SECTION TM
TRANSAXLE & TRANSMISSION

CONTENTS

TYPE 1 (4AT: RE4F03B)

BASIC INSPECTION 10

DIAGNOSIS AND REPAIR WORKFLOW 10
Work Flow 10
Diagnostic Work Sheet 11

FUNCTION DIAGNOSIS 13

A/T CONTROL SYSTEM 13
Cross-Sectional View 13
Shift Mechanism 14
TCM Function 21
CAN Communication 22
Input/Output Signal of TCM 22
Line Pressure Control 23
Shift Control 24
Lock-up Control 25
Engine Brake Control (Overrun Clutch Control) 26
Control Valve 28
Centrifugal Cancel Mechanism 28
Component Parts Location 30

A/T SHIFT LOCK SYSTEM 31
System Description 31
Component Parts Location 31

ON BOARD DIAGNOSTIC (OBD) SYSTEM 32
Introduction 32
OBD Function for A/T System 32
One or Two Trip Detection Logic of OBD 32
OBD Diagnostic Trouble Code (DTC) 32
Malfunction Indicator Lamp (MIL) 33

DIAGNOSIS SYSTEM (TCM) 35
CONSULT-III Function (TRANSMISSION) 35
Diagnosis Procedure without CONSULT-III 38

COMPONENT DIAGNOSIS 43

DTC U1000 CAN COMMUNICATION LINE 43
Description 43
On Board Diagnosis Logic 43
Possible Cause 43
DTC Confirmation Procedure 43
Diagnosis Procedure 43

DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH 44
Description 44
CONSULT-III Reference Value in Data Monitor Mode 44
On Board Diagnosis Logic 44
Possible Cause 44
DTC Confirmation Procedure 44
Diagnosis Procedure 44
Component Inspection 46

DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT 48
Description 48
CONSULT-III Reference Value in Data Monitor Mode 48
On Board Diagnosis Logic 48
Possible Cause 48
DTC Confirmation Procedure 48
Diagnosis Procedure 48
Component Inspection 50

DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) 52
Description 52
CONSULT-III Reference Value in Data Monitor Mode 52
On Board Diagnosis Logic 52
Possible Cause 52
DTC Confirmation Procedure 52
Diagnosis Procedure 53

DTC P0725 ENGINE SPEED SIGNAL 56
Description 56

CONSULT-III Reference Value in Data Monitor Mode 56
On Board Diagnosis Logic 56
Possible Cause 56
DTC Confirmation Procedure 56
Diagnosis Procedure 56

DTC P0731 A/T 1ST GEAR FUNCTION 59
Description 59
On Board Diagnosis Logic 59
Possible Cause 59
DTC Confirmation Procedure 59
Diagnosis Procedure 60

DTC P0732 A/T 2ND GEAR FUNCTION 62
Description 62
On Board Diagnosis Logic 62
Possible Cause 62
DTC Confirmation Procedure 62
Diagnosis Procedure 63

DTC P0733 A/T 3RD GEAR FUNCTION 65
Description 65
On Board Diagnosis Logic 65
Possible Cause 65
DTC Confirmation Procedure 65
Diagnosis Procedure 66

DTC P0734 A/T 4TH GEAR FUNCTION 68
Description 68
CONSULT-III Reference Value in Data Monitor Mode 68
On Board Diagnosis Logic 68
Possible Cause 68
DTC Confirmation Procedure 68
Diagnosis Procedure 69

DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE 73
Description 73
CONSULT-III Reference Value in Data Monitor Mode 73
On Board Diagnosis Logic 73
Possible Cause 73
DTC Confirmation Procedure 73
Diagnosis Procedure 73
Component Inspection 75

DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP) 76
Description 76
CONSULT-III Reference Value in Data Monitor Mode 76
On Board Diagnosis Logic 76
Possible Cause 76
DTC Confirmation Procedure 76
Diagnosis Procedure 77

DTC P0745 LINE PRESSURE SOLENOID VALVE 81
Description 81
CONSULT-III Reference Value in Data Monitor Mode 81
On Board Diagnosis Logic 81
Possible Cause 81
DTC Confirmation Procedure 81
Diagnosis Procedure 81
Component Inspection 84

DTC P0750 SHIFT SOLENOID VALVE A 85
Description 85
CONSULT-III Reference Value in Data Monitor Mode 85
On Board Diagnosis Logic 85
Possible Cause 85
DTC Confirmation Procedure 85
Diagnosis Procedure 85
Component Inspection 87

DTC P0755 SHIFT SOLENOID VALVE B 89
Description 89
CONSULT-III Reference Value in Data Monitor Mode 89
On Board Diagnosis Logic 89
Possible Cause 89
DTC Confirmation Procedure 89
Diagnosis Procedure 89
Component Inspection 91

DTC P1760 OVERRUN CLUTCH SOLENOID VALVE 93
Description 93
CONSULT-III Reference Value in Data Monitor Mode 93
On Board Diagnosis Logic 93
Possible Cause 93
DTC Confirmation Procedure 93
Diagnosis Procedure 93
Component Inspection 95

DTC VEHICLE SPEED SENSOR MTR 97
Description 97
CONSULT-III Reference Value in Data Monitor Mode 97
On Board Diagnosis Logic 97
Possible Cause 97
DTC Confirmation Procedure 97
Diagnosis Procedure 97

DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE) 99
Description 99
CONSULT-III Reference Value in Data Monitor Mode 99
On Board Diagnosis Logic 99
Possible Cause 99
DTC Confirmation Procedure 99
Diagnosis Procedure 99
Component Inspection 102

DTC TURBINE REVOLUTION SENSOR 104
Description 104
CONSULT-III Reference Value in Data Monitor Mode 104
On Board Diagnosis Logic 104
Possible Cause 104
DTC Confirmation Procedure 104
Diagnosis Procedure 104

CONTROL UNIT (RAM), CONTROL UNIT (ROM) 108
Description 108
On Board Diagnosis Logic 108
Possible Cause 108
DTC Confirmation Procedure 108
Diagnosis Procedure 108

MAIN POWER SUPPLY AND GROUND CIRCUIT 109
Description 109
On Board Diagnosis Logic 109
Possible Cause 109
DTC Confirmation Procedure 109
Diagnosis Procedure 109

PNP, OD SWITCH AND CLOSED THROTTLE, WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT 111
CONSULT-III Reference Value in Data Monitor Mode 111
TCM Terminal and Reference Value 111
Diagnosis Procedure 111
Component Inspection 115

A/T SHIFT LOCK SYSTEM 116
Wiring Diagram - A/T Shift Lock System - 116
Terminals And Reference Values 116
Diagnosis Procedure 117

ECU DIAGNOSIS 119

TCM 119
Reference Value 119
Wiring Diagram - A/T CONTROL SYSTEM - 123
Fail-Safe 123
DTC Inspection Priority Chart 125
DTC Index 125
DTC Alphabetical Index 126

SYMPTOM DIAGNOSIS 127

SYSTEM SYMPTOM 127
Symptom Chart 127
OD OFF Indicator Lamp Does Not Come On 138
Engine Cannot Be Started in "P" and "N" Position 140
In "P" Position, Vehicle Moves Forward or Backward When Pushed 140
In "N" Position, Vehicle Moves 141
Large Shock "N" → "R" Position 142
Vehicle Does Not Creep Backward in "R" Position 142
Vehicle Does Not Creep Forward in "D", "2" or "1" Position 144
Vehicle Cannot Be Started from D_1 145
A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kick-down: $D_4 \rightarrow D_2$ 146
A/T Does Not Shift: $D_2 \rightarrow D_3$ 148
A/T Does Not Shift: $D_3 \rightarrow D_4$ 149
A/T Does Not Perform Lock-up 151
A/T Does Not Hold Lock-up Condition 151
Lock-up Is Not Released 152
Engine Speed Does Not Return to Idle (Light Braking $D_4 \rightarrow D_3$) 153
A/T Does Not Shift: $D_4 \rightarrow D_3$, When OD OFF 154
A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever "D" → "2" Position 155
A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever "2" → "1" Position 156
Vehicle Does Not Decelerate by Engine Brake 158
TCM Self-Diagnosis Does Not Activate 161

PRECAUTION 163

PRECAUTIONS 163
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 163
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 163
Precaution for On Board Diagnosis (OBD) System of A/T and Engine (For Type1 Only) 163
Precaution 164
Service Notice or Precaution 165
Wiring Diagram and Trouble Diagnosis 165

PREPARATION 166

PREPARATION 166
Special Service Tool 166
Commercial Service Tool 169

ON-VEHICLE MAINTENANCE 171

A/T FLUID 171
Checking A/T Fluid 171
Changing A/T Fluid 171
A/T Fluid Cooler Cleaning 172

STALL TEST 175
Inspection and Judgment 175

LINE PRESSURE TEST 178
Inspection and Judgment 178

ROAD TEST 180
Description 180
Check Before Engine Is Started 180
Check at Idle 181
Cruise Test - Part 1 183
Cruise Test - Part 2 185
Cruise Test - Part 3 186
Vehicle Speed When Shifting Gears 188

Vehicle Speed When Performing and Releasing Complete Lock-up 188

ON-VEHICLE REPAIR 189

TRANSMISSION CONTROL MODULE 189
Exploded View 189
Removal and Installation 189

CONTROL SYSTEM 191
Control Valve Assembly and Accumulators 191

PARK/NEUTRAL POSITION (PNP) SWITCH . 195
Park/Neutral Position (PNP) Switch 195

REVOLUTION SENSOR 197
Revolution Sensor 197
Turbine Revolution Sensor (Power Train Revolution Sensor) 197

DIFFERENTIAL SIDE OIL SEAL 199
Differential Side Oil Seal 199

SHIFT CONTROL SYSTEM 200
Control Device Removal and Installation 200
Control Device Disassembly and Assembly 203
Selector Lever Knob Removal and Installation 203
Adjustment of A/T Position 204
Checking of A/T Position 204

KEY INTERLOCK CABLE 206
Removal and Installation 206

AIR BREATHER HOSE 209
Removal and Installation 209

REMOVAL AND INSTALLATION 210

TRANSAXLE ASSEMBLY 210
Exploded View 210
Removal and Installation 210

DISASSEMBLY AND ASSEMBLY 213

OVERHAUL 213
Component 213
Oil Channel 219
Location of Adjusting Shims, Needle Bearings and Thrust Washers 220
Location of Snap Rings 221

DISASSEMBLY 222
Disassembly 222

REPAIR FOR COMPONENT PARTS 237
Manual Shaft 237
Oil Pump 240
Control Valve Assembly 243
Control Valve Upper Body 252
Control Valve Lower Body 255
Reverse Clutch 258
High Clutch 262
Forward and Overrun Clutches 267
Low & Reverse Brake 273
Rear Internal Gear and Forward Clutch Hub 278
Output Shaft, Output Gear, Idler Gear, Reduction Pinion Gear and Bearing Retainer 281
Band Servo Piston Assembly 287
Final Drive 292

ASSEMBLY 297
Assembly (1) 297
Adjustment (1) 298
Assembly (2) 303
Adjustment (2) 307
Assembly (3) 311

SERVICE DATA AND SPECIFICATIONS (SDS) 319

SERVICE DATA AND SPECIFICATIONS (SDS) 319
General Specification 319
Vehicle Speed at Which Gear Shifting Occurs 319
Vehicle Speed at When Lock-up Occurs/Releases . 319
Stall Speed 319
Line Pressure 319
Adjusting shims, Needle Bearings, Thrust Washers and Snap Rings 320
Control Valves 321
Accumulator 321
Clutches and Brakes 321
Final Drive 323
Planetary Carrier 323
Oil Pump 323
Input Shaft 323
Reduction Pinion Gear 323
Band Servo 323
Output Shaft 323
Bearing Retainer 324
Total End Play 324
Reverse Clutch End Play 324
Removal and Installation 324
Shift Solenoid Valves 324
Solenoid Valves 324
A/T Fluid Temperature Sensor 325
Revolution Sensor 325
Dropping Resistor 325
Turbine Revolution Sensor (Power Train Revolution Sensor) 325

TYPE 2 (4AT: RE4F03B)

BASIC INSPECTION 326

DIAGNOSIS AND REPAIR WORKFLOW 326
Work Flow 326
Diagnostic Work Sheet 327

FUNCTION DIAGNOSIS 329

A/T CONTROL SYSTEM 329

Cross-Sectional View 329
Shift Mechanism 330
TCM Function 337
CAN Communication 338
Input/Output Signal of TCM 338
Line Pressure Control 339
Shift Control 340
Lock-up Control 341
Engine Brake Control (Overrun Clutch Control) ... 342
Control Valve 344
Centrifugal Cancel Mechanism 344
Component Parts Location 346

A/T SHIFT LOCK SYSTEM 347
System Description 347
Component Parts Location 347

DIAGNOSIS SYSTEM (TCM) 348
CONSULT-III Function (TRANSMISSION) 348
Diagnosis Procedure without CONSULT-III 350

COMPONENT DIAGNOSIS 355

VEHICLE SPEED SENSOR - A/T (REVOLUTION SENSOR) 355
Description 355
CONSULT-III Reference Value in Data Monitor Mode 355
On Board Diagnosis Logic 355
Possible Cause 355
DTC Confirmation Procedure 355
Diagnosis Procedure 356

VEHICLE SPEED SENSOR MTR 359
Description 359
CONSULT-III Reference Value in Data Monitor Mode 359
On Board Diagnosis Logic 359
Possible Cause 359
DTC Confirmation Procedure 359
Diagnosis Procedure 359

SHIFT SOLENOID VALVE A 361
Description 361
CONSULT-III Reference Value in Data Monitor Mode 361
On Board Diagnosis Logic 361
Possible Cause 361
DTC Confirmation Procedure 361
Diagnosis Procedure 361
Component Inspection 363

SHIFT SOLENOID VALVE B 365
Description 365
CONSULT-III Reference Value in Data Monitor Mode 365
On Board Diagnosis Logic 365
Possible Cause 365
DTC Confirmation Procedure 365
Diagnosis Procedure 365
Component Inspection 367

OVERRUN CLUTCH SOLENOID VALVE 369
Description 369
CONSULT-III Reference Value in Data Monitor Mode 369
On Board Diagnosis Logic 369
Possible Cause 369
DTC Confirmation Procedure 369
Diagnosis Procedure 369
Component Inspection 371

TORQUE CONVERTER CLUTCH SOLENOID VALVE 373
Description 373
CONSULT-III Reference Value in Data Monitor Mode 373
On Board Diagnosis Logic 373
Possible Cause 373
DTC Confirmation Procedure 373
Diagnosis Procedure 373
Component Inspection 375

BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE) 376
Description 376
CONSULT-III Reference Value in Data Monitor Mode 376
On Board Diagnosis Logic 376
Possible Cause 376
DTC Confirmation Procedure 376
Diagnosis Procedure 376
Component Inspection 379

ENGINE SPEED SIGNAL 381
Description 381
CONSULT-III Reference Value in Data Monitor Mode 381
On Board Diagnosis Logic 381
Possible Cause 381
DTC Confirmation Procedure 381
Diagnosis Procedure 381

TURBINE REVOLUTION SENSOR 383
Description 383
CONSULT-III Reference Value in Data Monitor Mode 383
On Board Diagnosis Logic 383
Possible Cause 383
DTC Confirmation Procedure 383
Diagnosis Procedure 383

LINE PRESSURE SOLENOID VALVE 387
Description 387
CONSULT-III Reference Value in Data Monitor Mode 387
On Board Diagnosis Logic 387
Possible Cause 387
DTC Confirmation Procedure 387

Diagnosis Procedure 387
Component Inspection 390

CAN COMMUNICATION LINE 391
Description 391
On Board Diagnosis Logic 391
Possible Cause 391
DTC Confirmation Procedure 391
Diagnosis Procedure 391

MAIN POWER SUPPLY AND GROUND CIRCUIT 392
Description 392
On Board Diagnosis Logic 392
Possible Cause 392
DTC Confirmation Procedure 392
Diagnosis Procedure 392

A/T 1ST GEAR FUNCTION 394
Description 394
On Board Diagnosis Logic 394
Possible Cause 394
DTC Confirmation Procedure 394
Diagnosis Procedure 395

A/T 2ND GEAR FUNCTION 397
Description 397
On Board Diagnosis Logic 397
Possible Cause 397
DTC Confirmation Procedure 397
Diagnosis Procedure 398

A/T 3RD GEAR FUNCTION 400
Description 400
On Board Diagnosis Logic 400
Possible Cause 400
DTC Confirmation Procedure 400
Diagnosis Procedure 401

A/T 4TH GEAR FUNCTION 403
Description 403
On Board Diagnosis Logic 403
Possible Cause 403
DTC Confirmation Procedure 403
Diagnosis Procedure 404

A/T TCC S/V FUNCTION (LOCK-UP) 408
Description 408
CONSULT-III Reference Value in Data Monitor Mode 408
On Board Diagnosis Logic 408
Possible Cause 408
DTC Confirmation Procedure 408
Diagnosis Procedure 409

CONTROL UNIT (RAM), CONTROL UNIT (ROM) 413
Description 413
On Board Diagnosis Logic 413
Possible Cause 413
DTC Confirmation Procedure 413
Diagnosis Procedure 413

PNP, OD SWITCH AND CLOSED THROTTLE, WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT 414
CONSULT-III Reference Value in Data Monitor Mode 414
TCM Terminal and Reference Value 414
Diagnosis Procedure 414
Component Inspection 418

A/T SHIFT LOCK SYSTEM 419
Wiring Diagram - A/T Shift Lock System - 419
Terminals And Reference Values 419
Diagnosis Procedure 420

ECU DIAGNOSIS 422

TCM 422
Reference Value 422
Wiring Diagram - A/T CONTROL SYSTEM - 426
Fail-Safe 426
Alphabetical Index 428

SYMPTOM DIAGNOSIS 429

SYSTEM SYMPTOM 429
Symptom Chart 429
OD OFF Indicator Lamp Does Not Come On 440
Engine Cannot Be Started in "P" and "N" Position. 442
In "P" Position, Vehicle Moves Forward or Backward When Pushed 442
In "N" Position, Vehicle Moves 443
Large Shock "N" → "R" Position 444
Vehicle Does Not Creep Backward in "R" Position. 444
Vehicle Does Not Creep Forward in "D", "2" or "1" Position 446
Vehicle Cannot Be Started from D_1 447
A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$ 448
A/T Does Not Shift: $D_2 \rightarrow D_3$ 450
A/T Does Not Shift: $D_3 \rightarrow D_4$ 451
A/T Does Not Perform Lock-up 452
A/T Does Not Hold Lock-up Condition 453
Lock-up Is Not Released 454
Engine Speed Does Not Return to Idle (Light Braking $D_4 \rightarrow D_3$) 455
A/T Does Not Shift: $D_4 \rightarrow D_3$, When OD OFF 456
A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever "D" → "2" Position 456
A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever "2" → "1" Position 458
Vehicle Does Not Decelerate by Engine Brake ... 460
TCM Self-Diagnosis Does Not Activate 463

PRECAUTION 465

PRECAUTIONS 465

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 465
Precaution Necessary for Steering Wheel Rotation After Battery Disconnect 465
Precaution for On Board Diagnosis (OBD) System of A/T and Engine (For Type1 Only) 465
Precaution 466
Service Notice or Precaution 467
Wiring Diagram and Trouble Diagnosis 467

PREPARATION 468

PREPARATION 468
Special Service Tool 468
Commercial Service Tool 471

ON-VEHICLE MAINTENANCE 473

A/T FLUID 473
Checking A/T Fluid 473
Changing A/T Fluid 473
A/T Fluid Cooler Cleaning 474

STALL TEST 477
Inspection and Judgment 477

LINE PRESSURE TEST 480
Inspection and Judgment 480

ROAD TEST 482
Description 482
Check Before Engine Is Started 482
Check at Idle 483
Cruise Test - Part 1 485
Cruise Test - Part 2 487
Cruise Test - Part 3 488
Vehicle Speed When Shifting Gears 490
Vehicle Speed When Performing and Releasing Complete Lock-up 490

ON-VEHICLE REPAIR 491

TRANSMISSION CONTROL MODULE 491
Exploded View 491
Removal and Installation 491

SHIFT CONTROL SYSTEM 493
Control Device Removal and Installation 493
Control Device Disassembly and Assembly 496
Selector Lever Knob Removal and Installation 496
Adjustment of A/T Position 497
Checking of A/T Position 497

KEY INTERLOCK CABLE 499
Removal and Installation 499

AIR BREATHER HOSE 502
Removal and Installation 502

REMOVAL AND INSTALLATION 503

TRANSAXLE ASSEMBLY 503
Exploded View 503
Removal and Installation 503

DISASSEMBLY AND ASSEMBLY 506

OVERHAUL 506
Component 506
Oil Channel 512
Location of Adjusting Shims, Needle Bearings and Thrust Washers 513
Location of Snap Rings 514

DISASSEMBLY 515
Disassembly 515

REPAIR FOR COMPONENT PARTS 530
Manual Shaft 530
Oil Pump 533
Control Valve Assembly 536
Control Valve Upper Body 545
Control Valve Lower Body 548
Reverse Clutch 551
High Clutch 555
Forward and Overrun Clutches 560
Low & Reverse Brake 566
Rear Internal Gear and Forward Clutch Hub 571
Output Shaft, Output Gear, Idler Gear, Reduction Pinion Gear and Bearing Retainer 574
Band Servo Piston Assembly 580
Final Drive 585

ASSEMBLY 590
Assembly (1) 590
Adjustment (1) 591
Assembly (2) 596
Adjustment (2) 600
Assembly (3) 604

SERVICE DATA AND SPECIFICATIONS (SDS) 612

SERVICE DATA AND SPECIFICATIONS (SDS) 612
General Specification 612
Vehicle Speed at Which Gear Shifting Occurs 612
Vehicle Speed at When Lock-up Occurs/Releases 612
Stall Speed 612
Line Pressure 612
Adjusting shims, Needle Bearings, Thrust Washers and Snap Rings 613
Control Valves 614
Accumulator 614
Clutches and Brakes 614
Final Drive 616
Planetary Carrier 616
Oil Pump 616
Input Shaft 616
Reduction Pinion Gear 616

Band Servo 616
Output Shaft 616
Bearing Retainer 617
Total End Play 617
Reverse Clutch End Play 617
Removal and Installation 617
Shift Solenoid Valves 617
Solenoid Valves 617
A/T Fluid Temperature Sensor 618
Revolution Sensor 618
Dropping Resistor 618
Turbine Revolution Sensor (Power Train Revolution Sensor) 618

5MT: RS5F91R

FUNCTION DIAGNOSIS 619

M/T SYSTEM 619
System Diagram 619
System Description 620

COMPONENT DIAGNOSIS 621

POSITION SWITCH 621

BACK-UP LAMP SWITCH 621
BACK-UP LAMP SWITCH : Component Parts Location 621
BACK-UP LAMP SWITCH : Component Inspection 621

PARK/NEUTRAL POSITION (PNP) SWITCH 621
PARK/NEUTRAL POSITION (PNP) SWITCH : Component Parts Location 621
PARK/NEUTRAL POSITION (PNP) SWITCH : Component Inspection 621

SYMPTOM DIAGNOSIS 623

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 623
NVH Troubleshooting Chart 623

PRECAUTION 624

PRECAUTIONS 624
Service Notice or Precautions for Manual Transaxle 624

PREPARATION 625

PREPARATION 625
Special Service Tools 625
Commercial Service Tools 627

ON-VEHICLE MAINTENANCE 628

GEAR OIL 628
Exploded View 628
Draining 628
Refilling 628
Inspection 628

ON-VEHICLE REPAIR 629

SIDE OIL SEAL 629
Exploded View 629
Removal and Installation 629

CONTROL LINKAGE 630
Exploded View 630
Removal and Installation 630
Inspection 631

AIR BREATHER HOSE 632
Exploded View 632
Removal and Installation 632

REMOVAL AND INSTALLATION 633

TRANSAXLE ASSEMBLY 633
Exploded View 633
Removal and Installation 633

DISASSEMBLY AND ASSEMBLY 635

TRANSAXLE ASSEMBLY 635
Exploded View 635
Disassembly 639
Assembly 645

INPUT SHAFT AND GEAR 653
Exploded View 653
Disassembly 653
Assembly 653
Inspection 653

MAINSHAFT AND GEAR 655
Exploded View 655
Disassembly 655
Assembly 656
Inspection 657

FINAL DRIVE 659
Exploded View 659
Disassembly 659
Assembly 659
Inspection 659

SHIFT CONTROL 661
Exploded View 661
Disassembly 661
Assembly 661
Inspection 661

SERVICE DATA AND SPECIFICATIONS (SDS) 662

SERVICE DATA AND SPECIFICATIONS (SDS) 662
General Specification 662

6MT: RS6F94R

FUNCTION DIAGNOSIS 663

M/T SYSTEM 663
System Diagram 663
System Description 664

COMPONENT DIAGNOSIS 665

POSITION SWITCH 665

BACK-UP LAMP SWITCH 665
BACK-UP LAMP SWITCH : Component Parts Location 665
BACK-UP LAMP SWITCH : Component Inspection 665

PARK/NEUTRAL POSITION (PNP) SWITCH 665
PARK/NEUTRAL POSITION (PNP) SWITCH : Component Parts Location 665
PARK/NEUTRAL POSITION (PNP) SWITCH : Component Inspection 665

SYMPTOM DIAGNOSIS 667

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 667
NVH Troubleshooting Chart 667

PRECAUTION 668

PRECAUTIONS 668
Service Notice or Precautions for Manual Transaxle 668

PREPARATION 669

PREPARATION 669
Special Service Tools 669
Commercial Service Tools 670

ON-VEHICLE MAINTENANCE 672

GEAR OIL 672
Exploded View 672
Draining 672
Refilling 672
Inspection 672

ON-VEHICLE REPAIR 673

SIDE OIL SEAL 673
Exploded View 673
Removal and Installation 673

CONTROL LINKAGE 674
Exploded View 674
Removal and Installation 674
Inspection 677

AIR BREATHER HOSE 678
Exploded View 678
Removal and Installation 678

REMOVAL AND INSTALLATION 680

TRANSAXLE ASSEMBLY 680
Exploded View 680
Removal and Installation 681

DISASSEMBLY AND ASSEMBLY 683

TRANSAXLE ASSEMBLY 683
Exploded View 683
Disassembly 688
Assembly 694

INPUT SHAFT AND GEAR 700
Exploded View 700
Disassembly 700
Assembly 701
Inspection 702

MAINSHAFT AND GEAR 704
Exploded View 704
Disassembly 704
Assembly 705
Inspection 707

REVERSE IDLER SHAFT AND GEAR 709
Exploded View 709
Disassembly 709
Assembly 710

FINAL DRIVE 711
Exploded View 711
Disassembly 711
Assembly 711
Inspection 712

SHIFT FORK AND FORK ROD 714
Exploded View 714
Disassembly 714
Assembly 714
Inspection 714

SERVICE DATA AND SPECIFICATIONS (SDS) 715

SERVICE DATA AND SPECIFICATIONS (SDS) 715
General Specification 715

BASIC INSPECTION

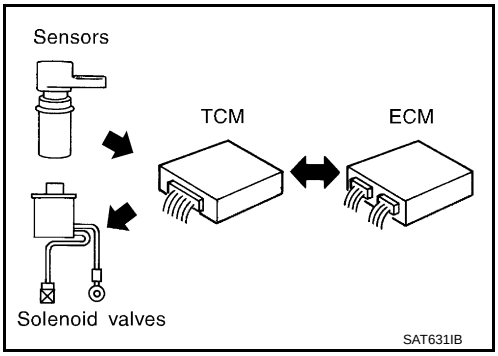
DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

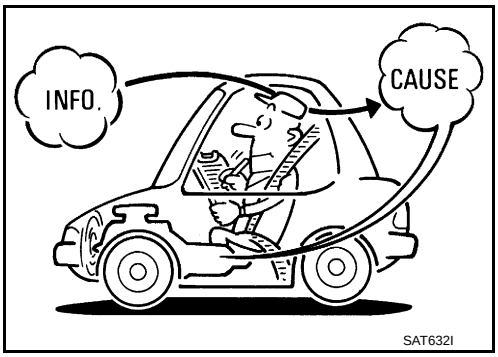
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INTRODUCTION

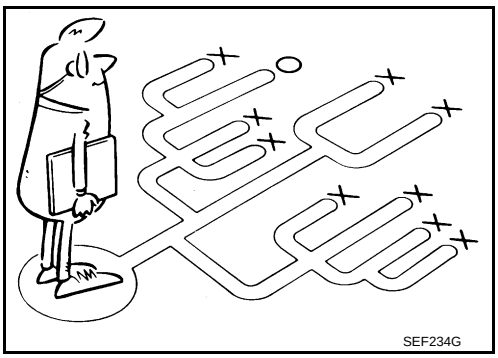
The TCM receives a signal from the vehicle speed sensor, accelerator pedal position sensor (throttle position sensor) or PNP switch. Then provides shift control or lock-up control via A/T solenoid valves. The TCM also communicates with the ECM by means of a signal sent from sensing elements used with 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 an error that occurs intermittently rather than continuously. Most intermittent errors 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 errors. A road test with CONSULT-III (or GST) or a circuit tester connected should be performed. Follow the “DETAILED 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 errors, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A “Diagnostic work sheet” as shown on the example (Refer to TM-11) should be used.
Start your diagnosis by looking for “conventional” errors first. This will help troubleshoot driveability errors on an electronically controlled engine vehicle.
Also check related Service bulletins.



DETAILED FLOW

1.COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using diagnosis worksheet. Refer to TM-11, "Diagnostic Work Sheet".

>> GO TO 2.

2.CHECK SYMPTOM 1

Check the following items based on the information obtained from the customer.
- Fail-safe. Refer to TM-123, "Fail-Safe".
- A/T fluid inspection. Refer to TM-171, "Checking A/T Fluid".
- Stall test. Refer to TM-175, "Inspection and Judgment".
- Line pressure test. Refer to TM-178, "Inspection and Judgment".

>> GO TO 3.

3.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is detected.

- Record DTC.
- Erase DTC. Refer to TM-35, "CONSULT-III Function (TRANSMISSION)".

Is any DTC detected?

YES >> GO TO 4.
NO >> GO TO 6.

4.PERFORM DIAGNOSTIC PROCEDURE

Perform “Diagnosis Procedure” for the displayed DTC.

>> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE

Perform “DTC CONFIRMATION PROCEDURE”.

Is DTC detected?

YES >> GO TO 4.
NO >> GO TO 6.

6.CHECK SYMPTOM 2

Try to confirm the symptom described by the customer.

Is any malfunction present?

YES >> GO TO 7.
NO >> INSPECTION END

7.ROAD TEST

Perform “ROAD TEST”. Refer to TM-180, "Description".

>> GO TO 8.

8.CHECK SYMPTOM 3

Try to confirm the symptom described by the customer.

Is any malfunction present?

YES >> GO TO 2.
NO >> INSPECTION END

Diagnostic Work Sheet

INFOID:0000000001728291

INFORMATION FROM CUSTOMER

KEY POINTS

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

Customer name MR/MS	Model and Year	VIN
Trans. Model	Engine	Mileage
Malfunction Date	Manuf. Date	In Service Date
Frequency	❑ Continuous ❑ Intermittent (times a day)	

Symptoms	❑ Vehicle does not move. (❑ Any position ❑ Particular position)	
	❑ No up-shift (❑ 1st → 2nd ❑ 2nd → 3rd ❑ 3rd → 4th ❑ 4th → 5th)	
	❑ No down-shift (❑ 5th → 4th ❑ 4th → 3rd ❑ 3rd → 2nd ❑ 2nd → 1st)	
	❑ Lock-up malfunction	
	❑ Shift point too high or too low.	
	❑ Shift shock or slip (❑ N → D ❑ N → R ❑ Lock-up ❑ Any drive position)	
	❑ Noise or vibration	
	❑ No kick down	
	❑ No pattern select	
	❑ Others ( )	
Malfunction indicator lamp (MIL)	❑ Continuously lit	❑ Not lit

DIAGNOSTIC WORK SHEET

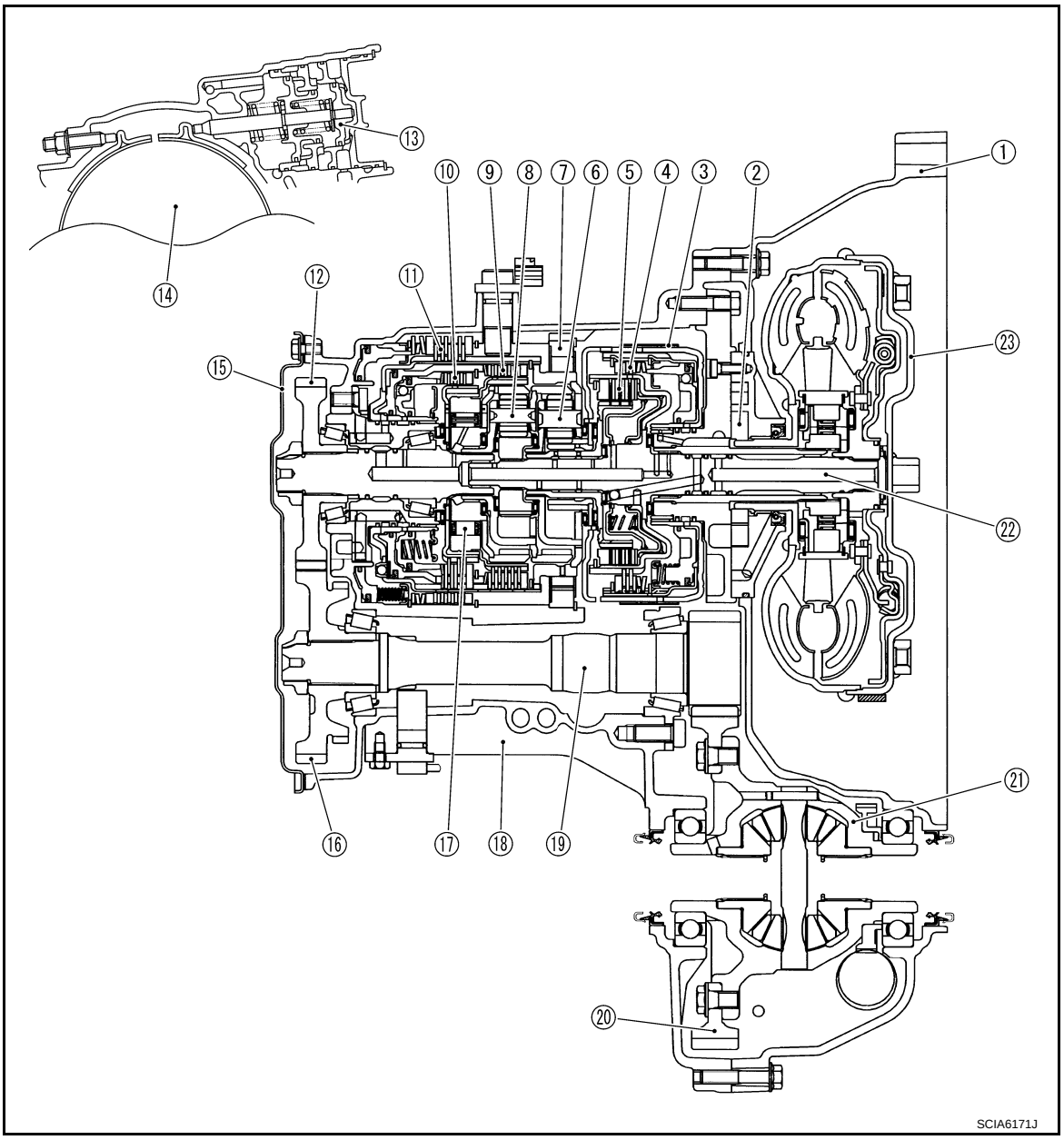
1	❑ Read the item on cautions concerning fail-safe and understand the customer's complaint.			TM-123
2	❑ A/T fluid inspection, stall test and line pressure test			
		❑ A/T fluid inspection		TM-171
		❑ Leak (Repair leak location.) ❑ State ❑ Amount		
3		❑ Stall test		TM-175
		❑ Torque converter one-way clutch ❑ Front brake ❑ High and low reverse clutch ❑ Low coast brake ❑ Forward brake ❑ Reverse brake ❑ Forward one-way clutch	❑ 1st one-way clutch ❑ 3rd one-way clutch ❑ Engine ❑ Line pressure low ❑ Except for input clutch and direct clutch, clutches and brakes OK	
		❑ Line pressure test - Suspected part:		TM-178
4	❑ Perform self-diagnosis. — Check detected items to repair or replace malfunctioning part.			TM-35 or TM-38
5	❑ Perform road test.			
	5-1	❑ Check before engine is started		TM-180
	5-2	❑ Check at idle		TM-181
	5-3	Cruise test	❑ Part 1	TM-183
			❑ Part 2	TM-185
			❑ Part 3	TM-186
	❑ Check malfunction phenomena to repair or replace malfunctioning part after completing all road test. Refer to TM-127.			
5	❑ Drive vehicle to check that the malfunction phenomenon has been resolved.			
6	❑ Erase the results of the self-diagnosis from the TCM and the ECM.			TM-35 or TM-38

FUNCTION DIAGNOSIS

A/T CONTROL SYSTEM

Cross-Sectional View

INFOID:0000000001694420

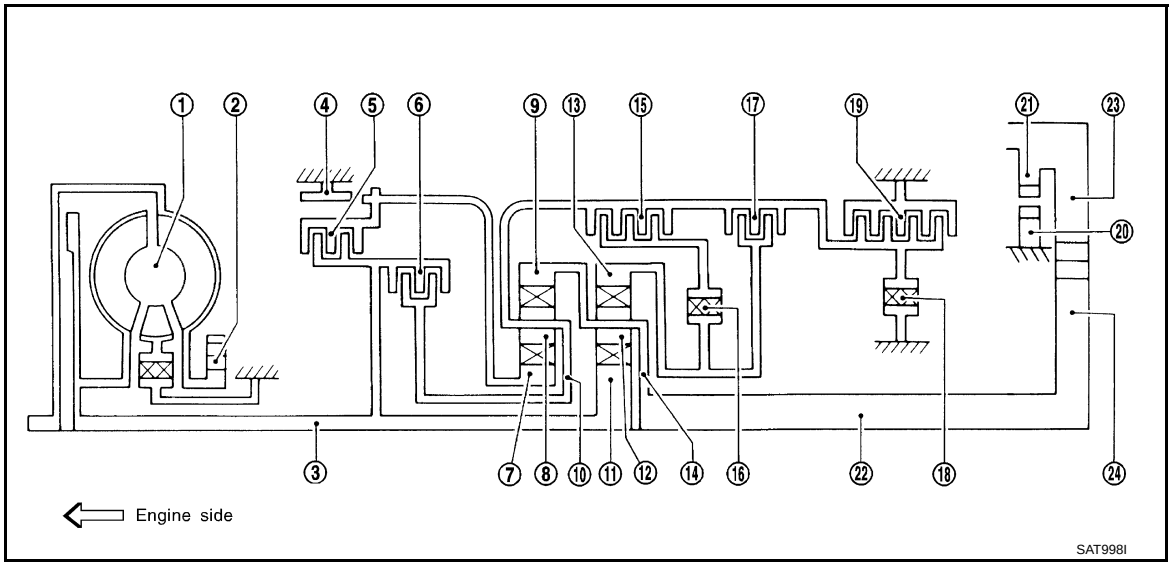


1. Converter housing
2. Oil pump
3. Brake band
4. Reverse clutch
5. High clutch
6. Front planetary gear
7. Low one-way clutch
8. Rear planetary gear
9. Forward clutch
10. Overrun clutch
11. Low & reverse brake
12. Output gear
13. Band servo piston
14. Reverse clutch drum
15. Side cover
16. Idler gear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

Shift Mechanism

INFOID:0000000001694421

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**.

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

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					
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.

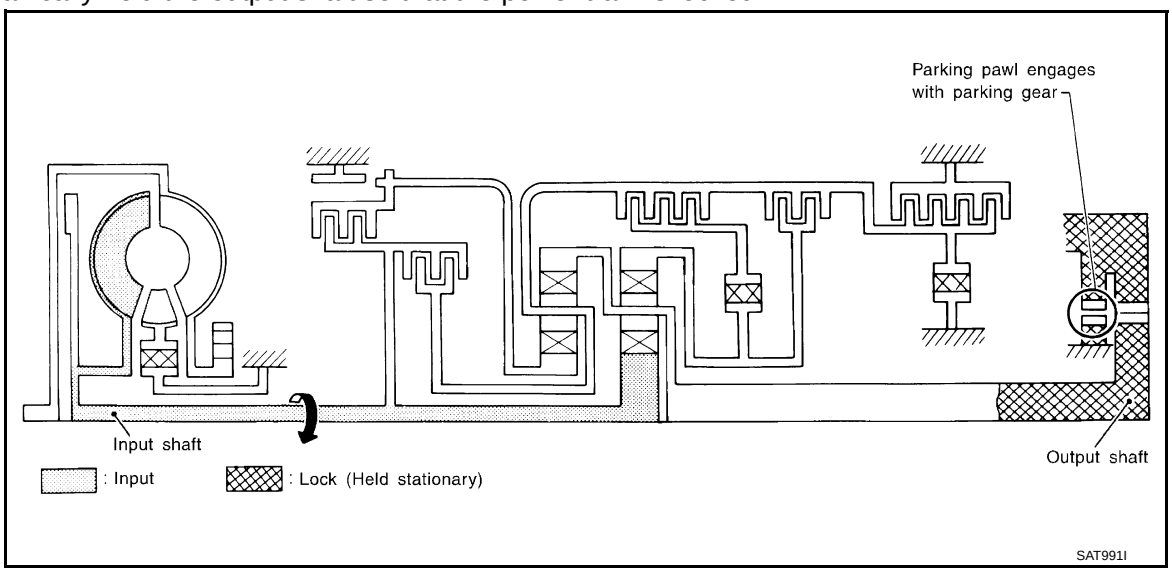
- **: Overrun clutch remains in engaged condition when throttle opening is less than 1/16.

POWER TRANSMISSION

“N” and “P” Positions

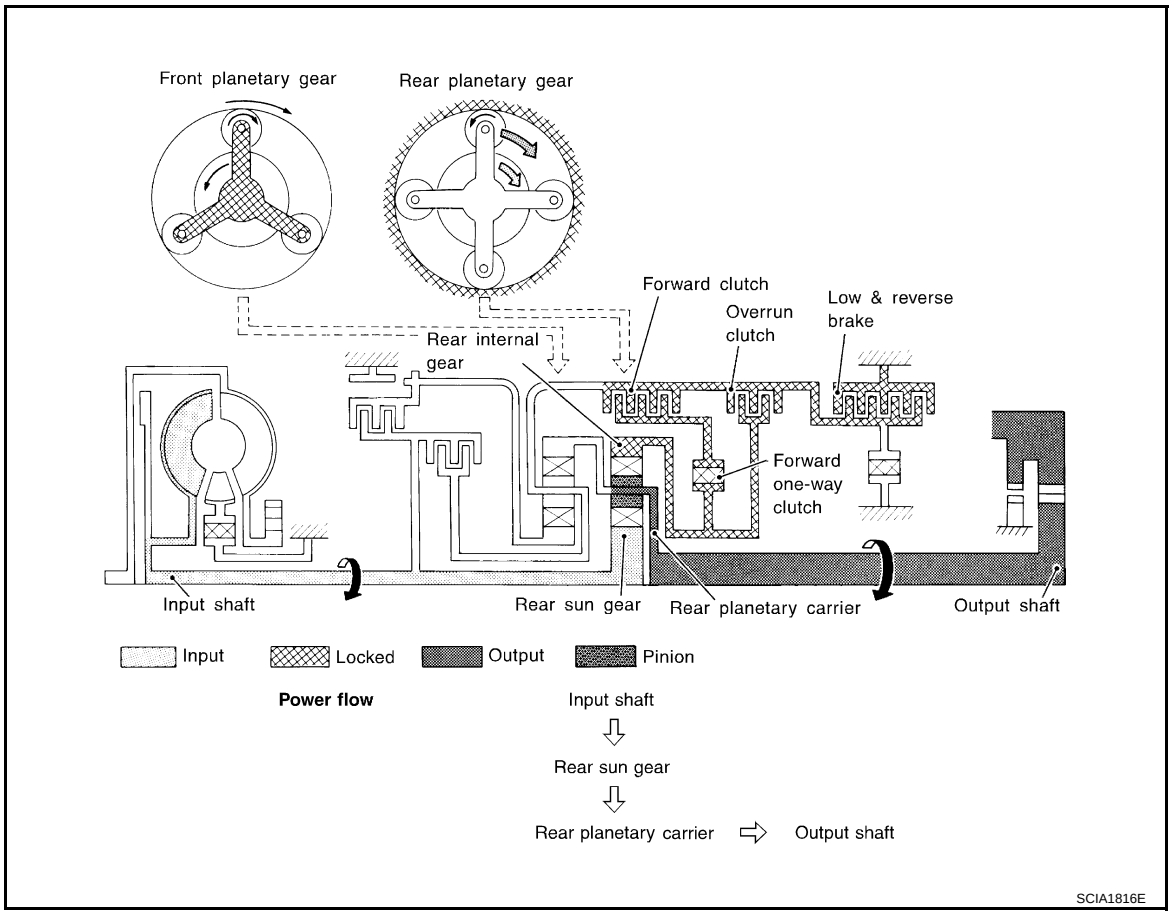
- “N” position
  Power from the input shaft is not transmitted to the output shaft because the clutches do not operate.
- “P” position

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.



“1$_1$” Position

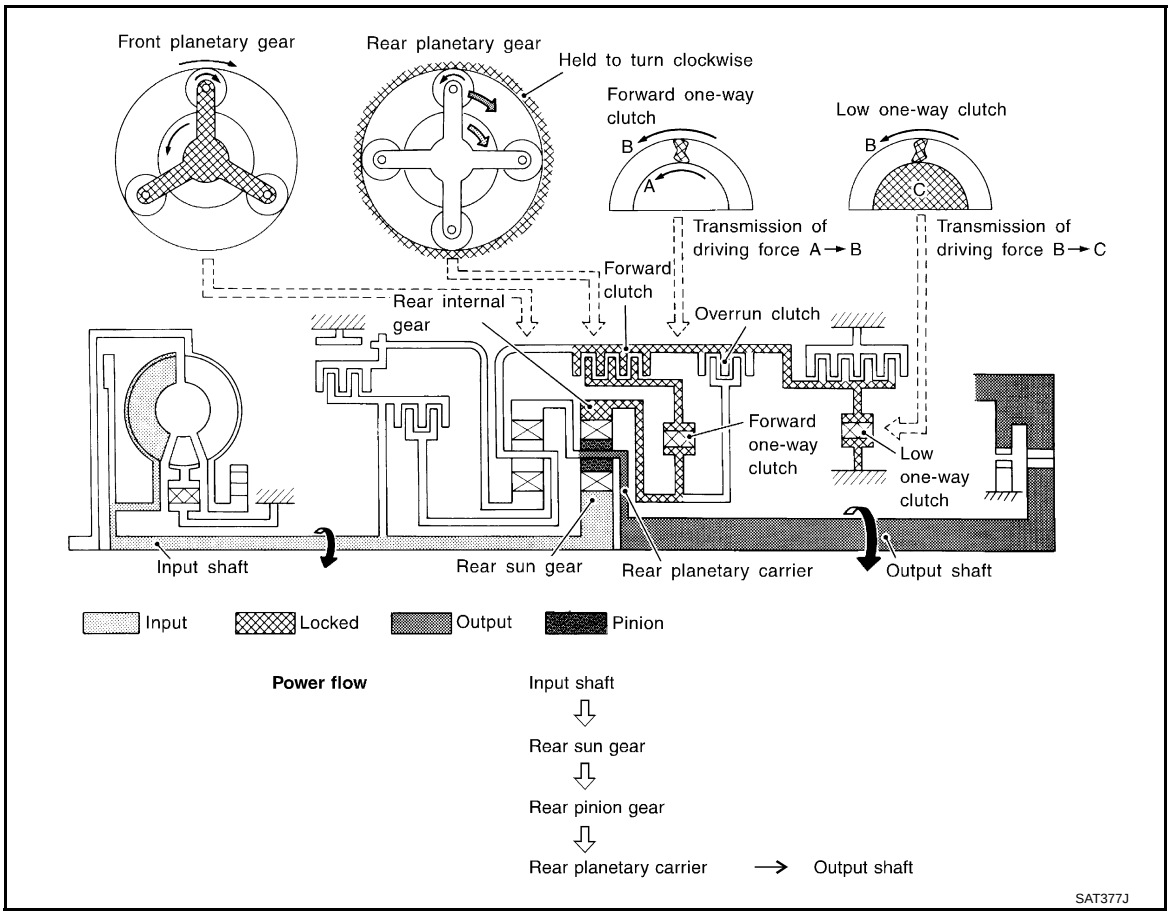
• **Forward clutch** • **Forward one-way clutch** • **Overrun clutch** • **Low & reverse brake**	As overrun clutch engages, rear internal gear is locked by the operation of low and reverse brake. This is different from that of D$_1$ and 2$_1$.
Engine brake	Overrun clutch always engages, therefore engine brake can be obtained when decelerating.



“D$_1$” and “2$_1$” Positions

• **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)	D_1: OD OFF (OD OFF indicator lamp is on) and throttle opening is less than specification* 2_1: Always engaged At D_1 and 2_1 positions, engine brake is not activated due to free turning of low one- way clutch.

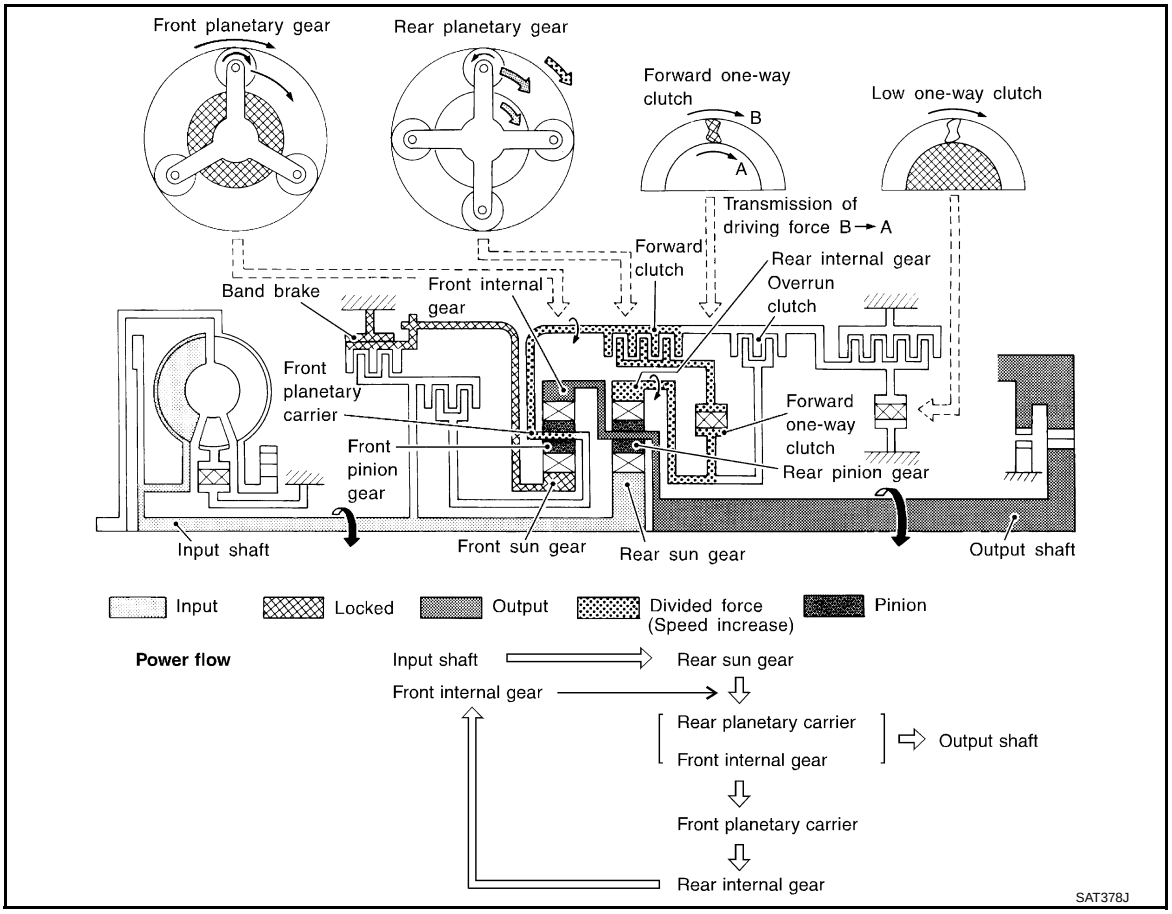
*: Overrun clutch remains in engaged condition when throttle opening is less than 1/16.



"D_2", "2_2" and "1_2" Positions

• **Forward clutch** • **Forward one-way clutch** • **Brake band**	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. 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.
Overrun clutch engagement conditions	D_2: OD OFF (OD OFF indicator lamp is on) and throttle opening is less than specification* 2_2 and 1_2: Always engaged

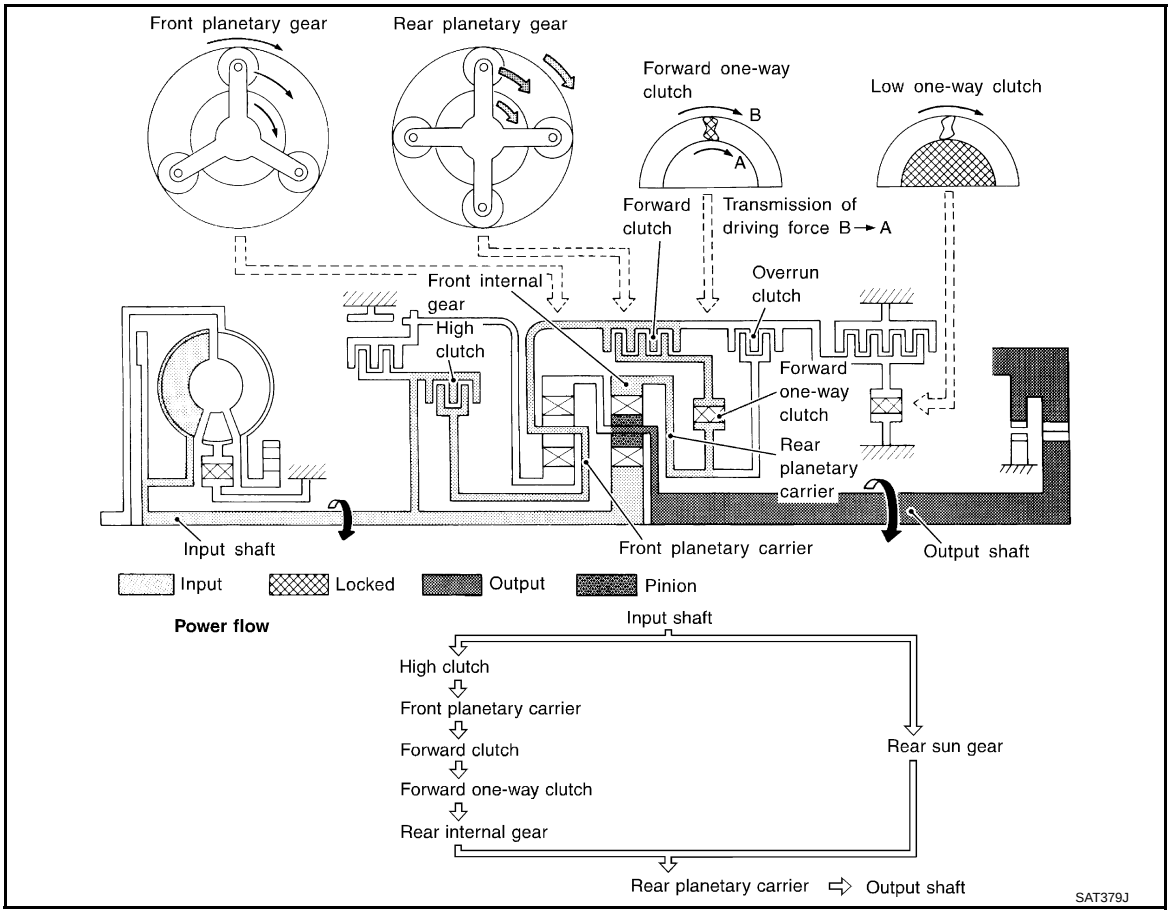
*: Overrun clutch remains in engaged condition when throttle opening is less than 1/16.



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

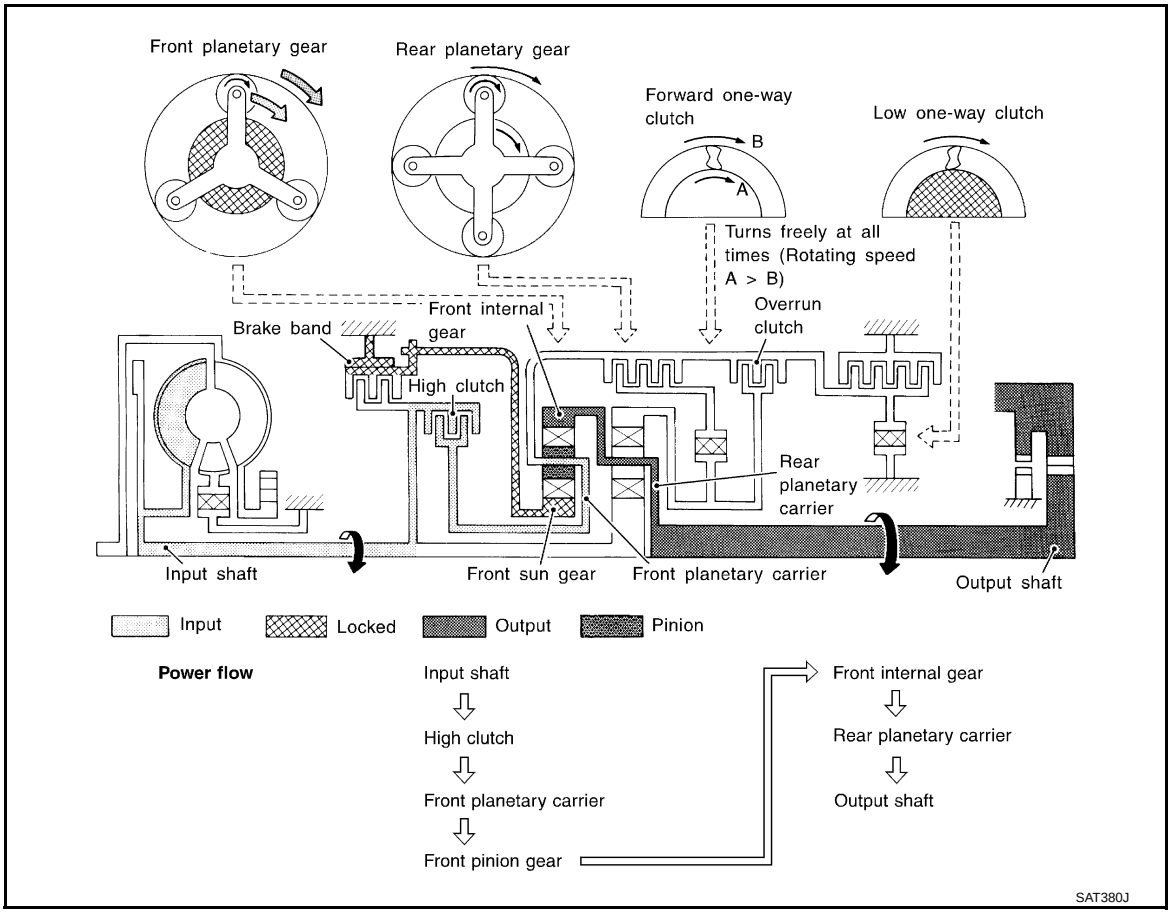
• **High clutch** • **Forward clutch** • **Forward one-way clutch**	Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch. This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.
Overrun clutch engagement conditions	D3: OD OFF (OD OFF indicator lamp is on) and throttle opening is less than specification* 23 and 13: Always engaged

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



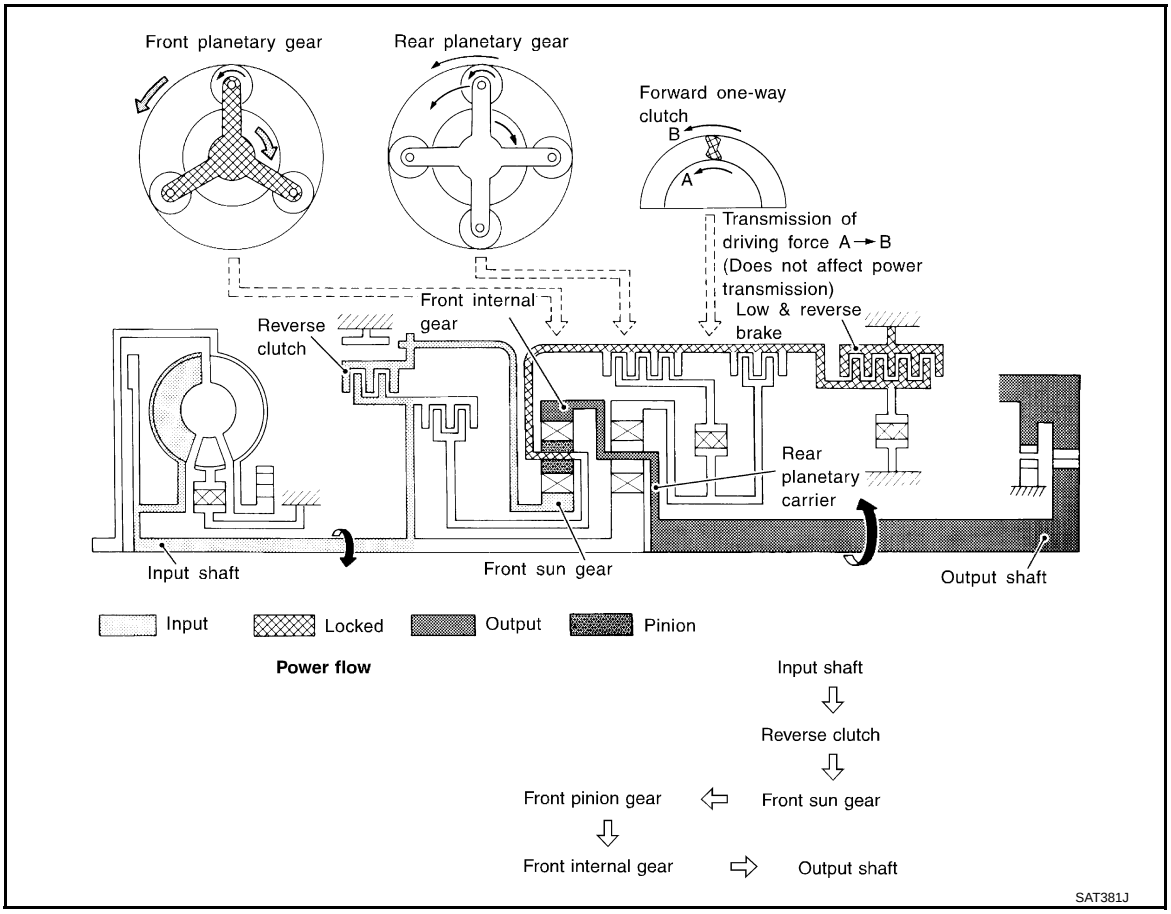
"D4" (OD) Position

• **High clutch** • **Brake band** • **Forward clutch** (Does not affect power transmission)	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.
Engine brake	At D4 position, there is no one-way clutch in the power transaxle line and engine brake can be obtained when decelerating.



"R" Position

• **Reverse clutch** • **Low & reverse brake**	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.
Engine brake	As there is no one-way clutch in the power transaxle line, engine brake can be obtained when decelerating.



TCM Function

INFOID:0000000001694422

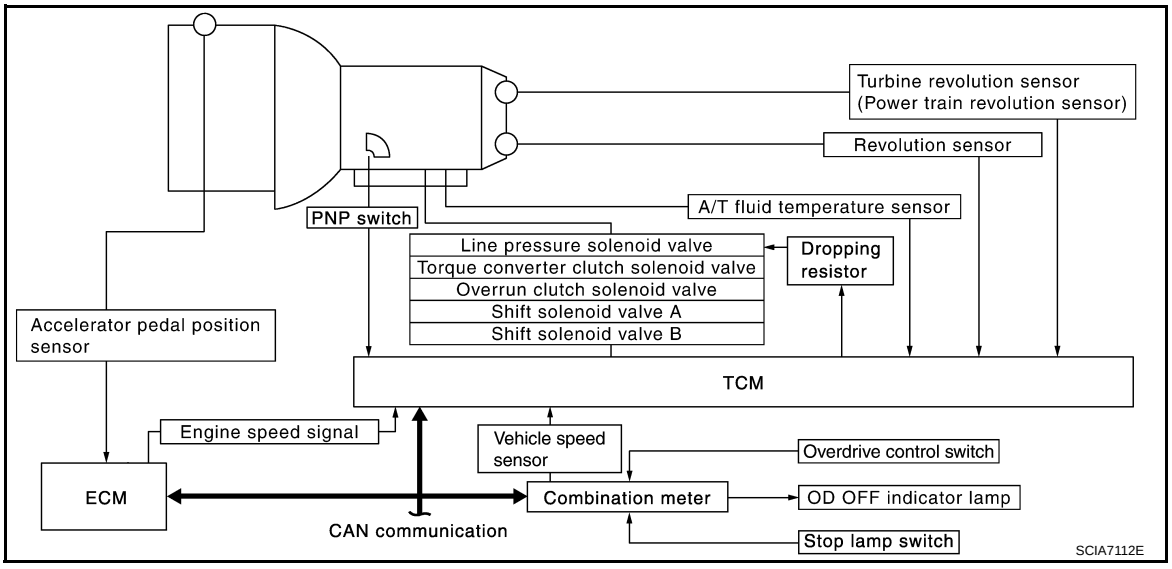
The function of the TCM is to:
- Receive input signals sent from various switches and sensors.
- Determine required line pressure, shifting point, lock-up operation, and engine brake operation.
- Send required output signals to the respective solenoids.

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-III 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



CAN Communication

INFOID:0000000001694423

SYSTEM DESCRIPTION

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-13, "System Description".

Input/Output Signal of TCM

INFOID:0000000001694424

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		(*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			(*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
	PNP switch	X	X	X	X	X	(*3) X	(*4) X
	Stop lamp switch signal(*5)		X		X	X		(*4) X
	A/T fluid temperature sensors	X	X		X			X
	Overdrive control switch signal(*5)		X		X	X		(*4) X
	TCM power supply voltage signal	X						X

Control item		Line pressure control	Vehicle speed control	Shift control	Lock-up control	Engine brake control	Fail-safe function	Self-diagnostics function
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.

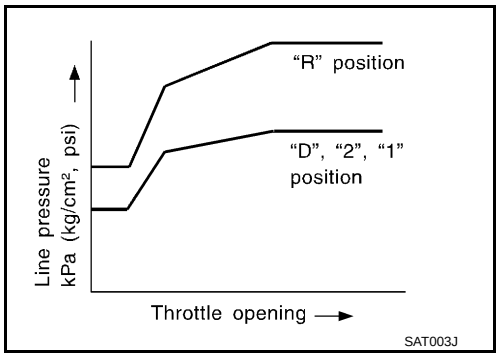
Line Pressure Control

INFOID:0000000001694425

- 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.

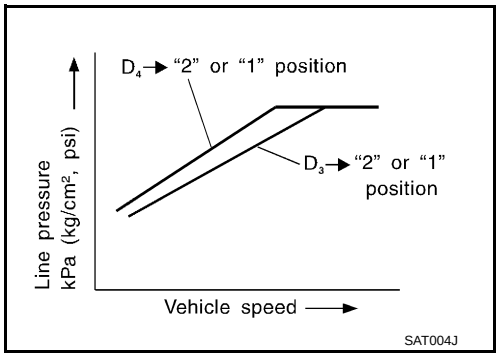
NORMAL CONTROL

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



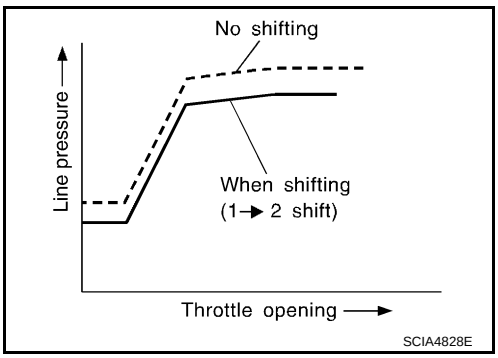
BACK-UP CONTROL (ENGINE BRAKE)

If the selector lever is shifted to "2" position while driving in D_4 or D_3, 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.



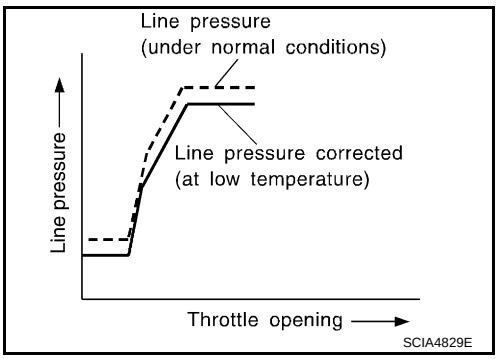
DURING SHIFT CHANGE

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.

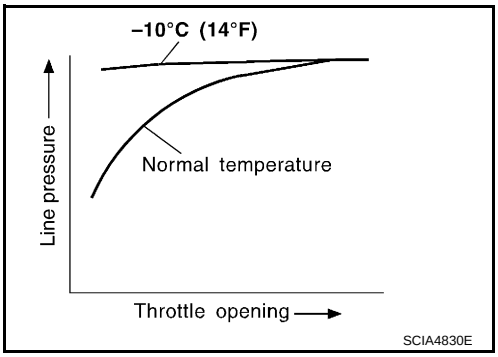


AT LOW FLUID TEMPERATURE

- 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

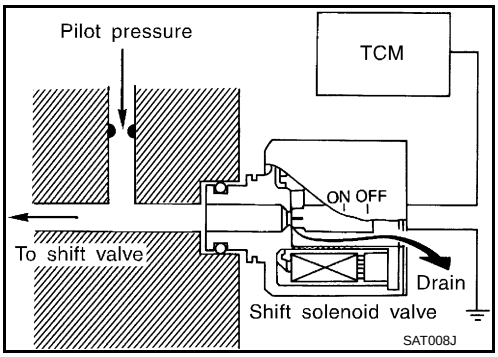
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The shift is regulated entirely by electronic control to accommodate vehicle speed and varying engine operations. This is accomplished by electrical signals transmitted by the revolution sensor and the ECM (accelerator pedal position sensor). This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

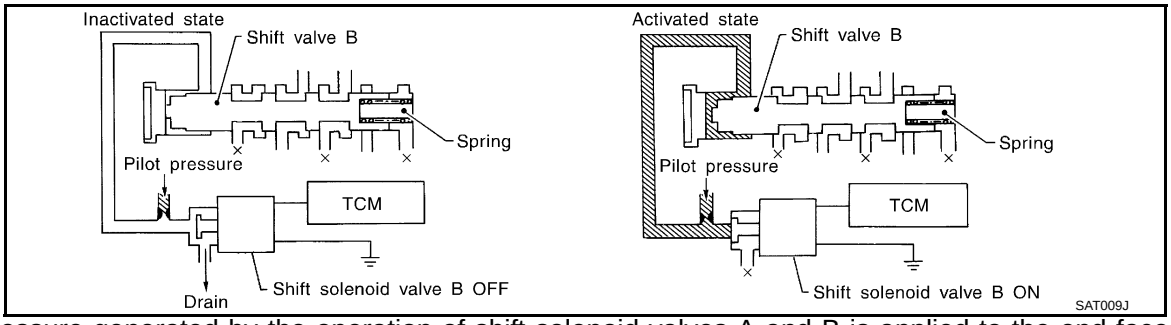
The shift solenoid valve performs simple ON-OFF operation. When set to “ON”, the drain circuit closes and pilot pressure is applied to the shift valve.



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)

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

INFOID:0000000001694427

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.

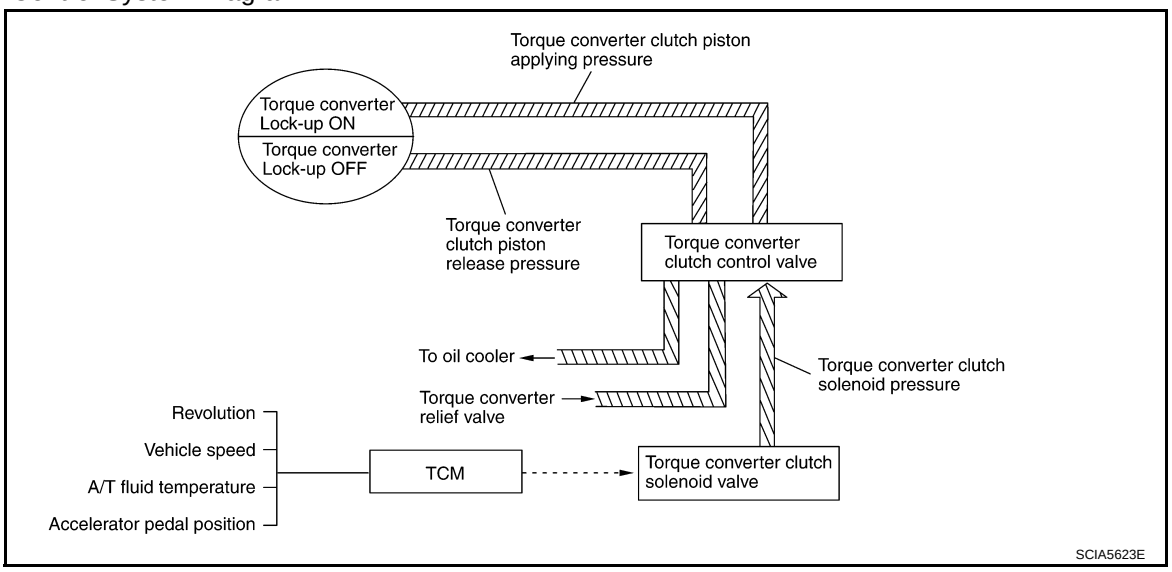
CONDITIONS FOR LOCK-UP OPERATION

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	D_4	D_3
Vehicle speed sensor	More than set value	
Throttle position sensor	Less than set opening	
Closed throttle position switch	OFF	
A/T fluid temperature sensor	More than 40°C (104°F)	

TORQUE CONVERTER CLUTCH SOLENOID VALVE CONTROL

Lock-up Control System Diagram



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.

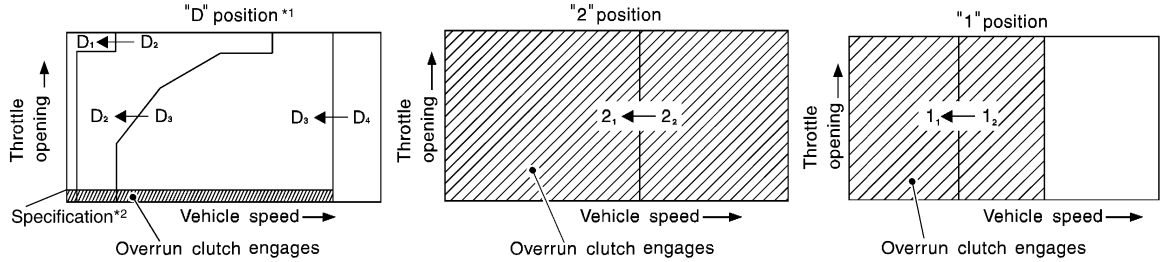
Engine Brake Control (Overrun Clutch Control)

INFOID:0000000001694428

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



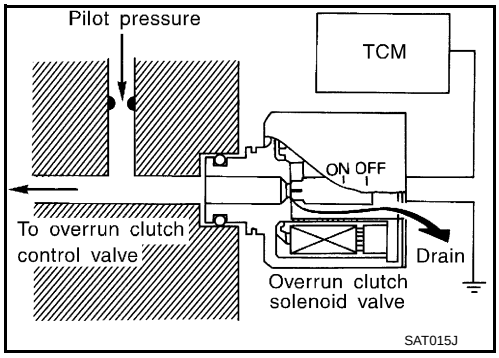
Selector lever position	Gear position	Throttle opening
"D" position *1	D1,D2,D3 gear position	Less than specification *2
"2" position	21,22 gear position	At any position
"1" position	11,12 gear position	

*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.

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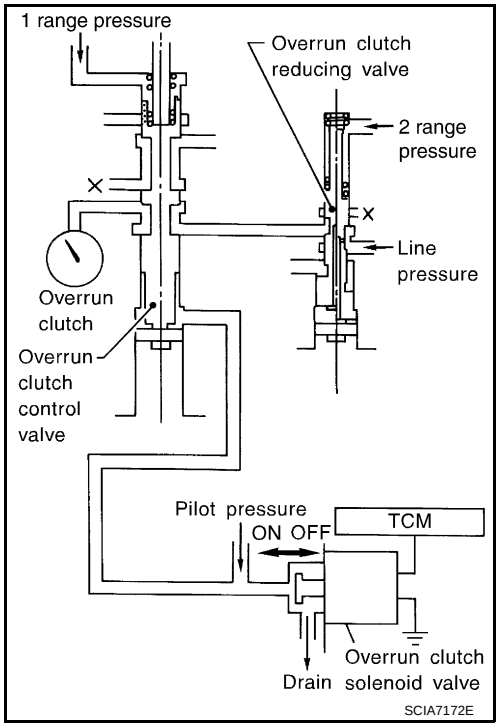
OVERRUN CLUTCH SOLENOID VALVE CONTROL

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.



Control Valve

INFOID:0000000001694429

FUNCTION OF CONTROL VALVES

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 D_4. (Interlocking occurs if the overrun clutch engages during D_4.)
1st reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when downshifting from the 1st position 1_2 to 1_1.
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.

Centrifugal Cancel Mechanism

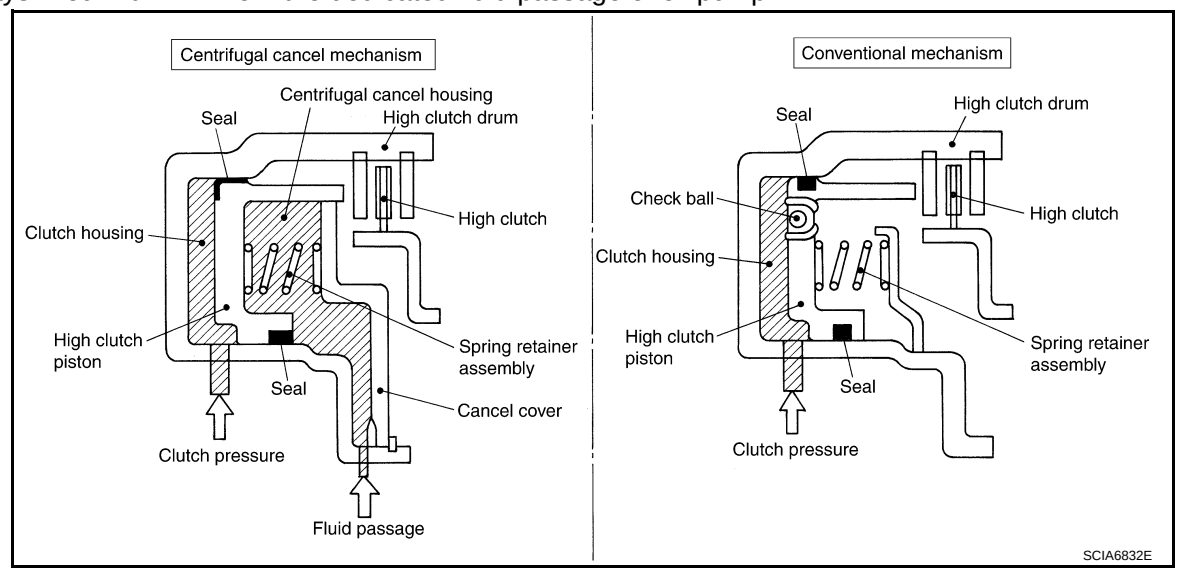
INFOID:0000000001694419

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.

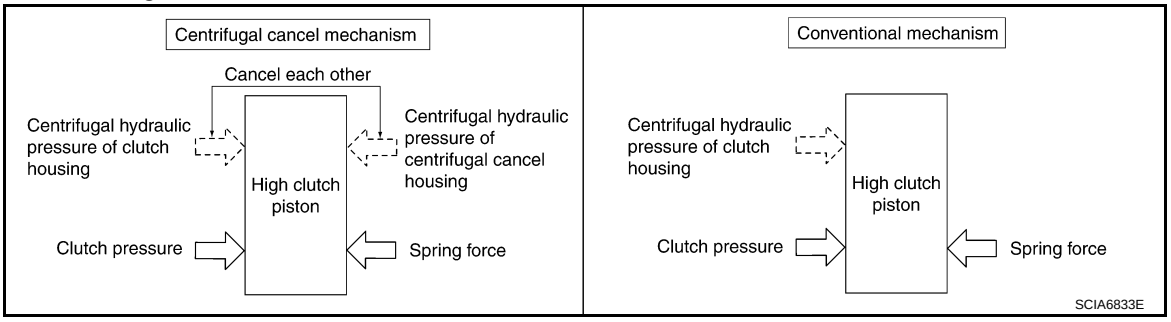


When Clutch Pressure Is Not Applied

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.

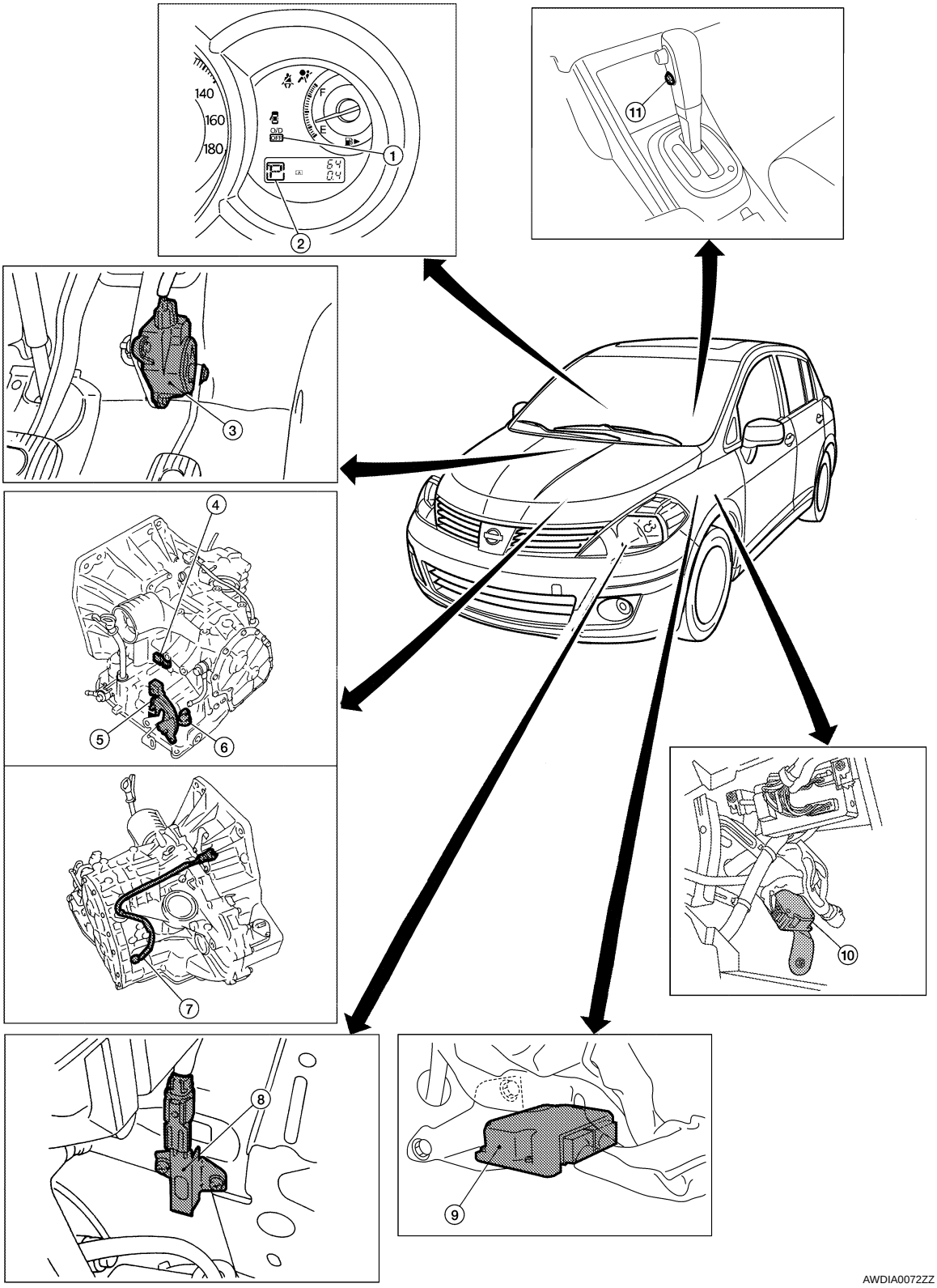
When Clutch Pressure Is Applied

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.



Component Parts Location

INFOID:0000000001694446



1. OD OFF indicator lamp
2. Shift position indicator
3. Accelerator pedal position (APP)
4. Turbine revolution sensor (Power train revolution sensor)
5. PNP switch
6. Terminal body (Terminal cord assembly connector)
7. Revolution sensor
8. Dropping resistor
9. TCM (LHD)
10. TCM (RHD)
11. Overdrive control switch

A/T SHIFT LOCK SYSTEM

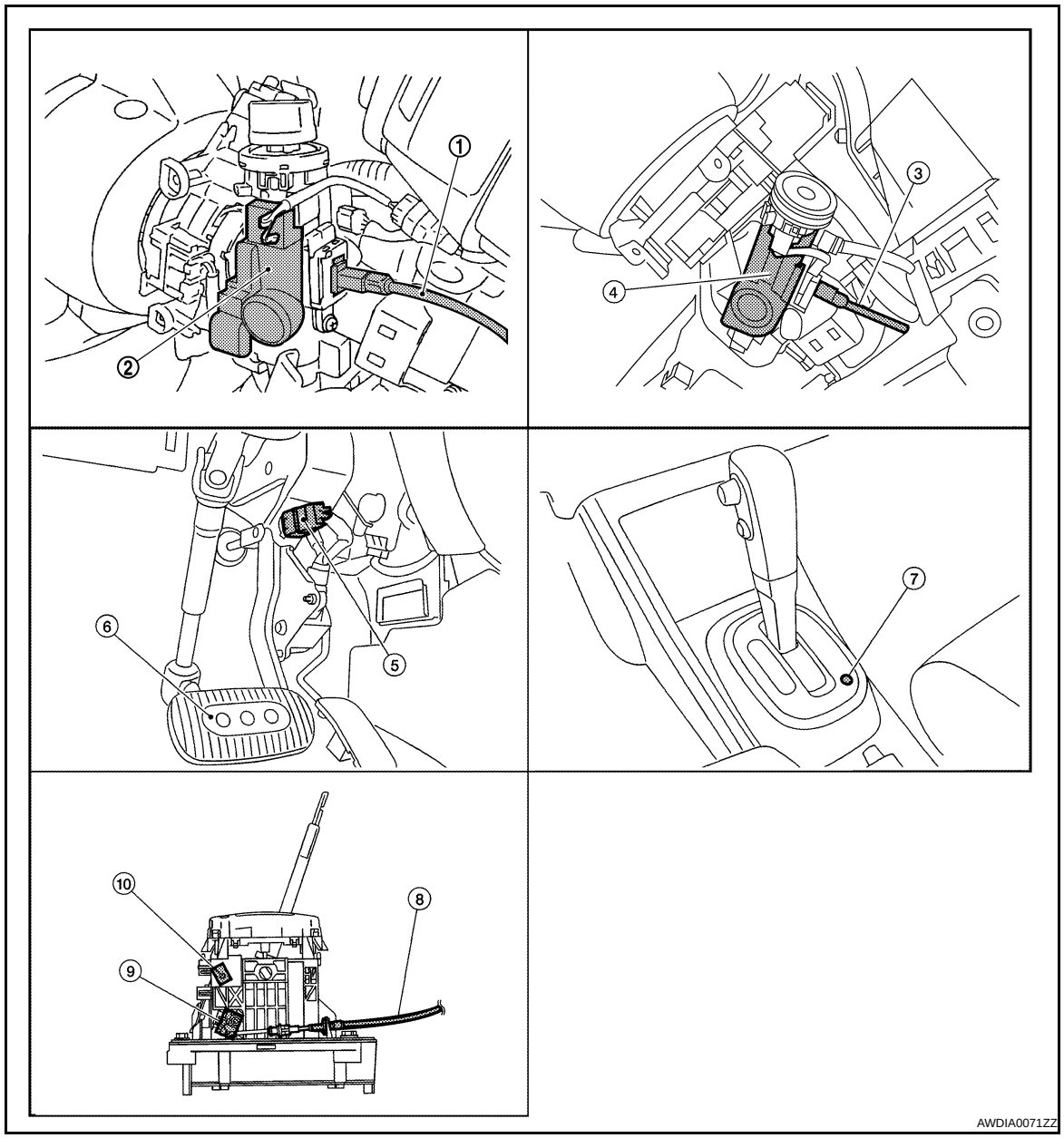
System Description

INFOID:0000000001694430

- 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.

Component Parts Location

INFOID:0000000001694431



1. Key interlock cable
2. Key cylinder
3. Brake pedal
4. Stop lamp switch
A. Park position switch
B. Shift lock solenoid
C. Shift lock release button

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Introduction

INFOID:0000000001694433

A/T system has two self-diagnostic systems.
The first is emission-related on board diagnostic system (OBD) 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 self-diagnostic items. For detail, refer to TM-35, "CONSULT-III Function (TRANSMISSION)".

OBD Function for A/T System

INFOID:0000000001694434

The ECM provides emission-related on board diagnostic (OBD) 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

INFOID:0000000001694435

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 Diagnostic Trouble Code (DTC)

INFOID:0000000001694436

HOW TO READ DTC AND 1ST TRIP DTC

DTC and 1st trip DTC can be read by the following methods.
(with CONSULT-III or GST) CONSULT-III or GST (Generic Scan Tool) Examples: P0705, P0720 etc.
These DTC are prescribed by SAE J2012.
(CONSULT-III 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-III can identify them as shown below, therefore, CONSULT-III (if available) is recommended.

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-III or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-III screen, not on the GST. For detail, refer to EC-107, "CONSULT-III Function".
Only one set of freeze frame data (either 1st trip freeze frame data of 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-III, 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-III 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. For details, refer to EC-107, "CONSULT-III Function".

- **Diagnostic trouble codes (DTC)**
- **1st trip diagnostic trouble codes (1st trip DTC)**
- **Freeze frame data**
- **1st trip freeze frame data**
- **System readiness test (SRT) codes**
- **Test values**

HOW TO ERASE DTC (WITH CONSULT-III)

- **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-III “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 TM-38, "Diagnosis Procedure without CONSULT-III". (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-114, "Diagnosis Tool Function".

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 TM-38, "Diagnosis Procedure without CONSULT-III". (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Perform “OBD SELF-DIAGNOSTIC PROCEDURE (No tools)”. Refer to EC-107, "CONSULT-III Function".

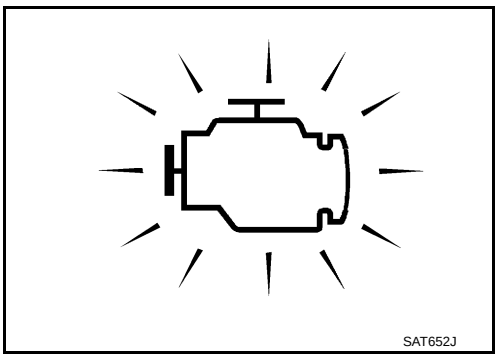
Malfunction Indicator Lamp (MIL)

INFOID:0000000001694437

DESCRIPTION

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 MWI-15, "WARNING LAMPS/INDICATOR LAMPS : System Description", or see EC-324, "Description".
2. When the engine is started, the MIL should go off.
   - If the MIL remains on, the on board diagnostic system has detected anengine system malfunction.


SAT652J

DIAGNOSIS SYSTEM (TCM)

CONSULT-III Function (TRANSMISSION)

INFOID:0000000001694438

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

TCM diagnostic mode	Description
WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the TCM for setting the status suitable for required operation, input/output signals are received from the TCM and received data is displayed.
SELF-DIAG RESULTS	Displays TCM self-diagnosis results.
DATA MONITOR	Displays TCM input/output data in real time.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
FUNCTION TEST	Conducted by CONSULT-III instead of a technician to determine whether each system is “OK” or “NG”.
ECU PART NUMBER	TCM part number can be read.

SELF-DIAGNOSTIC RESULT MODE

Operation Procedure

After performing SELF-DIAGNOSTIC RESULT MODE, place check marks for results on the TM-11, "Diagnostic Work Sheet". Reference pages are provided following the items.

Display Items List

Items (CONSULT-III screen terms)	Malfunction is detected when...	OBD (DTC)	Reference page
		MIL indicator lamp*1, “ENGINE” with CONSULT-III or GST	
CAN COMM CIRCUIT	• When malfunction is detected in CAN communication line.	U1000	TM-43
PNP SW/CIRC	• TCM does not receive the correct voltage signal (based on the gear position) from the switch.	P0705	TM-44
ATF TEMP SEN/CIRC	• TCM receives an excessively low or high voltage from the sensor.	P0710	TM-48
VHCL SPEED SEN-A/T	• TCM does not receive the proper voltage signal from the sensor.	P0720	TM-52
ENGINE SPEED SIG	• TCM does not receive the proper voltage signal from the ECM.	P0725	TM-56
A/T 1ST GR FNCTN	• A/T cannot be shifted to the 1st gear position even if electrical circuit is good.	P0731*2	TM-59
A/T 2ND GR FNCTN	• A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	P0732*2	TM-62
A/T 3RD GR FNCTN	• A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.	P0733*2	TM-65
A/T 4TH GR FNCTN	• A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	P0734*2	TM-68
T/C CLUTCH SOL/V	• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P0740	TM-73
A/T TCC S/V FNCTN	• A/T cannot perform lock-up even if electrical circuit is good.	P0744*2	TM-76
LINE PRESSURE S/V	• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P0745	TM-81
SHIFT SOLENOID/V A	• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P0750	TM-85
SHIFT SOLENOID/V B	• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P0755	TM-89

Items (CONSULT-III screen terms)	Malfunction is detected when...	OBD (DTC)	Reference page
		MIL indicator lamp*1, “ENGINE” with CONSULT-III or GST	
OVERRUN CLUTCH S/V	• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P1760	TM-93
VHCL SPEED SEN-MTR	• TCM does not receive the proper voltage signal from the sensor.	—	TM-97
BATT/FLUID TEMP SEN	• TCM receives an excessively low or high voltage from the sensor.	—	TM-99
TURBINE SENSOR	• TCM does not receive proper voltage signal from sensor.	—	TM-104
CONTROL UNIT (RAM)	• TCM memory (RAM) is malfunctioning.	—	TM-108
CONTROL UNIT (ROM)	• TCM memory (ROM) is malfunctioning.	—	TM-108
INITIAL START	• This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen). Refer to TM-109.	—	TM-109
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED)	• No failure has been detected.	—	—

*1: Refer to TM-33, "Malfunction Indicator Lamp (MIL)".

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

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	—	▼	

Monitored item (Unit)	Monitor Item Selection			Remarks
	TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
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
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.
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)	—	—	▼	

DTC WORK SUPPORT MODE

Display Items List

DTC work support item	Description	Check item
1ST GR FNCTN P0731	Following items for “A/T 1st gear function (P0731)” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	• Shift solenoid valve A • Shift solenoid valve B • Each clutch • Hydraulic control circuit
2ND GR FNCTN P0732	Following items for “A/T 2nd gear function (P0732)” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	• Shift solenoid valve B • Each clutch • Hydraulic control circuit
3RD GR FNCTN P0733	Following items for “A/T 3rd gear function (P0733)” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	• Shift solenoid valve A • Each clutch • Hydraulic control circuit
4TH GR FNCTN P0734	Following items for “A/T 4th gear function (P0734)” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	• 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	Following items for “A/T TCC S/V function (lock-up) (P0744)” can be confirmed. • Self-diagnosis status (whether the diagnosis is being performed or not) • Self-diagnostic results (OK or NG)	• Torque converter clutch solenoid valve • Each clutch • Hydraulic control circuit

Diagnosis Procedure without CONSULT-III

INFOID:0000000001694439

TCM SELF-DIAGNOSTIC PROCEDURE

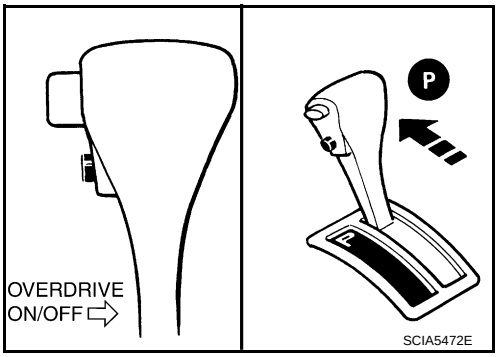
Description

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

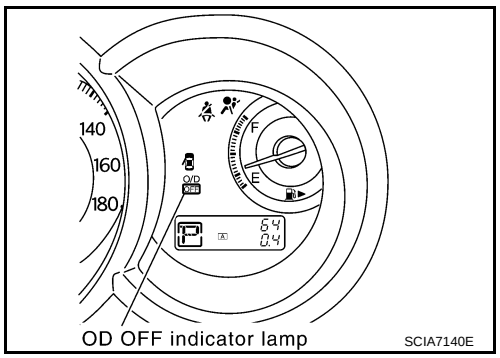
1. Park vehicle on flat surface.
2. Move selector lever to “P” position.
3. Turn ignition switch OFF. Wait at least 5 seconds.



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 TM-138, "OD OFF Indicator Lamp Does Not Come On" before proceeding.



OD OFF indicator lamp SCIA7140E

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.

3.CHECK SELF-DIAGNOSIS CODE

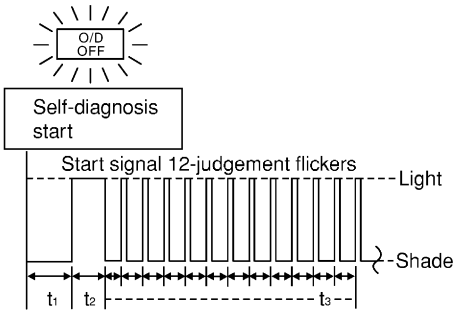
Check OD OFF indicator lamp. Refer to "Judgement of Self-diagnosis Code".

>> **DIAGNOSIS END**

Judgement of Self-diagnosis Code

OD OFF indicator lamp

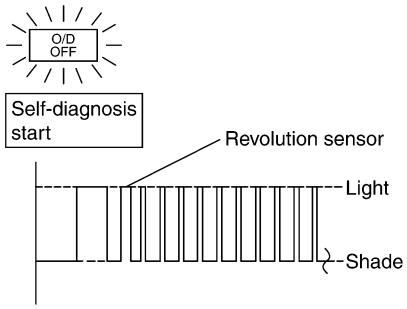
All judgement flickers are the same.



SCIA7161E

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

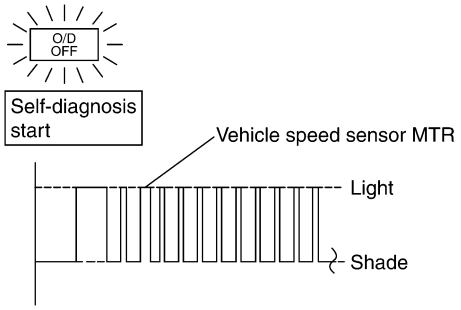
1st judgement flicker is longer than others.



SCIA5591E

Revolution sensor circuit is short-circuited or disconnected.
⇒ **Go to TM-52.**

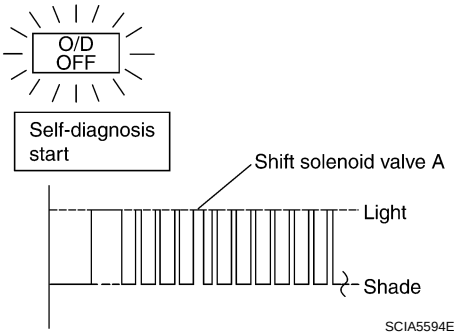
2nd judgement flicker is longer than others.



SCIA5592E

Vehicle speed sensor circuit is short-circuited or disconnected.
⇒ **Go to TM-97.**

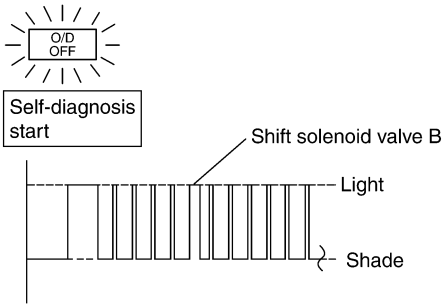
4th judgement flicker is longer than others.



SCIA5594E

Shift solenoid valve A circuit is short-circuited or disconnected.
⇒ **Go to TM-85.**

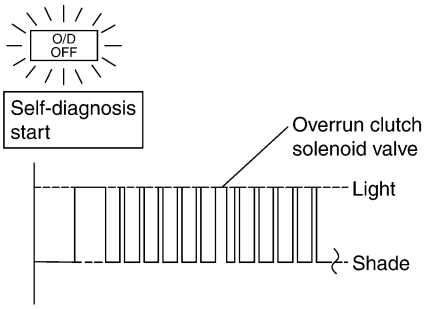
5th judgement flicker is longer than others.



SCIA5595E

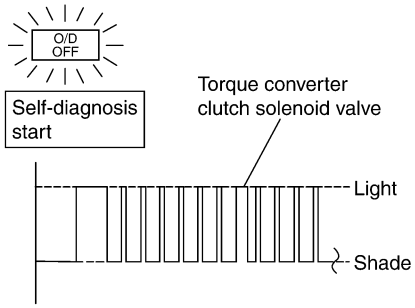
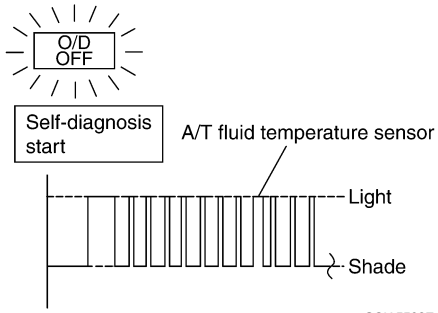
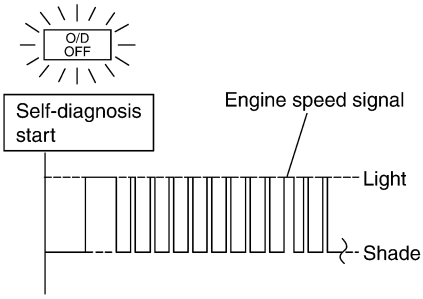
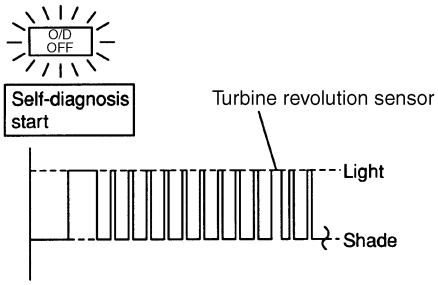
Shift solenoid valve B circuit is short-circuited or disconnected.
⇒ **Go to TM-89.**

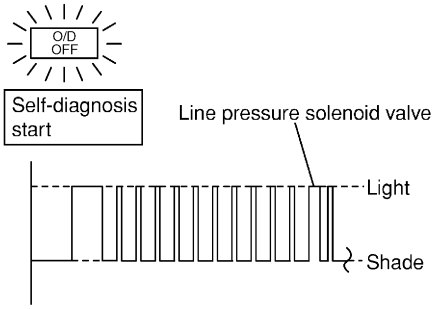
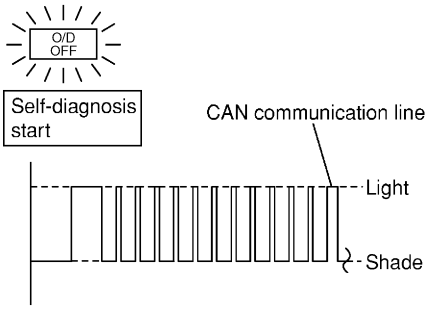
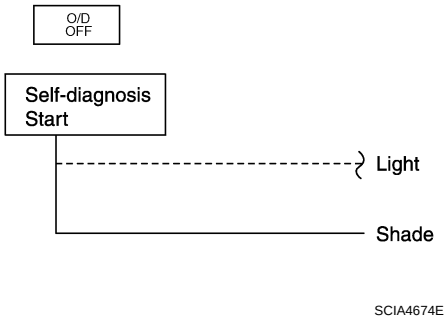
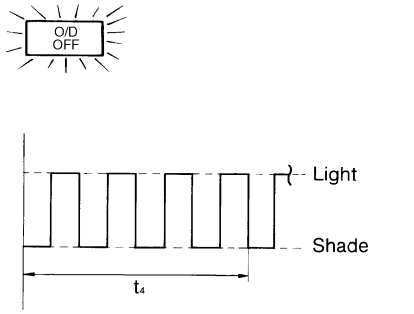
6th judgement flicker is longer than others.



SCIA5596E

Overrun clutch solenoid valve circuit is short-circuited or disconnected.
⇒ **Go to TM-93.**

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 TM-73.**	8th judgement flicker is longer than others.  SCIA5598E A/T fluid temperature sensor is disconnected or TCM power supply circuit is damaged. ⇒ **Go to TM-99.**
9th judgement flicker is longer than others.  SCIA5599E Engine speed signal circuit is short-circuited or disconnected. ⇒ **Go to TM-56.**	10th judgement flicker is longer than others.  SCIA7082E Turbine revolution sensor (power train revolution sensor) circuit is short-circuited or disconnected. ⇒ **Go to TM-104.**

OD OFF indicator lamp	
11th judgement flicker is longer than others.  SCIA7083E Line pressure solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to TM-81.**	12th judgement flicker is longer than others.  SCIA7085E CAN communication line is damaged. ⇒ **Go to TM-43.**
Lamp turns off.  SCIA4674E 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 TM-161, "TCM Self-Diagnosis Does Not Activate".**	Flickers as shown below.  SCIA4675E Battery power is low. Battery has been disconnected for a long time. Battery is connected reversely. (When reconnecting TCM connectors.—This is not a malfunction.) ⇒ **Go to TM-109.**

t_1 = 2.5 seconds t_2 = 2.0 seconds t_3 = 1.0 second t_4 = 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 "Diagnostic Procedure Without CONSULT-III".
3. Turn ignition switch OFF. (The self-diagnostic results will be erased.)

COMPONENT DIAGNOSIS

DTC U1000 CAN COMMUNICATION LINE

Description

INFOID:0000000001694277

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

INFOID:0000000001694278

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

Possible Cause

INFOID:0000000001694279

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

DTC Confirmation Procedure

INFOID:0000000001694280

NOTE:
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-III

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 TM-43, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

WITHOUT CONSULT-III

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 TM-38, "Diagnosis Procedure without CONSULT-III".
4. If DTC is detected, go to TM-43, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001694282

1. CHECK CAN COMMUNICATION CIRCUIT

With CONSULT-III

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

Is any malfunction of the “U1000 CAN COMM CIRCUIT” indicated?

YES >> Print out CONSULT-III screen, GO TO LAN section. Refer to LAN-12, "Precautions for Trouble Diagnosis".
NO >> **INSPECTION END**

DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

Description

INFOID:0000000001694283

- 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-III Reference Value in Data Monitor Mode

INFOID:0000000001694284

Remarks: Specification data are reference values.

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

INFOID:0000000001694285

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

Possible Cause

INFOID:0000000001694286

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

DTC Confirmation Procedure

INFOID:0000000001694287

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-III

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 TM-44, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000001694289

1.CHECK INPUT SIGNAL

With CONSULT-III

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-III.
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

OK or NG

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

2.CHECK INPUT SIGNAL

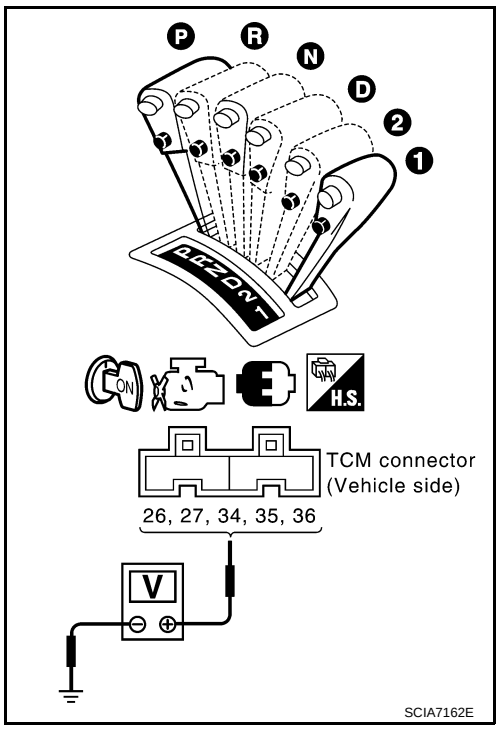
Without CONSULT-III

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



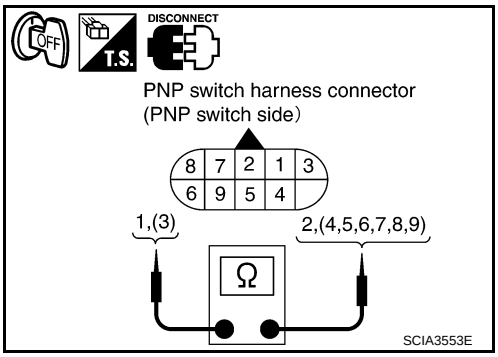
OK or NG

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

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.

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 TM-204, "Adjustment of A/T Position".
NG >> Repair or replace PNP switch. Refer to TM-195, "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.
- Ignition switch.

OK or NG

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

6. CHECK DTC

Perform TM-44, "DTC Confirmation Procedure".

OK or NG

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

7. CHECK TCM

1. Check TCM input/output signal. Refer to TM-119, "Reference Value".
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.

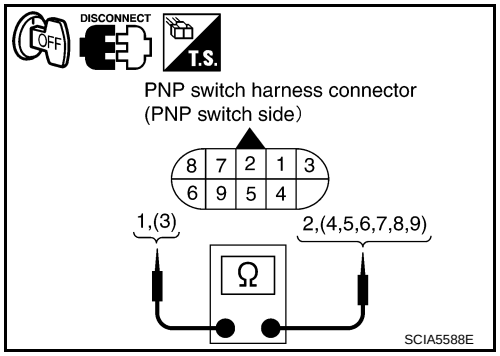
Component Inspection

INFOID:0000000001694290

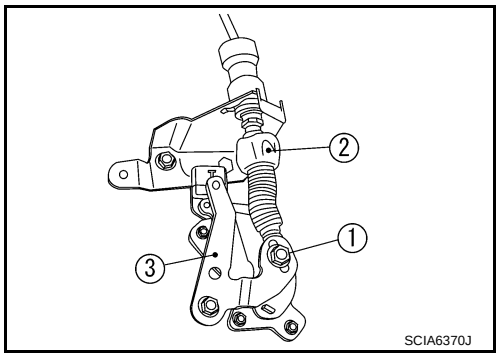
PNP SWITCH

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 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 TM-204, "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 TM-195, "Park/Neutral Position (PNP) Switch".
6. If NG on step 4, replace PNP switch. Refer to TM-195, "Park/Neutral Position (PNP) Switch".



DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

Description

INFOID:0000000001694291

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

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000001694292

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).	1.5V
	When A/T fluid temperature is 80°C (176°F).	0.5V

On Board Diagnosis Logic

INFOID:0000000001694293

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

Possible Cause

INFOID:0000000001694294

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

DTC Confirmation Procedure

INFOID:0000000001694295

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-III

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 TM-48, "Diagnosis Procedure".

WITH GST

Follow the procedure “With CONSULT-III”.

Diagnosis Procedure

INFOID:0000000001694297

1.CHECK INPUT SIGNAL

With CONSULT-III

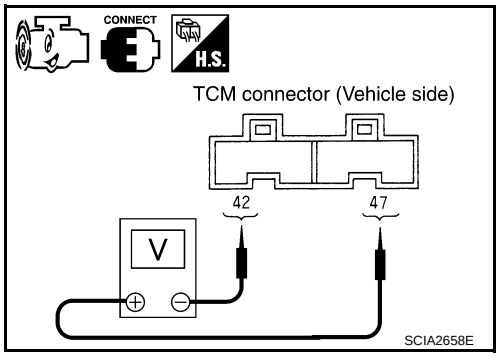
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-III.
3. Read out the value of “FLUID TEMP SE”.

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

Without CONSULT-III

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).	1.5V
			When A/T fluid temperature is 80°C (176°F).	0.5V



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.

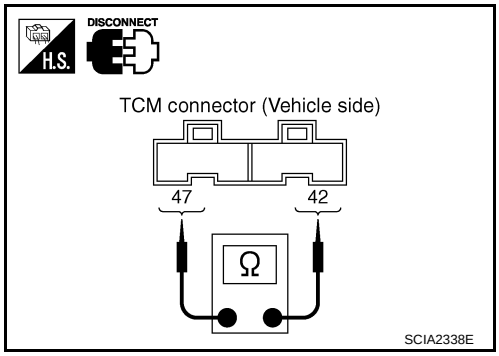
OK or NG

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

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



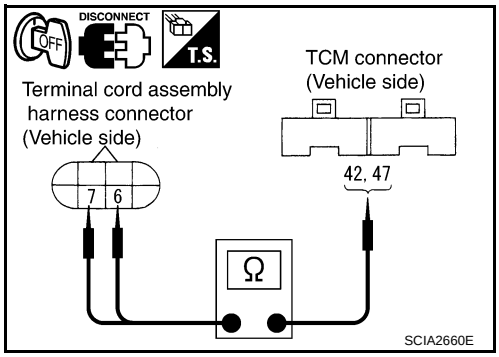
OK or NG

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	



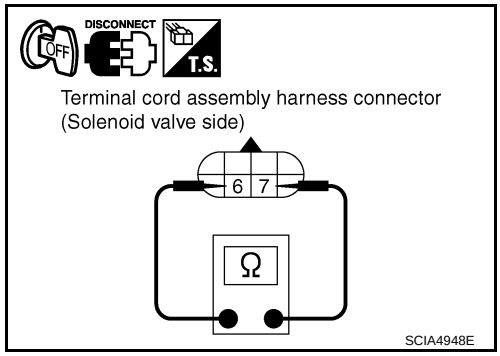
4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

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.



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

4. Reinstall any part removed.

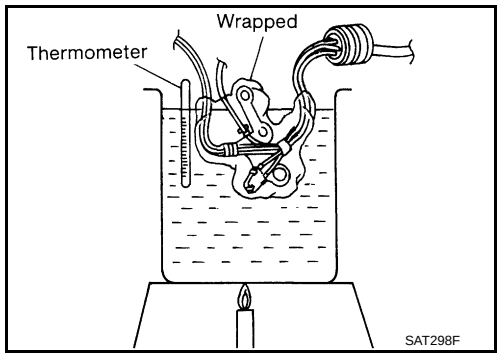
OK or NG

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

6.DETECT MALFUNCTIONING ITEM

1. Remove oil pan. Refer to TM-191, "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.



Temperature [°C (°F)]	Resistance (Approx.)
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 TM-48, "DTC Confirmation Procedure".

OK or NG

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

8.CHECK TCM

1. Check TCM input/output signal. Refer to TM-119, "Reference Value".
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.

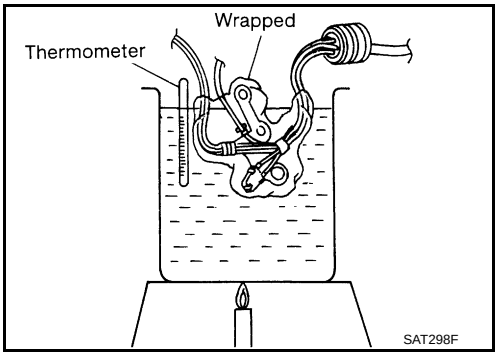
Component Inspection

INFOID:0000000001694298

A/T FLUID TEMPERATURE SENSOR

- Remove oil pan. Refer to TM-191, "Control Valve Assembly and Accumulators".
- Check resistance between terminal cord assembly harness connector terminals while changing temperature as shown.

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



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

Description

INFOID:0000000001694299

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-III Reference Value in Data Monitor Mode

INFOID:0000000001694300

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

INFOID:0000000001694301

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

Possible Cause

INFOID:0000000001694302

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

DTC Confirmation Procedure

INFOID:0000000001694303

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-III

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 TM-53, "Diagnosis Procedure".
   If the check result is OK, go to following step.
4. Select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 TM-53, "Diagnosis 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-III”.

WITHOUT CONSULT-III

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 TM-38, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-53, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001694305

1.CHECK INPUT SIGNAL

With CONSULT-III
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-III.
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.

2. CHECK REVOLUTION SENSOR

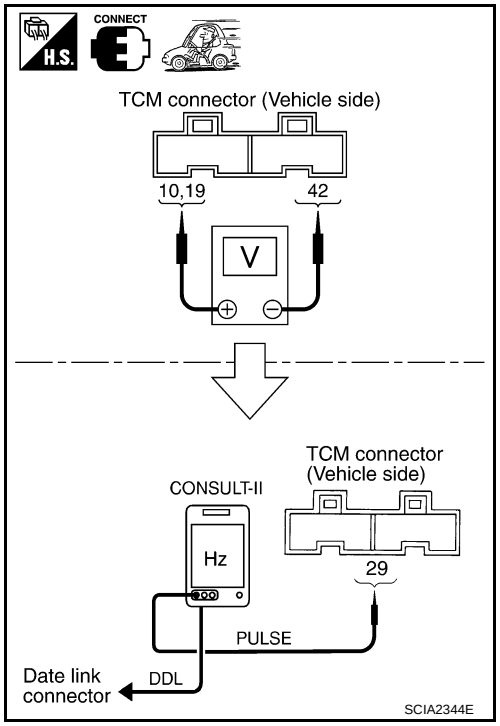
With CONSULT-III
1. Start engine.
2. Check power supply to revolution sensor by voltage between TCM connector terminals.

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-III 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

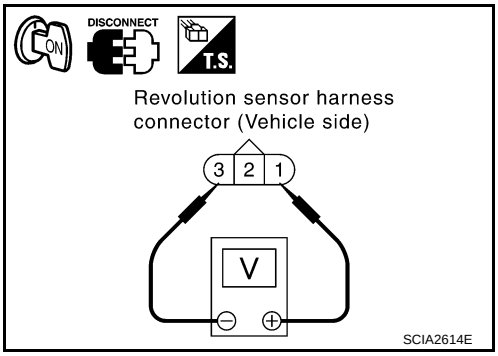
OK >> GO TO 8.
NG >> GO TO 3.

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.)

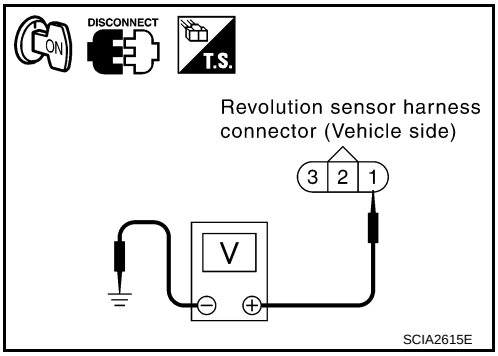
4. Check voltage between revolution sensor harness connector terminals.

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.

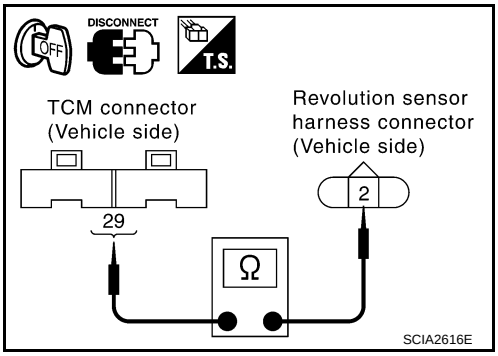
OK or NG

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 TM-119, "Reference Value".
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

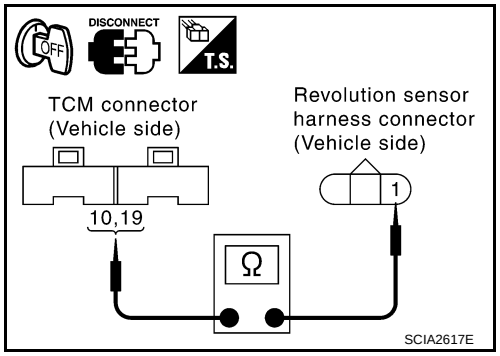
OK >> GO TO 8.
NG >> Repair or replace damaged parts.

6. CHECK HARNESS BETWEEN TCM AND 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.

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.

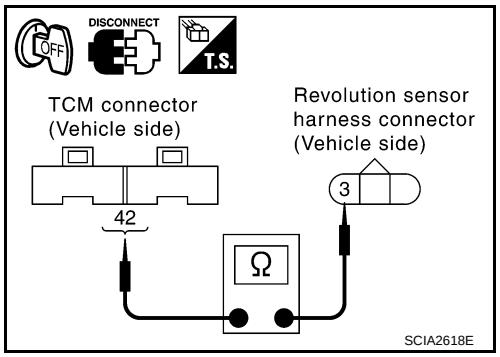
OK or NG

OK >> 10A fuse (No.58, 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 TM-52, "DTC Confirmation Procedure".

OK or NG

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

DTC P0725 ENGINE SPEED SIGNAL

Description

INFOID:0000000001694306

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

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000001694307

Remarks: Specification data are reference values.

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

On Board Diagnosis Logic

INFOID:0000000001694308

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

Possible Cause

INFOID:0000000001694309

Harness or connector
(Circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000001694310

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-III

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 POSI: More than 1.0/8
   SLCT LVR POSI: “D” position
4. If the check result is NG, go to TM-56, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

WITHOUT CONSULT-III

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 TM-38, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-56, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001694312

1.CHECK DTC WITH ECM

Check DTC with CONSULT-III “ENGINE”.
Turn ignition switch ON and select “SELF-DIAGNOSTIC RESULTS” mode for “ENGINE” with CONSULT-III. Refer to EC-107, "CONSULT-III Function".

OK or NG

OK >> GO TO 2.

NG >> Check ignition signal circuit for engine control. Refer to EC-319, "Diagnosis Procedure".

2. CHECK INPUT SIGNAL

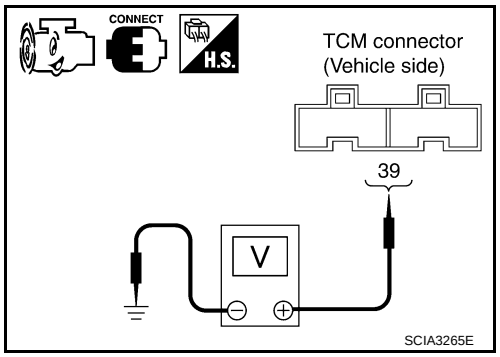
With CONSULT-III

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

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

Without CONSULT-III

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



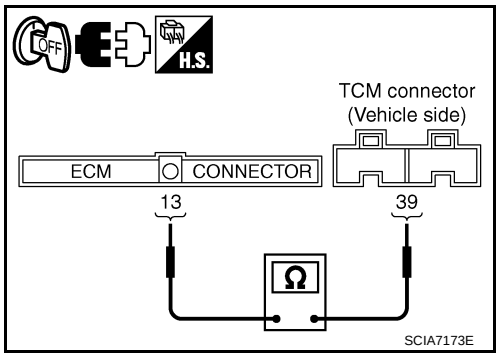
item	Connector	Terminal	Condition	Judgement standard (Approx.)
Engine speed signal	E32	39 - Ground	ON and	Refer to EC-328.

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

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 TM-56, "DTC Confirmation Procedure".

OK or NG

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

5. CHECK TCM

1. Check TCM input/output signal. Refer to TM-119, "Reference Value".
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

Description

INFOID:0000000001694313

- 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

INFOID:0000000001694314

- This is an OBD self-diagnostic item.
- Diagnostic trouble code “P0731 A/T 1ST GR FNCTN” with CONSULT-III 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 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 (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 gear position above
  *: “P0731 A/T 1ST GR FNCTN” is detected.

Possible Cause

INFOID:0000000001694315

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

DTC Confirmation Procedure

INFOID:0000000001694316

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-III

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 - 1.5V
   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-III 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-III screen, go to TM-60, "Diagnosis Procedure".
   If “STOP VEHICLE” appears on CONSULT-III 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-III 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 TM-35, "CONSULT-III Function (TRANSMISSION)".**
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 TM-60, "Diagnosis Procedure".
   Refer to TM-319, "Vehicle Speed at Which Gear Shifting Occurs".

WITH GST
Follow the procedure “WITH CONSULT-III”.

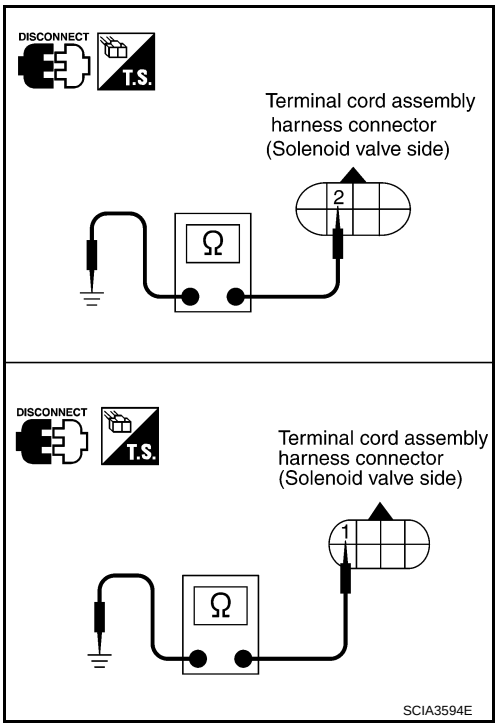
Diagnosis Procedure

INFOID:0000000001694317

1.CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to TM-191, "Control Valve Assembly and Accumulators".
- Shift solenoid valve A
- Shift solenoid valve B
2. Check resistance between terminal cord assembly harness connector terminals and ground.

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



OK or NG

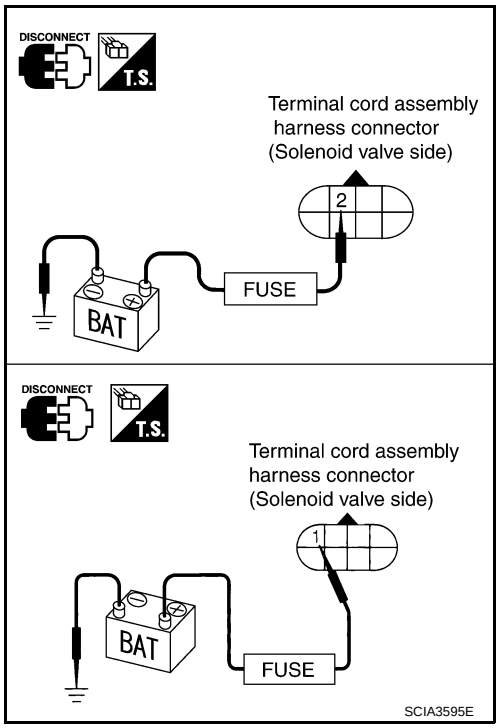
OK >> GO TO 2.
NG >> Repair or replace damaged parts.

2.CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to TM-191, "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.

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 TM-243, "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 TM-59, "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

Description

INFOID:0000000001694318

- 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

INFOID:0000000001694319

- This is an OBD self-diagnostic item.
- Diagnostic trouble code “P0732 A/T 2ND GR FNCTN” with CONSULT-III 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 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 (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 gear position above
  *: “P0732 A/T 2ND GR FNCTN” is detected.

Possible Cause

INFOID:0000000001694320

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

DTC Confirmation Procedure

INFOID:0000000001694321

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-III

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 - 1.5V
   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-III 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-III screen, go to TM-63, "Diagnosis Procedure".
   If “STOP VEHICLE” appears on CONSULT-III screen, go to following step.

- **Make sure that “GEAR” shows “2” when depressing accelerator pedal to WOT.**
- **If “TESTING” does not appear on CONSULT-III 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 TM-35, "CONSULT-III Function (TRANSMISSION)".**

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 TM-63, "Diagnosis Procedure".
   Refer to TM-319, "Vehicle Speed at Which Gear Shifting Occurs".

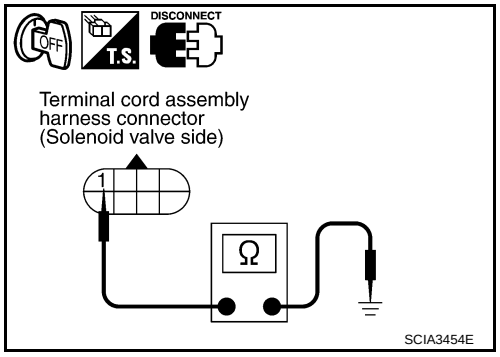
WITH GST
Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

INFOID:0000000001694322

1.CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to TM-191, "Control Valve Assembly and Accumulators".
- Shift solenoid valve B
2. Check resistance between terminal cord assembly harness connector terminal and ground.

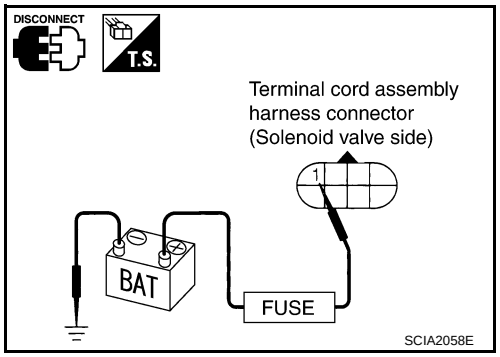


Solenoid valve	Terminal		Resistance (Approx.)
Shift solenoid valve B	1	Ground	5 - 20 Ω

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

2.CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to TM-191, "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.



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 TM-243, "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 TM-62, "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

Description

INFOID:0000000001694323

- 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

INFOID:0000000001694324

- This is an OBD self-diagnostic item.
- Diagnostic trouble code “P0733 A/T 3RD GR FNCTN” with CONSULT-III 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

INFOID:0000000001694325

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

DTC Confirmation Procedure

INFOID:0000000001694326

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-III

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 - 1.5V
   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-III 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-III screen, go to TM-66, "Diagnosis Procedure".
   If “STOP VEHICLE” appears on CONSULT-III 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-III 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 TM-35, "CONSULT-III Function (TRANSMISSION)".**

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 TM-66, "Diagnosis Procedure".
   Refer to TM-319, "Vehicle Speed at Which Gear Shifting Occurs".

WITH GST
Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

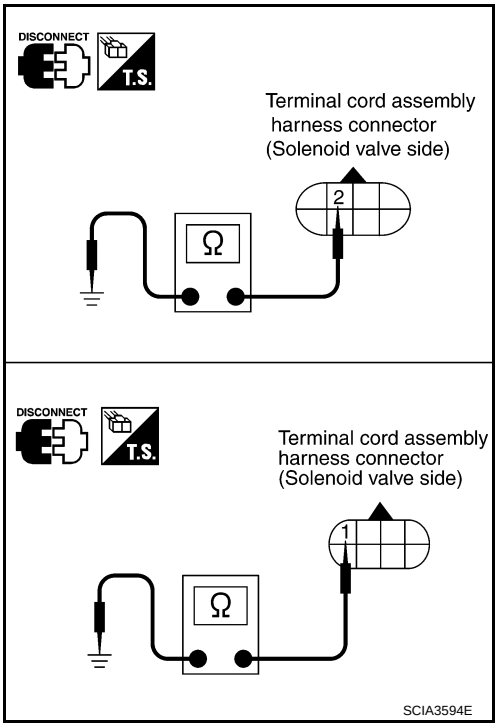
INFOID:0000000001694327

1. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to TM-191, "Control Valve Assembly and Accumulators".
- Shift solenoid valve A
- Shift solenoid valve B

2. Check resistance between terminal cord assembly harness connector terminals and ground.

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



OK or NG

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

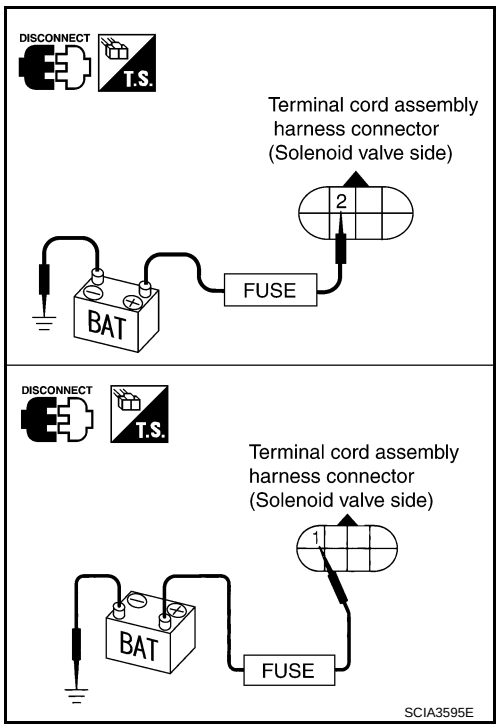
2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to TM-191, "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.

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 TM-243, "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 TM-65, "DTC Confirmation Procedure".

OK or NG

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

DTC P0734 A/T 4TH GEAR FUNCTION

Description

INFOID:0000000001694328

- 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-III Reference Value in Data Monitor Mode

INFOID:0000000001694329

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

INFOID:0000000001694330

- This is an OBD self-diagnostic item.
- Diagnostic trouble code “P0734 A/T 4TH GR FNCTN” with CONSULT-III 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

INFOID:0000000001694331

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

DTC Confirmation Procedure

INFOID:0000000001694332

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-III

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 - 1.5V
   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-III 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-III screen, go to TM-69, "Diagnosis Procedure".
   If “STOP VEHICLE” appears on CONSULT-III 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-III 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 TM-35, "CONSULT-III Function (TRANSMISSION)".**

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 TM-69, "Diagnosis Procedure".
   Refer to TM-319, "Vehicle Speed at Which Gear Shifting Occurs".

WITH GST

Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

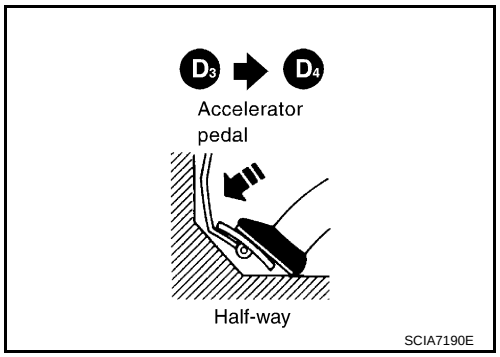
INFOID:0000000001694333

1. CHECK SHIFT-UP (D3 TO D4)

During TM-183, "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 TM-178, "Inspection and Judgment".

OK or NG

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

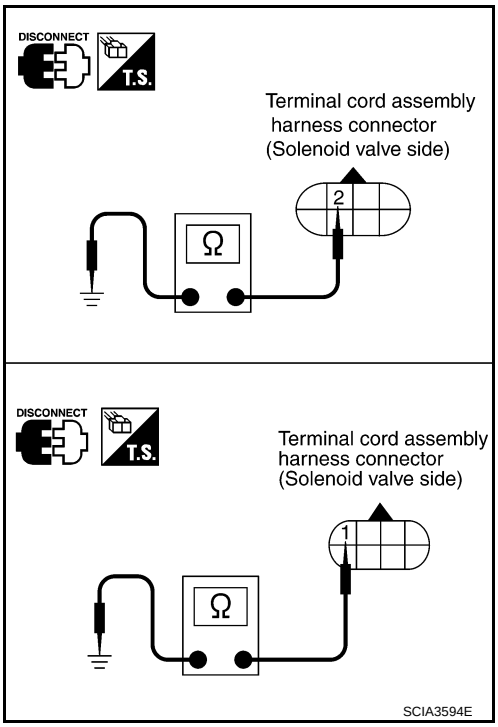
3.CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to TM-191, "Control Valve Assembly and Accumulators".
- Shift solenoid valve A
- Shift solenoid valve B
2. Check resistance between terminal cord assembly harness connector terminals and ground.

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

OK or NG

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

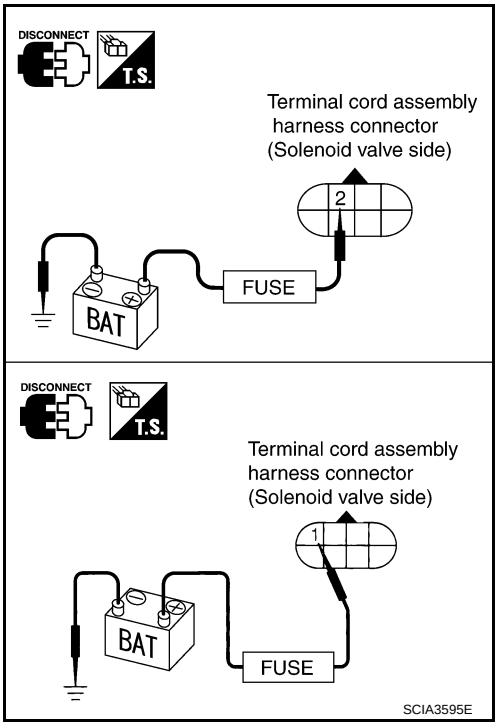


4.CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to TM-191, "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.

OK or NG

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



5.CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to TM-243, "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

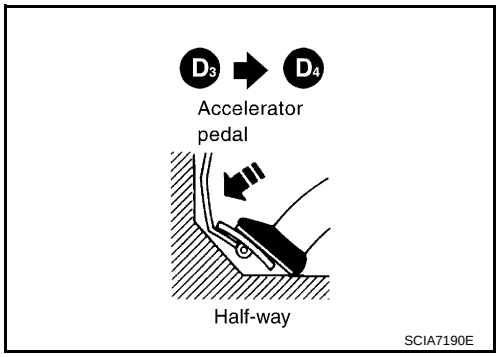
OK >> GO TO 6.
NG >> Repair control valve.

6. CHECK SHIFT-UP (D_3 TO D_4)

During TM-183, "Cruise Test - Part 1".

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

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



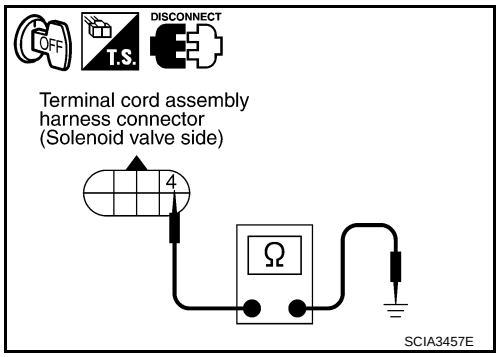
7. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to TM-191, "Control Valve Assembly and Accumulators".
- Line pressure solenoid valves
2. Check resistance between terminal cord assembly harness connector terminal and ground.

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

OK or NG

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

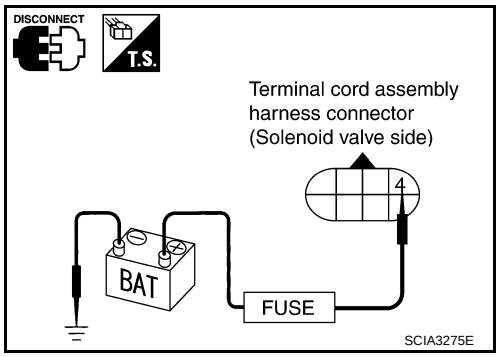


8. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to TM-191, "Control Valve Assembly and Accumulators".
- Line pressure solenoid valves
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.

OK or NG

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



9. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to TM-243, "Control Valve Assembly".
2. Check line pressure circuit valves for sticking.
- Pilot valve
- Shift solenoid valve A
- Shift solenoid valve B

OK or NG

OK >> GO TO 10.

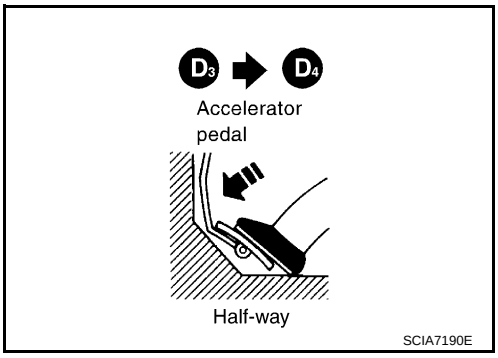
NG >> Repair control valve.

10. CHECK SHIFT-UP (D_3 TO D_4)

During TM-183, "Cruise Test - Part 1".

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

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



11. CHECK DTC

Perform TM-68, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Perform TM-183, "Cruise Test - Part 1" again and return to the start point of this test group.

DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

Description

INFOID:0000000001694334

- 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-III Reference Value in Data Monitor Mode

INFOID:0000000001694335

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

INFOID:0000000001694336

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

Possible Cause

INFOID:0000000001694337

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

DTC Confirmation Procedure

INFOID:0000000001694338

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-III

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “A/T” with CONSULT-III 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 TM-73, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

WITHOUT CONSULT-III

1. Start engine.
2. Drive vehicle in D1→ D2→ D3→ D4→ D4 lock-up position.
3. Perform self-diagnosis. Refer to TM-38, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-73, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001694340

1.CHECK INPUT SIGNAL

With CONSULT-III

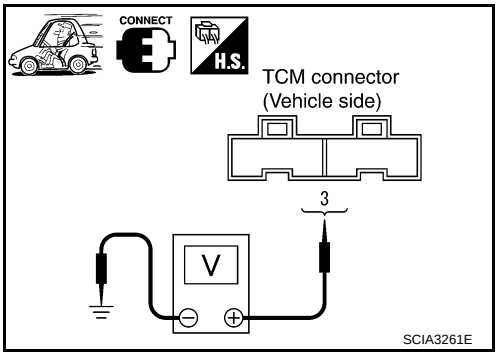
1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-III.
3. Read out the value of “TCC S/V DUTY” while driving. Check the value changes according to driving speed.

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

Without CONSULT-III

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 - 15V
			When A/T does not perform lock-up.	0V



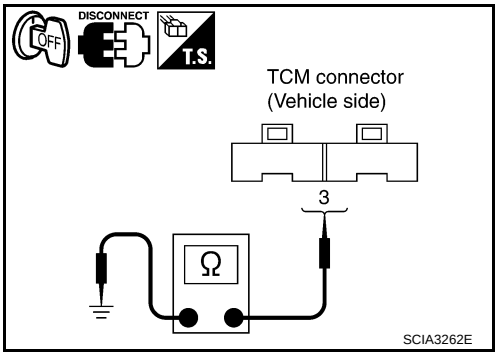
OK or NG

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



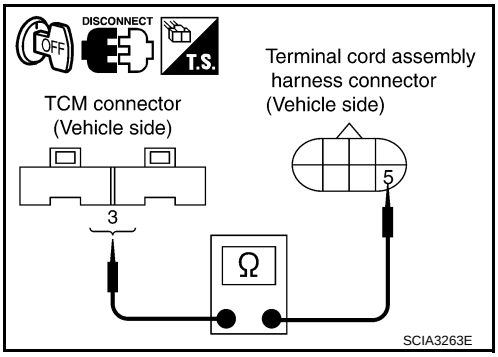
OK or NG

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

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.

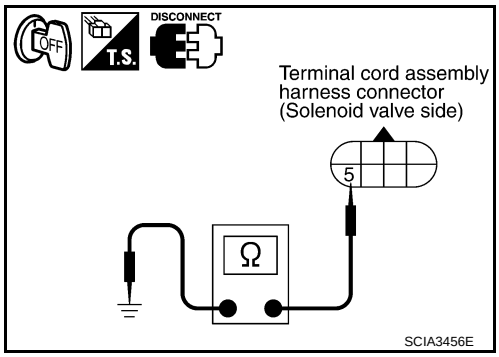
OK or NG

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 TM-73, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6.CHECK TCM

1. Check TCM input/output signal. Refer to TM-119, "Reference Value".
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

INFOID:0000000001694341

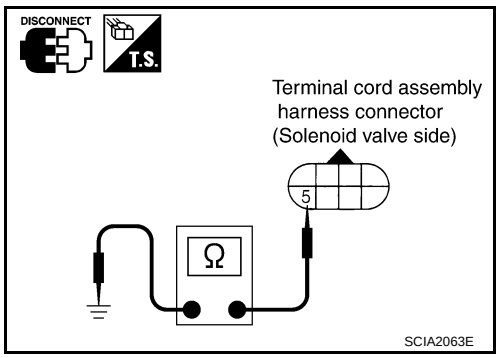
TORQUE CONVERTER CLUTCH SOLENOID VALVE

- For removal, refer to TM-191, "Control Valve Assembly and Accumulators".

Resistance Check

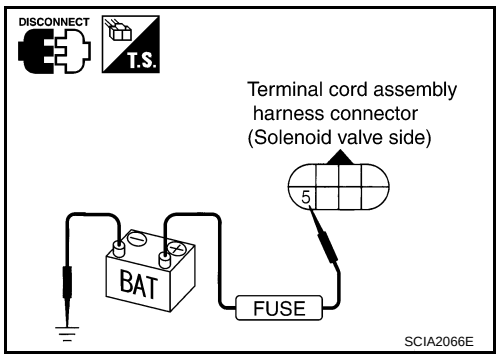
- Check resistance between terminal and ground.

Solenoid valve	Terminal		Resistance (Approx.)
Torque converter clutch solenoid valve	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)

Description

INFOID:0000000001694342

- 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-III Reference Value in Data Monitor Mode

INFOID:0000000001694343

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

INFOID:0000000001694344

- This is an OBD self-diagnostic item.
- Diagnostic trouble code “P0744 A/T TCC S/V FNCTN” with CONSULT-III 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 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 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

INFOID:0000000001694345

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

DTC Confirmation Procedure

INFOID:0000000001694346

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-III

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 - 1.5V
   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-III 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 TM-319, "Vehicle Speed at Which Gear Shifting Occurs".**
- **If “TESTING” does not appear on CONSULT-III 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 TM-35, "CONSULT-III Function (TRANSMISSION)".**

6. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “DIAGNOSTIC PROCEDURE”.)
Refer to TM-77, "Diagnosis Procedure".
Refer to TM-319, "Vehicle Speed at When Lock-up Occurs/Releases".

WITH GST
Follow the procedure “WITH CONSULT-III”.

Diagnosis Procedure

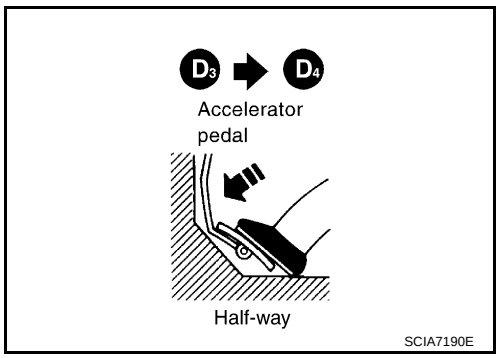
INFOID:0000000001694347

1.CHECK SHIFT-UP (D3 TO D4)

During TM-183, "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 TM-178, "Inspection and Judgment".

OK or NG

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

3.CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to TM-243, "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

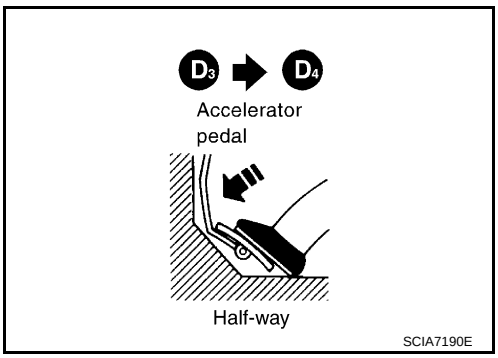
OK >> GO TO 4.
NG >> Repair control valve.

4.CHECK SHIFT-UP (D3 TO D4)

During TM-183, "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 TM-76, "DTC Confirmation Procedure".

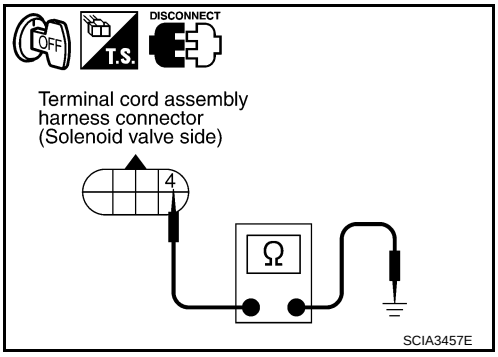
OK or NG

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

6. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to TM-191, "Control Valve Assembly and Accumulators".
- Line pressure solenoid valve
2. Check resistance between terminal cord assembly harness connector terminal and ground.

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



OK or NG

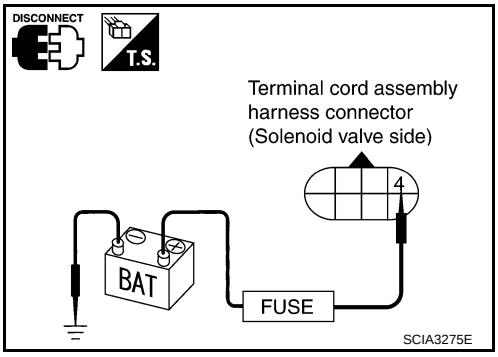
OK >> GO TO 7.
NG >> Replace solenoid valve assembly.

7. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to TM-191, "Control Valve Assembly and Accumulators".
- Line pressure solenoid valve
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.

OK or NG

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



8. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to TM-243, "Control Valve Assembly".
2. Check line pressure circuit valves for sticking.
- Pressure regulator valve
- Pilot valve
- Pressure modifier valve

OK or NG

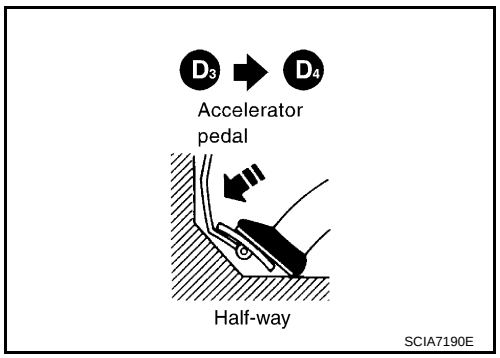
OK >> GO TO 9.
NG >> Repair control valve.

9. CHECK SHIFT-UP (D3 TO D4)

During TM-183, "Cruise Test - Part 1".

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

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



10. CHECK DTC

Perform TM-76, "DTC Confirmation Procedure".

OK or NG

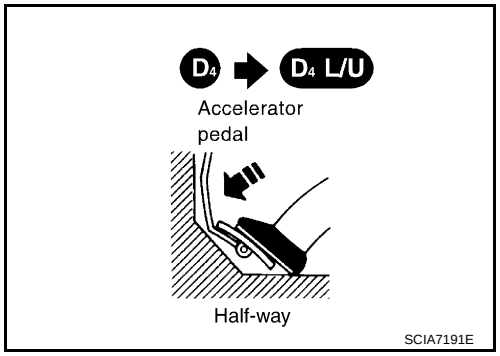
OK >> **INSPECTION END**
NG >> GO TO 11. Check for proper lock-up.

11. CHECK LOCK-UP

During TM-183, "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.



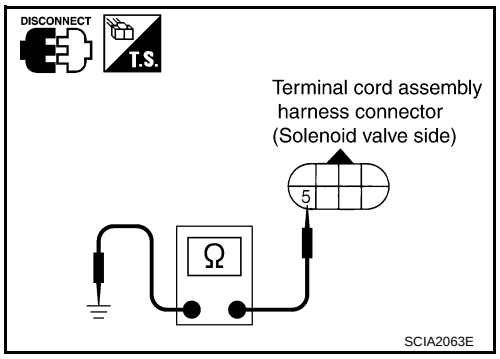
12. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to TM-191, "Control Valve Assembly and Accumulators".
- Torque converter clutch solenoid valve
2. Check resistance between terminal cord assembly harness connector terminal and ground.

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

OK or NG

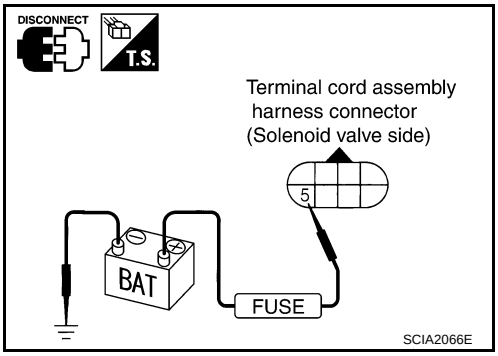
OK >> GO TO 13.
NG >> Replace solenoid valve assembly.



13. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to TM-191, "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.



OK or NG

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

14. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to TM-243, "Control Valve Assembly".
2. Check control valves for sticking.

- Torque converter clutch control valve
- Torque converter clutch relief valve

OK or NG

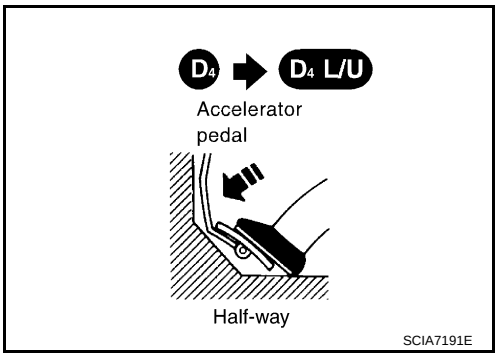
OK >> GO TO 15.
NG >> Repair control valve.

15. CHECK LOCK-UP

During TM-183, "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 TM-76, "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

Description

INFOID:0000000001694348

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-III Reference Value in Data Monitor Mode

INFOID:0000000001694349

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

INFOID:0000000001694350

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

Possible Cause

INFOID:0000000001694351

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

DTC Confirmation Procedure

INFOID:0000000001694352

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-III

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-III.
2. Touch “START”.
3. Depress accelerator pedal completely and wait at least 1 second.
4. If the check result is NG, go to TM-81, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

WITHOUT CONSULT-III

1. Start engine.
2. With brake pedal depressed, shift the lever from “P”→“N”→“D”→“N”→“P” positions.
3. Perform self-diagnosis. Refer to TM-38, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-81, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001694354

1.CHECK INPUT SIGNAL

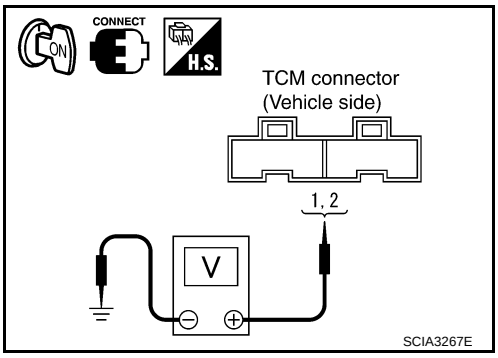
With CONSULT-III

1. Turn ignition switch ON. (Do not start engine.)
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-III.
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%

Without CONSULT-III

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground.



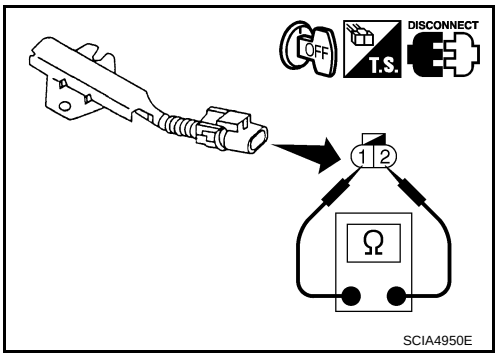
Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Line pressure solenoid valve	E31	1 - Ground	When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
			When depressing accelerator pedal fully after warming up engine.	0V
Line pressure solenoid valve (with dropping resistor)	E31	2 - Ground	When releasing accelerator pedal after warming up engine.	4 - 14V
			When depressing accelerator pedal fully after warming up engine.	0V

OK or NG

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

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

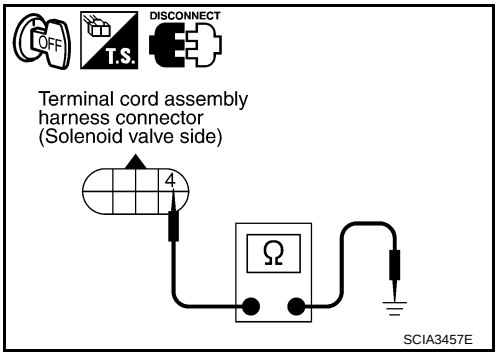
OK >> GO TO 3.
NG >> Repair or replace damaged parts.

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



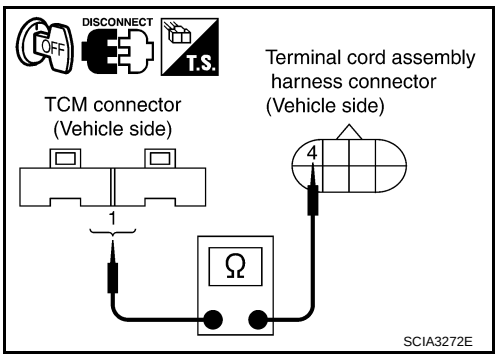
OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

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

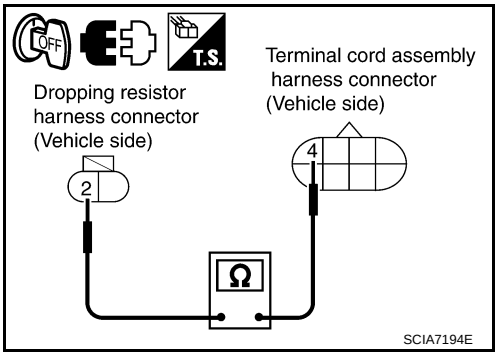
1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector	Terminal	Continuity
TCM	E31	1	Yes
Terminal cord assembly harness connector	F30	4	



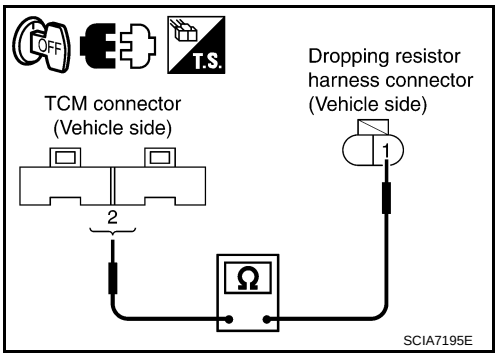
4. Check continuity between terminal cord assembly harness connector terminal and dropping resistor harness connector terminal.

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 TM-81, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to TM-119, "Reference Value".
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

INFOID:0000000001694355

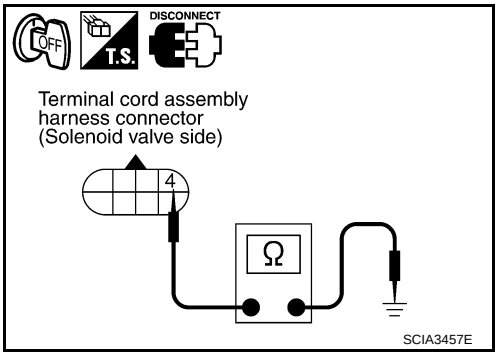
LINE PRESSURE SOLENOID VALVE

- For removal, refer to TM-191, "Control Valve Assembly and Accumulators".

Resistance Check

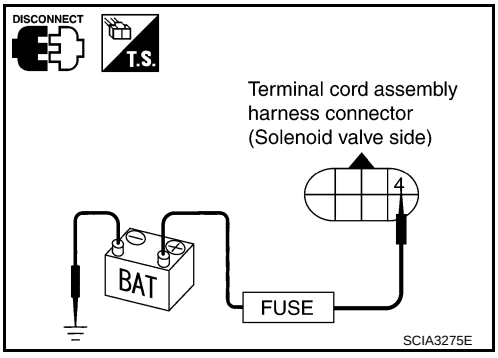
- Check resistance between terminal and ground.

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



Operation Check

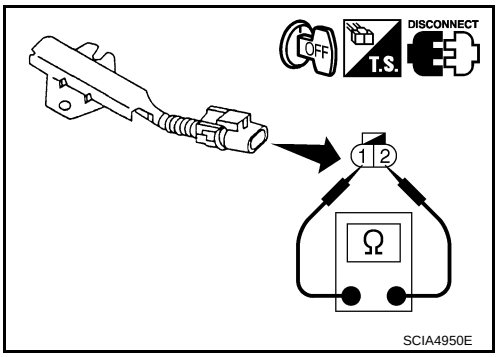
- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DROPPING RESISTOR

- Check resistance between terminals.

Item	Connector	Terminal	Resistance (Approx.)
Dropping resistor	E7	1 - 2	12 Ω



DTC P0750 SHIFT SOLENOID VALVE A

Description

INFOID:0000000001694356

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-III Reference Value in Data Monitor Mode

INFOID:0000000001694357

Remarks: Specification data are reference values.

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

INFOID:0000000001694358

- This is an OBD self-diagnostic item.
- Diagnostic trouble code “P0750 SHIFT SOLENOID/V A” with CONSULT-III or 4th judgement flicker without CONSULT-III is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

INFOID:0000000001694359

- Harness or connector
  (The solenoid circuit is open or shorted.)
- Shift solenoid valve A

DTC Confirmation Procedure

INFOID:0000000001694360

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-III

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 TM-85, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

WITHOUT CONSULT-III

1. Start engine.
2. Drive vehicle in D1→ D2 position.
3. Perform self-diagnosis. Refer to TM-38, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-85, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001694362

1.CHECK INPUT SIGNAL

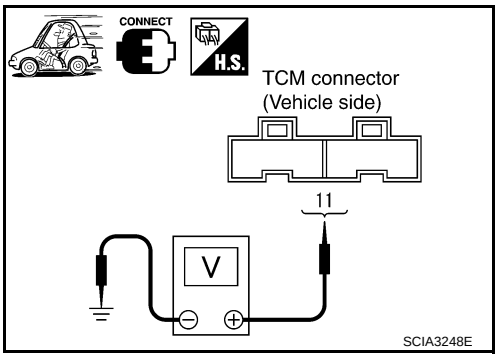
With CONSULT-III

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-III.
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

Without CONSULT-III

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



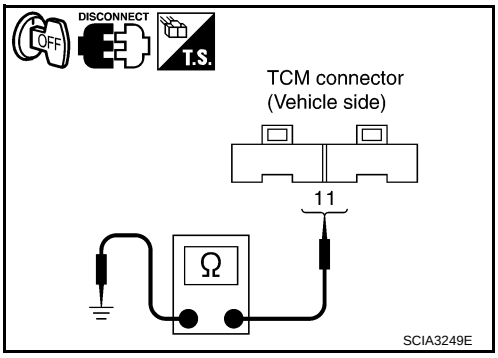
Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Shift solenoid valve A	E31	11 - Ground	When shift solenoid valve A operates. (When driving in “D1” or “D4”.)	Battery voltage
			When shift solenoid valve A does not operate. (When driving in “D2” or “D3”.)	0V

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

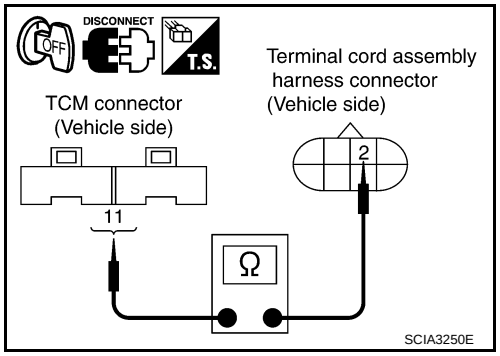
OK or NG

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

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	

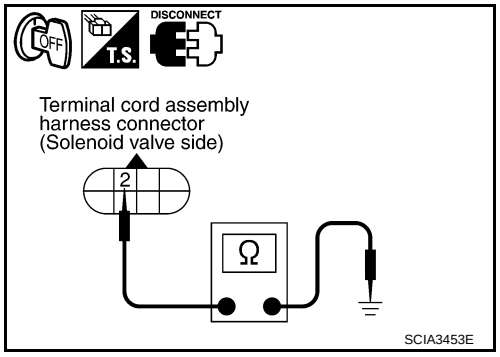
4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

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 TM-85, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to TM-119, "Reference Value".
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

INFOID:0000000001694363

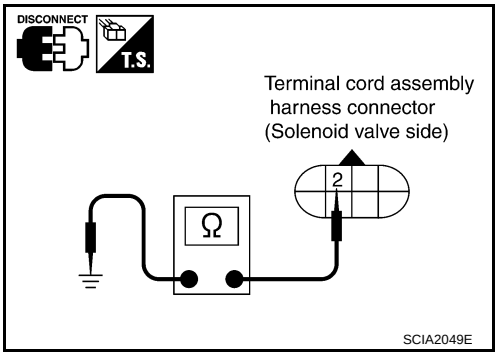
SHIFT SOLENOID VALVE A

- For removal, refer to TM-191, "Control Valve Assembly and Accumulators".

Resistance Check

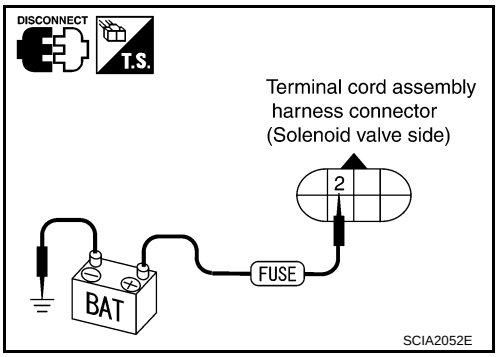
• Check resistance between terminal and ground.

Solenoid valve	Terminal		Resistance (Approx.)
Shift solenoid valve A	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.



DTC P0755 SHIFT SOLENOID VALVE B

Description

INFOID:0000000001694364

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-III Reference Value in Data Monitor Mode

INFOID:0000000001694365

Remarks: Specification data are reference values.

Item name	Condition	Display value
SHIFT S/V B	When shift solenoid valve B operates. (When driving in “D_1” or “D_2”.)	ON
	When shift solenoid valve B does not operate. (When driving in “D_3” or “D_4”.)	OFF

On Board Diagnosis Logic

INFOID:0000000001694366

- This is an OBD self-diagnostic item.
- Diagnostic trouble code “P0755 SHIFT SOLENOID/V B” with CONSULT-III or 5th judgement flicker without CONSULT-III is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

INFOID:0000000001694367

- Harness or connector
  (The solenoid circuit is open or shorted.)
- Shift solenoid valve B

DTC Confirmation Procedure

INFOID:0000000001694368

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-III

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 TM-89, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

WITHOUT CONSULT-III

1. Start engine.
2. Drive vehicle in D_1→ D_2→ D_3 position.
3. Perform self-diagnosis. Refer to TM-38, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-89, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001694370

1. CHECK INPUT SIGNAL

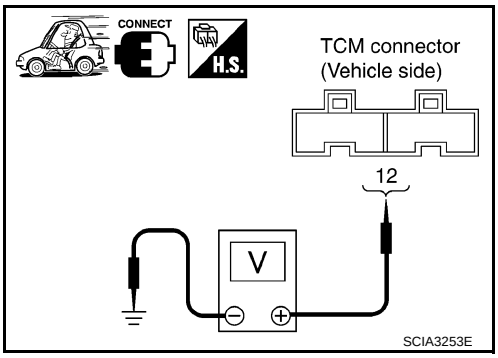
With CONSULT-III

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-III.
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

Without CONSULT-III

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



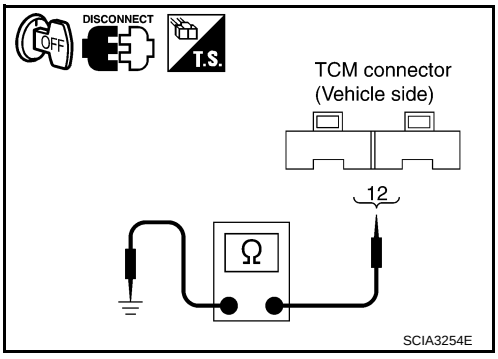
Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Shift solenoid valve B	E31	12 - Ground	When shift solenoid valve B operates. (When driving in “D1” or “D2”.)	Battery voltage
			When shift solenoid valve B does not operate. (When driving in “D3” or “D4”.)	0V

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

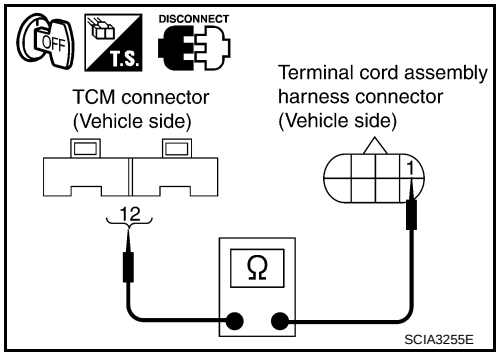
OK or NG

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

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	E101	12	Yes
Terminal cord assembly harness connector	F30	1	

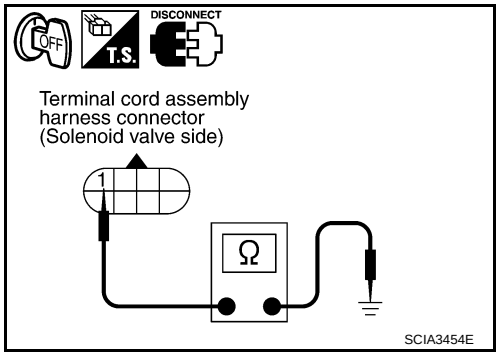
4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

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 TM-89, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6.CHECK TCM

1. Check TCM input/output signal. Refer to TM-119, "Reference Value".
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

INFOID:0000000001694371

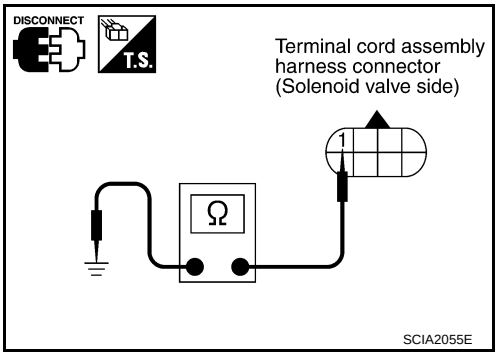
SHIFT SOLENOID VALVE B

- For removal, refer to TM-191, "Control Valve Assembly and Accumulators".

Resistance Check

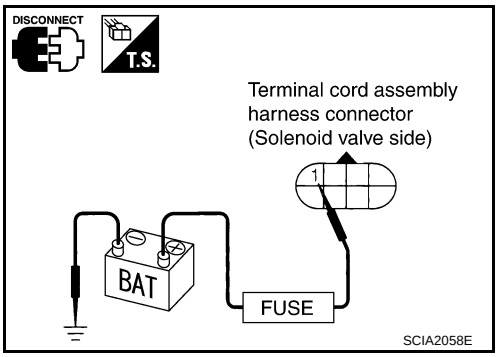
• Check resistance between terminal and ground.

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



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

Description

INFOID:0000000001694378

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-III Reference Value in Data Monitor Mode

INFOID:0000000001694379

Remarks: Specification data are reference values.

Item name	Condition	Display value
OVERRUN/C S/V	When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to TM-14.)	ON
	When overrun clutch solenoid valve does not operate. (When overrun clutch engaged. Refer to TM-14.)	OFF

On Board Diagnosis Logic

INFOID:0000000001694380

- This is an OBD self-diagnostic item.
- Diagnostic trouble code “P1760 OVERRUN CLUTCH S/V” with CONSULT-III or 6th judgement flicker without CONSULT-III is detected when TCM detects an improper voltage drop when it tries to operate solenoid valve.

Possible Cause

INFOID:0000000001694381

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

DTC Confirmation Procedure

INFOID:0000000001694382

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-III

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 TM-93, "Diagnosis Procedure".

WITH GST

Follow the procedure “WITH CONSULT-III”.

WITHOUT CONSULT-III

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 TM-38, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-93, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001694384

1.CHECK INPUT SIGNAL

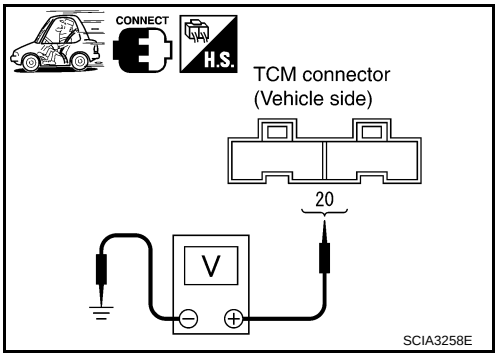
With CONSULT-III

1. Start engine.I
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 TM-14.)	ON
	When overrun clutch solenoid valve does not operate. (When overrun clutch engaged. Refer to TM-14.)	OFF

Without CONSULT-III

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



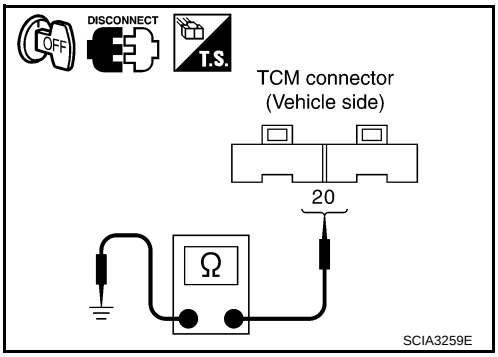
Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Overrun clutch solenoid valve	E31	20 - Ground	When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to TM-14.)	Battery voltage
			When overrun clutch solenoid valve dose not operate. (When overrun clutch engaged. Refer to TM-14.)	0V

OK or NG

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

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

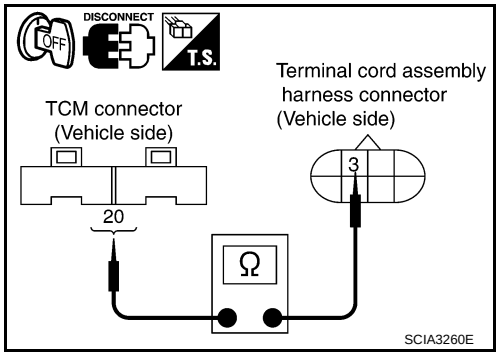
OK >> GO TO 5.
NG >> GO TO 3.

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	E101	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.

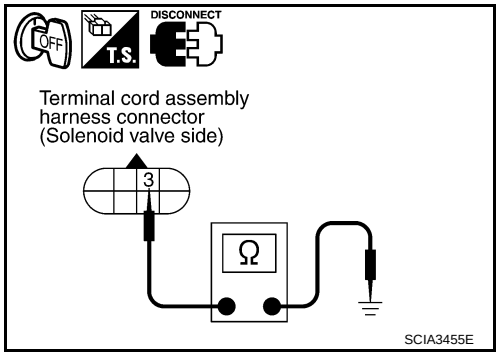
OK or NG

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 TM-93, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to TM-119, "Reference Value".
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

INFOID:0000000001694385

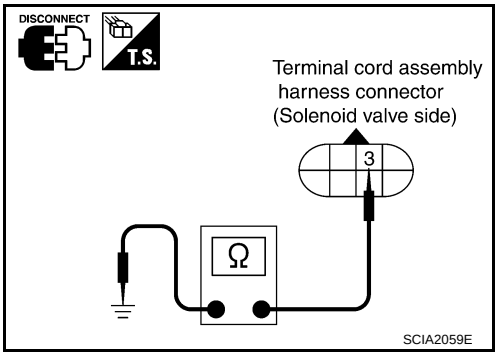
OVERRUN CLUTCH SOLENOID VALVE

- For removal, refer to TM-191, "Control Valve Assembly and Accumulators".

Resistance Check

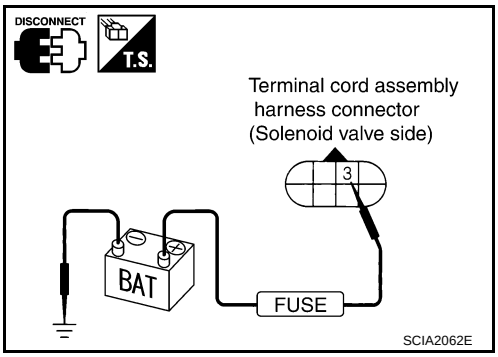
• Check resistance between terminal and ground.

Solenoid valve	Terminal		Resistance (Approx.)
Overrun clutch solenoid valve	3	Ground	20 - 30Ω



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

Description

INFOID:0000000001694386

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-III Reference Value in Data Monitor Mode

INFOID:0000000001694387

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

INFOID:0000000001694388

- This is not an OBD self-diagnostic item.
- Diagnostic trouble code “VHCL SPEED SEN-MTR” with CONSULT-III or 2nd judgement flicker without CONSULT-III is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

INFOID:0000000001694389

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

DTC Confirmation Procedure

INFOID:0000000001694390

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-III

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 TM-97, "Diagnosis Procedure".

WITHOUT CONSULT-III

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 TM-38, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-97, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001694392

1.CHECK INPUT SIGNAL

With CONSULT-III

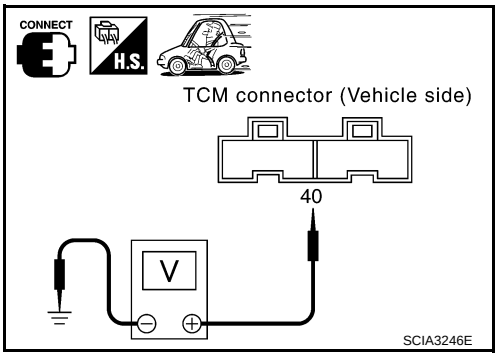
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-III.
3. Read out the value of “VHCL/S SE-MTR” while driving. Check the value changes according to driving speed.

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

Without CONSULT-III

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 0V and more than 4.5V



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEM

Check the following items:
- Combination meter.
- 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 TM-97, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 4.

4. CHECK TCM

1. Check TCM input/output signal. Refer to TM-119, "Reference Value".
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)

Description

INFOID:0000000001694393

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

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000001694394

Remarks: Specification data are reference values.

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

On Board Diagnosis Logic

INFOID:0000000001694395

- This is not an OBD self-diagnostic item.
- Diagnostic trouble code “BATT/FLUID TEMP SEN” with CONSULT-III or 8th judgement flicker without CONSULT-III is detected when TCM receives an excessively low or high voltage from the sensor.

Possible Cause

INFOID:0000000001694396

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

DTC Confirmation Procedure

INFOID:0000000001694397

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-III

1. Start engine.
2. Select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 TM-99, "Diagnosis Procedure".

WITHOUT CONSULT-III

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 TM-38, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-99, "Diagnosis Procedure".

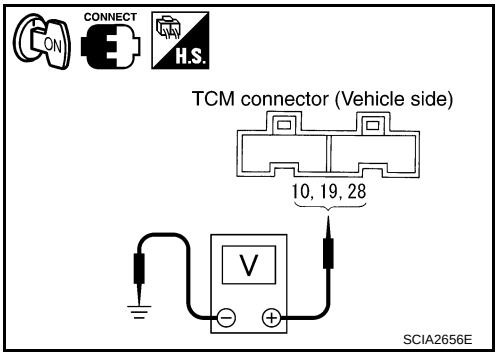
Diagnosis Procedure

INFOID:0000000001694399

1.CHECK TCM POWER SOURCE

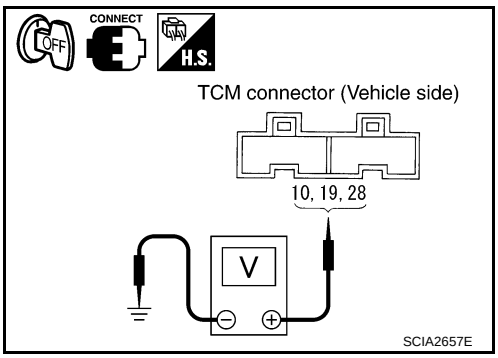
1. Turn ignition switch ON. (Do not start engine.)

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	0V
		19	0V
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.

OK or NG

OK >> GO TO 9.
NG >> Repair or replace damaged parts.

3. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR

With CONSULT-III

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

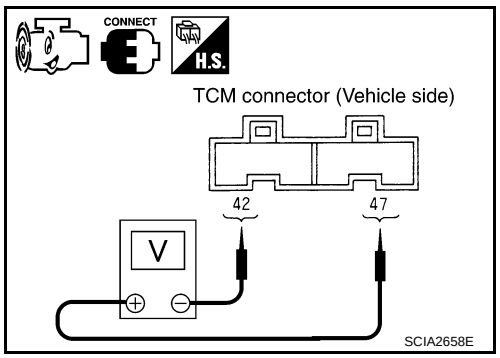
Item name	Condition	Display value
FLUID TEMP SE	When A/T fluid temperature is 20°C (68°F).	1.5V
	When A/T fluid temperature is 80°C (176°F).	0.5V

Without CONSULT-III

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).	1.5V
			When A/T fluid temperature is 80°C (176°F).	0.5V



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.

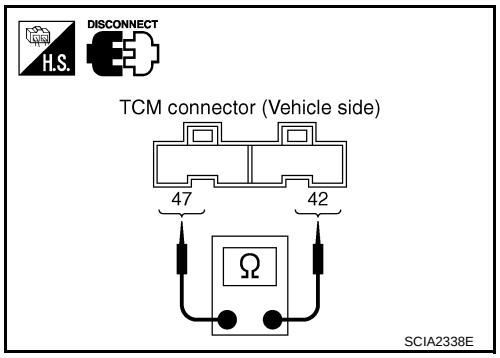
OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

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



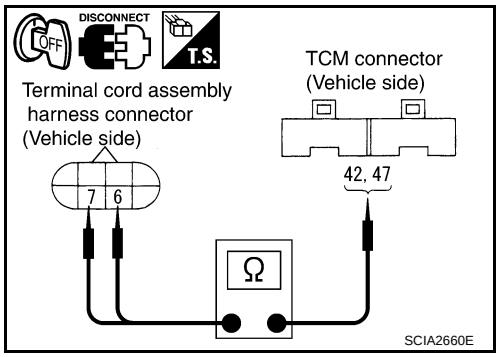
OK or NG

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

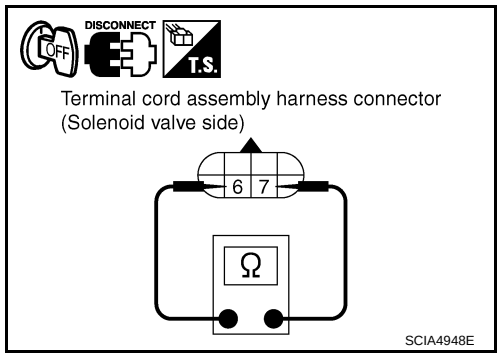
OK >> GO TO 7.

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.

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



4. Reinstall any part removed.

OK or NG

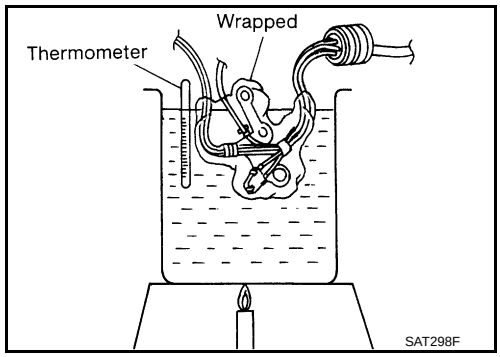
OK >> GO TO 8.
NG >> Repair or replace damaged parts.

8. DETECT MALFUNCTIONING ITEM

1. Remove oil pan. Refer to TM-191, "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.

Temperature [°C (°F)]	Resistance (Approx.)
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 TM-99, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 10.

10. CHECK TCM

1. Check TCM input/output signal. Refer to TM-119, "Reference Value".
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.

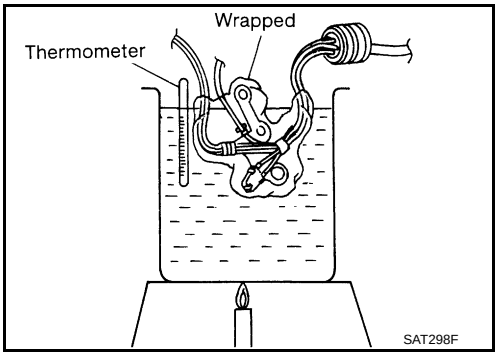
Component Inspection

INFOID:0000000001694400

A/T FLUID TEMPERATURE SENSOR

- Remove oil pan. Refer to TM-191, "Control Valve Assembly and Accumulators".
- Check resistance between terminal cord assembly harness connector terminals while changing temperature as shown.

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



DTC TURBINE REVOLUTION SENSOR

Description

INFOID:0000000001694401

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-III Reference Value in Data Monitor Mode

INFOID:0000000001694402

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

INFOID:0000000001694403

- This is not an OBD self-diagnostic item.
- Diagnostic trouble code “TURBINE SENSOR” with CONSULT-III or 10th judgement flicker without CONSULT-III is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

INFOID:0000000001694404

- Harness or connector
  (The sensor circuit is open or shorted.)
- Turbine revolution sensor (power train revolution sensor)

DTC Confirmation Procedure

INFOID:0000000001694405

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-III

1. Start engine.
2. Select “DATA MONITOR” mode for “A/T” with CONSULT-III.
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 TM-104, "Diagnosis Procedure".

WITHOUT CONSULT-III

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 TM-38, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-104, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001694407

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-III.
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.

2. CHECK TURBINE REVOLUTION SENSOR (POWER TRAIN REVOLUTION SENSOR)

With CONSULT-II

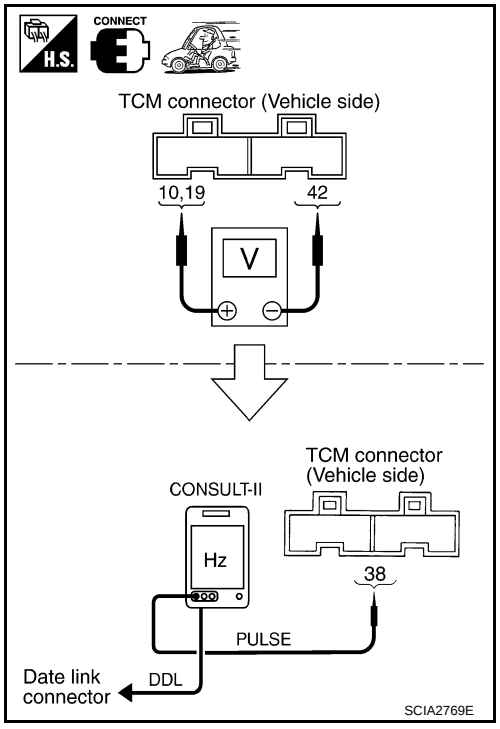
1. Start engine.
2. Check power supply to turbine revolution sensor (power train revolution sensor) by voltage between TCM connector terminals.

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-III 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

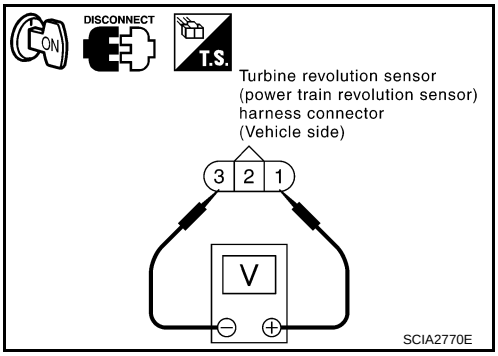
OK >> GO TO 8.
NG >> GO TO 3.

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.

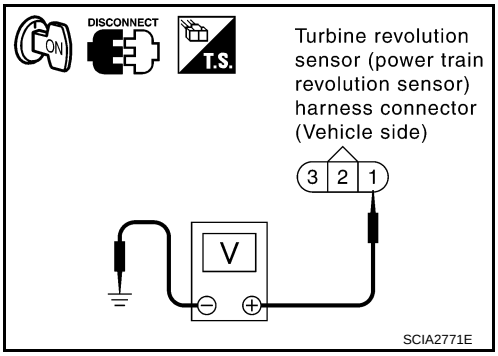
4. Check voltage between turbine revolution sensor (power train revolution sensor) harness connector terminals.

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.

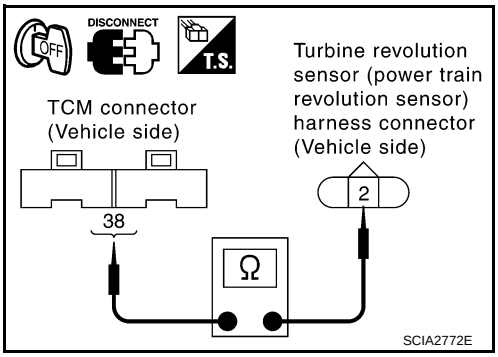
OK or NG

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.

5. CHECK TCM

1. Check TCM input/output signal. Refer to TM-119, "Reference Value".
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

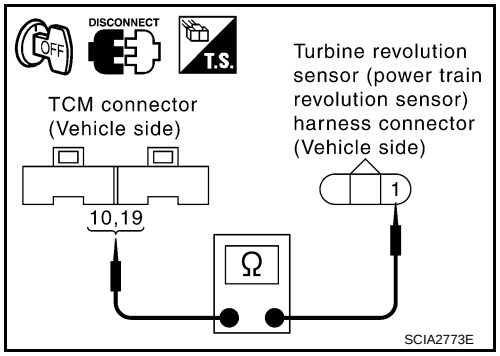
OK or NG

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.



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	

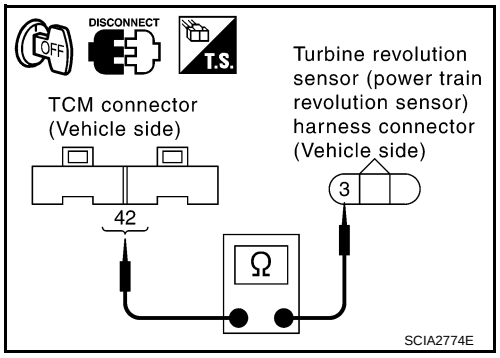
4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

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.

8. CHECK DTC

Perform TM-104, "DTC Confirmation Procedure".

OK or NG

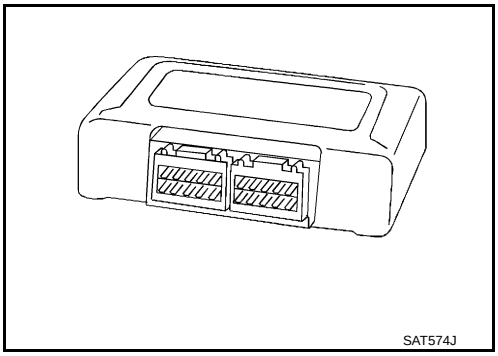
OK >> **INSPECTION END**
NG >> GO TO 5.

CONTROL UNIT (RAM), CONTROL UNIT (ROM)

Description

INFOID:0000000001694408

The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls the A/T.



On Board Diagnosis Logic

INFOID:0000000001694409

- This is not an OBD self-diagnostic item.
- Diagnostic trouble code “CONTROL UNIT (RAM)”, “CONTROL UNIT (ROM)” with CONSULT-III is detected when TCM memory (RAM) or (ROM) is malfunctioning.

Possible Cause

INFOID:0000000001694410

TCM.

DTC Confirmation Procedure

INFOID:0000000001694411

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-III
1. Turn ignition switch ON and select “DATA MONITOR” mode for A/T with CONSULT-III.
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 TM-108, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001694412

1.CHECK DTC

With CONSULT-III
1. Turn ignition switch ON and select “SELF-DIAG RESULTS” mode for A/T with CONSULT-III.
2. Touch “ERASE”.
3. Perform TM-108, "DTC Confirmation Procedure".

Is the “CONTROL UNIT (RAM)” or “CONTROL UNIT (ROM)” displayed again?

YES >> Replace TCM. Refer to TM-189, "Removal and Installation".
NO >> **INSPECTION END**

MAIN POWER SUPPLY AND GROUND CIRCUIT

Description

INFOID:0000000001694413

When the power supply to the TCM is cut OFF, for example because the battery is removed, and the self-diagnosis memory function stops, malfunction is detected.

On Board Diagnosis Logic

INFOID:0000000001694414

- This is not an OBD self-diagnostic item.
- Diagnostic trouble code “INITIAL START” with CONSULT-III is detected when TCM dose not receive the voltage signal from the battery power supply.
- This is not a malfunction message. (Whenever shutting OFF a power supply to the TCM, this message appears on the screen.)

Possible Cause

INFOID:0000000001694415

Harness or connector
(Battery or ignition switch and TCM circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000001694416

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-III

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “A/T” with CONSULT-III.
3. Touch “START”.
4. Wait for at least 2 consecutive seconds.
5. If DTC is detected, go to TM-109, "Diagnosis Procedure".

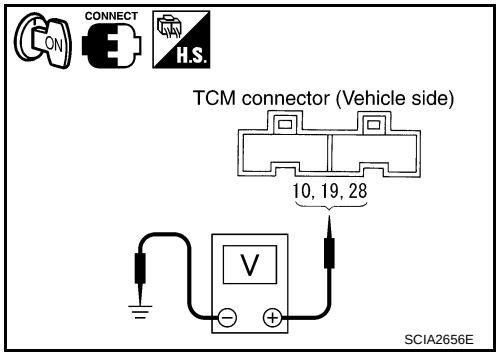
Diagnosis Procedure

INFOID:0000000001694418

1.CHECK TCM POWER SOURCE

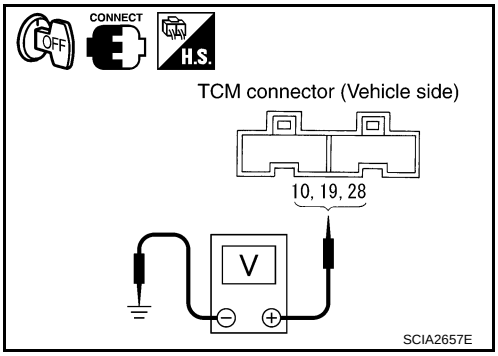
1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground.

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	0V
		19	0V
Power supply (Memory back-up)	E32	28	Battery voltage

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEM

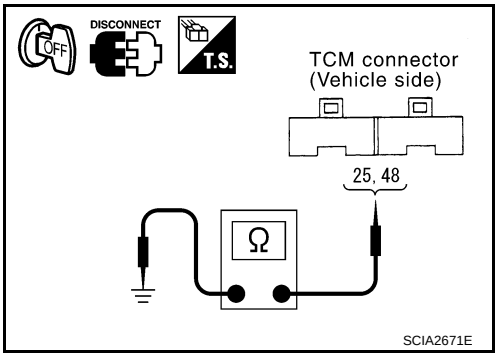
Check the following items:
- Harness for short or open between ignition switch and TCM terminals 10, 19
- Harness for short or open between battery and TCM terminal 28
- 10A fuse (No.13, located in the fuse block) and 10A fuse (No. 49, located in the IPDM E/R)
- Ignition switch.

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.

4. CHECK DTC

Perform TM-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 TM-119, "Reference Value".
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

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000001694273

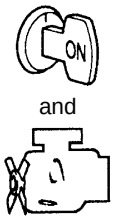
Remarks: Specification data are reference values.

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 Terminal and Reference Value

INFOID:0000000001694274

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.	0V
27	G	PNP switch “2” position		When setting selector lever to “2” position.	Battery voltage
				When setting selector lever to other positions.	0V
34	LG	PNP switch “D” position		When setting selector lever to “D” position.	Battery voltage
				When setting selector lever to other positions.	0V
35	SB	PNP switch “R” position		When setting selector lever to “R” position.	Battery voltage
				When setting selector lever to other positions.	0V
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.	0V

Diagnosis Procedure

INFOID:0000000001694275

1. CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TM-35, "CONSULT-III Function (TRANSMISSION)".

Is a malfunction in the CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to TM-43.
NO (With CONSULT-III) >>GO TO 2.
NO (Without CONSULT-III) >>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-III.
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

OK or NG

OK >> GO TO 4.
NG >> Check PNP switch circuit. Refer to TM-44.

3.CHECK PNP SWITCH CIRCUIT

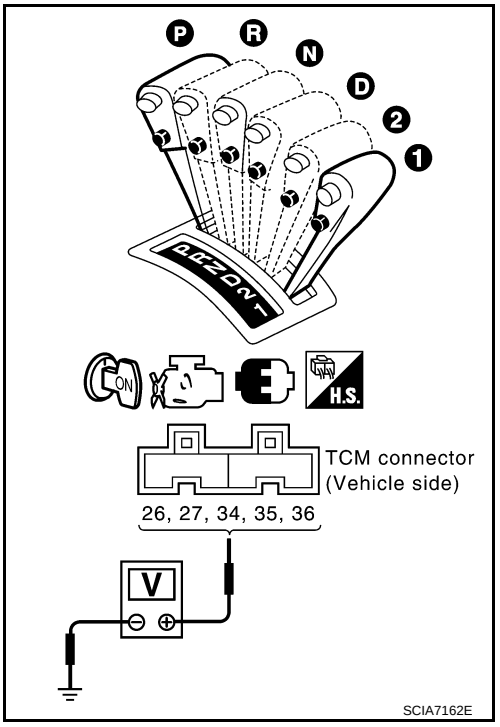
Without CONSULT-II

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.

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

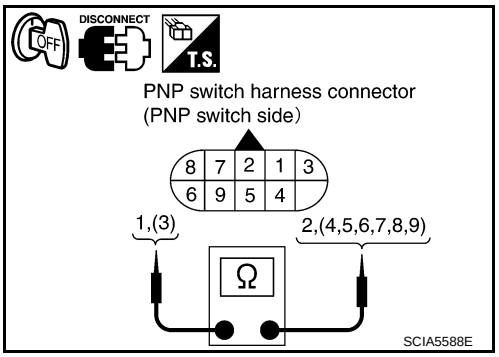


OK or NG

OK >> GO TO 4.
NG >> Check PNP switch circuit. Refer to TM-44.

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 TM-204, "Adjustment of A/T Position".
NG >> Repair or replace PNP switch. Refer to TM-195, "Park/Neutral Position (PNP) Switch".

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.
- Ignition switch.

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-III.
3. Read out "OVERDRIVE SW". Check the signal of overdrive control switch is indicated properly.

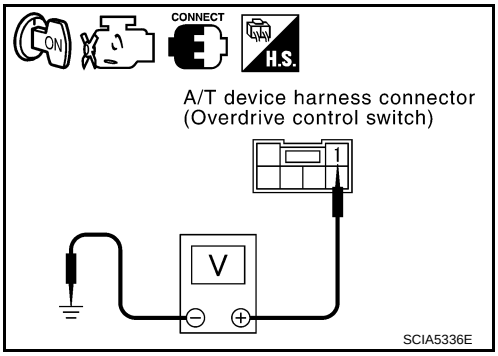
Item name	Overdrive control switch Condition	Display value
OVERDRIVE SW	Depressed	ON
	Released	OFF

Without CONSULT-II

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

2. Check voltage between A/T device harness connector terminal and ground.

Item	Connector	Terminal	Overdrive control switch Condition	Judgement standard (Approx.)
A/T device harness connector (Overdrive control switch)	M38	1 - Ground	Released	Battery voltage
			Depressed	0V



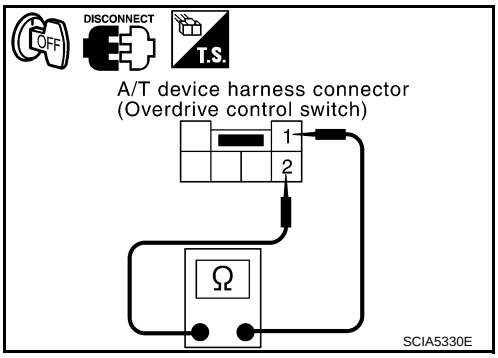
OK or NG

OK >> GO TO 10.
NG >> GO TO 8.

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.

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.

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-III.
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.

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-286, "Description" or EC-290, "Description".

11. PERFORM SELF-DIAGNOSIS

Without CONSULT-III

Perform self-diagnosis. Refer to TM-38, "Diagnosis Procedure without CONSULT-III".

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 TM-38, "Diagnosis Procedure without CONSULT-III".

12. CHECK TCM

1. Check TCM input/output signal. Refer to TM-119, "Reference Value".
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.

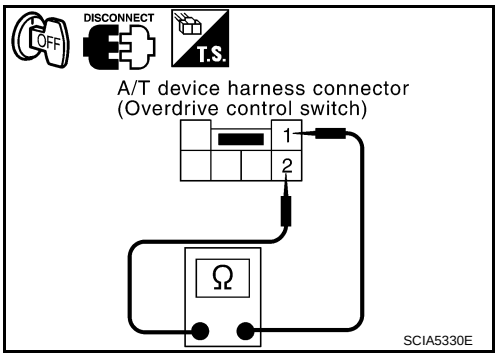
Component Inspection

INFOID:0000000001694276

OVERDRIVE CONTROL SWITCH

- Check continuity between A/T device harness connector terminals.

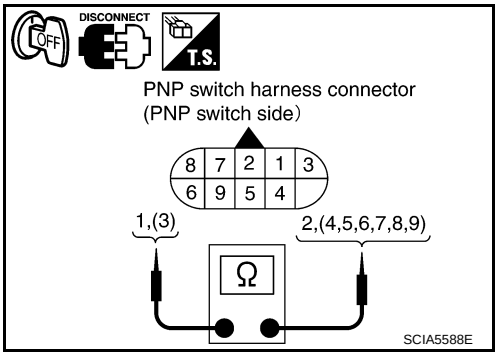
Item	Connector	Terminal	Overdrive control switch condition	Continuity
A/T device harness connector (Overdrive control switch)	M38	1 - 2	Released	No
			Depressed	Yes



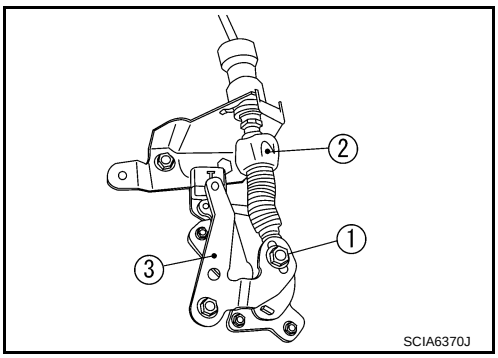
PNP SWITCH

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	



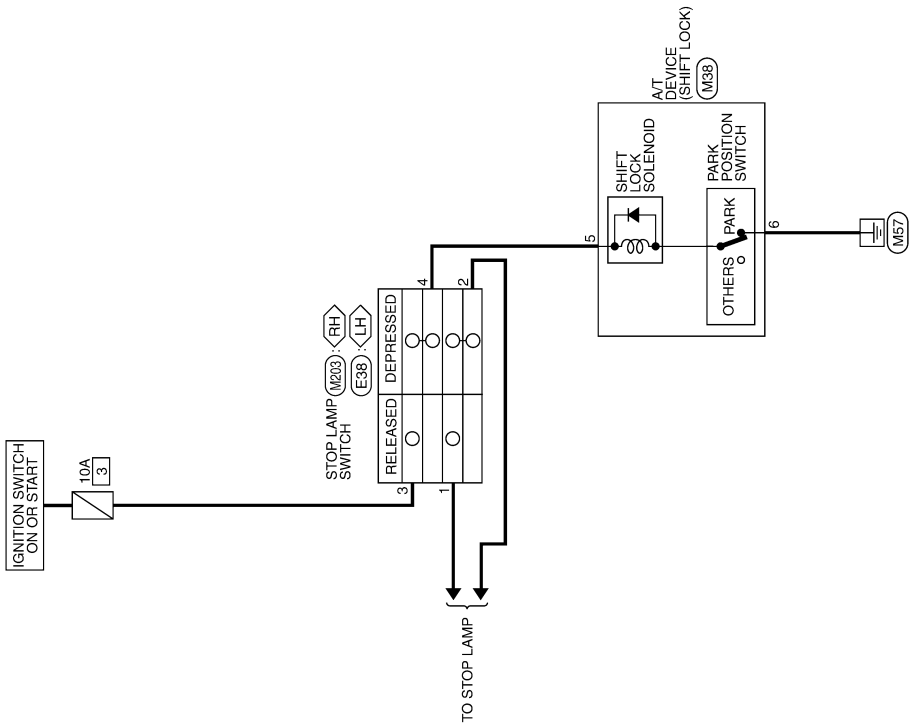
2. If NG, check again with control cable (2) disconnected from manual shaft of A/T assembly. Refer to step 1.
   (1): Lock nut
   (3): Manual shaft
3. If OK on step 2, adjust control cable (2). Refer to TM-204, "Adjustment of A/T Position".
4. If NG on step 2, remove PNP switch from A/T assembly and check continuity of PNP switch terminals. Refer to step 1.
5. If OK on step 4, adjust PNP switch. Refer to TM-195, "Park/Neutral Position (PNP) Switch".
6. If NG on step 4, replace PNP switch. Refer to TM-195, "Park/Neutral Position (PNP) Switch".



A/T SHIFT LOCK SYSTEM

Wiring Diagram - A/T Shift Lock System -

INFOID:0000000001696292



A/T SHIFT LOCK SYSTEM

ALDWA0058GE

Terminals And Reference Values

INFOID:0000000001696359

SHIFT LOCK CONTROL UNIT INSPECTION TABLE

Data are reference values.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	VOLTAGE (Approx.)
1	P	O/D switch	Ignition switch: “ON”	Battery voltage
			Ignition switch: “OFF”	0V
2	B	Ground	Always	0V
3	L	Illumination	Parking lamps: “ON”	Battery voltage
			Parking lamps: “OFF”	0V
4	B	Ground	Always	0V
5	LG	Shift lock solenoid	When ignition switch is "ON", brake pedal is depressed and selector lever is set in "P" position.	Battery voltage
			Except above.	0V
6	B	Ground	Always	0V

Diagnosis Procedure

INFOID:0000000001728307

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 TM-206, "Removal and Installation" .

2. CHECK A/T POSITION

Check A/T position. Refer to TM-204, "Checking of A/T Position" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to TM-204, "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

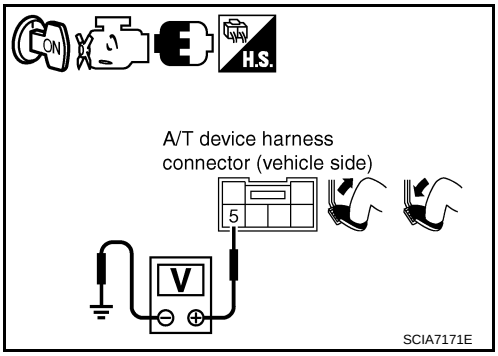
OK or NG

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

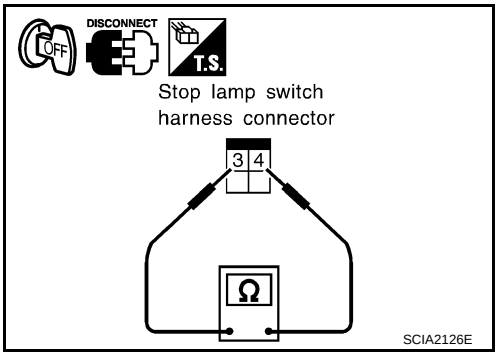
Brake pedal released: 0V

OK or NG

OK >> GO TO 7.
NG >> GO TO 5.

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, "Inspection and Adjustment" .

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.

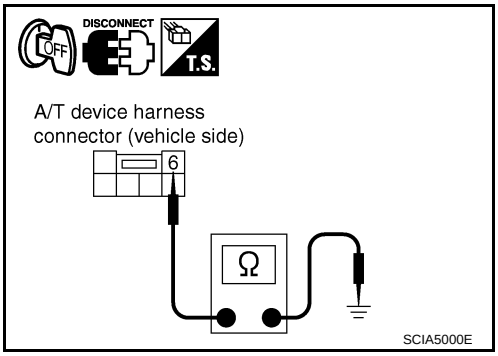
- Harness for short or open between ignition switch and stop lamp switch harness connector
- Harness for short or open between stop lamp switch harness connector and A/T device harness connector
- 10A fuse [No. 3, located in the fuse block (J/B)]
- Ignition switch.

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.

ECU DIAGNOSIS

TCM

Reference Value

INFOID:0000000001694441

REFERENCE VALUES

NOTICE:

1. The CONSULT-III 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-III display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.
2. Shift schedule (which implies gear position) displayed on CONSULT-III and that indicated in Service Manual may differ slightly. This occurs because of the following reasons:

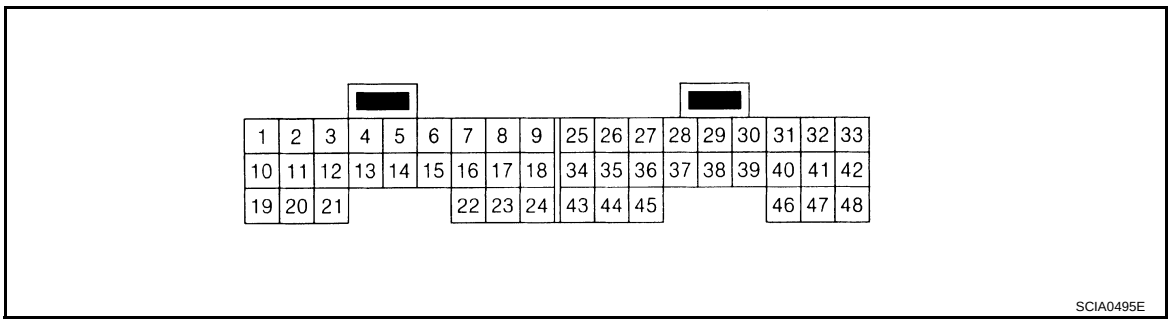
- Actual shift schedule has more or less tolerance or allowance,
- Shift schedule indicated in Service Manual refers to the point where shifts start, and
- Gear position displayed on CONSULT-III indicates the point where shifts are completed.

