

AUTOMATIC TRANSAXLE

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TROUBLE DIAGNOSIS — INDEX

Alphabetical & P No. Index for DTC

Alphabetical & P No. Index for DTC

NHAT0001

NHAT0001S01

ALPHABETICAL INDEX FOR DTC

Items (CONSULT-II screen terms)	DTC	Reference page
	CONSULT-II GST*1	
A/T 1ST GR FNCTN	P0731	AT-131
A/T 2ND GR FNCTN	P0732	AT-137
A/T 3RD GR FNCTN	P0733	AT-143
A/T 4TH GR FNCTN	P0734	AT-149
A/T TCC S/V FNCTN	P0744	AT-163
ATF TEMP SEN/CIRC	P0710	AT-115
CAN COMM CIRCUIT	U1000	AT-105
ENGINE SPEED SIG	P0725	AT-126
L/PRESS SOL/CIRC	P0745	AT-173
O/R CLTCH SOL/CIRC	P1760	AT-196
PNP SW/CIRC	P0705	AT-109
SFT SOL A/CIRC*2	P0750	AT-179
SFT SOL B/CIRC*2	P0755	AT-184
TCC SOLENOID/CIRC	P0740	AT-158
TP SEN/CIRC A/T*2	P1705	AT-189
VEH SPD SEN/CIR AT*3	P0720	AT-121

*1: These numbers are prescribed by SAE J2012.

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

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

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TROUBLE DIAGNOSIS — INDEX

Alphabetical & P No. Index for DTC (Cont'd)

P NO. INDEX FOR DTC

=NHAT0001S02

DTC	Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*1		
P0705	PNP SW/CIRC	AT-109
P0710	ATF TEMP SEN/CIRC	AT-115
P0720	VEH SPD SEN/CIR AT*3	AT-121
P0725	ENGINE SPEED SIG	AT-126
P0731	A/T 1ST GR FNCTN	AT-131
P0732	A/T 2ND GR FNCTN	AT-137
P0733	A/T 3RD GR FNCTN	AT-143
P0734	A/T 4TH GR FNCTN	AT-149
P0740	TCC SOLENOID/CIRC	AT-158
P0744	A/T TCC S/V FNCTN	AT-163
P0745	L/PRESS SOL/CIRC	AT-173
P0750	SFT SOL A/CIRC*2	AT-179
P0755	SFT SOL B/CIRC*2	AT-184
P1705	TP SEN/CIRC A/T*2	AT-189
P1760	O/R CLTCH SOL/CIRC	AT-196
U1000	CAN COMM CIRCUIT	AT-105

*1: These numbers are prescribed by SAE J2012.

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

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

PRECAUTIONS

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

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

NHAT0002

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER" used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS composition which is available to INFINITI I35 is as follows:

- For a frontal collision
The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, crush zone sensor, warning lamp, wiring harness and spiral cable.
- For a side collision
The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), satellite sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS 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 should be performed by an authorized INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system.
- 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 harness connector.

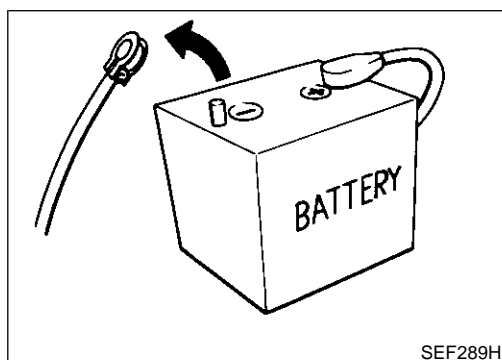
Precautions for On Board Diagnostic (OBD) System of A/T and Engine

NHAT0003

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 the negative battery 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 connector is 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 connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to a malfunction of the EGR system or fuel injection system, etc.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the TCM or ECM before returning the vehicle to the customer.



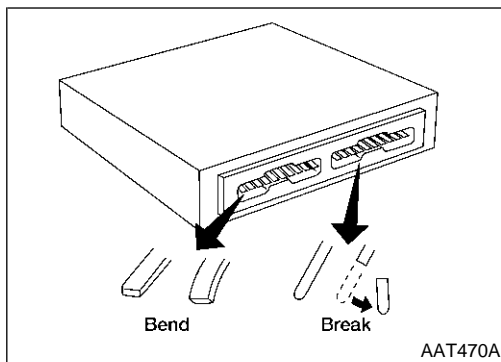
Precautions

NHAT0004

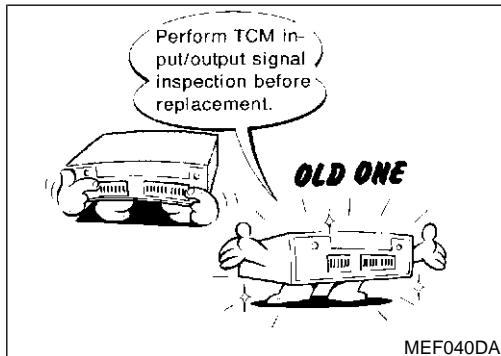
- Before connecting or disconnecting the TCM harness connector, turn ignition switch OFF and disconnect negative battery terminal. Failure to do so may damage the TCM. Because battery voltage is applied to TCM even if ignition switch is turned off.

PRECAUTIONS

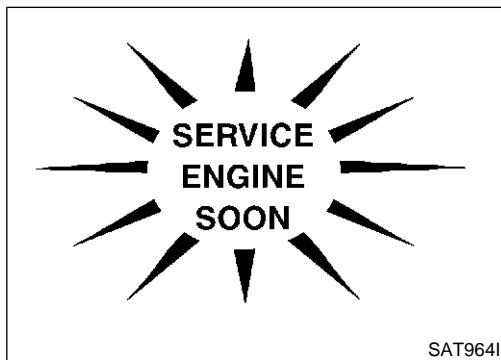
Precautions (Cont'd)



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



- Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly or not. (See page AT-99.)



- 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 transaxle.
- 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 transaxle 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. GI
 - Replace ATF cooler if excessive foreign material is found in oil pan or clogging strainer. Refer to “ATF COOLER SERVICE” (Refer to AT-10). MA
 - After overhaul, refill the transaxle with new ATF. EM
 - 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. LC
- Always follow the procedures under MA-21, “Changing A/T Fluid” when changing A/T fluid. EC

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Service Notice or Precautions

NHAT0005

NHAT0005S01

FAIL-SAFE

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

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

When the ignition key is turned ON following Fail-Safe operation, A/T CHECK indicator lamp blinks for about 8 seconds. [For “TCM Self-diagnostic Procedure (No Tools)”, refer to AT-53.] BR

The blinking of the A/T CHECK indicator lamp for about 8 seconds will appear only once and be cleared. The customer may resume normal driving conditions. ST

Always follow the “Work Flow” (Refer to AT-63).

The SELF-DIAGNOSIS results will be as follows: RS

- 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. BT

TORQUE CONVERTER SERVICE

NHAT0005S02

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

- External leaks in the hub weld area.
- Converter hub is scored or damaged.
- Converter pilot is broken, damaged or fits poorly into crankshaft. SC
- 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.) EL
- Converter is contaminated with engine coolant containing antifreeze.
- Internal failure 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: IDX

- 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.

PRECAUTIONS

Service Notice or Precautions (Cont'd)

- Transaxle 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.

ATF COOLER SERVICE

If A/T fluid contains frictional material (clutches, bands, etc.), replace radiator and flush cooler line using cleaning solvent and compressed air after repair of A/T. Refer to LC-20, "Radiator".

NHAT0005S03

OBD-II SELF-DIAGNOSIS

- A/T self-diagnosis is performed by the TCM in combination with the ECM. The results can be read through the blinking pattern of the A/T CHECK indicator lamp or the malfunction indicator lamp (MIL). Refer to the table on AT-43 for the indicator used to display each self-diagnostic result.

NHAT0005S04

- The self-diagnostic results indicated by the MIL are automatically stored in both the ECM and TCM memories.

Always perform the procedure "HOW TO ERASE DTC" on AT-39 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 A/T CHECK indicator lamp does not indicate any malfunctions.

- park/neutral position (PNP) switch
- A/T 1st, 2nd, 3rd, or 4th gear function
- A/T TCC S/V function (lock-up).

*: For details of OBD-II, refer to EC-75, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION".

- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector.**

For description and how to disconnect, refer to EL-7, "Description".

Wiring Diagrams and Trouble Diagnosis

When you read wiring diagrams, refer to the following:

- GI-11, "HOW TO READ WIRING DIAGRAMS"
- EL-11, "POWER SUPPLY ROUTING" for power distribution circuit

When you perform trouble diagnosis, refer to the following:

- GI-36, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"
- GI-25, "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT"

NHAT0006

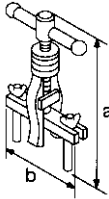
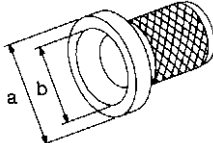
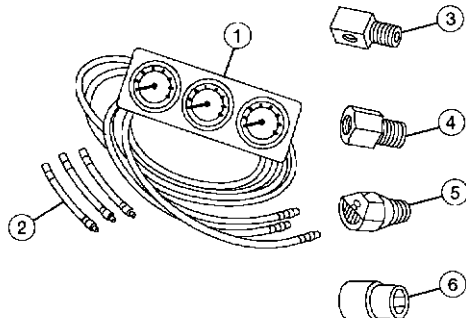
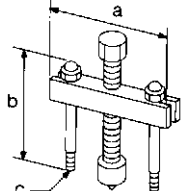
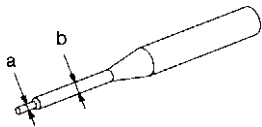

PREPARATION

Special Service Tools

Special Service Tools


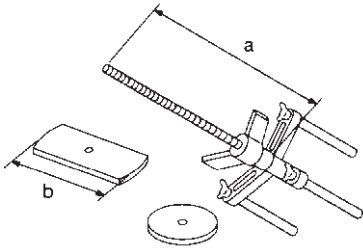
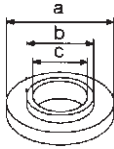
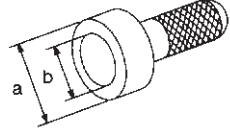
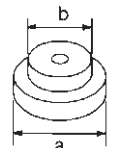
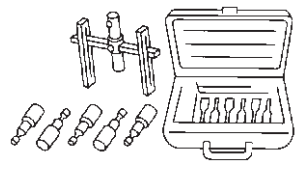
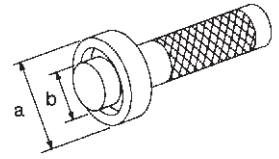
NHAT0007

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		
KV381054S0 (J34286) Puller		<ul style="list-style-type: none"> ● Removing differential side oil seals ● Removing differential side bearing outer race ● Removing idler gear bearing outer race <p>a: 250 mm (9.84 in) b: 160 mm (6.30 in)</p>	GI MA EM LC
ST33400001 (J26082) Drift		<ul style="list-style-type: none"> ● Installing differential side oil seal ● Installing oil seal on oil pump housing <p>a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.</p>	EC FE
(J34301-C) Oil pressure gauge set 1 (J34301-1) Oil pressure gauge 2 (J34301-2) Hoses 3 (J34298) Adapter 4 (J34282-2) Adapter 5 (790-301-1230-A) 60° Adapter 6 (J34301-15) Square socket		<ul style="list-style-type: none"> ● Measuring line pressure 	AT AX SU BR ST
ST27180001 (J25726-A) Puller		<ul style="list-style-type: none"> ● Removing idler gear <p>a: 100 mm (3.94 in) b: 110 mm (4.33 in) c: M8 x 1.25P</p>	RS BT HA
ST23540000 (J25689-A) Pin punch		<ul style="list-style-type: none"> ● Removing and installing parking rod plate and manual plate pins <p>a: 2.3 mm (0.091 in) dia. b: 4 mm (0.16 in) dia.</p>	SC EL
ST25710000 (J25689-A) Pin punch		<ul style="list-style-type: none"> ● Aligning groove of manual shaft and hole of transmission case <p>a: 2 mm (0.08 in) dia.</p>	IDX

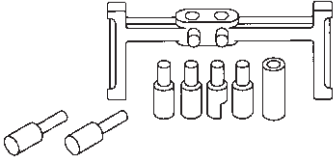
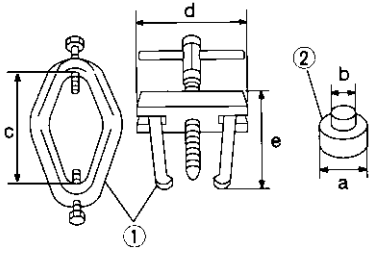
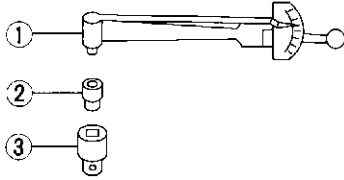
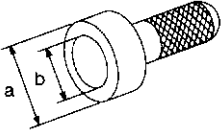
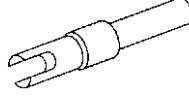
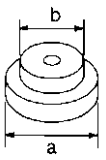
PREPARATION

Special Service Tools (Cont'd)

Tool number (Kent-Moore No.) Tool name	Description
KV32101000 (J25689-A) Pin punch	 <ul style="list-style-type: none"> ● Removing and installing manual shaft retaining pin ● Removing and installing pinion mate shaft lock pin <p>a: 4 mm (0.16 in) dia.</p> <p>NT410</p>
KV31102400 (J34285 and J34285-87) Clutch spring compressor	 <ul style="list-style-type: none"> ● Removing and installing clutch return springs ● Installing low and reverse brake piston <p>a: 320 mm (12.60 in) b: 174 mm (6.85 in)</p> <p>NT423</p>
KV40100630 (J26092) Drift	 <ul style="list-style-type: none"> ● Installing reduction gear bearing inner race ● Installing idler gear bearing inner race <p>a: 67.5 mm (2.657 in) dia. b: 44 mm (1.73 in) dia. c: 38.5 mm (1.516 in) dia.</p> <p>NT107</p>
ST30720000 (J25405 and J34331) Bearing installer	 <ul style="list-style-type: none"> ● Installing idler gear bearing outer race <p>a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.</p> <p>NT115</p>
ST35321000 (—) Drift	 <ul style="list-style-type: none"> ● Installing output shaft bearing <p>a: 49 mm (1.93 in) dia. b: 41 mm (1.61 in) dia.</p> <p>NT073</p>
(J34291-A) Shim setting gauge set	 <ul style="list-style-type: none"> ● Selecting oil pump cover bearing race and oil pump thrust washer ● Selecting side gear thrust washer <p>NT101</p>
ST33230000 (J25805-01) Drift	 <ul style="list-style-type: none"> ● Installing differential side bearing inner race <p>a: 51 mm (2.01 in) dia. b: 28.5 mm (1.122 in) dia.</p> <p>NT084</p>

PREPARATION

Special Service Tools (Cont'd)

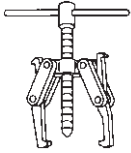
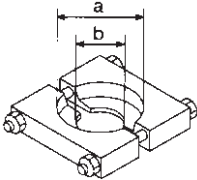
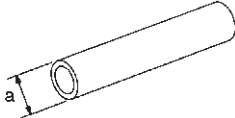
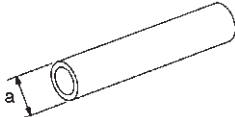
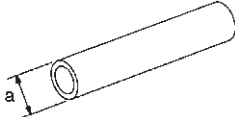
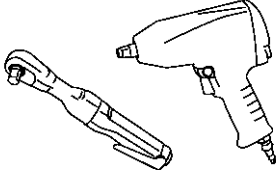
Tool number (Kent-Moore No.) Tool name	Description		
(J34290) Shim selecting tool set		<ul style="list-style-type: none"> Selecting differential side bearing adjusting shim 	GI MA EM
ST3306S001 (J22888-D) Differential side bearing puller set 1 ST33051001 (J22888-D) Puller 2 ST33061000 (J8107-2) Adapter		<ul style="list-style-type: none"> Removing differential side bearing inner race <p> 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) </p>	LC EC FE
ST3127S000 (J25765-A) Preload gauge 1 GG91030000 (J25765-A) Torque wrench 2 HT62940000 (—) Socket adapter 3 HT62900000 (—) Socket adapter		<ul style="list-style-type: none"> Checking differential side bearing preload 	AT AX SU BR
ST35271000 (J26091) Drift		<ul style="list-style-type: none"> Installing idler gear <p> a: 72 mm (2.83 in) dia. b: 63 mm (2.48 in) dia. </p>	ST RS
(J39713) Preload adapter		<ul style="list-style-type: none"> Selecting differential side bearing adjusting shim Checking differential side bearing preload 	BT HA
ST30613000 (J25742-3) Drift		<p> a: 72 mm (2.83 in) dia. b: 48 mm (1.89 in) dia. </p>	SC EL IDX

PREPARATION

Commercial Service Tools

Commercial Service Tools

NHAT0008

Tool name	Description
Puller	 <ul style="list-style-type: none"> ● Removing idler gear bearing inner race ● Removing and installing band servo piston snap ring <p>NT077</p>
Puller	 <ul style="list-style-type: none"> ● Removing reduction gear bearing inner race a: 60 mm (2.36 in) dia. b: 35 mm (1.38 in) dia. <p>NT411</p>
Drift	 <ul style="list-style-type: none"> ● Installing needle bearing on bearing retainer a: 36 mm (1.42 in) dia. <p>NT083</p>
Drift	 <ul style="list-style-type: none"> ● Removing needle bearing from bearing retainer a: 33.5 mm (1.319 in) dia. <p>NT083</p>
Drift	 <ul style="list-style-type: none"> ● Installing differential side bearing outer race a: 75 mm (2.95 in) dia. <p>NT083</p>
Power tool	 <ul style="list-style-type: none"> ● Loosening bolt and nuts <p>PBIC0190E</p>

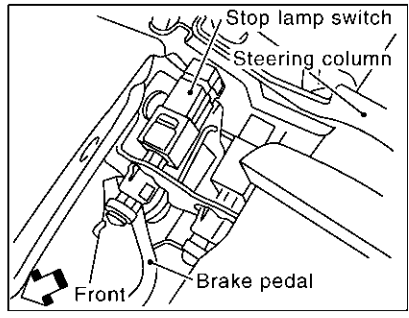
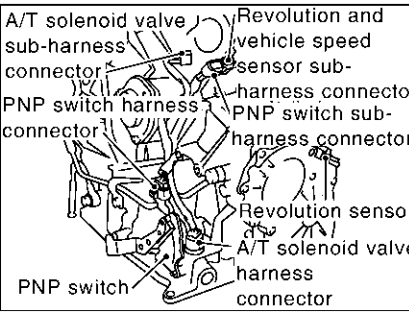
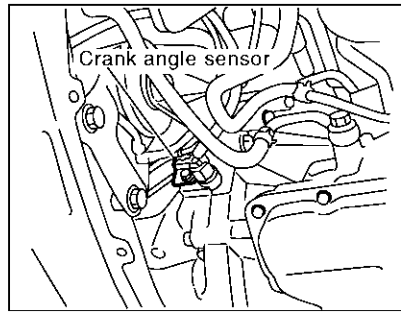
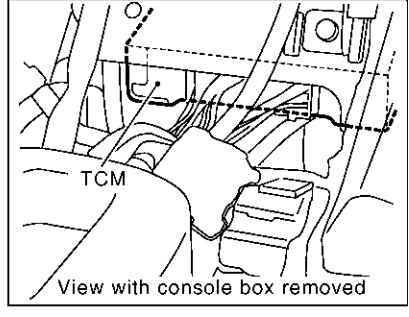
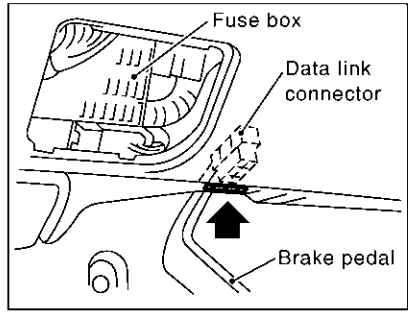
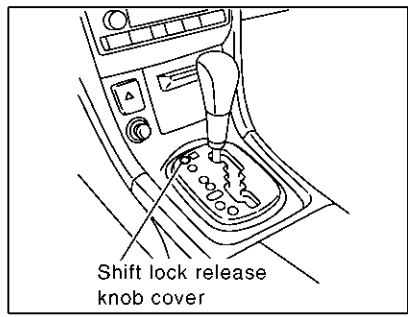
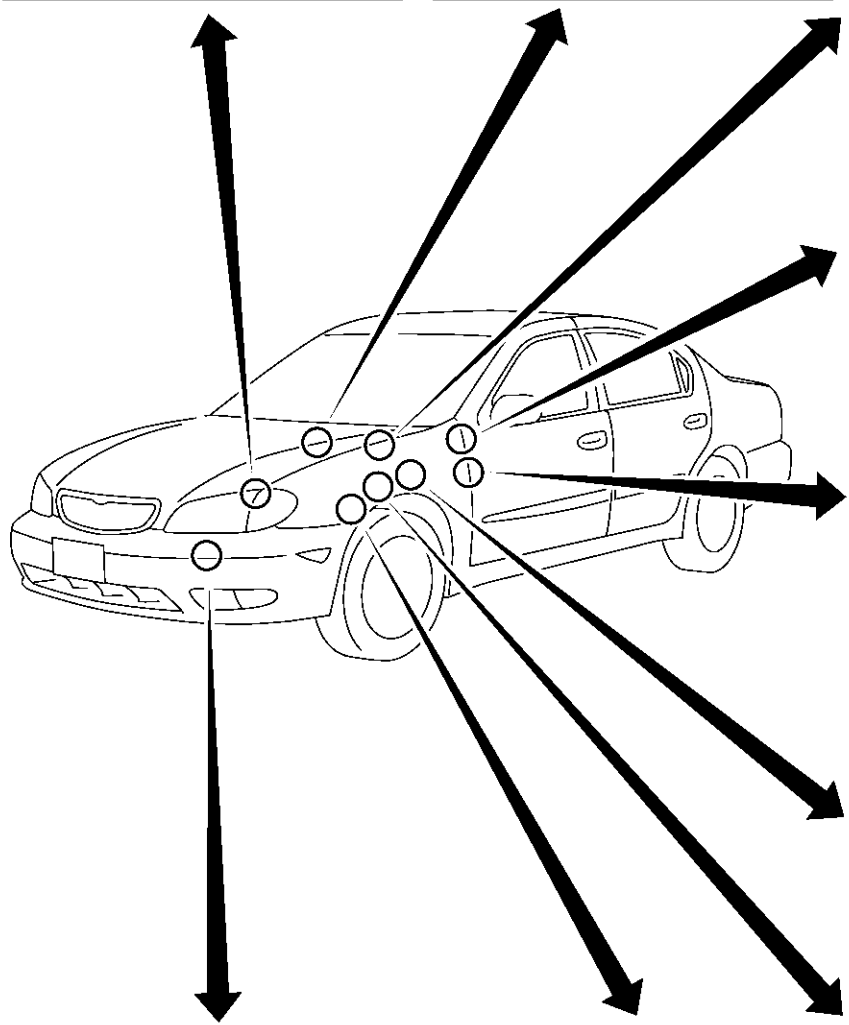
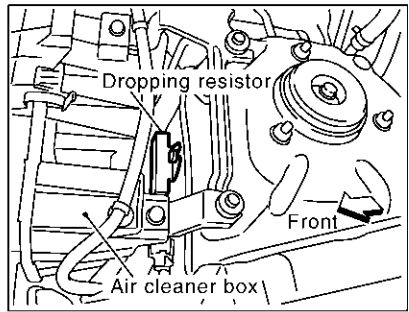
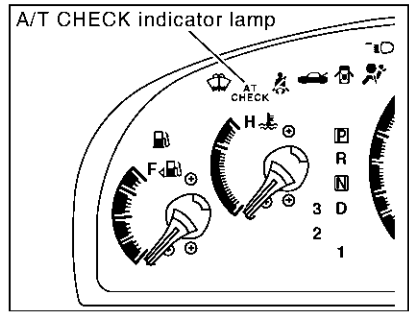
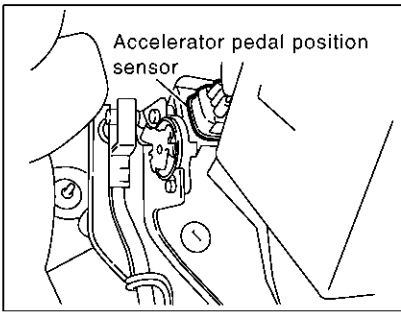
OVERALL SYSTEM

A/T Electrical Parts Location

A/T Electrical Parts Location

NHAT0009

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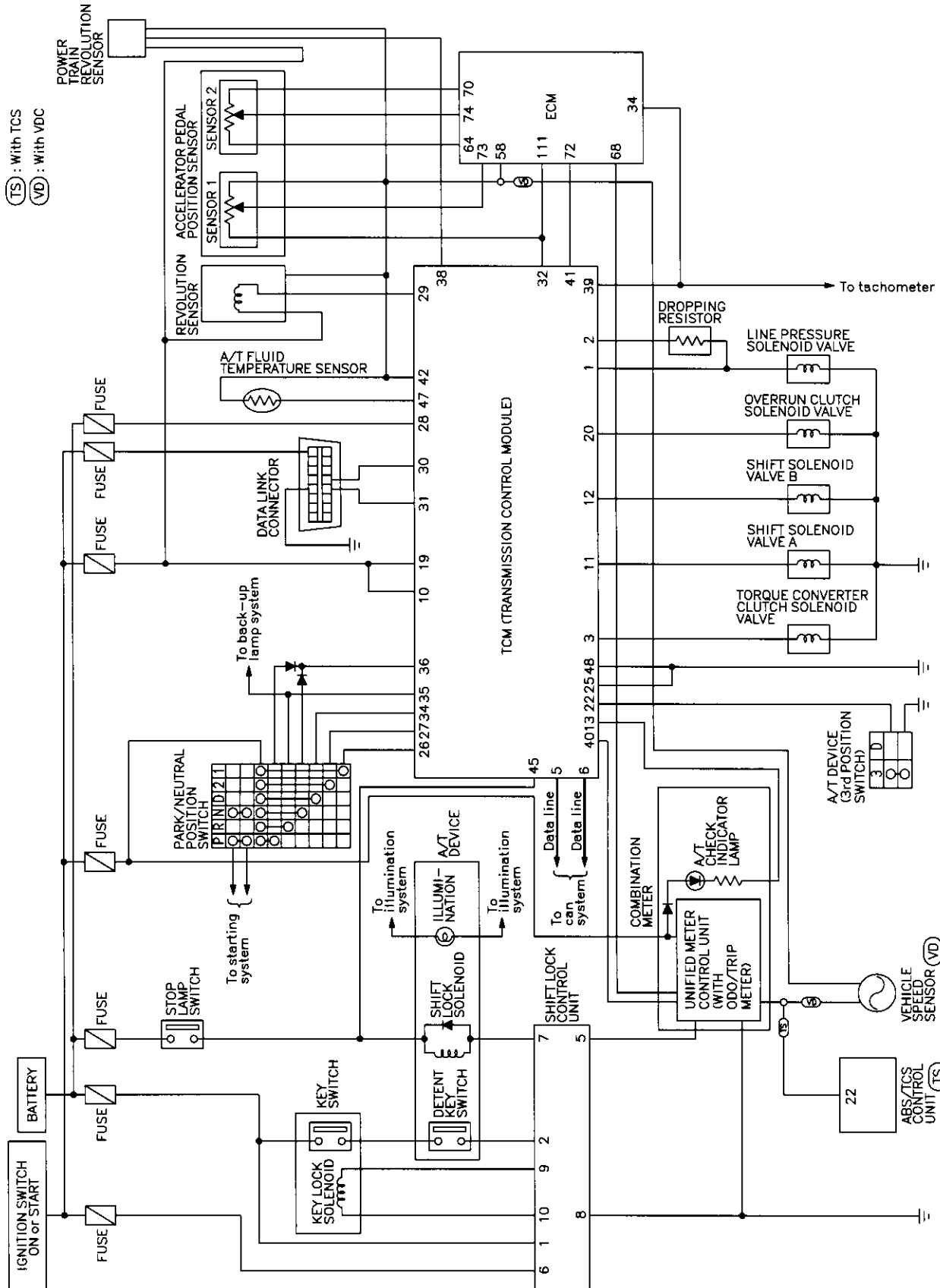
SAT603KA

OVERALL SYSTEM

Circuit Diagram

Circuit Diagram

NHAT0010



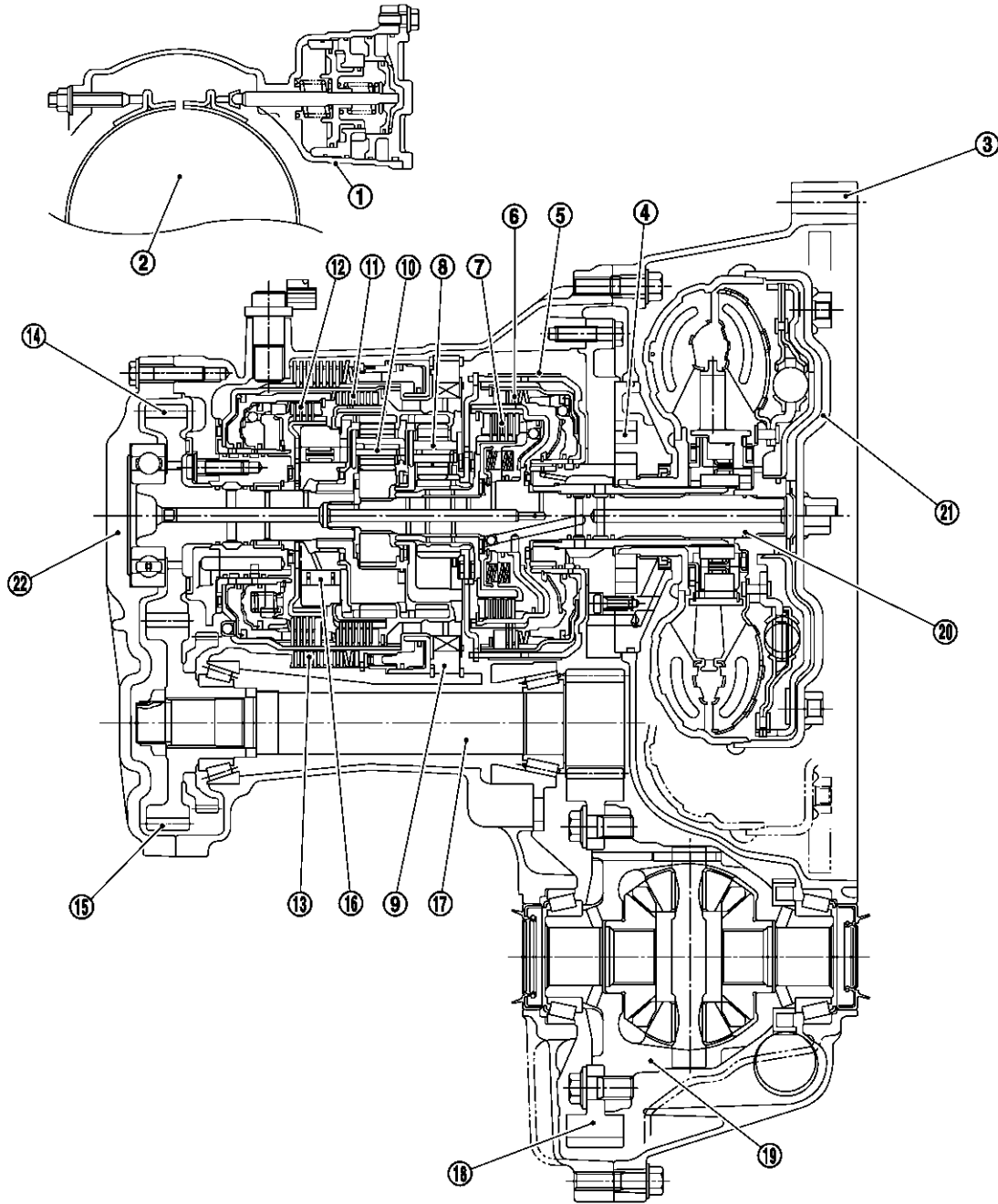
MAT087B

OVERALL SYSTEM

Cross-sectional View

Cross-sectional View

NHAT0011



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

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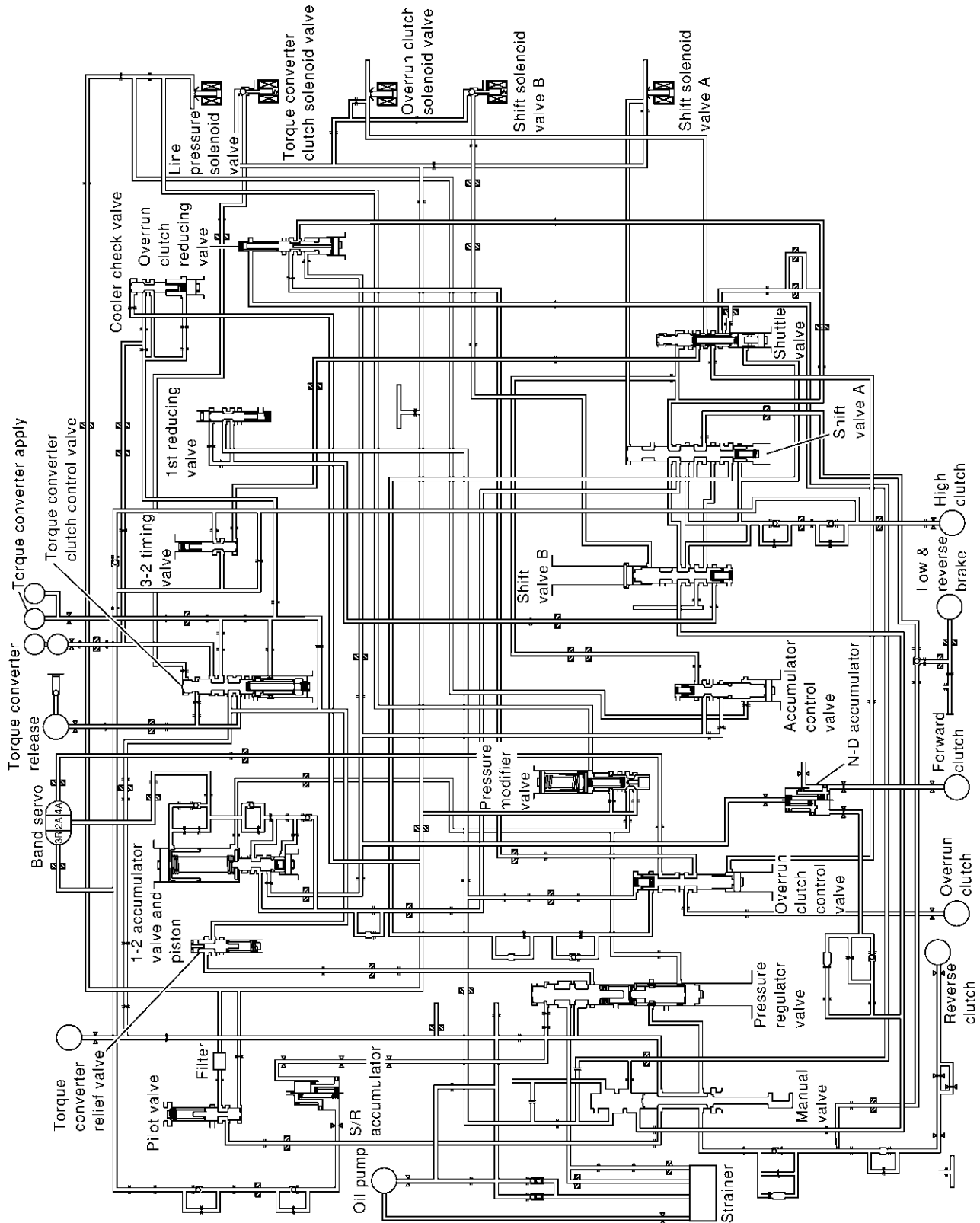
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OVERALL SYSTEM

Hydraulic Control Circuit

Hydraulic Control Circuit

NHAT0012



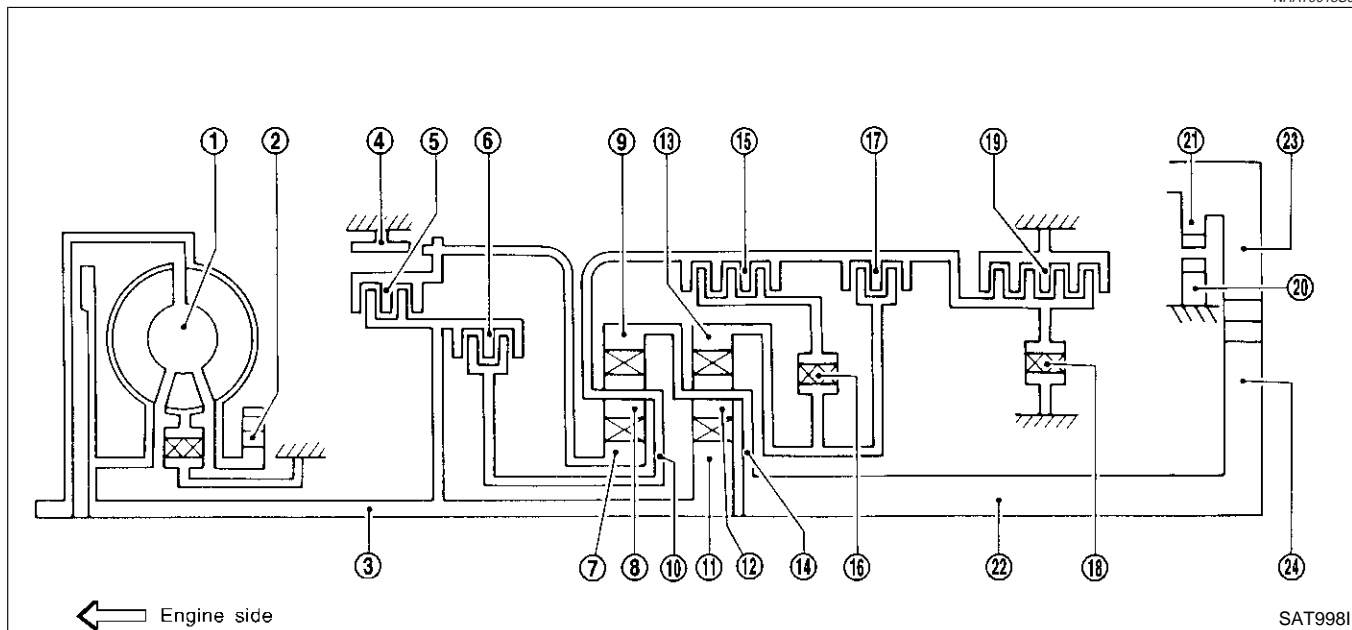
SAT489K

Shift Mechanism

NHAT0013

NHAT0013S01

CONSTRUCTION



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

FUNCTION OF CLUTCH AND BRAKE

NHAT0013S02

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

OVERALL SYSTEM

Shift Mechanism (Cont'd)

CLUTCH AND BAND CHART

NHAT0013S03

Shift position	Reverse clutch 5	High clutch 6	Forward clutch 15	Over-run clutch 17	Band servo			Forward one-way clutch 16	Low one-way clutch 18	Low & reverse brake 19	Lock-up	Remarks
					2nd apply	3rd release	4th apply					
P												PARK POSITION
R	○									○		REVERSE POSITION
N												NEUTRAL POSITION
D*4	1st		○	*1D				B	B			Automatic shift 1 ⇔ 2 ⇔ 3 ⇔ 4
	2nd		○	*1 A	○			B				
	3rd		○	○	*1 A	*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		○		Locks (held stationary) in 1st speed 1 ⇔ 2 ⇔ 3
	2nd		○	○	○			B				
	3rd		○	○	○	*2C	C	B				

*1: Operates when selector lever is set in 3rd position.

*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 in condition *2 above, and brake band contracts.

*4: A/T will not shift to 4th when selector lever is set in 3rd position.

○: Operates

A: Operates when throttle opening is less than 3.0/16, activating engine brake.

B: Operates during "progressive" acceleration.

C: Operates but does not affect power transmission.

D: Operates when throttle opening is less than 3.0/16, but does not affect engine brake.

OVERALL SYSTEM

Shift Mechanism (Cont'd)

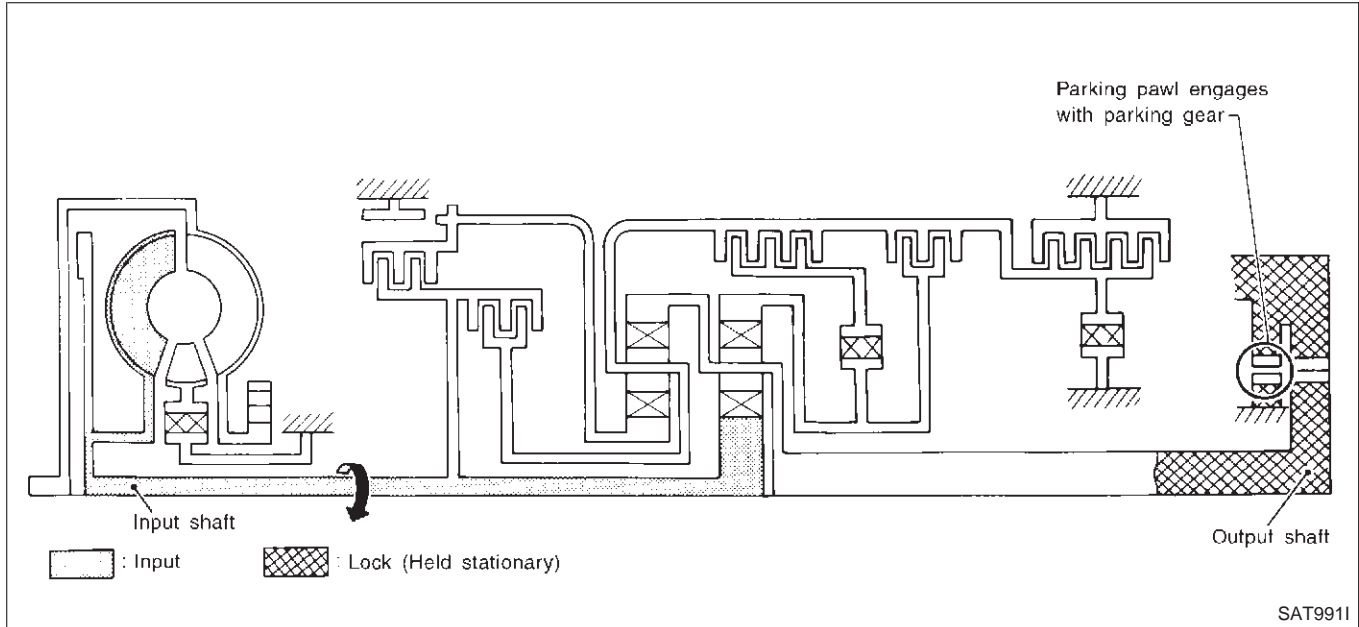
POWER TRANSMISSION

=NHAT0013S04

P and N Positions

NHAT0013S0401

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



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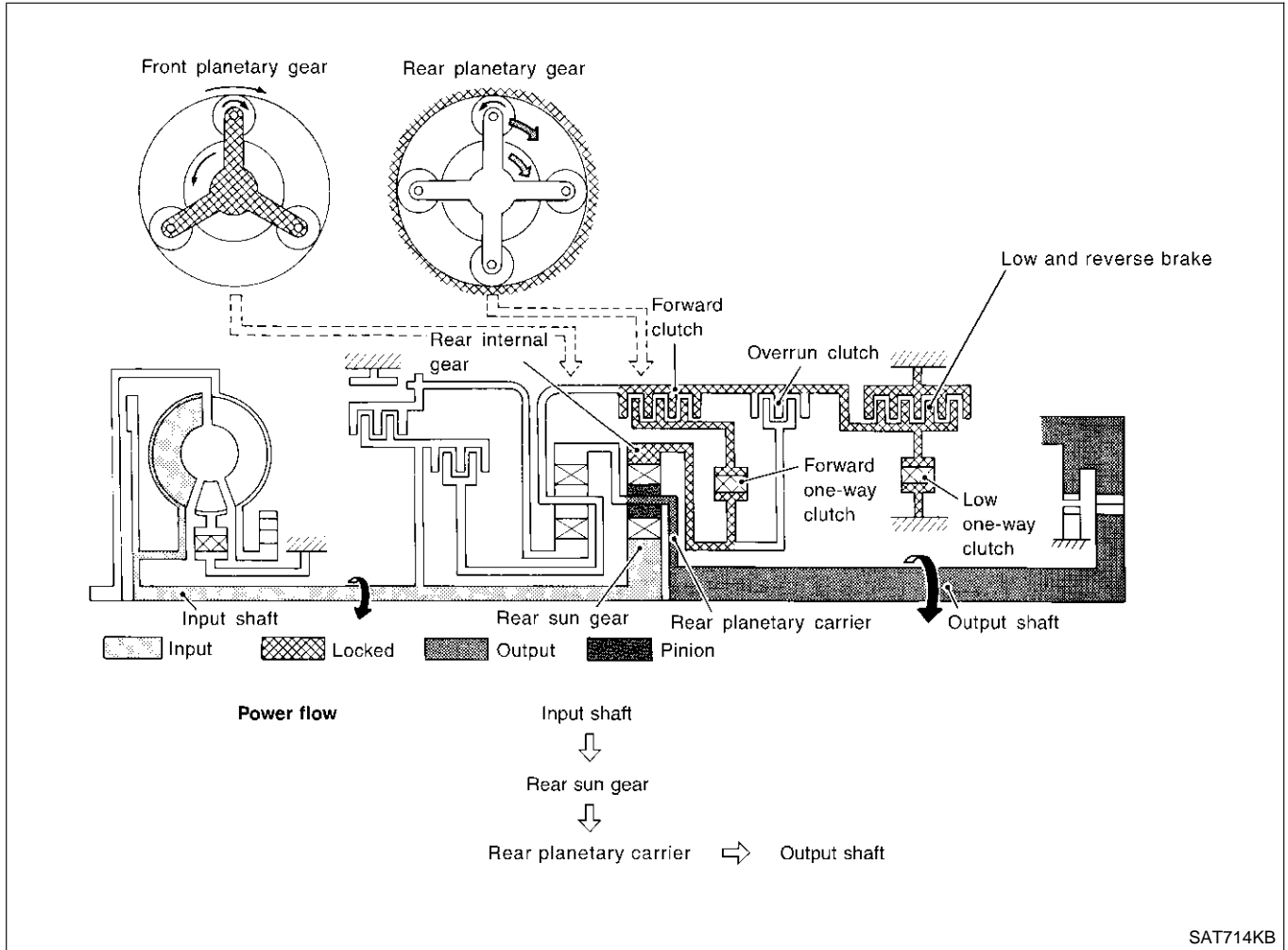
OVERALL SYSTEM

Shift Mechanism (Cont'd)

1₁ Position

=NHAT0013S0402

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



SAT714KB

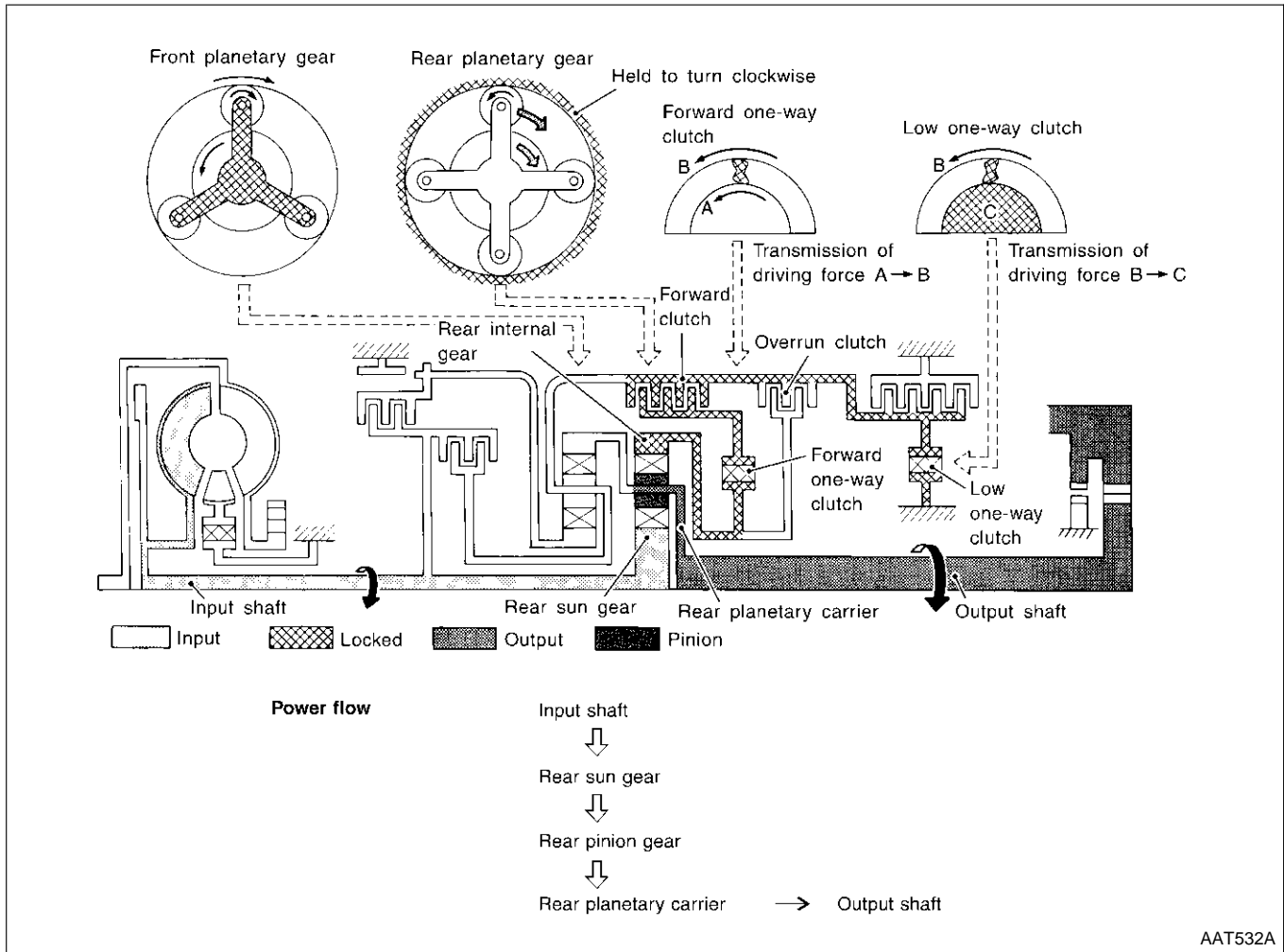
OVERALL SYSTEM

Shift Mechanism (Cont'd)

D₁ and 2₁ Positions

=NHAT0013S0403

<ul style="list-style-type: none"> ● Forward one-way clutch ● Forward clutch ● Low one-way clutch 	Rear internal gear is locked to rotate counterclockwise because of the functioning of these three clutches.
Overrun clutch engagement conditions (Engine brake)	D ₁ : Selector lever is set in 3rd position and throttle opening is less than 3.0/16 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.



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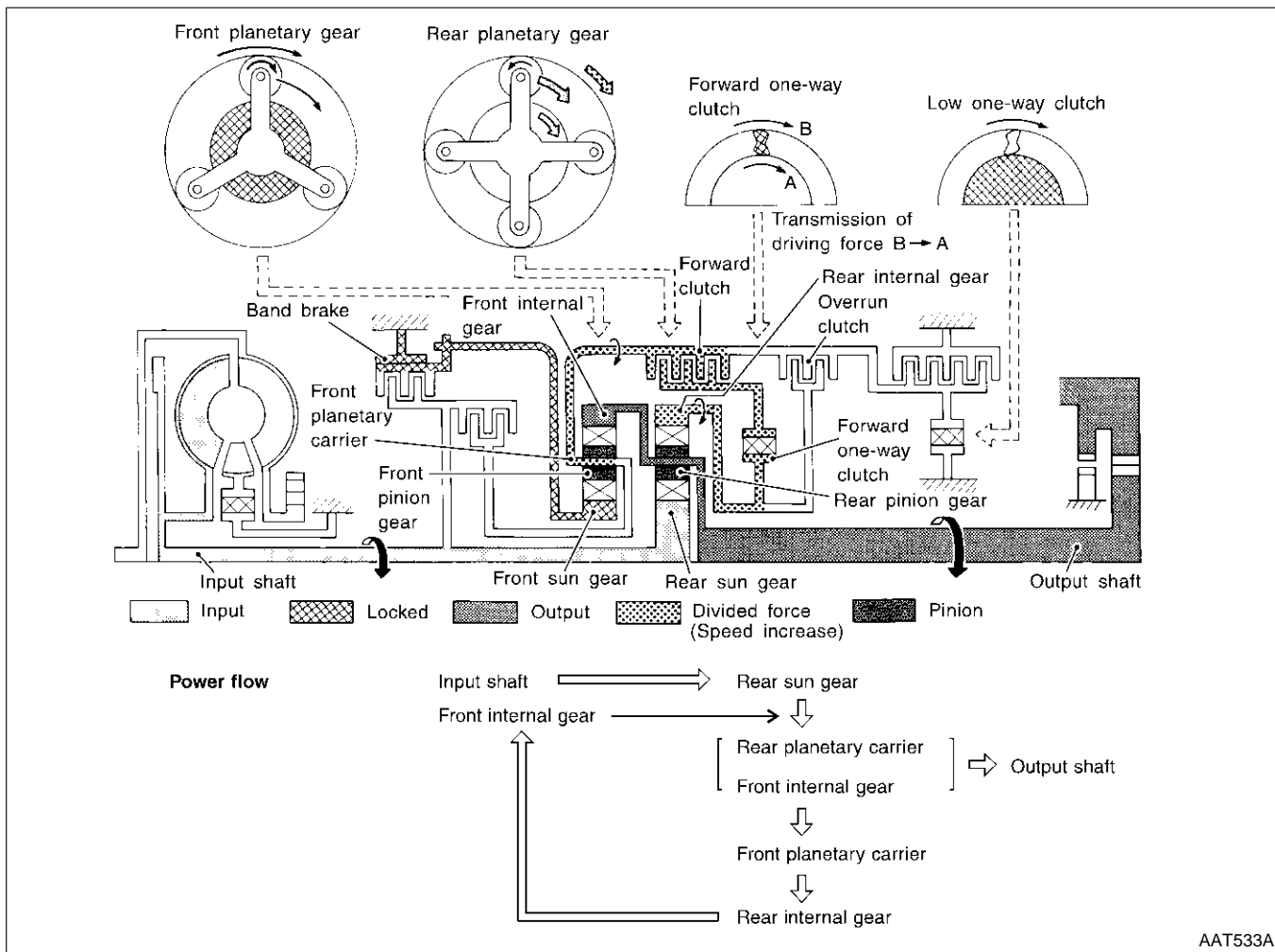
OVERALL SYSTEM

Shift Mechanism (Cont'd)

D₂, 2₂ and 1₂ Positions

=NHAT0013S0404

<ul style="list-style-type: none"> • Forward clutch • Forward one-way clutch • Brake band 	<p>Rear sun gear drives rear planetary carrier and combined front internal gear. Front internal gear now rotates around front sun gear accompanying front planetary carrier. As front planetary carrier transfers the power to rear internal gear through forward clutch and forward one-way clutch, this rotation of rear internal gear increases the speed of rear planetary carrier compared with that of the 1st speed.</p>
<p>Overrun clutch engagement conditions</p>	<p>D₂: Selector lever is set in 3rd position and throttle opening is less than 3.0/16 2₂, and 1₂: Always engaged</p>



AAT533A

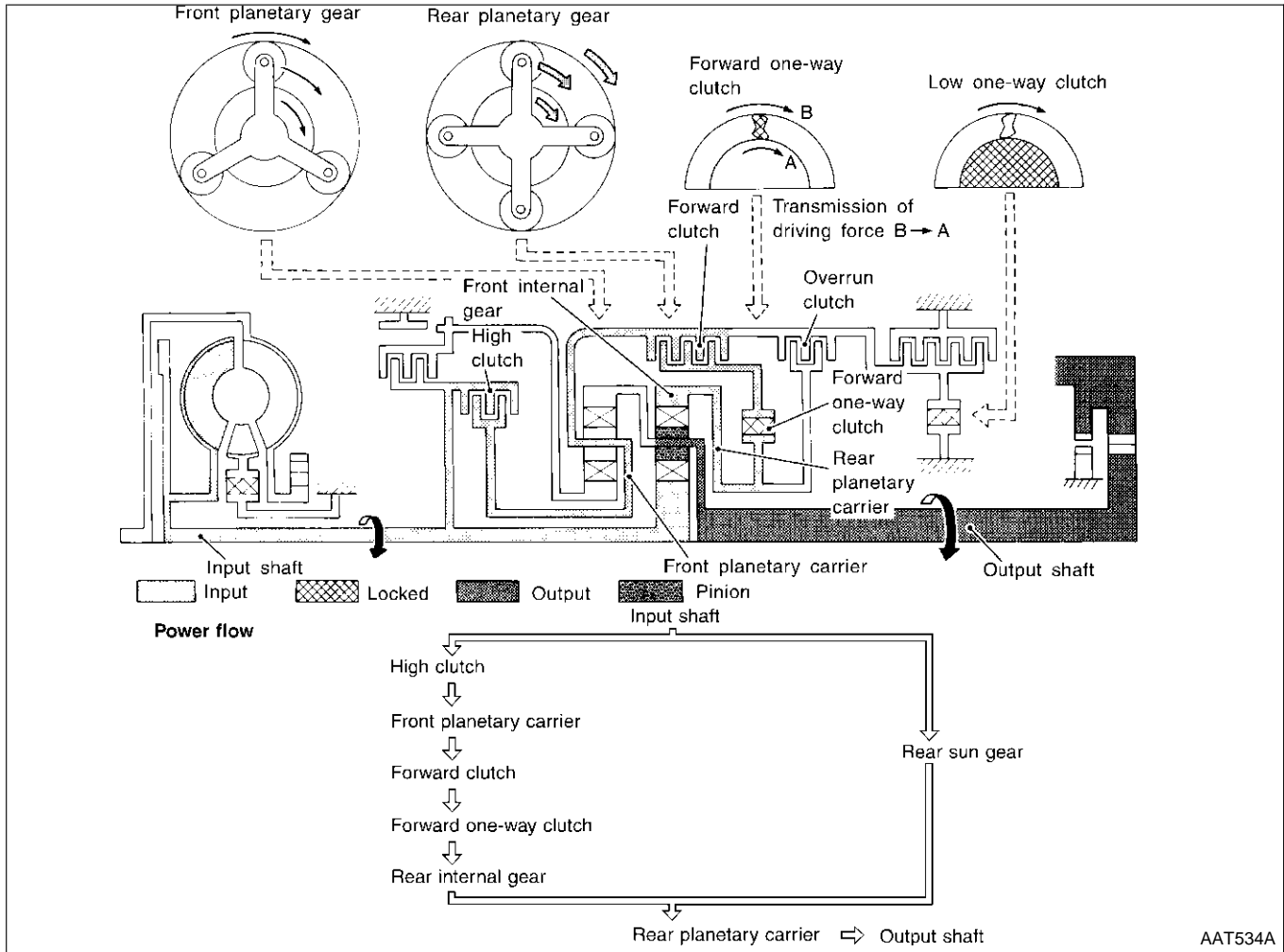
OVERALL SYSTEM

Shift Mechanism (Cont'd)

D₃, 2₃ and 1₃ Position

=NHAT0013S0405

<ul style="list-style-type: none"> ● High clutch ● Forward clutch ● Forward one-way clutch 	<p>Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch.</p> <p>This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.</p>
<p>Overrun clutch engagement conditions</p>	<p>D₃: Selector lever is set in 3rd position and throttle opening is less than 3.0/16</p> <p>2₃ and 1₃: Always engaged.</p>



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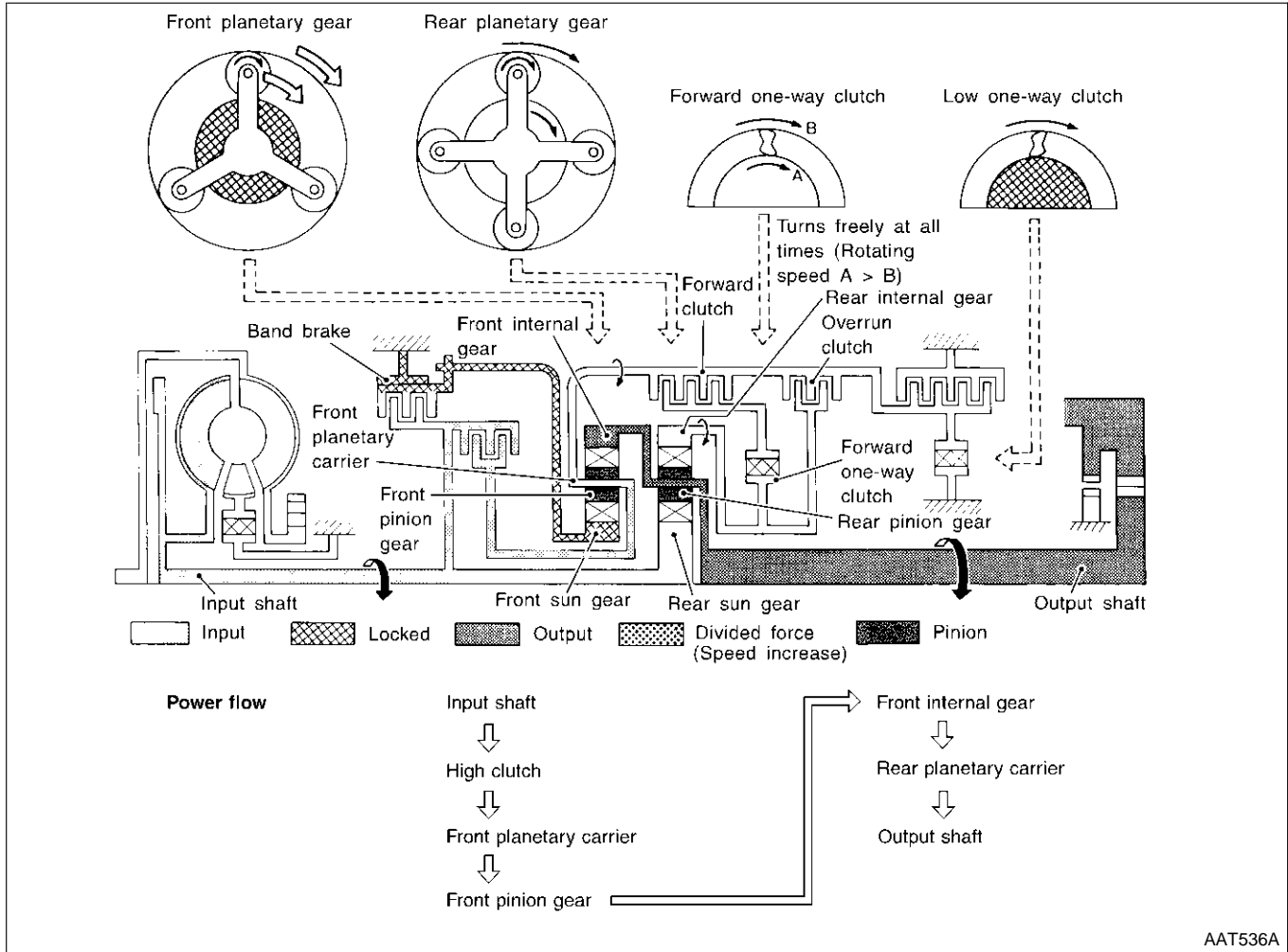
OVERALL SYSTEM

Shift Mechanism (Cont'd)

D₄ Position

=NHAT0013S0406

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



AAT536A

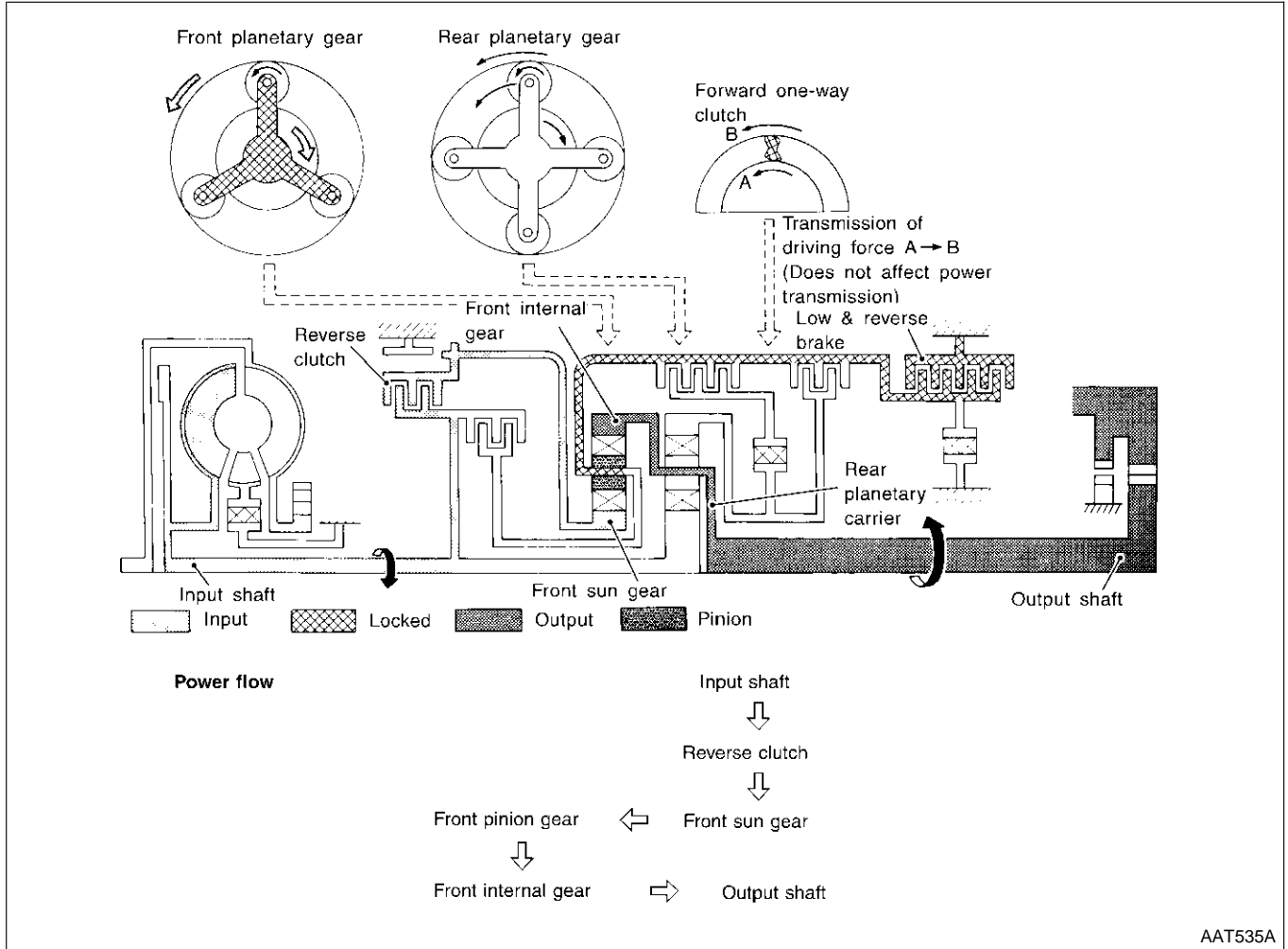
OVERALL SYSTEM

Shift Mechanism (Cont'd)

R Position

=NHAT0013S0407

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



AAT535A

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OVERALL SYSTEM

Control System

Control System

=NHAT0014

OUTLINE

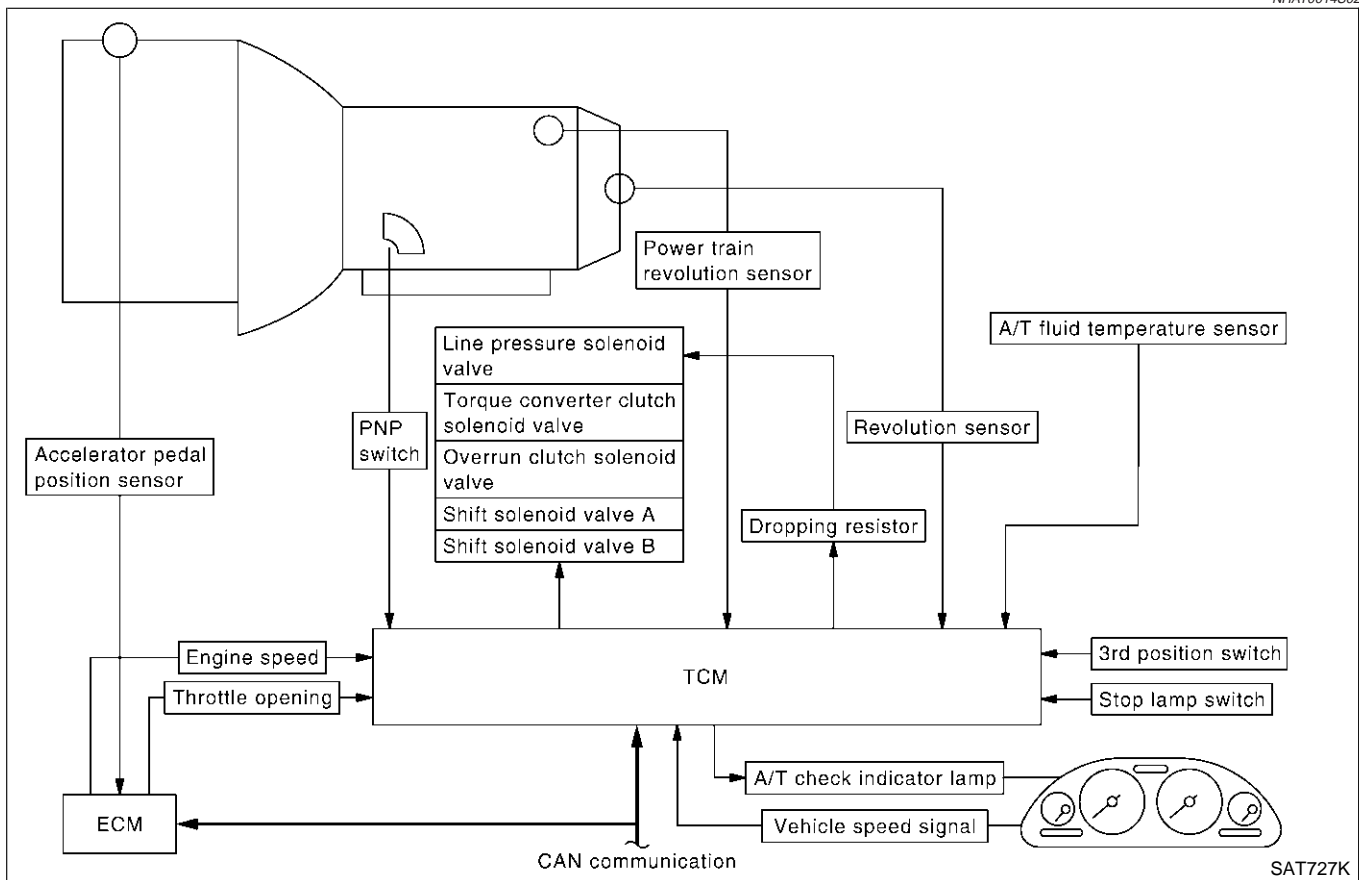
NHAT0014S01

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

SENSORS (OR SIGNALS)		TCM	ACTUATORS
Park/neutral position (PNP) switch Accelerator pedal position sensor Closed throttle position signal Wide open throttle position signal Engine speed signal A/T fluid temperature sensor Revolution sensor (VHCL/S SE-1) Vehicle speed sensor (VHCL/S SE-2) 3rd position switch ASCD control unit Stop lamp switch Power train revolution sensor	▶	Shift control Line pressure control Lock-up control Overrun clutch control Timing control Fail-safe control Self-diagnosis CAN communication line control	Shift solenoid valve A Shift solenoid valve B Overrun clutch solenoid valve Torque converter clutch solenoid valve Line pressure solenoid valve A/T CHECK indicator lamp

CONTROL SYSTEM

NHAT0014S02



OVERALL SYSTEM

Control System (Cont'd)

NHAT0014S03

TCM FUNCTION

The function of the TCM is to:

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

INPUT/OUTPUT SIGNAL OF TCM

NHAT0014S04

	Sensors and solenoid valves	Function	
Input	Park/neutral position (PNP) switch	Detects select lever position and sends a signal to TCM.	GI
	Accelerator pedal position sensor	Detects accelerator pedal position as throttle valve position signal, and sends a signal from ECM to TCM.	MA
	Closed throttle position signal	Detects throttle valve's fully-closed position and sends a signal from ECM to TCM.	EM
	Wide open throttle position switch	Detects a throttle valve position of greater than 1/2 or full throttle and sends a signal from ECM to TCM.	LC
	Engine speed signal	From ECM.	EC
	A/T fluid temperature sensor	Detects transmission fluid temperature and sends a signal to TCM.	FE
	Revolution sensor (VHCL/S SE-1)	Detects output shaft rpm and sends a signal to TCM.	AT
	Vehicle speed sensor (VHCL/S SE-2)	Used as an auxiliary vehicle speed sensor. Sends a signal when revolution sensor (installed on transmission) malfunctions.	AX
	3rd position switch	Sends a signal, which prohibits a shift to D position, to the TCM.	SU
	Power train revolution sensor	Detects forward clutch drum rpm and sends a signal to TCM.	BR
Stop lamp switch	Send the lock-up release signal to the TCM at time of D ₄ (lock-up).	ST	
Output	Shift solenoid valve A/B	Selects shifting point suited to driving conditions in relation to a signal sent from TCM.	RS
	Line pressure solenoid valve	Regulates (or decreases) line pressure suited to driving conditions in relation to a signal sent from TCM.	BT
	Torque converter clutch solenoid valve	Regulates (or decreases) lock-up pressure suited to driving conditions in relation to a signal sent from TCM.	HA
	Overrun clutch solenoid valve	Controls an "engine brake" effect suited to driving conditions in relation to a signal sent from TCM.	SC
	A/T CHECK indicator lamp	Shows TCM faults, when A/T control components malfunction.	EL

CAN Communication

NHAT0285

SYSTEM DESCRIPTION

NHAT0285S01

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.

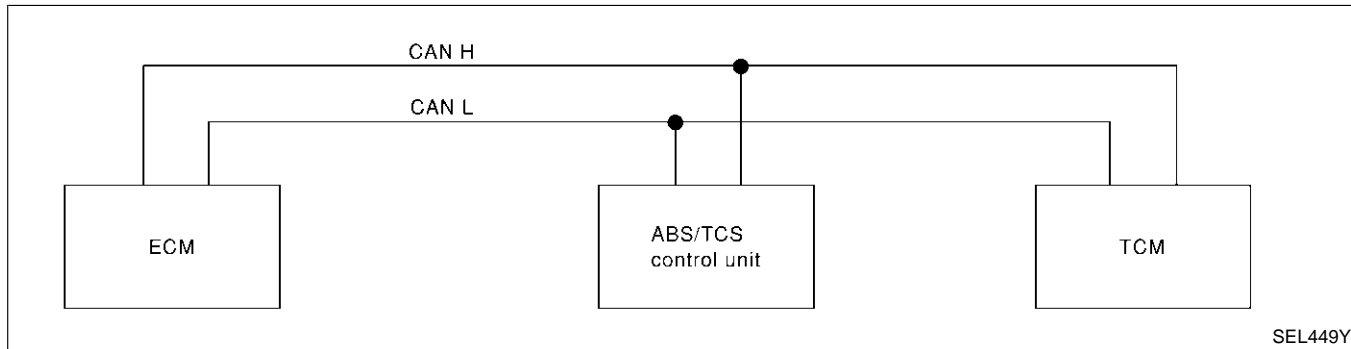
IDX

OVERALL SYSTEM

CAN Communication (Cont'd)

For TCS Models System Diagram

=NHAT0285S0101



SEL449Y

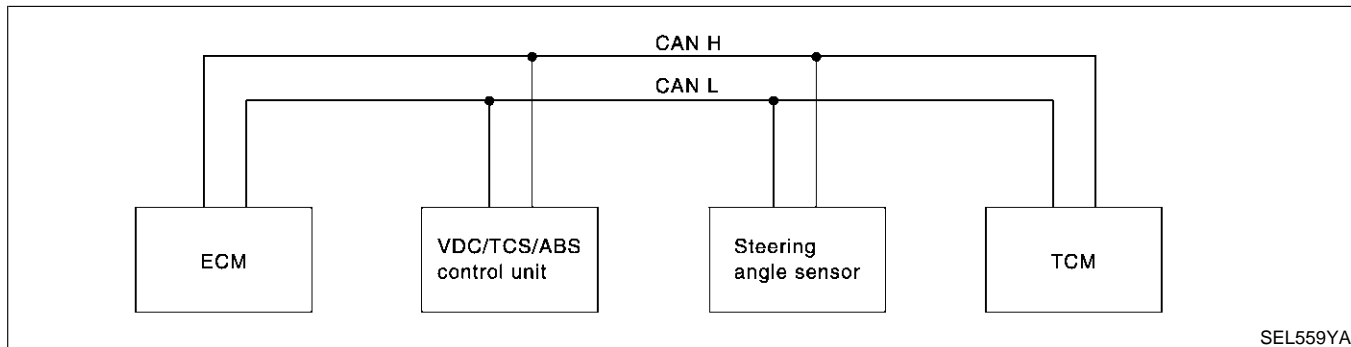
Input/Output Signal Chart

T: Transmit R: Receive

Signals	ECM	ABS/TCS control unit	TCM
Accelerator pedal position signal	T	R	R
Output shaft revolution signal	R		T
TCS self-diagnostic signal	R	T	
ABS self-diagnostic signal	R	T	

For VDC Models System Diagram

NHAT0285S0102



SEL559YA

Input/output Signal Chart

T: Transmit R: Receive

Signals	ECM	Steering angle sensor	VDC/TCS/ABS control unit	TCM
Output shaft revolution signal	R			T
VDC/TCS self-diagnostic signal	R		T	
ABS self-diagnostic signal	R		T	
Engine speed signal	T		R	
Accelerator pedal position signal	T		R	R
Steering wheel angle sensor signal		T	R	

Control Mechanism

LINE PRESSURE CONTROL

=NHAT0015

NHAT0015S01

TCM has various line pressure control characteristics to meet the driving conditions.

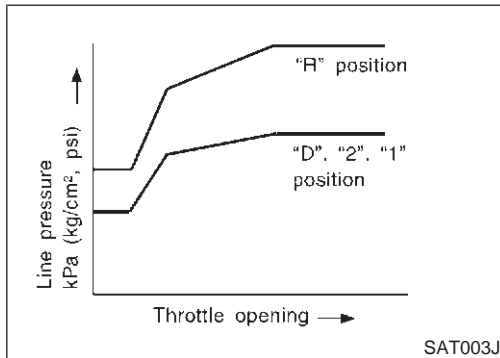
An ON-OFF duty signal is sent to the line pressure solenoid valve based on TCM characteristics.

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.

GI

MA

EM



SAT003J

Normal Control

NHAT0015S0101

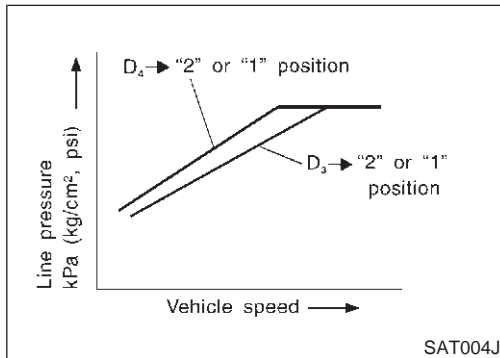
The line pressure to throttle opening characteristics is set for suitable clutch operation.

LC

EC

FE

AT



SAT004J

Back-up Control (Engine brake)

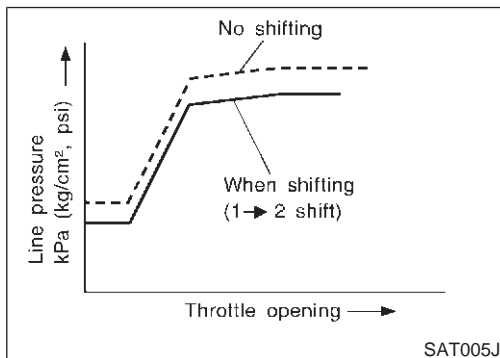
NHAT0015S0102

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

AX

SU

BR



SAT005J

During Shift Change

NHAT0015S0103

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.

ST

RS

BT

HA

SC

EL

At Low Fluid Temperature

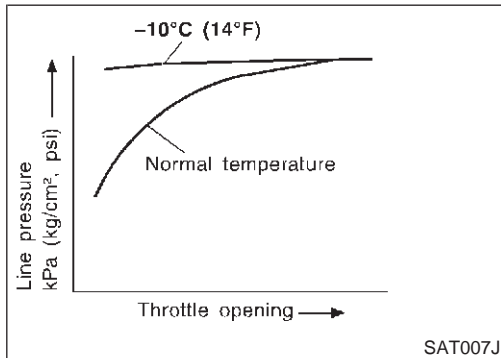
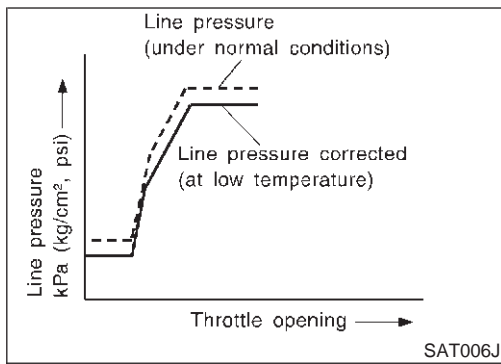
NHAT0015S0104

- Fluid viscosity and frictional characteristics of the clutch facing change with fluid temperature. Clutch engaging or band-contacting pressure is compensated for, according to fluid temperature, to stabilize shifting quality.

IDX

OVERALL SYSTEM

Control Mechanism (Cont'd)

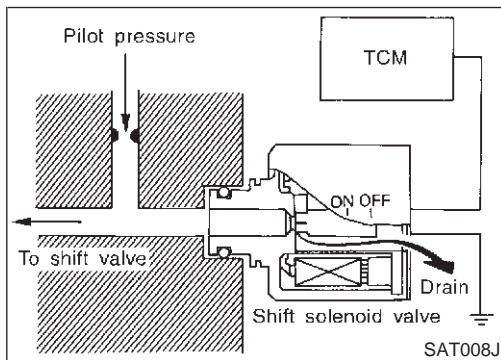


- The line pressure is reduced below 60°C (140°F) to prevent shifting shock due to low viscosity of automatic transmission fluid when temperature is low.
- Line pressure is increased to a maximum irrespective of the throttle opening when fluid temperature drops to -10°C (14°F). This pressure rise is adopted to prevent a delay in clutch and brake operation due to extreme drop of fluid viscosity at low temperature.

SHIFT CONTROL

NHAT0015S02

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 throttle position sensor. This results in improved acceleration performance and fuel economy.



Control of Shift Solenoid Valves A and B

NHAT0015S0201

The TCM activates shift solenoid valves A and B according to signals from the accelerator pedal position sensor (throttle 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

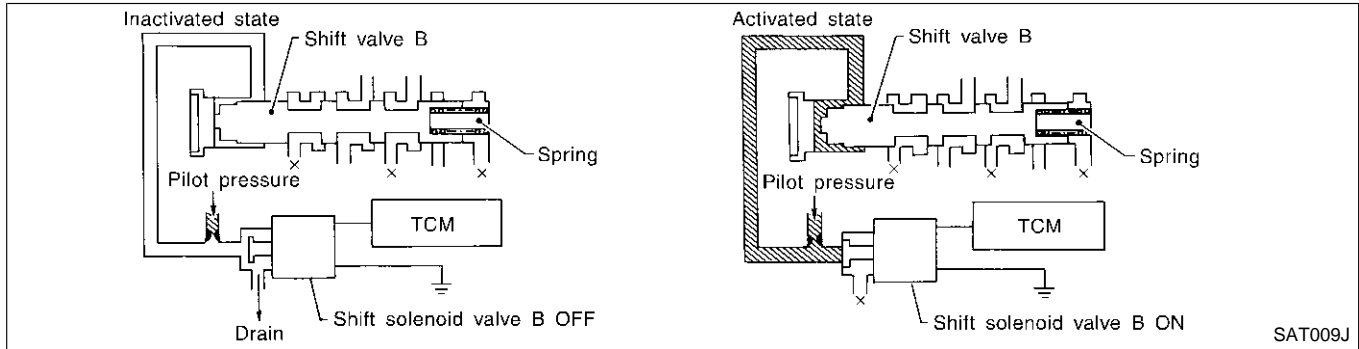
Shift solenoid valve	Gear position				
	D ₁ , 2 ₁ , 1 ₁	D ₂ , 2 ₂ , 1 ₂	D ₃	D ₄ (O/D)	N-P
A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)	ON (Closed)
B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)

OVERALL SYSTEM

Control Mechanism (Cont'd)

Control of Shift Valves A and B

NHAT0015S0202



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 drawing 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

NHAT0015S03

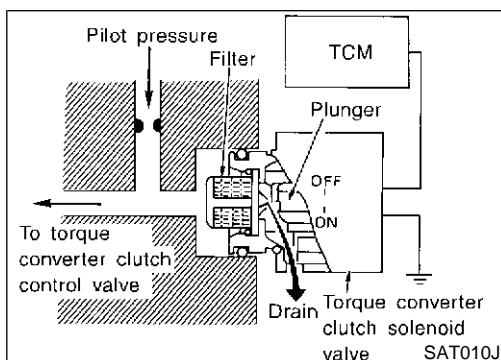
The torque converter clutch piston in the torque converter is locked to eliminate torque converter slip to increase power transmission efficiency. The solenoid valve is controlled by an ON-OFF duty signal sent from the TCM. The signal is converted to an oil pressure signal which controls the lock-up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

Conditions for Lock-up Operation

NHAT0015S0301

When vehicle is driven in 3rd or 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.

Selector lever	D position	3rd position
Gear position	D ₄	D ₃
Vehicle speed sensor	More than set value	
Accelerator pedal position sensor (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

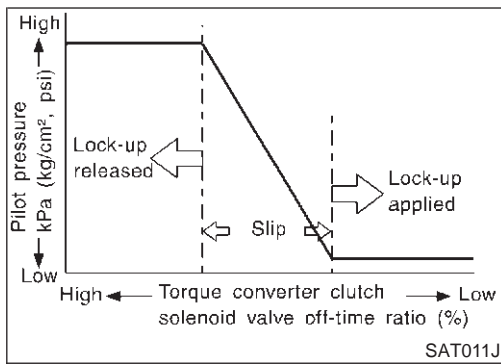
NHAT0015S0302

The torque converter clutch solenoid valve is controlled by the TCM. The plunger closes the drain circuit during the OFF period, and opens the circuit during the ON period. If the percentage of OFF-time increases in one cycle, the pilot pressure drain time is reduced and pilot pressure remains high.

The torque converter clutch piston is designed to slip to adjust the ratio of ON-OFF, thereby reducing lock-up shock.

OVERALL SYSTEM

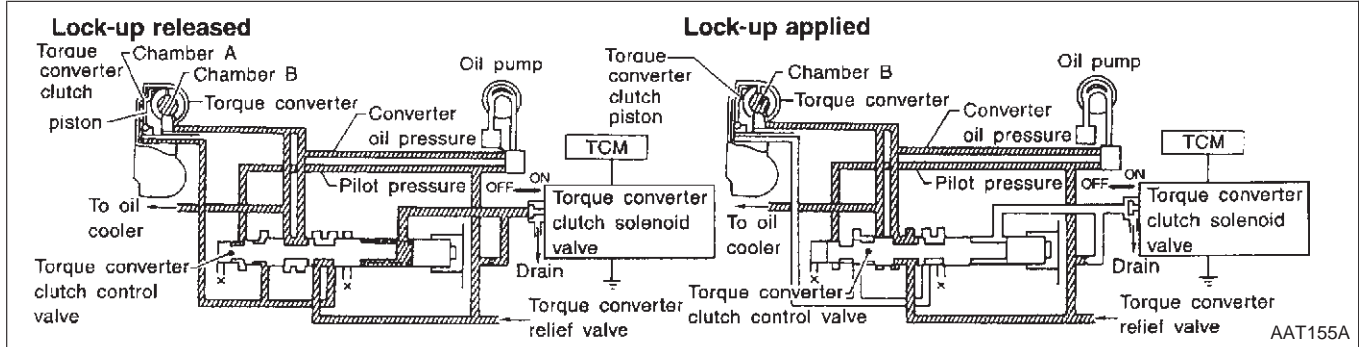
Control Mechanism (Cont'd)



OFF-time INCREASING
 ↓
 Amount of drain DECREASING
 ↓
 Pilot pressure HIGH
 ↓
 Lock-up RELEASING

Torque Converter Clutch Control Valve Operation

NHAT0015S0303



AAT155A

Lock-up released

The OFF-duration of the torque converter clutch solenoid valve is long, and pilot pressure is high. The pilot pressure pushes the end face of the torque converter clutch control valve in combination with spring force to move the valve to the left. As a result, converter pressure is applied to chamber A (torque converter clutch piston release side). Accordingly, the torque converter clutch piston remains unlocked.

Lock-up applied

When the OFF-duration of the torque converter clutch solenoid valve is short, pilot pressure drains and becomes low. Accordingly, the control valve moves to the right by the pilot pressure of the other circuit and converter pressure. As a result, converter pressure is applied to chamber B, keeping the torque converter clutch piston applied.

Also smooth lock-up is provided by transient application and release of the lock-up.

OVERRUN CLUTCH CONTROL (ENGINE BRAKE CONTROL)

NHAT0015S04

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.

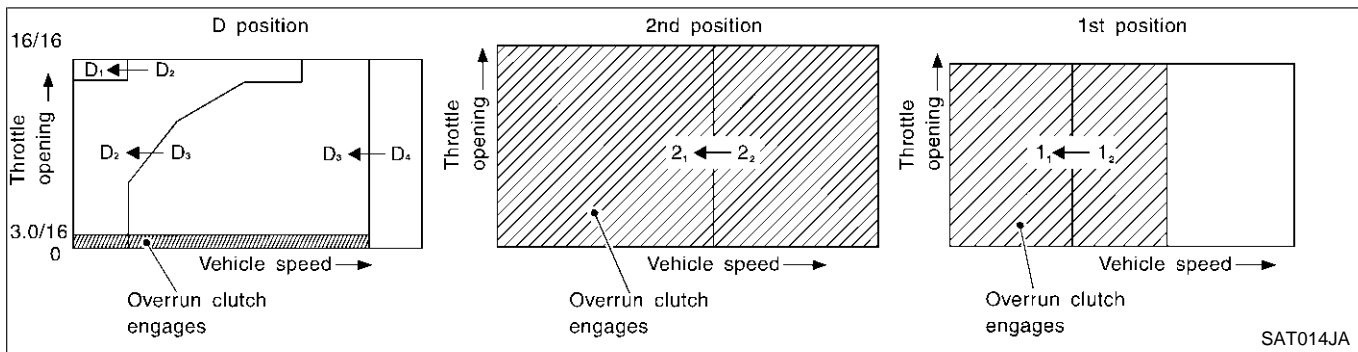
Overrun Clutch Operating Conditions

NHAT0015S0401

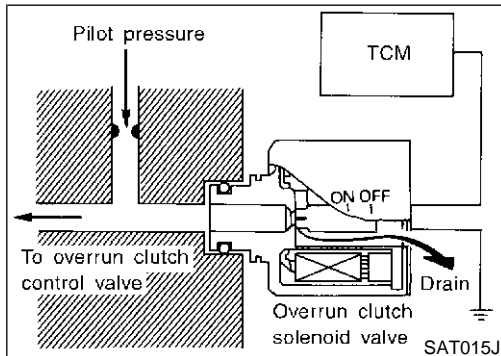
Selector lever position	Gear position	Throttle opening
D position	D ₁ , D ₂ , D ₃ gear position	Less than 3.0/16
2nd position	2 ₁ , 2 ₂ gear position	At any position
1st position	1 ₁ , 1 ₂ gear position	

OVERALL SYSTEM

Control Mechanism (Cont'd)



SAT014JA



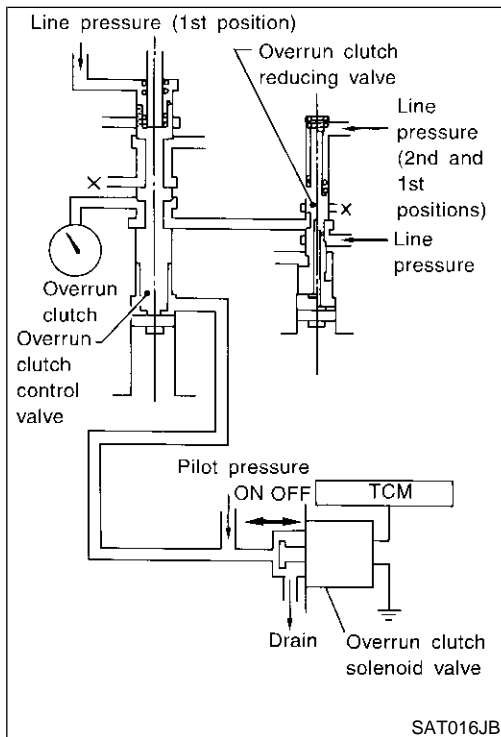
SAT015J

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.



SAT016JB

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.

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. This causes the overrun clutch to engage.

In the 1st position, the overrun clutch control valve remains pushed down so that the overrun clutch is engaged at all times.

Control Valve

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.

GI

MA

EM

LC

EC

FE

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

NHAT0016

NHAT0016S01

OVERALL SYSTEM

Control Valve (Cont'd)

Valve name	Function
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 up-shifting (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 up-shifting (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 .)
"1" 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 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	Dampens the shock encountered when 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 down shifting.
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 little heat is generated, saves the volume of cooler flow, and stores the oil pressure for lock up.

Introduction

NHAT0017

The A/T system has two self-diagnostic systems.

The first is the emission-related on board diagnostic system (OBD-II) performed by the TCM (transmission control module) 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 A/T CHECK indicator lamp. The malfunction is stored in the TCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For detail, refer to AT-43.

OBD-II Function for A/T System

NHAT0018

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

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

One or Two Trip Detection Logic of OBD-II

NHAT0019

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. — First Trip
If the same malfunction as that experienced during the first test drive is sensed during the second test drive, the MIL will illuminate. — Second Trip

A/T-related parts for which the MIL illuminates during the first or second test drive are listed below.

Items	MIL	
	One trip detection	Two trip detection
Shift solenoid valve A — DTC: P0750	X	
Shift solenoid valve B — DTC: P0755	X	
Accelerator pedal position sensor (Throttle position sensor) or switch — DTC: P1705	X	
Except above		X



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

OBD-II Diagnostic Trouble Code (DTC)

NHAT0020

HOW TO READ DTC AND 1ST TRIP DTC

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

( With CONSULT-II or  GST) CONSULT-II or GST (Generic Scan Tool) Examples: P0705, P0710, P0720, P0725, etc.

These DTCs are prescribed by SAE J2012.

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

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

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

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD-II Diagnostic Trouble Code (DTC) (Cont'd)

SELECT SYSTEM
A/T
ENGINE

SAT014K

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

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

SAT015K

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

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

SAT016K

Freeze Frame Data and 1st Trip Freeze Frame Data

The ECM has a memory function, which stores the driving condition such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed and vehicle speed at the moment the ECM detects a malfunction. NHAT0020S0101

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data, and the data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For detail, refer to EC-99, "CONSULT-II".

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.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD-II Diagnostic Trouble Code (DTC) (Cont'd)

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 DTCs) are cleared when the ECM memory is erased.

HOW TO ERASE DTC

The diagnostic trouble code can be erased by CONSULT-II, GST or ECM DIAGNOSTIC TEST MODE as described following. NHAT0020S02

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

The following emission-related diagnostic information is cleared from the ECM memory when erasing DTC related to OBD-II. For details, refer to EC-76, "Emission-related Diagnostic Information".

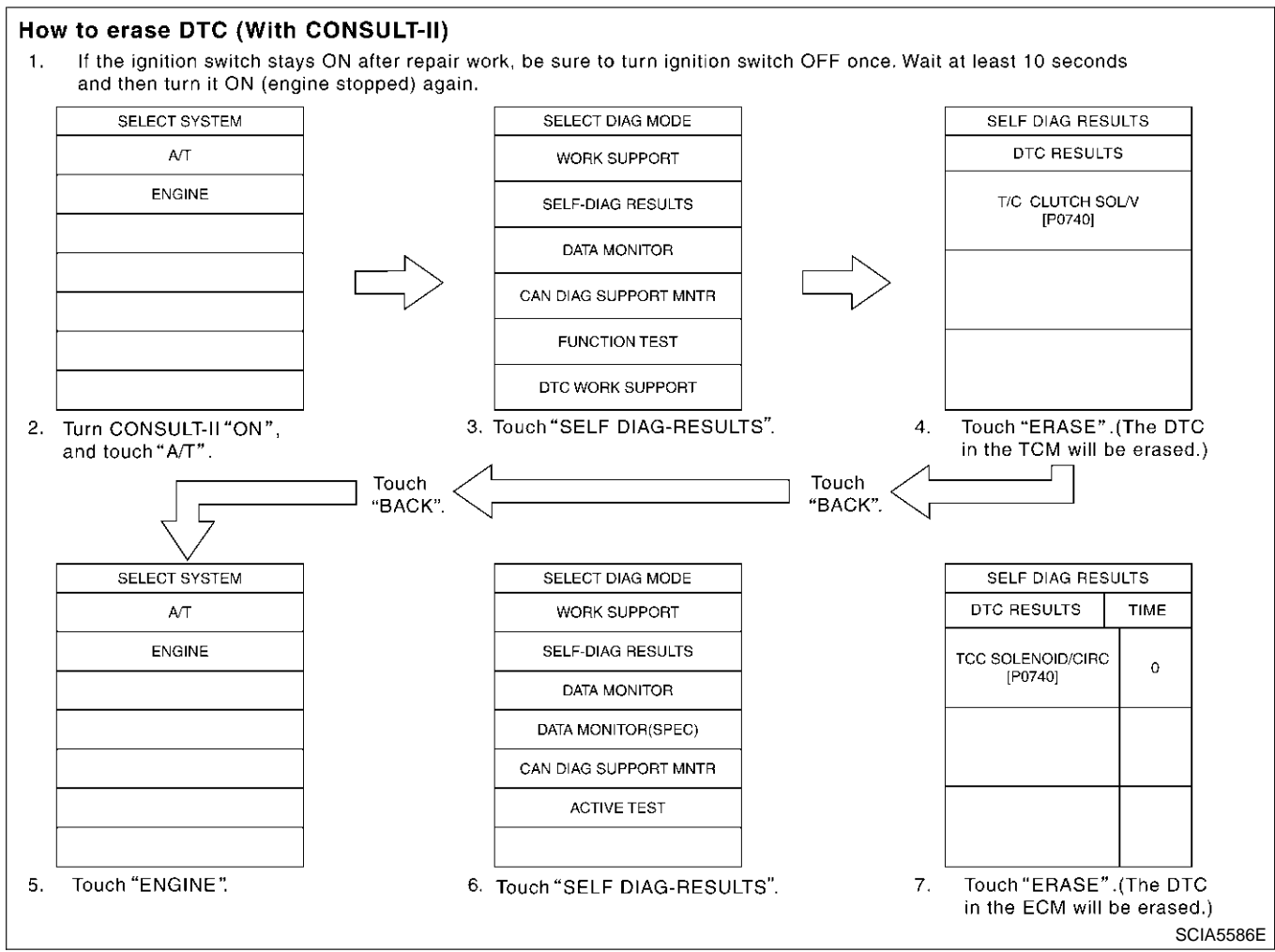
- Diagnostic trouble codes (DTC)
- 1st trip diagnostic trouble codes (1st trip DTC)
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

Ⓔ HOW TO ERASE DTC (WITH CONSULT-II)

- If a DTC is displayed for both ECM and TCM, it needs to be erased for both ECM and TCM. NHAT0020S03
1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
 2. Turn CONSULT-II "ON" and touch "A/T".
 3. Touch "SELF-DIAG RESULTS".
 4. Touch "ERASE". (The DTC in the TCM will be erased.) Then touch "BACK" twice.
 5. Touch "ENGINE".
 6. Touch "SELF DIAGNOSIS".
 7. Touch "ERASE". (The DTC in the ECM will be erased.)

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD-II Diagnostic Trouble Code (DTC) (Cont'd)

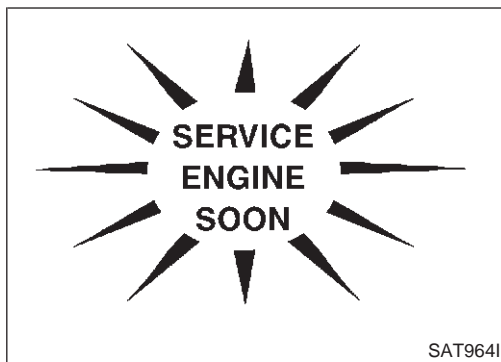


HOW TO ERASE DTC (WITH GST)

NHAT0020S04

HOW TO ERASE DTC (NO TOOLS)

NHAT0020S05



Malfunction Indicator Lamp (MIL)

^{NHAT0021}

1. The malfunction indicator lamp will light up when the ignition switch is turned ON without the engine running. This is for checking the lamp.
 - If the malfunction indicator lamp does not light up, refer to EL-150, "WARNING LAMPS". [Or see EC-90, "Malfunction indicator lamp (MIL)" and EC-99, "CONSULT-II".]
2. When the engine is started, the malfunction indicator lamp should go off. If the lamp remains on, the on board diagnostic system has detected an emission-related (OBD-II) malfunction. For detail, refer to EC-75, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION".

GI

MA

EM

LC

EC

FE

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

CONSULT-II

^{NHAT0022}

After performing "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" (AT-42), place check marks for results on the "Diagnostic Worksheet", AT-61. Reference pages are provide following the items.

NOTICE:

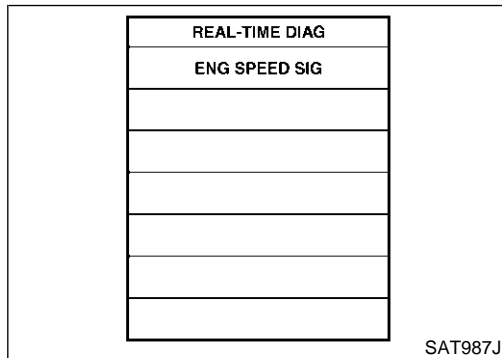
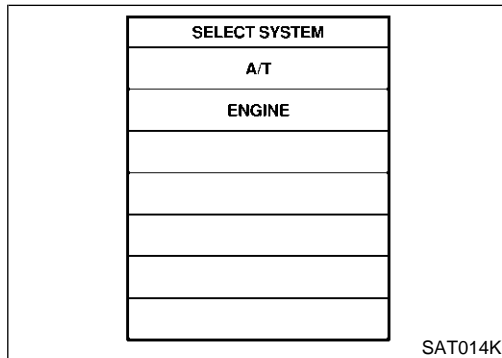
- 1) The CONSULT-II electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid). Check for time difference between actual shift timing and the CONSULT-II display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning.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

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

FUNCTION		
Diagnostic test mode	Function	Reference page
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-II.	—
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.	Refer to AT-42
Data monitor	Input/Output data in the ECM can be read.	Refer to AT-45
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.	—
Function test	Performed by CONSULT-II instead of a technician to determine whether each system is "OK" or "NG".	—
DTC work support	Select the operating condition to confirm Diagnostic Trouble Codes.	Refer to AT-48
TCM part number	TCM part number can be read.	—

=NHAT0022S11



Ⓔ SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)

NHAT0022S01



1. Turn on CONSULT-II and touch "ENGINE" for OBD-II detected items or touch "A/T" for TCM self-diagnosis.
If "ENGINE" or "A/T" is not displayed, go to GI-42, "CONSULT-II Data Link Connector (DLC) Circuit".
2. Touch "SELF DIAGNOSIS".
Display shows malfunction experienced since the last erasing operation.
CONSULT-II performs "Real Time Diagnosis".
Also, any malfunction detected while in this mode will be displayed at real time.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)



SELF-DIAGNOSTIC RESULT TEST MODE

NHAT0022S02

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	OBD-II (DTC)	
"A/T"	"ENGINE"		 Available by A/T CHECK indicator lamp	 Available by malfunction indicator lamp*2, "ENGINE" on CON- SULT-II or GST	
—	PNP SW/CIRC	<ul style="list-style-type: none"> TCM does not receive the correct voltage signal (based on the gear position) from the switch. 	—	P0705	GI
Park/neutral position (PNP) switch circuit					
—	VEH SPD SEN/ CIR AT	<ul style="list-style-type: none"> TCM does not receive the proper voltage signal from the sensor. 	X	P0720	EM
Revolution sensor					
—	—	<ul style="list-style-type: none"> TCM does not receive the proper voltage signal from the combination meter. 	X	—	EC
Vehicle speed signal (from Meter)					
—	A/T 1ST GR FNCTN	<ul style="list-style-type: none"> A/T cannot be shifted to the 1st gear position even if electrical circuit is good. 	—	P0731*1	AT
A/T 1st gear function					
—	A/T 2ND GR FNCTN	<ul style="list-style-type: none"> A/T cannot be shifted to the 2nd gear position even if electrical circuit is good. 	—	P0732*1	SU
A/T 2nd gear function					
—	A/T 3RD GR FNCTN	<ul style="list-style-type: none"> A/T cannot be shifted to the 3rd gear position even if electrical circuit is good. 	—	P0733*1	ST
A/T 3rd gear function					
—	A/T 4TH GR FNCTN	<ul style="list-style-type: none"> A/T cannot be shifted to the 4th gear position even if electrical circuit is good. 	—	P0734*1	BT
A/T 4th gear function					
—	A/T TCC S/V FNCTN	<ul style="list-style-type: none"> A/T cannot perform lock-up even if electrical circuit is good. 	—	P0744*1	SC
A/T TCC S/V function (lock-up)					
—	SFT SOL A/CIRC	<ul style="list-style-type: none"> TCM detects an improper voltage drop when it tries to operate the solenoid valve. 	X	P0750	SC
Shift solenoid valve A					
—	SFT SOL B/CIRC	<ul style="list-style-type: none"> TCM detects an improper voltage drop when it tries to operate the solenoid valve. 	X	P0755	EL
Shift solenoid valve B					
—	O/R CLUCH SOL/ CIRC	<ul style="list-style-type: none"> TCM detects an improper voltage drop when it tries to operate the solenoid valve. 	X	P1760	IDX
Overrun clutch solenoid valve					
—	TCC SOLENOID/ CIRC	<ul style="list-style-type: none"> TCM detects an improper voltage drop when it tries to operate the solenoid valve. 	X	P0740	
T/C clutch solenoid valve					
—	L/PRESS SOL/ CIRC	<ul style="list-style-type: none"> TCM detects an improper voltage drop when it tries to operate the solenoid valve. 	X	P0745	
Line pressure solenoid valve					
LINE PRESSURE S/V					

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	OBD-II (DTC)
"A/T"	"ENGINE"		 Available by A/T CHECK indicator lamp	 Available by malfunction indicator lamp*2, "ENGINE" on CON- SULT-II or GST
Accelerator pedal position sensor		● TCM receives an excessively low or high voltage from the sensor.	X	P1705
THROTTLE POSI SEN	TP SEN/CIRC A/T			
Engine speed signal		● TCM does not receive the proper voltage signal from the ECM.	X	P0725
ENGINE SPEED SIG	—			
A/T fluid temperature sensor		● TCM receives an excessively low or high voltage from the sensor.	X	P0710
BATT/FLUID TEMP SEN	ATF TEMP SEN/CIRC			
CAN communication*3		● When malfunction is detected in CAN communication line.	X	U1000
CAN COMM CIRCUIT	CAN COMM CIRCUIT			
Power train revolution sensor		● TCM does not receive the proper voltage signal from the sensor.	X	—
TURBINE REV	—			
TCM (RAM)		● TCM memory (RAM) is malfunctioning	—	—
CONTROL UNIT (RAM)	—			
TCM (ROM)		● TCM memory (ROM) is malfunctioning	—	—
CONTROL UNIT (ROM)	—			
TCM (EEP ROM)		● TCM memory (EEP ROM) is malfunctioning.	—	—
CONT UNIT (EEP ROM)	—			
Initial start		● This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen.)	X	—
INITIAL START	—			
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED**)		● No failure has been detected.	X	X

X: Applicable

—: Not applicable

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

*2: Refer to EC-90, "Malfunction Indicator Lamp (MIL)".

*3: If malfunction is detected in multiple systems including CAN communication line, CAN communication line trouble diagnosis shall be performed first.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

DATA MONITOR MODE (A/T)

NHAT0022S03

Item	Display	SELECT MONITOR ITEM			Description	Remarks
		TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU		
Vehicle speed sensor 1 (A/T) (Revolution sensor)	VHCL/S SE-A/T [km/h] or [mph]	X	—	▼	<ul style="list-style-type: none"> Vehicle speed computed from signal of revolution sensor is displayed. 	When racing engine in "N" or "P" position with vehicle stationary, CONSULT-II data may not indicate 0 km/h (0 mph).
Vehicle speed sensor 2 (Meter)	VHCL/S SE-MTR [km/h] or [mph]	X	—	▼	<ul style="list-style-type: none"> Vehicle speed computed from signal of vehicle speed signal is displayed. 	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.
Accelerator pedal position sensor	THRTL POS SEN [V]	X	—	▼	<ul style="list-style-type: none"> Accelerator pedal position sensor signal voltage is displayed. 	
A/T fluid temperature sensor	FLUID TEMP SE [V]	X	—	▼	<ul style="list-style-type: none"> A/T fluid temperature sensor signal voltage is displayed. Signal voltage lowers as fluid temperature rises. 	
Battery voltage	BATTERY VOLT [V]	X	—	▼	<ul style="list-style-type: none"> Source voltage of TCM is displayed. 	
Engine speed	ENGINE SPEED [rpm]	X	X	▼	<ul style="list-style-type: none"> Engine speed, computed from engine speed signal, is displayed. 	Engine speed display may not be accurate under approx. 800 rpm. It may not indicate 0 rpm even when engine is not running.
Power train revolution sensor	TURBINE REV [rpm]	X	—	▼	<ul style="list-style-type: none"> This sensor checks the changing speed then perform the oil pressure control and the torque down control. 	Error may occur under approx. 800 rpm and will not indicate 0 rpm even if engine is not running.
3rd position switch	OVERDRIVE SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> ON/OFF status, computed from signal of 3rd position switch, is displayed. 	
PN position (PNP) switch	PN POSI SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> ON/OFF status, computed from signal of PN position switch, is displayed. 	
R position switch	R POSITION SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> ON/OFF status, computed from signal of R position switch, is displayed. 	
D position switch	D POSITION SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> ON/OFF status, computed from signal of D position switch, is displayed. 	

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Item	Display	SELECT MONITOR ITEM			Description	Remarks
		TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU		
2 position switch	2 POSITION SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> ON/OFF status, computed from signal of 2 position switch, is displayed. 	
1 position switch	1 POSITION SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> ON/OFF status, computed from signal of 1 position switch, is displayed. 	
ASCD cruise signal	ASCD-CRUISE [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> Status of ASCD cruise signal is displayed. ON ... Cruising state OFF ... Normal running state 	This is displayed even when no ASCD is mounted.
ASCD OD cut signal	ASCD-OD CUT [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> Status of ASCD OD release signal is displayed. ON ... OD released OFF ... OD not released 	This is displayed even when no ASCD is mounted.
Kickdown switch	KICKDOWN SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> ON/OFF status, computed from signal of kickdown switch, is displayed. 	This is displayed even when no kickdown switch is equipped.
A/T mode switch	POWER SHIFT SW [ON/OFF]	X	—	▼		Not mounted but displayed.
Closed throttle position signal	CLOSED THL/SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> ON/OFF status, computed from signal of closed throttle position signal, is displayed. 	This means closed throttle position signal input via CAN communication line.
Wide open throttle position signal	W/O THRL/P-SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> ON/OFF status, computed from signal of wide open throttle position signal, is displayed. 	This means wide open throttle position signal input via CAN communication line.
Shift solenoid valve A	*SHIFT S/V A [ON/OFF]	—	—	▼	<ul style="list-style-type: none"> Displays status of check signal (re-input signal) for TCM control signal output. Remains unchanged when solenoid valves are open or shorted. 	
Shift solenoid valve B	*SHIFT S/V B [ON/OFF]	—	—	▼		
Overrun clutch solenoid valve	*OVERRUN/C S/V [ON/OFF]	—	—	▼		
A/T mode switch	HOLD SW [ON/OFF]	X	—	▼		Not mounted but displayed.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Item	Display	SELECT MONITOR ITEM			Description	Remarks
		TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU		
Stop lamp switch	BRAKE SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> ON/OFF status is displayed. ON ... Brake pedal is depressed. OFF ... Brake pedal is released. 	
Gear position	GEAR	—	X	▼	<ul style="list-style-type: none"> Gear position data used for computation by TCM, is displayed. 	
Selector lever position	SLCT LVR POSI	—	X	▼	<ul style="list-style-type: none"> Selector lever position data, used for computation by TCM, is displayed. 	A specific value used for control is displayed if fail-safe is activated due to error.
Vehicle speed	VEHICLE SPEED [km/h] or [mph]	—	X	▼	<ul style="list-style-type: none"> Vehicle speed data, used for computation by TCM, is displayed. 	
Throttle position	THROTTLE POSI [8]	—	X	▼	<ul style="list-style-type: none"> Throttle position data, used for computation by TCM, is displayed. 	A specific value used for control is displayed if fail-safe is activated due to error.
Line pressure duty	LINE PRES DTY [%]	—	X	▼	<ul style="list-style-type: none"> Control value of line pressure solenoid valve, computed by TCM from each input signal, is displayed. 	
Torque converter clutch solenoid valve duty	TCC S/V DUTY [%]	—	X	▼	<ul style="list-style-type: none"> Control value of torque converter clutch solenoid valve, computed by TCM from each input signal, is displayed. 	
Shift solenoid valve A	SHIFT S/V A [ON/OFF]	—	X	▼	<ul style="list-style-type: none"> Control value of shift solenoid valve A, computed by TCM from each input signal, is displayed. 	Control value of solenoid is displayed even if solenoid circuit is disconnected.
Shift solenoid valve B	SHIFT S/V B [ON/OFF]	—	X	▼	<ul style="list-style-type: none"> Control value of shift solenoid valve B, computed by TCM from each input signal, is displayed. 	The "OFF" signal is displayed if solenoid circuit is shorted.
Overrun clutch solenoid valve	OVERRUN/C S/V [ON/OFF]	—	X	▼	<ul style="list-style-type: none"> Control value of overrun clutch solenoid valve computed by TCM from each input signal is displayed. 	
Self-diagnosis display lamp (A/T CHECK indicator lamp)	SELF-D DP LMP [ON/OFF]	—	X	▼	<ul style="list-style-type: none"> Control status of A/T CHECK indicator lamp is displayed. 	

