ring | 63. Forward clutch assembly and overrun clutch assembly |
| 64. Drive plate | 65. Drive plate | 66. D-ring |
| 67. Forward clutch piston | 68. D-ring | 69. Needle bearing |
| 70. Seal lip | 71. Driven plate | 72. Snap ring |
| 73. Low & reverse brake assembly | 74. Retaining plate | 75. Drive plate |
| 76. Retaining plate | 77. Dish plate | 78. Driven plate |
| 79. Snap ring | 80. Spring retainer assembly | 81. Low & reverse brake piston |
| 82. D-ring | | |

Refer to GI section to make sure icons (symbol marks) in the figure. Refer to [GI-10, "Components"](#) .

OVERHAUL

SEC. 310•311•312•314•315•317•319



SCIA7959E


- | | | |
|----------------------------------|--------------------------|-------------------|
| 1. Snap ring | 2. Governor cap | 3. O-ring |
| 4. Lock nut | 5. Anchor end pin | 6. Transaxle case |
| 7. Reduction pinion gear bearing | 8. Reduction pinion gear | 9. Brake band |

OVERHAUL

-
- | | | |
|---|------------------------------|--|
| 10. Snap ring | 11. Radial needle bearing | 12. Seal ring |
| 13. Bearing retainer | 14. O-ring | 15. Servo release accumulator piston |
| 16. Return spring | 17. Control valve assembly | 18. Oil pan gasket |
| 19. Oil pan | 20. Drain plug gasket | 21. Drain plug |
| 22. Magnet | 23. Oil pan fitting bolt | 24. Snap ring |
| 25. O-ring | 26. O-ring | 27. N-D accumulator piston |
| 28. Return spring | 29. O-ring | 30. Lip seal |
| 31. Turbine revolution sensor (power train revolution sensor) | 32. O-ring | 33. Retaining pin |
| 34. Detent spring | 35. Retaining pin | 36. Manual shaft |
| 37. Manual shaft oil seal | 38. Manual plate | 39. Parking rod plate |
| 40. Parking rod | 41. OD servo piston retainer | 42. Snap ring |
| 43. O-ring | 44. OD servo piston | 45. D-ring |
| 46. Servo piston retainer | 47. O-ring | 48. E-ring |
| 49. Spring retainer | 50. OD servo return spring | 51. D-ring |
| 52. Band servo piston | 53. Band servo thrust washer | 54. Band servo piston stem |
| 55. 2nd servo return spring | 56. PNP switch | 57. Parking shaft |
| 58. Return spring | 59. Thrust needle bearing | 60. Seal ring |
| 61. Output shaft | 62. Output shaft bearing | 63. Output shaft adjusting shim |
| 64. Side cover | 65. Side cover fitting bolt | 66. Lock nut |
| 67. Idler gear | 68. Idler gear bearing | 69. Reduction pinion gear adjusting shim |
| 70. Parking actuator support | 71. Parking pawl | 72. LH differential side oil seal |
| 73. Revolution sensor | | |

Refer to GI section to make sure icons (symbol marks) in the figure. Refer to [GI-10, "Components"](#) .

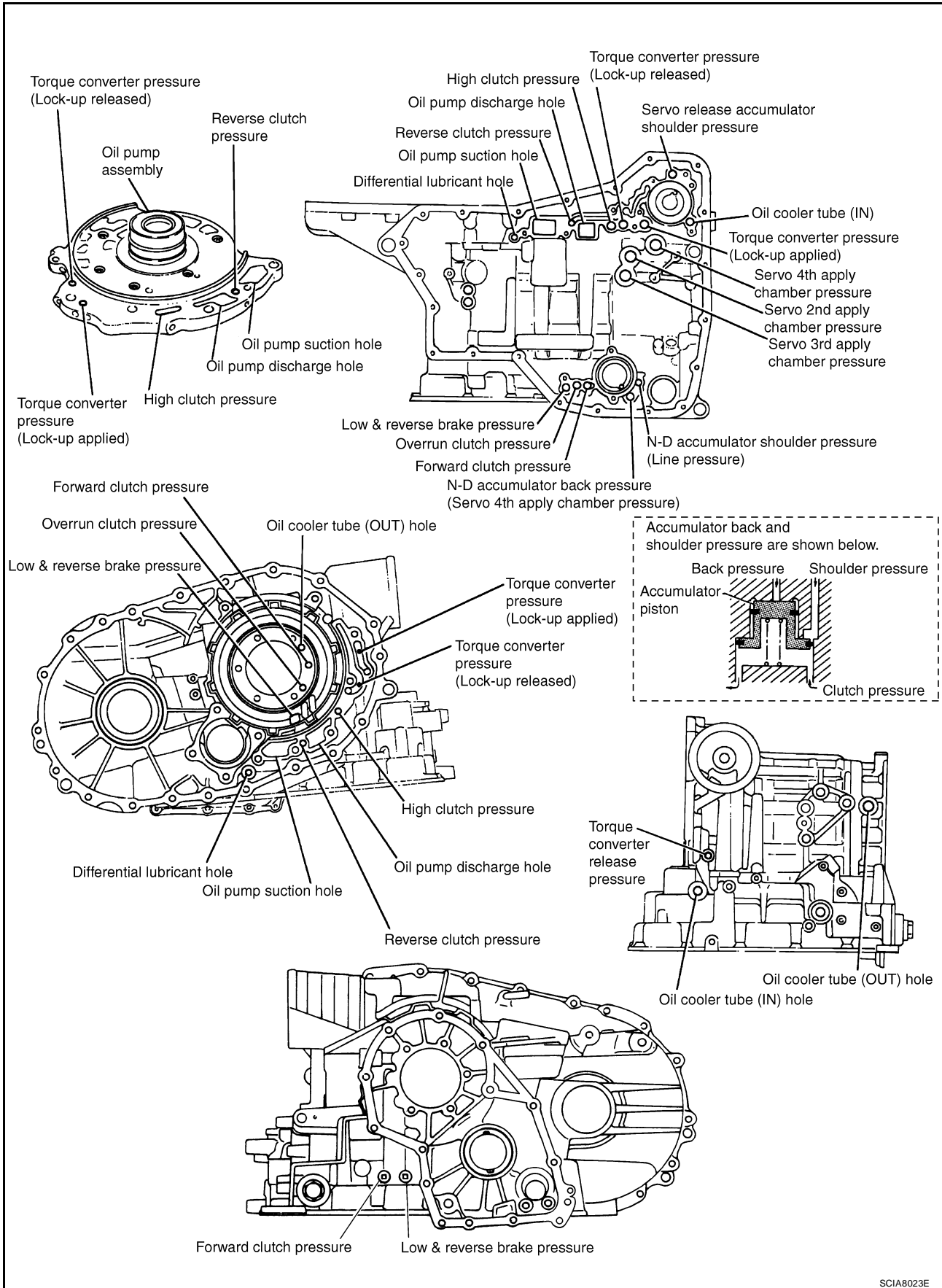
However, refer to the following symbol for others.

: Apply Genuine Anaerobic Liquid Gasket or equivalent.

OVERHAUL

Oil Channel

UCS005VZ

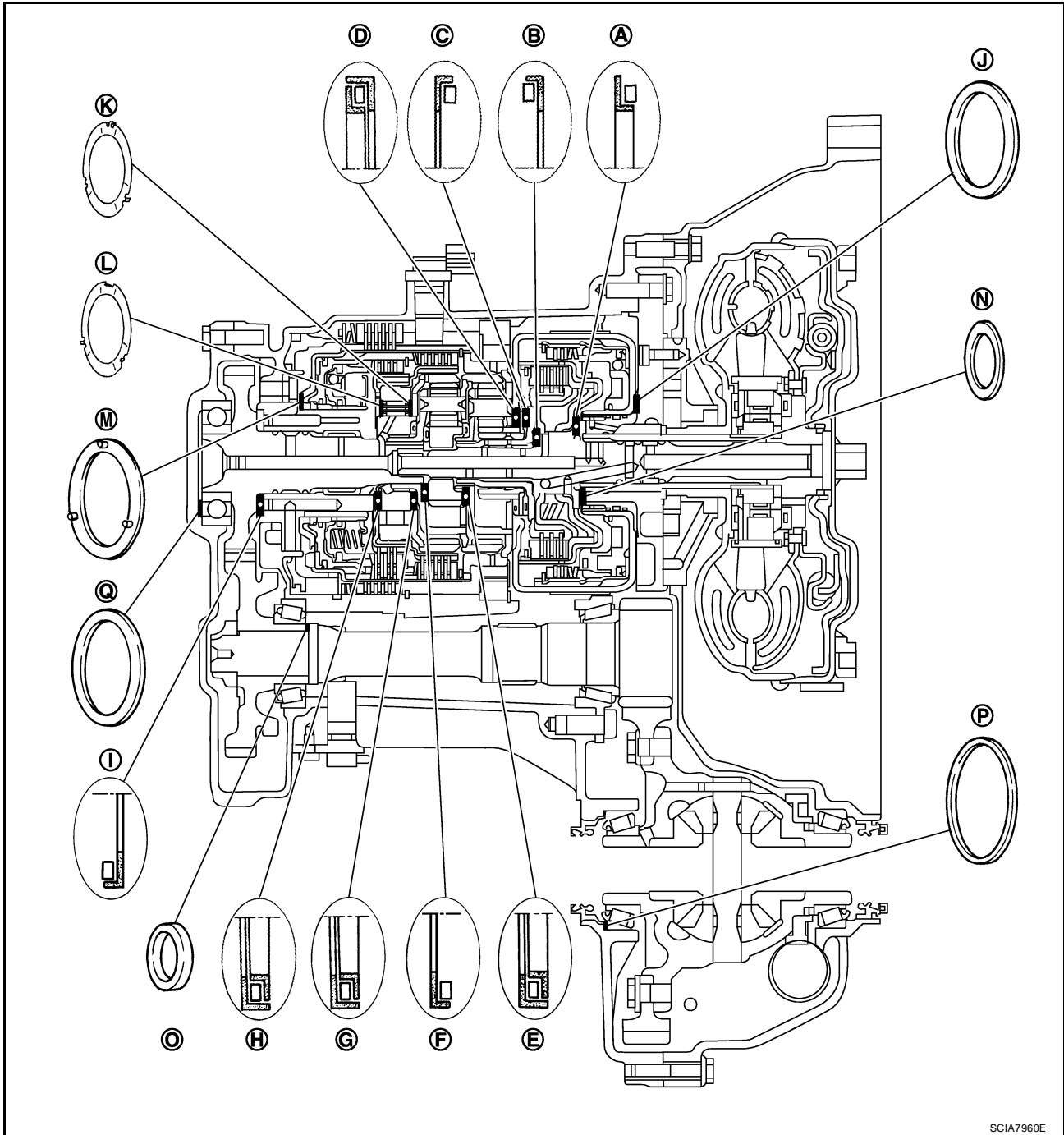


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OVERHAUL

Locations of Adjusting Shims, Needle Bearings and Thrust Washers

UCS005W0



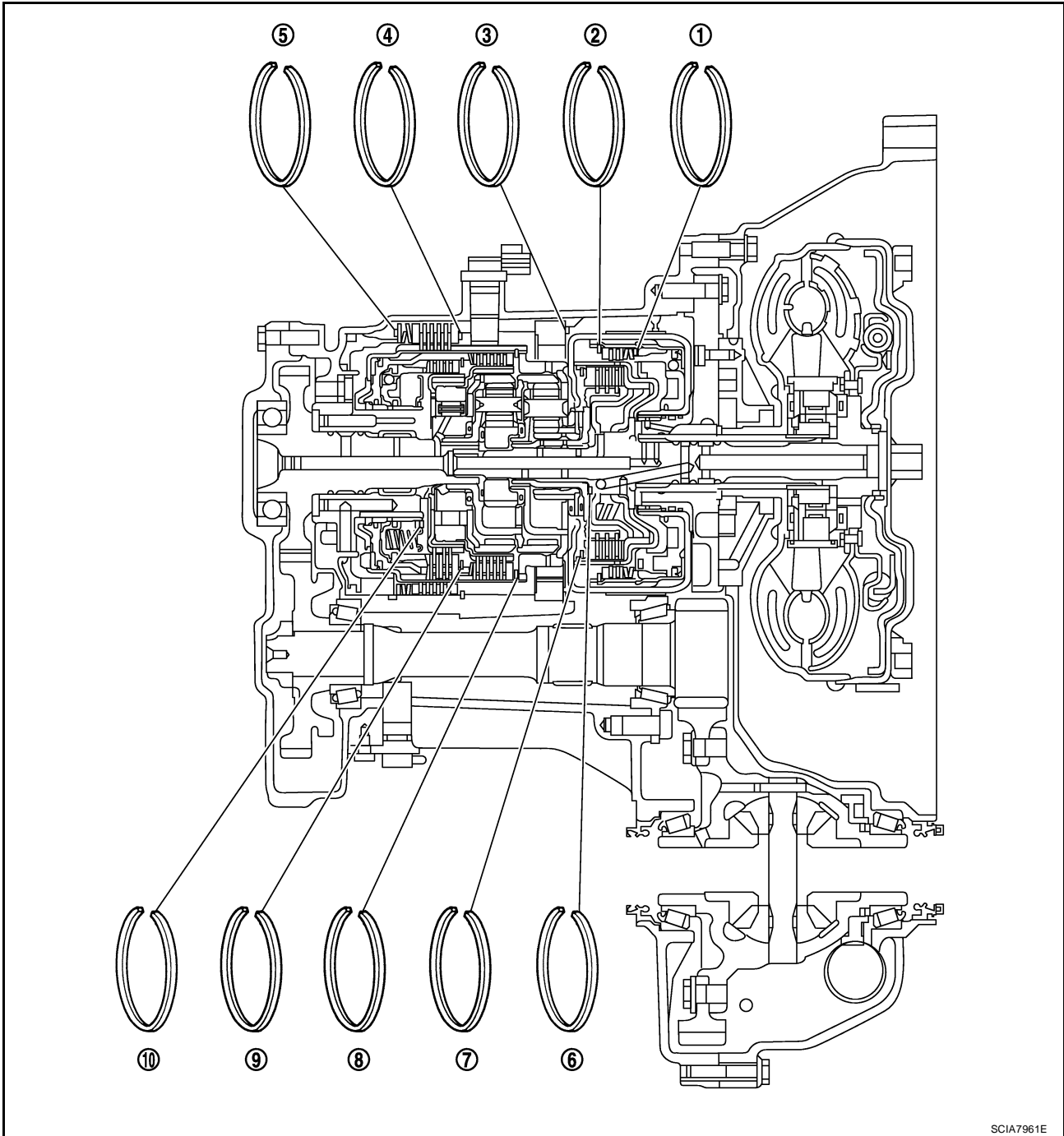
SCIA7960E

- Refer to [AT-373, "Adjusting shims, Needle Bearings, Thrust Washers and Snap Rings"](#) .

OVERHAUL

Locations of Snap Rings

UCS005W1



- Refer to [AT-373, "Adjusting shims, Needle Bearings, Thrust Washers and Snap Rings"](#) .

DISASSEMBLY

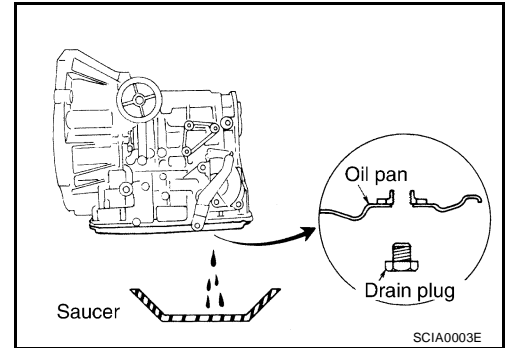
PFP:31020

DISASSEMBLY

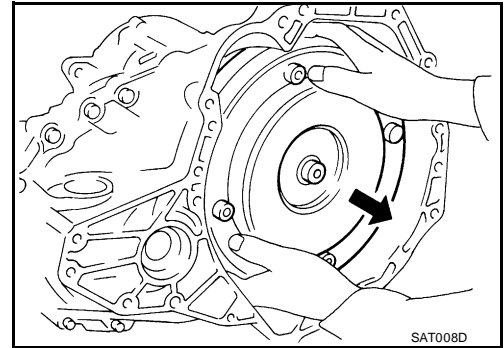
Disassembly

UCS005W2

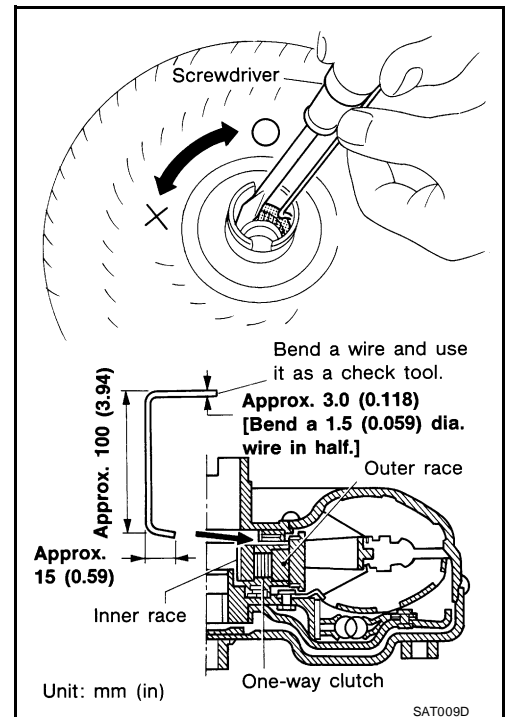
1. Drain ATF through drain hole.
2. Remove drain plug gasket from drain plug.



3. Remove torque converter.

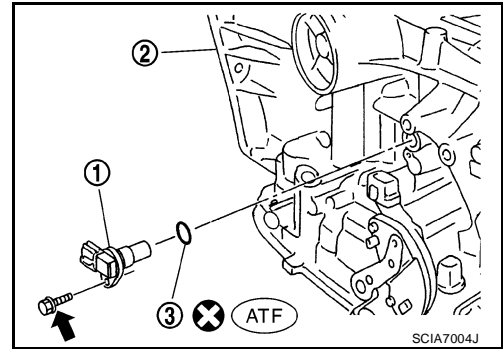


4. Check torque converter one-way clutch using check tool as shown in the figure.
 - a. Insert check tool into groove of bearing support built into one-way clutch outer race.
 - b. When fixing bearing support with check tool, rotate one-way clutch spline using screwdriver.
 - c. Check that inner race rotates clockwise only. If not, replace torque converter assembly.

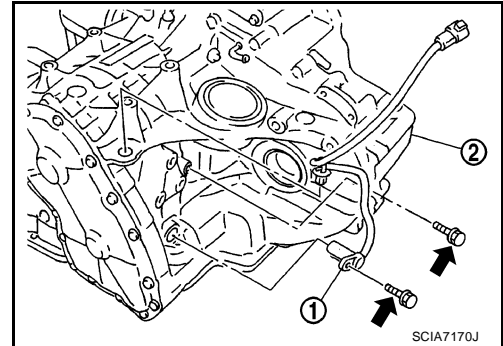


DISASSEMBLY

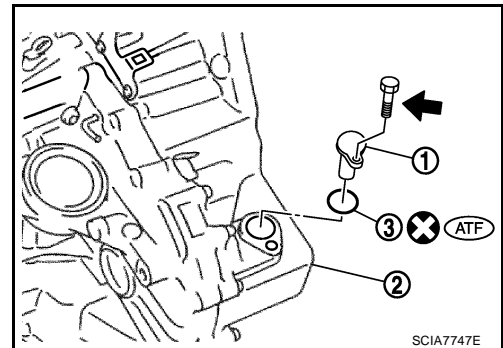
5. Remove turbine revolution sensor (power train revolution sensor) (1) from transaxle case (2).
 ←: Bolt (1)
6. Remove O-ring (3) from turbine revolution sensor (power train revolution sensor) (1).



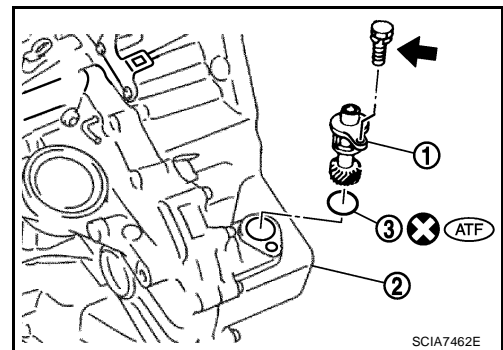
7. Remove revolution sensor (1) from transaxle case (2).
 ←: Bolt (2)



8. Remove plug or speedometer pinion according to the following procedures.
 - a. With ABS
 - i. Remove plug (1) from converter housing (2).
 ←: Bolt (1)
 - ii. Remove O-ring (3) from plug (1).



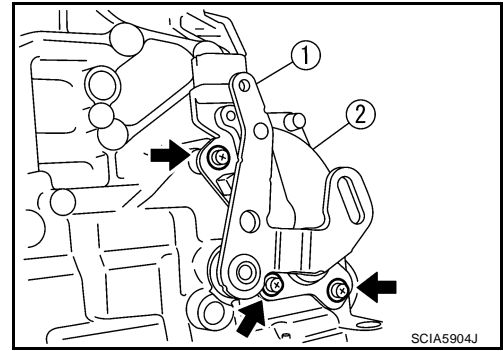
- b. Without ABS
 - i. Remove speedometer pinion (1) from converter housing (2).
 ←: Bolt (1)
 - ii. Remove O-ring (3) from speedometer pinion (1).



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DISASSEMBLY

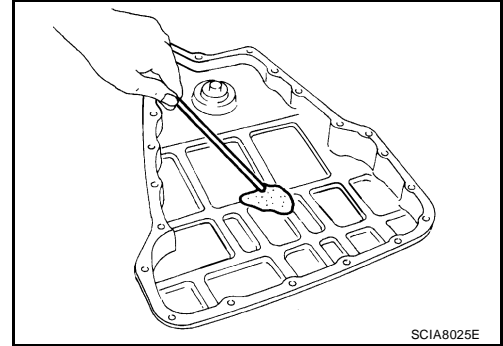
9. Set manual shaft (1) in "P" position.
10. Remove PNP switch (2) from transaxle case.
 ←: Bolt (3)
11. Remove oil pan fitting bolts.
12. Remove oil pan and oil pan gasket.



13. Check foreign materials in oil pan to help determine causes of malfunction. If the ATF is very dark, smells burned, or contains foreign particles, frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.

● If frictional material is detected, replace radiator after repair of A/T. Refer to [CO-11, "RADIATOR"](#) .

14. Remove magnets from oil pan.



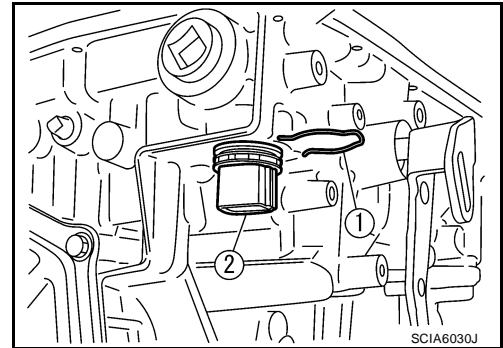
15. Remove control valve assembly according to the following procedures.

- a. Remove snap ring (1) from terminal body (2).

CAUTION:


Do not expand snap ring (1) excessively.

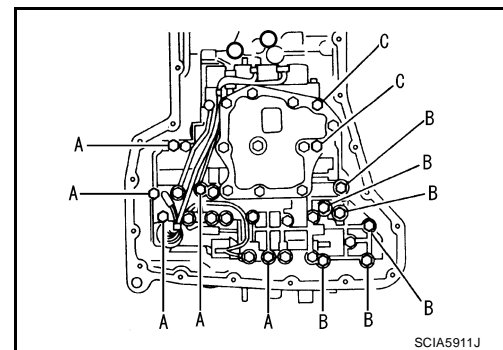
- b. Push terminal body (2) into transaxle case.



- c. Remove control valve assembly fitting bolts **A** , **B** and **C** .

Bolt length, number and location:

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



- d. Remove control valve assembly from transaxle case.

CAUTION:

Be careful not to drop manual valve.

DISASSEMBLY

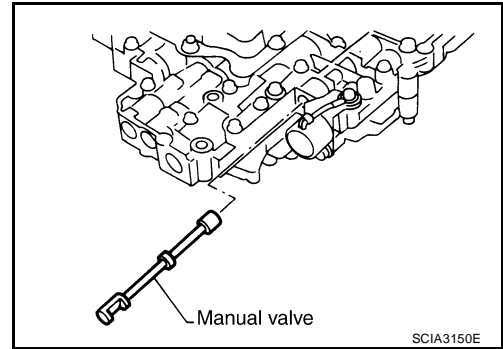
16. Remove manual valve from control valve assembly.

- Inspect the sliding surfaces of manual valve and valve body, and replace if damaged or dented.

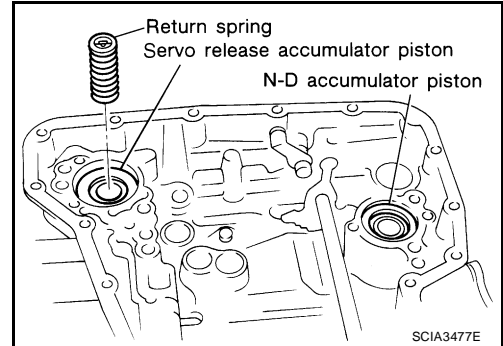
CAUTION:

Be careful not to drop manual valve.

17. Remove O-ring from terminal body.



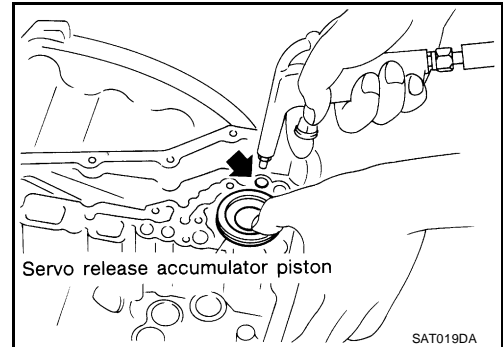
18. Remove return spring from servo release accumulator piston.



19. Apply compressed air into the oil hole as shown in the figure, and remove servo release accumulator piston from transaxle case.

CAUTION:

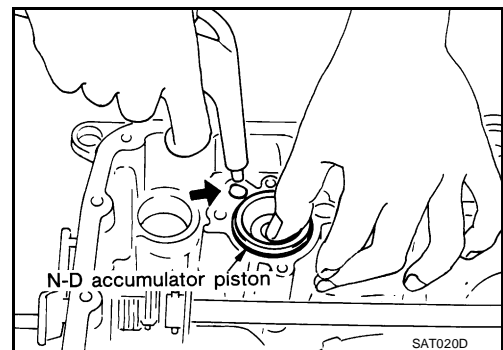
Strong flow of air will push the accumulator piston out along with a splash of ATF. Cover the area with lint-free cloth and blow air little by little to avoid this.



20. Apply compressed air into the oil hole as shown in the figure, and remove N-D accumulator piston and return spring from transaxle case.

CAUTION:

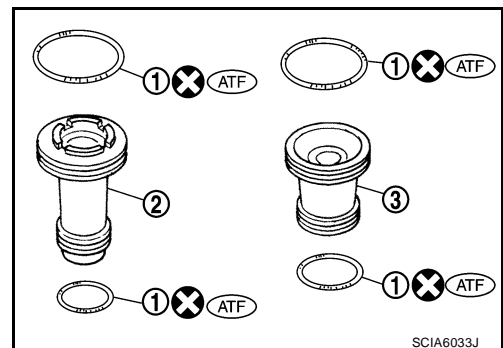
Strong flow of air will push the accumulator piston out along with a splash of ATF. Cover the area with lint free-cloth and blow air little by little to avoid this.



21. Remove O-rings (1) from servo release accumulator piston (2) and N-D accumulator piston (3).

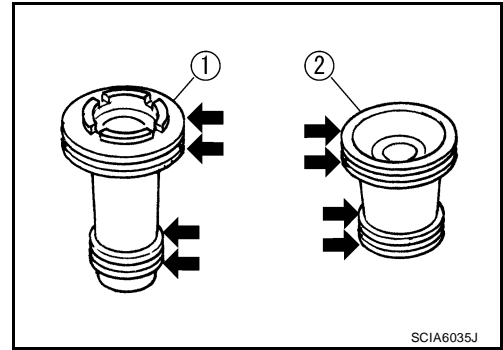
CAUTION:

Wrap the removed servo release accumulator piston (2) and N-D accumulator piston (3) in a lint-free cloth.



DISASSEMBLY

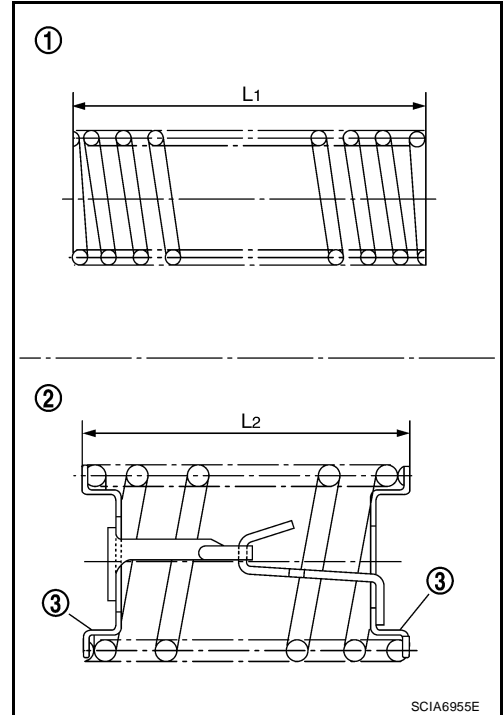
- **Inspect the sliding surfaces of each accumulator piston and transaxle case, and replace if damaged or dented.**
(1): Servo release accumulator piston
(2): N-D accumulator piston



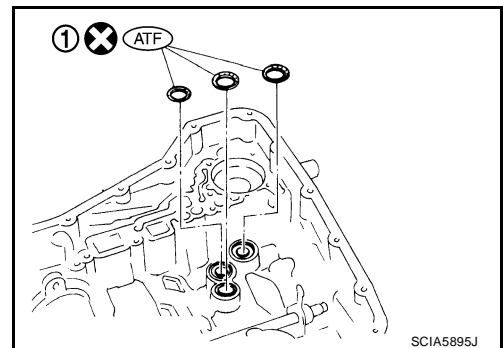
- Inspect each return spring, and replace if deformed or worn. Refer to [AT-374, "Accumulator"](#) for free length (L_1) and length (L_2).
(1): Return spring (Servo release accumulator)
(2): Return spring (N-D accumulator)

CAUTION:

Do not remove spring retainer (3).



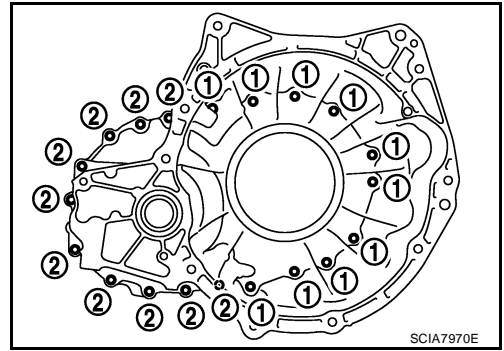
22. Remove lip seals (1) from transaxle case.



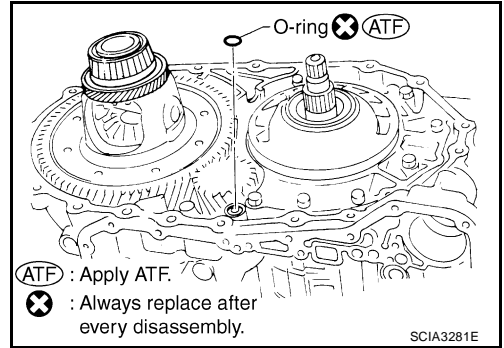
23. Remove converter housing according to the following procedures.

DISASSEMBLY

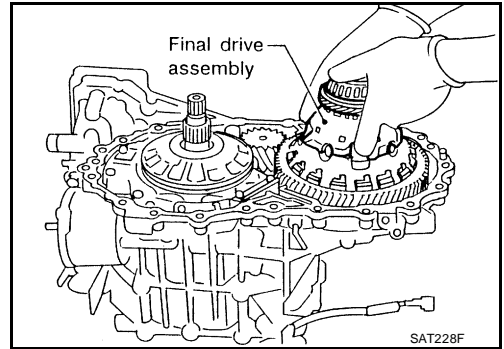
- a. Remove converter housing fitting bolts (1) and (2) using a power tool.
- b. Remove bracket from converter housing
- c. Remove converter housing by tapping it lightly.



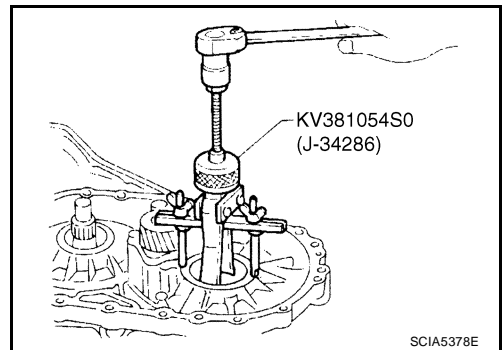
- d. Remove O-ring from differential lubricant hole.



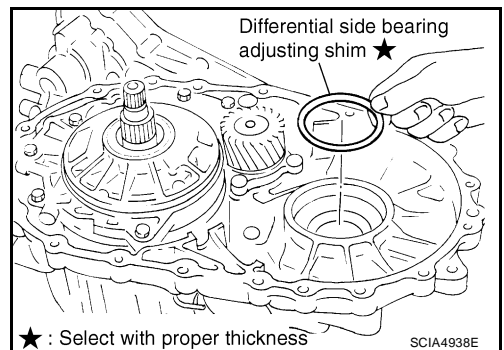
24. Remove final drive assembly from transaxle case.



25. Remove differential side bearing outer race from transaxle case and converter housing.



26. Remove differential side bearing adjusting shim from transaxle case.



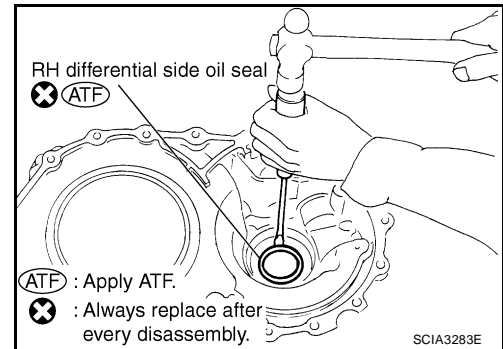
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27. Remove RH differential side oil seal from converter housing using a flat-bladed screwdriver.

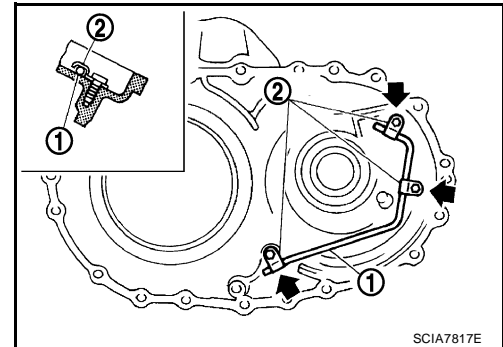
CAUTION:

Be careful not to scratch converter housing.



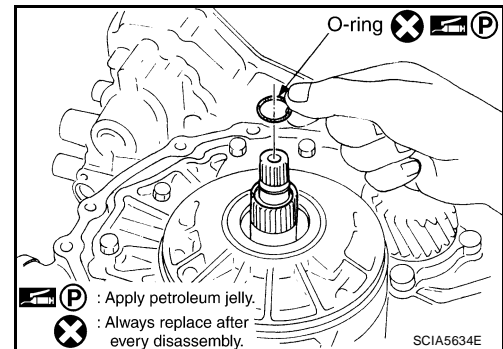
28. Remove differential lubricant tube (1) and clips (2) from converter housing.

← Bolt (3)

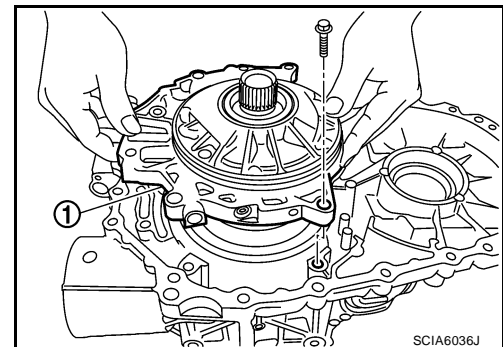


29. Remove oil pump assembly according to the following procedures.

- a. Remove O-ring from input shaft assembly (high clutch drum).

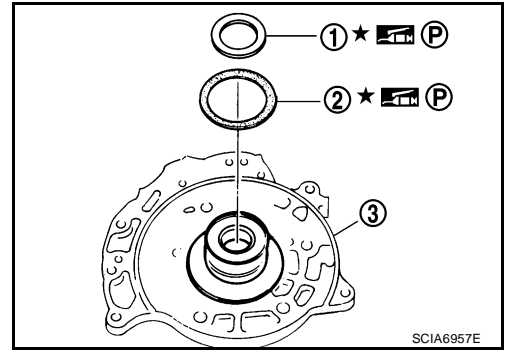


- b. Remove oil pump assembly fitting bolts, and then remove oil pump assembly (1) from transaxle case.
- c. Remove O-ring from oil pump assembly (1).

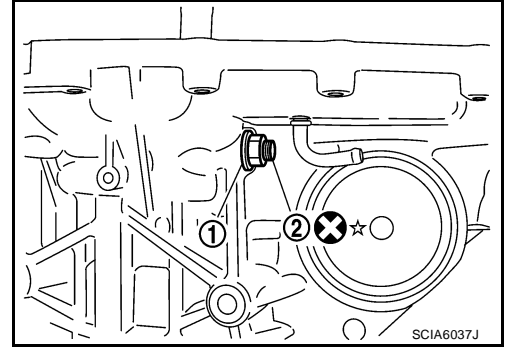


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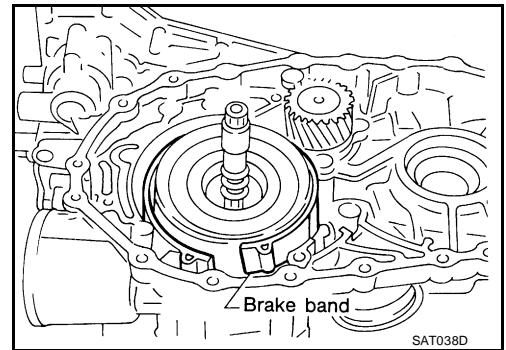
- d. Remove bearing race (1) and thrust washer (2) from oil pump assembly (3).



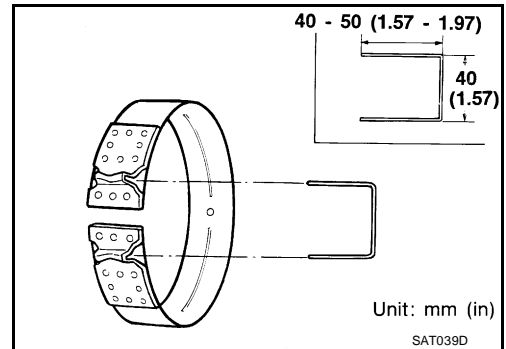
30. Remove brake band according to the following procedures.
- a. Loosen lock nut (1), and then remove anchor end pin (2) and lock nut (1) as a set from transaxle case.



- b. Remove brake band from transaxle case.

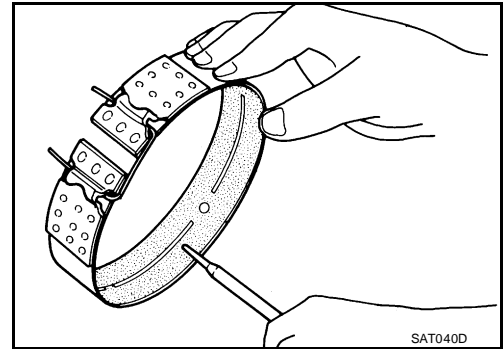


- To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. When removing brake band, always secure it with a clip as shown in the figure. Leave the clip in position after removing brake band.



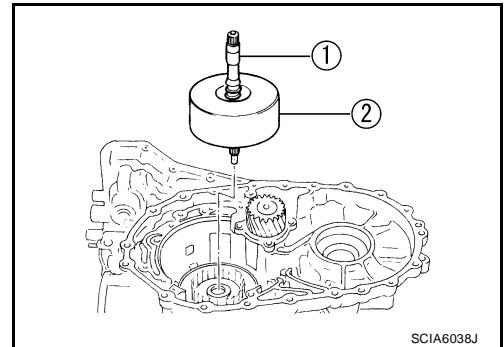
DISASSEMBLY

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

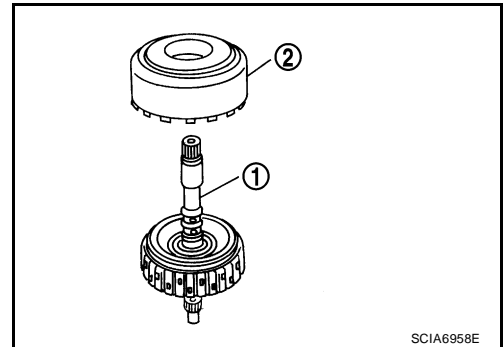


31. Remove input shaft assembly (high clutch assembly) and reverse clutch assembly according to the following procedures.

- a. Remove input shaft assembly (high clutch assembly) (1) with reverse clutch assembly (2).

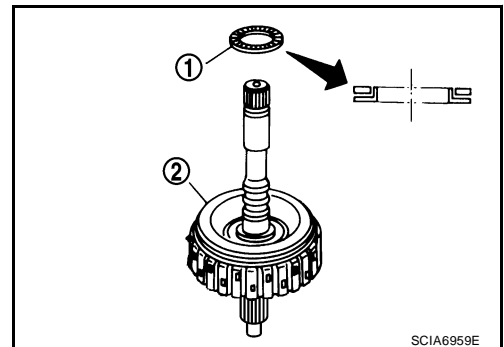


- b. Remove input shaft assembly (high clutch assembly) (1) from reverse clutch assembly (2).



- c. Remove needle bearing (1) from input shaft assembly (high clutch drum) (2).

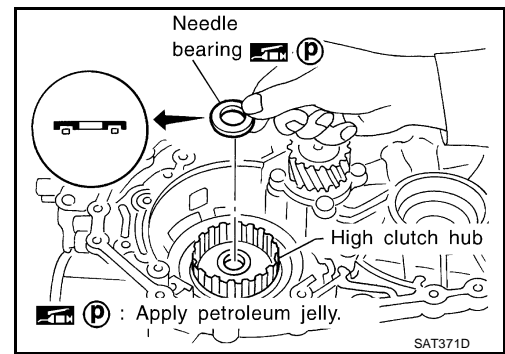
- Inspect needle bearing (1) and input shaft assembly (high clutch drum) (2), and replace if damaged or worn.



DISASSEMBLY

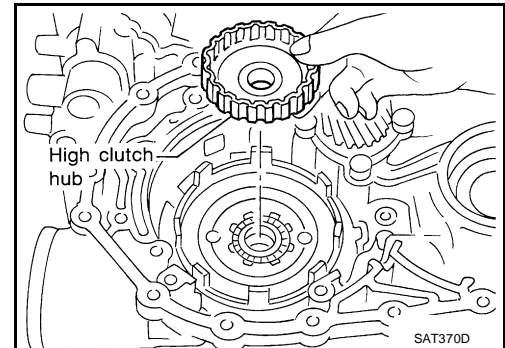
32. Remove needle bearing from high clutch hub.

- **Inspect needle bearing, and replace if damaged or worn.**



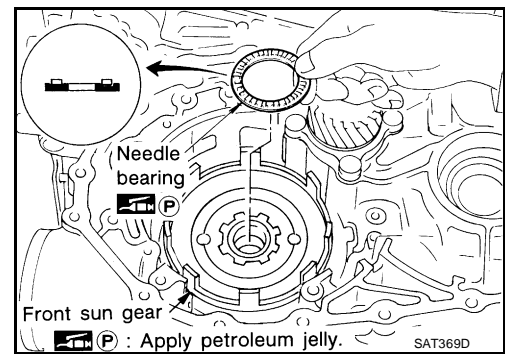
33. Remove high clutch hub from front sun gear.

- **Inspect high clutch hub, and replace if damaged or worn.**

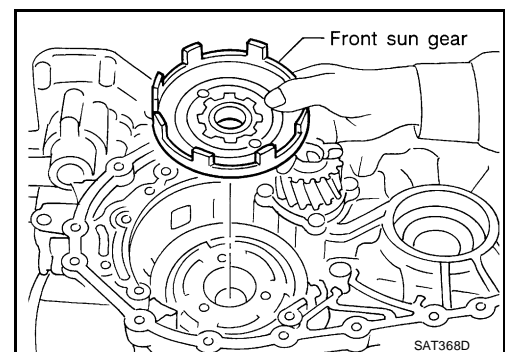


34. Remove needle bearing from front sun gear.

- **Inspect needle bearing, and replace if damaged or worn.**

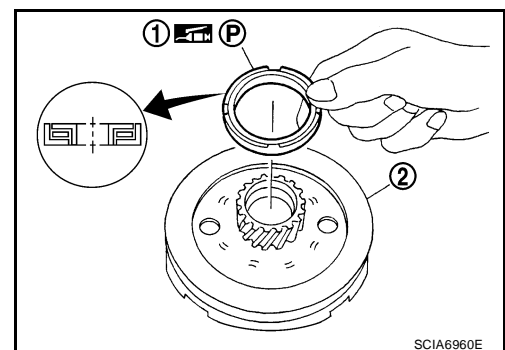


35. Remove front sun gear from front planetary carrier.



36. Remove needle bearing (1) from front sun gear (2).

- **Inspect needle bearing (1) and front sun gear (2), and replace if damaged or worn.**

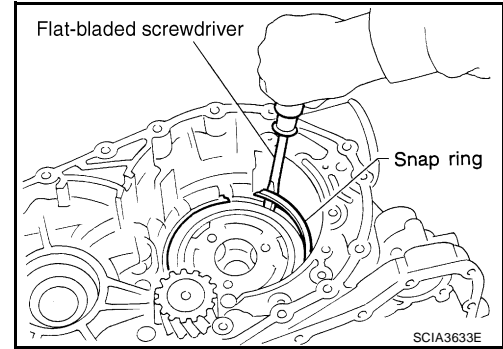


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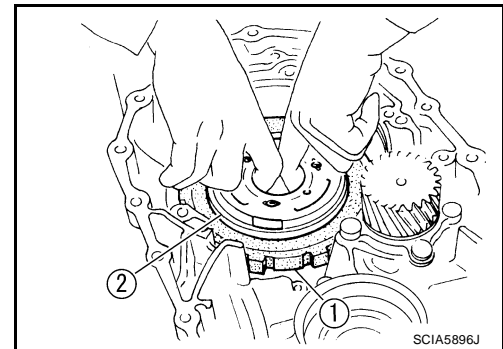
DISASSEMBLY

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

a. Remove snap ring using a flat-bladed screwdriver.



b. Remove low one-way clutch (1) and front planetary carrier (2) as a set from transaxle case.