3. Shift solenoid valve “A” or “B” is displayed on CONSULT-III 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).	1.5V
	When A/T fluid temperature is 80°C (176°F).	0.5V
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
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
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

Item name	Condition	Display value (Approx.)
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
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
OVERRUN/C S/V	When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to TM-14.)	ON
	When overrun clutch solenoid valve does not operate. (When overrun clutch engaged. Refer to TM-14.)	OFF
BRAKE SW	Depressed brake pedal.	ON
	Released brake pedal.	OFF
GEAR	During driving	1, 2, 3, 4
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
VEHICLE SPEED	During driving	Approximately matches the speedometer reading.
LINE PRES DTY	Line pressure low ⇔ Line pressure high	0% ⇔ 94%
TCC S/V DUTY	Lock-up OFF ⇔ Lock-up ON	4% ⇔ 94%

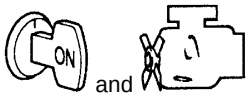
TCM CONNECTOR TERMINAL LAYOUT

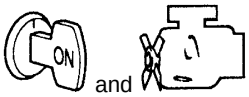
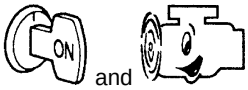
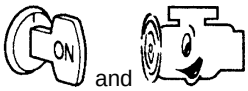


TERMINALS AND REFERENCE VALUES FOR TCM

Data are reference valuesand are 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 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	P	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	4 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
3	GR	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	0V
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”.		0V
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”.)	0V
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”.)	0V
19	R	Power supply	When turning ignition switch to “ON”.		Battery voltage
			When turning ignition switch to “OFF”.		0V
20	V	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to TM-14.)	Battery voltage
				When overrun clutch solenoid valve does not operate. (When overrun clutch engaged. Refer to TM-14.)	0V
25	B	Ground	Always		0V
26	Y	PNP switch “1” position		When setting selector lever to “1” position.	Battery voltage
				When setting selector lever to other positions.	0V
27	G	PNP switch “2” position		When setting selector lever to “2” position.	Battery voltage
				When setting selector lever to other positions.	0V
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)	—		—

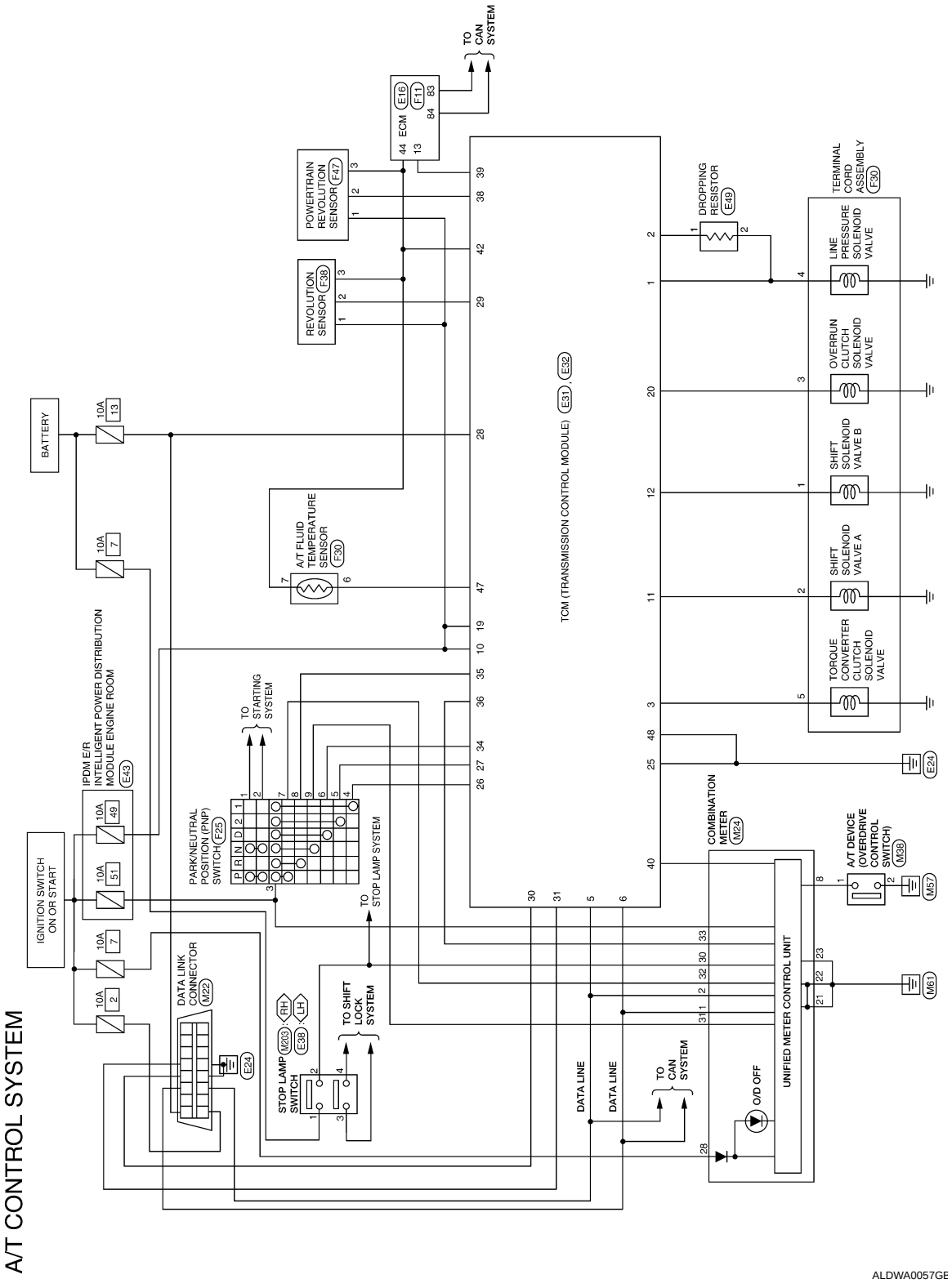
Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
34	LG	PNP switch “D” position		When setting selector lever to “D” position.	Battery voltage
				When setting selector lever to other positions.	0V
35	SB	PNP switch “R” position		When setting selector lever to “R” position.	Battery voltage
				When setting selector lever to other positions.	0V
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.	0V
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-328.	
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 0V and more than 4.5V
42	B	Sensor ground	Always		0V
47	BR	A/T fluid temperature sensor		When A/T fluid temperature is 20°C (68°F).	1.5V
				When A/T fluid temperature is 80°C (176°F).	0.5V
48	B	Ground	Always		0V

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

[*2]: These terminals are connected to the ECM.

Wiring Diagram - A/T CONTROL SYSTEM -

INFOID:0000000001694443



Fail-Safe

INFOID:0000000001694442

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 TM-10, "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 Sensor Signal and Throttle Position Sensor 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	$D_1 \Leftrightarrow D_2 \Leftrightarrow D_3 \Leftrightarrow D_4$
“2”	“2” position and other position signals (Except “1” position)	$2_1 \Leftrightarrow 2_2 \Leftrightarrow 2_3$
	“2” position and “1” position signals	$2_1 \Leftrightarrow 2_2$
“1”	“1” position and other position signals (Except “2” position)	$1_1 \Leftrightarrow 1_2 \Leftrightarrow 1_3$
	“1” position and “2” position signals	$1_1 \Leftrightarrow 1_2$

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	–	●→×		●→×	–		–	–	
	×	●	2nd	–	●→×		×	–		–	–	
	×	×	3rd	–	x		×	–		–	–	
“1” position	●	●	1st	–	●→×		●→×	–		–	–	
	×	●	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.

DTC Inspection Priority Chart

INFOID:0000000001694444

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 TM-43.

Priority	Detected items
1	CAN communication line
2	Except above

DTC Index

INFOID:0000000001696263

NOTE:
If DTC "CAN COMM CIRCUIT" is displayed with other DTCs, first perform the trouble diagnosis for DTC "CAN COMM CIRCUIT". Refer to TM-43.

DTC CONSULT-III or GST*1	Items (CONSULT-III screen terms)	Reference page
P0705	PNP SW/CIRC	TM-44
P0710	ATF TEMP SEN/CIRC	TM-48
P0720	VHCL SPEED SEN-A/T*3	TM-52
P0725	ENGINE SPEED SIG	TM-56
P0731	A/T 1ST GR FNCTN	TM-59
P0732	A/T 2ND GR FNCTN	TM-62
P0733	A/T 3RD GR FNCTN	TM-65
P0734	A/T 4TH GR FNCTN	TM-68
P0740	T/C CLUTCH SOL/V	TM-73
P0744	A/T TCC S/V FNCTN	TM-76
P0745	LINE PRESSURE S/V	TM-81
P0750	SHIFT SOLENOID/V A*2	TM-85
P0755	SHIFT SOLENOID/V B*2	TM-89
P1760	OVERRUN CLUTCH S/V	TM-93
U1000	CAN COMM CIRCUIT	TM-43
—	BATT/FLUID TEMP SEN	TM-99
—	CONTROL UNIT (RAM)	TM-108
—	CONTROL UNIT (ROM)	TM-108
—	TURBINE SENSOR	TM-104
—	VHCL SPEED SEN-MTR	TM-97

*1: This number is prescribed by ISO 15031-5.

*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.

DTC Alphabetical Index

INFOID:0000000001696262

NOTE:
If DTC "CAN COMM CIRCUIT" is displayed with other DTCs, first perform the trouble diagnosis for DTC "CAN COMM CIRCUIT". Refer to TM-43.

Items (CONSULT-II screen terms)	DTC	Reference page
	CONSULT-II or GST*1	
A/T 1ST GR FNCTN	P0731	TM-59
A/T 2ND GR FNCTN	P0732	TM-62
A/T 3RD GR FNCTN	P0733	TM-65
A/T 4TH GR FNCTN	P0734	TM-68
A/T TCC S/V FNCTN	P0744	TM-76
ATF TEMP SEN/CIRC	P0710	TM-48
BATT/FLUID TEMP SEN	—	TM-99
CAN COMM CIRCUIT	U1000	TM-43
CONTROL UNIT (RAM)	—	TM-108
CONTROL UNIT (ROM)	—	TM-108
ENGINE SPEED SIG	P0725	TM-56
LINE PRESSURE S/V	P0745	TM-81
OVERRUN CLUTCH S/V	P1760	TM-93
PNP SW/CIRC	P0705	TM-44
SHIFT SOLENOID/V A*2	P0750	TM-85
SHIFT SOLENOID/V B*2	P0755	TM-89
T/C CLUTCH SOL/V	P0740	TM-73
TURBINE SENSOR	—	TM-104
VHCL SPEED SEN-A/T*3	P0720	TM-52
VHCL SPEED SEN-MTR	—	TM-97

*1: This number is prescribed by ISO 15031-5.

*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.

SYMPTOM DIAGNOSIS

SYSTEM SYMPTOM

Symptom Chart

INFOID:0000000001694440

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-297
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	TM-52 and TM-97
			3. Engine speed signal	TM-56
			4. A/T fluid temperature sensor	TM-48
			5. Line pressure test	TM-178
			6. Torque converter clutch solenoid valve	TM-73
			7. Control valve assembly	TM-191
		OFF vehicle	8. Torque converter	TM-222
	Torque converter clutch piston slip.	ON vehicle	1. A/T fluid level	TM-171
			2. Accelerator pedal position sensor	EC-297
			3. Line pressure test	TM-178
			4. Torque converter clutch solenoid valve	TM-73
			5. Line pressure solenoid valve	TM-81
			6. Control valve assembly	TM-191
		OFF vehicle	7. Torque converter	TM-222
	Lock-up point is extremely high or low.	ON vehicle	1. Accelerator pedal position sensor	EC-297
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	TM-52 and TM-97
			3. Torque converter clutch solenoid valve	TM-73
			4. Control valve assembly	TM-191

Items	Symptom	Condition	Diagnostic item	Reference page
Shift Shock	Sharp shock in shifting from “N” to “D” position.	ON vehicle	1. Engine idling speed	EC-26
			2. Accelerator pedal position sensor	EC-297
			3. Line pressure test	TM-178
			4. A/T fluid temperature sensor	TM-48
			5. Engine speed signal	TM-56
			6. Line pressure solenoid valve	TM-81
			7. Control valve assembly	TM-191
			8. Accumulator N-D	TM-191
		OFF vehicle	9. Forward clutch	TM-267
	Too sharp a shock in changing from D_1 to D_2.	ON vehicle	1. Accelerator pedal position sensor	EC-297
			2. Line pressure test	TM-178
			3. Accumulator servo release	TM-191
			4. Control valve assembly	TM-191
			5. A/T fluid temperature sensor	TM-48
		OFF vehicle	6. Brake band	TM-287
	Too sharp a shock in changing from D_2 to D_3.	ON vehicle	1. Accelerator pedal position sensor	EC-297
			2. Line pressure test	TM-178
			3. Control valve assembly	TM-191
		OFF vehicle	4. High clutch	TM-262
			5. Brake band	TM-287
	Too sharp a shock in changing from D_3 to D_4.	ON vehicle	1. Accelerator pedal position sensor	EC-297
			2. Line pressure test	TM-178
			3. Control valve assembly	TM-191
		OFF vehicle	4. Brake band	TM-287
			5. Overrun clutch	TM-267
			6. Forward one-way clutch	TM-278
	Gear change shock during deceleration by releasing accelerator pedal.	ON vehicle	1. Accelerator pedal position sensor	EC-297
			2. Line pressure test	TM-178
			3. Overrun clutch solenoid valve	TM-93
			4. Control valve assembly	TM-191
	Large shock in changing from 1_2 to 1_1 in “1” position.	ON vehicle	1. Control valve assembly	TM-191
		OFF vehicle	2. Low & reverse brake	TM-273

Items	Symptom	Condition	Diagnostic item	Reference page
Improper Shift Timing	Too high a gear change point from D_1 to D_2, from D_2 to D_3, from D_3 to D_4.	ON vehicle	1. Accelerator pedal position sensor	EC-297
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	TM-52 and TM-97
			3. Shift solenoid valve A	TM-85
			4. Shift solenoid valve B	TM-89
	Gear change directly from D_1 to D_3 occurs.	ON vehicle	1. A/T fluid level	TM-171
			2. Accumulator servo release	TM-191
		OFF vehicle	3. Brake band	TM-287
	Too high a change point from D_4 to D_3, from D_3 to D_2, from D_2 to D_1.	ON vehicle	1. Accelerator pedal position sensor	EC-297
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	TM-52 and TM-97
	Kickdown does not operate when depressing accelerator pedal in D_4 within kickdown vehicle speed.	ON vehicle	1. Accelerator pedal position sensor	EC-297
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	TM-52 and TM-97
			3. Shift solenoid valve A	TM-85
			4. Shift solenoid valve B	TM-89
	Kickdown operates or engine overruns when depressing accelerator pedal in D_4 beyond kickdown vehicle speed limit.	ON vehicle	1. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	TM-52 and TM-97
			2. Accelerator pedal position sensor	EC-297
			3. Shift solenoid valve A	TM-85
			4. Shift solenoid valve B	TM-89
	Gear change from 2_2 to 2_3 in “2” position.	ON vehicle	1. PNP switch adjustment	TM-195
			2. Control cable adjustment	TM-204
	Gear change from 1_1 to 1_2 in “1” position.	ON vehicle	1. PNP switch adjustment	TM-195
			2. Control cable adjustment	TM-204

Items	Symptom	Condition	Diagnostic item	Reference page
No Down Shift	Failure to change gear from D_4 to D_3.	ON vehicle	1. A/T fluid level	TM-171
			2. Accelerator pedal position sensor	EC-297
			3. Overrun clutch solenoid valve	TM-93
			4. Shift solenoid valve A	TM-85
			5. Line pressure solenoid valve	TM-81
			6. Control valve assembly	TM-191
		OFF vehicle	7. Brake band	TM-287
			8. Overrun clutch	TM-267
	Failure to change gear from D_3 to D_2 or from D_4 to D_2.	ON vehicle	1. A/T fluid level	TM-171
			2. Accelerator pedal position sensor	EC-297
			3. Shift solenoid valve A	TM-85
			4. Shift solenoid valve B	TM-89
			5. Control valve assembly	TM-191
		OFF vehicle	6. High clutch	TM-262
			7. Brake band	TM-287
	Failure to change gear from D_2 to D_1 or from D_3 to D_1.	ON vehicle	1. A/T fluid level	TM-171
			2. Accelerator pedal position sensor	EC-297
			3. Shift solenoid valve A	TM-85
			4. Shift solenoid valve B	TM-89
			5. Control valve assembly	TM-191
		OFF vehicle	6. Low one-way clutch	TM-222
			7. High clutch	TM-262
			8. Brake band	TM-287
	Failure to change from D_3 to 2_2 when shifting selector lever into “2” position. TM-155	ON vehicle	1. Accelerator pedal position sensor	EC-297
			2. Shift solenoid valve B	TM-89
			3. Control valve assembly	TM-191
			4. Control cable adjustment	TM-204
		OFF vehicle	5. Brake band	TM-287
No Down Shift	Does not change from 1_2 to 1_1 in 1st position.	ON vehicle	1. PNP switch adjustment	TM-195
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	TM-52 and TM-97
			3. Shift solenoid valve A	TM-85
			4. Control valve assembly	TM-191
			5. Overrun clutch solenoid valve	TM-93
		OFF vehicle	6. Overrun clutch	TM-267
			7. Low & reverse brake	TM-273

Items	Symptom	Condition	Diagnostic item	Reference page
No Up Shift	Failure to change gear from D_1 to D_2.	ON vehicle	1. Control cable adjustment	TM-204
			2. Shift solenoid valve A	TM-85
			3. Control valve assembly	TM-191
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	TM-52 and TM-97
			5. Accelerator pedal position sensor	EC-297
		OFF vehicle	6. Brake band	TM-287
	Failure to change gear from D_2 to D_3.	ON vehicle	1. Control cable adjustment	TM-204
			2. Shift solenoid valve B	TM-89
			3. Control valve assembly	TM-191
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	TM-52 and TM-97
			5. Accelerator pedal position sensor	EC-297
		OFF vehicle	6. High clutch	TM-262
			7. Brake band	TM-287
	Failure to change gear from D_3 to D_4.	ON vehicle	1. PNP switch adjustment	TM-195
			2. Overdrive control switch	TM-111
			3. Control cable adjustment	TM-204
			4. Shift solenoid valve A	TM-85
			5. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	TM-52 and TM-97
			6. A/T fluid temperature sensor	TM-48
		OFF vehicle	7. Brake band	TM-287
No Up Shift	A/T does not shift to D_4 when driving with OD ON. (OD OFF indicator lamp is off.)	ON vehicle	1. Accelerator pedal position sensor	EC-297
			2. PNP switch adjustment	TM-195
			3. Overdrive control switch	TM-111
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	TM-52 and TM-97
			5. Shift solenoid valve A	TM-85
			6. Overrun clutch solenoid valve	TM-93
			7. Control valve assembly	TM-191
			8. A/T fluid temperature sensor	TM-48
			9. Line pressure solenoid valve	TM-81
		OFF vehicle	10. Brake band	TM-287
			11. Overrun clutch	TM-267

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	TM-204
			2. Stall test	TM-175
			3. Line pressure test	TM-178
			4. Line pressure solenoid valve	TM-81
			5. Control valve assembly	TM-191
		OFF vehicle	6. Reverse clutch	TM-258
			7. High clutch	TM-262
			8. Forward clutch	TM-267
			9. Overrun clutch	TM-267
			10. Low & reverse brake	TM-273
	Vehicle will not run in “D” and “2” positions (but runs in “1” and “R” positions).	ON vehicle	1. Control cable adjustment	TM-204
		OFF vehicle	2. Low one-way clutch	TM-222

Items	Symptom	Condition	Diagnostic item	Reference page
Slips/Will Not Engage	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	TM-171
			2. Stall test	TM-175
			3. Line pressure test	TM-178
			4. Line pressure solenoid valve	TM-81
			5. Control valve assembly	TM-191
			6. Accumulator N-D	TM-191
		OFF vehicle	7. Reverse clutch	TM-258
			8. High clutch	TM-262
			9. Forward clutch	TM-267
			10. Forward one-way clutch	TM-278
			11. Low one-way clutch	TM-222
	Clutches or brakes slip somewhat in starting.	ON vehicle	1. A/T fluid level	TM-171
			2. Control cable adjustment	TM-204
			3. Accelerator pedal position sensor	EC-297
			4. Line pressure test	TM-178
			5. Line pressure solenoid valve	TM-81
			6. Control valve assembly	TM-191
			7. Accumulator N-D	TM-191
		OFF vehicle	8. Forward clutch	TM-267
			9. Reverse clutch	TM-258
			10. Low & reverse brake	TM-273
			11. Oil pump	TM-240
			12. Torque converter	TM-222
	No creep at all. TM-142, TM-144	ON vehicle	1. A/T fluid level	TM-171
			2. Line pressure test	TM-178
			3. Control valve assembly	TM-191
		OFF vehicle	4. Forward clutch	TM-267
			5. Oil pump	TM-240
			6. Torque converter	TM-222
	Almost no shock or clutches slipping in change from D_1 to D_2.	ON vehicle	1. A/T fluid level	TM-171
			2. Accelerator pedal position sensor	EC-297
			3. Line pressure test	TM-178
			4. Accumulator servo release	TM-191
			5. Control valve assembly	TM-191
		OFF vehicle	6. Brake band	TM-287

Items	Symptom	Condition	Diagnostic item	Reference page
Slips/Will Not Engage	Almost no shock or slipping in changing from D_2 to D_3.	ON vehicle	1. A/T fluid level	TM-171
			2. Accelerator pedal position sensor	EC-297
			3. Line pressure test	TM-178
			4. Control valve assembly	TM-191
		OFF vehicle	5. High clutch	TM-262
			6. Forward clutch	TM-267
	Almost no shock or slipping in changing from D_3 to D_4.	ON vehicle	1. A/T fluid level	TM-171
			2. Accelerator pedal position sensor	EC-297
			3. Line pressure test	TM-178
			4. Control valve assembly	TM-191
		OFF vehicle	5. Brake band	TM-287
	Races extremely fast or slips in changing from D_4 to D_3 when depressing accelerator pedal.	ON vehicle	1. A/T fluid level	TM-171
			2. Accelerator pedal position sensor	EC-297
			3. Line pressure test	TM-178
			4. Line pressure solenoid valve	TM-81
			5. Shift solenoid valve A	TM-85
			6. Control valve assembly	TM-191
		OFF vehicle	7. Brake band	TM-287
			8. Forward clutch	TM-267
	Races extremely fast or slips in changing from D_4 to D_2 when depressing accelerator pedal.	ON vehicle	1. A/T fluid level	TM-171
			2. Accelerator pedal position sensor	EC-297
			3. Line pressure test	TM-178
			4. Line pressure solenoid valve	TM-81
			5. Shift solenoid valve A	TM-85
			6. Shift solenoid valve B	TM-89
			7. Control valve assembly	TM-191
		OFF vehicle	8. Brake band	TM-287
			9. Forward clutch	TM-267

Items	Symptom	Condition	Diagnostic item	Reference page
Slips/Will Not Engage	Races extremely fast or slips in changing from D_3 to D_2 when depressing accelerator pedal.	ON vehicle	1. A/T fluid level	TM-171
			2. Accelerator pedal position sensor	EC-297
			3. Line pressure test	TM-178
			4. Line pressure solenoid valve	TM-81
			5. Shift solenoid valve B	TM-89
			6. Control valve assembly	TM-191
		OFF vehicle	7. Brake band	TM-287
			8. High clutch	TM-262
	Races extremely fast or slips in changing from D_4 or D_3 to D_1 when depressing accelerator pedal.	ON vehicle	1. A/T fluid level	TM-171
			2. Accelerator pedal position sensor	EC-297
			3. Line pressure test	TM-178
			4. Line pressure solenoid valve	TM-81
			5. Shift solenoid valve A	TM-85
			6. Shift solenoid valve B	TM-89
			7. Control valve assembly	TM-191
		OFF vehicle	8. Forward clutch	TM-267
			9. Forward one-way clutch	TM-278
			10. Low one-way clutch	TM-222
	Vehicle will not run in any position.	ON vehicle	1. A/T fluid level	TM-171
			2. Control cable adjustment	TM-204
			3. Line pressure test	TM-178
			4. Line pressure solenoid valve	TM-81
		OFF vehicle	5. Oil pump	TM-240
			6. High clutch	TM-262
			7. Brake band	TM-287
			8. Low & reverse brake	TM-273
			9. Torque converter	TM-222
			10. Parking components	TM-213
Others	Engine cannot be started in “P” and “N” positions. TM-140	ON vehicle	1. Ignition switch and starter	STR-6
			2. Control cable adjustment	TM-204
			3. PNP switch adjustment	TM-195
	Engine starts in positions other than “P” and “N”.	ON vehicle	1. Control cable adjustment	TM-204
			2. PNP switch adjustment	TM-195

Items	Symptom	Condition	Diagnostic item	Reference page
Others	Transaxle noise in“ P” and “N” positions.	ON vehicle	1. A/T fluid level	TM-171
			2. Line pressure test	TM-178
			3. Accelerator pedal position sensor	EC-297
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	TM-52 and TM-97
		OFF vehicle	5. Oil pump	TM-240
			6. Torque converter	TM-222
	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	TM-204
		OFF vehicle	2. Parking components	TM-213
	Vehicle runs in “N” position. TM-141	ON vehicle	1. Control cable adjustment	TM-204
		OFF vehicle	2. Forward clutch	TM-267
			3. Reverse clutch	TM-258
			4. Overrun clutch	TM-267
	Vehicle braked when shifting into “R” position.	ON vehicle	1. A/T fluid level	TM-171
			2. Control cable adjustment	TM-204
			3. Line pressure test	TM-178
			4. Line pressure solenoid valve	TM-81
			5. Control valve assembly	TM-191
		OFF vehicle	6. High clutch	TM-262
			7. Brake band	TM-287
			8. Forward clutch	TM-267
			9. Overrun clutch	TM-267
	Excessive creep.	ON vehicle	1. Engine idling speed	EC-26
	Engine stops when shifting lever into “R”, “D”, “2” and “1” positions.	ON vehicle	1. Engine idling speed	EC-26
			2. A/T fluid level	TM-171
			3. Torque converter clutch solenoid valve	TM-73
			4. Control valve assembly	TM-191
		OFF vehicle	5. Torque converter	TM-222
	Vehicle braked by gear change from D_1 to D_2.	ON vehicle	1. A/T fluid level	TM-171
		OFF vehicle	2. Reverse clutch	TM-258
			3. Low & reverse brake	TM-273
			4. High clutch	TM-262
			5. Low one-way clutch	TM-222
	Vehicle braked by gear change from D_2 to D_3.	ON vehicle	1. A/T fluid level	TM-171
		OFF vehicle	2. Brake band	TM-287

Items	Symptom	Condition	Diagnostic item	Reference page
Others	Vehicle braked by gear change from D_3 to D_4.	ON vehicle	1. A/T fluid level	TM-171
		OFF vehicle	2. Overrun clutch	TM-267
			3. Forward one-way clutch	TM-278
			4. Reverse clutch	TM-258
	Maximum speed not attained. Poor acceleration.	ON vehicle	1. A/T fluid level	TM-171
			2. PNP switch adjustment	TM-195
			3. Overdrive control switch	TM-111
			4. Accelerator pedal position sensor	EC-297
			5. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	TM-52 and TM-97
			6. Shift solenoid valve A	TM-85
			7. Shift solenoid valve B	TM-89
			8. Control valve assembly	TM-191
		OFF vehicle	9. Reverse clutch	TM-258
			10. High clutch	TM-262
			11. Brake band	TM-287
			12. Low & reverse brake	TM-273
			13. Oil pump	TM-240
			14. Torque converter	TM-222
	Transaxle noise in “D”, “2”, “1” and “R” positions.	ON vehicle	1. A/T fluid level	TM-171
		OFF vehicle	2. Torque converter	TM-222
	Engine brake does not operate in “1” position.	ON vehicle	1. PNP switch adjustment	TM-195
			2. Control cable adjustment	TM-204
			3. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	TM-52 and TM-97
			4. Control valve assembly	TM-191
			5. Overrun clutch solenoid valve	TM-93
		OFF vehicle	6. Overrun clutch	TM-267
			7. Low & reverse brake	TM-273

Items	Symptom	Condition	Diagnostic item	Reference page
Others	Transaxle overheats.	ON vehicle	1. A/T fluid level	TM-171
			2. Engine idling speed	EC-26
			3. Accelerator pedal position sensor	EC-297
			4. Line pressure test	TM-178
			5. Line pressure solenoid valve	TM-81
			6. Control valve assembly	TM-191
		OFF vehicle	7. Oil pump	TM-240
			8. Reverse clutch	TM-258
			9. High clutch	TM-262
			10. Brake band	TM-287
			11. Forward clutch	TM-267
			12. Overrun clutch	TM-267
			13. Low & reverse brake	TM-273
			14. Torque converter	TM-222
	ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. A/T fluid level	TM-171
		OFF vehicle	2. Reverse clutch	TM-258
			3. High clutch	TM-262
			4. Brake band	TM-287
			5. Forward clutch	TM-267
			6. Overrun clutch	TM-267
			7. Low & reverse brake	TM-273
	Unusual smell at A/T fluid charging pipe.	ON vehicle	1. A/T fluid level	TM-171
		OFF vehicle	2. Torque converter	TM-222
			3. Oil pump	TM-240
			4. Reverse clutch	TM-258
			5. High clutch	TM-262
			6. Brake band	TM-287
			7. Forward clutch	TM-267
			8. Overrun clutch	TM-267
			9. Low & reverse brake	TM-273

OD OFF Indicator Lamp Does Not Come On

INFOID:0000000001696242

SYMPTOM:
OD OFF indicator lamp does not come on for about 2 seconds when turning ignition switch to ON.

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TM-35, "CONSULT-III Function (TRANSMISSION)" or TM-350, "Diagnosis Procedure without CONSULT-III".

Is a malfunction in CAN communication indicated in the results?

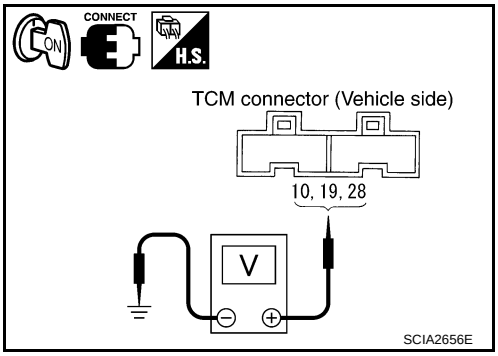
YES >> Check CAN communication line. Refer to TM-43, "Description" (type 1) or TM-391, "Description" (type 2).
NO >> GO TO 2.

2.CHECK TCM POWER SOURCE

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground.

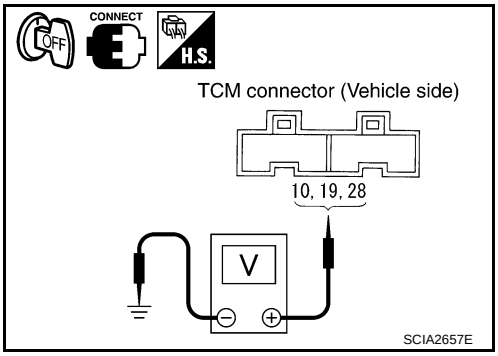
.

Item	Connector	Terminal	Judgement standard (Approx.)
TCM connector	E31	10	Battery voltage
		19	
	E32	28	



3. Turn ignition switch OFF.
4. Check voltage between TCM connector terminals and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
TCM connector	E31	10	0V
		19	0V
	E32	28	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
- Harness for short or open between battery and TCM connector terminal 28
- 10A fuse (No.13, located in the fuse block) and 10A fuse (No.49, located in the IPDM E/R)
- Ignition switch.

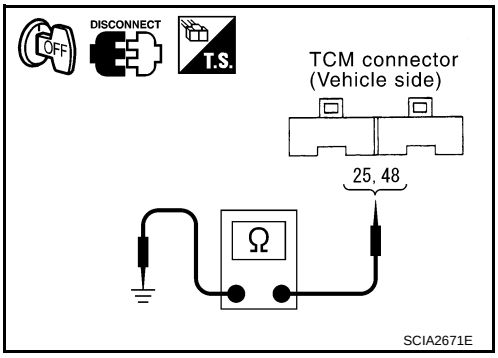
OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK TCM GROUND CIRCUIT

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

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.

OK or NG

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

6. CHECK SYMPTOM

Check again. Refer to TM-180, "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 TM-119, "Reference Value" (Type 1) or TM-422, "Reference Value" (Type 2).
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.

Engine Cannot Be Started in "P" and "N" Position

INFOID:0000000001696243

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.**

1.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis. Refer to TM-35, "CONSULT-III Function (TRANSMISSION)" or TM-38, "Diagnosis Procedure without CONSULT-III".

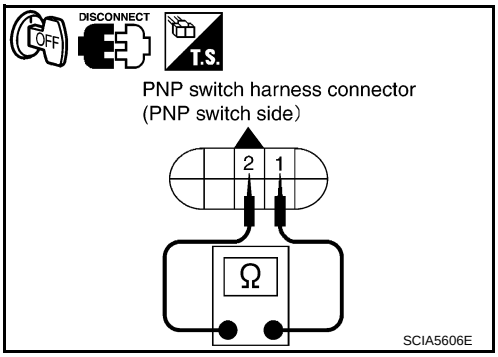
Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to TM-35, "CONSULT-III Function (TRANSMISSION)" or TM-38, "Diagnosis Procedure without CONSULT-III".
NO >> GO TO 2.

2.CHECK PNP SWITCH

Check continuity between PNP switch harness connector terminals.

Selector lever position	Connector	terminal	Continuity
“P”, “N”	F25	1 - 2	Yes
Other positions			No



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.CHECK CONTROL CABLE ADJUSTMENT

Check PNP switch again with control cable disconnected from manual shaft of A/T assembly. Refer to test group 2.

OK or NG

OK >> Adjust control cable. Refer to TM-204, "Adjustment of A/T Position".
NG >> 1. Check PNP switch (Refer to test group 2.) again after adjusting PNP switch (Refer to TM-46).
- If OK, **INSPECTION END**
- If NG, repair or replace PNP switch. Refer to TM-195, "Park/Neutral Position (PNP) Switch".

4.CHECK STARTING SYSTEM

Check starting system. Refer to STR-6, "System Description".

OK or NG

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

In "P" Position, Vehicle Moves Forward or Backward When Pushed

INFOID:0000000001696244

SYMPTOM:
Vehicle moves when it is pushed forward or backward with selector lever in “P” position.

1.CHECK A/T POSITION

Check A/T position. Refer to TM-204, "Checking of A/T Position".

OK or NG

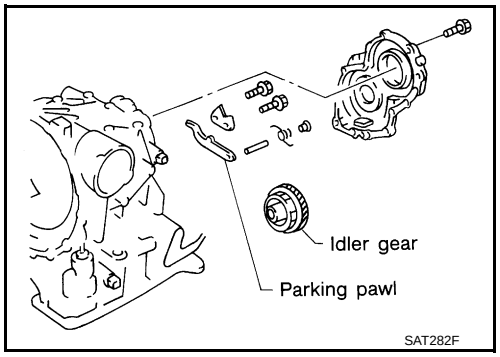
OK >> GO TO 2.
NG >> Adjust A/T position. Refer to TM-204, "Adjustment of A/T Position".

2.CHECK PARKING COMPONENTS

Check parking components. Refer to TM-213, "Component" and TM-222, "Disassembly".

OK or NG

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



In "N" Position, Vehicle Moves

INFOID:0000000001696245

SYMPTOM:
Vehicle moves forward or backward when selecting “N” position.

1.CHECK A/T POSITION

Check A/T position. Refer to TM-204, "Checking of A/T Position".

OK or NG

OK >> GO TO 2.
NG >> Adjust A/T position. Refer to TM-204, "Adjustment of A/T Position".

2.CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to TM-171, "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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

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

4.DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to TM-222, "Disassembly".
2. Check the following items:

- Forward clutch assembly. Refer to TM-267, "Forward and Overrun Clutches".
- Overrun clutch assembly. Refer to TM-267, "Forward and Overrun Clutches".
- Reverse clutch assembly. Refer to TM-258, "Reverse Clutch".

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5.CHECK SYMPTOM

Check again. Refer to TM-181, "Check at Idle".

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 6.

6.CHECK TCM

1. Check TCM input/output signals. Refer to TM-22, "Input/Output Signal of TCM".
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

INFOID:0000000001696246

SYMPTOM:
There is a large shock when changing from “N” to “R” position.

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to TM-35, "CONSULT-III Function (TRANSMISSION)" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to TM-38, "Diagnosis Procedure without CONSULT-III".
NO >> GO TO 2.

2.CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “D” position. Refer to TM-178, "Inspection and Judgment".

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-240, "Oil Pump".

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK SYMPTOM

Check again. Refer to TM-181, "Check at Idle".

OK or NG

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

5.CHECK TCM

1. Check TCM input/output signals. Refer to TM-22, "Input/Output Signal of TCM".
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

INFOID:0000000001696247

SYMPTOM:
Vehicle does not creep backward when selecting “R” position.

1.CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to TM-171, "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 TM-178, "Inspection and Judgment".

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following item:
- Oil pump assembly. Refer to TM-240, "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 TM-175, "Inspection and Judgment".

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 TM-222, "Disassembly".
2. Check the following items:
- Low & reverse brake assembly. Refer to TM-273, "Low & Reverse Brake".
- Reverse clutch assembly. Refer to TM-258, "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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to TM-222, "Disassembly".
2. Check the following items:
- Reverse clutch assembly. Refer to TM-258, "Reverse Clutch".
- High clutch assembly. Refer to TM-262, "High Clutch".
- Low & reverse brake assembly. Refer to TM-273, "Low & Reverse Brake".
- Forward clutch assembly. Refer to TM-267, "Forward and Overrun Clutches".
- Overrun clutch assembly. Refer to TM-267, "Forward and Overrun Clutches".

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

8. CHECK SYMPTOM

Check again. Refer to TM-181, "Check at Idle".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 9.

9.CHECK TCM

1. Check TCM input/output signals. Refer to TM-22, "Input/Output Signal of TCM".
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

INFOID:0000000001696248

SYMPTOM:
Vehicle does not creep forward when selecting “D”, “2” or “1” position.

1.CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to TM-171, "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 TM-178, "Inspection and Judgment".

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following item:

- Oil pump assembly. Refer to TM-240, "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 TM-175, "Inspection and Judgment".

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5.DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to TM-222, "Disassembly".
2. Check the following items:

- Oil pump assembly. Refer to TM-240, "Oil Pump".
- Forward clutch assembly. Refer to TM-267, "Forward and Overrun Clutches".
- Forward one-way clutch. Refer to TM-278, "Rear Internal Gear and Forward Clutch Hub".
- Low one-way clutch. Refer to TM-222, "Disassembly".
- Torque converter. Refer to TM-222, "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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 7.
NG >> GO TO 5.

7.CHECK SYMPTOM

Check again. Refer to TM-181, "Check at Idle".

OK or NG

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

8.CHECK TCM

1. Check TCM input/output signals. Refer to TM-22, "Input/Output Signal of TCM".
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

INFOID:0000000001696249

SYMPTOM:
Vehicle cannot be started from D1 on “Cruise Test — Part 1”.

1.CHECK SYMPTOM

Check symptom. Refer to TM-181, "Check at Idle".

Is “Vehicle Dose Not Creep Backward in “R” Position” OK?

OK >> GO TO 2.
NG >> GO TO TM-142, "Vehicle Does Not Creep Backward in "R" Position".

2.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to XX-XX, "*****" or XX-XX, "*****".
NO >> GO TO 3.

3.CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to EC-297, "Description" (type 1) or EC-583, "Description" (type 2).

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 TM-178, "Inspection and Judgment".

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following items:

- Forward clutch assembly. Refer to TM-267, "Forward and Overrun Clutches".
- Low one-way clutch. Refer to TM-222, "Disassembly".
- Forward one-way clutch. Refer to TM-278, "Rear Internal Gear and Forward Clutch Hub".
- High clutch assembly. Refer to TM-262, "High Clutch".
- Torque converter. Refer to TM-222, "Disassembly".
- Oil pump assembly. Refer to TM-240, "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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 7.
NG >> GO TO 5.

7.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-183, "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 TM-22, "Input/Output Signal of TCM".
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: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$

INFOID:0000000001696250

SYMPTOM:
A/T does not shift from D_1 to D_2 at the specified speed on “Cruise Test — Part 1”.
A/T does not shift from D_4 to D_2 when depressing accelerator pedal fully at the specified speed on “Cruise Test — Part 2”.

1.CHECK SYMPTOM

Check symptom. Refer to TM-181, "Check at Idle" and TM-183, "Cruise Test - Part 1".

Are “Vehicle Dose Not Creep Forward in “D”, “2” or “1” Position” and “Vehicle Cannot Be Started from D_1” OK?

YES >> GO TO 2.
NG >> GO TO TM-144, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" and TM-145, "Vehicle Cannot Be Started from D1".

2.CHECK A/T POSITION

Check A/T position. Refer to TM-204, "Checking of A/T Position".

OK or NG

OK >> GO TO 3.
NG >> Adjust A/T position. Refer to TM-204, "Adjustment of A/T Position".

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 XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2) and XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

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-297, "Description" (type 1) or EC-583, "Description" (type 2).

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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6.DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following items:
- Servo piston assembly
- Brake band

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

7.DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to TM-191, "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 TM-183, "Cruise Test - Part 1" and TM-185, "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 TM-22, "Input/Output Signal of TCM".
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: $D_2 \rightarrow D_3$

INFOID:0000000001696251

SYMPTOM:
A/T does not shift from D_2 to D_3 at the specified speed on “Cruise Test — Part 1” and “Cruise Test — Part 2”.

1.CHECK SYMPTOM

Check symptom. Refer to TM-181, "Check at Idle" and TM-183, "Cruise Test - Part 1".

Are “Vehicle Does Not Creep Forward in “D”, “2” or “1” Position” and “Vehicle Cannot Be Started from D_1” OK?

YES >> GO TO 2.
NO >> Go to TM-144, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" and TM-145, "Vehicle Cannot Be Started from D_1".

2.CHECK A/T POSITION

Check A/T position. Refer to TM-204, "Checking of A/T Position".

OK or NG

OK >> GO TO 3.
NG >> Adjust A/T position. Refer to TM-204, "Adjustment of A/T Position".

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 XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2) and XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

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-297, "Description" (type 1) or EC-583, "Description" (type 2).

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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following items:
- Servo piston assembly
- High clutch assembly. Refer to TM-262, "High Clutch".
- Oil pump assembly. Refer to TM-240, "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 TM-191, "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.

8.CHECK SYMPTOM

Check again. Refer to TM-183, "Cruise Test - Part 1" and TM-185, "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 TM-22, "Input/Output Signal of TCM".
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: $D_3 \rightarrow D_4$

INFOID:0000000001696252

SYMPTOM:
- **A/T does not shift from D_3 to D_4 at the specified speed on “Cruise Test — Part 1” and “Cruise Test — Part 2”.**
- **A/T must be warm before D_3 to D_4 shift will occur.**

1.CHECK SYMPTOM

Check symptom. Refer to TM-181, "Check at Idle" and TM-183, "Cruise Test - Part 1".

Are “Vehicle Does Not Creep Forward in “D”, “2” or “1” Position” and “Vehicle Cannot Be Started from D_1” OK?

YES >> GO TO 2.
NO >> Go to TM-144, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" and TM-145, "Vehicle Cannot Be Started from D_1".

2.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to XX-XX, "*****" or XX-XX, "*****".

NO >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to EC-297, "Description" (type 1) or EC-583, "Description" (type 2).

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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following items:

- Servo piston assembly
- Brake band
- Torque converter. Refer to TM-222, "Disassembly".
- Oil pump assembly. Refer to TM-240, "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 TM-191, "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 TM-183, "Cruise Test - Part 1" and TM-185, "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 TM-22, "Input/Output Signal of TCM".
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 Perform Lock-up

INFOID:0000000001696253

SYMPTOM:
A/T does not perform lock-up at the specified speed on “Cruise Test — Part 1”.

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to XX-XX, "*****" or XX-XX, "*****".
NO >> GO TO 2.

2.CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to EC-297, "Description" (type 1) or EC-583, "Description" (type 2).

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 TM-191, "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 TM-222, "Disassembly".
4. Check the following items:
- Torque converter. Refer to TM-222, "Disassembly".

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK SYMPTOM

Check again. Refer to TM-183, "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 TM-22, "Input/Output Signal of TCM".
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 Hold Lock-up Condition

INFOID:0000000001696254

SYMPTOM:
A/T does not hold lock-up condition for more than 30 seconds on “Cruise Test — Part 1”.

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to XX-XX, "*****" or XX-XX, "*****".
NO >> GO TO 2.

2.CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following items:

- Torque converter. Refer to TM-222, "Disassembly".
- Oil pump assembly. Refer to TM-240, "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 TM-191, "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.

5.CHECK SYMPTOM

Check again. Refer to TM-183, "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 TM-22, "Input/Output Signal of TCM".
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

INFOID:0000000001696255

SYMPTOM:
Lock-up is not released when accelerator pedal is released on “Cruise Test — Part 1”.

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to XX-XX, "*****" or XX-XX, "*****".
NO >> GO TO 2.

2.CHECK SYMPTOM

Check again. Refer to TM-183, "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 TM-22, "Input/Output Signal of TCM".
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.

Engine Speed Does Not Return to Idle (Light Braking D4→ D3)

INFOID:0000000001696256

SYMPTOM:
Engine speed does not smoothly return to idle when A/T shifts from D4 to D3 on "Cruise Test — Part 1".

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to XX-XX, "*****" or XX-XX, "*****".
NO >> GO TO 2.

2. CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to EC-297, "Description" (type 1) or EC-583, "Description" (type 2).

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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

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

4. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following items:
- Overrun clutch assembly. Refer to TM-267, "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 TM-191, "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.

6.CHECK SYMPTOM

Check again. Refer to TM-183, "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 TM-22, "Input/Output Signal of TCM".
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

INFOID:0000000001696257

SYMPTOM:
A/T does not shift from D4 to D3 when OD OFF (OD OFF indicator lamp is on) on "Cruise Test — Part 3".

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is a malfunction in CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).
NO >> GO TO 2.

2.CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

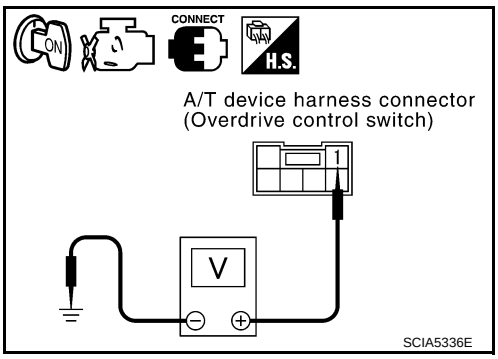
With CONSULT-II

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

Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine)
2. Check voltage between A/T device harness connector terminal and ground.



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 TM-148, "A/T Does Not Shift: D2→ D3".
NG >> Check overdrive control switch circuit. Refer to XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever "D" → "2" Position

INFOID:0000000001696258

SYMPTOM:
A/T does not shift from D_3 to 2_2 when changing selector lever from “D” to “2” position on “Cruise Test — Part 3”.

1.CHECK SYMPTOM

Check symptom. Refer to TM-183, "Cruise Test - Part 1" or TM-185, "Cruise Test - Part 2".

Is “A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$” OK?

YES (With CONSULT-II) >>GO TO 2.
YES (Without CONSULT-II) >>GO TO 3.
NO >> GO TO TM-146, "A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$".

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.

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 circuit. Refer to TM-46, "Component Inspection".

3.CHECK PNP SWITCH CIRCUIT

Without CONSULT-II

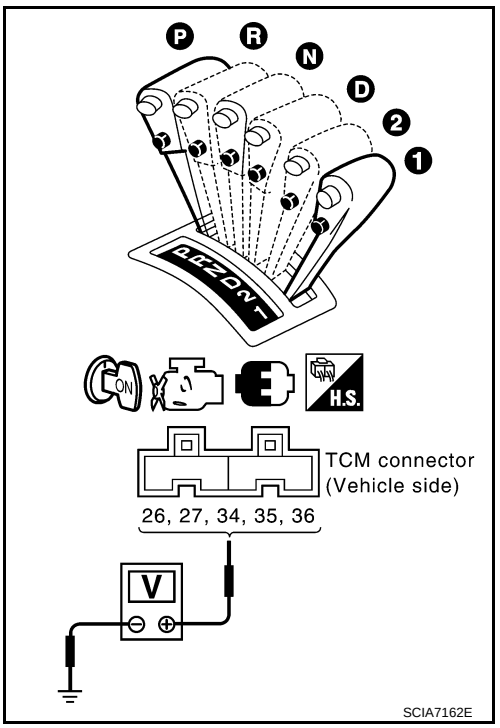
1. Turn ignition switch ON. (Do not start engine.)

2. Check voltage between TCM connector terminals and ground while moving selector lever through each position.

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 circuit. Refer to TM-46, "Component Inspection".

A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever "2" → "1" Position

INFOID:0000000001696259

SYMPTOM:

A/T does not shift from 2_2 to 1_1 when changing selector lever from “2” to “1” position on “Cruise Test — Part 3”.

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

OK or NG

OK >> GO TO 3

NG >> Check PNP switch circuit. Refer to TM-46, "Component Inspection".

2.CHECK PNP SWITCH CIRCUIT

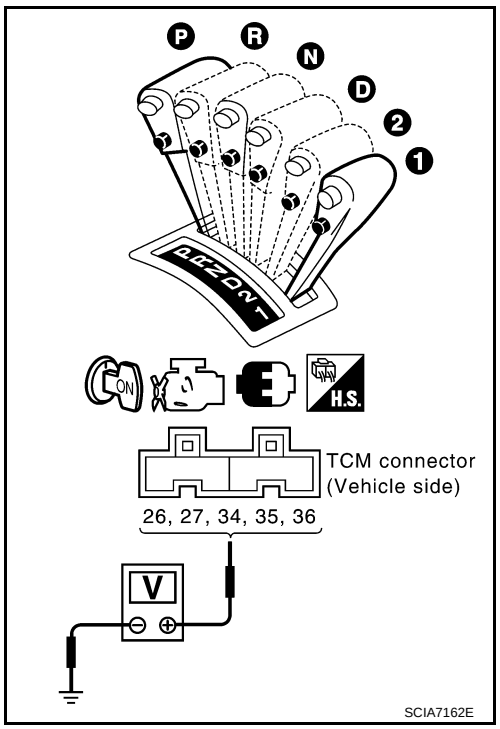
Without CONSULT-II

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.

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 circuit. Refer to TM-46, "Component Inspection".

3.CHECK A/T POSITION

Check A/T position. Refer to TM-204, "Checking of A/T Position".

OK or NG

OK >> GO TO 4.

NG >> Adjust A/T position. Refer to TM-204, "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 XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2) and XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

OK or NG

OK >> GO TO 5.

NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

5.CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 7.

NG >> GO TO 6.

6.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following items:

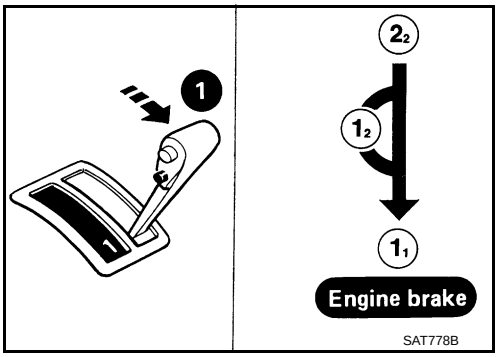
- Servo piston assembly
- Brake band

OK or NG

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

7.CHECK SYMPTOM

Check again. Refer to TM-186, "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 TM-22, "Input/Output Signal of TCM".
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

INFOID:0000000001696260

SYMPTOM:

- **Vehicle does not decelerate by engine brake when shifting from 2_2 (1_2) to 1_1"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".**

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is a malfunction in CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).
NO >> GO TO 2.

2.CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

With CONSULT-II

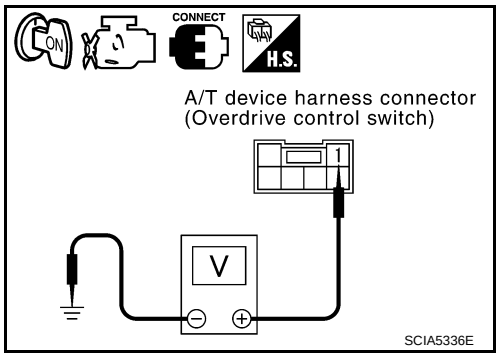
1. Turn ignition switch ON. (Do not start engine)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out "OVERDRIVE SW".
   Check the signal of the overdrive control switch is indicated properly.

Item name	Overdrive control switch Condition	Display value
OVERDRIVE SW	Depressed	ON
	Released	OFF

Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine)
2. Check voltage between A/T device harness connector terminal and ground.

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



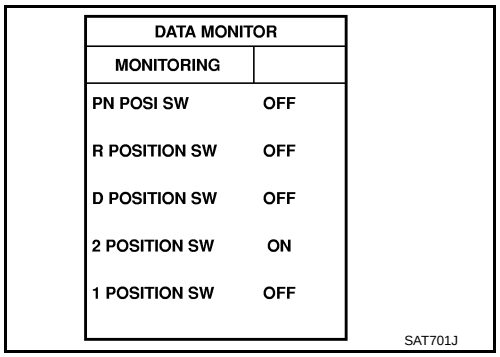
OK or NG

OK (With CONSULT-II)>>GO TO 3.
OK (Without CONSULT-II)>>GO TO 4.
NG >> Check overdrive control switch circuit. Refer to XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

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.



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 circuit. Refer to TM-46, "Component Inspection".

4.CHECK PNP SWITCH CIRCUIT

Without CONSULT-II

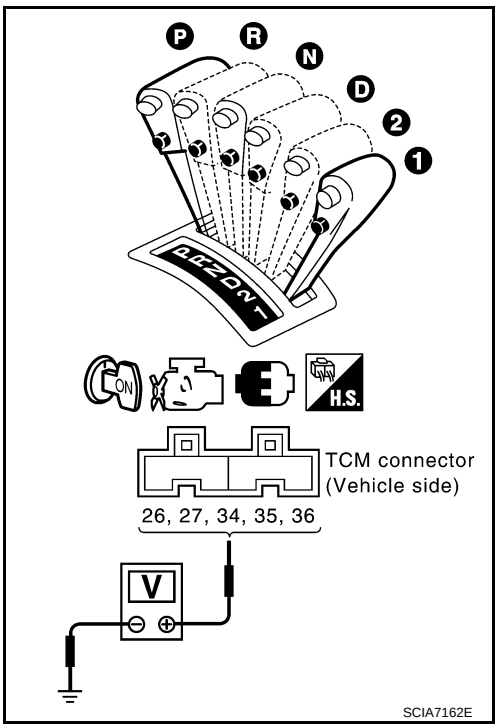
1. Turn ignition switch ON. (Do not start engine.)

2. Check voltage between TCM connector terminals and ground while moving selector lever through each position.

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 circuit. Refer to XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

5. CHECK A/T POSITION

Check A/T position. Refer to TM-204, "Checking of A/T Position".

OK or NG

OK >> GO TO 6.

NG >> Adjust A/T position. Refer to TM-204, "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 XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2) and XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

OK or NG

OK >> GO TO 7.

NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

7. CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to EC-297, "Description" (type 1) or EC-583, "Description" (type 2).

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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 10.

NG >> GO TO 9.

9. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "Control Valve Assembly and Accumulators".

2. Check the following.
- Shift valve A
- Overrun clutch solenoid valve
3. Disassemble A/T. Refer to TM-222, "Disassembly".
4. Check the following.
- Overrun clutch assembly. Refer to TM-267, "Forward and Overrun Clutches".
- Low & reverse brake assembly. Refer to TM-273, "Low & Reverse Brake".

OK or NG

OK >> GO TO 10.
NG >> Repair or replace damaged parts.

10. CHECK SYMPTOM

Check again. Refer to TM-186, "Cruise Test - Part 3".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 11.

11. CHECK TCM

1. Check TCM input/output signals. Refer to TM-22, "Input/Output Signal of TCM".
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.

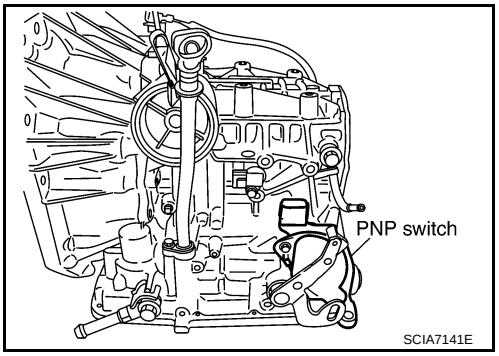
TCM Self-Diagnosis Does Not Activate

INFOID:0000000001696261

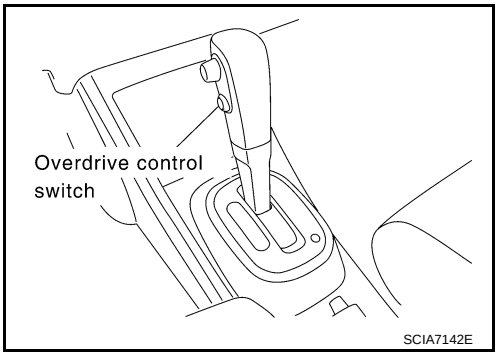
SYMPTOM:
OD OFF indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

DESCRIPTION

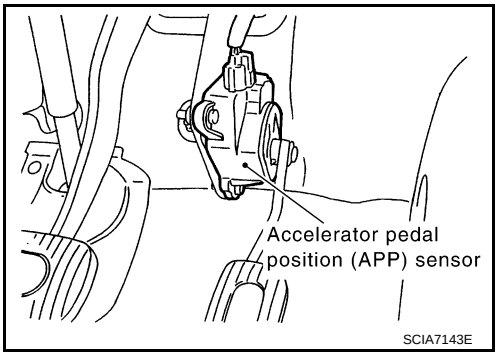
- PNP switch
  PNP switch assembly includes a transaxle position switch. The transaxle position switch detects the selector lever position and sends a signal to the TCM.



- Overdrive control switch
  Overdrive control switch detects the switch position (ON or OFF) and sends a signal 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 stitch, overdrive control switch, closed throttle position signal and wide open throttle position signal circuit. Refer to TM-115, "Component Inspection".

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001696264

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. 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.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001696265

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- 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 NATS, 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.

Precaution for On Board Diagnosis (OBD) System of A/T and Engine (For Type1 Only)

INFOID:0000000001696266

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.

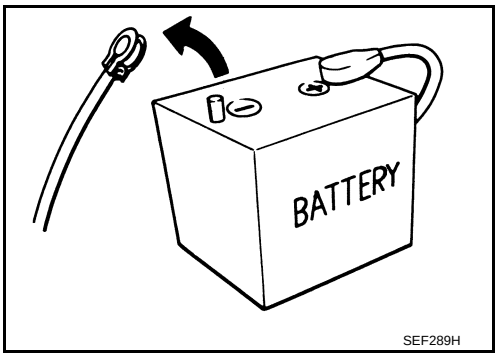
CAUTION:

- **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.**

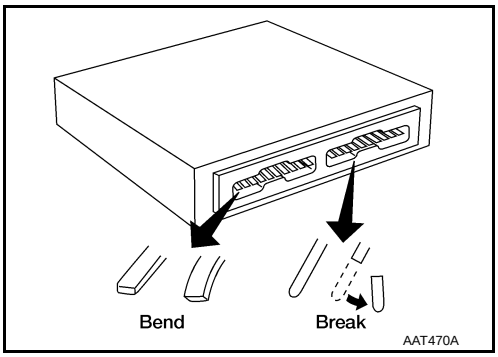
Precaution

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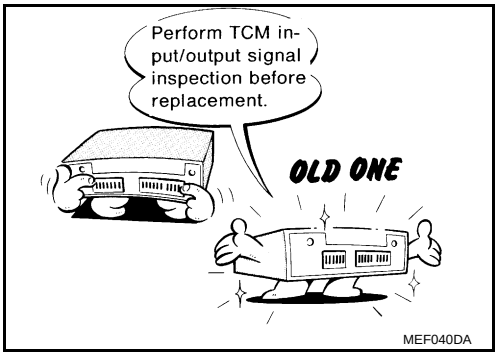
- **Before connecting or disconnecting the TCM harness connector, turn ignition switch OFF and disconnect the battery cable from the negative terminal. Failure to do so may damage the TCM. Because battery voltage is applied to TCM even if ignition switch is turned off.**



- **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 XX-XX, "*****".)**
- **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.
- 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.
- 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 XX-XX, "*****", XX-XX, "*****".

Service Notice or Precaution

INFOID:0000000001696268

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.

OBD SELF-DIAGNOSIS (FOR TYPE 1 ONLY)

- 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 XX-XX, "*****" 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 XX-XX, "***" 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, refer to XX-XX, "*****".

Wiring Diagram and Trouble Diagnosis

INFOID:0000000001696269

When reading wiring diagrams, refer to the following:

- XX-XX, "*****"
- XX-XX, "*****"

When performing trouble diagnosis, refer to the following:

- XX-XX, "*****"
- XX-XX, "*****"

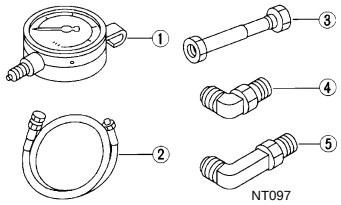
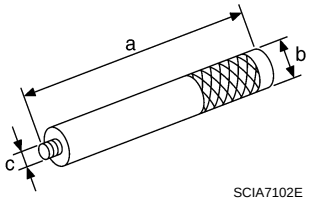
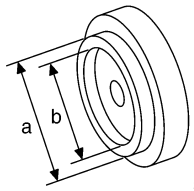
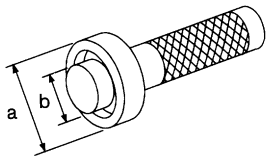
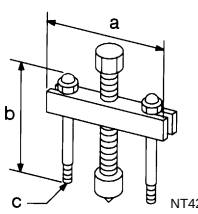
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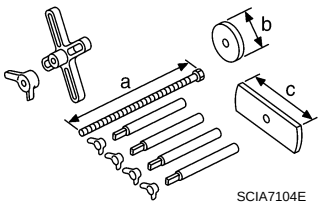
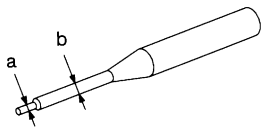
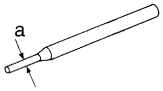
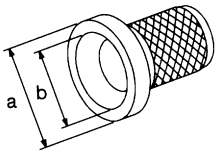
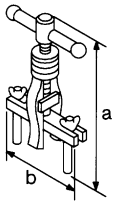
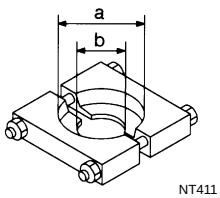
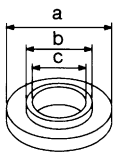
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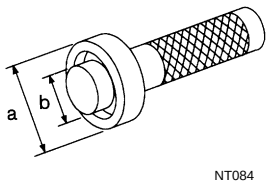
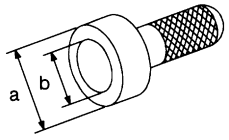
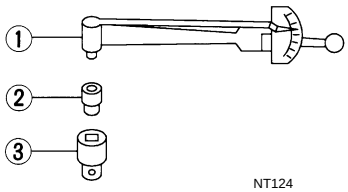
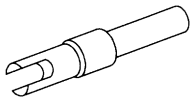
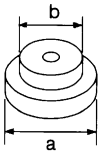
Special Service Tool

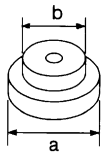
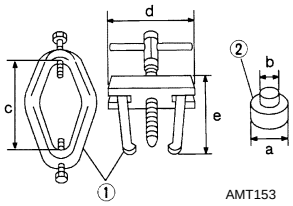
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The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST2505S001 (J-34301) Oil pressure gauge set 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  NT097	Measuring line pressure
ST35325000 (—) Drift  SCIA7102E	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**
KV31103000 (J-38982) Drift  SCIA7103E	Installing LH differential side oil seal (Use with ST35325000) **a: 59 mm (2.32 in) dia.** **b: 49 mm (1.93 in) dia.**
ST37830000 (—) Drift  NT084	Installing idler gear bearing outer race **a: 61.9 mm (2.437 in) dia.** **b: 39 mm (1.54 in) dia.**
ST27180001 (J-25726-A) Puller  NT424	Removing idler gear **a: 100 mm (3.94 in)** **b: 110 mm (4.33 in)** **c: M8 X 1.25P**

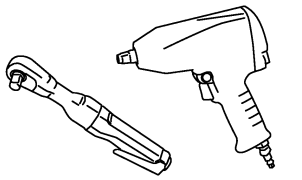
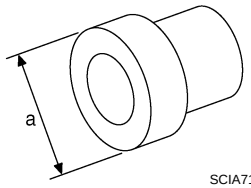
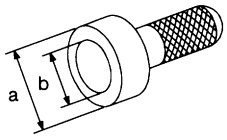
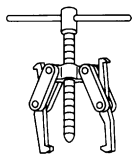
Tool number (Kent-Moore No.) Tool name	Description
KV31103200 (J-39186) Clutch spring compressor  SCIA7104E	• Removing and installing clutch spring retainer assembly • Removing and installing cancel cover **a: 179 mm (7.05 in)** **b: 76 mm (2.99 in) dia.** **c: 174 mm (6.85 in)**
ST23540000 (J-25689-A) Pin punch  NT442	• 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	• 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	• 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.**

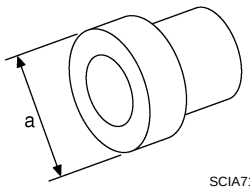
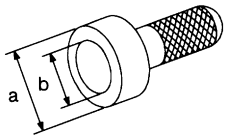
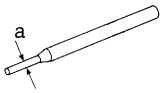
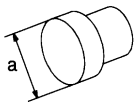
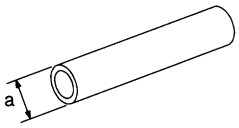
Tool number (Kent-Moore No.) Tool name	Description
ST37830000 (—) Drift  NT084	Installing idler gear bearing outer race **a: 61.9 mm (2.437 in) dia.** **b: 39 mm (1.54 in) dia.**
ST35271000 (J-26091) Drift  NT115	Installing idler gear **a: 72 mm (2.83 in) dia.** **b: 63 mm (2.48 in) dia.**
ST3127S000 (J-25765-A) Preload gauge 1. GG9103000 (J-25765-A) Torque wrench 2. HT62940000 (—) Socket adapter 3. HT62900000 (—) Socket adapter  NT124	• Measuring turning torque of reduction pinion gear • Measuring turning torque of final drive assembly
KV38105710 (J-39026) Preload adapter  NT087	• Selecting differential side bearing adjusting shim • Measuring turning torque of final drive assembly
ST35321000 (—) Drift  NT073	Installing output shaft bearing **a: 49 mm (1.93 in) dia.** **b: 41 mm (1.61 in) dia.**

Tool number (Kent-Moore No.) Tool name	Description
ST30633000 (—) Drift  NT073	Installing differential side bearing outer races **a: 67 mm (2.48 in) dia.** **b: 49 mm (1.93 in) dia.**
ST3306S001 (J-22888-D) Differential side bearing puller set 1. ST33051001 Puller 2. ST33061000 Adapter  AMT153	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)**

Commercial Service Tool

INFOID:0000000001731385

Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts
Drift  SCIA7105E	Installing manual shaft oil seal **a: 22 mm (0.87 in) dia.**
Drift  NT115	Installing RH differential side oil seal **a: 54 mm (2.13 in) dia.** **b: 47 mm (1.85 in) dia.**
Puller  NT077	• Removing idler gear bearing inner race • Removing and installing band servo piston snap ring

Tool name	Description
Drift  SCIA7105E	Removing idler gear bearing inner race **a: 34 mm (1.34 in) dia.**
Drift  NT115	Installing differential side bearings **a: 45 mm (1.77 in) dia.** **b: 41 mm (1.61 in) dia.**
Pin punch  NT410	Aligning groove of manual shaft and hole of transaxle case **a: 2 mm (0.08 in) dia.**
Drift  NT109	Removing idler gear bearing inner race **a: 34 mm (1.34 in) dia.**
Drift  NT083	Installing radial needle bearing on bearing retainer **a: 36 mm (1.42 in) dia.**

ON-VEHICLE MAINTENANCE

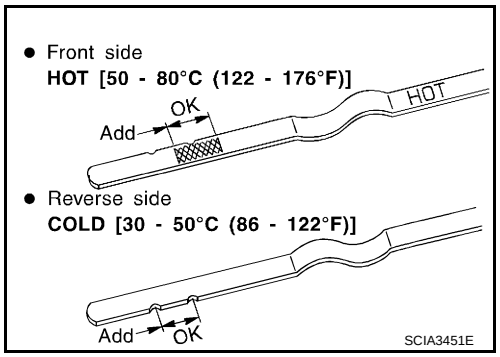
A/T FLUID

Checking A/T Fluid

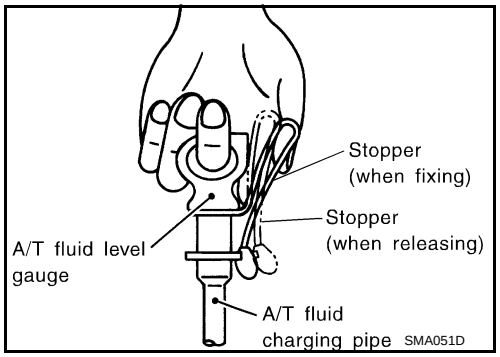
INFOID:0000000001728293

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 secure 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 secure 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. If the A/T fluid smells burnt, 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 TM-172, "A/T Fluid Cooler Cleaning".
7. Install the removed A/T fluid level gauge into the A/T fluid charging pipe.
CAUTION:
Firmly secure the A/T fluid level gauge to the A/T fluid charging pipe using the stopper attached.

Changing A/T Fluid

INFOID:0000000001728294

1. Warm up A/T fluid.
2. Stop engine.
3. Drain A/T fluid by removing the drain plug from the transaxle.
4. Reinstall the drain plug and new gasket and tighten to the specified torque.

Drain plug: **Refer to TM-213, "Component".**

CAUTION:
Do not reuse drain plug gasket.

5. 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-19, "Fluids and Lubricants".

6. Run engine at idle speed for 5 minutes.
7. Check A/T fluid level and condition. Refer to TM-171, "Checking A/T Fluid".

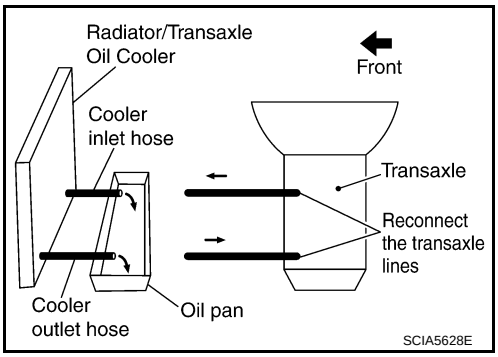
A/T Fluid Cooler Cleaning

INFOID:0000000001731916

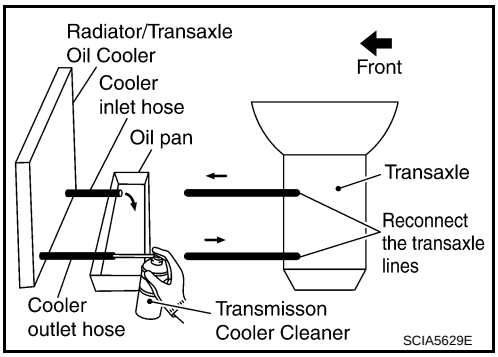
Whenever the A/T is repaired, overhauled, or replaced, the A/T fluid cooler mounted in the radiator must be inspected and cleaned.
Metal debris and friction material, if present, can become trapped in the A/T fluid cooler. This debris can contaminate the newly serviced A/T or, in severe cases, can block 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

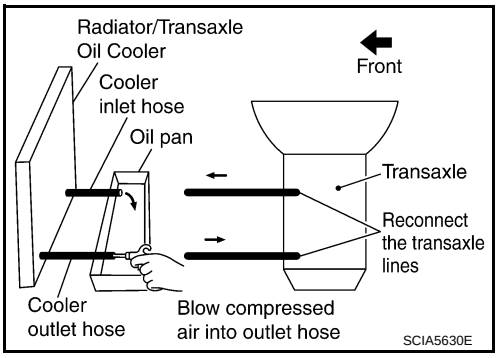
1. Identify the A/T inlet and outlet fluid cooler hoses.
2. Position an oil pan under the A/T inlet and outlet fluid cooler hoses.
3. Disconnect the A/T fluid cooler inlet and outlet rubber hoses from the steel cooler tubes or bypass valve.
   NOTE:
   Replace the cooler hoses if rubber material from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



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



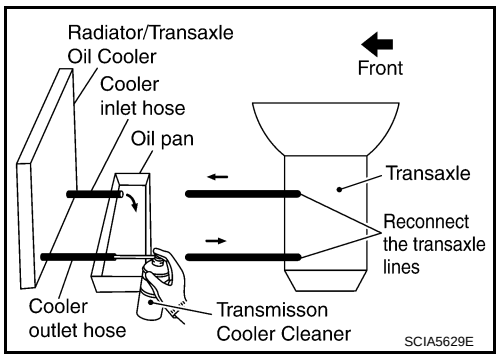
9. Blow compressed air regulated to 5 - 9 kg/cm^2 (70 - 130 psi) through the cooler outlet hose for 10 seconds to force out any remaining A/T fluid.
10. Repeat steps 5 through 9 three additional times.

11. Position an oil pan under the banjo bolts that connect the A/T fluid cooler steel lines to the A/T.
12. Remove the banjo bolts.
13. 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.
14. Blow compressed air regulated to 5 - 9 kg/cm^2 (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.
15. Ensure all debris is removed from the steel cooler lines.
16. Ensure all debris is removed from the banjo bolts and fittings.
17. Perform "A/T FLUID COOLER DIAGNOSIS PROCEDURE".

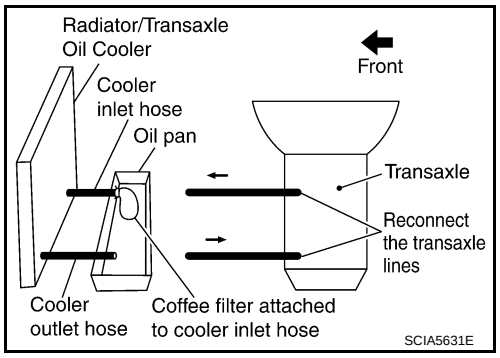
A/T FLUID COOLER DIAGNOSIS PROCEDURE

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

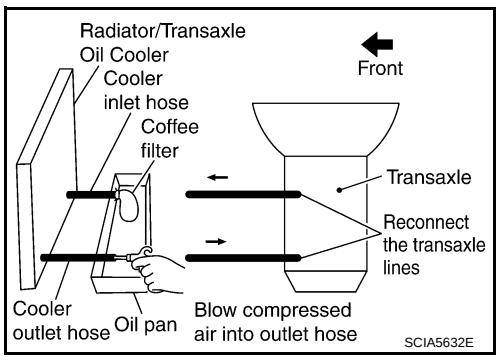
1. Position an oil pan under the A/T inlet and outlet cooler hoses.
2. Clean the exterior and tip of the cooler inlet hose.
3. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.
   CAUTION:
   - **Wear safety glasses and rubber 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.**



4. 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.
5. Tie a common white, basket-type coffee filter to the end of the cooler inlet hose.



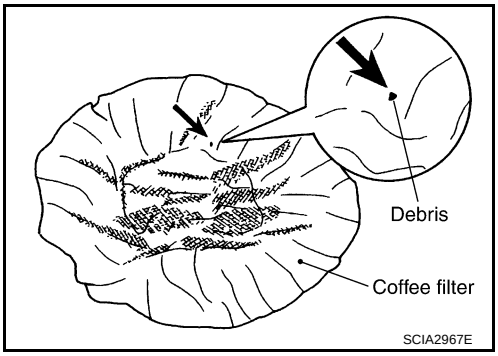
6. Insert the tip of an air gun into the end of the cooler outlet hose.
7. Wrap a shop rag around the air gun tip and end of cooler outlet hose.
8. Blow compressed air regulated to 5 - 9 kg/cm^2 (70 - 130 psi) through the cooler outlet hose to force any remaining A/T fluid into the coffee filter.
9. Remove the coffee filter from the end of the cooler inlet hose.
10. Perform "A/T FLUID COOLER INSPECTION PROCEDURE".



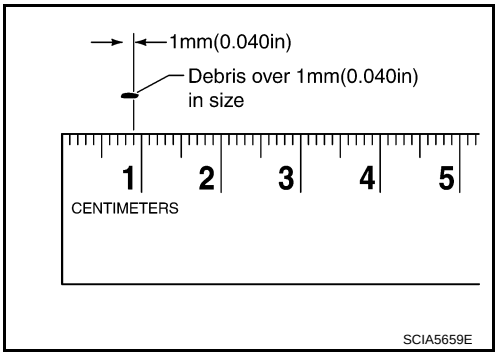
A/T FLUID COOLER INSPECTION PROCEDURE

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-16, "Removal and Installation".



A/T FLUID COOLER FINAL INSPECTION

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

STALL TEST

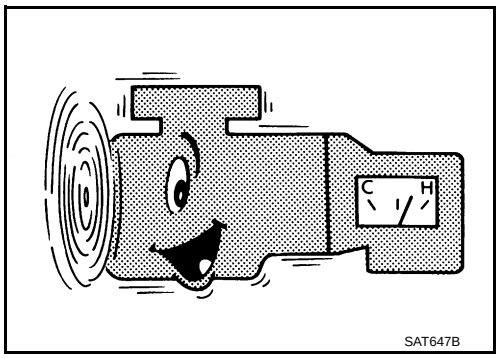
Inspection and Judgment

INFOID:0000000001724664

STALL TEST PROCEDURE

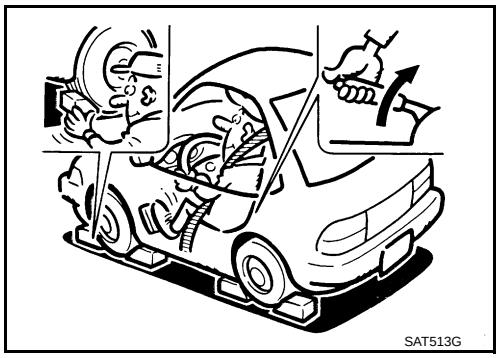
1. Check ATF and engine oil levels. If necessary, add ATF and engine oil.
2. Drive vehicle for approximately 10 minutes or until ATF and engine oil reach operating temperature.

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

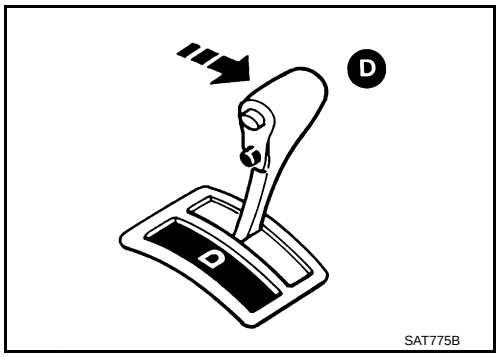


SAT647B

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.**


SAT513G

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

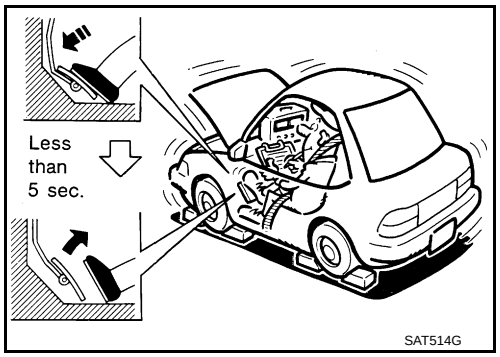


SAT775B

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

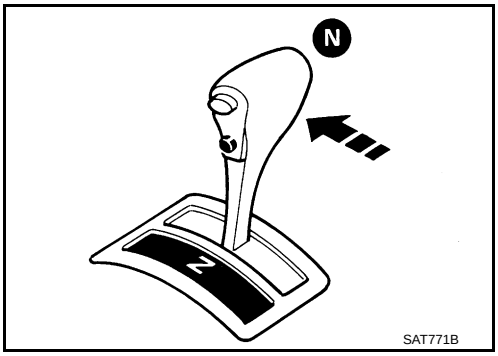
CAUTION:
Do not hold down the accelerator pedal for more than 5 seconds during this test.

Stall revolution: 2,300 - 2,750 rpm



SAT514G

8. Move selector lever to “N” position.
9. Cool off ATF.
   CAUTION:
   Run the engine at idle for at least 1 minute.
10. 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 XX-XX, "*****".

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:

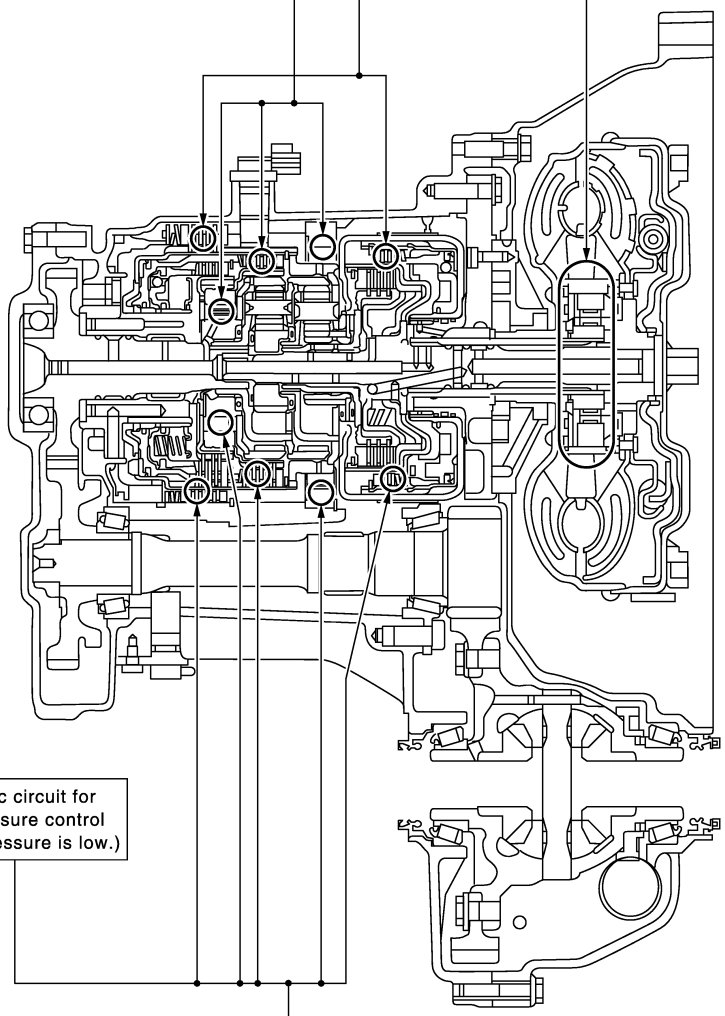
- Poor acceleration during starts. ..... One-way clutch seizure in torque converter

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	

SCIA7987E

LINE PRESSURE TEST

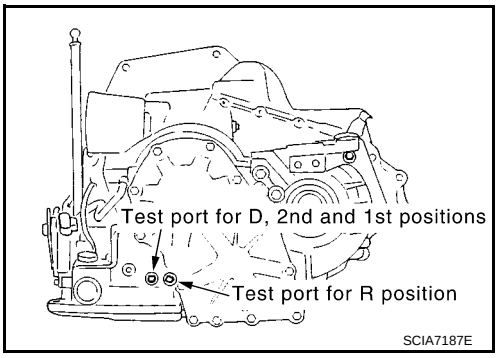
Inspection and Judgment

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LINE PRESSURE TEST PORTS

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

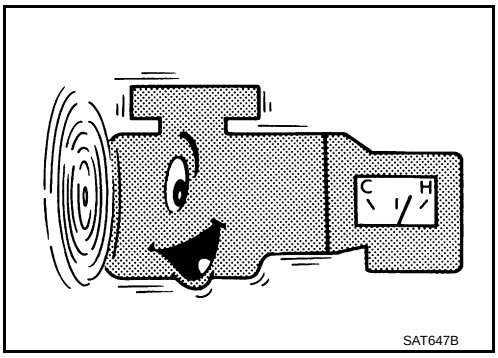
- **Always replace pressure plugs as they are self-sealing bolts.**



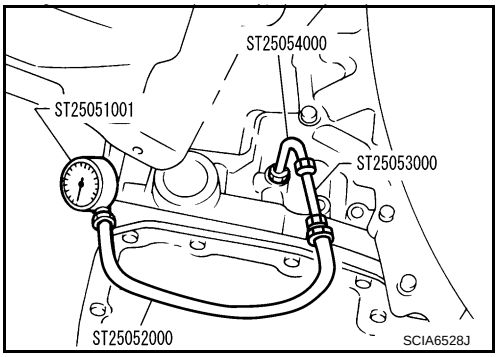
LINE PRESSURE TEST PROCEDURE

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.

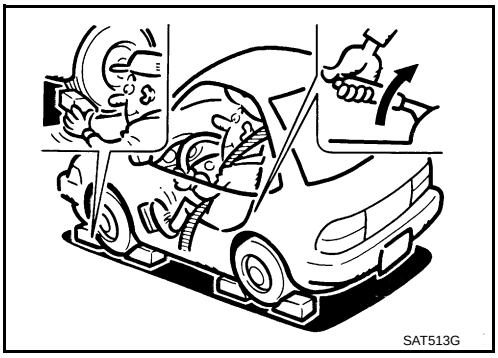
ATF operating temperature: 50 - 80°C (122 -176°F)



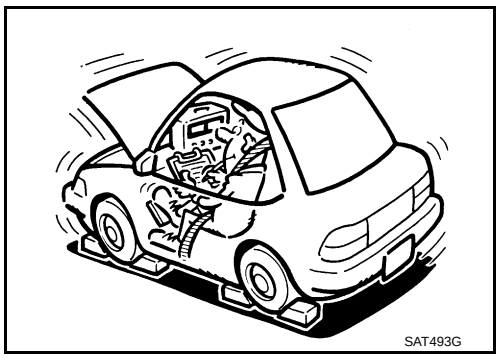
3. Install oil pressure gauge to corresponding line pressure test port.



4. Set parking brake and block wheels.



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 "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.	• 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.	• Fluid pressure leakage between manual valve and particular clutch • For example, line pressure is: – 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 TM-14, "Shift Mechanism".
	Line pressure is high.	• 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.	• 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

ROAD TEST

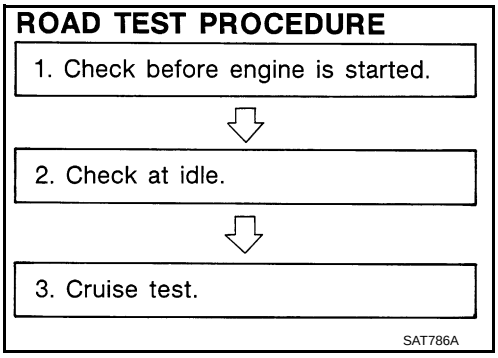
Description

INFOID:0000000001696152

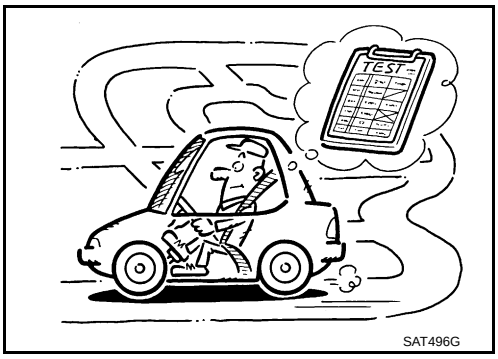
DESCRIPTION

- 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 TM-180.
2. Check at idle. Refer to TM-181.
3. Cruise test
   - Inspection all the item from Part 1 to Part 3. Refer to TM-183, TM-185 and TM-186.



- 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 XX-XX, "*****", XX-XX, "*****" and XX-XX, "*****".

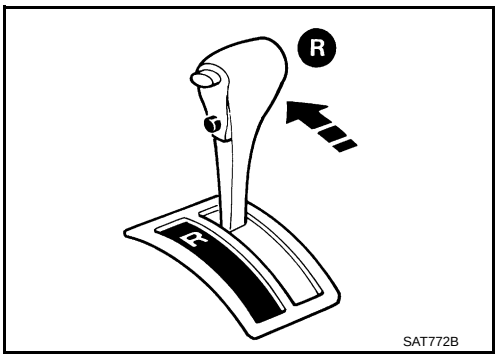


Check Before Engine Is Started

INFOID:0000000001696170

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.

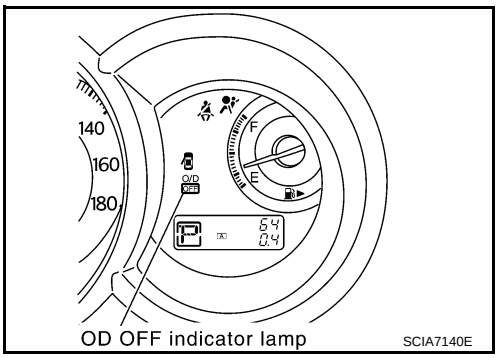


4. Turn ignition switch ON. (Do not start engine.)

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

YES >> 1. Turn ignition switch OFF.
2. Perform self-diagnosis and note NG items. Refer to XX-XX, "*****", XX-XX, "*****".
3. Go to TM-181, "Check at Idle".

NO >> Stop “Road Test”. Go to TM-138, "OD OFF Indicator Lamp Does Not Come On".



Check at Idle

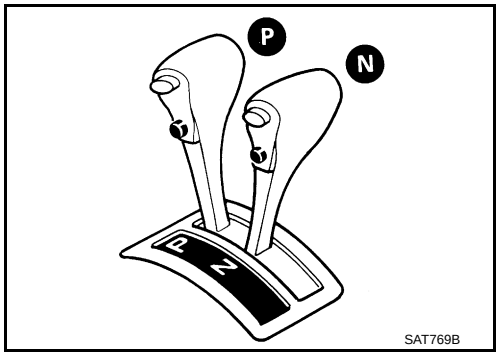
INFOID:0000000001696171

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 XX-XX, "*****".
• GO TO TM-140, "Engine Cannot Be Started in "P" and "N" Position".

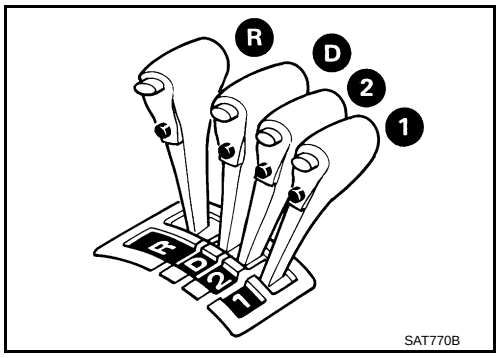


2.CHECK ENGINE START

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.

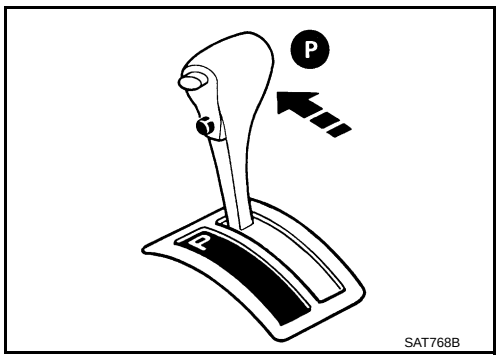
Is engine started?

YES >> • Stop “Road Test”. Mark the box on the XX-XX, "*****".
• GO TO TM-140, "Engine Cannot Be Started in "P" and "N" Position".
• Continue “Road Test”.
NO >> GO TO 3.



3.CHECK VEHICLE MOVE

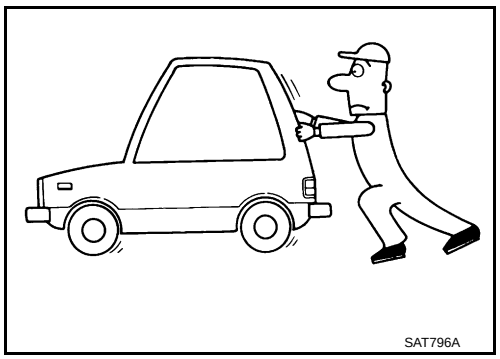
1. Move selector lever to “P” position.
2. Turn ignition switch OFF.
3. Release parking brake.



4. Push vehicle forward or backward.

Does vehicle move when it is pushed forward or backyard?

YES >> • Mark the box on the XX-XX, "*****".
• GO TO TM-140, "In "P" Position, Vehicle Moves Forward or Backward When Pushed".
• Continue “Road Test”.
NO >> GO TO 4.



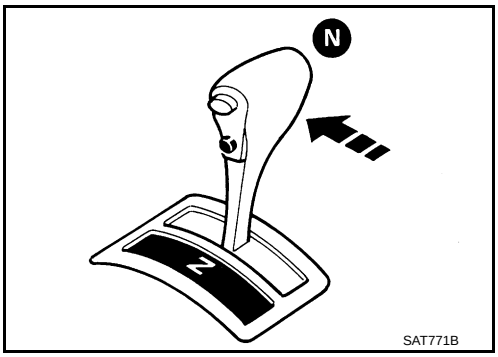
4.CHECK VEHICLE MOVE

1. Apply parking brake.

2. Start engine.
3. Move selector lever to “N” position.
4. Release parking brake.

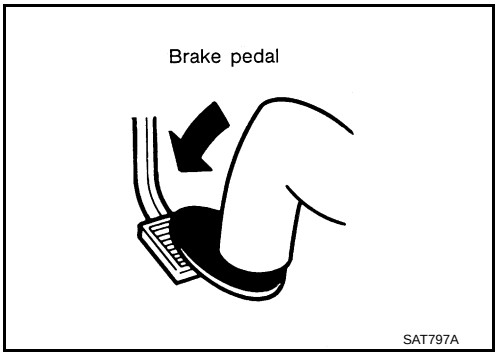
Does vehicle move forward or backward?

YES >> • Mark the box on the XX-XX, "*****".
• GO TO TM-141, "In "N" Position, Vehicle Moves".
• Continue “Road Test”.
NO >> GO TO 5.



5.CHECK SHIFT SHOCK

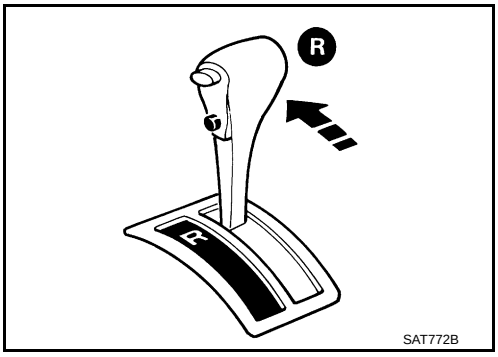
1. Apply foot brake.



2. Move selector lever to “R” position.

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

YES >> • Mark the box on the XX-XX, "*****".
• GO TO TM-142, "Large Shock "N" → "R" Position" .
• Continue “Road Test”.
NO >> GO TO 6.

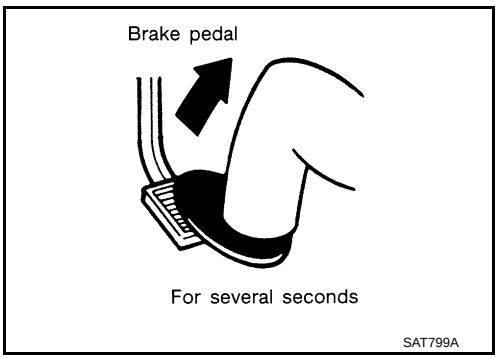


6.CHECK VEHICLE MOVE

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 XX-XX, "*****".
• GO TO TM-142, "Vehicle Does Not Creep Backward in "R" Position".
• Continue “Road Test”.

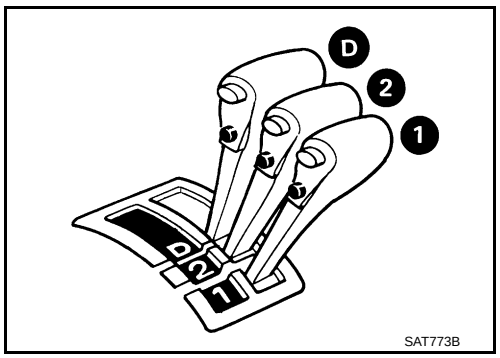


7.CHECK VEHICLE MOVE

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 TM-183, "Cruise Test - Part 1".
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-144, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position".
• Continue “Road Test”.



Cruise Test - Part 1

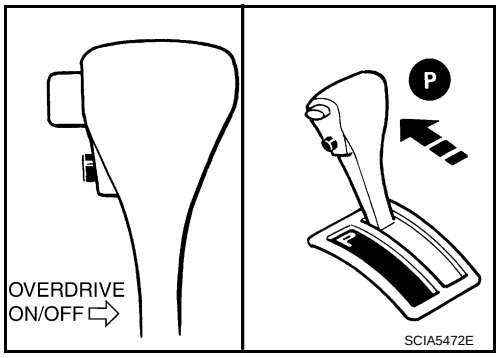
INFOID:0000000001696172

1. CHECK STARTING GEAR (D1) POSITION

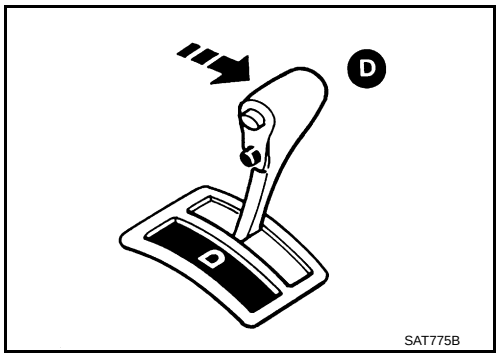
1. Drive vehicle for approximately 10 minutes to warm engine oil and ATF up to operating temperature.

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.

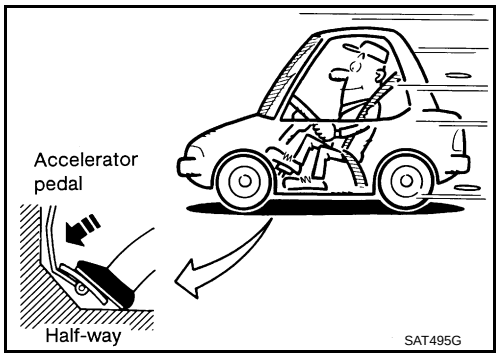


7. Accelerate vehicle by constantly depressing accelerator pedal half-way.

Read gear position. Refer to XX-XX, "***".**

Does vehicle start from D1?

YES >> GO TO 2.
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-145, "Vehicle Cannot Be Started from D1".
• Continue “Road Test”.



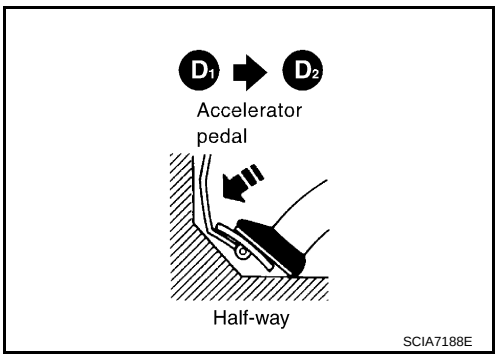
2. CHECK SHIFT-UP (D1 TO D2)

Check shift-up (D1 to D2).
Specified speed when shifting from D1 to D2. Refer to TM-188, "Vehicle Speed When Shifting Gears".

Read gear position, throttle opening and vehicle speed. Refer to XX-XX, "***".**

Does A/T shift from D_1 to D_2 at the specified speed?

YES >> GO TO 3.
NO >>
- Mark the box on the XX-XX, "*****".
- GO TO TM-146, "A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$".
- Continue “Road Test”.



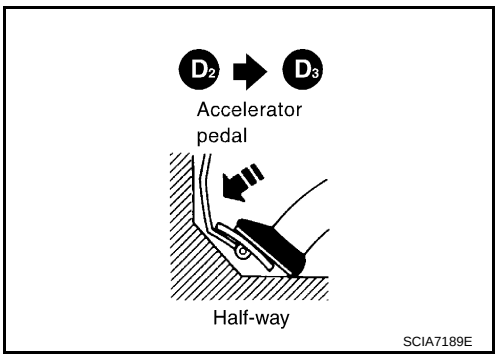
3. CHECK SHIFT-UP (D_2 TO D_3)

Check shift-up (D_2 to D_3).
Specified speed when shifting from D_2 to D_3. Refer to TM-188, "Vehicle Speed When Shifting Gears".

Read gear position, throttle opening and vehicle speed. Refer to XX-XX, "***".**

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

YES >> GO TO 4.
NO >>
- Mark the box on the XX-XX, "*****".
- GO TO TM-148, "A/T Does Not Shift: $D_2 \rightarrow D_3$".
- Continue “Road Test”.



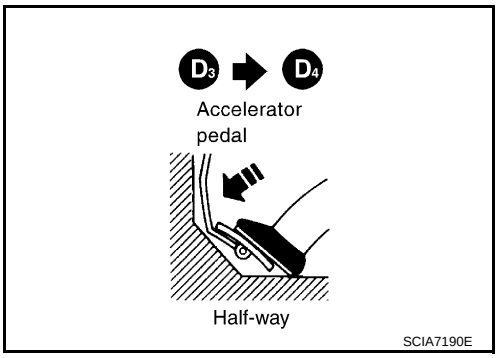
4. CHECK SHIFT-UP (D_3 TO D_4)

Check shift-up (D_3 to D_4).
Specified speed when shifting from D_3 to D_4. Refer to TM-188, "Vehicle Speed When Shifting Gears".

Read gear position, throttle opening and vehicle speed. Refer to XX-XX, "***".**

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

YES >> GO TO 5.
NO >>
- Mark the box on the XX-XX, "*****".
- GO TO TM-149, "A/T Does Not Shift: $D_3 \rightarrow D_4$".
- Continue “Road Test”.



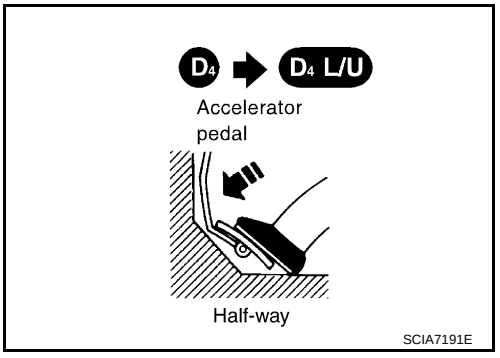
5. CHECK LOCK-UP (D_4 TO D_4L/U)

Check lock-up (D_4 to D_4L/U).
Specified speed when lock-up occurs. Refer to TM-188, "Vehicle Speed When Performing and Releasing Complete Lock-up".

Read vehicle speed, throttle opening when lock-up duty becomes 94%. Refer to XX-XX, "***".**

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

YES >> GO TO 6.
NO >>
- Mark the box on the XX-XX, "*****".
- GO TO TM-151, "A/T Does Not Perform Lock-up".
- Continue “Road Test”.



6. CHECK LOCK-UP HOLD

Check lock-up hold.

When lock-up duty becomes 94%. Refer to XX-XX, "***".**

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

YES >> GO TO 7.
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-151, "A/T Does Not Hold Lock-up Condition".
• Continue “Road Test”.

7.CHECK SHIFT-DOWN (D4L/U TO D4)

Release accelerator pedal.

When lock-up duty becomes 4%. Refer to XX-XX, "***".**

Is lock-up released when accelerator pedal is released?

YES >> GO TO 8.
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-152, "Lock-up Is Not Released".
• Continue “Road Test”.

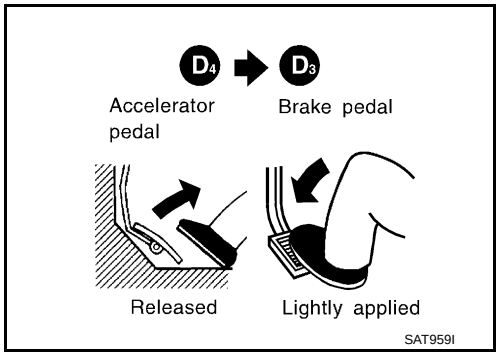
8.CHECK SHIFT-DOWN (D4 TO D3)

Decelerate vehicle by applying foot brake lightly.

Read gear position and engine speed. Refer to XX-XX, "***".**

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

YES >> 1. Stop vehicle.
2. Go to TM-185, "Cruise Test - Part 2".
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-153, "Engine Speed Does Not Return to Idle (Light Braking D4→ D3)".
• Continue “Road Test”.



Cruise Test - Part 2

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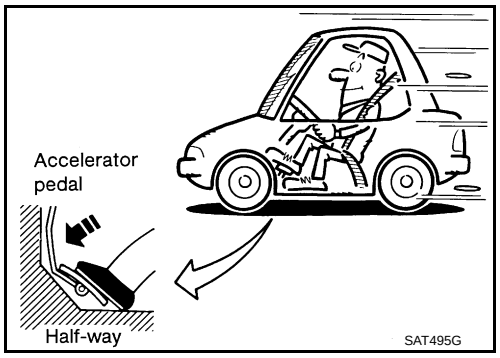
1.CHECK STARTING GEAR (D1) POSITION

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 XX-XX, "***".**

Does vehicle start from D1?

YES >> GO TO 2.
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-145, "Vehicle Cannot Be Started from D1".
• Continue “Road Test”.



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

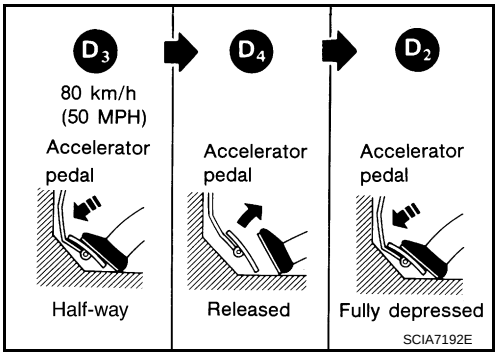
1. Accelerate vehicle to 80 km/h (50 MPH) as shown in the figure.

2. Release accelerator pedal and then quickly depress it fully.

Read gear position and throttle opening. Refer to XX-XX, "***".**

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 XX-XX, "*****".
• GO TO TM-146, "A/T Does Not Shift: D1→ D2or Does Not Kickdown: D4→ D2".
• Continue “Road Test”.



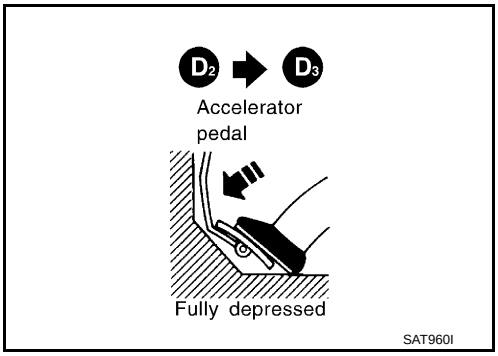
3.CHECK SHIFT-UP (D2 TO D3)

Check shift-up (D2 to D3)
Specified speed when shifting from D2 to D3. Refer to TM-188, "Vehicle Speed When Shifting Gears".

Read gear position, throttle opening and vehicle speed. Refer to XX-XX, "***".**

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

YES >> GO TO 4.
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-148, "A/T Does Not Shift: D2→ D3".
• Continue “Road Test”.



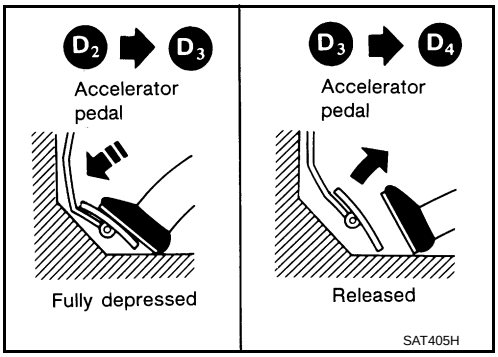
4.CHECK SHIFT-UP (D3 TO D4) AND ENGINE BRAKE

Release accelerator pedal after shifting from D2 to D3.

Read gear position, throttle opening and vehicle speed. Refer to XX-XX, "***".**

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

YES >> 1. Stop vehicle.
2. Go to TM-186, "Cruise Test - Part 3".
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-149, "A/T Does Not Shift: D3→ D4".
• Continue “Road Test”.

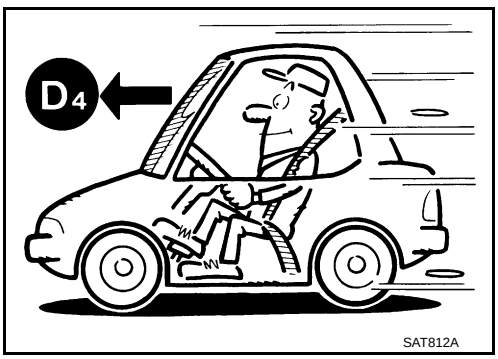


Cruise Test - Part 3

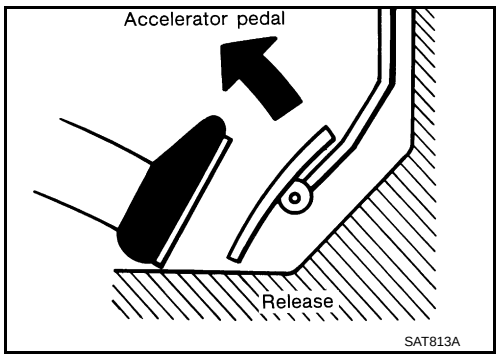
INFOID:0000000001696174

1.CHECK SHIFT-DOWN (D4 TO D3) (WITH OVERDRIVE CONTROL SWITCH)

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.

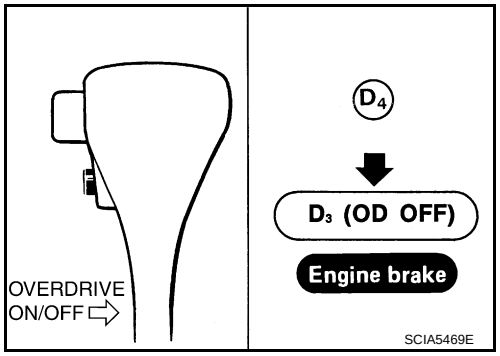


5. Push overdrive control switch. (OD OFF indicator lamp is on.)

Read gear position and vehicle speed. Refer to XX-XX, "***".**

Does A/T shift from D_4 to D_3 (OD OFF)?

YES >> GO TO 2.
NO >>
- Mark the box on the XX-XX, "*****".
- GO TO TM-154, "A/T Does Not Shift: $D_4 \rightarrow D_3$, When OD OFF".
- Continue “Road Test”.

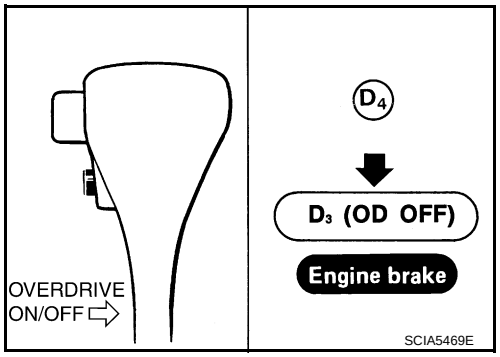


2. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >> GO TO 3.
NO >>
- Mark the box on the XX-XX, "*****".
- GO TO TM-158, "Vehicle Does Not Decelerate by Engine Brake".
- Continue “Road Test”.



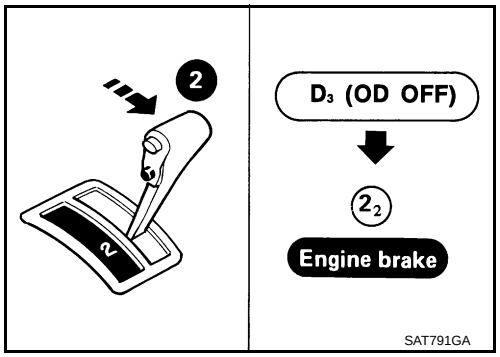
3. CHECK SHIFT-DOWN (D_3 TO 2_2)

Move selector lever from “D” to “2” position while driving in D_3 (OD OFF).

Read gear position. Refer to XX-XX, "***".**

Does A/T shift from D_3 (OD OFF) to 2_2?

YES >> GO TO 4.
NO >>
- Mark the box on the XX-XX, "*****".
- GO TO TM-155, "A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever "D" → "2" Position" .
- Continue “Road Test”.



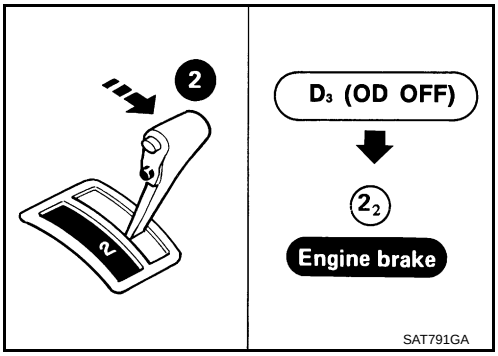
4. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >> GO TO 5.

NO >>
- Mark the box on the XX-XX, "*****".
- GO TO TM-158, "Vehicle Does Not Decelerate by Engine Brake".
- Continue “Road Test”.



5. CHECK SHIFT-DOWN (22 TO 11)

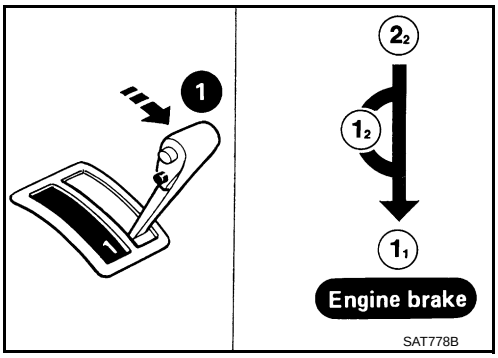
Move selector lever from “2” to “1” position while driving in 22.

Read gear position. Refer to XX-XX, "***".**

Does A/T shift from 22 to 11 position?

YES >> GO TO 6.

NO >>
- Mark the box on the XX-XX, "*****".
- GO TO TM-156, "A/T Does Not Shift: 22→ 11, When Selector Lever "2" → "1" Position" .
- Continue “Road Test”.



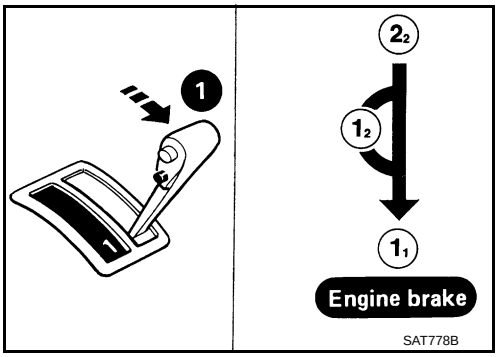
6. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >>
1. Stop vehicle.
2. Perform self-diagnosis. Refer to XX-XX, "*****", XX-XX, "*****".

NO >>
- Mark the box on the XX-XX, "*****".
- GO TO TM-158, "Vehicle Does Not Decelerate by Engine Brake".
- Stop “Road Test”.



Vehicle Speed When Shifting Gears

INFOID:0000000001696175

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)	41 - 49 (25 - 30)
Half throttle	31 - 39 (19 - 24)	60 - 68 (37 - 42)	122 - 130 (76 - 81)	63 - 71 (39 - 44)	36 - 44 (22 - 27)	5 - 13 (3 - 8)

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

Vehicle Speed When Performing and Releasing Complete Lock-up

INFOID:0000000001696176

Throttle position	Selector lever position	Vehicle speed [km/h (MPH)]	
		Lock-up “ON”	Lock-up “OFF”
2.0 / 8	D position	76 - 84 (47 - 52)	56 - 64 (35 - 40)
	D position (OD OFF)	86 - 94 (53 - 58)	83 - 91 (52 - 57)

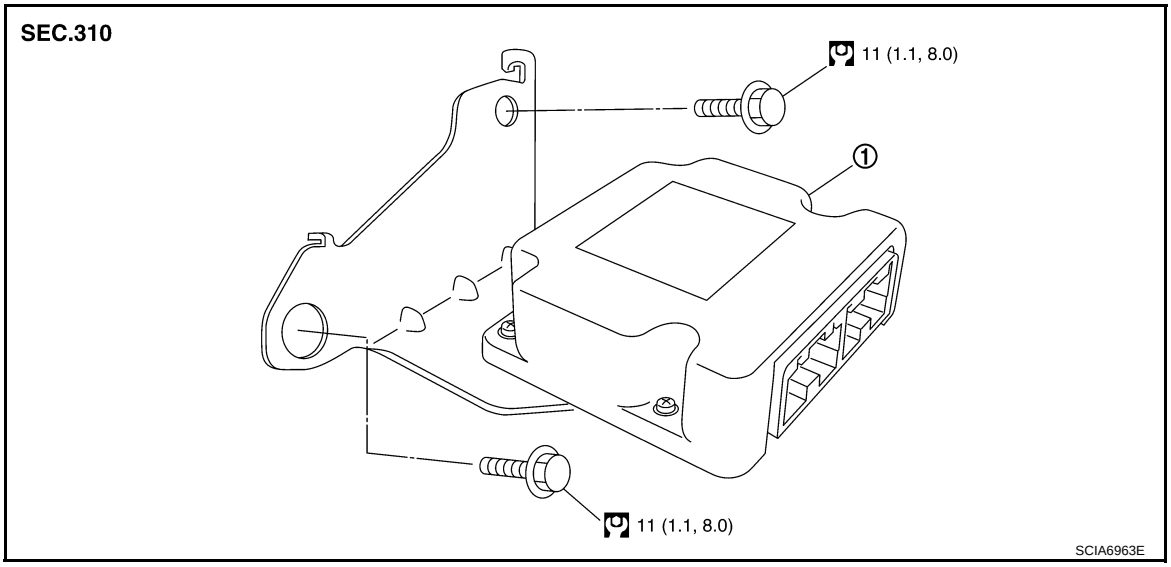
ON-VEHICLE REPAIR

TRANSMISSION CONTROL MODULE

Exploded View

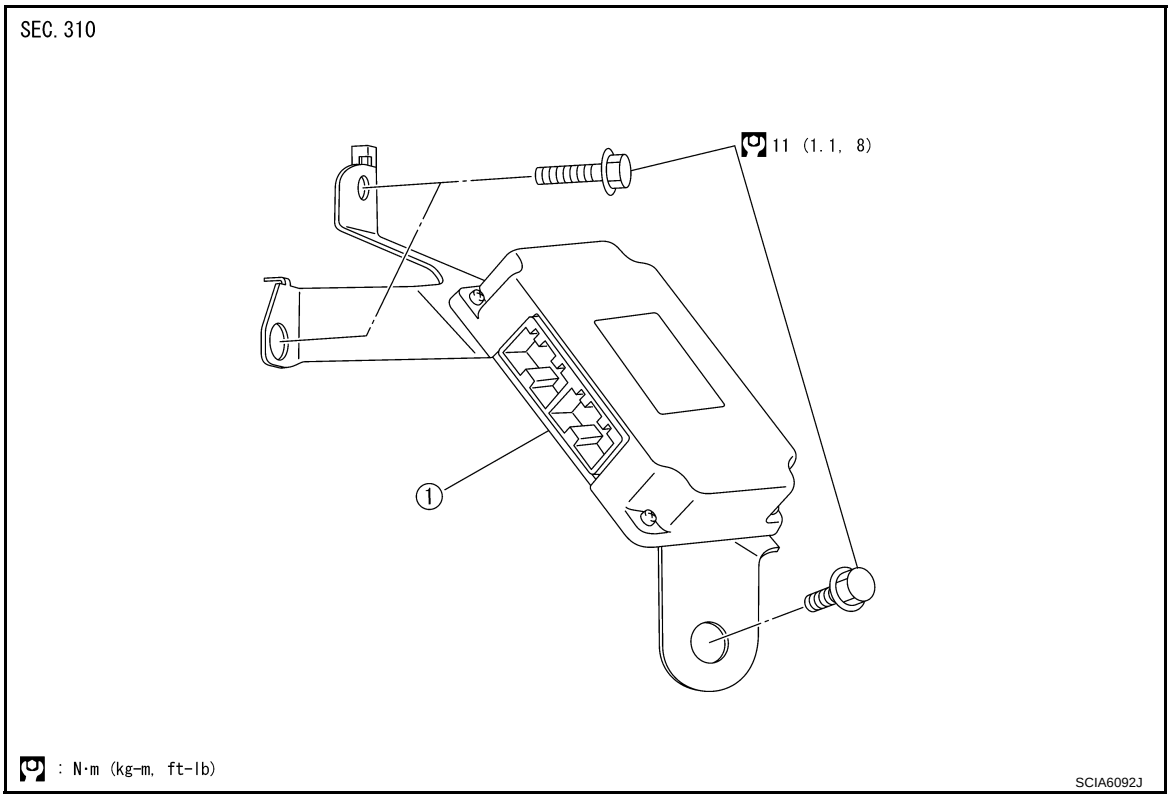
INFOID:0000000001731388

LHD MODELS



1. TCM

RHD MODELS



1. TCM

Removal and Installation

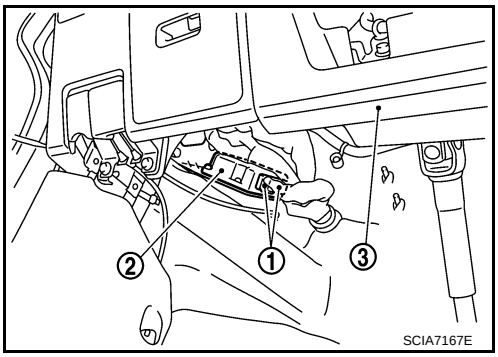
INFOID:0000000001731370

NOTE:

Removal of LHD is shown. TCM for RHD is in the same location and uses the same procedure as LHD. Refer to TM-30, "Component Parts Location" for location detail.

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

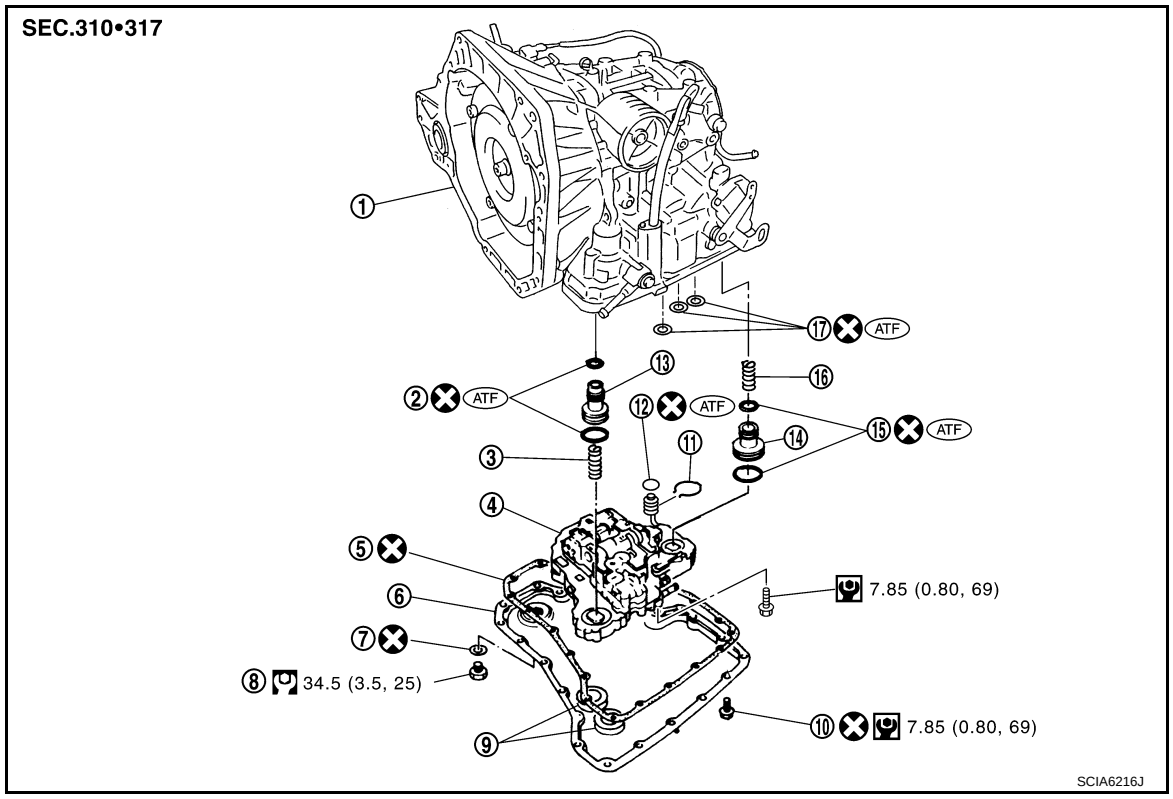
Installation is in the reverse order of removal.

CONTROL SYSTEM

Control Valve Assembly and Accumulators

INFOID:0000000001733158

COMPONENTS



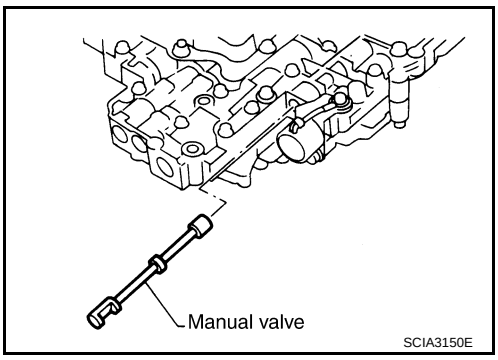
1. A/T	2. O-ring	3. Return spring
4. Control valve assembly	5. Oil pan gasket	6. Oil pan
7. Drain plug gasket	8. Drain plug	9. Magnet
10. Oil pan fitting bolt	11. Snap ring	12. O-ring
13. Servo release accumulator piston	14. N-D accumulator piston	15. O-ring
16. Return spring	17. Lip seal	

REMOVAL

Refer to the figure for control valve assembly and accumulators removal procedure.

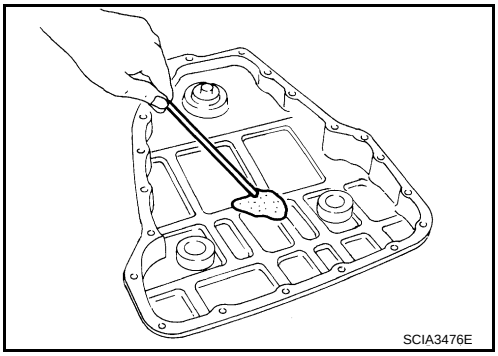
CAUTION:

- **Do not drop manual valve and servo release accumulator return spring.**



- Check for 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.

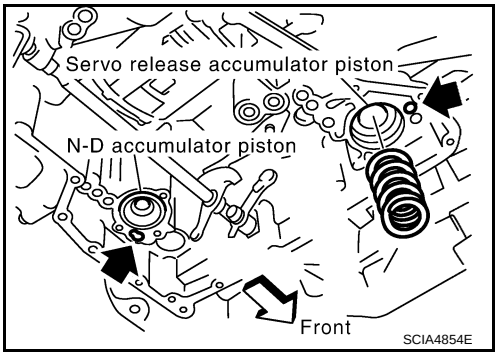
- **If frictional material is detected, flush the A/T fluid cooler after repair of A/T. Refer to TM-172, "A/T Fluid Cooler Cleaning".**


SCIA3476E

- Remove servo release accumulator piston and N-D accumulator piston by applying compressed air if necessary.

CAUTION:

Hold each piston with lint-free paper.

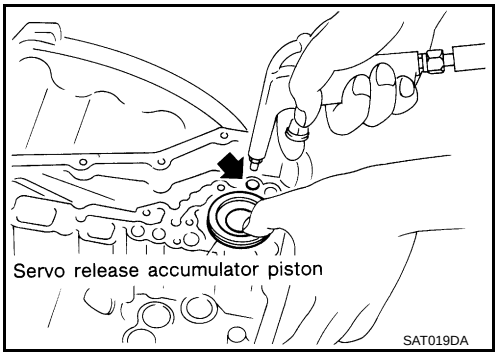


SCIA4854E

- 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. Cover the area with lint-free paper and blow air little by little to avoid this.

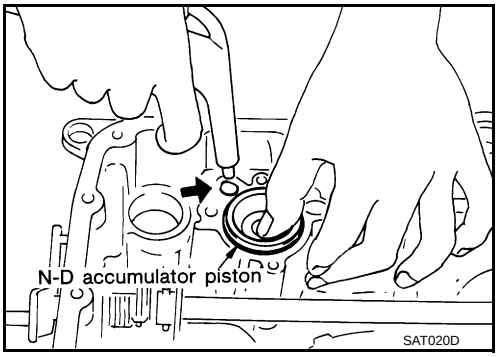


SAT019DA

- Apply compressed air to the oil hole as shown, and remove N-D accumulator piston and return spring from transaxle case.

CAUTION:

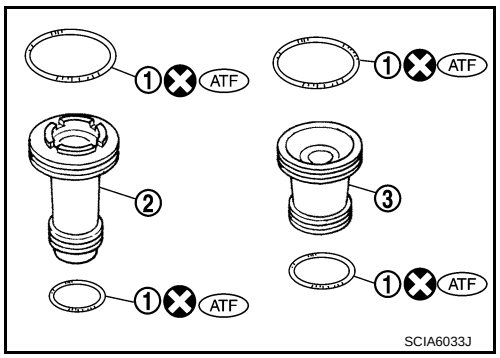
Strong flow of air will push the accumulator piston out along with a splash of ATF. Cover the area with lint-free paper and blow air little by little to avoid this.



SAT020D

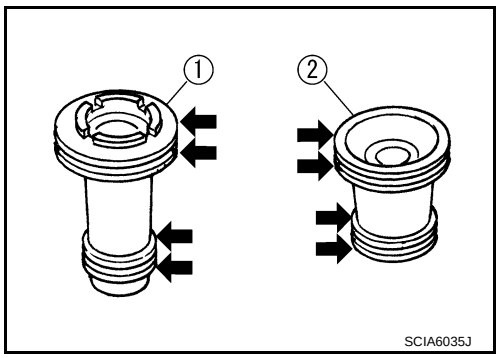
- Remove O-rings (1) from servo release accumulator piston (2) and N-D accumulator piston (3).

CAUTION:
Wrap the removed servo release accumulator piston (2) and N-D accumulator piston (3) in a lint-free paper.



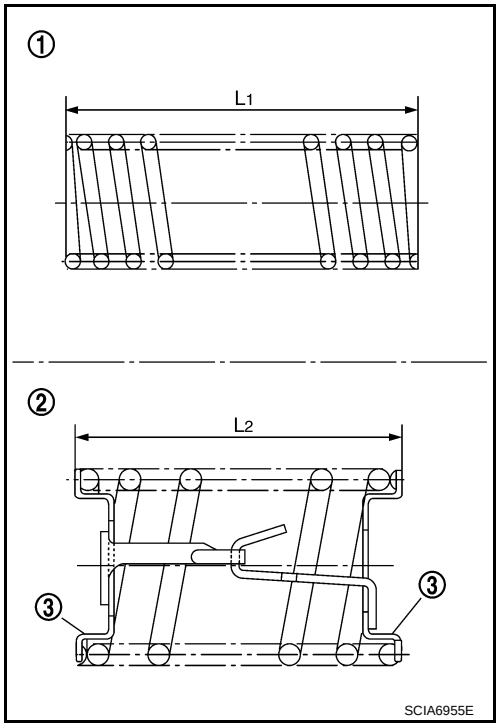
INSPECTION

- 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 TM-321, "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).



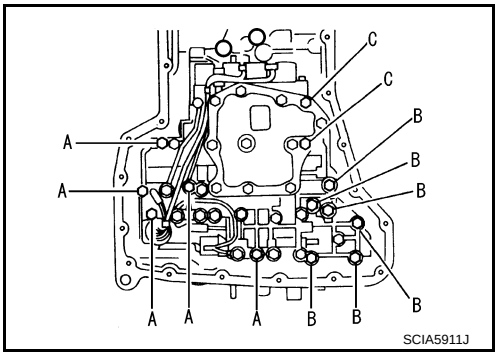
INSTALLATION

Install is in the reverse order of removal.

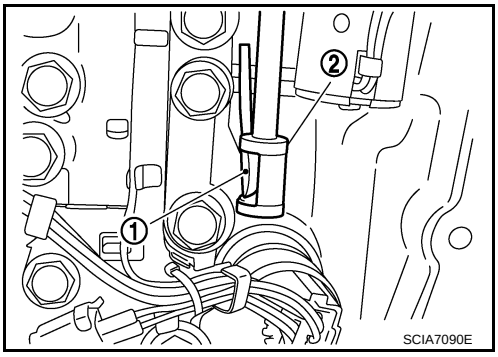
CAUTION:
- **Completely remove all moisture, oil and old gasket, etc. from the oil pan gasket mounting surface of transaxle case and oil pan.**
- **Do not reuse O-rings, lip seals, oil pan gasket and oil pan bolts.**
- **Apply ATF to manual valve, O-rings, lip seals and sliding surfaces transaxle case.**

- Install bolts (A), (B) and (C) in control valve assembly.

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



- 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 TM-171, "Checking A/T Fluid".

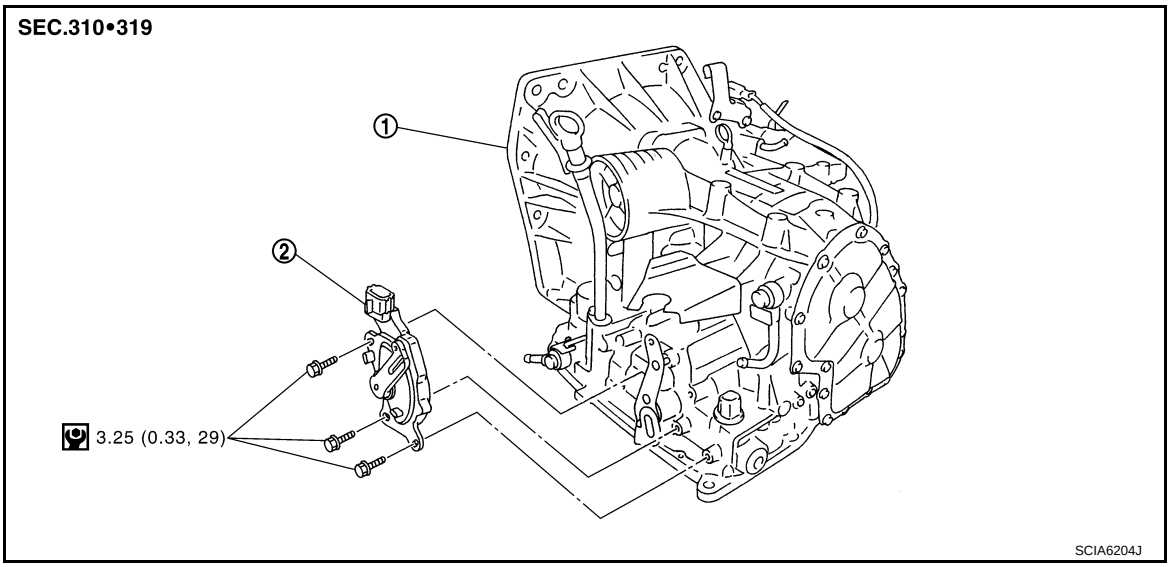


PARK/NEUTRAL POSITION (PNP) SWITCH

Park/Neutral Position (PNP) Switch

INFOID:0000000001733159

COMPONENTS



1. A/T
2. PNP switch

REMOVAL

1. Remove the air duct. Refer to EM-27, "Removal and Installation".
2. Disconnect the PNP switch connector.
3. Disconnect the control cable from the PNP switch.
4. Remove the PNP switch bolts and the PNP switch.

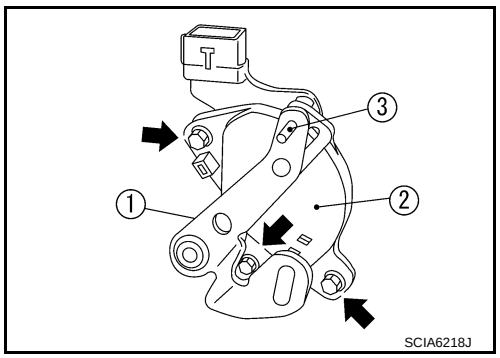
INSTALLATION

Installation is in the reverse order of removal.

- Align PNP switch position when installing.
- After installation is completed, check and adjust A/T position. Refer to TM-204, "Checking of A/T Position" and TM-204, "Adjustment of A/T Position".
- After installation is completed, check continuity of PNP switch. Refer to TM-46, "Component Inspection".

PARK/NEUTRAL POSITION (PNP) SWITCH ADJUSTMENT

1. Set selector lever and manual shaft (1) in “N” position.
2. Remove the air duct. Refer to EM-27, "Removal and Installation".
3. Remove control cable from manual shaft (1).
4. Loosen PNP switch bolts.
   ⬅: Bolt
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.
8. Remove the pin (3) from adjustment hole after adjusting PNP switch (2).
9. Check continuity of PNP switch (2). Refer to TM-46, "Component Inspection".
10. Adjust and check A/T position. Refer to TM-204, "Checking of A/T Position" and TM-204, "Adjustment of A/T Position".



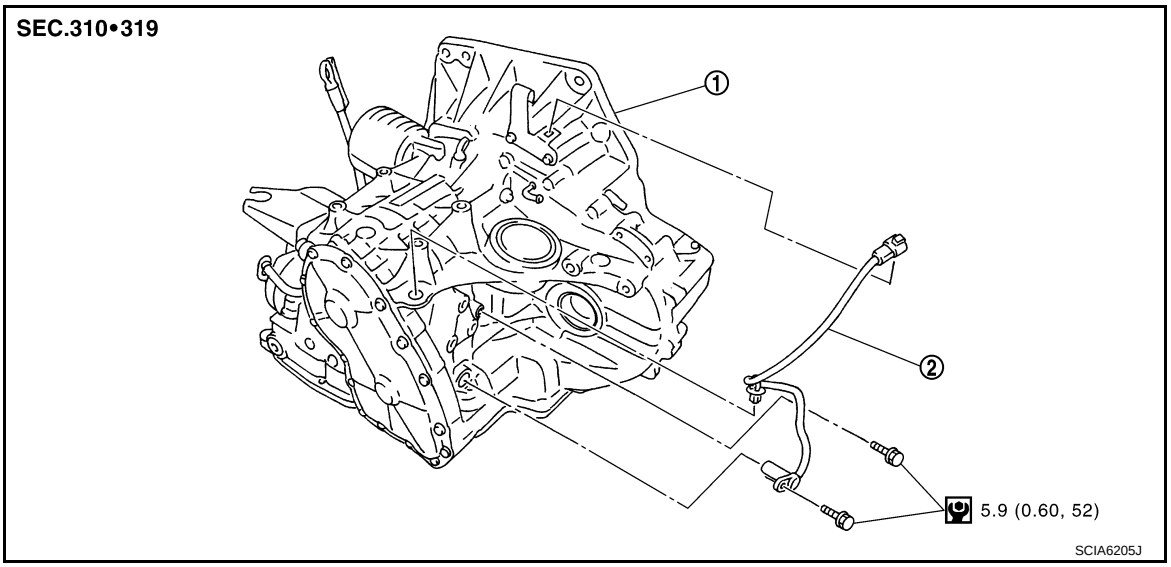
11. Reinstall any parts removed.

REVOLUTION SENSOR

Revolution Sensor

INFOID:0000000001733160

COMPONENTS



1. A/T
2. Revolution sensor

REMOVAL

Refer to the figure for revolution sensor removal procedure.

INSTALLATION

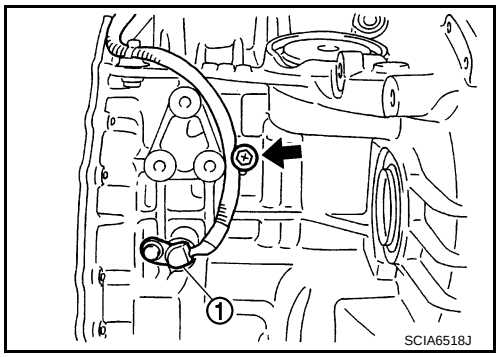
Installation is in the reverse order of removal.

CAUTION:

Ensure revolution sensor harness is firmly secured with bolt.

(1): Revolution sensor

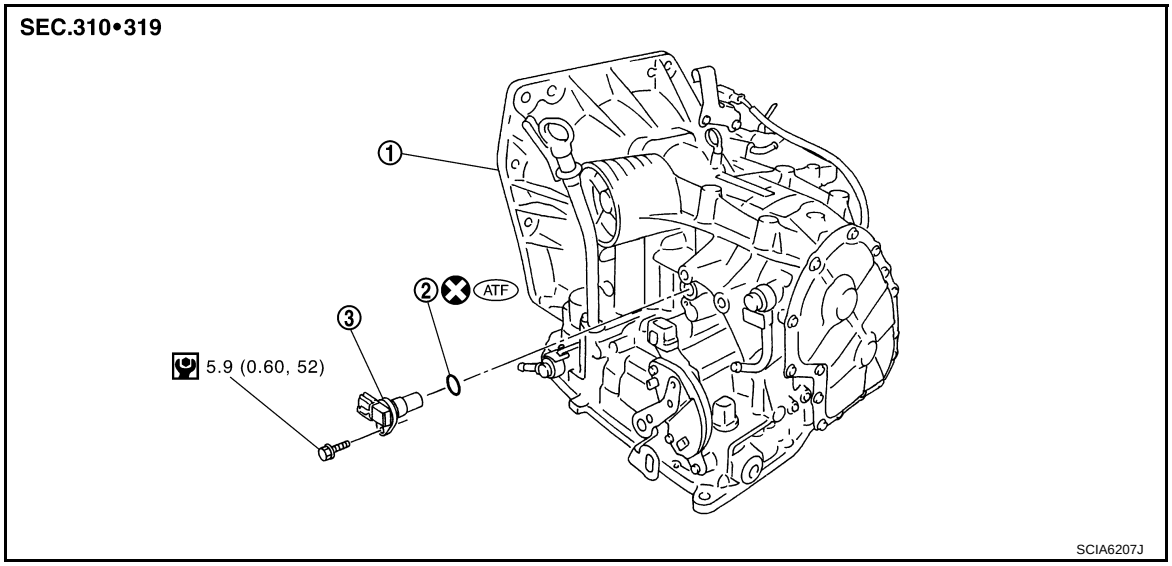
⬅: Bolt



Turbine Revolution Sensor (Power Train Revolution Sensor)

INFOID:0000000001733161

COMPONENTS



1. A/T
2. O-ring
3. Turbine revolution sensor (power train revolution sensor)

REMOVAL

Refer to the figure for turbine revolution sensor (power train revolution sensor) removal procedure.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**

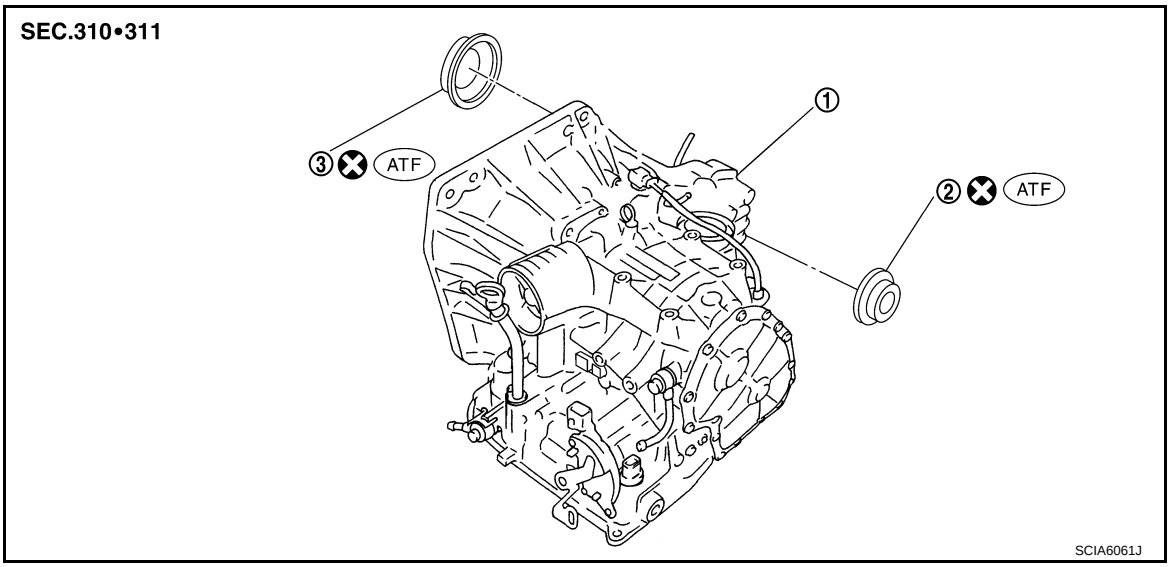
After installing control cable, check and adjust A/T position. Refer to TM-204, "Checking of A/T Position" and TM-204, "Adjustment of A/T Position".

DIFFERENTIAL SIDE OIL SEAL

Differential Side Oil Seal

INFOID:0000000001733162

COMPONENTS



1. A/T
2. LH differential side oil seal
3. RH differential side oil seal

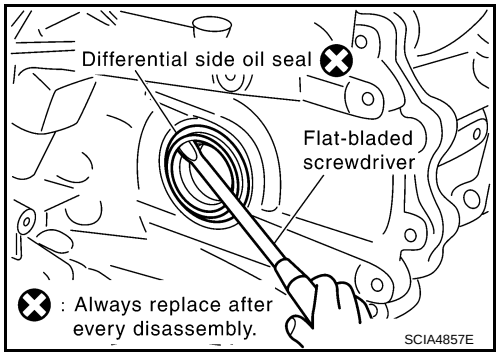
REMOVAL

Refer to figure for differential side oil seals removal procedure.

- Remove differential side oil seals using suitable tool.

CAUTION:

Do not scratch transaxle case and converter housing.



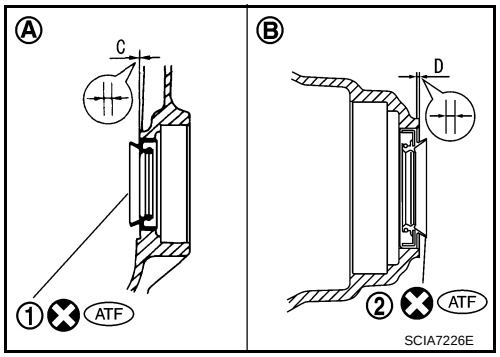
INSTALLATION

Note the following, and install in the reverse order of removal.

- Drive each differential side oil seal (1) and (2) evenly into the transaxle case side (A) using Tools and converter housing side (B) using suitable tool to specified dimension “C” or “D”.

Tool number : ST35325000

: KV31103000



Unit: mm (in)

Engine type	HR16DE
Dimension “C”	0 ± 0.5 (0 ± 0.020)
Dimension “D”	1.1 ± 0.5 (0.043 ± 0.020)

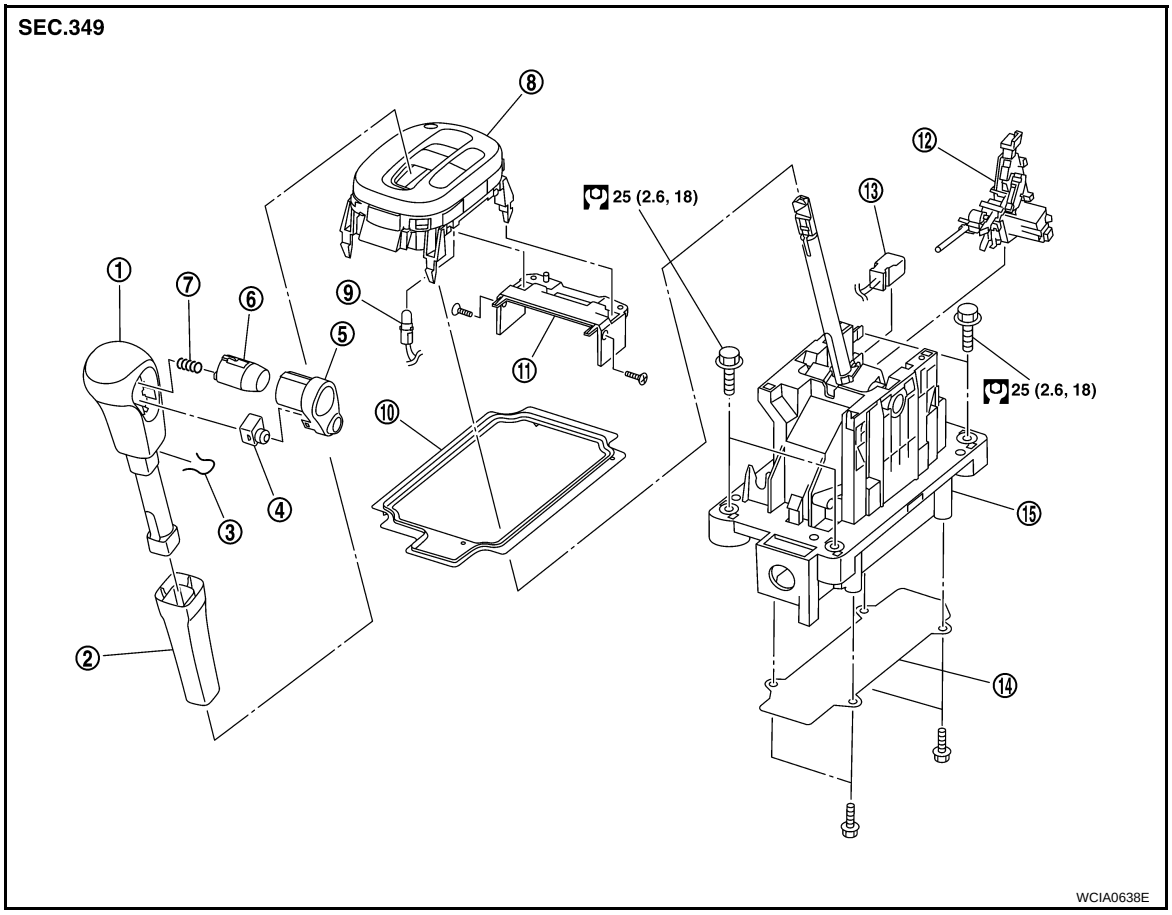
After installing differential side oil seal, check A/T fluid leakage and A/T fluid level. Refer to TM-171, "Checking A/T Fluid".

SHIFT CONTROL SYSTEM

Control Device Removal and Installation

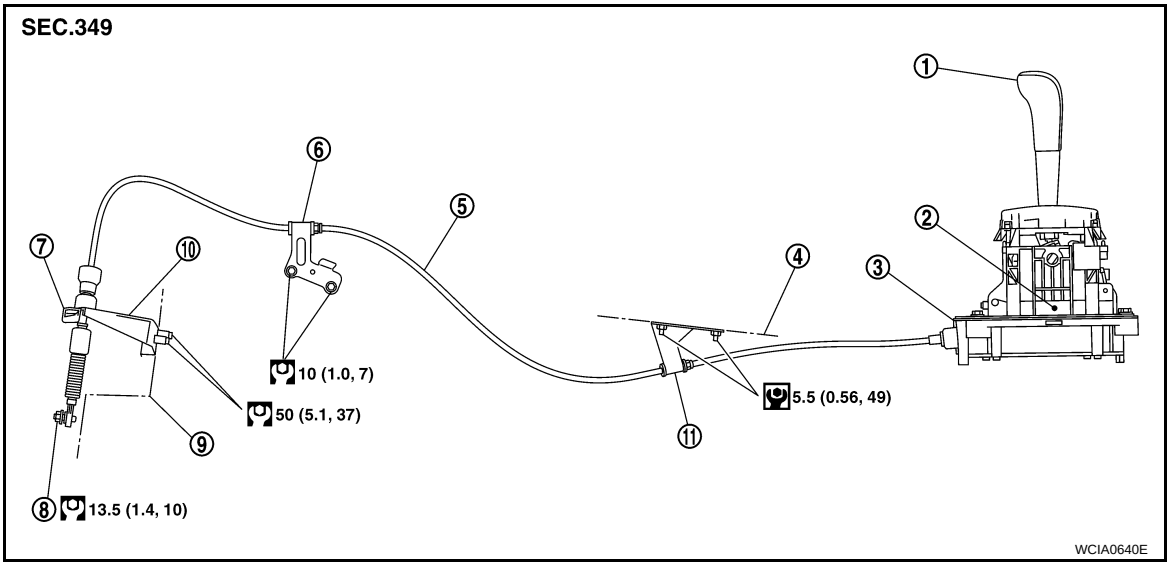
INFOID:0000000001731375

CONTROL DEVICE COMPONENTS



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

CONTROL CABLE COMPONENTS



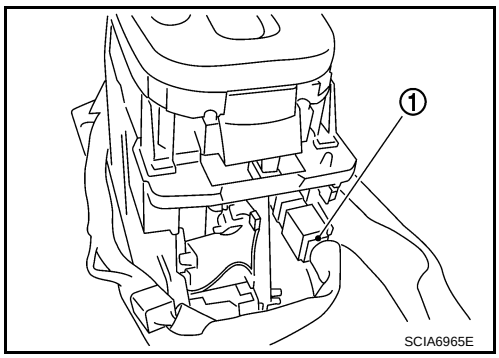
1. Selector lever knob
2. Control device assembly
3. Lock plate
4. Floor panel
5. Control cable
6. Bracket
7. Lock plate
8. Lock nut
9. A/T assembly
10. Bracket
11. Bracket

REMOVAL

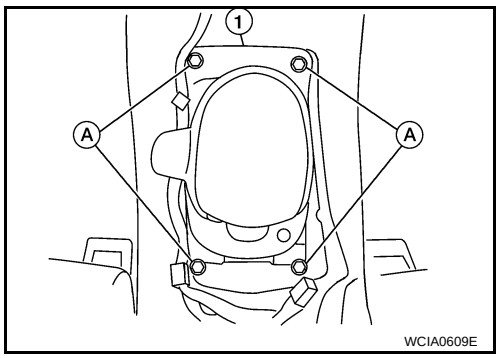
CAUTION:

Make sure that parking brake is applied before removal/installation.

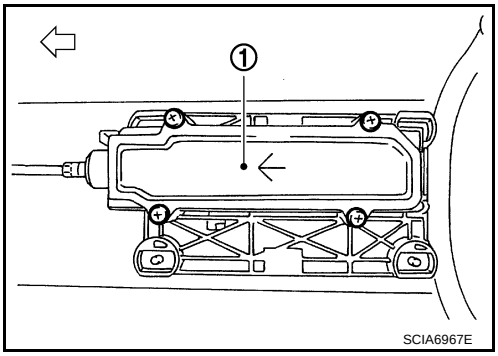
1. Place the selector lever in the “N” position.
2. Remove the center console assembly. Refer to IP-11, "Removal and Installation".
3. Disconnect the A/T device harness connector (1).
4. Remove the key interlock cable from the control device assembly. Refer to TM-206, "Removal and Installation".



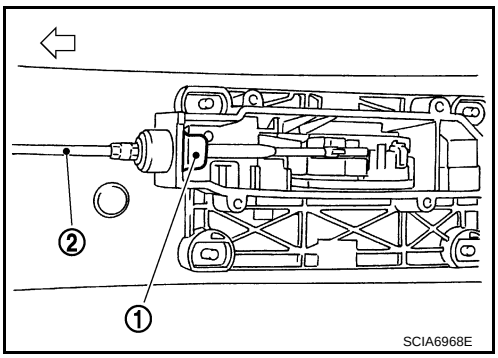
5. Remove the bolts (A) from the control device assembly (1).
6. Remove exhaust front tube, center muffler and heat plates. Refer to EX-5, "Removal and Installation".



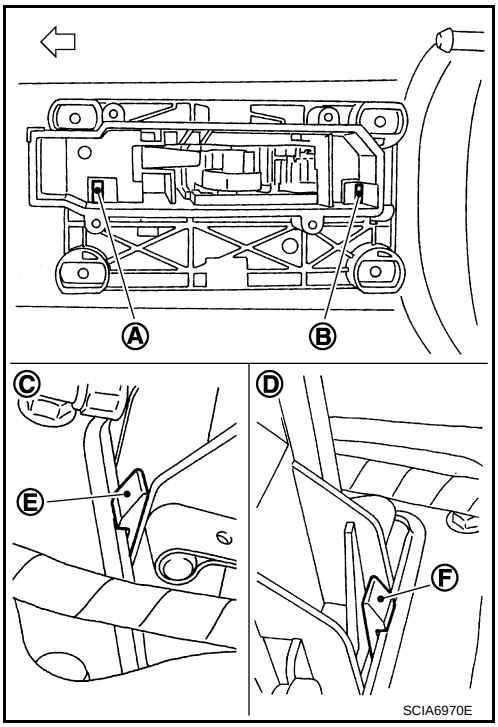
7. Remove the plate (1) from the control device assembly.
   ⇦: Vehicle front



8. Remove the lock plate (1) from the control cable (2).
   ⇦: Vehicle front
9. Remove the control cable (2) from the control device assembly.



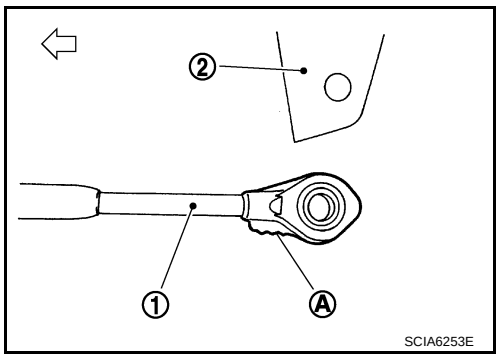
10. Insert flat-bladed screwdrivers at points (A) and (B) as shown, and press both tabs (E) and (F) at the front (C) and rear (D) slightly toward the center of the control device assembly to remove the control device assembly from the underside of the vehicle.
    ⇦: Vehicle front



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 TM-204, "Adjustment of A/T Position" and TM-204, "Checking of A/T Position".



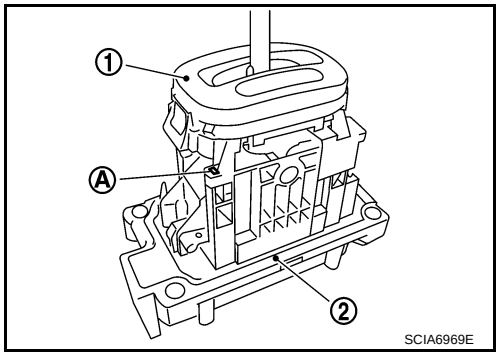
Control Device Disassembly and Assembly

INFOID:0000000001731376

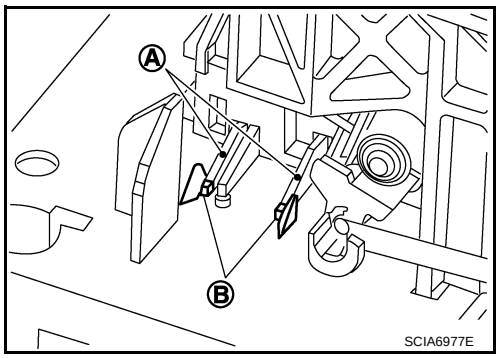
DISASSEMBLY

NOTE:
Refer to TM-200, "Control Device Removal and Installation" to disassemble.

1. Remove selector lever knob from control device assembly. Refer to TM-203, "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.

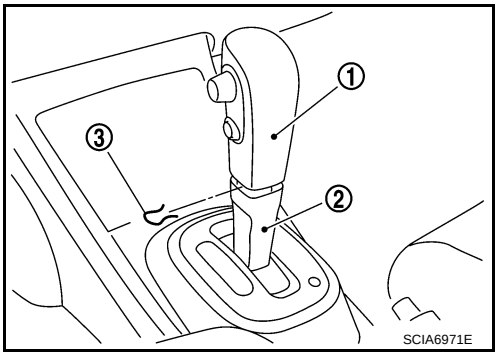
Selector Lever Knob Removal and Installation

INFOID:0000000001731377

REMOVAL

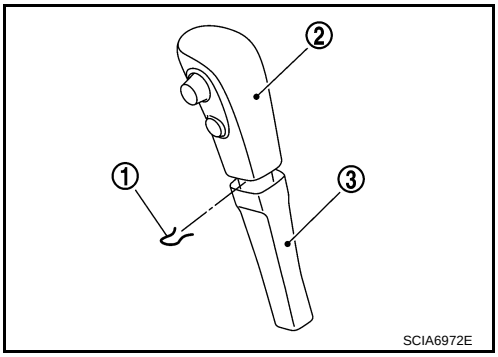
CAUTION:
Make sure that parking brake is applied before removal/installation.

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.**



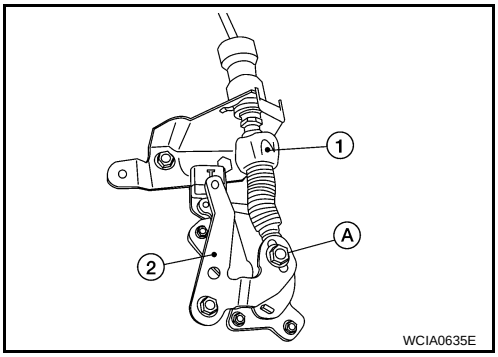
Adjustment of A/T Position

INFOID:0000000001731378

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-27, "Removal and Installation".
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 TM-200, "Control Device Removal and Installation".



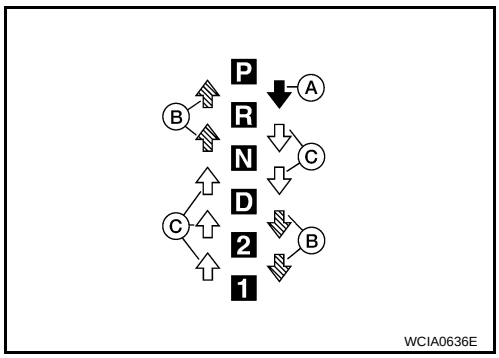
   CAUTION:
   Secure manual lever when tightening nut.
6. Move selector lever from “P” to “1” position again. Make sure that selector lever moves smoothly.
7. Check A/T position. Refer to TM-204, "Checking of A/T Position".
8. Install air duct assembly. Refer to EM-27, "Removal and Installation".

Checking of A/T Position

INFOID:0000000001731379

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.



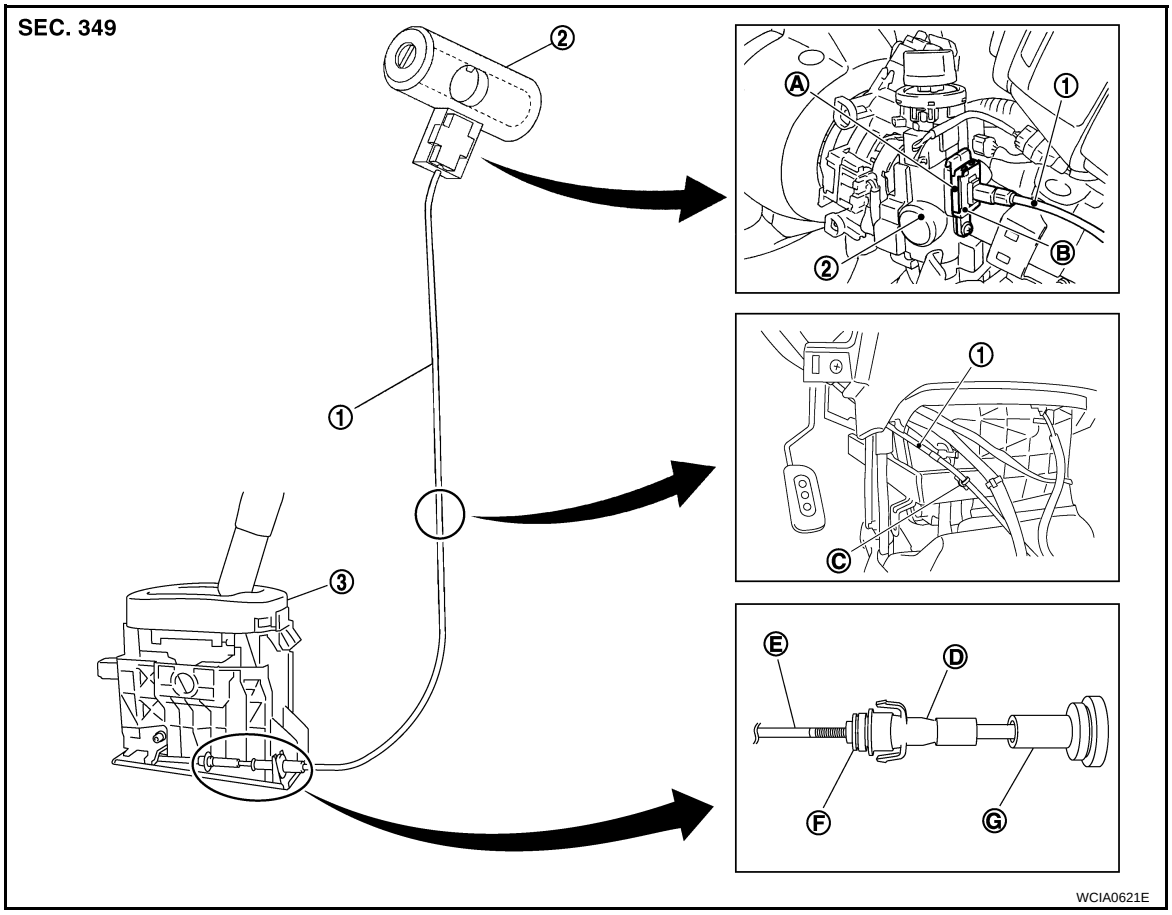
WCIA0636E

KEY INTERLOCK CABLE

Removal and Installation

INFOID:0000000001731380

COMPONENTS



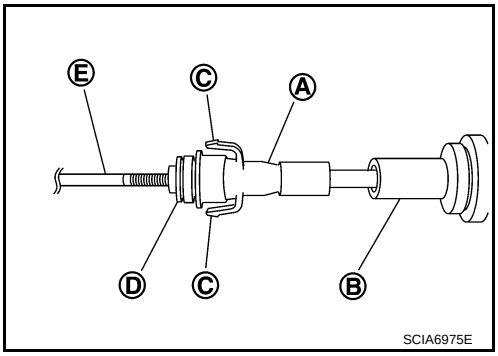
1. Key interlock cable
2. Key cylinder
3. Control device assembly
A. Lock plate
B. Holder
C. Clip
D. Slider
E. Key interlock rod
F. Adjust holder
G. Casing cap

REMOVAL

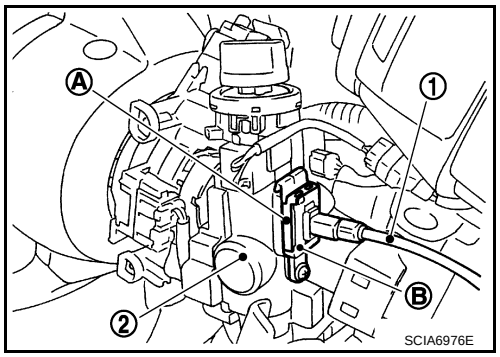
CAUTION:

Make sure that parking brake is applied before removal and installation.

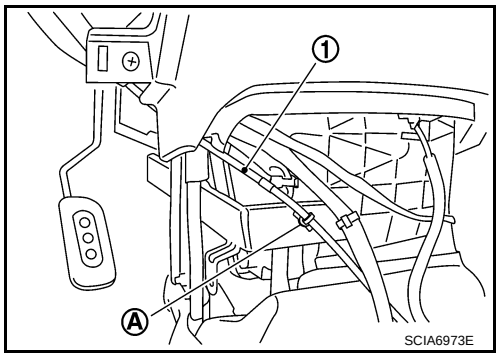
1. Place the selector lever in the “N” position.
2. Remove the selector lever knob. Refer to TM-203, "Selector Lever Knob Removal and Installation".
3. Remove the center console assembly. Refer to IP-11, "Removal and Installation".
4. Slide the slider (A) toward the casing cap (B) while pressing tabs (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).



7. Remove steering column cover (upper and lower) and instrument lower finisher. Refer to IP-11, "Removal and Installation".
8. Pull out the lock plate (A) from the holder (B).
9. Remove the key interlock cable (1) from the key cylinder (2).



10. Remove the clip (A), and then remove the key interlock cable (1).

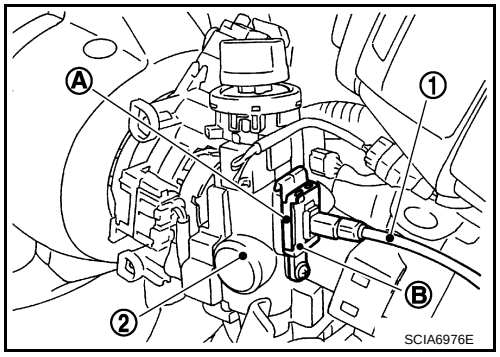


INSTALLATION

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.**

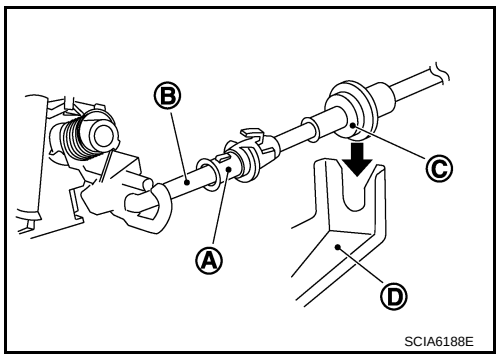
1. Place the selector lever in the “P” position.
2. Turn ignition switch to “ACC” or “ON” position.
3. Set the key interlock cable (1) to the key cylinder (2).
4. Install the lock plate (A) to the holder (B).
5. Turn ignition switch to “LOCK” position.



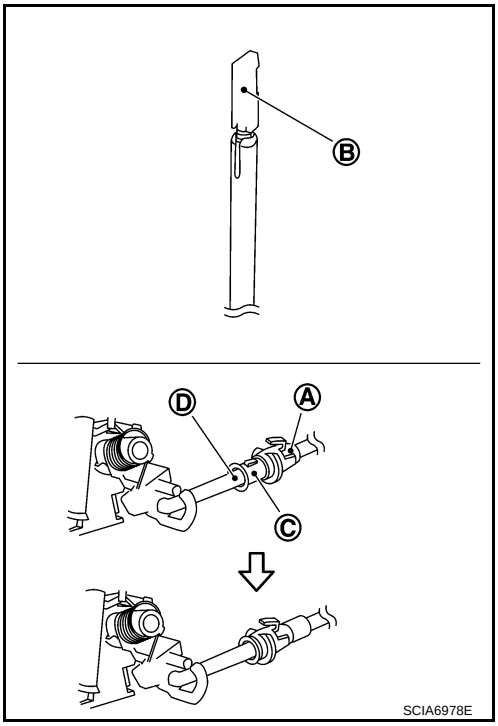
6. Temporarily install the adjust holder (A) to the key interlock rod (B).
7. Install the casing cap (C) to the cable bracket (D) on the control device assembly.

   CAUTION:

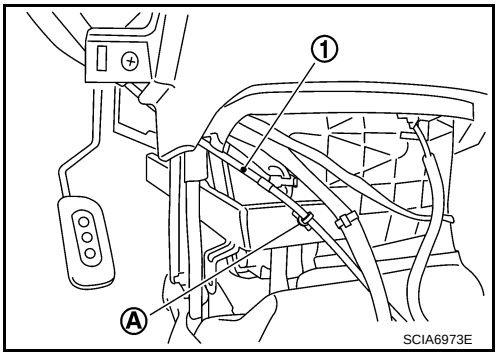
   - **Do not bend or twist key interlock cable excessively when installing.**
   - **After installing key interlock cable to cable bracket (D) on control device assembly, make sure casing cap (C) is firmly secured in cable bracket (D) on control device assembly.**
   - **If casing cap (C) is loose [less than 39.2 N (4.0 kg, 8.8 lb) removing force], replace key interlock cable.**



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-11, "Removal and Installation".
11. Install the center console assembly. Refer to IP-11, "Removal and Installation".
12. Install the selector lever knob. Refer to TM-203, "Selector Lever Knob Removal and Installation".
13. Check shift lock system. Refer to TM-31, "System Description".

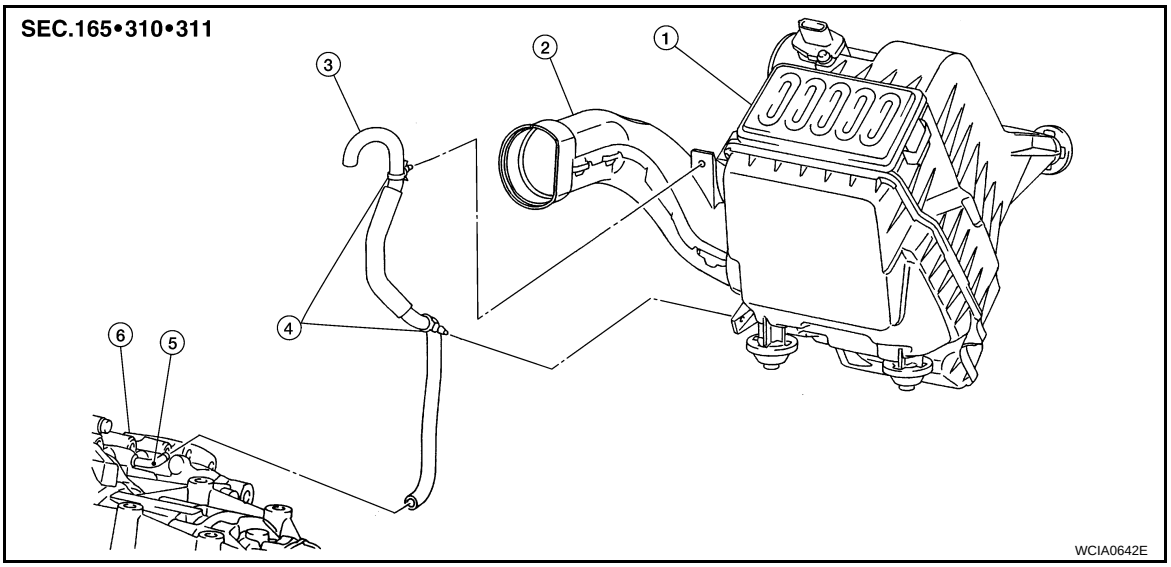


AIR BREATHER HOSE

Removal and Installation

INFOID:0000000001731381

COMPONENTS



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-27, "Removal and Installation".
2. Remove air breather hose.

INSTALLATION

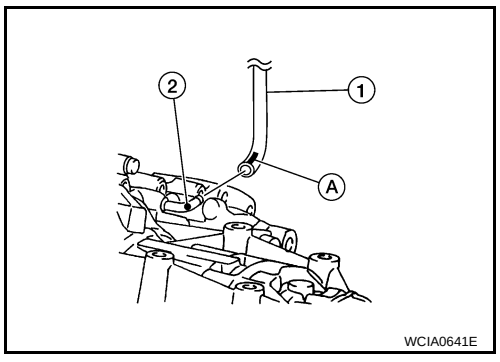
Installation is in the reverse order of removal.

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.

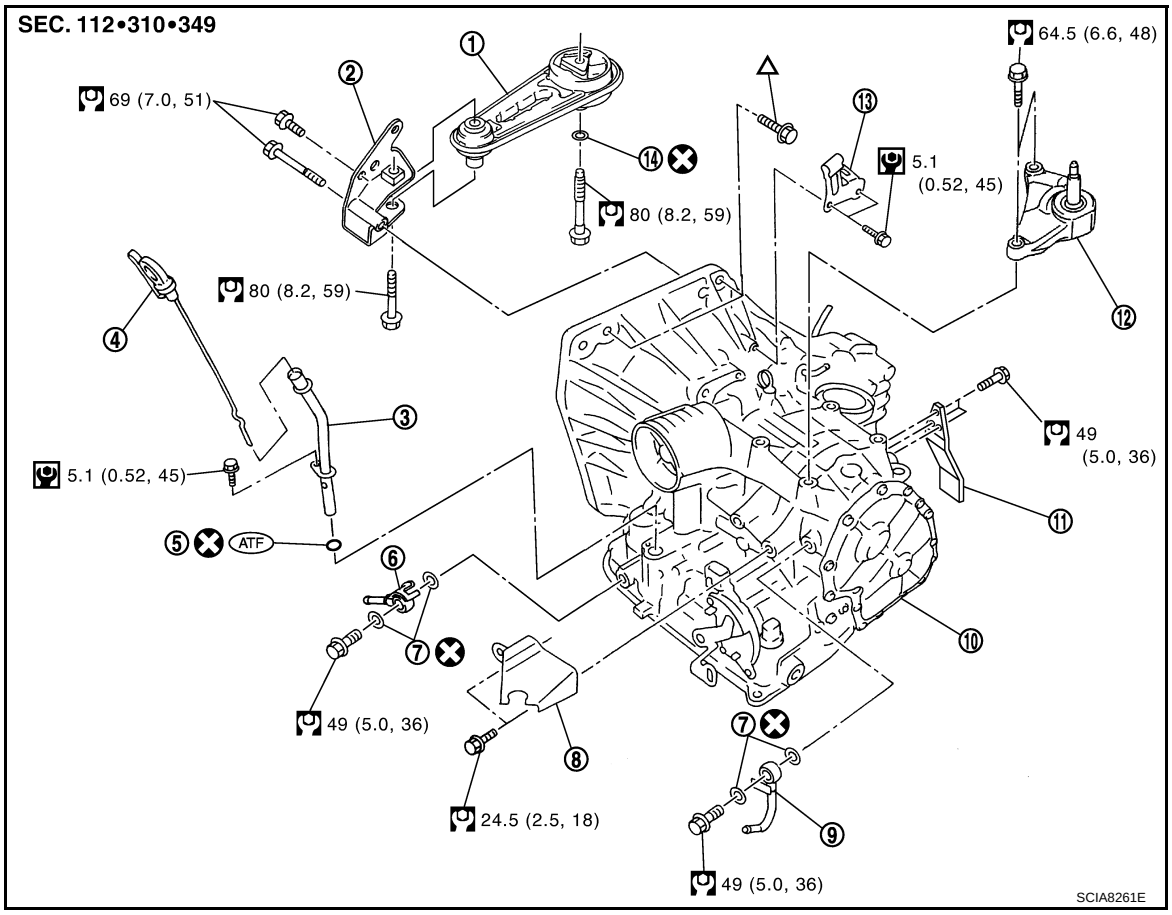


REMOVAL AND INSTALLATION

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001731386



1. Rear torque rod
2. Rear engine mounting bracket
3. A/T fluid charging pipe
4. A/T fluid level gauge
5. O-ring
6. Fluid cooler tube
7. Copper washer
8. Bracket
9. Fluid cooler tube
10. A/T assembly
11. Rear gusset
12. Engine mounting bracket (LH)
13. Bracket
14. Washer

△: Refer to installation.

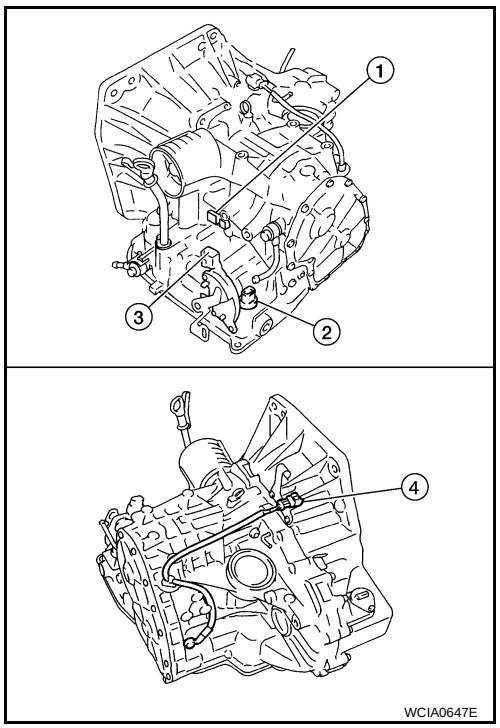
Removal and Installation

INFOID:0000000001731383

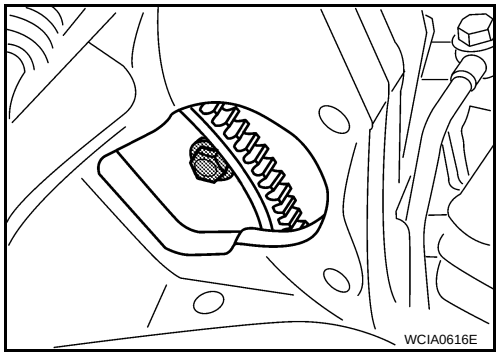
REMOVAL

1. Remove the engine and transaxle as an assembly. Refer to EM-89, "Removal and Installation".

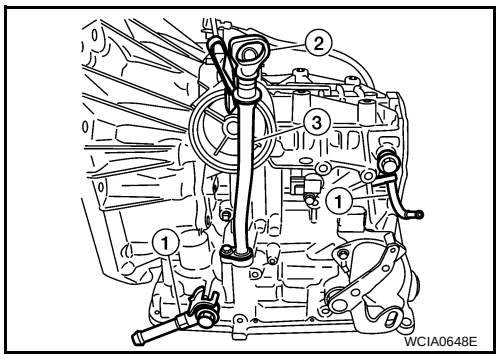
2. Disconnect the following connectors and remove the wire harness.
   - Turbine revolution sensor (power train revolution sensor) harness connector (1)
   - Terminal cord assembly harness connector (2)
   - PNP switch connector (3)
   - Revolution sensor harness connector (4)



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.



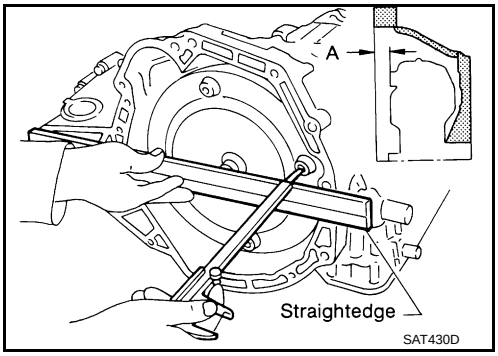
4. Put matching marks on the drive plate and torque converter.
   CAUTION:
   For matching marks, use paint. Never damage the drive plate or torque converter.
5. Remove the transaxle to engine and engine to transaxle bolts.
6. Separate the transaxle from the engine.
   CAUTION:
   Secure torque converter to prevent it from dropping.
7. If necessary, remove the following from the transaxle:
   - 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



INSPECTION

When installing the torque converter to the transaxle measure distance A.

Dimension A: 16.2 mm (0.638 in) or more

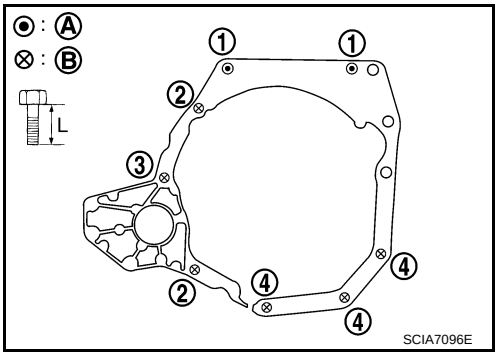


INSTALLATION

Installation is in the reverse order of removal.

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 TM-210, "Exploded View".**
- **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-50, "Removal and Installation".**
- **After converter is installed to drive plate, rotate crankshaft several turns to check that transaxle rotates freely without binding.**
- 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 assembly to the engine, attach the bolts in accordance with the following standard.

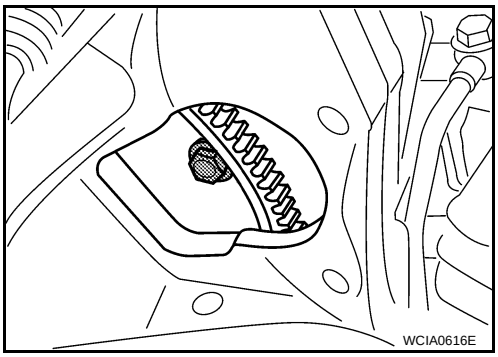


Bolt No.	1	2	3	4
Number of bolts	2	2	1	3
Bolt length “L” [mm (in)]	40 (1.57)	44 (1.73)	69 (2.72)	49 (1.93)
Tightening torque [N·m (kg-m, ft-lb)]	48 (4.9, 35)			

(A): A/T to engine
(B): Engine to A/T

- 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 bolts : 51 N·m (5.2 kg-m, 38 ft-lb)



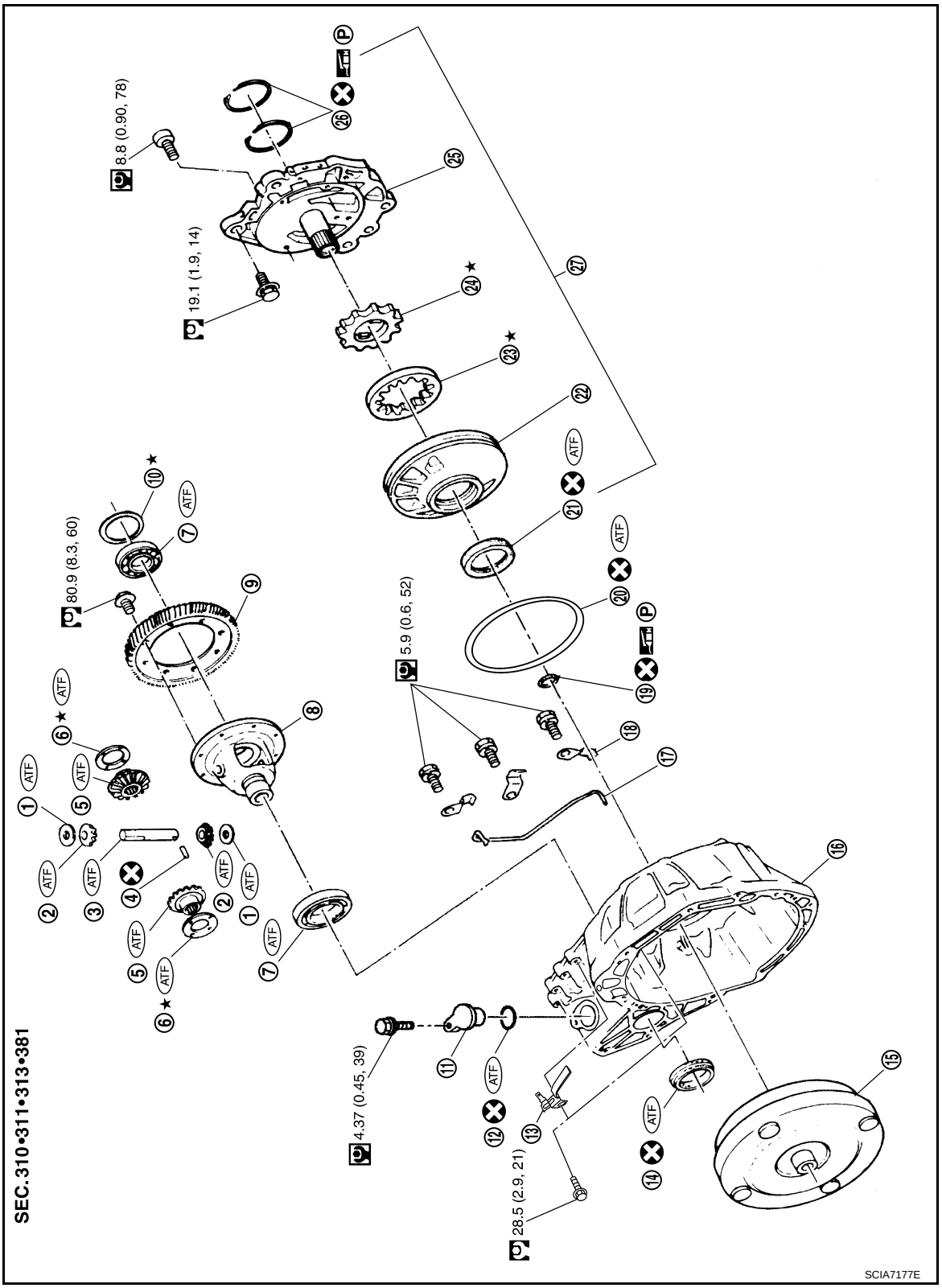
- After completing installation, check for A/T fluid leakage, A/T fluid level and A/T positions. Refer to TM-171, "Checking A/T Fluid" and TM-204, "Checking of A/T Position".

DISASSEMBLY AND ASSEMBLY

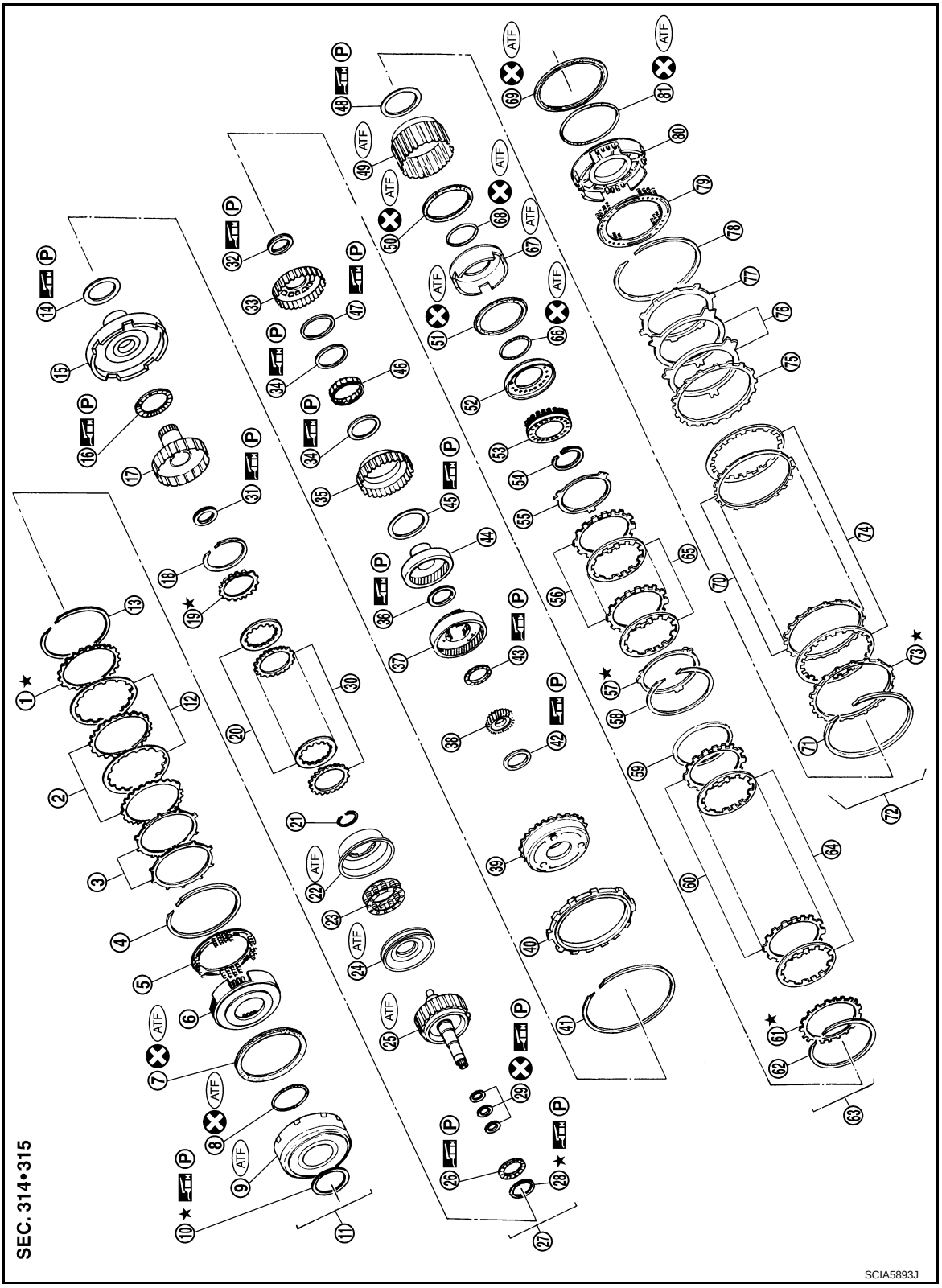
OVERHAUL

Component

INFOID:0000000001730978

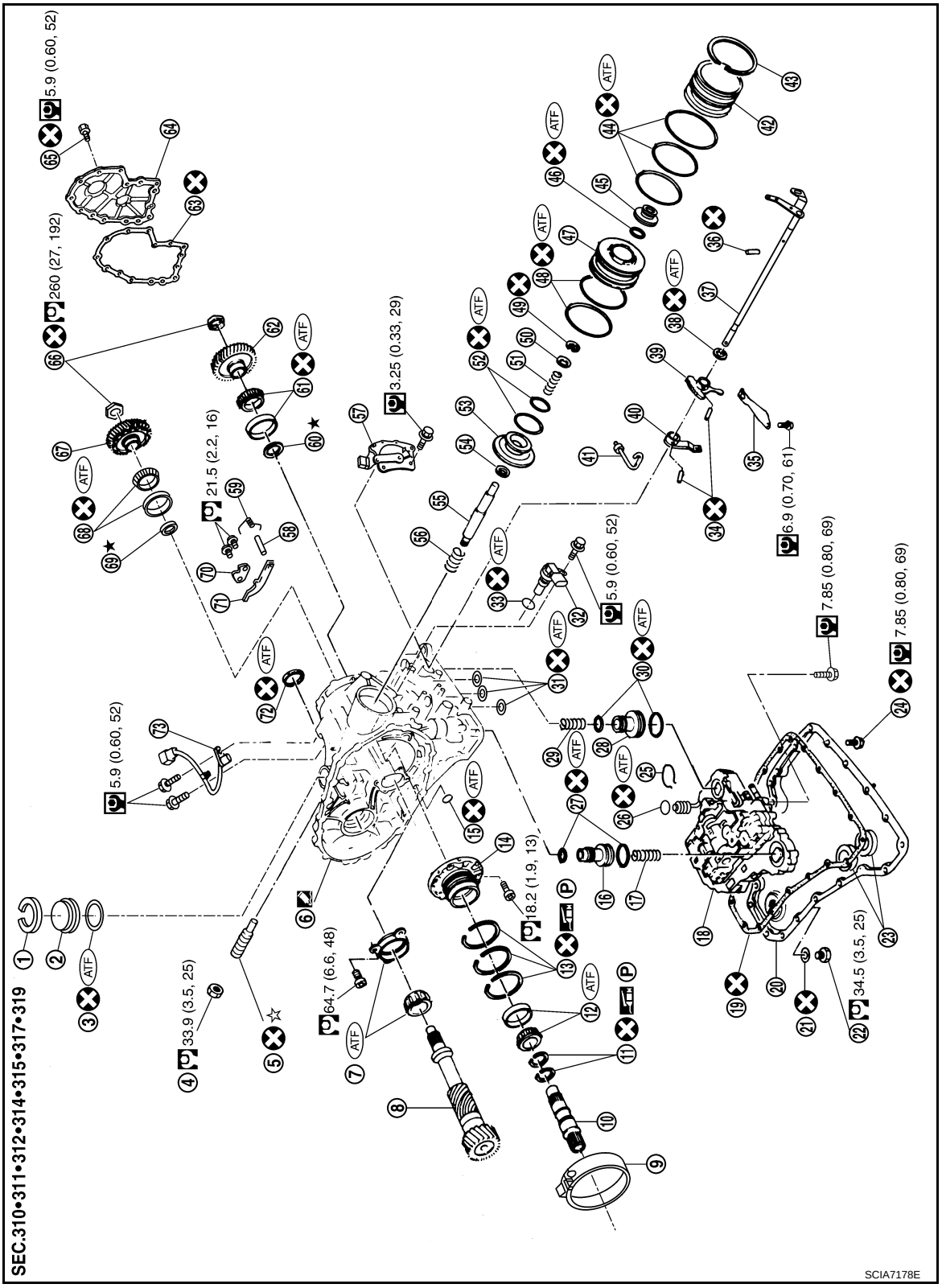


1. Pinion mate gear thrust washer
2. Pinion mate gear
3. Pinion mate shaft
4. Lock pin
5. Side gear
6. Side gear thrust washer
7. Differential side bearing
8. Differential case
9. Final gear
10. Differential side bearing adjusting shim
11. Plug
12. O-ring
13. Bracket
14. RH differential side oil seal
15. Torque converter
16. Converter housing
17. Differential lubricant tube
18. Clip
19. O-ring
20. O-ring
21. Oil pump housing oil seal
22. Oil pump housing
23. Outer gear
24. Inner gear
25. Oil pump cover
26. Seal ring
27. Oil pump assembly



1. Retaining plate
2. Driven plate
3. Dish plate
4. Snap ring
5. Spring retainer assembly
6. Reverse clutch piston
7. Seal ring
8. D-ring
9. Reverse clutch drum
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 ring
51. Seal ring
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. Seal ring
70. Driven plate
71. Snap ring
72. Low & reverse brake assembly
73. Retaining plate
74. Drive plate
75. Retaining plate
76. Dish plate
77. Driven plate
78. Snap ring
79. Spring retainer assembly
80. Low & reverse brake piston
81. D-ring



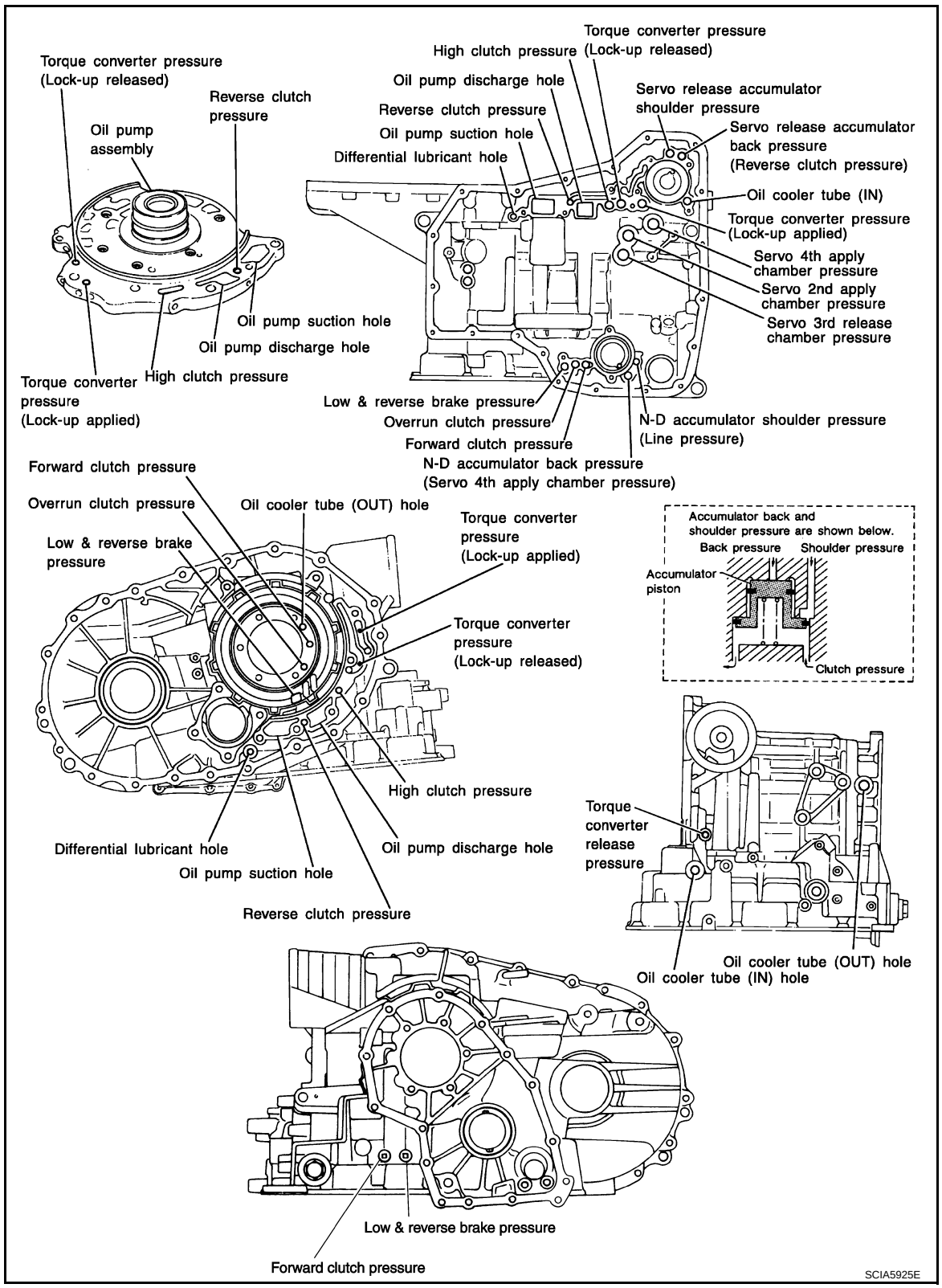
1. Snap ring
2. Governor cap
3. O-ring
4. Lock nut
5. Anchor end pin
6. Transaxle case
7. Reduction pinion gear bearing
8. Reduction pinion gear
9. Brake band
10. Output shaft
11. Seal ring
12. Output shaft bearing
13. Seal ring
14. Bearing retainer
15. O-ring
16. Servo release accumulator piston
17. Return spring
18. Control valve assembly

19. Oil pan gasket
20. Oil pan
21. Drain plug gasket
22. Drain plug
23. Magnet
24. Oil pan fitting bolt
25. Snap ring
26. O-ring
27. O-ring
28. N-D accumulator piston
29. Return spring
30. O-ring
31. Lip seal
32. Turbine revolution sensor (power train revolution sensor)
33. O-ring
34. Retaining pin
35. Detent spring
36. Retaining pin
37. Manual shaft
38. Manual shaft oil seal
39. Manual plate
40. Parking rod plate
41. Parking rod
42. OD servo piston retainer
43. Snap ring
44. O-ring
45. OD servo piston
46. D-ring
47. Servo piston retainer
48. O-ring
49. E-ring
50. Spring retainer
51. OD servo return spring
52. D-ring
53. Band servo piston
54. Band servo thrust washer
55. Band servo piston stem
56. 2nd servo return spring
57. PNP switch
58. Parking shaft
59. Return spring
60. Output gear adjusting spacer
61. Output gear bearing
62. Output gear
63. Side cover gasket
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

: Apply locking sealant (Loctite #518).

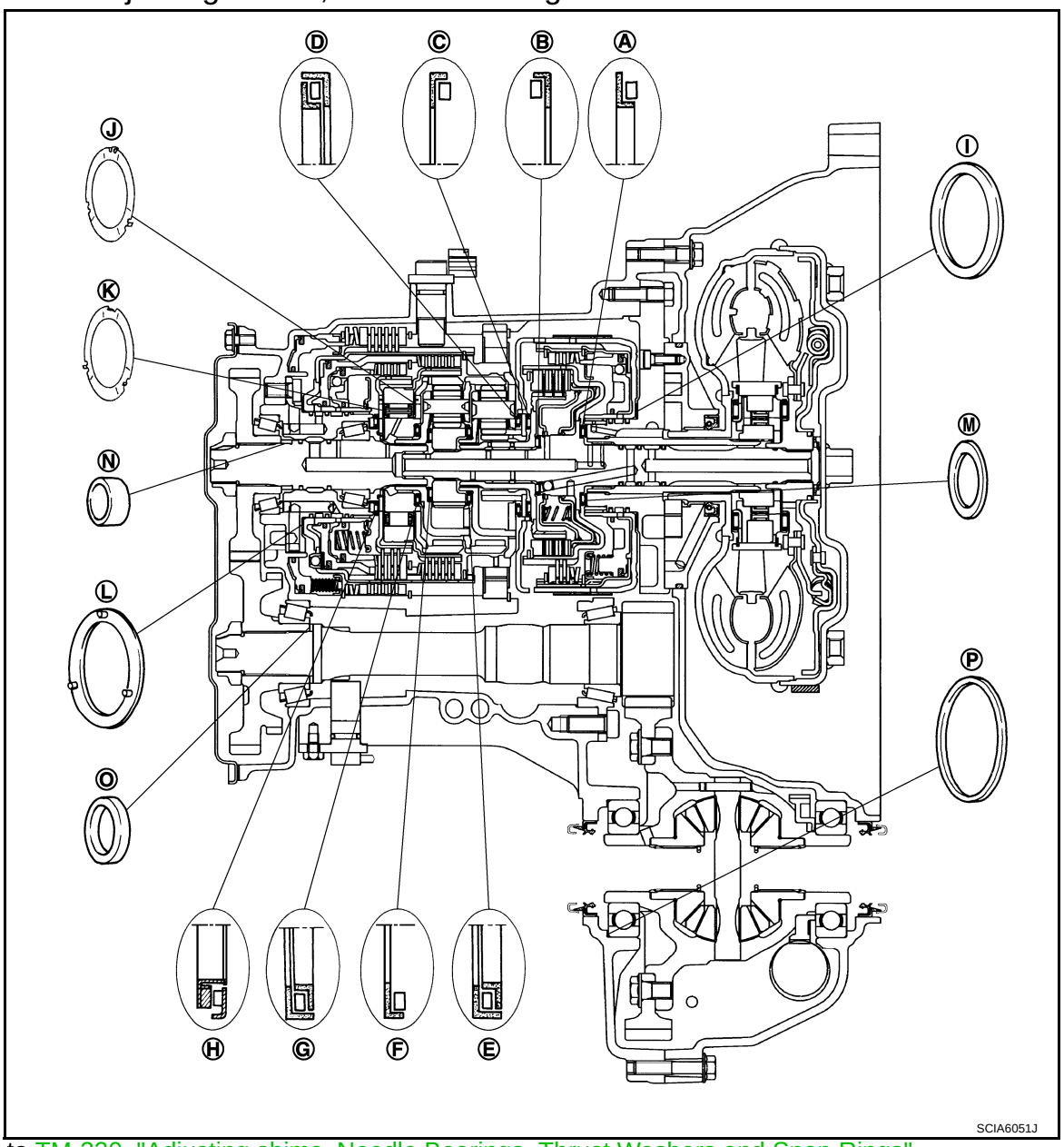
Oil Channel

INFOID:0000000001730979



Location of Adjusting Shims, Needle Bearings and Thrust Washers

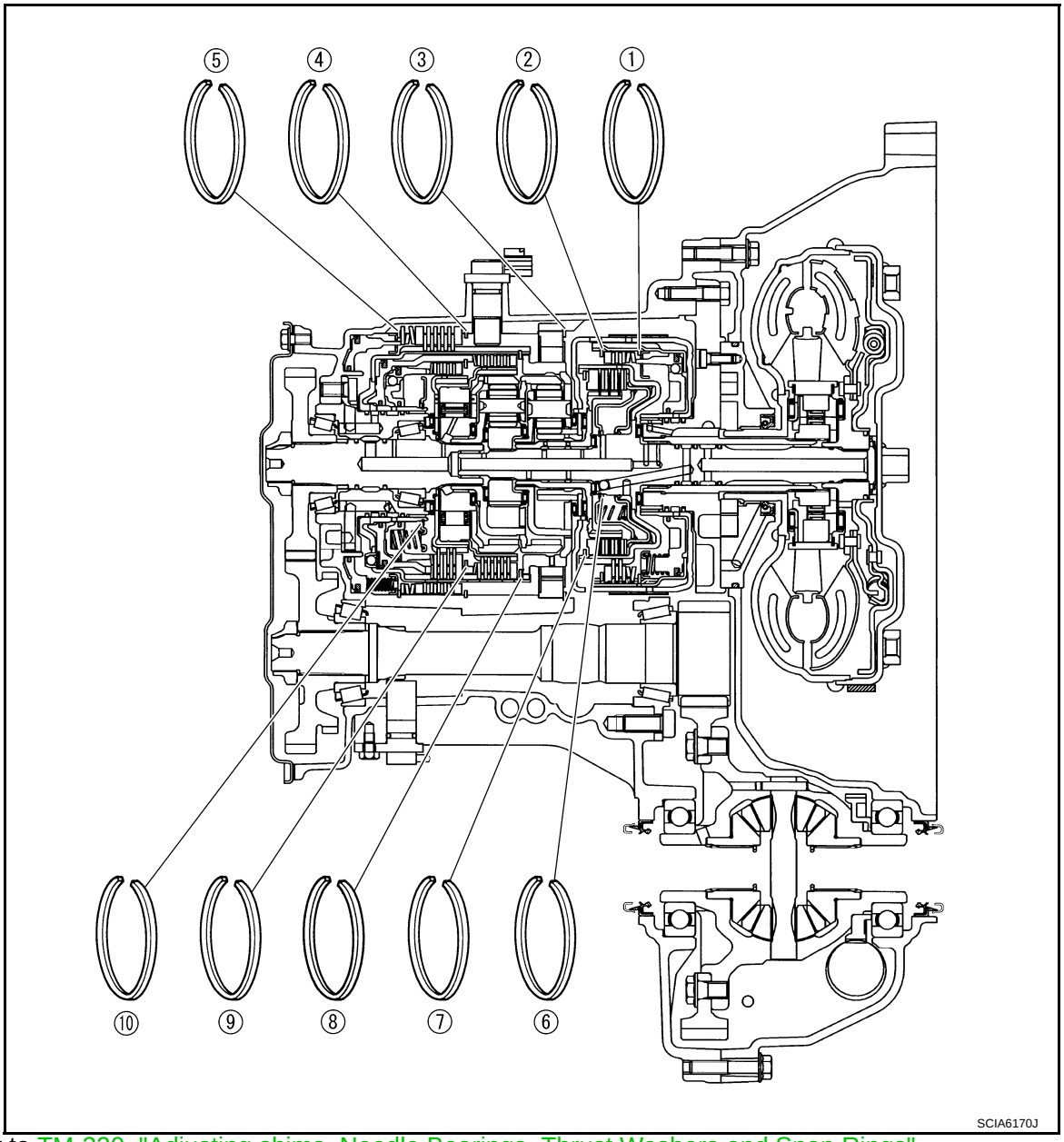
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- Refer to TM-320, "Adjusting shims, Needle Bearings, Thrust Washers and Snap Rings".

Location of Snap Rings

INFOID:0000000001730981



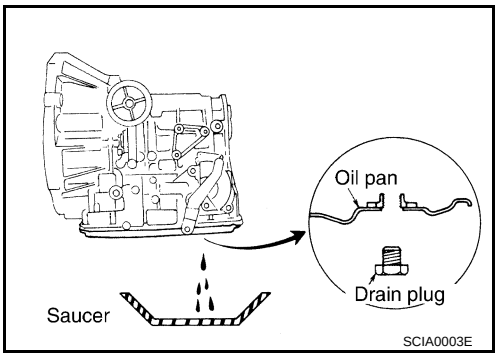
- Refer to TM-320, "Adjusting shims, Needle Bearings, Thrust Washers and Snap Rings".

DISASSEMBLY

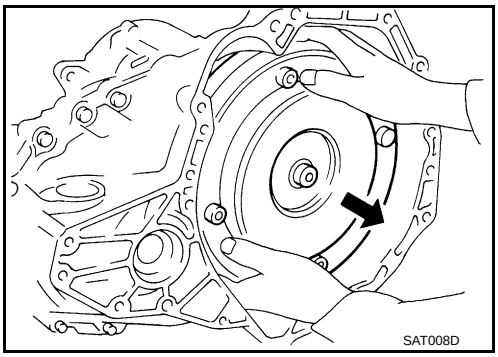
Disassembly

INFOID:0000000001730982

1. Drain ATF through drain hole.
2. Remove drain plug gasket from drain plug.



3. Remove torque converter.

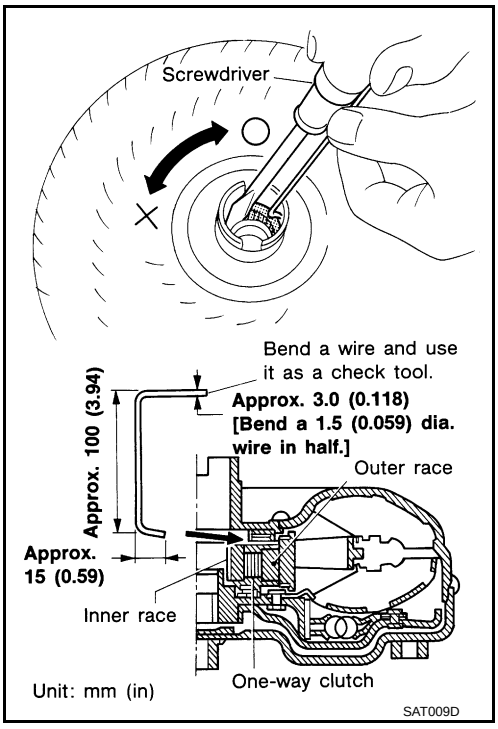


4. Check torque converter one-way clutch using check tool as shown.

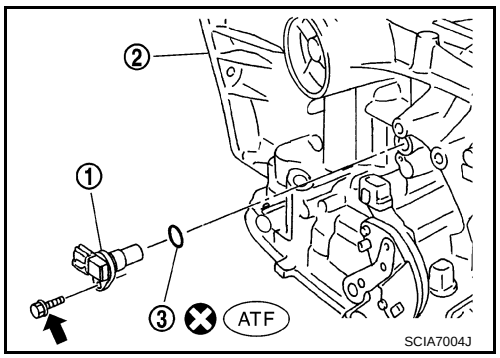
a. Insert check tool into groove of bearing support built into one-way clutch outer race.

b. When secring bearing support with check tool, rotate one-way clutch spline using suitable tool.