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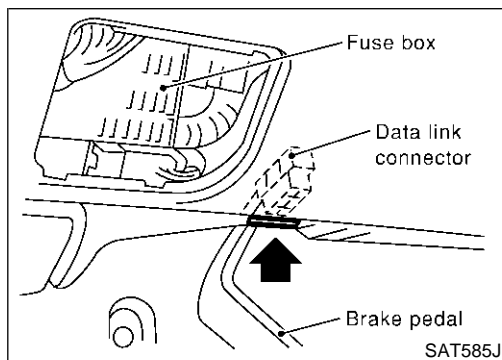
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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Item	Display	SELECT MONITOR ITEM			Description	Remarks
		TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU		
Torque converter slip ratio	TC SLIP RATIO [0.000]	—	—	▼	● Ratio of engine revolution to input shaft revolution of torque converter	
Torque converter slip speed	TC SLIP SPEED [rpm]	—	—	▼	● Difference in revolution between input shaft revolution and input shaft revolution of torque converter	Display doesn't indicate 0 rpm even if engine is stopped. But this isn't malfunction.
Voltage	Voltage [V]	—	—	▼	● Value measured by voltage probe is displayed.	
Frequency	Frequency [Hz]	—	—	▼	● Value measured by pulse probe is displayed. If measurement is impossible, “#” sign is displayed. “#” sign is also displayed at the final data value until the measurement result is obtained.	
Duty cycle (high)	DUTY-HI [%]	—	—	▼	● Duty cycle value for measurement probe is displayed.	
Duty cycle (low)	DUTY-LOW [%]	—	—	▼		
Plus width (high)	PLS WIDTH-HI [msec]	—	—	▼	● Measured pulse width of measurement probe is displayed.	
Plus width (low)	PLS WIDTH-LOW [msec]	—	—	▼		

X: Applicable —: Not applicable ▼: Option



DTC WORK SUPPORT MODE WITH CONSULT-II CONSULT-II Setting Procedure

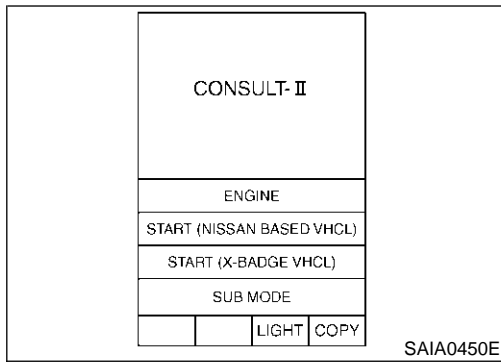
NHAT0022S04

NHAT0022S0401

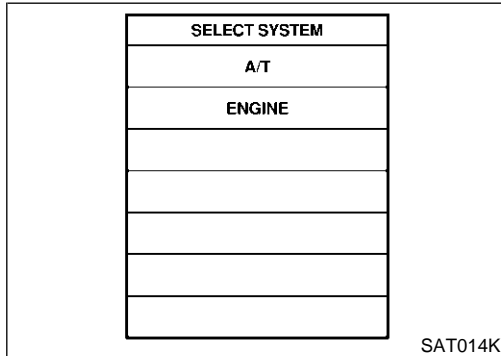
1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to Data link connector, which is located in left side dash panel.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

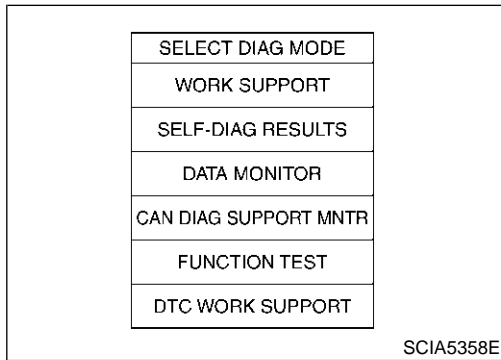
CONSULT-II (Cont'd)



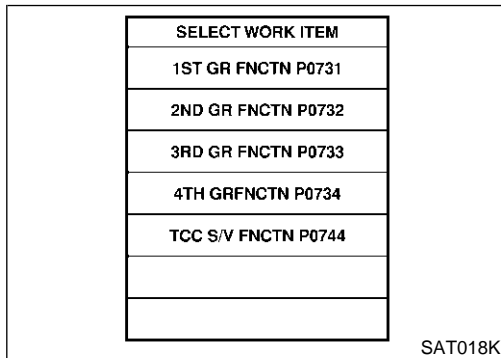
3. Turn ignition switch ON.
4. Touch "START (NISSAN BASED VHCL)".



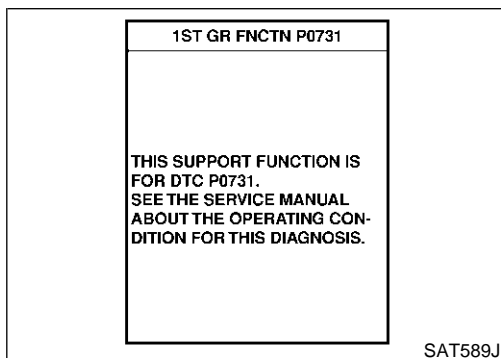
5. Touch "A/T". If "A/T" is not indicated, go to GI-42, "CONSULT-II Data Link Connector (DLC) Circuit".



6. Touch "DTC WORK SUPPORT".



7. Touch select item menu (1ST, 2ND, etc.).



8. Touch "START".

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

1ST GR FNCTN P0731	
OUT OF CONDITON	
MONITOR	
GEAR	XXX
VEHICLE SPEED	XXXkm/h
THROTTLE POSI	XXX
TCC S/V DUTY	XXX %

SAT019K

1ST GR FNCTN P0731	
TESTING	
MONITOR	
GEAR	XXX
VEHICLE SPEED	XXXkm/h
THROTTLE POSI	XXX
TCC S/V DUTY	XXX %

SAT591J

1ST GR FNCTN P0731	
STOP VEHICLE	

SAT592J

1ST GR FNCTN P0731	
NG	

SAT593J

1ST GR FNCTN P0731	
DRIVE VHCL IN D RANGE SHIFTING 1 → 2 → 3 → 4 UNDER NORMAL ACCELERATION. DOES A/T SHFT NORMAL CHECK FOR PROPER SHF TIMING AND SHFT SHOCK	

SAT594J

9. Perform driving test according to "DTC CONFIRMATION PROCEDURE" in "TROUBLE DIAGNOSIS FOR DTC".

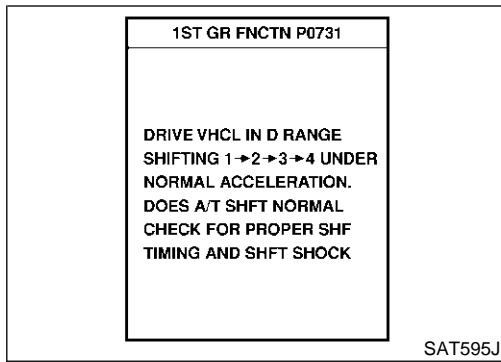
- When testing conditions are satisfied, CONSULT-II screen changes from "OUT OF CONDITION" to "TESTING".

10. Stop vehicle. If "NG" appears on the screen, malfunction may exist. Go to "DIAGNOSTIC PROCEDURE".

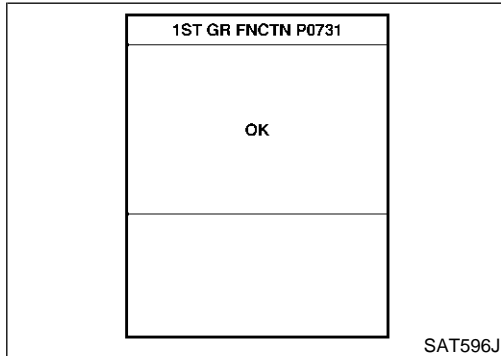
11. Perform test drive to check gear shift feeling in accordance with instructions displayed.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

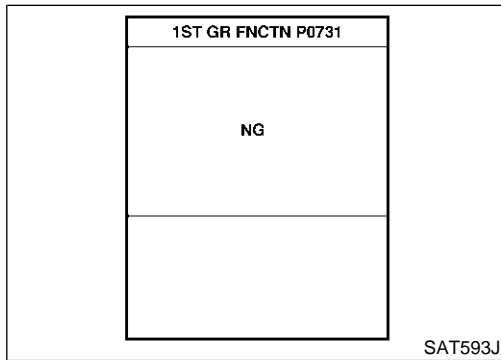
CONSULT-II (Cont'd)



12. Touch "YES" or "NO".



13. CONSULT-II procedure ended.
If "NG" appears on the screen, a malfunction may exist. Go to "DIAGNOSTIC PROCEDURE".



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DTC WORK SUPPORT MODE

NHAT0022S05

DTC work support item	Description	Check item
1ST GR FNCTN P0731	Following items for "A/T 1st gear function (P0731)" can be confirmed. <ul style="list-style-type: none"> Self-diagnosis status (whether the diagnosis is being conducted or not) Self-diagnosis result (OK or NG) 	<ul style="list-style-type: none"> Shift solenoid valve A Shift solenoid valve B Each clutch Hydraulic control circuit
2ND GR FNCTN P0732	Following items for "A/T 2nd gear function (P0732)" can be confirmed. <ul style="list-style-type: none"> Self-diagnosis status (whether the diagnosis is being conducted or not) Self-diagnosis result (OK or NG) 	<ul style="list-style-type: none"> 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. <ul style="list-style-type: none"> Self-diagnosis status (whether the diagnosis is being conducted or not) Self-diagnosis result (OK or NG) 	<ul style="list-style-type: none"> Shift solenoid valve A Each clutch Hydraulic control circuit

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

DTC work support item	Description	Check item
4TH GR FNCTN P0734	Following items for "A/T 4th gear function (P0734)" can be confirmed. <ul style="list-style-type: none">● Self-diagnosis status (whether the diagnosis is being conducted or not)● Self-diagnosis result (OK or NG)	<ul style="list-style-type: none">● Shift solenoid valve A● Shift solenoid valve B● Overrun clutch solenoid valve● Line pressure solenoid valve● Each clutch● Hydraulic control circuit
TCC S/V FNCTN P0744	Following items for "A/T TCC S/V function (lock-up) (P0744)" can be confirmed. <ul style="list-style-type: none">● Self-diagnosis status (whether the diagnosis is being conducted or not)● Self-diagnosis result (OK or NG)	<ul style="list-style-type: none">● Torque converter clutch solenoid valve● Each clutch● Hydraulic control circuit

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Diagnostic Procedure Without CONSULT-II

Diagnostic Procedure Without CONSULT-II

 **OBD-II SELF-DIAGNOSTIC PROCEDURE (WITH GST)** =NHAT0023
NHAT0023S01

Refer to EC-113, "Generic Scan Tool (GST)".

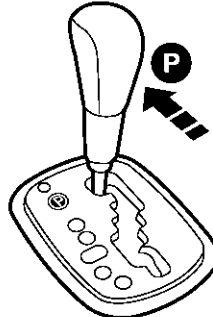
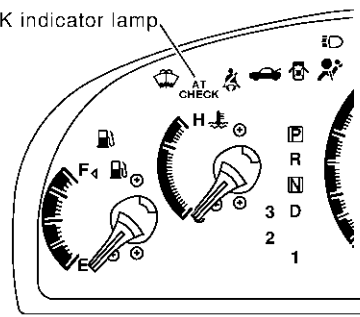
 **OBD-II SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)**

Refer to EC-90, "Malfunction Indicator Lamp (MIL)".

NHAT0023S02

TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

NHAT0023S03

1	CHECK A/T CHECK INDICATOR LAMP	
<ol style="list-style-type: none"> 1. Move selector lever to P position. Start engine and warm it up to normal engine operating temperature. 2. Turn ignition switch to OFF position. 3. Wait 5 seconds. 4. Turn ignition switch to ON position. (Do not start engine.) 		
		
<ol style="list-style-type: none"> 5. Does A/T CHECK indicator lamp come on for about 2 seconds? 		SAT491K
<p>A/T CHECK indicator lamp</p> 		SAT604K
Yes or No		
Yes	▶	GO TO 2.
No	▶	Stop procedure. Perform "A/T CHECK Indicator Lamp Does Not Come On", AT-224 before proceeding.

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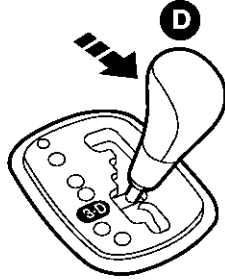
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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Diagnostic Procedure Without CONSULT-II (Cont'd)

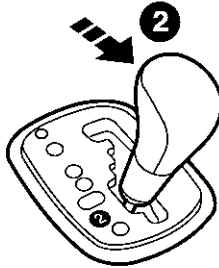
2 JUDGEMENT PROCEDURE STEP 1

1. Turn ignition switch to OFF position.
2. Turn ignition switch to ACC position.
3. Depress and hold accelerator pedal fully. Depress brake pedal, then move selector lever from P to D position.
4. Turn ignition switch to ON position.
(Do not start engine.)



SAT493K

5. Wait 3 seconds.
6. Move selector lever to 2nd position.
7. Release accelerator pedal and brake pedal.

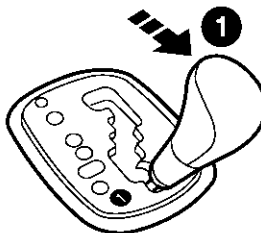


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▶ GO TO 3.

3 JUDGEMENT PROCEDURE STEP 2

1. Move selector lever to 1st position.
2. Depress brake pedal.
3. Depress accelerator pedal fully and release it.
4. The A/T CHECK indicator lamp will begin to flash ON and OFF.

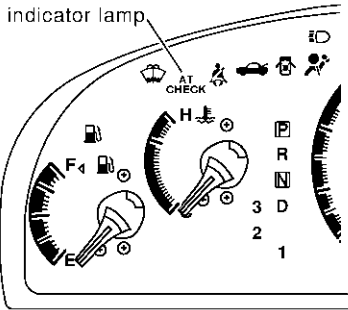


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▶ GO TO 4.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Diagnostic Procedure Without CONSULT-II (Cont'd)

4	CHECK SELF-DIAGNOSTIC CODE
<p>Check A/T CHECK indicator lamp. Refer to "JUDGEMENT OF SELF-DIAGNOSIS CODE", AT-56.</p> <p>A/T CHECK indicator lamp</p>  <p>SAT604K</p>	
▶	DIAGNOSIS END

- GI
- MA
- EM
- LC
- EC
- FE
- AT**
- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

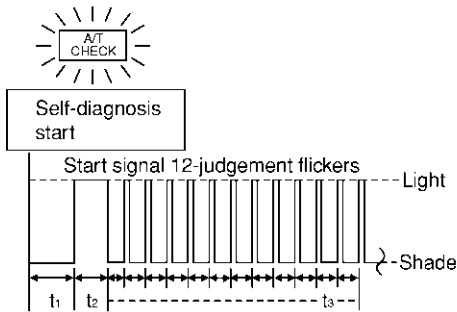
Diagnostic Procedure Without CONSULT-II (Cont'd)

JUDGEMENT OF SELF-DIAGNOSIS CODE

=NHAT0023S04

A/T CHECK indicator lamp:

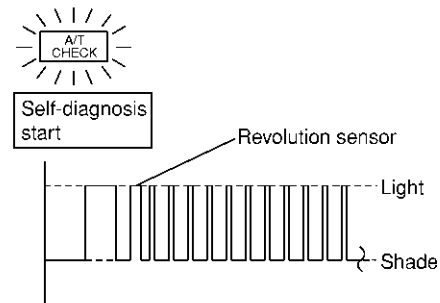
All judgement flickers are the same.



SAT518K

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

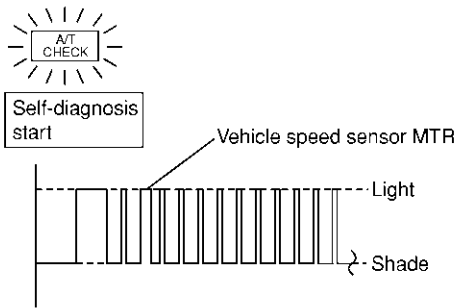
1st judgement flicker is longer than others.



SAT543K

Revolution sensor circuit is short-circuited or disconnected.
⇒ Go to **VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR), AT-121.**

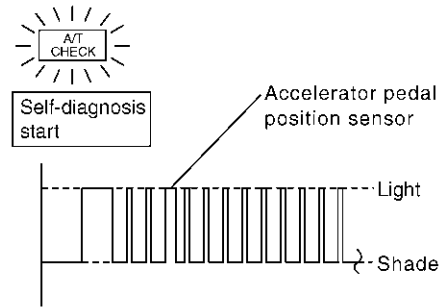
2nd judgement flicker is longer than others.



SAT544K

Vehicle speed sensor circuit is short-circuited or disconnected.
⇒ Go to **VEHICLE SPEED SENSOR-MTR, AT-208.**

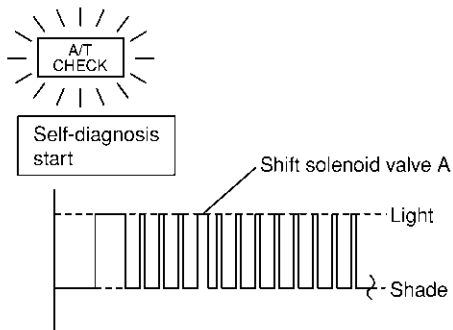
3rd judgement flicker is longer than others.



SAT545K

Accelerator pedal position sensor (throttle position sensor) circuit is short-circuited or disconnected.
⇒ **GO TO ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR), AT-189.**

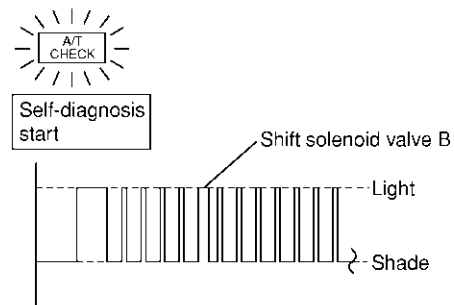
4th judgement flicker is longer than others.



SAT546K

Shift solenoid valve A circuit is short-circuited or disconnected.
⇒ Go to **SHIFT SOLENOID VALVE A, AT-179.**

5th judgement flicker is longer than others.



SAT547K

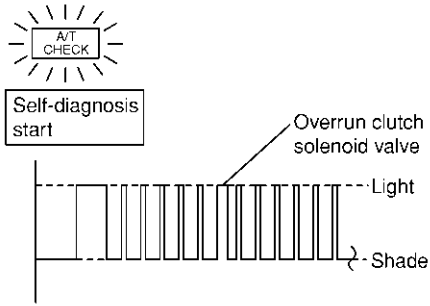
Shift solenoid valve B circuit is short-circuited or disconnected.
⇒ Go to **SHIFT SOLENOID VALVE B, AT-184.**

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Diagnostic Procedure Without CONSULT-II (Cont'd)

A/T CHECK indicator lamp:

6th judgement flicker is longer than others.

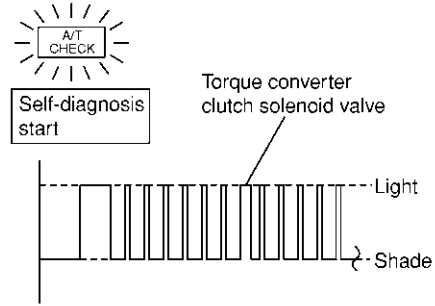


SAT548K

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

⇒ Go to **VERRUN CLUTCH SOLENOID VALVE, AT-196.**

7th judgement flicker is longer than others.

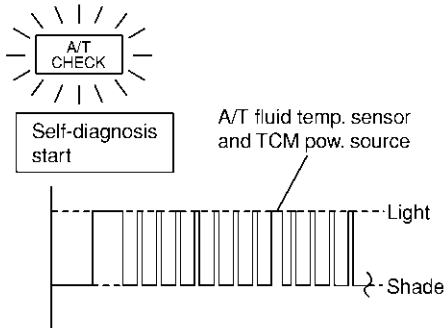


SAT549K

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

⇒ Go to **TORQUE CONVERTER CLUTCH SOLENOID VALVE, AT-158.**

8th judgement flicker is longer than others.

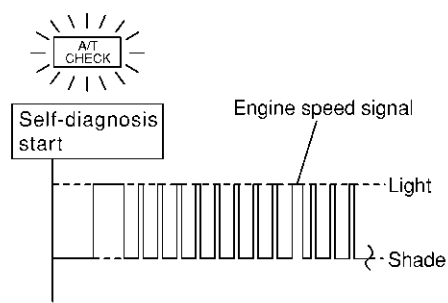


SAT550K

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

⇒ Go to **A/T FLUID TEMPERATURE SENSOR AND TCM POWER SOURCE, AT-201.**

9th judgement flicker is longer than others.

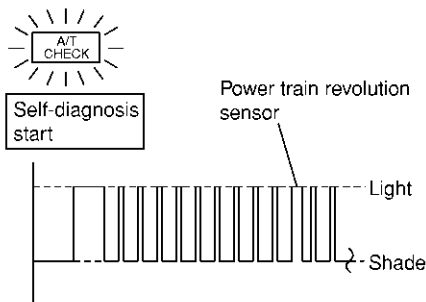


SAT551K

Engine speed signal circuit is short-circuited or disconnected.

⇒ Go to **ENGINE SPEED SIGNAL, AT-126.**

10th judgement flicker is longer than others.

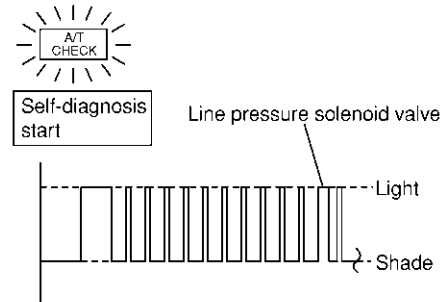


SAT552K

Power train revolution circuit is short-circuited or disconnected.

⇒ Go to **POWER TRAIN REVOLUTION SENSOR, AT-213.**

11th judgement flicker is longer than others.



SAT553K

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

⇒ Go to **LINE PRESSURE SOLENOID VALVE, AT-173.**

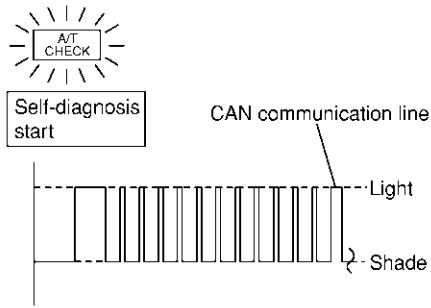
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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Diagnostic Procedure Without CONSULT-II (Cont'd)

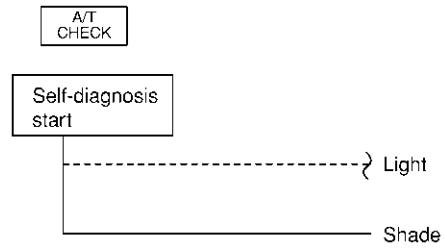
A/T CHECK indicator lamp:

12th judgement flicker is longer than others.



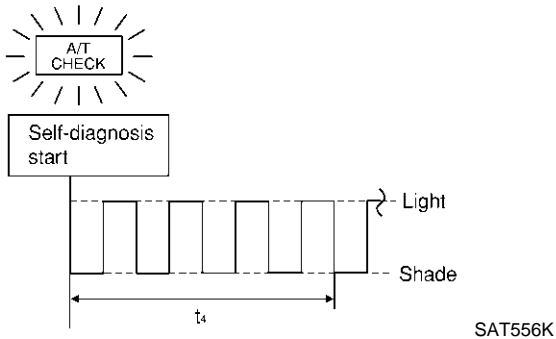
CAN communication line is damaged.
⇒ **Go to CAN COMMUNICATION LINE, AT-105.**

Lamp comes off.



Park/neutral position (PNP) switch, 3rd position switch, closed throttle position signal or wide-open throttle position signal circuit is disconnected or TCM is damaged.
⇒ **Go to TCM Self-diagnosis Does Not Activate, AT-267.**

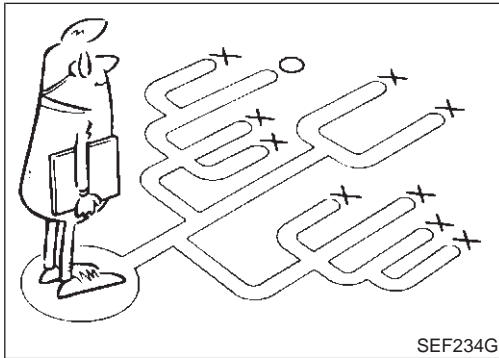
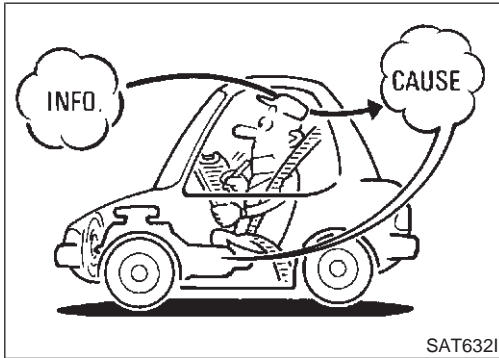
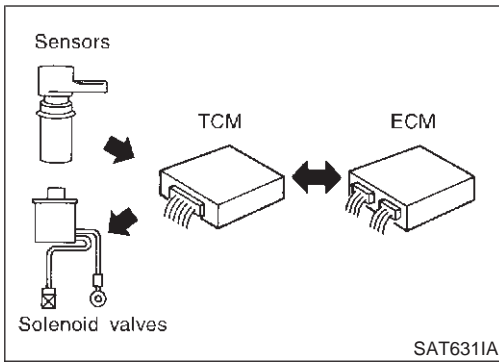
Flickers as shown below.



Battery power is low.
Battery has been disconnected for a long time.
Battery is connected conversely.
(When reconnecting TCM connectors. — This is not a problem.)

$t_1 = 2.5$ seconds $t_2 = 2.0$ seconds $t_3 = 1.0$ second $t_4 = 1.0$ second

NHAT0024



Introduction

The TCM receives a signal from the vehicle speed sensor, electric throttle control actuator (throttle position sensor) or park/neutral position (PNP) switch and provides shift control or lock-up control via A/T solenoid valves.

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

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

It is much more difficult to diagnose an incident that occurs intermittently rather than continuously. Most intermittent incidents 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 incidents. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the "Work Flow". Refer to AT-63.

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 incidents, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "DIAGNOSITC WORKSHEET" like the example (AT-60) should be used.

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

Also check related Service bulletins for information.

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TROUBLE DIAGNOSIS — INTRODUCTION

Introduction (Cont'd)

DIAGNOSTIC WORKSHEET

Information from Customer

=NHAT0024S01

NHAT0024S0101

KEY POINTS

WHAT Vehicle & A/T model

WHEN Date, Frequencies

WHERE Road conditions

HOW Operating conditions, Symptoms

Customer name MR/MS	Model & Year	VIN
Trans. model	Engine	Mileage
Incident Date	Manuf. Date	In Service Date
Frequency	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent (times a day)	
Symptoms	<input type="checkbox"/> Vehicle does not move. (<input type="checkbox"/> Any position <input type="checkbox"/> Particular position)	
	<input type="checkbox"/> No up-shift (<input type="checkbox"/> 1st → 2nd <input type="checkbox"/> 2nd → 3rd <input type="checkbox"/> 3rd → O/D)	
	<input type="checkbox"/> No down-shift (<input type="checkbox"/> O/D → 3rd <input type="checkbox"/> 3rd → 2nd <input type="checkbox"/> 2nd → 1st)	
	<input type="checkbox"/> Lockup malfunction	
	<input type="checkbox"/> Shift point too high or too low.	
	<input type="checkbox"/> Shift shock or slip (<input type="checkbox"/> N → D <input type="checkbox"/> Lockup <input type="checkbox"/> Any drive position)	
	<input type="checkbox"/> Noise or vibration	
	<input type="checkbox"/> No kickdown	
	<input type="checkbox"/> No pattern select	
A/T CHECK indicator lamp	<input type="checkbox"/> Others ()	
	Blinks for about 8 seconds.	
	<input type="checkbox"/> Continuously lit	<input type="checkbox"/> Not lit
Malfunction indicator lamp (MIL)	<input type="checkbox"/> Continuously lit	<input type="checkbox"/> Not lit

TROUBLE DIAGNOSIS — INTRODUCTION

Introduction (Cont'd)

Diagnostic Worksheet

=NHAT0024S0102

1.	<input type="checkbox"/> Read the Fail-safe and listen to customer complaints.	AT-9			
2.	<input type="checkbox"/> CHECK A/T FLUID	AT-65	GI		
	<input type="checkbox"/> Leakage (Follow specified procedure) <input type="checkbox"/> Fluid condition <input type="checkbox"/> Fluid level		MA		
3.	<input type="checkbox"/> Perform STALL TEST and LINE PRESSURE TEST.	AT-65, 69	EM		
	<input type="checkbox"/> Stall test — Mark possible damaged components/others.		LC		
	<table style="width: 100%; border: none;"> <tr> <td style="border: none; width: 50%; vertical-align: top;"> <input type="checkbox"/> Torque converter one-way clutch <input type="checkbox"/> Reverse clutch <input type="checkbox"/> Forward clutch <input type="checkbox"/> Overrun clutch <input type="checkbox"/> Forward one-way clutch </td> <td style="border: none; width: 50%; vertical-align: top;"> <input type="checkbox"/> Low & reverse brake <input type="checkbox"/> Low one-way clutch <input type="checkbox"/> Engine <input type="checkbox"/> Line pressure is low <input type="checkbox"/> Clutches and brakes except high clutch and brake band are OK </td> </tr> </table>	<input type="checkbox"/> Torque converter one-way clutch <input type="checkbox"/> Reverse clutch <input type="checkbox"/> Forward clutch <input type="checkbox"/> Overrun clutch <input type="checkbox"/> Forward one-way clutch	<input type="checkbox"/> Low & reverse brake <input type="checkbox"/> Low one-way clutch <input type="checkbox"/> Engine <input type="checkbox"/> Line pressure is low <input type="checkbox"/> Clutches and brakes except high clutch and brake band are OK		EC
<input type="checkbox"/> Torque converter one-way clutch <input type="checkbox"/> Reverse clutch <input type="checkbox"/> Forward clutch <input type="checkbox"/> Overrun clutch <input type="checkbox"/> Forward one-way clutch	<input type="checkbox"/> Low & reverse brake <input type="checkbox"/> Low one-way clutch <input type="checkbox"/> Engine <input type="checkbox"/> Line pressure is low <input type="checkbox"/> Clutches and brakes except high clutch and brake band are OK				
	<input type="checkbox"/> Line pressure test — Suspected parts:		FE		
4.	<input type="checkbox"/> Perform all ROAD TEST and mark required procedures.	AT-70	AT		
4-1.	Check before engine is started.	AT-71	AX		
	<input type="checkbox"/> A/T CHECK Indicator Lamp Does Not Come On, AT-224. <input type="checkbox"/> SELF-DIAGNOSTIC PROCEDURE - Mark detected items.		SU		
	<input type="checkbox"/> Park/neutral position (PNP) switch, AT-109. <input type="checkbox"/> A/T fluid temperature sensor, AT-115. <input type="checkbox"/> Vehicle speed sensor-A/T (Revolution sensor), AT-121. <input type="checkbox"/> Engine speed signal, AT-126. <input type="checkbox"/> Power train revolution sensor, AT-213. <input type="checkbox"/> Torque converter clutch solenoid valve, AT-158. <input type="checkbox"/> Line pressure solenoid valve, AT-173. <input type="checkbox"/> Shift solenoid valve A, AT-179. <input type="checkbox"/> Shift solenoid valve B, AT-184. <input type="checkbox"/> Accelerator pedal position sensor (throttle position sensor), AT-189. <input type="checkbox"/> Overrun clutch solenoid valve, AT-196. <input type="checkbox"/> Park/neutral position (PNP) & 3rd position switches, closed throttle position signal and wide-open throttle position signal, AT-267. <input type="checkbox"/> A/T fluid temperature sensor and TCM power source, AT-201. <input type="checkbox"/> Vehicle speed sensor-MTR, AT-208. <input type="checkbox"/> CAN communication line, AT-105. <input type="checkbox"/> Control unit (RAM), Control unit (ROM), AT-218. <input type="checkbox"/> Control unit (EEP ROM), AT-220. <input type="checkbox"/> Battery <input type="checkbox"/> Others		BR		
			ST		
			RS		
			BT		
			HA		
4-2.	Check at idle	AT-72	SC		
	<input type="checkbox"/> Engine Cannot Be Started In P and N Positions, AT-226. <input type="checkbox"/> In P Position, Vehicle Moves Forward or Backward When Pushed, AT-228. <input type="checkbox"/> In N Position, Vehicle Moves, AT-229. <input type="checkbox"/> Large Shock. N → R Position, AT-231. <input type="checkbox"/> Vehicle Does Not Creep Backward In R Position, AT-233. <input type="checkbox"/> Vehicle Does Not Creep Forward In D, 2nd or 1st Position, AT-236.		EL		
			IDX		

TROUBLE DIAGNOSIS — INTRODUCTION

Introduction (Cont'd)

4.	4-3.	Cruise test	AT-75 AT-78
		Part-1	
		<input type="checkbox"/> Vehicle Cannot Be Started From D ₁ , AT-239. <input type="checkbox"/> A/T Does Not Shift: D ₁ → D ₂ or Does Not Kickdown: D ₄ → D ₂ , AT-242. <input type="checkbox"/> A/T Does Not Shift: D ₂ → D ₃ , AT-245. <input type="checkbox"/> A/T Does Not Shift: D ₃ → D ₄ , AT-248. <input type="checkbox"/> A/T Does Not Perform Lock-up, AT-251. <input type="checkbox"/> A/T Does Not Hold Lock-up Condition, AT-253. <input type="checkbox"/> Lock-up Is Not Released, AT-255. <input type="checkbox"/> Engine Speed Does Not Return To Idle (Light Braking D ₄ → D ₃), AT-256.	
		Part-2	AT-82
		<input type="checkbox"/> Vehicle Does Not Start From D ₁ , AT-259. <input type="checkbox"/> A/T Does Not Shift: D ₁ → D ₂ or Does Not Kickdown: D ₄ → D ₂ , AT-242. <input type="checkbox"/> A/T Does Not Shift: D ₂ → D ₃ , AT-245. <input type="checkbox"/> A/T Does Not Shift: D ₃ → D ₄ , AT-248.	
		Part-3	AT-84
		<input type="checkbox"/> A/T Does Not Shift: D ₄ → D ₃ When selector lever is set in D → 3rd Position, AT-260. <input type="checkbox"/> Engine Speed Does Not Return To Idle (Engine Brake In D ₃), AT-256. <input type="checkbox"/> A/T Does Not Shift: D ₃ → 2 ₂ , When Selector Lever D → 2nd Position, AT-261. <input type="checkbox"/> Engine Speed Does Not Return To Idle (Engine Brake In 2 ₂), AT-256. <input type="checkbox"/> A/T Does Not Shift: 2 ₂ → 1 ₁ , When Selector Lever 2nd → 1st Position, AT-262. <input type="checkbox"/> Vehicle Does Not Decelerate By Engine Brake, AT-265. <input type="checkbox"/> SELF-DIAGNOSTIC PROCEDURE — Mark detected items.	
		<input type="checkbox"/> Park/neutral position (PNP) switch, AT-109. <input type="checkbox"/> A/T fluid temperature sensor, AT-115. <input type="checkbox"/> Vehicle speed sensor-A/T (Revolution sensor), AT-121. <input type="checkbox"/> Engine speed signal, AT-126. <input type="checkbox"/> Power train revolution sensor, AT-213. <input type="checkbox"/> Torque converter clutch solenoid valve, AT-158. <input type="checkbox"/> Line pressure solenoid valve, AT-173. <input type="checkbox"/> Shift solenoid valve A, AT-179. <input type="checkbox"/> Shift solenoid valve B, AT-184. <input type="checkbox"/> Accelerator pedal position sensor (throttle position sensor), AT-189. <input type="checkbox"/> Overrun clutch solenoid valve, AT-196. <input type="checkbox"/> Park/neutral position (PNP) & 3rd position switches, closed throttle position signal and wide-open throttle position signal, AT-267. <input type="checkbox"/> A/T fluid temperature sensor and TCM power source, AT-201. <input type="checkbox"/> Vehicle speed sensor-MTR, AT-208. <input type="checkbox"/> CAN communication line, AT-105. <input type="checkbox"/> Control unit (RAM), Control unit (ROM), AT-218. <input type="checkbox"/> Control unit (EEP ROM), AT-220. <input type="checkbox"/> Battery <input type="checkbox"/> Others	
5.		<input type="checkbox"/> For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.	AT-43
6.		<input type="checkbox"/> Perform all ROAD TEST and re-mark required procedures.	AT-70
7.		<input type="checkbox"/> Perform DTC CONFIRMATION PROCEDURE for following MIL indicating items and check out NG items. Refer to EC-76, "Emission-related Diagnostic Information".	EC-76
		<input type="checkbox"/> DTC (P0731) A/T 1st gear function, AT-131. <input type="checkbox"/> DTC (P0732) A/T 2nd gear function, AT-137. <input type="checkbox"/> DTC (P0733) A/T 3rd gear function, AT-143. <input type="checkbox"/> DTC (P0734) A/T 4th gear function, AT-149. <input type="checkbox"/> DTC (P0744) A/T TCC S/V function (lock-up), AT-163.	
8.		<input type="checkbox"/> Perform the Diagnostic Procedures for all remaining items marked NG. Repair or replace the damaged parts. Refer to the Symptom Chart when you perform the procedures. (The chart also shows some other possible symptoms and the component inspection orders.)	AT-88 AT-99
9.		<input type="checkbox"/> Erase DTC from TCM and ECM memories.	AT-39

Work Flow

HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR

NHAT0025

NHAT0025S01

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

Make good use of the two sheets provided, "Information from Customer" (AT-60) and "Diagnostic Worksheet" (AT-61), to perform the best troubleshooting possible.

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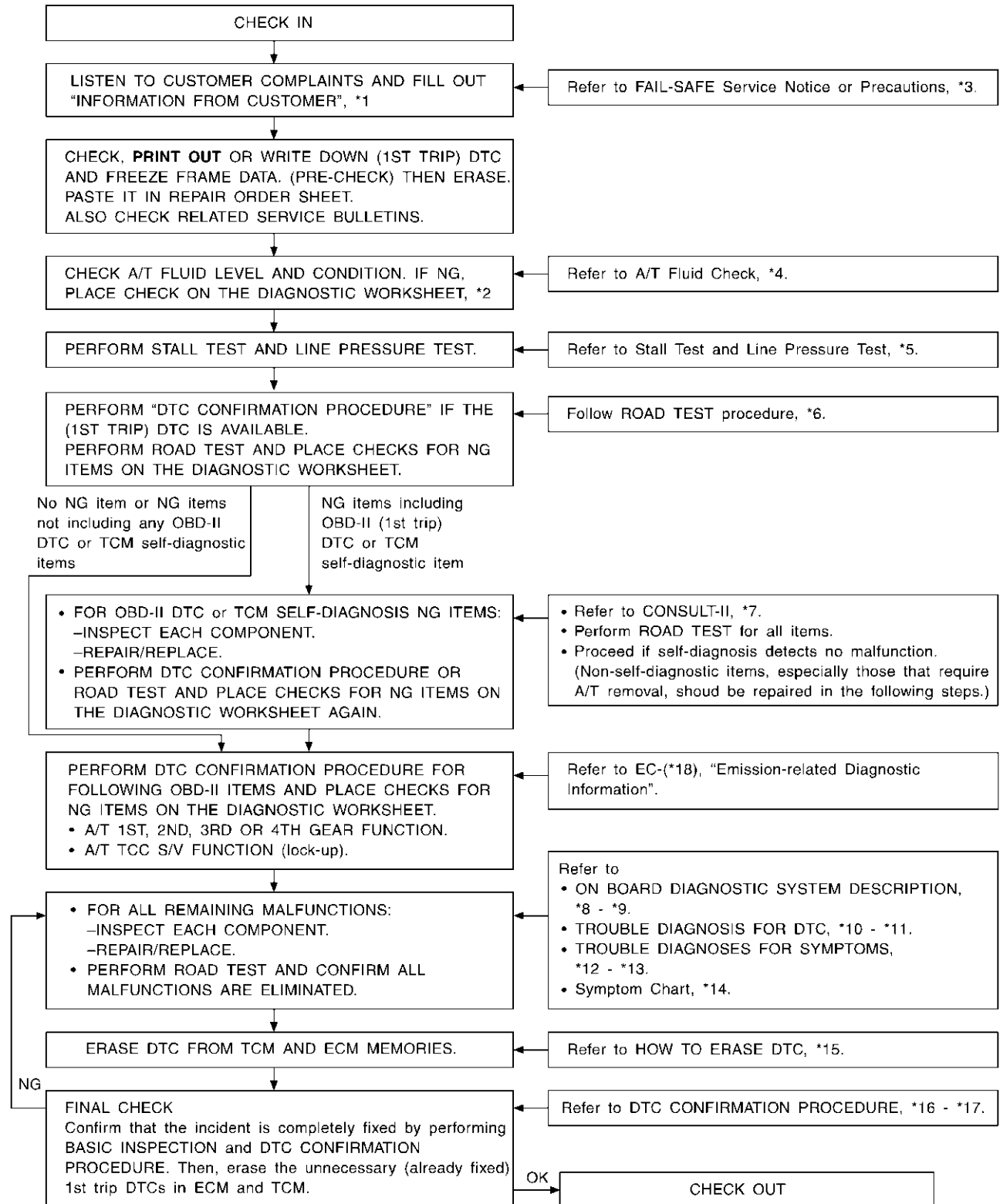
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TROUBLE DIAGNOSIS — INTRODUCTION

Work Flow (Cont'd)

WORK FLOW CHART

=NHAT0025S02



SAT086JI

*1: AT-60

*2: AT-61

*3: AT-9

*4: AT-65

*5: AT-65, 69

*6: AT-70

*7: AT-41

*8: AT-37

*9: AT-56

*10: AT-109

*11: AT-220

*12: AT-222

*13: AT-267

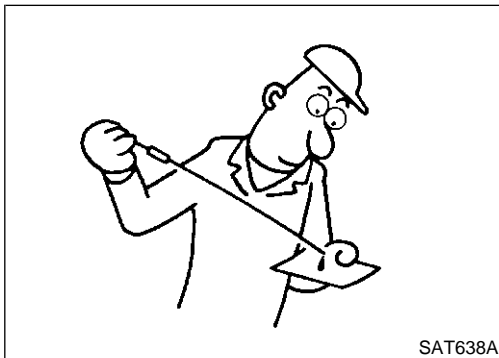
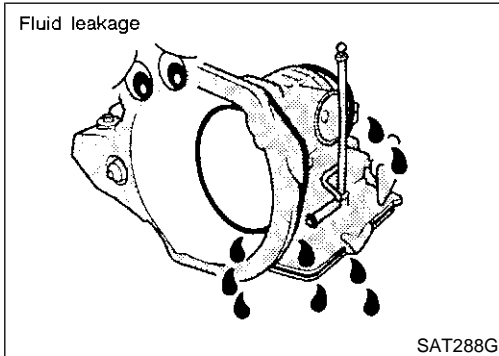
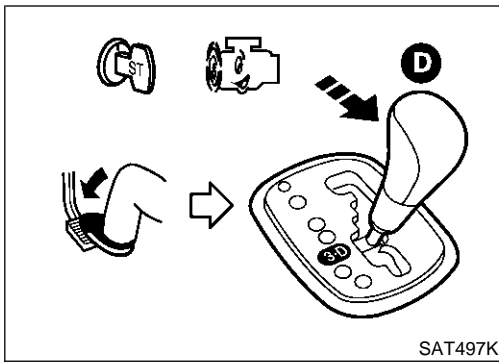
*14: AT-88

*15: AT-39

*16: AT-110

*17: AT-220

*18: EC-76



A/T Fluid Check

NHAT0026

FLUID LEAKAGE CHECK

NHAT0026S01

1. Clean area suspected of leaking. — for example, mating surface of converter housing and transmission case.
2. Start engine, apply foot brake, place selector lever in D position and wait a few minutes.
3. Stop engine.
4. Check for fresh leakage.

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FLUID CONDITION CHECK

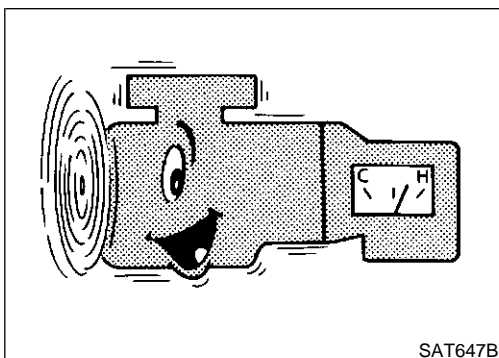
NHAT0026S02

Fluid color	Suspected problem
Dark or black with burned odor	Wear of frictional material
Milky pink	Water contamination — Road water entering through filler tube or breather
Varnished fluid, light to dark brown and tacky	Oxidation — Over or under filling, — Overheating

FLUID LEVEL CHECK

NHAT0026S03

Refer to MA-20, "Checking A/T Fluid".



Stall Test

NHAT0027

STALL TEST PROCEDURE

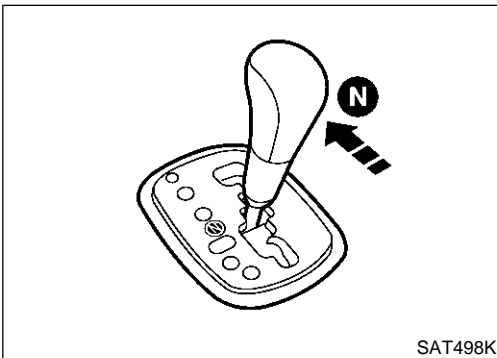
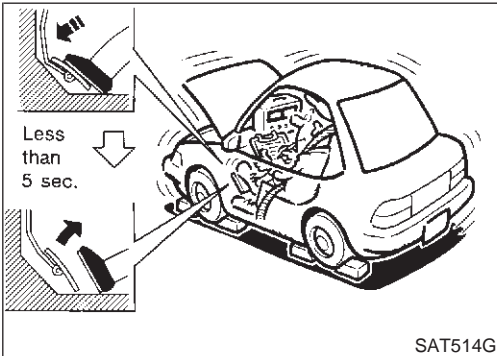
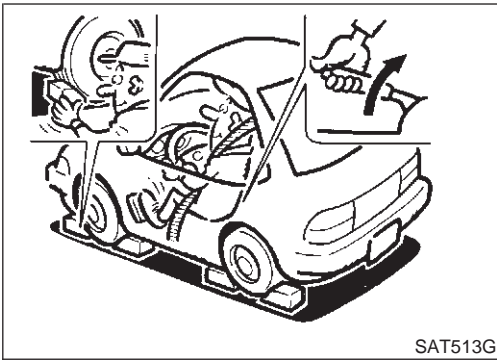
NHAT0027S01

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

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

TROUBLE DIAGNOSIS — BASIC INSPECTION

Stall Test (Cont'd)



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.
 - During test, never hold throttle wide open for more than 5 seconds.
Stall revolution:
2,550 - 3,050 rpm
8. Move selector lever to N position.
9. Cool off ATF.
 - Run engine at idle for at least one minute.
10. Repeat steps 5 through 9 with selector lever in 2nd , 1st and R positions.

JUDGEMENT OF STALL TEST

NHAT0027S02

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, follow the "WORK FLOW CHART" shown in AT-64.

NOTE:

Stall revolution is too high in D, 3rd, 2nd or 1st 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 selector lever set to 3rd position.
1st and 2nd gears in 2nd 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 1st position. Low & reverse brake slippage
- Engine brake functions in 1st 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 since automatic fluid temperature increases abnormally.

- Slippage occurs in 3rd and 4th gears in D position. High clutch slippage GI
- Slippage occurs in 2nd and 4th gear in D position. Brake band slippage MA
- Engine brake does not function in 2nd and 3rd gears in D position with 3rd position switch set to ON, 2nd gear in 2nd position, and 1st gear in 1st position. Overrun clutch slippage EM

Stall revolution less than specifications:

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

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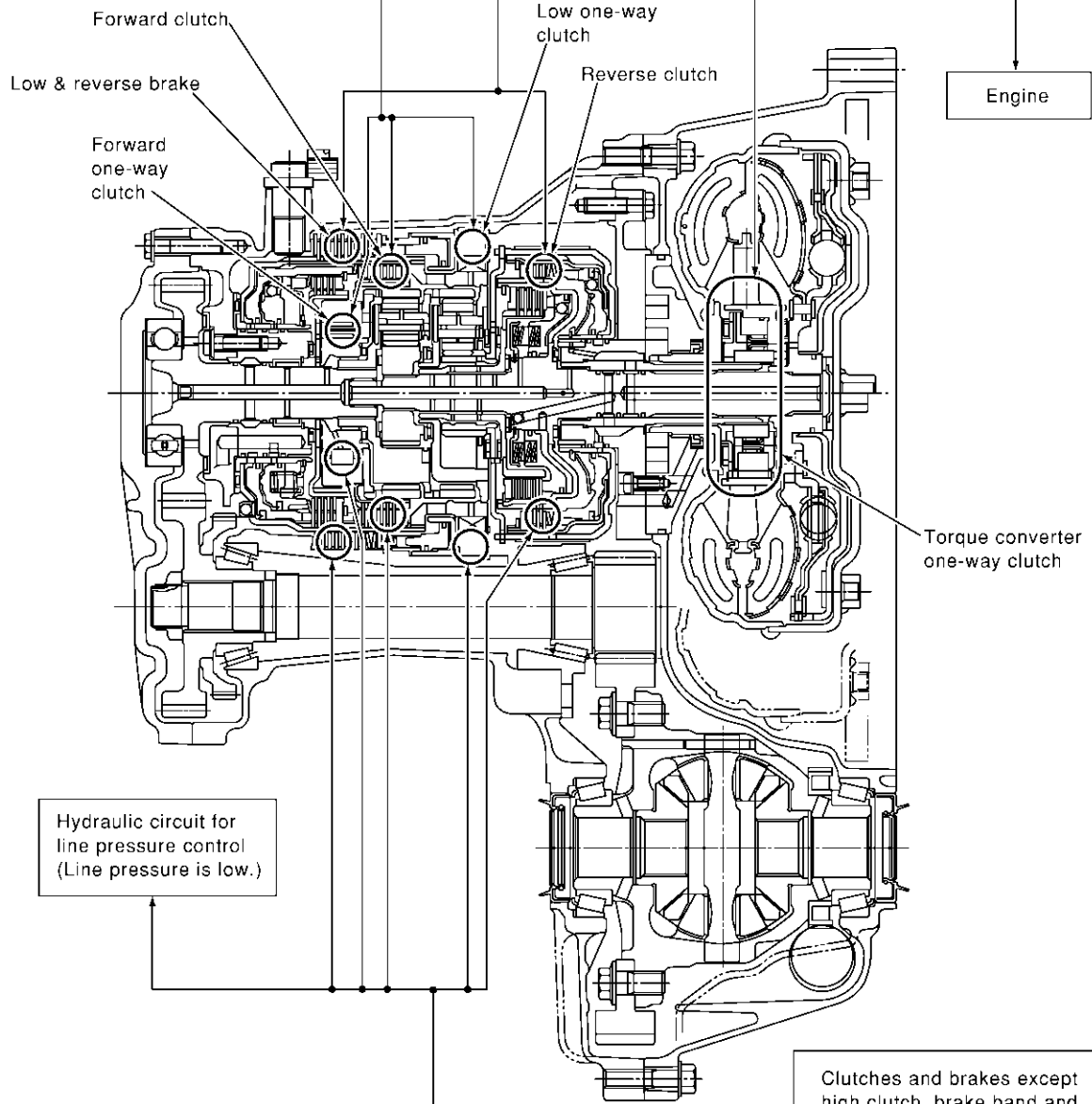
TROUBLE DIAGNOSIS — BASIC INSPECTION

Stall Test (Cont'd)

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

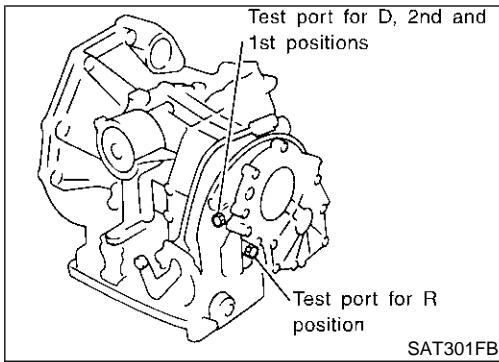
O : Stall revolution is normal.
 H : Stall revolution is higher than specified.
 L : Stall revolution is lower than specified.

Damaged components



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

SAT499K



Line Pressure Test

NHAT0028

LINE PRESSURE TEST PORTS

NHAT0028S01

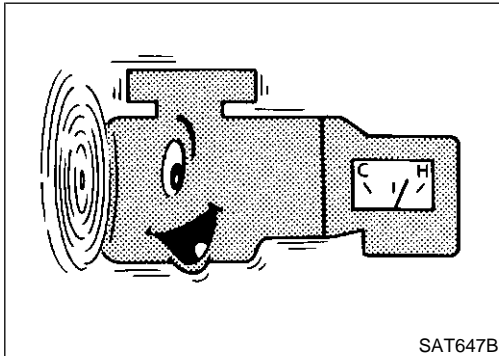
Location of line pressure test ports are shown in the illustration.

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

GI

MA

EM



LINE PRESSURE TEST PROCEDURE

NHAT0028S02

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

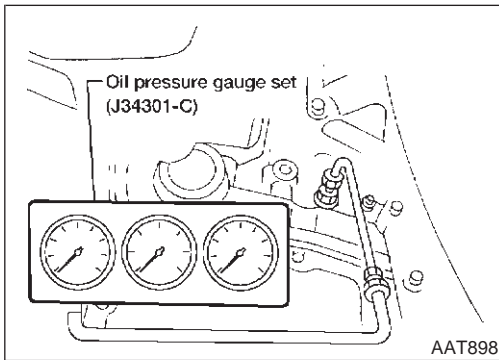
**ATF operating temperature:
50 - 80°C (122 - 176°F)**

LC

EC

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AT



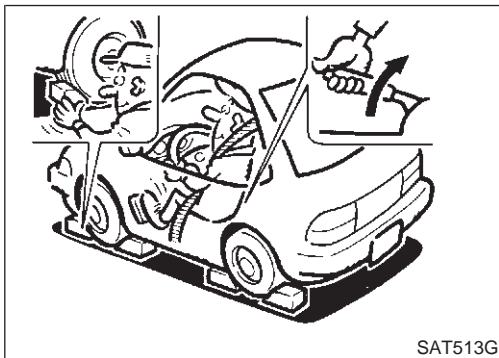
3. Install pressure gauge to corresponding line pressure port.

AX

SU

BR

ST



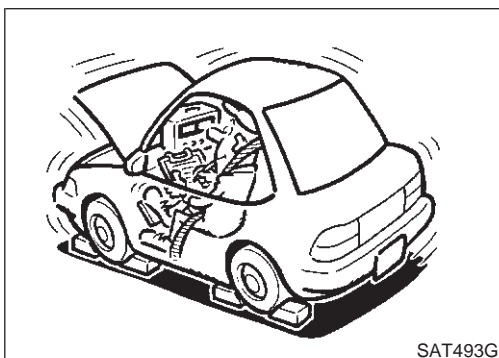
4. Set parking brake and block wheels.
 - **Continue to depress brake pedal fully while line pressure test is being performed at stall speed.**

RS

BT

HA

SC



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

EL

IDX

Line pressure: Refer to SDS, AT-383.

TROUBLE DIAGNOSIS — BASIC INSPECTION

Line Pressure Test (Cont'd)

JUDGEMENT OF LINE PRESSURE TEST

NHAT0028S03

Judgement		Suspected parts
At idle	Line pressure is low in all positions.	<ul style="list-style-type: none"> ● Oil pump wear ● Control piston damage ● Pressure regulator valve or plug sticking ● Spring for pressure regulator valve damaged ● Fluid pressure leakage between oil strainer and pressure regulator valve ● Clogged strainer
	Line pressure is low in particular position.	<ul style="list-style-type: none"> ● Fluid pressure leakage between manual valve and particular clutch ● For example, line pressure is: <ul style="list-style-type: none"> – Low in R and 1st positions, but – Normal in D and 2nd positions. Therefore, fluid leakage exists at or around low and reverse brake circuit. Refer to "CLUTCH AND BAND CHART", AT-20.
	Line pressure is high.	<ul style="list-style-type: none"> ● Maladjustment of accelerator pedal position sensor (throttle position sensor) ● A/T fluid temperature sensor damaged ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure modifier valve sticking ● Pressure regulator valve or plug sticking ● Open in dropping resistor circuit
At stall speed	Line pressure is low.	<ul style="list-style-type: none"> ● Maladjustment of accelerator pedal position sensor (throttle position sensor) ● 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 PROCEDURE

1. Check before engine is started.



2. Check at idle.



3. Cruise test.

SAT786A

Road Test

DESCRIPTION

NHAT0029

NHAT0029S01

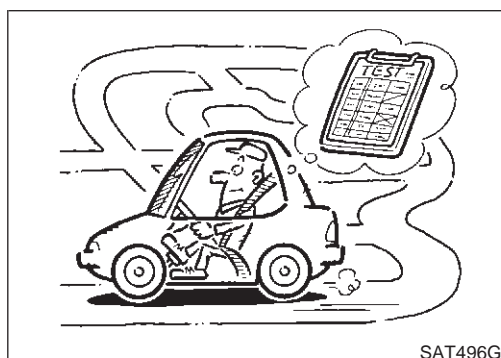
- The purpose of the test is to determine overall performance of A/T and analyze causes of problems.

- The road test consists of the following three parts:

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

- Before road test, familiarize yourself with all test procedures and items to check.

- Conduct tests on all items until specified symptom is found. Troubleshoot items which check out No Good after road test. Refer to "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION" and "TROUBLE DIAGNOSES FOR SYMPTOMS", AT-37 to AT-56 and AT-222 to AT-267.



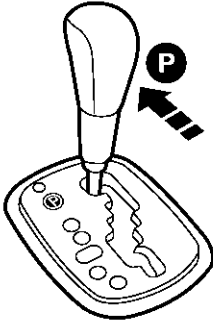
SAT496G

TROUBLE DIAGNOSIS — BASIC INSPECTION

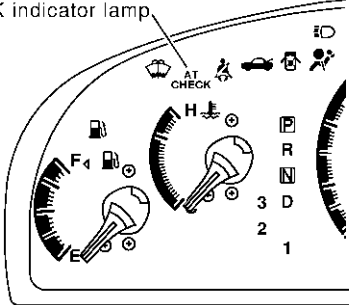
Road Test (Cont'd)

1. CHECK BEFORE ENGINE IS STARTED

=NHAT0029S02

1	CHECK A/T CHECK INDICATOR LAMP	
<p>1. Park vehicle on flat surface. 2. Move selector lever to P position.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch to OFF position. Wait at least 5 seconds. 4. Turn ignition switch to ON position. (Do not start engine.) 5. Does A/T CHECK indicator lamp come on for about 2 seconds?</p> <p style="text-align: center;">Yes or No</p>		
SAT491K		
Yes	▶	GO TO 2.
No	▶	Stop ROAD TEST. Go to "A/T CHECK Indicator Lamp Does Not Come On", AT-224.

GI
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AT

2	CHECK A/T CHECK INDICATOR LAMP	
<p>Does A/T CHECK indicator lamp flicker for about 8 seconds?</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Yes or No</p>		
SAT604K		
Yes	▶	TCM is under Fail-safe mode. Perform self-diagnosis and check NG items on the DIAGNOSTIC WORKSHEET, AT-60. Refer to SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II), AT-42, or TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS), AT-53.
No	▶	<p>1. Turn ignition switch to OFF position. 2. Perform self-diagnosis and note NG items. Refer to SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II), AT-42, TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS), AT-53. 3. Go to "2. CHECK AT IDLE", AT-72.</p>

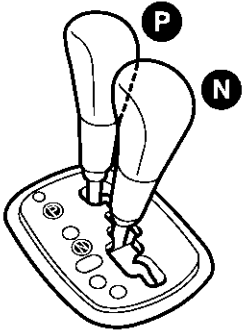
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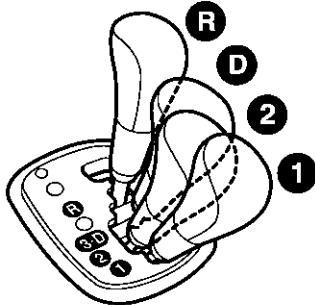
TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

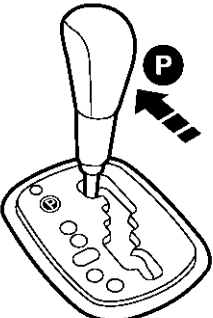
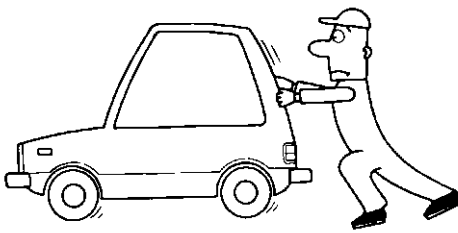
2. CHECK AT IDLE

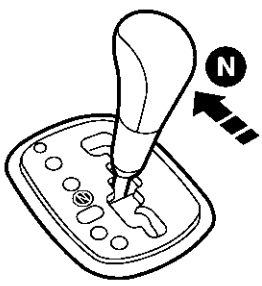
NHAT0029S03

1	CHECK ENGINE START	
<p>1. Park vehicle on flat surface. 2. Move selector lever to P position.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch to OFF position. 4. Turn ignition switch to START position. 5. Is engine started?</p> <p style="text-align: right;">SAT502K</p>		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Stop ROAD TEST. Mark the box on the DIAGNOSTIC WORKSHEET. Go to "Engine Cannot Be Started In P and N Position", AT-226.

2	CHECK ENGINE START	
<p>1. Turn ignition switch to ACC position. 2. Move selector lever to D, 1st, 2nd or R position.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch to START position. 4. Is engine started?</p> <p style="text-align: right;">SAT503K</p>		
Yes or No		
Yes	▶	Stop ROAD TEST. Mark the box on the DIAGNOSTIC WORKSHEET. Go to "Engine Cannot Be Started In P and N Position", AT-226.
No	▶	GO TO 3.


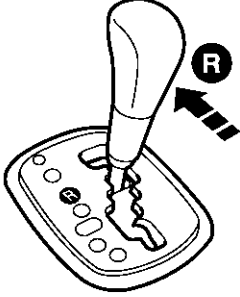
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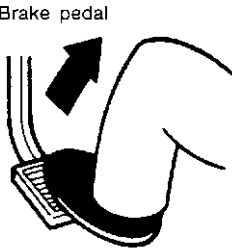
3	CHECK VEHICLE MOVE	
1. Move selector lever to P position.		
		
SAT491K		
2. Turn ignition switch to OFF position. 3. Release parking brake. 4. Push vehicle forward or backward.		
		
SAT796A		
5. Does vehicle move when it is pushed forward or backward? 6. Apply parking brake.		
Yes or No		
Yes	▶	Mark the box of "In P Position, Vehicle Moves Forward Or Backward When Pushed" on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.
No	▶	GO TO 4.

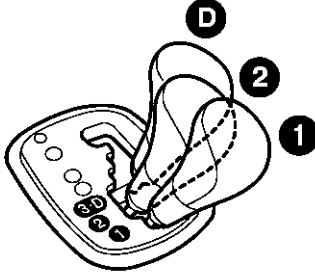
4	CHECK VEHICLE MOVE	
1. Start engine. 2. Move selector lever to N position.		
		
SAT498K		
3. Release parking brake. 4. Does vehicle move forward or backward?		
Yes or No		
Yes	▶	Mark the box of "In N Position, Vehicle Moves" on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.
No	▶	GO TO 5.

TROUBLE DIAGNOSIS — BASIC INSPECTION

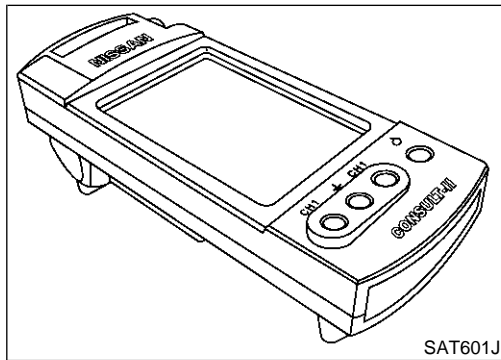
Road Test (Cont'd)

5	CHECK SHIFT SHOCK	
1. Apply foot brake.		
		
2. Move selector lever to R position.		
SAT797A		
		
3. Is there large shock when changing from N to R position?		
SAT506K		
Yes or No		
Yes	▶	Mark the box of "Large Shock N → R Position" on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.
No	▶	GO TO 6.

6	CHECK VEHICLE MOVE	
1. Release foot brake for several seconds.		
		
For several seconds		
SAT799A		
2. Does vehicle creep backward when foot brake is released?		
Yes or No		
Yes	▶	GO TO 7.
No	▶	Mark the box of "Vehicle Does Not Creep Backward In R Position" on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.

7	CHECK VEHICLE MOVE	
<p>1. Move selector lever to D, 2nd and 1st positions and check if vehicle creeps forward.</p> <div style="text-align: center;">  </div>		
SAT507K		
<p>2. Does vehicle creep forward in all three positions?</p> <p style="text-align: center;">Yes or No</p>		
Yes	▶	Go to 3. CRUISE TEST, AT-75.
No	▶	Mark the box of "Vehicle Does Not Creep Forward In D, 2nd Or 1st Position" on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.

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3. CRUISE TEST

NHAT0029S04

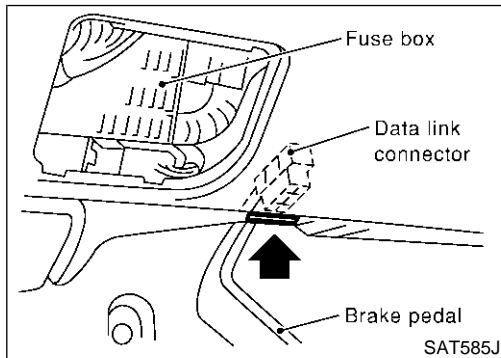
- Check all items listed in Parts 1 through 3.

Ⓔ With CONSULT-II

NHAT0029S0401

- Using CONSULT-II, conduct a cruise test and record the result.
- Print the result and ensure that shifts and lock-ups take place as per Shift Schedule.

AX
SU
BR
ST

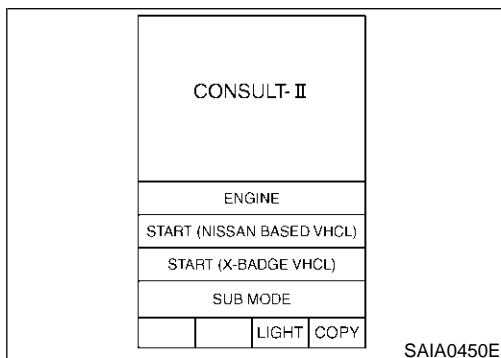


CONSULT-II Setting Procedure

NHAT0029S0402

1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector, which is located in left side dash panel.

RS
BT
HA
SC
EL



3. Turn ignition switch ON.
4. Touch "START (NISSAN BASED VHCL)".

IDX

TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

SELECT SYSTEM
A/T
ENGINE

SAT014K

5. Touch "A/T". If "A/T" is not indicated, go to GI-42, "CONSULT-II Data Link Connector (DLC) Circuit".

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
CAN DIAG SUPPORT MNTR
FUNCTION TEST
DTC WORK SUPPORT

SCIA5358E

6. Touch "DATA MONITOR".

DATA MONITOR
SELECT MONITOR ITEM
TCM INPUT SIGNALS
MAIN SIGNAL
SELECTION FROM MENU

SAT175K

7. Touch "MAIN SIGNALS" or "TCM INPUT SIGNALS".

8. See "Numerical Display", "Barchart Display" or "Line Graph Display".

SET RECORDING CONDITION
AUTO TRIG
MANU TRIG
TRIGGER POINT
<< [Progress Bar] >>
0% 20% 40% 60% 80% 100%
Recording Speed
MIN [Progress Bar] MAX
<< /64 /32 /16 /8 /4 /2 FULL >>

SAT973J

9. Touch "SETTING" to set recording condition ("AUTO TRIG" or "MANU TRIG") and touch "BACK".

10. Touch "Start".

DATA MONITOR	
MONITOR	NO DTC
ENGINE SPEED	XXX rpm
GEAR	XXX
SLCT LVR POSI	N/P
VEHICLE SPEED	XXX km/h
THROTTLE POSI	XXX
LINE PRES DTY	XX%
TCC S/V DUTY	XX%
SHIFT S/V A	XX
SHIFT S/V B	XX

SAT134K

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

TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

Cruise Test — Part 1

=NHAT0029S0404

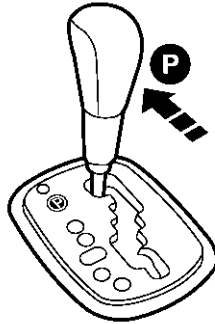
1 CHECK STARTING GEAR (D₁) POSITION

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

ATF operating temperature:

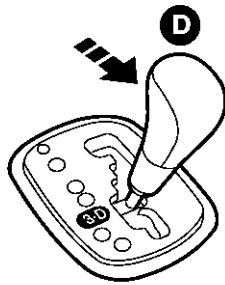
50 - 80°C (122 - 176°F)

2. Park vehicle on flat surface.
3. Set selector lever is in D position.
4. Move selector lever to P position.



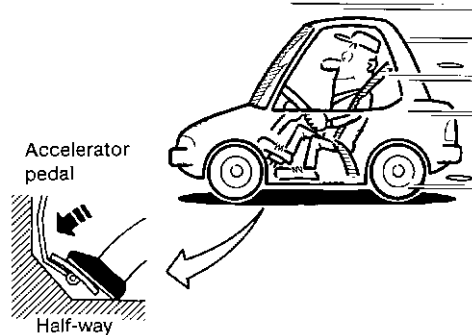
SAT491K

5. Start engine.
6. Move selector lever to D position.



SAT493K

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



SAT495G

8. Does vehicle start from D₁?

Read gear position.

Yes or No

Yes



GO TO 2.

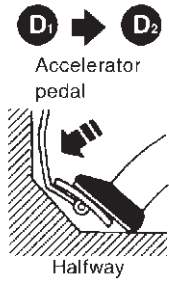
No

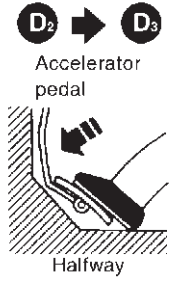


Mark the box of "Vehicle Cannot Be Started From D₁" on the DIAGNOSTIC WORK-SHEET. Continue ROAD TEST.

TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

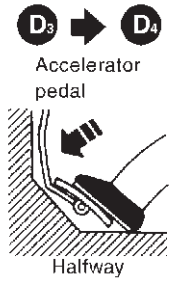
2	CHECK SHIFT UP (D₁ TO D₂)	
Does A/T shift from D ₁ to D ₂ at the specified speed? Ⓔ Read gear position, throttle opening and vehicle speed. Specified speed when shifting from D ₁ to D ₂ : Refer to Shift schedule, AT-382.		
		
SAT954I		
Yes or No		
Yes	▶	GO TO 3.
No	▶	Mark the box of "A/T Does Not Shift: D ₁ → D ₂ Or Does Not Kickdown: D ₄ → D ₂ " on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.

3	CHECK SHIFT UP (D₂ TO D₃)	
Does A/T shift from D ₂ to D ₃ at the specified speed? Ⓔ Read gear position, throttle position and vehicle speed. Specified speed when shifting from D ₂ to D ₃ : Refer to Shift schedule, AT-382.		
		
SAT955I		
Yes or No		
Yes	▶	GO TO 4.
No	▶	Mark the box of "A/T Does Not Shift: D ₂ → D ₃ " on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.

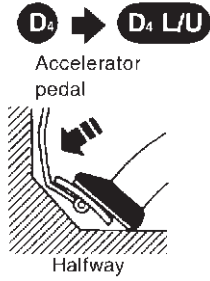
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TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

4	CHECK SHIFT UP (D₃ TO D₄)	
Does A/T shift from D ₃ to D ₄ at the specified speed? Ⓔ Read gear position, throttle position and vehicle speed. Specified speed when shifting from D₃ to D₄: Refer to shift schedule, AT-382.		
		
Yes or No		
Yes	▶	GO TO 5.
No	▶	Mark the box of "A/T Does Not Shift: D ₃ → D ₄ " on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.

SAT956I

5	CHECK LOCK-UP (D₄ TO D₄L/U)	
Does A/T perform lock-up at the specified speed? Ⓔ Read vehicle speed, throttle position when lock-up duty becomes 94%. Specified speed when lock-up occurs: Refer to Shift schedule, AT-382.		
		
Yes or No		
Yes	▶	GO TO 6.
No	▶	Mark the box of "A/T Does Not Perform Lock-up" on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.

SAT957I

6	CHECK HOLD LOCK-UP	
Does A/T hold lock-up condition for more than 30 seconds? <p style="text-align: center;">Yes or No</p>		
Yes	▶	GO TO 7.
No	▶	Mark the box of "A/T Does Not Hold Lock-up Condition" on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.

TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

7	CHECK SHIFT DOWN (D₄L/U TO D₄)	
<p>1. Release accelerator pedal.</p> <div style="text-align: center;"> </div>		
SAT958I		
<p>2. Is lock-up released when accelerator pedal is released?</p> <p style="text-align: center;">Yes or No</p>		
Yes	▶	GO TO 8.
No	▶	Mark the box of "Lock-up Is Not Released" on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.

GI
 MA
 EM
 LC
 EC
 FE

8	CHECK SHIFT DOWN (D₄ TO D₃)	
<p>1. Decelerate vehicle by applying foot brake lightly.</p> <div style="text-align: center;"> </div>		
SAT959I		
<p>2. Does engine speed return to idle smoothly when A/T is shifted from D₄ to D₃?</p> <p>Ⓔ Read gear position and engine speed.</p> <p style="text-align: center;">Yes or No</p>		
Yes	▶	1. Stop vehicle. 2. Go to "Cruise Test — Part 2", AT-82.
No	▶	Mark the box of "Engine Speed Does Not Return To Idle (Light Braking D ₄ → D ₃)" on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.

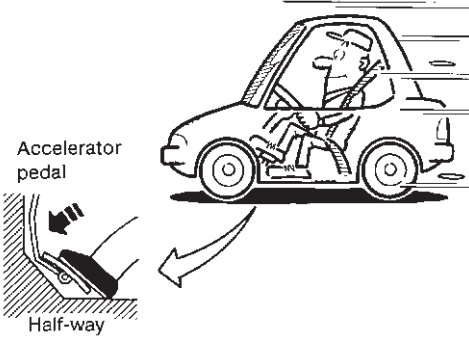
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TROUBLE DIAGNOSIS — BASIC INSPECTION

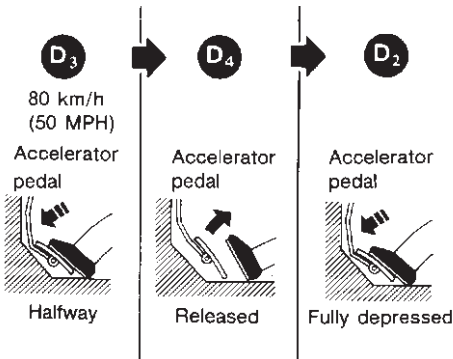
Road Test (Cont'd)

Cruise Test — Part 2

=NHAT0029S0405

1	CHECK STARTING GEAR (D₁) POSITION	
<p>1. Confirm selector lever is in D position. 2. Accelerate vehicle by half throttle again.</p> <div style="text-align: center;">  </div>		
<p>3. Does vehicle start from D₁? <input type="radio"/> Read gear position.</p> <p style="text-align: center;">Yes or No</p>		
Yes	▶	GO TO 2.
No	▶	Mark the box of "Vehicle Does Not Start From D ₁ " on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.

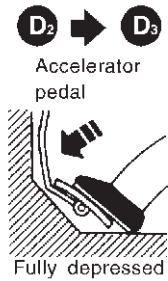
SAT495G

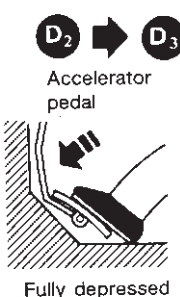
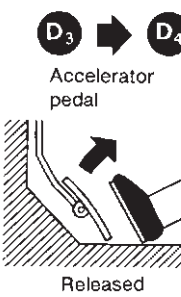
2	CHECK SHIFT UP AND SHIFT DOWN (D₃ TO D₄ TO D₂)	
<p>1. Accelerate vehicle to 80 km/h (50 MPH) as shown in illustration. 2. Release accelerator pedal and then quickly depress it fully.</p> <div style="text-align: center;">  </div>		
<p>3. Does A/T shift from D₄ to D₂ as soon as accelerator pedal is depressed fully? <input type="radio"/> Read gear position and throttle position.</p> <p style="text-align: center;">Yes or No</p>		
Yes	▶	GO TO 3.
No	▶	Mark the box of "A/T Does Not Shift: D ₁ → D ₂ Or Does Not Kickdown: D ₄ → D ₂ " on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.

SAT404H

TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

3	CHECK SHIFT UP (D₂ TO D₃)	
<p>Does A/T shift from D₂ to D₃ at the specified speed?</p> <p>Ⓔ Read gear position, throttle position and vehicle speed. Specified speed when shifting from D₂ to D₃: Refer to Shift schedule, AT-382.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT960I</p>		
Yes or No		
Yes	▶	GO TO 4.
No	▶	Mark the box of "A/T Does Not Shift: D ₂ → D ₃ " on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.

4	CHECK SHIFT UP (D₃ TO D₄) AND ENGINE BRAKE	
<p>Release accelerator pedal after shifting from D₂ to D₃.</p> <p>Does A/T shift from D₃ to D₄ and does vehicle decelerate by engine brake?</p> <p>Ⓔ Read gear position, throttle position and vehicle speed.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <p style="text-align: right;">SAT405H</p>		
Yes or No		
Yes	▶	1. Stop vehicle. 2. Go to "CRUISE TEST — Part 3", AT-84.
No	▶	Mark the box of "A/T Does Not Shift: D ₃ → D ₄ " on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.

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TROUBLE DIAGNOSIS — BASIC INSPECTION

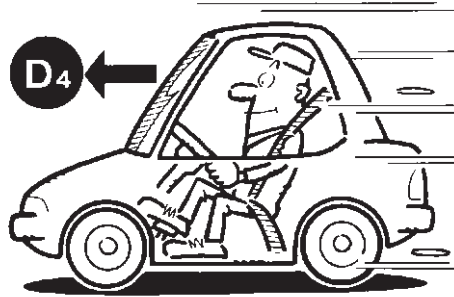
Road Test (Cont'd)

Cruise Test — Part 3

=NHAT0029S0406

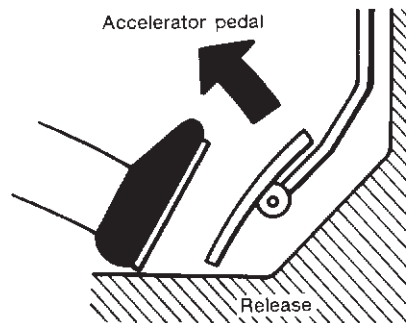
1 VEHICLE SPEED (D₄) POSITION

1. Confirm selector lever is in D position.
2. Accelerate vehicle using half-throttle to D₄.



SAT812A

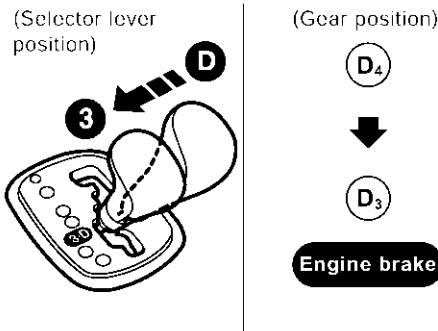
3. Release accelerator pedal.



SAT813A

4. Set selector lever sets in 3rd position while driving in D₄.
5. Does A/T shift from D₄ to D₃?

Read gear position and vehicle speed.



SAT677K

Yes or No

Yes



GO TO 2.

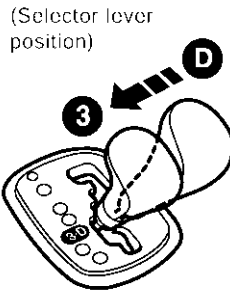
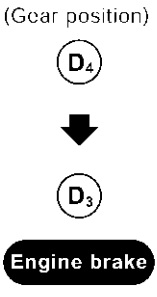
No



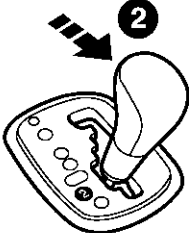
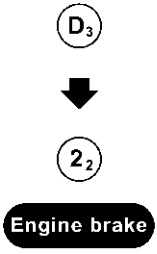
Mark the box of "A/T Does Not Shift: D₄ → D₃, When selector lever D → 3rd position on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.

TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

2	CHECK ENGINE BRAKE		
Does vehicle decelerate by engine brake?			
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>(Selector lever position)</p>  </div> <div style="text-align: center;"> <p>(Gear position)</p>  </div> </div>			
SAT677K			
Yes or No			
Yes	▶	GO TO 3.	
No	▶	Mark the box of "Engine Speed Does Not Return To Idle (Light Braking D ₄ → D ₃)" on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.	

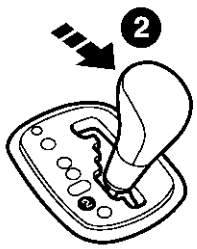
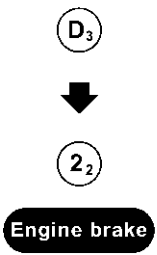
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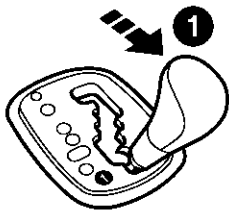
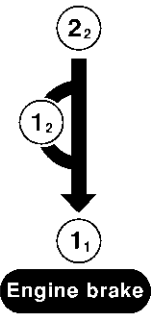
3	CHECK SHIFT DOWN (D₃ TO D₂)		
1. Move selector lever from 3rd to 2nd position while driving in D ₃ . 2. Does A/T shift from D ₃ to 2 ₂ ? Ⓔ Read gear position.			
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>2</p>  </div> <div style="text-align: center;">  </div> </div>			
SAT678K			
Yes or No			
Yes	▶	GO TO 4.	
No	▶	Mark the box of "A/T Does Not Shift: D ₃ → D ₂ , When Selector Lever 3rd → 2nd Position" on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.	

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TROUBLE DIAGNOSIS — BASIC INSPECTION

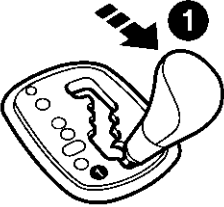
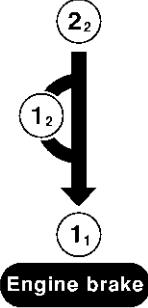
Road Test (Cont'd)

4	CHECK ENGINE BRAKE	
Does vehicle decelerate by engine brake?		
<div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: center;">  </div> </div>		
SAT678K		
Yes or No		
Yes	▶	GO TO 5.
No	▶	Mark the box of "Engine Speed Does Not Return To Idle (Light Braking D ₄ → D ₃)" on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.

5	CHECK SHIFT DOWN (2₂ TO 1₁)	
1. Move selector lever from 2nd to 1st position while driving in 2 ₂ . 2. Does A/T shift from 2 ₂ to 1 ₁ position? Ⓔ Read gear position.		
<div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: center;">  </div> </div>		
SAT514K		
Yes or No		
Yes	▶	GO TO 6.
No	▶	Mark the box of "A/T Does Not Shift: 2 ₂ → 1 ₁ , When Selector Lever 2nd → 1st Position" on the DIAGNOSTIC WORKSHEET. Continue ROAD TEST.

TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

6	CHECK ENGINE BRAKE	
Does vehicle decelerate by engine brake?		
<div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: center;">  <p>Engine brake</p> </div> </div>		
SAT514K		
Yes or No		
Yes	▶	<ol style="list-style-type: none"> 1. Stop vehicle. 2. Perform self-diagnosis. Refer to TCM Self-diagnostic Procedure (No Tools), AT-53.
No	▶	Mark the box of "Vehicle Does Not Decelerate By Engine Brake" on the DIAGNOSTIC WORKSHEET. Stop ROAD TEST.

GI

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Chart

Symptom Chart

NHAT0030

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	AT-189
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-121, 208
			3. Engine speed signal	AT-126
			4. A/T fluid temperature sensor	AT-201
			5. Line pressure test	AT-69
			6. Torque converter clutch solenoid valve	AT-158
			7. Control valve assembly	AT-283
	OFF vehicle	8. Torque converter	AT-294	
	Torque converter clutch piston slip.	ON vehicle	1. Fluid level	AT-65
			2. Accelerator pedal position sensor	AT-189
			3. Line pressure test	AT-69
			4. Torque converter clutch solenoid valve	AT-158
			5. Line pressure solenoid valve	AT-173
6. Control valve assembly			AT-283	
OFF vehicle	7. Torque converter	AT-294		
Lock-up point is extremely high or low. AT-251	ON vehicle	1. Accelerator pedal position sensor	AT-189	
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-121, 208	
		3. Torque converter clutch solenoid valve	AT-158	
		4. Control valve assembly	AT-283	
Shift Shock	ON vehicle	1. Engine idling rpm	EC-59	
		2. Accelerator pedal position sensor	AT-189	
		3. Line pressure test	AT-69	
		4. A/T fluid temperature sensor	AT-201	
		5. Engine speed signal	AT-126	
		6. Line pressure solenoid valve	AT-173	
		7. Control valve assembly	AT-283	
		8. Accumulator N-D	AT-283	
	OFF vehicle	9. Forward clutch	AT-337	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
Shift Shock	Too sharp a shock in change from D ₁ to D ₂ .	ON vehicle	1. Accelerator pedal position sensor	AT-189	
			2. Line pressure test	AT-69	GI
			3. Accumulator servo release	AT-283	
			4. Control valve assembly	AT-283	MA
			5. A/T fluid temperature sensor	AT-201	
		OFF vehicle	6. Brake band	AT-342	EM
	Too sharp a shock in change from D ₂ to D ₃ .	ON vehicle	1. Accelerator pedal position sensor	AT-189	
			2. Line pressure test	AT-69	LC
			3. Control valve assembly	AT-283	
			4. A/T fluid temperature sensor	AT-201	EC
		OFF vehicle	5. High clutch	AT-332	
			6. Brake band	AT-354	FE
	Too sharp a shock in change from D ₃ to D ₄ .	ON vehicle	1. Accelerator pedal position sensor	AT-189	
			2. Line pressure test	AT-69	AT
			3. Control valve assembly	AT-283	
			4. A/F fluid temperature sensor	AT-201	AX
		OFF vehicle	5. Brake band	AT-354	
			6. Overrun clutch	AT-337	SU
			7. Forward one-way clutch	AT-345	BR
	Gear change shock felt during deceleration by releasing accelerator pedal.	ON vehicle	1. Accelerator pedal position sensor	AT-189	
2. Line pressure test			AT-69	ST	
3. Overrun clutch solenoid valve			AT-196		
4. Control valve assembly			AT-283	RS	
Large shock changing from 1 ₂ to 1 ₁ in 1st position.	ON vehicle	1. Control valve assembly	AT-283		
	OFF vehicle	2. Low & reverse brake	AT-342	BT	
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 . AT-242, 245, 248	ON vehicle	1. Accelerator pedal position sensor	AT-189	HA
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-121, 208	SC
			3. Shift solenoid valve A	AT-179	
			4. Shift solenoid valve B	AT-184	EL
	Gear change directly from D ₁ to D ₃ occurs.	ON vehicle	1. Fluid level	AT-65	
			2. Accumulator servo release	AT-283	IDX
		OFF vehicle	3. Brake band	AT-354	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
Improper Shift Timing	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	AT-189
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-121, 208
	Kickdown does not operate when depressing pedal in D ₄ within kickdown vehicle speed.	ON vehicle	1. Accelerator pedal position sensor	AT-189
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-121, 208
			3. Shift solenoid valve A	AT-179
			4. Shift solenoid valve B	AT-184
	Kickdown operates or engine overruns when depressing pedal in D ₄ beyond kickdown vehicle speed limit.	ON vehicle	1. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-121, 208
			2. Accelerator pedal position sensor	AT-189
			3. Shift solenoid valve A	AT-179
			4. Shift solenoid valve B	AT-184
Gear change from 2 ₂ to 2 ₃ in 2nd position.	ON vehicle	1. Park/neutral position (PNP) switch	AT-109	
		2. Control cable adjustment	AT-285	
Gear change from 1 ₁ to 1 ₂ in 1st position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-284	
		2. Control cable adjustment	AT-285	
No Down Shift	Failure to change gear from D ₄ to D ₃ .	ON vehicle	1. Fluid level	AT-65
			2. Accelerator pedal position sensor	AT-189
			3. Overrun clutch solenoid valve	AT-196
			4. Shift solenoid valve A	AT-179
			5. Line pressure solenoid valve	AT-173
			6. Control valve assembly	AT-283
		OFF vehicle	7. Brake band	AT-354
			8. Overrun clutch	AT-337
	Failure to change gear from D ₃ to D ₂ or from D ₄ to D ₂ .	ON vehicle	1. Fluid level	AT-65
			2. Accelerator pedal position sensor	AT-189
			3. Shift solenoid valve A	AT-179
			4. Shift solenoid valve B	AT-184
			5. Control valve assembly	AT-283
		OFF vehicle	6. High clutch	AT-332
7. Brake band			AT-354	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
No Down Shift	Failure to change gear from D ₂ to D ₁ or from D ₃ to D ₁ .	ON vehicle	1. Fluid level	AT-65	
			2. Accelerator pedal position sensor	AT-189	GI
			3. Shift solenoid valve A	AT-179	
			4. Shift solenoid valve B	AT-184	MA
			5. Control valve assembly	AT-283	
		OFF vehicle	6. Low one-way clutch	AT-289	EM
			7. High clutch	AT-332	
			8. Brake band	AT-354	LC
	Failure to change from D ₃ to 2 ₂ when changing lever into 2nd position. AT-256	ON vehicle	1. Accelerator pedal position sensor	AT-189	EC
			2. Shift solenoid valve B	AT-184	
			3. Control valve assembly	AT-283	FE
			4. Control cable adjustment	AT-285	
		OFF vehicle	5. Brake band	AT-354	AT
	Does not change from 1 ₂ to 1 ₁ in 1st position.	ON vehicle	1. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-121, 208	AX
2. Shift solenoid valve A			AT-179		
3. Control valve assembly			AT-283	SU	
OFF vehicle		4. Low one-way clutch	AT-289	BR	
		5. Brake band	AT-354		
		6. Low & reverse brake	AT-342		
No Up Shift	Failure to change gear from D ₁ to D ₂ .	ON vehicle	1. Control cable adjustment	AT-285	ST
			2. Shift solenoid valve A	AT-179	
			3. Control valve assembly	AT-283	RS
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-121, 208	BT
			5. Accelerator pedal position sensor	AT-189	
		OFF vehicle	6. Brake band	AT-354	HA
	Failure to change gear from D ₂ to D ₃ .	ON vehicle	1. Control cable adjustment	AT-285	SC
			2. Shift solenoid valve B	AT-184	
			3. Control valve assembly	AT-283	EL
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-121, 208	
			5. Accelerator pedal position sensor	AT-189	
		OFF vehicle	6. High clutch	AT-332	IDX
			7. Brake band	AT-354	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
No Up Shift	Failure to change gear from D ₃ to D ₄ .	ON vehicle	1. Park/neutral position (PNP) switch	AT-109	
			2. 3rd position switch	AT-267	
			3. Control cable adjustment	AT-285	
			4. Shift solenoid valve A	AT-179	
			5. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-121, 208	
			6. A/T fluid temperature sensor	AT-201	
			7. Accelerator pedal position sensor	AT-189	
		OFF vehicle	8. Brake band	AT-354	
		A/T does not shift to D ₄ when driving with selector lever from 3rd to D position.	ON vehicle	1. Accelerator pedal position sensor	AT-189
				2. Park/neutral position (PNP) switch	AT-109
				3. 3rd position switch	AT-267
	4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR			AT-121, 208	
	5. Shift solenoid valve A			AT-179	
	6. Overrun clutch solenoid valve			AT-196	
	7. Control valve assembly			AT-283	
	8. A/T fluid temperature sensor			AT-201	
	9. Line pressure solenoid valve			AT-173	
	OFF vehicle	10. Brake band	AT-354		
		11. Overrun clutch	AT-337		
Slips/Will Not Engage	Vehicle will not run in R position (but runs in D, 2nd and 1st positions). Clutch slips. Very poor acceleration. AT-233	ON vehicle	1. Control cable adjustment	AT-285	
			2. Stall test	AT-65	
			3. Line pressure test	AT-69	
			4. Line pressure solenoid valve	AT-173	
			5. Control valve assembly	AT-283	
			OFF vehicle	6. Reverse clutch	AT-329
				7. High clutch	AT-332
				8. Forward clutch	AT-337
				9. Overrun clutch	AT-337
				10. Low & reverse brake	AT-342
	ON vehicle	1. Control cable adjustment	AT-285		
	OFF vehicle	2. Low one-way clutch	AT-289		

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
Slips/Will Not Engage	Vehicle will not run in D, 1st, 2nd positions (but runs in R position). Clutch slips. Very poor acceleration. AT-236	ON vehicle	1. Fluid level	AT-65	
			2. Stall test	AT-65	GI
			3. Line pressure test	AT-69	
			4. Line pressure solenoid valve	AT-173	MA
			5. Control valve assembly	AT-283	
			6. Accumulator N-D	AT-283	EM
		OFF vehicle	7. Reverse clutch	AT-329	
			8. High clutch	AT-332	LC
			9. Forward clutch	AT-337	
			10. Forward one-way clutch	AT-345	EC
			11. Low one-way clutch	AT-289	FE
	Clutches or brakes slip somewhat in starting.	ON vehicle	1. Fluid level	AT-65	
			2. Control cable adjustment	AT-285	AT
			3. Accelerator pedal position sensor	AT-189	
			4. Line pressure test	AT-69	AX
			5. Line pressure solenoid valve	AT-173	
			6. Control valve assembly	AT-283	SU
			7. Accumulator N-D	AT-283	
			8. Shift solenoid valve A	AT-179	BR
			9. Shift solenoid valve B	AT-184	
			10. Overrun clutch solenoid valve	AT-196	ST
			11. Torque converter clutch solenoid valve	AT-158	
OFF vehicle		12. Forward clutch	AT-337	RS	
		13. Reverse clutch	AT-329		
		14. Low & reverse brake	AT-342	BT	
		15. Oil pump	AT-311		
		16. Torque converter	AT-294	HA	
No creep at all. AT-233, 236	ON vehicle	1. Fluid level	AT-65		
		2. Line pressure test	AT-69	SC	
		3. Control valve assembly	AT-283		
	OFF vehicle	4. Forward clutch	AT-337	EL	
		5. Oil pump	AT-311		
		6. Torque converter	AT-294	IDX	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
Slips/Will Not Engage	Almost no shock or clutches slipping in change from D ₁ to D ₂ .	ON vehicle	1. Fluid level	AT-65	
			2. Accelerator pedal position sensor	AT-189	
			3. Line pressure test	AT-69	
			4. Accumulator servo release	AT-283	
			5. Control valve assembly	AT-283	
		OFF vehicle	6. Brake band	AT-354	
	Almost no shock or slipping in change from D ₂ to D ₃ .	ON vehicle	1. Fluid level	AT-65	
			2. Accelerator pedal position sensor	AT-189	
			3. Line pressure test	AT-69	
			4. Control valve assembly	AT-283	
		OFF vehicle	5. High clutch	AT-332	
			6. Brake band	AT-354	
	Almost no shock or slipping in change from D ₃ to D ₄ .	ON vehicle	1. Fluid level	AT-65	
			2. Accelerator pedal position sensor	AT-189	
			3. Line pressure test	AT-69	
			4. Control valve assembly	AT-283	
		OFF vehicle	5. Brake band	AT-354	
		Races extremely fast or slips in changing from D ₄ to D ₃ when depressing pedal.	ON vehicle	1. Fluid level	AT-65
	2. Accelerator pedal position sensor			AT-189	
	3. Line pressure test			AT-69	
	4. Line pressure solenoid valve			AT-173	
	5. Shift solenoid valve A			AT-179	
	6. Control valve assembly			AT-283	
	OFF vehicle		7. Brake band	AT-354	
8. Forward clutch			AT-337		
Races extremely fast or slips in changing from D ₄ to D ₂ when depressing pedal.			ON vehicle	1. Fluid level	AT-65
				2. Accelerator pedal position sensor	AT-189
	3. Line pressure test	AT-69			
	4. Line pressure solenoid valve	AT-173			
	5. Shift solenoid valve A	AT-179			
	6. Shift solenoid valve B	AT-184			
	7. Control valve assembly	AT-283			
OFF vehicle	8. Brake band	AT-354			
9. Forward clutch	AT-337				

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Chart (Cont'd)

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 pedal.	ON vehicle	1. Fluid level	AT-65	
			2. Accelerator pedal position sensor	AT-189	GI
			3. Line pressure test	AT-69	
			4. Line pressure solenoid valve	AT-173	MA
			5. Shift solenoid valve B	AT-184	
			6. Control valve assembly	AT-283	EM
		OFF vehicle	7. Brake band	AT-354	
			8. High clutch	AT-332	LC
	Races extremely fast or slips in changing from D ₄ or D ₃ to D ₁ when depressing pedal.	ON vehicle	1. Fluid level	AT-65	
			2. Accelerator pedal position sensor	AT-189	EC
			3. Line pressure test	AT-69	
			4. Line pressure solenoid valve	AT-173	FE
			5. Shift solenoid valve A	AT-179	
			6. Shift solenoid valve B	AT-184	AT
			7. Control valve assembly	AT-283	AX
		OFF vehicle	8. Forward clutch	AT-337	
			9. Forward one-way clutch	AT-345	SU
			10. Low one-way clutch	AT-289	
	Vehicle will not run in any position.	ON vehicle	1. Fluid level	AT-65	BR
			2. Control cable adjustment	AT-285	
			3. Line pressure test	AT-69	ST
4. Line pressure solenoid valve			AT-173		
OFF vehicle		5. Oil pump	AT-311	RS	
		6. Torque converter	AT-294		
		7. Parking components	AT-289	BT	
NOT USED	Engine cannot be started in P and N positions. AT-226	ON vehicle	1. Ignition switch and starter	EL-12, and SC-10	
			2. Control cable adjustment	AT-285	HA
			3. Park/neutral position (PNP) switch adjustment	AT-284	SC
	Engine starts in positions other than P and N. AT-226	ON vehicle	1. Control cable adjustment	AT-285	EL
			2. Park/neutral position (PNP) switch adjustment	AT-284	

IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
NOT USED	Transaxle noise in P and N positions.	ON vehicle	1. Fluid level	AT-65
			2. Line pressure test	AT-69
			3. Accelerator pedal position sensor	AT-189
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-121, 208
		OFF vehicle	5. Oil pump	AT-311
			6. Torque converter	AT-294
	Vehicle moves when changing into P position or parking gear does not disengage when shifted out of P position. AT-228	ON vehicle	1. Control cable adjustment	AT-285
		OFF vehicle	2. Parking components	AT-289
	Vehicle runs in N position. AT-229	ON vehicle	1. Control cable adjustment	AT-285
		OFF vehicle	2. Forward clutch	AT-337
			3. Reverse clutch	AT-329
			4. Overrun clutch	AT-337
	Vehicle braked when shifting into R position.	ON vehicle	1. Fluid level	AT-65
			2. Line pressure test	AT-69
			3. Line pressure solenoid valve	AT-173
			4. Control valve assembly	AT-283
		OFF vehicle	5. High clutch	AT-332
			6. Brake band	AT-354
			7. Forward clutch	AT-337
			8. Overrun clutch	AT-337
Excessive creep.	ON vehicle	1. Engine idling rpm	EC-59	
Engine stops when shifting lever into R, D, 2nd and 1st position.	ON vehicle	1. Engine idling rpm	EC-59	
		2. Fluid level	AT-65	
		3. Torque converter clutch solenoid valve	AT-158	
		4. Control valve assembly	AT-283	
	OFF vehicle	5. Torque converter	AT-294	
Vehicle braked by gear change from D ₁ to D ₂ .	ON vehicle	1. Fluid level	AT-65	
	OFF vehicle	2. Reverse clutch	AT-329	
		3. Low & reverse brake	AT-342	
		4. High clutch	AT-332	
		5. Low one-way clutch	AT-289	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
NOT USED	Vehicle braked by gear change from D ₂ to D ₃ .	ON vehicle	1. Fluid level	AT-65	
		OFF vehicle	2. Brake band	AT-354	GI
	Vehicle braked by gear change from D ₃ to D ₄ .	ON vehicle	1. Fluid level	AT-65	
		OFF vehicle	2. Overrun clutch	AT-337	MA
			3. Forward one-way clutch	AT-345	EM
	Maximum speed not attained. Acceleration poor.	ON vehicle	4. Reverse clutch	AT-329	
			1. Fluid level	AT-65	LC
			2. Park/neutral position (PNP) switch	AT-109	
			3. 3rd position switch	AT-267	EC
			4. Accelerator pedal position sensor	AT-189	
			5. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-121, 208	FE
			6. Shift solenoid valve A	AT-179	AT
			7. Shift solenoid valve B	AT-184	
		OFF vehicle	8. Control valve assembly	AT-283	AX
			9. Reverse clutch	AT-329	
			10. High clutch	AT-332	SU
			11. Brake band	AT-354	
			12. Low & reverse brake	AT-342	BR
			13. Oil pump	AT-311	
	Transaxle noise in D, 2nd, 1st and R positions.	14. Torque converter	AT-294	ST	
ON vehicle		1. Fluid level	AT-65		
Engine brake does not operate in "1st" position. AT-259	ON vehicle	2. Torque converter	AT-294	RS	
	ON vehicle	1. Park/neutral position (PNP) switch	AT-109		
		2. Control cable adjustment	AT-285	BT	
		3. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-121, 208	HA	
		4. Control valve assembly	AT-283		
		5. Overrun clutch solenoid valve	AT-196	SC	
	OFF vehicle	6. Overrun clutch	AT-337		
7. Low & reverse brake	AT-342	EL			

IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

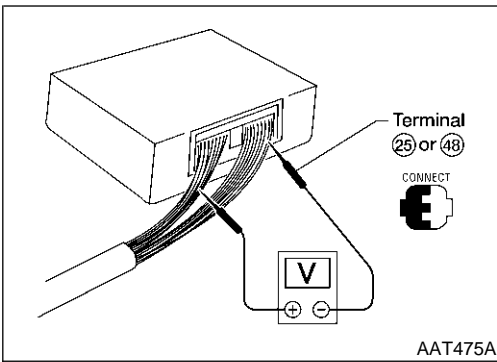
Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
	Transaxle overheats.	ON vehicle	1. Fluid level	AT-65
			2. Engine idling rpm	AT-69
			3. Accelerator pedal position sensor	AT-189
			4. Line pressure test	AT-69
			5. Line pressure solenoid valve	AT-173
			6. Control valve assembly	AT-283
		OFF vehicle	7. Oil pump	AT-311
			8. Reverse clutch	AT-329
			9. High clutch	AT-332
			10. Brake band	AT-354
			11. Forward clutch	AT-337
			12. Overrun clutch	AT-337
			13. Low & reverse brake	AT-342
			14. Torque converter	AT-294
NOT USED	ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	AT-65
		OFF vehicle	2. Reverse clutch	AT-329
			3. High clutch	AT-332
			4. Brake band	AT-354
			5. Forward clutch	AT-337
			6. Overrun clutch	AT-337
			7. Low & reverse brake	AT-342
NOT USED	Offensive smell at fluid charging pipe.	ON vehicle	1. Fluid level	AT-65
		OFF vehicle	2. Torque converter	AT-294
			3. Oil pump	AT-311
			4. Reverse clutch	AT-329
			5. High clutch	AT-332
			6. Brake band	AT-354
			7. Forward clutch	AT-337
			8. Overrun clutch	AT-337
			9. Low & reverse brake	AT-342

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

TCM Terminals and Reference Value

=NHAT0031



TCM Terminals and Reference Value

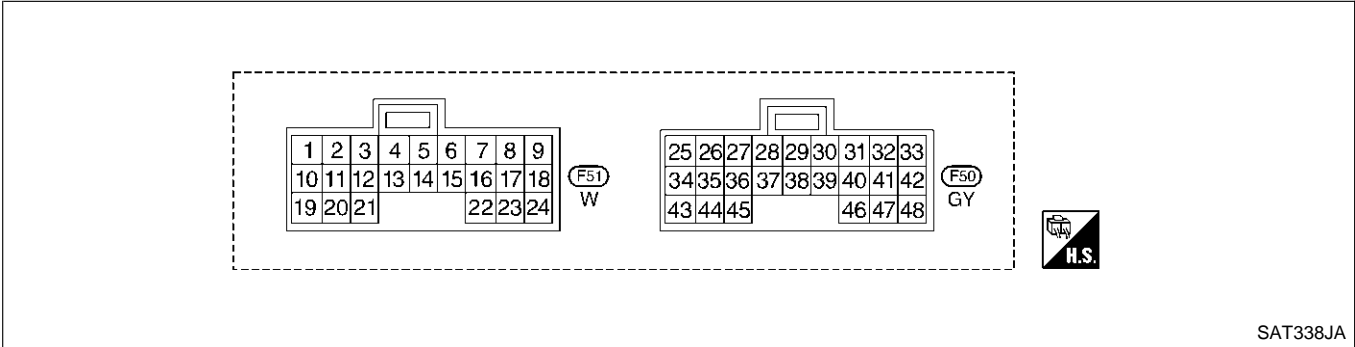
PREPARATION

- Measure voltage between each terminal and terminal 25 or 48 by following "TCM INSPECTION TABLE".

NHAT0031S01

TCM HARNESS CONNECTOR TERMINAL LAYOUT



NHAT0031S02



TCM INSPECTION TABLE



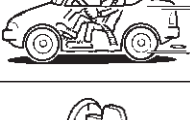
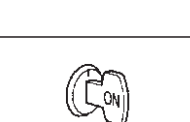
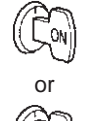


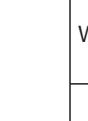
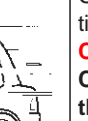

(Data are reference values.)

NHAT0031S03

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
1	G/R	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	W/B	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
3	G/B	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 (high)	—	—
6	R	CAN-L (low)	—	—
10	R/Y	Power source	 When turning ignition switch to ON.	Battery voltage
			or  When turning ignition switch to OFF.	0V












TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

TCM Terminals and Reference Value (Cont'd)

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
11	R/Y	Shift solenoid valve A		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
12	LG/B	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in D ₁ or D ₂ .)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in D ₃ or D ₄ .)	0V
13	G/R	A/T CHECK indicator lamp		When AT CHECK indicator lamp is ON.	0V
				When AT CHECK indicator lamp is OFF.	Battery voltage
19	R/Y	Power source	Same as No. 10		
20	BR/Y	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage
				When overrun clutch solenoid valve does not operate.	0V
22	G/Y	3rd position switch		When the selector lever is in a position other than 3rd position.	Battery voltage
				When the selector lever is in 3rd position.	0V
25	B	Ground	—		0V
26	PU/R	PNP switch 1st position		When setting selector lever to 1st position.	Battery voltage
				When setting selector lever to other positions.	0V
27	P/B	PNP switch 2nd position		When setting selector lever to 2nd position.	Battery voltage
				When setting selector lever to other positions.	0V
28	Y/R	Power source (Memory back-up)	 or 	When turning ignition switch to OFF.	Battery voltage
				When turning ignition switch to ON.	Battery voltage
29	W	Revolution sensor (VHCL/S SEN)		When moving 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.	450 Hz
				When vehicle parks.	0V

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

TCM Terminals and Reference Value (Cont'd)

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)		
30*	BR/Y	Data link connector (RX)		—	—	GI
31*	P	Data link connector (TX)		—	—	MA
32	R	Sensor power		Ignition switch ON.	4.5 - 5.5V	EM
				Ignition switch OFF.	0V	
34	Y/PU	PNP switch D position		When setting selector lever to D position.	Battery voltage	LC
				When setting selector lever to other positions.	0V	
35	G/W	PNP switch R position		When setting selector lever to R position.	Battery voltage	EC
				When setting selector lever to other positions.	0V	
36	R/G	PNP switch P or N position		When setting selector lever to P or N position.	Battery voltage	FE
				When setting selector lever to other positions.	0V	
38	PU	Power train revolution sensor		When moving 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.	240 Hz	AT
				When vehicle parks.	Under 1.3V or over 4.5V	
39	W/G	Engine speed signal (TACHO)		Refer to EC-136, "ECM INSPECTION TABLE".		ST
40	PU/R	Vehicle speed sensor (MTR)		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Intermittently changes between approx. 0V and approx. 4.5V	BT
41	W	Accelerator pedal position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V	HA
42	B	Sensor ground		—	0V	SC
45	R/G	Stop lamp switch		When depressing brake pedal	Battery voltage	EL
				When releasing brake pedal	0V	
47	G	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V	IDX
				When ATF temperature is 80°C (176°F).	0.5V	
48	B	Ground		—	0V	

*: These terminals are connected to the Data link connector.