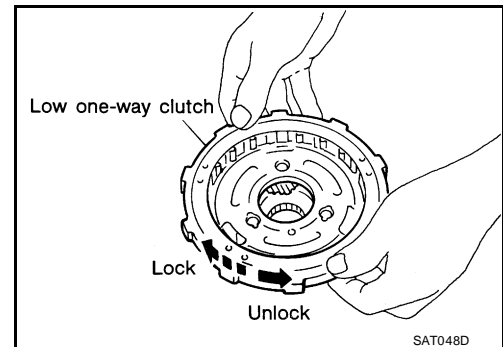


c. Check that low one-way clutch rotates counter-clockwise around front planetary carrier. Then try to turn it clockwise and check that it is locked.

- **Replace low one-way clutch if necessary.**

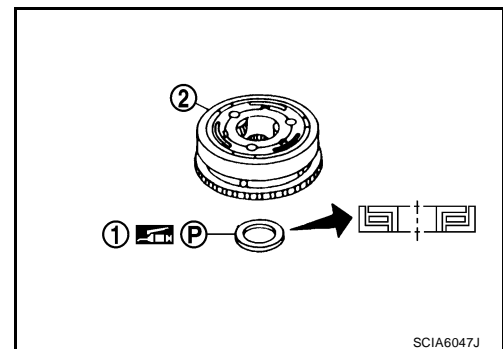
d. Remove low one-way clutch from front planetary carrier by turning it in the direction of unlock.

- **Inspect low one-way clutch, and replace if damaged or worn.**



e. Remove needle bearing (1) from front planetary carrier (2).

- **Inspect needle bearing (1) and front planetary carrier (2), and replace if damaged or worn.**



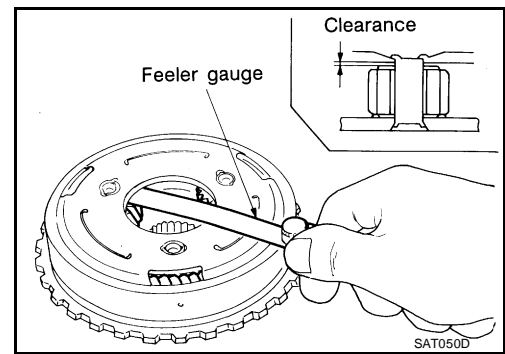
DISASSEMBLY

- f. Check clearance between pinion washer and front planetary carrier using feeler gauge.

Standard clearance and allowable limit:

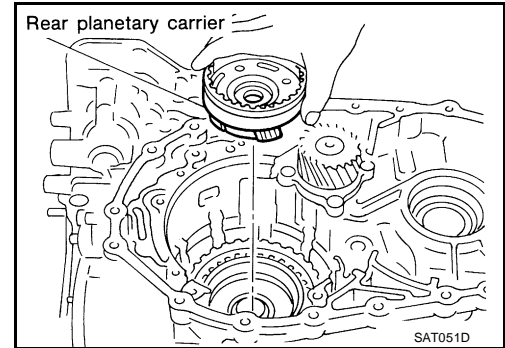
Refer to [AT-376, "Planetary Carrier"](#) .

- **Replace front planetary carrier if the clearance exceeds allowable limit.**



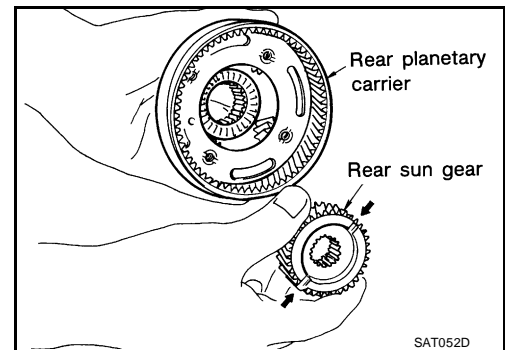
38. Remove rear planetary carrier and rear sun gear according to the following procedures.

- a. Remove rear planetary carrier (with rear sun gear) from transaxle case.



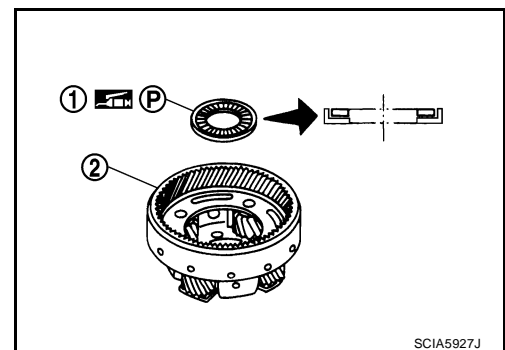
- b. Remove rear sun gear from rear planetary carrier.

- **Inspect rear sun gear, and replace if damaged or worn.**



- c. Remove needle bearing (1) from rear planetary carrier (2).

- **Inspect needle bearing (1) and rear planetary carrier (2), and replace if damaged or worn.**



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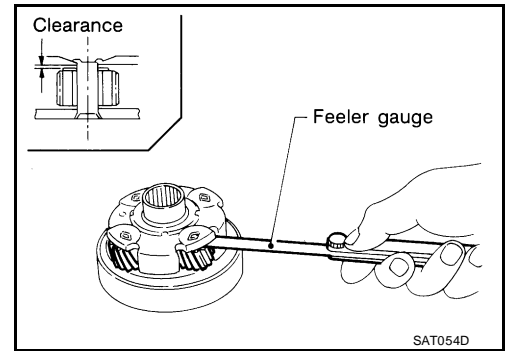
DISASSEMBLY

- d. Check clearance between pinion washer and rear planetary carrier using feeler gauge.

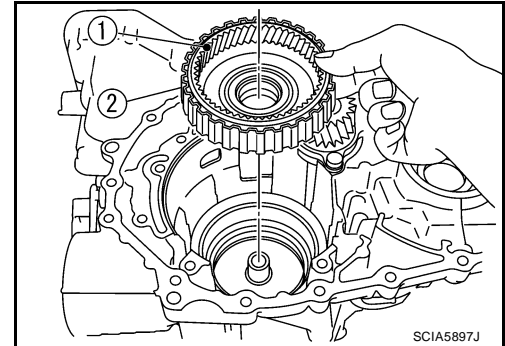
Standard clearance and allowable limit:

Refer to [AT-376, "Planetary Carrier"](#) .

- **Replace rear planetary carrier if the clearance exceeds allowable limit.**

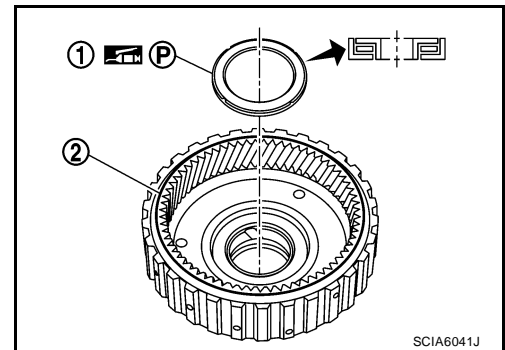


39. Remove rear internal gear (1) and forward clutch hub (2) as a set from forward clutch drum.

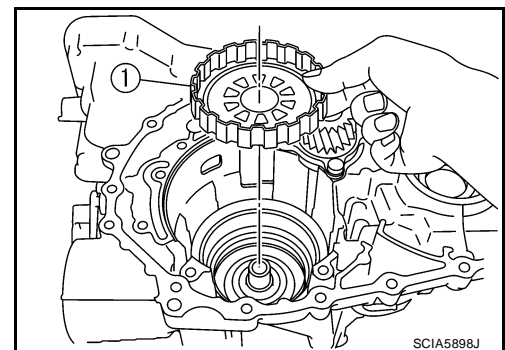


40. Remove needle bearing (1) from rear internal gear (2).

- **Inspect needle bearing (1), and replace if damaged or worn.**

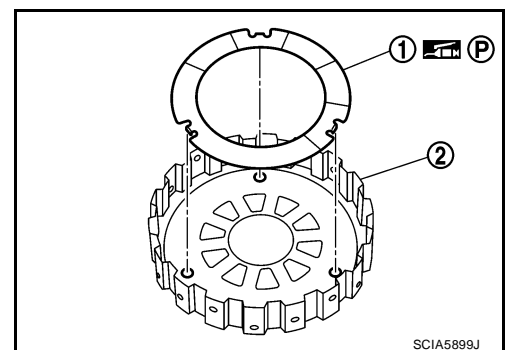


41. Remove overrun clutch hub (1) from forward clutch drum.



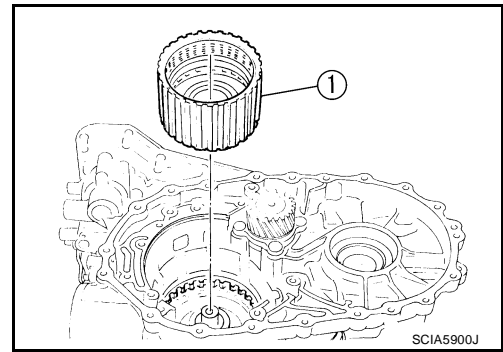
42. Remove thrust washer (1) from overrun clutch hub (2).

- **Inspect thrust washer (1) and overrun clutch hub (2), and replace if damaged or worn.**



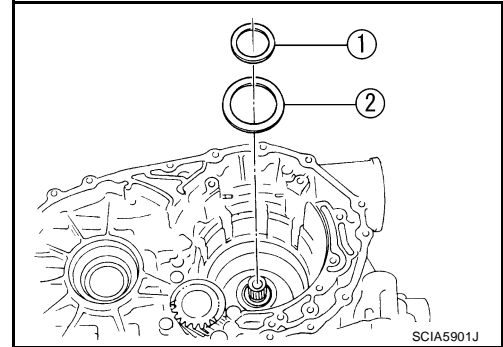
DISASSEMBLY

43. Remove forward clutch assembly and overrun clutch assembly (1) from transaxle case.



44. Remove needle bearing (1) and thrust washer (2) from bearing retainer.

- Inspect needle bearing (1) and thrust washer (2), and replace damaged or worn.

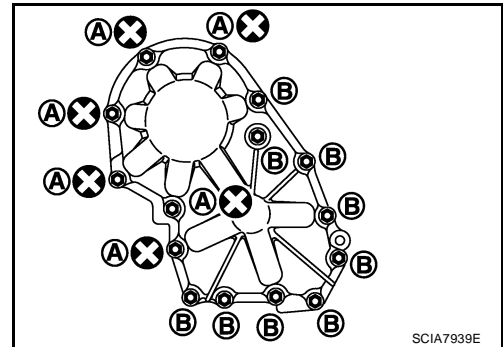


45. Remove output shaft assembly according to the following procedures.

- a. Remove side cover fitting bolts.

CAUTION:

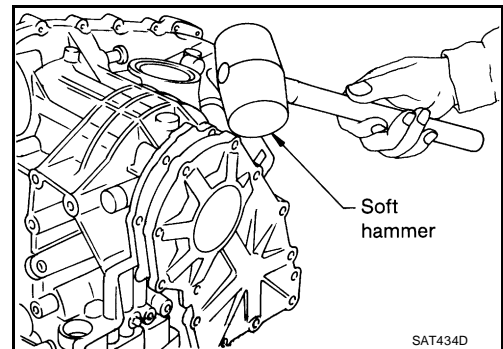
- Do not mix bolts A and B.
- Always replace bolts A as they are self-sealing bolts.



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

CAUTION:

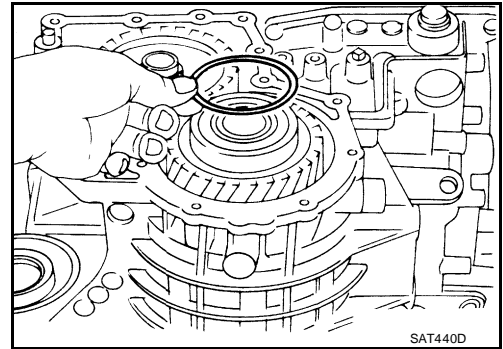
- Be careful not to drop output shaft assembly. It might come out when removing side cover.
- Be careful not to damage side cover.



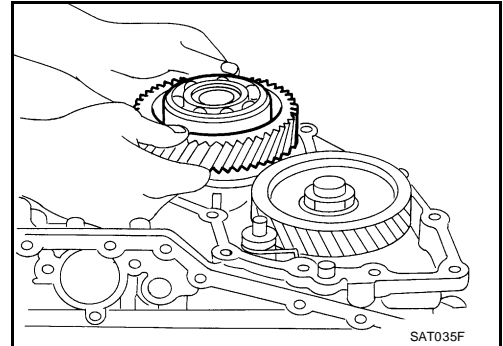
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DISASSEMBLY

c. Remove output shaft adjusting shim.



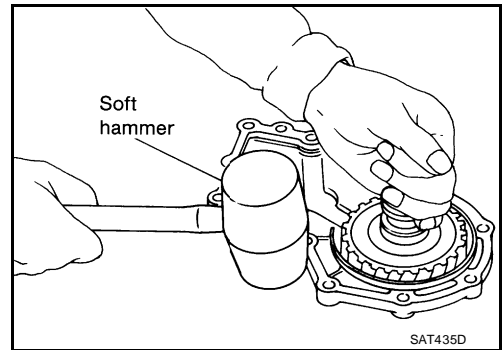
d. Remove output shaft assembly.



- If output shaft assembly came off with side cover, tap side cover with a soft hammer to separate.

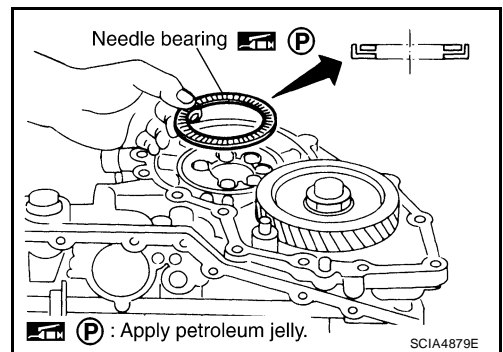
CAUTION:

Be careful not to damage side cover.



e. Remove needle bearing.

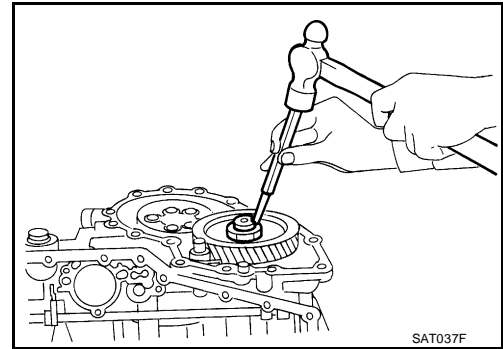
- **Check needle bearing, and replace if damaged or worn.**



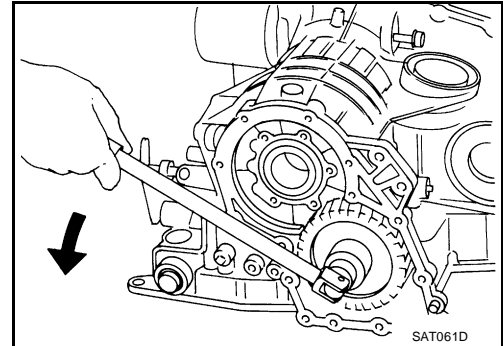
46. Disassemble reduction pinion gear according to the following procedures.

DISASSEMBLY

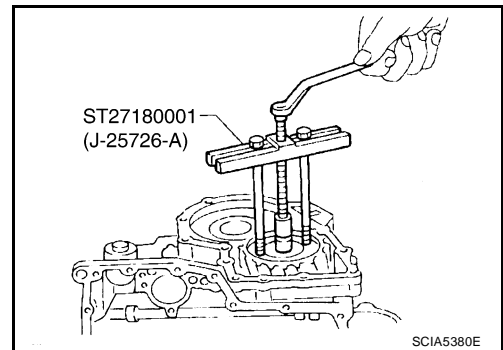
- a. Set manual shaft to "P" position to fix idler gear.
- b. Unlock idler gear lock nut with pin punch.



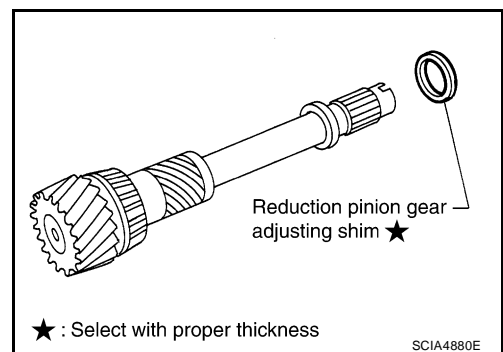
- c. Remove idler gear lock nut.



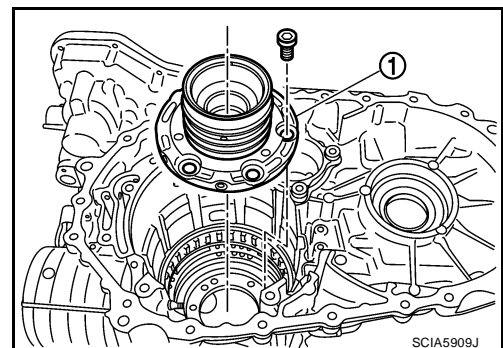
- d. Remove idler gear with puller.
- e. Remove reduction pinion gear.



- f. Remove reduction pinion gear adjusting shim from reduction pinion gear.



- 47. Remove bearing retainer fitting bolts, and then remove bearing retainer (1) from transaxle case.



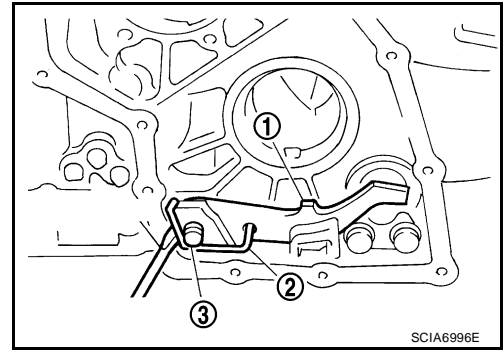
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DISASSEMBLY

48. Remove return spring (2) from parking shaft (3) using a flat-bladed screwdriver.

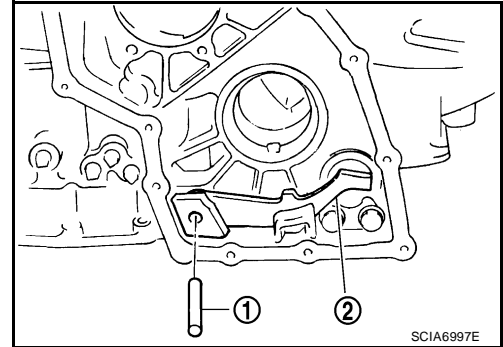
(1): Parking pawl

- Inspect return spring (2), and replace if damaged or worn.



49. Draw out parking shaft (1), and then remove parking pawl (2) from transaxle case.

- Inspect parking shaft (1) and parking pawl (2), and replace if damaged or worn.



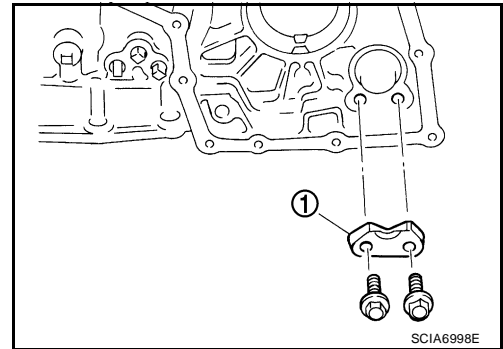
50. Remove parking actuator support (1) from transaxle case.

- Inspect parking actuator support (1), and replace if damaged or worn.

51. Remove snap ring from transaxle case using a flat-bladed screwdriver.

52. Remove governor cap from transaxle case.

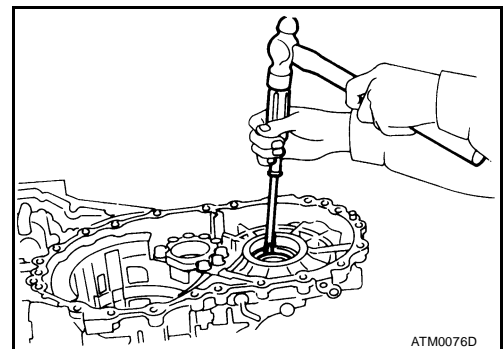
53. Remove O-ring from governor cap.



54. Remove LH differential side oil seal from transaxle case using a flat-bladed screwdriver.

CAUTION:

Be careful not to scratch transaxle case.



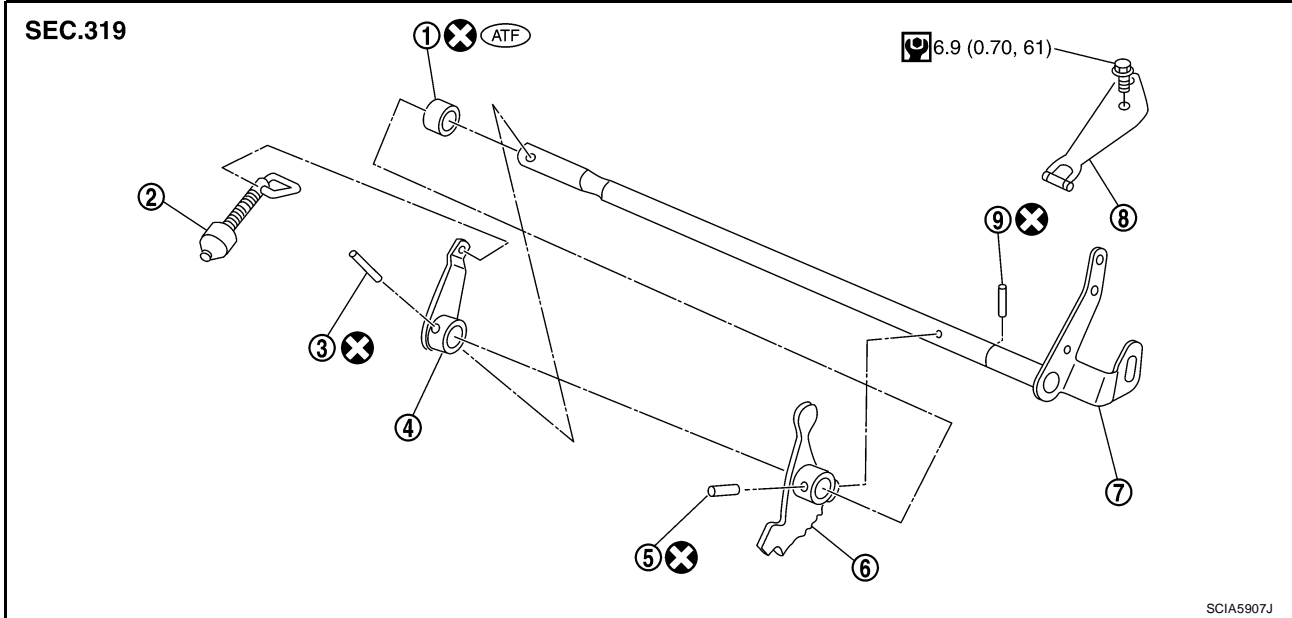
REPAIR FOR COMPONENT PARTS

REPAIR FOR COMPONENT PARTS

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Manual Shaft COMPONENTS

UCS005W3

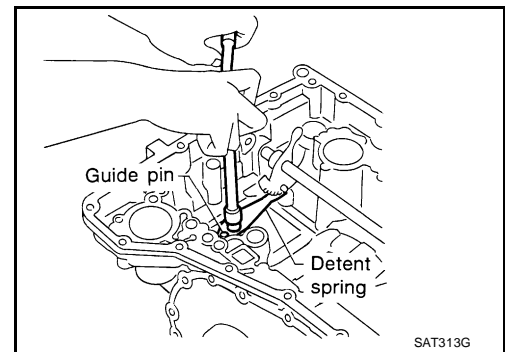


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|--------------------------|------------------|------------------|
| 1. Manual shaft oil seal | 2. Parking rod | 3. Retaining pin |
| 4. Parking rod plate | 5. Retaining pin | 6. Manual plate |
| 7. Manual shaft | 8. Detent spring | 9. Retaining pin |

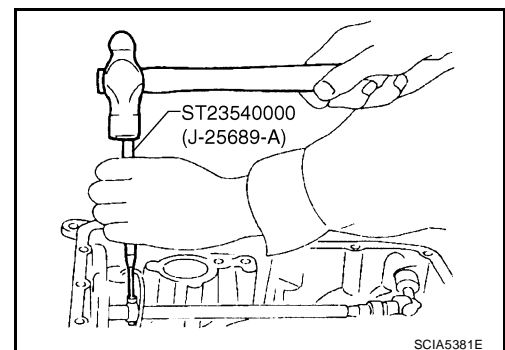
Refer to GI section to make sure icons (symbol marks) in the figure. Refer to [GI-10, "Components"](#) .

REMOVAL

1. Remove detent spring from transaxle case.

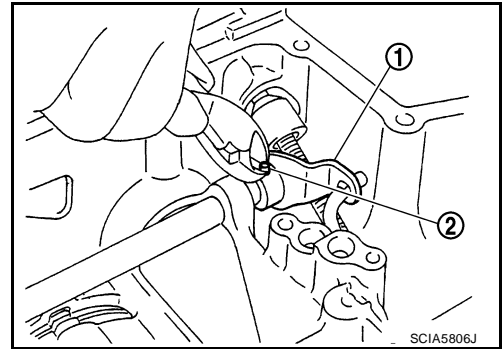


2. Drive out retaining pin of manual plate using the pin punch.

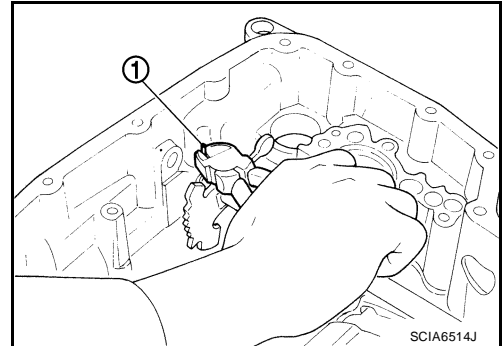


REPAIR FOR COMPONENT PARTS

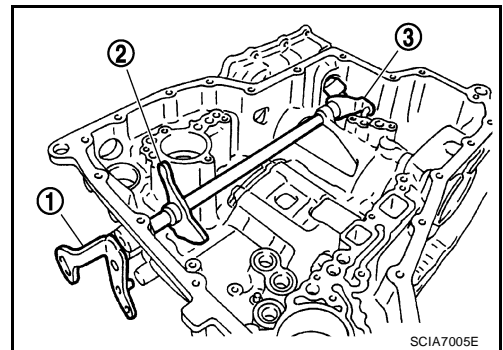
3. Pull out retaining pin (2) of parking rod plate (1) using nippers.



4. Pull out retaining pin (1) of manual shaft using nippers.



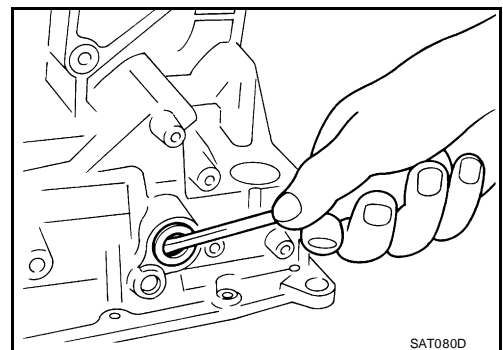
5. Remove parking rod plate (with parking rod) (3) from manual shaft (1).
6. Remove parking rod from parking rod plate (3).
7. Remove manual plate (2) from manual shaft (1).
8. Draw out manual shaft (1) from transaxle case.



9. Remove manual shaft oil seal from transaxle case using a flat-bladed screwdriver.

CAUTION:

Be careful not to scratch transaxle case.



INSPECTION

Check component parts, and replace if damaged or worn.

REPAIR FOR COMPONENT PARTS

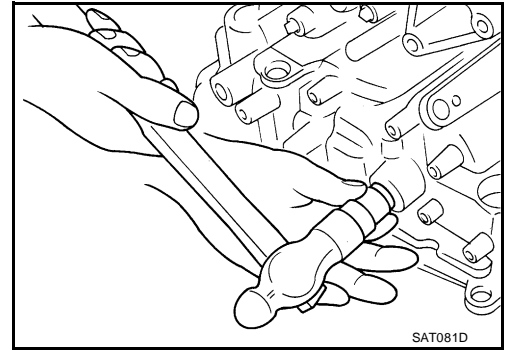
INSTALLATION

1. Drive manual shaft oil seal into transaxle case using a drift [commercial service tool: 22 mm (0.87 in) dia.].

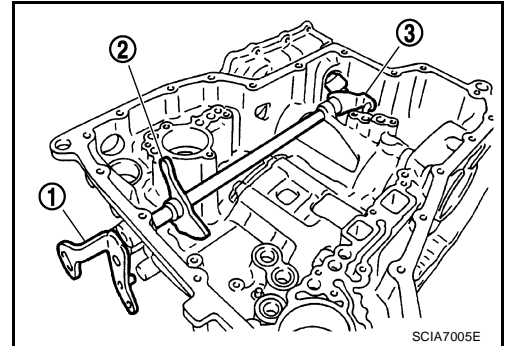
CAUTION:

- Do not reuse manual shaft oil seal.
- Apply ATF to outer surface of manual shaft oil seal.

2. Install parking rod to parking rod plate.



3. Insert manual shaft (1) to transaxle case, and install manual plate (2) to manual shaft (1).
4. Install parking rod plate (with parking rod) (3) to manual shaft (1).

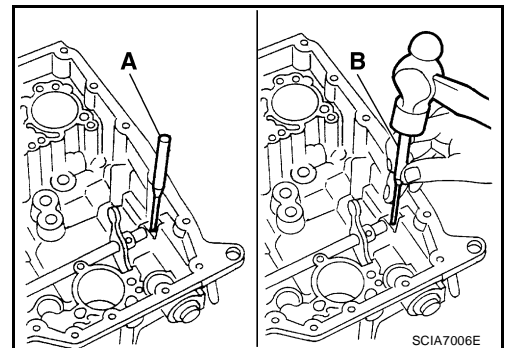


5. Align groove of manual shaft and hole of transaxle case using a pin punch A [commercial service tool: 2 mm (0.08 in) dia.].
6. Drive retaining pin of manual shaft into transaxle case using Tool B.

Tool number: ST23540000 (J-25689-A)

CAUTION:

Do not reuse retaining pin.

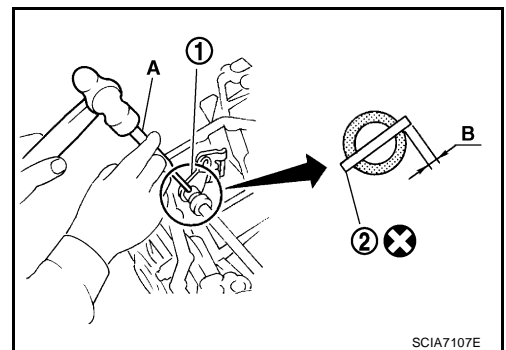


7. Set parking rod plate (1) onto manual shaft, and drive retaining pin (2) of parking rod plate (1).

Tool number: ST23540000 (J-25689-A)

CAUTION:

The retaining pin end should protrude approx. 3mm (0.12 in) (B) from the outer surface of parking rod plate (1).



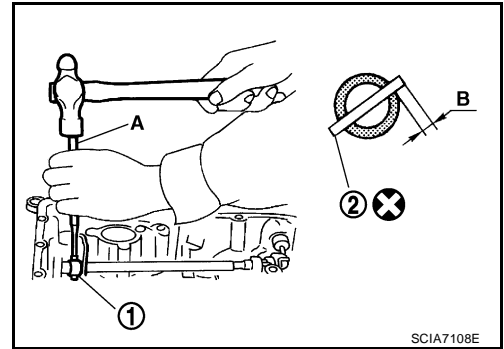
REPAIR FOR COMPONENT PARTS

8. Set manual plate (1) onto manual shaft, and drive retaining pin (2) of manual plate (1).

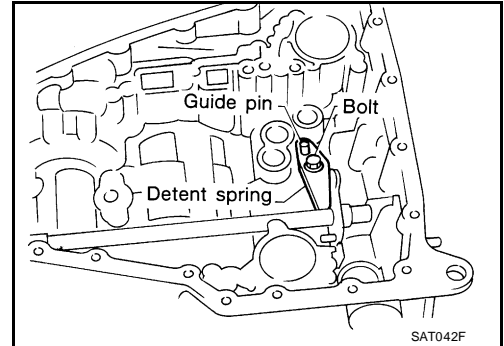
Tool number: ST23540000 (J-25698-A)

CAUTION:

The retaining pin end should protrude approx. 3mm (0.12 in) (B) from the outer surface of manual plate (1).



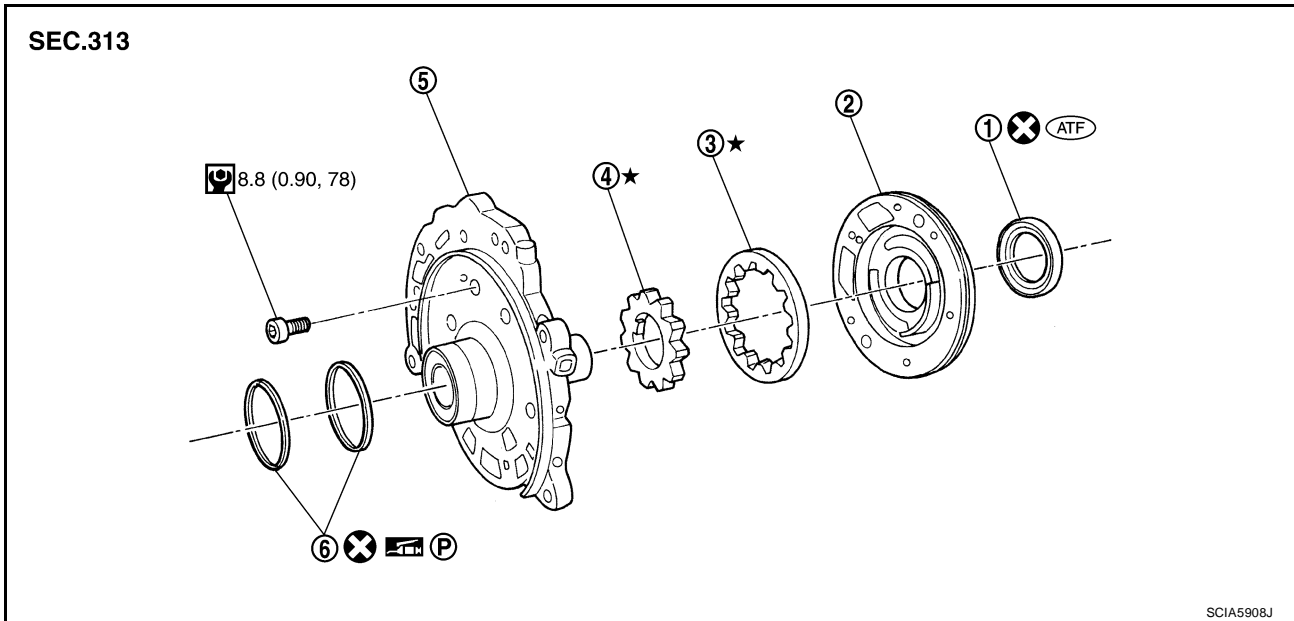
9. Install detent spring on transaxle case.
10. Tighten detent spring fitting bolt to the specified torque. Refer to [AT-279, "COMPONENTS"](#) .



REPAIR FOR COMPONENT PARTS

Oil Pump COMPONENTS

UCS005W4

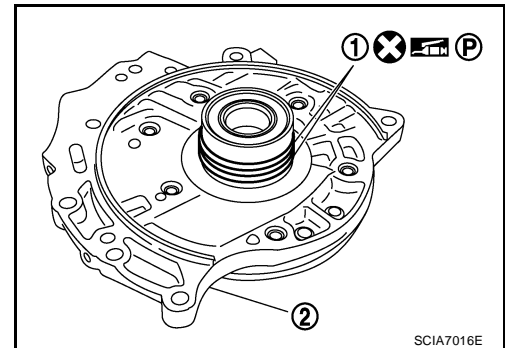


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| 1. Oil pump housing oil seal | 2. Oil pump housing | 3. Outer gear |
| 4. Inner gear | 5. Oil pump cover | 6. Seal ring |

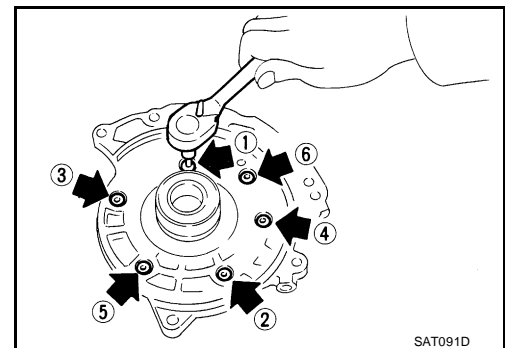
Refer to GI section to make sure icons (symbol marks) in the figure. Refer to [GI-10. "Components"](#) .

DISASSEMBLY

1. Remove seal rings (1) from oil pump assembly (2).

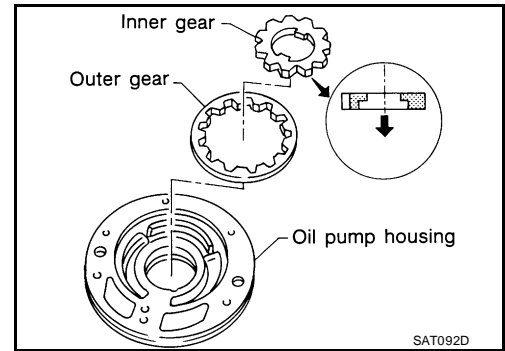


2. Remove bolts in the order as shown in the figure, and remove oil pump cover.



REPAIR FOR COMPONENT PARTS

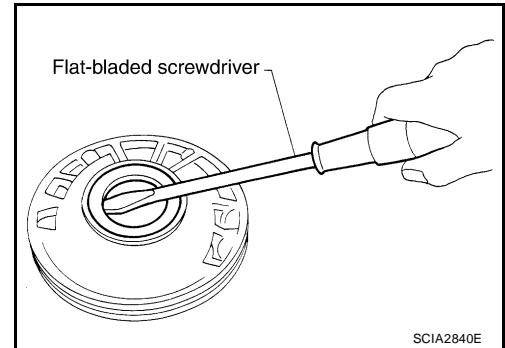
3. Remove inner gear and outer gear from oil pump housing.



4. Remove oil pump housing oil seal using a flat-bladed screwdriver.

CAUTION:

Be careful not to scratch oil pump housing.



REPAIR FOR COMPONENT PARTS

INSPECTION

Oil Pump Housing, Oil Pump Cover, Inner Gear and Outer Gear

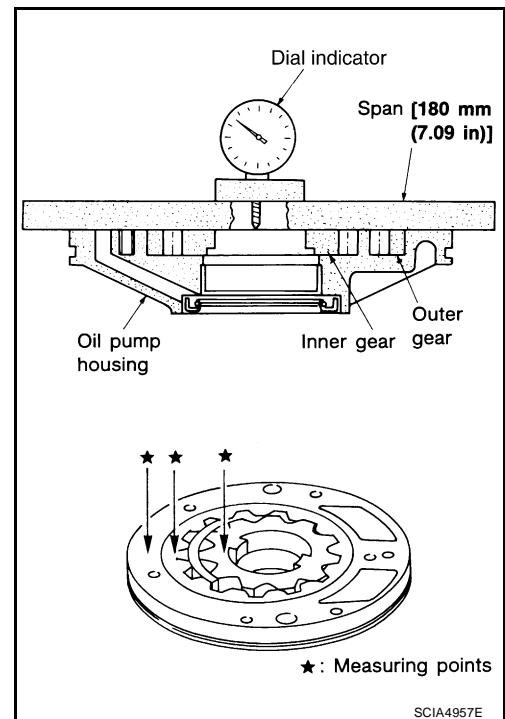
Check for wear or damage. Replace if necessary.

Side Clearances

- Measure side clearance of inner gear and outer gear in at least four places around each outside edge. Clearances measured values should be within the specified clearance.

Standard clearance: Refer to [AT-376, "Oil Pump"](#) .

- If clearance is less than standard, select inner gear and outer gear as a set so that clearance is within specifications. Refer to "Parts Information" for the inner gear and outer gear selection.
- If clearance is more than standard, replace whole oil pump assembly except oil pump cover.

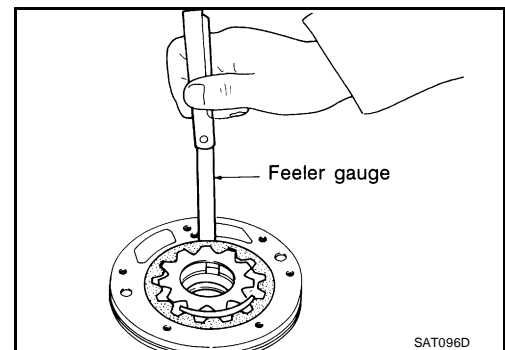


- Measure clearance between outer gear and oil pump housing.

Standard clearance and allowable limit:

Refer to [AT-376, "Oil Pump"](#) .

- If not within allowable limit, replace whole oil pump assembly except oil pump cover.



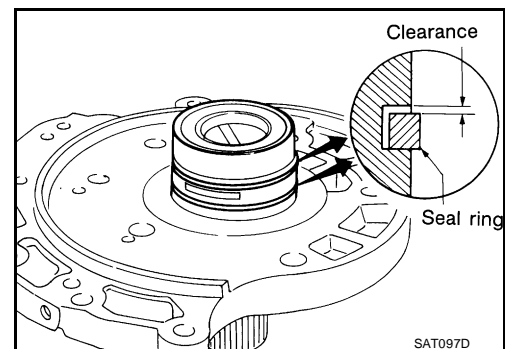
Seal Ring Clearance

- Measure clearance between seal ring and ring groove.

Standard clearance and allowable limit:

Refer to [AT-376, "Oil Pump"](#) .

- If not within allowable limit, replace oil pump cover assembly.



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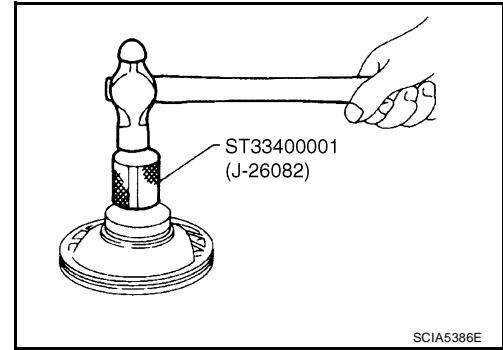
REPAIR FOR COMPONENT PARTS

ASSEMBLY

1. Install oil pump housing oil seal on oil pump housing.

CAUTION:

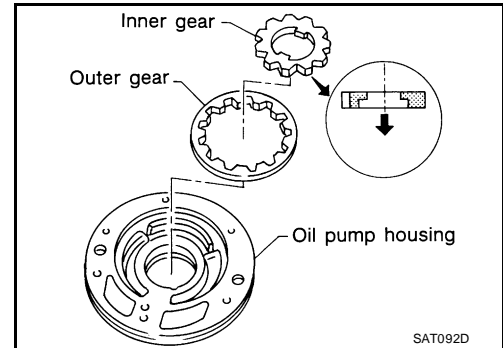
- Do not reuse oil pump housing oil seal.
- Apply ATF to outer surface of oil pump housing oil seal.



2. Install inner gear and outer gear on oil pump housing.

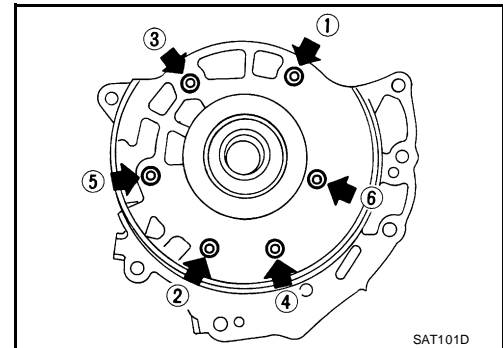
CAUTION:

Be careful with the direction of inner gear.



3. Install oil pump cover on oil pump housing.

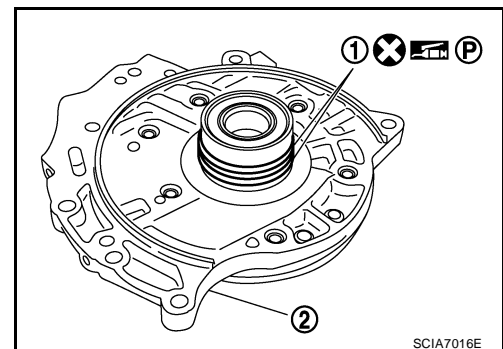
- a. Wrap masking tape around splines of oil pump cover assembly to protect seal. Position oil pump cover assembly on oil pump housing assembly, then remove masking tape.
- b. Tighten oil pump cover fitting bolts in the order as shown in the figure, and then tighten them to the specified torque in the same order. Refer to [AT-283, "COMPONENTS"](#) .



4. Install seal rings (1) to oil pump assembly (2) carefully after packing ring groove with petroleum jelly.

CAUTION:

Do not spread gap of seal rings (1) excessively while installing. The seal rings (1) may be deformed.