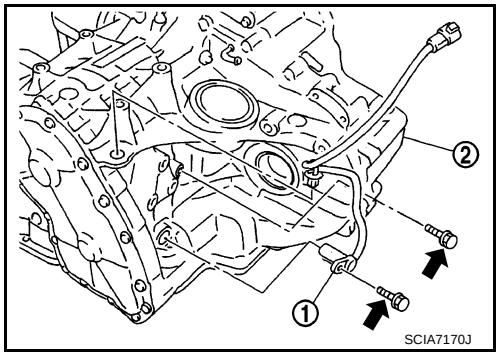
c. Check that inner race rotates clockwise only. If not, replace torque converter assembly.



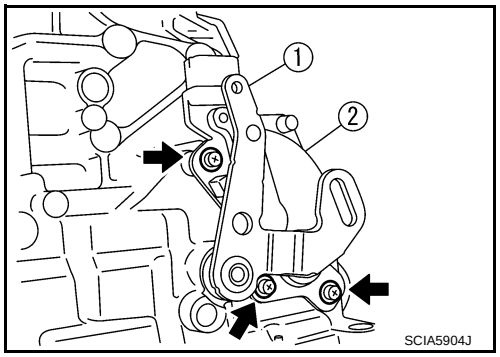
5. Remove turbine revolution sensor (power train revolution sensor) (1) from transaxle case (2).
   ⬅: Bolt (1)
6. Remove O-ring (3) from turbine revolution sensor (power train revolution sensor) (1).



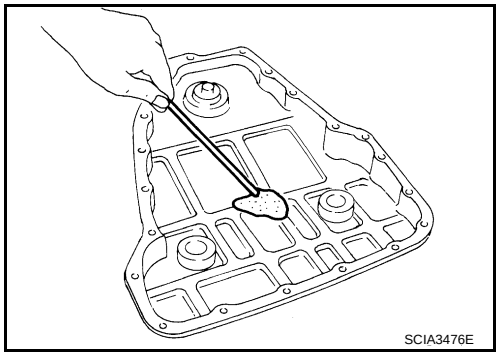
7. Remove revolution sensor (1) from transaxle case (2).
   ⬅: Bolt (2)



8. Set manual shaft (1) in “P” position.
9. Remove PNP switch (2) from transaxle case.
   ⬅: Bolt (3)



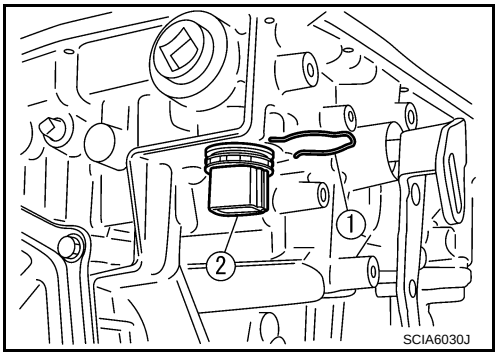
10. Remove oil pan bolts.
11. Remove oil pan and oil pan gasket.
12. Check foreign materials in oil pan to help determine causes of malfunction. If the ATF is very dark, smells burned, or contains foreign particles, frictional material (clutches, band) may need replacement. A tacky film that will not 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, clean the A/T fluid cooler after repair of A/T. Refer to TM-172, "A/T Fluid Cooler Cleaning".**
13. Remove magnets from oil pan.



14. 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.

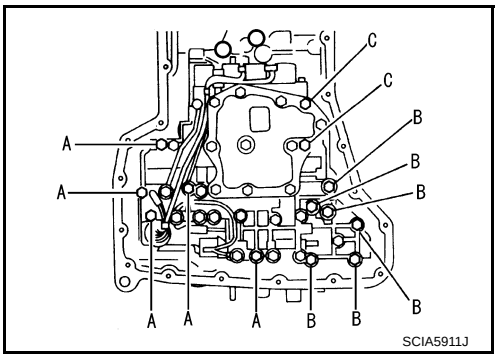
b. Push terminal body (2) into transaxle case.



c. Remove control valve assembly 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

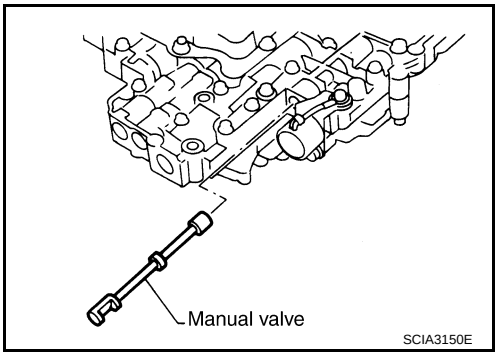


d. Remove control valve assembly from transaxle case.
CAUTION:
Do not drop manual valve.

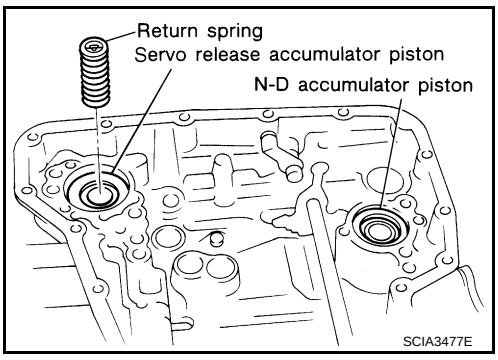
15. Remove manual valve from control valve assembly.
- **Inspect the sliding surfaces of manual valve and valve body, and replace if damaged or dented.**

CAUTION:
Do not drop manual valve.

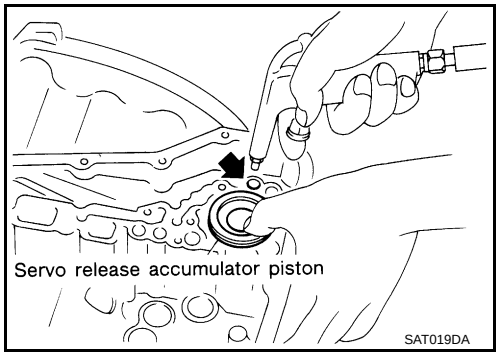
16. Remove O-ring from terminal body.



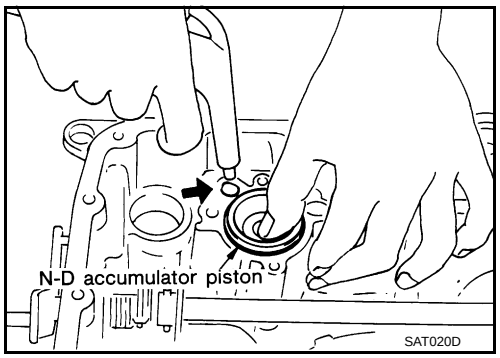
17. Remove return spring from servo release accumulator piston.



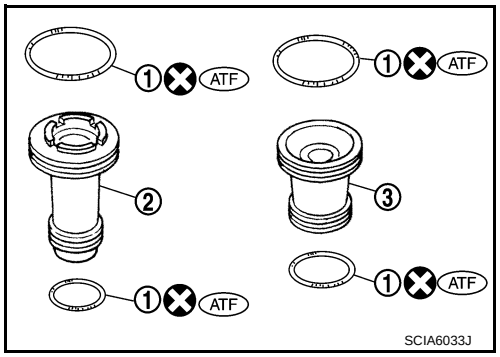
18. Apply compressed air into the oil hole as shown, and remove servo release accumulator piston from transaxle case.
CAUTION:
Strong flow of air will push the accumulator piston out along with a splash of ATF. Cover the area with lint-free cloth and blow air little by little to avoid this.



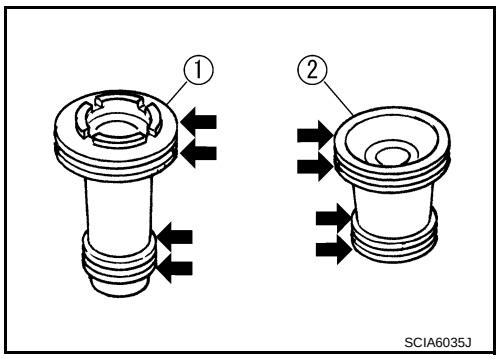
19. Apply compressed air into the oil hole as shown, and remove N-D accumulator piston and return spring from transaxle case.
CAUTION:
Strong flow of air will push the accumulator piston out along with a splash of ATF. Cover the area with lint free-cloth and blow air little by little to avoid this.



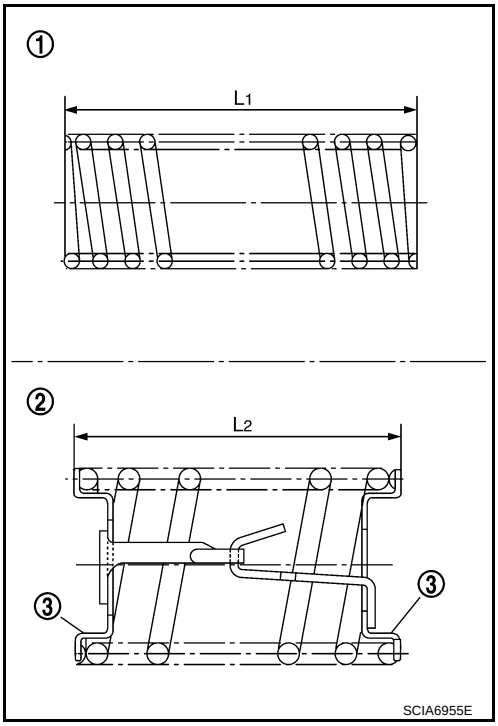
20. Remove O-rings (1) from servo release accumulator piston (2) and N-D accumulator piston (3).
CAUTION:
Wrap the removed servo release accumulator piston (2) and N-D accumulator piston (3) in a lint-free cloth.



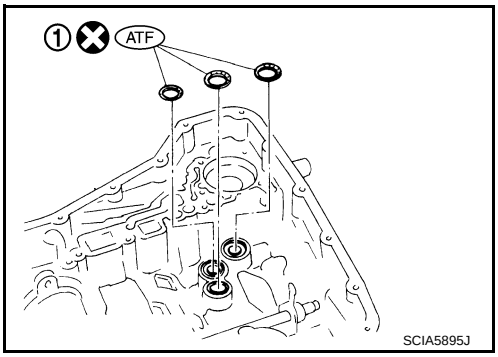
- **Inspect the sliding surfaces of each accumulator piston and transaxle case, and replace if damaged or dented.**
(1): Servo release accumulator piston
(2): N-D accumulator piston



- Inspect each return spring, and replace if deformed or worn. Refer to **TM-321, "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).

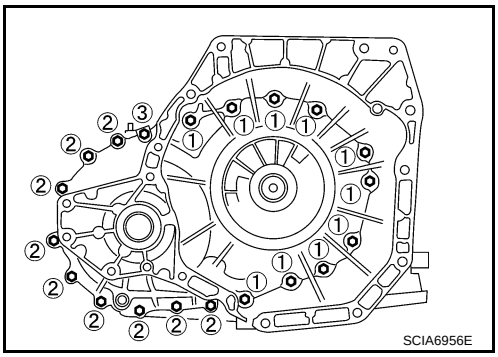


21. Remove lip seals (1) from transaxle case.

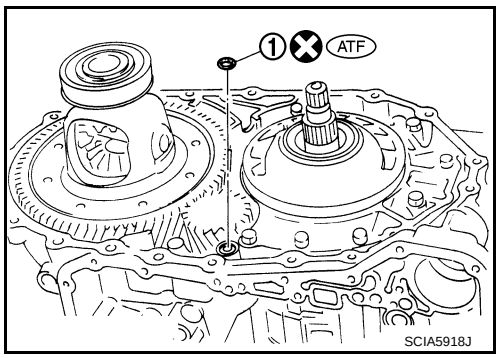


22. Remove converter housing according to the following procedures.

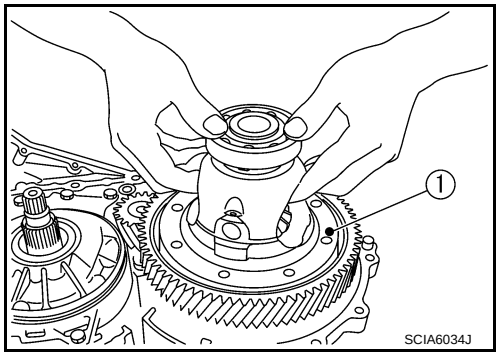
a. Remove converter housing fitting bolts (1), (2) and (3) using a power tool.
b. Remove bracket from converter housing
c. Remove converter housing by tapping it lightly.



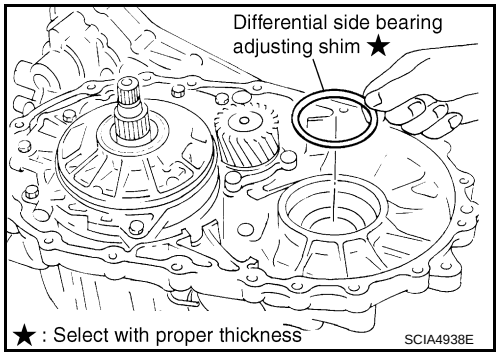
d. Remove O-ring (1) from differential lubricant hole.



23. Remove plug from converter housing.
24. Remove O-ring from plug.
25. Remove final drive assembly (1) from transaxle case.



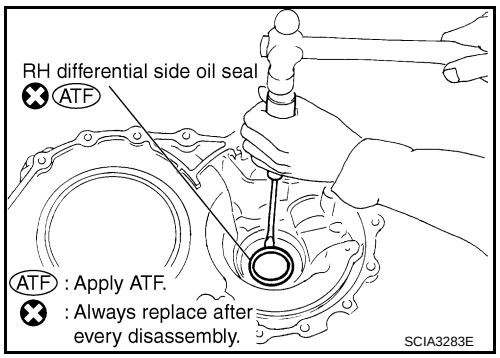
26. Remove differential side bearing adjusting shim from transaxle case.



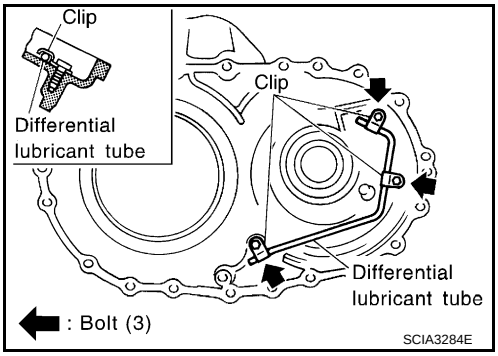
27. Remove RH differential side oil seal from converter housing using suitable tool.

CAUTION:

Do not scratch converter housing.

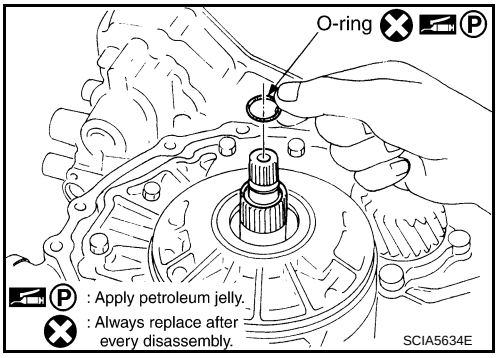


28. Remove differential lubricant tube and clips from converter housing.



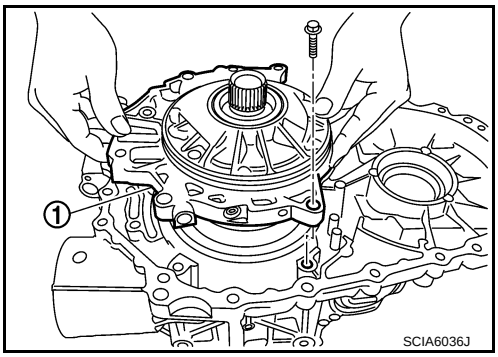
29. Remove oil pump assembly according to the following procedures.

a. Remove O-ring from input shaft assembly (high clutch drum).

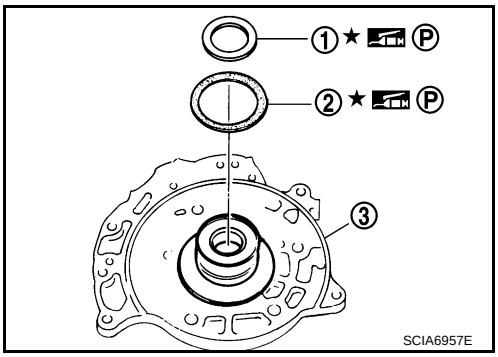


b. Remove oil pump assembly fitting bolts, and then remove oil pump assembly (1) from transaxle case.

c. Remove O-ring from oil pump assembly (1).

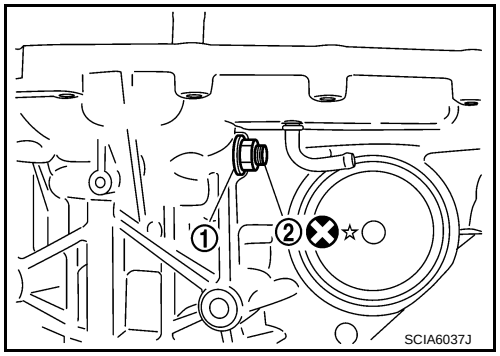


d. Remove bearing race (1) and thrust washer (2) from oil pump assembly (3).

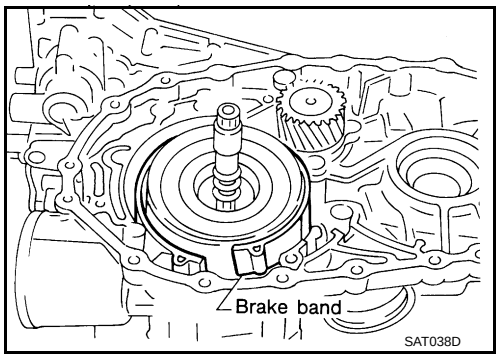


30. Remove brake band according to the following procedures.

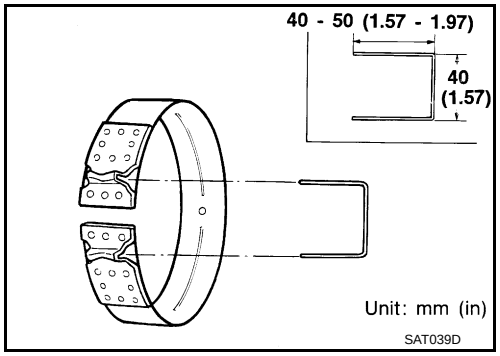
a. Loosen lock nut (1), and then remove anchor end pin (2) and lock nut (1) as a set from transaxle case.



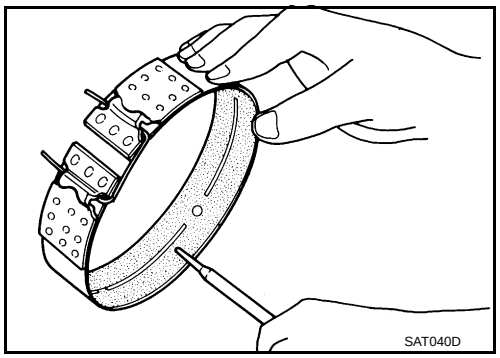
b. Remove brake band from transaxle case.



- **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. Leave the clip in position after removing brake band.**

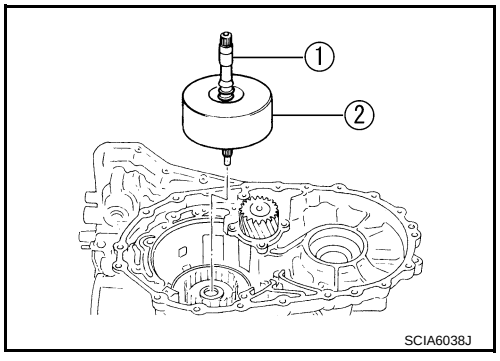


c. Check brake band facing for damage, cracks, wear or burns.

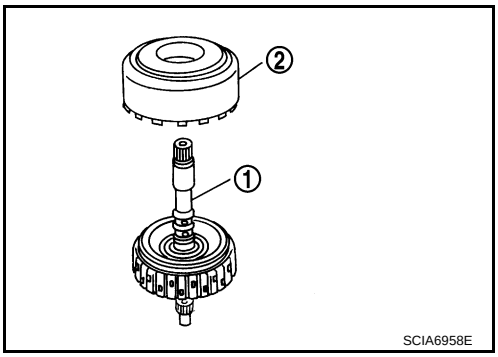


31. Remove input shaft assembly (high clutch assembly) and reverse clutch assembly according to the following procedures.

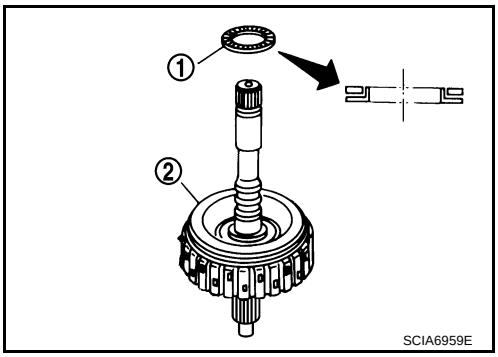
a. Remove input shaft assembly (high clutch assembly) (1) with reverse clutch assembly (2).



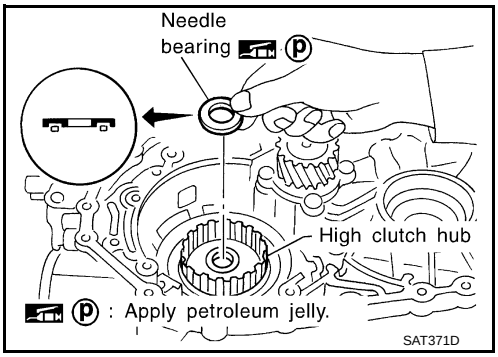
b. Remove input shaft assembly (high clutch assembly) (1) from reverse clutch assembly (2).



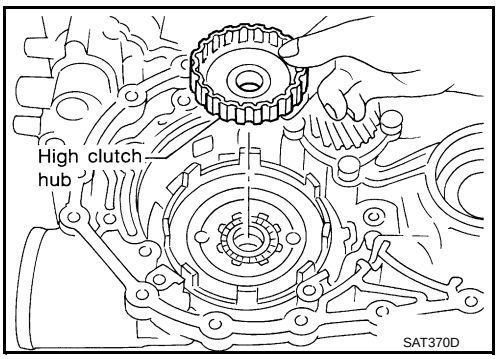
c. Remove needle bearing (1) from input shaft assembly (high clutch drum) (2).
   - **Inspect needle bearing (1) and input shaft assembly (high clutch drum) (2), and replace if damaged or worn.**



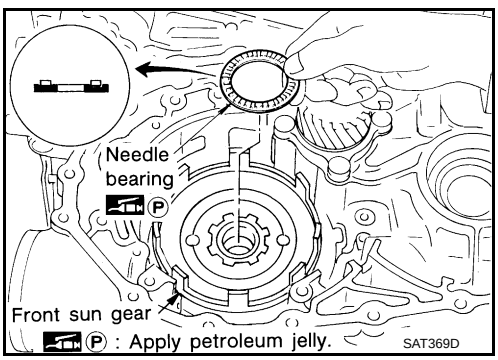
32. Remove needle bearing from high clutch hub.
   - **Inspect needle bearing, and replace if damaged or worn.**



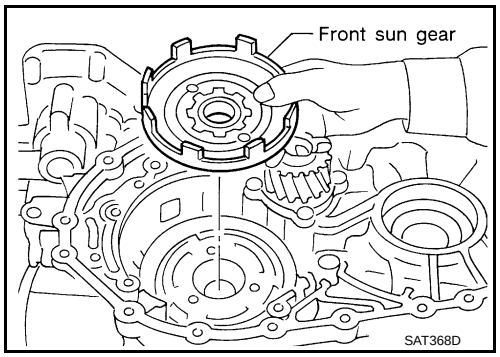
33. Remove high clutch hub from front sun gear.
   - **Inspect high clutch hub, and replace if damaged or worn.**



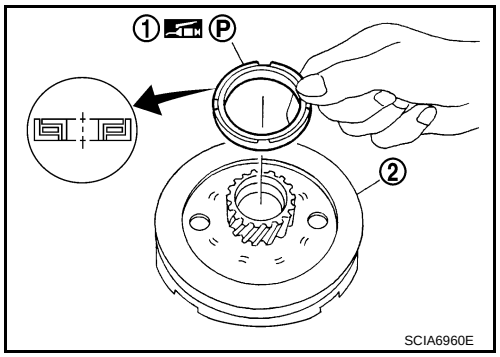
34. Remove needle bearing from front sun gear.
   - **Inspect needle bearing, and replace if damaged or worn.**



35. Remove front sun gear from front planetary carrier.

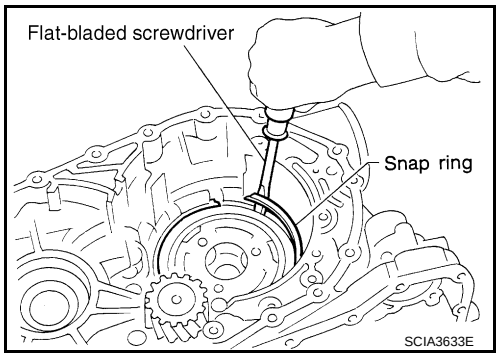


36. Remove needle bearing (1) from front sun gear (2).
    - **Inspect needle bearing (1) and front sun gear (2), and replace if damaged or worn.**

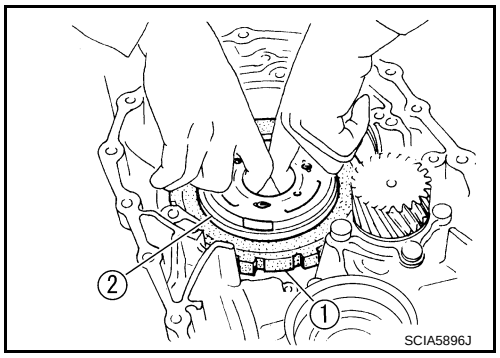


37. Remove front planetary carrier and low one-way clutch according to the following procedures.

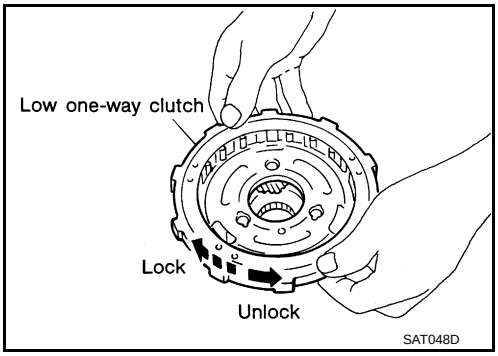
a. Remove snap ring using suitable tool.



b. Remove low one-way clutch (1) and front planetary carrier (2) as a set from transaxle case.

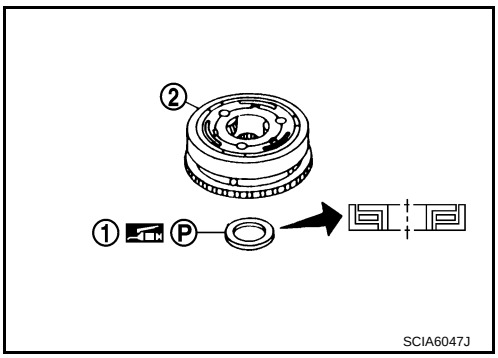


c. Check that low one-way clutch rotates counter-clockwise around front planetary carrier. Then try to turn it clockwise and check that it is locked.
   - **Replace low one-way clutch if necessary.**



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.**

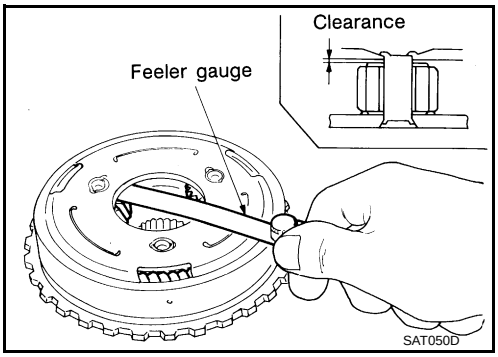


f. Check clearance between pinion washer and front planetary carrier using feeler gauge.

   Standard clearance and allowable limit:

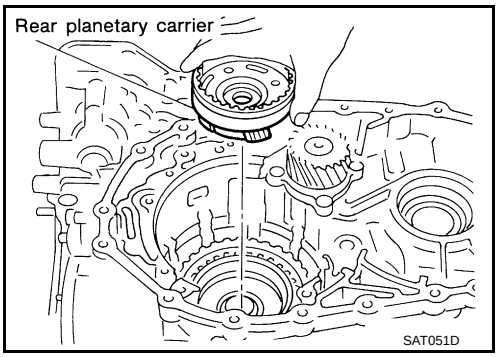
   Refer to TM-323, "Planetary Carrier".

   - **Replace front planetary carrier if the clearance exceeds allowable limit.**

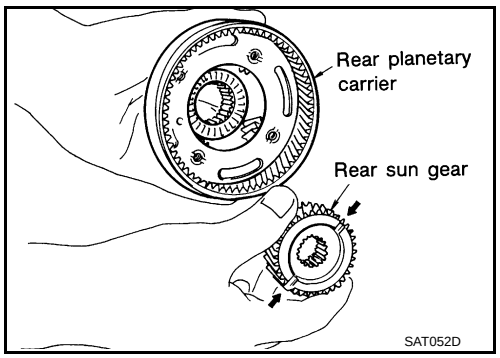


38. Remove rear planetary carrier and rear sun gear according to the following procedures.

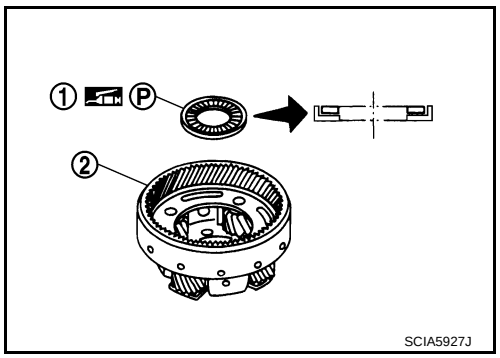
a. Remove rear planetary carrier (with rear sun gear) from transaxle case.



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.**

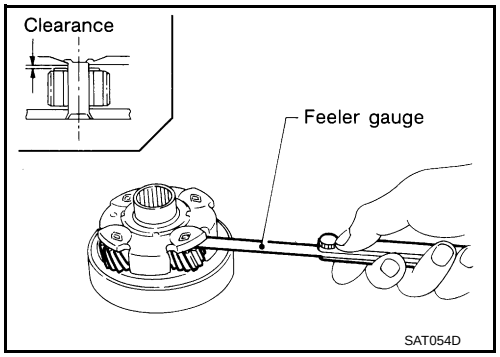


d. Check clearance between pinion washer and rear planetary carrier using feeler gauge.

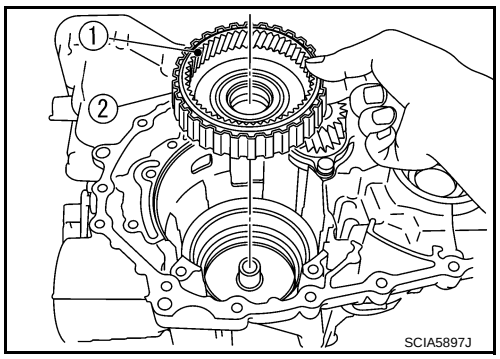
Standard clearance and allowable limit:

Refer to TM-323, "Planetary Carrier".

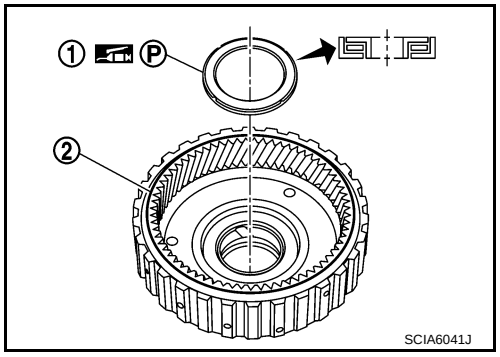
- **Replace rear planetary carrier if the clearance exceeds allowable limit.**



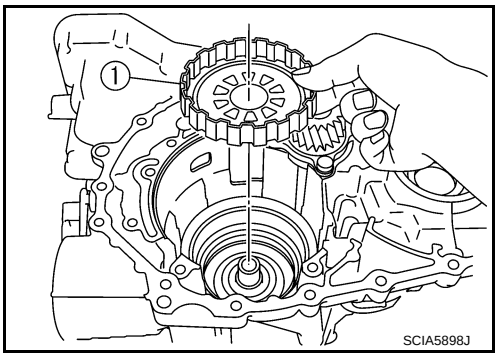
39. Remove rear internal gear (1) and forward clutch hub (2) as a set from forward clutch drum.



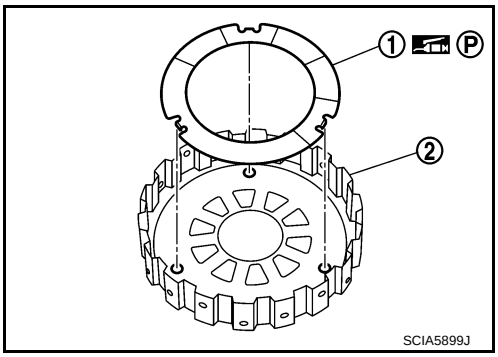
40. Remove needle bearing (1) from rear internal gear (2).
- **Inspect needle bearing (1), and replace if damaged or worn.**



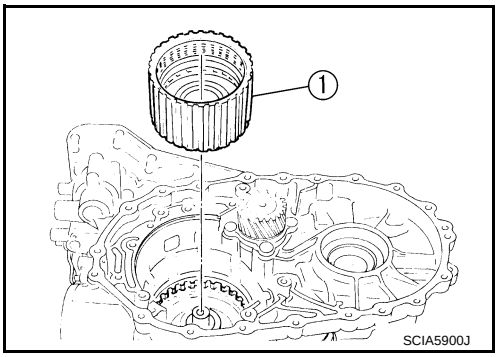
41. Remove overrun clutch hub (1) from forward clutch drum.



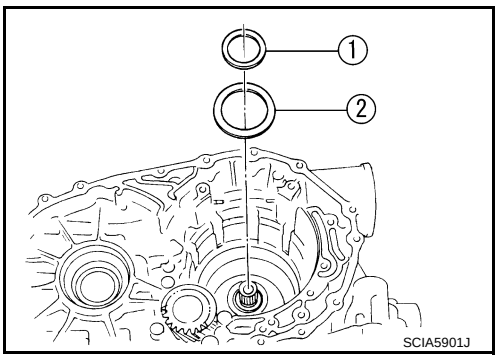
42. Remove thrust washer (1) from overrun clutch hub (2).
    - **Inspect thrust washer (1) and overrun clutch hub (2), and replace if damaged or worn.**



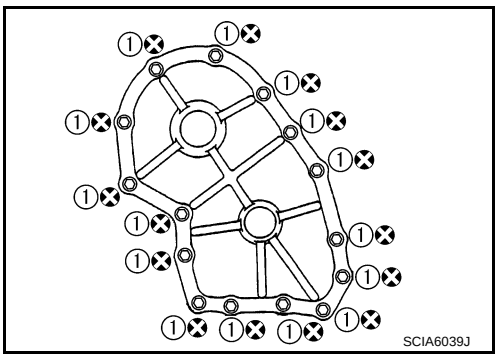
43. Remove forward clutch assembly and overrun clutch assembly (1) from transaxle case.



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 side cover fitting bolts (1), and then remove side cover by lightly tapping it using a soft hammer.
    CAUTION:
    Do not damage side cover.
46. Remove side cover gasket from side cover.

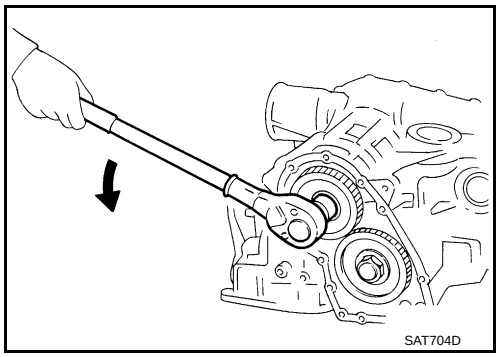


47. Remove output shaft, output gear and reduction gear according to the following procedures.

a. Set manual shaft in “P” position to fix idler gear and output gear.

b. Unlock both idler gear and output gear lock nuts using a pin punch.

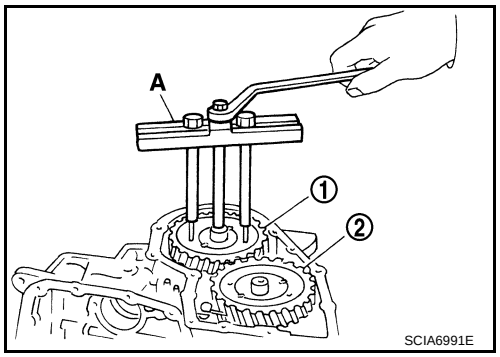
c. Remove idler gear and output gear lock nuts.



d. Remove idler gear (2) and output gear (1) using Tool A.

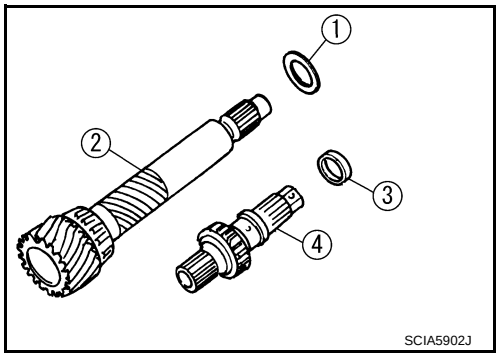
Tool number: ST27180001

e. Remove reduction pinion gear and output shaft from transaxle case.

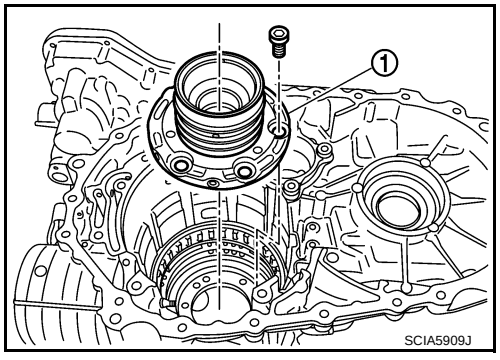


f. Remove reduction pinion gear adjusting shim (1) from reduction pinion gear (2).

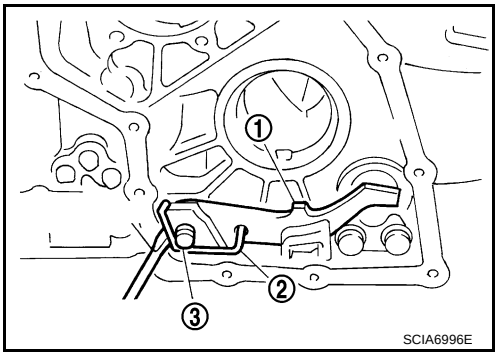
g. Remove output gear adjusting spacer (3) from output shaft (4).



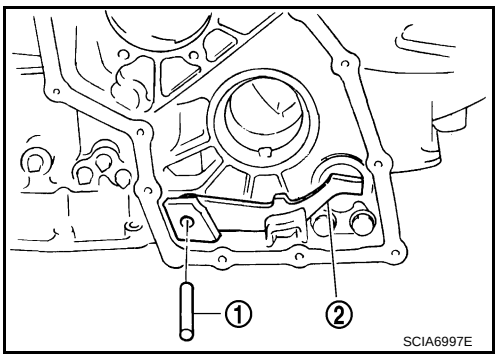
48. Remove bearing retainer fitting bolts, and then remove bearing retainer (1) from transaxle case.



49. Remove return spring (2) from parking shaft (3) suitable tool.
(1): Parking pawl
- **Inspect return spring (2), and replace if damaged or worn.**

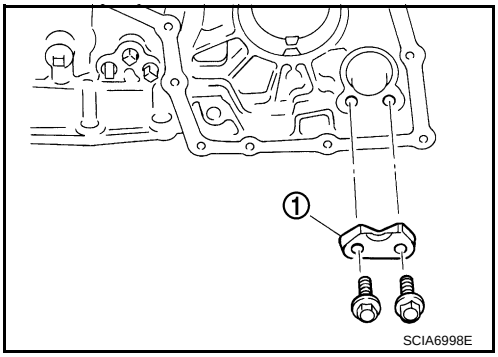


50. Draw out parking shaft (1), and then remove parking pawl (2) from transaxle case.
- **Inspect parking shaft (1) and parking pawl (2), and replace if damaged or worn.**

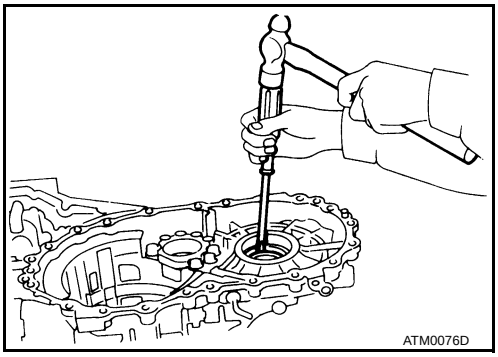


51. Remove parking actuator support (1) from transaxle case.
- **Inspect parking actuator support (1), and replace if damaged or worn.**

52. Remove snap ring from transaxle case using suitable tool.
53. Remove governor cap from transaxle case.
54. Remove O-ring from governor cap.



55. Remove LH differential side oil seal from transaxle case using suitable tool.
CAUTION:
Do not scratch transaxle case.

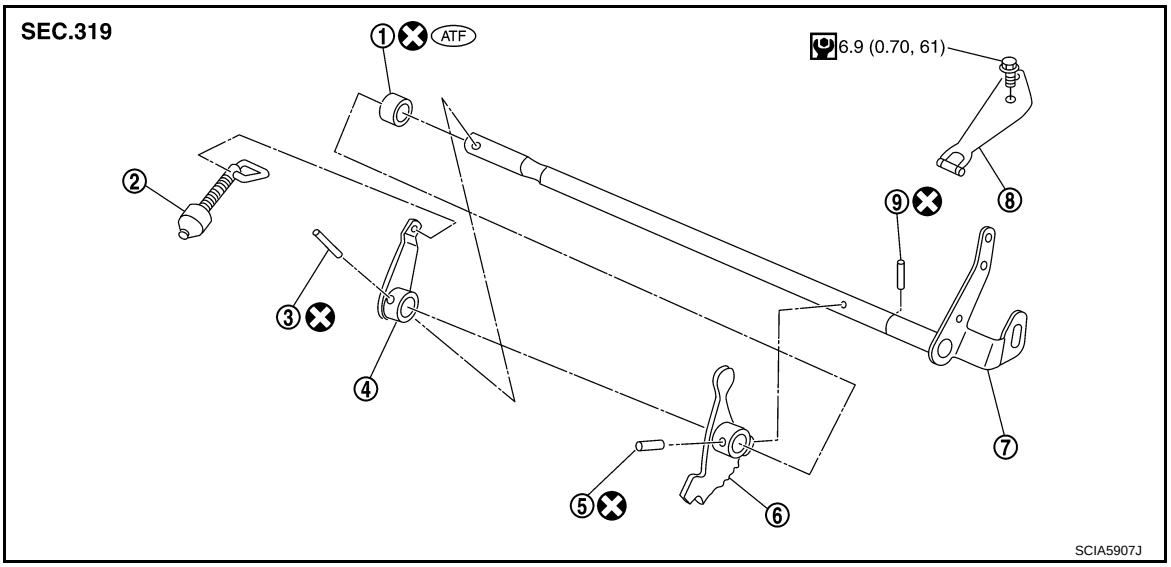


REPAIR FOR COMPONENT PARTS

Manual Shaft

INFOID:0000000001730983

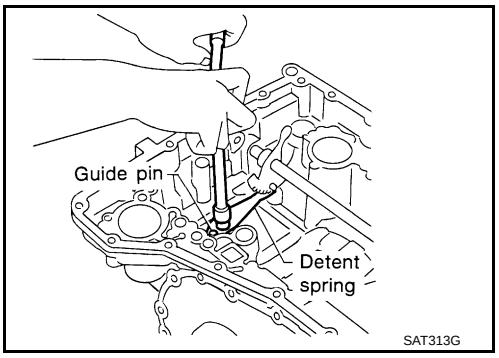
COMPONENTS



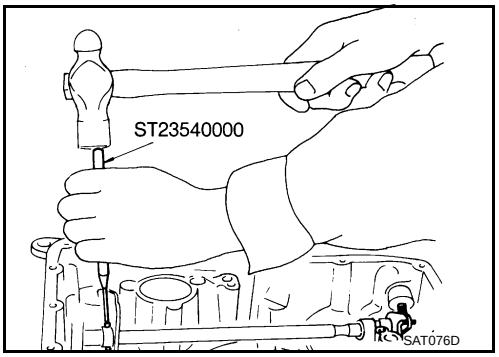
1. Manual shaft oil seal
2. Parking rod
3. Retaining pin
4. Parking rod plate
5. Retaining pin
6. Manual plate
7. Manual shaft
8. Detent spring
9. Retaining pin

REMOVAL

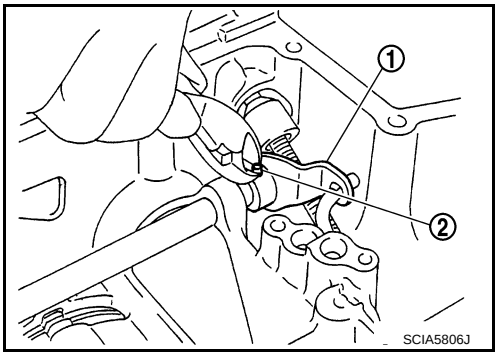
1. Remove detent spring from transaxle case.



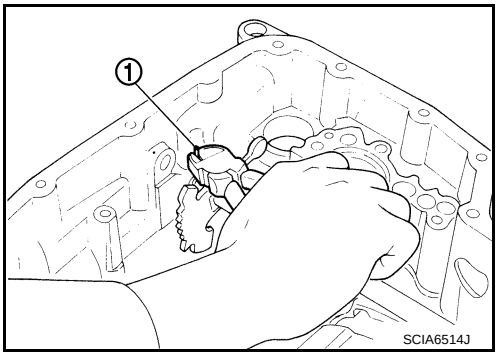
2. Drive out retaining pin of manual plate using suitable tool.



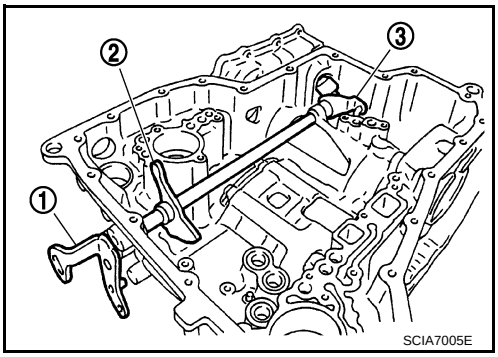
3. Pull out retaining pin (2) of parking rod plate (1) using suitable tool.



4. Pull out retaining pin (1) of manual shaft using suitable tool.



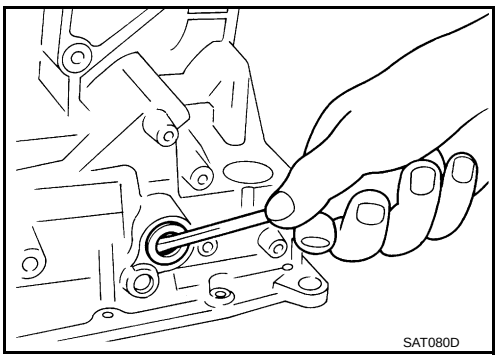
5. Remove parking rod plate (with parking rod) (3) from manual shaft (1).
6. Remove parking rod from parking rod plate (3).
7. Remove manual plate (2) from manual shaft (1).
8. Draw out manual shaft (1) from transaxle case.



9. Remove manual shaft oil seal from transaxle case using suitable tool.

CAUTION:

Do not scratch transaxle case.



INSPECTION

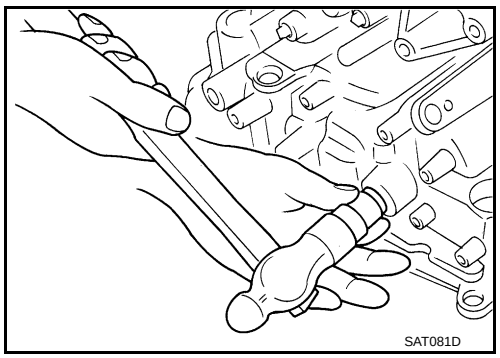
Check component parts, and replace if damaged or worn.

INSTALLATION

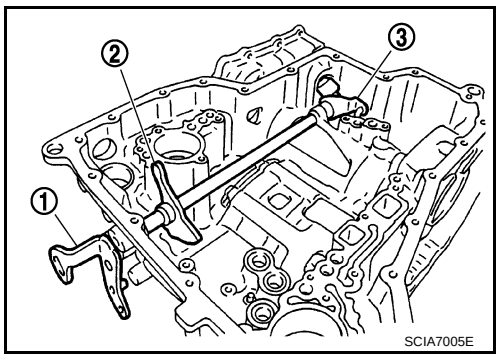
1. Drive manual shaft oil seal into transaxle case using suitable tool.

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.



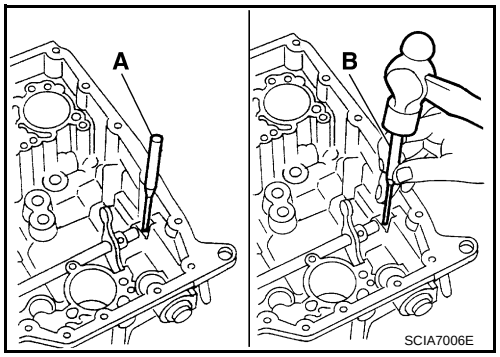
3. Insert manual shaft (1) to transaxle case, and install manual plate (2) to manual shaft (1).
4. Install parking rod plate (with parking rod) (3) to manual shaft (1).



5. Align groove of manual shaft and hole of transaxle case using suitable tool (A).
6. Drive retaining pin of manual shaft into transaxle case using Tool (B).

Tool number B: ST23540000

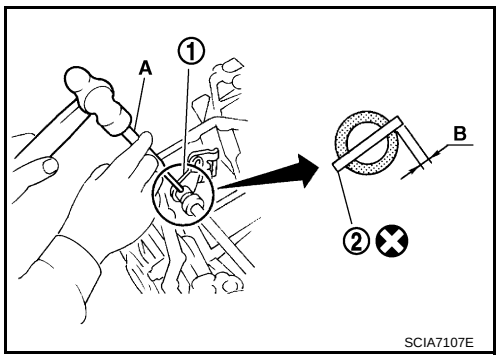
CAUTION:
Do not reuse retaining pin.



7. Set parking rod plate (1) onto manual shaft, and drive retaining pin (2) of parking rod plate (1) using Tool (A).

Tool number A: ST23540000

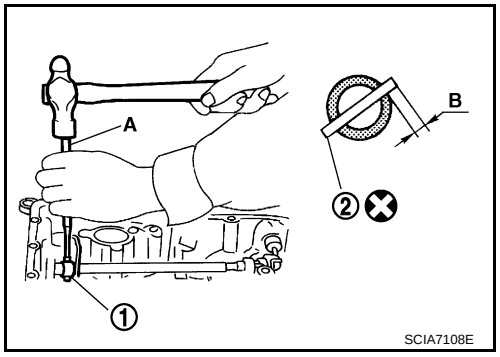
CAUTION:
The retaining pin end should protrude approx. 3mm (0.12 in) (B) from the outer surface of parking rod plate (1).



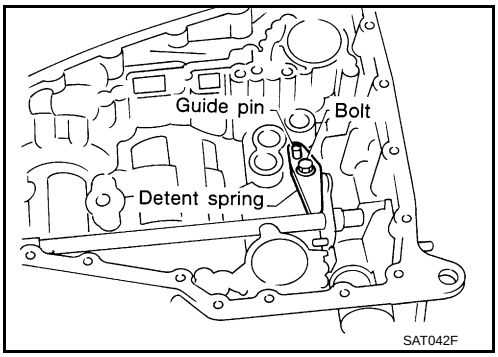
8. Set manual plate (1) onto manual shaft, and drive retaining pin (2) of manual plate (1) using Tool (A).

Tool number A: ST23540000

CAUTION:
The retaining pin end should protrude approx. 3mm (0.12 in) (B) from the outer surface of manual plate (1).



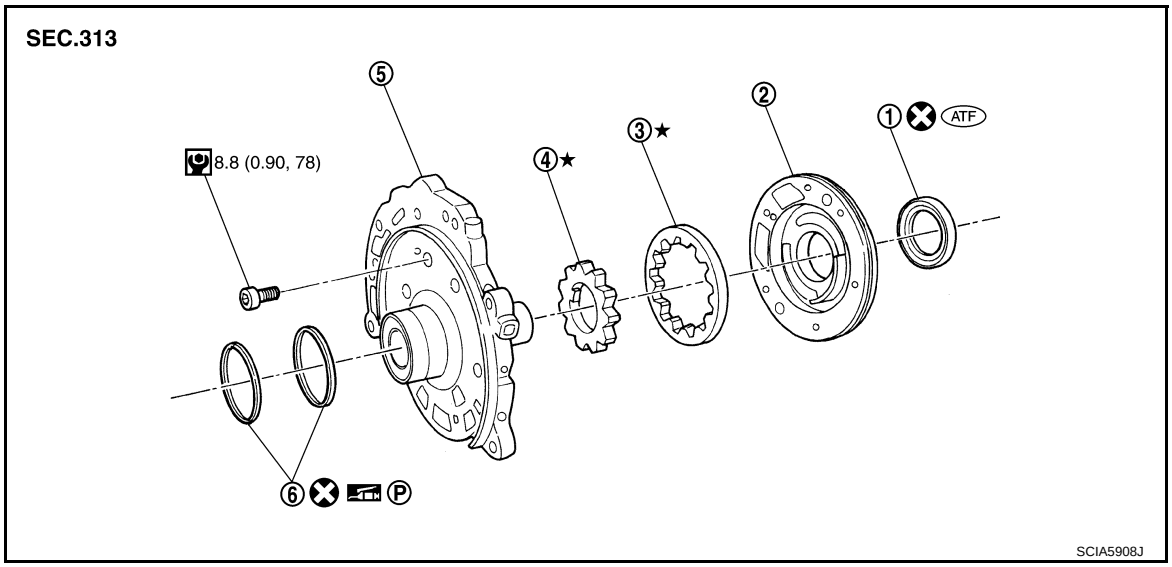
9. Install detent spring on transaxle case.
10. Tighten detent spring bolt to the specified torque. Refer to TM-213, "Component".



Oil Pump

INFOID:0000000001730984

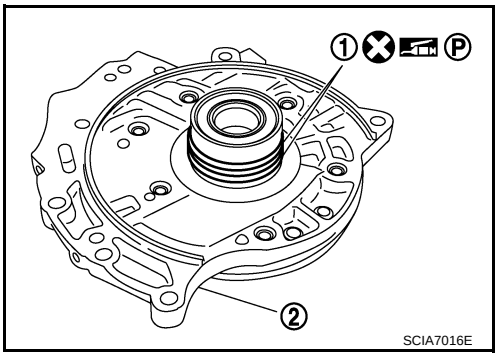
COMPONENTS



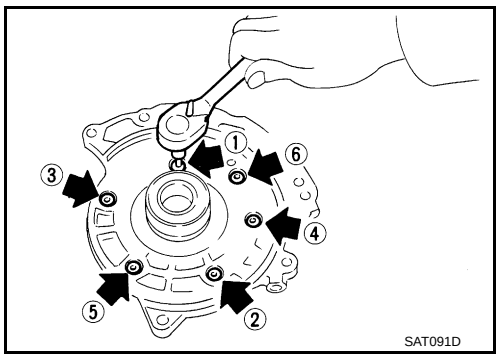
1. Oil pump housing oil seal
2. Oil pump housing
3. Outer gear
4. Inner gear
5. Oil pump cover
6. Seal ring

DISASSEMBLY

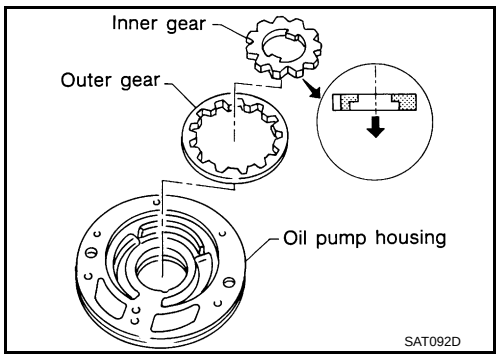
1. Remove seal rings (1) from oil pump assembly (2).



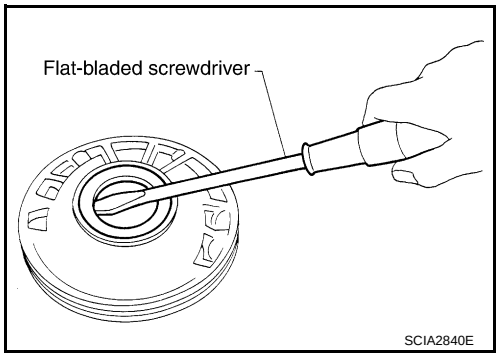
2. Remove bolts in the order as shown, and remove oil pump cover.



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



4. Remove oil pump housing oil seal using suitable tool.
CAUTION:
Do not scratch oil pump housing.



INSPECTION

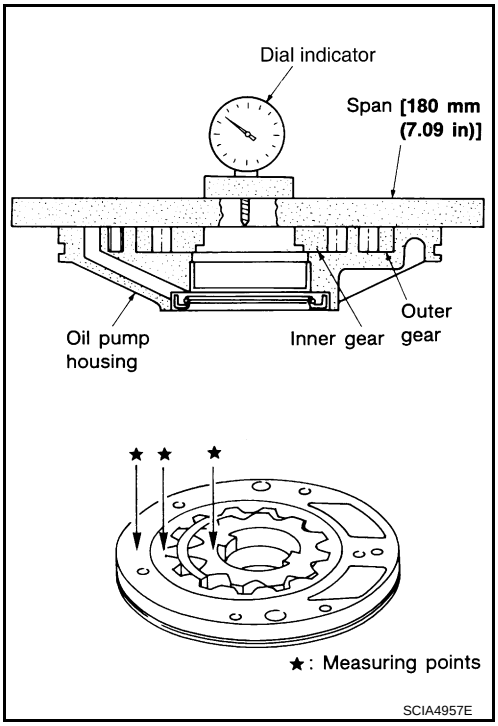
Oil Pump Housing, Oil Pump Cover, Inner Gear and Outer Gear
Check for wear or damage. Replace if necessary.

Side Clearances

- Measure side clearance of inner gear and outer gear in at least four places around each outside edge. Maximum measured values should be within the specified clearance.

Standard clearance: Refer to TM-323, "Oil Pump".

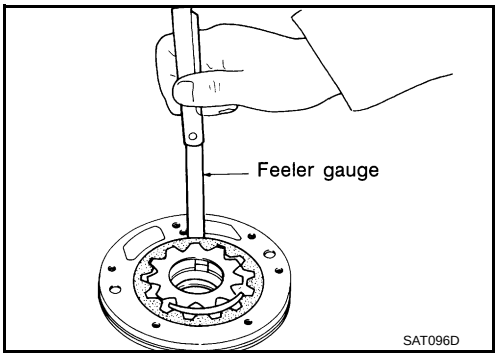
- If clearance is less than standard, select inner gear and outer gear as a set so that clearance is within specifications.
- If clearance is more than standard, replace whole oil pump assembly except oil pump cover.



- Measure clearance between outer gear and oil pump housing.

Standard clearance and allowable limit:
Refer to TM-323, "Oil Pump".

- If not within allowable limit, replace whole oil pump assembly except oil pump cover.

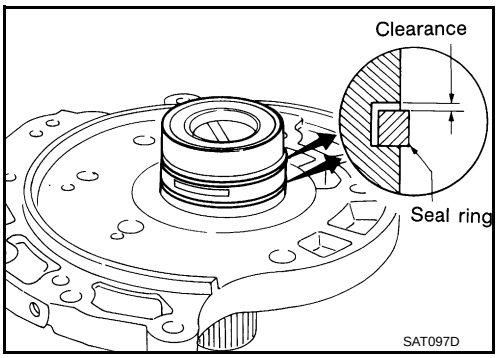


Seal Ring Clearance

- Measure clearance between seal ring and ring groove.

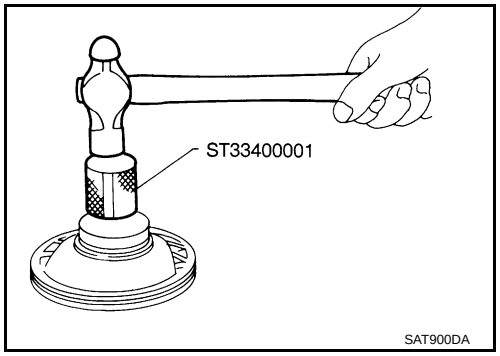
Standard clearance and allowable limit:
Refer to TM-323, "Oil Pump".

- If not within allowable limit, replace oil pump cover assembly.

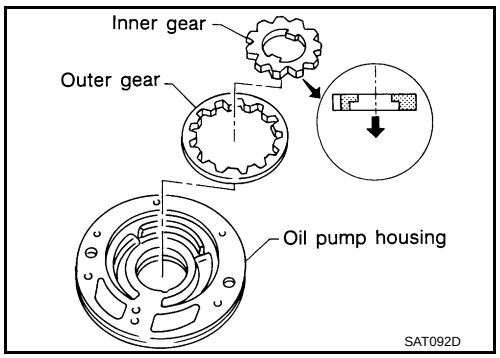


ASSEMBLY

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.**



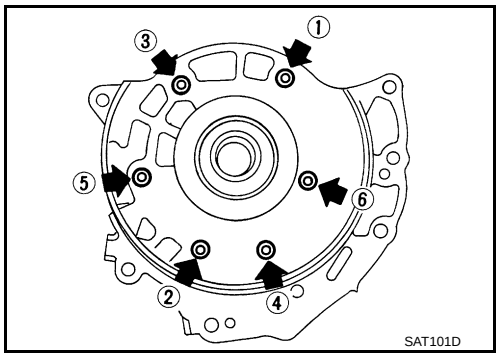
2. Install inner gear and outer gear on oil pump housing.
CAUTION:
Be careful with the direction of inner gear.



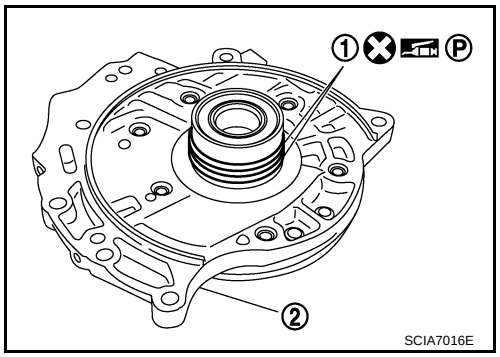
3. Install oil pump cover on oil pump housing.

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, and then tighten them to the specified torque in the same order.



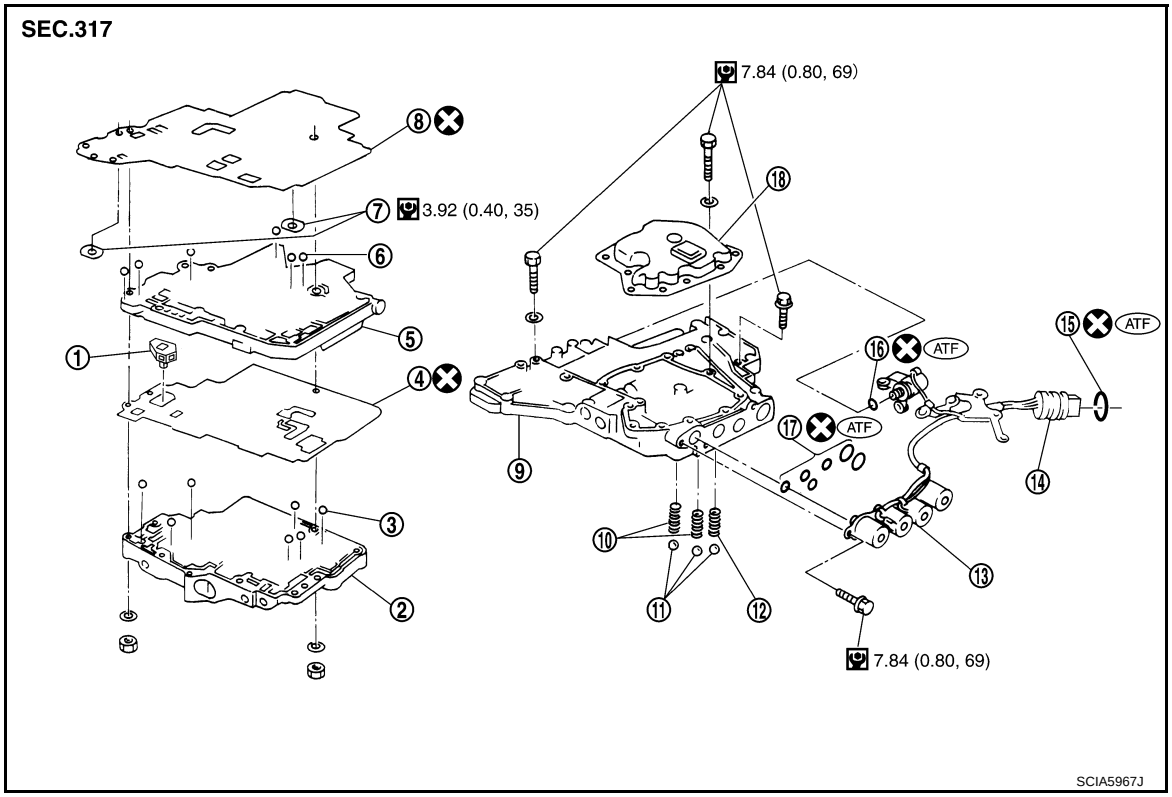
4. Install seal rings (1) to oil pump assembly (2) carefully after packing ring groove with petroleum jelly.
CAUTION:
Do not spread gap of seal rings (1) excessively while installing. The seal rings (1) may be deformed.



Control Valve Assembly

INFOID:0000000001730985

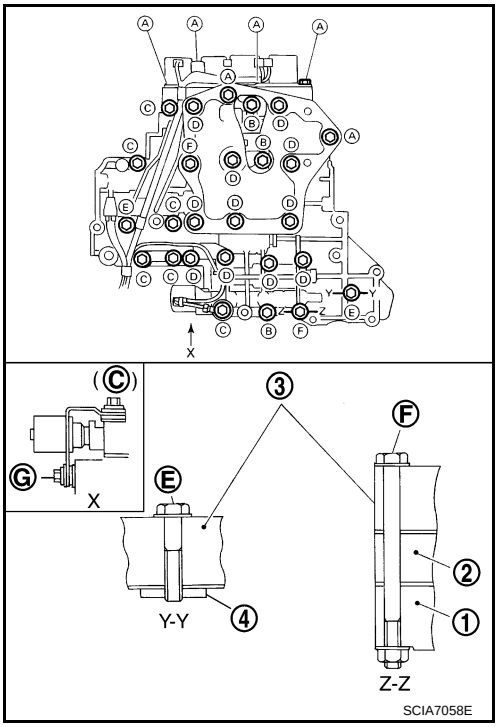
COMPONENTS



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

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).

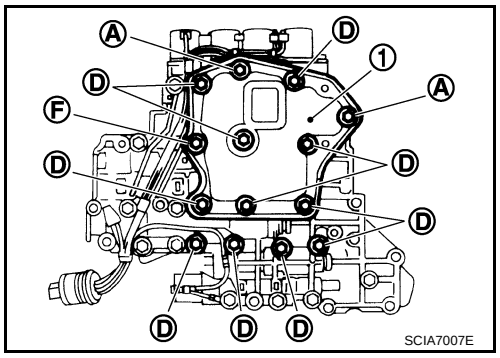


Bolt length, number and location:

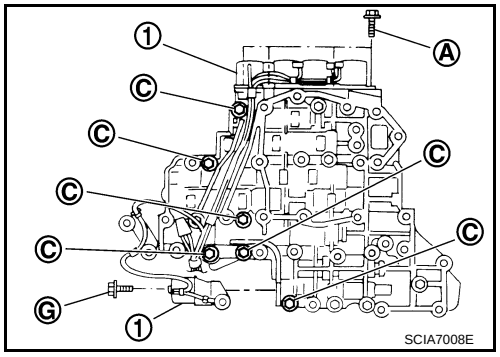
Bolt symbol	A	B	C	D	E	F*	G
Bolt length "ℓ" [mm (in)]	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1

*: Reamer bolt and nut.

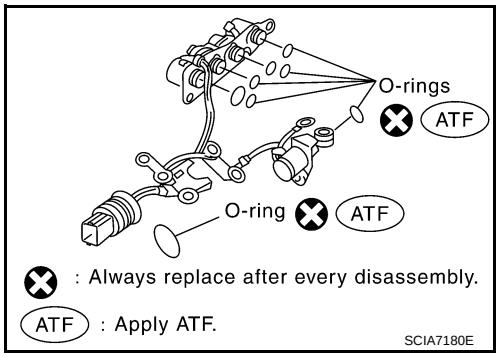
1. Remove bolts (A), (D), reamer bolt (F) and nut, and remove oil strainer (1) from control valve assembly.



2. Remove bolts (A), (C) and (G), and then remove solenoid valve assembly (1) from control valve assembly.



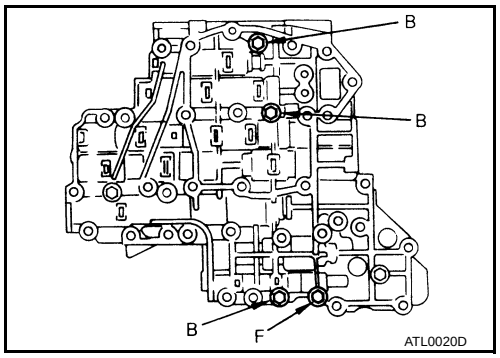
3. Remove O-rings from solenoid valves and terminal body.



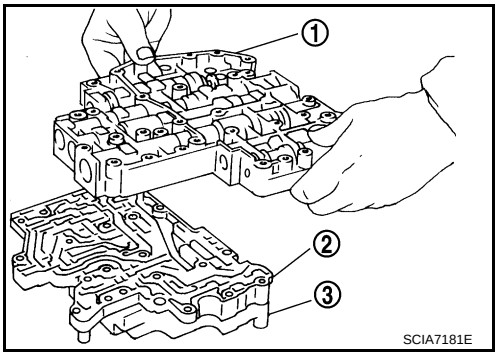
4. Place control valve upper body face down, and remove bolts (B), reamer bolt (F) and nut.

CAUTION:

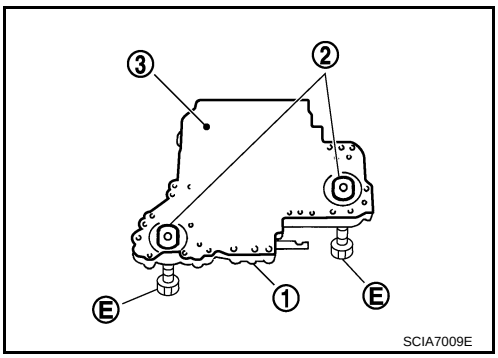
Remove bolts with control valve upper body facing down, because control valve upper body and control valve inter body may come off and steel ball may fall and be lost.



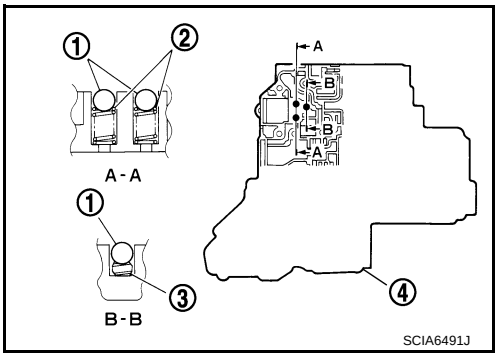
5. Remove control valve lower body (1) from control valve inter body (2).
(3): Control valve upper body



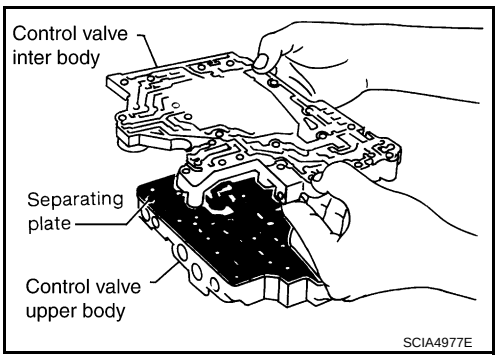
6. Turn over control valve lower body (1).
7. Remove bolts (E), support plates (2) and separating plate (3) from control valve lower body (1).



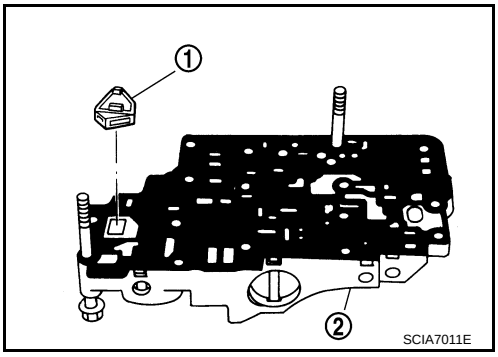
8. Remove check balls (1), line pressure relief valve springs (2) and torque converter pressure holding spring (3) from control valve lower body.
CAUTION:
Do not lose check balls (1), line pressure relief valve springs (2) and torque converter pressure holding spring (3).



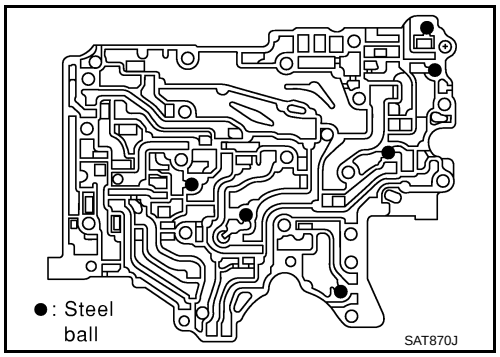
9. Remove control valve inter body from control valve upper body.



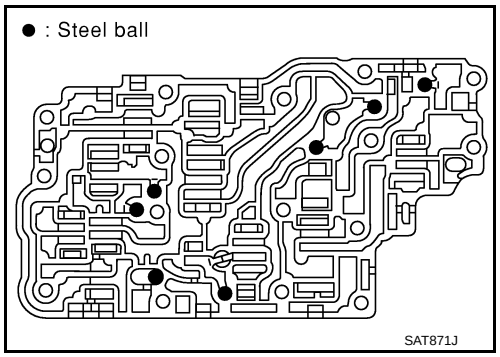
10. Remove pilot filter (1) from control valve upper body (2).
11. Remove separating plate from control valve upper body (2).



12. Check to see that steel balls are properly positioned in control valve inter body and then remove them.
CAUTION:
Do not lose steel balls.



13. Check to see that steel balls are properly positioned in control valve upper body and then remove them.
CAUTION:
Do not lose steel balls.

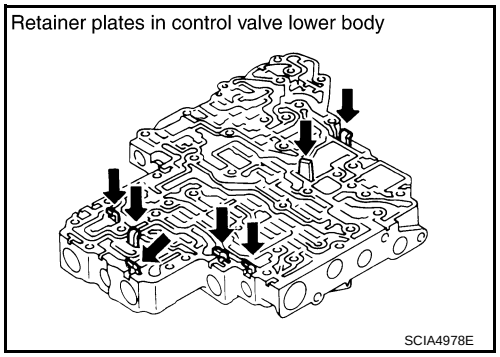


INSPECTION

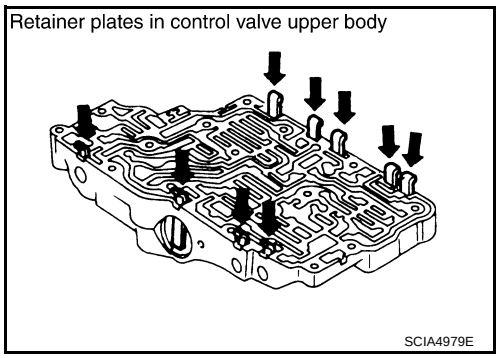
Control Valve Lower and Upper Bodies

CAUTION:
Do not lose these parts.

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

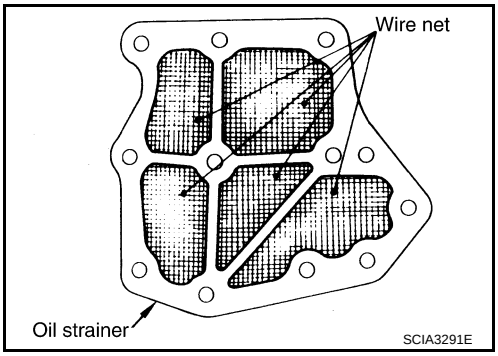


- Check to see that retainer plates are properly positioned in control valve upper body.



Oil Strainer

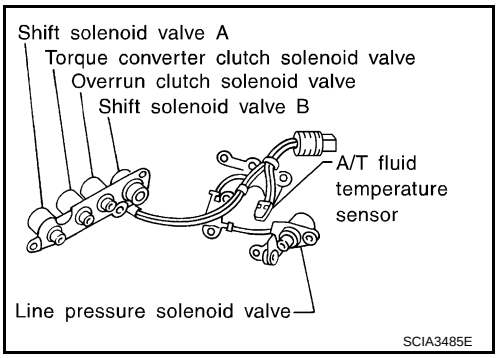
Check wire netting of oil strainer for damage. Replace if necessary.



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 TM-87, "Component Inspection".
- For shift solenoid valve B, refer to TM-91, "Component Inspection".
- For line pressure solenoid valve, refer to TM-84, "Component Inspection".
- For torque converter clutch solenoid valve, refer to TM-75, "Component Inspection"
- For overrun clutch solenoid valve, refer to TM-75, "Component Inspection".



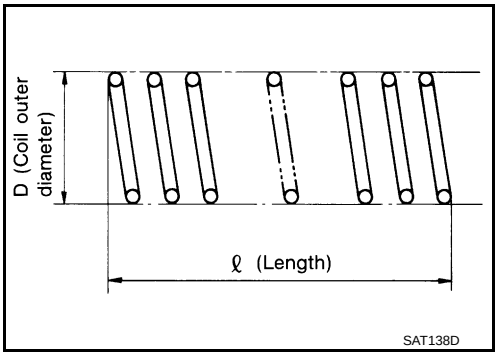
A/T Fluid Temperature Sensor

Measure resistance.

- For A/T fluid temperature sensor, refer to TM-50, "Component Inspection".

Line Pressure Relief Valve Springs and Torque Converter Pressure Holding Spring

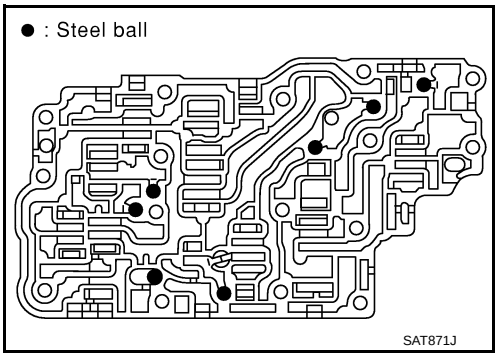
- Check each spring for damage or deformation. Also measure free length and outer diameter. Refer to TM-321, "Control Valves".
- Replace springs if deformed or fatigued.



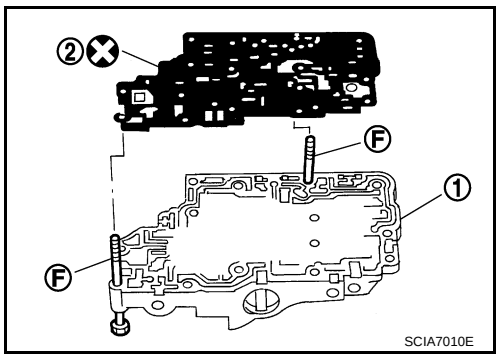
ASSEMBLY

1. Install control valve upper, inter and lower body.

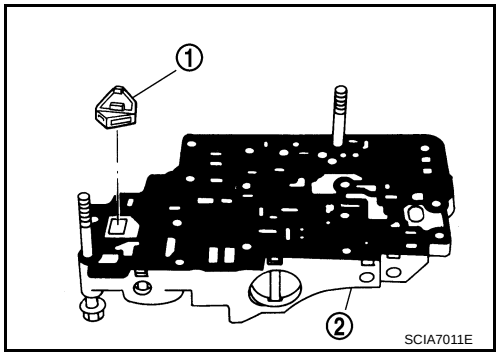
a. Place oil circuit of control valve upper body face up. Install steel balls in their proper positions.



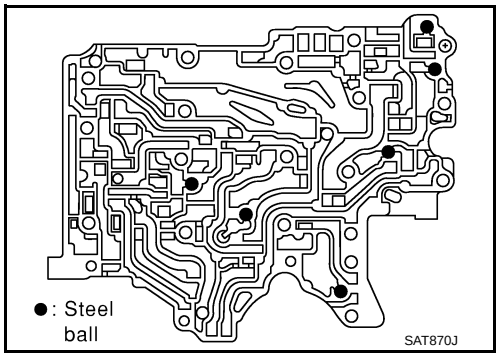
b. Install reamer bolts (F) from bottom of control valve upper body (1). Using reamer bolts (F) as guides, install separating plate (2) as a set.



c. Install pilot filter (1) on control valve upper body (2).



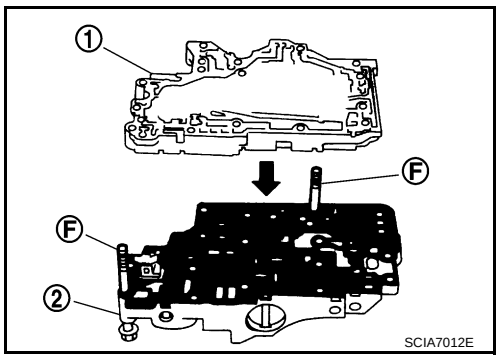
d. Place control valve inter body as shown (side of control valve lower body face up). Install steel balls in their proper positions.



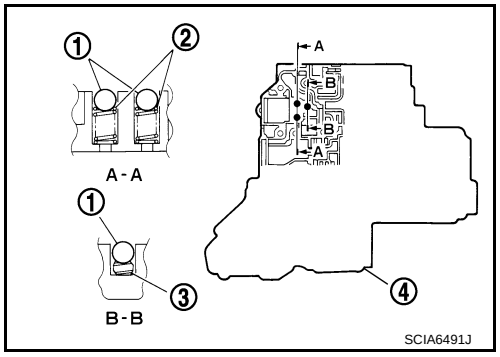
e. Install control valve inter body (1) on control valve upper body (2) using reamer bolts (F) as guides.

CAUTION:

Do not dislocate or drop steel balls.

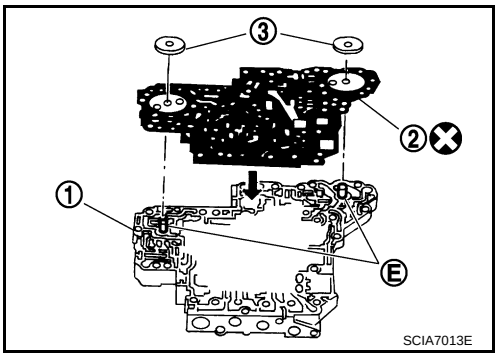


f. Install check balls (1), line pressure relief valve springs (2) and torque converter pressure holding spring (3) in their proper positions in control valve lower body (4).

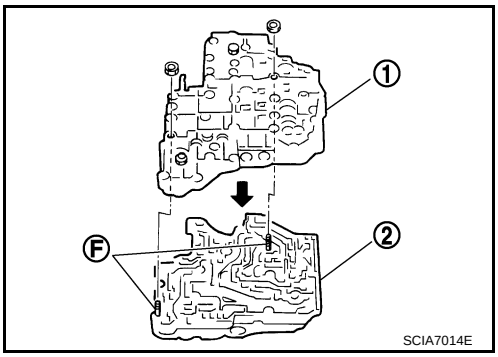


g. Install bolts (E) from bottom of control valve lower body (1). Using bolts (E) as guides, install separating plate (2) as a set.

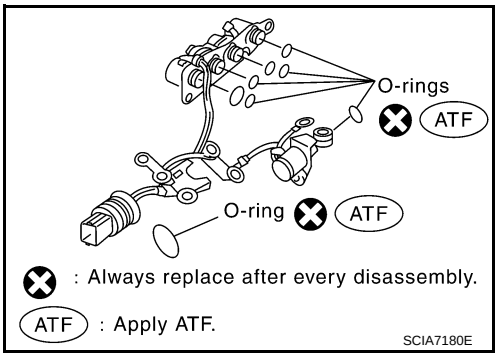
h. Install support plates (3) on control valve lower body (1).



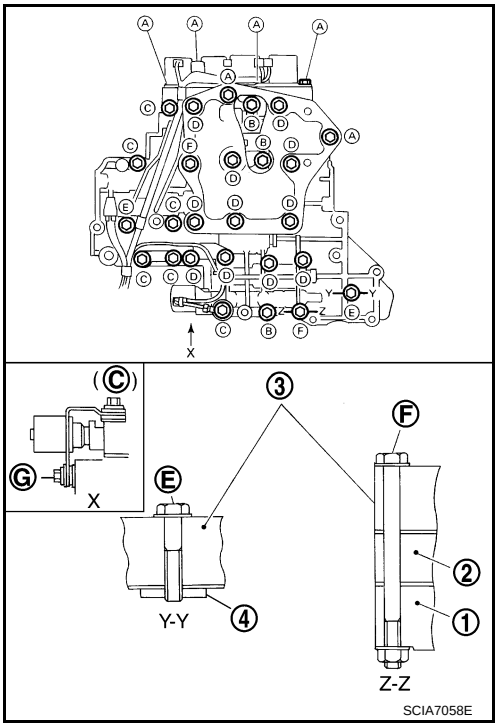
i. Install control valve lower body (1) on control valve inter body (2) using reamer bolts (F) as guides, and tighten reamer bolts (F) slightly.



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



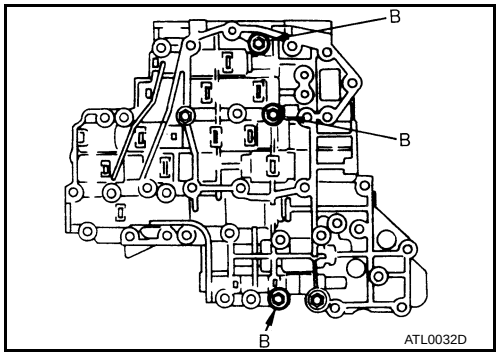
Bolt length, number and location:

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.

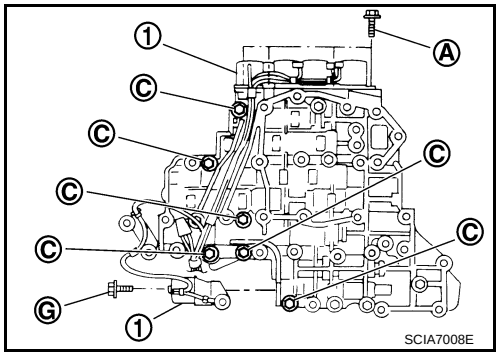
a. Install and tighten bolts (B) to the specified torque.

Bolts: 7.84 N·m (0.80 kg-m, 69 in-lb)



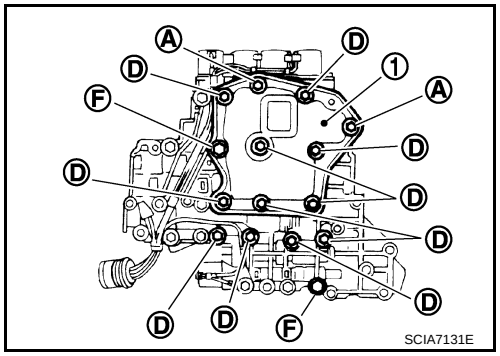
b. Install solenoid valve assembly (1) on control valve assembly.
c. Tighten bolts (A), (C) and (G) to the specified torque.

Bolts: 7.84 N·m (0.80 kg-m, 69 in-lb)



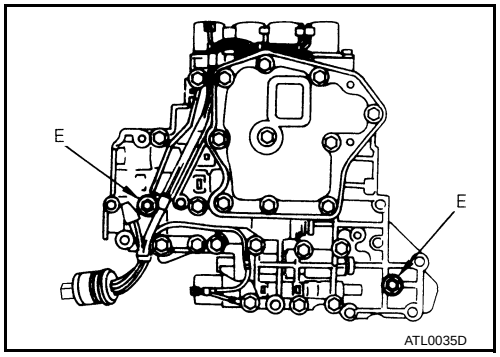
d. Remove reamer bolts (F), and then set oil strainer (1) on control valve assembly
e. Install and tighten bolts (A), (D), reamer bolts (F) and nuts to the specified torque.

Nuts and bolts: 7.84 N·m (0.80 kg-m, 69 in-lb)



f. Tighten bolts (E) to the specified torque.

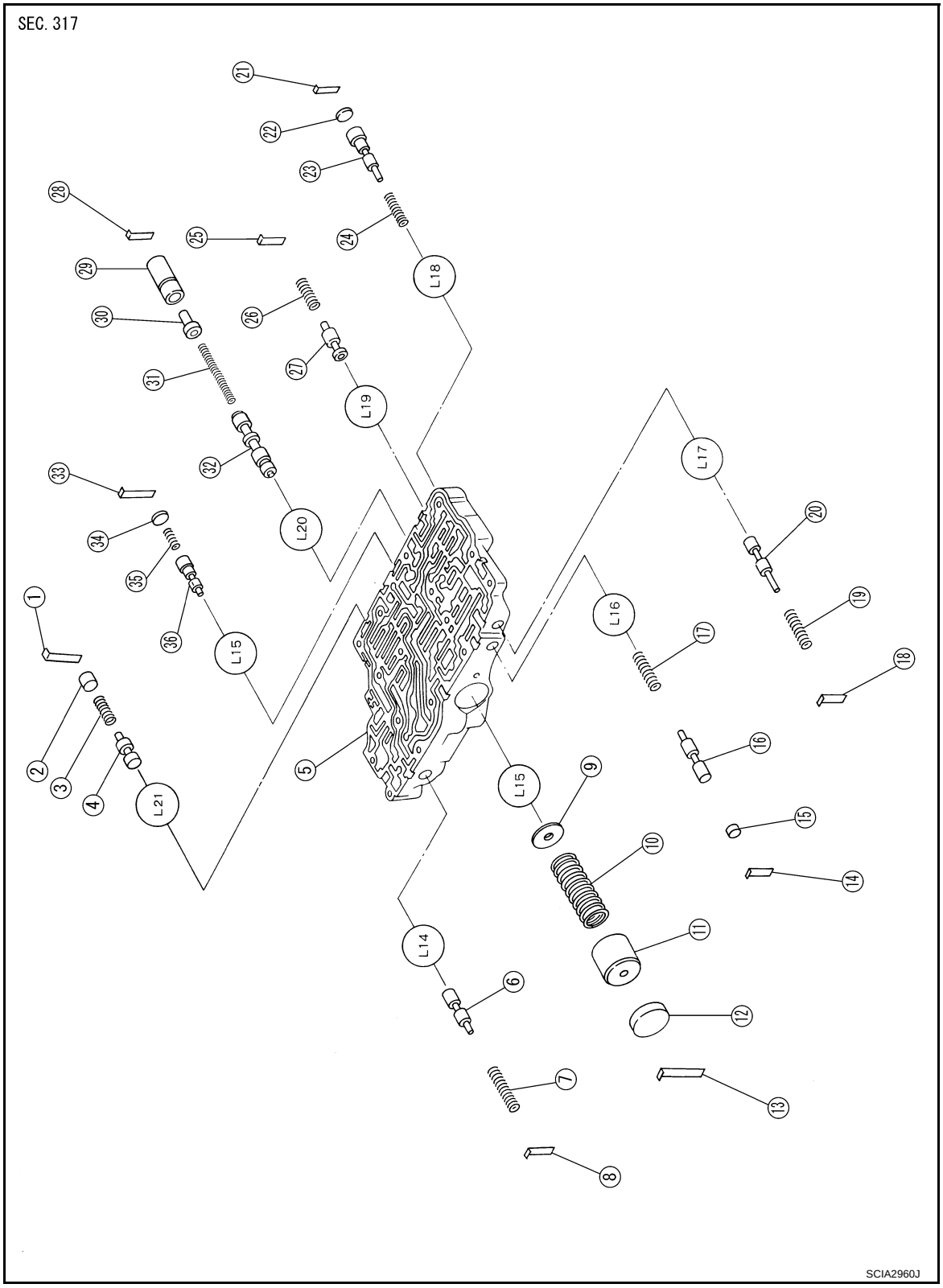
Bolts: 3.92 N·m (0.40 kg-m, 35 in-lb)



Control Valve Upper Body

INFOID:0000000001730986

COMPONENTS



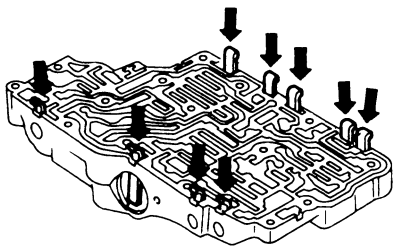
1. Retainer plate
2. Plug
3. Cooler check valve spring
4. Cooler check valve
5. Control valve upper body
6. Pilot valve
7. Pilot valve spring
8. Retainer plate
9. 1-2 accumulator retainer plate

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

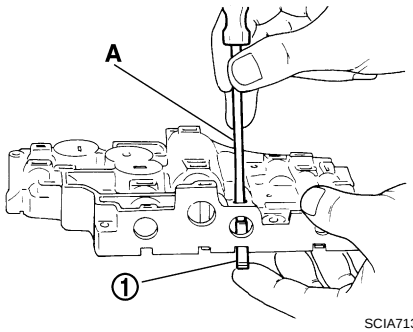
1. Remove valves at retainer plates.
CAUTION:
Do not use a magnetic pick-up tool.

Retainer plates in control valve upper body



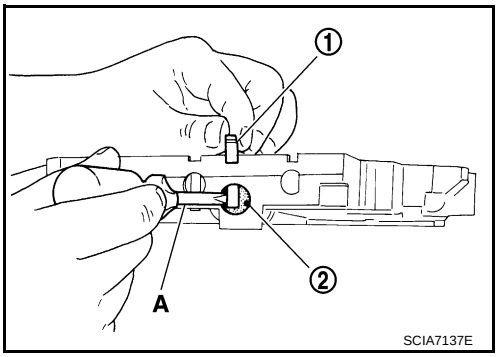
SCIA4979E

a. Use suitable tool (A) to remove retainer plates (1).



SCIA7136E

b. Remove retainer plates (1) while holding spring, plugs (2) or sleeves using suitable tool (A).
CAUTION:
Remove plugs (2) slowly to prevent internal parts from jumping out.

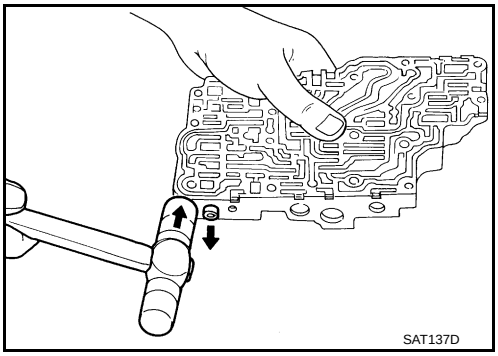


SCIA7137E

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

CAUTION:

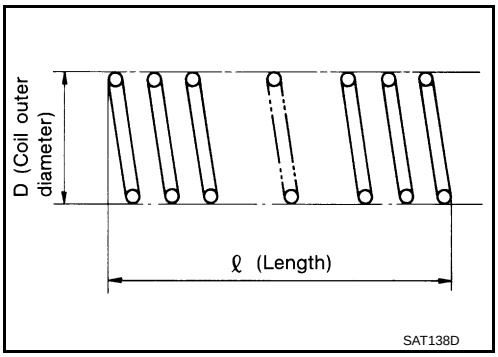
- **If a valve is hard to remove, place valve body face down and lightly tap it with a soft hammer.**
- **Do not drop or damage valves and sleeves.**



INSPECTION

Valve Springs

- Check each valve spring for damage or deformation. Also measure free length and outer diameter. Refer to TM-321, "Control Valves".
- Replace valve springs if deformed or fatigued.



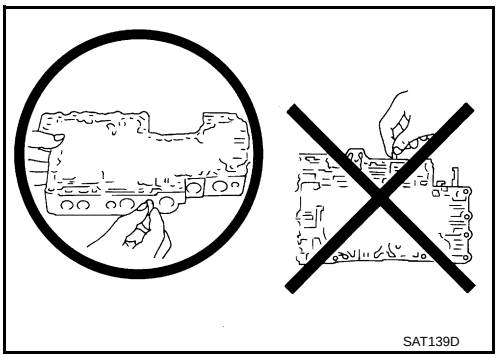
Control Valves

Check sliding surfaces of valves, sleeves and plugs. Replace if necessary.

ASSEMBLY

CAUTION:

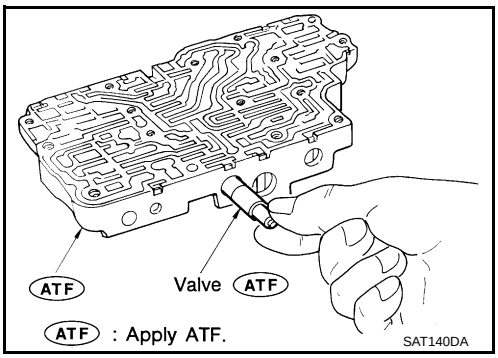
- **Apply ATF to all components before installation.**
- **Lay control valve body down when installing valves. Do not stand control valve body upright.**



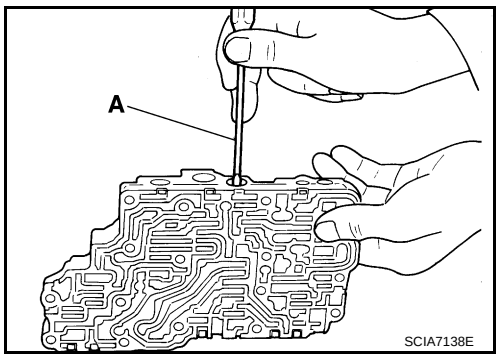
Lubricate control valve body and all valves with ATF. Install control valves by sliding them carefully into their bores.

CAUTION:

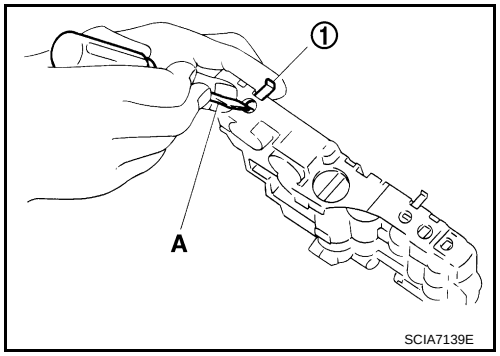
- **Install each control valve one by one.**
- **Install control valves after checking, because some of them are similar.**
- **Do not scratch or damage valve body.**



- Use suitable tool wraped with vinyl tape (A) and use it to insert valves into their proper positions.

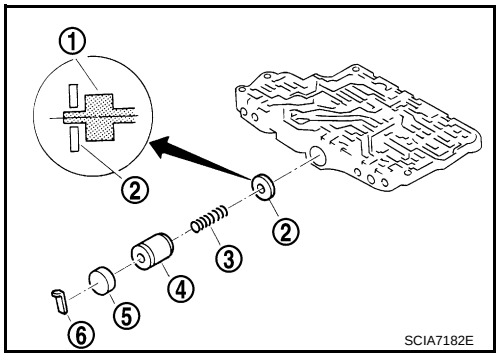


- Install retainer plates (1).
- While pushing plug or return spring, install retainer plate (1) using suitable tool (A).



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).

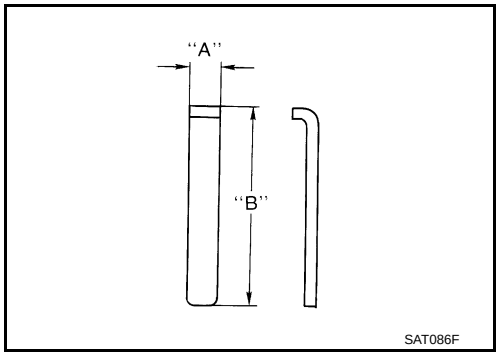


Retainer Plate (Control Valve Upper Body)

Install proper retainer plates.

Unit: mm (in)

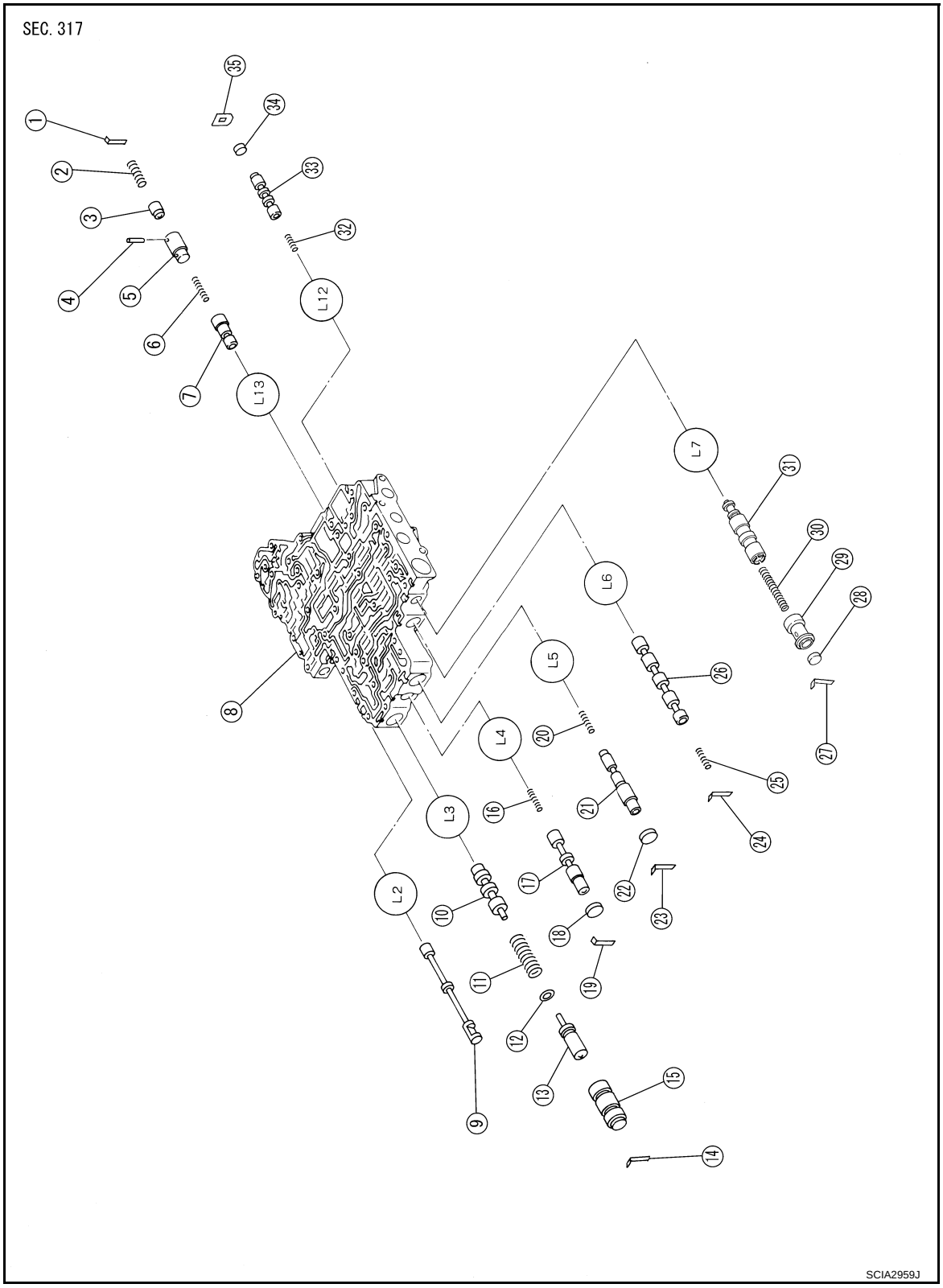
Location	Retainer plate designation	Width "A"	Length "B"
L14	Pilot valve	6.0 (0.236)	21.5 (0.846)
L15	1-2 accumulator valve		40.5 (1.594)
	1-2 accumulator piston		
L16	1st reducing valve		21.5 (0.846)
L17	3-2 timing valve		
L18	Overrun clutch reducing valve		24.0 (0.945)
L19	Torque converter relief valve		21.5 (0.846)
L20	Torque converter clutch control valve		28.0 (1.102)
L21	Cooler check valve		24.0 (0.945)



Control Valve Lower Body

INFOID:0000000001730987

COMPONENTS

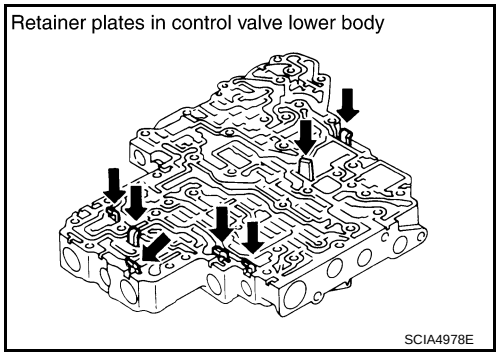


1. Retainer plate
2. Pressure modifier piston spring
3. Pressure modifier piston
4. Parallel pin
5. Sleeve
6. Pressure modifier valve spring
7. Pressure modifier valve
8. Control valve lower body
9. Manual valve
10. Pressure regulator valve
11. Pressure regulator valve spring
12. Spring seat
13. Plug
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

DISASSEMBLY

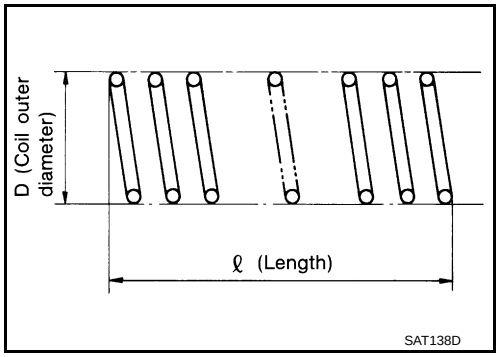
Remove valves at retainer plate.
For removal procedures, refer to TM-252, "Control Valve Upper Body".



INSPECTION

Valve Springs

- Check each valve spring for damage or deformation. Also measure free length and outer diameter. Refer to TM-321, "Control Valves".
- Replace valve springs if deformed or fatigued.



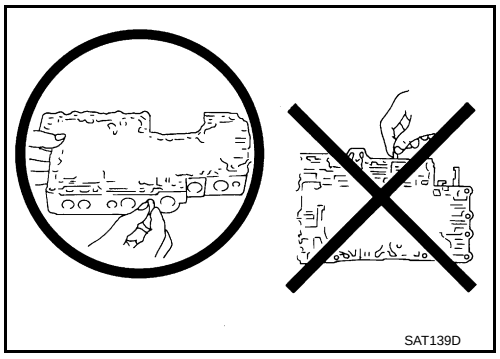
Control Valves

Check sliding surfaces of control valves, sleeves and plugs for damage. Replace if necessary.

ASSEMBLY

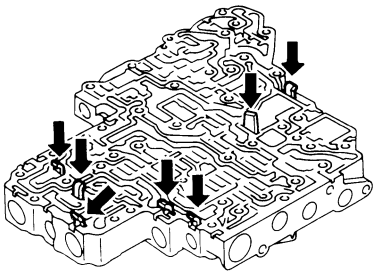
CAUTION:

- **Apply ATF to all components before installation.**
- **Lay control valve body down when installing valves. Do not stand control valve body upright.**



Install control valves.
For installation procedures, refer to TM-252, "Control Valve Upper Body".

Retainer plates in control valve lower body

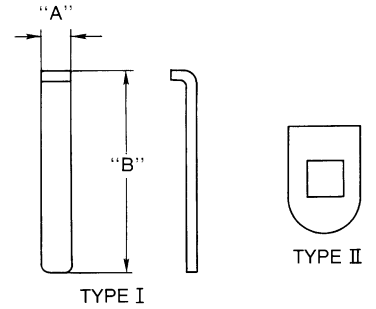


SCIA4978E

Retainer Plate (Control Valve Lower Body)
Install proper retainer plates.

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

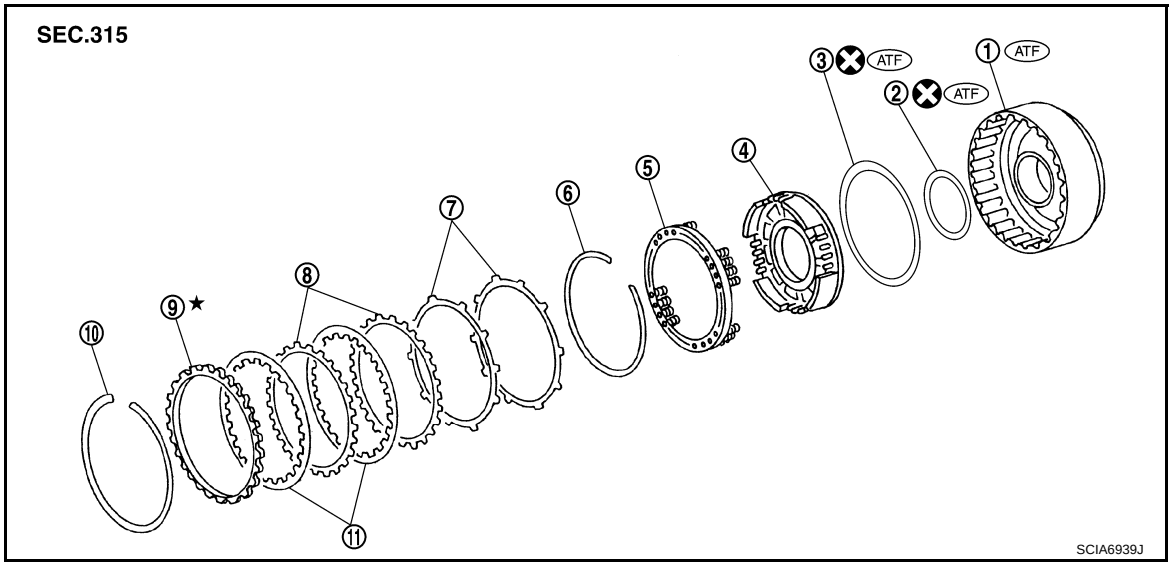


SAT089F

Reverse Clutch

INFOID:0000000001730988

COMPONENTS



1. Reverse clutch drum
2. D-ring
3. Seal ring
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

DISASSEMBLY

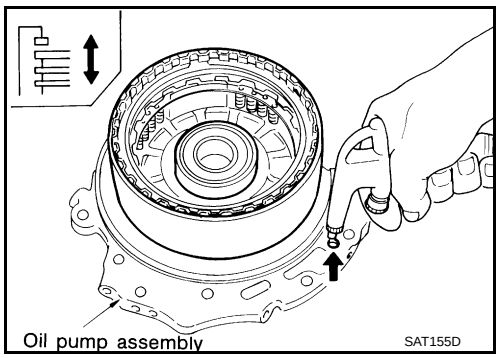
1. Check operation of reverse clutch

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.

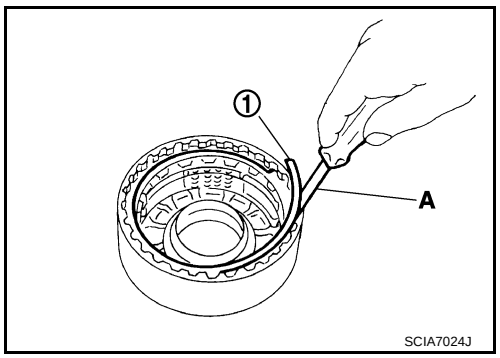
c. Check to see that retaining plate moves to snap ring.

d. If retaining plate does not contact snap ring:
- D-ring might be damaged.
- Seal ring might be damaged.
- Fluid might be leaking past piston check ball.



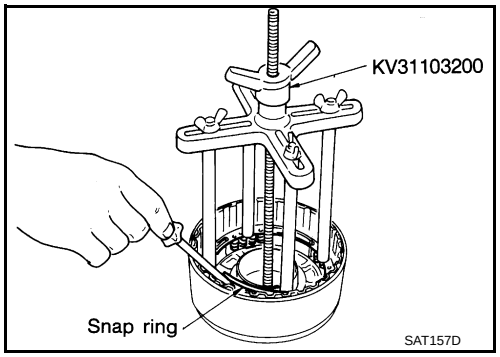
2. Remove snap ring (1) using suitable tool (A).

3. Remove retaining plate, drive plates, driven plates and dish plates.

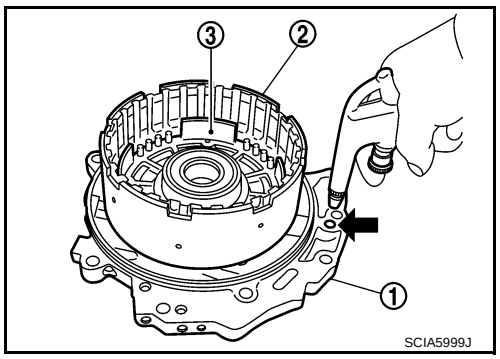


4. Set Tool on spring retainer assembly, and remove snap ring from reverse clutch drum while compressing spring retainer assembly.
CAUTION:
Set Tool directly over return springs.

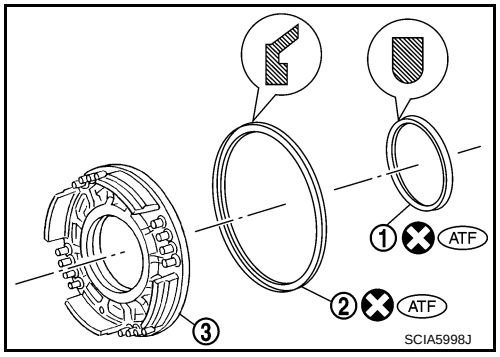
5. Remove spring retainer assembly from reverse clutch drum.
CAUTION:
Do not remove return springs from spring retainer.



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 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 ring (2) from reverse clutch piston (3).



INSPECTION

Reverse Clutch Snap Ring

Check for deformation, fatigue or damage. Replace if necessary.

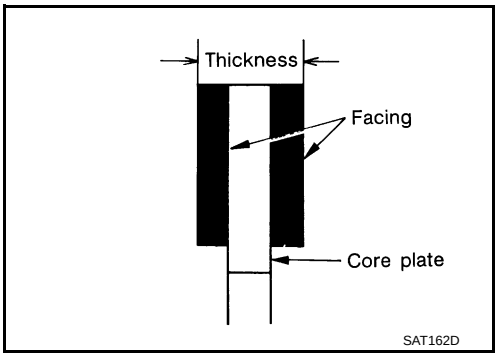
Reverse Clutch Drive Plates

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

Thickness of drive plate

Standard and allowable limit:

Refer to TM-321, "Clutches and Brakes".



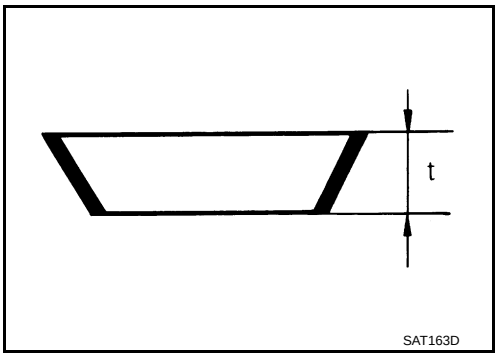
CAUTION:

- **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)



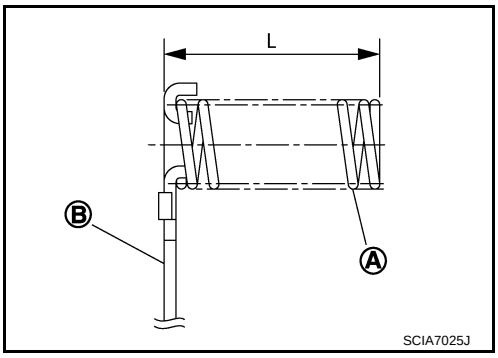
Reverse Clutch Spring Retainer Assembly

Measure length (L) of spring retainer assembly. Replace if damaged, deformed or worn.

Length (L): 20.1 mm (0.791 in)

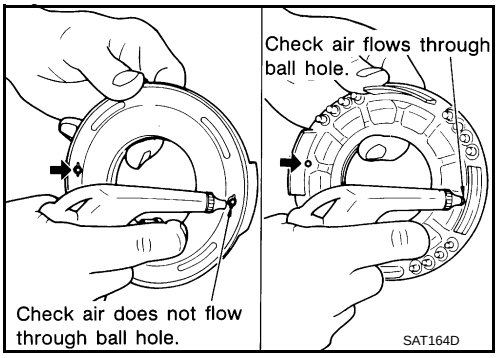
CAUTION:

Do not remove return springs (A) from spring retainer (B)



Reverse Clutch Piston

- Make sure that check balls do not stick.
- 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.

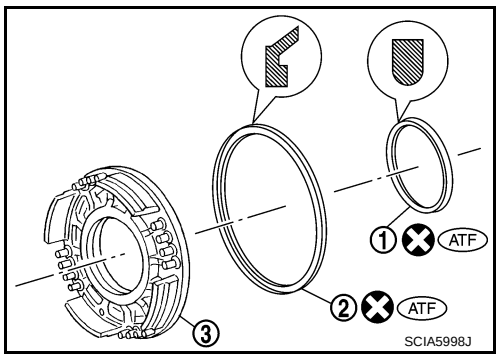


Reverse Clutch Drum

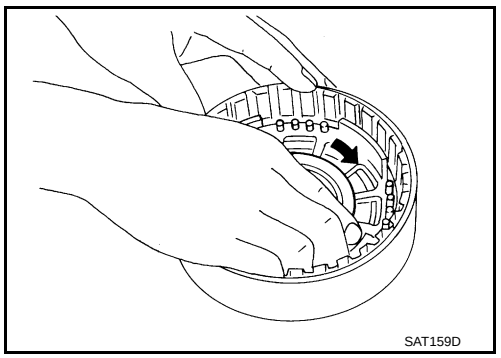
Check for deformation or damage. Replace if necessary.

ASSEMBLY

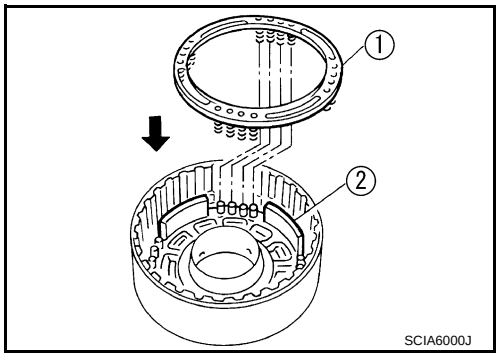
1. Install D-ring (1) and seal ring (2) on reverse clutch piston (3).
CAUTION:
Be careful with the direction of seal ring (2).



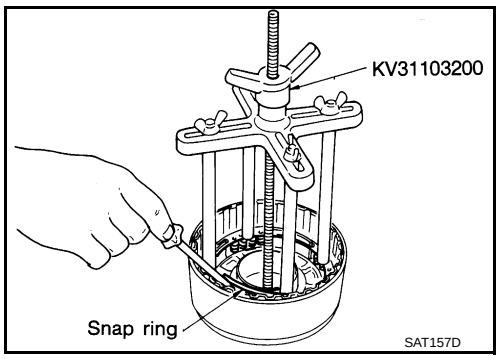
2. Install reverse clutch piston by turning it slowly.
CAUTION:
Apply ATF to inner surface of reverse clutch drum.



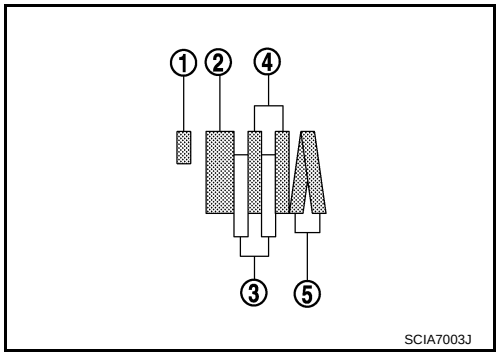
3. Install spring retainer assembly (1) to reverse clutch piston (2).



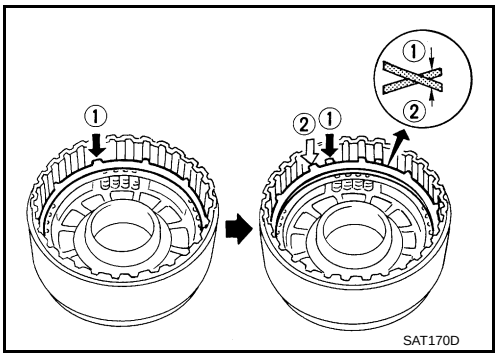
4. Set Tool on spring retainer assembly, and install snap ring while compressing spring retainer assembly.
CAUTION:
Set Tool directly over return springs.



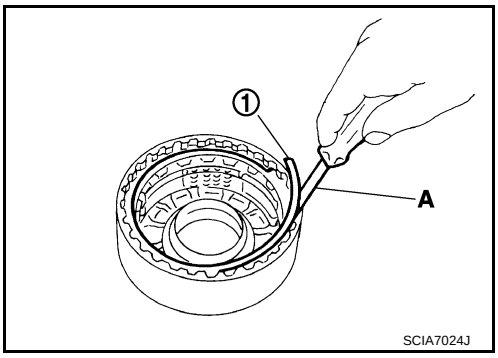
5. Install dish plates (5), driven plates (4), drive plates (3) and retaining plate (2).
(1): Snap ring
(2): Retaining plate
(3): Drive plate
(4): Driven plate
(5): Dish plate
Drive plate/Driven plate: 2/2
CAUTION:
Be careful with the order of plates.



NOTE:
Install two dish plates fitting each installation direction with reverse clutch drum groove displaced slightly.



6. Install snap ring (1) using suitable tool (A).



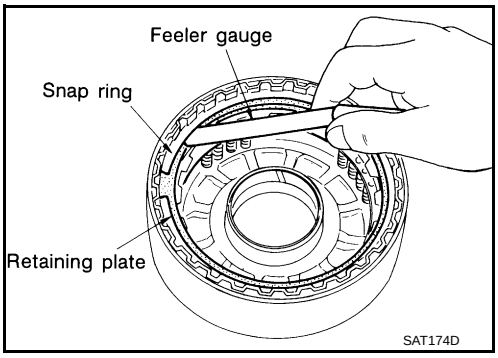
7. Measure clearance between retaining plate and snap ring using feeler gauge. If not within allowable limit, select proper retaining plate.

Specified clearance

Standard and allowable limit:

Refer to TM-321, "Clutches and Brakes".

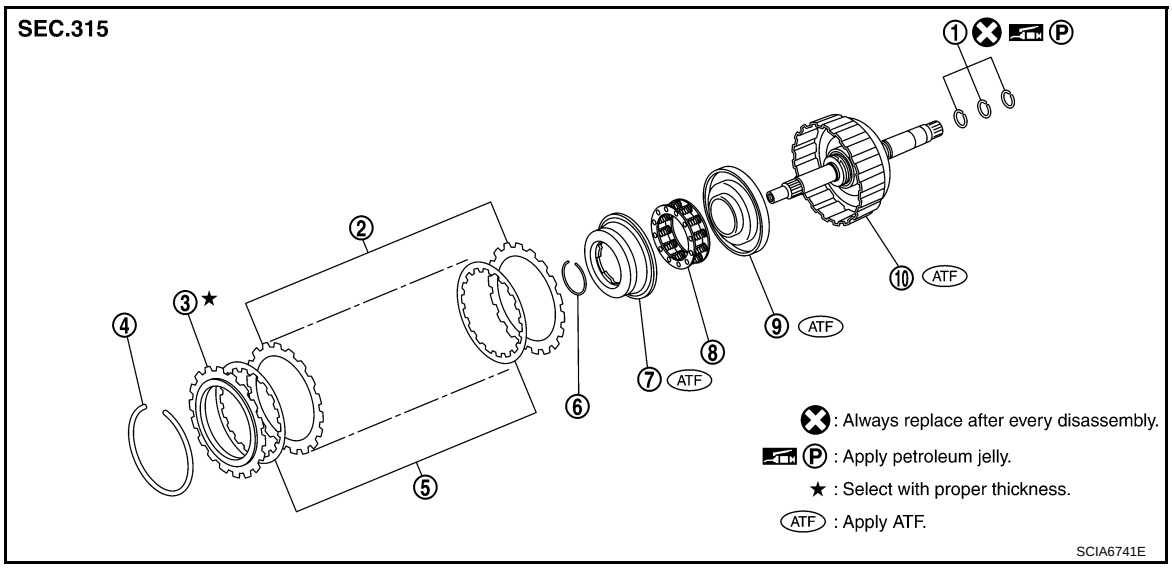
8. Check operation of reverse clutch. Refer to TM-258, "Reverse Clutch".



High Clutch

INFOID:0000000001730989

COMPONENTS



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)

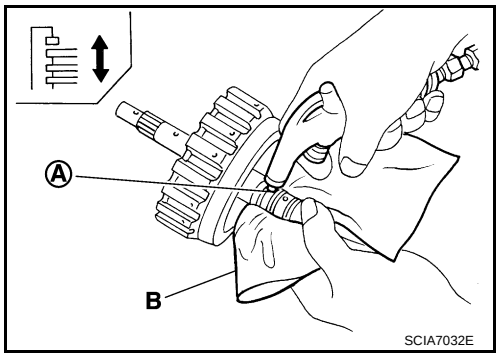
DISASSEMBLY

1. Check operation of high clutch.

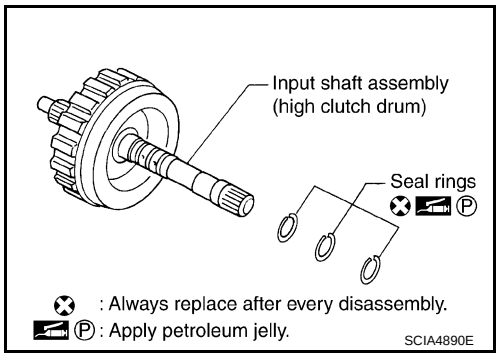
a. Apply compressed air into the oil hole (A) of input shaft assembly (high clutch drum) at the location as shown.
CAUTION:
Block the oil hole (A) on the opposite side with lint-free cloth (B).

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

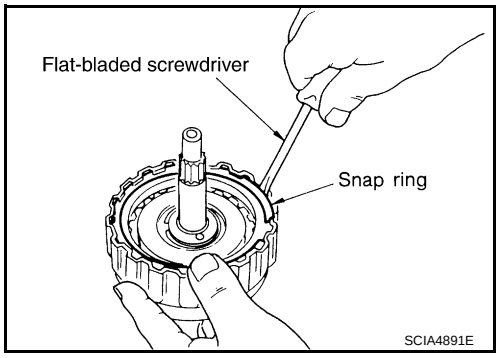
c. If retaining plate does not contact snap ring:
- High clutch piston seal might be damaged.



2. Remove seal rings from input shaft assembly (high clutch drum).



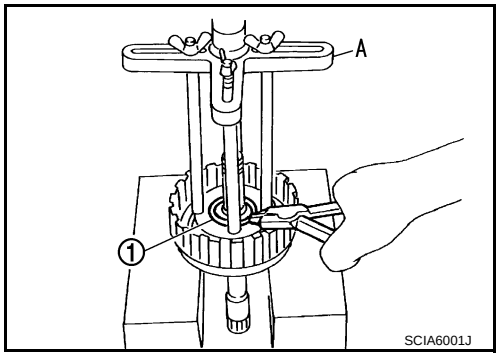
3. Remove snap ring using suitable tool.
4. Remove retaining plate, drive plates and driven plates.



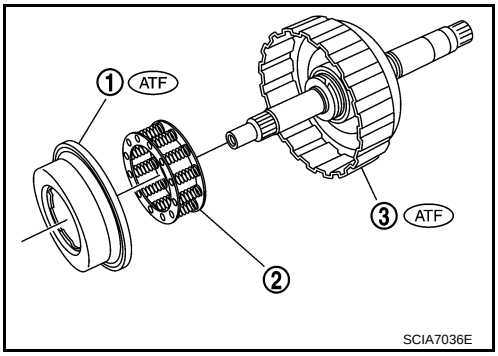
5. Set Tool (A) on cancel cover, and remove snap ring (1) from input shaft assembly (high clutch drum) while compressing spring retainer assembly.

Tool number: KV31103200

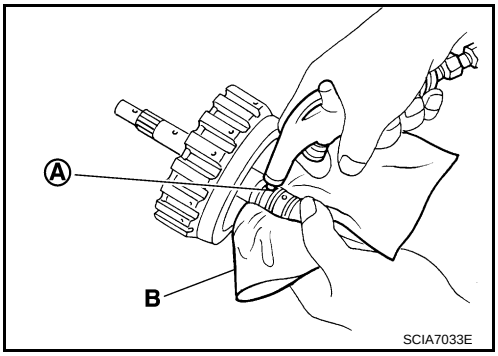
CAUTION:
Do not expand snap ring (1) excessively.



6. 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.



7. Apply compressed air into the oil hole (A) at the location as shown 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).**



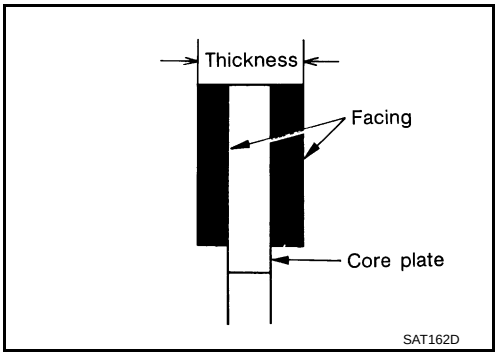
INSPECTION

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 TM-321, "Clutches and Brakes".

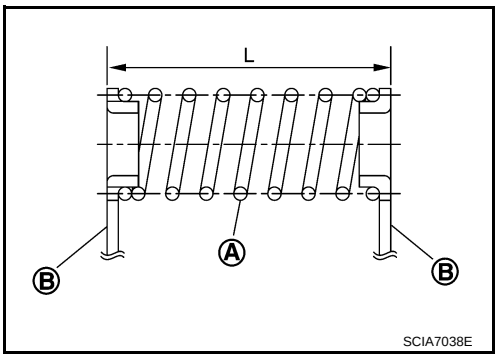
CAUTION:
- **Measure the thickness at 3 locations and find the average.**
- **Inspect ALL drive plates.**
- **Replace if the thickness is below the allowable limit.**



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.

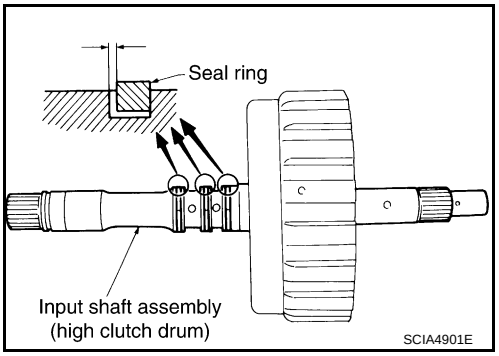
Seal Ring Clearance

- 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 TM-323, "Input Shaft".

- If not within allowable limit, replace input shaft assembly (high clutch drum).

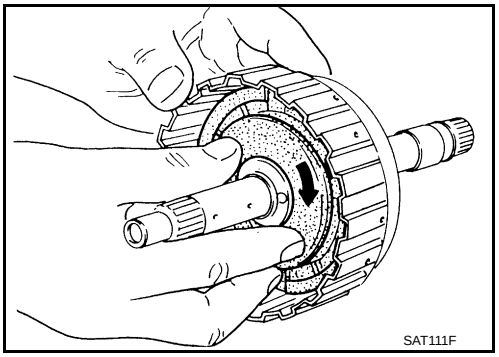


ASSEMBLY

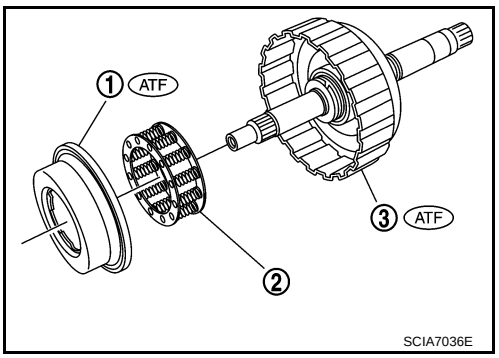
1. Install high clutch piston by turning it slowly.

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).

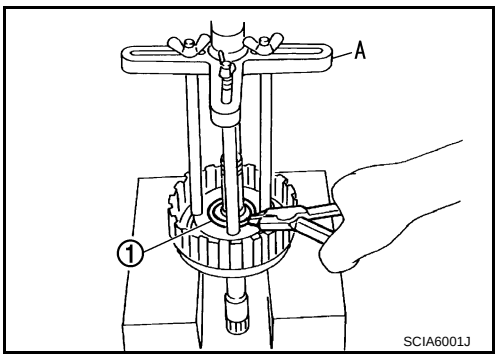


3. Set Tool A on cancel cover, and install snap ring (1) to input shaft assembly (high clutch drum) while slowly compressing spring retainer assembly.

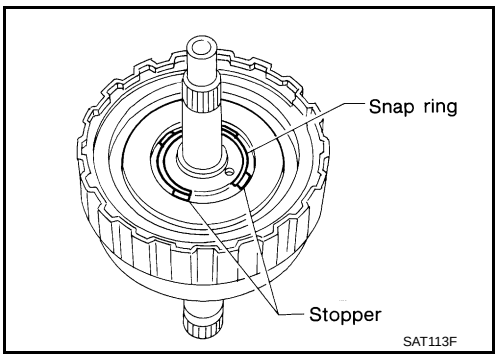
Tool number: KV31103200

CAUTION:

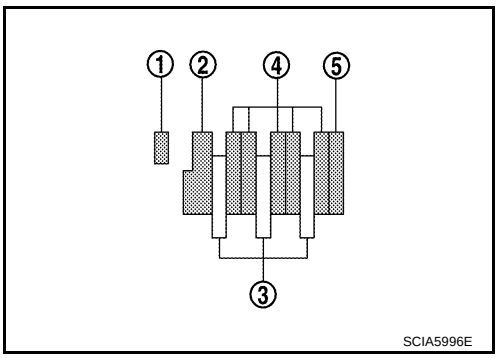
- **Do not expand snap ring (1) excessively.**
- **Install spring retainer assembly without tilting.**



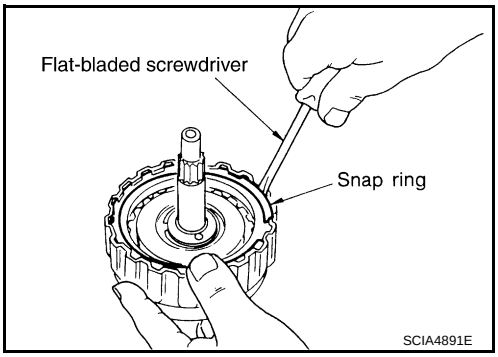
- **Do not align snap ring gap with cancel cover stopper.**



4. Install driven plates (4), (5), drive plates (3) and retaining plate (2).
(1): Snap ring
(2): Retaining plate
(3): Drive plate
(4): Driven plate
(5): Driven plate
Drive plate/Driven plate: 3/6 (1+5)
CAUTION:
Be careful with the order and direction of plates.



5. Install snap ring using suitable tool.



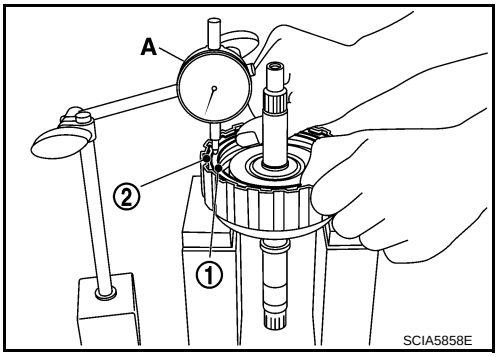
6. Set dial indicator (A) on retaining plate (1), and measure clearance between retaining plate (1) and snap ring (2). If not within allowable limit, select proper retaining plate (1).

Specified clearance

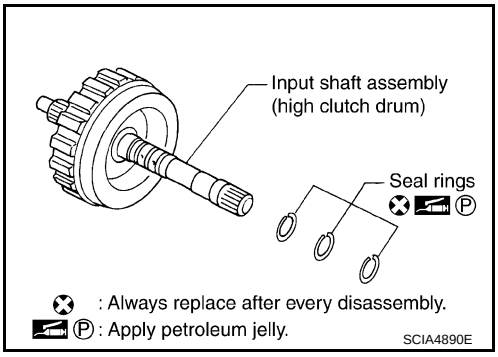
Standard and allowable limit:

Refer to TM-321, "Clutches and Brakes".

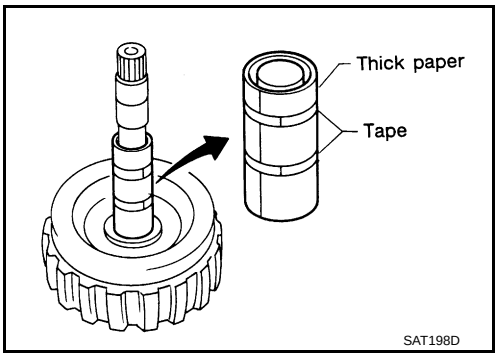
7. Check operation of high clutch. Refer to TM-262, "High Clutch".



8. Install seal rings to input shaft assembly (high clutch drum).



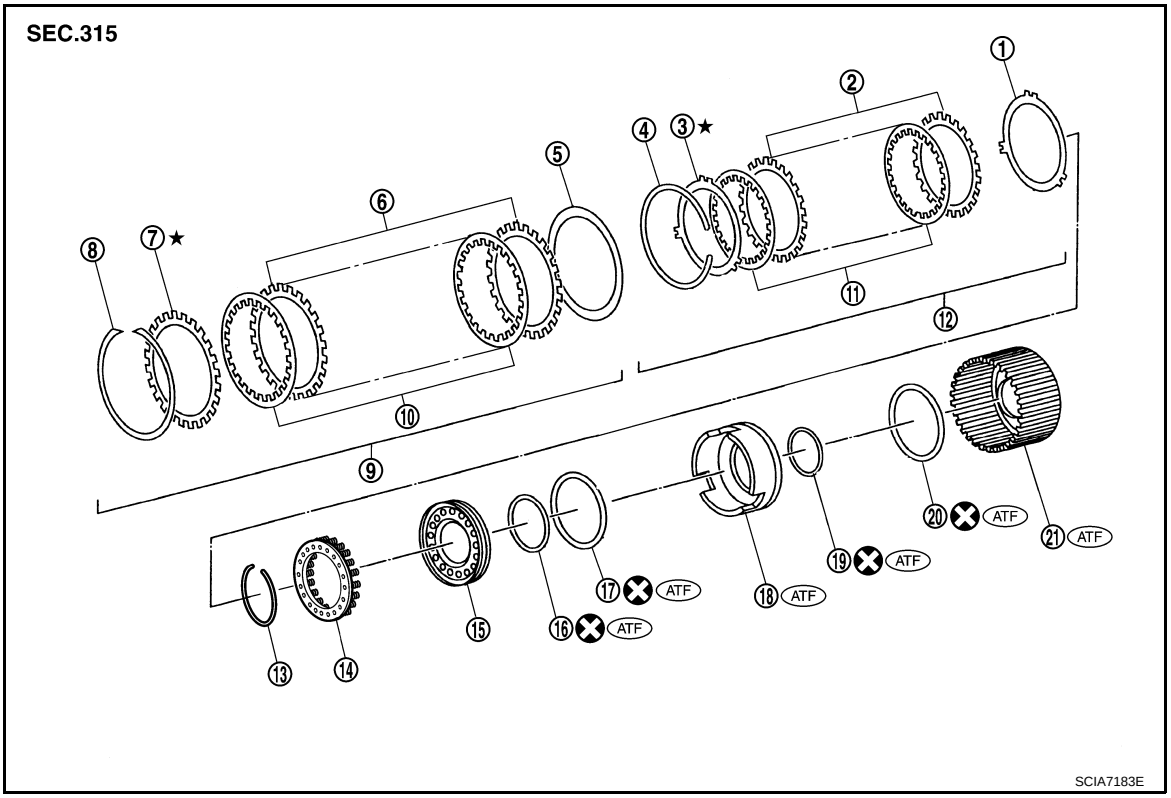
CAUTION:
Roll paper around seal rings to prevent seal rings from spreading.



Forward and Overrun Clutches

INFOID:0000000001730990

COMPONENTS



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 ring
18. Forward clutch piston
19. D-ring
20. Seal ring
21. Forward clutch drum

DISASSEMBLY

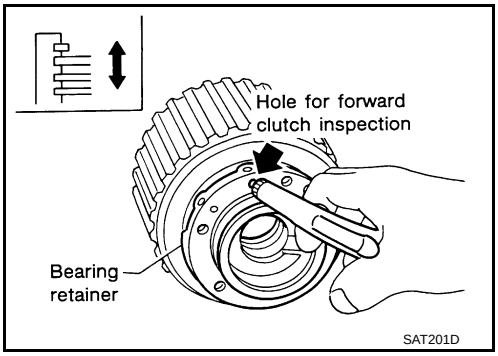
1. Check operation of forward clutch.

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.

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 ring might be damaged.
- Fluid might be leaking past piston check ball.



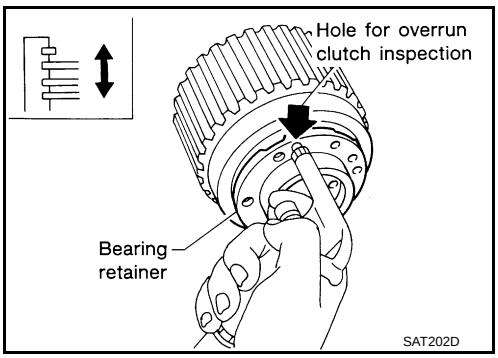
2. Check operation of overrun clutch.

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.

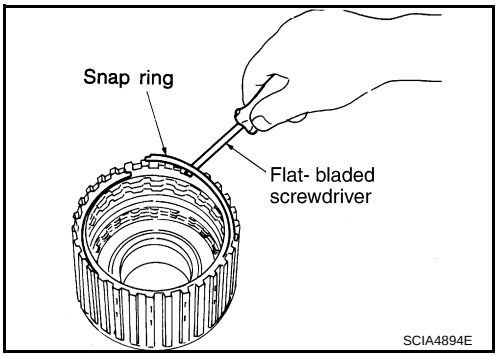
c. Check to see that retaining plate moves to snap ring.

d. If retaining plate does not contact snap ring:
- D-ring might be damaged.
- Seal ring might be damaged.
- Fluid might be leaking past piston check ball.



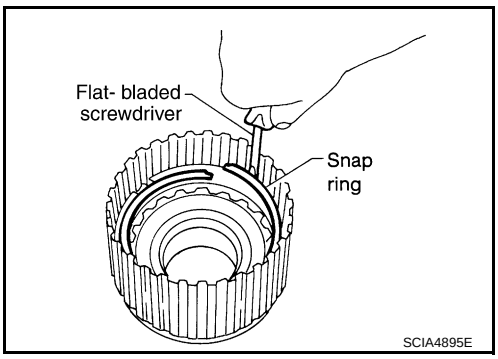
3. Remove snap ring for forward clutch from forward clutch drum using suitable tool.

4. Remove retaining plate, drive plates, driven plates and dish plate for forward clutch.



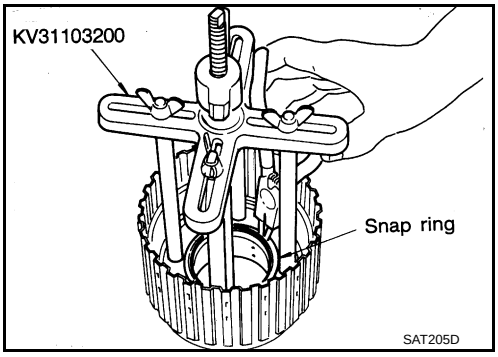
5. Remove snap ring for overrun clutch from forward clutch drum using suitable tool.

6. Remove retaining plate, drive plates, driven plates and dish plate for overrun clutch.



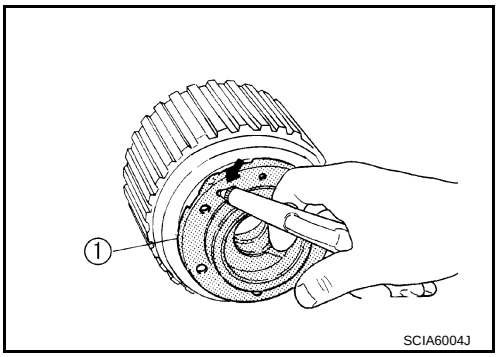
7. Set Tool on spring retainer assembly, and remove snap ring from forward clutch drum while compressing spring retainer assembly.
CAUTION:
- **Set Tool directly over return springs.**
- **Do not expand snap ring excessively.**

8. Remove spring retainer assembly from forward clutch drum.
CAUTION:
Do not remove return springs from spring retainer.



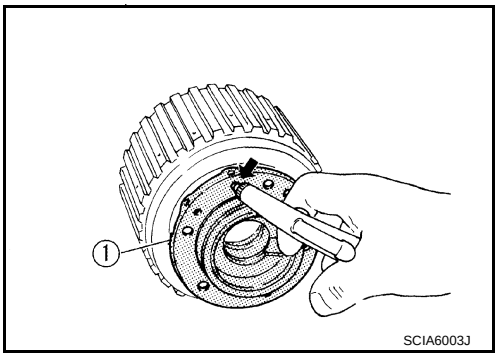
9. Install seal rings to bearing retainer (1), and set forward clutch drum. Then apply compressed air into the oil hole at the location as shown to remove overrun clutch piston from forward clutch piston.

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.

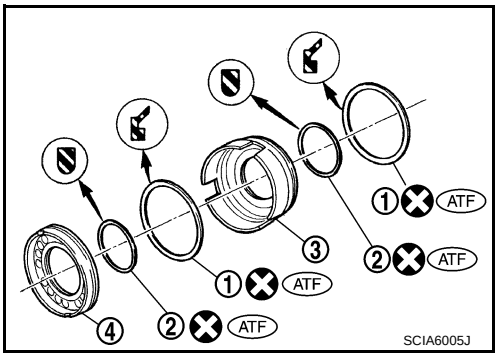


10. Install seal rings to bearing retainer (1), and set forward clutch drum. Then apply compressed air into the oil hole at the location as shown to remove forward clutch piston from forward clutch drum.

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 rings (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

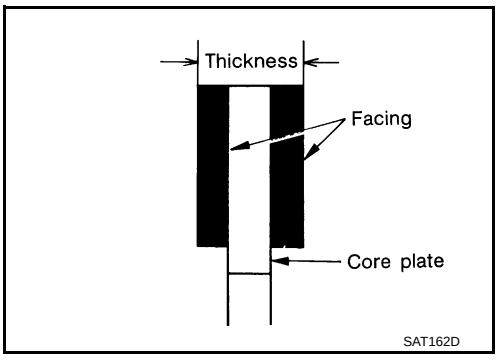
Standard and allowable limit:

Refer to TM-321, "Clutches and Brakes".

Overrun clutch

Standard and allowable limit:

Refer to TM-321, "Clutches and Brakes".



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

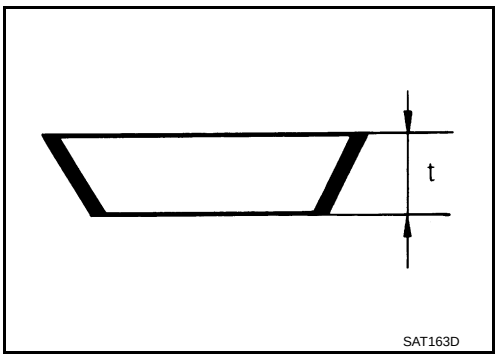
- Check for deformation or damage.

- 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)



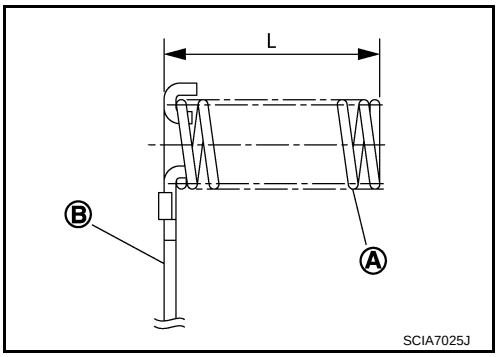
Forward Clutch and Overrun Clutch Spring Retainer Assembly

Check length (L) of spring retainer assembly. Replace if damaged, deformed or worn.

Length (L): 27.7 mm (0.1091 in)

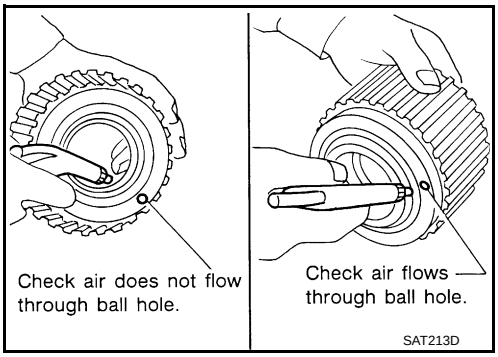
CAUTION:

Do not remove return springs (A) from spring retainer (B)



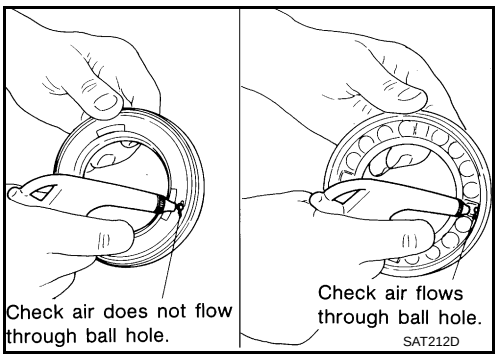
Forward Clutch Drum

- Make sure that check balls do not stick.
- 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.



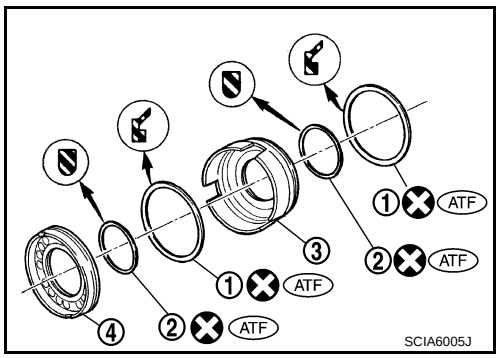
Overrun Clutch Piston

- Make sure that check balls do not stick.
- 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.

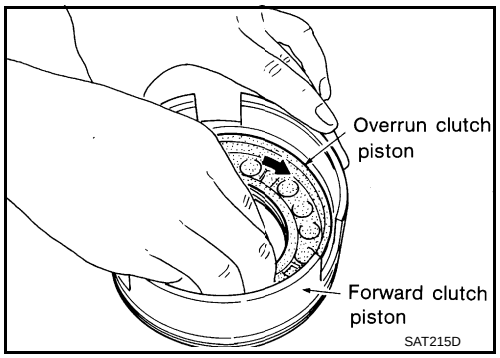


ASSEMBLY

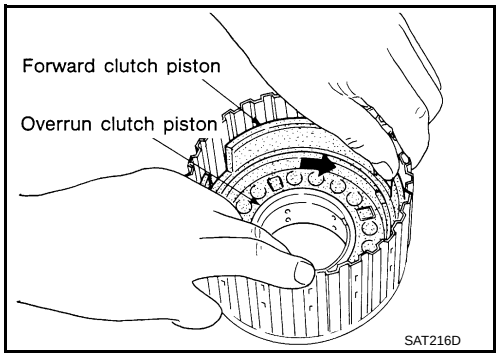
1. Install seal rings (1) and D-rings (2) on forward clutch piston (3) and overrun clutch piston (4).
CAUTION:
Be careful with the direction of seal rings (1).



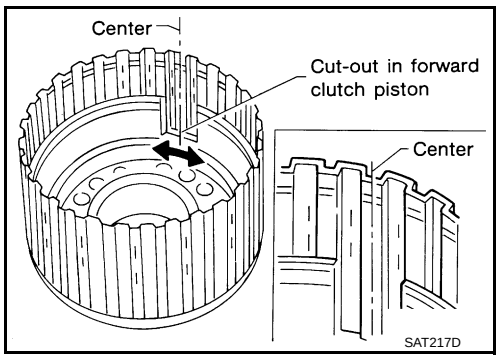
2. Install overrun clutch piston on forward clutch piston by turning it slowly.
CAUTION:
Apply ATF to inner surface of forward clutch piston.



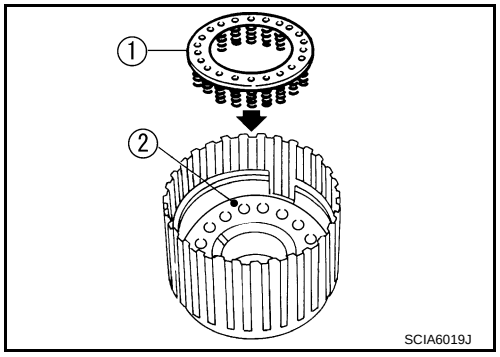
3. Install forward clutch piston with overrun clutch piston on forward clutch drum by turning it slowly.
CAUTION:
Apply ATF to inner surface of forward clutch drum.



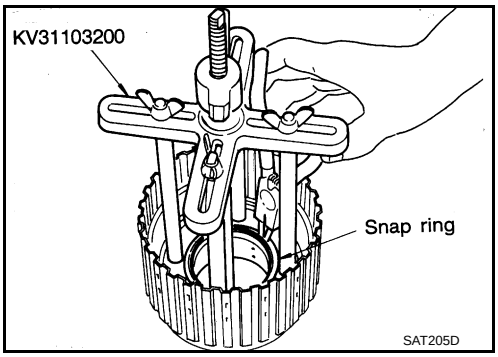
4. Align notch in forward clutch piston with groove in forward clutch drum.



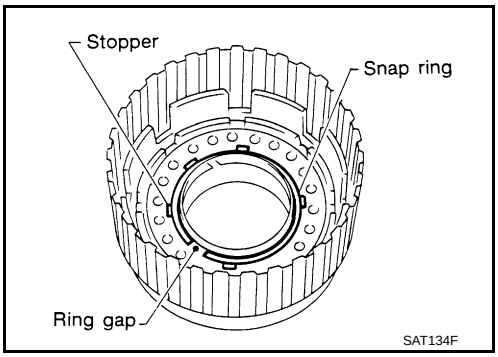
5. Install spring retainer assembly (1) on overrun clutch piston (2).



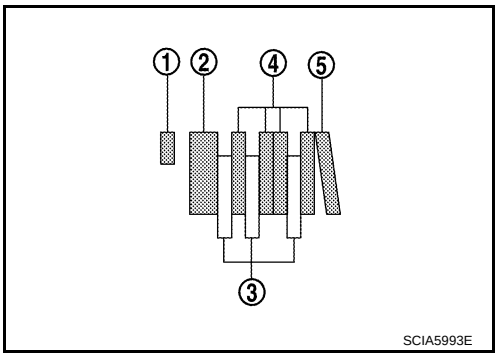
6. Set Tool on spring retainer assembly, and install snap ring while compressing spring retainer assembly.
CAUTION:
- **Set Tool directly over return springs.**
- **Do not expand snap ring excessively.**



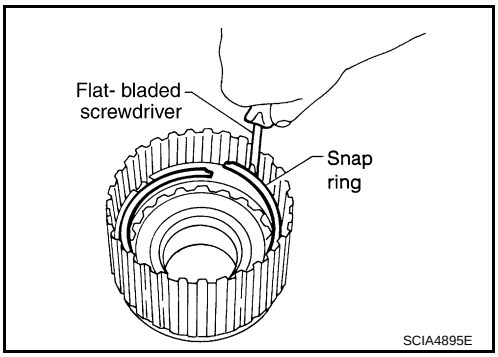
- **Do not align snap ring gap with spring retainer assembly stopper.**



7. Install dish plate (5), driven plates (4), drive plates (3) and retaining plate (2) 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 suitable tool.

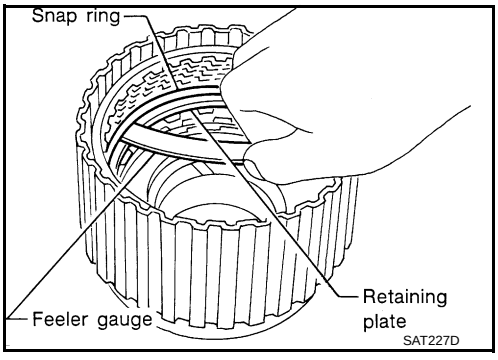


9. Measure clearance between overrun clutch retaining plate and snap ring using feeler gauge. If not within allowable limit, select proper retaining plate.

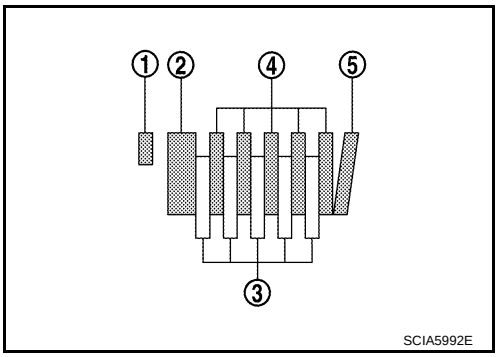
Specified clearance

Standard and allowable limit:

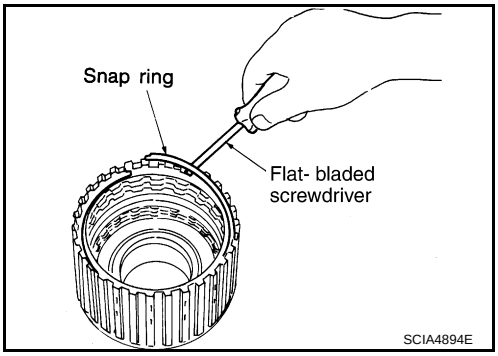
Refer to TM-321, "Clutches and Brakes".



10. Install dish plate (5), driven plates (4), drive plates (3) and retaining plate (2) 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.



11. Install snap ring for forward clutch using suitable tool.



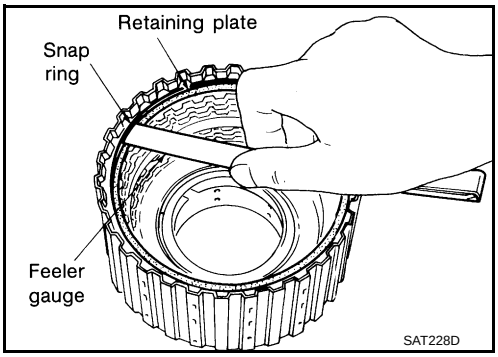
12. Measure clearance between forward clutch retaining plate and snap ring using feeler gauge. If not within allowable limit, select proper retaining plate.

Specified clearance

Standard and allowable limit:

Refer to TM-321, "Clutches and Brakes".

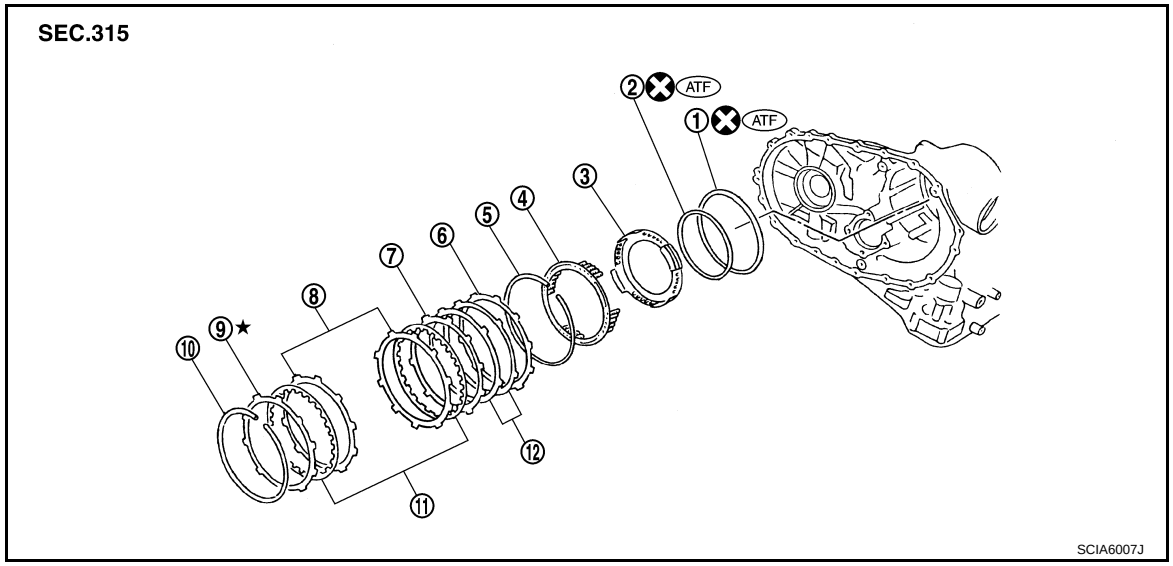
13. Check operation of forward clutch and overrun clutch. Refer to TM-267, "Forward and Overrun Clutches".



Low & Reverse Brake

INFOID:0000000001730991

COMPONENTS



1. Seal ring
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

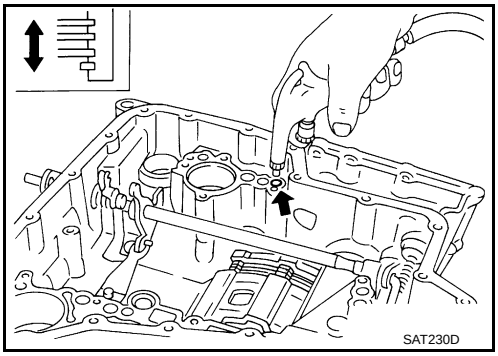
DISASSEMBLY

1. Check operation of low & reverse brake.

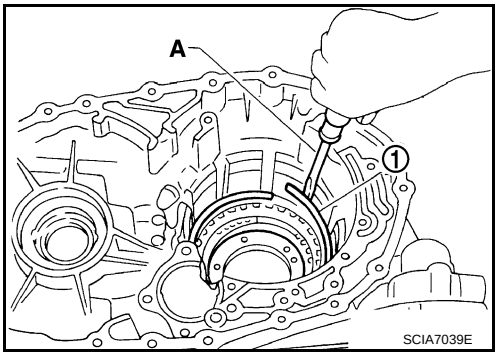
a. Apply compressed air into oil hole of transaxle case at the location as shown.

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

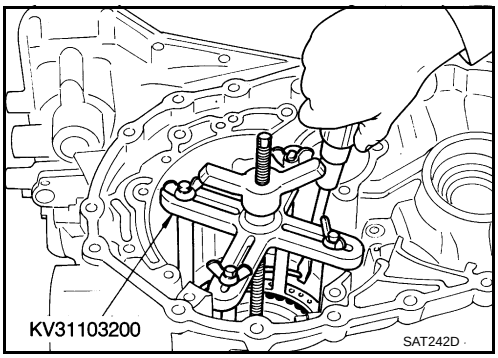
c. If retaining plate does not contact snap ring:
- D-ring might be damaged.
- Seal ring might be damaged.



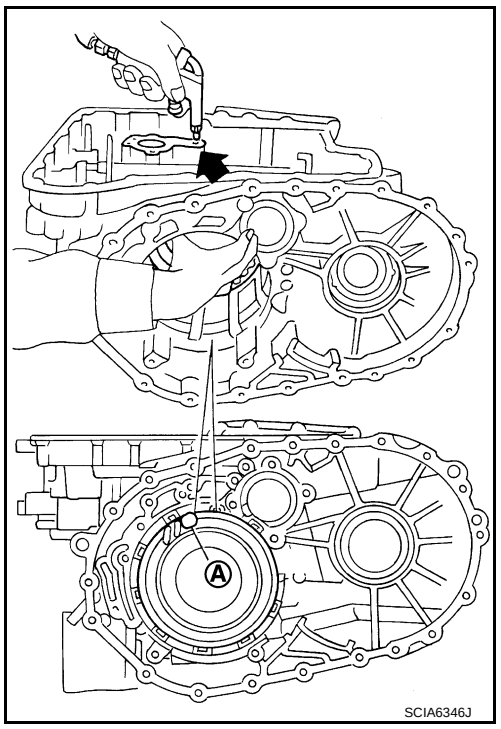
2. Remove snap ring (1) using suitable tool (A).
3. Remove retaining plates, drive plates, driven plates, dish plates.



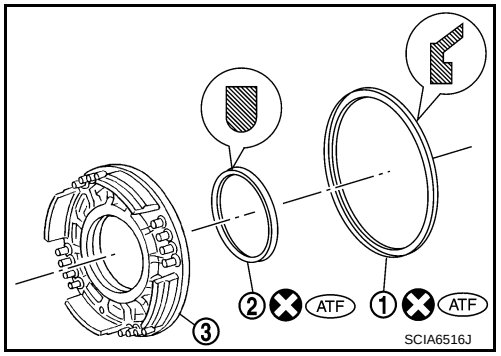
4. Set Tool on spring retainer assembly, and remove snap ring from transaxle case while compressing spring retainer assembly.
CAUTION:
Set Tool directly over return springs.
5. Remove spring retainer assembly from transaxle case.
CAUTION:
Do not remove return springs from spring retainer.



6. Apply compressed air into the oil hole on transaxle case as shown 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.
7. Remove low & reverse brake piston from transaxle case by turning it.
8. Inspect transaxle case. Replace if damaged or worn.



9. Remove seal ring (1) and D-ring (2) from low & reverse brake piston (3).



INSPECTION

Low & Reverse Brake Snap Rings

Check for deformation, fatigue or damage. Replace if necessary.

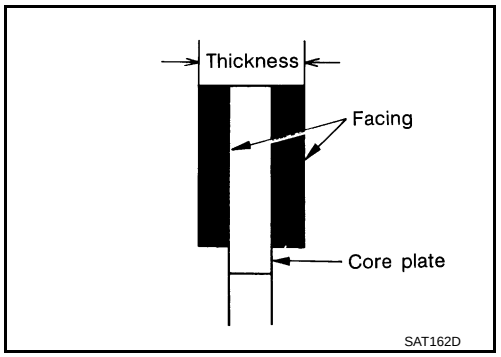
Low & Reverse Brake Drive Plates

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

Thickness of drive plate

Standard and allowable limit:

Refer to TM-321, "Clutches and Brakes".



CAUTION:

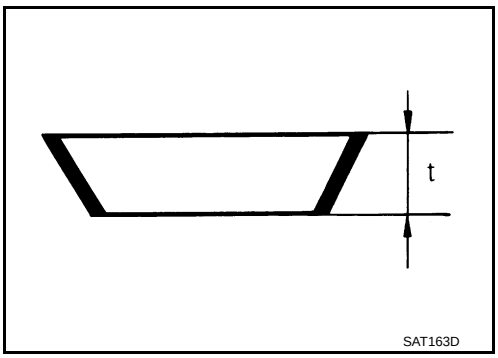
- **Measure the thickness at 3 locations and find the average.**
- **Inspect ALL drive plates.**
- **Replace if the thickness is below the allowable limit.**

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)



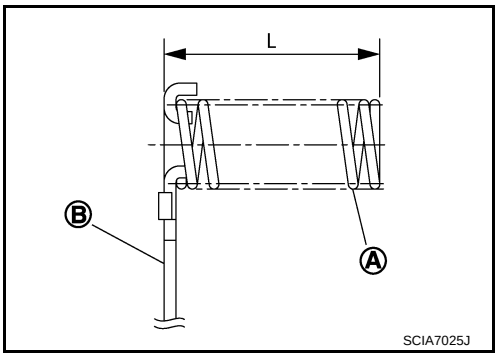
Low & Reverse Brake Spring Retainer Assembly

Check length (L) of spring retainer assembly. Replace if damaged, deformed or worn.

Length (L): 26.3 mm (1.035 in)

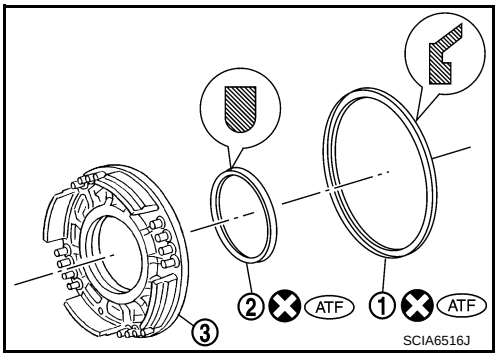
CAUTION:

Do not remove return springs (A) from spring retainer (B)



ASSEMBLY

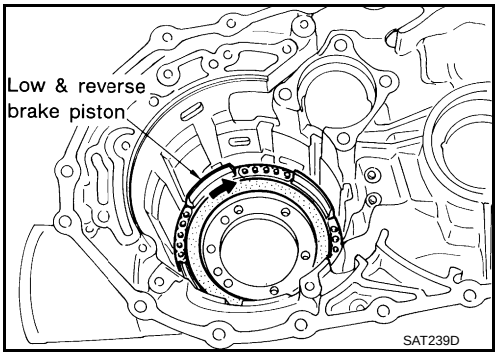
1. Install seal ring (1) and D-ring (2) on low & reverse brake piston (3).



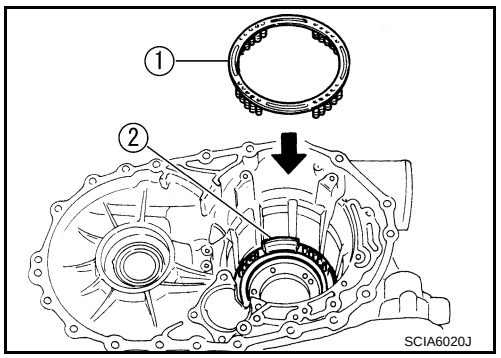
2. Install low & reverse brake piston in transaxle case while turning it.

CAUTION:

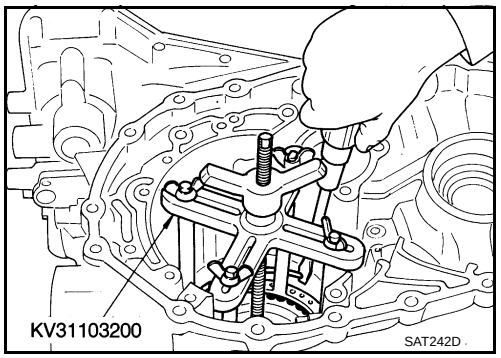
Apply ATF to inner surface of transaxle case.



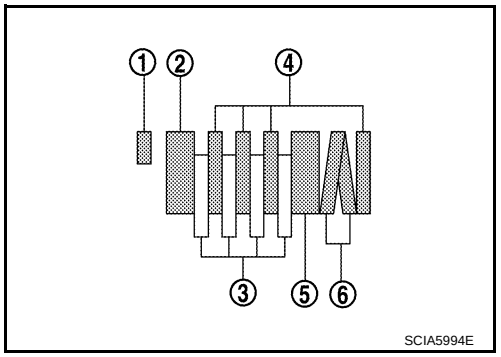
3. Install spring retainer assembly (1) on low & reverse brake piston (2).



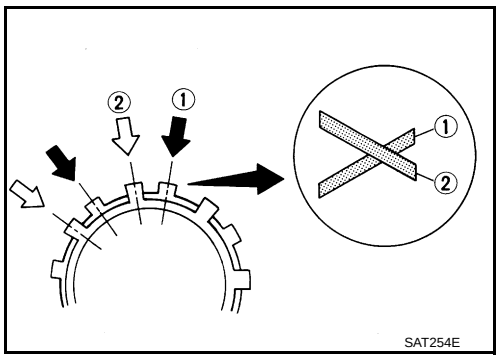
4. Set Tool on spring retainer assembly, and install snap ring while compressing spring retainer assembly.
CAUTION:
Set Tool directly over return springs.



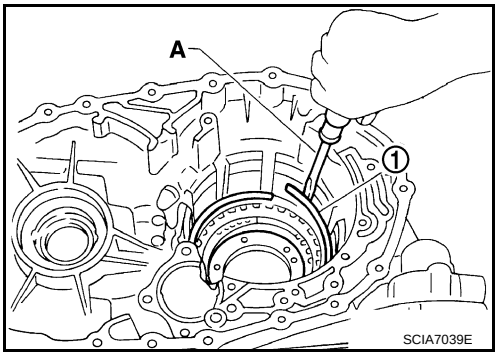
5. Install driven plates (4), dish plates (6), retaining plates (2), (5) and drive plates (3).
(1): Snap ring
(2): Retaining plate
(3): Drive plate
(4): Driven plate
(5): Retaining plate
(6): Dish plate
Drive plate/Driven plate: 4/4
CAUTION:
Be careful with the order of plates



NOTE:
Install two dish plates fitting each installation direction with groove (1) and (2) displaced slightly.



6. Install snap ring (1) using suitable tool (A).

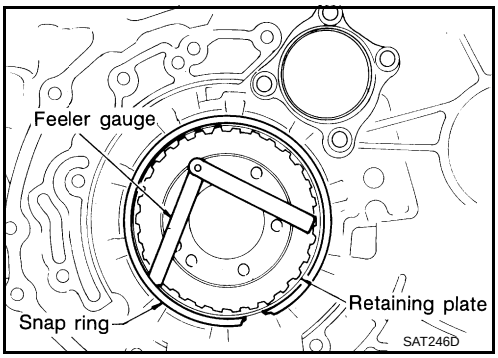


7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate (front side).

Specified clearance

Standard and allowable limit:

Refer to TM-321, "Clutches and Brakes".

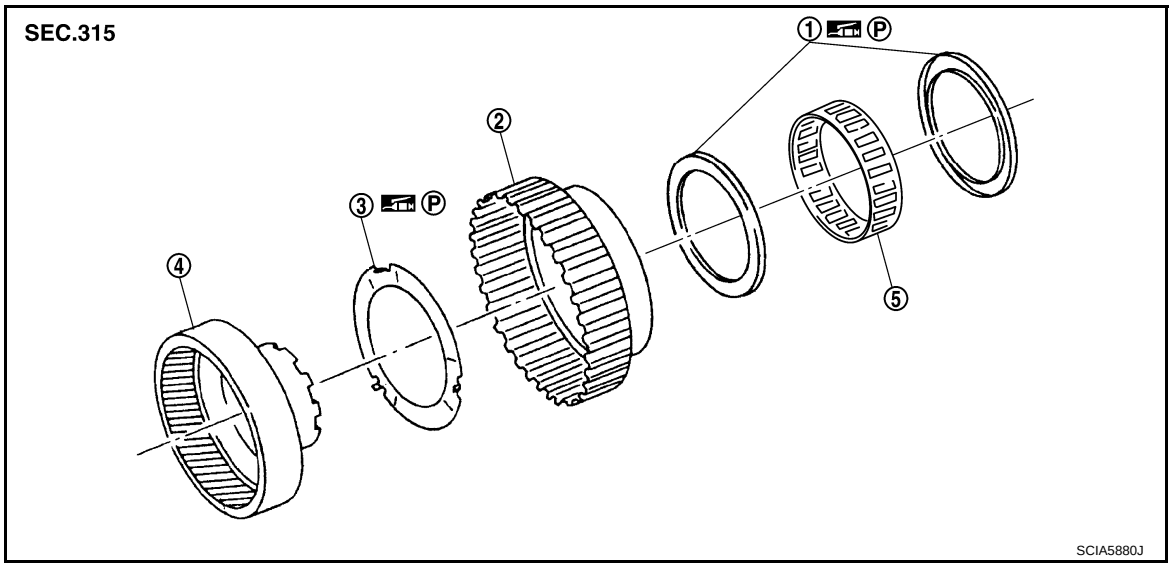


8. Check operation of low & reverse brake. Refer to TM-273, "Low & Reverse Brake".

Rear Internal Gear and Forward Clutch Hub

INFOID:0000000001730992

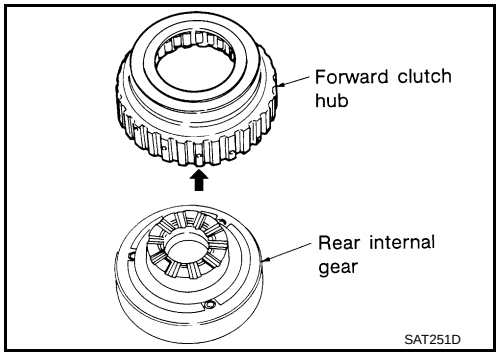
COMPONENTS



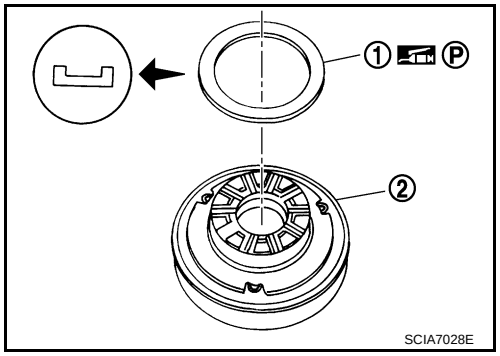
1. End bearing
2. Forward clutch hub
3. Thrust washer
4. Rear internal gear
5. Forward one-way clutch

DISASSEMBLY

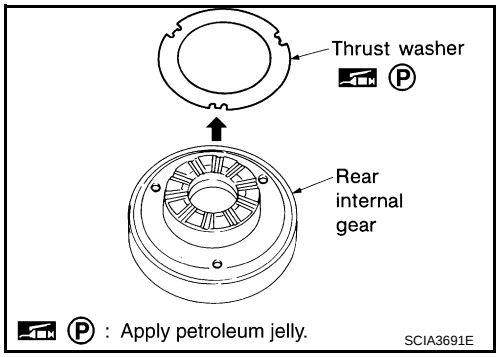
1. Remove forward clutch hub from rear internal gear.



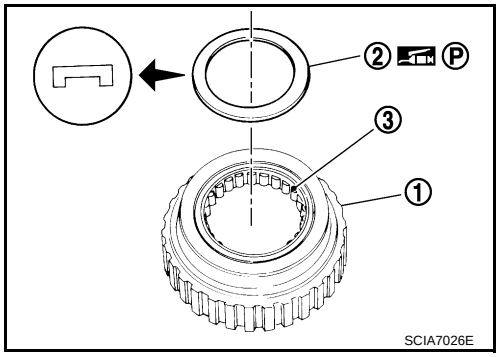
2. Remove end bearing (1) from rear internal gear (2).



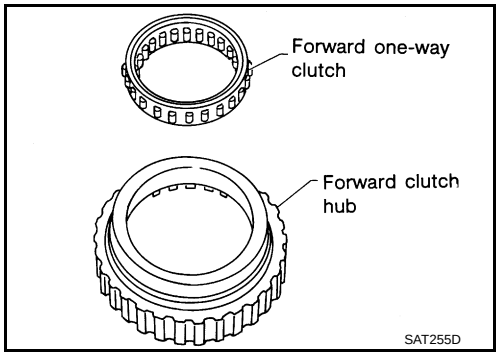
3. Remove thrust washer from rear internal gear.



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.

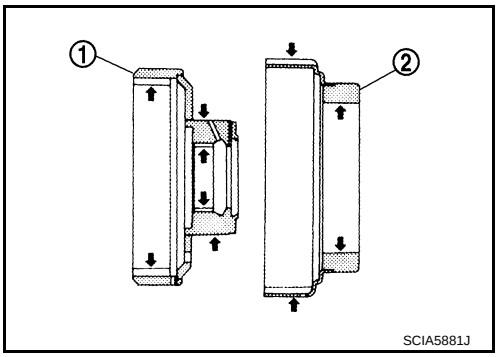


INSPECTION

Rear Internal Gear and Forward Clutch Hub

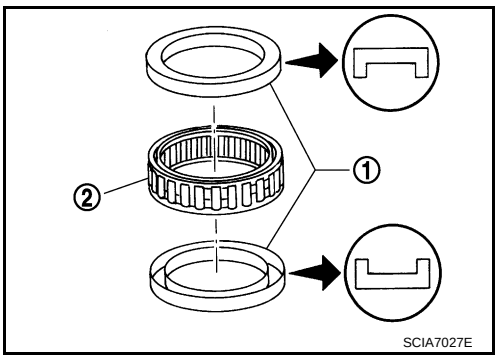
Check rubbing surfaces for wear or damage. Replace if necessary.

(1): Rear internal gear
(2): Forward clutch hub



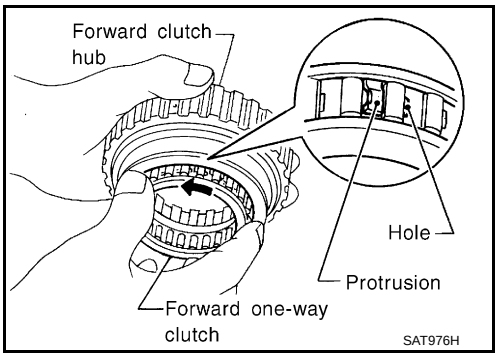
End Bearings and Forward One-way Clutch

- Check end bearings (1) for deformation and damage. Replace if necessary.
- Check forward one-way clutch (2) for wear and damage. Replace if necessary.

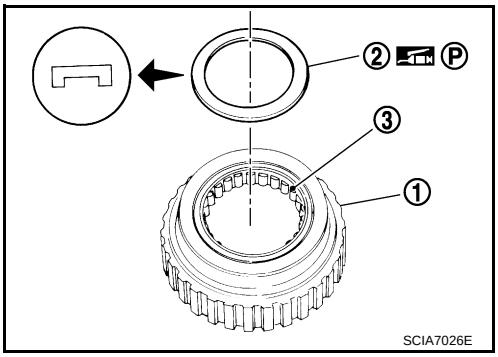


ASSEMBLY

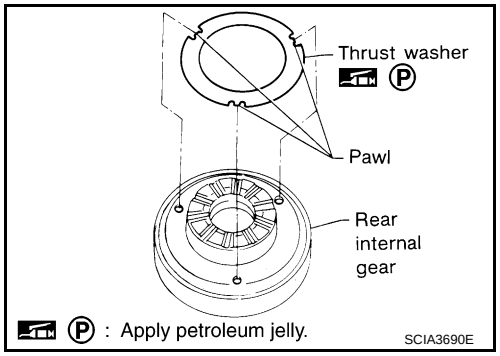
1. Install forward one-way clutch on forward clutch hub.
   CAUTION:
   Be careful with the direction of forward one-way clutch.



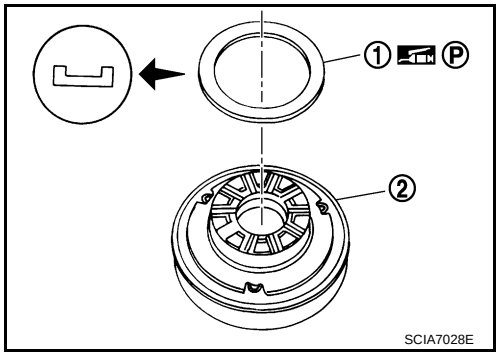
2. Install end bearing (2) on forward one-way clutch (3).
   (1): Forward clutch hub



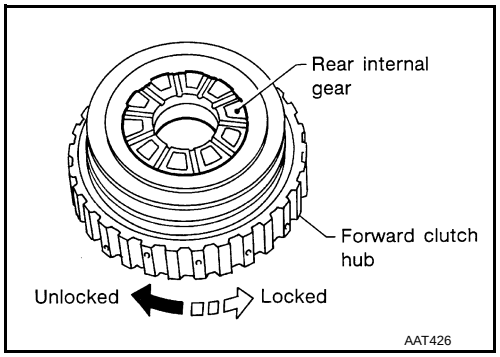
3. Install thrust washer on rear internal gear.
CAUTION:
Align pawls of thrust washer with holes of rear internal gear.



4. Install end bearing (1) on rear internal gear (2).



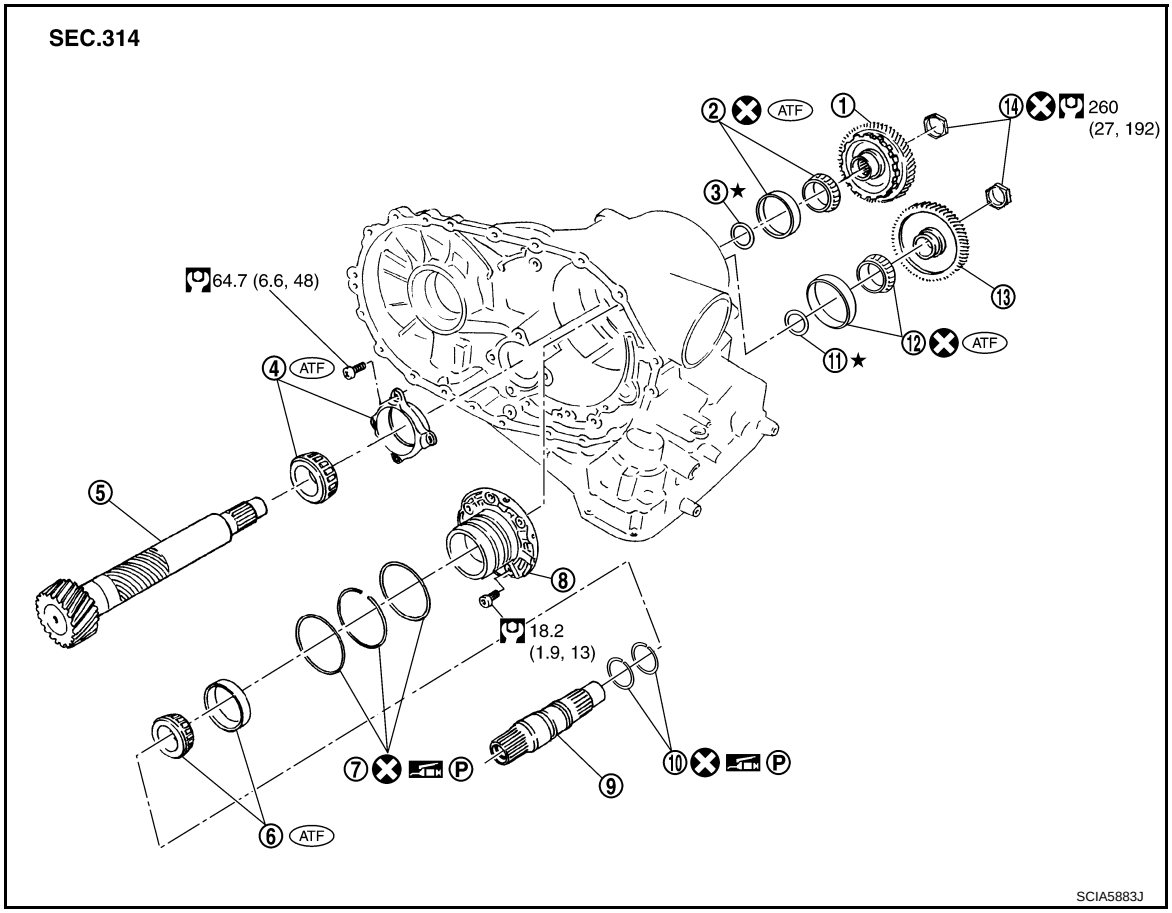
5. Install forward clutch hub on rear internal gear.
CAUTION:
- **Check operation of forward one-way clutch.**
  Hold rear internal gear and turn forward clutch hub.
  Check forward clutch hub for correct locking and unlocking directions.
- **If not as shown, check the installation direction of forward one-way clutch.**



Output Shaft, Output Gear, Idler Gear, Reduction Pinion Gear and Bearing Retainer

INFOID:0000000001730993

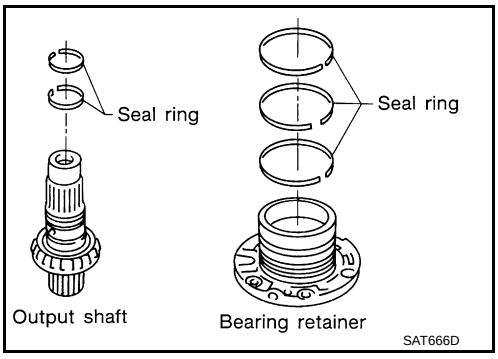
COMPONENTS



1. Idler gear
2. Idler gear bearing
3. Reduction pinion gear adjusting shim
4. Reduction pinion gear bearing
5. Reduction pinion gear
6. Output shaft bearing
7. Seal ring
8. Bearing retainer
9. Output shaft
10. Seal ring
11. Output gear adjusting spacer
12. Output gear bearing
13. Output gear
14. Lock nut

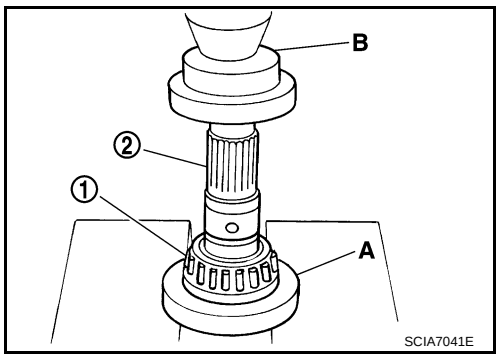
DISASSEMBLY

1. Remove seal rings from output shaft and bearing retainer.

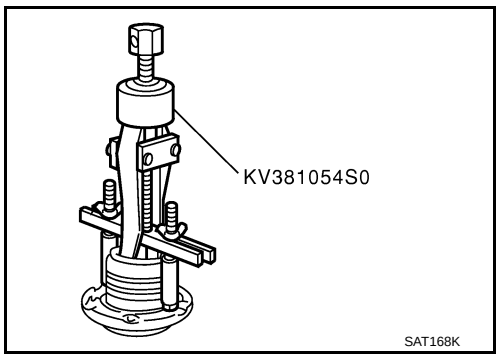


2. Remove output shaft bearing according to the following procedures.

a. Set output shaft bearing inner race (1) on suitable tool (A), and set a suitable tool (B) on output shaft (2), and press output shaft (2) to remove output shaft bearing inner race (1).
CAUTION:
Set a drift (A) on output shaft bearing inner race (1).



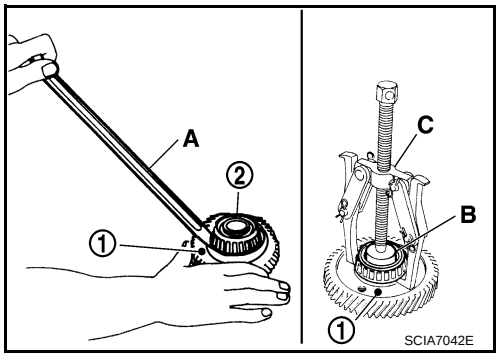
b. Set Tool on output shaft bearing outer race, and remove output shaft bearing outer race from bearing retainer.



3. Remove output gear bearing according to the following procedures.

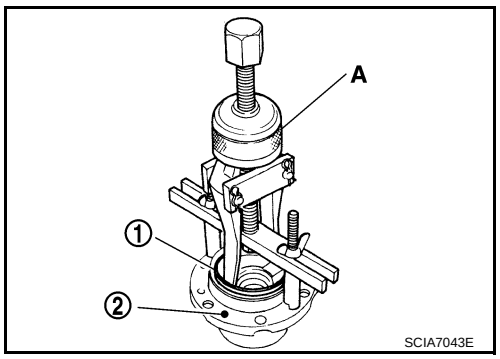
a. Insert suitable tool (A) between the mating surfaces of output gear (1) and output gear bearing inner race (2), and enlarge the gap.
CAUTION:
Do not damage output gear (1).

b. Set a suitable tool (B) on output gear (1), and remove output gear bearing inner race (2) using suitable tool (C).



c. Set Tool (A) on output gear bearing outer race (1), and remove output gear bearing outer race (1) from bearing retainer (2).

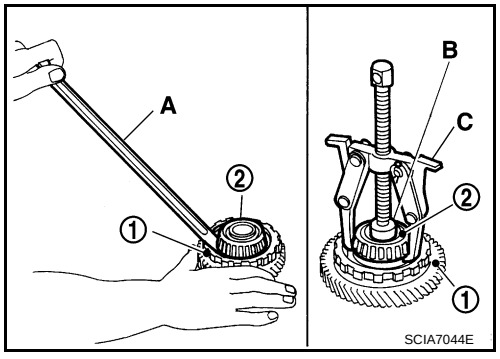
Tool number: KV381054S0



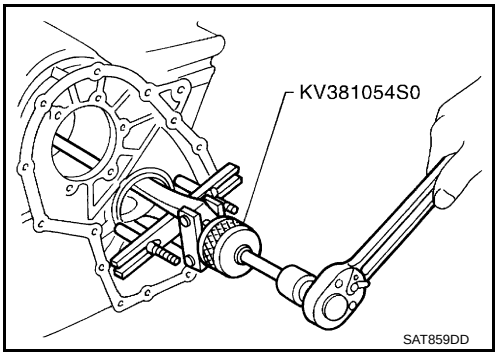
4. Remove idler gear bearing according to the following procedures.

a. Insert suitable tool (A) between the mating surfaces of idler gear (1) and idler gear bearing inner race (2), and enlarge the gap.
CAUTION:
Do not damage idler gear (1).

b. Set suitable tool (B), on idler gear (1), and remove idler gear bearing inner race (2) using suitable tool (C).



c. Set Tool on idler gear bearing outer race, and remove idler gear bearing outer race from transaxle case.

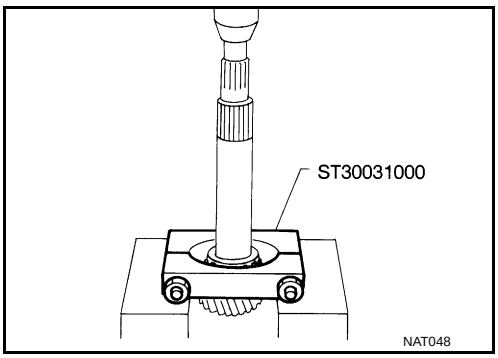


5. Remove reduction pinion gear bearing according to the following procedures.

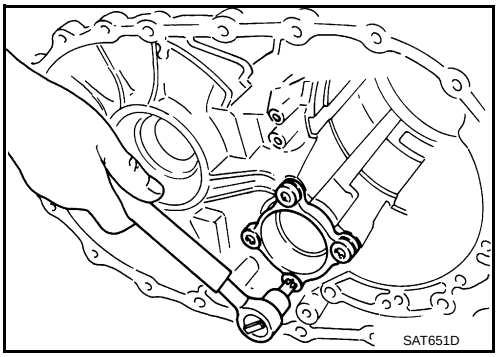
a. Set Tool on reduction pinion gear bearing inner race, and press reduction pinion gear to remove reduction pinion gear bearing inner race.

CAUTION:

Set Tool on reduction pinion gear bearing inner race.



b. Remove reduction pinion gear bearing outer race from transaxle case.



INSPECTION

Output Shaft, Output Gear, 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.
- **When replacing taper roller bearing, replace outer and inner race as a set.**

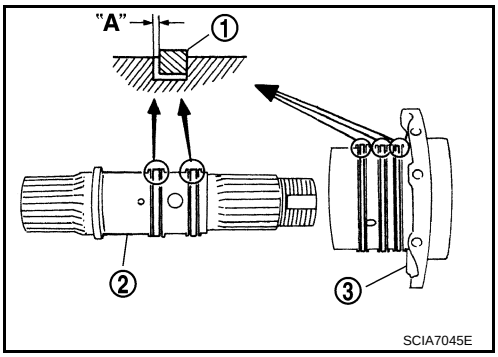
Check for damage or deformation. Replace if necessary.

Seal Ring Clearance

- Install new seal rings (1) on output shaft (2).
- Measure clearance “A” between each seal ring and groove.

Standard clearance and allowable limit:

Refer to TM-323, "Output Shaft".



- Replace output shaft (2) if the measurements exceed the allowable limit.
- Install new seal rings (1) on bearing retainer (3).
- Measure clearance “A” between each seal ring and groove.

Standard clearance and allowable limit:

Refer to TM-324, "Bearing Retainer".

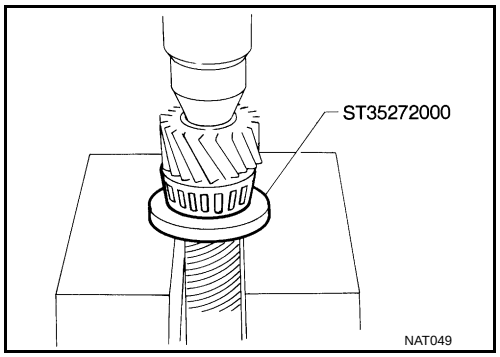
- Replace bearing retainer (3) if the measurements exceed the allowable limit.

ASSEMBLY

1. Install reduction pinion gear bearing according to the following procedures.

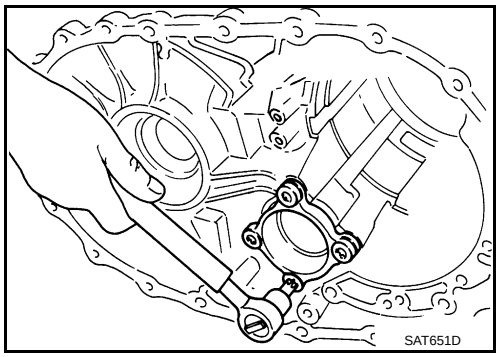
a. Set Tool on reduction pinion gear bearing inner race, and press reduction pinion gear to reduction pinion gear bearing inner race.

CAUTION:
Set Tool on reduction pinion gear bearing inner race.



b. Install reduction pinion gear bearing outer race to transaxle case.

c. Tighten reduction pinion gear bearing outer race bolts to the specified torque.



2. Checking reduction pinion gear bearing preload. Refer to TM-298, "Adjustment (1)".

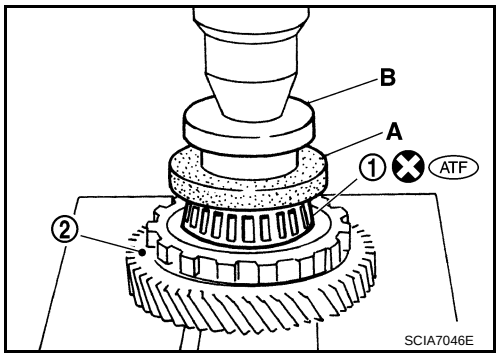
3. Install idler gear bearing according to the following procedures.

CAUTION:
Do not reuse idler gear bearing.

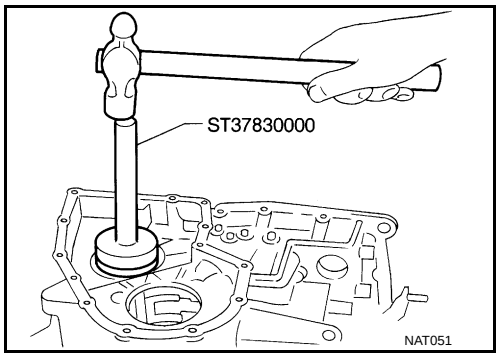
a. Set Tool (A) and suitable tool (B) on idler gear bearing inner race (1), and press idler gear bearing inner race (1) to idler gear (2).

Tool number: KV35272000

CAUTION:
Set Tool (A) on idler gear bearing inner race (1).



b. Set Tool on idler gear bearing outer race, and drive idler gear bearing outer race into transaxle case.

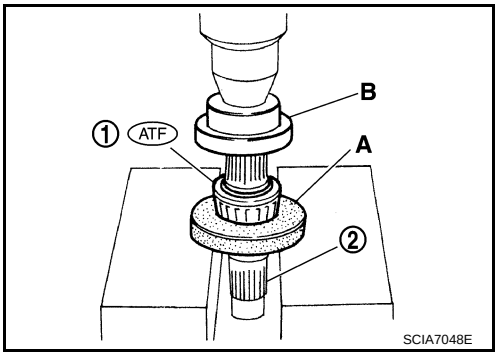


4. Install output shaft bearing according to the following procedures.

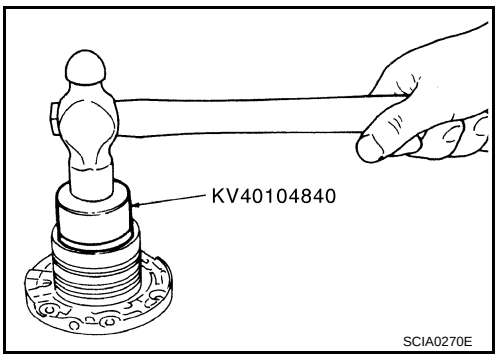
a. Set suitable tool (A) and a suitable tool (B) on output shaft bearing inner race (1), and press output shaft (2) to output shaft bearing inner race (1).

CAUTION:

Set suitable tool (A) on output shaft bearing inner race (1).



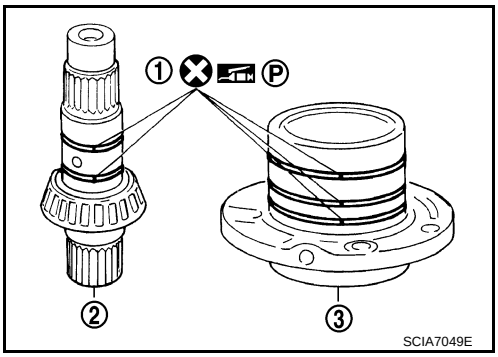
b. Set Tool on output shaft bearing outer race, and drive output shaft bearing outer race to bearing retainer.



5. Checking output shaft bearing preload. Refer to TM-298, "Adjustment (1)".

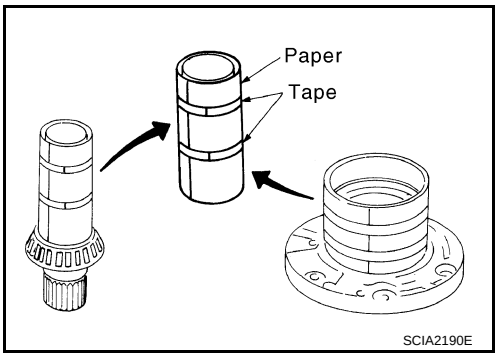
6. Install seal rings according to the following procedures.

a. Install seal rings (1) evenly to the grooves on output shaft (2) and bearing retainer (3), and fully close the opening.



CAUTION:

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



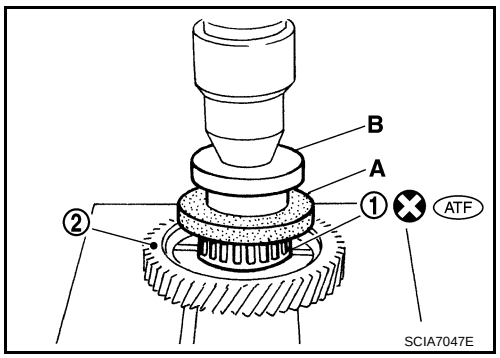
7. Install output gear bearing according to the following procedures.

CAUTION:
Do not reuse output gear bearing.

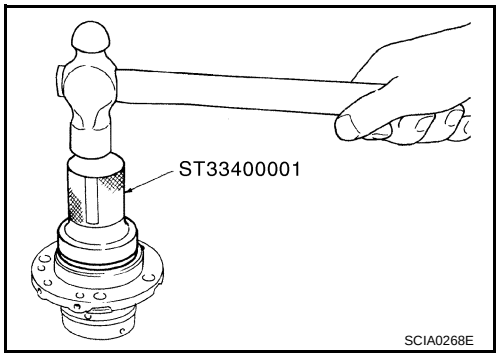
a. Set Tool (A) and suitable (B) on output gear bearing inner race (1), and press output gear bearing inner race (1) to output gear (2).

Tool number: KV35272000

CAUTION:
Set Tool (A) on output gear bearing inner race (1).



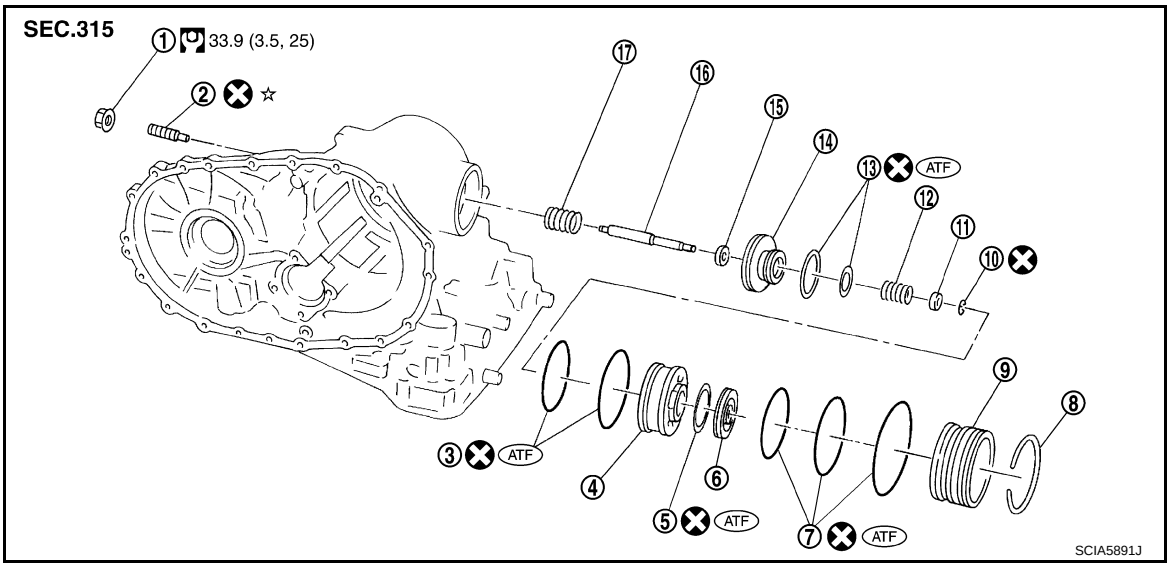
b. Set Tool on output gear bearing outer race, and drive output gear bearing outer race to bearing retainer.



Band Servo Piston Assembly

INFOID:0000000001730994

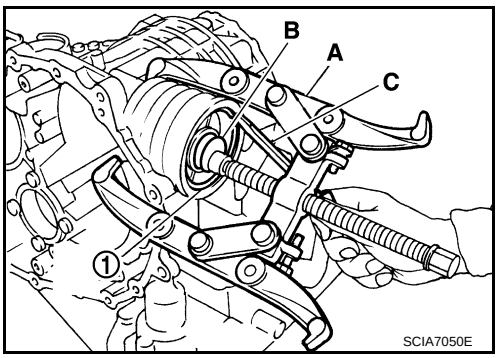
COMPONENTS



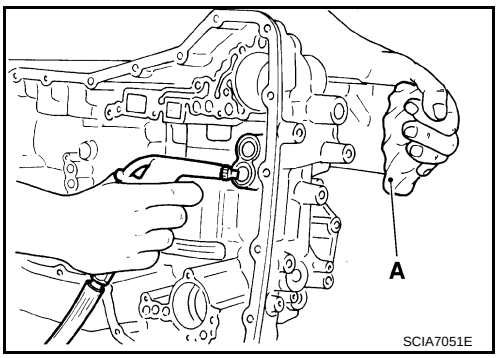
1. Lock nut
2. Anchor end pin
3. O-ring
4. Servo piston retainer
5. D-ring
6. OD servo piston
7. O-ring
8. Snap ring
9. OD servo piston retainer
10. E-ring
11. Spring retainer
12. OD servo return spring
13. D-ring
14. Band servo piston
15. Band servo thrust washer
16. Band servo piston stem
17. 2nd servo return spring

DISASSEMBLY

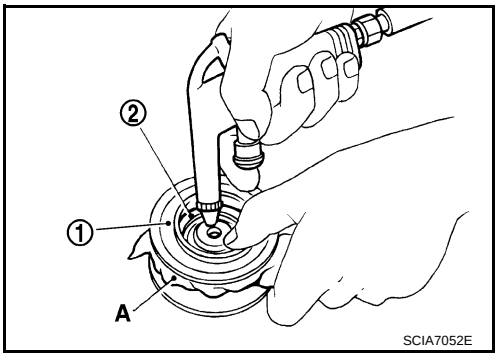
1. Push in OD servo piston assembly using suitable tool (A) and suitable tool (B), and then remove snap ring (1) from transaxle case using suitable tool (C).



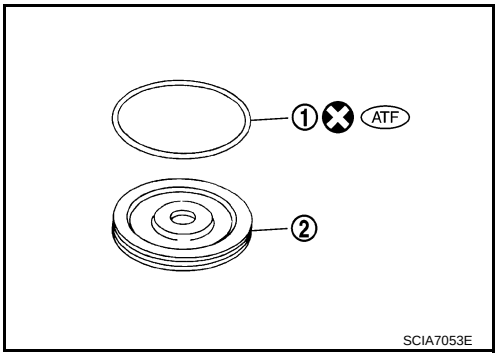
2. Apply compressed air into the oil hole as shown to remove OD servo piston assembly and band servo piston assembly.
CAUTION:
Do not blow air in too quickly, or OD servo piston assembly, band servo piston assembly and ATF could jump out. Carefully blow air little by little while protecting with lint-free cloth A.
3. Remove 2nd servo return spring from transaxle case.



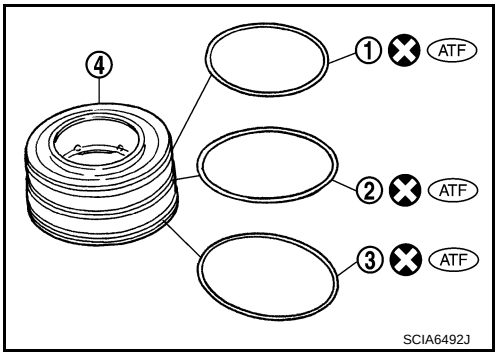
4. Wrap OD servo piston retainer (1) using lint-free cloth A, and then apply compressed air into the band servo piston stem hole on OD servo piston (2) to remove OD servo piston (2) from OD servo piston retainer (1).
CAUTION:
Do not blow air in too quickly, or OD servo piston (2) and ATF could jump out. Carefully blow air little by little while protecting with lint-free cloth A.



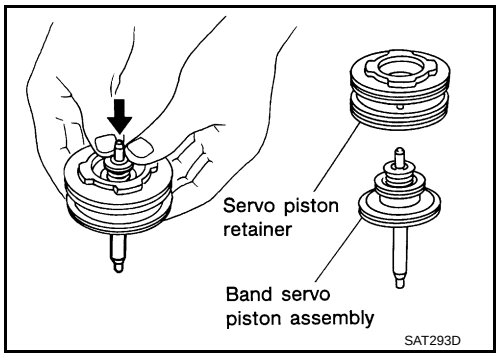
5. Remove D-ring (1) from OD servo piston (2).