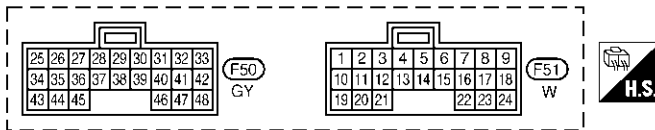
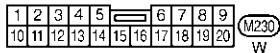
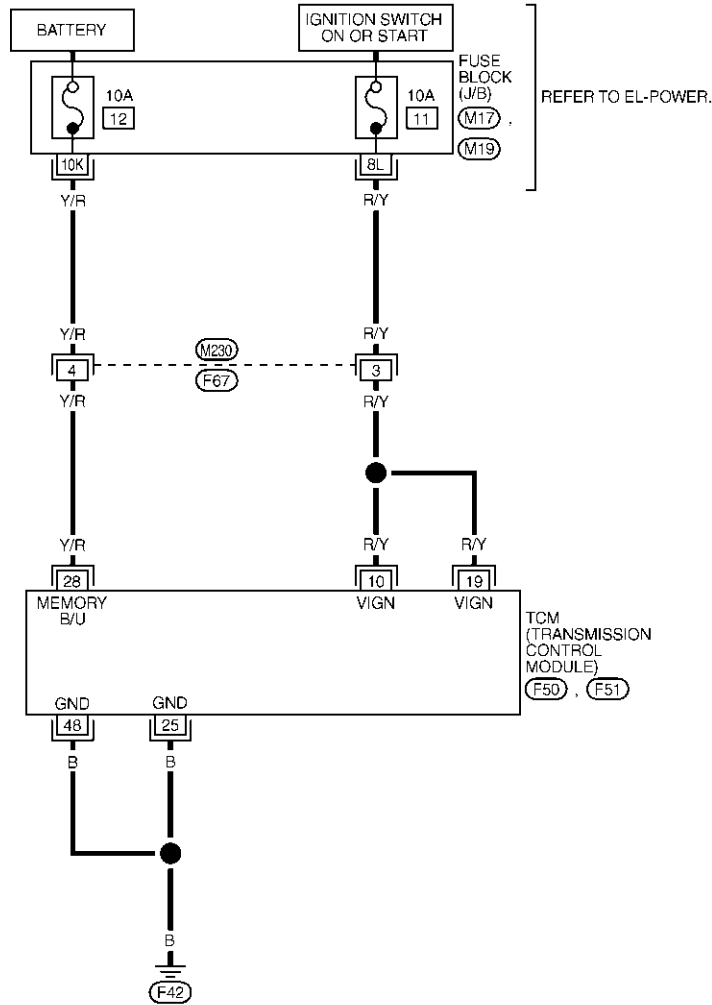
TROUBLE DIAGNOSIS FOR POWER SUPPLY

Wiring Diagram — AT — MAIN

Wiring Diagram — AT — MAIN

NHAT0032

AT-MAIN-01



REFER TO THE FOLLOWING.
 (M17), (M19) - FUSE BLOCK - JUNCTION BOX (J/B)

MAT088B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
10	R/Y	POWER SOURCE	WHEN IGN ON	BATTERY VOLTAGE
			WHEN IGN OFF	0V
19	R/Y	POWER SOURCE	SAME AS NO. 10	
25	B	GROUND	—	0V
28	Y/R	POWER SOURCE (MEMOLY BACK-UP)	WHEN IGN ON	BATTERY VOLTAGE
			WHEN IGN OFF	BATTERY VOLTAGE
48	B	GROUND	—	0V





SAT292KB

TROUBLE DIAGNOSIS FOR POWER SUPPLY

Wiring Diagram — AT — MAIN (Cont'd)

TCM TERMINALS AND REFERENCE VALUE

=NHAT0032S01

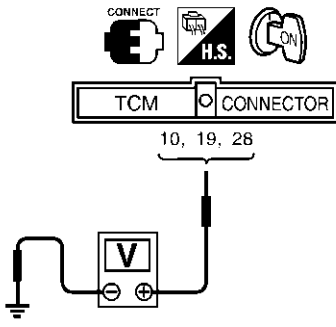
Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
10	R/Y	Power source		Battery voltage
			or 	0V
19	R/Y	Power source	Same as No. 10	
25	B	Ground	—	0V
28	Y/R	Power source (Memory back-up)		Battery voltage
			or 	Battery voltage
48	B	Ground	—	0V

GI
MA
EM
LC
EC
FE

AT

Diagnostic Procedure

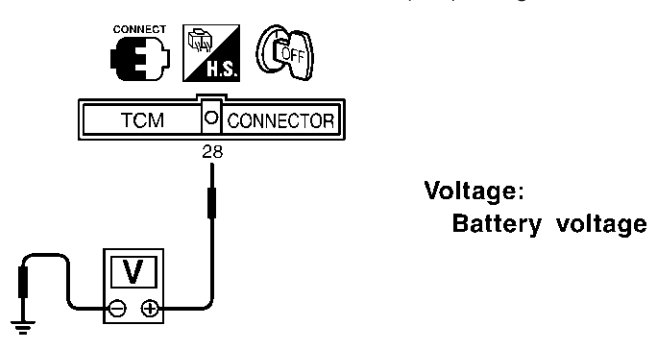
NHAT0033

1	CHECK TCM POWER SOURCE STEP 1
<p>1. Turn ignition switch to ON position. (Do not start engine.)</p> <p>2. Check voltage between TCM harness connectors F50, 51 terminals 10 (R/Y), 19 (R/Y), 28 (Y/R) and ground.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> </div> <p style="text-align: right;">SAT611J</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 2.
NG	▶ GO TO 3.

AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

TROUBLE DIAGNOSIS FOR POWER SUPPLY

Diagnostic Procedure (Cont'd)

2	CHECK TCM POWER SOURCE STEP 2	
<p>1. Turn ignition switch to OFF position. 2. Check voltage between TCM harness connector F50 terminal 28 (Y/R) and ground.</p>		
		
SAT612JF		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING ITEM	
<p>Check the following items:</p> <ul style="list-style-type: none"> ● Harness for short or open between battery, ignition switch and TCM harness connectors F50, F51 terminals 10 (R/Y), 19 (R/Y) and 28 (Y/R) ● Fuse ● Ignition switch <p>Refer to EL-11, "POWER SUPPLY ROUTING".</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace damaged parts.

4	CHECK TCM GROUND CIRCUIT	
<p>1. Turn ignition switch to OFF position. 2. Disconnect TCM harness connector. 3. Check continuity between TCM harness connector F50 terminals 25 (B), 48 (B) and ground. Refer to wiring diagram — AT — MAIN. Continuity should exist. If OK, check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	INSPECTION END
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC U1000 CAN COMMUNICATION LINE

Description

Description

^{NHAT0252}
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 units transmits/receives data but selectively reads required data only.

TCM TERMINALS AND REFERENCE VALUE

^{NHAT0252S01}

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
5	L	CAN-H (high)	—	—
6	R	CAN-L (low)	—	—

On Board Diagnosis Logic

^{NHAT0253}
Diagnostic trouble code CAN COMM CIRCUIT with CONSULT-II or U1000 without CONSULT-II is detected when malfunction is detected in CAN communication line.

Possible Cause

^{NHAT0254}
Check harness or connector.
(CAN communication line is open or shorted.)

DTC U1000 CAN COMMUNICATION LINE

Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
CAN DIAG SUPPORT MNTR
FUNCTION TEST
DTC WORK SUPPORT

SCIA5358E

Diagnostic Trouble Code (DTC) Confirmation Procedure

After the repair, perform the following procedure to confirm the malfunction is eliminated. NHAT0255

WITH CONSULT-II

- 1) Turn ignition switch "ON". NHAT0255S01
- 2) Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 3) Wait at least 6 seconds or start engine and wait for at least 6 seconds.

WITH GST

Follow the procedure "With CONSULT-II". NHAT0255S02




DTC U1000 CAN COMMUNICATION LINE

Wiring Diagram — AT — CAN

Wiring Diagram — AT — CAN

NHAT0256

AT-CAN-01

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

GI

MA

EM

LC

EC

FE

AT

AX

SU

BR

ST

RS

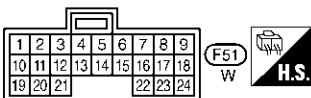
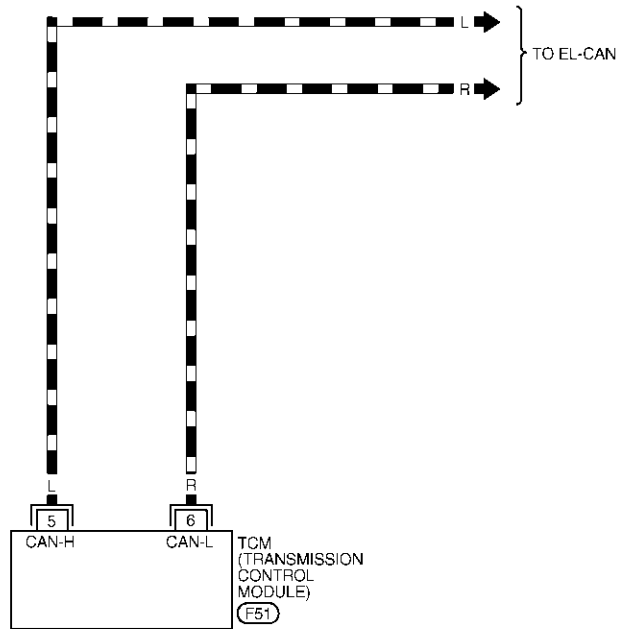
BT

HA

SC

EL

IDX



MAT390B

DTC U1000 CAN COMMUNICATION LINE

Wiring Diagram — AT — CAN (Cont'd)

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
5	L	CAN-H (HIGH)	—	—
6	R	CAN-L (LOW)	—	—

SAT594KC

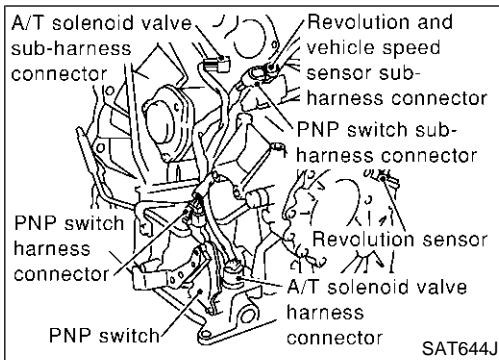
Diagnostic Procedure

NHAT0257

1	CHECK CAN COMMUNICATION CIRCUIT																								
<p>Ⓔ With CONSULT-II</p> <ol style="list-style-type: none"> Turn ignition switch to "ON" position. (Do not start engine.) Select "SELF-DIAG RESULTS" mode for "A/T" with CONSULT-II. The "CAN COMM CIRCUIT" is detected. 																									
<table border="1" style="margin: auto;"> <tr> <td colspan="4">SELF-DIAG RESULTS</td> </tr> <tr> <td colspan="4">DTC RESULTS</td> </tr> <tr> <td colspan="4">CAN COMM CIRCUIT [U1000]</td> </tr> <tr> <td colspan="4"> </td> </tr> <tr> <td colspan="2">ERASE</td> <td colspan="2">PRINT</td> </tr> <tr> <td>MODE</td> <td>BACK</td> <td>LIGHT</td> <td>COPY</td> </tr> </table>		SELF-DIAG RESULTS				DTC RESULTS				CAN COMM CIRCUIT [U1000]								ERASE		PRINT		MODE	BACK	LIGHT	COPY
SELF-DIAG RESULTS																									
DTC RESULTS																									
CAN COMM CIRCUIT [U1000]																									
ERASE		PRINT																							
MODE	BACK	LIGHT	COPY																						
PCIA0061E																									
Yes or No?																									
Yes	▶ Print out CONSULT-II screen, go to EL-450 and EL-463, "CAN SYSTEM".																								
No	▶ INSPECTION END																								

DTC P0705 PARK/NEUTRAL POSITION SWITCH

Description



Description

NHAT0034

- The park/neutral position (PNP) switch includes a transmission range switch.
- The transmission range switch detects the selector lever position and sends a signal to the TCM.

GI

MA

EM

TCM TERMINALS AND REFERENCE VALUE

NHAT0034S01

LC

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
26	PU/R	PNP switch 1st position	When setting selector lever to 1st position.	Battery voltage
			When setting selector lever to other positions.	0V
27	P/B	PNP switch 2nd position	When setting selector lever to 2nd position.	Battery voltage
			When setting selector lever to other positions.	0V
34	Y/PU	PNP switch D position	When setting selector lever to D position.	Battery voltage
			When setting selector lever to other positions.	0V
35	G/W	PNP switch R position	When setting selector lever to R position.	Battery voltage
			When setting selector lever to other positions.	0V
36	R/G	PNP switch P or N position	When setting selector lever to P or N position.	Battery voltage
			When setting selector lever to other positions.	0V

EC

FE

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

On Board Diagnosis Logic

NHAT0201

Diagnostic trouble code PNP SW/CIRC with CONSULT-II or P0705 without CONSULT-II is detected when TCM does not receive the correct voltage signal from the switch based on the gear position.

DTC P0705 PARK/NEUTRAL POSITION SWITCH

Possible Cause

Possible Cause

NHAT0202

Check the following items.

- Harness or connectors
(The park/neutral position (PNP) switch circuit is open or shorted.)
- Park/neutral position (PNP) switch

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0203

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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

Ⓔ WITH CONSULT-II

NHAT0203S01

- 1) Turn ignition switch ON.
- 2) Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- 3) Start engine and maintain the following conditions for at least 5 consecutive seconds.

VHCL SPEED SE: 10 km/h (6 MPH) or more

THRTL POS SEN: More than 1.3V

Selector lever: 3rd or D position

Ⓔ WITH GST

NHAT0203S02

Follow the procedure "With CONSULT-II".

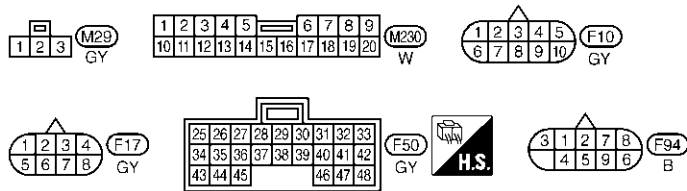
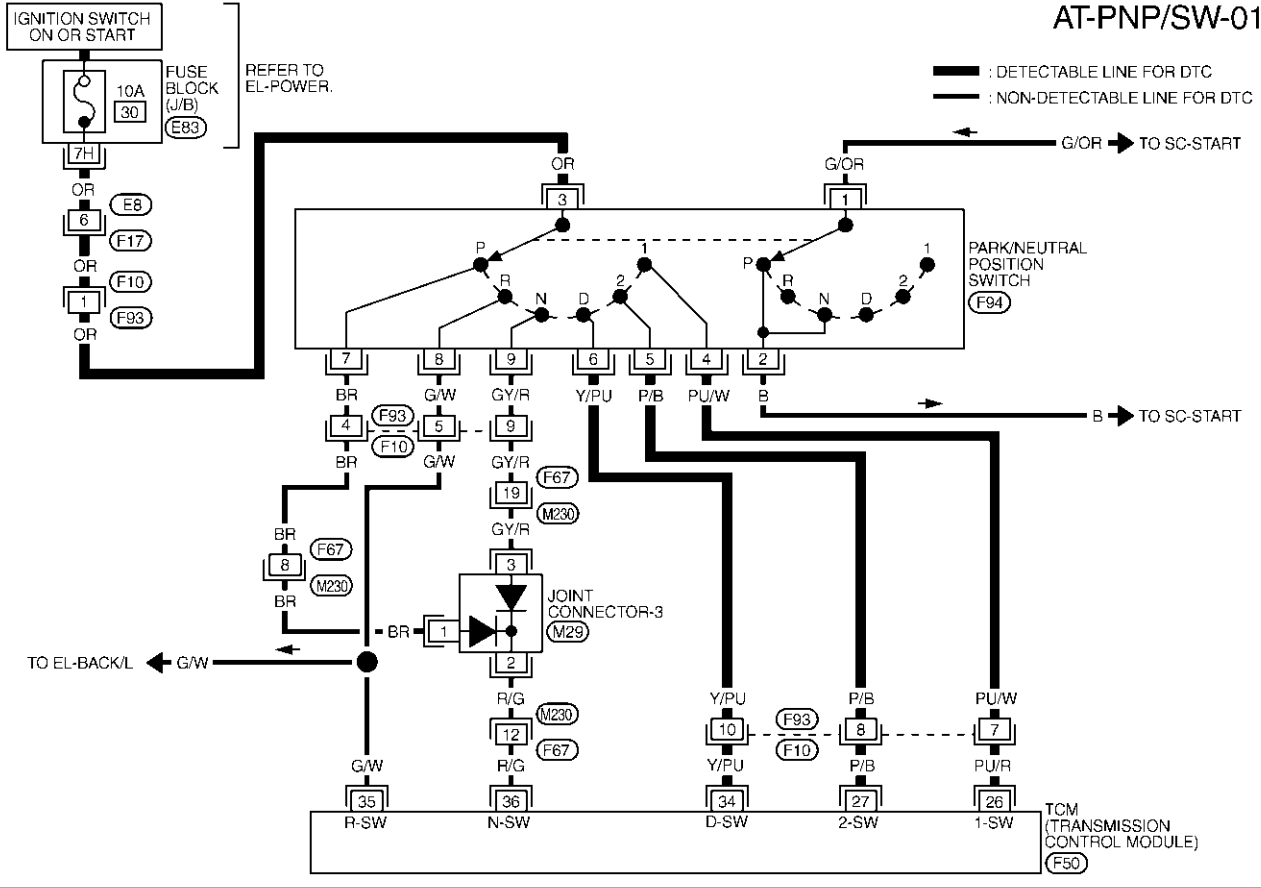
DTC P0705 PARK/NEUTRAL POSITION SWITCH

Wiring Diagram — AT — PNP/SW

Wiring Diagram — AT — PNP/SW

NHAT0035

AT-PNP/SW-01



REFER TO THE FOLLOWING.
 (E83) - FUSE BLOCK-JUNCTION BOX (J/B)

MAT387B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINALS AND 25 OR 48 (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
26	PU/R	PNP SWITCH 1st POSITION	WHEN IGN ON AND SELECTOR LEVER 1st POSITION WHEN IGN ON AND SELECTOR LEVER OTHER POSITIONS	BATTERY VOLTAGE 0V
27	P/B	PNP SWITCH 2nd POSITION	WHEN IGN ON AND SELECTOR LEVER 2nd POSITION WHEN IGN ON AND SELECTOR LEVER OTHER POSITIONS	BATTERY VOLTAGE 0V
34	Y/PU	PNP SWITCH D POSITION	WHEN IGN ON AND SELECTOR LEVER D POSITION WHEN IGN ON AND SELECTOR LEVER OTHER POSITIONS	BATTERY VOLTAGE 0V
35	G/W	PNP SWITCH R POSITION	WHEN IGN ON AND SELECTOR LEVER R POSITION WHEN IGN ON AND SELECTOR LEVER OTHER POSITIONS	BATTERY VOLTAGE 0V
36	R/G	PNP SWITCH P OR N POSITION	WHEN IGN ON AND SELECTOR LEVER P POSITION WHEN IGN ON AND SELECTOR LEVER OTHER POSITIONS	BATTERY VOLTAGE 0V


DTC P0705 PARK/NEUTRAL POSITION SWITCH

Diagnostic Procedure

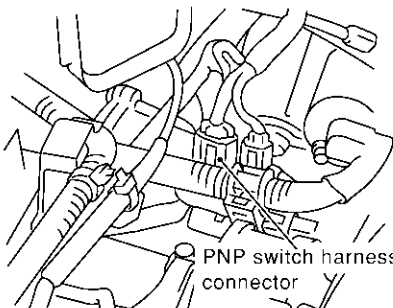

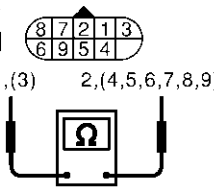
Diagnostic Procedure

NHAT0036

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 6.

2	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (With CONSULT-II)															
<p> With CONSULT-II</p> <ol style="list-style-type: none"> Turn ignition switch to ON position. (Do not start engine.) Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II. Read out P, R, N, D, 2nd and 1st position switches moving selector lever to each position. Check the signal of the selector lever position is indicated properly. 																
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITORING</th> <th></th> </tr> </thead> <tbody> <tr> <td>PN POSI SW</td> <td>OFF</td> </tr> <tr> <td>R POSITION SW</td> <td>OFF</td> </tr> <tr> <td>D POSITION SW</td> <td>OFF</td> </tr> <tr> <td>2 POSITION SW</td> <td>ON</td> </tr> <tr> <td>1 POSITION SW</td> <td>OFF</td> </tr> </tbody> </table>			DATA MONITOR		MONITORING		PN POSI SW	OFF	R POSITION SW	OFF	D POSITION SW	OFF	2 POSITION SW	ON	1 POSITION SW	OFF
DATA MONITOR																
MONITORING																
PN POSI SW	OFF															
R POSITION SW	OFF															
D POSITION SW	OFF															
2 POSITION SW	ON															
1 POSITION SW	OFF															
OK or NG																
OK	▶	GO TO 7.														
NG	▶	GO TO 3.														

SAT701J

3	DETECT MALFUNCTIONING ITEM																						
<p>Check the following item:</p> <ul style="list-style-type: none"> Park/neutral position (PNP) switch <p>Check continuity between PNP switch harness connector F94 terminals 1 (G/OR) and 2 (B) and between terminals 3 (OR) and 4 (PU/W), 5 (P/B), 6 (Y/PU), 7 (BR), 8 (G/W), 9 (GY/R) while moving manual shaft through each position.</p>																							
<div style="display: flex; align-items: center;">  <div style="margin-left: 20px;">   </div> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Lever position</th> <th colspan="2">Terminal No.</th> </tr> </thead> <tbody> <tr> <td>P</td> <td>3 - 7</td> <td>1 - 2</td> </tr> <tr> <td>R</td> <td>3 - 8</td> <td></td> </tr> <tr> <td>N</td> <td>3 - 9</td> <td>1 - 2</td> </tr> <tr> <td>D</td> <td>3 - 6</td> <td></td> </tr> <tr> <td>2</td> <td>3 - 5</td> <td></td> </tr> <tr> <td>1</td> <td>3 - 4</td> <td></td> </tr> </tbody> </table> </div>			Lever position	Terminal No.		P	3 - 7	1 - 2	R	3 - 8		N	3 - 9	1 - 2	D	3 - 6		2	3 - 5		1	3 - 4	
Lever position	Terminal No.																						
P	3 - 7	1 - 2																					
R	3 - 8																						
N	3 - 9	1 - 2																					
D	3 - 6																						
2	3 - 5																						
1	3 - 4																						
OK or NG																							
OK	▶	GO TO 5.																					
NG	▶	GO TO 4.																					

SAT615JA

DTC P0705 PARK/NEUTRAL POSITION SWITCH

Diagnostic Procedure (Cont'd)

4	CHECK MANUAL CONTROL CABLE ADJUSTMENT	
Check PNP switch again with manual control cable disconnected from manual shaft of A/T assembly. Refer to test group 2 (With CONSULT-II) or 6 (Without CONSULT-II).		
OK or NG		
OK	▶	Adjust manual control cable. Refer to AT-285.
NG	▶	Repair or replace PNP switch.

5	DETECT MALFUNCTIONING ITEM	
Check the following items:		
<ul style="list-style-type: none"> ● Harness for short or open between ignition switch and park/neutral position (PNP) switch ● Harness for short or open between park/neutral position (PNP) switch and TCM ● Fuse ● Joint connector-3 M29 ● Ignition switch <p>Refer to EL-11, "POWER SUPPLY ROUTING".</p>		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

6	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (Without CONSULT-II)																																										
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch to ON position. (Do not start engine.) 2. Check voltage between TCM harness connector F50 terminals 26 (PU/R), 27 (P/B), 34 (Y/PU), 35 (G/W), 36 (R/G) and ground while moving selector lever through each position. 																																											
<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="text-align: center;"> </div> <div style="text-align: center;"> <p>CONNECT</p> <p>Voltage: B: Battery voltage 0: 0V</p> </div> <div> <table border="1" style="border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Lever position</th> <th colspan="5">Terminal No.</th> </tr> <tr> <th>36</th> <th>35</th> <th>34</th> <th>27</th> <th>26</th> </tr> </thead> <tbody> <tr> <td>P, N</td> <td>B</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>R</td> <td>0</td> <td>B</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>D</td> <td>0</td> <td>0</td> <td>B</td> <td>0</td> <td>0</td> </tr> <tr> <td>2</td> <td>0</td> <td>0</td> <td>0</td> <td>B</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>B</td> </tr> </tbody> </table> </div> </div>			Lever position	Terminal No.					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
Lever position	Terminal No.																																										
	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																																						
SAT840J																																											
OK or NG																																											
OK	▶	GO TO 7.																																									
NG	▶	GO TO 3.																																									

7	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-110.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 8.

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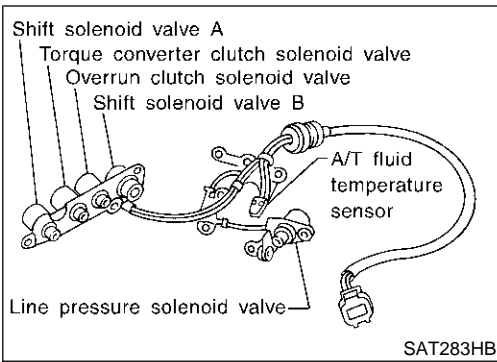
DTC P0705 PARK/NEUTRAL POSITION SWITCH

Diagnostic Procedure (Cont'd)

8	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 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 P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

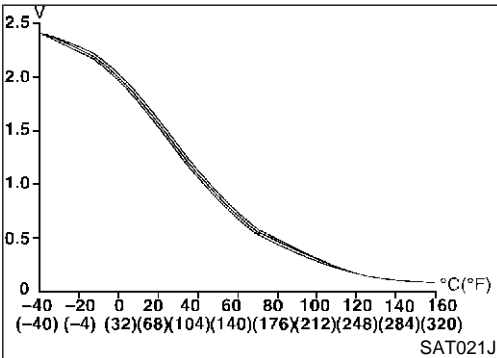
Description



Description

NHAT0037

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



CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

NHAT0037S01

Remarks: Specification data are reference values.

Monitor item	Condition	Specification (Approximately)	
A/T fluid temperature sensor	Cold [20°C (68°F)]	1.5V	2.5 kΩ
	Hot [80°C (176°F)]	0.5V	0.3 kΩ

TCM TERMINALS AND REFERENCE VALUE

NHAT0037S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
42	B	Sensor ground	—	0V
47	G	A/T fluid temperature sensor	When ATF temperature is 20°C (68°F).	1.5V
			When ATF temperature is 80°C (176°F).	0.5V

On Board Diagnosis Logic

NHAT0204

Diagnostic trouble code ATF TEMP SEN/CIRC with CONSULT-II or P0710 without CONSULT-II is detected when TCM receives an excessively low or high voltage from the sensor.

DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

Possible Cause

Possible Cause

NHAT0205

Check the following items.

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

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0206

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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

Ⓔ WITH CONSULT-II

NHAT0206S01

- 1) Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- 2) Start engine and maintain the following conditions for at least 10 minutes (Total). (It is not necessary to maintain continuously.)

CMPS-RPM (REF): 450 rpm or more

VHCL SPEED SE: 10 km/h (6 MPH) or more

THRTL POS SEN: More than 1.2V

Selector lever: D position

Ⓔ WITH GST

NHAT0206S02

Follow the procedure "With CONSULT-II".

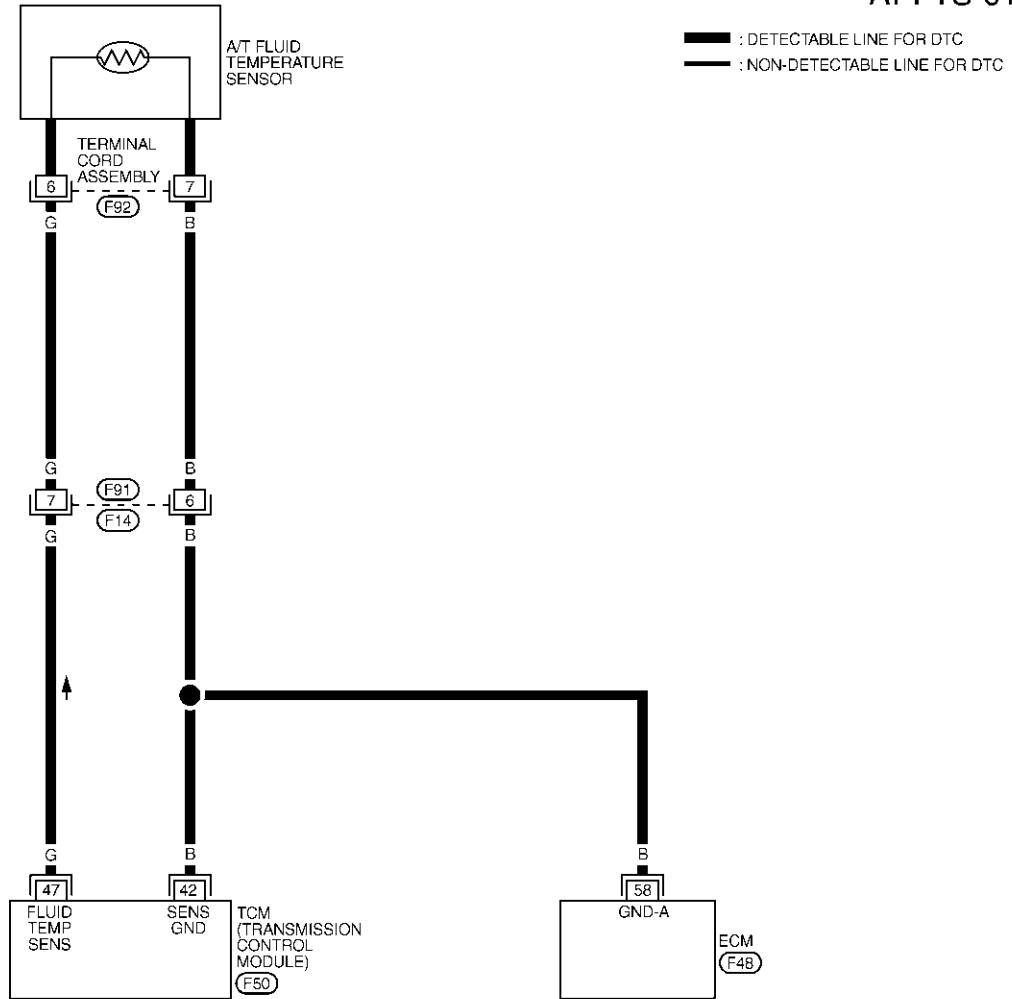
DTC P0710 AT FLUID TEMPERATURE SENSOR CIRCUIT

Wiring Diagram — AT — FTS

Wiring Diagram — AT — FTS

NHAT0038

AT-FTS-01



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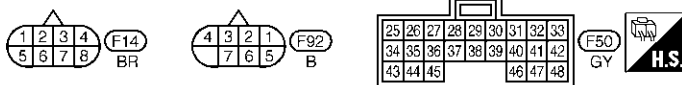
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MAT805A



REFER TO THE FOLLOWING.
 (F48) - ELECTRICAL UNITS

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
42	B	SENSOR GROUND	—	0V
47	G	A/T FLUID TEMPERATURE SENSOR	WHEN IGN ON AND ATF TEMPERATURE IS 20°C (68°F)	1.5V
			WHEN IGN ON AND ATF TEMPERATURE IS 80°C (176°F)	0.5V

SAT591KA


DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

Diagnostic Procedure

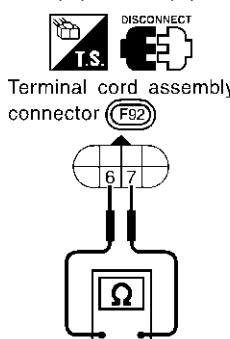
Diagnostic Procedure

=NHAT0039

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 6.

2	CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (With CONSULT-II)															
<p> With CONSULT-II</p> <ol style="list-style-type: none"> Start engine. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II. Read out the value of "FLUID TEMP SE". 																
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITORING</th> <th></th> </tr> </thead> <tbody> <tr> <td>VHCL/S SE-A/T</td> <td>XXX km/h</td> </tr> <tr> <td>VHCL/S SE-MTR</td> <td>XXX km/h</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td>FLUID TEMP SE</td> <td>XXX V</td> </tr> <tr> <td>BATTERY VOLT</td> <td>XXX V</td> </tr> </tbody> </table>			DATA MONITOR		MONITORING		VHCL/S SE-A/T	XXX km/h	VHCL/S SE-MTR	XXX km/h	THRTL POS SEN	XXX V	FLUID TEMP SE	XXX V	BATTERY VOLT	XXX V
DATA MONITOR																
MONITORING																
VHCL/S SE-A/T	XXX km/h															
VHCL/S SE-MTR	XXX km/h															
THRTL POS SEN	XXX V															
FLUID TEMP SE	XXX V															
BATTERY VOLT	XXX V															
<p>Voltage: Cold [20°C (68°F)] → Hot [80°C (176°F)]: Approximately 1.5V → 0.5V</p>																
OK or NG																
OK	▶	GO TO 7.														
NG	▶	GO TO 3.														

SAT614J

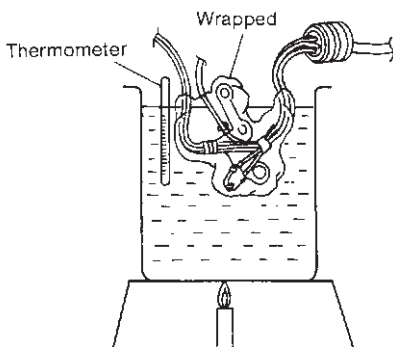
3	CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY	
<ol style="list-style-type: none"> Turn ignition switch to OFF position. Disconnect terminal cord assembly connector in engine compartment. Check resistance between terminals 6 (G) and 7 (B) when A/T is cold. 		
		
<p>Resistance: Cold [20°C (68°F)] Approximately 2.5 kΩ</p>		
<ol style="list-style-type: none"> Reinstall any part removed. 		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 5.

SAT616JA

DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

Diagnostic Procedure (Cont'd)

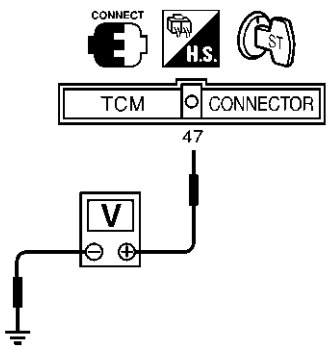
4	DETECT MALFUNCTIONING ITEM	
Check the following items: <ul style="list-style-type: none"> ● Harness for short to ground or short to power or open between TCM, ECM and terminal cord assembly ● Ground circuit for ECM Refer to EC-152, "TROUBLE DIAGNOSIS FOR POWER SUPPLY".		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

5	DETECT MALFUNCTIONING ITEM							
1. Remove oil pan, refer to AT-283. 2. Check the following items: <ul style="list-style-type: none"> ● A/T fluid temperature sensor Check resistance between A/T fluid temperature sensor harness connector F92 terminals 6 (G) and 7 (B) while changing temperature as shown at below.								
								
SAT298F								
<table border="1" style="margin: auto;"> <thead> <tr> <th style="width: 50%;">Temperature °C (°F)</th> <th style="width: 50%;">Resistance</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">20 (68)</td> <td style="text-align: center;">Approximately 2.5 kΩ</td> </tr> <tr> <td style="text-align: center;">80 (176)</td> <td style="text-align: center;">Approximately 0.3 kΩ</td> </tr> </tbody> </table>			Temperature °C (°F)	Resistance	20 (68)	Approximately 2.5 kΩ	80 (176)	Approximately 0.3 kΩ
Temperature °C (°F)	Resistance							
20 (68)	Approximately 2.5 kΩ							
80 (176)	Approximately 0.3 kΩ							
MTBL0210								
<ul style="list-style-type: none"> ● Harness of terminal cord assembly for short or open 								
OK or NG								
OK	▶	GO TO 7.						
NG	▶	Repair or replace damaged parts.						

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DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

Diagnostic Procedure (Cont'd)

6	CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (Without CONSULT-II)	
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine. Check voltage between TCM harness connector F50 terminal 47 (G) and ground while warming up A/T. 		
		
<p>Voltage: Cold [20°C (68°F)] → Hot [80°C (176°F)]: Approximately 1.5V → 0.5V</p>		
OK or NG		
OK	▶	GO TO 7.
NG	▶	GO TO 3.

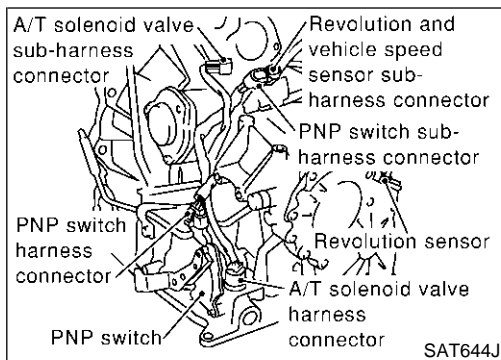
SAT335JA

7	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-116.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 8.

8	CHECK TCM INSPECTION	
<ol style="list-style-type: none"> Perform TCM input/output signal inspection. 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 P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

Description



Description


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.

NHAT0040

TCM TERMINALS AND REFERENCE VALUE

NHAT0040S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
29	W	Revolution sensor	 <p>When moving 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.</p>	450 Hz
			When vehicle parks.	0V
42	B	Sensor ground	—	0V

On Board Diagnosis Logic

Diagnostic trouble code VEH SPD SEN/CIR AT with CONSULT-II or P0720 without CONSULT-II is detected when TCM does not receive the proper voltage signal from the sensor.

NHAT0207

Possible Cause

Check the following items.

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

NHAT0208

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
CAN DIAG SUPPORT MNTR
FUNCTION TEST
DTC WORK SUPPORT

SCIA5358E

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0209

CAUTION:

- Always drive vehicle at a safe speed.
- Be careful not to rev engine into the red zone on the tachometer.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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

Ⓔ WITH CONSULT-II

NHAT0209S01

- 1) Turn ignition switch ON and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 2) Drive vehicle and check for an increase of "VHCL/S SE-MTR" value.
If the check result is NG, go to "DIAGNOSTIC PROCEDURE", AT-209.
If the check result is OK, go to following step.
- 3) Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.

- 4) Start engine and maintain the following conditions for at least 5 consecutive seconds.

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

THRTL POS SEN: More than 1.2V

Selector lever: 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 "DIAGNOSTIC PROCEDURE", AT-124.

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

- 5) Maintain the following conditions for at least 5 consecutive seconds.

CMPS-RPM (REF): 3,500 rpm or more

THRTL POS SEN: More than 1.2V

Selector lever: D position

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

Ⓕ WITH GST

NHAT0209S02

Follow the procedure "With CONSULT-II".

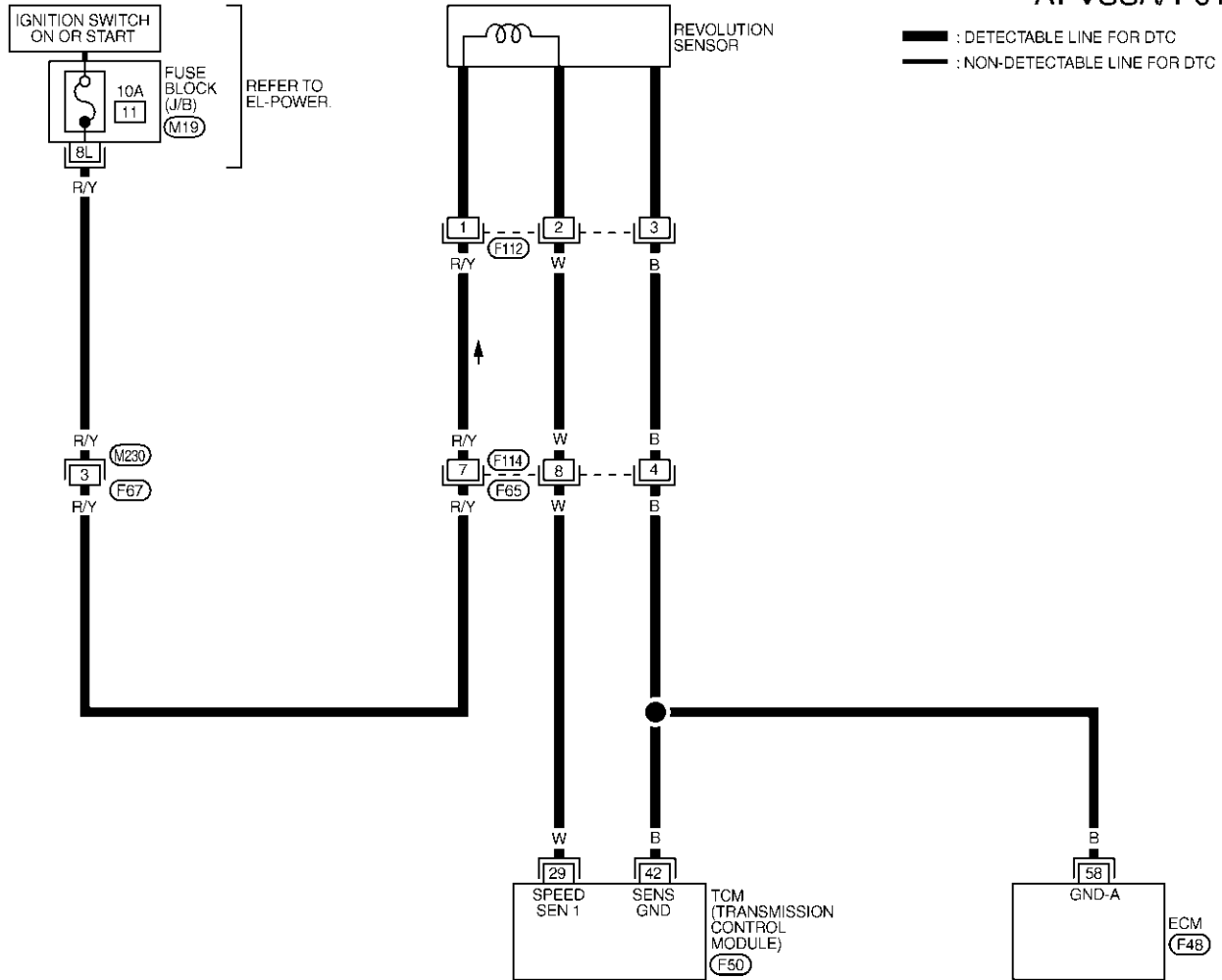
DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

Wiring Diagram — AT — VSSA/T

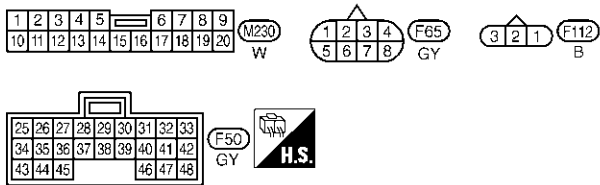
Wiring Diagram — AT — VSSA/T

NHAT0041

AT-VSSA/T-01



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REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK - JUNCTION BOX (J/B)
 (F48) - ELECTRICAL UNITS

MAT090B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)(Approx.)
29	W	REVOLUTION SENSOR	WHEN MOVING 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.	450 Hz
42	B	SENSOR GROUND	WHEN VEHICLE PARKS.	0V
				0V

SAT679K

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

Diagnostic Procedure

Diagnostic Procedure

NHAT0042

1	CHECK INPUT SIGNAL (With CONSULT-II)															
<p>Ⓔ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine. 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II. 3. Read out the value of "VHCL/S SE-A/T" while driving. Check the value changes according to driving speed. 																
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITORING</th> <th></th> </tr> </thead> <tbody> <tr> <td>VHCL/S SE-A/T</td> <td>XXX km/h</td> </tr> <tr> <td>VHCL/S SE-MTR</td> <td>XXX km/h</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td>FLUID TEMP SE</td> <td>XXX V</td> </tr> <tr> <td>BATTERY VOLT</td> <td>XXX V</td> </tr> </tbody> </table>			DATA MONITOR		MONITORING		VHCL/S SE-A/T	XXX km/h	VHCL/S SE-MTR	XXX km/h	THRTL POS SEN	XXX V	FLUID TEMP SE	XXX V	BATTERY VOLT	XXX V
DATA MONITOR																
MONITORING																
VHCL/S SE-A/T	XXX km/h															
VHCL/S SE-MTR	XXX km/h															
THRTL POS SEN	XXX V															
FLUID TEMP SE	XXX V															
BATTERY VOLT	XXX V															
SAT614J																
OK or NG																
OK	▶	GO TO 3.														
NG	▶	GO TO 2.														

2	CHECK REVOLUTION SENSOR (With CONSULT-II)							
<p>Ⓔ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine. 								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Condition</th> <th>Judgement standard (Approx.)</th> </tr> </thead> <tbody> <tr> <td>When moving 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.</td> <td style="text-align: center;">450 Hz</td> </tr> <tr> <td>When vehicle parks.</td> <td style="text-align: center;">0V</td> </tr> </tbody> </table>			Condition	Judgement standard (Approx.)	When moving 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.	450 Hz	When vehicle parks.	0V
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When moving 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.	450 Hz							
When vehicle parks.	0V							
MTBL1182								
<ul style="list-style-type: none"> ● Harness for short or open between TCM, ECM and revolution sensor ● Harness for short or open between ignition switch and revolution sensor 								
OK or NG								
OK	▶	GO TO 3.						
NG	▶	Repair or replace damaged parts.						

3	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-122.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 4.

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

Diagnostic Procedure (Cont'd)

4	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 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.

GI

MA

EM

LC

EC

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SU

BR

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RS

BT

HA

SC

EL

IDX

DTC P0725 ENGINE SPEED SIGNAL

Description


Description

The engine speed signal is sent from the ECM to the TCM. NHAT0043

TCM TERMINALS AND REFERENCE VALUE

NHAT0043S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
39	W/G	Engine speed signal		Refer to EC-136, "ECM INSPECTION TABLE".

On Board Diagnosis Logic

Diagnostic trouble code ENGINE SPEED SIG with CONSULT-II or P0725 without CONSULT-II is detected when TCM does not receive the proper voltage signal from ECM. NHAT0210

Possible Cause

Check harness or connectors. (The sensor circuit is open or shorted.) NHAT0211

DTC P0725 ENGINE SPEED SIGNAL

Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0212

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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

WITH CONSULT-II

NHAT0212S01

- 1) Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- 2) Start engine and maintain the following conditions for at least 10 consecutive seconds.

VHCL SPEED SE: 10 km/h (6 MPH) or more

THRTL POS SEN: More than 1.2V

Selector lever: D position

WITH GST

NHAT0212S02

Follow the procedure "With CONSULT-II".

GI

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LC

EC

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AT

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ST

RS

BT

HA

SC

EL

IDX

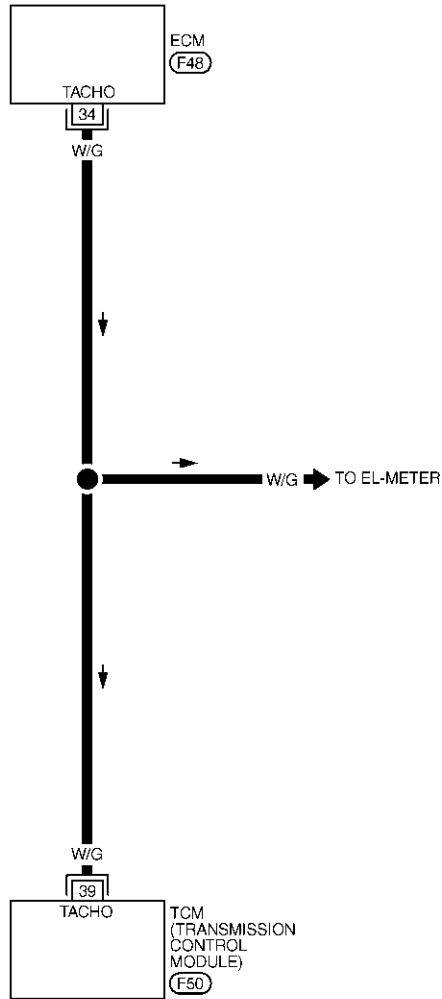
DTC P0725 ENGINE SPEED SIGNAL

Wiring Diagram — AT — ENGSS

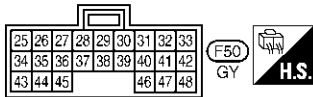
Wiring Diagram — AT — ENGSS

NHAT0044

AT-ENGSS-01



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



REFER TO THE FOLLOWING.
 (F48) - ELECTRICAL UNITS

MAT092B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
39	W/G	ENGINE SPEED SIGNAL.	REFER TO EC section, "ECM INSPECTION TABLE".	

SAT296KB

DTC P0725 ENGINE SPEED SIGNAL

Diagnostic Procedure

Diagnostic Procedure

NHAT0045

1	CHECK DTC WITH ECM	
<ul style="list-style-type: none"> Check P code with CONSULT-II "ENGINE". Turn ignition switch ON and select "SELF-DIAGNOSTIC RESULTS" mode for "ENGINE" with CONSULT-II. Refer to EC-90, "MALFUNCTION Indicator Lamp (MIL)". <p style="text-align: center;">OK or NG</p>		
OK (with CONSULT-II)	▶	GO TO 2.
OK (without CONSULT-II)	▶	GO TO 4.
NG	▶	Check ignition signal circuit for engine control. Refer to EC-677, "IGNITION SIGNAL".

2	CHECK INPUT SIGNAL (With CONSULT-II)															
<p>E With CONSULT-II</p> <ol style="list-style-type: none"> Start engine. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "AT" with CONSULT-II. Read out the value of "ENGINE SPEED". Check engine speed changes according to throttle position. 																
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITORING</th> <th></th> </tr> </thead> <tbody> <tr> <td>ENGINE SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>TURBINE REV</td> <td>XXX rpm</td> </tr> <tr> <td>OVERDRIVE SW</td> <td>ON</td> </tr> <tr> <td>PN POSI SW</td> <td>OFF</td> </tr> <tr> <td>R POSITION SW</td> <td>OFF</td> </tr> </tbody> </table> <p style="text-align: right; margin-right: 50px;">SAT645J</p> <p style="text-align: center;">OK or NG</p>			DATA MONITOR		MONITORING		ENGINE SPEED	XXX rpm	TURBINE REV	XXX rpm	OVERDRIVE SW	ON	PN POSI SW	OFF	R POSITION SW	OFF
DATA MONITOR																
MONITORING																
ENGINE SPEED	XXX rpm															
TURBINE REV	XXX rpm															
OVERDRIVE SW	ON															
PN POSI SW	OFF															
R POSITION SW	OFF															
OK	▶	GO TO 5.														
NG	▶	GO TO 3.														

3	DETECT MALFUNCTIONING ITEM	
<p>Check the following items:</p> <ul style="list-style-type: none"> Harness for short or open between TCM and ECM Resistor and ignition coil <p>Refer to EC-677, "IGNITION SIGNAL".</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	Repair or replace damaged parts.

GI
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LC
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EL
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DTC P0725 ENGINE SPEED SIGNAL

Diagnostic Procedure (Cont'd)

4	CHECK INPUT SIGNAL (Without CONSULT-II)
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine. Check voltage between TCM harness connector F50 terminal 39 (W/G) and ground. 	
<p>Voltage: Refer to EC-136, "ECM INSPECTION TABLE".</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 5.
NG	▶ GO TO 3.

SAT520JD

5	CHECK DTC
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-127.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ GO TO 6.

6	CHECK TCM INSPECTION
<ol style="list-style-type: none"> Perform TCM input/output signal inspection. 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

Description

- This malfunction will not be detected while the A/T CHECK 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.

NHAT0046

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)

TCM TERMINALS AND REFERENCE VALUE

NHAT0046S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
11	R/Y	Shift solenoid valve A	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
12	LG/B	Shift solenoid valve B	When shift solenoid valve B operates. (When driving in D ₁ or D ₂ .)	Battery voltage
			When shift solenoid valve B does not operate. (When driving in D ₃ or D ₄ .)	0V



On Board Diagnosis Logic

NHAT0213

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 is detected.

Diagnostic trouble code A/T 1ST GR FNCTN with CONSULT-II or P0731 without CONSULT-II is detected when A/T cannot be shifted to the 1st gear position even if electrical circuit is good.

DTC P0731 A/T 1ST GEAR FUNCTION

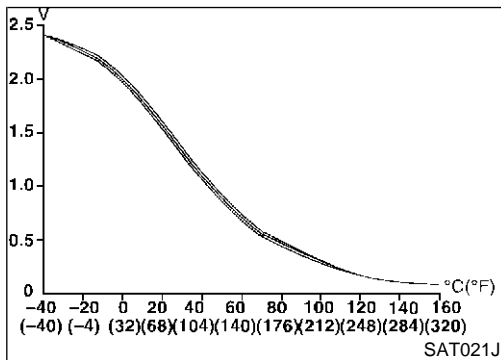
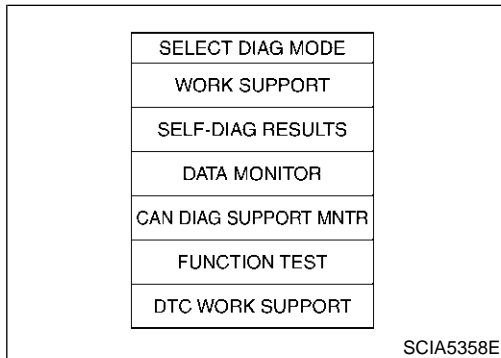
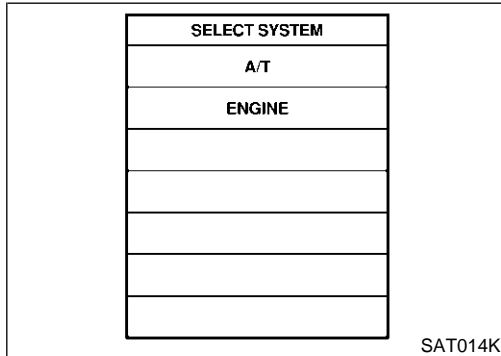
Possible Cause

Possible Cause

NHAT0214

Check the following items.

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



Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0215

CAUTION:

- Always drive vehicle at a safe speed.
- Be careful not to rev engine into the red zone on the tachometer.

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always drive vehicle on a level road to improve the accuracy of test.

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

WITH CONSULT-II

NHAT0215S01

- 1) Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
- 2) Make sure that output voltage of A/T fluid temperature sensor is within the range below.

FLUID TEMP SEN: 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).

- 3) Select “1ST GR FNCTN P0731” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.
- 4) Accelerate vehicle to 20 to 25 km/h (12 to 16 MPH) under the following condition and release the accelerator pedal completely.

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

Selector lever: D position

- Check that “GEAR” shows “2” after releasing pedal.
- 5) Depress accelerator pedal to WOT (more than 7.0/8 of “THROTTLE POSI”) quickly from a speed of 20 to 25 km/h (12 to 16 MPH) until “TESTING” changes to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)

If the check result NG appears on CONSULT-II screen, go to “DIAGNOSTIC PROCEDURE”, AT-135.

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

- Check that “GEAR” shows “1” when depressing accelerator pedal to WOT.
- If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAG RESULTS” for “ENGINE”. In case

DTC P0731 A/T 1ST GEAR FUNCTION

Diagnostic Trouble Code (DTC) Confirmation Procedure (Cont'd)

a 1st trip DTC other than P0731 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".

- 6) Stop vehicle.
- 7) 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 P0731 exists.	2 → 2 → 3 → 3
	4 → 3 → 3 → 4

- 8) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
Refer to AT-135, "DIAGNOSTIC PROCEDURE".
Refer to AT-382, "Shift Schedule".



WITH GST

Follow the procedure "With CONSULT-II".

NHAT0215S02

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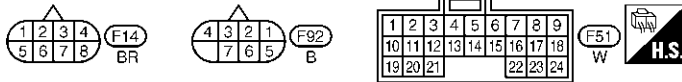
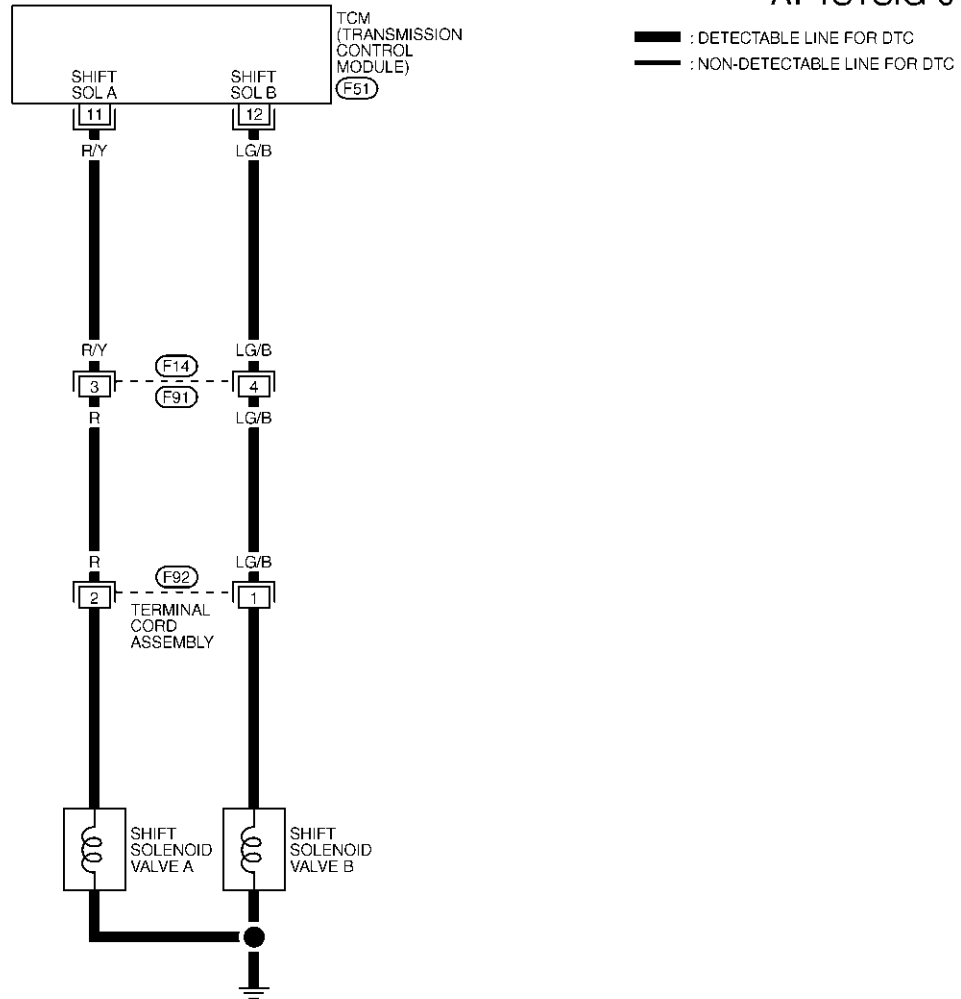
DTC P0731 A/T 1ST GEAR FUNCTION

Wiring Diagram — AT — 1ST

Wiring Diagram — AT — 1ST

NHAT0047

AT-1STSIG-01



MAT808A

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
11	R/Y	SHIFT SOLENOID VALVE A	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A OPERATES (WHEN DRIVING IN D1 OR D4)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A DOES NOT OPERATE (WHEN DRIVING IN D2 OR D3)	0V
12	LG/B	SHIFT SOLENOID VALVE B	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B OPERATES (WHEN DRIVING IN D1 OR D2)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B DOES NOT OPERATE (WHEN DRIVING IN D3 OR D4)	0V

SAT297KA

Diagnostic Procedure

NHAT0048

1

CHECK SHIFT SOLENOID VALVE RESISTANCE

NHAT0048

1. Remove control valve assembly. Refer to AT-283.

- Shift solenoid valve A
- Shift solenoid valve B

2. Check resistance between two terminals.

DISCONNECT

T.S.

Terminal cord assembly connector (F92)

Solenoid valve	Terminal No. (Wire color)	Resistance
Shift solenoid valve A	2 (R)	Ground
Shift solenoid valve B	1 (LG/B)	
		5 - 20 Ω

SAT043KE

OK or NG

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

GI
MA
EM
LC
EC
FE
AT

2

CHECK SHIFT SOLENOID VALVE OPERATION

NHAT0048

1. Remove control valve assembly. Refer to AT-283.

- Shift solenoid valve A
- Shift solenoid valve B

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

DISCONNECT

T.S.

Terminal cord assembly connector (F92)

SAT044K

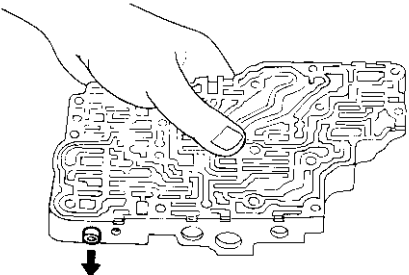
OK or NG

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

AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0731 A/T 1ST GEAR FUNCTION

Diagnostic Procedure (Cont'd)

3	CHECK CONTROL VALVE
<p>1. Disassemble control valve assembly. Refer to "Control Valve Assembly", AT-283.</p> <p>2. Check to ensure that:</p> <ul style="list-style-type: none">● 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. <div data-bbox="609 409 1015 682" style="text-align: center;"></div> <p style="text-align: right;">SAT367H</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 4.
NG	▶ Repair control valve assembly.

4	CHECK DTC
<p>Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-132.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ INSPECTION END
NG	▶ Check transaxle inner parts. (Clutch, brake, etc.)

DTC P0732 A/T 2ND GEAR FUNCTION

Description

Description

- This malfunction will not be detected while the A/T CHECK 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.


NHAT0049

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)

TCM TERMINALS AND REFERENCE VALUE

NHAT0049S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
12	LG/B	Shift solenoid valve B	 When shift solenoid valve B operates. (When driving in D ₁ or D ₂ .)	Battery voltage
			When shift solenoid valve B does not operate. (When driving in D ₃ or D ₄ .)	0V

On Board Diagnosis Logic

NHAT0216

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 is detected.

Diagnostic trouble code A/T 2ND GR FNCTN with CONSULT-II or P0732 without CONSULT-II is detected when A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.

DTC P0732 A/T 2ND GEAR FUNCTION

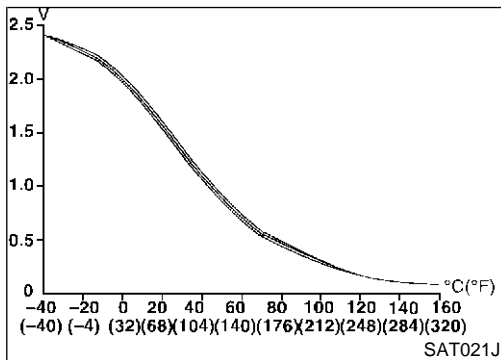
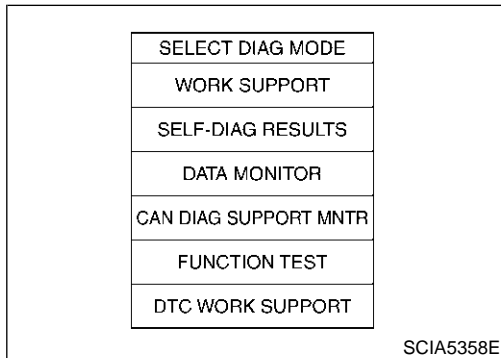
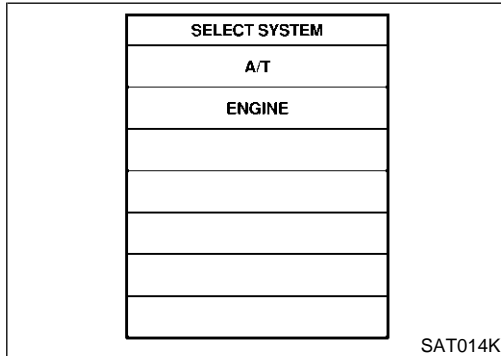
Possible Cause

Possible Cause

NHAT0217

Check the following items.

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



Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0218

CAUTION:

- Always drive vehicle at a safe speed.
- Be careful not to rev engine into the red zone on the tachometer.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always drive vehicle on a level road to improve the accuracy of test.

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

⑤ WITH CONSULT-II

NHAT0218S01

- 1) Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 2) Make sure that output voltage of A/T fluid temperature sensor is within the range below.

FLUID TEMP SEN: 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).

- 3) Select "2ND GR FNCTN P0732" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
- 4) Accelerate vehicle to 45 to 50 km/h (28 to 31 MPH) under the following condition and release the accelerator pedal completely.

THROTTLE POSI: Less than 1.0/8

Selector lever: D position (O/D ON)

- Check that "GEAR" shows "3" or "4" after releasing pedal.
- 5) Depress accelerator pedal to WOT (more than 7.0/8 of "THROTTLE POSI") quickly from a speed of 45 to 50 km/h (28 to 31 MPH) until "TESTING" changes to "STOP VEHICLE" or "COMPLETE". (It will take approximately 3 seconds.)

If the check result NG appears on CONSULT-II screen, go to "DIAGNOSTIC PROCEDURE", AT-141.

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

- Check that "GEAR" shows "2" when depressing accelerator pedal to WOT.
- If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAG RESULTS" for "ENGINE". In case

DTC P0732 A/T 2ND GEAR FUNCTION

Diagnostic Trouble Code (DTC) Confirmation Procedure (Cont'd)

a 1st trip DTC other than P0732 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".

- 6) Stop vehicle.
- 7) 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 P0732 exists.	4 → 3 → 3 → 4

- 8) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
Refer to AT-141, "DIAGNOSTIC PROCEDURE".
Refer to AT-382, "Shift Schedule".

 **WITH GST**

Follow the procedure "With CONSULT-II".

NHAT0218S02

GI

MA

EM

LC

EC

FE

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

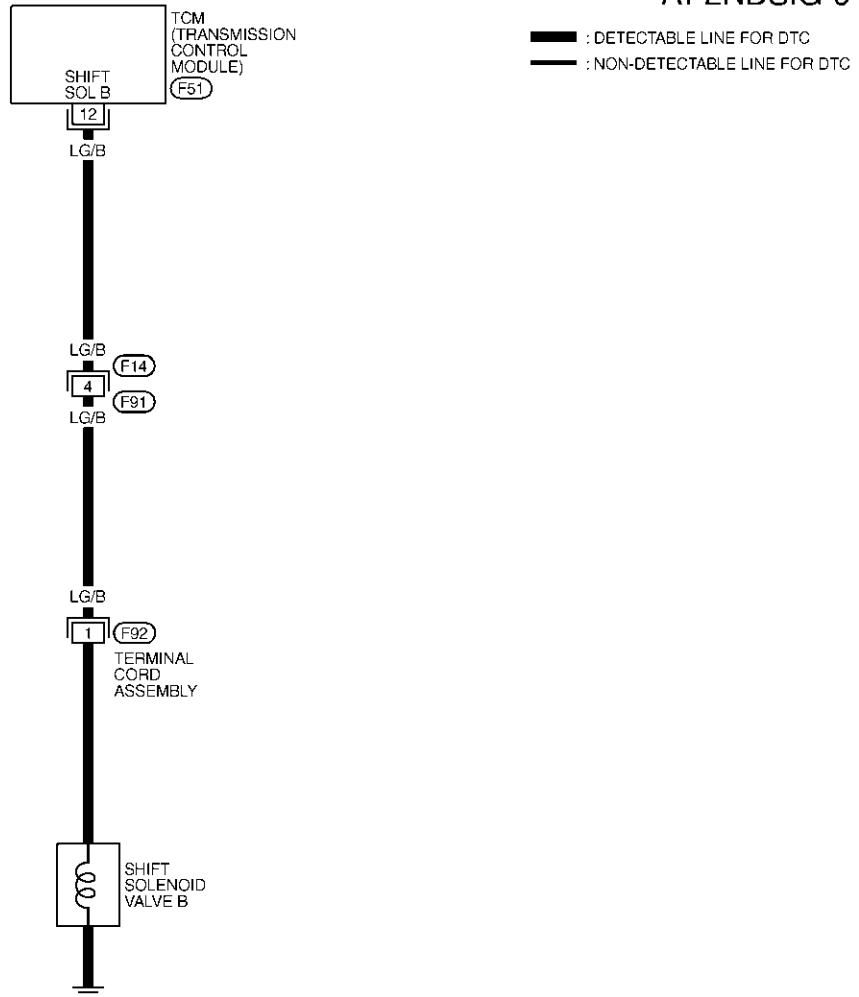
DTC P0732 A/T 2ND GEAR FUNCTION

Wiring Diagram — AT — 2ND

Wiring Diagram — AT — 2ND

NHAT0050

AT-2NDSIG-01



MAT809A

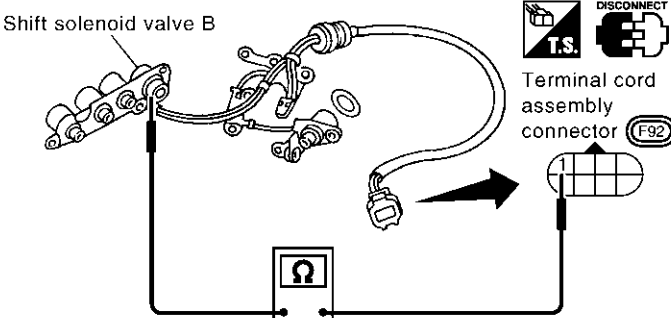
TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
12	LG/B	SHIFT SOLENOID VALVE B	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B OPERATES (WHEN DRIVING IN D1 OR D2)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B DOES NOT OPERATE (WHEN DRIVING IN D3 OR D4)	0V

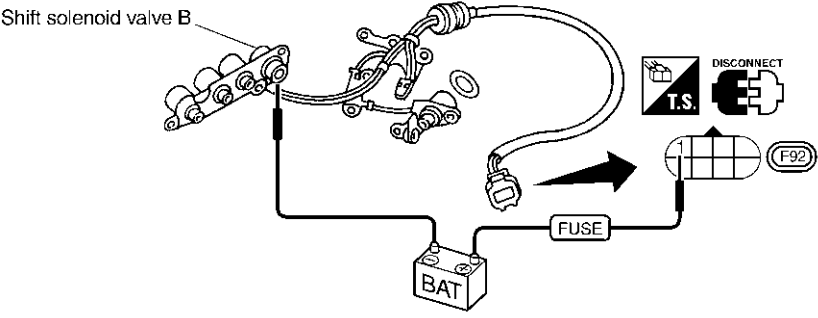
SAT298KA

Diagnostic Procedure

NHAT0051

1	CHECK SHIFT SOLENOID VALVE RESISTANCE	
<p>1. Remove control valve assembly. Refer to AT-283.</p> <ul style="list-style-type: none"> ● Shift solenoid valve B <p>2. Check resistance to the terminal and ground.</p>		
		
SAT045KE		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair or replace shift solenoid valve assembly.

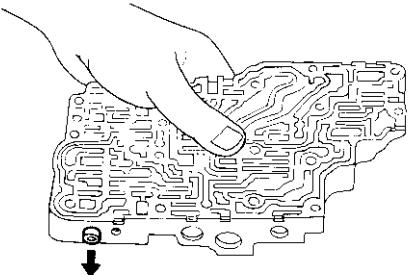
GI
 MA
 EM
 LC
 EC
 FE
AT

2	CHECK SHIFT SOLENOID VALVE OPERATION	
<p>1. Remove control valve assembly. Refer to AT-283.</p> <ul style="list-style-type: none"> ● Shift solenoid valve B <p>2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.</p>		
		
SAT036K		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Repair or replace shift solenoid valve assembly.

AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DTC P0732 A/T 2ND GEAR FUNCTION

Diagnostic Procedure (Cont'd)

3	CHECK CONTROL VALVE
<p>1. Disassemble control valve assembly. Refer to "Control Valve Assembly", AT-315.</p> <p>2. Check to ensure that:</p> <ul style="list-style-type: none">● 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.	
	
SAT367H	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Repair control valve assembly.

4	CHECK DTC
<p>Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-138.</p>	
OK or NG	
OK	▶ INSPECTION END
NG	▶ Check transaxle iner parts. (Clutch, brake, etc.)

DTC P0733 A/T 3RD GEAR FUNCTION

Description

Description

- This malfunction will not be detected while the A/T CHECK 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.


NHAT0052

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)

TCM TERMINALS AND REFERENCE VALUE

NHAT0052S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
11	R/Y	Shift solenoid valve A	 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

On Board Diagnosis Logic

NHAT0219

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 is detected.

Diagnostic trouble code A/T 3RD GR FNCTN with CONSULT-II or P0733 without CONSULT-II is detected when A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.

DTC P0733 A/T 3RD GEAR FUNCTION

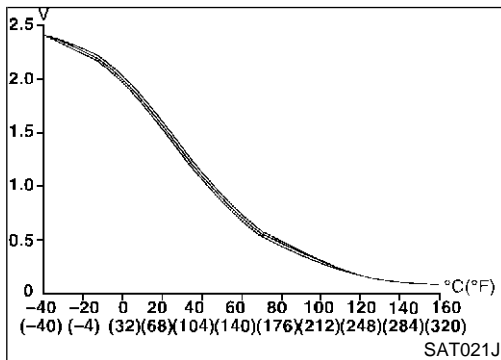
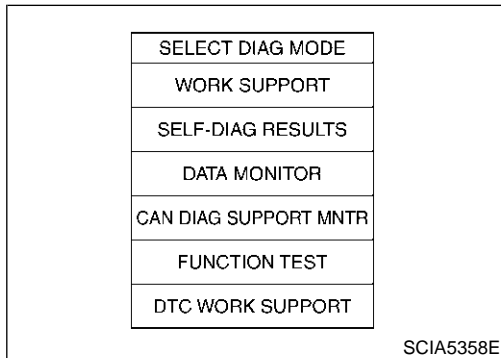
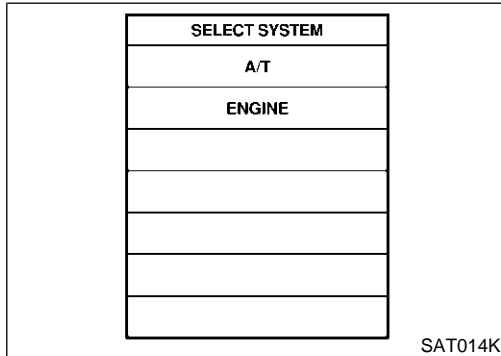
Possible Cause

Possible Cause

NHAT0220

Check the following items.

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



Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0221

CAUTION:

- Always drive vehicle at a safe speed.
- Be careful not to rev engine into the red zone on the tachometer.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always drive vehicle on a level road to improve the accuracy of test.

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

WITH CONSULT-II

NHAT0221S01

- 1) Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 2) Make sure that output voltage of A/T fluid temperature sensor is within the range below.

FLUID TEMP SEN: 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).

- 3) Select "3RD GR FNCTN P0733" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
- 4) Accelerate vehicle to 60 to 75 km/h (37 to 47 MPH) under the following condition and release the accelerator pedal completely.

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

Selector lever: D position

- Check that "GEAR" shows "4" after releasing pedal.
- 5) Depress accelerator pedal steadily with 3.5/8 - 4.5/8 of "THROTTLE POSI" from a speed of 60 to 75 km/h (37 to 47 MPH) until "TESTING" changes to "STOP VEHICLE" or "COMPLETED". (It will take approximately 3 seconds.)

If the check result NG appears on CONSULT-II screen, go to "DIAGNOSTIC PROCEDURE", AT-147.

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

- Check that "GEAR" shows "3" when depressing accelerator pedal with 3.5/8 - 4.5/8 of "THROTTLE POSI".
- If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAG RESULTS" for "ENGINE". In case

DTC P0733 A/T 3RD GEAR FUNCTION

Diagnostic Trouble Code (DTC) Confirmation Procedure (Cont'd)

a 1st trip DTC other than P0733 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".

- 6) Stop vehicle.
- 7) 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 P0733 exists.	1 → 1 → 4 → 4

- 8) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
Refer to AT-147, "DIAGNOSTIC PROCEDURE".
Refer to AT-382, "Shift Schedule".



WITH GST

Follow the procedure "With CONSULT-II".

NHAT0221S02

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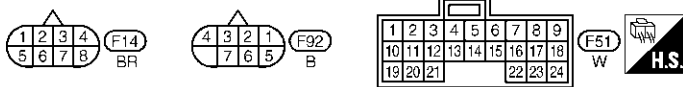
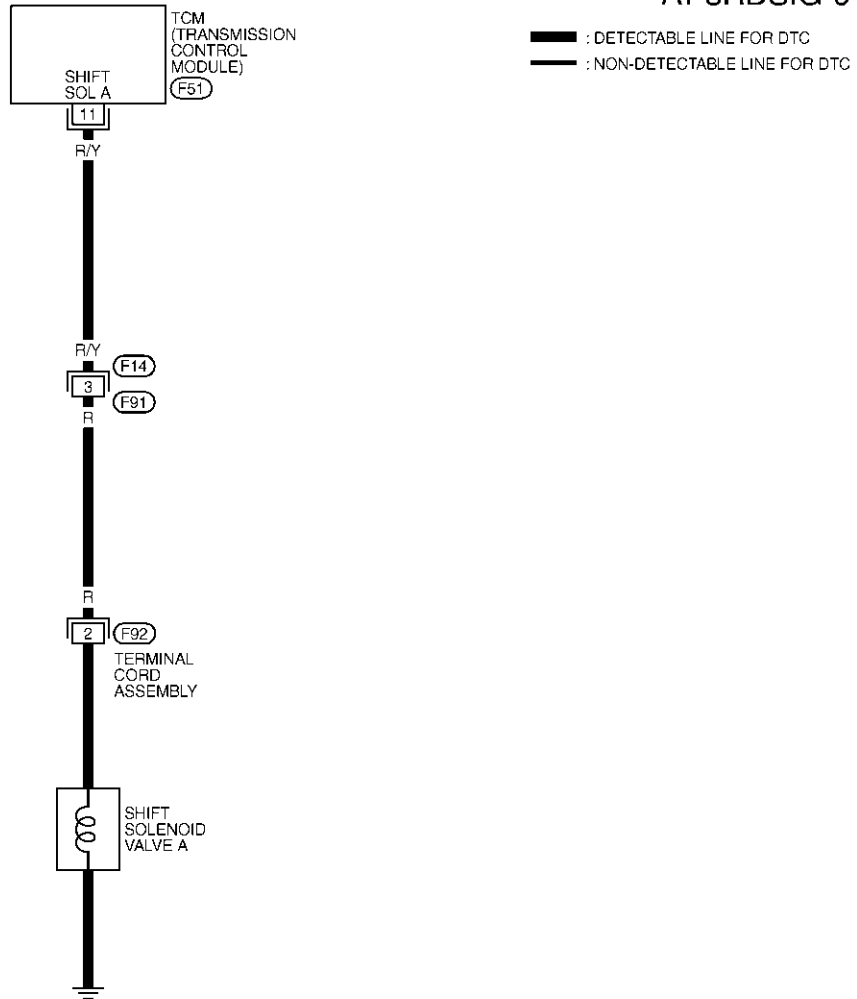
DTC P0733 A/T 3RD GEAR FUNCTION

Wiring Diagram — AT — 3RD

Wiring Diagram — AT — 3RD

NHAT0053

AT-3RDSIG-01



MAT810A

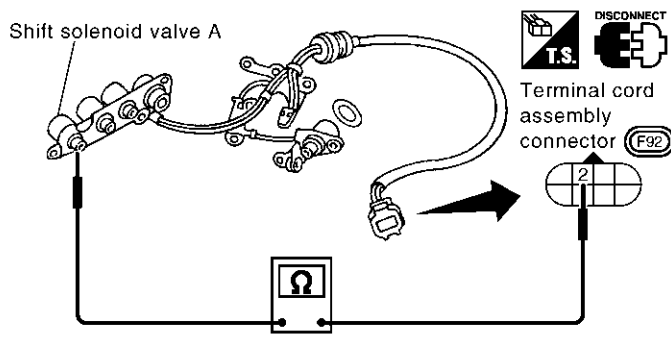
TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
11	R/Y	SHIFT SOLENOID VALVE A	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A OPERATES (WHEN DRIVING IN D1 OR D4)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A DOES NOT OPERATE (WHEN DRIVING IN D2 OR D3)	0V

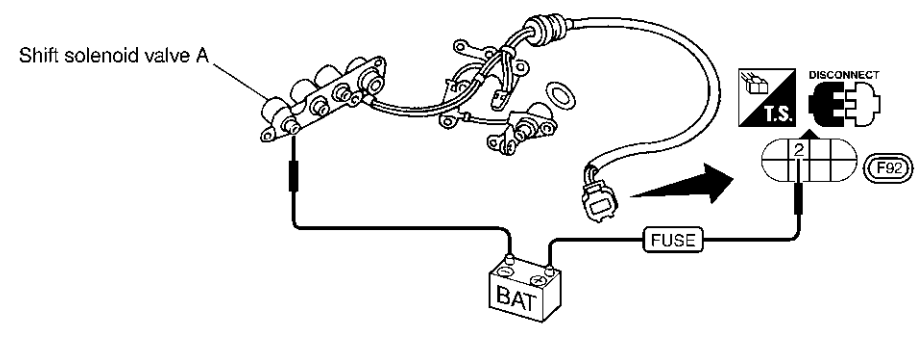
SAT299KA

Diagnostic Procedure

NHAT0054

1	CHECK SHIFT SOLENOID VALVE RESISTANCE									
<p>1. Remove control valve assembly. Refer to AT-283.</p> <ul style="list-style-type: none"> ● Shift solenoid valve A <p>2. Check resistance to the terminal and ground.</p>										
<div style="display: flex; align-items: center;">  <table border="1" style="margin-left: 20px; border-collapse: collapse;"> <thead> <tr> <th>Solenoid valve</th> <th colspan="2">Terminal No. (Wire color)</th> <th>Resistance</th> </tr> </thead> <tbody> <tr> <td>Shift solenoid valve A</td> <td>2 (R)</td> <td>Ground</td> <td>20 - 30 Ω</td> </tr> </tbody> </table> </div>			Solenoid valve	Terminal No. (Wire color)		Resistance	Shift solenoid valve A	2 (R)	Ground	20 - 30 Ω
Solenoid valve	Terminal No. (Wire color)		Resistance							
Shift solenoid valve A	2 (R)	Ground	20 - 30 Ω							
SAT046KE										
OK or NG										
OK	▶	GO TO 2.								
NG	▶	Repair or replace shift solenoid valve assembly.								

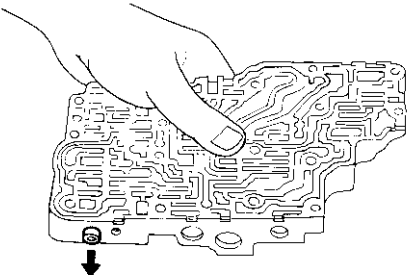
GI
MA
EM
LC
EC
FE
AT

2	CHECK SHIFT SOLENOID VALVE OPERATION	
<p>1. Remove control valve assembly. Refer to AT-283.</p> <ul style="list-style-type: none"> ● Shift solenoid valve A <p>2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.</p>		
<div style="display: flex; align-items: center;">  </div>		
SAT035K		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Repair or replace shift solenoid valve assembly.

AX
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ST
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SC
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IDX

DTC P0733 A/T 3RD GEAR FUNCTION

Diagnostic Procedure (Cont'd)

3	CHECK CONTROL VALVE
<p>1. Disassemble control valve assembly. Refer to "Control Valve Assembly", AT-315.</p> <p>2. Check to ensure that:</p> <ul style="list-style-type: none">● 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.	
	
SAT367H	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Repair control valve assembly.

4	CHECK DTC
<p>Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-144.</p>	
OK or NG	
OK	▶ INSPECTION END
NG	▶ Check transaxle inner parts. (Clutch, brake, etc.)

DTC P0734 A/T 4TH GEAR FUNCTION

Description

Description

- This malfunction will not be detected while the A/T CHECK indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into fourth gear position or line pressure is low 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.

NHAT0055

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

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

NHAT0055S01





Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Torque converter clutch solenoid valve duty	Lock-up OFF	Approximately 4%
	↓ Lock-up ON	↓ Approximately 94%
Line pressure solenoid valve duty	Small throttle opening (Low line pressure)	Approximately 24%
	↓ Large throttle opening (High line pressure)	↓ Approximately 95%

TCM TERMINALS AND REFERENCE VALUE

NHAT0055S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
1	G/R	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	W/B	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
11	R/Y	Shift solenoid valve A	 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
12	LG/B	Shift solenoid valve B	 When shift solenoid valve B operates. (When driving in D ₁ or D ₂ .)	Battery voltage
			When shift solenoid valve B does not operate. (When driving in D ₃ or D ₄ .)	0V

DTC P0734 A/T 4TH GEAR FUNCTION

On Board Diagnosis Logic

NHAT0222

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:

Torque converter slip ratio = $A \times C/B$

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes

If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction.

This malfunction will be caused when shift solenoid valve 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 is detected.

And also, this malfunction will be caused when line pressure is lower than normal such as when line pressure solenoid valve is stuck open.

Diagnostic trouble code A/T 4TH GR FNCTN with CONSULT-II or P0734 without CONSULT-II is detected when A/T cannot be shifted to the 4th gear position even if electrical circuit is good.

Possible Cause

NHAT0223

Check the following items.

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

DTC P0734 A/T 4TH GEAR FUNCTION

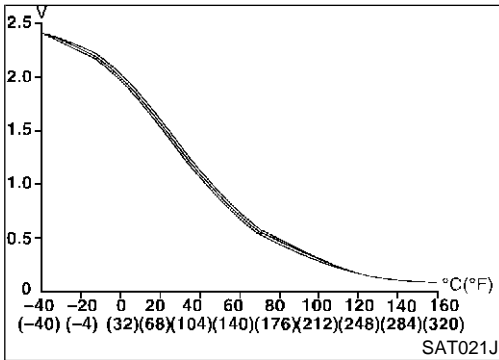
Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
CAN DIAG SUPPORT MNTR
FUNCTION TEST
DTC WORK SUPPORT

SCIA5358E



Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0224

CAUTION:

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

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always drive vehicle on a level road to improve the accuracy of test.

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

WITH CONSULT-II

NHAT0224S01

- 1) Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
- 2) Make sure that output voltage of A/T fluid temperature sensor is within the range below.
FLUID TEMP SEN: 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).
- 3) Select “4TH GR FNCTN P0734” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.
- 4) Accelerate vehicle to 55 to 65 km/h (34 to 40 MPH) under the following condition and release the accelerator pedal completely.
THROTTLE POSI: Less than 5.5/8 (at all times during step 4)
Selector lever: D position
 - Check that “GEAR” shows “3” after releasing pedal.
- 5) Depress accelerator pedal steadily with 1.0/8 - 2.0/8 of “THROTTLE POSI” from a speed of 55 to 65 km/h (34 to 40 MPH) until “TESTING” has turned to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)
If the check result NG appears on CONSULT-II screen, go to “DIAGNOSTIC PROCEDURE”, AT-154.
If “STOP VEHICLE” appears on CONSULT-II screen, go to following step.
 - Check that “GEAR” shows “4” when depressing accelerator pedal with 1.0/8 - 2.0/8 of “THROTTLE POSI”.
 - If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAG RESULTS” for “ENGINE”. In case a 1st trip DTC other than P0734 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.
- 6) Stop vehicle.
- 7) Follow the instruction displayed. (Check for normal shifting referring to the table below.)

GI
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DTC P0734 A/T 4TH GEAR FUNCTION

Diagnostic Trouble Code (DTC) Confirmation Procedure (Cont'd)

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 P0734 exists.	2 → 2 → 3 → 3
	1 → 2 → 2 → 1

- 8) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
Refer to AT-154, "DIAGNOSTIC PROCEDURE".
Refer to AT-382, "Shift Schedule".



WITH GST

Follow the procedure "With CONSULT-II".

NHAT0224S02

DTC P0734 A/T 4TH GEAR FUNCTION

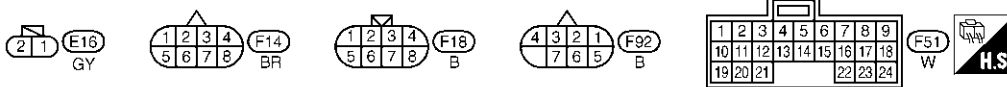
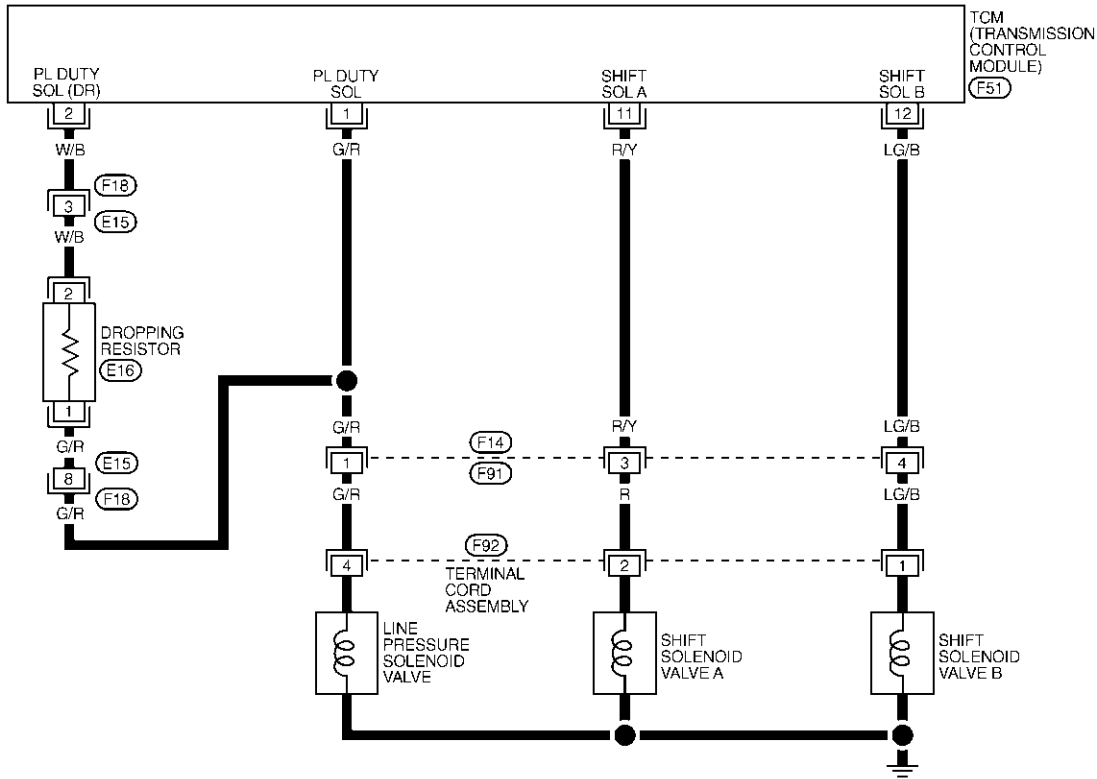
Wiring Diagram — AT — 4TH

Wiring Diagram — AT — 4TH

NHAT0056

AT-4THSIG-01

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



MAT093B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
1	G/R	LINE PRESSURE SOLENOID VALVE	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	1.5 - 3.0V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V
2	W/B	LINE PRESSURE SOLENOID VALVE (DROPPING RESISTOR)	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	4 - 14V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V
11	R/Y	SHIFT SOLENOID VALVE A	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A OPERATES (WHEN DRIVING IN D1 OR D4)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A DOES NOT OPERATE (WHEN DRIVING IN D2 OR D3)	0V
12	LG/B	SHIFT SOLENOID VALVE B	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B OPERATES (WHEN DRIVING IN D1 OR D2)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B DOES NOT OPERATE (WHEN DRIVING IN D3 OR D4)	0V

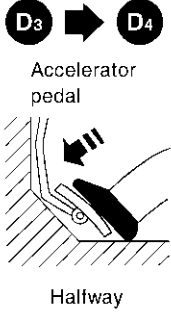
SAT300KA

DTC P0734 A/T 4TH GEAR FUNCTION

Diagnostic Procedure

Diagnostic Procedure

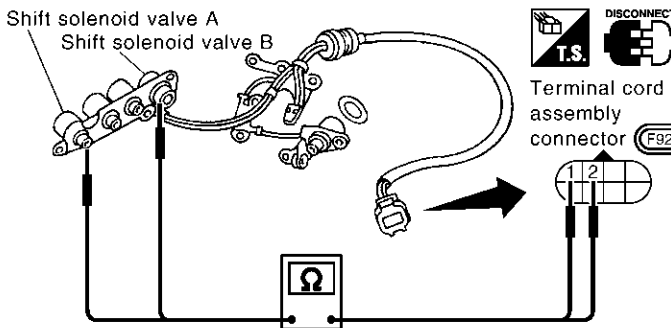

NHAT0057

1	CHECK SHIFT UP (D₃ TO D₄)	
During "Cruise test – Part 1" (AT-78), does A/T shift from D ₃ to D ₄ at the specified speed?		
		
Yes or No		
Yes	▶	GO TO 11.
No	▶	GO TO 2.

SAT988H

2	CHECK LINE PRESSURE												
Perform line pressure test. Refer to AT-69.													
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Engine speed rpm</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>D, 2 and 1 positions</th> <th>R position</th> </tr> </thead> <tbody> <tr> <td>Idle</td> <td>500 (5.1, 73)</td> <td>778 (7.9, 113)</td> </tr> <tr> <td>Stall</td> <td>1,233 (12.6, 179)</td> <td>1,918 (19.6, 278)</td> </tr> </tbody> </table>			Engine speed rpm	Line pressure kPa (kg/cm ² , psi)		D, 2 and 1 positions	R position	Idle	500 (5.1, 73)	778 (7.9, 113)	Stall	1,233 (12.6, 179)	1,918 (19.6, 278)
Engine speed rpm	Line pressure kPa (kg/cm ² , psi)												
	D, 2 and 1 positions	R position											
Idle	500 (5.1, 73)	778 (7.9, 113)											
Stall	1,233 (12.6, 179)	1,918 (19.6, 278)											
OK or NG													
OK	▶	GO TO 3.											
NG	▶	GO TO 7.											

MTBL1183

3	CHECK SHIFT SOLENOID VALVE RESISTANCE													
1. Remove control valve assembly. Refer to AT-283. ● Shift solenoid valve A ● Shift solenoid valve B 2. Check resistance between two terminals.														
<div style="display: flex; align-items: center;"> <div style="flex: 1;">  </div> <div style="flex: 1; text-align: center;"> <p>Terminal cord assembly connector (F92)</p>  </div> <div style="flex: 2;"> <table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th>Solenoid valve</th> <th>Terminal No. (Wire color)</th> <th>Resistance</th> </tr> </thead> <tbody> <tr> <td>Shift solenoid valve A</td> <td>2 (R)</td> <td rowspan="2" style="text-align: center;">Ground</td> </tr> <tr> <td>Shift solenoid valve B</td> <td>1 (LG/B)</td> <td>20 - 30 Ω</td> </tr> <tr> <td></td> <td></td> <td>5 - 20 Ω</td> </tr> </tbody> </table> </div> </div>			Solenoid valve	Terminal No. (Wire color)	Resistance	Shift solenoid valve A	2 (R)	Ground	Shift solenoid valve B	1 (LG/B)	20 - 30 Ω			5 - 20 Ω
Solenoid valve	Terminal No. (Wire color)	Resistance												
Shift solenoid valve A	2 (R)	Ground												
Shift solenoid valve B	1 (LG/B)		20 - 30 Ω											
		5 - 20 Ω												
OK or NG														
OK	▶	GO TO 5.												
NG	▶	Replace shift solenoid valve assembly.												

SAT043KE

DTC P0734 A/T 4TH GEAR FUNCTION

Diagnostic Procedure (Cont'd)

4	CHECK SHIFT SOLENOID VALVE OPERATION
<p>1. Remove control valve assembly. Refer to AT-283.</p> <ul style="list-style-type: none"> ● Shift solenoid valve A ● Shift solenoid valve B <p>2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.</p>	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Replace shift solenoid valve assembly.

GI
 MA
 EM
 LC
 EC
 FE
AT

5	CHECK CONTROL VALVE
<p>1. Disassemble control valve assembly. Refer to AT-315.</p> <p>2. Check to ensure that:</p> <ul style="list-style-type: none"> ● 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.

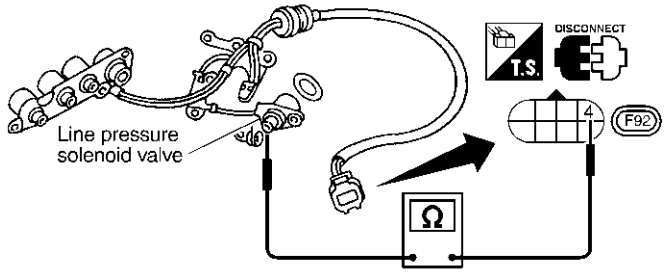
AX
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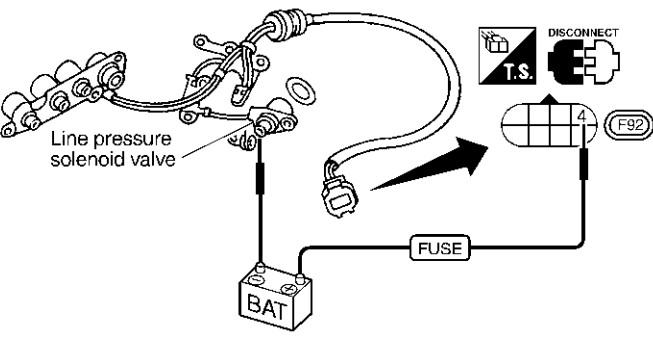
6	CHECK SHIFT UP (D₃ TO D₄)
Does A/T shift from D ₃ to D ₄ at the specified speed?	
OK or NG	
OK	▶ GO TO 11.
NG	▶ Check transaxle inner parts. (Clutch, brake, etc.)

EL
 IDX

DTC P0734 A/T 4TH GEAR FUNCTION

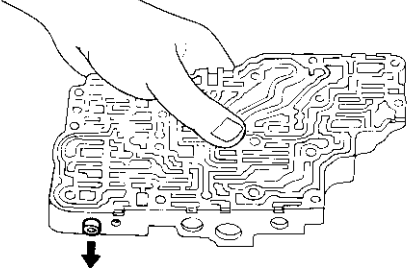
Diagnostic Procedure (Cont'd)

7	CHECK SOLENOID VALVE RESISTANCE		
<p>1. Remove control valve assembly. Refer to AT-283.</p> <ul style="list-style-type: none"> ● Line pressure solenoid valves <p>2. Check resistance to the terminal and ground.</p>			
			
SAT625JB			
OK or NG			
OK	▶	GO TO 9.	
NG	▶	Replace solenoid valve assembly.	

8	CHECK SOLENOID VALVE OPERATION		
<p>1. Remove control valve assembly. Refer to AT-283.</p> <ul style="list-style-type: none"> ● Line pressure solenoid valves <p>2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.</p>			
			
SAT626J			
OK or NG			
OK	▶	GO TO 9.	
NG	▶	Replace solenoid valve assembly.	

DTC P0734 A/T 4TH GEAR FUNCTION

Diagnostic Procedure (Cont'd)

9	CHECK CONTROL VALVE	
<p>1. Disassemble control valve assembly. Refer to AT-315.</p> <p>2. Check line pressure circuit valves for sticking.</p> <ul style="list-style-type: none"> ● Pressure regulator valve ● Pilot valve ● Pressure modifier valve 		
		
SAT367H		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Repair control valve.

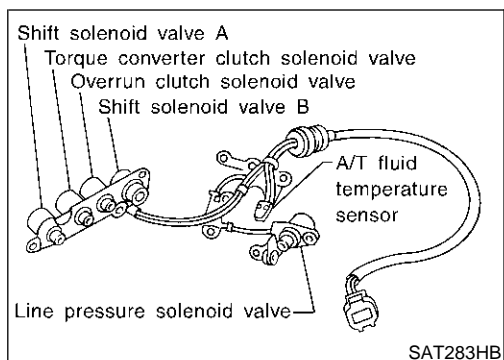
10	CHECK SHIFT UP (D₃ TO D₄)	
Does A/T shift from D ₃ to D ₄ at the specified speed?		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Check transaxle inner parts. (Clutch, brake, etc.)

11	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-151.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	Perform "Cruise test — Part 1" again and return to the start point of this test group.

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DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

Description



Description

NHAT0058

The torque converter clutch solenoid valve is activated, with the gear in D₄, by the TCM in response to signals sent from the vehicle speed and throttle position sensors. 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 2.0/8) in lock-up condition, the engine speed should not change abruptly. If there is a big jump in engine speed, there is no lock-up.

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

NHAT0058S01


Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Torque converter clutch solenoid valve duty	Lock-up OFF	Approximately 4%
	↓ Lock-up ON	↓ Approximately 94%

TCM TERMINALS AND REFERENCE VALUE

NHAT0058S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
3	G/B	Torque converter clutch solenoid valve	 When A/T performs lock-up.	8 - 15V
			When A/T does not perform lock-up.	0V

On Board Diagnosis Logic

NHAT0225

Diagnostic trouble code TCC SOLENOID/CIRC with CONSULT-II or P0740 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

NHAT0226

Check the following items.

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

DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0227

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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

WITH CONSULT-II

NHAT0227S01

- 1) Turn ignition switch ON. (Do not start engine.)
- 2) Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II and wait at least 1 second.
- 3) Start engine and maintain the following conditions for at least 5 consecutive seconds.

VHCL SPEED SE: 80 km/h (50 MPH) or more

THROTTLE POSI: 0.5/8 - 1.0/8

Selector lever: D position (O/D ON)

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

WITH GST

NHAT0227S02

Follow the procedure "With CONSULT-II".

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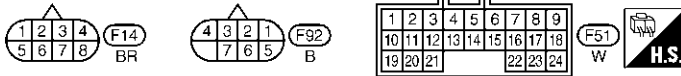
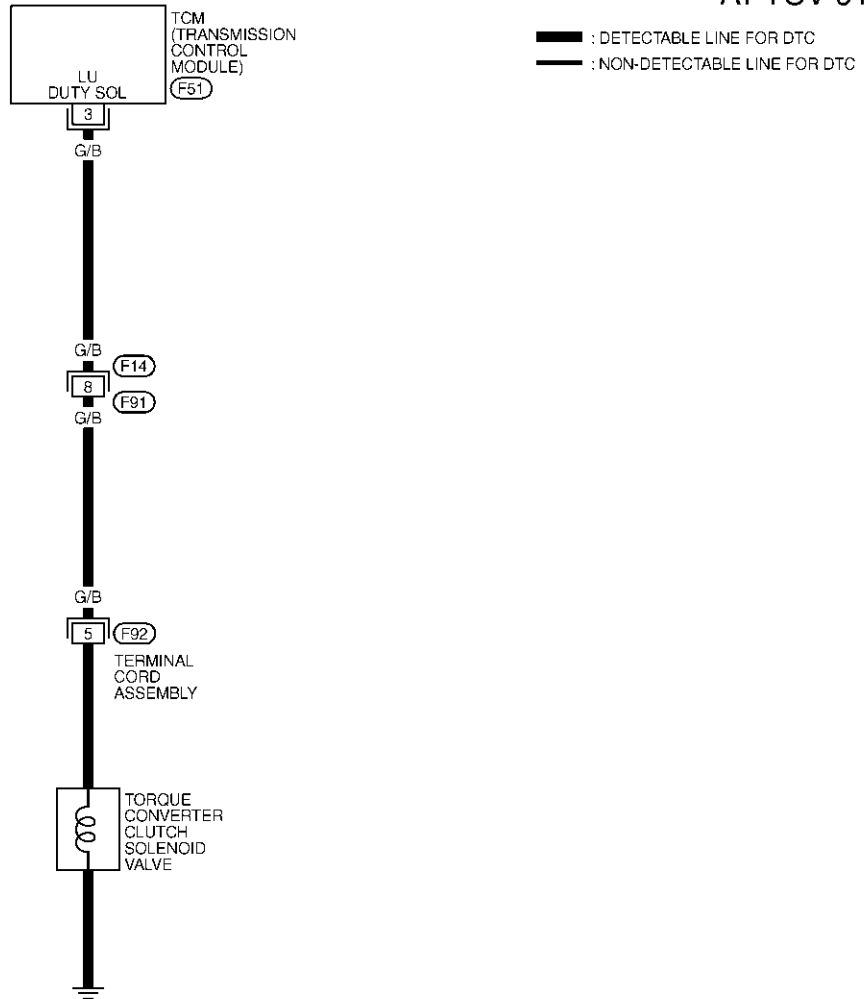
DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

Wiring Diagram — AT — TCV

Wiring Diagram — AT — TCV

NHAT0059

AT-TCV-01



MAT812A

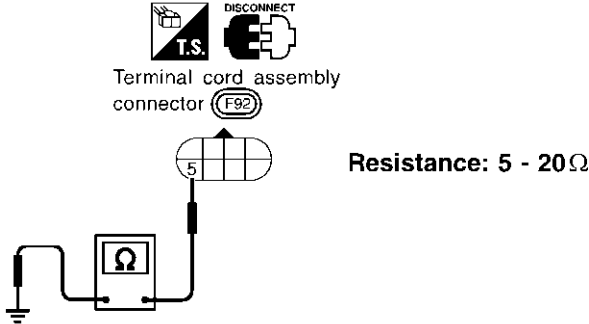
TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
3	G/B	TORQUE CONVERTER CLUTCH SOLENOID VALVE	VEHICLE STARTS AND A/T PERFORMS LOCK-UP	8 - 15V
			VEHICLE STARTS AND A/T DOES NOT PERFORM LOCK-UP	0V

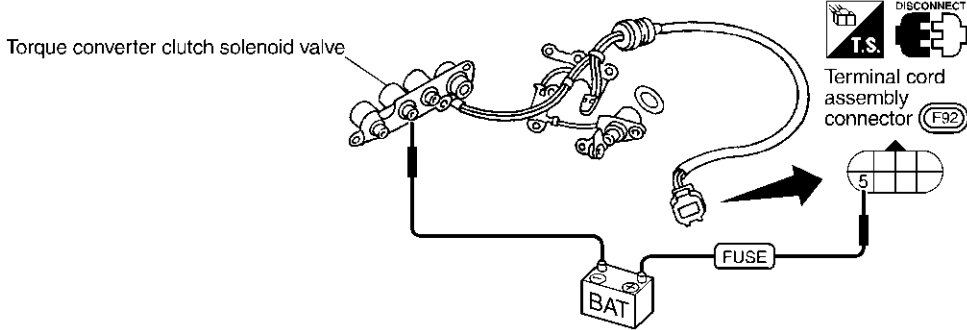
SAT305KA

Diagnostic Procedure

NHAT0060

1	CHECK SOLENOID VALVE RESISTANCE	
<ol style="list-style-type: none"> Turn ignition switch to OFF position. Disconnect terminal cord assembly connector in engine compartment. Check resistance between terminal 5 (G/B) and ground. 		
 <p>Resistance: 5 - 20Ω</p>		
SAT627JE		
OK or NG		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

GI
MA
EM
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EC
FE
AT

2	CHECK SOLENOID VALVE OPERATION	
<ol style="list-style-type: none"> Remove oil pan. Refer to AT-283. Check the following items: <ul style="list-style-type: none"> Torque converter clutch solenoid valve <ol style="list-style-type: none"> Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground. 		
 <p>OK or NG</p>		
SAT037KA		
<ul style="list-style-type: none"> Harness of terminal cord assembly for short or open 		
OK	▶	GO TO 3.
NG	▶	Repair or replace damaged parts.

AX
SU
BR
ST
RS
BT
HA
SC

3	CHECK POWER SOURCE CIRCUIT	
<ol style="list-style-type: none"> Turn ignition switch to OFF position. Disconnect TCM harness connector. Check continuity between terminal cord assembly connector terminal 5 (G/B) and TCM harness connector F51 terminal 3 (G/B). Refer to wiring diagram — AT — TCV. Continuity should exist. If OK, check harness for short to ground and short to power. 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.

EL
IDX

DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

Diagnostic Procedure (Cont'd)

4	CHECK DTC
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-159.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ GO TO 5.

5	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 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 P0744 A/T TCC S/V FUNCTION (LOCK-UP)

Description

Description

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis. NHAT0061
- This malfunction will not be detected while the A/T CHECK indicator lamp is indicating another self-diagnosis malfunction. GI
- 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. MA
EM
LC

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

NHAT0061S01

Remarks: Specification data are reference values.




Monitor item	Condition	Specification
Torque converter clutch solenoid valve duty	Lock-up OFF	Approximately 4%
	↓ Lock-up ON	↓ Approximately 94%

AT

TCM TERMINALS AND REFERENCE VALUE

NHAT0061S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
1	G/R	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	W/B	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
3	G/B	Torque converter clutch solenoid valve	 When A/T performs lock-up.	8 - 15V
			When A/T does not perform lock-up.	0V

AX

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On Board Diagnosis Logic

NHAT0228

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. IDX

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

On Board Diagnosis Logic (Cont'd)

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 is detected.

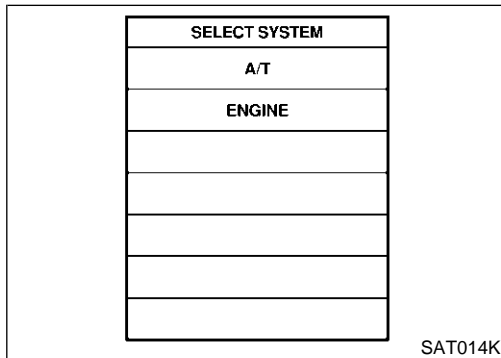
Diagnostic trouble code A/T TCC S/V FNCTN with CONSULT-II or P0744 without CONSULT-II is detected when A/T cannot perform lock-up even if electrical circuit is good.

Possible Cause

Check the following items.

NHAT0229

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



Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0230

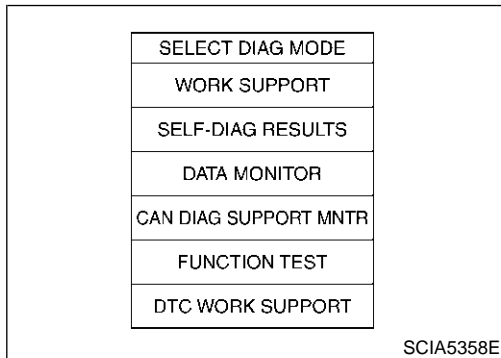
CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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



WITH CONSULT-II

NHAT0230S01

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

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

FLUID TEMP SEN: 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).

3) Select "TCC S/V FNCTN P0744" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".

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

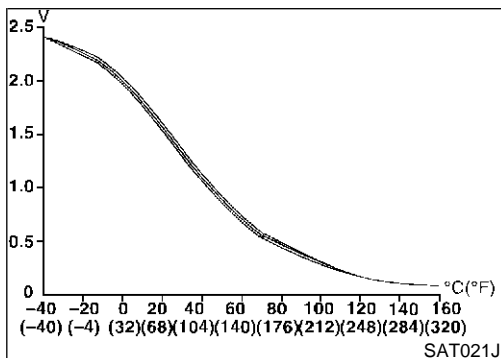
THROTTLE POSI: 1.0/8 - 2.0/8 (at all times during step 4)

Selector lever: D position

TCC S/V DUTY: More than 94%

VHCL/S SE-A/T: Constant speed of more than 80 km/h (50 MPH)

- Check that "GEAR" shows "4".
- For shift schedule, refer to SDS, AT-382.
- If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAG RESULTS". In case a 1st trip DTC



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

Diagnostic Trouble Code (DTC) Confirmation Procedure (Cont'd)

other than P0744 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.

- 5) Make sure that “OK” is displayed. (If “NG” is displayed, refer to “DIAGNOSTIC PROCEDURE”.)
Refer to AT-167, “DIAGNOSTIC PROCEDURE”.
Refer to AT-382, “Shift Schedule”.



WITH GST

Follow the procedure “With CONSULT-II”.

NHAT0230S02

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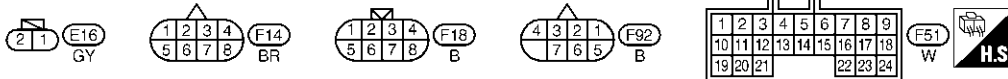
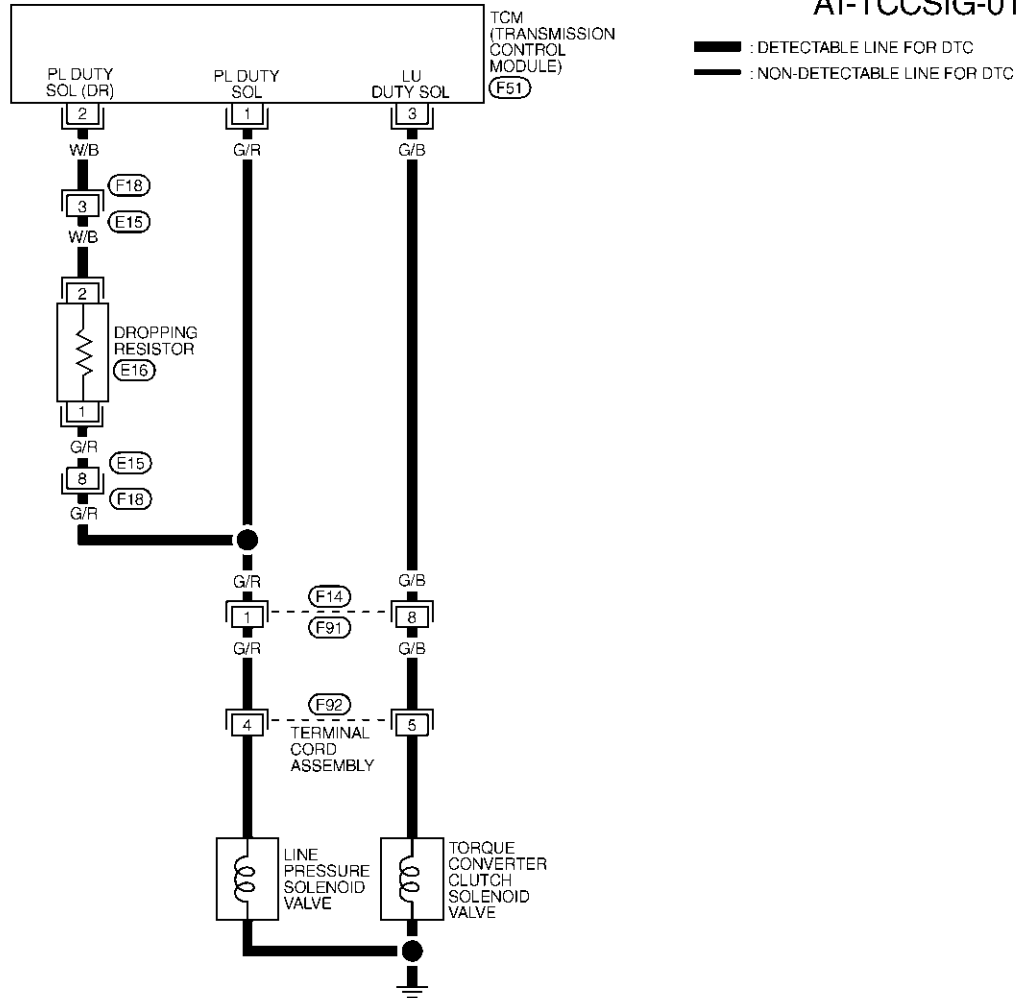
DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

Wiring Diagram — AT — TCCSIG

Wiring Diagram — AT — TCCSIG

=NHAT0062

AT-TCCSIG-01



MAT094B

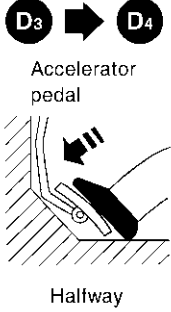
TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
1	G/R	LINE PRESSURE SOLENOID VALVE	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	1.5 - 3.0V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V
2	W/B	LINE PRESSURE SOLENOID VALVE (DROPPING RESISTOR)	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	4 - 14V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V
3	G/B	TORQUE CONVERTER CLUTCH SOLENOID VALVE	WHEN VEHICLE STARTS AND A/T PERFORMS LOCK-UP	8 - 15V
			WHEN VEHICLE STARTS AND A/T DOES NOT PERFORM LOCK-UP	0V

SAT306KA

Diagnostic Procedure

NHAT0063

1	CHECK SHIFT UP (D₃ TO D₄)	
During "Cruise test — Part 1" (AT-78), does A/T shift from D ₃ to D ₄ at the specified speed?		
		