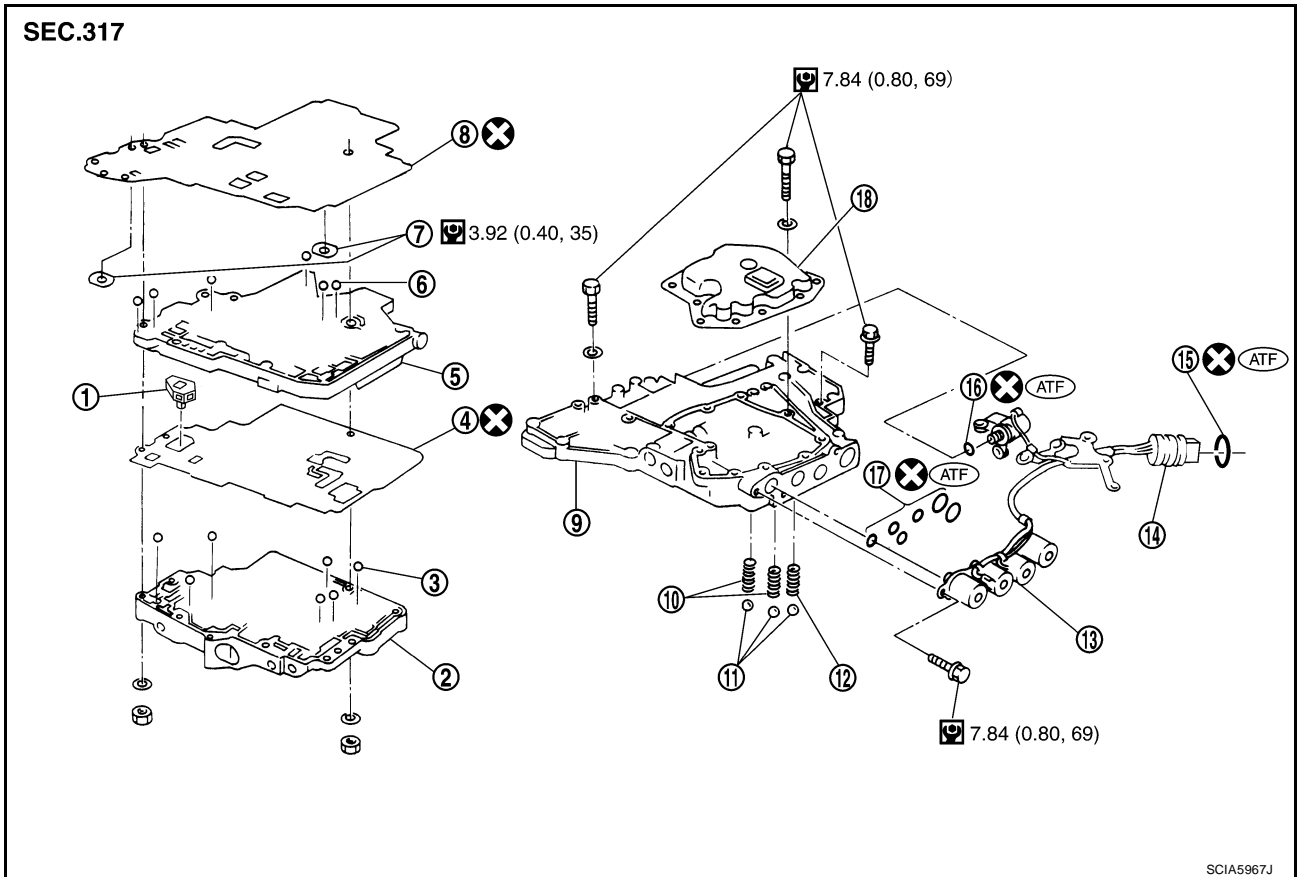


REPAIR FOR COMPONENT PARTS

Control Valve Assembly COMPONENTS

UCS005W5

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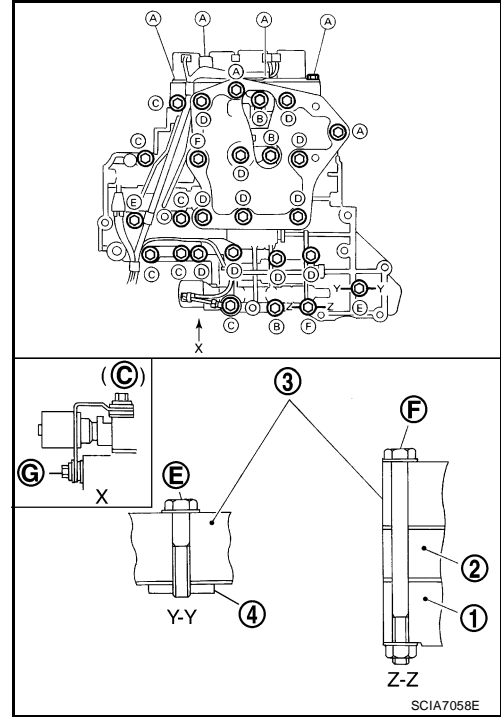
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|---------------------------------------|-----------------------------|--|
| 1. Pilot filter | 2. Control valve upper body | 3. Steel ball |
| 4. Separating plate | 5. Control valve inter body | 6. Steel ball |
| 7. Support plate | 8. Separating plate | 9. Control valve lower body |
| 10. Line pressure relief valve spring | 11. Check ball | 12. Torque converter pressure holding spring |
| 13. Solenoid valve assembly | 14. Terminal body | 15. O-ring |
| 16. O-ring | 17. O-ring | 18. Oil strainer |

Refer to G1 section to make sure icons (symbol marks) in the figure. Refer to [G1-10, "Components"](#) .


REPAIR FOR COMPONENT PARTS

DISASSEMBLY

Place control valve assembly with control valve upper body (1) side down. Remove bolts (A) to (G), reamer bolts (F), nuts and support plates (4) according to the following procedures. Separate control valve upper body (1), control valve inter body (2) and control valve lower body (3).

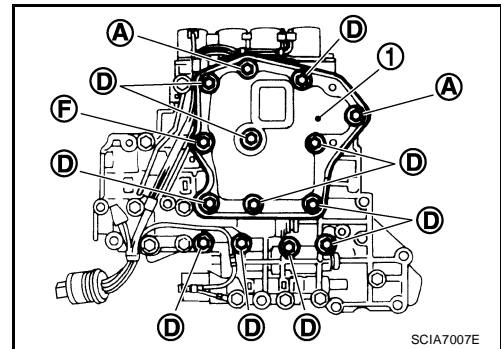


Bolt length, number and location:

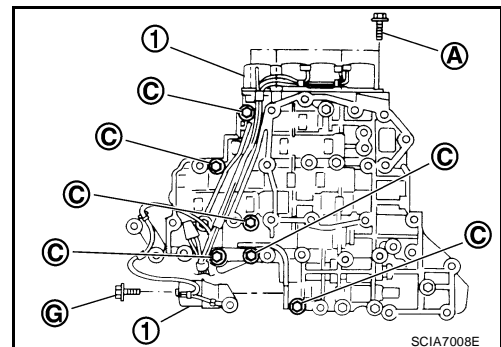
Bolt symbol	A	B	C	D	E	F*	G
Bolt length "ℓ" [mm (in)] 	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1

*: Reamer bolt and nut.

1. Remove bolts (A), (D), reamer bolt (F) and nut, and remove oil strainer (1) from control valve assembly.

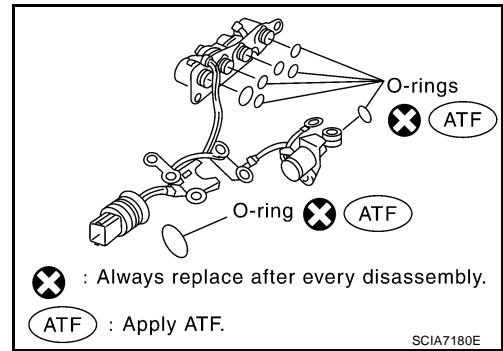


2. Remove bolts (A), (C) and (G), and then remove solenoid valve assembly (1) from control valve assembly.



REPAIR FOR COMPONENT PARTS

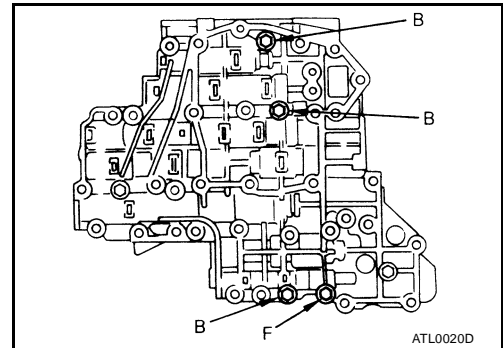
- Remove O-rings from solenoid valves and terminal body.



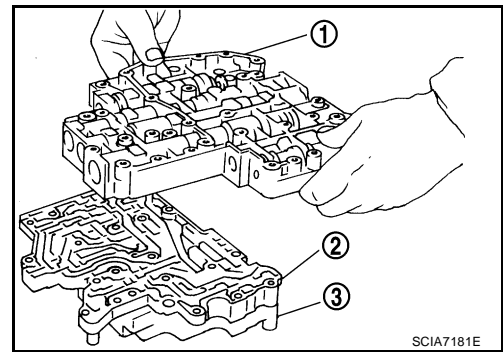
- Place control valve upper body face down, and remove bolts (B), reamer bolt (F) and nut.

CAUTION:

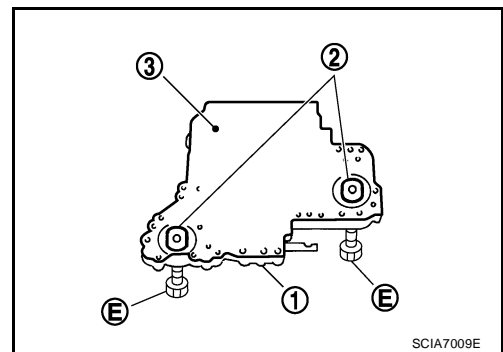
Remove bolts with control valve upper body facing down, because control valve upper body and control valve inter body may come off and steel ball may fall and be lost.



- Remove control valve lower body (1) from control valve inter body (2).
(3): Control valve upper body



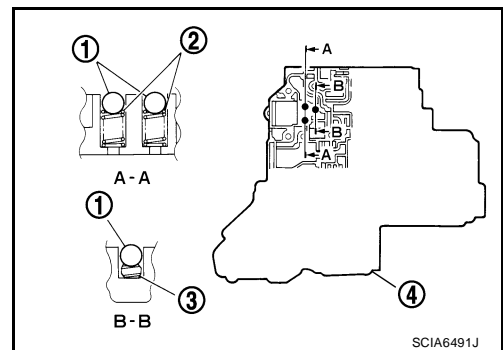
- Turn over control valve lower body (1).
- Remove bolts (E), support plates (2) and separating plate (3) from control valve lower body (1).



- Remove check balls (1), line pressure relief valve springs (2) and torque converter pressure holding spring (3) from control valve lower body (4).

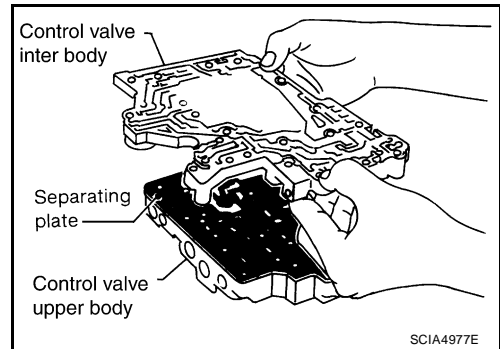
CAUTION:

Be careful not to lose check balls (1), line pressure relief valve springs (2) and torque converter pressure holding spring (3).

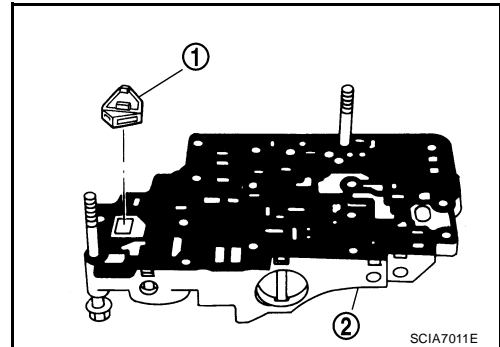


REPAIR FOR COMPONENT PARTS

9. Remove control valve inter body from control valve upper body.

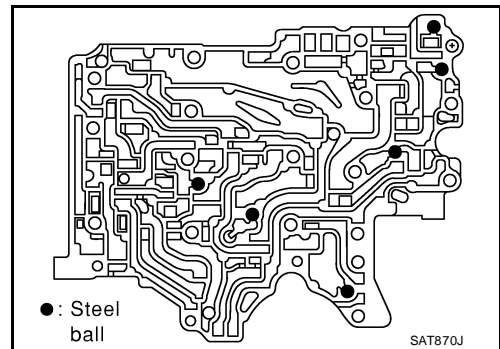


10. Remove pilot filter (1) from control valve upper body (2).
11. Remove separating plate from control valve upper body (2).



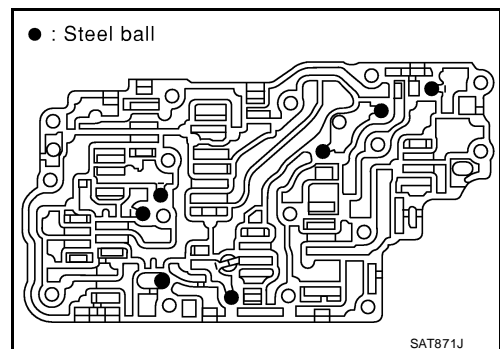
12. Check to see that steel balls are properly positioned in control valve inter body and then remove them.

CAUTION:
Be careful not to lose steel balls.



13. Check to see that steel balls are properly positioned in control valve upper body and then remove them.

CAUTION:
Be careful not to lose steel balls.



REPAIR FOR COMPONENT PARTS

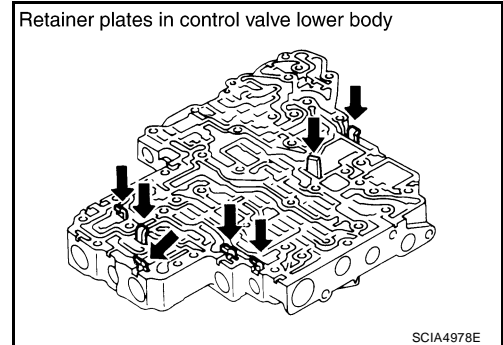
INSPECTION

Control Valve Lower and Upper Bodies

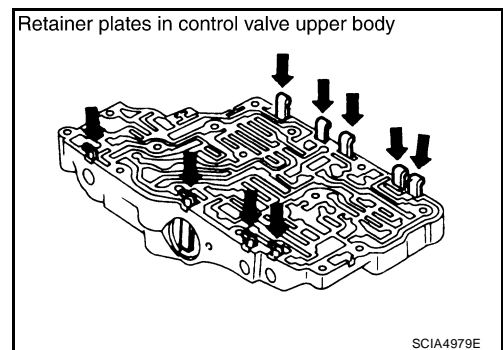
CAUTION:

Be careful not to lose these parts.

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

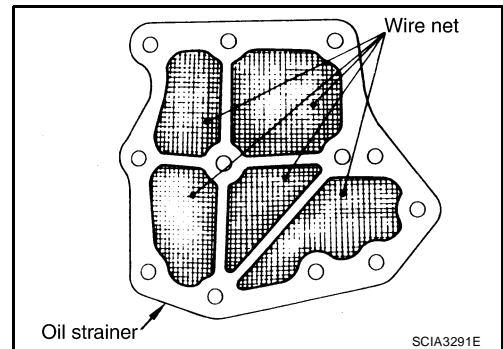


- Check to see that retainer plates are properly positioned in control valve upper body.



Oil Strainer

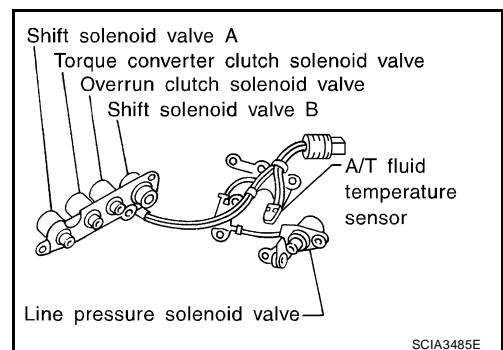
Check wire netting of oil strainer for damage. Replace if necessary.



Shift Solenoid Valves "A" and "B", Line Pressure Solenoid Valve, Torque Converter Clutch Solenoid Valve and Overrun Clutch Solenoid Valve

Measure resistance.

- For shift solenoid valve A, refer to [AT-150, "Component Inspection"](#) .
- For shift solenoid valve B, refer to [AT-155, "Component Inspection"](#) .
- For line pressure solenoid valve, refer to [AT-146, "Component Inspection"](#) .
- For torque converter clutch solenoid valve, refer to [AT-134, "Component Inspection"](#) .
- For overrun clutch solenoid valve, refer to [AT-161, "Component Inspection"](#) .



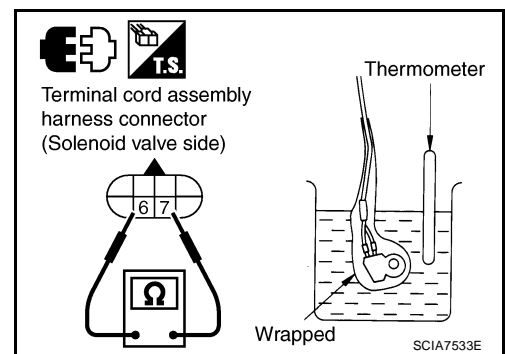
A/T Fluid Temperature Sensor

Measure resistance.

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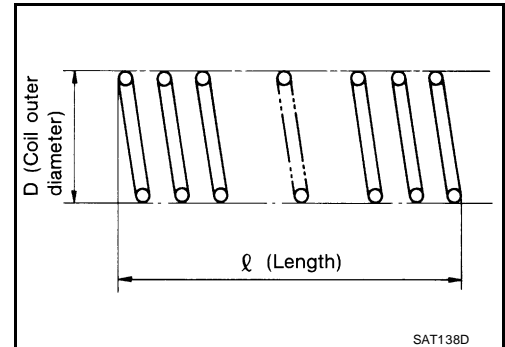
REPAIR FOR COMPONENT PARTS

- For A/T fluid temperature sensor, refer to [AT-170, "Component Inspection"](#) .



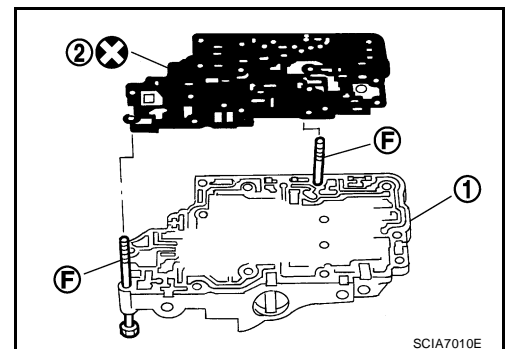
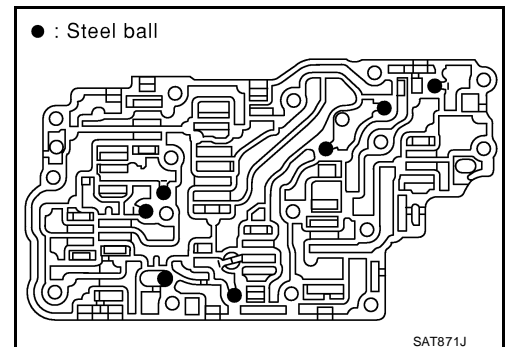
Line Pressure Relief Valve Springs and Torque Converter Pressure Holding Spring

- Check each spring for damage or deformation. Also measure free length and outer diameter. Refer to [AT-374, "Control Valves"](#) .
- Replace springs if deformed or fatigued.



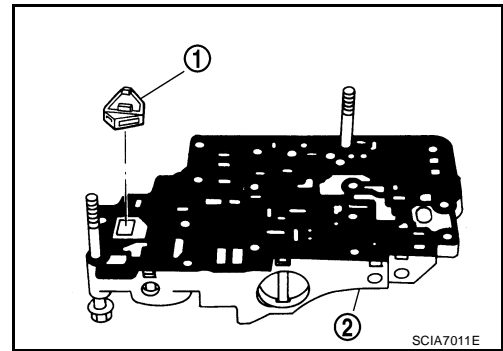
ASSEMBLY

- Install control valve upper, inter and lower body.
 - Place oil circuit of control valve upper body face up. Install steel balls in their proper positions.
- Install reamer bolts (F) from bottom of control valve upper body (1). Using reamer bolts (F) as guides, install separating plate (2) as a set.

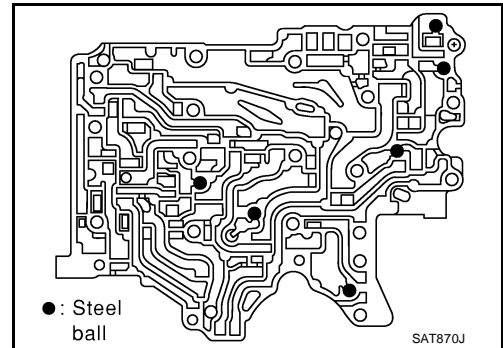


REPAIR FOR COMPONENT PARTS

c. Install pilot filter (1) on control valve upper body (2).

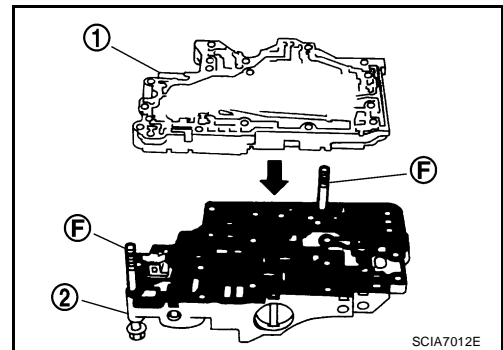


d. Place control valve inter body as shown in figure (side of control valve lower body face up). Install steel balls in their proper positions.

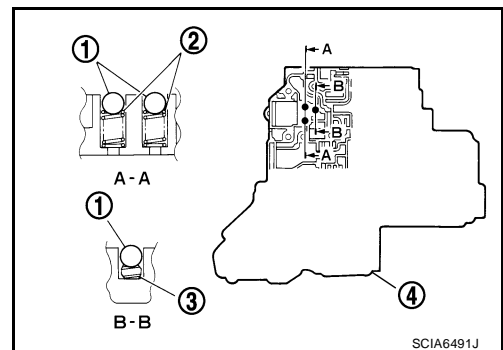


e. Install control valve inter body (1) on control valve upper body (2) using reamer bolts (F) as guides.

CAUTION:
Be careful not to dislocate or drop steel balls.

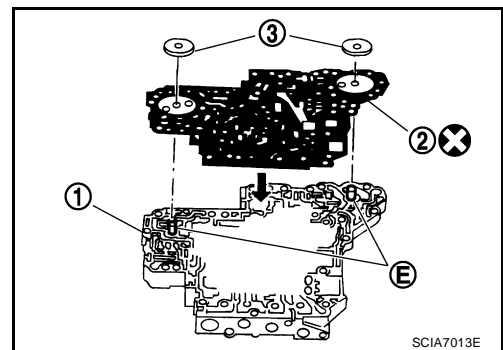


f. Install check balls (1), line pressure relief valve springs (2) and torque converter pressure holding spring (3) in their proper positions in control valve lower body (4).



g. Install bolts (E) from bottom of control valve lower body (1). Using bolts (E) as guides, install separating plate (2) as a set.

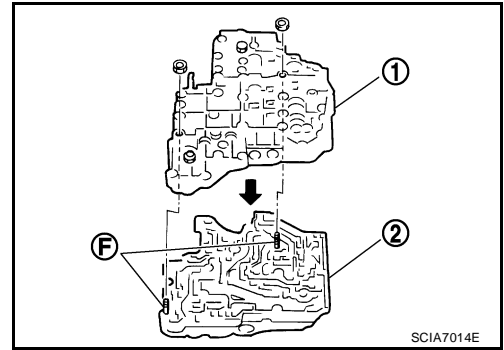
h. Install support plates (3) on control valve lower body (1).



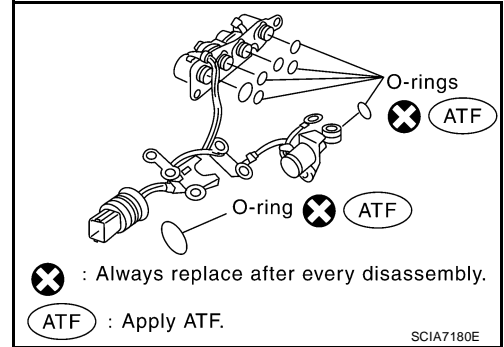
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REPAIR FOR COMPONENT PARTS

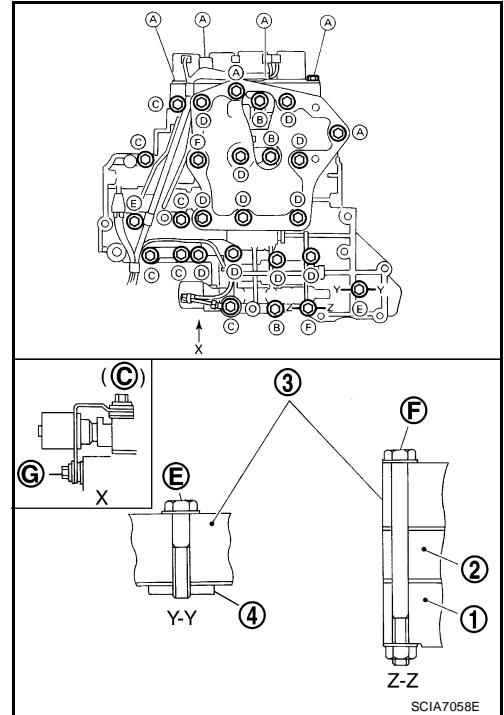
- i. Install control valve lower body (1) on control valve inter body (2) using reamer bolts (F) as guides, and tighten reamer bolts (F) slightly.




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



3. Install and tighten bolts.
 (1): Control valve upper body
 (2): Control valve inter body
 (3): Control valve lower body
 (4): Support plate




Bolt length, number and location:

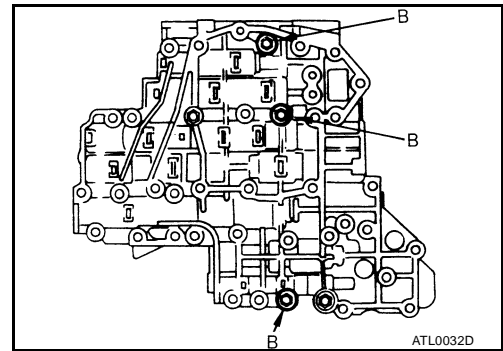
Bolt symbol	A	B	C	D	E	F*	G
Bolt length "ℓ" [mm (in)] 	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1
Tightening torque [N·m (kg-m, in-lb)]	7.84 (0.80, 69)				3.92 (0.40, 35)		7.84 (0.80, 69)

*: Reamer bolt and nut.

REPAIR FOR COMPONENT PARTS


a. Install and tighten bolts (B) to the specified torque.

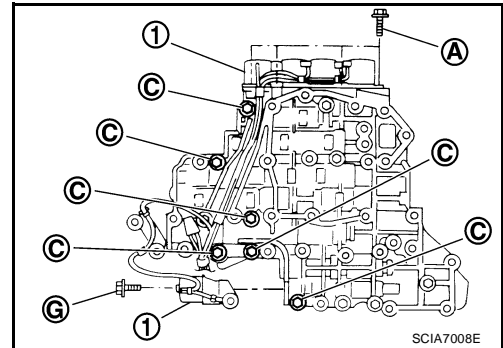
: **7.84 N-m (0.80 kg-m, 69 in-lb)**



b. Install solenoid valve assembly (1) on control valve assembly.


c. Tighten bolts (A), (C) and (G) to the specified torque.

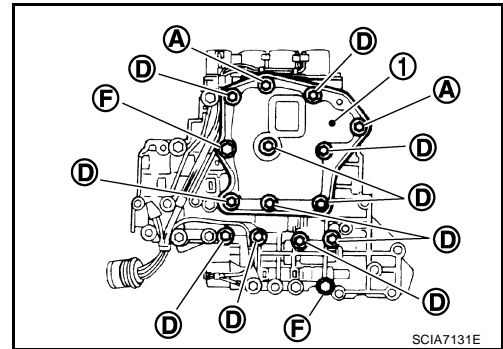
: **7.84 N-m (0.80 kg-m, 69 in-lb)**




d. Remove reamer bolts (F), and then set oil strainer (1) on control valve assembly

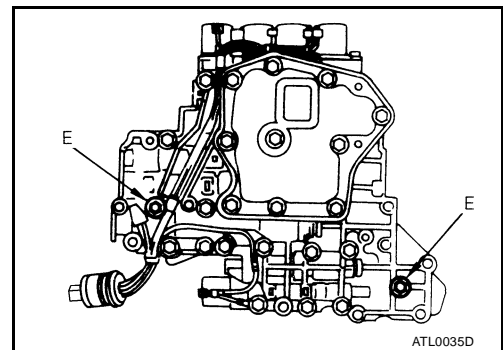
e. Install and tighten bolts (A), (D), reamer bolts (F) and nuts to the specified torque.

: **7.84 N-m (0.80 kg-m, 69 in-lb)**



f. Tighten bolts (E) to the specified torque.

: **3.92 N-m (0.40 kg-m, 35 in-lb)**

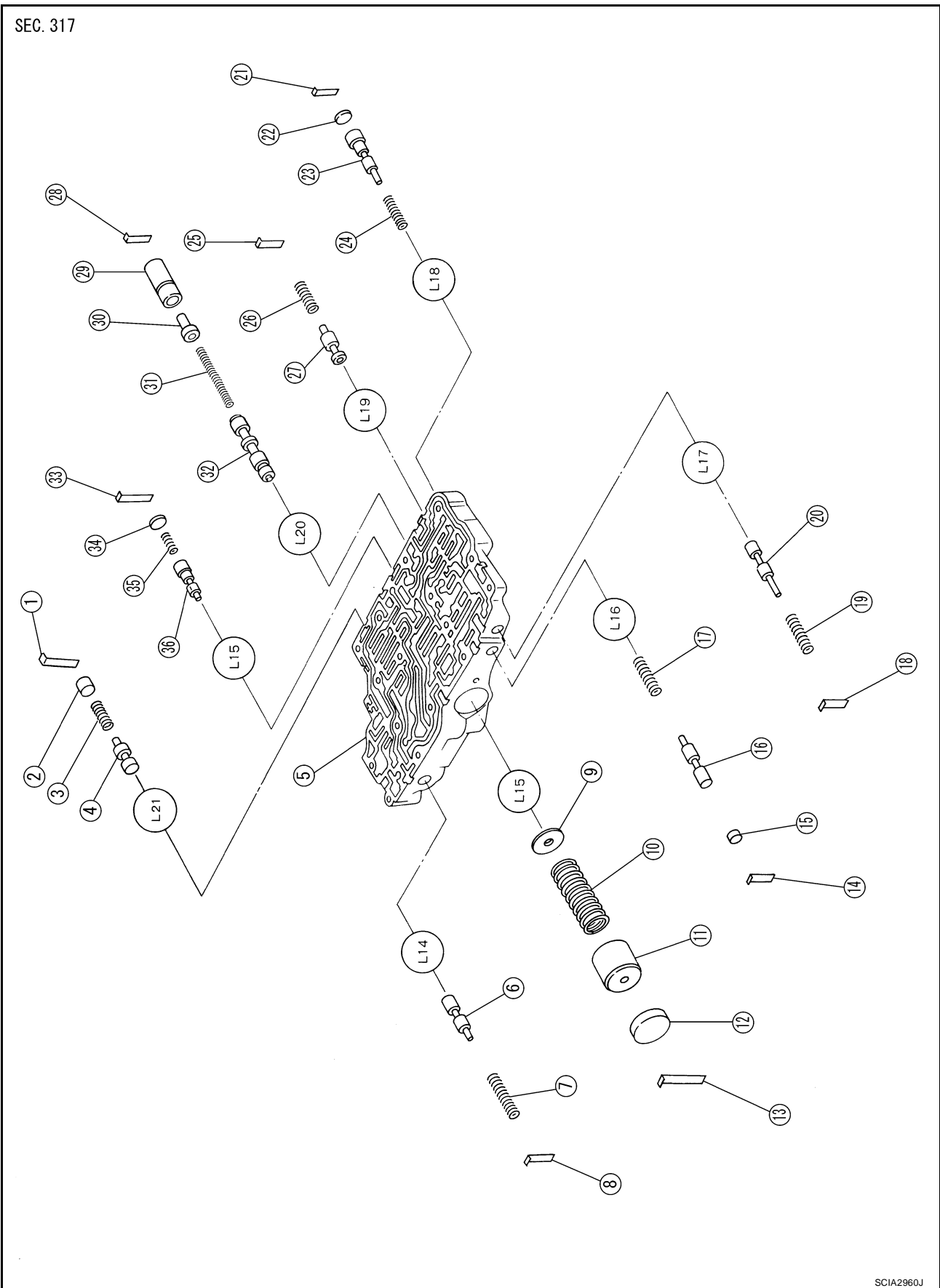


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REPAIR FOR COMPONENT PARTS

Control Valve Upper Body COMPONENTS

UCS005W6



SCIA2960J

REPAIR FOR COMPONENT PARTS

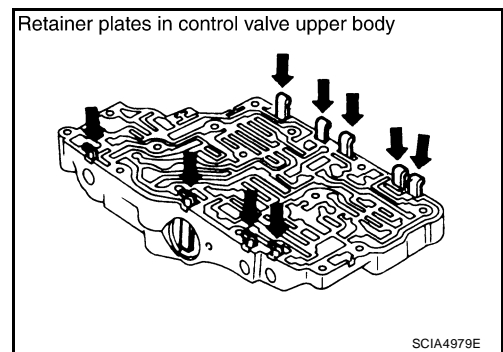
- | | | |
|--|---|--|
| 1. Retainer plate | 2. Plug | 3. Cooler check valve spring |
| 4. Cooler check valve | 5. Control valve upper body | 6. Pilot valve |
| 7. Pilot valve spring | 8. Retainer plate | 9. 1-2 accumulator retainer plate |
| 10. 1-2 accumulator piston spring | 11. 1-2 accumulator piston | 12. Plug |
| 13. Retainer plate | 14. Retainer plate | 15. Plug |
| 16. 1st reducing valve | 17. 1st reducing valve spring | 18. Retainer plate |
| 19. 3-2 timing valve spring | 20. 3-2 timing valve | 21. Retainer plate |
| 22. Plug | 23. Overrun clutch reducing valve | 24. Overrun clutch reducing valve spring |
| 25. Retainer plate | 26. Torque converter relief valve spring | 27. Torque converter relief valve |
| 28. Retainer plate | 29. Sleeve | 30. Plug |
| 31. Torque converter clutch control valve spring | 32. Torque converter clutch control valve | 33. Retainer plate |
| 34. Plug | 35. 1-2 accumulator valve spring | 36. 1-2 accumulator valve |

DISASSEMBLY

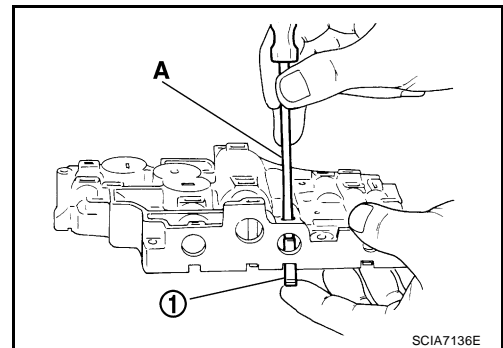
1. Remove valves at retainer plates.

CAUTION:

Do not use a magnetic pick-up tool.



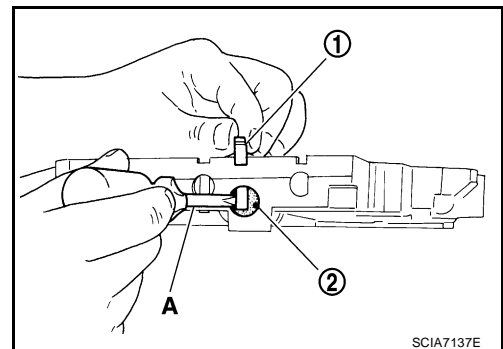
- a. Use a flat-bladed screwdriver A to remove retainer plates (1).



- b. Remove retainer plates (1) while holding spring, plugs (2) or sleeves using a flat-bladed screwdriver A.

CAUTION:

Remove plugs (2) slowly to prevent internal parts from jumping out.

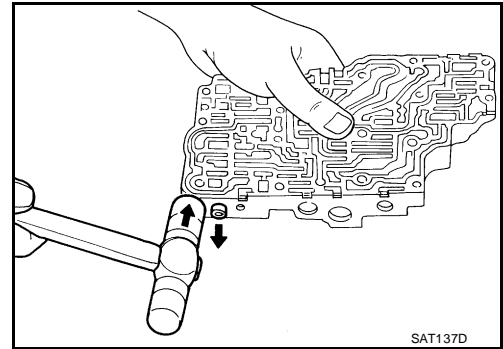


REPAIR FOR COMPONENT PARTS

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

CAUTION:

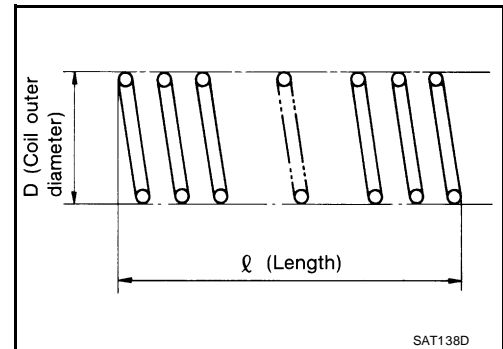
- If a valve is hard to remove, place valve body face down and lightly tap it with a soft hammer.
- Be careful not to drop or damage valves and sleeves.



INSPECTION

Valve Springs

- Check each valve spring for damage or deformation. Also measure free length and outer diameter. Refer to [AT-374, "Control Valves"](#).
- Replace valve springs if deformed or fatigued.



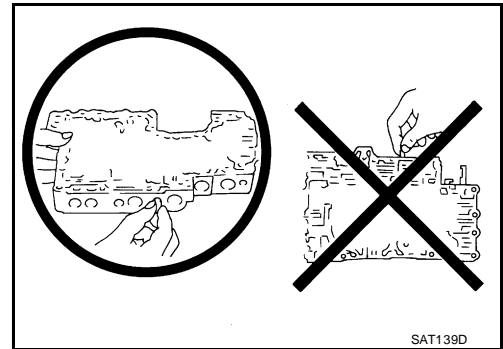
Control Valves

Check sliding surfaces of valves, sleeves and plugs. Replace if necessary.

ASSEMBLY

CAUTION:

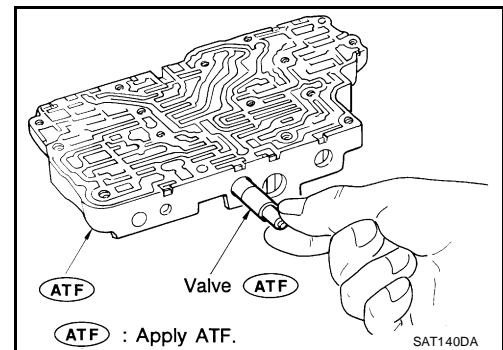
- Apply ATF to all components before installation.
- Lay control valve body down when installing valves. Do not stand control valve body upright.



Lubricate control valve body and all valves with ATF. Install control valves by sliding them carefully into their bores.

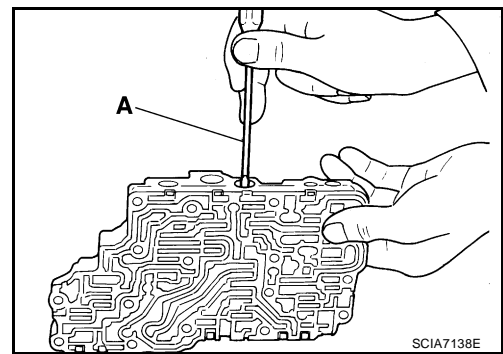
CAUTION:

- Install each control valve one by one.
- Install control valves after checking, because some of them are similar.
- Be careful not to scratch or damage valve body.

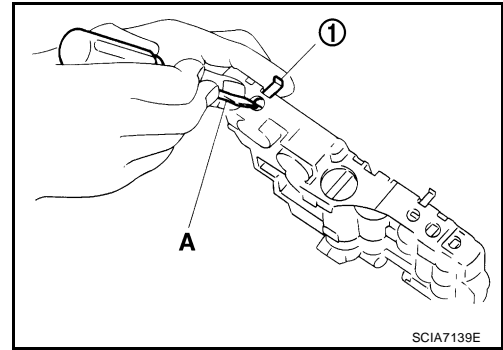


REPAIR FOR COMPONENT PARTS

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

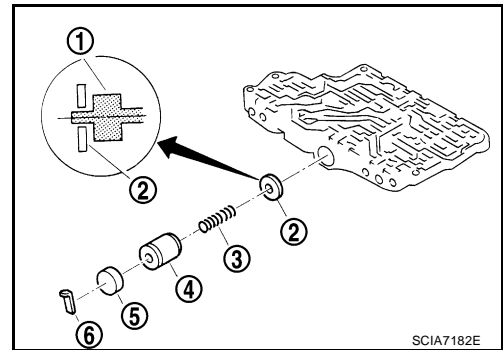


- Install retainer plates (1).
- While pushing plug or return spring, install retainer plate (1) using a flat-bladed screwdriver A.



1-2 Accumulator Valve

- Install 1-2 accumulator valve (1), 1-2 accumulator valve spring and plug. Align 1-2 accumulator retainer plate (2) from opposite side of control valve body.
- Install 1-2 accumulator valve piston spring (3), 1-2 accumulator piston (4), plug (5) and retainer plate (6).

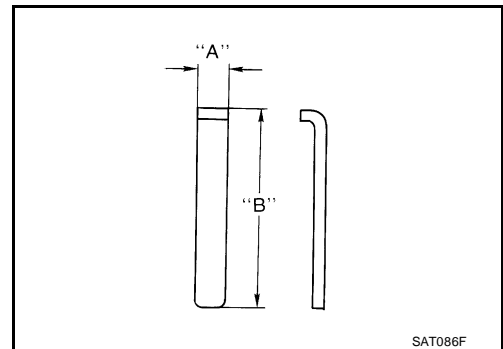


Retainer Plate (Control Valve Upper Body)

Install proper retainer plates. Refer to [AT-296, "COMPONENTS"](#).

Unit: mm (in)

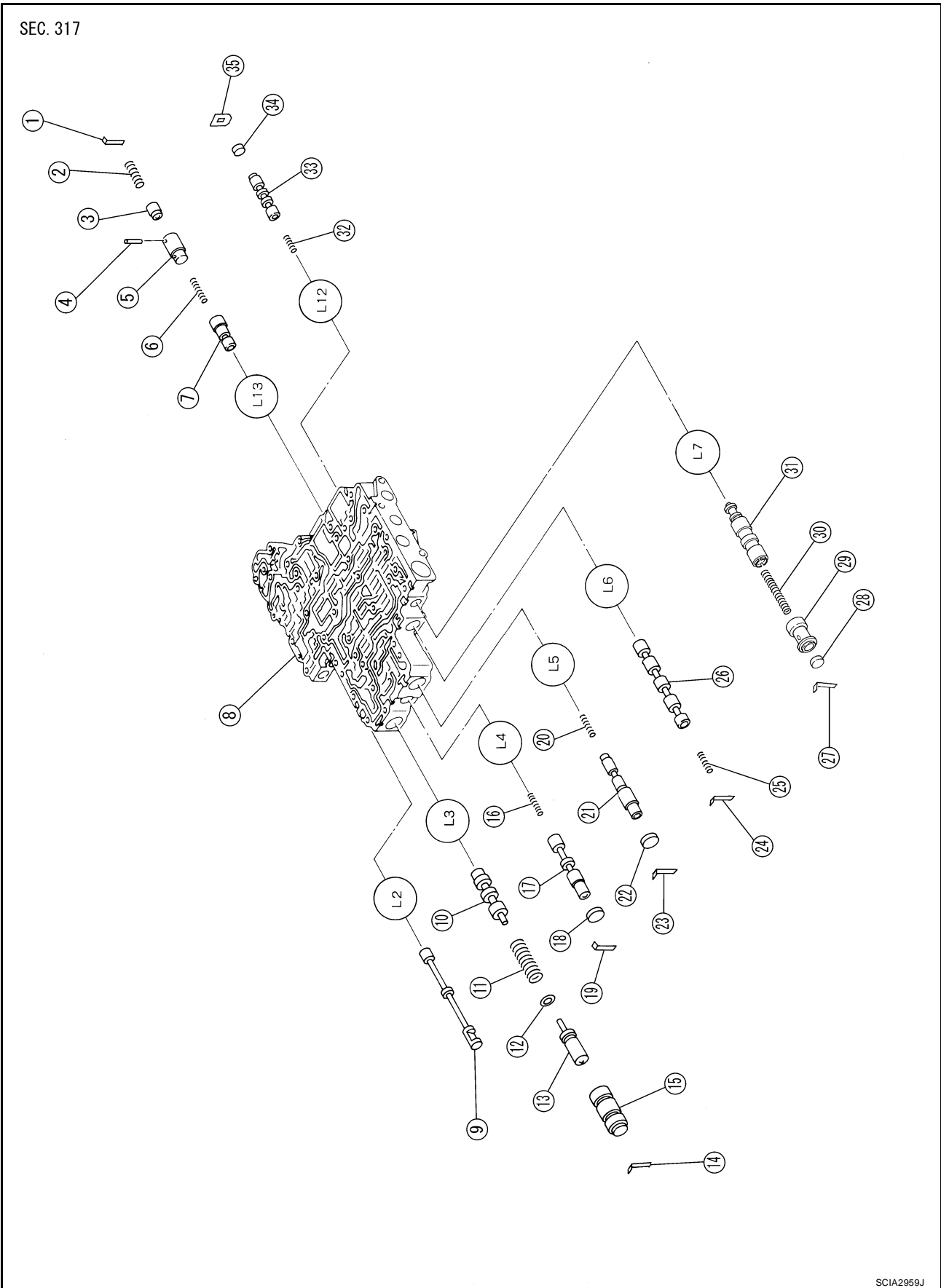
Location	Retainer plate designation	Width "A"	Length "B"
L14	Pilot valve	6.0 (0.236)	21.5 (0.846)
L15	1-2 accumulator valve		40.5 (1.594)
	1-2 accumulator piston		
L16	1st reducing valve		21.5 (0.846)
L17	3-2 timing valve		24.0 (0.945)
L18	Overrun clutch reducing valve		21.5 (0.846)
L19	Torque converter relief valve		28.0 (1.102)
L20	Torque converter clutch control valve		24.0 (0.945)
L21	Cooler check valve		



REPAIR FOR COMPONENT PARTS

Control Valve Lower Body COMPONENTS

UCS005W7



SCIA2959J

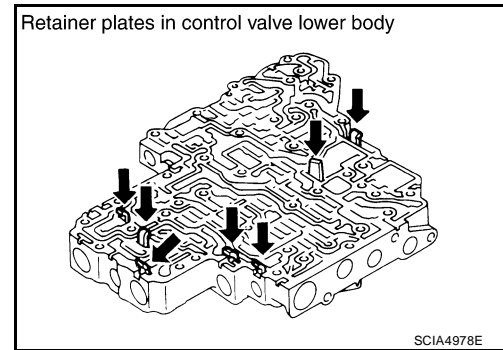
REPAIR FOR COMPONENT PARTS

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

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DISASSEMBLY

Remove valves at retainer plate.
For removal procedures, refer to [AT-297, "DISASSEMBLY"](#) .

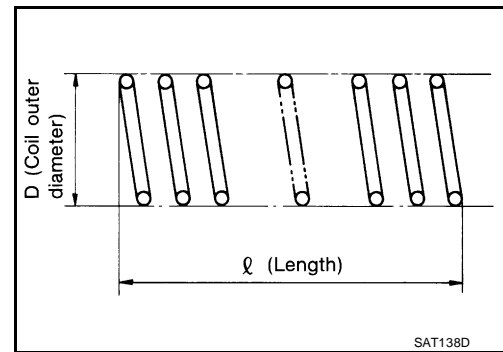


D
E

INSPECTION

Valve Springs

- Check each valve spring for damage or deformation. Also measure free length and outer diameter. Refer to [AT-374, "Control Valves"](#) .
- Replace valve springs if deformed or fatigued.