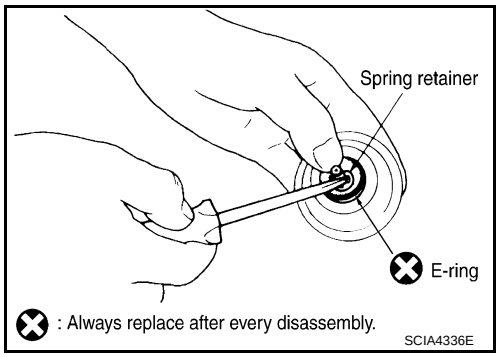
6. Remove O-rings (1), (2) and (3) from OD servo piston retainer (4).
(1): O-ring (small diameter)
(2): O-ring (medium diameter)
(3): O-ring (large diameter)



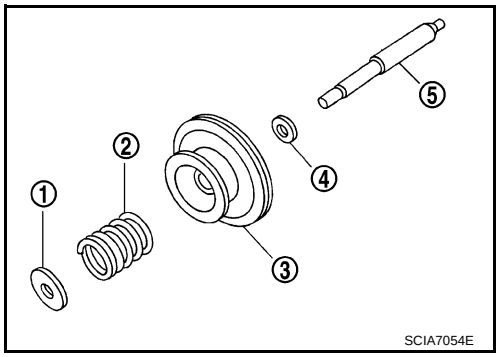
7. Press in band servo piston assembly to remove from servo piston retainer.



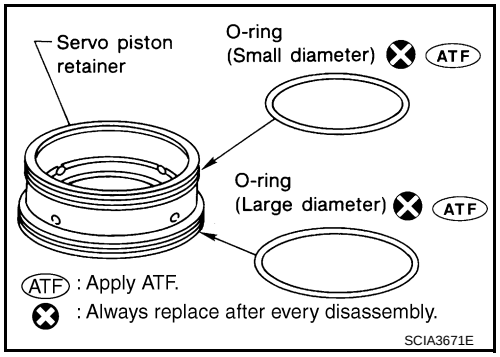
8. Place band servo piston stem on a wooden block, and remove E-ring from band servo piston stem using suitable tool while pressing spring retainer downward.



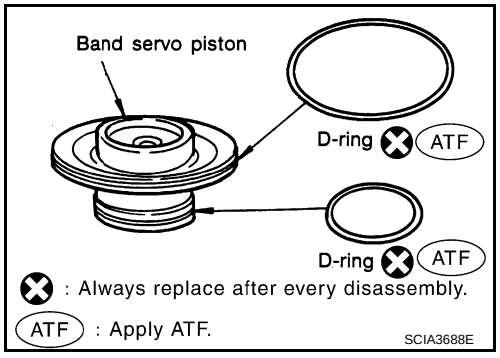
9. Remove spring retainer (1), OD servo return spring (2), band servo piston (3) and band servo thrust washer (4) from band servo piston stem (5).



10. Remove O-rings from servo piston retainer.



11. Remove D-rings from band servo piston.



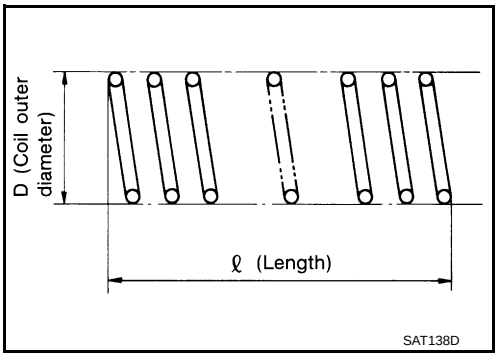
INSPECTION

Pistons, Retainers and Piston Stem

Check the sliding surfaces for damage or excessive wear. Replace if necessary.

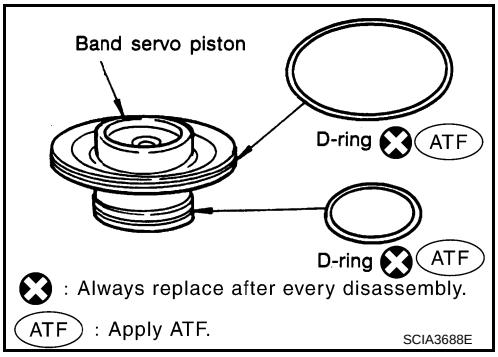
Return Springs

- Check each return spring for damage or deformation. Also measure free length. Refer to TM-323, "Band Servo".
- Replace springs if deformed or fatigued.

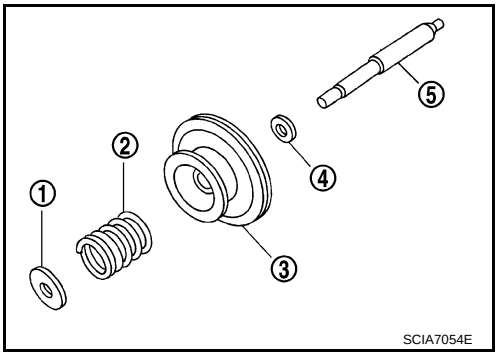


ASSEMBLY

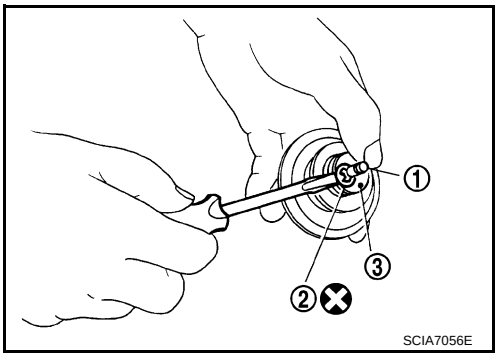
1. Install D-rings to band servo piston.



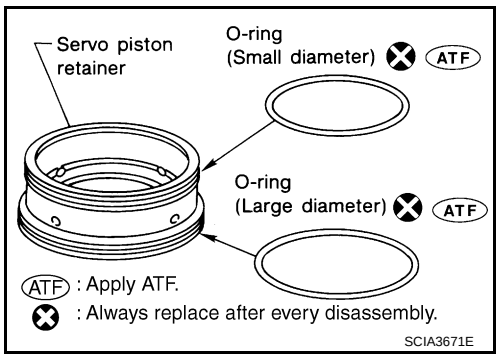
2. Install band servo thrust washer (4), band servo piston (3), OD servo return spring (2) and spring retainer (1) to band servo piston stem (5).



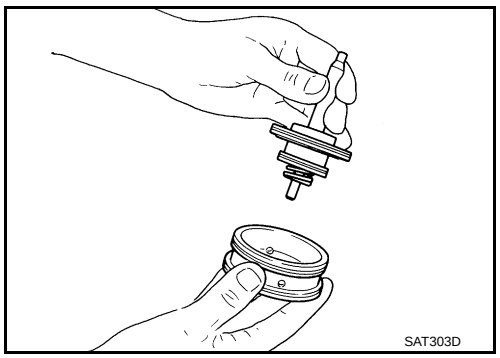
3. Place band servo piston stem (1) on a wooden block, and install E-ring (2) to band servo piston stem (1) while pressing spring retainer (3) downward.



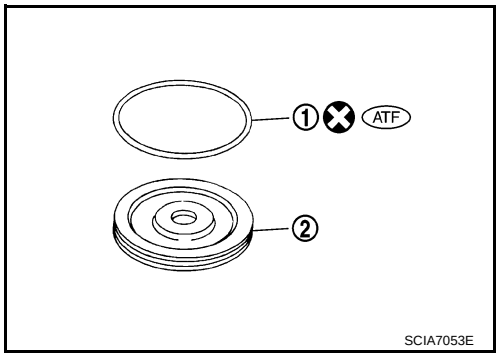
4. Install O-rings to servo piston retainer



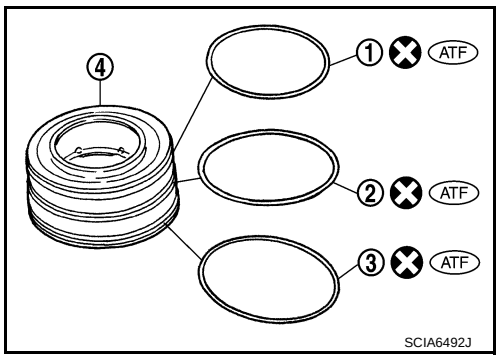
5. Install band servo piston assembly to servo piston retainer by pushing it inward.



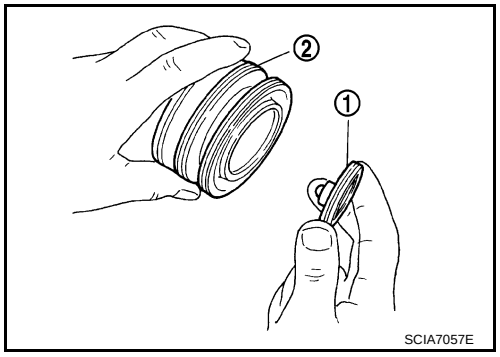
6. Install D-ring (1) to OD servo piston (2).



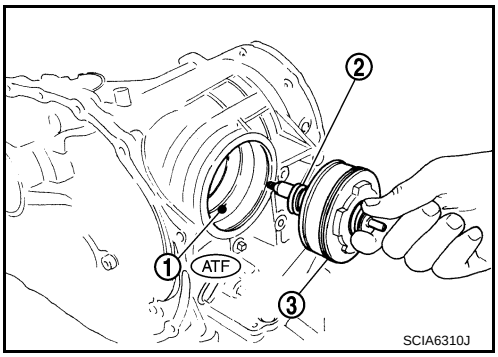
7. Install O-rings (1), (2) and (3) to OD servo piston retainer (4).
(1): O-ring (small diameter)
(2): O-ring (medium diameter)
(3): O-ring (large diameter)



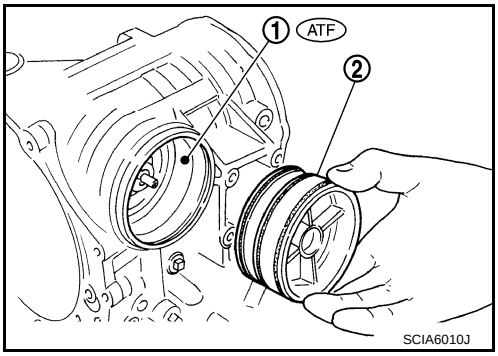
8. Install OD servo piston (1) to OD servo piston retainer (2) as shown.



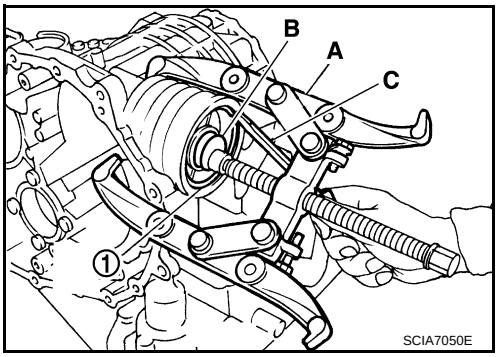
9. Install 2nd servo return spring (2) and band servo piston assembly (3) to transaxle case (1).



10. Install OD servo piston assembly (2) to transaxle case (1).



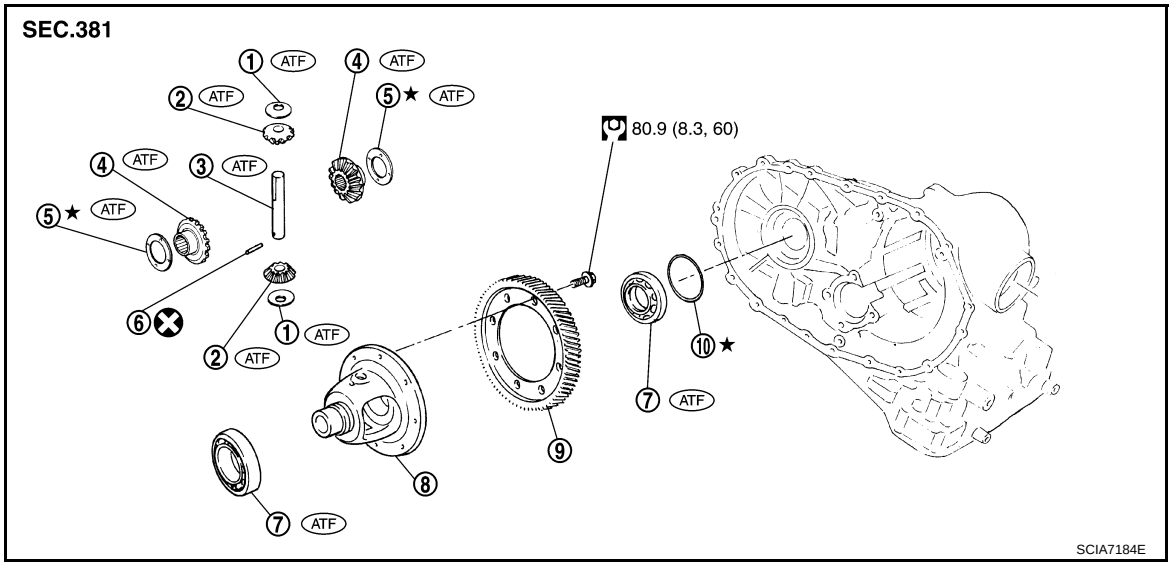
11. Push in OD servo piston assembly using suitable tool (A) and-suitable tool (B), and install snap ring (1) to transaxle case using suitable tool (C).



Final Drive

INFOID:0000000001730995

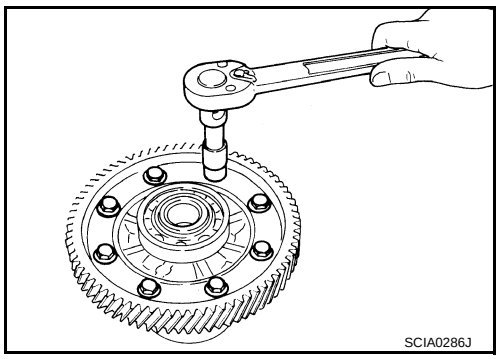
COMPONENTS



1. Pinion mate gear thrust washer
2. Pinion mate gear
3. Pinion mate shaft
4. Side gear
5. Side gear thrust washer
6. Lock pin
7. Differential side bearing
8. Differential case
9. Final gear
10. Differential side bearing adjusting shim

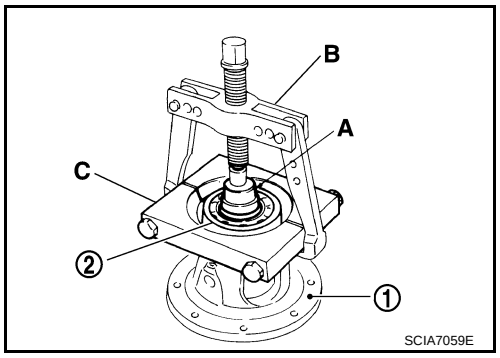
DISASSEMBLY

1. Remove final gear from differential case.


SCIA0286J

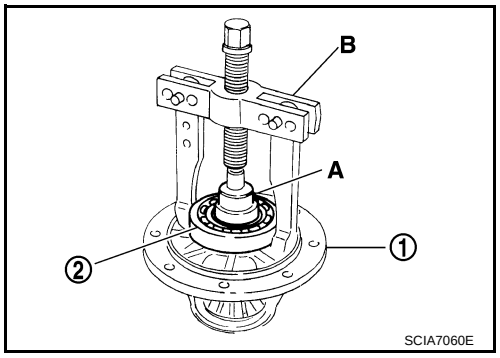
2. Remove differential side bearings according to the following procedures.

a. Set suitable tool (A) on differential case (1), and remove differential side bearing (RH side) (2) from differential case (1) using suitable tool (B) and suitable tool (C).



SCIA7059E

b. Set suitable tool (A) on differential case (1), and remove differential side bearing (LH side) (2) from differential case (1) using suitable tool (B).

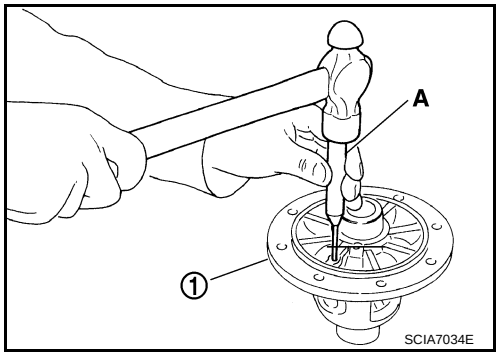


SCIA7060E

3. Remove pinion mate gear and side gear according to the following procedures.

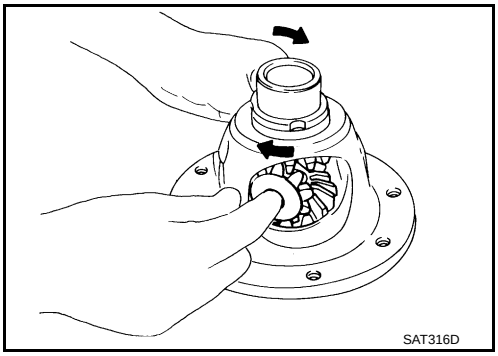
a. Drive out lock pin from differential case (1) using Tool (A).

Tool number: KV32101000



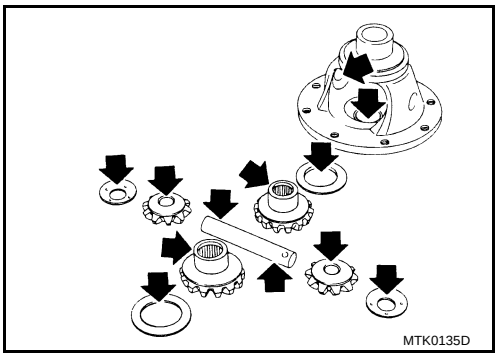
SCIA7034E

b. Remove pinion mate shaft from differential case.
c. Rotate pinion mate gears and pinion mate gear thrust washers to remove.
d. Remove side gears and side gear thrust washers from differential case.

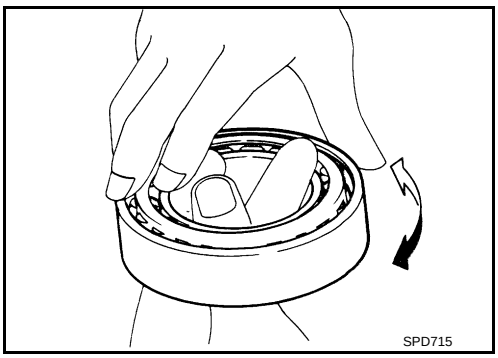

SAT316D

INSPECTION

Gears, Washers, Pinion Mate Shaft and Differential Case
Check the sliding surfaces for wear, seizure, crack or damage. Replace if necessary.


MTK0135D

Bearings
Make sure bearings roll freely and are free from noise, cracks, pitting or wear. Replace if necessary.

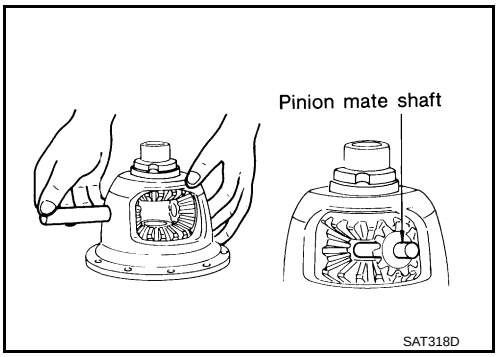

SPD715

ASSEMBLY

1. Install pinion mate gears and side gears according to the following procedures.

a. Attach side gear thrust washers to side gears, then install pinion mate gear thrust washers and pinion mate gears in place.
CAUTION:
Apply plenty of ATF to each sliding / rotating surface before assembly.

b. Set 2 pinion mate gears and thrust washers on the same axis, and while rotating them simultaneously, align them with the insert hole of pinion mate shaft on differential case to insert pinion mate shaft.
CAUTION:
After aligning 2 pinion mate gears with side gear teeth and centering with pinion mate shaft, take pinion mate shaft out and move pinion mate gears in place while rotating the them simultaneously.

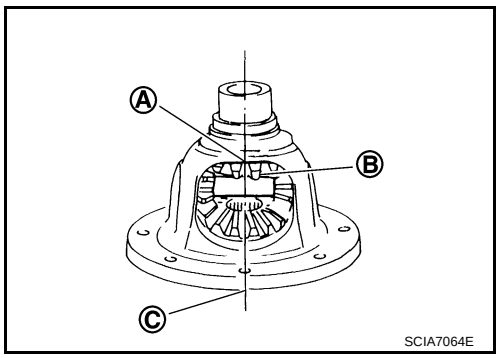


SAT318D

2. 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.



SCIA7064E

c. Adjust the back clearance of side gear according to the following procedures.

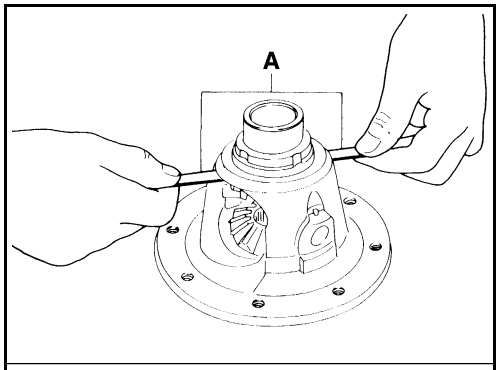
i. Insert feeler gauges (A) of the same thickness to the back of side gear from both sides, preventing side gear from falling, to measure the clearance.
- Measure clearance 3 times by rotating side gears and take the average.

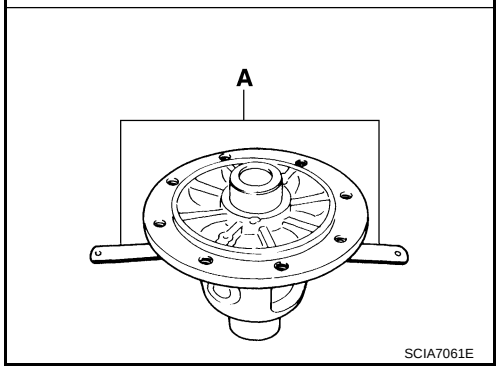
CAUTION:
In all 3 measurements, maximize the clearance by aligning teeth on side gears at the top and bottom at the same position.

ii. Select side gear thrust washer so that the clearance will fall within the standard.

Differential side gear clearance:

Refer to TM-323, "Final Drive".





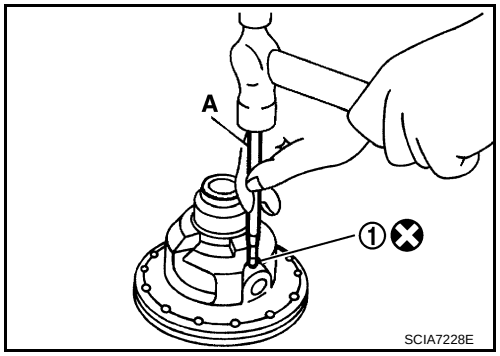
SCIA7061E

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].

3. Install lock pin (1) to pinion mate shaft using Tool (A).

Tool number: KV32101000

CAUTION:
Make sure that lock pin (1) flush with differential case.

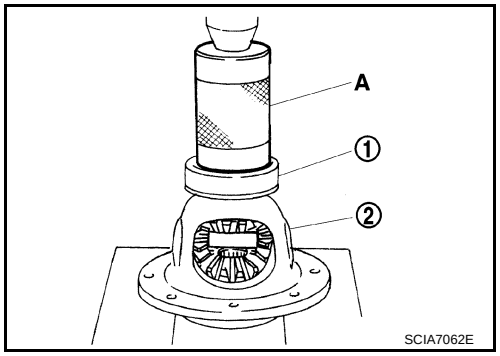


SCIA7228E

4. Set Tool (A) on differential side bearing (RH side) (1), and press differential side bearing (RH side) (1) to differential case (2).

Tool number: ST33200000

CAUTION:
Set Tool (A) on differential side bearing inner race.

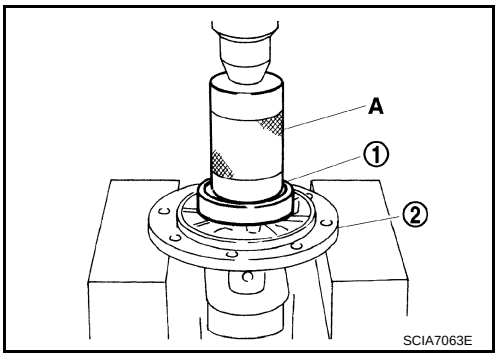


SCIA7062E

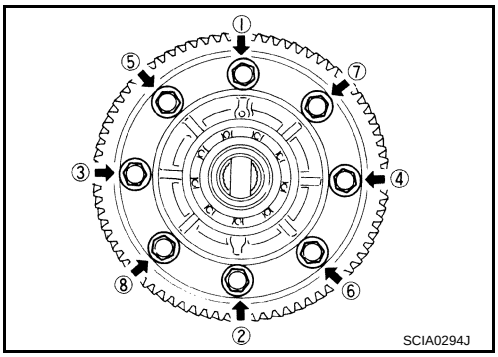
5. Set Tool (A) on differential side bearing (LH side) (1), and press differential side bearing (LH side) (1) to differential case (2).

Tool number: ST33200000

CAUTION:
Set Tool (A) on differential side bearing inner race.



6. Install final gear on differential case, and tighten bolts to the specified torque in the numerical order as shown.

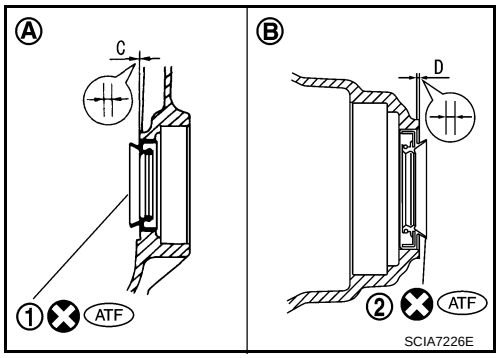


ASSEMBLY

Assembly (1)

INFOID:0000000001730996

1. Drive transaxle case side oil seal (1) using Tools, and converter housing side oil seal (2) using suitable tool, to the dimensions as shown
(A): Transaxle case side
(B): Converter housing side



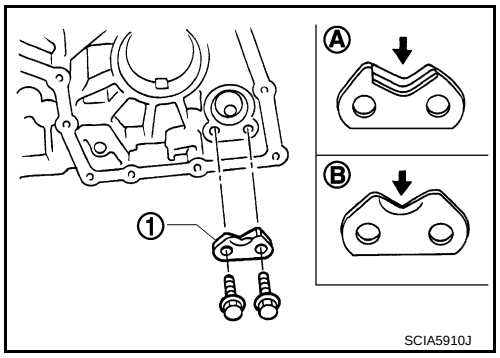
Tool numbers : ST35325000 (—)
: KV31103000 (—)

Dimension "C" : 0 ±±
Dimension "D" : 1.1 ± 0.5 mm (0.043 ± 0.020 in)

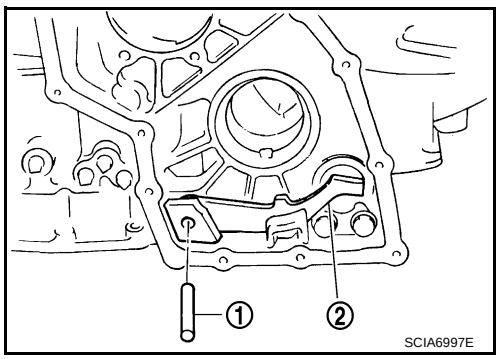
NOTE:
Differential side oil seal pulling direction is used as the reference.

2. Install O-ring on governor cap.
CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**

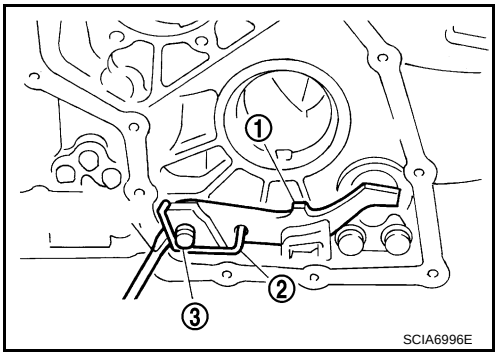
3. Install governor cap in transaxle case.
4. Install snap ring in transaxle case.
5. Install parking actuator support (1) on transaxle case.
(A): Inside
(B): Outside
CAUTION:
Be careful with the direction of parking actuator support (1).



6. Tighten parking actuator support bolts to the specified torque.
7. Install parking pawl (2) on transaxle case, and secure it with parking shaft (1).



8. Install return spring (2) on parking shaft (3) and parking pawl (1) using suitable tool.



Adjustment (1)

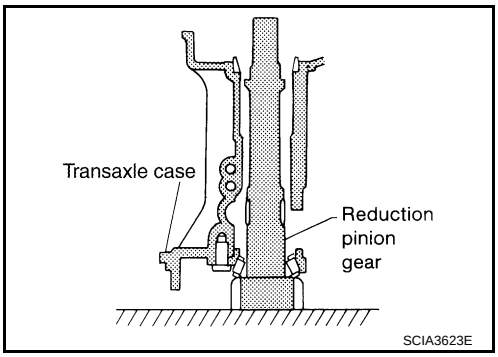
INFOID:0000000001730997

REDUCTION PINION GEAR BEARING PRELOAD

1. Select proper thickness of reduction pinion gear adjusting shim using the following procedures.

a. Place reduction pinion gear on transaxle case as shown.

b. Install idler gear bearing outer race on transaxle case.

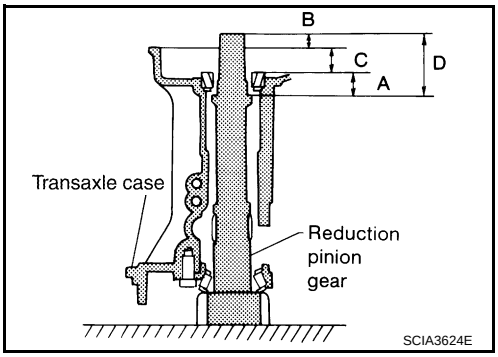


c. Place idler gear bearing inner race on outer race.

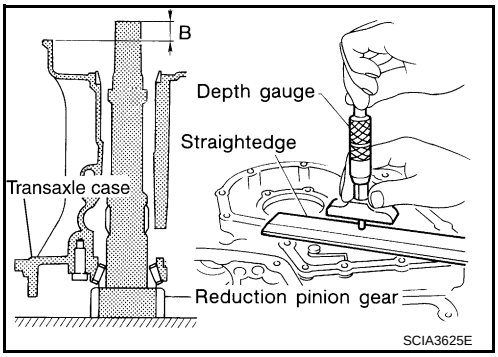
d. Measure dimensions “B”, “C” and “D”, and calculate dimension “A”.

“A”: Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.

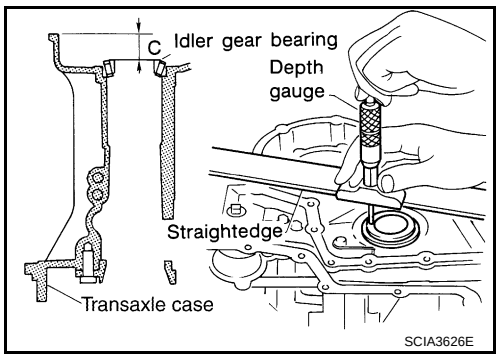
A = D – (B + C)



- 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.**

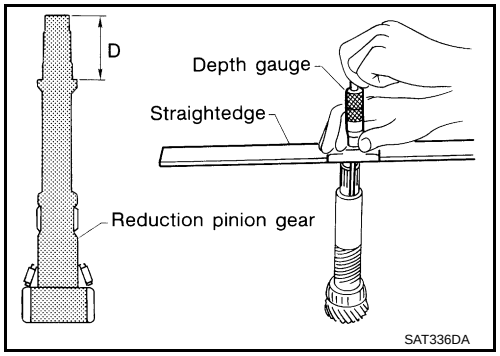


- Measure dimension “C” between the surface of idler gear bearing inner race and the surface of transaxle case.
- **Measure dimension “C” in at least two places, and take the average.**



- 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”.

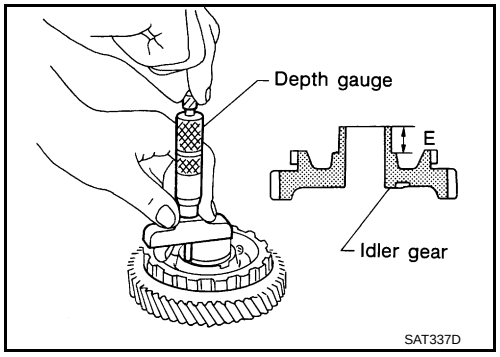
A = D – (B + C)



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.**

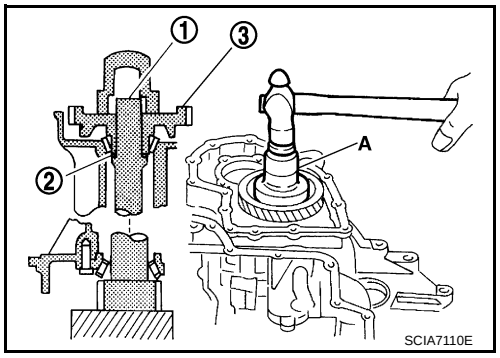
f. Select proper thickness of reduction pinion gear adjusting shim.

Proper shim thickness = A – E – 0.05 mm (0.0020 in)*
(*: Bearing preload)



2. Install reduction pinion gear (1) and reduction pinion gear adjusting shim (2) selected in step 2-e on transaxle case.
CAUTION:
Apply ATF to reduction pinion gear bearing.
3. Press idler gear bearing inner race on idler gear (3). Refer to TM-281, "Output Shaft, Output Gear, Idler Gear, Reduction Pinion Gear and Bearing Retainer".
4. Set Tool (A) on idler gear (3), and press idler gear (3) on reduction pinion gear (1).
CAUTION:
- **Apply ATF to idler gear bearing.**
- **Press idler gear (3) until idler gear (3) fully contacts reduction pinion gear bearing adjusting shim (2).**

Tool number: ST35271000



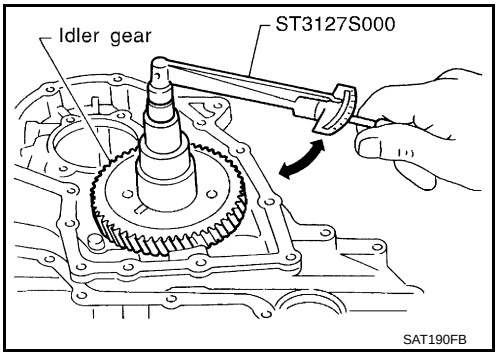
5. Set manual shaft in “P” position to secure idler gear (3).
6. Tighten lock nut of idler gear to the specified torque.
CAUTION:
Lock idler gear with parking pawl when tightening lock nut.

7. Measure turning torque of reduction pinion gear.

Turning torque of reduction pinion gear:

Refer to TM-323, "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.**



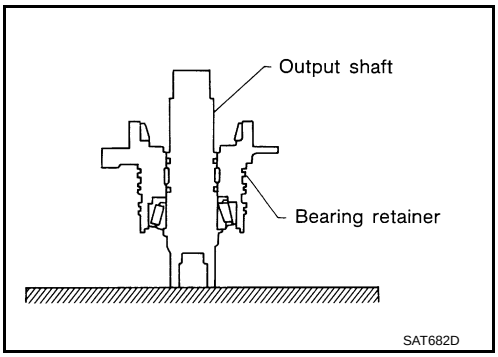
OUTPUT SHAFT BEARING PRELOAD

1. Select proper thickness of output gear adjusting spacer using the following procedures.

a. Remove paper rolled around output shaft.

b. Install output gear bearing outer race on bearing retainer.

c. Place bearing retainer on output shaft.

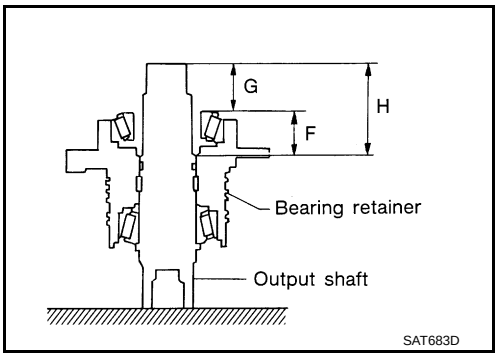


d. Place output gear bearing inner race on bearing retainer.

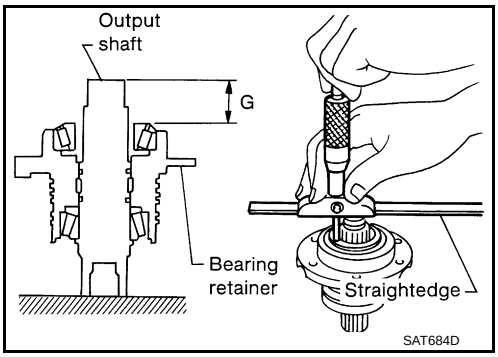
e. Measure dimensions “G” and “H”, and calculate dimension “F”.

“F”: Distance between the surface of output gear bearing inner race and adjusting spacer mating surface of output shaft.

F = H – G

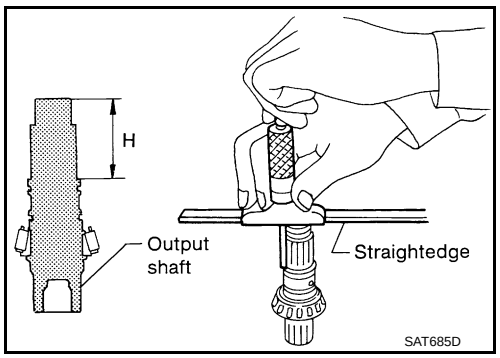


- Measure dimension “G” between end of output shaft and surface of output gear bearing inner race.
- **Measure dimension “G” in at least two places, and take the average.**



- Measure dimension “H” between end of output shaft and adjusting spacer mating surface of output shaft.
- **Measure dimension “H” in at least two places, and take the average.**
- Calculate dimension “F”.

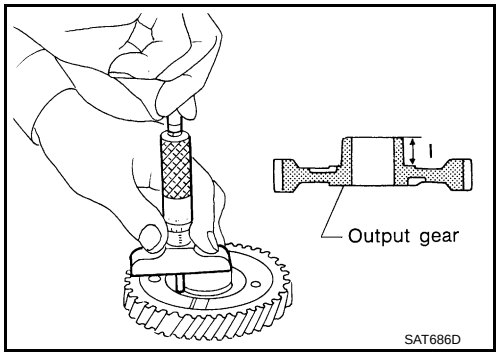
F = H – G



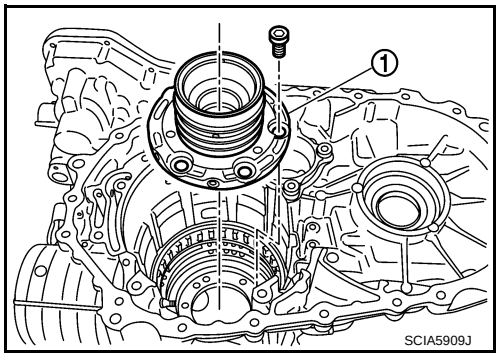
f. Measure dimension “I” between end of output gear (adjusting spacer mating surface) and output gear bearing inner race fitting surface.
- **Measure dimension “I” in at least two places, and take the average.**

g. Select proper thickness of output gear adjusting spacer.

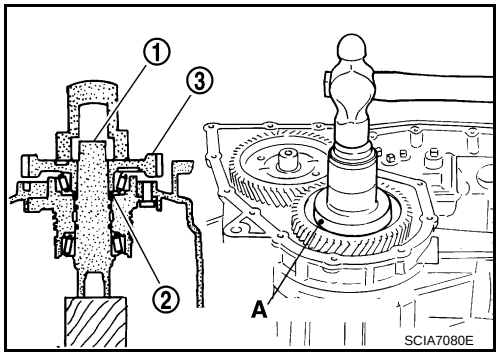
Proper spacer thickness
= F – I – [0.03 – 0.08 mm (0.0012 – 0.0031 in)]*
(*: Bearing preload)



2. Install bearing retainer (1) in transaxle case.
3. Tighten bearing retainer bolts to the specified torque.



4. Install output shaft (1) and output gear adjusting spacer (2) selected in step 1-f on transaxle case.
CAUTION:
- **Apply ATF to output shaft bearing.**
- **Do not force output shaft to install or seal ring may be damaged.**
5. Press output gear bearing inner race on output gear (3).
6. Set Tool (A) on output gear (3), and press output gear (3) on output shaft (1).
CAUTION:
- **Apply ATF to output gear bearing.**
- **Do not pinch seal ring when output shaft is pressed in.**
- **Press output gear (3) until output gear (3) fully contacts output gear adjusting space (2).**

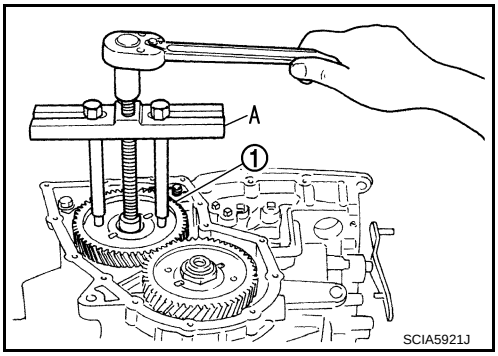


Tool number: ST35271000

7. Set manual shaft in “P” position to secure idler gear.
8. Tighten lock nut of output gear to the specified torque.
CAUTION:
- **Do not reuse lock nut.**
- **Lock idler gear with parking pawl when tightening lock nut.**

9. Remove idler gear (1) using Tool (A) to measure output shaft bearing preload.

Tool number: ST27180001



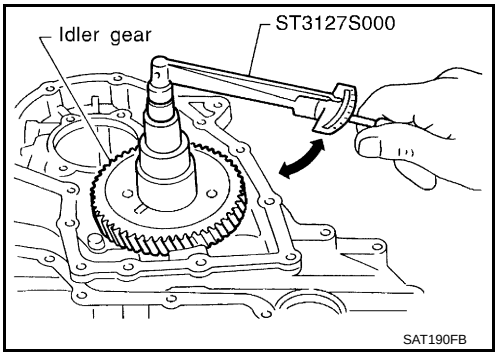
10. Measure turning torque of output shaft.

Turning torque of output shaft:

Refer to TM-323, "Output Shaft".

- **When measuring turning torque, turn output shaft in both directions several times to seat bearing rollers correctly.**
- **If turning torque is out of specification, decrease or increase thickness of output gear adjusting spacer.**

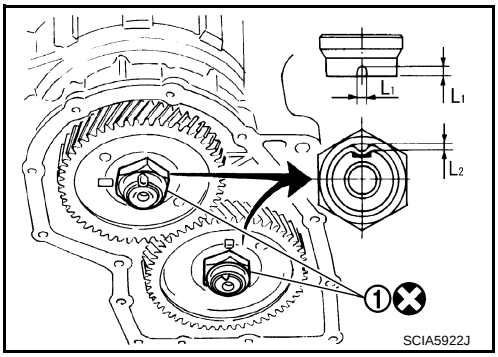
11. Press idler gear on reduction pinion gear.



12. Tighten lock nut (1) of idler gear to the specified torque.
13. After properly adjusting turning torque, clinch lock nuts (1) of idler gear and output gear as shown.

L_1: 3 mm (0.12 in) or more

L_2: 1 mm (0.04 in) or more

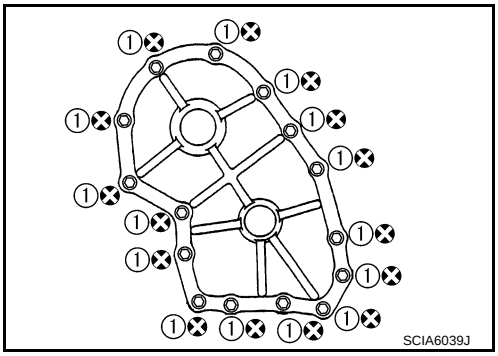


14. Install side cover gasket and side cover on transaxle case.

CAUTION:

- **Do not reuse side cover gasket.**
- **Completely remove all moisture, oil and old gasket, etc. from the transaxle case and side cover mating surfaces.**

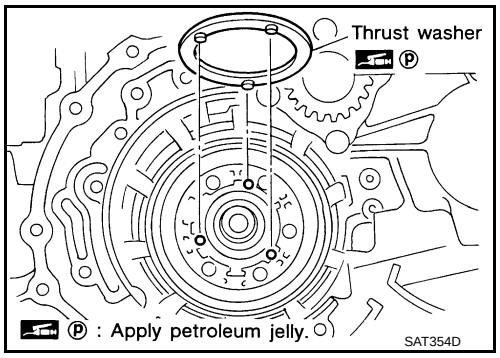
15. Tighten side cover bolts (1) to the specified torque.



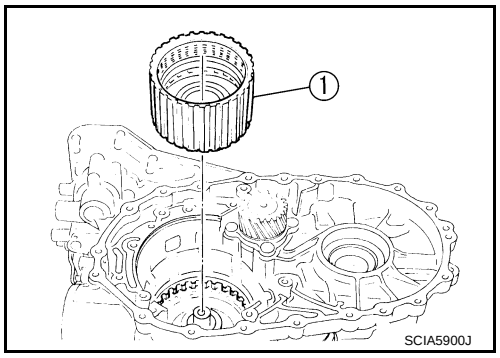
Assembly (2)

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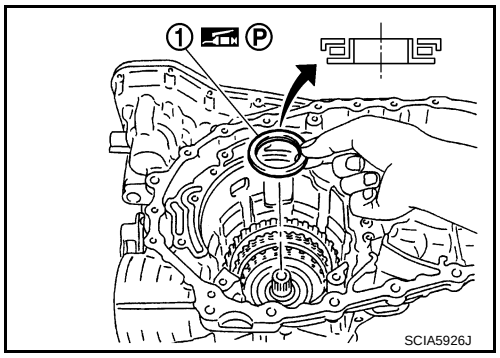
1. Remove paper rolled around bearing retainer.
2. Install thrust washer on bearing retainer.
   CAUTION:
   Align pawls of thrust washer with holes of bearing retainer.



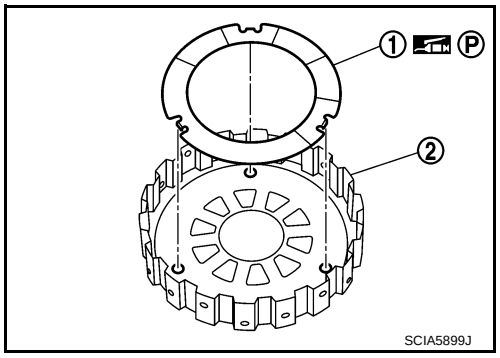
3. Install forward clutch assembly and overrun clutch assembly (1) into transaxle case.
   CAUTION:
   - **Align teeth of low & reverse brake drive plates before installing.**
   - **Make sure that bearing retainer seal rings are not spread.**



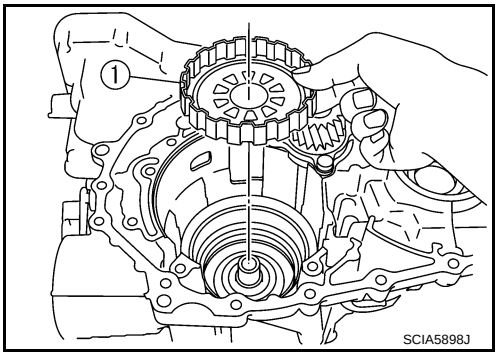
4. Install needle bearing (1) on bearing retainer.
   CAUTION:
   Be careful with the direction of needle bearing.



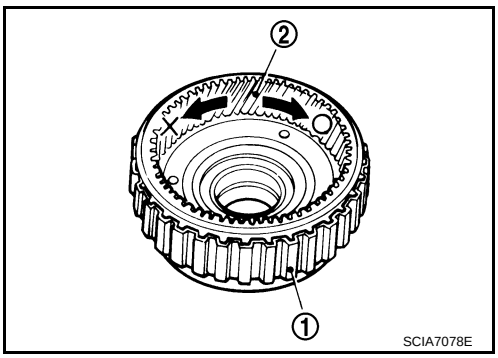
5. Install thrust washer (1) on overrun clutch hub (2).
   CAUTION:
   Align pawls of thrust washer (1) with holes of overrun clutch hub (2).



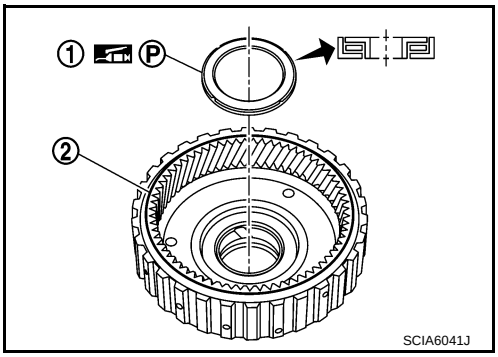
6. Install overrun clutch hub (1) into forward clutch drum.
CAUTION:
Align teeth of overrun clutch drive plates before installing.



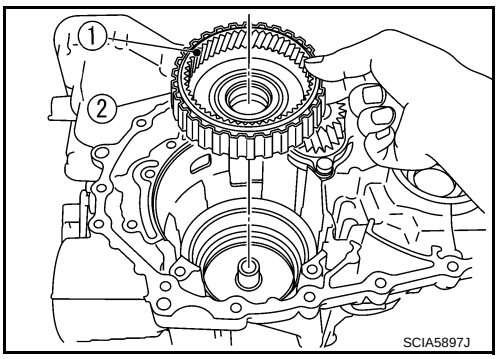
7. Hold forward clutch hub, and check that rear internal gear locks when tried to rotate counterclockwise.
CAUTION:
If rear internal gear rotates counterclockwise, check installation direction of forward one-way clutch.



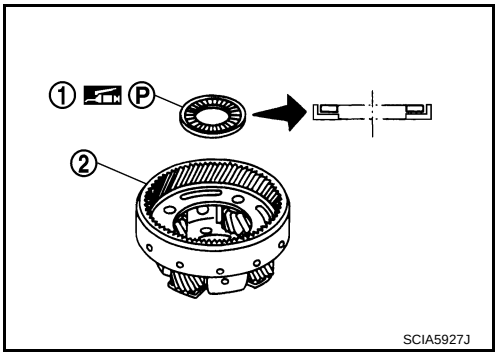
8. Install needle bearing (1) on rear internal gear (2).
CAUTION:
Be careful with the direction of needle bearing (1).



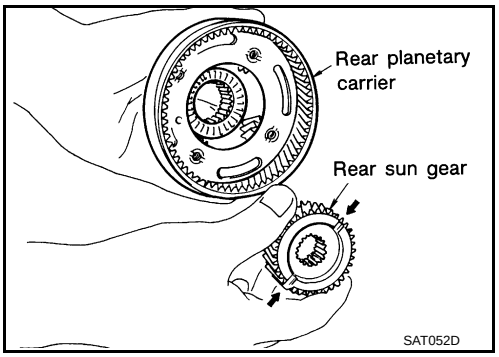
9. Install rear internal gear (1) and forward clutch hub (2) as a set into forward clutch drum.
CAUTION:
Align teeth of forward clutch drive plates before installing.



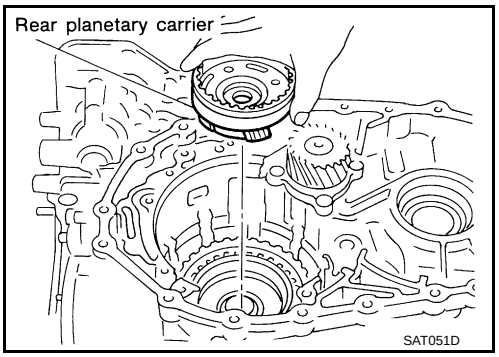
10. Install needle bearing (1) on rear planetary carrier (2).
CAUTION:
Be careful with the direction of needle bearing (1).



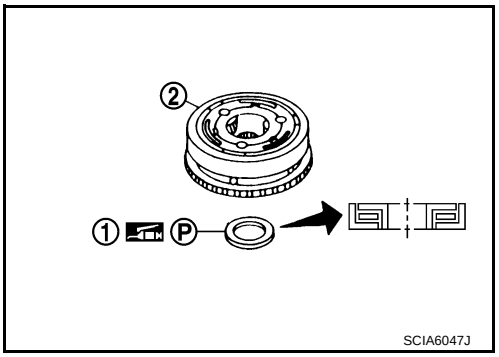
11. Install rear sun gear on rear planetary carrier.
CAUTION:
Be careful with the direction of rear sun gear.



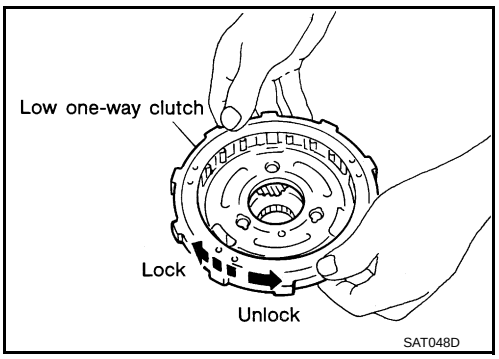
12. Install rear planetary carrier in transaxle case.



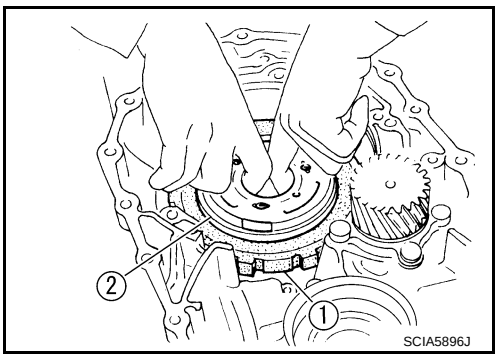
13. Install needle bearing (1) on front planetary carrier (2).
CAUTION:
Be careful with the direction of needle bearing (1).



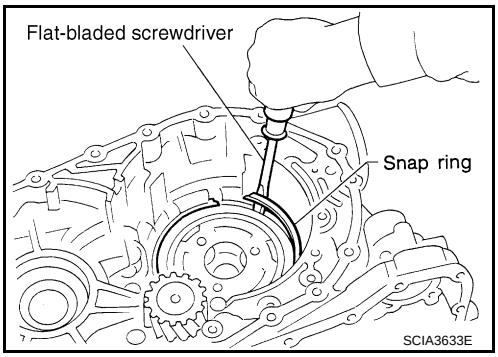
14. Install low one-way clutch to front planetary carrier by turning it in the direction of unlock.
15. Check that low one-way clutch rotates counterclockwise around front planetary carrier. Then try to turn it clockwise and check that it is locked.



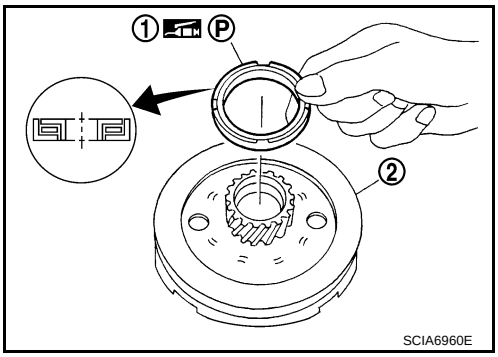
16. Install front planetary carrier (2) and low one-way clutch (1) as a set into transaxle case.



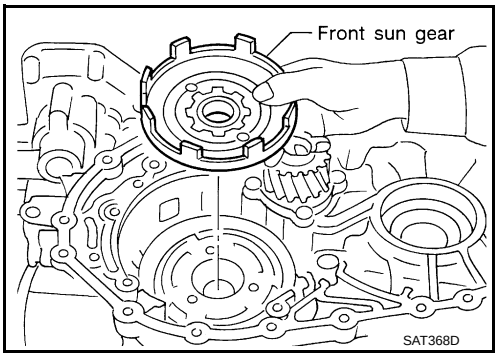
17. Install snap ring into transaxle case using suitable tool.



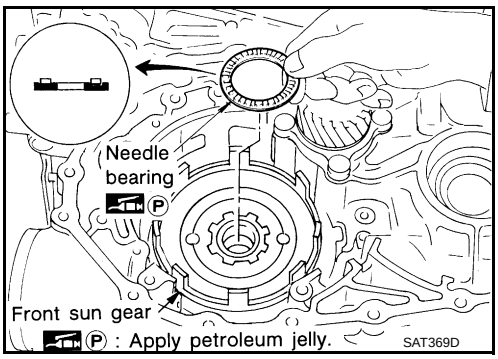
18. Install needle bearing (1) on front sun gear (2).
CAUTION:
Be careful with the direction of needle bearing (1).



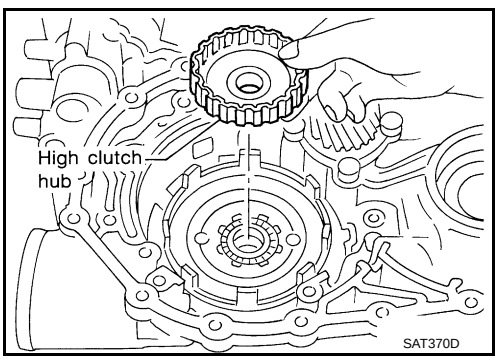
19. Install front sun gear on front planetary carrier.



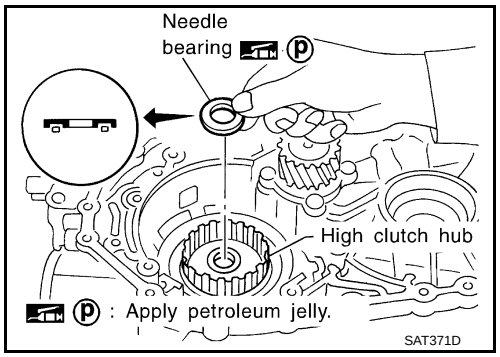
20. Install needle bearing on front sun gear.
CAUTION:
Be careful with the direction of needle bearing.



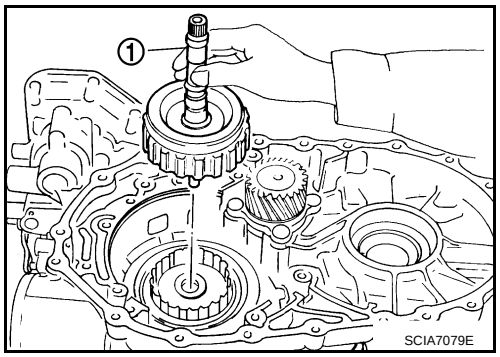
21. Install high clutch hub on front sun gear.



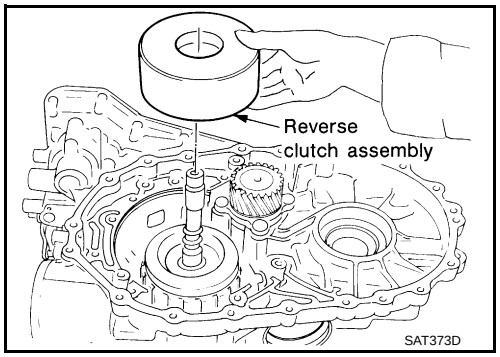
22. Install needle bearing on high clutch hub.
CAUTION:
Be careful with the direction of needle bearing.
23. Remove paper rolled around input shaft assembly (high clutch drum).



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.



Adjustment (2)

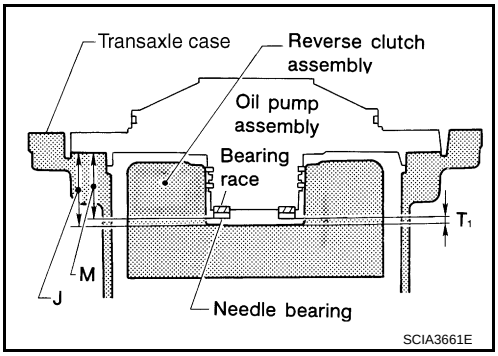
INFOID:0000000001730999

When any parts listed below are replaced, adjust total end play and reverse clutch end play.

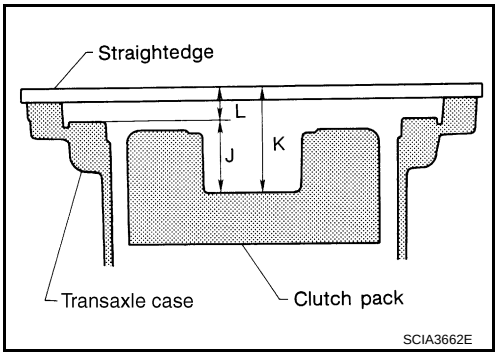
Part name	Total end play	Reverse clutch end play
Transaxle case	●	●
Overrun clutch hub	●	●
Rear internal gear	●	●
Rear planetary carrier	●	●
Rear sun gear	●	●
Front planetary carrier	●	●
Front sun gear	●	●
High clutch hub	●	●
Input shaft assembly (high clutch drum)	●	●
Oil pump cover	●	●
Reverse clutch drum	—	●

TOTAL END PLAY

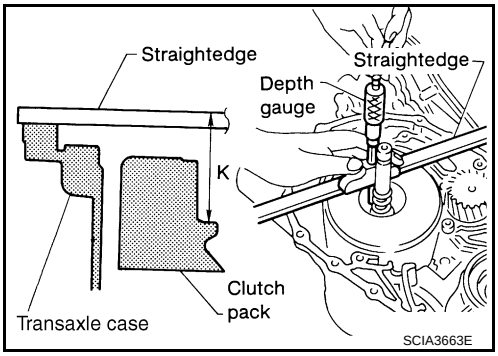
- Measure clearance between reverse clutch drum and needle bearing for oil pump cover.
- Select proper thickness of bearing race so that end play is within specifications.



1. Measure dimensions “K” and “L”, and then calculate dimension “J”.



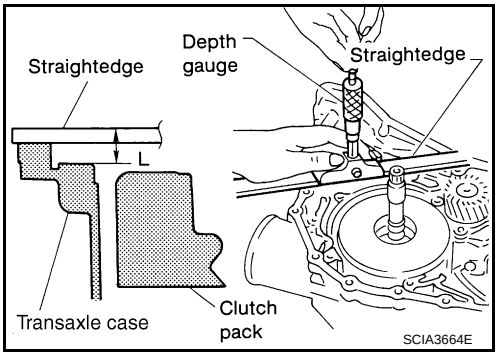
a. Measure dimension “K”.



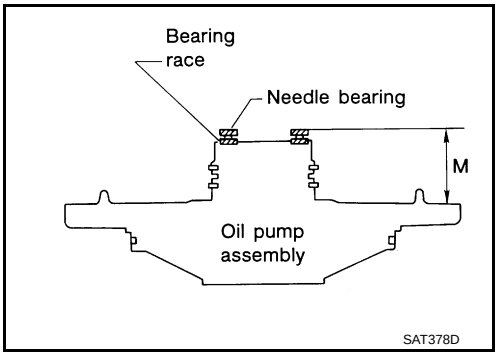
b. Measure dimension “L”.
c. Calculate dimension “J”.

“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



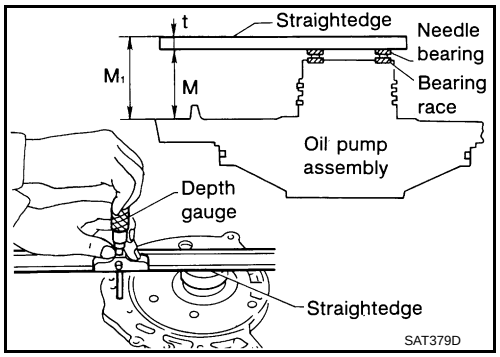
2. Measure dimension “M”.
a. Place bearing race and needle bearing on oil pump assembly.



b. Measure dimension “M”.

“M”: Distance between transaxle case fitting surface of oil pump cover and needle bearing on oil pump cover.

“M_1”: Indication of gauge



c. Measure thickness of straightedge “t”.

$M = M_1 - t$

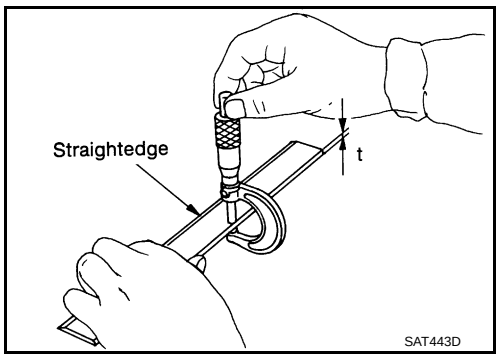
3. Adjust total end play “T_1”.

$T_1 = J - M$

Total end play “T_1”:

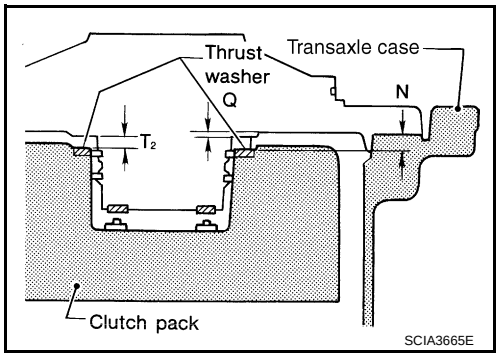
Refer to TM-324, "Total End Play".

- Select proper thickness of bearing race so that total end play is within specifications.

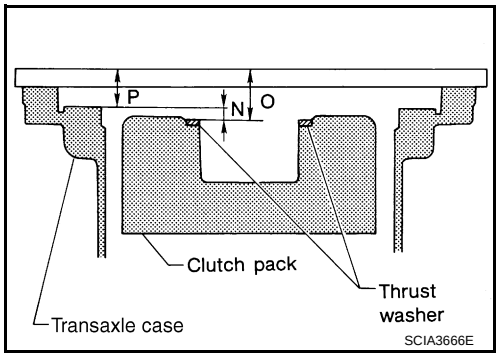


REVERSE CLUTCH END PLAY

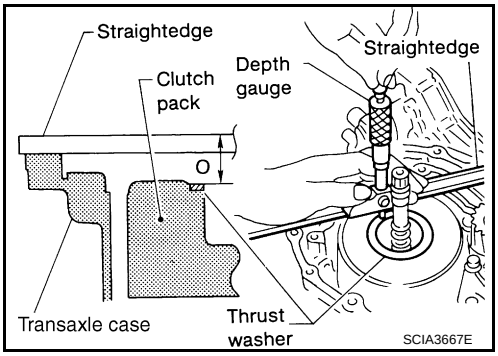
- Measure clearance between oil pump cover and thrust washer for reverse clutch drum.
- Select proper thickness of thrust washer so that end play is within specification.



1. Measure dimensions “O” and “P”, and then calculate dimension “N”.



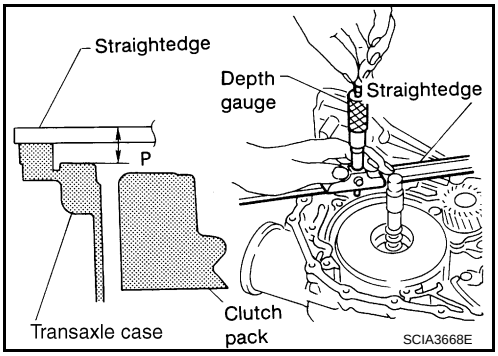
a. Place thrust washer on reverse clutch drum.
b. Measure dimension “O”.



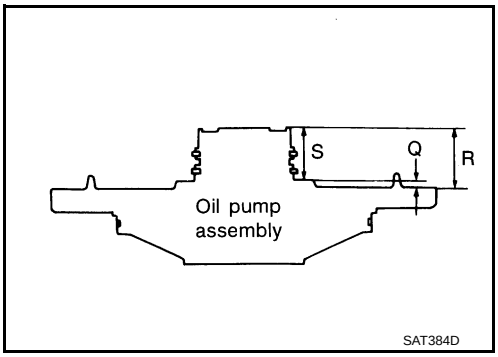
c. Measure dimension “P”.
d. Calculate dimension “N”.

“N”: Distance between oil pump fitting surface of transaxle case and thrust washer on reverse clutch drum.

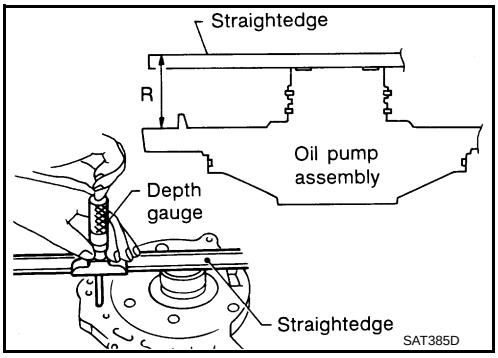
N = O – P



2. Measure dimensions “R” and “S”, and then calculate dimension “Q”.



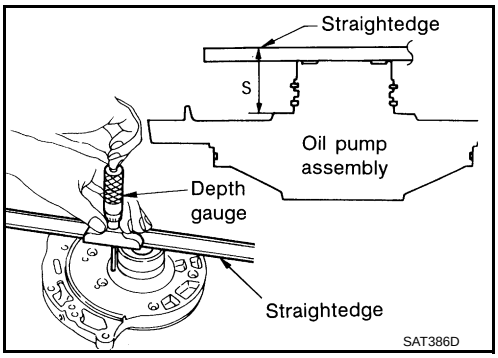
a. Measure dimension “R”.



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 "T_2".

T_2 = N – Q

Reverse clutch end play:

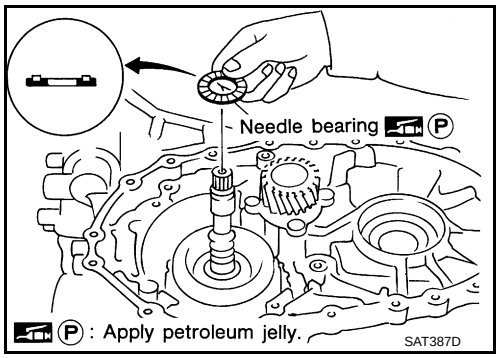
Refer to TM-324, "Reverse Clutch End Play".

- Select proper thickness of thrust washer so that reverse clutch end play is within specifications.

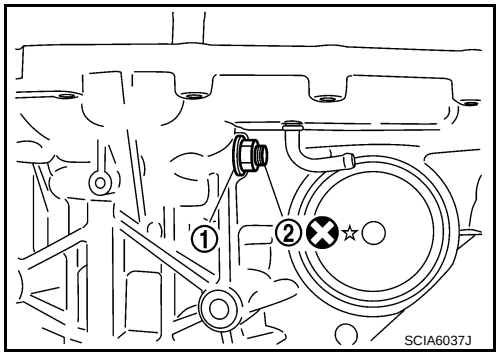
Assembly (3)

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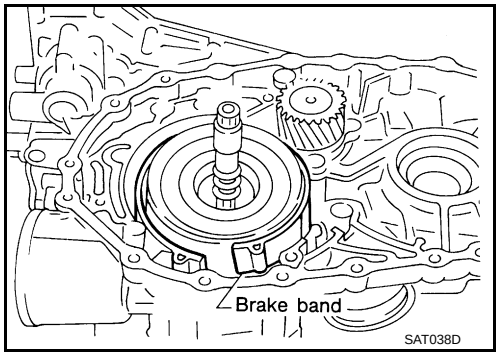
1. Remove reverse clutch assembly.
2. Install needle bearing on input shaft assembly (high clutch drum).
   CAUTION:
   Be careful with the direction of needle bearing.
3. Install reverse clutch assembly.
   CAUTION:
   Align teeth of reverse clutch drive plates before installing.



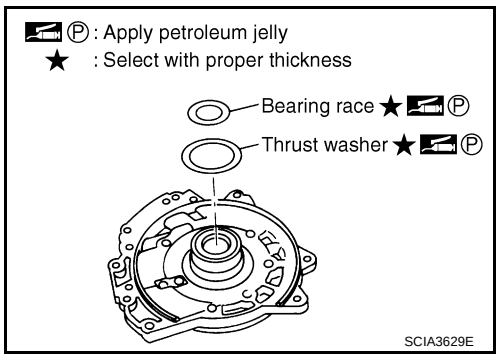
4. Install anchor end pin (2) and lock nut (1) on transaxle case.



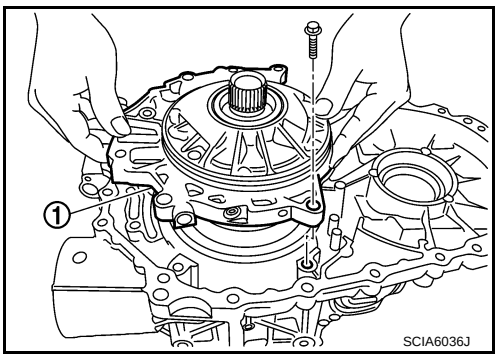
5. Place brake band on outside of reverse clutch drum.
6. Tighten anchor end pin just enough so that brake band is evenly fitted on reverse clutch drum.



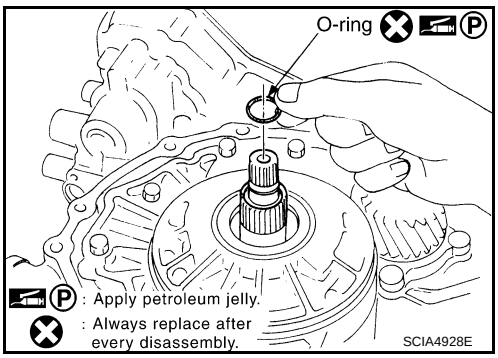
7. Install bearing race selected in total end play adjustment step on oil pump cover.
8. Install thrust washer selected in reverse clutch end play adjustment step on oil pump cover.
9. Install O-ring to oil pump assembly.
   CAUTION:
   - **Do not reuse O-ring.**
   - **Apply ATF to O-ring.**



10. Install oil pump assembly (1) on transaxle case.
11. Tighten oil pump bolts to the specified torque.



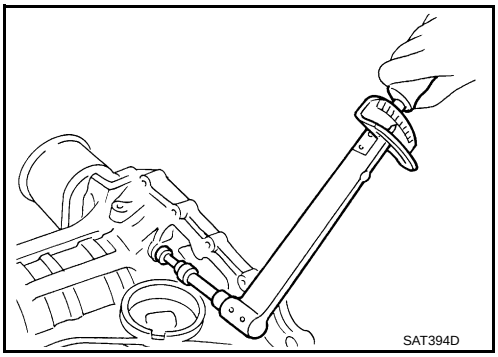
12. Install O-ring to input shaft assembly (high clutch drum).



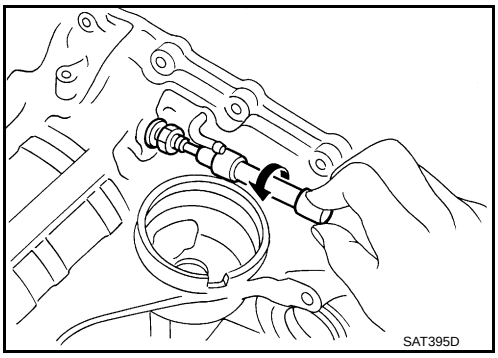
13. Adjust brake band.

a. Tighten anchor end pin to the specified torque.

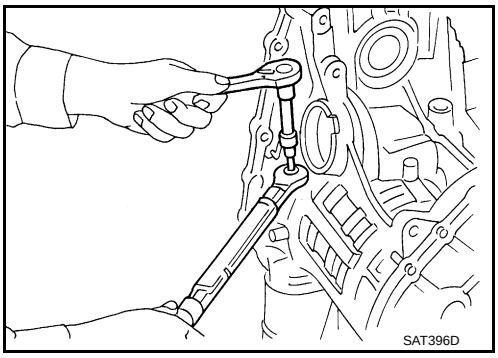
Anchor end pin : 4.9 N·m (0.50 kg-m, 43 in-lb)



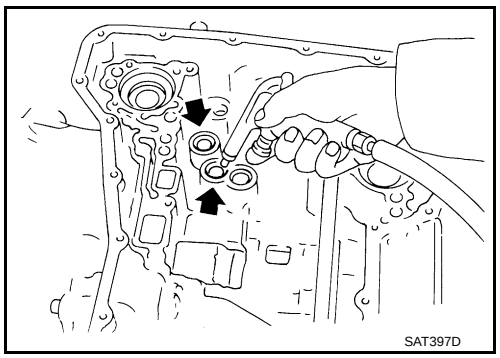
b. Back off anchor end pin two and a half turns.



c. Tighten lock nut while holding anchor end pin.



14. Apply compressed air into oil holes of transaxle case and check operation of brake band.



15. Select proper thickness of differential side bearing adjusting shim using the following procedures.
    - Measure differential side bearing end play, and calculate the adjusting shim thickness so that the end play is within the specifications.

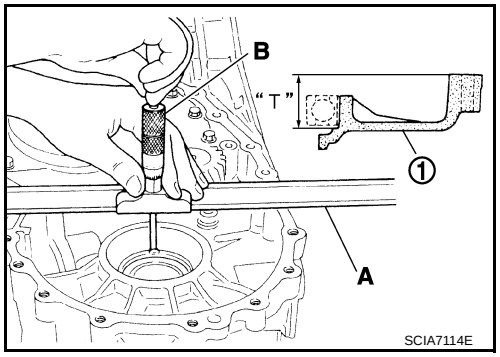
Differential side bearing end play:

Refer to TM-323, "Final Drive".

a. Place a straightedge (A) onto transaxle case (1), and measure the depth “T” of transaxle case (1) to the mating surface for differential side bearing using depth gauge (B).

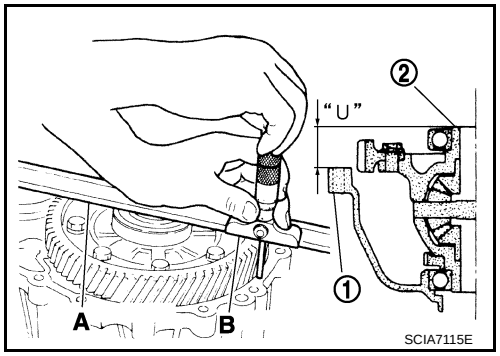
T = (Measurement) - (Straightedge thickness)

- **Measure the depth “T” in at least two places, and take the average.**



b. Install final drive assembly onto converter housing (1).

c. Place a straightedge (A) onto differential case (2), and measure the height “U” to the end of converter housing (1) using depth gauge (B).
   - **Measure the height “U” in at least two places, and take the average.**



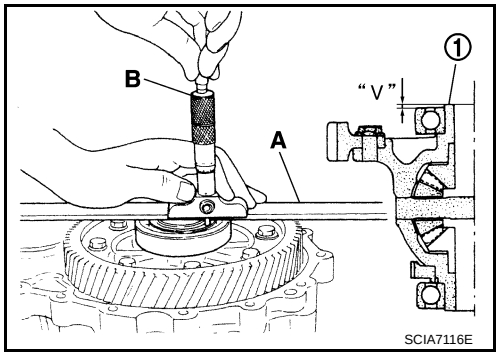
d. Place a straightedge (A) onto differential case (1), and measure the height “V” to the end of differential side bearing outer race using depth gauge (B).
   - **Measure the height “V” in at least two places, and take the average.**

e. Select proper thickness of differential side bearing adjusting shim.

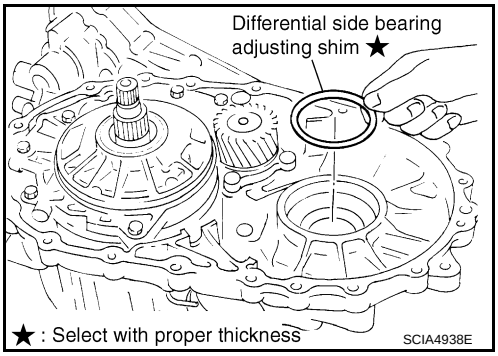
Proper shim thickness

= T - U + V + [0 - 0.15 mm (0 - 0.0059 in)]*

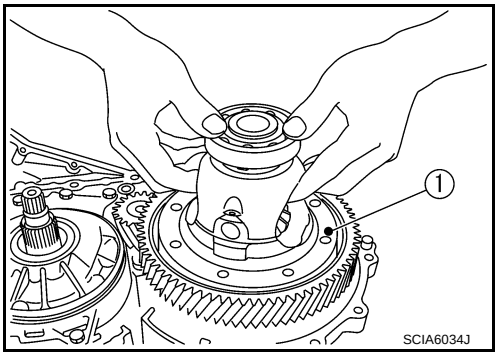
(*: differential side bearing end play)



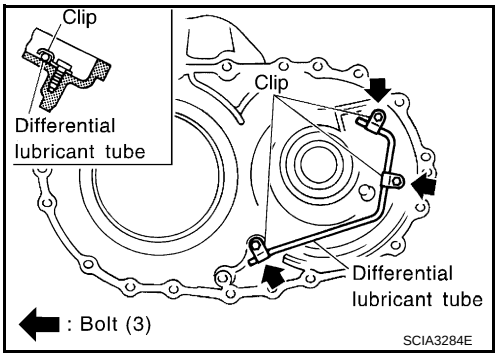
16. Install differential side bearing adjusting shim selected in differential side bearing end play adjustment step on transaxle case.



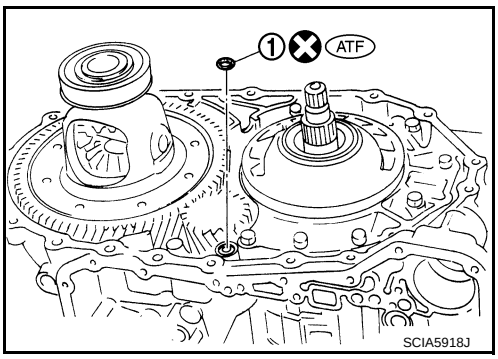
17. Install final drive assembly (1) on transaxle case.



18. Install differential lubricant tube and clips on converter housing.
19. Tighten differential lubricant tube fitting bolts to the specified torque.



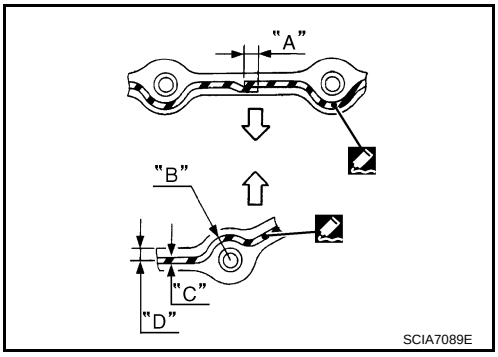
20. Install O-ring (1) on differential oil port of transaxle case as shown.



21. Apply locking sealant (loctite #518) to transaxle case as shown.
⇦: Inside of transaxle case

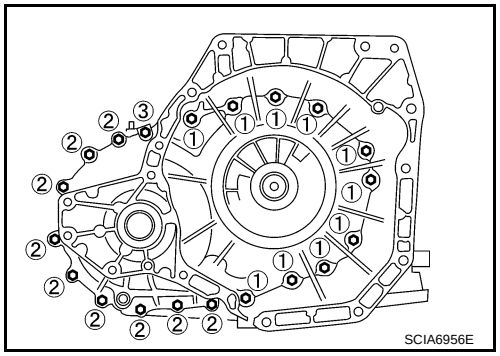
“A” : 3 - 5 mm (0.12 - 0.20 in)
“B” : 8 mm (0.31 in) R
“C” : 1.5 mm (0.059 in) dia.
“D” : 4 mm (0.16 in)

CAUTION:



Completely remove all moisture, oil and old sealant, etc. from the transaxle case and converter housing mating surfaces.

22. Install converter housing on transaxle case.
23. Install bracket on converter housing.
24. Tighten converter housing bolts (1), (2) and (3) to the specified torque.

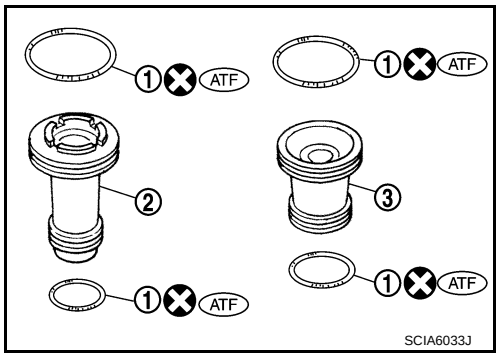


Bolt	1	2	3*
Bolt length [mm (in)]	30 (1.18)	40 (1.57)	
Number of bolts	10	9	1

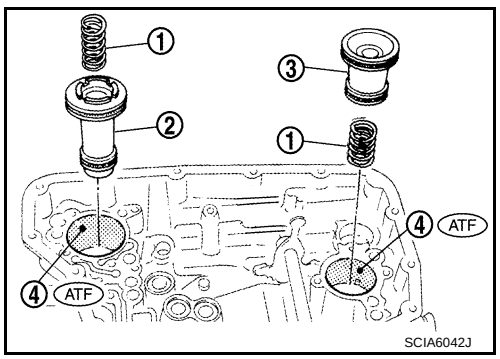
*: Tighten with bracket.

25. Install O-ring to plug.
CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**
26. Install plug to converter housing.
27. Tighten plug fitting bolt to the specified torque.
28. Install accumulator pistons.

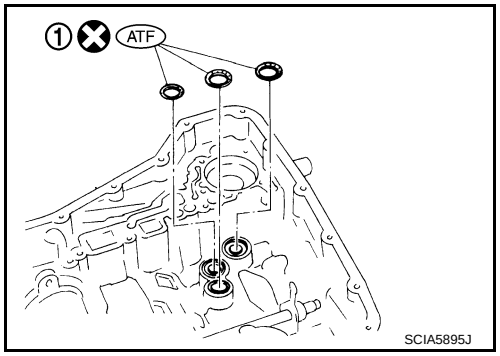
a. Install O-rings (1) on servo release accumulator piston (2) and N-D accumulator piston (3). Refer to TM-321, "Accumulator".



b. Install return springs (1), servo release accumulator piston (2) and N-D accumulator piston (3) into transaxle case (4). Refer to TM-321, "Accumulator".



29. Install lip seals (1) for band servo oil holes on transaxle case.



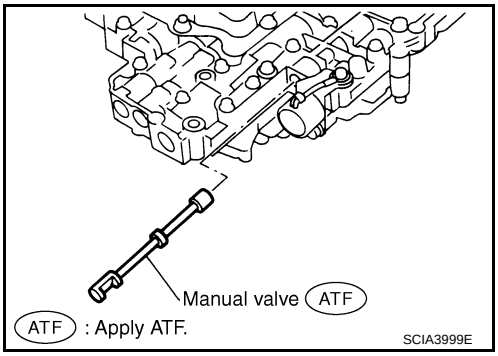
30. Install control valve assembly on transaxle case.

a. Install O-ring on terminal body.

CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**

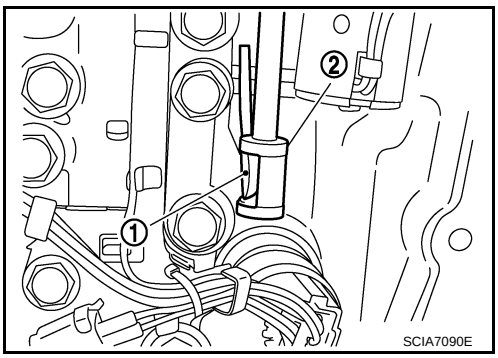
b. Insert manual valve into control valve assembly.

CAUTION:
Do not drop manual valve.



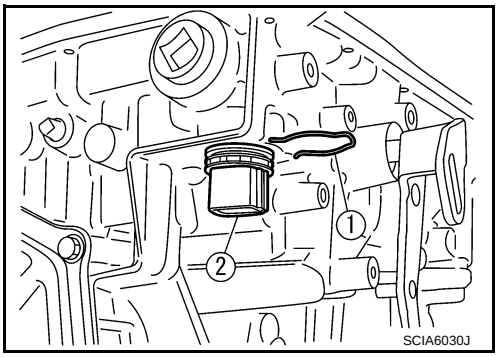
c. Set manual shaft in “N” position.

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.

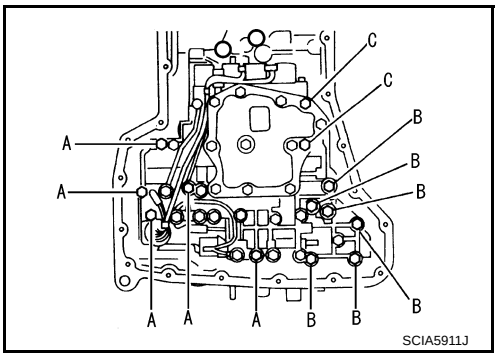
f. Install snap ring (1) to terminal body (2).



g. Tighten bolts (A), (B) and (C) to the specified torque.

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



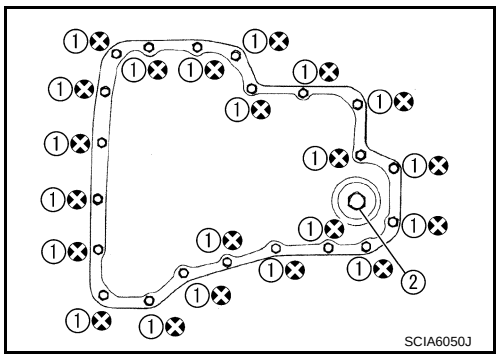
31. Install oil pan.

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 bolts (1) to the specified torque.
CAUTION:
- **Always replace oil pan bolts (1) as they are self-sealing bolts.**
- **Tighten four bolts in a criss-cross pattern to prevent dislocation of gasket.**

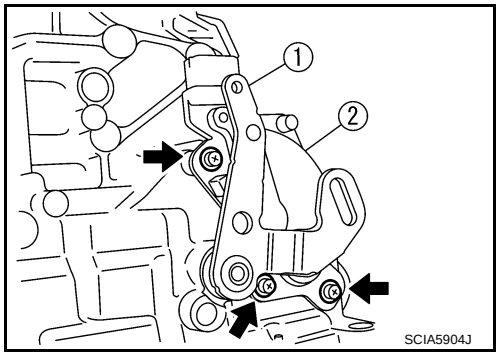

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e. Install drain plug gasket and drain plug (2) to oil pan.
CAUTION:
Do not reuse drain plug gasket.

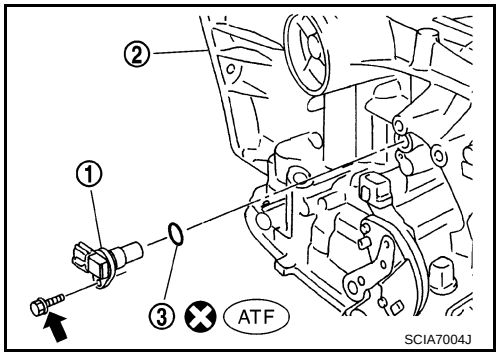
f. Tighten drain plug to the specified torque.

32. 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.
f. Remove pin from adjustment hole after adjusting PNP switch (2).

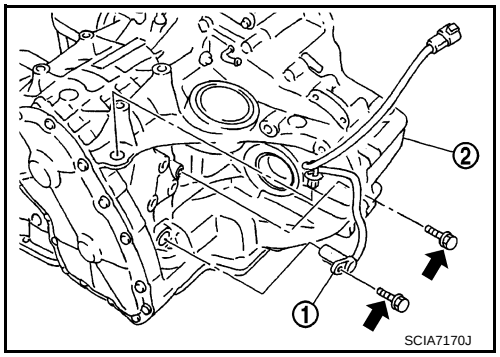

SCIA5904J

33. Install O-ring (3) to turbine revolution sensor (power train revolution sensor) (1).
34. Install turbine revolution sensor (power train revolution sensor) (1) to transaxle case (2).
⬅: Bolt
35. Tighten turbine revolution sensor (power train revolution sensor) bolt to the specified torque.



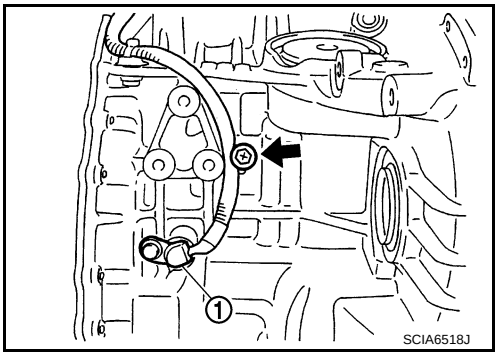
SCIA7004J

36. Install revolution sensor (1) to transaxle case (2).
37. Tighten revolution sensor bolts to the specified torque.
⬅: Bolt


SCIA7170J

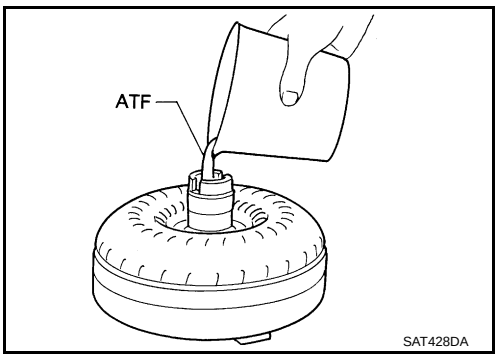
CAUTION:

Ensure revolution sensor harness is firmly secured with bolt.
(1): Revolution sensor
⬅: Bolt

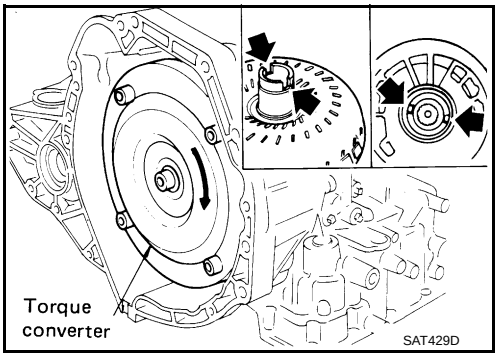


38. Install torque converter.

a. Pour ATF into torque converter.
- **Approximately 1 liter (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.**

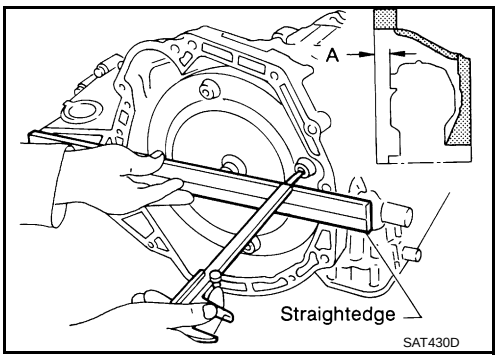


b. Install torque converter while aligning notches of torque converter with notches of oil pump.



c. Measure distance “A” to make sure that torque converter is in proper position.

Distance “A”: 16.2 mm (0.638 in) or more



SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000001730959

Engine		HR16DE
Automatic transaxle model		RE4F03B
Automatic transaxle assembly	Model code number	3CX3C
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 J ATF or equivalent*
Fluid capacity [ℓ (Imp qt)]		7.7 (6-3/4)

*: Refer to MA-19, "Fluids and Lubricants".

Vehicle Speed at Which Gear Shifting Occurs

INFOID:0000000001730960

Throttle position	Vehicle speed km/h (MPH)					
	$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$
Full throttle	51 - 59 (32 - 37)	97 - 105 (60 - 65)	154 - 162 (96 - 101)	150 - 158 (93 - 98)	87 - 95 (54 - 59)	41 - 49 (25 - 30)
Half throttle	31 - 39 (19 - 24)	60 - 68 (37 - 42)	122 - 130 (76 - 81)	63 - 71 (39 - 44)	36 - 44 (22 - 27)	5 - 13 (3 - 8)

- At half throttle, the accelerator opening is 1/2 of the full opening.

Vehicle Speed at When Lock-up Occurs/Releases

INFOID:0000000001730961

Throttle position	Selector lever position	Vehicle speed km/h (MPH)	
		Lock-up ON	Lock-up OFF
2.0/8	“D” position	76 - 84 (47 - 52)	56 - 64 (35 - 40)
	“D” position (OD OFF)	86 - 94 (53 - 58)	83 - 91 (52 - 57)

Stall Speed

INFOID:0000000001730962

Stall revolution (rpm)	2,250 - 2,700

Line Pressure

INFOID:0000000001730963

Engine speed	Line pressure kPa (bar, kg/cm^2, psi)	
	“D”, “2” and “1” positions	“R” position
Idle speed	500 (5.0, 5.1, 73)	778 (7.8, 7.9, 113)
Stall speed	1,159 (11.6, 11.8, 168)	1,804 (18.0, 18.4, 262)

Adjusting shims, Needle Bearings, Thrust Washers and Snap Rings

INFOID:0000000001731392

NOTE:
Refer to XX-XX, "*****" or XX-XX, "*****".

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	58.99 (2.3224)	42.1 (1.657)

OUTER DIAMETER AND INNER DIAMETER OF THRUST WASHERS

Unit: mm (in)

Location	Outer diameter	Inner diameter
I	72.0 (2.835)	55.5 (2.185)
J, K	82.0 (3.228)	59.0 (2.323)
L	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
M	48.0 (1.890)	33.0 (1.299)
N	29.0 (1.142)	25.0 (0.984)
O	34.3 (1.350)	26.1 (1.028)
P	79.5 (3.130)	72.0 (2.835)

OUTER DIAMETER OF SNAP RINGS

Unit: mm (in)

Location	Outer diameter
1	142.0 (5.59)
2	
3	162.3 (6.39)
4	
5	
7	113.0 (4.45)
8	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)

Control Valves

INFOID:0000000001731393

CONTROL VALVE SPRINGS

Unit: mm (in)

Location		spring designation	Free length (l)	Outer diameter (D)
Upper body	L14	Pilot valve spring	38.98 (1.5346)	8.9 (0.350)
	L15	1–2 accumulator valve spring	20.5 (0.807)	6.95 (0.2737)
		1–2 accumulator piston spring	55.66 (2.1913)	19.5 (0.768)
	L16	1st reducing valve spring	27.0 (1.063)	7.0 (0.276)
	L17	3–2 timing valve spring	23.0 (0.906)	6.65 (0.2618)
	L18	Overrun clutch reducing valve spring	37.5 (1.476)	7.0 (0.276)
	L19	Torque converter relief valve spring	33.3 (1.311)	9.0 (0.354)
	L20	Torque converter clutch control valve spring	53.01 (2.0870)	6.5 (0.256)
	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

INFOID:0000000001731394

RETURN SPRINGS

Unit: mm (in)

Location	Free length (L_1)
Servo release accumulator	62.8 (2.472)

Unit: mm (in)

Location	Length (L_2)
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

INFOID:0000000001731395

REVERSE CLUTCH

Number of drive plates		2
Number of driven plates		2
Drive plate thickness [mm (in)]	Standard	2.0 (0.079)
	Allowable limit	1.8 (0.070)

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)

HIGH CLUTCH

Number of drive plates		3	
Number of driven plates		6 (1*1 + 5*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
		1.5 (0.059)	2.0 (0.079)
Clearance [mm (in)]	Standard	1.4 - 1.8 (0.055 - 0.070)	
	Allowable limit	2.4 (0.094)	

FORWARD CLUTCH

Number of drive plates		5
Number of driven plates		5
Drive plate thickness [mm (in)]	Standard	1.8 (0.070)
	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		4
Number of driven plates		4
Drive plate thickness [mm (in)]	Standard	2.0 (0.079)
	Allowable limit	1.8 (0.070)
Driven plate thickness [mm (in)]	Standard	2.0 (0.079)
Clearance [mm (in)]	Standard	1.4 - 1.8 (0.055 - 0.070)
	Allowable limit	2.6 (0.102)

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)

Final Drive

INFOID:0000000001731396

DIFFERENTIAL SIDE GEAR CLEARANCE

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

DIFFERENTIAL SIDE BEARING END PLAY

Differential side bearing end play [mm (in)]	0 - 0.15 (0 - 0.0059)

Planetary Carrier

INFOID:0000000001731397

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

INFOID:0000000001731398

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

INFOID:0000000001731399

SEAL RING CLEARANCE

Input shaft seal ring clearance [mm (in)]	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.098)

SEAL RING

Unit: mm (in)

Outer diameter	Inner diameter	Width
24 (0.94)	20.4 (0.803)	1.97 (0.0776)

Reduction Pinion Gear

INFOID:0000000001731400

TURNING TORQUE

Turning torque of reduction pinion gear [N·m (kg-m, in-lb)]	0.11 - 0.69 (0.02 - 0.07, 1 - 6)

Band Servo

INFOID:0000000001731401

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

INFOID:0000000001731402

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)

TURNING TORQUE

Turning torque of output shaft [N·m (kg-m, in-lb)]	0.25 - 0.88 (0.03 - 0.08, 3 - 7)

Bearing Retainer

INFOID:0000000001731403

SEAL RING CLEARANCE

Bearing retainer seal ring clearance [mm (in)]	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

Total End Play

INFOID:0000000001731404

Total end play [mm (in)]	0.25 - 0.55 (0.0098 - 0.0217)

Reverse Clutch End Play

INFOID:0000000001731405

Reverse clutch end play [mm (in)]	0.65 - 1.0 (0.0256 - 0.039)

Removal and Installation

INFOID:0000000001731406

Distance between end of converter housing and torque converter [mm (in)]	16.2 (0.638)

Shift Solenoid Valves

INFOID:0000000001731407

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

INFOID:0000000001731408

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

INFOID:0000000001731409

Remarks: Specification data are reference values.

Condition	Specification (Approx.)	
Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	1.5V ↓ 0.5V	2.5 kΩ ↓ 0.3 kΩ

Revolution Sensor

INFOID:0000000001731410

Condition	Judgement standard
When driving at 20 km/h (12 MPH)	150 Hz (Approx.)

Dropping Resistor

INFOID:0000000001731411

Resistance	12Ω (Approx.)

Turbine Revolution Sensor (Power Train Revolution Sensor)

INFOID:0000000001731412

Condition	Judgement standard
When driving at 20 km/h (12 MPH)	360 Hz (Approx.)

BASIC INSPECTION

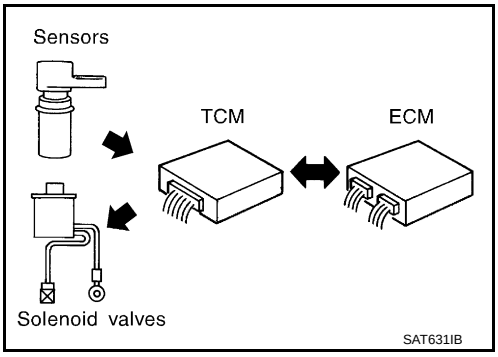
DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

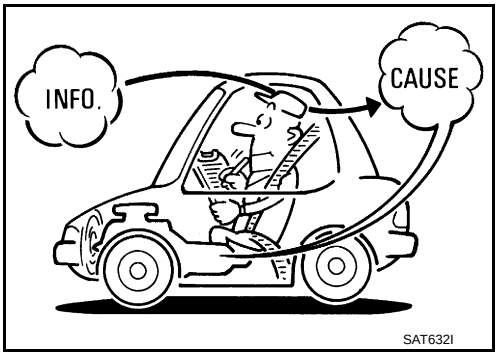
INFOID:0000000001728326

INTRODUCTION

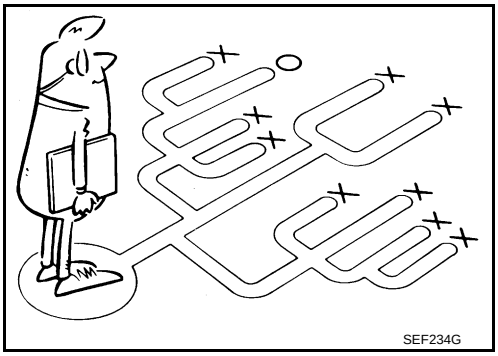
The TCM receives a signal from the vehicle speed sensor, accelerator pedal position sensor (throttle position sensor) or PNP switch. Then provides shift control or lock-up control via A/T solenoid valves. The TCM also communicates with the ECM by means of a signal sent from sensing elements used with 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 an error that occurs intermittently rather than continuously. Most intermittent errors 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 errors. A road test with CONSULT-III (or GST) or a circuit tester connected should be performed. Follow the “DETAILED 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 errors, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A “Diagnostic work sheet” as shown on the example (Refer to TM-327) should be used.
Start your diagnosis by looking for “conventional” errors first. This will help troubleshoot driveability errors on an electronically controlled engine vehicle.
Also check related Service bulletins.



DETAILED FLOW

1.COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using diagnosis worksheet. Refer to TM-327, "Diagnostic Work Sheet".

>> GO TO 2.

2.CHECK SYMPTOM 1

Check the following items based on the information obtained from the customer.
- Fail-safe. Refer to TM-426, "Fail-Safe".
- A/T fluid inspection. Refer to TM-473, "Checking A/T Fluid".
- Stall test. Refer to TM-477, "Inspection and Judgment".
- Line pressure test. Refer to TM-480, "Inspection and Judgment".

>> GO TO 3.

3.ROAD TEST

Perform “ROAD TEST”. Refer to TM-482, "Description".

>> GO TO 4.

4.PERFORM SELF-DIAGNOSTIC PROCEDURE

Perform “Self-Diagnosis Procedure”. Refer to TM-348, "CONSULT-III Function (TRANSMISSION)" or TM-350, "Diagnosis Procedure without CONSULT-III".

>> GO TO 5.

5.CHECK SYMPTOM 2

Try to confirm the symptom described by the customer.

Is any malfunction present?

YES >> GO TO 6.
NO >> INSPECTION END

6.CHECK SYMPTOM 3

Try to confirm the symptom described by the customer.

Is any malfunction present?

YES >> GO TO 2.
NO >> INSPECTION END

Diagnostic Work Sheet

INFOID:0000000001728327

INFORMATION FROM CUSTOMER

KEY POINTS
- **WHAT**..... Vehicle and A/T model
- **WHEN**..... Date, Frequencies
- **WHERE**..... Road conditions
- **HOW**..... Operating conditions, Symptoms

Customer name MR/MS	Model and Year	VIN
Trans. Model	Engine	Mileage
Malfunction Date	Manuf. Date	In Service Date
Frequency	❑ Continuous ❑ Intermittent (times a day)	
Symptoms	❑ Vehicle does not move. (❑ Any position ❑ Particular position)	
	❑ No up-shift (❑ 1st → 2nd ❑ 2nd → 3rd ❑ 3rd → 4th ❑ 4th → 5th)	
	❑ No down-shift (❑ 5th → 4th ❑ 4th → 3rd ❑ 3rd → 2nd ❑ 2nd → 1st)	
	❑ Lock-up malfunction	
	❑ Shift point too high or too low.	
	❑ Shift shock or slip (❑ N → D ❑ N → R ❑ Lock-up ❑ Any drive position)	
	❑ Noise or vibration	
	❑ No kick down	
	❑ No pattern select	
	❑ Others ( )	
Malfunction indicator lamp (MIL)	❑ Continuously lit	❑ Not lit

DIAGNOSTIC WORK SHEET

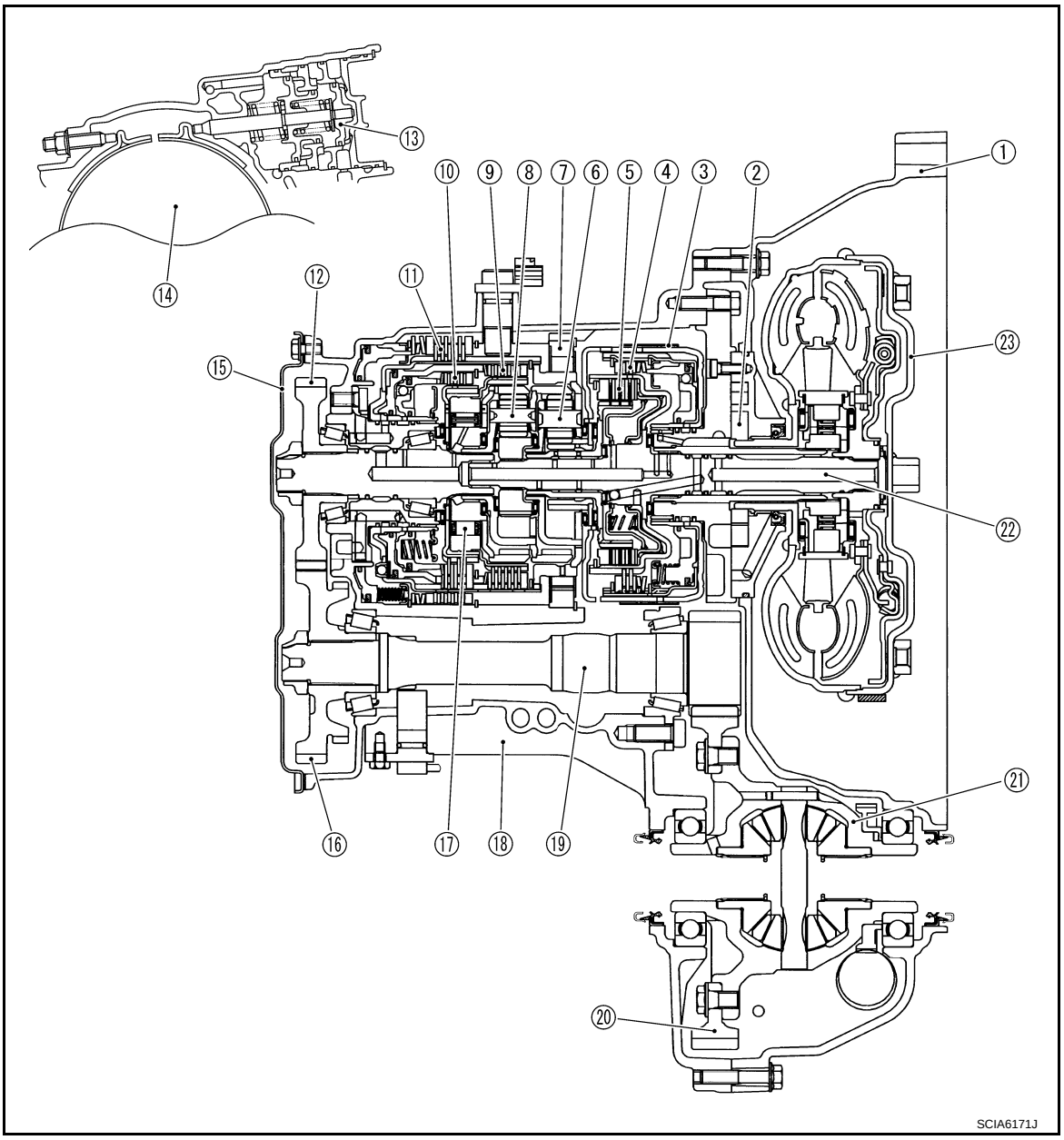
1	❏ Read the item on cautions concerning fail-safe and understand the customer's complaint.			TM-426
2	❏ A/T fluid inspection, stall test and line pressure test			
		❏ A/T fluid inspection		TM-473
		❏ Leak (Repair leak location.) ❏ State ❏ Amount		
3		❏ Stall test		TM-477
		❏ Torque converter one-way clutch ❏ Front brake ❏ High and low reverse clutch ❏ Low coast brake ❏ Forward brake ❏ Reverse brake ❏ Forward one-way clutch	❏ 1st one-way clutch ❏ 3rd one-way clutch ❏ Engine ❏ Line pressure low ❏ Except for input clutch and direct clutch, clutches and brakes OK	
		❏ Line pressure test - Suspected part:		TM-480
4	❏ Perform self-diagnosis. — Check detected items to repair or replace malfunctioning part.			TM-348 or TM-350
5	❏ Perform road test.			
	5-1	❏ Check before engine is started		TM-482
	5-2	❏ Check at idle		TM-483
	5-3	Cruise test	❏ Part 1	TM-485
			❏ Part 2	TM-487
			❏ Part 3	TM-488
	❏ Check malfunction phenomena to repair or replace malfunctioning part after completing all road test. Refer to TM-429.			
5	❏ Drive vehicle to check that the malfunction phenomenon has been resolved.			
6	❏ Erase the results of the self-diagnosis from the TCM and the ECM.			TM-348 or TM-350

FUNCTION DIAGNOSIS

A/T CONTROL SYSTEM

Cross-Sectional View

INFOID:0000000001714309

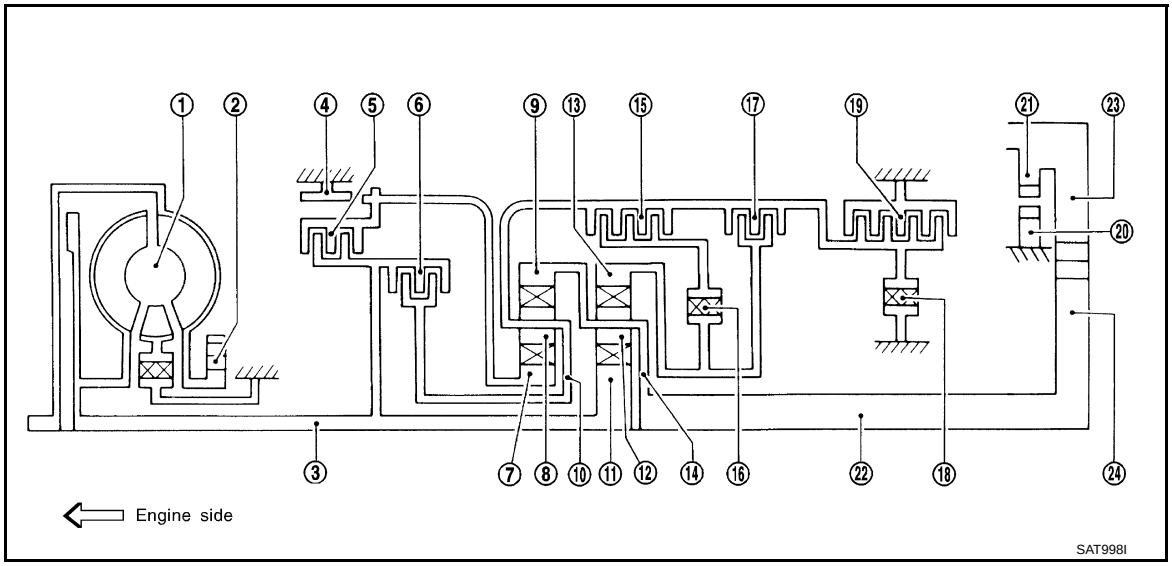


1. Converter housing
2. Oil pump
3. Brake band
4. Reverse clutch
5. High clutch
6. Front planetary gear
7. Low one-way clutch
8. Rear planetary gear
9. Forward clutch
10. Overrun clutch
11. Low & reverse brake
12. Output gear
13. Band servo piston
14. Reverse clutch drum
15. Side cover
16. Idler gear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

Shift Mechanism

INFOID:0000000001714310

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**.

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

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					
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.

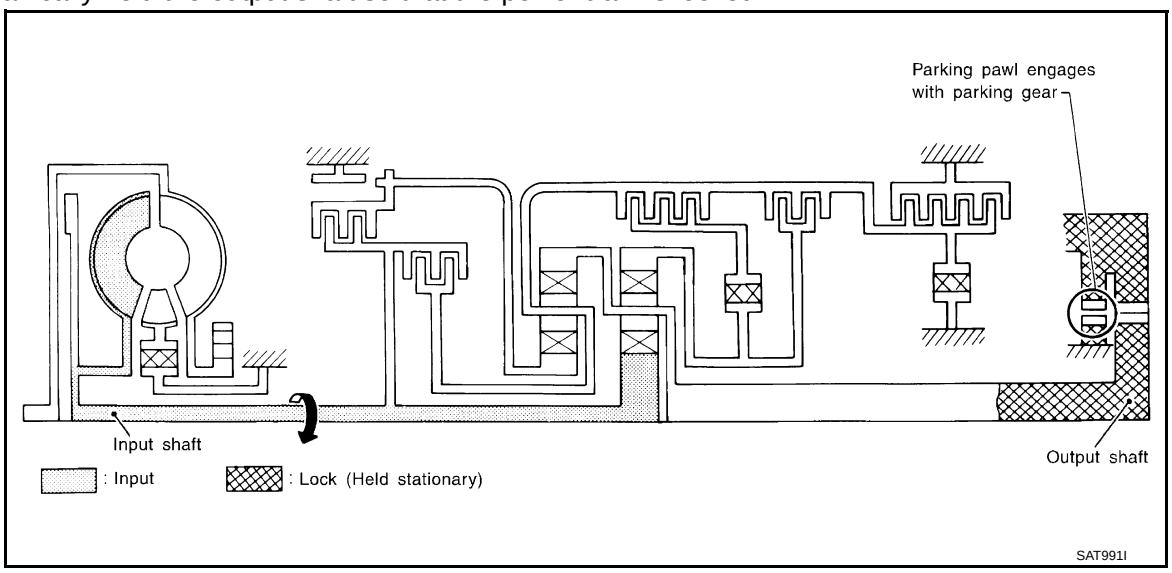
- **: Overrun clutch remains in engaged condition when throttle opening is less than 1/16.

POWER TRANSMISSION

“N” and “P” Positions

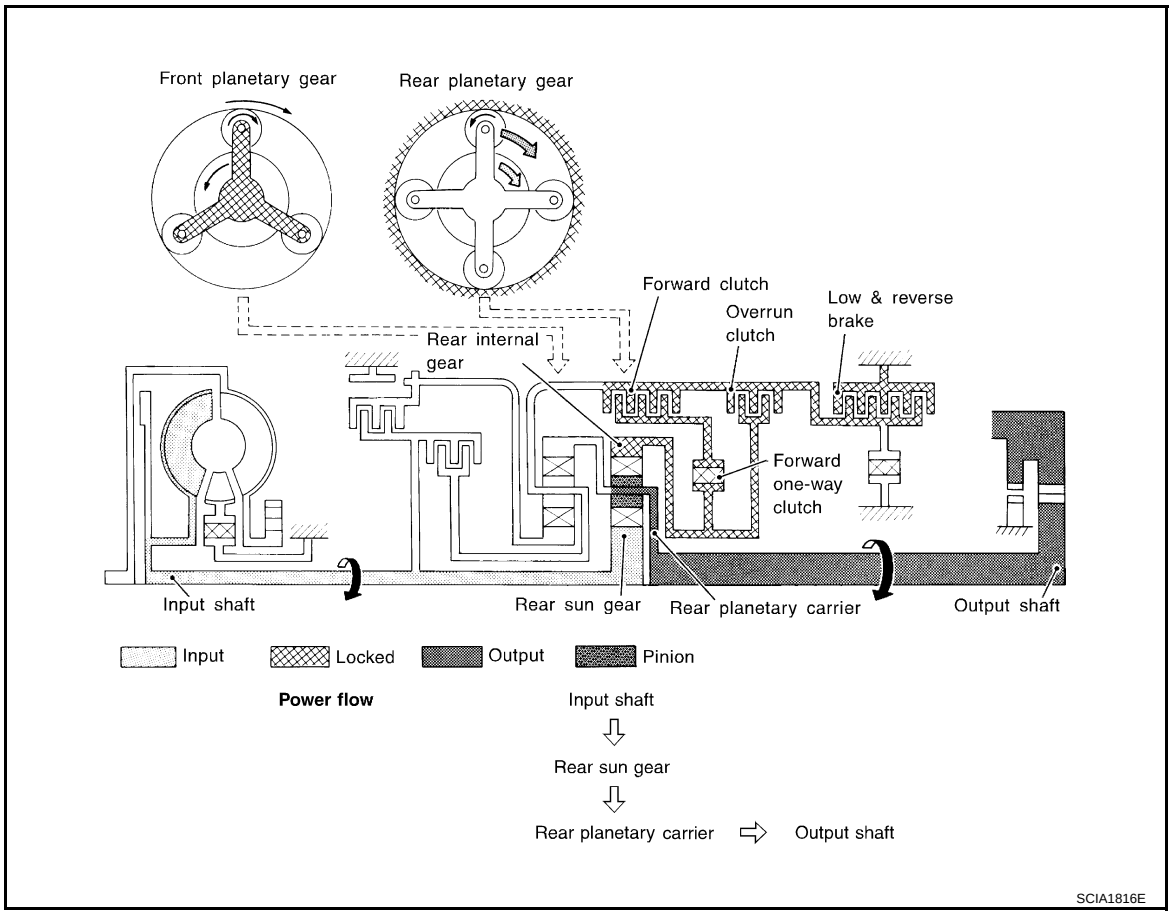
- “N” position
  Power from the input shaft is not transmitted to the output shaft because the clutches do not operate.
- “P” position

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.



“1$_1$” Position

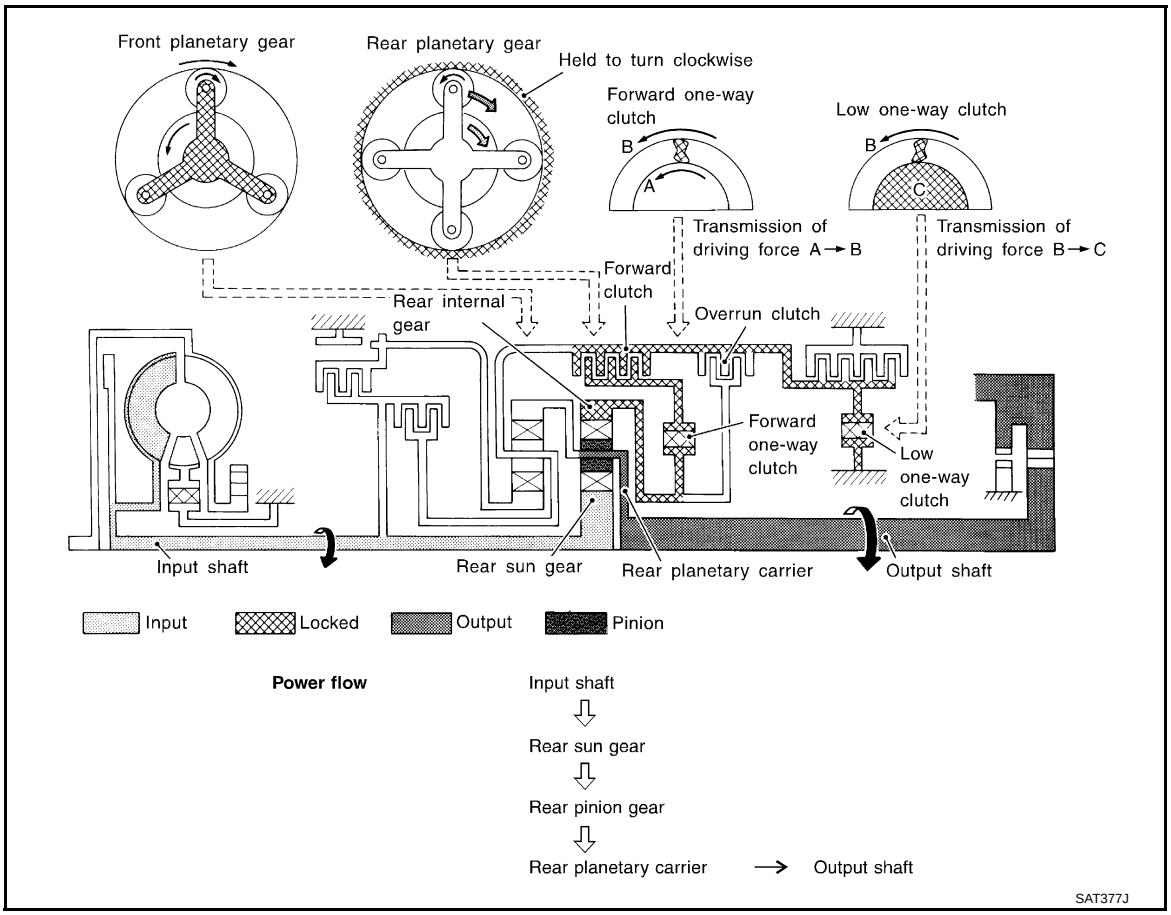
• **Forward clutch** • **Forward one-way clutch** • **Overrun clutch** • **Low & reverse brake**	As overrun clutch engages, rear internal gear is locked by the operation of low and reverse brake. This is different from that of D$_1$ and 2$_1$.
Engine brake	Overrun clutch always engages, therefore engine brake can be obtained when decelerating.



“D$_1$” and “2$_1$” Positions

• **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)	D_1: OD OFF (OD OFF indicator lamp is on) and throttle opening is less than specification* 2_1: Always engaged At D_1 and 2_1 positions, engine brake is not activated due to free turning of low one- way clutch.

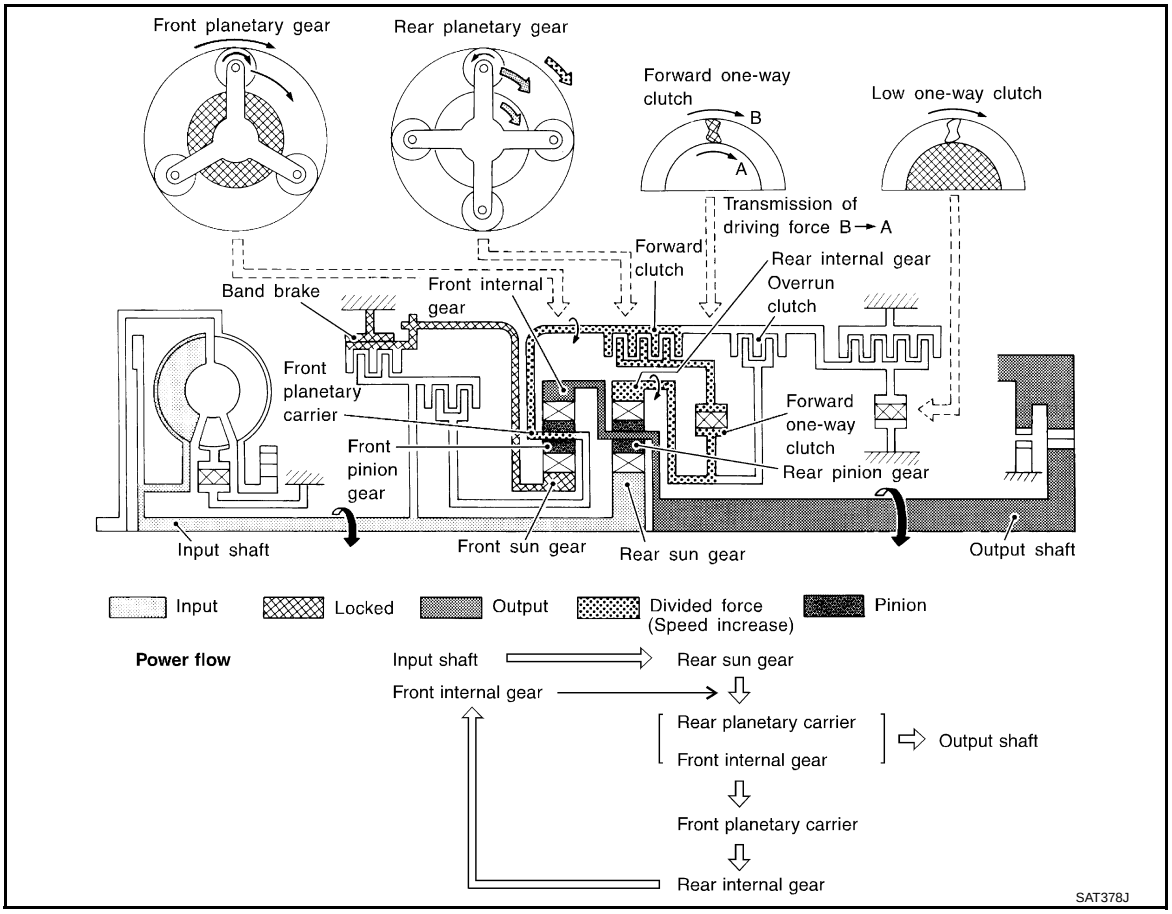
*: Overrun clutch remains in engaged condition when throttle opening is less than 1/16.



"D_2", "2_2" and "1_2" Positions

• **Forward clutch** • **Forward one-way clutch** • **Brake band**	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. 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.
Overrun clutch engagement conditions	D_2: OD OFF (OD OFF indicator lamp is on) and throttle opening is less than specification* 2_2 and 1_2: Always engaged

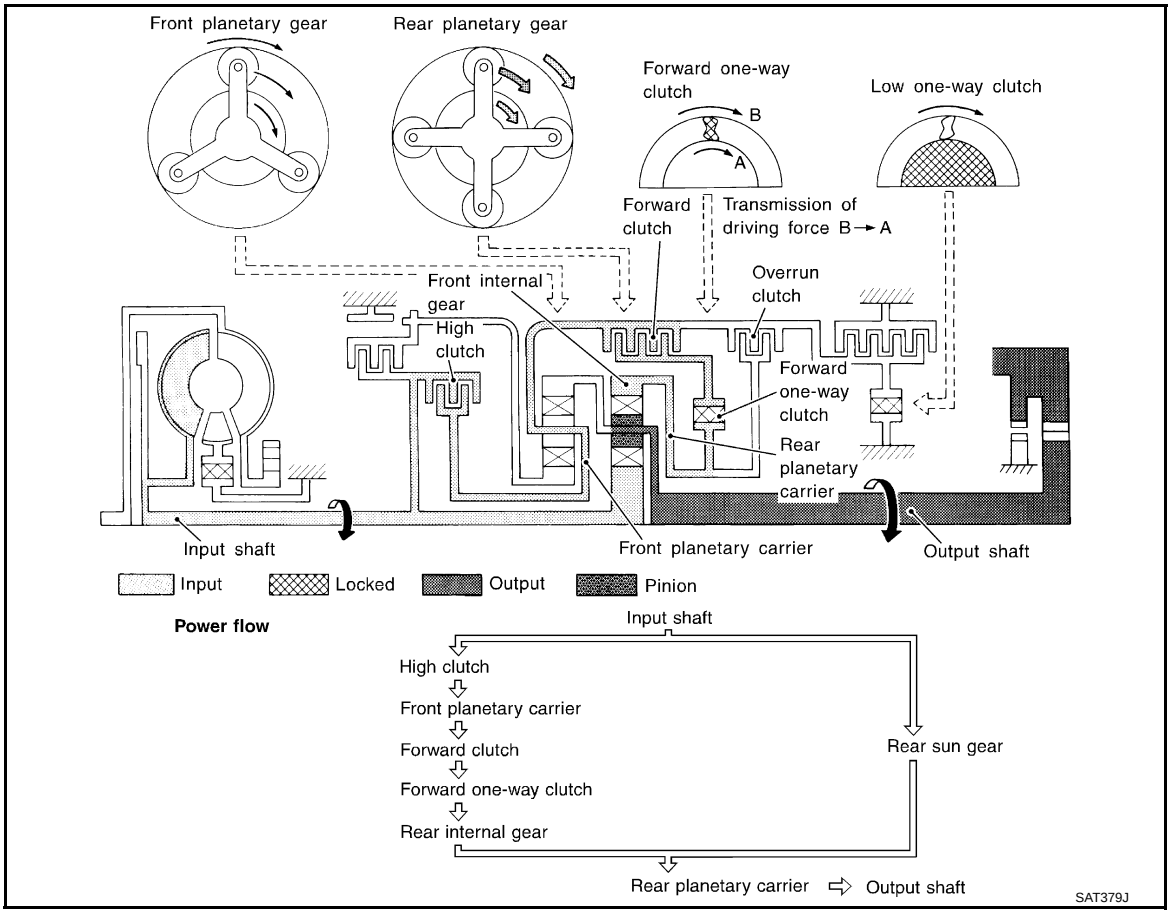
*: Overrun clutch remains in engaged condition when throttle opening is less than 1/16.



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

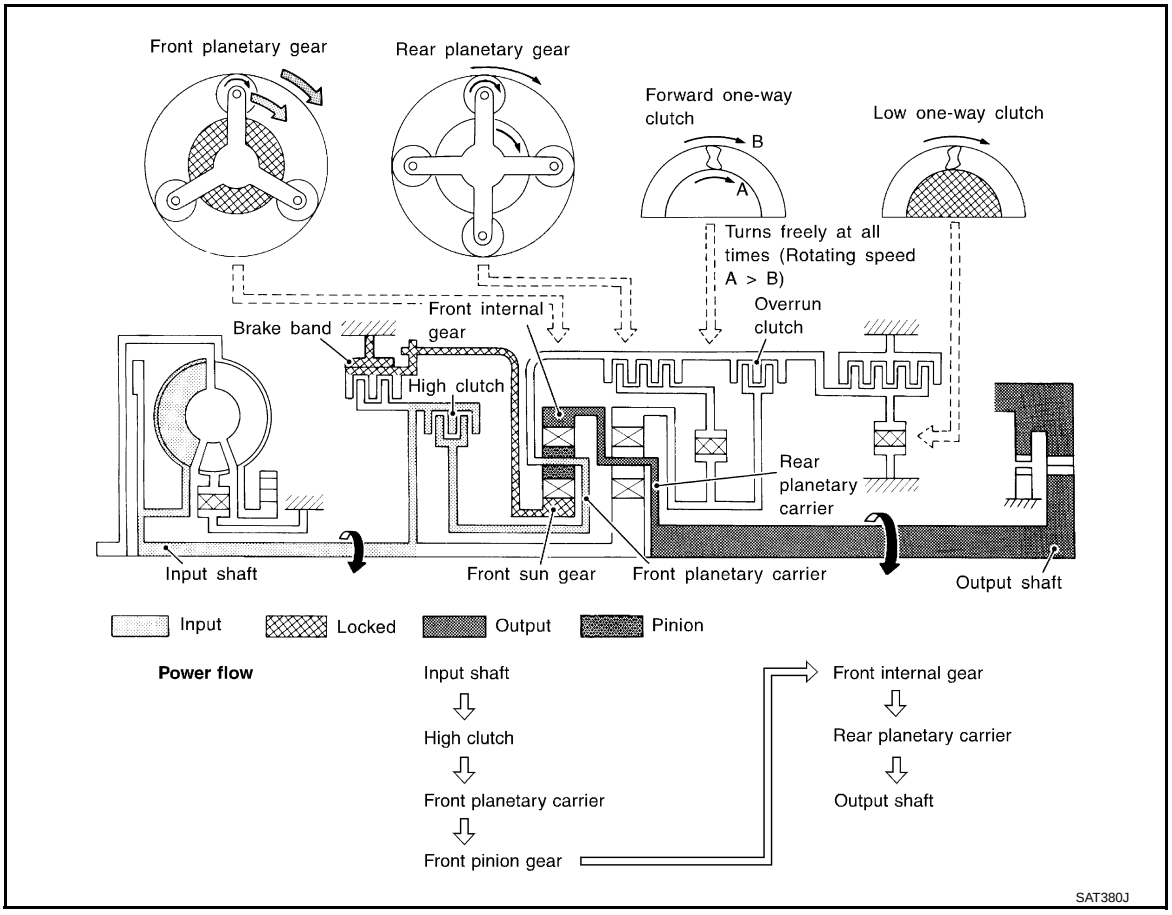
• **High clutch** • **Forward clutch** • **Forward one-way clutch**	Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch. This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.
Overrun clutch engagement conditions	D3: OD OFF (OD OFF indicator lamp is on) and throttle opening is less than specification* 23 and 13: Always engaged

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



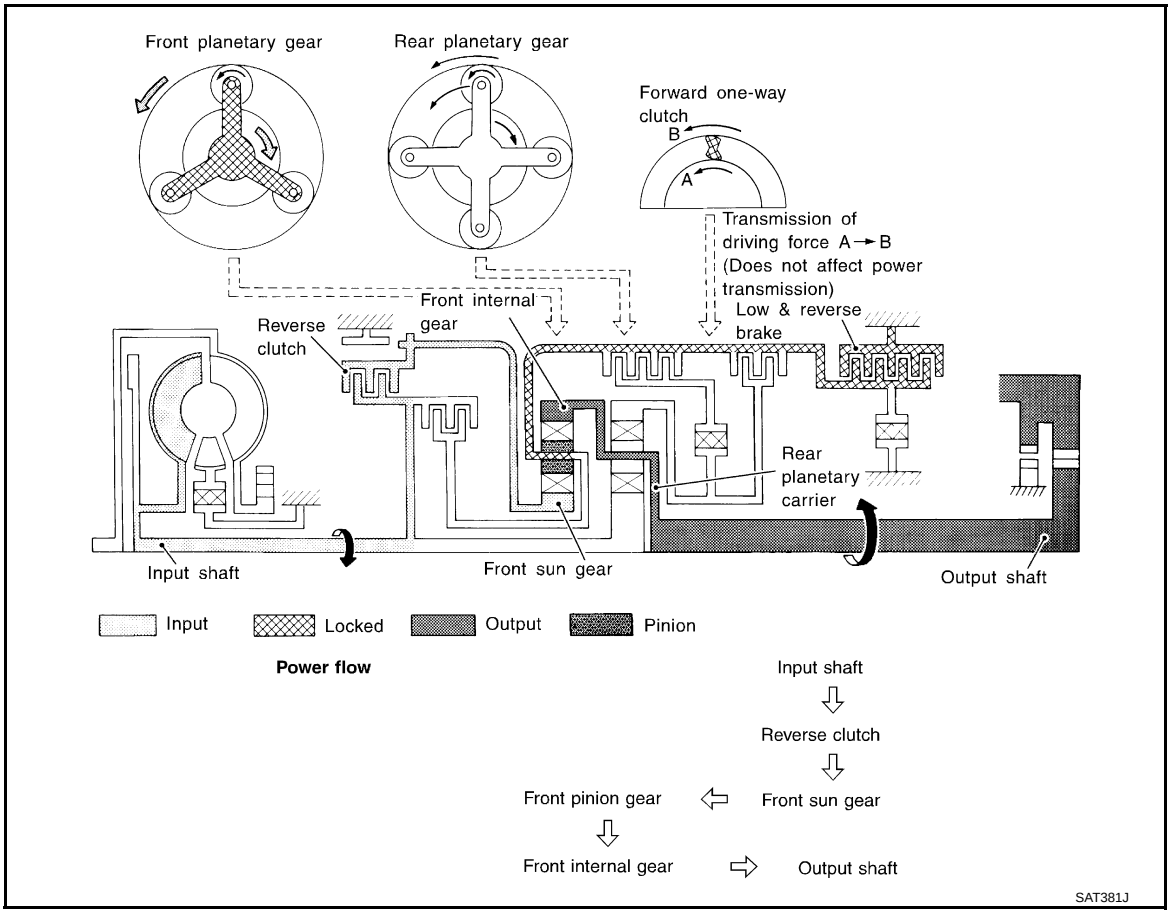
"D4" (OD) Position

• **High clutch** • **Brake band** • **Forward clutch** (Does not affect power transmission)	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.
Engine brake	At D4 position, there is no one-way clutch in the power transaxle line and engine brake can be obtained when decelerating.



"R" Position

• **Reverse clutch** • **Low & reverse brake**	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.
Engine brake	As there is no one-way clutch in the power transaxle line, engine brake can be obtained when decelerating.



TCM Function

INFOID:0000000001714311

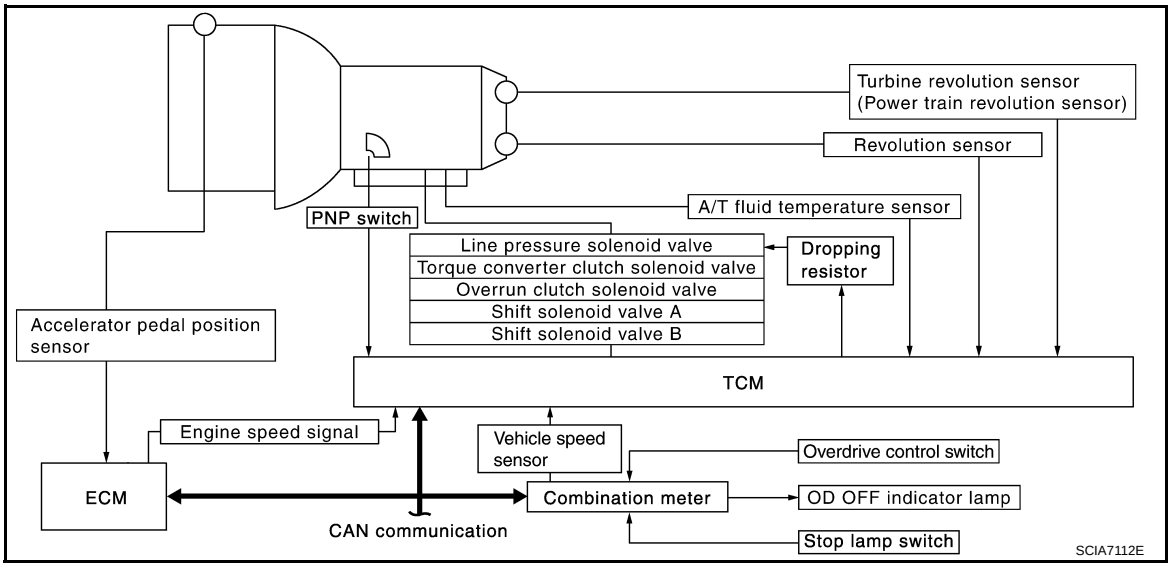
The function of the TCM is to:
- Receive input signals sent from various switches and sensors.
- Determine required line pressure, shifting point, lock-up operation, and engine brake operation.
- Send required output signals to the respective solenoids.

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-III 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



CAN Communication

INFOID:0000000001714312

SYSTEM DESCRIPTION

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-13, "System Description".

Input/Output Signal of TCM

INFOID:0000000001714313

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		(*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			(*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
	PNP switch	X	X	X	X	X	(*3) X	(*4) X
	Stop lamp switch signal(*5)		X		X	X		(*4) X
	A/T fluid temperature sensors	X	X		X			X
	Overdrive control switch signal(*5)		X		X	X		(*4) X
	TCM power supply voltage signal	X						X

Control item		Line pressure control	Vehicle speed control	Shift control	Lock-up control	Engine brake control	Fail-safe function	Self-diagnostics function
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.

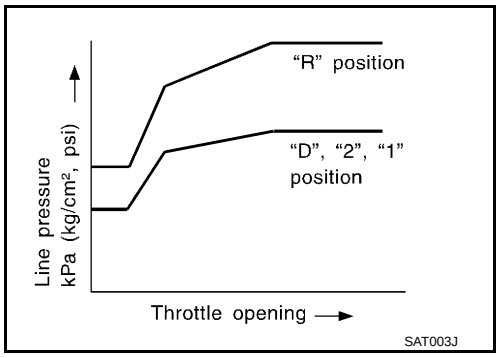
Line Pressure Control

INFOID:0000000001714314

- 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.

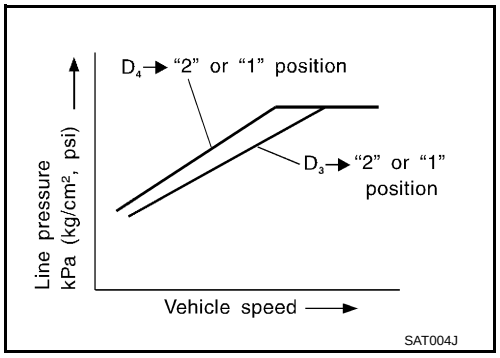
NORMAL CONTROL

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



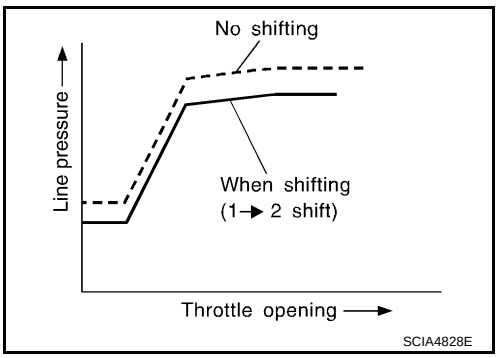
BACK-UP CONTROL (ENGINE BRAKE)

If the selector lever is shifted to "2" position while driving in D_4 or D_3, 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.



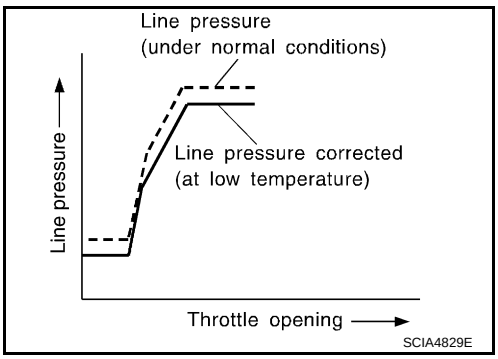
DURING SHIFT CHANGE

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.

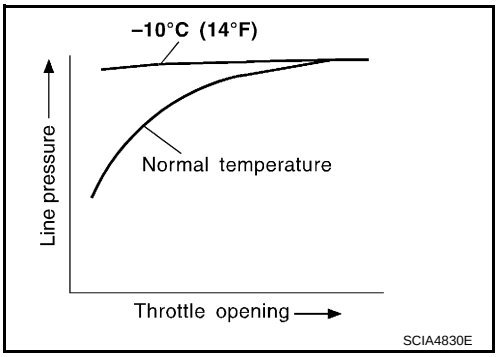


AT LOW FLUID TEMPERATURE

- 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

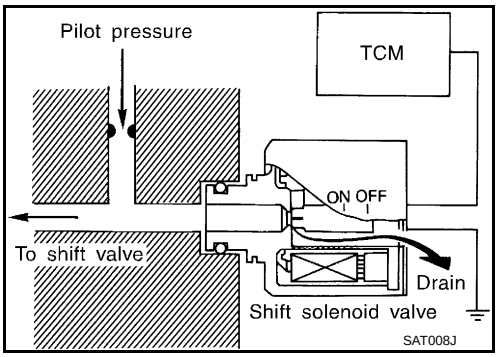
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The shift is regulated entirely by electronic control to accommodate vehicle speed and varying engine operations. This is accomplished by electrical signals transmitted by the revolution sensor and the ECM (accelerator pedal position sensor). This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

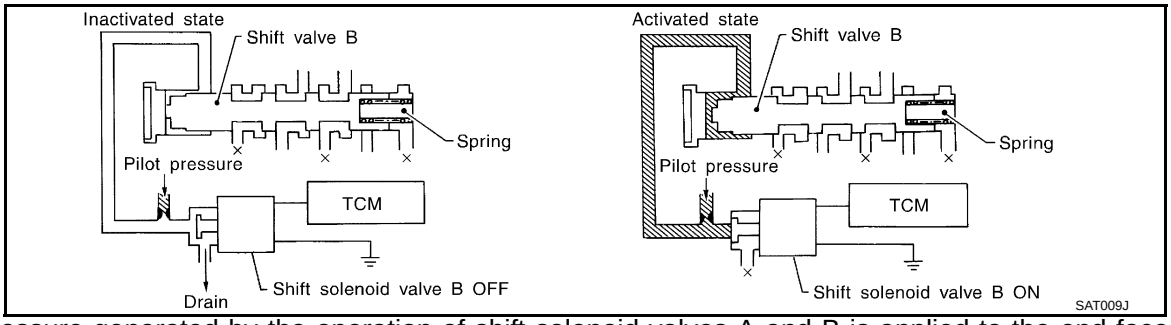
The shift solenoid valve performs simple ON-OFF operation. When set to “ON”, the drain circuit closes and pilot pressure is applied to the shift valve.



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)

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

INFOID:0000000001714316

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.

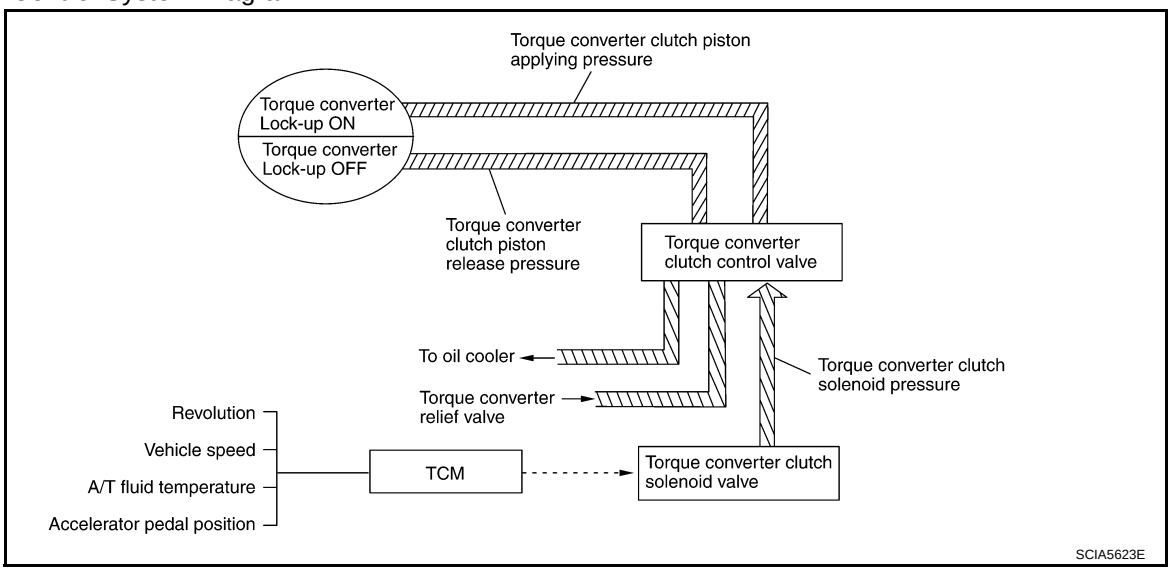
CONDITIONS FOR LOCK-UP OPERATION

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	D_4	D_3
Vehicle speed sensor	More than set value	
Throttle position sensor	Less than set opening	
Closed throttle position switch	OFF	
A/T fluid temperature sensor	More than 40°C (104°F)	

TORQUE CONVERTER CLUTCH SOLENOID VALVE CONTROL

Lock-up Control System Diagram



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.

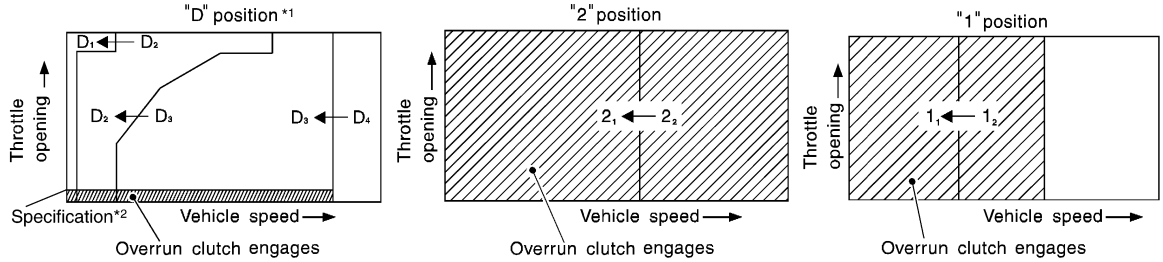
Engine Brake Control (Overrun Clutch Control)

INFOID:0000000001714317

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



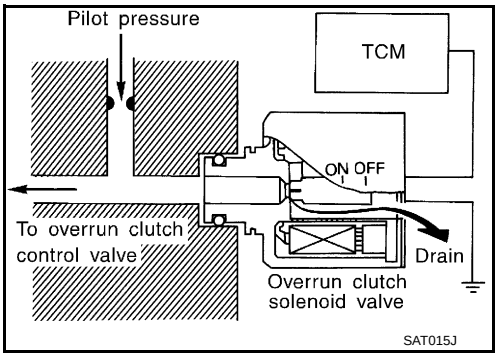
Selector lever position	Gear position	Throttle opening
"D" position *1	D_1,D_2,D_3 gear position	Less than specification *2
"2" position	2_1,2_2 gear position	At any position
"1" position	1_1,1_2 gear position	

*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.

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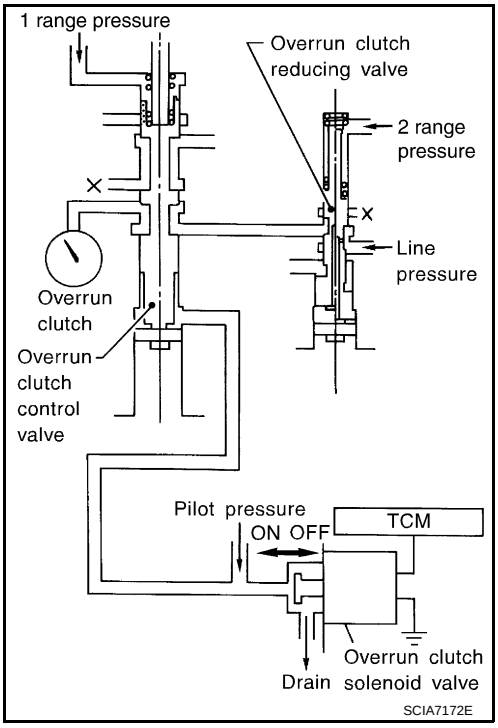
OVERRUN CLUTCH SOLENOID VALVE CONTROL

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.



Control Valve

INFOID:0000000001714318

FUNCTION OF CONTROL VALVES

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 D_4. (Interlocking occurs if the overrun clutch engages during D_4.)
1st reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when downshifting from the 1st position 1_2 to 1_1.
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.

Centrifugal Cancel Mechanism

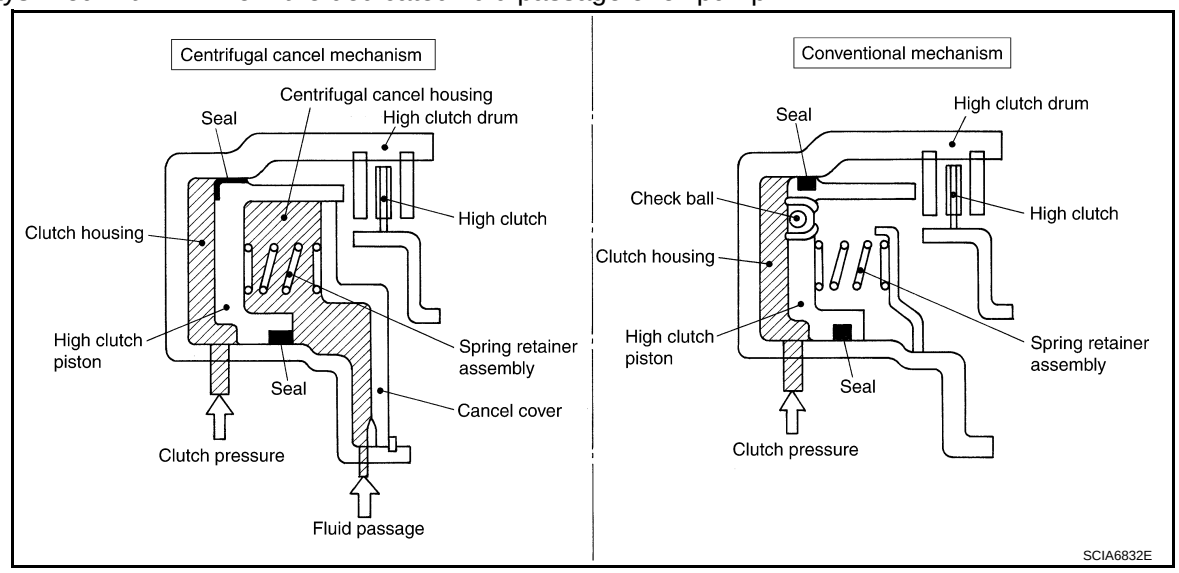
INFOID:0000000001714319

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.

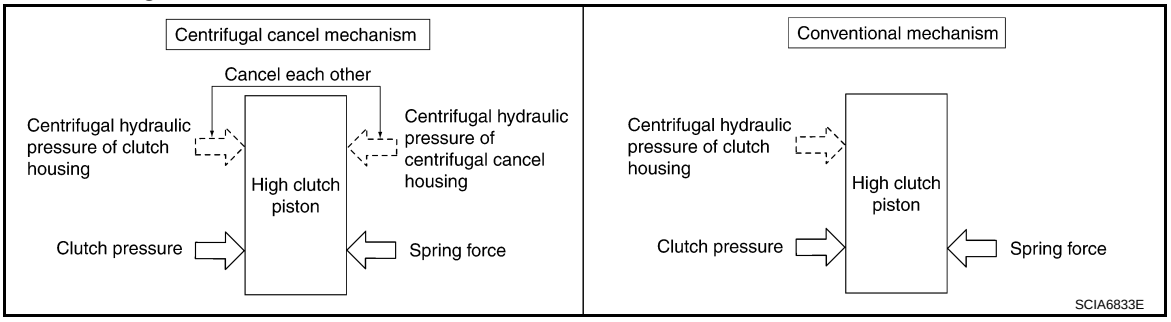


When Clutch Pressure Is Not Applied

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.

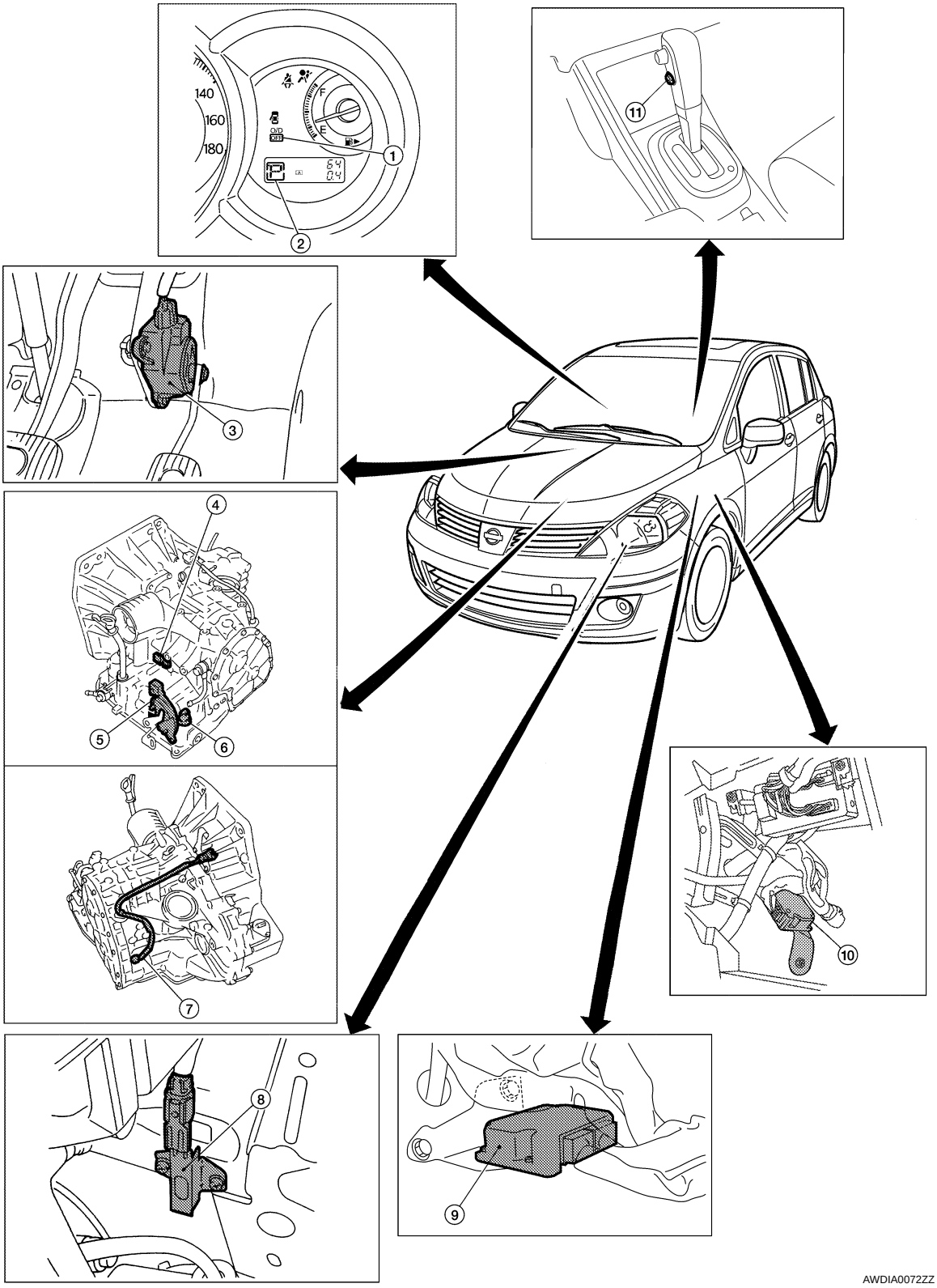
When Clutch Pressure Is Applied

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.



Component Parts Location

INFOID:0000000001714320



1. OD OFF indicator lamp
2. Shift position indicator
3. Accelerator pedal position (APP)
4. Turbine revolution sensor (Power train revolution sensor)
5. PNP switch
6. Terminal body (Terminal cord assembly connector)
7. Revolution sensor
8. Dropping resistor
9. TCM (LHD)
10. TCM (RHD)
11. Overdrive control switch

A/T SHIFT LOCK SYSTEM

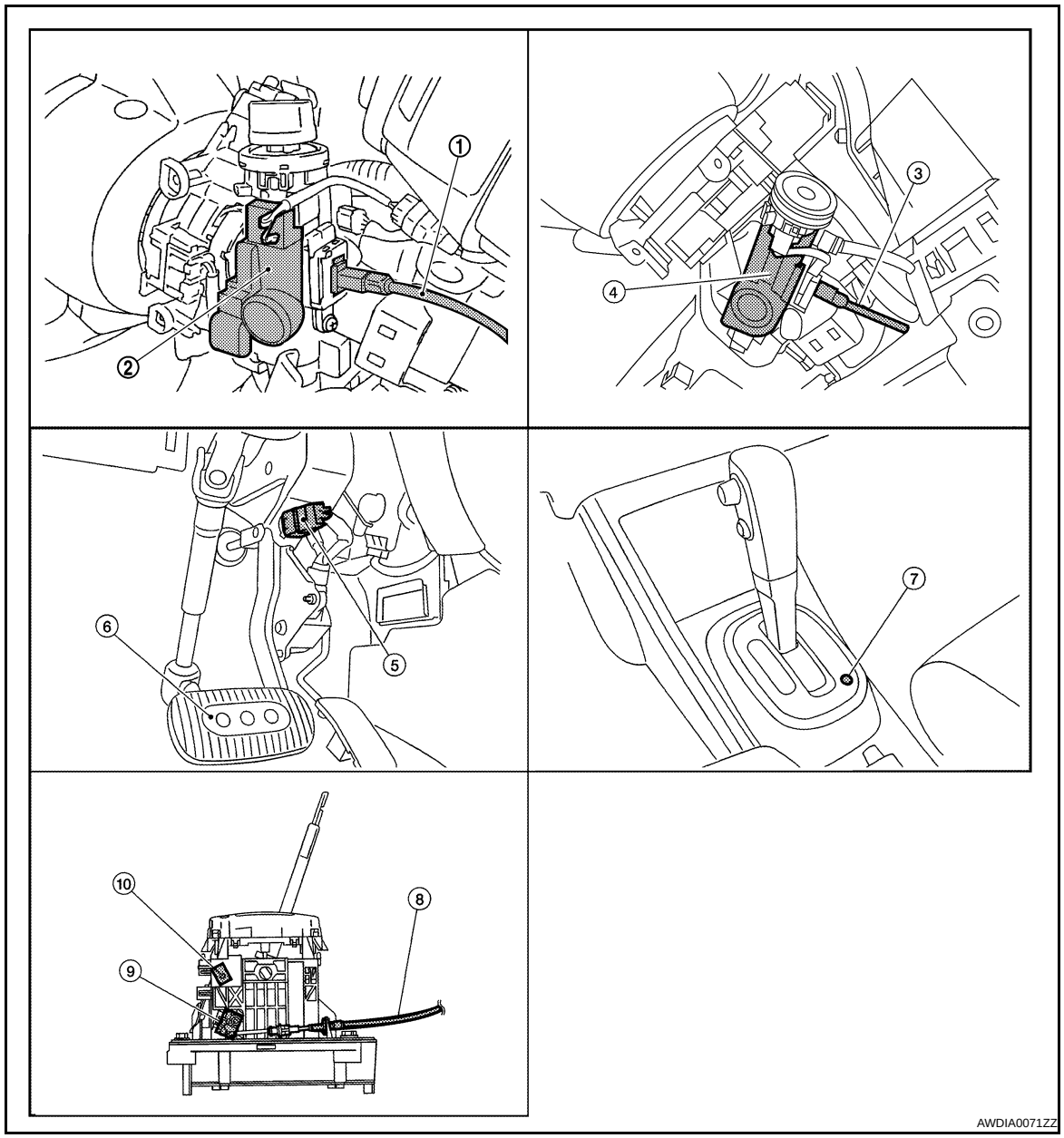
System Description

INFOID:0000000001714321

- 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.

Component Parts Location

INFOID:0000000001714322



1. Key interlock cable
2. Key cylinder
3. Brake pedal
4. Stop lamp switch
A. Park position switch
B. Shift lock solenoid
C. Shift lock release button

DIAGNOSIS SYSTEM (TCM)

CONSULT-III Function (TRANSMISSION)

INFOID:0000000001714329

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

TCM diagnostic mode	Description
WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the TCM for setting the status suitable for required operation, input/output signals are received from the TCM and received data is displayed.
SELF-DIAG RESULTS	Displays TCM self-diagnosis results.
DATA MONITOR	Displays TCM input/output data in real time.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
FUNCTION TEST	Conducted by CONSULT-III instead of a technician to determine whether each system is “OK” or “NG”.
ECU PART NUMBER	TCM part number can be read.

SELF-DIAGNOSTIC RESULT MODE

Operation Procedure

After performing TM-38, "Diagnosis Procedure without CONSULT-III", place check marks for results on the XX-XX, "*****". Reference pages are provided following the items.

Display Items List

Items (CONSULT-III screen terms)	Malfunction is detected when...	Reference page
VHCL SPEED SEN-A/T	• TCM does not receive the proper voltage signal from the sensor.	XX-XX, "*****"
VHCL SPEED SEN-MTR	• TCM does not receive the proper voltage signal from the sensor.	XX-XX, "*****"
SHIFT SOLENOID/V A	• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	XX-XX, "*****"
SHIFT SOLENOID/V B	• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	XX-XX, "*****"
OVERRUN CLUTCH S/V	• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	XX-XX, "*****"
T/C CLUTCH SOL/V	• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	XX-XX, "*****"
BATT/FLUID TEMP SEN	• TCM receives an excessively low or high voltage from the sensor.	XX-XX, "*****"
ENGINE SPEED SIG	• TCM does not receive the proper voltage signal from the ECM.	XX-XX, "*****"
TURBINE SENSOR	• TCM does not receive proper voltage signal from sensor.	XX-XX, "*****"
LINE PRESSURE S/V	• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	XX-XX, "*****"
CAN COMM CIRCUIT	• When malfunction is detected in CAN communication line.	XX-XX, "*****"
A/T 1ST GR FNCTN	• A/T cannot be shifted to the 1st gear position even if electrical circuit is good.	XX-XX, "*****"
A/T 2ND GR FNCTN	• A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	XX-XX, "*****"
A/T 3RD GR FNCTN	• A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.	XX-XX, "*****"
A/T 4TH GR FNCTN	• A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	XX-XX, "*****"
A/T TCC S/V FNCTN	• A/T cannot perform lock-up even if electrical circuit is good.	XX-XX, "*****"
CONTROL UNIT (RAM)	• TCM memory (RAM) is malfunctioning.	XX-XX, "*****"
CONTROL UNIT (ROM)	• TCM memory (ROM) is malfunctioning.	XX-XX, "*****"

Items (CONSULT-III screen terms)	Malfunction is detected when...	Reference page
INITIAL START	• This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen). Refer to XX-XX, "*****".	XX-XX, "*****"
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED)	• No failure has been detected.	—

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
GEAR	—	X	▼	Gear position recognized by the TCM updated after gear-shifting

Monitored item (Unit)	Monitor Item Selection			Remarks
	TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
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.
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)	—	—	▼	

Diagnosis Procedure without CONSULT-III

INFOID:0000000001714330

⊗ TCM SELF-DIAGNOSTIC PROCEDURE

Description

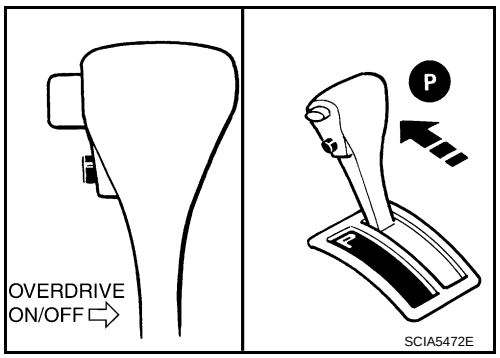
If a malfunction occurs in electrical system, turning ignition switch ON will illuminate OD OFF indicator lamp for 2 seconds. To detect a malfunction, entering a self-diagnosis start signal retrieves information on malfunctions from memory and indicates malfunction by blinking OD OFF indicator lamp.

Diagnostic Procedure

1. CHECK OD OFF INDICATOR LAMP

1. Park vehicle on flat surface.

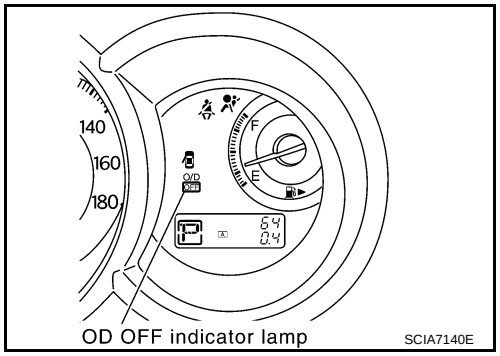
2. Move selector lever to “P” position.
3. Turn ignition switch OFF. Wait at least 5 seconds.



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 XX-XX, "*****" 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.

3. CHECK SELF-DIAGNOSIS CODE

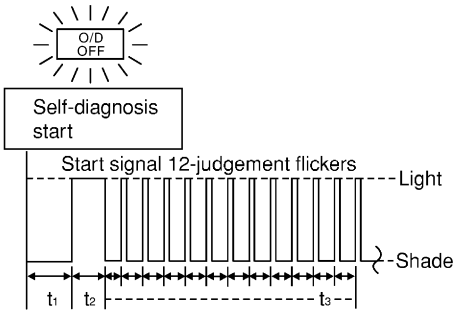
Check OD OFF indicator lamp. Refer to "Judgement of Self-diagnosis Code".

>> **DIAGNOSIS END**

Judgement of Self-diagnosis Code

OD OFF indicator lamp

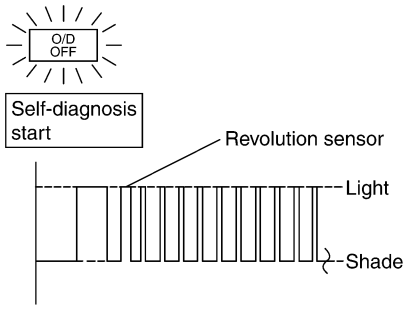
All judgement flickers are the same.



SCIA7161E

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

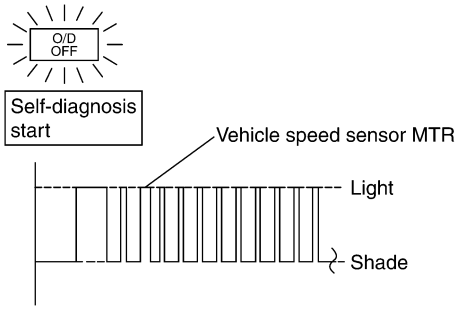
1st judgement flicker is longer than others.



SCIA5591E

Revolution sensor circuit is short-circuited or disconnected.
⇒ **Go to XX-XX, "*****".**

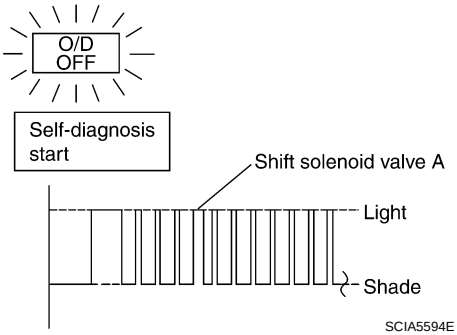
2nd judgement flicker is longer than others.



SCIA5592E

Vehicle speed sensor circuit is short-circuited or disconnected.
⇒ **Go to XX-XX, "*****".**

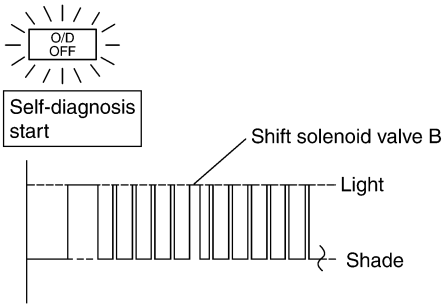
4th judgement flicker is longer than others.



SCIA5594E

Shift solenoid valve A circuit is short-circuited or disconnected.
⇒ **Go to XX-XX, "*****".**

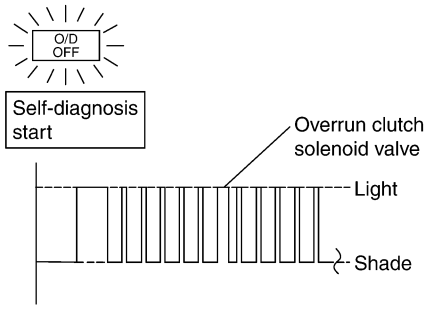
5th judgement flicker is longer than others.



SCIA5595E

Shift solenoid valve B circuit is short-circuited or disconnected.
⇒ **Go to XX-XX, "*****".**

6th judgement flicker is longer than others.

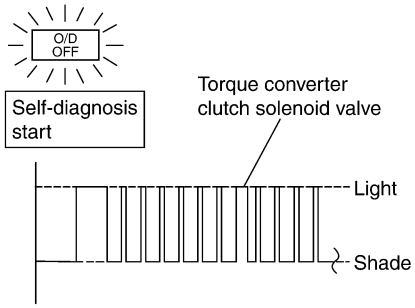


SCIA5596E

Overrun clutch solenoid valve circuit is short-circuited or disconnected.
⇒ **Go to XX-XX, "*****".**

OD OFF indicator lamp

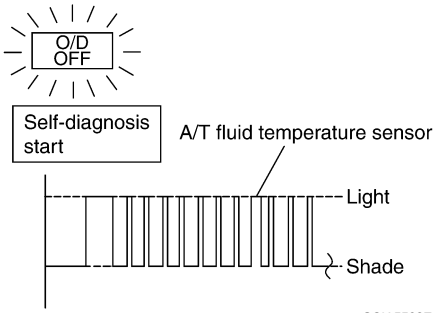
7th judgement flicker is longer than others.



SCIA5597E

Torque converter clutch solenoid valve circuit is short-circuited or disconnected.
⇒ **Go to XX-XX, "*****".**

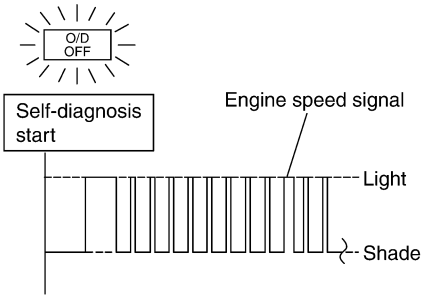
8th judgement flicker is longer than others.



SCIA5598E

A/T fluid temperature sensor is disconnected or TCM power supply circuit is damaged.
⇒ **Go to XX-XX, "*****".**

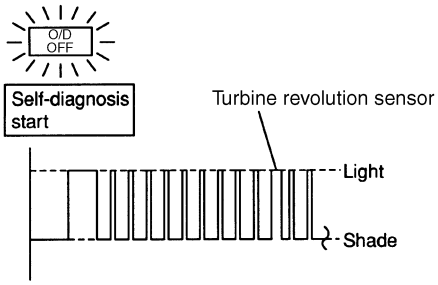
9th judgement flicker is longer than others.



SCIA5599E

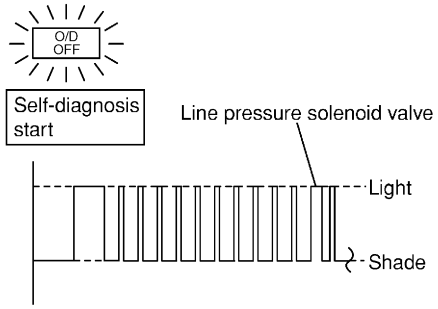
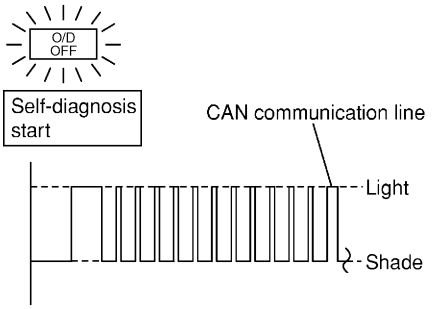
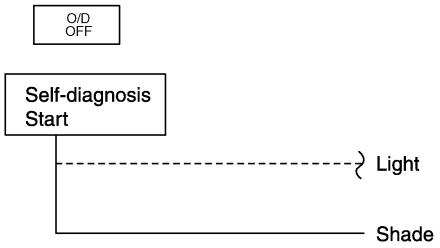
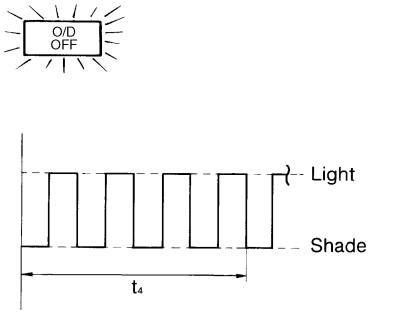
Engine speed signal circuit is short-circuited or disconnected.
⇒ **Go to XX-XX, "*****" .**

10th judgement flicker is longer than others.



SCIA7082E

Turbine revolution sensor (power train revolution sensor) circuit is short-circuited or disconnected.
⇒ **Go to XX-XX, "*****".**

OD OFF indicator lamp	
11th judgement flicker is longer than others.  SCIA7083E Line pressure solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to XX-XX, "*****".**	12th judgement flicker is longer than others.  SCIA7085E CAN communication line is damaged. ⇒ **Go to XX-XX, "*****".**
Lamp turns off.  SCIA4674E 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 XX-XX, "*****".**	Flickers as shown below.  SCIA4675E Battery power is low. Battery has been disconnected for a long time. Battery is connected reversely. (When reconnecting TCM connectors.—This is not a malfunction.) ⇒ **Go to XX-XX, "*****".**

t_1 = 2.5 seconds t_2 = 2.0 seconds t_3 = 1.0 second t_4 = 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 "Diagnostic Procedure Without CONSULT-III".
3. Turn ignition switch OFF. (The self-diagnostic results will be erased.)

COMPONENT DIAGNOSIS

VEHICLE SPEED SENSOR - A/T (REVOLUTION SENSOR)

Description

INFOID:0000000001712982

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-III Reference Value in Data Monitor Mode

INFOID:0000000001712983

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

INFOID:0000000001712984

Diagnostic trouble code “VHCL SPEED SEN-A/T” with CONSULT-III or 1st judgement flicker without CONSULT-III is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

INFOID:0000000001712985

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

DTC Confirmation Procedure

INFOID:0000000001712986

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-III

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
2. Touch “START”.
3. Drive vehicle and check for an increase of “VHCL/S SE-A/T” value.
   If the check result is NG, go to TM-356, "Diagnosis Procedure".
   If the check result is OK, go to following step.
4. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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 TM-356, "Diagnosis 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.

WITHOUT CONSULT-III

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 TM-38, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-356, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001712988

1. CHECK INPUT SIGNAL

With CONSULT-III

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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.

2. CHECK REVOLUTION SENSOR

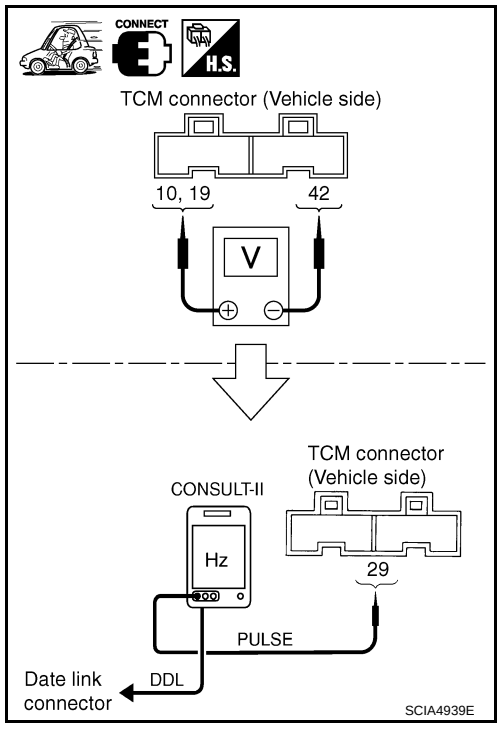
1. Start engine.
2. Check power supply to revolution sensor by voltage between TCM connector terminals.

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-III 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

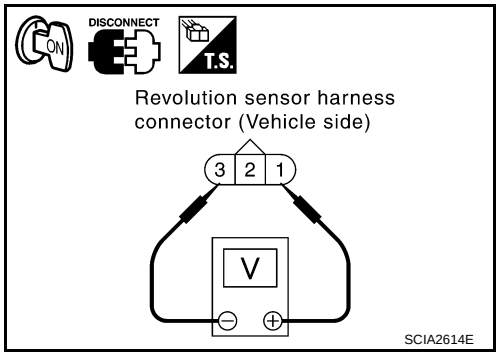
OK >> GO TO 8.
NG >> GO TO 3.

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.)

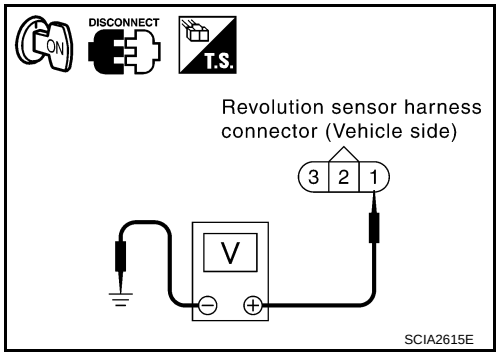
4. Check voltage between revolution sensor harness connector terminals.

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.

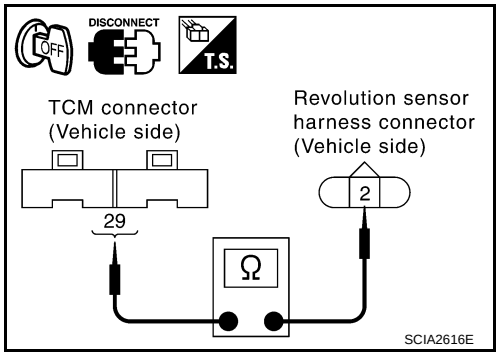
OK or NG

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 signals. Refer to TM-422, "Reference Value".
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

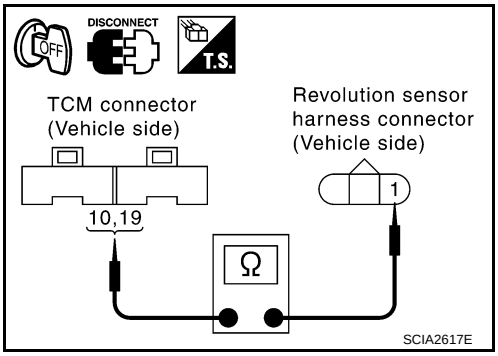
OK >> GO TO 8.
NG >> Repair or replace damaged parts.

6. CHECK HARNESS BETWEEN TCM AND 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.

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.

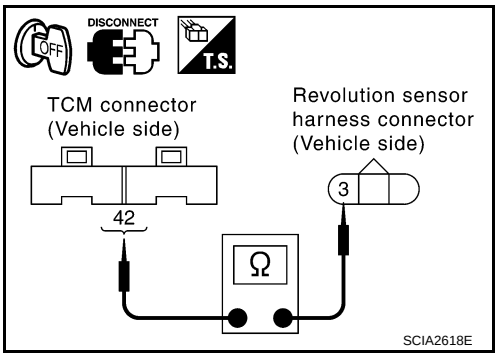
OK or NG

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 TM-355, "DTC Confirmation Procedure".

OK or NG

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

VEHICLE SPEED SENSOR MTR

Description

INFOID:0000000001712989

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-III Reference Value in Data Monitor Mode

INFOID:0000000001712990

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

INFOID:0000000001712991

Diagnostic trouble code “VHCL SPEED SEN-MTR” with CONSULT-III or 2nd judgement flicker without CONSULT-III is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

INFOID:0000000001712992

- Harness or connector
  (Sensor circuit is open or shorted.)
- Vehicle speed sensor

DTC Confirmation Procedure

INFOID:0000000001712993

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-III

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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 TM-359, "Diagnosis Procedure".

WITHOUT CONSULT-III

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 TM-38, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-359, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001712995

1.CHECK INPUT SIGNAL

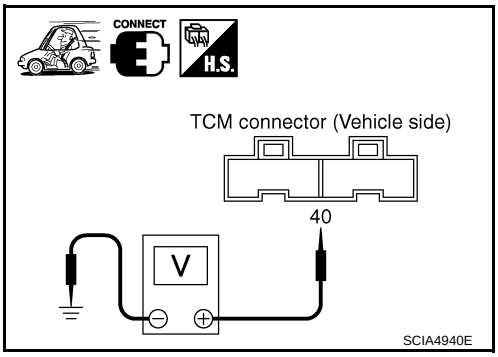
With CONSULT-III

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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.

Without CONSULT-III

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 0V and more than 4.5V

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEM

Check the following items:

- Combination meter. Refer to MWI-4, "METER SYSTEM : System Description".
- 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 TM-359, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 4.

4. CHECK TCM

1. Check TCM input/output signals. Refer to TM-422, "Reference Value".
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.

SHIFT SOLENOID VALVE A

Description

INFOID:0000000001713002

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-III Reference Value in Data Monitor Mode

INFOID:0000000001713003

Remarks: Specification data are reference values.

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

INFOID:0000000001713004

Diagnostic trouble code “SHIFT SOLENOID/V A” with CONSULT-III or 4th judgement flicker without CONSULT-III is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

INFOID:0000000001713005

- Harness or connector
  (Solenoid circuit is open or shorted.)
- Shift solenoid valve A

DTC Confirmation Procedure

INFOID:0000000001713006

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-III

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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 TM-361, "Diagnosis Procedure".

WITHOUT CONSULT-III

1. Start engine.
2. Drive vehicle in D1→ D2 position.
3. Perform self-diagnosis. Refer to TM-38, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-361, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001713008

1.CHECK INPUT SIGNAL

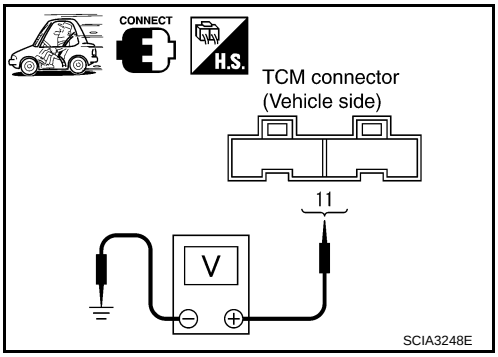
With CONSULT-III

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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 "D_1" or "D_4".)	ON
	When shift solenoid valve A does not operate. (When driving in "D_2" or "D_3".)	OFF

Without CONSULT-III

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



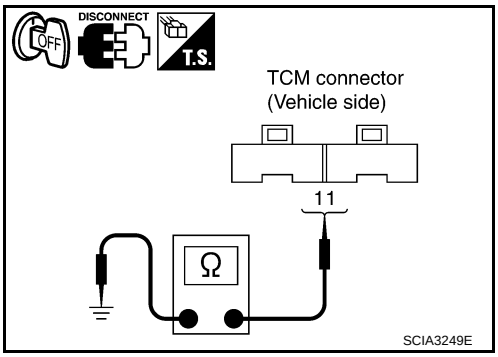
Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Shift solenoid valve A	E31	11 - Ground	When shift solenoid valve A operates. (When driving in "D_1" or "D_4".)	Battery voltage
			When shift solenoid valve A does not operate. (When driving in "D_2" or "D_3".)	0V

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.



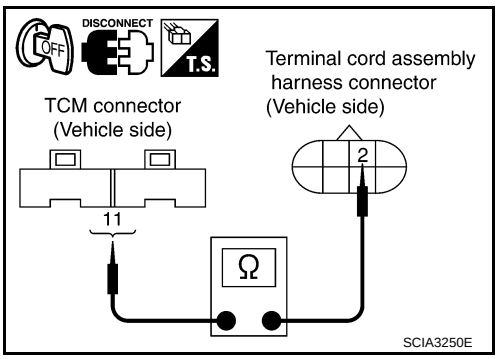
Solenoid Valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve A	E31	11 - Ground	20 - 30 Ω

OK or NG

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

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	

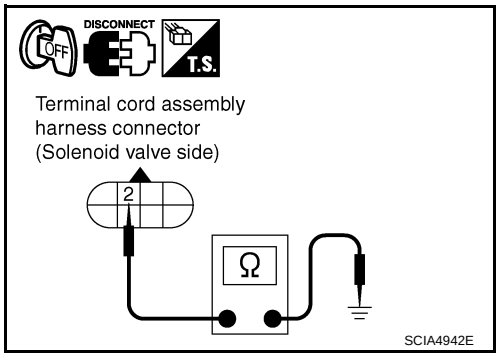
4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

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 TM-361, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6.CHECK TCM

1. Check TCM input/output signals. Refer to XX-XX, "*****".
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

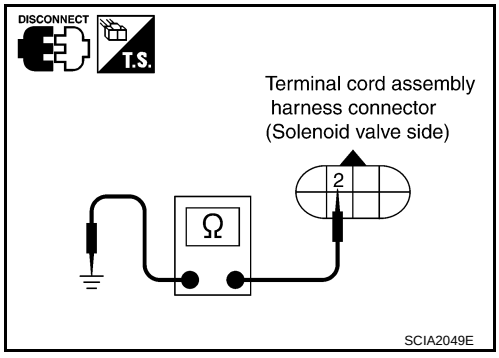
INFOID:0000000001713009

SHIFT SOLENOID VALVE A

- For removal, refer to XX-XX, "*****".

Resistance Check

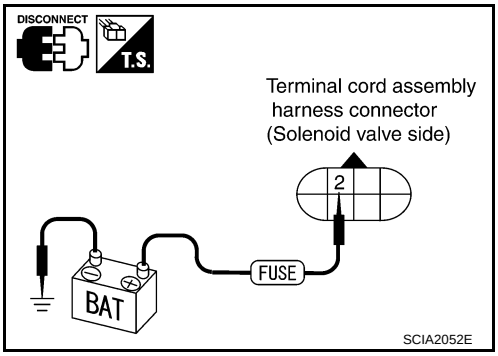
- Check resistance between terminal and ground.



Solenoid valve	Terminal		Resistance (Approx.)
Shift solenoid valve A	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.



SHIFT SOLENOID VALVE B

Description

INFOID:0000000001713010

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-III Reference Value in Data Monitor Mode

INFOID:0000000001713011

Remarks: Specification data are reference values.

Item name	Condition	Display value
SHIFT S/V B	When shift solenoid valve B operates. (When driving in “D_1” or “D_2”.)	ON
	When shift solenoid valve B does not operate. (When driving in “D_3” or “D_4”.)	OFF

On Board Diagnosis Logic

INFOID:0000000001713012

Diagnostic trouble code “SHIFT SOLENOID/V B” with CONSULT-III or 5th judgement flicker without CONSULT-III is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

INFOID:0000000001713013

- Harness or connector
  (Solenoid circuit is open or shorted.)
- Shift solenoid valve B

DTC Confirmation Procedure

INFOID:0000000001713014

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.**

WITH CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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 TM-365, "Diagnosis Procedure".

WITHOUT CONSULT-III

1. Start engine.
2. Drive vehicle in D_1→ D_2→ D_3 position.
3. Perform self-diagnosis.
   Refer to TM-38, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-365, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001713016

1.CHECK INPUT SIGNAL

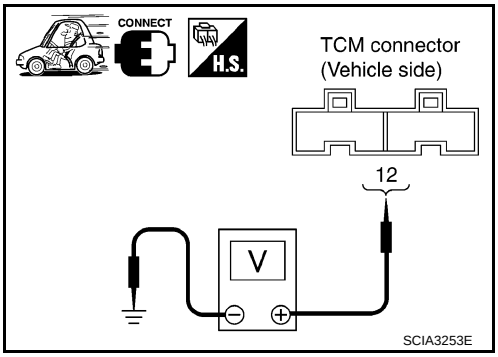
With CONSULT-III

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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

Without CONSULT-III

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



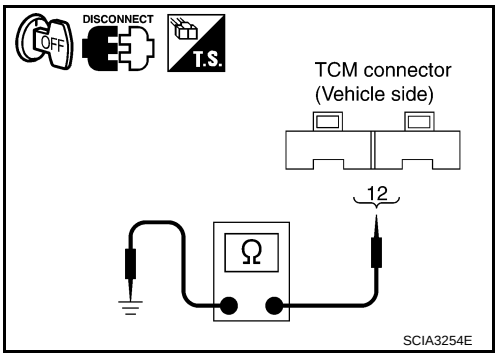
Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Shift solenoid valve B	E31	12 - Ground	When shift solenoid valve B operates. (When driving in "D1" or "D2".)	Battery voltage
			When shift solenoid valve B does not operate. (When driving in "D3" or "D4".)	0V

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.



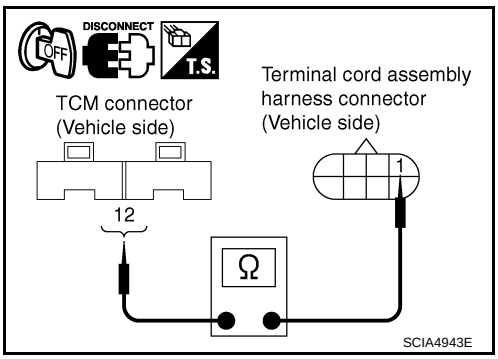
Solenoid Valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve B	E31	12 - Ground	5 - 20 Ω

OK or NG

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

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	E101	12	Yes
Terminal cord assembly harness connector	F30	1	

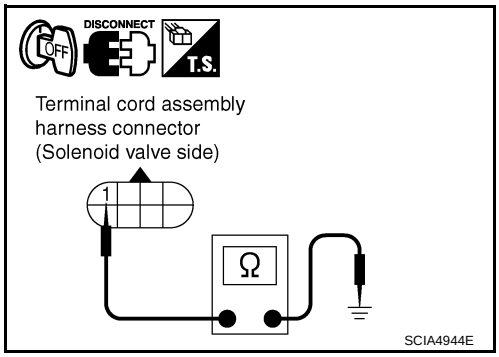
4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

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 TM-365, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signals. Refer to XX-XX, "*****".
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

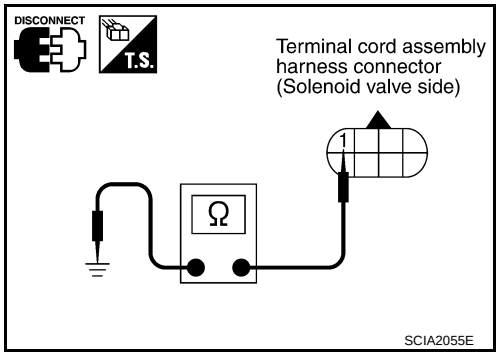
INFOID:0000000001713017

SHIFT SOLENOID VALVE B

- For removal, refer to XX-XX, "*****".

Resistance Check

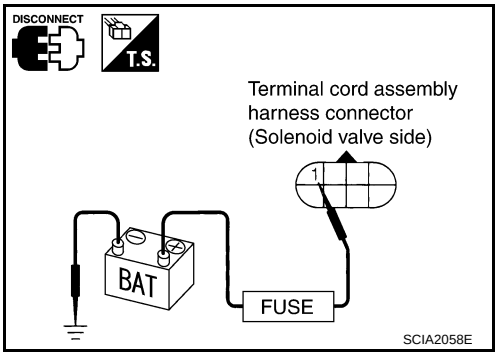
- Check resistance between terminal and ground.



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

Operation Check

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



OVERRUN CLUTCH SOLENOID VALVE

Description

INFOID:0000000001713018

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-III Reference Value in Data Monitor Mode

INFOID:0000000001713019

Remarks: Specification data are reference values.

Item name	Condition	Display value
OVERRUN/C S/V	When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to XX-XX, "*****".)	ON
	When overrun clutch solenoid valve does not operate. (When overrun clutch engaged. Refer to XX-XX, "*****".)	OFF

On Board Diagnosis Logic

INFOID:0000000001713020

Diagnostic trouble code “OVERRUN CLUTCH S/V” with CONSULT-III or 6th judgement flicker without CONSULT-III is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

INFOID:0000000001713021

- Harness or connector
  (Solenoid circuit is open or shorted.)
- Overrun clutch solenoid valve

DTC Confirmation Procedure

INFOID:0000000001713022

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-III

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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 TM-369, "Diagnosis Procedure".

WITHOUT CONSULT-III

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 TM-38, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-369, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001713024

1.CHECK INPUT SIGNAL

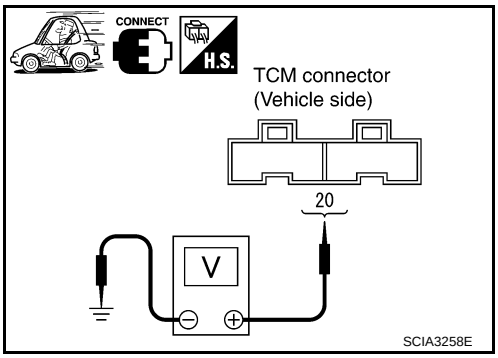
With CONSULT-III

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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 XX-XX, "*****".)	ON
	When overrun clutch solenoid valve dose not operate. (When overrun clutch engaged. Refer to XX-XX, "*****".)	OFF

Without CONSULT-III

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



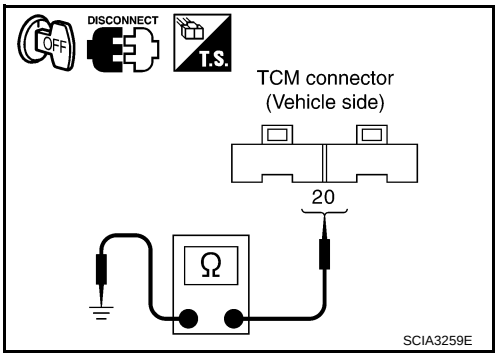
Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Overrun clutch solenoid valve	E31	20 - Ground	When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to XX-XX, "*****".)	Battery voltage
			When overrun clutch solenoid valve dose not operate. (When overrun clutch engaged. Refer to XX-XX, "*****".)	0V

OK or NG

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

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

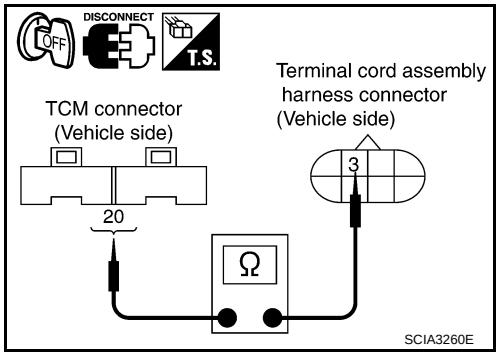
OK or NG

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	E101	20	Yes
Terminal cord assembly harness connector	F30	3	

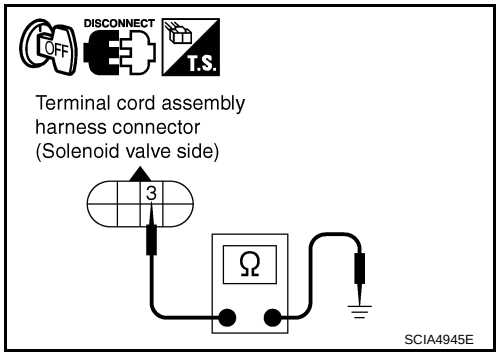
4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

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 TM-369, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signals. Refer to XX-XX, "*****".
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

INFOID:0000000001713025

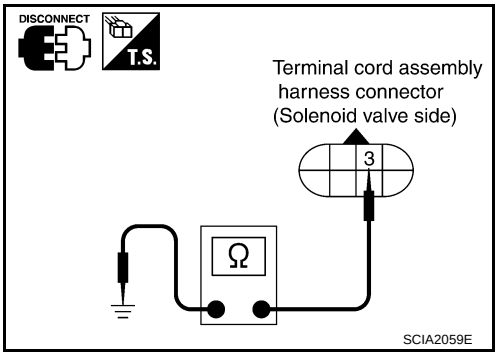
OVERRUN CLUTCH SOLENOID VALVE

- For removal, refer to XX-XX, "*****".

Resistance Check

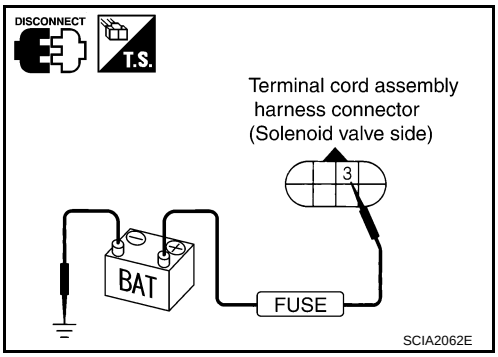
• Check resistance between terminal and ground.

Solenoid valve	Terminal		Resistance (Approx.)
Overrun clutch solenoid valve	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.



TORQUE CONVERTER CLUTCH SOLENOID VALVE

Description

INFOID:0000000001713026

- 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-III Reference Value in Data Monitor Mode

INFOID:0000000001713027

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

INFOID:0000000001713028

Diagnostic trouble code “T/C CLUTCH SOL/V” with CONSULT-III or 7th judgement flicker without CONSULT-III is detected when TCM detects an improper voltage drop while it tries to operate the solenoid valve.

Possible Cause

INFOID:0000000001713029

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

DTC Confirmation Procedure

INFOID:0000000001713030

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-III

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III 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 TM-373, "Diagnosis Procedure".

WITHOUT CONSULT-III

1. Start engine.
2. Drive vehicle in D1→ D2→ D3→ D4→ D4 lock-up position.
3. Perform self-diagnosis. Refer to TM-350, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-373, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001713032

1.CHECK INPUT SIGNAL

With CONSULT-III

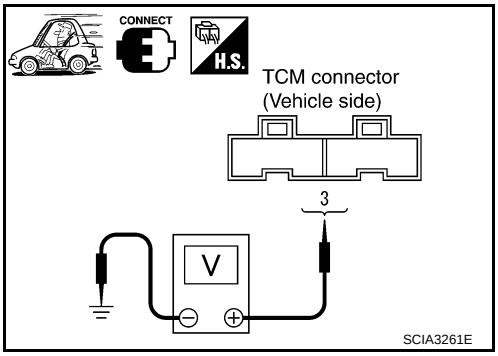
1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.

3. Read out the value of “TCC S/V DUTY” while driving. Check the value changes according to driving speed.

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

Without CONSULT-III

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



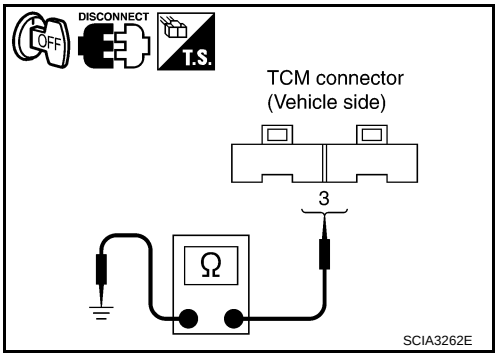
Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Torque converter clutch solenoid valve	E31	3 - Ground	When A/T performs lock-up.	8 - 15V
			When A/T does not perform lock-up.	0V

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.



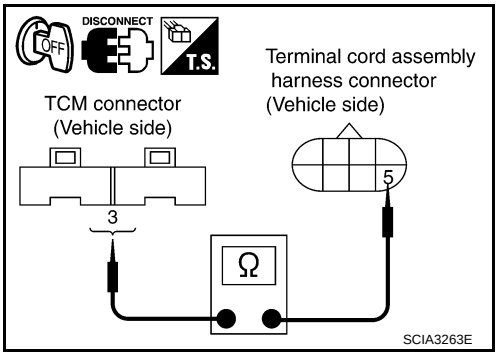
Solenoid Valve	Connector	Terminal	Resistance (Approx.)
Torque converter clutch solenoid valve	E31	3 - Ground	5 - 20 Ω

OK or NG

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

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	

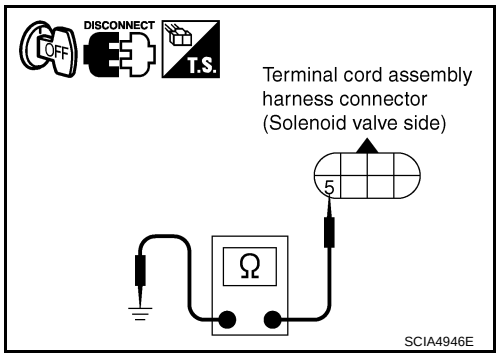
4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

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 TM-373, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6.CHECK TCM

1. Check TCM input/output signals. Refer to XX-XX, "*****".
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

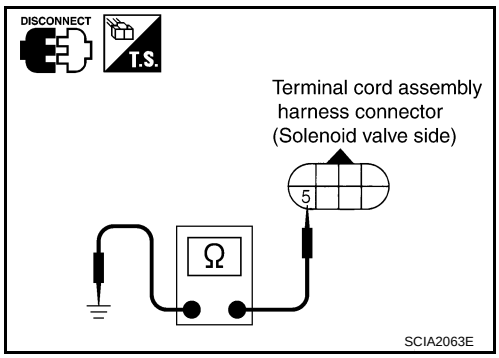
INFOID:0000000001713033

TORQUE CONVERTER CLUTCH SOLENOID VALVE

- For removal, refer to XX-XX, "*****".

Resistance Check

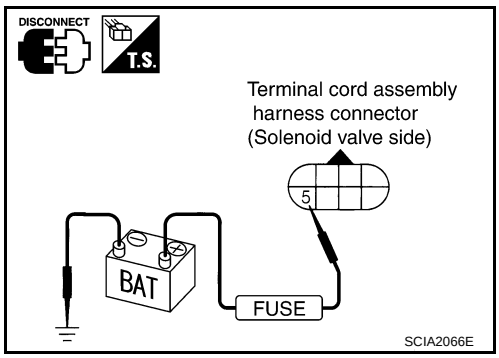
- Check resistance between terminal and ground.



Solenoid valve	Terminal		Resistance (Approx.)
Torque converter clutch solenoid valve	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.



BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

Description

INFOID:0000000001713034

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

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000001713035

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).	1.5V
	When A/T fluid temperature is 80°C (176°F).	0.5V

On Board Diagnosis Logic

INFOID:0000000001713036

Diagnostic trouble code “BATT/FLUID TEMP SEN” with CONSULT-III or 8th judgement flicker without CONSULT-III is detected when TCM receives an excessively low or high voltage from the sensor.

Possible Cause

INFOID:0000000001713037

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

DTC Confirmation Procedure

INFOID:0000000001713038

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-III

1. Start engine.
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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 TM-376, "Diagnosis Procedure".

WITHOUT CONSULT-III

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 TM-350, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-376, "Diagnosis Procedure".

Diagnosis Procedure

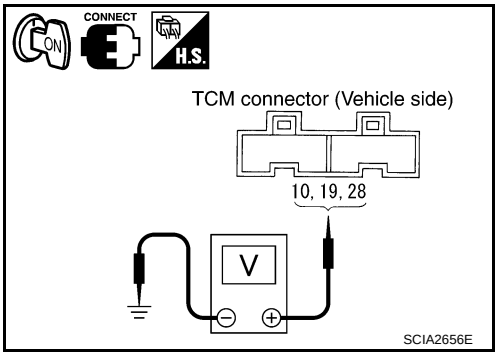
INFOID:0000000001713040

1.CHECK TCM POWER SOURCE

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

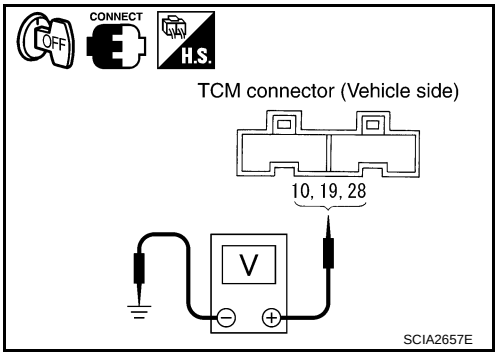
2. Check voltage between TCM connector terminal and ground.

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 terminal and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
Power supply	E31	10	0V
		19	0V
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.

OK or NG

OK >> GO TO 9.
NG >> Repair or replace damaged parts.

3. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR

With CONSULT-III

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Read out the value of “FLUID TEMP SE”.

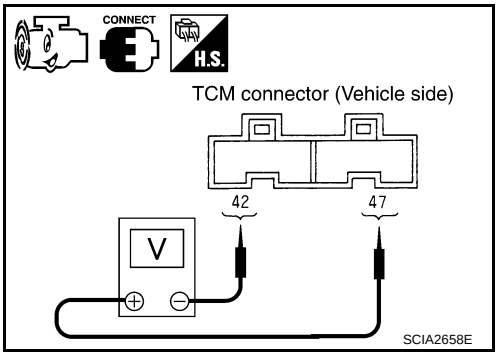
Item name	Condition	Display value (Approx.)
FLUID TEMP SE	When A/T fluid temperature is 20°C (68°F).	1.5V
	When A/T fluid temperature is 80°C (176°F).	0.5V

Without CONSULT-III

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).	1.5V
			When A/T fluid temperature is 80°C (176°F).	0.5V



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.

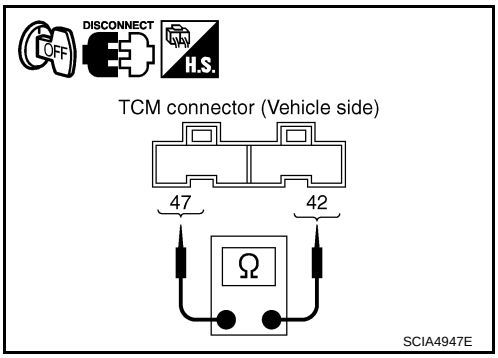
OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. 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



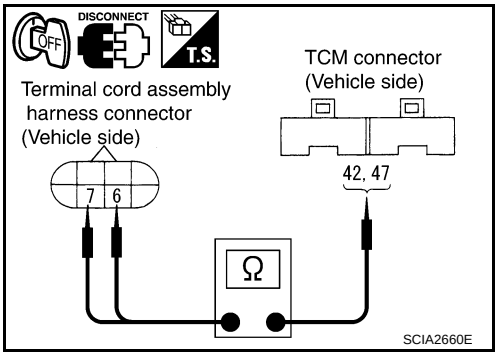
OK or NG

OK >> GO TO 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 terminals and TCM connector terminals.

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	



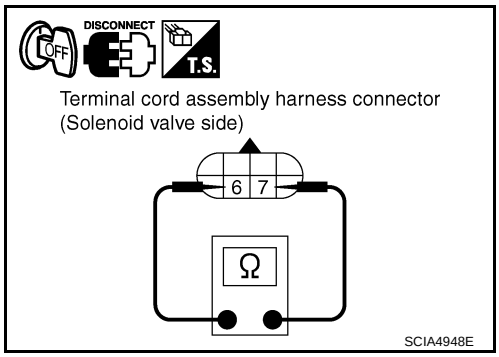
4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

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 harness connector terminals.



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

4. Reinstall any part removed.

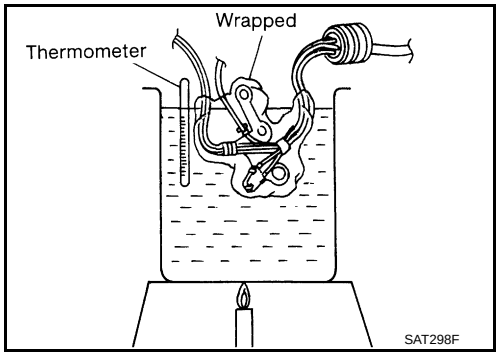
OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

8. DETECT MALFUNCTIONING ITEM

1. Remove oil pan. Refer to XX-XX, "*****".
2. Check the following items:

- A/T fluid temperature sensor
- Check resistance between terminal cord assembly harness connector terminals while changing temperature as shown.