SAT988H		
Yes or No		
Yes	▶	GO TO 11.
No	▶	GO TO 2.

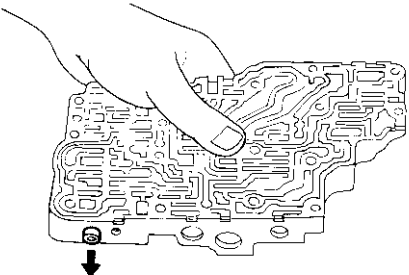
GI
 MA
 EM
 LC
 EC
 FE

2	CHECK LINE PRESSURE												
Perform line pressure test. Refer to AT-69.													
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Engine speed rpm</th> <th colspan="2">Line pressure kPa (kg/cm², psi)</th> </tr> <tr> <th>D, 2 and 1 positions</th> <th>R position</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Idle</td> <td style="text-align: center;">500 (5.1, 73)</td> <td style="text-align: center;">778 (7.9, 113)</td> </tr> <tr> <td style="text-align: center;">Stall</td> <td style="text-align: center;">1,233 (12.6, 179)</td> <td style="text-align: center;">1,918 (19.6, 278)</td> </tr> </tbody> </table>			Engine speed rpm	Line pressure kPa (kg/cm ² , psi)		D, 2 and 1 positions	R position	Idle	500 (5.1, 73)	778 (7.9, 113)	Stall	1,233 (12.6, 179)	1,918 (19.6, 278)
Engine speed rpm	Line pressure kPa (kg/cm ² , psi)												
	D, 2 and 1 positions	R position											
Idle	500 (5.1, 73)	778 (7.9, 113)											
Stall	1,233 (12.6, 179)	1,918 (19.6, 278)											
MTBL1183													
OK or NG													
OK	▶	GO TO 3.											
NG	▶	GO TO 6.											

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

Diagnostic Procedure (Cont'd)

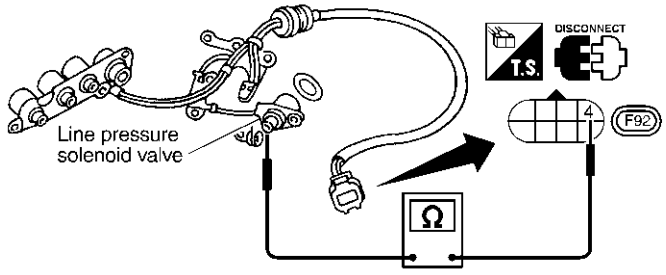
3	CHECK CONTROL VALVE		
<p>1. Disassemble control valve assembly. Refer to AT-315.</p> <p>2. Check to ensure that:</p> <ul style="list-style-type: none"> ● Valve, sleeve and plug slide along valve bore under their own weight. ● Valve, sleeve and plug are free from burrs, dents and scratches. ● Control valve springs are free from damage, deformation and fatigue. ● Hydraulic line is free from obstacles. 			
			
SAT367H			
OK or NG			
OK	▶	GO TO 4.	
NG	▶	Repair control valve.	

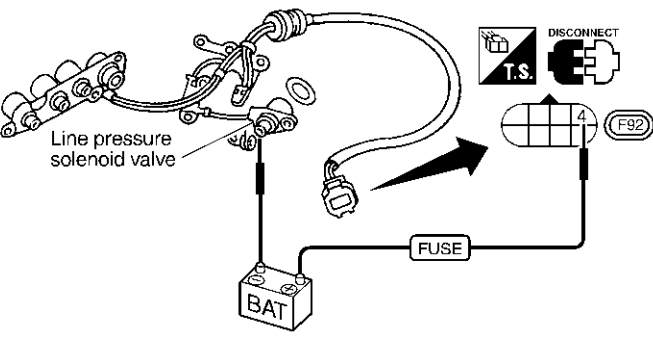
4	CHECK SHIFT UP (D₃ TO D₄)		
Does A/T shift from D ₃ to D ₄ at the specified speed?			
OK or NG			
OK	▶	GO TO 5.	
NG	▶	Check control valve again. Repair or replace control valve assembly.	

5	CHECK DTC		
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-164.			
OK or NG			
OK	▶	INSPECTION END	
NG	▶	GO TO 11. Check for proper lock-up.	

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

Diagnostic Procedure (Cont'd)

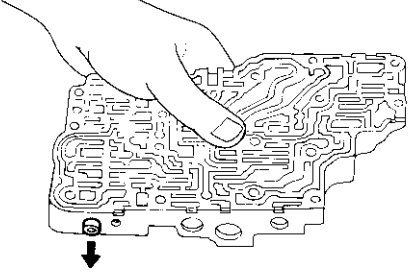
6	CHECK SOLENOID VALVE RESISTANCE	
<p>1. Remove control valve assembly. Refer to AT-283.</p> <ul style="list-style-type: none"> ● Line pressure solenoid valve <p>2. Check resistance to the terminal and ground.</p>		
		
SAT625JB		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace solenoid valve assembly.

7	CHECK SOLENOID VALVE OPERATION	
<p>1. Remove control valve assembly. Refer to AT-315.</p> <ul style="list-style-type: none"> ● Line pressure solenoid valve <p>2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.</p>		
		
SAT626J		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace solenoid valve assembly.

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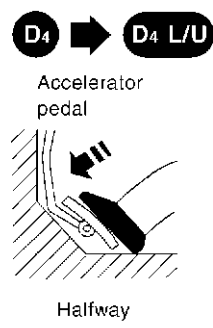
DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

Diagnostic Procedure (Cont'd)

8	CHECK CONTROL VALVE	
<p>1. Disassemble control valve assembly. Refer to AT-315. 2. Check line pressure circuit valves for sticking.</p> <ul style="list-style-type: none"> ● Pressure regulator valve ● Pilot valve ● Pressure modifier valve 		
		
SAT367H		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Repair control valve.

9	CHECK SHIFT UP (D₃ TO D₄)	
Does A/T shift from D ₃ to D ₄ at the specified speed?		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Check control valve again. Repair or replace control valve assembly.

10	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-164.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 11. Check for proper lock-up.

11	CHECK LOCK-UP	
During "Cruise test — Part 1" (AT-78), does A/T perform lock-up at the specified speed?		
		
SAT989H		
Yes or No		
Yes	▶	Perform "Cruise test — Part 1" again and return to the start point of this test group.
No	▶	GO TO 12.

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

Diagnostic Procedure (Cont'd)

12 CHECK SOLENOID VALVE RESISTANCE

- Remove control valve assembly. Refer to AT-283.
 - Torque converter clutch solenoid valve
- Check resistance to the terminal and ground.

Solenoid valve	Terminal No. (Wire color)		Resistance
Torque converter clutch solenoid valve	5 (G/B)	Ground	5 - 20Ω

SAT047KC

OK or NG

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

GI
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FE

13 CHECK SOLENOID VALVE OPERATION

- Remove control valve assembly. Refer to AT-283.
 - Torque converter clutch solenoid valve
- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.

SAT037KA

OK or NG

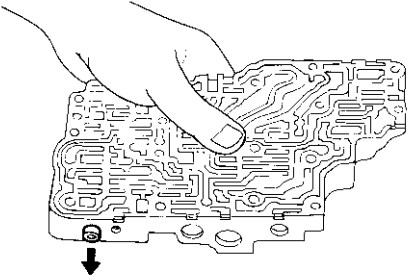
OK	▶	GO TO 14.
NG	▶	Replace solenoid valve assembly.

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

Diagnostic Procedure (Cont'd)

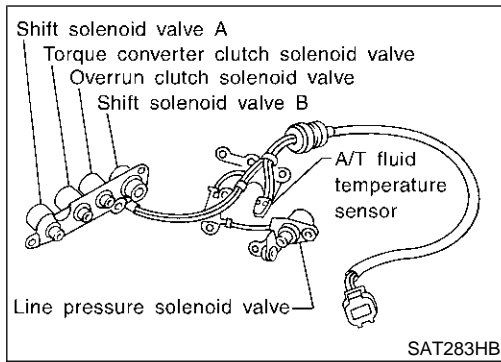
14	CHECK CONTROL VALVE
1. Disassemble control valve assembly. Refer to AT-315. 2. Check control valves for sticking. <ul style="list-style-type: none">● Torque converter clutch control valve● Torque converter clutch relief valve	
	
SAT367H	
OK or NG	
OK	▶ GO TO 15.
NG	▶ Repair control valve.

15	CHECK LOCK-UP
Does A/T perform lock-up at the specified speed?	
Yes or No	
Yes	▶ GO TO 16.
No	▶ Check control valve again. Repair or replace control valve assembly.

16	CHECK DTC
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-164.	
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



Description

NHAT0064

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

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

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

NHAT0064S01

Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Line pressure solenoid valve duty	Small throttle opening (Low line pressure)	Approximately 24%
	↓ Large throttle opening (High line pressure)	↓ Approximately 95%

NOTE:

The line pressure duty cycle value is not consistent 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.

TCM TERMINALS AND REFERENCE VALUE

NHAT0064S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)	
1	G/R	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	W/B	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

On Board Diagnosis Logic

NHAT0231

Diagnostic trouble code L/PRESS SOL/CIRC with CONSULT-II or P0745 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

DTC P0745 LINE PRESSURE SOLENOID VALVE

Possible Cause

Possible Cause

NHAT0232

Check the following items.

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

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0233

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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

WITH CONSULT-II

NHAT0233S01

- 1) Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- 2) Depress accelerator pedal completely and wait at least 5 seconds.

WITH GST

NHAT0233S02

Follow the procedure "With CONSULT-II".

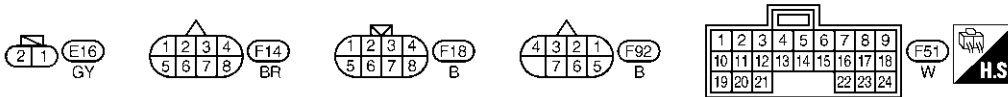
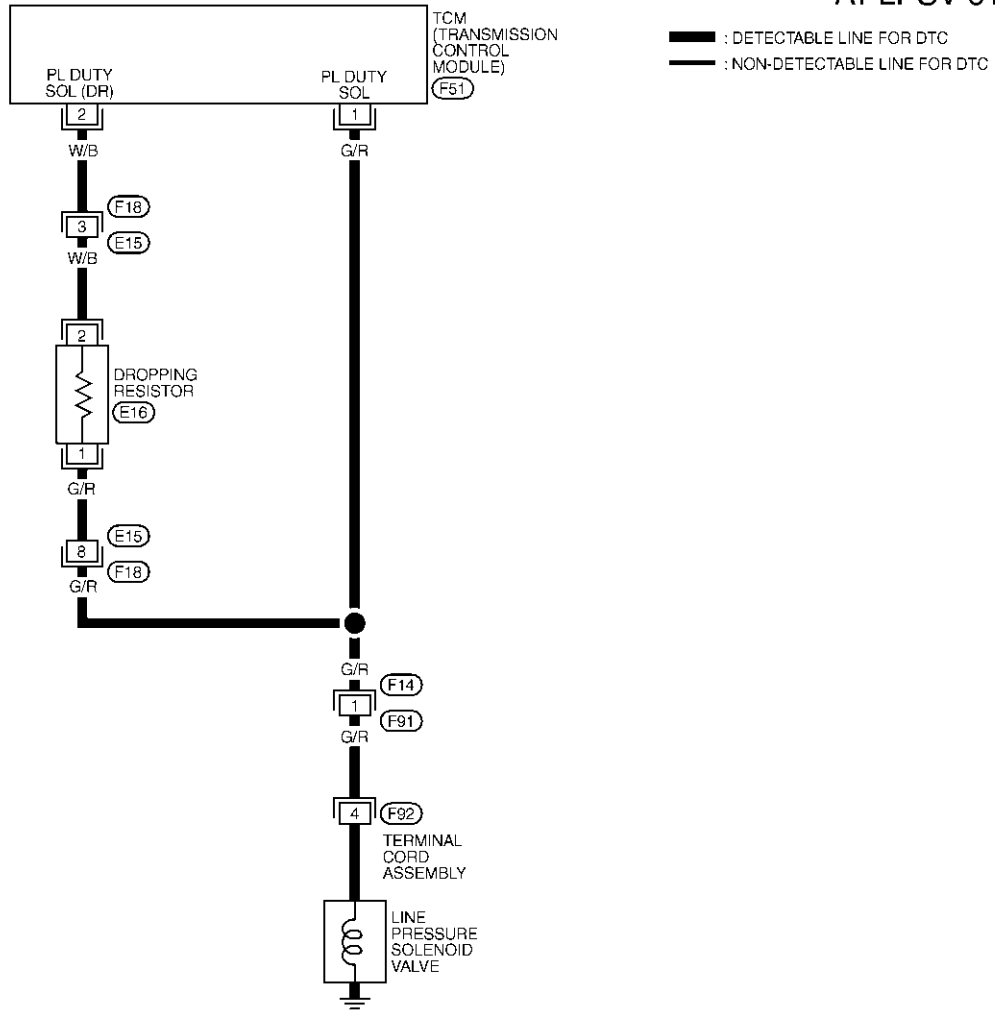
DTC P0745 LINE PRESSURE SOLENOID VALVE

Wiring Diagram — AT — LPSV

Wiring Diagram — AT — LPSV

NHAT0065

AT-LPSV-01



MAT095B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
1	G/R	LINE PRESSURE SOLENOID VALVE	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	1.5 - 3.0V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V
2	W/B	LINE PRESSURE SOLENOID VALVE (DROPPING RESISTOR)	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	4 - 14V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V

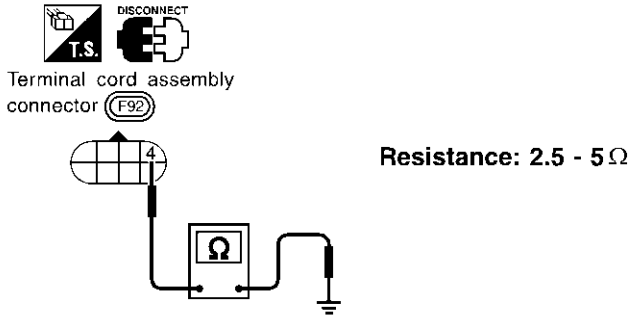
SAT307KA

DTC P0745 LINE PRESSURE SOLENOID VALVE

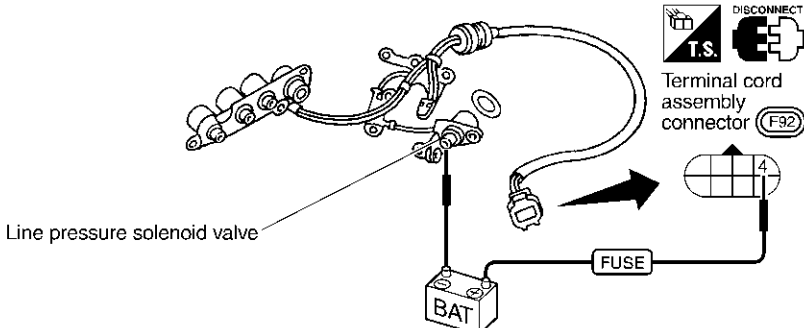
Diagnostic Procedure

Diagnostic Procedure

NHAT0066

1	CHECK SOLENOID VALVE RESISTANCE		
<p>1. Turn ignition switch to OFF position. 2. Disconnect terminal cord assembly connector in engine compartment. 3. Check resistance between terminal 4 (G/R) and ground.</p>			
			
OK or NG			
OK	▶	GO TO 3.	
NG	▶	GO TO 2.	

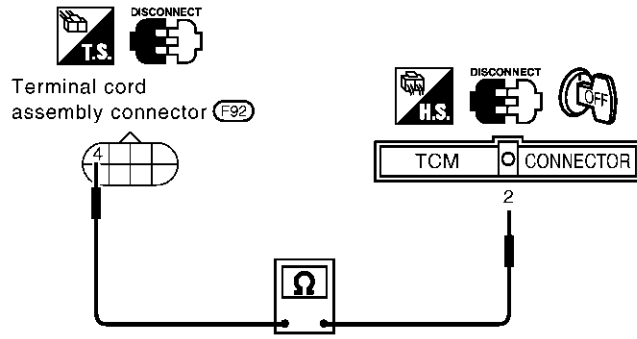
SAT630JB

2	CHECK SOLENOID VALVE OPERATION		
<p>1. Remove control valve assembly. Refer to AT-283. 2. Check the following items: ● Line pressure solenoid valve i. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.</p>			
			
OK or NG			
OK	▶	GO TO 3.	
NG	▶	Repair or replace damaged parts.	

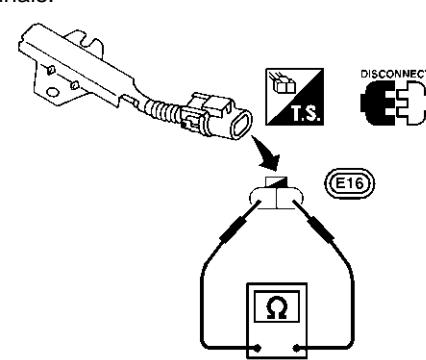
SAT038KA

DTC P0745 LINE PRESSURE SOLENOID VALVE

Diagnostic Procedure (Cont'd)

3	CHECK POWER SOURCE AND DROPPING RESISTOR CIRCUIT
<p>1. Turn ignition switch to OFF position. 2. Disconnect TCM harness connector. 3. Check resistance between terminal 4 (G/R) and TCM harness connector F51 terminal 2 (W/B).</p>	
	
Resistance: 10 - 15 Ω	
SAT631JF	
OK or NG	
OK	▶ GO TO 5.
NG	▶ GO TO 4.

GI
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4	DETECT MALFUNCTIONING ITEM
<p>Check the following items:</p> <ul style="list-style-type: none"> ● Dropping resistor ● Check resistance between two terminals. 	
	
Resistance: 12Ω (Approx.)	
SAT933IB	
OK or NG	
<ul style="list-style-type: none"> ● Harness for short or open between TCM harness connector F50 terminal 2 (W/B) and terminal cord assembly 	
OK	▶ GO TO 5.
NG	▶ Repair or replace damaged parts.

AX
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ST
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BT
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SC

5	CHECK POWER SOURCE CIRCUIT
<p>1. Turn ignition switch to OFF position. 2. Check continuity between terminal cord assembly connector terminal 4 (G/R) and TCM harness connector F50 terminal 1 (G/R). Refer to wiring diagram — AT — LPSV. Continuity should exist. If OK, check harness for short to ground and short to power. 3. Reinstall any part removed.</p>	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

EL
IDX

DTC P0745 LINE PRESSURE SOLENOID VALVE

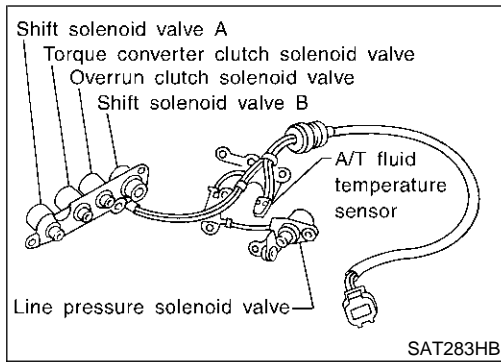
Diagnostic Procedure (Cont'd)

6	CHECK DTC
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-174.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ GO TO 7.

7	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 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 P0750 SHIFT SOLENOID VALVE A

Description



Description

Shift solenoid valves A and B are turned ON or OFF by the TCM in response to signals sent from the park/neutral position (PNP) switch, vehicle speed and electric throttle control actuator (throttle position sensors). Gears will then be shifted to the optimum position.

NHAT0067

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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)

LC
EC

TCM TERMINALS AND REFERENCE VALUE

NHAT0067S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
11	R/Y	Shift solenoid valve A	 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

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On Board Diagnosis Logic

Diagnostic trouble code SFT SOL A/CIRC with CONSULT-II or P0750 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

NHAT0234

RS
BT
HA

Possible Cause

Check the following items.

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

NHAT0235

SC
EL
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DTC P0750 SHIFT SOLENOID VALVE A

Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0236

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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

WITH CONSULT-II

NHAT0236S01

- 1) Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- 2) Start engine.
- 3) Drive vehicle in D position and allow the transmission to shift 1 → 2 ("GEAR").

WITH GST

NHAT0236S02

Follow the procedure "With CONSULT-II".

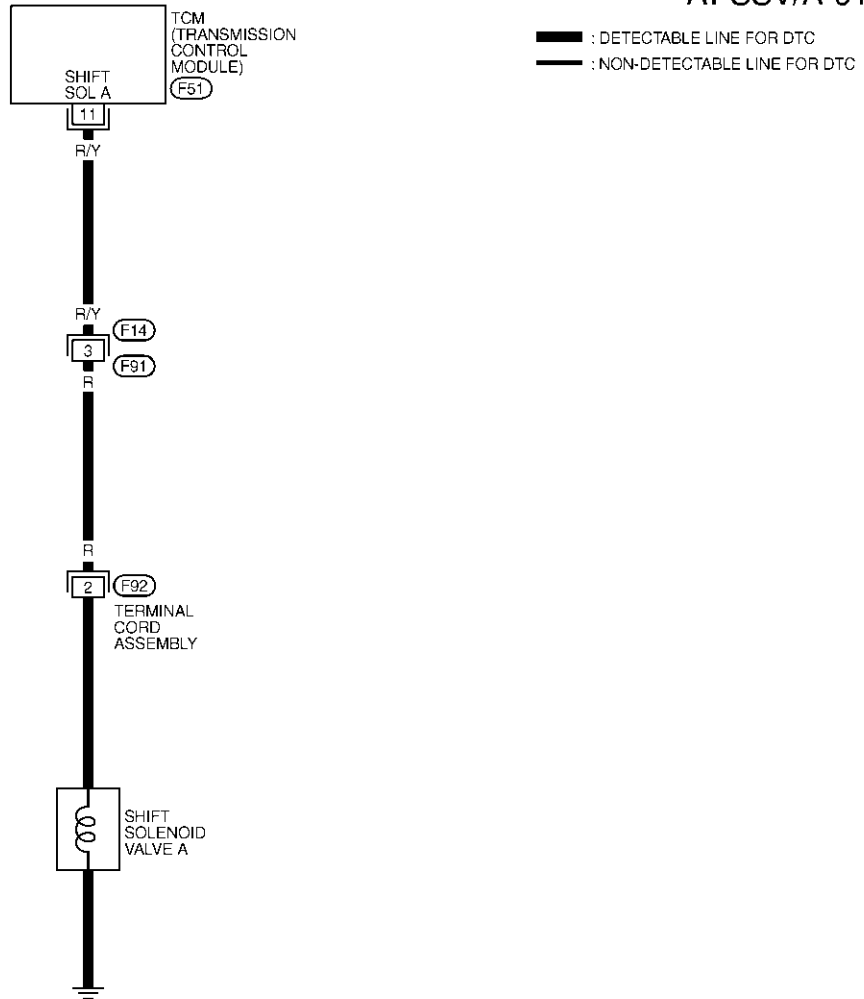
DTC P0750 SHIFT SOLENOID VALVE A

Wiring Diagram — AT — SSV/A

Wiring Diagram — AT — SSV/A

NHAT0068

AT-SSV/A-01



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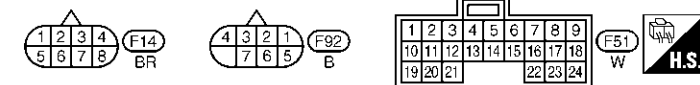
HA

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MAT815A

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TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
11	R/Y	SHIFT SOLENOID VALVE A	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A OPERATES (WHEN DRIVING IN D1 OR D4)	BATTERY VOTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A DOES NOT OPERATE (WHEN DRIVING IN D2 OR D3)	0V

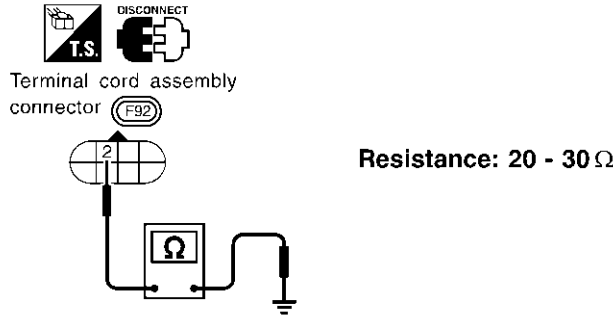
SAT308KA

DTC P0750 SHIFT SOLENOID VALVE A

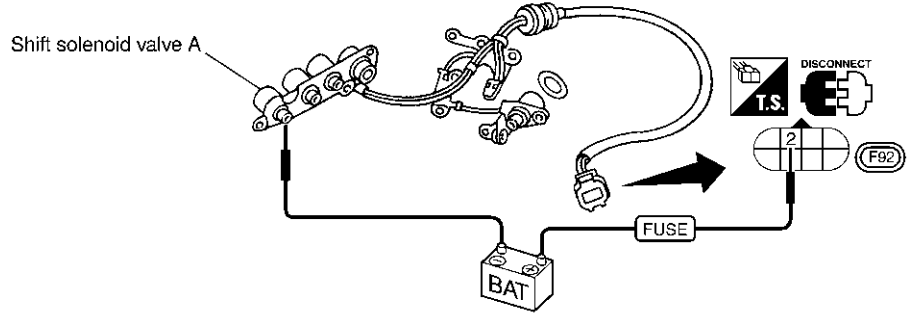
Diagnostic Procedure

Diagnostic Procedure

NHAT0069

1	CHECK SHIFT SOLENOID VALVE RESISTANCE	
<p>1. Turn ignition switch to OFF position. 2. Disconnect terminal cord assembly connector in engine compartment. 3. Check resistance between terminal 2 (R) and ground.</p>		
 <p>Terminal cord assembly connector (F92)</p> <p>Resistance: 20 - 30 Ω</p> <p>OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

SAT632JD

2	CHECK SHIFT SOLENOID VALVE OPERATION	
<p>1. Remove control valve assembly. Refer to AT-283. 2. Check the following items:</p> <ul style="list-style-type: none"> ● Shift solenoid valve A ● Operation check <p>i. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.</p>		
 <p>Shift solenoid valve A</p> <p>BAT</p> <p>FUSE</p> <p>OK or NG</p>		
<ul style="list-style-type: none"> ● Harness of terminal cord assembly for short or open 		
OK	▶	GO TO 3.
NG	▶	Repair or replace damaged parts.

SAT035K

3	CHECK POWER SOURCE CIRCUIT	
<p>1. Turn ignition switch to OFF position. 2. Disconnect TCM harness connector. 3. Check continuity between terminal cord assembly connector terminal 2 (R) and TCM harness connector F51 terminal 11 (R/Y). Refer to wiring diagram — AT — SSV/A. Continuity should exist. If OK, check harness for short to ground and short to power. 4. Reinstall any part removed.</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0750 SHIFT SOLENOID VALVE A

Diagnostic Procedure (Cont'd)

4	CHECK DTC
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-180.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ GO TO 5.

GI

MA

5	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 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.

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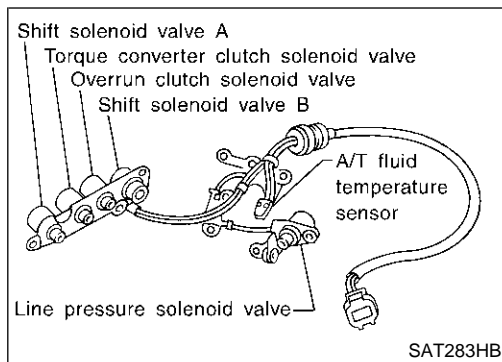
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DTC P0755 SHIFT SOLENOID VALVE B

Description



Description


Shift solenoid valves A and B are turned ON or OFF^{NHAT0070} by the TCM in response to signals sent from the park/neutral position (PNP) switch, vehicle speed and electric throttle control actuator (throttle position sensors). 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)

TCM TERMINALS AND REFERENCE VALUE

NHAT0070S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
12	LG/B	Shift solenoid valve B	 When shift solenoid valve B operates. (When driving in D ₁ or D ₂ .)	Battery voltage
			When shift solenoid valve B does not operate. (When driving in D ₃ or D ₄ .)	0V

On Board Diagnosis Logic

Diagnostic trouble code SFT SOL B/CIRC with CONSULT-II or P0755 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.^{NHAT0237}

Possible Cause

Check the following items.

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

NHAT0239

DTC P0755 SHIFT SOLENOID VALVE B

Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0238

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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

WITH CONSULT-II

NHAT0238S01

- 1) Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- 2) Start engine.
- 3) Drive vehicle in D position and allow the transmission to shift 1 → 2 → 3 ("GEAR").

WITH GST

NHAT0238S02

Follow the procedure "With CONSULT-II".

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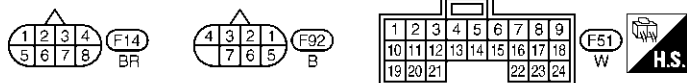
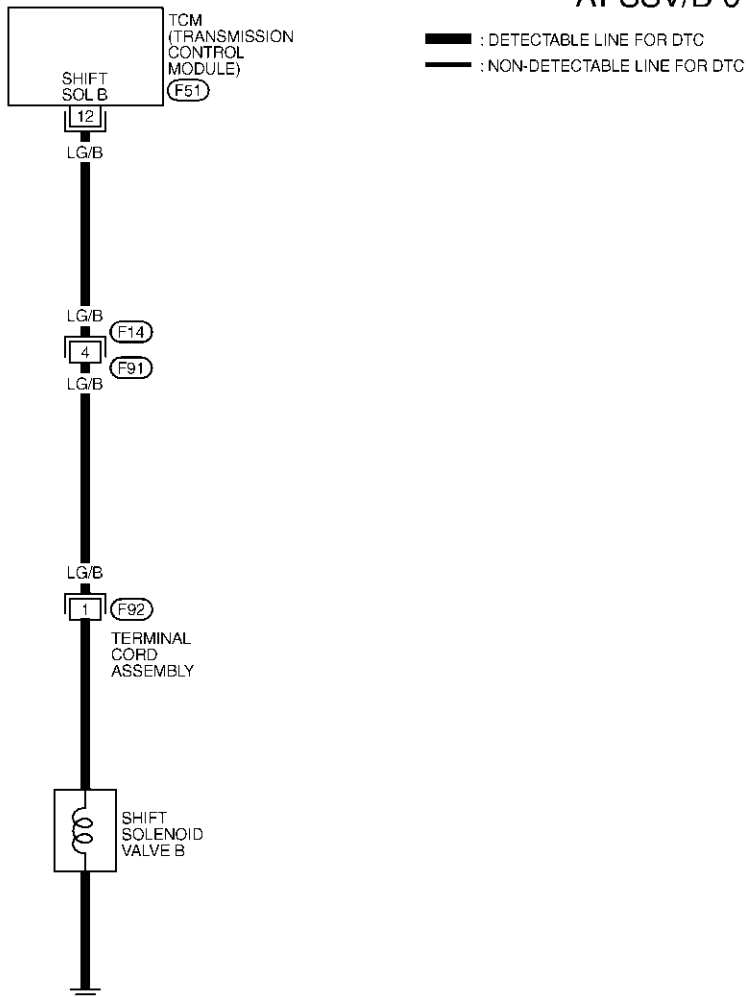
DTC P0755 SHIFT SOLENOID VALVE B

Wiring Diagram — AT — SSV/B

Wiring Diagram — AT — SSV/B

NHAT0071

AT-SSV/B-01



MAT816A

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
12	LG/B	SHIFT SOLENOID VALVE B	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B OPERATES (WHEN DRIVING IN D1 OR D2)	BATTERY VOTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B DOES NOT OPERATE (WHEN DRIVING IN D3 OR D4)	0V

SAT309KA

Diagnostic Procedure

NHAT0072

1	CHECK SHIFT SOLENOID VALVE RESISTANCE		
<p>1. Turn ignition switch to OFF position. 2. Disconnect terminal cord assembly connector in engine compartment. 3. Check resistance between terminal 1 (LG/B) and ground.</p> <div style="text-align: center;"> <p>Terminal cord assembly connector (F92)</p> <p>Resistance: 5 - 20 Ω</p> <p>OK or NG</p> </div>			
OK		▶	GO TO 3.
NG		▶	GO TO 2.

GI
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AT

2	CHECK SHIFT SOLENOID VALVE OPERATION		
<p>1. Remove control valve assembly. Refer to AT-283. 2. Check the following items: ● Shift solenoid valve B ● Operation check i. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.</p> <div style="text-align: center;"> <p>Shift solenoid valve B</p> <p>FUSE</p> <p>BAT</p> <p>Resistance: 5 - 20 Ω</p> <p>OK or NG</p> </div>			
● Harness of terminal cord assembly for short or open			
OK		▶	GO TO 3.
NG		▶	Repair or replace damaged parts.

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3	CHECK POWER SOURCE CIRCUIT		
<p>1. Turn ignition switch to OFF position. 2. Disconnect TCM harness connector. 3. Check continuity between terminal cord assembly connector terminal 1 (LG/B) and TCM harness connector F51 terminal 12 (LG/B). Refer to wiring diagram — AT — SSV/B. Continuity should exist. If OK, check harness for short to ground and short to power. 4. Reinstall any part removed.</p> <div style="text-align: center;"> <p>OK or NG</p> </div>			
OK		▶	GO TO 4.
NG		▶	Repair open circuit or short to ground or short to power in harness or connectors.

EL
IDX

DTC P0755 SHIFT SOLENOID VALVE B

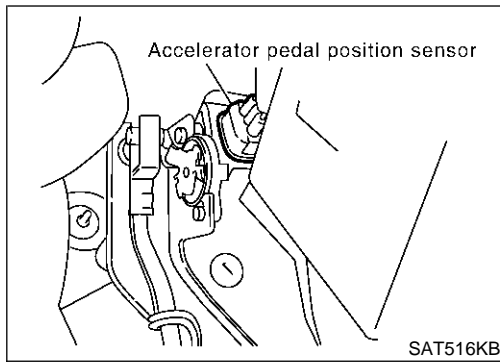
Diagnostic Procedure (Cont'd)

4	CHECK DTC
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-185.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ GO TO 5.

5	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 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 P1705 ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

Description



Description

The accelerator pedal position sensor is part of the system that controls throttle position. Accelerator pedal position signal is sent to the ECM. And the signal is also sent to TCM as throttle valve position signal.

NHAT0073

GI

MA

EM

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

NHAT0073S01

Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Accelerator pedal position sensor	Fully-closed throttle	Approximately 0.5V
	Fully-open throttle	Approximately 4V

LC



EC

FE

TCM TERMINALS AND REFERENCE VALUE

NHAT0073S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
32	R	Sensor power	 Ignition switch ON.	4.5 - 5.5V
			Ignition switch OFF.	0V
41	W	Accelerator pedal position sensor	 When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V
42	B	Sensor ground	—	0V

AT

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DTC P1705 ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

On Board Diagnosis Logic

On Board Diagnosis Logic

Diagnostic trouble code TP SEN/CIRC A/T with CONSULT-II or P1705 without CONSULT-II is detected when TCM receives an excessively low or high voltage from the sensor. =NHAT0240

Possible Cause

Check the following items. NHAT0241

- Harness or connectors
(The sensor circuit is open or shorted.)
- Accelerator pedal position sensor

DTC P1705 ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0242

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
CAN DIAG SUPPORT MNTR
FUNCTION TEST
DTC WORK SUPPORT

SCIA5358E

WITH CONSULT-II

NHAT0242S01

- 1) Turn ignition switch ON and select "DATA MONITOR" mode for "A/T" with CONSULT-II.

Accelerator pedal condition	Accelerator pedal position sensor (THRTL POS SEN)
Fully released	Approx. 0.5V
Partially depressed	0.5 - 4V
Fully depressed	Approx. 4V

SELECT SYSTEM
A/T
ENGINE

SAT014K

If the check result is NG, go to "DIAGNOSTIC PROCEDURE", AT-193.

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

- 2) Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- 3) Start engine and maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.

VHCL SPEED SE: 10 km/h (6 MPH) or more
THRTL POS SEN (accelerator pedal position sensor): Approximately 3V or less
Selector lever: D position

If the check result is NG, go to "DIAGNOSTIC PROCEDURE", AT-193.

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

- 4) Maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.
VHCL SPEED SE: 10 km/h (6 MPH) or more
Accelerator pedal: Wide open throttle
Selector lever: D position

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

SEF949Y

WITH GST

NHAT0242S02

Follow the procedure "With CONSULT-II".

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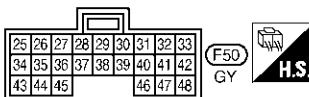
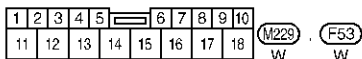
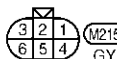
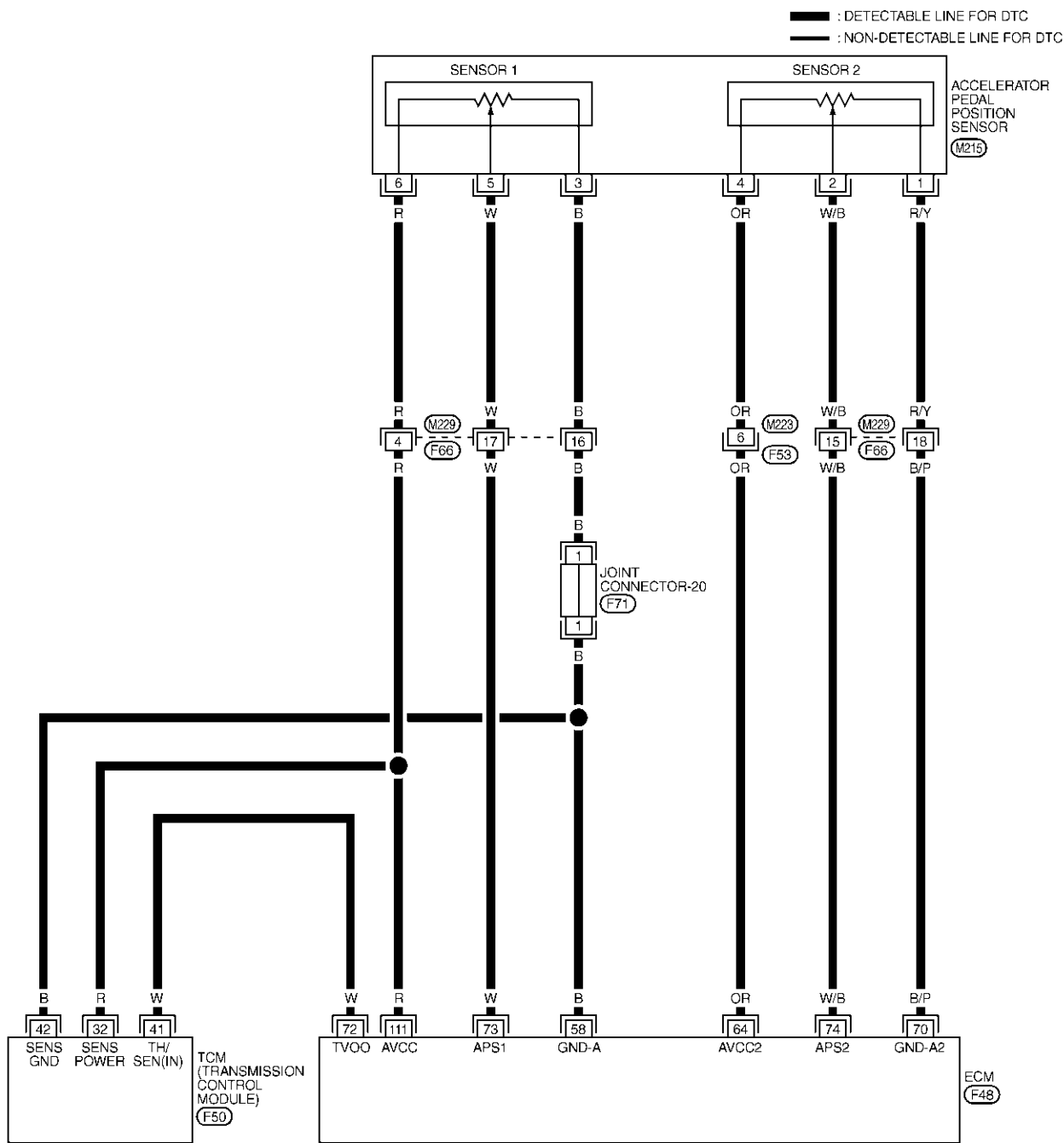
DTC P1705 ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

Wiring Diagram — AT — TPS

Wiring Diagram — AT — TPS

NHAT0074

AT-TPS-01



REFER TO THE FOLLOWING.
 (F48) -ELECTRICAL UNITS

MAT388B

DTC P1705 ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

Wiring Diagram — AT — TPS (Cont'd)

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
32	R	SENSOR POWER	WHEN IGN ON	4.5 - 5.5V
			WHEN IGN OFF	0V
41	W	ACCELERATOR PEDAL POSITION SENSOR	WHEN IGN ON AND ACCELERATOR PEDAL IS DEPRESSED SLOWLY AFTER WARMING UP ENGINE (VOLTAGE RISES GRADUALLY IN RESPONSE TO THROTTLE POSITION.)	FULLY-CLOSED THROTTLE: 0.5V FULLY-OPEN THROTTLE: 4V
			—	0V
42	B	SENSOR GROUND	—	0V

GI
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SAT310KC

AT
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Diagnostic Procedure

NHAT0075

1	CHECK DTC WITH ECM
<ul style="list-style-type: none"> Check P code with CONSULT-II "ENGINE". Turn ignition switch ON and select "SELF DIAGNOSTIC RESULTS" mode for "ENGINE" with CONSULT-II. Refer to EC-90, "Malfunction Indicator Lamp (MIL)". <p style="text-align: center;">OK or NG</p>	
OK (with CONSULT-II) ▶	GO TO 2.
OK (without CONSULT-II) ▶	GO TO 3.
NG ▶	Check accelerator pedal position sensor circuit for engine control. Refer to EC-643, EC-650, EC-662, "DTC P2122, P2123, P2127, P2128, P2138 APP SENSOR".

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DTC P1705 ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

Diagnostic Procedure (Cont'd)

2	CHECK INPUT SIGNAL (With CONSULT-II)															
<p>Ⓔ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch to ON position. (Do not start engine.) 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II. 3. Read out the value of "THRTL POS SEN". <p>Voltage:</p> <p style="padding-left: 20px;">Fully-closed throttle: Approximately 0.5V</p> <p style="padding-left: 20px;">Fully-open throttle: Approximately 4V</p>																
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th colspan="2">MONITORING</th> </tr> </thead> <tbody> <tr> <td>VHCL/S SE-A/T</td> <td>XXX km/h</td> </tr> <tr> <td>VHCL/S SE-MTR</td> <td>XXX km/h</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td>FLUID TEMP SE</td> <td>XXX V</td> </tr> <tr> <td>BATTERY VOLT</td> <td>XXX V</td> </tr> </tbody> </table>			DATA MONITOR		MONITORING		VHCL/S SE-A/T	XXX km/h	VHCL/S SE-MTR	XXX km/h	THRTL POS SEN	XXX V	FLUID TEMP SE	XXX V	BATTERY VOLT	XXX V
DATA MONITOR																
MONITORING																
VHCL/S SE-A/T	XXX km/h															
VHCL/S SE-MTR	XXX km/h															
THRTL POS SEN	XXX V															
FLUID TEMP SE	XXX V															
BATTERY VOLT	XXX V															
SAT614J																
OK or NG																
OK	▶	GO TO 4.														
NG	▶	Check harness for short or open between ECM and TCM regarding accelerator pedal position sensor circuit.														

3	CHECK INPUT SIGNAL (Without CONSULT-II)	
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch to ON position. (Do not start engine.) 2. Check voltage between TCM harness connector F50 terminals 41 (W) and 42 (B) while accelerator pedal is depressed slowly. 		
SAT349JC		
<p>Voltage:</p> <p style="padding-left: 20px;">Fully-closed throttle valve: Approximately 0.5V</p> <p style="padding-left: 20px;">Fully-open throttle valve: Approximately 4V</p> <p style="padding-left: 20px;">(Voltage rises gradually in response to throttle position.)</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Check harness for short or open between ECM and TCM regarding accelerator pedal position sensor circuit.

DTC P1705 ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

Diagnostic Procedure (Cont'd)

4	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-191.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 5.

GI

MA

5	CHECK TCM INSPECTION	
1. Perform TCM input/output signal inspection. 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.

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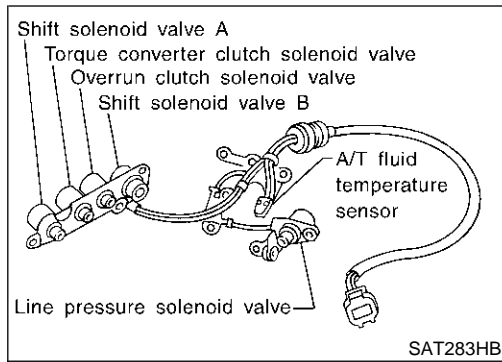
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DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

Description




Description

The overrun clutch solenoid valve is activated by the TCM in response to signals sent from the park/neutral position (PNP) switch, 3rd position switch, vehicle speed and accelerator pedal position sensor (throttle position sensors). The overrun clutch operation will then be controlled. NHAT0076

TCM TERMINALS AND REFERENCE VALUE

NHAT0076S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
20	BR/Y	Overrun clutch solenoid valve	 When overrun clutch solenoid valve operates.	Battery voltage
			When overrun clutch solenoid valve does not operate.	0V

On Board Diagnosis Logic

Diagnostic trouble code O/R CLTCH SOL/CIRC with CONSULT-II or P1760 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve. NHAT0243

Possible Cause

Check the following items.

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

NHAT0244

DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0245

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always drive vehicle on a level road to improve accuracy of test.

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

Ⓔ WITH CONSULT-II

NHAT0245S01

- 1) Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- 2) Start engine.
- 3) Accelerate vehicle to a speed of more than 10 km/h (6 MPH) with D position.
- 4) Release accelerator pedal completely with 3rd position.

Ⓔ WITH GST

NHAT0245S02

Follow the procedure "With CONSULT-II".

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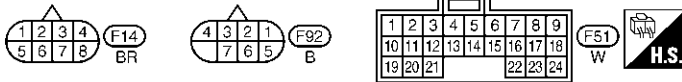
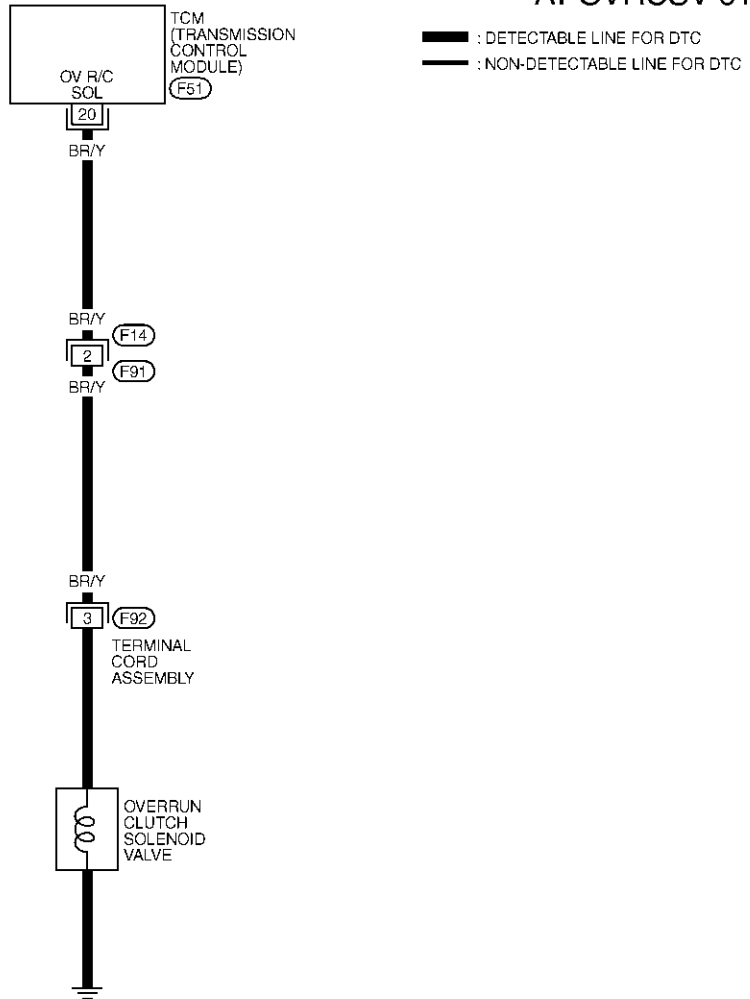
DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

Wiring Diagram — AT — OVRCSV

Wiring Diagram — AT — OVRCSV

NHAT0077

AT-OVRCSV-01



MAT818A

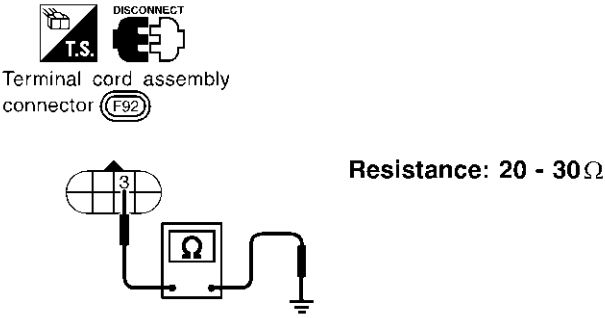
TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
20	BR/Y	OVERRUN CLUTCH SOLENOID VALVE	WHEN VEHICLE STARTS AND OVERRUN CLUTCH S/V OPERATES	BATTERY VOTAGE
			WHEN VEHICLE STARTS AND OVERRUN CLUTCH S/V DOES NOT OPERATE	0V

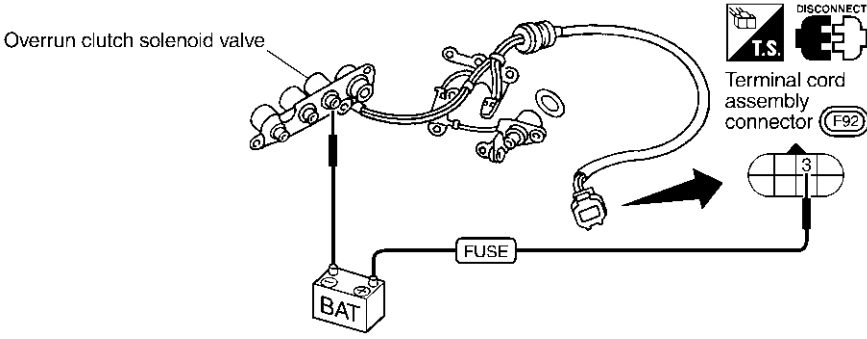
SAT311KA

Diagnostic Procedure

NHAT0078

1	CHECK SOLENOID VALVE RESISTANCE	
<ol style="list-style-type: none"> Turn ignition switch to OFF position. Disconnect terminal cord assembly connector in engine compartment. Check resistance between terminal 3 (BR/Y) and ground. 		
 <p>Terminal cord assembly connector (F92)</p> <p>Resistance: 20 - 30Ω</p> <p>OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

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2	CHECK SOLENOID VALVE OPERATION	
<ol style="list-style-type: none"> Remove control valve assembly. Refer to AT-283. Check the following items: <ul style="list-style-type: none"> Overrun clutch solenoid valve Operation check <ol style="list-style-type: none"> Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground. 		
 <p>Overrun clutch solenoid valve</p> <p>Terminal cord assembly connector (F92)</p> <p>BAT</p> <p>FUSE</p> <p>OK or NG</p>		
<ul style="list-style-type: none"> Harness of terminal cord assembly for short or open 		
OK	▶	GO TO 3.
NG	▶	Repair or replace damaged parts.

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3	CHECK POWER SOURCE CIRCUIT	
<ol style="list-style-type: none"> Turn ignition switch to OFF position. Disconnect TCM harness connector. Check continuity between terminal cord assembly connector terminal 3 (BR/Y) and TCM harness connector F51 terminal 20 (BR/Y). Refer to wiring diagram — AT — OVRCVS. <p>Continuity should exist.</p> If OK, check harness for short to ground and short to power. 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.

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DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

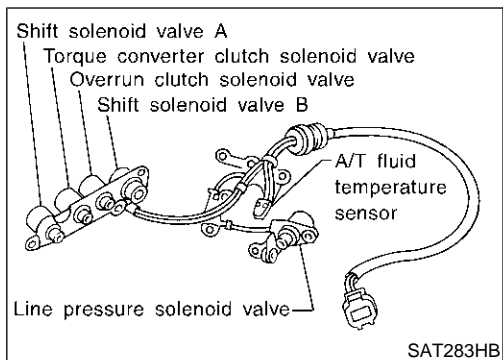
Diagnostic Procedure (Cont'd)

4	CHECK DTC
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-197.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ GO TO 5.

5	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 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)

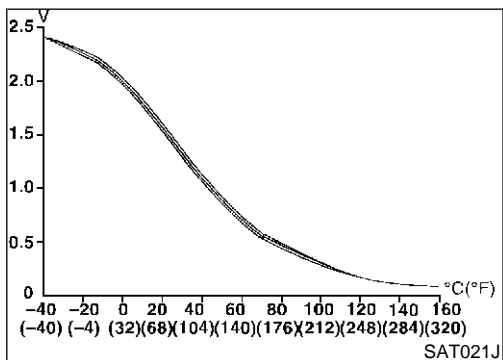
Description



Description

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

NHAT0079



CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

NHAT0079S01

Remarks: Specification data are reference values.

Monitor item	Condition	Specification (Approximately)	
A/T fluid temperature sensor	Cold [20°C (68°F)]	1.5V	2.5 kΩ
	Hot [80°C (176°F)]	0.5V	0.3 kΩ

TCM TERMINALS AND REFERENCE VALUE

NHAT0079S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
10	R/Y	Power source	When turning ignition switch to ON.	Battery voltage
			When turning ignition switch to OFF.	0V
19	R/Y	Power source	Same as No. 10	
28	Y/R	Power source (Memory back-up)	When turning ignition switch to OFF.	Battery voltage
			When turning ignition switch to ON.	Battery voltage
42	B	Sensor ground	—	0V
47	G	A/T fluid temperature sensor	When ATF temperature is 20°C (68°F).	1.5V
			When ATF temperature is 80°C (176°F).	0.5V

DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

On Board Diagnosis Logic

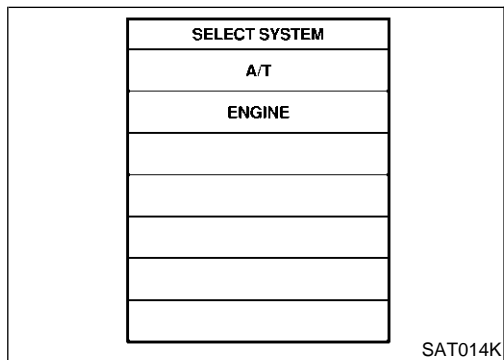
On Board Diagnosis Logic

Diagnostic trouble code BATT/FLUID TEMP SEN with CONSULT-II ^{NHAT0246} or 8th judgement flicker without CONSULT-II is detected when TCM receives an excessively low or high voltage from the sensor.

Possible Cause

Check the following items. NHAT0247

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

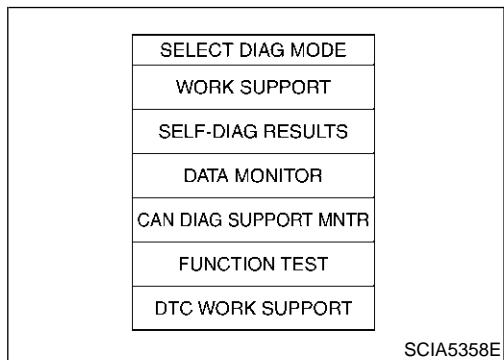


Diagnostic Trouble Code (DTC) Confirmation Procedure

After the repair, perform the following procedure to confirm the malfunction is eliminated. NHAT0248

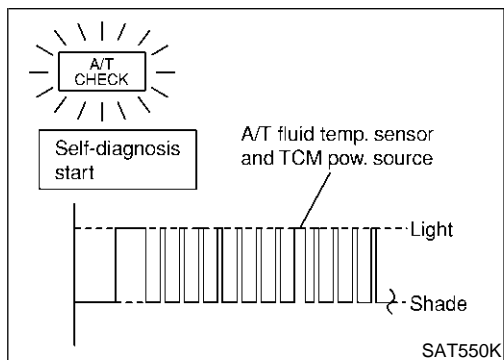
Ⓔ WITH CONSULT-II NHAT0248S01

- 1) Start engine.
- 2) Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 3) Drive vehicle under the following conditions:
Selector lever in D, vehicle speed higher than 20 km/h (12 MPH).



ⓧ WITHOUT CONSULT-II NHAT0248S02

- 1) Start engine.
- 2) Drive vehicle under the following conditions:
Selector lever in D, vehicle speed higher than 20 km/h (12 MPH).
- 3) Perform self-diagnosis.
Refer to AT-53, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)".



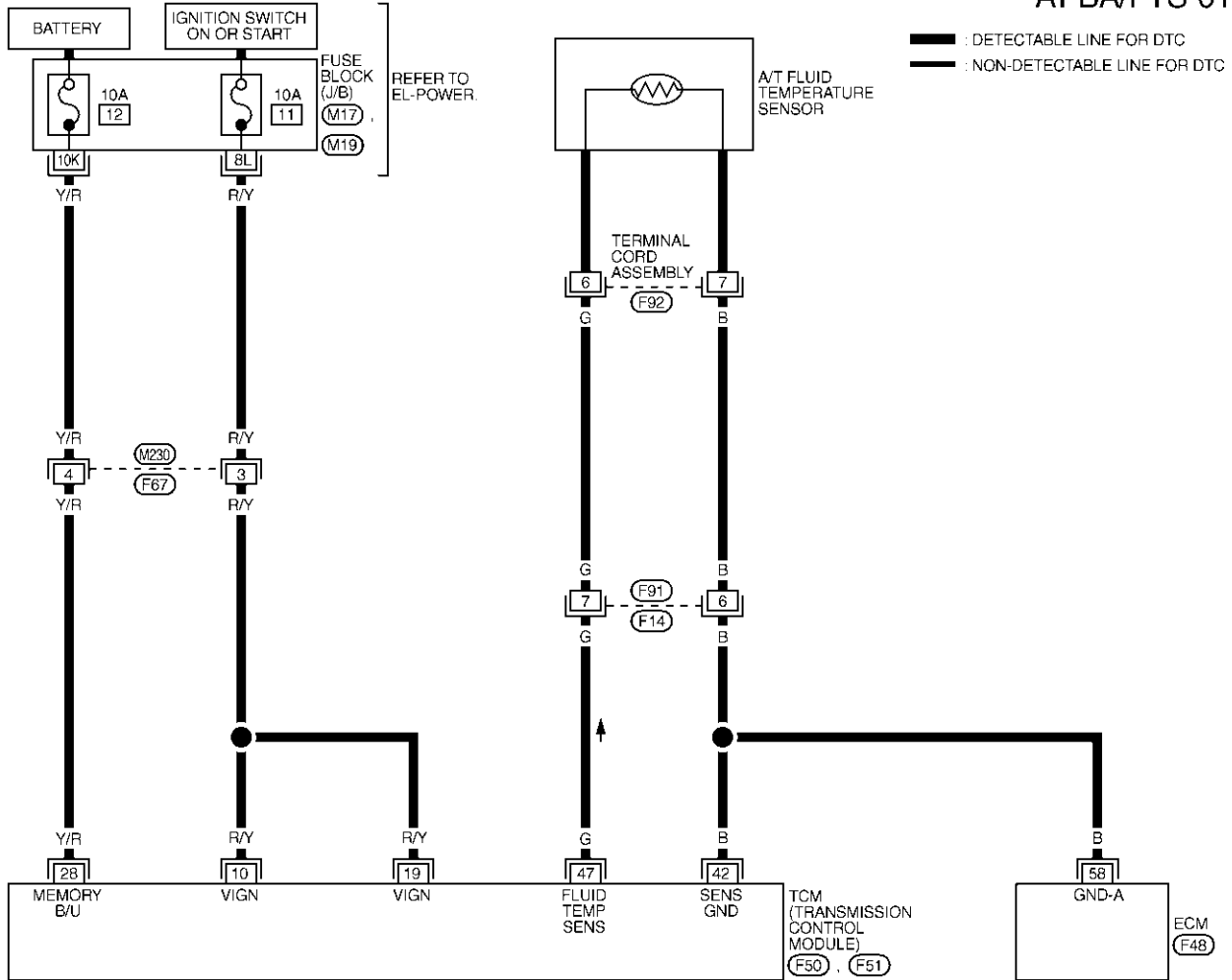
DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

Wiring Diagram — AT — BA/FTS

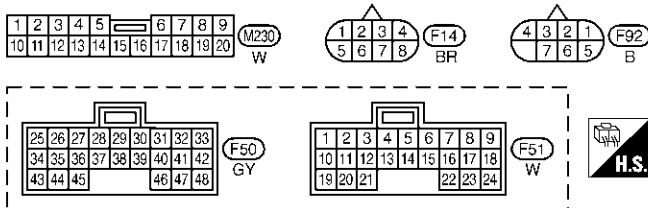
Wiring Diagram — AT — BA/FTS

NHAT0080

AT-BA/FTS-01



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REFER TO THE FOLLOWING.
 (M17) (M19) - FUSE BLOCK - JUNCTION BOX (J/B)
 (F48) - ELECTRICAL UNITS

MAT097B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND (B) 25 OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)(Approx.)
10	R/Y	POWER SOURCE	WHEN IGN ON	BATTERY VOLTAGE
			WHEN IGN OFF	0V
19	R/Y	POWER SOURCE	SAME AS NO. 10	
28	Y/R	POWER SOURCE (MEMORY BACK-UP)	WHEN IGN ON	BATTERY VOLTAGE
			WHEN IGN OFF	BATTERY VOLTAGE
42	B	SENSOR GROUND	—	0V
47	G	A/T FLUID TEMPERATURE SENSOR	WHEN IGN ON AND ATF TEMPERATURE IS 20°C (68°F)	1.5V
			WHEN IGN ON AND ATF TEMPERATURE IS 80°C (176°F)	0.5V

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DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

Diagnostic Procedure

Diagnostic Procedure

NHAT0081

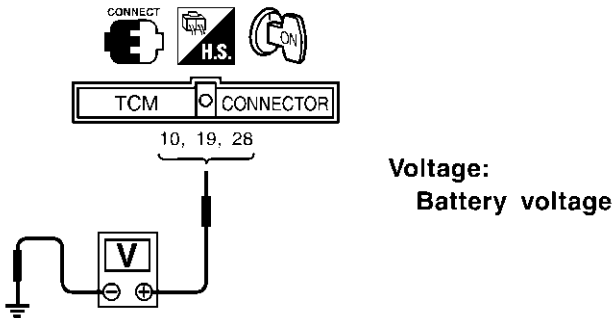
1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 9.

2	CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (With CONSULT-II)															
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine. 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II. 3. Read out the value of "FLUID TEMP SE". 																
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITORING</th> <th></th> </tr> </thead> <tbody> <tr> <td>VHCL/S SE-A/T</td> <td>XXX km/h</td> </tr> <tr> <td>VHCL/S SE-MTR</td> <td>XXX km/h</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td>FLUID TEMP SE</td> <td>XXX V</td> </tr> <tr> <td>BATTERY VOLT</td> <td>XXX V</td> </tr> </tbody> </table>			DATA MONITOR		MONITORING		VHCL/S SE-A/T	XXX km/h	VHCL/S SE-MTR	XXX km/h	THRTL POS SEN	XXX V	FLUID TEMP SE	XXX V	BATTERY VOLT	XXX V
DATA MONITOR																
MONITORING																
VHCL/S SE-A/T	XXX km/h															
VHCL/S SE-MTR	XXX km/h															
THRTL POS SEN	XXX V															
FLUID TEMP SE	XXX V															
BATTERY VOLT	XXX V															
SAT614J																
<p>Voltage: Cold [20°C (68°F)] → Hot [80°C (176°F)]: Approximately 1.5V → 0.5V</p> <p style="text-align: center;">OK or NG</p>																
OK	▶	GO TO 10.														
NG	▶	GO TO 3.														

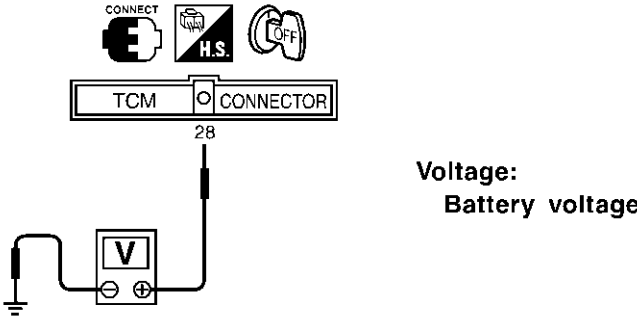
3	DETECT MALFUNCTIONING ITEM	
<p>Check the following items:</p> <ul style="list-style-type: none"> ● Harness for short or open between TCM, ECM and terminal cord assembly ● Ground circuit for ECM <p>Refer to EC-152, "TROUBLE DIAGNOSIS FOR POWER SUPPLY".</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 4.
NG	▶	Repair or replace damaged parts.

DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

Diagnostic Procedure (Cont'd)

4	CHECK TCM POWER SOURCE STEP 1		
<p>1. Turn ignition switch to ON position. (Do not start engine.)</p> <p>2. Check voltage between TCM harness connectors F50, F51 terminals 10 (R/Y), 19 (R/Y), 28 (Y/R) and ground.</p>			
			
<p>Voltage: Battery voltage</p>			
<p>SAT611J</p>			
OK or NG			
OK	▶	GO TO 5.	
NG	▶	GO TO 6.	

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5	CHECK TCM POWER SOURCE STEP 2		
<p>1. Turn ignition switch to OFF position.</p> <p>2. Check voltage between TCM harness connector F50 terminal 28 (Y/R) and ground.</p>			
			
<p>Voltage: Battery voltage</p>			
<p>SAT612JG</p>			
OK or NG			
OK	▶	GO TO 7.	
NG	▶	GO TO 6.	

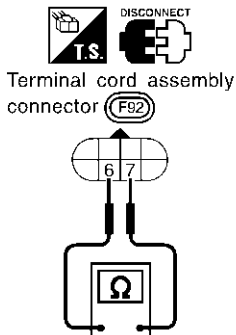
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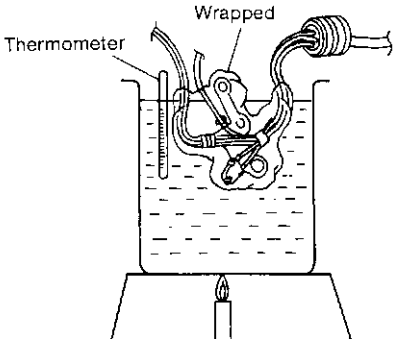
6	DETECT MALFUNCTIONING ITEM		
<p>Check the following items:</p> <ul style="list-style-type: none"> ● Harness for short or open between battery, ignition switch and TCM ● Ignition switch and fuse Refer to EL-11, "POWER SUPPLY ROUTING". 			
OK or NG			
OK	▶	GO TO 7.	
NG	▶	Repair or replace damaged parts.	

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DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

Diagnostic Procedure (Cont'd)

7	CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY
<p>1. Turn ignition switch to OFF position. 2. Disconnect terminal cord assembly connector in engine compartment. 3. Check resistance between terminals 6 (G) and 7 (B) when A/T is cold.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Terminal cord assembly connector (F82)</p> </div> <div style="text-align: center;"> <p>Resistance: Cold [20°C (68°F)] Approximately 2.5 kΩ</p> </div> </div> <p>4. Reinstall any part removed.</p> <p style="text-align: right;">SAT616JA</p>	
OK or NG	
OK	▶ GO TO 10.
NG	▶ GO TO 8.

8	DETECT MALFUNCTIONING ITEM						
<p>1. Remove oil pan. Refer to AT-283. 2. Check the following items: ● A/T fluid temperature sensor i. Check resistance between two terminals while changing temperature as shown below.</p> <div style="text-align: center;">  </div> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Temperature °C (°F)</th> <th style="text-align: center;">Resistance</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">20 (68)</td> <td style="text-align: center;">Approximately 2.5 kΩ</td> </tr> <tr> <td style="text-align: center;">80 (176)</td> <td style="text-align: center;">Approximately 0.3 kΩ</td> </tr> </tbody> </table> <p style="text-align: right;">SAT298F</p> <p>● Harness of terminal harness assembly for short or open</p> <p style="text-align: right;">MTBL0210</p>		Temperature °C (°F)	Resistance	20 (68)	Approximately 2.5 kΩ	80 (176)	Approximately 0.3 kΩ
Temperature °C (°F)	Resistance						
20 (68)	Approximately 2.5 kΩ						
80 (176)	Approximately 0.3 kΩ						
OK or NG							
OK	▶ GO TO 10.						
NG	▶ Repair or replace damaged parts.						

DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

Diagnostic Procedure (Cont'd)

9	CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (Without CONSULT-II)	
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> Start engine. Check voltage between TCM harness connector F50 terminal 47 (G) and ground while warming up A/T. 		
SAT354JB		
<p>Voltage: Cold [20°C (68°F)] → Hot [80°C (176°F)]: Approximately 1.5V → 0.5V</p> <ol style="list-style-type: none"> Turn ignition switch to OFF position. Disconnect TCM harness connector. Check resistance between TCM harness connector F50 terminal 42 (B) and ground. Refer to wiring diagram — AT — BA/FTS. <p>Continuity should exist.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 10.
NG	▶	GO TO 3.

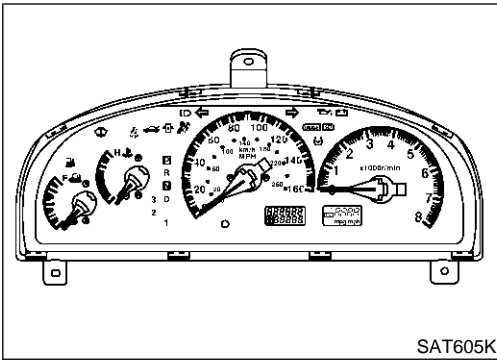
10	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-202.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 11.

11	CHECK TCM INSPECTION	
<ol style="list-style-type: none"> Perform TCM input/output signal inspection. 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.

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DTC VEHICLE SPEED SENSOR-MTR

Description



Description


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.

NHAT0082

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

NHAT0082S01

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
40	PU/R	Vehicle speed sensor	 <p>When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.</p>	Intermittently changes between approx. 0V and approx. 4.5V.

On Board Diagnosis Logic

Diagnostic trouble code VHCL SPEED SEN-MTR with CONSULT-II or 2nd judgement flicker without CONSULT-II is detected when TCM does not receive the proper voltage signal from the sensor.

NHAT0249

Possible Cause

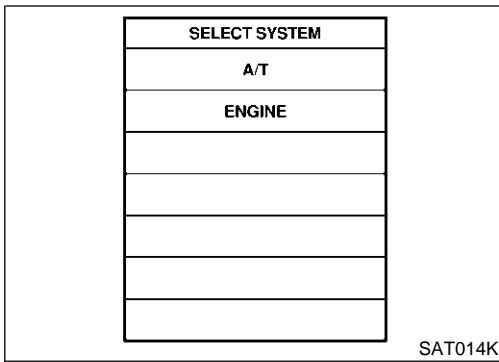
Check the following items.

- Harness or connectors (The sensor circuit is open or shorted.)
- Combination meter
- ABS/TCS control unit (with TCS)
- Vehicle speed sensor (with VDC)

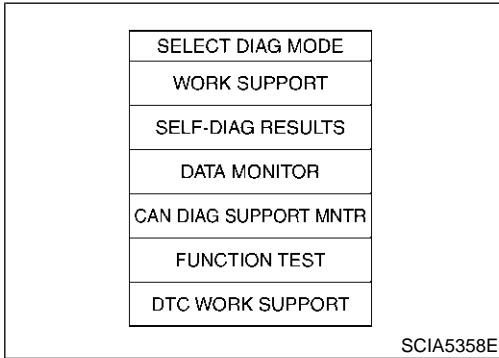
NHAT0250

DTC VEHICLE SPEED SENSOR-MTR

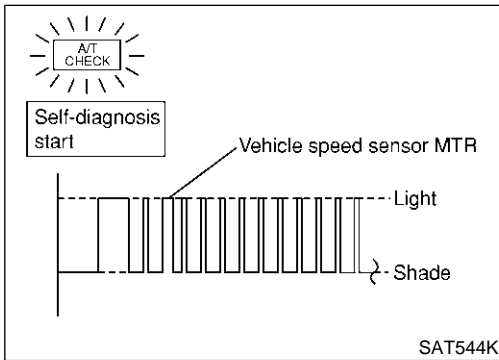
Diagnostic Trouble Code (DTC) Confirmation Procedure



SAT014K



SCIA5358E



SAT544K

Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0251

CAUTION:

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

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

WITH CONSULT-II

NHAT0251S01

- 1) Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
- 2) Start engine and accelerate vehicle from 0 to 25 km/h (0 to 16 MPH).

WITHOUT CONSULT-II

NHAT0251S02

- 1) Start engine.
- 2) Drive vehicle under the following conditions:
Selector lever in D and vehicle speed higher than 25 km/h (16 MPH).
- 3) Perform self-diagnosis.
Refer to AT-53, “TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)”.

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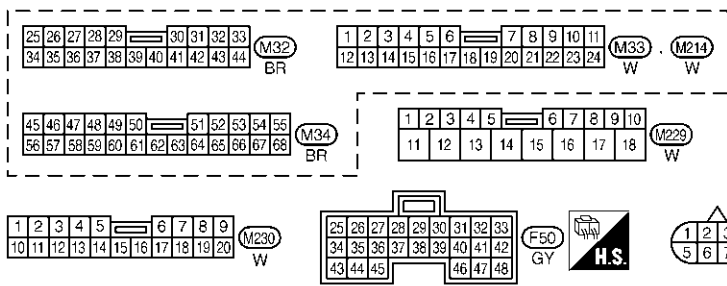
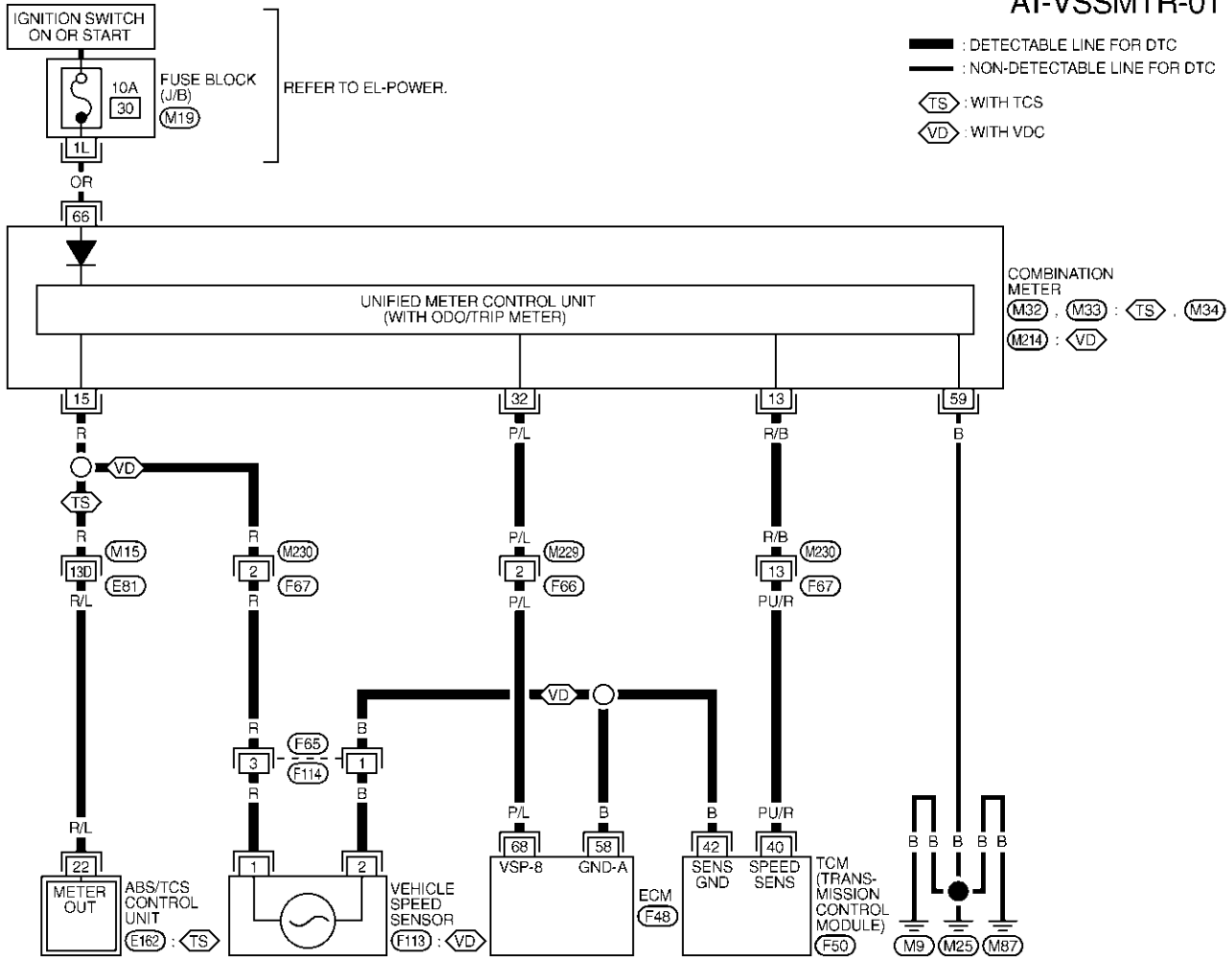
DTC VEHICLE SPEED SENSOR-MTR

Wiring Diagram — AT — VSSMTR

Wiring Diagram — AT — VSSMTR

NHAT0083

AT-VSSMTR-01



REFER TO THE FOLLOWING.

- (M15) -SUPER MULTIPLE JUNCTION (SMJ)
- (M19) -FUSE BLOCK-JUNCTION BOX (J/B)
- (E162) , (F48) -ELECTRICAL UNITS

MAT389B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
40	PU/R	VEHICLE SPEED SENSOR	WHEN MOVING VEHICLE AT 2 TO 3 KM/H (1 TO 2 MPH) FOR 1 M (3 FT)	INTERMITTENTLY CHANGES BETWEEN Approx. 0V AND Approx. 4.5V

SAT680K

Diagnostic Procedure

NHAT0084

1	CHECK INPUT SIGNAL
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Ⓔ With CONSULT-II

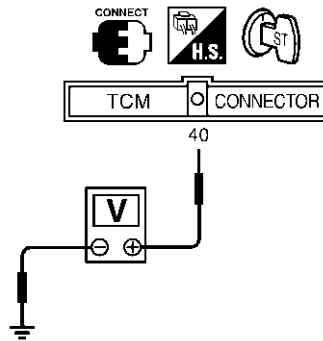
1. Start engine.
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "VHCL/S SE-MTR" while driving.
Check the value changes according to driving speed.

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

SAT614J

⊗ Without CONSULT-II

1. Start engine.
2. Check voltage between TCM harness connector F50 terminal 40 (PU/R) and ground while driving at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.



SAT356JB

Voltage:
Intermittently changes between approx. 0V and approx. 4.5V.

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING ITEM
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Check the following items:

- Combination meter
Refer to EL-125, "METERS AND GAUGES".
- Harness for short or open between TCM and combination meter
- ABS/TCS control unit (with TCS)
Refer to BR-46, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION".
- Harness for short or open between combination meter and ABS/TCS control unit (with TCS)
- Vehicle speed sensor and ground circuit for vehicle speed sensor (with VDC)
Refer to EL-125, "METERS AND GAUGES".
- Harness for short or open between combination meter and vehicle speed sensor (with VDC)

OK or NG

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

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DTC VEHICLE SPEED SENSOR-MTR

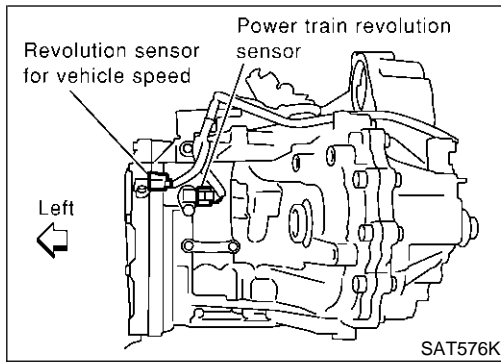
Diagnostic Procedure (Cont'd)

3	CHECK DTC
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-209.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ GO TO 4.

4	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 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 POWER TRAIN REVOLUTION SENSOR

Description



Description



The power train revolution sensor detects forward clutch drum rpm (revolutions per minute). It is located on the input side of the automatic transmission. The vehicle speed sensor A/T (Revolution sensor) is located on the output side of the automatic transmission. With the two sensors, input and output shaft rpms are accurately detected. The result is optimal shift timing during deceleration and improved shifting.

NHAT0272

TCM TERMINALS AND REFERENCE VALUE

NHAT0272S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
38	PU	Power train revolution sensor	 <p>When moving 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.</p>	240 Hz
			When vehicle parks.	Under 1.3V or over 4.5V
42	B	Sensor ground		0V

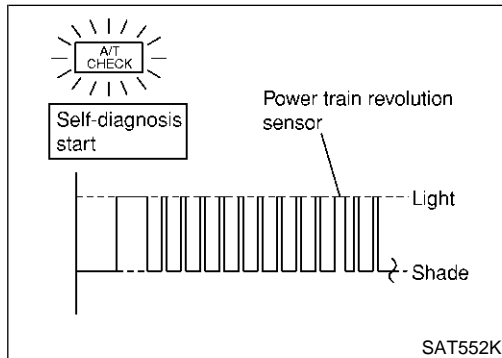
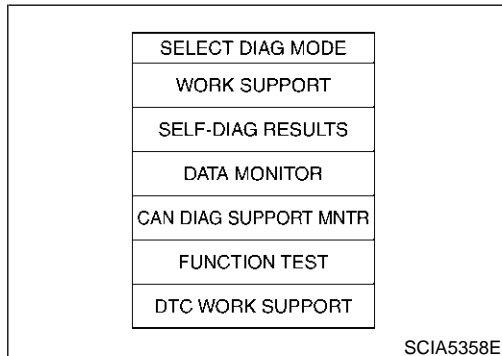
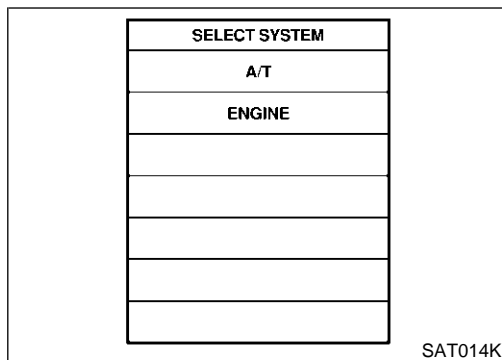
On Board Diagnosis Logic

NHAT0279

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
E : TURBINE REV NO TOOLS : 10th judgement flicker	TCM does not receive the proper voltage signal from the sensor.	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Power train revolution sensor

DTC POWER TRAIN REVOLUTION SENSOR

Diagnostic Trouble Code (DTC) Confirmation Procedure



Diagnostic Trouble Code (DTC) Confirmation Procedure

=NHAT0277

CAUTION:

- Always drive vehicle at a safe speed.
- If conducting this “DTC CONFIRMATION PROCEDURE” again, always turn ignition switch “OFF” and wait at least 5 seconds before continuing.

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

WITH CONSULT-II

NHAT0277S01

- 1) Start engine.
- 2) Select “DATA MONITOR” mode for “A/T” with CONSULT-II.
- 3) Drive vehicle under the following conditions:
Selector lever in “D”, vehicle speed higher than 40 km/h (25 MPH), engine speed higher than 1,500 rpm, throttle opening greater than 1.0/8 of the full throttle position and driving for more than 5 seconds.

NO TOOLS

NHAT0277S02

- 1) Start engine.
- 2) Drive vehicle under the following conditions:
Selector lever in “D”, vehicle speed higher than 40 km/h (25 MPH), engine speed higher than 1,500 rpm, throttle opening greater than 1.0/8 of the full throttle position and driving for more than 5 seconds.
- 3) Perform self-diagnosis.
Refer to AT-53, “TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)”.

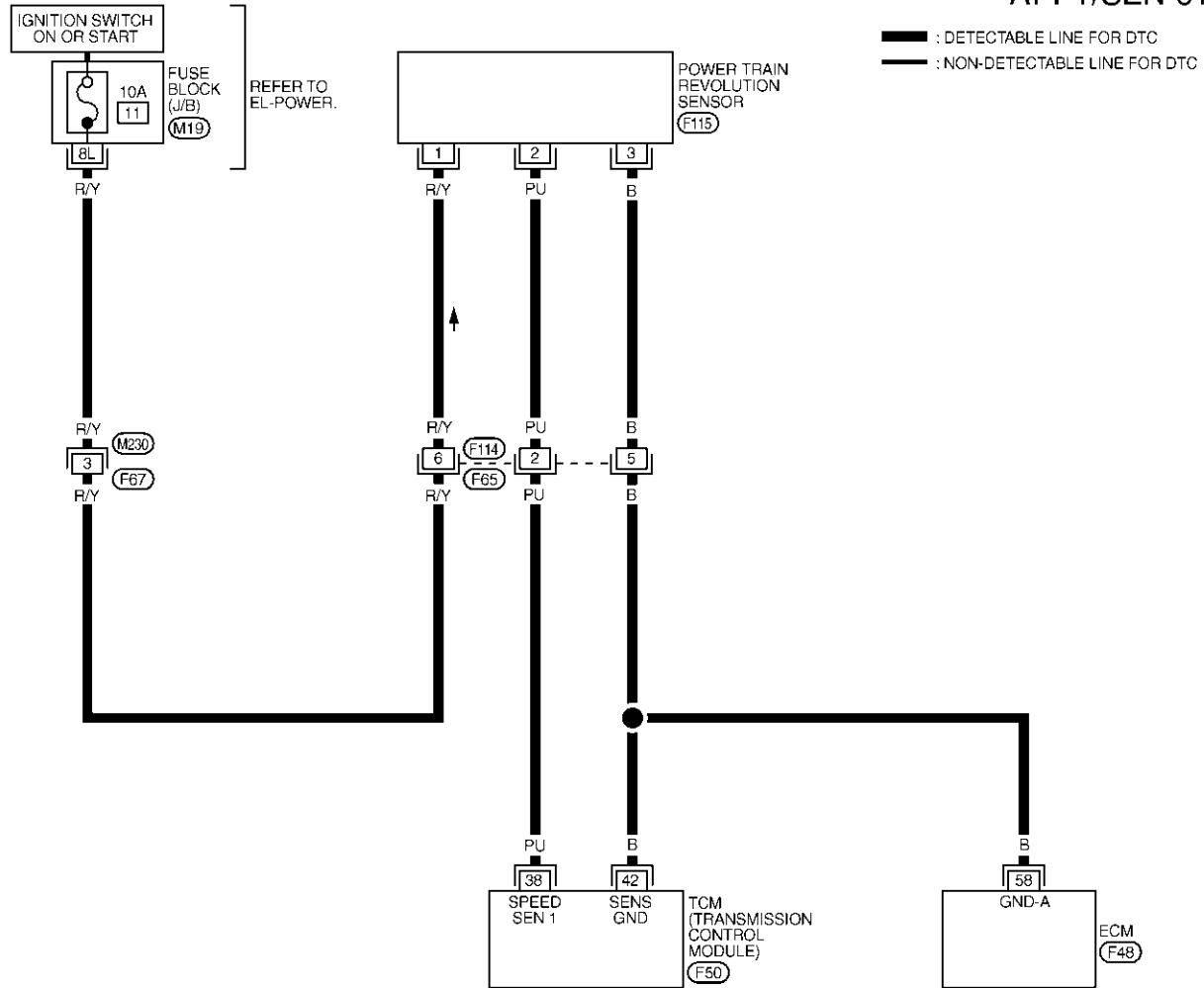
DTC POWER TRAIN REVOLUTION SENSOR

Wiring Diagram — AT — P/T SEN-01

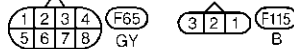
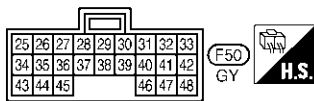
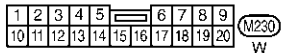
Wiring Diagram — AT — P/T SEN-01

NHAT0276

AT-PT/SEN-01



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REFER TO THE FOLLOWING.
 (M19) - FUSE BLOCK - JUNCTION BOX (J/B)
 (F48) - ELECTRICAL UNITS

MAT091B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)(Approx.)
38	PU	POWER TRAIN REVOLUTION SENSOR	WHEN MOVING 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. WHEN VEHICLE PARKS.	240 Hz
42	B	SENSOR GROUND	—	UNDER 1.3V OR OVER 4.5V 0V


SAT595KA


DTC POWER TRAIN REVOLUTION SENSOR


Diagnostic Procedure

Diagnostic Procedure

NHAT0274

1	CHECK INPUT SIGNAL															
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine. 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II. 3. Read out the value of "TURBINE REV". Check the value changes according to engine speed. <p>NOTE: "TURBINE REV" in "TCM INPUT SIGNALS" means power train revolution sensor.</p>																
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITORING</th> <th></th> </tr> </thead> <tbody> <tr> <td>ENGINE SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>TURBINE REV</td> <td>XXX rpm</td> </tr> <tr> <td>OVERDRIVE SW</td> <td>ON</td> </tr> <tr> <td>PN POSI SW</td> <td>OFF</td> </tr> <tr> <td>R POSITION SW</td> <td>OFF</td> </tr> </tbody> </table>			DATA MONITOR		MONITORING		ENGINE SPEED	XXX rpm	TURBINE REV	XXX rpm	OVERDRIVE SW	ON	PN POSI SW	OFF	R POSITION SW	OFF
DATA MONITOR																
MONITORING																
ENGINE SPEED	XXX rpm															
TURBINE REV	XXX rpm															
OVERDRIVE SW	ON															
PN POSI SW	OFF															
R POSITION SW	OFF															
SAT740J																
OK or NG																
OK	▶	GO TO 4.														
NG	▶	GO TO 2.														

2	CHECK POWER TRAIN REVOLUTION SENSOR (With CONSULT-II)							
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine. 								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Condition</th> <th>Judgement standard (Approx.)</th> </tr> </thead> <tbody> <tr> <td>When moving 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.</td> <td style="text-align: center;">240 Hz</td> </tr> <tr> <td>When vehicle parks.</td> <td style="text-align: center;">Under 1.3V or over 4.5V</td> </tr> </tbody> </table>			Condition	Judgement standard (Approx.)	When moving 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.	240 Hz	When vehicle parks.	Under 1.3V or over 4.5V
Condition	Judgement standard (Approx.)							
When moving 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.	240 Hz							
When vehicle parks.	Under 1.3V or over 4.5V							
MTBL1177								
OK or NG								
OK	▶	GO TO 4.						
NG	▶	GO TO 3.						

3	CHECK POWER TRAIN REVOLUTION SENSOR (Without CONSULT-II)	
<p> Without CONSULT-II</p> <p>Check the power train revolution sensor. Refer to AT-217, "Component Inspection".</p>		
OK or NG		
OK	▶	Harness for short or open between TCM, ECM and revolution sensor
NG	▶	Replace power train revolution sensor.

DTC POWER TRAIN REVOLUTION SENSOR

Diagnostic Procedure (Cont'd)

4	CHECK DTC
Perform "Diagnostic Trouble Code (DTC) confirmation procedure", AT-214.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ GO TO 5.

5	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminal for damage or loose connection with harness connector.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ Repair or replace damaged parts.

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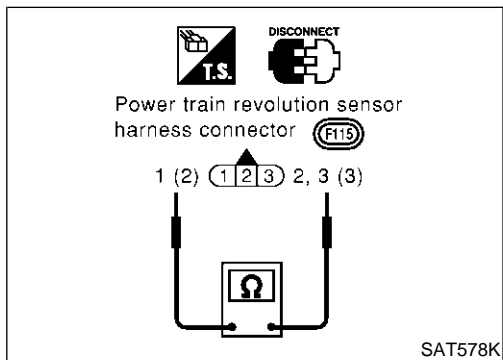
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Component Inspection

POWER TRAIN REVOLUTION SENSOR

NHAT0275

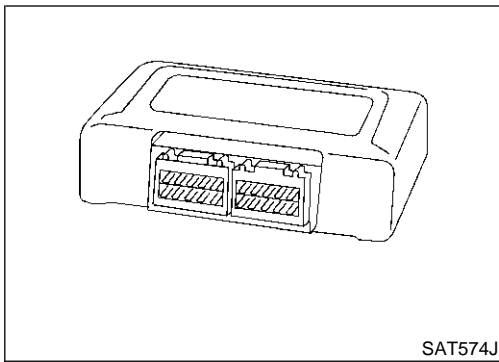
NHAT0275S01

- Check resistance between terminals 1 (R/Y), 2 (PU) and 3 (B).

Terminal No. (Wire color)		Resistance (Approx.)
1 (R/Y)	2 (PU)	No continuity
1 (R/Y)	3 (B)	No continuity
2 (PU)	3 (B)	2.4 - 2.8 kΩ

DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)

Description



Description

The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls the A/T. NHAT0085

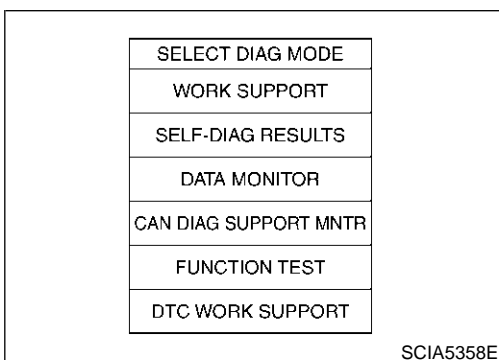
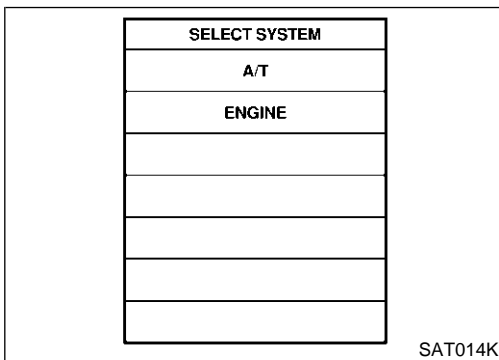
On Board Diagnosis Logic

Diagnostic trouble code CONTROL UNIT (RAM), CONTROL UNIT (ROM) with CONSULT-II is detected when TCM memory (RAM) or (ROM). NHAT0258

Possible Cause

TCM

NHAT0269



Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0259

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

Ⓔ WITH CONSULT-II

NHAT0259S01

- 1) Turn ignition switch ON and select "DATA MONITOR" mode for A/T with CONSULT-II.
- 2) Start engine.
- 3) Run engine for at least 2 seconds at idle speed.

DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)

Diagnostic Procedure

Diagnostic Procedure

NHAT0086

1	INSPECTION START	
<p>E With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch ON and select "SELF DIAGNOSIS" mode for A/T with CONSULT-II. 2. Touch "ERASE". 3. Perform "Diagnostic Trouble Code (DTC) Confirmation Procedure", AT-218. 4. Is the "CONTROL UNIT (RAM)" or "CONTROL UNIT (ROM)" displayed again? <p style="text-align: center;">Yes or No</p>		
Yes	▶	Replace TCM.
No	▶	INSPECTION END

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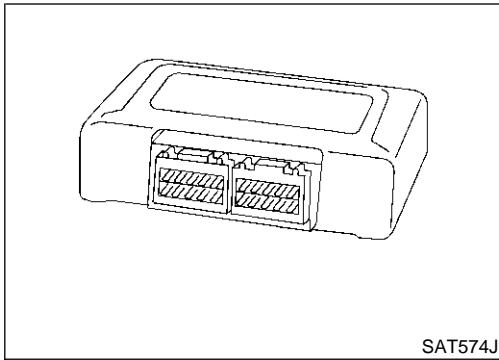
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DTC CONTROL UNIT (EEP ROM)

Description



Description

The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls the A/T. NHAT0199

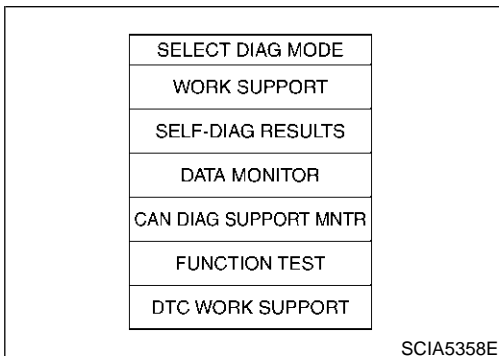
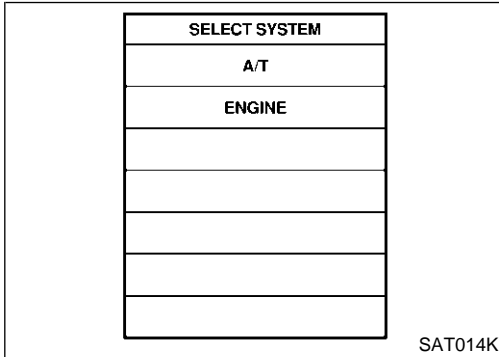
On Board Diagnosis Logic

Diagnostic trouble code CONTROL UNIT (EEP ROM) with CONSULT-II is detected when TCM memory (EEP ROM) is malfunctioning. NHAT0260

Possible Cause

TCM

NHAT0270



Diagnostic Trouble Code (DTC) Confirmation Procedure

NHAT0261

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓔ WITH CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode for A/T with CONSULT-II. NHAT0261S01
- 2) Start engine.
- 3) Run engine for at least 2 seconds at idle speed.

Diagnostic Procedure

=NHAT0200

1	CHECK DTC	
<p>E With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON" and select "SELF DIAGNOSIS" mode for A/T with CONSULT-II. 2. Move selector lever to "R" position. 3. Depress accelerator pedal (Full throttle position). 4. Touch "ERASE". 5. Turn ignition switch to "OFF" position for 10 seconds. 6. Perform "Diagnostic Trouble Code (DTC) Confirmation Procedure", AT-220. <p style="text-align: center;">Is the "CONT UNIT (EEP ROM)" displayed again?</p>		
Yes	▶	Replace TCM.
No	▶	INSPECTION END

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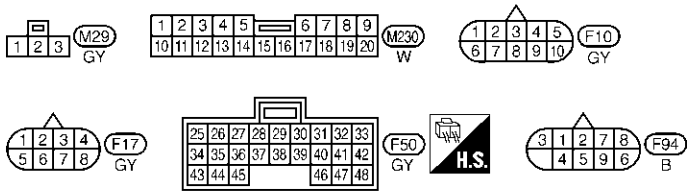
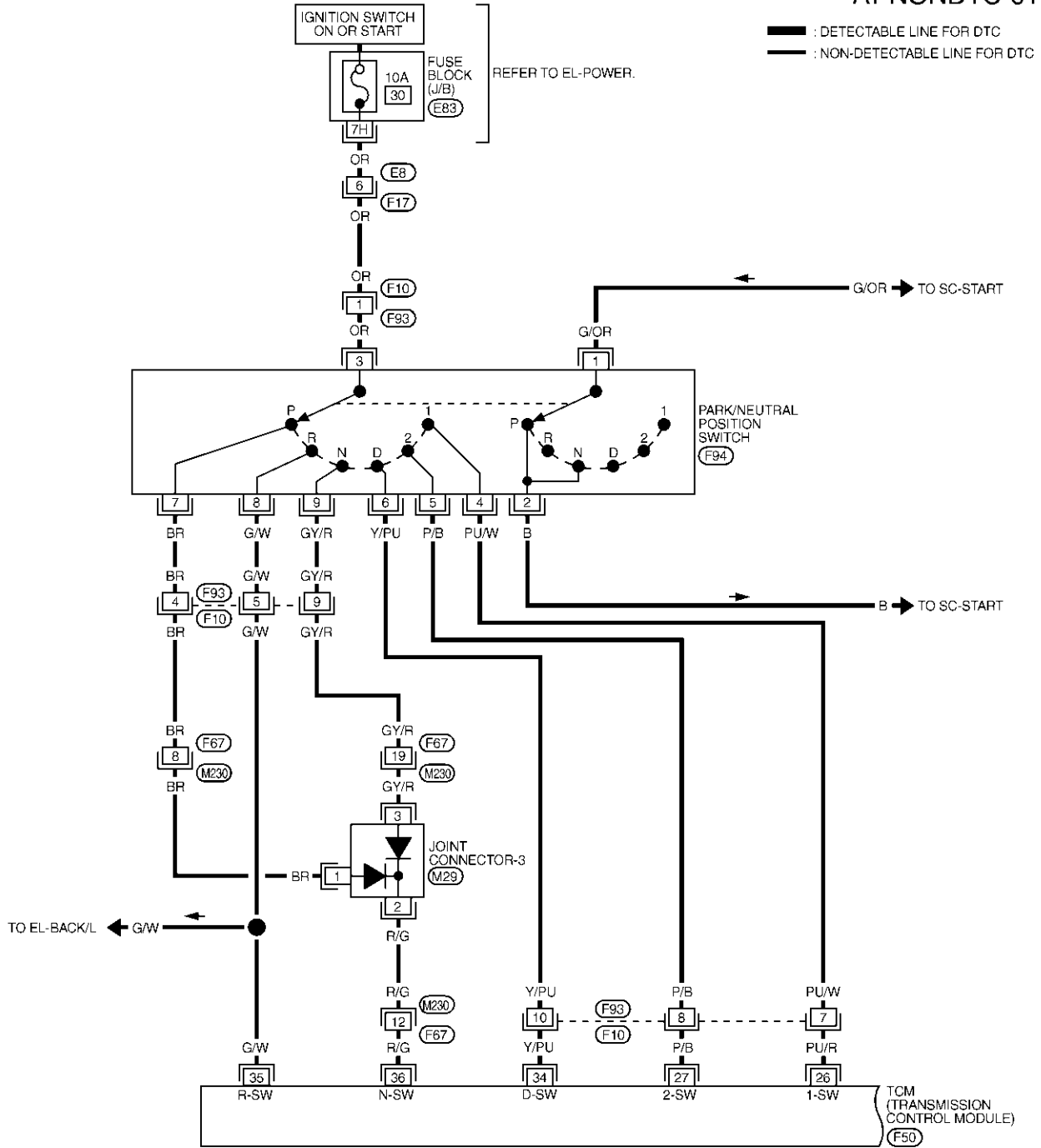
TROUBLE DIAGNOSES FOR SYMPTOMS

Wiring Diagram — AT — NONDTC

Wiring Diagram — AT — NONDTC

NHAT0087

AT-NONDTC-01



REFER TO THE FOLLOWING.
 (E83) - FUSE BLOCK-JUNCTION BOX (J/B)

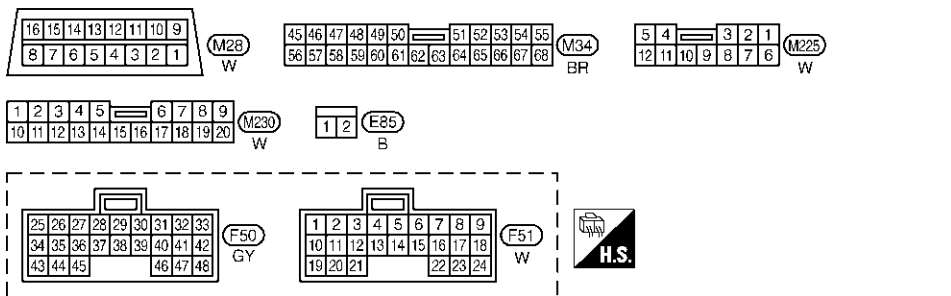
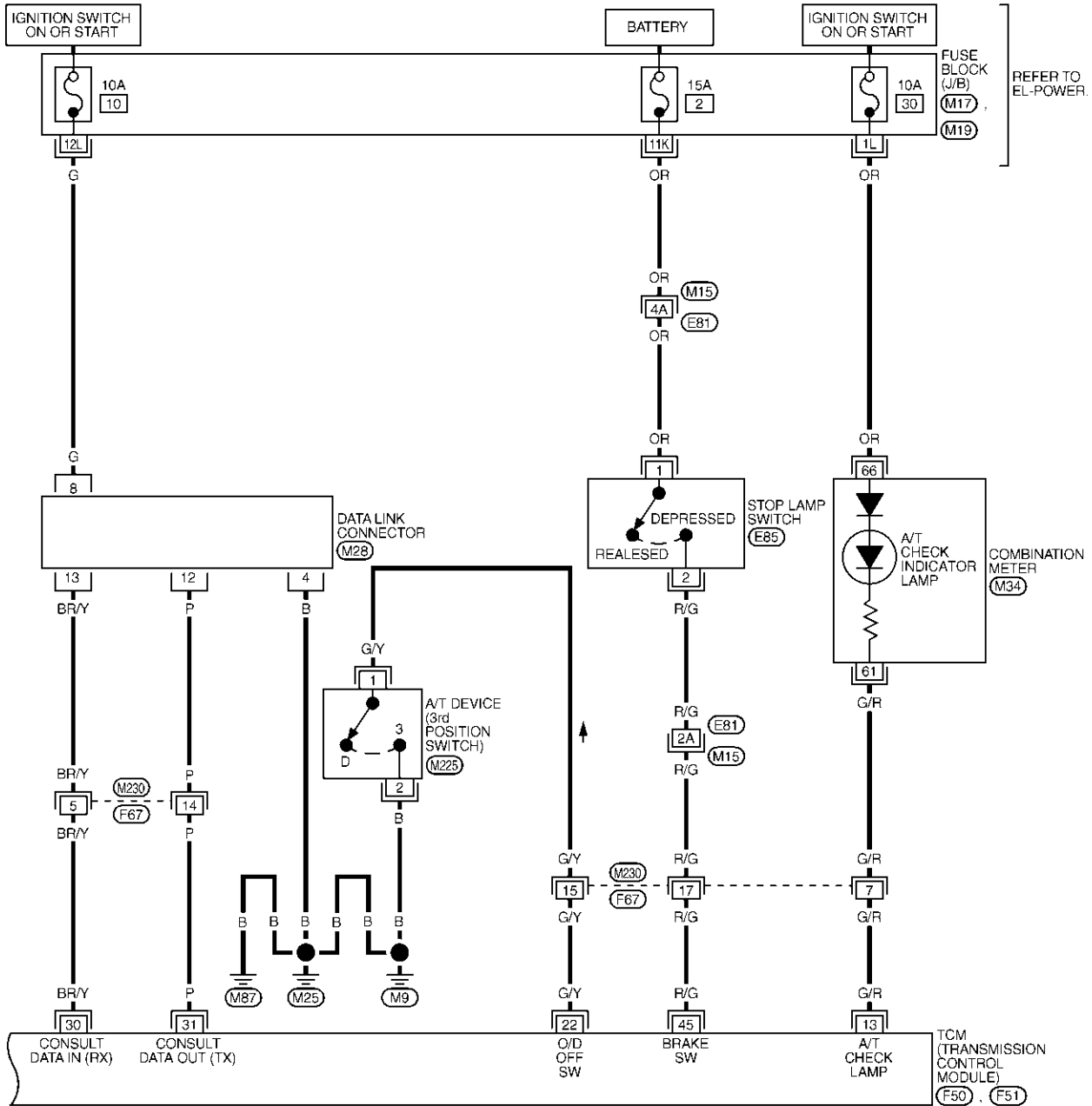
TROUBLE DIAGNOSES FOR SYMPTOMS

Wiring Diagram — AT — NONDTC (Cont'd)

AT-NONDTC-02

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

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REFER TO THE FOLLOWING:
 (M15) - SUPER
 MULTIPLE JUNCTION (SMJ)
 (M17) . (M19) - FUSE BLOCK -
 JUNCTION BOX (J/B)



MAT100B

TROUBLE DIAGNOSES FOR SYMPTOMS

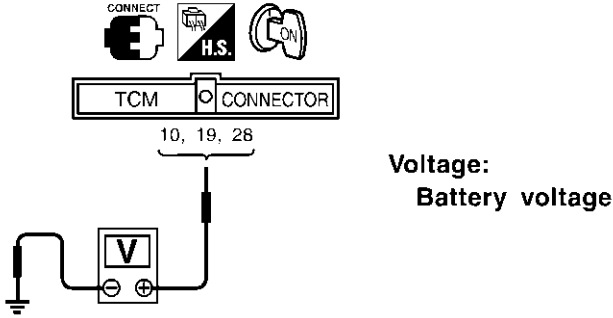
A/T CHECK Indicator Lamp Does Not Come On

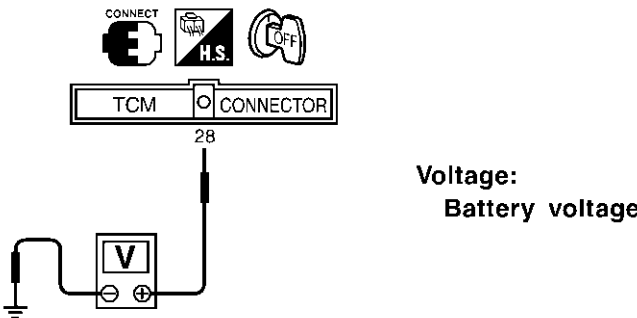
A/T CHECK Indicator Lamp Does Not Come On

NHAT0088

SYMPTOM:

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

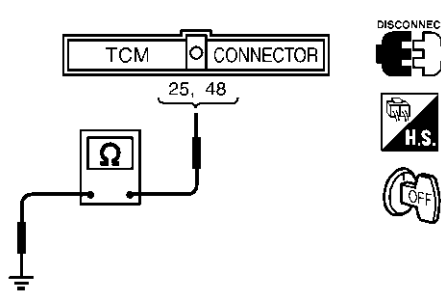
1	CHECK TCM POWER SOURCE
<p>1. Turn ignition switch to ON position. (Do not start engine.)</p> <p>2. Check voltage between TCM harness connectors F50, F51 terminals 10 (R/Y), 19 (R/Y), 28 (Y/R) and ground. Refer to AT-102, "Wiring Diagram —AT— MAIN".</p>	
 <p style="text-align: right;">Voltage: Battery voltage</p>	
SAT611J	
OK or NG	
OK	▶ GO TO 2.
NG	▶ GO TO 3.

2	CHECK POWER SOURCE STEP 2
<p>1. Turn ignition switch to OFF position.</p> <p>2. Check voltage between TCM harness connector F50 terminal 28 (Y/R) and ground. Refer to AT-102, "Wiring Diagram —AT— MAIN".</p>	
 <p style="text-align: right;">Voltage: Battery voltage</p>	
SAT612JG	
OK or NG	
OK	▶ GO TO 4.
NG	▶ GO TO 3.

3	DETECT MALFUNCTIONING ITEM
<p>Check the following items:</p> <ul style="list-style-type: none"> ● Harness for short or open between battery, ignition switch and TCM Refer to AT-102, "Wiring Diagram — AT — MAIN". ● Ignition switch and fuse Refer to EL-11, "POWER SUPPLY ROUTING". 	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Repair or replace damaged parts.

TROUBLE DIAGNOSES FOR SYMPTOMS

A/T CHECK Indicator Lamp Does Not Come On (Cont'd)

4	CHECK TCM GROUND CIRCUIT	<p>1. Turn ignition switch to OFF position. 2. Disconnect TCM harness connector. 3. Check continuity between TCM harness connector F50 terminals 25 (B), 48 (B) and ground. Refer to AT-102, "Wiring Diagram — AT — MAIN".</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT515J</p> <p>Continuity should exist. If OK, check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	GI MA EM LC EC FE
OK	▶	GO TO 5.	
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors. Refer to "Wiring Diagram — AT — MAIN" in AT-102.	AT

5	DETECT MALFUNCTIONING ITEM	<p>Check the following items:</p> <ul style="list-style-type: none"> ● A/T CHECK indicator lamp ● Harness and fuse for short or open between ignition switch and combination meter Refer to EL-11, "POWER SUPPLY ROUTING". ● Harness for short or open between combination meter and TCM <p style="text-align: center;">OK or NG</p>	AX SU BR
OK	▶	GO TO 6.	ST
NG	▶	Repair or replace damaged parts.	

6	CHECK SYMPTOM	<p>Check again.</p> <p style="text-align: center;">OK or NG</p>	RS BT
OK	▶	INSPECTION END	HA
NG	▶	GO TO 7.	

7	CHECK TCM INSPECTION	<p>1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.</p> <p style="text-align: center;">OK or NG</p>	SC EL
OK	▶	INSPECTION END	IDX
NG	▶	Repair or replace damaged parts.	

TROUBLE DIAGNOSES FOR SYMPTOMS

Engine Cannot Be Started In P and N Position

Engine Cannot Be Started In P and N Position

=NHAT0089

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 PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT
<p>Ⓔ With CONSULT-II Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?</p>	
<p>ⓧ Without CONSULT-II Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?</p>	
SAT555K	
Yes or No	
Yes	▶ Check park/neutral position (PNP) switch circuit. Refer to "DTC P0705", AT-109.
No	▶ GO TO 2.