F
G

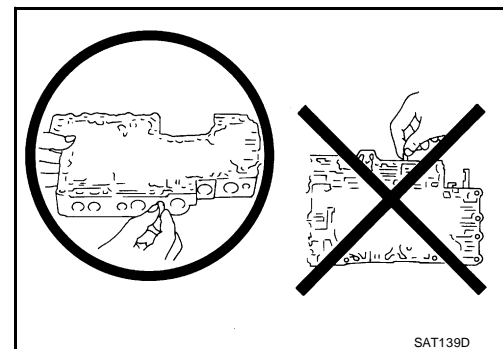
Control Valves

Check sliding surfaces of control valves, sleeves and plugs for damage. Replace if necessary.

ASSEMBLY

CAUTION:

- Apply ATF to all components before installation.
- Lay control valve body down when installing valves. Do not stand control valve body upright.



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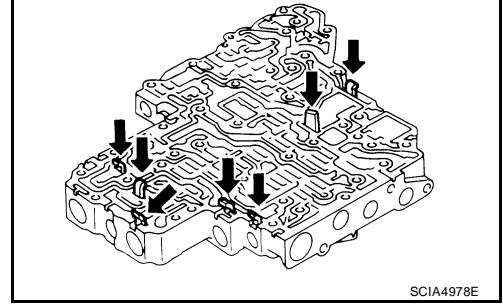
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REPAIR FOR COMPONENT PARTS

Install control valves.

For installation procedures, refer to [AT-298, "ASSEMBLY"](#) .

Retainer plates in control valve lower body

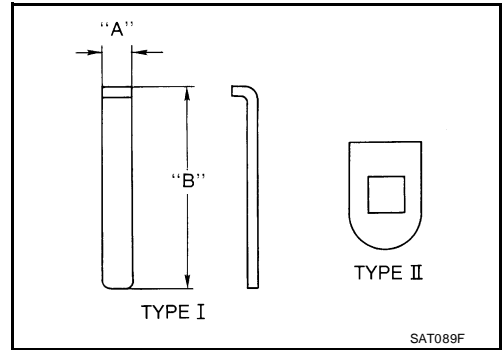


Retainer Plate (Control Valve Lower Body)

Install proper retainer plates. Refer to [AT-300, "COMPONENTS"](#) .

Unit: mm (in)

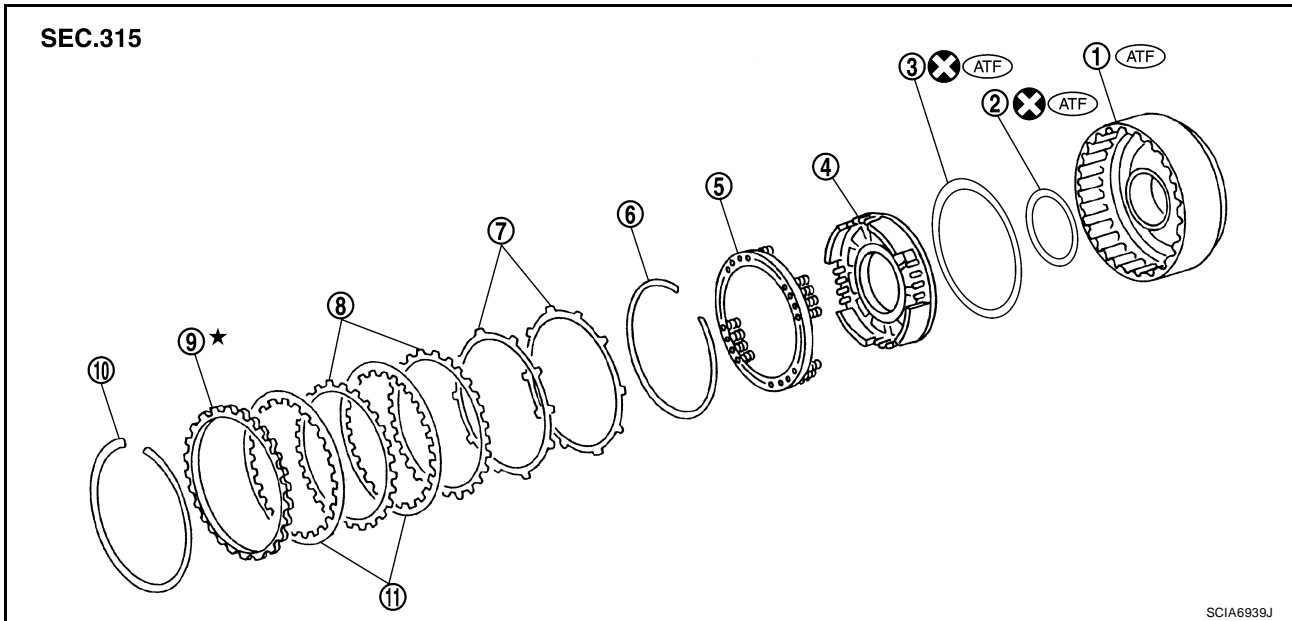
Location	Retainer plate designation	Width "A"	Length "B"	Type
L3	Pressure regulator valve	6.0 (0.236)	28.0 (1.102)	I
L4	Overrun clutch control valve			
L5	Accumulator control valve			
L6	Shift valve A			
L7	Shuttle valve			
L12	Shift valve B	17.0 (0.669)	24.0 (0.945)	II
L13	Pressure modifier valve	6.0 (0.236)	28.0 (1.102)	I



REPAIR FOR COMPONENT PARTS

Reverse Clutch COMPONENTS

UCS005W8

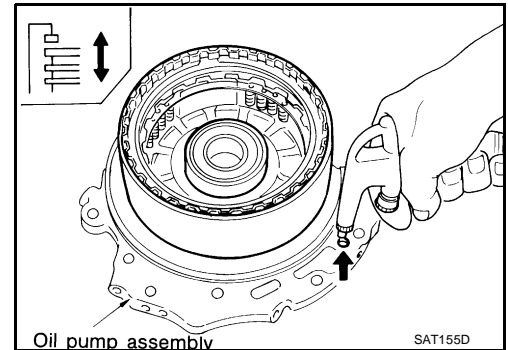


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|--------------------------|-----------------------------|--------------------|
| 1. Reverse clutch drum | 2. D-ring | 3. Seal lip |
| 4. Reverse clutch piston | 5. Spring retainer assembly | 6. Snap ring |
| 7. Dish plate | 8. Driven plate | 9. Retaining plate |
| 10. Snap ring | 11. Drive plate | |

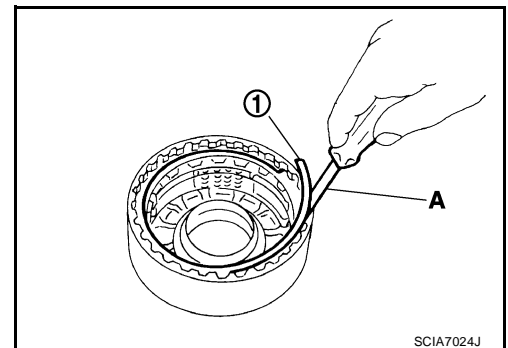
Refer to GI section to make sure icons (symbol marks) in the figure. Refer to [GI-10, "Components"](#) .

DISASSEMBLY

1. Check operation of reverse clutch
 - a. Install seal rings to drum support of oil pump assembly, and set reverse clutch assembly.
 - b. Apply compressed air into the oil hole at the location as shown in the figure.
 - c. Check to see that retaining plate moves to snap ring.
 - d. If retaining plate does not contact snap ring:
 - D-ring might be damaged.
 - Seal lip might be damaged.
 - Fluid might be leaking past piston check ball.



2. Remove snap ring (1) using a flat-bladed screwdriver A.
3. Remove retaining plate, drive plates, driven plates and dish plates.



REPAIR FOR COMPONENT PARTS

4. Set Tool A on spring retainer assembly, and remove snap ring (1) from reverse clutch drum while compressing spring retainer assembly.

Tool number: KV31103200 (J-39186)

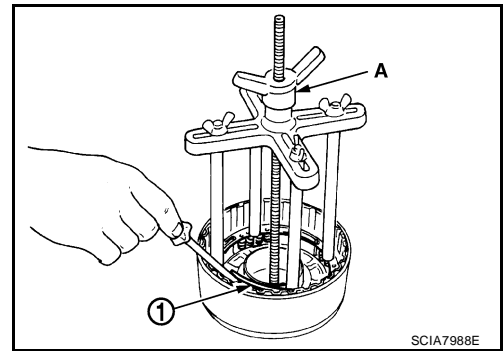
CAUTION:

Set SST directly over return springs.

5. Remove spring retainer assembly from reverse clutch drum.

CAUTION:

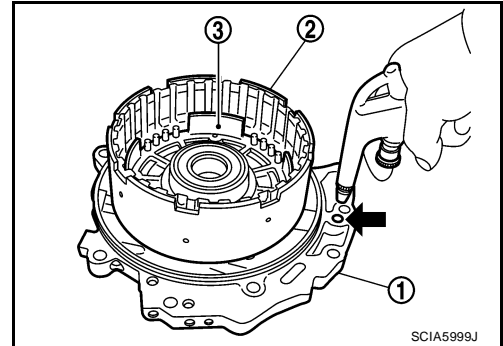
Do not remove return springs from spring retainer.



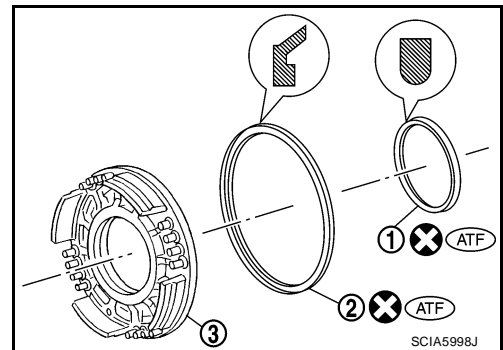
6. Install seal rings to drum support of oil pump assembly (1), and set reverse clutch drum (2). Then apply compressed air into the oil hole at the location as shown in the figure to remove reverse clutch piston (3) from reverse clutch drum (2).

CAUTION:

Do not flow air in too quickly or reverse clutch piston (3) and ATF could jump out. Carefully flow air in little by little while protecting with lint-free cloth.



7. Remove D-ring (1) and seal lip (2) from reverse clutch piston (3).



REPAIR FOR COMPONENT PARTS

INSPECTION

Reverse Clutch Snap Ring

Check for deformation, fatigue or damage. Replace if necessary.

Reverse Clutch Drive Plates

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

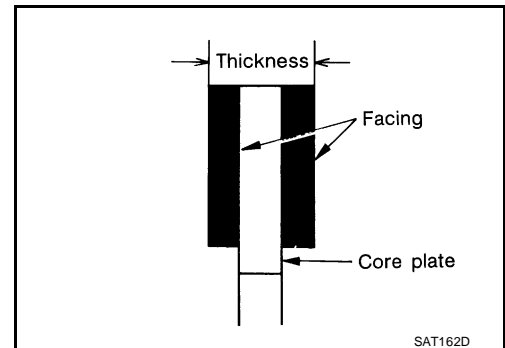
Thickness of drive plate

Standard and allowable limit:

Refer to [AT-374, "REVERSE CLUTCH"](#) .

CAUTION:

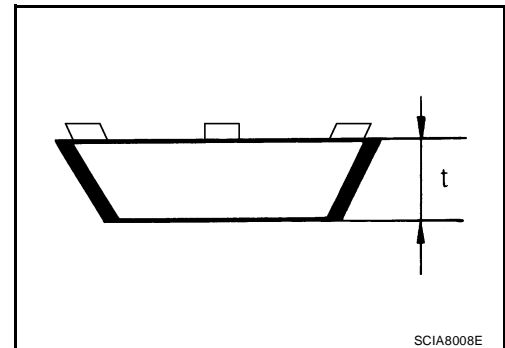
- Measure the thickness at 3 locations and find the average.
- Inspect all drive plates.
- Replace if the thickness is below the allowable limit.



Reverse Clutch Dish Plates

- Check for deformation or damage.
- Measure thickness (t) of dish plate. Replace if damaged, deformed or worn.

Thickness of dish plate (t): 2.87 mm (0.1130 in)



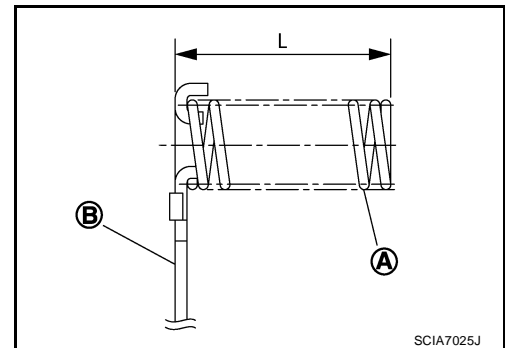
Reverse Clutch Spring Retainer Assembly

Measure length (L) of spring retainer assembly. Replace if damaged, deformed or worn.

Length (L): 20.1 mm (0.791 in)

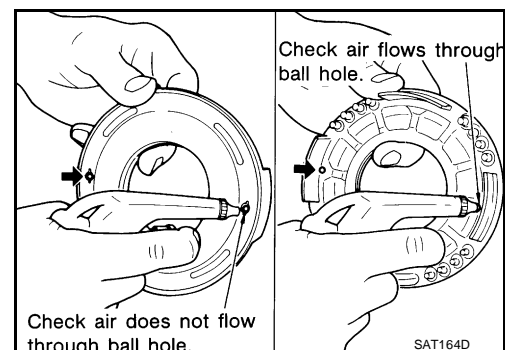
CAUTION:

Do not remove return springs (A) from spring retainer (B)



Reverse Clutch Piston

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



Reverse Clutch Drum

Check for deformation or damage. Replace if necessary.

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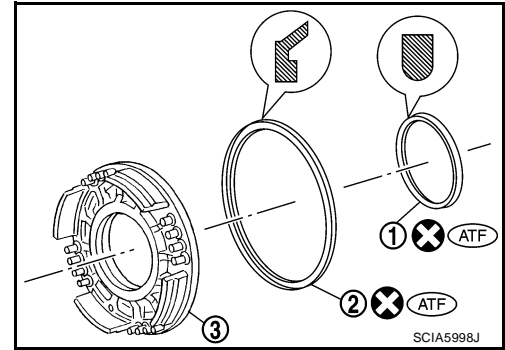
REPAIR FOR COMPONENT PARTS

ASSEMBLY

1. Install D-ring (1) and seal lip (2) on reverse clutch piston (3).

CAUTION:

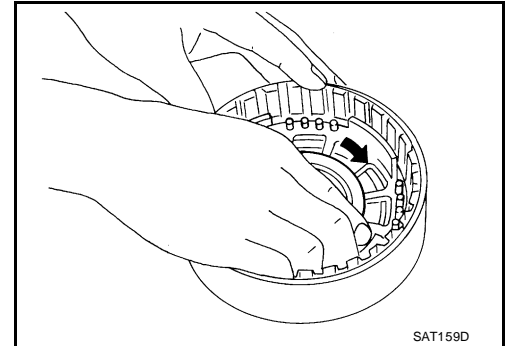
Be careful with the direction of seal lip (2).



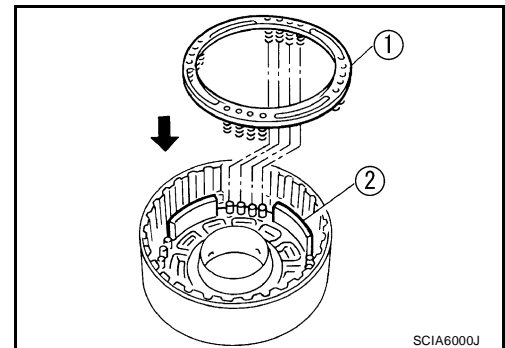
2. Install reverse clutch piston by turning it slowly.

CAUTION:

Apply ATF to inner surface of reverse clutch drum.



3. Install spring retainer assembly (1) to reverse clutch piston (2).

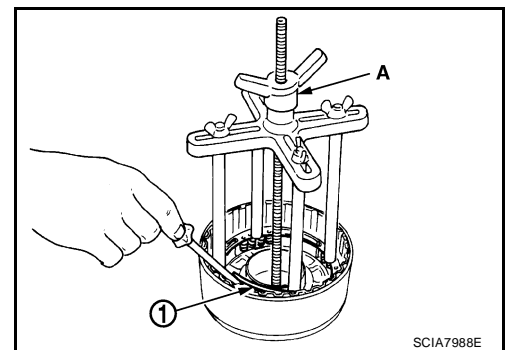


4. Set Tool A on spring retainer assembly, and install snap ring (1) while compressing spring retainer assembly.

Tool number: **KV31103200 (J-39186)**

CAUTION:

Set SST directly over return springs.



REPAIR FOR COMPONENT PARTS

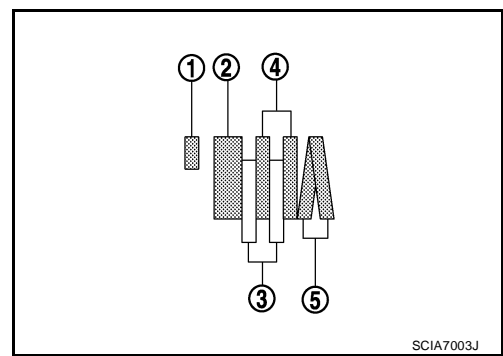
5. Install dish plates, driven plates, drive plates and retaining plate.

- (1): Snap ring
- (2): Retaining plate
- (3): Drive plate
- (4): Driven plate
- (5): Dish plate

Drive plate/Driven plate: 2/2

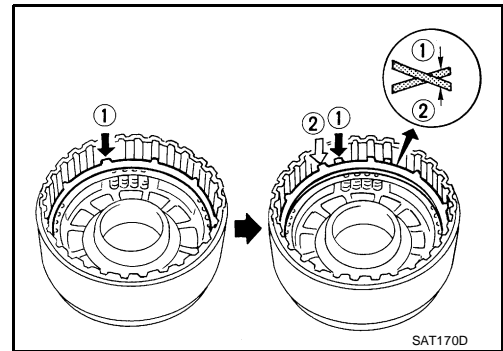
CAUTION:

Be careful with the order of plates.

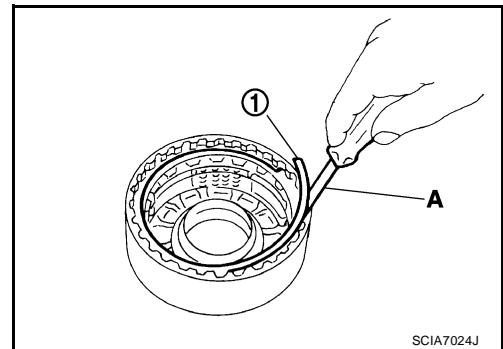


NOTE:

Install two dish plates fitting each installation direction with reverse clutch drum groove displaced slightly.



6. Install snap ring (1) using a flat-bladed screwdriver A.



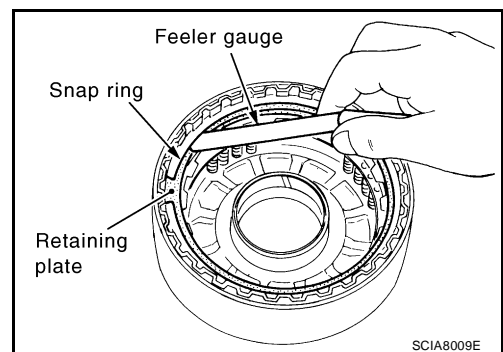
7. Measure clearance between retaining plate and snap ring using feeler gauge. If not within allowable limit, select proper retaining plate. Refer to "Parts Information" for retaining plate selection.

Specified clearance

Standard and allowable limit:

Refer to [AT-374, "REVERSE CLUTCH"](#) .

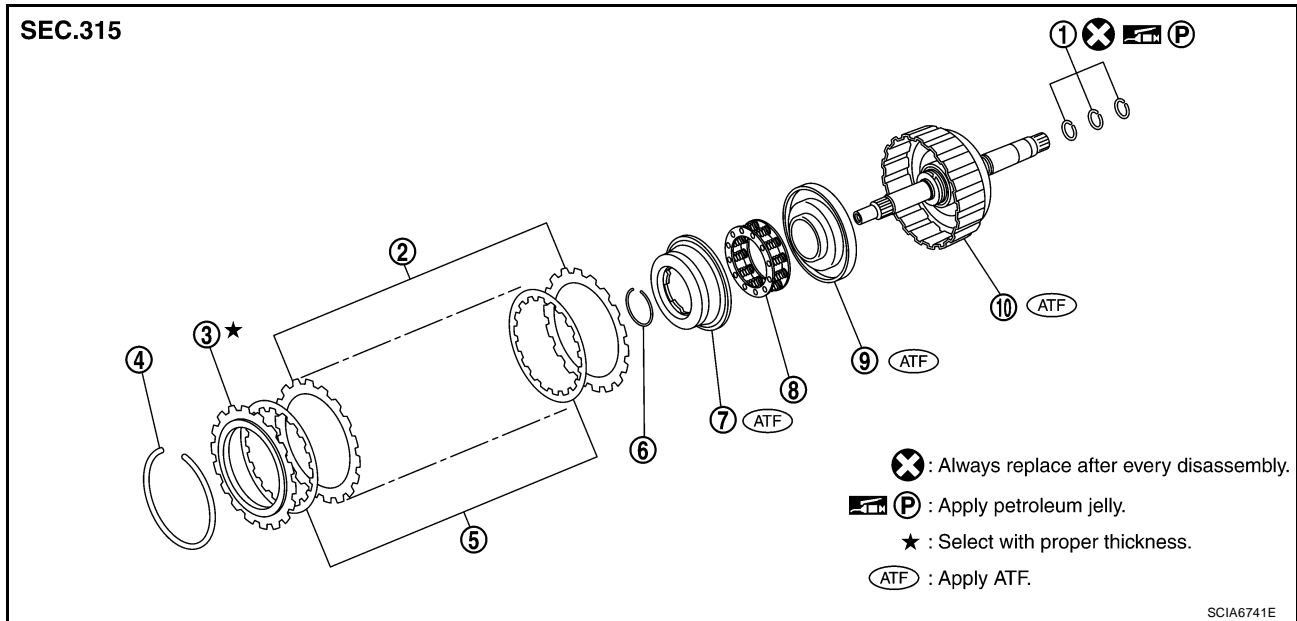
8. Check operation of reverse clutch. Refer to [AT-303, "DISASSEMBLY"](#) .



REPAIR FOR COMPONENT PARTS

High Clutch COMPONENTS

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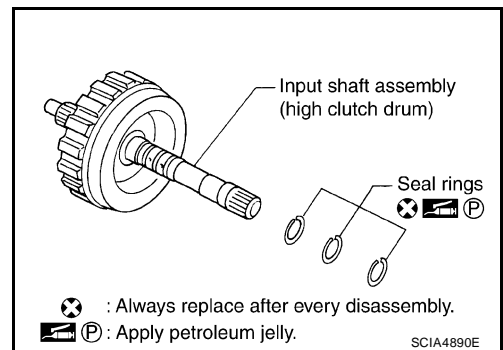
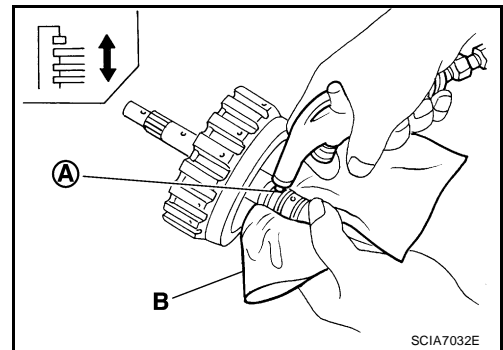


- | | | |
|---|-----------------------------|-----------------------|
| 1. Seal ring | 2. Driven plate | 3. Retaining plate |
| 4. Snap ring | 5. Drive plate | 6. Snap ring |
| 7. Cancel cover | 8. Spring retainer assembly | 9. High clutch Piston |
| 10. Input shaft assembly (high clutch drum) | | |

DISASSEMBLY

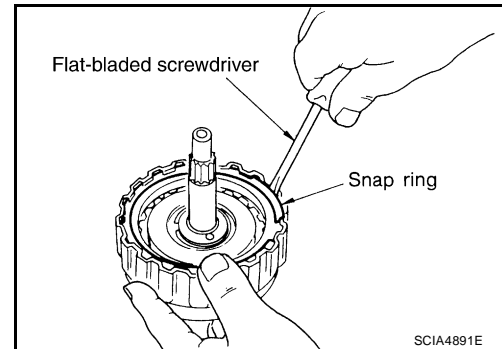
1. Check operation of high clutch.
 - a. Apply compressed air into the oil hole (A) of input shaft assembly (high clutch drum) at the location as shown in the figure.

CAUTION:
Block the oil hole (A) on the opposite side with lint-free cloth B.
 - b. Check to see that retaining plate moves to snap ring.
 - c. If retaining plate does not contact snap ring:
 - High clutch piston seal might be damaged.
2. Remove seal rings from input shaft assembly (high clutch drum).



REPAIR FOR COMPONENT PARTS

- Remove snap ring using a flat-bladed screwdriver.
- Remove retaining plate, drive plates and driven plates.

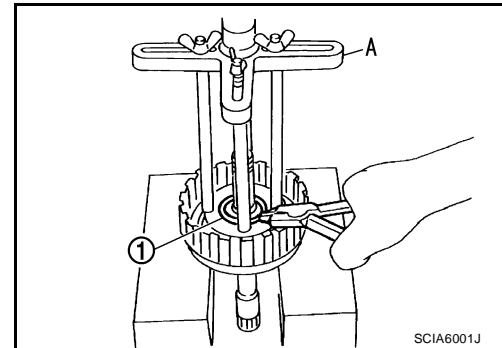


- Set Tool A on cancel cover, and remove snap ring (1) from input shaft assembly (high clutch drum) while compressing spring retainer assembly.

Tool number: KV31103200 (J-39186)

CAUTION:

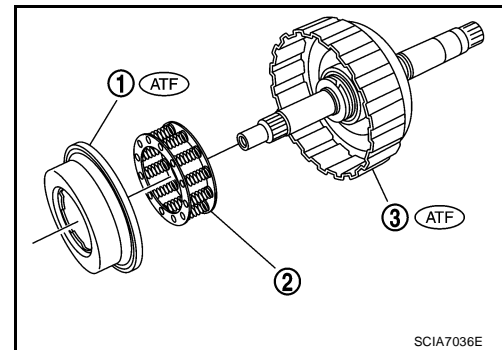
Do not expand snap ring (1) excessively.



- Remove cancel cover (1) and spring retainer assembly (2) from input shaft assembly (high clutch drum) (3).

CAUTION:

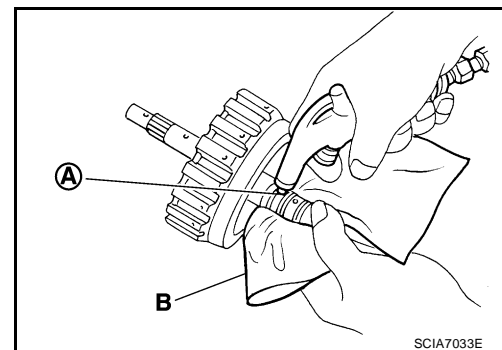
Do not remove return springs from spring retainers.



- Apply compressed air into the oil hole (A) at the location as shown in the figure to remove high clutch piston from input shaft assembly (high clutch drum).

CAUTION:

- Do not blow air in too quickly, or high clutch piston and ATF could jump out. Carefully blow air little by little while protecting with lint-free cloth B.
- Block the oil hole on the opposite side with lint-free cloth B.



REPAIR FOR COMPONENT PARTS

INSPECTION

High Clutch Snap Ring

Check for deformation, fatigue or damage. Replace if necessary.

High Clutch Drive Plates

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

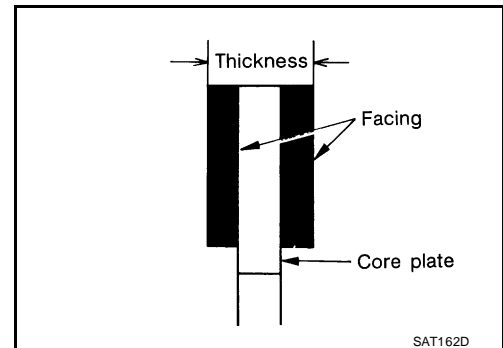
Thickness of drive plate

Standard and allowable limit:

Refer to [AT-375, "HIGH CLUTCH"](#) .

CAUTION:

- Measure the thickness at 3 locations and find the average.
- Inspect all drive plates.
- Replace if the thickness is below the allowable limit.



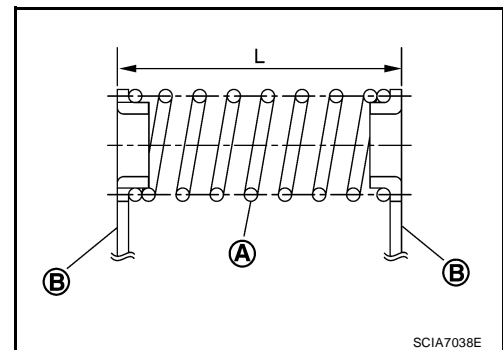
High Clutch Spring Retainer Assembly

Check length (L) of springs retainer assembly. Replace if damaged, deformed or worn.

Length (L): **20.6 mm (0.811 in)**

CAUTION:

Do not remove return springs (A) from spring retainers (B).



High Clutch Piston and Cancel Cover

Check for deformation or damage. Replace if necessary.

Input Shaft Assembly (High Clutch Drum)

Check for deformation or damage. Replace if necessary.

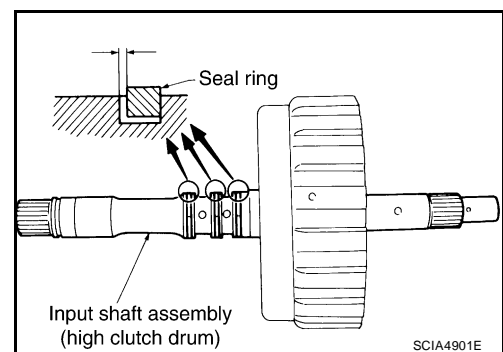
Seal Ring Clearance

- Install new seal rings onto input shaft assembly (high clutch drum).
- Measure clearance between seal ring and ring groove.

Standard clearance and allowable limit:

Refer to [AT-376, "Input Shaft"](#) .

- If not within allowable limit, replace input shaft assembly (high clutch drum).



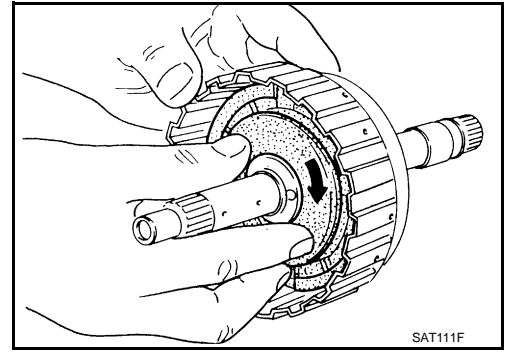
REPAIR FOR COMPONENT PARTS

ASSEMBLY

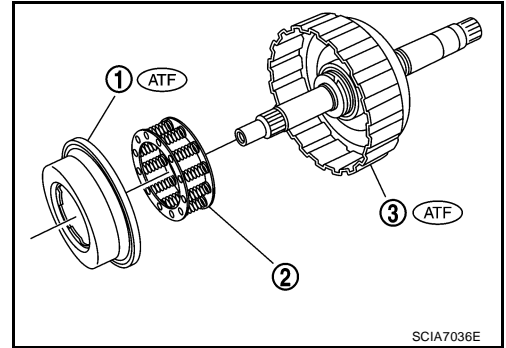
1. Install high clutch piston by turning it slowly.

CAUTION:

Apply ATF to inner surface of input shaft assembly (high clutch drum) and high clutch piston.



2. Install spring retainer assembly (2) and cancel cover (1) on input shaft assembly (high clutch drum) (3).

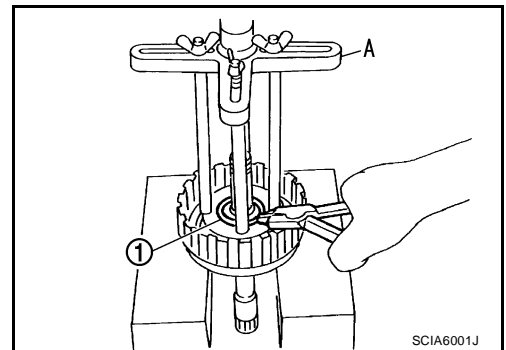


3. Set Tool A on cancel cover, and install snap ring (1) to input shaft assembly (high clutch drum) while slowly compressing spring retainer assembly.

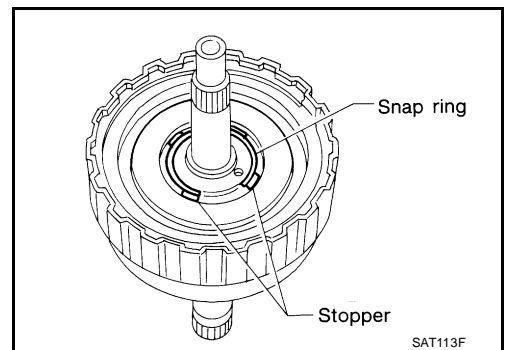
Tool number: KV31103200 (J-39186)

CAUTION:

- Do not expand snap ring (1) excessively.
- Install spring retainer assembly without tilting.



- Do not align snap ring gap with cancel cover stopper.



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REPAIR FOR COMPONENT PARTS

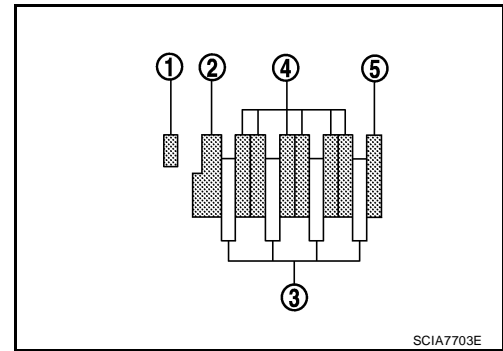
4. Install driven plates, drive plates and retaining plate.

- (1): Snap ring
- (2): Retaining plate
- (3): Drive plate
- (4): Driven plate
- (5): Driven plate

Drive plate/Driven plate: 4/7 (1+6)

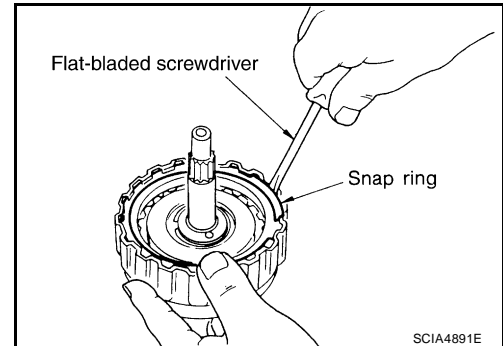
CAUTION:

Be careful with the order and direction of plates.



SCIA7703E

5. Install snap ring using a flat-bladed screwdriver.



SCIA4891E

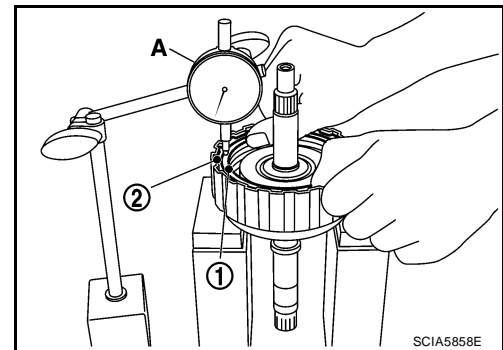
6. Set dial indicator A on retaining plate (1), and measure clearance between retaining plate (1) and snap ring (2). If not within allowable limit, select proper retaining plate (1). Refer to "Parts Information" for retaining plate selection.

Specified clearance

Standard and allowable limit:

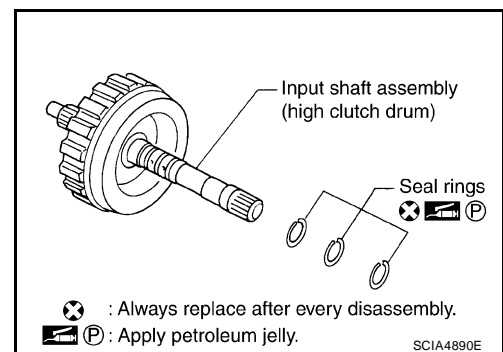
Refer to [AT-375, "HIGH CLUTCH"](#) .

7. Check operation of high clutch. Refer to [AT-308, "DISASSEMBLY"](#) .



SCIA5858E

8. Install seal rings to input shaft assembly (high clutch drum).

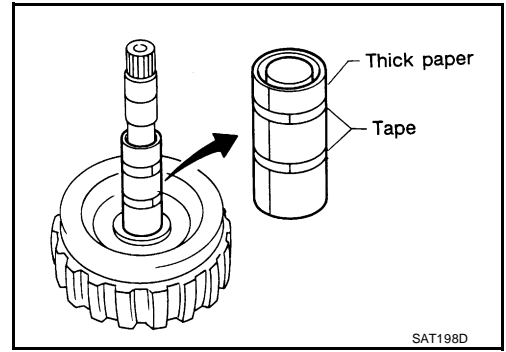


SCIA4890E

REPAIR FOR COMPONENT PARTS

CAUTION:

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

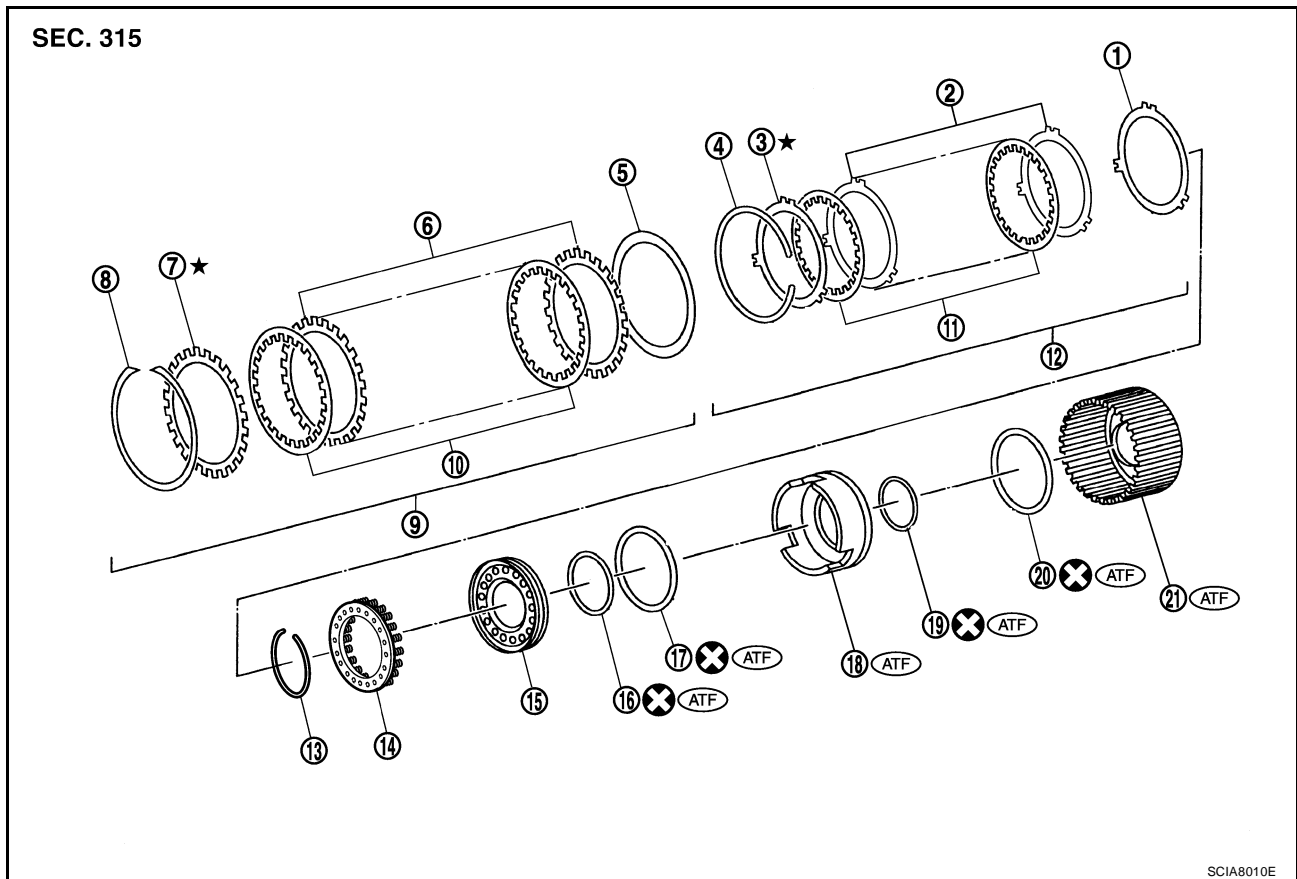


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REPAIR FOR COMPONENT PARTS

UCS005WA

Forward and Overrun Clutches COMPONENTS



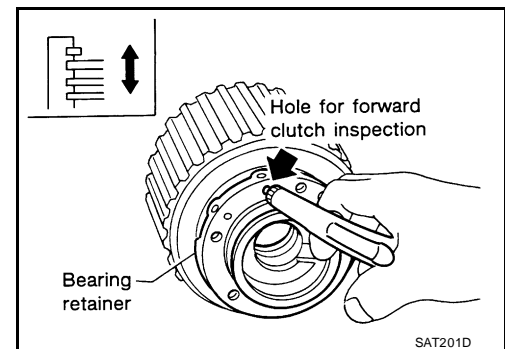
SCIA8010E

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|--------------------|------------------------------|---------------------------|
| 1. Dish plate | 2. Driven plate | 3. Retaining plate |
| 4. Snap ring | 5. Dish plate | 6. Driven plate |
| 7. Retaining plate | 8. Snap ring | 9. Forward clutch |
| 10. Drive plate | 11. Drive plate | 12. Overrun clutch |
| 13. Snap ring | 14. Spring retainer assembly | 15. Overrun clutch piston |
| 16. D-ring | 17. Seal lip | 18. Forward clutch piston |
| 19. D-ring | 20. Seal lip | 21. Forward clutch drum |

Refer to Refer to Service Manual for symbol mark in the figure.

DISASSEMBLY

1. Check operation of forward clutch.
 - a. Install seal rings to bearing retainer, and set forward clutch drum.
 - b. Apply compressed air into oil hole of bearing retainer at the location as shown in the figure.
 - c. Check to see that retaining plate moves to snap ring.
 - d. If retaining plate does not contact snap ring:
 - D-ring might be damaged.
 - Seal lip might be damaged.
 - Fluid might be leaking past piston check ball.

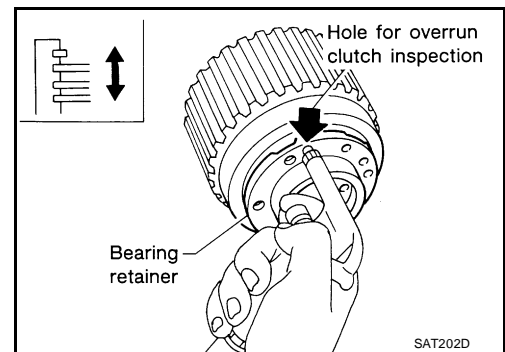


SAT201D

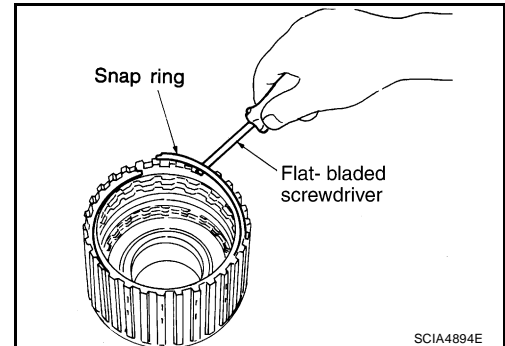
2. Check operation of overrun clutch.
 - a. Install seal rings to bearing retainer, and set forward clutch drum.

REPAIR FOR COMPONENT PARTS

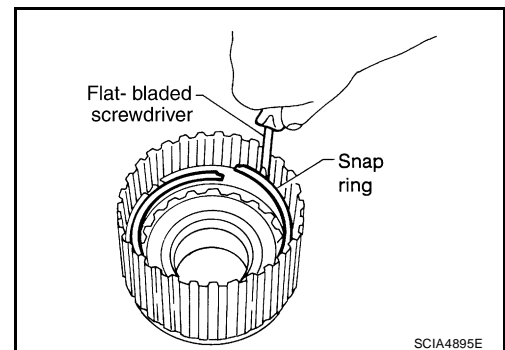
- b. Apply compressed air into oil hole of bearing retainer at the location as shown in the figure.
- c. Check to see that retaining plate moves to snap ring.
- d. If retaining plate does not contact snap ring:
 - D-ring might be damaged.
 - Seal lip might be damaged.
 - Fluid might be leaking past piston check ball.



3. Remove snap ring for forward clutch from forward clutch drum using a flat-bladed screwdriver.
4. Remove retaining plate, drive plates, driven plates and dish plate for forward clutch.



5. Remove snap ring for overrun clutch from forward clutch drum using a flat-bladed screwdriver.
6. Remove retaining plate, drive plates, driven plates and dish plate for overrun clutch.



7. Set Tool A on spring retainer assembly, and remove snap ring (1) from forward clutch drum while compressing spring retainer assembly.

Tool number: KV31103200 (J-39186)

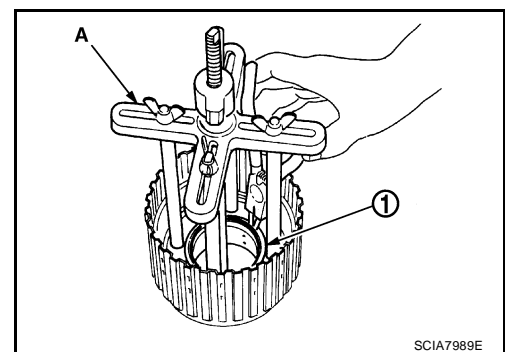
CAUTION:

- Set SST directly over return springs.
- Do not expand snap ring excessively.

8. Remove spring retainer assembly from forward clutch drum.

CAUTION:

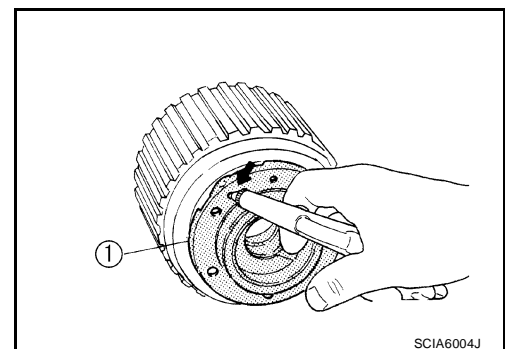
Do not remove return springs from spring retainer.



9. Install seal rings to bearing retainer (1), and set forward clutch drum. Then apply compressed air into the oil hole at the location as shown in the figure to remove overrun clutch piston from forward clutch piston.

CAUTION:

Do not blow air in too quickly, or overrun clutch piston and ATF could jump out. Carefully blow air little by little while protecting with lint-free cloth.