Temperature [°C (°F)]	Resistance (Approx.)
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 TM-376, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 10.

10. CHECK TCM

1. Check TCM input/output signal. Refer to XX-XX, "*****".
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.

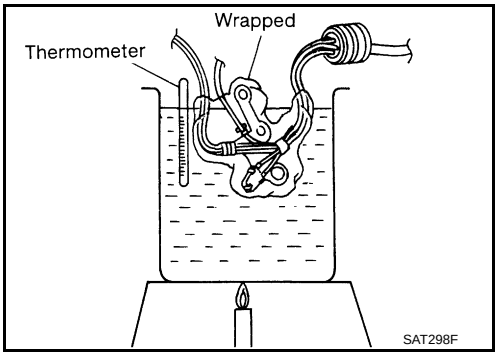
Component Inspection

INFOID:0000000001713041

A/T FLUID TEMPERATURE SENSOR

- For removal, refer to XX-XX, "*****".
- Check resistance between terminal cord assembly harness connector terminals while changing temperature as shown.

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



ENGINE SPEED SIGNAL

Description

INFOID:0000000001713042

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

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000001713043

Remarks: Specification data are reference values.

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

On Board Diagnosis Logic

INFOID:0000000001713044

Diagnostic trouble code “ENGINE SPEED SIG” with CONSULT-III or 9th judgement flicker without CONSULT-III is detected when TCM does not receive the proper voltage signal from ECM.

Possible Cause

INFOID:0000000001713045

Harness or connector
(Circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000001713046

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-III

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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 POSI: More than 1.0/8
   SLCT LVR POSI: “D” position
4. If the check result is NG, go to TM-381, "Diagnosis Procedure".

WITHOUT CONSULT-III

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 TM-350, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-381, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001713048

1.CHECK DTC WITH ECM

Check DTC with CONSULT-III “ENGINE”.
Turn ignition switch ON and select “SELF-DIAGNOSTIC RESULTS” mode for “ENGINE” with CONSULT-III.
Refer to XX-XX, "*****".

OK or NG

OK >> GO TO 2.
NG >> Check ignition signal circuit for engine control. Refer to XX-XX, "*****".

2.CHECK INPUT SIGNAL

With CONSULT-III

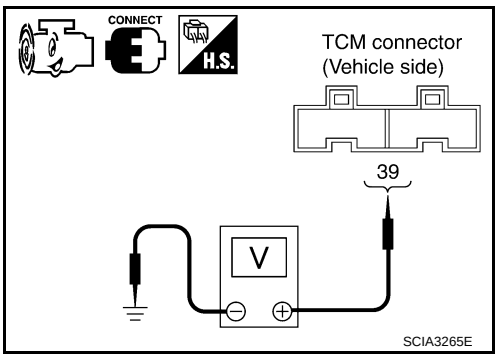
1. Start engine.

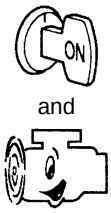
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-II.
3. Read out the value of “ENGINE SPEED”. Check engine speed changes according to throttle position.

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

Without CONSULT-III

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



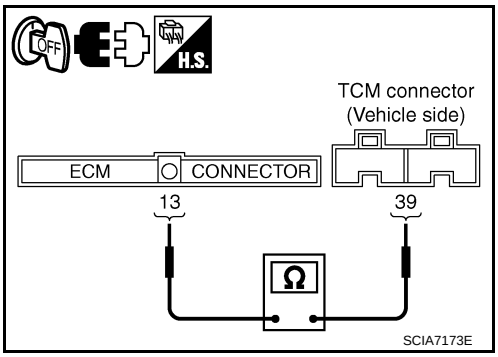
Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Engine speed signal	E32	39 - Ground		Refer to XX-XX, "*****".

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

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 TM-381, "DTC Confirmation Procedure".

OK or NG

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

5. CHECK TCM

1. Check TCM input/output signal. Refer to XX-XX, "*****".
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.

TURBINE REVOLUTION SENSOR

Description

INFOID:0000000001713049

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-III Reference Value in Data Monitor Mode

INFOID:0000000001713050

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

INFOID:0000000001713051

Diagnostic trouble code “TURBINE SENSOR” with CONSULT-III or 10st judgement flicker without CONSULT-III is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

INFOID:0000000001713052

- Harness or connector
  (Sensor circuit is open or shorted.)
- Turbine revolution sensor (power train revolution sensor)

DTC Confirmation Procedure

INFOID:0000000001713053

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-III

1. Start engine.
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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 TM-383, "Diagnosis Procedure".

WITHOUT CONSULT-III

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 TM-350, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-383, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001713055

1.CHECK INPUT SIGNAL

With CONSULT-III

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.

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.

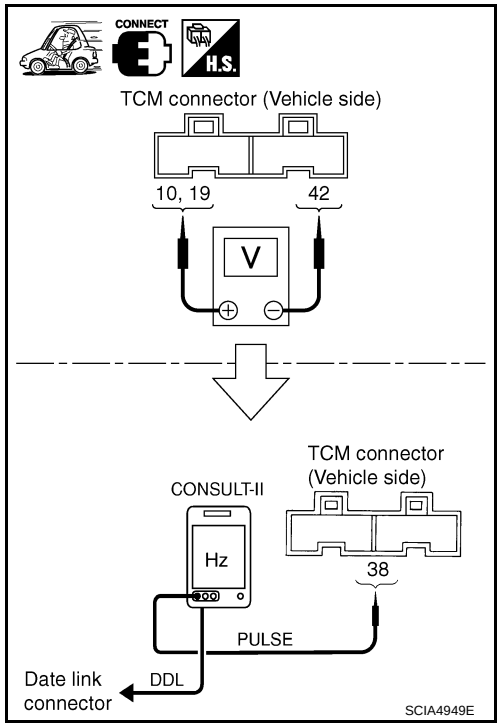
OK or NG

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

2. CHECK TURBINE REVOLUTION SENSOR

1. Start engine.
2. Check power supply to turbine revolution sensor (power train revolution sensor) by voltage between TCM connector terminals.

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

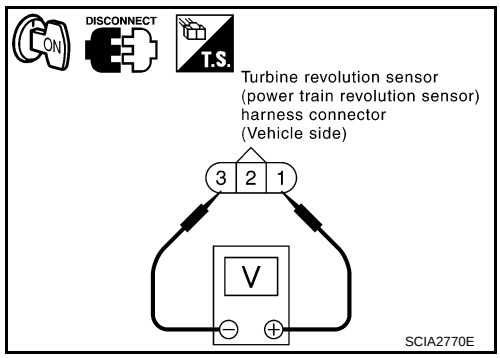
OK or NG

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

3. CHECK POWER AND SENSOR GROUND

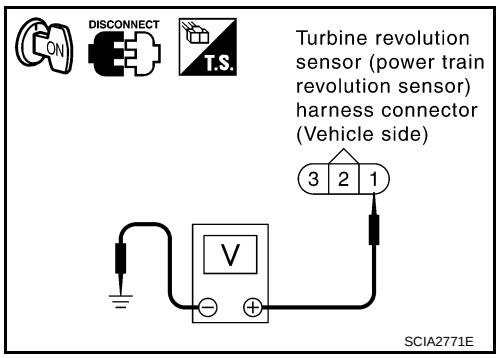
1. Turn ignition switch OFF.
2. Disconnect the turbine revolution sensor (power train revolution sensor) harness connector.
3. Turn ignition switch ON.
4. Check voltage between turbine revolution sensor (power train revolution sensor) harness connector terminals.

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.

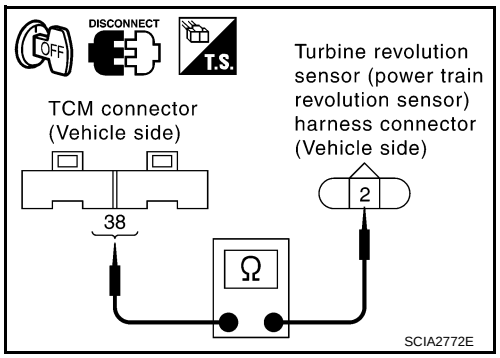
OK or NG

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.

5. CHECK TCM

1. Check TCM input/output signals. Refer to XX-XX, "*****".
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

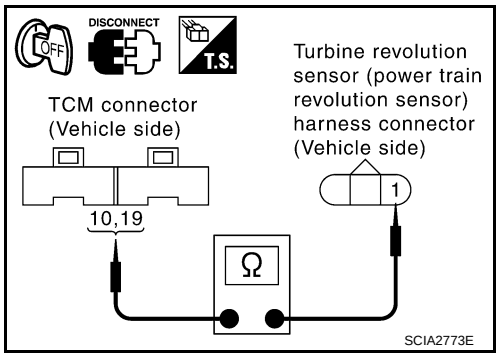
OK or NG

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.

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.

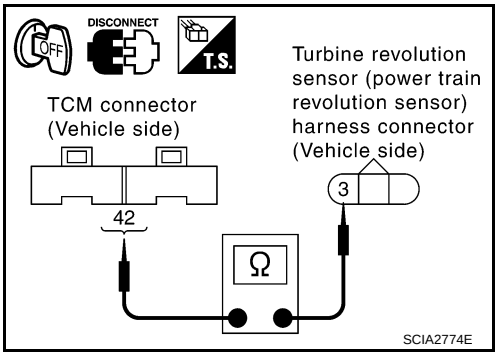
OK or NG

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 SENSOR [(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.

8. CHECK DTC

Perform TM-383, "DTC Confirmation Procedure".

OK or NG

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

LINE PRESSURE SOLENOID VALVE

Description

INFOID:0000000001713056

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-III Reference Value in Data Monitor Mode

INFOID:0000000001713057

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

INFOID:0000000001713058

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

Possible Cause

INFOID:0000000001713059

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

DTC Confirmation Procedure

INFOID:0000000001713060

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-III

1. Turn ignition switch ON and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
2. Touch “START”.
3. Depress accelerator pedal completely and wait at least 1 second.
4. If the check result is NG, go to TM-387, "Diagnosis Procedure".

WITHOUT CONSULT-III

1. Start engine.
2. With brake pedal depressed, shift the lever from “P”→“N”→“D”→“N”→“P” positions.
3. Perform self-diagnosis. Refer to TM-350, "Diagnosis Procedure without CONSULT-III".
4. If the check result is NG, go to TM-387, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001713062

1.CHECK INPUT SIGNAL

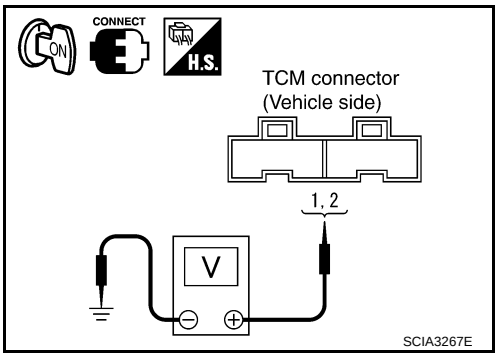
With CONSULT-III

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

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

Without CONSULT-III

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground.



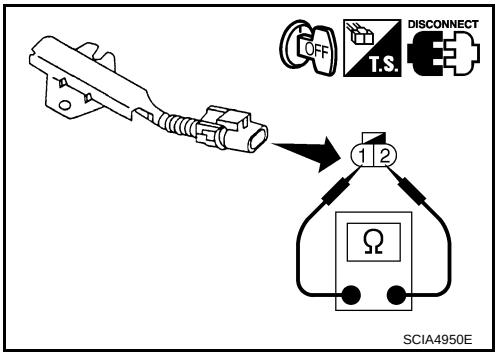
Item	Connector	Terminal	Condition	Judgement standard (Approx.)
Line pressure solenoid valve	E31	1 - Ground	When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
			When depressing accelerator pedal fully after warming up engine.	0V
Line pressure solenoid valve (with dropping resistor)	E31	2 - Ground	When releasing accelerator pedal after warming up engine.	4 - 14V
			When depressing accelerator pedal fully after warming up engine.	0V

OK or NG

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

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

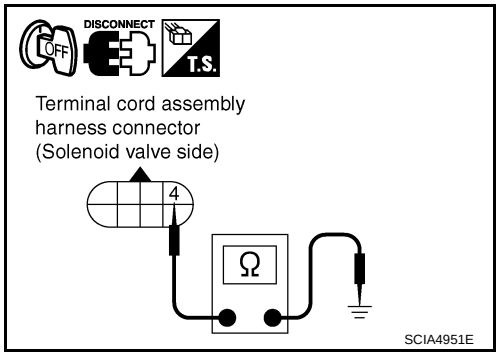
OK >> GO TO 3.
NG >> Repair or replace damaged parts.

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



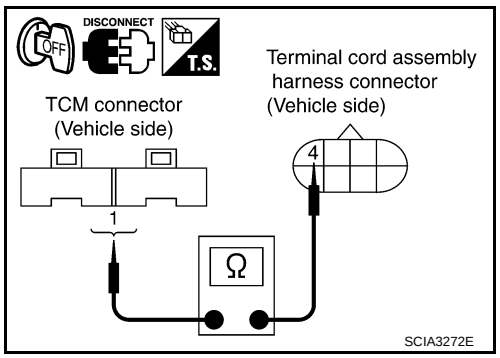
OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

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

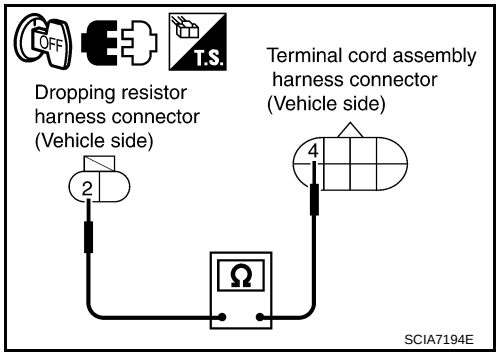
1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector	Terminal	Continuity
TCM	E31	1	Yes
Terminal cord assembly harness connector	F30	4	



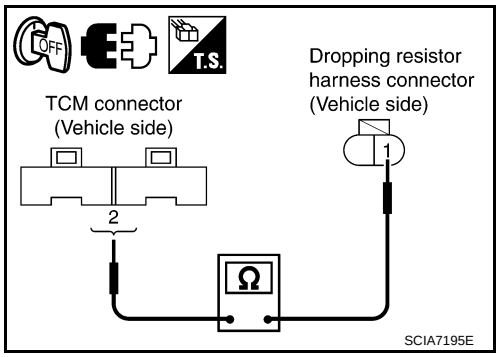
4. Check continuity between terminal cord assembly harness connector terminal and dropping resistor harness connector terminal.

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 TM-387, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signals. Refer to XX-XX, "*****".
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

INFOID:0000000001713063

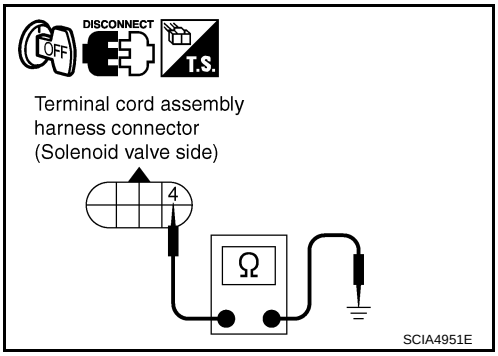
LINE PRESSURE SOLENOID VALVE

- For removal, refer to XX-XX, "*****".

Resistance Check

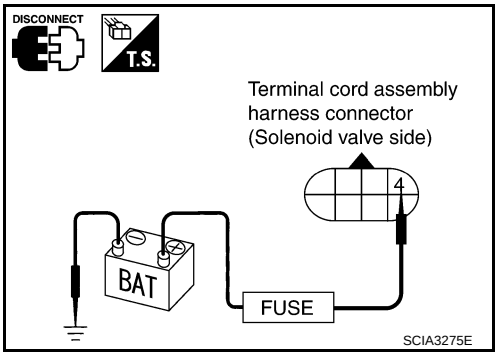
- Check resistance between terminal and ground.

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



Operation Check

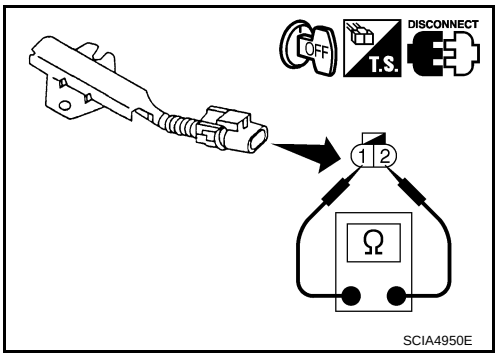
- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DROPPING RESISTOR

- Check resistance between terminals.

Item	Connector	Terminal	Resistance (Approx.)
Dropping resistor	E49	1 - 2	12 Ω



CAN COMMUNICATION LINE

Description

INFOID:0000000001713064

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

INFOID:0000000001713065

Diagnostic trouble code “U1000 CAN COMM CIRCUIT” with CONSULT-III or 12th judgement flicker without CONSULT-III is detected when TCM cannot communicate to other control units.

Possible Cause

INFOID:0000000001713066

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

DTC Confirmation Procedure

INFOID:0000000001713067

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-III

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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 TM-391, "Diagnosis Procedure".

WITHOUT CONSULT-III

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 TM-350, "Diagnosis Procedure without CONSULT-III".
4. If DTC is detected, go to TM-391, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001713069

1.CHECK CAN COMMUNICATION CIRCUIT

With CONSULT-III

1. Turn ignition switch ON and start engine.
2. Select “SELF-DIAGNOSTIC RESULTS” mode for “TRANSMISSION” with CONSULT-III.

Is any malfunction of the “CAN COMM CIRCUIT” indicated?

YES >> Print out CONSULT-III screen, GO TO LAN section. Refer to XX-XX, "*****"
NO >> **INSPECTION END**

MAIN POWER SUPPLY AND GROUND CIRCUIT

Description

INFOID:0000000001713070

When the power supply to the TCM is cut “OFF”, for example because the battery is removed, and the self-diagnostics memory function stops, malfunction is detected.

On Board Diagnosis Logic

INFOID:0000000001713071

- Diagnostic trouble code “INITIAL START” with CONSULT-III is detected when TCM does not receive the voltage signal from the battery power supply.
- This is not a malfunction message. (Whenever shutting “OFF” a power supply to the TCM, this message appears on the screen.)

Possible Cause

INFOID:0000000001713072

Harness or connector
(Battery or ignition switch and TCM circuit is open or shorted.)

DTC Confirmation Procedure

INFOID:0000000001713073

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-III
1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
3. Touch “START”.
4. Wait for at least 2 consecutive seconds.
5. If DTC is detected, go to TM-392, "Diagnosis Procedure".

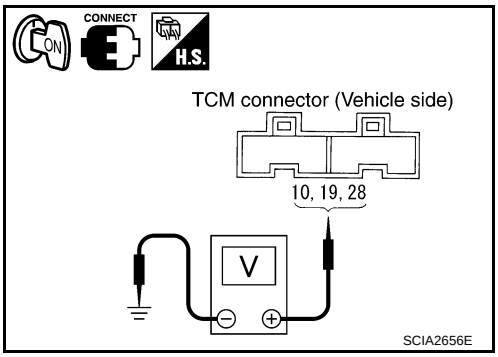
Diagnosis Procedure

INFOID:0000000001713075

1.CHECK TCM POWER SOURCE

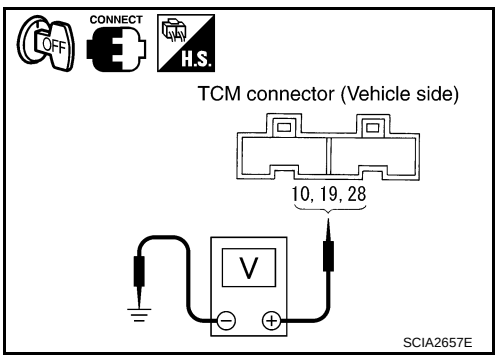
1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground.

Name	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.

Name	Connector	Terminal	Judgement standard (Approx.)
Power supply	E31	10	0V
		19	0V
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 XX.

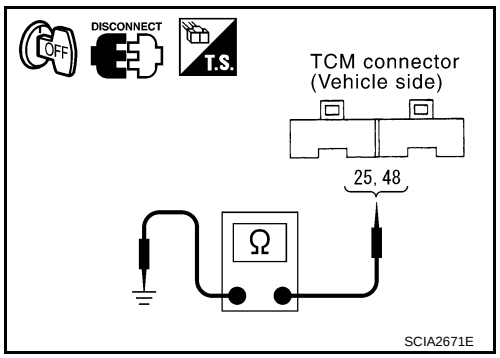
OK or NG

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.

4. CHECK DTC

Perform TM-392, "DTC Confirmation Procedure".

OK or NG

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

5. CHECK TCM

1. Check TCM input/output signals. Refer to XX-XX, "*****".
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 1ST GEAR FUNCTION

Description

INFOID:0000000001713076

- 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

INFOID:0000000001713077

- Diagnostic trouble code “A/T 1ST GR FNCTN” with CONSULT-III 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 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 (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 gear position above
  *: “A/T 1ST GR FNCTN” is detected.

Possible Cause

INFOID:0000000001713078

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

DTC Confirmation Procedure

INFOID:0000000001713079

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-III

1. Start engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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 - 1.5V
   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 “TRANSMISSION” with CONSULT-III 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-III screen, go to TM-395, "Diagnosis Procedure".
   If "STOP VEHICLE" appears on CONSULT-III 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-III for a long time, select "SELF-DIAGNOSTIC RESULTS" for "TRANSMISSION". In case a DTC other than "A/T 1ST GR FNCTN" is shown, refer to XX-XX, "*****".**

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 TM-395, "Diagnosis Procedure".
   Refer to XX-XX, "*****".

Diagnosis Procedure

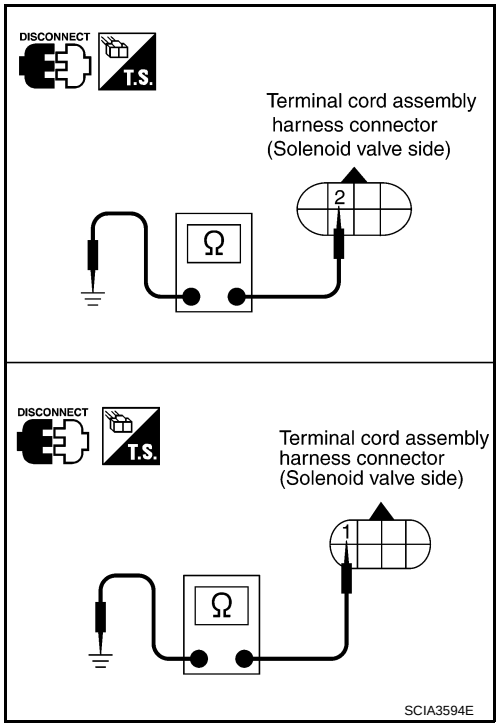
INFOID:0000000001713080

1. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to XX-XX, "*****".
- Shift solenoid valve A
- Shift solenoid valve B

2. Check resistance between terminal cord assembly harness connector terminals and ground.

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



OK or NG

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

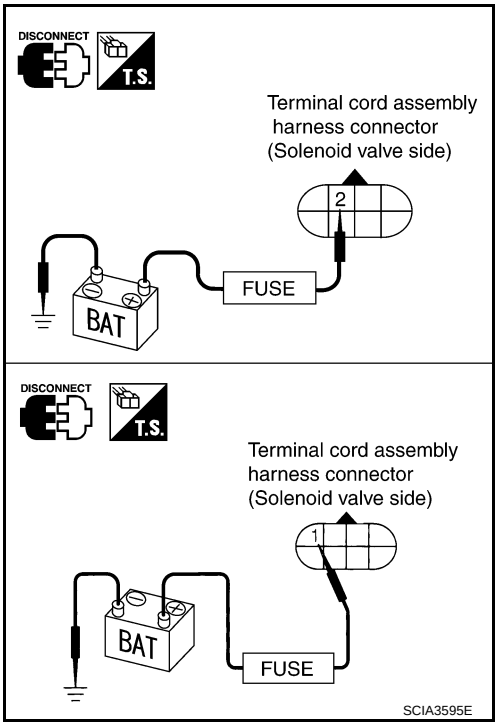
2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to XX-XX, "*****".
- 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.

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 XX-XX, "*****".
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 TM-394, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Check control valve again. Repair or replace control valve assembly.

A/T 2ND GEAR FUNCTION

Description

INFOID:0000000001713081

- 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

INFOID:0000000001713082

- Diagnostic trouble code “A/T 2ND GR FNCTN” with CONSULT-III 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 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 (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 gear position above
  *: “A/T 2ND GR FNCTN” is detected.

Possible Cause

INFOID:0000000001713083

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

DTC Confirmation Procedure

INFOID:0000000001713084

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-III

1. Start engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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 - 1.5V
   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 “TRANSMISSION” with CONSULT-III 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-III screen, go to TM-398, "Diagnosis Procedure".
   If “STOP VEHICLE” appears on CONSULT-III screen, go to following step.
- **Make sure that “GEAR” shows “2” when depressing accelerator pedal to WOT.**
- **If “TESTING” does not appear on CONSULT-III for a long time, select “SELF-DIAGNOSTIC RESULTS” for “TRANSMISSION”. In case a DTC other than “A/T 2ND GR FNCTN” is shown, refer to XX-XX, "*****".**

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

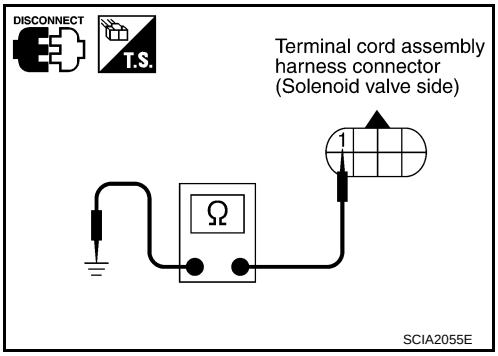
9. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “Diagnostic Procedure”.)
   Refer to TM-398, "Diagnosis Procedure".
   Refer to XX-XX, "*****".

Diagnosis Procedure

INFOID:0000000001713085

1. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to XX-XX, "*****".
- Shift solenoid valve B
2. Check resistance between terminal cord assembly harness connector terminal and ground.



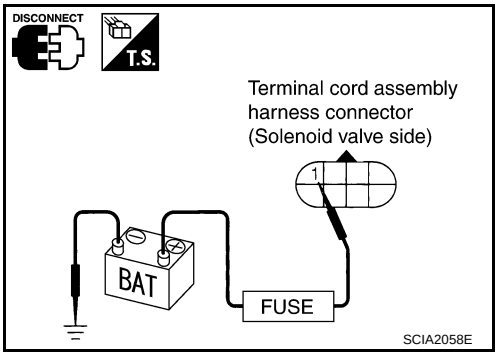
Solenoid valve	Terminal		Resistance (Approx.)
Shift solenoid valve B	1	Ground	5 - 20 Ω

OK or NG

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

2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to XX-XX, "*****".
- Shift solenoid valve B
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



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 XX-XX, "*****".
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 TM-397, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Check control valve again. Repair or replace control valve assembly.

A/T 3RD GEAR FUNCTION

Description

INFOID:0000000001713086

- 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

INFOID:0000000001713087

- Diagnostic trouble code “A/T 3RD GR FNCTN” with CONSULT-III 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
  *: “A/T 3RD GR FNCTN” is detected.

Possible Cause

INFOID:0000000001713088

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

DTC Confirmation Procedure

INFOID:0000000001713089

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-III

1. Start engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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 - 1.5V
   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 “TRANSMISSION” with CONSULT-III 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-III screen, go to TM-401, "Diagnosis Procedure".
   If “STOP VEHICLE” appears on CONSULT-III 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-III for a long time, select “SELF-DIAG RESULTS” for “TRANSMISSION”. In case a DTC other than “A/T 3RD GR FNCTN” is shown, refer to XX-XX, "*****".**

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 TM-401, "Diagnosis Procedure".
   Refer to XX-XX, "*****".

Diagnosis Procedure

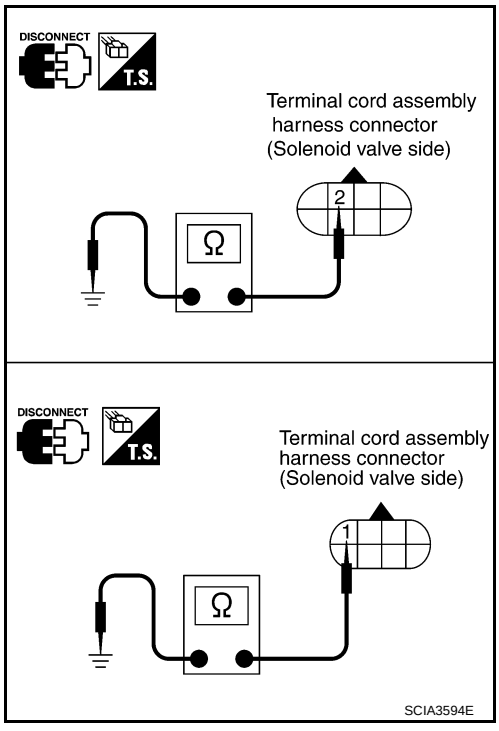
INFOID:0000000001713090

1. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to XX-XX, "*****".
- Shift solenoid valve A
- Shift solenoid valve B

2. Check resistance between terminal cord assembly harness connector terminals and ground.

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



OK or NG

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

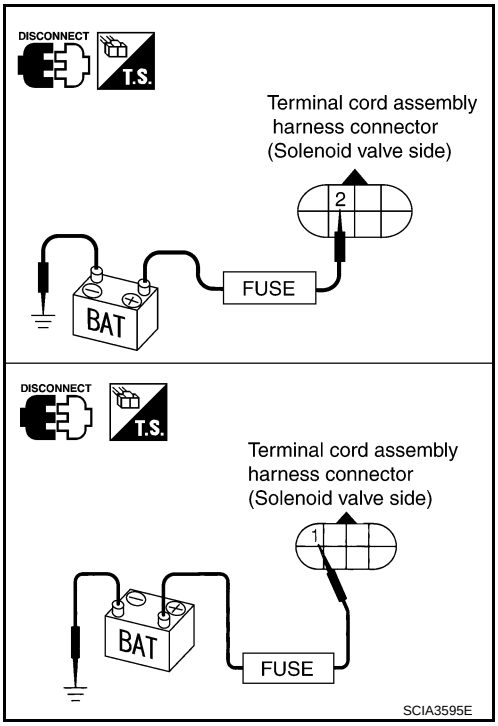
2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to XX-XX, "*****".
- 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.

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 XX-XX, "*****".
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 TM-400, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Check control valve again. Repair or replace control valve assembly.

A/T 4TH GEAR FUNCTION

Description

INFOID:0000000001713091

- 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-III REFERENCE VALUE IN DATA MONITOR MODE

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

INFOID:0000000001713092

- Diagnostic trouble code “A/T 4TH GR FNCTN” with CONSULT-III 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 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
  *: “A/T 4TH GR FNCTN” is detected.

Possible Cause

INFOID:0000000001713093

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

DTC Confirmation Procedure

INFOID:0000000001713094

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-III

1. Start engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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 - 1.5V
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 “TRANSMISSION” with CONSULT-III 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-III screen, go to TM-404, "Diagnosis Procedure".
If “STOP VEHICLE” appears on CONSULT-III 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-III for a long time, select “SELF-DIAG RESULTS” for “A/T”. In case a DTC other than “A/T 4TH GR FNCTN” is shown, refer to XX-XX, "*****".**
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 TM-404, "Diagnosis Procedure".
Refer to XX-XX, "*****".

Diagnosis Procedure

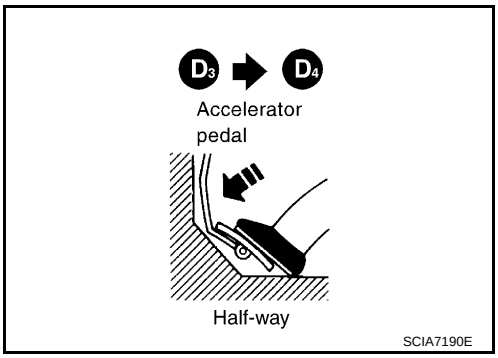
INFOID:0000000001713095

1.CHECK SHIFT-UP (D3 TO D4)

During XX-XX, "*****".

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 XX-XX, "*****".

OK or NG

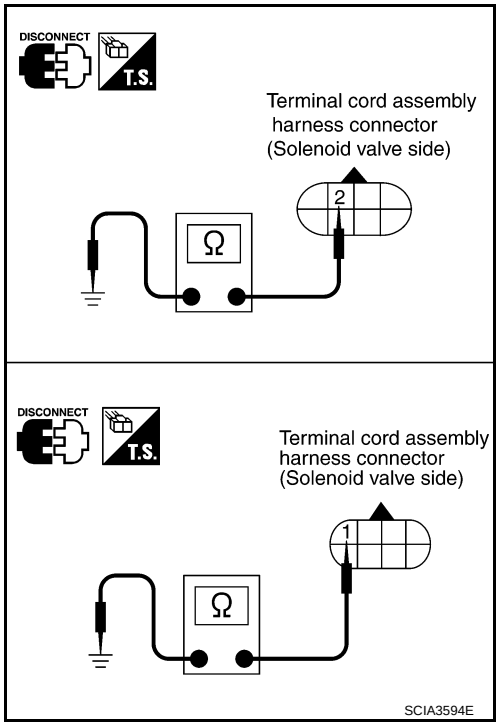
OK >> GO TO 3.
NG >> GO TO 7.

3.CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to XX-XX, "*****".
- Shift solenoid valve A
- Shift solenoid valve B

2. Check resistance between terminal cord assembly harness connector terminals and ground.

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

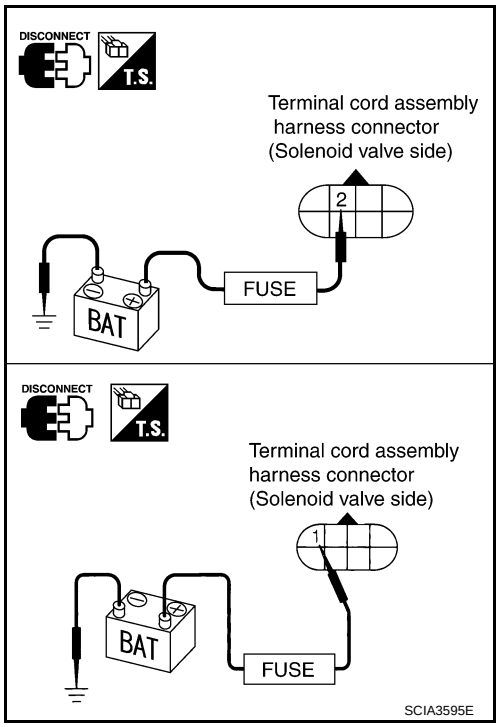


OK or NG

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

4. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to XX-XX, "*****".
- 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.



OK or NG

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

5. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to XX-XX, "*****".
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

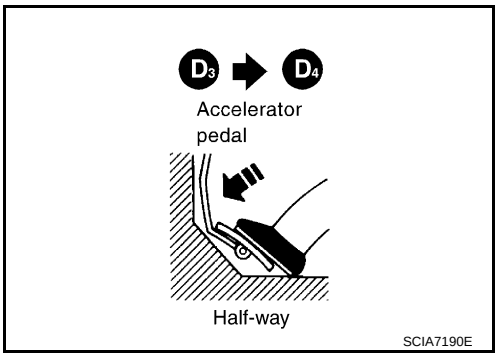
OK >> GO TO 6.
NG >> Repair control valve.

6. CHECK SHIFT-UP (D3 TO D4)

During XX-XX, "*****".

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.



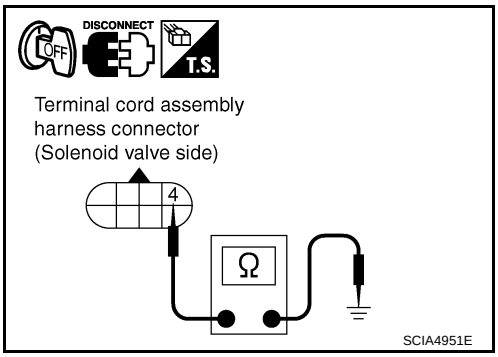
7. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to XX-XX, "*****".
- Line pressure solenoid valves
2. Check resistance between terminal cord assembly harness connector terminal and ground.

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

OK or NG

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

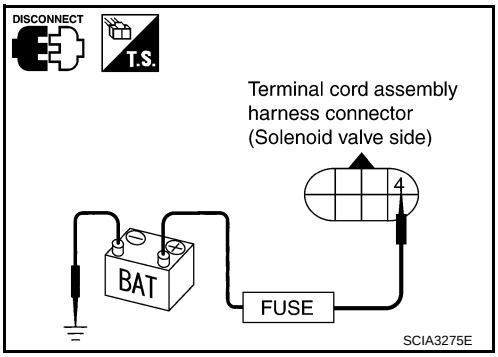


8. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to XX-XX, "*****".
- Line pressure solenoid valves
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.

OK or NG

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



9. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to XX-XX, "*****".
2. Check line pressure circuit valves for sticking.
- Pilot valve
- Shift solenoid valve A
- Shift solenoid valve B

OK or NG

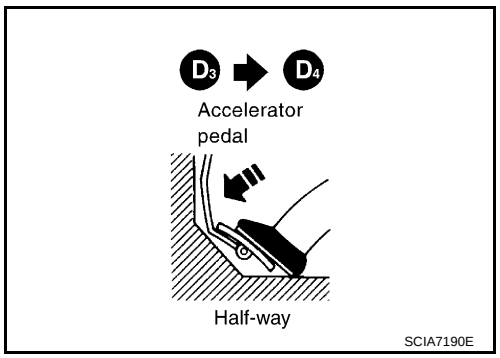
OK >> GO TO 10.
NG >> Repair or replace control valve.

10. CHECK SHIFT-UP (D3 TO D4)

During XX-XX, "*****".

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

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



11. CHECK DTC

Perform TM-403, "DTC Confirmation Procedure".

OK or NG

OK >> **INSPECTION END**
NG >> Perform XX-XX, "*****" again and return to the start point of this test group.

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

Description

INFOID:0000000001713096

- 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-III Reference Value in Data Monitor Mode

INFOID:0000000001713097

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

INFOID:0000000001713098

- Diagnostic trouble code “A/T TCC S/V FNCTN” with CONSULT-III 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 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 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
  *: “A/T TCC S/V FNCTN” is detected.

Possible Cause

INFOID:0000000001713099

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

DTC Confirmation Procedure

INFOID:0000000001713100

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-III

1. Start engine and select “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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 - 1.5V
   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 “TRANSMISSION” with CONSULT-III 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 XX-XX, "*****".**
- **If “TESTING” does not appear on CONSULT-III for a long time, select “SELF-DIAG RESULTS”. In case a DTC other than “A/T TCC S/V FNCTN” is shown, refer to XX-XX, "*****".**

6. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “DIAGNOSTIC PROCEDURE”.)
Refer to TM-409, "Diagnosis Procedure".
Refer to XX-XX, "*****".

Diagnosis Procedure

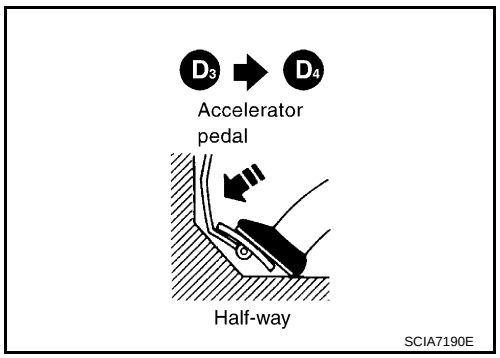
INFOID:0000000001713101

1. CHECK SHIFT-UP (D3 TO D4)

During XX-XX, "*****".

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 XX-XX, "*****".

OK or NG

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

3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to XX-XX, "*****".
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

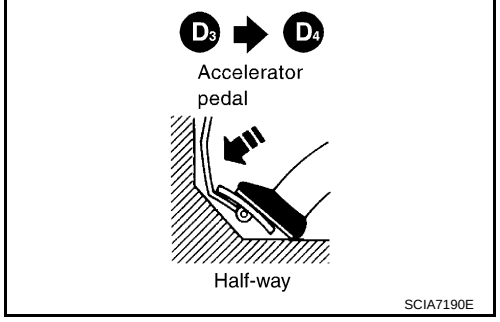
OK >> GO TO 4.
NG >> Repair or replace control valve.

4. CHECK SHIFT-UP (D3 TO D4)

During XX-XX, "*****".

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 TM-408, "DTC Confirmation Procedure".

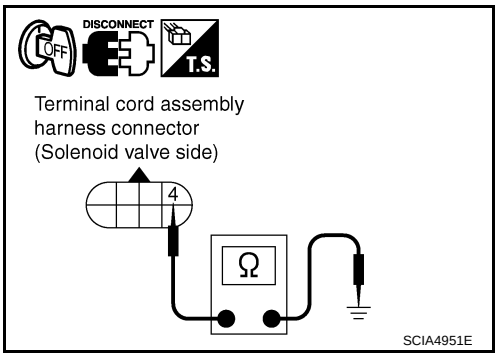
OK or NG

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

6.CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to XX-XX, "*****".
- Line pressure solenoid valve
2. Check resistance between terminal cord assembly harness connector terminal and ground.

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



OK or NG

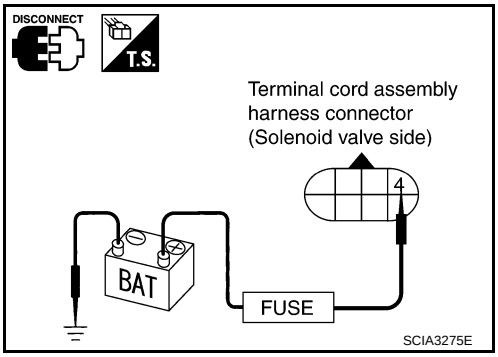
OK >> GO TO 7.
NG >> Replace solenoid valve assembly.

7.CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to XX-XX, "*****".
- Line pressure solenoid valve
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.

OK or NG

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



8.CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to XX-XX, "*****".
2. Check line pressure circuit valves for sticking.
- Pressure regulator valve
- Pilot valve
- Pressure modifier valve

OK or NG

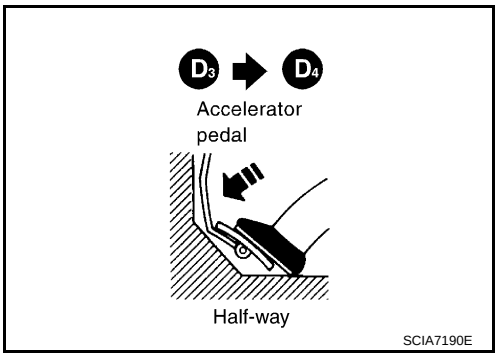
OK >> GO TO 9.
NG >> Repair or replace control valve.

9.CHECK SHIFT-UP (D_3 TO D_4)

During XX-XX, "*****".

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

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



10. CHECK DTC

Perform TM-408, "DTC Confirmation Procedure".

OK or NG

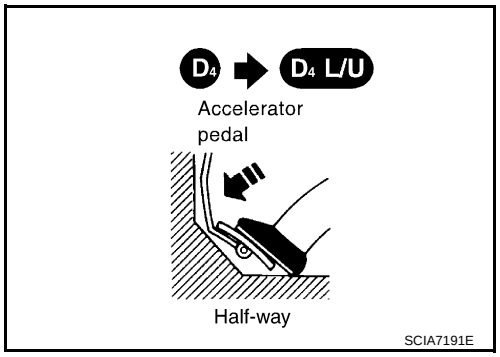
OK >> **INSPECTION END**
NG >> GO TO 11.

11. CHECK LOCK-UP

During XX-XX, "*****".

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

YES >> Perform XX-XX, "*****" again and return to the start point of this test group.
NO >> GO TO 12.



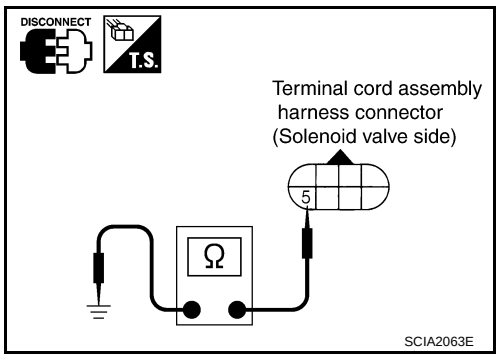
12. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to XX-XX, "*****".
- Torque converter clutch solenoid valve
2. Check resistance between terminal cord assembly harness connector terminal and ground.

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

OK or NG

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

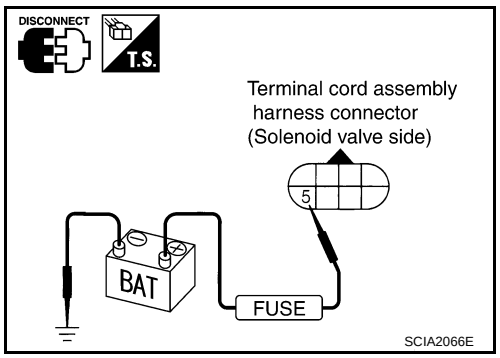


13. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to XX-XX, "*****".
- Torque converter clutch solenoid valve
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.

OK or NG

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



14. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to XX-XX, "*****".
2. Check control valves for sticking.
- Torque converter clutch control valve
- Torque converter clutch relief valve

OK or NG

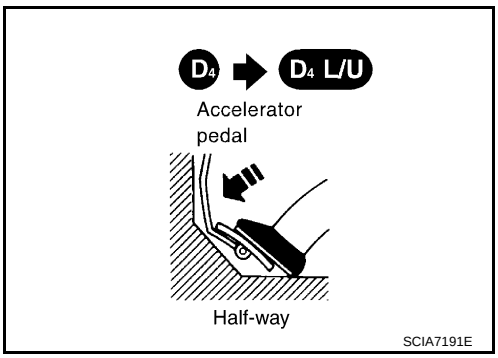
OK >> GO TO 15.
NG >> Repair or replace control valve.

15.CHECK LOCK-UP

During XX-XX, "*****".

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 TM-408, "DTC Confirmation Procedure".

OK or NG

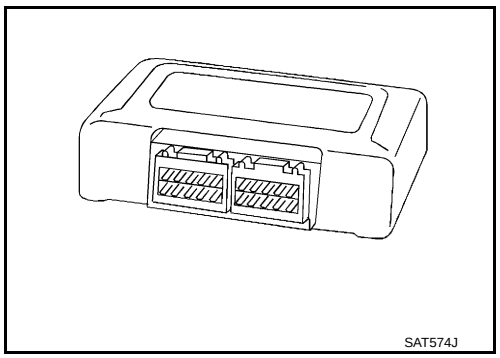
OK >> **INSPECTION END**
NG >> Perform XX-XX, "*****" again and return to the start point of this test group.

CONTROL UNIT (RAM), CONTROL UNIT (ROM)

Description

INFOID:0000000001713102

The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls the A/T.



On Board Diagnosis Logic

INFOID:0000000001713103

Diagnostic trouble code “CONTROL UNIT (RAM)”, “CONTROL UNIT (ROM)” with CONSULT-III is detected when TCM memory (RAM) or (ROM) is malfunctioning.

Possible Cause

INFOID:0000000001713104

TCM.

DTC Confirmation Procedure

INFOID:0000000001713105

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-III

1. Turn ignition switch ON and select “DATA MONITOR” mode for TRANSMISSION with CONSULT-III.
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 TM-413, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000001713106

1.CHECK DTC

With CONSULT-III

1. Turn ignition switch ON and select “SELF-DIAG RESULTS” mode for TRANSMISSION with CONSULT-III.
2. Touch “ERASE”.
3. Perform TM-413, "DTC Confirmation Procedure".

Is the “CONTROL UNIT (RAM)” or “CONTROL UNIT (ROM)” displayed again?

YES >> Replace TCM.
NO >> **INSPECTION END**

PNP, OD SWITCH AND CLOSED THROTTLE, WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT

CONSULT-III Reference Value in Data Monitor Mode

INFOID:0000000001713107

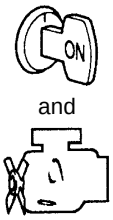
Remarks: Specification data are reference values.

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 Terminal and Reference Value

INFOID:0000000001713108

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.	0V
27	G	PNP switch “2” position		When setting selector lever to “2” position.	Battery voltage
				When setting selector lever to other positions.	0V
34	LG	PNP switch “D” position		When setting selector lever to “D” position.	Battery voltage
				When setting selector lever to other positions.	0V
35	SB	PNP switch “R” position		When setting selector lever to “R” position.	Battery voltage
				When setting selector lever to other positions.	0V
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.	0V

Diagnosis Procedure

INFOID:0000000001713109

1.CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to XX-XX, "*****".

Is a malfunction in the CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to TM-391.
NO (With CONSULT-III) >>GO TO 2.
NO (Without CONSULT-III) >>GO TO 3.

2. CHECK PNP SWITCH CIRCUIT

With CONSULT-III

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “TRANSMISSION” with CONSULT-III.
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

OK or NG

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

3. CHECK PNP SWITCH CIRCUIT

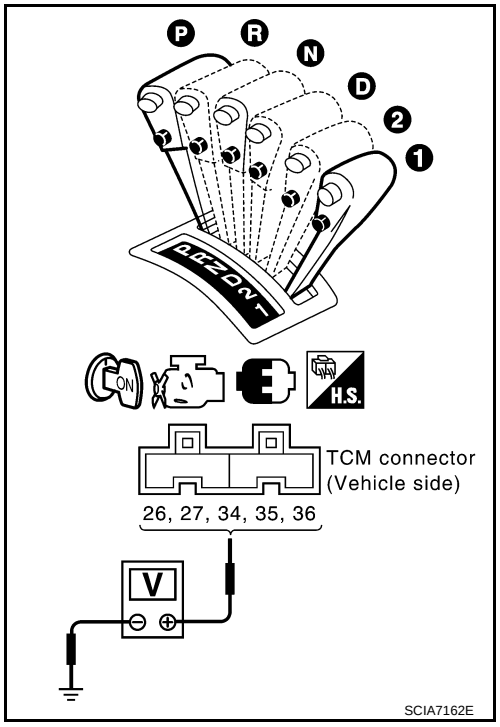
Without CONSULT-III

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

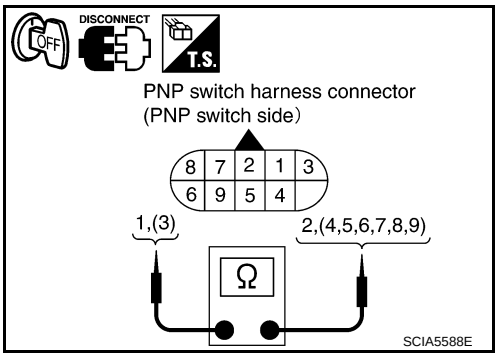


OK or NG

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

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 XX-XX, "*****".
NG >> Repair or replace PNP switch. Refer to XX-XX, "*****".

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.
- Ignition switch.

OK or NG

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

7. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

With CONSULT-III

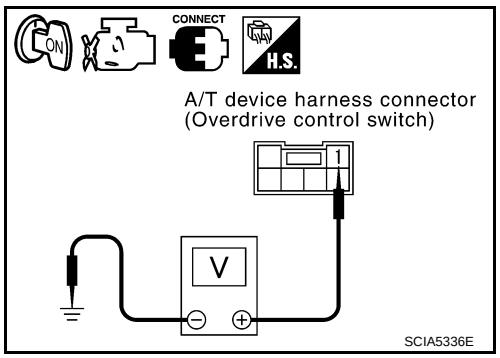
1. Turn ignition switch ON. (Do not start engine.)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "TRANSMISSION" with CONSULT-III.
3. Read out "OVERDRIVE SW". Check the signal of overdrive control switch is indicated properly.

Item name	Overdrive control switch Condition	Display value
OVERDRIVE SW	Depressed	ON
	Released	OFF

Without CONSULT-III

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

2. Check voltage between A/T device harness connector terminal and ground.



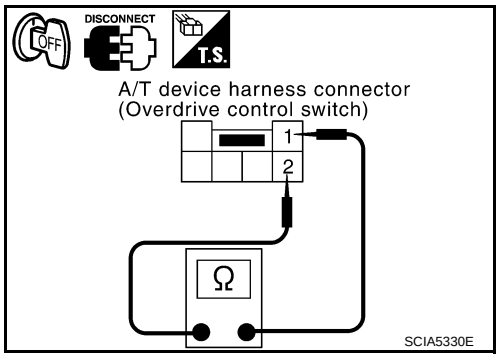
Item	Connector	Terminal	Overdrive control switch Condition	Judgement standard (Approx.)
A/T device harness connector (Overdrive control switch)	M38	1 - Ground	Released	Battery voltage
			Depressed	0V

OK or NG

OK >> GO TO 10.
NG >> GO TO 8.

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.



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.

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-III

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for TRANSMISSION with CONSULT-III.
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.

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 XX-XX, "*****".

11. PERFORM SELF-DIAGNOSIS

Without CONSULT-III
Perform self-diagnosis. Refer to XX-XX, "*****".

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 XX-XX, "*****".

12. CHECK TCM

1. Check TCM input/output signal. Refer to XX-XX, "*****".
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.

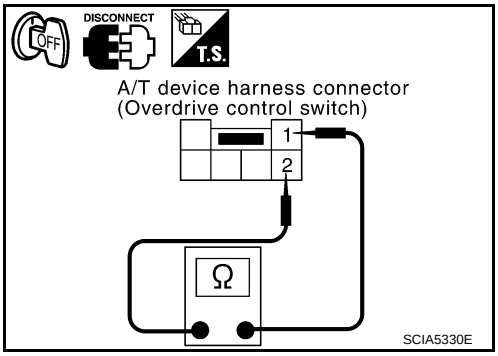
Component Inspection

INFOID:0000000001713110

OVERDRIVE CONTROL SWITCH

- Check continuity between A/T device harness connector terminals.

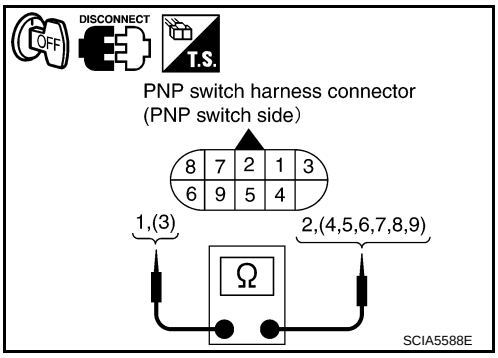
Item	Connector	Terminal	Overdrive control switch condition	Continuity
A/T device harness connector (Overdrive control switch)	M38	1 - 2	Released	No
			Depressed	Yes



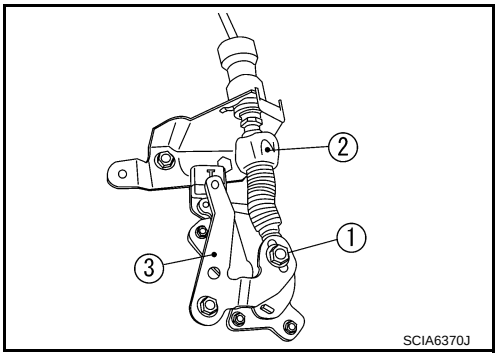
PNP SWITCH

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	



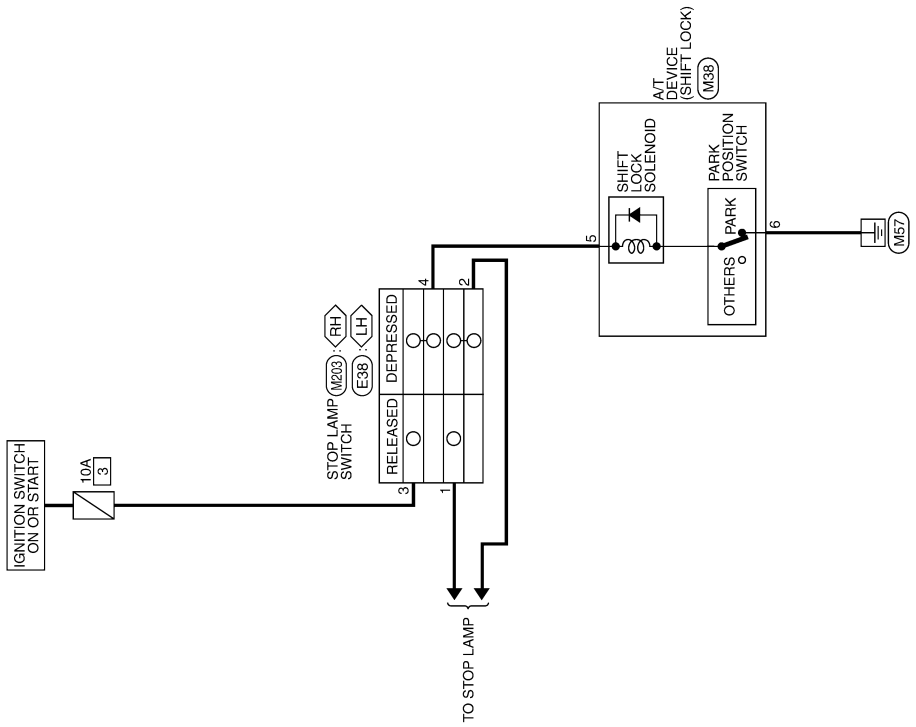
2. If NG, check again with control cable (2) disconnected from manual shaft of A/T assembly. Refer to step 1.
   (1): Lock nut
   (3): Manual shaft
3. If OK on step 2, adjust control cable (2). Refer to XX-XX, "*****".
4. If NG on step 2, remove PNP switch from A/T assembly and check continuity of PNP switch terminals. Refer to step 1.
5. If OK on step 4, adjust PNP switch. Refer to XX-XX, "*****".
6. If NG on step 4, replace PNP switch. Refer to XX-XX, "*****".



A/T SHIFT LOCK SYSTEM

Wiring Diagram - A/T Shift Lock System -

INFOID:0000000001731057



ALDWA0058GE

Terminals And Reference Values

INFOID:0000000001731059

SHIFT LOCK CONTROL UNIT INSPECTION TABLE

Data are reference values.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	VOLTAGE (Approx.)
1	P	O/D switch	Ignition switch: “ON”	Battery voltage
			Ignition switch: “OFF”	0V
2	B	Ground	Always	0V
3	L	Illumination	Parking lamps: “ON”	Battery voltage
			Parking lamps: “OFF”	0V
4	B	Ground	Always	0V
5	LG	Shift lock solenoid	When ignition switch is "ON", brake pedal is depressed and selector lever is set in "P" position.	Battery voltage
			Except above.	0V
6	B	Ground	Always	0V

Diagnosis Procedure

INFOID:0000000001731062

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 XX-XX, "*****" .

2. CHECK A/T POSITION

Check A/T position. Refer to XX-XX, "*****" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to XX-XX, "*****" .

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

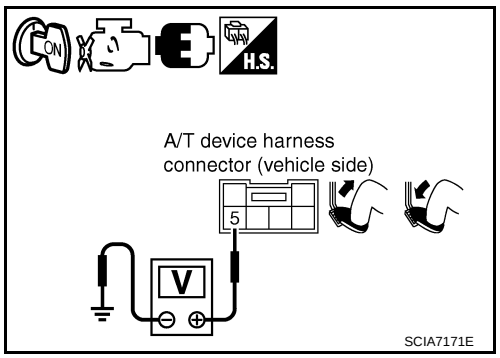
1. Turn ignition switch ON. (Do not start engine.)

2. Check voltage between A/T device harness connector terminal 5 and ground.

Voltage:

Brake pedal depressed: Battery voltage

Brake pedal released: 0V



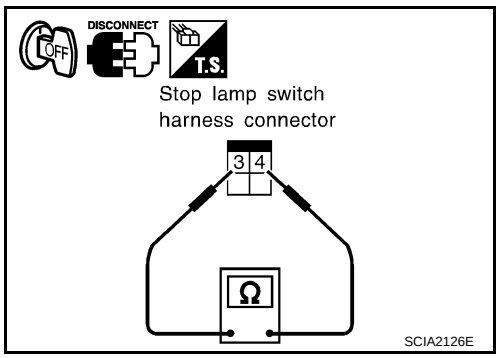
OK or NG

OK >> GO TO 7.
NG >> GO TO 5.

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 XX-XX, "***" .**

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.

OK or NG

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

7. CHECK GROUND CIRCUIT

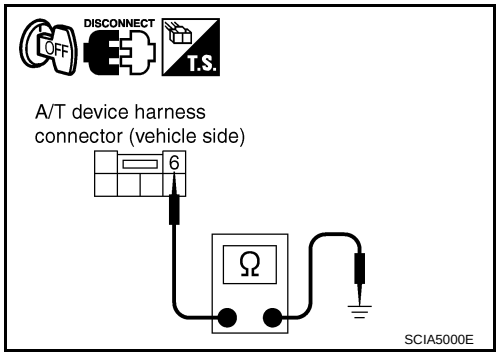
1. Turn ignition switch OFF.
2. Disconnect A/T device harness connector.
3. Check continuity between A/T device harness connector terminal 6 and ground.

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.



ECU DIAGNOSIS

TCM

Reference Value

INFOID:0000000001714339

REFERENCE VALUES

NOTICE:

1. The CONSULT-III 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-III display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.
2. Shift schedule (which implies gear position) displayed on CONSULT-III and that indicated in Service Manual may differ slightly. This occurs because of the following reasons:

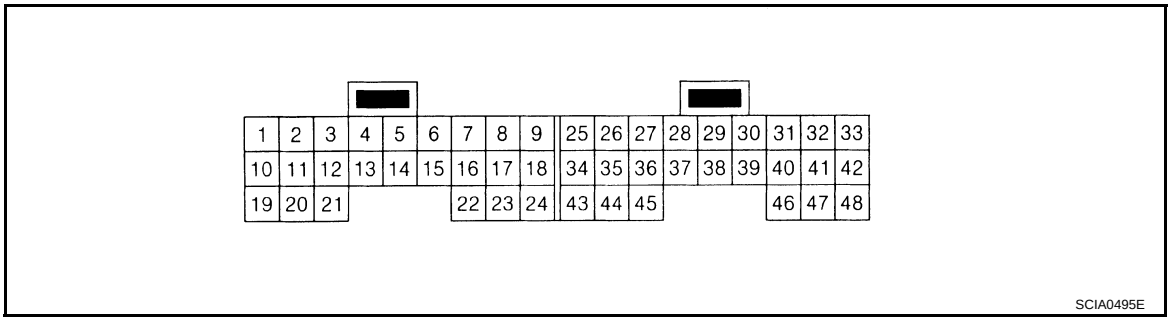
- Actual shift schedule has more or less tolerance or allowance,
- Shift schedule indicated in Service Manual refers to the point where shifts start, and
- Gear position displayed on CONSULT-III indicates the point where shifts are completed.

3. Shift solenoid valve “A” or “B” is displayed on CONSULT-III 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).	1.5V
	When A/T fluid temperature is 80°C (176°F).	0.5V
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
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
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

Item name	Condition	Display value (Approx.)
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
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
OVERRUN/C S/V	When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to TM-14.)	ON
	When overrun clutch solenoid valve does not operate. (When overrun clutch engaged. Refer to TM-14.)	OFF
BRAKE SW	Depressed brake pedal.	ON
	Released brake pedal.	OFF
GEAR	During driving	1, 2, 3, 4
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
VEHICLE SPEED	During driving	Approximately matches the speedometer reading.
LINE PRES DTY	Line pressure low ⇔ Line pressure high	0% ⇔ 94%
TCC S/V DUTY	Lock-up OFF ⇔ Lock-up ON	4% ⇔ 94%

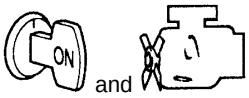
TCM CONNECTOR TERMINAL LAYOUT

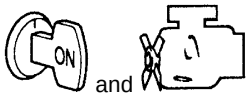
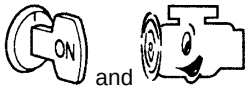
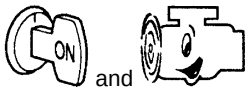


TERMINALS AND REFERENCE VALUES FOR TCM

Data are reference valuesand are 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 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	P	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	4 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
3	GR	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	0V
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”.		0V
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”.)	0V
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”.)	0V
19	R	Power supply	When turning ignition switch to “ON”.		Battery voltage
			When turning ignition switch to “OFF”.		0V
20	V	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates. (When overrun clutch disengaged. Refer to TM-330.)	Battery voltage
				When overrun clutch solenoid valve does not operate. (When overrun clutch engaged. Refer to TM-330.)	0V
25	B	Ground	Always		0V
26	Y	PNP switch “1” position		When setting selector lever to “1” position.	Battery voltage
				When setting selector lever to other positions.	0V
27	G	PNP switch “2” position		When setting selector lever to “2” position.	Battery voltage
				When setting selector lever to other positions.	0V
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)	—		—

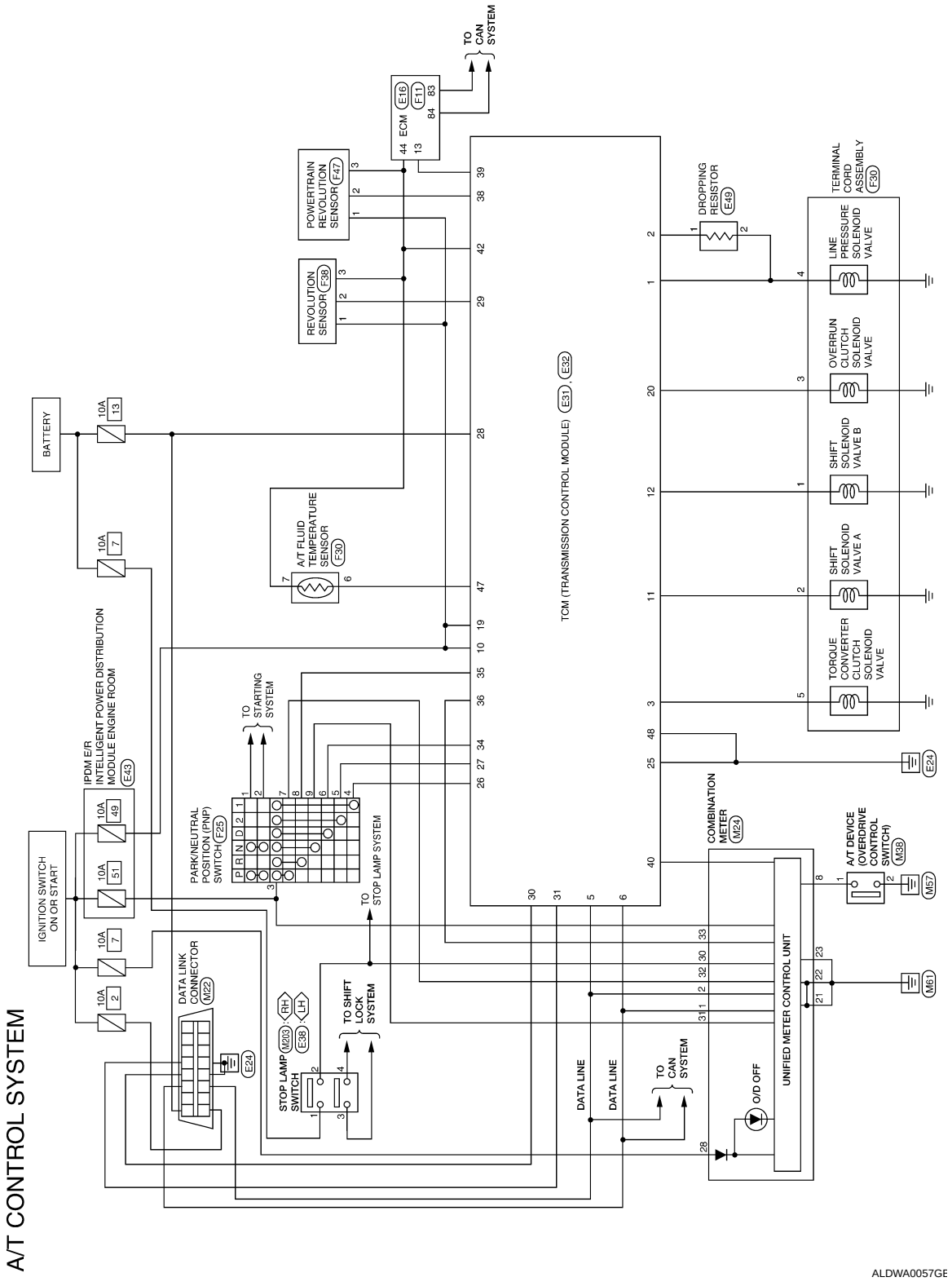
Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
34	LG	PNP switch “D” position		When setting selector lever to “D” position.	Battery voltage
				When setting selector lever to other positions.	0V
35	SB	PNP switch “R” position		When setting selector lever to “R” position.	Battery voltage
				When setting selector lever to other positions.	0V
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.	0V
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 XX-XX, "*****".	
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 0V and more than 4.5V
42	B	Sensor ground	Always		0V
47	BR	A/T fluid temperature sensor		When A/T fluid temperature is 20°C (68°F).	1.5V
				When A/T fluid temperature is 80°C (176°F).	0.5V
48	B	Ground	Always		0V

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

*2: These terminals are connected to the ECM.

Wiring Diagram - A/T CONTROL SYSTEM -

INFOID:0000000001714340



Fail-Safe

INFOID:0000000001714341

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 TM-10, "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 Sensor Signal and Throttle Position Sensor 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	$D_1 \Leftrightarrow D_2 \Leftrightarrow D_3 \Leftrightarrow D_4$
“2”	“2” position and other position signals (Except “1” position)	$2_1 \Leftrightarrow 2_2 \Leftrightarrow 2_3$
	“2” position and “1” position signals	$2_1 \Leftrightarrow 2_2$
“1”	“1” position and other position signals (Except “2” position)	$1_1 \Leftrightarrow 1_2 \Leftrightarrow 1_3$
	“1” position and “2” position signals	$1_1 \Leftrightarrow 1_2$

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	–	●→×		●→×	–		–	–	
	×	●	2nd	–	●→×		×	–		–	–	
	×	×	3rd	–	x		×	–		–	–	
“1” position	●	●	1st	–	●→×		●→×	–		–	–	
	×	●	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.

Alphabetical Index

INFOID:0000000001714344

NOTE:
If DTC “CAN COMM CIRCUIT” is displayed with other DTCs, first perform the trouble diagnosis for DTC “CAN COMM CIRCUIT”. Refer to XX-XX, "***".**

X: Applicable, —: Not applicable

Items (CONSULT-II screen terms)	TCM self-diagnosis		Reference page
	OD OFF indicator lamp	“A/T” with CONSULT-II	
A/T 1ST GR FNCTN	—	X	XX-XX, "*****"
A/T 2ND GR FNCTN	—	X	XX-XX, "*****"
A/T 3RD GR FNCTN	—	X	XX-XX, "*****"
A/T 4TH GR FNCTN	—	X	XX-XX, "*****"
A/T TCC S/V FNCTN	—	X	XX-XX, "*****"
BATT/FLUID TEMP SEN	X	X	XX-XX, "*****"
CAN COMM CIRCUIT	X	X	XX-XX, "*****"
CONTROL UNIT (RAM)	—	X	XX-XX, "*****"
CONTROL UNIT (ROM)	—	X	XX-XX, "*****"
ENGINE SPEED SIG	X	X	XX-XX, "*****"
LINE PRESSURE S/V	X	X	XX-XX, "*****"
OVERRUN CLUTCH S/V	X	X	XX-XX, "*****"
SHIFT SOLENOID/V A	X	X	XX-XX, "*****"
SHIFT SOLENOID/V B	X	X	XX-XX, "*****"
T/C CLUTCH SOL/V	X	X	XX-XX, "*****"
THROTTLE POSI SEN	X	X	XX-XX, "*****"
TURBINE SENSOR	X	X	XX-XX, "*****"
VHCL SPEED SEN-A/T	X	X	XX-XX, "*****"
VHCL SPEED SEN-MTR	X	X	XX-XX, "*****"

SYMPTOM DIAGNOSIS

SYSTEM SYMPTOM

Symptom Chart

INFOID:0000000001714345

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-583
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	XX-XX, "*****" and XX-XX, "*****"
			3. Engine speed signal	XX-XX, "*****"
			4. A/T fluid temperature sensor	XX-XX, "*****"
			5. Line pressure test	XX-XX, "*****"
			6. Torque converter clutch solenoid valve	XX-XX, "*****"
			7. Control valve assembly	XX-XX, "*****"
		OFF vehicle	8. Torque converter	XX-XX, "*****"
	Torque converter clutch piston slip.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Accelerator pedal position sensor	EC-583
			3. Line pressure test	TM-178
			4. Torque converter clutch solenoid valve	XX-XX, "*****"
			5. Line pressure solenoid valve	XX-XX, "*****"
			6. Control valve assembly	XX-XX, "*****"
		OFF vehicle	7. Torque converter	XX-XX, "*****"
	Lock-up point is extremely high or low.	ON vehicle	1. Accelerator pedal position sensor	EC-583
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	XX-XX, "*****" and XX-XX, "*****"
			3. Torque converter clutch solenoid valve	XX-XX, "*****"
			4. Control valve assembly	XX-XX, "*****"

Items	Symptom	Condition	Diagnostic item	Reference page
Shift Shock	Sharp shock in shifting from “N” to “D” position.	ON vehicle	1. Engine idling speed	XX-XX, "*****" (Type 1), XX-XX, "*****" (Type 2)
			2. Accelerator pedal position sensor	EC-297 (Type 1), EC-583 (Type 2)
			3. Line pressure test	TM-178
			4. A/T fluid temperature sensor	TM-48 (Type 1), XX-XX, "*****" (Type 2)
			5. Engine speed signal	TM-56 (Type 1), XX-XX, "*****" (Type 2)
			6. Line pressure solenoid valve	TM-81 (Type 1), XX-XX, "*****" (Type 2)
			7. Control valve assembly	XX-XX, "*****"
			8. Accumulator N-D	XX-XX, "*****"
		OFF vehicle	9. Forward clutch	XX-XX, "*****"
	Too sharp a shock in changing from D_1 to D_2.	ON vehicle	1. Accelerator pedal position sensor	EC-297 (Type 1), EC-583 (Type 2)
			2. Line pressure test	TM-178
			3. Accumulator servo release	XX-XX, "*****"
			4. Control valve assembly	XX-XX, "*****"
			5. A/T fluid temperature sensor	TM-48 (Type 1), XX-XX, "*****" (Type 2)
		OFF vehicle	6. Brake band	XX-XX, "*****"
	Too sharp a shock in changing from D_2 to D_3.	ON vehicle	1. Accelerator pedal position sensor	EC-297 (Type 1), EC-583 (Type 2)
			2. Line pressure test	TM-178
			3. Control valve assembly	XX-XX, "*****"
		OFF vehicle	4. High clutch	XX-XX, "*****"
			5. Brake band	XX-XX, "*****"
	Too sharp a shock in changing from D_3 to D_4.	ON vehicle	1. Accelerator pedal position sensor	EC-297 (Type 1), EC-583 (Type 2)
			2. Line pressure test	TM-178
			3. Control valve assembly	XX-XX, "*****"
		OFF vehicle	4. Brake band	XX-XX, "*****"
			5. Overrun clutch	XX-XX, "*****"
			6. Forward one-way clutch	XX-XX, "*****"
	Gear change shock during deceleration by releasing accelerator pedal.	ON vehicle	1. Accelerator pedal position sensor	EC-297 (Type 1), EC-583 (Type 2)
			2. Line pressure test	TM-178
			3. Overrun clutch solenoid valve	TM-93 (Type 1), XX-XX, "*****" (Type 2)
			4. Control valve assembly	XX-XX, "*****"
	Large shock in changing from 1_2 to 1_1 in “1” position.	ON vehicle	1. Control valve assembly	XX-XX, "*****"
		OFF vehicle	2. Low & reverse brake	XX-XX, "*****"

Items	Symptom	Condition	Diagnostic item	Reference page
Improper Shift Timing	Too high a gear change point from D_1 to D_2, from D_2 to D_3, from D_3 to D_4.	ON vehicle	1. Accelerator pedal position sensor	EC-583
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	XX-XX, "*****" and XX-XX, "*****"
			3. Shift solenoid valve A	XX-XX, "*****"
			4. Shift solenoid valve B	XX-XX, "*****"
	Gear change directly from D_1 to D_3 occurs.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Accumulator servo release	XX-XX, "*****"
		OFF vehicle	3. Brake band	XX-XX, "*****"
	Too high a change point from D_4 to D_3, from D_3 to D_2, from D_2 to D_1.	ON vehicle	1. Accelerator pedal position sensor	EC-583
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	XX-XX, "*****" and XX-XX, "*****"
	Kickdown does not operate when depressing accelerator pedal in D_4 within kickdown vehicle speed.	ON vehicle	1. Accelerator pedal position sensor	EC-583
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	XX-XX, "*****" and XX-XX, "*****"
			3. Shift solenoid valve A	XX-XX, "*****"
			4. Shift solenoid valve B	XX-XX, "*****"
	Kickdown operates or engine overruns when depressing accelerator pedal in D_4 beyond kickdown vehicle speed limit.	ON vehicle	1. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	XX-XX, "*****" and XX-XX, "*****"
			2. Accelerator pedal position sensor	EC-583
			3. Shift solenoid valve A	XX-XX, "*****"
			4. Shift solenoid valve B	XX-XX, "*****"
	Gear change from 2_2 to 2_3 in “2” position.	ON vehicle	1. PNP switch adjustment	XX-XX, "*****"
			2. Control cable adjustment	XX-XX, "*****"
	Gear change from 1_1 to 1_2 in “1” position.	ON vehicle	1. PNP switch adjustment	XX-XX, "*****"
			2. Control cable adjustment	XX-XX, "*****"

Items	Symptom	Condition	Diagnostic item	Reference page
No Down Shift	Failure to change gear from D_4 to D_3.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Accelerator pedal position sensor	EC-583
			3. Overrun clutch solenoid valve	XX-XX, "*****"
			4. Shift solenoid valve A	XX-XX, "*****"
			5. Line pressure solenoid valve	XX-XX, "*****"
			6. Control valve assembly	XX-XX, "*****"
		OFF vehicle	7. Brake band	XX-XX, "*****"
			8. Overrun clutch	XX-XX, "*****"
	Failure to change gear from D_3 to D_2 or from D_4 to D_2.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Accelerator pedal position sensor	EC-583
			3. Shift solenoid valve A	XX-XX, "*****"
			4. Shift solenoid valve B	XX-XX, "*****"
			5. Control valve assembly	XX-XX, "*****"
		OFF vehicle	6. High clutch	XX-XX, "*****"
			7. Brake band	XX-XX, "*****"
	Failure to change gear from D_2 to D_1 or from D_3 to D_1.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Accelerator pedal position sensor	EC-583
			3. Shift solenoid valve A	XX-XX, "*****"
			4. Shift solenoid valve B	XX-XX, "*****"
			5. Control valve assembly	XX-XX, "*****"
		OFF vehicle	6. Low one-way clutch	XX-XX, "*****"
			7. High clutch	XX-XX, "*****"
			8. Brake band	XX-XX, "*****"
	Failure to change from D_3 to 2_2 when shifting selector lever into “2” position. XX-XX, "*****"	ON vehicle	1. Accelerator pedal position sensor	EC-583
			2. Shift solenoid valve B	XX-XX, "*****"
			3. Control valve assembly	XX-XX, "*****"
			4. Control cable adjustment	XX-XX, "*****"
		OFF vehicle	5. Brake band	XX-XX, "*****"
No Down Shift	Does not change from 1_2 to 1_1 in 1st position.	ON vehicle	1. PNP switch adjustment	XX-XX, "*****"
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	XX-XX, "*****" and XX-XX, "*****"
			3. Shift solenoid valve A	XX-XX, "*****"
			4. Control valve assembly	XX-XX, "*****"
			5. Overrun clutch solenoid valve	XX-XX, "*****"
		OFF vehicle	6. Overrun clutch	XX-XX, "*****"
			7. Low & reverse brake	XX-XX, "*****"

Items	Symptom	Condition	Diagnostic item	Reference page
No Up Shift	Failure to change gear from D_1 to D_2.	ON vehicle	1. Control cable adjustment	XX-XX, "*****"
			2. Shift solenoid valve A	XX-XX, "*****"
			3. Control valve assembly	XX-XX, "*****"
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	XX-XX, "*****" and XX-XX, "*****"
			5. Accelerator pedal position sensor	EC-583
		OFF vehicle	6. Brake band	XX-XX, "*****"
	Failure to change gear from D_2 to D_3.	ON vehicle	1. Control cable adjustment	XX-XX, "*****"
			2. Shift solenoid valve B	XX-XX, "*****"
			3. Control valve assembly	XX-XX, "*****"
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	XX-XX, "*****" and XX-XX, "*****"
			5. Accelerator pedal position sensor	EC-583
		OFF vehicle	6. High clutch	XX-XX, "*****"
			7. Brake band	XX-XX, "*****"
	Failure to change gear from D_3 to D_4.	ON vehicle	1. PNP switch adjustment	XX-XX, "*****"
			2. Overdrive control switch	XX-XX, "*****"
			3. Control cable adjustment	XX-XX, "*****"
			4. Shift solenoid valve A	XX-XX, "*****"
			5. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	XX-XX, "*****" and XX-XX, "*****"
			6. A/T fluid temperature sensor	XX-XX, "*****"
		OFF vehicle	7. Brake band	XX-XX, "*****"
No Up Shift	A/T does not shift to D_4 when driving with OD ON. (OD OFF indicator lamp is off.)	ON vehicle	1. Accelerator pedal position sensor	EC-583
			2. PNP switch adjustment	XX-XX, "*****"
			3. Overdrive control switch	XX-XX, "*****"
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	XX-XX, "*****" and XX-XX, "*****"
			5. Shift solenoid valve A	XX-XX, "*****"
			6. Overrun clutch solenoid valve	XX-XX, "*****"
			7. Control valve assembly	XX-XX, "*****"
			8. A/T fluid temperature sensor	XX-XX, "*****"
			9. Line pressure solenoid valve	XX-XX, "*****"
		OFF vehicle	10. Brake band	XX-XX, "*****"
			11. Overrun clutch	XX-XX, "*****"

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	XX-XX, "*****"
			2. Stall test	XX-XX, "*****"
			3. Line pressure test	TM-178
			4. Line pressure solenoid valve	XX-XX, "*****"
			5. Control valve assembly	XX-XX, "*****"
		OFF vehicle	6. Reverse clutch	XX-XX, "*****"
			7. High clutch	XX-XX, "*****"
			8. Forward clutch	XX-XX, "*****"
			9. Overrun clutch	XX-XX, "*****"
			10. Low & reverse brake	XX-XX, "*****"
	Vehicle will not run in “D” and “2” positions (but runs in “1” and “R” positions).	ON vehicle	1. Control cable adjustment	XX-XX, "*****"
		OFF vehicle	2. Low one-way clutch	XX-XX, "*****"

Items	Symptom	Condition	Diagnostic item	Reference page
Slips/Will Not Engage	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	XX-XX, "*****"
			2. Stall test	TM-175
			3. Line pressure test	TM-178
			4. Line pressure solenoid valve	XX-XX, "*****"
			5. Control valve assembly	XX-XX, "*****"
			6. Accumulator N-D	XX-XX, "*****"
		OFF vehicle	7. Reverse clutch	XX-XX, "*****"
			8. High clutch	XX-XX, "*****"
			9. Forward clutch	XX-XX, "*****"
			10. Forward one-way clutch	XX-XX, "*****"
			11. Low one-way clutch	XX-XX, "*****"
	Clutches or brakes slip somewhat in starting.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Control cable adjustment	XX-XX, "*****"
			3. Accelerator pedal position sensor	EC-583
			4. Line pressure test	TM-178
			5. Line pressure solenoid valve	XX-XX, "*****"
			6. Control valve assembly	XX-XX, "*****"
			7. Accumulator N-D	XX-XX, "*****"
		OFF vehicle	8. Forward clutch	XX-XX, "*****"
			9. Reverse clutch	XX-XX, "*****"
			10. Low & reverse brake	XX-XX, "*****"
			11. Oil pump	XX-XX, "*****"
			12. Torque converter	XX-XX, "*****"
	No creep at all. XX-XX, "*****", XX-XX, "*****"	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Line pressure test	TM-178
			3. Control valve assembly	XX-XX, "*****"
		OFF vehicle	4. Forward clutch	XX-XX, "*****"
			5. Oil pump	XX-XX, "*****"
			6. Torque converter	XX-XX, "*****"
	Almost no shock or clutches slipping in change from D_1 to D_2.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Accelerator pedal position sensor	EC-583
			3. Line pressure test	TM-178
			4. Accumulator servo release	XX-XX, "*****"
			5. Control valve assembly	XX-XX, "*****"
		OFF vehicle	6. Brake band	XX-XX, "*****"

Items	Symptom	Condition	Diagnostic item	Reference page
Slips/Will Not Engage	Almost no shock or slipping in changing from D_2 to D_3.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Accelerator pedal position sensor	EC-583
			3. Line pressure test	TM-178
			4. Control valve assembly	XX-XX, "*****"
		OFF vehicle	5. High clutch	XX-XX, "*****"
			6. Forward clutch	XX-XX, "*****"
	Almost no shock or slipping in changing from D_3 to D_4.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Accelerator pedal position sensor	EC-583
			3. Line pressure test	TM-178
			4. Control valve assembly	XX-XX, "*****"
		OFF vehicle	5. Brake band	XX-XX, "*****"
	Races extremely fast or slips in changing from D_4 to D_3 when depressing accelerator pedal.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Accelerator pedal position sensor	EC-583
			3. Line pressure test	TM-178
			4. Line pressure solenoid valve	XX-XX, "*****"
			5. Shift solenoid valve A	XX-XX, "*****"
			6. Control valve assembly	XX-XX, "*****"
		OFF vehicle	7. Brake band	XX-XX, "*****"
			8. Forward clutch	XX-XX, "*****"
	Races extremely fast or slips in changing from D_4 to D_2 when depressing accelerator pedal.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Accelerator pedal position sensor	EC-583
			3. Line pressure test	TM-178
			4. Line pressure solenoid valve	XX-XX, "*****"
			5. Shift solenoid valve A	XX-XX, "*****"
			6. Shift solenoid valve B	XX-XX, "*****"
			7. Control valve assembly	XX-XX, "*****"
		OFF vehicle	8. Brake band	XX-XX, "*****"
			9. Forward clutch	XX-XX, "*****"

Items	Symptom	Condition	Diagnostic item	Reference page
Slips/Will Not Engage	Races extremely fast or slips in changing from D_3 to D_2 when depressing accelerator pedal.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Accelerator pedal position sensor	EC-583
			3. Line pressure test	TM-178
			4. Line pressure solenoid valve	XX-XX, "*****"
			5. Shift solenoid valve B	XX-XX, "*****"
			6. Control valve assembly	XX-XX, "*****"
		OFF vehicle	7. Brake band	XX-XX, "*****"
			8. High clutch	XX-XX, "*****"
	Races extremely fast or slips in changing from D_4 or D_3 to D_1 when depressing accelerator pedal.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Accelerator pedal position sensor	EC-583
			3. Line pressure test	TM-178
			4. Line pressure solenoid valve	XX-XX, "*****"
			5. Shift solenoid valve A	XX-XX, "*****"
			6. Shift solenoid valve B	XX-XX, "*****"
			7. Control valve assembly	XX-XX, "*****"
		OFF vehicle	8. Forward clutch	XX-XX, "*****"
			9. Forward one-way clutch	XX-XX, "*****"
			10. Low one-way clutch	XX-XX, "*****"
	Vehicle will not run in any position.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Control cable adjustment	XX-XX, "*****"
			3. Line pressure test	TM-178
			4. Line pressure solenoid valve	XX-XX, "*****"
		OFF vehicle	5. Oil pump	XX-XX, "*****"
			6. High clutch	XX-XX, "*****"
			7. Brake band	XX-XX, "*****"
			8. Low & reverse brake	XX-XX, "*****"
			9. Torque converter	XX-XX, "*****"
			10. Parking components	XX-XX, "*****"
Others	Engine cannot be started in “P” and “N” positions. XX-XX, "*****"	ON vehicle	1. Ignition switch and starter	XX-XX, "*****", XX-XX, "*****"
			2. Control cable adjustment	XX-XX, "*****"
			3. PNP switch adjustment	XX-XX, "*****"
	Engine starts in positions other than “P” and “N”.	ON vehicle	1. Control cable adjustment	XX-XX, "*****"
			2. PNP switch adjustment	XX-XX, "*****"

Items	Symptom	Condition	Diagnostic item	Reference page
Others	Transaxle noise in“ P” and “N” positions.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Line pressure test	TM-178
			3. Accelerator pedal position sensor	EC-583
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	XX-XX, "*****" and XX-XX, "*****"
		OFF vehicle	5. Oil pump	XX-XX, "*****"
			6. Torque converter	XX-XX, "*****"
	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	XX-XX, "*****"
		OFF vehicle	2. Parking components	XX-XX, "*****"
	Vehicle runs in “N” position. XX-XX, "*****"	ON vehicle	1. Control cable adjustment	XX-XX, "*****"
		OFF vehicle	2. Forward clutch	XX-XX, "*****"
			3. Reverse clutch	XX-XX, "*****"
			4. Overrun clutch	XX-XX, "*****"
	Vehicle braked when shifting into “R” position.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Control cable adjustment	XX-XX, "*****"
			3. Line pressure test	TM-178
			4. Line pressure solenoid valve	XX-XX, "*****"
			5. Control valve assembly	XX-XX, "*****"
		OFF vehicle	6. High clutch	XX-XX, "*****"
			7. Brake band	XX-XX, "*****"
			8. Forward clutch	XX-XX, "*****"
			9. Overrun clutch	XX-XX, "*****"
	Excessive creep.	ON vehicle	1. Engine idling speed	EC-389
	Engine stops when shifting lever into “R”, “D”, “2” and “1” positions.	ON vehicle	1. Engine idling speed	EC-389
			2. A/T fluid level	XX-XX, "*****"
			3. Torque converter clutch solenoid valve	XX-XX, "*****"
			4. Control valve assembly	XX-XX, "*****"
		OFF vehicle	5. Torque converter	XX-XX, "*****"
	Vehicle braked by gear change from D_1 to D_2.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
		OFF vehicle	2. Reverse clutch	XX-XX, "*****"
			3. Low & reverse brake	XX-XX, "*****"
			4. High clutch	XX-XX, "*****"
			5. Low one-way clutch	XX-XX, "*****"
	Vehicle braked by gear change from D_2 to D_3.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
		OFF vehicle	2. Brake band	XX-XX, "*****"

Items	Symptom	Condition	Diagnostic item	Reference page
Others	Vehicle braked by gear change from D_3 to D_4.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
		OFF vehicle	2. Overrun clutch	XX-XX, "*****"
			3. Forward one-way clutch	XX-XX, "*****"
			4. Reverse clutch	XX-XX, "*****"
	Maximum speed not attained. Poor acceleration.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. PNP switch adjustment	XX-XX, "*****"
			3. Overdrive control switch	XX-XX, "*****"
			4. Accelerator pedal position sensor	EC-583
			5. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	XX-XX, "*****" and XX-XX, "*****"
			6. Shift solenoid valve A	XX-XX, "*****"
			7. Shift solenoid valve B	XX-XX, "*****"
			8. Control valve assembly	XX-XX, "*****"
		OFF vehicle	9. Reverse clutch	XX-XX, "*****"
			10. High clutch	XX-XX, "*****"
			11. Brake band	XX-XX, "*****"
			12. Low & reverse brake	XX-XX, "*****"
			13. Oil pump	XX-XX, "*****"
			14. Torque converter	XX-XX, "*****"
	Transaxle noise in “D”, “2”, “1” and “R” positions.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
		OFF vehicle	2. Torque converter	XX-XX, "*****"
	Engine brake does not operate in “1” position.	ON vehicle	1. PNP switch adjustment	XX-XX, "*****"
			2. Control cable adjustment	XX-XX, "*****"
			3. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	XX-XX, "*****" and XX-XX, "*****"
			4. Control valve assembly	XX-XX, "*****"
			5. Overrun clutch solenoid valve	XX-XX, "*****"
		OFF vehicle	6. Overrun clutch	XX-XX, "*****"
			7. Low & reverse brake	XX-XX, "*****"

Items	Symptom	Condition	Diagnostic item	Reference page
Others	Transaxle overheats.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
			2. Engine idling speed	EC-389
			3. Accelerator pedal position sensor	EC-583
			4. Line pressure test	TM-178
			5. Line pressure solenoid valve	XX-XX, "*****"
			6. Control valve assembly	XX-XX, "*****"
		OFF vehicle	7. Oil pump	XX-XX, "*****"
			8. Reverse clutch	XX-XX, "*****"
			9. High clutch	XX-XX, "*****"
			10. Brake band	XX-XX, "*****"
			11. Forward clutch	XX-XX, "*****"
			12. Overrun clutch	XX-XX, "*****"
			13. Low & reverse brake	XX-XX, "*****"
			14. Torque converter	XX-XX, "*****"
	ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
		OFF vehicle	2. Reverse clutch	XX-XX, "*****"
			3. High clutch	XX-XX, "*****"
			4. Brake band	XX-XX, "*****"
			5. Forward clutch	XX-XX, "*****"
			6. Overrun clutch	XX-XX, "*****"
			7. Low & reverse brake	XX-XX, "*****"
	Unusual smell at A/T fluid charging pipe.	ON vehicle	1. A/T fluid level	XX-XX, "*****"
		OFF vehicle	2. Torque converter	XX-XX, "*****"
			3. Oil pump	XX-XX, "*****"
			4. Reverse clutch	XX-XX, "*****"
			5. High clutch	XX-XX, "*****"
			6. Brake band	XX-XX, "*****"
			7. Forward clutch	XX-XX, "*****"
			8. Overrun clutch	XX-XX, "*****"
			9. Low & reverse brake	XX-XX, "*****"

OD OFF Indicator Lamp Does Not Come On

INFOID:0000000001714346

SYMPTOM:
OD OFF indicator lamp does not come on for about 2 seconds when turning ignition switch to ON.

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-350, "Diagnosis Procedure without CONSULT-III".

Is a malfunction in CAN communication indicated in the results?

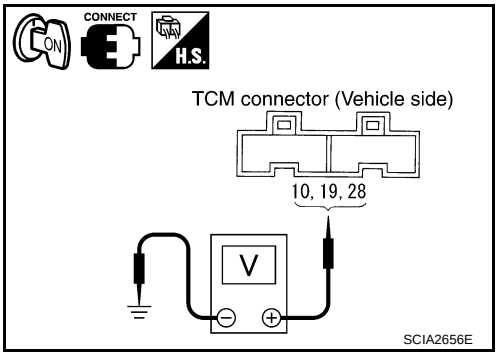
YES >> Check CAN communication line. Refer to XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).
NO >> GO TO 2.

2.CHECK TCM POWER SOURCE

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground.

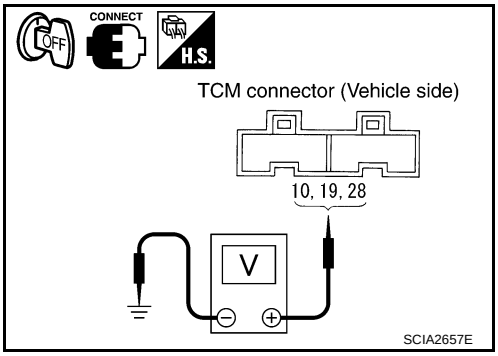
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Item	Connector	Terminal	Judgement standard (Approx.)
TCM connector	E31	10	Battery voltage
		19	
	E32	28	



3. Turn ignition switch OFF.
4. Check voltage between TCM connector terminals and ground.

Item	Connector	Terminal	Judgement standard (Approx.)
TCM connector	E31	10	0V
		19	0V
	E32	28	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
- Harness for short or open between battery and TCM connector terminal 28
- 10A fuse (No.13, located in the fuse block) and 10A fuse (No.49, located in the IPDM E/R)
- Ignition switch.

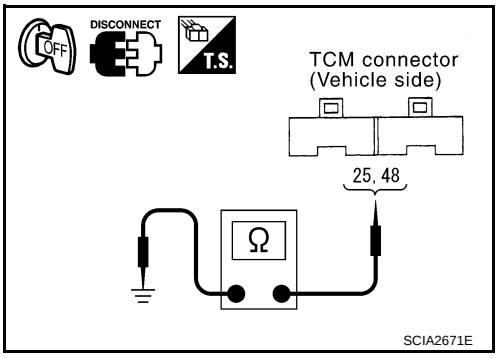
OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK TCM GROUND CIRCUIT

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

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.

OK or NG

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

6. CHECK SYMPTOM

Check again. Refer to TM-180, "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 XX-XX, "*****" (Type 1) or TM-422, "Reference Value" (Type 2).
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.

Engine Cannot Be Started in "P" and "N" Position

INFOID:0000000001714347

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.**

1.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis. Refer to XX-XX, "*****" or XX-XX, "*****".

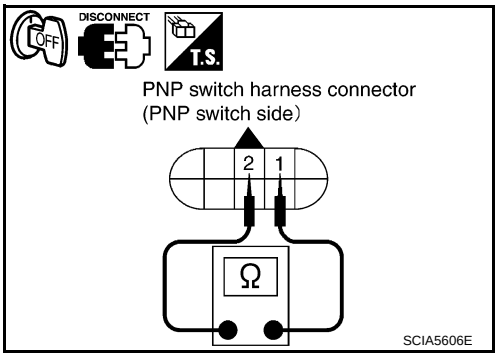
Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to XX-XX, "*****" or XX-XX, "*****".
NO >> GO TO 2.

2.CHECK PNP SWITCH

Check continuity between PNP switch harness connector terminals.

Selector lever position	Connector	terminal	Continuity
“P”, “N”	F25	1 - 2	Yes
Other positions			No



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.CHECK CONTROL CABLE ADJUSTMENT

Check PNP switch again with control cable disconnected from manual shaft of A/T assembly. Refer to test group 2.

OK or NG

OK >> Adjust control cable. Refer to TM-204, "Adjustment of A/T Position".
NG >> 1. Check PNP switch (Refer to test group 2.) again after adjusting PNP switch (Refer to TM-46).
- If OK, **INSPECTION END**
- If NG, repair or replace PNP switch. Refer to TM-195, "Park/Neutral Position (PNP) Switch".

4.CHECK STARTING SYSTEM

Check starting system. Refer to STR-6, "System Description".

OK or NG

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

In "P" Position, Vehicle Moves Forward or Backward When Pushed

INFOID:0000000001714348

SYMPTOM:
Vehicle moves when it is pushed forward or backward with selector lever in “P” position.

1.CHECK A/T POSITION

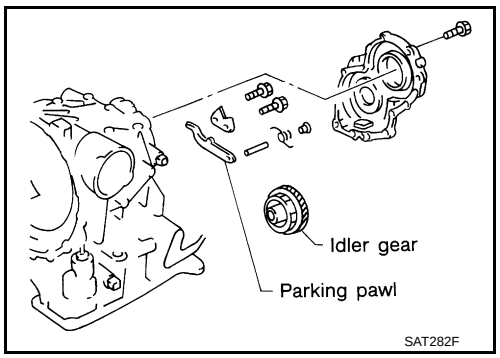
Check A/T position. Refer to TM-204, "Checking of A/T Position".

OK or NG

OK >> GO TO 2.
NG >> Adjust A/T position. Refer to TM-204, "Adjustment of A/T Position".

2.CHECK PARKING COMPONENTS

Check parking components. Refer to TM-213, "Component" and TM-222, "Disassembly".



OK or NG

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

In "N" Position, Vehicle Moves

INFOID:0000000001714349

SYMPTOM:
Vehicle moves forward or backward when selecting “N” position.

1.CHECK A/T POSITION

Check A/T position. Refer to TM-204, "Checking of A/T Position".

OK or NG

OK >> GO TO 2.
NG >> Adjust A/T position. Refer to TM-204, "Adjustment of A/T Position".

2.CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to TM-171, "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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

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

4.DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to TM-222, "Disassembly".
2. Check the following items:

- Forward clutch assembly. Refer to TM-267, "Forward and Overrun Clutches".
- Overrun clutch assembly. Refer to TM-267, "Forward and Overrun Clutches".
- Reverse clutch assembly. Refer to TM-258, "Reverse Clutch".

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5.CHECK SYMPTOM

Check again. Refer to TM-181, "Check at Idle".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6.CHECK TCM

1. Check TCM input/output signals. Refer to TM-22, "Input/Output Signal of TCM".
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

INFOID:0000000001714350

SYMPTOM:
There is a large shock when changing from “N” to “R” position.

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to TM-35, "CONSULT-III Function (TRANSMISSION)" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to TM-38, "Diagnosis Procedure without CONSULT-III".
NO >> GO TO 2.

2.CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “D” position. Refer to TM-178, "Inspection and Judgment".

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-240, "Oil Pump".

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK SYMPTOM

Check again. Refer to TM-181, "Check at Idle".

OK or NG

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

5.CHECK TCM

1. Check TCM input/output signals. Refer to TM-22, "Input/Output Signal of TCM".
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

INFOID:0000000001714351

SYMPTOM:
Vehicle does not creep backward when selecting “R” position.

1.CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to TM-171, "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 TM-178, "Inspection and Judgment".

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following item:
- Oil pump assembly. Refer to TM-240, "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 TM-175, "Inspection and Judgment".

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 TM-222, "Disassembly".
2. Check the following items:
- Low & reverse brake assembly. Refer to TM-273, "Low & Reverse Brake".
- Reverse clutch assembly. Refer to TM-258, "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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7.DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to TM-222, "Disassembly".
2. Check the following items:
- Reverse clutch assembly. Refer to TM-258, "Reverse Clutch".
- High clutch assembly. Refer to TM-262, "High Clutch".
- Low & reverse brake assembly. Refer to TM-273, "Low & Reverse Brake".
- Forward clutch assembly. Refer to TM-267, "Forward and Overrun Clutches".
- Overrun clutch assembly. Refer to TM-267, "Forward and Overrun Clutches".

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

8.CHECK SYMPTOM

Check again. Refer to TM-181, "Check at Idle".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 9.

9.CHECK TCM

1. Check TCM input/output signals. Refer to TM-22, "Input/Output Signal of TCM".
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

INFOID:0000000001714352

SYMPTOM:
Vehicle does not creep forward when selecting “D”, “2” or “1” position.

1.CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to TM-171, "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 TM-178, "Inspection and Judgment".

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following item:

- Oil pump assembly. Refer to TM-240, "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 TM-175, "Inspection and Judgment".

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5.DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to TM-222, "Disassembly".
2. Check the following items:

- Oil pump assembly. Refer to TM-240, "Oil Pump".
- Forward clutch assembly. Refer to TM-267, "Forward and Overrun Clutches".
- Forward one-way clutch. Refer to TM-278, "Rear Internal Gear and Forward Clutch Hub".
- Low one-way clutch. Refer to TM-222, "Disassembly".
- Torque converter. Refer to TM-222, "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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 7.
NG >> GO TO 5.

7. CHECK SYMPTOM

Check again. Refer to TM-181, "Check at Idle".

OK or NG

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

8. CHECK TCM

1. Check TCM input/output signals. Refer to TM-22, "Input/Output Signal of TCM".
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

INFOID:0000000001714353

SYMPTOM:
Vehicle cannot be started from D1 on “Cruise Test — Part 1”.

1. CHECK SYMPTOM

Check symptom. Refer to TM-181, "Check at Idle".

Is “Vehicle Dose Not Creep Backward in “R” Position” OK?

OK >> GO TO 2.
NG >> GO TO TM-444, "Vehicle Does Not Creep Backward in "R" Position".

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to XX-XX, "*****" or XX-XX, "*****".
NO >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

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 TM-178, "Inspection and Judgment".

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following items:

- Forward clutch assembly. Refer to TM-267, "Forward and Overrun Clutches".
- Low one-way clutch. Refer to TM-222, "Disassembly".
- Forward one-way clutch. Refer to TM-278, "Rear Internal Gear and Forward Clutch Hub".
- High clutch assembly. Refer to TM-262, "High Clutch".
- Torque converter. Refer to TM-222, "Disassembly".
- Oil pump assembly. Refer to TM-240, "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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 7.
NG >> GO TO 5.

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-183, "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 TM-22, "Input/Output Signal of TCM".
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: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$

INFOID:0000000001714354

SYMPTOM:
A/T does not shift from D_1 to D_2 at the specified speed on "Cruise Test — Part 1".
A/T does not shift from D_4 to D_2 when depressing accelerator pedal fully at the specified speed on "Cruise Test — Part 2".

1. CHECK SYMPTOM

Check symptom. Refer to TM-181, "Check at Idle" and TM-183, "Cruise Test - Part 1".

Are "Vehicle Dose Not Creep Forward in "D", "2" or "1" Position" and "Vehicle Cannot Be Started from D_1" OK?

YES >> GO TO 2.
NG >> GO TO TM-446, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" and TM-447, "Vehicle Cannot Be Started from D_1".

2. CHECK A/T POSITION

Check A/T position. Refer to TM-204, "Checking of A/T Position".

OK or NG

OK >> GO TO 3.
NG >> Adjust A/T position. Refer to TM-204, "Adjustment of A/T Position".

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 XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2) and XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

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 XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following items:
- Servo piston assembly
- Brake band

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to TM-191, "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 TM-183, "Cruise Test - Part 1" and TM-185, "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 TM-22, "Input/Output Signal of TCM".
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: $D_2 \rightarrow D_3$

INFOID:0000000001714355

SYMPTOM:
A/T does not shift from D_2 to D_3 at the specified speed on "Cruise Test — Part 1" and "Cruise Test — Part 2".

1.CHECK SYMPTOM

Check symptom. Refer to TM-181, "Check at Idle" and TM-183, "Cruise Test - Part 1".

Are "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" and "Vehicle Cannot Be Started from D_1" OK?

YES >> GO TO 2.
NO >> Go to TM-446, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" and TM-447, "Vehicle Cannot Be Started from D_1".

2.CHECK A/T POSITION

Check A/T position. Refer to TM-204, "Checking of A/T Position".

OK or NG

OK >> GO TO 3.
NG >> Adjust A/T position. Refer to TM-204, "Adjustment of A/T Position".

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 XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2) and XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

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 XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following items:

- Servo piston assembly
- High clutch assembly. Refer to TM-262, "High Clutch".
- Oil pump assembly. Refer to TM-240, "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 TM-191, "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.

8. CHECK SYMPTOM

Check again. Refer to TM-183, "Cruise Test - Part 1" and TM-185, "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 TM-22, "Input/Output Signal of TCM".
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: $D_3 \rightarrow D_4$

INFOID:0000000001714356

SYMPTOM:

- **A/T does not shift from D_3 to D_4 at the specified speed on “Cruise Test — Part 1” and “Cruise Test — Part 2”.**
- **A/T must be warm before D_3 to D_4 shift will occur.**

1. CHECK SYMPTOM

Check symptom. Refer to TM-181, "Check at Idle" and TM-183, "Cruise Test - Part 1".

Are “Vehicle Does Not Creep Forward in “D”, “2” or “1” Position” and “Vehicle Cannot Be Started from D_1” OK?

YES >> GO TO 2.
NO >> Go to TM-446, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" and TM-447, "Vehicle Cannot Be Started from D_1".

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to XX-XX, "*****" or XX-XX, "*****".
NO >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following items:

- Servo piston assembly
- Brake band
- Torque converter. Refer to TM-222, "Disassembly".
- Oil pump assembly. Refer to TM-240, "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 TM-191, "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 TM-183, "Cruise Test - Part 1" and TM-185, "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 TM-22, "Input/Output Signal of TCM".
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 Perform Lock-up

INFOID:0000000001714357

SYMPTOM:
A/T does not perform lock-up at the specified speed on “Cruise Test — Part 1”.

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to XX-XX, "*****" or XX-XX, "*****".
NO >> GO TO 2.

2.CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

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 TM-191, "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 TM-222, "Disassembly".
4. Check the following items:

- Torque converter. Refer to TM-222, "Disassembly".

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4.CHECK SYMPTOM

Check again. Refer to TM-183, "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 TM-22, "Input/Output Signal of TCM".
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 Hold Lock-up Condition

INFOID:0000000001714358

SYMPTOM:
A/T does not hold lock-up condition for more than 30 seconds on “Cruise Test — Part 1”.

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to XX-XX, "*****" or XX-XX, "*****".
NO >> GO TO 2.

2.CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following items:
- Torque converter. Refer to TM-222, "Disassembly".
- Oil pump assembly. Refer to TM-240, "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 TM-191, "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.

5.CHECK SYMPTOM

Check again. Refer to TM-183, "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 TM-22, "Input/Output Signal of TCM".
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

INFOID:0000000001714359

SYMPTOM:
Lock-up is not released when accelerator pedal is released on “Cruise Test — Part 1”.

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to XX-XX, "*****" or XX-XX, "*****".
NO >> GO TO 2.

2.CHECK SYMPTOM

Check again. Refer to TM-183, "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 TM-22, "Input/Output Signal of TCM".

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.

Engine Speed Does Not Return to Idle (Light Braking D4→ D3)

INFOID:0000000001714360

SYMPTOM:
Engine speed does not smoothly return to idle when A/T shifts from D4 to D3 on “Cruise Test — Part 1”.

1.CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is any malfunction detected by self-diagnostic results?

YES >> Check the malfunctioning system. Refer to XX-XX, "*****" or XX-XX, "*****".
NO >> GO TO 2.

2.CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

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

4.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following items:
- Overrun clutch assembly. Refer to TM-267, "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 TM-191, "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.

6.CHECK SYMPTOM

Check again. Refer to TM-183, "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 TM-22, "Input/Output Signal of TCM".
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

INFOID:0000000001714361

SYMPTOM:
A/T does not shift from D4 to D3 when OD OFF (OD OFF indicator lamp is on) on "Cruise Test — Part 3".

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is a malfunction in CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).
NO >> GO TO 2.

2.CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

With CONSULT-II

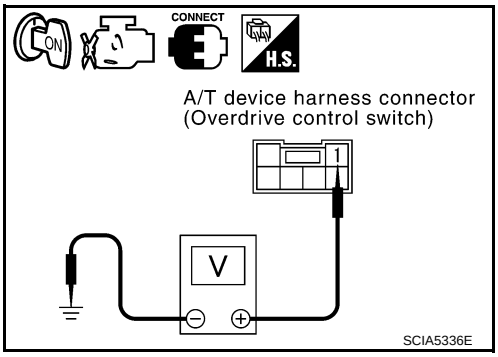
1. Turn ignition switch ON. (Do not start engine)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out "OVERDRIVE SW".
   Check the signal of the overdrive control switch is indicated properly.

Item name	Overdrive control switch Condition	Display value
OVERDRIVE SW	Depressed	ON
	Released	OFF

Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine)
2. Check voltage between A/T device harness connector terminal and ground.

Item	Connector	Terminal	Overdrive control switch Condition	Judgement standard (Approx.)
A/T device harness connector (Overdrive control switch)	M38	1 - Ground	Released	Battery voltage
			Depressed	0V



OK or NG

OK >> GO TO TM-450, "A/T Does Not Shift: D2→ D3".
NG >> Check overdrive control switch circuit. Refer to XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

A/T Does Not Shift: D3→ 22, When Selector Lever "D" → "2" Position

INFOID:0000000001714362

SYMPTOM:
A/T does not shift from D3 to 22 when changing selector lever from "D" to "2" position on "Cruise Test — Part 3".

1.CHECK SYMPTOM

Check symptom. Refer to TM-183, "Cruise Test - Part 1" or TM-185, "Cruise Test - Part 2".

Is "A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$" OK?

YES (With CONSULT-II) >>GO TO 2.
YES (Without CONSULT-II) >>GO TO 3.
NO >> GO TO TM-448, "A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$".

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.

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 circuit. Refer to TM-46, "Component Inspection".

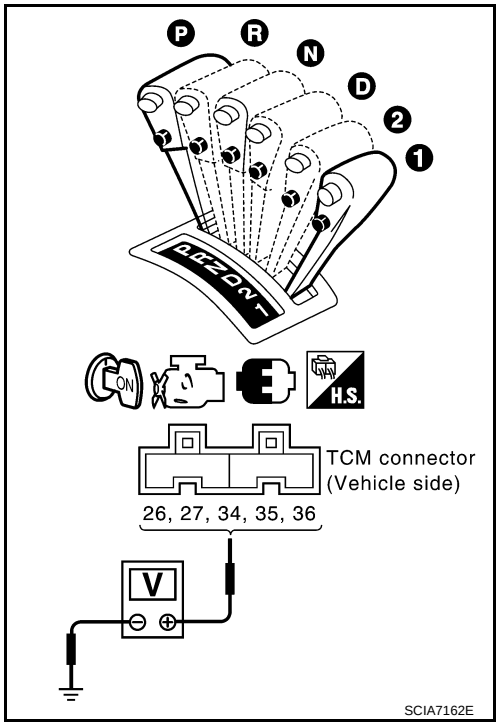
3. CHECK PNP SWITCH CIRCUIT

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.

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 circuit. Refer to TM-46, "Component Inspection".

A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever "2" → "1" Position

INFOID:0000000001714363

SYMPTOM:
A/T does not shift from 2_2 to 1_1 when changing selector lever from “2” to “1” position on “Cruise Test — Part 3”.

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

OK or NG

OK >> GO TO 3
NG >> Check PNP switch circuit. Refer to TM-46, "Component Inspection".

2.CHECK PNP SWITCH CIRCUIT

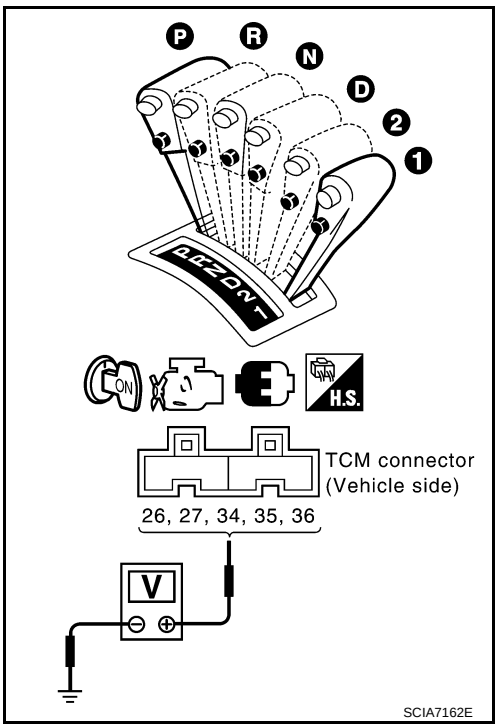
Without CONSULT-II
1. Turn ignition switch ON. (Do not start engine.)

2. Check voltage between TCM connector terminals and ground while moving selector lever through each position.

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 circuit. Refer to TM-46, "Component Inspection".

3.CHECK A/T POSITION

Check A/T position. Refer to TM-204, "Checking of A/T Position".

OK or NG

OK >> GO TO 4.

NG >> Adjust A/T position. Refer to TM-204, "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 XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2) and XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

OK or NG

OK >> GO TO 5.

NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

5.CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 7.

NG >> GO TO 6.

6.DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "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 TM-222, "Disassembly".
4. Check the following items:

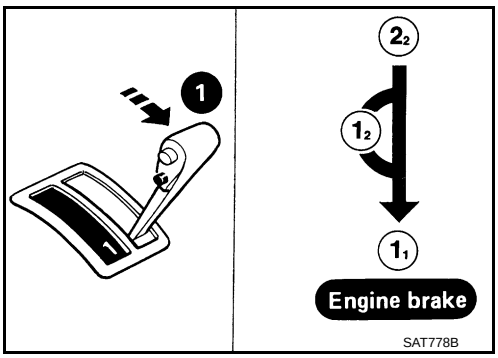
- Servo piston assembly
- Brake band

OK or NG

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

7.CHECK SYMPTOM

Check again. Refer to TM-186, "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 TM-22, "Input/Output Signal of TCM".
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

INFOID:0000000001714364

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".**

1.CHECK CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to XX-XX, "*****" or TM-38, "Diagnosis Procedure without CONSULT-III".

Is a malfunction in CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).
NO >> GO TO 2.

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.

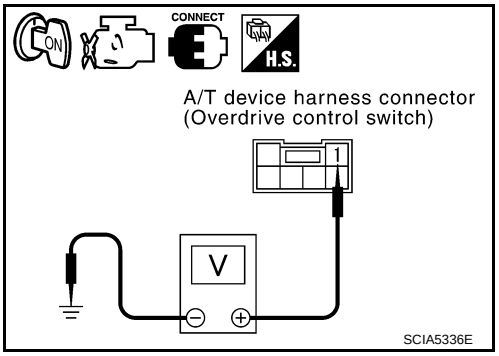
Item name	Overdrive control switch Condition	Display value
OVERDRIVE SW	Depressed	ON
	Released	OFF

Without CONSULT-II

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

2. Check voltage between A/T device harness connector terminal and ground.

Item	Connector	Terminal	Overdrive control switch Condition	Judgement standard (Approx.)
A/T device harness connector (Overdrive control switch)	M38	1 - Ground	Released	Battery voltage
			Depressed	0V



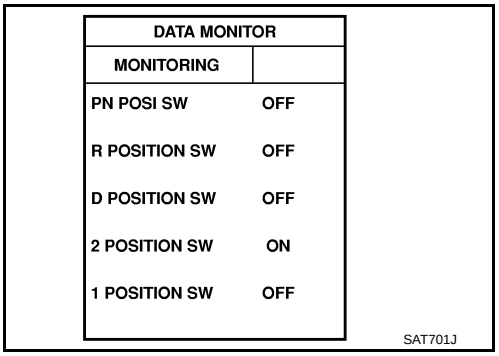
OK or NG

OK (With CONSULT-II)>>GO TO 3.
OK (Without CONSULT-II)>>GO TO 4.
NG >> Check overdrive control switch circuit. Refer to XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

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.



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 circuit. Refer to TM-46, "Component Inspection".

4.CHECK PNP SWITCH CIRCUIT

Without CONSULT-II

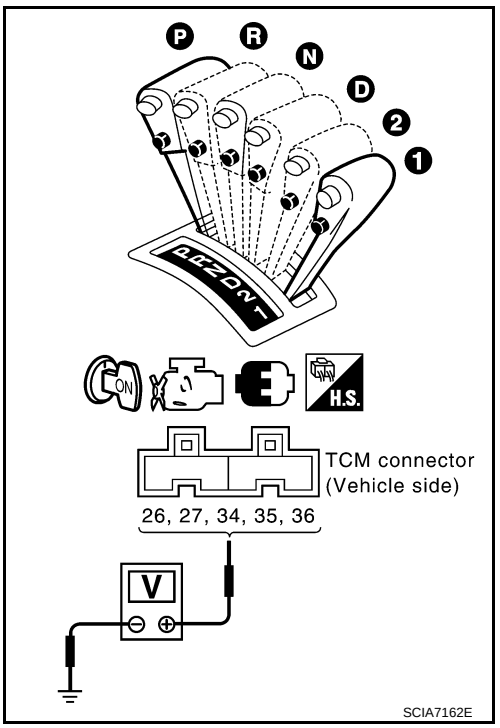
1. Turn ignition switch ON. (Do not start engine.)

2. Check voltage between TCM connector terminals and ground while moving selector lever through each position.

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 circuit. Refer to XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

5. CHECK A/T POSITION

Check A/T position. Refer to TM-204, "Checking of A/T Position".

OK or NG

OK >> GO TO 6.

NG >> Adjust A/T position. Refer to TM-204, "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 XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2) and XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

OK or NG

OK >> GO TO 7.

NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

7. CHECK ACCELERATOR PEDAL POSITION SENSOR

Check accelerator pedal position sensor. Refer to XX-XX, "*****" (type 1) or XX-XX, "*****" (type 2).

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 TM-213, "Component".
2. Check A/T fluid condition. Refer to TM-171, "Checking A/T Fluid".

OK or NG

OK >> GO TO 10.

NG >> GO TO 9.

9. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to TM-191, "Control Valve Assembly and Accumulators".
2. Check the following.

- Shift valve A
- Overrun clutch solenoid valve

3. Disassemble A/T. Refer to TM-222, "Disassembly".
4. Check the following.

- Overrun clutch assembly. Refer to TM-267, "Forward and Overrun Clutches".
- Low & reverse brake assembly. Refer to TM-273, "Low & Reverse Brake".

OK or NG

OK >> GO TO 10.
NG >> Repair or replace damaged parts.

10. CHECK SYMPTOM

Check again. Refer to TM-186, "Cruise Test - Part 3".

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 11.

11. CHECK TCM

1. Check TCM input/output signals. Refer to TM-22, "Input/Output Signal of TCM".
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.

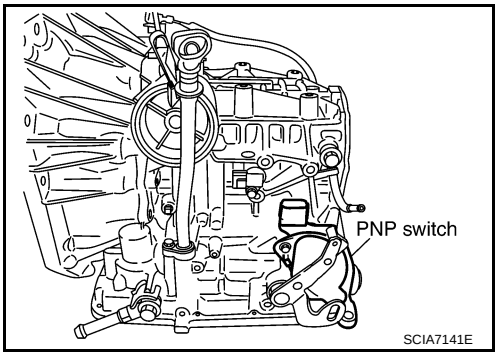
TCM Self-Diagnosis Does Not Activate

INFOID:0000000001714365

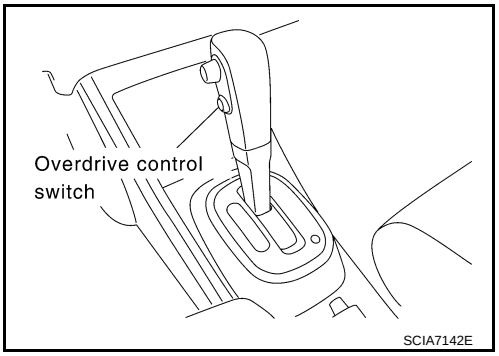
SYMPTOM:
OD OFF indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

DESCRIPTION

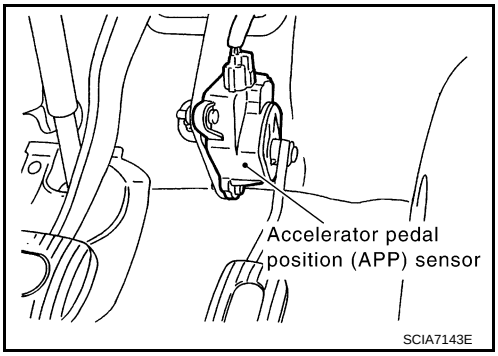
- PNP switch
  PNP switch assembly includes a transaxle position switch. The transaxle position switch detects the selector lever position and sends a signal to the TCM.



- Overdrive control switch
  Overdrive control switch detects the switch position (ON or OFF) and sends a signal 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 stitch, overdrive control switch, closed throttle position signal and wide open throttle position signal circuit. Refer to TM-115, "Component Inspection".

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000001723044

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. 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.**

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:0000000001723045

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYSTEM).
- 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 NATS, 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.

Precaution for On Board Diagnosis (OBD) System of A/T and Engine (For Type1 Only)

INFOID:0000000001723046

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.

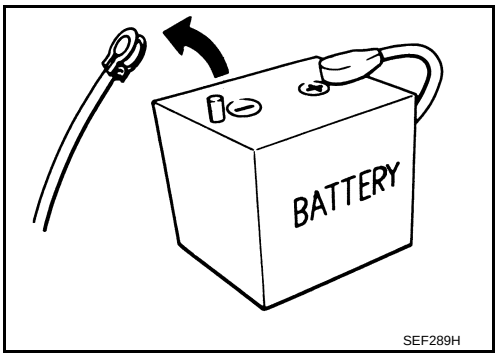
CAUTION:

- **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.**

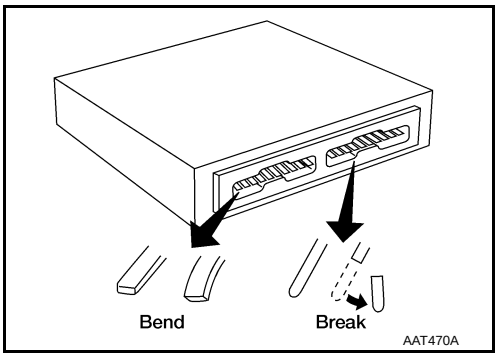
Precaution

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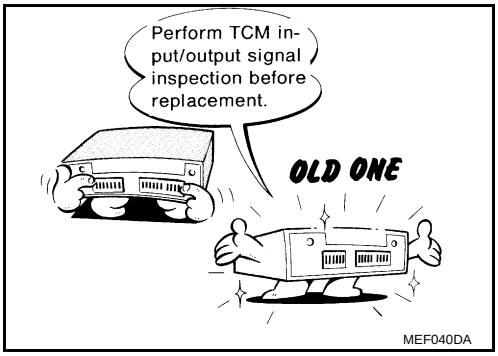
- **Before connecting or disconnecting the TCM harness connector, turn ignition switch OFF and disconnect the battery cable from the negative terminal. Failure to do so may damage the TCM. Because battery voltage is applied to TCM even if ignition switch is turned off.**



- **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 XX-XX, "*****".)**
- **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.
- 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.
- 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 XX-XX, "*****", XX-XX, "*****".

Service Notice or Precaution

INFOID:0000000001723048

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.

OBD SELF-DIAGNOSIS (FOR TYPE 1 ONLY)

- 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 XX-XX, "*****" 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 XX-XX, "***" 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, refer to XX-XX, "*****".

Wiring Diagram and Trouble Diagnosis

INFOID:0000000001723049

When reading wiring diagrams, refer to the following:

- XX-XX, "*****"
- XX-XX, "*****"

When performing trouble diagnosis, refer to the following:

- XX-XX, "*****"
- XX-XX, "*****"

PREPARATION

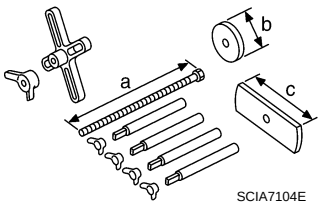
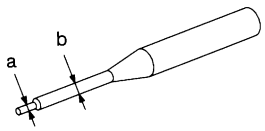
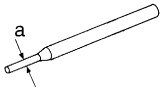
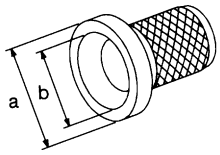
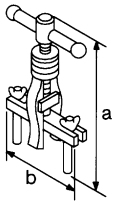
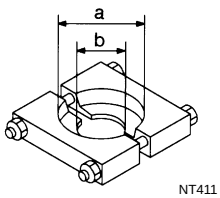
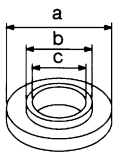
PREPARATION

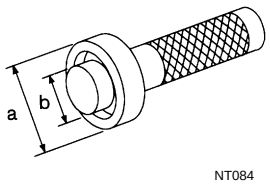
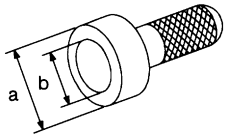
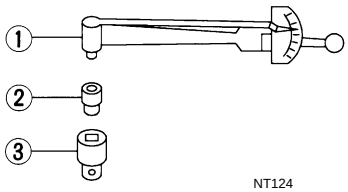
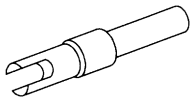
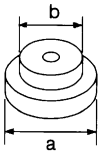
Special Service Tool

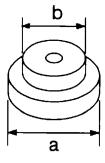
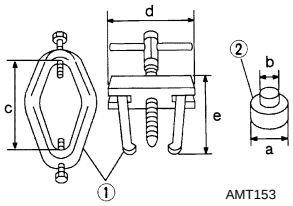
INFOID:0000000001731413

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
ST2505S001 (J-34301) Oil pressure gauge set 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	Measuring line pressure
ST35325000 (—) Drift	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**
KV31103000 (J-38982) Drift	Installing LH differential side oil seal (Use with ST35325000) **a: 59 mm (2.32 in) dia.** **b: 49 mm (1.93 in) dia.**
ST37830000 (—) Drift	Installing idler gear bearing outer race **a: 61.9 mm (2.437 in) dia.** **b: 39 mm (1.54 in) dia.**
ST27180001 (J-25726-A) Puller	Removing idler gear **a: 100 mm (3.94 in)** **b: 110 mm (4.33 in)** **c: M8 X 1.25P**

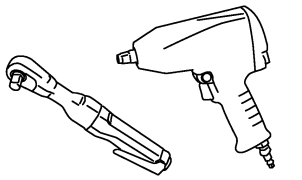
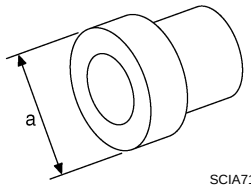
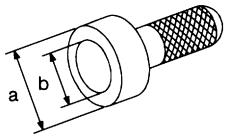
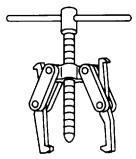
Tool number (Kent-Moore No.) Tool name	Description
KV31103200 (J-39186) Clutch spring compressor  SCIA7104E	• Removing and installing clutch spring retainer assembly • Removing and installing cancel cover **a: 179 mm (7.05 in)** **b: 76 mm (2.99 in) dia.** **c: 174 mm (6.85 in)**
ST23540000 (J-25689-A) Pin punch  NT442	• 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	• 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	• 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.**

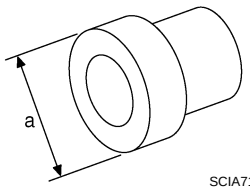
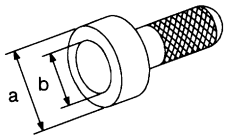
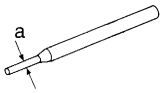
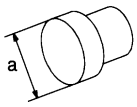
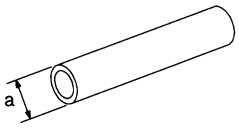
Tool number (Kent-Moore No.) Tool name	Description
ST37830000 (—) Drift  NT084	Installing idler gear bearing outer race **a: 61.9 mm (2.437 in) dia.** **b: 39 mm (1.54 in) dia.**
ST35271000 (J-26091) Drift  NT115	Installing idler gear **a: 72 mm (2.83 in) dia.** **b: 63 mm (2.48 in) dia.**
ST3127S000 (J-25765-A) Preload gauge 1. GG9103000 (J-25765-A) Torque wrench 2. HT62940000 (—) Socket adapter 3. HT62900000 (—) Socket adapter  NT124	• Measuring turning torque of reduction pinion gear • Measuring turning torque of final drive assembly
KV38105710 (J-39026) Preload adapter  NT087	• Selecting differential side bearing adjusting shim • Measuring turning torque of final drive assembly
ST35321000 (—) Drift  NT073	Installing output shaft bearing **a: 49 mm (1.93 in) dia.** **b: 41 mm (1.61 in) dia.**

Tool number (Kent-Moore No.) Tool name	Description
ST30633000 (—) Drift  NT073	Installing differential side bearing outer races **a: 67 mm (2.48 in) dia.** **b: 49 mm (1.93 in) dia.**
ST3306S001 (J-22888-D) Differential side bearing puller set 1. ST33051001 Puller 2. ST33061000 Adapter  AMT153	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)**

Commercial Service Tool

INFOID:0000000001731414

Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts
Drift  SCIA7105E	Installing manual shaft oil seal **a: 22 mm (0.87 in) dia.**
Drift  NT115	Installing RH differential side oil seal **a: 54 mm (2.13 in) dia.** **b: 47 mm (1.85 in) dia.**
Puller  NT077	• Removing idler gear bearing inner race • Removing and installing band servo piston snap ring

Tool name	Description
Drift  SCIA7105E	Removing idler gear bearing inner race **a: 34 mm (1.34 in) dia.**
Drift  NT115	Installing differential side bearings **a: 45 mm (1.77 in) dia.** **b: 41 mm (1.61 in) dia.**
Pin punch  NT410	Aligning groove of manual shaft and hole of transaxle case **a: 2 mm (0.08 in) dia.**
Drift  NT109	Removing idler gear bearing inner race **a: 34 mm (1.34 in) dia.**
Drift  NT083	Installing radial needle bearing on bearing retainer **a: 36 mm (1.42 in) dia.**

ON-VEHICLE MAINTENANCE

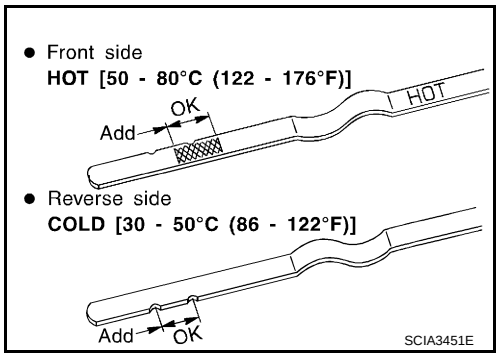
A/T FLUID

Checking A/T Fluid

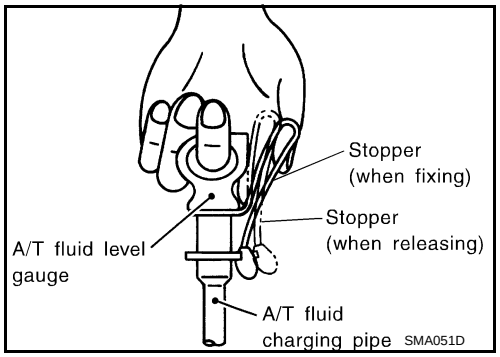
INFOID:0000000001728296

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 secure 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 secure 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. If the A/T fluid smells burnt, 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 TM-474, "A/T Fluid Cooler Cleaning".
7. Install the removed A/T fluid level gauge into the A/T fluid charging pipe.
CAUTION:
Firmly secure the A/T fluid level gauge to the A/T fluid charging pipe using the stopper attached.

Changing A/T Fluid

INFOID:0000000001728297

1. Warm up A/T fluid.
2. Stop engine.
3. Drain A/T fluid by removing the drain plug from the transaxle.
4. Reinstall the drain plug and new gasket and tighten to the specified torque.

Drain plug: **Refer to TM-213, "Component".**

CAUTION:
Do not reuse drain plug gasket.

5. 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-19, "Fluids and Lubricants".

6. Run engine at idle speed for 5 minutes.
7. Check A/T fluid level and condition. Refer to TM-473, "Checking A/T Fluid".

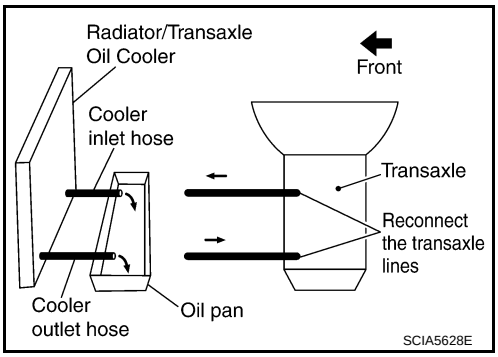
A/T Fluid Cooler Cleaning

INFOID:0000000001731917

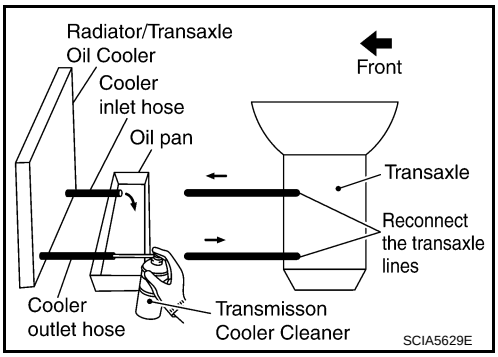
Whenever the A/T is repaired, overhauled, or replaced, the A/T fluid cooler mounted in the radiator must be inspected and cleaned.
Metal debris and friction material, if present, can become trapped in the A/T fluid cooler. This debris can contaminate the newly serviced A/T or, in severe cases, can block 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.

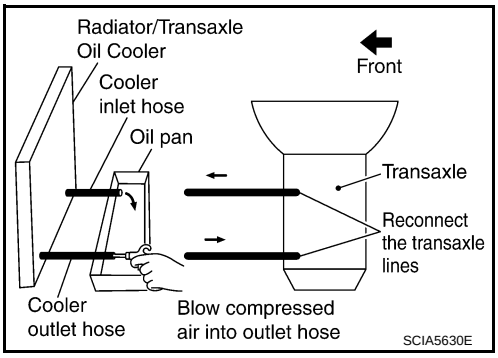
A/T FLUID COOLER CLEANING PROCEDURE

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





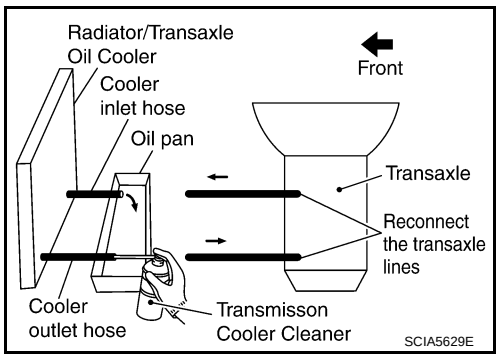
9. Blow compressed air regulated to 5 - 9 kg/cm^2 (70 - 130 psi) through the cooler outlet hose for 10 seconds to force out any remaining A/T fluid.
10. Repeat steps 5 through 9 three additional times.

11. Position an oil pan under the banjo bolts that connect the A/T fluid cooler steel lines to the A/T.
12. Remove the banjo bolts.
13. 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.
14. Blow compressed air regulated to 5 - 9 kg/cm^2 (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.
15. Ensure all debris is removed from the steel cooler lines.
16. Ensure all debris is removed from the banjo bolts and fittings.
17. Perform "A/T FLUID COOLER DIAGNOSIS PROCEDURE".

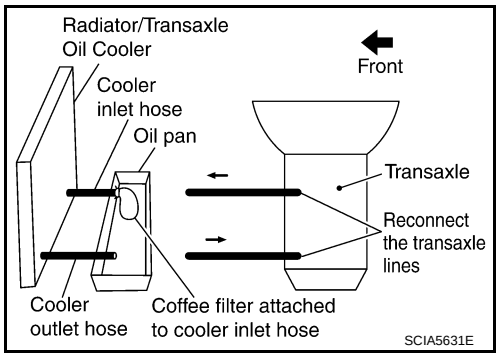
A/T FLUID COOLER DIAGNOSIS PROCEDURE

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

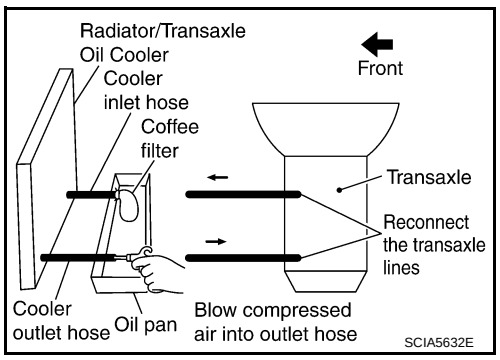
1. Position an oil pan under the A/T inlet and outlet cooler hoses.
2. Clean the exterior and tip of the cooler inlet hose.
3. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.
   CAUTION:
   - **Wear safety glasses and rubber 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.**



4. 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.
5. Tie a common white, basket-type coffee filter to the end of the cooler inlet hose.



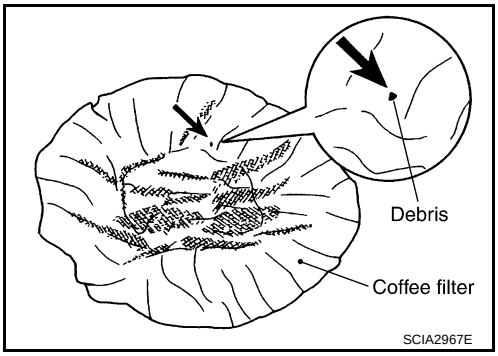
6. Insert the tip of an air gun into the end of the cooler outlet hose.
7. Wrap a shop rag around the air gun tip and end of cooler outlet hose.
8. Blow compressed air regulated to 5 - 9 kg/cm^2 (70 - 130 psi) through the cooler outlet hose to force any remaining A/T fluid into the coffee filter.
9. Remove the coffee filter from the end of the cooler inlet hose.
10. Perform "A/T FLUID COOLER INSPECTION PROCEDURE".



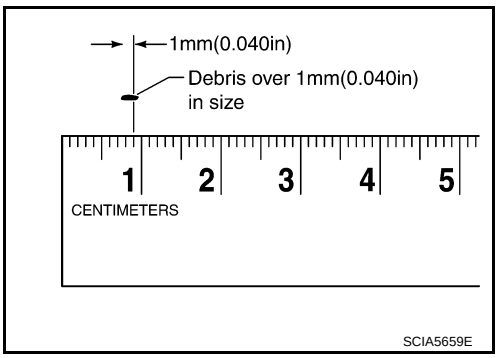
A/T FLUID COOLER INSPECTION PROCEDURE

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-16, "Removal and Installation".



A/T FLUID COOLER FINAL INSPECTION

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

STALL TEST

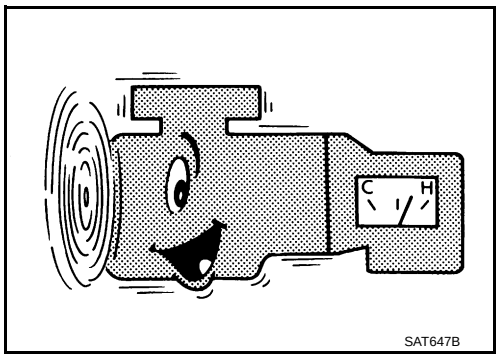
Inspection and Judgment

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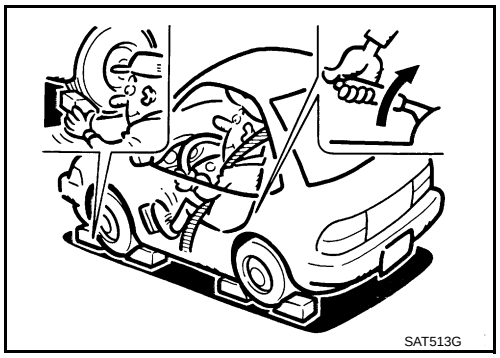
STALL TEST PROCEDURE

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.

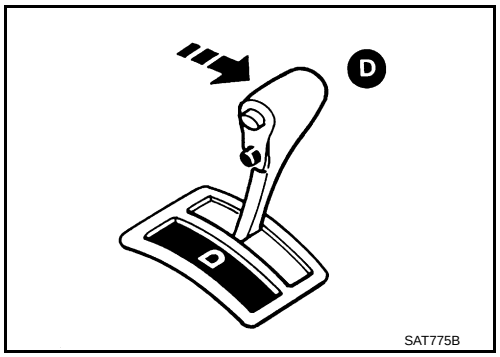
ATF operating temperature: 50 - 80°C (122 - 176°F)



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.**



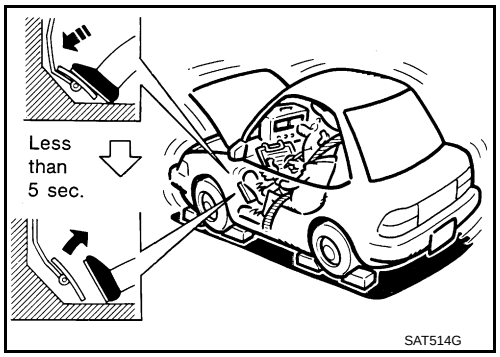
5. Start engine, apply foot brake, and place selector lever in “D” position.



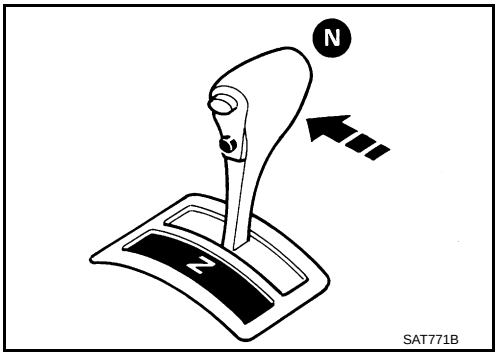
6. Accelerate to wide open throttle gradually while applying foot brake.
7. Quickly note the engine stall revolution and immediately release throttle.

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

Stall revolution: 2,300 - 2,750 rpm



8. Move selector lever to “N” position.
9. Cool off ATF.
   CAUTION:
   Run the engine at idle for at least 1 minute.
10. 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 XX-XX, "*****".

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

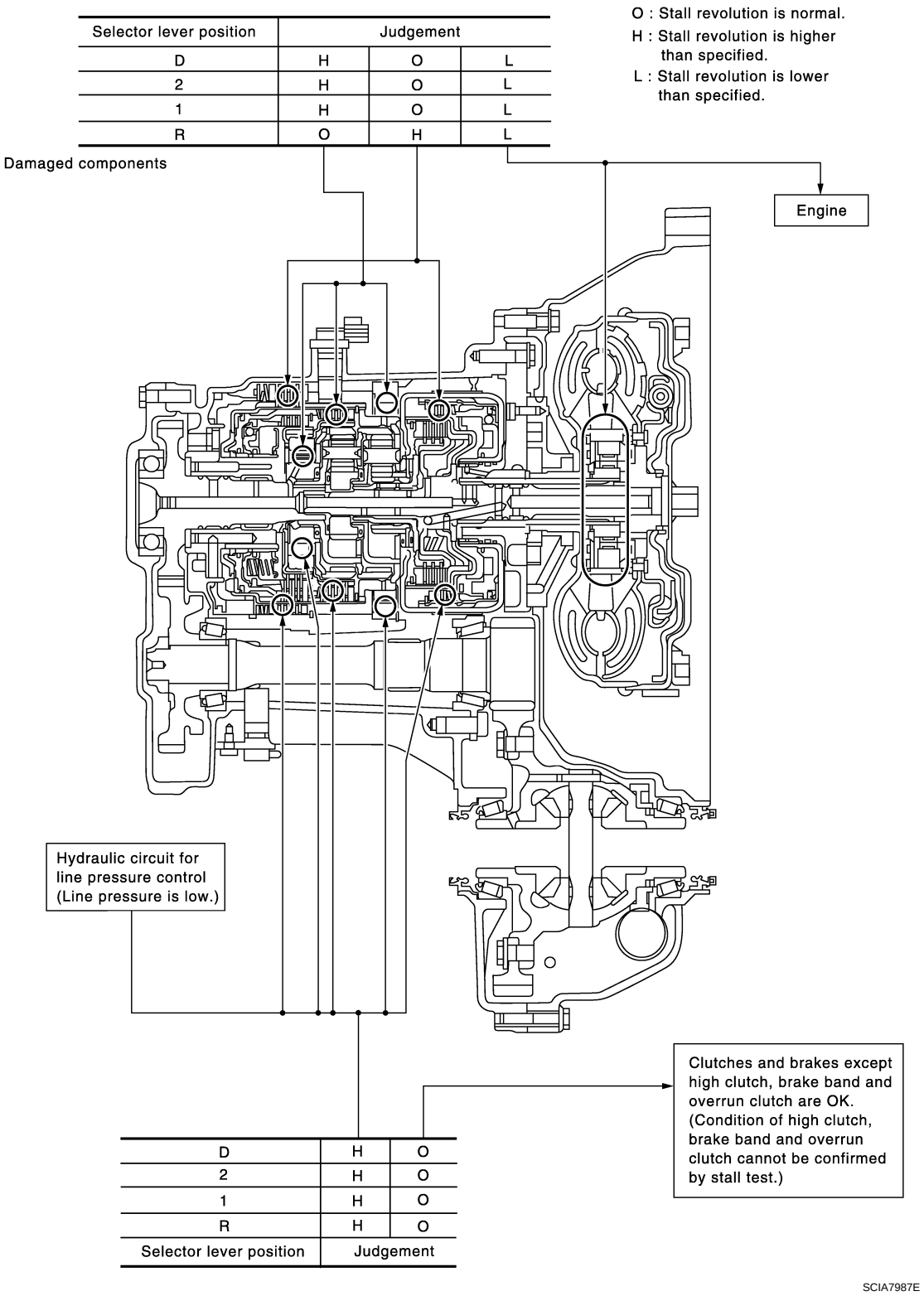
CAUTION:

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



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

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

LINE PRESSURE TEST

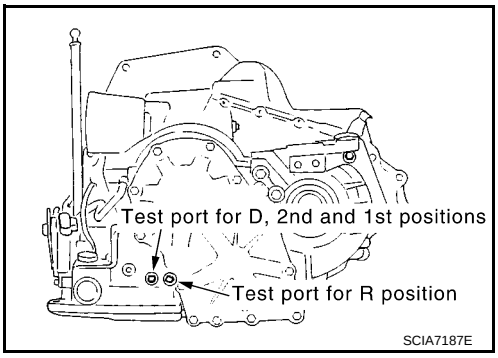
Inspection and Judgment

INFOID:0000000001726681

LINE PRESSURE TEST PORTS

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

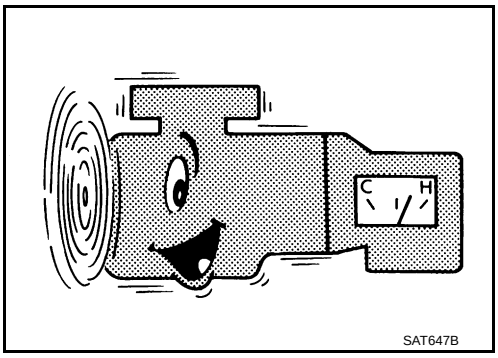
- **Always replace pressure plugs as they are self-sealing bolts.**



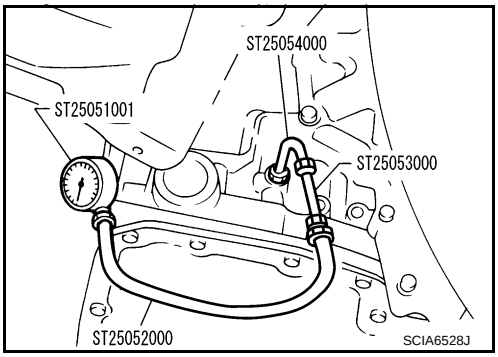
LINE PRESSURE TEST PROCEDURE

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.

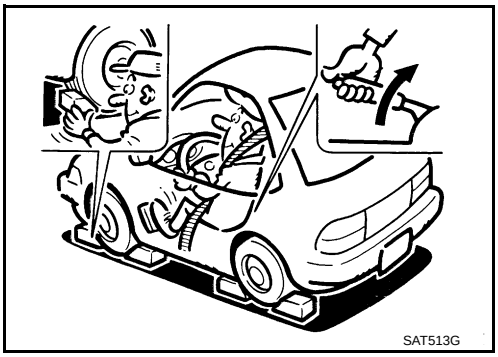
ATF operating temperature: 50 - 80°C (122 -176°F)



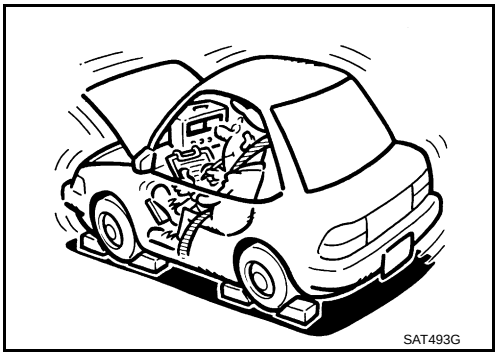
3. Install oil pressure gauge to corresponding line pressure test port.



4. Set parking brake and block wheels.



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 "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.	• 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.	• Fluid pressure leakage between manual valve and particular clutch • For example, line pressure is: – 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 TM-14, "Shift Mechanism".
	Line pressure is high.	• 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.	• 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

ROAD TEST

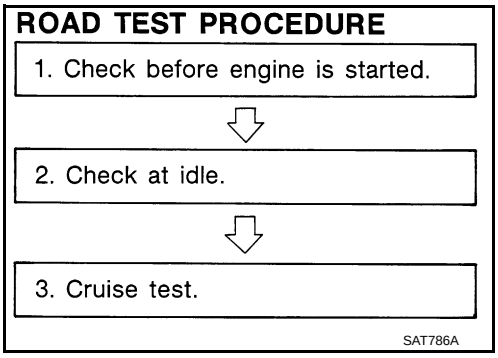
Description

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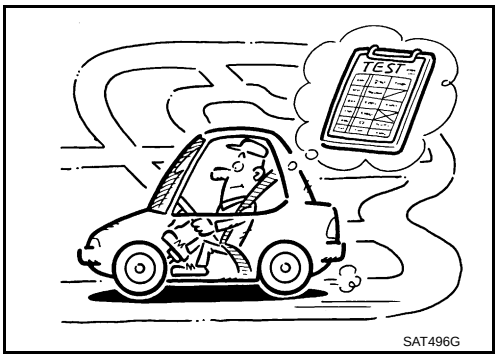
DESCRIPTION

- 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 TM-482.
2. Check at idle. Refer to TM-483.
3. Cruise test
   - Inspection all the item from Part 1 to Part 3. Refer to TM-485, TM-487 and TM-488.



- 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 XX-XX, "*****", XX-XX, "*****" and XX-XX, "*****".

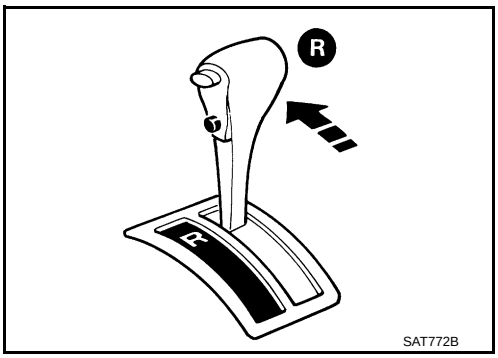


Check Before Engine Is Started

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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.

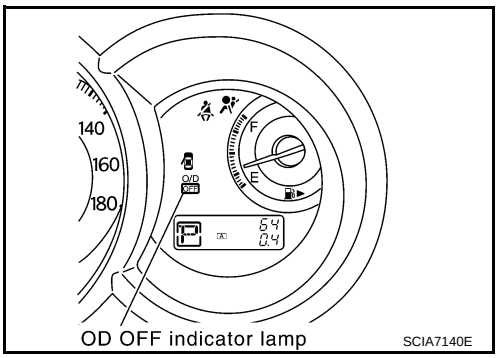


4. Turn ignition switch ON. (Do not start engine.)

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

YES >> 1. Turn ignition switch OFF.
2. Perform self-diagnosis and note NG items. Refer to XX-XX, "*****", XX-XX, "*****".
3. Go to TM-483, "Check at Idle".

NO >> Stop “Road Test”. Go to TM-138, "OD OFF Indicator Lamp Does Not Come On".



Check at Idle

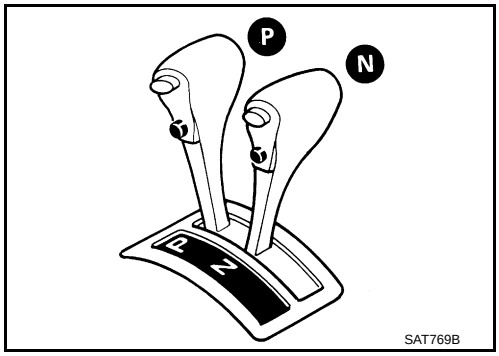
INFOID:0000000001726684

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 XX-XX, "*****".
• GO TO TM-140, "Engine Cannot Be Started in "P" and "N" Position".

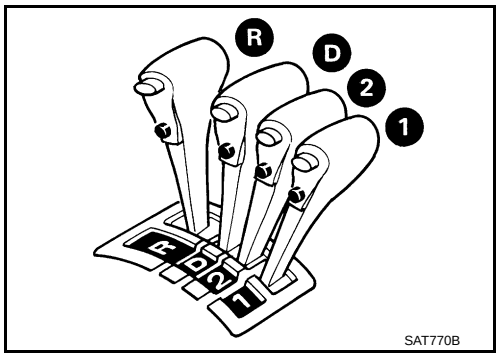


2.CHECK ENGINE START

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.

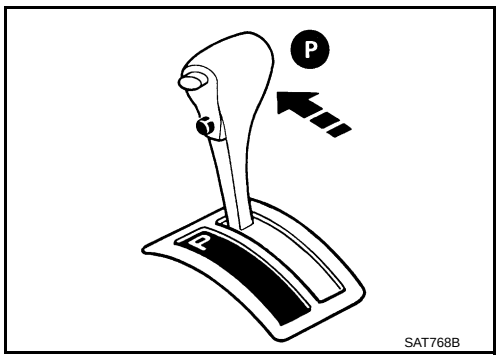
Is engine started?

YES >> • Stop “Road Test”. Mark the box on the XX-XX, "*****".
• GO TO TM-140, "Engine Cannot Be Started in "P" and "N" Position".
• Continue “Road Test”.
NO >> GO TO 3.



3.CHECK VEHICLE MOVE

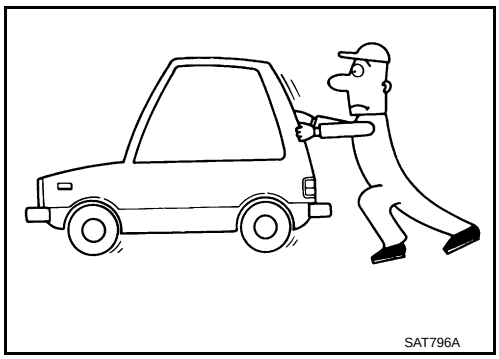
1. Move selector lever to “P” position.
2. Turn ignition switch OFF.
3. Release parking brake.



4. Push vehicle forward or backward.

Does vehicle move when it is pushed forward or backyard?

YES >> • Mark the box on the XX-XX, "*****".
• GO TO TM-140, "In "P" Position, Vehicle Moves Forward or Backward When Pushed".
• Continue “Road Test”.
NO >> GO TO 4.



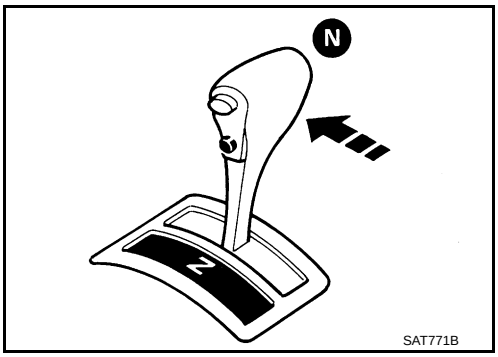
4.CHECK VEHICLE MOVE

1. Apply parking brake.

2. Start engine.
3. Move selector lever to “N” position.
4. Release parking brake.

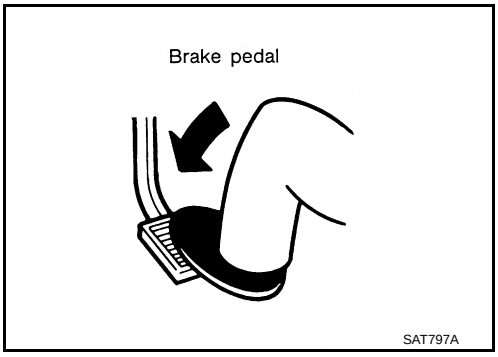
Does vehicle move forward or backward?

YES >> • Mark the box on the XX-XX, "*****".
• GO TO TM-141, "In "N" Position, Vehicle Moves".
• Continue “Road Test”.
NO >> GO TO 5.



5.CHECK SHIFT SHOCK

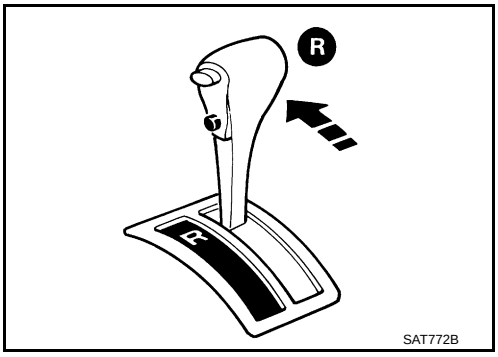
1. Apply foot brake.



2. Move selector lever to “R” position.

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

YES >> • Mark the box on the XX-XX, "*****".
• GO TO TM-142, "Large Shock "N" → "R" Position" .
• Continue “Road Test”.
NO >> GO TO 6.

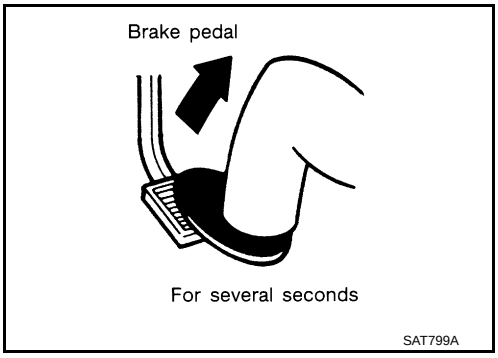


6.CHECK VEHICLE MOVE

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 XX-XX, "*****".
• GO TO TM-142, "Vehicle Does Not Creep Backward in "R" Position".
• Continue “Road Test”.

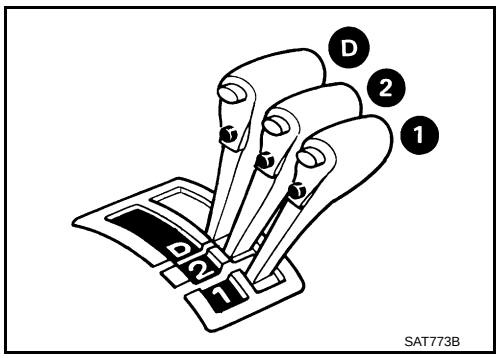


7.CHECK VEHICLE MOVE

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 TM-485, "Cruise Test - Part 1".
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-144, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position".
• Continue “Road Test”.



Cruise Test - Part 1

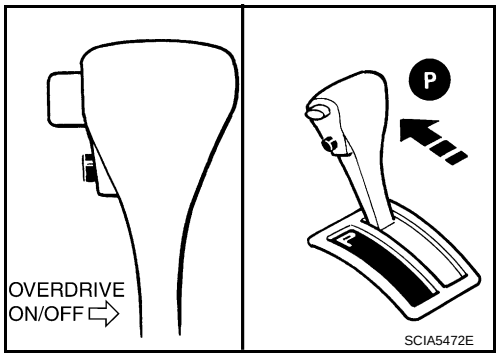
INFOID:0000000001726685

1. CHECK STARTING GEAR (D1) POSITION

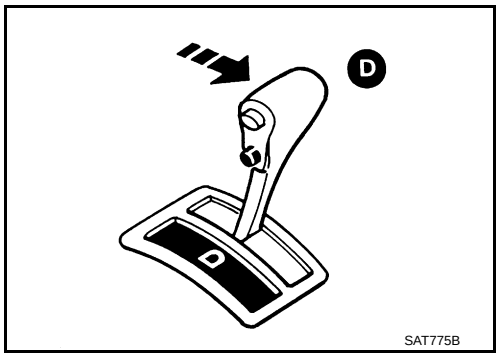
1. Drive vehicle for approximately 10 minutes to warm engine oil and ATF up to operating temperature.

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.

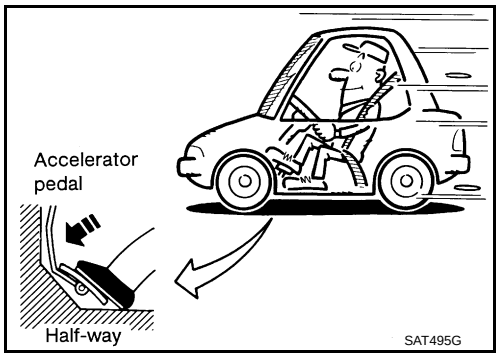


7. Accelerate vehicle by constantly depressing accelerator pedal half-way.

Read gear position. Refer to XX-XX, "***".**

Does vehicle start from D1?

YES >> GO TO 2.
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-145, "Vehicle Cannot Be Started from D1".
• Continue “Road Test”.



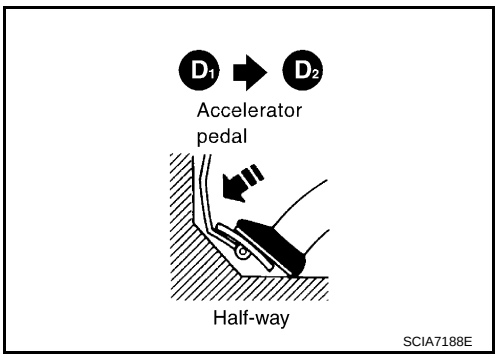
2. CHECK SHIFT-UP (D1 TO D2)

Check shift-up (D1 to D2).
Specified speed when shifting from D1 to D2. Refer to TM-490, "Vehicle Speed When Shifting Gears".

Read gear position, throttle opening and vehicle speed. Refer to XX-XX, "***".**

Does A/T shift from D_1 to D_2 at the specified speed?

YES >> GO TO 3.
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-146, "A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$".
• Continue “Road Test”.



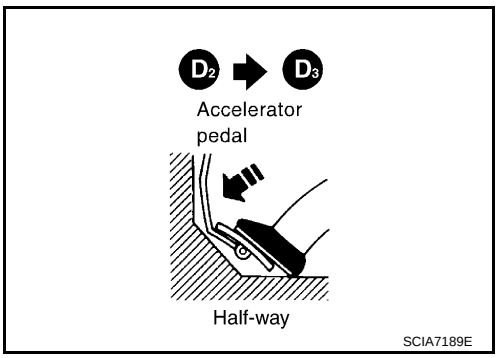
3. CHECK SHIFT-UP (D_2 TO D_3)

Check shift-up (D_2 to D_3).
Specified speed when shifting from D_2 to D_3. Refer to TM-490, "Vehicle Speed When Shifting Gears".

Read gear position, throttle opening and vehicle speed. Refer to XX-XX, "***".**

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

YES >> GO TO 4.
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-148, "A/T Does Not Shift: $D_2 \rightarrow D_3$".
• Continue “Road Test”.



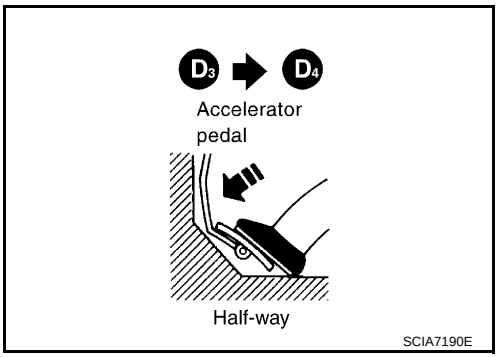
4. CHECK SHIFT-UP (D_3 TO D_4)

Check shift-up (D_3 to D_4).
Specified speed when shifting from D_3 to D_4. Refer to TM-490, "Vehicle Speed When Shifting Gears".

Read gear position, throttle opening and vehicle speed. Refer to XX-XX, "***".**

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

YES >> GO TO 5.
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-149, "A/T Does Not Shift: $D_3 \rightarrow D_4$".
• Continue “Road Test”.



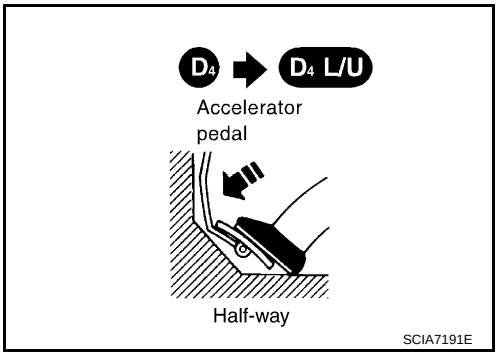
5. CHECK LOCK-UP (D_4 TO D_4L/U)

Check lock-up (D_4 to D_4L/U).
Specified speed when lock-up occurs. Refer to TM-490, "Vehicle Speed When Performing and Releasing Complete Lock-up".

Read vehicle speed, throttle opening when lock-up duty becomes 94%. Refer to XX-XX, "***".**

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

YES >> GO TO 6.
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-151, "A/T Does Not Perform Lock-up".
• Continue “Road Test”.



6. CHECK LOCK-UP HOLD

Check lock-up hold.

When lock-up duty becomes 94%. Refer to XX-XX, "***".**

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

YES >> GO TO 7.
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-151, "A/T Does Not Hold Lock-up Condition".
• Continue “Road Test”.

7.CHECK SHIFT-DOWN (D4L/U TO D4)

Release accelerator pedal.

When lock-up duty becomes 4%. Refer to XX-XX, "***".**

Is lock-up released when accelerator pedal is released?

YES >> GO TO 8.
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-152, "Lock-up Is Not Released".
• Continue “Road Test”.

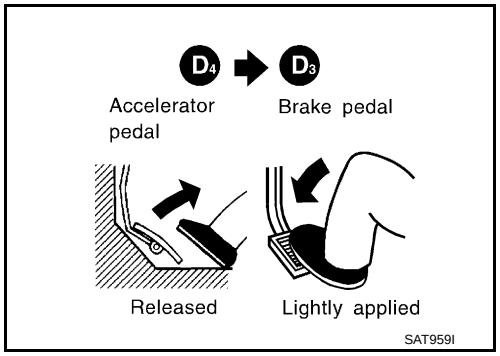
8.CHECK SHIFT-DOWN (D4 TO D3)

Decelerate vehicle by applying foot brake lightly.

Read gear position and engine speed. Refer to XX-XX, "***".**

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

YES >> 1. Stop vehicle.
2. Go to TM-487, "Cruise Test - Part 2".
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-153, "Engine Speed Does Not Return to Idle (Light Braking D4→ D3)".
• Continue “Road Test”.



Cruise Test - Part 2

INFOID:0000000001726686

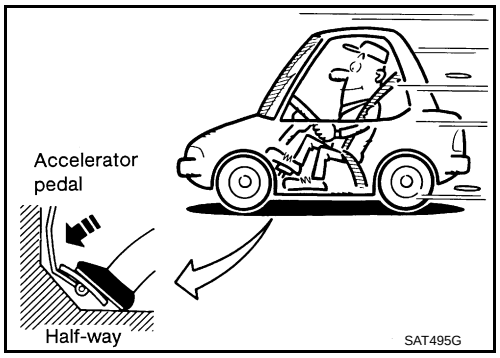
1.CHECK STARTING GEAR (D1) POSITION

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 XX-XX, "***".**

Does vehicle start from D1?

YES >> GO TO 2.
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-145, "Vehicle Cannot Be Started from D1".
• Continue “Road Test”.



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

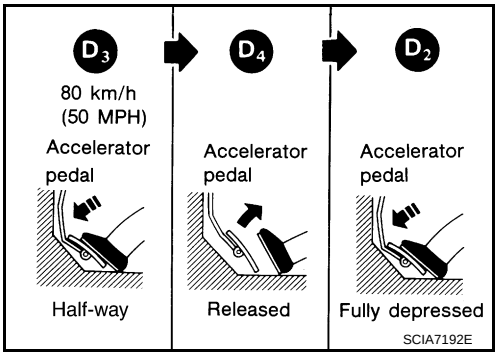
1. Accelerate vehicle to 80 km/h (50 MPH) as shown in the figure.

2. Release accelerator pedal and then quickly depress it fully.

Read gear position and throttle opening. Refer to XX-XX, "***".**

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 XX-XX, "*****".
• GO TO TM-146, "A/T Does Not Shift: D1→ D2or Does Not Kickdown: D4→ D2".
• Continue “Road Test”.



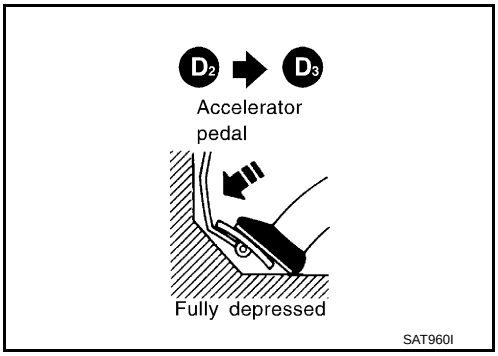
3. CHECK SHIFT-UP (D2 TO D3)

Check shift-up (D2 to D3)
Specified speed when shifting from D2 to D3. Refer to TM-490, "Vehicle Speed When Shifting Gears".

Read gear position, throttle opening and vehicle speed. Refer to XX-XX, "***".**

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

YES >> GO TO 4.
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-148, "A/T Does Not Shift: D2→ D3".
• Continue “Road Test”.



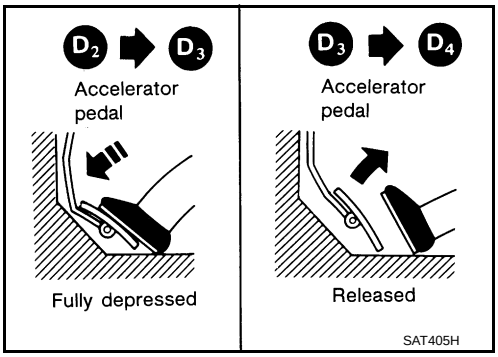
4. CHECK SHIFT-UP (D3 TO D4) AND ENGINE BRAKE

Release accelerator pedal after shifting from D2 to D3.

Read gear position, throttle opening and vehicle speed. Refer to XX-XX, "***".**

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

YES >> 1. Stop vehicle.
2. Go to TM-488, "Cruise Test - Part 3".
NO >> • Mark the box on the XX-XX, "*****".
• GO TO TM-149, "A/T Does Not Shift: D3→ D4".
• Continue “Road Test”.

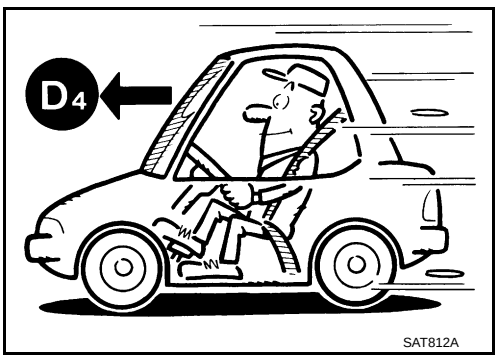


Cruise Test - Part 3

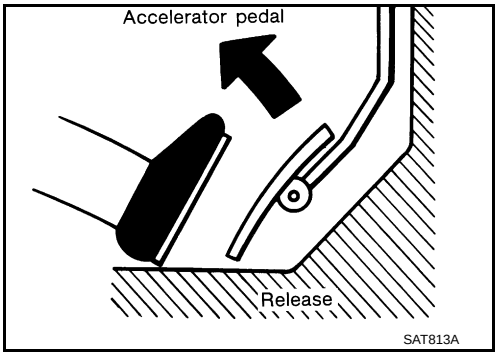
INFOID:0000000001726687

1. CHECK SHIFT-DOWN (D4 TO D3) (WITH OVERDRIVE CONTROL SWITCH)

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.

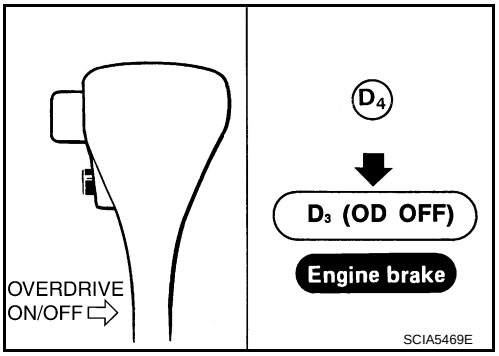


5. Push overdrive control switch. (OD OFF indicator lamp is on.)

Read gear position and vehicle speed. Refer to XX-XX, "***".**

Does A/T shift from D_4 to D_3 (OD OFF)?

YES >> GO TO 2.
NO >>
- Mark the box on the XX-XX, "*****".
- GO TO TM-154, "A/T Does Not Shift: $D_4 \rightarrow D_3$, When OD OFF".
- Continue “Road Test”.

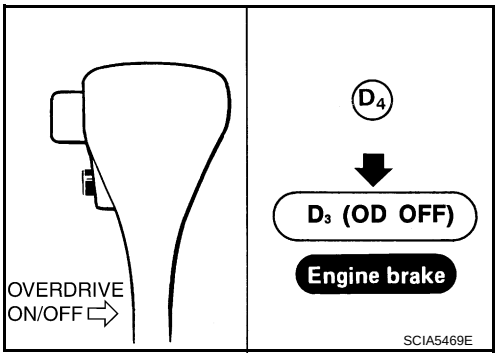


2. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >> GO TO 3.
NO >>
- Mark the box on the XX-XX, "*****".
- GO TO TM-158, "Vehicle Does Not Decelerate by Engine Brake".
- Continue “Road Test”.



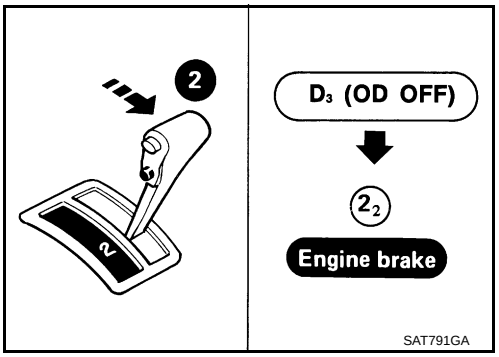
3. CHECK SHIFT-DOWN (D_3 TO 2_2)

Move selector lever from “D” to “2” position while driving in D_3 (OD OFF).

Read gear position. Refer to XX-XX, "***".**

Does A/T shift from D_3 (OD OFF) to 2_2?

YES >> GO TO 4.
NO >>
- Mark the box on the XX-XX, "*****".
- GO TO TM-155, "A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever "D" → "2" Position" .
- Continue “Road Test”.



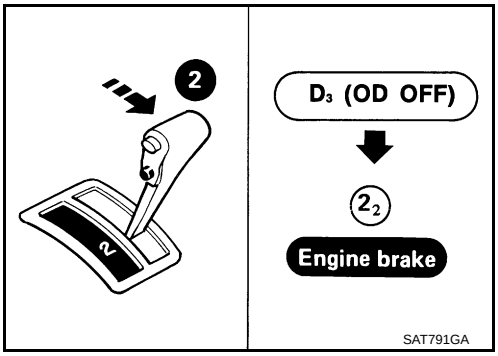
4. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >> GO TO 5.

NO >>
- Mark the box on the XX-XX, "*****".
- GO TO TM-158, "Vehicle Does Not Decelerate by Engine Brake".
- Continue “Road Test”.



5. CHECK SHIFT-DOWN (22 TO 11)

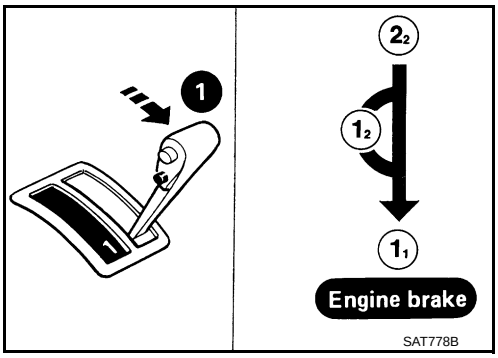
Move selector lever from “2” to “1” position while driving in 22.

Read gear position. Refer to XX-XX, "***".**

Does A/T shift from 22 to 11 position?

YES >> GO TO 6.

NO >>
- Mark the box on the XX-XX, "*****".
- GO TO TM-156, "A/T Does Not Shift: 22→ 11, When Selector Lever "2" → "1" Position" .
- Continue “Road Test”.



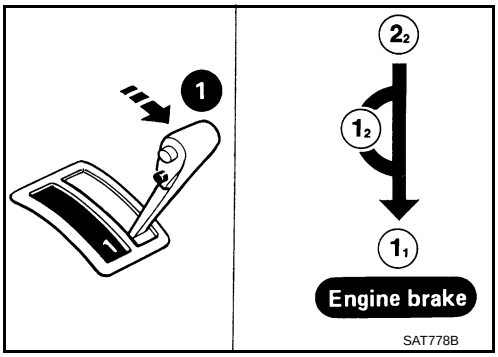
6. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >>
1. Stop vehicle.
2. Perform self-diagnosis. Refer to XX-XX, "*****", XX-XX, "*****".

NO >>
- Mark the box on the XX-XX, "*****".
- GO TO TM-158, "Vehicle Does Not Decelerate by Engine Brake".
- Stop “Road Test”.



Vehicle Speed When Shifting Gears

INFOID:0000000001726688

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)	41 - 49 (25 - 30)
Half throttle	31 - 39 (19 - 24)	60 - 68 (37 - 42)	122 - 130 (76 - 81)	63 - 71 (39 - 44)	36 - 44 (22 - 27)	5 - 13 (3 - 8)

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

Vehicle Speed When Performing and Releasing Complete Lock-up

INFOID:0000000001726689

Throttle position	Selector lever position	Vehicle speed [km/h (MPH)]	
		Lock-up “ON”	Lock-up “OFF”
2.0 / 8	D position	76 - 84 (47 - 52)	56 - 64 (35 - 40)
	D position (OD OFF)	86 - 94 (53 - 58)	83 - 91 (52 - 57)

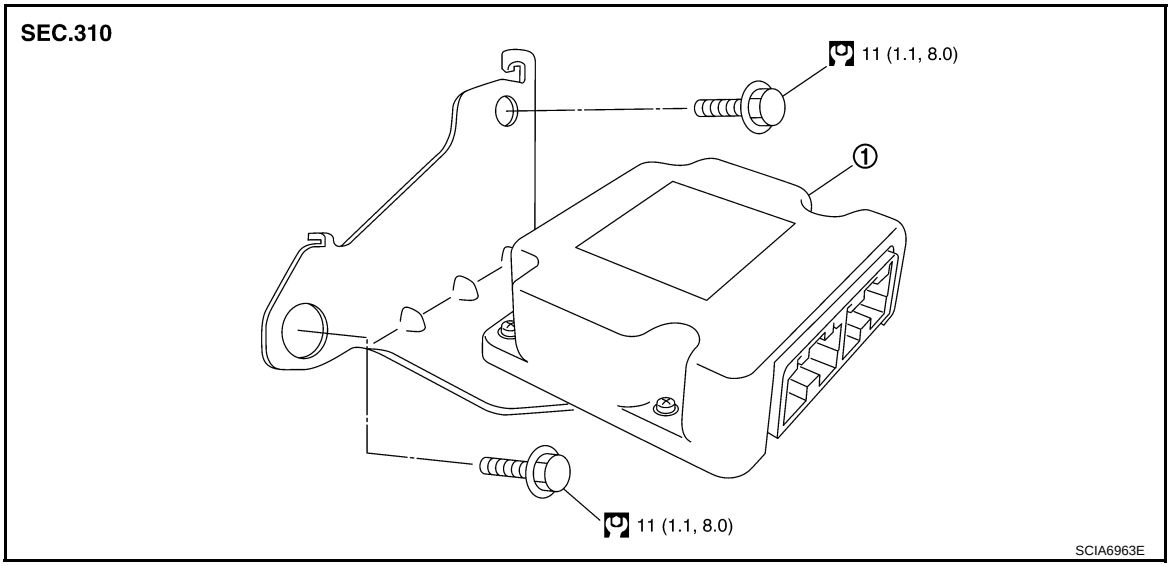
ON-VEHICLE REPAIR

TRANSMISSION CONTROL MODULE

Exploded View

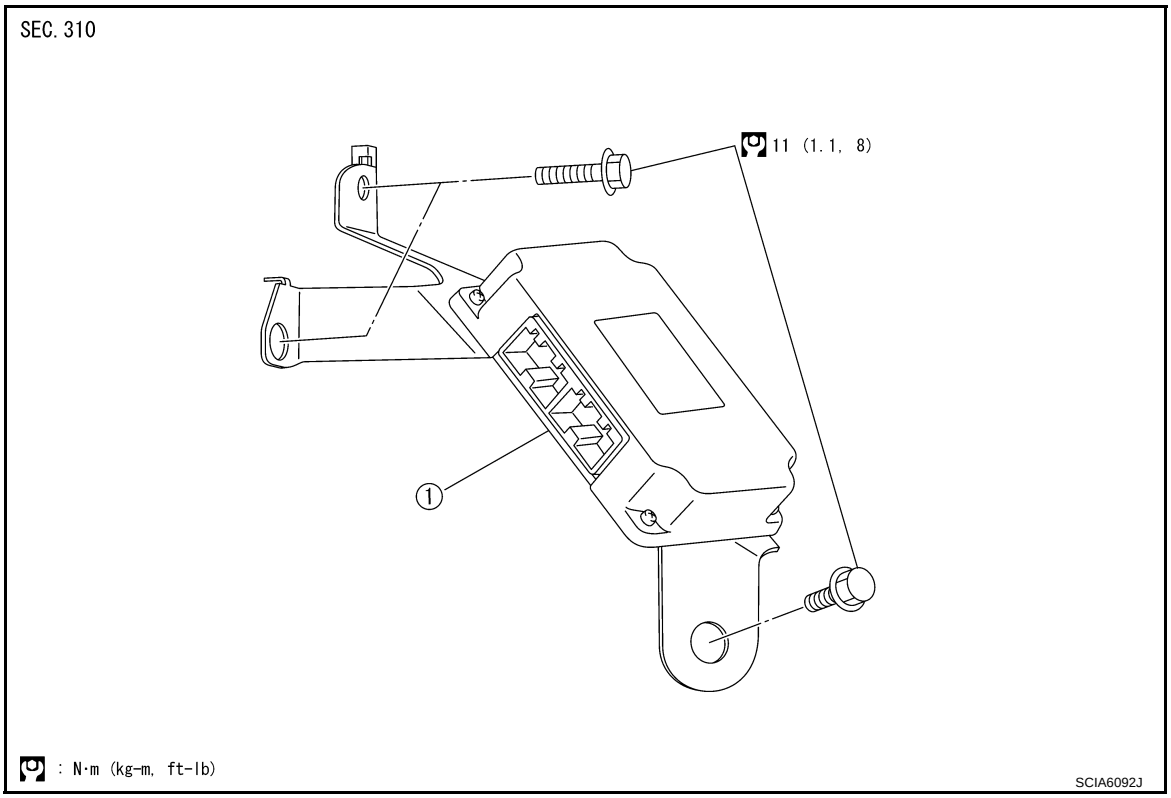
INFOID:0000000001731415

LHD MODELS



1. TCM

RHD MODELS



1. TCM

Removal and Installation

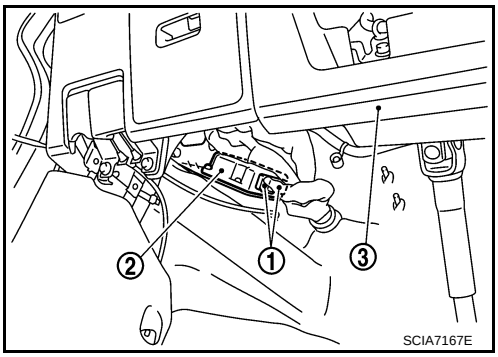
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NOTE:

Removal of LHD is shown. TCM for RHD is in the same location and uses the same procedure as LHD. Refer to TM-30, "Component Parts Location" for location detail.

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

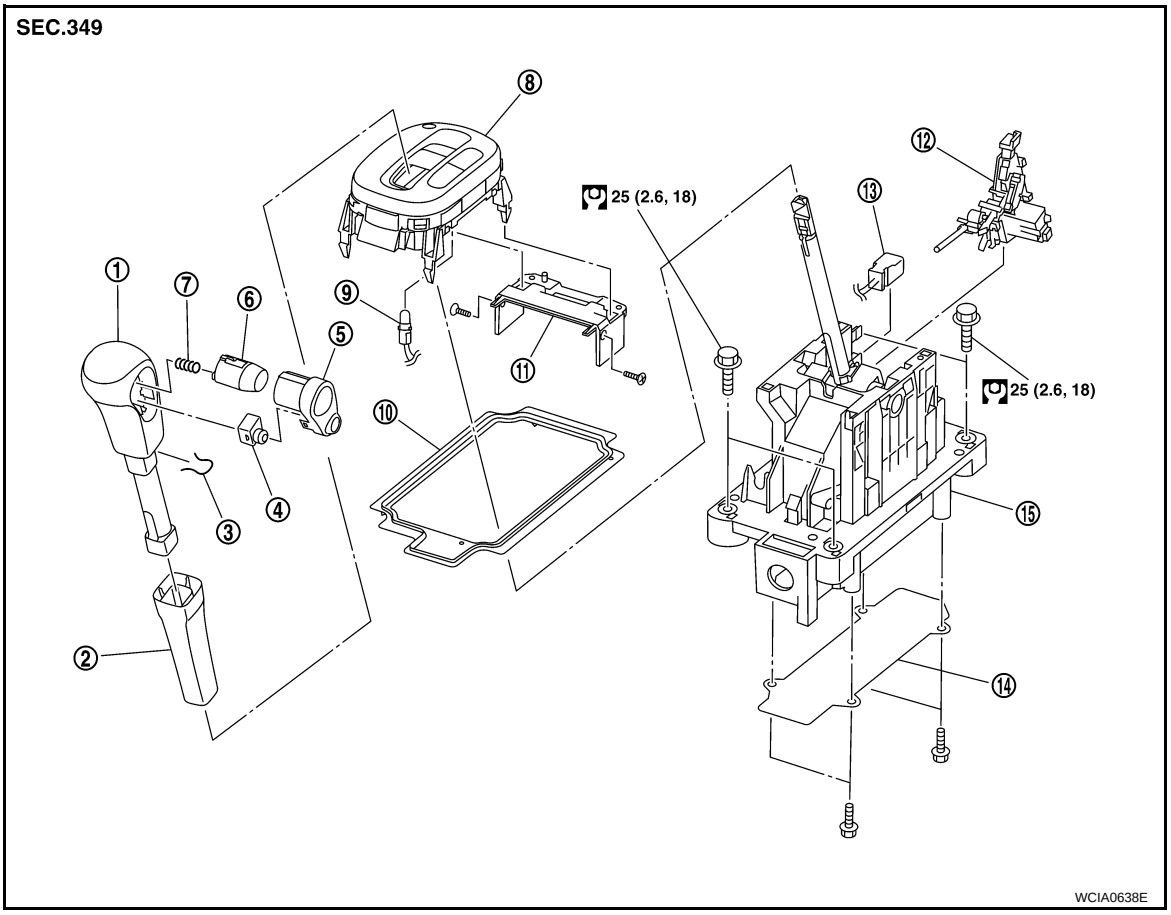
Installation is in the reverse order of removal.

SHIFT CONTROL SYSTEM

Control Device Removal and Installation

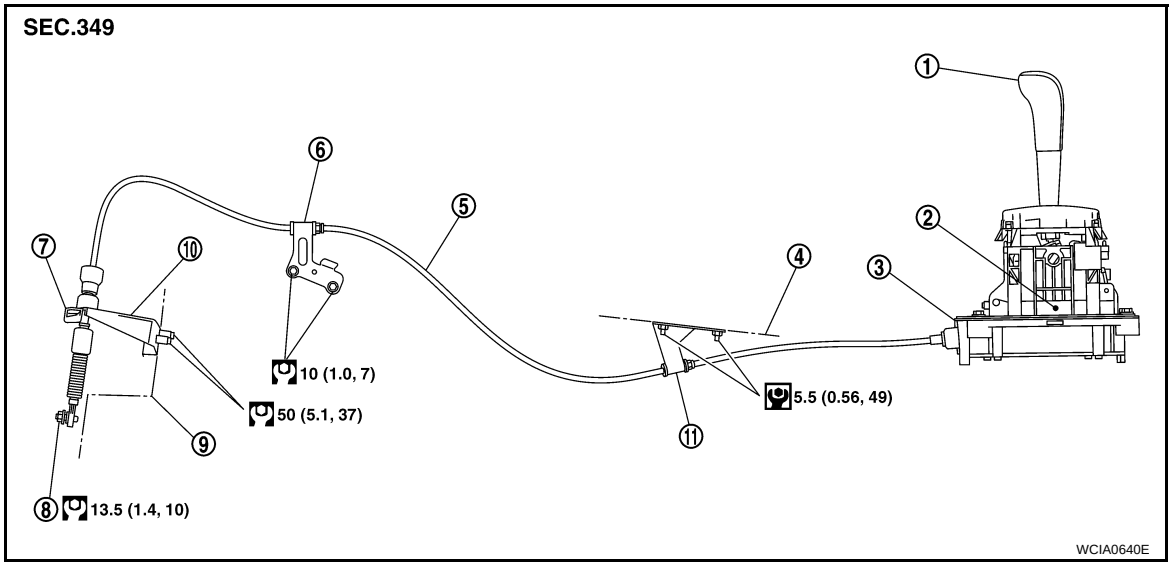
INFOID:0000000001731421

CONTROL DEVICE COMPONENTS



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

CONTROL CABLE COMPONENTS



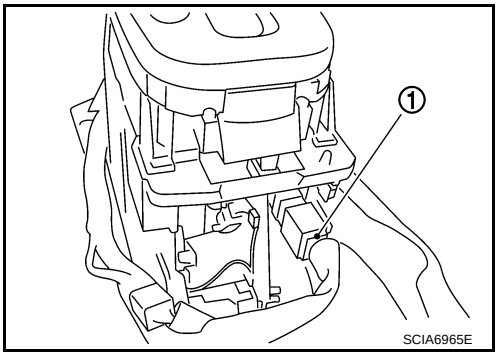
1. Selector lever knob
2. Control device assembly
3. Lock plate
4. Floor panel
5. Control cable
6. Bracket
7. Lock plate
8. Lock nut
9. A/T assembly
10. Bracket
11. Bracket

REMOVAL

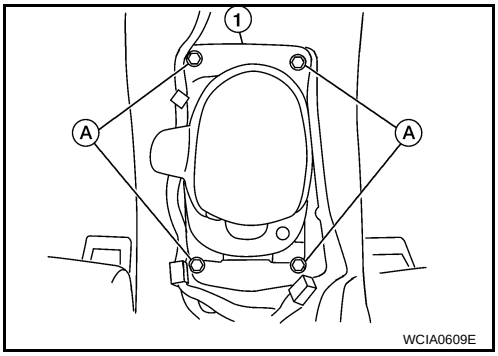
CAUTION:

Make sure that parking brake is applied before removal/installation.

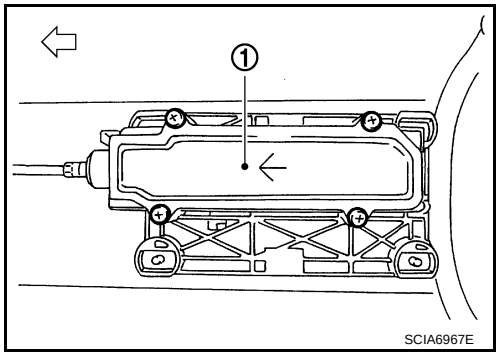
1. Place the selector lever in the “N” position.
2. Remove the center console assembly. Refer to IP-11, "Removal and Installation".
3. Disconnect the A/T device harness connector (1).
4. Remove the key interlock cable from the control device assembly. Refer to TM-499, "Removal and Installation".



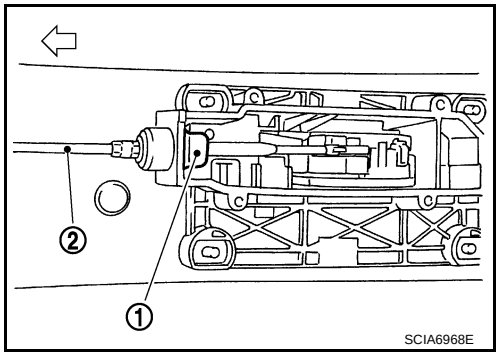
5. Remove the bolts (A) from the control device assembly (1).
6. Remove exhaust front tube, center muffler and heat plates. Refer to EX-5, "Removal and Installation".



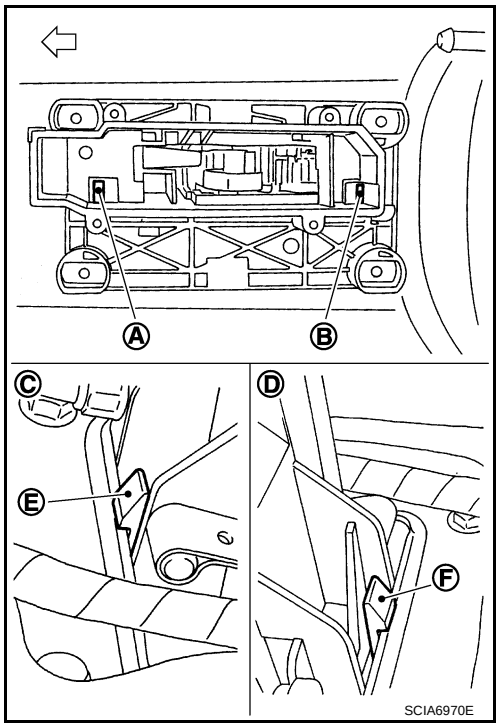
7. Remove the plate (1) from the control device assembly.
⇦: Vehicle front



8. Remove the lock plate (1) from the control cable (2).
⇦: Vehicle front
9. Remove the control cable (2) from the control device assembly.

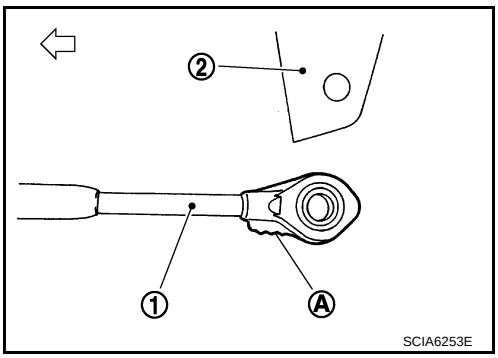


10. Insert flat-bladed screwdrivers at points (A) and (B) as shown, and press both tabs (E) and (F) at the front (C) and rear (D) slightly toward the center of the control device assembly to remove the control device assembly from the underside of the vehicle.
⇦: Vehicle front



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 TM-497, "Adjustment of A/T Position" and TM-497, "Checking of A/T Position".



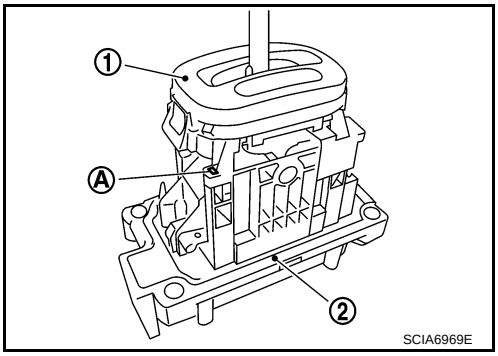
Control Device Disassembly and Assembly

INFOID:0000000001731422

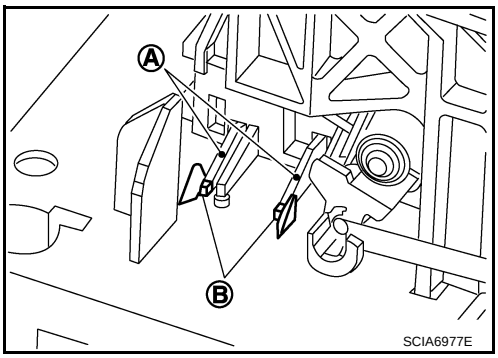
DISASSEMBLY

NOTE:
Refer to TM-493, "Control Device Removal and Installation" to disassemble.

1. Remove selector lever knob from control device assembly. Refer to TM-496, "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.

Selector Lever Knob Removal and Installation

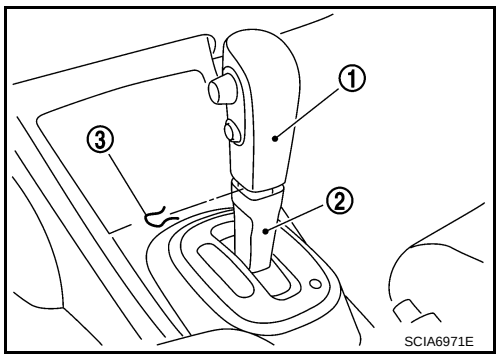
INFOID:0000000001731423

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.

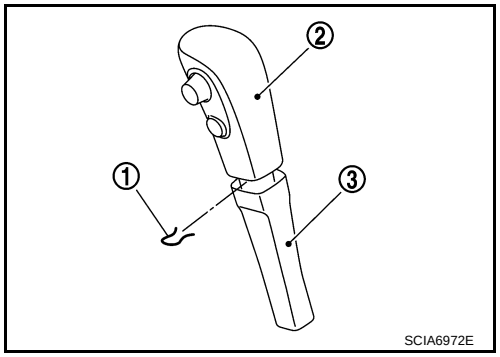
CAUTION:
Do not push selector button.



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

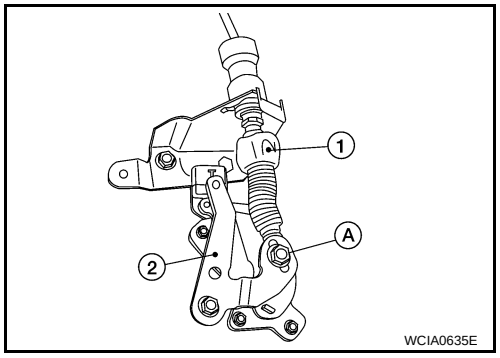
INFOID:0000000001731424

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-27, "Removal and Installation".
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 TM-493, "Control Device Removal and Installation".



CAUTION:
Secure manual lever when tightening nut.

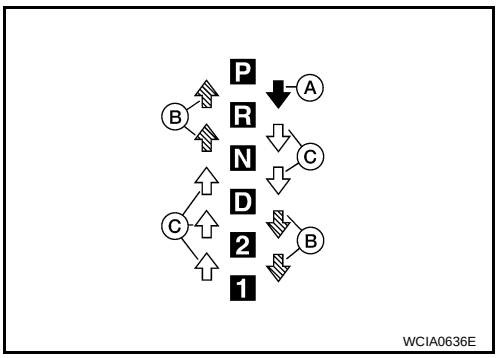
6. Move selector lever from “P” to “1” position again. Make sure that selector lever moves smoothly.
7. Check A/T position. Refer to TM-497, "Checking of A/T Position".
8. Install air duct assembly. Refer to EM-27, "Removal and Installation".

Checking of A/T Position

INFOID:0000000001731425

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.

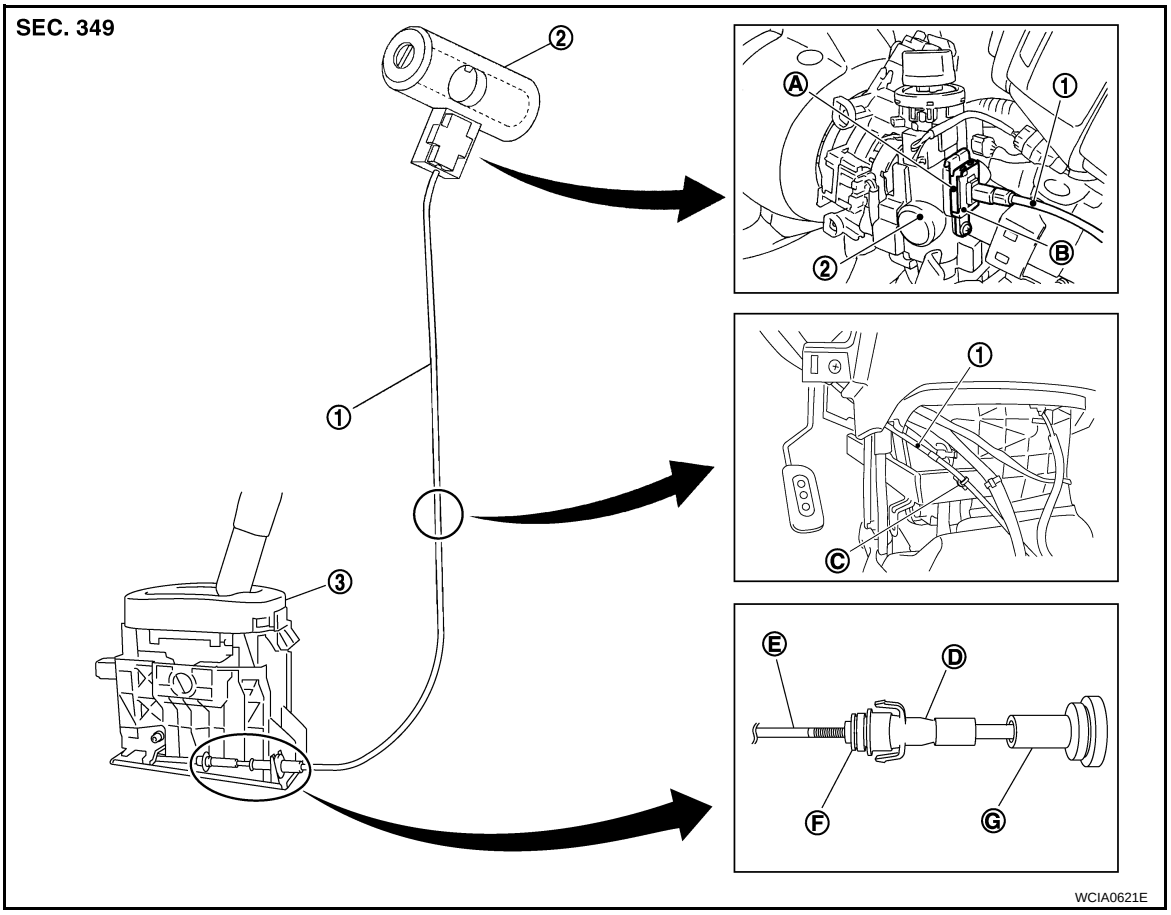


KEY INTERLOCK CABLE

Removal and Installation

INFOID:0000000001731426

COMPONENTS



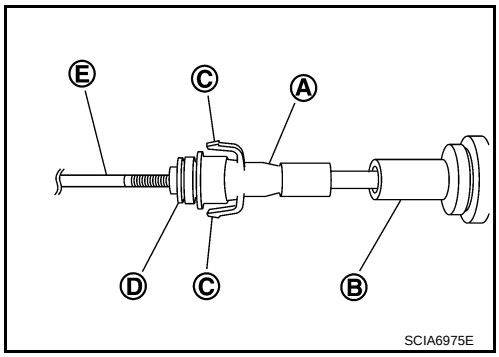
1. Key interlock cable
2. Key cylinder
3. Control device assembly
A. Lock plate
B. Holder
C. Clip
D. Slider
E. Key interlock rod
F. Adjust holder
G. Casing cap

REMOVAL

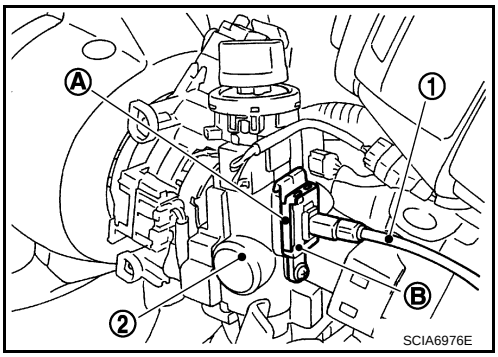
CAUTION:

Make sure that parking brake is applied before removal and installation.

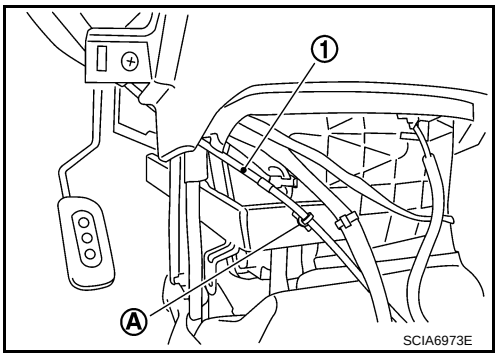
1. Place the selector lever in the “N” position.
2. Remove the selector lever knob. Refer to TM-496, "Selector Lever Knob Removal and Installation".
3. Remove the center console assembly. Refer to IP-11, "Removal and Installation".
4. Slide the slider (A) toward the casing cap (B) while pressing tabs (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).



7. Remove steering column cover (upper and lower) and instrument lower finisher. Refer to IP-11, "Removal and Installation".
8. Pull out the lock plate (A) from the holder (B).
9. Remove the key interlock cable (1) from the key cylinder (2).



10. Remove the clip (A), and then remove the key interlock cable (1).

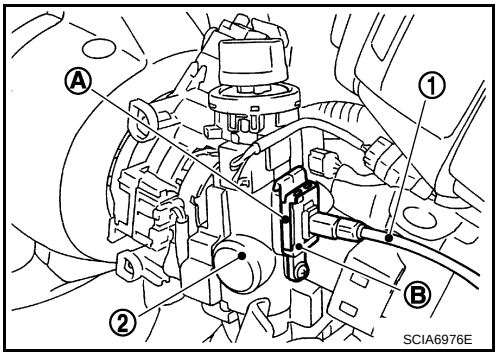


INSTALLATION

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.**

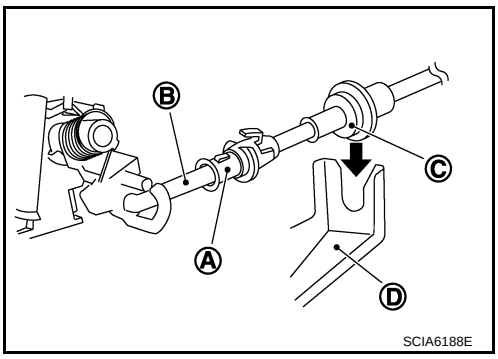
1. Place the selector lever in the “P” position.
2. Turn ignition switch to “ACC” or “ON” position.
3. Set the key interlock cable (1) to the key cylinder (2).
4. Install the lock plate (A) to the holder (B).
5. Turn ignition switch to “LOCK” position.



6. Temporarily install the adjust holder (A) to the key interlock rod (B).
7. Install the casing cap (C) to the cable bracket (D) on the control device assembly.

   CAUTION:

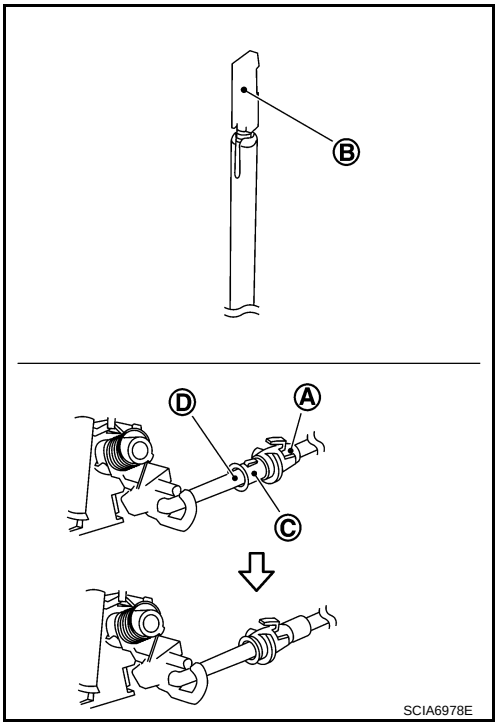
   - **Do not bend or twist key interlock cable excessively when installing.**
   - **After installing key interlock cable to cable bracket (D) on control device assembly, make sure casing cap (C) is firmly secured in cable bracket (D) on control device assembly.**
   - **If casing cap (C) is loose [less than 39.2 N (4.0 kg, 8.8 lb) removing force], replace key interlock cable.**



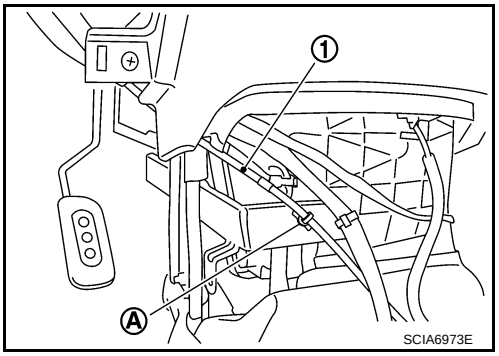
8. Slide the slider (A) toward the key interlock rod (D) while pressing the pull lock (B) down to securely connect the adjust holder (C) with the key interlock rod (D).