2	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH
Check for short or open of park/neutral position (PNP) switch harness connector F94 terminals 1 (G/OR) and 2 (B). Refer to AT-111.	
OK or NG	
OK	▶ GO TO 3.
NG	▶ Repair or replace park/neutral position (PNP) switch.

3	ADJUST CONTROL CABLE
Check control cable. Refer to AT-285.	
SAT023JA	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Adjust control cable. Refer to AT-285.

TROUBLE DIAGNOSES FOR SYMPTOMS

Engine Cannot Be Started In P and N Position (Cont'd)

4	CHECK STARTING SYSTEM	
Check starting system. Refer to SC-10, "System Description".		
OK or NG		
OK	▶	INSPECTION END
NG	▶	Repair or replace damaged parts.

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TROUBLE DIAGNOSES FOR SYMPTOMS

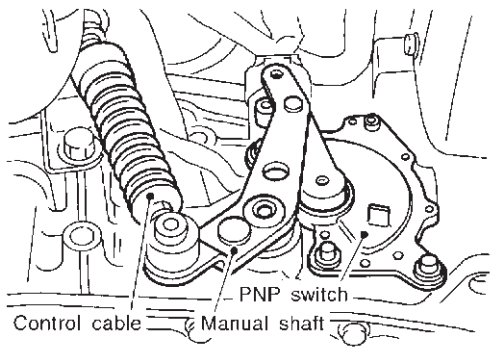
In P Position, Vehicle Moves Forward or Backward When Pushed

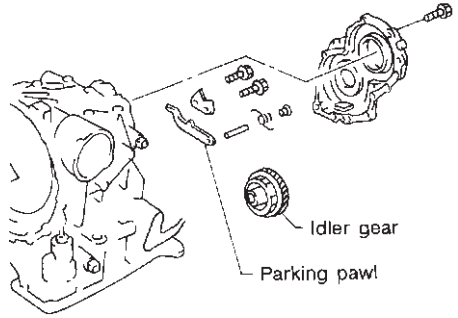
In P Position, Vehicle Moves Forward or Backward When Pushed

=NHAT0090

SYMPTOM:

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

1	ADJUST CONTROL CABLE	<p>Check control cable. Refer to AT-285.</p>  <p style="text-align: right;">SAT023JA</p>	
OK or NG			
OK	▶	GO TO 2.	
NG	▶	Adjust control cable. Refer to AT-285.	

2	CHECK PARKING COMPONENTS	<p>Check parking components. Refer to AT-289, 363, "Overhaul" and "Assembly".</p>  <p style="text-align: right;">SAT282F</p>	
OK or NG			
OK	▶	INSPECTION END	
NG	▶	Repair or replace damaged parts.	

TROUBLE DIAGNOSES FOR SYMPTOMS

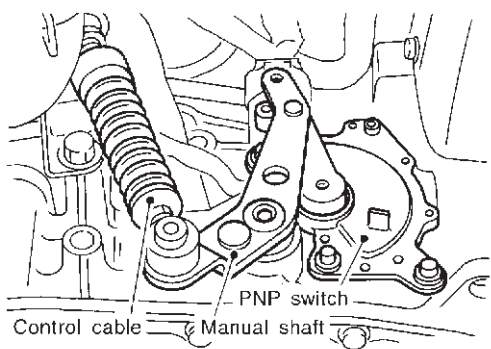
In N Position, Vehicle Moves


In N Position, Vehicle Moves

=NHAT0091

SYMPTOM:

Vehicle moves forward or backward when selecting N position.

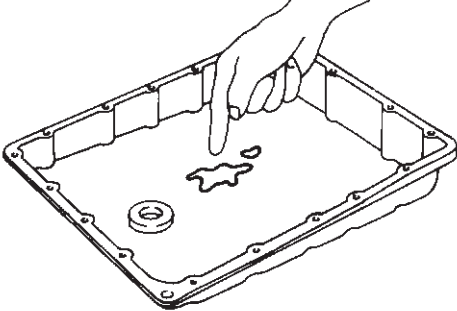
1	ADJUST CONTROL CABLE	<p>Check control cable. Refer to AT-285.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT023JA</p>	
OK or NG			
OK	▶	GO TO 2.	
NG	▶	Adjust control cable. Refer to AT-285.	

2	CHECK A/T FLUID LEVEL	<p>Check A/T fluid level again.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT638A</p>	
OK or NG			
OK	▶	GO TO 3.	
NG	▶	Refill ATF.	

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TROUBLE DIAGNOSES FOR SYMPTOMS

In N Position, Vehicle Moves (Cont'd)

3	CHECK A/T FLUID CONDITION	
<p>1. Remove oil pan. 2. Check A/T fluid condition.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT171B</p>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING ITEM	
<p>1. Disassemble A/T. Refer to AT-294. 2. Check the following items:</p> <ul style="list-style-type: none"> ● Forward clutch assembly ● Overrun clutch assembly ● Reverse clutch assembly 		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair or replace damaged parts.

5	CHECK SYMPTOM	
Check again.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 6.

6	CHECK TCM INSPECTION	
<p>1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.</p>		
OK or NG		
OK	▶	INSPECTION END
NG	▶	Repair or replace damaged parts.

TROUBLE DIAGNOSES FOR SYMPTOMS

Large Shock. N → R Position

Large Shock. N → R Position

=NHAT0092

SYMPTOM:

There is large shock when changing from N to R position.

1	CHECK SELF-DIAGNOSTIC RESULTS	
Does self-diagnosis show damage to A/T fluid temperature sensor, line pressure solenoid valve or accelerator pedal position sensor (throttle position sensor) circuit?		
SAT582KA		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK DAMAGED CIRCUIT	
Check damaged circuit.		
▶ Refer to "DTC P0710, P0745 or P1705", AT-115, 173 or 189.		

3	CHECK LINE PRESSURE	
Check line pressure at idle with selector lever in D position. Refer to AT-69, "LINE PRESSURE TEST".		
SAT494G		
OK or NG		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to AT-283.		
2. Check the following items:		
<ul style="list-style-type: none"> ● Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter) ● Line pressure solenoid valve ● Oil pump assembly 		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair or replace damaged parts.

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TROUBLE DIAGNOSES FOR SYMPTOMS

Large Shock. N → R Position (Cont'd)

5	CHECK SYMPTOM
Check again.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ GO TO 6.

6	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ Repair or replace damaged parts.

TROUBLE DIAGNOSES FOR SYMPTOMS


Vehicle Does Not Creep Backward In R Position

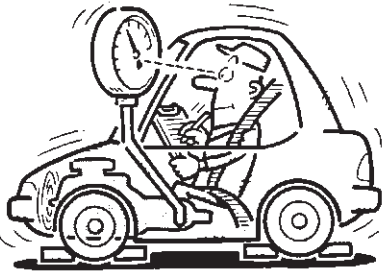
Vehicle Does Not Creep Backward In R Position

=NHAT0093

SYMPTOM:

Vehicle does not creep backward when selecting R position.

1	CHECK A/T FLUID LEVEL	
Check A/T fluid level again.		
		
SAT638A		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Refill ATF.

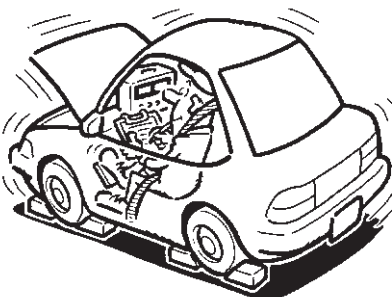
2	CHECK LINE PRESSURE	
Check line pressure at idle with selector lever in R position. Refer to AT-69, "LINE PRESSURE TEST".		
		
SAT494G		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING ITEM	
<ol style="list-style-type: none"> 1. Remove control valve assembly. Refer to AT-283, "ON-VEHICLE SERVICE". 2. Check the following items: <ul style="list-style-type: none"> ● Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter) ● Line pressure solenoid valve 3. Disassemble A/T. Refer to AT-294. 4. Check the following item: <ul style="list-style-type: none"> ● Oil pump assembly 		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace damaged parts.

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TROUBLE DIAGNOSES FOR SYMPTOMS

Vehicle Does Not Creep Backward In R Position (Cont'd)

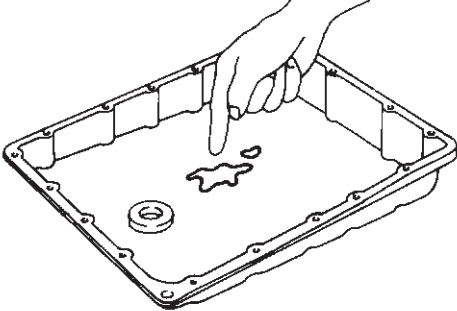
4	CHECK STALL REVOLUTION	
<p>Check stall revolution with selector lever in 1st and R positions.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT493G</p>		
OK or NG		
	OK (Refer to "Stall test", AT-65.)	▶ GO TO 7.
	OK in 1st position, NG in R position	▶ GO TO 5.
	NG in both 1st and R positions	▶ GO TO 6.

5	DETECT MALFUNCTIONING ITEM	
<p>1. Disassemble A/T. Refer to AT-294. 2. Check the following item:</p> <ul style="list-style-type: none"> ● Reverse clutch assembly 		
OK or NG		
	OK	▶ GO TO 7.
	NG	▶ Repair or replace damaged parts.

6	DETECT MALFUNCTIONING ITEM	
<p>1. Disassemble A/T. Refer to AT-294. 2. Check the following items:</p> <ul style="list-style-type: none"> ● Reverse clutch assembly ● High clutch assembly ● Low & reverse brake assembly ● Forward clutch assembly ● Overrun clutch assembly 		
OK or NG		
	OK	▶ GO TO 7.
	NG	▶ Repair or replace damaged parts.

TROUBLE DIAGNOSES FOR SYMPTOMS

Vehicle Does Not Creep Backward In R Position (Cont'd)

7	CHECK A/T FLUID CONDITION		
<p>1. Remove oil pan. 2. Check A/T fluid condition.</p>			
			
SAT171B			
OK or NG			
OK	▶	GO TO 9.	
NG	▶	GO TO 8.	

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8	DETECT MALFUNCTIONING ITEM		
<p>1. Disassemble A/T. Refer to AT-294. 2. Check the following items:</p> <ul style="list-style-type: none"> ● Reverse clutch assembly ● High clutch assembly ● Low & reverse brake assembly ● Forward clutch assembly ● Overrun clutch assembly 			
OK or NG			
OK	▶	GO TO 9.	
NG	▶	Repair or replace damaged parts.	

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9	CHECK SYMPTOM		
Check again.			
OK or NG			
OK	▶	INSPECTION END	
NG	▶	GO TO 10.	

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10	CHECK TCM INSPECTION		
<p>1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.</p>			
OK or NG			
OK	▶	INSPECTION END	
NG	▶	Repair or replace damaged parts.	

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TROUBLE DIAGNOSES FOR SYMPTOMS


Vehicle Does Not Creep Forward in D, 2nd or 1st Position

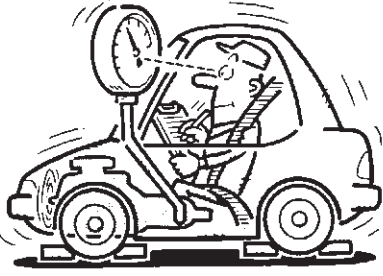
Vehicle Does Not Creep Forward in D, 2nd or 1st Position

=NHAT0094

SYMPTOM:

Vehicle does not creep forward when selecting D, 2nd or 1st position.

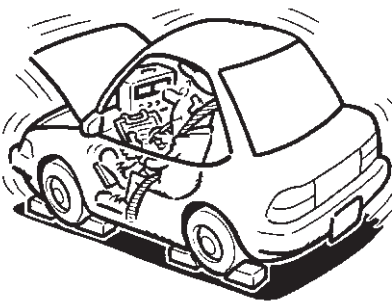
1	CHECK A/T FLUID LEVEL	
Check A/T fluid level again.		
		
SAT638A		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Refill ATF.

2	CHECK LINE PRESSURE	
Check line pressure at idle with selector lever in D position. Refer to AT-69, "LINE PRESSURE TEST".		
		
SAT494G		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING ITEM	
<ol style="list-style-type: none"> 1. Remove control valve assembly. Refer to AT-283. 2. Check the following items: <ul style="list-style-type: none"> ● Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter) ● Line pressure solenoid valve 3. Disassemble A/T. Refer to AT-294. 4. Check the following item: <ul style="list-style-type: none"> ● Oil pump assembly 		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace damaged parts.

TROUBLE DIAGNOSES FOR SYMPTOMS

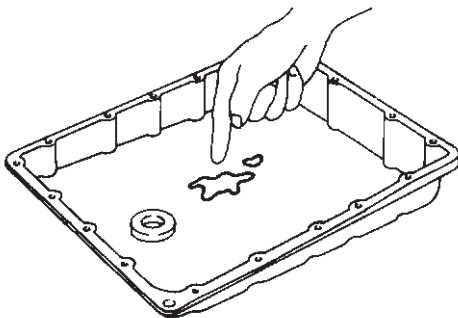
Vehicle Does Not Creep Forward in D, 2nd or 1st Position (Cont'd)

4	CHECK STALL REVOLUTION	
<p>Check stall revolution with selector lever in D position. Refer to AT-65, "STALL TEST".</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT493G</p>		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

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5	DETECT MALFUNCTIONING ITEM	
<p>1. Disassemble A/T. Refer to AT-294. 2. Check the following items:</p> <ul style="list-style-type: none"> ● Forward clutch assembly ● Forward one-way clutch ● Low one-way clutch ● Reverse clutch assembly ● High clutch assembly <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	Repair or replace damaged parts.

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6	CHECK A/T FLUID CONDITION	
<p>1. Remove oil pan. 2. Check A/T fluid condition.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT171B</p>		
OK or NG		
OK	▶	GO TO 8.
NG	▶	GO TO 7.

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TROUBLE DIAGNOSES FOR SYMPTOMS

Vehicle Does Not Creep Forward in D, 2nd or 1st Position (Cont'd)

7		DETECT MALFUNCTIONING ITEM
1. Disassemble A/T. Refer to AT-294. 2. Check the following items: <ul style="list-style-type: none">● Forward clutch assembly● Forward one-way clutch● Low one-way clutch● Reverse clutch assembly● High clutch assembly		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

8		CHECK SYMPTOM
Check again.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 9.

9		CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	Repair or replace damaged parts.

TROUBLE DIAGNOSES FOR SYMPTOMS

Vehicle Cannot Be Started From D₁

Vehicle Cannot Be Started From D₁

=NHAT0095

SYMPTOM:

Vehicle cannot be started from D₁ on Cruise test — Part 1.

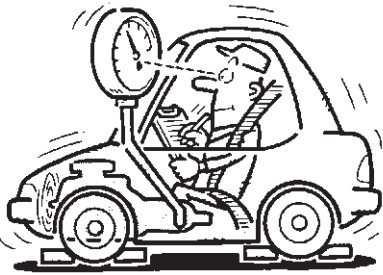
1	CHECK SYMPTOM
Is "Vehicle Does Not Creep Backward In R Position" OK?	
Yes or No	
Yes	▶ GO TO 2.
No	▶ Go to "Vehicle Does Not Creep Backward In R Position", AT-233.

2	CHECK SELF-DIAGNOSTIC RESULTS
Does self-diagnosis show damage to vehicle speed sensor-A/T (revolution sensor), overrun clutch solenoid valve, torque converter clutch solenoid valve, shift solenoid valve A, B or vehicle speed sensor-MTR after cruise test?	
<p style="text-align: right;">SAT733K</p>	
Yes or No	
Yes	▶ Check damaged circuit. Refer to "DTC P0720, P0740, P0750, P0755, P1760 or VHCL SPEED SEN-MTR", AT-121, 158, 179, 184, 196 or 208.
No	▶ GO TO 3.

3	CHECK ACCELERATOR PEDAL POSITION SENSOR
Check accelerator pedal position sensor. Refer to AT-189, "DTC P1705".	
<p style="text-align: right;">SAT516KB</p>	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Repair or replace accelerator pedal position sensor.

TROUBLE DIAGNOSES FOR SYMPTOMS

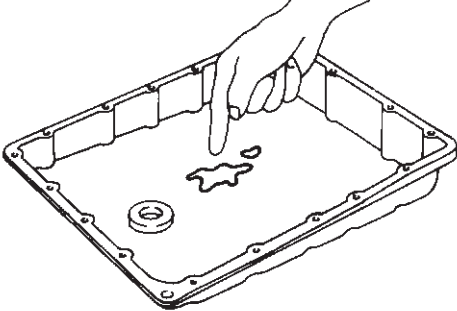
Vehicle Cannot Be Started From D₁ (Cont'd)

4	CHECK LINE PRESSURE
Check line pressure at stall point with selector lever in D position. Refer to "LINE PRESSURE TEST", AT-69.	
	
SAT494G	
OK or NG	
OK	▶ GO TO 6.
NG	▶ GO TO 5.

5	DETECT MALFUNCTIONING ITEM
1. Remove control valve assembly. Refer to AT-283.	
2. Check the following items:	
● Shift valve A	
● Shift valve B	
● Shift solenoid valve A	
● Shift solenoid valve B	
● Pilot valve	
● Pilot filter	
3. Disassemble A/T. Refer to AT-294.	
4. Check the following items:	
● High clutch assembly	
● Torque converter	
● Oil pump assembly	
● Reverse clutch assembly	
● Low & reverse brake assembly	
OK or NG	
OK	▶ GO TO 8.
NG	▶ Repair or replace damaged parts.

TROUBLE DIAGNOSES FOR SYMPTOMS

Vehicle Cannot Be Started From D₁ (Cont'd)

6	CHECK A/T FLUID CONDITION	
<p>1. Remove oil pan. 2. Check A/T fluid condition.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT171B</p>		
OK or NG		
OK	▶	GO TO 7.
NG	▶	GO TO 5.

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7	DETECT MALFUNCTIONING ITEM	
<p>1. Remove control valve assembly. Refer to AT-283. 2. Check the following items:</p> <ul style="list-style-type: none"> ● 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.

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8	CHECK SYMPTOM	
Check again.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 9.

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9	CHECK TCM INSPECTION	
<p>1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.</p>		
OK or NG		
OK	▶	INSPECTION END
NG	▶	Repair or replace damaged parts.

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TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$

A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$

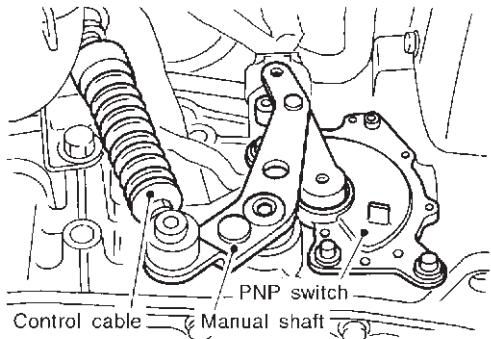
=NHAT0096

SYMPTOM:

A/T does not shift from D_1 to D_2 at the specified speed.

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

1	CHECK SYMPTOM	
Are "Vehicle Does Not Creep Forward In D, 2nd or 1st Position" and "Vehicle Cannot Be Started From D_1 " OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to "Vehicle Does Not Creep Forward In D, 2nd or 1st Position" and "Vehicle Cannot Be Started From D_1 ", AT-236, AT-239.

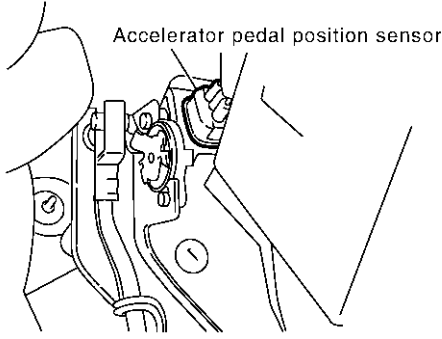
2	ADJUST CONTROL CABLE	
Check control cable. Refer to AT-285.		
		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Adjust control cable. Refer to AT-285.

SAT023JA

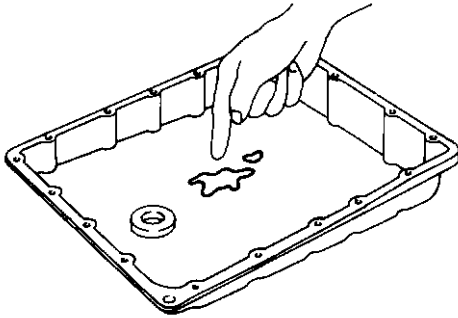
3	CHECK VEHICLE SPEED SENSOR-A/T AND VEHICLE SPEED SENSOR-MTR CIRCUIT	
Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to "DTC P0720 and VHCL SPEED SEN-MTR", AT-121 and AT-208.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuits.

TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Shift: D₁ → D₂ or Does Not Kickdown: D₄ → D₂ (Cont'd)

4	CHECK ACCELERATOR PEDAL POSITION SENSOR	
Check accelerator pedal position sensor. Refer to AT-189, "DTC P1705".		
		
SAT516KB		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair or replace accelerator pedal position sensor.

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5	CHECK A/T FLUID CONDITION	
<ol style="list-style-type: none"> 1. Remove oil pan. 2. Check A/T fluid condition. 		
		
SAT171B		
OK or NG		
OK	▶	GO TO 7.
NG	▶	GO TO 6.

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6	DETECT MALFUNCTIONING ITEM	
<ol style="list-style-type: none"> 1. Remove control valve. Refer to AT-283. 2. Check the following items: <ul style="list-style-type: none"> ● Shift valve A ● Shift valve B ● Shift solenoid valve A ● Shift solenoid valve B ● Pilot valve ● Pilot filter 3. Disassemble A/T. Refer to AT-294. 4. Check the following items: <ul style="list-style-type: none"> ● Servo piston assembly ● Brake band 		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

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TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$ (Cont'd)

7		DETECT MALFUNCTIONING ITEM
1. Remove control valve. Refer to AT-283. 2. Check the following items: <ul style="list-style-type: none">● 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.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 9.

9		CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	Repair or replace damaged parts.

TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Shift: D₂ → D₃

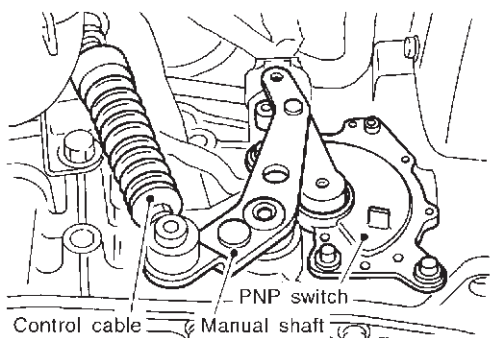
A/T Does Not Shift: D₂ → D₃

=NHAT0097

SYMPTOM:

A/T does not shift from D₂ to D₃ at the specified speed.

1	CHECK SYMPTOM	
Are "Vehicle Does Not Creep Forward In D, 2nd or 1st Position" and "Vehicle Cannot Be Started From D ₁ " OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to "Vehicle Does Not Creep Forward In D, 2nd or 1st Position" and "Vehicle Cannot Be Started From D ₁ ", AT-236, AT-239.

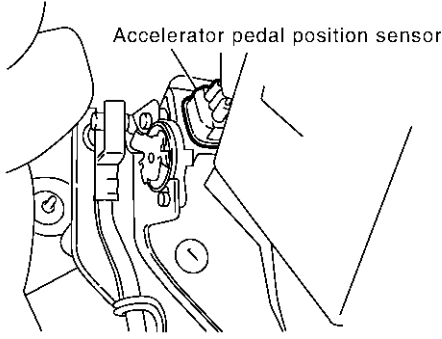
2	ADJUST CONTROL CABLE	
Check control cable. Refer to AT-285.		
		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Adjust control cable. Refer to AT-285.

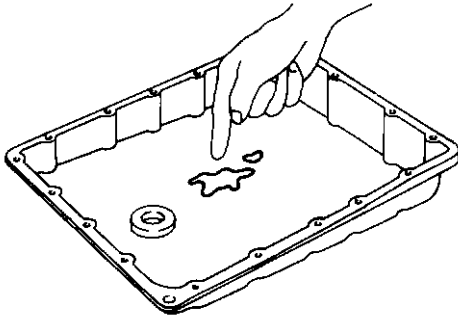
3	CHECK VEHICLE SPEED SENSOR-A/T AND VEHICLE SPEED SENSOR-MTR CIRCUIT	
Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to "DTC P0720 and VHCL SPEED SEN-MTR", AT-121 and AT-208.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuits.

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TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Shift: D₂ → D₃ (Cont'd)

4	CHECK ACCELERATOR PEDAL POSITION SENSOR	
<p>Check accelerator pedal position sensor. Refer to AT-189, "DTC P1705".</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT516KB</p>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair or replace accelerator pedal position sensor.

5	CHECK A/T FLUID CONDITION	
<p>1. Remove oil pan. 2. Check A/T fluid condition.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT171B</p>		
OK or NG		
OK	▶	GO TO 7.
NG	▶	GO TO 6.

6	DETECT MALFUNCTIONING ITEM	
<p>1. Remove control valve assembly. Refer to AT-283. 2. Check the following items:</p> <ul style="list-style-type: none"> ● Shift valve B ● Shift solenoid valve B ● Pilot valve ● Pilot filter <p>3. Disassemble A/T. Refer to AT-294. 4. Check the following items:</p> <ul style="list-style-type: none"> ● Servo piston assembly ● High clutch assembly ● Brake band 		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Shift: D₂ → D₃ (Cont'd)

7	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to AT-283. 2. Check the following items: <ul style="list-style-type: none"> ● Shift valve B ● Shift solenoid valve B ● Pilot valve ● Pilot filter 		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

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8	CHECK SYMPTOM	
Check again.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 9.

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9	CHECK TCM INSPECTION	
1. Perform TCM input/output signal inspection. 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.

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TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Shift: $D_3 \rightarrow D_4$

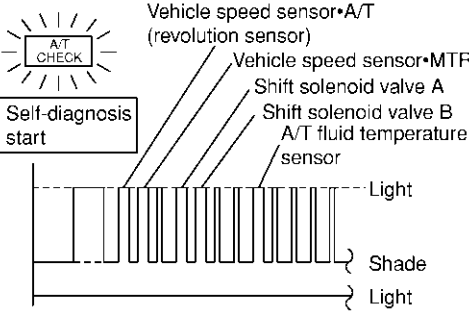
A/T Does Not Shift: $D_3 \rightarrow D_4$

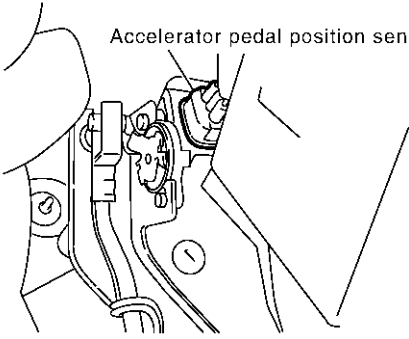
=NHAT0098

SYMPTOM:

- A/T does not shift from D_3 to D_4 at the specified speed.
- A/T must be warm before D_3 to D_4 shift will occur.

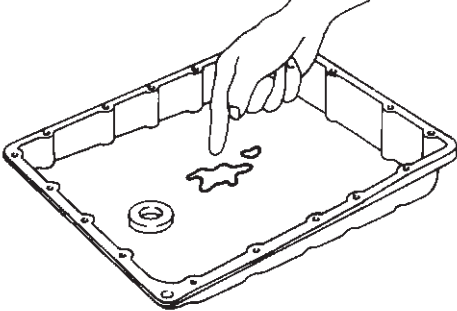
1	CHECK SYMPTOM
Are "Vehicle Does Not Creep Forward In D, 2nd or 1st Position" and "Vehicle Cannot Be Started From D_1 " OK?	
Yes or No	
Yes	▶ GO TO 2.
No	▶ Go to "Vehicle Does Not Creep Forward In D, 2nd or 1st Position" and "Vehicle Cannot Be Started From D_1 ", AT-236, AT-239.

2	CHECK SELF-DIAGNOSTIC RESULTS
<p>E With CONSULT-II Does self-diagnosis, after cruise test, show damage to any of the following circuits?</p> <ul style="list-style-type: none"> ● Park/neutral position (PNP) switch ● 3rd position switch ● A/T fluid temperature sensor ● Vehicle speed sensor-A/T (revolution sensor) ● Shift solenoid valve A or B ● Vehicle speed sensor-MTR 	
	
SAT586K	
Yes or No	
Yes	▶ Check damaged circuit. Refer to "DTC P0705, P0710, P0720, P0750, P0755 or VHCL SPEED SEN-MTR", AT-109, AT-115, AT-121, AT-179, AT-184 or AT-208.
No	▶ GO TO 3.

3	CHECK ACCELERATOR PEDAL POSITION SENSOR
Check accelerator pedal position sensor. Refer to AT-189, "DTC P1705".	
	
SAT516KB	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Repair or replace accelerator pedal position sensor.

TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Shift: D₃ → D₄ (Cont'd)

4	CHECK A/T FLUID CONDITION	
<p>1. Remove oil pan. 2. Check A/T fluid condition.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT171B</p>		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

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5	DETECT MALFUNCTIONING ITEM	
<p>1. Remove control valve assembly. Refer to AT-283. 2. Check the following items:</p> <ul style="list-style-type: none"> ● Shift valve A ● Shift solenoid valve A ● Pilot valve ● Pilot filter <p>3. Disassemble A/T. Refer to AT-294. 4. Check the following items:</p> <ul style="list-style-type: none"> ● Servo piston assembly ● Brake band 		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

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6	DETECT MALFUNCTIONING ITEM	
<p>1. Remove control valve assembly. Refer to AT-283. 2. Check the following items:</p> <ul style="list-style-type: none"> ● 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.

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7	CHECK SYMPTOM	
Check again.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 8.

TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Shift: $D_3 \rightarrow D_4$ (Cont'd)

8	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ Repair or replace damaged parts.

TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Perform Lock-up

A/T Does Not Perform Lock-up

=NHAT0099

SYMPTOM:

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

1	CHECK SELF-DIAGNOSTIC RESULTS	
Does self-diagnosis show damage to A/T fluid temperature sensor, vehicle speed sensor-A/T (revolution sensor), engine speed signal, torque converter clutch solenoid valve or vehicle speed-MTR after cruise test?		
SAT734K		
Yes or No		
Yes	▶	Check damaged circuit. Refer to "DTC P0710, P0720, P0725, P0740 or VEHICLE SPEED SENSOR-MTR", AT-115, 121, 126, 158 or 208.
No	▶	GO TO 2.

2	CHECK ACCELERATOR PEDAL POSITION SENSOR	
Check accelerator pedal position sensor. Refer to AT-189, "DTC P1705".		
SAT516KB		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Repair or replace accelerator pedal position sensor.

3	DETECT MALFUNCTIONING ITEM	
<ol style="list-style-type: none"> 1. Remove control valve. Refer to AT-283. 2. Check the following items: <ul style="list-style-type: none"> ● Torque converter clutch control valve ● Torque converter relief valve ● Pilot valve ● Pilot filter 3. Disassemble A/T. Refer to AT-294. 4. Check the following item: <ul style="list-style-type: none"> ● Torque converter 		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace damaged parts.

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TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Perform Lock-up (Cont'd)

4	CHECK SYMPTOM
Check again.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ GO TO 5.

5	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ Repair or replace damaged parts.

TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Hold Lock-up Condition

A/T Does Not Hold Lock-up Condition

=NHAT0100

SYMPTOM:

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

1	CHECK SELF-DIAGNOSTIC RESULTS	
Does self-diagnosis show damage to engine speed signal circuit after cruise test?		
SAT551K		
Yes or No		
Yes	▶	Check engine speed signal circuit. Refer to "DTC P0725", AT-126.
No	▶	GO TO 2.

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2	CHECK A/T FLUID CONDITION	
<ol style="list-style-type: none"> Remove oil pan. Check A/T fluid condition. 		
SAT171B		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

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3	DETECT MALFUNCTIONING ITEM	
<ol style="list-style-type: none"> Remove control valve assembly. Refer to AT-283. Check the following items: <ul style="list-style-type: none"> Torque converter clutch control valve Pilot valve Pilot filter Disassemble A/T. Refer to AT-294. Check torque converter and oil pump assembly. 		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair or replace damaged parts.

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TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Hold Lock-up Condition (Cont'd)

4		DETECT MALFUNCTIONING ITEM
1. Remove control valve assembly. Refer to AT-283. 2. Check the following items: <ul style="list-style-type: none">● Torque converter clutch control valve● Pilot valve● Pilot filter		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair or replace damaged parts.

5		CHECK SYMPTOM
Check again.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 6.

6		CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	Repair or replace damaged parts.

TROUBLE DIAGNOSES FOR SYMPTOMS

Lock-up Is Not Released

Lock-up Is Not Released

=NHAT0101

SYMPTOM:

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

1	CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR) CIRCUIT	
<p><input type="radio"/> With CONSULT-II Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to accelerator pedal position sensor (throttle position sensor) circuit?</p>		
<p><input checked="" type="radio"/> Without CONSULT-II Does self-diagnosis show damage to accelerator pedal position sensor (throttle position sensor) circuit?</p>		
SAT555K		
Yes or No		
Yes	▶	Check accelerator pedal position sensor (throttle position sensor) circuit. Refer to "DTC P1705", AT-189.
No	▶	GO TO 2.

2	CHECK SYMPTOM	
Check again.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 3.

3	CHECK TCM INSPECTION	
<p>1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.</p>		
OK or NG		
OK	▶	INSPECTION END
NG	▶	Repair or replace damaged parts.

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TROUBLE DIAGNOSES FOR SYMPTOMS

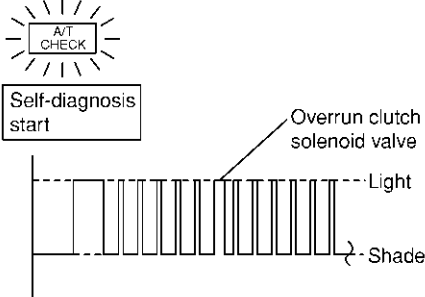
Engine Speed Does Not Return To Idle (Light Braking D₄ → D₃)

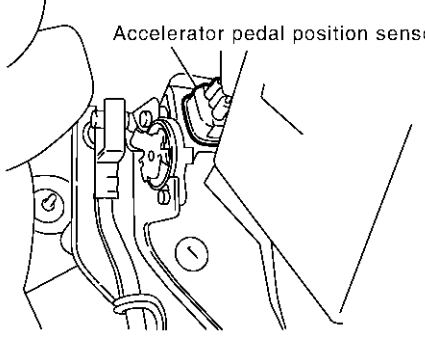
Engine Speed Does Not Return To Idle (Light Braking D₄ → D₃)

=NHAT0102

SYMPTOM:

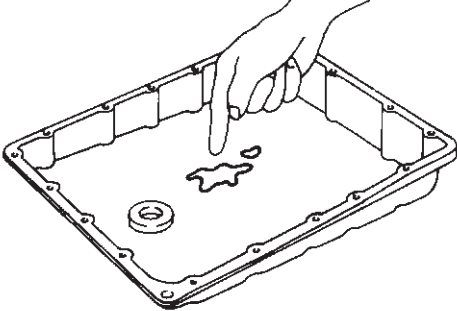
- Engine speed does not smoothly return to idle when A/T shifts from D₄ to D₃.
- Vehicle does not decelerate by engine brake when turning A/T selector lever D to 3rd position.
- Vehicle does not decelerate by engine brake when shifting A/T from D to 2nd position.

1	CHECK SELF-DIAGNOSTIC RESULTS
Does self-diagnosis show damage to overrun clutch solenoid valve circuit after cruise test?	
	
SAT548K	
Yes or No	
Yes	▶ Check overrun clutch solenoid valve circuit. Refer to "DTC P1760", AT-197.
No	▶ GO TO 2.

2	CHECK ACCELERATOR PEDAL POSITION SENSOR
Check accelerator pedal position sensor. Refer to AT-189, "DTC P1705".	
	
SAT516KB	
OK or NG	
OK	▶ GO TO 3.
NG	▶ Repair or replace accelerator pedal position sensor.

TROUBLE DIAGNOSES FOR SYMPTOMS

Engine Speed Does Not Return To Idle (Light Braking D₄ → D₃) (Cont'd)

3	CHECK A/T FLUID CONDITION	
<p>1. Remove oil pan. 2. Check A/T fluid condition.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT171B</p>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

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4	DETECT MALFUNCTIONING ITEM	
<p>1. Remove control valve assembly. Refer to AT-283. 2. Check the following items:</p> <ul style="list-style-type: none"> ● Overrun clutch control valve ● Overrun clutch reducing valve ● Overrun clutch solenoid valve <p>3. Disassemble A/T. Refer to AT-294. 4. Check the following item:</p> <ul style="list-style-type: none"> ● Overrun clutch assembly 		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Repair or replace damaged parts.

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5	DETECT MALFUNCTIONING ITEM	
<p>1. Remove control valve assembly. Refer to AT-283. 2. Check the following items:</p> <ul style="list-style-type: none"> ● 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.

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6	CHECK SYMPTOM	
Check again.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 7.

EL
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TROUBLE DIAGNOSES FOR SYMPTOMS

Engine Speed Does Not Return To Idle (Light Braking D₄ → D₃) (Cont'd)

7	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ Repair or replace damaged parts.

TROUBLE DIAGNOSES FOR SYMPTOMS

Vehicle Does Not Start From D₁

Vehicle Does Not Start From D₁

=NHAT0103

SYMPTOM:

Vehicle does not start from D₁ on Cruise test — Part 2.

1	CHECK SELF-DIAGNOSTIC RESULTS	
Does self-diagnosis show damage to vehicle speed sensor-A/T (revolution sensor), shift solenoid valve A, B or vehicle speed sensor-MTR after cruise test?		
Yes or No		
Yes	▶	Check damaged circuit. Refer to "DTC P0720, P0750, P0755 or VHCL SPEED SEN-MTR", AT-121, 179, 184 or 208.
No	▶	GO TO 2.

2	CHECK SYMPTOM	
Check again.		
OK or NG		
OK	▶	Go to "Vehicle Cannot Be Started From D ₁ ", AT-239.
NG	▶	GO TO 3.

3	CHECK TCM INSPECTION	
1. Perform TCM input/output signal inspection. 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.

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TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Shift: D₄ → D₃, When 3rd Position Switch ON → OFF

A/T Does Not Shift: D₄ → D₃, When 3rd Position Switch ON → OFF

=NHAT0104

SYMPTOM:

A/T does not shift from D₄ to D₃ when changing selector lever from D to 3rd position.

1	CHECK 3RD POSITION SWITCH CIRCUIT	
<p><input type="radio"/> With CONSULT-II Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to 3rd position switch circuit?</p>		
<p><input checked="" type="radio"/> Without CONSULT-II Does self-diagnosis show damage to 3rd position switch circuit?</p> <div style="text-align: center; margin: 20px 0;"> <pre> graph TD A["A/T CHECK"] --> B["Self-diagnosis start"] B -.-> C["Light"] B --> D["Shade"] </pre> </div>		
SAT555K		
Yes or No		
Yes	▶	Check 3rd position switch circuit. Refer to "TCM Self-diagnosis Does Not Activate", AT-267.
No	▶	Go to "A/T Does Not Shift: D ₂ → D ₃ ", AT-245.

TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Shift: D₃ → 2₂, When Selector Lever D → 2nd Position

A/T Does Not Shift: D₃ → 2₂, When Selector Lever D → 2nd Position

=NHAT0105

SYMPTOM:

A/T does not shift from D₃ to 2₂ when changing selector lever from D to 2nd position.

1	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT	
<p><input type="radio"/> With CONSULT-II Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?</p>		
<p><input checked="" type="radio"/> Without CONSULT-II Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?</p> <div style="text-align: center;"> <pre> graph TD A["A/T CHECK"] --> B["Self-diagnosis start"] B -.-> C["Light"] B --> D["Shade"] </pre> </div>		
SAT555K		
Yes or No		
Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to "DTC P0705", AT-109.
No	▶	Go to "A/T Does Not Shift: D ₁ → D ₂ or Does Not Kickdown: D ₄ → D ₂ ", AT-242.

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TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Shift: 2₂ → 1₁, When Selector Lever 2nd → 1st Position

A/T Does Not Shift: 2₂ → 1₁, When Selector Lever 2nd → 1st Position

=NHAT0106

SYMPTOM:

A/T does not shift from 2₂ to 1₁ when changing selector lever from 2nd to 1st position.

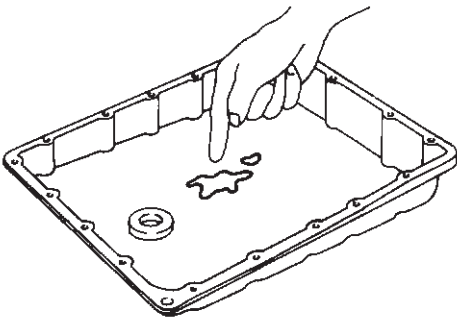
1	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT
<p>Ⓔ With CONSULT-II Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?</p>	
<p>ⓧ Without CONSULT-II Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?</p>	
SAT555K	
Yes or No	
Yes	▶ Check park/neutral position (PNP) switch circuit. Refer to "DTC P0705", AT-109.
No	▶ GO TO 2.

2	ADJUST CONTROL CABLE
Check control cable. Refer to AT-285.	
SAT023JA	
OK or NG	
OK	▶ GO TO 3.
NG	▶ Adjust control cable. Refer to AT-285.

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 "DTC P0720 and VHCL SPEED SEN-MTR", AT-121 and AT-208.	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Repair or replace vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuits.

TROUBLE DIAGNOSES FOR SYMPTOMS

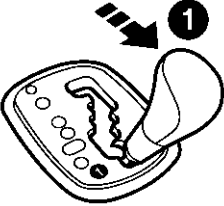
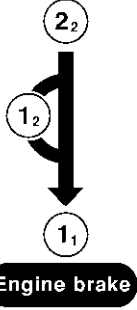
A/T Does Not Shift: 2₂ → 1₁, When Selector Lever 2nd → 1st Position (Cont'd)

4	CHECK A/T FLUID CONDITION	
<p>1. Remove oil pan. 2. Check A/T fluid condition.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT171B</p>		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

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5	DETECT MALFUNCTIONING ITEM	
<p>1. Remove control valve. Refer to AT-283. 2. Check the following items: <ul style="list-style-type: none"> ● Shift solenoid valve A ● Overrun clutch solenoid valve </p> <p>3. Disassemble A/T. Refer to AT-294. 4. Check the following items: <ul style="list-style-type: none"> ● Servo piston assembly ● Brake band </p>		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Repair or replace damaged parts.

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6	CHECK SYMPTOM	
<p>Check again.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <p style="text-align: right;">SAT514K</p>		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 7.

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TROUBLE DIAGNOSES FOR SYMPTOMS

A/T Does Not Shift: 2₂ → 1₁, When Selector Lever 2nd → 1st Position (Cont'd)

7	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ Repair or replace damaged parts.

TROUBLE DIAGNOSES FOR SYMPTOMS

Vehicle Does Not Decelerate By Engine Brake

Vehicle Does Not Decelerate By Engine Brake

=NHAT0107

SYMPTOM:

Vehicle does not decelerate by engine brake when shifting from 2₂ (1₂) to 1₁.

1	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT	
<p><input type="radio"/> With CONSULT-II Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?</p>		
<p><input checked="" type="radio"/> Without CONSULT-II Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?</p>		
SAT555K		
Yes or No		
Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to "DTC P0705", AT-109.
No	▶	GO TO 2.

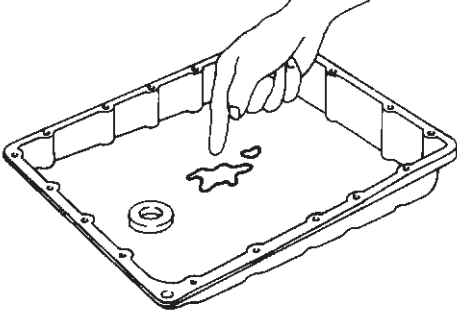
2	ADJUST CONTROL CABLE	
Check control cable. Refer to AT-285.		
SAT023JA		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Adjust control cable. Refer to AT-285.

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 "DTC P0720 and VHCL SPEED SEN-MTR", AT-121 and AT-208.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuits.

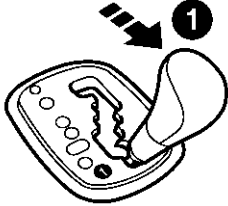
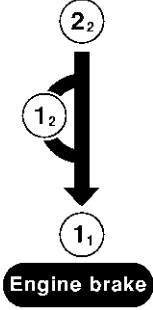
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TROUBLE DIAGNOSES FOR SYMPTOMS

Vehicle Does Not Decelerate By Engine Brake (Cont'd)

4	CHECK A/T FLUID CONDITION	
<p>1. Remove oil pan. 2. Check A/T fluid condition.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT171B</p>		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM	
<p>1. Remove control valve. Refer to AT-283. 2. Check the following items:</p> <ul style="list-style-type: none"> ● Shift valve A ● Overrun clutch solenoid valve <p>3. Disassemble A/T. Refer to AT-294. 4. Check the following items:</p> <ul style="list-style-type: none"> ● Overrun clutch assembly ● Low & reverse brake assembly 		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Repair or replace damaged parts.

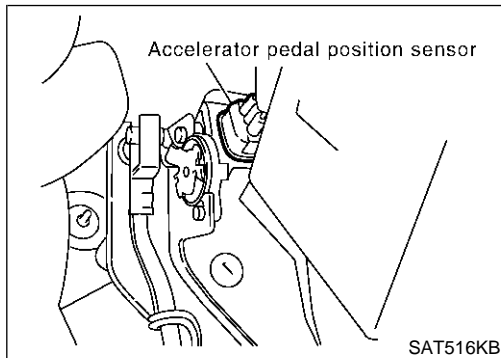
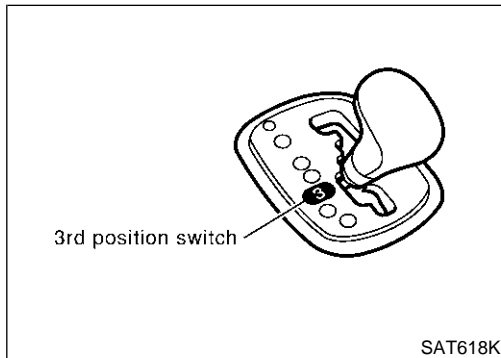
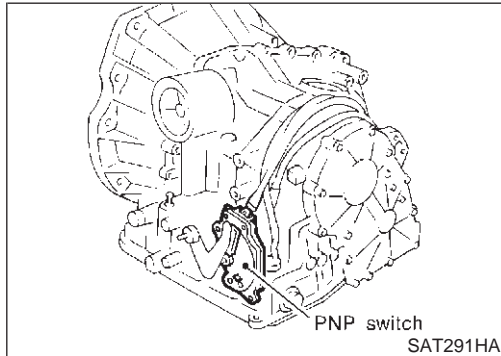
6	CHECK SYMPTOM	
<p>Check again.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <p style="text-align: right;">SAT514K</p>		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 7.

TROUBLE DIAGNOSES FOR SYMPTOMS

Vehicle Does Not Decelerate By Engine Brake (Cont'd)

7	CHECK TCM INSPECTION	
	1. Perform TCM input/output signal inspection. 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.

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TCM Self-diagnosis Does Not Activate

NHAT0108

SYMPTOM:

A/T CHECK indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

DESCRIPTION

NHAT0108S01

- **Park/neutral position (PNP) switch**
The park/neutral (PNP) switch includes a transmission range switch. The transmission range switch detects the selector lever position and sends a signal to the TCM.
- **3rd position switch**
Detects the 3rd position 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 TCM.

TROUBLE DIAGNOSES FOR SYMPTOMS

TCM Self-diagnosis Does Not Activate (Cont'd)

DIAGNOSTIC PROCEDURE

=NHAT0108S02

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes (With CONSULT-II) ▶	GO TO 2.	
No (Without CONSULT-II) ▶	GO TO 4.	

2	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (With CONSULT-II)															
<p>Ⓔ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch to "ON" position. (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, 2nd and 1st position switches moving selector lever to each position. Check that the signal of the selector lever position is indicated properly. 																
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITORING</th> <th></th> </tr> </thead> <tbody> <tr> <td>PN POSI SW</td> <td style="text-align: center;">OFF</td> </tr> <tr> <td>R POSITION SW</td> <td style="text-align: center;">OFF</td> </tr> <tr> <td>D POSITION SW</td> <td style="text-align: center;">OFF</td> </tr> <tr> <td>2 POSITION SW</td> <td style="text-align: center;">ON</td> </tr> <tr> <td>1 POSITION SW</td> <td style="text-align: center;">OFF</td> </tr> </tbody> </table>			DATA MONITOR		MONITORING		PN POSI SW	OFF	R POSITION SW	OFF	D POSITION SW	OFF	2 POSITION SW	ON	1 POSITION SW	OFF
DATA MONITOR																
MONITORING																
PN POSI SW	OFF															
R POSITION SW	OFF															
D POSITION SW	OFF															
2 POSITION SW	ON															
1 POSITION SW	OFF															
OK or NG																
OK ▶	GO TO 6.															
NG ▶	GO TO 3.															

SAT701J

TROUBLE DIAGNOSES FOR SYMPTOMS

TCM Self-diagnosis Does Not Activate (Cont'd)

3	DETECT MALFUNCTIONING ITEM																						
<p>Check the following items:</p> <ul style="list-style-type: none"> ● Park/neutral position (PNP) switch a. Check continuity between PNP switch harness connector F94 terminals 1 (G/OR) and 2 (B) and between terminals 3 (OR) and 4 (PU/W), 5 (P/B), 6 (Y/PU), 7 (BR), 8 (G/W), 9 (GY/R) while moving manual shaft through each position. 																							
<p>View with air cleaner box removed</p>		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Lever position</th> <th colspan="2" style="text-align: center;">Terminal No.</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">P</td> <td style="text-align: center;">3 - 7</td> <td style="text-align: center;">1 - 2</td> </tr> <tr> <td style="text-align: center;">R</td> <td style="text-align: center;">3 - 8</td> <td></td> </tr> <tr> <td style="text-align: center;">N</td> <td style="text-align: center;">3 - 9</td> <td style="text-align: center;">1 - 2</td> </tr> <tr> <td style="text-align: center;">D</td> <td style="text-align: center;">3 - 6</td> <td></td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">3 - 5</td> <td></td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">3 - 4</td> <td></td> </tr> </tbody> </table>	Lever position	Terminal No.		P	3 - 7	1 - 2	R	3 - 8		N	3 - 9	1 - 2	D	3 - 6		2	3 - 5		1	3 - 4	
Lever position	Terminal No.																						
P	3 - 7	1 - 2																					
R	3 - 8																						
N	3 - 9	1 - 2																					
D	3 - 6																						
2	3 - 5																						
1	3 - 4																						
SAT615JA																							
<ul style="list-style-type: none"> b. If NG, check again with manual control cable disconnected from manual shaft of A/T assembly. Refer to step a. c. If OK on step b, adjust manual control cable. Refer to AT-285. d. If NG on step b, remove park/neutral position (PNP) switch from A/T and check continuity of park/neutral position (PNP) switch terminals. Refer to step a. e. If OK on step d, adjust park/neutral position (PNP) switch. Refer to AT-284. f. If NG on step d, replace park/neutral position (PNP) switch. <ul style="list-style-type: none"> ● Harness for short or open between ignition switch and park/neutral position (PNP) switch ● Harness for short or open between park/neutral position (PNP) switch and TCM 																							
OK or NG																							
OK	▶	GO TO 6.																					
NG	▶	Repair or replace damaged parts.																					

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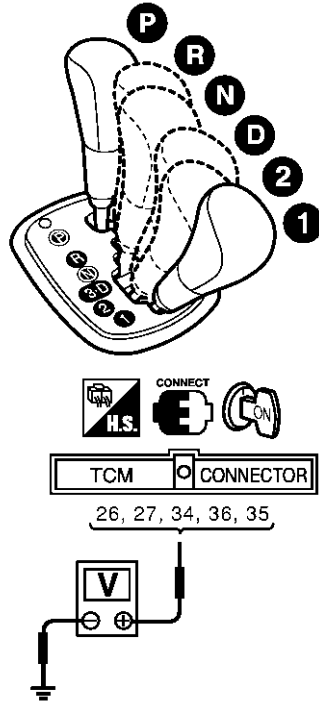
TROUBLE DIAGNOSES FOR SYMPTOMS

TCM Self-diagnosis Does Not Activate (Cont'd)

4 CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (Without CONSULT-II)

⊗ Without CONSULT-II

1. Turn ignition switch to ON position. (Do not start engine.)
2. Check voltage between TCM harness connector F50 terminals 26 (PU/R), 27 (P/B), 34 (Y/PU), 35 (G/W), 36 (R/G) and ground while moving selector lever through each position.



Voltage:
B: Battery voltage
0: 0V

SAT588K

Lever position	Terminal No.				
	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

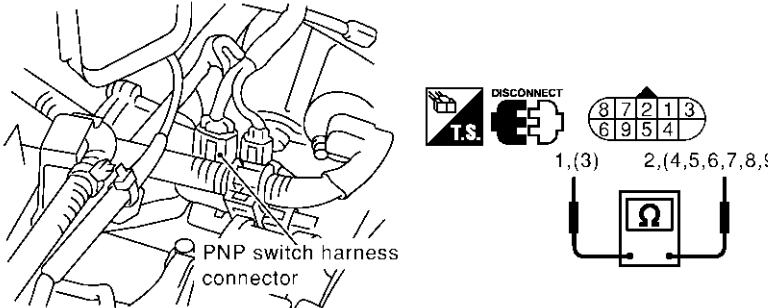
MTBL0119

OK or NG

OK	▶	GO TO 8.
NG	▶	GO TO 5.

TROUBLE DIAGNOSES FOR SYMPTOMS

TCM Self-diagnosis Does Not Activate (Cont'd)

5	DETECT MALFUNCTIONING ITEM	<p>Check the following items:</p> <ul style="list-style-type: none"> ● Park/neutral position (PNP) switch a. Check continuity between PNP switch harness connector F94 terminals 1 (G/OR) and 2 (B) and between terminals 3 (OR) and 4 (PU/W), 5 (P/B), 6 (Y/PU), 7 (BR), 8 (G/W), 9 (GY/R) while moving manual shaft through each position. 																						
 <p style="text-align: center;">View with air cleaner box removed</p>		<table border="1" style="margin: auto;"> <thead> <tr> <th>Lever position</th> <th colspan="2">Terminal No.</th> </tr> </thead> <tbody> <tr> <td>P</td> <td>3 - 7</td> <td>1 - 2</td> </tr> <tr> <td>R</td> <td>3 - 8</td> <td></td> </tr> <tr> <td>N</td> <td>3 - 9</td> <td>1 - 2</td> </tr> <tr> <td>D</td> <td>3 - 6</td> <td></td> </tr> <tr> <td>2</td> <td>3 - 5</td> <td></td> </tr> <tr> <td>1</td> <td>3 - 4</td> <td></td> </tr> </tbody> </table>	Lever position	Terminal No.		P	3 - 7	1 - 2	R	3 - 8		N	3 - 9	1 - 2	D	3 - 6		2	3 - 5		1	3 - 4		SAT615JA
Lever position	Terminal No.																							
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		<ul style="list-style-type: none"> b. If NG, check again with manual control cable disconnected from manual shaft of A/T assembly. Refer to step a. c. If OK on step b, adjust manual control cable. Refer to AT-285. d. If NG on step b, remove park/neutral position (PNP) switch from A/T and check continuity of park/neutral position (PNP) switch terminals. Refer to step a. e. If OK on step d, adjust park/neutral position (PNP) switch. Refer to AT-284. f. If NG on step d, replace park/neutral position (PNP) switch. <ul style="list-style-type: none"> ● Harness for short or open between ignition switch and park/neutral position (PNP) switch ● Harness for short or open between park/neutral position (PNP) switch and TCM <p style="text-align: center;">OK or NG</p>																						
OK		▶	GO TO 8.																					
NG		▶	Repair or replace damaged parts.																					

6	CHECK 3RD POSITION SWITCH CIRCUIT (With CONSULT-II)	<p>Ⓔ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch to "ON" position. (Do not start engine.) 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II. 3. Read out "OVERDRIVE SW"*. <p>Check the signal of the overdrive control switch is indicated properly. (Overdrive control switch "ON" displayed on CONSULT-II means overdrive "OFF".)</p> <p>*: "OVERDRIVE SW" means 3rd position switch</p>															
		<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th colspan="2">MONITORING</th> </tr> </thead> <tbody> <tr> <td>ENGINE SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>TURBINE REV</td> <td>XXX rpm</td> </tr> <tr> <td>OVERDRIVE SW</td> <td>ON</td> </tr> <tr> <td>PN POSI SW</td> <td>OFF</td> </tr> <tr> <td>R POSITION SW</td> <td>OFF</td> </tr> </tbody> </table>	DATA MONITOR		MONITORING		ENGINE SPEED	XXX rpm	TURBINE REV	XXX rpm	OVERDRIVE SW	ON	PN POSI SW	OFF	R POSITION SW	OFF	SAT645J
DATA MONITOR																	
MONITORING																	
ENGINE SPEED	XXX rpm																
TURBINE REV	XXX rpm																
OVERDRIVE SW	ON																
PN POSI SW	OFF																
R POSITION SW	OFF																
		OK or NG															
OK		▶	GO TO 10.														
NG		▶	GO TO 7.														

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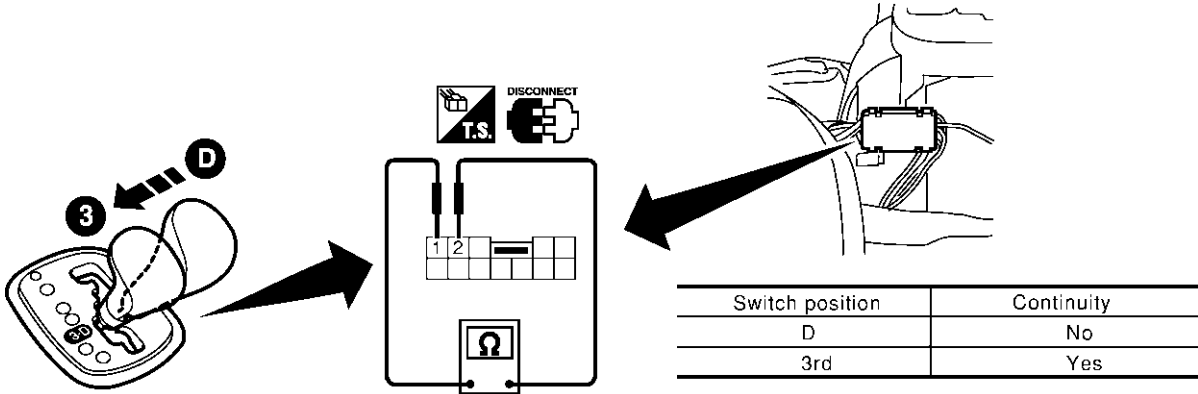
TROUBLE DIAGNOSES FOR SYMPTOMS

TCM Self-diagnosis Does Not Activate (Cont'd)

7 DETECT MALFUNCTIONING ITEM

Check the following items:

- 3rd position switch.
- a. Check continuity between A/T device (3rd position switch) harness connector M165 terminals 1 (G/Y) and 2 (B).



- Harness for short or open between TCM and 3rd position switch
- Harness of ground circuit for 3rd position switch for short or open

SAT606K

OK or NG

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

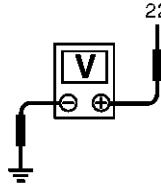
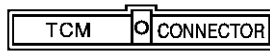
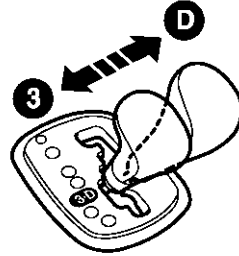
TROUBLE DIAGNOSES FOR SYMPTOMS

TCM Self-diagnosis Does Not Activate (Cont'd)

8 CHECK 3RD POSITION SWITCH CIRCUIT (Without CONSULT-II)

⊗ Without CONSULT-II

1. Turn ignition switch to ON position.
(Do not start engine.)
2. Check voltage between TCM harness connector F51 terminal 22 (G/Y) and ground when 3rd position switch is ON and OFF.



Switch position	Voltage
D	Battery voltage
3rd	0V

SAT617KA

OK or NG

OK	▶	GO TO 12.
NG	▶	GO TO 9.

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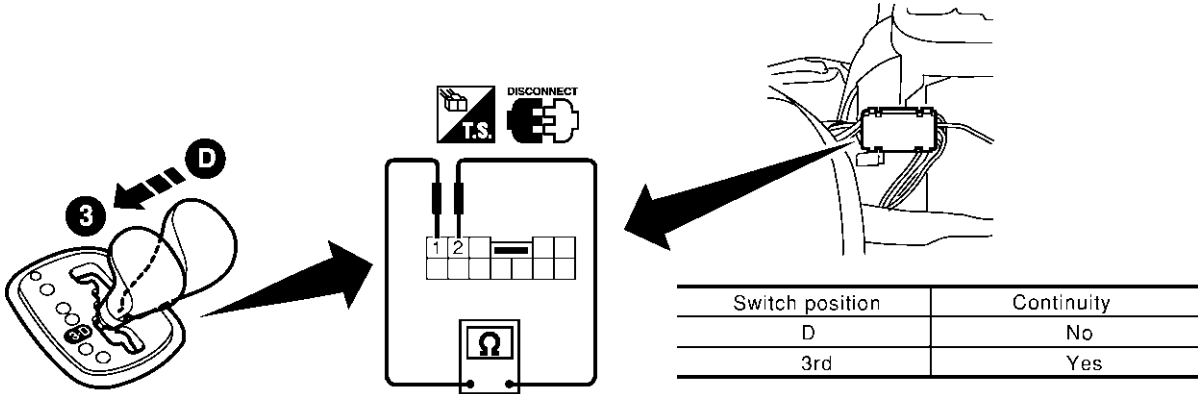
TROUBLE DIAGNOSES FOR SYMPTOMS

TCM Self-diagnosis Does Not Activate (Cont'd)

9 DETECT MALFUNCTIONING ITEM

Check the following items:

- 3rd position switch.
- a. Check continuity between A/T device (3rd positions witch) harness connector M165 terminals 1 (G/Y) and 2 (B).



- Harness for short or open between TCM and 3rd position switch
- Harness of ground circuit for 3rd position switch for short or open

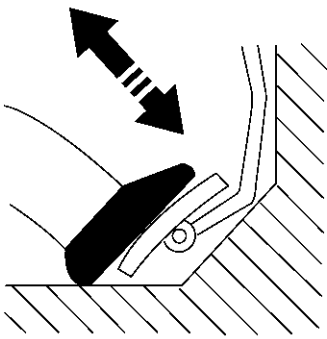
SAT606K

OK or NG

OK	▶	GO TO 12.
NG	▶	Repair or replace damaged parts.

TROUBLE DIAGNOSES FOR SYMPTOMS

TCM Self-diagnosis Does Not Activate (Cont'd)

10	CHECK CLOSED THROTTLE POSITION AND WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT (With CONSULT-II)	<p>Ⓔ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch to "ON" position. (Do not start engine.) 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II. 3. Read out "CLOSED THL/SW" and "W/O THRL/P-SW" depressing and releasing accelerator pedal. Check the signal of throttle position switch is indicated properly. <div style="text-align: center; margin: 10px 0;"> <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Accelerator pedal condition</th> <th colspan="2">Data monitor</th> </tr> <tr> <th>CLOSED THL/SW</th> <th>W/O THRL/P-SW</th> </tr> </thead> <tbody> <tr> <td>Released</td> <td>ON</td> <td>OFF</td> </tr> <tr> <td>Fully depressed</td> <td>OFF</td> <td>ON</td> </tr> </tbody> </table> </div> <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;">  </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <table border="1" style="border-collapse: collapse; width: 100%;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITORING</th> <th></th> </tr> </thead> <tbody> <tr> <td>POWERSHIFT SW</td> <td>OFF</td> </tr> <tr> <td>CLOSED THL/SW</td> <td>OFF</td> </tr> <tr> <td>W/O THRL/P-SW</td> <td>OFF</td> </tr> <tr> <td>HOLD SW</td> <td>OFF</td> </tr> <tr> <td>BRAKE SW</td> <td>ON</td> </tr> </tbody> </table> </div> </div> <p style="text-align: right; margin-top: 10px;">MTBL0011</p> <p style="text-align: right; margin-top: 10px;">SAT646J</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>	Accelerator pedal condition	Data monitor		CLOSED THL/SW	W/O THRL/P-SW	Released	ON	OFF	Fully depressed	OFF	ON	DATA MONITOR		MONITORING		POWERSHIFT SW	OFF	CLOSED THL/SW	OFF	W/O THRL/P-SW	OFF	HOLD SW	OFF	BRAKE SW	ON	GI MA EM LC EC FE AT AX SU BR
Accelerator pedal condition	Data monitor																											
	CLOSED THL/SW	W/O THRL/P-SW																										
Released	ON	OFF																										
Fully depressed	OFF	ON																										
DATA MONITOR																												
MONITORING																												
POWERSHIFT SW	OFF																											
CLOSED THL/SW	OFF																											
W/O THRL/P-SW	OFF																											
HOLD SW	OFF																											
BRAKE SW	ON																											
OK	▶	GO TO 13.																										
NG	▶	GO TO 11.																										

11	DETECT MALFUNCTIONING ITEM	<p>Check the following items:</p> <ul style="list-style-type: none"> ● Accelerator pedal position sensor ● Harness for short or open between accelerator pedal position sensor and ECM <p style="text-align: center; margin-top: 10px;">OK or NG</p>	
OK	▶	GO TO 13.	
NG	▶	Repair or replace damaged parts.	

12	CHECK CLOSED THROTTLE POSITION AND WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT (Without CONSULT-II)	<p>⊗ Without CONSULT-II</p> <p>Check the following items:</p> <ul style="list-style-type: none"> ● Accelerator pedal position sensor ● Harness for short or open between accelerator pedal position sensor and ECM <p style="text-align: center; margin-top: 10px;">OK or NG</p>	
OK	▶	GO TO 13.	
NG	▶	Repair or replace damaged part.	

TROUBLE DIAGNOSES FOR SYMPTOMS

TCM Self-diagnosis Does Not Activate (Cont'd)

13	CHECK DTC
Perform "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)", AT-53.	
OK or NG	
OK	▶ INSPECTION END
NG	▶ GO TO 14.

14	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 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.

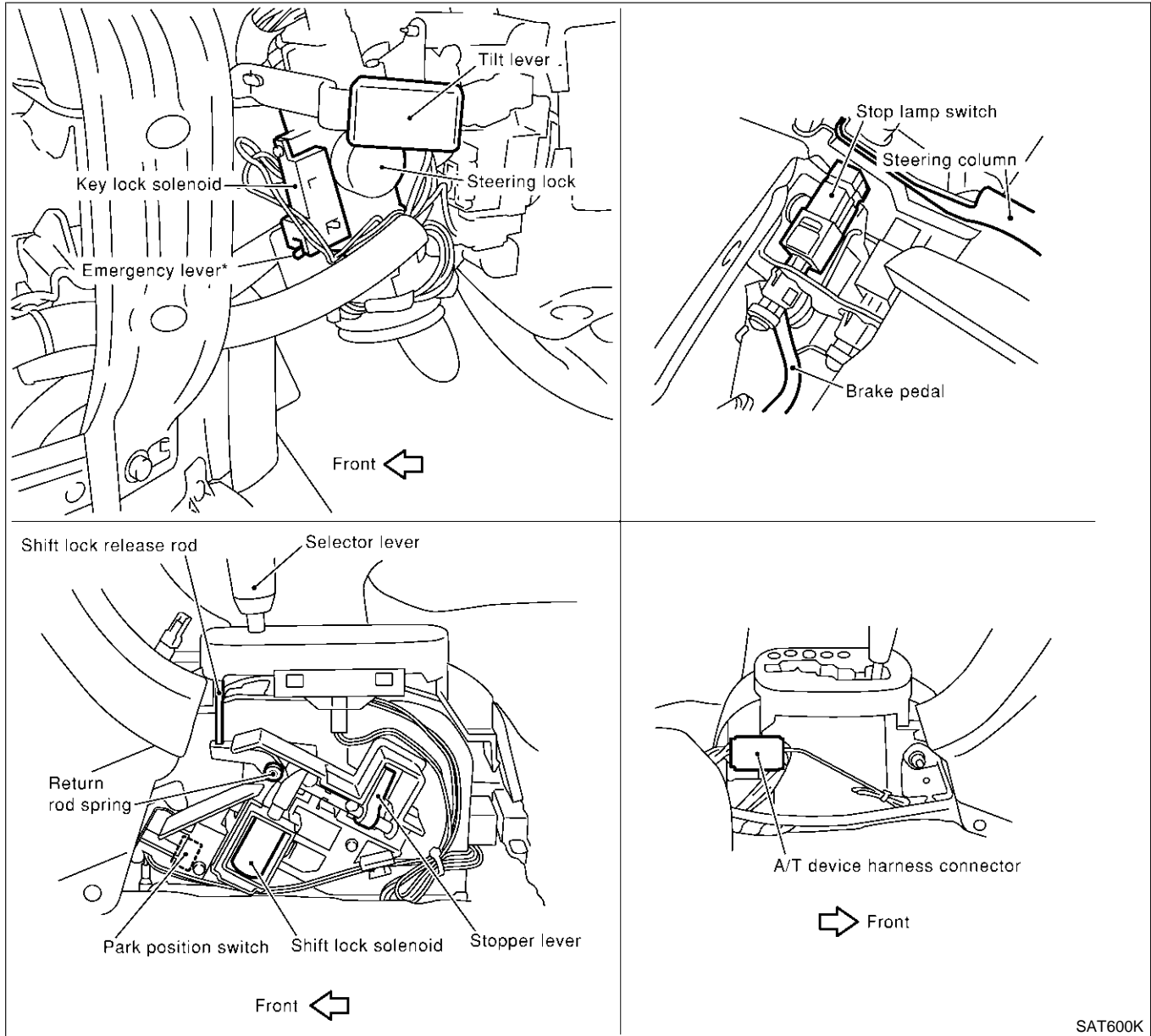
Description

NHAT0109

- The mechanical key interlock mechanism also operates as a shift lock:
With the key switch turned to ON, the selector lever cannot be shifted from P (parking) to any other position unless the brake pedal is depressed.
With the key removed, the selector lever cannot be shifted from P to any other position.
The key cannot be removed unless the selector lever is placed in P.
- 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 the key cylinder, respectively.

Shift Lock System Electrical Parts Location

NHAT0111



*: This emergency lever insures that when battery is off ignition key cannot be removed. In the situation like this, by operating this lever, ignition key can be removed.

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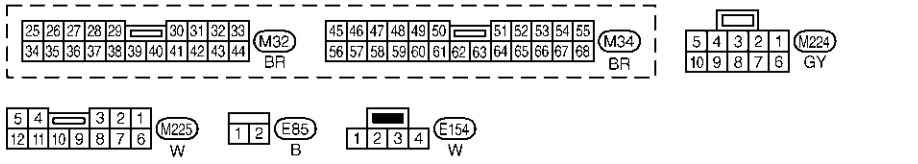
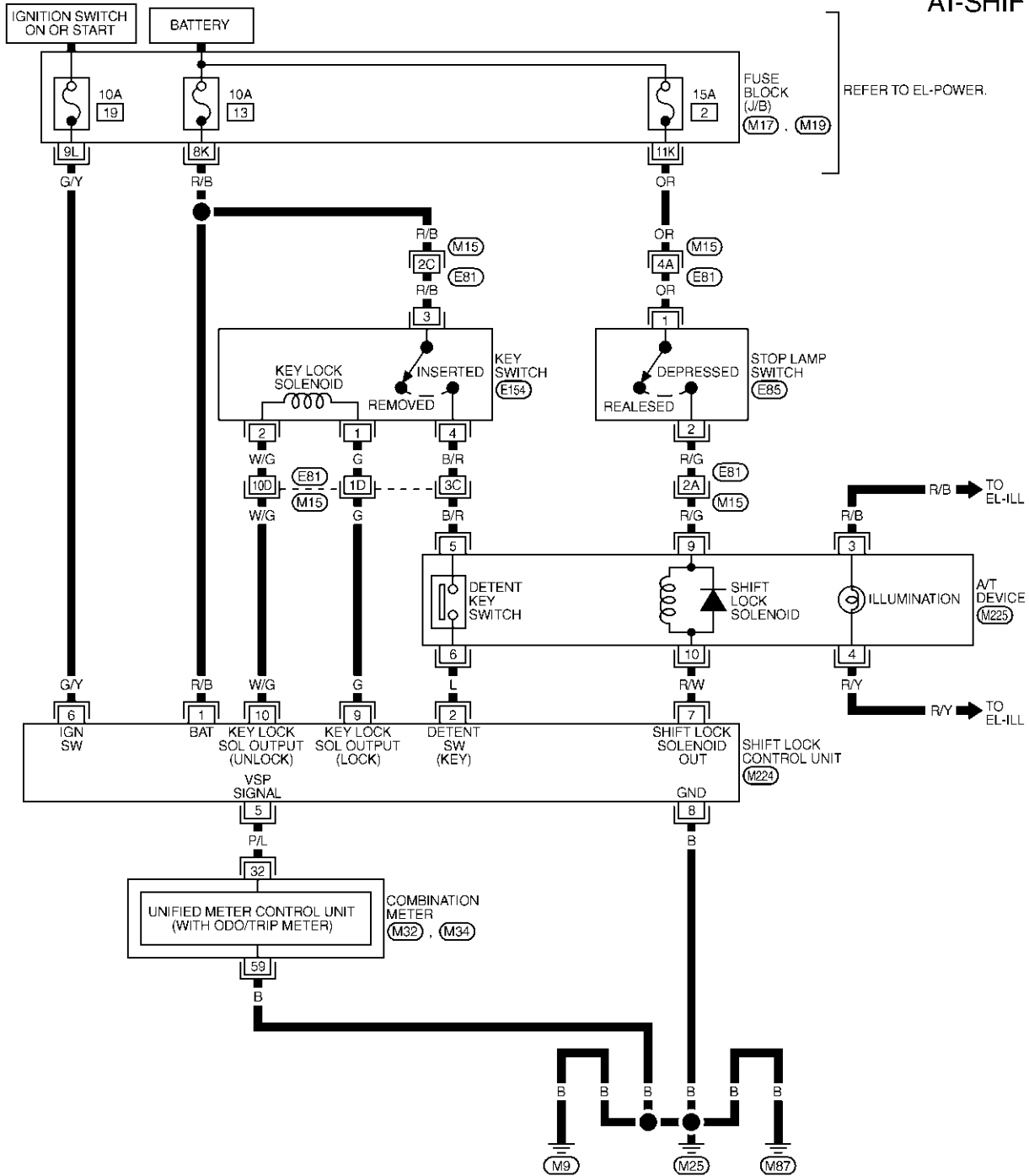
AT/ SHIFT LOCK SYSTEM

Wiring Diagram — SHIFT —

Wiring Diagram — SHIFT —

NHAT0110

AT-SHIFT-01



REFER TO THE FOLLOWING.
 (M15) - SUPER
 MULTIPLE JUNCTION (SMJ)
 (M17), (M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MAT101B

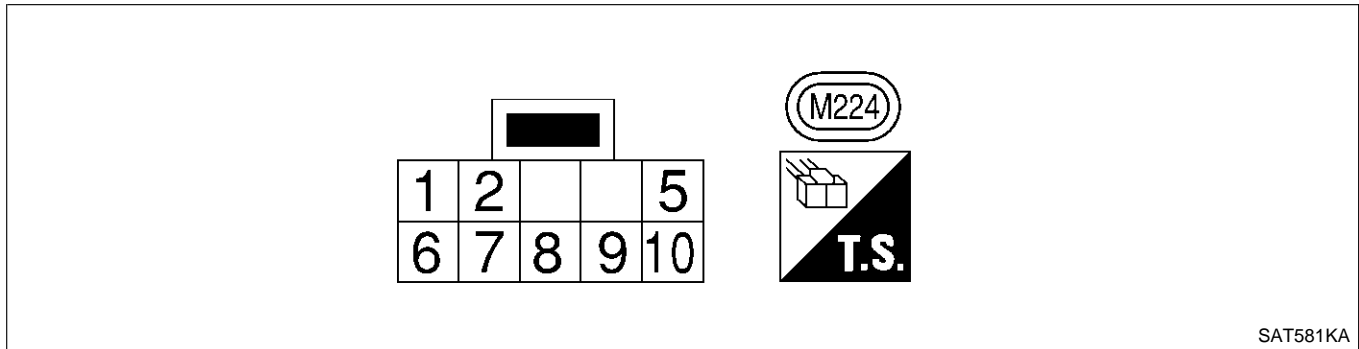
A/T SHIFT LOCK SYSTEM

Shift Lock Control Unit Reference Values

Shift Lock Control Unit Reference Values SHIFT LOCK HARNESS CONNECTOR TERMINAL LAYOUT

NHAT0281

NHAT0281S01



SAT581KA

SHIFT LOCK CONTROL UNIT INSPECTION TABLE

Data are reference values.

NHAT0281S02

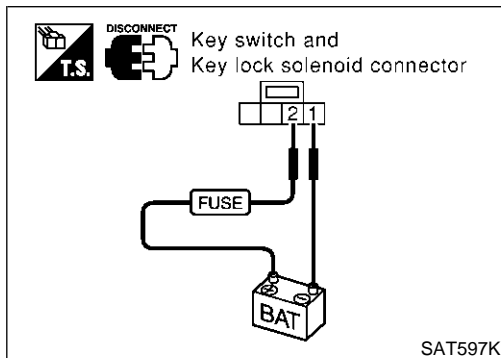
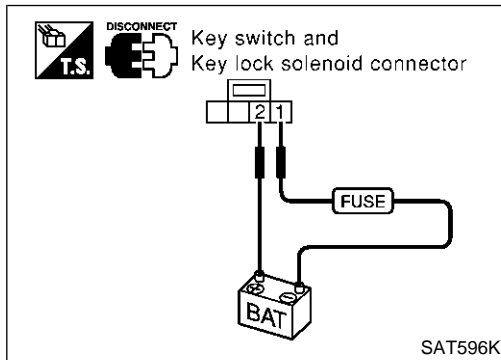
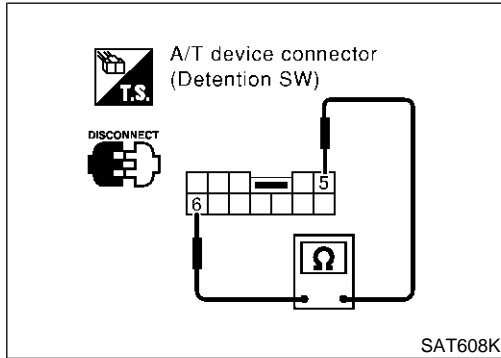
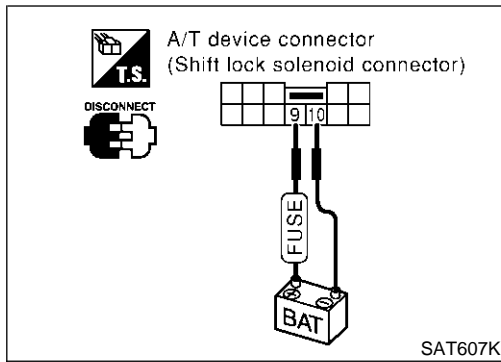
Terminal No. (Wire color)		Item	Condition	Judgement standard
(+)	(-)			
1 (R/B)	8 (B)	Power source	IGN SW: "ON"	Battery voltage
			IGN SW: "OFF"	
2 (L)	8 (B)	Detention SW (for key)	The position when the key is inserted and the selector lever is set to a position other than the "P" position.	Battery voltage
			Except the above	Approx. 0V
5 (P/L)	8 (B)	Vehicle speed signal	When the vehicle speed is 20 km/h (12 MPH).	Approx. 28 Hz
			When the vehicle speed is 0 km/h (0 MPH).	No pulse
6 (G/Y)	8 (B)	IGN signal	IGN SW: "ON"	Battery voltage
			IGN SW: "OFF"	Approx. 0V
7 (R/W)	8 (B)	Shift lock solenoid	When the brake pedal is depressed.	Battery voltage
			When IGN SW is ON and the vehicle speed is 8 km/h (5 MPH) or less.	Approx. 0V
8 (B)	—	Ground	IGN SW: "ON"	Approx. 0V
9 (G)	8 (B)	Key lock signal	When the selector lever is set to a position other than the "P" position and the ignition switch is turned from "ON" to "OFF".	-12 voltage for approx. 30 msec.
			Except the above	Approx. 0V
10 (W/G)	8 (B)	Key unlock signal	At the moment selector is set to the "P" position from any position other than "P". The unlock signal generates only once after the lock signal is output.	Battery voltage for approx. 150 msec.
			Except the above	Approx. 0V

CAUTION:

Confirm that the pointer swings only momentarily because the output time is so short. If the inspection is done with an oscilloscope, it should be observed that the power source voltage lasts for 3.5 to 10 ms.

A/T SHIFT LOCK SYSTEM

Component Inspection



Component Inspection

NHAT0280

SHIFT LOCK SOLENOID

NHAT0280S01

- Check operation by applying battery voltage to control device connector.

CAUTION:

Be sure to apply the voltage of the correct polarity to the respective terminals. Otherwise, the part may be damaged.

Connector No.	Terminal No. (Wire color)
M225	9 (R/G) (Battery voltage) - 10 (R/W) (Ground)

DETENTION SWITCH

NHAT0280S02

For Key:

NHAT0280S0201

- Check continuity between terminals of the control device connector.

Condition	Connector No.	Terminal No. (Wire color)	Continuity
The position when the selector lever is set to a position other than the "P" position, or when it is shifted from the "R" to the "P" position	M225	5 (B/R) - 6 (L)	Yes
Except the above			No

KEY LOCK SOLENOID

NHAT0280S03

Key Lock

NHAT0280S0301

- Check operation by applying battery voltage to key switch and key lock solenoid connector.

CAUTION:

Be careful not to cause burnout of the harness.

Connector No.	Terminal No. (Wire color)
E154	1 (G) (Battery voltage) - 2 (W/G) (Ground)

Key Unlock

NHAT0280S0302

- Check operation by applying battery voltage to key switch and key lock solenoid connector.

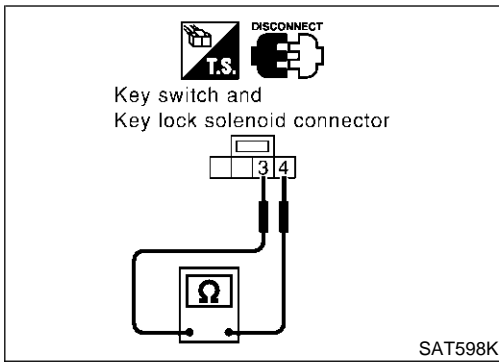
CAUTION:

Be careful not to cause burnout of the harness.

Connector No.	Terminal No. (Wire color)
E154	2 (W/G) (Battery voltage) - 1 (G) (Ground)

A/T SHIFT LOCK SYSTEM

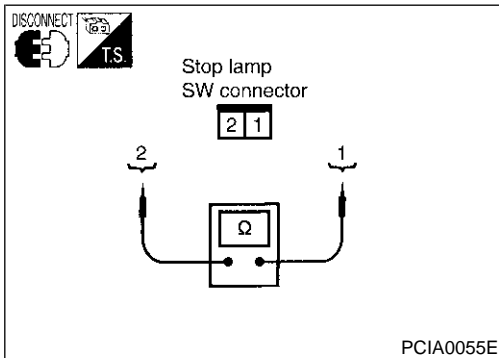
Component Inspection (Cont'd)



KEY SWITCH

- Check continuity between terminals of the key switch and key lock solenoid connector. NHAT0280S04

Condition	Connector No.	Terminal No. (Wire color)	Continuity
Key inserted	E154	3 (R/B) - 4 (B/R)	Yes
Key withdrawn			No



STOP LAMP SWITCH

- Check continuity between terminals of the stop lamp switch connector. NHAT0280S05

Condition	Connector No.	Terminal No. (Wire color)	Continuity
When brake pedal is depressed	E85	1 (OR) - 2 (R/G)	Yes
When brake pedal is released			No

Check stop lamp switch after adjusting brake pedal. Refer to BR-11, "BRAKE PEDAL AND BRACKET".

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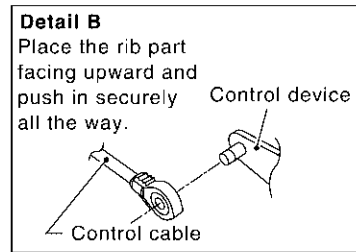
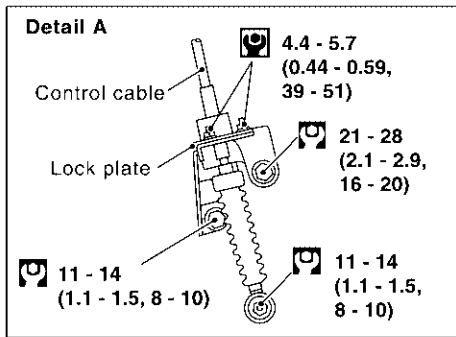
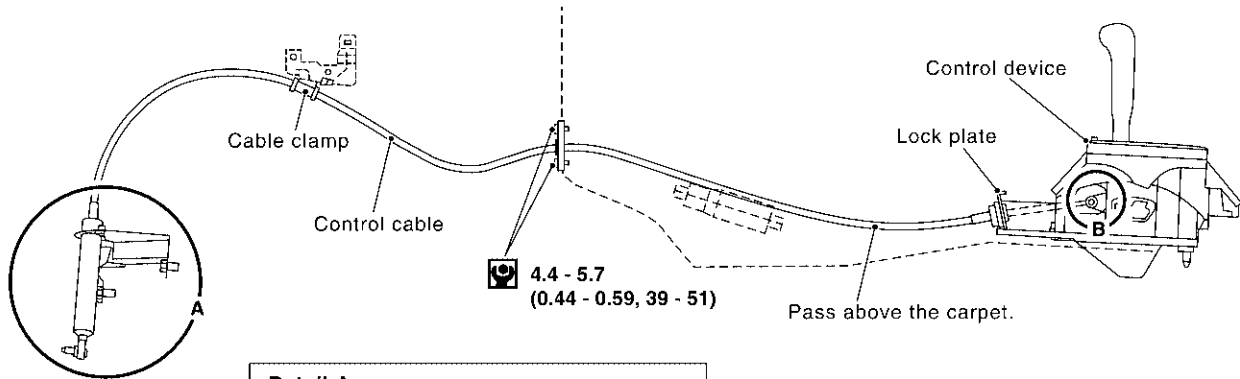
SHIFT CONTROL SYSTEM

Control Cable

Control Cable

NHAT0263

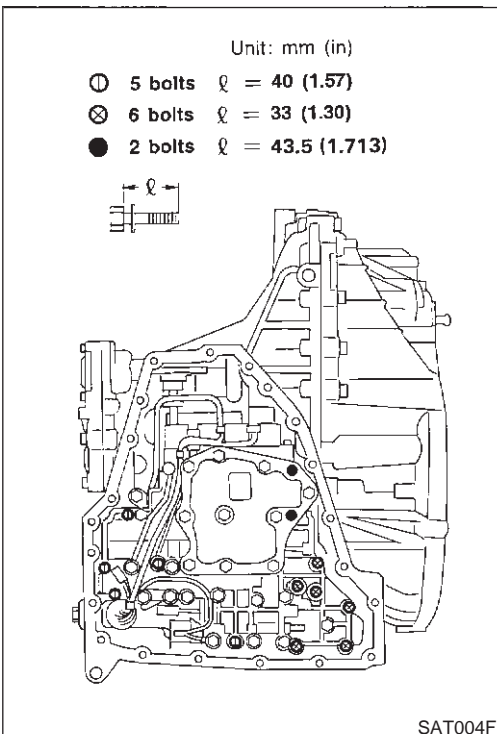
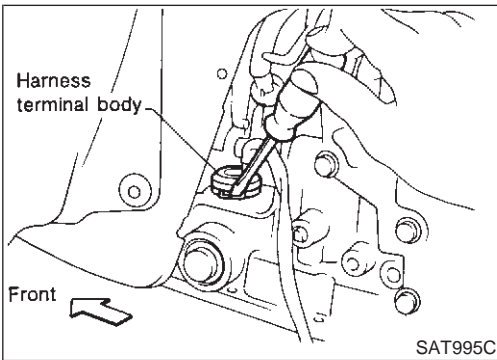
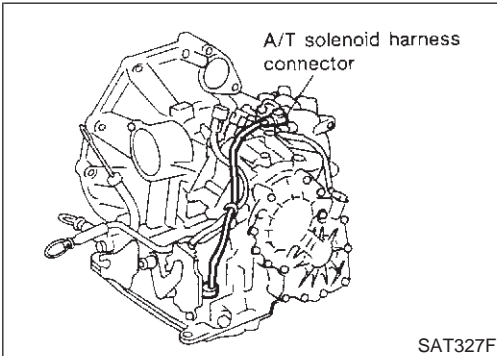
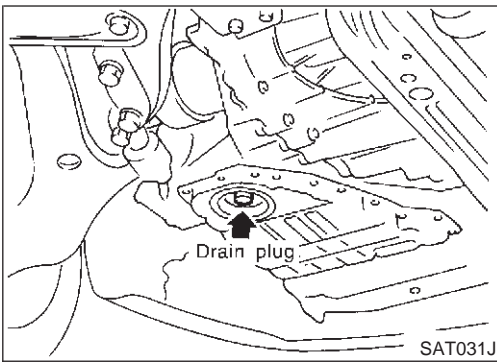
SEC. 349



: N•m (kg-m, in-lb)

: N•m (kg-m, ft-lb)

SAT754J



Control Valve Assembly and Accumulators

NHAT0114

REMOVAL

NHAT0114S01

1. Drain ATF from transaxle.
 2. Remove oil pan and gasket.
 3. Disconnect A/T solenoid harness connector.
 4. Remove stopper ring from terminal cord assembly harness terminal body.
 5. Remove terminal cord assembly harness from transmission case by pushing on terminal body.
 6. Remove control valve assembly by removing fixing bolts I, X and ●.
- Bolt length, number and location are shown in the illustration.
- **Be careful not to drop manual valve and servo release accumulator return spring.**
7. Disassemble and inspect control valve assembly if necessary. Refer to AT-315.

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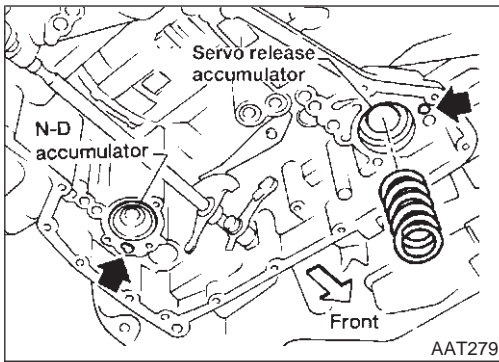
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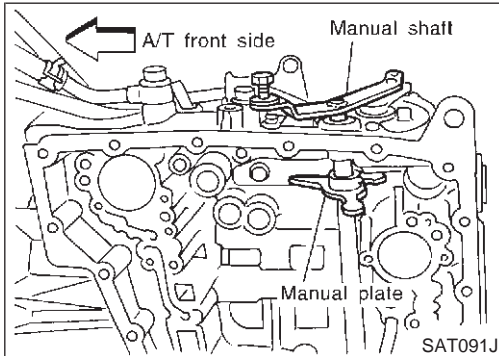
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ON-VEHICLE SERVICE

Control Valve Assembly and Accumulators (Cont'd)

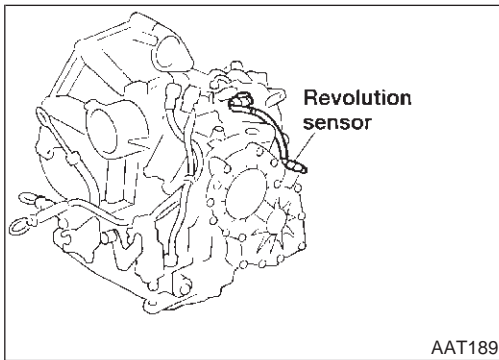


8. Remove servo release and N-D accumulators by applying compressed air if necessary.
- Hold each piston with a rag.



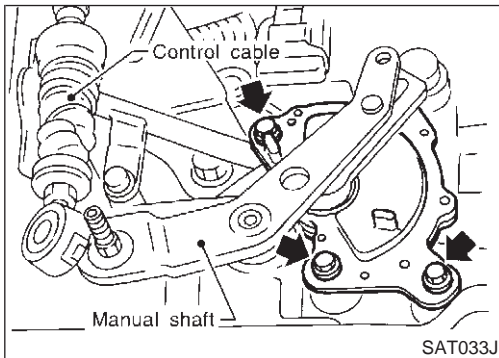
INSTALLATION

- Set manual shaft in Neutral, then align manual plate with groove in manual valve. NHAT0114S02
- After installing control valve assembly, make sure that selector lever can be moved to all positions.



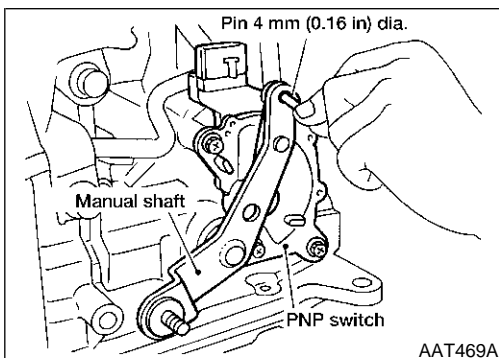
Revolution Sensor Replacement

1. Remove under cover.
 2. Remove revolution sensor from A/T. NHAT0115
 3. Reinstall any part removed.
- Always use new sealing parts.

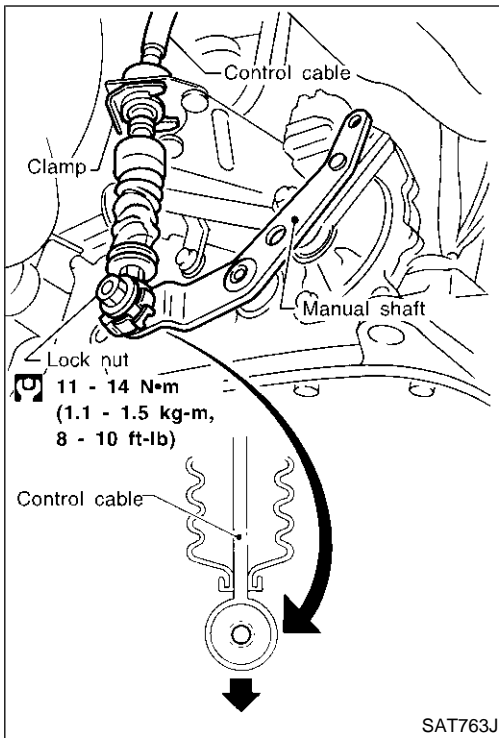


Park/Neutral Position (PNP) Switch Adjustment

1. Remove control cable from manual shaft. NHAT0116
2. Set manual shaft in N position.
3. Loosen park/neutral position (PNP) switch fixing bolts.



4. Insert pin into adjustment holes in both park/neutral position (PNP) switch and manual shaft as near vertical as possible.
5. Reinstall any part removed.
6. Check continuity of park/neutral position (PNP) switch. Refer to AT-109.



Control Cable Adjustment

NHAT0117

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

1. Place selector lever in P position.
2. Loosen control cable lock nut and place manual shaft in P position.

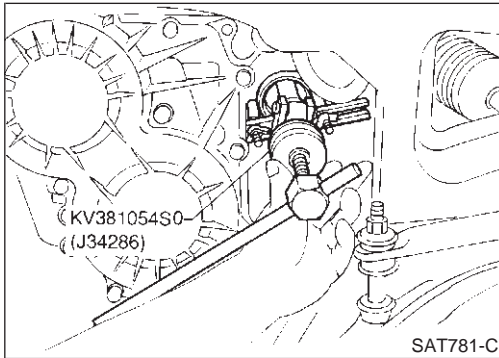
CAUTION:

Turn wheels more than 1/4 rotations and apply the park lock.

3. Push control cable in the direction of the arrow shown in the illustration by specified force.

Specified force: 4.9 - 9.8 N (0.5 - 1.0 kg, 1.1 - 2.2 lb)

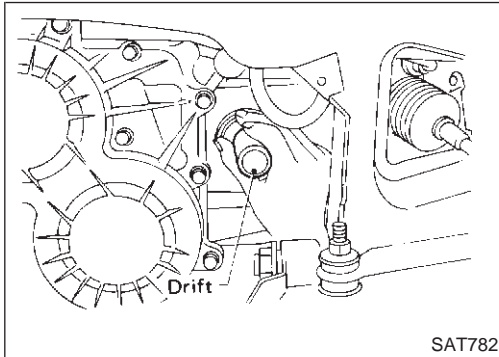
4. Tighten control cable lock nut.
 5. Move selector lever from P to 1 position again. Make sure that selector lever moves smoothly.
- Make sure that the starter operates when the selector lever is placed in the N or P position.
 - Make sure that the transmission is locked properly when the selector lever is placed in the P position.



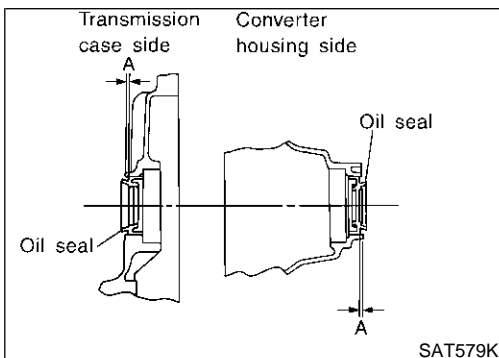
Differential Side Oil Seal Replacement

NHAT0118

1. Remove drive shaft assembly. Refer to AX-9, "Drive Shaft".
2. Remove oil seal.



3. Install oil seal.
- Apply ATF before installing.



- Install oil seals so dimension A is within specification
A: -0.5 mm (-0.02 in) to 0.5 mm (0.02 in)
4. Reinstall any part removed.

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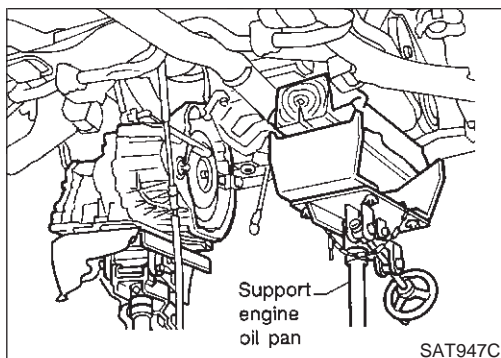
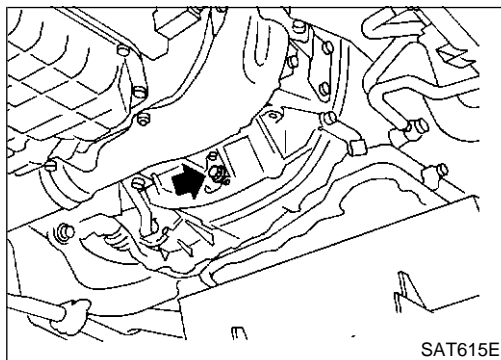
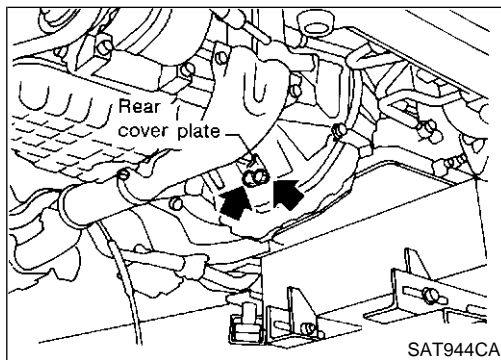
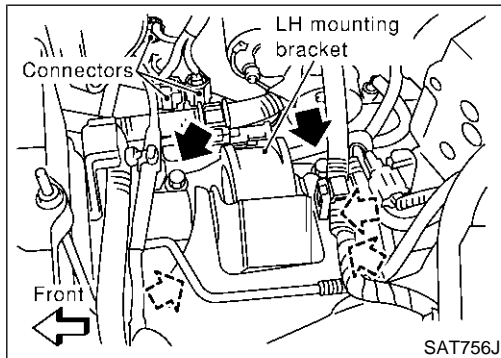
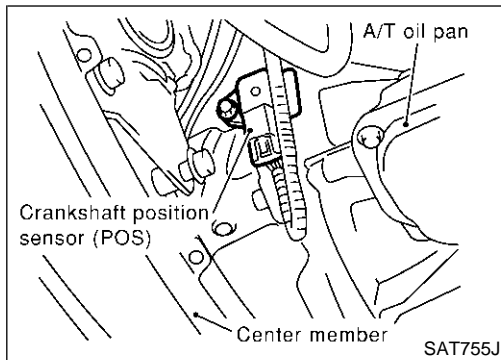
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REMOVAL AND INSTALLATION

Removal

NHAT0119



Removal

CAUTION:

When removing the transaxle assembly from engine, first remove the crankshaft position sensor (POS) from the assembly.

Be careful not to damage sensor edge.

1. Remove battery and bracket.
2. Remove air cleaner and resonator.
3. Disconnect terminal cord assembly harness connector and park/neutral position (PNP) switch harness connectors.
4. Disconnect harness connectors of revolution sensor, ground and vehicle speed sensor.
5. Remove crankshaft position sensor (POS) from transaxle.
6. Remove LH mounting bracket from transaxle and body.
7. Disconnect control cable at transaxle side.
8. Drain ATF.
9. Remove exhaust front tube.
10. Remove drive shafts. Refer to AX-9, "Drive Shaft".
11. Disconnect fluid cooler hoses.
12. Remove starter motor from transaxle.
13. Support engine by placing a jack under oil pan.

● Do not place jack under oil pan drain plug.

14. Remove center member.

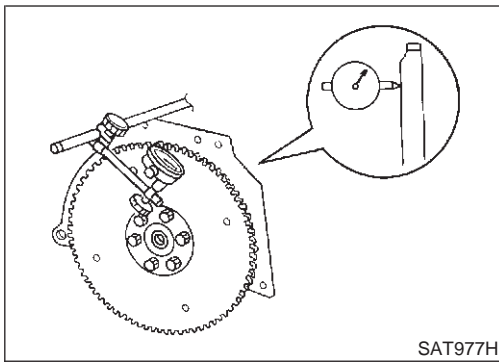
15. Remove rear cover plate and bolts securing torque converter to drive plate.

● Rotate crankshaft for access to securing bolts.

16. Support transaxle with a jack.

17. Remove bolts fixing A/T to engine.

18. Lower transaxle while supporting it with a jack.



SAT977H

Installation

- Drive plate runout

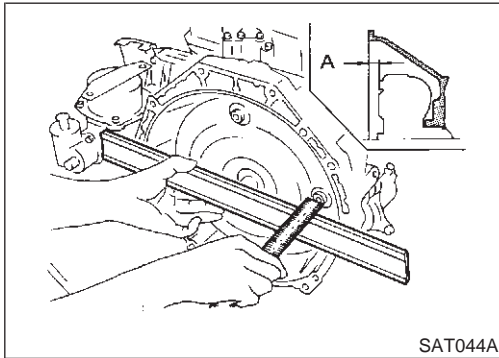
CAUTION:

Do not allow any magnetic materials to contact the ring gear teeth.

Maximum allowable runout:

Refer to EM-82, "Drive Plate Runout".

- If this runout is outside the standard, replace drive plate and ring gear.

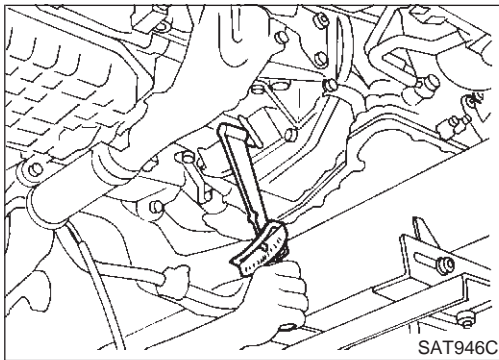


SAT044A

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

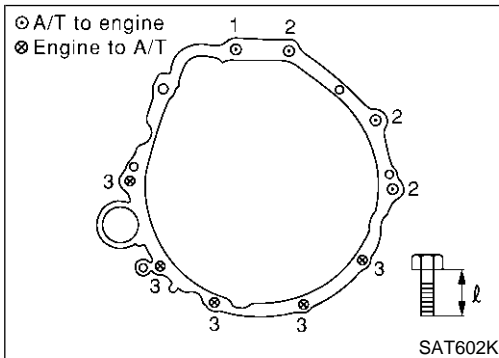
Distance "A":

14 mm (0.55 in) or more



SAT946C

- Install bolts fixing converter to drive plate.
- **With converter installed, rotate crankshaft several turns to check that transaxle rotates freely without binding.**



SAT602K

- Tighten bolts securing transaxle.
- Tighten LH mounting bracket bolts to the specified torque. Refer to EM-69, "Removal and Installation".
- Tighten center member bolts to the specified torque. Refer to EM-69, "Removal and Installation".
- Tighten rear plate cover bolts to the specified torque. Refer to EM-14, "OIL PAN".

Bolt No.	Tightening torque N·m (kg·m, ft·lb)	ℓ mm (in)
1	69.6 - 79.4 (7.1 - 8.0, 52 - 58)	65 (2.56)
2	69.6 - 79.4 (7.1 - 8.0, 52 - 58)	52 (2.05)
3	69.6 - 79.4 (7.1 - 8.0, 52 - 58)	40 (1.57)

- Reinstall any part removed.

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REMOVAL AND INSTALLATION

Installation (Cont'd)

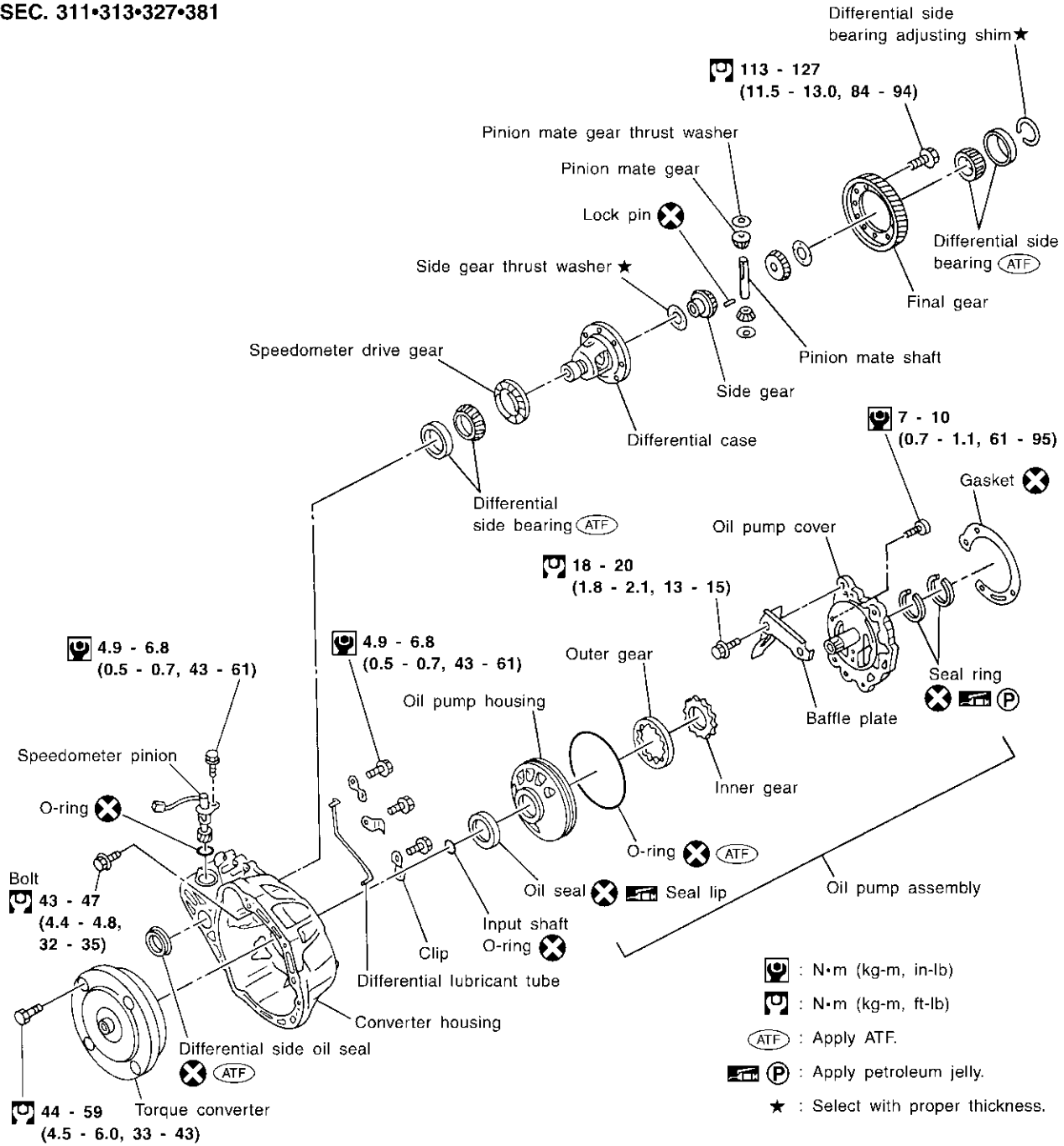


- Check fluid level in transaxle.
- Move selector lever through all positions to be sure that transaxle operates correctly.
With parking brake applied, rotate engine at idling. Move selector lever through N to D, to 3, to 2, to 1 and to R position. A slight shock should be felt by hand gripping selector each time transaxle is shifted.
- Perform road test. Refer to AT-70.