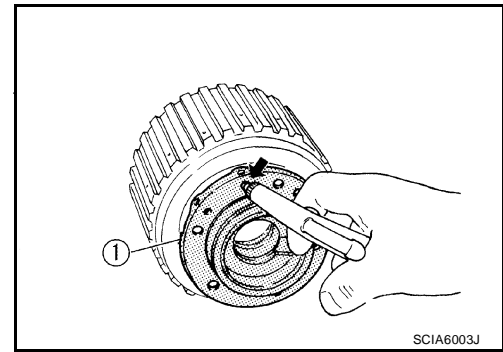
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REPAIR FOR COMPONENT PARTS

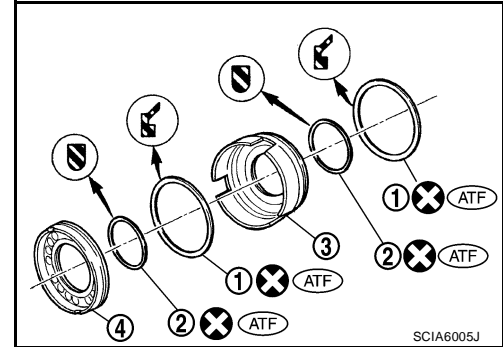
10. Install seal rings to bearing retainer (1), and set forward clutch drum. Then apply compressed air into the oil hole at the location as shown in the figure to remove forward clutch piston from forward clutch drum.

CAUTION:

Do not blow air in too quickly, or forward clutch piston and ATF could jump out. Carefully blow air little by little while protecting with lint-free cloth.



11. Remove seal lips (1) and D-rings (2) from forward clutch piston (3) and overrun clutch piston (4).



INSPECTION

Forward Clutch and Overrun Clutch Snap Rings

Check for deformation, fatigue or damage. Replace if necessary.

Forward Clutch and Overrun Clutch Drive Plates

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

Thickness of drive plate

Forward clutch

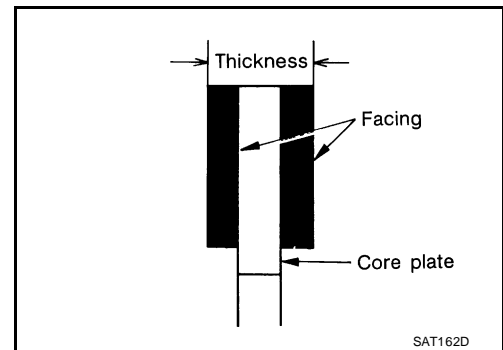
Standard and allowable limit:

Refer to [AT-375, "FORWARD CLUTCH"](#) .

Overrun clutch

Standard and allowable limit:

Refer to [AT-375, "OVERRUN CLUTCH"](#) .



CAUTION:

- Measure the thickness at 3 locations and find the average.
- Inspect all drive plates.
- Replace if the thickness is below the allowable limit.

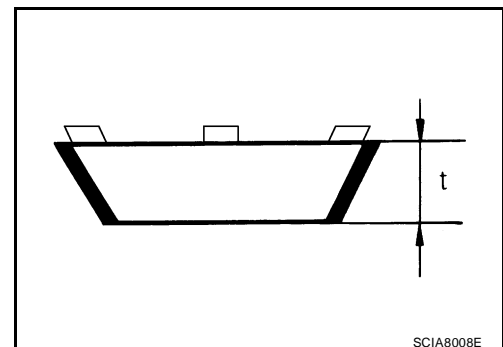
Forward Clutch and Overrun Clutch Dish Plates

- Check for deformation or damage.
- Measure thickness (t) of dish plate. Replace if damaged, deformed or worn.

Thickness of dish plate (t)

Forward clutch: 2.5 mm (0.098 in)

Overrun clutch: 2.15 mm (0.0846 in)



REPAIR FOR COMPONENT PARTS

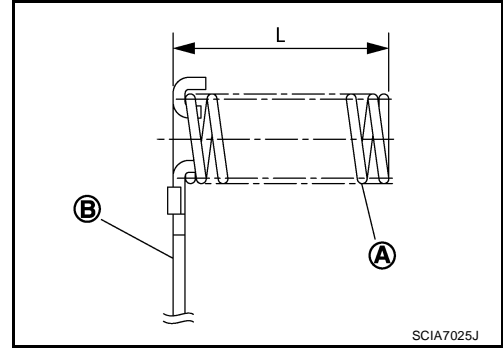
Forward Clutch and Overrun Clutch Spring Retainer Assembly

Check length (L) of spring retainer assembly. Replace if damaged, deformed or worn.

Length (L): 27.7 mm (0.1091 in)

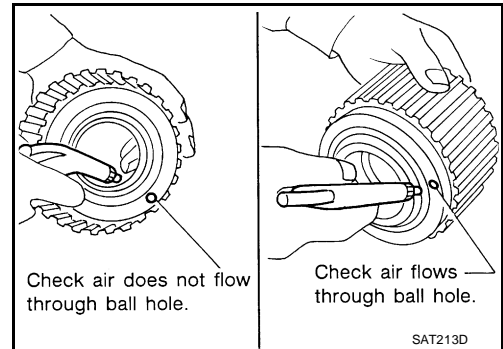
CAUTION:

Do not remove return springs (A) from spring retainer (B)



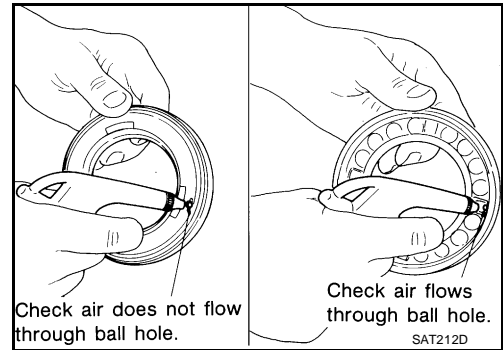
Forward Clutch Drum

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



Overrun Clutch Piston

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

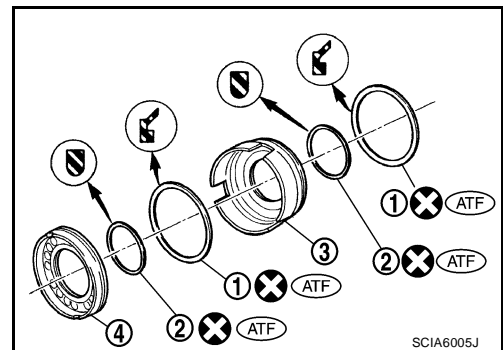


ASSEMBLY

1. Install seal lips (1) and D-rings (2) on forward clutch piston (3) and overrun clutch piston (4).

CAUTION:

Be careful with the direction of seal lips (1).

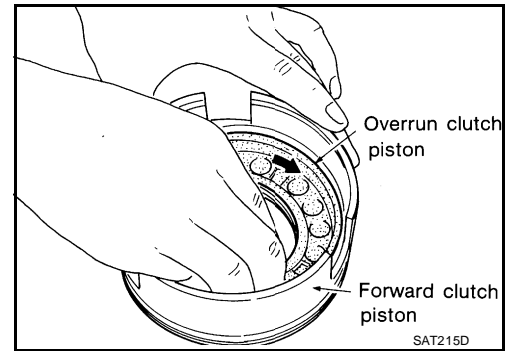


REPAIR FOR COMPONENT PARTS

2. Install overrun clutch piston on forward clutch piston by turning it slowly.

CAUTION:

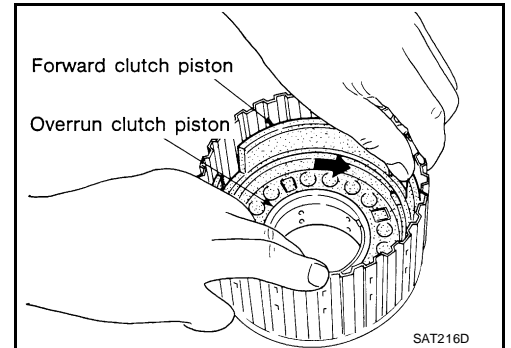
Apply ATF to inner surface of forward clutch piston.



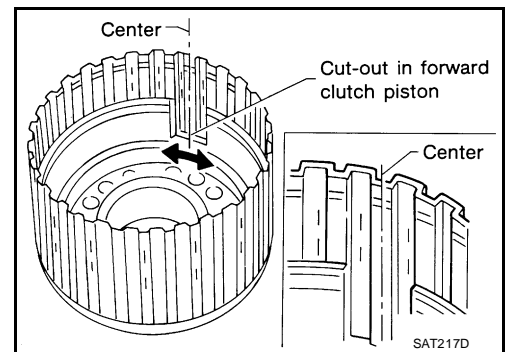
3. Install forward clutch piston with overrun clutch piston on forward clutch drum by turning it slowly.

CAUTION:

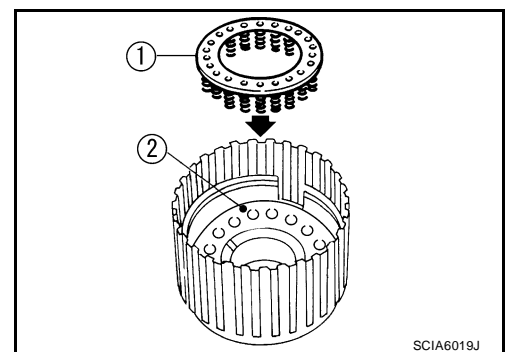
Apply ATF to inner surface of forward clutch drum.



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



5. Install spring retainer assembly (1) on overrun clutch piston (2).

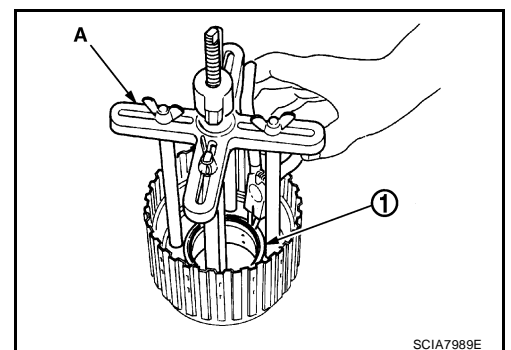


6. Set Tool A on spring retainer assembly, and install snap ring (1) while compressing spring retainer assembly.

Tool number: KV31103200 (J-39186)

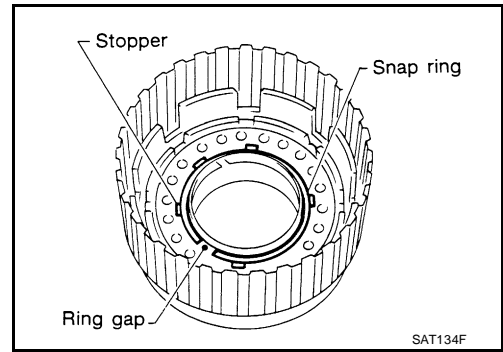
CAUTION:

- Set SST directly over return springs.
- Do not expand snap ring excessively.



REPAIR FOR COMPONENT PARTS

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



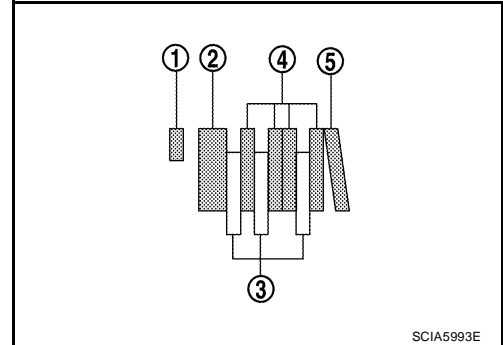
7. Install dish plate, driven plates, drive plates and retaining plate for overrun clutch.

- (1): Snap ring
- (2): Retaining plate
- (3): Drive plate
- (4): Driven plate
- (5): Dish plate

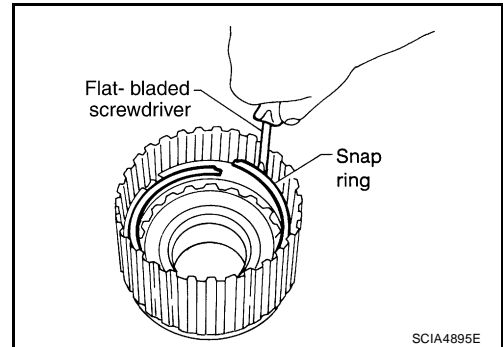
Drive plate/Driven plate: 3/4

CAUTION:

Be careful with the order of plates.



8. Install snap ring for overrun clutch using a flat-bladed screwdriver.

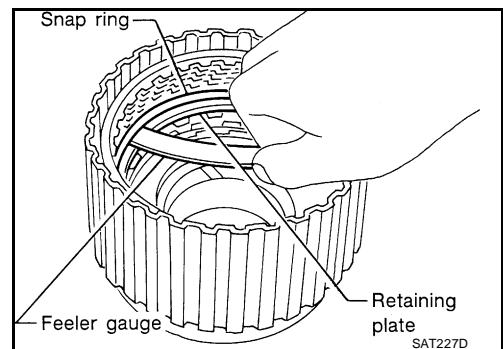


9. Measure clearance between overrun clutch retaining plate and snap ring using feeler gauge. If not within allowable limit, select proper retaining plate. Refer to "Parts Information" for retaining plate selection.

Specified clearance

Standard and allowable limit:

Refer to [AT-375, "OVERRUN CLUTCH"](#) .



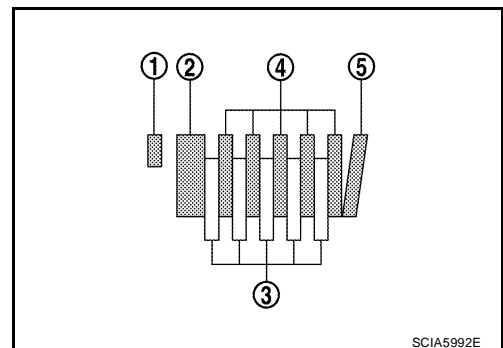
10. Install dish plate, driven plates, drive plates and retaining plate for forward clutch.

- (1): Snap ring
- (2): Retaining plate
- (3): Drive plate
- (4): Driven plate
- (5): Dish plate

Drive plate/Driven plate: 5/5

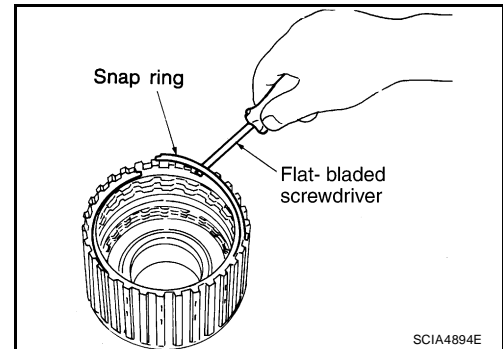
CAUTION:

Be careful with the order of plates.



REPAIR FOR COMPONENT PARTS

11. Install snap ring for forward clutch using a flat-bladed screwdriver.



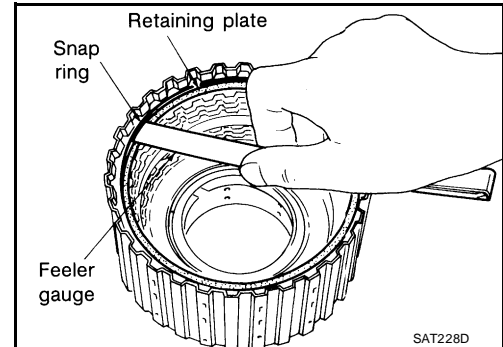
12. Measure clearance between forward clutch retaining plate and snap ring using feeler gauge. If not within allowable limit, select proper retaining plate. Refer to "Parts Information" for retaining plate selection.

Specified clearance

Standard and allowable limit:

Refer to [AT-375, "FORWARD CLUTCH"](#) .

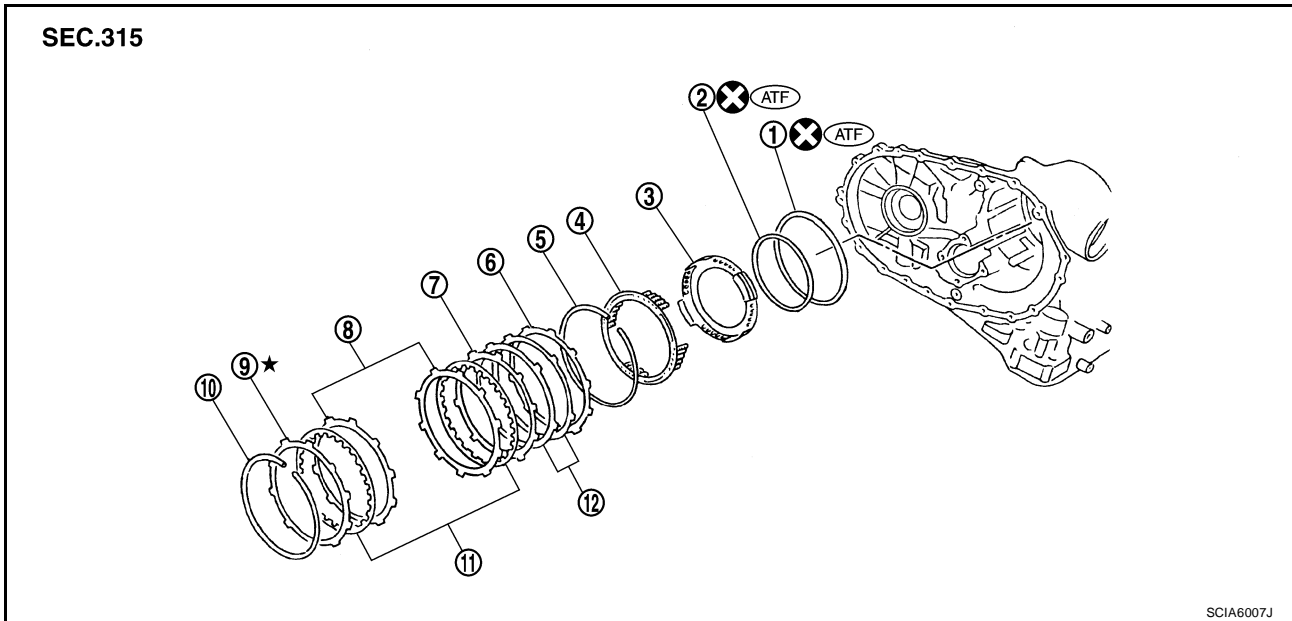
13. Check operation of forward clutch and overrun clutch. Refer to [AT-314, "DISASSEMBLY"](#) .



REPAIR FOR COMPONENT PARTS

Low & Reverse Brake COMPONENTS

UCS005WB

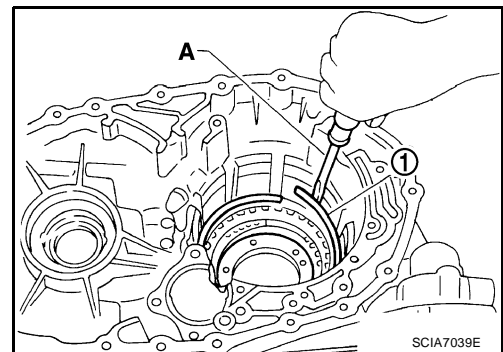
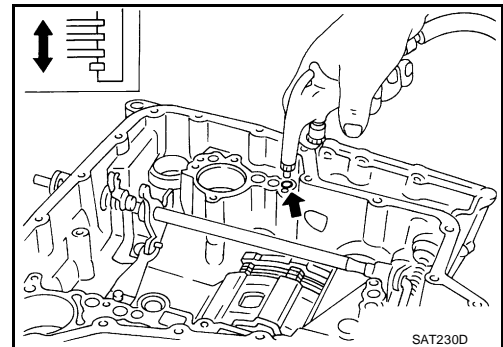


- | | | |
|-----------------------------|-----------------|-------------------------------|
| 1. Seal lip | 2. D-ring | 3. Low & reverse brake piston |
| 4. Spring retainer assembly | 5. Snap ring | 6. Driven plate |
| 7. Retaining plate | 8. Driven plate | 9. Retaining plate |
| 10. Snap ring | 11. Drive plate | 12. Dish plate |

Refer to GI section to make sure icons (symbol marks) in the figure. Refer to [GI-10, "Components"](#).

DISASSEMBLY

1. Check operation of low & reverse brake.
 - a. Apply compressed air into oil hole of transaxle case at the location as shown in the figure.
 - b. Check to see that retaining plate moves to snap ring.
 - c. If retaining plate does not contact snap ring:
 - D-ring might be damaged.
 - Seal lip might be damaged.
2. Remove snap ring (1) using a flat-bladed screwdriver A.
3. Remove retaining plates, drive plates, driven plates, dish plates.



REPAIR FOR COMPONENT PARTS

- Set Tool A on spring retainer assembly, and remove snap ring from transaxle case while compressing spring retainer assembly.

Tool number: KV31103200 (J-39186)

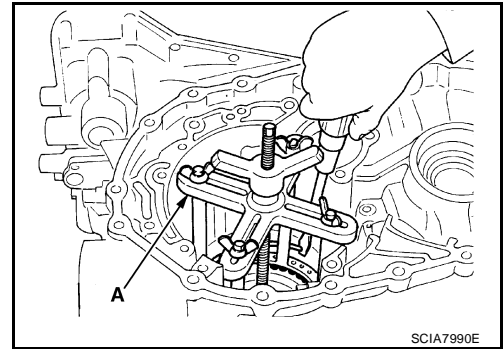
CAUTION:

Set SST directly over return springs.

- Remove spring retainer assembly from transaxle case.

CAUTION:

Do not remove return springs from spring retainer.

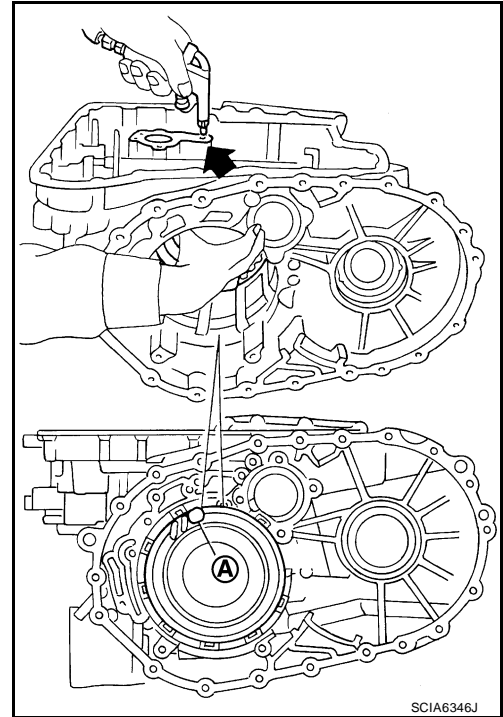


- Apply compressed air into the oil hole on transaxle case as shown in the figure to raise piston while strongly pressing the whole low & reverse brake piston by hand. When applying compressed air, strongly press the whole piston and adjust the pressure so that it is raised evenly. Portion (A) (low & reverse brake pressure) especially tends to tilt.

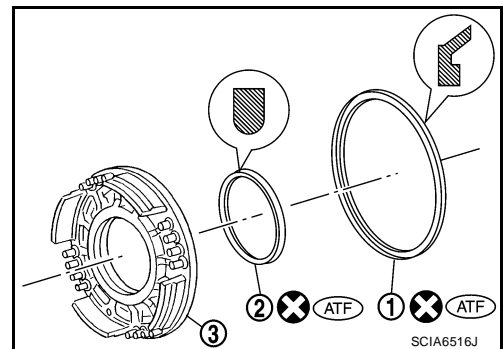
CAUTION:

Apply air gradually and allow low & reverse brake piston to come out evenly.

- Remove low & reverse brake piston from transaxle case by turning it.
- Inspect transaxle case. Replace if damaged or worn.



- Remove seal lip (1) and D-ring (2) from low & reverse brake piston (3).



REPAIR FOR COMPONENT PARTS

INSPECTION

Low & Reverse Brake Snap Rings

Check for deformation, fatigue or damage. Replace if necessary.

Low & Reverse Brake Drive Plates

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

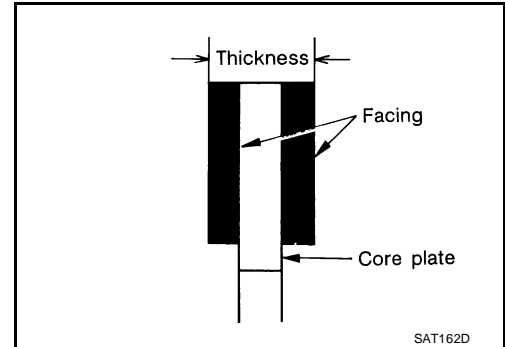
Thickness of drive plate

Standard and allowable limit:

Refer to [AT-375](#), "LOW & REVERSE BRAKE" .

CAUTION:

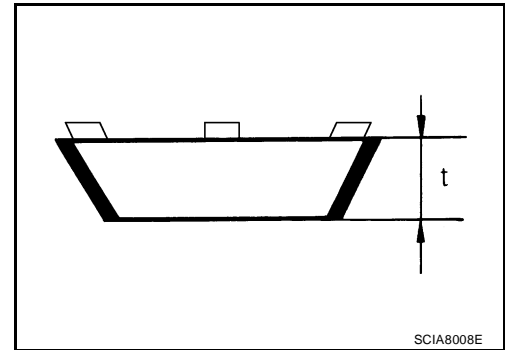
- Measure the thickness at 3 locations and find the average.
- Inspect all drive plates.
- Replace if the thickness is below the allowable limit.



Low & Reverse Brake Dish Plates

- Check for deformation or damage.
- Measure thickness (t) of dish plate. Replace if damaged, deformed or worn.

Thickness of dish plate (t): 2.93 mm (0.1154 in)



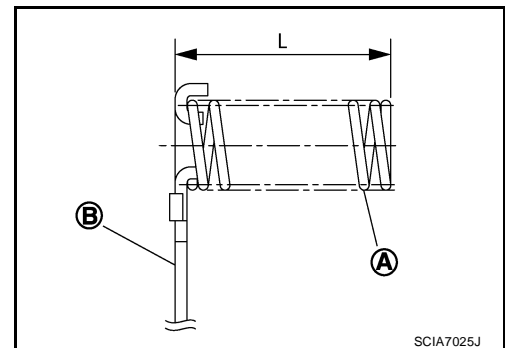
Low & Reverse Brake Spring Retainer Assembly

Check length (L) of spring retainer assembly. Replace if damaged, deformed or worn.

Length (L): 26.3 mm (1.035 in)

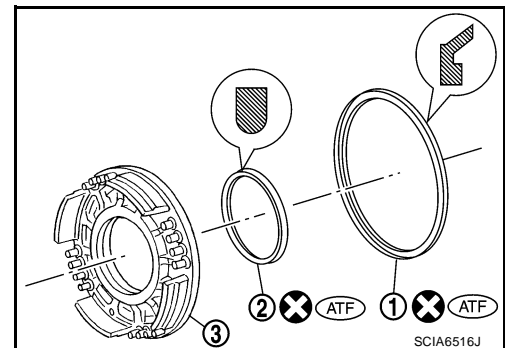
CAUTION:

Do not remove return springs (A) from spring retainer (B)



ASSEMBLY

1. Install seal lip (1) and D-ring (2) on low & reverse brake piston (3).

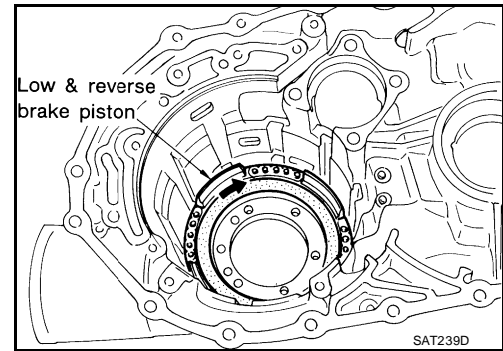


REPAIR FOR COMPONENT PARTS

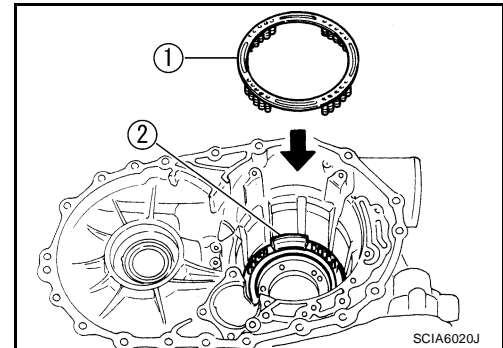
2. Install low & reverse brake piston in transaxle case while turning it.

CAUTION:

Apply ATF to inner surface of transaxle case.



3. Install spring retainer assembly (1) on low & reverse brake piston (2).

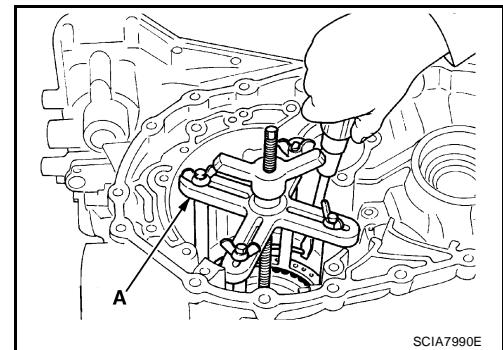


4. Set Tool A on spring retainer assembly, and install snap ring while compressing spring retainer assembly.

Tool number: KV31103200 (J-39186)

CAUTION:

Set SST directly over return springs.



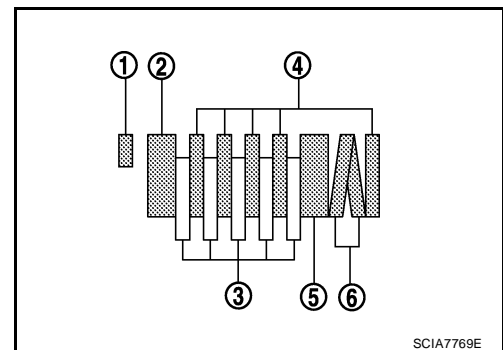
5. Install driven plates, dish plates, retaining plates and drive plates.

- (1): Snap ring
- (2): Retaining plate
- (3): Drive plate
- (4): Driven plate
- (5): Retaining plate
- (6): Dish plate

Drive plate/Driven plate: 5/5

CAUTION:

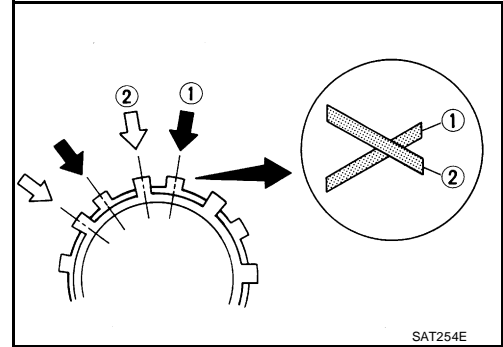
Be careful with the order of plates



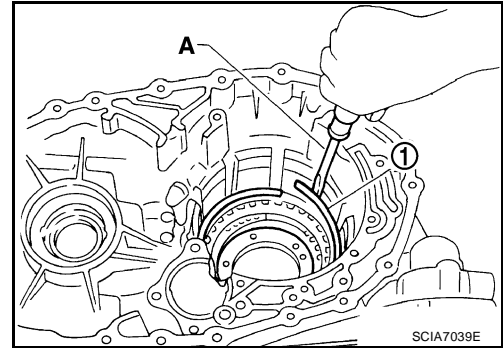
REPAIR FOR COMPONENT PARTS

NOTE:

Install two dish plates fitting each installation direction with groove displaced slightly.



6. Install snap ring (1) using a flat-bladed screwdriver A.



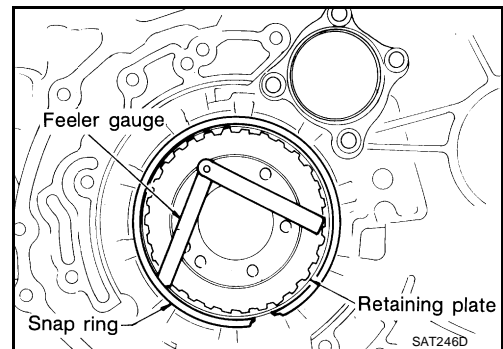
7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate (front side). Refer to "Parts Information" for retaining plate selection.

Specified clearance

Standard and allowable limit:

Refer to [AT-375, "LOW & REVERSE BRAKE"](#) .

8. Check operation of low & reverse brake. Refer to [AT-321, "DIS-ASSEMBLY"](#) .

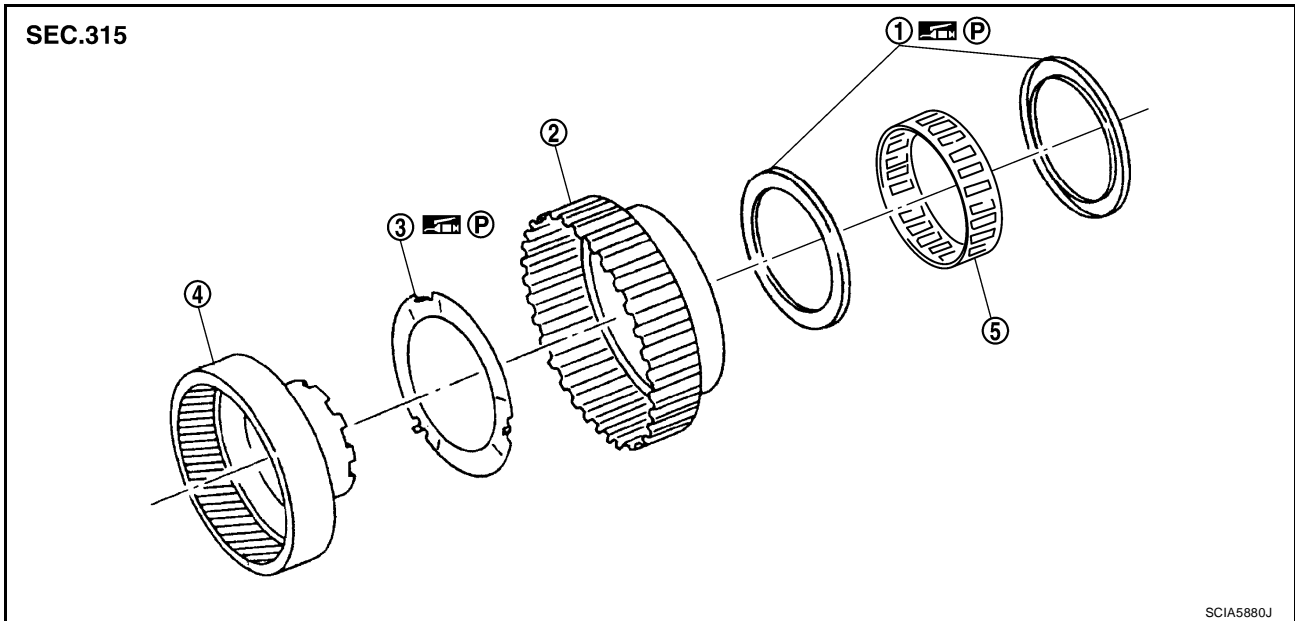


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REPAIR FOR COMPONENT PARTS

Rear Internal Gear and Forward Clutch Hub COMPONENTS

UCS005WC

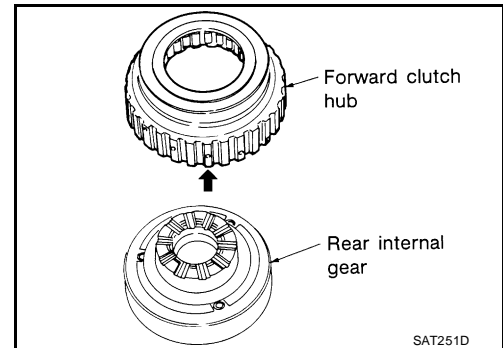


- 1. End bearing
- 2. Forward clutch hub
- 3. Thrust washer
- 4. Rear internal gear
- 5. Forward one-way clutch

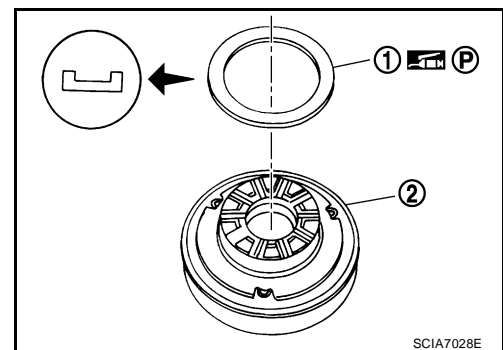
Refer to GI section to make sure icons (symbol marks) in the figure. Refer to [GI-10, "Components"](#) .

DISASSEMBLY

1. Remove forward clutch hub from rear internal gear.

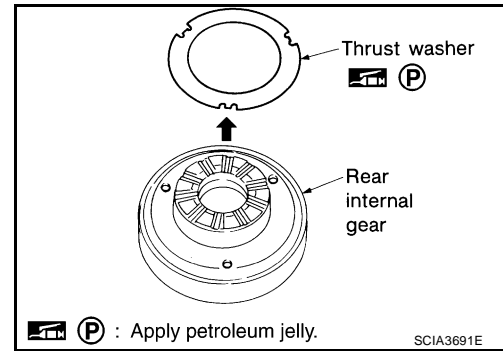


2. Remove end bearing (1) from rear internal gear (2).

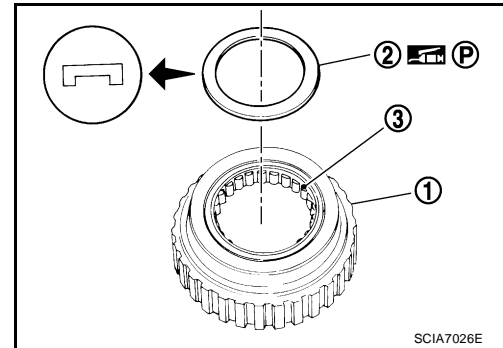


REPAIR FOR COMPONENT PARTS

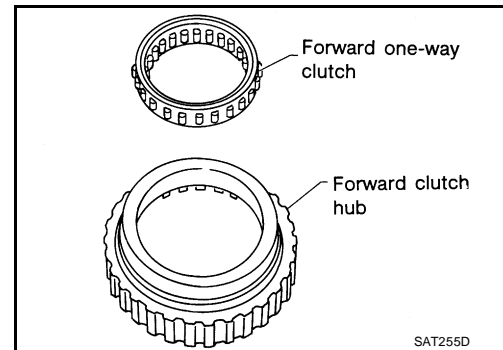
3. Remove thrust washer from rear internal gear.



4. Remove end bearing (2) from forward one-way clutch (3).
(1): Forward clutch hub



5. Remove forward one-way clutch from forward clutch hub.



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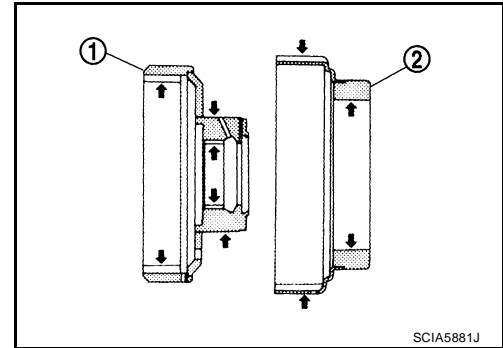
REPAIR FOR COMPONENT PARTS

INSPECTION

Rear Internal Gear and Forward Clutch Hub

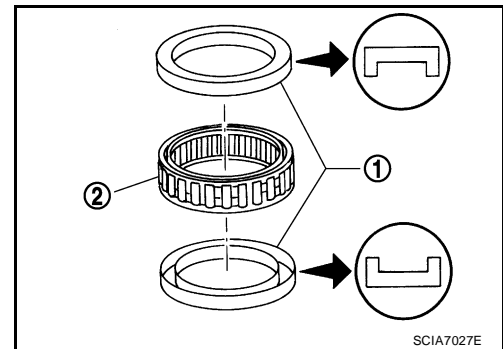
Check rubbing surfaces for wear or damage. Replace if necessary.

- (1): Rear internal gear
- (2): Forward clutch hub



End Bearings and Forward One-way Clutch

- Check end bearings (1) for deformation and damage. Replace if necessary.
- Check forward one-way clutch (2) for wear and damage. Replace if necessary.

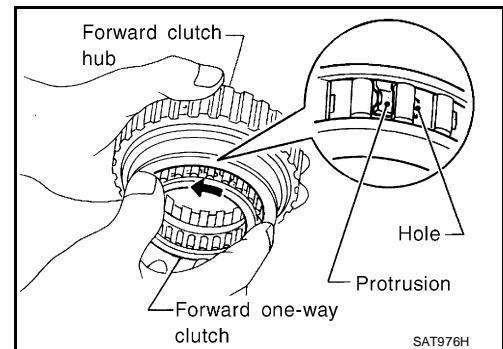


ASSEMBLY

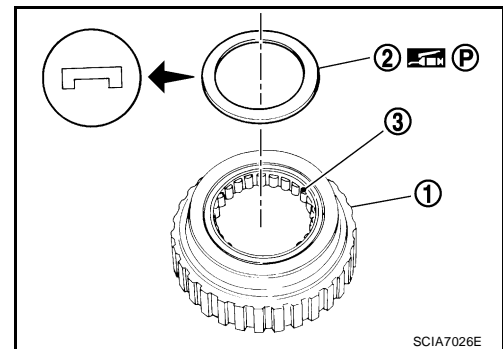
1. Install forward one-way clutch on forward clutch hub.

CAUTION:

Be careful with the direction of forward one-way clutch.



2. Install end bearing (2) on forward one-way clutch (3).
(1): Forward clutch hub

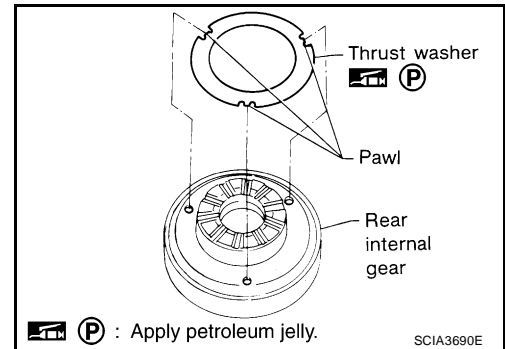


REPAIR FOR COMPONENT PARTS

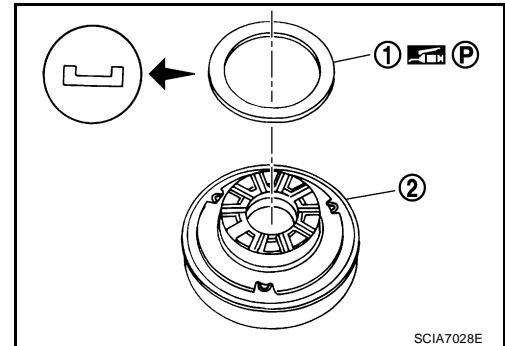
3. Install thrust washer on rear internal gear.

CAUTION:

Align pawls of thrust washer with holes of rear internal gear.



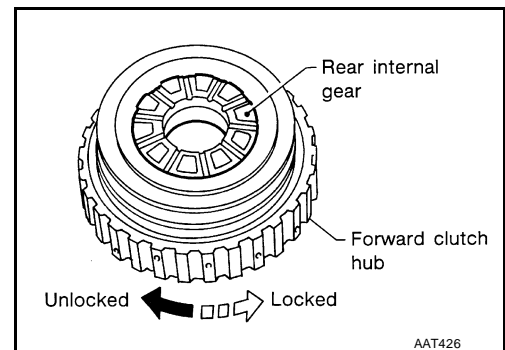
4. Install end bearing (1) on rear internal gear (2).



5. Install forward clutch hub on rear internal gear.

CAUTION:

- Check operation of forward one-way clutch. Hold rear internal gear and turn forward clutch hub. Check forward clutch hub for correct locking and unlocking directions.
- If not as shown in figure, check the installation direction of forward one-way clutch.



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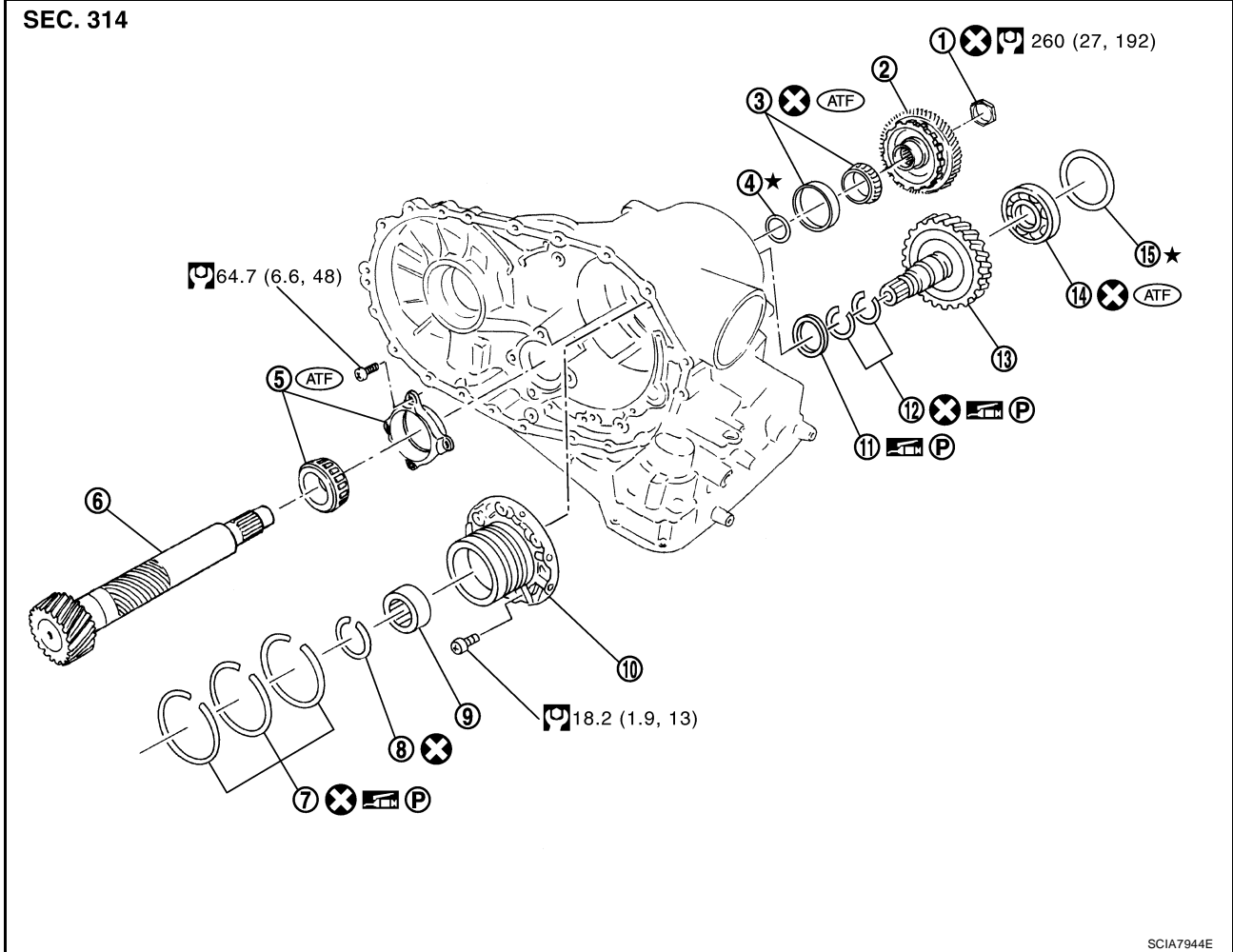
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REPAIR FOR COMPONENT PARTS

Output Shaft, Output Gear, Idler Gear, Reduction Pinion Gear and Bearing Retainer COMPONENTS

UCS005WD

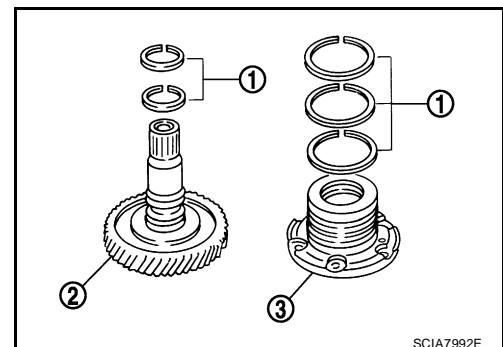


- | | | |
|---|----------------------------------|---------------------------------|
| 1. Lock nut | 2. Idler gear | 3. Idler gear bearing |
| 4. Reduction pinion gear adjusting shim | 5. Reduction pinion gear bearing | 6. Reduction pinion gear |
| 7. Seal ring | 8. Snap ring | 9. Radial needle bearing |
| 10. Bearing retainer | 11. Thrust needle bearing | 12. Seal ring |
| 13. Output shaft | 14. Output shaft bearing | 15. Output shaft adjusting shim |

Refer to GI section to make sure icons (symbol marks) in the figure. Refer to [GI-10, "Components"](#) .