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-11, "Removal and Installation".
11. Install the center console assembly. Refer to IP-11, "Removal and Installation".
12. Install the selector lever knob. Refer to TM-496, "Selector Lever Knob Removal and Installation".
13. Check shift lock system. Refer to TM-31, "System Description".

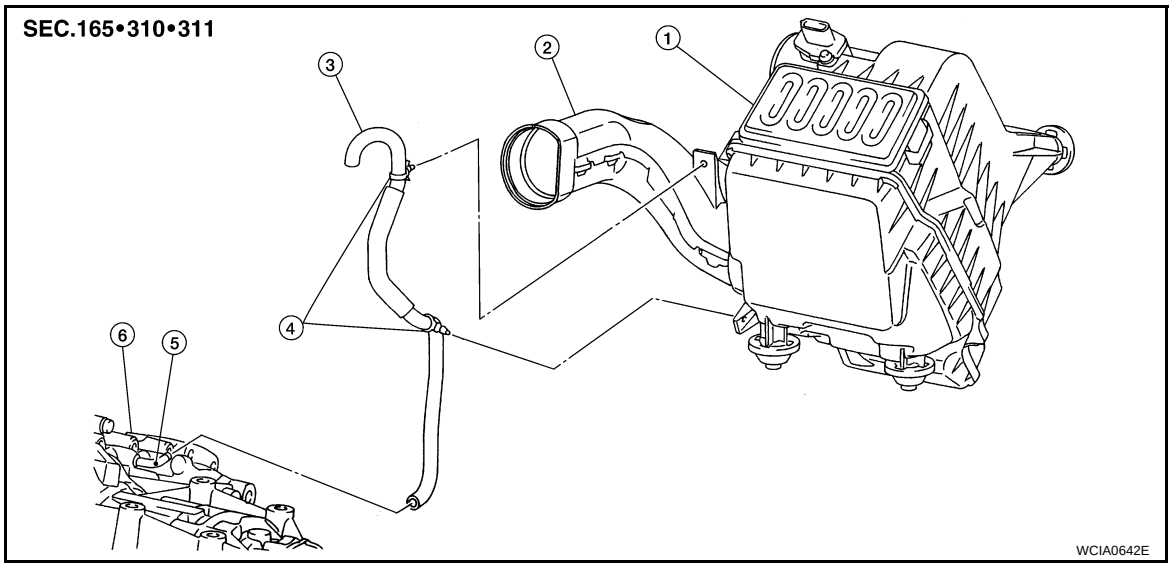


AIR BREATHER HOSE

Removal and Installation

INFOID:0000000001731427

COMPONENTS



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-27, "Removal and Installation".
2. Remove air breather hose.

INSTALLATION

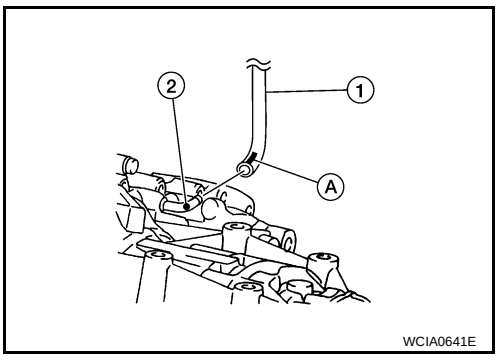
Installation is in the reverse order of removal.

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.

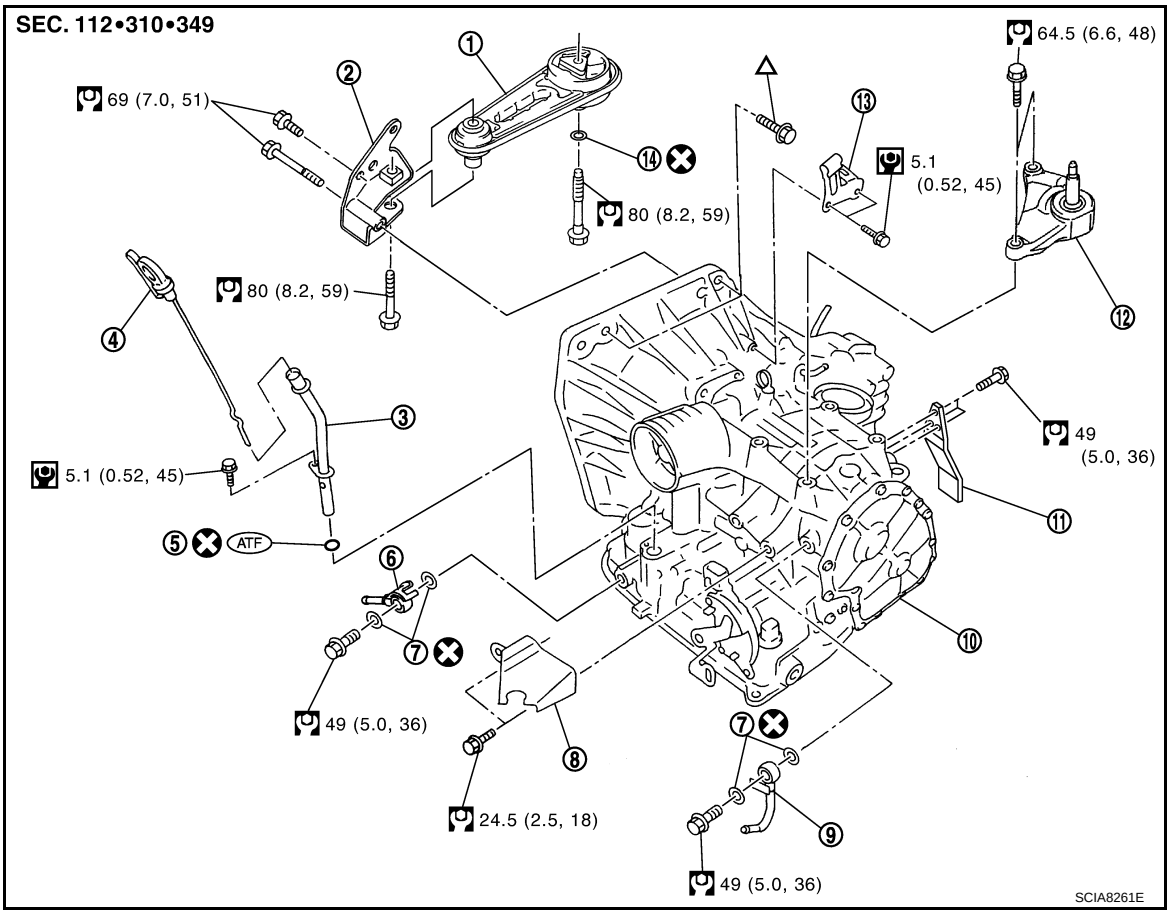


REMOVAL AND INSTALLATION

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001731428



1. Rear torque rod
2. Rear engine mounting bracket
3. A/T fluid charging pipe
4. A/T fluid level gauge
5. O-ring
6. Fluid cooler tube
7. Copper washer
8. Bracket
9. Fluid cooler tube
10. A/T assembly
11. Rear gusset
12. Engine mounting bracket (LH)
13. Bracket
14. Washer

△: Refer to installation.

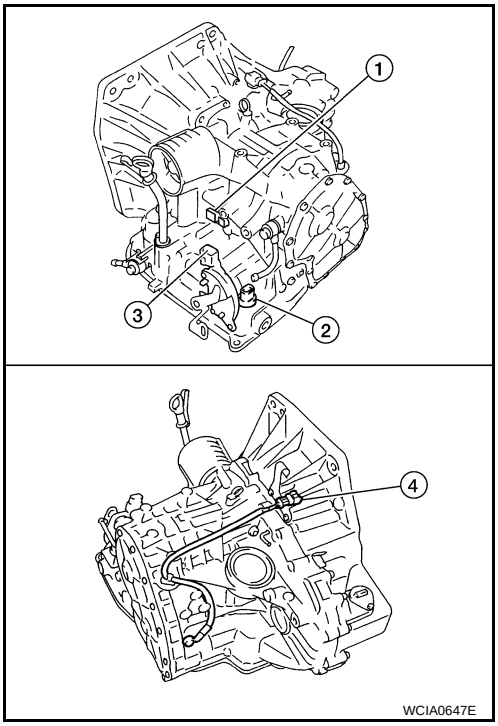
Removal and Installation

INFOID:0000000001731429

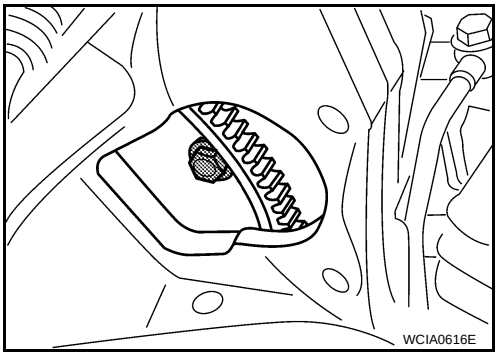
REMOVAL

1. Remove the engine and transaxle as an assembly. Refer to EM-89, "Removal and Installation".

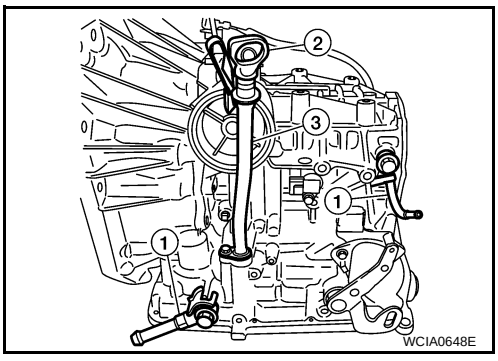
2. Disconnect the following connectors and remove the wire harness.
   - Turbine revolution sensor (power train revolution sensor) harness connector (1)
   - Terminal cord assembly harness connector (2)
   - PNP switch connector (3)
   - Revolution sensor harness connector (4)



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.



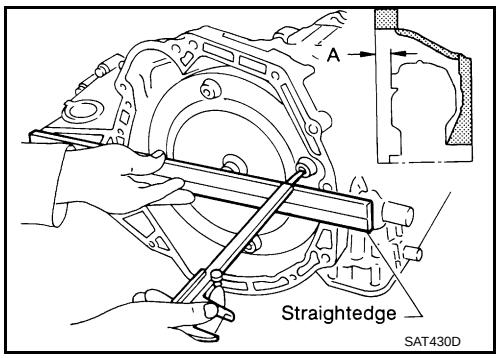
4. Put matching marks on the drive plate and torque converter.
   CAUTION:
   For matching marks, use paint. Never damage the drive plate or torque converter.
5. Remove the transaxle to engine and engine to transaxle bolts.
6. Separate the transaxle from the engine.
   CAUTION:
   Secure torque converter to prevent it from dropping.
7. If necessary, remove the following from the transaxle:
   - 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



INSPECTION

When installing the torque converter to the transaxle measure distance A.

Dimension A: 16.2 mm (0.638 in) or more

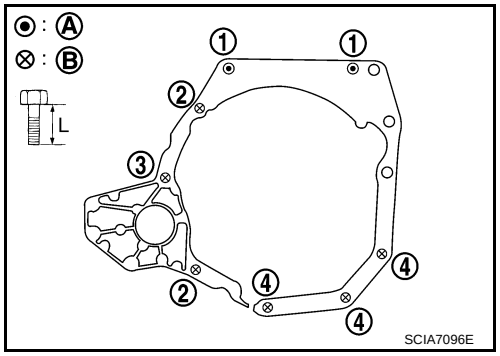


INSTALLATION

Installation is in the reverse order of removal.

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 TM-503, "Exploded View".**
- **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-50, "Removal and Installation".**
- **After converter is installed to drive plate, rotate crankshaft several turns to check that transaxle rotates freely without binding.**
- 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 assembly to the engine, attach the bolts in accordance with the following standard.

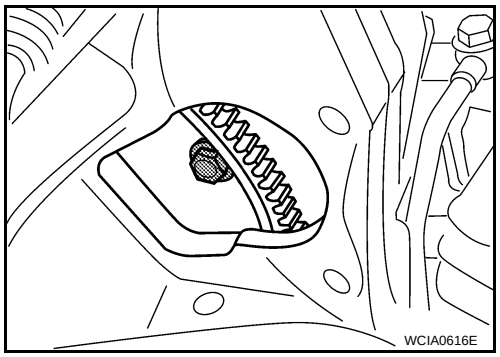


Bolt No.	1	2	3	4
Number of bolts	2	2	1	3
Bolt length “L” [mm (in)]	40 (1.57)	44 (1.73)	69 (2.72)	49 (1.93)
Tightening torque [N·m (kg-m, ft-lb)]	48 (4.9, 35)			

(A): A/T to engine
(B): Engine to A/T

- 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 bolts : 51 N·m (5.2 kg-m, 38 ft-lb)



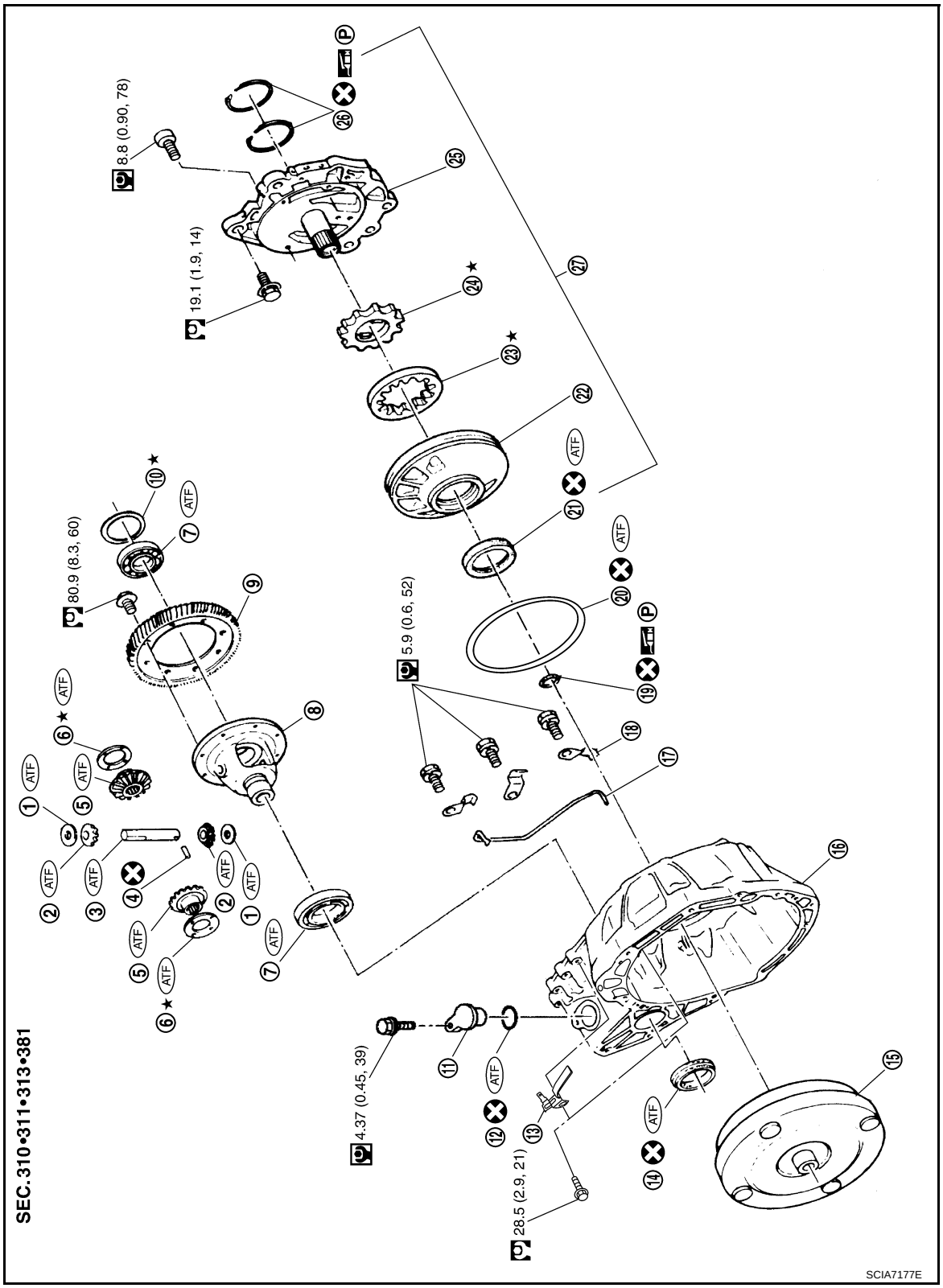
- After completing installation, check for A/T fluid leakage, A/T fluid level and A/T positions. Refer to TM-171, "Checking A/T Fluid" and TM-497, "Checking of A/T Position".

DISASSEMBLY AND ASSEMBLY

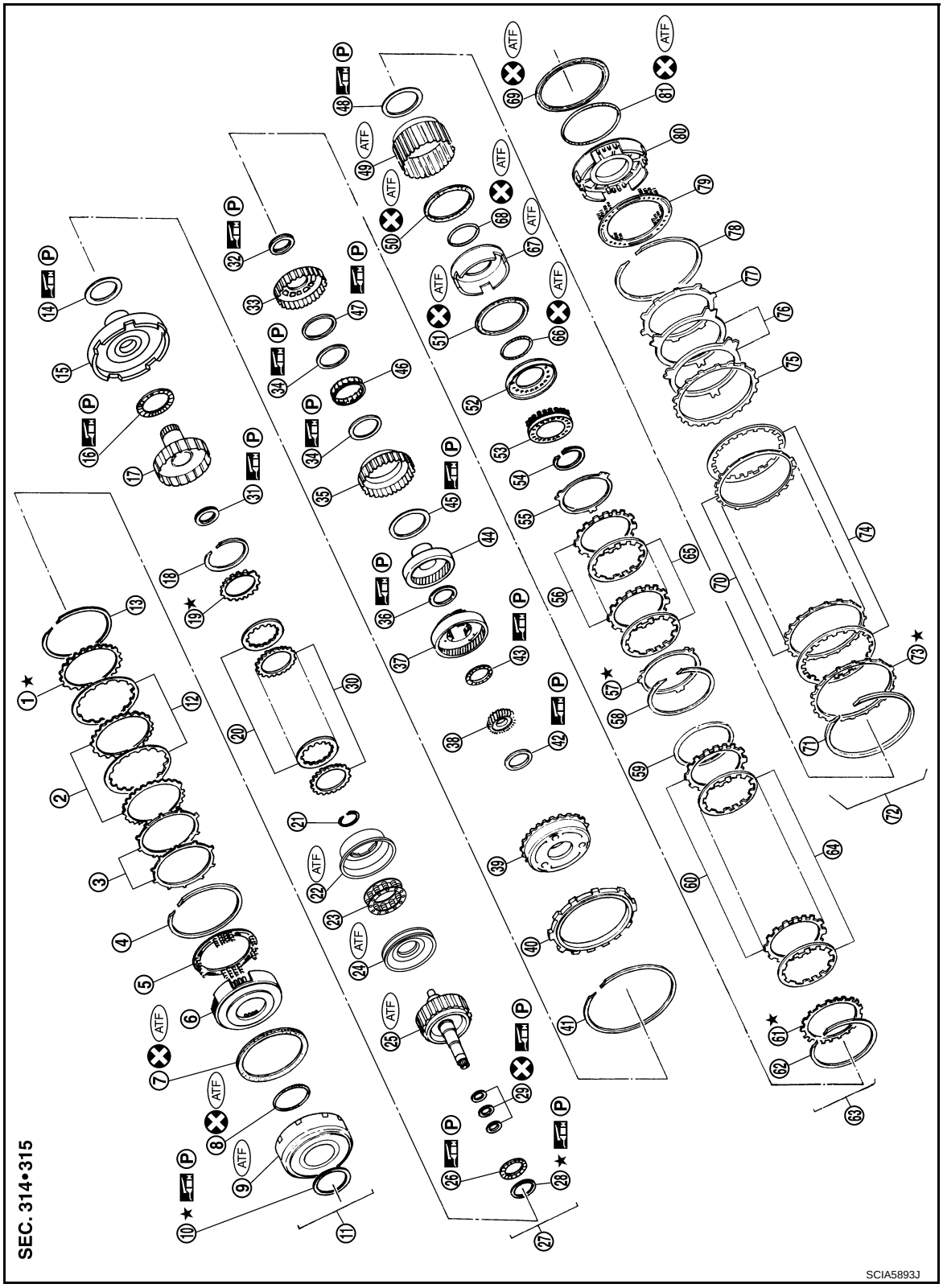
OVERHAUL

Component

INFOID:0000000001731430

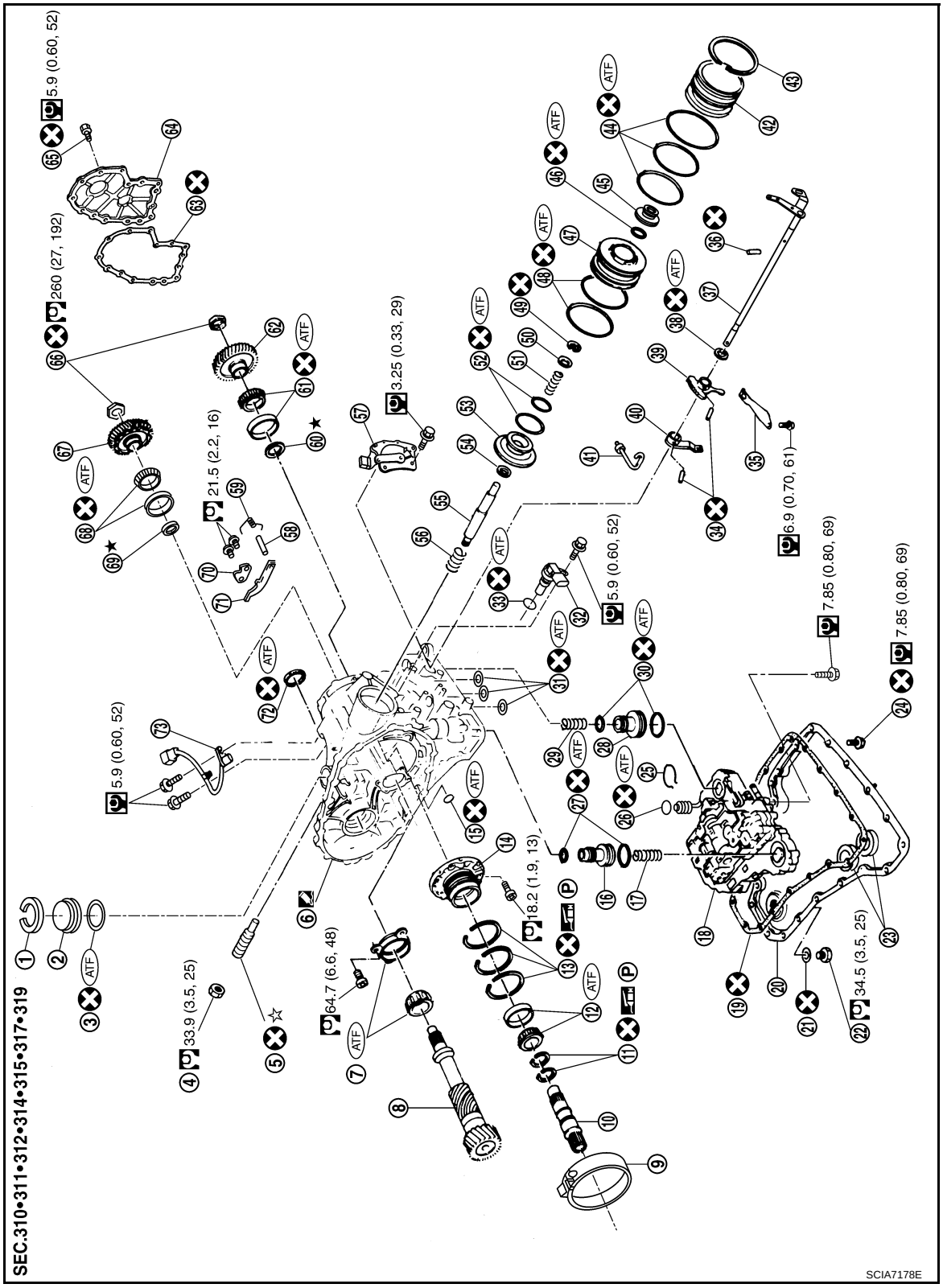


1. Pinion mate gear thrust washer
2. Pinion mate gear
3. Pinion mate shaft
4. Lock pin
5. Side gear
6. Side gear thrust washer
7. Differential side bearing
8. Differential case
9. Final gear
10. Differential side bearing adjusting shim
11. Plug
12. O-ring
13. Bracket
14. RH differential side oil seal
15. Torque converter
16. Converter housing
17. Differential lubricant tube
18. Clip
19. O-ring
20. O-ring
21. Oil pump housing oil seal
22. Oil pump housing
23. Outer gear
24. Inner gear
25. Oil pump cover
26. Seal ring
27. Oil pump assembly



1. Retaining plate
2. Driven plate
3. Dish plate
4. Snap ring
5. Spring retainer assembly
6. Reverse clutch piston
7. Seal ring
8. D-ring
9. Reverse clutch drum
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 ring
51. Seal ring
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. Seal ring
70. Driven plate
71. Snap ring
72. Low & reverse brake assembly
73. Retaining plate
74. Drive plate
75. Retaining plate
76. Dish plate
77. Driven plate
78. Snap ring
79. Spring retainer assembly
80. Low & reverse brake piston
81. D-ring



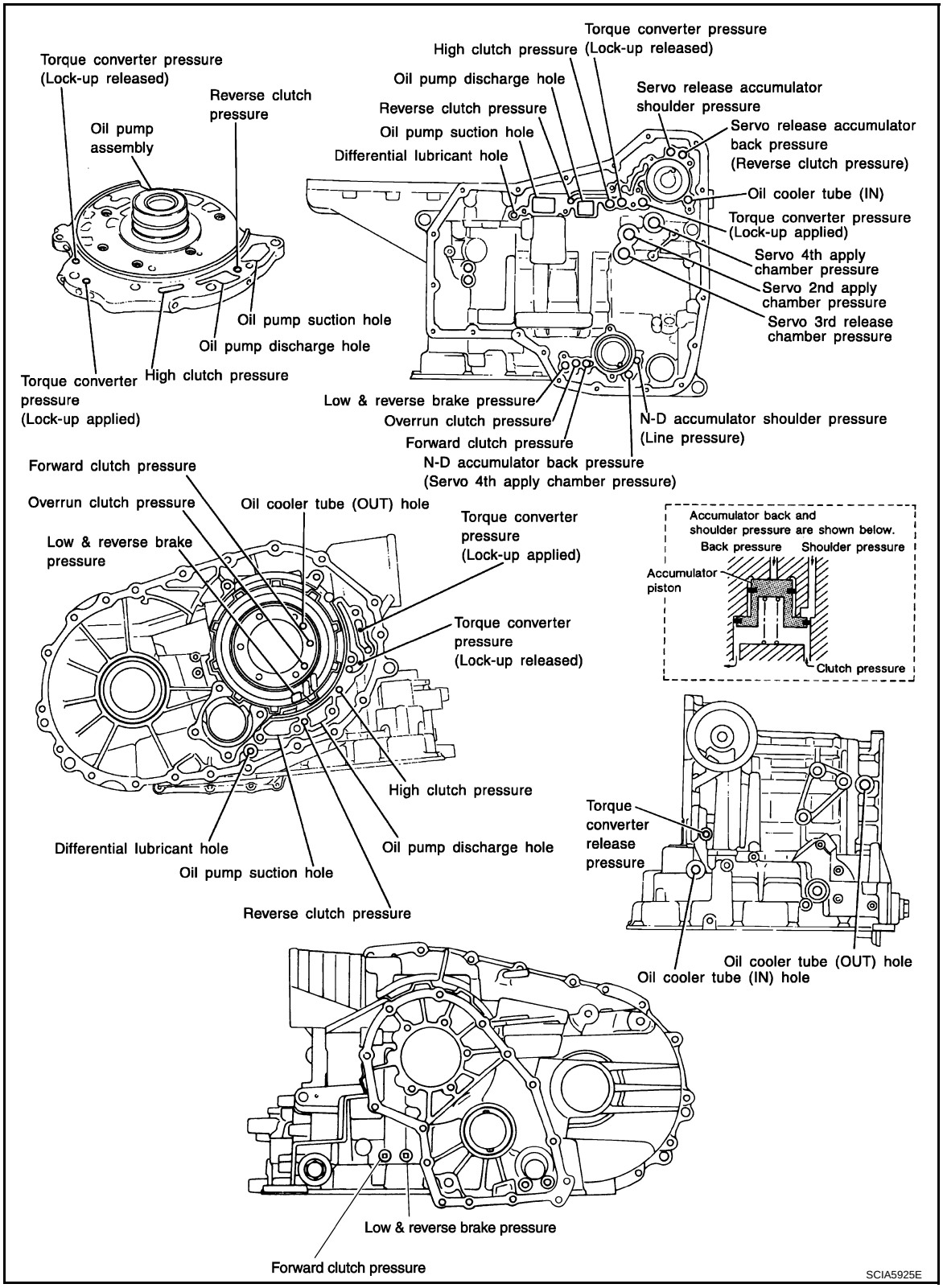
1. Snap ring
2. Governor cap
3. O-ring
4. Lock nut
5. Anchor end pin
6. Transaxle case
7. Reduction pinion gear bearing
8. Reduction pinion gear
9. Brake band
10. Output shaft
11. Seal ring
12. Output shaft bearing
13. Seal ring
14. Bearing retainer
15. O-ring
16. Servo release accumulator piston
17. Return spring
18. Control valve assembly

19. Oil pan gasket
20. Oil pan
21. Drain plug gasket
22. Drain plug
23. Magnet
24. Oil pan fitting bolt
25. Snap ring
26. O-ring
27. O-ring
28. N-D accumulator piston
29. Return spring
30. O-ring
31. Lip seal
32. Turbine revolution sensor (power train revolution sensor)
33. O-ring
34. Retaining pin
35. Detent spring
36. Retaining pin
37. Manual shaft
38. Manual shaft oil seal
39. Manual plate
40. Parking rod plate
41. Parking rod
42. OD servo piston retainer
43. Snap ring
44. O-ring
45. OD servo piston
46. D-ring
47. Servo piston retainer
48. O-ring
49. E-ring
50. Spring retainer
51. OD servo return spring
52. D-ring
53. Band servo piston
54. Band servo thrust washer
55. Band servo piston stem
56. 2nd servo return spring
57. PNP switch
58. Parking shaft
59. Return spring
60. Output gear adjusting spacer
61. Output gear bearing
62. Output gear
63. Side cover gasket
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

: Apply locking sealant (Loctite #518).

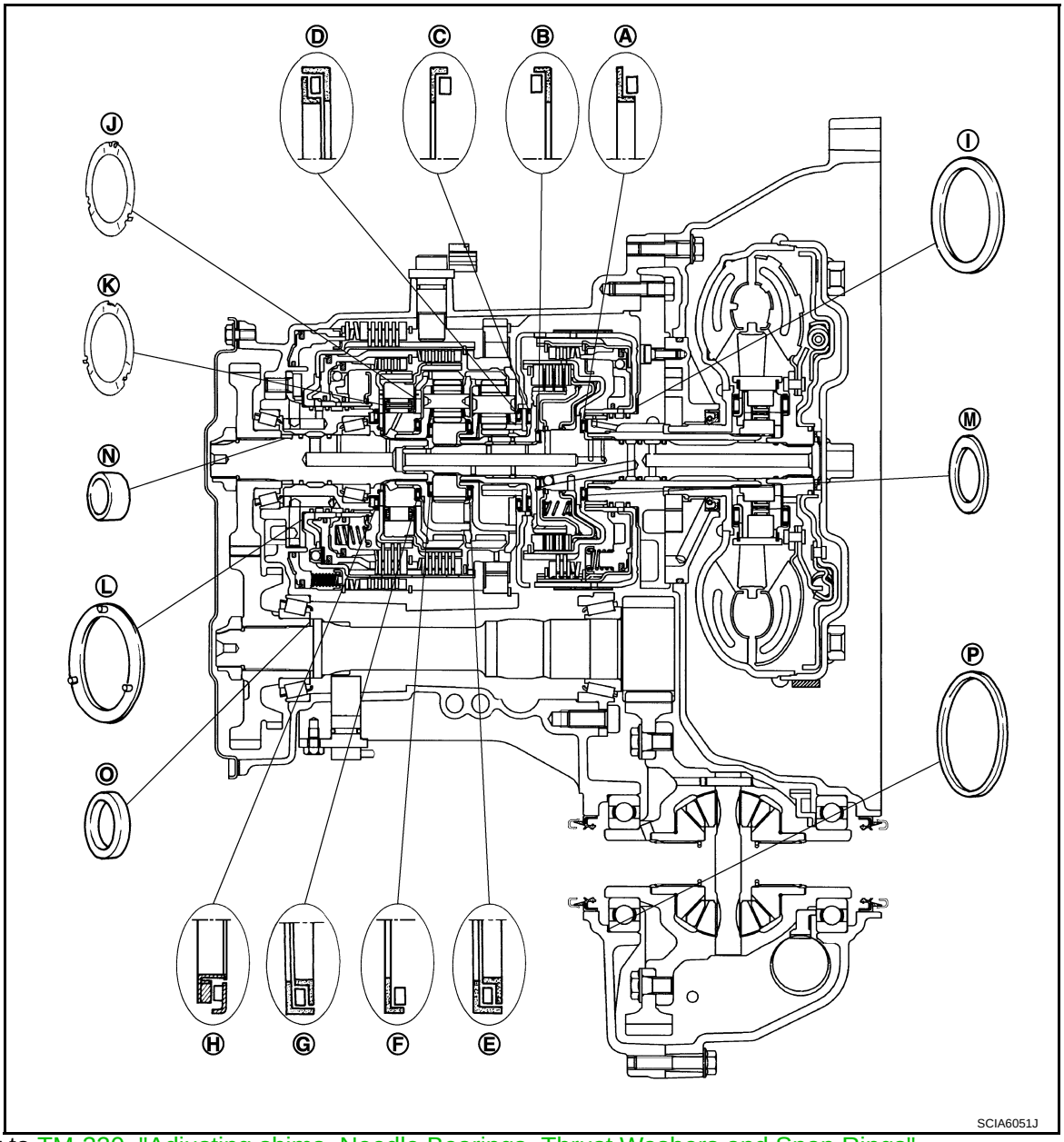
Oil Channel

INFOID:0000000001731431



Location of Adjusting Shims, Needle Bearings and Thrust Washers

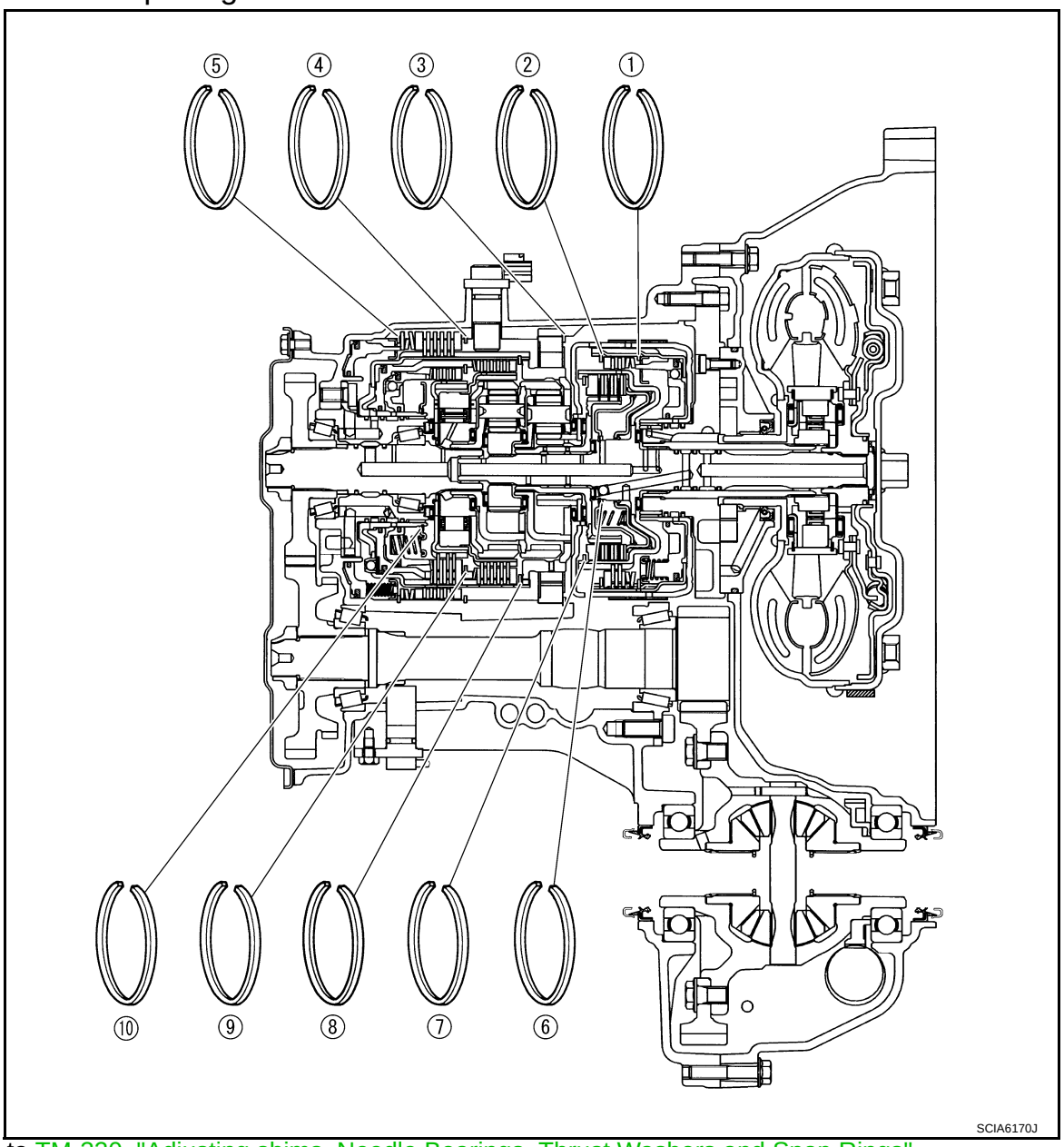
INFOID:0000000001731432



- Refer to TM-320, "Adjusting shims, Needle Bearings, Thrust Washers and Snap Rings".

Location of Snap Rings

INFOID:0000000001731433



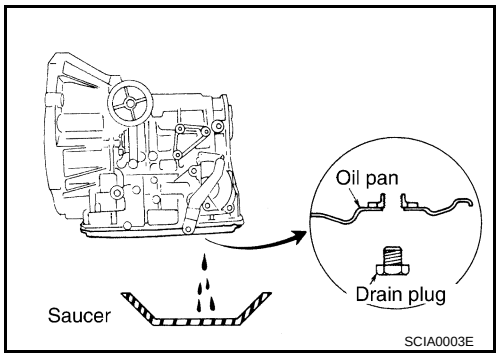
- Refer to TM-320, "Adjusting shims, Needle Bearings, Thrust Washers and Snap Rings".

DISASSEMBLY

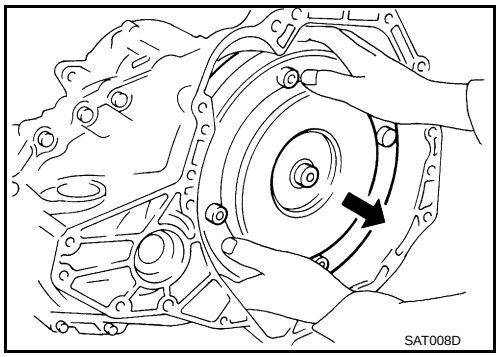
Disassembly

INFOID:0000000001731434

1. Drain ATF through drain hole.
2. Remove drain plug gasket from drain plug.



3. Remove torque converter.

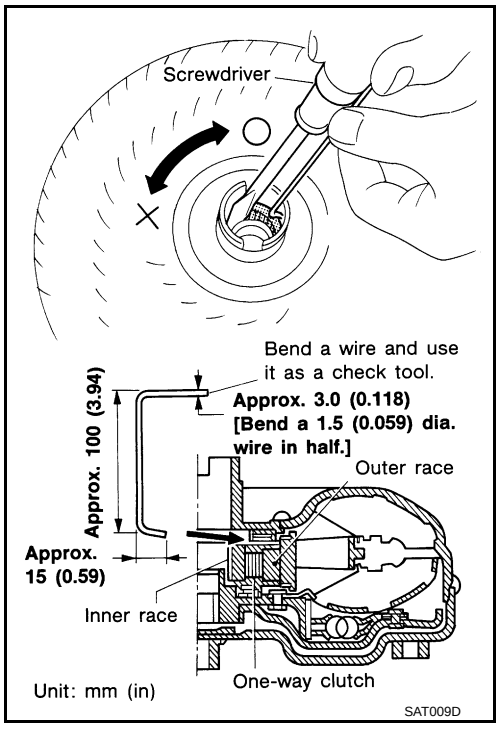


4. Check torque converter one-way clutch using check tool as shown.

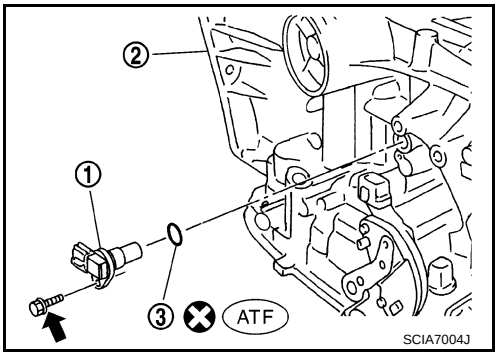
a. Insert check tool into groove of bearing support built into one-way clutch outer race.

b. When secring bearing support with check tool, rotate one-way clutch spline using suitable tool.

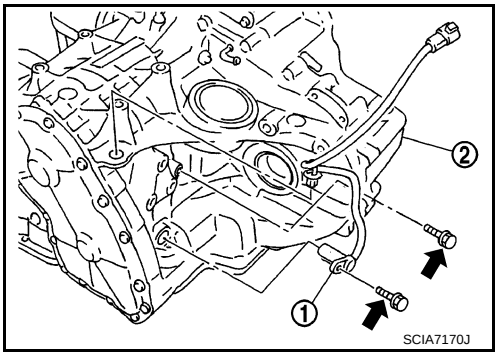
c. Check that inner race rotates clockwise only. If not, replace torque converter assembly.



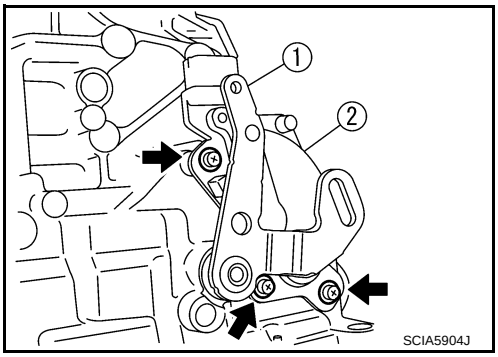
5. Remove turbine revolution sensor (power train revolution sensor) (1) from transaxle case (2).
   ⬅: Bolt (1)
6. Remove O-ring (3) from turbine revolution sensor (power train revolution sensor) (1).



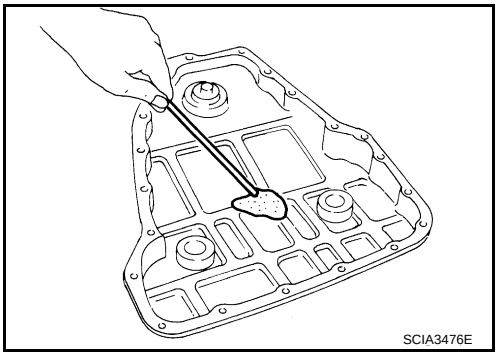
7. Remove revolution sensor (1) from transaxle case (2).
   ⬅: Bolt (2)



8. Set manual shaft (1) in “P” position.
9. Remove PNP switch (2) from transaxle case.
   ⬅: Bolt (3)



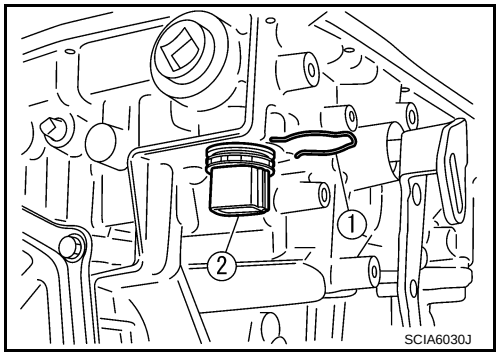
10. Remove oil pan bolts.
11. Remove oil pan and oil pan gasket.
12. Check foreign materials in oil pan to help determine causes of malfunction. If the ATF is very dark, smells burned, or contains foreign particles, frictional material (clutches, band) may need replacement. A tacky film that will not 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, clean the A/T fluid cooler after repair of A/T. Refer to TM-172, "A/T Fluid Cooler Cleaning".**
13. Remove magnets from oil pan.



14. 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.

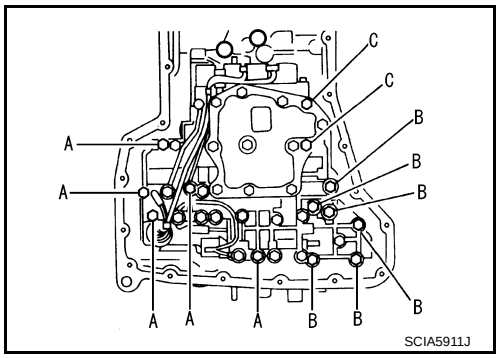
b. Push terminal body (2) into transaxle case.



c. Remove control valve assembly 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

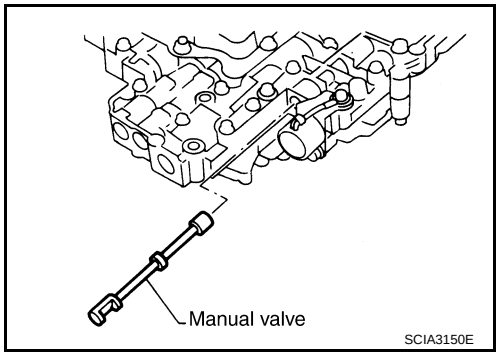


d. Remove control valve assembly from transaxle case.
CAUTION:
Do not drop manual valve.

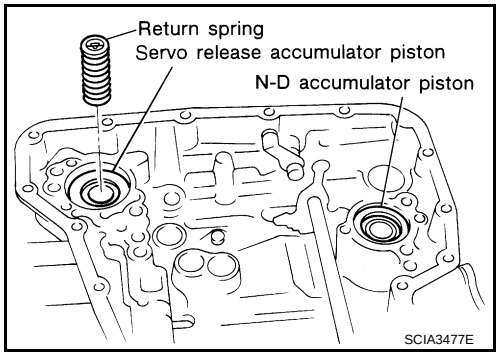
15. Remove manual valve from control valve assembly.
- **Inspect the sliding surfaces of manual valve and valve body, and replace if damaged or dented.**

CAUTION:
Do not drop manual valve.

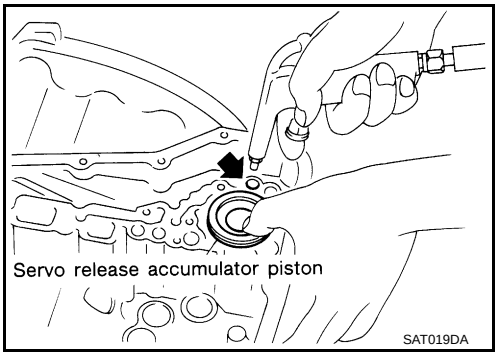
16. Remove O-ring from terminal body.



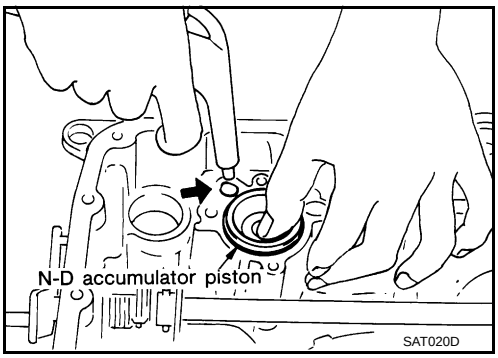
17. Remove return spring from servo release accumulator piston.



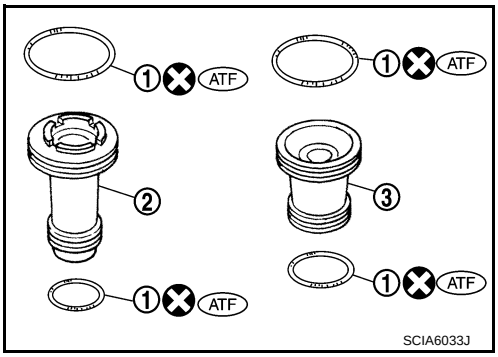
18. Apply compressed air into the oil hole as shown, and remove servo release accumulator piston from transaxle case.
CAUTION:
Strong flow of air will push the accumulator piston out along with a splash of ATF. Cover the area with lint-free cloth and blow air little by little to avoid this.



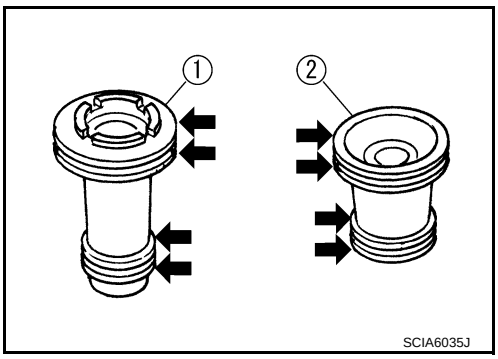
19. Apply compressed air into the oil hole as shown, and remove N-D accumulator piston and return spring from transaxle case.
CAUTION:
Strong flow of air will push the accumulator piston out along with a splash of ATF. Cover the area with lint free-cloth and blow air little by little to avoid this.



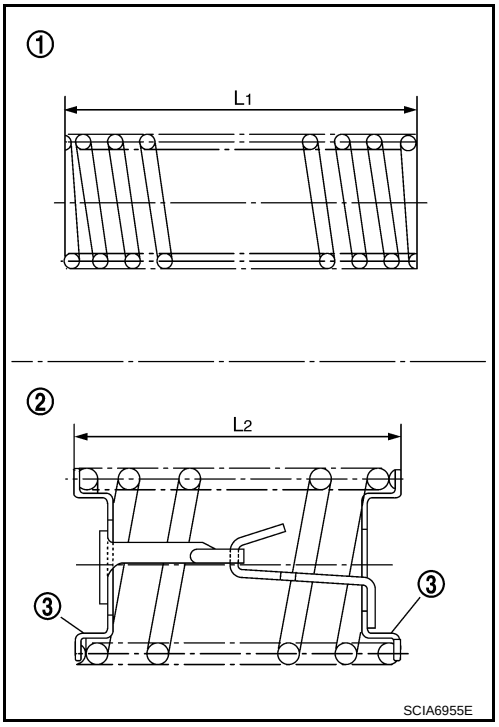
20. Remove O-rings (1) from servo release accumulator piston (2) and N-D accumulator piston (3).
CAUTION:
Wrap the removed servo release accumulator piston (2) and N-D accumulator piston (3) in a lint-free cloth.



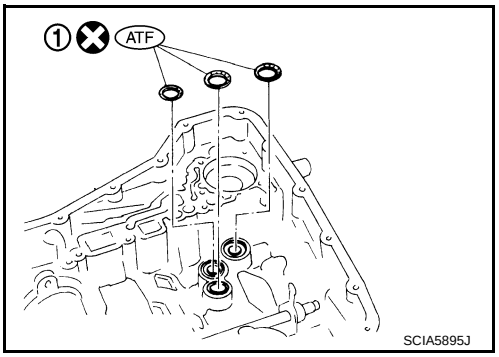
- **Inspect the sliding surfaces of each accumulator piston and transaxle case, and replace if damaged or dented.**
(1): Servo release accumulator piston
(2): N-D accumulator piston



- Inspect each return spring, and replace if deformed or worn. Refer to TM-321, "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).

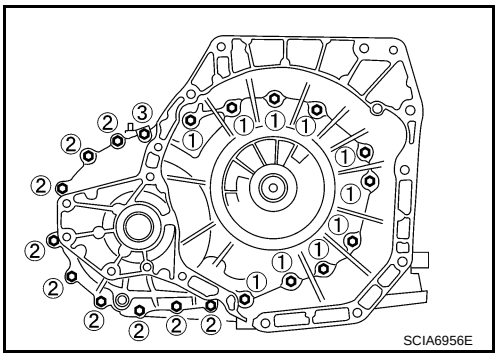


21. Remove lip seals (1) from transaxle case.

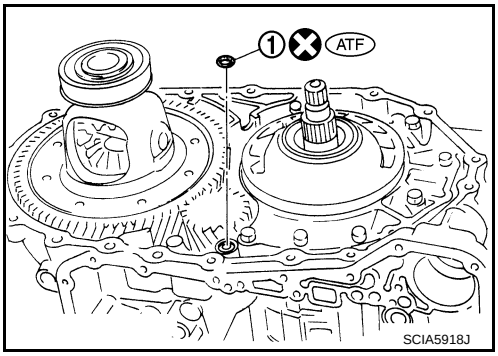


22. Remove converter housing according to the following procedures.

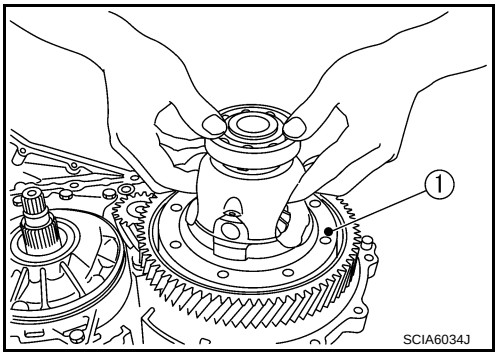
a. Remove converter housing fitting bolts (1), (2) and (3) using a power tool.
b. Remove bracket from converter housing
c. Remove converter housing by tapping it lightly.



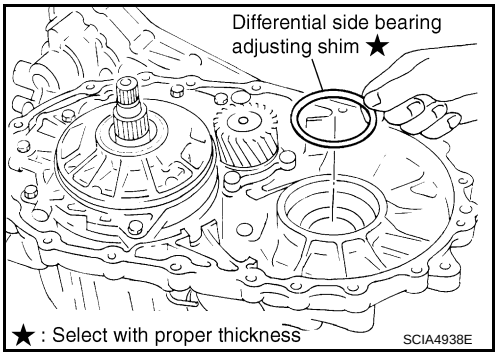
d. Remove O-ring (1) from differential lubricant hole.



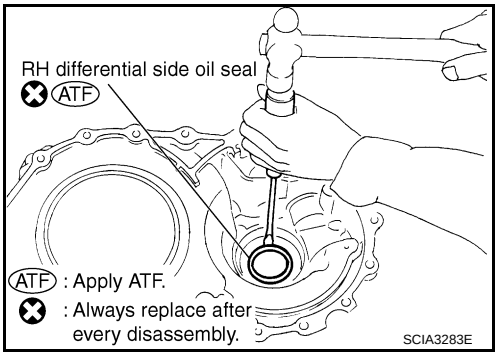
23. Remove plug from converter housing.
24. Remove O-ring from plug.
25. Remove final drive assembly (1) from transaxle case.



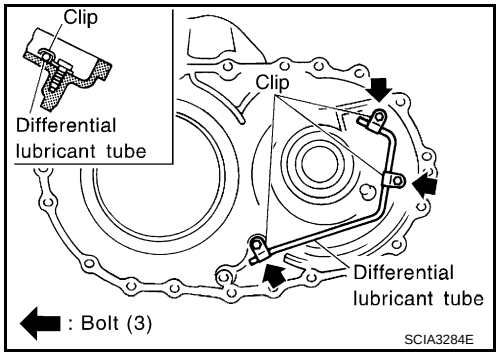
26. Remove differential side bearing adjusting shim from transaxle case.



27. Remove RH differential side oil seal from converter housing using suitable tool.
CAUTION:
Do not scratch converter housing.

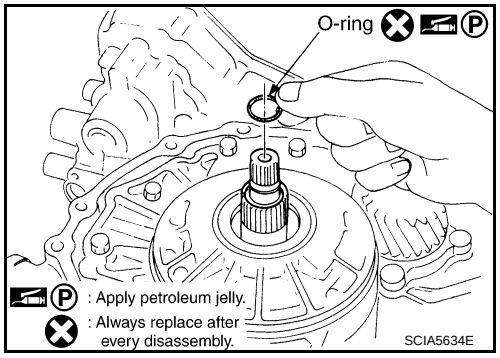


28. Remove differential lubricant tube and clips from converter housing.



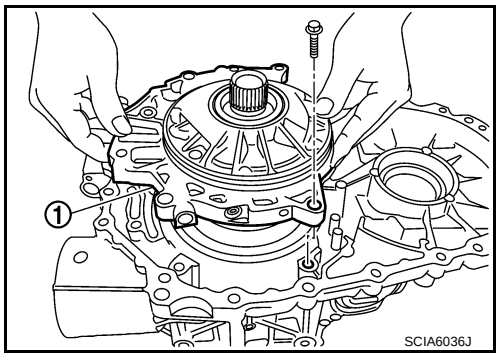
29. Remove oil pump assembly according to the following procedures.

a. Remove O-ring from input shaft assembly (high clutch drum).

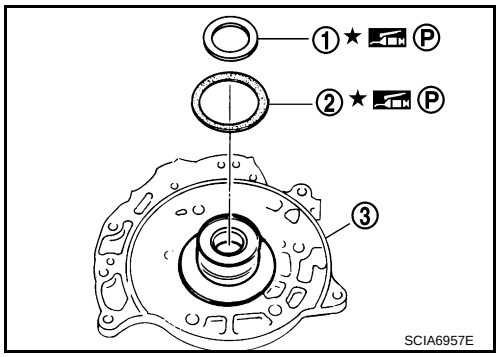


b. Remove oil pump assembly fitting bolts, and then remove oil pump assembly (1) from transaxle case.

c. Remove O-ring from oil pump assembly (1).

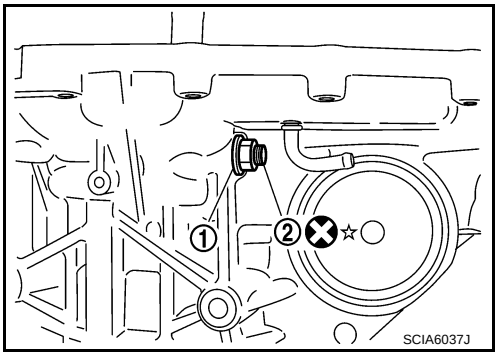


d. Remove bearing race (1) and thrust washer (2) from oil pump assembly (3).

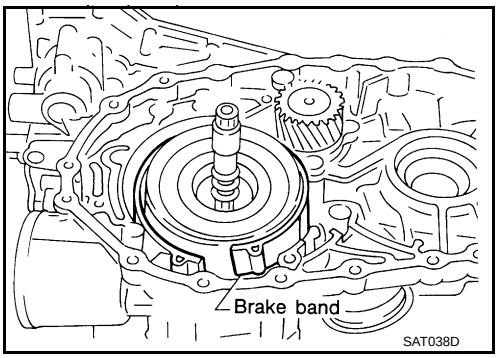


30. Remove brake band according to the following procedures.

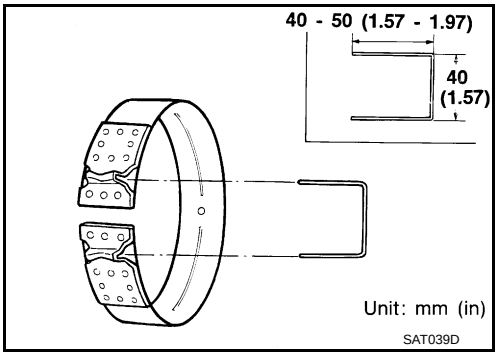
a. Loosen lock nut (1), and then remove anchor end pin (2) and lock nut (1) as a set from transaxle case.



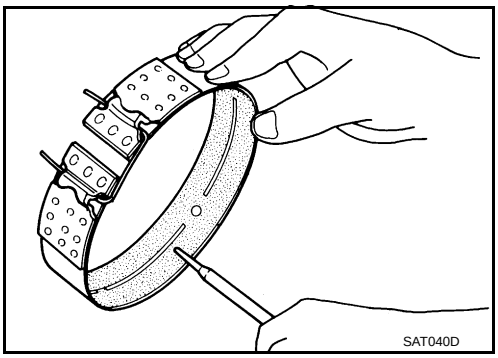
b. Remove brake band from transaxle case.



- **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. Leave the clip in position after removing brake band.**

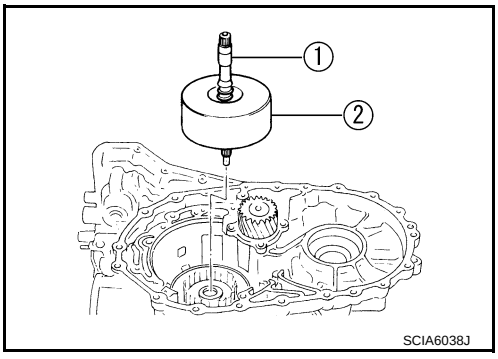


c. Check brake band facing for damage, cracks, wear or burns.

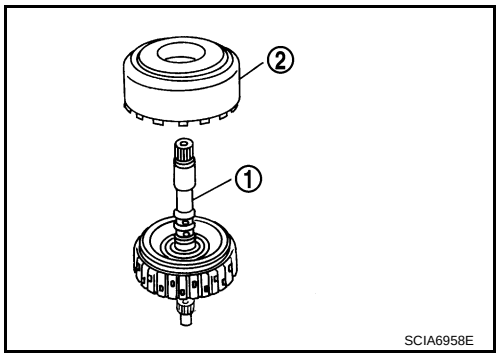


31. Remove input shaft assembly (high clutch assembly) and reverse clutch assembly according to the following procedures.

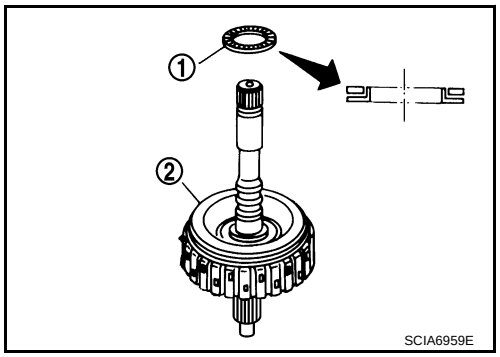
a. Remove input shaft assembly (high clutch assembly) (1) with reverse clutch assembly (2).



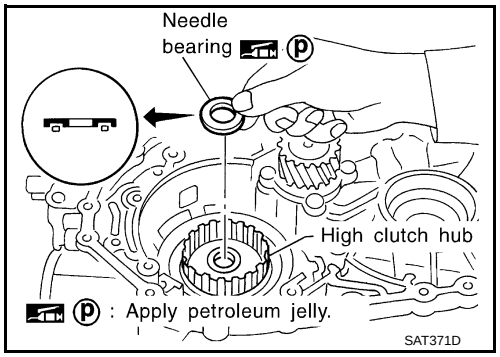
b. Remove input shaft assembly (high clutch assembly) (1) from reverse clutch assembly (2).



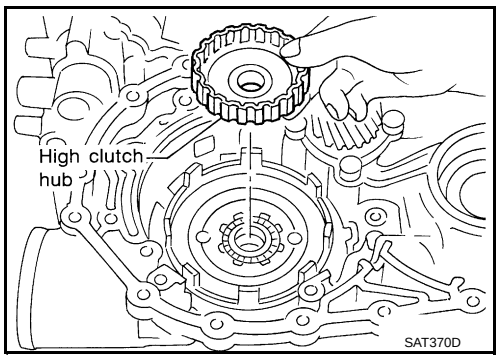
c. Remove needle bearing (1) from input shaft assembly (high clutch drum) (2).
   - **Inspect needle bearing (1) and input shaft assembly (high clutch drum) (2), and replace if damaged or worn.**



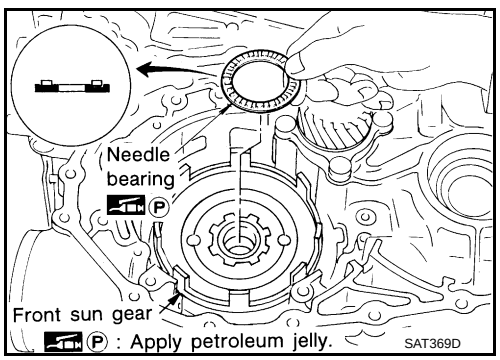
32. Remove needle bearing from high clutch hub.
   - **Inspect needle bearing, and replace if damaged or worn.**



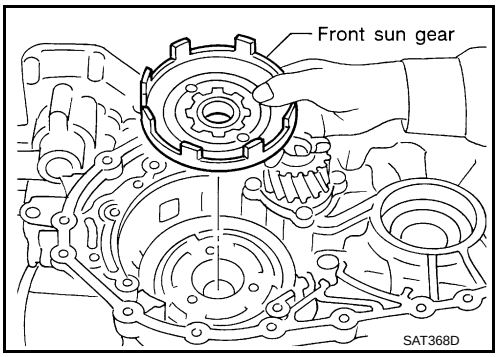
33. Remove high clutch hub from front sun gear.
   - **Inspect high clutch hub, and replace if damaged or worn.**



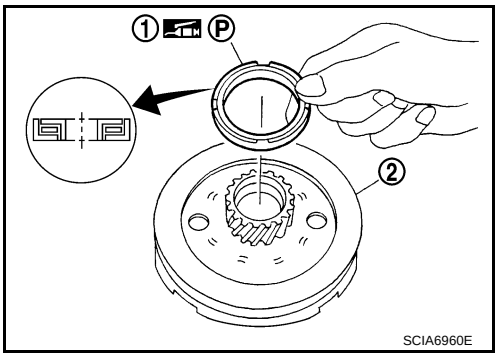
34. Remove needle bearing from front sun gear.
   - **Inspect needle bearing, and replace if damaged or worn.**



35. Remove front sun gear from front planetary carrier.

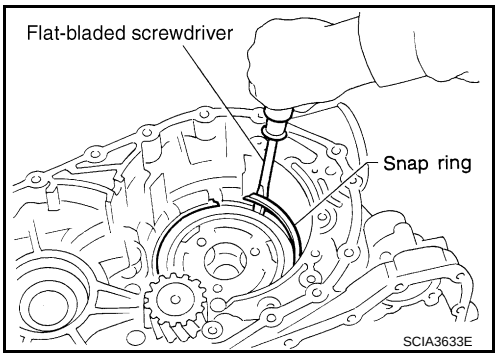


36. Remove needle bearing (1) from front sun gear (2).
    - **Inspect needle bearing (1) and front sun gear (2), and replace if damaged or worn.**

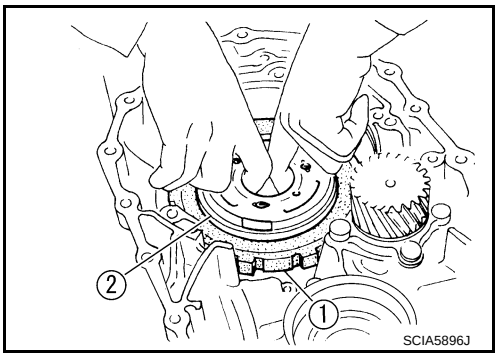


37. Remove front planetary carrier and low one-way clutch according to the following procedures.

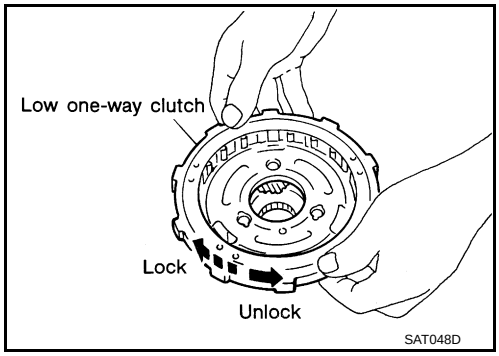
a. Remove snap ring using suitable tool.



b. Remove low one-way clutch (1) and front planetary carrier (2) as a set from transaxle case.

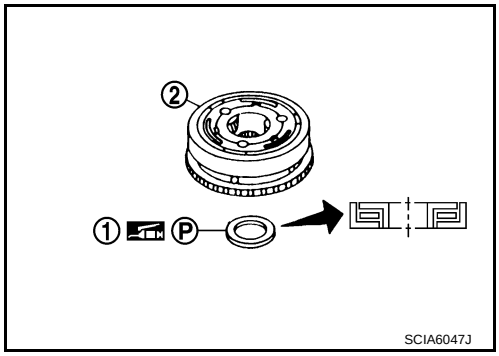


c. Check that low one-way clutch rotates counter-clockwise around front planetary carrier. Then try to turn it clockwise and check that it is locked.
   - **Replace low one-way clutch if necessary.**



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.**

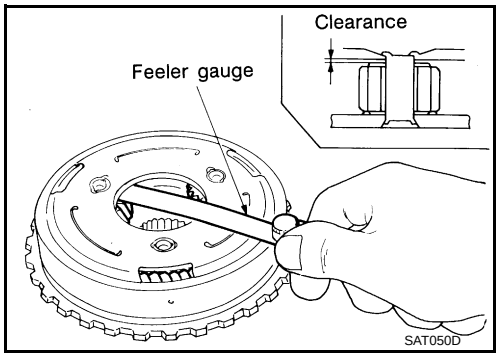


f. Check clearance between pinion washer and front planetary carrier using feeler gauge.

Standard clearance and allowable limit:

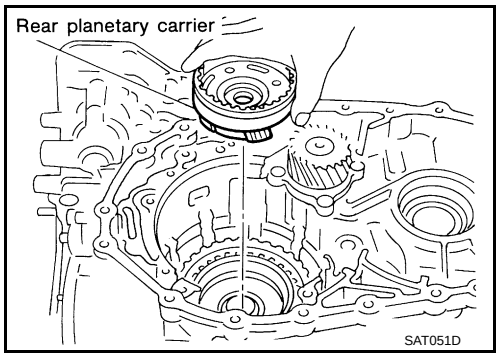
Refer to TM-323, "Planetary Carrier".

- **Replace front planetary carrier if the clearance exceeds allowable limit.**

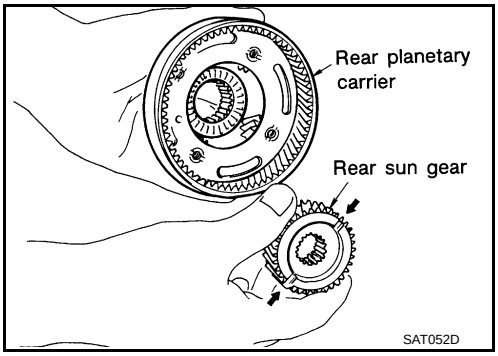


38. Remove rear planetary carrier and rear sun gear according to the following procedures.

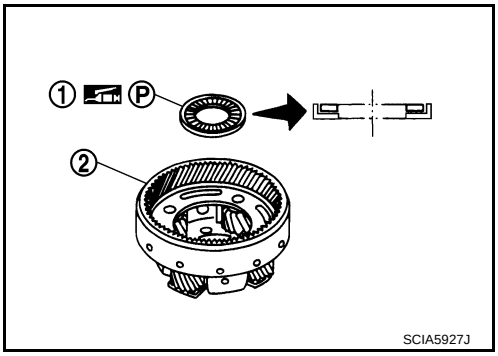
a. Remove rear planetary carrier (with rear sun gear) from transaxle case.



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.**

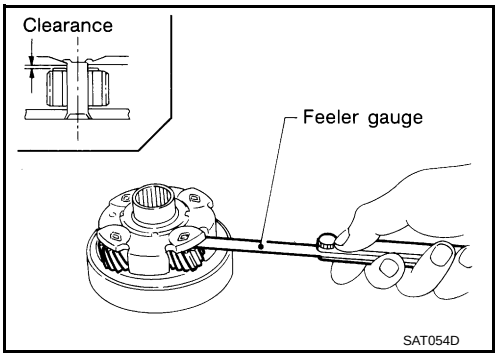


d. Check clearance between pinion washer and rear planetary carrier using feeler gauge.

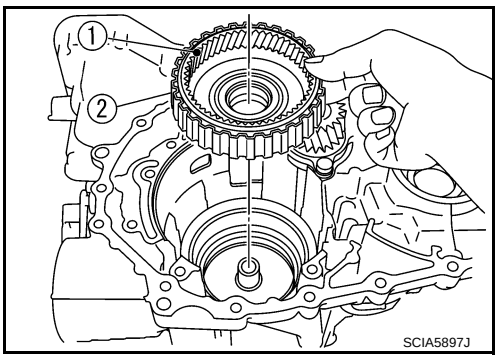
Standard clearance and allowable limit:

Refer to TM-323, "Planetary Carrier".

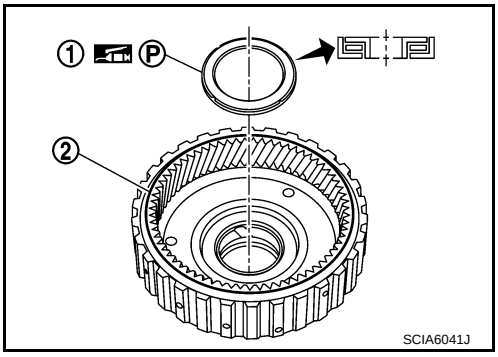
- **Replace rear planetary carrier if the clearance exceeds allowable limit.**



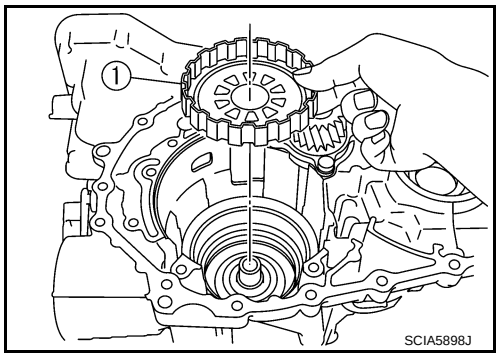
39. Remove rear internal gear (1) and forward clutch hub (2) as a set from forward clutch drum.



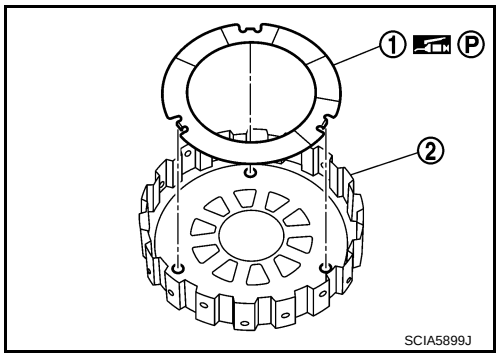
40. Remove needle bearing (1) from rear internal gear (2).
- **Inspect needle bearing (1), and replace if damaged or worn.**



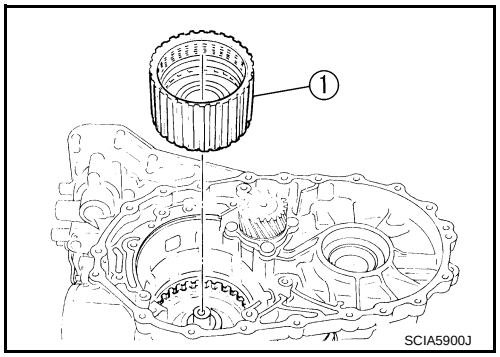
41. Remove overrun clutch hub (1) from forward clutch drum.



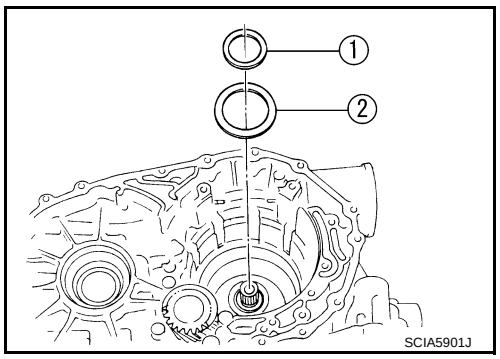
42. Remove thrust washer (1) from overrun clutch hub (2).
    - **Inspect thrust washer (1) and overrun clutch hub (2), and replace if damged or worn.**



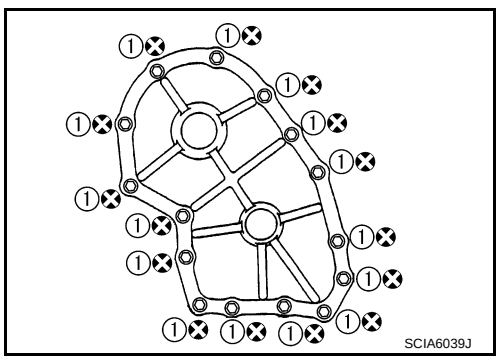
43. Remove forward clutch assembly and overrun clutch assembly (1) from transaxle case.



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 side cover fitting bolts (1), and then remove side cover by lightly tapping it using a soft hammer.
    CAUTION:
    Do not damage side cover.
46. Remove side cover gasket from side cover.

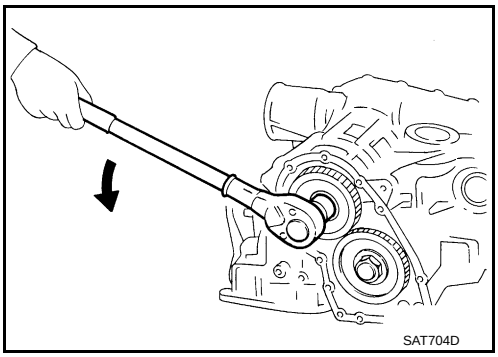


47. Remove output shaft, output gear and reduction gear according to the following procedures.

a. Set manual shaft in “P” position to fix idler gear and output gear.

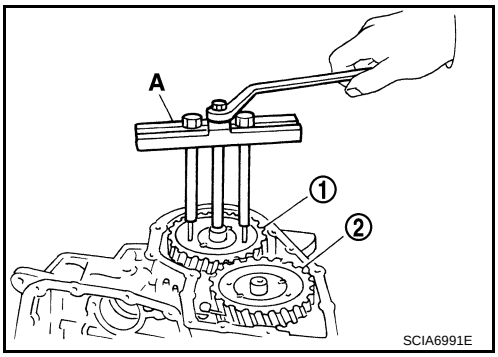
b. Unlock both idler gear and output gear lock nuts using a pin punch.

c. Remove idler gear and output gear lock nuts.



d. Remove idler gear (2) and output gear (1) using Tool A.

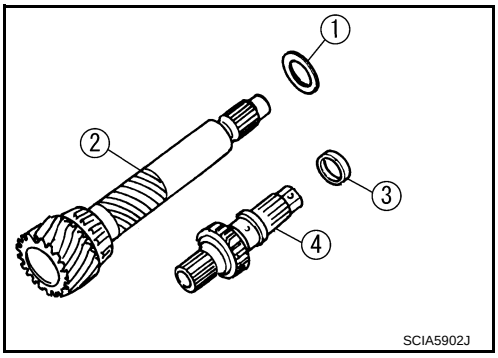
Tool number: ST27180001



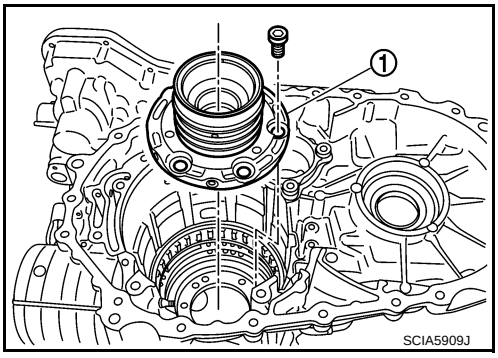
e. Remove reduction pinion gear and output shaft from transaxle case.

f. Remove reduction pinion gear adjusting shim (1) from reduction pinion gear (2).

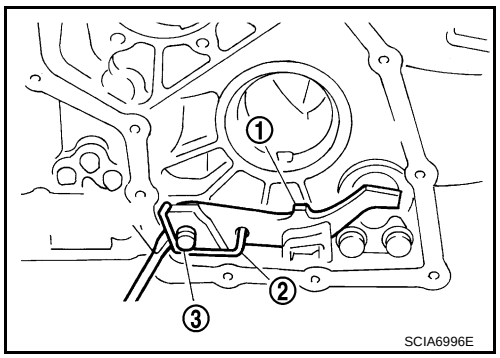
g. Remove output gear adjusting spacer (3) from output shaft (4).



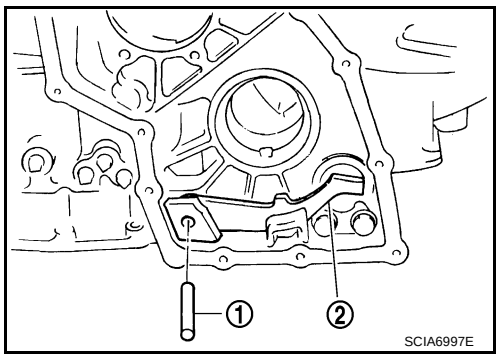
48. Remove bearing retainer fitting bolts, and then remove bearing retainer (1) from transaxle case.



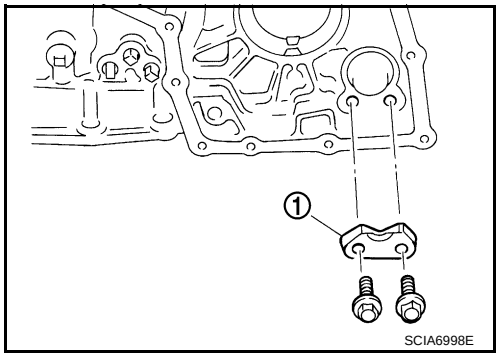
49. Remove return spring (2) from parking shaft (3) suitable tool.
(1): Parking pawl
• **Inspect return spring (2), and replace if damaged or worn.**



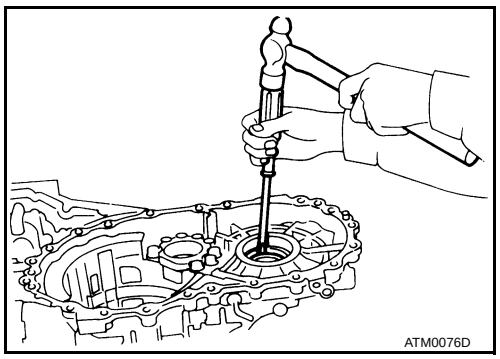
50. Draw out parking shaft (1), and then remove parking pawl (2) from transaxle case.
• **Inspect parking shaft (1) and parking pawl (2), and replace if damaged or worn.**



51. Remove parking actuator support (1) from transaxle case.
• **Inspect parking actuator support (1), and replace if damaged or worn.**
52. Remove snap ring from transaxle case using suitable tool.
53. Remove governor cap from transaxle case.
54. Remove O-ring from governor cap.



55. Remove LH differential side oil seal from transaxle case using suitable tool.
CAUTION:
Do not scratch transaxle case.

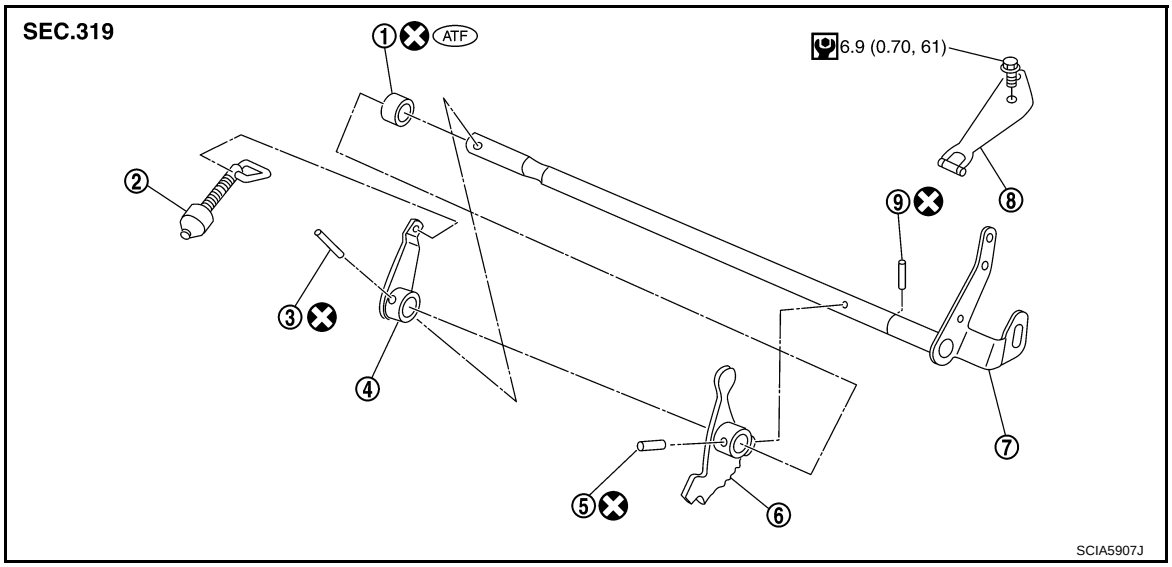


REPAIR FOR COMPONENT PARTS

Manual Shaft

INFOID:0000000001731435

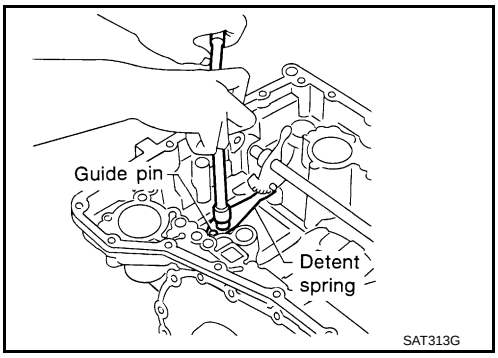
COMPONENTS



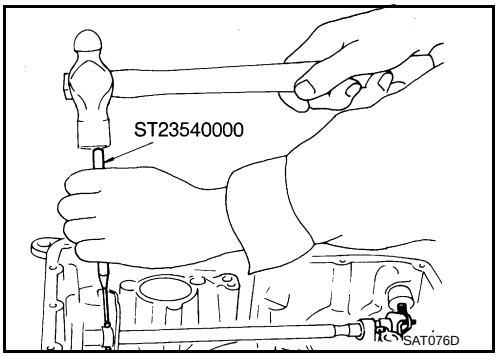
1. Manual shaft oil seal
2. Parking rod
3. Retaining pin
4. Parking rod plate
5. Retaining pin
6. Manual plate
7. Manual shaft
8. Detent spring
9. Retaining pin

REMOVAL

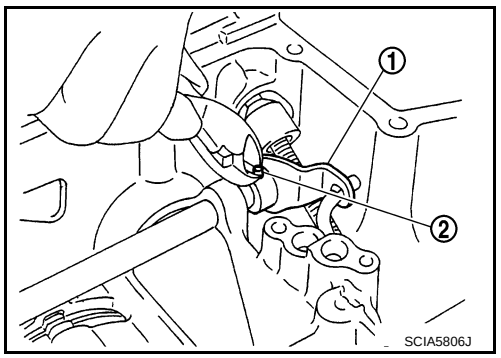
1. Remove detent spring from transaxle case.



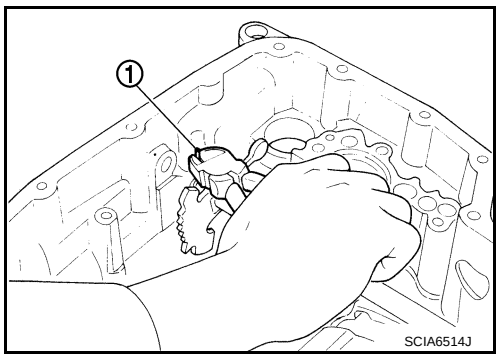
2. Drive out retaining pin of manual plate using suitable tool.



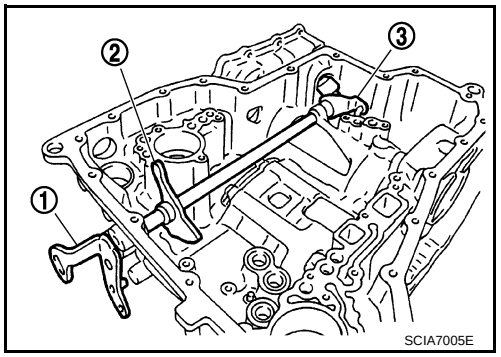
3. Pull out retaining pin (2) of parking rod plate (1) using suitable tool.



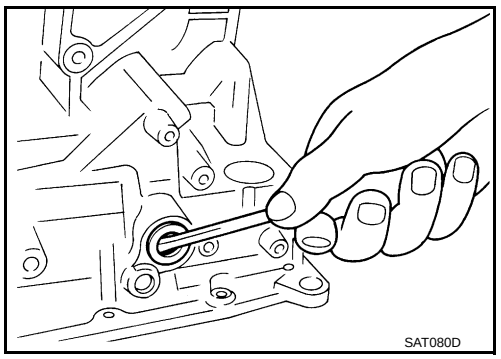
4. Pull out retaining pin (1) of manual shaft using suitable tool.



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 suitable tool.
CAUTION:
Do not scratch transaxle case.



INSPECTION

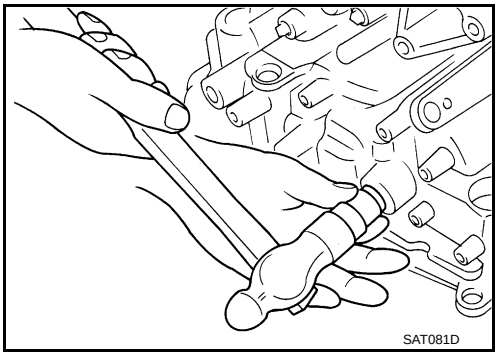
Check component parts, and replace if damaged or worn.

INSTALLATION

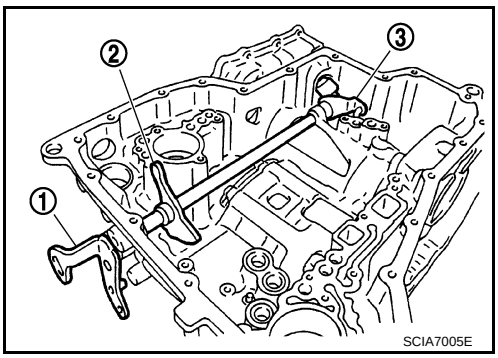
1. Drive manual shaft oil seal into transaxle case using suitable tool.

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.



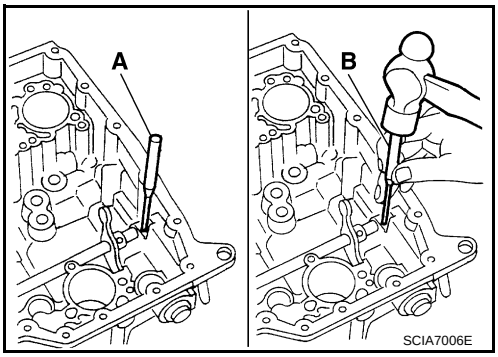
3. Insert manual shaft (1) to transaxle case, and install manual plate (2) to manual shaft (1).
4. Install parking rod plate (with parking rod) (3) to manual shaft (1).



5. Align groove of manual shaft and hole of transaxle case using suitable tool (A).
6. Drive retaining pin of manual shaft into transaxle case using Tool (B).

Tool number B: ST23540000

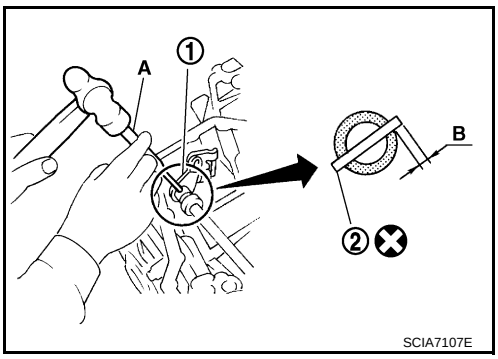
CAUTION:
Do not reuse retaining pin.



7. Set parking rod plate (1) onto manual shaft, and drive retaining pin (2) of parking rod plate (1) using Tool (A).

Tool number A: ST23540000

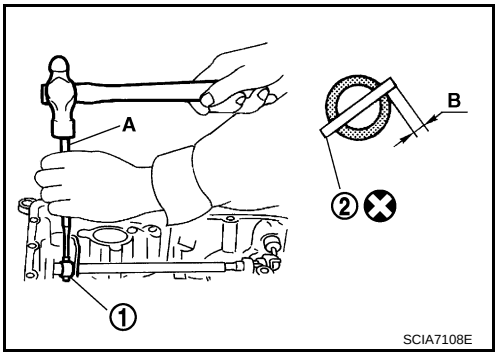
CAUTION:
The retaining pin end should protrude approx. 3mm (0.12 in) (B) from the outer surface of parking rod plate (1).



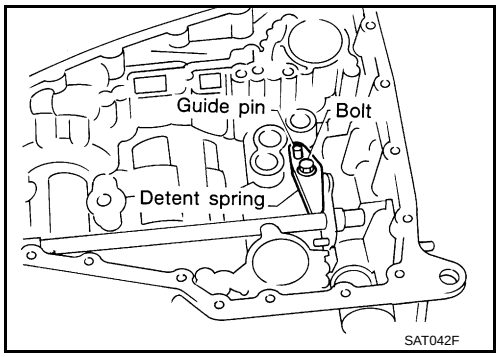
8. Set manual plate (1) onto manual shaft, and drive retaining pin (2) of manual plate (1) using Tool (A).

Tool number A: ST23540000

CAUTION:
The retaining pin end should protrude approx. 3mm (0.12 in) (B) from the outer surface of manual plate (1).



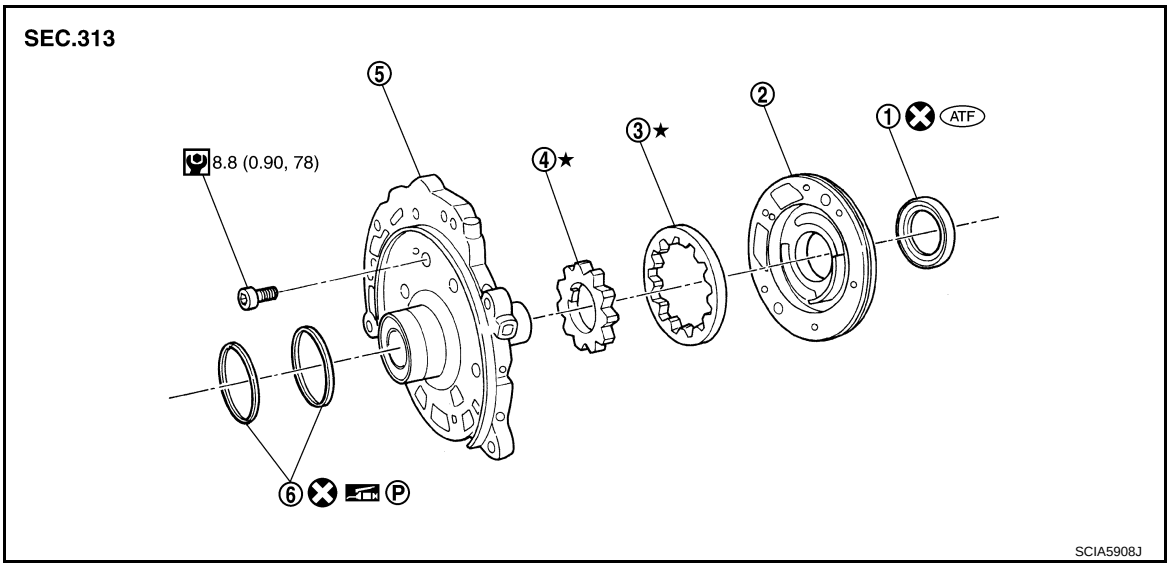
9. Install detent spring on transaxle case.
10. Tighten detent spring bolt to the specified torque. Refer to TM-213, "Component".



Oil Pump

INFOID:0000000001731436

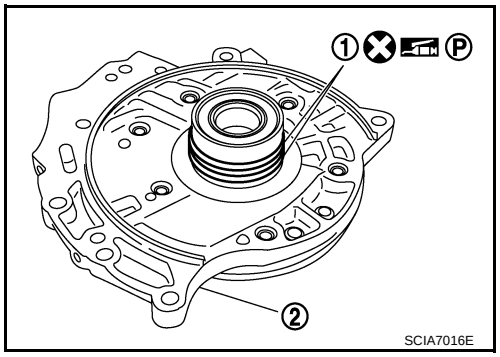
COMPONENTS



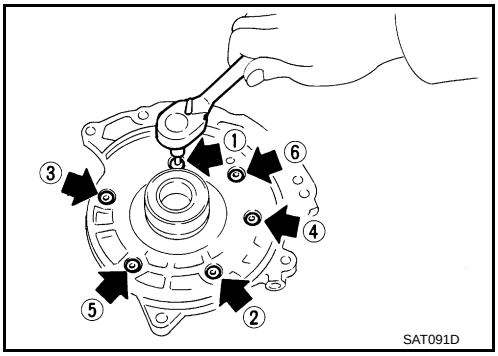
1. Oil pump housing oil seal
2. Oil pump housing
3. Outer gear
4. Inner gear
5. Oil pump cover
6. Seal ring

DISASSEMBLY

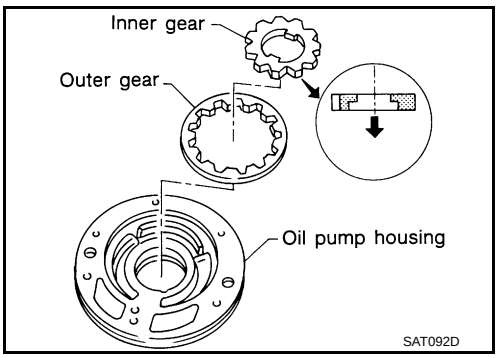
1. Remove seal rings (1) from oil pump assembly (2).



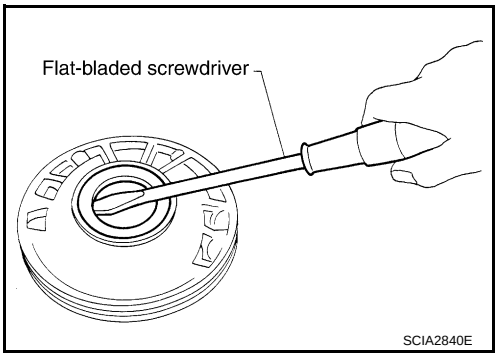
2. Remove bolts in the order as shown, and remove oil pump cover.



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



4. Remove oil pump housing oil seal using suitable tool.
CAUTION:
Do not scratch oil pump housing.



INSPECTION

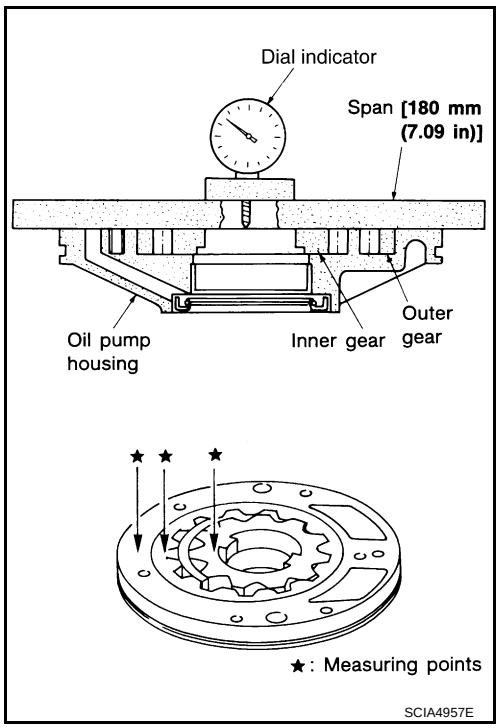
Oil Pump Housing, Oil Pump Cover, Inner Gear and Outer Gear
Check for wear or damage. Replace if necessary.

Side Clearances

- Measure side clearance of inner gear and outer gear in at least four places around each outside edge. Maximum measured values should be within the specified clearance.

Standard clearance: Refer to TM-323, "Oil Pump".

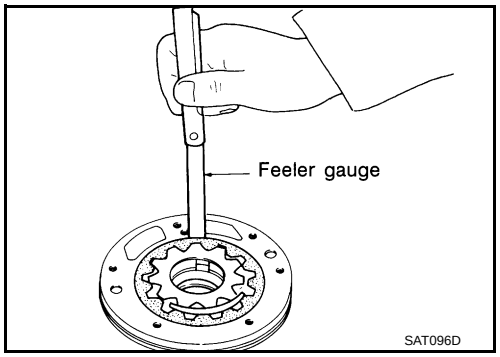
- If clearance is less than standard, select inner gear and outer gear as a set so that clearance is within specifications.
- If clearance is more than standard, replace whole oil pump assembly except oil pump cover.



- Measure clearance between outer gear and oil pump housing.

Standard clearance and allowable limit:
Refer to TM-323, "Oil Pump".

- If not within allowable limit, replace whole oil pump assembly except oil pump cover.

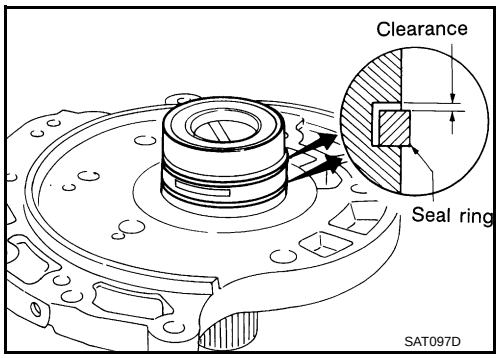


Seal Ring Clearance

- Measure clearance between seal ring and ring groove.

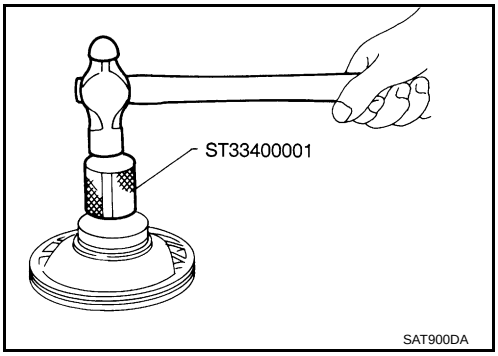
Standard clearance and allowable limit:
Refer to TM-323, "Oil Pump".

- If not within allowable limit, replace oil pump cover assembly.

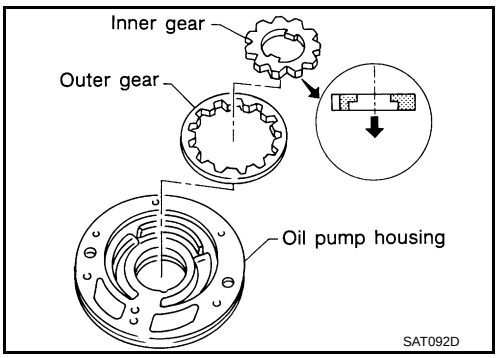


ASSEMBLY

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.**



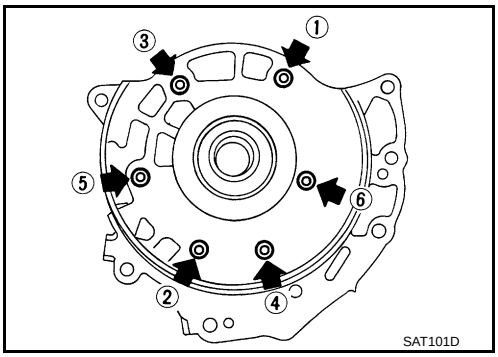
2. Install inner gear and outer gear on oil pump housing.
CAUTION:
Be careful with the direction of inner gear.



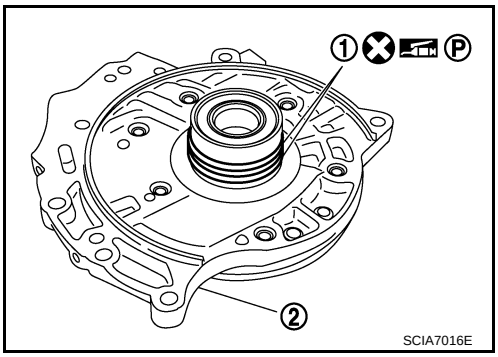
3. Install oil pump cover on oil pump housing.

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, and then tighten them to the specified torque in the same order.



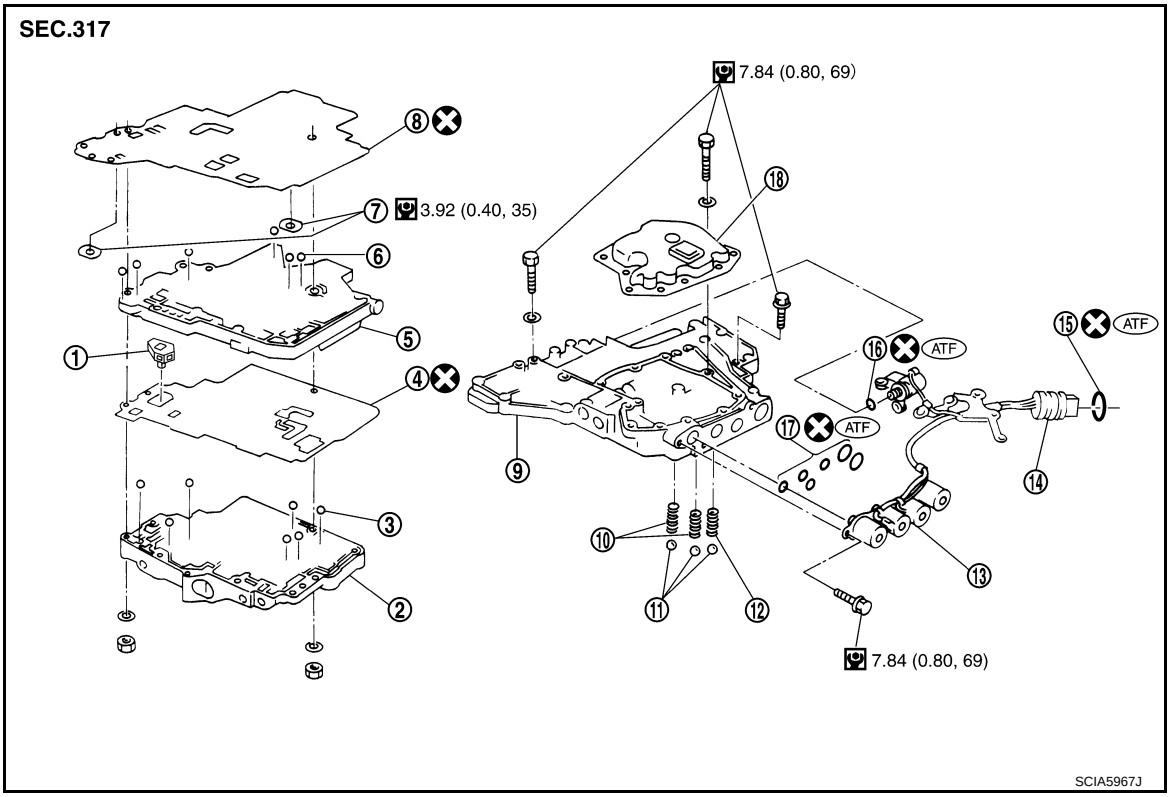
4. Install seal rings (1) to oil pump assembly (2) carefully after packing ring groove with petroleum jelly.
CAUTION:
Do not spread gap of seal rings (1) excessively while installing. The seal rings (1) may be deformed.



Control Valve Assembly

INFOID:0000000001731437

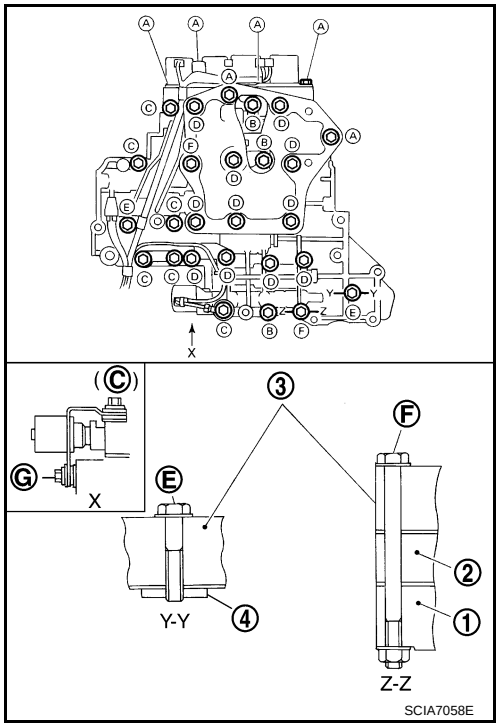
COMPONENTS



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

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).

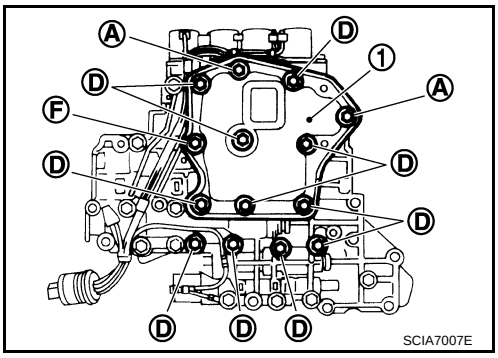


Bolt length, number and location:

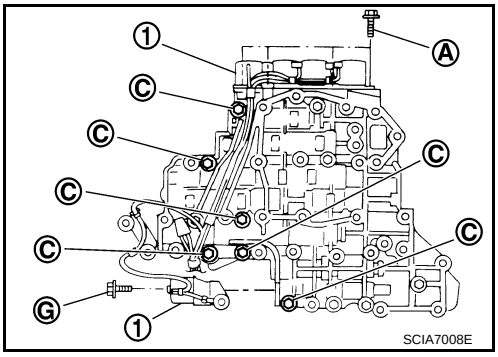
Bolt symbol	A	B	C	D	E	F*	G
Bolt length "ℓ" [mm (in)]	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1

*: Reamer bolt and nut.

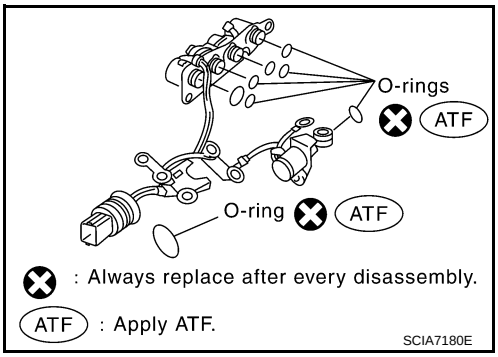
1. Remove bolts (A), (D), reamer bolt (F) and nut, and remove oil strainer (1) from control valve assembly.



2. Remove bolts (A), (C) and (G), and then remove solenoid valve assembly (1) from control valve assembly.



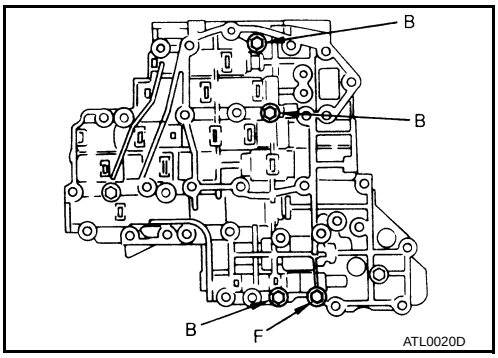
3. Remove O-rings from solenoid valves and terminal body.



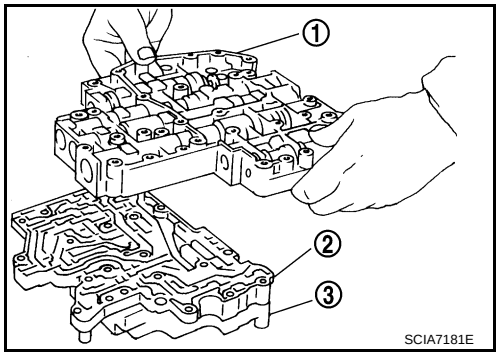
4. Place control valve upper body face down, and remove bolts (B), reamer bolt (F) and nut.

CAUTION:

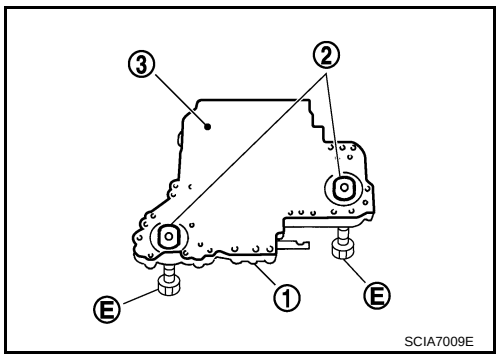
Remove bolts with control valve upper body facing down, because control valve upper body and control valve inter body may come off and steel ball may fall and be lost.



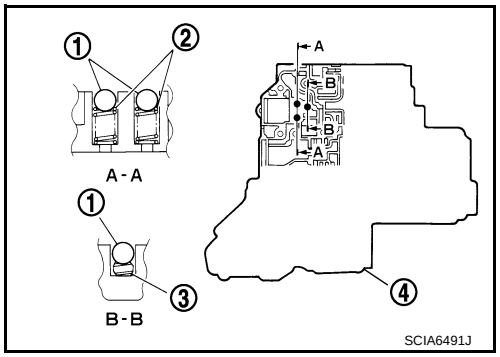
5. Remove control valve lower body (1) from control valve inter body (2).
(3): Control valve upper body



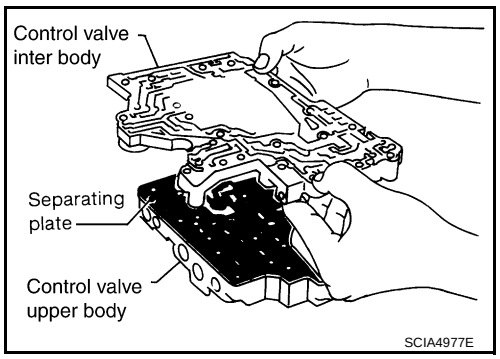
6. Turn over control valve lower body (1).
7. Remove bolts (E), support plates (2) and separating plate (3) from control valve lower body (1).



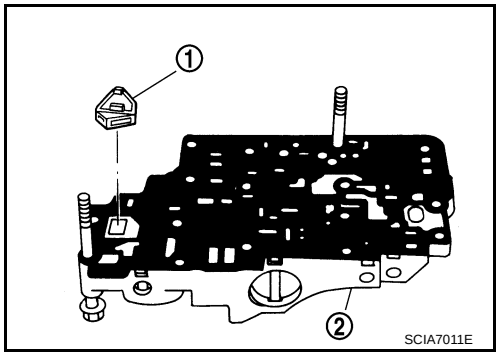
8. Remove check balls (1), line pressure relief valve springs (2) and torque converter pressure holding spring (3) from control valve lower body.
CAUTION:
Do not lose check balls (1), line pressure relief valve springs (2) and torque converter pressure holding spring (3).



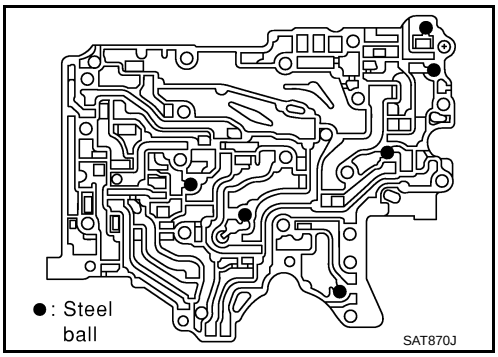
9. Remove control valve inter body from control valve upper body.



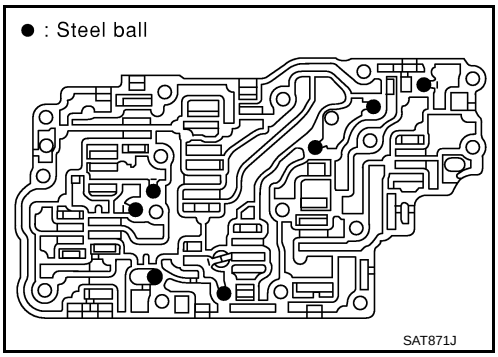
10. Remove pilot filter (1) from control valve upper body (2).
11. Remove separating plate from control valve upper body (2).



12. Check to see that steel balls are properly positioned in control valve inter body and then remove them.
CAUTION:
Do not lose steel balls.



13. Check to see that steel balls are properly positioned in control valve upper body and then remove them.
CAUTION:
Do not lose steel balls.

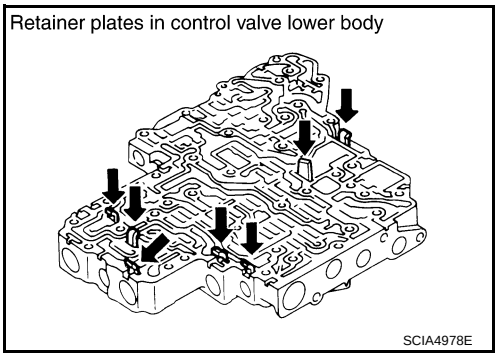


INSPECTION

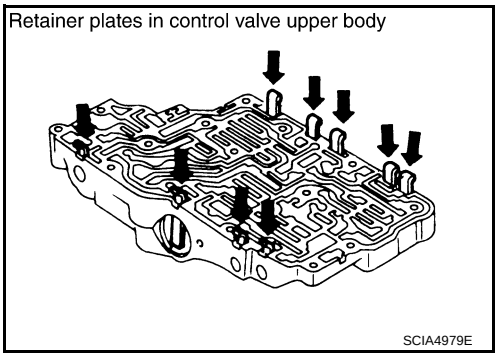
Control Valve Lower and Upper Bodies

CAUTION:
Do not lose these parts.

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

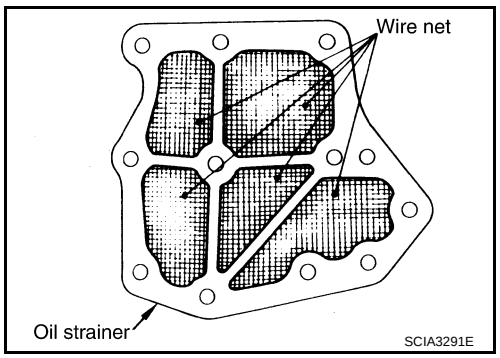


- Check to see that retainer plates are properly positioned in control valve upper body.



Oil Strainer

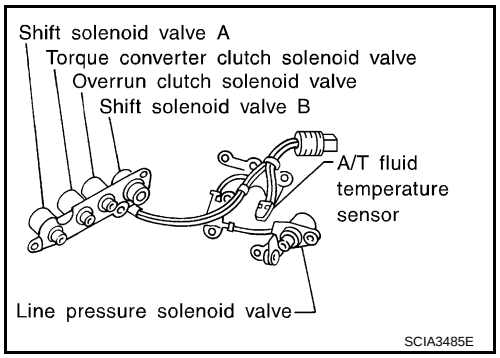
Check wire netting of oil strainer for damage. Replace if necessary.



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 TM-87, "Component Inspection".
- For shift solenoid valve B, refer to TM-91, "Component Inspection".
- For line pressure solenoid valve, refer to TM-84, "Component Inspection".
- For torque converter clutch solenoid valve, refer to TM-75, "Component Inspection"
- For overrun clutch solenoid valve, refer to TM-75, "Component Inspection".



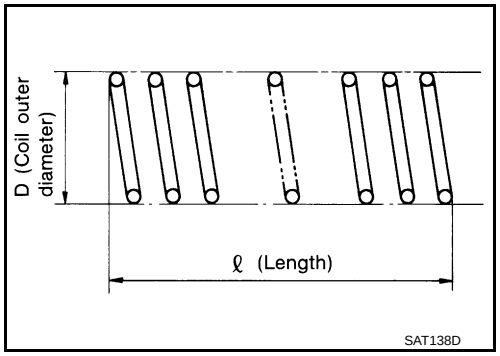
A/T Fluid Temperature Sensor

Measure resistance.

- For A/T fluid temperature sensor, refer to TM-50, "Component Inspection".

Line Pressure Relief Valve Springs and Torque Converter Pressure Holding Spring

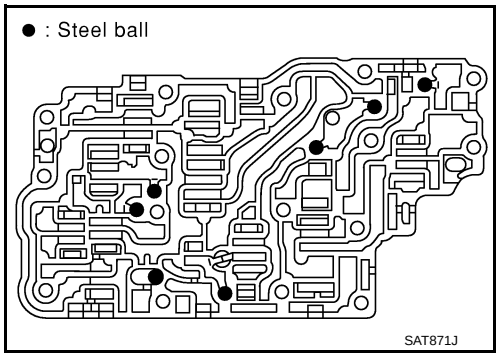
- Check each spring for damage or deformation. Also measure free length and outer diameter. Refer to TM-321, "Control Valves".
- Replace springs if deformed or fatigued.



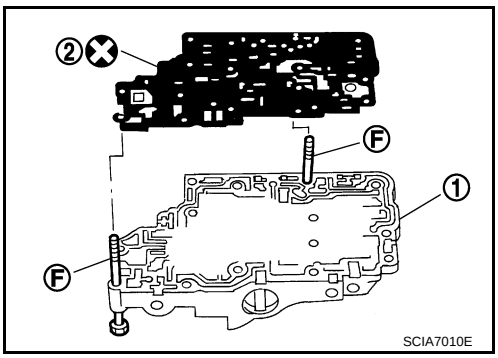
ASSEMBLY

1. Install control valve upper, inter and lower body.

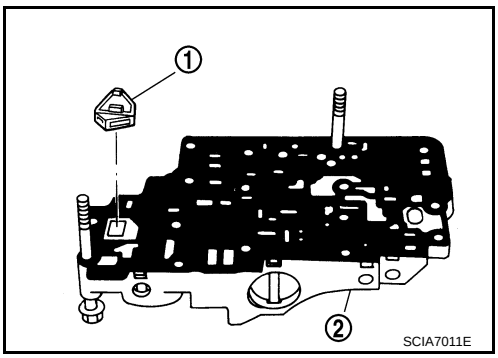
a. Place oil circuit of control valve upper body face up. Install steel balls in their proper positions.



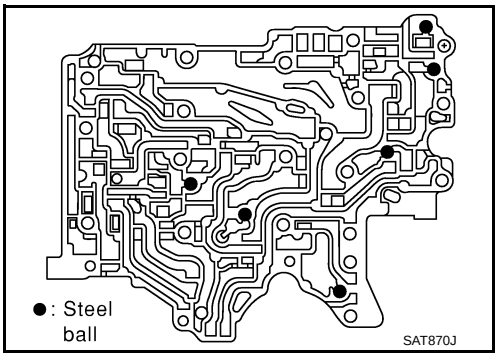
b. Install reamer bolts (F) from bottom of control valve upper body (1). Using reamer bolts (F) as guides, install separating plate (2) as a set.



c. Install pilot filter (1) on control valve upper body (2).



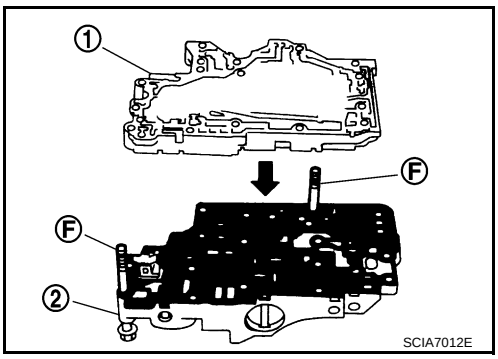
d. Place control valve inter body as shown (side of control valve lower body face up). Install steel balls in their proper positions.



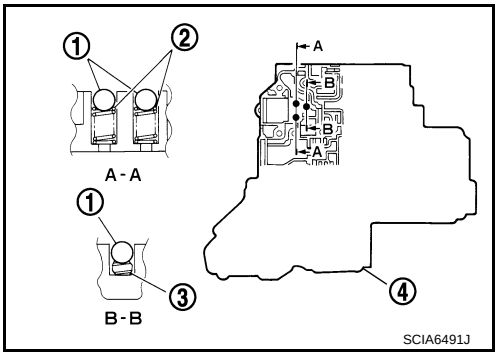
e. Install control valve inter body (1) on control valve upper body (2) using reamer bolts (F) as guides.

CAUTION:

Do not dislocate or drop steel balls.

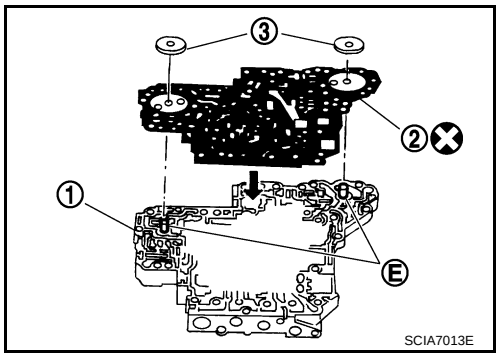


f. Install check balls (1), line pressure relief valve springs (2) and torque converter pressure holding spring (3) in their proper positions in control valve lower body (4).

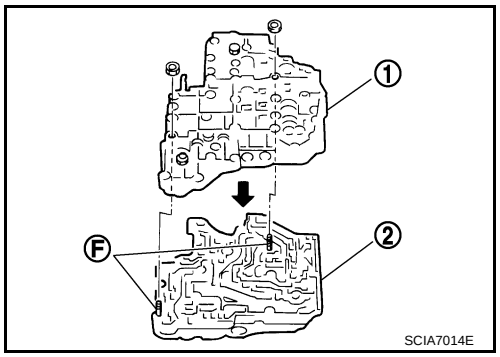


g. Install bolts (E) from bottom of control valve lower body (1). Using bolts (E) as guides, install separating plate (2) as a set.

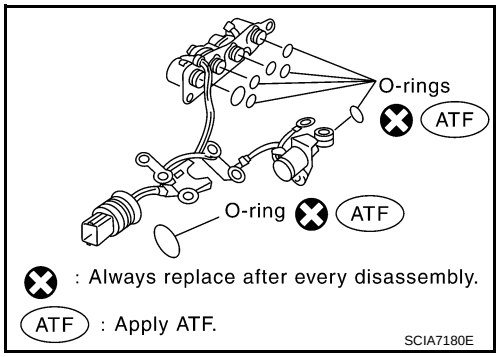
h. Install support plates (3) on control valve lower body (1).



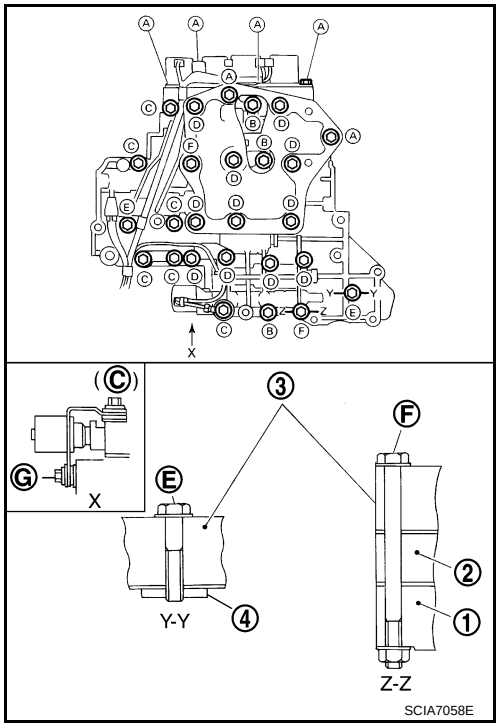
i. Install control valve lower body (1) on control valve inter body (2) using reamer bolts (F) as guides, and tighten reamer bolts (F) slightly.



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



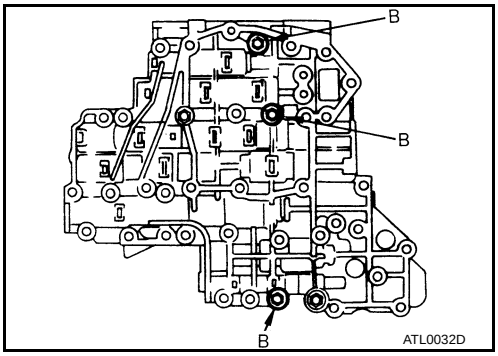
Bolt length, number and location:

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.

a. Install and tighten bolts (B) to the specified torque.

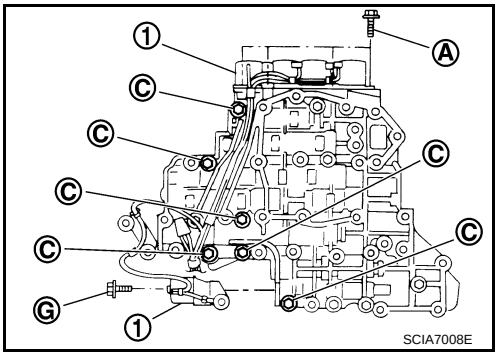
Bolts: 7.84 N·m (0.80 kg-m, 69 in-lb)



b. Install solenoid valve assembly (1) on control valve assembly.

c. Tighten bolts (A), (C) and (G) to the specified torque.

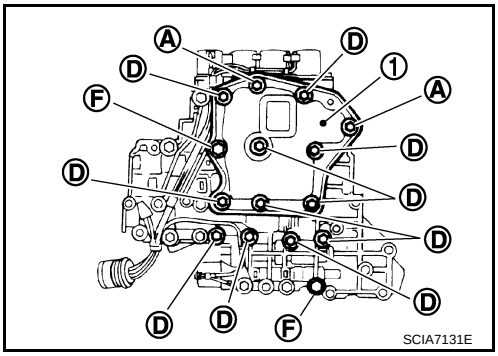
Bolts: 7.84 N·m (0.80 kg-m, 69 in-lb)



d. Remove reamer bolts (F), and then set oil strainer (1) on control valve assembly

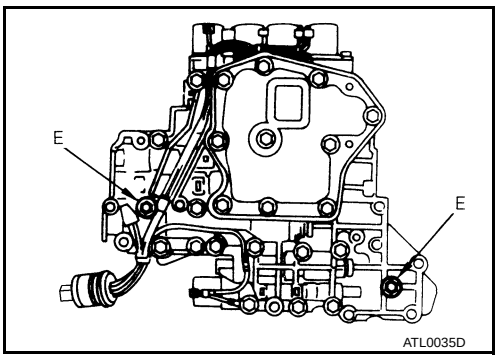
e. Install and tighten bolts (A), (D), reamer bolts (F) and nuts to the specified torque.

Nuts and bolts: 7.84 N·m (0.80 kg-m, 69 in-lb)



f. Tighten bolts (E) to the specified torque.

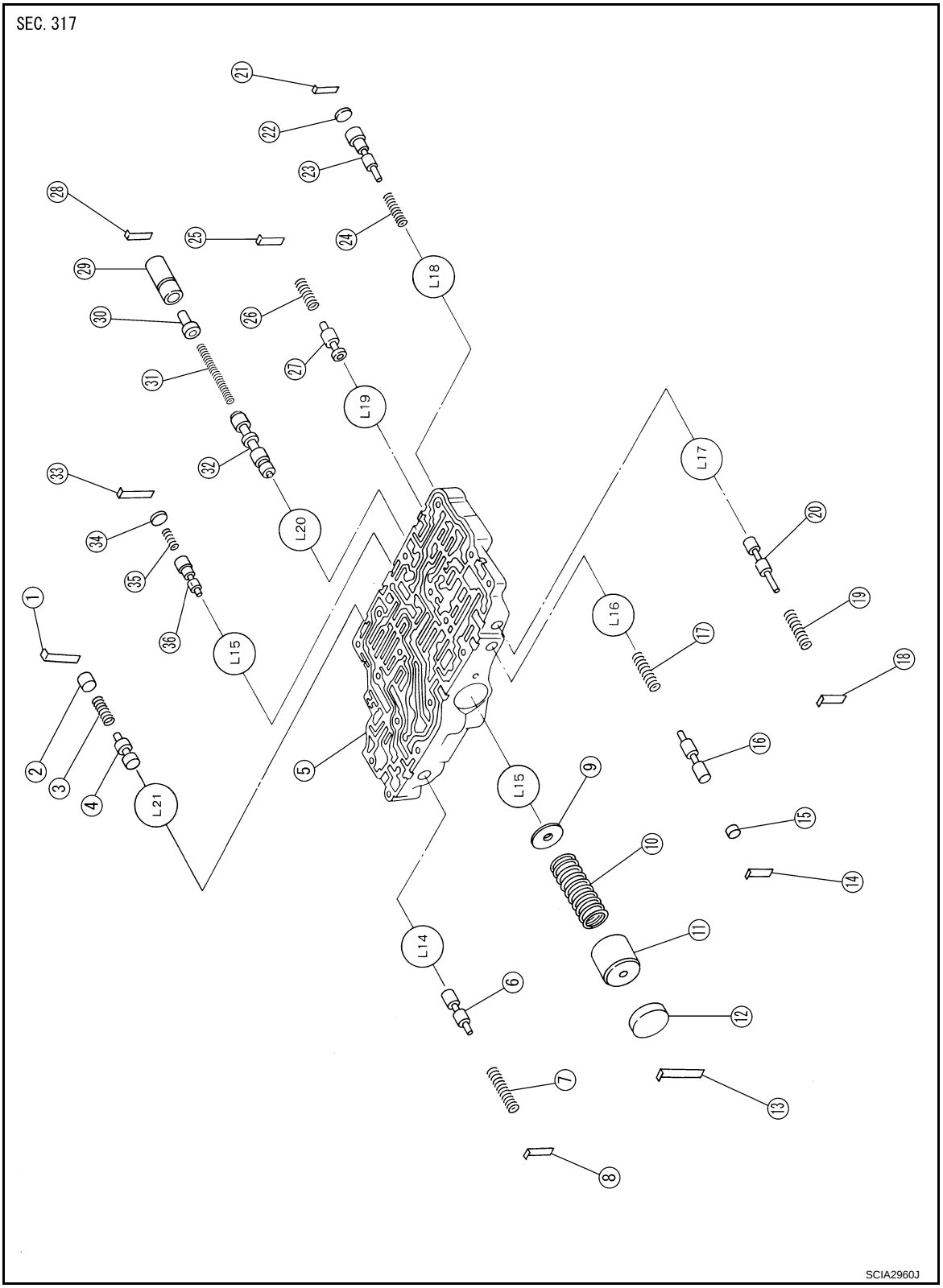
Bolts: 3.92 N·m (0.40 kg-m, 35 in-lb)



Control Valve Upper Body

INFOID:0000000001731438

COMPONENTS

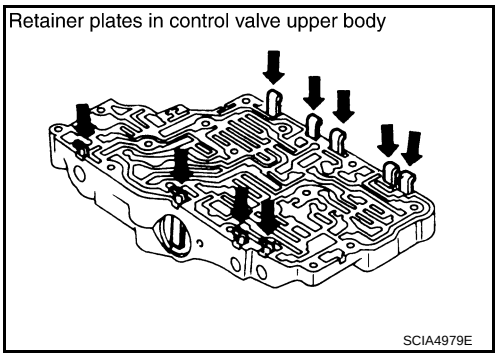


1. Retainer plate
2. Plug
3. Cooler check valve spring
4. Cooler check valve
5. Control valve upper body
6. Pilot valve
7. Pilot valve spring
8. Retainer plate
9. 1-2 accumulator retainer plate

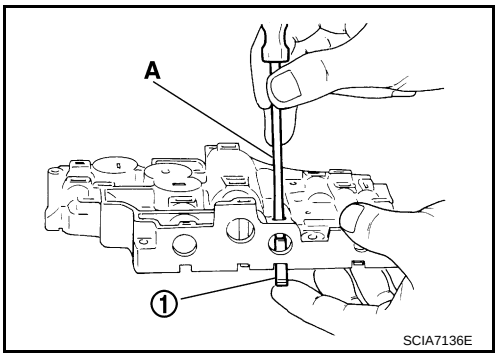
10. 1-2 accumulator piston spring
11. 1-2 accumulator piston
12. Plug
13. Retainer plate
14. Retainer plate
15. Plug
16. 1st reducing valve
17. 1st reducing valve spring
18. Retainer plate
19. 3-2 timing valve spring
20. 3-2 timing valve
21. Retainer plate
22. Plug
23. Overrun clutch reducing valve
24. 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

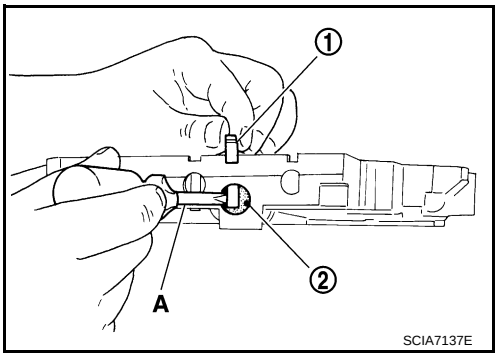
1. Remove valves at retainer plates.
CAUTION:
Do not use a magnetic pick-up tool.



a. Use suitable tool (A) to remove retainer plates (1).



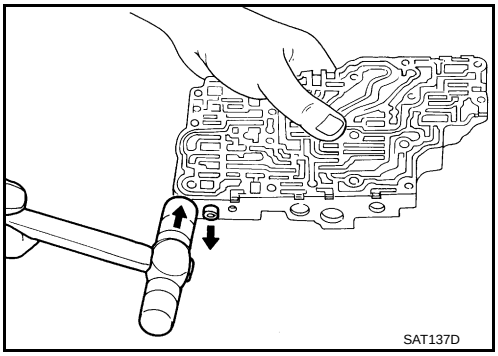
b. Remove retainer plates (1) while holding spring, plugs (2) or sleeves using suitable tool (A).
CAUTION:
Remove plugs (2) slowly to prevent internal parts from jumping out.



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

CAUTION:

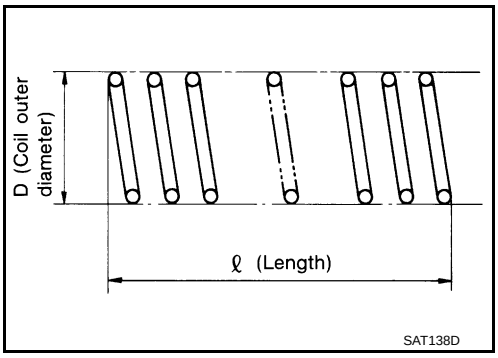
- **If a valve is hard to remove, place valve body face down and lightly tap it with a soft hammer.**
- **Do not drop or damage valves and sleeves.**



INSPECTION

Valve Springs

- Check each valve spring for damage or deformation. Also measure free length and outer diameter. Refer to TM-321, "Control Valves".
- Replace valve springs if deformed or fatigued.



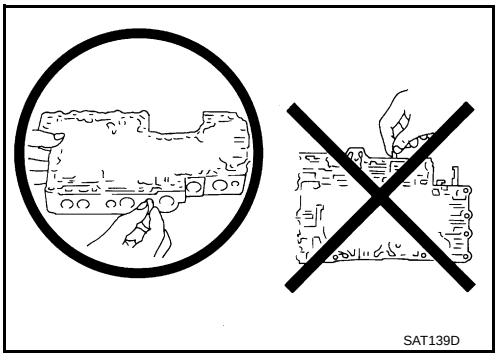
Control Valves

Check sliding surfaces of valves, sleeves and plugs. Replace if necessary.

ASSEMBLY

CAUTION:

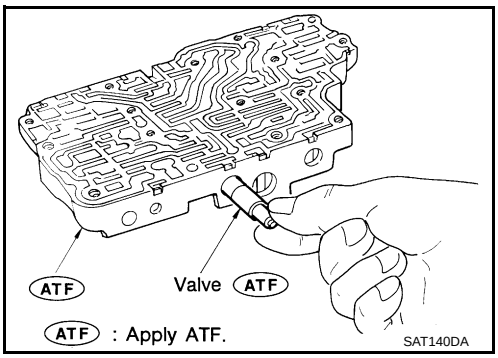
- **Apply ATF to all components before installation.**
- **Lay control valve body down when installing valves. Do not stand control valve body upright.**



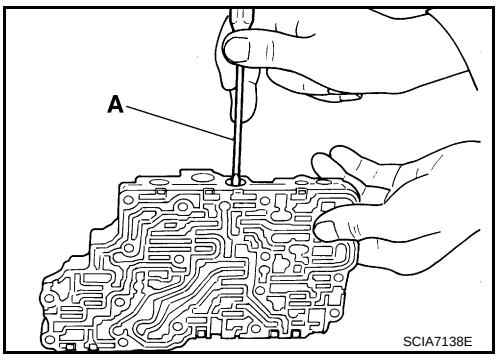
Lubricate control valve body and all valves with ATF. Install control valves by sliding them carefully into their bores.

CAUTION:

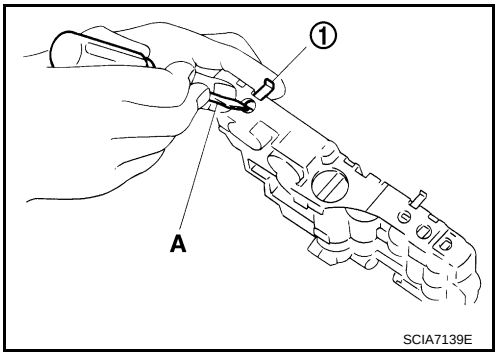
- **Install each control valve one by one.**
- **Install control valves after checking, because some of them are similar.**
- **Do not scratch or damage valve body.**



- Use suitable tool wraped with vinyl tape (A) and use it to insert valves into their proper positions.

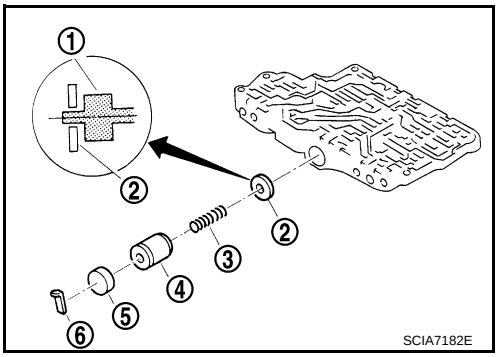


- Install retainer plates (1).
- While pushing plug or return spring, install retainer plate (1) using suitable tool (A).



1-2 Accumulator Valve

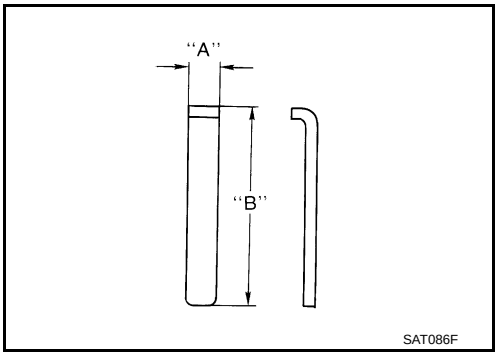
- Install 1-2 accumulator valve (1), 1-2 accumulator valve spring and plug. Align 1-2 accumulator retainer plate (2) from opposite side of control valve body.
- Install 1-2 accumulator valve piston spring (3), 1-2 accumulator piston (4), plug (5) and retainer plate (6).



Retainer Plate (Control Valve Upper Body)
Install proper retainer plates.

Unit: mm (in)

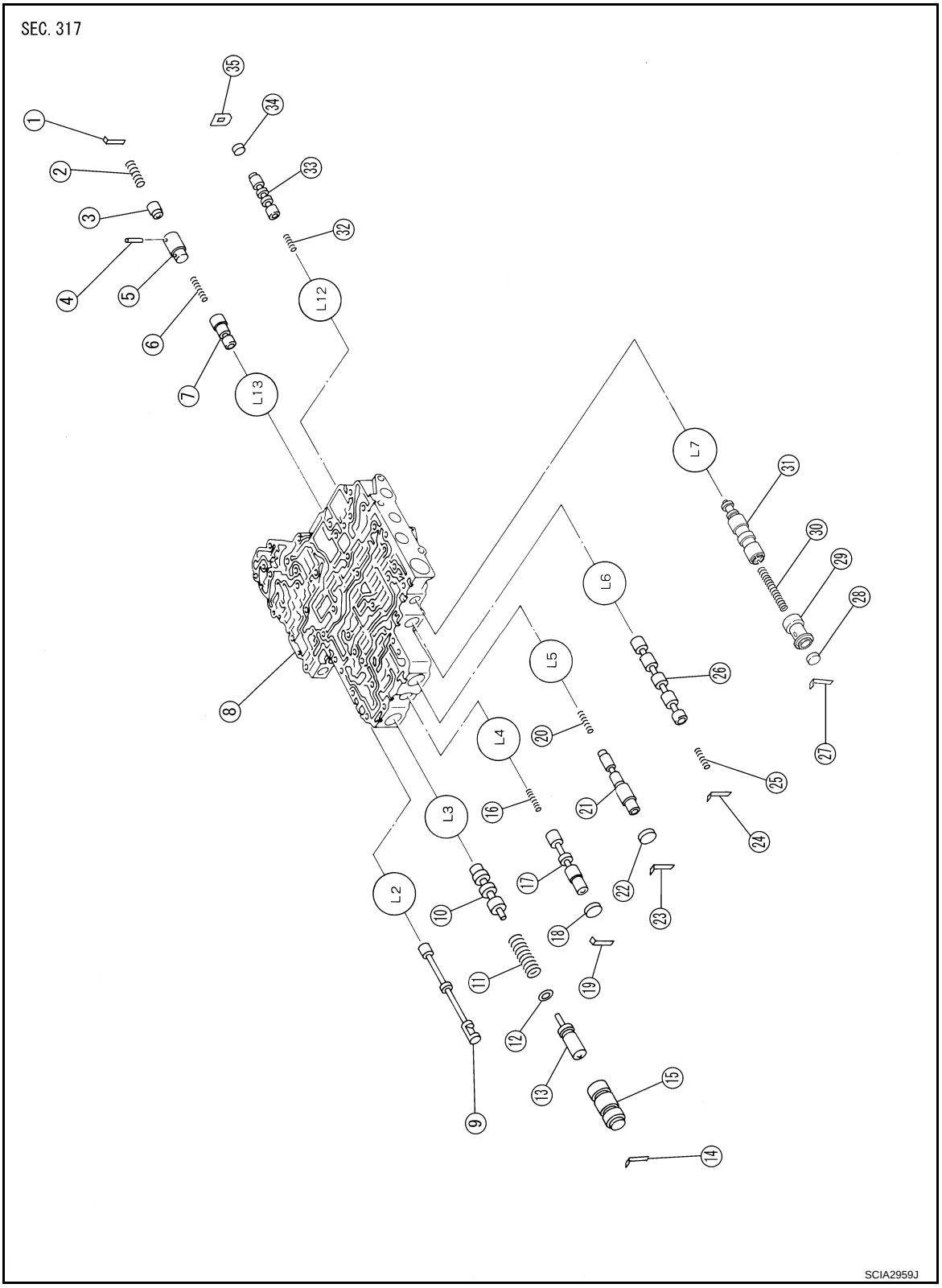
Location	Retainer plate designation	Width "A"	Length "B"
L14	Pilot valve	6.0 (0.236)	21.5 (0.846)
L15	1-2 accumulator valve		40.5 (1.594)
	1-2 accumulator piston		
L16	1st reducing valve		21.5 (0.846)
L17	3-2 timing valve		
L18	Overrun clutch reducing valve		24.0 (0.945)
L19	Torque converter relief valve		21.5 (0.846)
L20	Torque converter clutch control valve		28.0 (1.102)
L21	Cooler check valve		24.0 (0.945)



Control Valve Lower Body

INFOID:0000000001731439

COMPONENTS

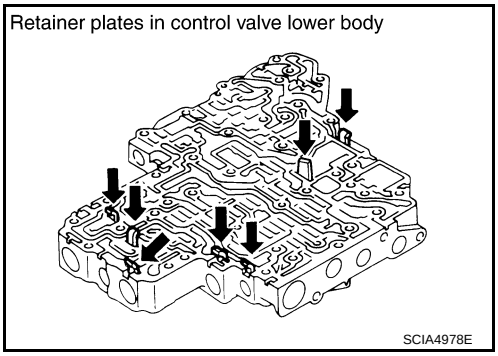


1. Retainer plate
2. Pressure modifier piston spring
3. Pressure modifier piston
4. Parallel pin
5. Sleeve
6. Pressure modifier valve spring
7. Pressure modifier valve
8. Control valve lower body
9. Manual valve
10. Pressure regulator valve
11. Pressure regulator valve spring
12. Spring seat
13. Plug
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

DISASSEMBLY

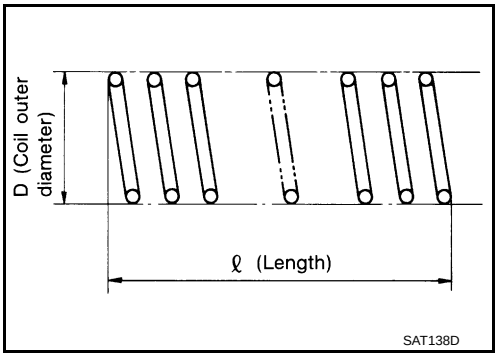
Remove valves at retainer plate.
For removal procedures, refer to TM-545, "Control Valve Upper Body".



INSPECTION

Valve Springs

- Check each valve spring for damage or deformation. Also measure free length and outer diameter. Refer to TM-321, "Control Valves".
- Replace valve springs if deformed or fatigued.



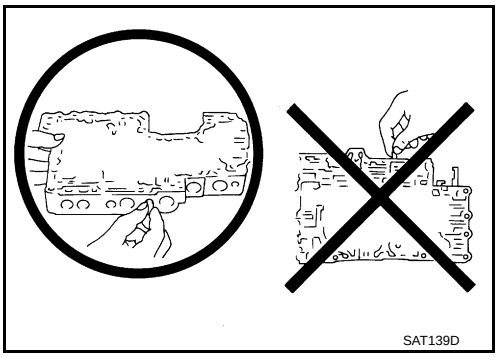
Control Valves

Check sliding surfaces of control valves, sleeves and plugs for damage. Replace if necessary.

ASSEMBLY

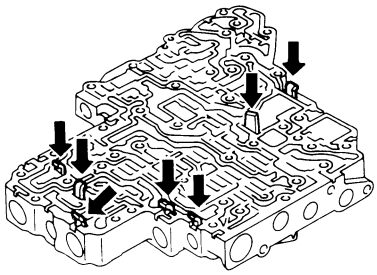
CAUTION:

- **Apply ATF to all components before installation.**
- **Lay control valve body down when installing valves. Do not stand control valve body upright.**



Install control valves.
For installation procedures, refer to TM-545, "Control Valve Upper Body".

Retainer plates in control valve lower body

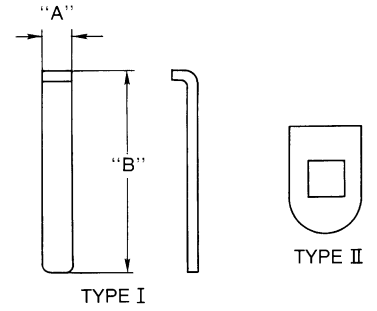


SCIA4978E

Retainer Plate (Control Valve Lower Body)
Install proper retainer plates.

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

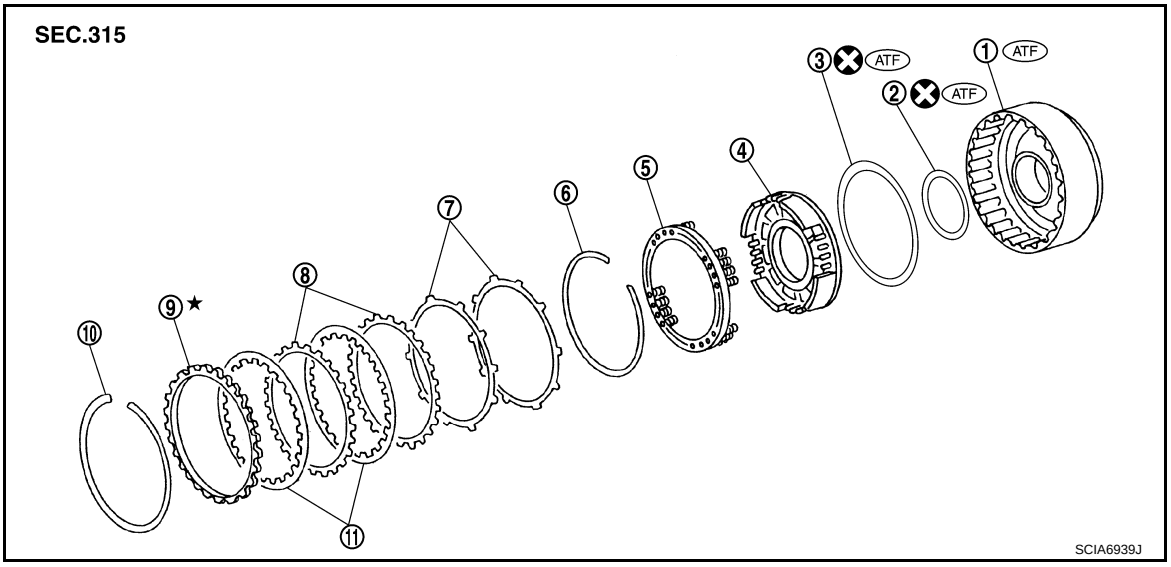


SAT089F

Reverse Clutch

INFOID:0000000001731440

COMPONENTS



1. Reverse clutch drum
2. D-ring
3. Seal ring
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

DISASSEMBLY

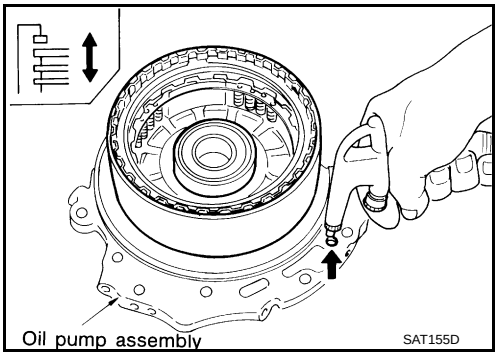
1. Check operation of reverse clutch

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.

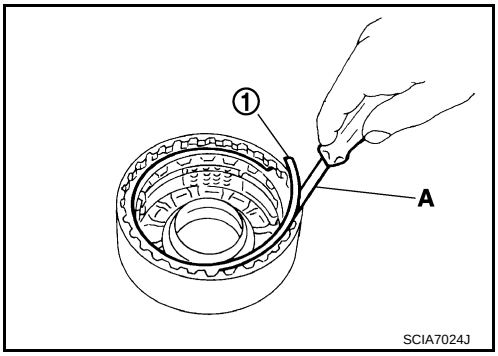
c. Check to see that retaining plate moves to snap ring.

d. If retaining plate does not contact snap ring:
- D-ring might be damaged.
- Seal ring might be damaged.
- Fluid might be leaking past piston check ball.



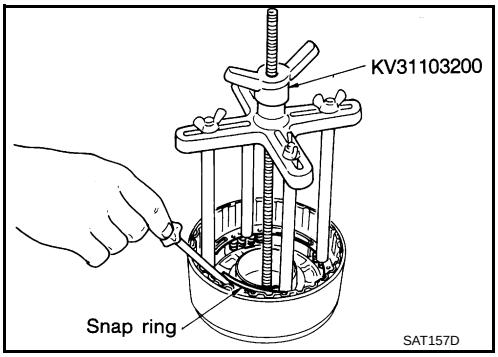
2. Remove snap ring (1) using suitable tool (A).

3. Remove retaining plate, drive plates, driven plates and dish plates.

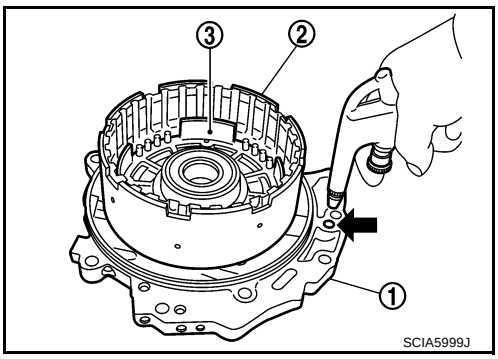


4. Set Tool on spring retainer assembly, and remove snap ring from reverse clutch drum while compressing spring retainer assembly.
CAUTION:
Set Tool directly over return springs.

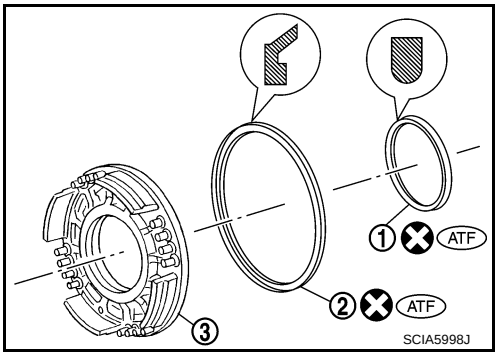
5. Remove spring retainer assembly from reverse clutch drum.
CAUTION:
Do not remove return springs from spring retainer.



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 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 ring (2) from reverse clutch piston (3).



INSPECTION

Reverse Clutch Snap Ring

Check for deformation, fatigue or damage. Replace if necessary.

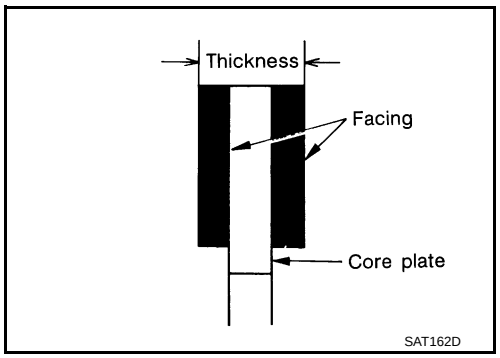
Reverse Clutch Drive Plates

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

Thickness of drive plate

Standard and allowable limit:

Refer to TM-321, "Clutches and Brakes".



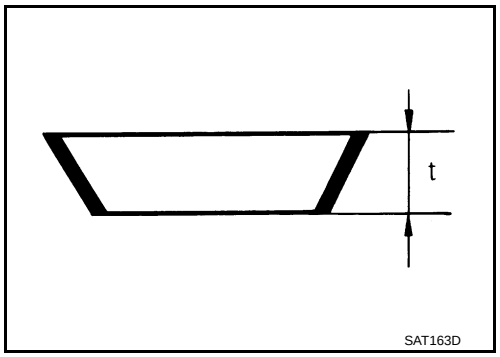
CAUTION:

- **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.

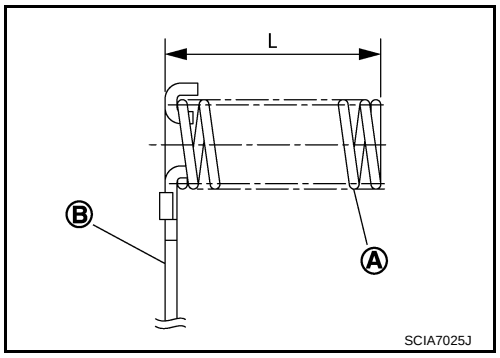
Thickness of dish plate (t): 2.87 mm (0.1130 in)



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)

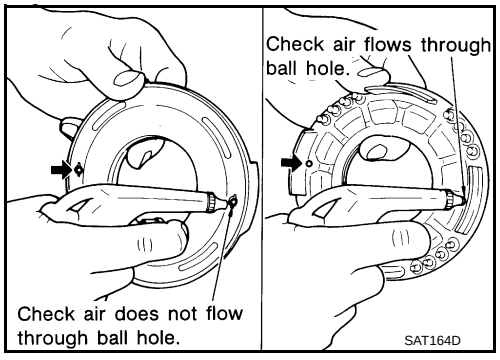


CAUTION:

Do not remove return springs (A) from spring retainer (B)

Reverse Clutch Piston

- Make sure that check balls do not stick.
- 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.

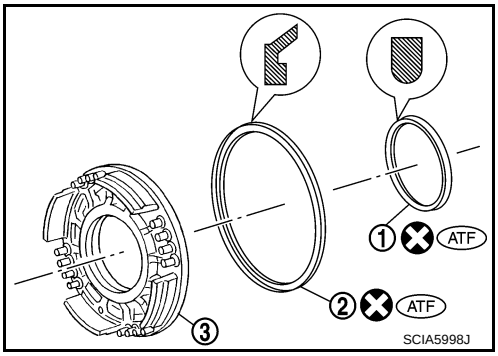


Reverse Clutch Drum

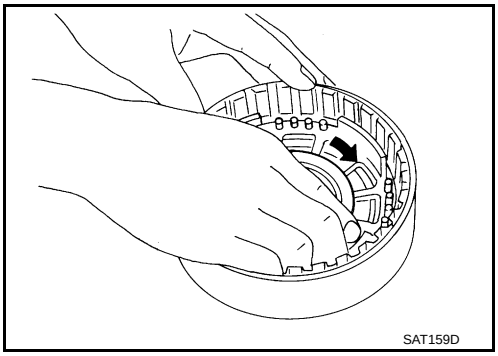
Check for deformation or damage. Replace if necessary.

ASSEMBLY

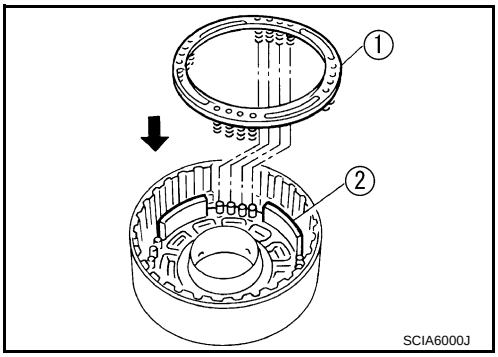
1. Install D-ring (1) and seal ring (2) on reverse clutch piston (3).
CAUTION:
Be careful with the direction of seal ring (2).



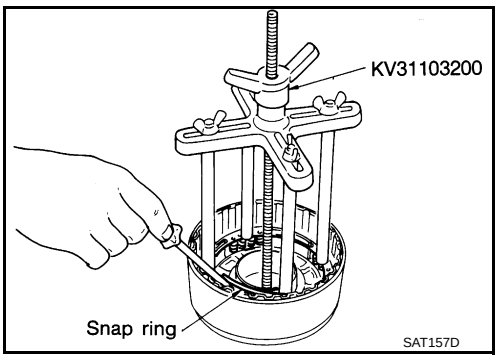
2. Install reverse clutch piston by turning it slowly.
CAUTION:
Apply ATF to inner surface of reverse clutch drum.



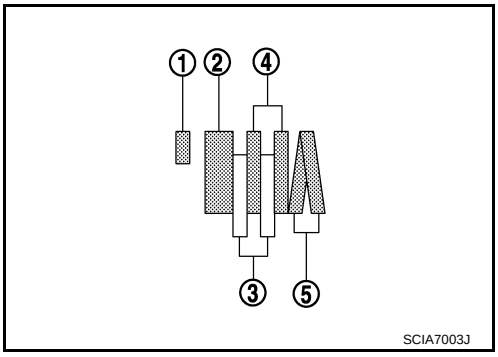
3. Install spring retainer assembly (1) to reverse clutch piston (2).



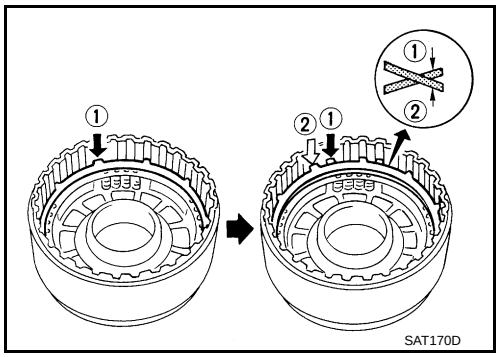
4. Set Tool on spring retainer assembly, and install snap ring while compressing spring retainer assembly.
CAUTION:
Set Tool directly over return springs.



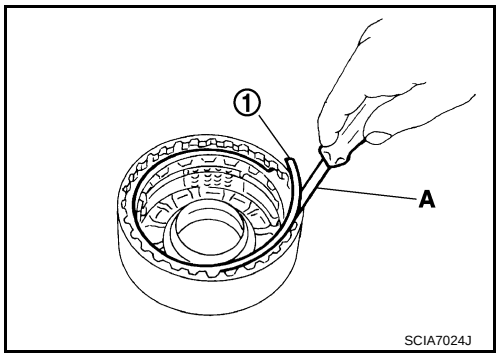
5. Install dish plates (5), driven plates (4), drive plates (3) and retaining plate (2).
(1): Snap ring
(2): Retaining plate
(3): Drive plate
(4): Driven plate
(5): Dish plate
Drive plate/Driven plate: 2/2
CAUTION:
Be careful with the order of plates.



NOTE:
Install two dish plates fitting each installation direction with reverse clutch drum groove displaced slightly.



6. Install snap ring (1) using suitable tool (A).



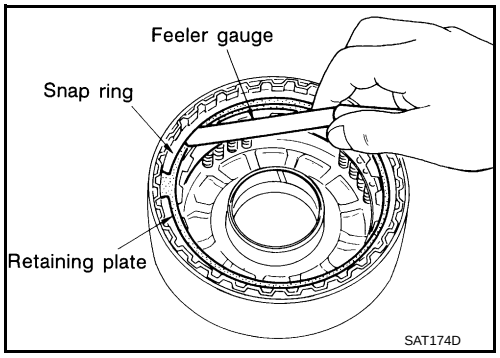
7. Measure clearance between retaining plate and snap ring using feeler gauge. If not within allowable limit, select proper retaining plate.

Specified clearance

Standard and allowable limit:

Refer to TM-321, "Clutches and Brakes".

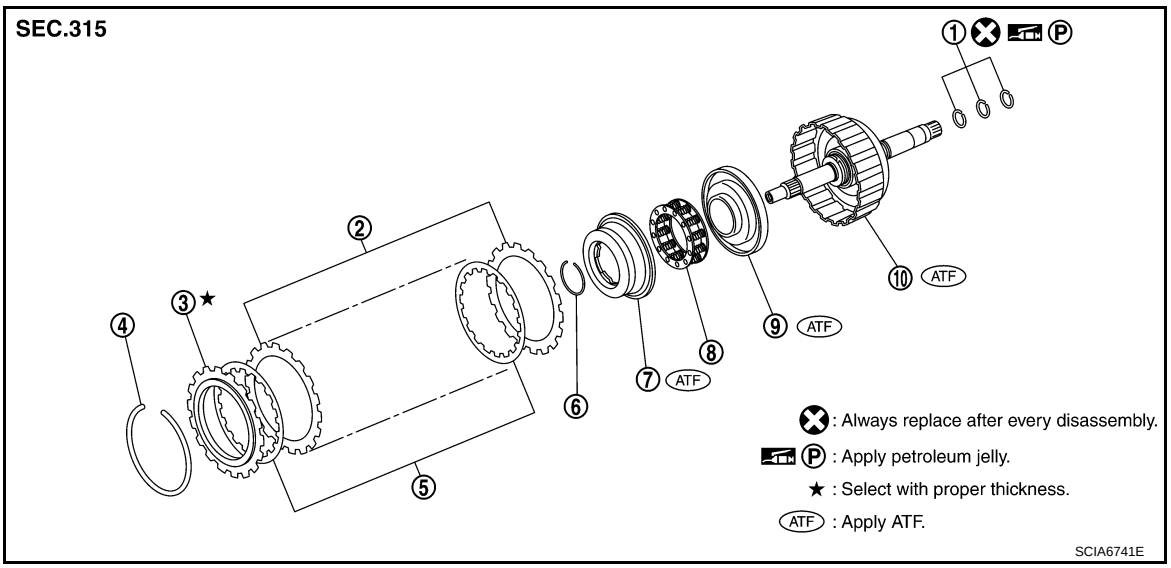
8. Check operation of reverse clutch. Refer to TM-258, "Reverse Clutch".



High Clutch

INFOID:0000000001731441

COMPONENTS



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)

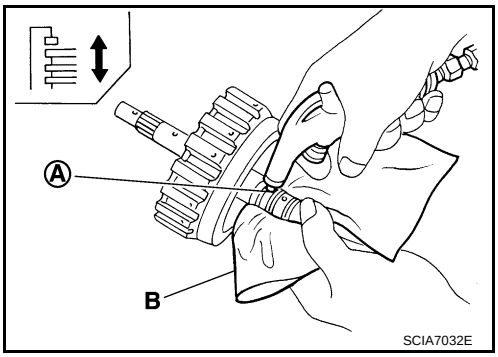
DISASSEMBLY

1. Check operation of high clutch.

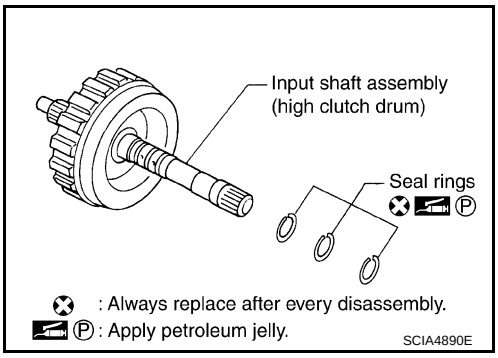
a. Apply compressed air into the oil hole (A) of input shaft assembly (high clutch drum) at the location as shown.
CAUTION:
Block the oil hole (A) on the opposite side with lint-free cloth (B).

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

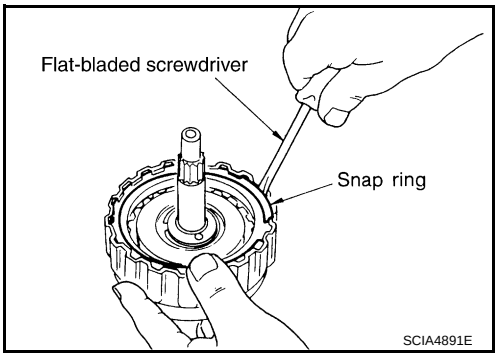
c. If retaining plate does not contact snap ring:
- High clutch piston seal might be damaged.



2. Remove seal rings from input shaft assembly (high clutch drum).



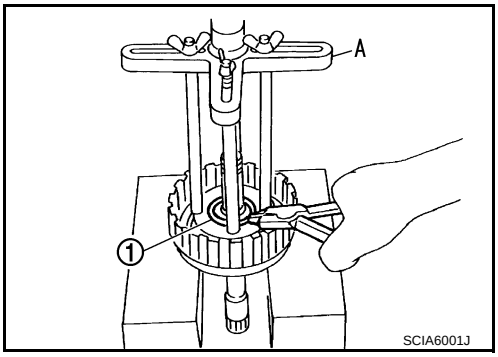
3. Remove snap ring using suitable tool.
4. Remove retaining plate, drive plates and driven plates.



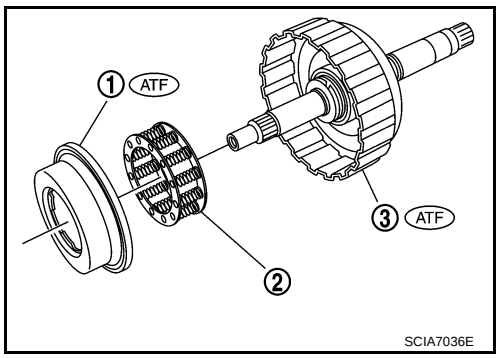
5. Set Tool (A) on cancel cover, and remove snap ring (1) from input shaft assembly (high clutch drum) while compressing spring retainer assembly.

Tool number: KV31103200

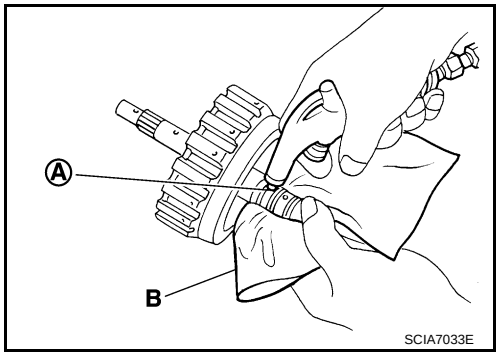
CAUTION:
Do not expand snap ring (1) excessively.



6. 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.



7. Apply compressed air into the oil hole (A) at the location as shown 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).**



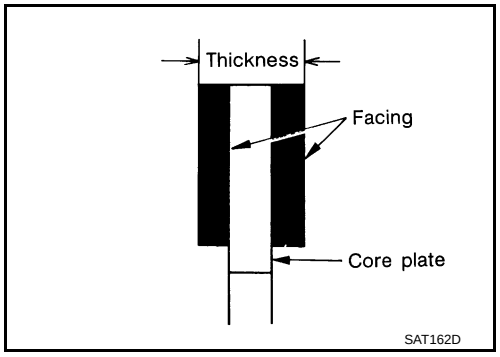
INSPECTION

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 TM-321, "Clutches and Brakes".

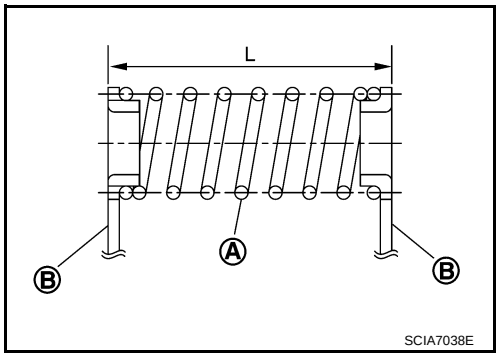
CAUTION:
- **Measure the thickness at 3 locations and find the average.**
- **Inspect ALL drive plates.**
- **Replace if the thickness is below the allowable limit.**



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.

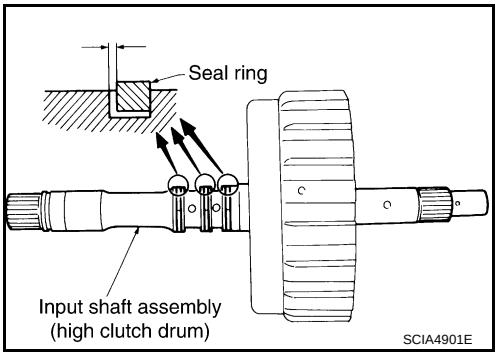
Seal Ring Clearance

- Install new seal rings onto input shaft assembly (high clutch drum).
- Measure clearance between seal ring and ring groove.

Standard clearance and allowable limit:

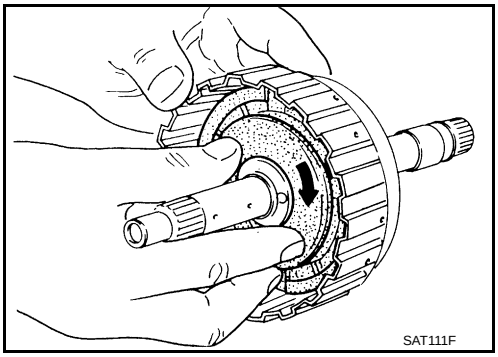
Refer to TM-323, "Input Shaft".

- If not within allowable limit, replace input shaft assembly (high clutch drum).

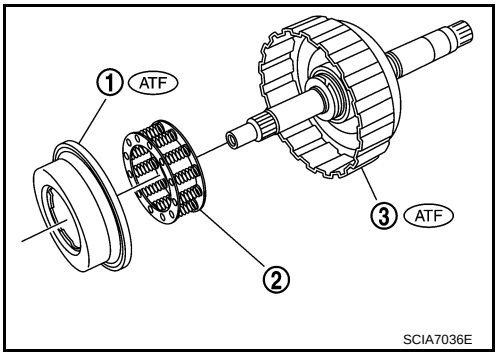


ASSEMBLY

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.



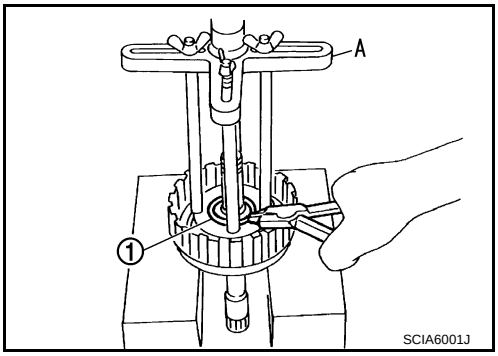
2. Install spring retainer assembly (2) and cancel cover (1) on input shaft assembly (high clutch drum) (3).



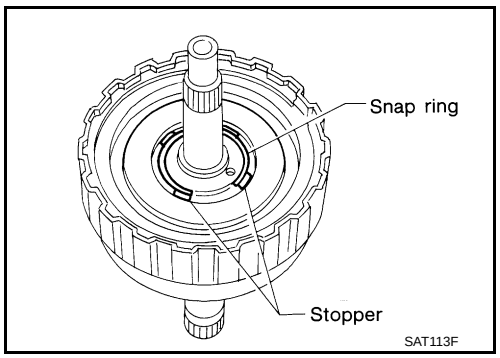
3. Set Tool A on cancel cover, and install snap ring (1) to input shaft assembly (high clutch drum) while slowly compressing spring retainer assembly.

Tool number: KV31103200

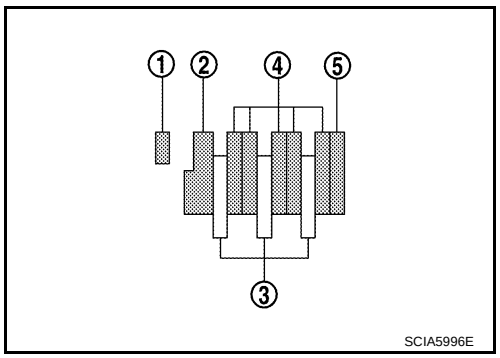
CAUTION:
- **Do not expand snap ring (1) excessively.**
- **Install spring retainer assembly without tilting.**



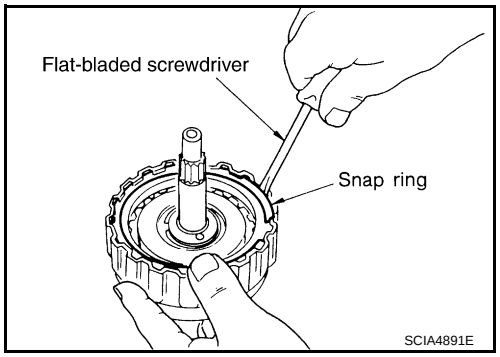
- **Do not align snap ring gap with cancel cover stopper.**



4. Install driven plates (4), (5), drive plates (3) and retaining plate (2).
(1): Snap ring
(2): Retaining plate
(3): Drive plate
(4): Driven plate
(5): Driven plate
Drive plate/Driven plate: 3/6 (1+5)
CAUTION:
Be careful with the order and direction of plates.



5. Install snap ring using suitable tool.



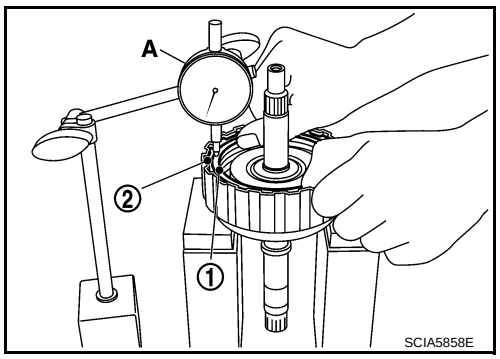
6. Set dial indicator (A) on retaining plate (1), and measure clearance between retaining plate (1) and snap ring (2). If not within allowable limit, select proper retaining plate (1).

Specified clearance

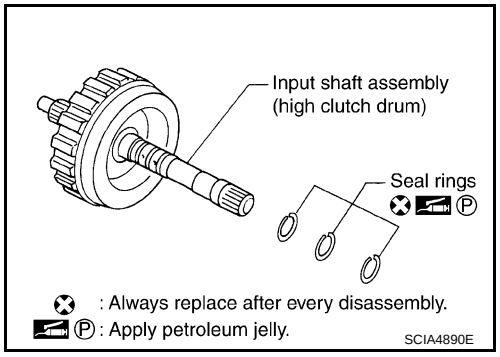
Standard and allowable limit:

Refer to TM-321, "Clutches and Brakes".

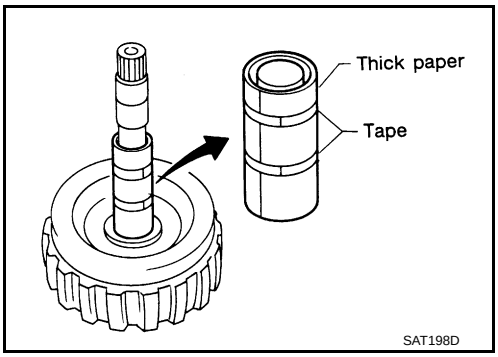
7. Check operation of high clutch. Refer to TM-262, "High Clutch".



8. Install seal rings to input shaft assembly (high clutch drum).



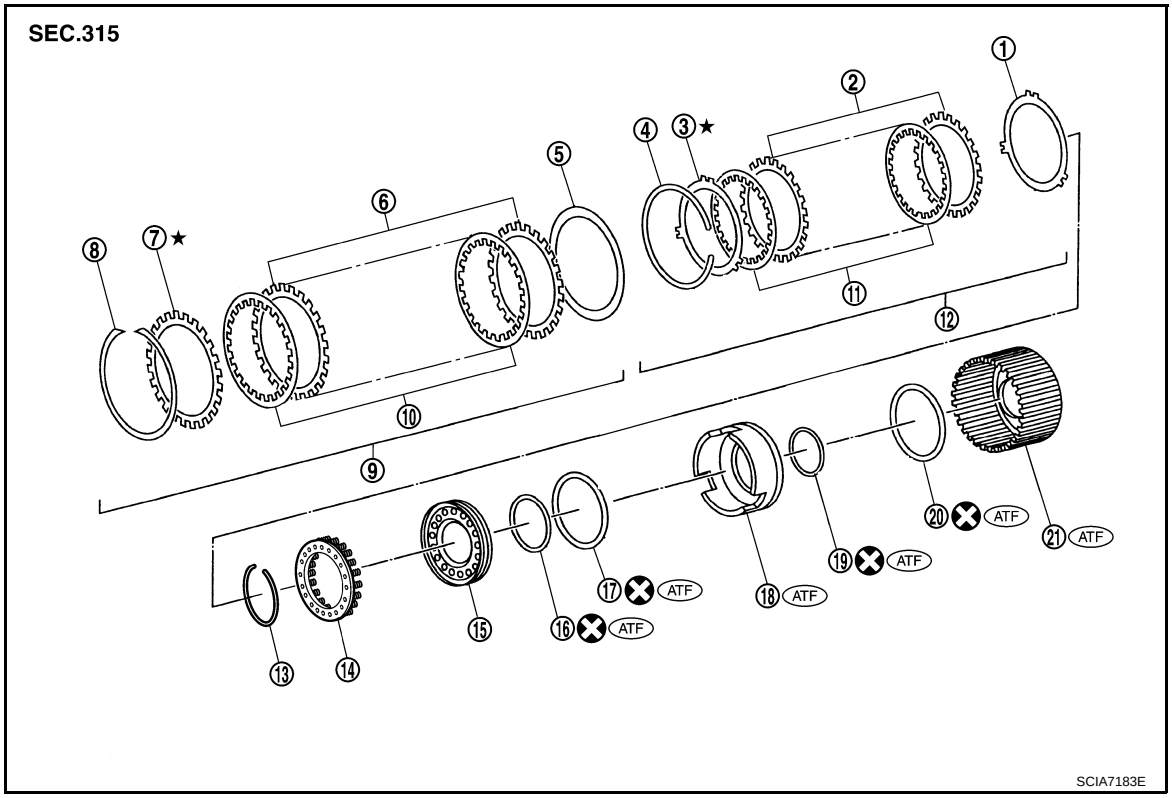
CAUTION:
Roll paper around seal rings to prevent seal rings from spreading.



Forward and Overrun Clutches

INFOID:0000000001731442

COMPONENTS



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 ring
18. Forward clutch piston
19. D-ring
20. Seal ring
21. Forward clutch drum

DISASSEMBLY

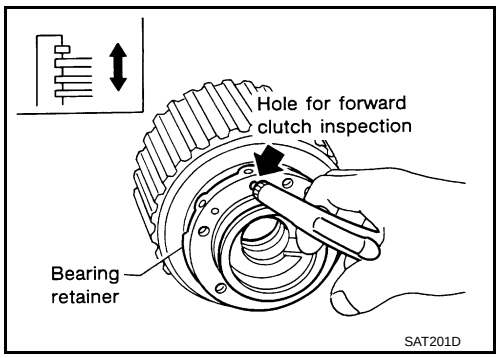
1. Check operation of forward clutch.

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.

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 ring might be damaged.
- Fluid might be leaking past piston check ball.



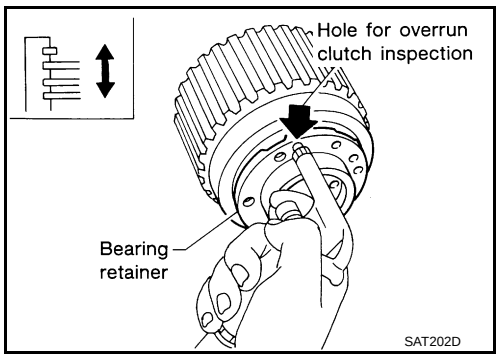
2. Check operation of overrun clutch.

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.

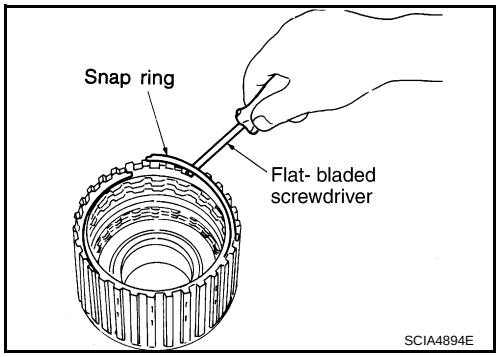
c. Check to see that retaining plate moves to snap ring.

d. If retaining plate does not contact snap ring:
- D-ring might be damaged.
- Seal ring might be damaged.
- Fluid might be leaking past piston check ball.



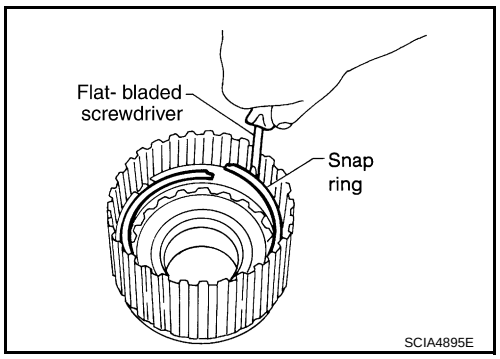
3. Remove snap ring for forward clutch from forward clutch drum using suitable tool.

4. Remove retaining plate, drive plates, driven plates and dish plate for forward clutch.



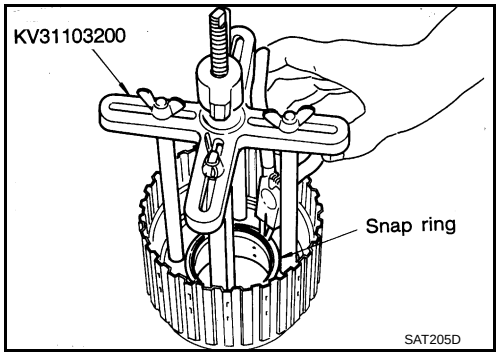
5. Remove snap ring for overrun clutch from forward clutch drum using suitable tool.

6. Remove retaining plate, drive plates, driven plates and dish plate for overrun clutch.



7. Set Tool on spring retainer assembly, and remove snap ring from forward clutch drum while compressing spring retainer assembly.
CAUTION:
- **Set Tool directly over return springs.**
- **Do not expand snap ring excessively.**

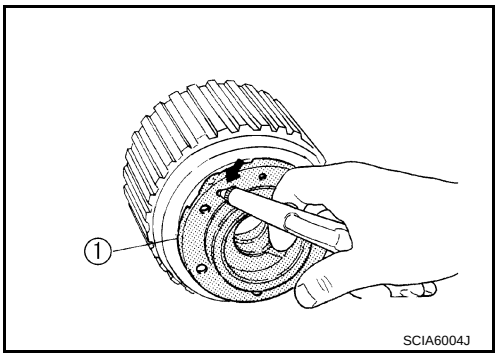
8. Remove spring retainer assembly from forward clutch drum.
CAUTION:
Do not remove return springs from spring retainer.



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 to remove overrun clutch piston from forward clutch piston.

CAUTION:

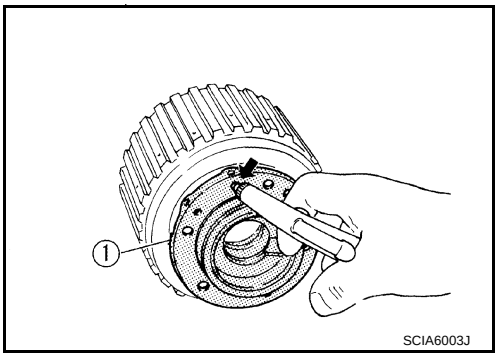
Do not blow air in too quickly, or overrun clutch piston and ATF could jump out. Carefully blow air little by little while protecting with lint-free cloth.



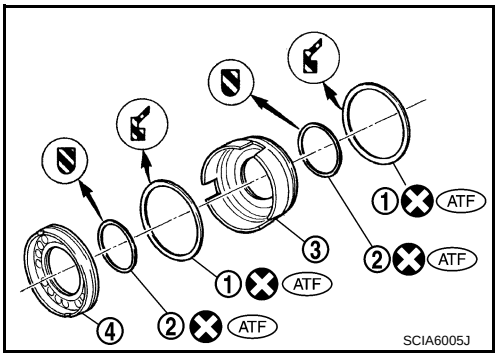
10. Install seal rings to bearing retainer (1), and set forward clutch drum. Then apply compressed air into the oil hole at the location as shown to remove forward clutch piston from forward clutch drum.

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 rings (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

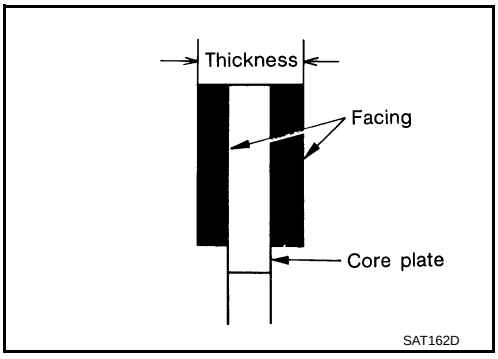
Standard and allowable limit:

Refer to TM-321, "Clutches and Brakes".

Overrun clutch

Standard and allowable limit:

Refer to TM-321, "Clutches and Brakes".



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

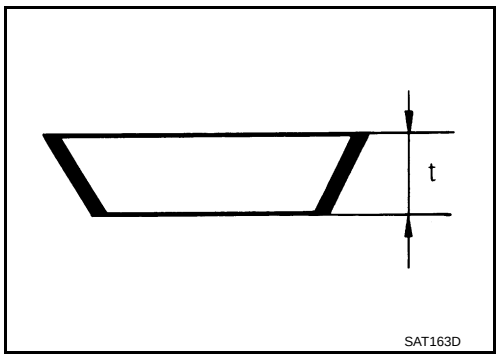
- Check for deformation or damage.

- 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)



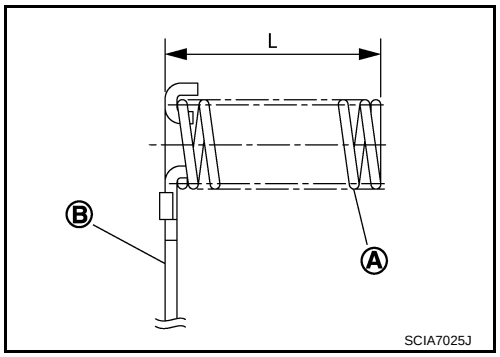
Forward Clutch and Overrun Clutch Spring Retainer Assembly

Check length (L) of spring retainer assembly. Replace if damaged, deformed or worn.

Length (L): 27.7 mm (0.1091 in)

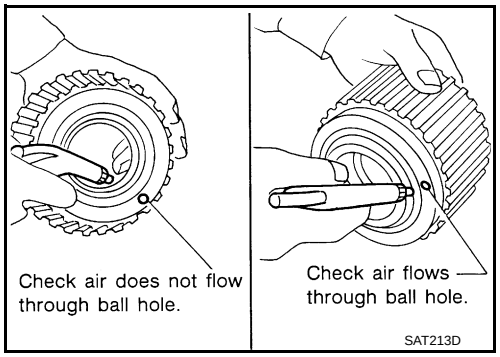
CAUTION:

Do not remove return springs (A) from spring retainer (B)



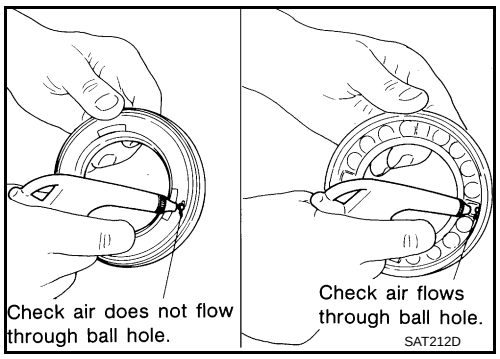
Forward Clutch Drum

- Make sure that check balls do not stick.
- 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.



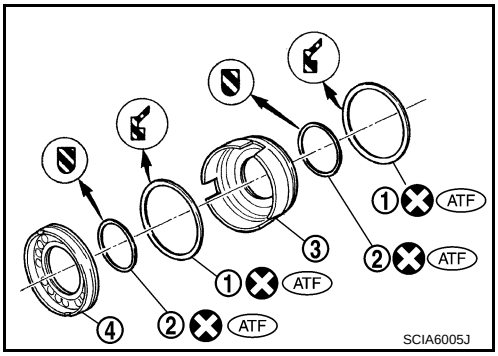
Overrun Clutch Piston

- Make sure that check balls do not stick.
- 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.

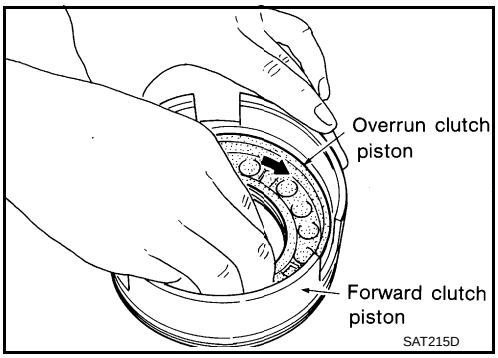


ASSEMBLY

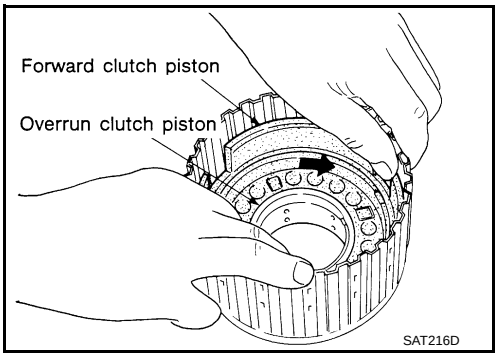
1. Install seal rings (1) and D-rings (2) on forward clutch piston (3) and overrun clutch piston (4).
CAUTION:
Be careful with the direction of seal rings (1).



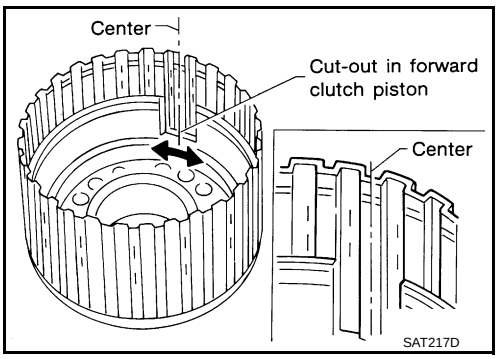
2. Install overrun clutch piston on forward clutch piston by turning it slowly.
CAUTION:
Apply ATF to inner surface of forward clutch piston.



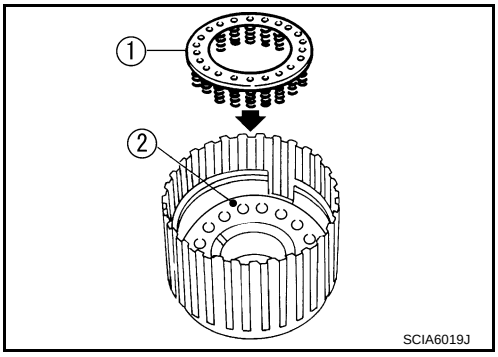
3. Install forward clutch piston with overrun clutch piston on forward clutch drum by turning it slowly.
CAUTION:
Apply ATF to inner surface of forward clutch drum.



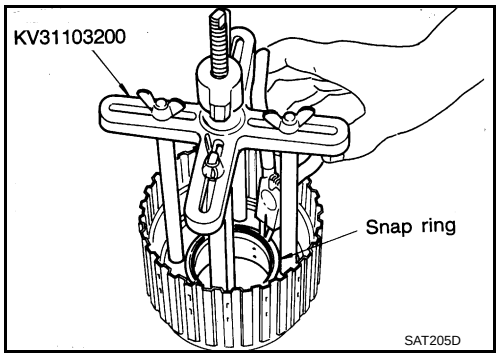
4. Align notch in forward clutch piston with groove in forward clutch drum.



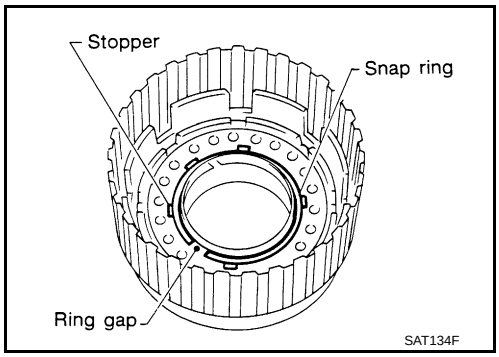
5. Install spring retainer assembly (1) on overrun clutch piston (2).



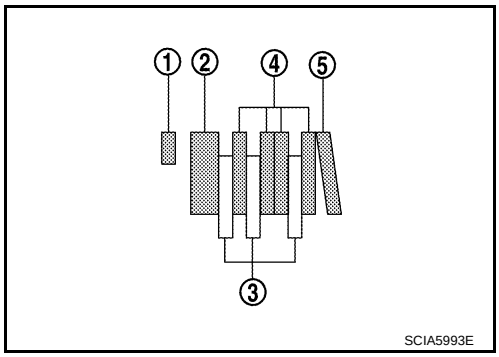
6. Set Tool on spring retainer assembly, and install snap ring while compressing spring retainer assembly.
CAUTION:
- **Set Tool directly over return springs.**
- **Do not expand snap ring excessively.**



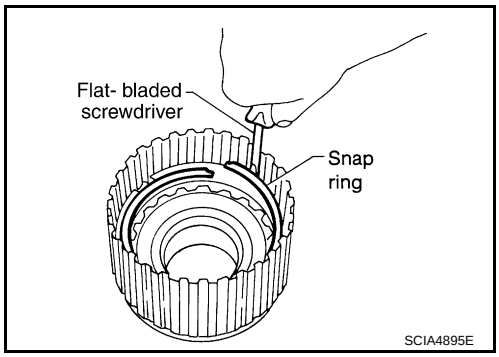
- **Do not align snap ring gap with spring retainer assembly stopper.**



7. Install dish plate (5), driven plates (4), drive plates (3) and retaining plate (2) 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 suitable tool.

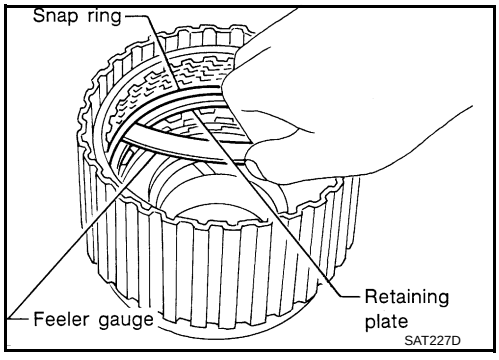


9. Measure clearance between overrun clutch retaining plate and snap ring using feeler gauge. If not within allowable limit, select proper retaining plate.

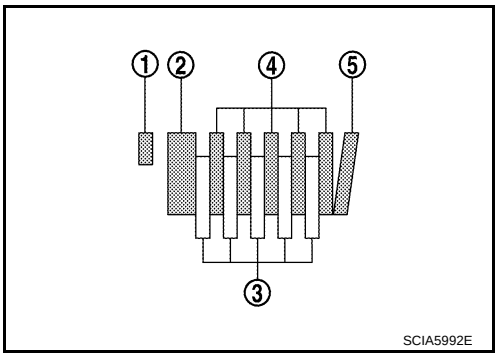
Specified clearance

Standard and allowable limit:

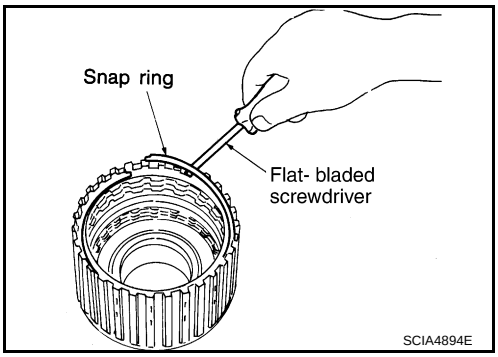
Refer to TM-321, "Clutches and Brakes".



10. Install dish plate (5), driven plates (4), drive plates (3) and retaining plate (2) 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.



11. Install snap ring for forward clutch using suitable tool.



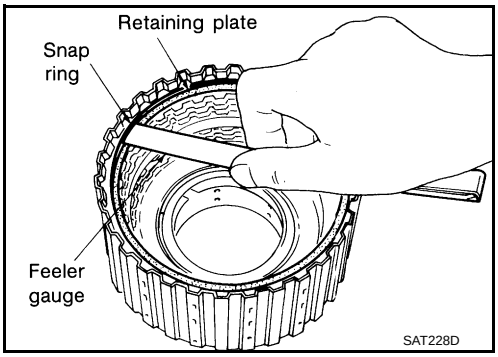
12. Measure clearance between forward clutch retaining plate and snap ring using feeler gauge. If not within allowable limit, select proper retaining plate.

    Specified clearance

    Standard and allowable limit:

    Refer to TM-321, "Clutches and Brakes".

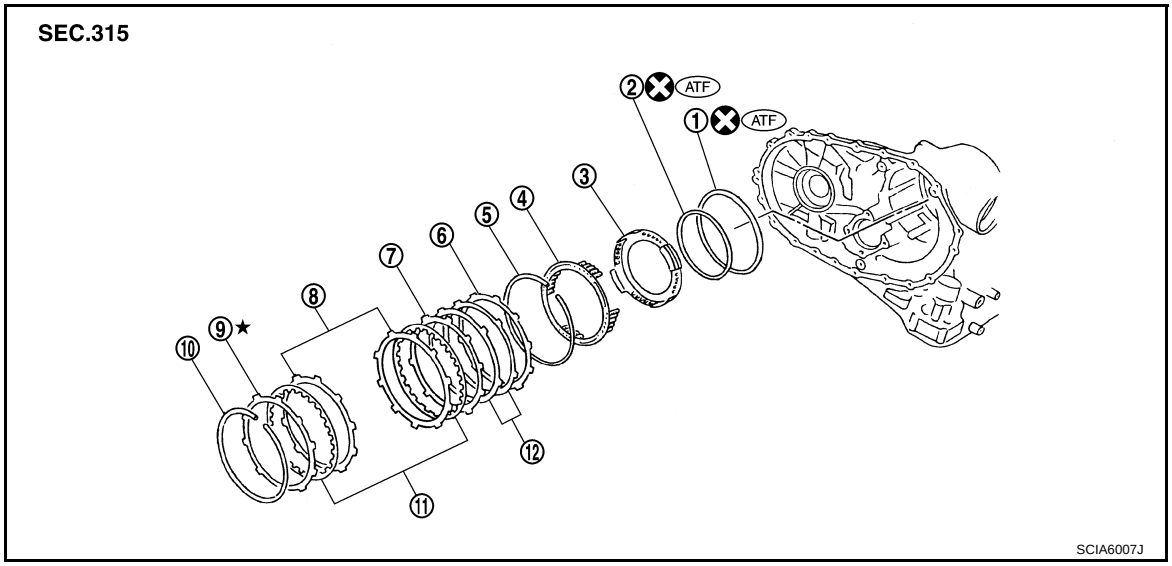
13. Check operation of forward clutch and overrun clutch. Refer to TM-267, "Forward and Overrun Clutches".



Low & Reverse Brake

INFOID:0000000001731443

COMPONENTS



1. Seal ring
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

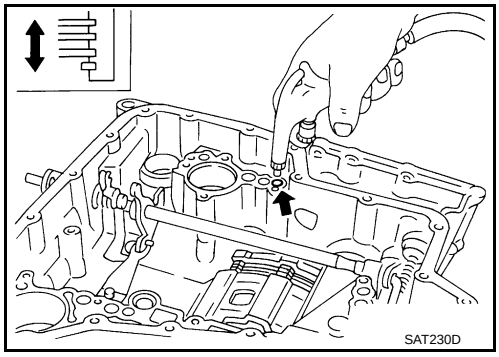
DISASSEMBLY

1. Check operation of low & reverse brake.

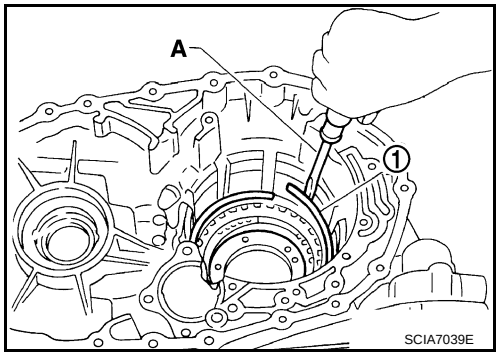
a. Apply compressed air into oil hole of transaxle case at the location as shown.

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

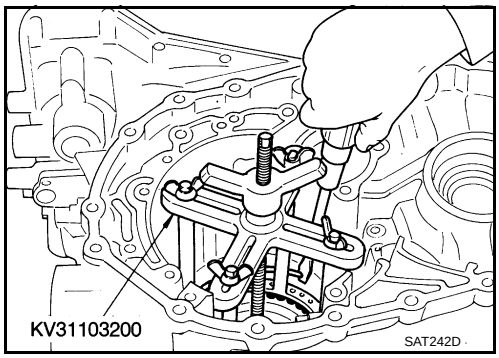
c. If retaining plate does not contact snap ring:
- D-ring might be damaged.
- Seal ring might be damaged.



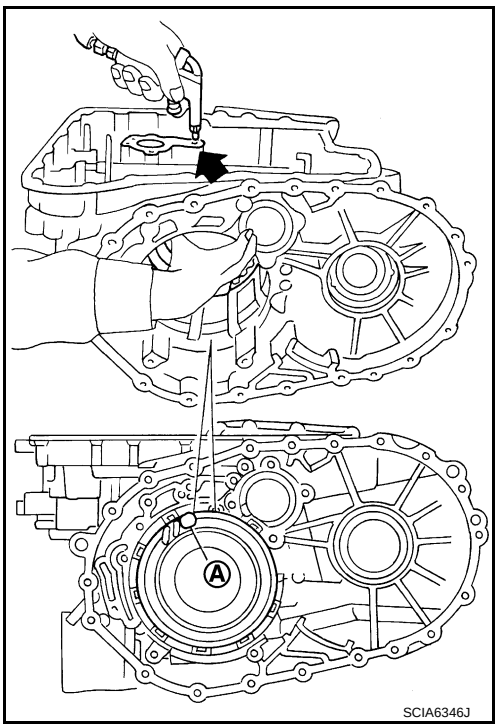
2. Remove snap ring (1) using suitable tool (A).
3. Remove retaining plates, drive plates, driven plates, dish plates.



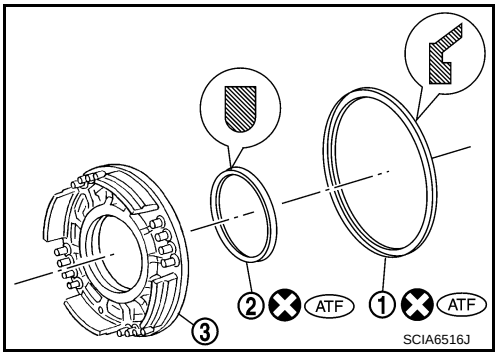
4. Set Tool on spring retainer assembly, and remove snap ring from transaxle case while compressing spring retainer assembly.
CAUTION:
Set Tool directly over return springs.
5. Remove spring retainer assembly from transaxle case.
CAUTION:
Do not remove return springs from spring retainer.



6. Apply compressed air into the oil hole on transaxle case as shown 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.
7. Remove low & reverse brake piston from transaxle case by turning it.
8. Inspect transaxle case. Replace if damaged or worn.



9. Remove seal ring (1) and D-ring (2) from low & reverse brake piston (3).



INSPECTION

Low & Reverse Brake Snap Rings

Check for deformation, fatigue or damage. Replace if necessary.

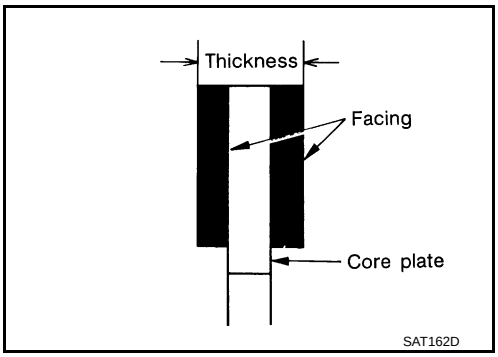
Low & Reverse Brake Drive Plates

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

Thickness of drive plate

Standard and allowable limit:

Refer to TM-321, "Clutches and Brakes".



CAUTION:

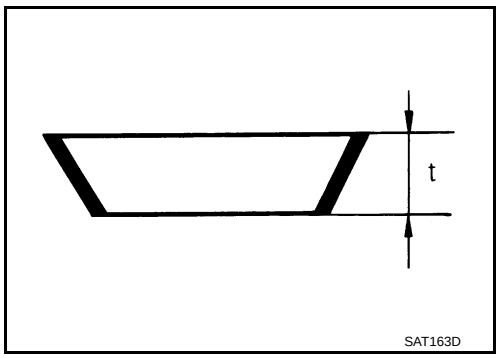
- **Measure the thickness at 3 locations and find the average.**
- **Inspect ALL drive plates.**
- **Replace if the thickness is below the allowable limit.**

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)

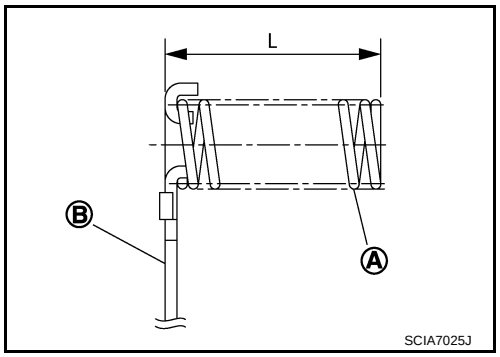


Low & Reverse Brake Spring Retainer Assembly

Check length (L) of spring retainer assembly. Replace if damaged, deformed or worn.