Components

NHAT0121

SEC. 311•313•327•381



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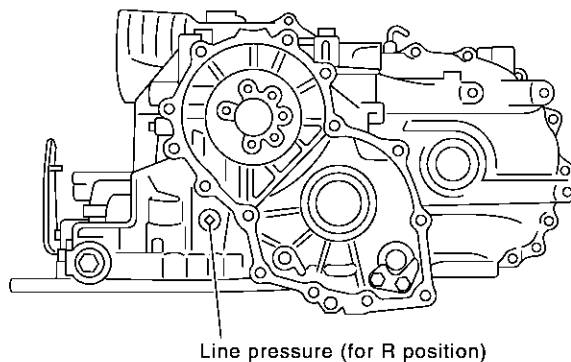
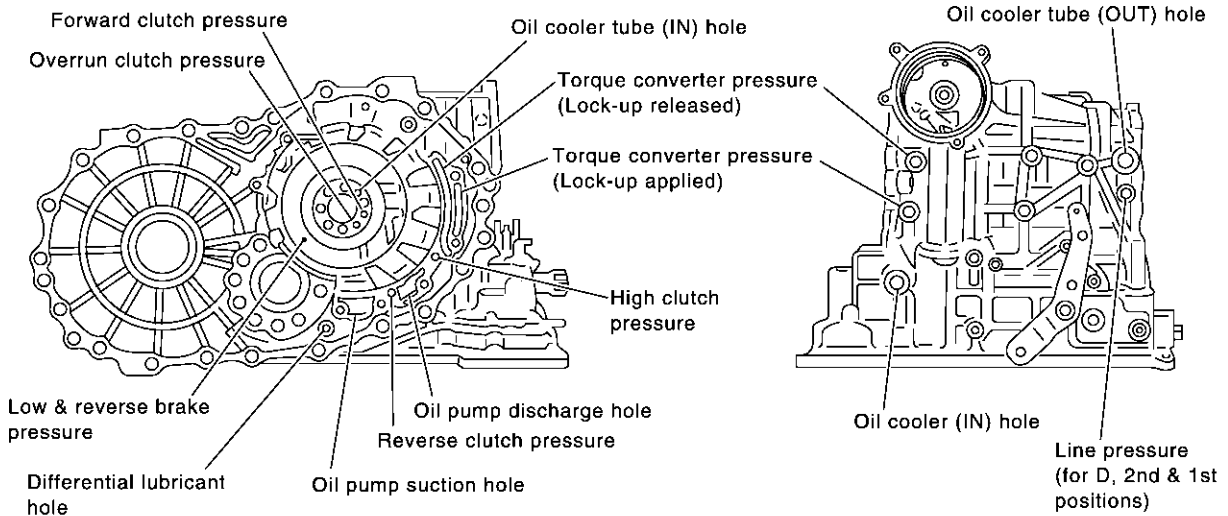
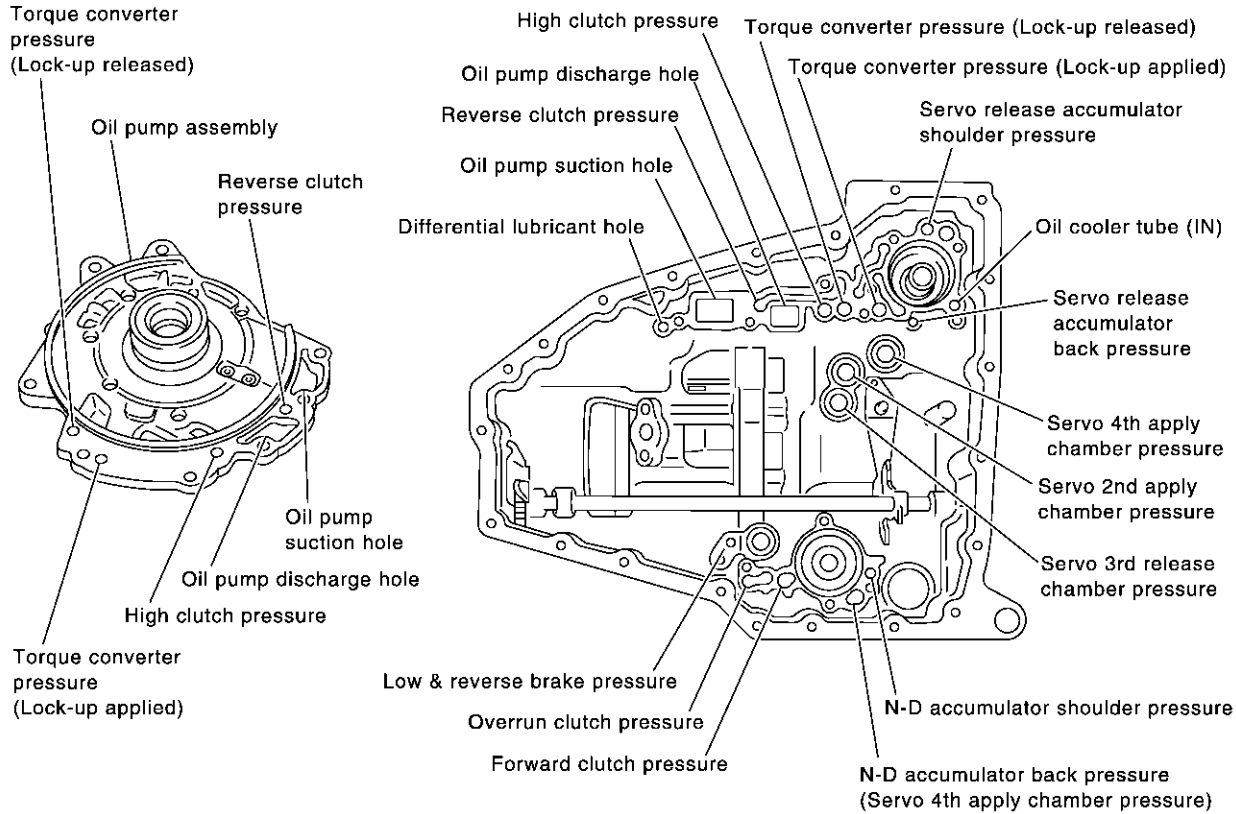
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Oil Channel



OVERHAUL

Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings

Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings

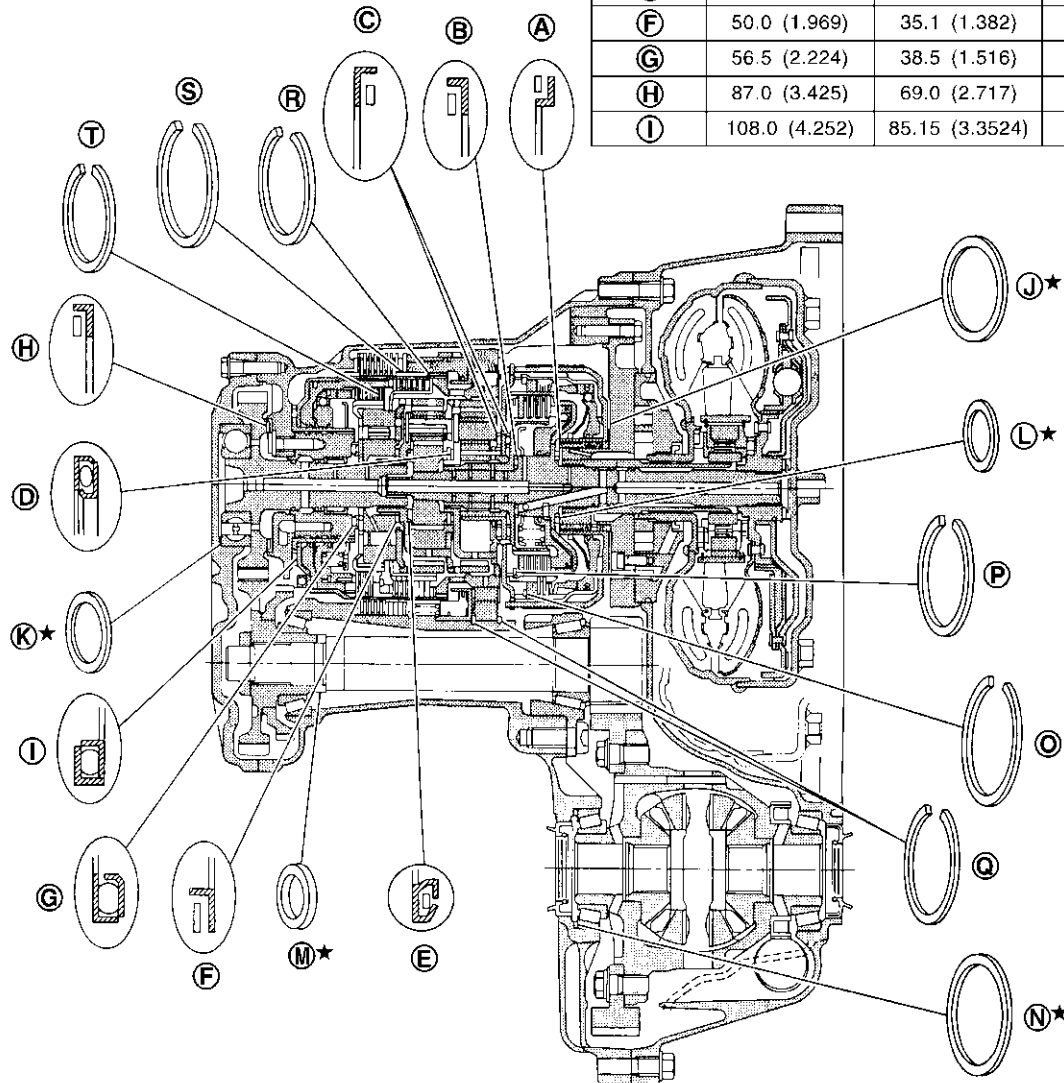
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Outer diameter of thrust washers

Item number	Outer diameter mm (in)	Parts number*
J ★	76.0 (2.992)	31508 80X13 - 31508 80X20
K ★	80.0 (3.150)	31438 80X60 - 31438 80X70

Outer and inner diameter of needle bearings

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Parts number*
A	50.0 (1.969)	35.1 (1.382)	31407 80X10
B	42.0 (1.654)	23.7 (0.933)	31407 80X01
C	70.0 (2.756)	50.0 (1.969)	31407 80X09
D	51.0 (2.008)	33.1 (1.303)	31407 80X02
E	48.0 (1.890)	30.0 (1.181)	31407 80X03
F	50.0 (1.969)	35.1 (1.382)	31407 80X10
G	56.5 (2.224)	38.5 (1.516)	31407 80X08
H	87.0 (3.425)	69.0 (2.717)	31407 80X07
I	108.0 (4.252)	85.15 (3.3524)	31407 80X06



Outer & inner diameter of bearing races, adjusting shims and adjusting spacer

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Parts number*
L ★	51.0 (2.008)	36.0 (1.417)	31435 80X00 - 31439 80X14
M ★	38.0 (1.496)	28.1 (1.106)	31439 85X01 - 31439 85X06 31439 83X11 - 31439 83X24 31439 81X00 - 31439 81X24 31439 81X46 - 31439 81X49 31439 81X60 - 31439 81X74
N ★	75.0 (2.953)	67.0 (2.638)	31438 80X00 - 31439 80X11

★ : Select proper thickness.

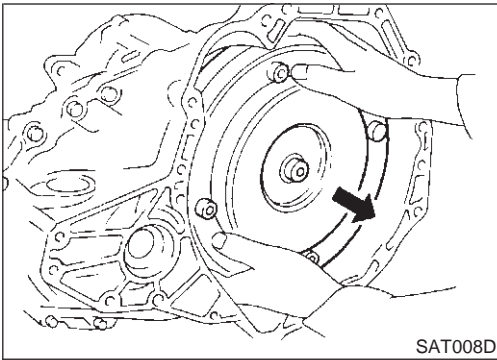
* : Always check with the Parts Department for the latest parts information.

Outer diameter of snap rings

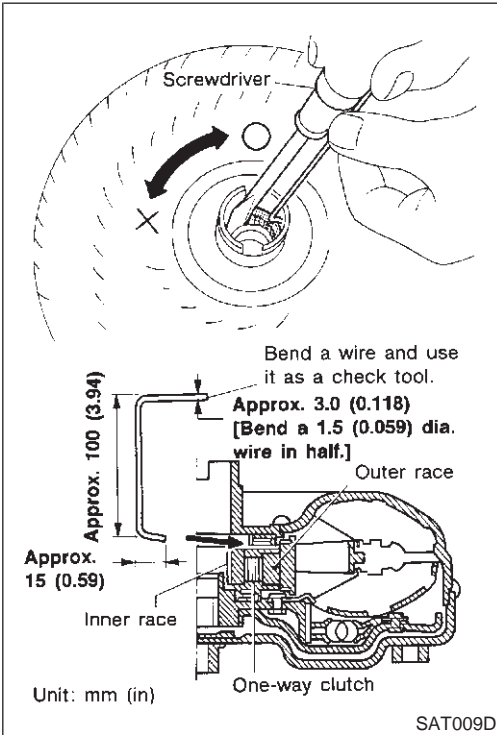
Item number	Outer diameter mm (in)	Parts number*
O	150 (5.91)	31506 80X13
P	119.1 (4.689)	31506 80X06
Q	182.8 (7.197)	31506 80X08
R	144.8 (5.701)	31506 80X03
S	173.8 (6.843)	31506 80X09
T	133.9 (5.272)	31506 80X01

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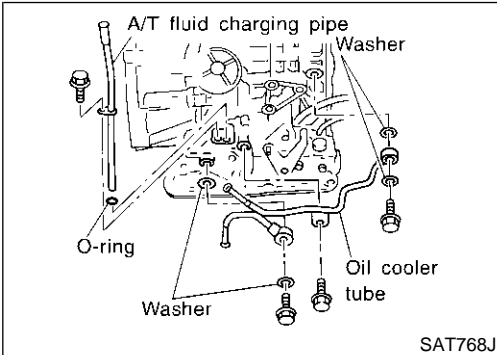
DISASSEMBLY



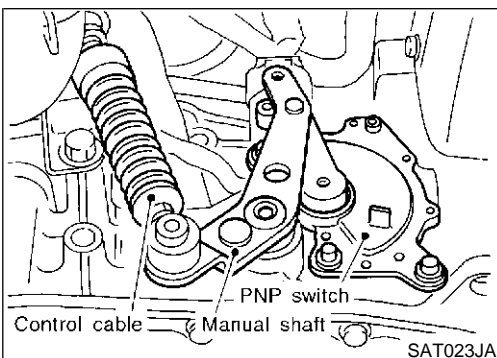
1. Drain ATF through drain plug.
2. Remove torque converter.



3. Check torque converter one-way clutch using check tool as shown at left.
 - a. Insert check tool into the groove of bearing support built into one-way clutch outer race.
 - b. When fixing bearing support with check tool, rotate one-way clutch spline using screwdriver.
 - c. Check that inner race rotates clockwise only. If not, replace torque converter assembly.

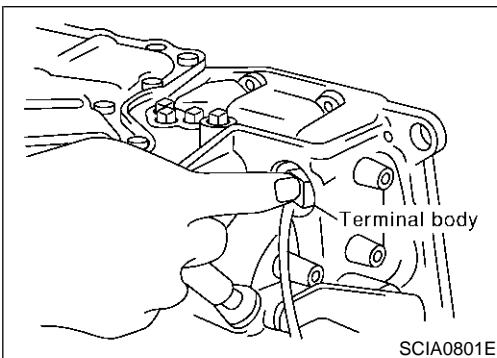
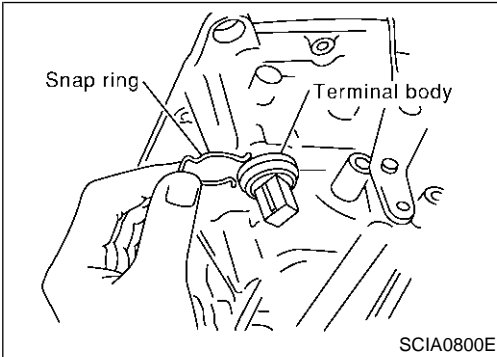
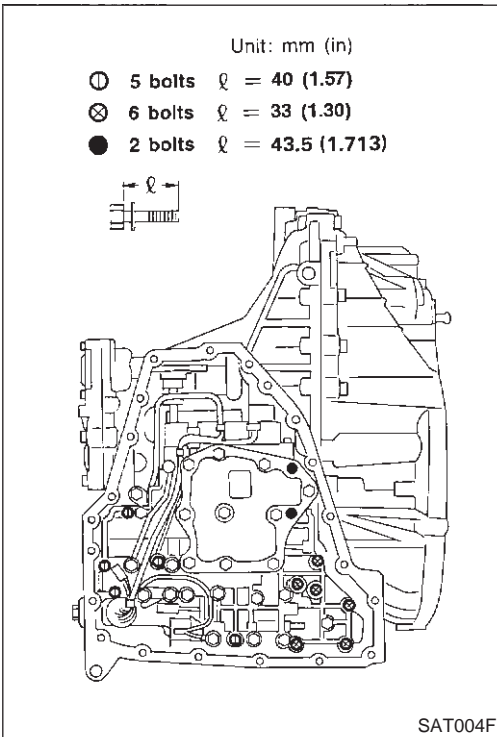
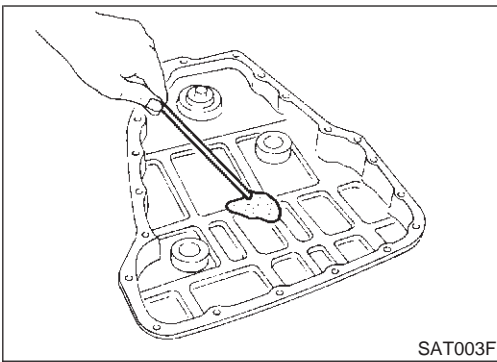


4. Remove A/T fluid charging pipe and fluid cooler tube.



5. Set manual shaft to position P.
6. Remove park/neutral position (PNP) switch.

DISASSEMBLY



7. Remove oil pan and oil pan gasket.
 - **Do not reuse oil pan bolts.**
8. Check foreign materials in oil pan to help determine causes of malfunction. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.
 - **If frictional material is detected, replace radiator after repair of A/T. Refer to LC-20, "Radiator".**
9. Remove control valve assembly according to the following procedures.
 - a. Remove control valve assembly mounting bolts I, X and ●.
 - b. Remove snap ring from terminal body.
 - c. Push terminal body into transmission case and draw out solenoid harness.

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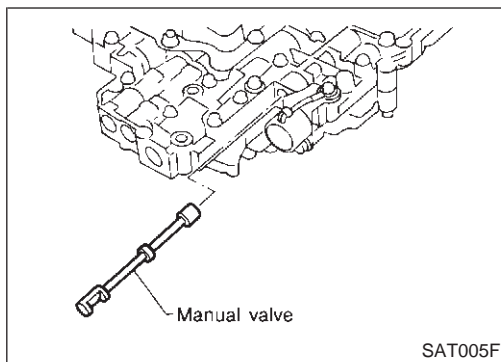
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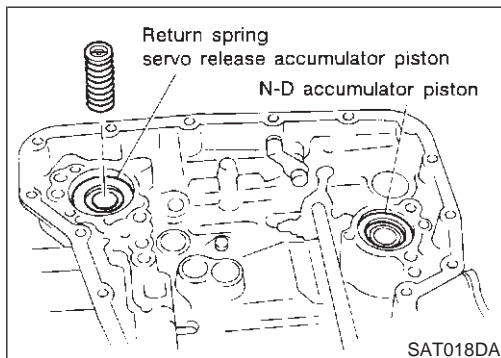
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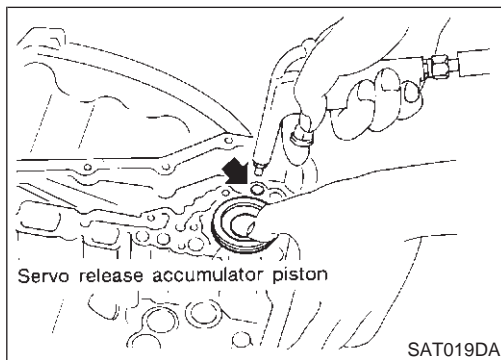
DISASSEMBLY



10. Remove manual valve from control valve assembly.

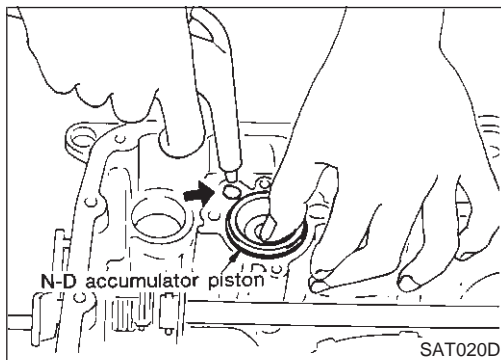


11. Remove return spring from servo release accumulator piston.



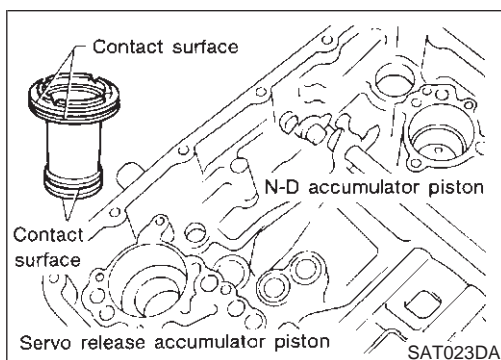
12. Remove servo release accumulator piston with compressed air.

13. Remove O-rings from servo release accumulator piston.



14. Remove N-D accumulator piston and return spring with compressed air.

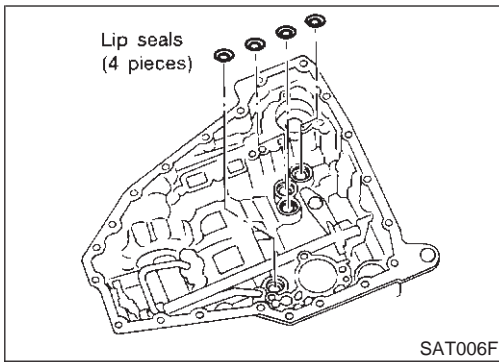
15. Remove O-rings from N-D accumulator piston.



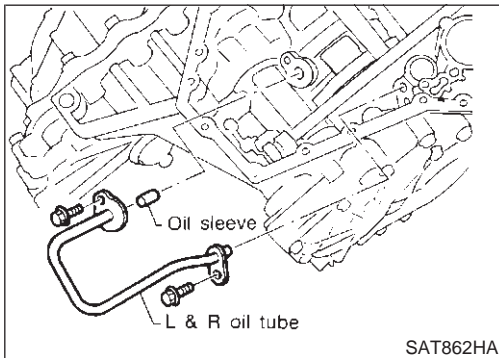
16. Check accumulator pistons and contact surface of transmission case for damage.

17. Check accumulator return springs for damage and free length.

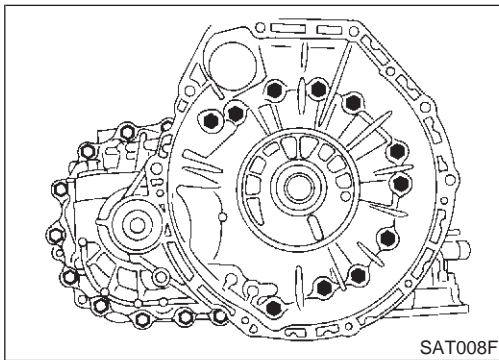
DISASSEMBLY



18. Remove lip seals.

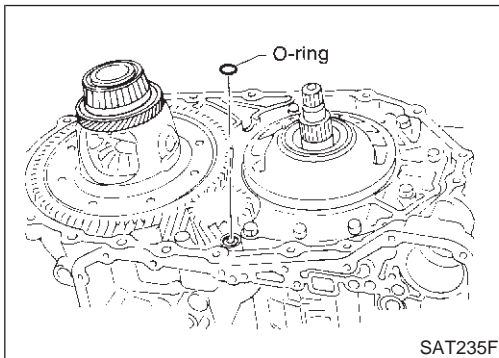


19. Remove L & R oil tube and oil sleeve.

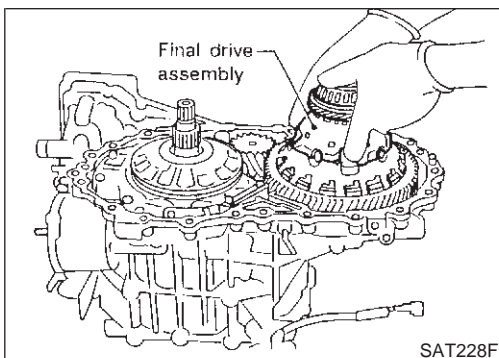


20. Remove converter housing according to the following procedures.

- Remove converter housing mounting bolts.
- Remove converter housing by tapping it lightly.



c. Remove O-ring from differential oil port.



21. Remove final drive assembly from transmission case.

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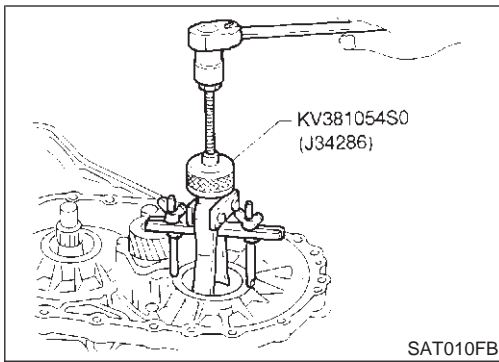
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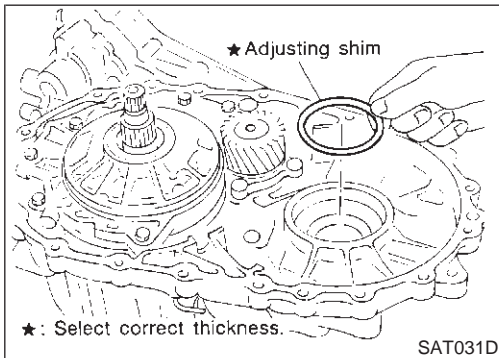
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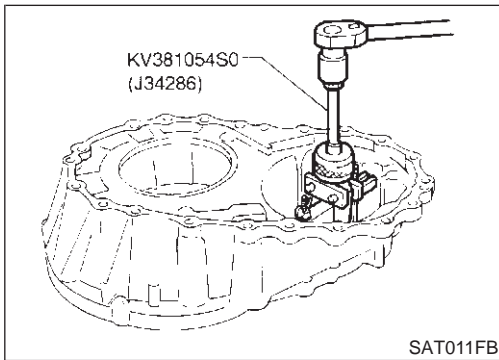
DISASSEMBLY



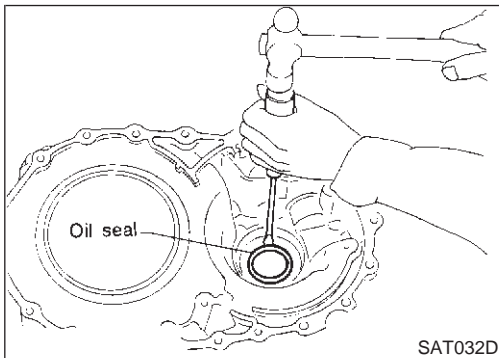
22. Remove differential side bearing outer race and side bearing adjusting shim from transmission case.



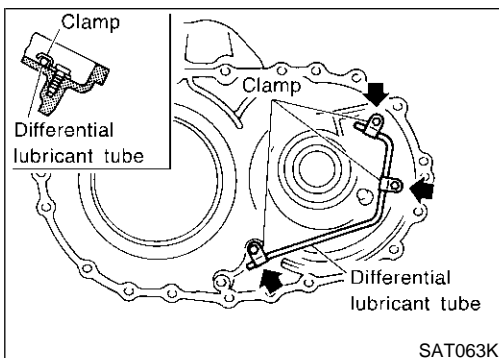
23. Remove differential side bearing adjusting shim from transmission case.



24. Remove differential side bearing outer race from converter housing.

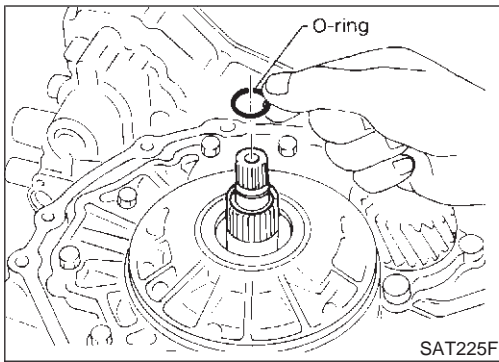


25. Remove oil seal with screwdriver from converter housing.
- **Be careful not to damage case.**

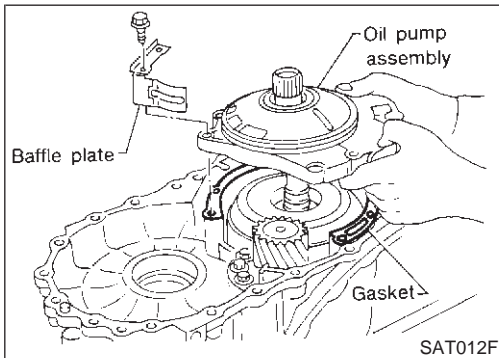


26. Remove differential lubricant tube from converter housing.

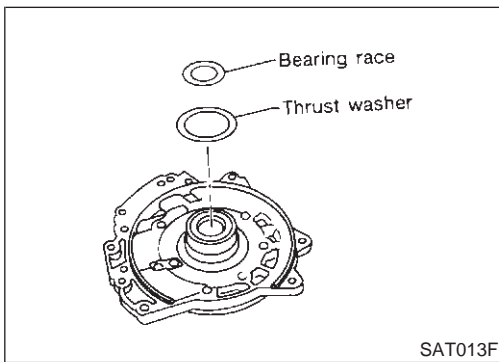
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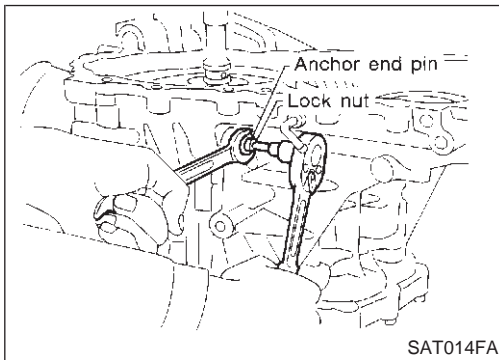
27. Remove oil pump according to the following procedures.
- Remove O-ring from input shaft.



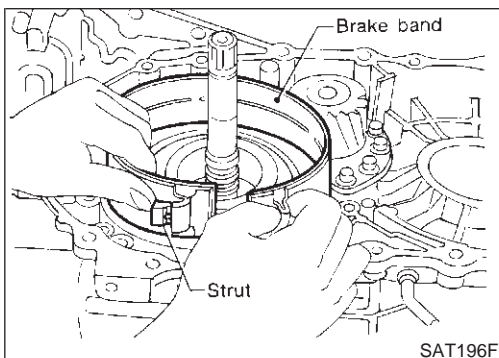
- Remove oil pump assembly, baffle plate and gasket from transmission case.



- Remove thrust washer and bearing race from oil pump assembly.



28. Remove brake band according to the following procedures.
- Loosen lock nut, then back off anchor end pin.
 - Do not reuse anchor end pin.**



- Remove brake band and strut from transmission case.

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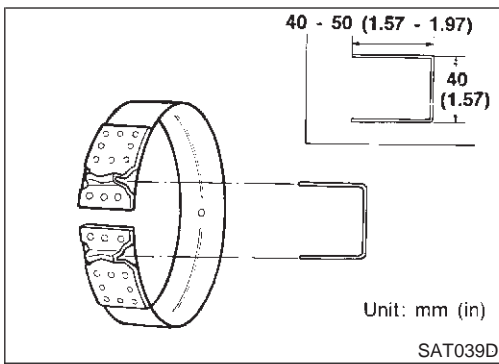
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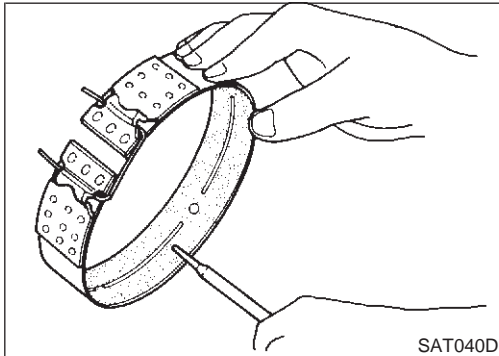
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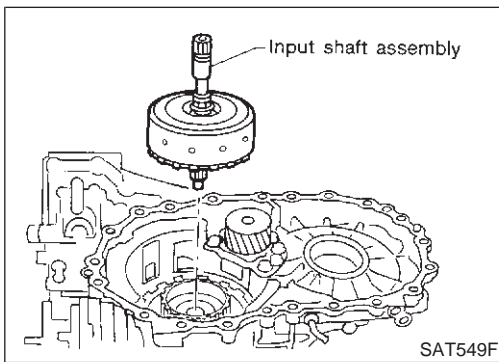
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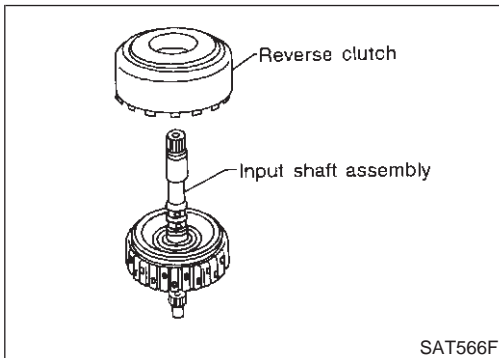
- To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. When removing the brake band, always secure it with a clip as shown in the figure at left. Leave the clip in position after removing the brake band.



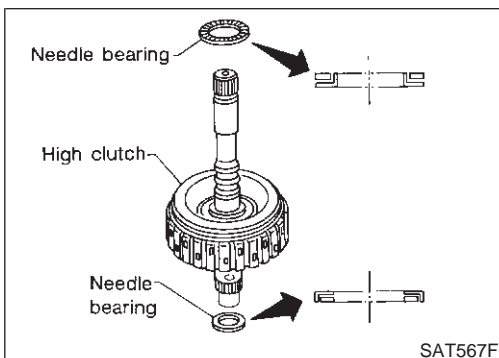
- Check brake band facing for damage, cracks, wear or burns.



- Remove input shaft assembly (high clutch) and reverse clutch according to the following procedures.
 - Remove input shaft assembly (high clutch) with reverse clutch.

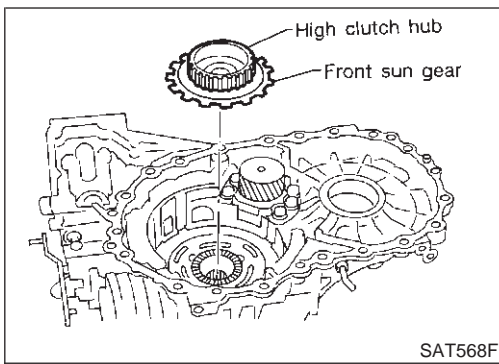


- Remove input shaft assembly (high clutch) from reverse clutch.

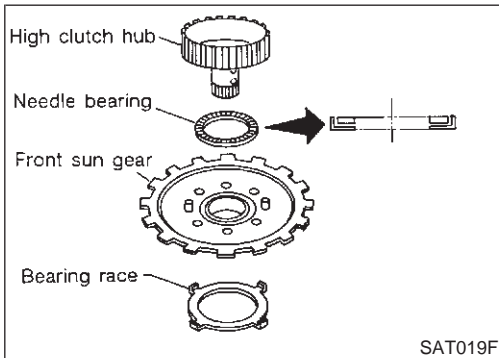


- Remove needle bearings from high clutch drum and check for damage or wear.

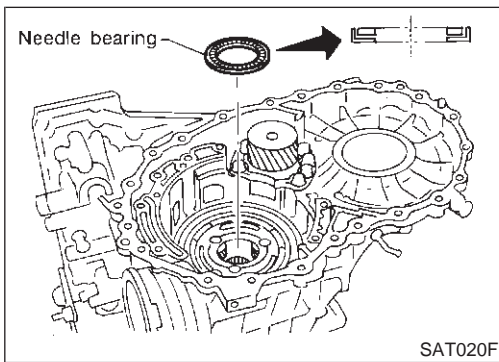
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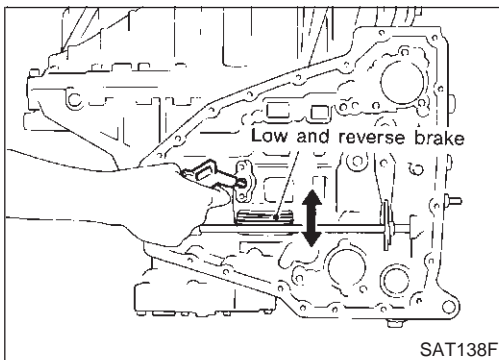
- d. Remove high clutch hub and front sun gear from transmission case.



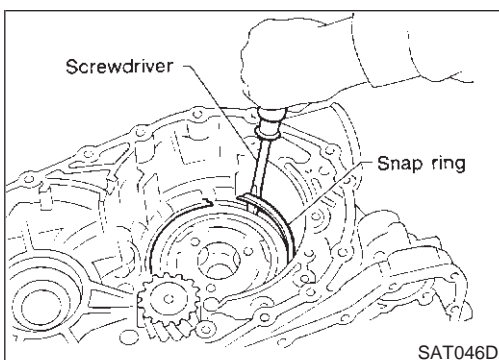
- e. Remove front sun gear and needle bearing from high clutch hub and check for damage or wear.
f. Remove bearing race from front sun gear and check for damage or wear.



30. Remove needle bearing from transmission case and check for damage or wear.



31. Apply compressed air and check to see that low and reverse brake operates.



32. Remove low one-way clutch and front planetary carrier assembly according to the following procedures.
a. Remove snap ring with flat-bladed screwdriver.

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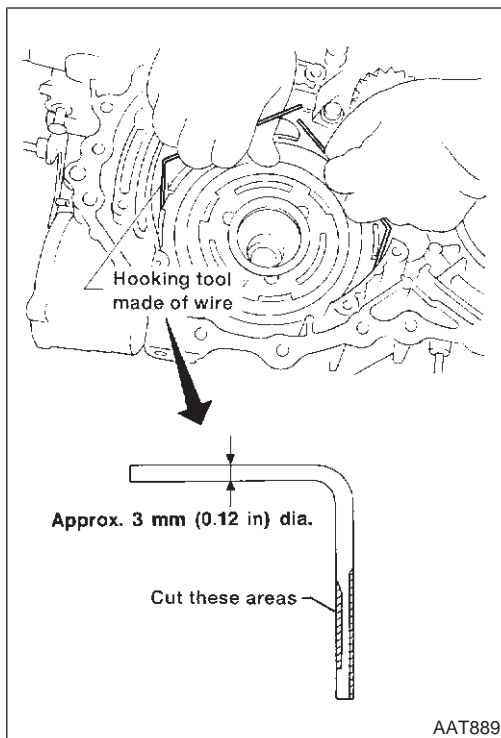
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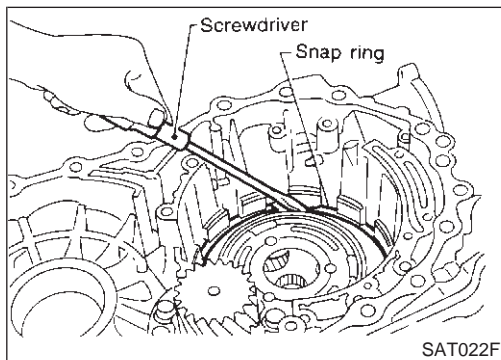
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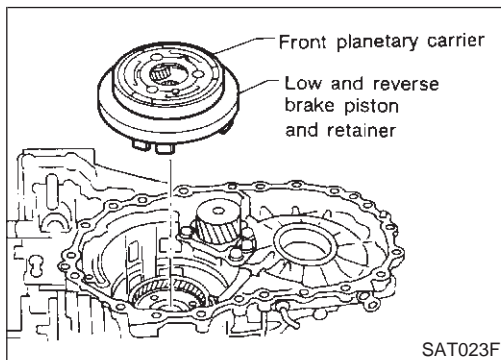
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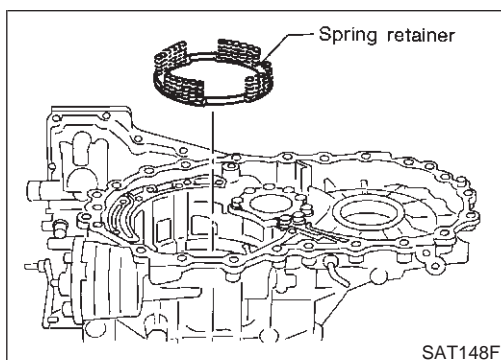
- b. Remove low one-way clutch with a hook made of wire.



- c. Remove snap ring with flat-bladed screwdriver.

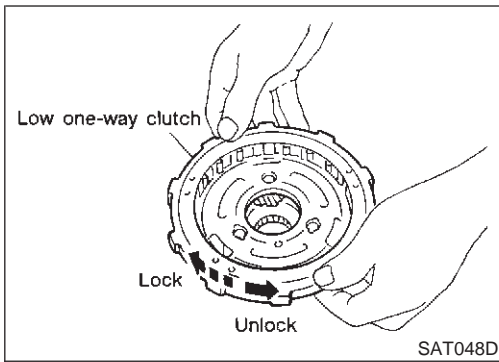


- d. Remove front planetary carrier with low and reverse brake piston and retainer.

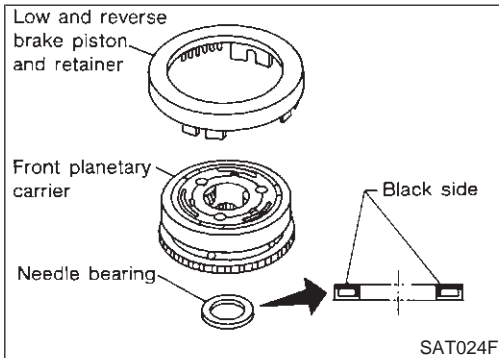


- e. Remove low and reverse brake spring retainer.
- Do not remove return springs from spring retainer.

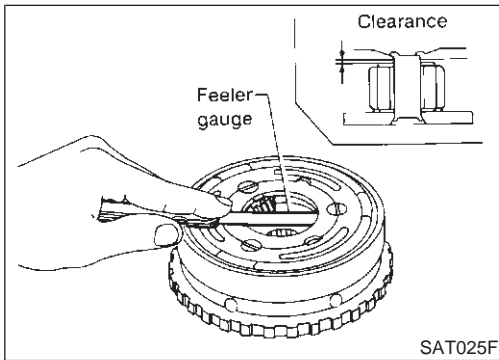
DISASSEMBLY



- f. Check that low one-way clutch rotates in the direction of the arrow and locks in the opposite direction.



- g. Remove needle bearing, low and reverse brake piston and retainer from front planetary carrier.



- h. Check front planetary carrier, low one-way clutch and needle bearing for damage or wear.
- i. Check clearance between planetary gears and planetary carrier with feeler gauge.

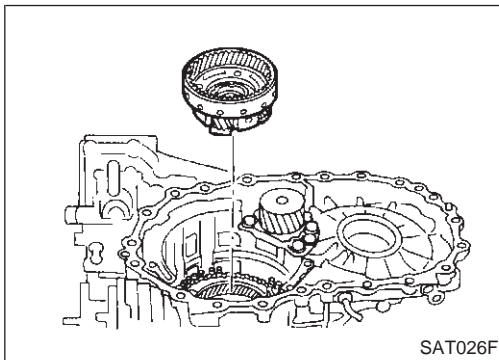
Standard clearance:

0.20 - 0.70 mm (0.0079 - 0.0276 in)

Allowable limit:

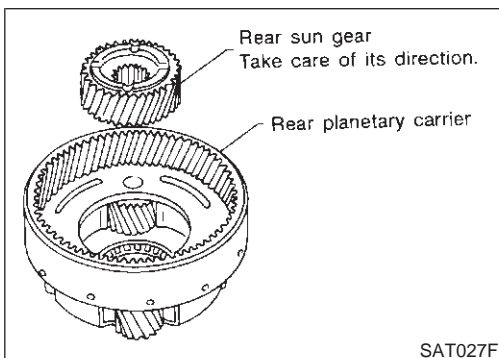
0.80 mm (0.0315 in)

Replace front planetary carrier if the clearance exceeds allowable limit.



33. Remove rear planetary carrier assembly and rear sun gear according to the following procedures.

- a. Remove rear planetary carrier assembly from transmission case.



- b. Remove rear sun gear from rear planetary carrier.

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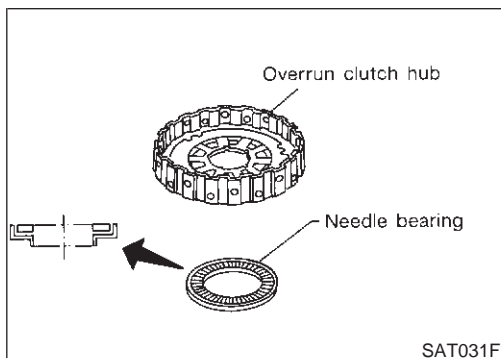
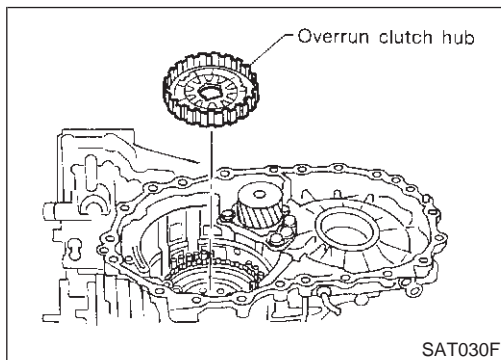
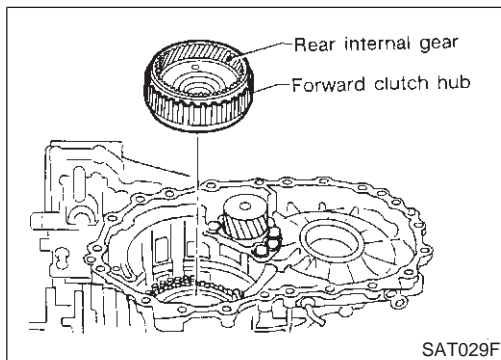
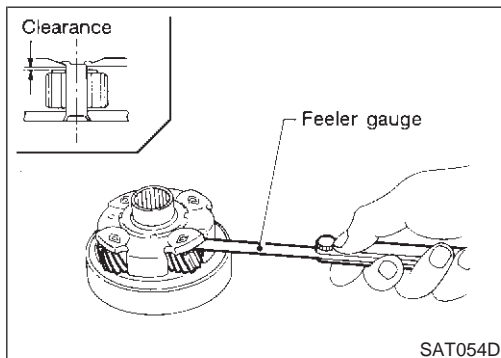
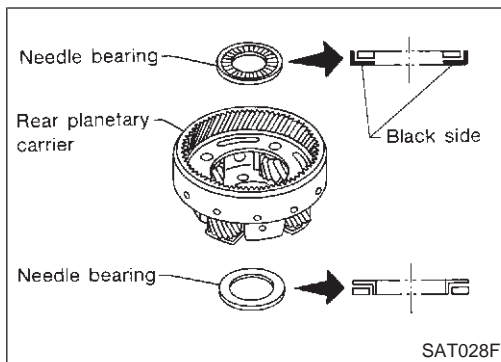
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c. Remove needle bearings from rear planetary carrier assembly.

d. Check rear planetary carrier, rear sun gear and needle bearings for damage or wear.

e. Check clearance between pinion washer and rear planetary carrier with feeler gauge.

Standard clearance:

0.20 - 0.70 mm (0.0079 - 0.0276 in)

Allowable limit:

0.80 mm (0.0315 in)

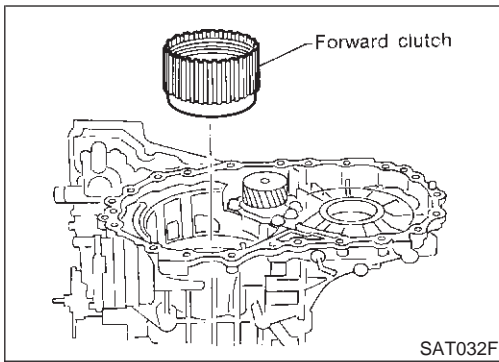
Replace rear planetary carrier if the clearance exceeds allowable limit.

34. Remove rear internal gear and forward clutch hub from transmission case.

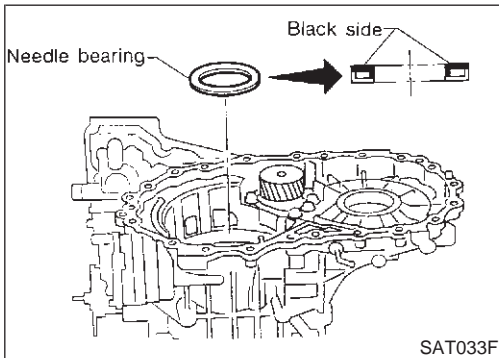
35. Remove overrun clutch hub from transmission case.

36. Remove needle bearing from overrun clutch hub and check for damage or wear.

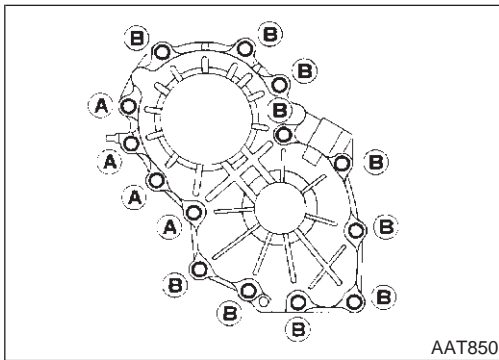
DISASSEMBLY



37. Remove forward clutch assembly from transmission case.



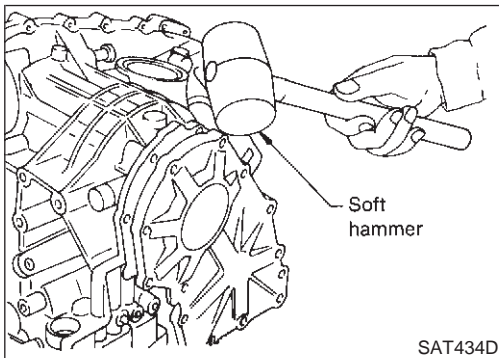
38. Remove needle bearing from transmission case.



39. Remove output shaft assembly according to the following procedures.

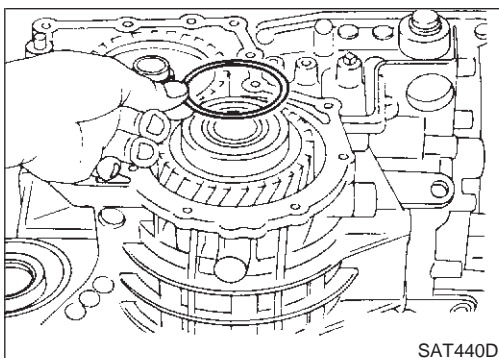
a. Remove side cover bolts.

- Do not mix bolts A and B.
- Always replace bolts A as they are self-sealing bolts.



b. Remove side cover by lightly tapping it with a soft hammer.

- Be careful not to drop output shaft assembly. It might come out when removing side cover.



c. Remove adjusting shim.

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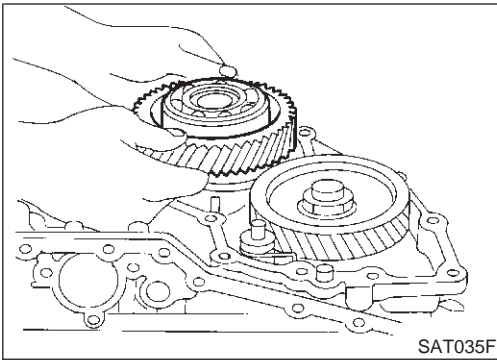
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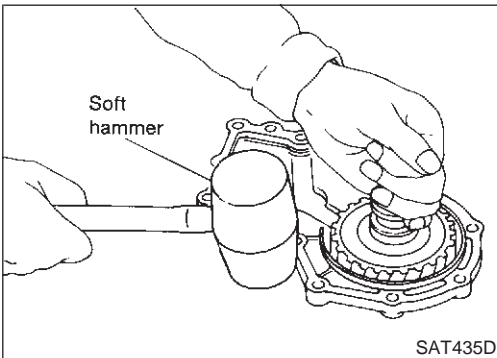
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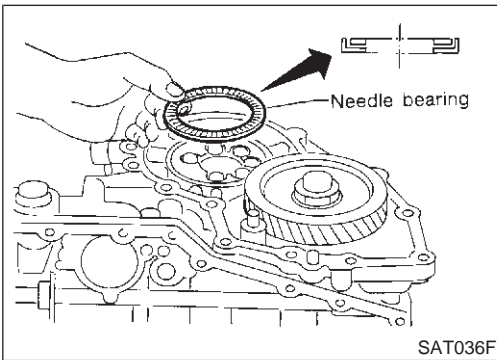
DISASSEMBLY



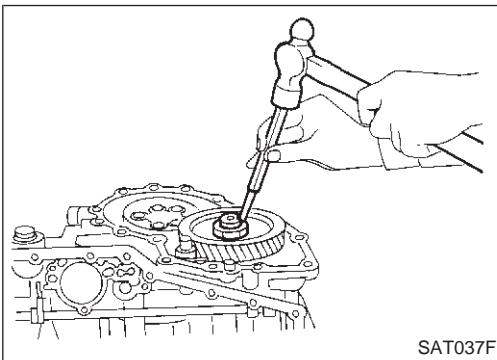
d. Remove output shaft assembly.



- If output shaft assembly comes off with side cover, tap cover with a soft hammer to separate.

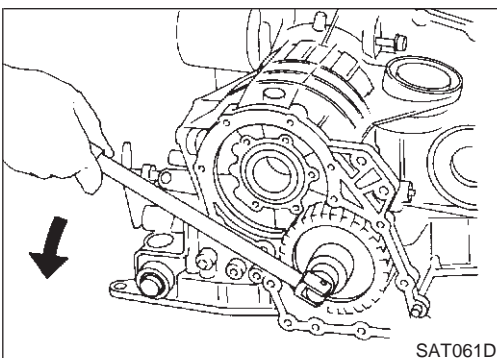


e. Remove needle bearing.



40. Disassemble reduction pinion gear according to the following procedures.

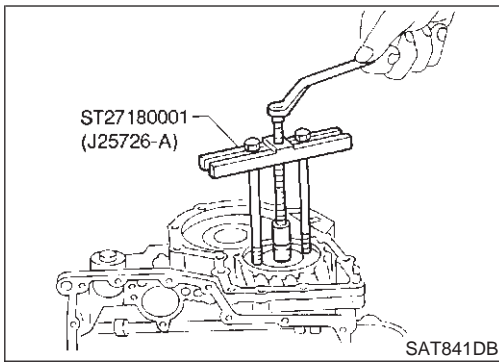
- a. Set manual shaft to position P to fix idler gear.
- b. Unlock idler gear lock nut using a pin punch.



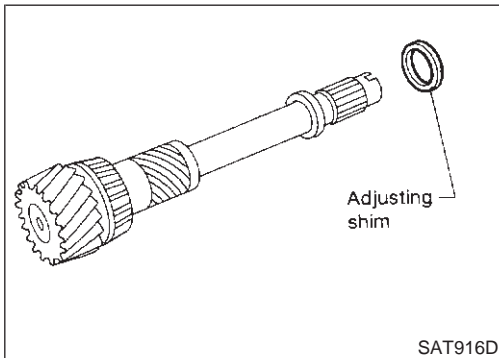
c. Remove idler gear lock nut.

- **Do not reuse idler gear lock nut.**

DISASSEMBLY

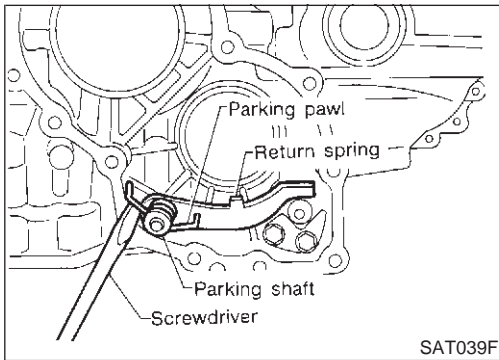


d. Remove idler gear with puller.



e. Remove reduction pinion gear.

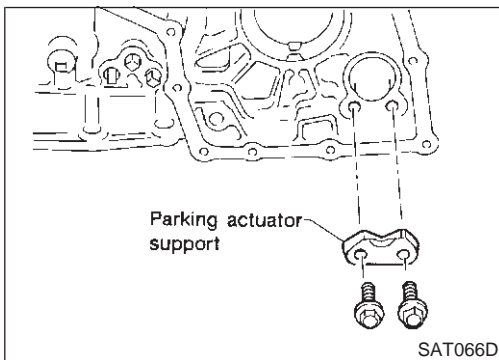
f. Remove adjusting shim from reduction pinion gear.



41. Remove return spring from parking shaft with screwdriver.

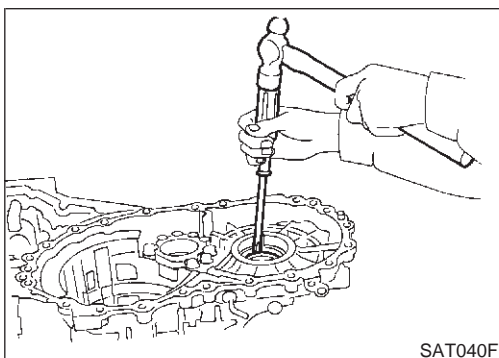
42. Draw out parking shaft and remove parking pawl from transmission case.

43. Check parking pawl and shaft for damage or wear.



44. Remove parking actuator support from transmission case.

45. Check parking actuator support for damage or wear.



46. Remove side oil seal with screwdriver from transmission case.

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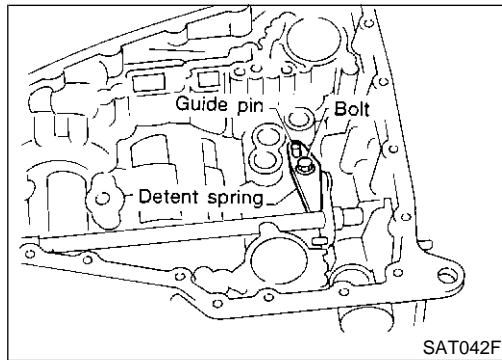
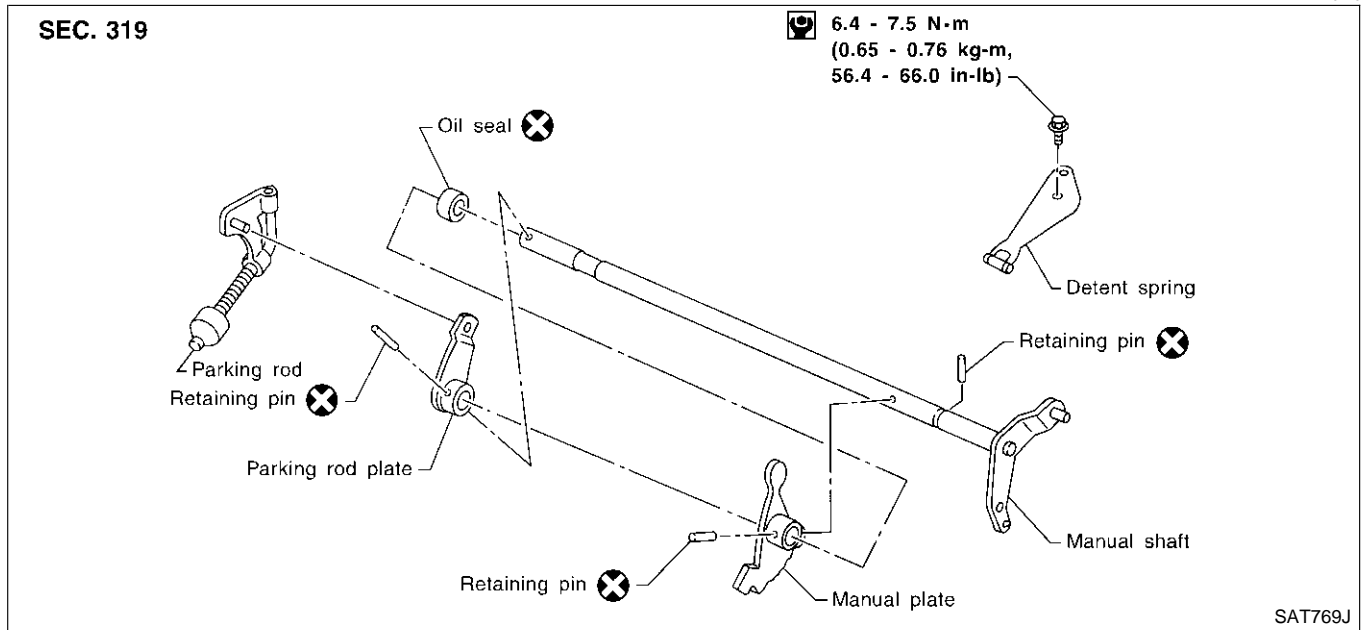
IDX

REPAIR FOR COMPONENT PARTS

Manual Shaft

Manual Shaft COMPONENTS

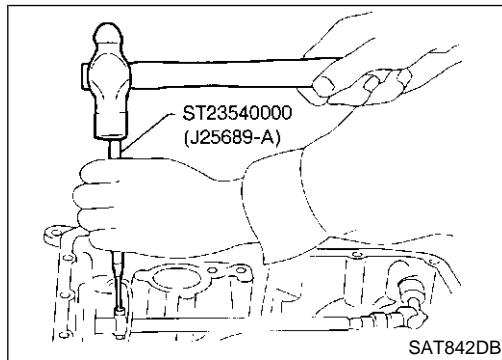
NHAT0125



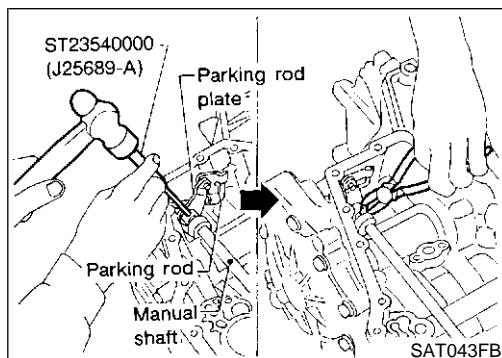
REMOVAL

NHAT0126

1. Remove detent spring from transmission case.



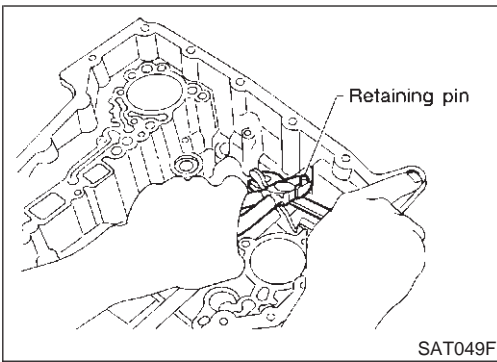
2. Drive out manual plate retaining pin.



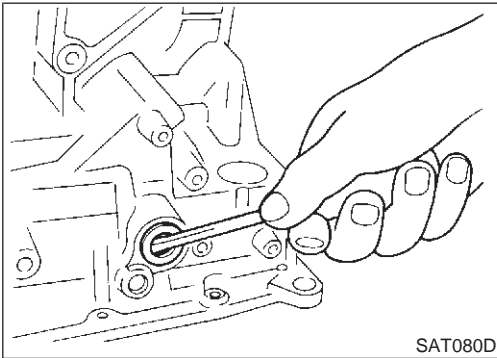
3. Drive and pull out parking rod plate retaining pin.
4. Remove parking rod plate from manual shaft.
5. Draw out parking rod from transmission case.

REPAIR FOR COMPONENT PARTS

Manual Shaft (Cont'd)



6. Pull out manual shaft retaining pin.
7. Remove manual shaft and manual plate from transmission case.

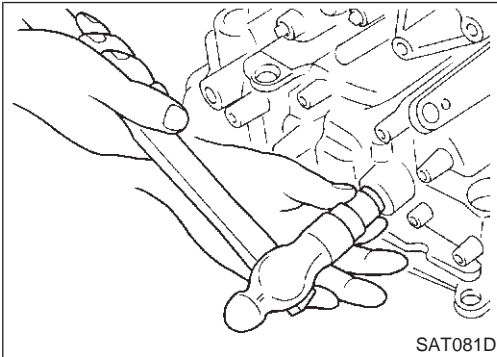


8. Remove manual shaft oil seal.

INSPECTION

- Check component parts for wear or damage. Replace if necessary.

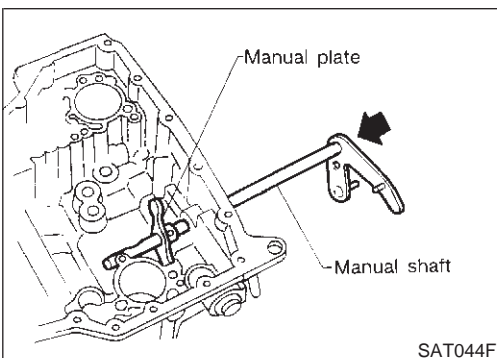
NHAT0127



INSTALLATION

1. Install manual shaft oil seal.
- Apply ATF to outer surface of oil seal.

NHAT0128



2. Install manual shaft and manual plate.

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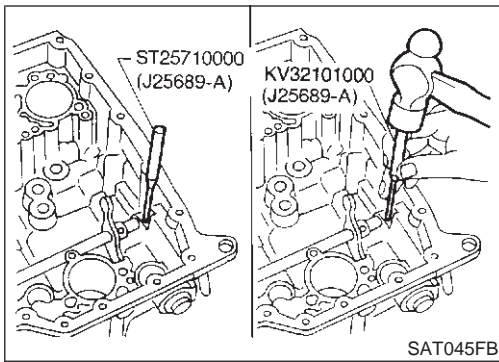
SC

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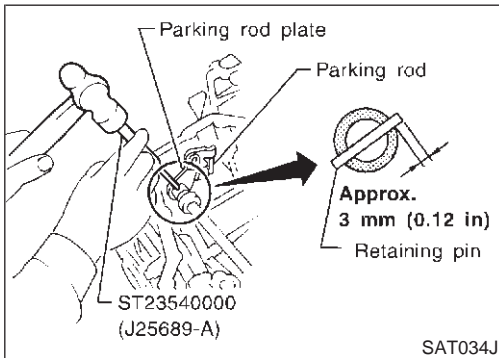
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REPAIR FOR COMPONENT PARTS

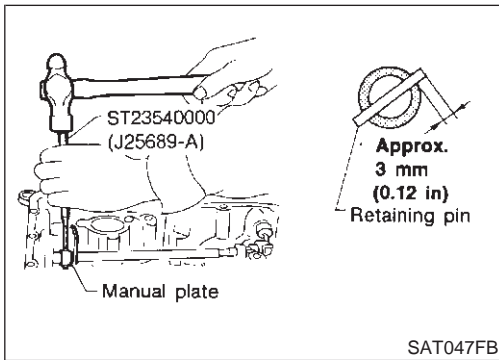
Manual Shaft (Cont'd)



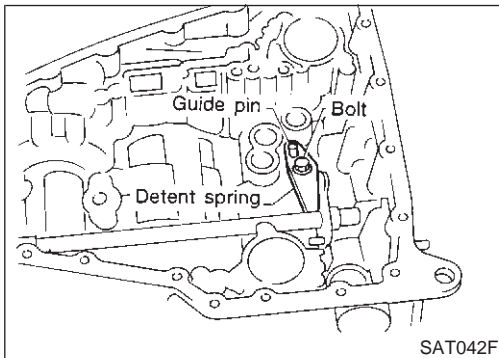
3. Align groove of manual shaft and hole of transmission case.
4. Install manual shaft retaining pin up to bottom of hole.



5. Install parking rod to parking rod plate.
 6. Set parking rod assembly onto manual shaft and drive retaining pin.
- Both ends of pin should protrude.



7. Drive manual plate retaining pin.
- Both ends of pin should protrude.

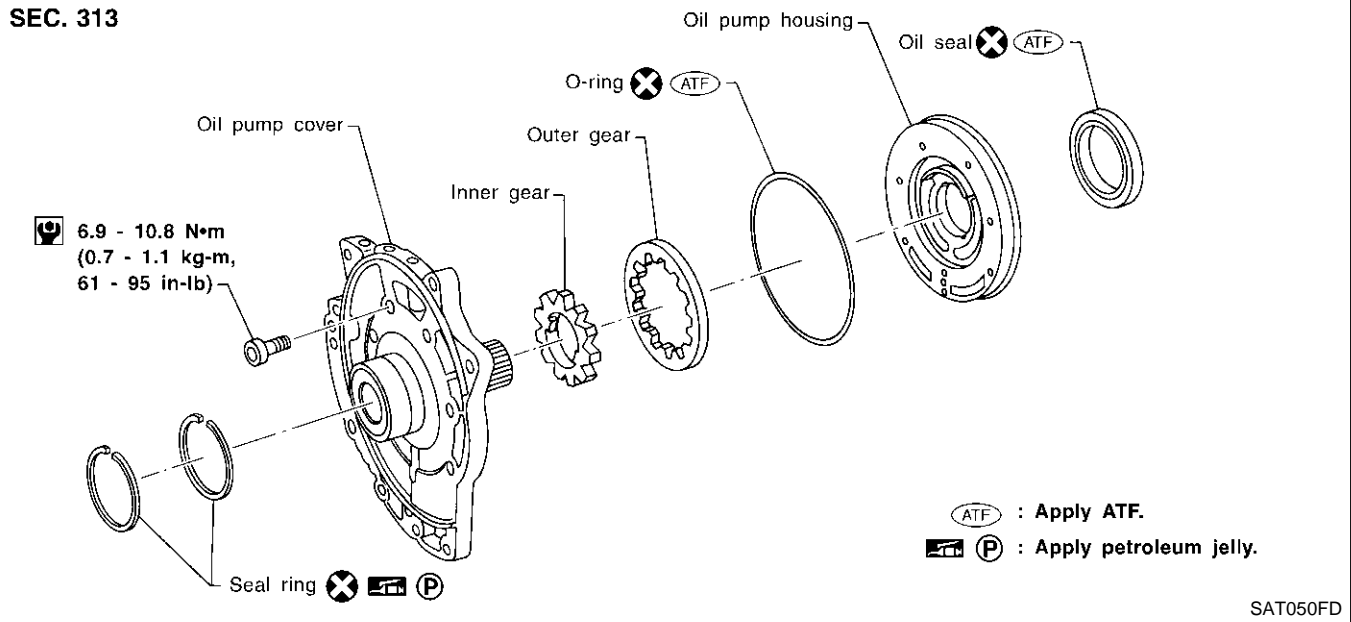


8. Install detent spring. Tighten detent spring bolts to the specified torque. Refer to AT-308.

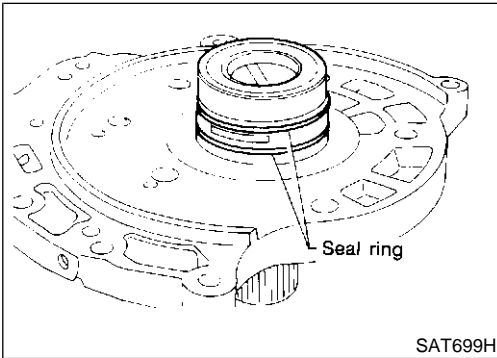
Oil Pump COMPONENTS

NHAT0129

SEC. 313



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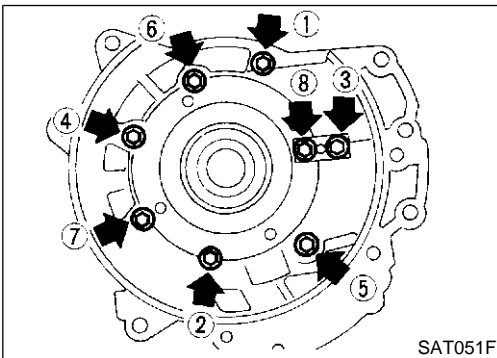


DISASSEMBLY

NHAT0130

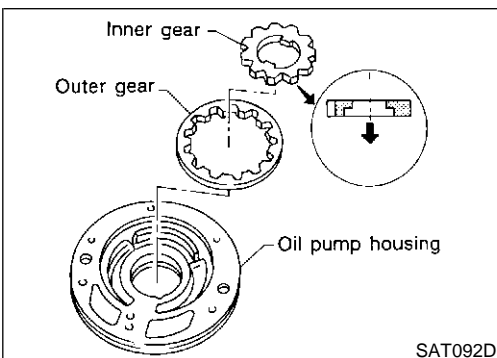
1. Remove seal rings.

AX
SU
BR
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RS



2. Loosen bolts in a crisscross pattern and remove oil pump cover.

BT
HA
SC
EL

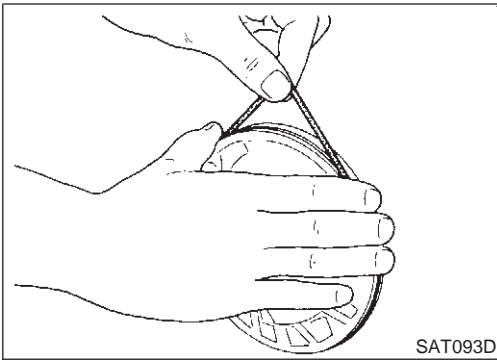


3. Remove inner and outer gear from oil pump housing.

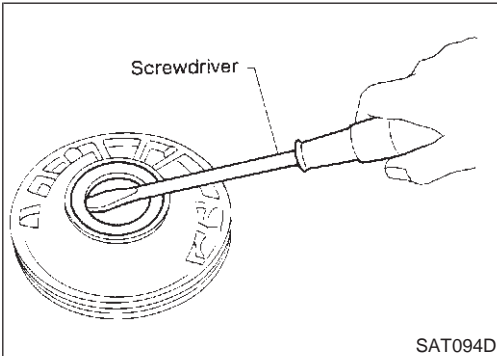
IDX

REPAIR FOR COMPONENT PARTS

Oil Pump (Cont'd)



4. Remove O-ring from oil pump housing.



5. Remove oil pump housing oil seal.

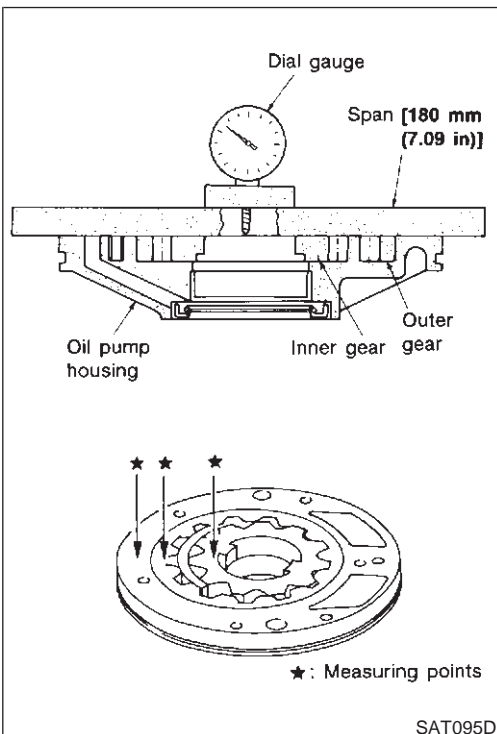
INSPECTION

Oil Pump Housing, Oil Pump Cover, Inner Gear and Outer Gear

NHAT0131

- Check for wear or damage.

NHAT0131S01



Side Clearances

NHAT0131S02

- Measure side clearance of inner and outer gears in at least four places around each outside edge. Maximum measured values should be within specified positions.

Standard clearance:

0.030 - 0.050 mm (0.0012 - 0.0020 in)

- If clearance is less than standard, select inner and outer gear as a set so that clearance is within specifications.

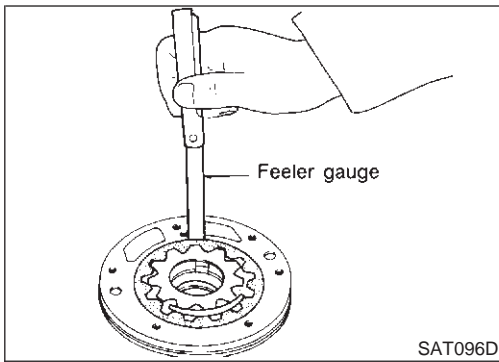
Inner and outer gear:

Refer to SDS, AT-388.

- If clearance is more than standard, replace whole oil pump assembly except oil pump cover.

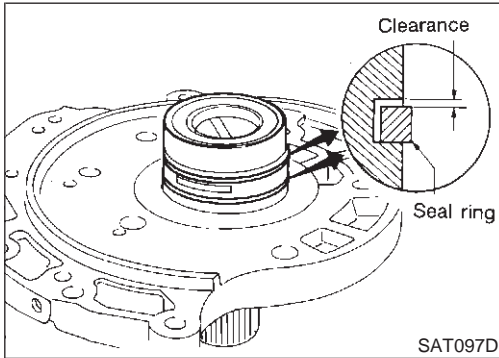
REPAIR FOR COMPONENT PARTS

Oil Pump (Cont'd)



- Measure clearance between outer gear and oil pump housing.
 - Standard clearance:**
0.111 - 0.181 mm (0.0044 - 0.0071 in)
 - Allowable limit:**
0.181 mm (0.0071 in)
- If not within allowable limit, replace whole oil pump assembly except oil pump cover.

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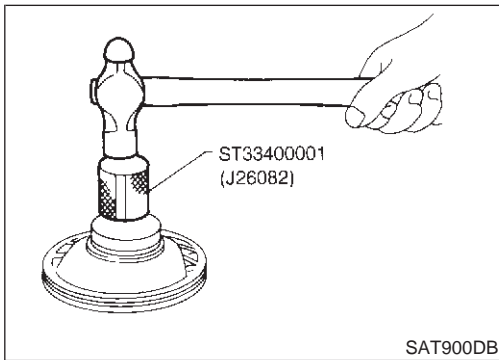
Seal Ring Clearance

NHAT0131S03

- Measure clearance between seal ring and ring groove.
 - Standard clearance:**
0.1 - 0.25 mm (0.0039 - 0.0098 in)
 - Allowable limit:**
0.25 mm (0.0098 in)
- If not within allowable limit, replace oil pump cover assembly.

LC
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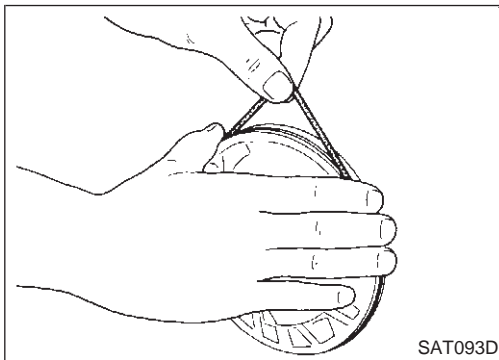


ASSEMBLY

NHAT0132

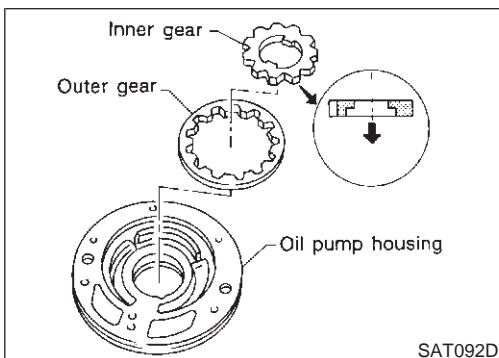
1. Install oil seal on oil pump housing.

AX
SU
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2. Install O-ring on oil pump housing.
 - **Apply ATF to O-ring.**

RS
BT
HA

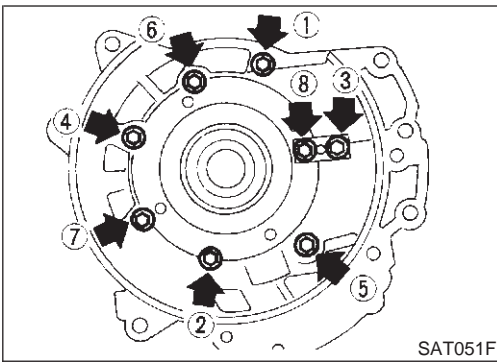


3. Install inner and outer gears on oil pump housing.
 - **Be careful of direction of inner gear.**

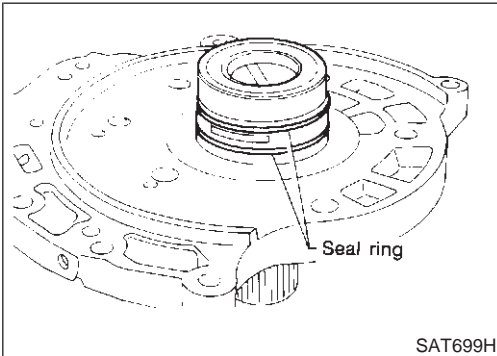
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REPAIR FOR COMPONENT PARTS

Oil Pump (Cont'd)



SAT051F



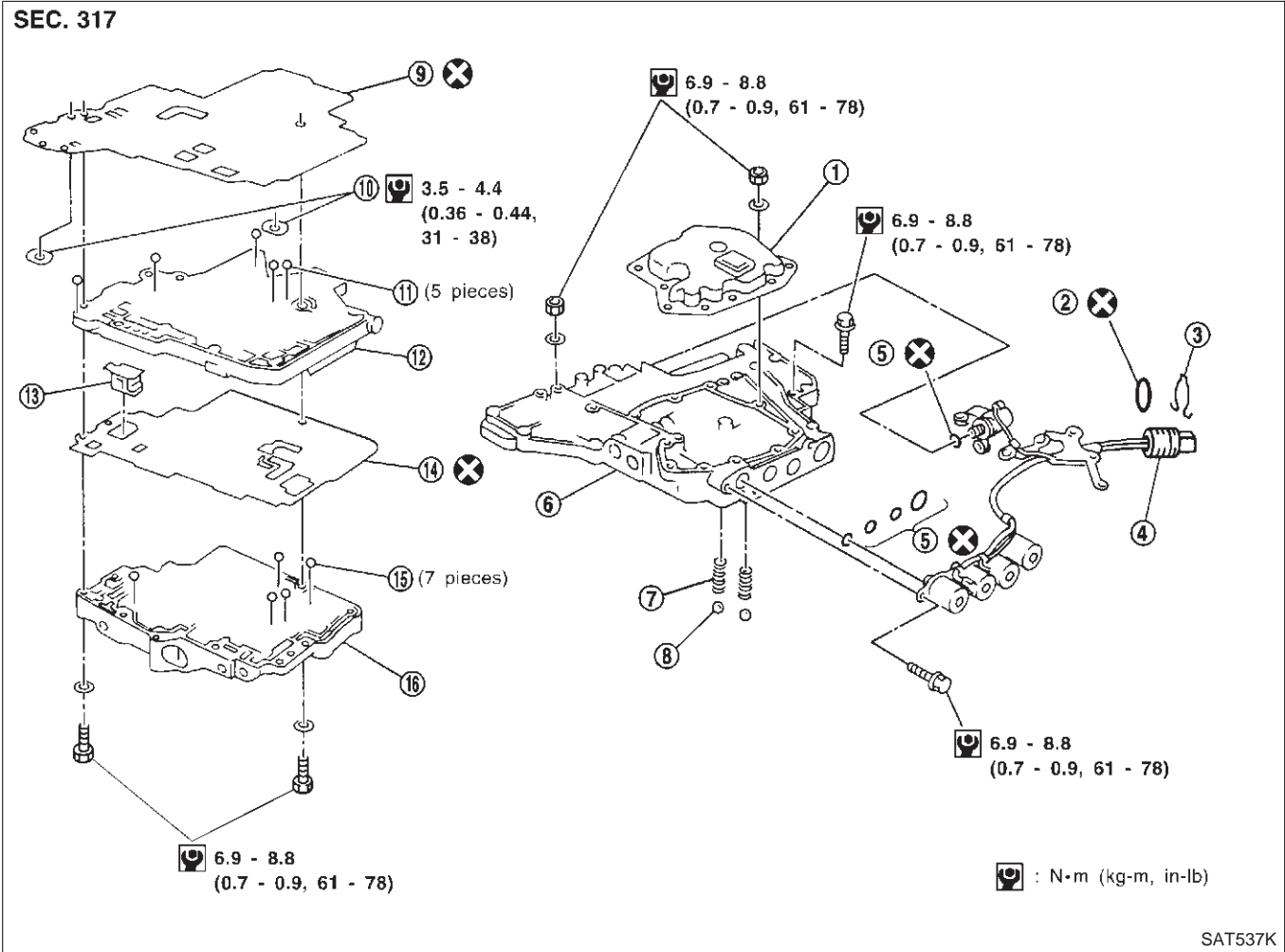
SAT699H

4. 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 bolts in a crisscross pattern. Tighten oil pump cover bolts to the specified torque. Refer to AT-311.

5. Install new seal rings carefully after packing ring groove with petroleum jelly.
 - **Do not spread gap of seal ring excessively while installing. The ring may be deformed.**

Control Valve Assembly
COMPONENTS

=NHAT0133




- | | | |
|-----------------------------|-----------------------------------|------------------------------|
| 1. Oil strainer | 7. Oil cooler relief valve spring | 12. Control valve inter body |
| 2. O-ring | 8. Check ball | 13. Pilot filter |
| 3. Snap ring | 9. Separating plate | 14. Separating plate |
| 4. Terminal body | 10. Support plate | 15. Steel ball |
| 5. O-rings | 11. Steel ball | 16. Control valve upper body |
| 6. Control valve lower body | | |

DISASSEMBLY

NHAT0134

Disassemble upper, inter and lower bodies.

Bolt length, number and location:

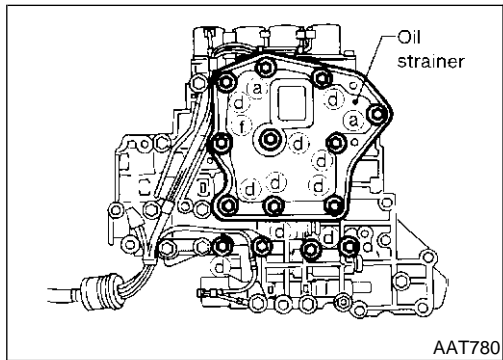
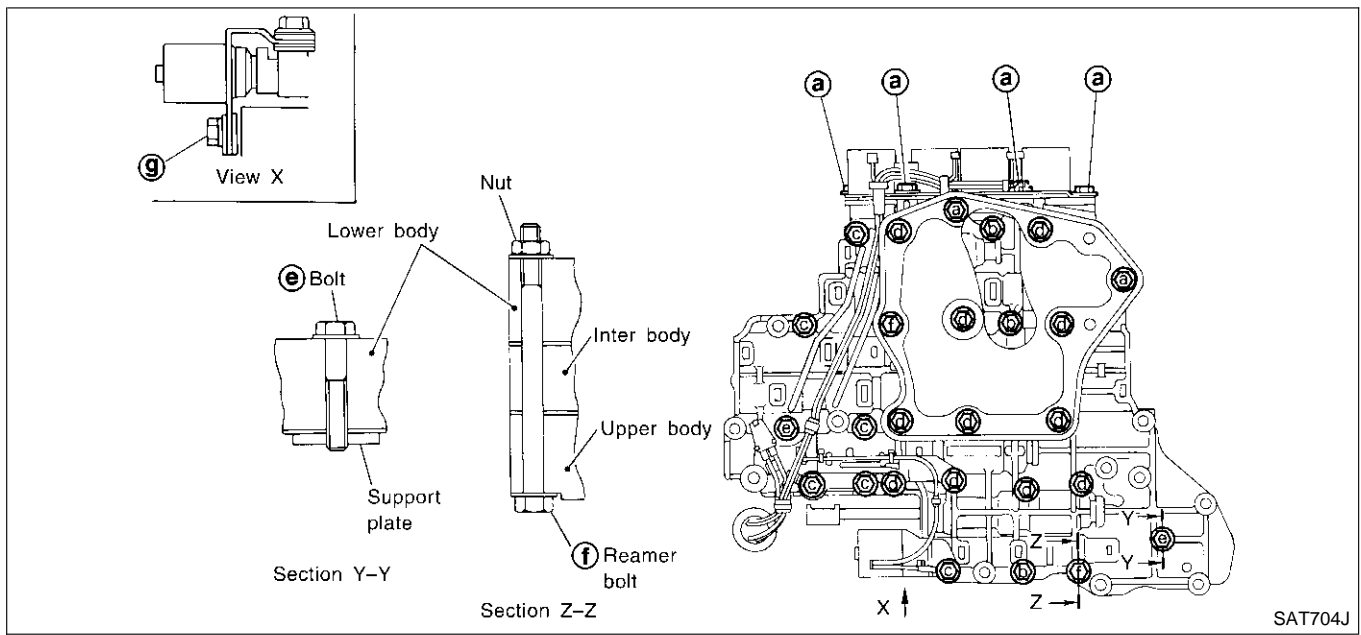
Bolt symbol	a	b	c	d	e	f	g
Bolt length "ℓ" mm (in)	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
							
Number of bolts	6	3	6	11	2	2	1

f: Reamer bolt and nut.

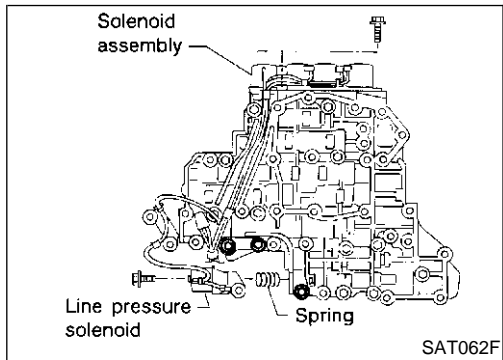
GI
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REPAIR FOR COMPONENT PARTS

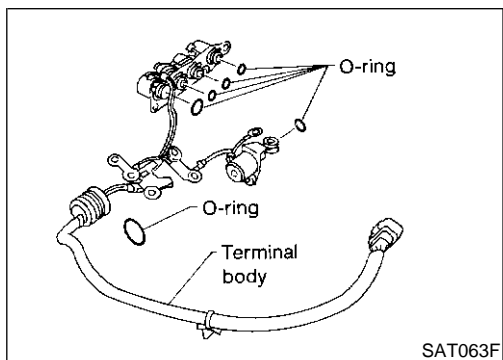
Control Valve Assembly (Cont'd)



1. Remove bolts **a**, **d** and nut **f** and remove oil strainer from control valve assembly.



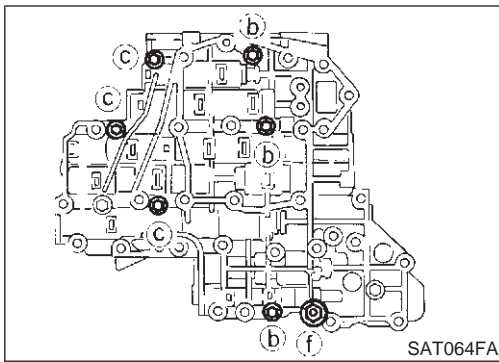
2. Remove solenoid valve assembly and line pressure solenoid valve from control valve assembly.



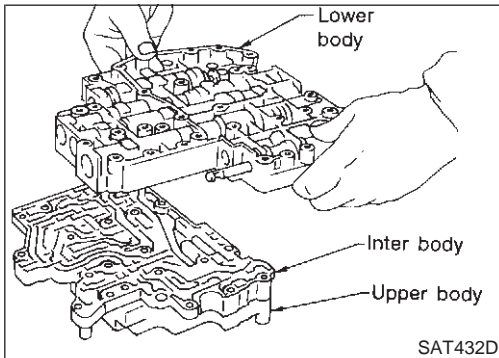
3. Remove O-rings from solenoid valves and terminal body.

REPAIR FOR COMPONENT PARTS

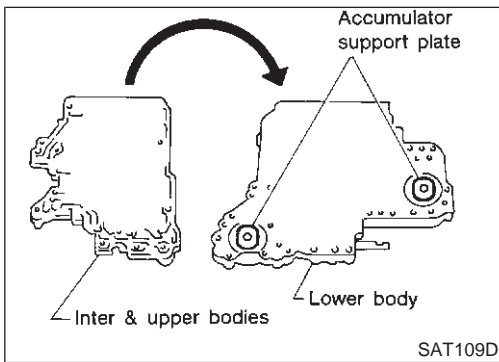
Control Valve Assembly (Cont'd)



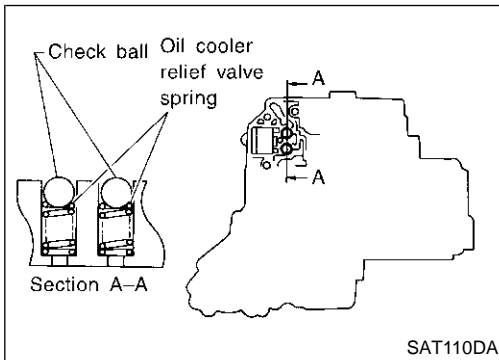
4. Place upper body facedown, and remove bolts **b**, **c** and nut **f**.



5. Remove inter body from lower body.



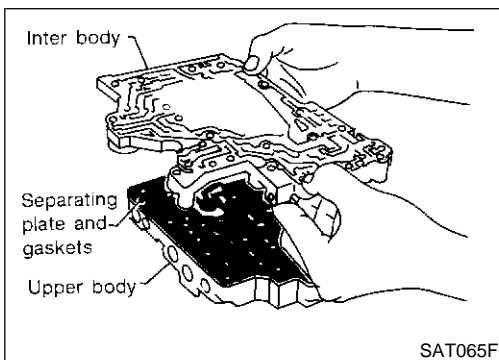
6. Turn over lower body, and remove accumulator support plate.



7. Remove bolts **e**, separating plate and separating gasket from lower body.

8. Remove check balls and oil cooler relief valve springs from lower body.

● **Be careful not to lose check balls and oil cooler relief valve springs.**



9. Remove inter body from upper body.

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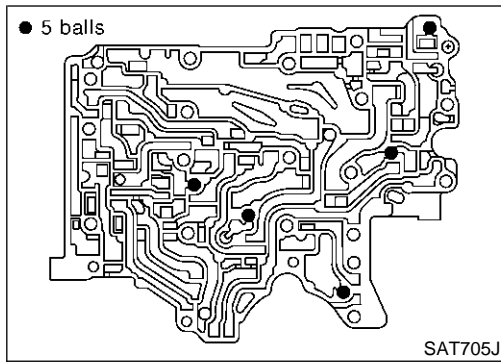
SC

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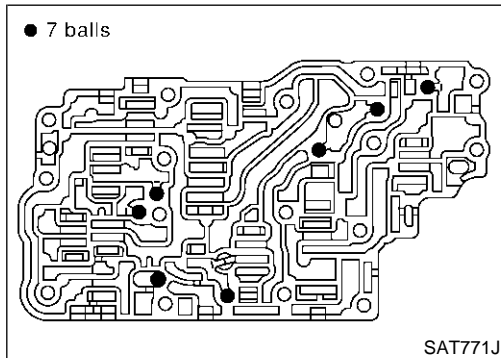
REPAIR FOR COMPONENT PARTS

Control Valve Assembly (Cont'd)



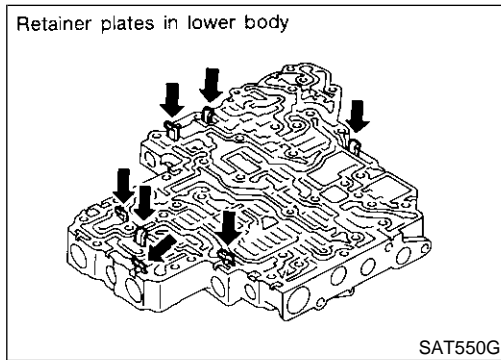
10. Check to see that steel balls are properly positioned in inter body and then remove them.

- **Be careful not to lose steel balls.**



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

- **Be careful not to lose steel balls.**



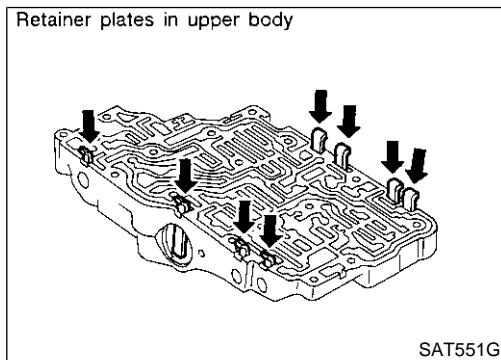
INSPECTION

NHAT0135

Lower and Upper Bodies

- Check to see that retainer plates are properly positioned in lower body.

NHAT0135S01



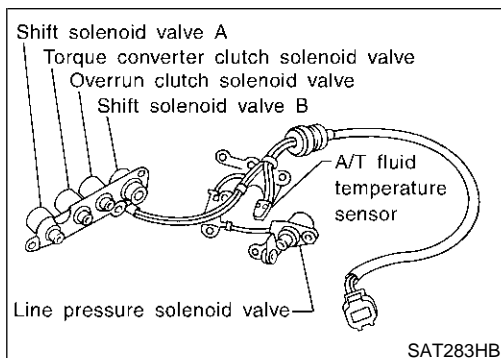
- Check to see that retainer plates are properly positioned in upper body.

- **Be careful not to lose these parts.**

Oil Strainer

- Check wire netting of oil strainer for damage.

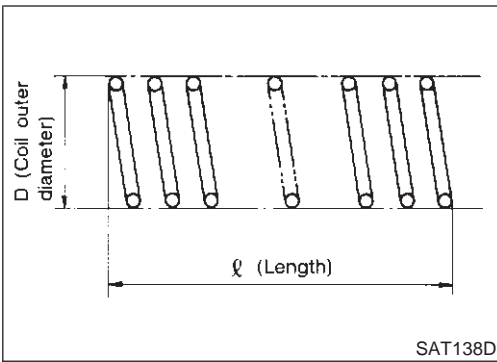
NHAT0135S02



Shift Solenoid Valves "A" and "B", Line Pressure Solenoid Valve, Torque Converter Clutch Solenoid Valve and Overrun Clutch Solenoid Valve

NHAT0135S03

- Measure resistance.
- For shift solenoid valve A, refer to AT-179.
- For shift solenoid valve B, refer to AT-184.
- For line pressure solenoid valve, refer to AT-173.
- For torque converter clutch solenoid valve, refer to AT-158.
- For overrun clutch solenoid valve, refer to AT-196.



Oil Cooler Relief Valve Spring

NHAT0135S04

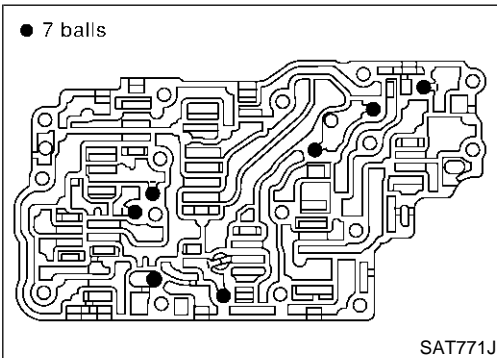
- Check springs for damage or deformation.
- Measure free length and outer diameter.

Inspection standard:
Refer to SDS, AT-383.

GI

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ASSEMBLY

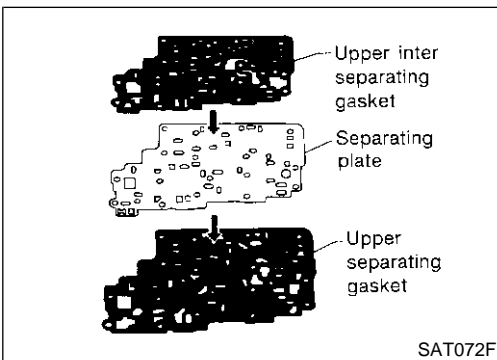
NHAT0136

1. Install upper, inter and lower body.
 - a. Place oil circuit of upper body face up. Install steel balls in their proper positions.

LC

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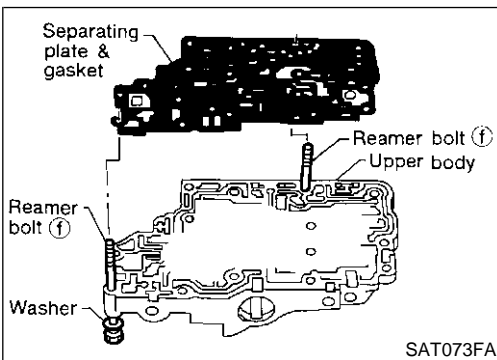
- b. Install upper separating gasket, upper inter separating gasket and upper separating plate in order shown in illustration.

AX

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ST



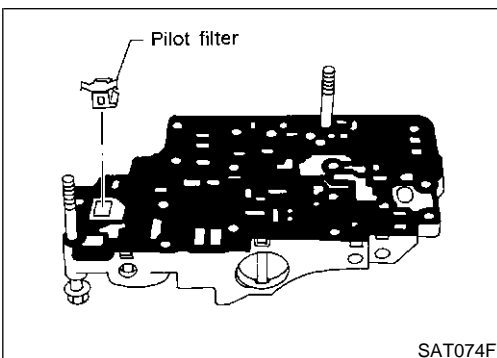
- c. Install reamer bolts **f** from bottom of upper body. Using reamer bolts as guides, install separating plate and gaskets as a set.

RS

BT

HA

SC



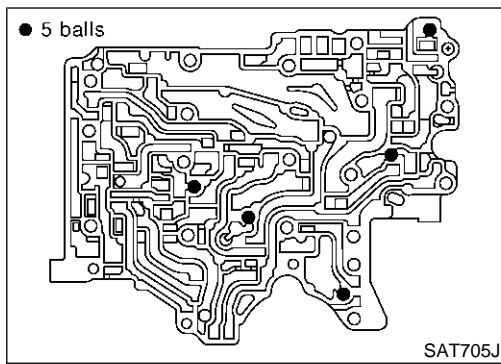
- d. Install pilot filter.

EL

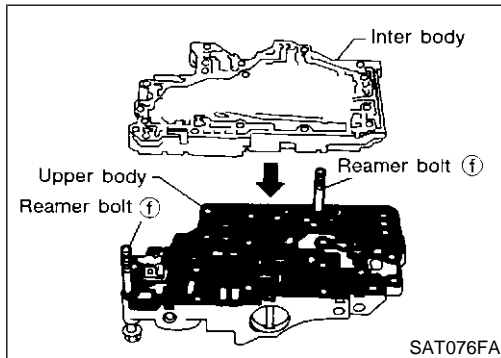
IDX

REPAIR FOR COMPONENT PARTS

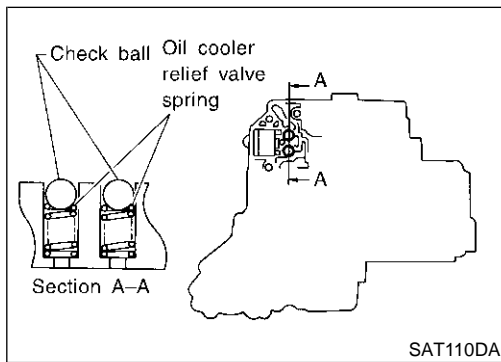
Control Valve Assembly (Cont'd)



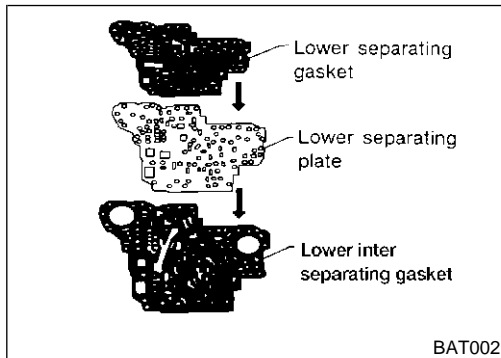
- e. Place lower body as shown in illustration (side of inter body face up). Install steel balls in their proper positions.



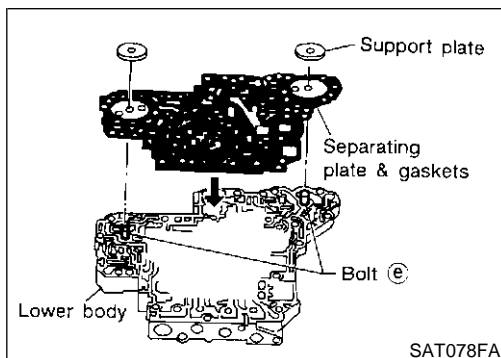
- f. Install inter body on upper body using reamer bolts f as guides.
- **Be careful not to dislocate or drop steel balls.**



- g. Install check balls and oil cooler relief valve springs in their proper positions in lower body.



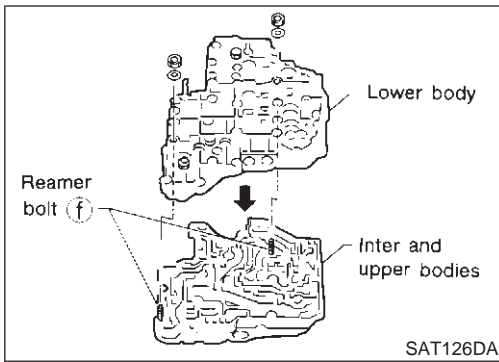
- h. Install lower separating gasket, lower inter separating gasket and lower separating plate in order shown in illustration.



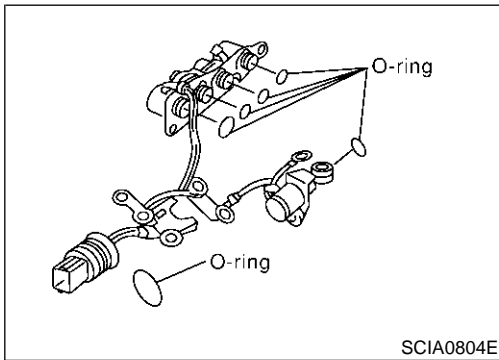
- i. Install bolts e from bottom of lower body. Using bolts e as guides, install separating plate and gaskets as a set.
- j. Temporarily install support plates on lower body.

REPAIR FOR COMPONENT PARTS

Control Valve Assembly (Cont'd)




- k. Install lower body on inter body using reamer bolts f as guides and tighten reamer bolts f slightly.

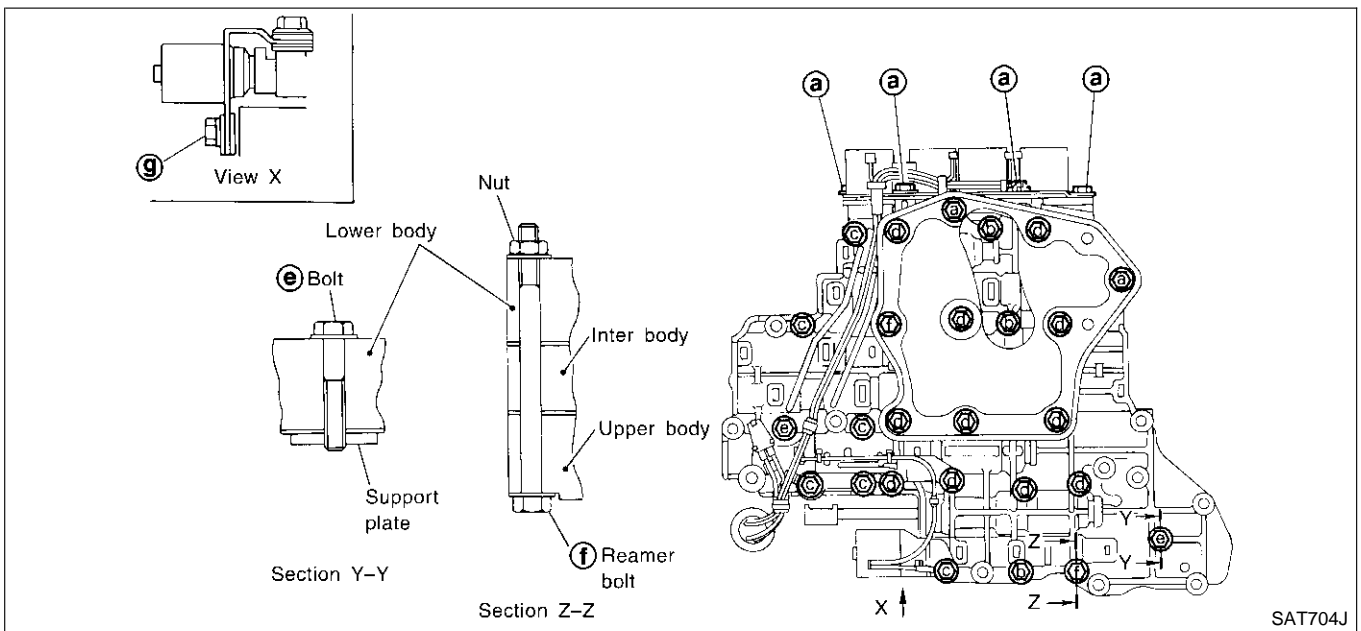


2. Install O-rings to solenoid valves and terminal body.
- Apply ATF to O-rings.

3. Install and tighten bolts.

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



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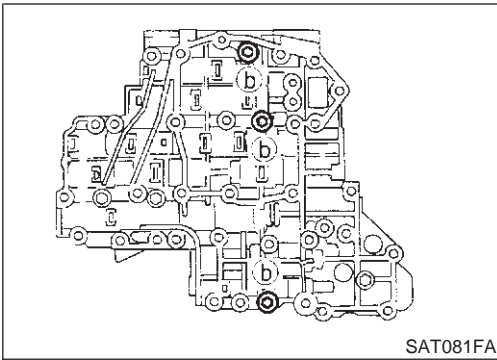
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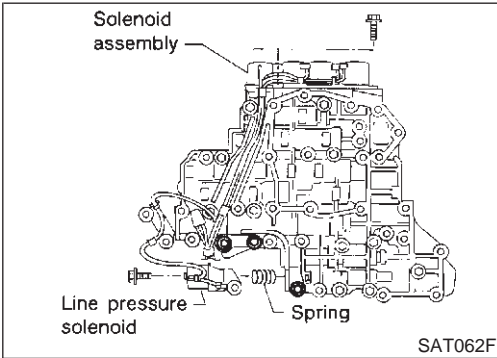
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REPAIR FOR COMPONENT PARTS

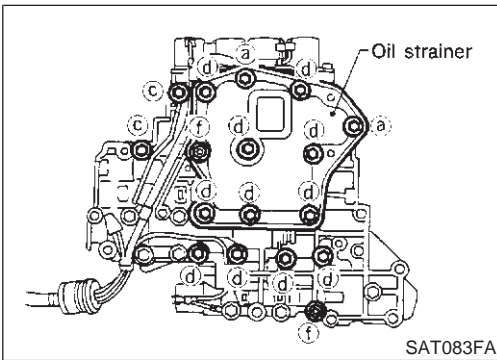
Control Valve Assembly (Cont'd)



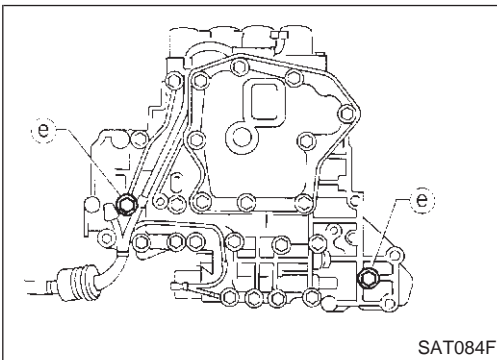
- a. Install and tighten bolts **b** to specified torque.
🔧 : 7 - 9 N·m (0.7 - 0.9 kg-m, 61 - 78 in-lb)



- b. Install solenoid valve assembly and line pressure solenoid valve to lower body.



- c. Set oil strainer, then tighten bolts **a**, **c**, **d** and nuts **f** to specified torque.
🔧 : 7 - 9 N·m (0.7 - 0.9 kg-m, 61 - 78 in-lb)



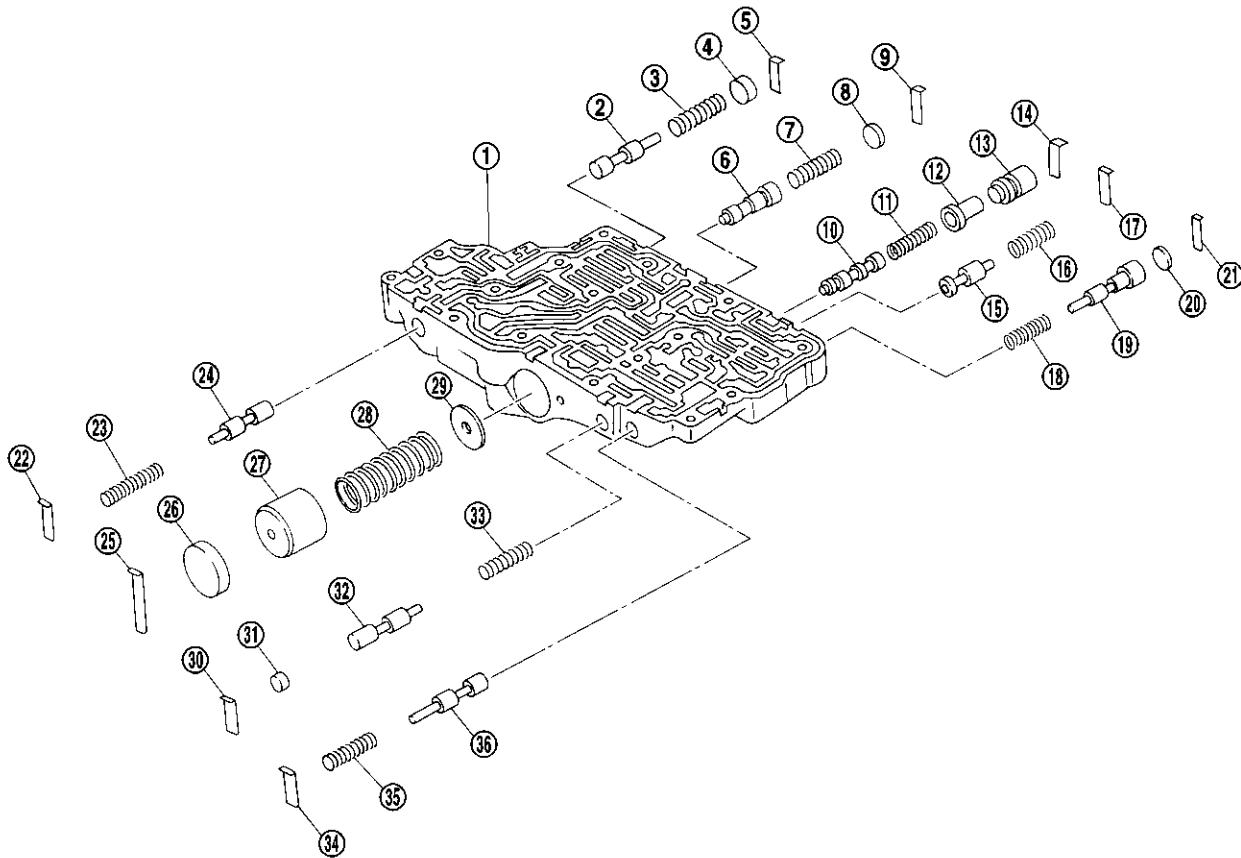
- d. Tighten bolts **e** to specified torque.
🔧 : 3.4 - 4.4 N·m (0.35 - 0.45 kg-m, 30.4 - 39.1 in-lb)

Control Valve Upper Body COMPONENTS

Apply ATF to all components before installation.

=NHAT0137

SEC. 317



- | | | |
|---|--|------------------------------------|
| 1. Upper body | 13. Torque converter clutch control sleeve | 25. Retainer plate |
| 2. Cooler check valve | 14. Retainer plate | 26. Plug |
| 3. Return spring | 15. Torque converter relief valve | 27. 1-2 accumulator piston |
| 4. Plug | 16. Return spring | 28. Return spring |
| 5. Retainer plate | 17. Retainer plate | 29. 1-2 accumulator retainer plate |
| 6. 1-2 accumulator valve | 18. Return spring | 30. Retainer plate |
| 7. Return spring | 19. Overrun clutch reducing valve | 31. Plug |
| 8. Plug | 20. Plug | 32. 1st reducing valve |
| 9. Retainer plate | 21. Retainer plate | 33. Return spring |
| 10. Torque converter clutch control valve | 22. Retainer plate | 34. Retainer plate |
| 11. Return spring | 23. Return spring | 35. Return spring |
| 12. Torque converter clutch control plug | 24. Pilot valve | 36. 3-2 timing valve |

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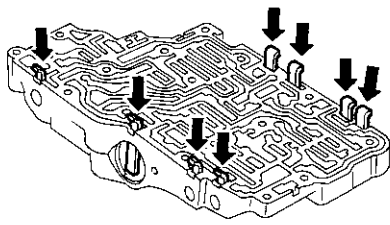
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REPAIR FOR COMPONENT PARTS

Control Valve Upper Body (Cont'd)

NHAT0138

Retainer plates in upper body

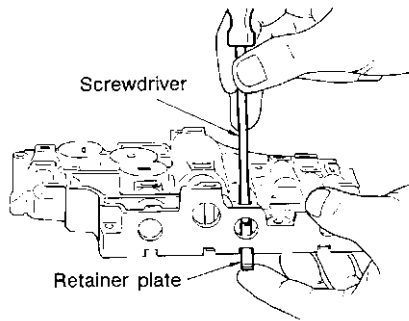


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DISASSEMBLY

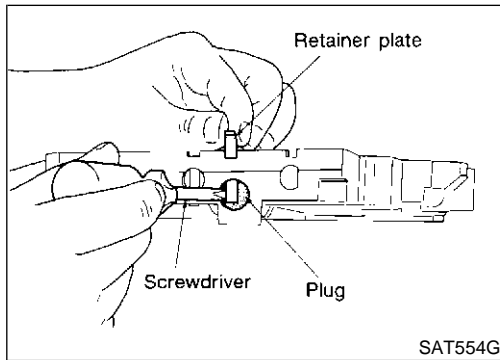
1. Remove valves at retainer plates.
 - Do not use a magnetic pick-up tool.