DISASSEMBLY

1. Remove seal rings (1) from output shaft (2) and bearing retainer (3).

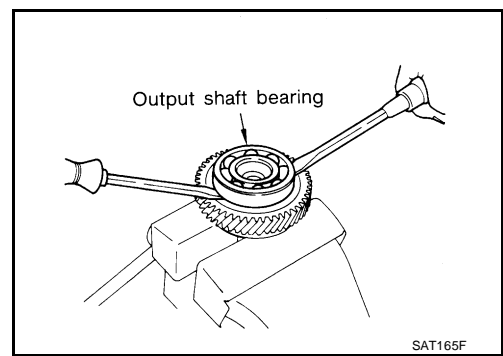


REPAIR FOR COMPONENT PARTS

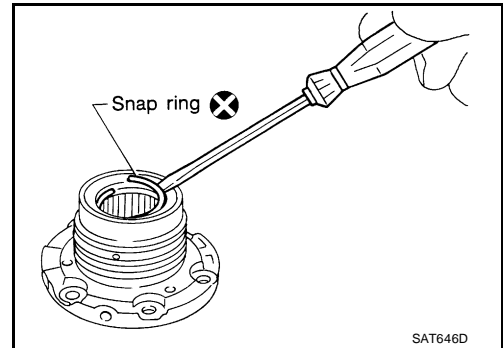
2. Remove output shaft bearing from output shaft with flat-bladed screwdrivers.

CAUTION:

- Always replace bearing with a new one when removed
- Do not damage output shaft.

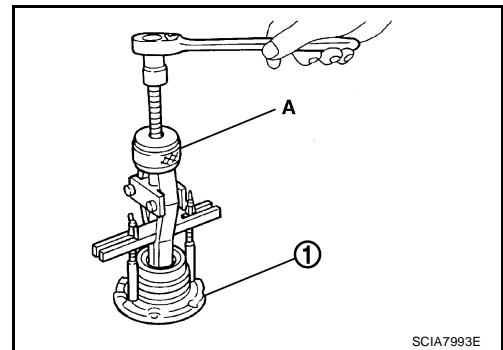


3. Remove snap ring from bearing retainer.



4. Remove radial needle bearing from bearing retainer (1).

Tool number: KV381054S0 (J-34286)

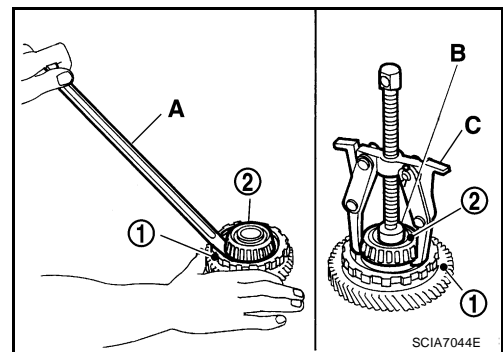


5. Insert a flat-bladed screwdriver A between the mating surfaces of idler gear (1) and idler gear bearing inner race (2), and enlarge the gap.

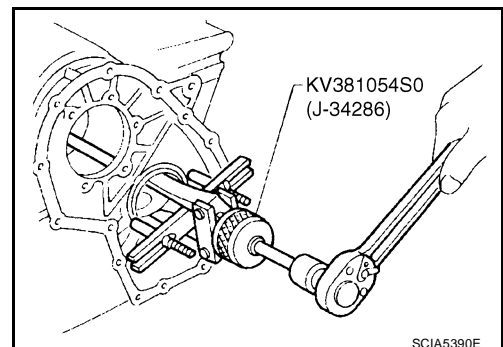
CAUTION:

Be careful not to damage idler gear (1).

6. Set a drift B [commercial service tool: 34 mm (1.34 in) dia.] on idler gear (1), and remove idler gear bearing inner race (2) using a puller C (commercial service tool).



7. Remove idler gear bearing outer race from transaxle case.

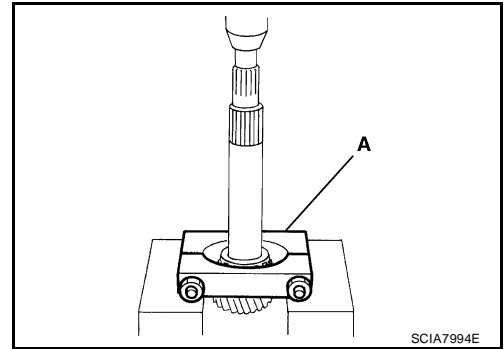


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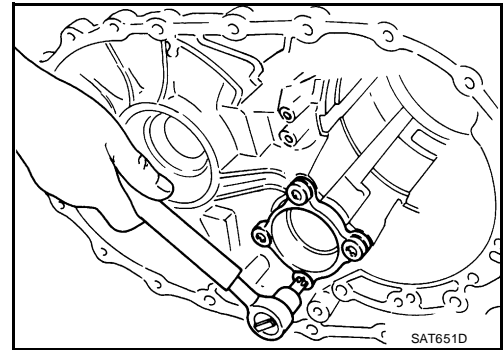
REPAIR FOR COMPONENT PARTS

8. Set Tool A to reduction pinion gear bearing inner race, press out reduction pinion gear bearing inner race from reduction pinion gear.

Tool number: ST30031000 (J-22912-01)



9. Remove reduction pinion gear bearing outer race from transaxle case.



REPAIR FOR COMPONENT PARTS

INSPECTION

Output Shaft, Idler Gear and Reduction Pinion Gear

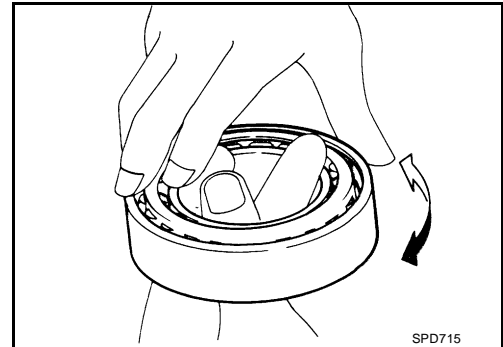
Check for wear, damage or crack. Replace if necessary.

Bearings

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear. Replace if necessary.

CAUTION:

When replacing taper roller bearing, replace outer and inner race as a set.



Seal Ring Clearance

- Install new seal rings to output shaft.
- Measure clearance between seal ring and ring groove of output shaft.

Standard clearance and allowable limit:

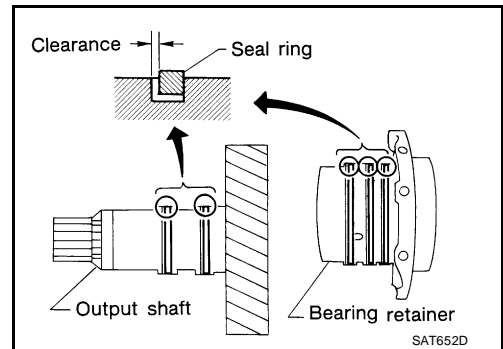
Refer to [AT-376, "Output Shaft"](#) .

- If not within allowable limit, replace output shaft.
- Install new seal rings to bearing retainer.
- Measure clearance between seal ring and ring groove of bearing retainer.

Standard clearance and allowable limit:

Refer to [AT-377, "Bearing Retainer"](#) .

- If not within allowable limit, replace bearing retainer.



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REPAIR FOR COMPONENT PARTS

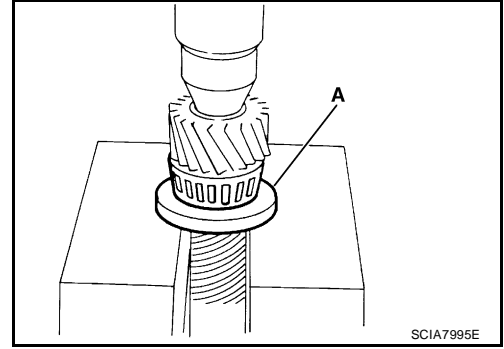
ASSEMBLY

1. Set Tool A on reduction pinion gear bearing inner race, and press reduction pinion gear to reduction pinion gear bearing inner race.

Tool number: ST35272000 (J-26092)

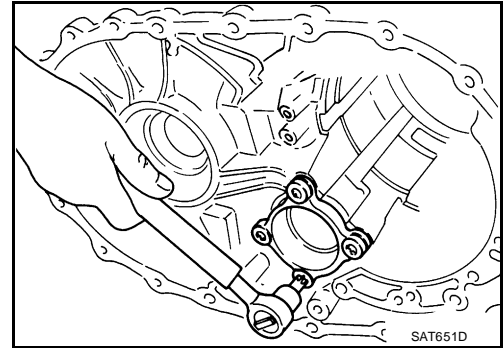
CAUTION:

Apply ATF to reduction pinion gear bearing inner race.



2. Install reduction pinion gear bearing outer race on transaxle case. Refer to [AT-330, "COMPONENTS"](#).

- Check reduction pinion gear bearing preload. Refer to [AT-351, "REDUCTION PINION GEAR BEARING PRELOAD"](#).

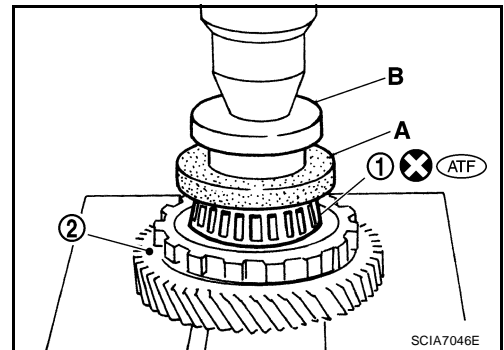


3. Set Tool A and a suitable drift B on idler gear bearing inner race (1), and press idler gear bearing inner race (1) to idler gear (2).

Tool number: ST35272000 (J-26092)

CAUTION:

- Do not reuse idler gear bearing.
- Apply ATF to idler gear bearing.

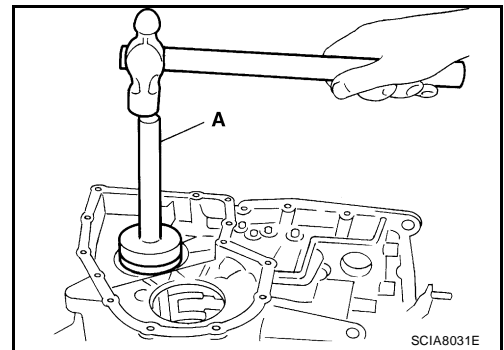


4. Set Tool A on idler gear bearing outer race, and drive idler gear bearing outer race into transaxle case.

Tool number: ST37830000 (—)

CAUTION:

- Do not reuse idler gear bearing.
- Apply ATF to idler gear bearing.

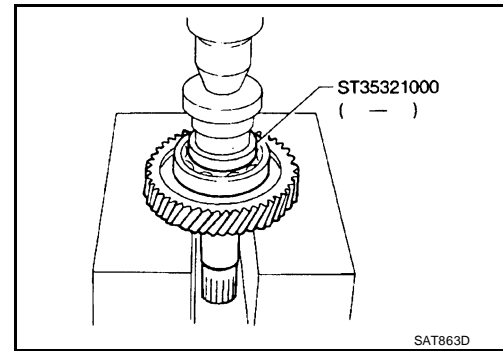


REPAIR FOR COMPONENT PARTS

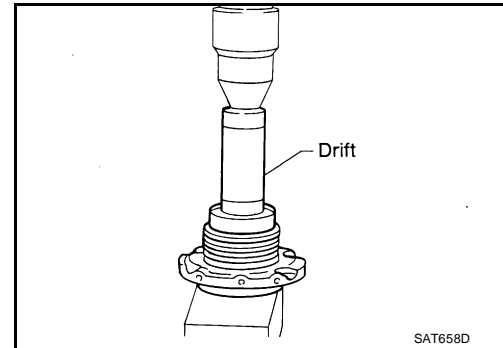
5. Press output shaft bearing on output shaft.

CAUTION:

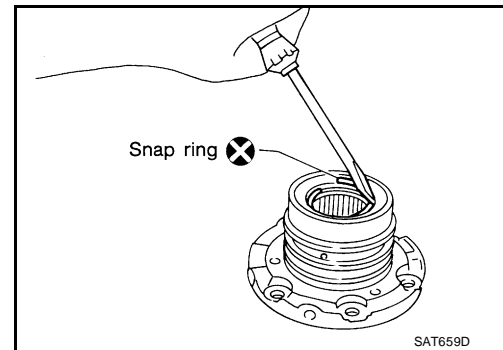
- Do not reuse output shaft bearing.
- Apply ATF to output shaft bearing.



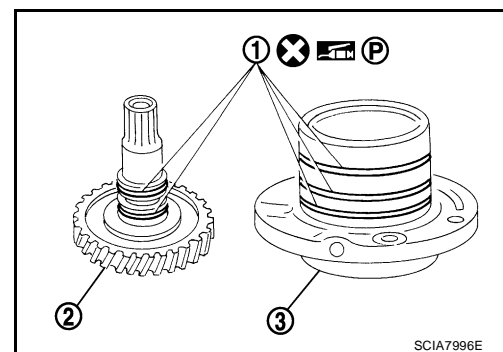
6. Set drift [commercial service tool] on radial needle bearing, and press radial needle bearing into bearing retainer.



7. Install snap ring to bearing retainer.



8. After packing ring grooves with petroleum jelly, carefully install new seal rings (1) on output shaft (2) and bearing retainer (3).



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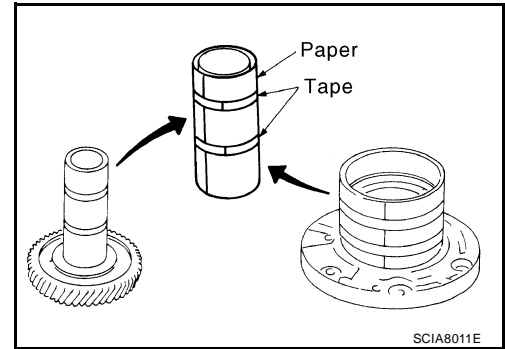
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REPAIR FOR COMPONENT PARTS

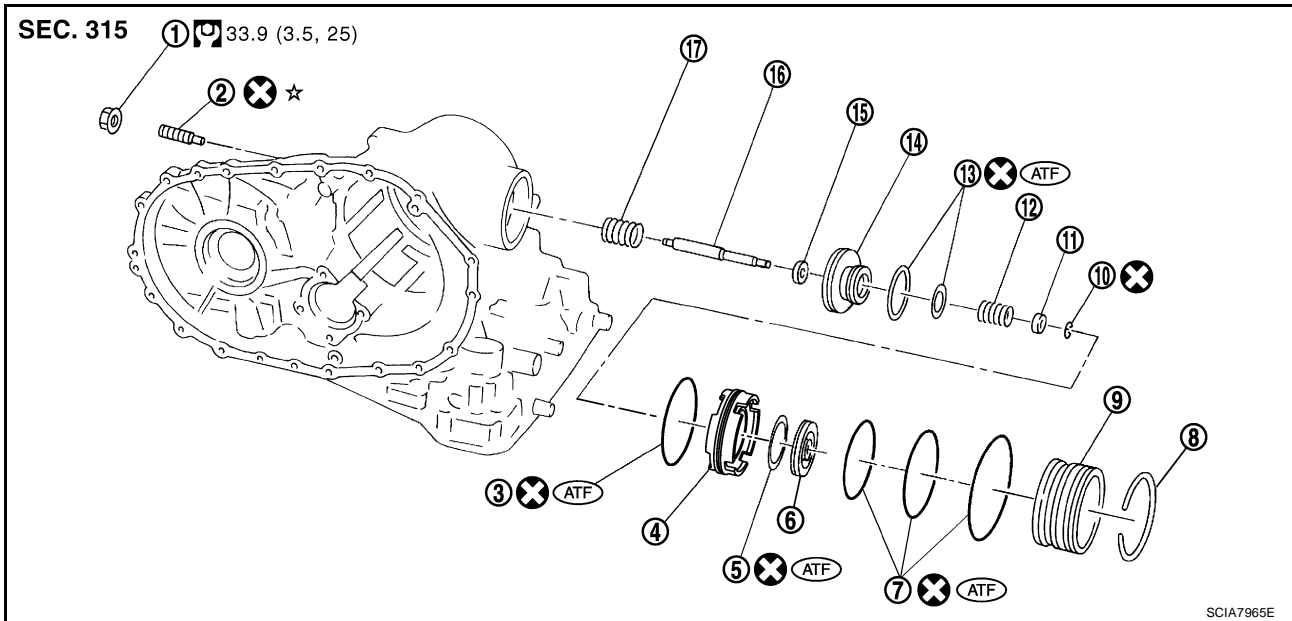
CAUTION:
Roll paper around seal rings to prevent seal rings from spreading.



REPAIR FOR COMPONENT PARTS

UCS005WE

Band Servo Piston Assembly COMPONENTS

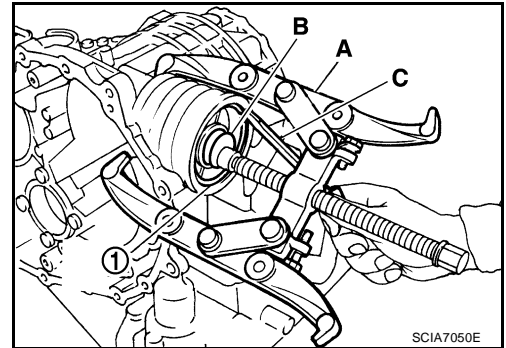


- | | | |
|----------------------------|-----------------------------|------------------------------|
| 1. Lock nut | 2. Anchor end pin | 3. O-ring |
| 4. Servo piston retainer | 5. D-ring | 6. OD servo piston |
| 7. O-ring | 8. Snap ring | 9. OD servo piston retainer |
| 10. E-ring | 11. Spring retainer | 12. OD servo return spring |
| 13. D-ring | 14. Band servo piston | 15. Band servo thrust washer |
| 16. Band servo piston stem | 17. 2nd servo return spring | |

Refer to GI section to make sure icons (symbol marks) in the figure. Refer to [GI-10. "Components"](#) .

DISASSEMBLY

1. Push in OD servo piston assembly using a puller A (commercial service tool) and a suitable drift B, and then remove snap ring (1) from transaxle case using a flat-bladed screwdriver C.

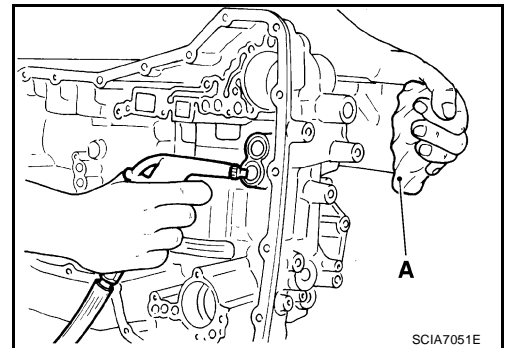


2. Apply compressed air into the oil hole as shown in the figure to remove OD servo piston assembly and band servo piston assembly.

CAUTION:

Do not blow air in too quickly, or OD servo piston assembly, band servo piston assembly and ATF could jump out. Carefully blow air little by little while protecting with lint-free cloth A.

3. Remove 2nd servo return spring from transaxle case.

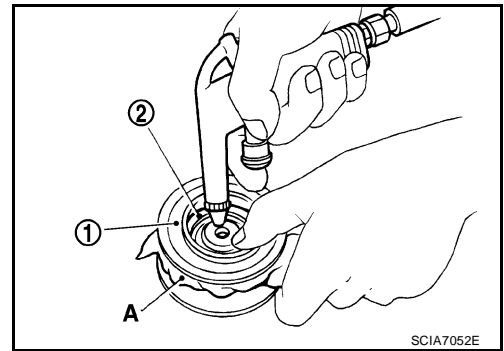


REPAIR FOR COMPONENT PARTS

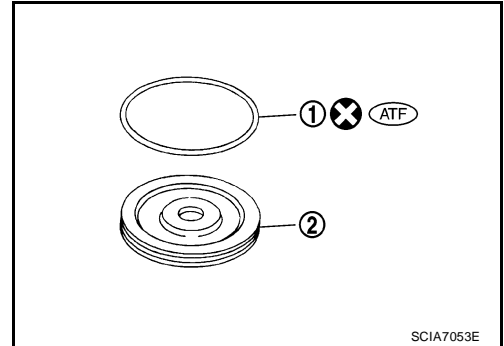
4. Wrap OD servo piston retainer (1) using lint-free cloth A, and then apply compressed air into the band servo piston stem hole on OD servo piston (2) to remove OD servo piston (2) from OD servo piston retainer (1).

CAUTION:

Do not blow air in too quickly, or OD servo piston (2) and ATF could jump out. Carefully blow air little by little while protecting with lint-free cloth A.

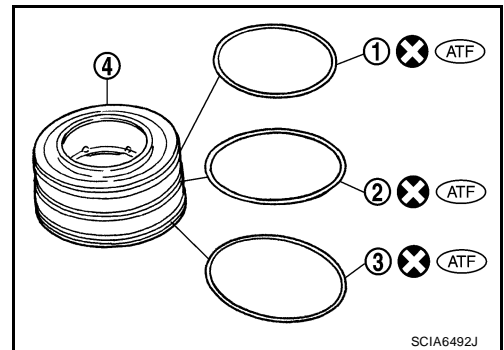


5. Remove D-ring (1) from OD servo piston (2).

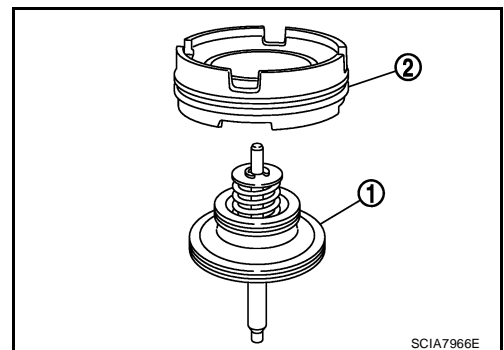


6. Remove O-rings and from OD servo piston retainer.

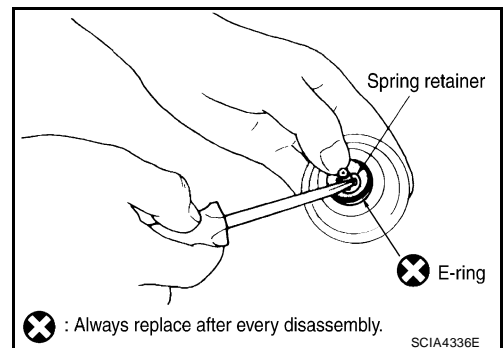
- (1): O-ring (small diameter)
- (2): O-ring (medium diameter)
- (3): O-ring (large diameter)
- (4): OD servo piston retainer



7. Remove band servo piston assembly (1) from servo piston retainer (2).

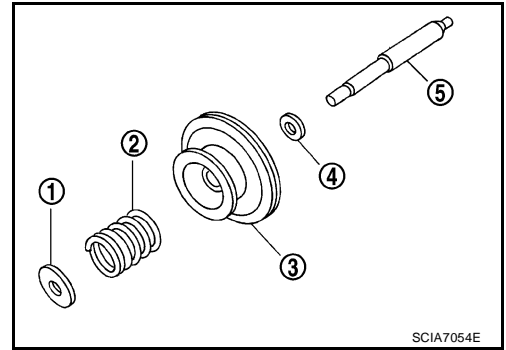


8. Place band servo piston stem on a wooden block, and remove E-ring from band servo piston stem using a flat-bladed screwdriver while pressing spring retainer downward.

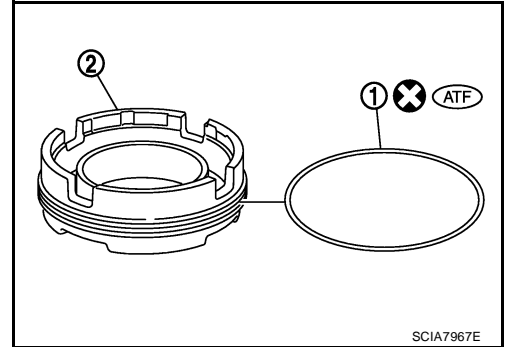


REPAIR FOR COMPONENT PARTS

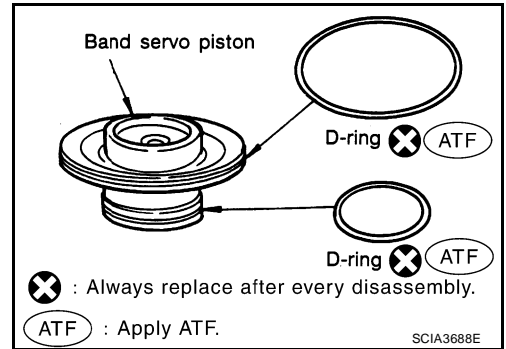
9. Remove spring retainer (1), OD servo return spring (2), band servo piston (3) and band servo thrust washer (4) from band servo piston stem (5).



10. Remove O-ring (1) from servo piston retainer (2).



11. Remove D-rings from band servo piston.



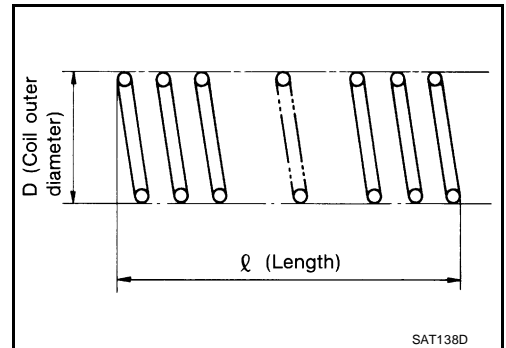
INSPECTION

Pistons, Retainers and Piston Stem

Check the sliding surfaces for damage or excessive wear. Replace if necessary.

Return Springs

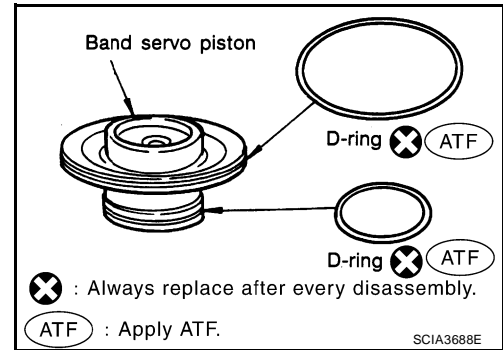
- Check each return spring for damage or deformation. Also measure free length. Refer to [AT-376, "Band Servo"](#) .
- Replace springs if deformed or fatigued.



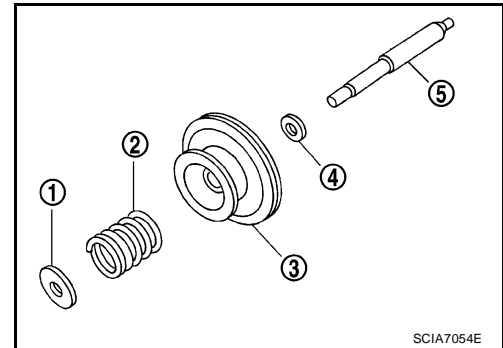
REPAIR FOR COMPONENT PARTS

ASSEMBLY

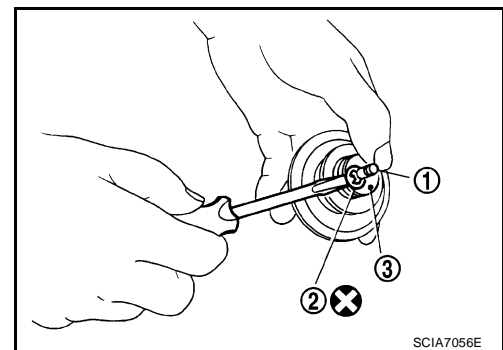
1. Install D-rings to band servo piston.



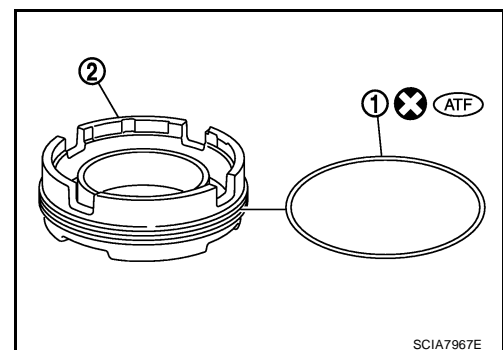
2. Install band servo thrust washer (4), band servo piston (3), OD servo return spring (2) and spring retainer (1) to band servo piston stem (5).



3. Place band servo piston stem (1) on a wooden block, and install E-ring (2) to band servo piston stem (1) while pressing spring retainer (3) downward.

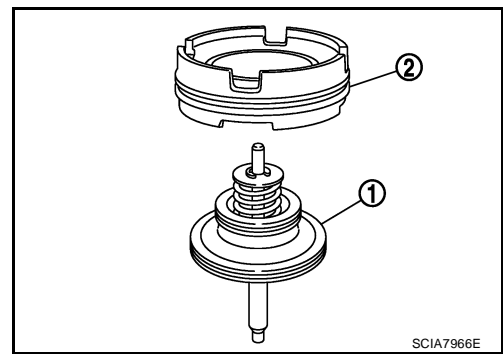


4. Install O-ring (1) to servo piston retainer (2).

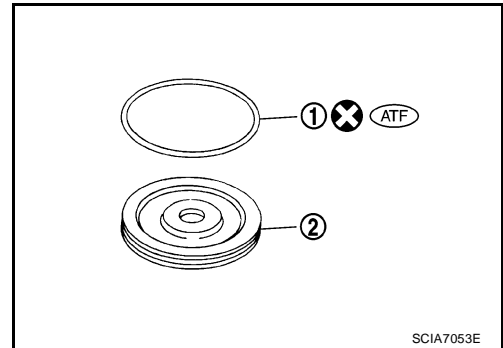


REPAIR FOR COMPONENT PARTS

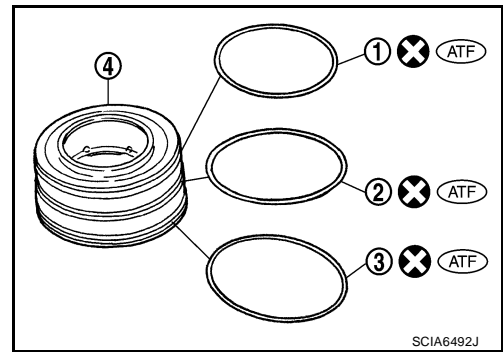
5. Install band servo piston assembly (1) to servo piston retainer (2) by pushing it inward.



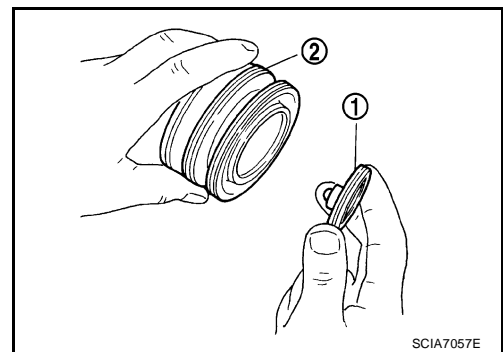
6. Install D-ring (1) to OD servo piston (2).



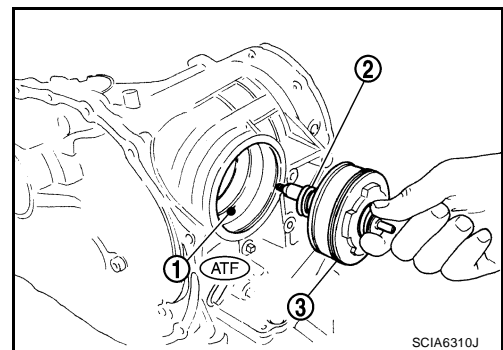
7. Install O-rings and to OD servo piston retainer.
 (1): O-ring (small diameter)
 (2): O-ring (medium diameter)
 (3): O-ring (large diameter)
 (4): OD servo piston retainer



8. Install OD servo piston (1) to OD servo piston retainer (2) fitting the figure direction on it.



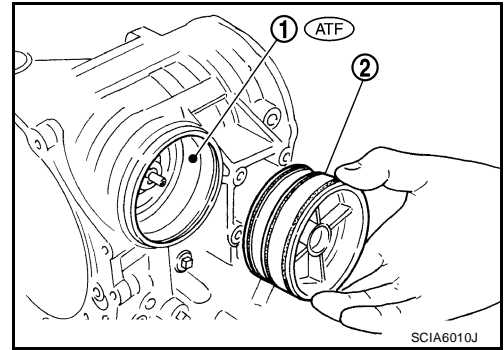
9. Install 2nd servo return spring (2) and band servo piston assembly (3) to transaxle case (1).



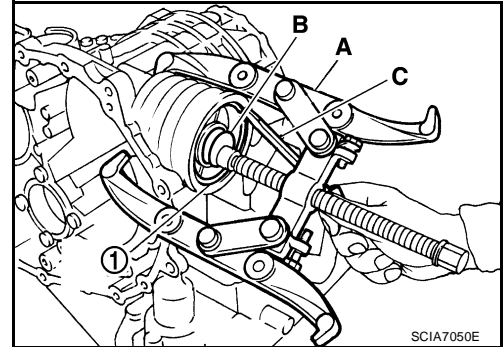
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REPAIR FOR COMPONENT PARTS

10. Install OD servo piston assembly (2) to transaxle case (1).



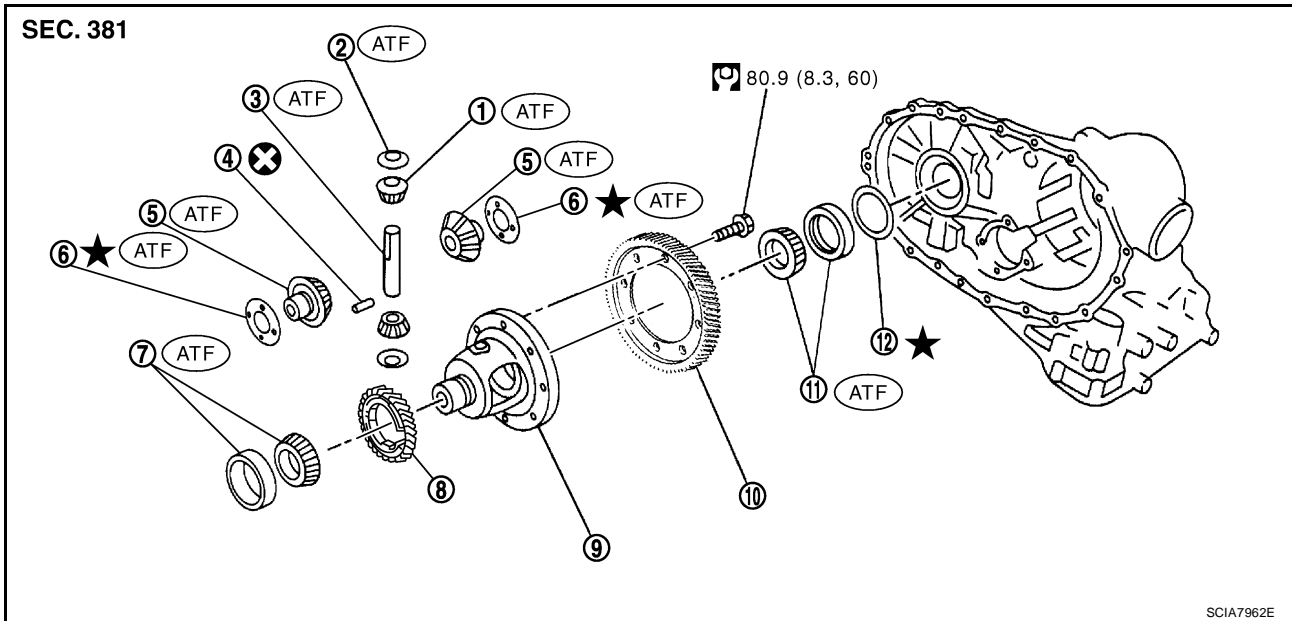
11. Push in OD servo piston assembly using a puller A (commercial service tool) and a suitable drift B, and install snap ring (1) to transaxle case using a flat-bladed screwdriver C.



REPAIR FOR COMPONENT PARTS

UCS005WF

Final Drive COMPONENTS

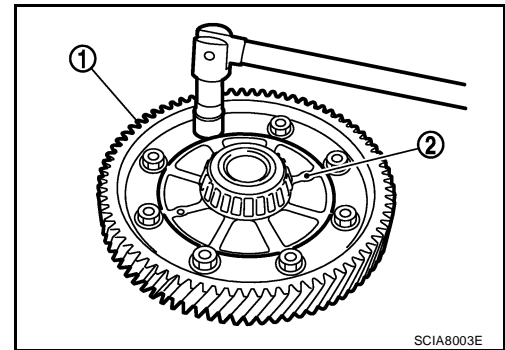


- | | | |
|------------------------------|-----------------------------------|--|
| 1. Pinion mate gear | 2. Pinion mate gear thrust washer | 3. Pinion mate shaft |
| 4. Lock pin | 5. Side gear | 6. Side gear thrust washer |
| 7. Differential side bearing | 8. Speedometer drive gear | 9. Differential case |
| 10. Final gear | 11. Differential side bearing | 12. Differential side bearing adjusting shim |

Refer to GI section to make sure icons (symbol marks) in the figure. Refer to [GI-10, "Components"](#) .

DISASSEMBLY

1. Remove final gear (1) from differential case (2).

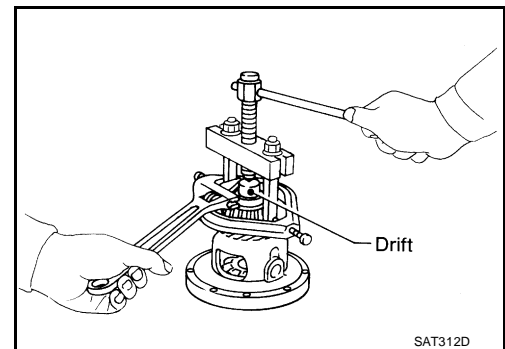


2. Press out differential side bearings.

Tool number: [ST3306S001 \(J-22888-D\)](#)

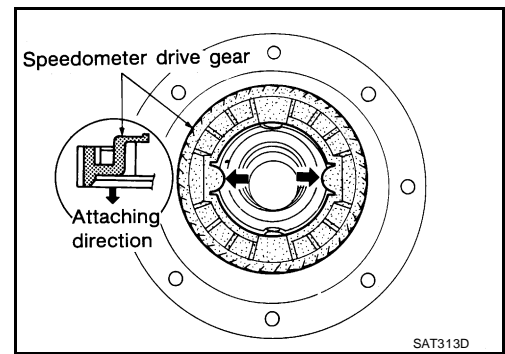
CAUTION:

Be careful not to mix up the right and left bearings.



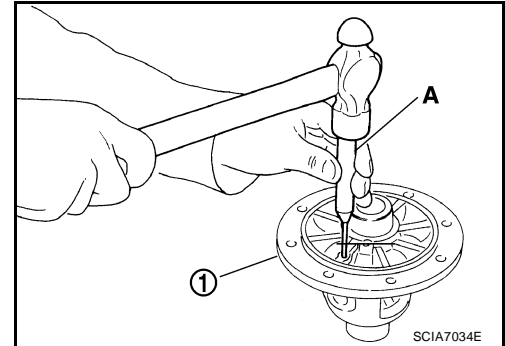
REPAIR FOR COMPONENT PARTS

3. Remove speedometer drive gear from differential case.

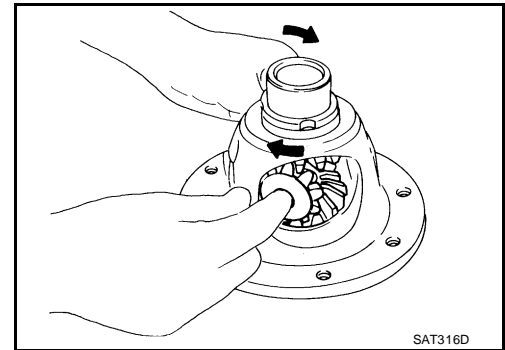


4. Drive out lock pin from differential case (1) using Tool (A).

Tool number: KV32101000 (J-25689-A)



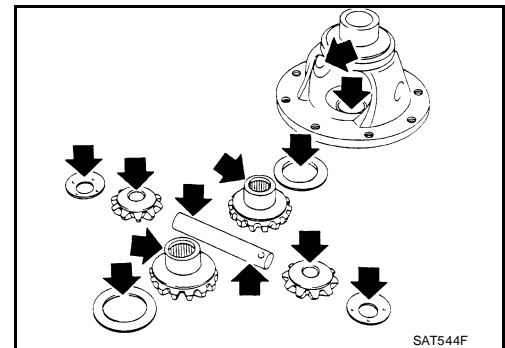
5. Draw out pinion mate shaft.
6. Remove pinion mate gears, pinion mate gear thrust washers, side gears and side gear thrust washers.



INSPECTION

Gears, Washers, Pinion Mate Shaft and Differential Case

- Check mating surfaces of differential case, side gears, pinion mate gears and pinion mate shaft. Replace if necessary.
- Check washers for wear. Replace if necessary.



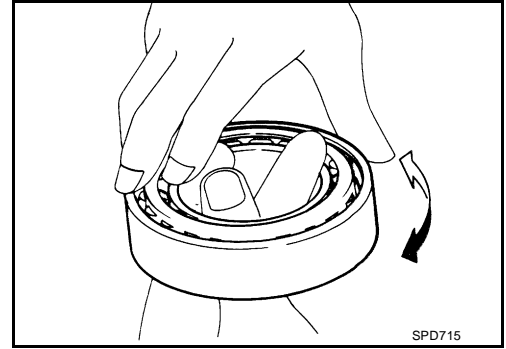
REPAIR FOR COMPONENT PARTS

Bearings

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear. Replace if necessary.

CAUTION:

When replacing taper roller bearing, replace outer and inner race as a set.



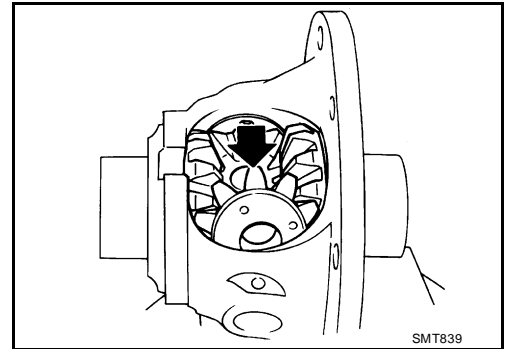
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ASSEMBLY

1. Attach side gear thrust washers to side gears, then install pinion mate thrust washers and pinion mate gears in place.

CAUTION:

Apply ATF to any parts.



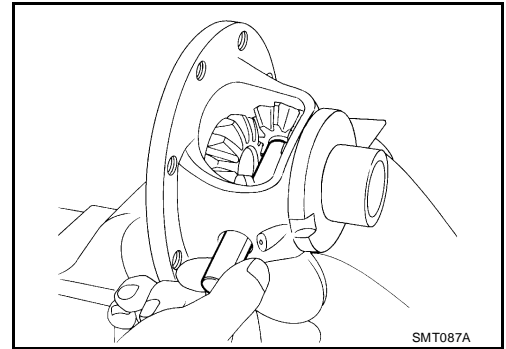
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2. Insert pinion mate shaft.

CAUTION:

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

- Apply ATF to pinion mate shaft.



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3. Select side gear thrust washers according to the following procedures.

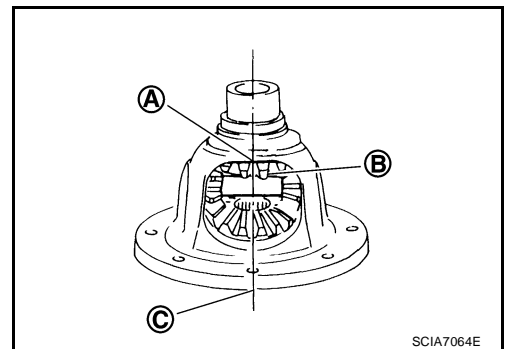
- a. Place differential case in the upright position so that the side gear to be measured is at the top.

(A): Location for inserting feeler gauge

(B): Side gear tooth

(C): The center line of differential case

- b. In order to maximize the back clearance, rotate side gears so that a tooth on side gears at the top and bottom will align at the same position as shown in the figure.



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REPAIR FOR COMPONENT PARTS

- c. Adjust the back clearance of side gear according to the following procedures.
- i. Insert feeler gauges A of the same thickness to the back of side gear from both sides, preventing side gear from falling, to measure the clearance.

- Measure clearance 3 times by rotating side gears and take the average.

CAUTION:

In all 3 measurements, maximize the clearance by aligning teeth on side gears at the top and bottom at the same position.

- ii. Select side gear thrust washer so that the clearance will fall within the standard.

Differential side gear clearance:

Refer to [AT-376, "Final Drive"](#) .

- iii. Turn differential case upside down, and measure the back clearance of the other side gear in the same manner.

NOTE:

Adjust the clearance to approx. 0.1 mm (0.004 in) for used differential [driven approx. 3,000 km (1864 mile) or more].

4. Install lock pin (1) to pinion mate shaft using the pin punch A.

Tool number: **KV32101000 (J-25689-A)**

CAUTION:

- Do not reuse lock pin.
- Make sure that lock pin is flush with differential case.