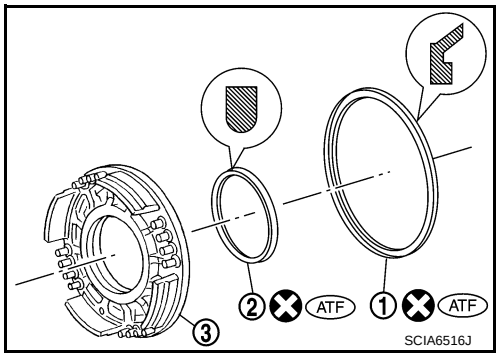
Length (L): 26.3 mm (1.035 in)

CAUTION:
Do not remove return springs (A) from spring retainer (B)



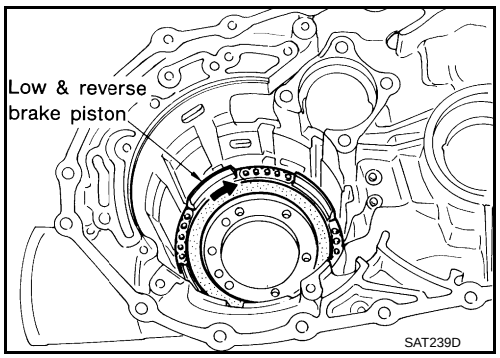
ASSEMBLY

1. Install seal ring (1) and D-ring (2) on low & reverse brake piston (3).

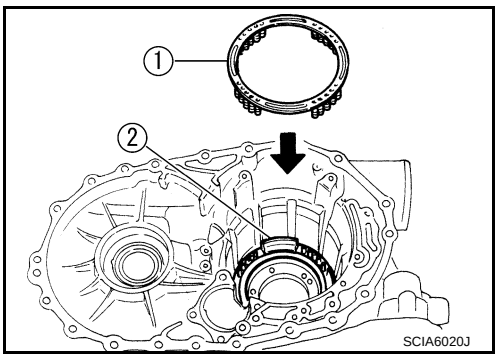


2. Install low & reverse brake piston in transaxle case while turning it.

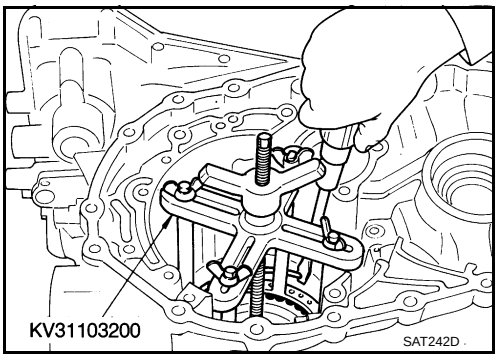
CAUTION:
Apply ATF to inner surface of transaxle case.



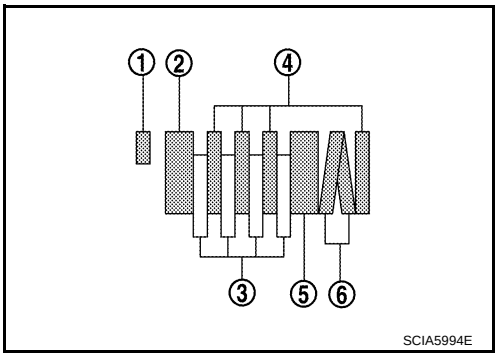
3. Install spring retainer assembly (1) on low & reverse brake piston (2).



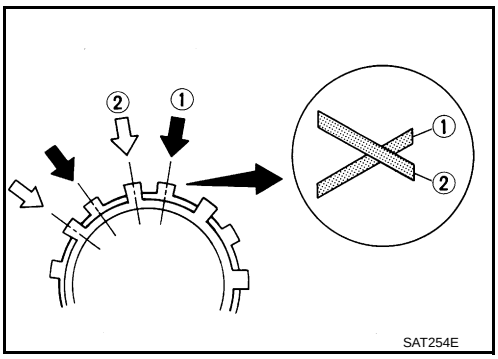
4. Set Tool on spring retainer assembly, and install snap ring while compressing spring retainer assembly.
CAUTION:
Set Tool directly over return springs.



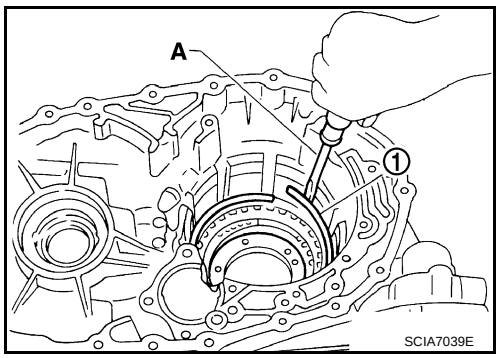
5. Install driven plates (4), dish plates (6), retaining plates (2), (5) and drive plates (3).
(1): Snap ring
(2): Retaining plate
(3): Drive plate
(4): Driven plate
(5): Retaining plate
(6): Dish plate
Drive plate/Driven plate: 4/4
CAUTION:
Be careful with the order of plates



NOTE:
Install two dish plates fitting each installation direction with groove (1) and (2) displaced slightly.



6. Install snap ring (1) using suitable tool (A).



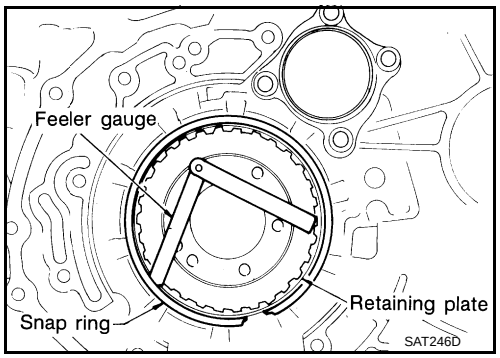
7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate (front side).

Specified clearance

Standard and allowable limit:

Refer to TM-321, "Clutches and Brakes".

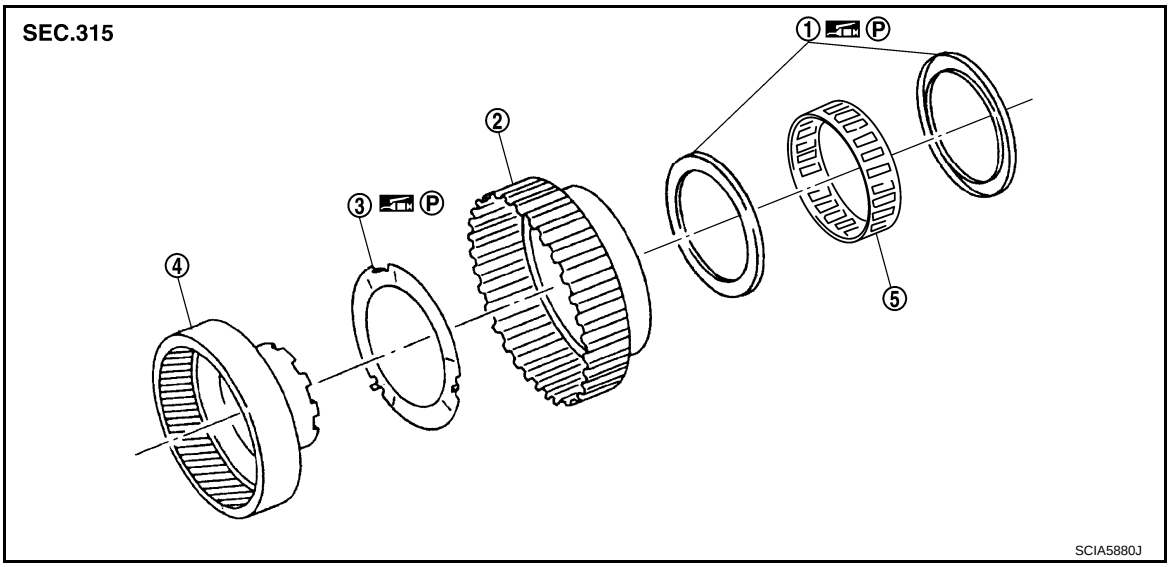
8. Check operation of low & reverse brake. Refer to TM-273, "Low & Reverse Brake".



Rear Internal Gear and Forward Clutch Hub

INFOID:0000000001731444

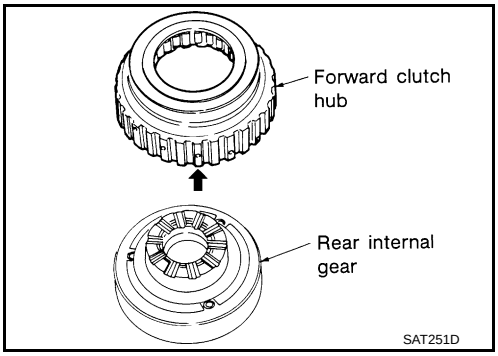
COMPONENTS



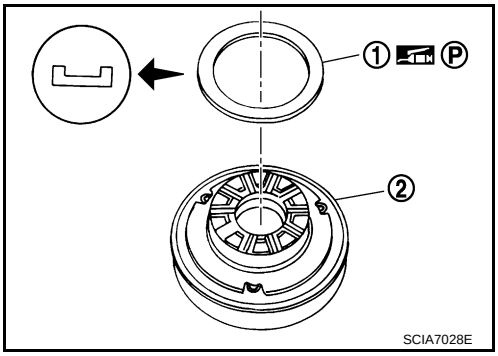
1. End bearing
2. Forward clutch hub
3. Thrust washer
4. Rear internal gear
5. Forward one-way clutch

DISASSEMBLY

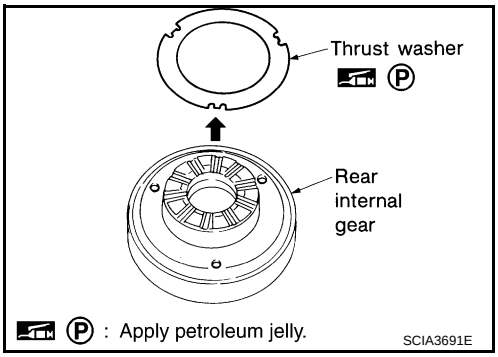
1. Remove forward clutch hub from rear internal gear.



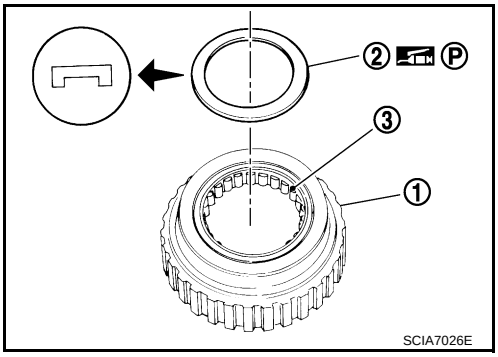
2. Remove end bearing (1) from rear internal gear (2).



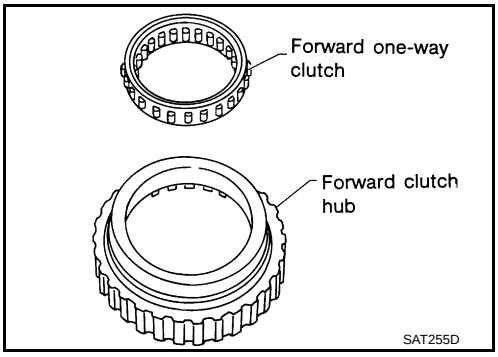
3. Remove thrust washer from rear internal gear.



4. Remove end bearing (2) from forward one-way clutch (3).
(1): Forward clutch hub



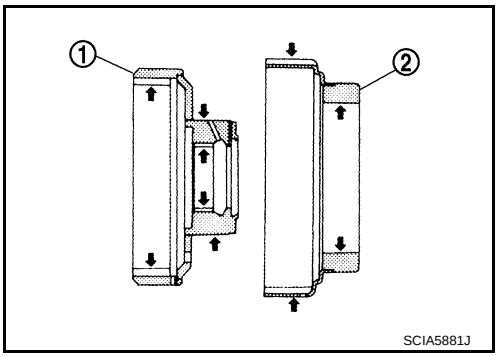
5. Remove forward one-way clutch from forward clutch hub.



INSPECTION

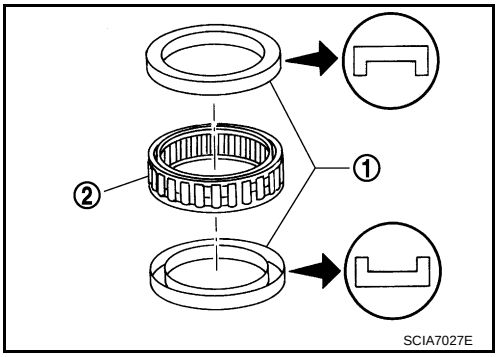
Rear Internal Gear and Forward Clutch Hub

Check rubbing surfaces for wear or damage. Replace if necessary.
(1): Rear internal gear
(2): Forward clutch hub



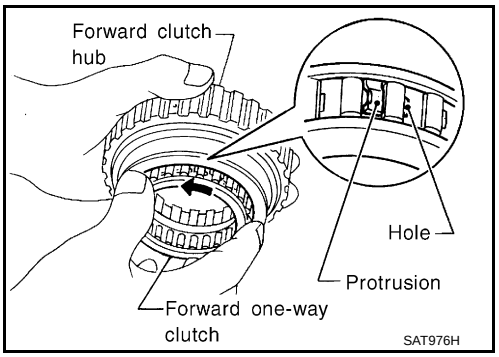
End Bearings and Forward One-way Clutch

- Check end bearings (1) for deformation and damage. Replace if necessary.
- Check forward one-way clutch (2) for wear and damage. Replace if necessary.

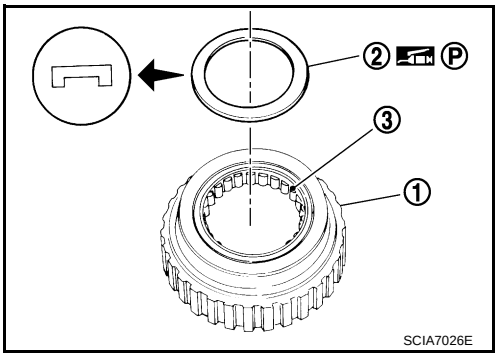


ASSEMBLY

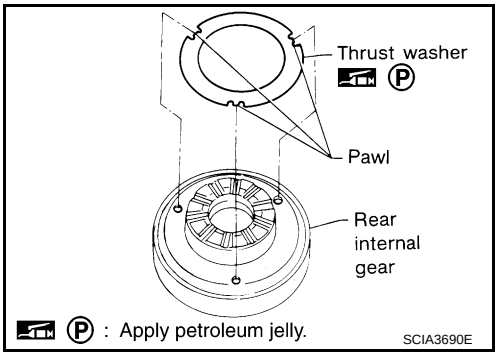
1. Install forward one-way clutch on forward clutch hub.
   CAUTION:
   Be careful with the direction of forward one-way clutch.



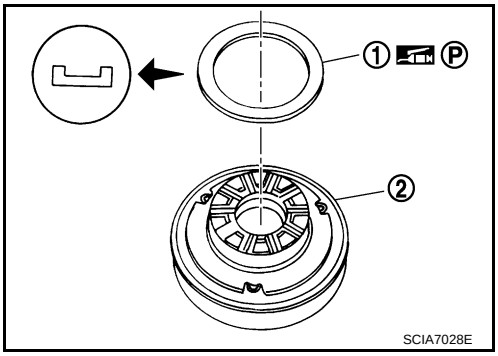
2. Install end bearing (2) on forward one-way clutch (3).
   (1): Forward clutch hub



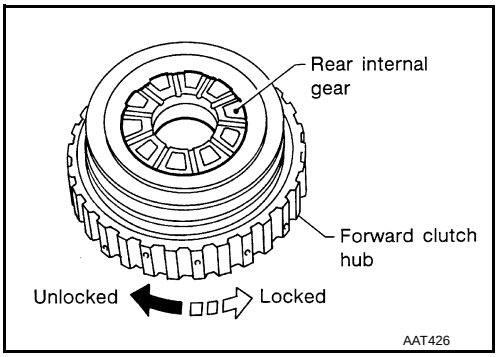
3. Install thrust washer on rear internal gear.
CAUTION:
Align pawls of thrust washer with holes of rear internal gear.



4. Install end bearing (1) on rear internal gear (2).



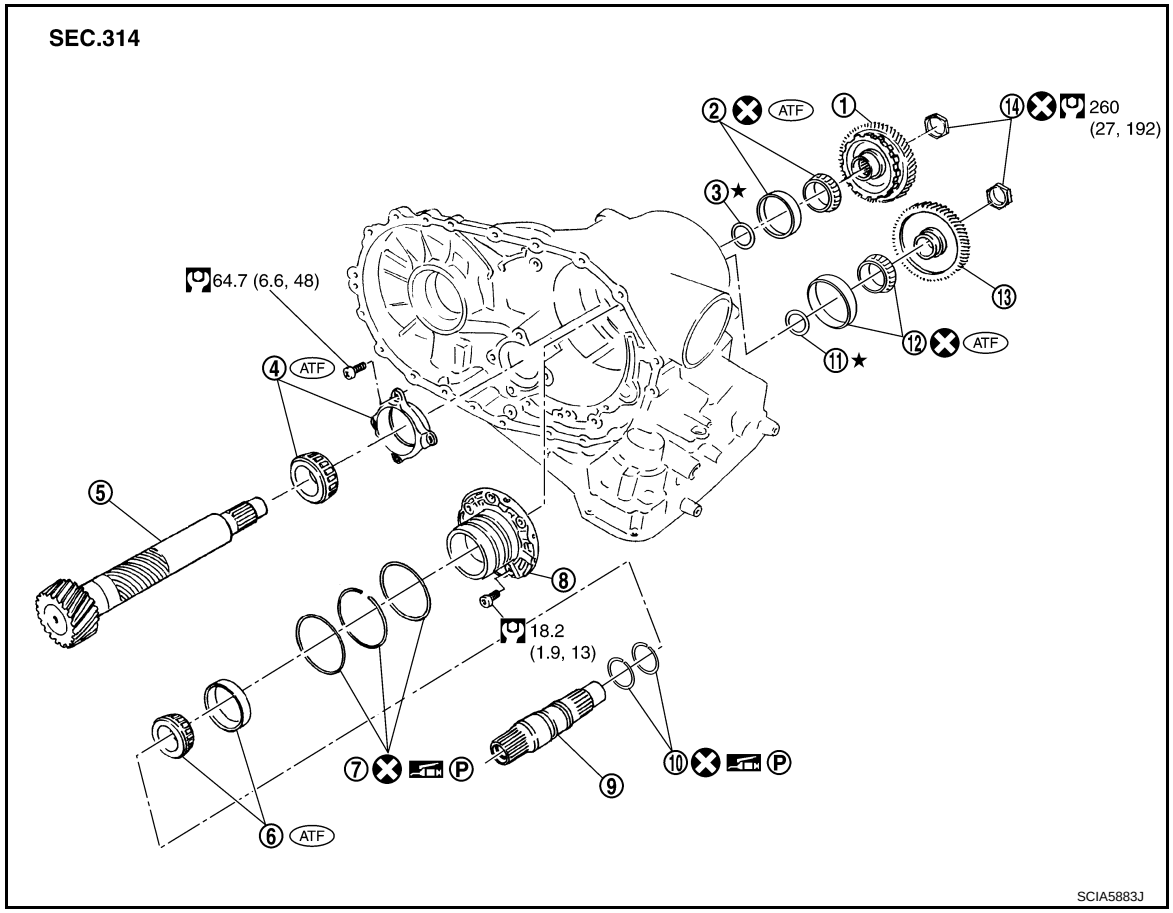
5. Install forward clutch hub on rear internal gear.
CAUTION:
- **Check operation of forward one-way clutch.**
  Hold rear internal gear and turn forward clutch hub.
  Check forward clutch hub for correct locking and unlocking directions.
- **If not as shown, check the installation direction of forward one-way clutch.**



Output Shaft, Output Gear, Idler Gear, Reduction Pinion Gear and Bearing Retainer

INFOID:0000000001731445

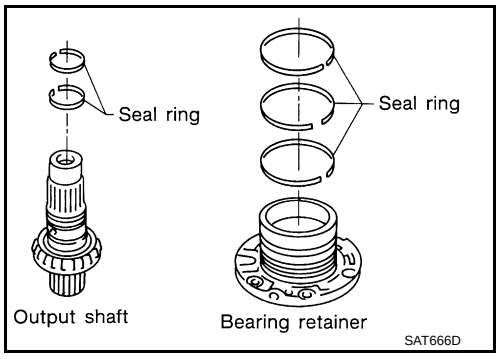
COMPONENTS



1. Idler gear
2. Idler gear bearing
3. Reduction pinion gear adjusting shim
4. Reduction pinion gear bearing
5. Reduction pinion gear
6. Output shaft bearing
7. Seal ring
8. Bearing retainer
9. Output shaft
10. Seal ring
11. Output gear adjusting spacer
12. Output gear bearing
13. Output gear
14. Lock nut

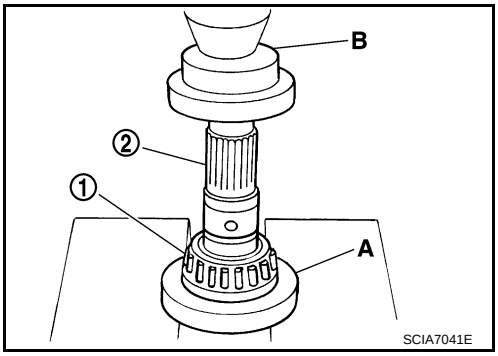
DISASSEMBLY

1. Remove seal rings from output shaft and bearing retainer.

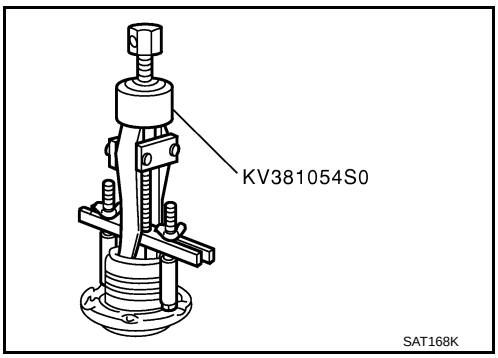


2. Remove output shaft bearing according to the following procedures.

a. Set output shaft bearing inner race (1) on suitable tool (A), and set a suitable tool (B) on output shaft (2), and press output shaft (2) to remove output shaft bearing inner race (1).
CAUTION:
Set a drift (A) on output shaft bearing inner race (1).



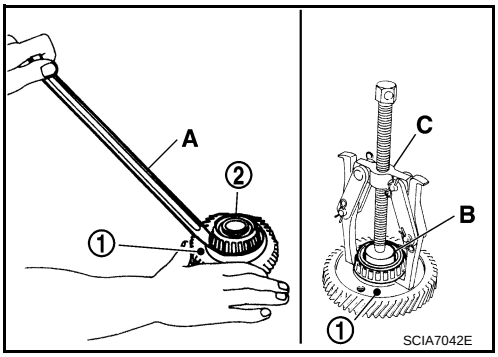
b. Set Tool on output shaft bearing outer race, and remove output shaft bearing outer race from bearing retainer.



3. Remove output gear bearing according to the following procedures.

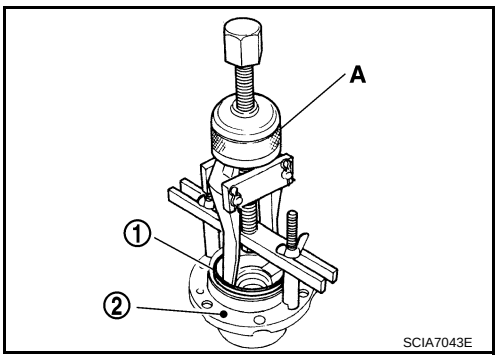
a. Insert suitable tool (A) between the mating surfaces of output gear (1) and output gear bearing inner race (2), and enlarge the gap.
CAUTION:
Do not damage output gear (1).

b. Set a suitable tool (B) on output gear (1), and remove output gear bearing inner race (2) using suitable tool (C).



c. Set Tool (A) on output gear bearing outer race (1), and remove output gear bearing outer race (1) from bearing retainer (2).

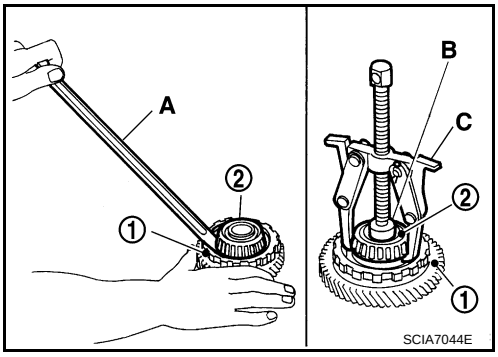
Tool number: KV381054S0



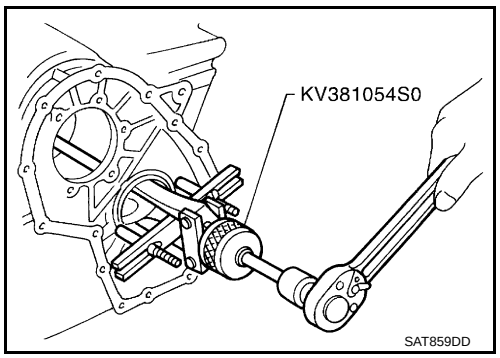
4. Remove idler gear bearing according to the following procedures.

a. Insert suitable tool (A) between the mating surfaces of idler gear (1) and idler gear bearing inner race (2), and enlarge the gap.
CAUTION:
Do not damage idler gear (1).

b. Set suitable tool (B), on idler gear (1), and remove idler gear bearing inner race (2) using suitable tool (C).



c. Set Tool on idler gear bearing outer race, and remove idler gear bearing outer race from transaxle case.

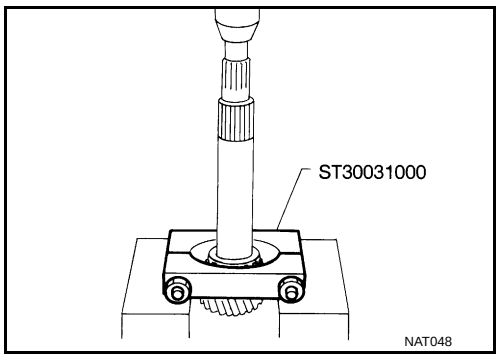


5. Remove reduction pinion gear bearing according to the following procedures.

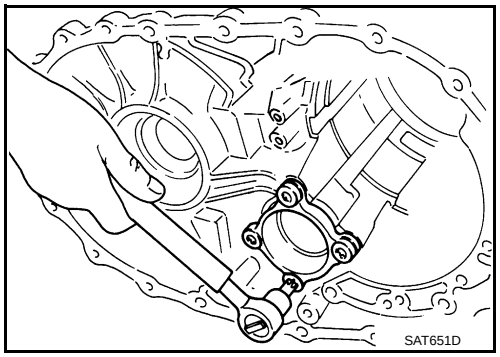
a. Set Tool on reduction pinion gear bearing inner race, and press reduction pinion gear to remove reduction pinion gear bearing inner race.

CAUTION:

Set Tool on reduction pinion gear bearing inner race.



b. Remove reduction pinion gear bearing outer race from transaxle case.



INSPECTION

Output Shaft, Output Gear, 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.
- **When replacing taper roller bearing, replace outer and inner race as a set.**

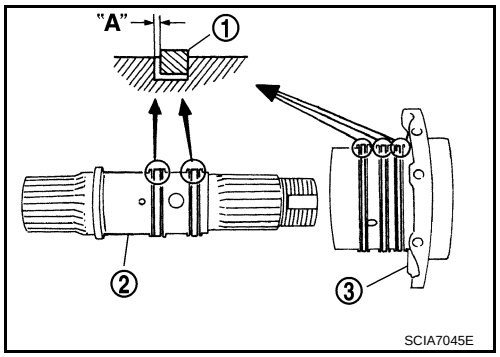
Check for damage or deformation. Replace if necessary.

Seal Ring Clearance

- Install new seal rings (1) on output shaft (2).
- Measure clearance “A” between each seal ring and groove.

Standard clearance and allowable limit:

Refer to TM-323, "Output Shaft".



- Replace output shaft (2) if the measurements exceed the allowable limit.
- Install new seal rings (1) on bearing retainer (3).
- Measure clearance “A” between each seal ring and groove.

Standard clearance and allowable limit:

Refer to TM-324, "Bearing Retainer".

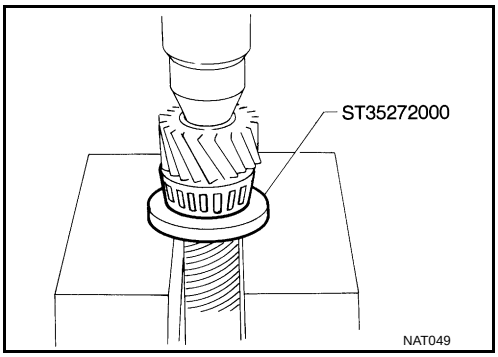
- Replace bearing retainer (3) if the measurements exceed the allowable limit.

ASSEMBLY

1. Install reduction pinion gear bearing according to the following procedures.

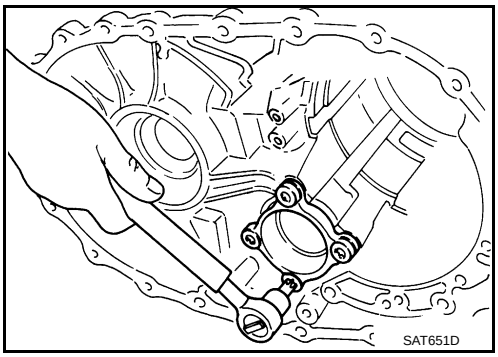
a. Set Tool on reduction pinion gear bearing inner race, and press reduction pinion gear to reduction pinion gear bearing inner race.

CAUTION:
Set Tool on reduction pinion gear bearing inner race.



b. Install reduction pinion gear bearing outer race to transaxle case.

c. Tighten reduction pinion gear bearing outer race bolts to the specified torque.



2. Checking reduction pinion gear bearing preload. Refer to TM-591, "Adjustment (1)".

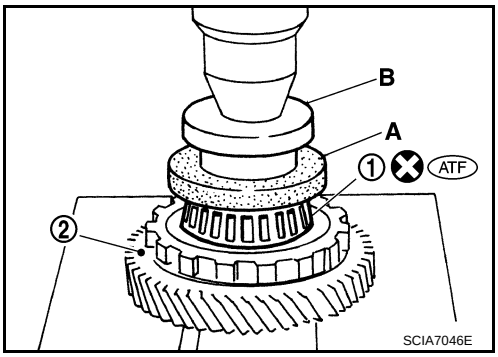
3. Install idler gear bearing according to the following procedures.

CAUTION:
Do not reuse idler gear bearing.

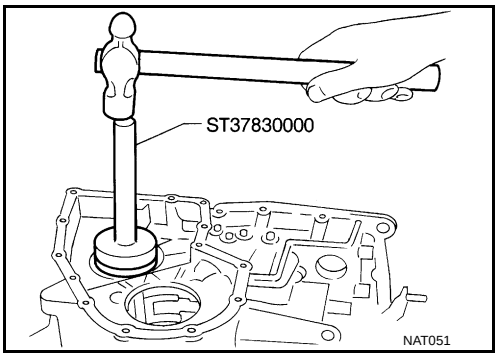
a. Set Tool (A) and suitable tool (B) on idler gear bearing inner race (1), and press idler gear bearing inner race (1) to idler gear (2).

Tool number: KV35272000

CAUTION:
Set Tool (A) on idler gear bearing inner race (1).



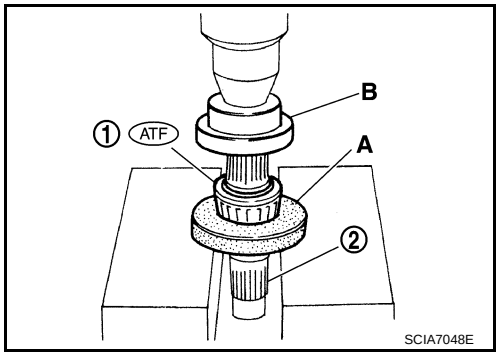
b. Set Tool on idler gear bearing outer race, and drive idler gear bearing outer race into transaxle case.



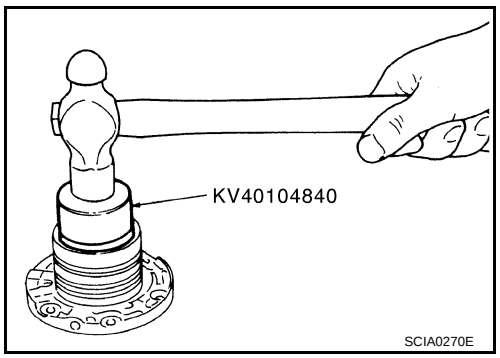
4. Install output shaft bearing according to the following procedures.

a. Set suitable tool (A) and a suitable tool (B) on output shaft bearing inner race (1), and press output shaft (2) to output shaft bearing inner race (1).

CAUTION:
Set suitable tool (A) on output shaft bearing inner race (1).



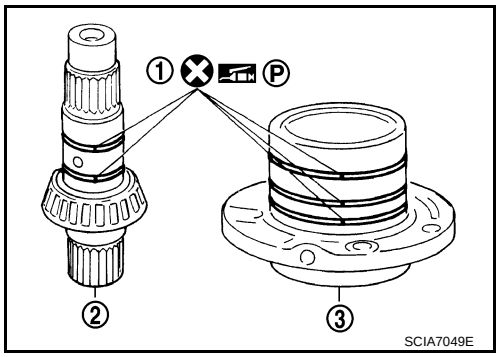
b. Set Tool on output shaft bearing outer race, and drive output shaft bearing outer race to bearing retainer.



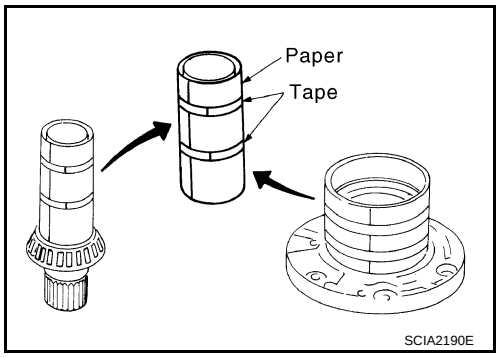
5. Checking output shaft bearing preload. Refer to TM-591, "Adjustment (1)".

6. Install seal rings according to the following procedures.

a. Install seal rings (1) evenly to the grooves on output shaft (2) and bearing retainer (3), and fully close the opening.



CAUTION:
Roll paper around seal rings to prevent seal rings from spreading.



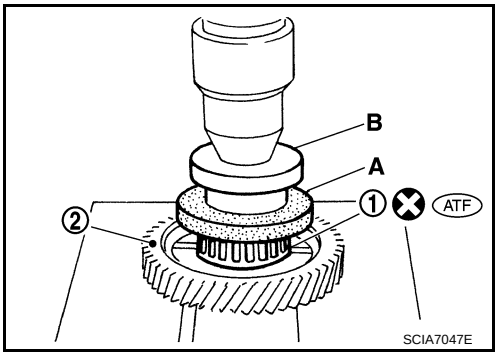
7. Install output gear bearing according to the following procedures.

CAUTION:
Do not reuse output gear bearing.

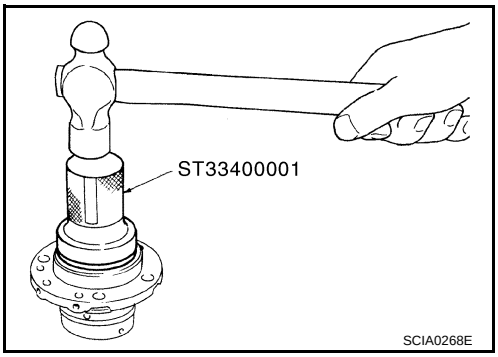
a. Set Tool (A) and suitable (B) on output gear bearing inner race (1), and press output gear bearing inner race (1) to output gear (2).

Tool number: KV35272000

CAUTION:
Set Tool (A) on output gear bearing inner race (1).



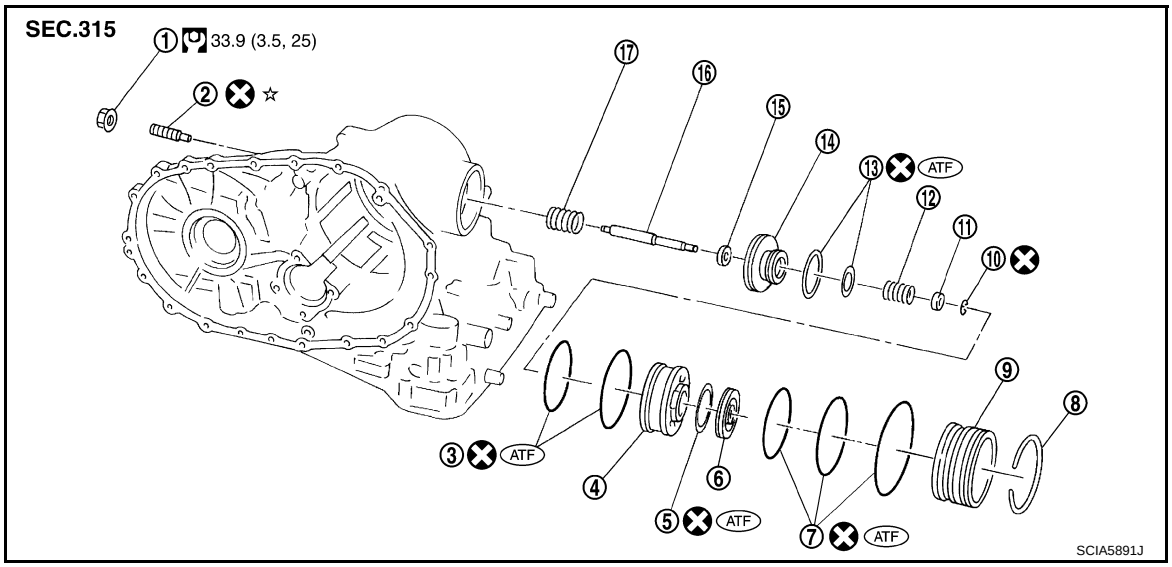
b. Set Tool on output gear bearing outer race, and drive output gear bearing outer race to bearing retainer.



Band Servo Piston Assembly

INFOID:0000000001731446

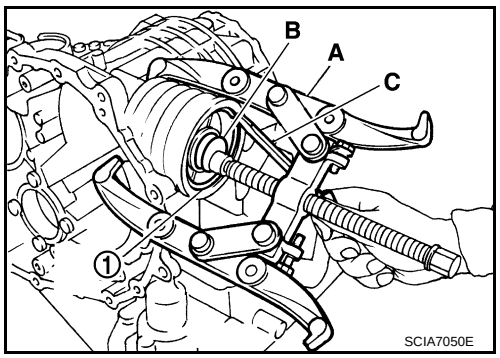
COMPONENTS



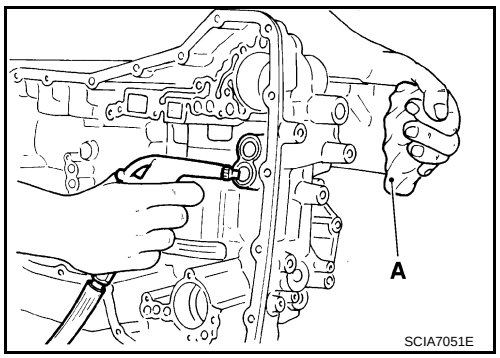
1. Lock nut
2. Anchor end pin
3. O-ring
4. Servo piston retainer
5. D-ring
6. OD servo piston
7. O-ring
8. Snap ring
9. OD servo piston retainer
10. E-ring
11. Spring retainer
12. OD servo return spring
13. D-ring
14. Band servo piston
15. Band servo thrust washer
16. Band servo piston stem
17. 2nd servo return spring

DISASSEMBLY

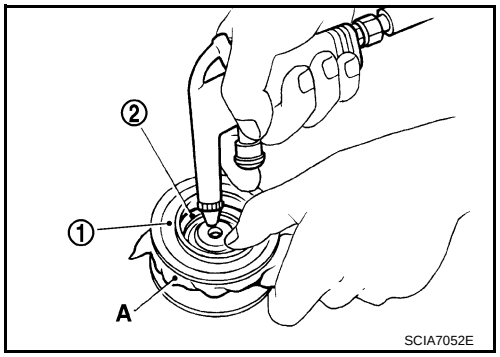
1. Push in OD servo piston assembly using suitable tool (A) and suitable tool (B), and then remove snap ring (1) from transaxle case using suitable tool (C).



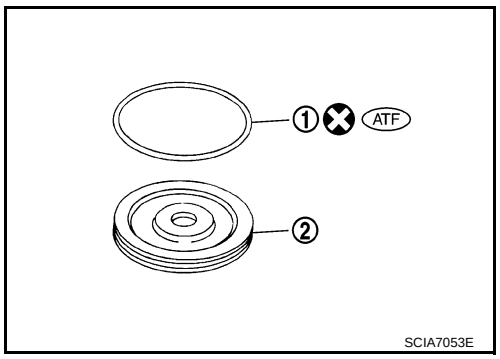
2. Apply compressed air into the oil hole as shown to remove OD servo piston assembly and band servo piston assembly.
CAUTION:
Do not blow air in too quickly, or OD servo piston assembly, band servo piston assembly and ATF could jump out. Carefully blow air little by little while protecting with lint-free cloth A.
3. Remove 2nd servo return spring from transaxle case.



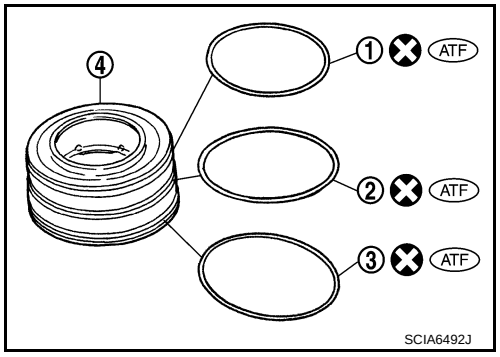
4. Wrap OD servo piston retainer (1) using lint-free cloth A, and then apply compressed air into the band servo piston stem hole on OD servo piston (2) to remove OD servo piston (2) from OD servo piston retainer (1).
CAUTION:
Do not blow air in too quickly, or OD servo piston (2) and ATF could jump out. Carefully blow air little by little while protecting with lint-free cloth A.



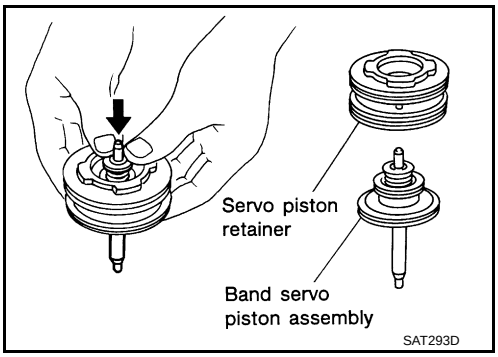
5. Remove D-ring (1) from OD servo piston (2).



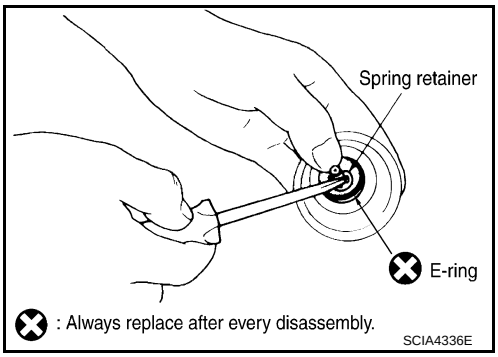
6. Remove O-rings (1), (2) and (3) from OD servo piston retainer (4).
(1): O-ring (small diameter)
(2): O-ring (medium diameter)
(3): O-ring (large diameter)



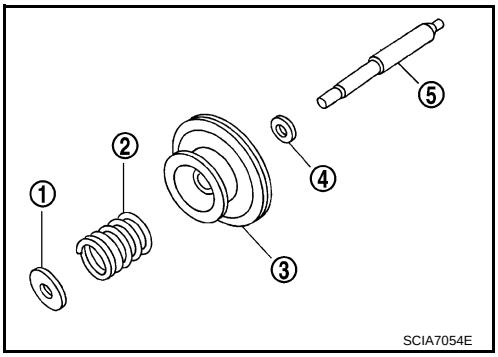
7. Press in band servo piston assembly to remove from servo piston retainer.



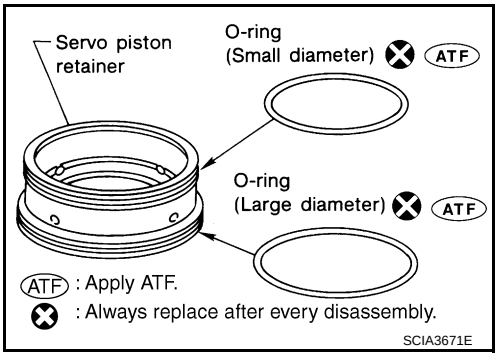
8. Place band servo piston stem on a wooden block, and remove E-ring from band servo piston stem using suitable tool while pressing spring retainer downward.



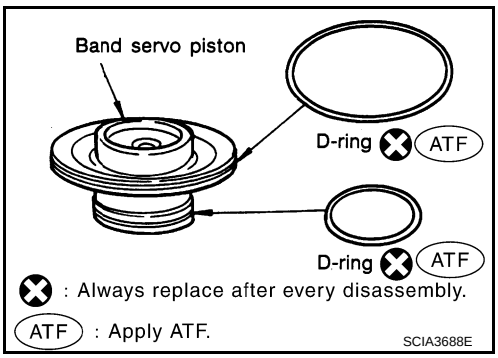
9. Remove spring retainer (1), OD servo return spring (2), band servo piston (3) and band servo thrust washer (4) from band servo piston stem (5).



10. Remove O-rings from servo piston retainer.



11. Remove D-rings from band servo piston.



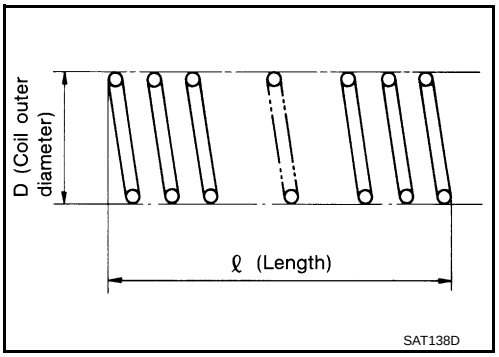
INSPECTION

Pistons, Retainers and Piston Stem

Check the sliding surfaces for damage or excessive wear. Replace if necessary.

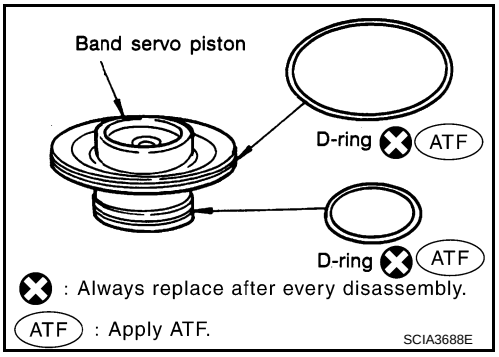
Return Springs

- Check each return spring for damage or deformation. Also measure free length. Refer to TM-323, "Band Servo".
- Replace springs if deformed or fatigued.

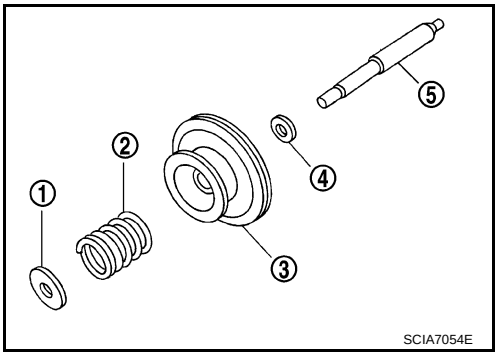


ASSEMBLY

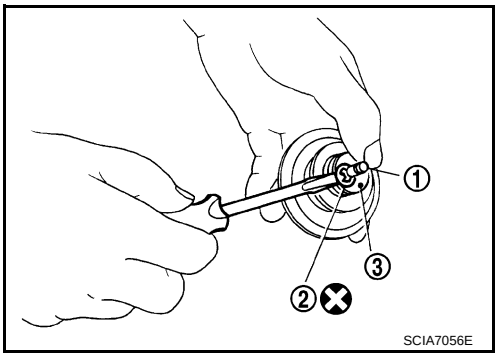
1. Install D-rings to band servo piston.



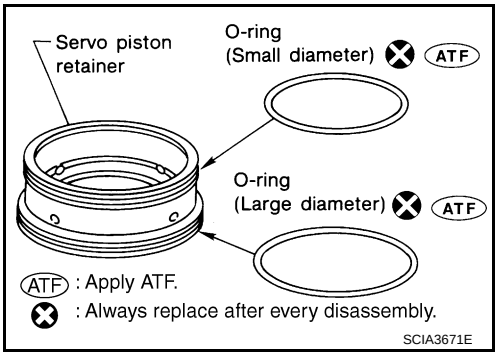
2. Install band servo thrust washer (4), band servo piston (3), OD servo return spring (2) and spring retainer (1) to band servo piston stem (5).



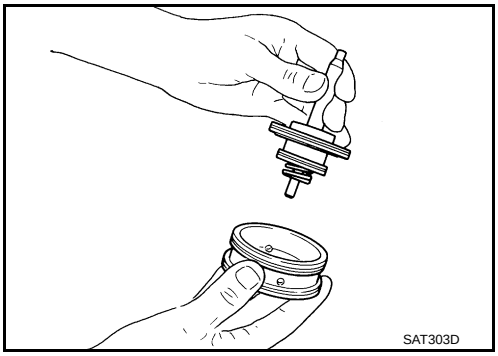
3. Place band servo piston stem (1) on a wooden block, and install E-ring (2) to band servo piston stem (1) while pressing spring retainer (3) downward.



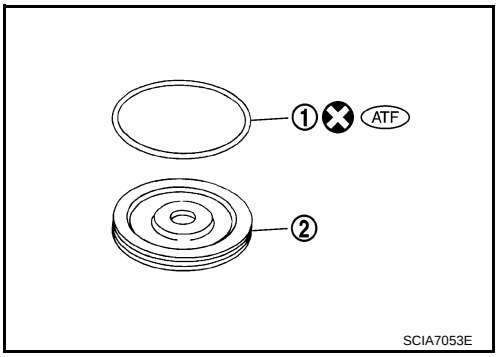
4. Install O-rings to servo piston retainer



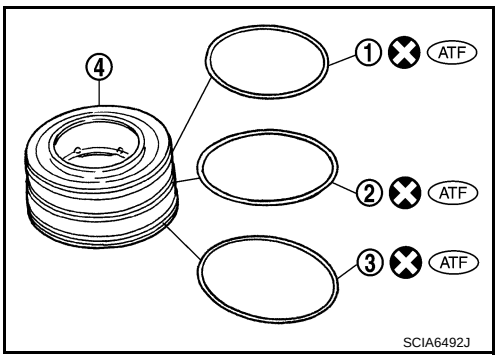
5. Install band servo piston assembly to servo piston retainer by pushing it inward.



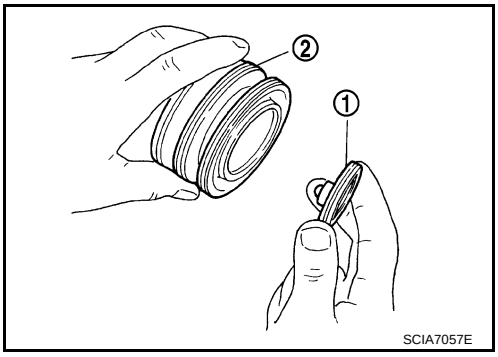
6. Install D-ring (1) to OD servo piston (2).



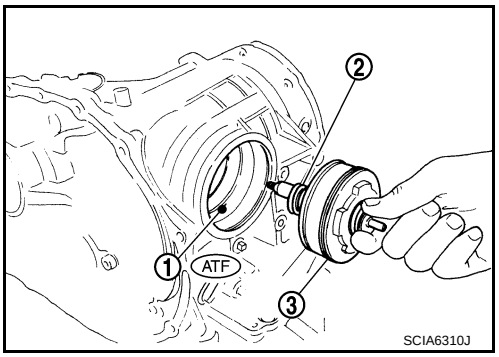
7. Install O-rings (1), (2) and (3) to OD servo piston retainer (4).
   (1): O-ring (small diameter)
   (2): O-ring (medium diameter)
   (3): O-ring (large diameter)



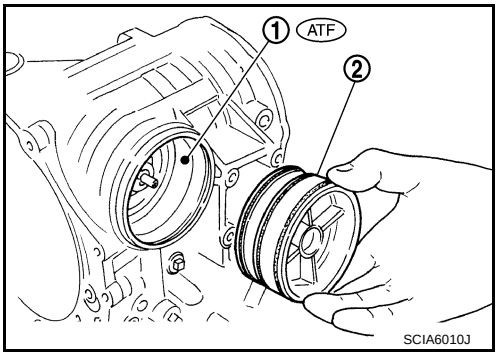
8. Install OD servo piston (1) to OD servo piston retainer (2) as shown.



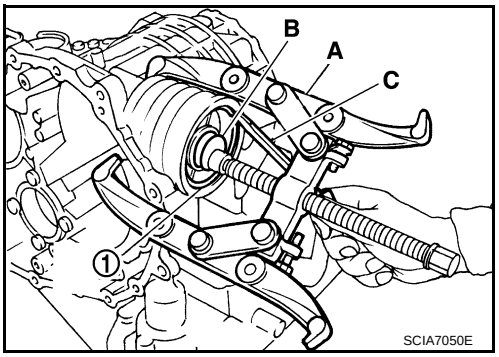
9. Install 2nd servo return spring (2) and band servo piston assembly (3) to transaxle case (1).



10. Install OD servo piston assembly (2) to transaxle case (1).



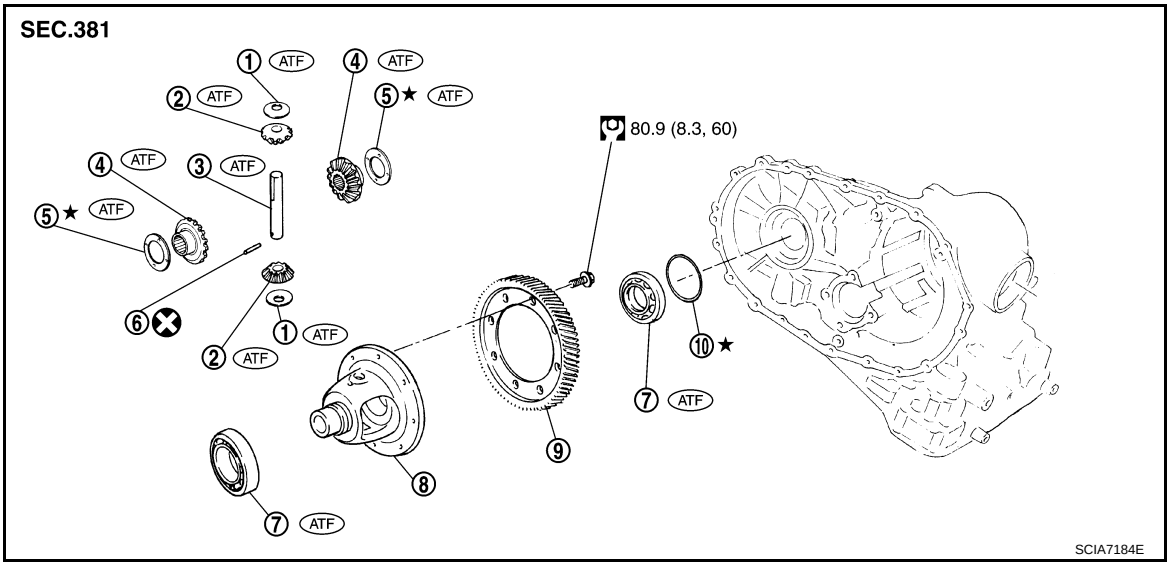
11. Push in OD servo piston assembly using suitable tool (A) and-suitable tool (B), and install snap ring (1) to transaxle case using suitable tool (C).



Final Drive

INFOID:0000000001731447

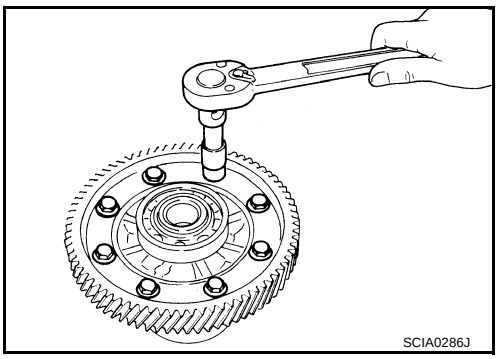
COMPONENTS



1. Pinion mate gear thrust washer
2. Pinion mate gear
3. Pinion mate shaft
4. Side gear
5. Side gear thrust washer
6. Lock pin
7. Differential side bearing
8. Differential case
9. Final gear
10. Differential side bearing adjusting shim

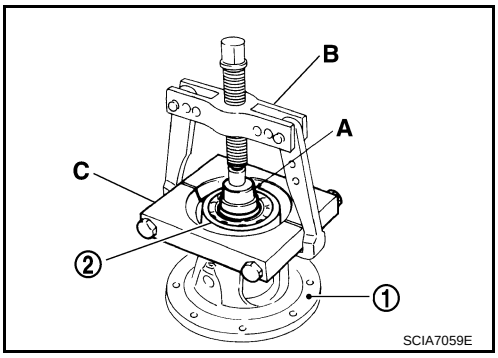
DISASSEMBLY

1. Remove final gear from differential case.

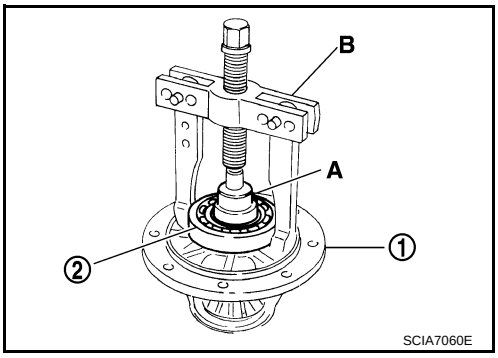


2. Remove differential side bearings according to the following procedures.

a. Set suitable tool (A) on differential case (1), and remove differential side bearing (RH side) (2) from differential case (1) using suitable tool (B) and suitable tool (C).



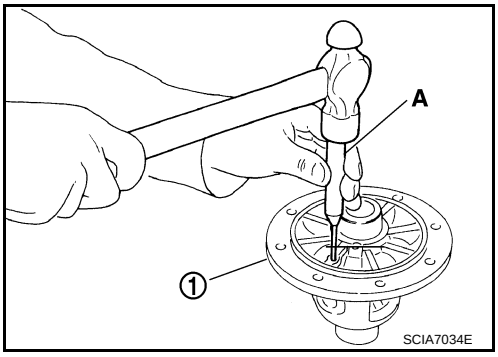
b. Set suitable tool (A) on differential case (1), and remove differential side bearing (LH side) (2) from differential case (1) using suitable tool (B).



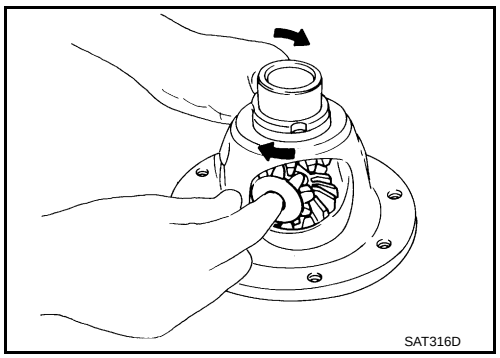
3. Remove pinion mate gear and side gear according to the following procedures.

a. Drive out lock pin from differential case (1) using Tool (A).

Tool number: KV32101000



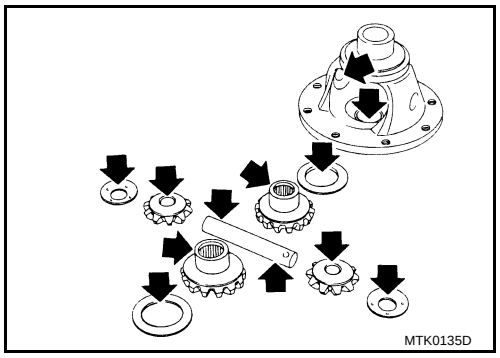
b. Remove pinion mate shaft from differential case.
c. Rotate pinion mate gears and pinion mate gear thrust washers to remove.
d. Remove side gears and side gear thrust washers from differential case.


SAT316D

INSPECTION

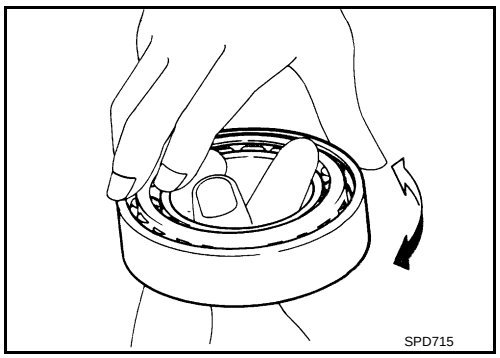
Gears, Washers, Pinion Mate Shaft and Differential Case

Check the sliding surfaces for wear, seizure, crack or damage. Replace if necessary.


MTK0135D

Bearings

Make sure bearings roll freely and are free from noise, cracks, pitting or wear. Replace if necessary.

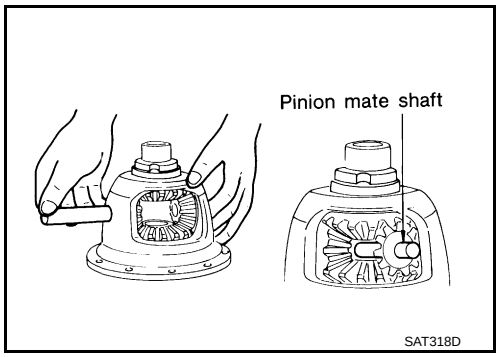

SPD715

ASSEMBLY

1. Install pinion mate gears and side gears according to the following procedures.

a. Attach side gear thrust washers to side gears, then install pinion mate gear thrust washers and pinion mate gears in place.
CAUTION:
Apply plenty of ATF to each sliding / rotating surface before assembly.

b. Set 2 pinion mate gears and thrust washers on the same axis, and while rotating them simultaneously, align them with the insert hole of pinion mate shaft on differential case to insert pinion mate shaft.
CAUTION:
After aligning 2 pinion mate gears with side gear teeth and centering with pinion mate shaft, take pinion mate shaft out and move pinion mate gears in place while rotating the them simultaneously.

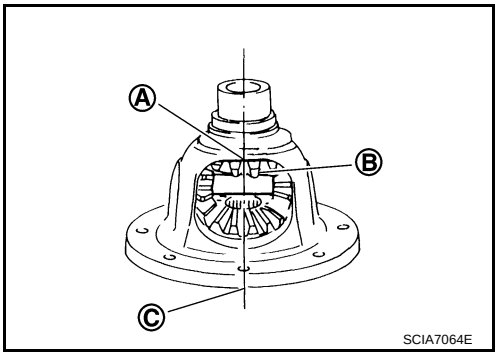


SAT318D

2. 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.



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.

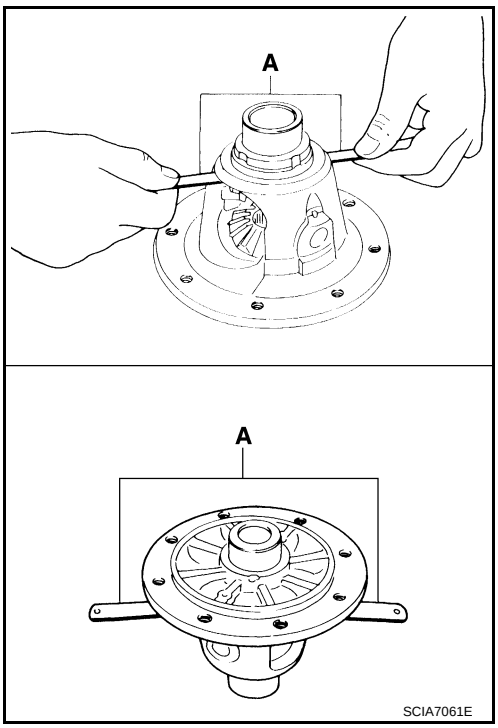
CAUTION:
In all 3 measurements, maximize the clearance by aligning teeth on side gears at the top and bottom at the same position.

ii. Select side gear thrust washer so that the clearance will fall within the standard.

Differential side gear clearance:

Refer to TM-323, "Final Drive".

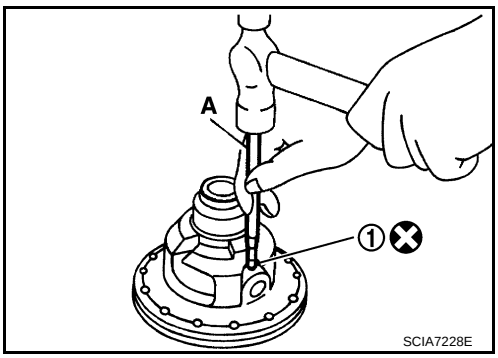
iii. Turn differential case upside down, and measure the back clearance of the other side gear in the same manner.
NOTE:
Adjust the clearance to approx. 0.1 mm (0.004 in) for used differential [driven approx. 3,000 km (1864 mile) or more].



3. Install lock pin (1) to pinion mate shaft using Tool (A).

Tool number: KV32101000

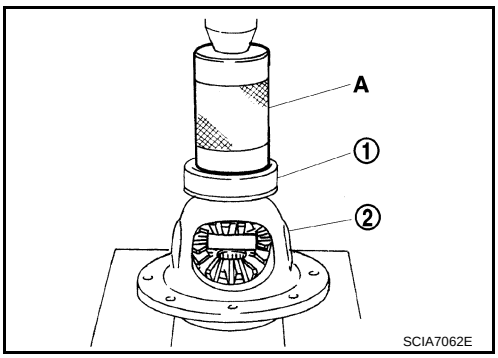
CAUTION:
Make sure that lock pin (1) flush with differential case.



4. Set Tool (A) on differential side bearing (RH side) (1), and press differential side bearing (RH side) (1) to differential case (2).

Tool number: ST33200000

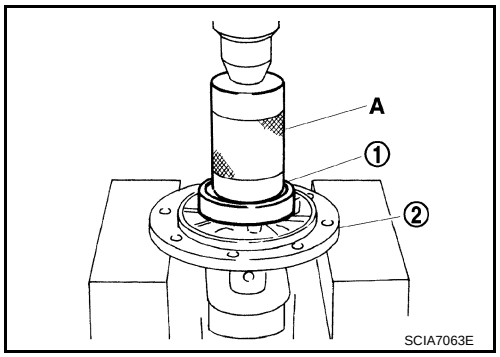
CAUTION:
Set Tool (A) on differential side bearing inner race.



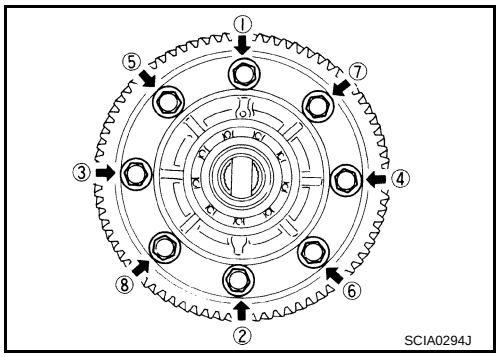
5. Set Tool (A) on differential side bearing (LH side) (1), and press differential side bearing (LH side) (1) to differential case (2).

Tool number: ST33200000

CAUTION:
Set Tool (A) on differential side bearing inner race.



6. Install final gear on differential case, and tighten bolts to the specified torque in the numerical order as shown.

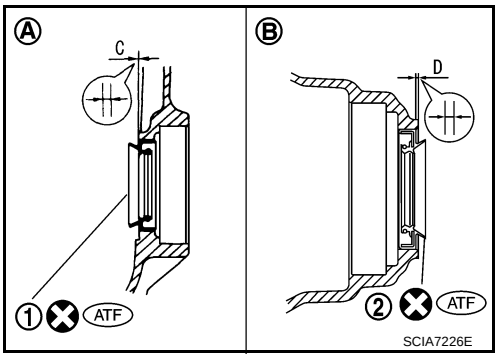


ASSEMBLY

Assembly (1)

INFOID:0000000001731448

1. Drive transaxle case side oil seal (1) using Tools, and converter housing side oil seal (2) using suitable tool, to the dimensions as shown
(A): Transaxle case side
(B): Converter housing side

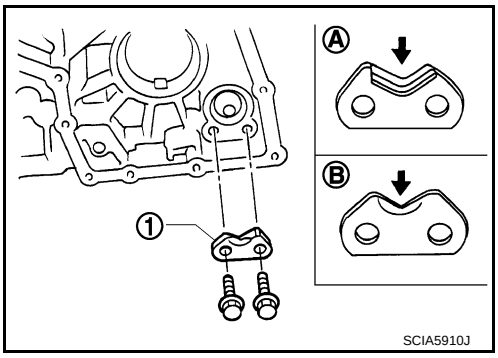


Tool numbers : ST35325000 (—)
: KV31103000 (—)

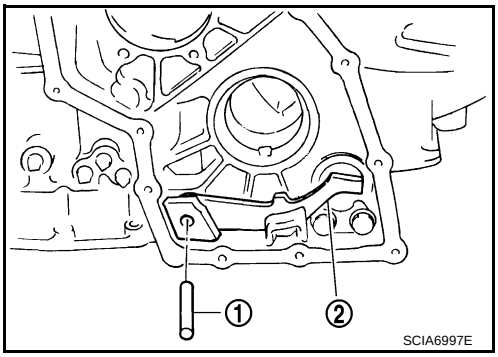
Dimension "C" : 0 ++
Dimension "D" : 1.1 ± 0.5 mm (0.043 ± 0.020 in)

NOTE:
Differential side oil seal pulling direction is used as the reference.

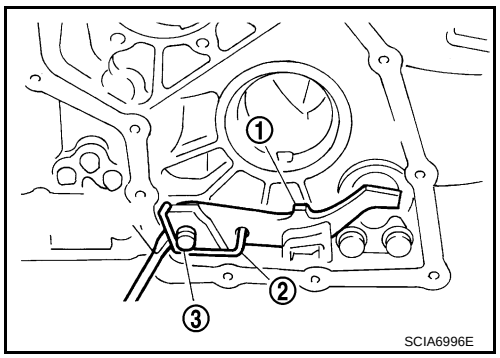
2. Install O-ring on governor cap.
CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**
3. Install governor cap in transaxle case.
4. Install snap ring in transaxle case.
5. Install parking actuator support (1) on transaxle case.
(A): Inside
(B): Outside
CAUTION:
Be careful with the direction of parking actuator support (1).
6. Tighten parking actuator support bolts to the specified torque.



7. Install parking pawl (2) on transaxle case, and secure it with parking shaft (1).



8. Install return spring (2) on parking shaft (3) and parking pawl (1) using suitable tool.



Adjustment (1)

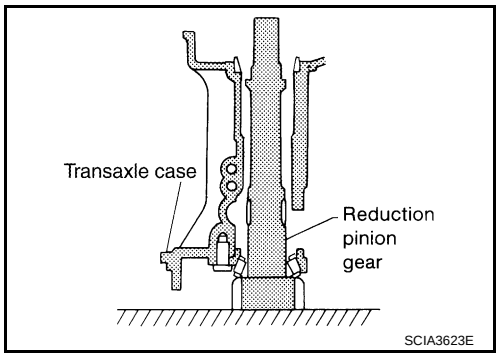
INFOID:0000000001731449

REDUCTION PINION GEAR BEARING PRELOAD

1. Select proper thickness of reduction pinion gear adjusting shim using the following procedures.

a. Place reduction pinion gear on transaxle case as shown.

b. Install idler gear bearing outer race on transaxle case.

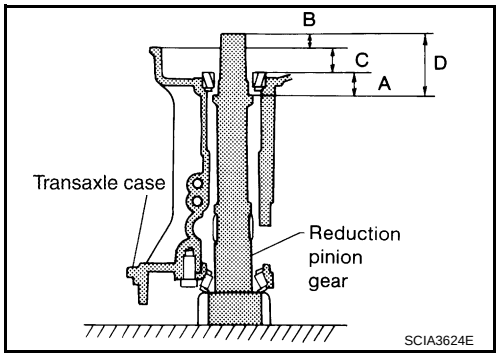


c. Place idler gear bearing inner race on outer race.

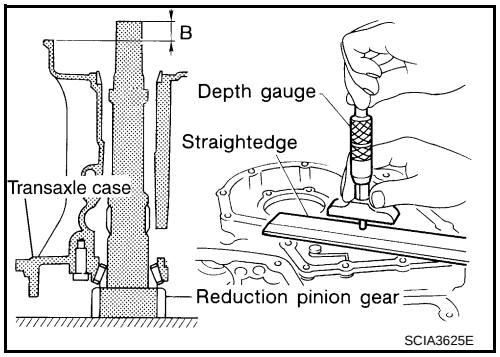
d. Measure dimensions “B”, “C” and “D”, and calculate dimension “A”.

“A”: Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.

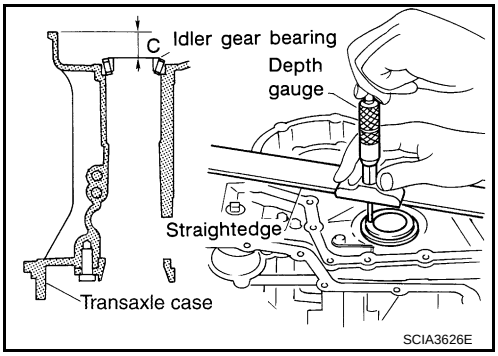
A = D – (B + C)



- 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.**

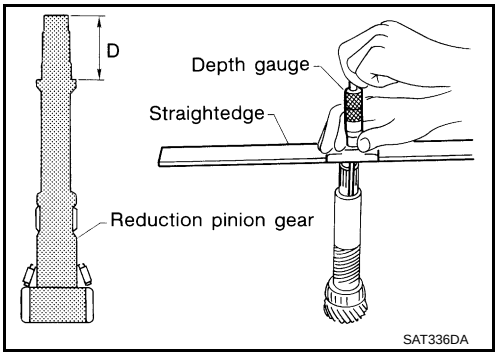


- Measure dimension “C” between the surface of idler gear bearing inner race and the surface of transaxle case.
- **Measure dimension “C” in at least two places, and take the average.**



- 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”.

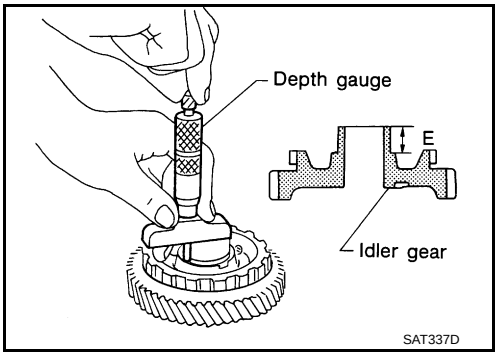
A = D – (B + C)



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.**

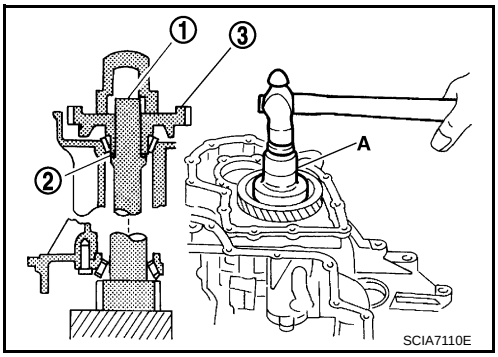
f. Select proper thickness of reduction pinion gear adjusting shim.

Proper shim thickness = A – E – 0.05 mm (0.0020 in)*
(*: Bearing preload)



2. Install reduction pinion gear (1) and reduction pinion gear adjusting shim (2) selected in step 2-e on transaxle case.
CAUTION:
Apply ATF to reduction pinion gear bearing.
3. Press idler gear bearing inner race on idler gear (3). Refer to TM-574, "Output Shaft, Output Gear, Idler Gear, Reduction Pinion Gear and Bearing Retainer".
4. Set Tool (A) on idler gear (3), and press idler gear (3) on reduction pinion gear (1).
CAUTION:
- **Apply ATF to idler gear bearing.**
- **Press idler gear (3) until idler gear (3) fully contacts reduction pinion gear bearing adjusting shim (2).**

Tool number: ST35271000



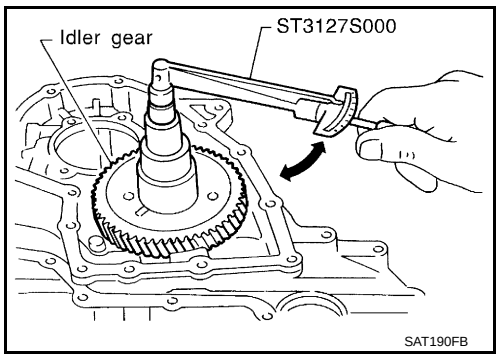
5. Set manual shaft in “P” position to secure idler gear (3).
6. Tighten lock nut of idler gear to the specified torque.
CAUTION:
Lock idler gear with parking pawl when tightening lock nut.

7. Measure turning torque of reduction pinion gear.

Turning torque of reduction pinion gear:

Refer to XX-XX, "***".**

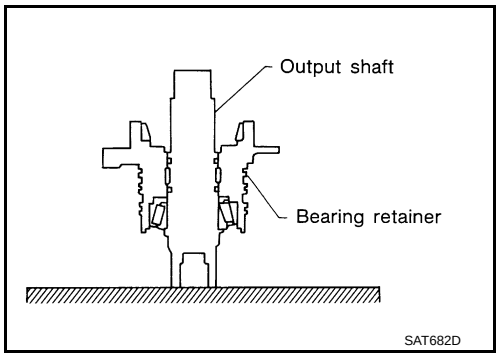
- **When measuring turning torque, turn reduction pinion gear in both directions several times to seat bearing rollers correctly.**
- **If turning torque is out of specification, decrease or increase thickness of reduction pinion gear adjusting shim.**



OUTPUT SHAFT BEARING PRELOAD

1. Select proper thickness of output gear adjusting spacer using the following procedures.

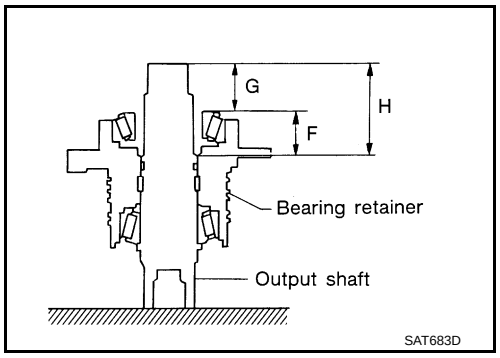
a. Remove paper rolled around output shaft.
b. Install output gear bearing outer race on bearing retainer.
c. Place bearing retainer on output shaft.



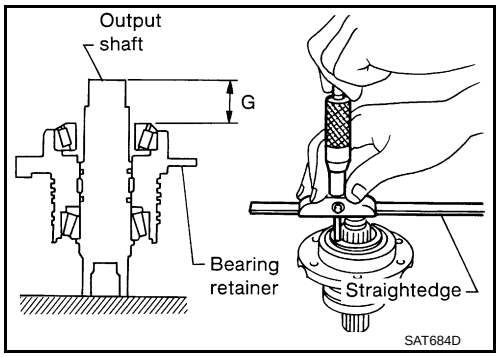
d. Place output gear bearing inner race on bearing retainer.
e. Measure dimensions “G” and “H”, and calculate dimension “F”.

“F”: Distance between the surface of output gear bearing inner race and adjusting spacer mating surface of output shaft.

F = H – G

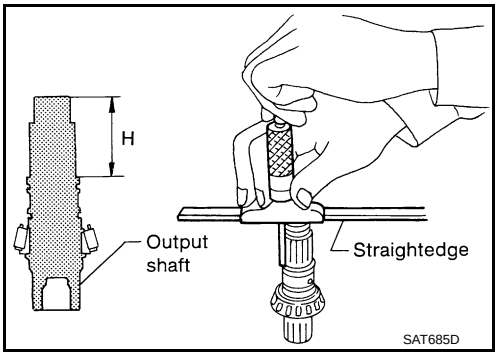


- Measure dimension “G” between end of output shaft and surface of output gear bearing inner race.
- **Measure dimension “G” in at least two places, and take the average.**



- Measure dimension “H” between end of output shaft and adjusting spacer mating surface of output shaft.
- **Measure dimension “H” in at least two places, and take the average.**
- Calculate dimension “F”.

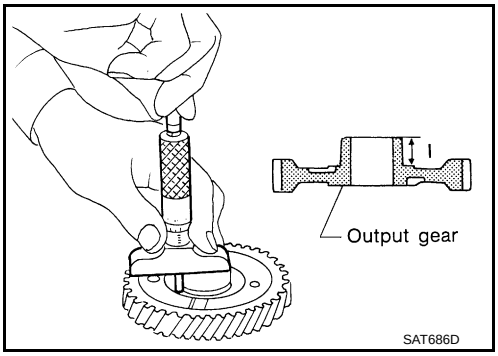
F = H – G



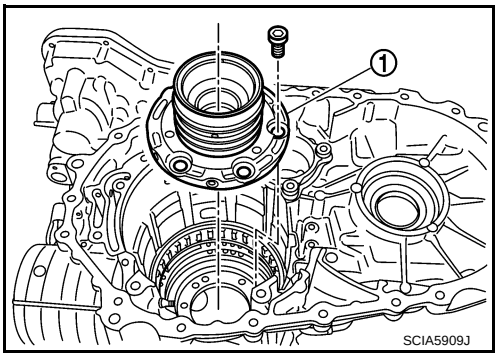
f. Measure dimension “I” between end of output gear (adjusting spacer mating surface) and output gear bearing inner race fitting surface.
- **Measure dimension “I” in at least two places, and take the average.**

g. Select proper thickness of output gear adjusting spacer.

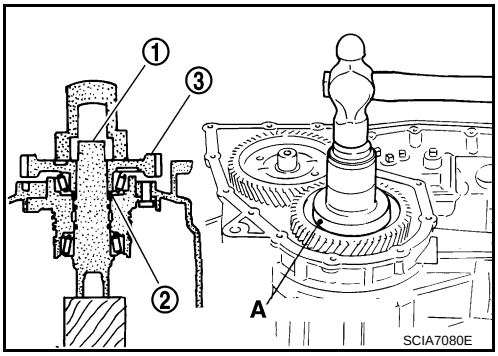
Proper spacer thickness
= F – I – [0.03 – 0.08 mm (0.0012 – 0.0031 in)]*
(*: Bearing preload)



2. Install bearing retainer (1) in transaxle case.
3. Tighten bearing retainer bolts to the specified torque.



4. Install output shaft (1) and output gear adjusting spacer (2) selected in step 1-f on transaxle case.
CAUTION:
- **Apply ATF to output shaft bearing.**
- **Do not force output shaft to install or seal ring may be damaged.**
5. Press output gear bearing inner race on output gear (3).
6. Set Tool (A) on output gear (3), and press output gear (3) on output shaft (1).
CAUTION:
- **Apply ATF to output gear bearing.**
- **Do not pinch seal ring when output shaft is pressed in.**
- **Press output gear (3) until output gear (3) fully contacts output gear adjusting space (2).**

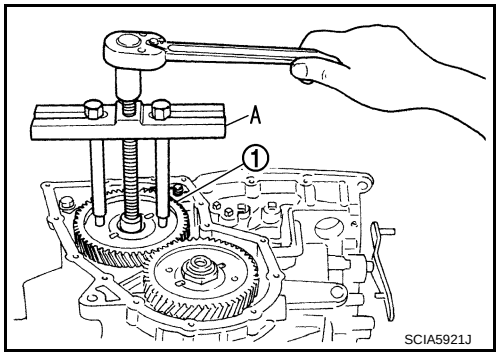


Tool number: ST35271000

7. Set manual shaft in “P” position to secure idler gear.
8. Tighten lock nut of output gear to the specified torque.
CAUTION:
- **Do not reuse lock nut.**
- **Lock idler gear with parking pawl when tightening lock nut.**

9. Remove idler gear (1) using Tool (A) to measure output shaft bearing preload.

Tool number: ST27180001



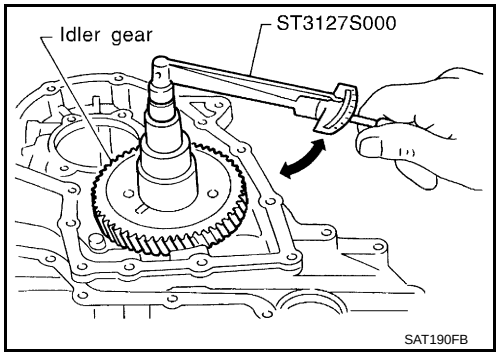
10. Measure turning torque of output shaft.

Turning torque of output shaft:

Refer to TM-323, "Output Shaft".

- **When measuring turning torque, turn output shaft in both directions several times to seat bearing rollers correctly.**
- **If turning torque is out of specification, decrease or increase thickness of output gear adjusting spacer.**

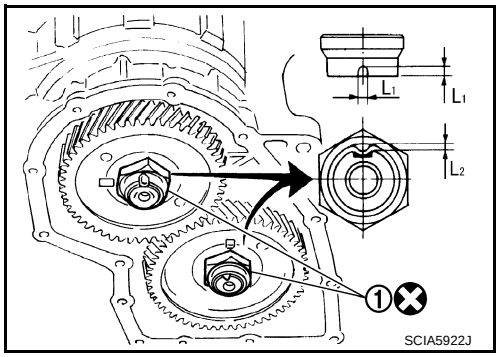
11. Press idler gear on reduction pinion gear.



12. Tighten lock nut (1) of idler gear to the specified torque.
13. After properly adjusting turning torque, clinch lock nuts (1) of idler gear and output gear as shown.

L_1: 3 mm (0.12 in) or more

L_2: 1 mm (0.04 in) or more

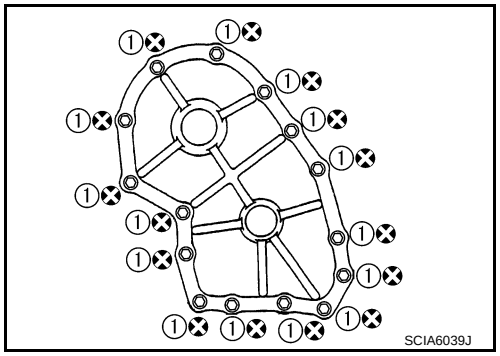


14. Install side cover gasket and side cover on transaxle case.

CAUTION:

- **Do not reuse side cover gasket.**
- **Completely remove all moisture, oil and old gasket, etc. from the transaxle case and side cover mating surfaces.**

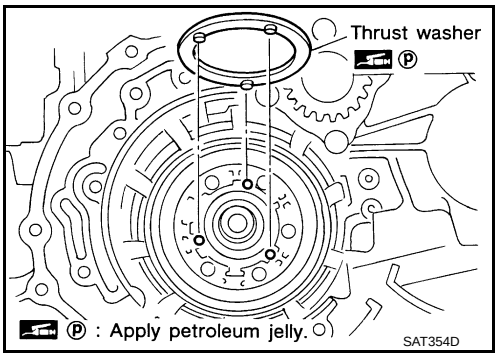
15. Tighten side cover bolts (1) to the specified torque.



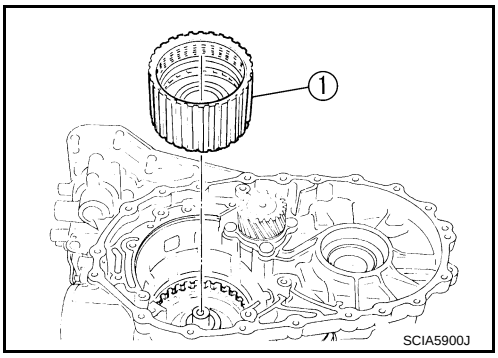
Assembly (2)

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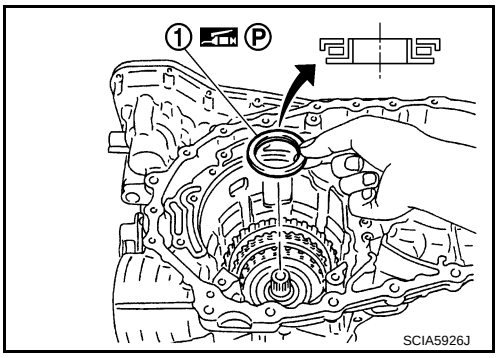
1. Remove paper rolled around bearing retainer.
2. Install thrust washer on bearing retainer.
   CAUTION:
   Align pawls of thrust washer with holes of bearing retainer.



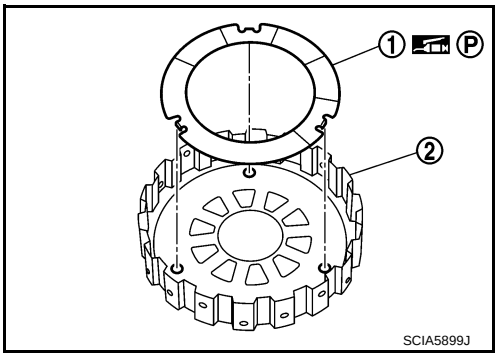
3. Install forward clutch assembly and overrun clutch assembly (1) into transaxle case.
   CAUTION:
   - **Align teeth of low & reverse brake drive plates before installing.**
   - **Make sure that bearing retainer seal rings are not spread.**



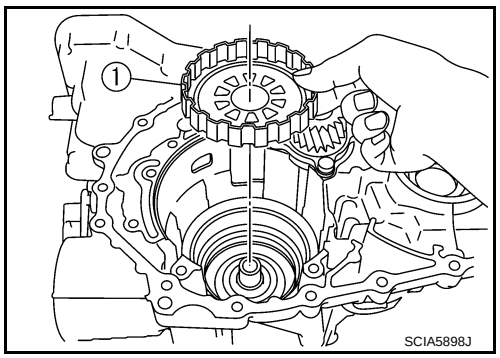
4. Install needle bearing (1) on bearing retainer.
   CAUTION:
   Be careful with the direction of needle bearing.



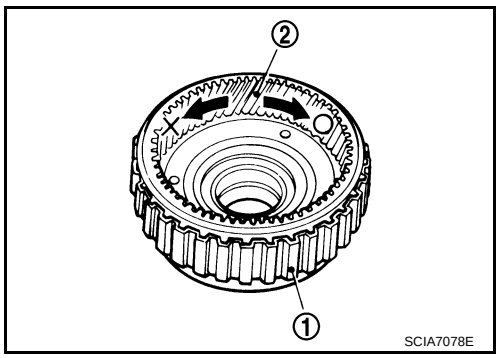
5. Install thrust washer (1) on overrun clutch hub (2).
   CAUTION:
   Align pawls of thrust washer (1) with holes of overrun clutch hub (2).



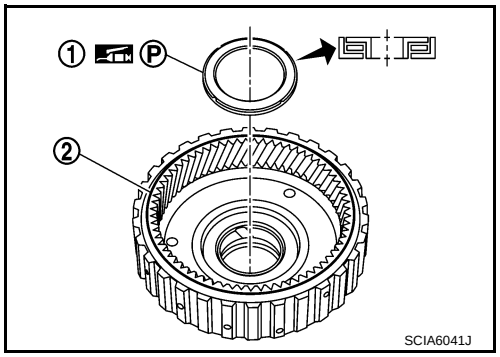
6. Install overrun clutch hub (1) into forward clutch drum.
CAUTION:
Align teeth of overrun clutch drive plates before installing.



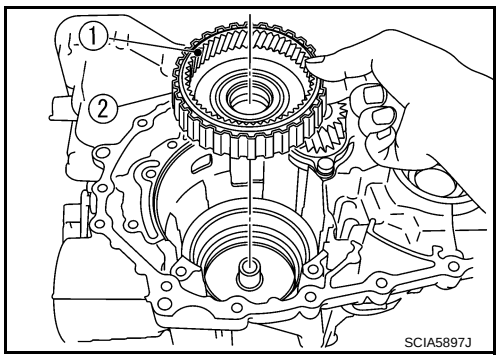
7. Hold forward clutch hub, and check that rear internal gear locks when tried to rotate counterclockwise.
CAUTION:
If rear internal gear rotates counterclockwise, check installation direction of forward one-way clutch.



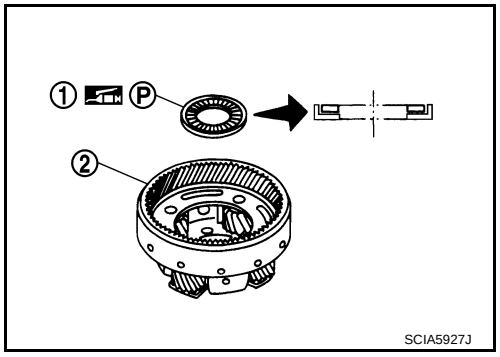
8. Install needle bearing (1) on rear internal gear (2).
CAUTION:
Be careful with the direction of needle bearing (1).



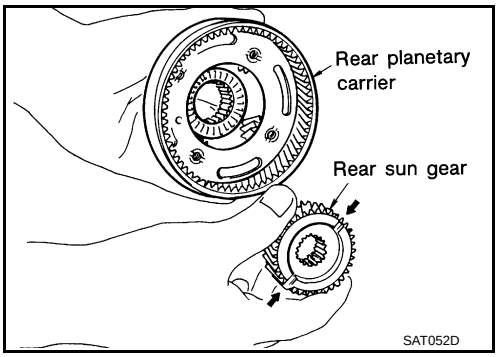
9. Install rear internal gear (1) and forward clutch hub (2) as a set into forward clutch drum.
CAUTION:
Align teeth of forward clutch drive plates before installing.



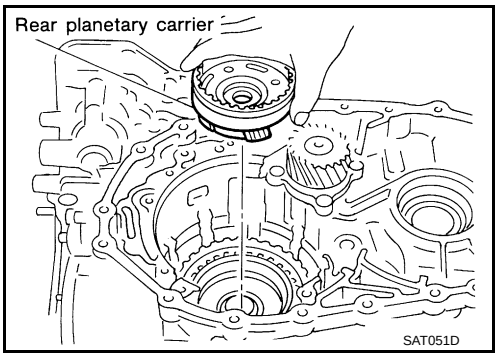
10. Install needle bearing (1) on rear planetary carrier (2).
CAUTION:
Be careful with the direction of needle bearing (1).



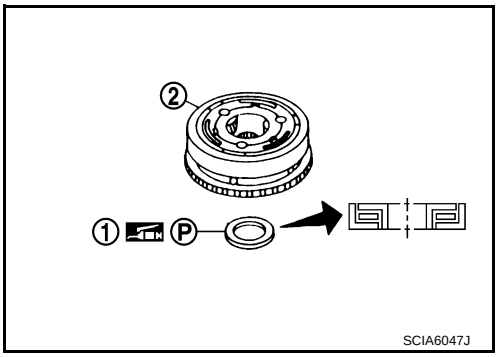
11. Install rear sun gear on rear planetary carrier.
CAUTION:
Be careful with the direction of rear sun gear.



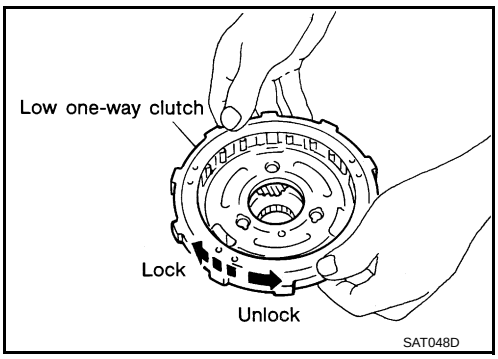
12. Install rear planetary carrier in transaxle case.



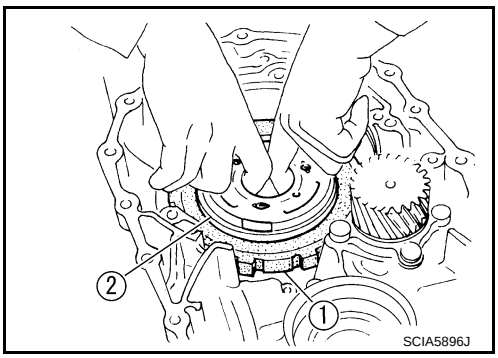
13. Install needle bearing (1) on front planetary carrier (2).
CAUTION:
Be careful with the direction of needle bearing (1).



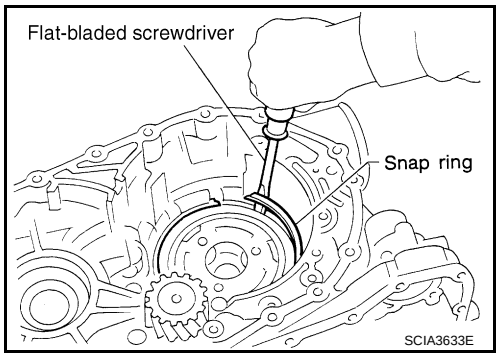
14. Install low one-way clutch to front planetary carrier by turning it in the direction of unlock.
15. Check that low one-way clutch rotates counterclockwise around front planetary carrier. Then try to turn it clockwise and check that it is locked.



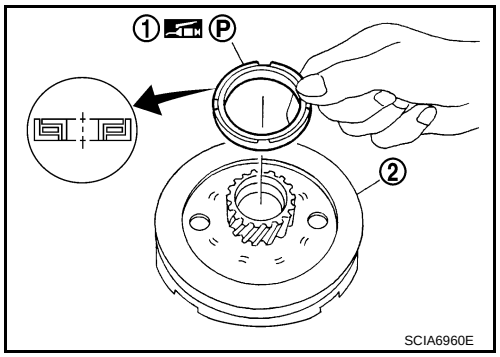
16. Install front planetary carrier (2) and low one-way clutch (1) as a set into transaxle case.



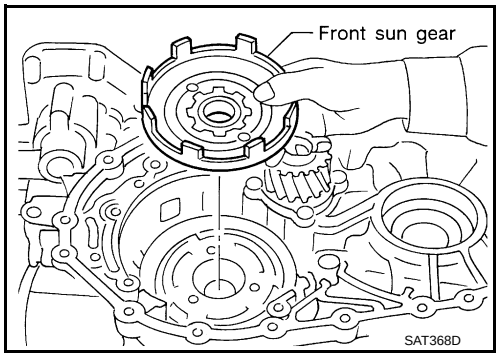
17. Install snap ring into transaxle case using suitable tool.



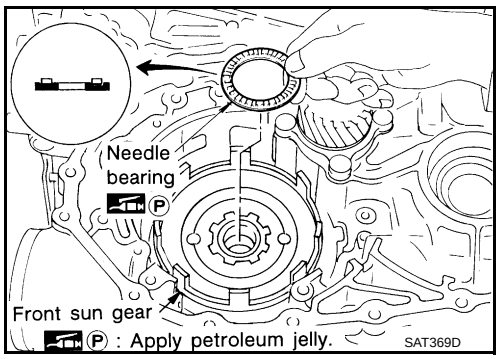
18. Install needle bearing (1) on front sun gear (2).
CAUTION:
Be careful with the direction of needle bearing (1).



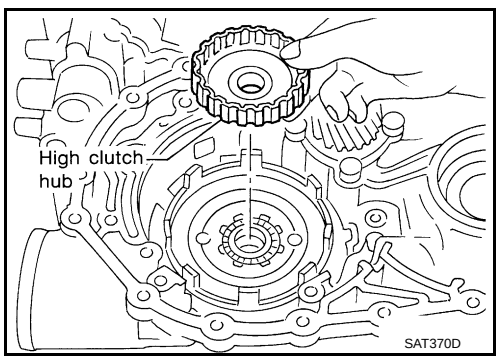
19. Install front sun gear on front planetary carrier.



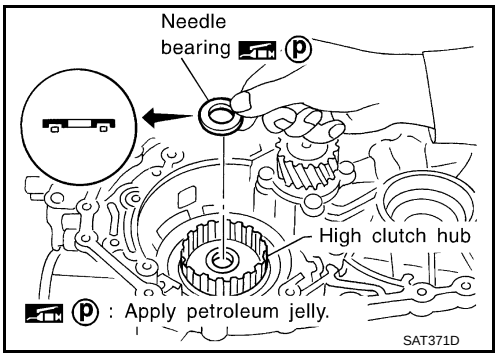
20. Install needle bearing on front sun gear.
CAUTION:
Be careful with the direction of needle bearing.



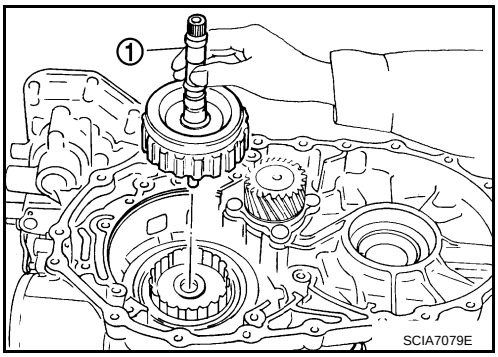
21. Install high clutch hub on front sun gear.



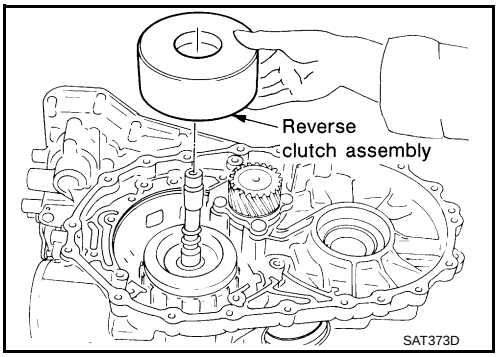
22. Install needle bearing on high clutch hub.
CAUTION:
Be careful with the direction of needle bearing.
23. Remove paper rolled around input shaft assembly (high clutch drum).



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.



Adjustment (2)

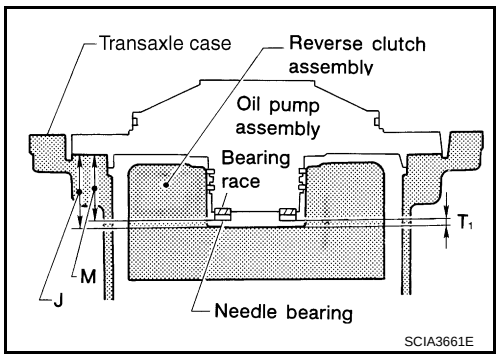
INFOID:0000000001731451

When any parts listed below are replaced, adjust total end play and reverse clutch end play.

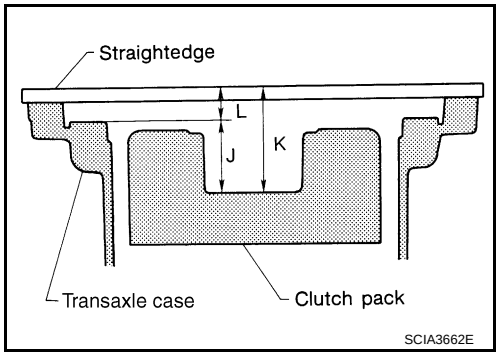
Part name	Total end play	Reverse clutch end play
Transaxle case	●	●
Overrun clutch hub	●	●
Rear internal gear	●	●
Rear planetary carrier	●	●
Rear sun gear	●	●
Front planetary carrier	●	●
Front sun gear	●	●
High clutch hub	●	●
Input shaft assembly (high clutch drum)	●	●
Oil pump cover	●	●
Reverse clutch drum	—	●

TOTAL END PLAY

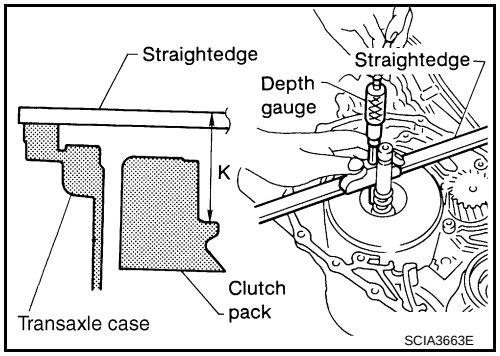
- Measure clearance between reverse clutch drum and needle bearing for oil pump cover.
- Select proper thickness of bearing race so that end play is within specifications.



1. Measure dimensions “K” and “L”, and then calculate dimension “J”.



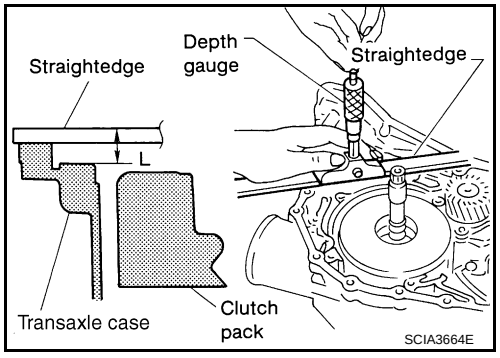
a. Measure dimension “K”.



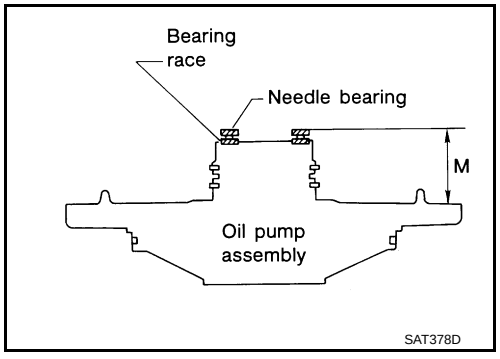
b. Measure dimension “L”.
c. Calculate dimension “J”.

“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



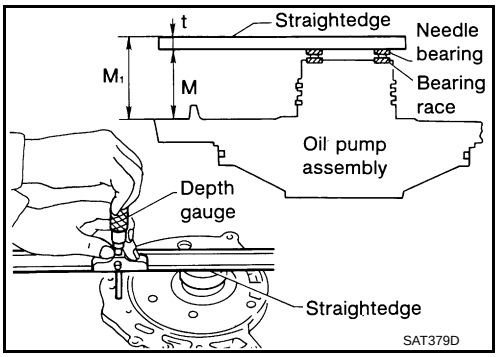
2. Measure dimension “M”.
a. Place bearing race and needle bearing on oil pump assembly.



b. Measure dimension “M”.

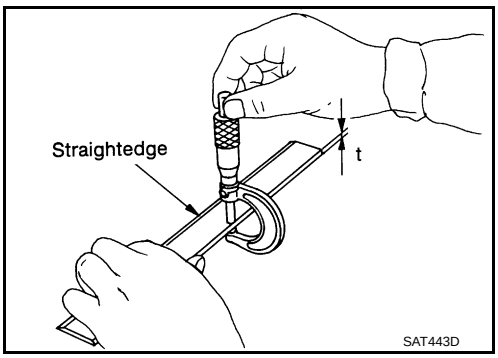
“M”: Distance between transaxle case fitting surface of oil pump cover and needle bearing on oil pump cover.

“M_1”: Indication of gauge



c. Measure thickness of straightedge “t”.

$M = M_1 – t$



3. Adjust total end play “T_1”.

$T_1 = J – M$

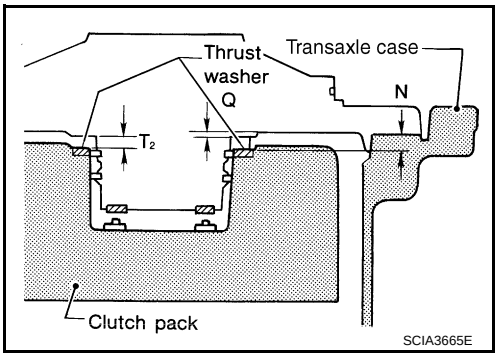
Total end play “T_1”:

Refer to TM-324, "Total End Play".

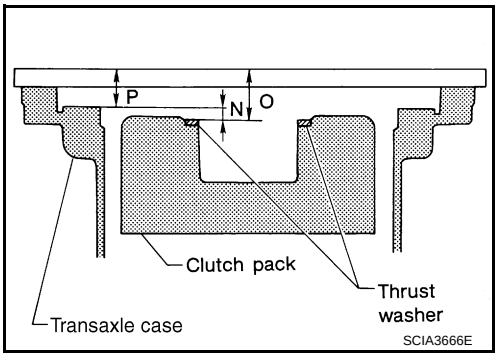
- Select proper thickness of bearing race so that total end play is within specifications.

REVERSE CLUTCH END PLAY

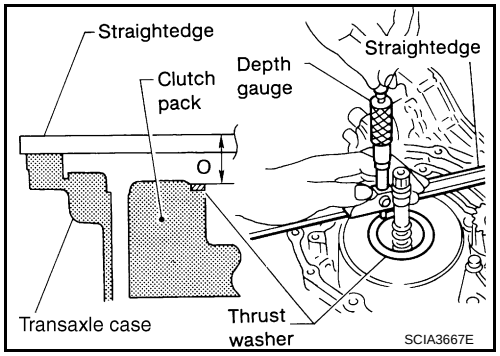
- Measure clearance between oil pump cover and thrust washer for reverse clutch drum.
- Select proper thickness of thrust washer so that end play is within specification.



1. Measure dimensions “O” and “P”, and then calculate dimension “N”.



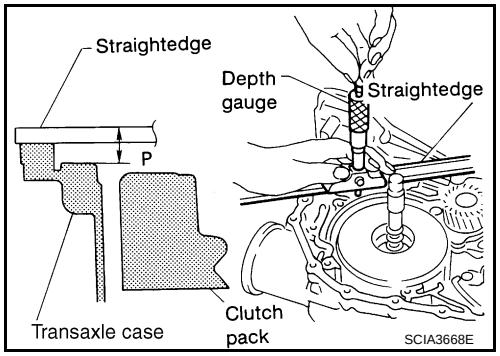
a. Place thrust washer on reverse clutch drum.
b. Measure dimension “O”.



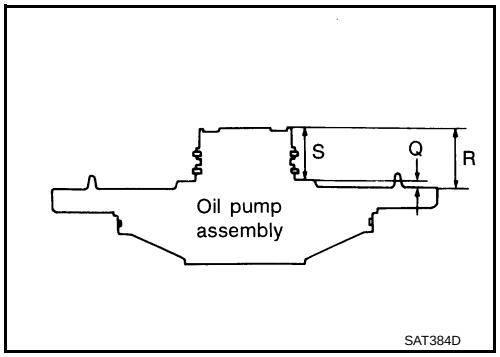
c. Measure dimension “P”.
d. Calculate dimension “N”.

“N”: Distance between oil pump fitting surface of transaxle case and thrust washer on reverse clutch drum.

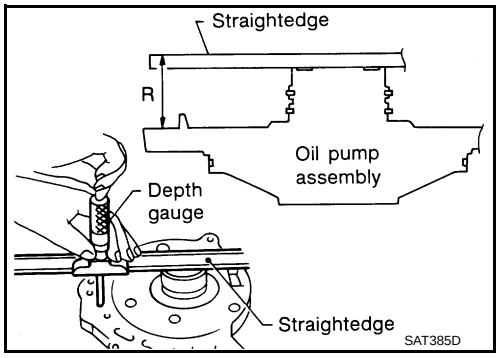
N = O – P



2. Measure dimensions “R” and “S”, and then calculate dimension “Q”.



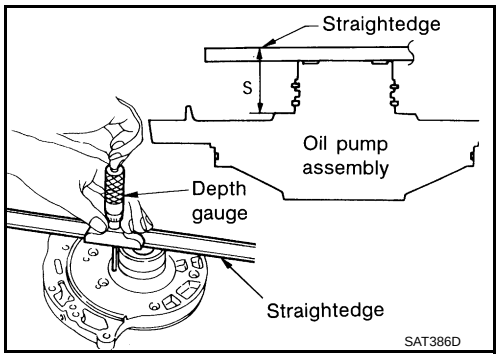
a. Measure dimension “R”.



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 “T_2”.

T_2 = N – Q

Reverse clutch end play:

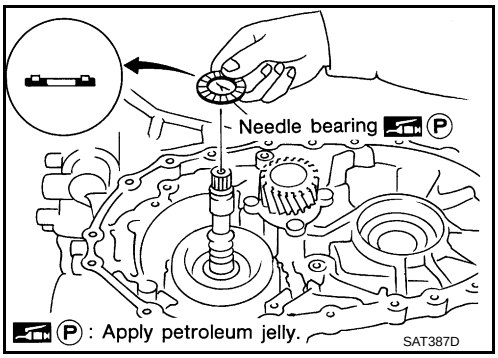
Refer to TM-324, "Reverse Clutch End Play".

- Select proper thickness of thrust washer so that reverse clutch end play is within specifications.

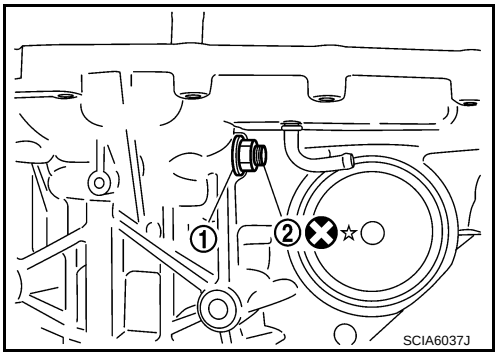
Assembly (3)

INFOID:0000000001731452

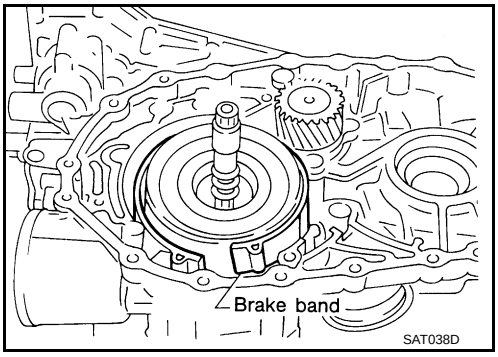
1. Remove reverse clutch assembly.
2. Install needle bearing on input shaft assembly (high clutch drum).
   CAUTION:
   Be careful with the direction of needle bearing.
3. Install reverse clutch assembly.
   CAUTION:
   Align teeth of reverse clutch drive plates before installing.



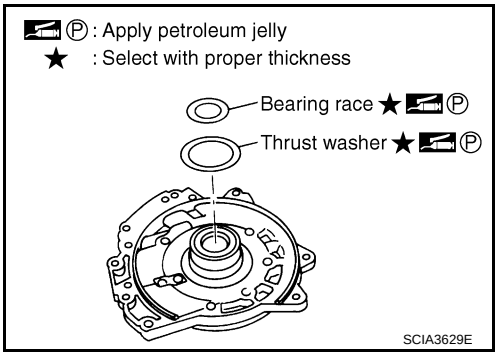
4. Install anchor end pin (2) and lock nut (1) on transaxle case.



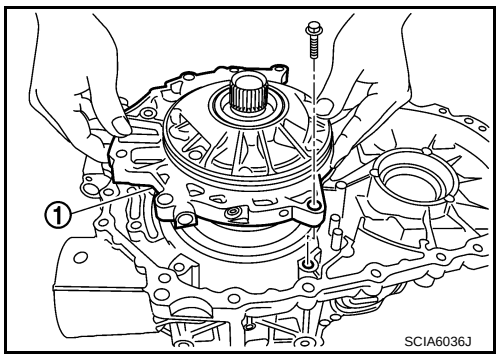
5. Place brake band on outside of reverse clutch drum.
6. Tighten anchor end pin just enough so that brake band is evenly fitted on reverse clutch drum.



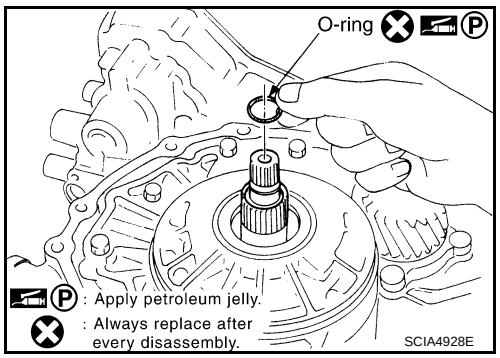
7. Install bearing race selected in total end play adjustment step on oil pump cover.
8. Install thrust washer selected in reverse clutch end play adjustment step on oil pump cover.
9. Install O-ring to oil pump assembly.
   CAUTION:
   - **Do not reuse O-ring.**
   - **Apply ATF to O-ring.**



10. Install oil pump assembly (1) on transaxle case.
11. Tighten oil pump bolts to the specified torque.



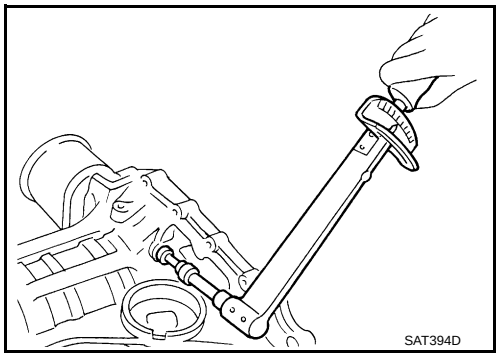
12. Install O-ring to input shaft assembly (high clutch drum).



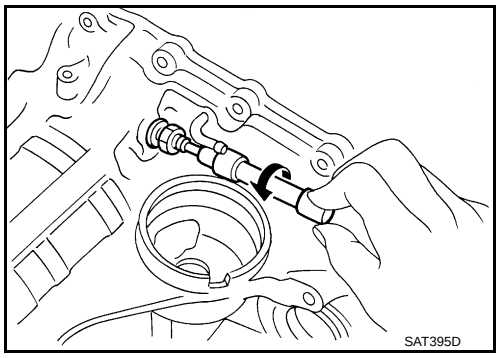
13. Adjust brake band.

a. Tighten anchor end pin to the specified torque.

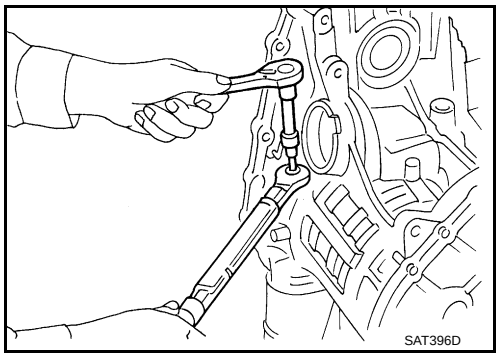
Anchor end pin : 4.9 N·m (0.50 kg-m, 43 in-lb)



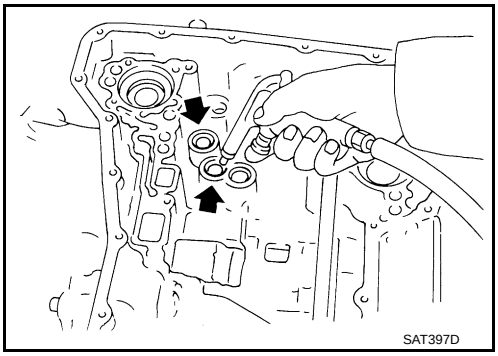
b. Back off anchor end pin two and a half turns.



c. Tighten lock nut while holding anchor end pin.



14. Apply compressed air into oil holes of transaxle case and check operation of brake band.



15. Select proper thickness of differential side bearing adjusting shim using the following procedures.
    - Measure differential side bearing end play, and calculate the adjusting shim thickness so that the end play is within the specifications.

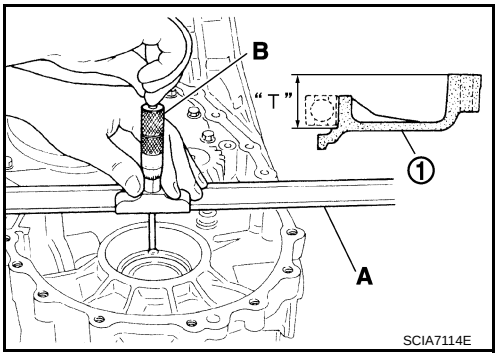
Differential side bearing end play:

Refer to TM-323, "Final Drive".

a. Place a straightedge (A) onto transaxle case (1), and measure the depth “T” of transaxle case (1) to the mating surface for differential side bearing using depth gauge (B).

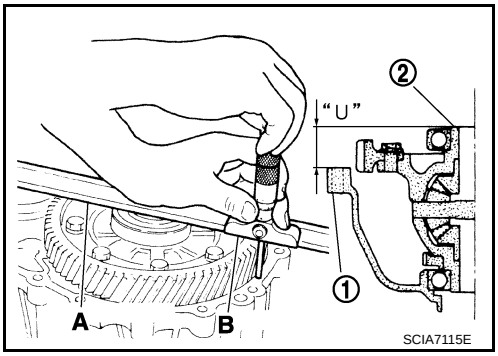
T = (Measurement) - (Straightedge thickness)

- **Measure the depth “T” in at least two places, and take the average.**



b. Install final drive assembly onto converter housing (1).

c. Place a straightedge (A) onto differential case (2), and measure the height “U” to the end of converter housing (1) using depth gauge (B).
   - **Measure the height “U” in at least two places, and take the average.**



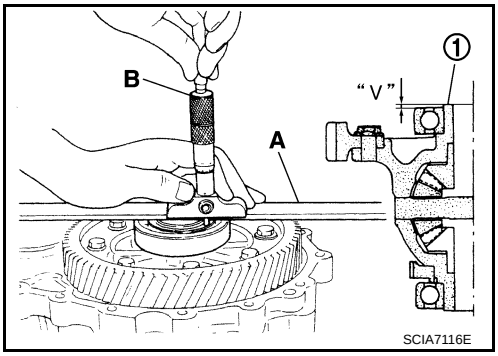
d. Place a straightedge (A) onto differential case (1), and measure the height “V” to the end of differential side bearing outer race using depth gauge (B).
   - **Measure the height “V” in at least two places, and take the average.**

e. Select proper thickness of differential side bearing adjusting shim.

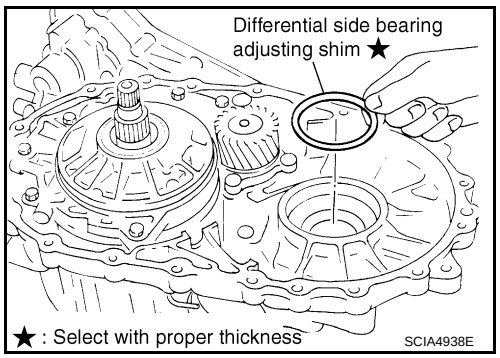
Proper shim thickness

= T - U + V + [0 - 0.15 mm (0 - 0.0059 in)]*

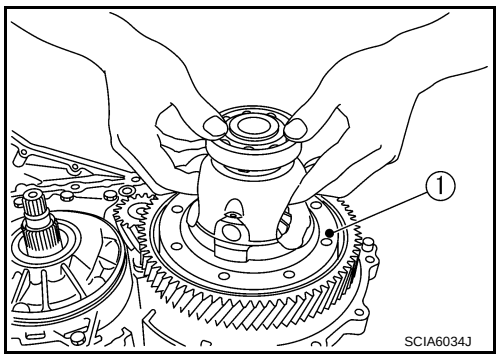
(*: differential side bearing end play)



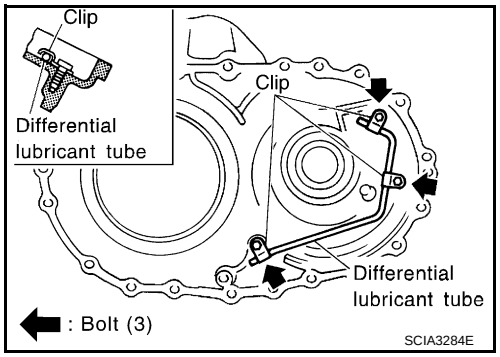
16. Install differential side bearing adjusting shim selected in differential side bearing end play adjustment step on transaxle case.



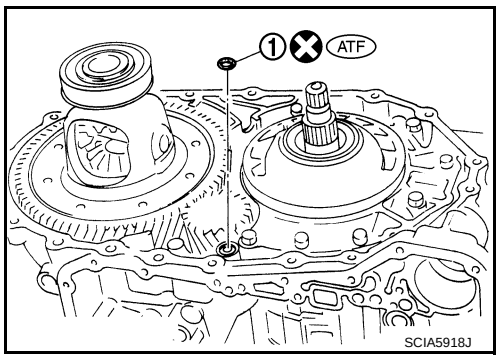
17. Install final drive assembly (1) on transaxle case.



18. Install differential lubricant tube and clips on converter housing.
19. Tighten differential lubricant tube fitting bolts to the specified torque.



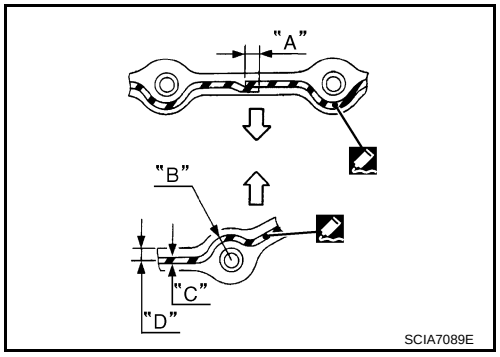
20. Install O-ring (1) on differential oil port of transaxle case as shown.



21. Apply locking sealant (loctite #518) to transaxle case as shown.
⇦: Inside of transaxle case

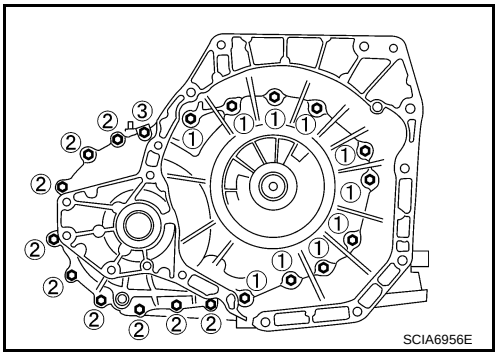
“A” : 3 - 5 mm (0.12 - 0.20 in)
“B” : 8 mm (0.31 in) R
“C” : 1.5 mm (0.059 in) dia.
“D” : 4 mm (0.16 in)

CAUTION:



Completely remove all moisture, oil and old sealant, etc. from the transaxle case and converter housing mating surfaces.

22. Install converter housing on transaxle case.
23. Install bracket on converter housing.
24. Tighten converter housing bolts (1), (2) and (3) to the specified torque.



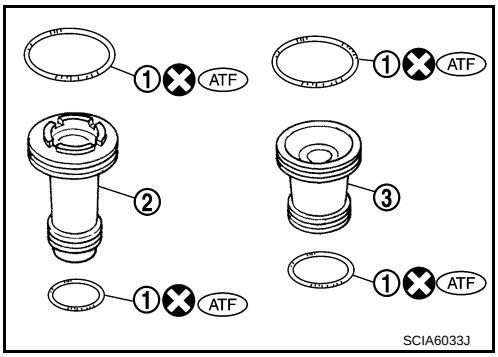
Bolt	1	2	3*
Bolt length [mm (in)]	30 (1.18)	40 (1.57)	
Number of bolts	10	9	1

*: Tighten with bracket.

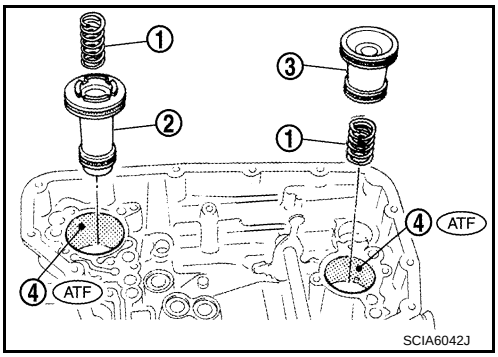
25. Install O-ring to plug.
CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**

26. Install plug to converter housing.
27. Tighten plug fitting bolt to the specified torque.
28. Install accumulator pistons.

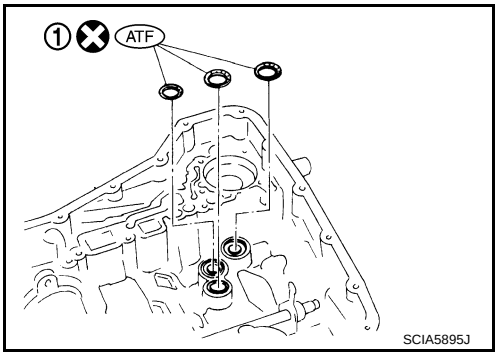
a. Install O-rings (1) on servo release accumulator piston (2) and N-D accumulator piston (3). Refer to TM-321, "Accumulator".



b. Install return springs (1), servo release accumulator piston (2) and N-D accumulator piston (3) into transaxle case (4). Refer to TM-321, "Accumulator".



29. Install lip seals (1) for band servo oil holes on transaxle case.



30. Install control valve assembly on transaxle case.

a. Install O-ring on terminal body.

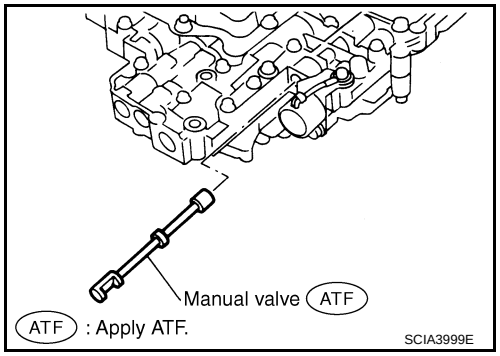
CAUTION:

- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**

b. Insert manual valve into control valve assembly.

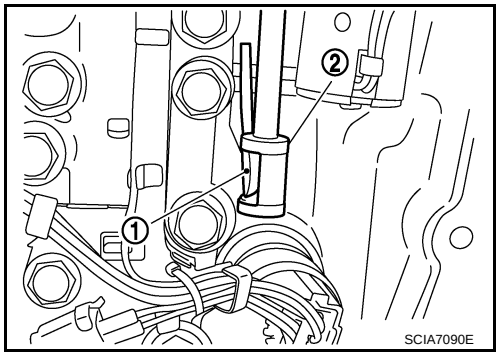
CAUTION:

Do not drop manual valve.



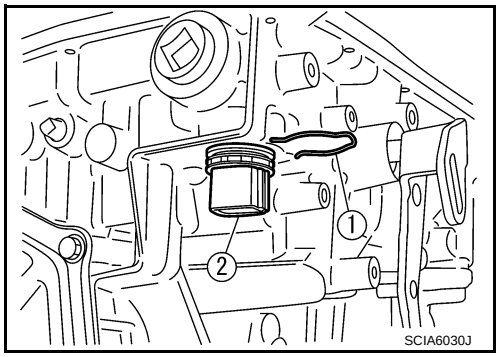
c. Set manual shaft in “N” position.

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.

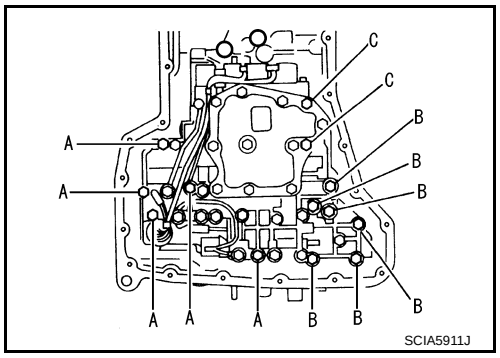
f. Install snap ring (1) to terminal body (2).



g. Tighten bolts (A), (B) and (C) to the specified torque.

Bolt length, number and location:

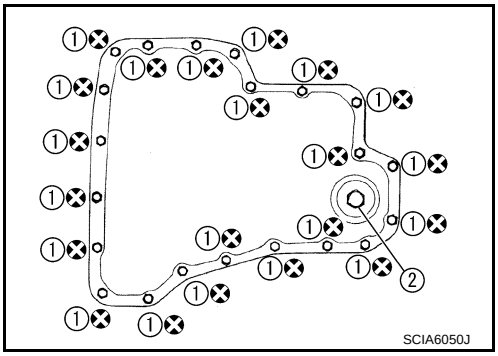
Bolt symbol	A	B	C
Bolt length “ℓ” [mm (in)] 	40.0 mm (1.575 in)	33.0 mm (1.299 in)	43.5 mm (1.713 in)
Number of bolts	5	6	2



31. 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.**



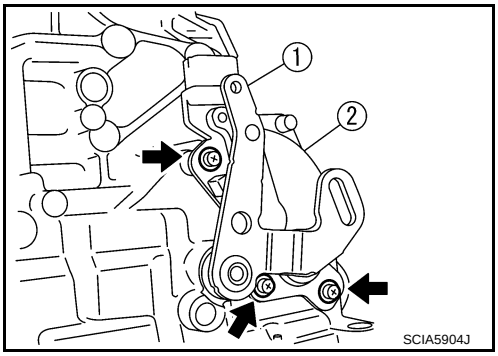
c. Install oil pan on transaxle case.
CAUTION:
Completely remove all moisture, oil and old gasket, etc. from the oil pan gasket mounting surface of oil pan.

d. Tighten oil pan bolts (1) to the specified torque.
CAUTION:
- **Always replace oil pan 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.

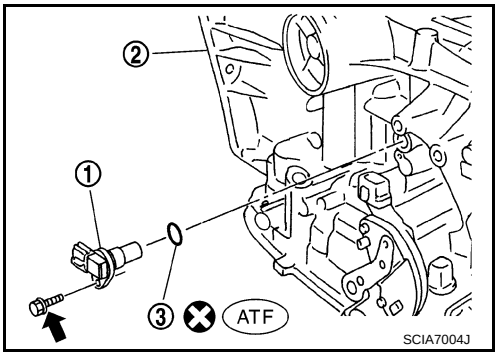
f. Tighten drain plug to the specified torque.

32. Install PNP switch (2) on transaxle case.
⬅: Bolt (3)

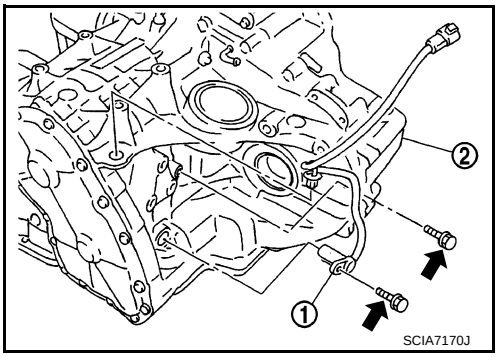


a. Set manual shaft (1) in “P” position.
b. Temporarily install PNP switch (2) on manual shaft (1).
c. Set manual shaft (1) in “N” position.
d. Use a 4 mm (0.16 in) dia. pin for this adjustment.
i. Insert the pin straight into the manual shaft (1) adjustment hole.
ii. Rotate PNP switch (2) until the pin can also be inserted straight into hole in PNP switch (2).
e. Tighten PNP switch fitting bolts to the specified torque.
f. Remove pin from adjustment hole after adjusting PNP switch (2).

33. Install O-ring (3) to turbine revolution sensor (power train revolution sensor) (1).
34. Install turbine revolution sensor (power train revolution sensor) (1) to transaxle case (2).
⬅: Bolt
35. Tighten turbine revolution sensor (power train revolution sensor) bolt to the specified torque.

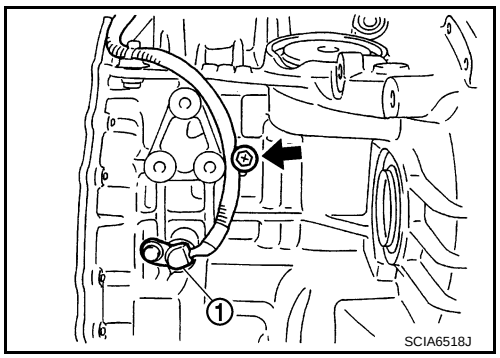


36. Install revolution sensor (1) to transaxle case (2).
37. Tighten revolution sensor bolts to the specified torque.
⬅: Bolt



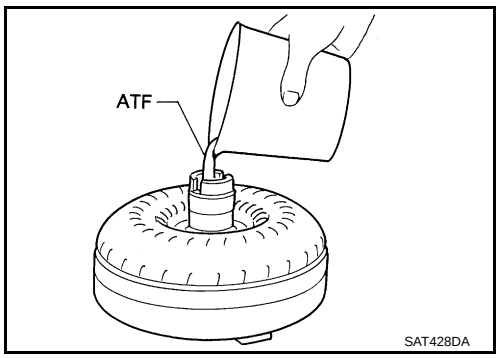
CAUTION:

Ensure revolution sensor harness is firmly secured with bolt.
(1): Revolution sensor
⬅: Bolt

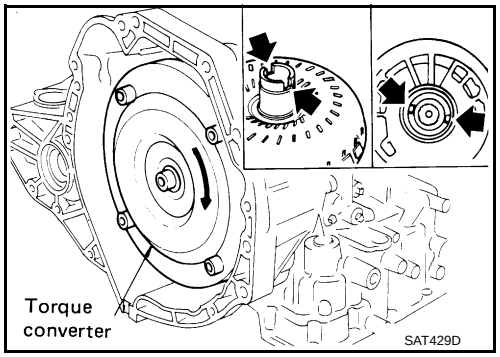


38. Install torque converter.

a. Pour ATF into torque converter.
- **Approximately 1 liter (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.**

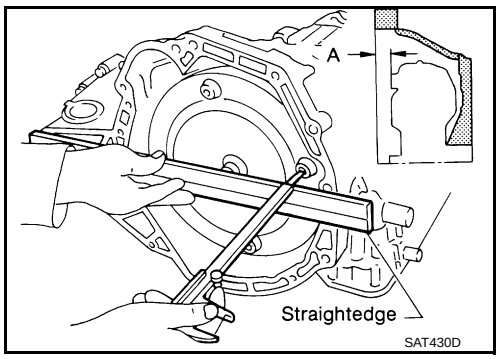


b. Install torque converter while aligning notches of torque converter with notches of oil pump.



c. Measure distance “A” to make sure that torque converter is in proper position.

Distance “A”: 16.2 mm (0.638 in) or more



SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000001731453

Engine		HR16DE
Automatic transaxle model		RE4F03B
Automatic transaxle assembly	Model code number	3CX3C
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 J ATF or equivalent*
Fluid capacity [ℓ (Imp qt)]		7.7 (6-3/4)

*: Refer to MA-19, "Fluids and Lubricants".

Vehicle Speed at Which Gear Shifting Occurs

INFOID:0000000001731454

Throttle position	Vehicle speed km/h (MPH)					
	$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$
Full throttle	51 - 59 (32 - 37)	97 - 105 (60 - 65)	154 - 162 (96 - 101)	150 - 158 (93 - 98)	87 - 95 (54 - 59)	41 - 49 (25 - 30)
Half throttle	31 - 39 (19 - 24)	60 - 68 (37 - 42)	122 - 130 (76 - 81)	63 - 71 (39 - 44)	36 - 44 (22 - 27)	5 - 13 (3 - 8)

- At half throttle, the accelerator opening is 1/2 of the full opening.

Vehicle Speed at When Lock-up Occurs/Releases

INFOID:0000000001731455

Throttle position	Selector lever position	Vehicle speed km/h (MPH)	
		Lock-up ON	Lock-up OFF
2.0/8	“D” position	76 - 84 (47 - 52)	56 - 64 (35 - 40)
	“D” position (OD OFF)	86 - 94 (53 - 58)	83 - 91 (52 - 57)

Stall Speed

INFOID:0000000001731456

Stall revolution (rpm)	2,250 - 2,700

Line Pressure

INFOID:0000000001731457

Engine speed	Line pressure kPa (bar, kg/cm^2, psi)	
	“D”, “2” and “1” positions	“R” position
Idle speed	500 (5.0, 5.1, 73)	778 (7.8, 7.9, 113)
Stall speed	1,159 (11.6, 11.8, 168)	1,804 (18.0, 18.4, 262)

Adjusting shims, Needle Bearings, Thrust Washers and Snap Rings

INFOID:0000000001731458

NOTE:
Refer to XX-XX, "*****" or XX-XX, "*****".

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	58.99 (2.3224)	42.1 (1.657)

OUTER DIAMETER AND INNER DIAMETER OF THRUST WASHERS

Unit: mm (in)

Location	Outer diameter	Inner diameter
I	72.0 (2.835)	55.5 (2.185)
J, K	82.0 (3.228)	59.0 (2.323)
L	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
M	48.0 (1.890)	33.0 (1.299)
N	29.0 (1.142)	25.0 (0.984)
O	34.3 (1.350)	26.1 (1.028)
P	79.5 (3.130)	72.0 (2.835)

OUTER DIAMETER OF SNAP RINGS

Unit: mm (in)

Location	Outer diameter
1	142.0 (5.59)
2	
3	162.3 (6.39)
4	
5	
7	113.0 (4.45)
8	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)

Control Valves

INFOID:0000000001731459

CONTROL VALVE SPRINGS

Unit: mm (in)

Location		spring designation	Free length (l)	Outer diameter (D)
Upper body	L14	Pilot valve spring	38.98 (1.5346)	8.9 (0.350)
	L15	1–2 accumulator valve spring	20.5 (0.807)	6.95 (0.2737)
		1–2 accumulator piston spring	55.66 (2.1913)	19.5 (0.768)
	L16	1st reducing valve spring	27.0 (1.063)	7.0 (0.276)
	L17	3–2 timing valve spring	23.0 (0.906)	6.65 (0.2618)
	L18	Overrun clutch reducing valve spring	37.5 (1.476)	7.0 (0.276)
	L19	Torque converter relief valve spring	33.3 (1.311)	9.0 (0.354)
	L20	Torque converter clutch control valve spring	53.01 (2.0870)	6.5 (0.256)
	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

INFOID:0000000001731460

RETURN SPRINGS

Unit: mm (in)

Location	Free length (L_1)
Servo release accumulator	62.8 (2.472)

Unit: mm (in)

Location	Length (L_2)
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

INFOID:0000000001731461

REVERSE CLUTCH

Number of drive plates		2
Number of driven plates		2
Drive plate thickness [mm (in)]	Standard	2.0 (0.079)
	Allowable limit	1.8 (0.070)

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)

HIGH CLUTCH

Number of drive plates		3	
Number of driven plates		6 (1*1 + 5*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
		1.5 (0.059)	2.0 (0.079)
Clearance [mm (in)]	Standard	1.4 - 1.8 (0.055 - 0.070)	
	Allowable limit	2.4 (0.094)	

FORWARD CLUTCH

Number of drive plates		5
Number of driven plates		5
Drive plate thickness [mm (in)]	Standard	1.8 (0.070)
	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		4
Number of driven plates		4
Drive plate thickness [mm (in)]	Standard	2.0 (0.079)
	Allowable limit	1.8 (0.070)
Driven plate thickness [mm (in)]	Standard	2.0 (0.079)
Clearance [mm (in)]	Standard	1.4 - 1.8 (0.055 - 0.070)
	Allowable limit	2.6 (0.102)

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)

Final Drive

INFOID:0000000001731462

DIFFERENTIAL SIDE GEAR CLEARANCE

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

DIFFERENTIAL SIDE BEARING END PLAY

Differential side bearing end play [mm (in)]	0 - 0.15 (0 - 0.0059)

Planetary Carrier

INFOID:0000000001731463

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

INFOID:0000000001731464

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

INFOID:0000000001731465

SEAL RING CLEARANCE

Input shaft seal ring clearance [mm (in)]	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.098)

SEAL RING

Unit: mm (in)

Outer diameter	Inner diameter	Width
24 (0.94)	20.4 (0.803)	1.97 (0.0776)

Reduction Pinion Gear

INFOID:0000000001731466

TURNING TORQUE

Turning torque of reduction pinion gear [N·m (kg-m, in-lb)]	0.11 - 0.69 (0.02 - 0.07, 1 - 6)

Band Servo

INFOID:0000000001731467

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

INFOID:0000000001731468

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)

TURNING TORQUE

Turning torque of output shaft [N·m (kg-m, in-lb)]	0.25 - 0.88 (0.03 - 0.08, 3 - 7)

Bearing Retainer

INFOID:0000000001731469

SEAL RING CLEARANCE

Bearing retainer seal ring clearance [mm (in)]	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

Total End Play

INFOID:0000000001731470

Total end play [mm (in)]	0.25 - 0.55 (0.0098 - 0.0217)

Reverse Clutch End Play

INFOID:0000000001731471

Reverse clutch end play [mm (in)]	0.65 - 1.0 (0.0256 - 0.039)

Removal and Installation

INFOID:0000000001731472

Distance between end of converter housing and torque converter [mm (in)]	16.2 (0.638)

Shift Solenoid Valves

INFOID:0000000001731473

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

INFOID:0000000001731474

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

INFOID:0000000001731475

Remarks: Specification data are reference values.

Condition	Specification (Approx.)	
Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	1.5V ↓ 0.5V	2.5 kΩ ↓ 0.3 kΩ

Revolution Sensor

INFOID:0000000001731476

Condition	Judgement standard
When driving at 20 km/h (12 MPH)	150 Hz (Approx.)

Dropping Resistor

INFOID:0000000001731477

Resistance	12Ω (Approx.)

Turbine Revolution Sensor (Power Train Revolution Sensor)

INFOID:0000000001731478

Condition	Judgement standard
When driving at 20 km/h (12 MPH)	360 Hz (Approx.)

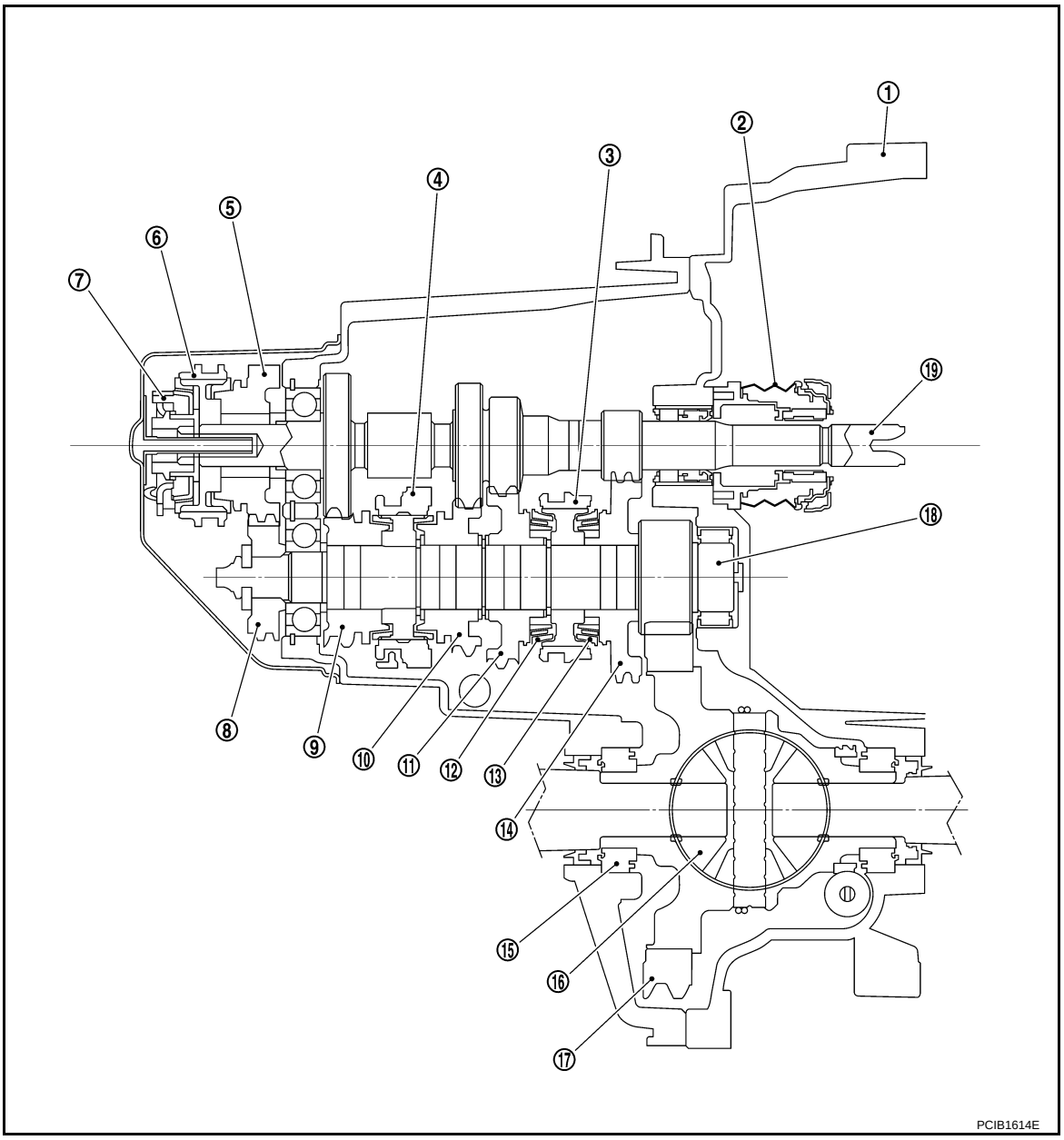
FUNCTION DIAGNOSIS

M/T SYSTEM

System Diagram

INFOID:0000000001381671

CROSS-SECTIONAL VIEW



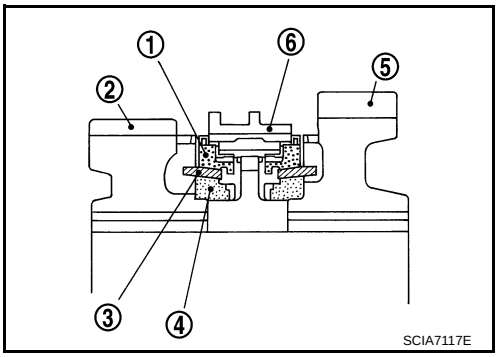
1. Clutch housing
2. CSC (Concentric Slave Cylinder)
3. 1st-2nd synchronizer assembly
4. 3rd-4th synchronizer assembly
5. 5th input gear
6. 5th-reverse synchronizer assembly
7. Reverse synchronizer cone
8. 5th main gear
9. 4th main gear
10. 3rd main gear
11. 2nd main gear
12. 2nd double cone synchronizer
13. 1st double cone synchronizer
14. 1st main gear
15. Differential side bearing
16. Differential assembly
17. Final gear
18. Mainshaft
19. Input shaft

System Description

INFOID:0000000001381672

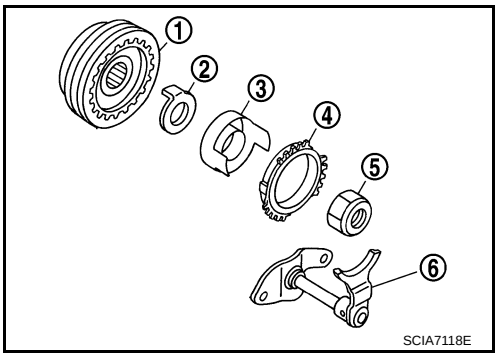
DOUBLE-CONE SYNCHRONIZER

Double-cone synchronizer is adopted for 1st and 2nd gears to reduce operating force of the shift lever.
(1): Outer baulk ring
(2): 2nd main gear
(3): Synchronizer cone
(4): Inner baulk ring
(5): 1st main gear
(6): 1st-2nd coupling sleeve



REVERSE GEAR NOISE PREVENTION FUNCTION (SYNCHRONIZING METHOD)

5th-reverse synchronizer hub assembly consists of reverse baulk ring, reverse synchronizer cone and reverse gear gate assembly. When the lever is shifted to the reverse position, the construction allows smooth shift operation by stopping the input shaft rotation by frictional force of synchronizer.
(1): 5th-reverse synchronizer hub assembly
(2): Lock washer
(3): Reverse synchronizer cone
(4): Reverse baulk ring
(5): Input shaft nut
(6): Reverse gear gate assembly



COMPONENT DIAGNOSIS

POSITION SWITCH

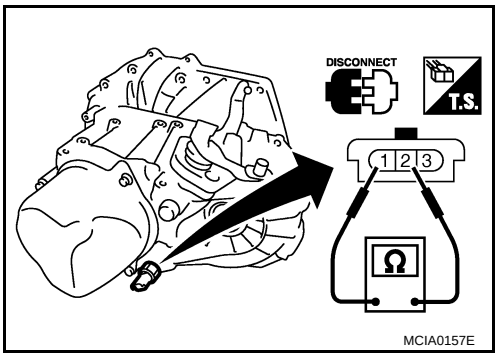
BACK-UP LAMP SWITCH

BACK-UP LAMP SWITCH : Component Parts Location

INFOID:0000000001381673

- Check continuity between terminals 1 and 2.

Gear position	Continuity
Reverse	Yes
Except reverse	No



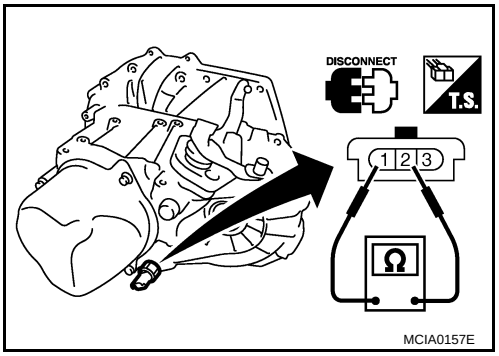
BACK-UP LAMP SWITCH : Component Inspection

INFOID:0000000001381674

1.CHECK BACK-UP LAMP SWITCH

Check continuity between terminals 1 and 2.

Gear position	Continuity
Reverse	Yes
Except reverse	No



Is the inspection result normal?

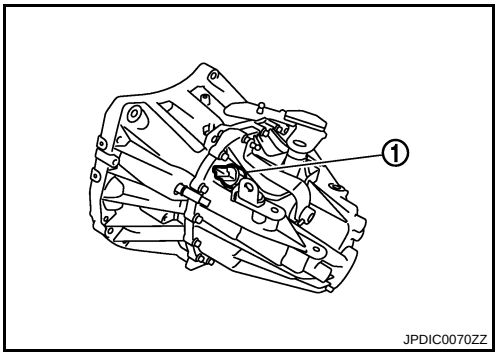
YES >> INSPECTION END
NO >> Replace position switch. Refer to TM-635, "Exploded View".

PARK/NEUTRAL POSITION (PNP) SWITCH

PARK/NEUTRAL POSITION (PNP) SWITCH : Component Parts Location

INFOID:0000000001381675

1 : Position switch



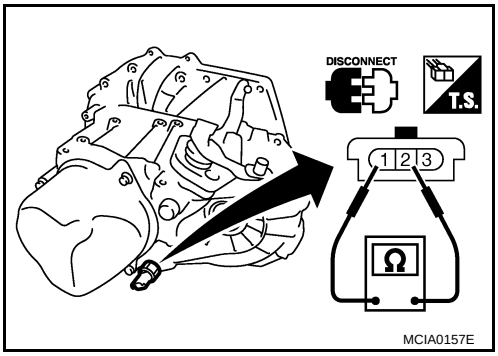
PARK/NEUTRAL POSITION (PNP) SWITCH : Component Inspection

INFOID:0000000001381676

1.CHECK PARK/NEUTRAL POSITION (PNP) SWITCH

Check continuity between terminals 2 and 3.

Gear position	Continuity
Neutral	Yes
Except neutral	No



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace position switch. Refer to TM-635, "Exploded View".

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000001381677

Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

Reference page		TM-635			TM-635			TM-630	TM-635	TM-635				
SUSPECTED PARTS (Possible cause)		OIL (Oil level is low.)	OIL (Wrong oil.)	OIL (Oil level is high.)	GASKET (Damaged)	OIL SEAL (Worn or damaged)	O-RING (Worn or damaged)	SHIFT CONTROL LINKAGE (Worn)	SHIFT FORK (Worn)	GEAR (Worn or damaged)	BEARING (Worn or damaged)	BAULK RING (Worn or damaged)	INSERT SPRING (Damaged)
Symptoms	Noise	1	2							3	3		
	Oil leakage		3	1	2	2	2						
	Hard to shift or will not shift		1	1				2				3	3
	Jumps out of gear							1	2	2			

PRECAUTION

PRECAUTIONS

Service Notice or Precautions for Manual Transaxle

INFOID:0000000001381678

CAUTION:

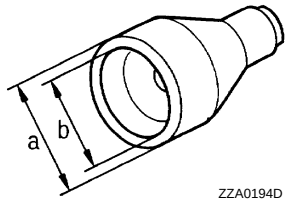
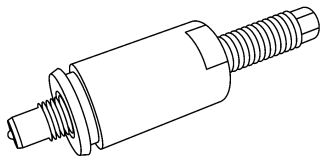
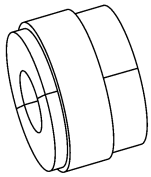
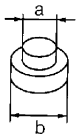
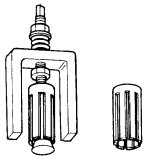
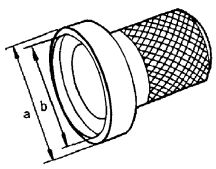
- **If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.**
- **Never reuse transaxle gear oil, once it has been drained.**
- **Check oil level or replace gear oil with vehicle on level surface.**
- **During removal or installation, keep inside of transaxle clear of dust or dirt.**
- **Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts they are applied.**
- **In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, use it.**
- **Never damage sliding surfaces and mating surfaces.**

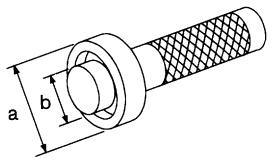
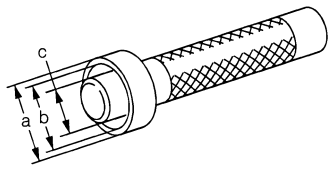
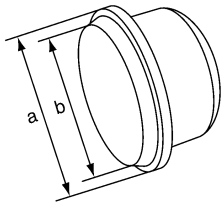
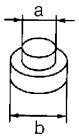
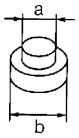
PREPARATION

PREPARATION

Special Service Tools

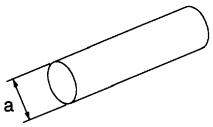
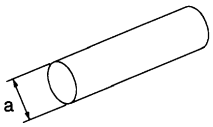
INFOID:0000000001381679

Tool number Tool name	Description
ST27862000 Drift a: 62.5 mm (2.461in) dia. b: 49 mm (1.93 in) dia.  ZZA0194D	Installing differential side oil seal
KV32300QAC (Renault SST: B.Vi.22-01) Puller  SCIA1781J	Removing 5th main gear
KV32300QAD (Renault SST: B.Vi.1000-01) Puller  SCIA1782J	Removing 5th main gear
ST35300000 Drift a: 45 mm (1.77 in) dia. b: 59 mm (2.32 in) dia.  ZZA0969D	• Removing input shaft rear bearing • Installing input shaft rear bearing • Removing mainshaft rear bearing • Installing mainshaft rear bearing
KV111038S0 Valve seat remover  ZZA0872D	Removing mainshaft front bearing
ST33061000 Drift a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.  ZZA0814D	Installing mainshaft front bearing

Tool number Tool name		Description
KV40100900 Drift a: 52 mm (2.05 in) dia. b: 39.5 mm (1.555 in) dia.	 NT084	Installing input shaft front bearing
ST33220000 Drift a: 32 mm (1.26 in) dia. b: 31.5 mm (1.240 in) dia. c: 21 mm (0.83 in) dia.	 ZZA1046D	Installing input shaft oil seal
KV32300QA (Renault SST: B.Vi.1554) Drift a: 65 mm (2.56 in) dia. b: 63 mm (2.48 in) dia.	 SCIA1783J	Installing differential side bearing outer race
ST33052000 Drift a: 22 mm (0.87 in) dia. b: 28 mm (1.10 in) dia.	 ZZA0969D	Removing differential side bearing
KV40104920 Drift a: 21.7 mm (0.854 in) dia. b: 44.7 mm (1.760 in) dia.	 ZZA0969D	Installing differential side bearing

Commercial Service Tools

INFOID:0000000001381680

Tool name	Description
Drift a: 38 mm (1.50 in) dia.  S-NT063	• Removing input shaft oil seal • Removing input shaft front bearing
Drift a: 14.5 mm (0.571 in) dia.  S-NT063	Installing bushing

ON-VEHICLE MAINTENANCE

GEAR OIL

Exploded View

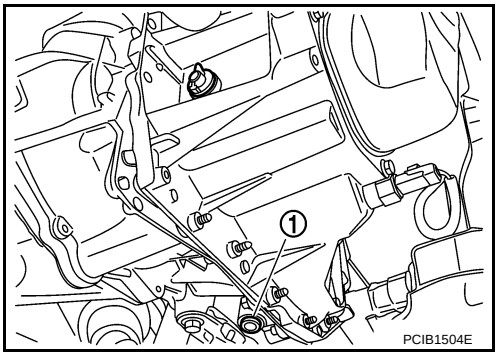
INFOID:0000000001381681

Refer to TM-635, "Exploded View".

Draining

INFOID:0000000001381682

1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug (1) and drain oil.
3. Set a new gasket on drain plug (1) and install it to transaxle and tighten drain plug to the specified torque. Refer to TM-635, "Exploded View".
   CAUTION:
   Do not reuse gasket.



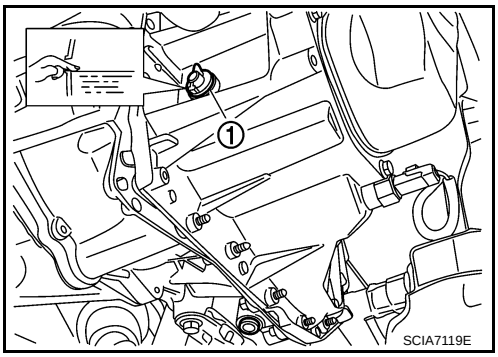
Refilling

INFOID:0000000001381683

1. Remove filler plug (1). Fill with new oil until oil level reaches the specified limit near filler plug hole as shown.

   Oil grade and capacity : Refer to MA-19, "Fluids and Lubricants".

2. After refilling oil, check oil level.
3. Set a new gasket on filler plug (1), then install it to transaxle and tighten to the specified torque. Refer to TM-635, "Exploded View".
   CAUTION:
   Do not reuse gasket.



Inspection

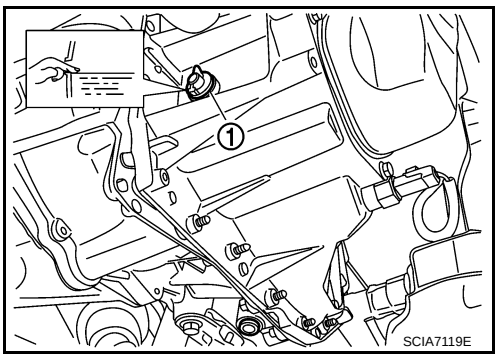
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LEAKAGE

Make sure that oil is not leaking from transaxle or around it.

LEVEL

1. Remove filler plug (1) and check oil level at filler plug hole as shown.
   CAUTION:
   Do not start engine while checking oil level.
2. Set a new gasket on filler plug (1) and install it to the transaxle case.
   CAUTION:
   Do not reuse gasket.
3. Tighten filler plug to the specified torque. Refer to TM-635, "Exploded View".



ON-VEHICLE REPAIR

SIDE OIL SEAL

Exploded View

INFOID:0000000001381685

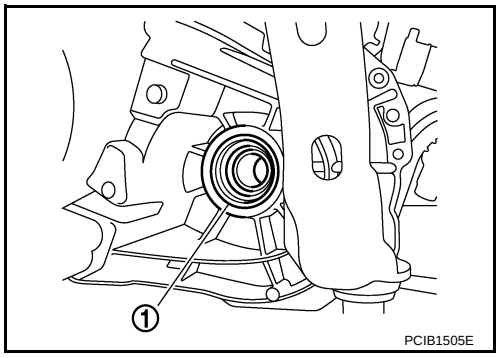
Refer to TM-635, "Exploded View".

Removal and Installation

INFOID:0000000001381686

REMOVAL

1. Remove front drive shafts from transaxle assembly. Refer to XX-XX, "*****".
2. Remove differential side oil seal (1) using suitable tool.
   CAUTION:
   Do not damage transaxle case and clutch housing.



INSTALLATION

Installation is in the reverse order of removal.

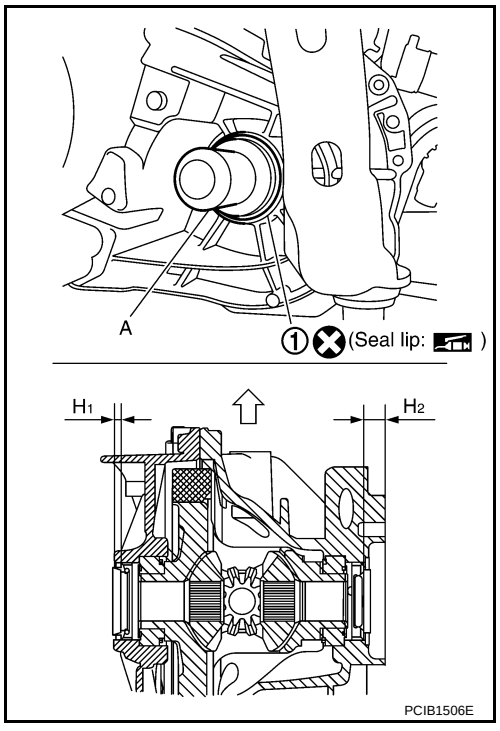
- ⇐: Front
- Install new differential side oil seal (1) to clutch housing and transaxle case using Tool (A).

Tool number : ST27862000 (—)

Dimension "H_1" : 5.7 - 6.3 mm (0.224 - 0.248 in)
Dimension "H_2" : 16.4 - 17.0 mm (0.646 - 0.669 in)

CAUTION:
- **Do not reuse differential side oil seal.**
- **When installing, do not incline differential side oil seal.**
- **Do not damage clutch housing or transaxle case.**

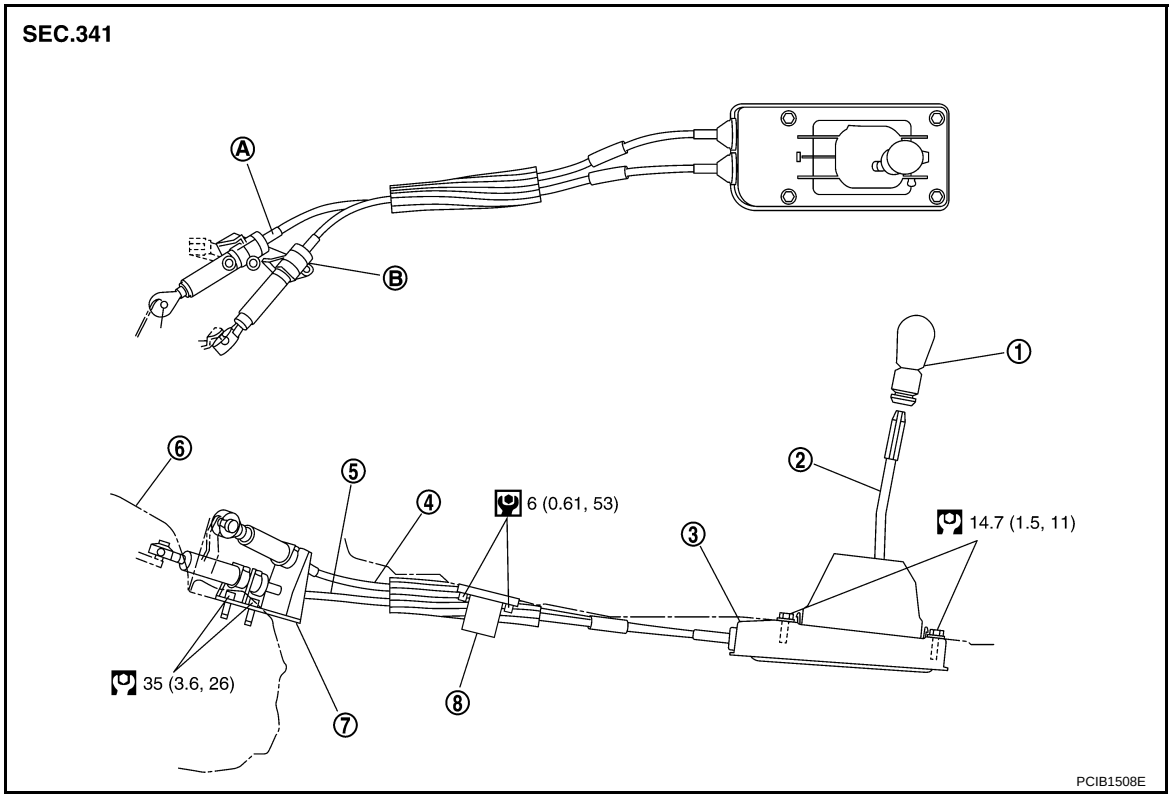
- Check oil level after installation. Refer to TM-628, "Inspection".



CONTROL LINKAGE

Exploded View

INFOID:0000000001381687



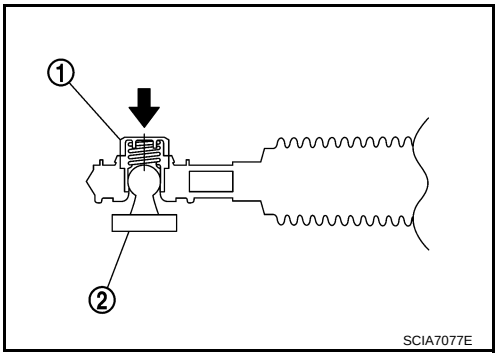
1. Control lever knob
2. Control lever
3. Control device assembly
4. Select cable
5. Shift cable
6. Clutch housing
7. Cable mounting bracket
8. Bracket
A: Black color
B: White color

Removal and Installation

INFOID:0000000001381688

REMOVAL

1. Remove battery. Refer to PG-6, "Removal and Installation".
2. Remove air duct (Inlet), air duct and air cleaner case. Refer to EM-27, "Removal and Installation".
3. Press the release button (1) of select cable and shift cable, and then remove select cable and shift cable from lever of control shaft (2).
4. Shift control lever to neutral position.
5. Remove control lever knob.
6. Remove center console assembly. Refer to IP-11, "Removal and Installation".
7. Remove control device assembly mounting bolts.
8. Remove exhaust front tube, center muffler and heat plate. Refer to EX-5, "Removal and Installation".
9. Remove bracket.
10. Remove select cable and shift cable from cable mounting bracket.
11. Remove control device assembly from the vehicle.

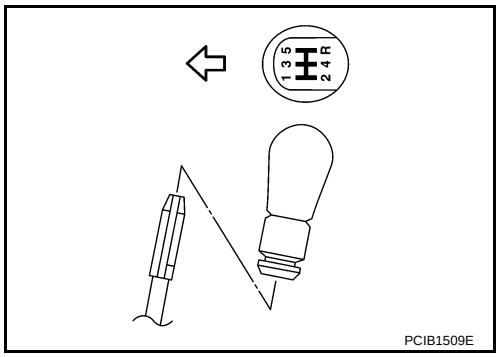


INSTALLATION

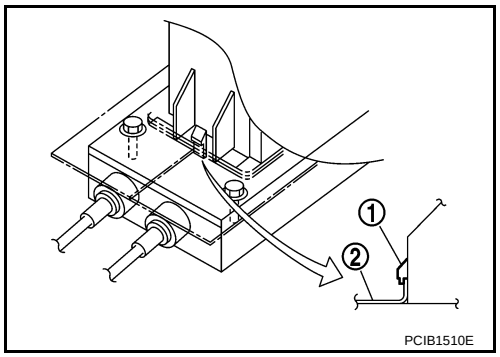
Installation is in the reverse order of removal.

- Securely assemble each cable and lever of control shaft.
- Be careful about the installation direction, and push control lever knob into control lever.

- ⇐: Front



- Make sure that the front/rear claws (1) of control device assembly are in contact with flange of the floor (2).



Inspection

INFOID:0000000001381689

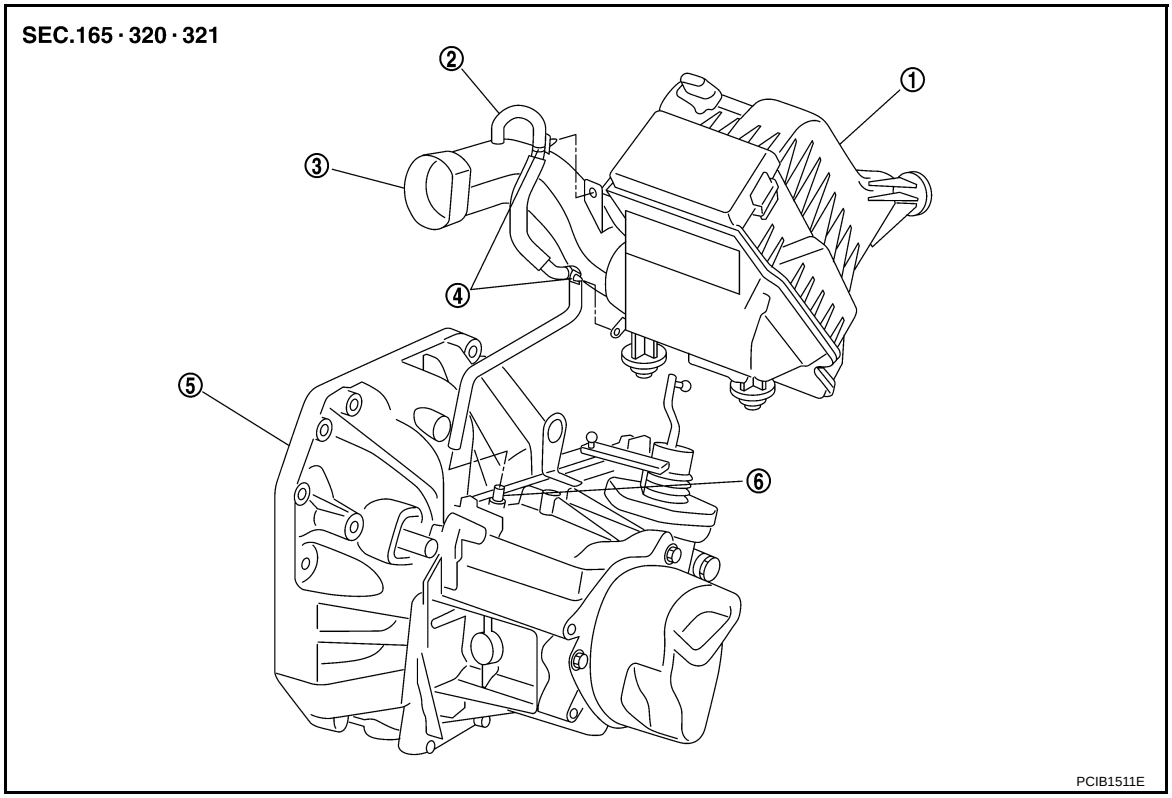
Inspect the following items:

- When control lever is selected to 1st-2nd side and 5th-reverse side, confirm control lever returns to neutral position smoothly.
- When control lever is shifted to each position, make sure there is no binding or disconnection in each boot.

AIR BREATHER HOSE

Exploded View

INFOID:0000000001381690



1. Air cleaner case
2. Air breather hose
3. Air duct
4. Clip
5. Transaxle assembly
6. 2 way connector

Removal and Installation

INFOID:0000000001381691

REMOVAL

1. Remove battery. Refer to PG-6, "Removal and Installation".
2. Remove air duct (Inlet), air duct and air cleaner case. Refer to EM-27, "Removal and Installation".
3. Remove air breather hose.
   CAUTION:
   When air breather hose is removed, be sure to hold 2 way connector securely.

INSTALLATION

Installation is in the reverse order of removal.

- When installing air breather hose on 2 way connector, paint mark must be rearward.
- When installing air breather hose on 2 way connector, push it until it hits the transaxle case.
- When installing air breather hose to air duct and air cleaner case, make sure that clips are fully inserted.

CAUTION:

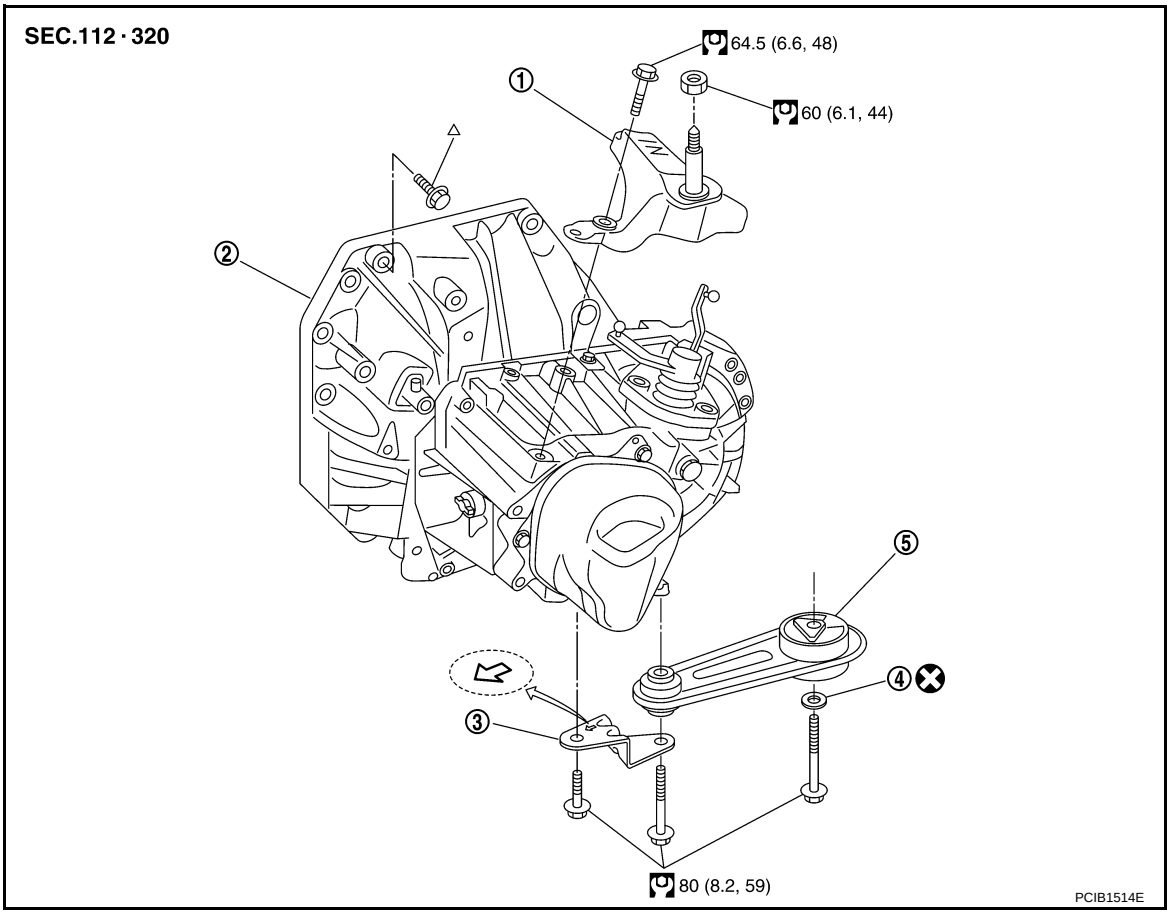
Make sure air breather hose is not collapsed or blocked due to folding or bending when installed.

REMOVAL AND INSTALLATION

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001381692



1. LH engine mount bracket (transaxle side)
2. Transaxle assembly
3. Rear engine mount bracket
4. Washer
5. Rear torque rod

△: Refer to installation.

Removal and Installation

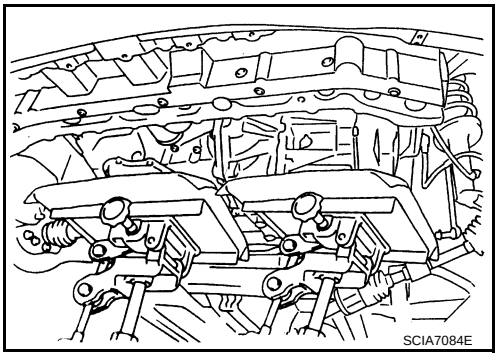
INFOID:0000000001381693

CAUTION:
If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.

REMOVAL

1. Remove battery. Refer to PG-6, "Removal and Installation".
2. Remove air breather hose. Refer to TM-632, "Removal and Installation".
3. Remove air duct (Inlet), air duct and air cleaner case. Refer to EM-27, "Removal and Installation".
4. Drain clutch fluid and then remove clutch tube from CSC. Refer to CL-12, "Removal and Installation".
   CAUTION:
   Do not depress clutch pedal during removal procedure.
5. Disconnect clip of engine harness from bracket.
6. Disconnect ground cable from transaxle assembly.
7. Remove starter motor. Refer to STR-13, "Removal and Installation".

8. Remove engine undercover.
9. Remove front drive shafts. Refer to FAX-10, "Removal and Installation (Left Side)" and FAX-11, "Removal and Installation (Right Side)".
   NOTE:
   Insert a suitable plug into side oil seal after removing front drive shaft.
10. Remove heat insulator and exhaust front tube. Refer to EX-5, "Removal and Installation".
11. Disconnect position switch harness connector and then disconnect clip from rear housing.
12. Drain gear oil. Refer to TM-628, "Draining".
13. Disconnect select cable and shift cable from transaxle assembly. Refer to TM-630, "Removal and Installation".
14. Support engine assembly and transaxle assembly with a jack.
    CAUTION:
    When setting a jack, be careful not to bring it into contact with switch.
15. Remove engine mount through bolt-securing nut. Refer to EM-89, "Exploded View".
16. Remove LH engine mount bracket (transaxle side) bolts.
17. Remove rear engine mount bracket and rear torque rod.
18. Remove transaxle assembly to engine assembly bolts.
19. Remove transaxle assembly from the vehicle.
    CAUTION:
    Secure transaxle assembly to a jack while removing it.



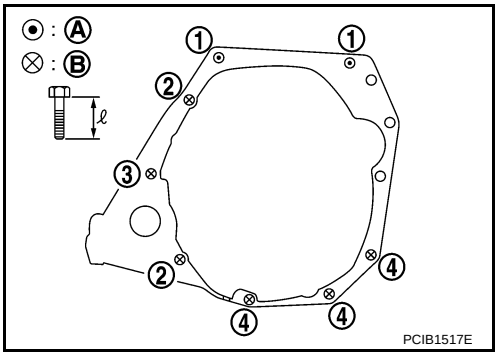
INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

When installing transaxle assembly, be careful not to bring transaxle input shaft into contact with clutch cover.

- If transaxle is removed from the vehicle, always replace CSC. Refer to CL-11, "Removal and Installation".
- When installing the transaxle assembly to the engine, install the bolts following the standard below.



Bolt No.	1	2	3	4
Quantity	2	2	1	3
Bolt length "ℓ" mm (in)	55 (2.17)	49 (1.93)	69 (2.72)	55 (2.17)
Tightening torque N·m (kg-m, ft-lb)	48.0 (4.9, 35)			

(A): M/T to engine
(B): Engine to M/T

- Bleed the air from the clutch hydraulic system. Refer to CL-8, "Air Bleeding Procedure".
- After installation, check oil level, and check for leaks and loose mechanisms. Refer to TM-628, "Inspection".

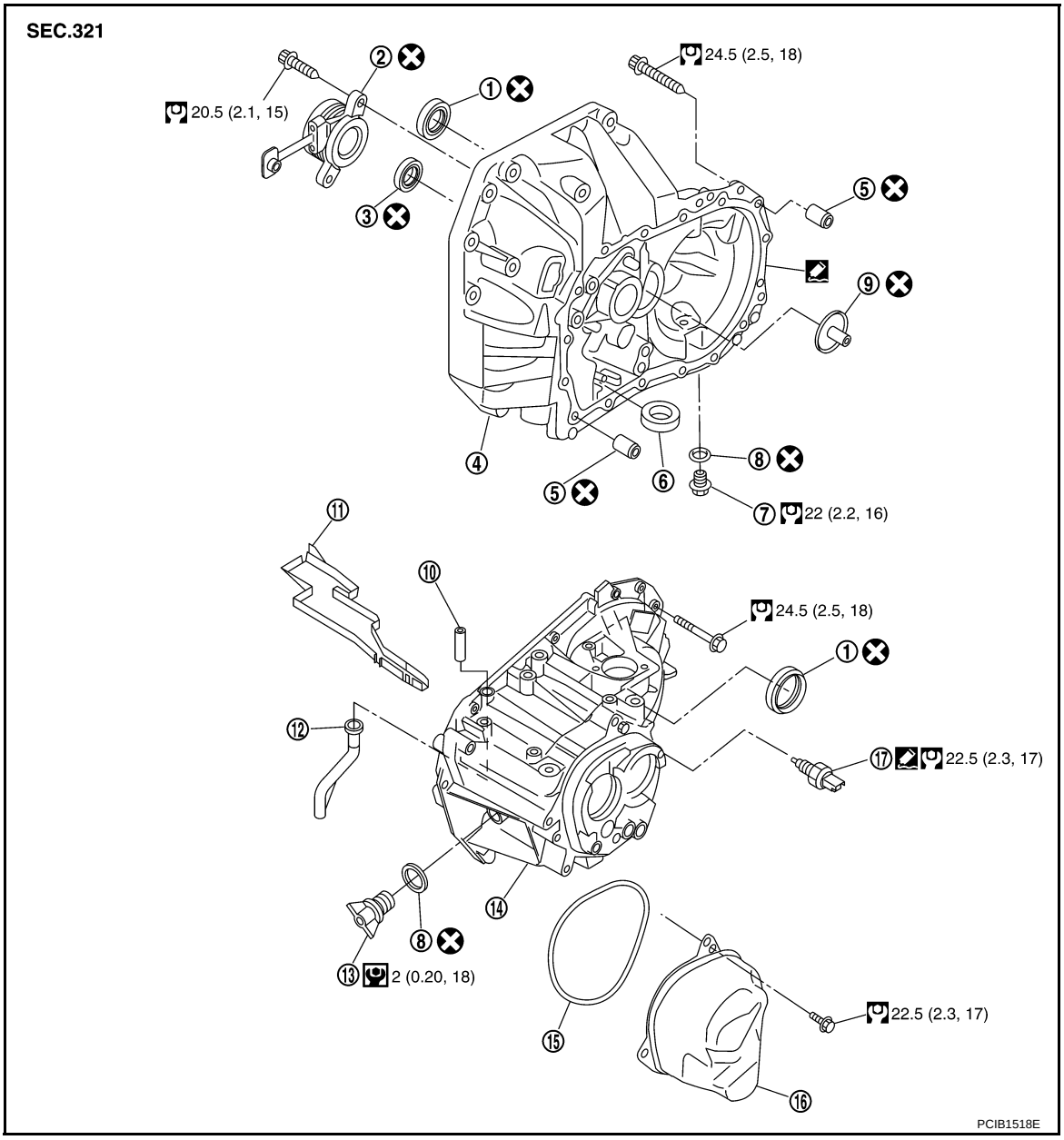
DISASSEMBLY AND ASSEMBLY

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001381694

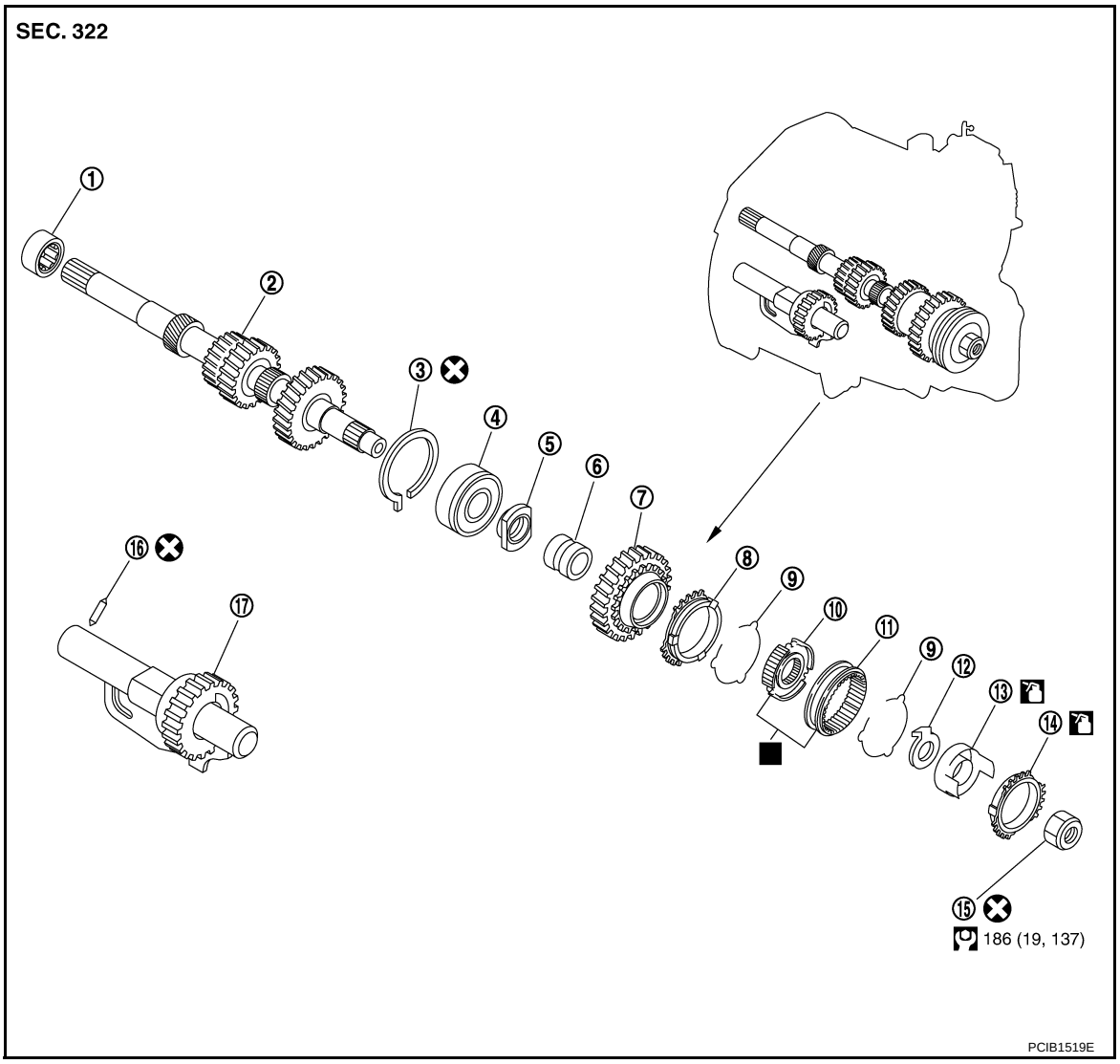
CASE AND HOUSING COMPONENTS



1. Differential side oil seal
2. CSC (Concentric Slave Cylinder)
3. Input shaft oil seal
4. Clutch housing
5. Dowel pin
6. Magnet
7. Drain plug
8. Gasket
9. Oil channel
10. 2 way connector
11. Oil gutter
12. Air breather inner tube
13. Filler plug
14. Transaxle case
15. O-ring
16. Rear housing
17. Position switch

: Apply Genuine Liquid Gasket, Three Bond TB1215 or the equivalent.

GEAR COMPONENTS

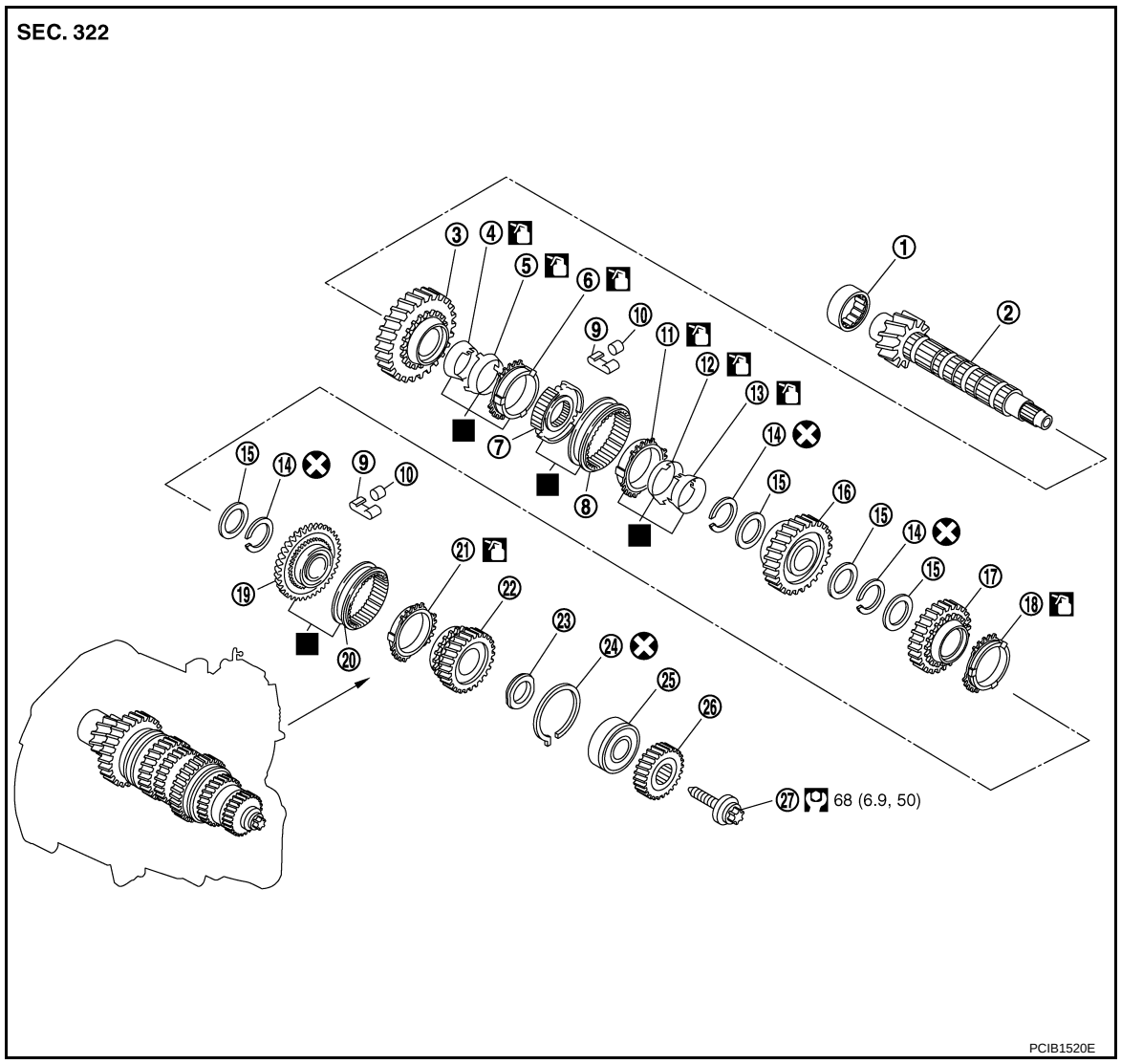


1. Input shaft front bearing
2. Input shaft
3. Snap ring
4. Input shaft rear bearing
5. Adapter plate
6. Bushing
7. 5th input gear
8. 5th baulk ring
9. Spread spring
10. 5th-reverse synchronizer hub
11. 5th-reverse coupling sleeve
12. Lock washer
13. Reverse synchronizer cone
14. Reverse baulk ring
15. Input shaft nut
16. Retaining pin
17. Reverse gear assembly

: Apply gear oil.

: Replace the parts as a set.

SEC. 322

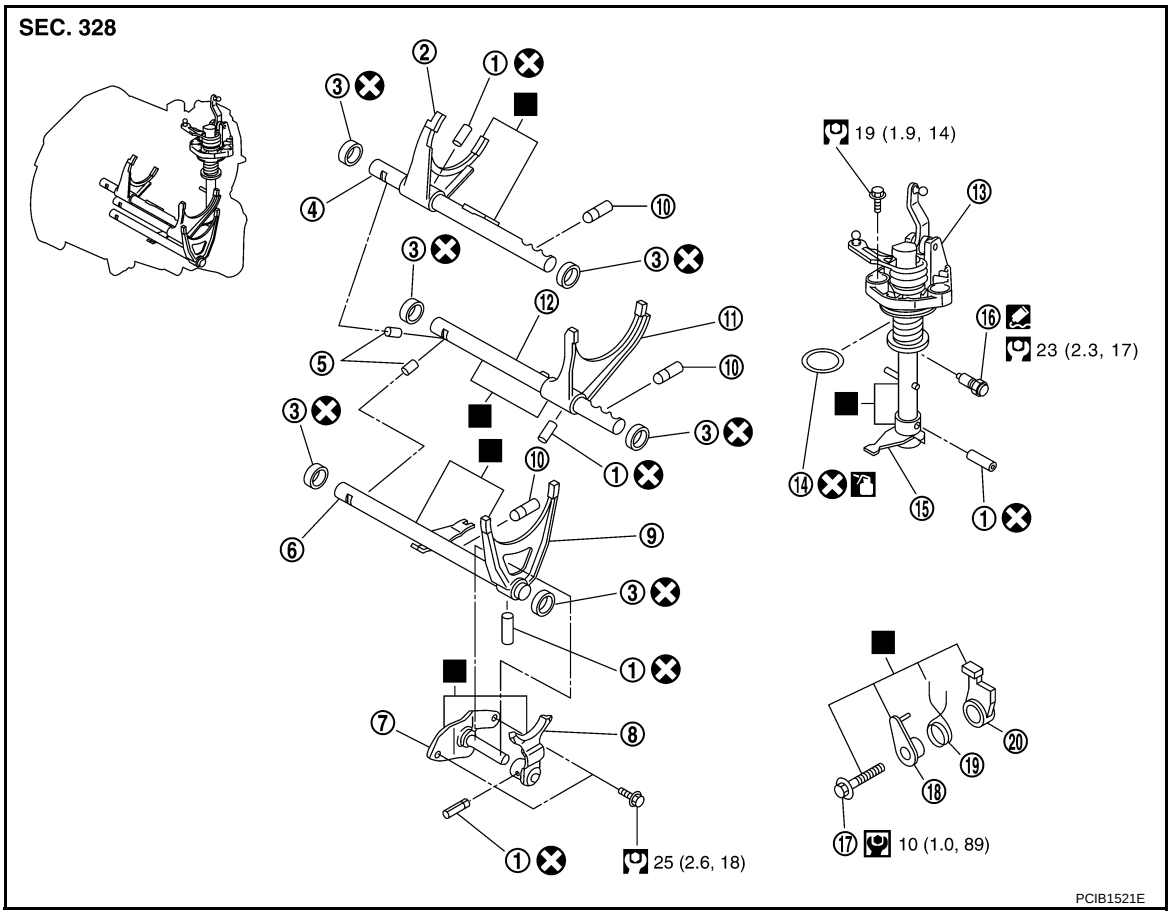


1. Mainshaft front bearing
2. Mainshaft
3. 1st main gear
4. 1st inner baulk ring
5. 1st synchronizer cone
6. 1st outer baulk ring
7. 1st-2nd synchronizer hub
8. 1st-2nd coupling sleeve
9. Spring
10. Insert key
11. 2nd outer baulk ring
12. 2nd synchronizer cone
13. 2nd inner baulk ring
14. Snap ring
15. Thrust washer
16. 2nd main gear
17. 3rd main gear
18. 3rd baulk ring
19. 3rd-4th synchronizer hub
20. 3rd-4th coupling sleeve
21. 4th baulk ring
22. 4th main gear
23. Washer
24. Snap ring
25. Mainshaft rear bearing
26. 5th main gear
27. Mainshaft bolt

: Apply gear oil.

■: Replace the parts as a set.

SHIFT CONTROL COMPONENTS



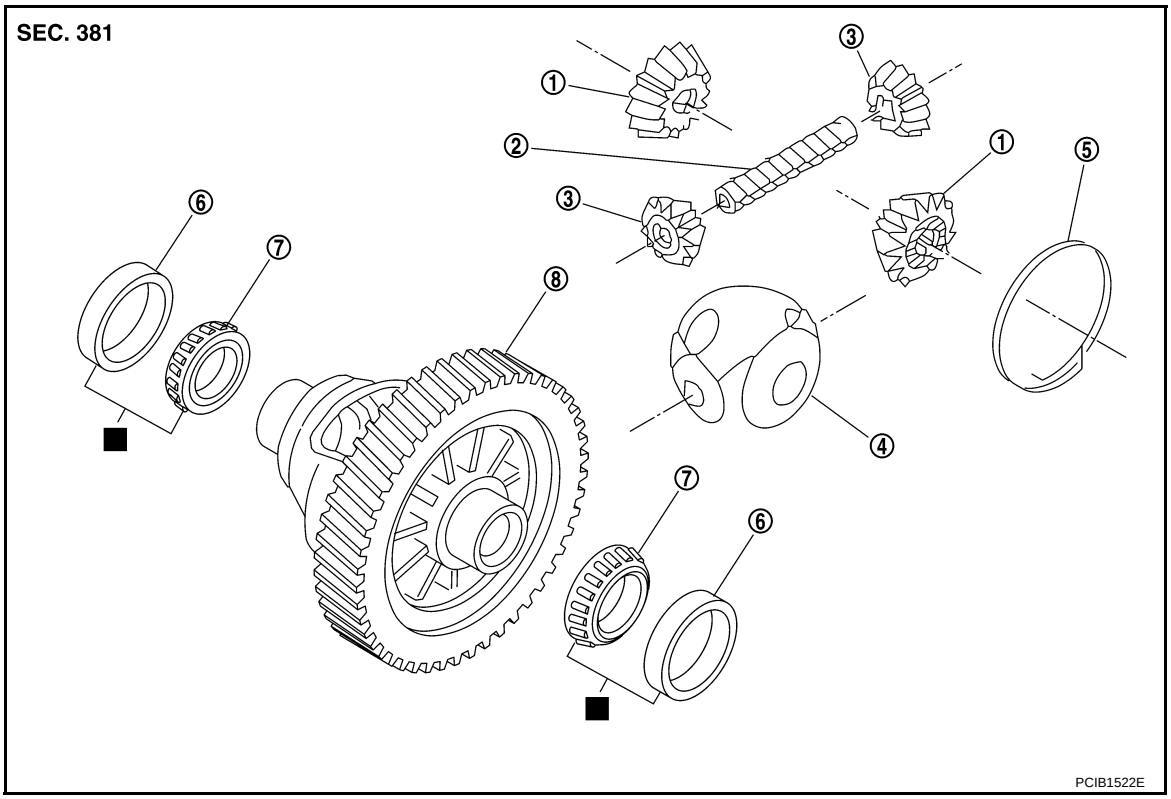
1. Retaining pin
2. 1st-2nd shift fork
3. Bushing
4. 1st-2nd fork rod
5. Lock pin
6. 5th-reverse fork rod
7. Bracket
8. Reverse gear gate
9. 5th-reverse shift fork
10. Check ball
11. 3rd-4th shift fork
12. 3rd-4th fork rod
13. Control shaft
14. O-ring
15. Selector
16. Check ball plug
17. Interlock bolt
18. Bushing
19. Spring
20. Striking interlock

: Apply gear oil.

: Replace the parts as a set.

: Apply Genuine Liquid Gasket, Three Bond TB1215 or the equivalent.

FINAL DRIVE COMPONENTS



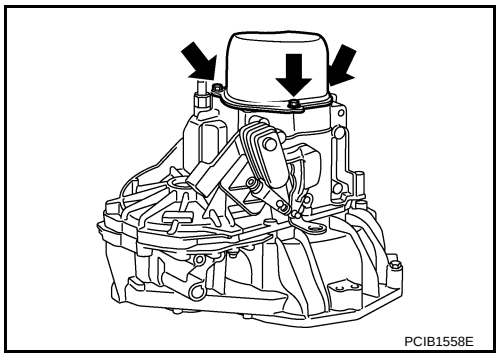
1. Side gear
2. Pinion mate shaft
3. Pinion mate gear
4. Thrust washer
5. Lock ring
6. Differential side bearing outer race
7. Differential side bearing
8. Differential case

■: Replace the parts as a set.

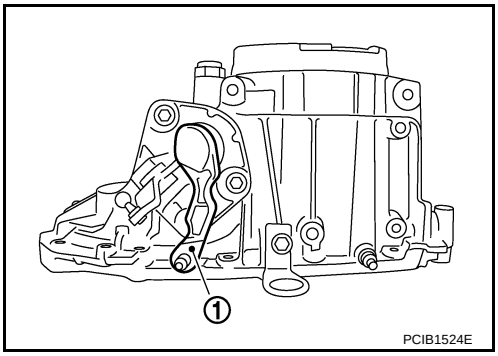
Disassembly

INFOID:0000000001381695

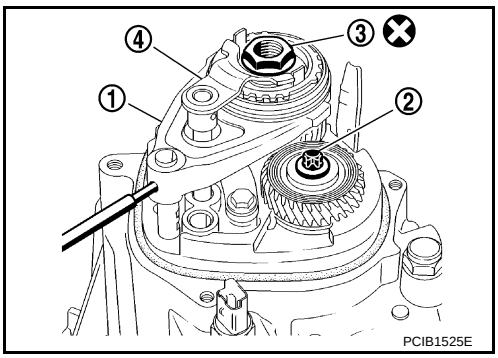
1. Remove drain plug and gasket from clutch housing, and then drain oil.
2. Remove filler plug and gasket from transaxle case.
3. Remove CSC from clutch housing. Refer to CL-11, "Removal and Installation".
4. Remove rear housing and O-ring from transaxle case.
   CAUTION:
   Rear housing oil channel is inserted to input shaft. Therefore, when removing rear housing, remove it to axial direction of input shaft.



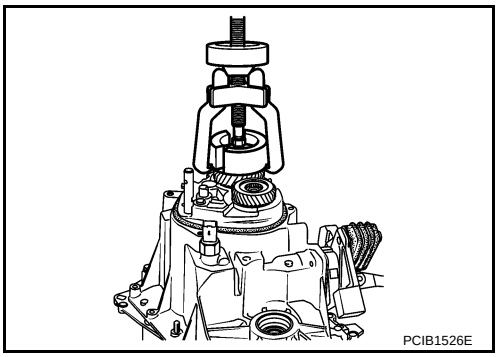
5. Shift the shift lever (1) of control shaft assembly to 3rd gear position.
   NOTE:
   - If not, the transaxle case cannot be removed from clutch housing.
   - 3rd gear position means that the shift lever of control shaft assembly is fully rotated clockwise and it is returned approximately 10°.



6. Push in the 5th-reverse shift fork (1), and then shift it to 5th gear position.
   NOTE:
   When it is shifted to the 5th gear and 3rd gear at the same time, the input shaft and mainshaft may not be rotated.
7. Remove mainshaft bolt (2) and input shaft nut (3).
   CAUTION:
   When mainshaft bolt and input shaft nut are removed, do not use a power tool in order to prevent the gear from being damaged.
8. Remove reverse gear gate assembly (4) bolts.
9. Remove retaining pin from 5th-reverse shift fork (1) using a pin punch.

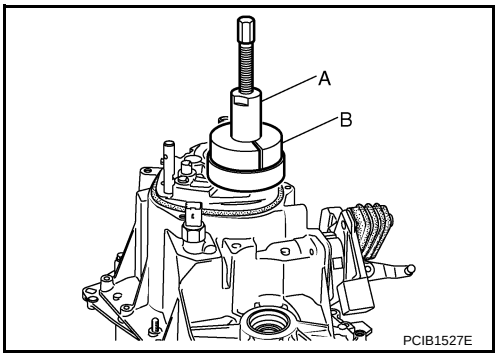


10. Remove 5th-reverse shift fork (1), reverse gear gate assembly (4) and 5th-reverse coupling sleeve from 5th-reverse synchronizer hub.
11. Remove 5th-reverse synchronizer hub from input shaft using a puller.
    CAUTION:
    Set the claw of the puller to the large width side of the hub when setting the puller in synchronizer hub.
12. Remove 5th baulk ring and 5th input gear.

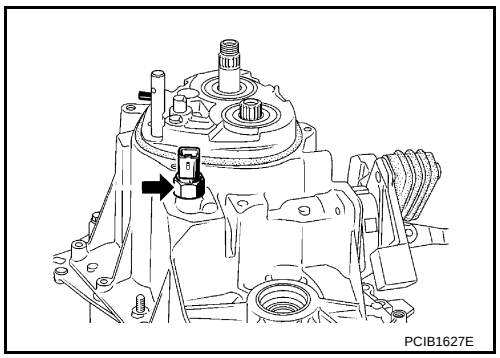


13. Remove 5th main gear from input shaft using Tools (A) and (B).

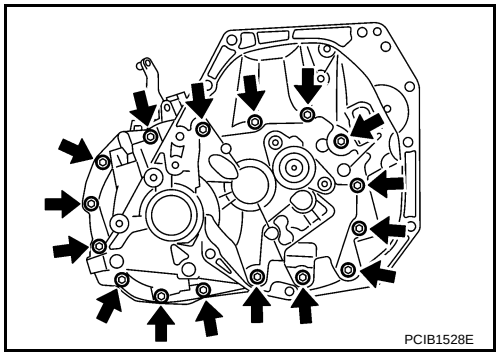
Tool number A: KV32300QAC
Tool number B: KV32300QAD



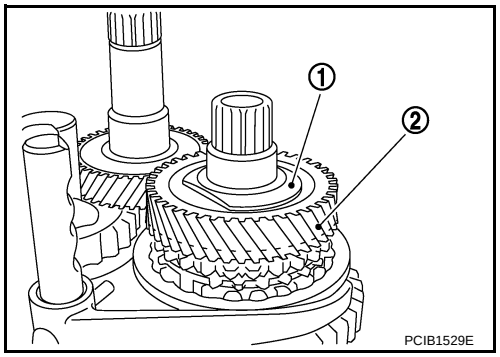
14. Remove position switch from transaxle case.


PCIB1627E

15. Remove clutch housing bolts.
16. Remove clutch housing from transaxle case.
17. Remove oil gutter from transaxle case.


PCIB1528E

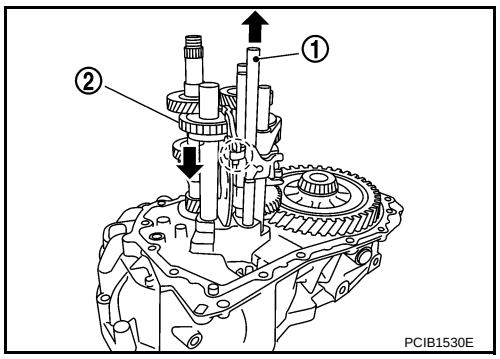
18. Remove washer (1) and 4th main gear (2) from mainshaft.



PCIB1529E

19. Remove 5th-reverse fork rod (1) according to the following.

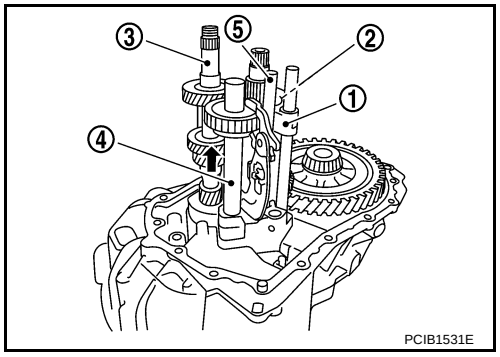
a. Lift up 5th-reverse fork rod (1) until it contacts the claw (⌒) of reverse gear assembly (2).
b. Push down gear of reverse gear assembly (2), and then remove 5th-reverse fork rod (1) from clutch housing.



PCIB1530E

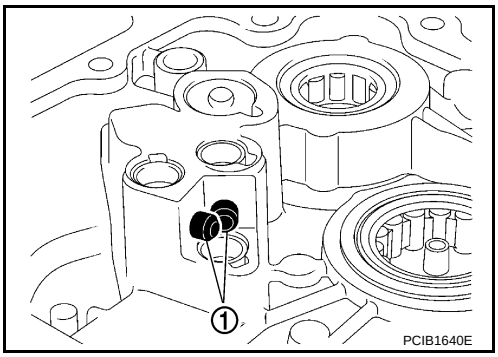
20. Remove 3rd-4th fork rod assembly (1), 3rd-4th coupling sleeve (2) and input shaft assembly (3) according to the following.

a. Remove 4th baulk ring, insert keys and springs from 3rd-4th synchronizer hub.
b. Lift the gear of the reverse gear assembly (4) up.
c. Lift up 1st-2nd fork rod (5), and then maintain neutral position.
d. Remove 3rd-4th fork rod assembly (1), 3rd-4th coupling sleeve (2) and input shaft assembly (3) together.