- a. Use a screwdriver to remove retainer plates.



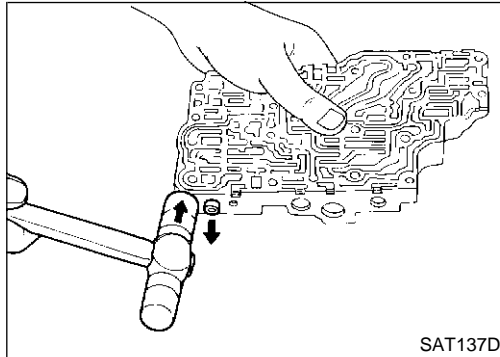
SAT553G

- b. Remove retainer plates while holding spring, plugs or sleeves.
 - Remove plugs slowly to prevent internal parts from jumping out.



SAT554G

- c. Place mating surface of valve body face down, and remove internal parts.
 - If a valve is hard to remove, place valve body face down and lightly tap it with a soft hammer.
 - Be careful not to drop or damage valves and sleeves.



SAT137D

INSPECTION

Valve Spring

NHAT0139

NHAT0139S01

- Measure free length and outer diameter of each valve spring. Also check for damage or deformation.

Inspection standard:

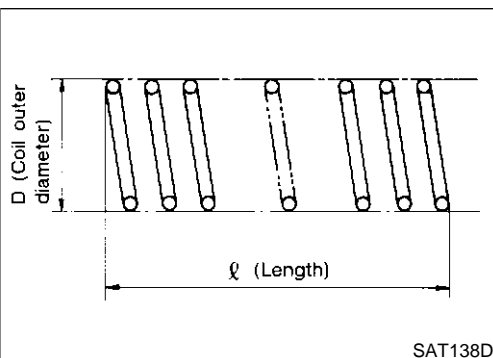
Refer to SDS, AT-383.

- Replace valve springs if deformed or fatigued.

Control Valves

NHAT0139S02

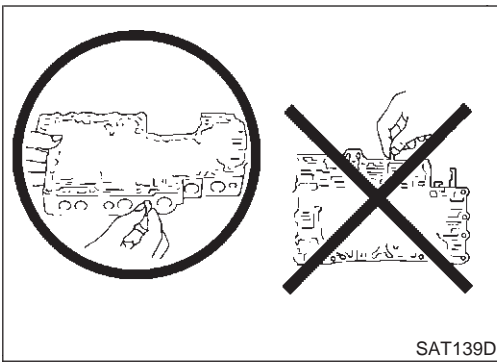
- Check sliding surfaces of valves, sleeves and plugs.



SAT138D

REPAIR FOR COMPONENT PARTS

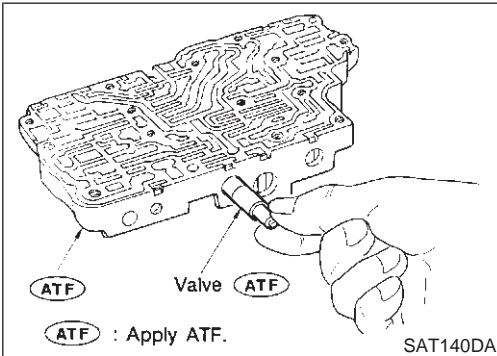
Control Valve Upper Body (Cont'd)



ASSEMBLY

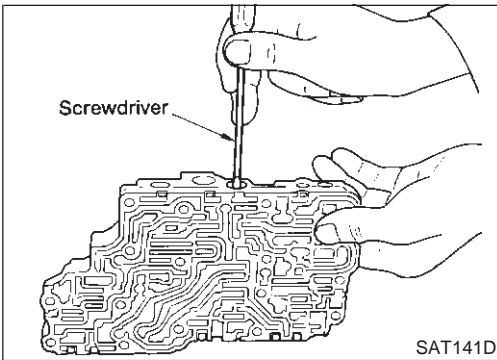
NHAT0140

- Lay control valve body down when installing valves. Do not stand the control valve body upright.

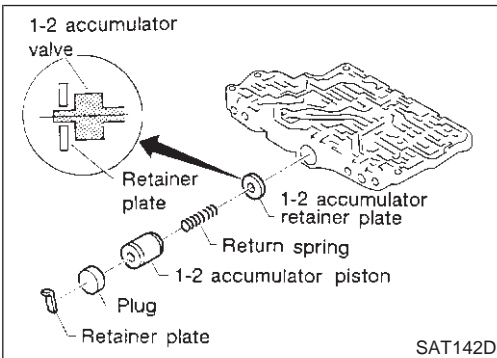


1. Lubricate the control valve body and all valves with ATF. Install control valves by sliding them carefully into their bores.

- Be careful not to scratch or damage valve body.



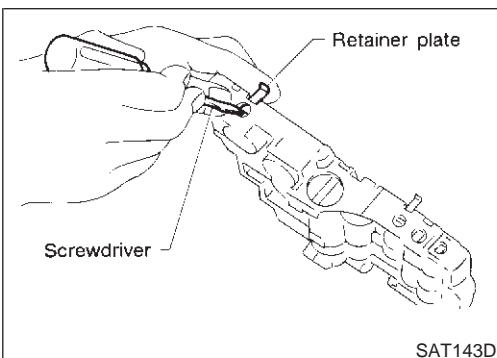
- Wrap a small screwdriver with vinyl tape and use it to insert the valves into their proper positions.



1-2 Accumulator Valve

NHAT0140S01

- Install 1-2 accumulator valve. Align 1-2 accumulator retainer plate from opposite side of control valve body.
- Install return spring, 1-2 accumulator piston and plug.



1. Install retainer plates.
- While pushing plug or return spring, install retainer plate.

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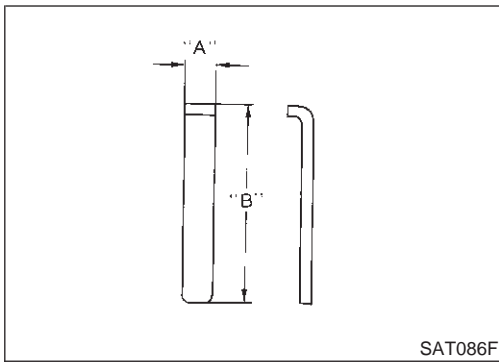
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REPAIR FOR COMPONENT PARTS

Control Valve Upper Body (Cont'd)



Retainer Plate (Upper body)

NHAT0140S02
Unit: mm (in)

No.	Name of control valve	Width A	Length B
22	Pilot valve	6.0 (0.236)	21.5 (0.846)
30	1st reducing valve		
34	3-2 timing valve		
17	Torque converter relief valve		38.5 (1.516)
9	1-2 accumulator valve		
25	1-2 accumulator piston valve		
21	Overrun clutch reducing valve		
5	Cooler check valve		
14	Torque converter clutch control valve		28.0 (1.102)

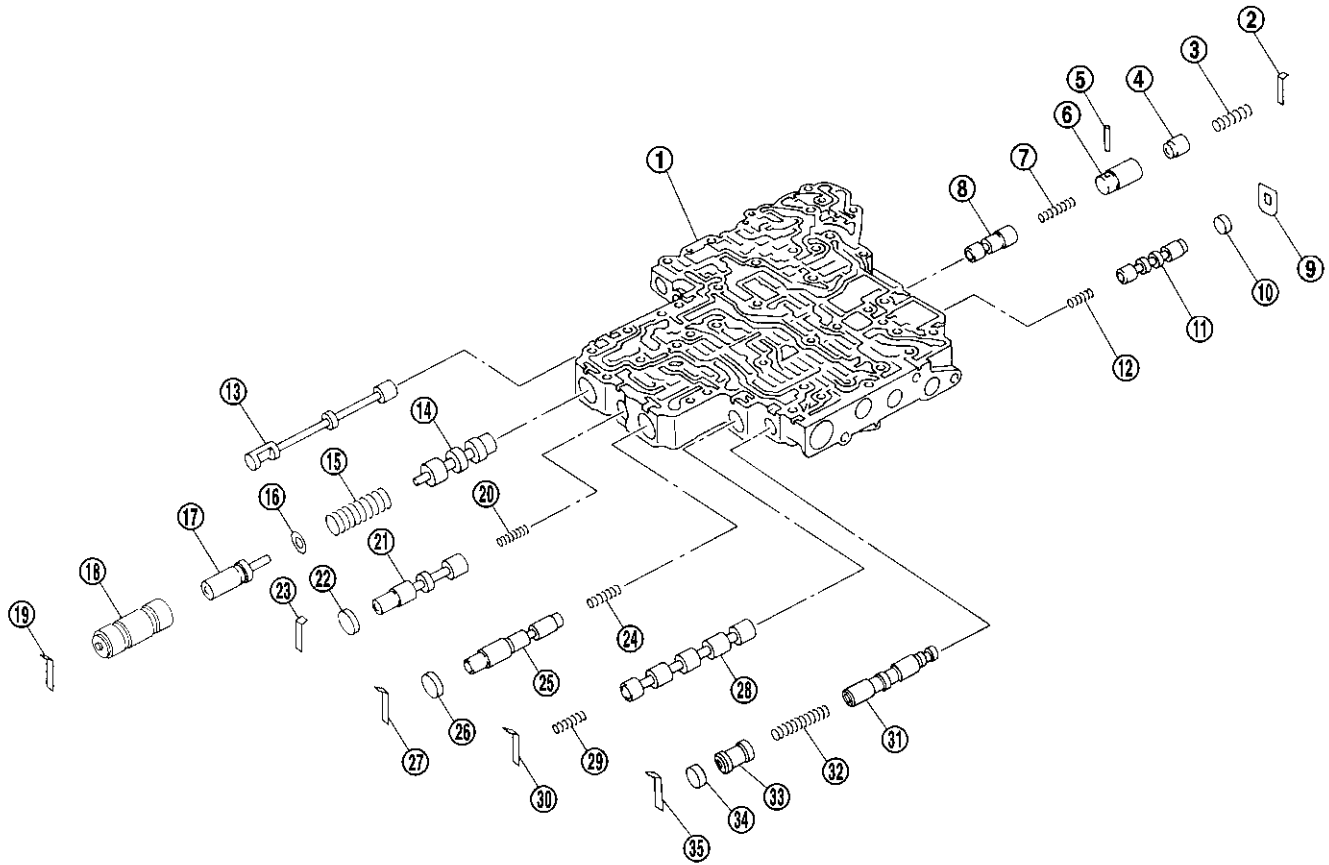
- Install proper retainer plates.
Refer to "Control Valve Upper Body", AT-323.

Control Valve Lower Body COMPONENTS

Apply ATF to all components before installation.

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SEC. 317



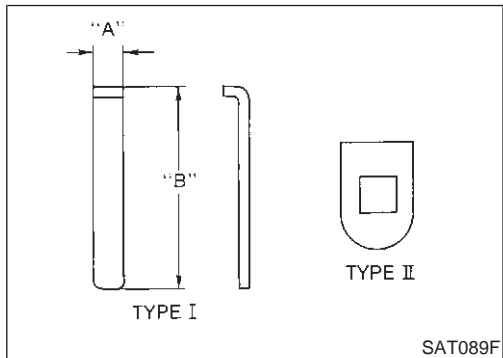
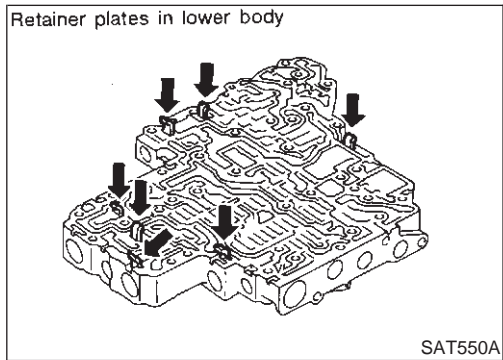
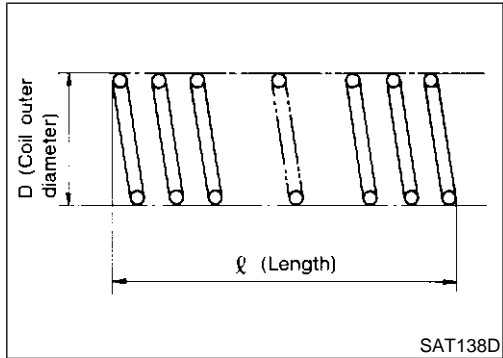
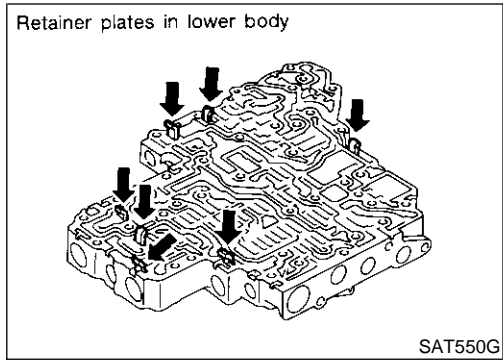
- | | | |
|----------------------------|----------------------------------|-------------------------------|
| 1. Lower body | 13. Manual valve | 25. Accumulator control valve |
| 2. Retainer plate | 14. Pressure regulator valve | 26. Plug |
| 3. Return spring | 15. Return spring | 27. Retainer plate |
| 4. Piston | 16. Spring seat | 28. Shift valve A |
| 5. Parallel pin | 17. Plug | 29. Return spring |
| 6. Sleeve | 18. Sleeve | 30. Retainer plate |
| 7. Return spring | 19. Retainer plate | 31. Shuttle valve |
| 8. Pressure modifier valve | 20. Return spring | 32. Return spring |
| 9. Retainer plate | 21. Overrun clutch control valve | 33. Plug |
| 10. Plug | 22. Plug | 34. Plug |
| 11. Shift valve B | 23. Retainer plate | 35. Retainer plate |
| 12. Return spring | 24. Return spring | |

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REPAIR FOR COMPONENT PARTS

Control Valve Lower Body (Cont'd)



DISASSEMBLY

NHAT0142

- Remove valves at retainer plate.
For removal procedures, refer to "DISASSEMBLY", "Control Valve Upper Body", AT-324.

INSPECTION

NHAT0143

Valve Springs

NHAT0143S01

- Check each valve spring for damage or deformation. Also measure free length and outer diameter.

Inspection standard:

Refer to SDS, AT-383.

- Replace valve springs if deformed or fatigued.

Control Valves

NHAT0143S02

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

ASSEMBLY

NHAT0144

- Install control valves.
For installation procedures, refer to "ASSEMBLY", "Control Valve Upper Body", AT-325.

Retainer Plate (Lower body)

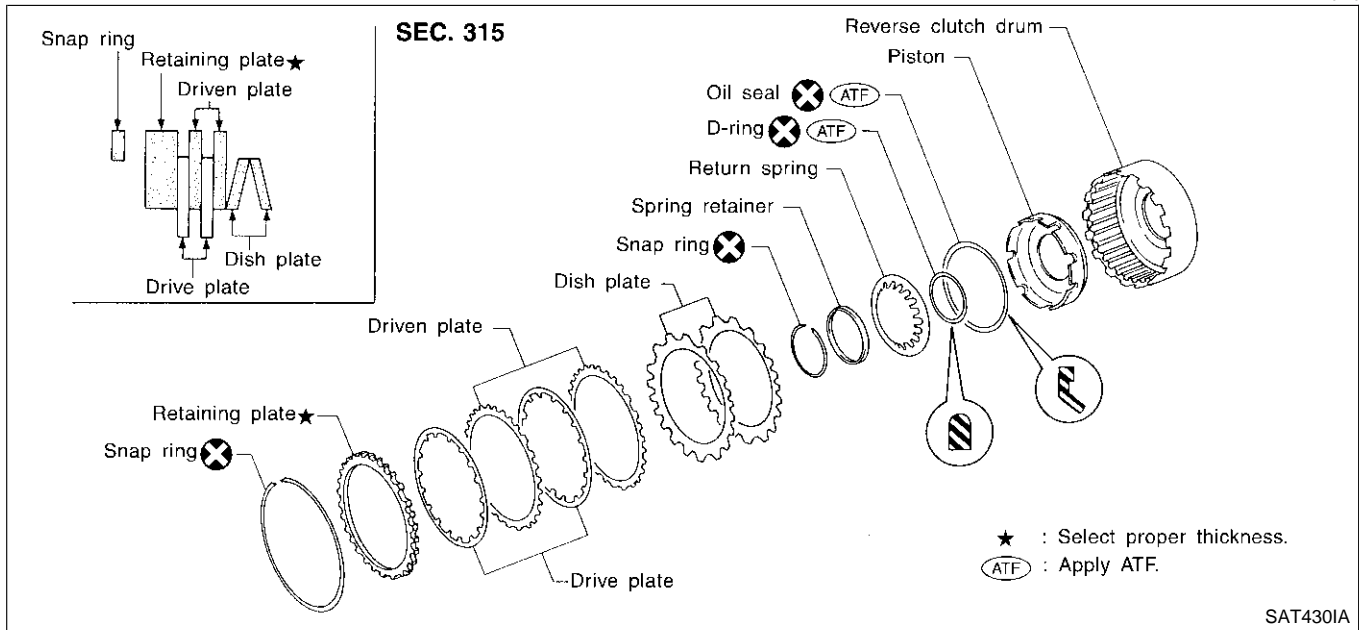
NHAT0144S01
Unit: mm (in)

No.	Name of control valve and plug	Width A	Length B	Type
19	Pressure regulator valve	6.0 (0.236)	28.0 (1.102)	I
27	Accumulator control valve			
30	Shift valve A			
23	Overrun clutch control valve			
2	Pressure modifier valve			
35	Shuttle valve	—	—	II
9	Shift valve B			

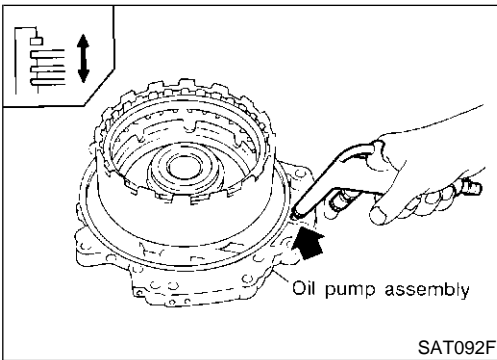
- Install proper retainer plates.
Refer to "Control Valve Lower Body", AT-327.

Reverse Clutch COMPONENTS

NHAT0145



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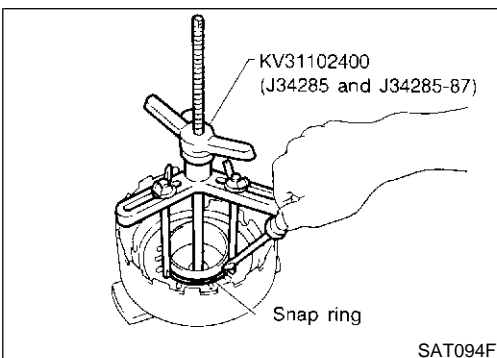
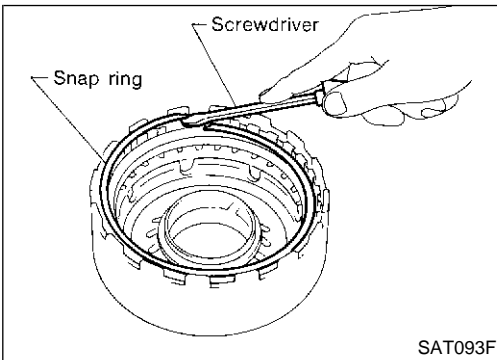


DISASSEMBLY

NHAT0146

1. Check operation of reverse clutch
 - a. Install seal ring onto drum support of oil pump cover and install reverse clutch assembly. Apply compressed air to oil hole.
 - 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.
 - Oil seal might be damaged.
 - Fluid might be leaking past piston check ball.
2. Remove snap ring.
3. Remove drive plates, driven plates, retaining plate, and dish plates.

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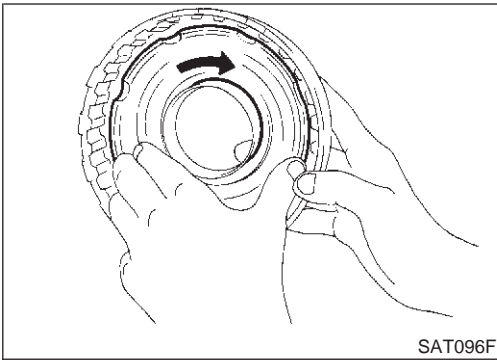


4. Set Tool on spring retainer and remove snap ring from reverse clutch drum while compressing return springs.
 - **Set Tool directly over springs.**
 - **Do not expand snap ring excessively.**
5. Remove spring retainer and return springs.

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REPAIR FOR COMPONENT PARTS

Reverse Clutch (Cont'd)

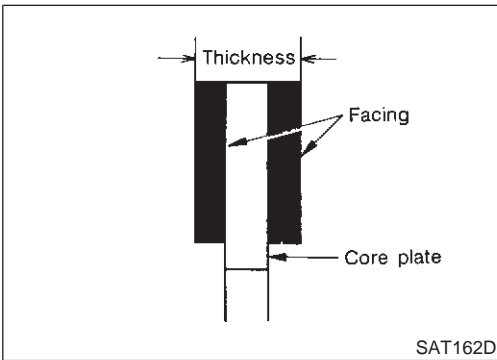


6. Remove piston from reverse clutch drum by turning it.
7. Remove D-ring and oil seal from piston.

INSPECTION

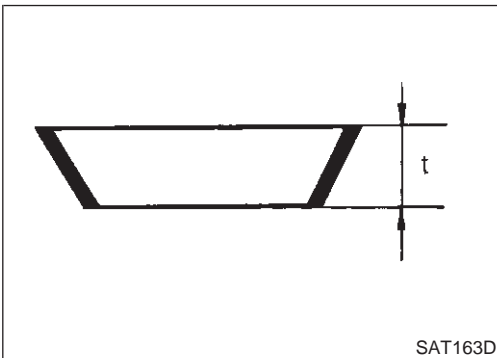
Reverse Clutch Snap Ring, Spring Retainer and Return Springs NHAT0147

- Check for deformation, fatigue or damage. NHAT0147S01
If necessary, replace.



Reverse Clutch Drive Plates NHAT0147S02

- Check facing for burns, cracks or damage.
- Measure thickness of facing.
Thickness of drive plate:
Standard value: 1.6 mm (0.063 in)
Wear limit: 1.4 mm (0.055 in)
- If not within wear limit, replace.



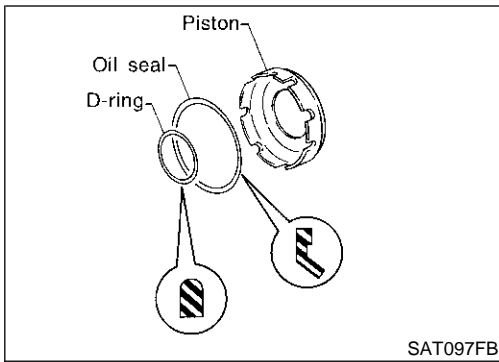
Reverse Clutch Dish Plates NHAT0147S03

- Check for deformation or damage.
- Measure thickness of dish plate.
Thickness of dish plate: 3.08 mm (0.1213 in)
- If deformed or fatigued, replace.

Reverse Clutch Piston NHAT0147S04

- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the 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.

NHAT0148



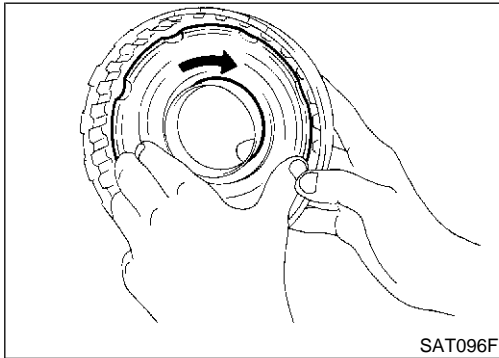
ASSEMBLY

1. Install D-ring and oil seal on piston.
 - Take care with the direction of oil seal.
 - Apply ATF to both parts.

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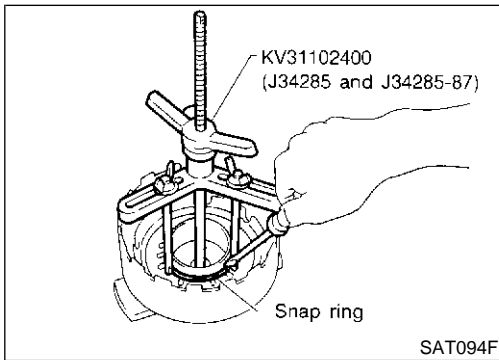
2. Install piston assembly by turning it slowly.
 - Apply ATF to inner surface of drum.

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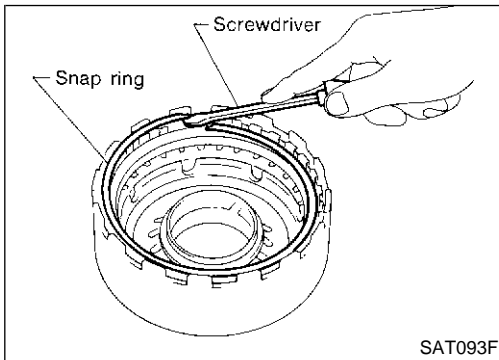
3. Install return springs and spring retainer on piston.
4. Set Tool on spring retainer and install snap ring while compressing return springs.
 - Set Tool directly over return springs.

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5. Install drive plates, driven plates, retaining plate and dish plates.
 - Take care with order of plates.
6. Install snap ring.

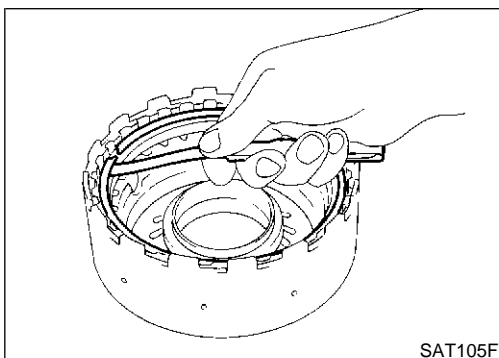
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7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

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Specified clearance:

Standard 0.5 - 0.8 mm (0.020 - 0.031 in)

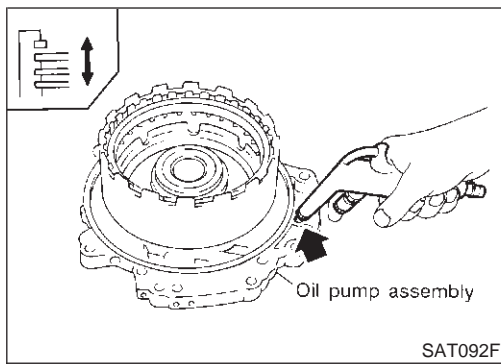
Allowable limit 1.2 mm (0.047 in)

Retaining plate:

Refer to SDS, AT-384.

REPAIR FOR COMPONENT PARTS

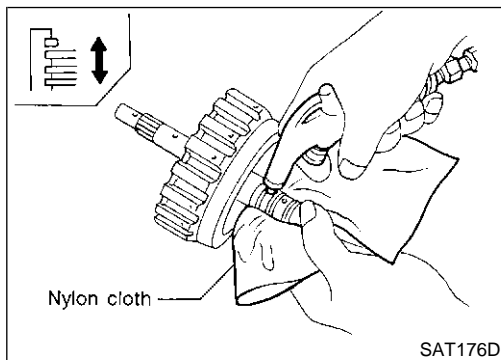
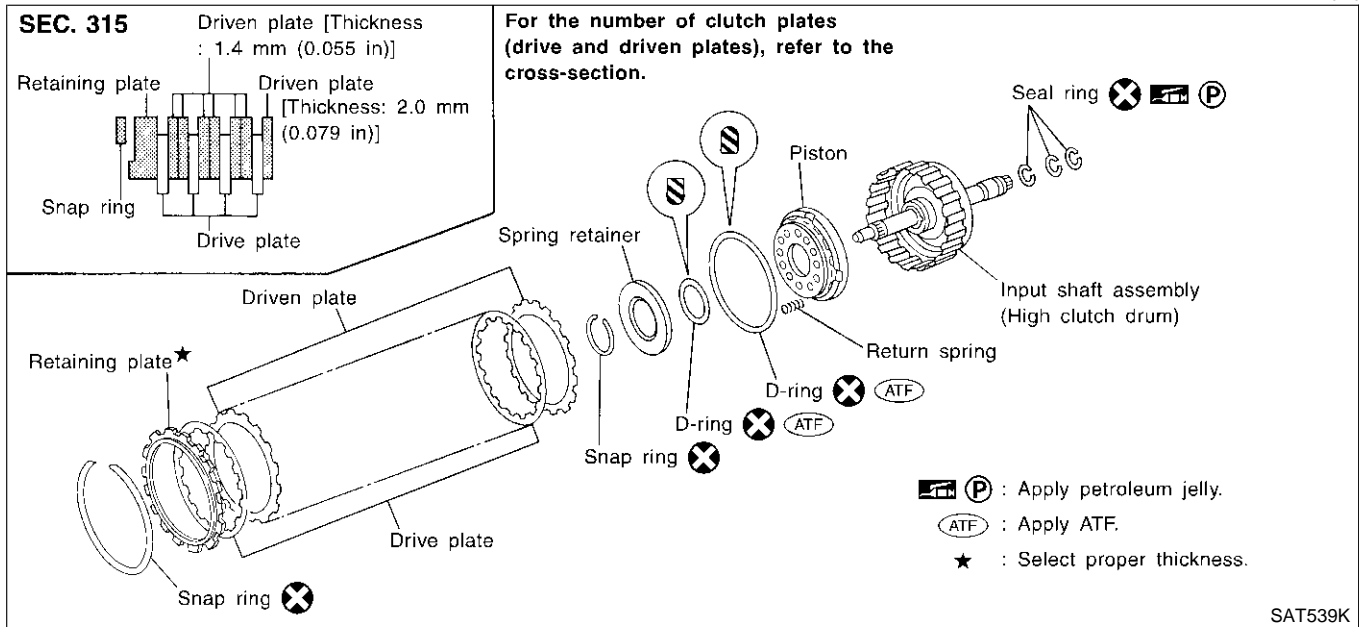
Reverse Clutch (Cont'd)



8. Check operation of reverse clutch.
Refer to "DISASSEMBLY", "Reverse Clutch", AT-329.

High Clutch COMPONENTS

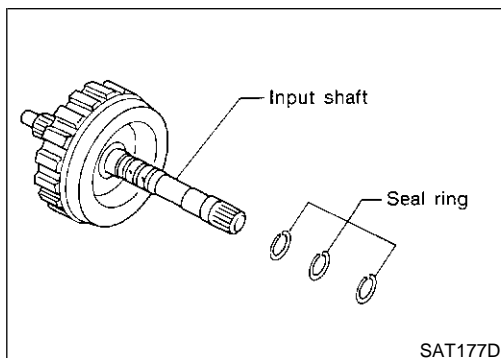
NHAT0149



DISASSEMBLY

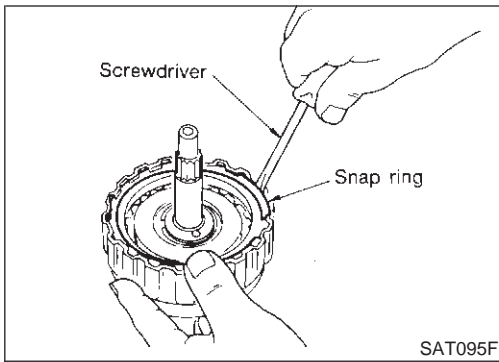
NHAT0150

1. Check operation of high clutch.
 - a. Apply compressed air to oil hole of input shaft with nylon cloth.
 - **Stop up hole on opposite side of input shaft with nylon cloth.**
 - 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.
 - Oil seal might be damaged.
 - Fluid might be leaking past piston check ball.
2. Remove seal rings from input shaft.
 - **Always replace when removed.**

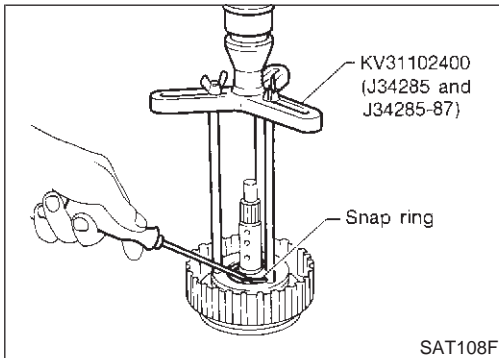


REPAIR FOR COMPONENT PARTS

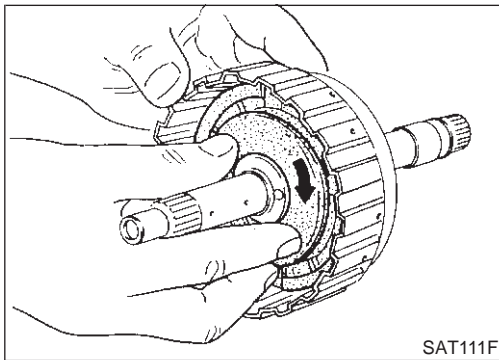
High Clutch (Cont'd)



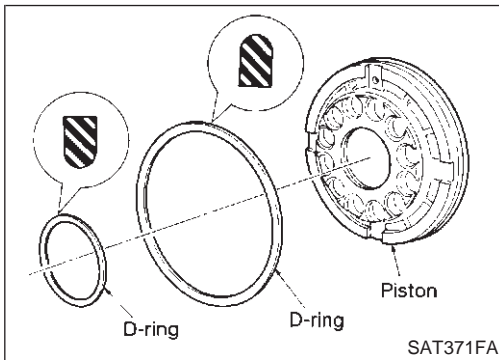
3. Remove snap ring.
4. Remove drive plates, driven plates and retaining plate.



5. Set Tool on spring retainer and remove snap ring from high clutch drum while compressing return springs.
 - **Set Tool directly over springs.**
 - **Do not expand snap ring excessively.**
6. Remove spring retainer and return springs.



7. Remove piston from high clutch drum by turning it.



8. Remove D-rings from piston.

INSPECTION

High Clutch Snap Ring, Spring Retainer and Return Springs

NHAT0151

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NHAT0151S01

- Check for deformation, fatigue or damage. If necessary, replace.
- **When replacing spring retainer and return springs, replace them as a set.**

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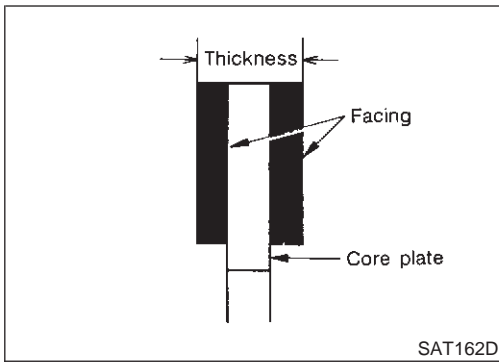
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REPAIR FOR COMPONENT PARTS

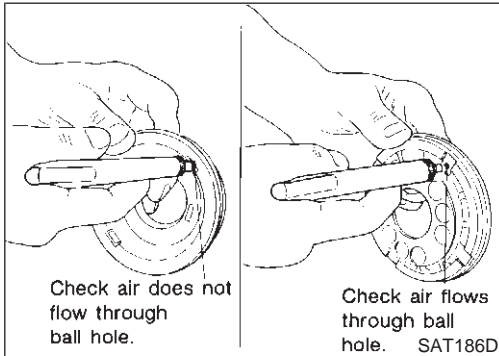
High Clutch (Cont'd)



High Clutch Drive Plates

NHAT0151S02

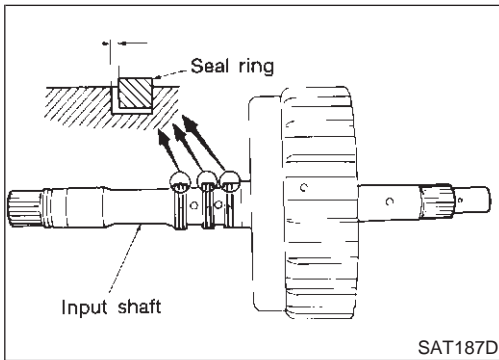
- Check facing for burns, cracks or damage.
- Measure thickness of facing.
Thickness of drive plate:
Standard value 1.6 mm (0.063 in)
Wear limit 1.4 mm (0.055 in)
- If not within wear limit, replace.



High Clutch Piston

NHAT0151S03

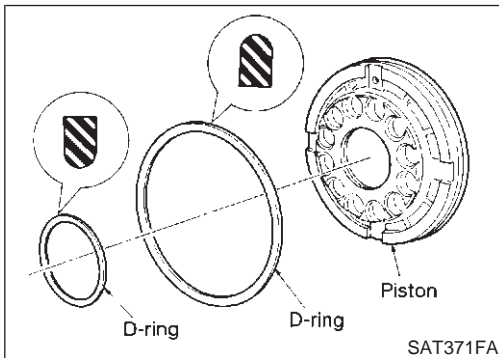
- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure that air leaks past ball.



Seal Ring Clearance

NHAT0151S04

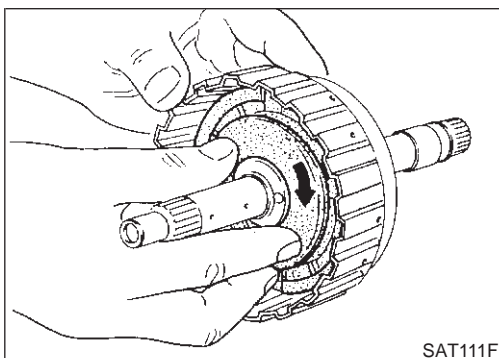
- Install new seal rings onto input shaft.
- Measure clearance between seal ring and ring groove.
Standard clearance:
0.08 - 0.23 mm (0.0031 - 0.0091 in)
Allowable limit:
0.23 mm (0.0091 in)
- If not within allowable limit, replace input shaft assembly.



ASSEMBLY

NHAT0152

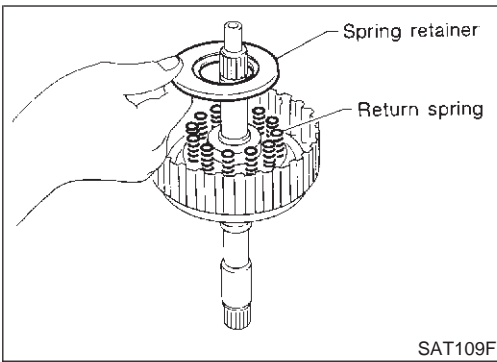
1. Install D-rings on piston.
- **Apply ATF to both parts.**



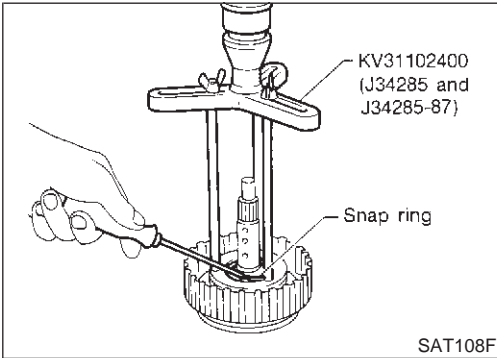
2. Install piston assembly by turning it slowly.
- **Apply ATF to inner surface of drum.**

REPAIR FOR COMPONENT PARTS

High Clutch (Cont'd)

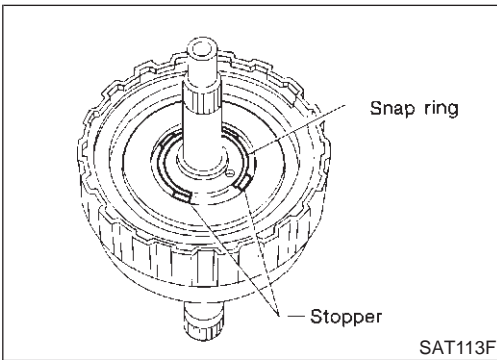


3. Install return springs and spring retainer on piston.

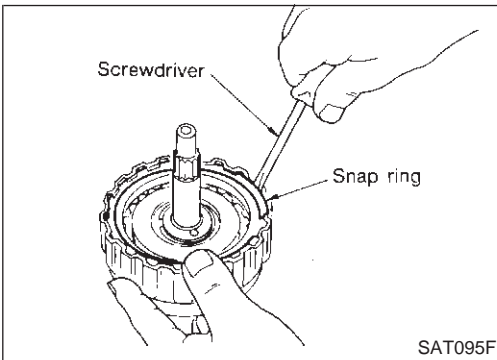


4. Set Tool on spring retainer and install snap ring while compressing return springs.

- **Set Tool directly over return springs.**



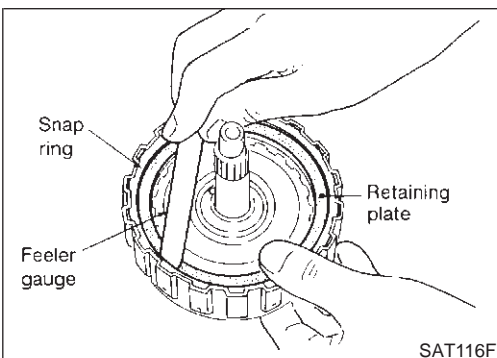
- **Do not align snap ring gap with spring retainer stopper.**



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

- **Take care with the order and direction of plates.**

6. Install snap ring.



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

Specified clearance:

Standard 1.8 - 2.2 mm (0.071 - 0.087 in)

Allowable limit 2.8 mm (0.110 in)

Retaining plate:

Refer to SDS, AT-384.

GI

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EM

LC

EC

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AT

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RS

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HA

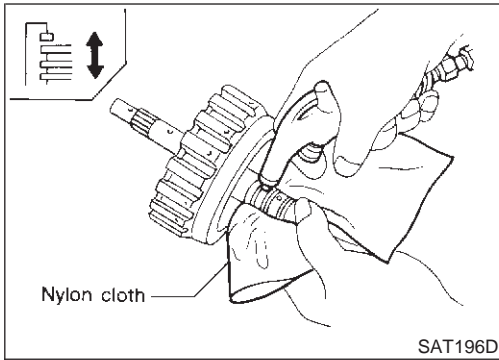
SC

EL

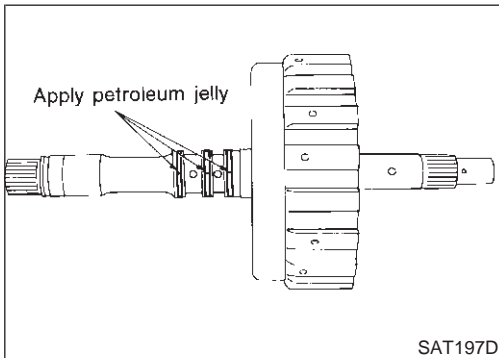
IDX

REPAIR FOR COMPONENT PARTS

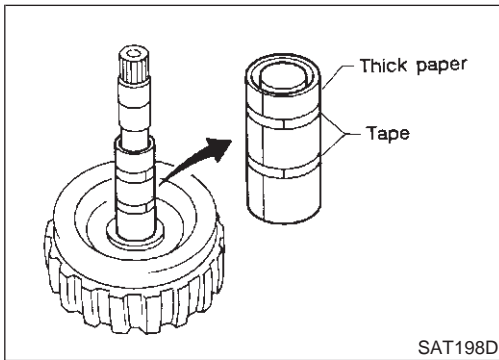
High Clutch (Cont'd)



8. Check operation of high clutch.
Refer to "DISASSEMBLY", "High Clutch", AT-332.



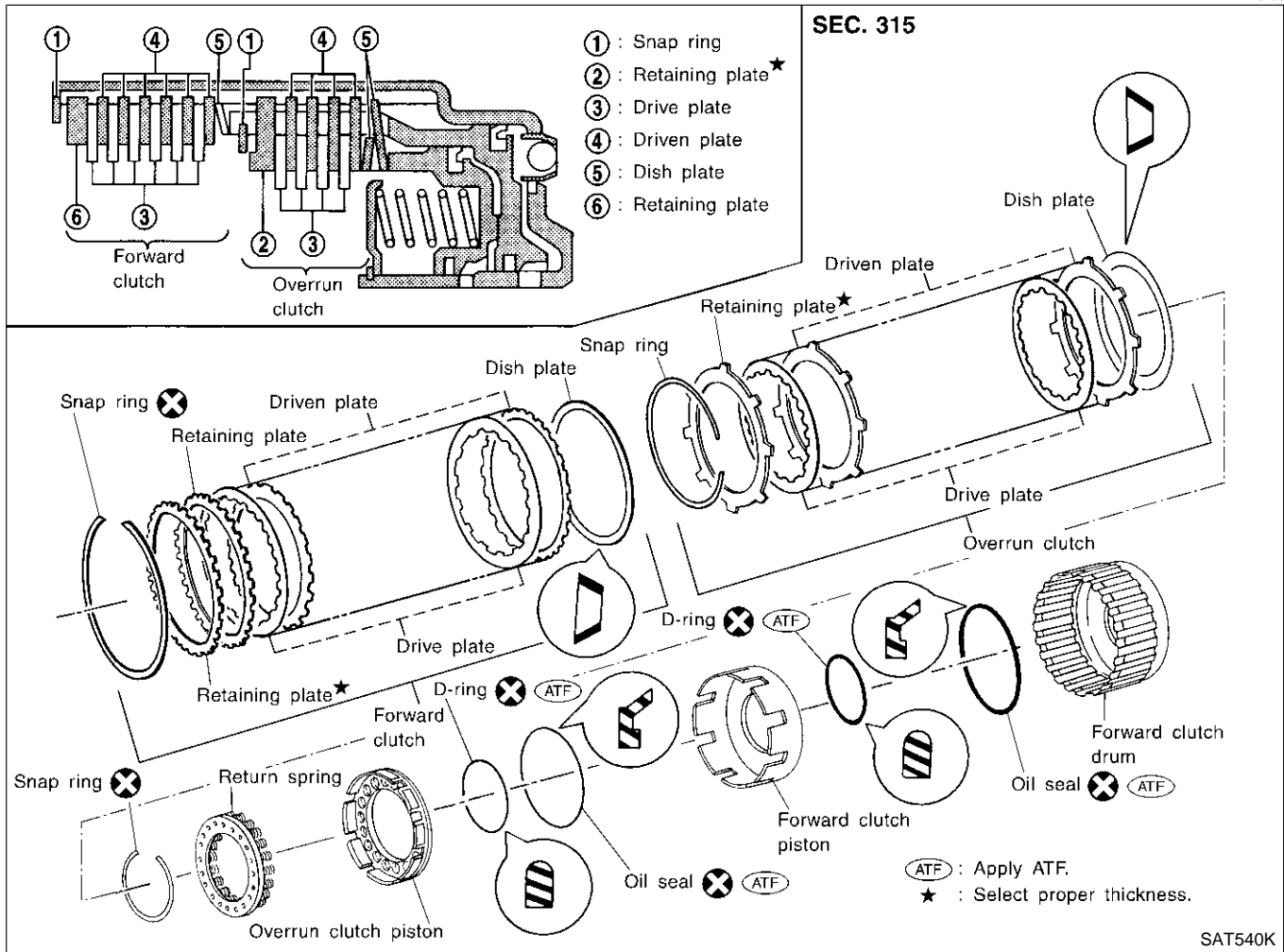
9. Install seal rings to input shaft.
 - Apply petroleum jelly to seal rings.
 - Always replace when removed.



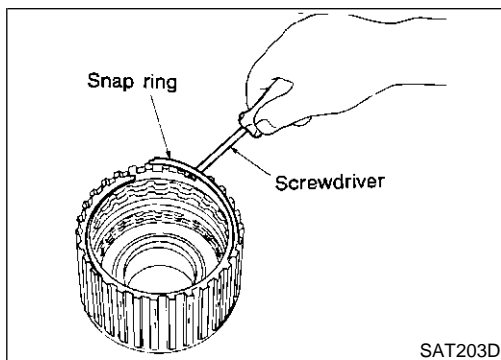
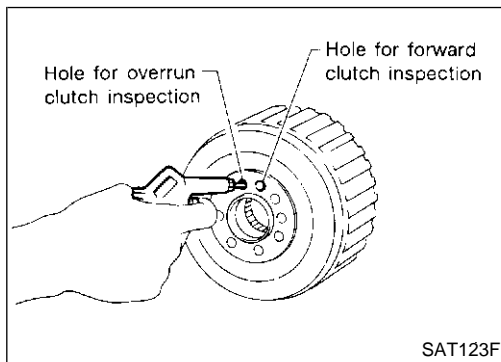
- Roll paper around seal rings to prevent seal rings from spreading.

Forward and Overrun Clutches
COMPONENTS

NHAT0153



GI
 MA
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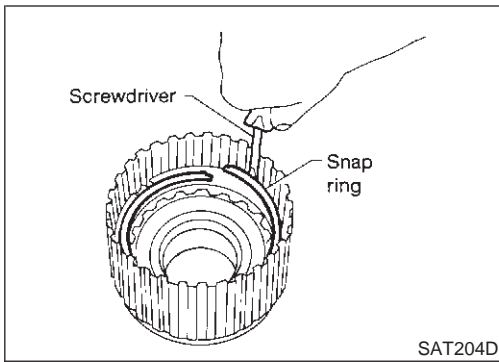
DISASSEMBLY

NHAT0154

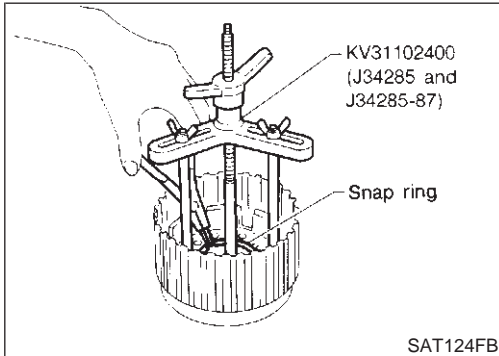
1. Check operation of forward clutch and overrun clutch.
 - a. Install bearing retainer on forward clutch drum.
 - b. Apply compressed air to oil hole of forward clutch drum.
 - c. Check to see that retaining plate moves to snap ring.
 - d. If retaining plate does not contact snap ring:
 - D-ring might be damaged.
 - Oil seal might be damaged.
 - Fluid might be leaking past piston check ball.
2. Remove snap ring for forward clutch.
3. Remove drive plates, driven plates, retaining plate and dish plate for forward clutch.

REPAIR FOR COMPONENT PARTS

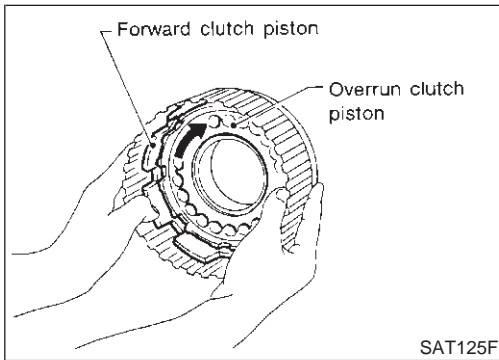
Forward and Overrun Clutches (Cont'd)



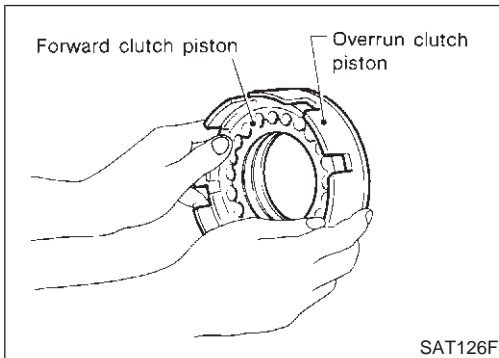
4. Remove snap ring for overrun clutch.
5. Remove drive plates, driven plates, retaining plate and dish plate for overrun clutch.



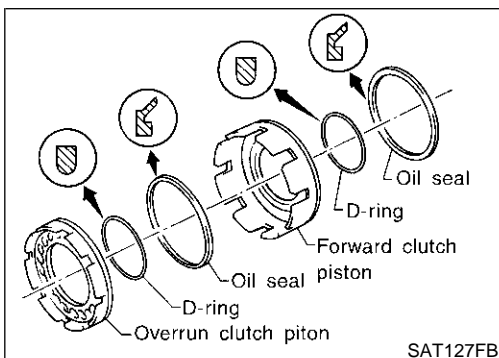
6. Set Tool on spring retainer and remove snap ring from forward clutch drum while compressing return springs.
 - **Set Tool directly over return springs.**
 - **Do not expand snap ring excessively.**
7. Remove spring retainer and return springs.
 - **Do not remove return springs from spring retainer.**



8. Remove forward clutch piston with overrun clutch piston from forward clutch drum by turning it.



9. Remove overrun clutch piston from forward clutch piston by turning it.



10. Remove D-rings and oil seals from forward clutch piston and overrun clutch piston.

REPAIR FOR COMPONENT PARTS

Forward and Overrun Clutches (Cont'd)

INSPECTION

Snap Rings, Spring Retainer and Return Springs

NHAT0155

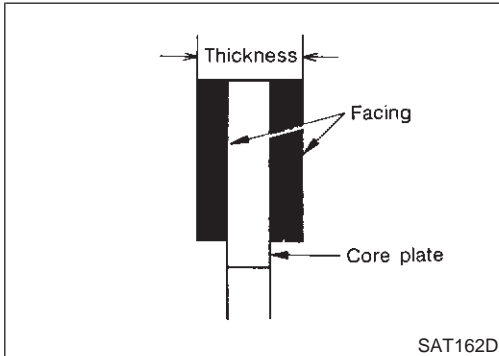
NHAT0155S01

- Check for deformation, fatigue or damage.
- Replace if necessary.
- **When replacing spring retainer and return springs, replace them as a set.**

GI

MA

EM



Forward Clutch and Overrun Clutch Drive Plates

NHAT0155S02

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

Thickness of drive plate:

Forward clutch

Standard value: 1.6 mm (0.063 in)

Wear limit: 1.4 mm (0.055 in)

Overrun clutch

Standard value: 1.6 mm (0.063 in)

Wear limit: 1.4 mm (0.055 in)

- If not within wear limit, replace.

LC

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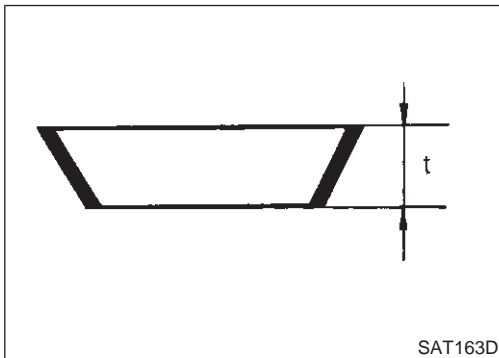
AT

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Forward Clutch and Overrun Clutch Dish Plates

NHAT0155S03

- Check for deformation or damage.
- Measure thickness of dish plate.

Thickness of dish plate:

Forward clutch 2.7 mm (0.106 in)

Overrun clutch 2.7 mm (0.106 in)

- If deformed or fatigued, replace.

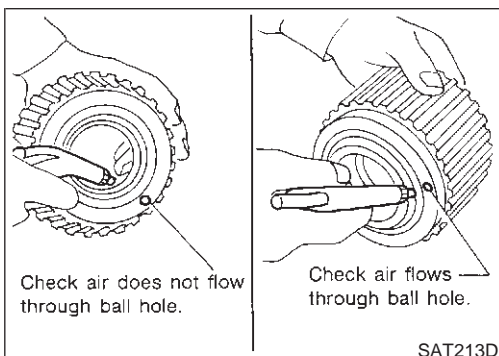
RS

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Forward Clutch Drum

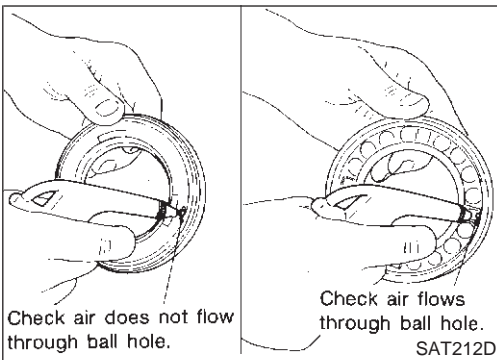
NHAT0155S04

- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole from outside of forward clutch drum. Make sure air leaks past ball.
- Apply compressed air to oil hole from inside of forward clutch drum. Make sure there is no air leakage.

IDX

REPAIR FOR COMPONENT PARTS

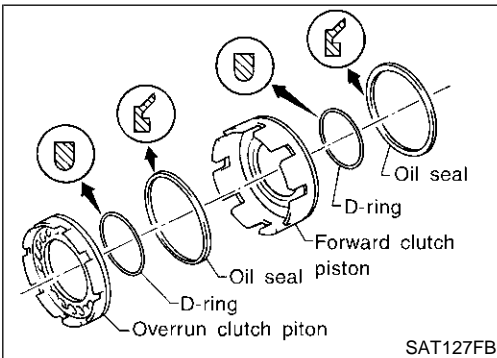
Forward and Overrun Clutches (Cont'd)



Overrun Clutch Piston

NHAT0155S05

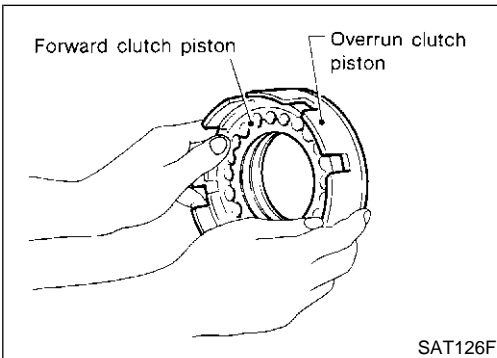
- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side. Make sure that air leaks past ball.



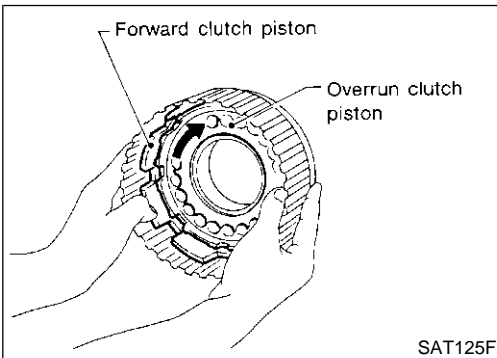
ASSEMBLY

NHAT0156

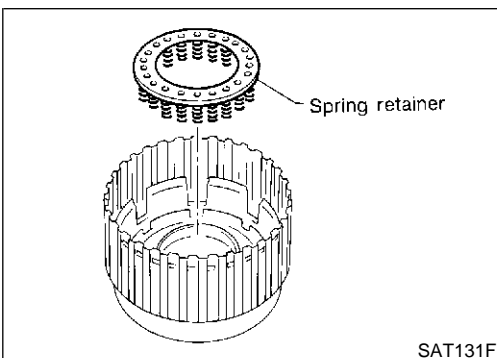
1. Install D-rings and oil seals on forward clutch piston and overrun clutch piston.
 - Take care with direction of oil seal.
 - Apply ATF to both parts.



2. Install overrun clutch piston assembly on forward clutch piston by turning it slowly.
 - Apply ATF to inner surface of forward clutch piston.



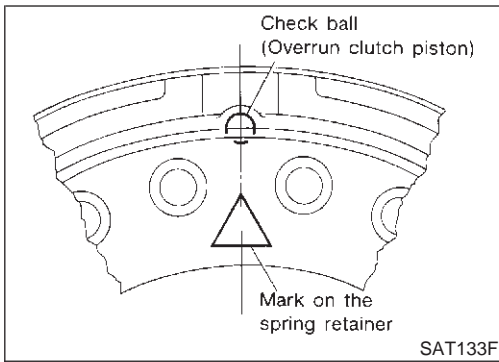
3. Install forward clutch piston assembly on forward clutch drum by turning it slowly.
 - Apply ATF to inner surface of drum.



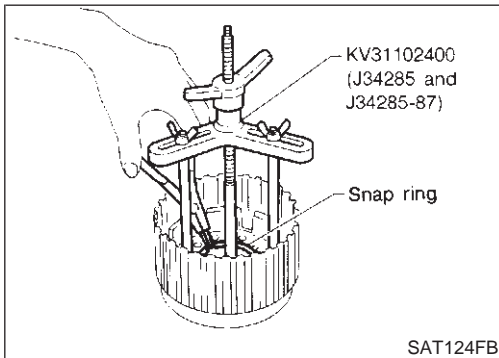
4. Install return spring on overrun clutch piston.

REPAIR FOR COMPONENT PARTS

Forward and Overrun Clutches (Cont'd)

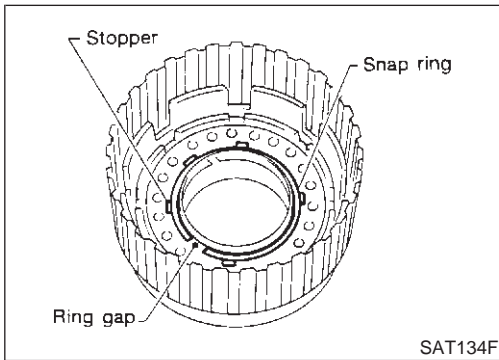


- Align the mark on spring retainer with check ball in overrun clutch piston.

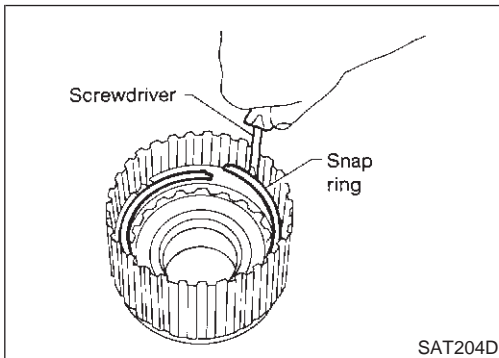


5. Set Tool on spring retainer and install snap ring while compressing return springs.

- **Set Tool directly over return springs.**



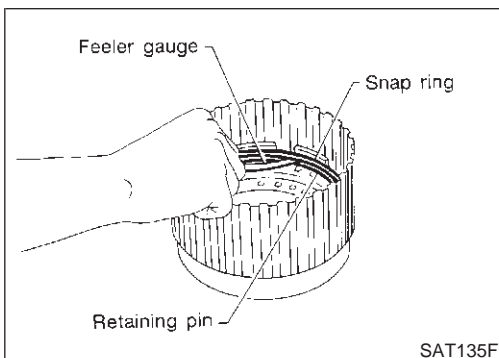
- **Do not align snap ring gap with spring retainer stopper.**



6. Install drive plates, driven plates, retaining plate and dish plate for overrun clutch.

- **Take care with order of plates.**

7. Install snap ring for overrun clutch.



8. Measure clearance between overrun clutch retaining plate and snap ring.

If not within allowable limit, select proper retaining plate.

Specified clearance:

Standard 0.7 - 1.1 mm (0.028 - 0.043 in)

Allowable limit 1.7 mm (0.067 in)

Overrun clutch retaining plate:

Refer to SDS, AT-385.

GI

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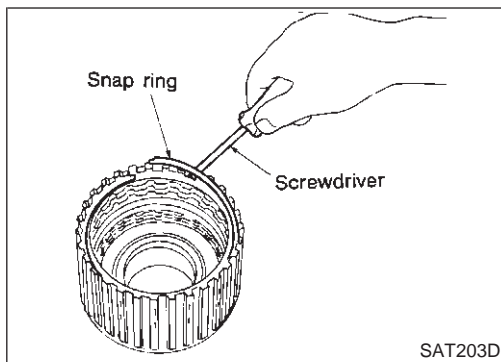
SC

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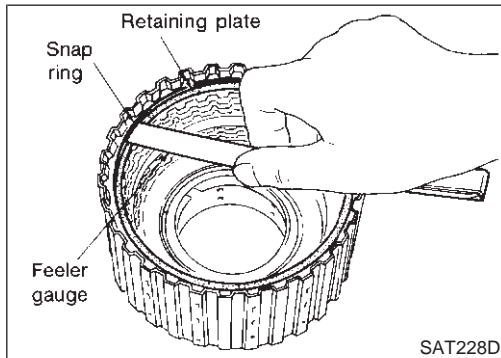
IDX

REPAIR FOR COMPONENT PARTS

Forward and Overrun Clutches (Cont'd)



9. Install drive plates, driven plates, retaining plate and dish plate for forward clutch.
 - **Take care with order of plates.**
10. Install snap ring for forward clutch.



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

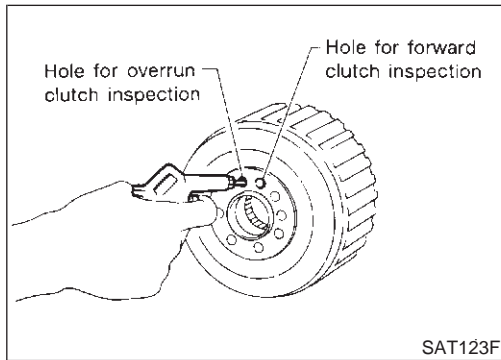
Specified clearance:

Standard 0.45 - 0.85 mm (0.0177 - 0.0335 in)

Allowable limit 1.85 mm (0.0728 in)

Forward clutch retaining plate:

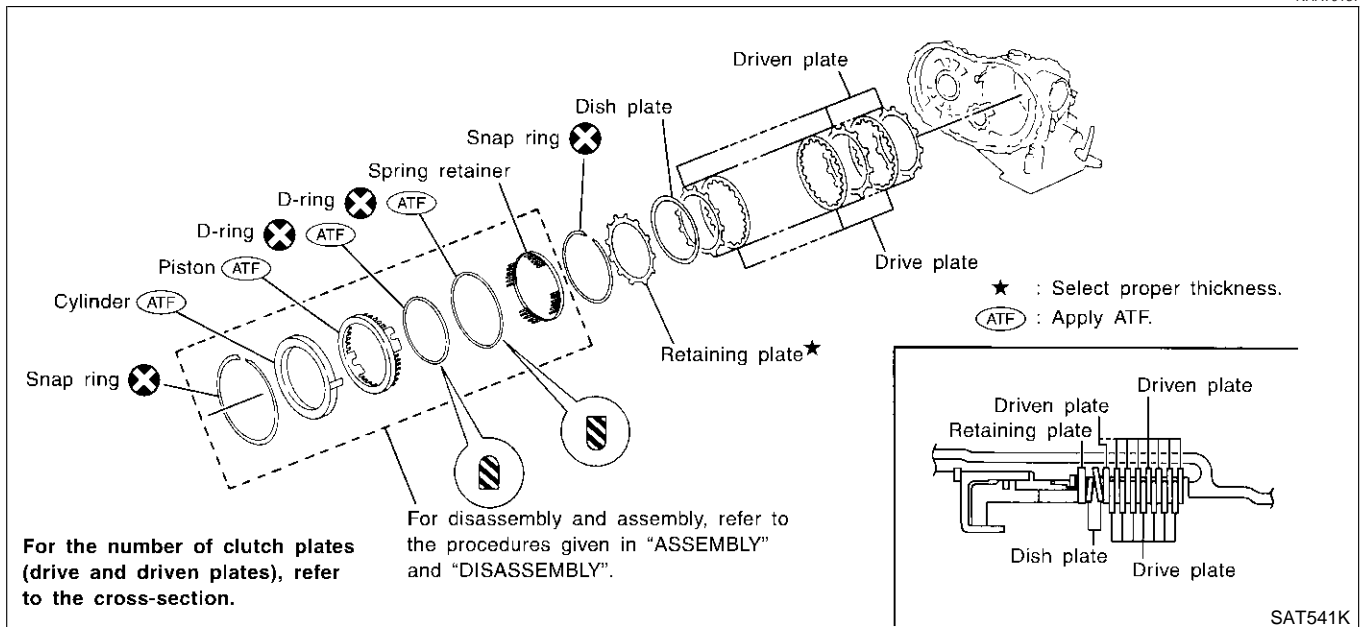
Refer to SDS, AT-385.



12. Check operation of forward clutch.
Refer to "DISASSEMBLY", "Forward Clutch and Overrun Clutch", AT-337.
13. Check operation of overrun clutch.
Refer to "DISASSEMBLY", "Forward Clutch and Overrun Clutch", AT-337.

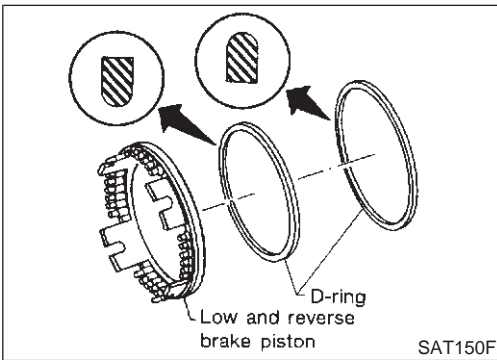
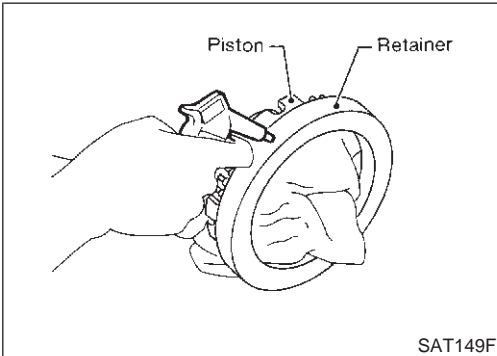
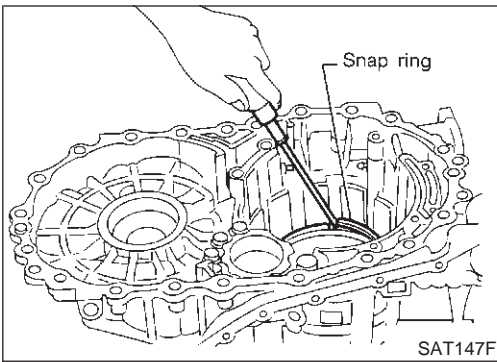
Low & Reverse Brake COMPONENTS

NHAT0157



REPAIR FOR COMPONENT PARTS

Low & Reverse Brake (Cont'd)



DISASSEMBLY

NHAT0158

1. Check operation of low & reverse brake.
 - a. Apply compressed air to oil hole of transmission case.
 - 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.
 - Fluid might be leaking past piston check ball.
2. In order to remove piston, apply compressed air to oil hole of retainer while holding piston.
 - **Apply air gradually and allow piston to come out evenly.**
3. Remove D-rings from piston.

GI

MA

EM

LC

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INSPECTION

NHAT0159

Low and Reverse Brake Snap Ring, Spring Retainer and Return Springs

NHAT0159S01

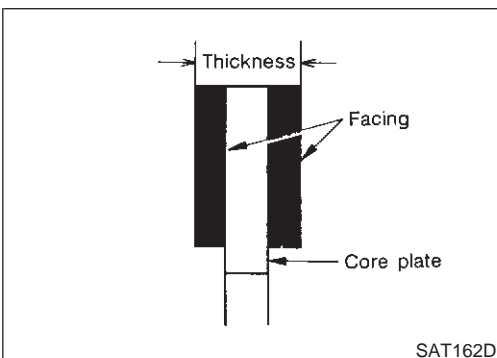
- Check for deformation, fatigue or damage. If necessary, replace.
- **When replacing spring retainer and return springs, replace them as a set.**

BT

HA

SC

EL



Low and Reverse Brake Drive Plate

NHAT0159S02

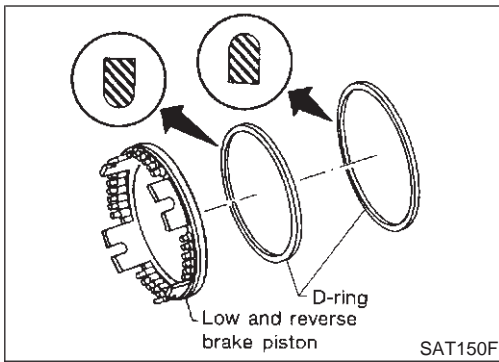
- Check facing for burns, cracks or damage.
- Measure thickness of facing.
 - Thickness of drive plate:**
 - Standard value 1.8 mm (0.071 in)**
 - Wear limit 1.6 mm (0.063 in)**
- If not within wear limit, replace.

IDX

REPAIR FOR COMPONENT PARTS

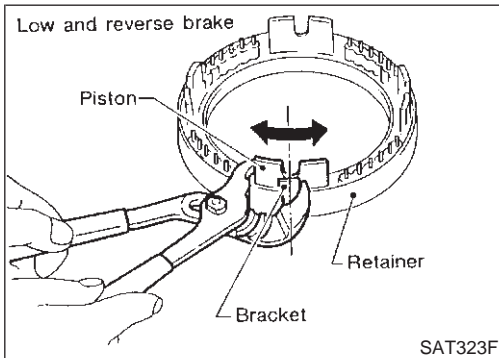
Low & Reverse Brake (Cont'd)

NHAT0160

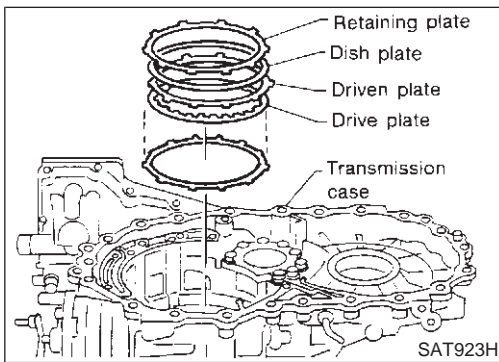


ASSEMBLY

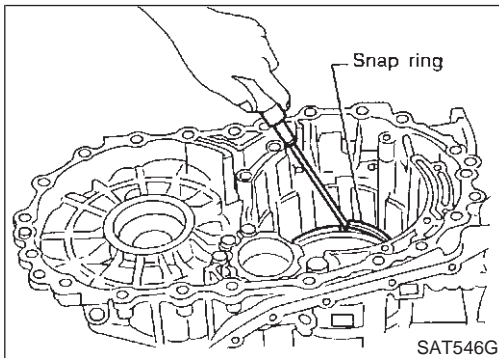
1. Install D-rings on piston.
 - Apply ATF to both parts.



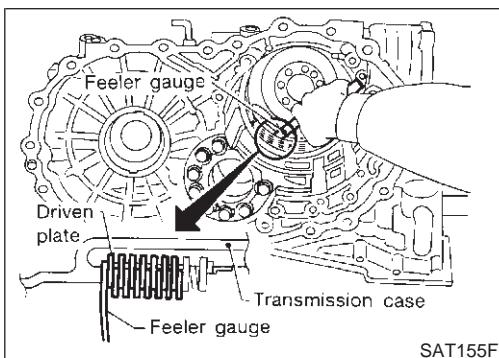
2. Set and align piston with retainer.
 - This operation is required in order to engage the protrusions of piston to return springs correctly. Further procedures are given in "ASSEMBLY".



3. Install driven plates, drive plates, retaining plate and dish plate on transmission case.
 - Take care with order of plates and direction of dish plate.



4. Install snap ring.



5. Measure clearance between driven plate and transmission case. If not within allowable limit, select proper retaining plate. (front side)

Specified clearance:

Standard 1.7 - 2.1 mm (0.067 - 0.083 in)

Allowable limit 3.3 mm (0.130 in)

Retaining plate:

Refer to SDS, AT-386.

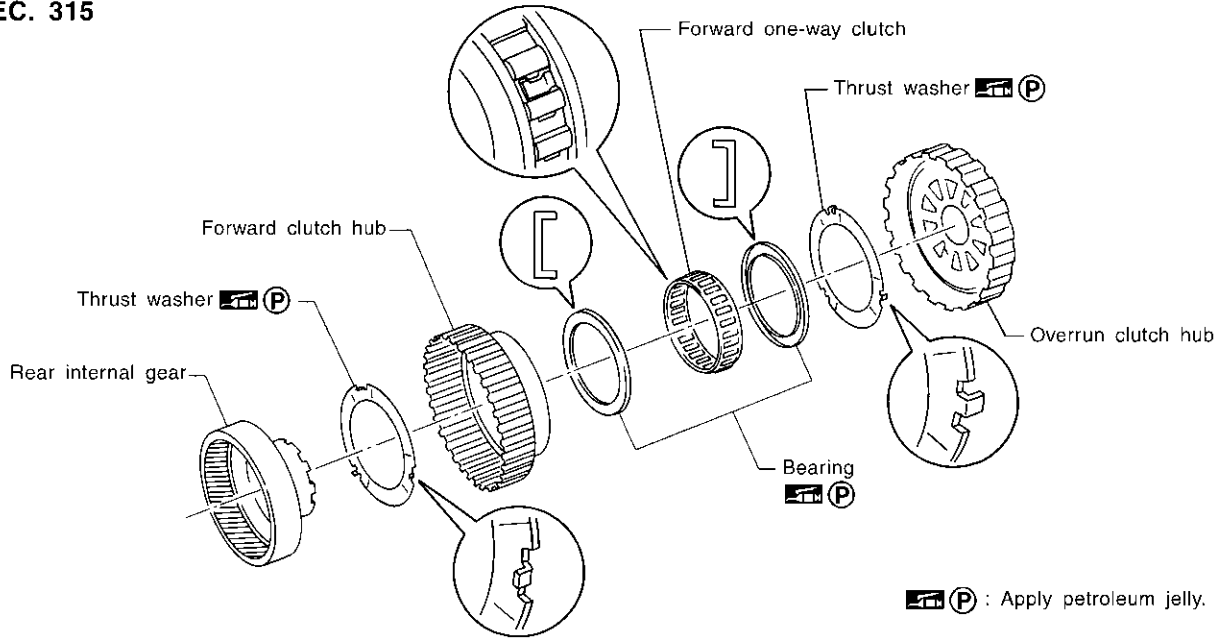
REPAIR FOR COMPONENT PARTS

Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

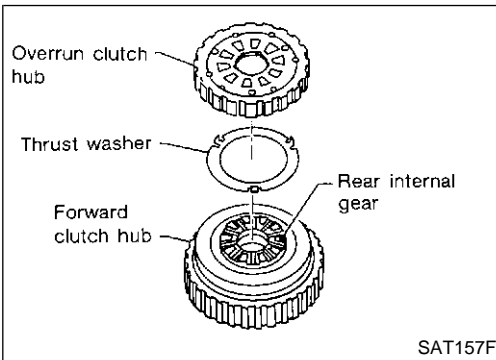
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub COMPONENTS

NHAT0161

SEC. 315



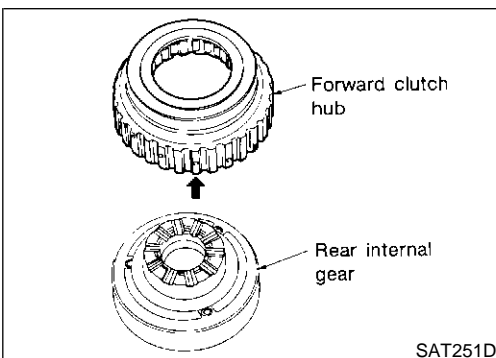
SAT975H



DISASSEMBLY

NHAT0162

1. Remove overrun clutch hub and thrust washer from forward clutch hub.



2. Remove forward clutch hub from rear internal gear.

GI

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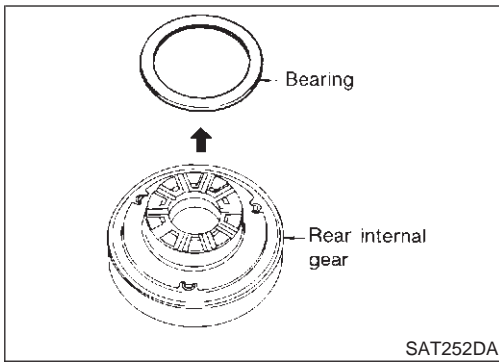
SC

EL

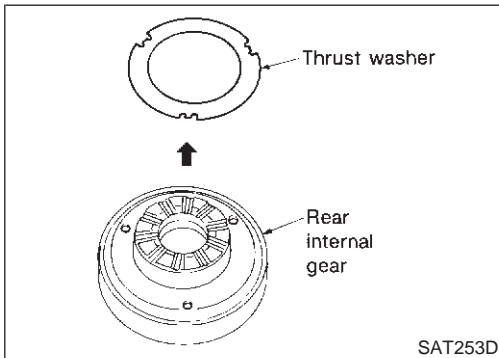
IDX

REPAIR FOR COMPONENT PARTS

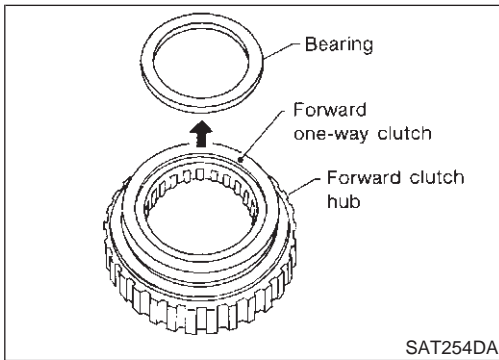
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub (Cont'd)



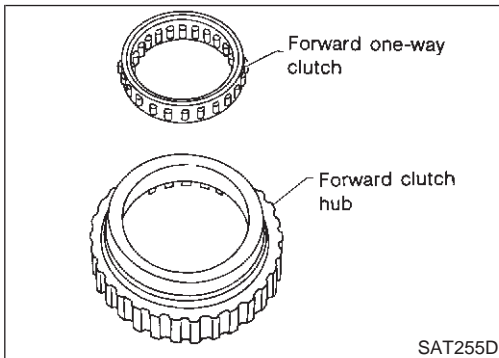
3. Remove bearing from rear internal gear.



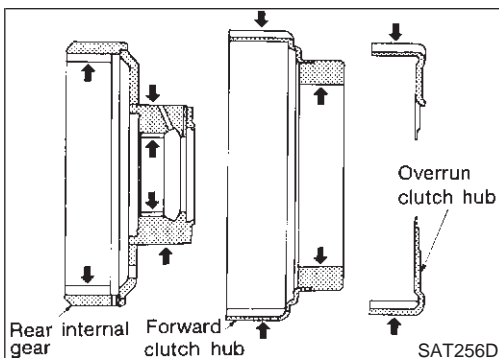
4. Remove thrust washer from rear internal gear.



5. Remove bearing from forward one-way clutch.



6. Remove forward one-way clutch from forward clutch hub.



INSPECTION

Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

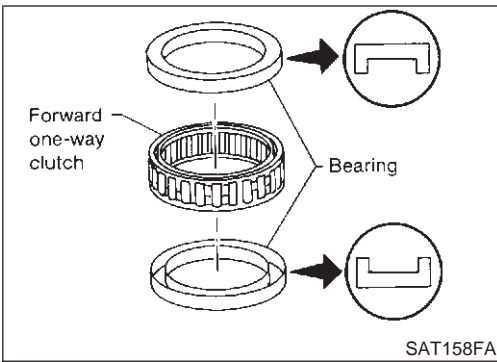
NHAT0163

NHAT0163S01

- Check rubbing surfaces for wear or damage.

REPAIR FOR COMPONENT PARTS

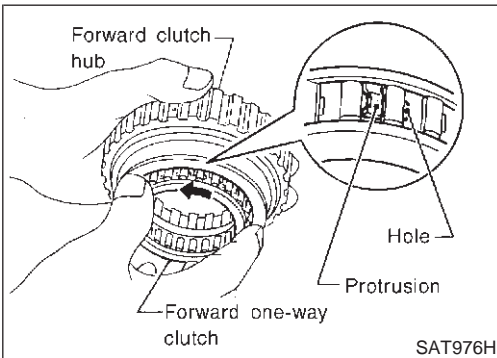
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub (Cont'd)



Bearings and Forward One-way Clutch

NHAT0163S02

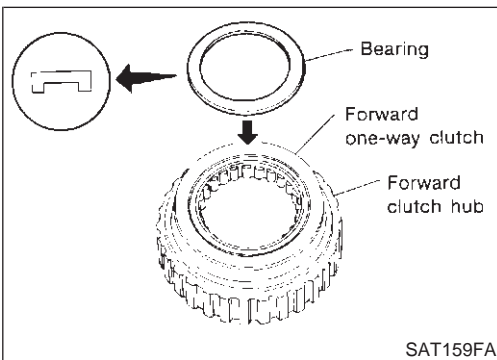
- Check bearings for deformation and damage.
- Check forward one-way clutch for wear and damage.



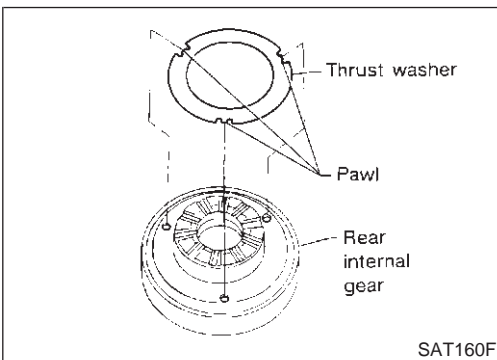
ASSEMBLY

NHAT0164

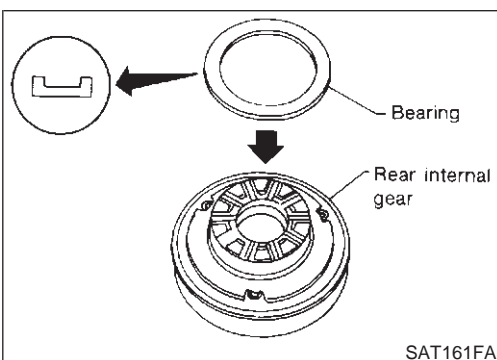
1. Install forward one-way clutch on forward clutch.
 - **Take care with the direction of forward one-way clutch.**



2. Install bearing on forward one-way clutch.
 - **Apply petroleum jelly to bearing.**



3. Install thrust washer on rear internal gear.
 - **Apply petroleum jelly to thrust washer.**
 - **Align hooks of thrust washer with holes of rear internal gear.**



4. Install bearing on rear internal gear.
 - **Apply petroleum jelly to bearing.**

GI

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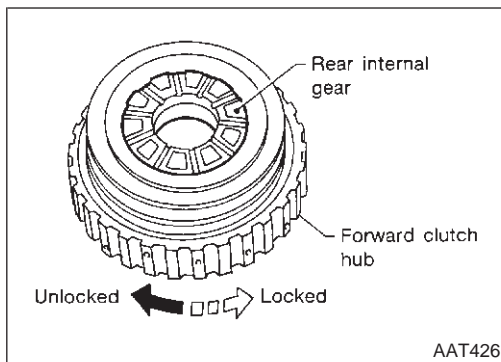
SC

EL

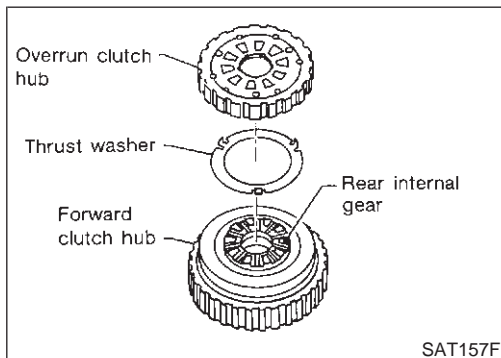
IDX

REPAIR FOR COMPONENT PARTS

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



5. Install forward clutch hub on rear internal gear.
 - **Check operation of forward one-way clutch. Hold rear internal gear and turn forward clutch hub. Check forward clutch hub for correct locking and unlocking directions.**
 - **If not as shown in illustration, check installation direction of forward one-way clutch.**



6. Install thrust washer and overrun clutch hub.
 - **Apply petroleum jelly to thrust washer.**
 - **Align hooks of thrust washer with holes of overrun clutch hub.**
 - **Align projections of rear internal gear with holes of overrun clutch hub.**

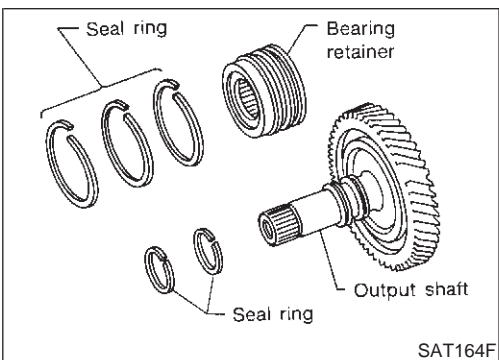
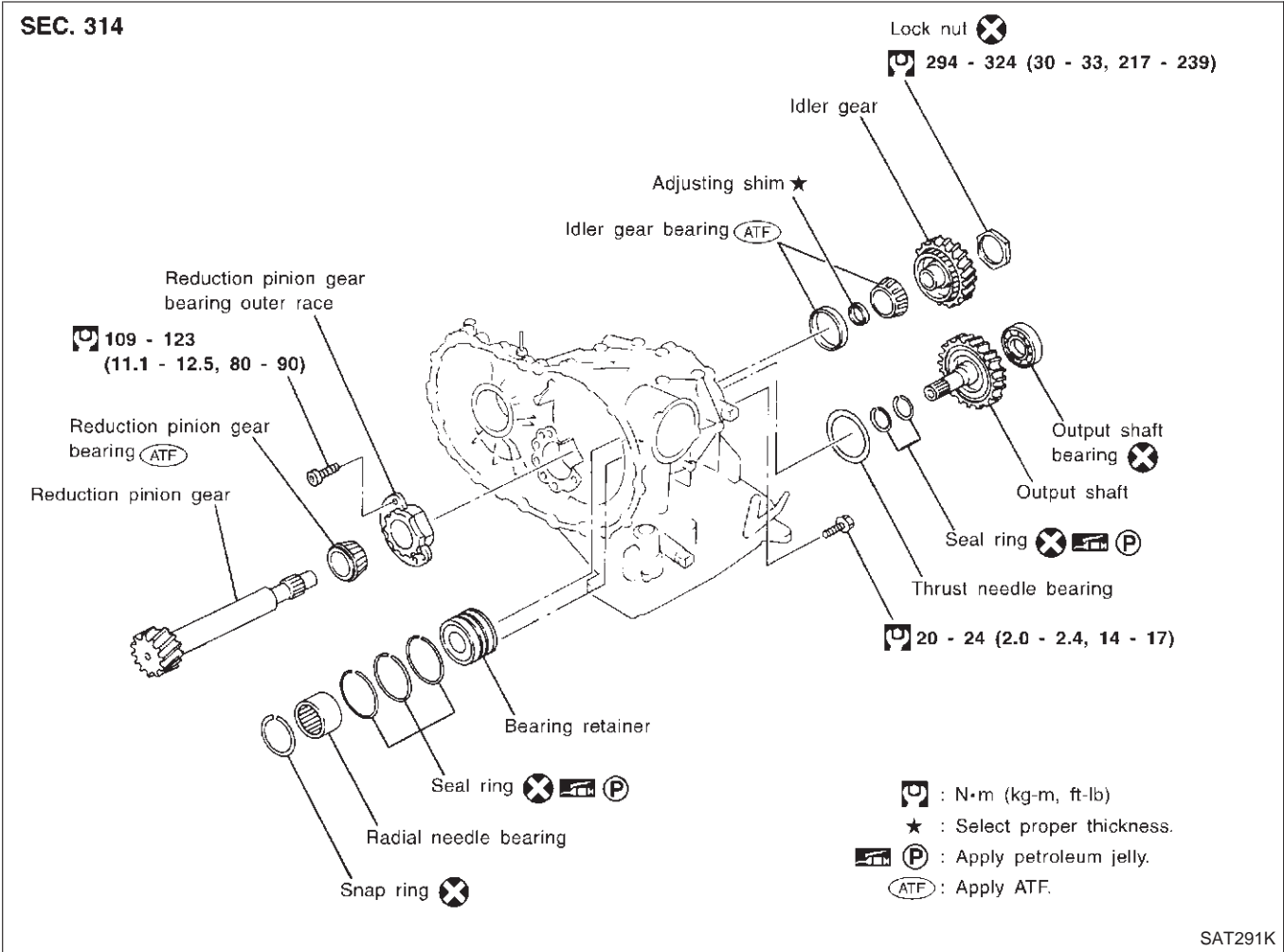
REPAIR FOR COMPONENT PARTS

Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer

Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer COMPONENTS

NHAT0165

GI
MA
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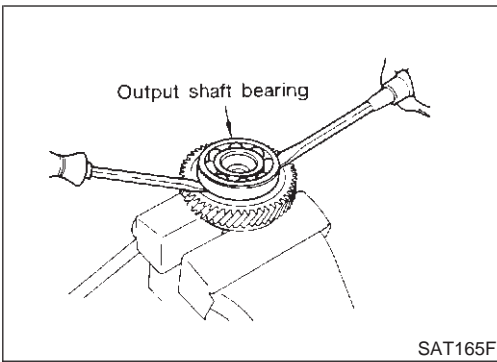
DISASSEMBLY

NHAT0166

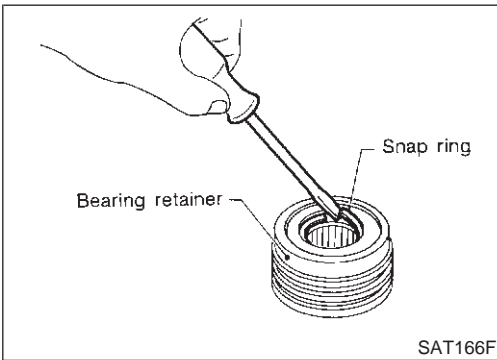
1. Remove seal rings from output shaft and bearing retainer.

REPAIR FOR COMPONENT PARTS

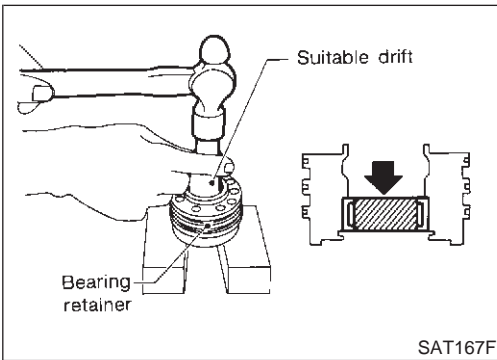
Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer (Cont'd)



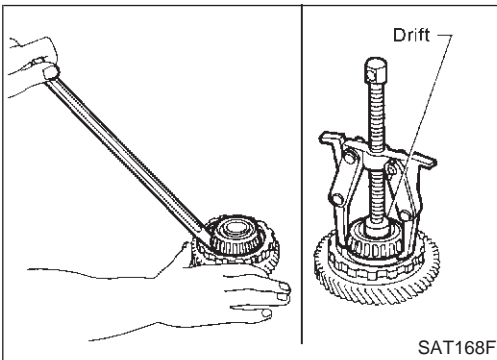
2. Remove output shaft bearing with screwdrivers.
 - Always replace bearing with a new one when removed.
 - Do not damage output shaft.



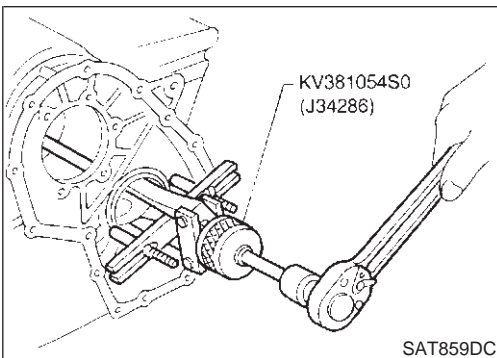
3. Remove snap ring from bearing retainer.



4. Remove needle bearing from bearing retainer.



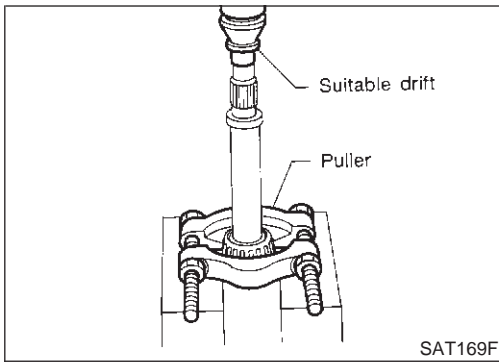
5. Remove idler gear bearing inner race from idler gear.



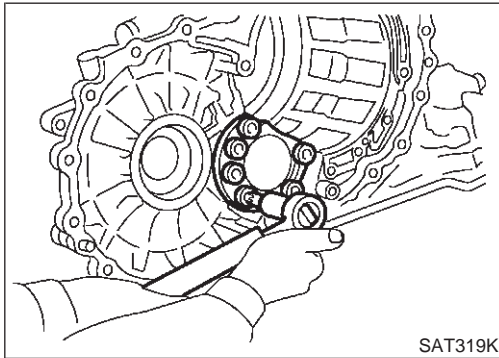
6. Remove idler gear bearing outer race from transmission case.

REPAIR FOR COMPONENT PARTS

Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer (Cont'd)



- Press out reduction pinion gear bearing inner race from reduction pinion gear.



- Remove reduction pinion gear bearing outer race from transmission case.

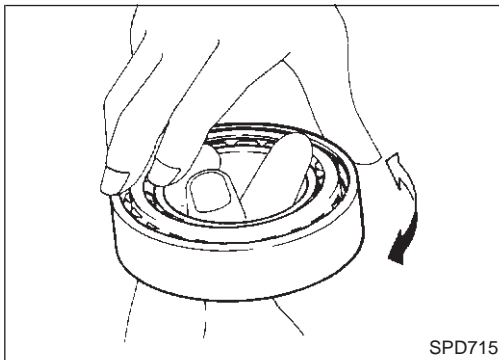
INSPECTION

Output Shaft, Idler Gear and Reduction Pinion Gear

NHAT0167

NHAT0167S01

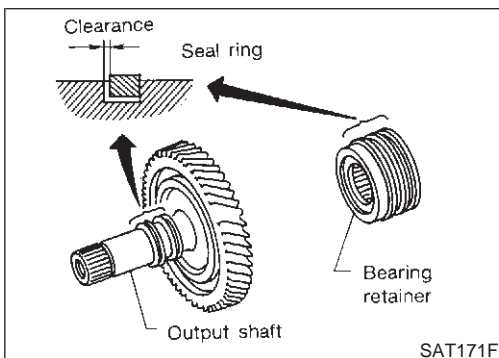
- Check shafts for cracks, wear or bending.
- Check gears for wear, chips and cracks.



Bearing

NHAT0167S02

- 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.**



Seal Ring Clearance

NHAT0167S03

- Install new seal rings to output shaft.
- Measure clearance between seal ring and ring groove of output shaft.

Standard clearance:

0.10 - 0.25 mm (0.0039 - 0.0098 in)

Allowable limit:

0.25 mm (0.0098 in)

- If not within allowable limit, replace output shaft.
- Install new seal rings to bearing retainer.

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REPAIR FOR COMPONENT PARTS

Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer (Cont'd)

- Measure clearance between seal ring and ring groove of bearing retainer.

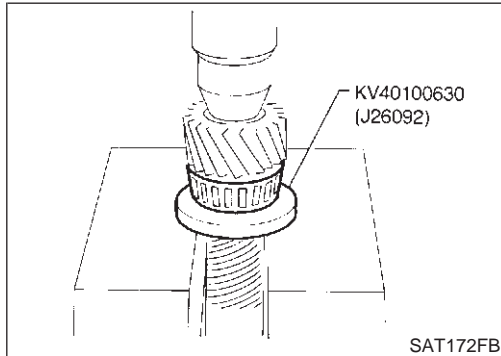
Standard clearance:

0.10 - 0.30 mm (0.0039 - 0.0118 in)

Allowable limit:

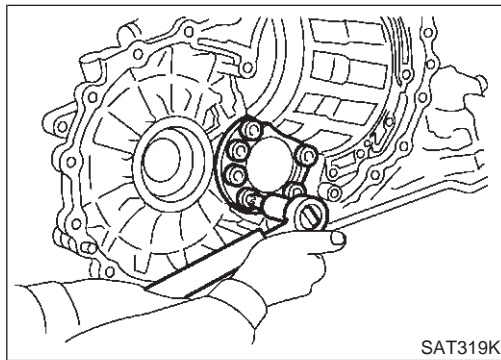
0.30 mm (0.0118 in)

- If not within allowable limit, replace bearing retainer.



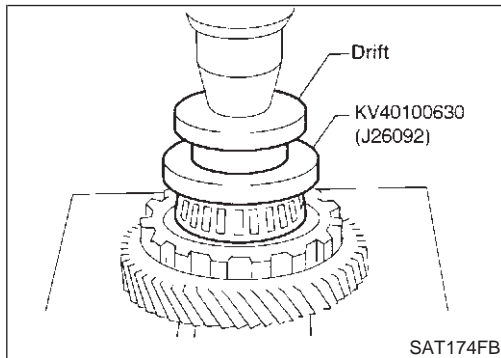
ASSEMBLY

1. Press reduction pinion gear bearing inner race on reduction pinion gear. NHAT0168

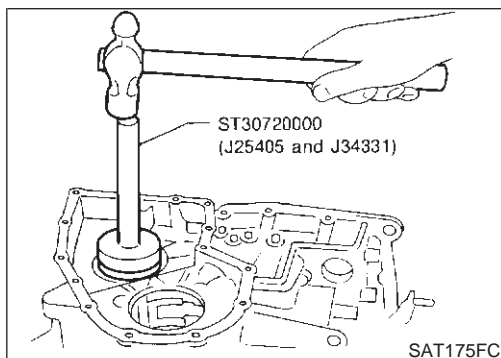


2. Install reduction pinion gear bearing outer race on transmission case.

⚙️ : 109 - 123 N·m (11.1 - 12.5 kg·m, 80 - 90 ft·lb)



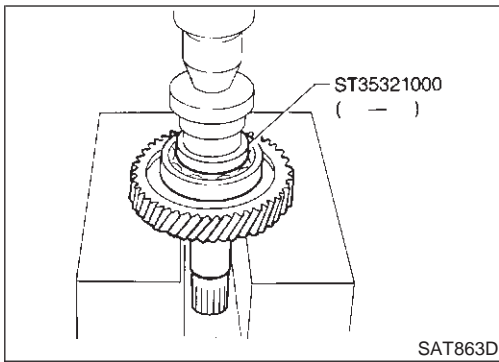
3. Press idler gear bearing inner race on idler gear.



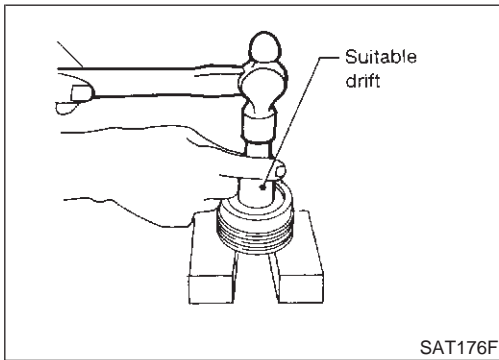
4. Install idler gear bearing outer race on transmission case.

REPAIR FOR COMPONENT PARTS

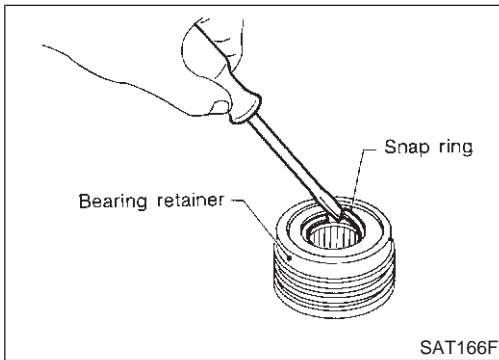
Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer (Cont'd)



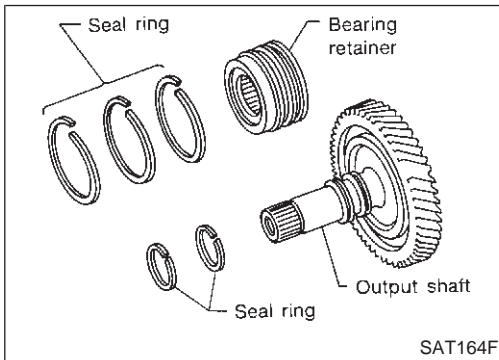
5. Press output shaft bearing on output shaft.



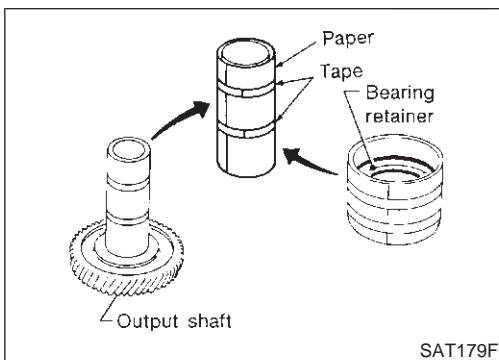
6. Press needle bearing on bearing retainer.



7. Install snap ring to bearing retainer.



8. After packing ring grooves with petroleum jelly, carefully install new seal rings on output shaft and bearing retainer.



- Roll paper around seal rings to prevent seal rings from spreading.

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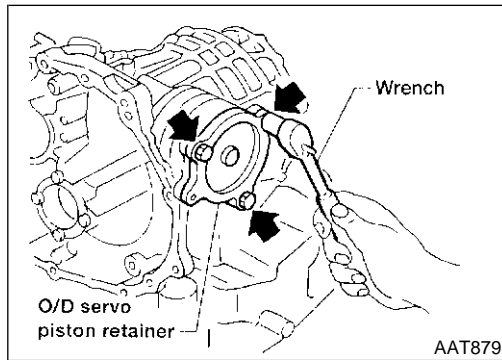
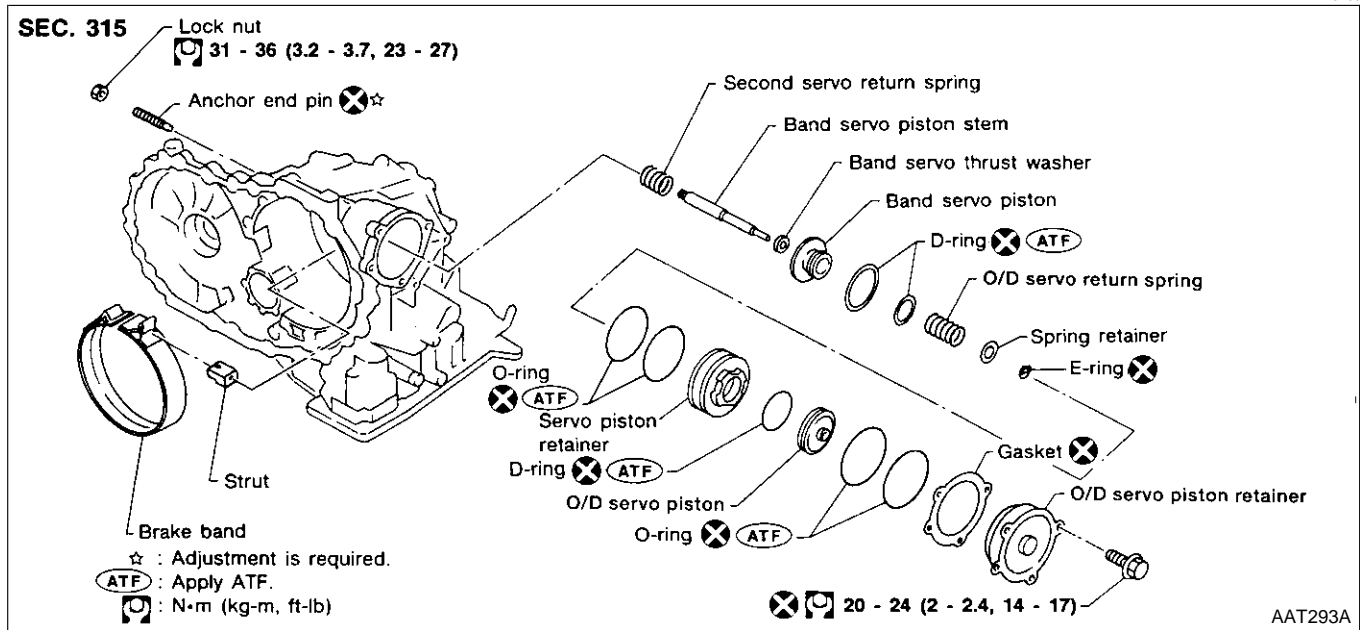
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REPAIR FOR COMPONENT PARTS

Band Servo Piston Assembly

Band Servo Piston Assembly COMPONENTS

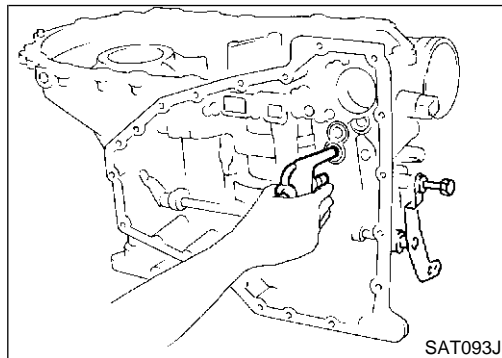
NHAT0169



DISASSEMBLY

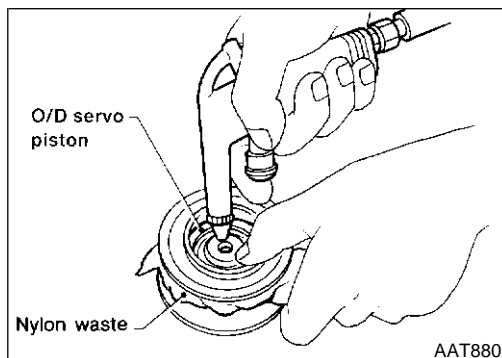
NHAT0170

1. Remove band servo piston fixing bolts.



2. Apply compressed air to oil hole in transmission case to remove O/D servo piston retainer and band servo piston assembly.

- Hold band servo piston assembly with a rag or nylon waste.

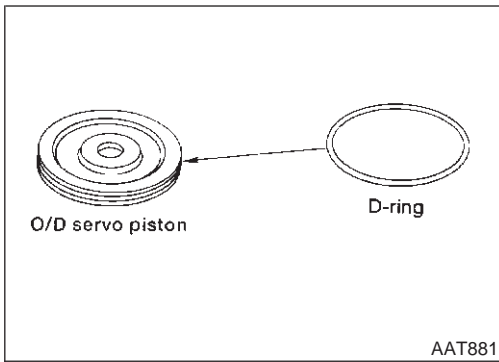


3. Apply compressed air to oil hole in O/D servo piston retainer to remove O/D servo piston from retainer.

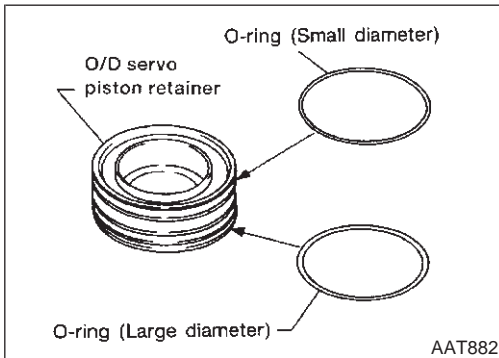
- Hold O/D band servo piston while applying compressed air.

REPAIR FOR COMPONENT PARTS

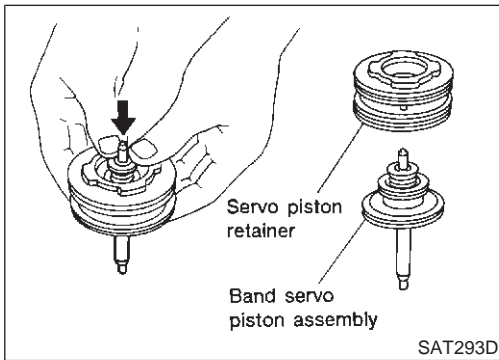
Band Servo Piston Assembly (Cont'd)



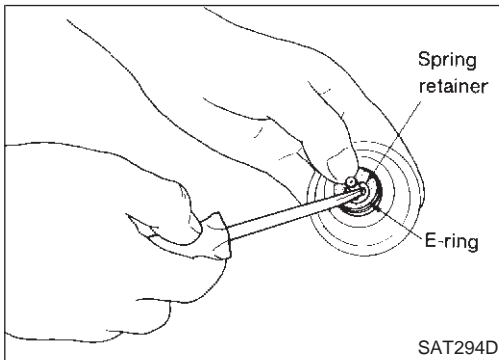
4. Remove D-ring from O/D servo piston.



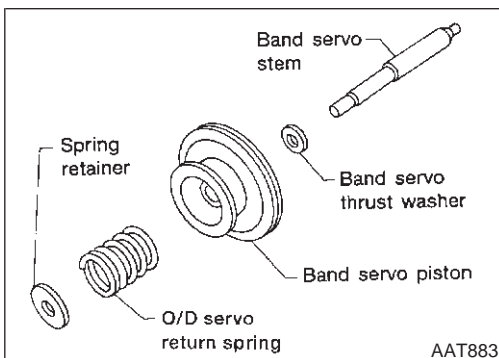
5. Remove O-rings from O/D servo piston retainer.