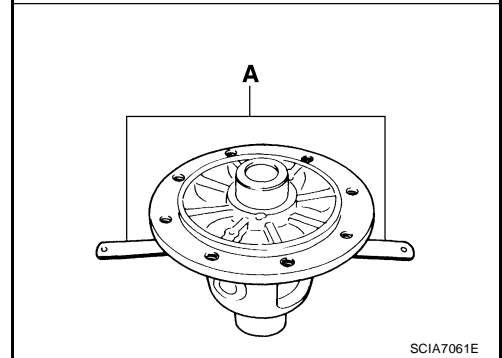
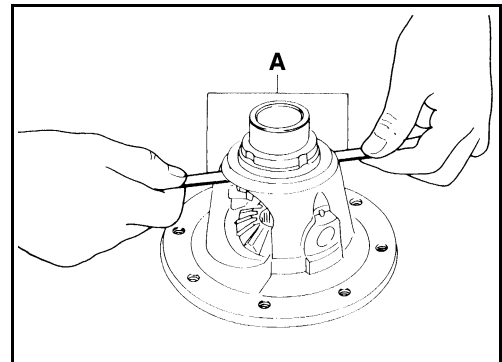
5. Install speedometer drive gear on differential case.

6. Set drift A [commercial service tool] on differential side bearing inner race, and press differential side bearing inner race into differential case.

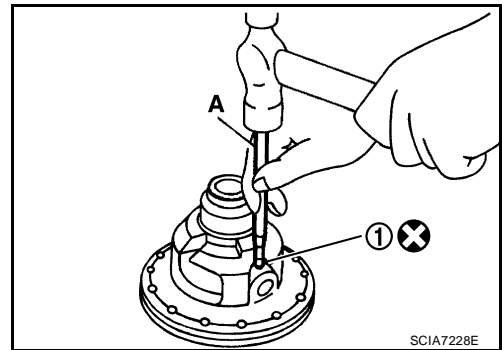
CAUTION:

Apply ATF to differential side bearings.

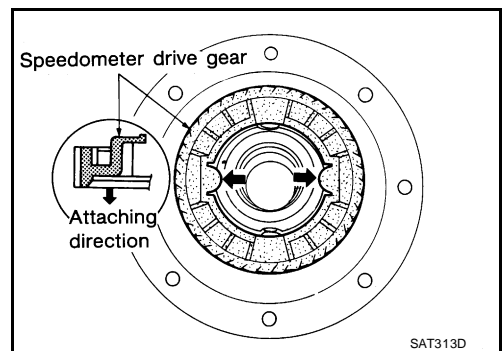
7. Install differential side bearing outer race and differential side bearing adjusting shim on transaxle case. Refer to [AT-348, "Assembly \(1\)"](#) .



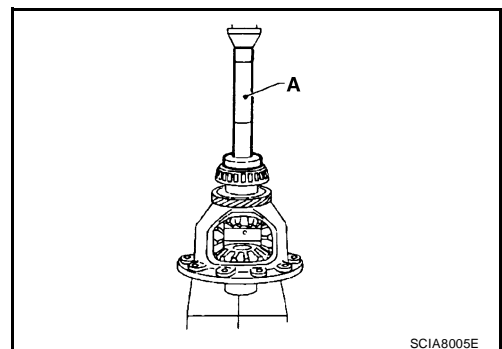
SCIA7061E



SCIA7228E



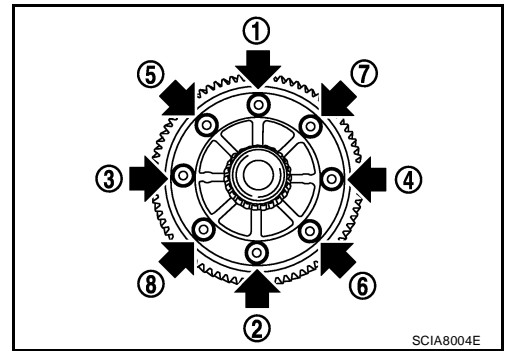
SAT313D



SCIA8005E

REPAIR FOR COMPONENT PARTS

8. Tighten final gear and tighten fixing bolts to the specified torque in numerical order as shown in the figure after temporarily tightening them. Refer to [AT-343, "COMPONENTS"](#) .



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ASSEMBLY

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ASSEMBLY

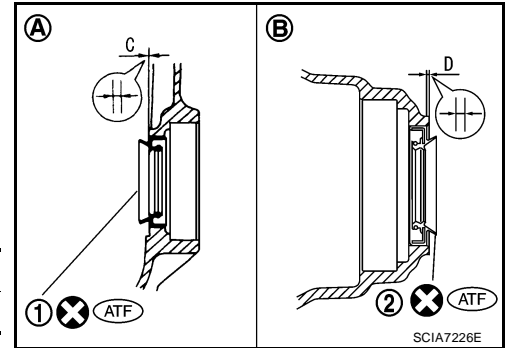
Assembly (1)

- Drive each differential side oil seal evenly using a drift (SST and commercial service tool) so that differential side oil seal protrudes by the dimension "C" or "D" respectively.
 - LH differential side oil seal
 - RH differential side oil seal

(A): Transaxle case side
(B): Converter housing side

Unit: mm (in)

Dimension "C"	0 ± 0.5 (0 ± 0.020)
Dimension "D"	6 ± 0.5 (0.043 ± 0.020)



NOTE:

Differential side oil seal pulling direction is used as the reference.

Drift to be used:

Location	Tool number
Transaxle case side (A)	ST35325000 (-) KV31103000 (J-38982)
Converter housing side (B)	Commercial service tool [Inner diameter: 47 mm (1.85 in), outer diameter: 54 mm (2.13 in)]

- Install O-ring on governor cap.

CAUTION:

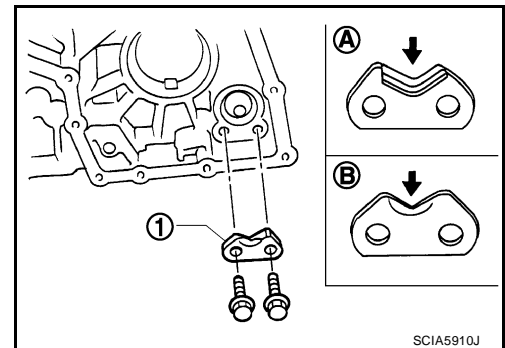
 - Do not reuse O-ring.
 - Apply ATF to O-ring.
- Install governor cap in transaxle case.
- Install snap ring in transaxle case.
- Install parking actuator support (1) on transaxle case.

(A): Inside
(B): Outside

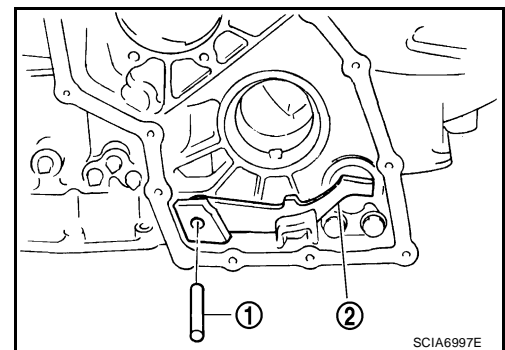
CAUTION:

Be careful with the direction of parking actuator support (1).

- Tighten parking actuator support fitting bolts to the specified torque. Refer to [AT-251, "Components"](#).

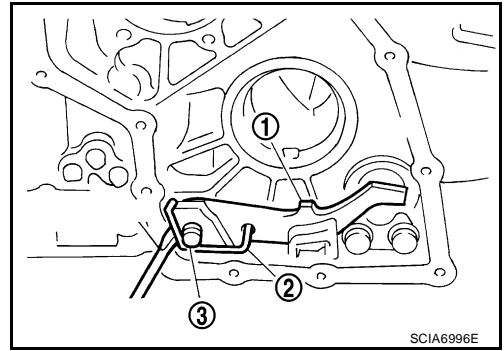


- Install parking pawl (2) on transaxle case, and fix it with parking shaft (1).



ASSEMBLY

8. Install return spring (2) on parking shaft (3) and parking pawl (1) using a flat-bladed screwdriver.



UCS005WH

Adjustment (1)

DIFFERENTIAL SIDE BEARING PRELOAD

1. Select proper thickness of differential side bearing adjusting shim using the following procedures.
 - a. Install differential side bearing outer race without differential side bearing adjusting shim on transaxle case.

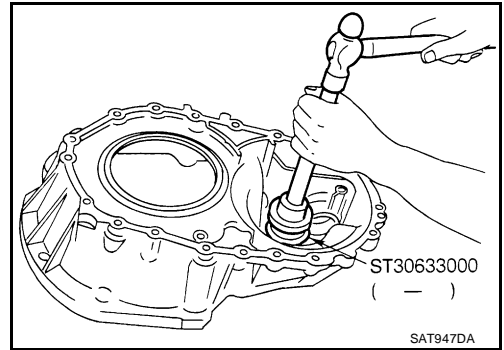
CAUTION:

Apply ATF to differential side bearing outer race.


- b. Install differential side bearing outer race on converter housing.

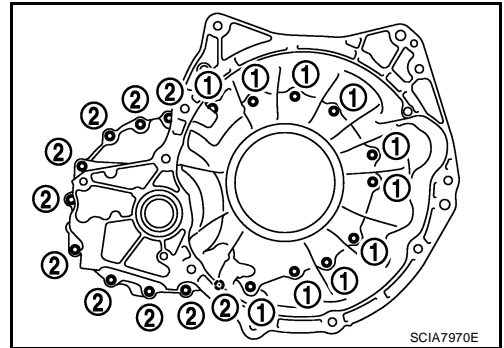
CAUTION:

Apply ATF to differential side bearing outer race.



- c. Place final drive assembly on transaxle case.
 - d. Tighten converter housing fitting bolts (1) and (2) to the specified torque. Refer to [AT-343, "Final Drive"](#).

Bolt	1	2
Bolt length [mm (in)]	32.8 (1.291)	40 (1.57)
		
Number of bolts	10	10



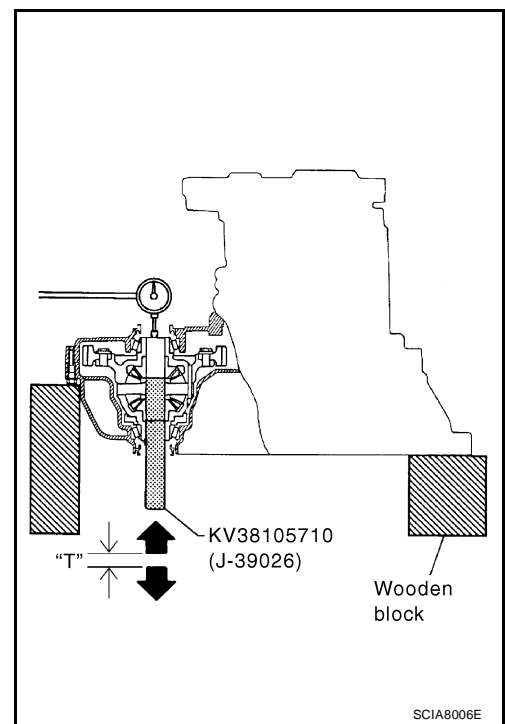
ASSEMBLY

- e. Attach dial indicator on differential case at converter housing side.
- f. Insert SST into differential side gear from transaxle case side.
- g. Move SST up and down and measure dial indicator deflection.
- h. Select proper thickness of differential side bearing adjusting shim. Refer to "Parts Information" for differential side bearing adjusting shim selection.

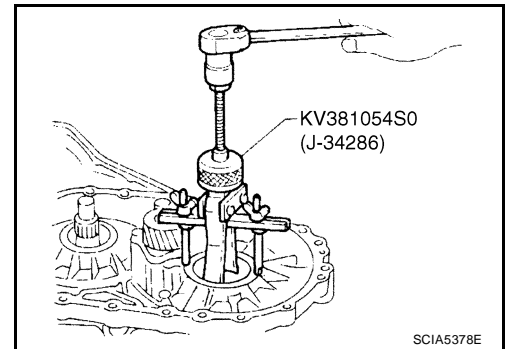
Suitable shim thickness = Dial indicator deflection + Specified bearing preload

Suitable shim thickness = Dial indicator deflection + Specified bearing preload

Bearing preload: Refer to [AT-376, "Final Drive"](#) .



- i. Remove converter housing from transaxle case.
- j. Remove final drive assembly from transaxle case.
- k. Remove differential side bearing outer race from transaxle case.
- l. Reinstall differential side bearing outer race and differential side bearing adjusting shim selected from "Parts Information" on transaxle case.
- m. Reinstall converter housing on transaxle case and tighten converter housing mounting bolts to the specified torque. Refer to [AT-251, "Components"](#) .

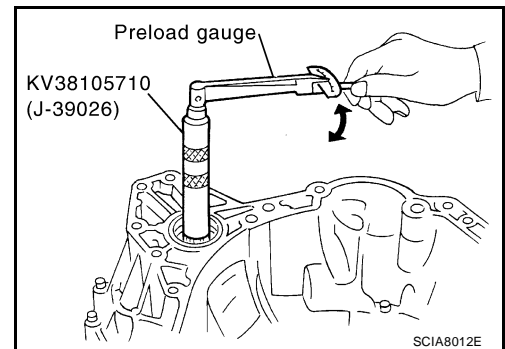


- n. Insert SST and measure turning torque of final drive assembly.
 - Turn final drive assembly in both directions several times to seat bearing rollers correctly.

Turning torque of final drive assembly (New bearing):

Refer to [AT-376, "Final Drive"](#) .

- When old bearing is used again, turning torque will be slightly less than the above.
- Make sure torque is close to the specified range.

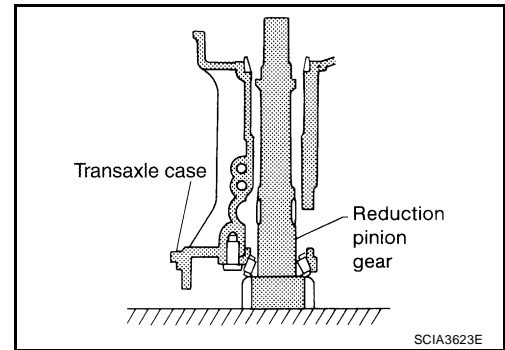


ASSEMBLY

REDUCTION PINION GEAR BEARING PRELOAD

1. Select proper thickness of reduction pinion gear adjusting shim using the following procedures.

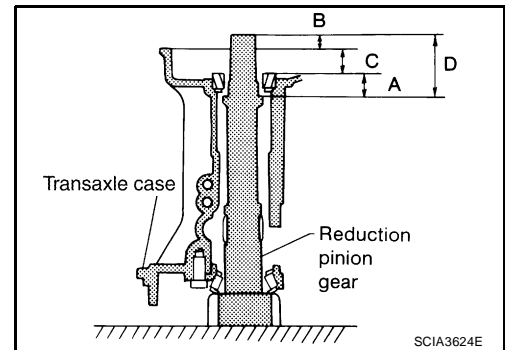
- Place reduction pinion gear on transaxle case as shown in the figure.
- Install idler gear bearing outer race on transaxle case. Refer to [AT-330, "COMPONENTS"](#).



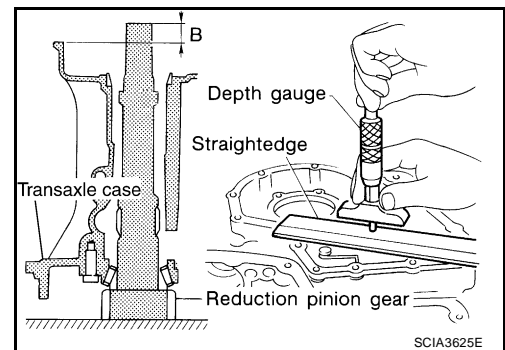
- Place idler gear bearing inner race on outer race.
- Measure dimensions "B", "C" and "D", and calculate dimension "A".

"A": Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.

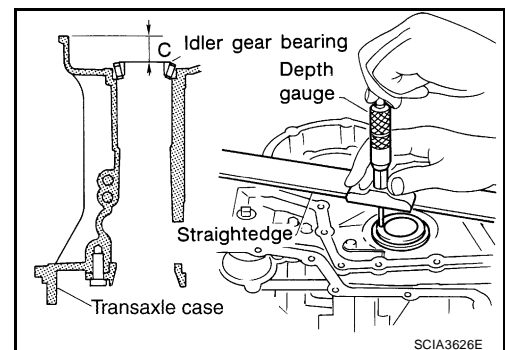
$$A = D - (B + C)$$



- Measure dimension "B" between the end of reduction pinion gear and the surface of transaxle case.
- **Measure dimension "B" in at least two places, and take the average.**



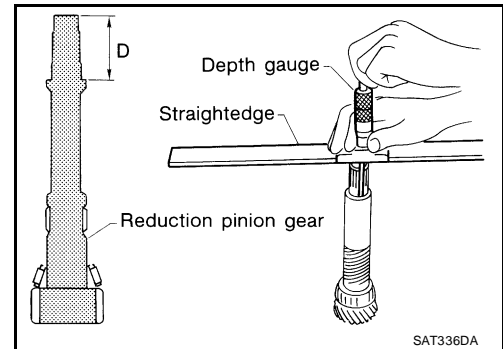
- Measure dimension "C" between the surface of idler gear bearing inner race and the surface of transaxle case.
- **Measure dimension "C" in at least two places, and take the average.**



ASSEMBLY

- Remove reduction pinion gear from transaxle case.
- Measure dimension "D" between the end of reduction pinion gear and the adjusting shim mating surface of reduction pinion gear.
- **Measure dimension "D" in at least two places, and take the average.**
- Calculate dimension "A".

$$A = D - (B + C)$$



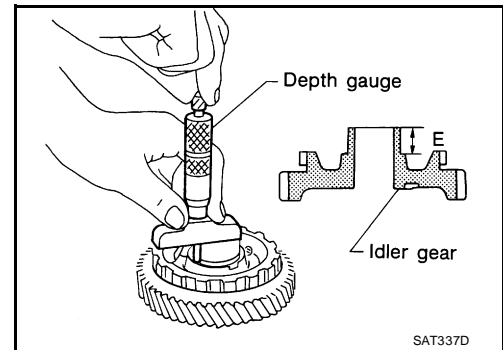
- e. Measure dimension "E" between the end of idler gear and idler gear bearing inner race mating surface of idler gear.

- **Measure dimension "E" in at least two places, and take the average.**

- f. Select proper thickness of reduction pinion gear adjusting shim. Refer to "Parts Information" for reduction pinion gear adjusting shim selection.

$$\text{Proper shim thickness} = A - E - 0.05 \text{ mm (0.0020 in)}^*$$

(*: Bearing preload)



2. Install reduction pinion gear and reduction pinion gear adjusting shim selected in step 1-f on transaxle case.

CAUTION:

Apply ATF to reduction pinion gear bearing.

3. Press idler gear bearing inner race on idler gear. Refer to [AT-330, "COMPONENTS"](#) .

4. Press idler gear on reduction pinion gear.

CAUTION:

- **Apply ATF to idler gear bearing.**

- **Press idler gear until idler gear fully contacts reduction pinion gear bearing adjusting shim.**

5. Set manual shaft in "P" position to fix idler gear.

6. Tighten lock nut of idler gear to the specified torque. Refer to [AT-251, "Components"](#) .

CAUTION:

Lock idler gear with parking pawl when tightening lock nut.

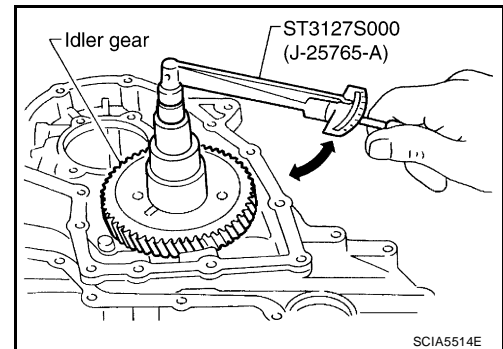
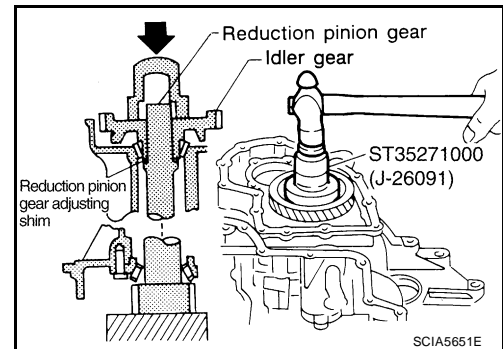
7. Measure turning torque of reduction pinion gear.

Turning torque of reduction pinion gear:

Refer to [AT-376, "Reduction Pinion Gear"](#) .

- **When measuring turning torque, turn reduction pinion gear in both directions several times to seat bearing rollers correctly.**

- **If turning torque is out of specification, decrease or increase thickness of reduction pinion gear adjusting shim.**

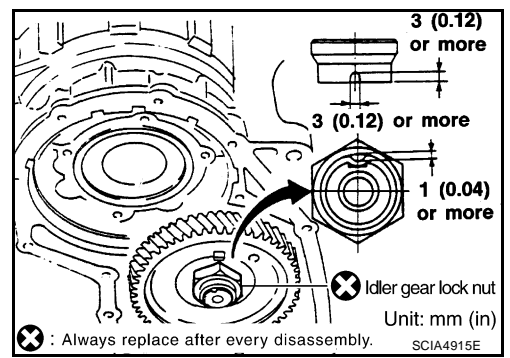


ASSEMBLY

8. After properly adjusting turning torque, clinch idler gear lock nut as shown.

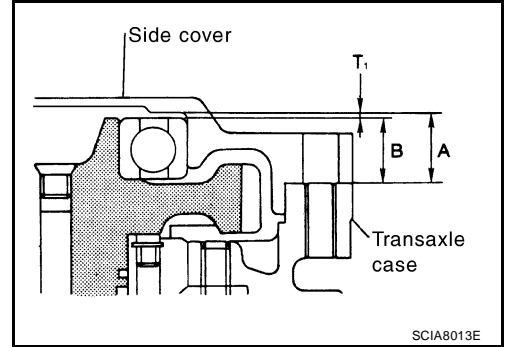
CAUTION:

Do not reuse idler gear lock nut.

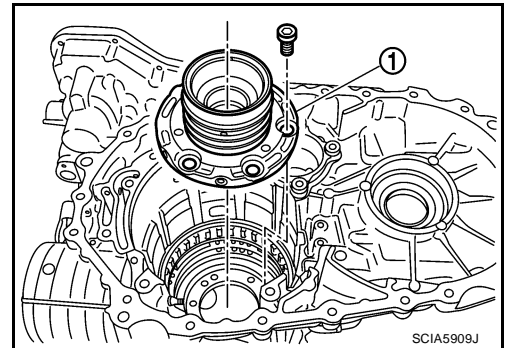


OUTPUT SHAFT END PLAY

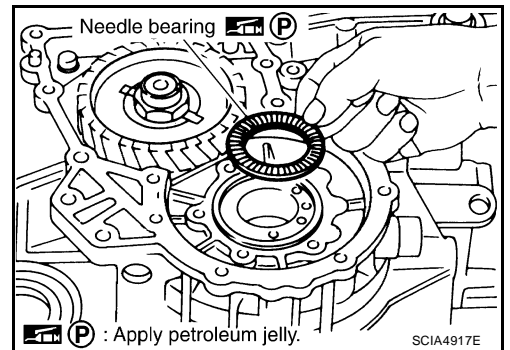
1. Select proper thickness of output shaft adjusting shim using the following procedures.



- a. Install bearing retainer (1) in transaxle case. Refer to [AT-330](#), "[COMPONENTS](#)".

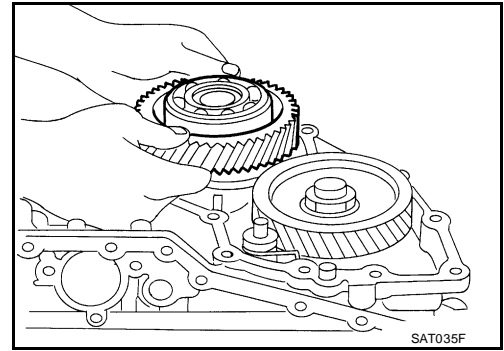


- b. Install needle bearing on bearing retainer.
CAUTION:
Be careful to direction of needle bearing.



ASSEMBLY

c. Install output shaft on transaxle case.



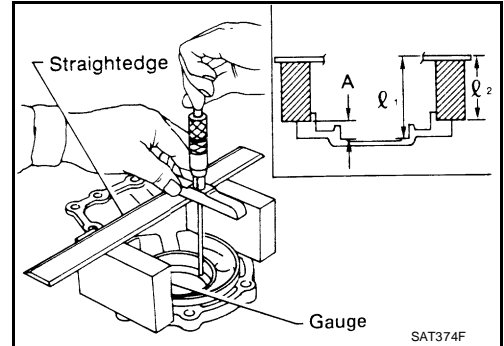
d. Measure dimensions “ ℓ_1 ” and “ ℓ_2 ” at side cover and then calculate dimension “A”.

- Measure dimension “ ℓ_1 ” and “ ℓ_2 ” in at least two places.

“A”: Distance between transaxle case fitting surface and adjusting shim mating surface.

$$A = \ell_1 - \ell_2$$

ℓ_2 : Height of gauge



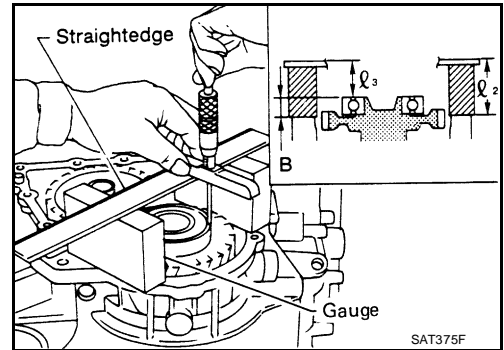
e. Measure dimensions “ ℓ_2 ” and “ ℓ_3 ” and then calculate dimension “B”.

- Measure dimension “ ℓ_2 ” and “ ℓ_3 ” in at least two places.

“B”: Distance between the end of output shaft bearing outer race and the side cover fitting surface of transaxle case.

$$B = \ell_2 - \ell_3$$

ℓ_2 : Height of gauge

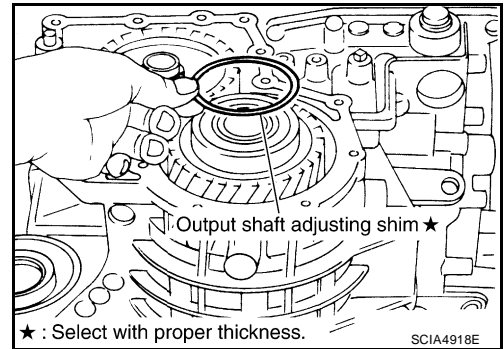


f. Select proper thickness of output shaft adjusting shim so that output shaft end play (clearance between side cover and output shaft bearing) is within specifications. Refer to “Parts Information” for output shaft adjusting shim selection.

Output shaft end play (A – B):

Refer to [AT-376, "Output Shaft"](#) .

g. Install output shaft adjusting shim on output shaft bearing.



2. Apply recommended sealant (Genuine Anaerobic Liquid Gasket or equivalent.) to transaxle case as shown in figure.

⇐: Inside of side cover

“A”: 3 - 5 mm (0.12 - 0.20 in)

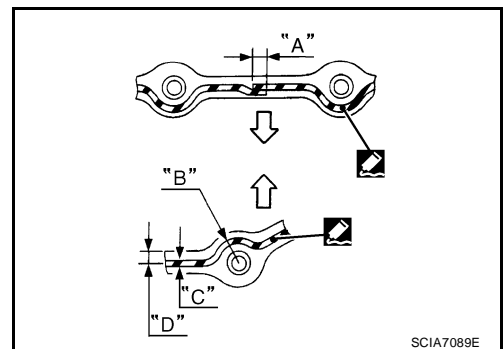
“B”: 8 mm (0.31 in) R

“C”: 1.5 mm (0.059 in) dia.

“D”: 4 mm (0.16 in)

CAUTION:

- Apply the sealant on the center between the bolt holes.



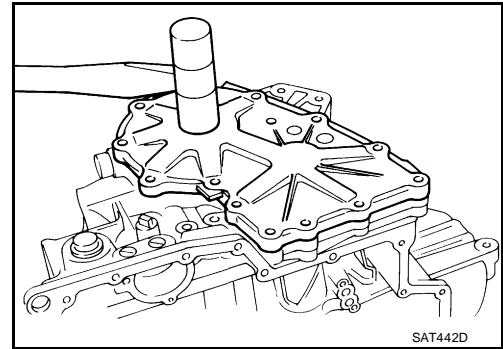
ASSEMBLY

- Completely remove all moisture, oil and old sealant, etc. from the transaxle case and side cover mounting surfaces.

3. Fit mounting part of output shaft bearing on side cover to output shaft bearing, and after adjusting knock pin position, install it with light taps of a soft hammer and things like that.

CAUTION:

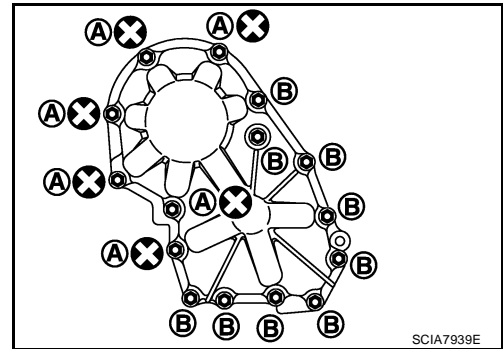
When installing, to avoid getting damaged and deformed, set mounting part straight to parallel with the mounting surface.



4. Tighten side cover fitting bolts to specified torque. Refer to [AT-251, "Components"](#) .

CAUTION:

- Do not mix bolts A and B.
- Always replace bolts A as they are self-sealing bolts.



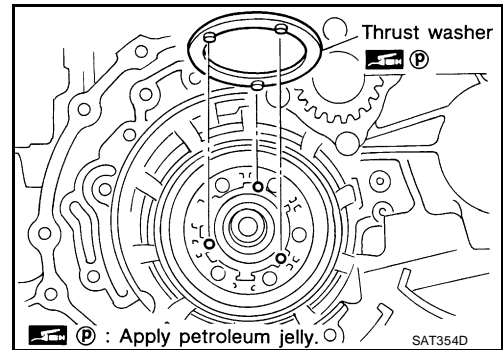
Assembly (2)

UCS005WI

1. Remove paper rolled around bearing retainer.
2. Install thrust washer on bearing retainer.

CAUTION:

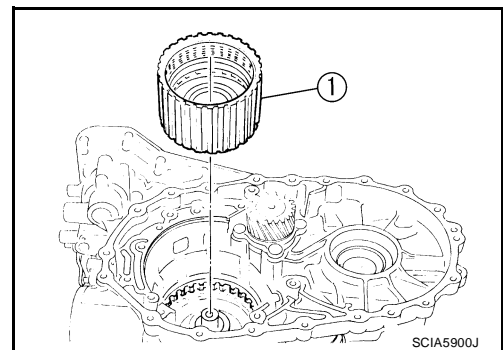
Align pawls of thrust washer with holes of bearing retainer.



3. Install forward clutch assembly and overrun clutch assembly (1) into transaxle case.

CAUTION:

- Align teeth of low & reverse brake drive plates before installing.
- Make sure that bearing retainer seal rings are not spread.



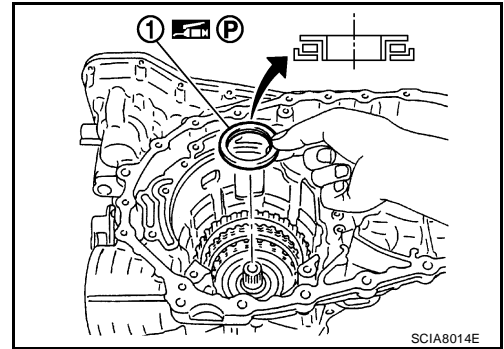
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ASSEMBLY

4. Install needle bearing (1) on bearing retainer.

CAUTION:

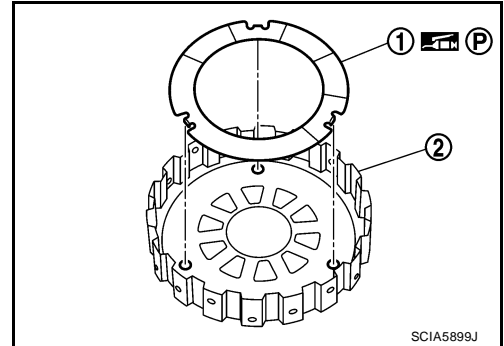
Be careful with the direction of needle bearing.



5. Install thrust washer (1) on overrun clutch hub (2).

CAUTION:

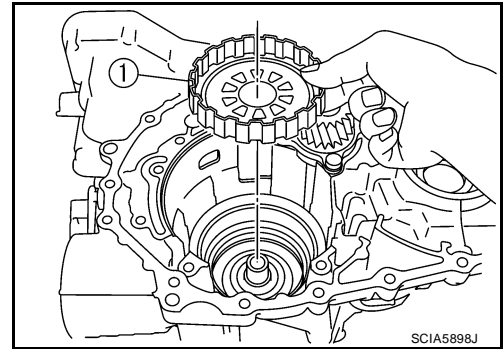
Align pawls of thrust washer (1) with holes of overrun clutch hub (2).



6. Install overrun clutch hub (1) into forward clutch drum.

CAUTION:

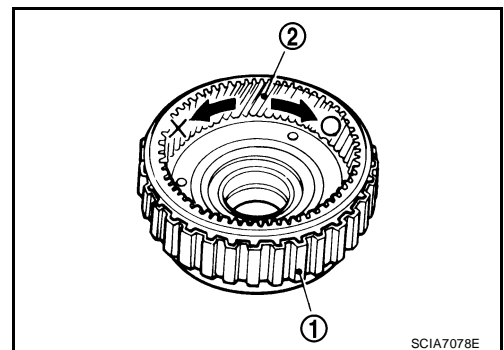
Align teeth of overrun clutch drive plates before installing.



7. Hold forward clutch hub, and check that rear internal gear locks when tried to rotate counterclockwise.

CAUTION:

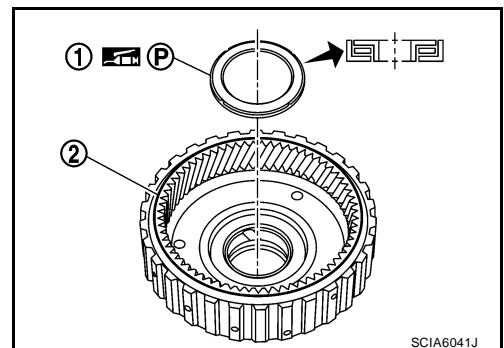
If rear internal gear rotates counterclockwise, check installation direction of forward one-way clutch.



8. Install needle bearing (1) on rear internal gear (2).

CAUTION:

Be careful with the direction of needle bearing (1).

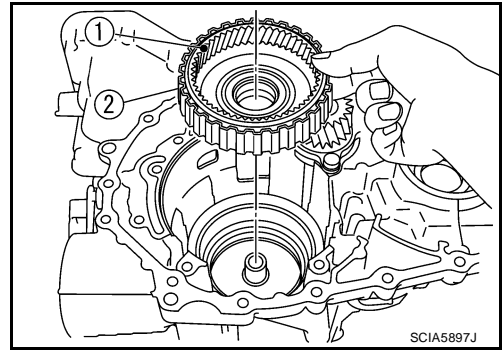


ASSEMBLY

9. Install rear internal gear (1) and forward clutch hub (2) as a set into forward clutch drum.

CAUTION:

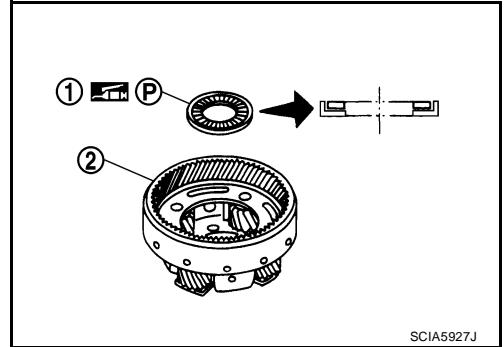
Align teeth of forward clutch drive plates before installing.



10. Install needle bearing (1) on rear planetary carrier (2).

CAUTION:

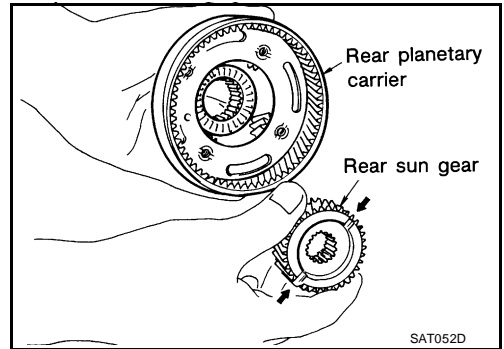
Be careful with the direction of needle bearing (1).



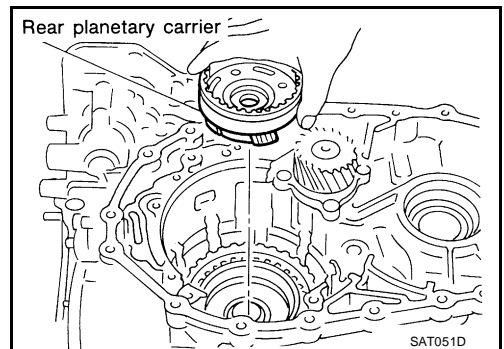
11. Install rear sun gear on rear planetary carrier.

CAUTION:

Be careful with the direction of rear sun gear.



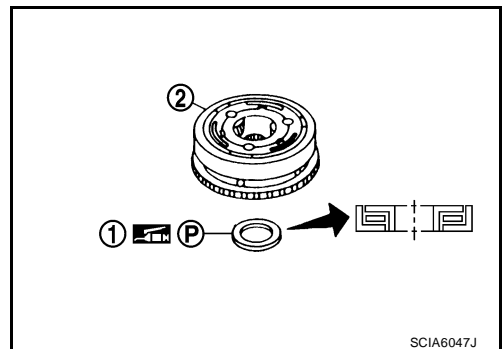
12. Install rear planetary carrier in transaxle case.



13. Install needle bearing (1) on front planetary carrier (2).

CAUTION:

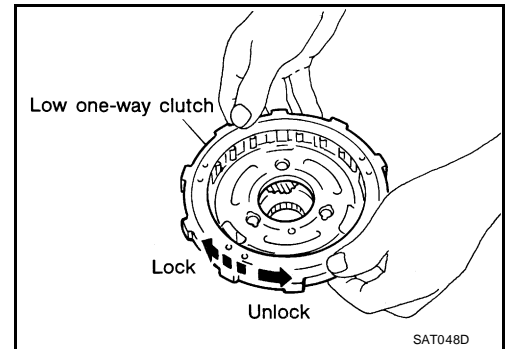
Be careful with the direction of needle bearing (1).



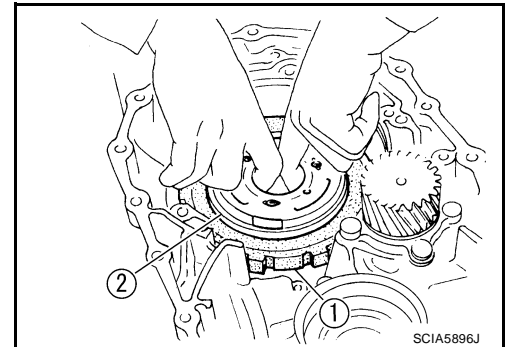
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ASSEMBLY

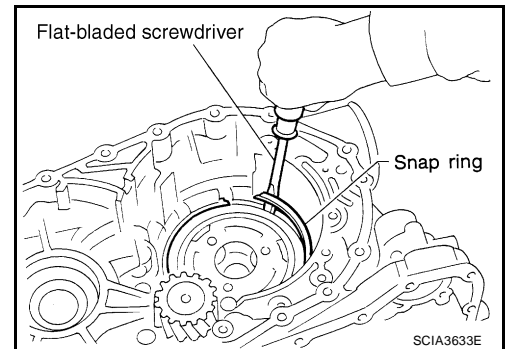
14. Install low one-way clutch to front planetary carrier by turning it in the direction of unlock.
15. Check that low one-way clutch rotates counterclockwise around front planetary carrier. Then try to turn it clockwise and check that it is locked.



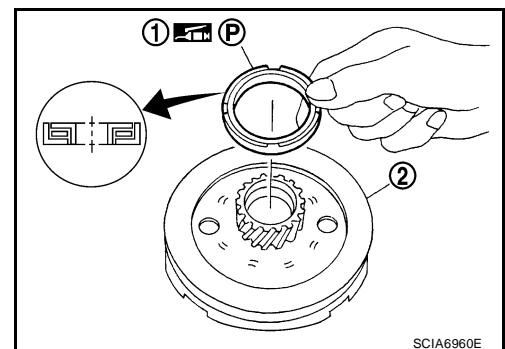
16. Install front planetary carrier (2) and low one-way clutch (1) as a set into transaxle case.



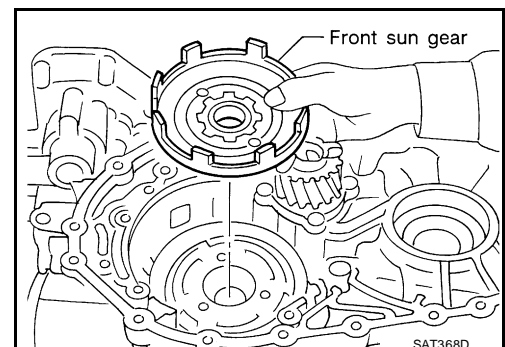
17. Install snap ring into transaxle case using a flat-bladed screwdriver.



18. Install needle bearing (1) on front sun gear (2).
CAUTION:
Be careful with the direction of needle bearing (1).



19. Install front sun gear on front planetary carrier.

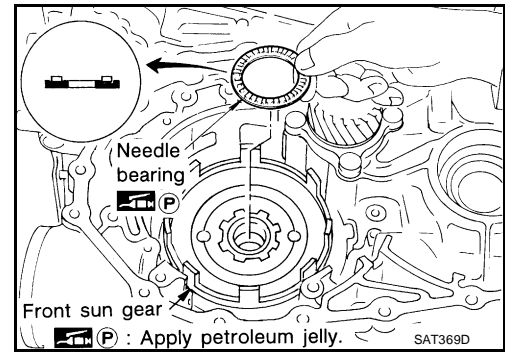


ASSEMBLY

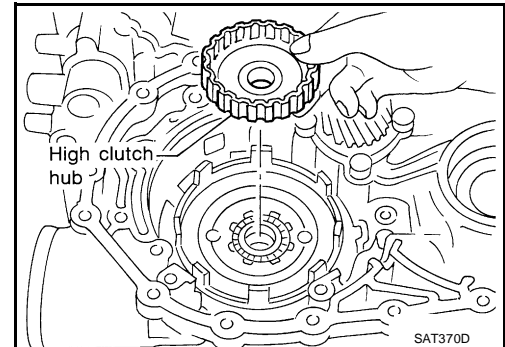
20. Install needle bearing on front sun gear.

CAUTION:

Be careful with the direction of needle bearing.



21. Install high clutch hub on front sun gear.

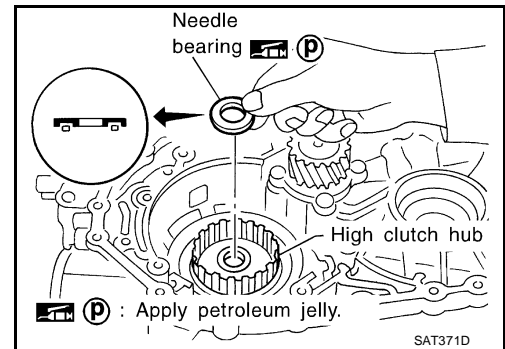


22. Install needle bearing on high clutch hub.

CAUTION:

Be careful with the direction of needle bearing.

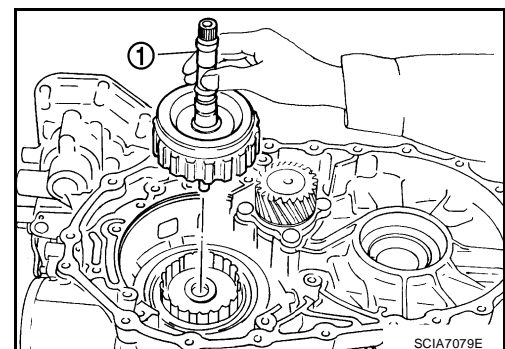
23. Remove paper rolled around input shaft assembly (high clutch drum).



24. Install input shaft assembly (high clutch assembly) (1).

CAUTION:

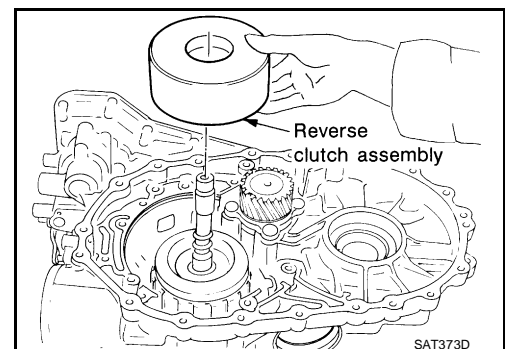
Align teeth of high clutch drive plates before installing.



25. Install reverse clutch assembly.

CAUTION:

Align teeth of reverse clutch drive plates before installing.



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ASSEMBLY

Adjustment (2)

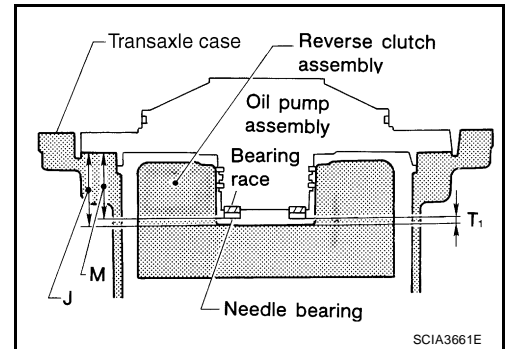
UCS005WJ

When any parts listed below are replaced, adjust total end play and reverse clutch end play.

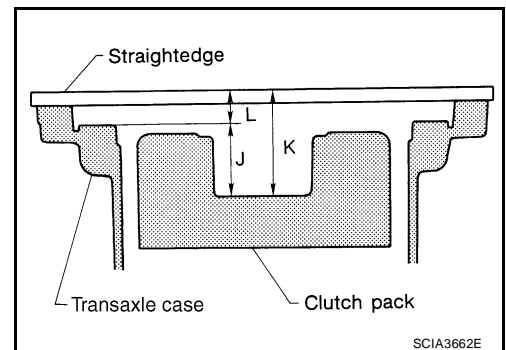
Part name	Total end play	Reverse clutch end play
Transaxle case	●	●
Overrun clutch hub	●	●
Rear internal gear	●	●
Rear planetary carrier	●	●
Rear sun gear	●	●
Front planetary carrier	●	●
Front sun gear	●	●
High clutch hub	●	●
Input shaft assembly (high clutch drum)	●	●
Oil pump cover	●	●
Reverse clutch drum	—	●

TOTAL END PLAY

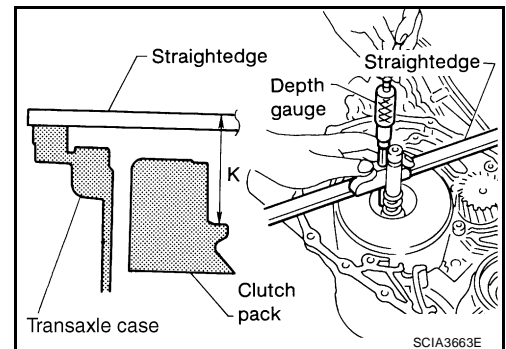
- Measure clearance between reverse clutch drum and needle bearing for oil pump cover.
- Select proper thickness of bearing race so that end play is within specifications.