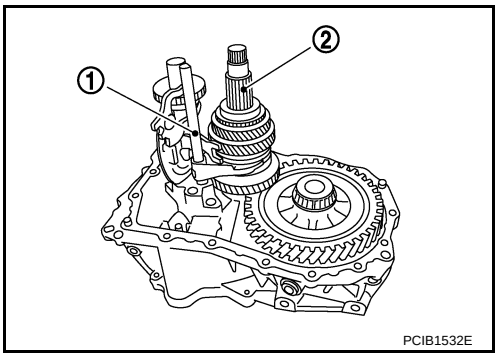


PCIB1531E

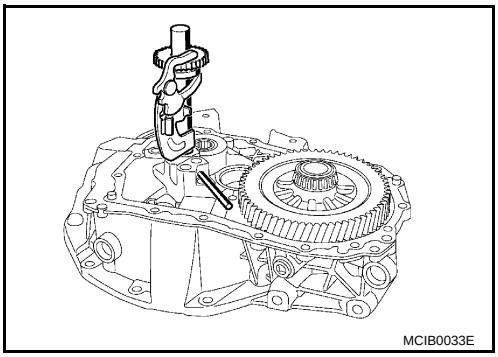
21. Remove lock pins (1) from clutch housing.



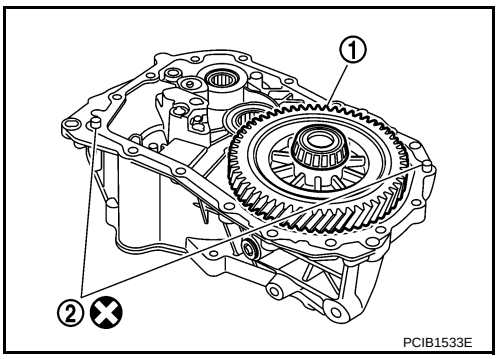
22. Remove 1st-2nd fork rod assembly (1) and mainshaft assembly (2) together from clutch housing.



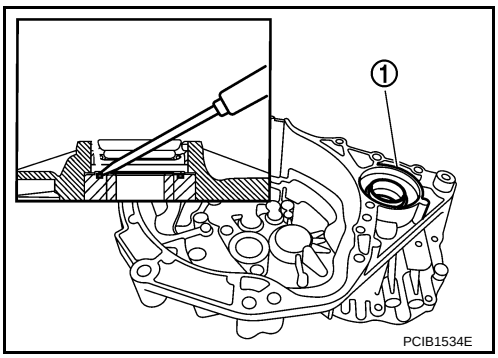
23. Remove retaining pin from reverse gear assembly using a pin punch.
24. Remove reverse gear assembly from clutch housing.



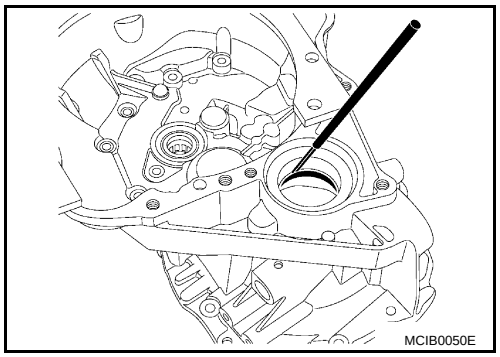
25. Remove final drive assembly (1) from clutch housing.
26. Remove magnet and dowel pins (2) from clutch housing.



27. Remove differential side oil seals (1) from clutch housing and transaxle case using a flat-bladed screwdriver.
CAUTION:
Be careful not to damage clutch housing and transaxle case.



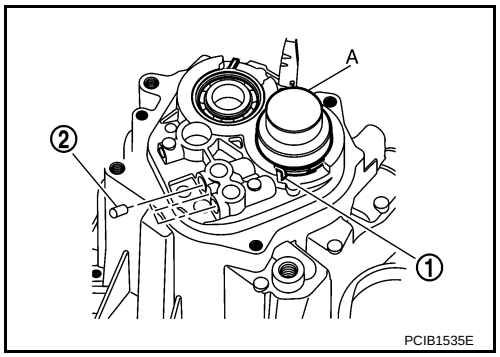
28. Remove differential side bearing outer races from clutch housing and transaxle case using a brass bar.
CAUTION:
Be careful not to damage clutch housing and transaxle case.



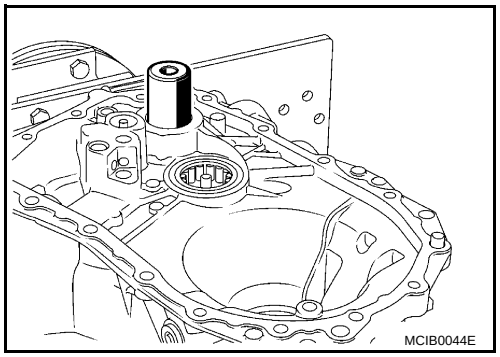
29. Using the drift, with snap rings (1) stretched, press out input shaft rear bearing and mainshaft rear bearing from transaxle case.

Tool number A: ST35300000

30. Remove check balls (2) and check check ball plugs from transaxle case.

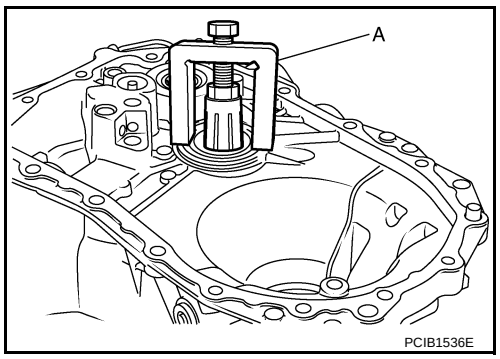


31. Remove input shaft oil seal and input shaft front bearing from clutch housing using a suitable drift.

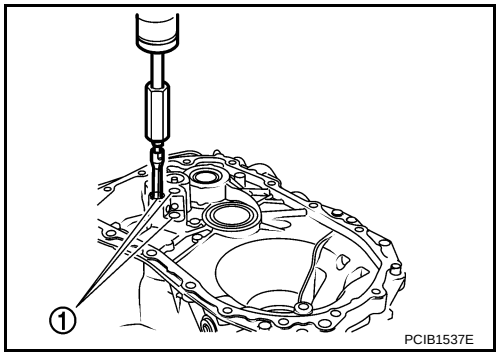


32. Separate oil channel tube at the root.
33. Remove mainshaft front bearing and oil channel from clutch housing using the valve seat remover.

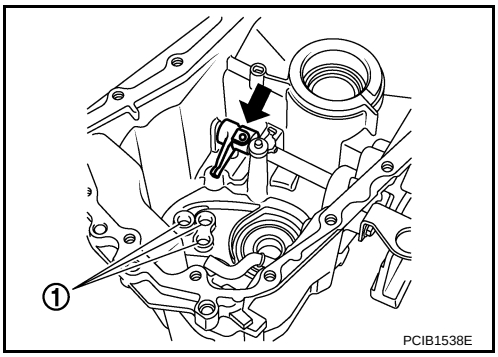
Tool number A: KV111038S0



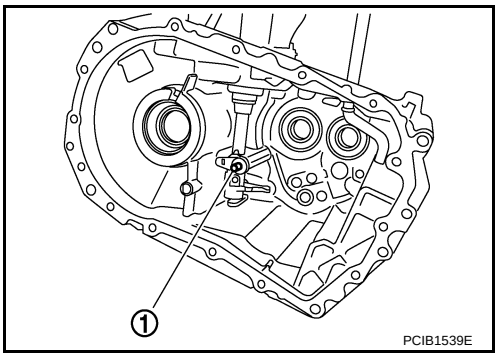
34. Remove bushings (1) from clutch housing using a suitable remover.



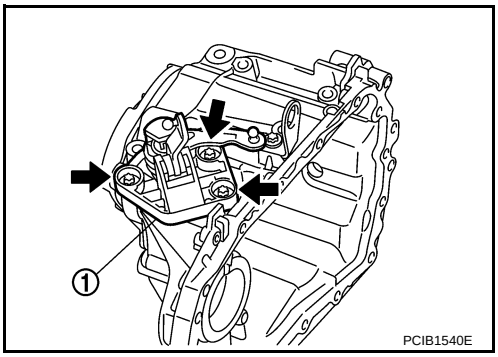
35. Remove retaining pin from selector using a pin punch.
36. Remove bushings (1) from transaxle case using a suitable remover.



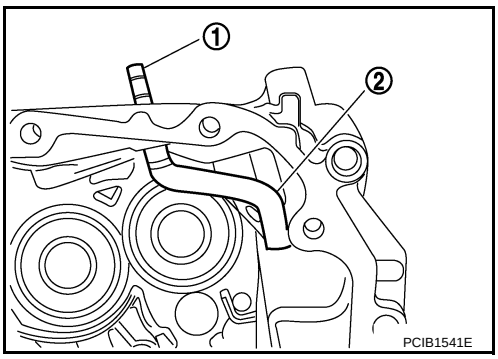
37. Remove interlock bolt (1), bushing, spring and striking interlock from transaxle case.



38. Remove control shaft (1) from transaxle case.



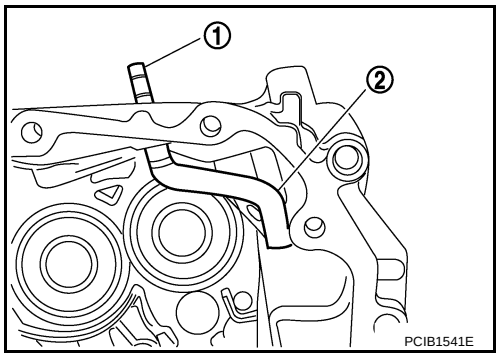
39. Pull out 2 way connector (1) straight from air breather inner tube (2).
40. Remove air breather inner tube (2) from transaxle case.



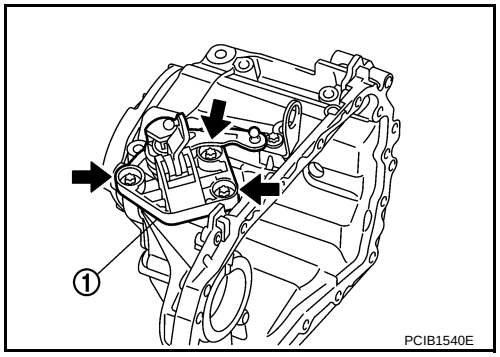
Assembly

INFOID:0000000001381696

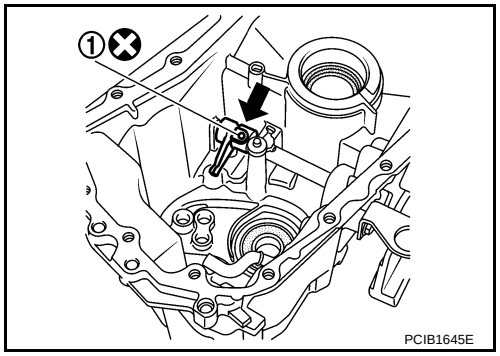
1. Install air breather inner tube (2) to transaxle case.
   CAUTION:
   Be careful not to damage air breather inner tube.
   NOTE:
   It is easy to install the air breather inner tube when its end is closed with tape. Remove the tape after the installation.
2. Insert 2 way connector (1) straight to air breather inner tube (2).
   CAUTION:
   Check air breather inner tube for twists after installing.
3. Apply gear oil to O-ring and install it to control shaft.
   CAUTION:
   Do not reuse O-ring.



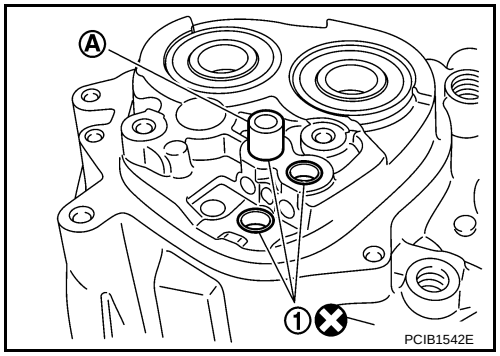
4. Install control shaft (1) to transaxle case and then install selector to control shaft. Tighten bolts to the specified torque. Refer to TM-635, "Exploded View".
   CAUTION:
   Be careful with the orientation of selector.



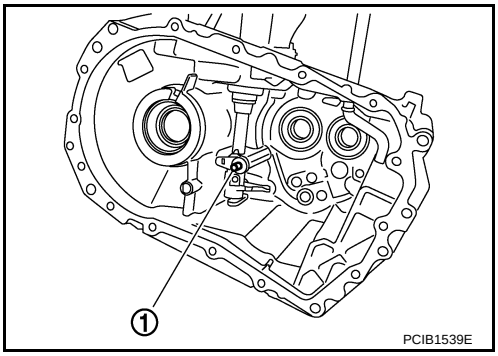
5. Install selector onto control shaft, and then install retaining pin (1) to selector.



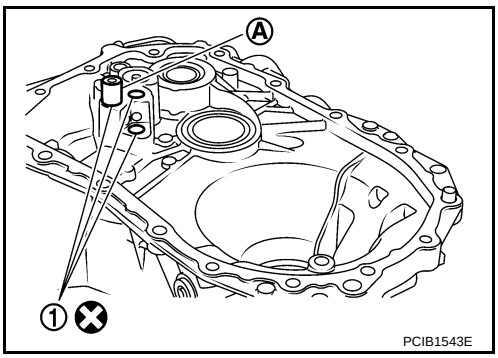
6. Install bushings (1) until it is flush with end face of transaxle case using a suitable drift (A).



7. Install striking interlock, spring, bushing and interlock bolt (1) to transaxle case, and then tighten interlock bolt to the specified torque. Refer to TM-635, "Exploded View".

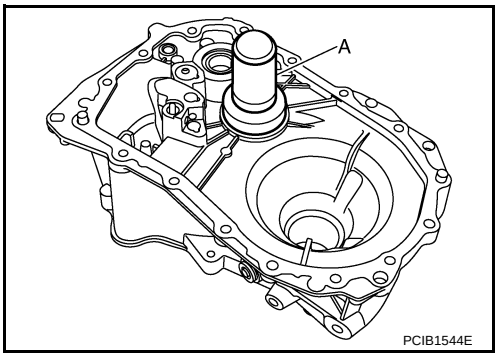


8. Install bushings (1) until it is flush with end face of clutch housing using a suitable drift (A).
9. Install oil channel to clutch housing.
CAUTION:
Do not reuse oil channel.



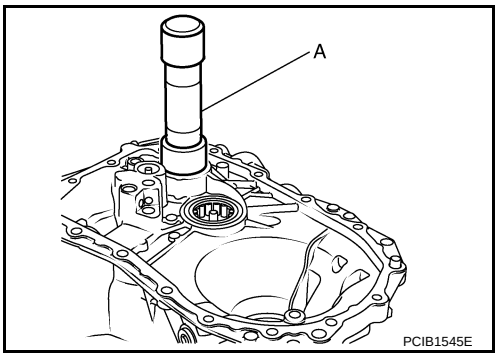
10. Install mainshaft front bearing until it is flush with end face of clutch housing using Tool (A).

Tool number A: ST33061000



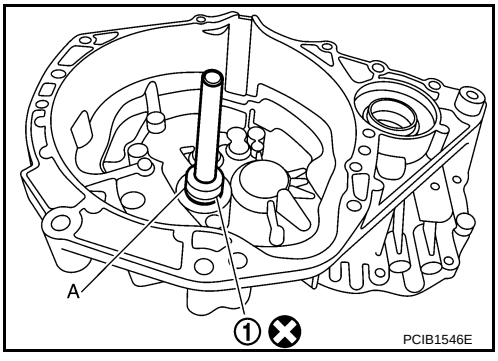
11. Install input shaft front bearing until it is flush with end face of clutch housing using Tool (A).

Tool number A: KV40100900

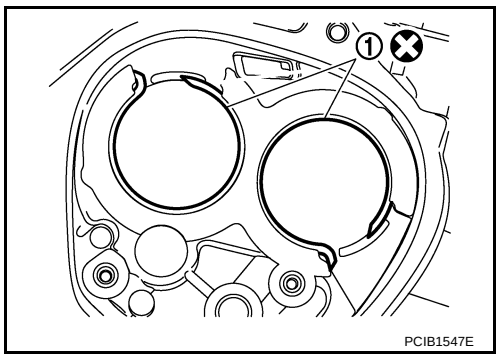


12. Install input shaft oil seal (1) until it is flush with end face of clutch housing using Tool (A).

Tool number A: ST33220000



13. Install snap ring (1) to transaxle case as shown in the figure.
CAUTION:
Be careful with the orientation of snap ring.

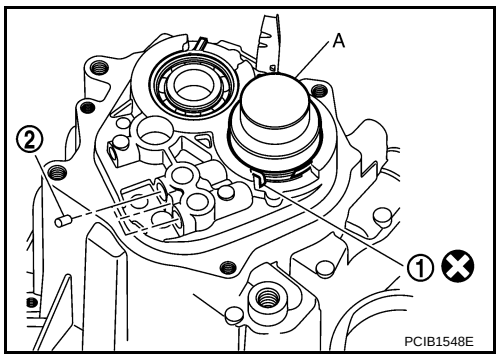


14. Using Tool (A), with snap rings (1) stretched, press in input shaft rear bearing and mainshaft rear bearing into transaxle case.

Tool number A: ST35300000

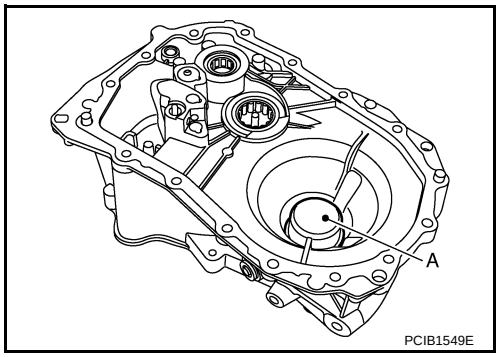
CAUTION:
Make sure that snap ring is installed to bearing groove properly.

15. Install check balls (2) to transaxle case.



16. Install differential side bearing outer races until it is flush with end face of clutch housing and transaxle case using Tool (A).

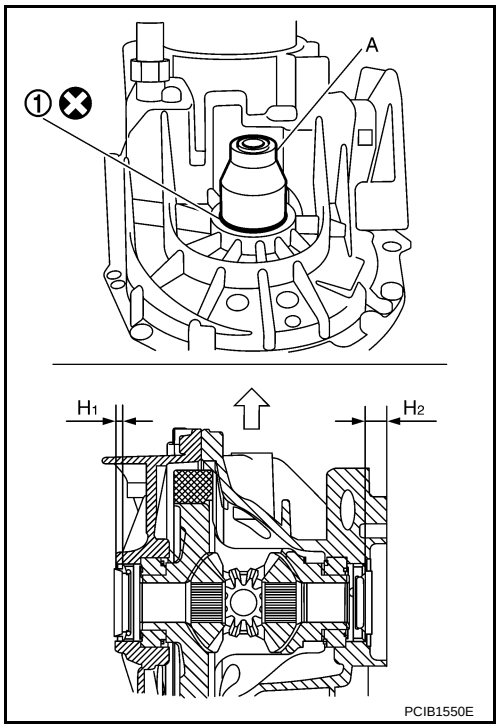
Tool number A: KV32300QA



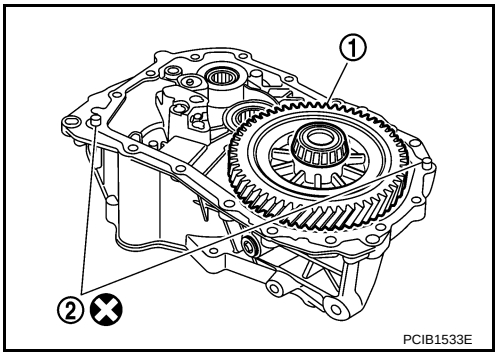
17. Install differential side oil seals (1) to clutch housing and transaxle case using Tool (A).

Tool number A: ST27862000

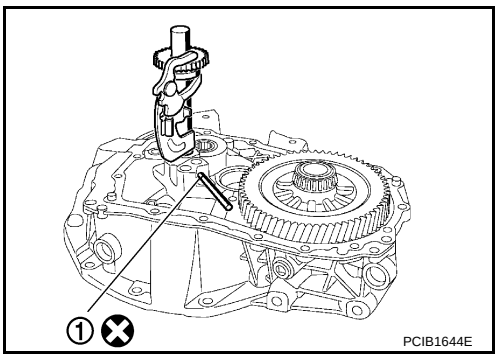
Dimension "H_1" : 5.7 - 6.3 mm (0.224 - 0.248 in)
Dimension "H_2" : 16.4 - 17.0 mm (0.646 - 0.669 in)



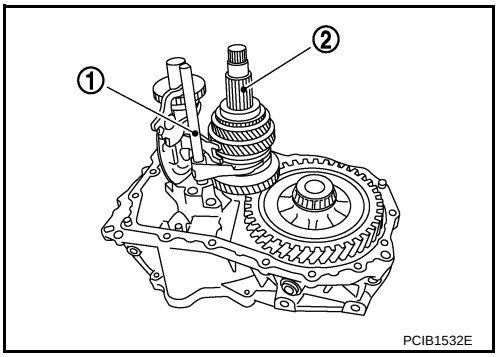
18. Install final drive assembly (1) to clutch housing.
19. Install dowel pins (2) and magnet to clutch housing.



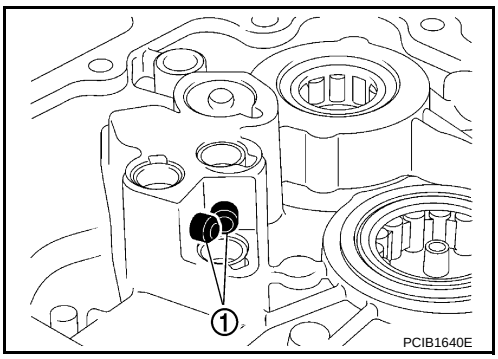
20. Install reverse gear assembly onto clutch housing, and then install retaining pin (1) to reverse gear assembly.



21. Set 1st-2nd fork rod assembly (1) to mainshaft assembly (2), and then install them to clutch housing.



22. Install lock pins (1) to clutch housing.



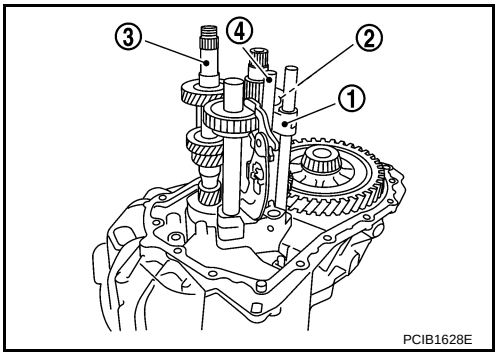
23. Install 3rd-4th fork rod assembly (1), 3rd-4th coupling sleeve (2) and input shaft assembly (3) according to the following.

a. Lift up 1st-2nd fork rod (4), and then maintain neutral position.

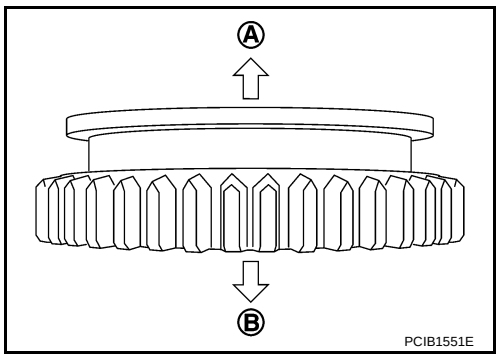
b. Set 3rd-4th fork rod assembly (1) to 3rd-4th coupling sleeve (2), and then install it together with input shaft assembly (3) to clutch housing.

CAUTION:

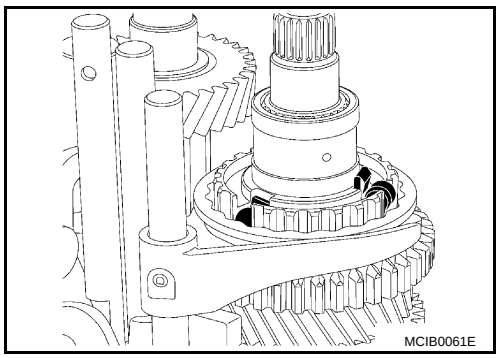
- **Set lock pin (3rd-4th fork rod side) to 1st-2nd fork rod groove, and then install 3rd-4th fork rod assembly.**



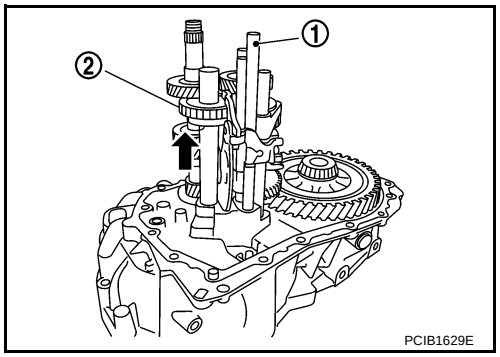
- **Be careful with the orientation of 3rd-4th coupling sleeve.**
  (A): 4th main gear
  (B): 3rd main gear
- **Install 3rd input gear of input shaft assembly so that it is lower than reverse main gear of 3rd-4th coupling sleeve.**



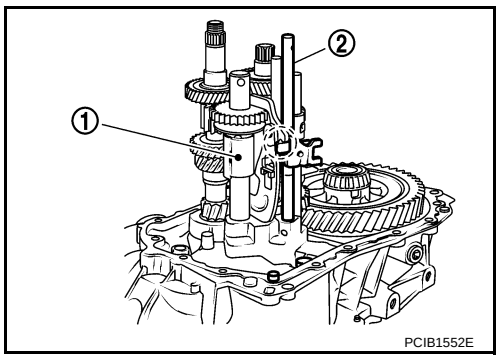
c. Install springs and Insert keys to 3rd-4th synchronizer hub.
d. Install 4th baulk ring.



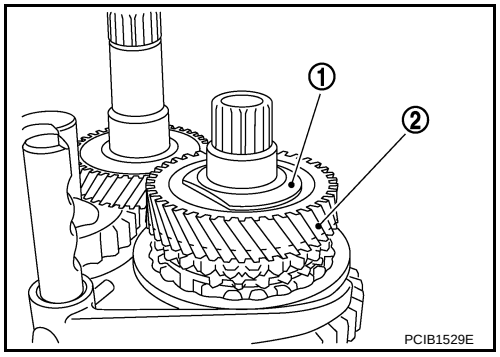
24. Install 5th-reverse fork rod (1) according to the following.
a. Lift the gear of the reverse gear assembly (2) up.
b. Temporarily install 5th-reverse fork rod (1) to clutch housing.



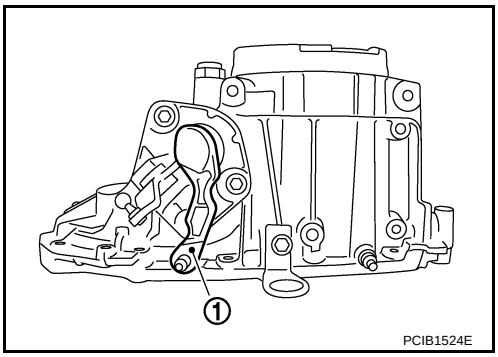
c. Push down gear of reverse gear assembly (1), and then install 5th-reverse fork rod (2) to clutch housing.
CAUTION:
Set lever of 5th-reverse fork rod so as to align with reverse gear assembly groove (◌).



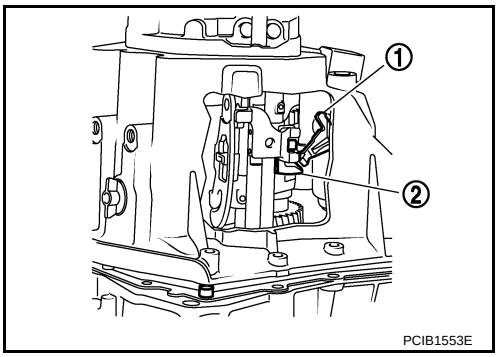
25. Install 4th main gear (2) and washer (1) to mainshaft.
CAUTION:
Install the washer with the convex side facing the rear side of the transaxle.
26. Pull down 3rd-4th shift fork, and then shift 3rd-4th coupling sleeve to 3rd gear side.



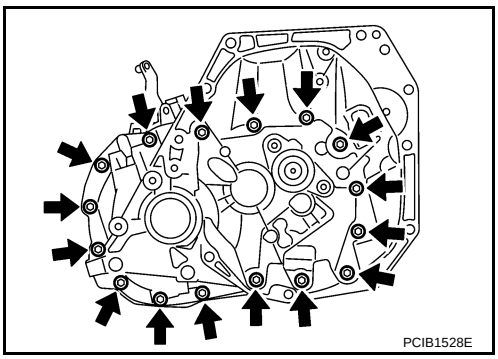
27. Shift the shift lever (1) of control shaft assembly to 3rd gear position.
    NOTE:
    - If not, the transaxle case cannot be removed from clutch housing.
    - 3rd gear position means that the shift lever of control shaft assembly is fully rotated clockwise and it is returned approximately 10°.



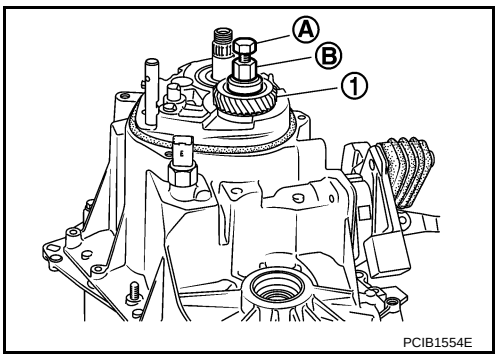
28. Install oil gutter to transaxle case.
29. Apply recommended sealant to mating surface of clutch housing.
    CAUTION:
    - **Remove old sealant adhering to the mating surfaces. Also remove any moisture, oil, or foreign material adhering to both mating surfaces.**
    - **Check for damage on the mounting surface.**
    - **Apply a continuous bead of liquid gasket to the mounting surface.**
30. Install transaxle case to clutch housing.
    (1): Selector
    (2): Shift fork
    CAUTION:
    - **Do not allow sealant to contact the transaxle case so as not to break the bead when installing.**
    - **Be careful to align the lever of 5th-reverse fork rod with reverse gear assembly sleeve.**
    NOTE:
    If installation is difficult, gently return shift lever of control shaft assembly counterclockwise slightly.



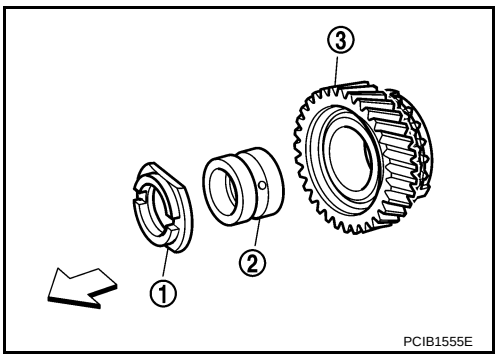
31. Fit shaft with bearing by rotating input shaft. Then, tighten bolts to the specified torque. Refer to TM-635, "Exploded View".
32. Apply recommended sealant to threads of position switch and check ball plug. Then install them to transaxle case and tighten to the specified torque. Refer to TM-635, "Exploded View".



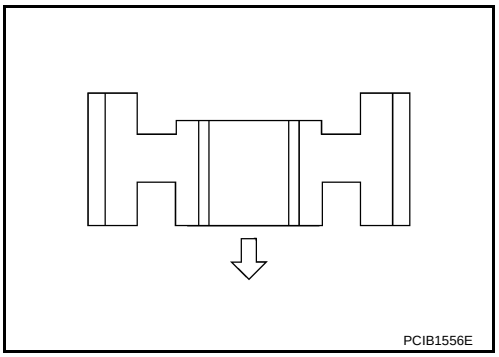
33. Apply gear oil to spline of mainshaft and then press in 5th main gear (1) to mainshaft using a suitable bolt (A) [M10 x 1.0] and nut (B).
34. Install spread springs to 5th-reverse synchronizer hub.



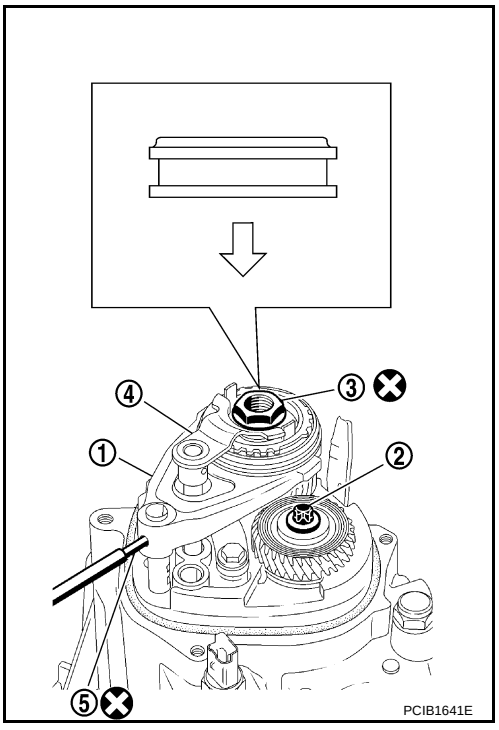
35. Install adapter plate (1), bushing (2) and 5th input gear (3) to input shaft.
    ⇦: Transaxle case side
    CAUTION:
    Be careful with the orientation of adapter plate.



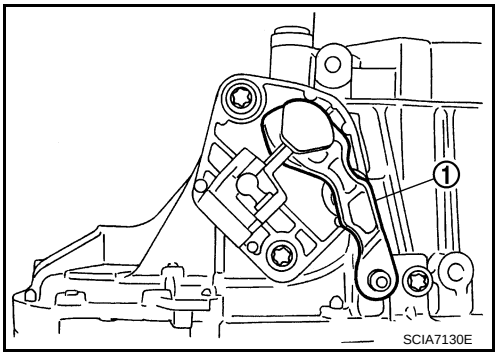
36. Install 5th baulk ring, 5th-reverse synchronizer hub, 5th-reverse coupling sleeve, lock washer, reverse synchronizer cone and reverse baulk ring to input shaft.
    CAUTION:
    - **Be careful with the orientation of 5th-reverse synchronizer hub.**
      ⇦: 5th input gear side



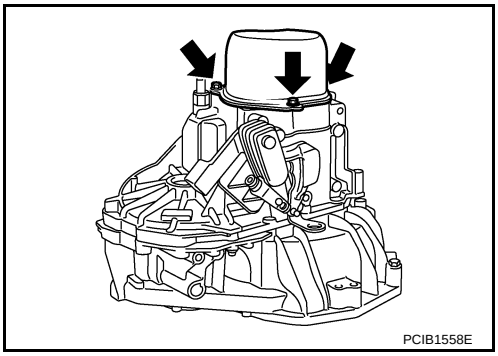
37. Set 5th-reverse shift fork (1) and reverse gear assembly (4) to 5th-reverse coupling sleeve, and then assemble input shaft and 5th-reverse fork rod.
    CAUTION:
    Be careful with the orientation of 5th-reverse coupling sleeve.
    ⇦: 5th input gear side
38. Make sure that the shift lever of control shaft assembly is shifted to 3rd gear position. And then, push in 5th-reverse shift fork (1) to shift it to 5th gear position.
    NOTE:
    When it is shifted to the 5th gear and 3rd gear at the same time, the input shaft and mainshaft may not be rotated.
39. Install mainshaft bolt (2) to mainshaft, and then tighten mainshaft bolt to the specified torque. Refer to TM-635, "Exploded View".
40. Install input shaft nut (3) to input shaft, and then tighten input shaft nut to the specified torque. Refer to TM-635, "Exploded View".
41. Install retaining pin (5) to 5th-reverse shift fork using a pin punch.



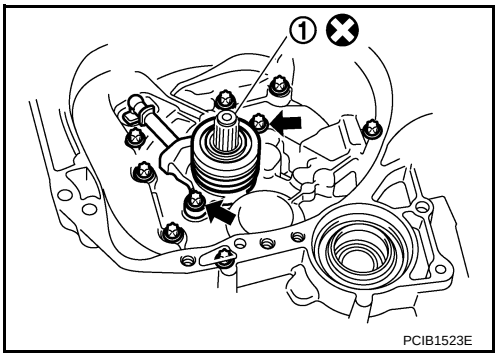
42. Shift the shift lever (1) of control shaft assembly to neutral position. And then, pull 5th-reverse shift fork to shift it to neutral position.



43. Install O-ring to rear housing and then install them to transaxle case. Tighten bolts to the specified torque. Refer to TM-635, "Exploded View".
CAUTION:
- **Rear housing oil channel is inserted to input shaft. Therefore, when installing rear housing, install it to axial direction of input shaft.**
- **Be careful to pinch O-ring when installing rear housing.**



44. Install CSC (1) to clutch housing. Refer to TM-635, "Exploded View".
45. Install gaskets onto drain plug and filler plug, and then install them to clutch housing and transaxle case. Refer to TM-635, "Exploded View".
CAUTION:
- **Do not reuse gasket.**
- **After oil is filled, tighten filler plug to specified torque.**



INPUT SHAFT AND GEAR

Exploded View

INFOID:0000000001381697

Refer to TM-635, "Exploded View".

Disassembly

INFOID:0000000001381698

Refer to TM-639, "Disassembly" for dissassembly procedure.

Assembly

INFOID:0000000001381699

Refer to TM-645, "Assembly" for assembly procedure.

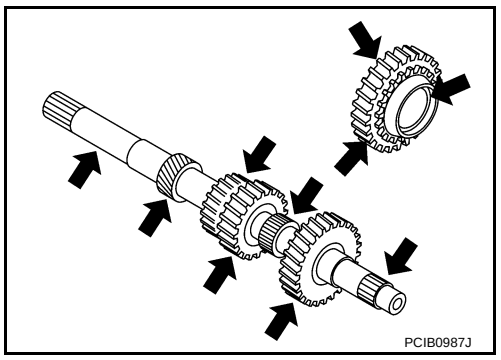
Inspection

INFOID:0000000001381700

INPUT SHAFT AND GEARS

Check items below. If necessary, replace them with new ones.

- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.

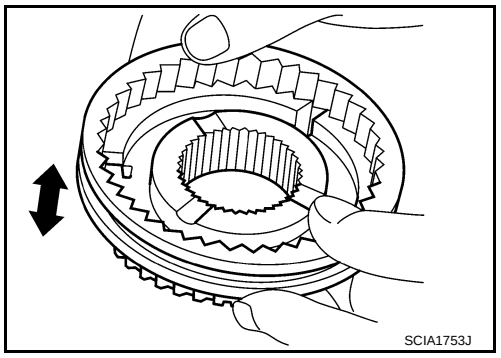

PCIB0987J

SYNCHRONIZER

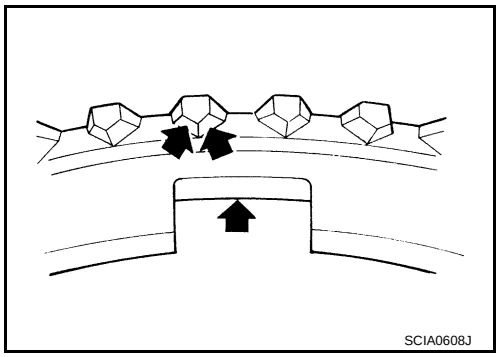
Synchronizer

Check items below. If necessary, replace them with new ones.

- Damage and excessive wear of contact surfaces of coupling sleeve, synchronizer hub.
- Coupling sleeve and synchronizer hub must move smoothly.

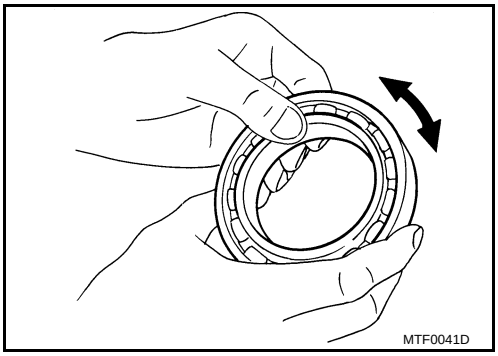

SCIA1753J

- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.


SCIA0608J

BEARING

Check for damage and rough rotation of bearing. If necessary, replace with new one.



MAINSHAFT AND GEAR

Exploded View

INFOID:0000000001381701

Refer to TM-635, "Exploded View".

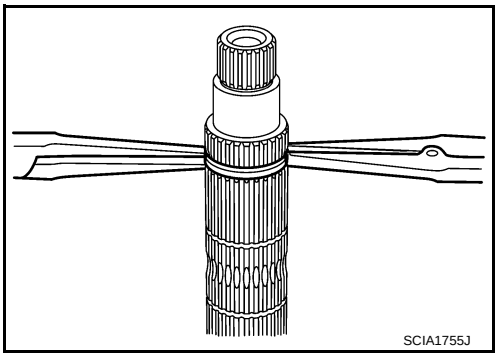
Disassembly

INFOID:0000000001381702

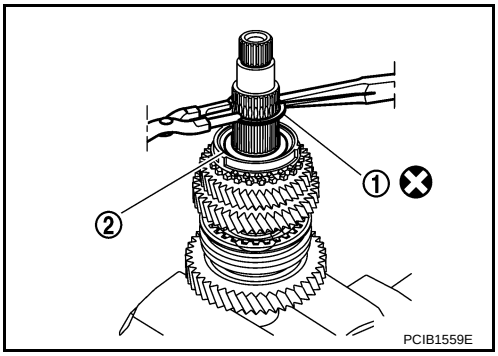
DISASSEMBLY

CAUTION:

- **Do not reuse snap ring.**
- **Set mainshaft on the vise with back plate and remove gears and snap rings.**
- **For installation and removal of snap ring, set snap ring pliers and flat pliers at both sides of snap ring. Stretch snap ring, and move it with flat pliers.**
- **Disassemble gear components putting matching marks on the parts that do not affect any functions.**

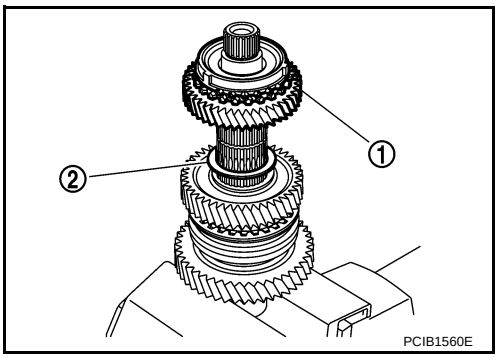

SCIA1755J

1. Remove snap ring (1) and thrust washer (2).



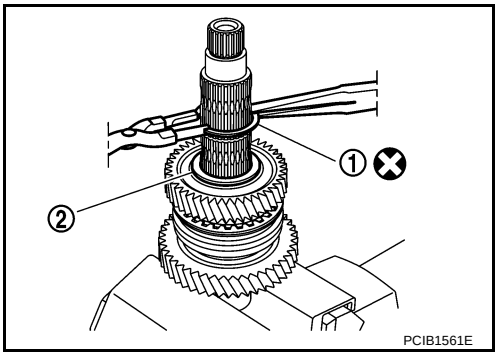
PCIB1559E

2. Remove 3rd baulk ring, 3rd main gear (1) and thrust washer (2).



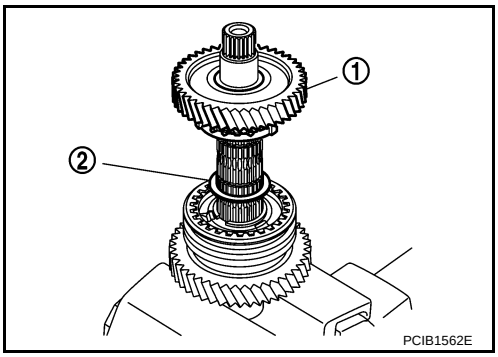
PCIB1560E

3. Remove snap ring (1) and thrust washer (2).

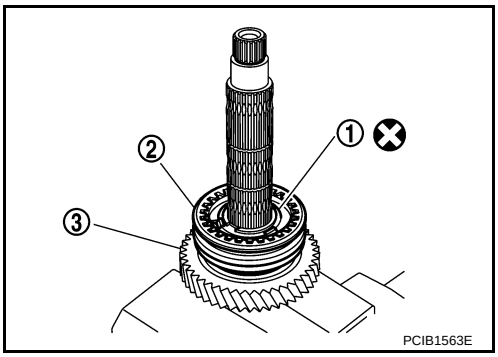


PCIB1561E

4. Remove 2nd main gear (1) and thrust washer (2).



5. Remove snap ring (1), 1st-2nd synchronizer hub assembly (2) and 1st main gear (3).



Assembly

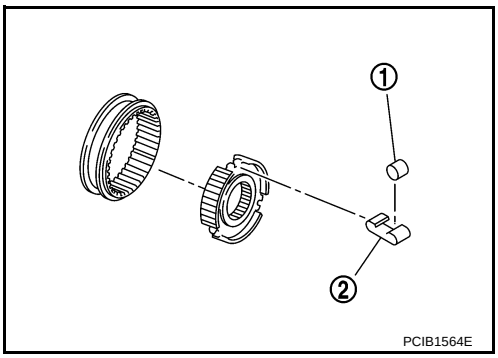
INFOID:0000000001381703

ASSEMBLY

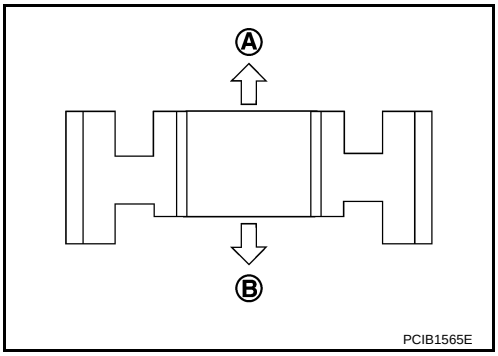
Assembly is in the reverse order of disassembly. Refer to TM-635, "Exploded View" when assembling.

CAUTION:

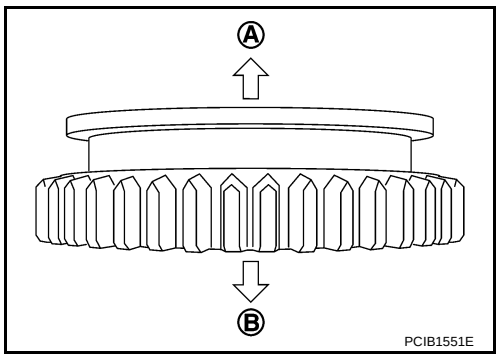
- **Do not reuse snap ring.**
- **For installation and removal of snap ring, set snap ring pliers and flat pliers at both sides of snap ring. Stretch snap ring, and move it with flat pliers.**
- **Make sure that snap ring is securely installed to the groove.**
- **Replace inner baulk ring, synchronizer cone and outer baulk ring as a set.**
- **Be careful with the orientation of insert key (1) and spring (2).**



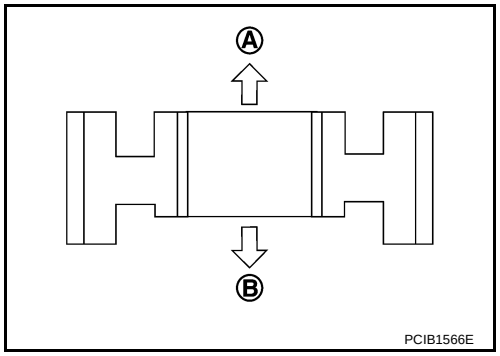
- **Be careful with the orientation of 3rd-4th synchronizer hub.**
  (A): 4th main gear side
  (B): 3rd main gear side



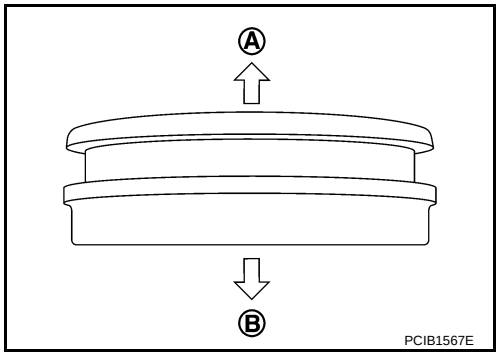
- **Be careful with the orientation of 3rd-4th coupling sleeve.**
  (A): 4th main gear side
  (B): 3rd main gear side



- **Be careful with the orientation of 1st-2nd synchronizer hub.**
  (A): 1st main gear side
  (B): 2nd main gear side



- **Be careful with the orientation of 1st-2nd coupling sleeve.**
  (A): 2nd main gear side
  (B): 1st main gear side



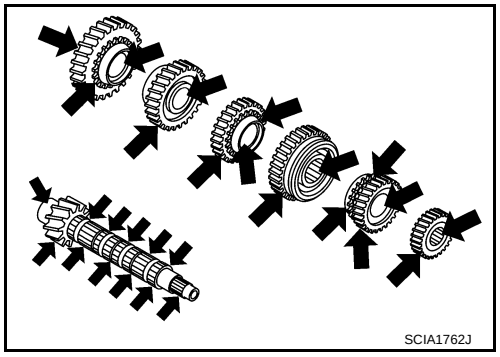
Inspection

INFOID:0000000001381704

MAINSHAFT AND GEARS

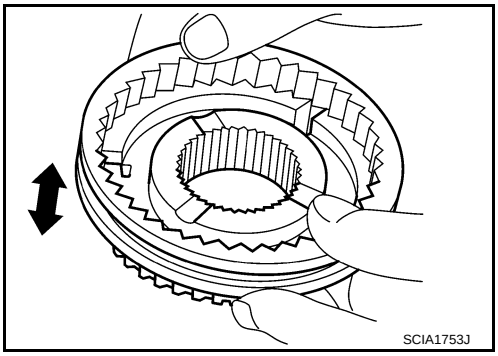
Check items below. If necessary, replace them with new ones.

- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.

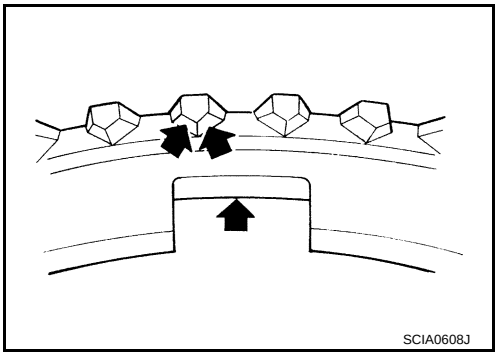


SYNCHRONIZER

Check items below. If necessary, replace them with new ones.
- Damage and excessive wear of contact surfaces of coupling sleeve, synchronizer hub, insert key and spring.
- Coupling sleeve and synchronizer hub must move smoothly.

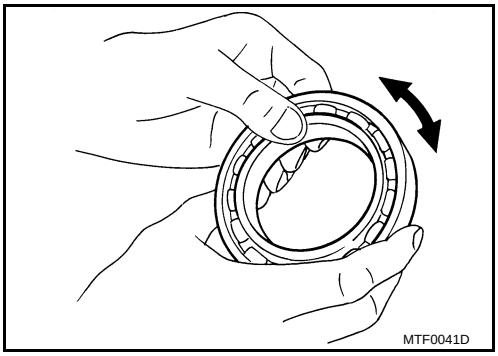

SCIA1753J

- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.


SCIA0608J

BEARING

Check for damage and rough rotation of bearing. If necessary, replace with new one.


MTF0041D

FINAL DRIVE

Exploded View

INFOID:0000000001381708

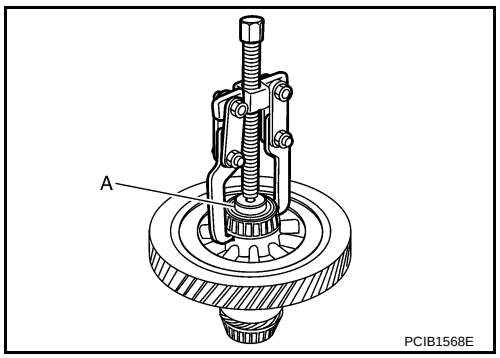
Refer to TM-635, "Exploded View".

Disassembly

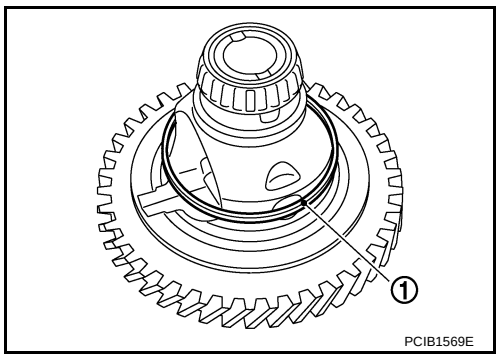
INFOID:0000000001381709

1. Remove differential side bearing using Tool (A) and suitable puller.

Tool number : ST33052000 —)



2. Remove lock ring (1) to differential case.
3. Remove pinion mate shaft, pinion mate gear, side gear and thrust washer to differential case.



Assembly

INFOID:0000000001381710

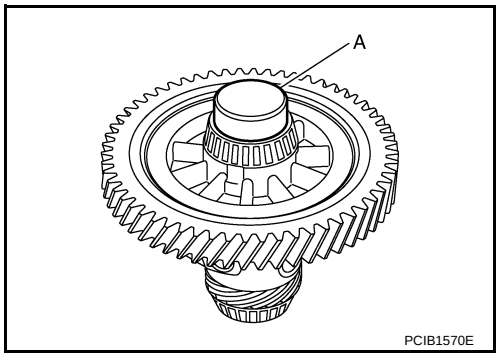
Assembly is in the reverse order of disassembly. Refer to TM-635, "Exploded View".

CAUTION:

Make sure that lock ring is securely installed to the groove.

- Install differential side bearing using Tool (A).

Tool number : KV40104920 —)

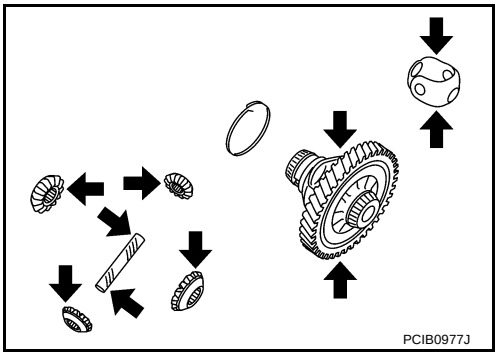


Inspection

INFOID:0000000001381711

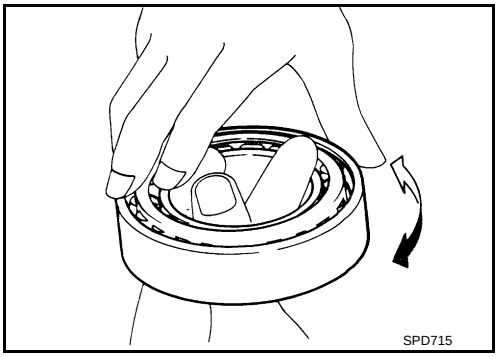
GEAR, WASHER SHAFT AND CASE

- Check side gears, thrust washers, pinion mate shaft, pinion mate gears, lock ring and differential case. If necessary, replace with a new one.



BEARING

- Check for bearing damage and rough rotation. If necessary, replace with a new one.
  CAUTION:
  When replacing tapered roller bearing, replace outer and inner races as a set.



SHIFT CONTROL

Exploded View

INFOID:0000000001381712

Refer to TM-635, "Exploded View".

Disassembly

INFOID:0000000001381713

Refer to TM-639, "Disassembly" for disassembly procedure.

Assembly

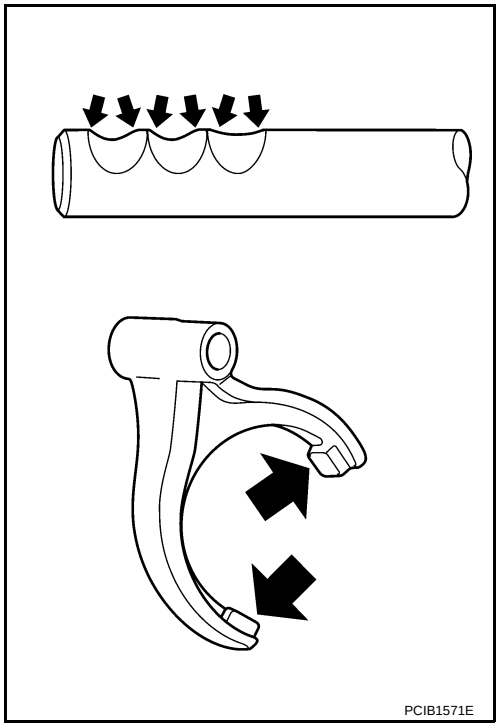
INFOID:0000000001381714

Refer to TM-645, "Assembly" for assembly procedure.

Inspection

INFOID:0000000001381715

- Check contact surface and sliding surface of fork rod and shift fork for wear, damage, and bend. Replace if necessary.



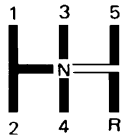
SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000001381716

TRANSAXLE

Engine type			HR16DE
Transaxle model			RS5F91R
Number of speed			5
Synchromesh type			Warner
Shift pattern			 SCIA0821E
Gear ratio	1st		3.7273
	2nd		2.0476
	3rd		1.3929
	4th		1.0968
	5th		0.8919
	Reverse		3.5455
	Final gear		4.0667
Number of teeth	Input gear	1st	11
		2nd	21
		3rd	28
		4th	31
		5th	37
		Reverse	11
	Main gear	1st	41
		2nd	43
		3rd	39
		4th	34
		5th	33
		Reverse	39
	Reverse idler gear		26
	Final gear	Final gear/Pinion	61/15
		Side gear/Pinion mate gear	13/9
Oil capacity		ℓ (US pt, Imp pt)	Approx. 2.6 (5-1/2, 4-5/8)
Remarks	Reverse synchronizer		Installed
	Double-cone synchronizer		1st and 2nd

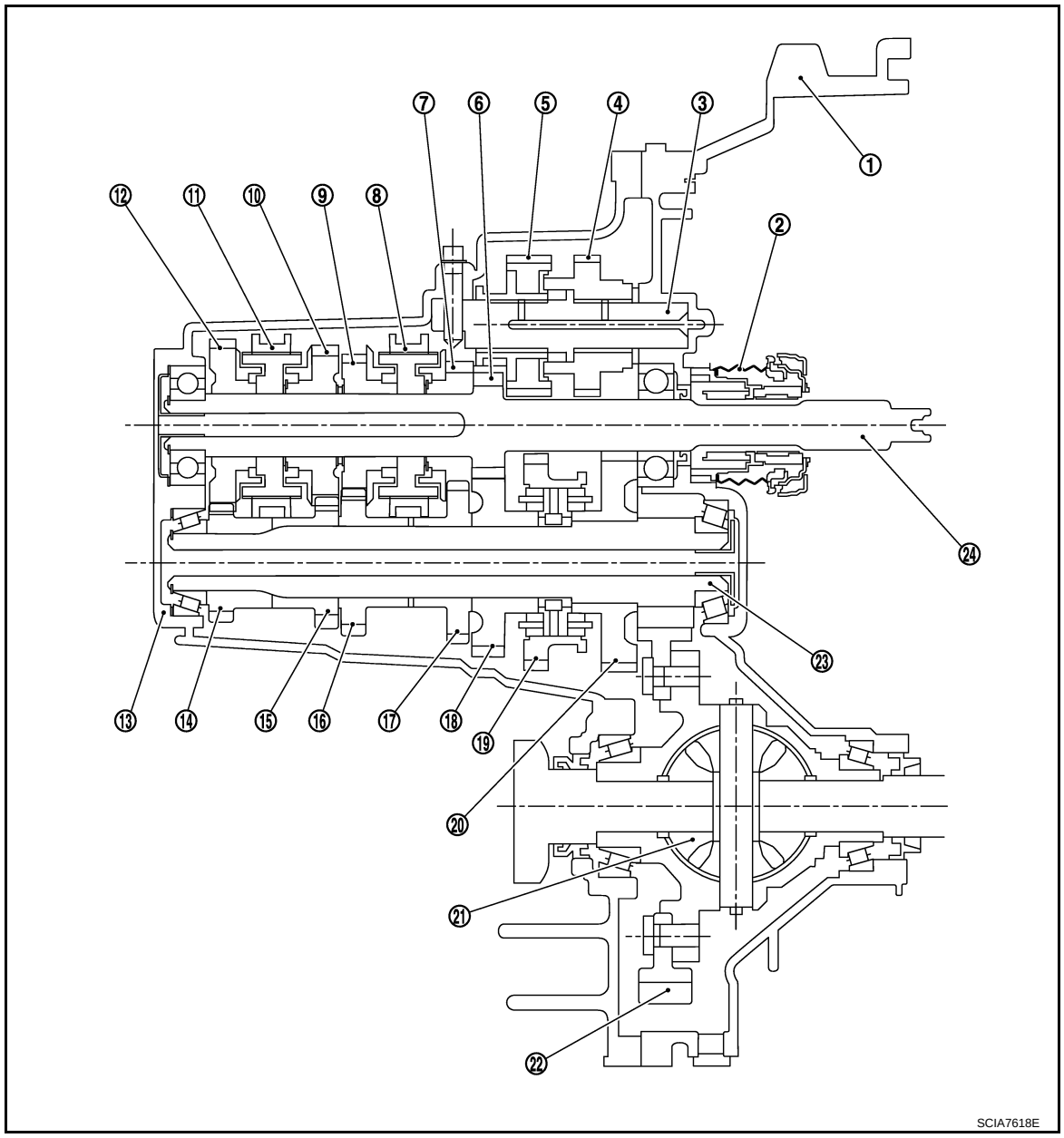
FUNCTION DIAGNOSIS

M/T SYSTEM

System Diagram

INFOID:0000000001381622

CROSS-SECTIONAL VIEW



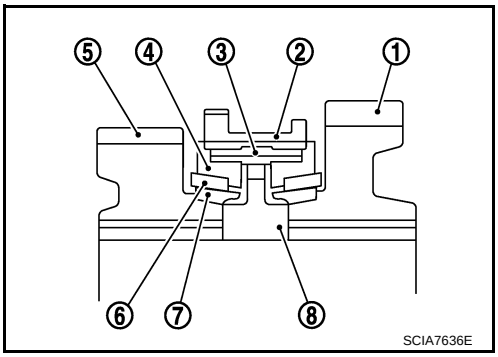
1. Clutch housing
2. CSC (Concentric Slave Cylinder)
3. Reverse idler shaft
4. Reverse input gear
5. Reverse output gear
6. 2nd input gear
7. 3rd input gear
8. 3rd-4th synchronizer assembly
9. 4th input gear
10. 5th input gear
11. 5th-6th synchronizer assembly
12. 6th input gear
13. Transaxle case
14. 6th main gear
15. 5th main gear
16. 4th main gear
17. 3rd main gear
18. 2nd main gear
19. 1st-2nd synchronizer assembly
20. 1st main gear
21. Differential assembly
22. Final gear
23. Mainshaft
24. Input shaft

System Description

INFOID:0000000001381623

TRIPLE-CONE SYNCHRONIZER

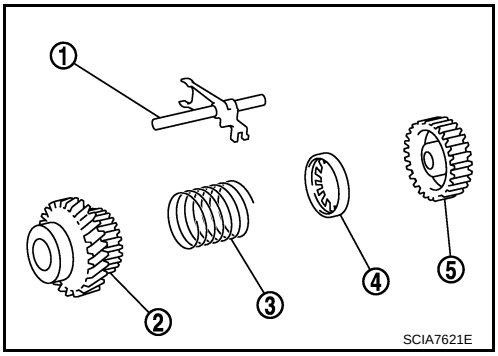
Triple-cone synchronizer is used for the 1st and the 2nd gears to reduce operating force of the control lever.



1 : 1st main gear
2 : 1st-2nd coupling sleeve
3 : Insert key
4 : Outer baulk ring
5 : 2nd main gear
6 : Synchronizer cone
7 : Inner baulk ring
8 : 1st-2nd synchronizer hub

REVERSE GEAR NOISE PREVENTION FUNCTION (SYNCHRONIZING METHOD)

Reverse gear assembly consists of reverse input gear, return spring, reverse baulk ring and reverse output gear. When the control lever is shifted to the reverse position, the construction allows smooth shift operation by stopping the reverse idler shaft rotation by frictional force of synchronizer.



1 : Reverse fork rod
2 : Reverse output gear
3 : Return spring
4 : Reverse baulk ring
5 : Reverse input gear

COMPONENT DIAGNOSIS

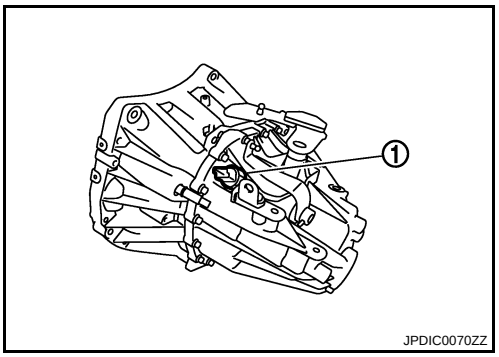
POSITION SWITCH

BACK-UP LAMP SWITCH

BACK-UP LAMP SWITCH : Component Parts Location

INFOID:0000000001381624

1 : Position switch



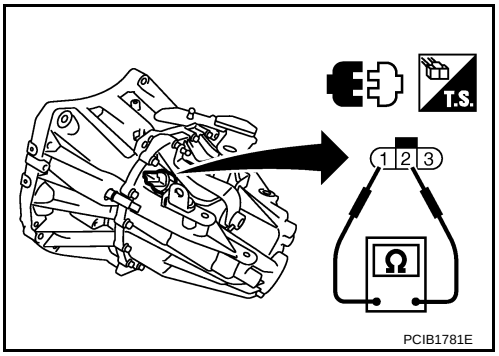
BACK-UP LAMP SWITCH : Component Inspection

INFOID:0000000001381625

1.CHECK BACK-UP LAMP SWITCH

Check continuity between position switch terminals with control lever turned to 1st to 6th and reverse position.

Terminals	Gear position	Continuity
1 – 2	Reverse	Existed
	Except reverse	Not existed



Is the inspection result normal?

YES >> INSPECTION END

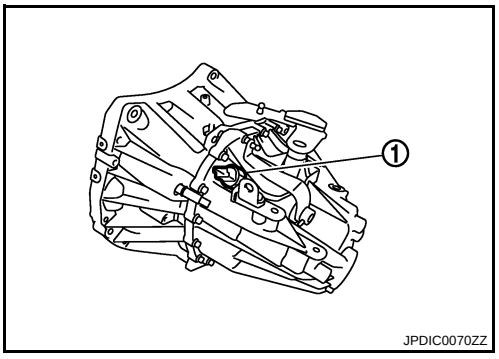
NO >> Replace position switch. Refer to TM-635, "Exploded View".

PARK/NEUTRAL POSITION (PNP) SWITCH

PARK/NEUTRAL POSITION (PNP) SWITCH : Component Parts Location

INFOID:0000000001381626

1 : Position switch



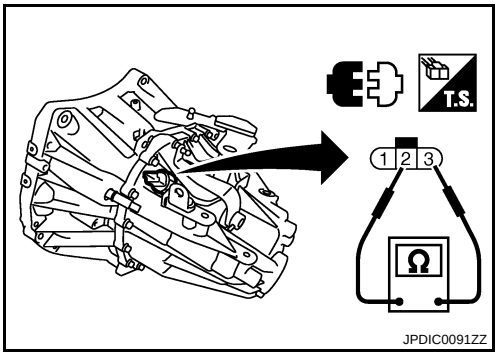
PARK/NEUTRAL POSITION (PNP) SWITCH : Component Inspection

INFOID:0000000001381627

1.CHECK PARK/NEUTRAL POSITION (PNP) SWITCH

Check continuity between position switch terminals with control lever turned to 1st to 6th and reverse position.

Terminals	Gear position	Continuity
2 – 3	Neutral	Existed
	Except neutral	Not existed



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace position switch. Refer to TM-635, "Exploded View".

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000001381628

Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

Reference page		TM-635			TM-635			TM-630	TM-635	TM-635			
SUSPECTED PARTS (Possible cause)		OIL (Oil level is low.)	OIL (Wrong oil.)	OIL (Oil level is high.)	GASKET (Damaged)	OIL SEAL (Worn or damaged)	O-RING (Worn or damaged)	SHIFT CONTROL LINKAGE (Worn)	SHIFT FORK (Worn)	GEAR (Worn or damaged)	BEARING (Worn or damaged)	BAULK RING (Worn or damaged)	INSERT SPRING (Damaged)
Symptoms	Noise	1	2							3	3		
	Oil leakage		3	1	2	2	2						
	Hard to shift or will not shift		1	1				2				3	3
	Jumps out of gear							1	2	2			

PRECAUTION

PRECAUTIONS

Service Notice or Precautions for Manual Transaxle

INFOID:0000000001381629

CAUTION:

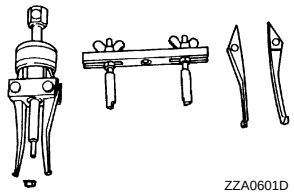
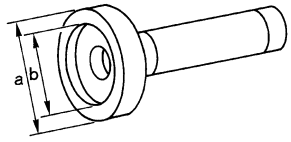
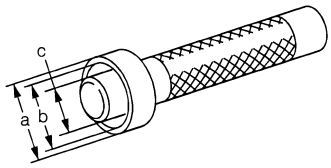
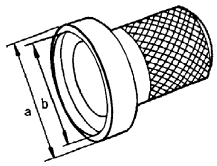
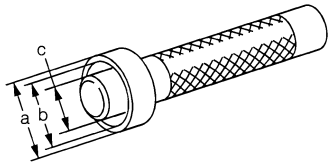
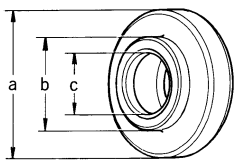
- **If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage.**
- **Never reuse transaxle gear oil, once it has been drained.**
- **Check oil level or replace gear oil with vehicle on level surface.**
- **During removal or installation, keep inside of transaxle clear of dust or dirt.**
- **Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts they are applied.**
- **In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, use it.**
- **Never damage sliding surfaces and mating surfaces.**

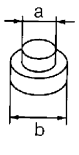
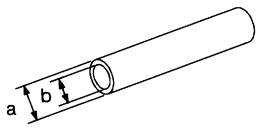
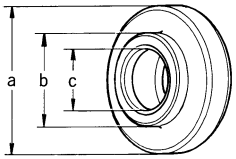
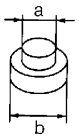
PREPARATION

PREPARATION

Special Service Tools

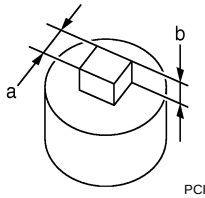
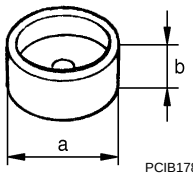
INFOID:0000000001381630

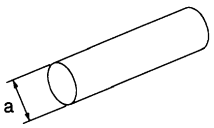
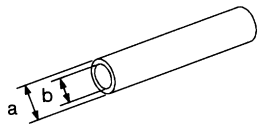
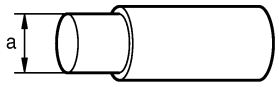
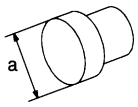
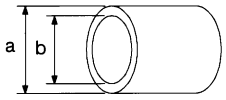
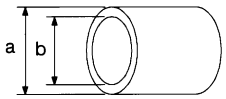
Tool number Tool name		Description
KV381054S0 Puller	 ZZA0601D	Removing mainshaft front bearing outer race
KV38100200 Drift a: 65 mm (2.56 in) dia. b: 49 mm (1.93 in) dia.	 ZZA1143D	• Installing mainshaft front bearing outer race • Installing mainshaft rear bearing outer race • Installing differential side bearing outer race (clutch housing side)
ST33220000 Drift a: 37 mm (1.46 in) dia. b: 31 mm (1.22 in) dia. c: 22 mm (0.87 in) dia.	 ZZA1046D	Installing input shaft oil seal
ST33400001 Drift a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.	 ZZA0814D	Installing differential side bearing outer race (transaxle case side)
KV38100300 Drift a: 54 mm (2.13 in) dia. b: 46 mm (1.81 in) dia. c: 32 mm (1.26 in) dia.	 ZZA1046D	Installing differential side oil seal
ST36720030 Drift a: 70 mm (2.76 in) dia. b: 40 mm (1.57 in) dia. c: 29 mm (1.14 in) dia.	 ZZA0978D	• Installing input shaft rear bearing • Installing mainshaft front bearing inner race

Tool number Tool name	Description
ST33052000 Drift a: 22 mm (0.87 in) dia. b: 28 mm (1.10 in) dia.  ZZA0969D	• Removing mainshaft rear bearing inner race • Removing 6th main gear • Removing 5th main gear • Removing 4th main gear • Removing 1st main gear • Removing 1st-2nd synchronizer assembly • Removing 2nd main gear • Removing bushing • Removing 3rd main gear • Removing mainshaft front bearing inner race
KV32102700 Drift a: 54 mm (2.13 in) dia. b: 32 mm (1.26 in) dia.  S-NT065	• Installing bushing • Installing 2nd main gear • Installing 3rd main gear • Installing 4th main gear • Installing 5th main gear • Installing 6th main gear
ST30901000 Drift a: 79 mm (3.11 in) dia. b: 45 mm (1.77 in) dia. c: 35.2 mm (1.386 in) dia.  ZZA0978D	Installing mainshaft rear bearing inner race
ST33061000 Drift a: 28.5 mm (1.122 in) dia. b: 38 mm (1.50 in) dia.  ZZA0969D	Removing differential side bearing inner race (clutch housing side)

Commercial Service Tools

INFOID:0000000001381631

Tool name	Description
Socket a: 8 mm (0.31 in) b: 5 mm (0.20 in)  PCIB1776E	Removing and installing drain plug
Spacer a: 25 mm (0.98 in) dia. b: 25 mm (0.98 in)  PCIB1780E	Removing mainshaft front bearing outer race

Tool name	Description
Drift a: 17 mm (0.67 in) dia.  S-NT063	• Installing bushing • Installing shifter lever oil seal • Installing selector lever oil seal
Drift a: 35 mm (1.38 in) dia. b: 25 mm (0.98 in) dia.  S-NT065	Installing input shaft front bearing
Drift a: 24 mm (0.94 in) dia.  PCIB1779E	Removing input shaft rear bearing
Drift a: 43 mm (1.69 in) dia.  NT109	• Removing differential side bearing inner race (transaxle case side) • Installing input shaft rear bearing
Drift a: 45 mm (1.77 in) dia. b: 39 mm (1.54 in) dia.  S-NT474	Installing differential side bearing inner race (clutch housing side)
Drift a: 52 mm (2.05 in) dia. b: 45 mm (1.77 in) dia.  S-NT474	Installing differential side bearing inner race (transaxle case side)

ON-VEHICLE MAINTENANCE

GEAR OIL

Exploded View

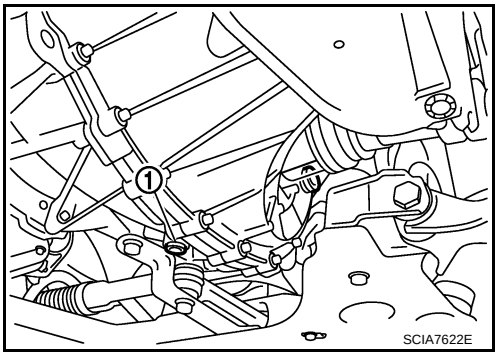
INFOID:0000000001381632

Refer to TM-635, "Exploded View".

Draining

INFOID:0000000001381633

1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug (1) and then drain oil.
3. Set a new gasket on drain plug (1) and install it to transaxle and tighten drain plug to the specified torque. Refer to TM-683, "Exploded View".
   CAUTION:
   Do not reuse gasket.



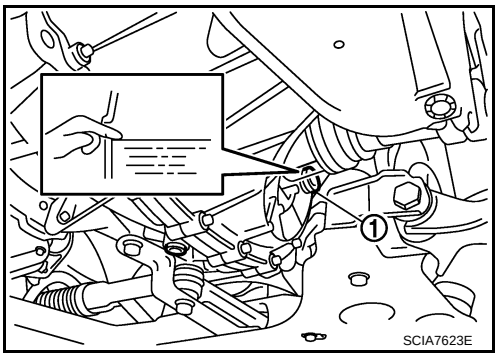
Refilling

INFOID:0000000001381634

1. Remove filler plug (1). Fill with new oil until oil level reaches the specified limit near filler plug hole as shown.

   Oil grade and capacity : Refer to MA-19, "Fluids and Lubricants".

2. After refilling oil, check oil level.
3. Set a new gasket on filler plug (1), then install it to transaxle and tighten to the specified torque. Refer to TM-683, "Exploded View".
   CAUTION:
   Do not reuse gasket.



Inspection

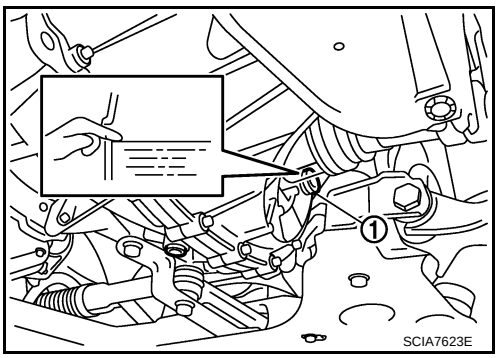
INFOID:0000000001381635

LEAKAGE

Make sure that oil is not leaking from transaxle or around it.

LEVEL

1. Remove filler plug (1) and check oil level at filler plug hole as shown.
   CAUTION:
   Do not start engine while checking oil level.
2. Set a new gasket on filler plug (1) and install it to the transaxle case.
   CAUTION:
   Do not reuse gasket.
3. Tighten filler plug to the specified torque. Refer to TM-683, "Exploded View".



ON-VEHICLE REPAIR

SIDE OIL SEAL

Exploded View

INFOID:0000000001381636

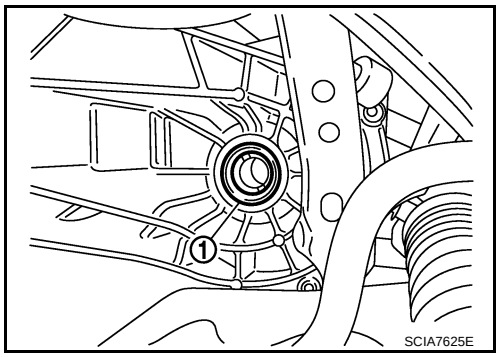
Refer to TM-635, "Exploded View".

Removal and Installation

INFOID:0000000001381637

REMOVAL

1. Remove front drive shafts. Refer to FAX-10, "Removal and Installation (Left Side)" and FAX-11, "Removal and Installation (Right Side)".
2. Remove differential side oil seals (1) using a suitable tool.
   CAUTION:
   Do not damage transaxle case and clutch housing.



INSTALLATION

Installation is in the reverse order of removal.

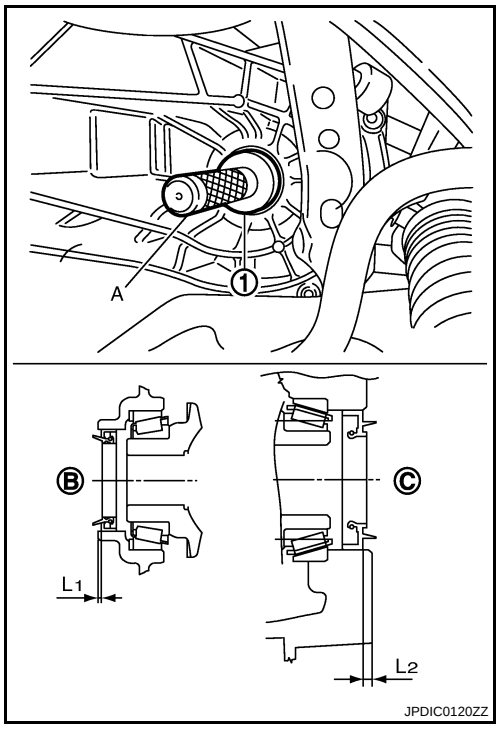
- Install differential side oil seals (1) to transaxle case side (B) and clutch housing side (C) using Tool (A).

Tool number : KV38100300

Dimension "L_1" : 1.2 - 1.8 mm (0.047 - 0.071 in)
Dimension "L_2" : 2.7 - 3.3 mm (0.106 - 0.130 in)

CAUTION:
- **Do not reuse differential side oil seal.**
- **When installing, never incline differential side oil seal.**
- **Do not damage clutch housing and transaxle case.**

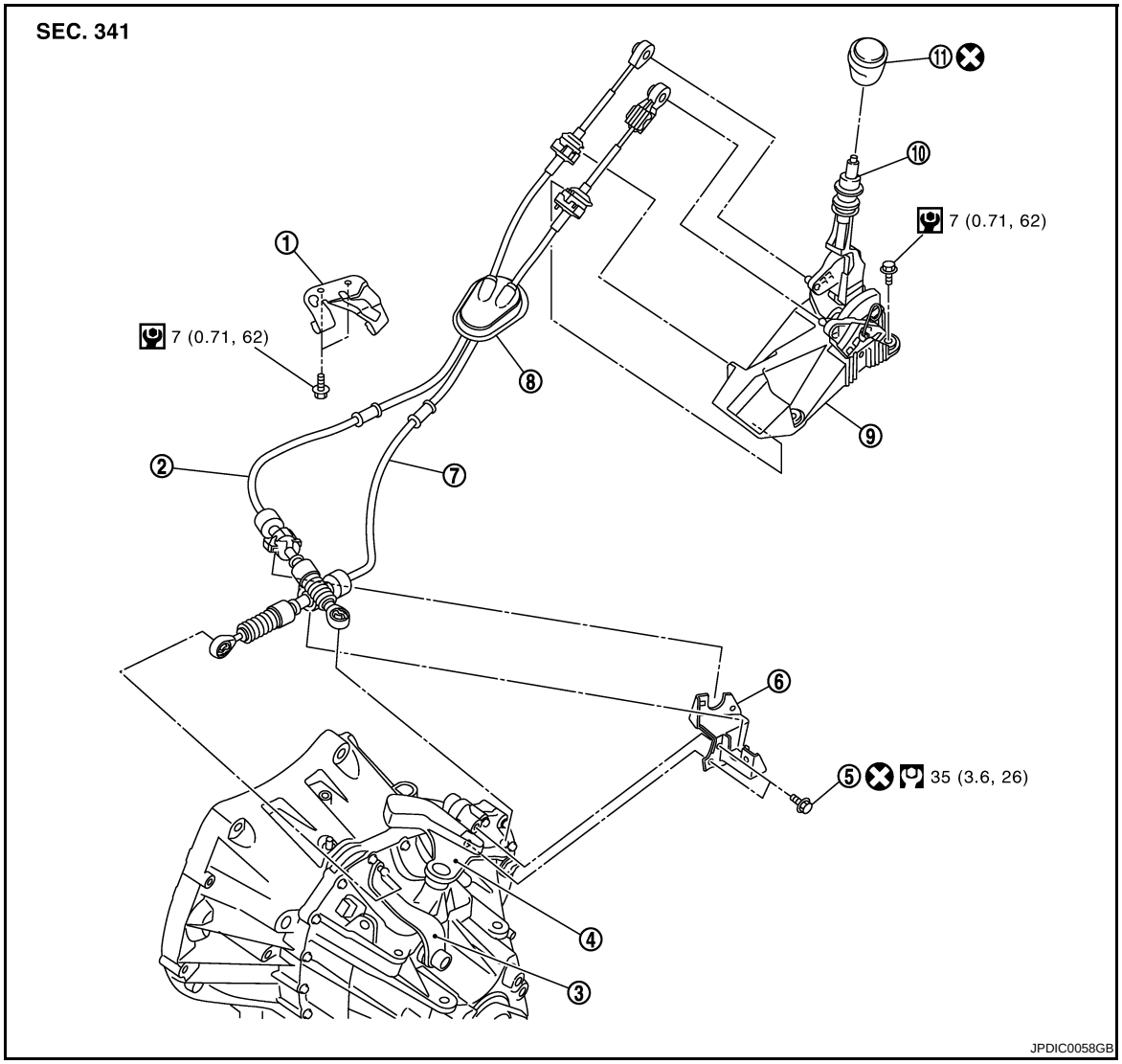
- Check oil level and oil leakage after installation. Refer to TM-628, "Inspection".



CONTROL LINKAGE

Exploded View

INFOID:0000000001381638



1. Bracket
2. Shift cable
3. Selector lever
4. Shifter lever
5. Tapping bolt
6. Cable mounting bracket
7. Select cable
8. Grommet
9. Control device assembly
10. Control lever
11. Control lever knob

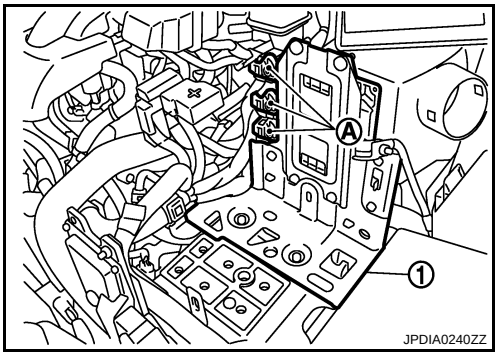
Removal and Installation

INFOID:0000000001381639

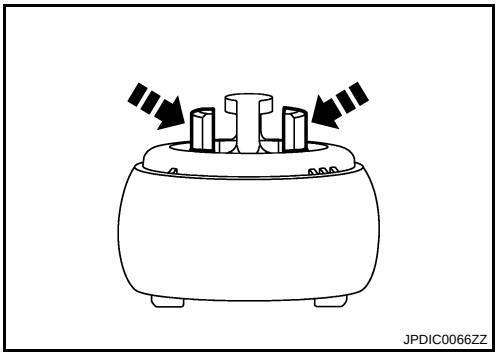
REMOVAL

1. Remove the air cleaner and air duct. Refer to EM-154, "Removal and Installation" (MR18DE) or EM-269, "Removal and Installation" (K9K).
2. Remove the battery. Refer to PG-6, "Removal and Installation".

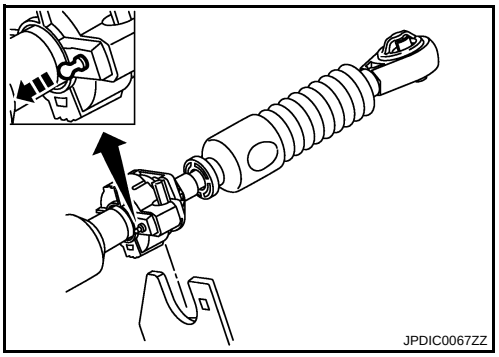
3. Disconnect connectors (A) and then remove bracket (1).



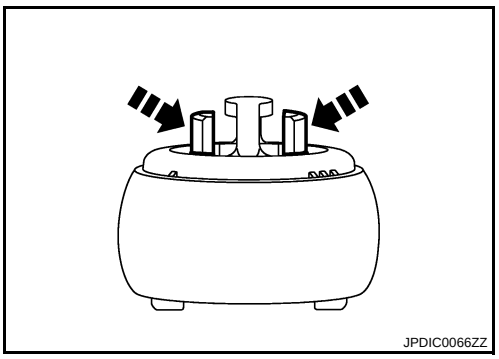
4. While pressing the lock of the select cable in the direction of the arrow shown, remove the select cable from the selector lever.
5. While pressing the lock of the shift cable in the direction of the arrow shown, remove the shift cable from the shifter lever.



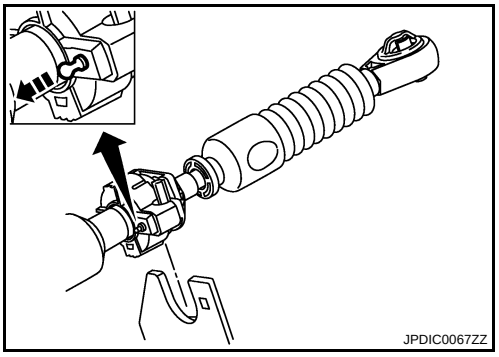
6. While pulling the lock of the select cable in the direction of the arrow shown, remove the select cable from the cable mounting bracket.
7. While pulling the lock of the shift cable in the direction of the arrow shown, remove the shift cable from the cable mounting bracket.
8. Remove the control lever knob.
9. Remove console finisher assembly and the center console assembly. Refer to IP-11, "Removal and Installation".
10. Shift the control lever to the neutral position.



11. While pressing the lock of the select cable in the direction of the arrow shown, remove the select cable from the control device assembly.
12. While pressing the lock of the shift cable in the direction of the arrow shown, remove the shift cable from the control device assembly.



13. While pulling the lock of the select cable in the direction of the arrow shown, remove the select cable from the control device assembly.
14. While pulling the lock of the shift cable in the direction of the arrow shown, remove the shift cable from the control device assembly.
15. Remove the control device assembly.
16. Remove the heat plate.
17. Remove the bracket.



18. Remove the grommet and then remove the shift cable and select cable from the vehicle.

INSTALLATION

Installation is in the reverse order of removal.

- Shift the control lever to the neutral position.
- Securely assemble each cable and the selector lever and shifter lever.
- Securely assemble each cable and the cable mounting bracket.
- Securely assemble each cable and the control device assembly.
- Make sure that the claws of grommet are in contact with the floor.
- Be careful about the installation direction and push the control lever knob into the control lever.

  CAUTION:

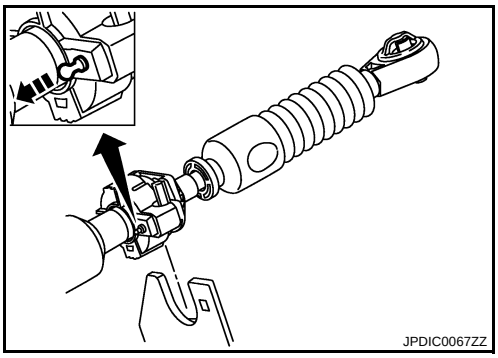
  Never reuse control lever knob.
- Tapping work for tapping bolt is not applied to new clutch housing. Do not perform tapping by other than screwing tapping bolt because tapping is formed by screwing tapping bolt into clutch housing.

  CAUTION:

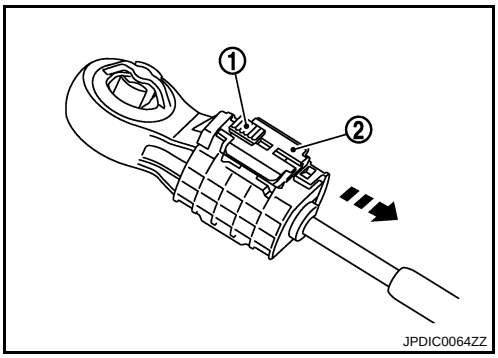
  Never reuse tapping bolt.

Install the select cable (the control device assembly side) with the following procedure.

1. While pulling the lock of the select cable in the direction of the arrow shown, install the select cable to the control device assembly.



2. Slide the lock (1) of the select cable in the direction of the arrow as shown to pull up the stopper (2) of the select cable.
3. Install the end of the select cable to the pin of the control device assembly.



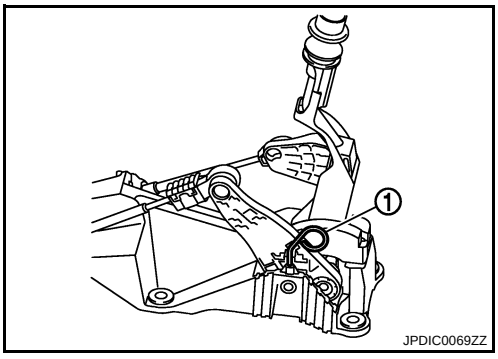
4. Install the lever stopper pin (1) or a pin [3 mm (0.12 in) dia.] to the control device assembly.

   CAUTION:

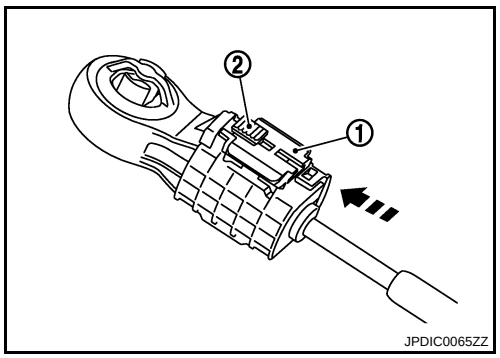
   Select cable cannot be adjusted accurately without a use of a lever stopper pin or a pin [3 mm (0.12 in) dia.].

   NOTE:

   A lever stopper pin is not included in control device assembly. Therefore, if the control device assembly is not replaced, prepare a pin [3 mm (0.12 in) dia.].
5. Check that the control lever does not move in the direction of the select. If it moves, repeat step 3.
6. Shift the control lever to 4th gear position.



7. With the stopper (1) of the select cable pressed into all the way, slide lock (2) of the select cable all the way in the direction of the arrow.
8. Remove the lever stopper pin or a pin [3 mm (0.12 in) dia.] from the control device assembly.
9. Shift the control lever to each gear position to check that there is no binding. If any, repeat step 3.



Inspection

INFOID:0000000001381640

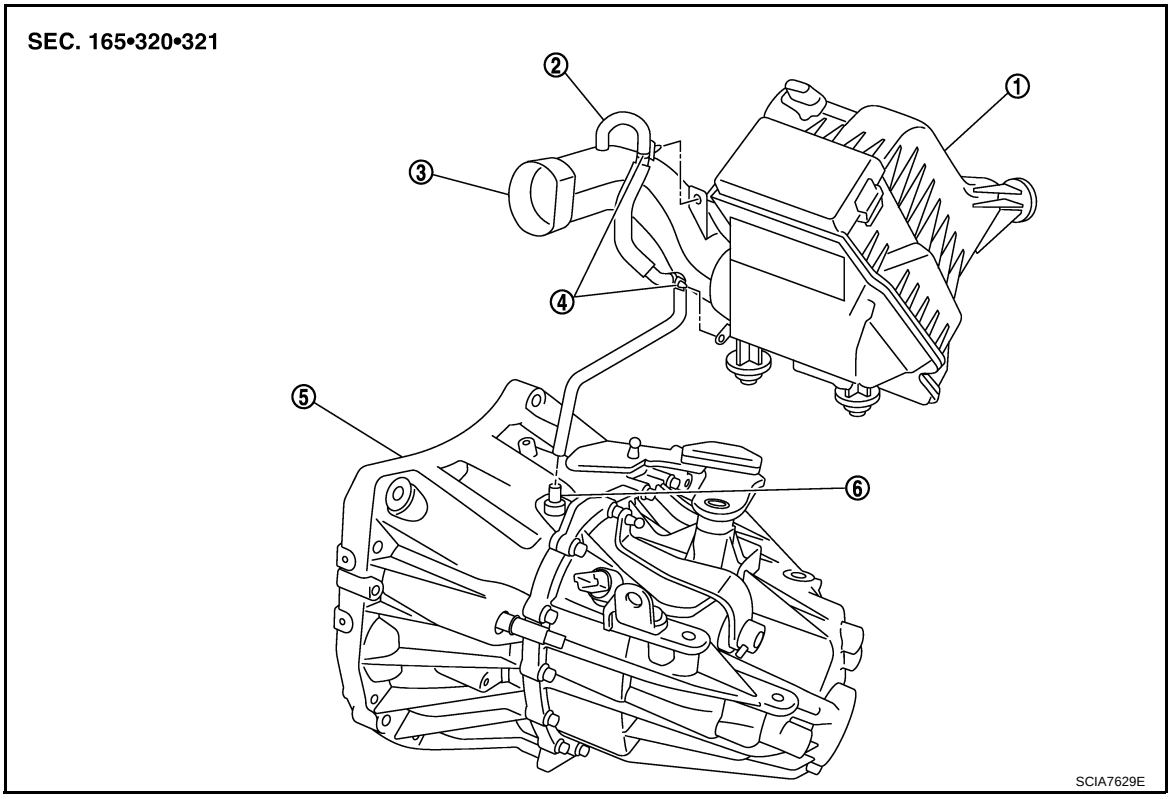
After installing, confirm the following items:
- When the control lever is shifted to 1st-2nd side and 5th-6th side, confirm the control lever returns to neutral position smoothly.
- When the control lever is shifted to each position, make sure there is no binding or disconnection in each boot.

AIR BREATHER HOSE

Exploded View

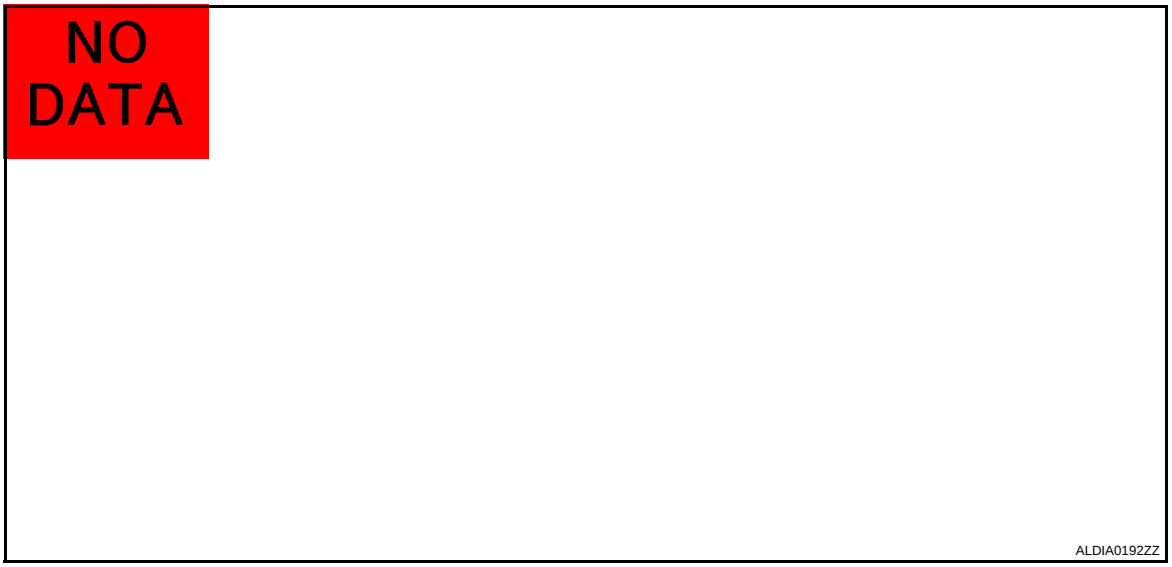
INFOID:0000000001381641

MR18DE ENGINE MODELS



1. Air cleaner case
2. Air breather hose
3. Air duct
4. Clip
5. Transaxle assembly
6. ⇐ Two way connector

K9K ENGINE MODELS



1. Air duct
2. Transaxle assembly
3. Air breather hose

Removal and Installation

INFOID:0000000001381642

REMOVAL

MR18DE Engine Models

1. Remove the battery. Refer to PG-6, "Removal and Installation".
2. Remove air duct and air cleaner case. Refer to EM-269, "Removal and Installation".
3. Remove the air breather hose.

CAUTION:
When removing air breather hose, be sure to hold two way connector securely.

K9K Engine Models

1. Remove the air duct.
2. Remove the 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.

MR18DE Engine Models

- When installing air breather hose on two way connector, aim paint mark face toward the vehicle front.
- When installing air breather hose on two way connector, push it until it hits transaxle case.
- When installing air breather hose to air cleaner case, make sure that clips are fully inserted.

K9K Engine Models

- When installing air breather hose to transaxle, aim paint mark face toward the vehicle front.
- When installing air breather hose to transaxle, push it until it hits transaxle case.
- When installing air breather hose to air duct, make sure that clip is fully inserted.

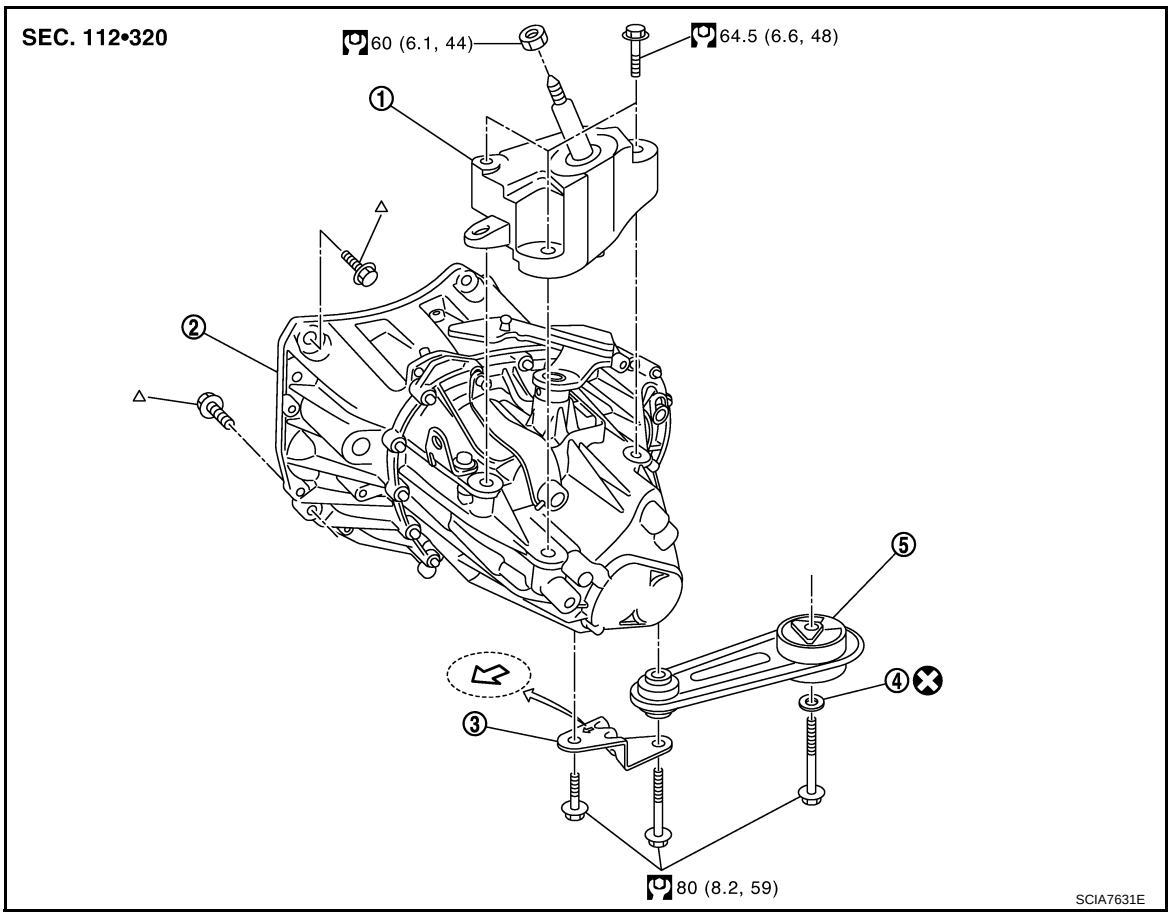
REMOVAL AND INSTALLATION

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001381643

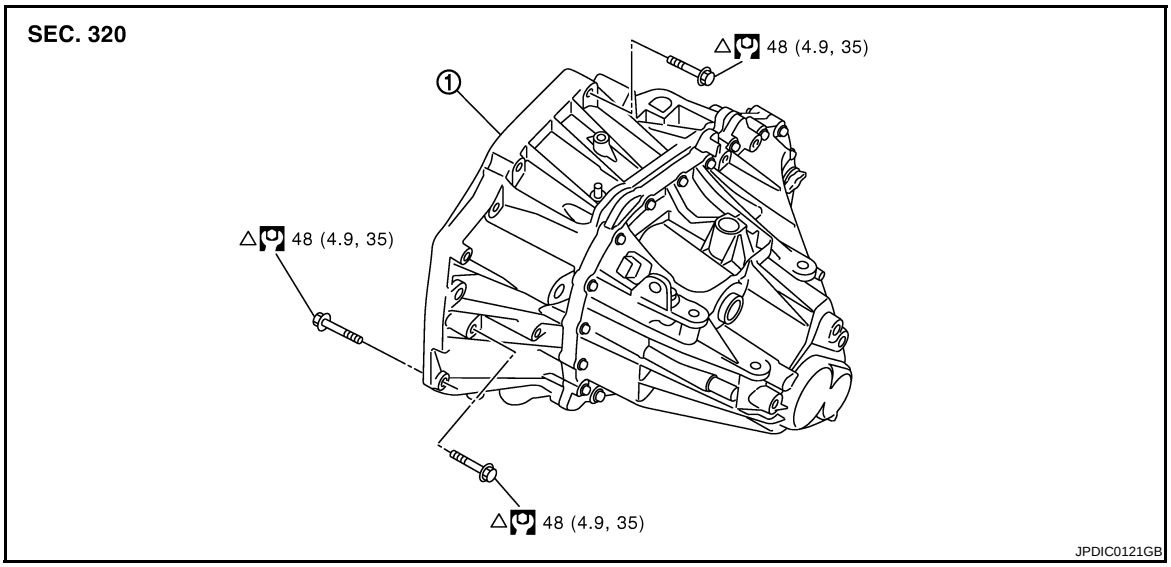
MR18DE



1. LH engine mount bracket (transaxle side)
2. Transaxle assembly
3. Rear engine mount bracket
4. Washer
5. Rear torque rod
⇐ Front

△: Refer to installation.

K9K



1. Transaxle assembly

△: Refer to installation.

Removal and Installation

INFOID:0000000001381644

CAUTION:
If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Return CSC insert to original position to remove transaxle assembly. Dust on clutch disc sliding parts may damage seal of CSC and may cause clutch fluid leakage. Refer to CL-11, "Removal and Installation".

REMOVAL

1. Drain gear oil. Refer to TM-672, "Draining".
2. Drain clutch fluid and remove clutch tube from CSC. Refer to CL-12, "Removal and Installation".
   CAUTION:
   Do not depress clutch pedal during removal procedure.
3. Remove the engine and transaxle as an assembly from the vehicle. Refer to EM-207, "Removal and Installation" (MR18DE) or EM-302, "Removal and Installation" (K9K).
4. Remove the transaxle to engine and engine to transaxle bolts.
5. Separate the tranaxle assembly from the engine.

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:
- **The transaxle assembly must not interfere with the wire harnesses and clutch tube.**
- **When installing transaxle assembly, never bring input shaft into contact with clutch cover.**

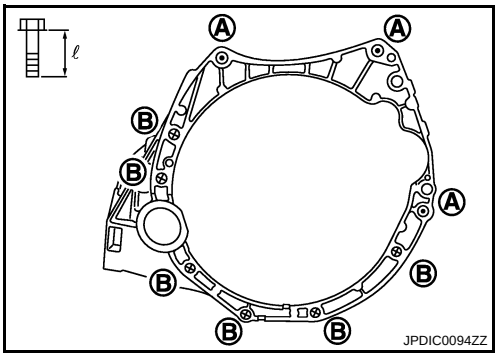
MR18DE

Tighten bolts to the specified torque.

: Transaxle to engine

: Engine to transaxle

Bolt symbol	A	B
Quantity	3	6



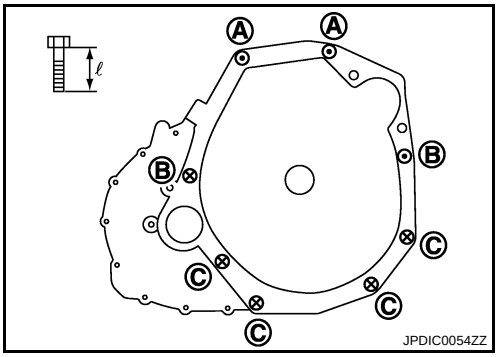
Bolt symbol	A	B
" ℓ " mm (in)	60 (2.36)	50 (1.97)
Tightening torque N·m (kg-m, ft-lb)	62.0 (6.3, 46)	

K9K

Tighten bolts to the specified torque.

: Transaxle to engine

: Engine to transaxle



Bolt symbol	A	B	C
Quantity	2	2	4
" ℓ " mm (in)	50 (1.97)	80 (3.15)	65 (2.56)
Tightening torque N·m (kg-m, ft-lb)	48 (4.9, 35)		

- Refer to CL-11, "Removal and Installation" for CSC (Concentric Slave Cylinder) installation procedure.
- Refer to TM-674, "Removal and Installation" for select cable and shift cable installation procedure.
- Bleed the air from the clutch hydraulic system. Refer to CL-8, "Air Bleeding Procedure".
- After installation, check for oil leakage and oil level. Refer to TM-672, "Inspection".

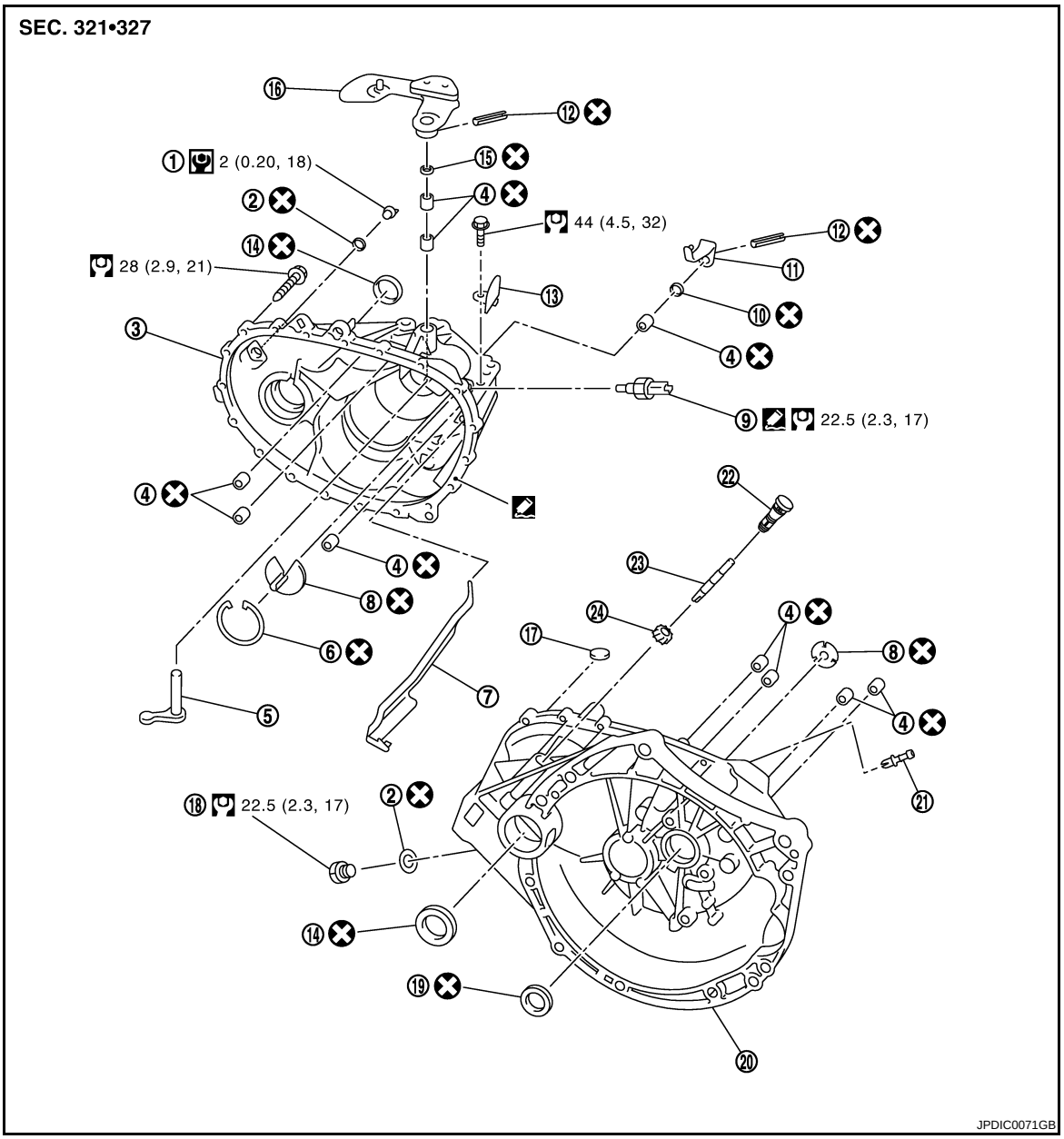
DISASSEMBLY AND ASSEMBLY

TRANSAXLE ASSEMBLY

Exploded View

INFOID:0000000001381645

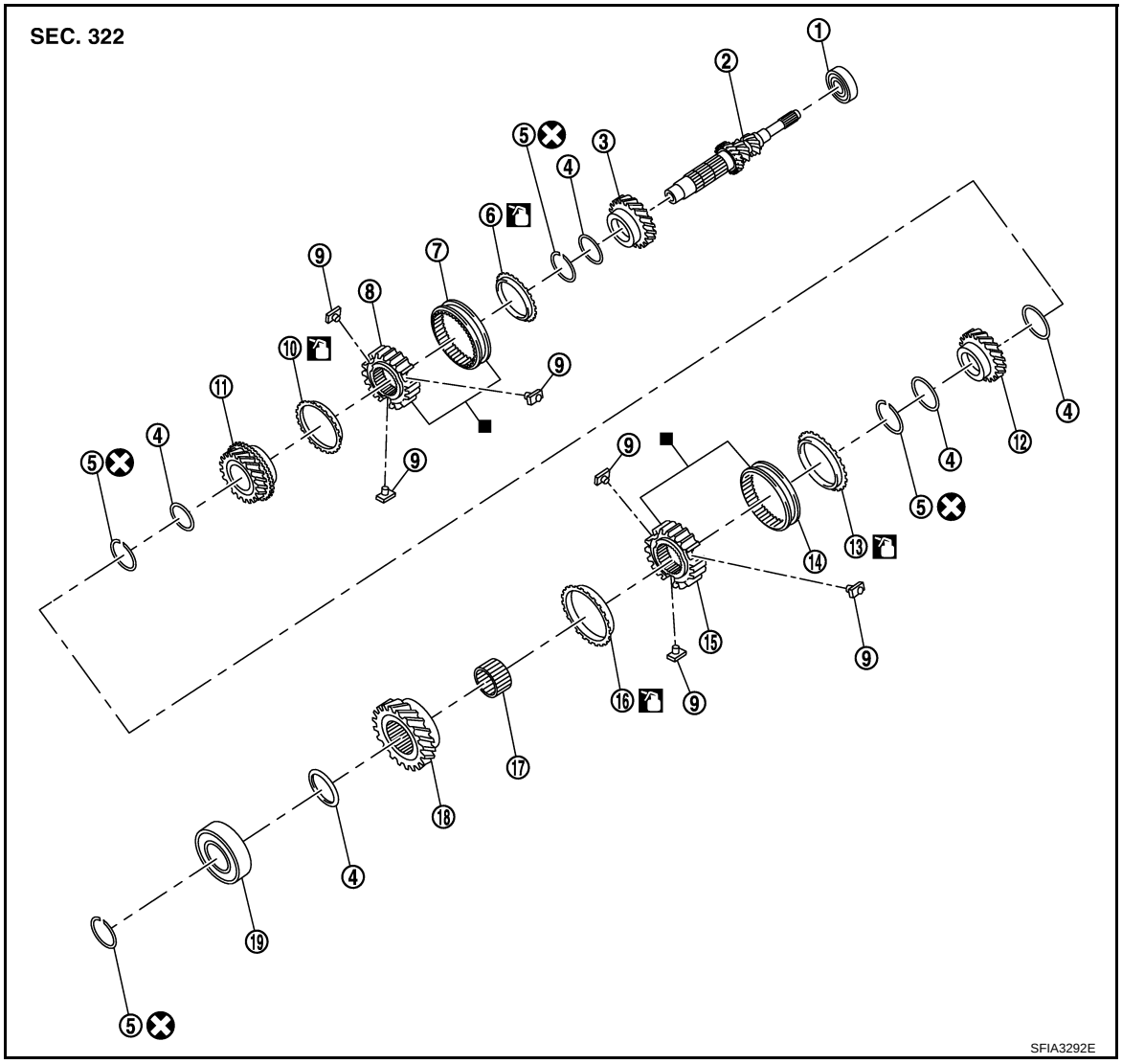
CASE AND HOUSING



1. Filler plug
2. Gasket
3. Transaxle case
4. Bushing
5. Shift finger
6. Snap ring
7. Oil gutter
8. Oil channel
9. Position switch
10. Shifter lever oil seal
11. Shifter lever
12. Retaining pin
13. Bracket
14. Differential side oil seal
15. Selector lever oil seal
16. Selector lever
17. Magnet
18. Drain plug
19. Input shaft oil seal
20. Clutch housing
21. Two way connector
22. Plug (if equipped)
23. Pinion shaft (if equipped)
24. Pinion gear (if equipped)

: Apply Genuine Liquid Gasket, Three Bond 1215 or an equivalent.

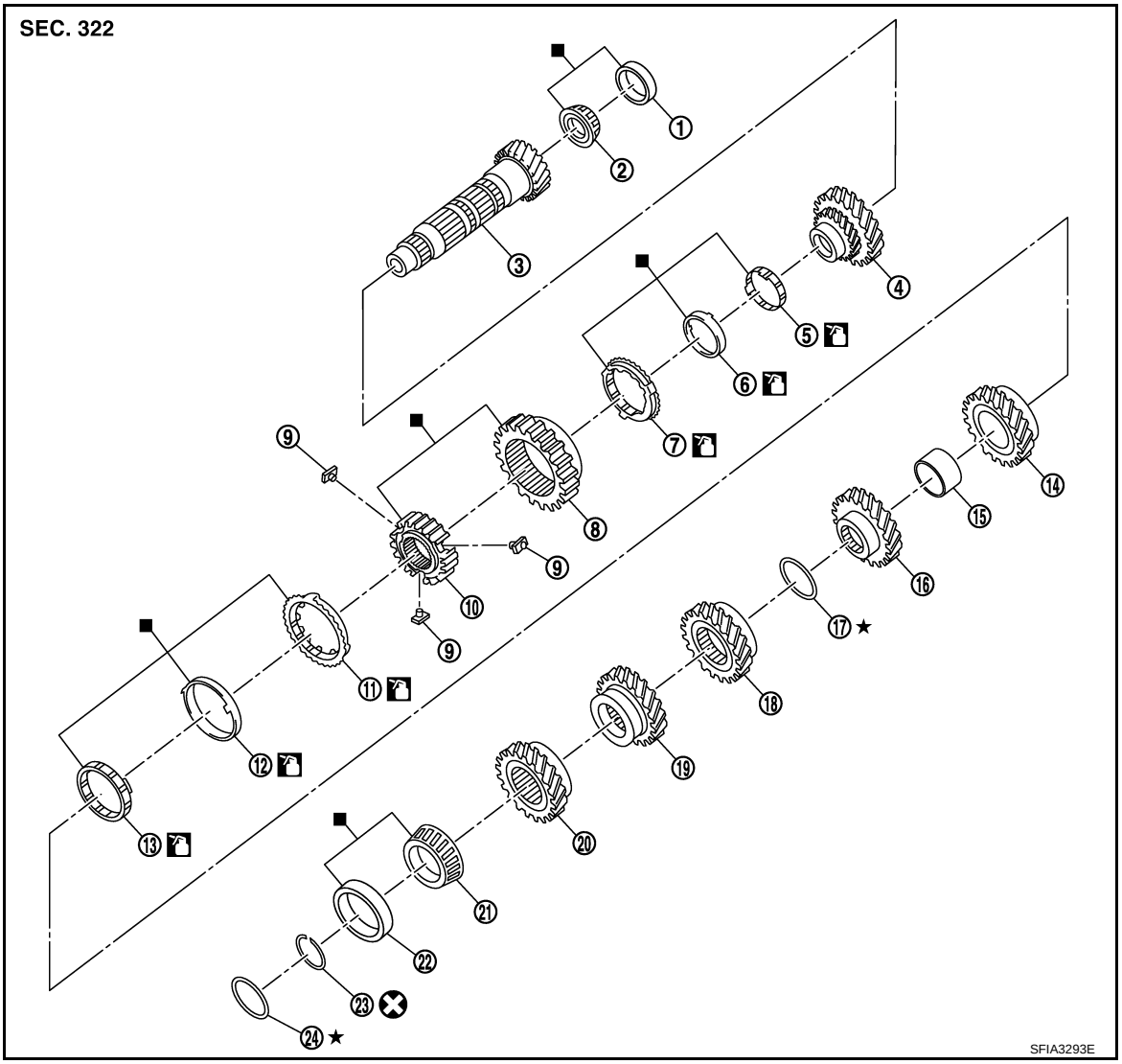
SHAFT AND GEAR



1. Input shaft front bearing
2. Input shaft
3. 3rd input gear
4. Washer
5. Snap ring
6. 3rd baulk ring
7. 3rd-4th coupling sleeve
8. 3rd-4th synchronizer hub
9. Insert key
10. 4th baulk ring
11. 4th input gear
12. 5th input gear
13. 5th baulk ring
14. 5th-6th coupling sleeve
15. 5th-6th synchronizer hub
16. 6th baulk ring
17. Needle bearing
18. 6th input gear
19. Input shaft rear bearing

: Apply gear oil.

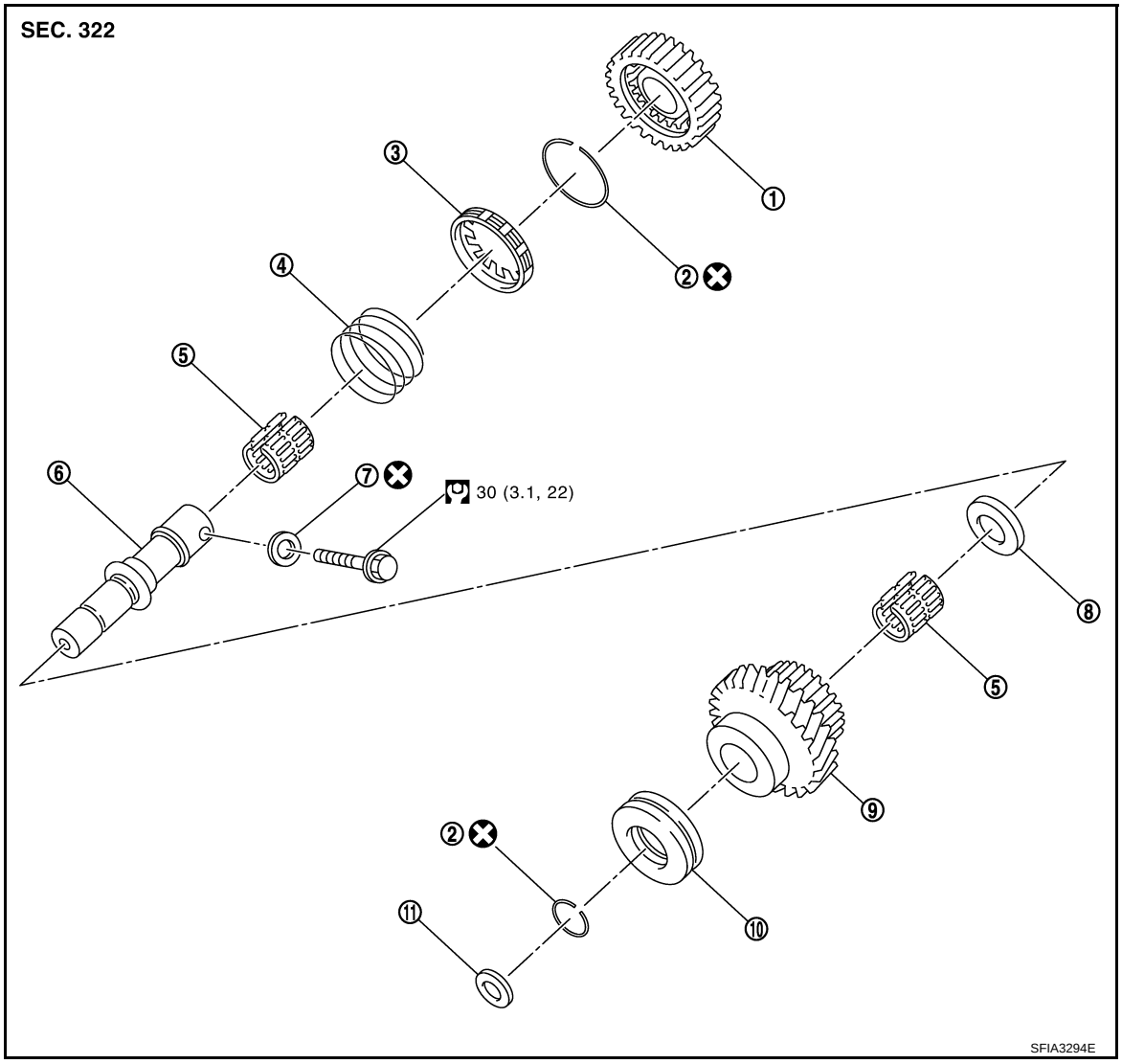
: Replace the parts as a set.



1. Mainshaft front bearing outer race	2. Mainshaft front bearing inner race	3. Mainshaft
4. 1st main gear	5. 1st inner baulk ring	6. 1st synchronizer cone
7. 1st outer baulk ring	8. 1st-2nd coupling sleeve	9. Insert key
10. 1st-2nd synchronizer hub	11. 2nd outer baulk ring	12. 2nd synchronizer cone
13. 2nd inner baulk ring	14. 2nd main gear	15. Bushing
16. 3rd main gear	17. Intermediate adjusting shim	18. 4th main gear
19. 5th main gear	20. 6th main gear	21. Mainshaft rear bearing inner race
22. Mainshaft rear bearing outer race	23. Snap ring	24. Bearing preloading shim

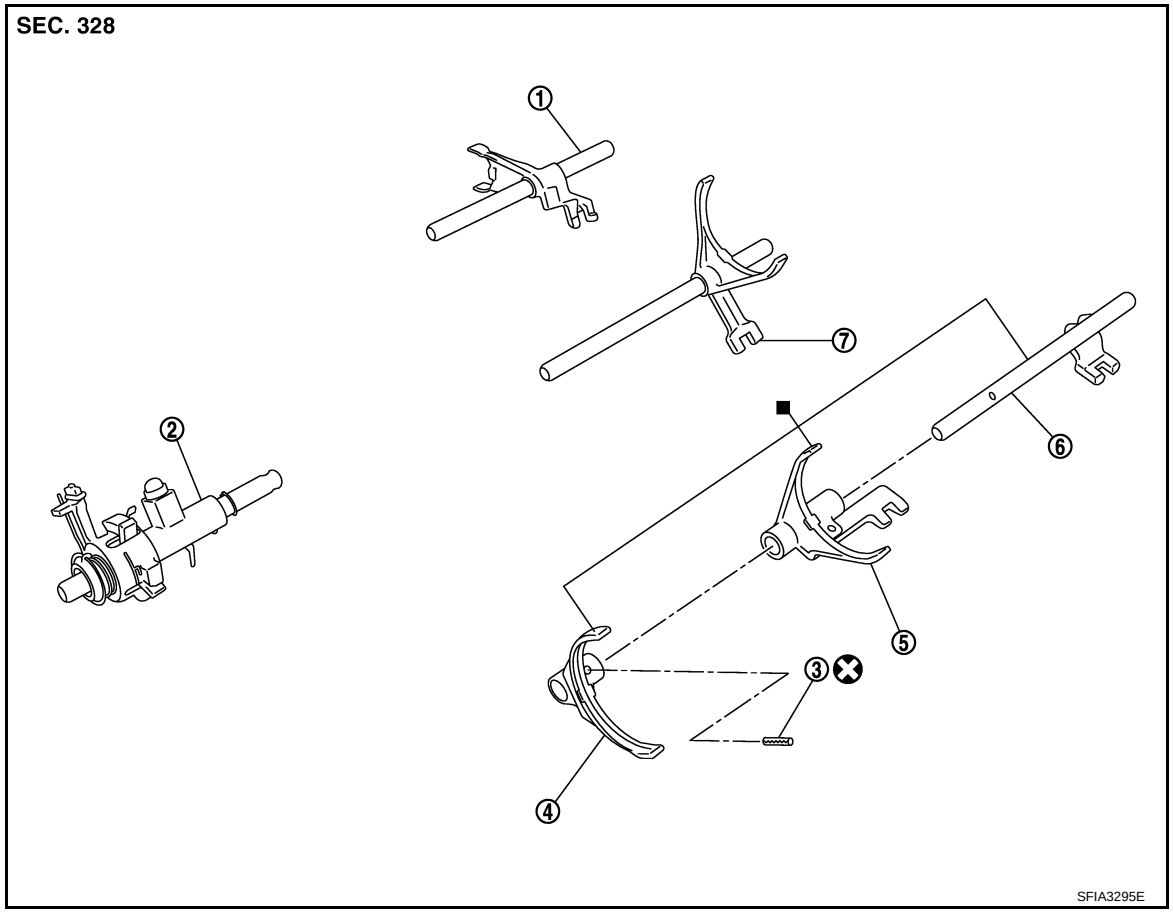
: Apply gear oil.

: Replace the parts as a set.



1. Reverse output gear
2. Snap ring
3. Reverse baulk ring
4. Return spring
5. Needle bearing
6. Reverse idler shaft
7. Seal washer
8. Washer
9. Reverse input gear
10. Lock washer
11. Spring washer

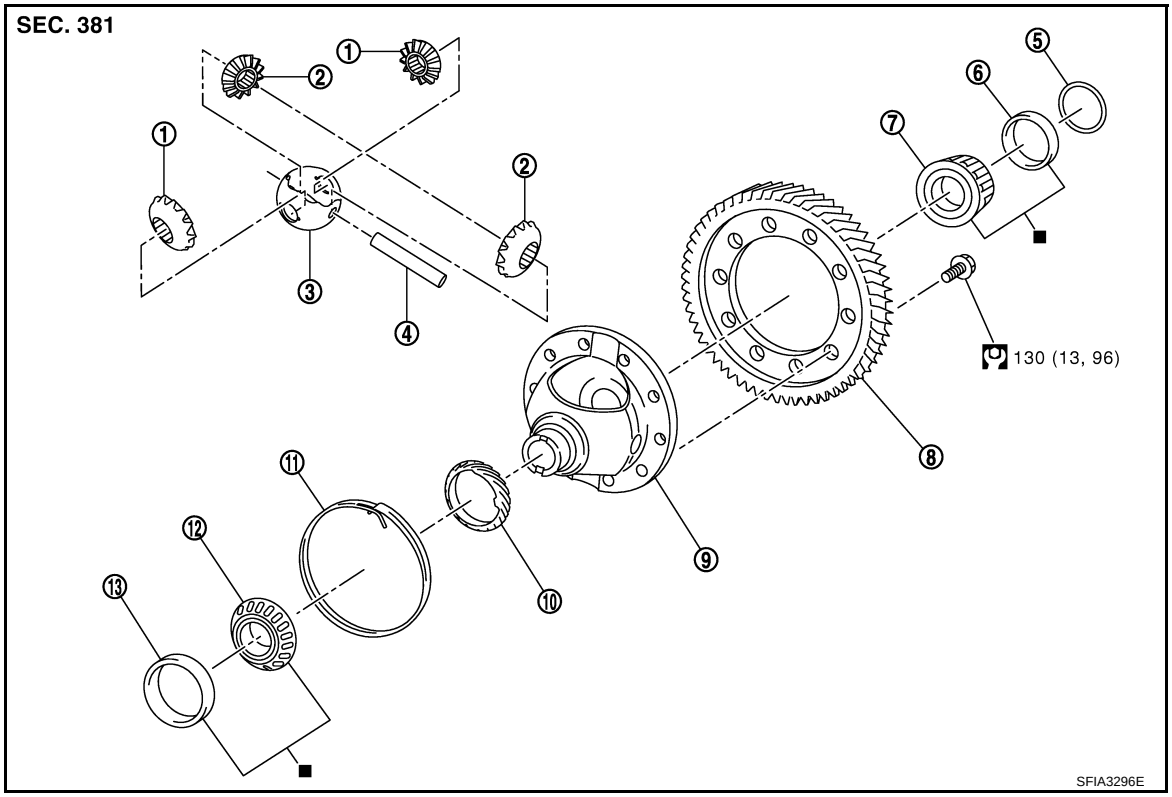
SHIFT FORK AND FORK ROD



1. Reverse fork rod
2. Selector
3. Retaining pin
4. 5th-6th shift fork
5. 3rd-4th shift fork
6. 3rd-4th and 5th-6th fork rod
7. 1st-2nd fork rod

■: Replace the parts as a set.

FINAL DRIVE



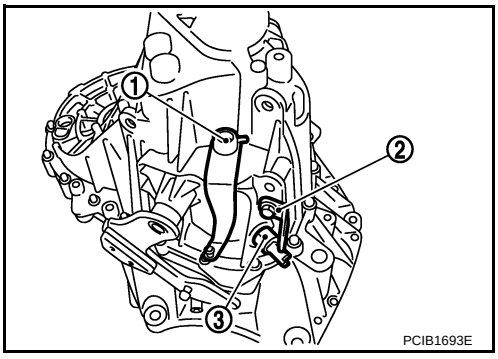
1. Side gear
2. Pinion mate gear
3. Thrust washer
4. Pinion mate shaft
5. shim
6. Differential side bearing outer race (transaxle case side)
7. Differential side bearing inner race (transaxle case side)
8. Final gear
9. Differential case
10. Speedometer drive gear
11. Lock ring
12. Differential side bearing inner race (clutch housing side)
13. Differential side bearing outer race (clutch housing side)

■: Replace the parts as a set.

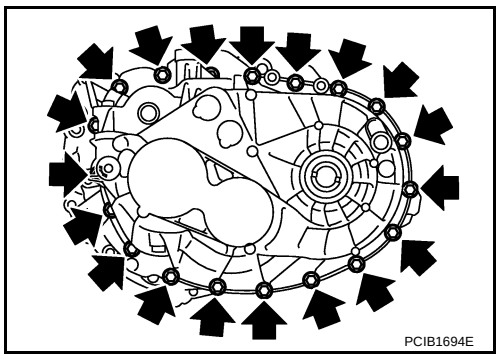
Disassembly

INFOID:0000000001381646

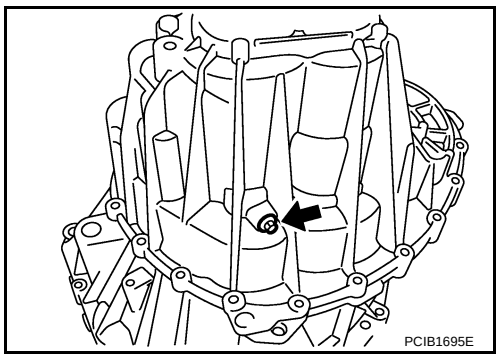
1. Drain the oil from the transaxle. Refer to TM-672, "Draining".
2. Remove filler plug and gasket from transaxle case.
3. Remove shift lever retaining pin (1) and shifter lever using suitable tool.
4. Remove bracket (2) and position switch (3) from transaxle case.



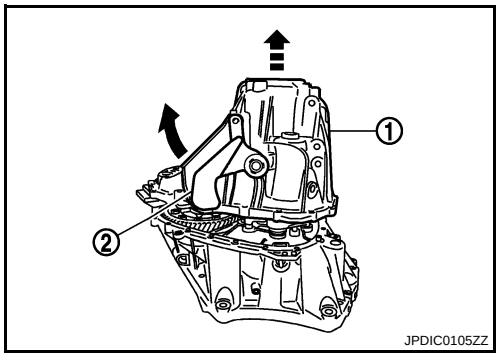
5. Remove the bolts as shown.


PCIB1694E

6. Remove reverse idler shaft bolt and seal washer.

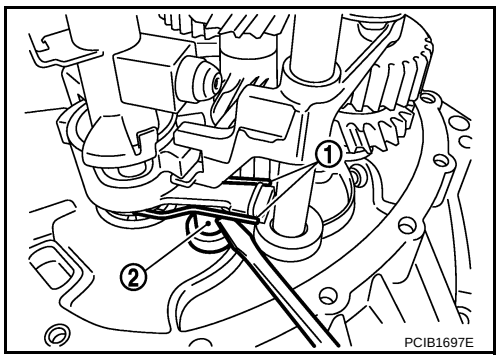

PCIB1695E

7. Remove transaxle case (1) upward while rotating selector lever (2).



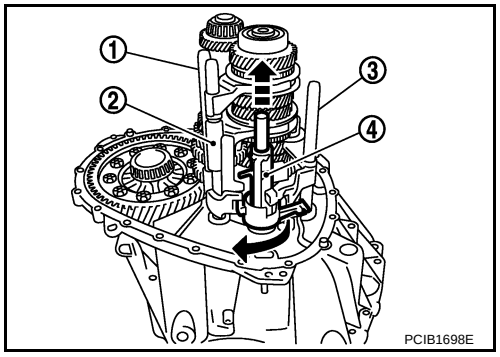
JPDIC0105ZZ

8. Remove spring (1) of selector from return bushing (2).



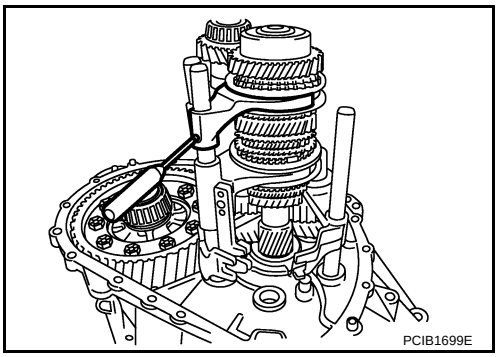
PCIB1697E

9. Move 1st-2nd fork rod (1), 3rd-4th and 5th-6th fork rod (2), and reverse fork rod (3) to neutral position.
10. Remove selector (4) from clutch housing.



PCIB1698E

11. Remove retaining pin from 5th-6th shift fork using a pin punch.

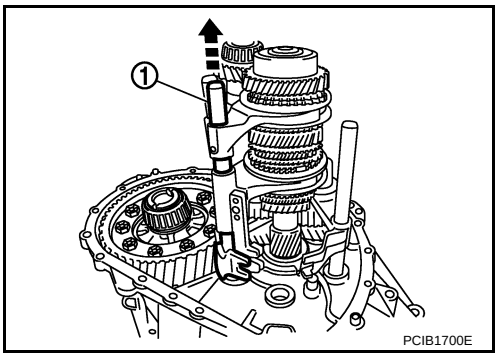

PCIB1699E

12. Remove 3rd-4th and 5th-6th fork rod (1) assembly according to the following.

a. Lift the fork rod up.

b. Remove 3rd-4th and 5th-6th fork rod (1) assembly from clutch housing.

c. Remove 3rd-4th shift fork and 5th-6th shift fork from 3rd-4th and 5th-6th fork rod.



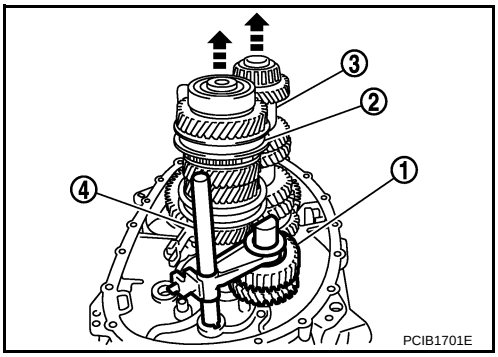
PCIB1700E

13. Remove reverse gear assembly (1) according to the following.

a. Lift up the input shaft assembly (2) and mainshaft assembly (3).

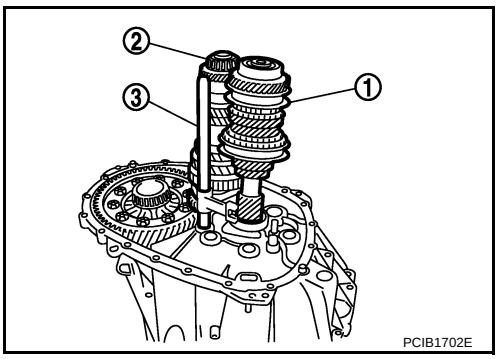
b. Remove reverse gear assembly (1) and reverse fork rod (4) from clutch housing.

14. Remove spring washer located under the reverse idler shaft.



PCIB1701E

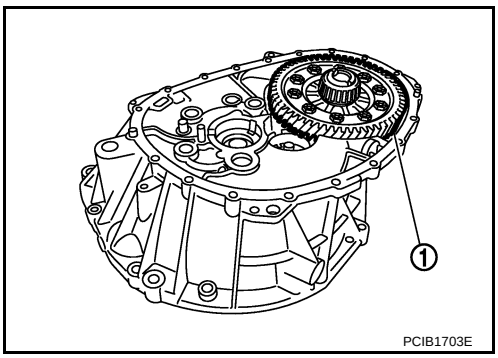
15. Remove input shaft assembly (1), mainshaft assembly (2), and 1st-2nd fork rod (3) from clutch housing.



PCIB1702E

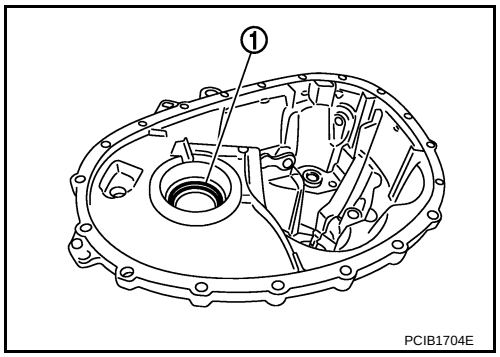
16. Remove final drive assembly (1) from clutch housing.

17. Remove magnet from clutch housing.

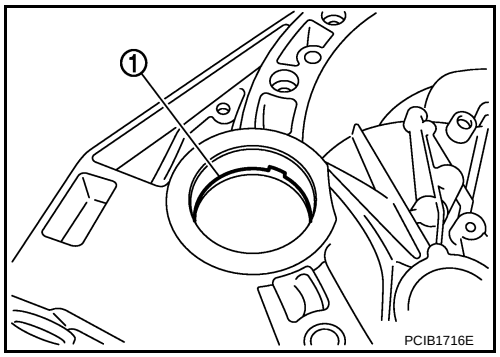


PCIB1703E

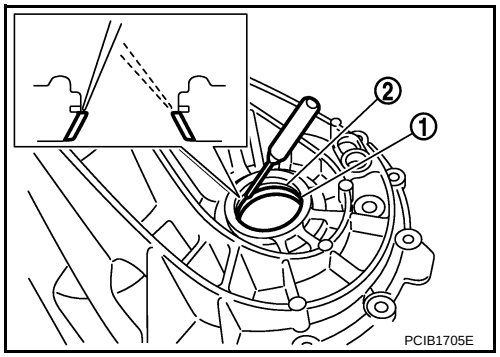
18. Remove differential side oil seals (1) from clutch housing and transaxle case using suitable tool.
CAUTION:
Do not damage clutch housing and transaxle case.



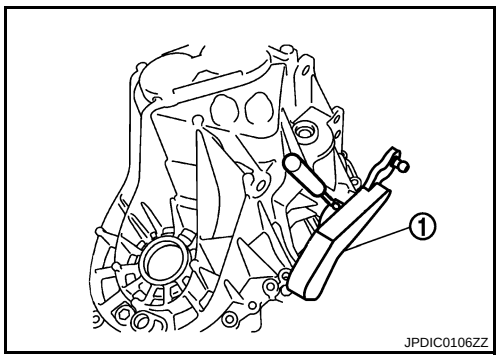
19. Remove differential side bearing outer race (1) from clutch housing using a brass bar.
CAUTION:
Do not damage clutch housing.



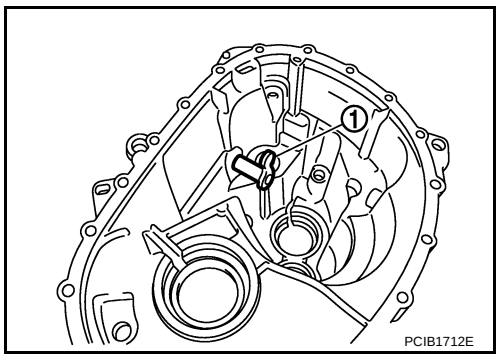
20. Remove differential side bearing outer race (1) and shim (2) from transaxle case using a brass bar as shown.
CAUTION:
Do not damage transaxle case.



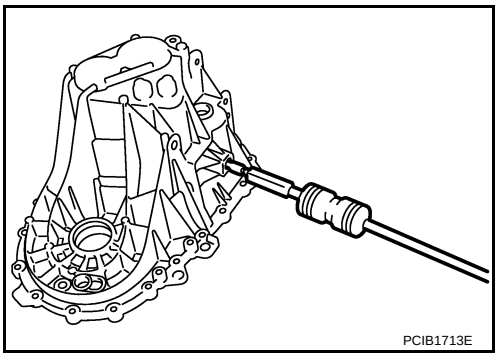
21. Remove retaining pin from selector lever (1) using suitable tool.
22. Remove selector lever.



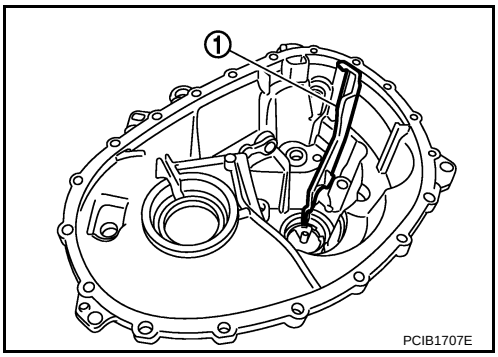
23. Remove shift finger (1) from transaxle case.



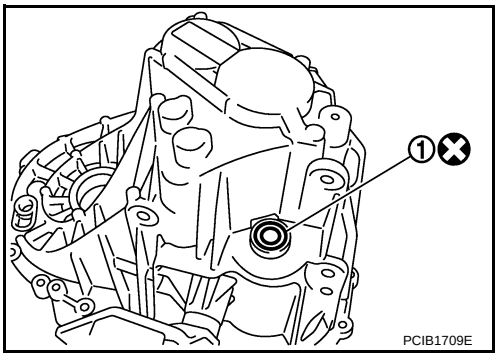
24. Remove selector lever oil seal and bushings from transaxle case using suitable tool.



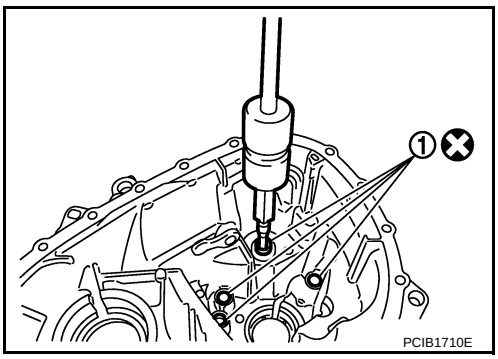
25. Remove oil gutter (1) from transaxle case.



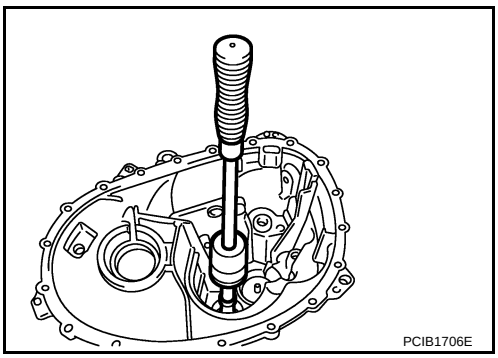
26. Remove shifter lever oil seal (1) from transaxle case.



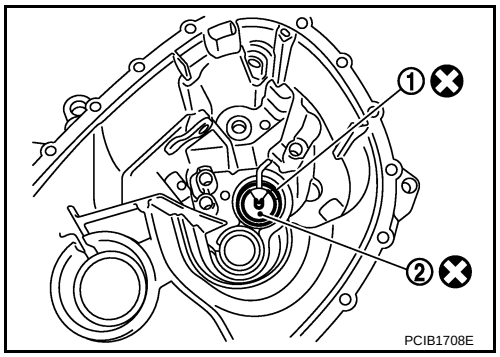
27. Remove bushings (1) from transaxle case using suitable tool.



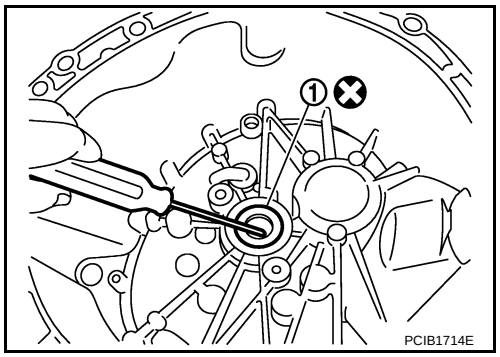
28. Remove mainshaft rear bearing outer race from transaxle case using suitable tool and then remove bearing preloading shim.
CAUTION:
Do not damage transaxle case.



29. Remove snap ring (1) and oil channel (2) from transaxle case.

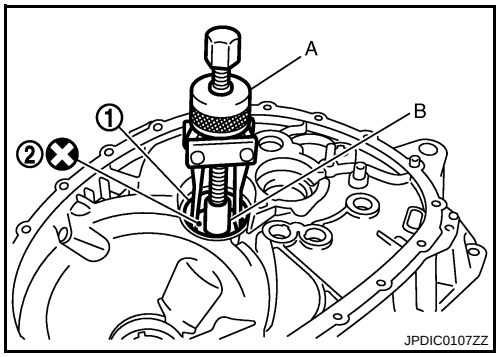


30. Remove input shaft oil seal (1) from clutch housing using suitable tool.

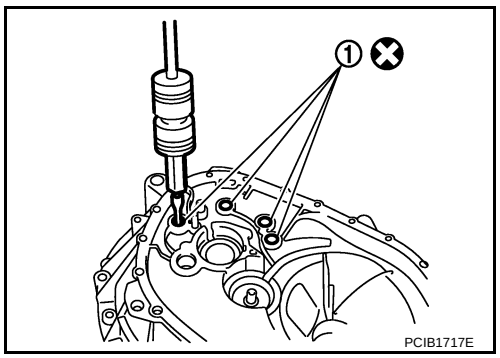


31. Remove mainshaft front bearing outer race (1) and oil channel (2) from clutch housing using Tool (A) and suitable tool (B).

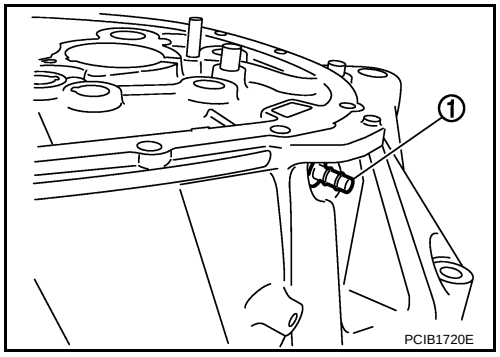
Tool number A: KV381054S0 (—)



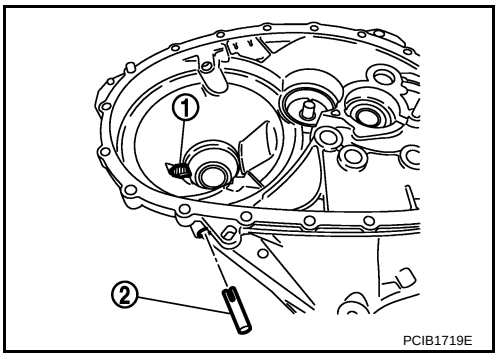
32. Remove bushings (1) from clutch housing using suitable tool.



33. Remove two way connector (1) from clutch housing.



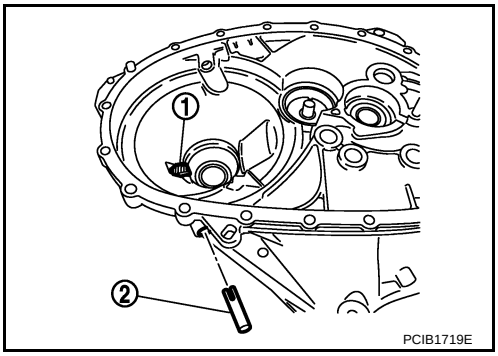
34. Remove pinion gear (1) and pinion shaft (2) from clutch housing.



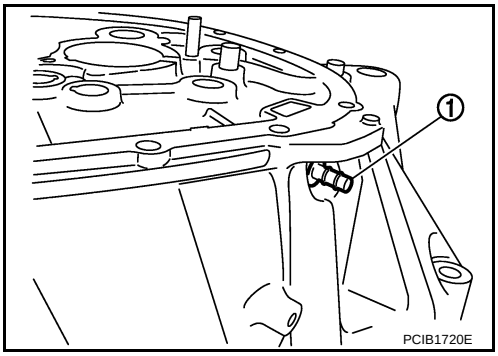
Assembly

INFOID:0000000001381647

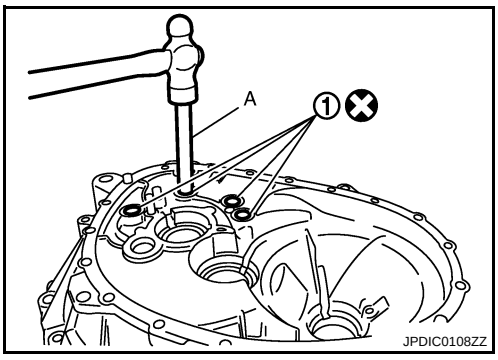
1. Install pinion gear (1) and pinion shaft (2) into clutch housing.



2. Install two way connector (1) into clutch housing.



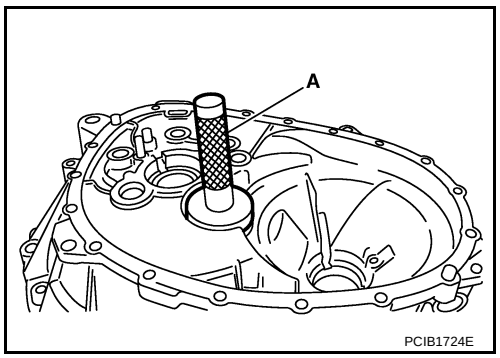
3. Install bushings (1) until they are flush with end face of clutch housing using suitable tool (A).
CAUTION:
Do not reuse bushings



4. Install oil channel and mainshaft front bearing outer race into clutch housing using Tool (A).

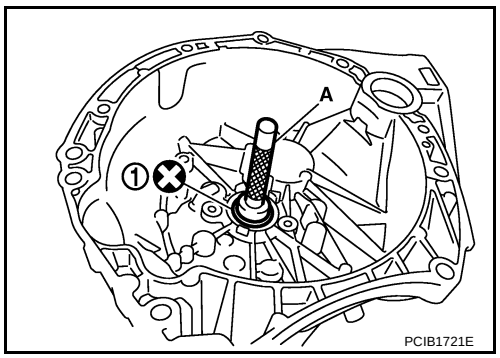
Tool number : KV38100200 (—)

CAUTION:
- **Do not reuse oil channel.**
- **Replace mainshaft front bearing outer race and mainshaft front bearing inner race as a set.**



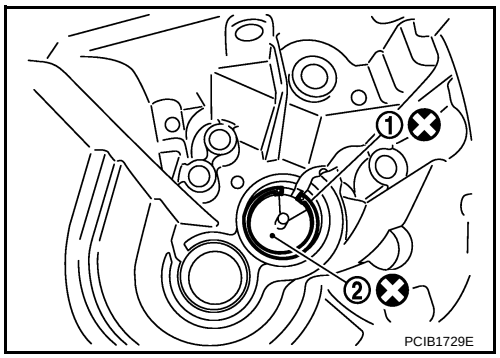
5. Install input shaft oil seal (1) into clutch housing using Tool (A).

Tool number : ST33220000 (—)



6. Install snap ring (1) and oil channel (2) onto transaxle case.

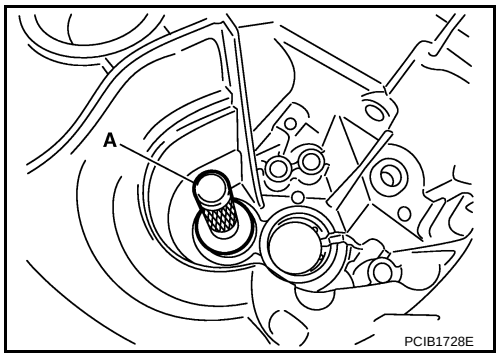
CAUTION:
Do not reuse snap ring or oil channel.



7. Install bearing preloading shim and mainshaft rear bearing outer race into transaxle case using Tool (A).

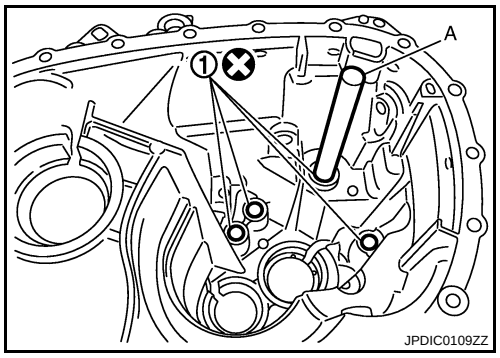
Tool number : KV38100200 (—)

CAUTION:
Replace mainshaft rear bearing outer race and mainshaft rear bearing inner race as a set.

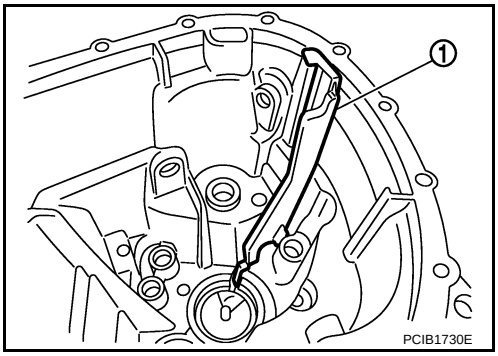


8. Install bushings (1) into transaxle case using suitable tool (A).

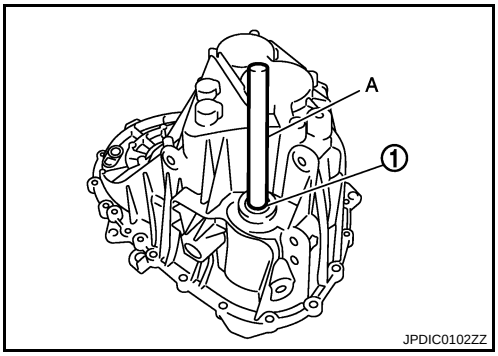
CAUTION:
Do not reuse bushings.



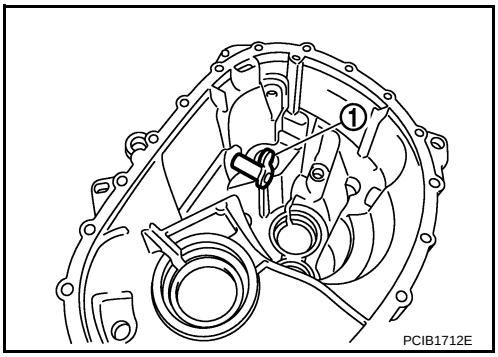
9. Install oil gutter (1) onto transaxle case.



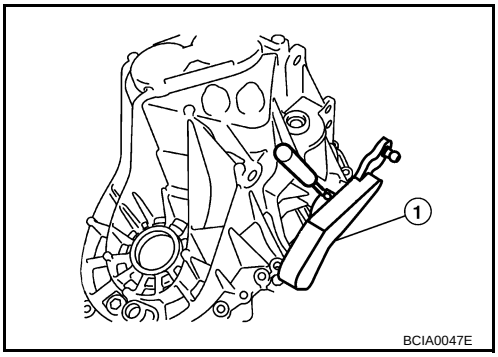
10. Install shifter lever oil seal (1) into transaxle case using suitable tool (A).
11. Install selector lever oil seal and bushings into transaxle case using suitable tool.



12. Install shift finger (1) into transaxle case.



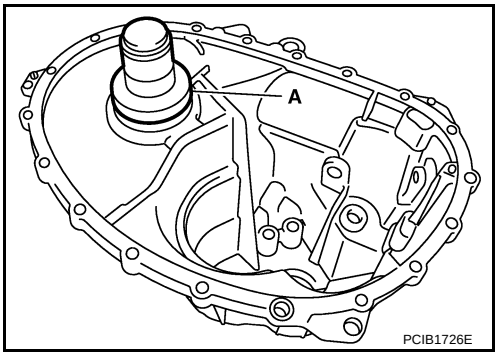
13. Install selector lever (1) and then install retaining pin.
CAUTION:
Do not reuse retaining pin.



14. Install shim and differential side bearing outer race (transaxle case side) into transaxle case using Tool (A).

Tool number : ST33400001 (—)

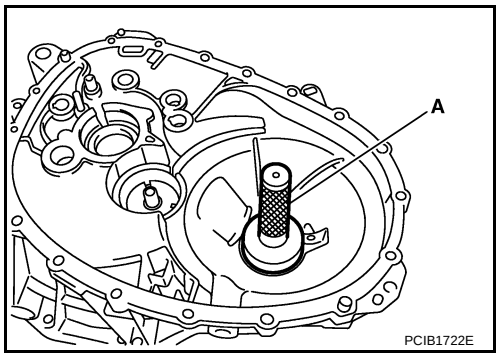
CAUTION:
Replace differential side bearing inner race and differential side bearing outer race as a set.



15. Install differential side bearing outer race (clutch housing side) into clutch housing using Tool (A).

Tool number : KV38100200 (—)

CAUTION:
Replace differential side bearing inner race and differential side bearing outer race as a set.



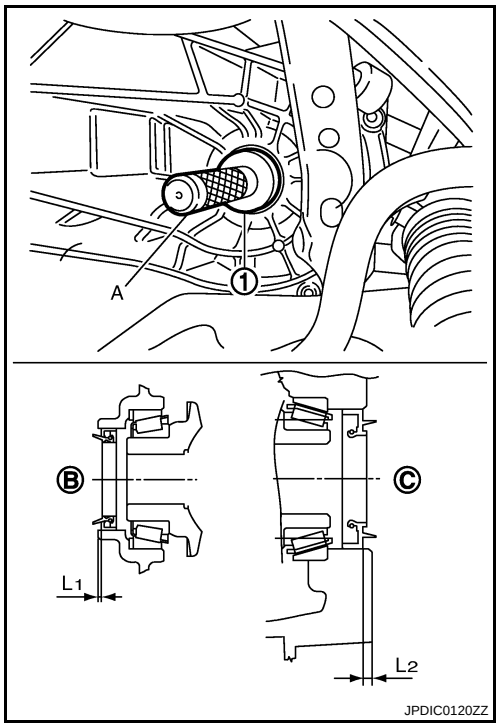
16. Install differential side oil seals (1) into clutch housing and transaxle case using Tool (A).

Tool number : KV38100300 (—)

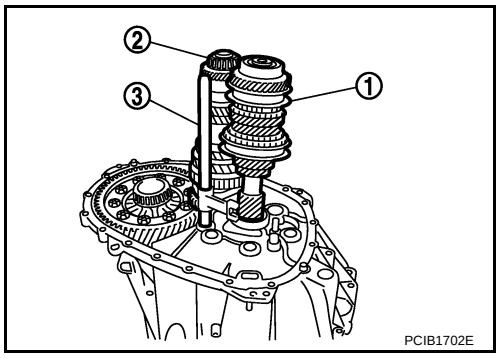
B : Transaxle case side
C : Clutch housing side

Dimension "L_1" : 1.2 - 1.8 mm (0.047 - 0.071 in)
Dimension "L_2" : 2.7 - 3.3 mm (0.106 - 0.130 in)

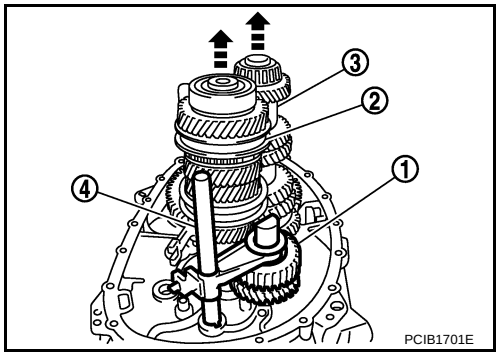
17. Install magnet onto clutch housing.
18. Install final drive assembly into clutch housing.



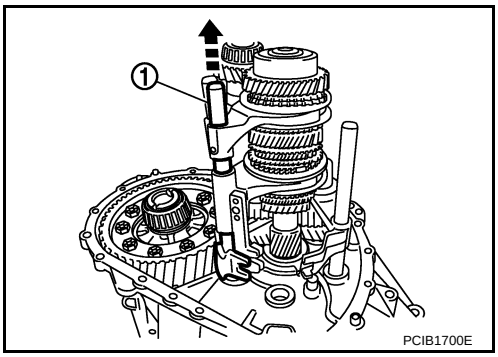
19. Install input shaft assembly (1), mainshaft assembly (2) and 1st-2nd fork rod (3) into clutch housing.
20. Install spring washer located under the reverse idler shaft.



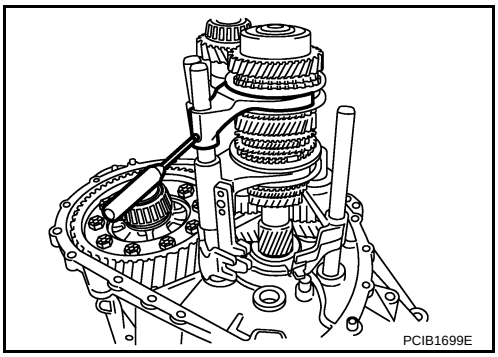
21. Install reverse gear assembly (1) according to the following.
a. Lift up the input shaft assembly (2) and mainshaft assembly (3).
b. Install reverse gear assembly and reverse fork rod (4) to clutch housing.
22. Install 3rd-4th shift fork and 5th-6th shift fork to 3rd-4th and 5th-6th fork rod.



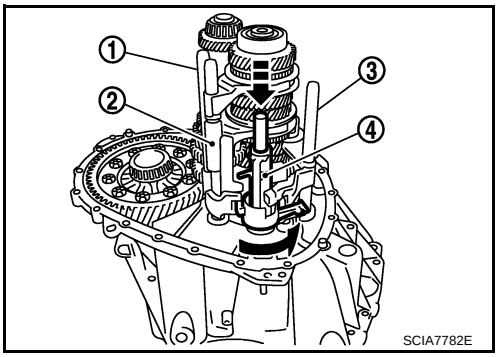
23. While lifting up fork rod (1), install 3rd-4th and 5th-6th fork rod assembly to clutch housing.
CAUTION:
Replace the 5th-6th shift fork, the 3rd-4th shift fork, and the 3rd-4th and 5th-6th fork rod as a set.



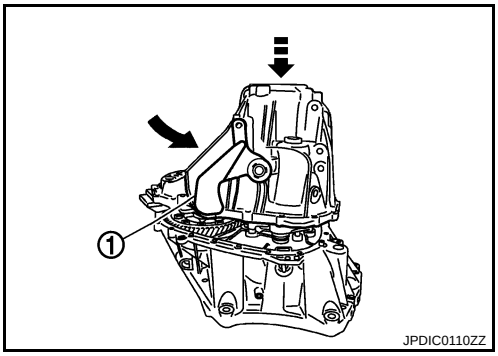
24. Install retaining pin into 5th-6th shift fork using suitable tool.
CAUTION:
Do not reuse retaining pin.



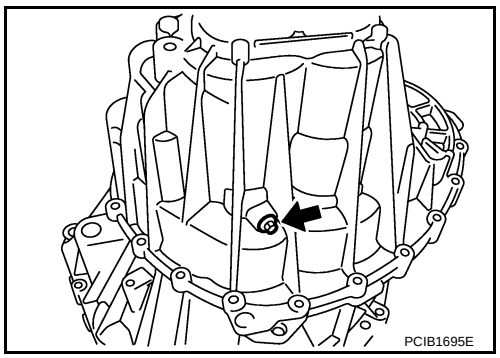
25. Move 1st-2nd fork rod (1), 3rd-4th and 5th-6th fork rod assembly (2), and reverse fork rod (3) to neutral position.
26. Install selector (4) into clutch housing.
27. Install spring of selector into return bushing.
28. Apply recommended sealant onto the mating surface of transaxle case.
CAUTION:
- **Remove old sealant adhering to the mating surfaces. Also remove any moisture, oil, or foreign material adhering to both mating surfaces.**
- **Check for damage on the mating surface.**
- **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent**
- **Apply a continuous bead of liquid gasket to the mating surface.**



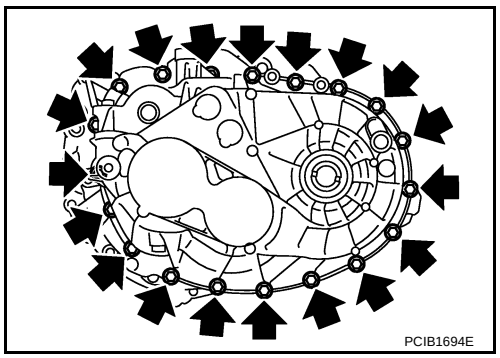
29. Engage shift finger and selector by moving selector lever (1). Install transaxle case to clutch housing.



30. Install seal washer and reverse idler shaft bolt, and then tighten bolt to the specified torque.
CAUTION:
Do not reuse seal washer.

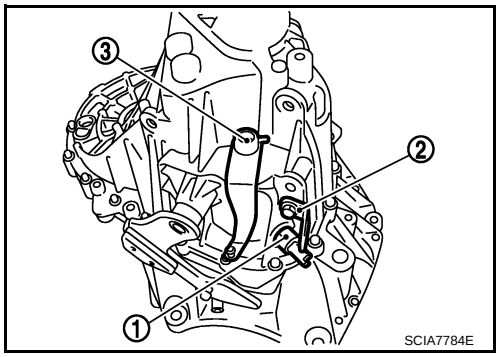

PCIB1695E

31. Tighten the bolts to the specified torque.


PCIB1694E

32. Apply recommended sealant to threads of position switch (1). Then install it to transaxle case and tighten to the specified torque.
- **Use Genuine Liquid Gasket, Three Bond 1215 or an equivalent.**

33. Install bracket (2), and then tighten the bolt to the specified torque.
34. Install shifter lever (3), and then install retaining pin using suitable tool.
CAUTION:
Do not reuse retaining pin.
35. Install new gasket onto drain plug and tighten to the specified torque.
CAUTION:
Do not reuse gasket.



SCIA7784E

36. After gear oil is filled, Install new gasket onto filler plug and tighten to the specified torque.
CAUTION:
Do not reuse gasket.

INPUT SHAFT AND GEAR

Exploded View

INFOID:0000000001381648

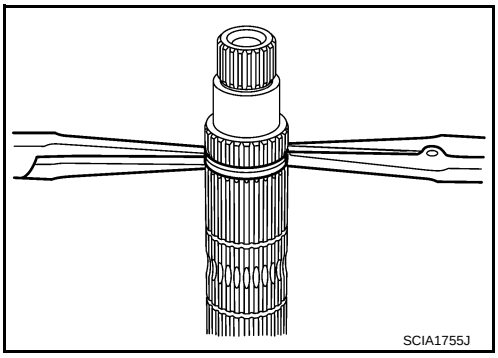
Refer to TM-635, "Exploded View".

Disassembly

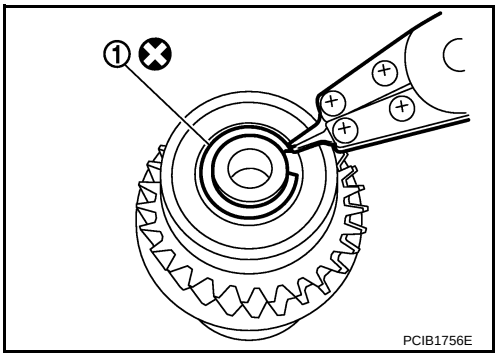
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CAUTION:

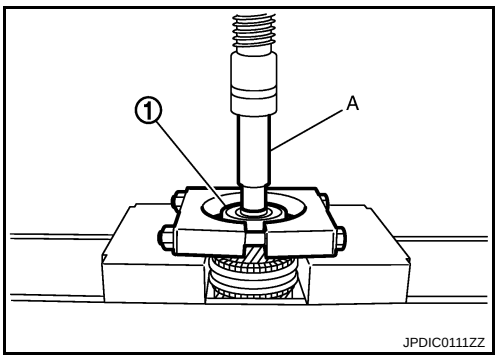
- **Set input shaft on the vise with back plate and remove gears and snap rings.**
- **For installation and removal of snap ring, set snap ring pliers and flat pliers at both sides of snap ring. Stretch snap ring, and move it with flat pliers.**
- **Disassemble gear components putting matching marks on the parts that do not affect any functions.**



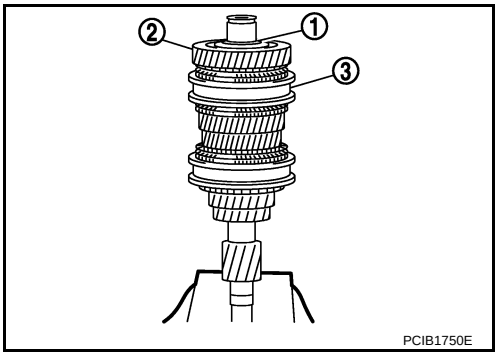
1. Remove snap ring (1).



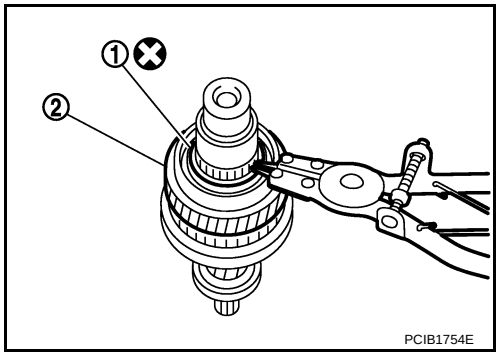
2. Set the drift (A) [Commercial service tool] and puller to input shaft rear bearing (1), and remove input shaft rear bearing from input shaft using a press.



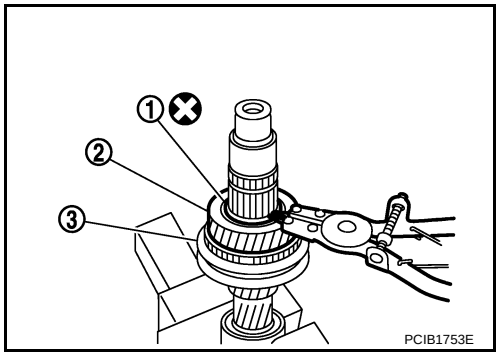
3. Remove washer (1), 6th input gear (2) and 5th-6th synchronizer assembly (3).
4. Remove needle bearing.



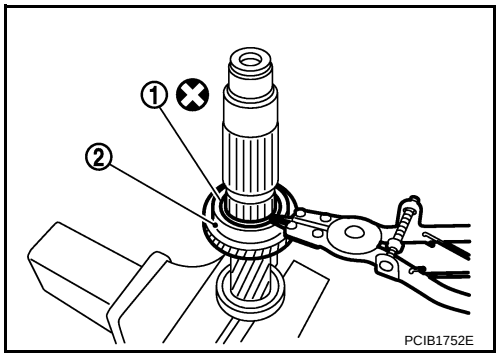
5. Remove snap ring (1), washer and 5th input gear (2).
6. Remove washer.



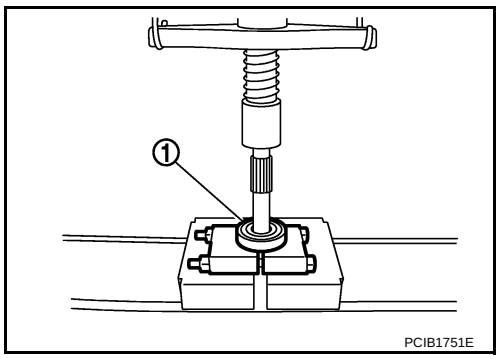
7. Remove snap ring (1), washer, 4th input gear (2) and 3rd-4th synchronizer assembly (3).



8. Remove snap ring (1), washer and 3rd input gear (2).



9. Remove input shaft front bearing (1) from input shaft using a press.

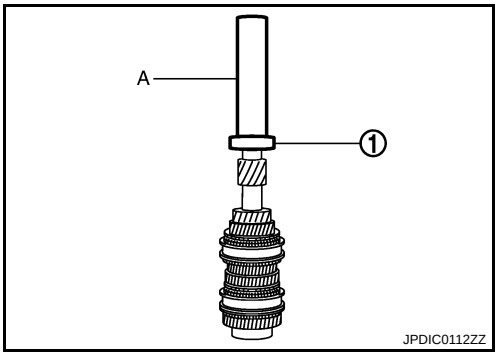


Assembly

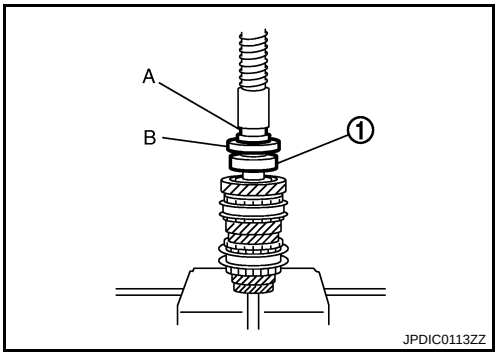
INFOID:0000000001381650

Note the following, and assembly is in the reverse order of disassembly.

- Press-fit the input shaft front bearing (1) onto the input shaft using the drift (A) [Commercial service tool] and press.

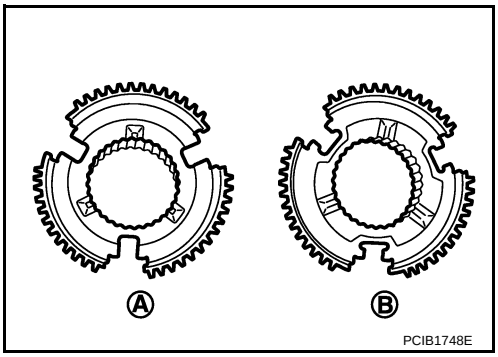


- Press-fit the input shaft rear bearing (1) onto the input shaft using the drift (A) [Commercial service tool], the drift (B) [SST: ST36720030] and press.



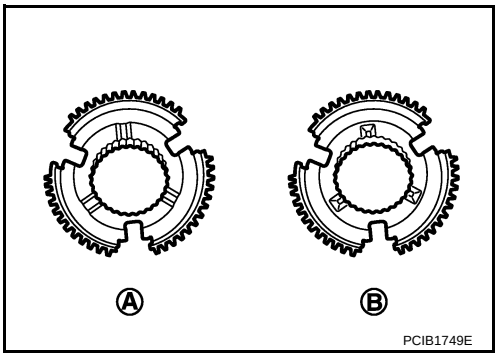
CAUTION:
- **Never reuse snap ring.**
- **Make sure that snap ring is securely installed in the groove.**
- **Apply gear oil to baulk ring.**
- **Replace coupling sleeve and synchronizer hub as a set.**
- **Be careful with the orientation of 3rd-4th synchronizer hub.**

A	: 3rd input gear side
B	: 4th input gear side



- **Be careful with the orientation of 5th-6th synchronizer hub.**

A	: 5th input gear side
B	: 6th input gear side

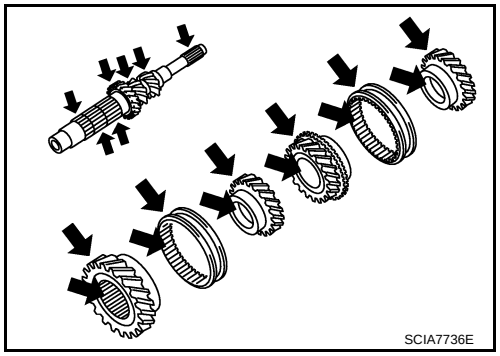


Inspection

INFOID:0000000001381651

INPUT SHAFT AND GEAR

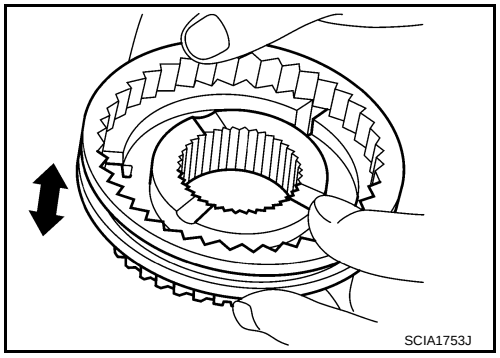
Check items below. If necessary, replace them with new ones.
- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.


SCIA7736E

SYNCHRONIZER

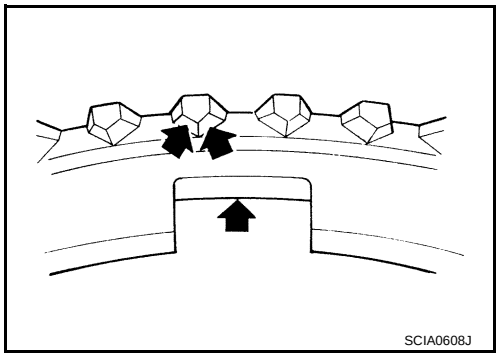
Synchronizer Hub and Coupling Sleeve

Check items below. If necessary, replace them with new ones.
- Damage and excessive wear of contact surfaces of coupling sleeve, synchronizer hub and insert key.
- Coupling sleeve and synchronizer hub must move smoothly.


SCIA1753J

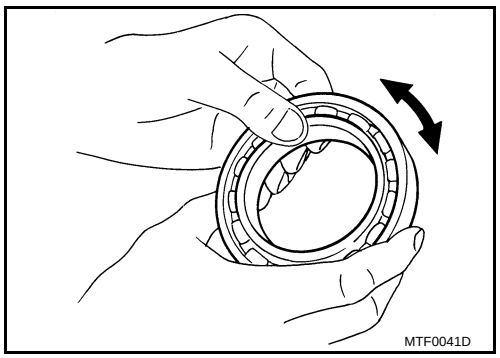
Baulk Ring

Check items below. If necessary, replace them with new ones.
- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.


SCIA0608J

BEARING

Check items below. If necessary, replace them with new ones.
- Damage and rough rotation of bearing


MTF0041D

MAINSHAFT AND GEAR

Exploded View

INFOID:0000000001381652

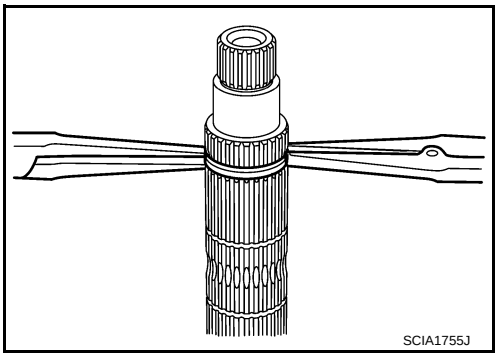
Refer to TM-635, "Exploded View".

Disassembly

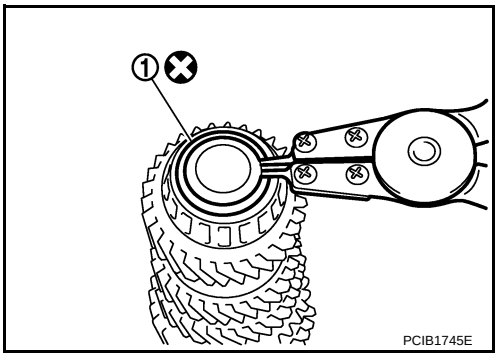
INFOID:0000000001381653

CAUTION:

- **Set mainshaft on the vise with back plate and remove gears and snap rings.**
- **For installation and removal of snap ring, set snap ring pliers and flat pliers at both sides of snap ring. Stretch snap ring, and move it with flat pliers.**
- **Disassemble gear components putting matching marks on the parts that do not affect any functions.**

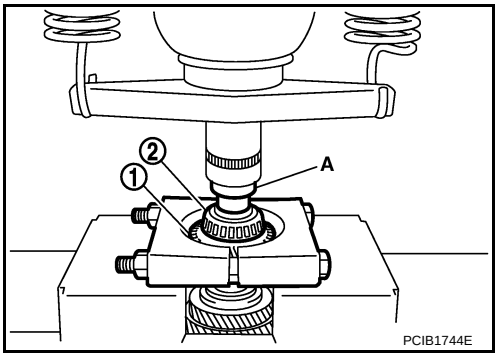

SCIA1755J

1. Remove snap ring (1).



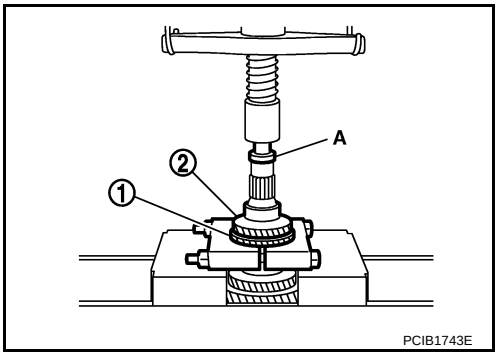
PCIB1745E

2. Set the drift (A) [SST: ST33052000] and puller on 6th main gear (1), and remove mainshaft rear bearing inner race (2) and 6th main gear from mainshaft using a press.



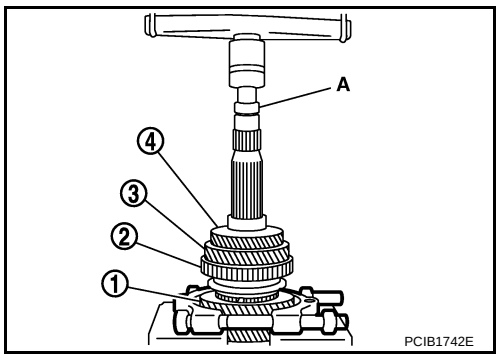
PCIB1744E

3. Set the drift (A) [SST: ST33052000] and puller on 4th main gear (1), and remove 5th main gear (2), and 4th main gear from mainshaft using a press.
4. Remove intermediate adjusting shim.

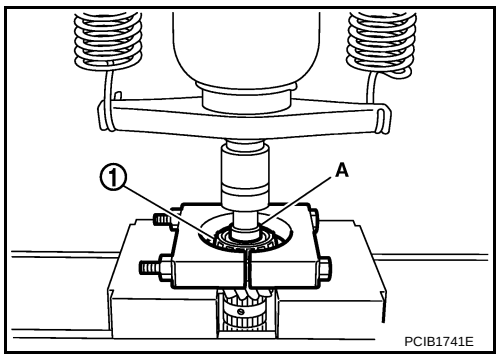


PCIB1743E

5. Set the drift (A) [SST: ST33052000] and puller on 1st main gear (1), and remove 1st main gear, 1st-2nd synchronizer assembly (2), 2nd main gear (3), bushing, and 3rd main gear (4) from mainshaft using a press.



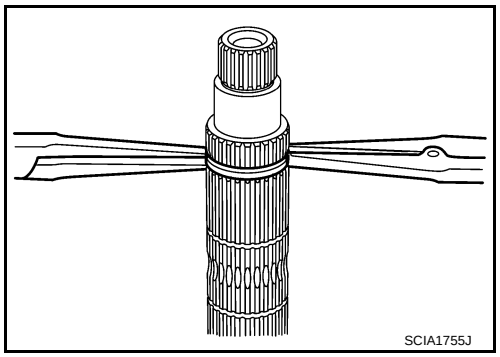
6. Set the drift (A) [SST: ST33052000] and puller on mainshaft front bearing inner race (1), and remove mainshaft front bearing inner race from mainshaft using a press.



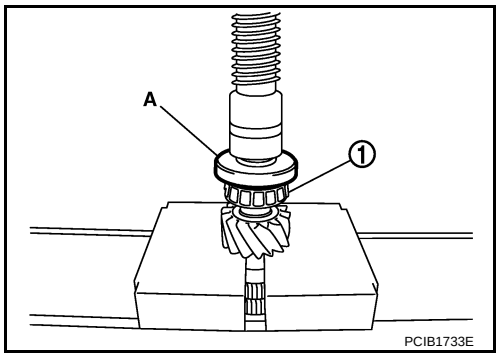
Assembly

INFOID:0000000001381654

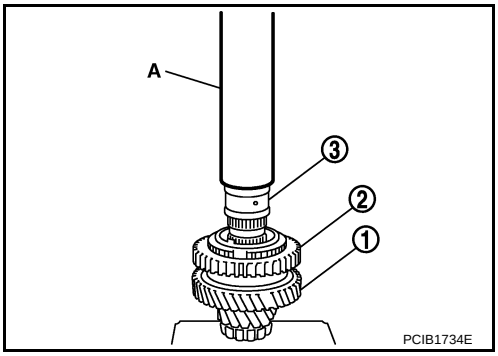
CAUTION:
For installation and removal of snap ring, set snap ring pliers and flat pliers at both sides of snap ring. Stretch snap ring, and move it with flat pliers.



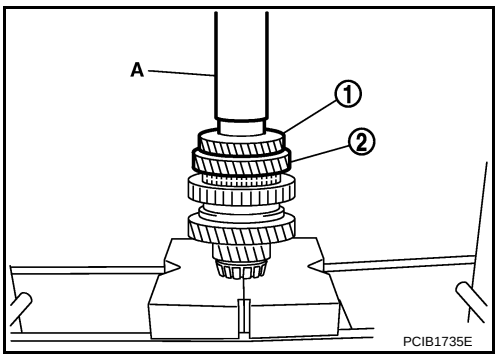
1. Press-fit the mainshaft front bearing inner race (1) onto the mainshaft using the drift (A) [SST: ST36720030] and press.
CAUTION:
Replace mainshaft front bearing outer race and mainshaft front bearing inner race as a set.
2. Apply gear oil to 1st inner baulk ring, 1st synchronizer cone, 1st outer baulk ring, 2nd inner baulk ring, 2nd synchronizer cone, and 2nd outer baulk ring.



3. Install 1st main gear (1), and 1st-2nd synchronizer assembly (2) onto the mainshaft.
   CAUTION:
   - **Replace 1st inner baulk ring, 1st synchronizer cone and 1st outer baulk ring as a set.**
   - **Replace 2nd inner baulk ring, 2nd synchronizer cone and 2nd outer baulk ring as a set.**
   - **Replace 1st-2nd coupling sleeve and 1st-2nd synchronizer hub as a set.**
4. Press-fit the bushing (3) onto the mainshaft using the drift (A) [SST: KV32102700] and press.



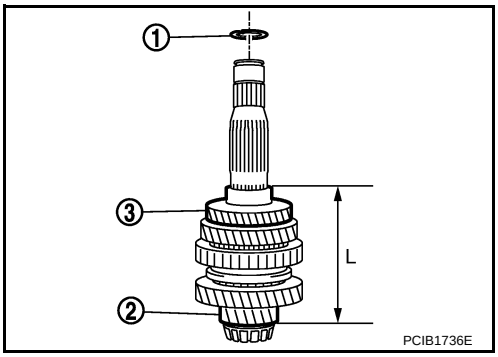
5. Press-fit 3rd main gear (1) to the mainshaft using the drift (A) [SST: KV32102700] and press after installing the 2nd main gear (2) and the 3rd main gear to the mainshaft.



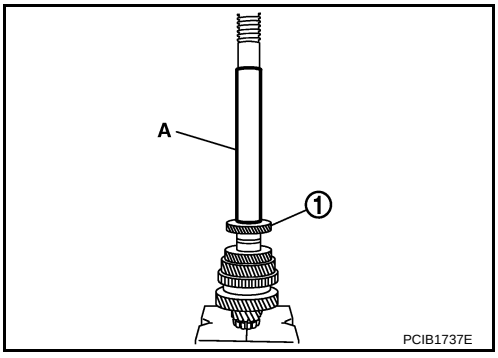
6. Select the thickness of the intermediate adjusting shim (1) needed by measuring the distance “L” between the base of the mainshaft (2) and the top of the 3rd main gear (3).

Unit: mm (in)

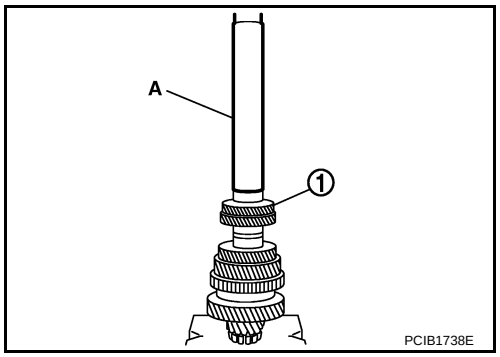
Distance “L”	Adjusting shim thickness
147.690 – 147.666 (5.8146 – 5.8136)	1.500 (0.0591)
147.665 – 147.641 (5.8136 – 5.8126)	1.525 (0.0600)
147.640 – 147.616 (5.8126 – 5.8116)	1.550 (0.0610)
147.615 – 147.591 (5.8116 – 5.8107)	1.575 (0.0620)
147.590 – 147.566 (5.8106 – 5.8097)	1.600 (0.0630)
147.565 – 147.541 (5.8096 – 5.8087)	1.625 (0.0640)
147.540 – 147.516 (5.8086 – 5.8077)	1.650 (0.0650)
147.515 – 147.491 (5.8077 – 5.8067)	1.675 (0.0659)
147.490 – 147.466 (5.8067 – 5.8057)	1.700 (0.0669)
147.465 – 147.441 (5.8057 – 5.8048)	1.725 (0.0679)
147.440 – 147.416 (5.8047 – 5.8038)	1.750 (0.0689)
147.415 – 147.391 (5.8037 – 5.8028)	1.775 (0.0699)



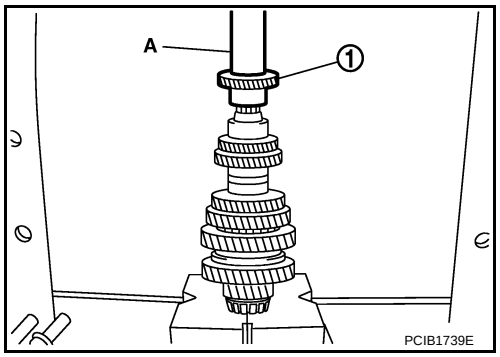
7. Install selected intermediate adjusting shim.
8. Press-fit the 4th main gear (1) onto the mainshaft using the drift (A) [SST: KV32102700].



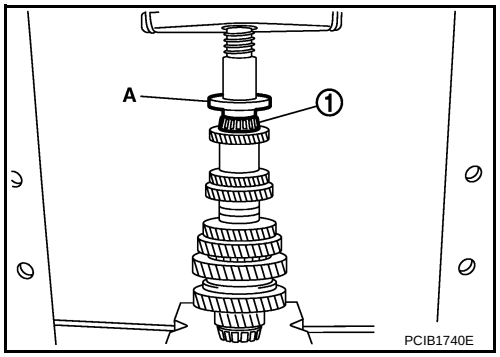
9. Press-fit the 5th main gear (1) onto the mainshaft using the drift (A) [SST: KV32102700].



10. Press-fit the 6th main gear (1) onto the mainshaft using the drift (A) [SST: KV32102700].



11. Press-fit the mainshaft rear bearing inner race (1) onto the mainshaft using the drift (A) [SST: ST30901000].
CAUTION:
Replace mainshaft rear bearing outer race and mainshaft rear bearing inner race as a set.
12. Install snap ring onto mainshaft.
CAUTION:
Never reuse snap ring.

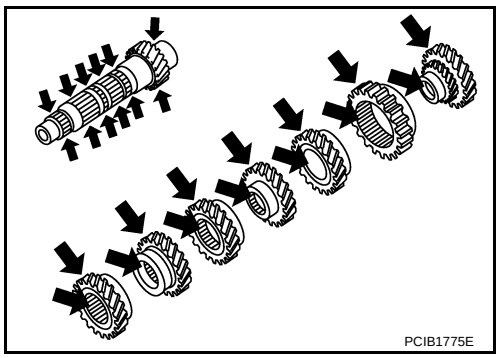


Inspection

INFOID:0000000001381655

MAINSHAFT AND GEAR

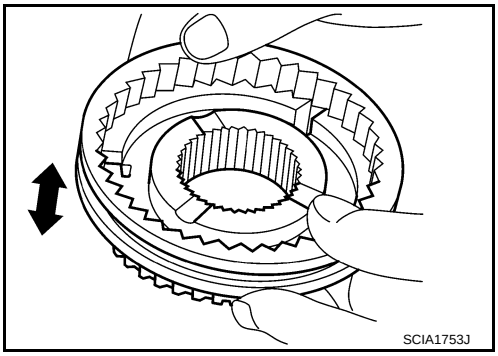
Check items below. If necessary, replace them with new ones.
- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.



SYNCHRONIZER

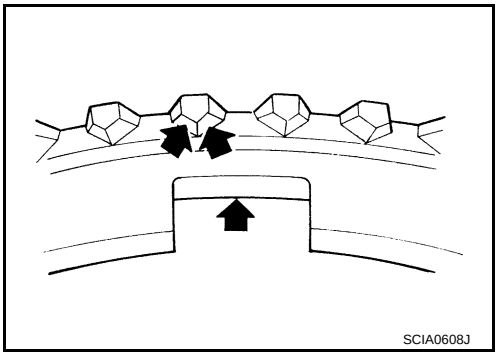
Synchronizer Hub and Coupling Sleeve

Check items below. If necessary, replace them with new ones.
- Damage and excessive wear of contact surfaces of coupling sleeve, synchronizer hub, insert key.
- Coupling sleeve and synchronizer hub must move smoothly.


SCIA1753J

Baulk Ring

Check items below. If necessary, replace them with new ones.
- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.

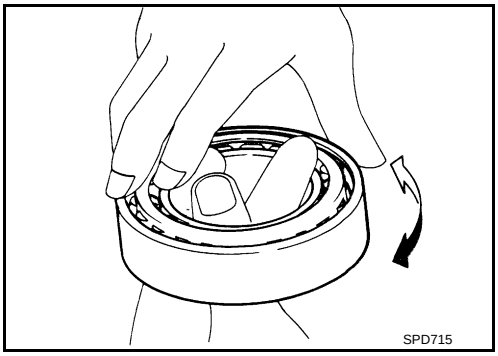

SCIA0608J

BEARING

Check for bearing damage and rough rotation. If necessary, replace with a new one.

CAUTION:

When replacing tapered roller bearing, replace outer and inner races as a set.


SPD715

CAUTION:

Bearing preloading shim: after the intermediate adjusting shim and/or the 6th main gear, 5th main gear, and 4th main gear have been replaced, it is necessary to modify the bearing preloading setting by changing the bearing preloading shim.
- **Replacing the intermediate adjusting shim.**
- **Increase the size of the bearing preloading shim, if the replaced intermediate adjusting shim is thinner than the shim used before.**
- **Decrease the size of the bearing preloading shim, if the replaced intermediate adjusting shim is thicker than the shim used before.**
- **Replacing the 6th main gear, 5th main gear, and 4th main gear.**
- **Measure the thickness of the main gear used before and the new main gear.**
- **Increase the thickness of the bearing preloading shim, if the difference is smaller than 0.025 mm (0.0010 in).**
- **Decrease the thickness of the bearing preloading shim, if the difference is greater than 0.025 mm (0.0010 in).**

REVERSE IDLER SHAFT AND GEAR

Exploded View

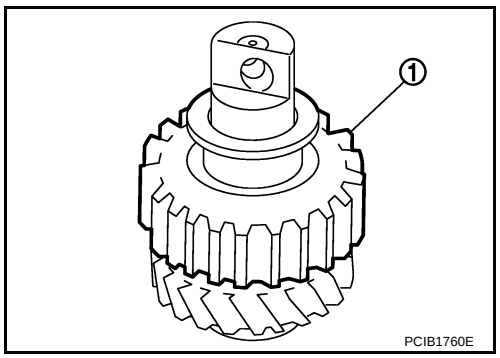
INFOID:0000000001381656

Refer to TM-635, "Exploded View".

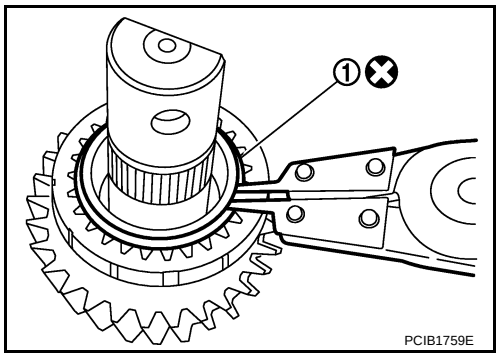
Disassembly

INFOID:0000000001381657

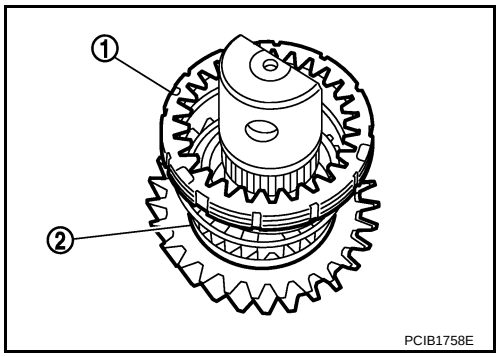
1. Remove reverse output gear (1).



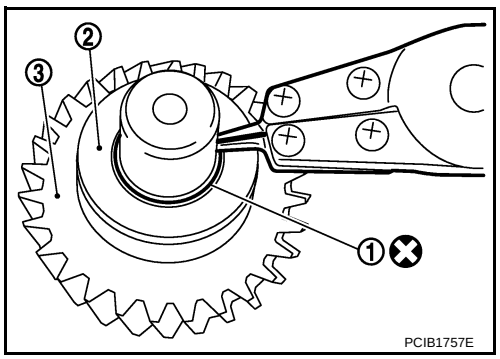
2. Remove snap ring (1).



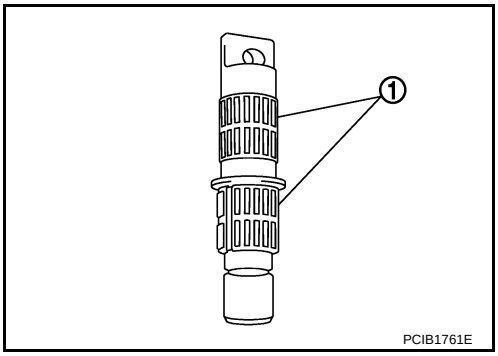
3. Remove reverse baulk ring (1) and return spring (2).



4. Remove snap ring (1), lock washer (2), reverse input gear (3) and washer.



5. Remove needle bearings (1) and washer from reverse idler shaft.



Assembly

INFOID:0000000001381658

Note the following, and assemble in the reverse order of disassembly.

CAUTION:

- **Never reuse snap ring.**
- **Make sure that snap ring is securely installed in the groove.**

FINAL DRIVE

Exploded View

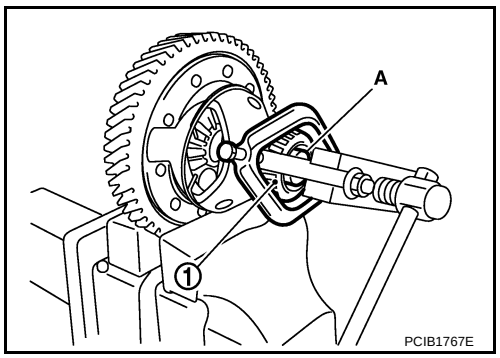
INFOID:0000000001381659

Refer to TM-635, "Exploded View".

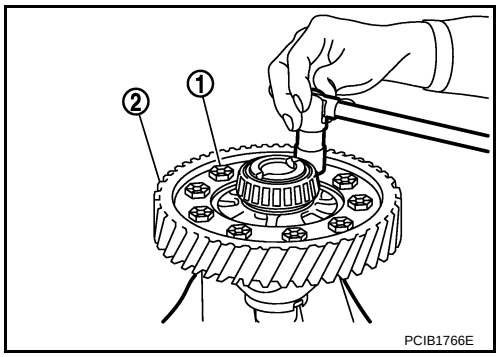
Disassembly

INFOID:0000000001381660

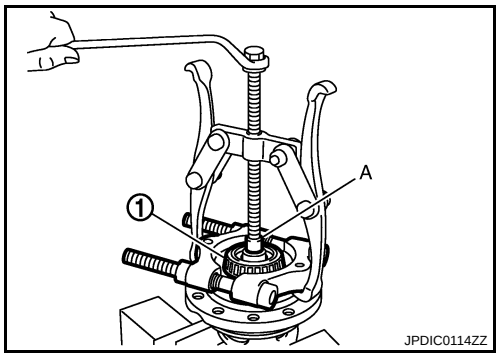
1. Remove differential side bearing inner race (clutch housing side) (1) using the drift (A) [SST: ST33061000] and a puller.
2. Remove speedometer drive gear.



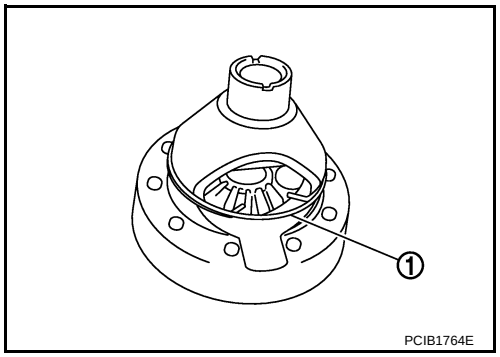
3. Remove final gear mounting bolts (1), and then separate the final gear (2) from differential case.



4. Remove differential side bearing inner race (transaxle case side) (1) using the drift (A) [Commercial service tool] and a suitable puller.



5. Remove lock ring (1) from differential case.
6. Remove pinion mate shaft, pinion mate gears, side gears and thrust washer from differential case.

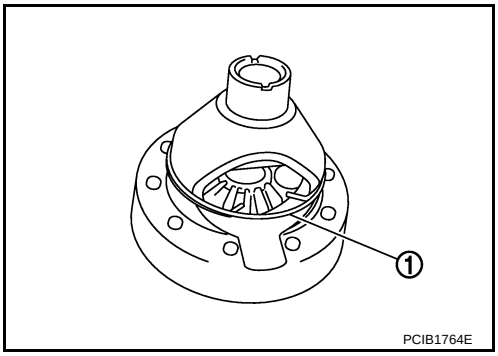


Assembly

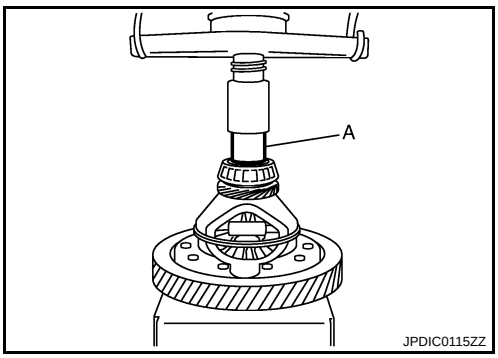
INFOID:0000000001381661

1. Install pinion mate shaft, pinion mate gears, side gears and thrust washer into differential case.

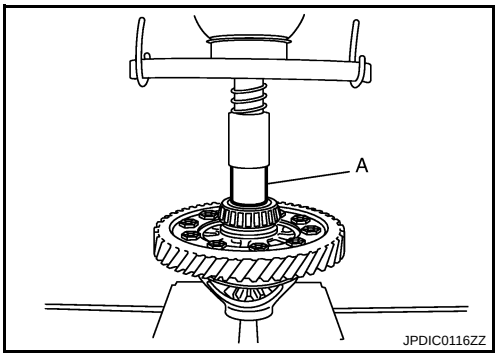
2. Install lock ring (1) onto differential case.
CAUTION:
Make sure that lock ring is securely installed in the groove.
3. Install final gear into differential case, and tighten final gear mounting bolts to the specified torque.
4. Install speedometer drive gear onto differential case.



5. Press-fit the differential side bearing inner race (clutch housing side) onto the differential case using the drift (A) [Commercial service tool] and press.
CAUTION:
Replace differential side bearing inner race and differential side bearing outer race as a set.



6. Press-fit the differential side bearing inner race (transaxle case side) onto the differential case using the drift (A) [Commercial service tool] and press.
CAUTION:
Replace differential side bearing inner race and differential side bearing outer race as a set.

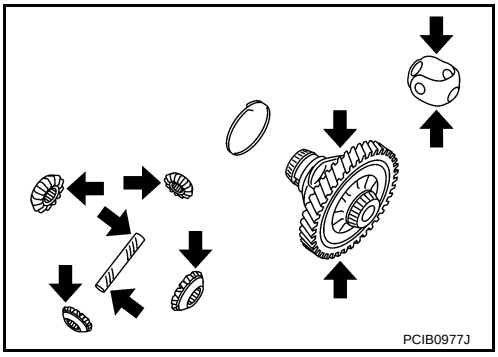


Inspection

INFOID:0000000001381662

GEAR, WASHER, SHAFT AND CASE

Check side gears, thrust washer, pinion mate shaft, pinion mate gears, lock ring and differential case. If necessary, replace with a new one.

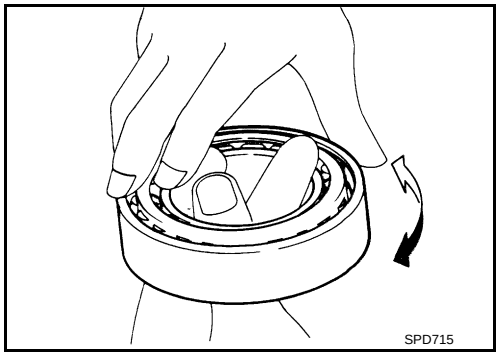


BEARING

Check for bearing damage and rough rotation. If necessary, replace with a new one.

CAUTION:

When replacing tapered roller bearing, replace outer and inner races as a set.



SHIFT FORK AND FORK ROD

Exploded View

INFOID:0000000001381663

Refer to TM-635, "Exploded View".

Disassembly

INFOID:0000000001381664

Refer to TM-639, "Disassembly" for disassembly procedure.

Assembly

INFOID:0000000001381665

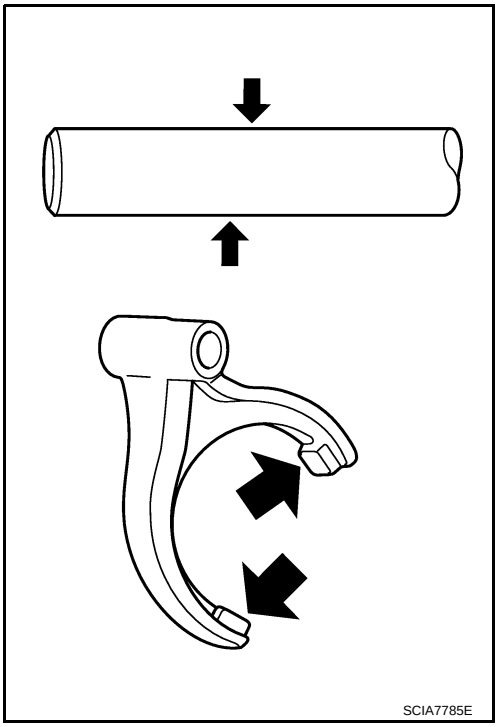
Refer to TM-645, "Assembly" for assembly procedure.

Inspection

INFOID:0000000001381666

FORK ROD AND SHIFT FORK

Check contact surface and sliding surface of fork rod and shift fork for wear, damage, and bend. Replace if necessary.



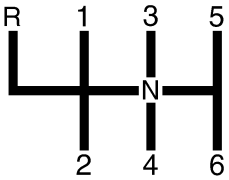
SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specification

INFOID:0000000001381667

TRANSAXLE

Engine type			MR18DE	K9K
Transaxle model			RS6F94R	
Number of speeds			6	
Synchromesh type			Warner	
Shift pattern			 PCIB1769E	
Gear ratio	1st		3.7273	
	2nd		2.1053	1.9474
	3rd		1.4516	1.3226
	4th		1.1714	0.975
	5th		0.9714	0.7632
	6th		0.8108	0.6383
	Reverse		3.6865	
	Final gear		3.9333	3.7333
Number of teeth	Input gear	1st	11	
		2nd	19	
		3rd	31	
		4th	35	40
		5th	35	38
		6th	37	47
		Reverse	11	
	Main gear	1st	41	
		2nd	40	37
		3rd	45	41
		4th	41	39
		5th	34	29
		6th	30	
		Reverse	42	
	Reverse idler gear	Input/Output	28/29	
	Final gear	Final Gear/Pinion	59/15	56/15
		Side Gear/Pinion mate gear	13/10	
Oil capacity		ℓ (US pt, Imp pt)	Approx. 2.0 (4-1/4, 3-1/2)	
Remarks	Reverse synchronizer		Installed	
	Triple-cone synchronizer		1st and 2nd	