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



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



8. Remove O/D servo return spring, band servo thrust washer and band servo piston stem from band servo piston.

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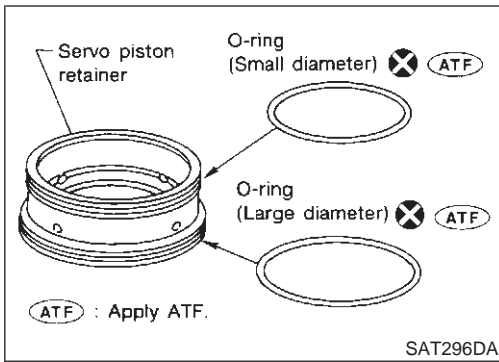
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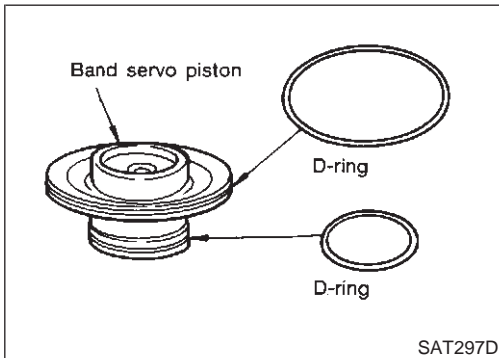
IDX

REPAIR FOR COMPONENT PARTS

Band Servo Piston Assembly (Cont'd)



9. Remove O-rings from servo piston retainer.



10. Remove D-rings from band servo piston.

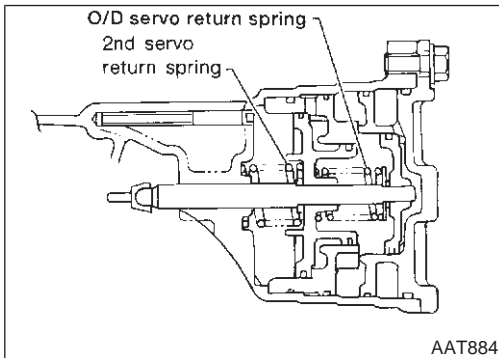
INSPECTION

Pistons, Retainers and Piston Stem

- Check frictional surfaces for abnormal wear or damage.

NHAT0171

NHAT0171S01

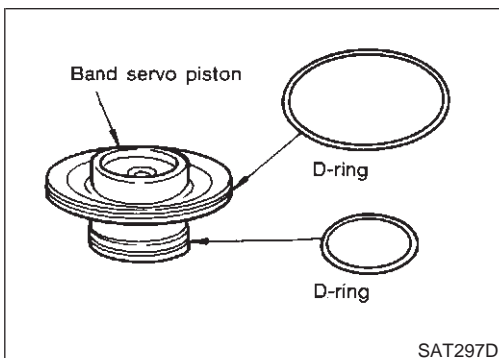


Return Springs

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

Inspection standard:
Refer to SDS, AT-389.

NHAT0171S02



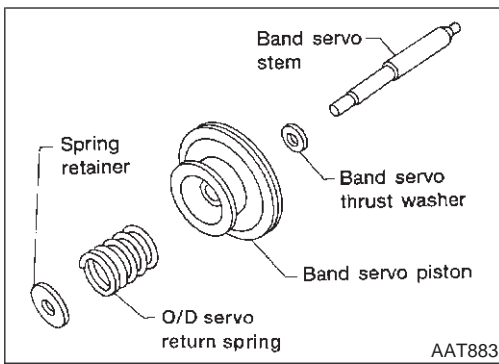
ASSEMBLY

1. Install D-rings to servo piston retainer.
- **Apply ATF to D-rings.**
 - **Pay attention to position of each O-ring.**

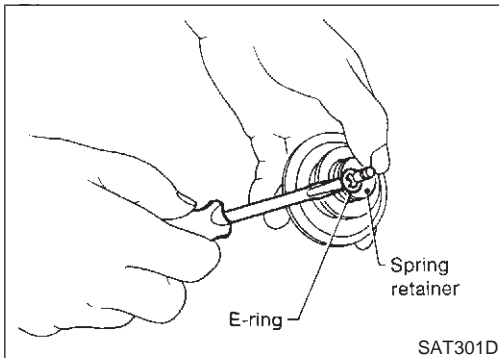
NHAT0172

REPAIR FOR COMPONENT PARTS

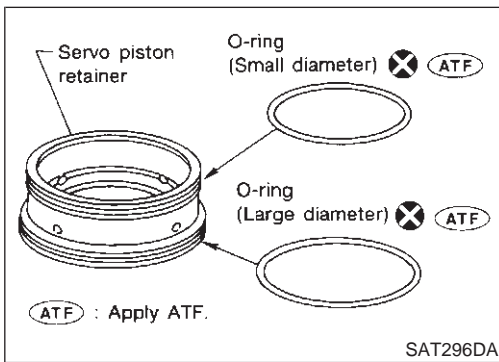
Band Servo Piston Assembly (Cont'd)



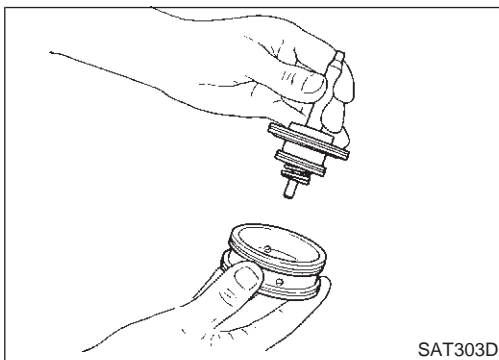
2. Install band servo piston stem, band servo thrust washer, O/D servo return spring and spring retainer to band servo piston.



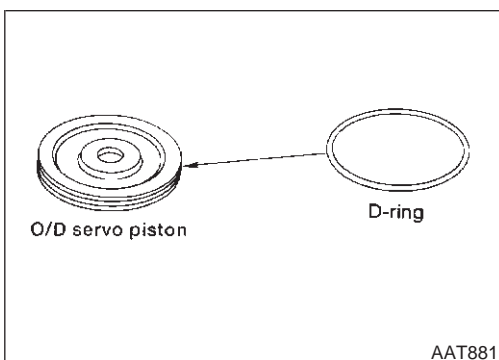
3. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, install E-ring.



4. Install O-rings to servo piston retainer.
 - **Apply ATF to O-rings.**
 - **Pay attention to position of each O-ring.**



5. Install band servo piston assembly to servo piston retainer by pushing it inward.



6. Install D-ring to O/D servo piston.
 - **Apply ATF to D-ring.**

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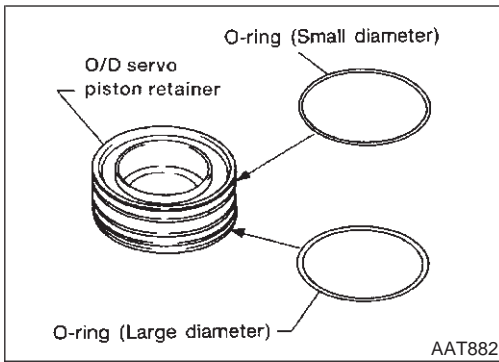
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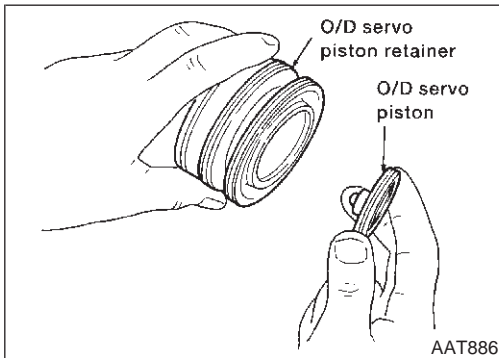
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REPAIR FOR COMPONENT PARTS

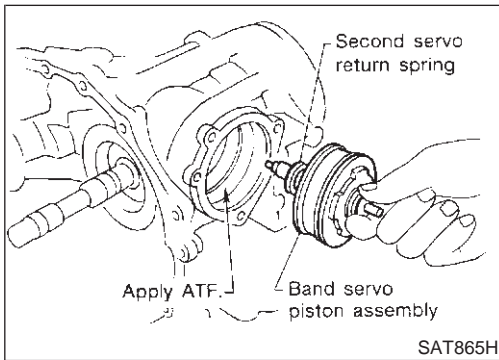
Band Servo Piston Assembly (Cont'd)



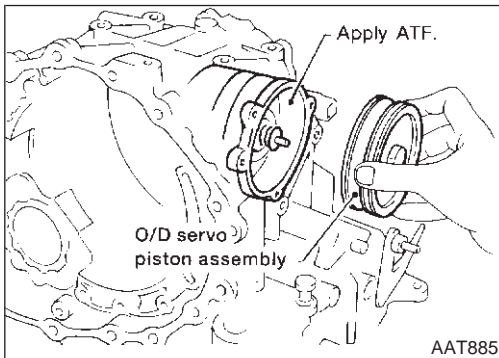
7. Install O-rings to O/D servo piston retainer.
 - Apply ATF to O-rings.
 - Pay attention to position of each O-ring.



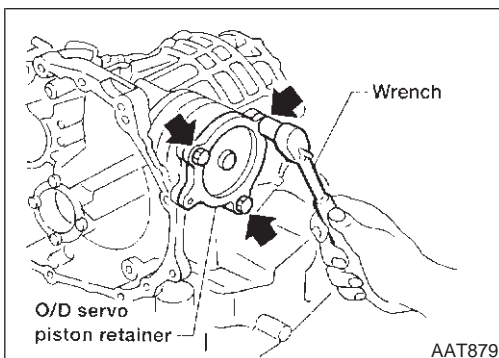
8. Install O/D servo piston to O/D servo piston retainer.



9. Install band servo piston assembly and 2nd servo return spring to transmission case.
 - Apply ATF to O-ring of band servo piston and transmission case.



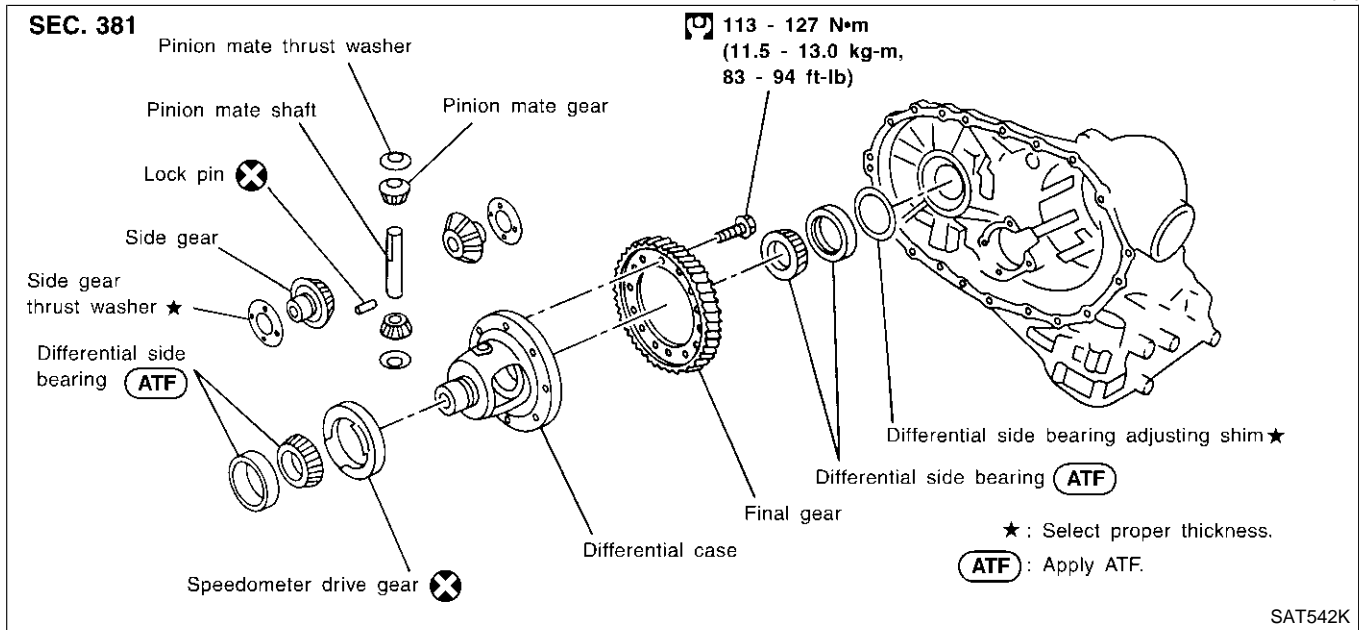
10. Install O/D servo piston assembly to transmission case.
 - Apply ATF to O-ring of band servo piston and transmission case.



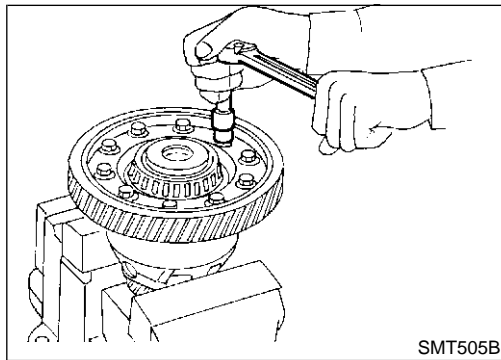
11. Install O/D servo piston retainer to transmission case. Refer to AT-354.

Final Drive COMPONENTS

NHAT0173



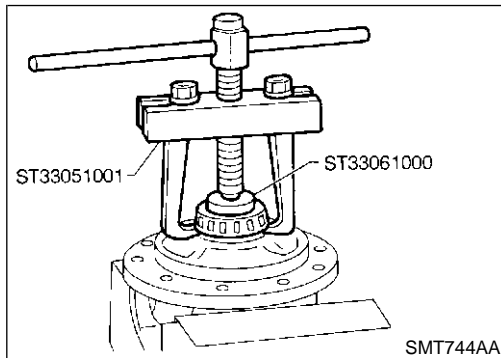
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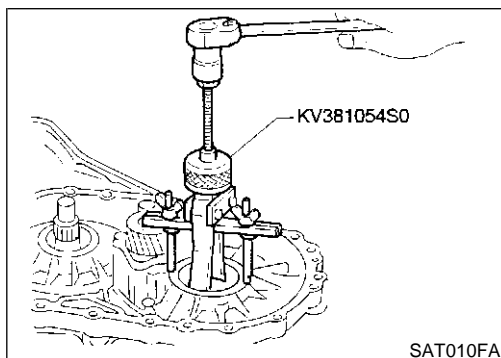
DISASSEMBLY

NHAT0174

1. Remove final gear.



2. Press out differential side bearings.
 - Be careful not to mix up the right and left bearings.

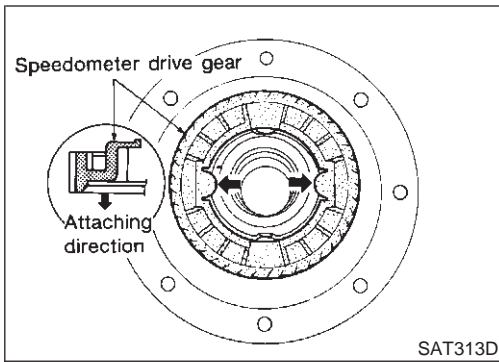


3. Remove differential side bearing outer race, and side bearing adjusting shim from transmission case.

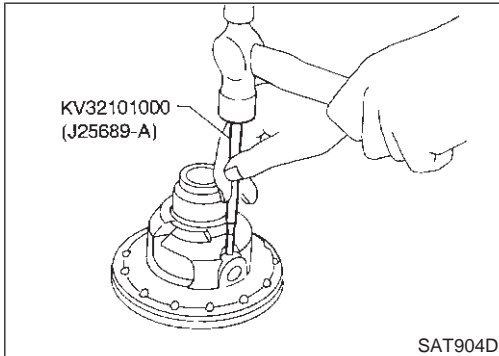
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REPAIR FOR COMPONENT PARTS

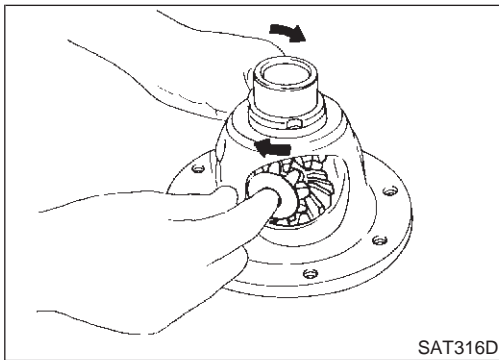
Final Drive (Cont'd)



4. Remove speedometer drive gear.

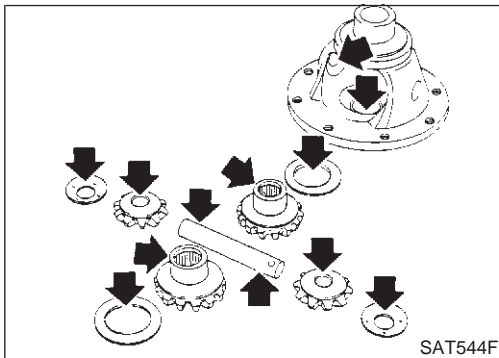


5. Drive out pinion mate shaft lock pin.



6. Draw out pinion mate shaft lock pin.

7. Remove pinion mate gears and side gears.



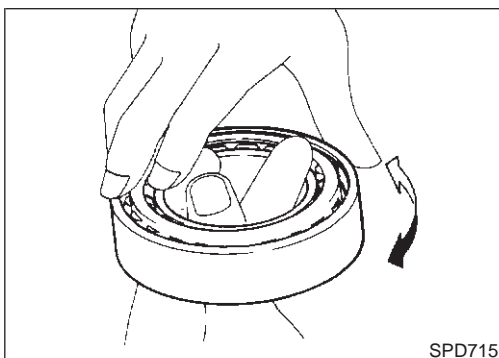
INSPECTION

Gear, washer, shaft and case

- Check mating surfaces of differential case, side gears and pinion mate gears.
- Check washers for wear.

NHAT0175

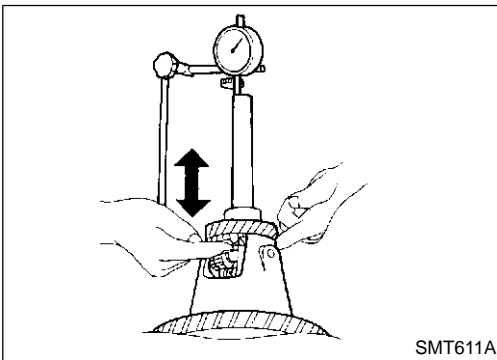
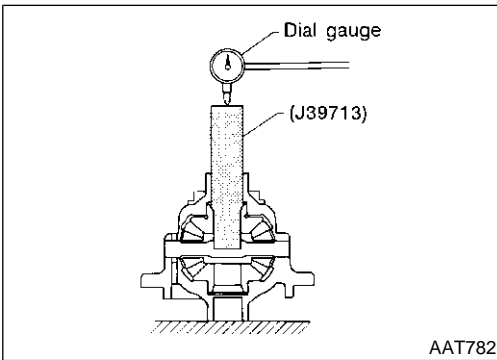
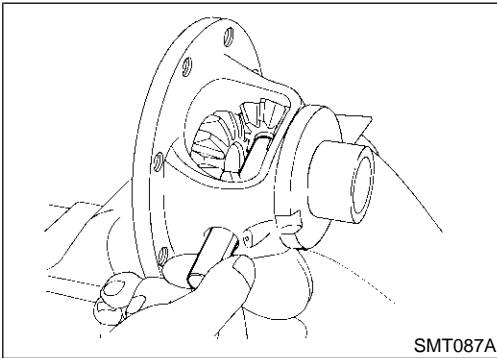
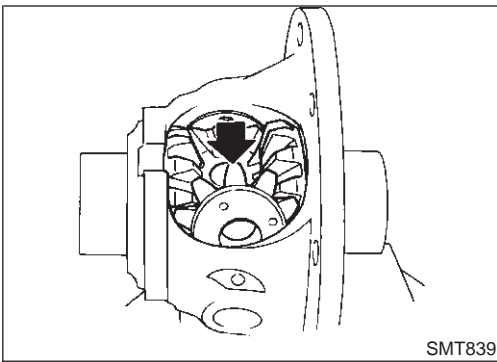
NHAT0175S01



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.

NHAT0175S03



ASSEMBLY

1. Attach side gear thrust washers to side gears, then install pinion mate thrust washers and pinion mate gears in place. NHAT0176

2. Insert pinion mate shaft.

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

3. Measure clearance between side gear and differential case with washers following the procedure below:

- a. Set Tool and dial indicator on side gear.

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

Clearance between side gear and differential case with washers:

0.1 - 0.2 mm (0.004 - 0.008 in)

- c. If not within specification, adjust clearance by changing thickness of side gear thrust washers.

**Side gear thrust washer:
Refer to SDS, AT-386.**

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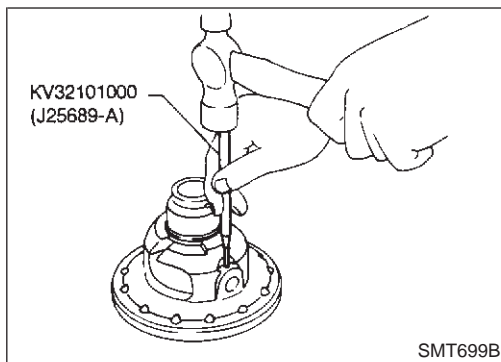
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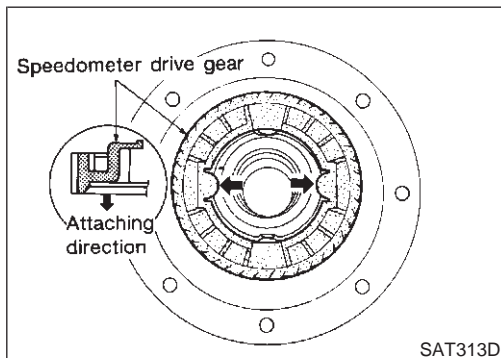
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REPAIR FOR COMPONENT PARTS

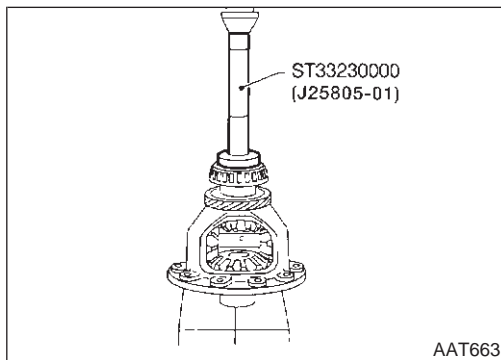
Final Drive (Cont'd)



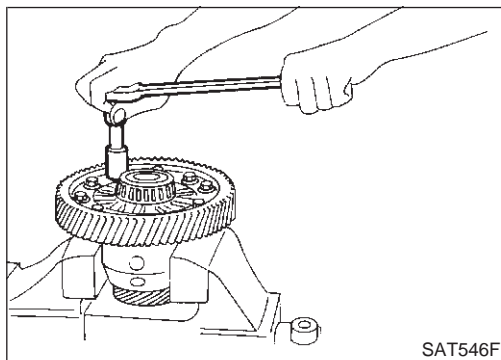
4. Install lock pin.
 - **Make sure that lock pin is flush with case.**



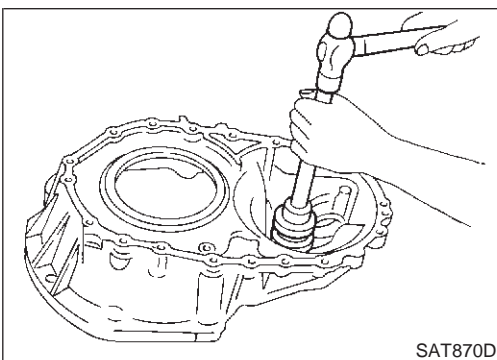
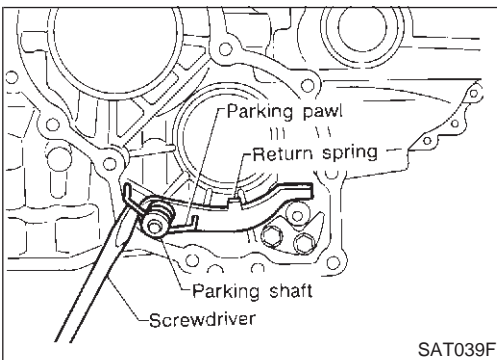
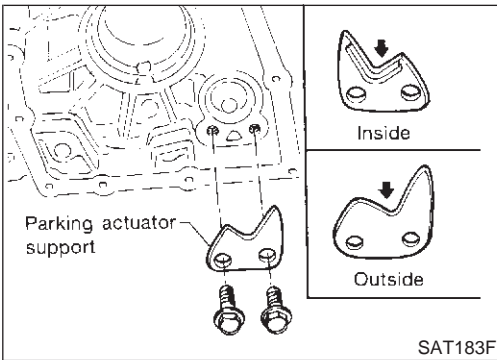
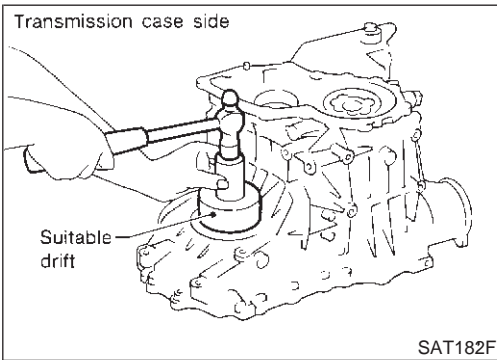
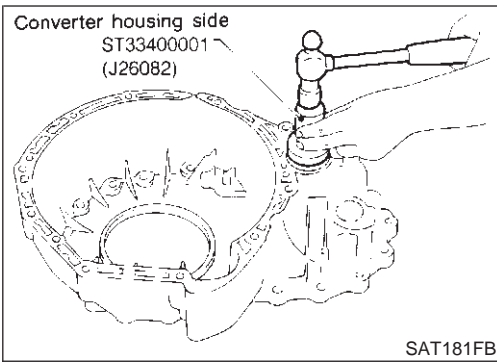
5. Install speedometer drive gear on differential case.
 - **Align the projection of speedometer drive gear with the groove of differential case.**



6. Press on differential side bearings.



7. Install final gear and tighten fixing bolts in a crisscross pattern.



Assembly (1)

NHAT0177

1. Install differential side oil seals on transmission case and converter housing.

2. Install parking actuator support to transmission case. Tighten parking actuator support bolts to the specified torque. Refer to AT-289.

- Pay attention to direction of parking actuator support.

3. Install parking pawl on transmission case and fix it with parking shaft.
4. Install return spring.

Adjustment (1)

DIFFERENTIAL SIDE BEARING PRELOAD

NHAT0178

NHAT0178S01

1. Install differential side bearing outer race without adjusting shim on transmission case.
2. Install differential side bearing outer race on converter housing.

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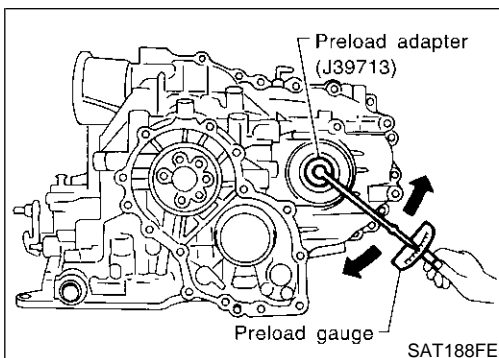
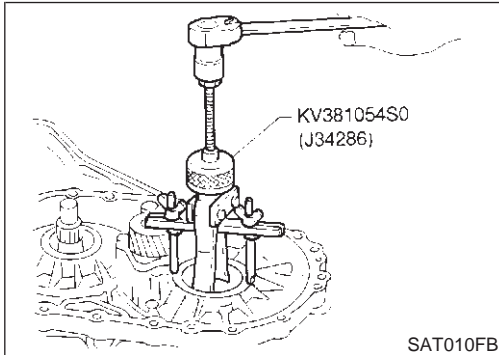
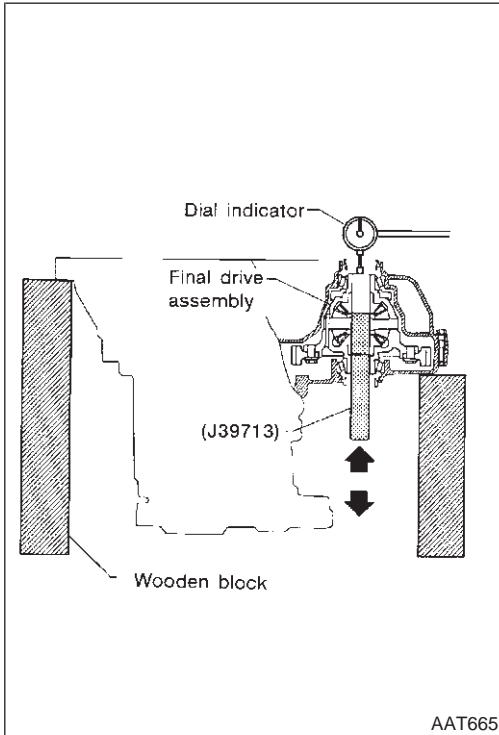
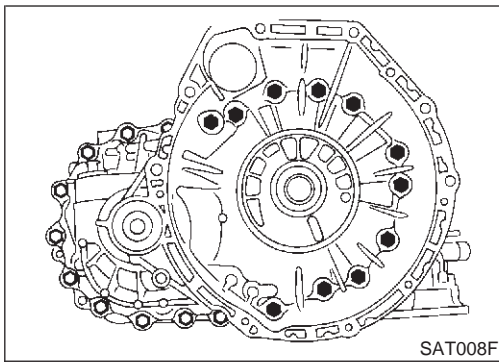
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ASSEMBLY

Adjustment (1) (Cont'd)



3. Place final drive assembly on transmission case.
4. Install transmission case on converter housing. Tighten transmission case fixing bolts to the specified torque. Refer to AT-289.

5. Attach dial indicator on differential case at converter housing side.
6. Insert Tool into differential side gear from transmission case side.
7. Move Tool up and down and measure dial indicator deflection.
8. Select proper thickness of differential side bearing adjusting shim(s).

Suitable shim thickness = Dial indicator deflection + Specified bearing preload

Differential side bearing preload adjusting shim:

Refer to SDS, AT-387.

Bearing preload:

0.05 - 0.09 mm (0.0020 - 0.0035 in)

9. Remove converter housing from transmission case.
10. Remove final drive assembly from transmission case.
11. Remove differential side bearing outer race from transmission case.
12. Reinstall differential side bearing outer race and shim(s) selected from SDS table on transmission case.
13. Reinstall converter housing on transmission case and tighten transmission case fixing bolts to the specified torque. Refer to AT-289.

14. Insert Tool and measure turning torque of final drive assembly.
- **Turn final drive assembly in both directions several times to seat bearing rollers correctly.**

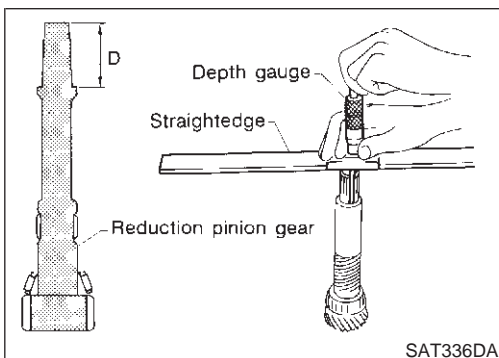
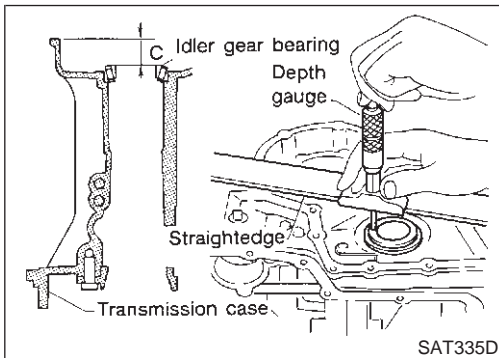
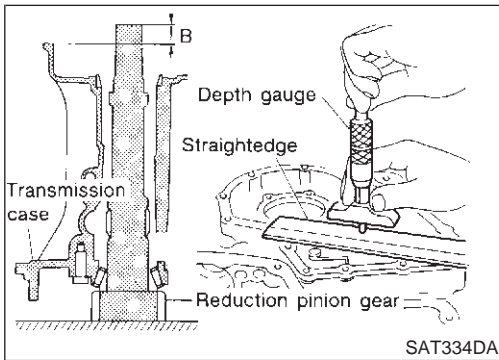
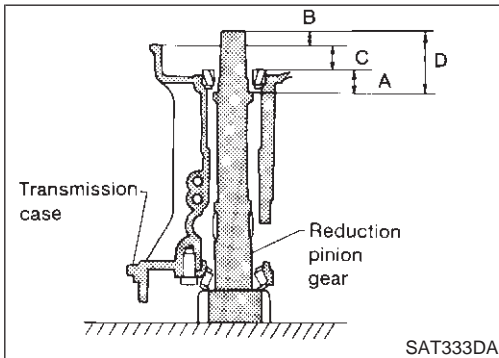
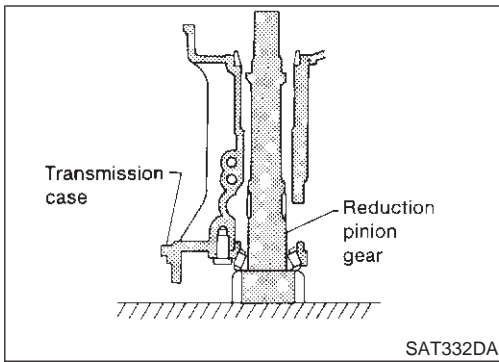
Turning torque of final drive assembly (New bearing):

0.78 - 1.37 N·m (8.0 - 14.0 kg·cm, 6.9 - 12.2 in·lb)

- When old bearing is used again, turning torque will be slightly less than the above.
- Make sure torque is close to the specified range.

Preload adapter:

RE4F04B-(J39713)



REDUCTION PINION GEAR BEARING PRELOAD

NHAT0178S02

1. Remove transmission case and final drive assembly from converter housing.
2. Select proper thickness of reduction pinion gear bearing adjusting shim using the following procedures.
 - a. Place reduction pinion gear on transmission case as shown.
 - b. Place idler gear bearing on transmission case.
 - c. Measure dimensions "B" "C" and "D" and calculate dimension "A".

$$A = D - (B + C)$$

"A": Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.

- Measure dimension "B" between the end of reduction pinion gear and the surface of transmission case.
- **Measure dimension "B" in at least two places.**

- Measure dimension "C" between the surface of idler gear bearing inner race and the surface of transmission case.
- **Measure dimension "C" in at least two places.**

- 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.**
- Calculate dimension "A".

$$A = D - (B + C)$$

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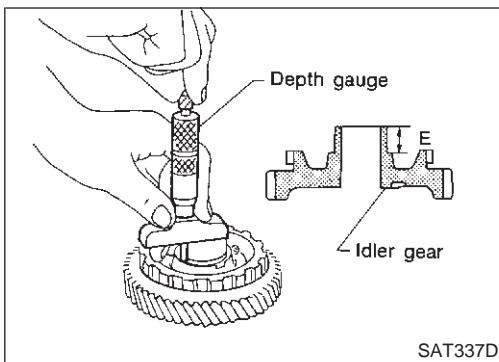
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ASSEMBLY

Adjustment (1) (Cont'd)

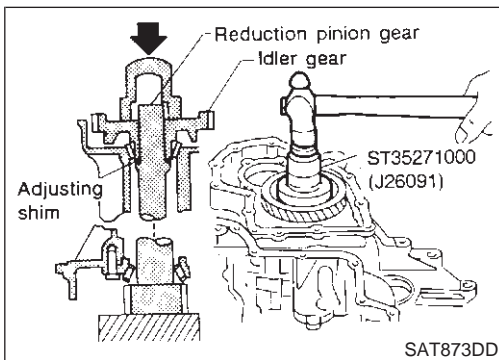


- d. Measure dimension "E" between the end of idler gear and the idler gear bearing inner race mating surface of idler gear.
 - **Measure dimension "E" in at least two places.**

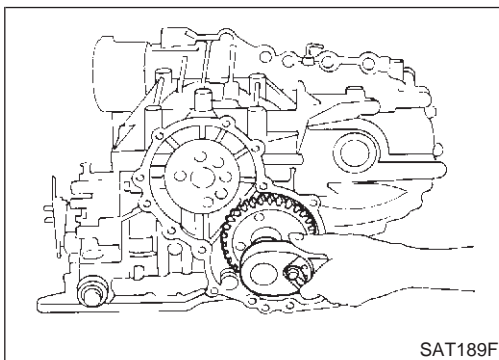
- e. Select proper thickness of reduction pinion gear bearing adjusting shim.

Proper shim thickness = A - E - 0.05 mm (0.0020 in)*
 (* ... Bearing preload)

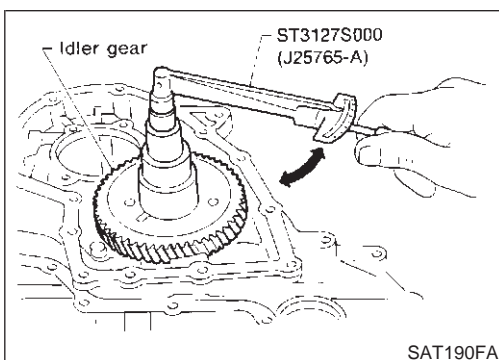
Reduction pinion gear bearing adjusting shim:
 Refer to SDS, AT-388.



3. Install reduction gear and reduction gear bearing adjusting shim selected in step 2-e on transmission case.
4. Press idler gear bearing inner race on idler gear.
5. Press idler gear on reduction gear.
 - **Press idler gear until idler gear fully contacts adjusting shim.**



6. Tighten idler gear lock nut to the specified torque. Refer to AT-349.
 - **Lock idler gear with parking pawl when tightening lock nut.**



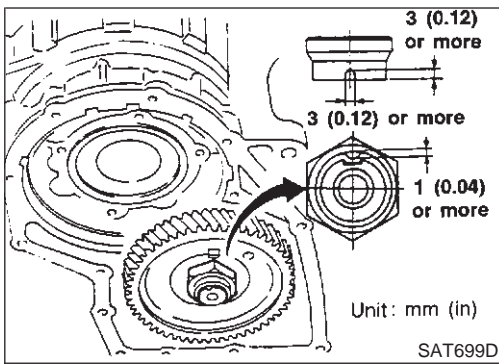
7. Measure turning torque of reduction pinion gear.
 - **When measuring turning torque, turn reduction pinion gear in both directions several times to seat bearing rollers correctly.**

Turning torque of reduction pinion gear:
0.05 - 0.39 N-m (0.5 - 4.0 kg-cm, 0.43 - 3.47 in-lb)

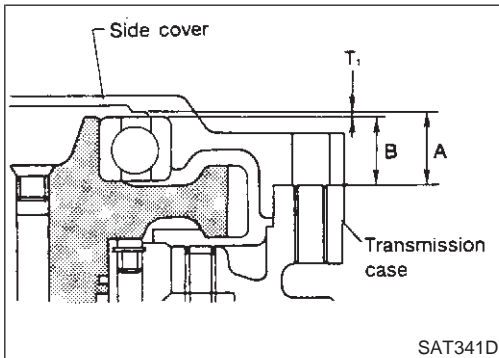
- If turning torque is out of specification, decrease or increase thickness of reduction pinion gear bearing adjusting shim.

ASSEMBLY

Adjustment (1) (Cont'd)



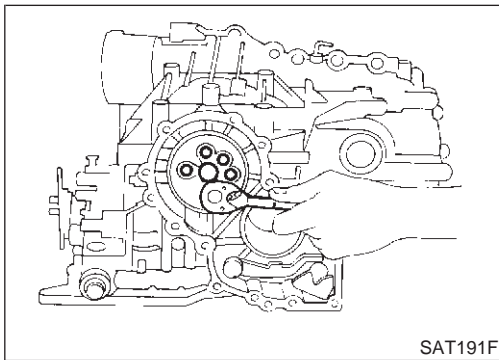
- After properly adjusting turning torque, clinch idler gear lock nut as shown.



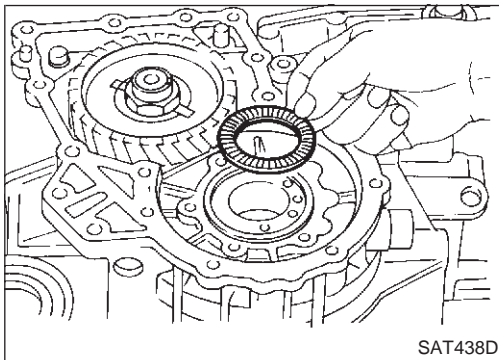
OUTPUT SHAFT END PLAY

NHAT0178S03

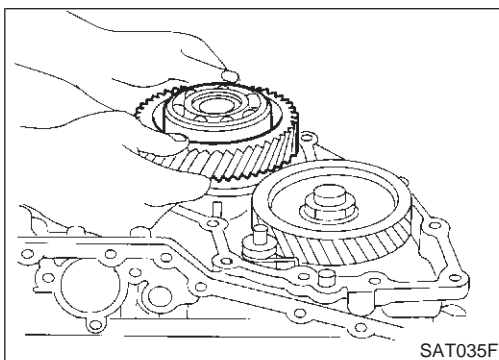
- Measure clearance between side cover and the end of the output shaft bearing.
- Select proper thickness of adjusting shim so that clearance is within specifications.



- Install bearing retainer for output shaft.



- Install output shaft thrust needle bearing on bearing retainer.



- Install output shaft on transmission case.

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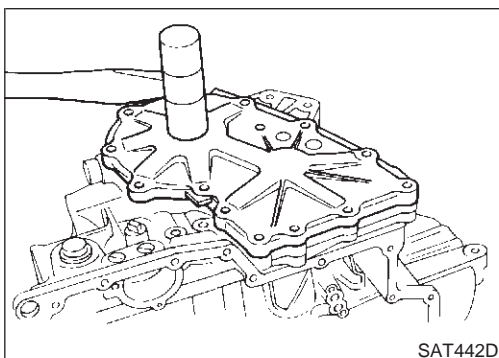
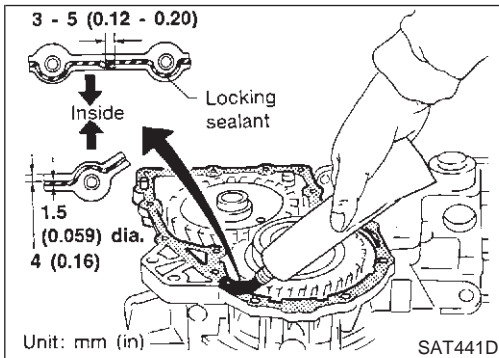
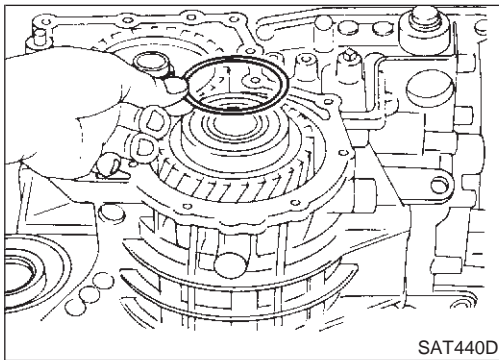
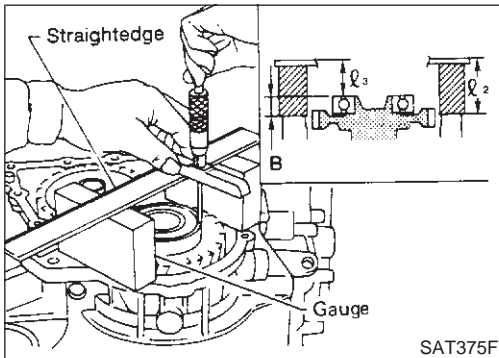
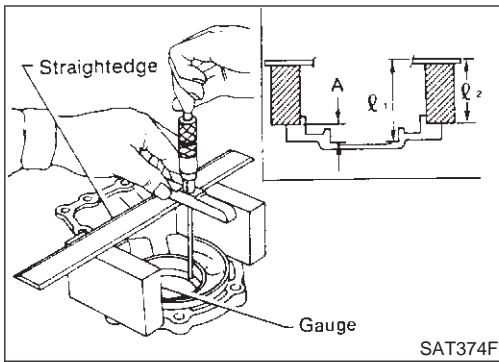
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ASSEMBLY

Adjustment (1) (Cont'd)



4. Measure dimensions " l_1 " and " l_2 " at side cover and then calculate dimension "A".
 - Measure dimension " l_1 " and " l_2 " in at least two places.
 - "A": Distance between transmission case fitting surface and adjusting shim mating surface.
 - $A = l_1 - l_2$
 - l_2 : Height of gauge
5. Measure dimensions " l_2 " and " l_3 " and then calculate dimension "B".
 - Measure " l_2 " and " l_3 " in at least two places.
 - "B": Distance between the end of output shaft bearing outer race and the side cover fitting surface of transmission case.
 - $B = l_2 - l_3$
 - l_2 : Height of gauge
6. Select proper thickness of adjusting shim so that output shaft end play (clearance between side cover and output shaft bearing) is within specifications.
 - Output shaft end play (A - B):
 - 0 - 0.15 mm (0 - 0.0059 in)
 - Output shaft end play adjusting shims:
 - Refer to SDS, AT-390.
7. Install adjusting shim on output shaft bearing.

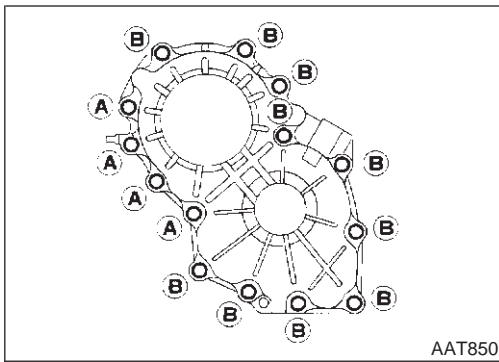
Assembly (2)

1. Apply Genuine Medium Strength Locking Sealant* to transmission case as shown in illustration.
 - *: Refer to GI section.
2. Set side cover on transmission case.
 - Apply locking sealant to the mating surface of transmission case.

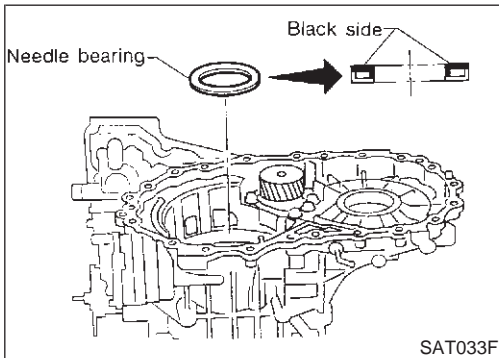
NHAT0179

ASSEMBLY

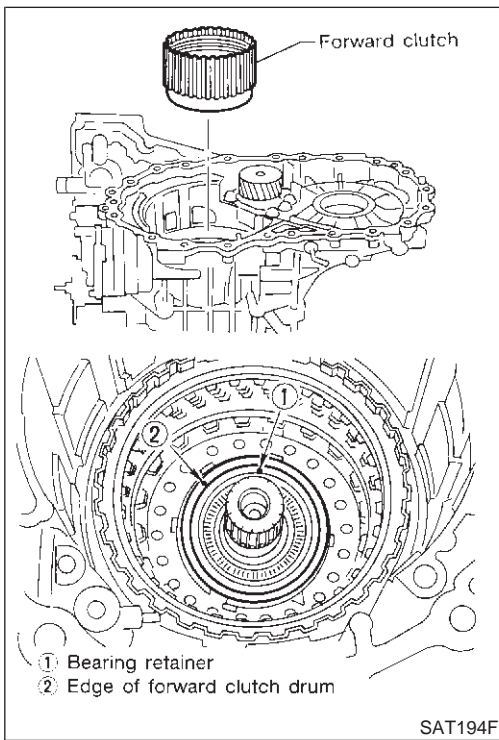
Assembly (2) (Cont'd)



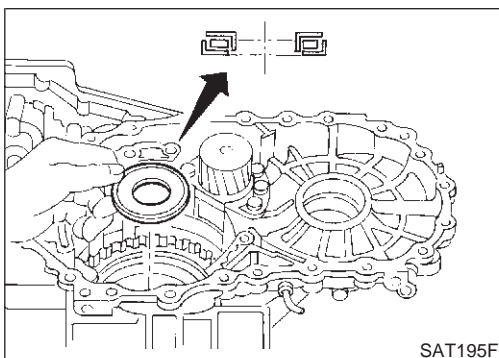
3. Tighten side cover fixing bolts to specified torque. Refer to AT-289.
 - Do not mix bolts A and B.
 - Always replace bolts A as they are self-sealing bolts.



4. Remove paper rolled around bearing retainer.
5. Install thrust washer on bearing retainer.
 - Apply petroleum jelly to thrust washer.



6. Install forward clutch assembly.
 - Align teeth of low & reverse brake drive plates before installing.
 - Make sure that bearing retainer seal rings are not spread.
 - If forward clutch assembly is correctly seated, points 1 and 2 are at almost same level.



7. Install thrust needle bearing on bearing retainer.
 - Apply petroleum jelly to thrust needle bearing.
 - Pay attention to direction of thrust needle bearing.

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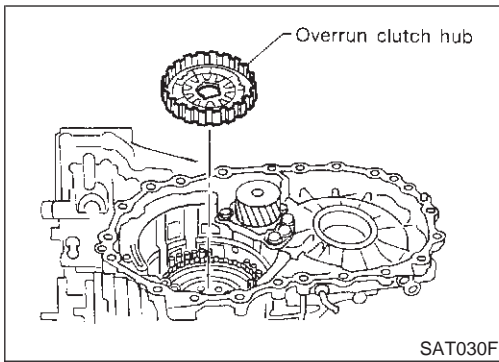
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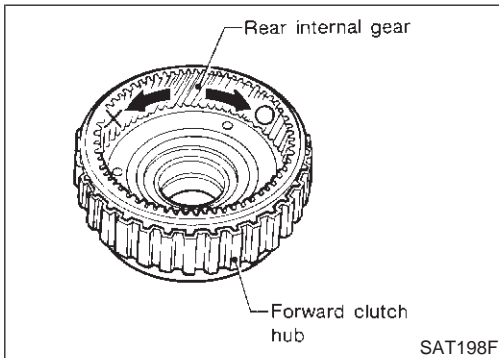
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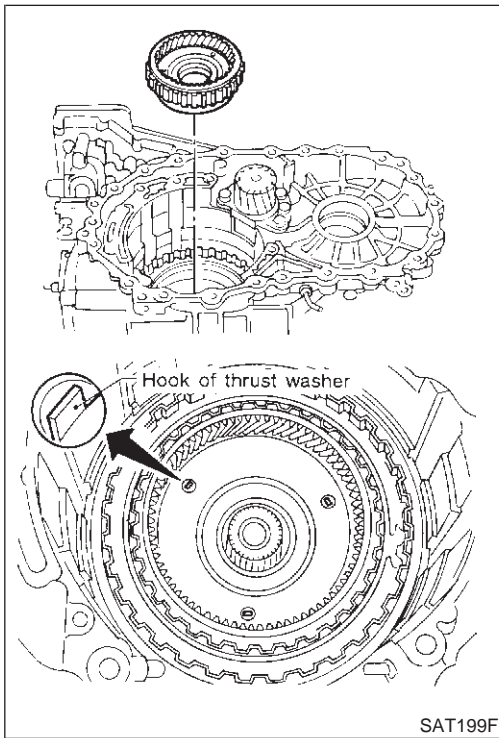
Assembly (2) (Cont'd)



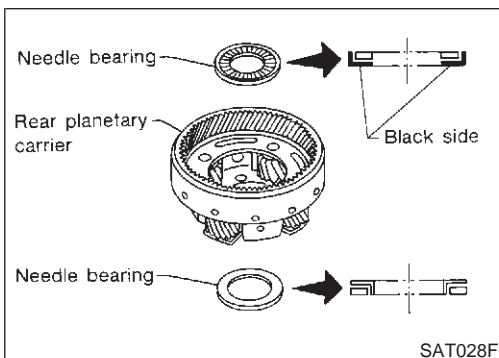
8. Install overrun clutch hub.
 - Apply petroleum jelly to thrust washers.
 - Align teeth of overrun clutch drive plates before installing.



9. Hold forward clutch hub and turn rear internal gear. Check overrun clutch hub for correct directions of lock and unlock.
 - If not shown as illustrated, check installed direction of forward one-way clutch.



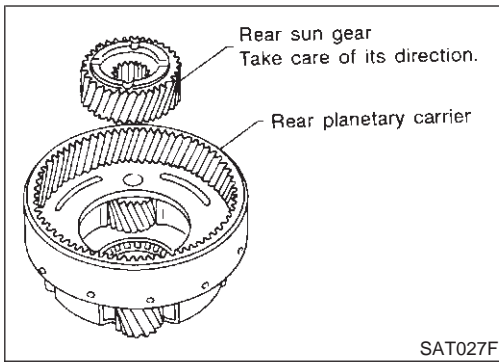
10. Install forward clutch hub and rear internal gear assembly.
 - Align teeth of forward clutch drive plates before installing.
 - Check that three hooks of thrust washer are correctly aligned after installing.



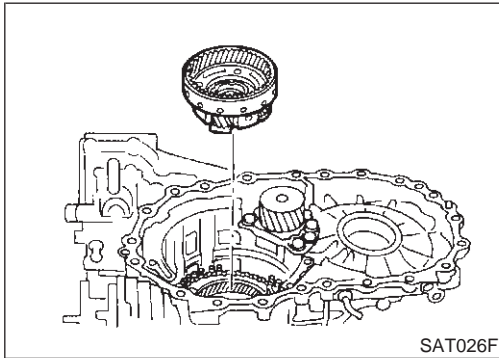
11. Install rear planetary carrier assembly and rear sun gear according to the following procedures.
 - a. Install needle bearings on rear planetary carrier.
 - Apply petroleum jelly to needle bearings.
 - Pay attention to direction of needle bearings.

ASSEMBLY

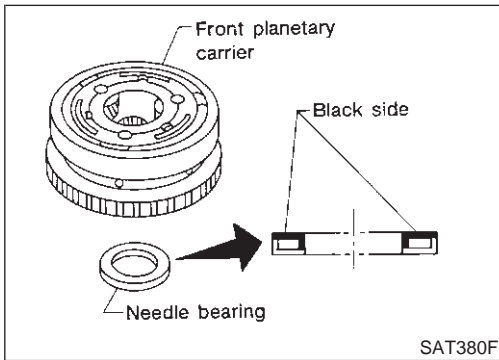
Assembly (2) (Cont'd)



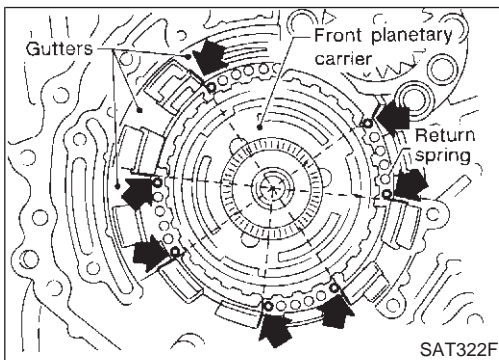
- b. Install rear sun gear on rear planetary carrier.
- Pay attention to direction of rear sun gear.



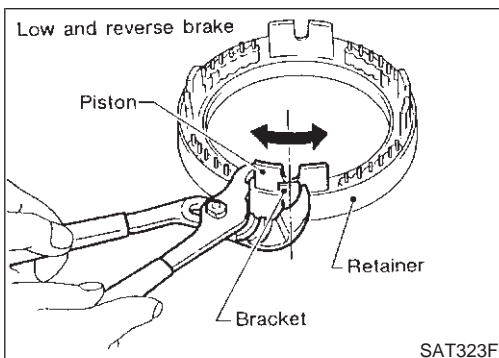
- c. Install rear planetary carrier on transmission case.



- 12. Install thrust needle bearing on front planetary carrier, then install them together on transmission case.
- Apply petroleum jelly to thrust needle bearing.
- Pay attention to direction of thrust needle bearing.



- 13. Install low and reverse brake piston according to the following procedures.
- a. Set and align return springs to transmission case gutters as shown in illustration.



- b. Set and align piston with retainer.

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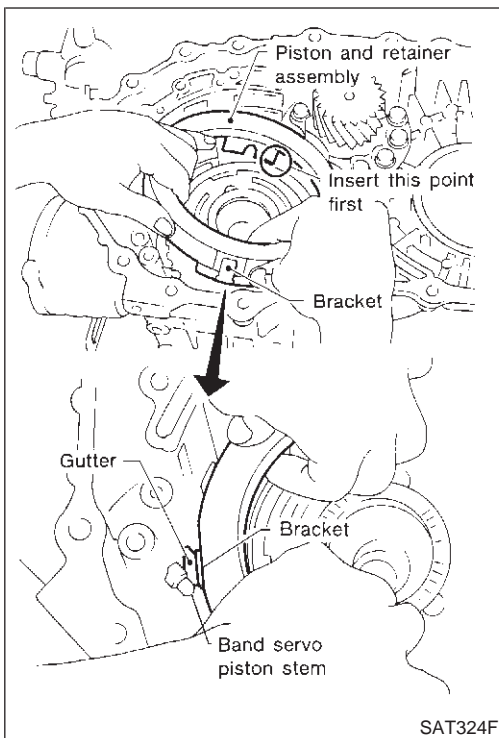
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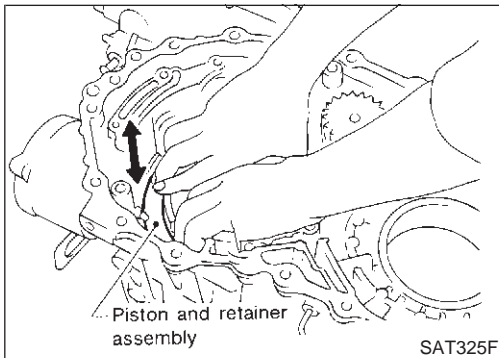
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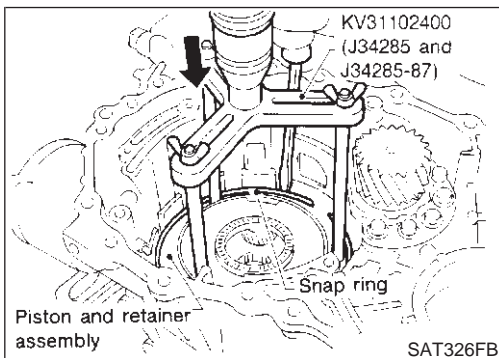
Assembly (2) (Cont'd)



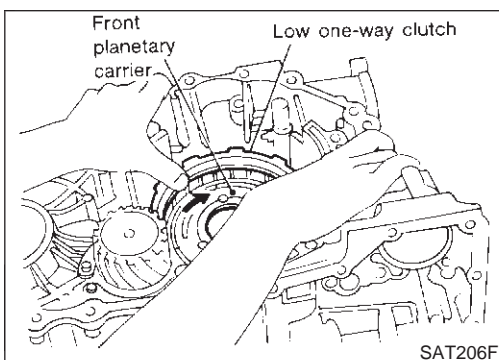
- c. Install piston and retainer assembly on the transmission case.
- **Align bracket to specified gutter as indicated in illustration.**



- d. Check that each protrusion of piston is correctly set to corresponding return spring as follows.
- **Push piston and retainer assembly evenly and confirm they move smoothly.**
 - **If they can not move smoothly, remove piston and retainer assembly and align return spring correctly as instructed in step "a".**



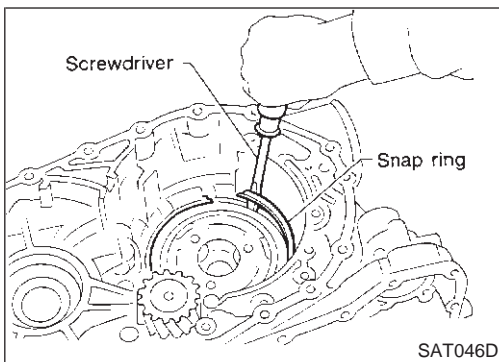
- e. Push down piston and retainer assembly and install snap ring.



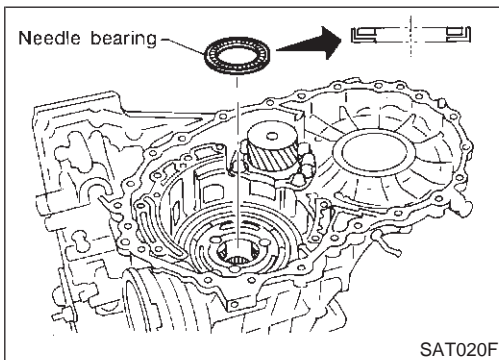
14. Install low one-way clutch to front planetary carrier by turning carrier in the direction of the arrow shown.

ASSEMBLY

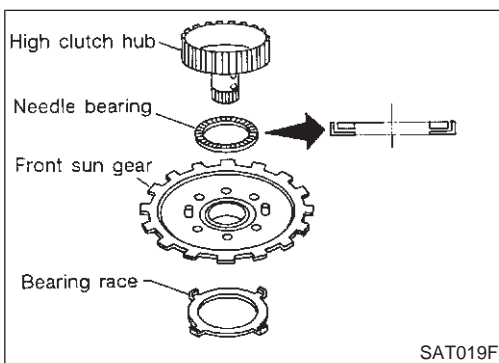
Assembly (2) (Cont'd)



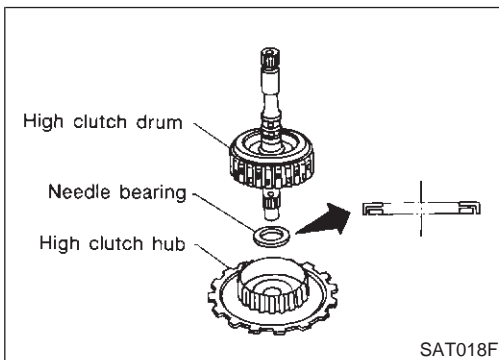
15. Install snap ring with screwdriver.
- **Forward clutch and bearing must be correctly installed for snap ring to fit into groove of transmission case.**



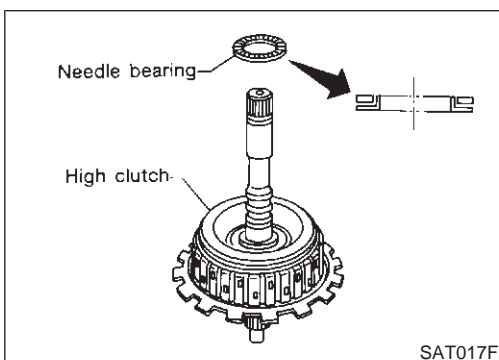
16. Install needle bearing on transmission case.
- **Apply petroleum jelly to needle bearing.**
 - **Pay attention to direction of needle bearing.**



17. Install bearing race, needle bearing and high clutch hub on front sun gear.
- **Apply petroleum jelly to needle bearing.**
 - **Pay attention to direction of needle bearing.**



18. Install needle bearing and high clutch drum on high clutch hub.



19. Install needle bearing on high clutch drum.
- **Apply petroleum jelly to needle bearing.**
 - **Pay attention to direction of needle bearing.**

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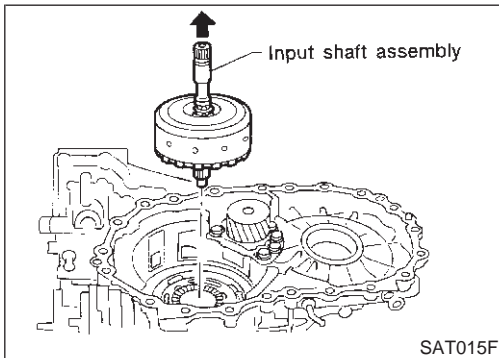
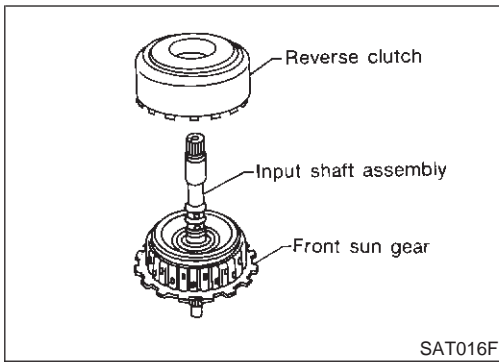
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ASSEMBLY

Assembly (2) (Cont'd)



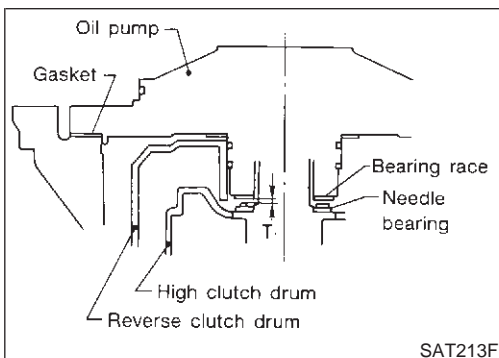
20. Remove paper rolled around input shaft.
21. Install input shaft assembly in reverse clutch.
 - **Align teeth of reverse clutch drive plates before installing.**

22. Install reverse clutch assembly on transmission case.
 - **Align teeth of high clutch drive plates before installing.**

Adjustment (2)

When any parts listed below are replaced, adjust total end play and reverse clutch end play. NHAT0180

Part name	Total end play	Reverse clutch end play
Transmission case	●	●
Overrun clutch hub	●	●
Rear internal gear	●	●
Rear planetary carrier	●	●
Rear sun gear	●	●
Front planetary carrier	●	●
Front sun gear	●	●
High clutch hub	●	●
High clutch drum	●	●
Oil pump cover	●	●
Reverse clutch drum	—	●



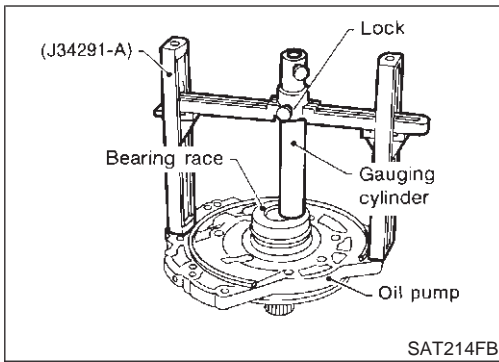
TOTAL END PLAY

1. Adjust total end play "T₁".

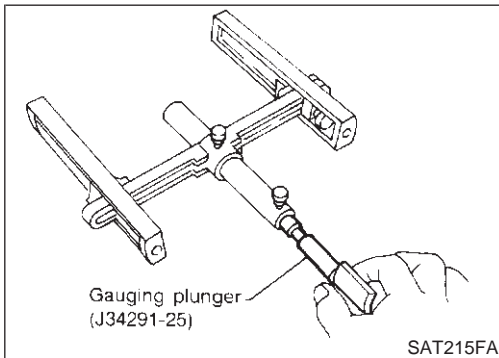
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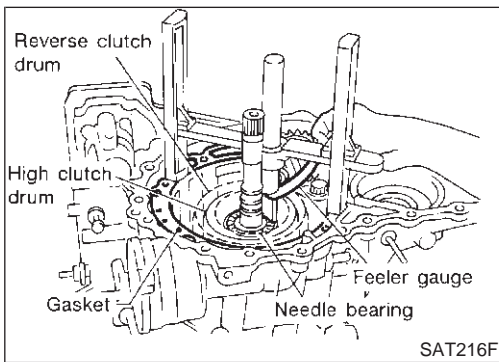
Adjustment (2) (Cont'd)



- a. With original bearing race installed, place Tool onto oil pump. The long ends of legs should be placed firmly on machined surface of oil pump assembly. The gauging cylinder should rest on top of bearing race. Lock gauging cylinder in place with set screw.



- b. Install gauging plunger into cylinder.



- c. With needle bearing installed on high clutch drum, place Tool legs on machined surface of transmission case (with gasket). Then allow plunger to rest on needle bearing.
- d. Measure gap between cylinder and plunger. This measurement should give exact total end play.

Total end play "T₁":

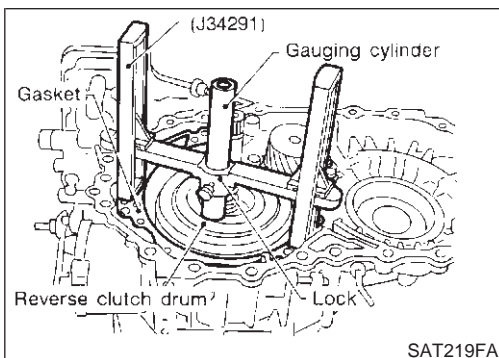
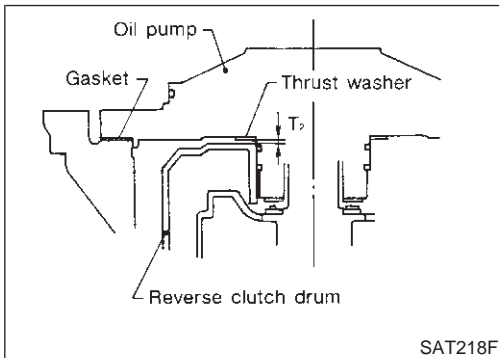
0.25 - 0.55 mm (0.0098 - 0.0217 in)

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

Available bearing race for adjusting total end play:

Refer to SDS, AT-390.

2. Adjust reverse clutch drum end play "T₂".



- a. Place Tool on machined surface of transmission case (with gasket). Then allow gauging cylinder to rest on reverse clutch drum. Lock cylinder in place with set screw.

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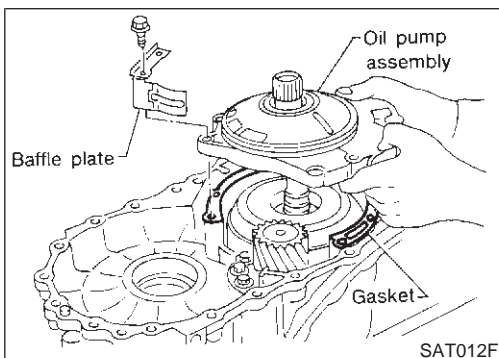
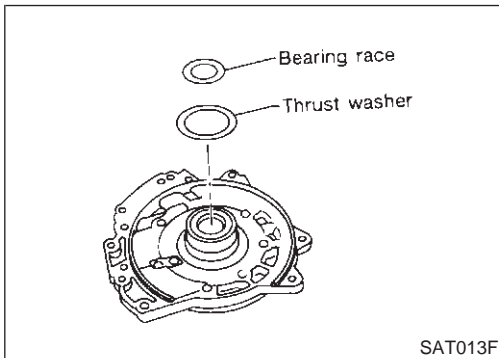
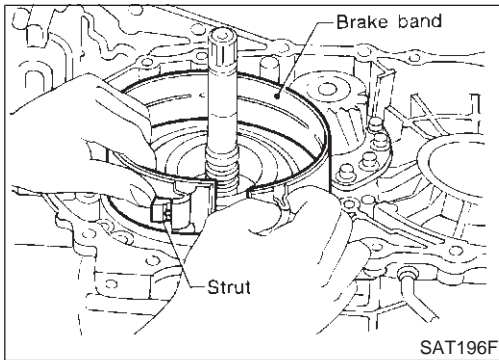
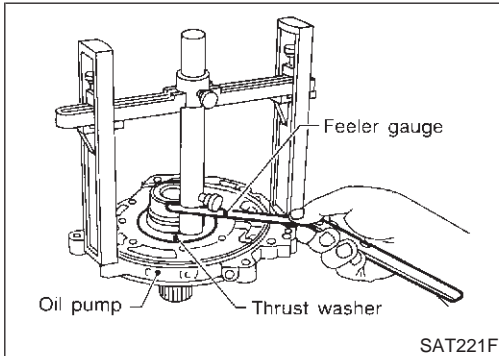
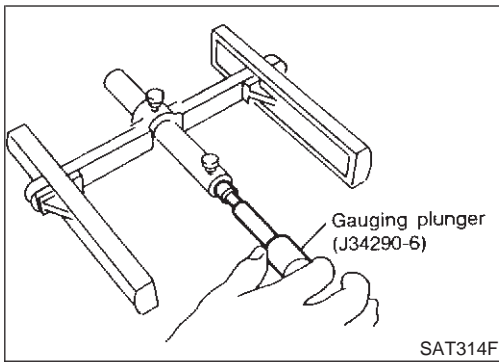
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ASSEMBLY

Adjustment (2) (Cont'd)



- b. Install gauging plunger into cylinder.
- c. With original thrust washer installed on oil pump, place Tool legs onto machined surface of oil pump assembly. Then allow plunger to rest on thrust washer.
- d. Measure gap between cylinder and plunger with feeler gauge. This measurement should give exact reverse clutch drum end play.

Reverse clutch drum end play "T₂":
0.55 - 0.90 mm (0.0217 - 0.0354 in)

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

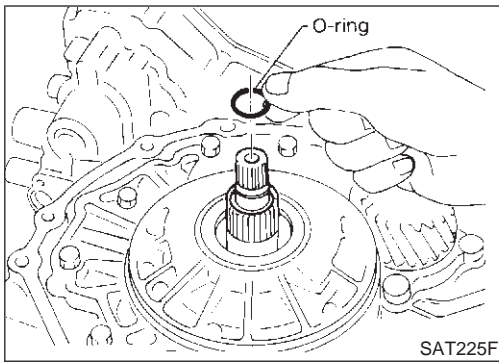
Available thrust washer for adjusting reverse clutch drum end play:

Refer to SDS, AT-390.

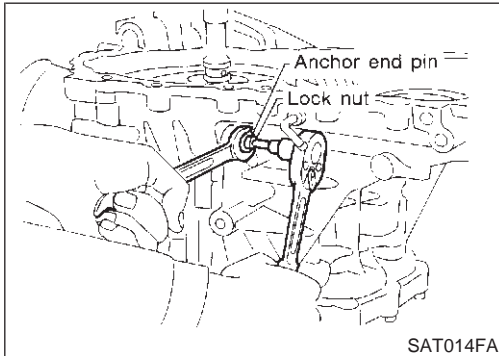
Assembly (3)

NHAT0181

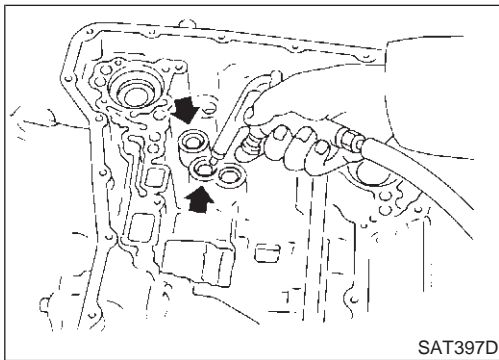
1. Install anchor end pin and lock nut on transmission case.
2. Place brake band on outside of reverse clutch drum. Tighten anchor end pin just enough so that brake band is evenly fitted on reverse clutch drum.
3. Place bearing race selected in total end play adjustment step on oil pump cover.
 - **Apply petroleum jelly to bearing race.**
4. Place thrust washer selected in reverse clutch end play step on reverse clutch drum.
 - **Apply petroleum jelly to thrust washer.**
5. Install oil pump assembly, baffle plate and gasket on transmission case.
6. Tighten oil pump fixing bolts to the specified torque.



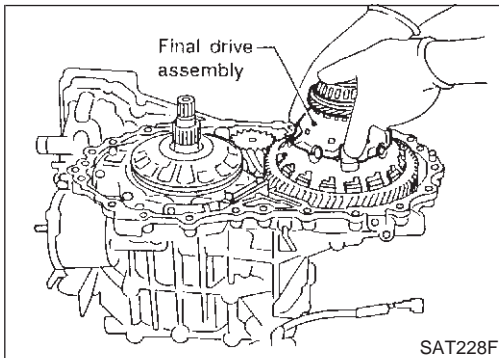
7. Install O-ring to input shaft.
 - **Apply ATF to O-ring.**



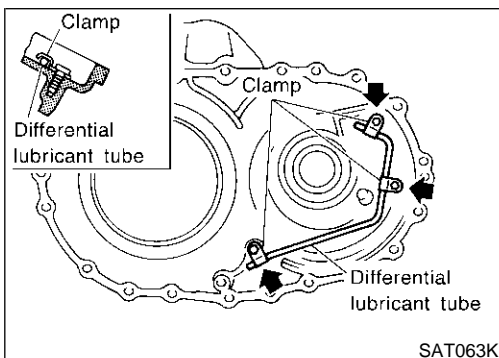
8. Adjust brake band.
 - a. Tighten anchor end pin to the specified torque.
 - Anchor end pin:**
Refer to SDS, AT-386.
 - b. Back off anchor end pin two and a half turns.
 - c. While holding anchor end pin, tighten lock nut.
 - Lock nut:**
Refer to SDS, AT-386.



9. Apply compressed air to oil holes of transmission case and check operation of brake band.



10. Install final drive assembly on transmission case.



11. Install differential lubricant tube on converter housing. Tighten differential lubricant tube bolts to the specified torque. Refer to AT-289.

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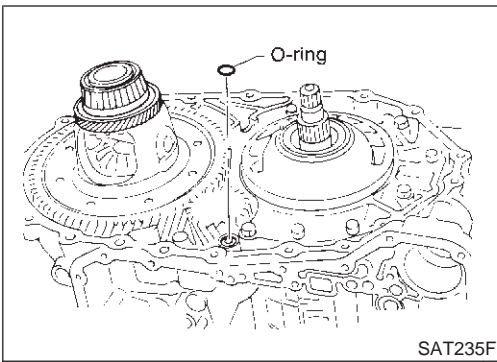
SC

EL

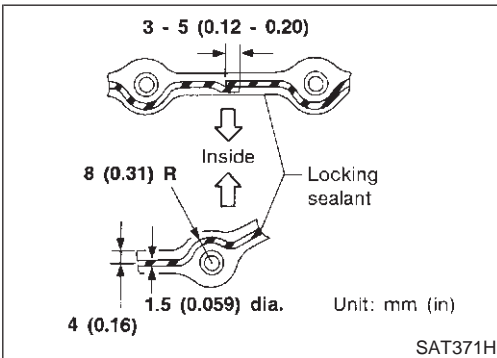
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ASSEMBLY

Assembly (3) (Cont'd)

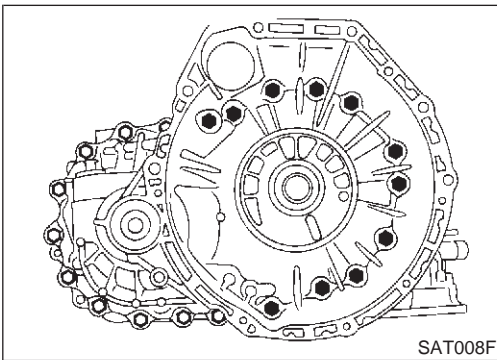


12. Install O-ring on differential oil port of transmission case.

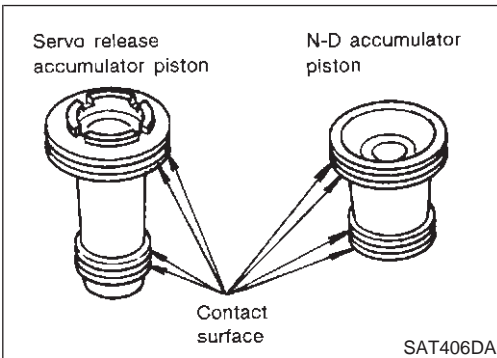


13. Install converter housing on transmission case.

- Apply locking sealant (Loctite #518) to mating surface of converter housing.

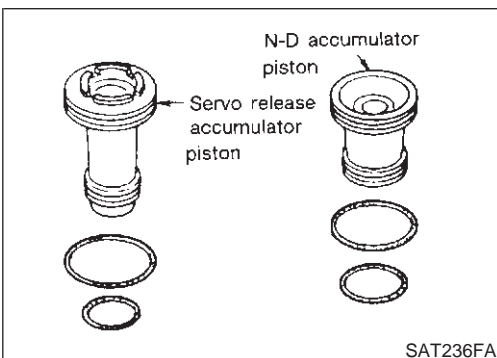


- Tighten converter housing bolts to the specified torque. Refer to AT-289.



14. Install accumulator piston.

- Check contact surface of accumulator piston for damage.



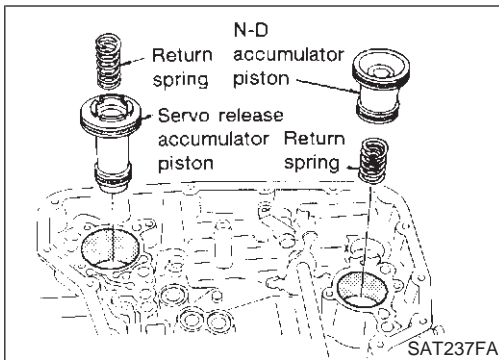
b. Install O-rings on accumulator piston.

- Apply ATF to O-rings.

Accumulator piston O-rings:
Refer to SDS, AT-383.

ASSEMBLY

Assembly (3) (Cont'd)



c. Install accumulator pistons and return springs on transmission case.

- **Apply ATF to inner surface of transmission case.**

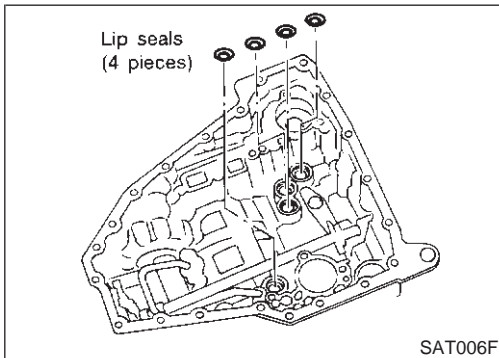
Return springs:

Refer to SDS, AT-384.

GI

MA

EM



15. Install lip seals for band servo oil holes on transmission case.

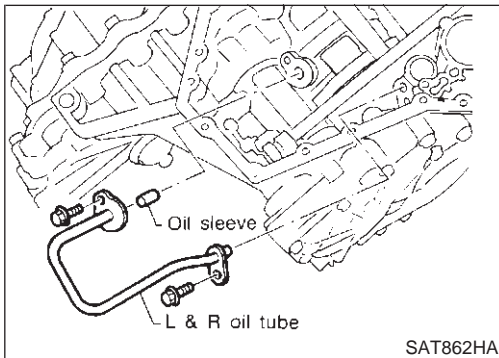
- **Apply petroleum jelly to lip seals.**

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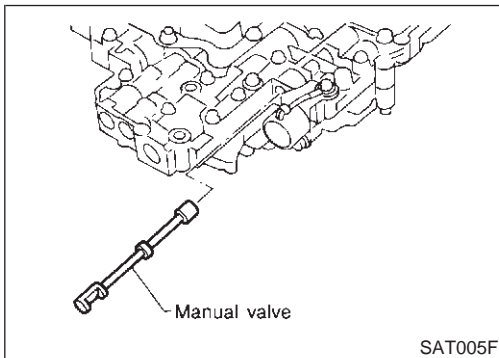
16. Install L & R oil tube and oil sleeve. Tighten L & R oil tube bolts to the specified torque. Refer to AT-289.

AX

SU

BR

ST



17. Install control valve assembly.

a. Insert manual valve into control valve assembly.

- **Apply ATF to manual valve.**

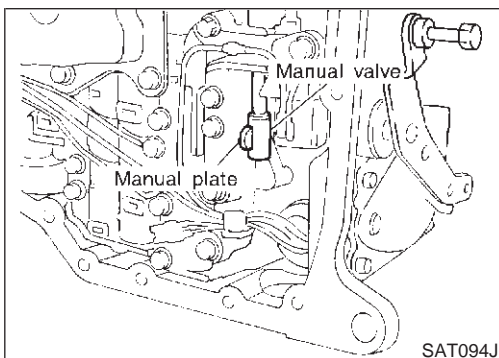
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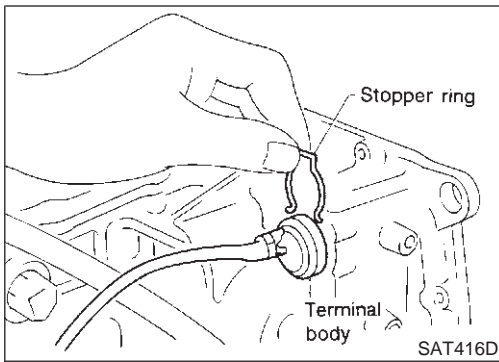
b. Set manual shaft in Neutral position.

c. Install control valve assembly on transmission case while aligning manual valve with manual plate.

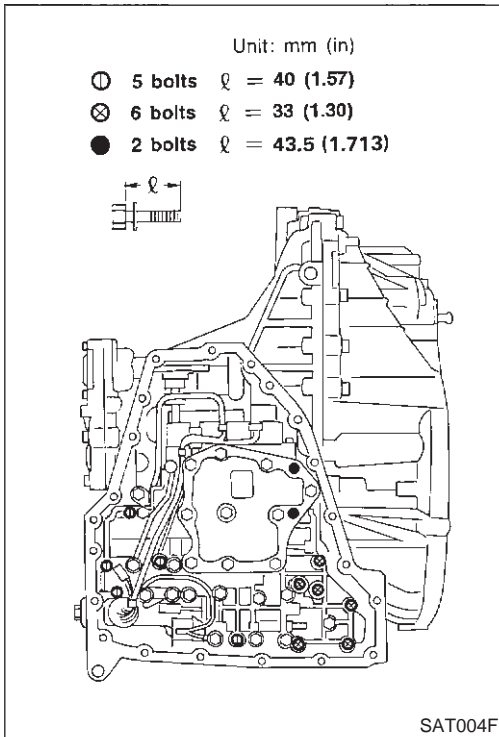
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ASSEMBLY

Assembly (3) (Cont'd)




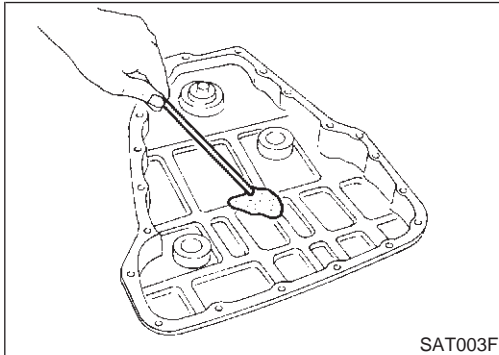
- d. Pass solenoid harness through transmission case and install terminal body on transmission case by pushing it.
- e. Install stopper ring to terminal body.



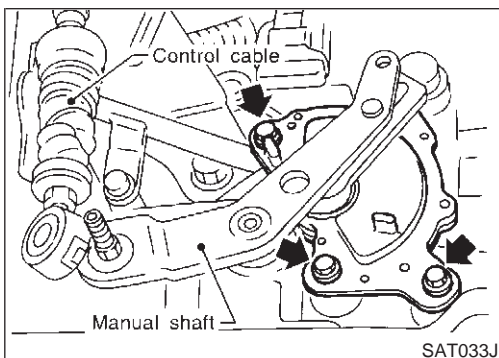
- f. Tighten bolts I, X and ●.

Bolt length, number and location:

Bolt	I	X	●
Bolt length "l"  mm (in)	40 (1.57)	33 (1.30)	43.5 (1.713)
Number of bolts	5	6	2



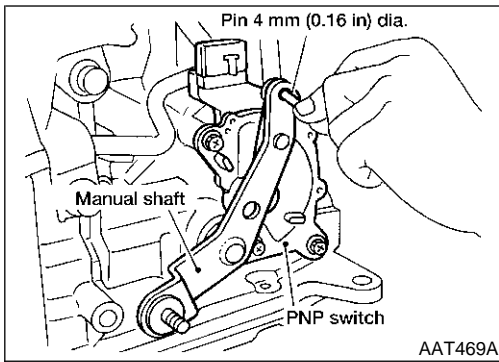
18. Install oil pan.
 - a. Attach a magnet to oil pan.
 - b. Install new oil pan gasket on transmission case.
 - c. Install oil pan on transmission case.
 - **Always replace oil pan bolts as they are self-sealing bolts.**
 - **Tighten four bolts in a criss-cross pattern to prevent dislocation of gasket.**
 - d. Tighten oil pan bolts and drain plug to the specified torque. Refer to AT-289.



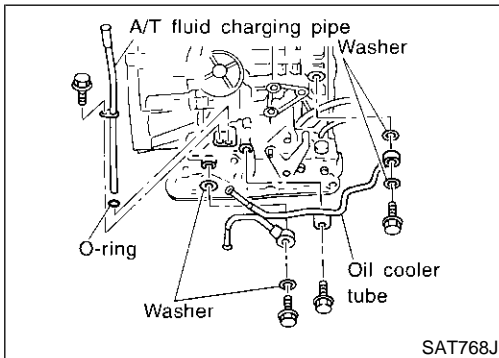
19. Install park/neutral position (PNP) switch.
 - a. Set manual shaft in P position.
 - b. Temporarily install park/neutral position (PNP) switch on manual shaft.
 - c. Move selector lever to N position.

ASSEMBLY

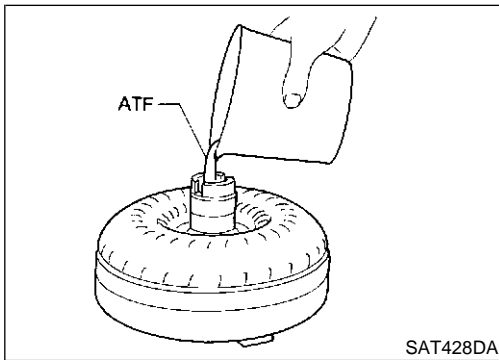
Assembly (3) (Cont'd)



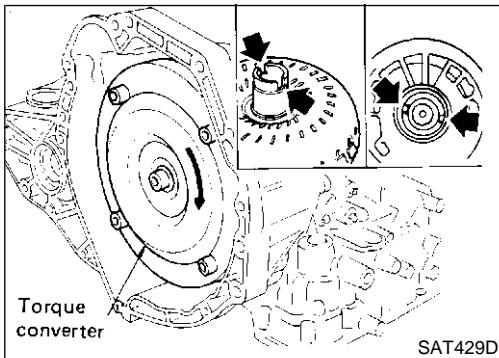
- d. Use a 4 mm (0.16 in) pin for this adjustment.
 - i. Insert the pin straight into the manual shaft adjustment hole.
 - ii. Rotate park/neutral position (PNP) switch until the pin can also be inserted straight into hole in park/neutral position (PNP) switch.
- e. Tighten park/neutral position (PNP) switch fixing bolts. Refer to AT-289.
- f. Remove pin from adjustment hole after adjusting park/neutral position (PNP) switch.



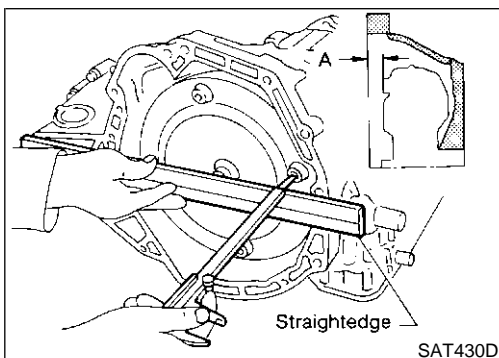
20. Install A/T fluid charging pipe and fluid cooler tube to transmission case. Tighten A/T fluid charging pipe and fluid cooler tube bolts to the specified torque. Refer to AT-289.



21. Install torque converter.
 - a. Pour ATF into torque converter.
 - **Approximately 1 liter (1-1/8 US qt, 7/8 Imp qt) of fluid is required for a new torque converter.**
 - **When reusing old torque converter, add the same amount of fluid as was drained.**



- b. Install torque converter while aligning notches of torque converter with notches of oil pump.



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

Distance A:
Refer to SDS, AT-391.

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SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

General Specifications

NHAT0182

Engine	VQ35DE	
Automatic transaxle model	RE4F04B	
Automatic transaxle assembly	Model code number	88X04
Transaxle gear ratio	1st	2.785
	2nd	1.545
	3rd	1.000
	4th	0.694
	Reverse	2.272
	Final drive	3.789
Recommended fluid	Nissan Matic "D" (Continental U.S. and Alaska) or Canada Nissan Automatic Transmission Fluid (Canada)*1	
Fluid capacity ℓ (US qt, Imp qt)	8.5 (9, 7-1/2)	

*1: Refer to MA-11, "Fluids and Lubricants".

Shift Schedule

NHAT0183

VEHICLE SPEED WHEN SHIFTING GEARS THROTTLE POSITION

NHAT0183S01

Throttle position	Shift pattern	Vehicle speed km/h (MPH)					
		D ₁ → D ₂	D ₂ → D ₃	D ₃ → D ₄	D ₄ → D ₃	D ₃ → D ₂	D ₂ → D ₁
Full throttle	Comfort	59 - 67 (37 - 42)	110 - 118 (68 - 73)	173 - 181 (108 - 112)	169 - 177 (105 - 110)	100 - 108 (62 - 67)	41 - 49 (25 - 30)
	Auto power	59 - 67 (37 - 42)	110 - 118 (68 - 73)	173 - 181 (108 - 112)	169 - 177 (105 - 110)	100 - 108 (62 - 67)	41 - 49 (25 - 30)
Half throttle	Comfort	45 - 53 (28 - 33)	77 - 85 (48 - 53)	133 - 141 (83 - 88)	84 - 92 (52 - 57)	46 - 54 (29 - 34)	15 - 23 (9 - 14)
	Auto power	45 - 53 (28 - 33)	77 - 85 (48 - 53)	134 - 142 (83 - 88)	121 - 129 (75 - 80)	54 - 62 (34 - 39)	16 - 24 (10 - 15)

VEHICLE SPEED WHEN PERFORMING AND RELEASING LOCK-UP

NHAT0183S02

Unit: km/h (MPH)

Throttle position	Selector lever position	Shift pattern	Vehicle speed Km/h (MPH)	
			Lock-up "ON"	Lock-up "OFF"
2.0/8	D position	Comfort	99 - 107 (62 - 66)	62 - 70 (39 - 43)
		Auto Power	99 - 107 (62 - 66)	62 - 70 (39 - 43)
	3rd position	Comfort	86 - 94 (53 - 58)	83 - 91 (52 - 57)
		Auto Power	86 - 94 (53 - 58)	83 - 91 (52 - 57)

NOTE:

- Lock-up vehicle speed indicates the speed in D₄ position.
- Perform lock-up inspection after warming up engine.
- Lock-up vehicle speed may vary depending on the driving conditions and circumstances.

Stall Revolution

NHAT0184

Engine	Stall revolution rpm
VQ35DE	2,550 - 3,050

SERVICE DATA AND SPECIFICATIONS (SDS)

Line Pressure

Line Pressure

NHAT0185

Engine speed rpm	Line pressure kPa (kg/cm ² , psi)	
	D, 2nd and 1st positions	R position
Idle	500 (5.1, 73)	778 (7.9, 113)
Stall	1,233 (12.6, 179)	1,918 (19.6, 278)

Control Valves

NHAT0186

CONTROL VALVE AND PLUG RETURN SPRINGS

NHAT0186S01
Unit: mm (in)

Parts			Item		
			Part No.*	Free length	Outer diameter
Upper body	23	Pilot valve spring	31742-3AX03	38.98 (1.535)	8.9 (0.350)
	7	1-2 accumulator valve spring	31742-3AX00	20.5 (0.807)	6.95 (0.274)
	28	1-2 accumulator piston spring	31742-3AX09	55.66 (2.191)	19.6 (0.772)
	33	1st reducing valve spring	31742-85X05	26.0 (1.024)	7.0 (0.276)
	35	3-2 timing valve spring	31736-01X00	23.0 (0.906)	6.65 (0.262)
	18	Overrun clutch reducing valve spring	31742-80X15	37.5 (1.476)	6.9 (0.272)
	16	Torque converter relief valve spring	31742-80X07	31.0 (1.220)	9.0 (0.354)
	11	Torque converter clutch control valve	31742-85X00	56.98 (2.243)	6.5 (0.256)
	3	Cooler check valve spring	31742-85X01	29.4 (1.157)	6.0 (0.236)
Lower body	15	Pressure regulator valve spring	31742-80X13	45.0 (1.772)	15.0 (0.591)
	20	Overrun clutch control valve spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	24	Accumulator control valve spring	31742-80X02	22.0 (0.866)	6.5 (0.256)
	29	Shift valve A spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	32	Shuttle valve spring	31762-41X04	51.0 (2.008)	5.65 (0.222)
	12	Shift valve B spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	7	Pressure modifier valve spring	31742-41X15	30.5 (1.201)	9.8 (0.386)
	3		31742-80X16	32.0 (1.260)	6.9 (0.272)
	—	Oil cooler relief valve spring	31872-31X00	17.02 (0.670)	8.0 (0.315)

*: Always check with the Parts Department for the latest parts information.

Accumulator

NHAT0187

O-RING

NHAT0187S01
Unit: mm (in)

Accumulator	Part No.*	Inner diameter (Small)	Part No.*	Inner diameter (Large)
Servo release accumulator	31526-41X03	26.9 (1.059)	31526-41X02	44.2 (1.740)
N-D accumulator	31526-31X08	34.6 (1.362)	31672-21X00	39.4 (1.551)

*: Always check with the Parts Department for the latest parts information.

SERVICE DATA AND SPECIFICATIONS (SDS)

Accumulator (Cont'd)

RETURN SPRING

^{=NHAT0187S02}
Unit: mm (in)

Accumulator	Part number*	Free length	Outer diameter
Servo release accumulator	31605-80X00	52.5 (2.067)	20.1 (0.791)
N-D accumulator	31605-85X01	45.01 (1.772)	28.0 (1.102)

*: Always check with the Parts Department for the latest parts information.

Clutch and Brakes

REVERSE CLUTCH

NHAT0188

NHAT0188S01

Model code number		88X04
Number of drive plates		2
Number of driven plates		2
Drive plate thickness mm (in)	Standard	1.6 (0.063)
	Allowable limit	1.4 (0.055)
Clearance mm (in)	Standard	0.5 - 0.8 (0.020 - 0.031)
	Allowable limit	1.2 (0.047)
Thickness of retaining plates	Thickness mm (in)	Part number*
	6.6 (0.260)	31537-80X05
	6.8 (0.268)	31537-80X06
	7.0 (0.276)	31537-80X07
	7.2 (0.283)	31537-80X08
	7.4 (0.291)	31537-80X09
	7.6 (0.299)	31537-80X20
7.8 (0.307)	31537-80X21	

*: Always check with the Parts Department for the latest parts information.

HIGH CLUTCH

NHAT0188S02

Model code number		88X04
Number of drive plates		4
Number of driven plates		6 + 1
Drive plate thickness mm (in)	Standard	1.6 (0.063)
	Allowable limit	1.4 (0.055)
Clearance mm (in)	Standard	1.8 - 2.2 (0.071 - 0.087)
	Allowable limit	2.8 (0.110)
Thickness of retaining plates	Thickness mm (in)	Part number*
	3.0 (0.118)	31537-81X10
	3.2 (0.126)	31537-81X11
	3.4 (0.134)	31537-81X12
	3.6 (0.142)	31537-81X13
	3.8 (0.150)	31537-81X14
4.0 (0.157)	31537-81X15	

*: Always check with the Parts Department for the latest parts information.

SERVICE DATA AND SPECIFICATIONS (SDS)

Clutch and Brakes (Cont'd)

FORWARD CLUTCH

NHAT0188S03

Model code number		88X04	
Number of drive plates		6	
Number of driven plates		6	
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Clearance mm (in)	Standard	0.45 - 0.85 (0.0177 - 0.0335)	
	Allowable limit	1.85 (0.0728)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		3.2 (0.126)	31537-80X76
		3.4 (0.134)	31537-80X75
		3.6 (0.142)	31537-80X70
		3.8 (0.150)	31537-80X71
		4.0 (0.157)	31537-80X72
		4.2 (0.165)	31537-80X73
		4.4 (0.173)	31537-80X74

*: Always check with the Parts Department for the latest parts information.

OVERRUN CLUTCH

NHAT0188S04

Model code number		88X04	
Number of drive plates		4	
Number of driven plates		4	
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Clearance mm (in)	Standard	0.7 - 1.1 (0.028 - 0.043)	
	Allowable limit	1.7 (0.067)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		3.0 (0.118)	31537-80X65
		3.2 (0.126)	31537-80X66
		3.4 (0.134)	31537-80X67
		3.6 (0.142)	31537-80X68
		3.8 (0.150)	31537-80X69

*: Always check with the Parts Department for the latest parts information.

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SERVICE DATA AND SPECIFICATIONS (SDS)

Clutch and Brakes (Cont'd)

LOW & REVERSE BRAKE

NHAT0188S05

Model code number		88X04
Number of drive plates		7
Number of driven plates		7
Drive plate thickness mm (in)	Standard	1.8 (0.071)
	Allowable limit	1.6 (0.063)
Clearance mm (in)	Standard	1.7 - 2.1 (0.067 - 0.083)
	Allowable limit	3.3 (0.130)
Thickness of retaining plates	Thickness mm (in)	Part number*
	2.0 (0.079)	31667-80X00
	2.2 (0.087)	31667-80X01
	2.4 (0.094)	31667-80X02
	2.6 (0.102)	31667-80X03
	2.8 (0.110)	31667-80X04
	3.0 (0.118)	31667-80X05
	3.2 (0.126)	31667-80X06
3.4 (0.134)	31667-80X07	

*: Always check with the Parts Department for the latest parts information.

BRAKE BAND

NHAT0188S06

Anchor end pin tightening torque N-m (kg-m, in-lb)	4.0 - 5.8 (0.41 - 0.59, 36 - 51)
Number of returning revolutions for anchor end pin	2.5
Lock nut tightening torque N-m (kg-m, ft-lb)	32 - 36 (3.2 - 3.7, 23 - 27)

CLUTCH AND BRAKE RETURN SPRINGS

NHAT0188S07
Unit: mm (in)

Parts	Part number*	Free length	Outer diameter
Forward clutch (Overrun clutch) (22 pcs)	31505-80X02	21.4 (0.843)	10.3 (0.406)
High clutch (10 pcs)	31505-80X05	22.5 (0.886)	10.8 (0.425)
Low & reverse brake (24 pcs)	31505-80X07	24.1 (0.949)	6.6 (0.260)

*: Always check with the Parts Department for the latest parts information.

Final Drive

DIFFERENTIAL SIDE GEAR CLEARANCE

NHAT0189

NHAT0189S01

Clearance between side gear and differential case with washer mm (in)	0.1 - 0.2 (0.004 - 0.008)
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DIFFERENTIAL SIDE GEAR THRUST WASHERS

NHAT0189S02

Thickness mm (in)	Part number*
0.75 (0.0295)	38424-81X00
0.80 (0.0315)	38424-81X01
0.85 (0.0335)	38424-81X02
0.90 (0.0354)	38424-81X03
0.95 (0.0374)	38424-81X04

*: Always check with the Parts Department for the latest parts information.

SERVICE DATA AND SPECIFICATIONS (SDS)

Final Drive (Cont'd)

DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTING SHIMS

NHAT0189S03

Thickness mm (in)	Part number*
0.48 (0.0189)	31438-80X00
0.52 (0.0205)	31438-80X01
0.56 (0.0220)	31438-80X02
0.60 (0.0236)	31438-80X03
0.64 (0.0252)	31438-80X04
0.68 (0.0268)	31438-80X05
0.72 (0.0283)	31438-80X06
0.76 (0.0299)	31438-80X07
0.80 (0.0315)	31438-80X08
0.84 (0.0331)	31438-80X09
0.88 (0.0346)	31438-80X10
0.92 (0.0362)	31438-80X11

*: Always check with the Parts Department for the latest parts information.

BEARING PRELOAD

NHAT0189S04

Differential side bearing preload mm (in)	0.05 - 0.09 (0.0020 - 0.0035)
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TURNING TORQUE

NHAT0189S05

Turning torque of final drive assembly N-m (kg-cm, in-lb)	0.78 - 1.37 (8.0 - 14.0, 6.9 - 12.2)
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CLUTCH AND BRAKE RETURN SPRINGS

NHAT0189S06
Unit: mm (in)

Parts	Part number*	Free length	Outer diameter
Forward clutch (Overrun clutch) (22 pcs)	31505-80X02	21.4 (0.843)	10.3 (0.406)
High clutch (10 pcs)	31505-80X05	22.5 (0.886)	10.8 (0.425)
Low & reverse brake (24 pcs)	31505-80X07	24.1 (0.949)	6.6 (0.260)

*: Always check with the Parts Department for the latest parts information.

Planetary Carrier and Oil Pump

PLANETARY CARRIER

NHAT0190

NHAT0190S01

Clearance between planetary carrier and pinion washer mm (in)	Standard	0.20 - 0.70 (0.0079 - 0.0276)
	Allowable limit	0.80 (0.0315)

SERVICE DATA AND SPECIFICATIONS (SDS)

Planetary Carrier and Oil Pump (Cont'd)

OIL PUMP

NHAT0190S02

Oil pump side clearance mm (in)	0.030 - 0.050 (0.0012 - 0.0020)	
Thickness of inner gears and outer gears	Inner gear	
	Thickness mm (in)	Part number*
	11.99 - 12.0 (0.4720 - 0.4724)	31346-80X00
	11.98 - 11.99 (0.4717 - 0.4720)	31346-80X01
	11.97 - 11.98 (0.4713 - 0.4717)	31346-80X02
	Outer gear	
Thickness mm (in)	Part number*	
11.99 - 12.0 (0.4720 - 0.4724)	31347-80X00	
11.98 - 11.99 (0.4717 - 0.4720)	31347-80X01	
11.97 - 11.98 (0.4713 - 0.4717)	31347-80X02	
Clearance between oil pump housing and outer gear mm (in)	Standard	0.111 - 0.181 (0.0044 - 0.0071)
	Allowable limit	0.181 (0.0071)
Oil pump cover seal ring clearance mm (in)	Standard	0.1 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

*: Always check with the Parts Department for the latest parts information.

Input Shaft

NHAT0191

SEAL RING CLEARANCE

NHAT0191S01

Input shaft seal ring clearance mm (in)	Standard	0.08 - 0.23 (0.0031 - 0.0091)
	Allowable limit	0.23 (0.0091)

SEAL RING

NHAT0191S02

Outer diameter mm (in)	Inner diameter mm (in)	Width mm (in)	Part number*
26.01 (1.024)	22.4 (0.882)	1.971 (0.078)	31525-80X02

*: Always check with the Parts Department for the latest Parts information.

Reduction Pinion Gear

NHAT0192

TURNING TORQUE

NHAT0192S01

Turning torque of reduction pinion gear N-m (kg-cm, in-lb)	0.05 - 0.39 (0.5 - 4.0, 0.43 - 3.47)
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REDUCTION PINION GEAR BEARING ADJUSTING SHIMS

NHAT0192S02

NO.	Thickness mm (in)	Part number	NO.	Thickness mm (in)	Part number*
1	5.00 (0.1969)	31439-81X00	30	5.58 (0.2197)	31439-81X60
2	5.02 (0.1976)	31439-81X01	31	5.60 (0.2205)	31439-81X61
3	5.04 (0.1984)	31439-81X02	32	5.62 (0.2213)	31439-81X62
4	5.06 (0.1992)	31439-81X03	33	5.64 (0.2220)	31439-81X63
5	5.08 (0.2000)	31439-81X04	34	5.66 (0.2228)	31439-81X64
6	5.10 (0.2008)	31439-81X05	35	5.68 (0.2236)	31439-81X65
7	5.12 (0.2016)	31439-81X06	36	5.70 (0.2244)	31439-81X66
8	5.14 (0.2024)	31439-81X07	37	5.72 (0.2252)	31439-81X67
9	5.16 (0.2031)	31439-81X08	38	5.74 (0.2260)	31439-81X68
10	5.18 (0.2039)	31439-81X09	39	5.76 (0.2268)	31439-81X69
11	5.20 (0.2047)	31439-81X10	40	5.78 (0.2276)	31439-81X70

SERVICE DATA AND SPECIFICATIONS (SDS)

Reduction Pinion Gear (Cont'd)

NO.	Thickness mm (in)	Part number	NO.	Thickness mm (in)	Part number*
12	5.22 (0.2055)	31439-81X11	41	5.80 (0.2283)	31439-81X71
13	5.24 (0.2063)	31439-81X12	42	5.82 (0.2291)	31439-81X72
14	5.26 (0.2071)	31439-81X13	43	5.84 (0.2299)	31439-81X73
15	5.28 (0.2079)	31439-81X14	44	5.86 (0.2307)	31439-81X74
16	5.30 (0.2087)	31439-81X15	45	4.72 (0.1858)	31439-83X11
17	5.32 (0.2094)	31439-81X16	46	4.74 (0.1866)	31439-83X12
18	5.34 (0.2102)	31439-81X17	47	4.76 (0.1874)	31439-83X13
19	5.36 (0.2110)	31439-81X18	48	4.78 (0.1882)	31439-83X14
20	5.38 (0.2118)	31439-81X19	49	4.80 (0.1890)	31439-83X15
21	5.40 (0.2126)	31439-81X20	50	4.82 (0.1898)	31439-83X16
22	5.42 (0.2134)	31439-81X21	51	4.84 (0.1906)	31439-83X17
23	5.44 (0.2142)	31439-81X22	52	4.86 (0.1913)	31439-83X18
24	5.46 (0.2150)	31439-81X23	53	4.88 (0.1921)	31439-83X19
25	5.48 (0.2157)	31439-81X24	54	4.90 (0.1929)	31439-83X20
26	5.50 (0.2165)	31439-81X46	55	4.92 (0.1937)	31439-83X21
27	5.52 (0.2173)	31439-81X47	56	4.94 (0.1945)	31439-83X22
28	5.54 (0.2181)	31439-81X48	57	4.96 (0.1953)	31439-83X23
29	5.56 (0.2189)	31439-81X49	58	4.98 (0.1961)	31439-83X24

*: Always check with the Parts Department for the latest parts information.

Band Servo

RETURN SPRING

NHAT0193

NHAT0193S01
Unit: mm (in)

Return spring	Part number*	Free length	Outer diameter
2nd servo return spring	31605-31X20	32.5 (1.280)	25.9 (1.020)
O/D servo return spring	31605-80X07	62.6 (2.465)	31.7 (1.248)

*: Always check with the Parts Department for the latest parts information.

Output Shaft

SEAL RING CLEARANCE

NHAT0194

NHAT0194S01

Output shaft seal ring clearance mm (in)	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

SEAL RING

NHAT0194S04

Outer diameter mm (in)	Inner diameter mm (in)	Width mm (in)	Part number*
33.711 (1.3272)	30.2 (1.189)	1.951 (0.0768)	31525-80X09

*: Always check with the Parts Department for the latest Parts information.

END PLAY

NHAT0194S02

Output shaft end play mm (in)	0 - 0.15 (0 - 0.0059)
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SERVICE DATA AND SPECIFICATIONS (SDS)

Output Shaft (Cont'd)

OUTPUT SHAFT ADJUSTING SHIMS

NHAT0194S03

Thickness mm (in)	Part number*
0.80 (0.0315)	31438-80X60
0.84 (0.0331)	31438-80X61
0.88 (0.0346)	31438-80X62
0.92 (0.0362)	31438-80X63
0.96 (0.0378)	31438-80X64
1.00 (0.0394)	31438-80X65
1.04 (0.0409)	31438-80X66
1.08 (0.0425)	31438-80X67
1.12 (0.0441)	31438-80X68
1.16 (0.0457)	31438-80X69
1.20 (0.0472)	31438-80X70

*: Always check with the Parts Department for the latest parts information.

Bearing Retainer

NHAT0195

SEAL RING CLEARANCE

NHAT0195S01

Bearing retainer seal ring clearance mm (in)	Standard	0.10 - 0.30 (0.0039 - 0.0118)
	Allowable limit	0.30 (0.0118)

Total End Play

NHAT0196

Total end play mm (in)	0.25 - 0.55 (0.0098 - 0.0217)
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BEARING RACE FOR ADJUSTING TOTAL END PLAY

NHAT0196S01

Thickness mm (in)	Part number*
0.8 (0.031)	31435-80X00
1.0 (0.039)	31435-80X01
1.2 (0.047)	31435-80X02
1.4 (0.055)	31435-80X03
1.6 (0.063)	31435-80X04
1.8 (0.071)	31435-80X05
2.0 (0.079)	31435-80X06
0.9 (0.035)	31435-80X09
1.1 (0.043)	31435-80X10
1.3 (0.051)	31435-80X11
1.5 (0.059)	31435-80X12
1.7 (0.067)	31435-80X13
1.9 (0.075)	31435-80X14

*: Always check with the Parts Department for the latest parts information.

Reverse Clutch End Play

NHAT0197

Reverse clutch end play mm (in)	0.55 - 0.90 (0.0217 - 0.0354)
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THRUST WASHERS FOR ADJUSTING REVERSE CLUTCH DRUM END PLAY

NHAT0197S01

Thickness mm (in)	Part number*
0.80 (0.0315)	31508-80X13
0.95 (0.0374)	31508-80X14
1.10 (0.0433)	31508-80X15
1.25 (0.0492)	31508-80X16
1.40 (0.0551)	31508-80X17
1.55 (0.0610)	31508-80X18
1.70 (0.0669)	31508-80X19
1.85 (0.0728)	31508-80X20

*: Always check with the Parts Department for the latest parts information.

SERVICE DATA AND SPECIFICATIONS (SDS)

Removal and Installation

Removal and Installation

NHAT0198
Unit: mm (in)

Distance between end of converter housing and torque converter	14 (0.55)
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Shift Solenoid Valves

NHAT0264

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

NHAT0265

Solenoid valves	Resistance (Approx.) Ω	Terminal No.
Shift solenoid valve A	20 - 30	2
Shift solenoid valve B	5 - 20	1
Overrun clutch solenoid valve	20 - 30	3
Line pressure solenoid valve	2.5 - 5	4
Torque converter clutch solenoid valve	5 - 20	5

A/T Fluid Temperature Sensor

NHAT0266

Remarks: Specification data are reference values.

Monitor item	Condition	Specification (Approximately)	
A/T fluid temperature sensor	Cold [20°C (68°F)]	1.5V	2.5 k Ω
	↓ Hot [80°C (176°F)]	↓ 0.5V	↓ 0.3 k Ω

Revolution Sensor (For Speed Sensor)

NHAT0267

Condition	Judgement standard
When moving 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.	450 Hz (Approx.)
When vehicle parks.	0V

Dropping Resistor

NHAT0268

Resistance	Approx. 12 Ω
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Power Train Revolution Sensor

NHAT0271

Condition	Judgement standard
When moving 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.	240 Hz (Approx.)
When vehicle parks.	Under 1.3V or over 4.5V

NOTES