1. Measure dimensions "K" and "L", and then calculate dimension "J".



- a. Measure dimension "K".

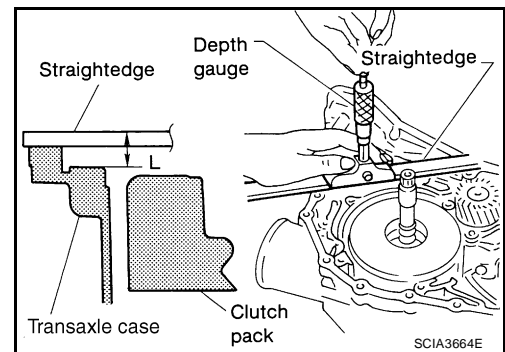


ASSEMBLY

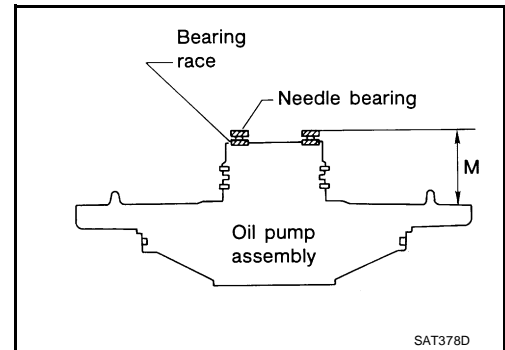
- b. Measure dimension "L".
- c. Calculate dimension "J".

"J": Distance between oil pump fitting surface of transaxle case and needle bearing mating surface of input shaft assembly (high clutch drum).

$$J = K - L$$



2. Measure dimension "M".
- a. Place bearing race and needle bearing on oil pump assembly.

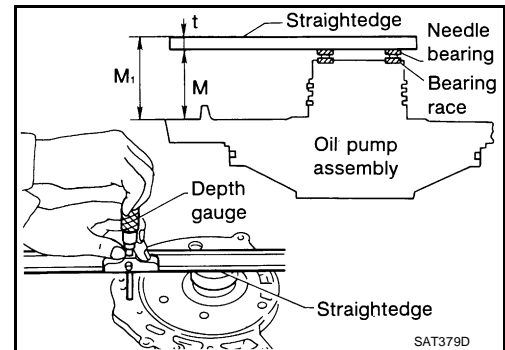


- b. Measure dimension "M".

"M": Distance between transaxle case fitting surface of oil pump cover and needle bearing on oil pump cover.

"M1 Indication of gauge

":



- c. Measure thickness of straightedge "t".

$$M = M1 - t$$

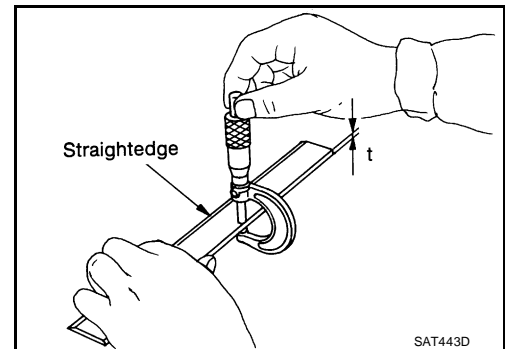
3. Adjust total end play "T1".

$$T1 = J - M$$

Total end play "T1":

Refer to [AT-377, "Total End Play"](#).

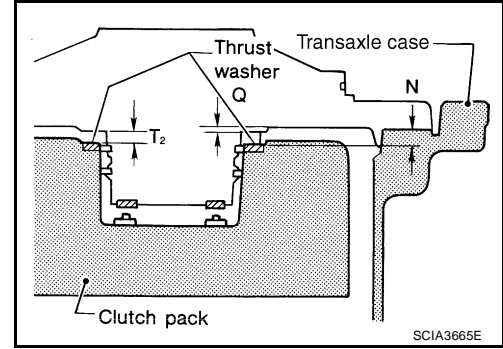
- Select proper thickness of bearing race so that total end play is within specifications. Refer to "Parts Information" for bearing race selection.



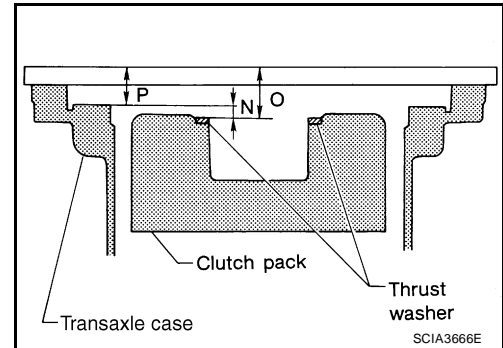
ASSEMBLY

REVERSE CLUTCH END PLAY

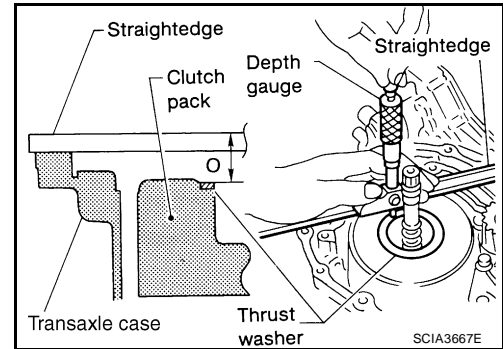
- Measure clearance between oil pump cover and thrust washer for reverse clutch drum.
- Select proper thickness of thrust washer so that end play is within specification.



1. Measure dimensions "O" and "P", and then calculate dimension "N".



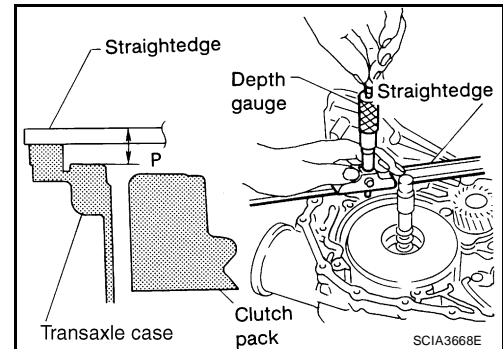
- a. Place thrust washer on reverse clutch drum.
- b. Measure dimension "O".



- c. Measure dimension "P".
- d. Calculate dimension "N".

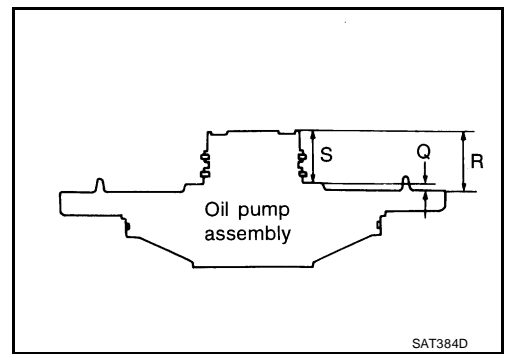
"N": Distance between oil pump fitting surface of transaxle case and thrust washer on reverse clutch drum.

$$N = O - P$$

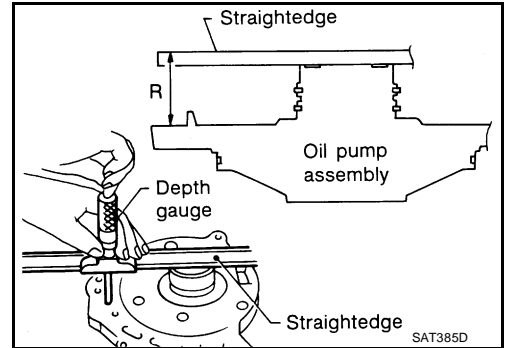


ASSEMBLY

2. Measure dimensions "R" and "S", and then calculate dimension "Q".



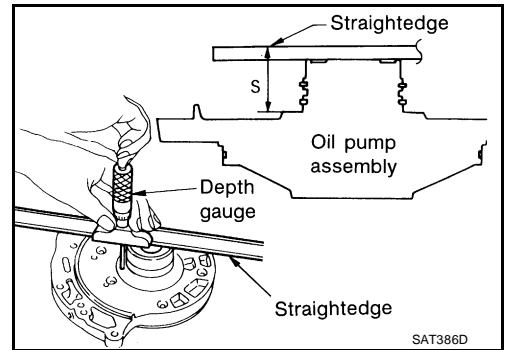
- a. Measure dimension "R".



- b. Measure dimension "S".
- c. Calculate dimension "Q".

"Q": Distance between transaxle case fitting surface and thrust washer mating surface.

$$Q = R - S$$



3. Adjust reverse clutch end play "T₂".

$$T_2 = N - Q$$

Reverse clutch end play:

Refer to [AT-377, "Reverse Clutch End Play"](#).

- Select proper thickness of thrust washer so that reverse clutch end play is within specifications. Refer to "Parts Information" for thrust washer selection.

Assembly (3)

UCS005WK

1. Remove reverse clutch assembly.
2. Install needle bearing on input shaft assembly (high clutch drum).

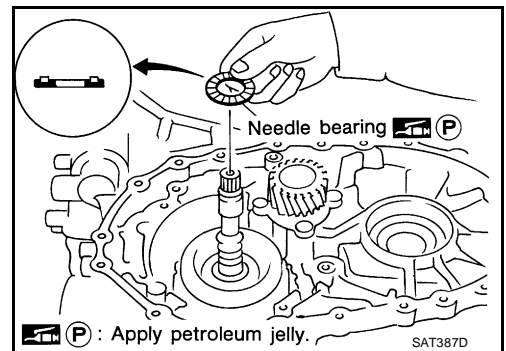
CAUTION:

Be careful with the direction of needle bearing.

3. Install reverse clutch assembly.

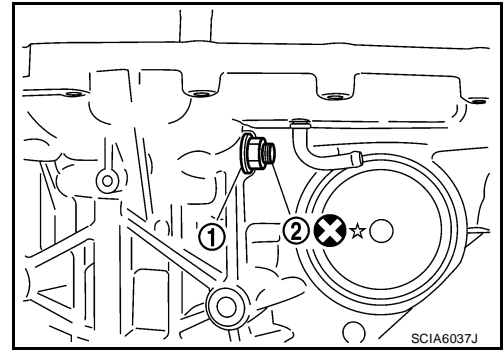
CAUTION:

Align teeth of reverse clutch drive plates before installing.

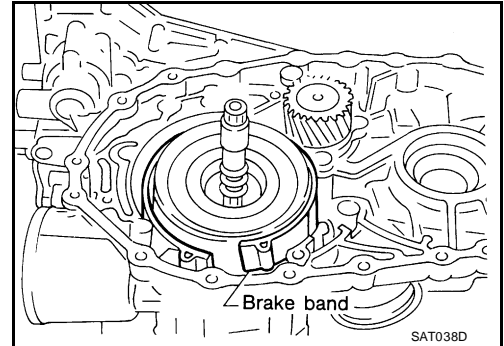


ASSEMBLY

4. Install anchor end pin (2) and lock nut (1) on transaxle case.



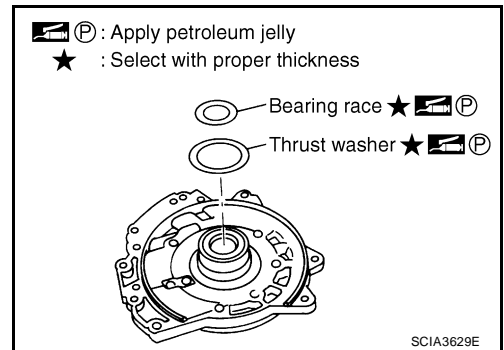
5. Place brake band on outside of reverse clutch drum.
6. Tighten anchor end pin just enough so that brake band is evenly fitted on reverse clutch drum.



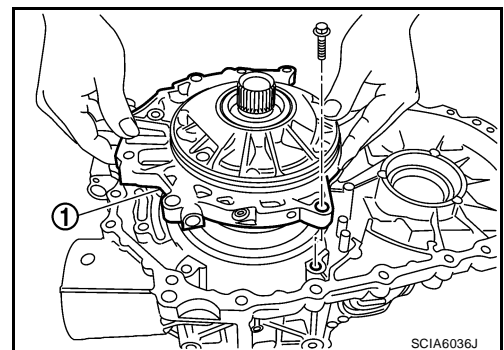
7. Install bearing race selected in total end play adjustment step on oil pump cover.
8. Install thrust washer selected in reverse clutch end play adjustment step on oil pump cover.
9. Install O-ring to oil pump assembly.

CAUTION:

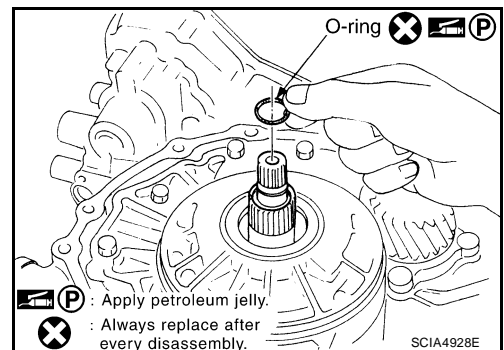
- Do not reuse O-ring.
- Apply ATF to O-ring.



10. Install oil pump assembly (1) on transaxle case.
11. Tighten oil pump fitting bolts to the specified torque. Refer to [AT-251, "Components"](#).



12. Install O-ring to input shaft assembly (high clutch drum).

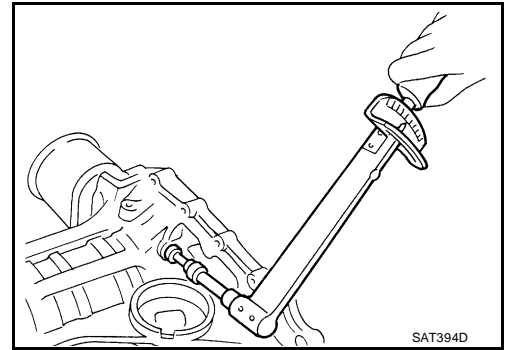


ASSEMBLY

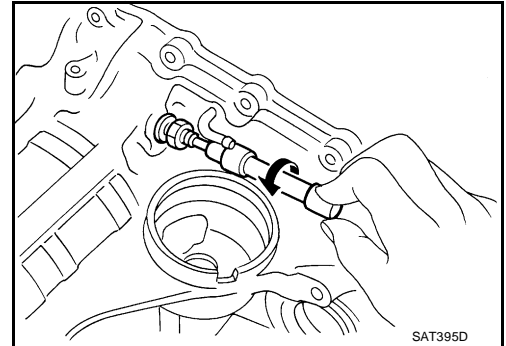
13. Adjust brake band.

a. Tighten anchor end pin to the specified torque.

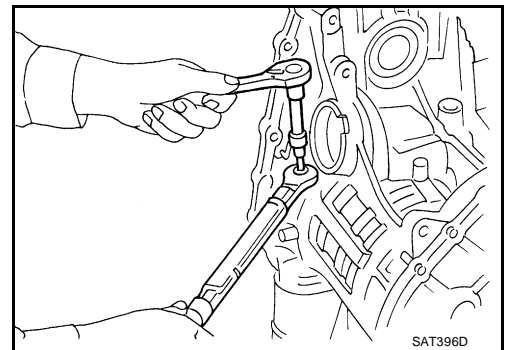
 **4.9 N·m (0.50 kg·m, 43 in·lb)**



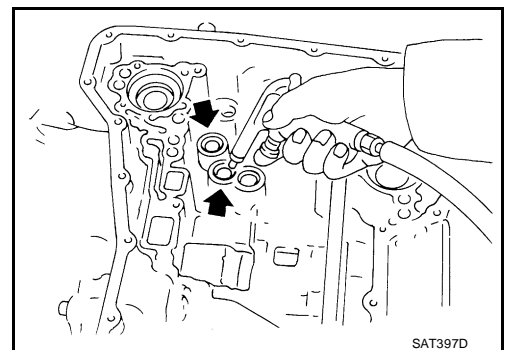
b. Back off anchor end pin two and a half turns.



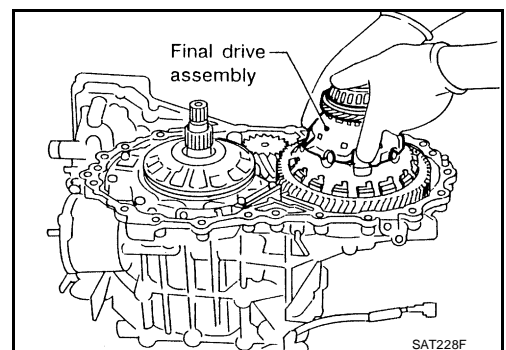
c. Tighten lock nut while holding anchor end pin. Refer to [AT-251, "Components"](#) .



14. Apply compressed air into oil holes of transaxle case and check operation of brake band.



15. Install final drive assembly on transaxle case.



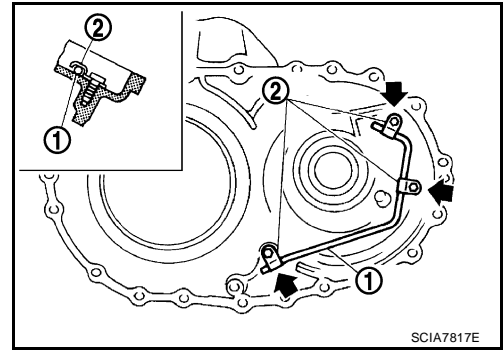
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ASSEMBLY

16. Install differential lubricant tube (1) and clips (2) on converter housing.

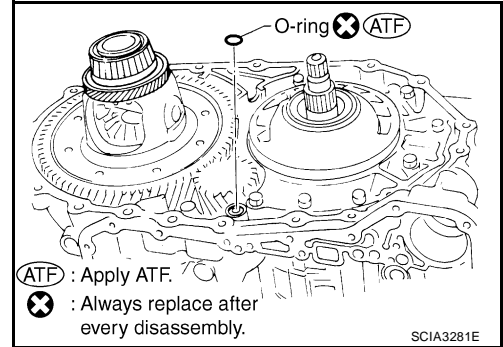
←: Bolt (3)

17. Tighten differential lubricant tube fitting bolts to the specified torque. Refer to [AT-251, "Components"](#) .



SCIA7817E

18. Install O-ring on differential oil port of transaxle case.



SCIA3281E

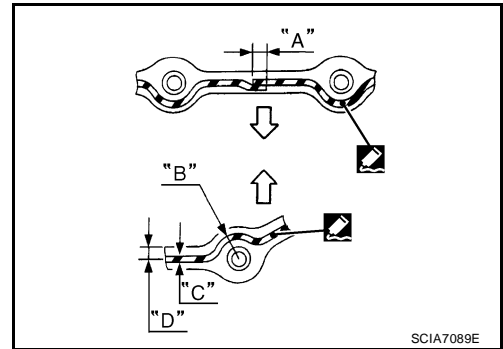
19. Apply locking sealant (loctite #518) to transaxle case as shown in the figure.

⇐: Inside of transaxle case

- "A": 3 - 5 mm (0.12 - 0.20 in)
- "B": 8 mm (0.31 in) R
- "C": 1.5 mm (0.059 in) dia.
- "D": 4 mm (0.16 in)

CAUTION:

Completely remove all moisture, oil and old sealant, etc. from the transaxle case and converter housing mating surfaces.




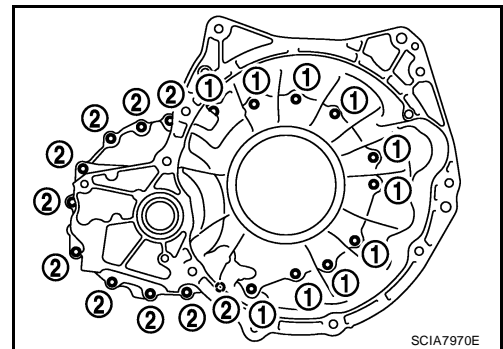
SCIA7089E

20. Install converter housing on transaxle case.

21. Install bracket on converter housing.

22. Tighten converter housing fitting bolts (1) and (2) to the specified torque. Refer to [AT-251, "Components"](#) .

Bolt	1	2
Bolt length [mm (in)]	32.8 (1.291)	40 (1.57)
		
Number of bolts	10	10

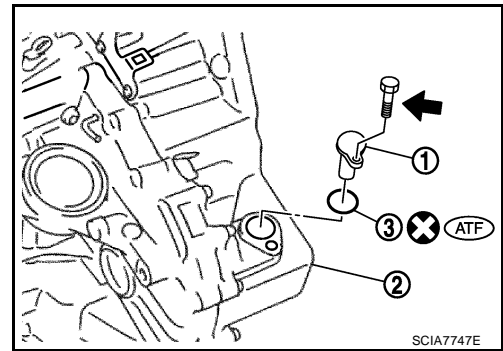


SCIA7970E

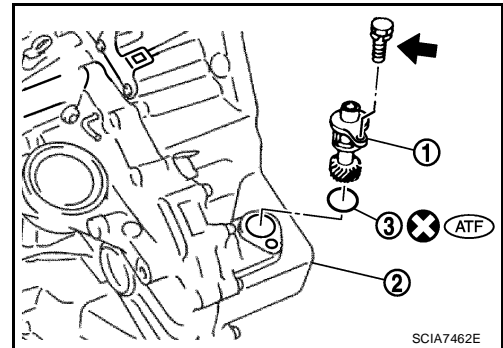
23. Install plug or speedometer pinion according to the following procedures.

ASSEMBLY

- a. With ABS
 - i. Install O-ring (3) to plug (1).
 - ii. Install plug (1) to converter housing (2).
 ←: Bolt (1)

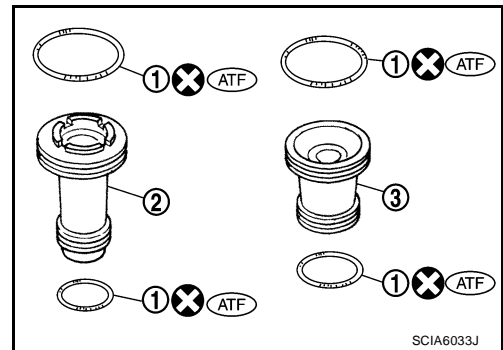


- b. Without ABS
 - i. Install O-ring (3) to speedometer pinion (1).
 - ii. Install speedometer pinion (1) to converter housing (2).
 ←: Bolt (1)

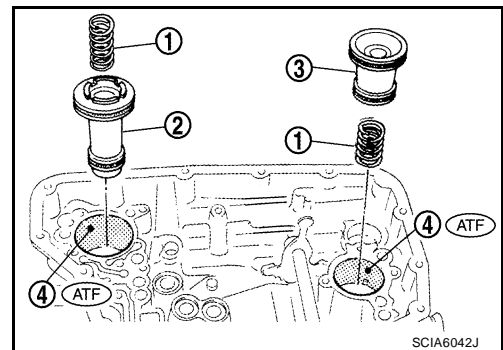


- 24. Tighten plug or speedometer pinion fitting bolt to the specified torque. Refer to [AT-251, "Components"](#) .
- 25. Install accumulator pistons.

- a. Install O-rings (1) on servo release accumulator piston (2) and N-D accumulator piston (3). Refer to [AT-374, "Accumulator"](#) .

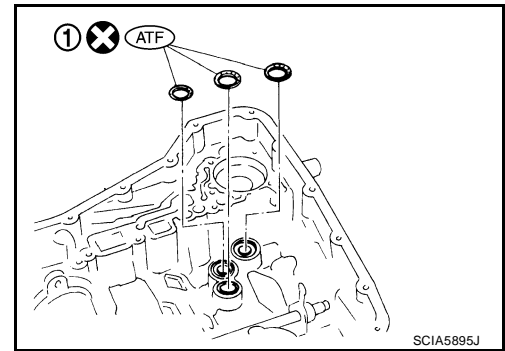


- b. Install return springs (1), servo release accumulator piston (2) and N-D accumulator piston (3) into transaxle case (4). Refer to [AT-374, "Accumulator"](#) .



ASSEMBLY

26. Install lip seals (1) for band servo oil holes on transaxle case.



27. Install control valve assembly on transaxle case.

a. Install O-ring on terminal body.

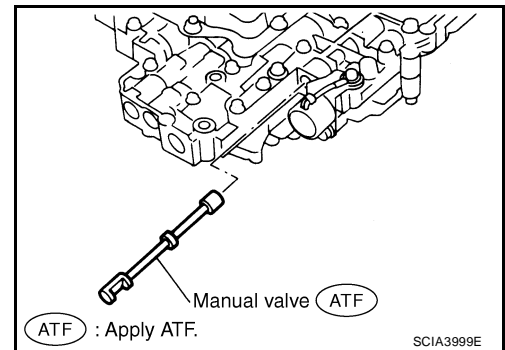
CAUTION:

- Do not reuse O-ring.
- Apply ATF to O-ring.

b. Insert manual valve into control valve assembly.

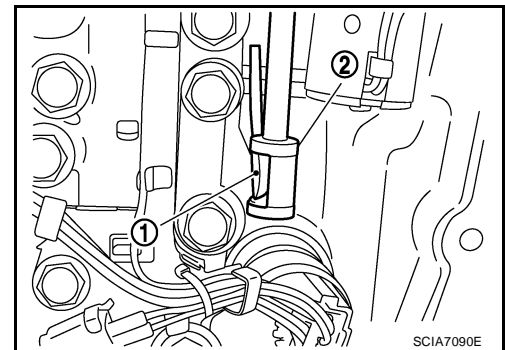
CAUTION:

Be careful not to drop manual valve.



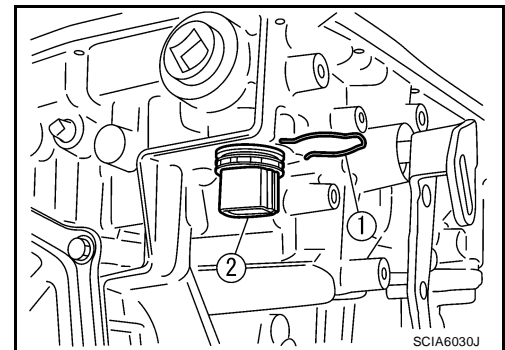
c. Set manual shaft in "N" position.

d. Install control valve assembly on transaxle case while aligning manual valve (2) with manual plate (1).



e. Install terminal body (2) into transaxle case by pushing it.

f. Install snap ring (1) to terminal body (2).

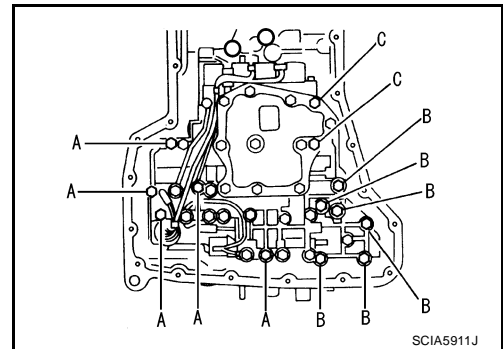


g. Tighten bolts **A** , **B** and **C** to the specified torque. Refer to [AT-251, "Components"](#) .

ASSEMBLY

Bolt length, number and location:

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



28. Install oil pan.

- a. Attach magnets on oil pan.
- b. Install oil pan gasket on transaxle case.

CAUTION:

- Completely remove all moisture, oil and old gasket, etc. from the oil pan gasket mounting surface of transaxle case.

- Do not reuse oil pan gasket.

- c. Install oil pan on transaxle case.

CAUTION:

Completely remove all moisture, oil and old gasket, etc. from the oil pan gasket mounting surface of oil pan.

- d. Tighten oil pan fitting bolts (1) to the specified torque. Refer to [AT-251, "Components"](#).

CAUTION:

- Always replace oil pan fitting bolts (1) as they are self-sealing bolts.

- Tighten four bolts in a criss-cross pattern to prevent dislocation of gasket.

- e. Install drain plug gasket and drain plug (2) to oil pan.

CAUTION:

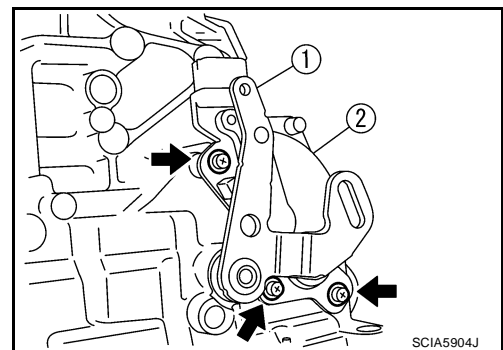
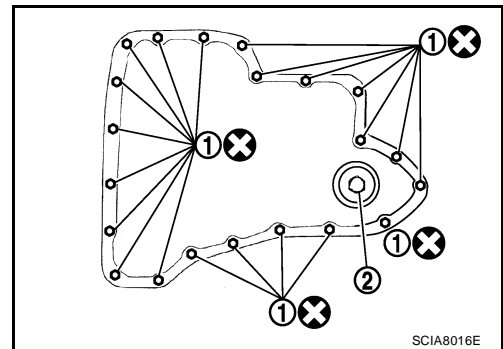
Do not reuse drain plug gasket.

- f. Tighten drain plug to the specified torque. Refer to [AT-251, "Components"](#).

29. Install PNP switch (2) on transaxle case.

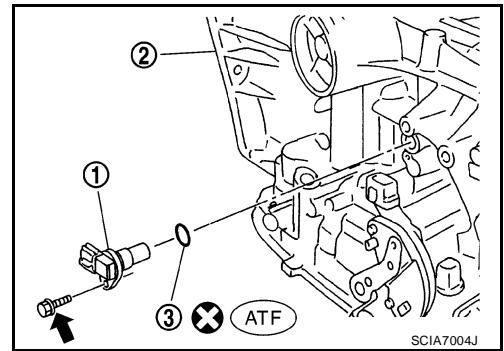
← Bolt (3)

- a. Set manual shaft (1) in "P" position.
- b. Temporarily install PNP switch (2) on manual shaft (1).
- c. Set manual shaft (1) in "N" position.
- d. Use a 4 mm (0.16 in) dia. pin for this adjustment.
 - i. Insert the pin straight into the manual shaft (1) adjustment hole.
 - ii. Rotate PNP switch (2) until the pin can also be inserted straight into hole in PNP switch (2).
- e. Tighten PNP switch fitting bolts to the specified torque. Refer to [AT-251, "Components"](#).
- f. Remove pin from adjustment hole after adjusting PNP switch (2).

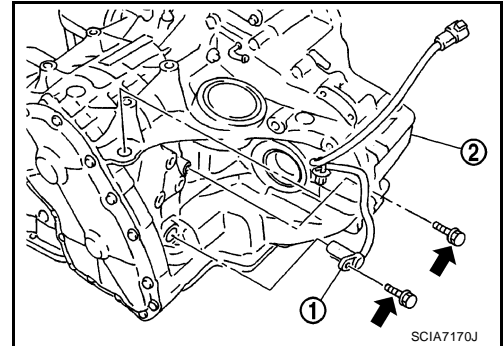


ASSEMBLY

30. Install O-ring (3) to turbine revolution sensor (power train revolution sensor) (1).
31. Install turbine revolution sensor (power train revolution sensor) (1) to transaxle case (2).
←: Bolt (1)
32. Tighten turbine revolution sensor (power train revolution sensor) fitting bolt to the specified torque. Refer to [AT-251, "Components"](#) .



33. Install revolution sensor (1) to transaxle case (2).
34. Tighten revolution sensor fitting bolts to the specified torque. Refer to [AT-251, "Components"](#) .
←: Bolt (2)

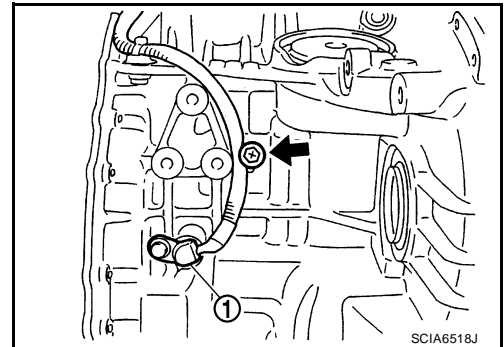


CAUTION:

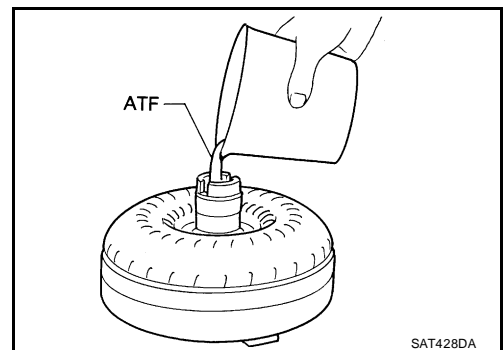
Ensure revolution sensor harness is firmly secured with bolt.

(1): Revolution sensor

←: Bolt (1)

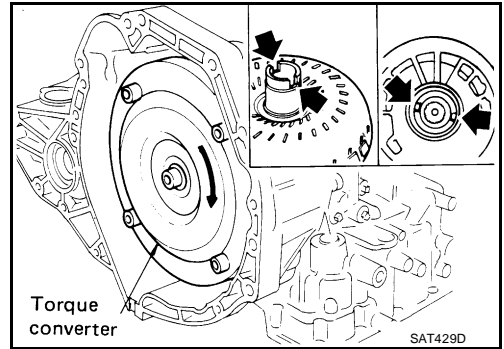


35. Install torque converter.
 - a. Pour ATF into torque converter.
 - Approximately 1 liter (1 US qt, 7/8 Imp pt) of fluid is required for a new torque converter.
 - When reusing old torque converter, add the same amount of ATF as was drained.



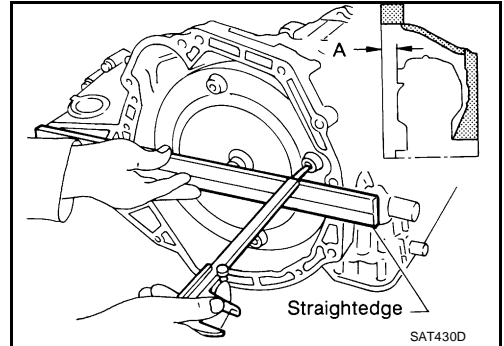
ASSEMBLY

- b. Install torque converter while aligning notches of torque converter with notches of oil pump.



- c. Measure distance "A" to make sure that torque converter is in proper position.

Distance "A": 14.4 mm (0.567 in) or more



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SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

UCS005WL

Engine	MR18DE	
Automatic transaxle model	RE4F03B	
Automatic transaxle assembly	Model code number 3CX0D	
Transaxle gear ratio	1st	2.861
	2nd	1.562
	3rd	1.000
	4th	0.697
	Reverse	2.310
	Final drive	4.072
Recommended fluid	Genuine NISSAN Matic D ATF (Continental U.S. and Alaska) or Canada NISSAN Automatic Transmission Fluid*	
Fluid capacity [ℓ (US qt, Imp qt)]	7.9 (8-3/8, 7)	

*: Refer to [MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS"](#) .

Vehicle Speed at Which Gear Shifting Occurs

UCS005WM

Throttle position	Vehicle speed km/h (MPH)					
	D1 → D2	D2 → D3	D3 → D4	D4 → D3	D3 → D2	D2 → D1
Full throttle	51 - 59 (32 - 37)	97 - 105 (60 - 65)	154 - 162 (96 - 101)	150 - 158 (93 - 98)	87 - 95 (54 - 59)	40 - 48 (25 - 30)
Half throttle	34 - 42 (21 - 26)	62 - 70 (39 - 43)	124 - 132 (77 - 82)	69 - 77 (43 - 48)	36 - 44 (22 - 27)	19 - 27 (12 - 17)

- At half throttle, the accelerator opening is 4/8 of the full opening.

Vehicle Speed at When Lock-up Occurs/Releases

UCS005WN

Throttle position	Selector lever position	Vehicle speed km/h (MPH)	
		Lock-up ON	Lock-up OFF
2.0/8	"D" position	86 - 94 (53 - 58)	59 - 67 (37 - 42)
	"D" position (OD OFF)	86 - 94 (53 - 58)	83 - 91 (52 - 57)

Stall Speed

UCS005WO

Stall revolution (rpm)	2,300 - 2,750
------------------------	---------------

Line Pressure

UCS005WP

Engine speed	Line pressure kPa (kg/cm ² , psi)	
	"D", "2" and "1" positions	"R" position
Idle speed	500 (5.1, 73)	778 (7.9, 113)
Stall speed	1,173 (12.0, 170)	1,825 (18.6, 265)

SERVICE DATA AND SPECIFICATIONS (SDS)

Adjusting shims, Needle Bearings, Thrust Washers and Snap Rings UCS005W0

NOTE:

Refer to [AT-260, "Locations of Adjusting Shims, Needle Bearings and Thrust Washers"](#) or [AT-261, "Locations of Snap Rings"](#).

OUTER DIAMETER AND INNER DIAMETER OF NEEDLE BEARINGS

Unit: mm (in)

Location	Outer diameter	Inner diameter
A	47.0 (1.850)	32.0 (1.260)
B	35.0 (1.378)	20.1 (0.791)
C	60.0 (2.362)	42.0 (1.654)
D	60.0 (2.362)	45.0 (1.772)
E	47.0 (1.850)	30.0 (1.181)
F	42.6 (1.677)	26.1 (1.028)
G	48.0 (1.890)	33.5 (1.319)
H	55.0 (2.165)	40.5 (1.594)
I	60.0 (2.362)	40.0 (1.575)

OUTER DIAMETER AND INNER DIAMETER OF THRUST WASHERS

Unit: mm (in)

Location	Outer diameter	Inner diameter
J	72.0 (2.835)	55.5 (2.185)
K, L	82.0 (3.228)	59.0 (2.323)
M	78.5 (3.091)	62.4 (2.457)

OUTER DIAMETER AND INNER DIAMETER OF BEARING RACES AND ADJUSTING SHIMS

Unit: mm (in)

Location	Outer diameter	Inner diameter
N	48.0 (1.890)	33.0 (1.299)
O	34.3 (1.350)	26.1 (1.028)
P	68.0 (2.677)	60.0 (2.632)
Q	72.0 (2.835)	61.0 (2.402)

OUTER DIAMETER OF SNAP RINGS

Unit: mm (in)

Location	Outer diameter
1	142.0 (5.59)
2	
3	
4	
5	
7	162.3 (6.39)
8	113.0 (4.45)
9	135.4 (5.33)
9	126.0 (4.96)

INNER DIAMETER OF SNAP RINGS

Unit: mm (in)

Location	Inner diameter
6	32.0 (1.260)
10	63.5 (2.500)

SERVICE DATA AND SPECIFICATIONS (SDS)

Control Valves CONTROL VALVE SPRINGS

UCS005WR

Unit: mm (in)

Location	spring designation	Free length (l)	Outer diameter (D)	
Upper body	L14	Pilot valve spring	38.98 (1.5346)	
	L15	1-2 accumulator valve spring	20.5 (0.807)	
		1-2 accumulator piston spring	55.66 (2.1913)	
	L16	1st reducing valve spring	27.0 (1.063)	
	L17	3-2 timing valve spring	23.0 (0.906)	
	L18	Overrun clutch reducing valve spring	37.5 (1.476)	
	L19	Torque converter relief valve spring	33.3 (1.311)	
	L20	Torque converter clutch control valve spring	53.01 (2.0870)	
L21	Cooler check valve spring	28.04 (1.1039)	7.15 (0.2815)	
Lower body	L3	Pressure regulator valve spring	45.0 (1.772)	15.0 (0.591)
	L4	Overrun clutch control valve spring	21.7 (0.854)	7.0 (0.276)
	L5	Accumulator control valve spring	22.0 (0.866)	6.5 (0.256)
	L6	Shift valve A spring	21.7 (0.854)	7.0 (0.276)
	L7	Shuttle valve spring	51.0 (2.008)	5.65 (0.2224)
	L12	Shift valve B spring	21.7 (0.854)	7.0 (0.276)
	L13	Pressure modifier valve spring	32.0 (1.260)	6.9 (0.272)
		Pressure modifier piston spring	30.5 (1.201)	9.8 (0.386)
	—	Line pressure relief valve spring	17.02 (0.6701)	8.0 (0.315)
—	Torque converter pressure holding spring	9.0 (0.354)	7.3 (0.287)	

Accumulator RETURN SPRINGS

UCS005WS

Unit: mm (in)

Location	Free length (L1)
Servo release accumulator	62.8 (2.472)

Unit: mm (in)

Location	Length (L2)
N-D accumulator	46.5 (1.831)

O-RINGS

Unit: mm (in)

Location	Inner diameter (Small)	Inner diameter (Large)
Servo release accumulator	26.9 (1.059)	44.2 (1.740)
N-D accumulator	34.6 (1.362)	39.4 (1.551)

Clutches and Brakes REVERSE CLUTCH

UCS005WT

Number of drive plates		2
Number of driven plates		2
Drive plate thickness [mm (in)]	Standard	2.0 (0.079)
	Allowable limit	1.8 (0.071)
Driven plate thickness [mm (in)]	Standard	2.0 (0.079)
Clearance [mm (in)]	Standard	0.5 - 0.8 (0.020 - 0.031)
	Allowable limit	1.2 (0.047)

SERVICE DATA AND SPECIFICATIONS (SDS)

HIGH CLUTCH

Number of drive plates		4	
Number of driven plates		7 (1*1 + 6*2)	
Drive plate thickness [mm (in)]	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Driven plate thickness [mm (in)]	Standard	*1	*2
		2.0 (0.079)	1.5 (0.059)
Clearance [mm (in)]	Standard	1.4 - 1.8 (0.055 - 0.071)	
	Allowable limit	2.6 (0.102)	

FORWARD CLUTCH

Number of drive plates		5	
Number of driven plates		5	
Drive plate thickness [mm (in)]	Standard	1.8 (0.071)	
	Allowable limit	1.6 (0.063)	
Driven plate thickness [mm (in)]	Standard	2.0 (0.079)	
Clearance [mm (in)]	Standard	0.45 - 0.85 (0.0177 - 0.0335)	
	Allowable limit	1.85 (0.0728)	

OVERRUN CLUTCH

Number of drive plates		3	
Number of driven plates		4	
Drive plate thickness [mm (in)]	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Driven plate thickness [mm (in)]	Standard	2.0 (0.079)	
Clearance [mm (in)]	Standard	1.0 - 1.4 (0.039 - 0.055)	
	Allowable limit	2.0 (0.079)	

LOW & REVERSE BRAKE

Number of drive plates		5	
Number of driven plates		5	
Drive plate thickness [mm (in)]	Standard	2.0 (0.079)	
	Allowable limit	1.8 (0.071)	
Driven plate thickness [mm (in)]	Standard	2.0 (0.079)	
Clearance [mm (in)]	Standard	1.4 - 1.8 (0.055 - 0.071)	
	Allowable limit	2.8 (0.110)	

BRAKE BAND

Anchor end pin tightening torque [N·m (kg·m, in·lb)]	4.9 (0.50, 43)
Number of returning revolutions for anchor end pin	2.5
Lock nut tightening torque [N·m (kg·m, ft·lb)]	33.9 (3.5, 25)

SERVICE DATA AND SPECIFICATIONS (SDS)

Final Drive

UCS005WU

DIFFERENTIAL SIDE GEAR CLEARANCE

Clearance between side gear and differential case with washer [mm (in)]	0.1 - 0.2 (0.004 - 0.008)
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BEARING PRELOAD

Differential side bearing preload mm (in)	0.05 - 0.09 (0.0020 - 0.0035)
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TURNING TORQUE

Turning torque of final drive assembly N-m (kg-cm, in-lb)	0.68 - 1.26 (7.0 - 13.0, 6.0 - 11.0)
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Planetary Carrier

UCS005WV

Clearance between planetary carrier and pinion washer [mm (in)]	Standard	0.15 - 0.70 (0.0059 - 0.0276)
	Allowable limit	0.80 (0.0315)

Oil Pump

UCS005WW

Oil pump side clearance	0.02 - 0.04 (0.0008 - 0.0016)	
Clearance between oil pump housing and outer gear [mm (in)]	Standard	0.08 - 0.15 (0.0031 - 0.0059)
	Allowable limit	0.15 (0.0059)
Oil pump cover seal ring clearance [mm (in)]	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

Input Shaft

UCS005WX

SEAL RING CLEARANCE

Input shaft seal ring clearance [mm (in)]	Standard	0.08 - 0.23 (0.0031 - 0.0091)
	Allowable limit	0.23 (0.091)

SEAL RING

Unit: mm (in)

Outer diameter	Inner diameter	Width
24 (0.94)	20.4 (0.803)	1.97 (0.0776)

Reduction Pinion Gear

UCS005WY

TURNING TORQUE

Turning torque of reduction pinion gear [N-m (kg-m, in-lb)]	0.11 - 0.69 (0.01 - 0.07, 1 - 6)
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Band Servo

UCS005WZ

RETURN SPRINGS

Unit: mm (in)

Return spring	Free length
2nd servo return spring	32.5 (1.280)
OD servo return spring	38.52 (1.5165)

Output Shaft

UCS005X0

SEAL RING CLEARANCE

Output shaft seal ring clearance [mm (in)]	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

SEAL RING

Unit: mm (in)

Outer diameter	Inner diameter	Width
29.5 (1.161)	26.2 (1.031)	1.95 (0.0768)

END PLAY

Output shaft end play mm (in)	0 - 0.5 (0 - 0.020)
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SERVICE DATA AND SPECIFICATIONS (SDS)

Bearing Retainer

UCS005X1

SEAL RING CLEARANCE

Bearing retainer seal ring clearance [mm (in)]	Standard	0.10 - 0.27 (0.0039 - 0.0106)
	Allowable limit	0.27 (0.0106)

Total End Play

UCS005X2

Total end play [mm (in)]	0.25 - 0.55 (0.0098 - 0.0217)
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Reverse Clutch End Play

UCS005X3

Reverse clutch end play [mm (in)]	0.65 - 1.0 (0.0256 - 0.039)
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Removal and Installation

UCS005X4

Distance between end of converter housing and torque converter [mm (in)]	14.4 (0.567)
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Shift Solenoid Valves

UCS005X5

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

Solenoid Valves

UCS005X6

Solenoid valve designation	Resistance (Approx.)	Terminal
Shift solenoid valve A	20 - 30 Ω	2
Shift solenoid valve B	5 - 20 Ω	1
Overrun clutch solenoid valve	20 - 30 Ω	3
Line pressure solenoid valve	2.5 - 5.0 Ω	4
Torque converter clutch solenoid valve	5 - 20 Ω	5

A/T Fluid Temperature Sensor

UCS005X7

Remarks: Specification data are reference values.

Condition	Specification (Approx.)	
Cold [20°C (68°F)]	1.5V	2.5 kΩ
↓	↓	↓
Hot [80°C (176°F)]	0.5V	0.3 kΩ

Revolution Sensor

UCS005X8

Condition	Judgment standard
When driving at 20 km/h (12 MPH)	150 Hz (Approx.)

Dropping Resistor

UCS005X9

Resistance	12Ω (Approx.)
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Turbine Revolution Sensor (Power Train Revolution Sensor)

UCS005XA

Condition	Judgment standard
When driving at 20 km/h (12 MPH)	360 Hz (Approx.)

SERVICE DATA AND SPECIFICATIONS (SDS)
